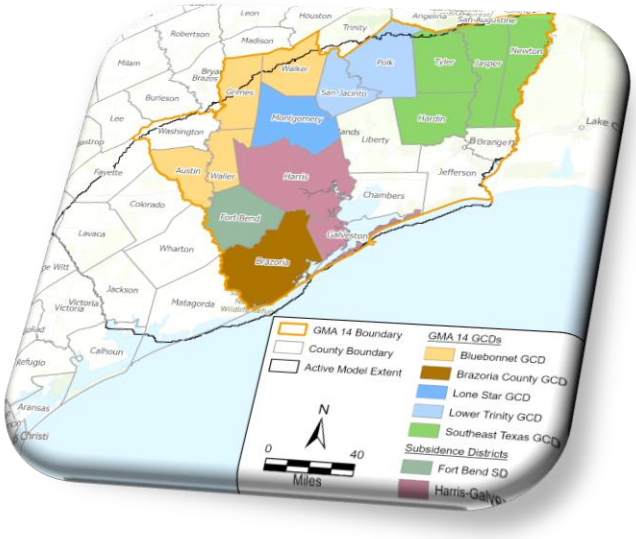
Northern Portion of the Gulf Coast Aquifer System Groundwater Availability Model for Groundwater Management Area 14 Joint Planning

Prepared For:
Groundwater Management Area 14



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September 8, 2025

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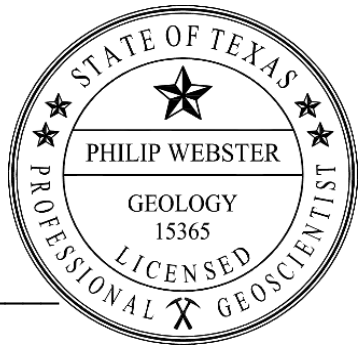

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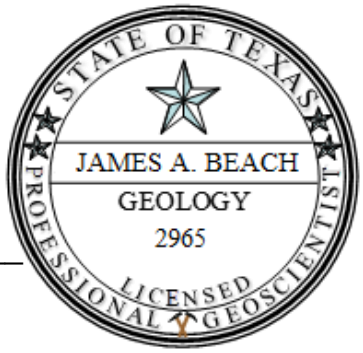

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Executive Summary

Groundwater Management Area 14 members manage the groundwater resources in the Gulf Coast Aquifer System from the western borders of Austin, Brazoria, Fort Bend, and Washington counties to the Texas border with Louisiana. In October 2019, the Harris-Galveston Subsidence District contracted the U.S. Geological Survey to update and refine the Houston-Area Groundwater Model, resulting in the GULF-2023 model, released in February 2024 by the Texas Water Development Board.

Prior to finalizing GULF-2023, stakeholders identified issues with the model affecting its utility for joint planning activities within Groundwater Management Area 14. To address these concerns, Groundwater Management Area 14 members initiated an update of GULF-2023, focusing on the skeletal storage, compaction, and subsidence package, hydraulic properties, and historical and predictive pumping data. Additionally, the model was converted from International System of Units to U.S. Customary Units and underwent recalibration to incorporate new data.

The purpose of the update was to rectify the identified issues and enhance the model for Groundwater Management Area 14's joint planning use. This model update was officially supported by Groundwater Management Area 14 members through a resolution adopted on May 14, 2024. The updated model, referred to as the GMA 14 Model, incorporates corrections based on new data collected by Lone Star Groundwater Conservation District, addressing compaction of fine-grained beds within the Gulf Coast Aquifer System, parameterization errors in GULF-2023, and other issues highlighted in stakeholder comments. Additionally, the model and report conform to Texas Water Development Board groundwater availability model and documentation standards.

We updated the conceptual model of GULF-2023 in three areas: (1) aquifer transmissivity, (2) groundwater pumping, and (3) aquifer compaction. We incorporated previously unpublished transmissivity results to enhance the available data. We then honored the transmissivity data for initializing the hydraulic properties in the model input files. For the pumping, we honored the estimated historical pumping values developed for the area by the Texas Water Development Board and others. While GULF-2023 allowed pumping to be reduced during calibration, we set up the GMA 14 Model to maintain the historical pumping estimates.

We updated the depth-dependent compaction property equations using Lone Star Groundwater Conservation District's newly acquired data from their 2024 coring program. For porosity, inelastic specific storage, and elastic specific storage, results from the new core samples were similar to the results from nearly 50 years ago in southern Harris and Galveston counties. (Gabrysch and Bonnet, 1974; 1976a; 1976b).

However, vertical hydraulic conductivity of the samples was about 10 times less than the earlier results. The lower vertical hydraulic conductivity indicates compaction may be about 10 times slower than the earlier data suggests.

Consistent with GULF-2023, we used MODFLOW 6, specifically MODFLOW 6.6.1 (Langevin and others, 2025), for the GMA 14 Model. We incorporated the updated conceptual model information into the input files for the model and converted other GULF-2023 input files as needed from length units of meters to feet. In addition, the shortest stress period in the model is one year, which reduced the total stress periods in the history matching period from 1896 through 2018 from 268 in GULF-2023 to 59 in the GMA 14 Model.

We calibrated the model using an ensemble approach to develop a base model and variations of the base model reflecting uncertainty in the model parameters. Calibration results indicated a good match between water level and subsidence simulated and measured values. The updated groundwater availability model provides improved utility for assessing regional groundwater management and joint planning by Groundwater Management Area 14 members.

1. Introduction

The Texas Water Development Board ("TWDB") delineates the Gulf Coast Aquifer System as a band of relatively young geologic formations that parallel the Gulf of Mexico coastline, stretching from the southern Texas border with Mexico to the eastern Texas border with Louisiana (George and Mace, 2011). Groundwater Management Area 14 members manage the groundwater resources in the Gulf Coast Aquifer System from the western borders of Austin, Brazoria, Fort Bend, and Washington counties to the Texas border with Louisiana. Figure 1 illustrates the administrative boundary of Groundwater Management Area 14.

In October 2019, the Harris-Galveston Subsidence District contracted with the U.S. Geological Survey to update and refine the Houston-Area Groundwater Model. The problem presented in the U.S. Geological Survey proposal is that the subsidence districts require an updated groundwater flow model incorporating new data that can then be used for regional planning. One of the U.S. Geological Survey's objectives was to coordinate work with the TWDB so that the updated model could be utilized by others for regional planning. Ellis and others (2023) documented the model update and in February 2024, the TWDB released the model known as GULF-2023 as the groundwater availability model for the northern portion of the Gulf Coast Aquifer System.

Prior to the TWDB's finalization and release of GULF-2023, they published a draft model and documentation for stakeholder comments. Comments submitted jointly on behalf of Groundwater Management Area 14 members and by Lone Star Groundwater Conservation District identified several issues with the model that made it difficult to, and potentially incapable for, use in the joint planning activities of Groundwater Management Area 14. To address some of the issues with the model, to improve its use for joint planning, and to incorporate new data for the aquifer system, Lone Star Groundwater Conservation District commissioned an update of GULF-2023 on behalf of Groundwater Management Area 14 members. As discussed in the comments on the draft GULF-2023 and through subsequent findings while working with the model files, our three areas of focus for the GULF-2023 update were:

- The skeletal storage, compaction, and subsidence package used simulate aquifer compaction and land subsidence
- The hydraulic properties as included in the node property flow package to more reasonably reflect observed data
- The historical pumping and predictive pumping as included in the well package

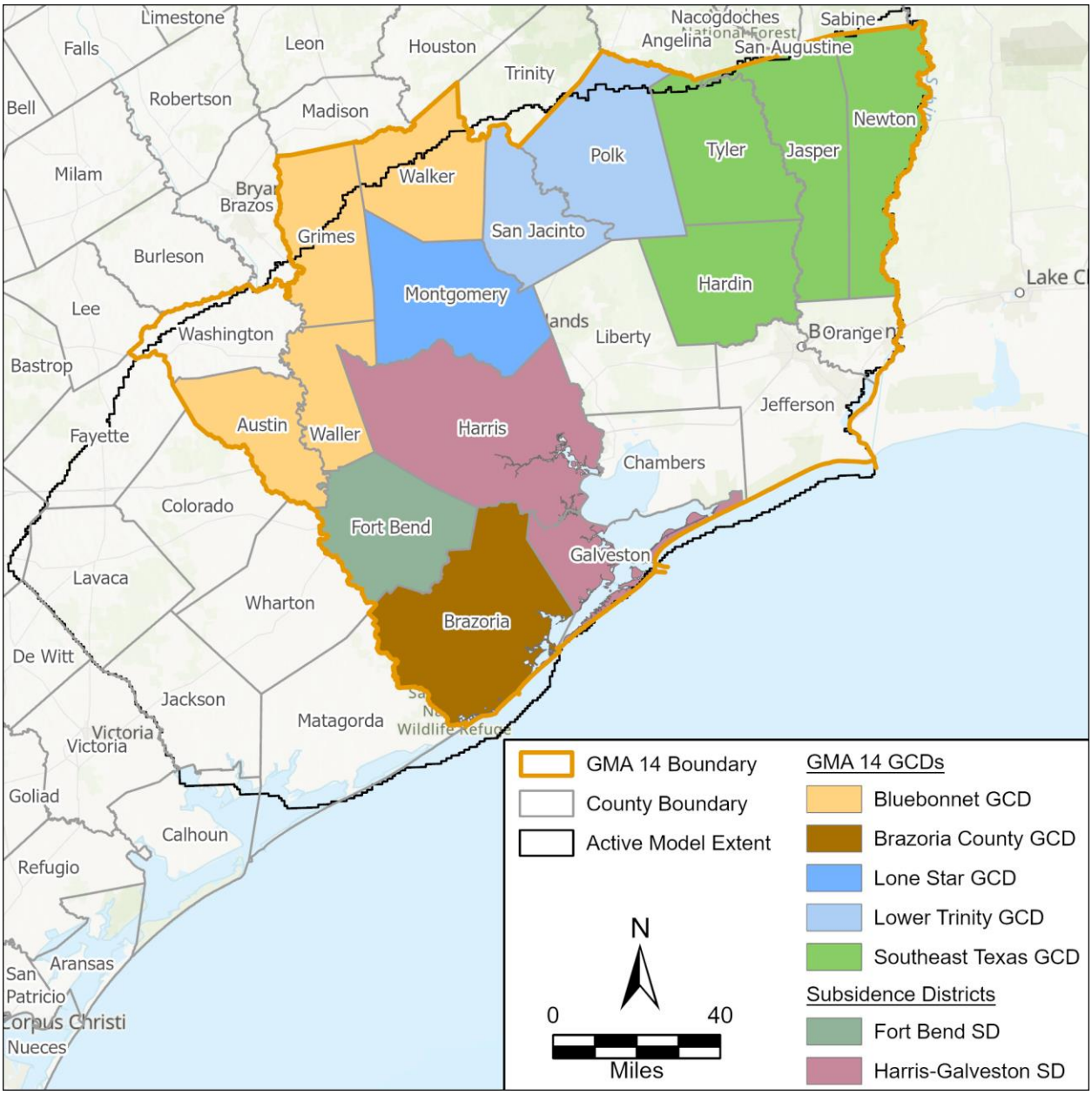

Figure 1. **Counties, subsidence districts, and member groundwater conservation districts within Groundwater Management Area 14.**

While we focused on the three areas above, we also reduced the number of stress periods in the model and converted the model from the International System of Units to U.S. Customary Units. In addition, our work on the model packages necessitated recalibration of the model. By correcting the above packages to better reflect the conceptual model and to incorporate new data, the existing calibration of GULF-2023 was not sufficient. Our work included updating the calibration using observed water levels, compaction, and subsidence, along with temporal trends in these observations.

The purpose of the model update was to address identified issues with GULF-2023, as presented in stakeholder comments on the model, and to improve the model for joint planning use by Groundwater Management Area 14. Groundwater Management Area 14 members recognized the need to update GULF-2023 for joint planning purposes and adopted a resolution during their May 14, 2024 meeting supporting the model update. The new data collected by Lone Star Groundwater Conservation District regarding compaction of the fine-grained beds within the Gulf Coast Aquifer System, parameterization errors in GULF-2023 (Keester, 2024), and issues identified by Groundwater Management Area 14 members in their comments on the draft GULF-2023 justify the groundwater availability model update. As an update to GULF-2023 specifically for Groundwater Management Area 14 joint planning purposes, throughout this report we refer to the updated model as the GMA 14 Model.

2. Conceptual Model Updates

As discussed below, our updates to the conceptual model focused on three areas:

1. Hydraulic properties, specifically transmissivity, of the aquifer layers
2. Groundwater pumping
3. Fine-grained material compaction

2.1. Hydraulic Properties

Aquifer transmissivity is the rate at which water is transmitted through a unit width of an aquifer over its entire thickness under a unit hydraulic gradient. It is a relative measurement of aquifer productivity that is most commonly derived from analysis of pumping test data. Transmissivity is equal to the hydraulic conductivity of an aquifer multiplied by its thickness.

Aquifer transmissivity is fundamental to groundwater flow modeling using MODFLOW. One of the basic equations applying Darcy's Law for groundwater flow to a mathematical expression of flow between model cells includes the calculation of transmissivity from hydraulic conductivity and the height of the model cell [see equation 2-3 in Langevin and others (2017)]. As such, incorporating measured transmissivity into the model update to the greatest extent possible was a priority.

We reviewed data from unpublished pumping tests for the Evangeline, Jasper, and Catahoula Aquifers to assist with filling in data gaps in the published pumping test datasets in the greater Houston and surrounding areas (that is, Montgomery, Harris, Fort Bend, Grimes, Waller, and Walker counties). Figure 2 shows the locations of wells with published and unpublished field data in the greater Houston area. The unpublished transmissivity values are based on data collected during constant-rate well pumping tests.

The use of the previously unpublished pumping test data allows for a reference of transmissivity values in areas with increasing population projections and water demands that may be subject to groundwater regulations. As shown on Figure 2, the inclusion of previously unpublished transmissivity data increased the spatial distribution of the data. We incorporated these additional transmissivity values into our update of the GMA 14 Model through interpolation of the available transmissivity data at the well locations. Figures 3, 4, 5, and 6 illustrate the interpolated transmissivity and pumping test locations for the Chicot, Evangeline, Jasper, and Catahoula aquifers, respectively.

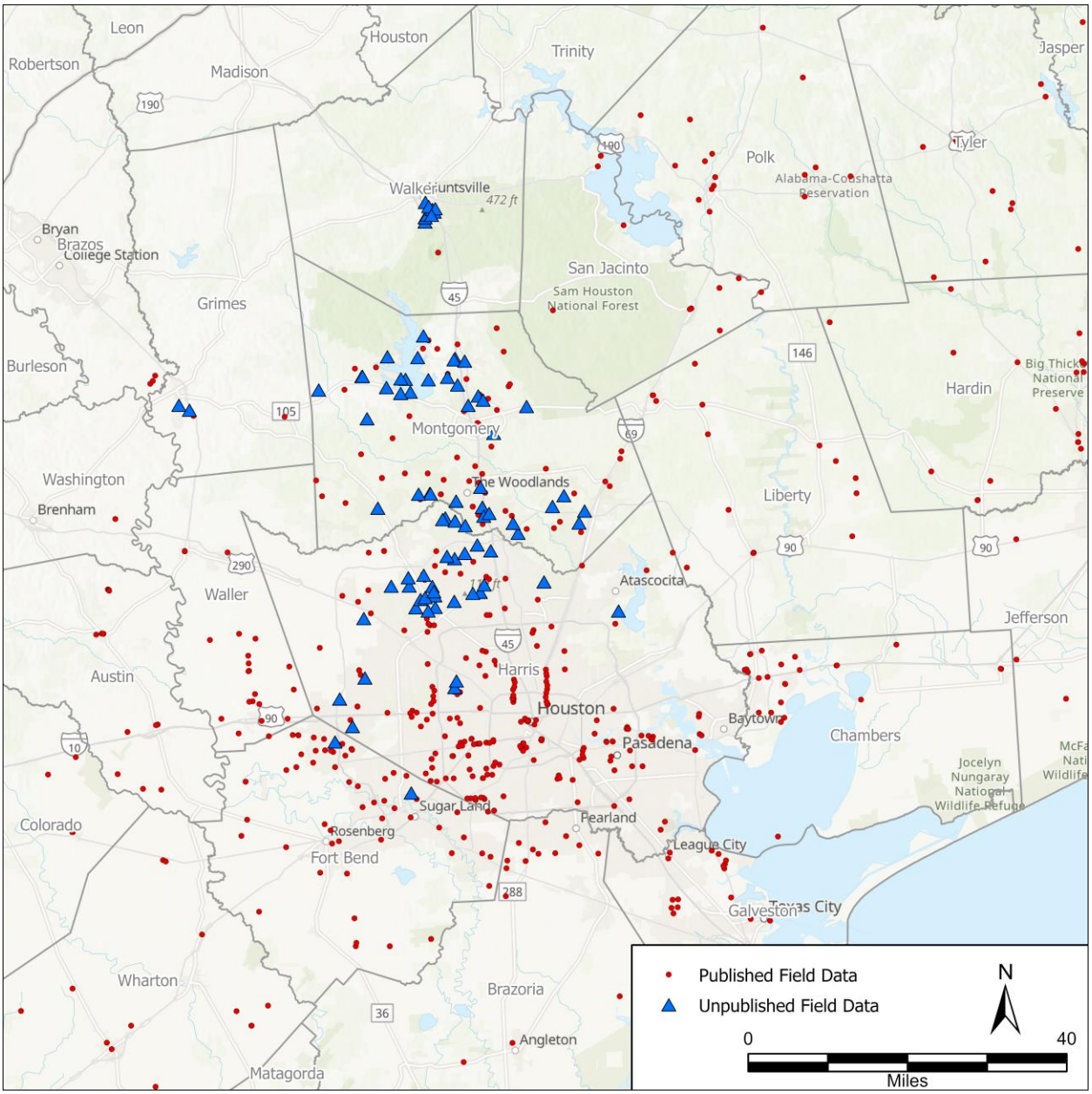

Figure 2. Map of locations of water wells with field data.

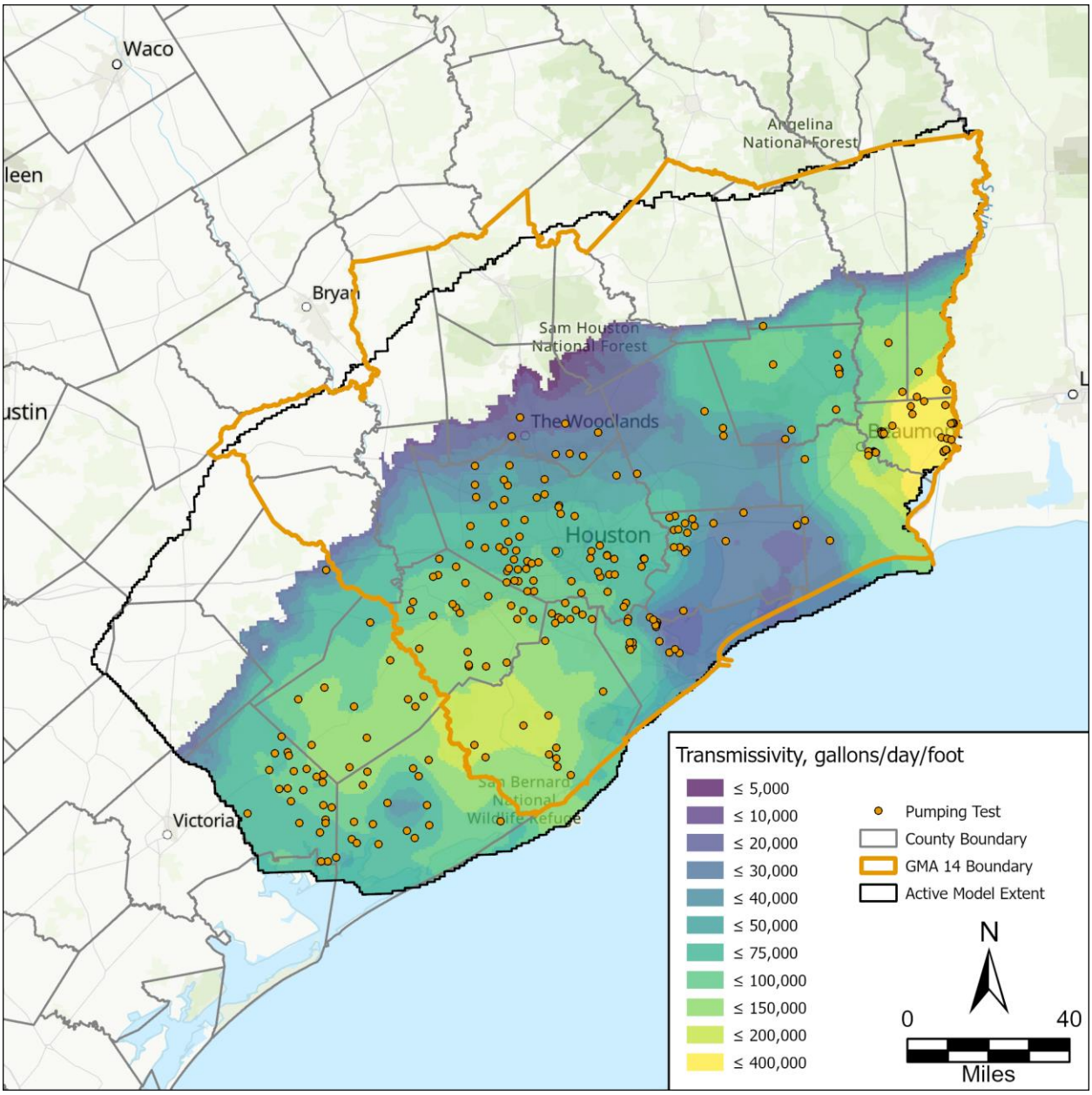

Figure 3. Chicot Aquifer interpolated transmissivity based on pumping test data.

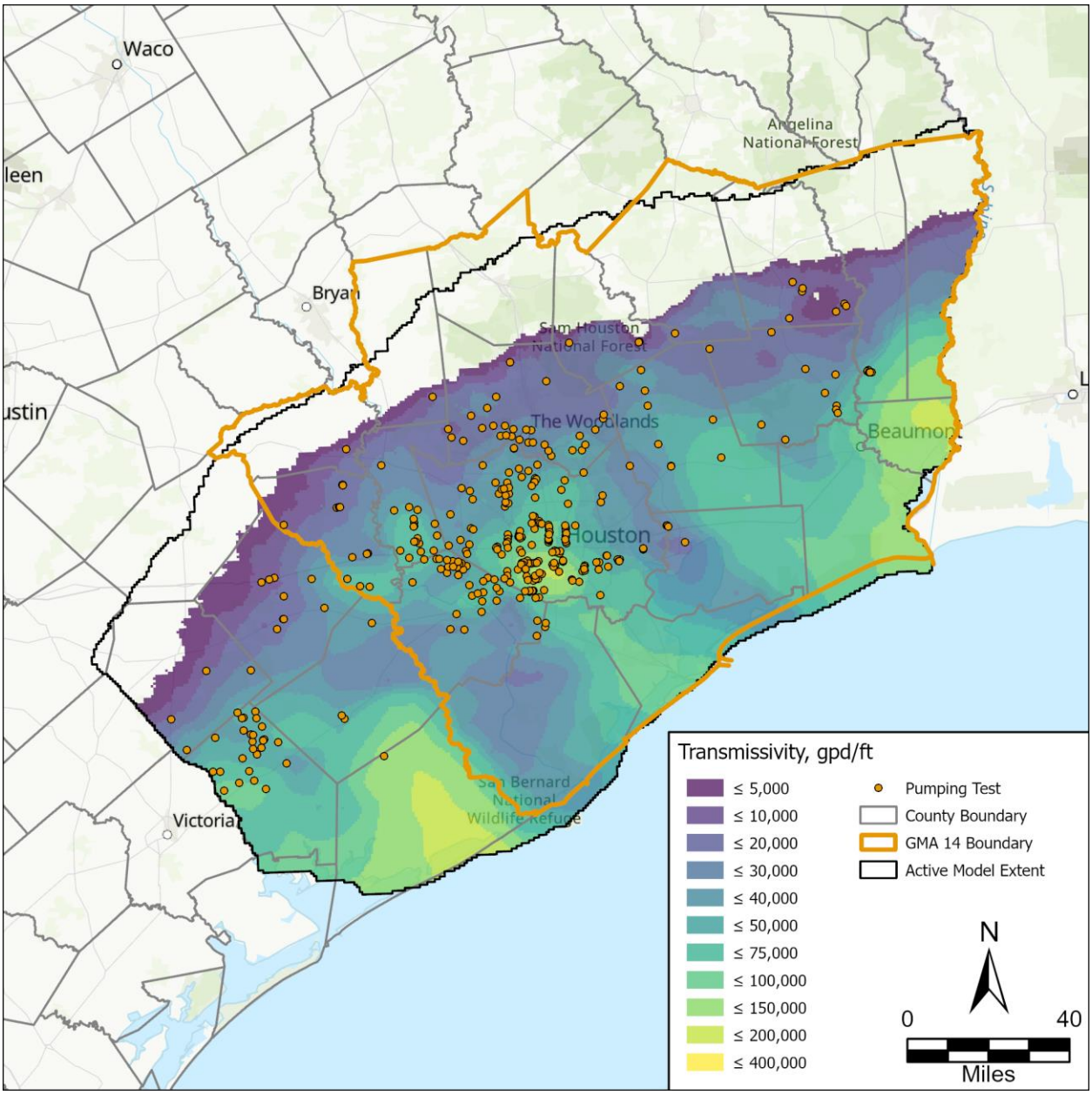

Figure 4. Evangeline Aquifer interpolated transmissivity based on pumping test data.

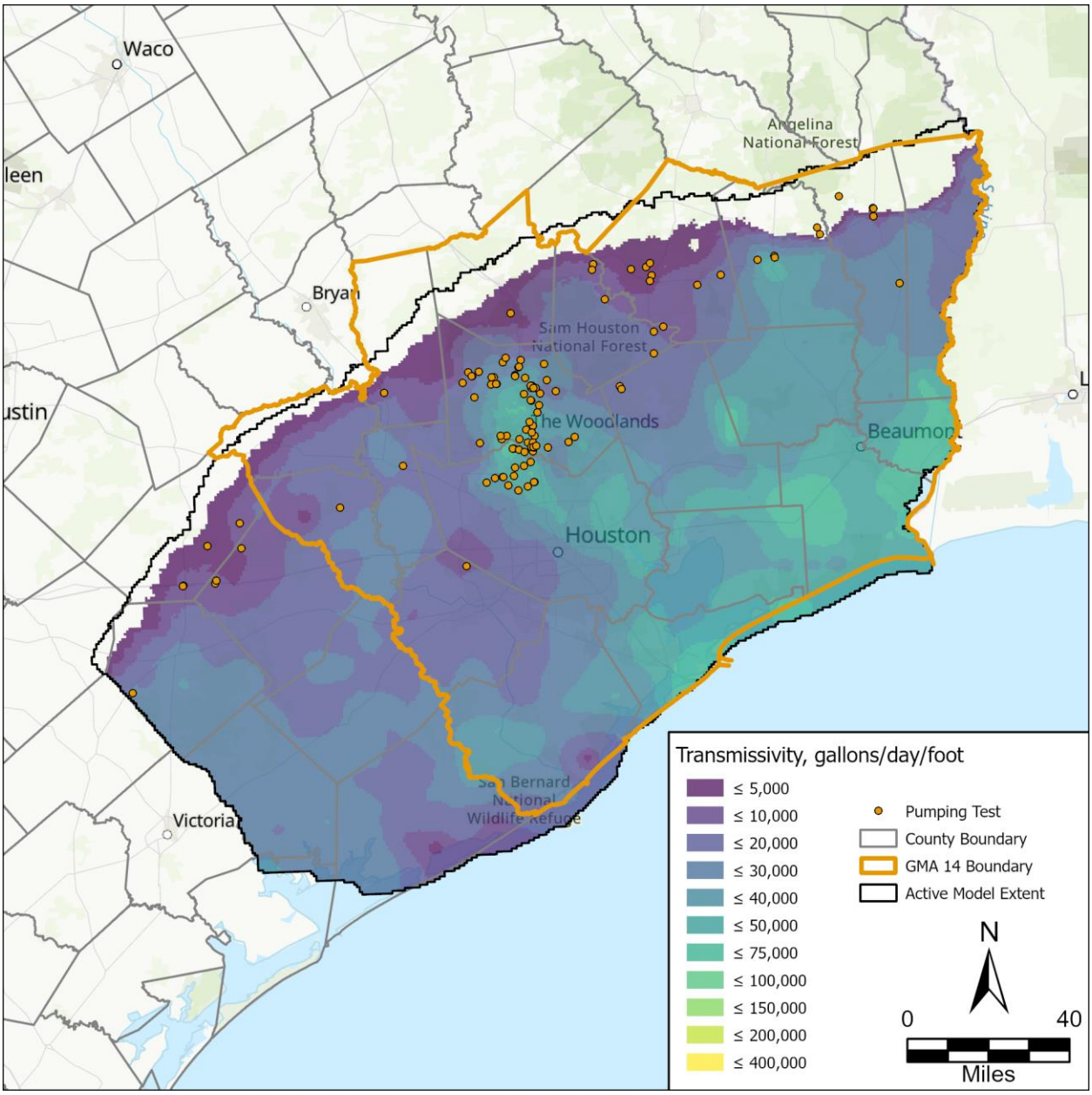

Figure 5. Jasper Aquifer interpolated transmissivity based on pumping test data.

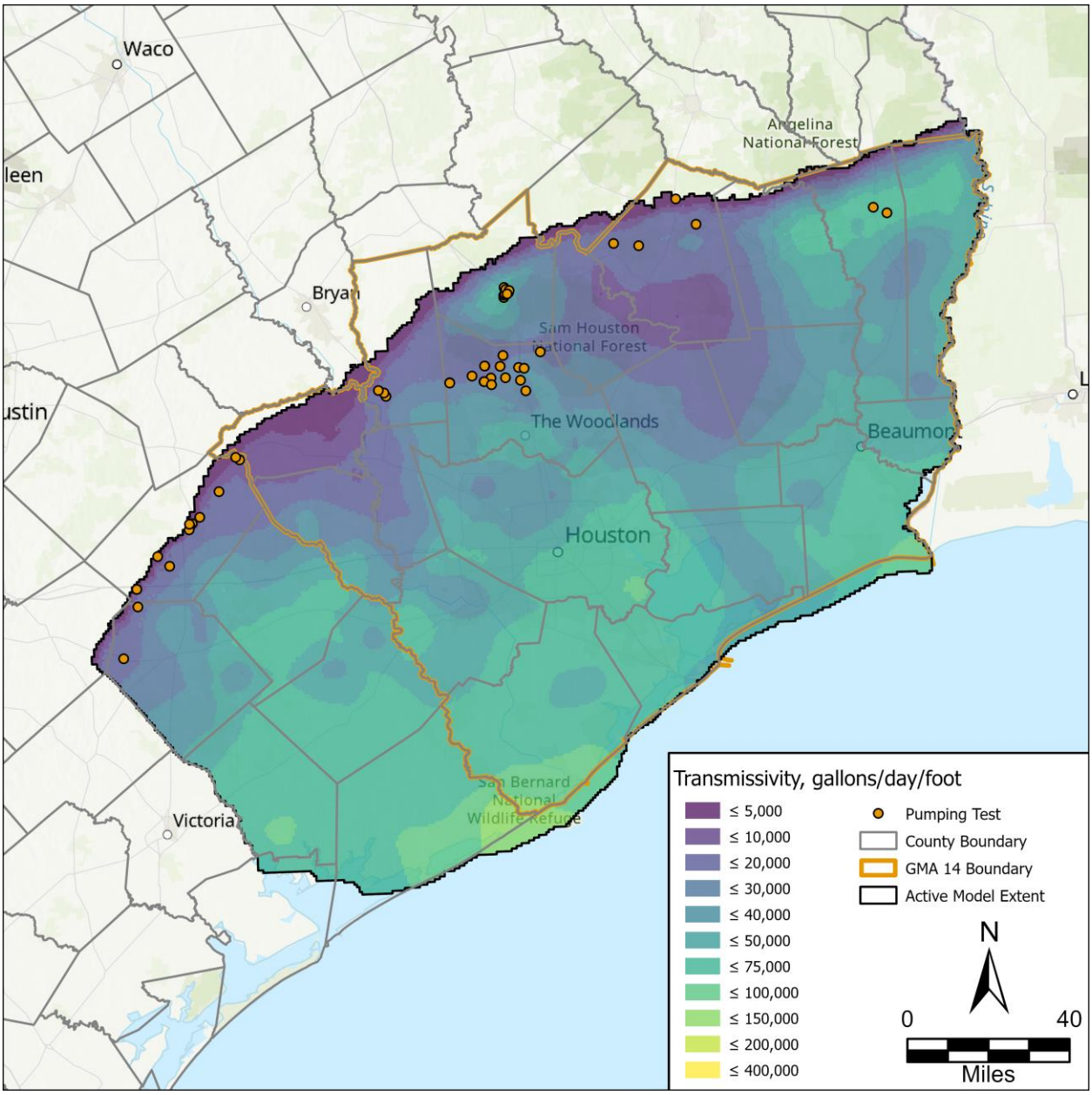

Figure 6. Catahoula Aquifer interpolated transmissivity based on pumping test data.

Appendix 1 contains a list of large capacity water wells with unpublished transmissivity values. Although unpublished, most of the Evangeline and Jasper Aquifer data were provided to the U.S. Geological Survey during development of the Houston-Area Groundwater Model (Kasmarek, 2013). Data for the Catahoula Aquifer is from the development of the Lone Star Groundwater Conservation District Catahoula Groundwater model (LBG-Guyton Associates and Intera, 2012) and the Lone Star Groundwater Conservation District Strategic Planning Study Task 3 (Seifert, Jr., 2017).

While we refer the transmissivity data for the Evangeline and Jasper aquifers as unpublished, the data are described in the LBG-Guyton Associates May 2011 Technical Memorandum: Groundwater Update and Improvements. This Technical Memorandum is included as an attachment in the June 2013 Regional Groundwater Update Project Report prepared for the Harris-Galveston Subsidence District, Fort Bend Subsidence District, and Lone Star Groundwater Conservation District (FNI and others, 2013). The effort described in the LBG-Guyton technical memorandum includes assembling and reviewing pumping tests from numerous large capacity public supply wells that located in the greater Houston area to help improve the transmissivity representation in the Houston-Area Groundwater Model (Kasmarek, 2013).

The pumping test data reviewed were from well construction records that were part of the LBG-Guyton files. As these data are from moderate to large capacity public supply wells, the pumping tests were performed with an extended continuous period of pumping, typically 36-hours, at a constant pumping rate followed by an extended water level recovery period of at least eight hours (LBG-Guyton Associates, 2011). The water level changes versus elapsed time data were plotted on a semilogarithmic graph and transmissivity values of the sands screened in the production well calculated using the modified non-equilibrium equation for groundwater flow and well hydraulics (Theis, 1935; Cooper and Jacob, 1946; Driscoll, 1986).

2.2. Groundwater Pumping

As part of our development of the GMA 14 Model, we reviewed the pumping rates applied in GULF-2023. The following summarizes our review and updates applied as part of our work.

2.2.1. GULF-2023 Model Pumping Review

GULF-2023 uses two separate input files for the MODFLOW Well package during the calibration period. The ".irr" file contains irrigation pumping and the ".wel" file contains non-irrigation pumping. Two versions of each file are included with the model, namely, a "prior" version with initial pumping inputs and a "posterior" version representing calibrated values.

Ellis and others (2023) used PEST++ (White and others, 2020) to calibrate the model. As part of their calibration approach for GULF-2023, they allowed the software to make changes to the input pumping over the calibration period of the model. While PEST++ modified both the prior irrigation and non-irrigation well input values over the calibration period, Ellis and others (2023) considered the irrigation pumping to be less certain and allowed greater reductions in the estimated historical pumping.

Appendix 2 includes a series of graphs showing the GULF-2023 pumping by county. The graphs show a comparison of the GULF-2023 prior and posterior versions of the irrigation and non-irrigation pumping. The graphs in Appendix 2 show very minor differences in the non-irrigation prior and posterior pumping. However, some of the figures illustrate relatively large differences in irrigation prior and posterior pumping, such as is in Colorado, Jackson, Lavaca, Liberty, Matagorda, Waller, and Wharton counties.

2.2.2. Comparison with Houston Area Groundwater Model Pumping

As part of the GMA 14 Model update, we also compared pumping between GULF-2023 and the Houston-Area Groundwater Model. The GULF-2023 calibration period extended through 2018 (Ellis and others, 2023) while the Houston-Area Groundwater Model calibration period was through 2009 (Kasmarek, 2013). Therefore, there are no model pumping input values available for comparison from 2010 through 2018. Appendix 3 includes graphs comparing the GULF-2023 and Houston-Area Groundwater Model pumping on a county basis.

Overall, the total pumping per county between the GULF-2023 and Houston-Area Groundwater Model models are similar for most counties. There can be differences in the totals between the GULF-2023 and Houston-Area Groundwater Model based on available pumping data at certain points in time. There are larger differences in the GULF-2023 and Houston-Area Groundwater Model total pumping in the counties where calibration reductions in irrigation pumping occurred. Austin, Brazoria, Fort Bend, and Harris counties also have notable differences in total county pumping between the GULF-2023 and Houston-Area Groundwater Model.

We also observe notable changes in the vertical distribution of pumping between the GULF-2023 and Houston-Area Groundwater Model in Fort Bend, Hardin, Harris, Jasper, Liberty, and Montgomery counties. Some of the differences in vertical distribution are likely due to a redefinition of the base of the Chicot Aquifer for the model. Young and Draper (2020) used a chronostratigraphic approach to redefine the base of the Chicot Aquifer (model layer 2). Their approach resulted in thickening of the Chicot Aquifer and thinning of the Evangeline Aquifer relative to the traditional hydrostratigraphic approach applied to the delineation of the contact between the two aquifers. This change in

approach to delineating the base of the Chicot Aquifer may be responsible for part of the vertical pumping differences between GULF-2023 and the Houston-Area Groundwater Model in parts of Fort Bend, Harris, and Liberty counties. We discuss differences in Montgomery County in detail in Section 2.2.3.3.

2.2.3. GMA 14 Model Pumping Update

Appendix 4 includes a series of graphs that shows the GMA 14 Model pumping inputs by county. There are three graphs per county that include the total pumping by layer, the irrigation pumping by layer, and the non-irrigation pumping by layer.

2.2.3.1. GMA 14 Model Irrigation Pumping

Our approach for the GMA 14 Model calibration was to not allow changes to the pumping input during the calibration process. The TWDB has developed estimates of water use in the state since 1955. While the process has changed over time, TWDB staff make significant efforts to obtain the best estimates possible for water use including irrigation pumping. Their estimates for irrigation use include crop histories, land use, and water use per crop which, since 2001, are then adjusted for precipitation and various other considerations (Furnans and others, 2022). Our approach for the GMA 14 Model is that the TWDB and others used reliable methods to develop irrigation estimates for counties in the greater Houston and surrounding areas. Irrigation survey maps combined with knowledge of crop irrigation requirements support the irrigation pumping included in the prior irrigation pumping file.

The only change we made to the GULF-2023 prior irrigation pumping file during the development of the GMA 14 Model pumping files was for Montgomery County. We found the prior irrigation file to contain minimal pumping for Montgomery County in the later stress periods of the model, so we set these values to zero. Within Lone Star Groundwater Conservation District, this irrigation pumping is permitted and reported by golf courses, nurseries, and others. We included this reported pumping within the non-irrigation pumping amounts discussed in the following section.

No additional changes were made to any of the prior irrigation well files for the other counties included in the model area. The pumping in the GMA 14 Model irrigation file is consistent with what is shown as prior amounts on the graphs in Appendix 2 with the exception of Montgomery County.

2.2.3.2. GMA 14 Model Non-irrigation Pumping

Four of the five groundwater conservation districts within Groundwater Management Area 14 reported varying degrees of historical non-exempt permitted groundwater production data for review. We compared reported non-exempt groundwater production from Bluebonnet Groundwater Conservation District, Brazoria County Groundwater

Conservation District, Lower Trinity Groundwater Conservation District, and Lone Star Groundwater Conservation District with the prior GULF-2023 non-irrigation pumping. Appendix 5 includes graphs comparing the available non-exempt permitted production data and the GULF-2023 prior non-irrigation pumping data. Each groundwater conservation district has years where the GULF-2023 prior non-irrigation pumping and the total reported non-exempt pumping have some differences, but overall the pumping between the two data sources is similar.

We reviewed the spatial distribution of the historical permitted production data when possible. We found that many of the wells with permitted production data provided by Bluebonnet Groundwater Conservation District, Brazoria County Groundwater Conservation District, and Lower Trinity Groundwater Conservation District did not include an assigned aquifer. Lone Star Groundwater Conservation District tracks pumping by aquifer and has estimated non-exempt pumping for the permitted and registered non-exempt wells.

2.2.3.3. Montgomery County Pumping Update

The only changes we made to the GULF-2023 prior non-irrigation pumping input as part of the GMA 14 Model development are in Montgomery County. Figure 7 shows a comparison of the GMA 14 Model pumping to the GULF-2023 pumping.

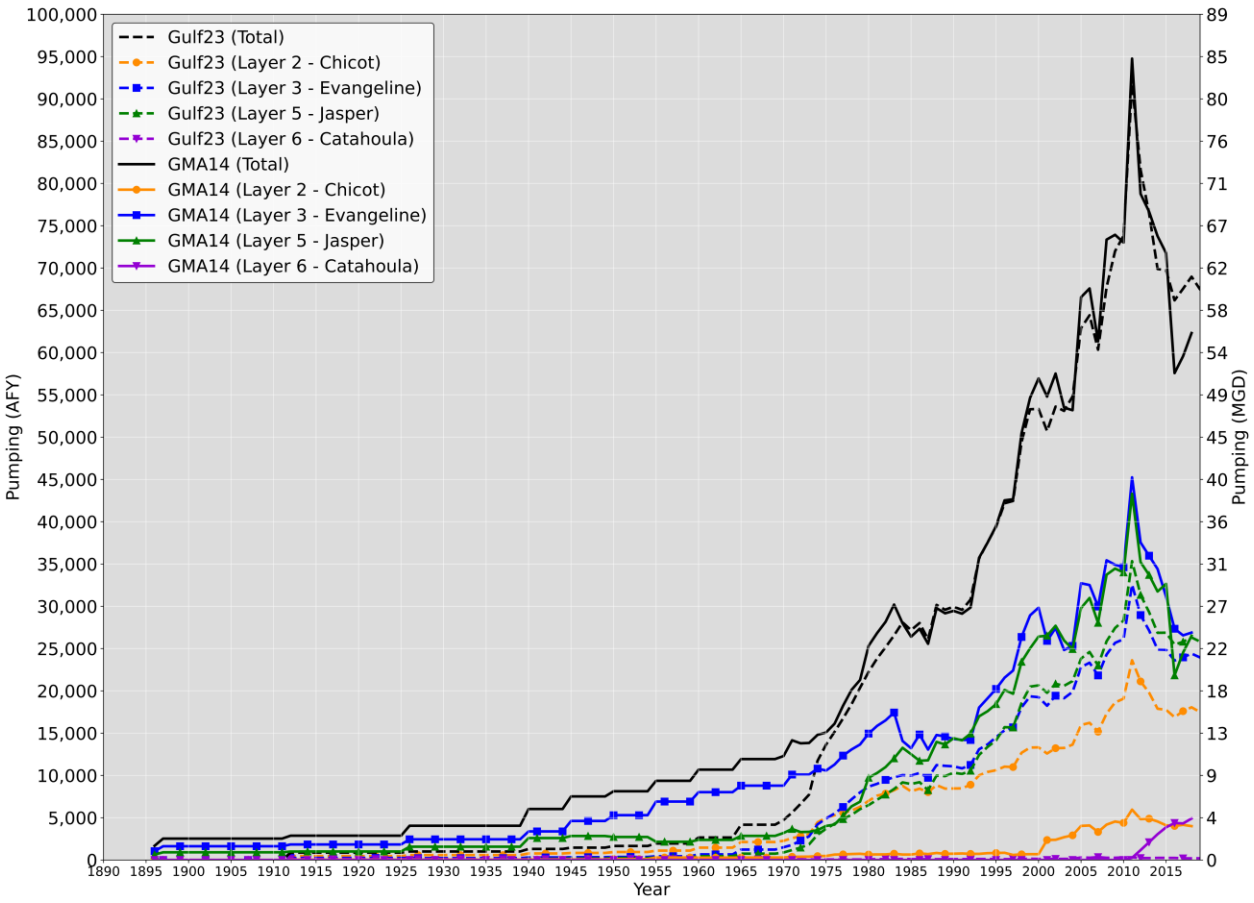

Figure 7. Comparison of the GMA 14 Model and GULF-2023 pumping in Montgomery County.

We used the total Houston-Area Groundwater Model pumping for Montgomery County from the beginning of the GMA 14 Model through 2002. We selected the use of the earlier Houston-Area Groundwater Model pumping inputs as Lone Star Groundwater Conservation District permits production by aquifer and the pumping from the Houston-Area Groundwater Model has a pumping distribution that is more representative of the current permitted pumping distribution. The Lone Star Groundwater Conservation District assigns aquifers to permitted and registered non-exempt wells based on a hydrostratigraphic understanding of the Gulf Coast Aquifer System and site-specific data.

The Montgomery County pumping in GULF-2023 is less than the Houston-Area Groundwater Model through about 1970 when the total GULF-2023 pumping starts to increase sharply. The Houston-Area Groundwater Model pumping is a better fit for the incorporation of the additional City of Conroe pumping beginning in 1955. For the GMA 14 Model, we did not change the total Montgomery County pumping with the addition of

the 1955 and beyond City of Conroe data or the 1975 and beyond San Jacinto River Authority – The Woodlands well production data. Rather, we reduced groundwater pumping evenly in other parts of Montgomery County to offset the increases in the Conroe and The Woodlands pumping. Our goal was to improve implementation of the historical pumping by Lone Star Groundwater Conservation District's two largest groundwater production permit holders.

Appendix 6 provides a comparison of the reported groundwater production for the City of Conroe and The Woodlands to the GULF-2023 and GMA 14 Model pumping. There are several utility districts located within the City of Conroe along Lake Conroe that have groundwater production wells completed in the Jasper which is why the GMA 14 Model pumping is slightly higher than the reported City of Conroe Jasper Aquifer pumping. The GMA 14 Model pumping in The Woodlands includes additional Evangeline Aquifer pumping related to irrigation for golf courses and nurseries which is not included in the pumping reported by the San Jacinto River Authority.

We used the Lone Star Groundwater Conservation District reported non-exempt permitted pumping as the basis for the 2003 to 2018 production to improve the spatial and vertical distribution of the GMA 14 Model pumping within Montgomery County. The Lone Star Groundwater Conservation District GULF-2023 comments (Drabek and Keester, 2023) submitted to the TWDB in April 2023 document the differences in the vertical distribution of pumping within Montgomery County. In Montgomery County, GULF-2023 overestimates pumping in the Chicot Aquifer and underestimates pumping in the Evangeline and Jasper aquifers.

These pumping discrepancies do not appear to be related to the change in aquifer structure based on the chronostratigraphic approach as the areas impacted by this structural change to the model layers occur in the southeast part of Montgomery County as documented in the Lone Star Phase 2 Subsidence Study (Keester and others, 2022). Review of Lone Star Groundwater Conservation District permitted pumping in the Evangeline Aquifer in the southeast part of Montgomery County indicates that the GULF-2023 Evangeline Aquifer pumping in that part of the county is similar to the reported non-exempt pumping.

Development of the Catahoula Aquifer in Montgomery County began in about 2011 and groundwater production had increased to about 4,900 acre-feet in 2018. The Montgomery County update of the non-irrigation well file includes the development of the pumping in the Catahoula Aquifer in Montgomery County.

2.3. Compaction

Ellis and others (2023) discuss how subsidence is largely dependent on the compaction properties of fine-grained sediments interbedded in the aquifer system. These compaction properties include:

- Porosity (θ) or Void Ratio (e)
- Compression Index (C_c)
- Recompression Index (C_r)
- Vertical Hydraulic Conductivity (K_v)

For these properties, Ellis and others (2023) reportedly used the depth-dependent relationships developed by Kelley and others (2018). For the compaction parameterization, Kelley and others (2018) evaluated the change in void ratio with applied stress data reported by Gabrysch and Bonnet (1974; 1976a; 1976b). Keester and others (2022) also evaluated the results from Gabrysch and Bonnet (1974; 1976a; 1976b) and found results similar to those of Kelley and others (2018) for the compaction parameterization.

A limitation of each of these studies is that they are geographically constrained to the sites where core samples were collected about 50 years ago. In addition, the core samples collected were from only the Chicot and Evangeline aquifers of the Gulf Coast Aquifer System. In 2024, to increase our conceptual understanding of the compaction parameters of the fine-grained sediments of the Chicot and Evangeline, and to get the first of its kind data for the Burkeville and Jasper, Lone Star Groundwater Conservation District conducted a drilling program to collect core samples in Montgomery County. Figure 8 illustrates locations where core samples for compaction parameter analysis have been collected.

2.3.1. Previous Investigations

It is beyond the scope of this report to detail the previous work on compaction parameterization. We discuss the data collected by Gabrysch and Bonnet (1974; 1976a; 1976b) within the context of the results from the Lone Star Groundwater Conservation District drilling program. We refer the reader to the work by Kelley and others (2018) and Keester and others (2022) for detailed analysis of the compaction data reported by Gabrysch and Bonnet (1974; 1976a; 1976b).

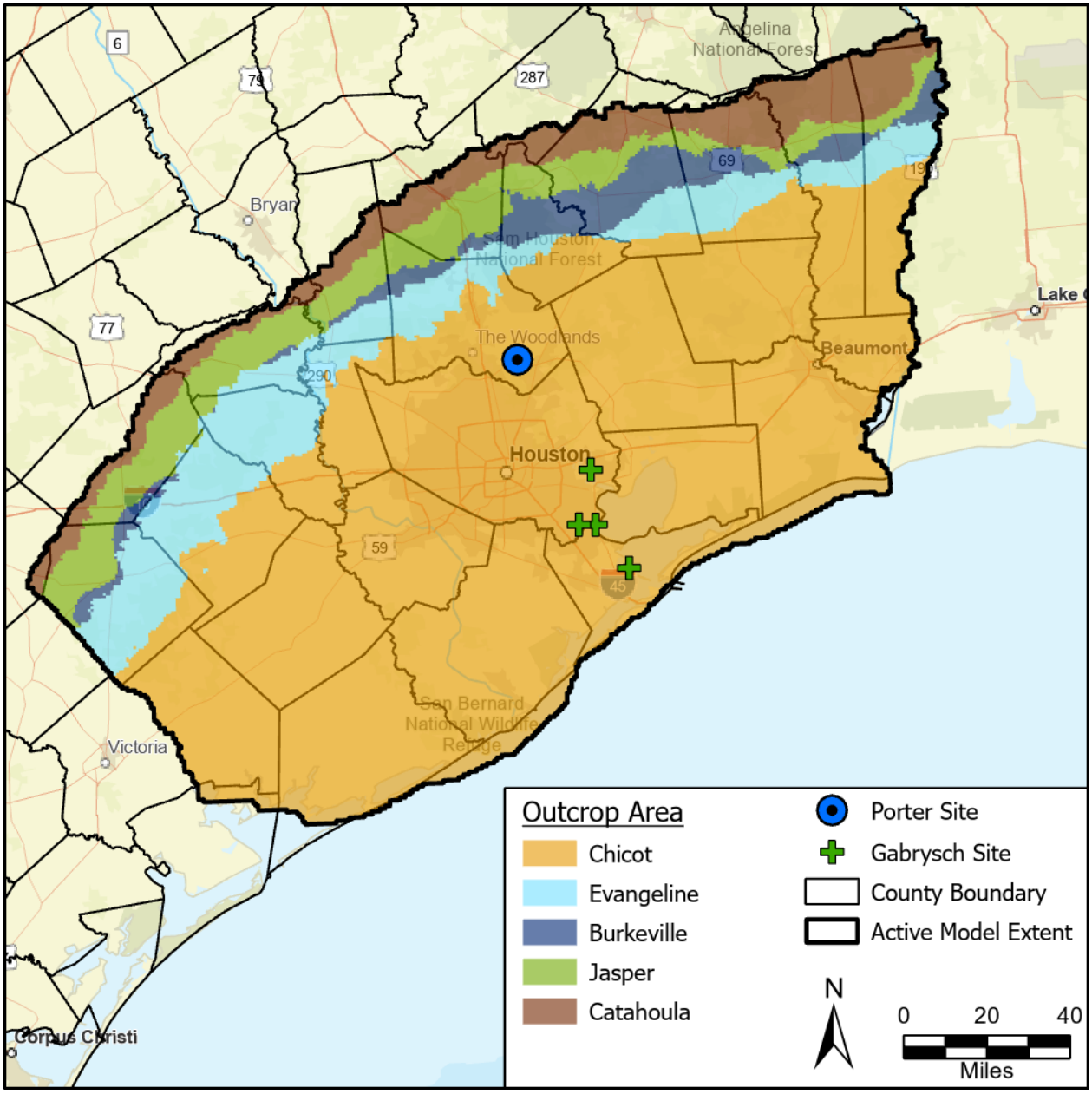

Figure 8. **Locations where core samples of the Gulf Coast Aquifer System have been collected for analysis of compaction properties.**

2.3.2. Lone Star Groundwater Conservation District Porter Site

At the Porter Site, Lone Star Groundwater Conservation District collected core samples from 18 distinct subsurface intervals. Table 1 provides the sample depths for collected core. Multiple tests were conducted on the samples; however, for the model update report we will focus on the tests and results related to the compaction parameter factors listed above. Additional details regarding core collection, preservation, and analyses are included in a project report in preparation as of the writing of this model report.

Table 1. Subsurface core samples collected at the Porter Site.

Core ID	Top	Bottom	Length	Aquifer	Description
1	78	84.95	6.95	Chicot	Lean Clay
2	198	206	8	Chicot	Lean Clay with Sand
3	308	319.6	11.6	Chicot	Fat Clay
4	457	463.15	6.15	Evangeline	Poorly Graded Sand with Silt
5	640	651.5	11.5	Evangeline	Fat Clay
6	833	848.35	15.35	Evangeline	Fat Clay
7	968	978.8	10.8	Evangeline	Clayey Sand
8	1,088	1,095.9	7.9	Evangeline	Fat Clay
9	1,198	1,203.4	5.4	Burkeville	Lean Clay
9B	1,208	1,217.85	9.85	Burkeville	Lean Clay
10	1,293	1,306.3	13.3	Burkeville	Fat Clay
11	1,463	1,475	12	Upper Jasper	Lean Clay
12	1,538	1,546.15	8.15	Upper Jasper	Silty Sand
13	1,633	1,644.35	11.35	Upper Jasper	Silty Sand
14	1,726	1,738	12	Upper Jasper	Lean Clay
15	1,888	1,896.1	8.1	Lower Jasper	Fat Clay
16	1,953	1,964.1	11.1	Lower Jasper	Fat Clay
17	2,058	2,065.45	7.45	Lower Jasper	Lean Clay
18	2,261	2,266.95	5.95	Lower Jasper	Fat Clay

2.3.2.1. Geostatic, Hydrostatic, and Effective Vertical Stress

Geostatic stress (σ) is a combination of the weight of sediments and fluids above a specified depth in the subsurface. The hydrostatic stress (u) is the pressure within the pore space of the sediments above a specified depth in the subsurface. Effective vertical stress (σ_v') is the difference between geostatic stress and hydrostatic stress. Terzaghi (1925) identified this relation which allows effective stress within an aquifer to be expressed as (Leake and Galloway, 2007):

$$\sigma_v' = \sigma - u \qquad \text{Eq. 1}$$

Commonly, the geostatic stress gradient (G_σ) is assumed to be 1.0 pounds per square inch per foot of burial. However, Tiab and Donaldson (2016) indicate the geostatic gradient in the Gulf Coast region increases with depth being about 0.85 pounds per square inch per foot near the surface and increasing to 1.0 pounds per square inch per foot at about 20,000 feet in depth. They indicate the reason for the trend is due to "sediments being younger and more compressible near the surface but being less compressible and more plastic with depth." For the Porter Site we obtained a bulk density log from which we calculated the geostatic stress gradient at the site and found it increased with depth as Tiab and Donaldson (2016) described for the Gulf Coast region. Figure 9 illustrates the geostatic stress at the Porter Site.

For the hydrostatic stress, we calculated the pore pressure using the method of Eaton (1972). This method requires the normal shale (that is, clay or fine-grained sediment) resistivity (R_n) and shale resistivity when the depth equals zero (R_0). To obtain these values, we must first determine the shale intervals within the formations. To quantify the shale intervals, we used the gamma log data to calculate the volume of shale (V_{sh}) using an equation for Tertiary age unconsolidated sediments (Asquith and Gibson, 1982):

$$V_{sh} = 0.083\left[2^{3.7\left(\frac{GR_{log}-GR_{min}}{GR_{max}-GR_{min}}\right)} - 1\right] \qquad \text{Eq. 2}$$

Where:

$GR_{log} = log\ response$

$GR_{min} = minimum\ log\ response = 26.695\ API$

$GR_{max} = maximum\ log\ response = 94.895\ API$

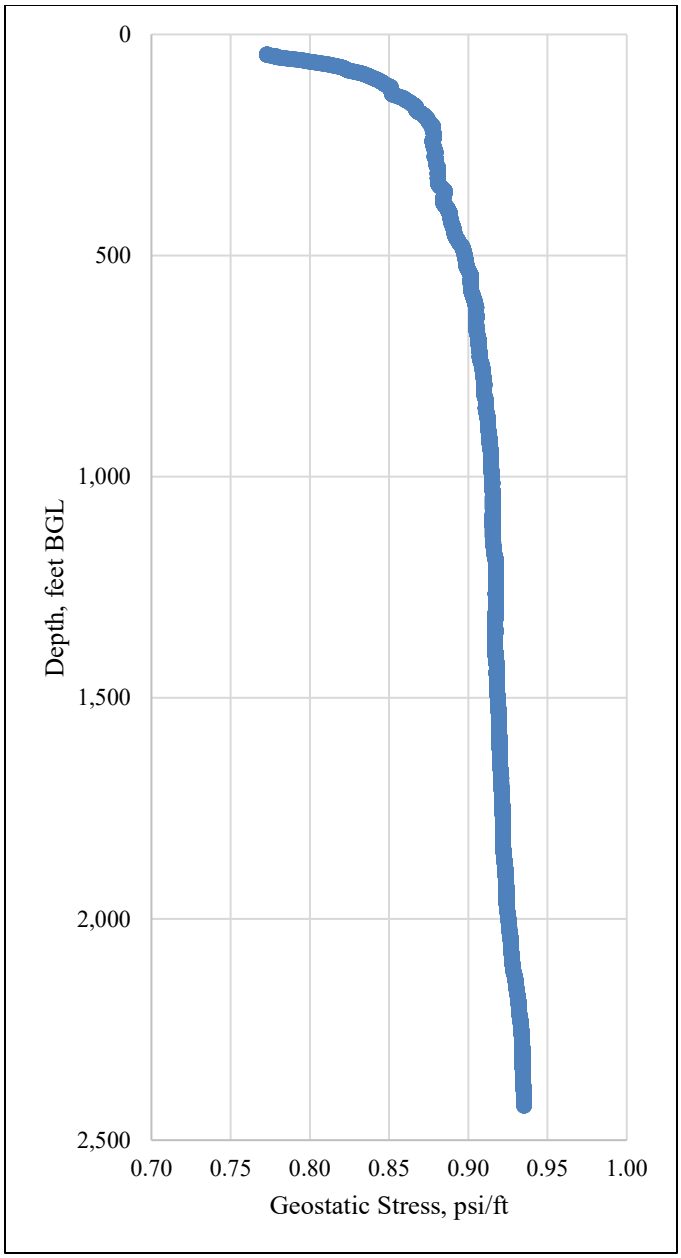

Figure 9. Porter Site geostatic stress.

We used a calculated shale volume of 30 percent as a cutoff for assigning an interval as shale. Using the volume of shale calculations, we then determined the normal shale resistivity as a best fit trend through the identified shale points at depths less than 1,000 feet below ground level with the trend line taking the form of (Zhang and Yin, 2017):

$$R_{n_Z} = R_0 exp^{bZ} \quad \text{Eq. 3}$$

Where:

$R_{n_Z} = normal\ shale\ resistivity\ at\ depth\ Z\ (ohm \cdot m)$
$R_0 = resitivity\ when\ Z = 0\ (ohm \cdot m) = 4.0\ ohm \cdot m$
$b = compaction\ parameter = 10^{-3.244}$
$Z = depth\ below\ ground\ level\ (ft)$

Figure 10 illustrates the shale resistivity and calculated trend for the normal shale resistivity at the Porter Site. Using the geostatic stress gradient, normal shale resistivity, and observed shale resistivity, we then calculated the pore pressure gradient (G_u) as (Eaton, 1995; Imhanzuaria and Bello, 2019):

$$G_u = G_\sigma - (G_\sigma - 0.433) \times \left(\frac{R_Z}{R_{n_Z}}\right)^{1.2} \quad \text{Eq. 4}$$

Where:

$R_Z = Deep\ resistivity\ value\ at\ depth\ Z\ (ohm \cdot m)$
$0.433 = normal\ pore\ pressure\ gradient\ (\frac{psi}{ft})$
$1.2 = constant$

Using the geophysical log data, we calculated the pore pressure gradient at 0.1-foot intervals for the shale intervals. As the shale intervals transition to sand layers, the calculated pore pressure decreases as the deep resistivity value increases. To account for the fluctuations, we calculated a moving median for each shale depth interval using the calculated pore pressure gradient values within 10 feet of the depth along with a running average of all calculated pore pressure values shallower than the depth of interest (Figure 11).

Using the calculated geostatic stress gradient and pore pressure (that is, hydrostatic stress) gradient, we could then calculate the in-situ effective stress for each Porter Site core sample. For most of the samples, we used the moving median pore pressure; however, three samples had a relatively high sand content, and we used the running average pore pressure value as more representative of the interval. Table 2 provides the calculated geostatic, hydrostatic, and effective stress for analyzed core samples.

The applied effective vertical stress during testing of the core samples is generally reported in units of kilopascal (“kPa”) or 1,000 pounds-force per square foot (“ksf”). Using the effective stress gradient calculated for each core sample, we converted the reported effective vertical stress during testing to an equivalent depth. We used the equivalent depths and applied the approach of Kelley and others (2018) to expand the depth-dependent relationships for compaction parameterization of the Gulf Coast Aquifer System fine-grained sediments.

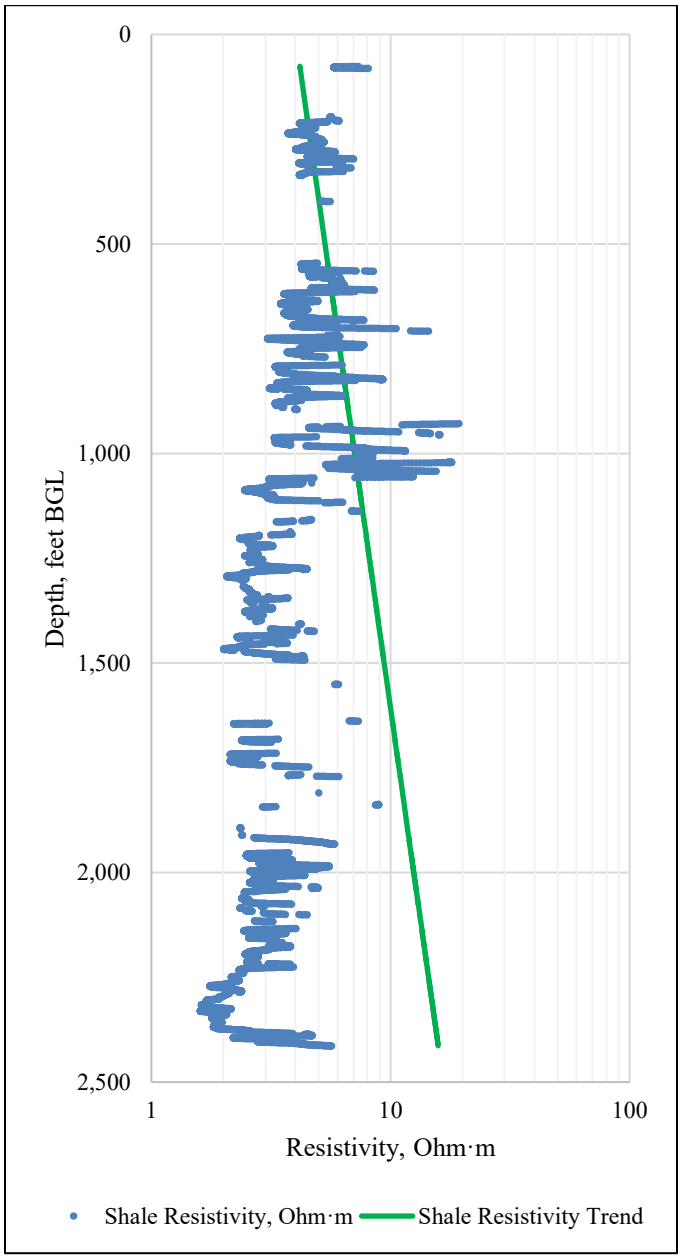

Figure 10. Shale resistivity and calculated normal shale resistivity trend.

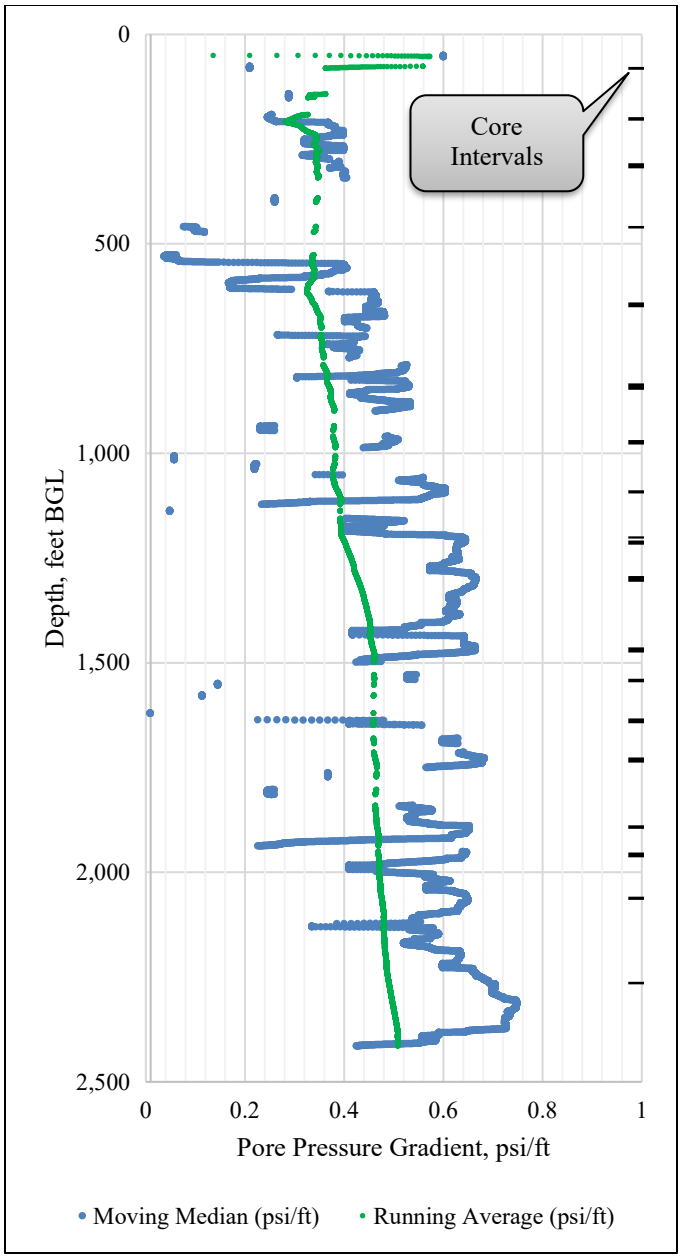

Figure 11. Calculated fine-grained sediment pore pressure gradient.

Table 2. Porter Site calculated geostatic stress, pore pressure (hydrostatic stress), and effective stress.

Core Sample†	Formation	Depth, feet BGL	Geostatic Stress, psi	Pore Pressure, psi	Effective Stress, psi
C1T2	Chicot	82	68	24	44
C2T4	Chicot	204	179	52	127
C3T3	Chicot	315	277	122	155
C4T2*	Evangeline	459	410	157	253
C5T5	Evangeline	648	586	293	293
C6T5	Evangeline	840	765	445	320
C6T6-TAMU	Evangeline	843	768	439	330
C6T6-SO	Evangeline	843	768	439	330
C7T3	Evangeline	974	890	478	413
C8T1	Evangeline	1,090	997	658	340
C9T1	Burkeville	1,199	1,100	755	345
C9BT1	Burkeville	1,210	1,110	779	331
C9BT4 - TAMU	Burkeville	1,199	1,100	755	345
C10T3	Burkeville	1,297	1,190	862	328
C11T3	Burkeville	1,467	1,347	973	373
C12T1*	Upper Jasper	1,540	1,415	709	706
C13T2*	Upper Jasper	1,635	1,504	751	754
C14T1	Upper Jasper	1,728	1,592	1,178	414
C15T5 - TAMU	Lower Jasper	1,897	1,752	1,236	516
C15T5 - SO	Lower Jasper	1,897	1,752	1,236	516
C15T6	Lower Jasper	1,900	1,754	1,227	527
C16T1	Lower Jasper	1,955	1,806	1,260	547
C17T1	Lower Jasper	2,059	1,909	1,332	577
C18T1	Lower Jasper	2,263	2,113	1,568	545

*Pore pressure value from running average values

† “T#” represents the tube number of the core sample.

2.3.2.2. Porosity

The porosity (θ) of a material is the amount open space within a solid volume. For example, if one cubic foot of fine-grained sediment has a porosity of 15 percent that means that 0.15 cubic feet of the sediment is open space where water or other liquid or gas can be stored. The porosity is related to the void ratio (e) as follows:

$$\theta = \frac{e}{1+e} \quad \text{Eq. 5}$$

During testing, a portion of the core sample is held within a chamber and vertical stress is applied to the sample. As effective vertical stress changes, the void ratio for the applied effective vertical stress is recorded. Figure 12 is an example of the test results for the effective vertical stress versus void ratio.

Analysis of the porosity data from the Porter Site cores showed results similar to the results from Gabrysch and Bonnet (1974; 1976a; 1976b). Figure 13 shows the measured porosity versus effective depth at the Porter Site and Gabrysch sites. While the results are similar, the porosity trend with effective depth is slightly higher. Equation 6 is the calculated best-fit trend line through all of the available porosity data from core analyses.

$$\theta = 0.3625e^{-1.00\times10^{-4}Z} \quad \text{Eq. 6}$$

Keester and others (2022)found a logarithmic trend best fit the Gabrysch data so a logarithmic trend was applied to the Porter Site data for comparison. However, when the data are combined, an exponential trend provides the best trend through the data. This exponential trend was applied within the model update as the initial estimate of fine-grained bed porosity prior to model calibration.

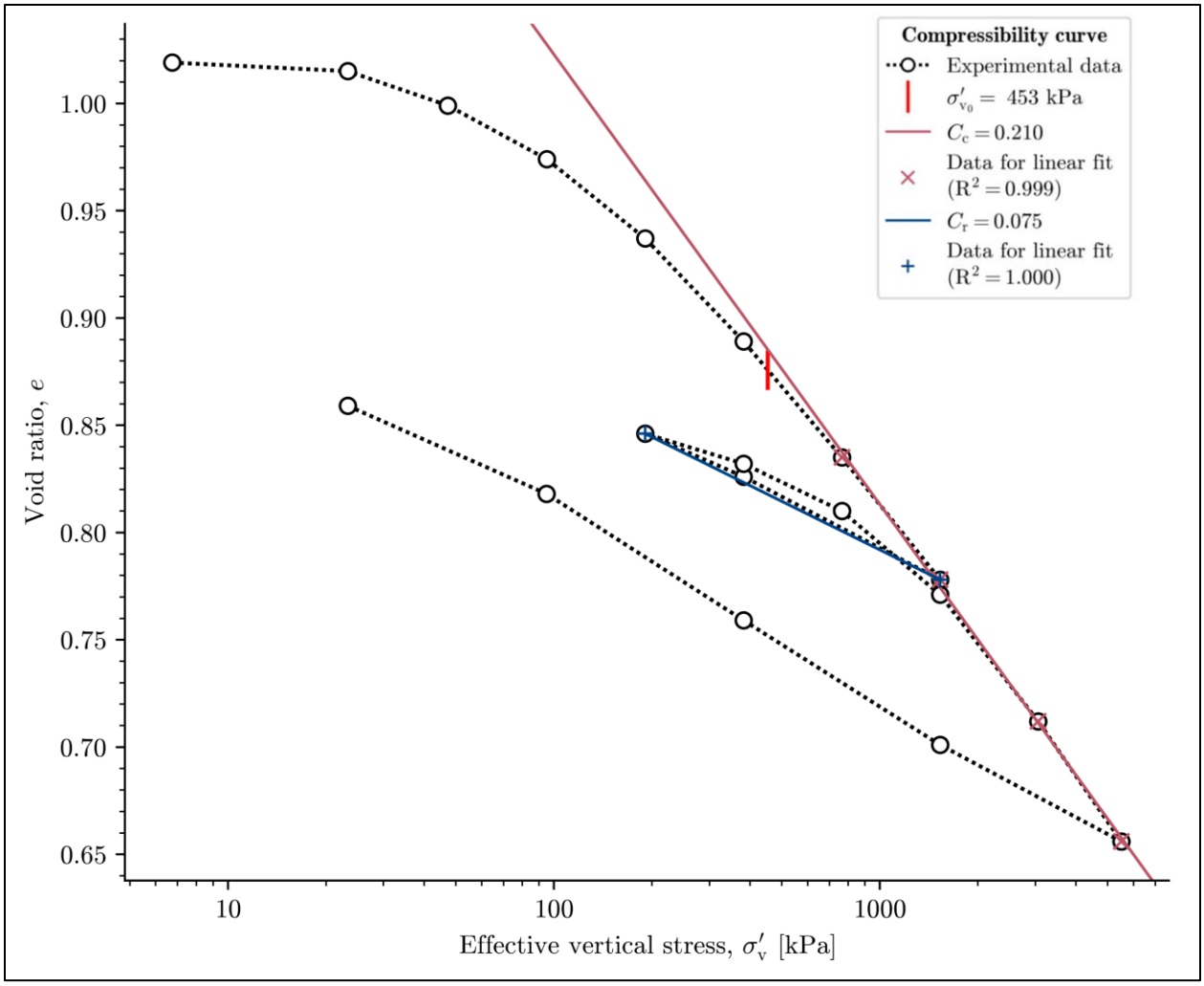

Figure 12. Effective vertical stress versus void ratio for core sample C8T1.

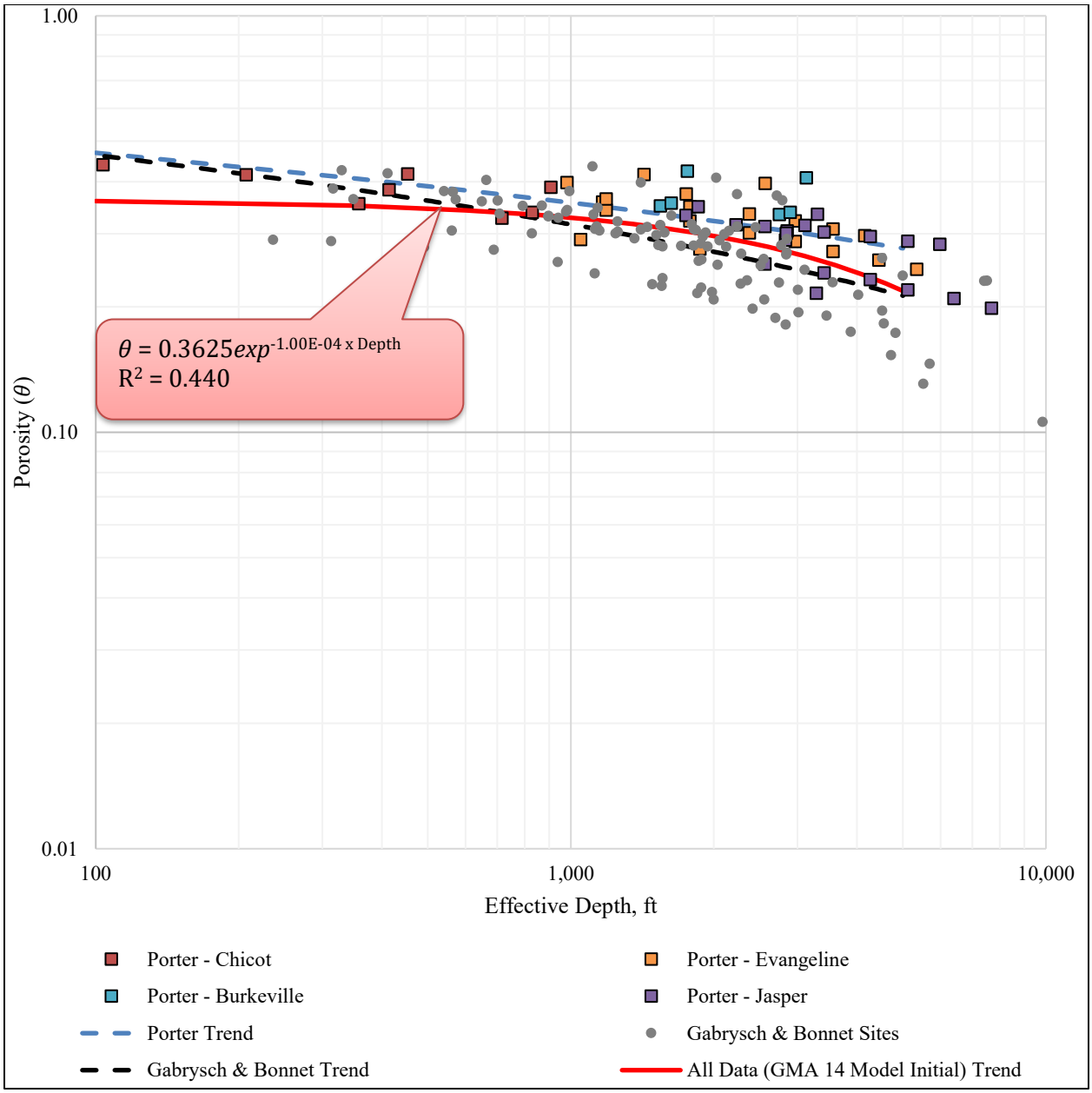

Figure 13. Porosity results from the compaction testing. Gabrysch & Bonnet trend from Keester and others (2022).

2.3.2.3. Compression and Recompression

The compression index is the change in void ratio over the logarithm of the effective stress during inelastic conditions. Similarly, the recompression index represents the same change during elastic conditions (Jorgensen, 1980). Lone Star Groundwater Conservation District worked with W.D. Von Gotten Engineering LLC and Innovative Geotechnology LLC to conduct consolidation testing on samples from each core to determine these indices for the core intervals. In addition, the Lone Star Groundwater Conservation District worked with Texas A&M University Zachry Department of Civil and Environmental Engineering to conduct consolidation testing of three samples at higher pressures than the commercial labs were capable of applying to verify results and extend analyses to greater effective depths. Using the void ratio and pressure data, the compression and recompression indices are calculated as follows (Jorgensen, 1980):

$$C_c = \frac{de}{d\log_{10}\sigma_v'} \{Loading\ Phase \quad \text{Eq. 7}$$

$$C_r = \frac{de}{d\log_{10}\sigma_v'} \{Unloading\ Phase \quad \text{Eq. 8}$$

Where:

$C_c = Compression\ index\ (dimensionless)$
$C_r = Recompression\ index\ (dimensionless)$

The compression index is determined as a slope of a fitted line of the curve defined by the plot of void ratio versus the logarithm of effective stress during the loading phase of testing which represents the inelastic range. For the recompression index, a line is fitted to the measurements during the unloading phase which represents the elastic range of the sediments. Figure 14 illustrates the calculation from the measurements using the test data for core C2T4.

Table 3 summarizes the common ranges of the indices for low to high plasticity clays. Most of the compression index results for the Porter Site data are within the low to medium plasticity range (Table 4). However, the recompression index results are generally within the typical high plasticity range. Table 5 summarizes the compression and recompression indices by aquifer.

A general range for the C_r/C_c is 0.02 to 0.2 with lower values representing highly structured and bounded soft clay and silt deposits (Terzaghi and others, 1996). The average C_r/C_c value of the Porter Site cores is 0.24 which is higher than the expected range for a clay. However, deviations from the literature values are expected due to potential variations in silt and sand content within the samples.

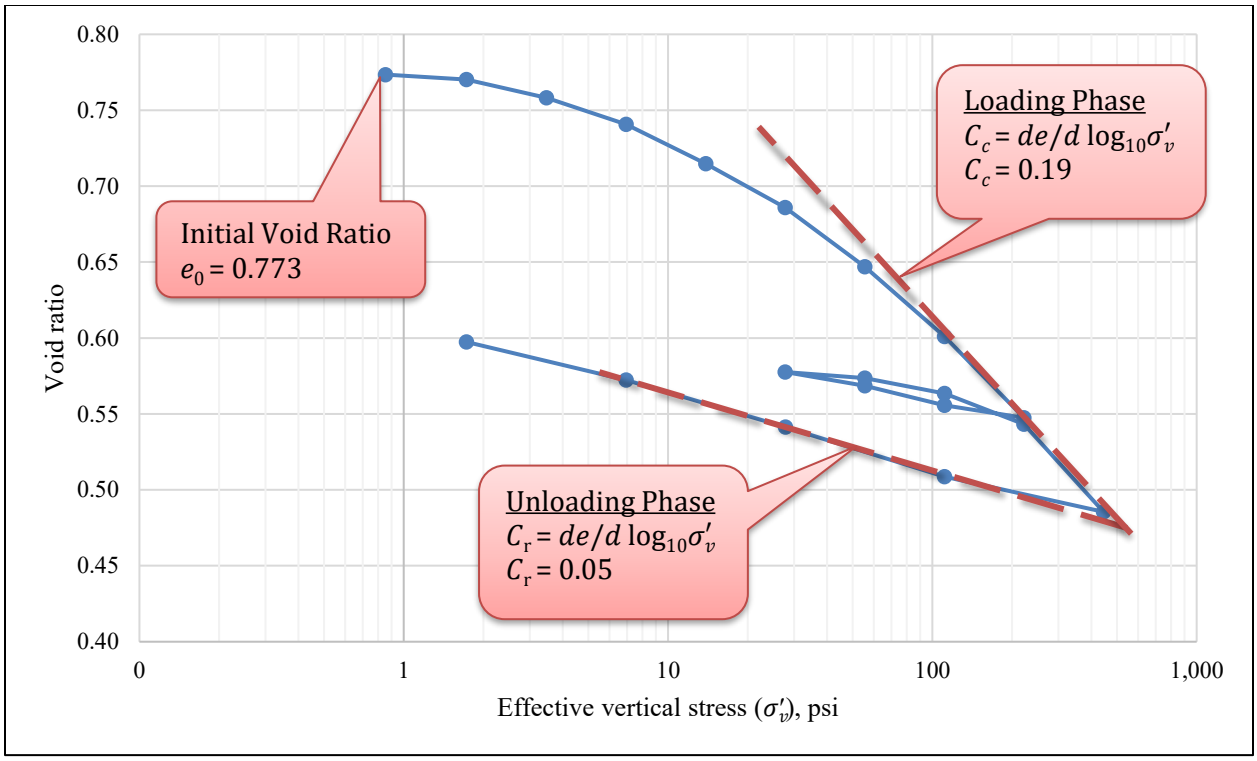

Figure 14. **Example of compression and recompression index determination.**

Table 3. **Typical compression and recompression index value ranges for clays (Terzaghi and others, 1996; Das, 2010).**

Clay Type	Compression Index	Recompression Index
Low-medium plasticity	0.1 to 0.3	0.005 to 0.015
High plasticity	0.3 to 0.6	0.01 to 0.05

Table 4. Compression and recompression index for each core sample.

Core Sample	Formation	Compression Index	Recompression Index	C_r/C_c
C1T2	Chicot	0.33	0.05	0.15
C2T4	Chicot	0.19	0.05	0.26
C3T3	Chicot	0.25	0.02	0.08
C4T2*	Evangeline	0.04	0.01	0.25
C5T5	Evangeline	0.26	0.04	0.15
C6T5	Evangeline	0.17	0.04	0.24
C6T6-TAMU	Evangeline	0.30	0.12	0.40
C6T6-SO	Evangeline	0.28	0.11	0.39
C7T3	Evangeline	0.11	0.02	0.18
C8T1	Evangeline	0.21	0.05	0.24
C9T1	Burkeville	0.15	0.02	0.13
C9BT1	Burkeville	0.16	0.03	0.19
C9BT4 - TAMU	Burkeville	0.29†	0.17†	0.59
C10T3	Burkeville	0.17	0.04	0.24
C11T3	Upper Jasper	0.17	0.02	0.12
C12T1*	Upper Jasper	0.05	0.002	0.04
C13T2*	Upper Jasper	0.06	0.02	0.33
C14T1	Upper Jasper	0.12	0.01	0.08
C15T5 - TAMU	Lower Jasper	0.23	0.09	0.39
C15T5 - SO	Lower Jasper	0.22	0.08	0.36
C15T6	Lower Jasper	0.2	0.1	0.50
C16T1	Lower Jasper	0.17	0.07	0.41
C17T1	Lower Jasper	0.12	0.02	0.17
C18T1	Lower Jasper	0.31	0.02	0.06

*samples with relatively high sand content that are not representative of the clay interbeds. Values not included in statistical summaries.

†Preliminary values as of this report. Values not included in statistical summaries.

Table 5. Average compression and recompression indices by aquifer.

Formation	Compression Index	Recompression Index	C_r/C_c
Chicot	0.26	0.04	0.16
Evangeline	0.22	0.06	0.27
Burkeville	0.16	0.03	0.19
Upper Jasper	0.15	0.02	0.10
Lower Jasper	0.21	0.06	0.32

2.3.2.4. Specific Storage

The specific storage (S_s) of aquifer sediments is the volume of water released from or added to storage in a unit volume of aquifer per unit decline or rise in water level (Bear, 1979). The specific storage value may be further defined as the sum of the elastic (S_{ske}) and inelastic (S_{skv}) components (Hoffman and others, 2003) with the inelastic component generally being approximately 100 times greater than the elastic component (Leake and Prudic, 1991; Young and others, 2006). However, other studies have found the ratio of the inelastic to elastic specific storage to be higher than 0.1 (Song and others, 2022; Jiangtao Li, 2022).

Previous investigations relied on the typical ratio of S_{skv} to S_{ske} (Kelley and others, 2018; Keester and others, 2022). However, for the Porter Site data, we applied the equations from Jorgensen (1980) relating C_c and C_r to S_{skv} and S_{ske}, respectively, as follows:

$$S_{skv} = \frac{0.434 C_c \gamma_w}{(1+e_0)\sigma_v'} \quad \text{Eq. 9}$$

$$S_{ske} = \frac{0.434 C_r \gamma_w}{(1+e_0)\sigma_v'} \quad \text{Eq. 10}$$

Where:

$e_0 = initial\ void\ ratio$

$\gamma_w = specific\ weight\ of\ water\ \approx 9.81 \frac{kN}{m^3} \approx 62.43 \frac{lbf}{ft^3}$

Figure 15 and Figure 16 illustrate the calculated inelastic and elastic, respectively, specific storage values. The inelastic storage values from the Porter Site data fall along a similar trend to results from the Gabrysch and Bonnet (1974; 1976a; 1976b) data with the trend lines through each data set essentially the same. Results for the elastic specific storage are also similar though slightly higher for some samples at greater effective depths. Equations 11 and 12 are the calculated best-fit trend lines through all of the available inelastic and elastic, respectively, calculated storage coefficient values based on data from core analyses.

$$S_{skv} = 6.916 \times 10^{-5} exp^{-2.84 \times 10^{-4} Z} \quad \text{Eq. 11}$$

$$S_{ske} = 1.244 \times 10^{-5} exp^{-2.21 \times 10^{-4} Z} \quad \text{Eq. 12}$$

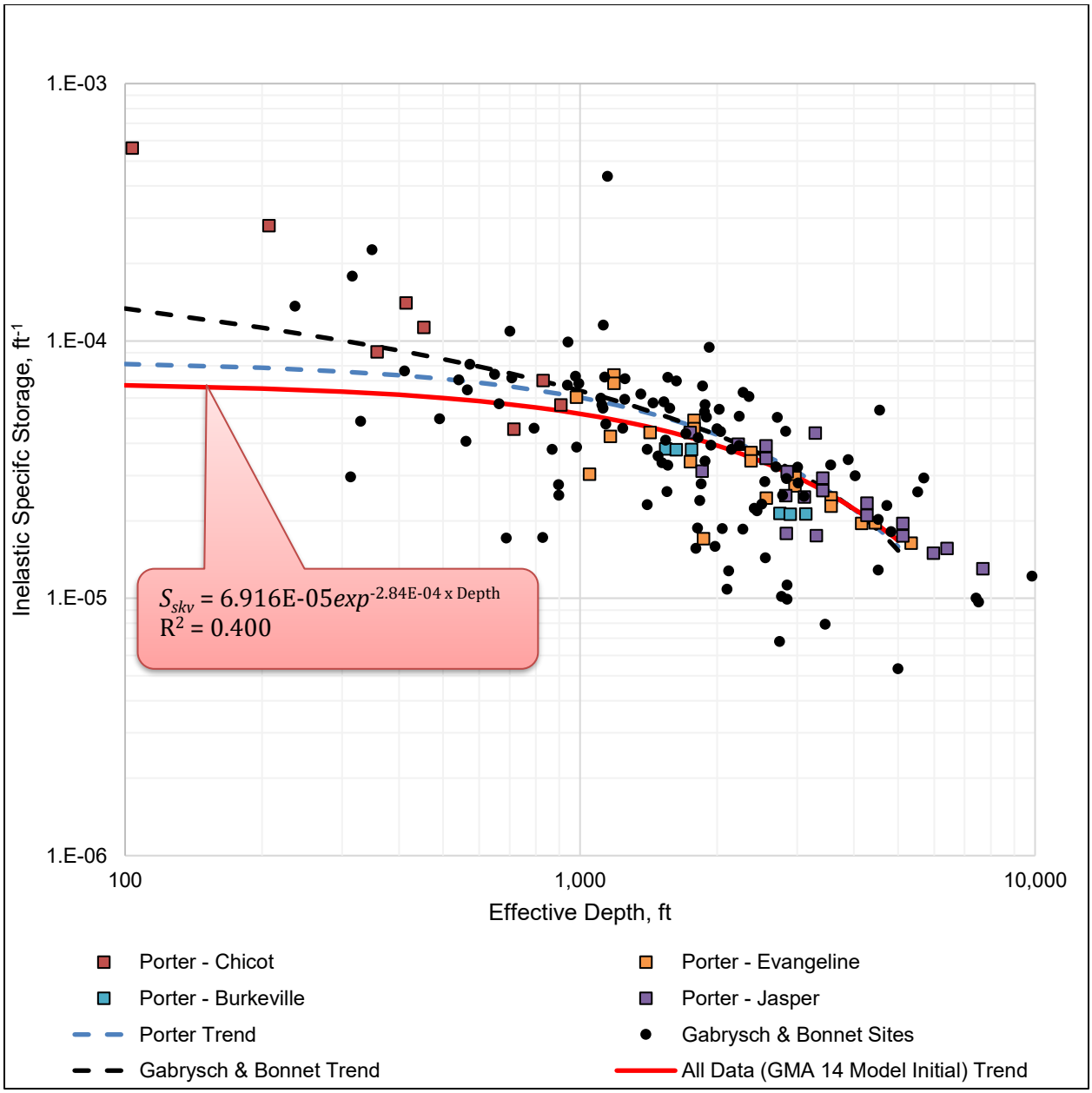

Figure 15. **Calculated inelastic specific storage (S_{skv}) results from the compaction testing. Gabrysch & Bonnet trend from Keester and others (2022).**

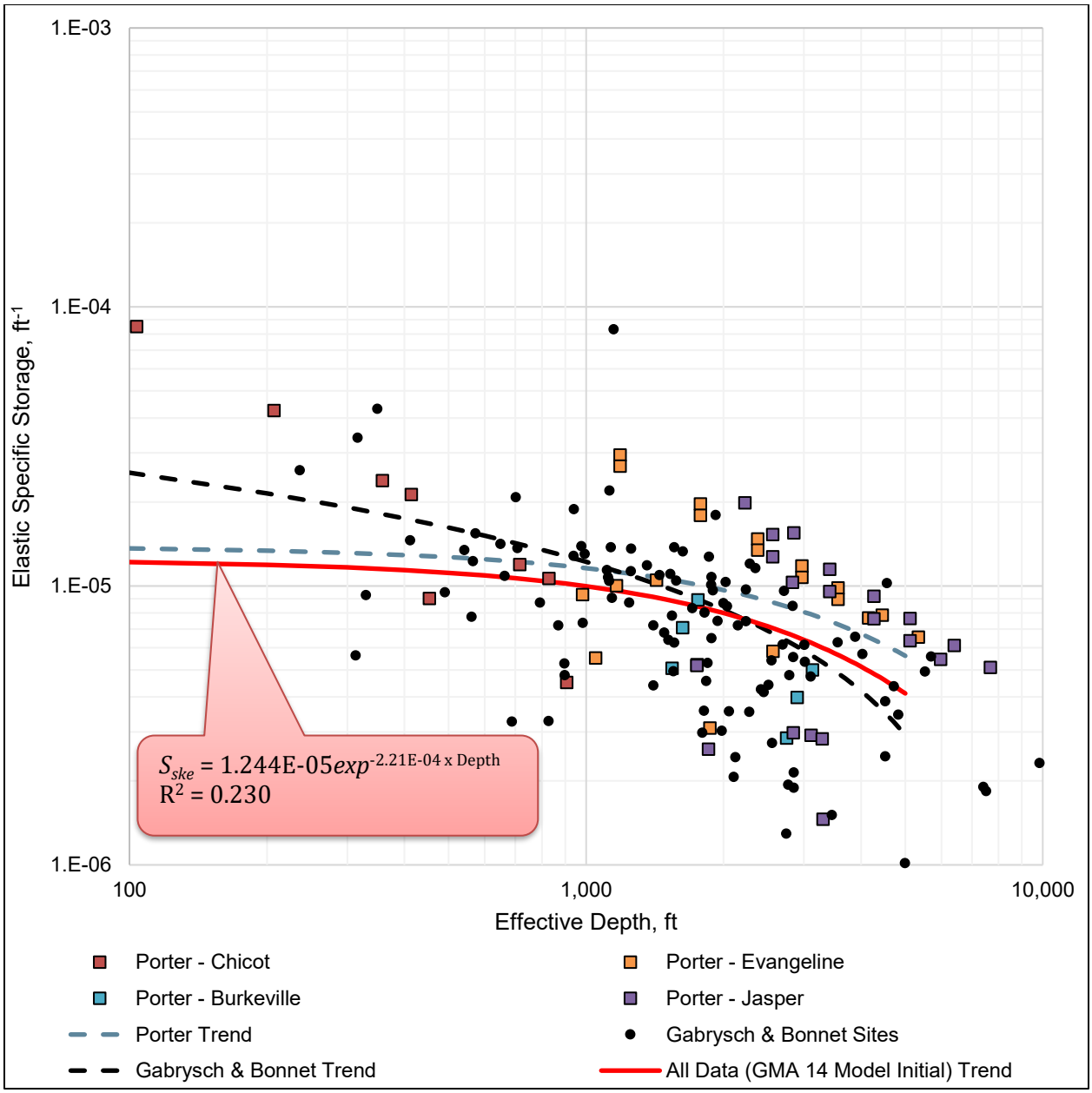

Figure 16. **Calculated elastic specific storage (S_{ske}) results from the compaction testing. Gabrysch & Bonnet trend from Keester and others (2022).**

2.3.2.5. Vertical Hydraulic Conductivity

The specific storage values of the clay beds control the amount of compaction that can occur under a given amount of stress. However, to determine the rate at which compaction occurs we also need to know the vertical hydraulic conductivity and thickness of the clay beds along with the specific storage.

The thickness and vertical hydraulic conductivity of individual clay beds affects the rate at which compaction may occur. When pumping from the aquifer occurs, water will preferentially move through the coarser-grained sediments (that is, sand) causing a pressure (that is, water level) decline. The decrease in pressure within the coarser-grained sediment layers creates a pressure gradient between the coarser-grained sediment layers and the finer-grained (that is, clay) sediment layers. This pressure gradient causes water to move from the finer-grained sediment layers into the coarser-grained sediment layers resulting in a decrease in pressure (and increase in effective stress) within the finer-grained sediment layers.

The decrease in pressure in a finer-grained sediment layer occurs immediately at the interface between that layer and the coarser-grained sediment layer. The decrease in pressure in the finer-grained sediment layer then propagates toward the center of the layer. Assuming consistent hydraulic properties of the layer, as the thickness of the finer-grained sediment layer increases, the time it takes for the pressure decrease to propagate to the center of the layer also increases. The amount of time it takes for full compaction to occur can be expressed as a "time constant" in compaction calculations (Hoffman and others, 2003). The time constant (τ_0) in Equation 13 represents the amount of time at which about 93 percent of the ultimate clay bed compaction will occur.

$$\tau_0 = \frac{\left(\frac{b_0}{2}\right)^2 S_s}{K_v} \qquad \text{Eq. 13}$$

Where:

$b_0 = initial\ thickness\ of\ the\ clay\ bed$

$K_v = vertical\ hydraulic\ conductivity$

As illustrated in Figure 17, approximately 50 percent of the compaction occurs relatively rapidly (within about 20 percent of the time constant) and then gradually slows over time. To understand the timing of compaction, understanding the vertical hydraulic conductivity of compressible beds is necessary as relatively small variations can greatly affect the timing of compaction. For example, with K_v as the denominator in Equation13, with each order of magnitude decrease in value the timing for compaction increases 10 times.

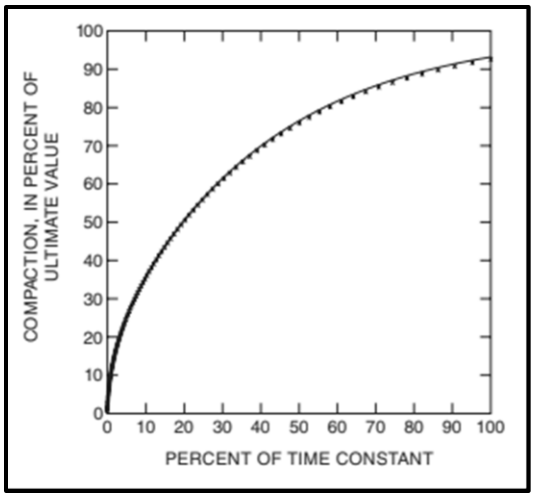

Figure 17. Illustration of compaction as a function of the compaction time constant. Reproduced from Hoffman and others (2003).

Kelley and others (2018) developed a model of vertical hydraulic conductivity with depth based on their analysis of data from Gabrysch and Bonnet (1974). To provide a lower bound on their vertical hydraulic conductivity estimates, Kelley and others (2018) also developed a depth dependent model using parameters from PRESS models (Espey, Huston, and Associates, Inc., 1982) which simulate one-dimensional compaction at sites across the Houston area.

Results from the Porter Site core analyses indicated the vertical hydraulic conductivity is generally lower than the Gabrysch and Bonnet (1974) data. The best fit trend line through the Porter Site data is an order of magnitude less than trend through the Gabrysch and Bonnet (1974) data. Figure 18 illustrates the data collected from core samples along with the trends.

The PRESS model (Espey, Huston, and Associates, Inc., 1982) input values were lower than most data points. Several of the results at greater effective depth were lower than the Porter Trend as some sample results are much higher than many of the data points. Testing narratives suggest some samples have microfractures which are allowing water to flow faster through the sample than the clay would allow, and the results are indicative of those microfractures rather than the material permeability. Nonetheless, as there are relatively few sites for the region, we used the best fit trend line through all of the data to develop a depth-dependent vertical hydraulic conductivity equation:

$$K_v = 8.774 \times 10^{-6} exp^{-7.71 \times 10^{-4} Z} \quad \text{Eq. 14}$$

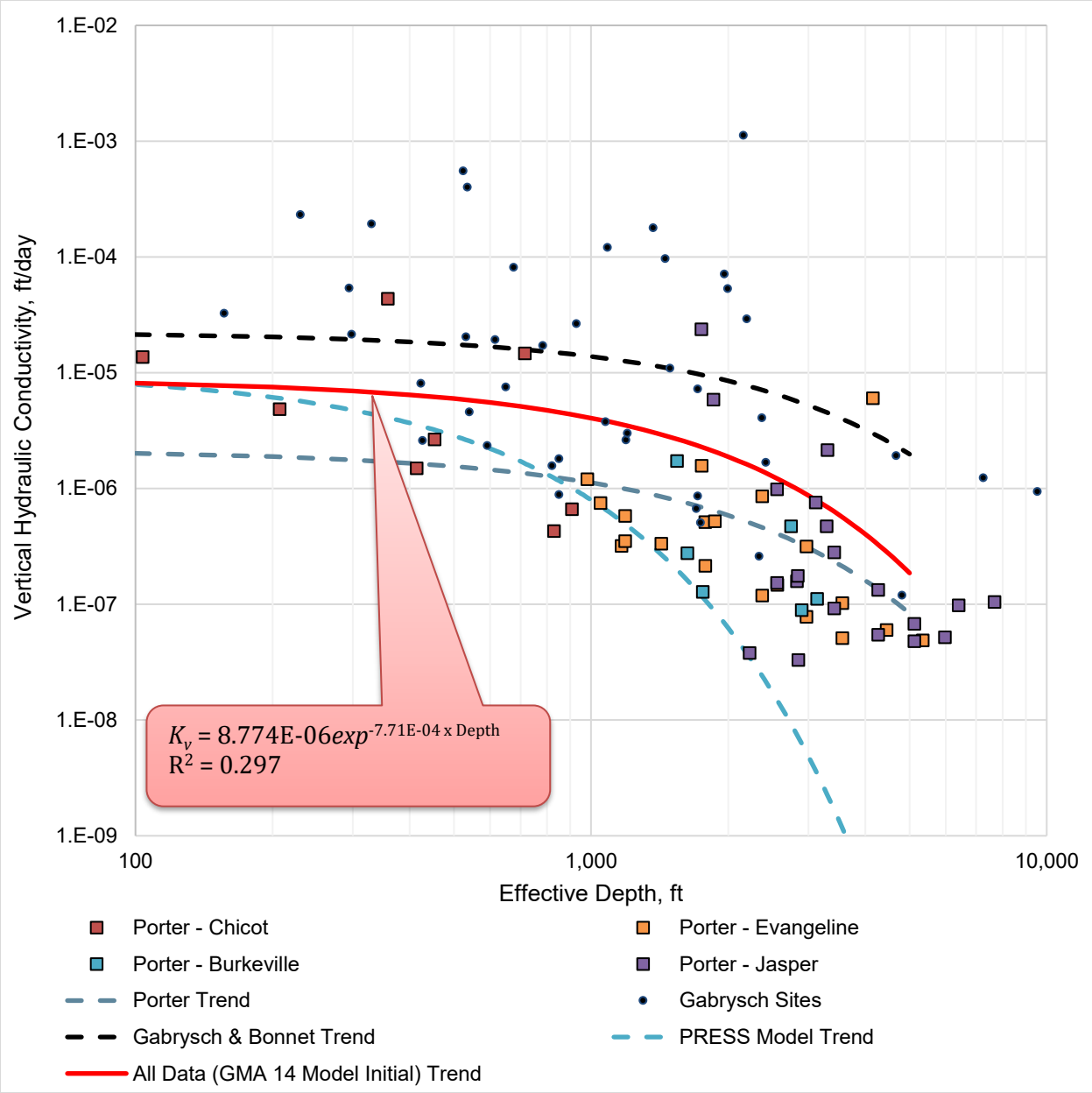

Figure 18. Vertical hydraulic conductivity results from the compaction testing. Gabrysch & Bonnet trend from Keester and others (2022).

3. Model Overview and Packages

We based the numerical model on GULF-2023 (Ellis and others, 2023) and conceptual model updates outlined in Section 2. We used the MODFLOW 6 code (Langevin and others, 2017) for the GMA 14 model. MODFLOW 6 is the latest version of the MODFLOW code developed by the U.S. Geological Survey and was originally released in 2017. The current version is MODFLOW 6.6.1 released on February 10, 2025 (Langevin and others, 2025).

A model developed using the MODFLOW 6 code consists of a combination of files that each provide information to a MODFLOW package. Each package represents a component of the groundwater flow system or output from the model. Table 6 lists the packages corresponding to file names utilized for the GMA 14 Model.

There are two Name (NAM) files for the GMA 14 Model. One NAM file is associated with simulation files that include information on the solver and time discretization. The other NAM file is for the model input and output files. Upon execution, MODFLOW 6 reads the *mfsim.nam* file to obtain the type of model, the timing of the model, and how the model is solved. In Table 6, these files are listed under the *Simulation Files* section. The *mfsim.nam* file points to the *gma14.nam* file which lists the other *Model Input Files* that define the GMA 14 Model. The GMA 14 Model provides model results as the following *Model Output Files*:

- Cell-by-Cell flows (“CBB”), which contains water budget information for each model cell per stress period
- Heads (“HDS”), which contains water levels for each model cell per stress period
- Listing (“LST”), which contains model run characteristics and water budget summaries

Along with the matrix head output file, we also used the Observation (“OBS6”) utility to output head results at specific model cells for use in our calibration processes. The following sections describe the files used in the GMA 14 Model.

Table 6. Summary of MODFLOW input files.

Package Name	File Type	Input Filename
Simulation Files		
Name	NAM	mfsim.nam
Time Discretization	TDIS	gma14.tdis
Iterative Model Solution	IMS	gma14.ims
Model Input Files		
Name	NAM	gma14.nam
Initial Conditions	IC	gma14.ic
Discretization	DIS	gma14.dis
Node Property Flow	NPF	gma14.npf
Storage	STO	gma14.sto
Skeletal Storage, Compaction, and Subsidence	CSUB	gma14.csub
Well	WEL	gma14.wel
Well	WEL	gma14.irr
Drain	DRN	gma14.drn
General Head Boundary	GHB	gma14.ghb
Recharge	RCH	gma14_rch_oc.rcha
Recharge	RCH	gma14_rch_sc.rcha
River	RIV	gma14.riv
Output Control	OC	gma14.oc
Observations	OBS	gma14.obs
Model Output Files		
Cell-by-Cell Flows	CBB	gma14.cbb
Heads	HDS	gma14.hds
List	LST	gma14.lst

3.1. Discretization Packages

Discretization refers to how the model domain is divided spatially and how time is represented in the model

3.1.1. Time Discretization

The Temporal Discretization ("TDIS") Package contains information on how time is represented in the model. The package defines the model's time units, how the total time is divided into discrete stress periods, the length of stress periods, and how each stress period is divided into time steps. Like GULF-2023, the GMA 14 Model has time units of days, starts on December 31, 1896, and continues to December 31, 2018. However, GULF-2023 used several monthly stress periods whereas the GMA 14 Model does not have any stress periods of less than one year. By eliminating the monthly stress periods, we reduced the total stress periods from 268 in GULF-2023 to a total of 59 stress periods for the history matching period.

Table 7 summarizes the details of each stress period. The first stress period is steady state to represent predevelopment conditions. The remaining stress periods are transient representing multiple years up until 1970. Starting in 1970, each stress period has a length of one year.

Table 7. Time Discretization Summary.

Stress Period	Length, days	Stress Period Start Date	Stress Period End Date	Type
1	1	12/31/1896	12/31/1896	Steady State
2	5,477	1/1/1897	12/31/1911	Transient
3	5,114	1/1/1912	12/31/1925	Transient
4	5,113	1/1/1926	12/31/1939	Transient
5	1,827	1/1/1940	12/31/1944	Transient
6	1,826	1/1/1945	12/31/1949	Transient
7	1,826	1/1/1950	12/31/1954	Transient
8	1,826	1/1/1955	12/31/1959	Transient
9	1,827	1/1/1960	12/31/1964	Transient
10	1,826	1/1/1965	12/31/1969	Transient
11	365	1/1/1970	12/31/1970	Transient
12	365	1/1/1971	12/31/1971	Transient
13	366	1/1/1972	12/31/1972	Transient
14	365	1/1/1973	12/31/1973	Transient
15	365	1/1/1974	12/31/1974	Transient
16	365	1/1/1975	12/31/1975	Transient
17	366	1/1/1976	12/31/1976	Transient
18	365	1/1/1977	12/31/1977	Transient
19	365	1/1/1978	12/31/1978	Transient

Stress Period	Length, days	Stress Period Start Date	Stress Period End Date	Type
20	365	1/1/1979	12/31/1979	Transient
21	366	1/1/1980	12/31/1980	Transient
22	365	1/1/1981	12/31/1981	Transient
23	365	1/1/1982	12/31/1982	Transient
24	365	1/1/1983	12/31/1983	Transient
25	366	1/1/1984	12/31/1984	Transient
26	365	1/1/1985	12/31/1985	Transient
27	365	1/1/1986	12/31/1986	Transient
28	365	1/1/1987	12/31/1987	Transient
29	366	1/1/1988	12/31/1988	Transient
30	365	1/1/1989	12/31/1989	Transient
31	365	1/1/1990	12/31/1990	Transient
32	365	1/1/1991	12/31/1991	Transient
33	366	1/1/1992	12/31/1992	Transient
34	365	1/1/1993	12/31/1993	Transient
35	365	1/1/1994	12/31/1994	Transient
36	365	1/1/1995	12/31/1995	Transient
37	366	1/1/1996	12/31/1996	Transient
38	365	1/1/1997	12/31/1997	Transient
39	365	1/1/1998	12/31/1998	Transient
40	365	1/1/1999	12/31/1999	Transient
41	366	1/1/2000	12/31/2000	Transient
42	365	1/1/2001	12/31/2001	Transient
43	365	1/1/2002	12/31/2002	Transient
44	365	1/1/2003	12/31/2003	Transient
45	366	1/1/2004	12/31/2004	Transient
46	365	1/1/2005	12/31/2005	Transient
47	365	1/1/2006	12/31/2006	Transient
48	365	1/1/2007	12/31/2007	Transient
49	366	1/1/2008	12/31/2008	Transient
50	365	1/1/2009	12/31/2009	Transient
51	365	1/1/2010	12/31/2010	Transient
52	365	1/1/2011	12/31/2011	Transient
53	366	1/1/2012	12/31/2012	Transient
54	365	1/1/2013	12/31/2013	Transient
55	365	1/1/2014	12/31/2014	Transient
56	365	1/1/2015	12/31/2015	Transient
57	366	1/1/2016	12/31/2016	Transient
58	365	1/1/2017	12/31/2017	Transient
59	365	1/1/2018	12/31/2018	Transient

3.1.2. Grid Discretization

The Grid Discretization ("DIS") package defines the spatial structure of the model grid. The GMA 14 Model is a structured grid that contains 6 layers, 350 rows, and 380 columns. The lower left corner of the model grid is located at TWDB GAM coordinate system 5,770,658 easting and 18,581,706 northing. Table 8 summarizes the representative hydrogeological unit for each model layer. Figures 19 through 24 show the active cells for each model layer.

Table 8. Model layers and corresponding hydrogeologic unit.

Model Layer	Hydrogeologic Unit
1	Shallow Aquifer System
2	Chicot Aquifer
3	Evangeline Aquifer
4	Burkeville Confining System
5	Jasper Aquifer
6	Catahoula Aquifer

We developed the GMA 14 Model grid starting with the GULF-2023 grid. We reprojected the grid to the TWDB GAM coordinate system (EPSG 10481) from NAD83 Conus Albers (EPSG 5070). The reprojection of the GULF-2023 grid to the TWDB GAM system resulted in an offset and rotation of the grid. To ensure the center of the GMA 14 Model grid cells were within the GULF-2023 grid cells, we adjusted the cell row lengths and rotated the grid. The cell row lengths for the GMA 14 Model now vary from 3,276 feet to 3,293 feet while keeping a constant column length of 3,277 feet with a rotation of 2.1 degrees. The adjustments ensured all GMA 14 Model active cell centers stayed within the corresponding GULF-2023 model cells.

Layer elevations are consistent with GULF-2023 as described by Ellis and others (2023). Figure 25 illustrates the layering of the Gulf Coast Aquifer System within the GMA 14 Model. Figure 26 shows the cross-section locations.

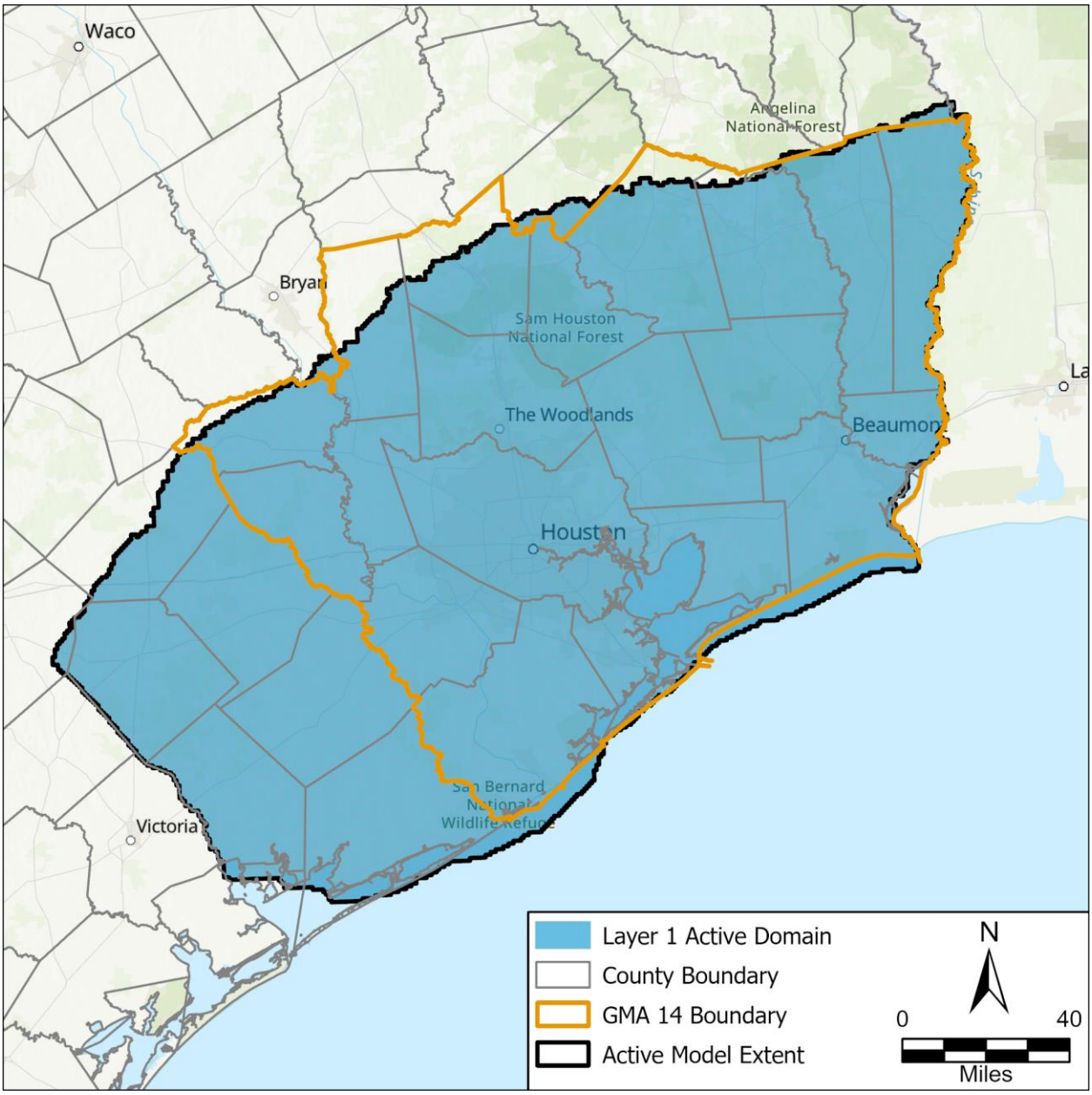

Figure 19. Layer 1 (shallow aquifer system) active model cells.

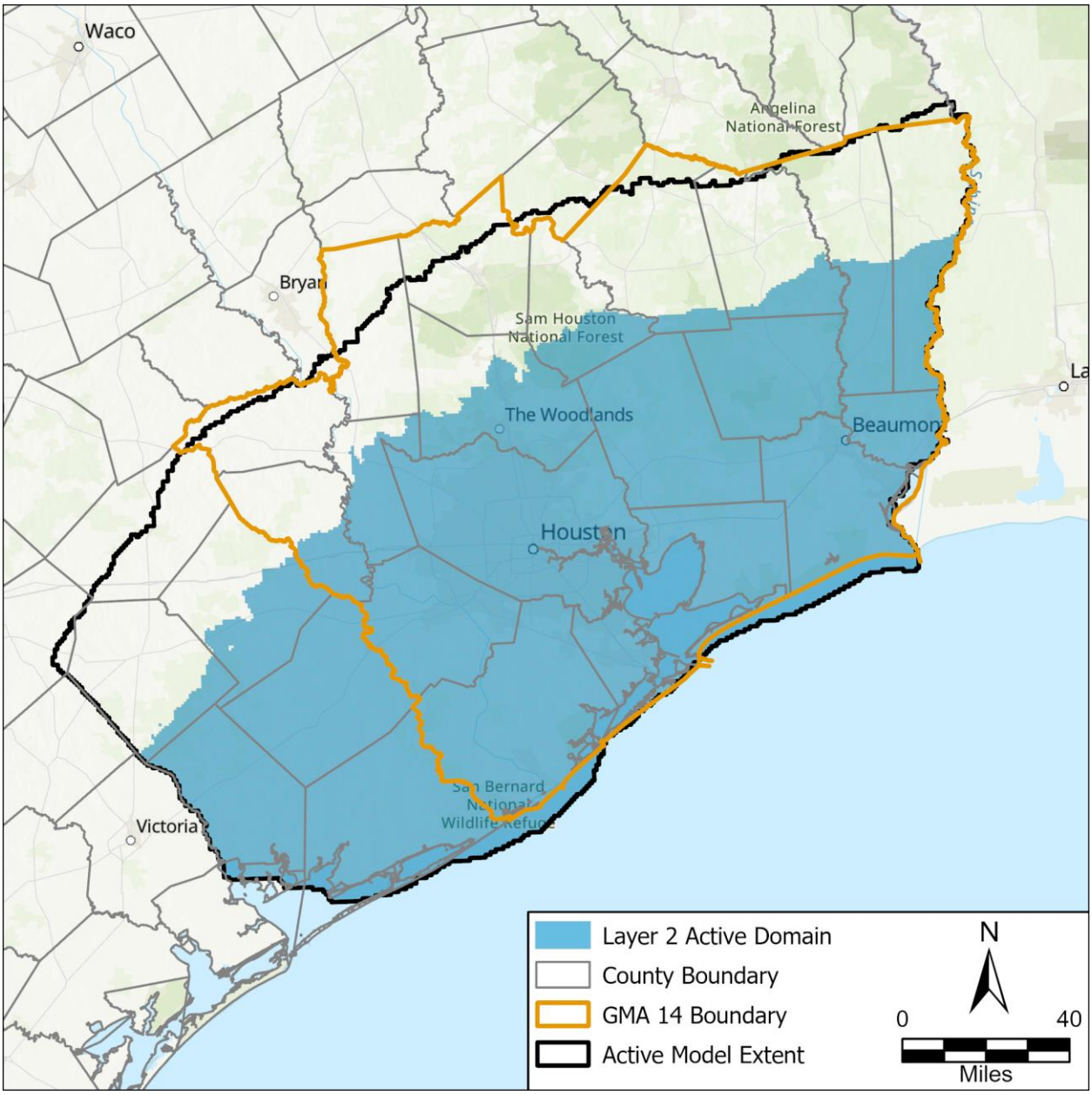

Figure 20. Layer 2 (Chicot Aquifer) active model cells.

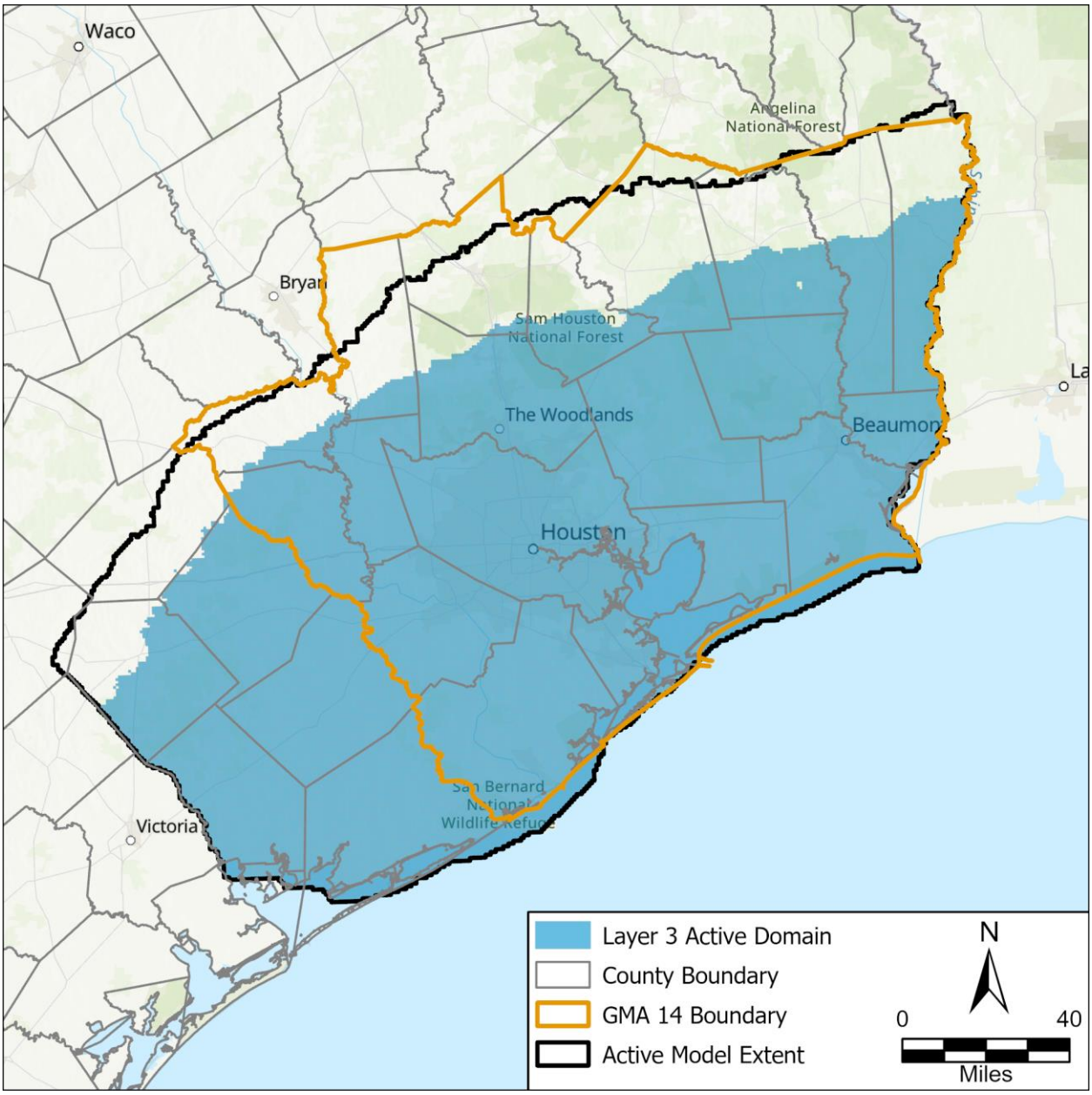

Figure 21. Layer 3 (Evangeline Aquifer) active model cells.

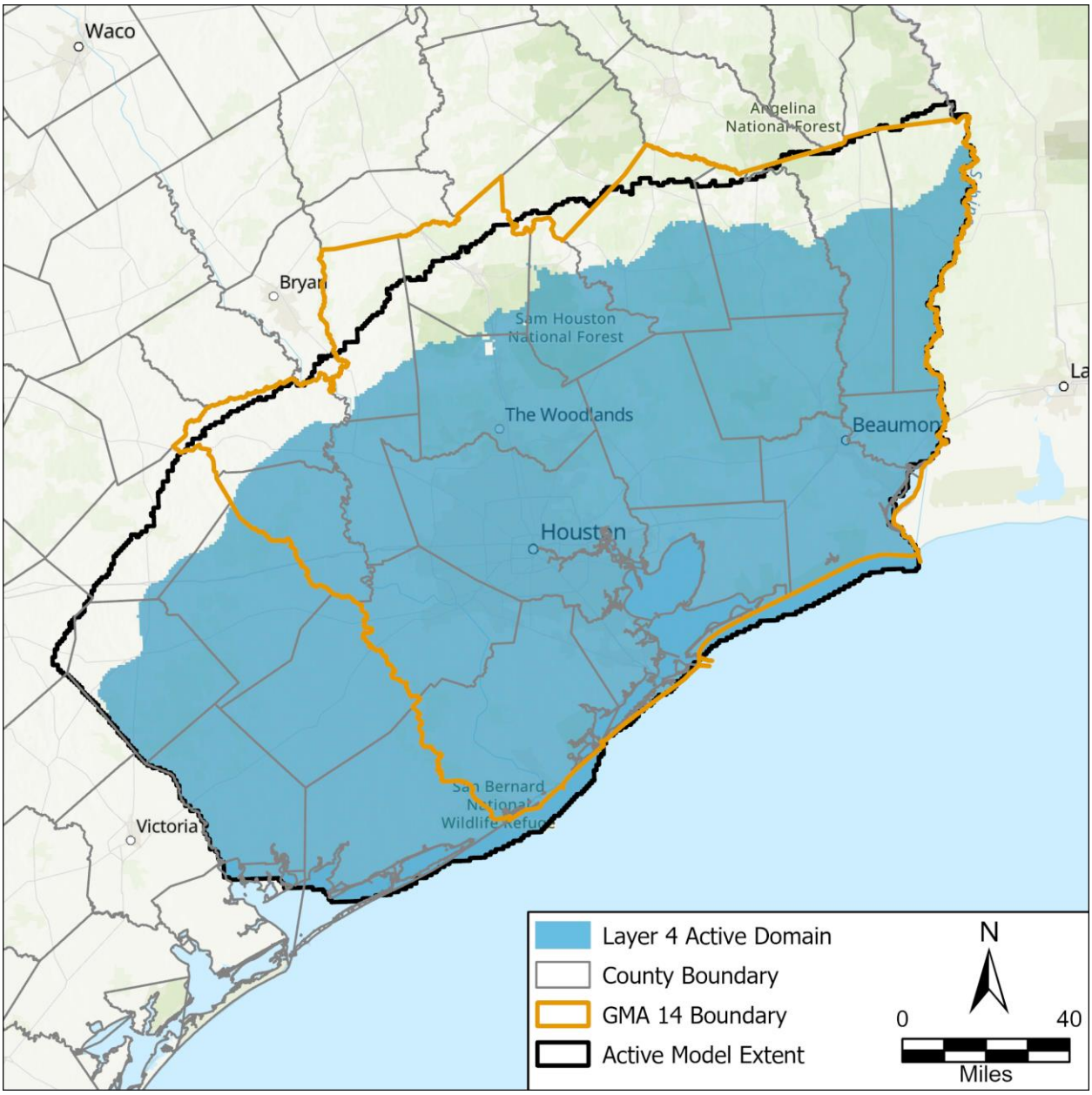

Figure 22. Layer 4 (Burkeville) active model cells.

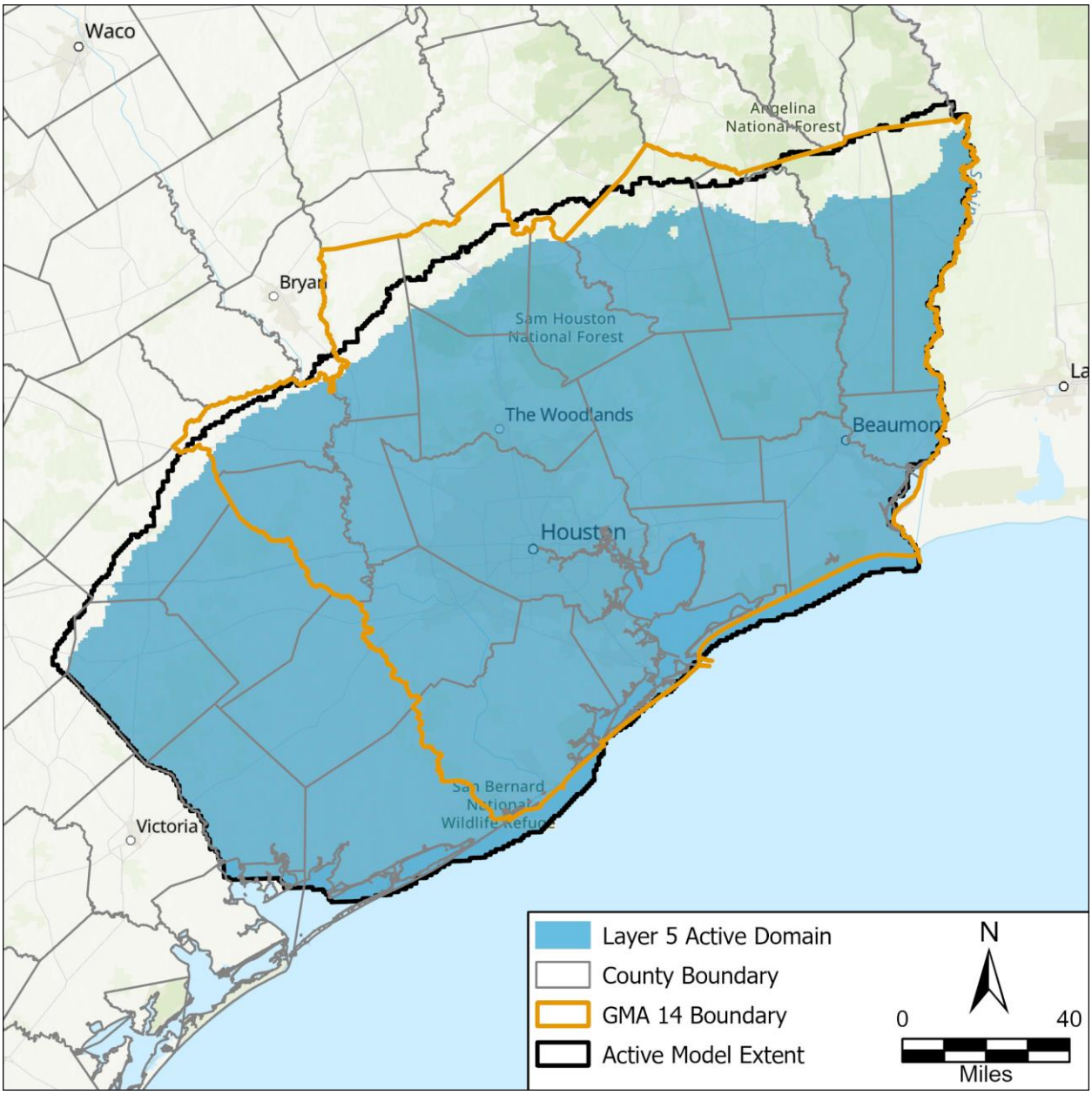

Figure 23. Layer 5 (Jasper Aquifer) active model cells.

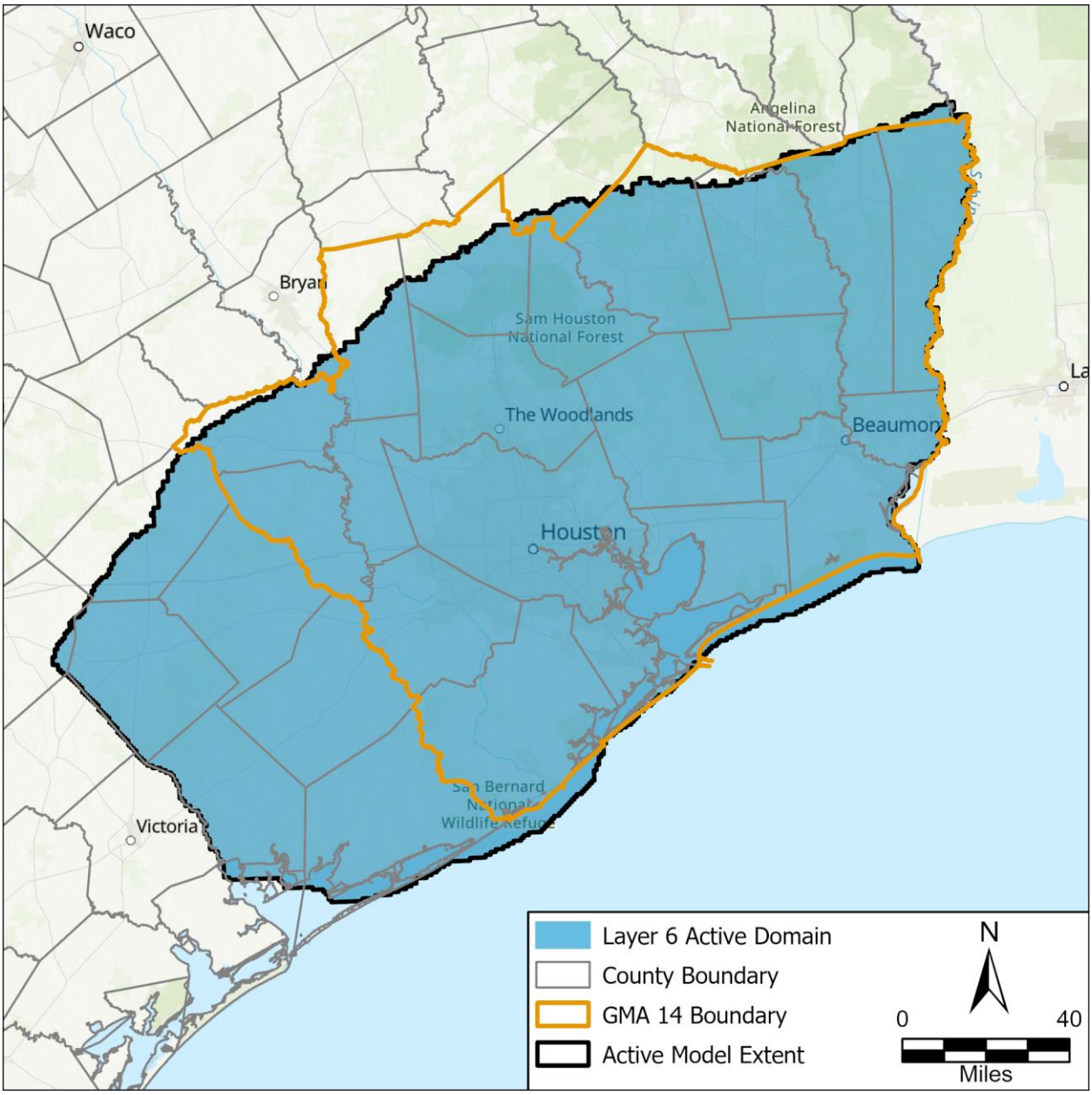

Figure 24. Layer 6 (Catahoula Aquifer) active model cells.

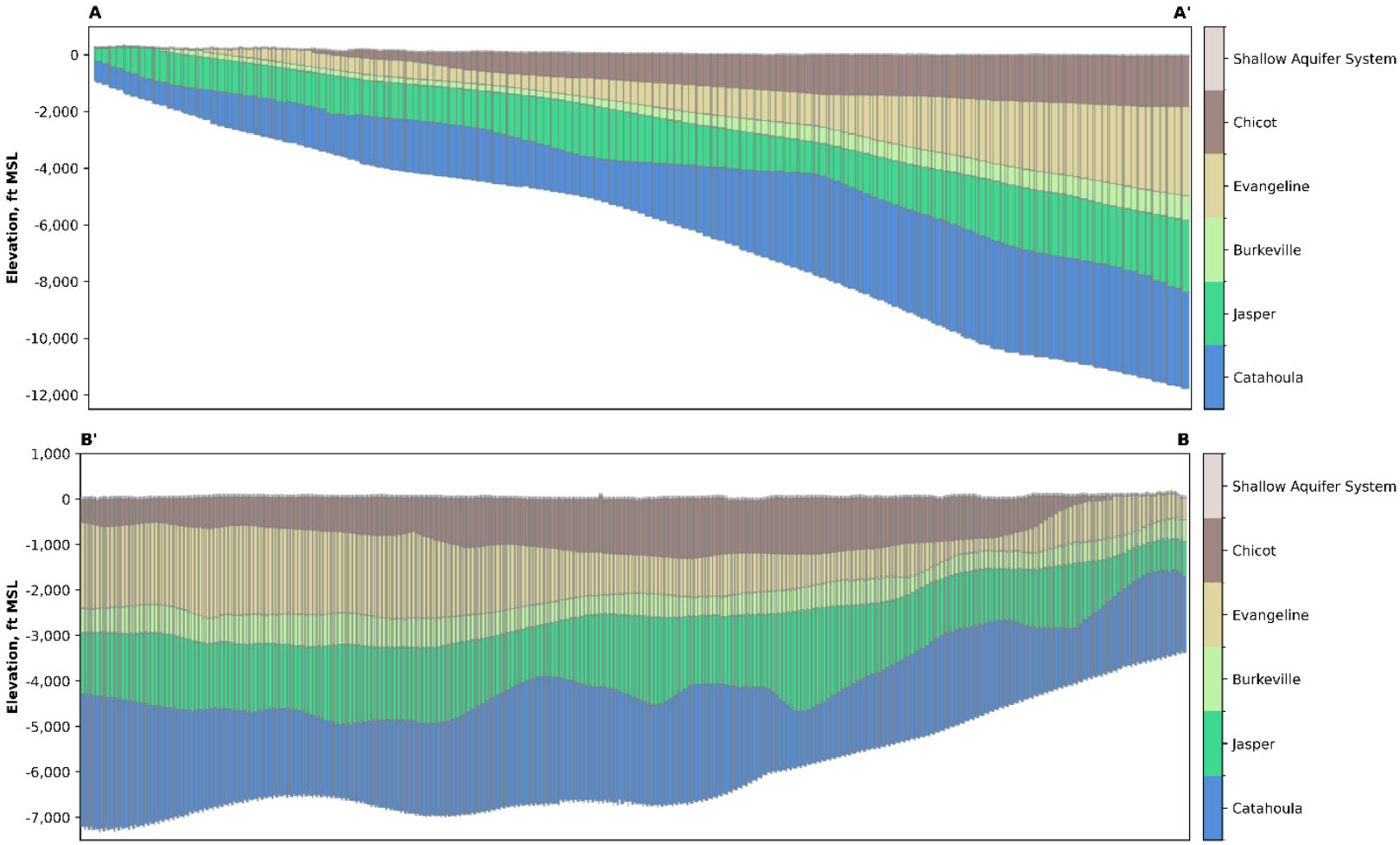

Figure 25. Model grid cross sections. Location of cross sections shown on Figure 26.

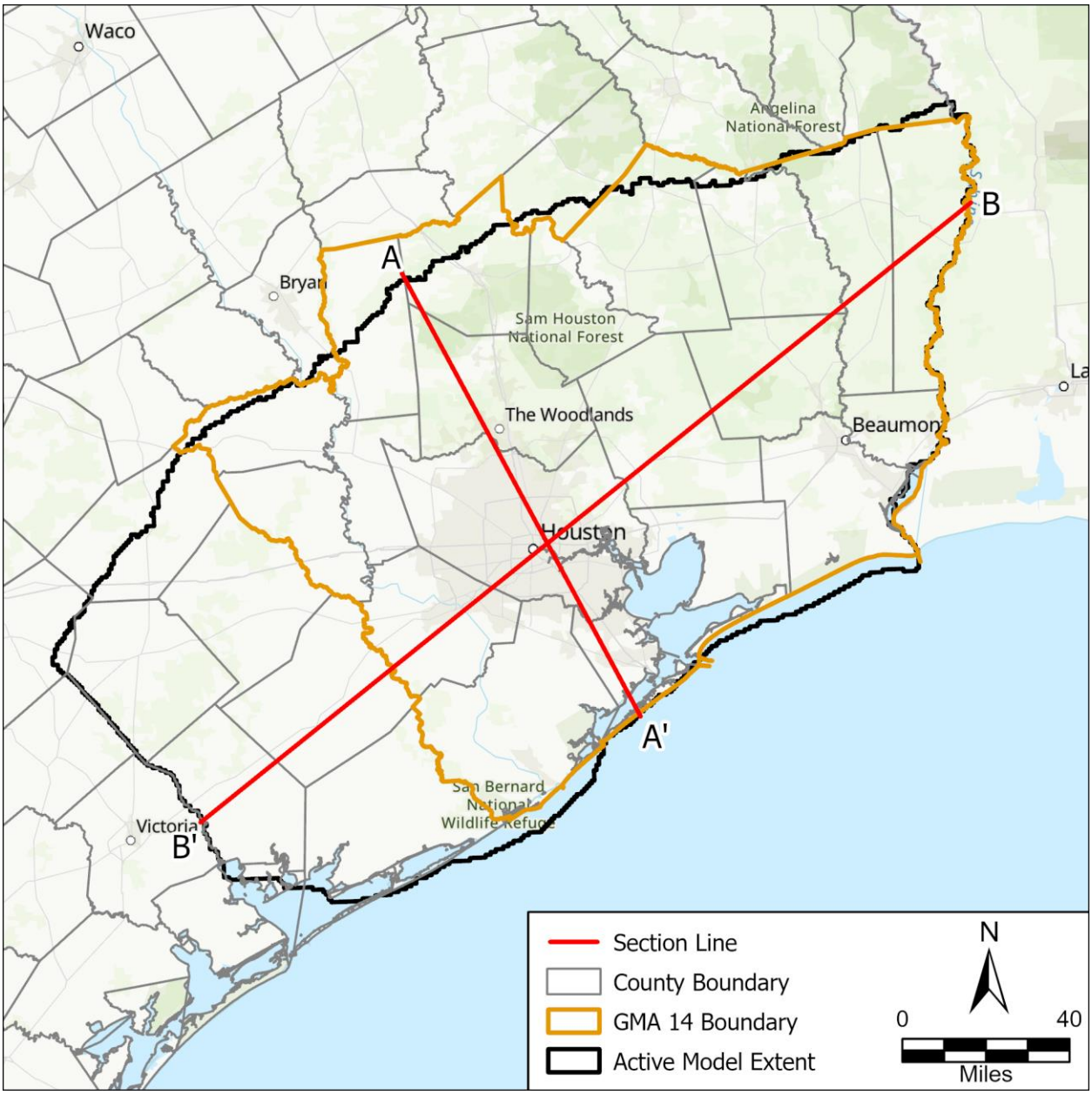

Figure 26. Sections lines for cross sections in Figure 25.

3.2. Node Property Flow Package

The Node Property Flow ("NPF") package handles how groundwater moves through the model by calculating the hydraulic conductance between adjacent cells. The NPF package also specifies whether a cell is always confined or is convertible between confined and unconfined conditions. The NPF package also specifies values for the horizontal hydraulic conductivity and vertical hydraulic conductivity each model layer.

We specified the initial GMA 14 Model horizontal hydraulic conductivity parameterization based on pumping test data described in Section 2.1. We interpolated the transmissivity values across the model domain then divided the transmissivity by the model layer thickness to define the initial horizontal hydraulic conductivity. We selected this approach to honor the test data which represents how the aquifers are being used and where water level data are being collected. Comparison of measured and calibrated properties is in Section 4.1.3.

Our approach differs from Ellis and others (2023) who noted that the horizontal hydraulic conductivity values in GULF-2023 were consistent with reported values for the Gulf Coast Aquifer System. By focusing on the horizontal hydraulic conductivity values, GULF-2023 underrepresented the reported transmissivity of the aquifers (Drabek and Keester, 2023). One effect of underrepresenting the transmissivity is that the model will produce higher drawdown at pumping rates than would occur at the measured transmissivity. In some areas, the underrepresented transmissivity may have resulted in the reduced pumping rates during calibration as discussed in Section 2.2.1.

The vertical hydraulic conductivity represents the ease of flow between model layers. For sand layers in direct contact, the vertical hydraulic conductivity may be within an order of magnitude of the horizontal hydraulic conductivity. However, the Gulf Coast Aquifer System has several clay interbeds which inhibit vertical flow. Nonetheless, due to the lack of measured values we used the vertical hydraulic conductivity from GULF-2023 for the initial values of the GMA 14 Model.

3.3. Storage Package

The Storage ("STO") package governs how groundwater is stored and released in the model layer due to a change in water level by considering specific storage for confined conditions and specific yield for unconfined conditions. Since specific storage is defined in the compaction package, the specific storage within the STO package is not read by MODFLOW and therefore only the specific yield is defined. There are insufficient specific yield field measurements available to compare to initial model values. We used the values developed for GULF-2023 as our initial input for the GMA 14 Model.

3.4. Skeletal Storage, Compaction, and Subsidence Package

The Skeletal Storage, Compaction, and Subsidence ("CSUB") package simulates land subsidence caused by compaction due to groundwater extraction. It accounts for elastic and inelastic storage changes and calculates vertical displacement in response to groundwater level decline (Hughes and others, 2022). The CSUB package includes parameterization for both coarse grain and fine grained (that is, interbeds) material.

Each interbed is simulated as delay or no-delay. Simulating compaction using the no-delay approach results in the interbed head and groundwater flow cell head equilibrating instantaneously, which is often valid where the interbeds are close to the surface and thin, indicating the time it takes for the heads to equilibrate is less than the stress period length. The delay approach uses the vertical hydraulic conductivity of the interbed to allow the groundwater flow cell and interbed to equilibrate over a period of time (Hughes and others, 2022). We limited the number of interbeds simulated as no-delay to cells of the most updip limit where layer thickness and compaction was limited. Figures 27 through 30 show the cell designations for each layer with simulated interbeds. We were not able to use fewer no-delay interbeds due to an increase in numerical instability with the model for cells with relatively small saturated thicknesses.

For delay interbeds, CSUB calculates interbed thickness by multiplying the representative interbed thickness (CSUB data parameter: *thick_frac*) by the equivalent number of interbeds in the interbed system (CSUB data parameter: *rnb*). For no-delay interbeds, interbed clay thickness is only the *thick_frac* and *rnb* can be any value as it is not used in the calculation (USGS, 2025a). The values of *thick_frac* and *rnb* are equivalent to the b_{equiv} and n_{equiv} values, respectively, discussed by Hughes and others (2022).

GULF-2023 defined *thick_frac* and *rnb* values for all interbeds regardless of whether designated as delay or no-delay. As a result, no-delay interbeds were about three to four times thinner than the clay thickness should be. This mistake in parameterization is understandable, but the effect of the error makes prediction of compaction and subsidence unrealistic where no-delay beds are present.

For the GMA 14 Model, since GULF-2023 provided *thick_frac* and *rnb* for all interbeds, we kept the delay interbed cells consistent with GULF-2023 values. However, for the GMA 14 Model no-delay interbeds, we determined *thick_frac* by multiplying the GULF-2023 *thick_frac* and *rnb* values. We then set the GMA 14 Model *rnb* value to 1.0. Figures 31 through 34 illustrate the interbed (clay) thicknesses for each model layer with simulated interbeds. Figures 35 through 38 illustrate the representative number of interbeds for each model layer with simulated interbeds.

To parameterize the depth dependent interbed compaction parameters (namely, inelastic specific storage, elastic specific storage, porosity, and vertical hydraulic conductivity), we used the depth to the cell center from the top of the model along with the depth-dependent equations described in Section 2.3.

Preconsolidation stress is essentially the amount of change in effective stress before inelastic compaction begins to occur. Ellis and others (2023)conceptualized the preconsolidation stress as linearly decreasing with depth. The preconsolidation stress is 75 feet at the surface and decreases to 0 feet at a depth of 870 feet as measured from the top of the model to the middle of the cell. The initial parameterization of the GMA 14 Model CSUB package uses the same conceptualization as GULF-2023 (Ellis and others, 2023).

The CSUB package also defines the coarse grain specific storage and porosity parameters. For the GMA 14 Model initial parameters, we used the values from GULF-2023.

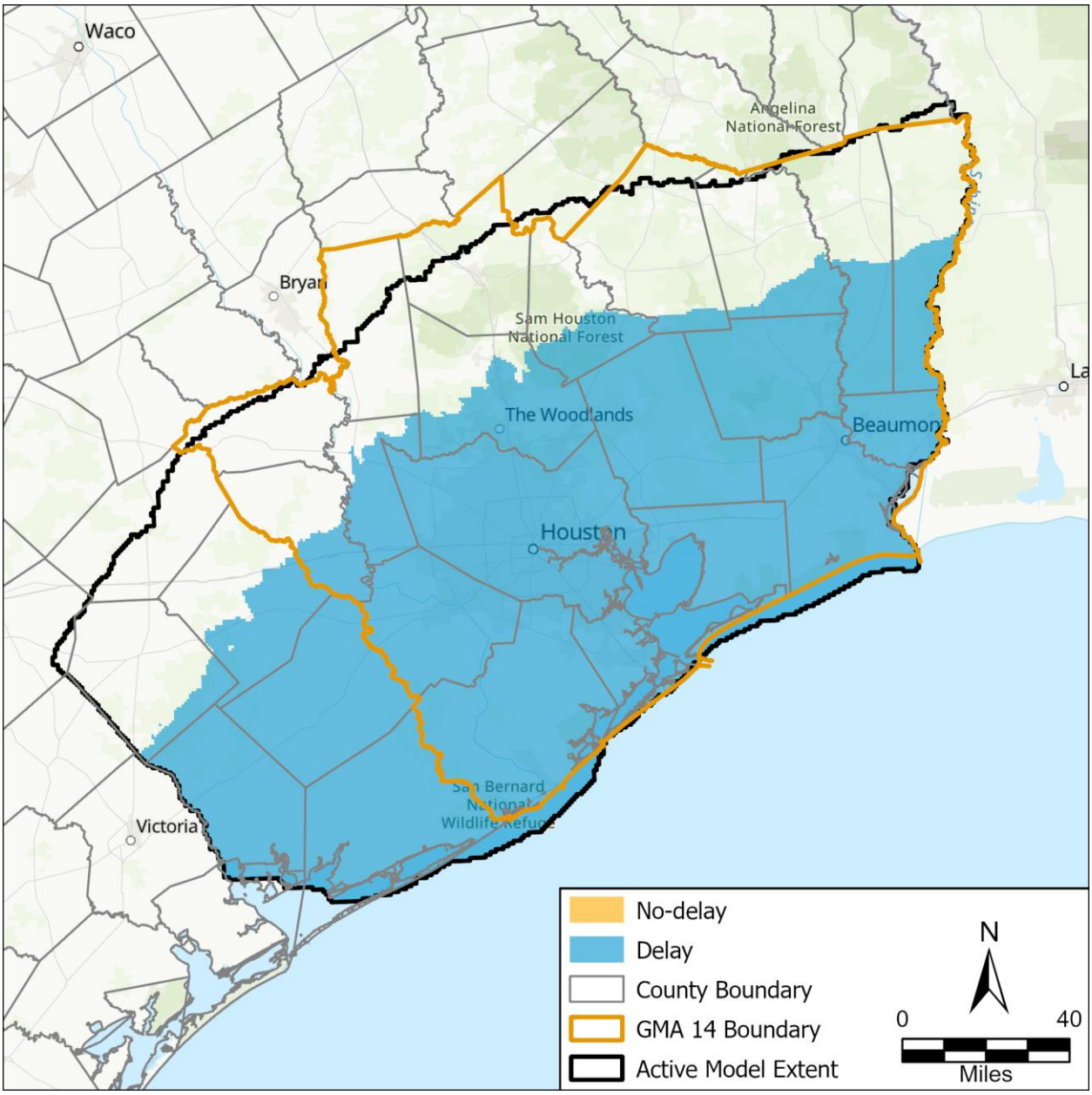

Figure 27. Interbed delay designations for Layer 2 (Chicot Aquifer).

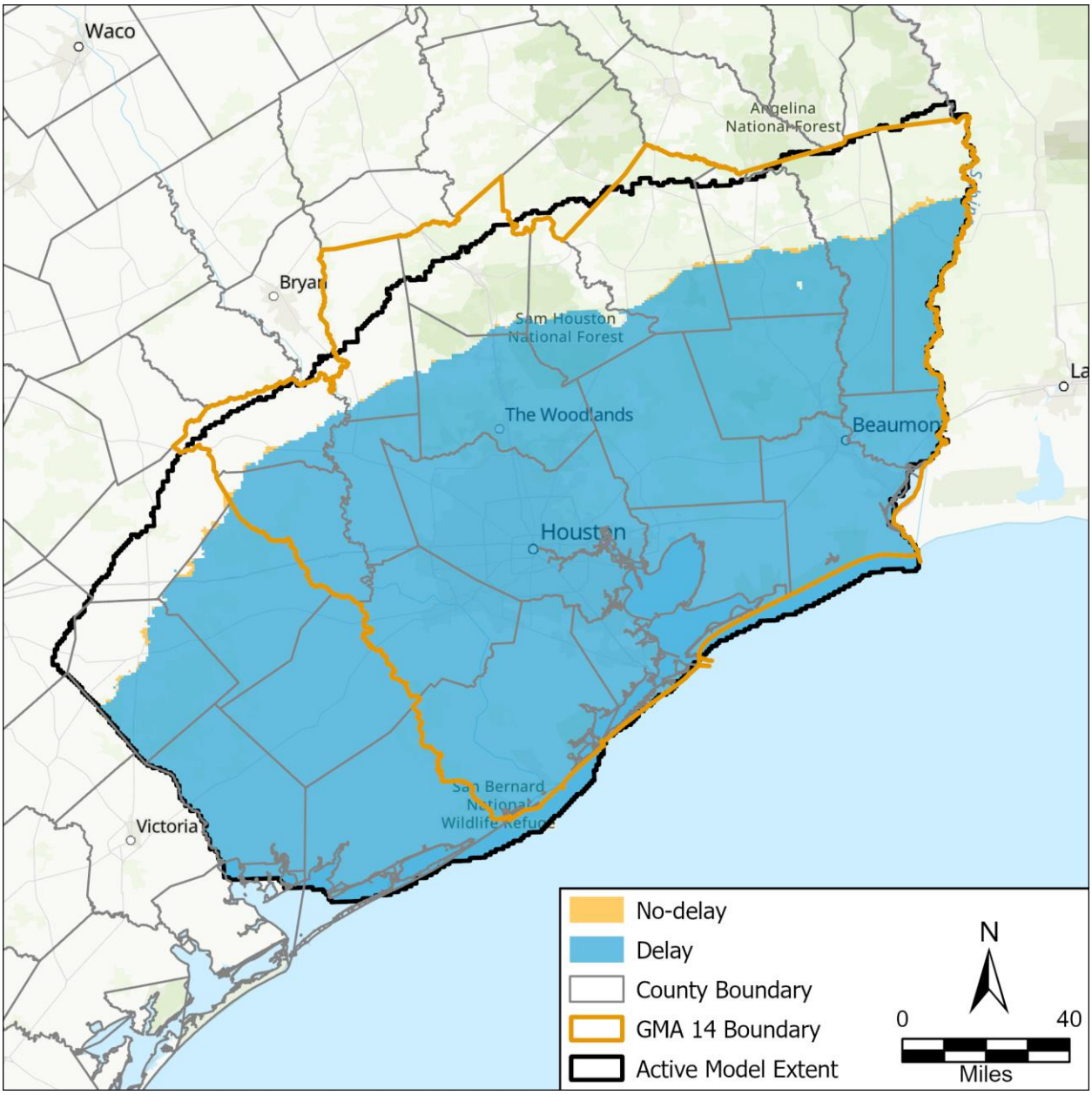

Figure 28. Interbed delay designations for Layer 3 (Evangeline Aquifer).

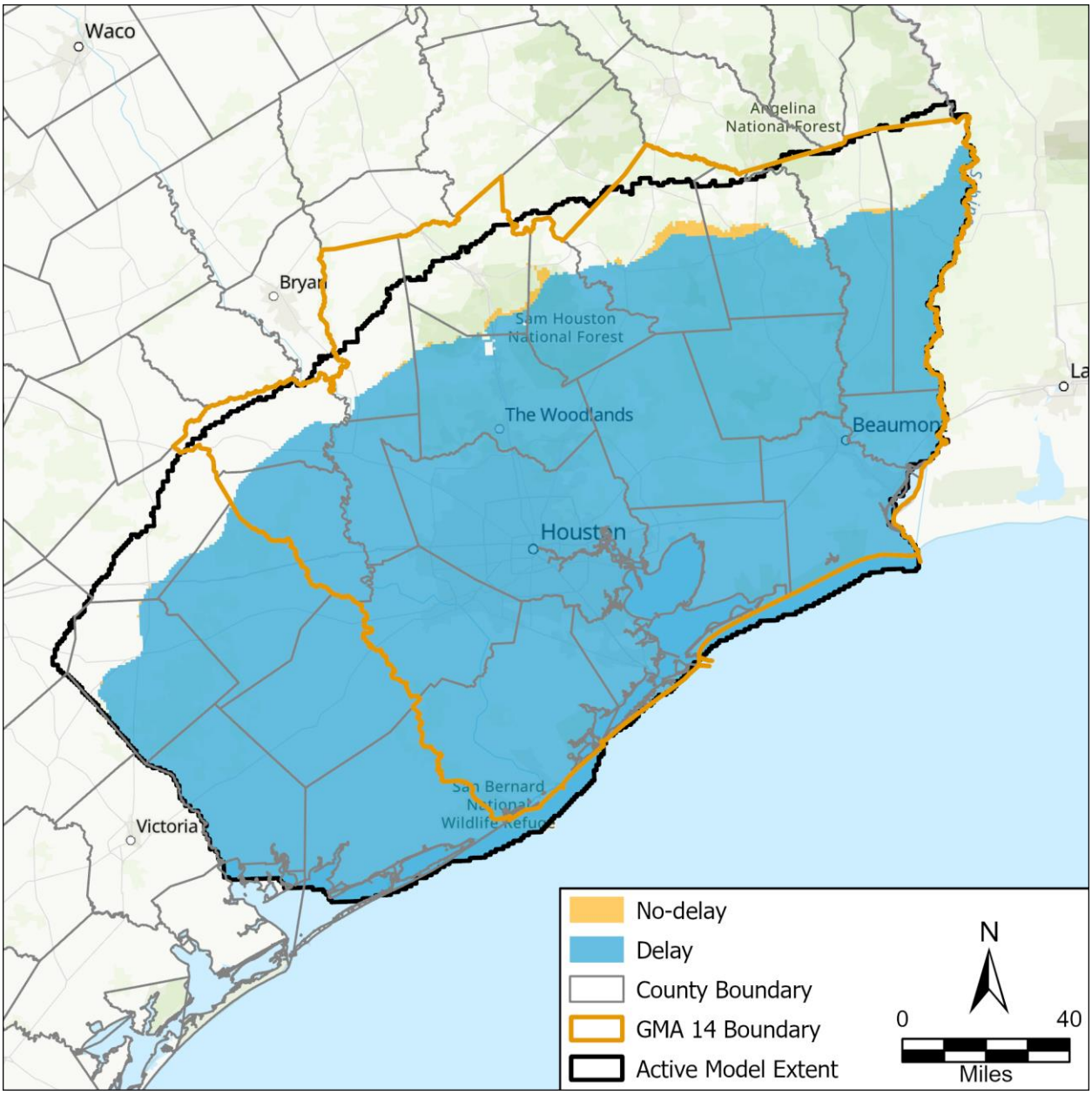

Figure 29. Interbed delay designations for Layer 4 (Burkeville).

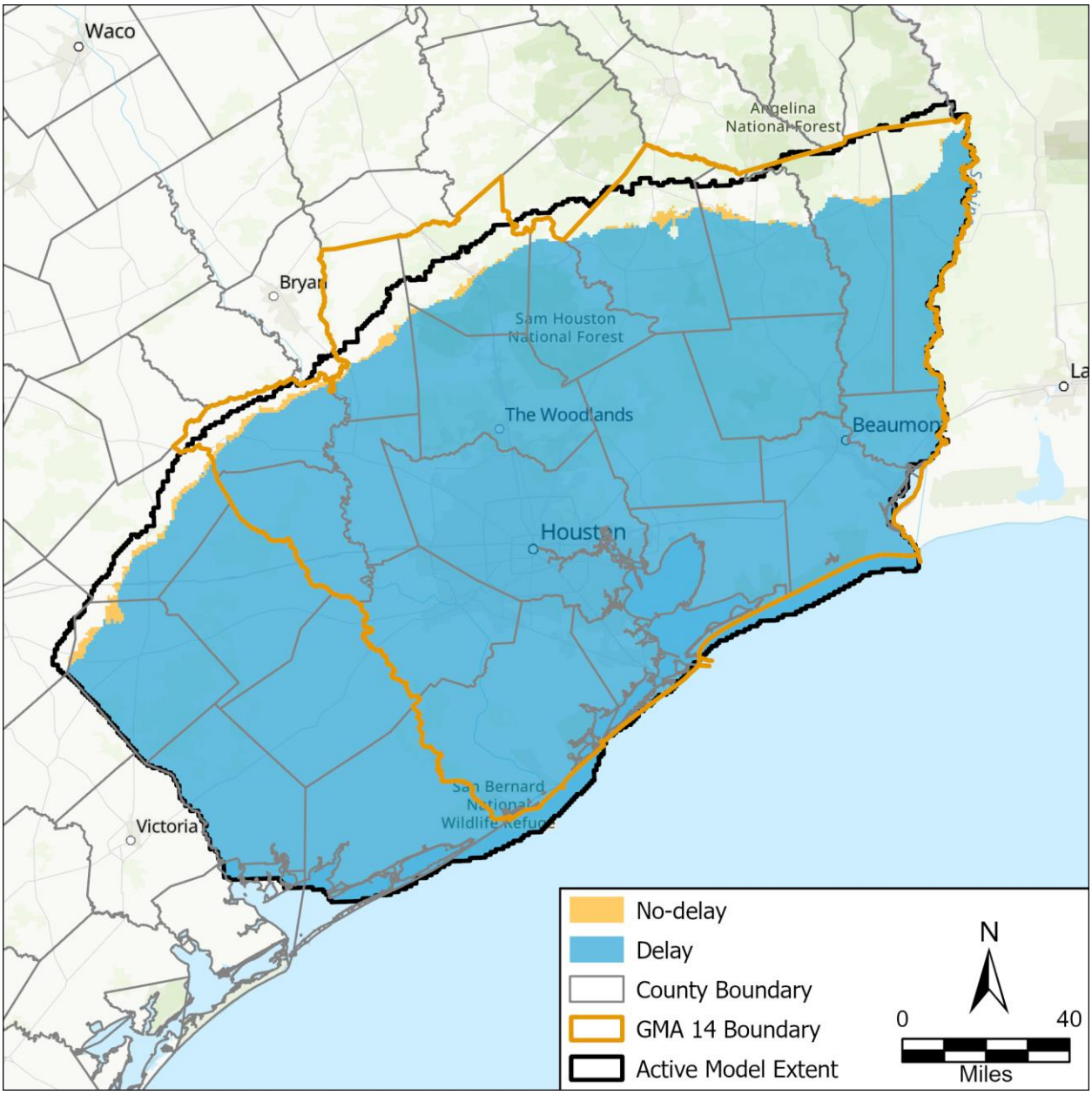

Figure 30. Interbed delay designations for Layer 5 (Jasper Aquifer).

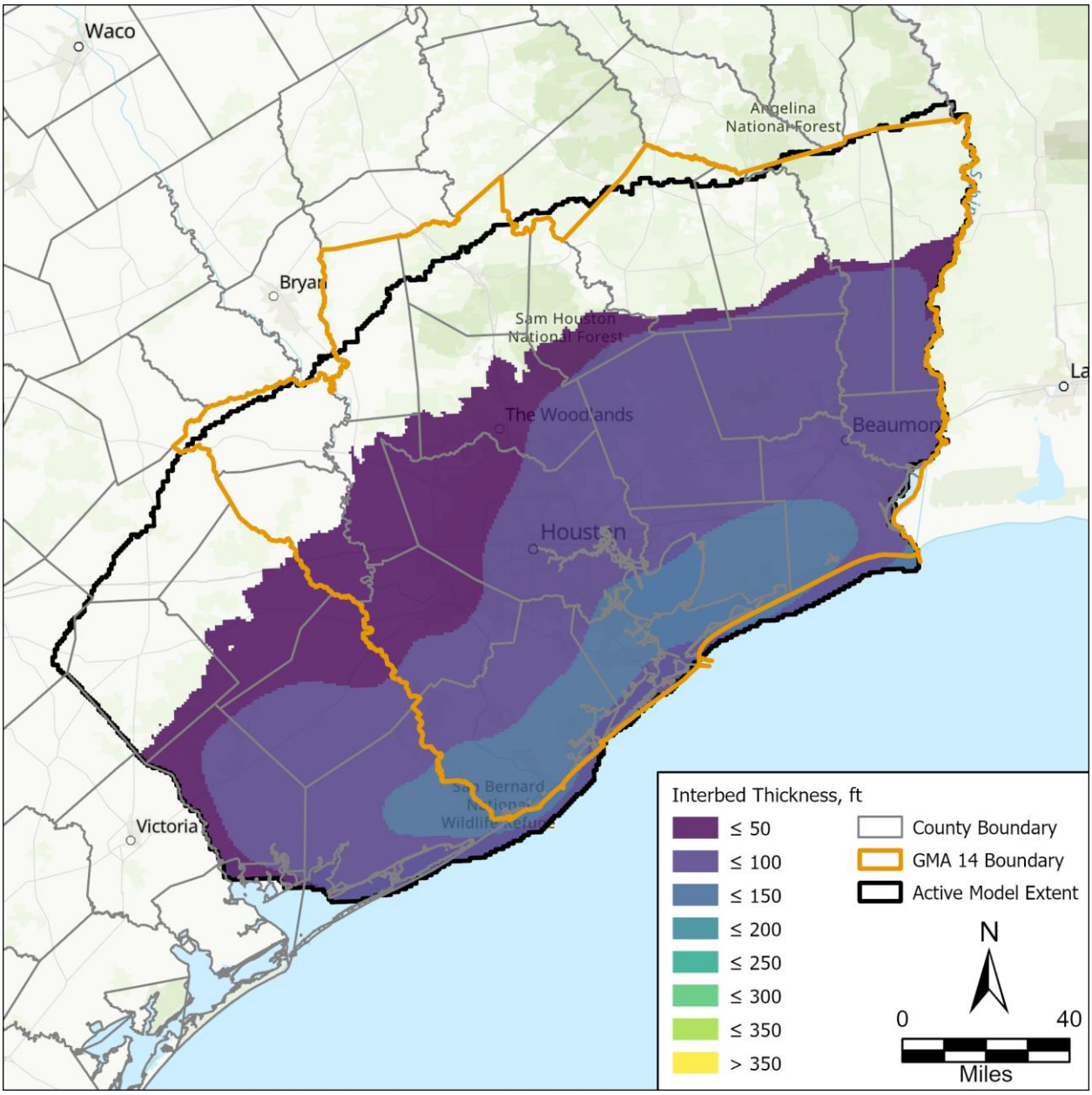

Figure 31. Interbed thickness values for Layer 2 (Chicot Aquifer).

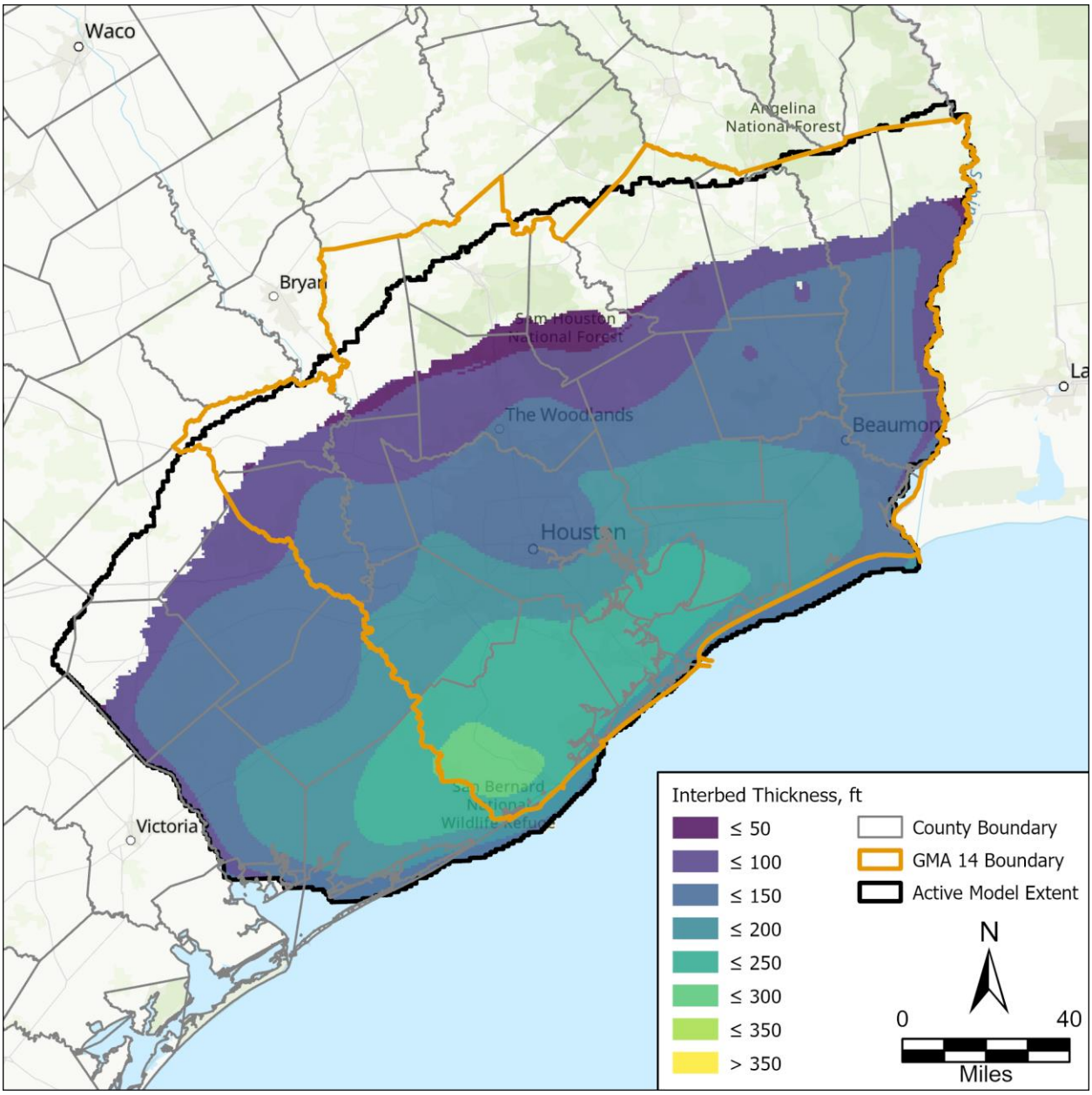

Figure 32. Interbed thickness values for Layer 3 (Evangeline Aquifer).

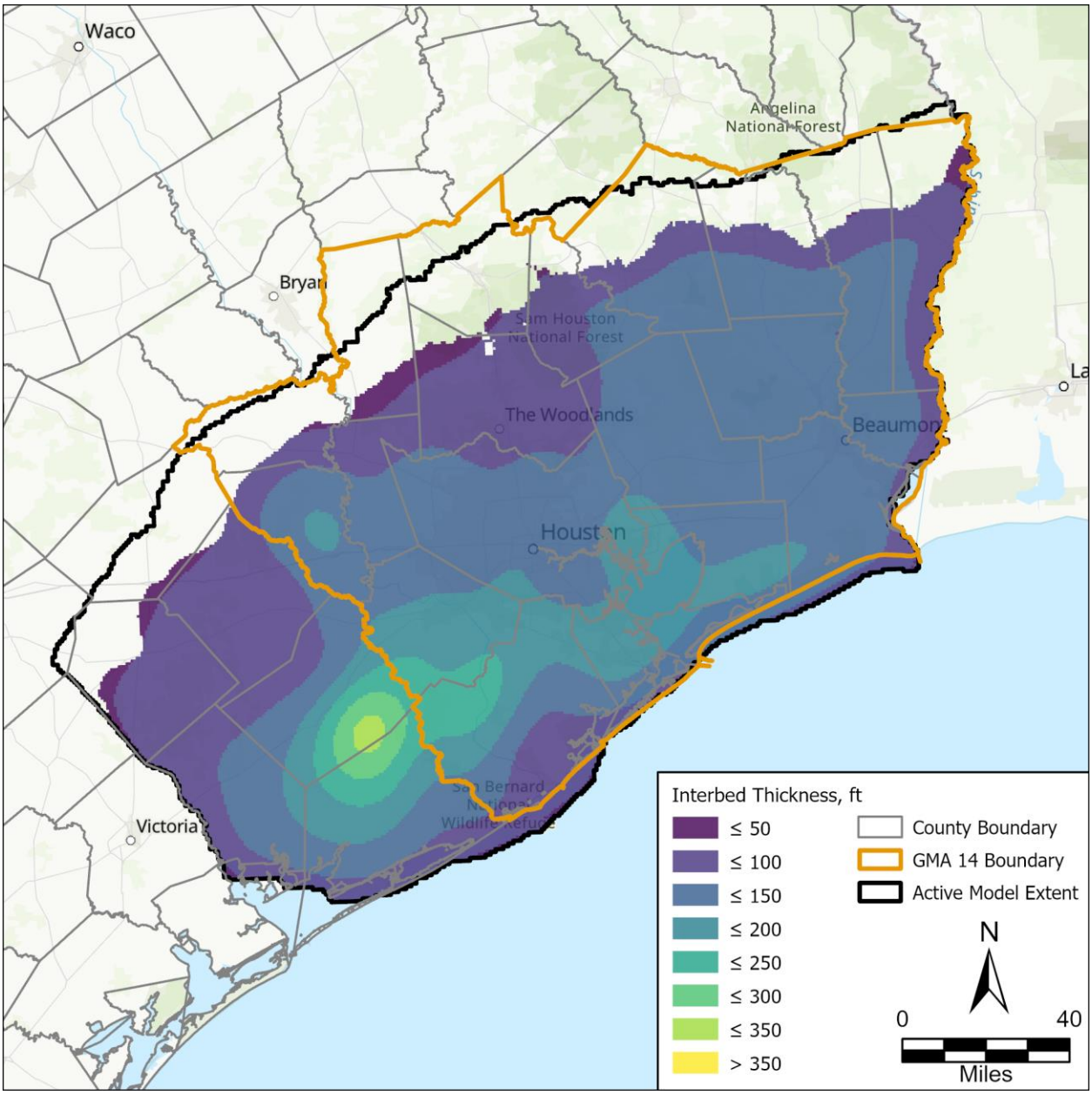

Figure 33. Interbed thickness values for Layer 4 (Burkeville).

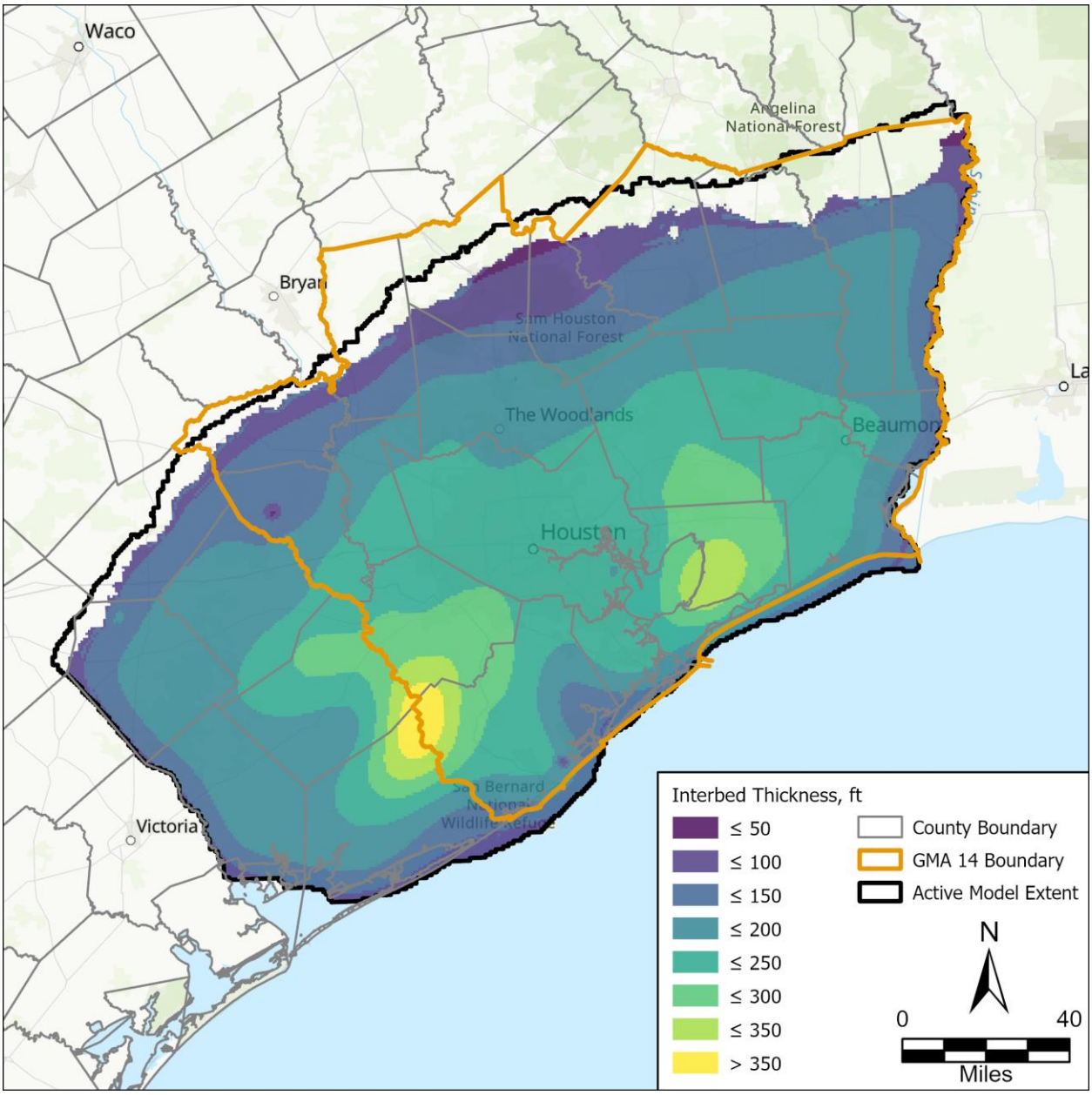

Figure 34. Interbed thickness values for Layer 5 (Jasper Aquifer).

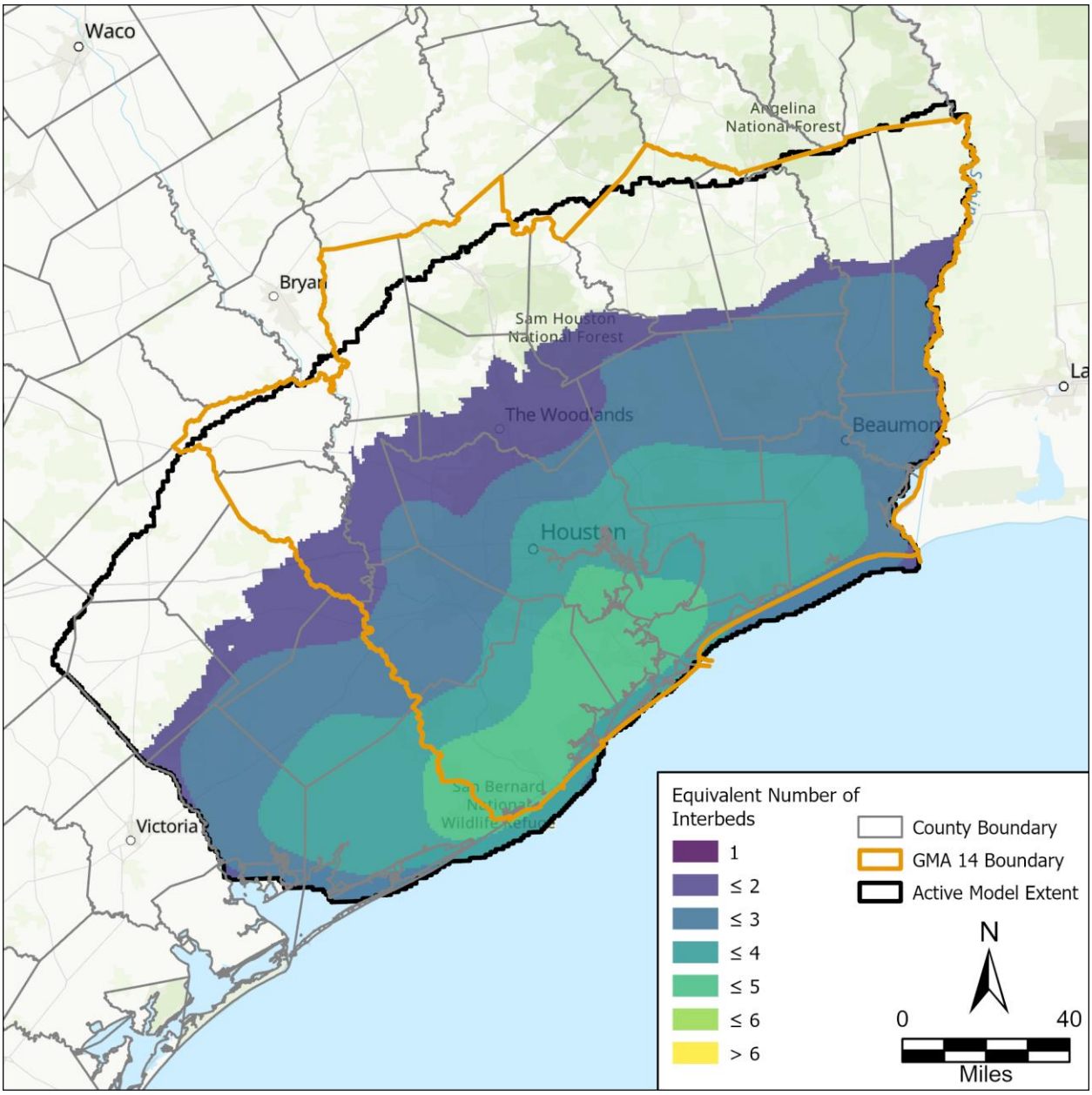

Figure 35. Equivalent number of interbeds for Layer 2 (Chicot Aquifer).

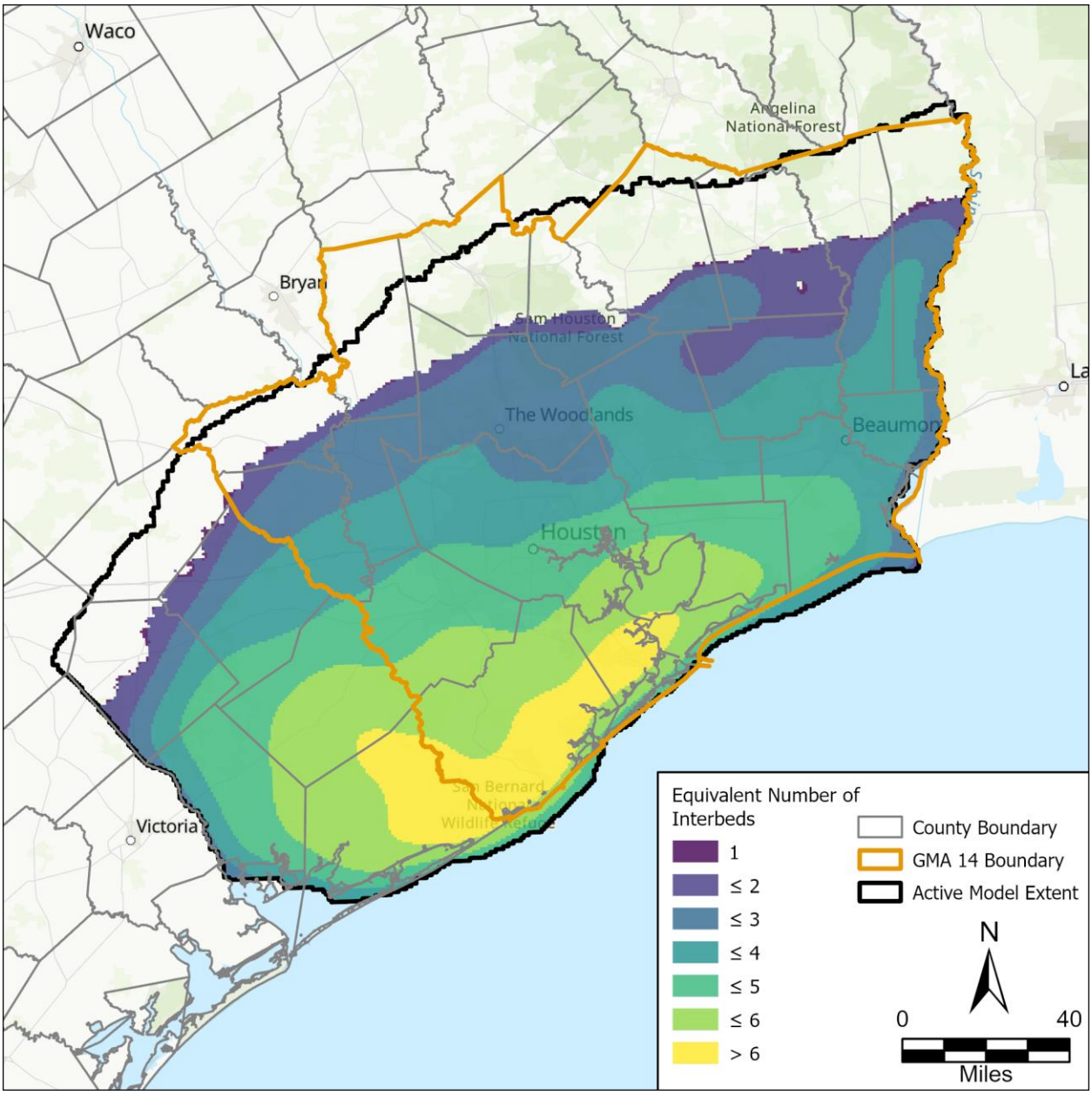

Figure 36. Equivalent number of interbeds for Layer 3 (Evangeline Aquifer).

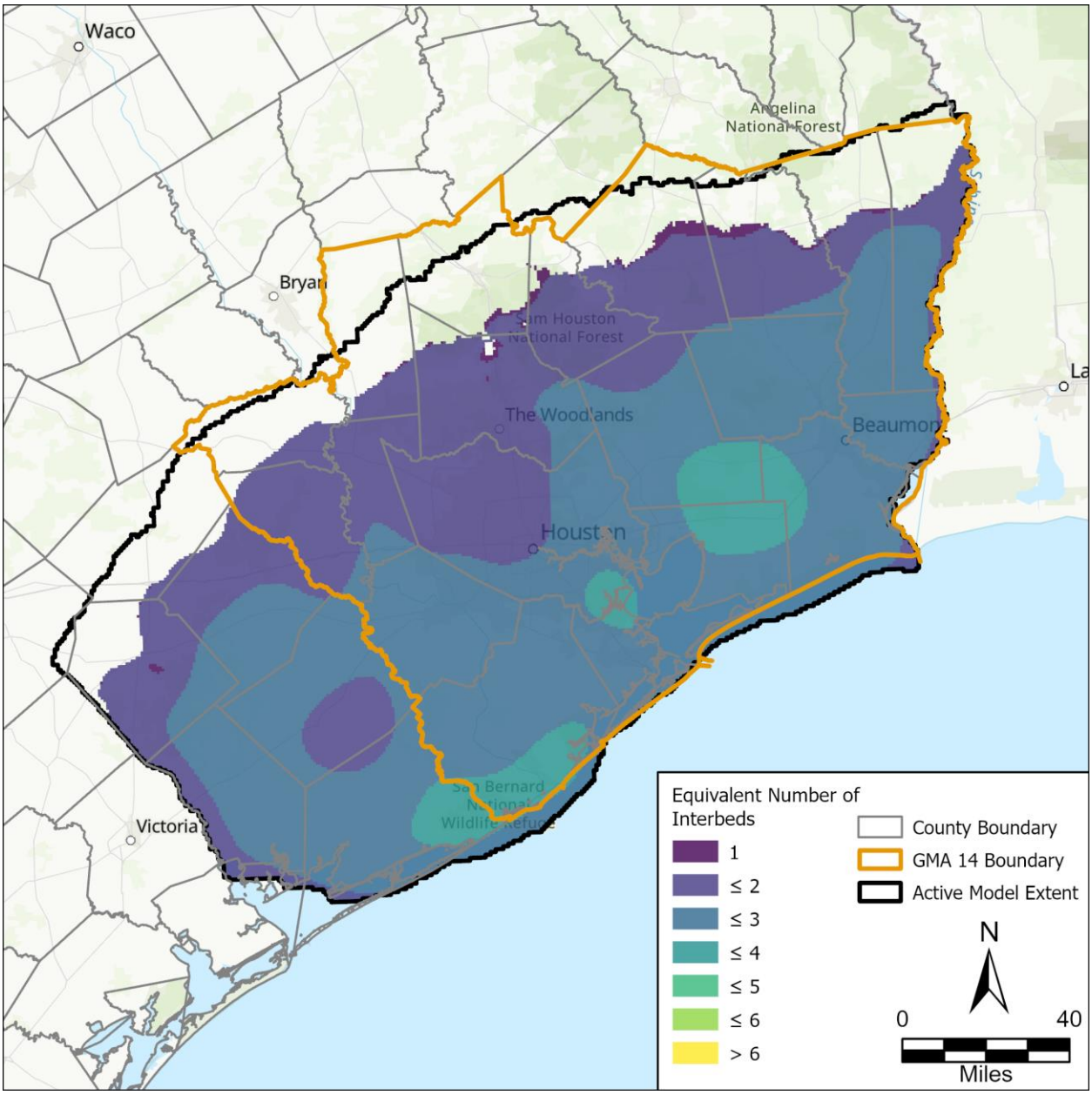

Figure 37. Equivalent number of interbeds for Layer 4 (Burkeville).

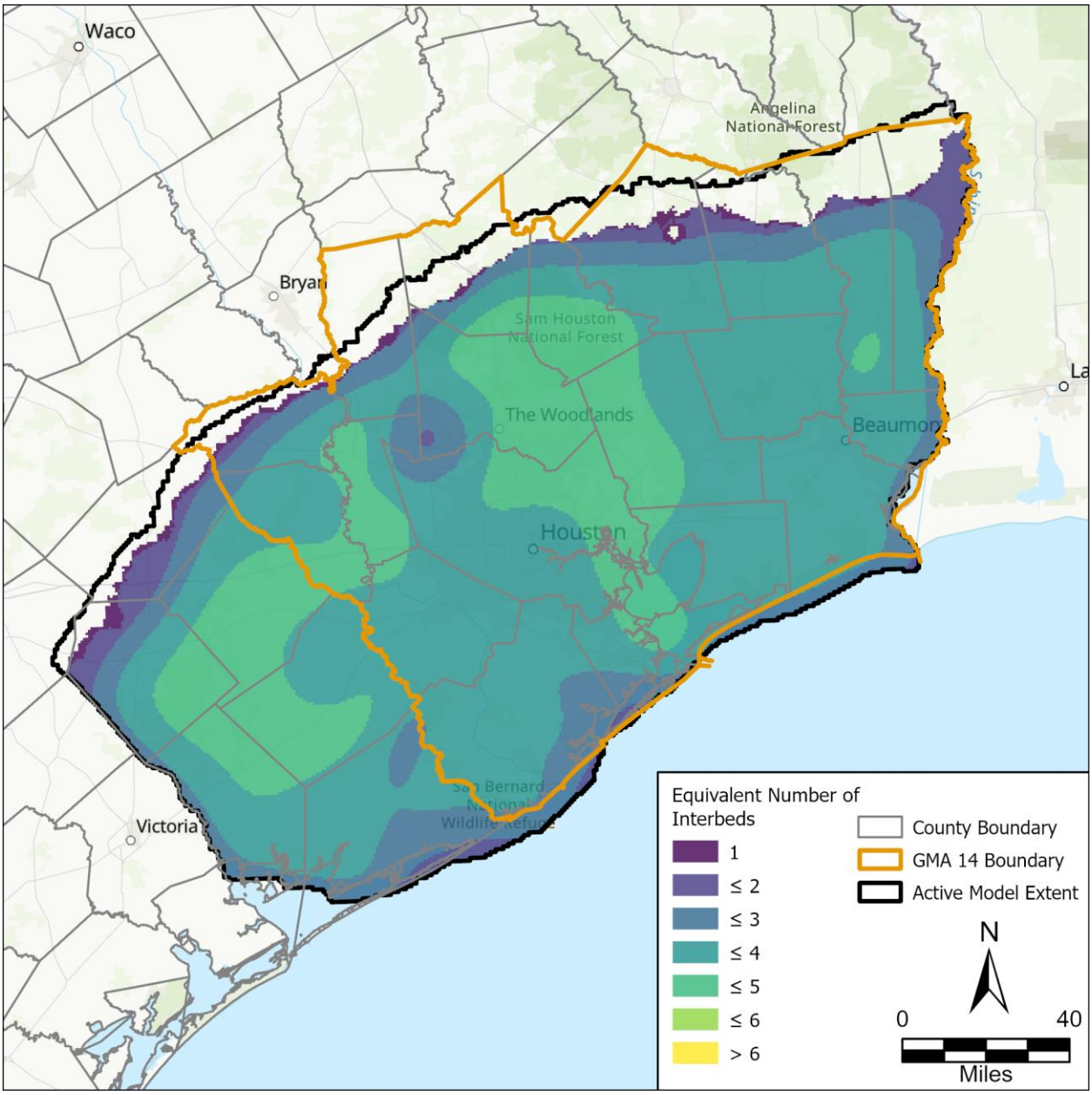

Figure 38. Equivalent number of interbeds for Layer 5 (Jasper Aquifer).

3.5. Well Package

The Well ("WEL") package represents groundwater extraction or injection by defined well locations and pumping rates by stress period. As described in Section 2.1, we created two WEL files, one with only irrigation pumping ("gma14.irr") and the other with all other pumping ("gma14.wel"). For both files, we set the AUTO_FLOW_REDUCE option to 0.1, causing pumping to reduce if a cell reaches 10 percent saturated thickness. The option provides numerical stability when the simulated water level approaches the bottom of the cell in convertible cells. Figures 39 through 42 illustrate the pumping distribution for each layer.

See Appendix 4 for the total pumping per county per stress period for each model layer.

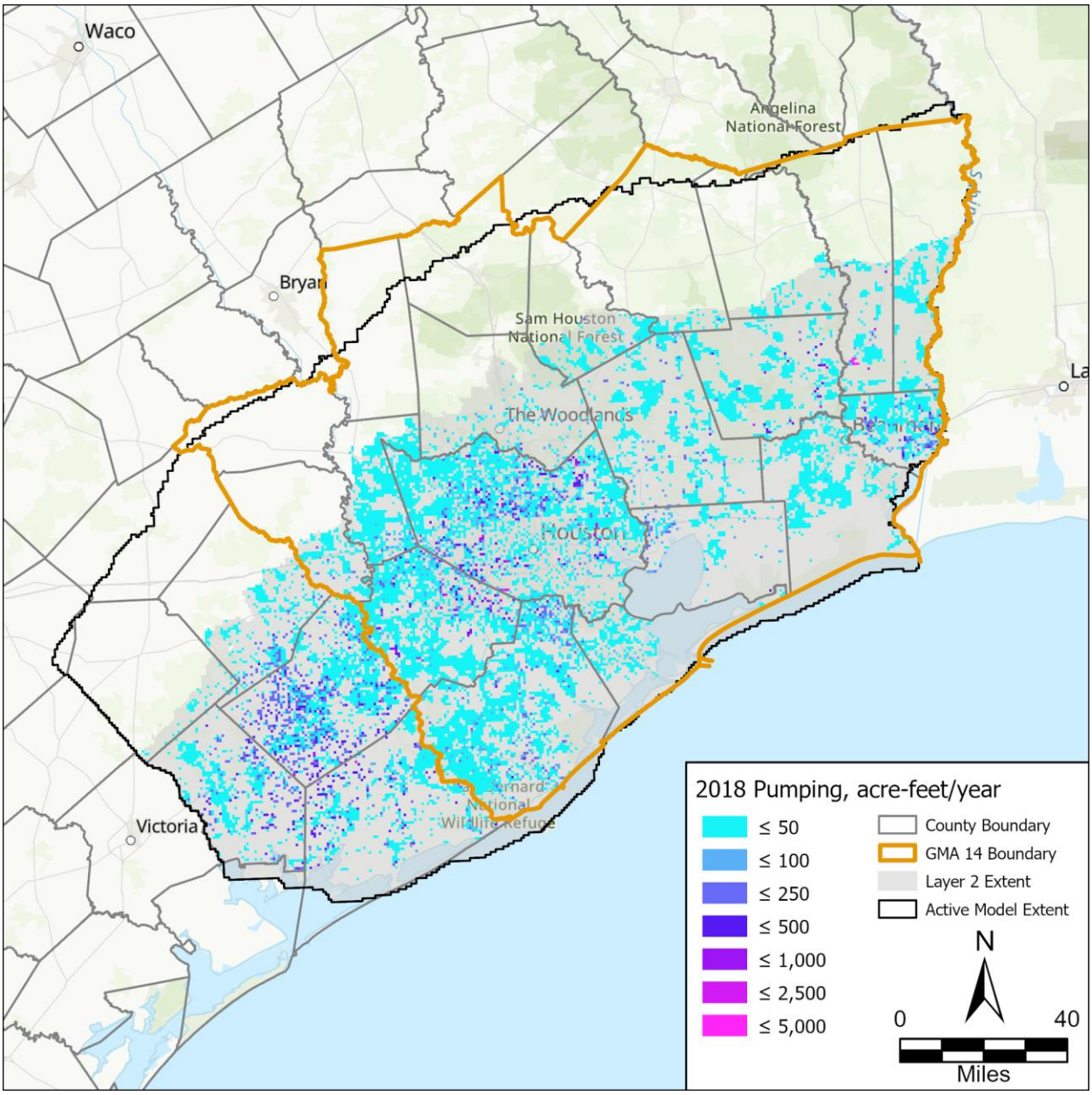

Figure 39. 2018 total pumping values for Layer 2 (Chicot Aquifer).

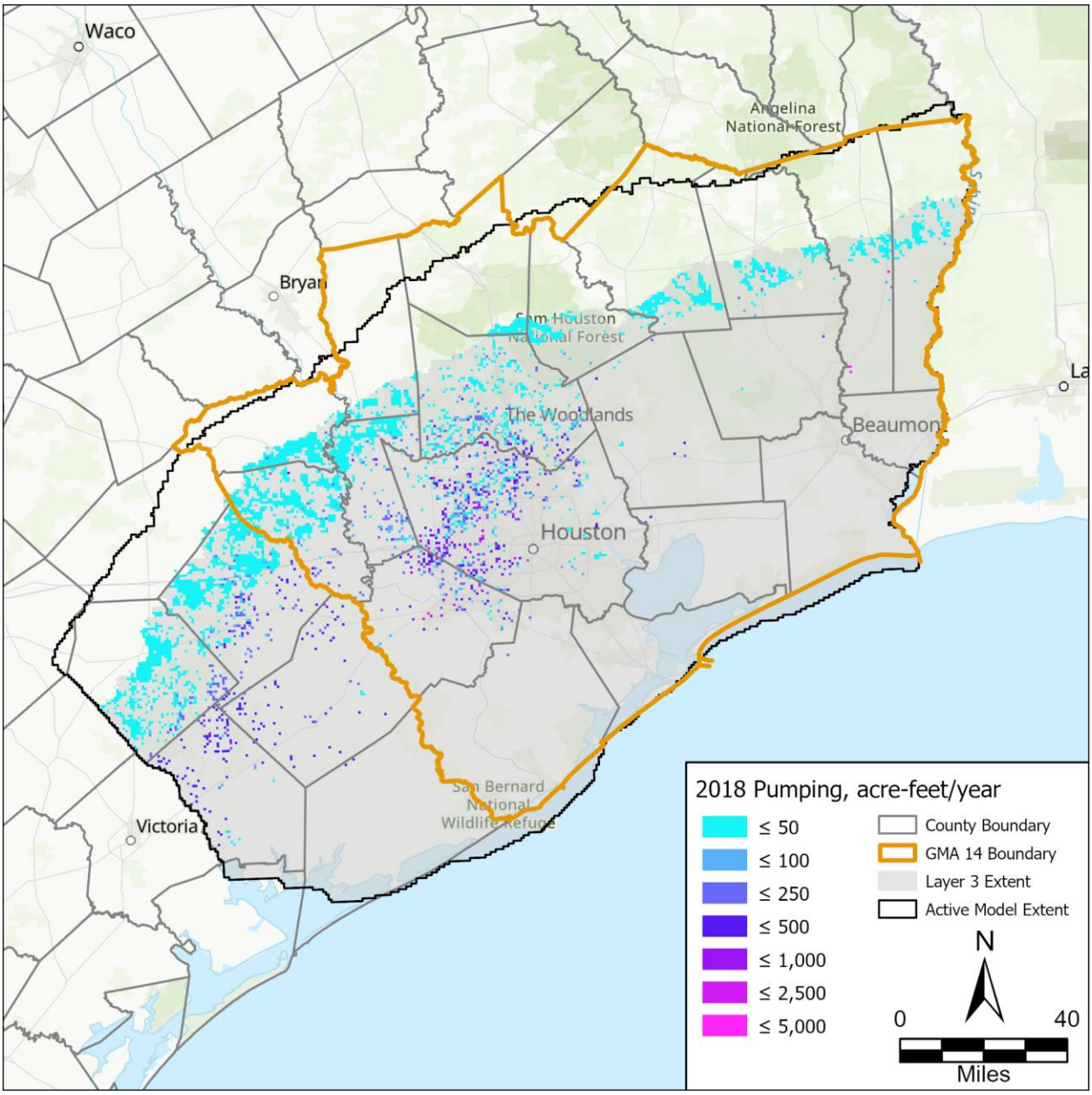

Figure 40. 2018 total pumping values for Layer 3 (Evangeline Aquifer).

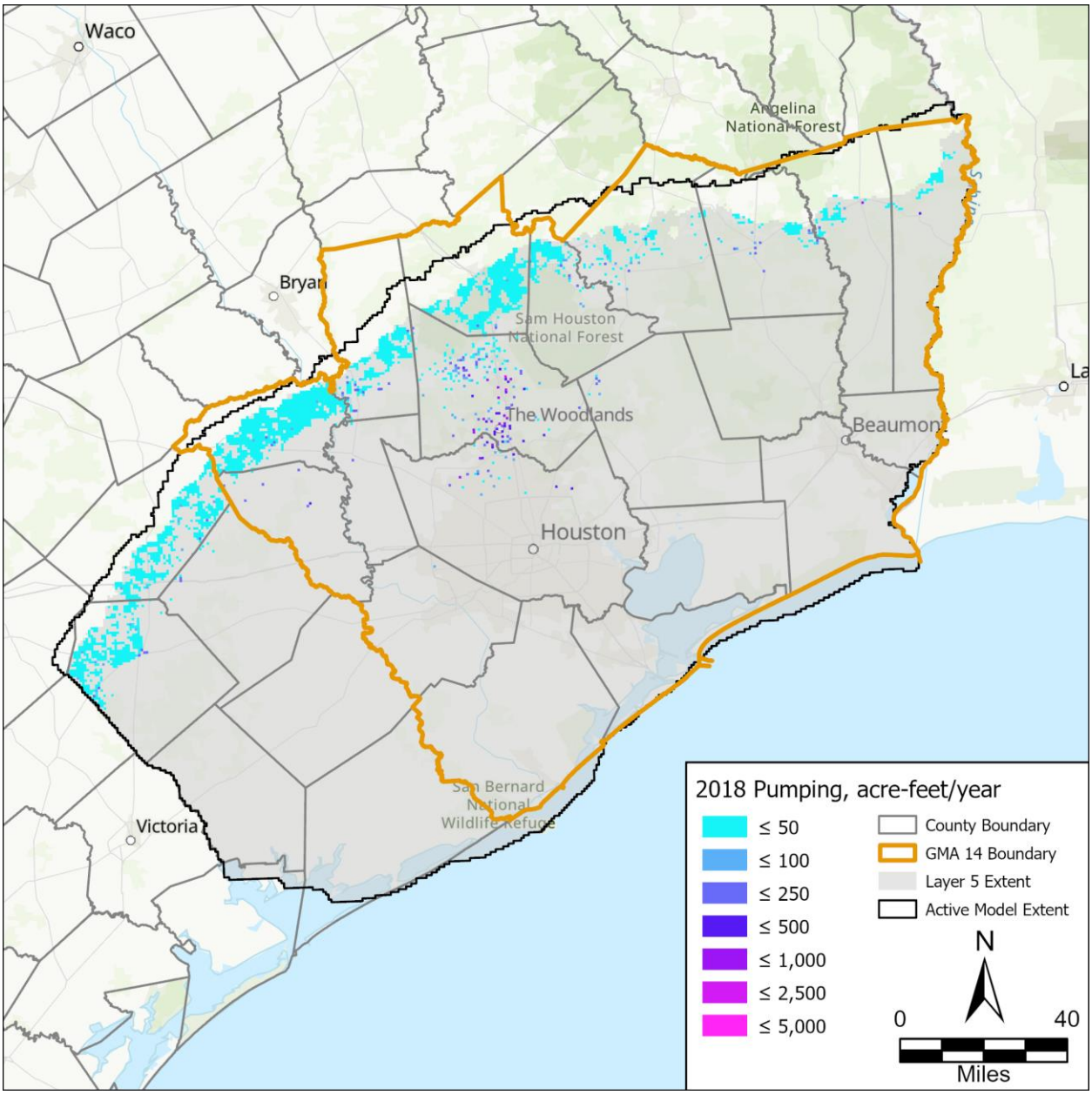

Figure 41. 2018 total pumping values for Layer 5 (Jasper Aquifer).

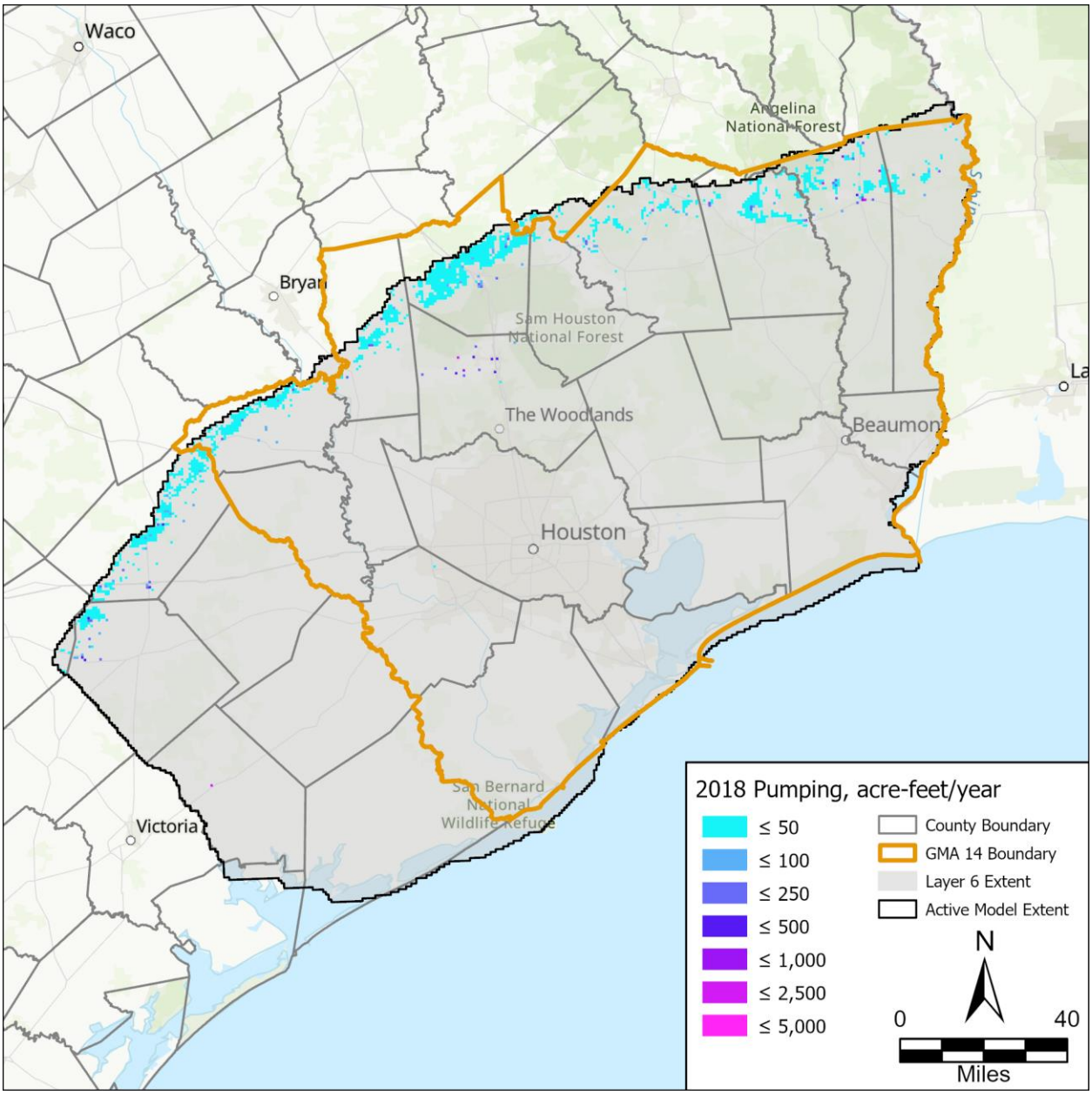

Figure 42. 2018 total pumping values for Layer 6 (Catahoula Aquifer).

3.6. Drain Package

The Drain (“DRN”) package simulates groundwater discharge through drains when the water table exceeds a specific elevation. Flow is calculated based on the difference between the water elevation and drain elevation using a conductance term to regulate flow. Once the water elevation drops below the drain elevation, flow ceases. With the GMA 14 Model, the DRN package was used to simulate springs and seeps (Figure 43).

For the GMA 14 Model, the DRN package elevations and conductance values are consistent GULF-2023 (Ellis and others, 2023) other than modifying the length units to feet.

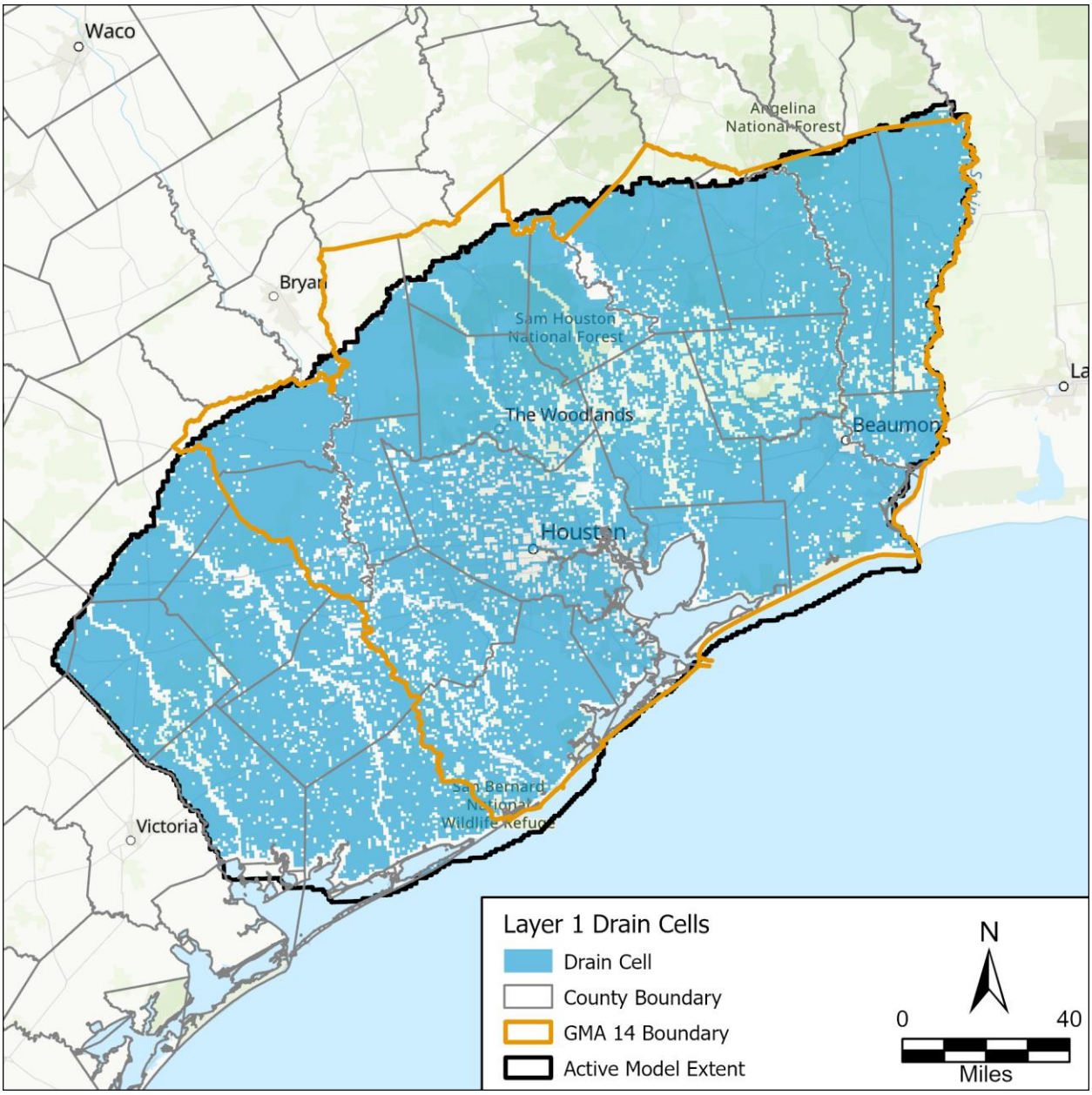

Figure 43. Layer 1 (shallow aquifer system) drain cell locations.

3.7. General-Heads Boundary Package

The General-Head Boundary (“GHB”) package provides a head-dependent boundary condition to represent groundwater flux between the water elevation at the model cell and the external water elevation. Flow is driven by the difference between the model cell water elevation and the boundary water elevation, regulated by conductance. Within the GMA 14 model, we used the GHB package to simulate flux between the groundwater system and the Gulf of Mexico (Figure 44).

For the GMA 14 Model, the GHB package is consistent GULF-2023 (Ellis and others, 2023) other than modifying the length units to feet. Calibrated conductance values are discussed in Section 4.1.5.

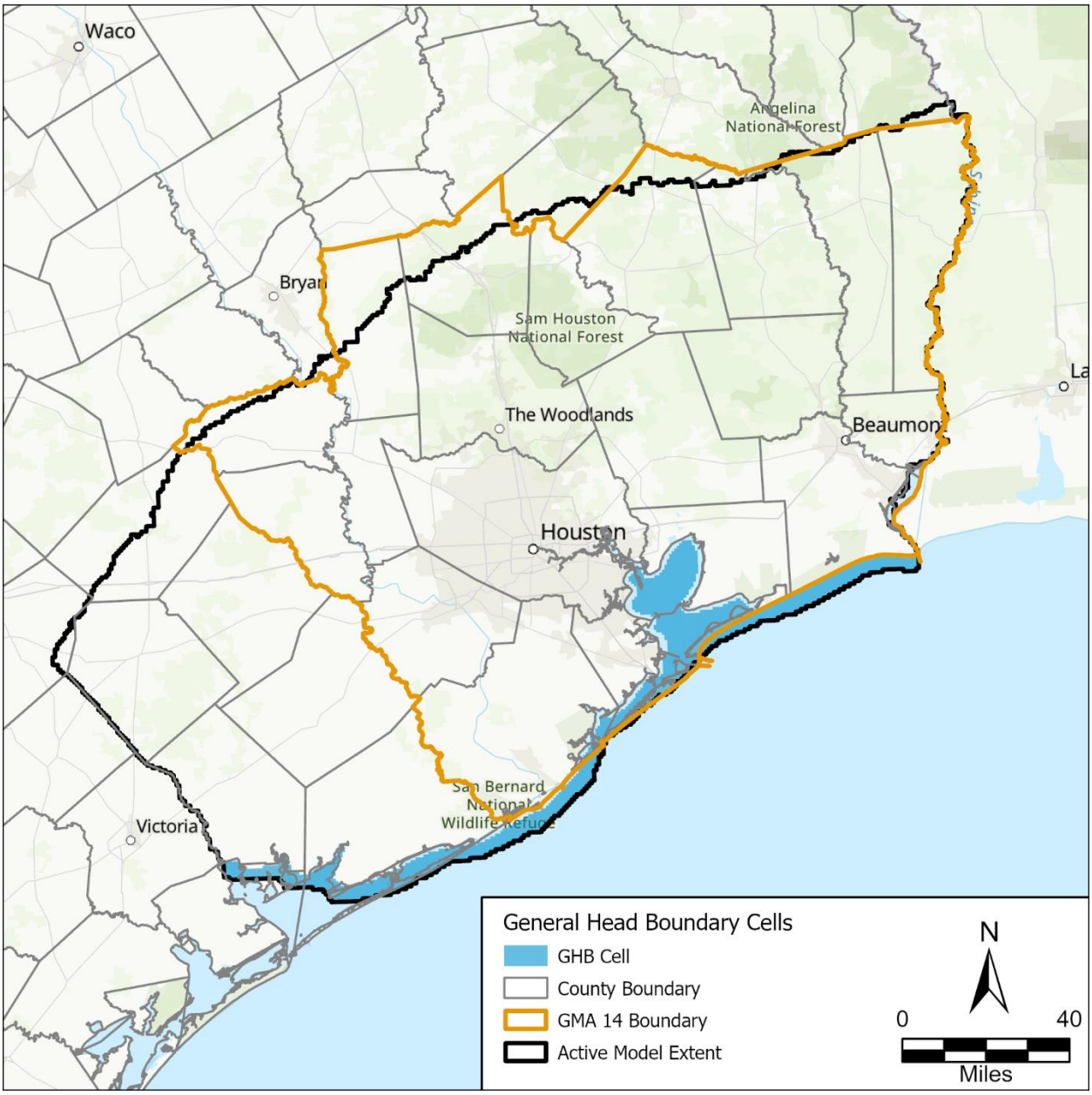

Figure 44. General head boundary cell locations for all layers.

3.8. Recharge Package

The Recharge (“RCH”) package simulates the addition of water to the groundwater system from precipitation, irrigation, or other sources. It applies recharge rates to the top model layer, which can vary spatially and temporally. The RCH package is essential for representing natural and artificial recharge processes affecting groundwater availability.

The GMA 14 Model contains a file for recharge to the outcrop (“gma14_rch_oc.rcha”) and a file for recharge to the subcrop (“gma14_rch_sc.rcha”). For the GMA 14 Model, the RCH package is consistent GULF-2023 (Ellis and others, 2023) other than modifying the length units to feet. We did not modify the soil-water-balance model developed for GULF-2023. Calibrated recharge values are discussed in Section 4.1.5.

3.9. River Package

The River (“RIV”) package provides a head-dependent boundary condition to represent flux between surface water and the modeled groundwater system. Flow between the river and aquifer is controlled by the head difference and riverbed properties. The RIV package is used to simulate baseflow conditions and surface water depletion due to groundwater pumping. The RIV package within the GMA 14 Model only interacts with layer 1. Figure 45 illustrates the river cell locations.

For the GMA 14 Model, the RIV package is consistent GULF-2023 (Ellis and others, 2023) other than modifying the length units to feet.

3.10. Output Control Package

The Output Control (“OC”) package informs MODFLOW of the frequency and type of model output, including heads, flows, and budget summaries. The GMA 14 Model outputs heads, flows, and the budget summary at the end of each stress period.

3.11. Iterative Model Solution Package

The Iterative Model Solution package (“IMS”) solves the system of equations governing groundwater flow using iterative numerical techniques. The IMS package describes the solver parameters that MODFLOW uses for solving the linear and nonlinear equations as part of the groundwater flow solution. We set the head change criteria for convergence of the nonlinear iterations to 0.1 feet and to 0.001 feet for the linear iterations. We set the flow residual criteria for convergence of the linear iterations to 0.1 ft^3/day.

3.12. Observations Utility

The Observations (“OBS”) Utility informs MODFLOW to output specific model results for specified cells and times. We used the utility to output head values calculated during the simulation at water level observation target locations.

Figure 45. Layer 1 (shallow aquifer system) river cell locations.

4. Model Calibration

For the GMA 14 Model calibration, we adjusted parameters to improve the fit to water level, compaction, and subsidence targets during the history matching period described in Section 3.1.1. We automated calibration using the PEST++ software (White and others, 2020) for history matching. Specifically, we used the Iterative Ensemble Smoother program of the PEST++ suite known as PESTPP-IES.

The Iterative Ensemble Smoother is a calibration approach that adjusts model parameters iteratively to improve the match between model outputs and observed data. It operates by generating an ensemble of parameter sets, each representing a possible realization of the system. Each realization is run through the groundwater model to generate simulated observations. These simulated values are compared to measured field observations which inherently contain noise due to measurement errors and natural variability. To account for this noise, PESTPP-IES assumes that both observations and parameters are probabilistic treating them as random variables with associated uncertainties. This PESTPP-IES approach allows for a calibration process that does not rely solely on a single best-fit solution but rather on a distribution of calibrated parameter values (White and others, 2020).

The PESTPP-IES calibration process is iterative, meaning that it refines parameter estimates over multiple adjustment cycles. After each iteration, PESTPP-IES adjusts the parameter ensemble to minimize the discrepancy between simulated and observed data as represented by a least-squares objective function. Each ensemble update is informed by the covariance between parameters and observations ensuring that parameter adjustments remain physically meaningful. Because PESTPP-IES works with an ensemble of parameter sets rather than a single deterministic parameter set, it naturally incorporates uncertainty quantification (White and others, 2020).

Within the ensemble of parameters sets, one realization is referred to as the “base model” which represents the parameter set defined by the user. The numerical model inputs outlined in Section 3 are the “base model” PESTPP-IES.

For a deterministic calibration approach, PEST++ would undertake as many model runs as adjustable parameters to calculate the sensitivity matrix between the parameters and observations, thus the calibration run time is dependent on the number of adjustable parameters. For example, if there are 1,000 adjustable parameters PEST++ would have to run the model 1,000 times and if each run took 10 minutes it would take 10,000 minutes of run time to complete one iteration. With the PESTPP-IES approach, sensitivities are approximated using the ensemble of model runs which reduces the number of runs required to the size of the ensemble. In the example above, the 1,000 adjustable parameters could be estimated through an ensemble of 100 realizations. The

ensemble approach of PESTPP-IES makes it particularly well-suited for highly parameterized groundwater models.

4.1. Calibration Procedures

4.1.1. Calibration targets

We developed the calibration target dataset for the GMA 14 Model using data from the TWDB database, U.S. Geological Survey databases, and water level targets Ellis and others (2023) used in the GULF-2023 calibration. The calibration targets used during history matching consisted of water level, compaction, and subsidence measurements. Since the GMA 14 Model simulates groundwater flow using one year stress periods, we filtered the water level and subsidence data to only end-of-year measurements. As end-of-year measurements are rarely available, we used values from within three months of the end of the stress period to reflect end-of-year conditions. If multiple values were within the 3-month range, we used the value closest to the end of the stress period. In the case where multiple wells within the same cell, we consolidated the measured values with priority given to the well with the longest measurement period. The approach resulted in 32,105 water level measurements (17,634 for the Chicot Aquifer [Layer 2], 10,627 for the Evangeline Aquifer [Layer 3], 2,930 for the Jasper Aquifer [Layer 5], and 914 for the Catahoula Aquifer [Layer 6]) from 1,820 wells and 2,554 compaction and subsidence measurements from extensometers, GPS stations, and benchmarks. Figure 46 shows the locations of wells by aquifer utilized for history matching. Figure 47 shows the locations of compaction (extensometer) and subsidence (GPS and benchmark) stations utilized for history matching.

We included all counties within the GMA 14 Model in the calibration target dataset. Most aquifer designations for the wells in the calibration target dataset are the TWDB aquifer designation. The only exception is the water level calibration target dataset for Montgomery County where, similar to the pumping dataset, we assigned the aquifer according to the permitted aquifer.

In addition to the water level, compaction, and subsidence measurements, the following targets were applied during history matching:

1. The change in target between stress periods.
2. The absolute change in targets between stress periods.
3. Trend in targets over the measurement period.
4. Trend in targets between calculated turning points.

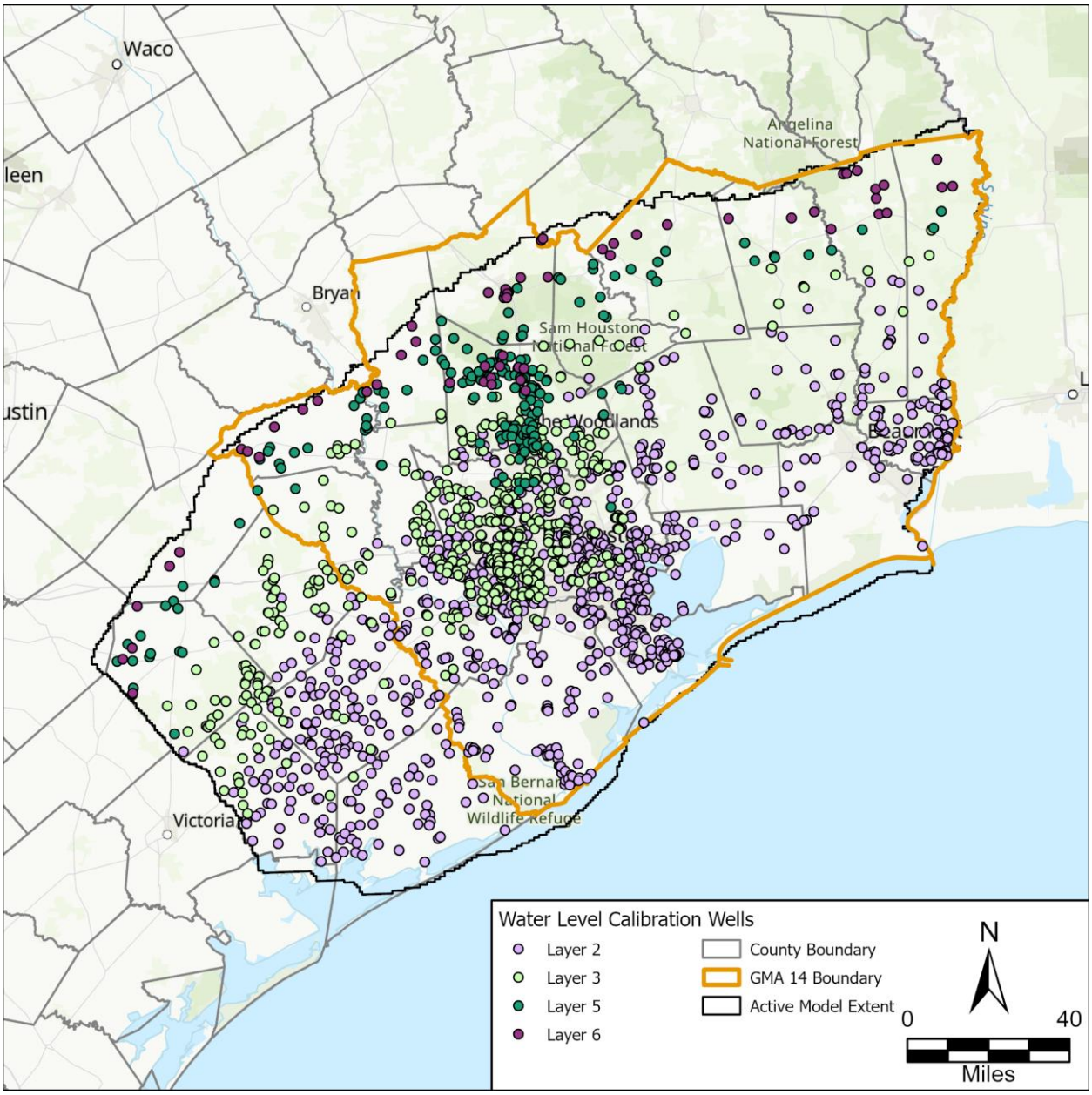

Figure 46. Wells with water level measurements used during calibration.

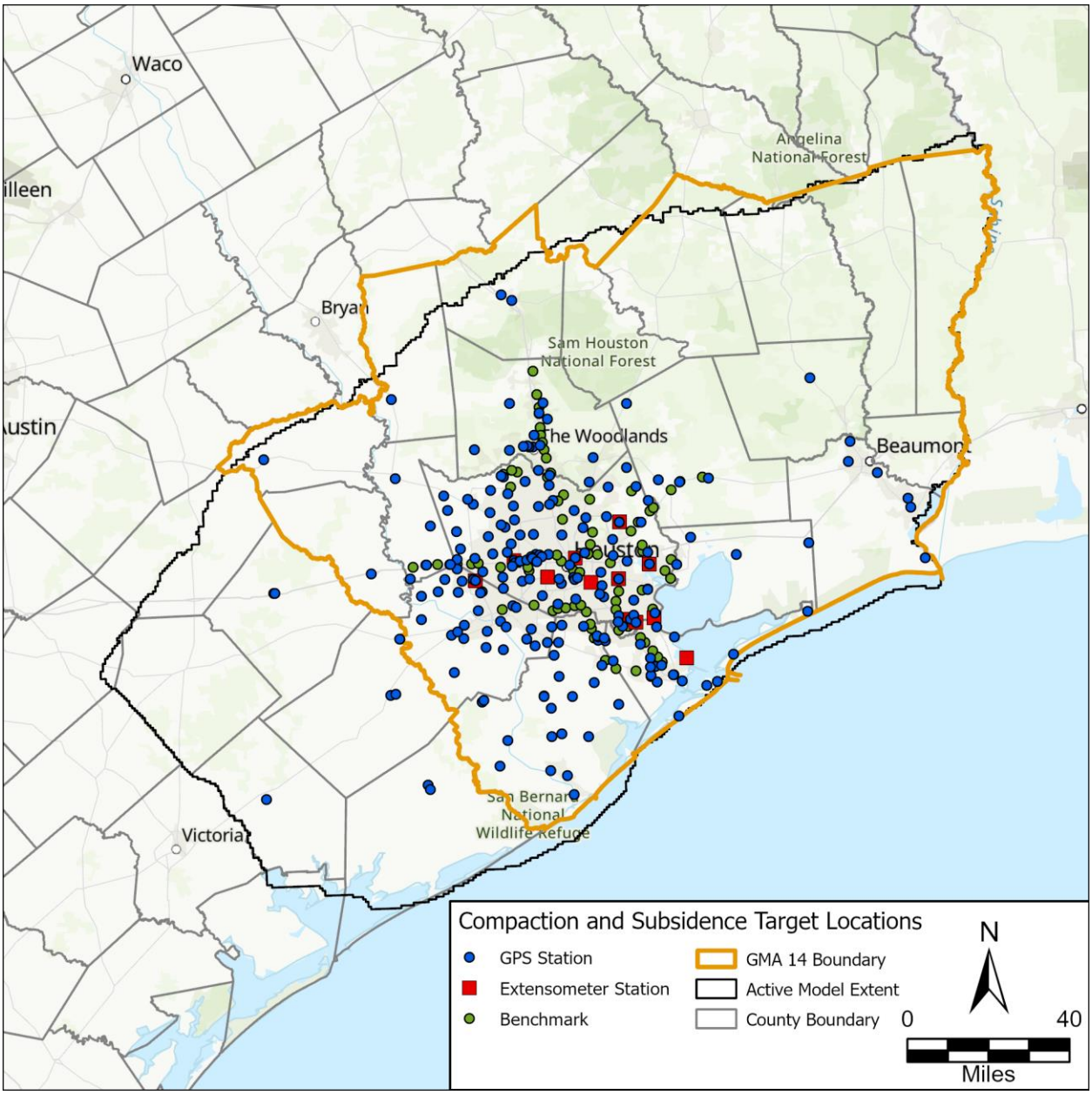

Figure 47. Compaction and subsidence station locations used during calibration.

We calculated the change in target between stress periods by subtracting the previous stress period measurement from the current stress period measurement. An increasing water level produced a negative result while a decline yielded a positive value. The absolute difference ensured all values were positive. This distinction allowed the model to capture both the magnitude and direction of measurement changes while the absolute difference emphasized the magnitude of the change. This analysis resulted in 30,287 difference-based and absolute difference-based water level targets and 2,266 difference-based and absolute difference-based compaction and subsidence targets.

The overall trend in either water level or subsidence measurements is calculated using the Kendall-Theil approach (Granato, 2006). As described by Granato (2006), this approach utilizes the available measurements to calculate a trend but is less susceptible to the influence of outliers compared to standard linear regression analysis. This analysis resulted in 1,190 overall water level trend targets and 71 compaction and subsidence trend targets. Figure 48 is an example of the calculated trend in measured water levels and Figure 49 illustrates an example of the calculated trends in an extensometer station.

Turning points in either water level or subsidence measurements refer to quantifiable changes in data trends. To conduct the analysis, we apply the Ramer-Douglas-Peucker algorithm (Ramer, 1972; Douglas and Peucker, 1973) to the data points. The algorithm simplifies data by only keeping values that indicate a change in slope. From this simplified set of points, we can identify the first and last year of a trend along with the trend between those years. Our analysis resulted in 3,328 water level targets of trend between turning points and 366 subsidence targets of the trend between turning points. Figure 48 is an example of the calculated turning points and trends between those turning points in measured water levels. Figure 49 is an example of the calculated turning points and trends between those turning points in measured subsidence.

Since PEST-IES estimates the objective function based on the summed squared residuals of targets, it is necessary to assign different weights to each target group. We grouped the water level and compaction/subsidence measurements separately and weighted each group such that it accounted for 50 percent of the total objective function. We applied this approach to minimize bias during calibration towards either measurement group. We further divided water levels by target metric and aquifer to more heavily weight water level differences and trends. Subsidence targets were also further broken down by target metric and station type.

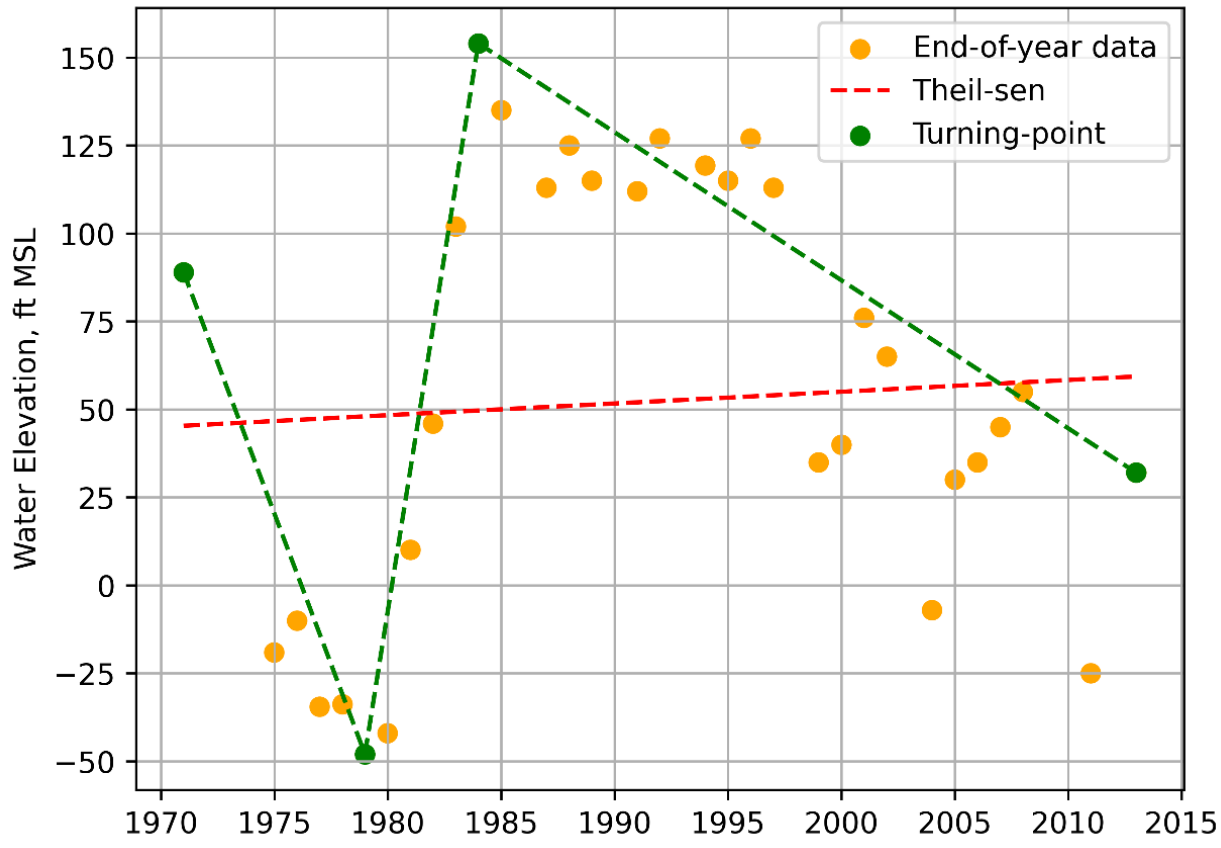

Figure 48. Example of the Theil-Sen and turning points applied to water level measurements.

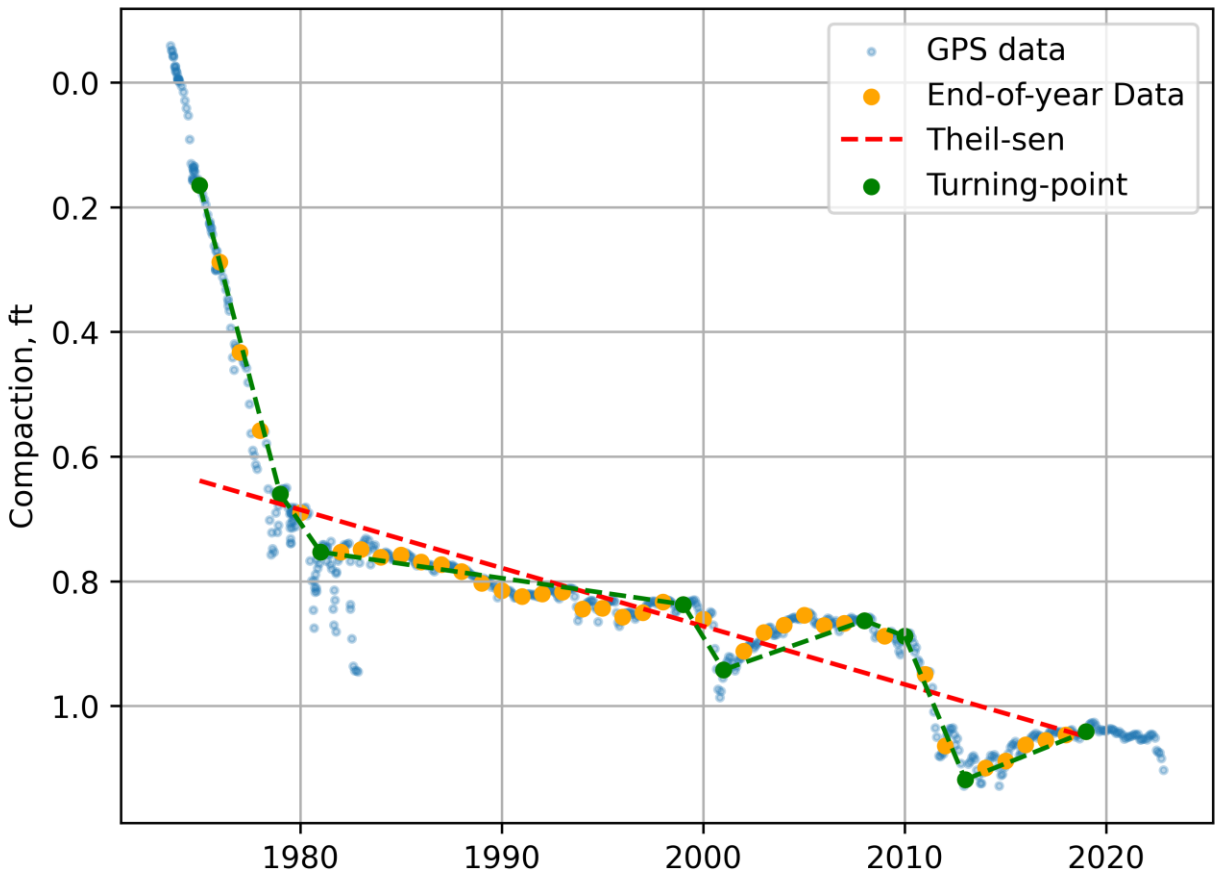

Figure 49. **Example of the Theil-Sen and turning points trends applied to an extensometer station.**

4.1.2. Parameter Adjustments

We adjusted parameters during history matching using multipliers on model-wide and pilot point scales. Our approach allowed calibration to fine tune parameterization at different resolutions. The multiplier scales used for each parameter along with the range of allowable values are summarized in Table 9. The multiplier upper and lower limit is the range of the allowable multipliers, and the ultimate upper and lower limit are the range of allowable model values after all multipliers. The ultimate upper and lower limits are based on reasonable expected values from the conceptual model.

Figures 50 through 55 show the locations of the pilot points for each layer. Pilot points are included in every 10 cells and are evenly spaced throughout each active layer extent.

Table 9. Parameters adjusted during history matching.

Parameter	Layers	Units	Model-wide Multiplier	Pilot Point Multiplier	Cell Multiplier	Multiplier Lower Limit	Multiplier Upper Limit	Ultimate Lower Limit	Ultimate Upper Limit
Recharge	1	ft/day	x			0.75	1.25	0	0.0012
General Head Boundary Conductance	All	ft^2/day	x			0.1	10	0.01	1000
River Conductance	1	ft^2/day	x		x	0.1	10	10	10,000
Aquifer Horizontal Hydraulic Conductivity	1, 4, & 5	ft/day	x	x		0.1	10	0.001	200
	2, 3, & 6	ft/day	x	x		0.75	1.25	0.001	200
Aquifer Vertical Hydraulic Conductivity	All	ft/day	x	x		0.1	10	1.0E-10	1
Specific Yield	1	-	x	x		0.25	1.5	0.001	0.25
	2-6	-	x	x		0.75	1.25	0.001	0.25
Coarse-Grained Elastic Specific Storage	All	ft^{-1}	x	x		0.1	10	1E-09	1E-04
Coarse-Grained Porosity	All	-	x	x		0.75	1.25	0.05	0.4
Interbed Elastic Specific Storage	2-5	ft^{-1}	x	x		0.15	5	1E-07	3E-03
Interbed Inelastic Specific Storage	2-5	ft^{-1}	x	x		0.15	5	1E-07	1E-03
Interbed Vertical Hydraulic Conductivity	2-5	ft/day	x	x		0.1	10	1E-09	0.001
Interbed Porosity	2-5	-	x	x		0.5	1.5	0.05	0.6

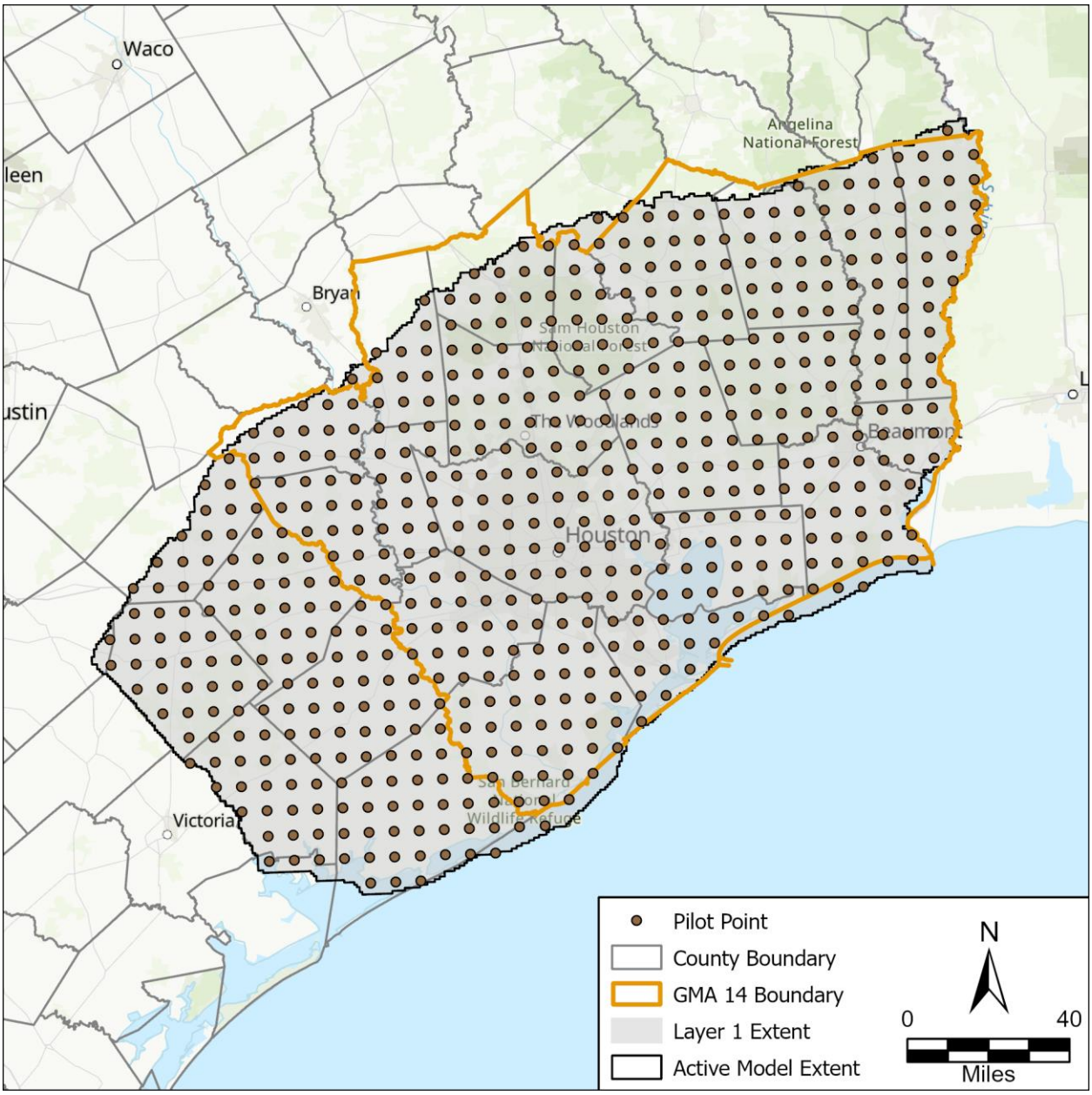

Figure 50. Pilot points for Layer 1 (shallow aquifer system).

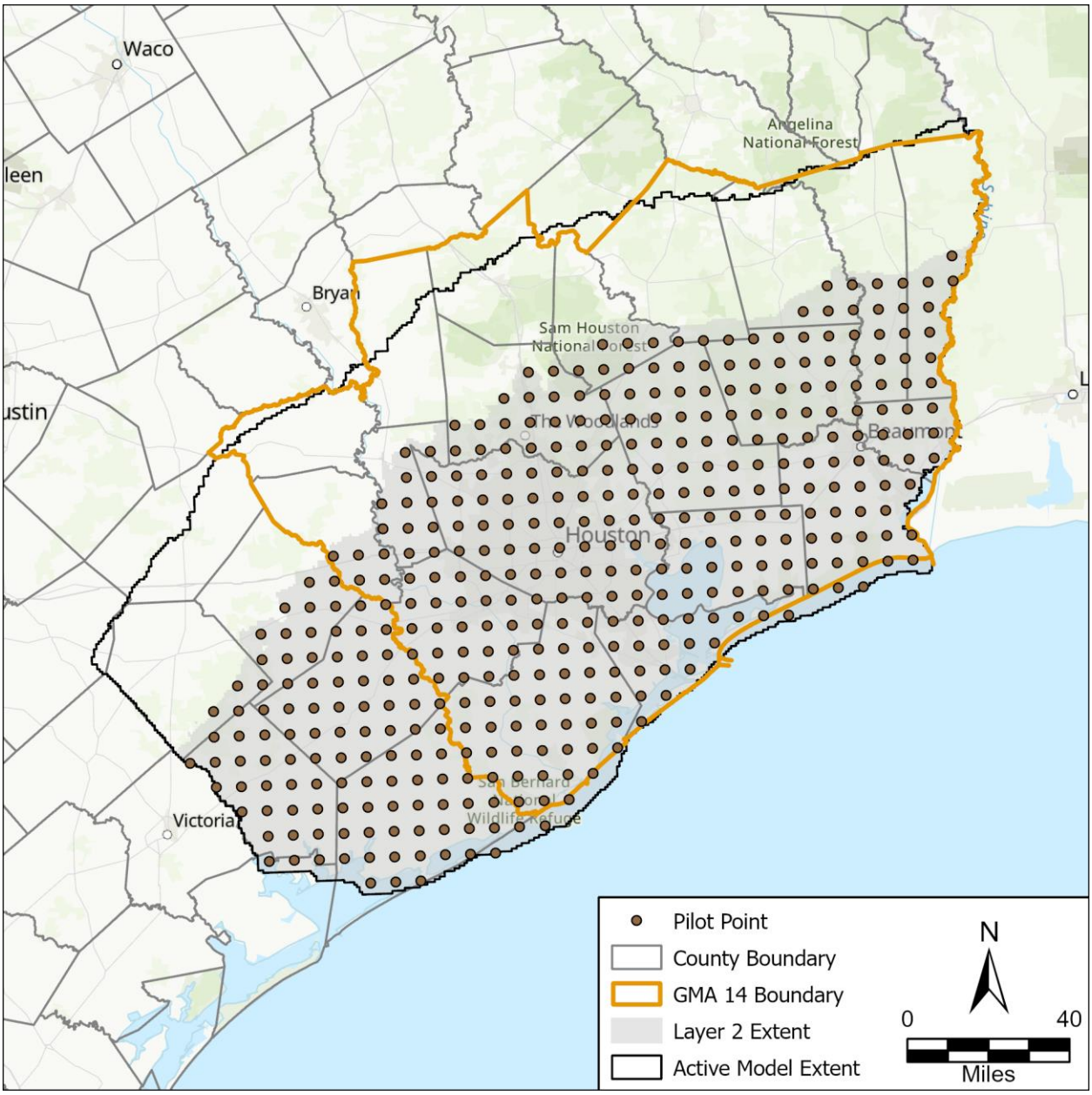

Figure 51. Pilot points for Layer 2 (Chicot Aquifer).

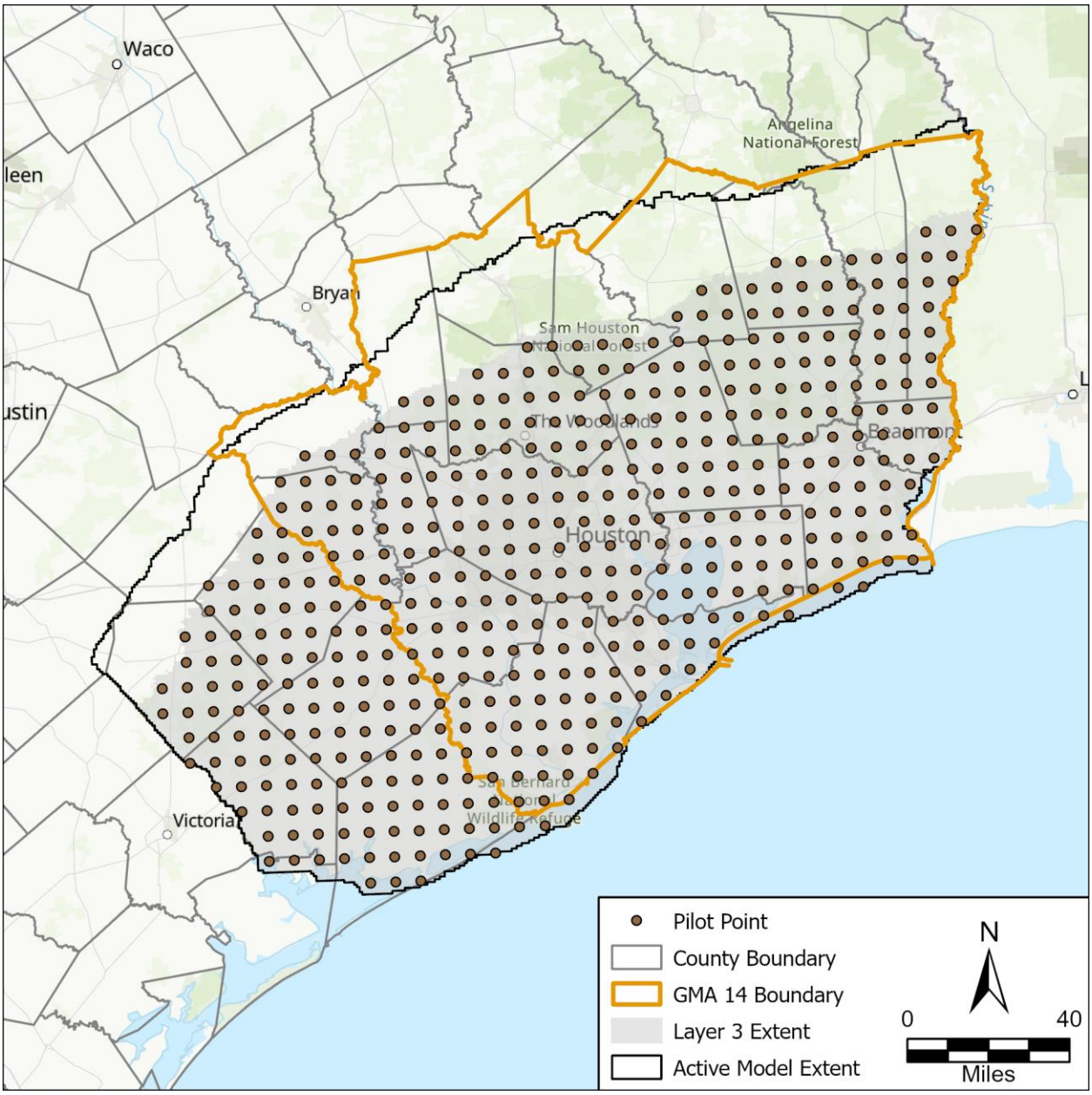

Figure 52. Pilot points for Layer 3 (Evangeline Aquifer).

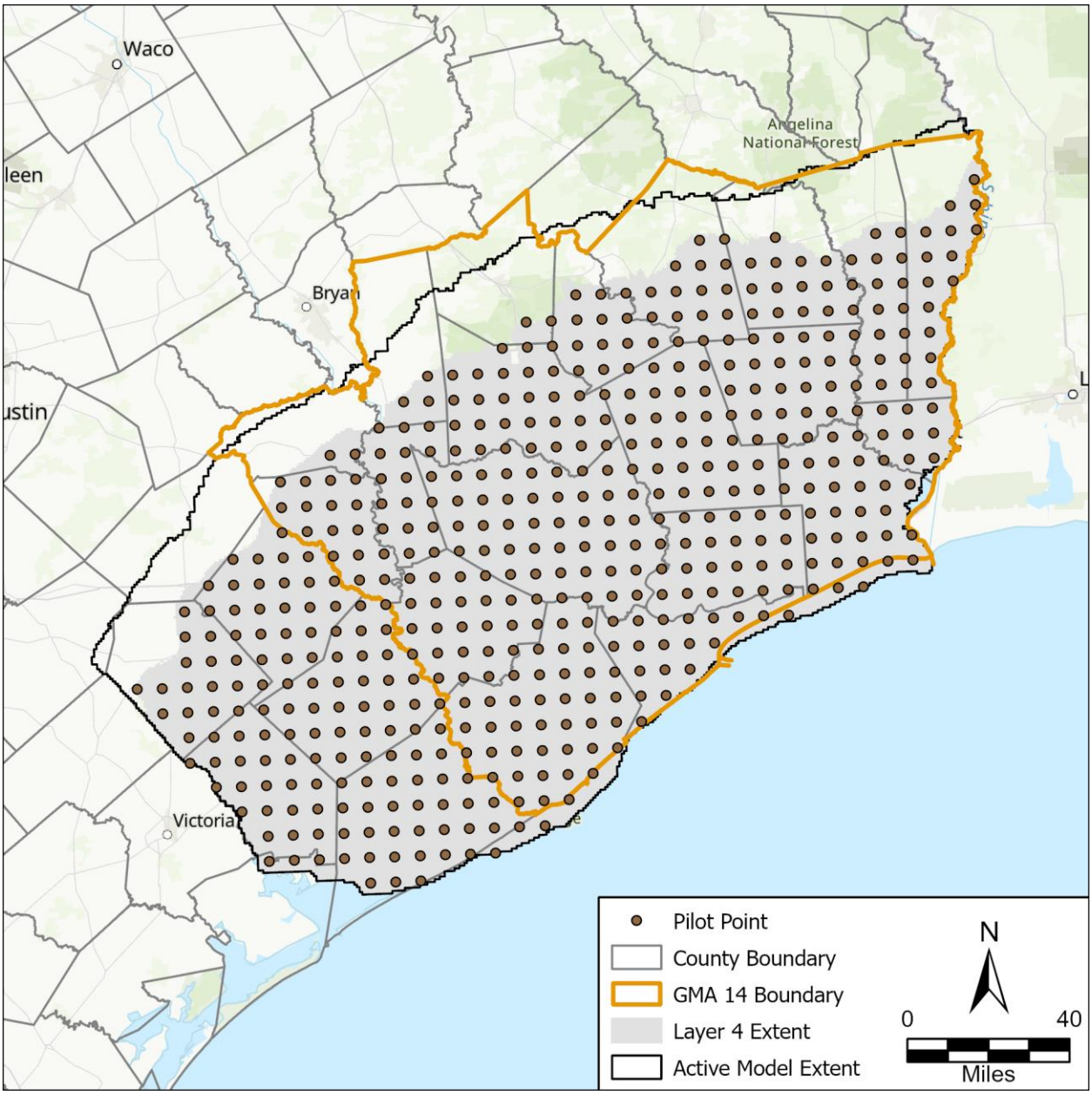

Figure 53. Pilot points for Layer 4 (Burkeville).

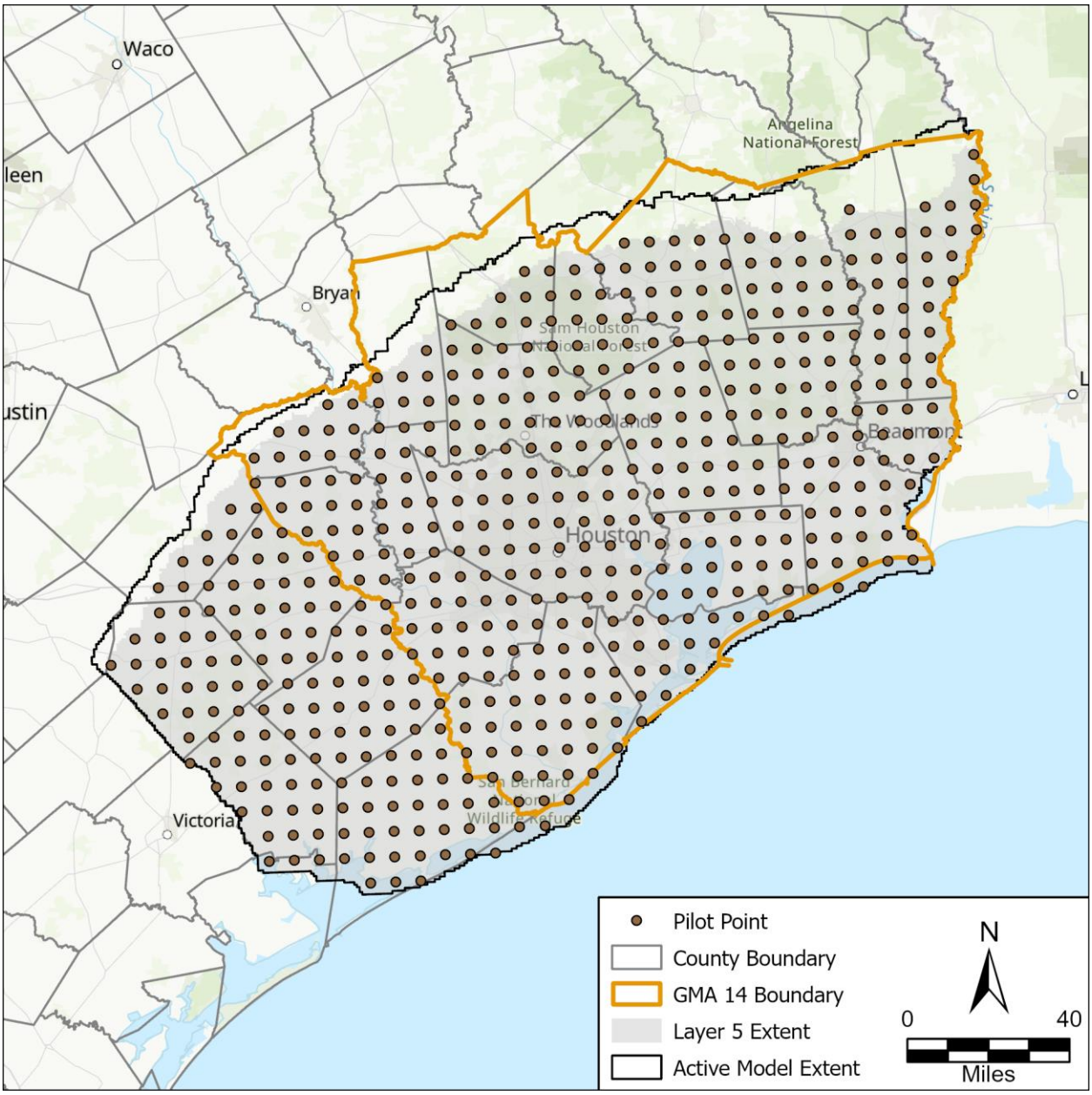

Figure 54. Pilot points for Layer 5 (Jasper Aquifer).

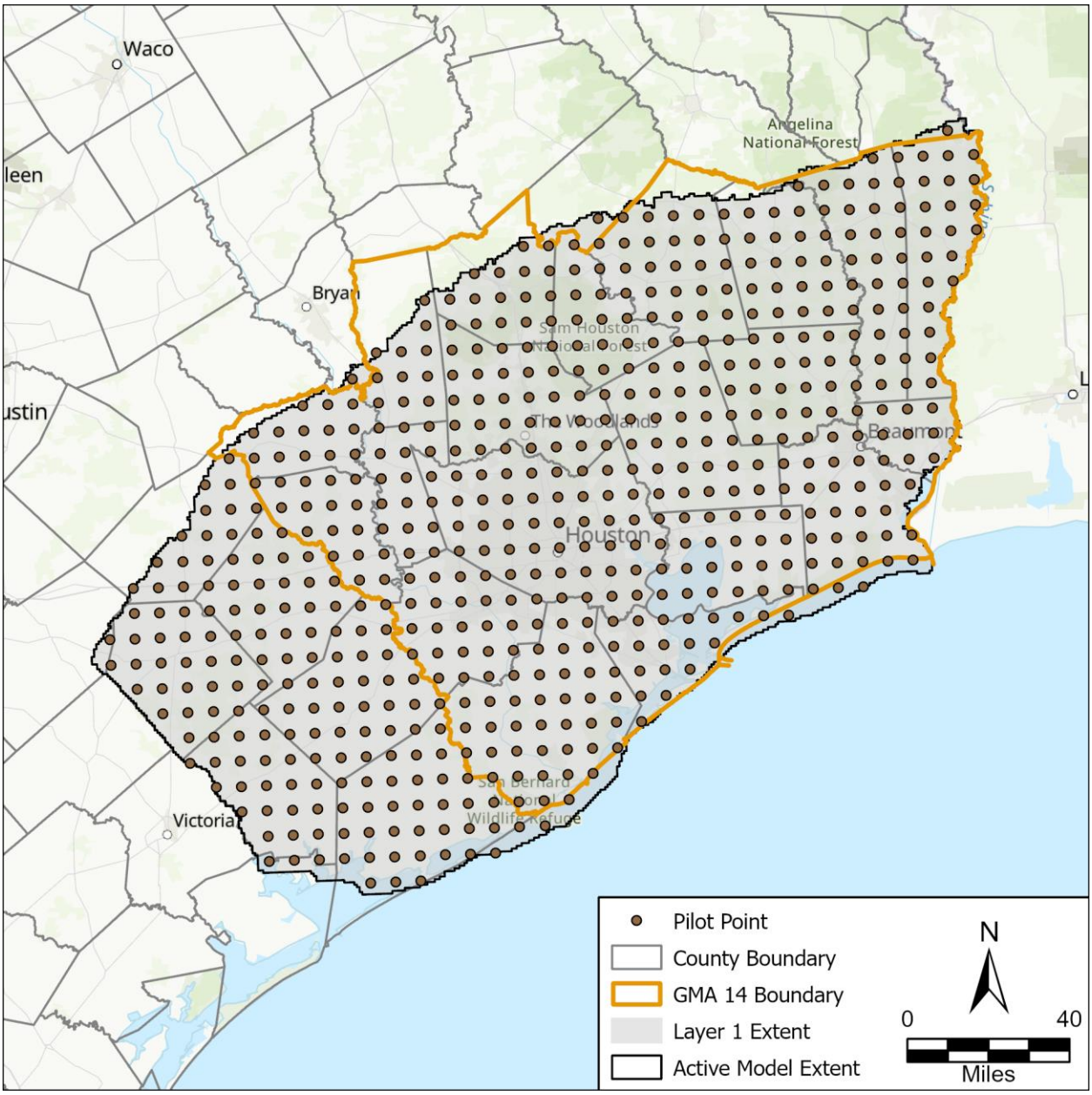

Figure 55. Pilot points for Layer 6 (Catahoula Aquifer).

4.1.3. Calibration of Hydraulic (NPF and STO) Properties

We applied model-wide and pilot-point scale multipliers to hydraulic properties for all layers during calibration. Table 10 summarizes the initial and calibrated value statistics by layer for each hydraulic property adjusted during calibration. The results of the hydraulic conductivity for the aquifer layers are illustrated in Figures 56 through 59. The model-wide mean value for the Chicot and Evangeline only slightly increased while the Jasper and Catahoula layer calibrated mean value stayed consistent with the initial value.

The modeled transmissivity is equal to the layer thickness multiplied by the hydraulic conductivity. We compared the transmissivity data from pumping tests to the calibrated transmissivity to verify the results are within the expected values. Figures 60 through 62 show the observed transmissivity from test data compared to the modeled transmissivity. The one-to-one line on each figure indicates where values would plot if the match were perfect.

The modeled transmissivity for Layer 2 (Chicot Aquifer) overall huddled around the one-to-one line, indicating a good fit between the modeled and test data. At the lower transmissivity range the modeled transmissivity was generally higher than the test data while the higher ranges the calibration under simulated the values. Similar to the Chicot, the calibration generally over simulated the transmissivity of the Evangeline at lower ranges and under simulated the higher values. The Jasper also under simulated the higher observed values. It should be noted that we used the observed values to parameterize the base model prior to calibration and the interpolation can smooth out the higher values.

We adjusted vertical hydraulic conductivity by 0.1 to 10 for each multiplier throughout all layers. The model-wide mean increased in layers 1 through 4 and decreased in the Jasper and Catahoula. Figures 63 through 66 illustrate the calibrated base model vertical hydraulic conductivity for each aquifer layer. The Chicot and Evangeline maintained higher values in the downdip regions which is consistent with the conceptual model of Ellis and others (2023).

We adjusted the specific yield multipliers by 0.25 to 1.5 in the shallow aquifer system and 0.75 to 1.25 in all other layers. Figures 67 through 70 illustrate the spatial distribution of the specific yield by layer. We applied a depth dependent function for specific yield in layer 2 (Chicot) while a constant value of 0.2 for all other layers which is consistent with the approach by Ellis and others (2023) in GULF-2023. The mean layer values changed slightly during calibration.

Table 10. Initial and calibrated hydraulic property statistics by layer.

Hydraulic Property	Layer	Initial			Calibrated Base Model		
		Min	Max	Mean	Min	Max	Mean
Aquifer Horizontal Hydraulic Conductivity	1	0.07	13.06	9.51	0.01	60.00	4.67
	2	0.71	36.20	11.30	0.63	47.59	13.29
	3	0.91	18.14	4.48	0.58	21.72	5.04
	4	0.11	0.11	0.11	0.02	1.03	0.22
	5	0.20	10.98	2.31	0.24	10.83	2.08
	6	0.48	8.53	3.01	0.43	13.82	3.30
Aquifer Vertical Hydraulic Conductivity	1	1.31E-07	2.61E-05	1.90E-05	1.72E-07	1.12E-03	1.54E-04
	2	8.77E-04	9.67E-01	8.83E-02	4.51E-04	1.00E+00	2.13E-01
	3	1.01E-04	1.31E-01	1.56E-02	5.89E-05	1.00E+00	8.47E-02
	4	9.24E-07	9.24E-07	9.24E-07	5.66E-08	5.46E-06	1.11E-06
	5	2.42E-03	1.32E-01	2.77E-02	8.61E-04	1.42E-01	1.04E-02
	6	5.28E-03	9.39E-02	3.31E-02	1.60E-04	4.27E-02	4.25E-03
Specific Yield	1	0.20	0.20	0.20	0.12	0.25	0.24
	2	1.00E-03	0.20	5.96E-02	1.04E-03	0.25	7.19E-02
	3	0.20	0.20	0.20	0.16	0.25	0.21
	4	0.20	0.20	0.20	0.20	0.25	0.24
	5	0.20	0.20	0.20	0.15	0.24	0.19
	6	0.20	0.20	0.20	0.17	0.25	0.22

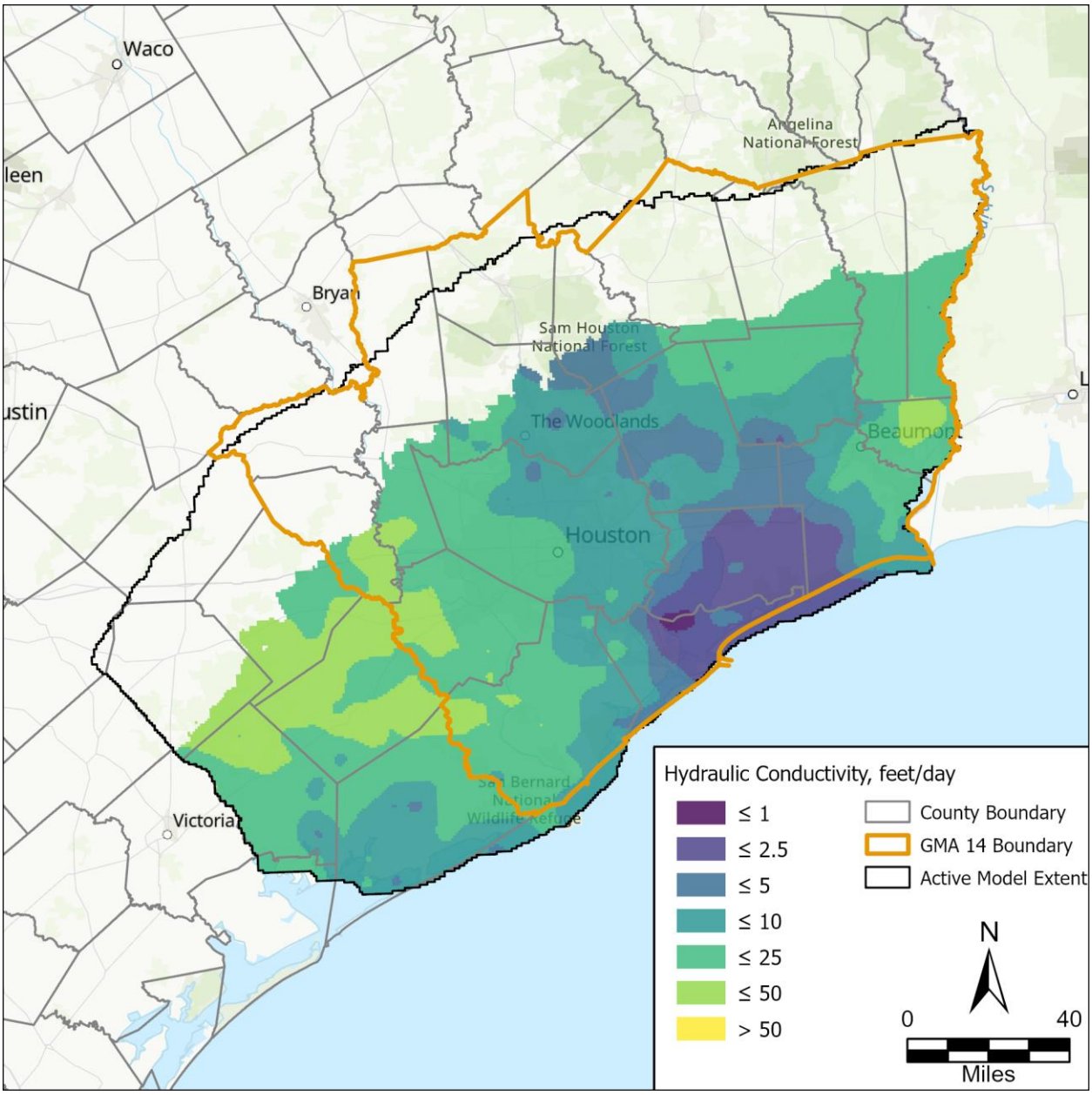

Figure 56. Calibrated layer 2 (Chicot Aquifer) hydraulic conductivity.

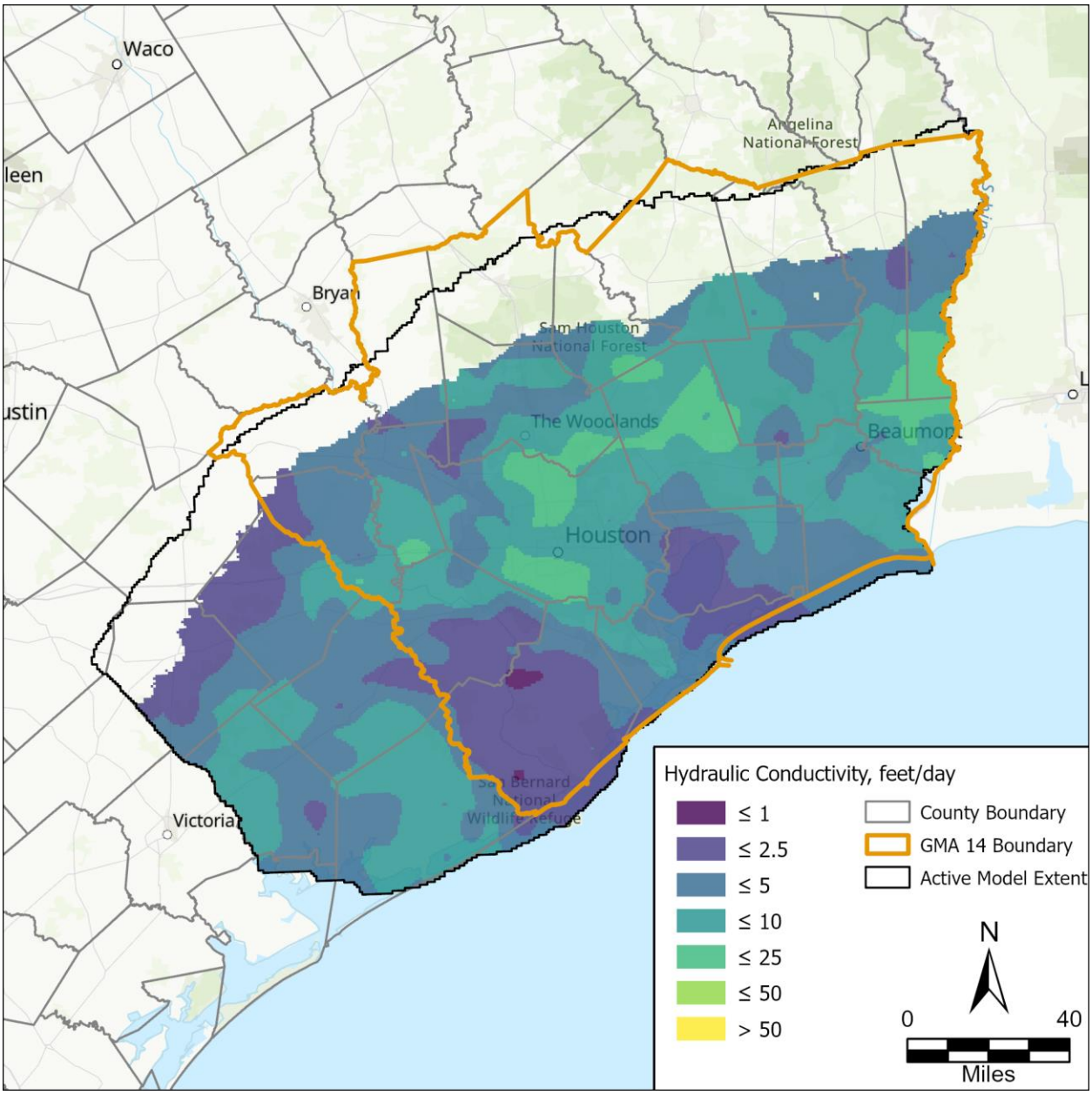

Figure 57. Calibrated layer 3 (Evangeline Aquifer) hydraulic conductivity.

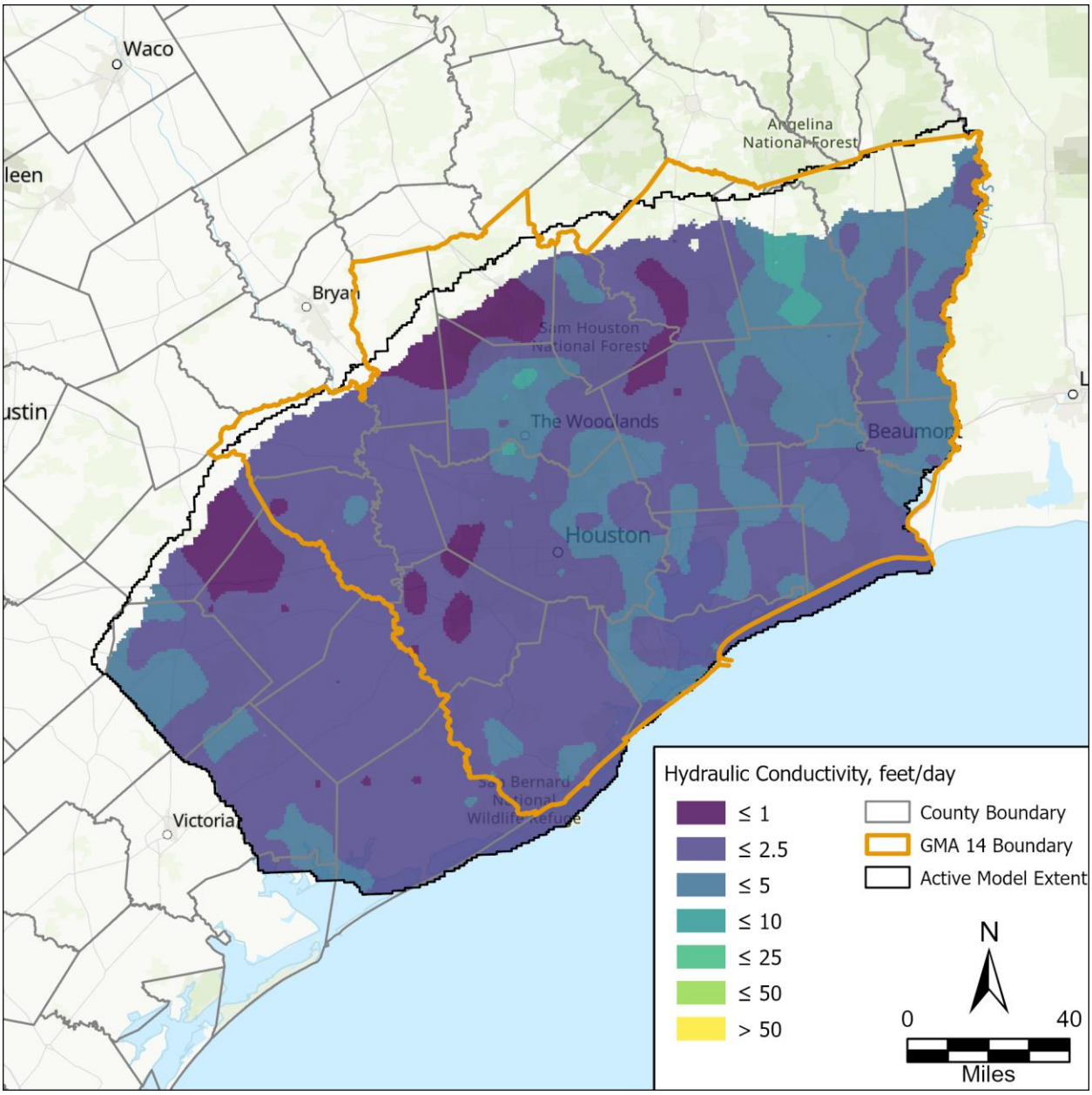

Figure 58. Calibrated layer 5 (Jasper Aquifer) hydraulic conductivity.

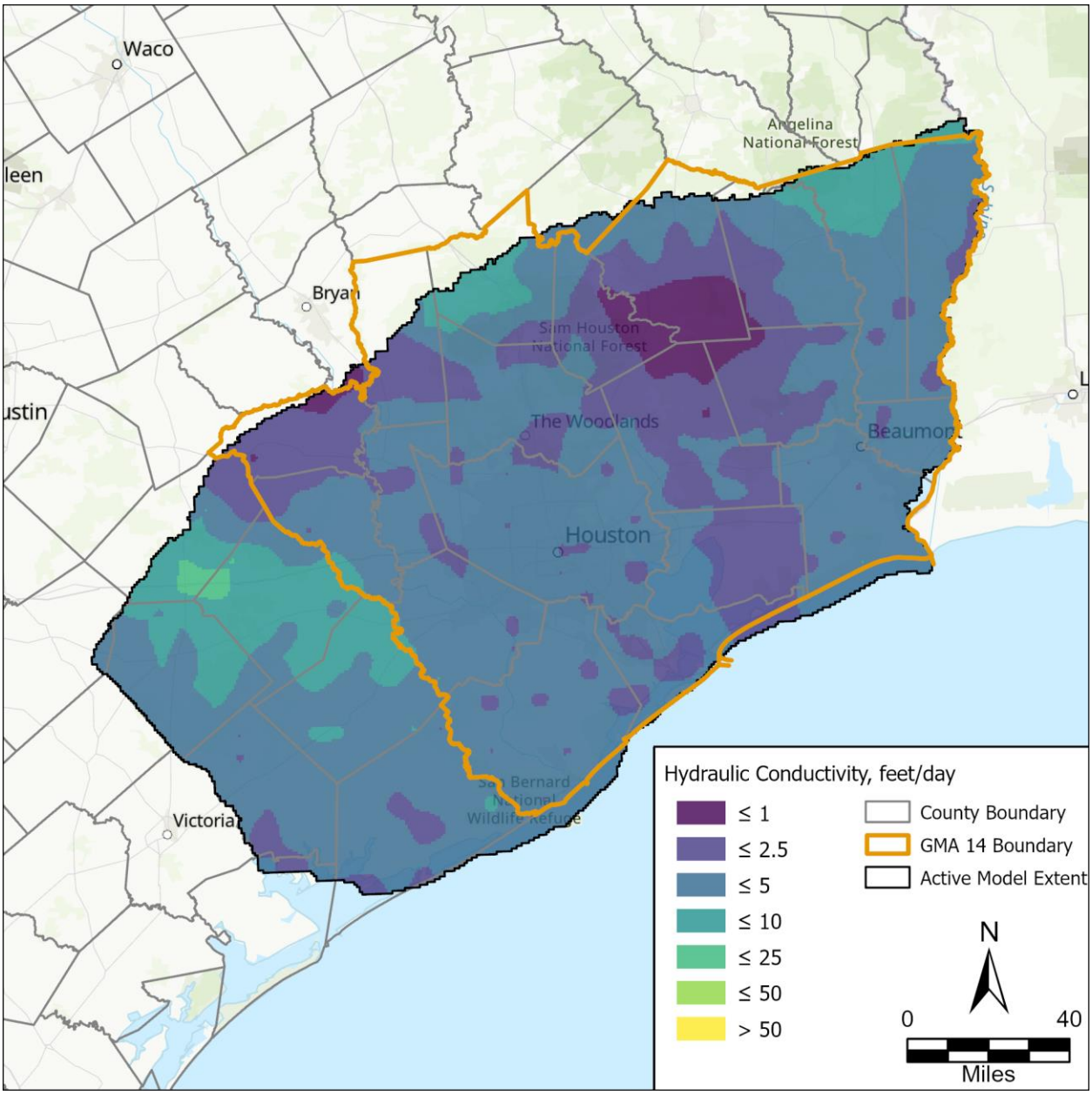

Figure 59. Calibrated layer 6 (Catahoula Aquifer) hydraulic conductivity.

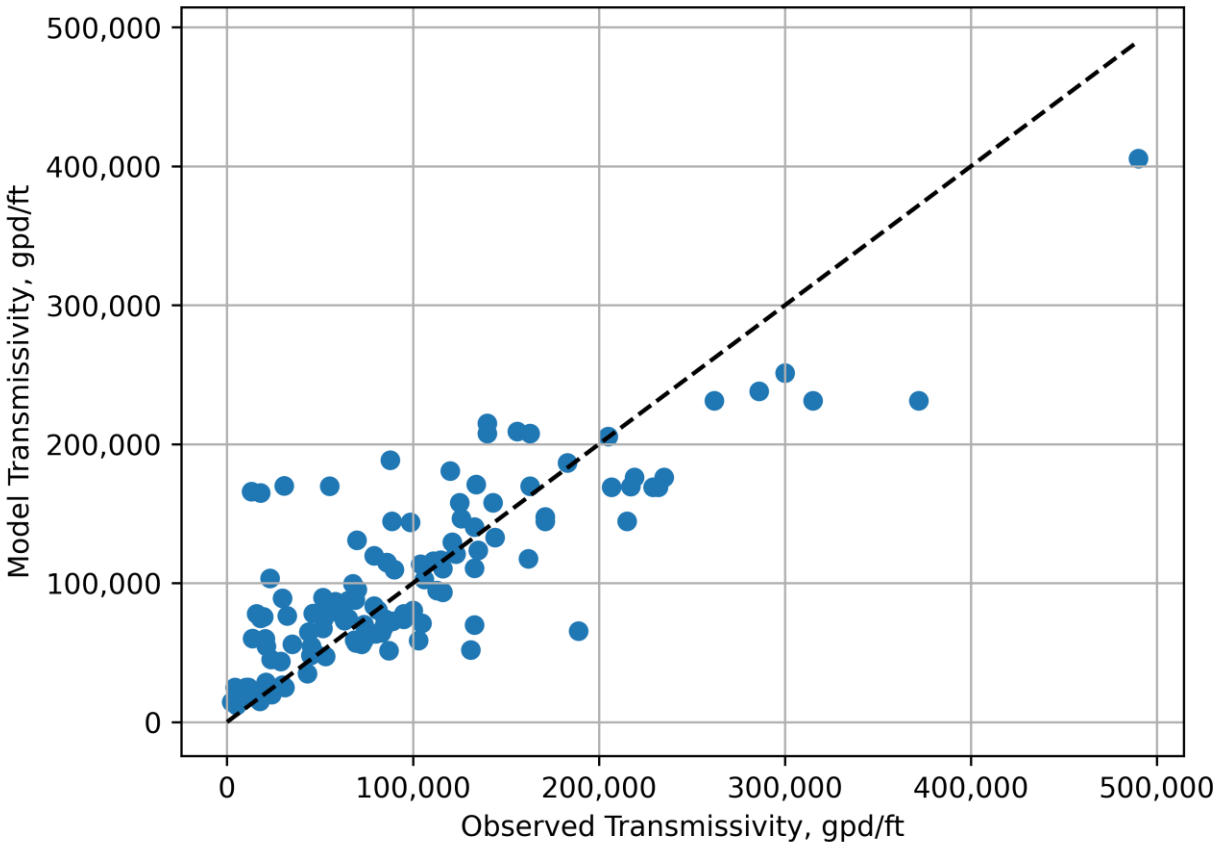

Figure 60. Observed versus calibrated transmissivity for Layer 2 (Chicot Aquifer).

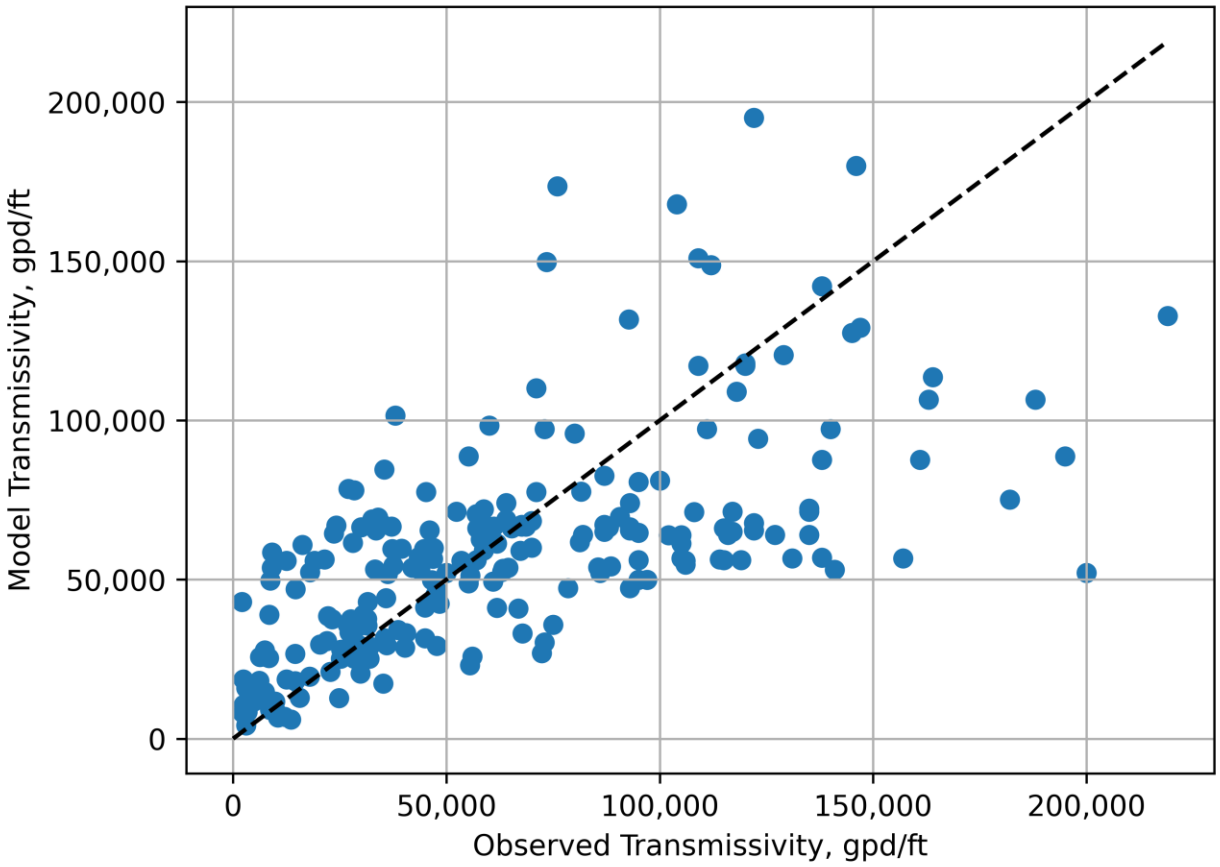

Figure 61. Observed versus calibrated transmissivity for Layer 3 (Evangeline Aquifer).

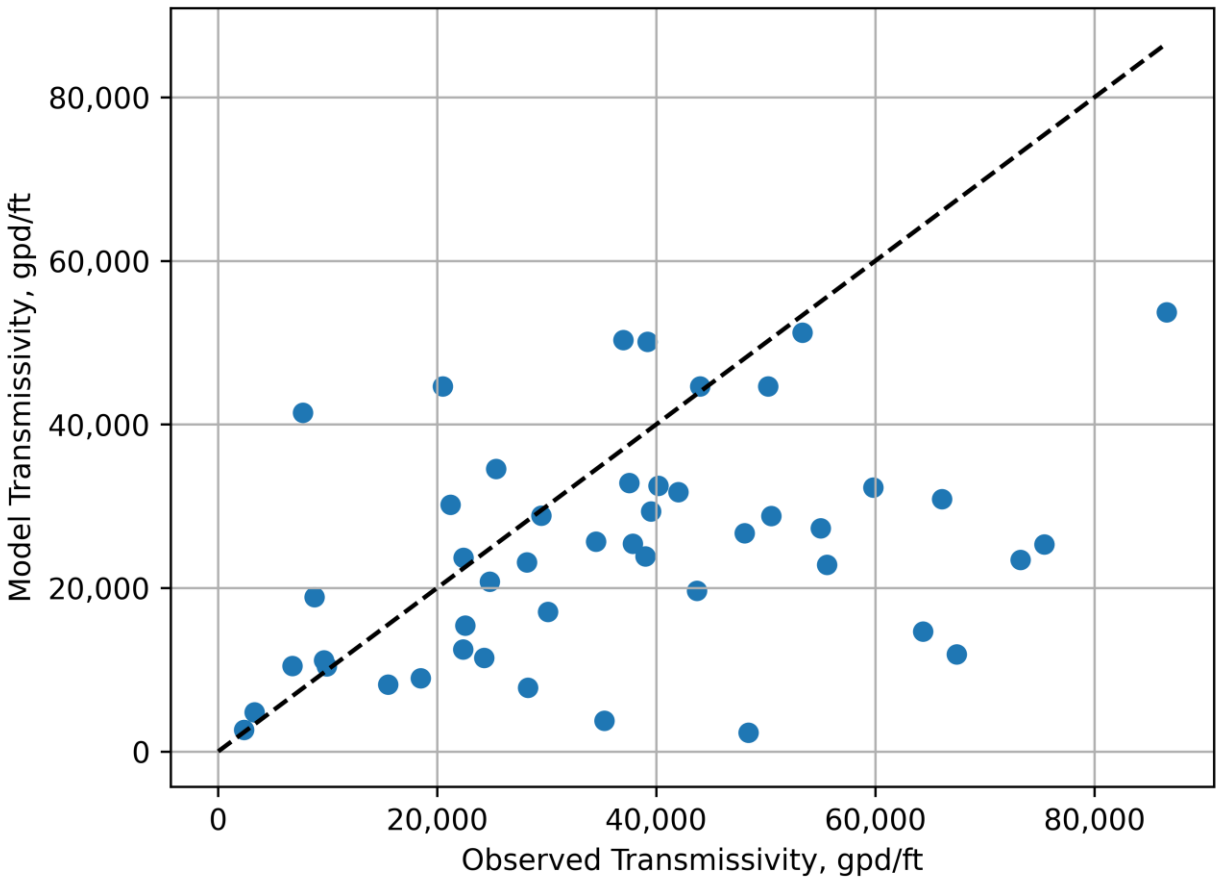

Figure 62. Observed versus calibrated transmissivity for Layer 5 (Jasper Aquifer).

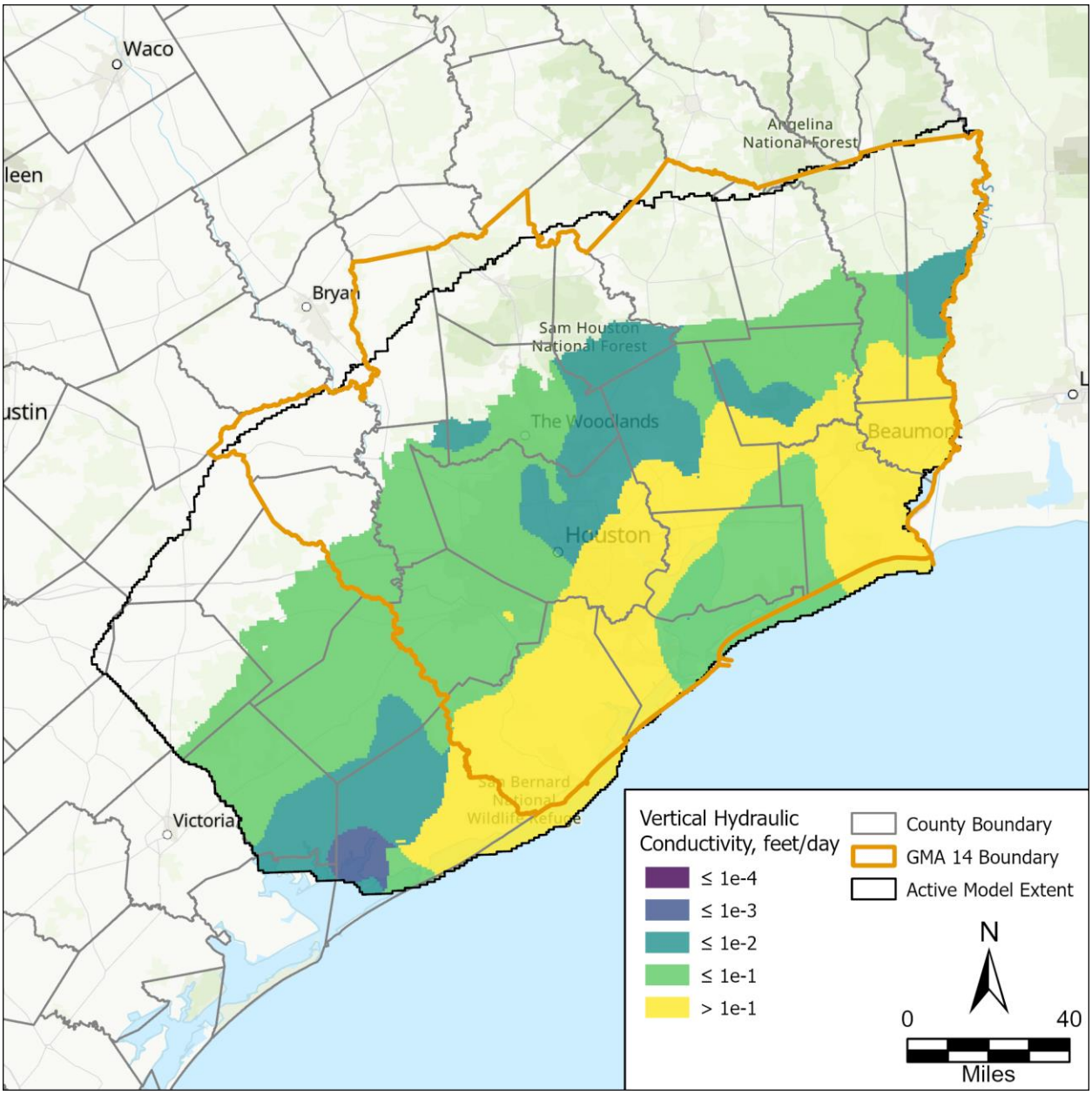

Figure 63. Calibrated layer 2 (Chicot Aquifer) vertical hydraulic conductivity.

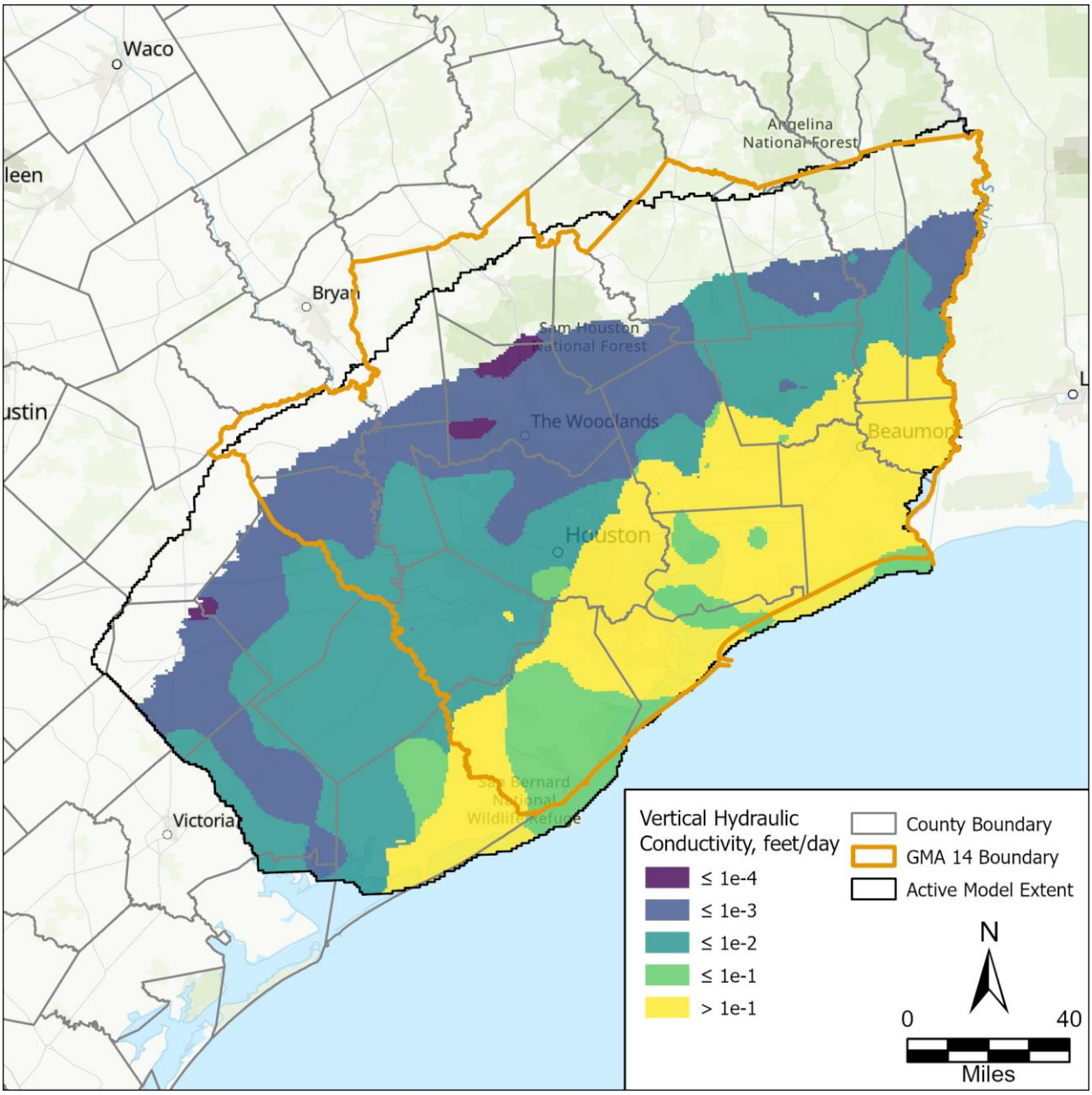

Figure 64. Calibrated layer 3 (Evangeline Aquifer) vertical hydraulic conductivity.

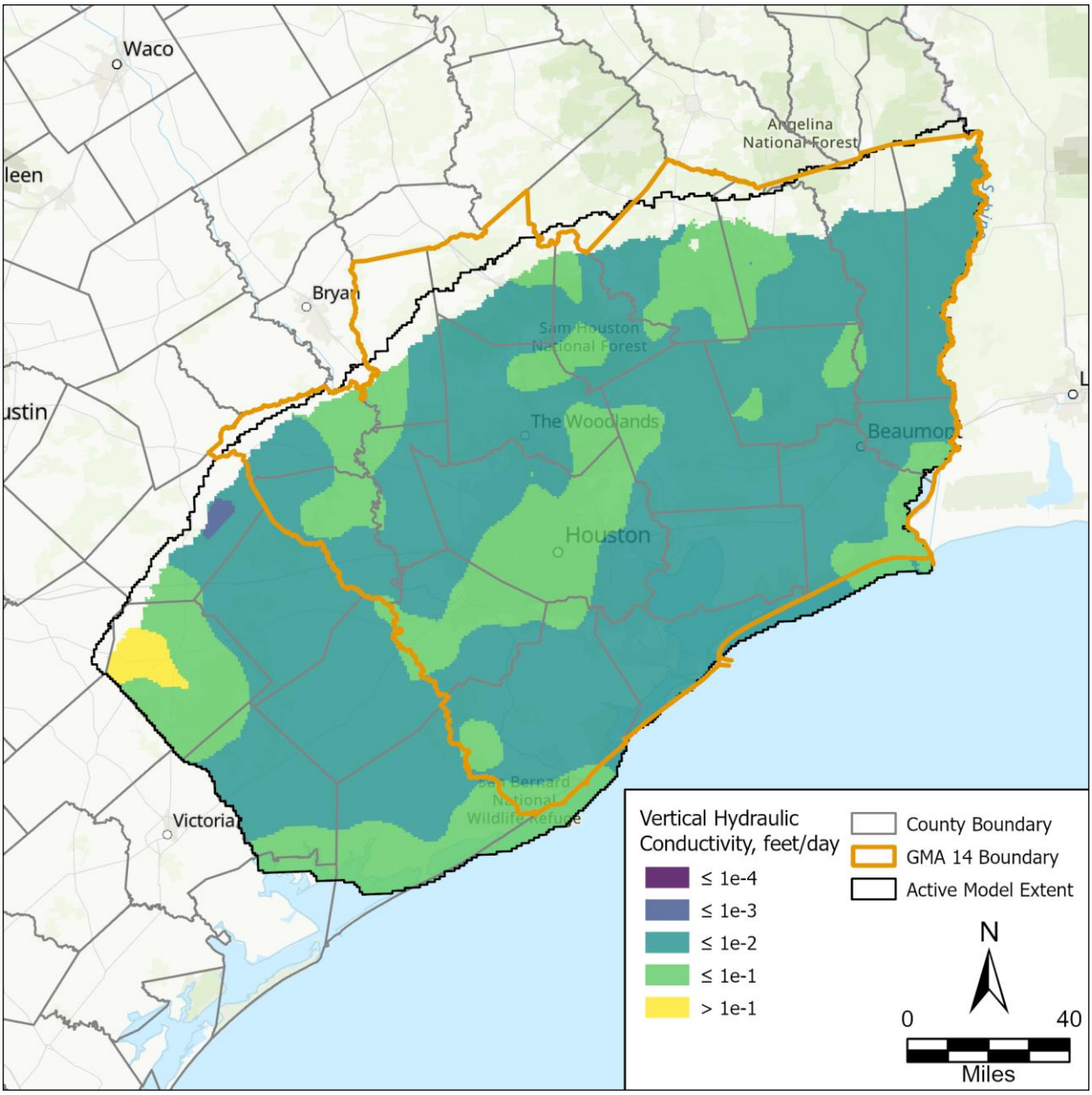

Figure 65. Calibrated layer 5 (Jasper Aquifer) vertical hydraulic conductivity.

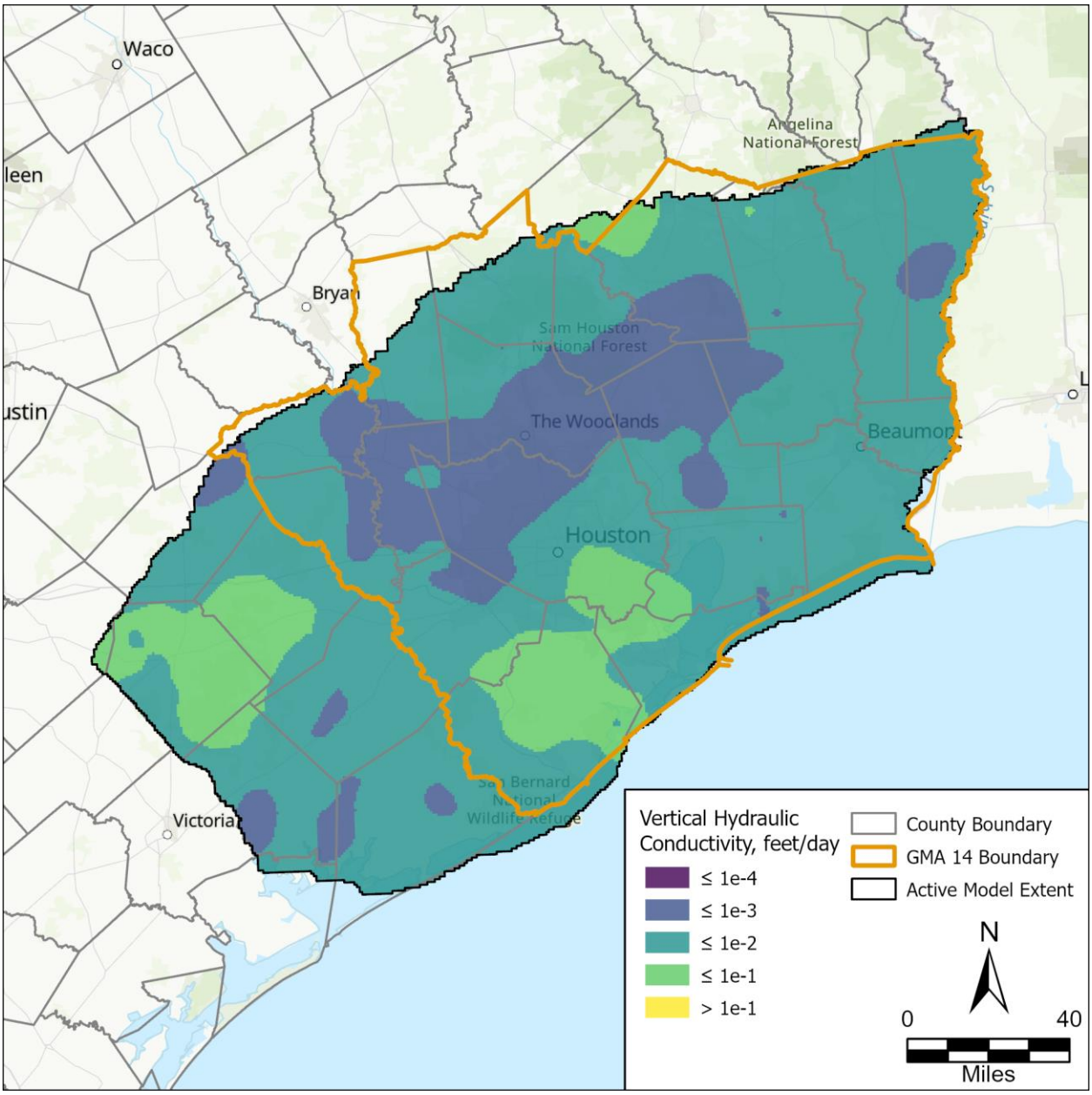

Figure 66. Calibrated layer 6 (Catahoula Aquifer) vertical hydraulic conductivity.

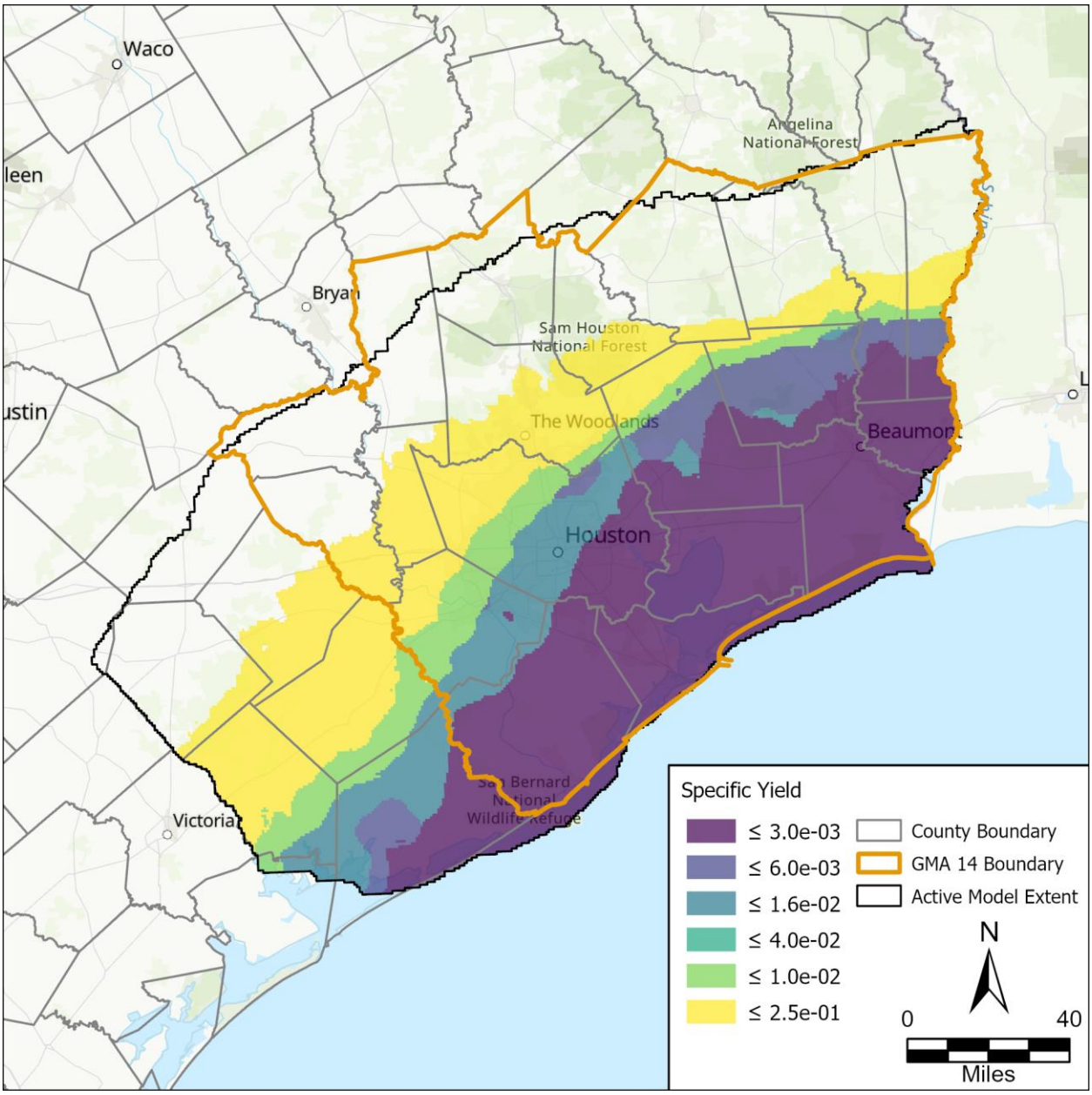

Figure 67. Layer 2 (Chicot Aquifer) calibrated specific yield.

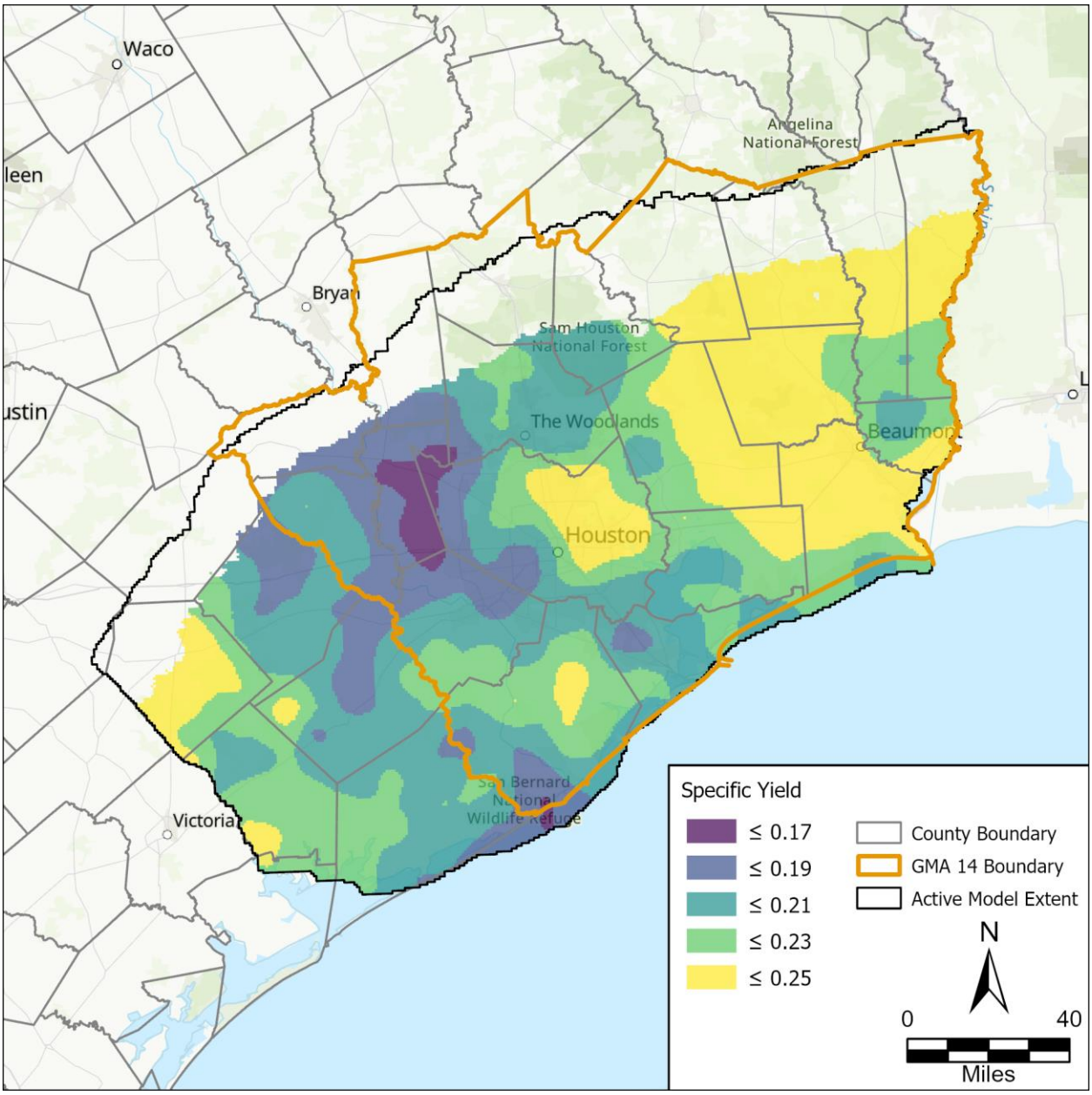

Figure 68. Layer 3 (Evangeline Aquifer) calibrated specific yield.

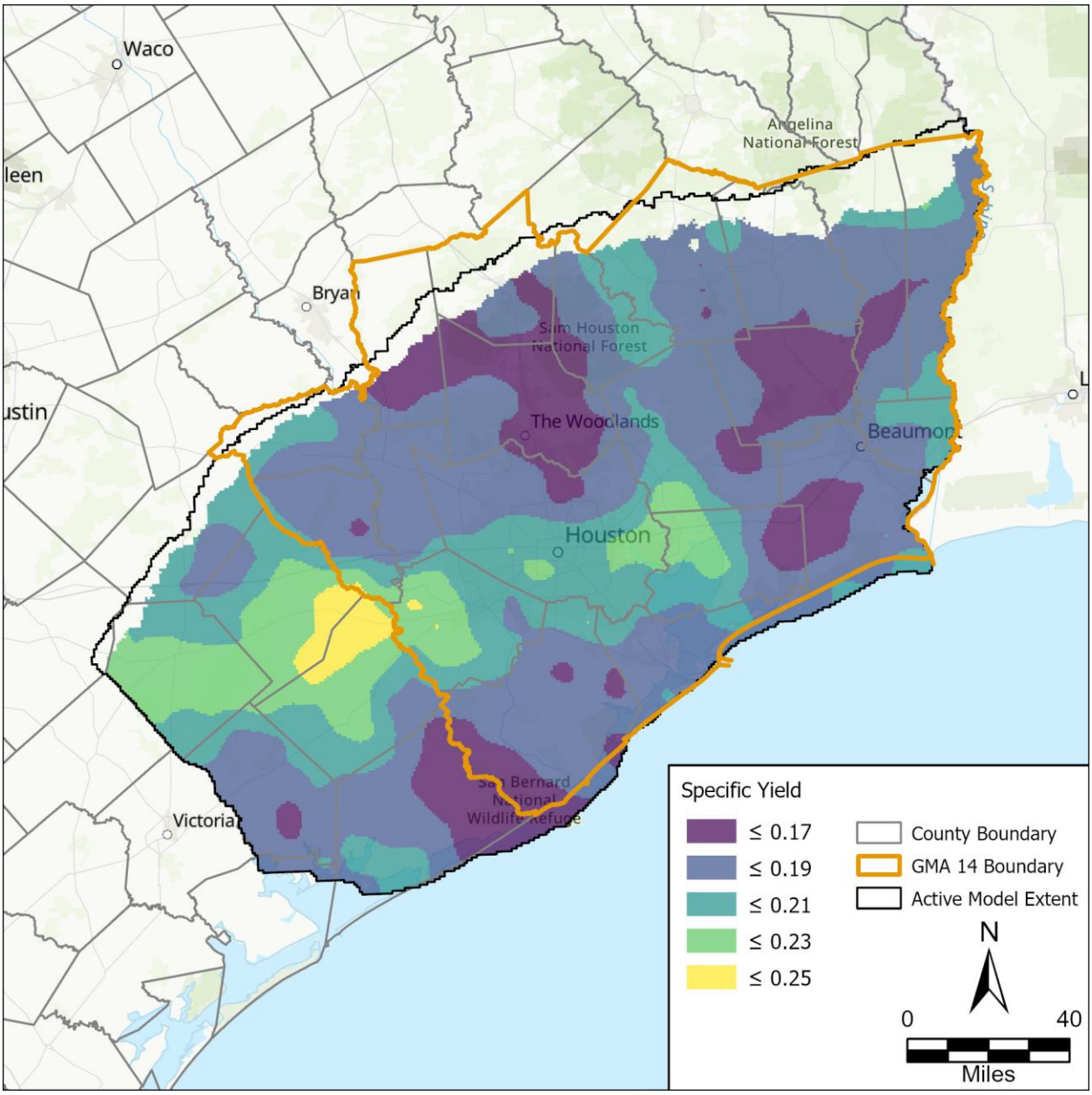

Figure 69. Layer 5 (Jasper Aquifer) calibrated specific yield.

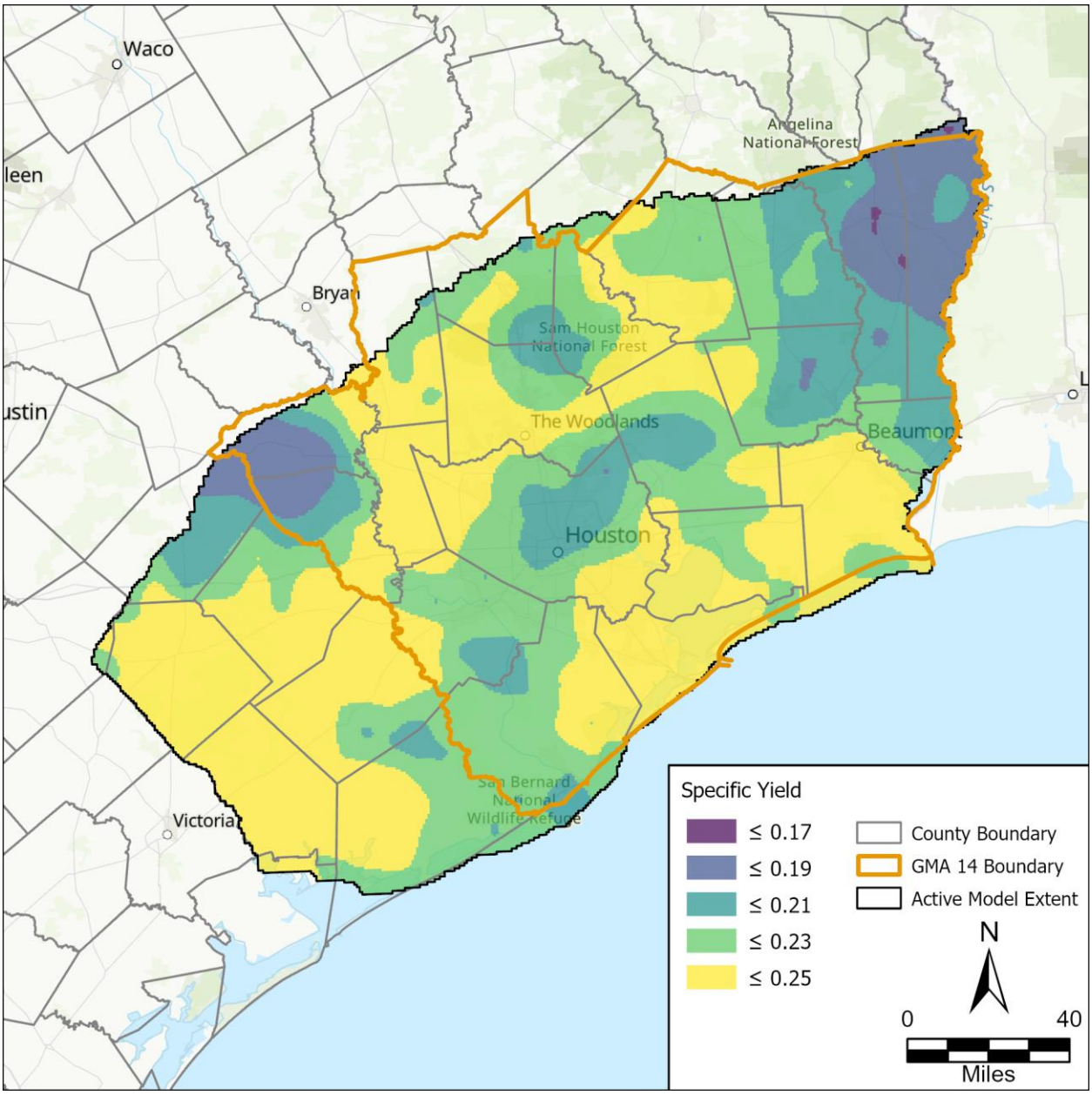

Figure 70. Layer 6 (Catahoula Aquifer) calibrated specific yield.

4.1.4. Calibration of Compaction (CSUB) Properties

We applied model-wide and pilot-point scale multipliers to interbed compaction properties for layers with interbeds. Table 11 summarizes the initial and calibrated base model statistics by layer for each interbed compaction property adjusted during calibration.

The interbed porosity varied using a multiplier range of 0.75 to 1.25. The model-wide mean increased in the Evangeline and decreased in the Chicot, Burkeville, and Jasper. Figures 71 through 73 illustrate the calibrated base model interbed porosity for each aquifer layer with interbeds. The Evangeline layer had the highest increase in areas in the northeast region, southwest regions, and Montgomery County.

The interbed elastic specific storage varied using a multiplier range of 0.15 to 5. The model-wide mean increased in the Burkeville and Jasper, decreased in the Evangeline, and the Chicot remained about the same. Figures 74 through 76 illustrate the calibrated base model interbed elastic specific storage for each aquifer layer with interbeds. The Chicot and Evangeline both had the most decrease in the shallowest depths and the most increase in the deeper depths. The Jasper layer values decreased with depth with the highest values around Montgomery and surrounding counties.

The interbed inelastic specific storage varied using a multiplier range of 0.15 to 5. The model-wide mean decreased in all layers. Figures 77 through 79 illustrate the calibrated base model interbed inelastic specific storage for each aquifer layer with interbeds. The Chicot had the highest changes in the deeper downdip regions of the model where values increased from the initial to the calibrated base model. Values within the Evangeline and Jasper aquifers predominantly decreased across the model domain during calibration. Values within the Evangeline are highest in Austin, Montgomery, and Harris counties with the lowest values in the northeastern region on the model. The Jasper had the highest values near the shallow depth and decreased with deeper depths.

The interbed vertical hydraulic conductivity varied using a multiplier range of 0.1 to 10. The model-wide mean increased in the Evangeline and Burkeville and decreased in the Chicot and Jasper. Figures 80 through 82 illustrate the calibrated base model interbed vertical hydraulic conductivity for each aquifer layer with interbeds. Values within the Chicot were highest in the eastern region of the model and were consistent across the reminder of the model area. The Evangeline had the highest values in the northeastern region of the model with the lowest values near the deeper regions near the Gulf of Mexico. The Jasper had the lowest overall mean value between the layers. Values within the Jasper were highest where the depths were shallow and increased with increased depth.

Table 11. Initial and calibrated interbed compaction properties statistics by layer.

Interbed Compaction Property	Layer	Initial			Calibrated Base Model		
		Min	Max	Mean	Min	Max	Mean
Porosity	2	0.33	0.45	0.37	0.18	0.47	0.31
	3	0.27	0.45	0.33	0.21	0.60	0.44
	4	0.26	0.45	0.31	0.10	0.44	0.24
	5	0.26	0.45	0.30	0.09	0.41	0.23
Elastic Specific Storage	2	1.33E-05	3.49E-05	2.08E-05	3.48E-06	7.53E-05	2.04E-05
	3	3.29E-06	3.49E-05	1.27E-05	8.45E-07	3.65E-05	5.79E-06
	4	3.29E-06	3.49E-05	9.93E-06	6.48E-07	5.00E-05	1.16E-05
	5	3.29E-06	3.49E-05	8.67E-06	3.69E-06	3.04E-04	5.45E-05
Inelastic Specific Storage	2	6.50E-05	1.79E-04	1.04E-04	5.79E-06	1.55E-04	5.53E-05
	3	1.21E-05	1.79E-04	6.20E-05	1.71E-06	9.42E-05	1.64E-05
	4	1.21E-05	1.79E-04	4.71E-05	1.00E-07	8.57E-06	1.43E-06
	5	1.21E-05	1.79E-04	4.05E-05	7.55E-07	9.78E-05	1.52E-05
Vertical Hydraulic Conductivity	2	7.13E-06	1.27E-05	1.00E-05	2.50E-07	2.80E-05	6.45E-06
	3	1.60E-06	1.27E-05	6.30E-06	2.27E-07	1.46E-04	1.35E-05
	4	9.92E-07	1.27E-05	4.80E-06	1.23E-07	1.88E-04	1.93E-05
	5	9.92E-07	1.27E-05	4.06E-06	8.14E-09	4.78E-06	2.95E-07

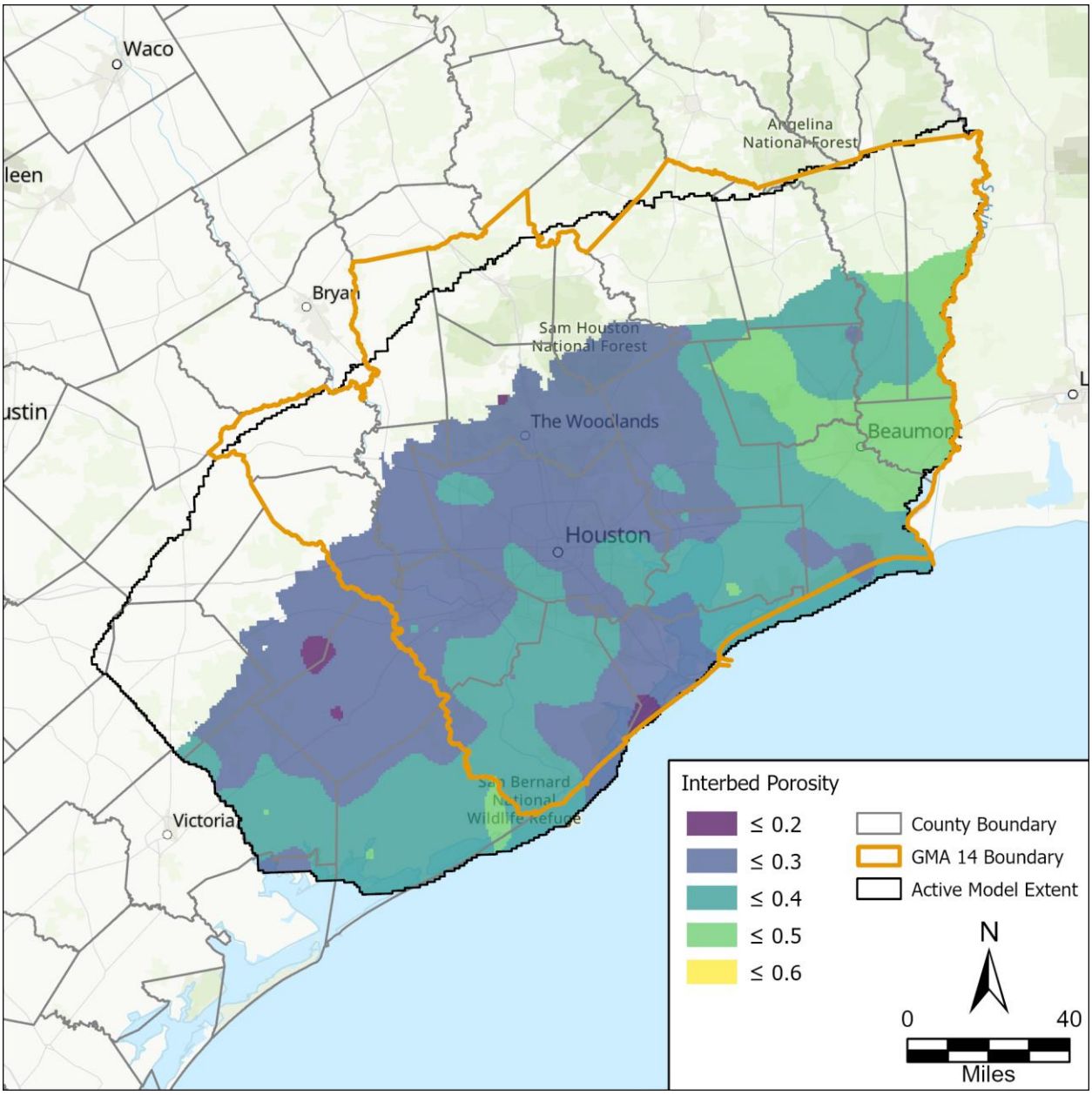

Figure 71. Layer 2 (Chicot Aquifer) calibrated interbed porosity.

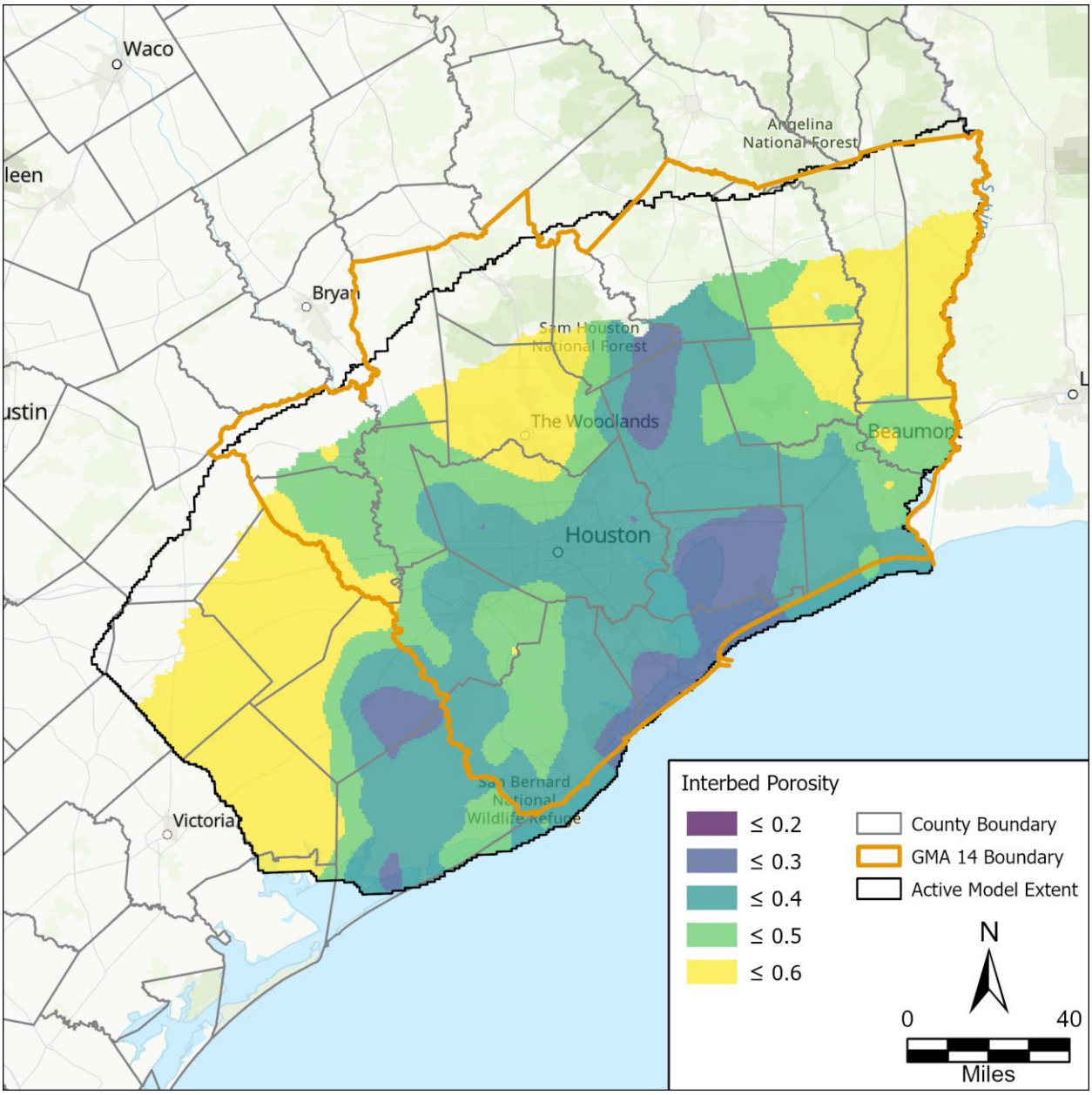

Figure 72. Layer 3 (Evangeline Aquifer) calibrated interbed porosity.

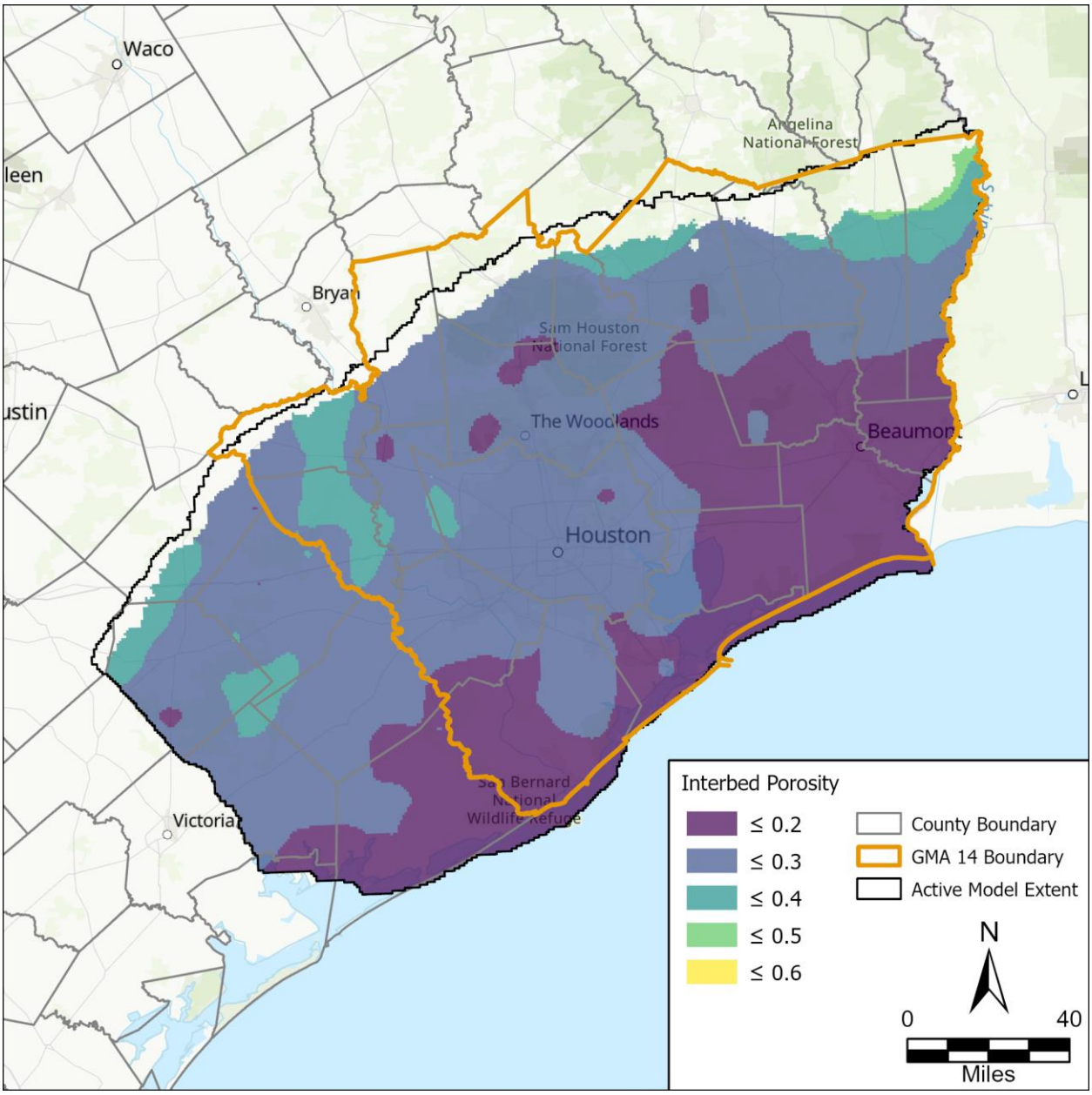

Figure 73. Layer 5 (Jasper Aquifer) calibrated interbed porosity.

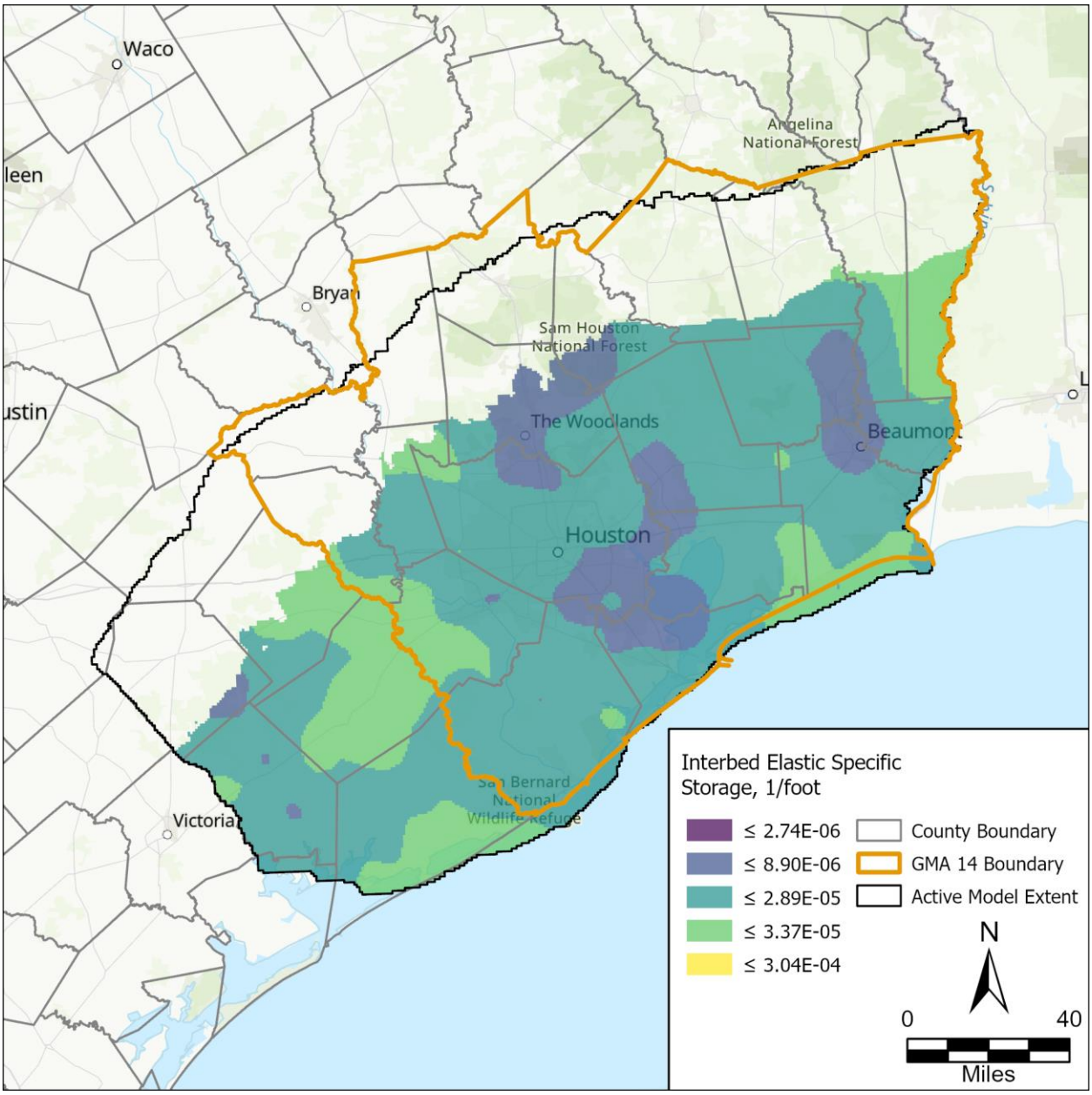

Figure 74. Layer 2 (Chicot Aquifer) calibrated interbed elastic specific storage.

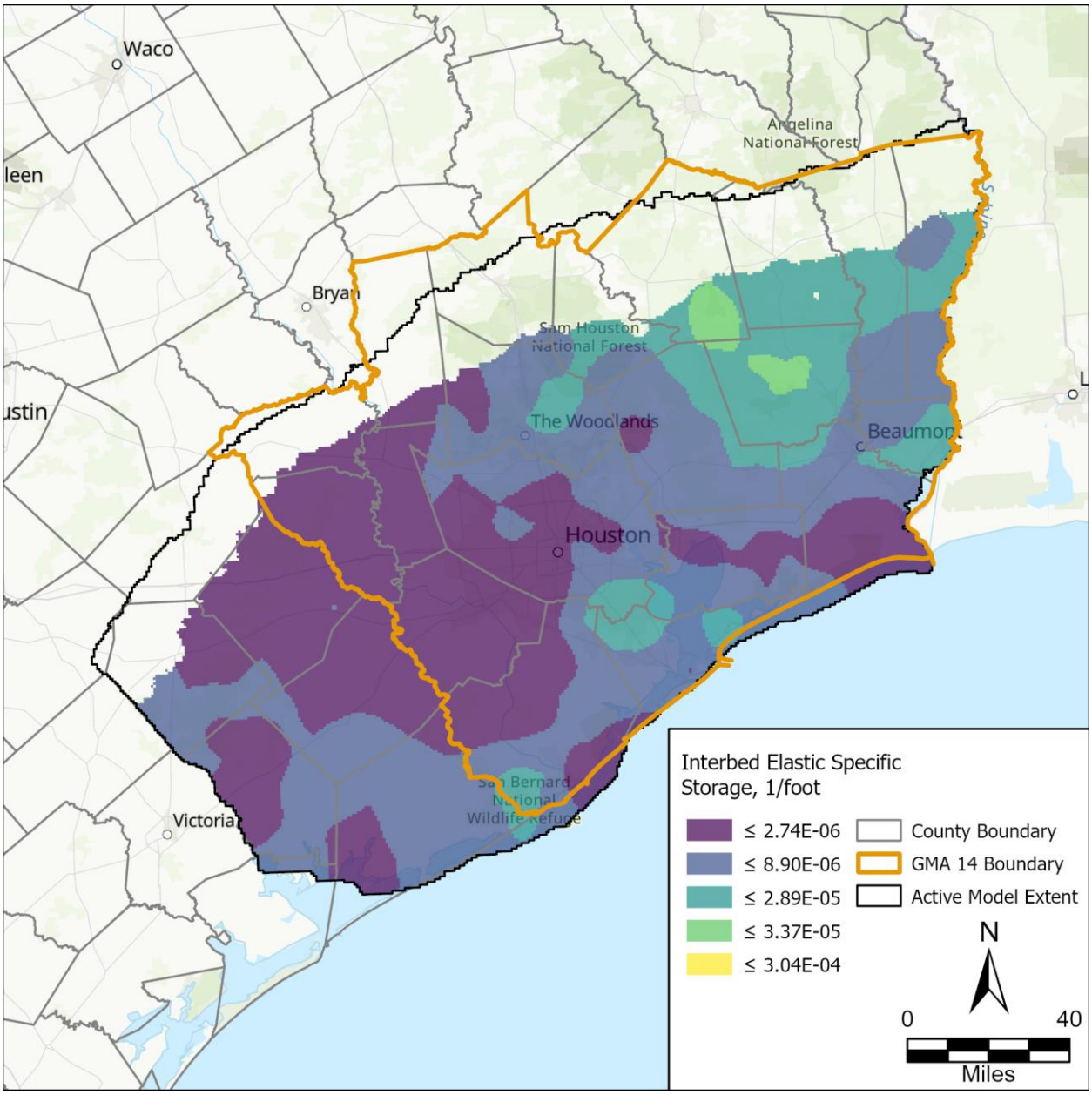

Figure 75. Layer 3 (Evangeline Aquifer) calibrated interbed elastic specific storage.

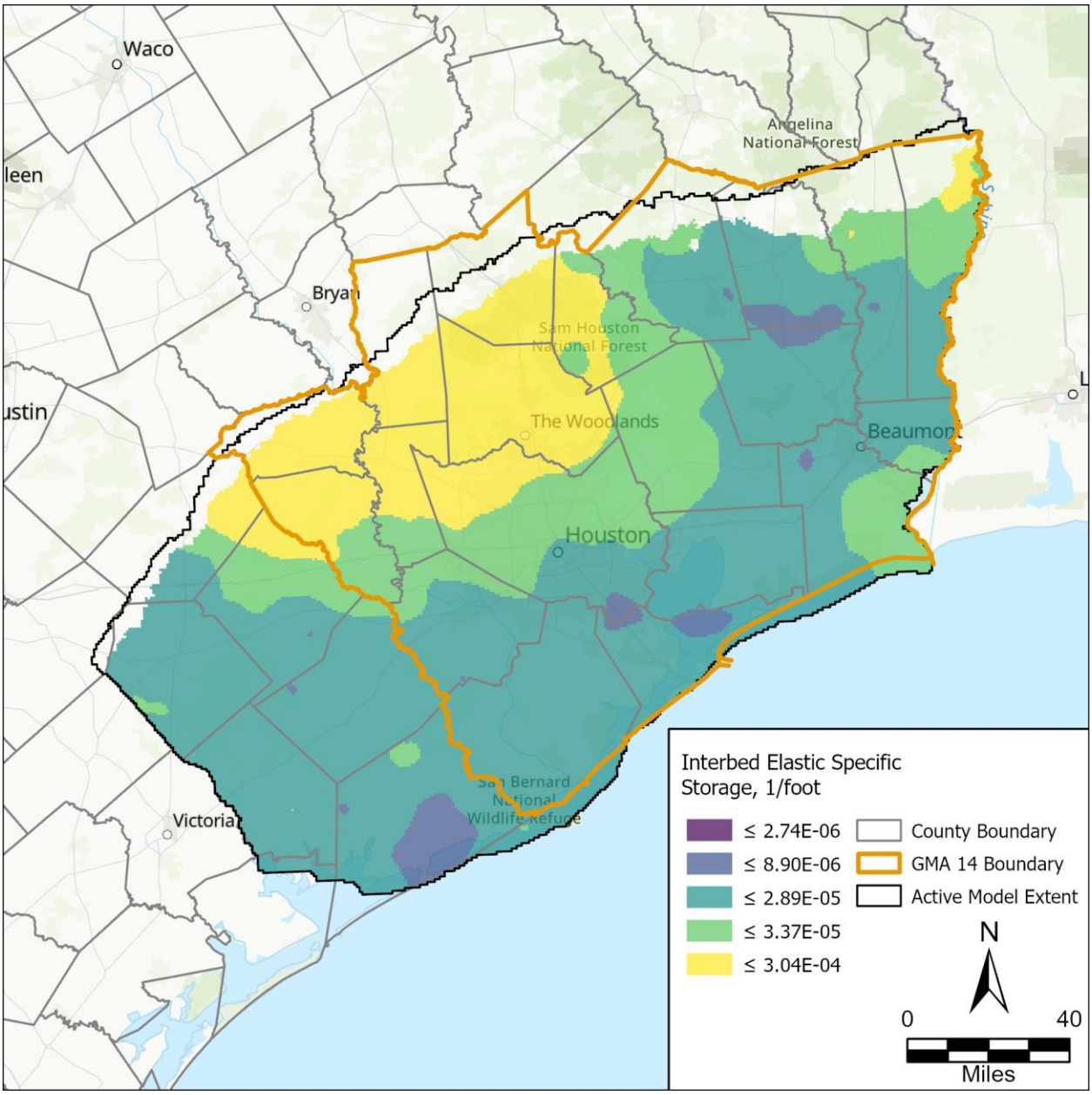

Figure 76. Layer 5 (Jasper Aquifer) calibrated interbed elastic specific storage.

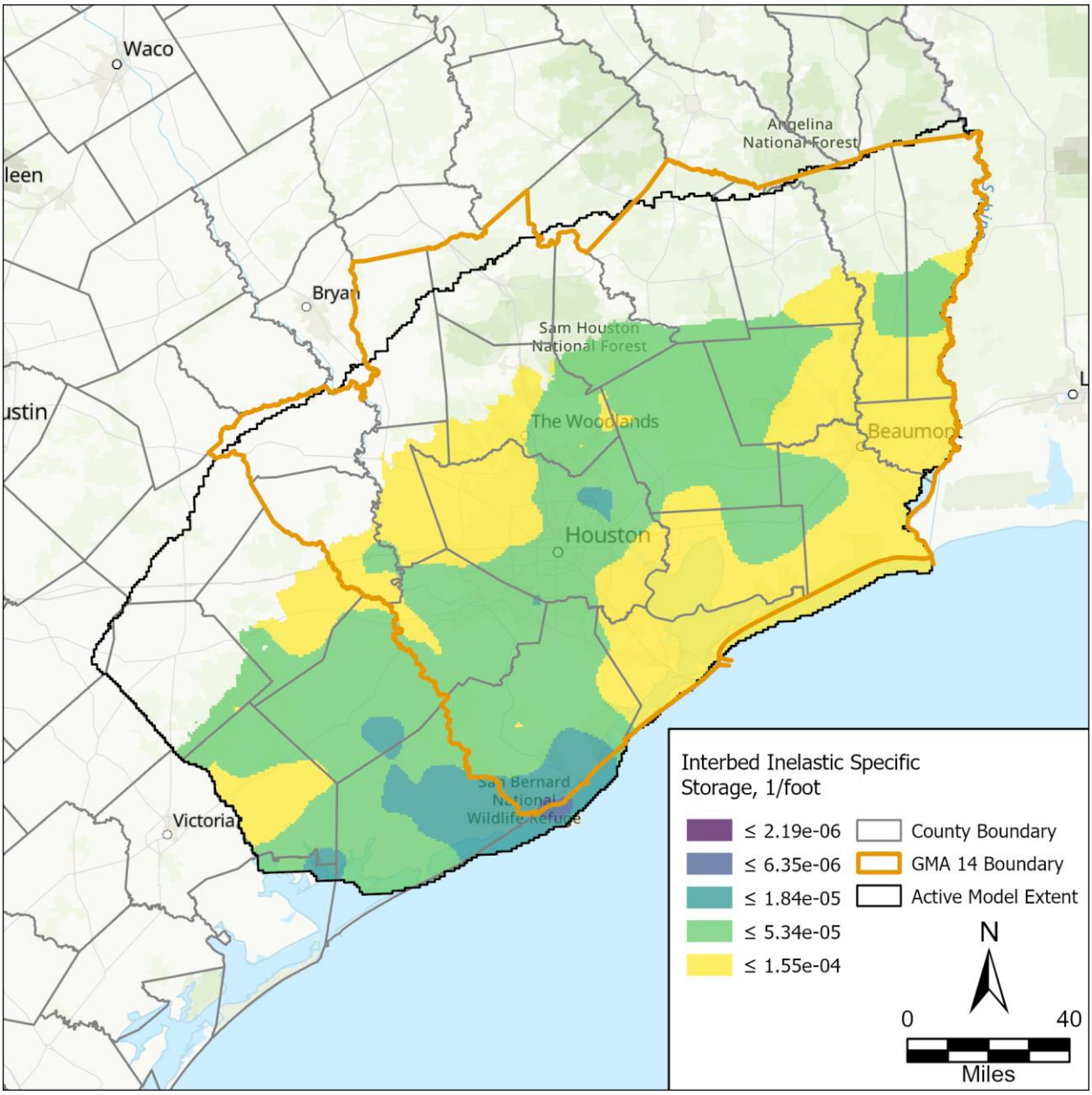

Figure 77. Layer 2 (Chicot Aquifer) calibrated interbed inelastic specific storage.

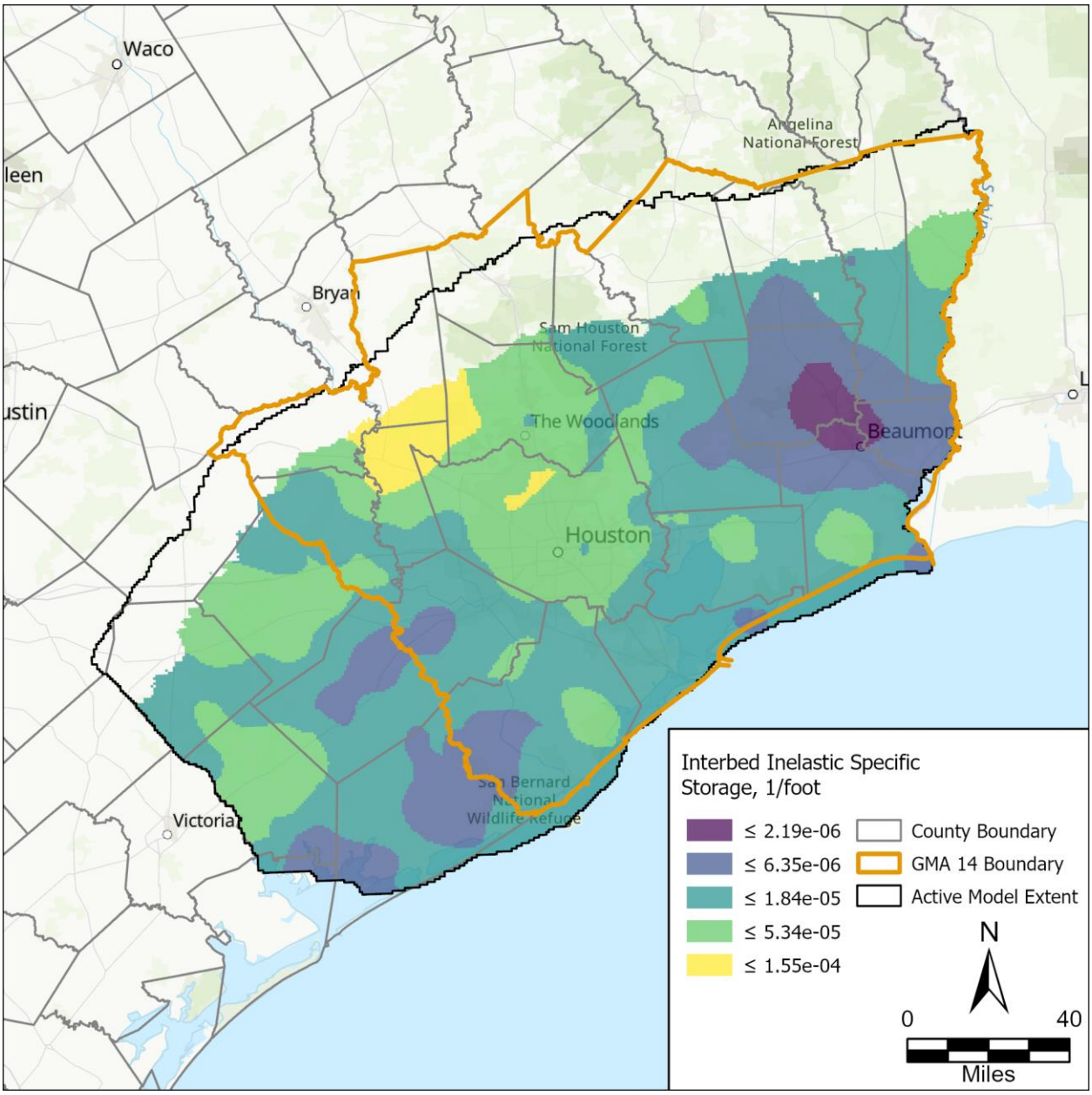

Figure 78. Layer 3 (Evangeline Aquifer) calibrated interbed inelastic specific storage.

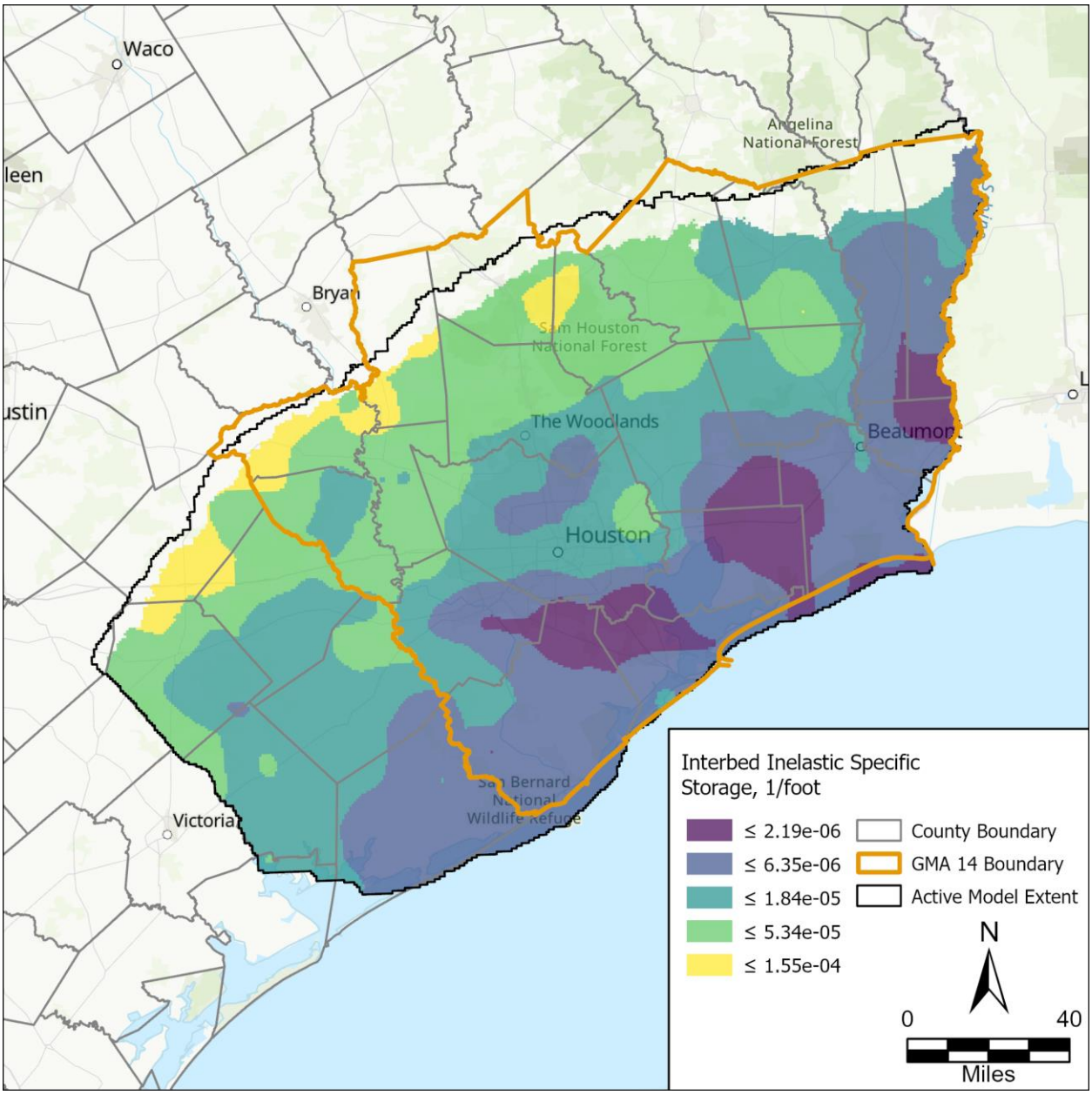

Figure 79. Layer 5 (Jasper Aquifer) calibrated interbed inelastic specific storage.

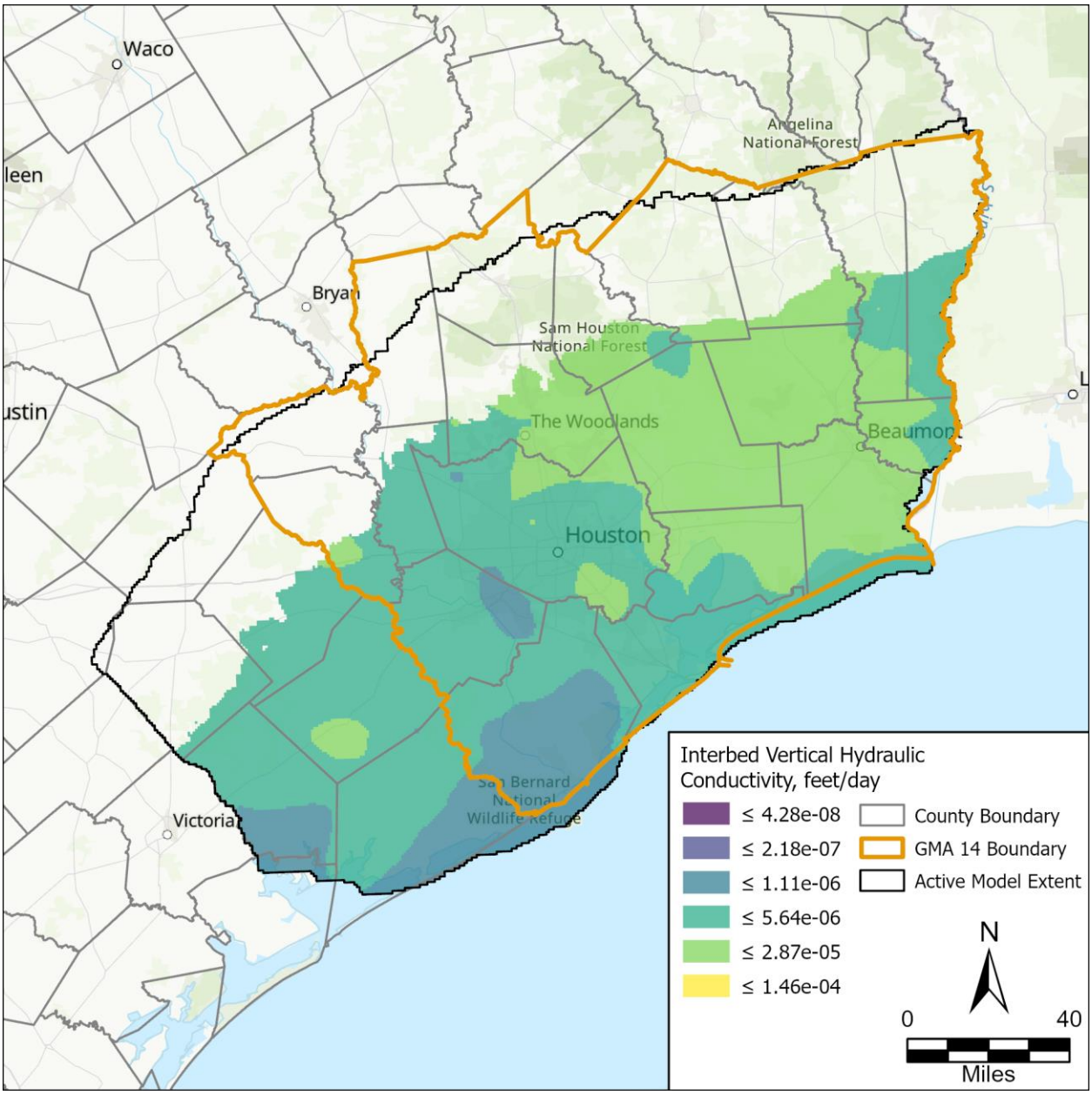

Figure 80. Layer 2 (Chicot Aquifer) calibrated interbed vertical hydraulic conductivity.

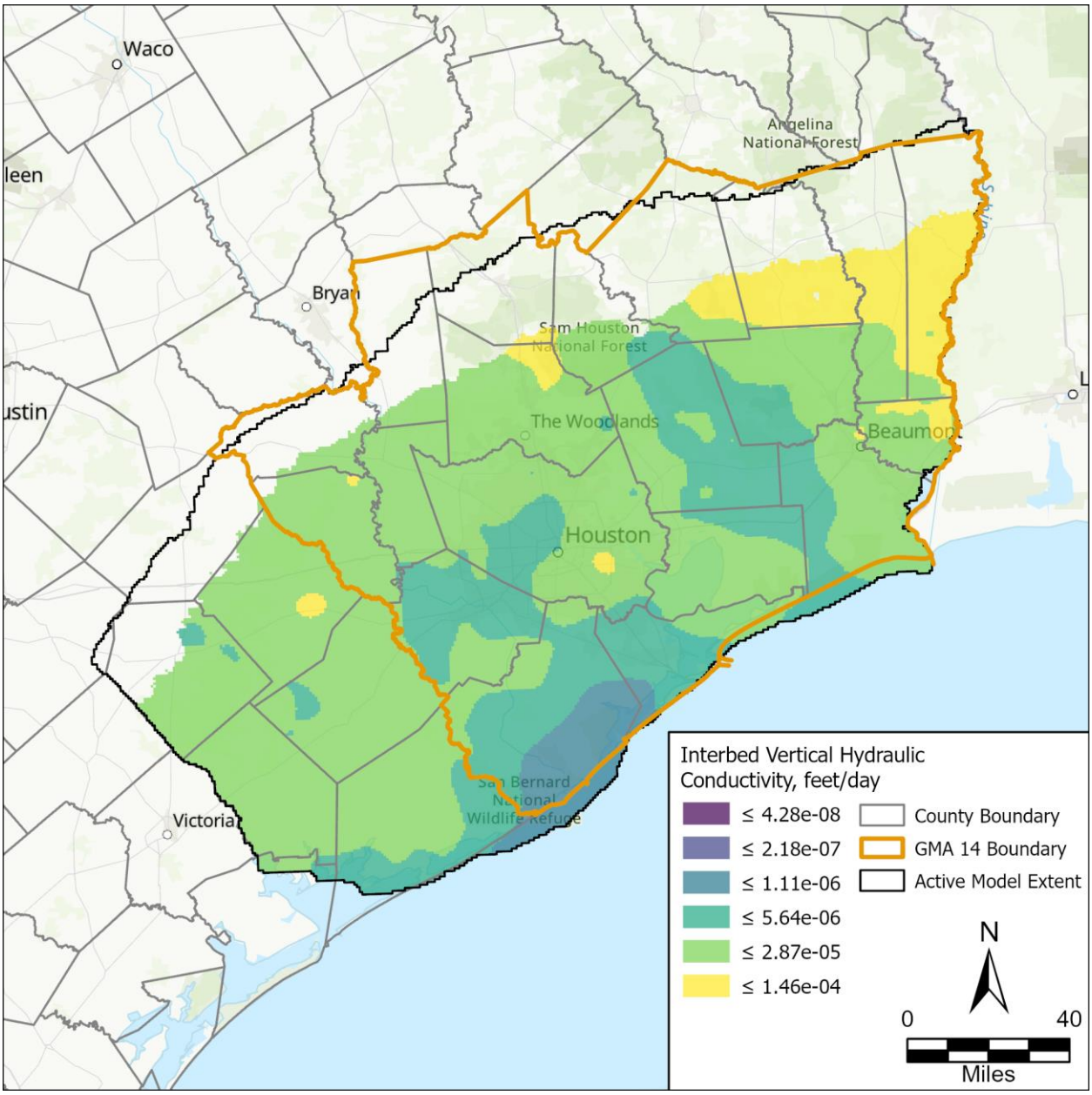

Figure 81. Layer 3 (Evangeline Aquifer) calibrated interbed vertical hydraulic conductivity.

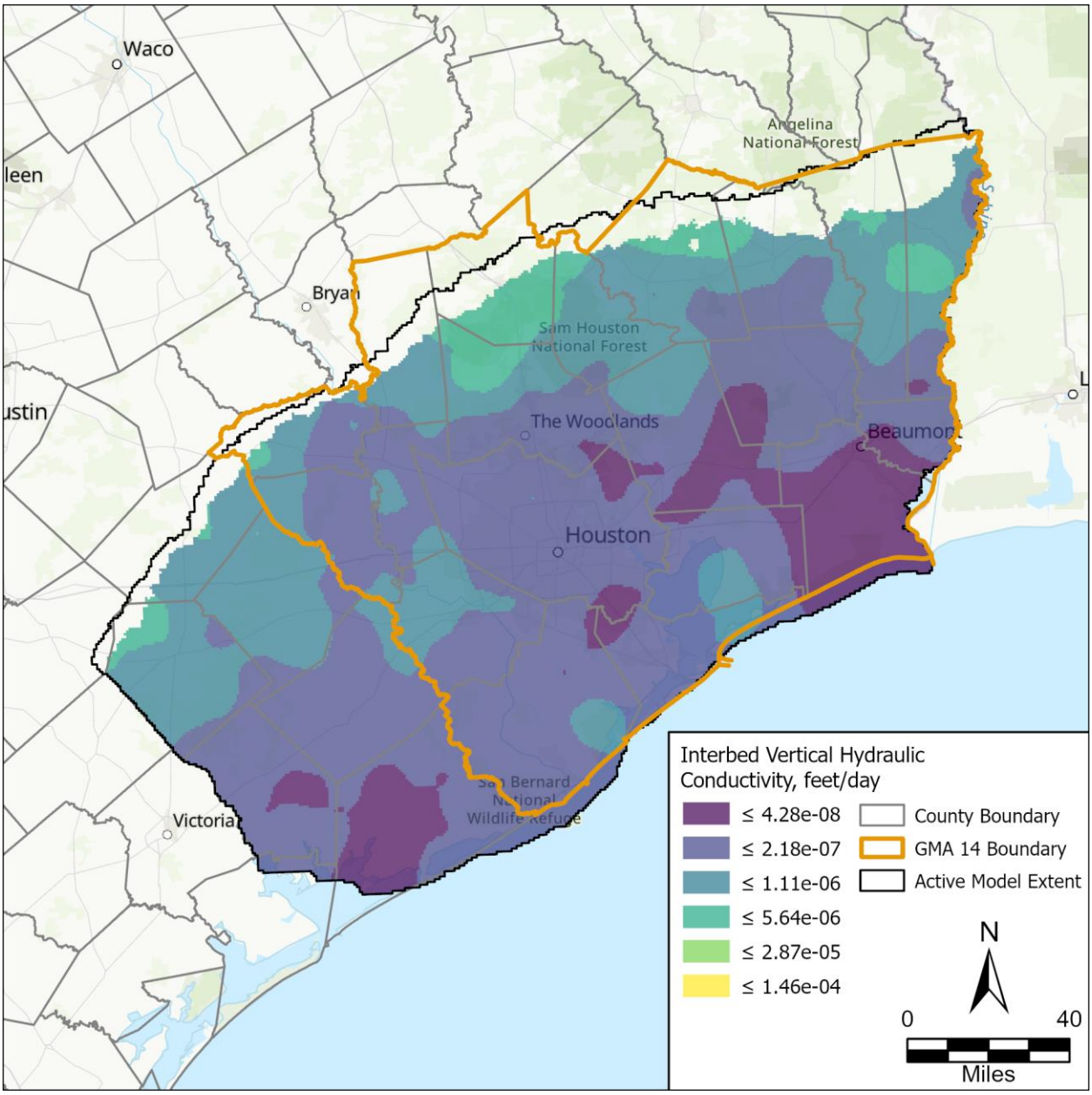

Figure 82. Layer 5 (Jasper Aquifer) calibrated interbed vertical hydraulic conductivity.

Model-wide and pilot-point scale multipliers were applied to coarse-grained storage properties for all layers during calibration. Table 12 summarizes the initial and calibrated base model statistics by layer for each coarse-grained storage property adjusted during calibration.

The coarse-grained elastic specific storage varied using a multiplier range of 0.1 to 10. The model-wide mean increased in the Chicot and Burkeville, decreased in the Evangeline, and stayed about the same as the initial values in the Jasper. Figures 83 through 86 illustrate the calibrated base model coarse-grained elastic specific storage for each aquifer. The coarse-grained elastic storage within the Chicot had the highest increase in central and southeastern Harris County.

The coarse-grained porosity varied using a multiplier range of 0.1 to 10. The model-wide mean increased in the shallow aquifer system, Burkeville, and Catahoula and decreased in the remaining layers. Overall, the mean calibrated values per layer are within 0.03 of the initial mean values. Figures 87 through 90 illustrate the calibrated base model coarse-grained porosity for each aquifer layer.

Table 12. Initial and calibrated coarse-grained storage properties by layer.

Coarse-Grained Storage Property	Layer	Initial			Calibrated Base Model		
		Min	Max	Mean	Min	Max	Mean
Elastic Specific Storage	1	9.20E-07	9.20E-07	9.20E-07	8.57E-08	7.49E-06	1.02E-06
	2	9.20E-07	9.20E-07	9.20E-07	6.45E-08	5.88E-06	1.13E-06
	3	9.20E-08	9.20E-08	9.20E-08	1.71E-09	1.68E-07	3.17E-08
	4	9.20E-07	9.20E-07	9.20E-07	4.51E-07	4.16E-05	4.52E-06
	5	9.20E-07	9.20E-07	9.20E-07	9.48E-08	5.56E-06	9.02E-07
	6	9.20E-07	9.20E-07	9.20E-07	5.57E-08	4.18E-06	4.11E-07
Porosity	1	0.15	0.15	0.15	0.10	0.16	0.12
	2	0.15	0.15	0.15	0.14	0.22	0.17
	3	0.15	0.15	0.15	0.14	0.22	0.18
	4	0.15	0.15	0.15	0.10	0.16	0.13
	5	0.15	0.15	0.15	0.12	0.19	0.16
	6	0.15	0.15	0.15	0.10	0.17	0.13

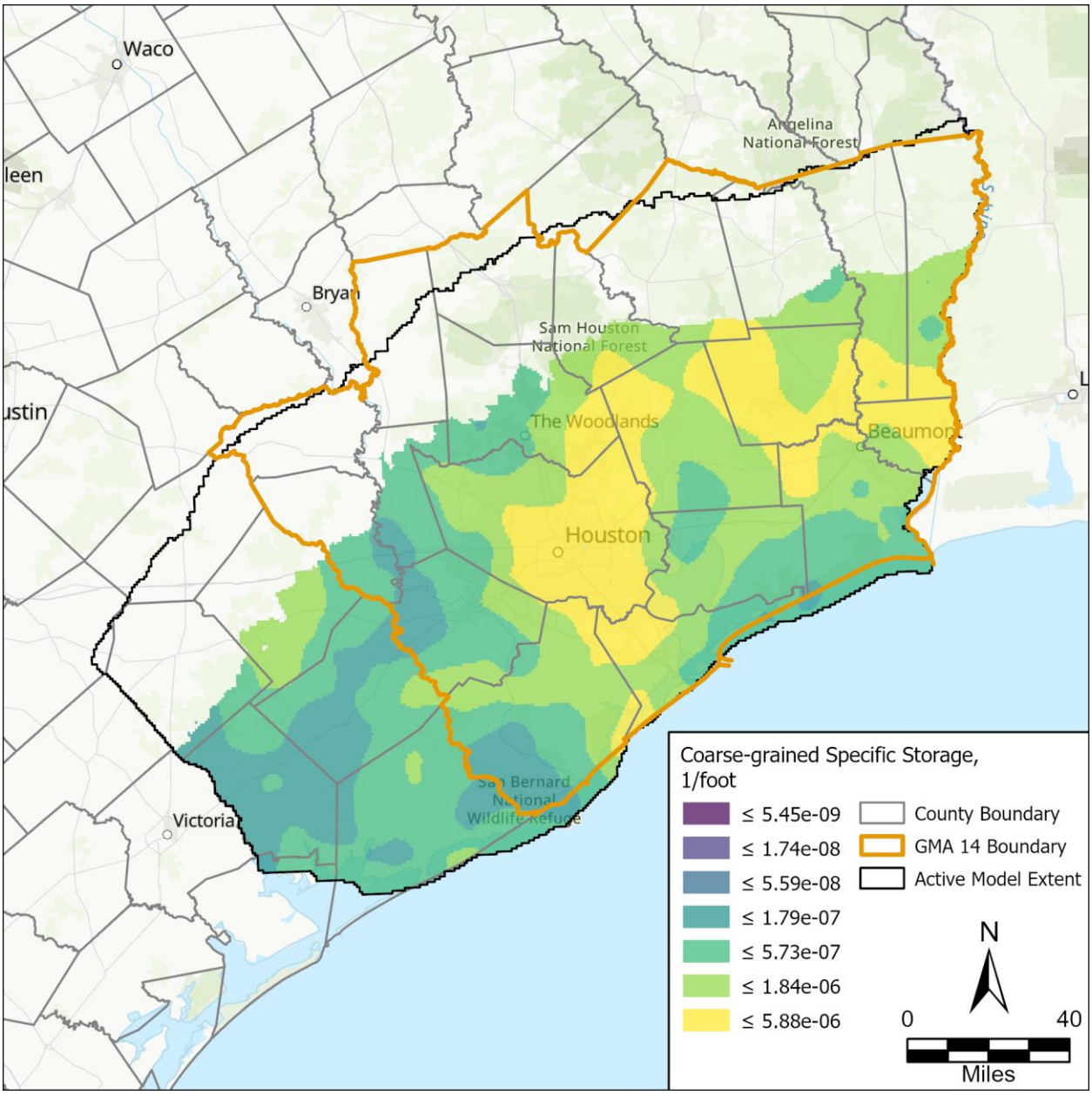

Figure 83. Layer 2 (Chicot Aquifer) calibrated coarse-grained elastic specific storage.

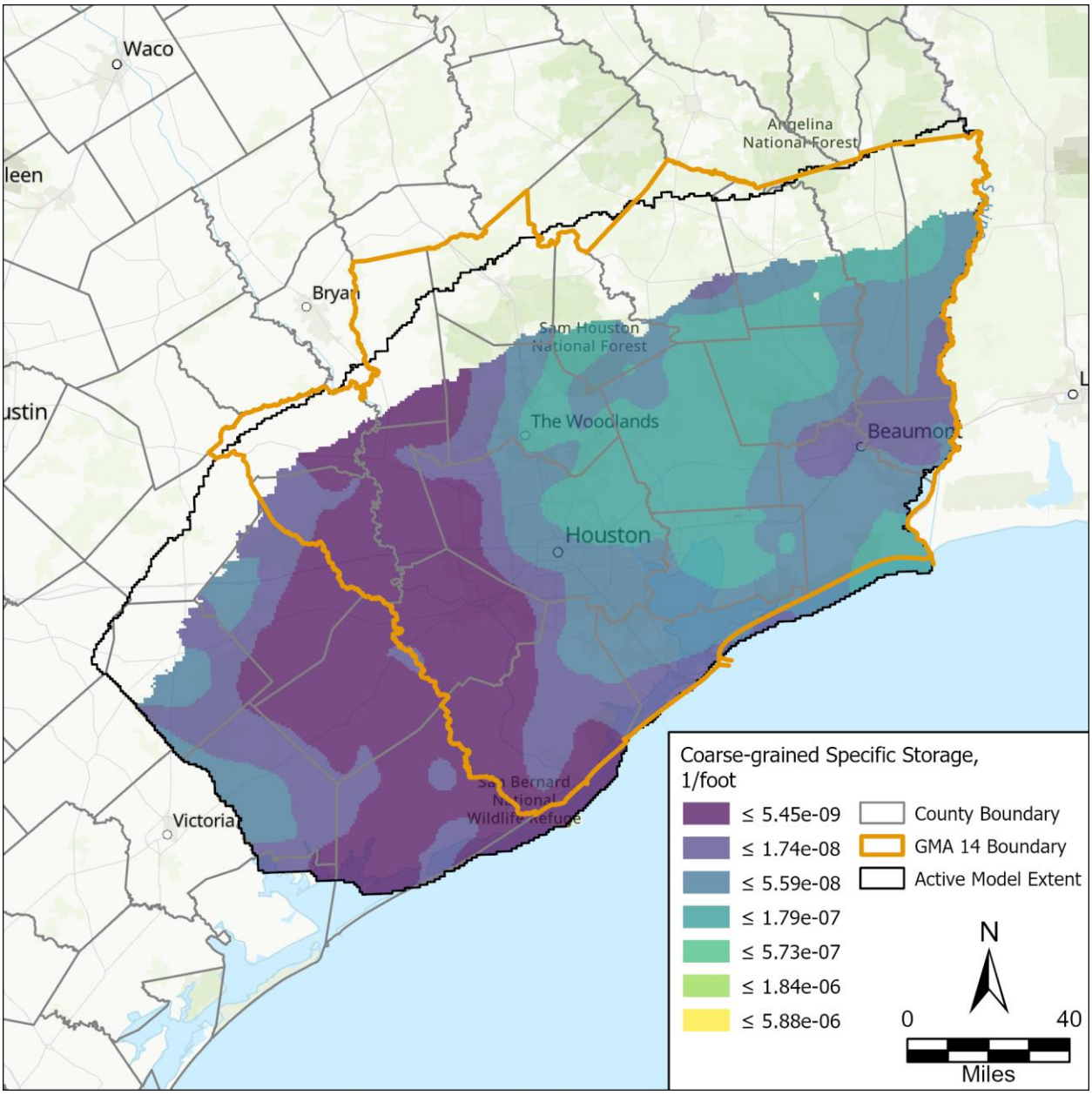

Figure 84. Layer 3 (Evangeline Aquifer) calibrated coarse-grained elastic specific storage.

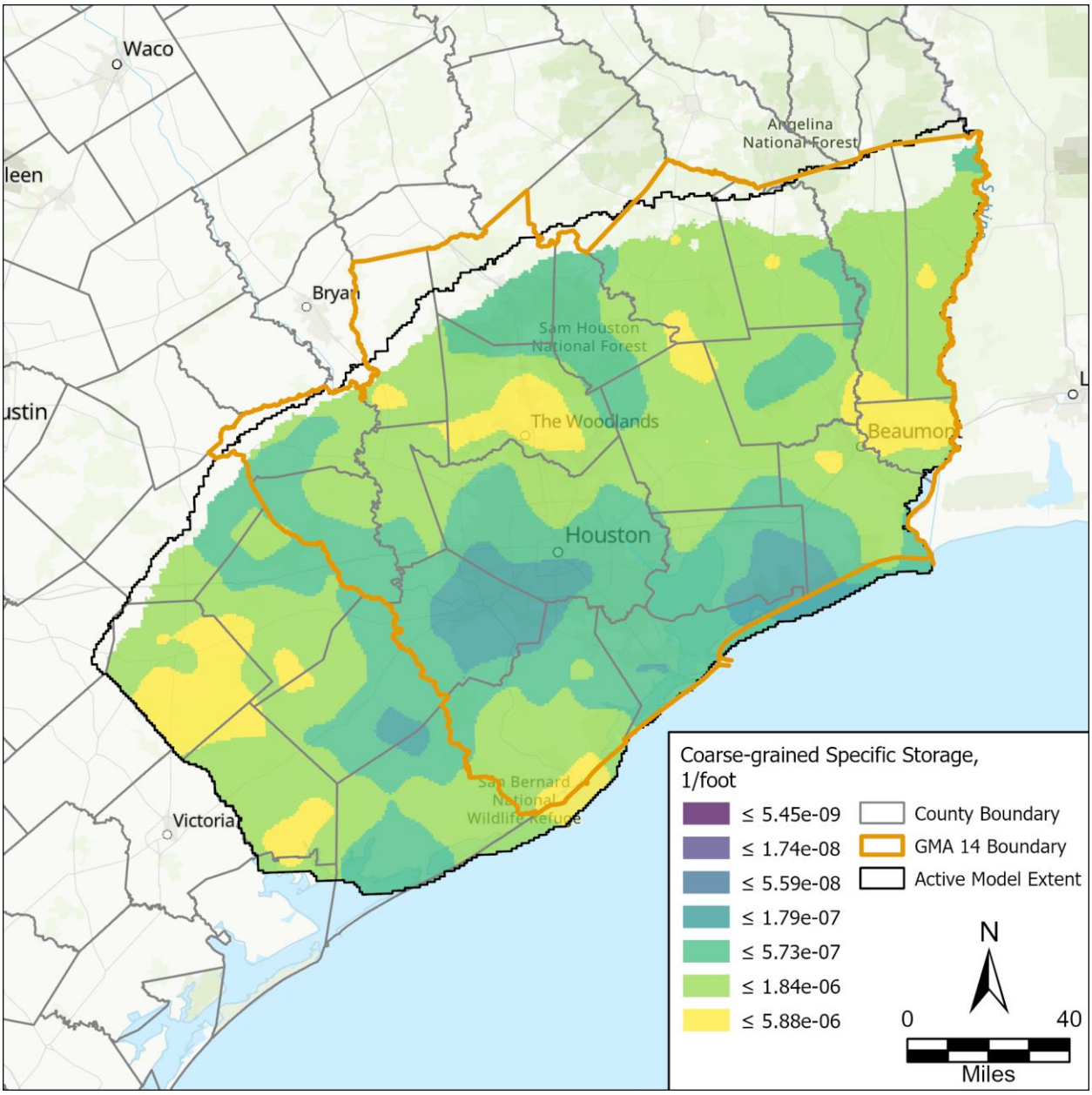

Figure 85. Layer 5 (Jasper Aquifer) calibrated coarse-grained elastic specific storage.

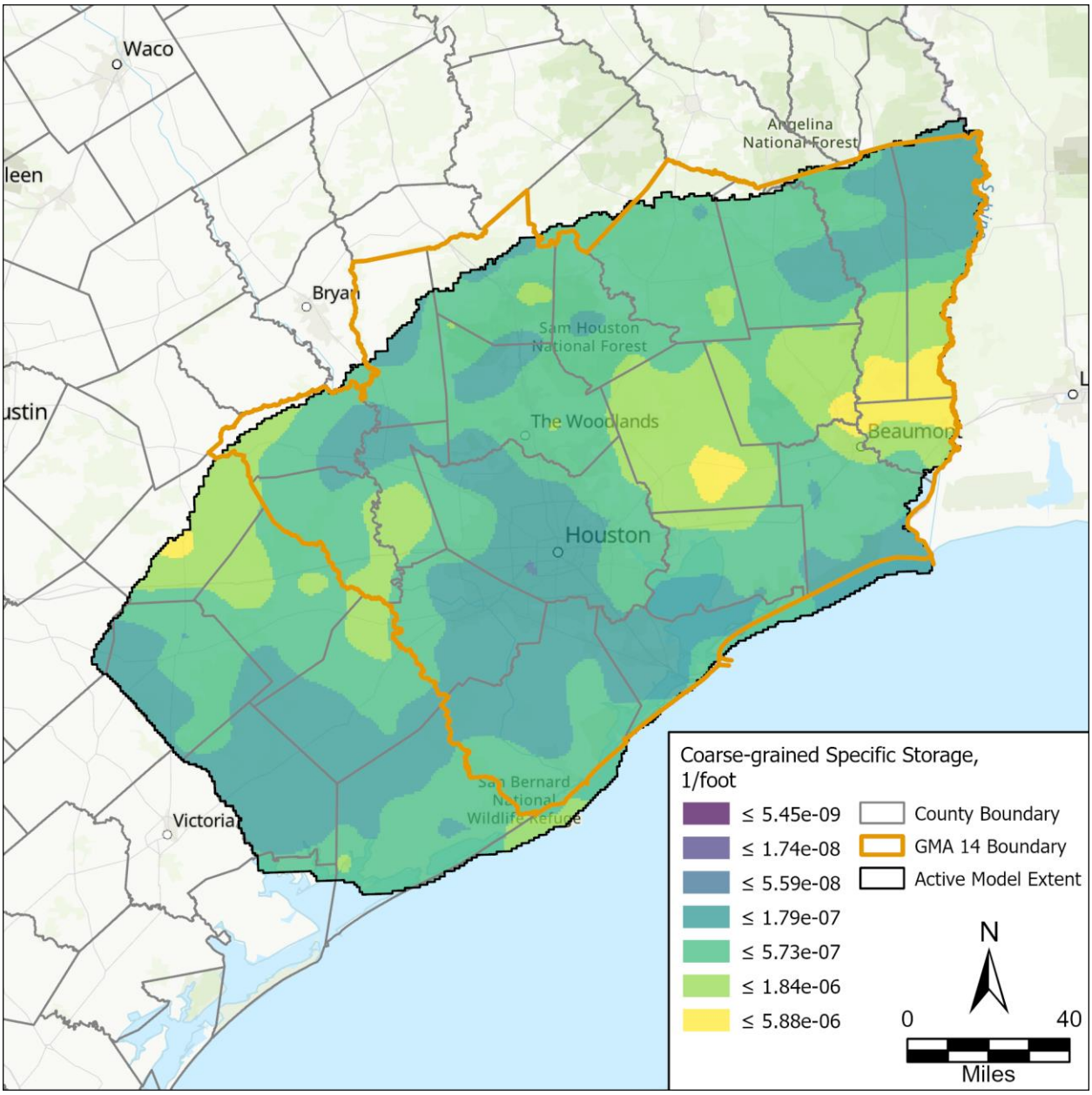

Figure 86. Layer 6 (Catahoula Aquifer) calibrated coarse-grained elastic specific storage.

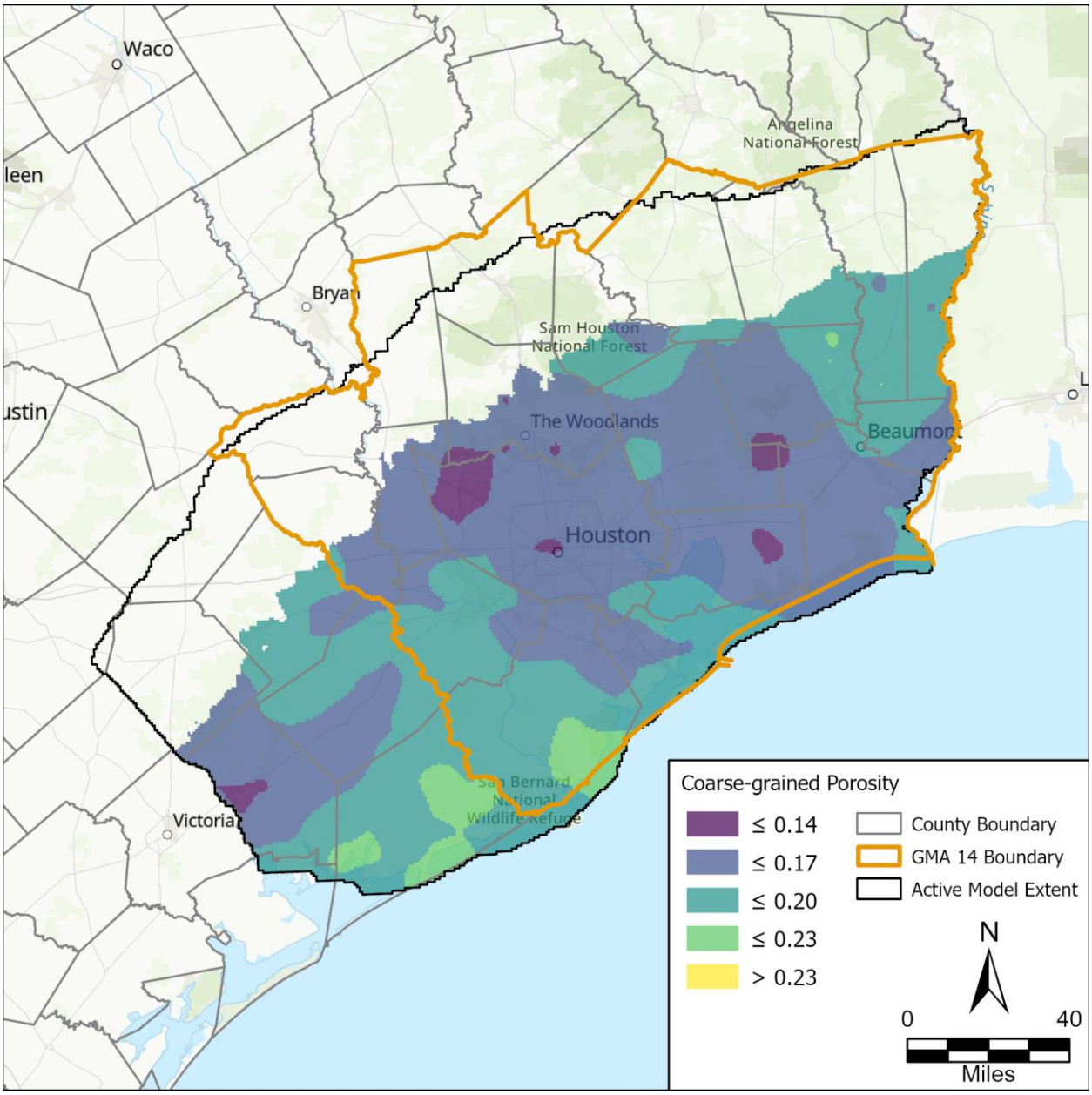

Figure 87. Layer 2 (Chicot Aquifer) calibrated coarse-grained porosity.

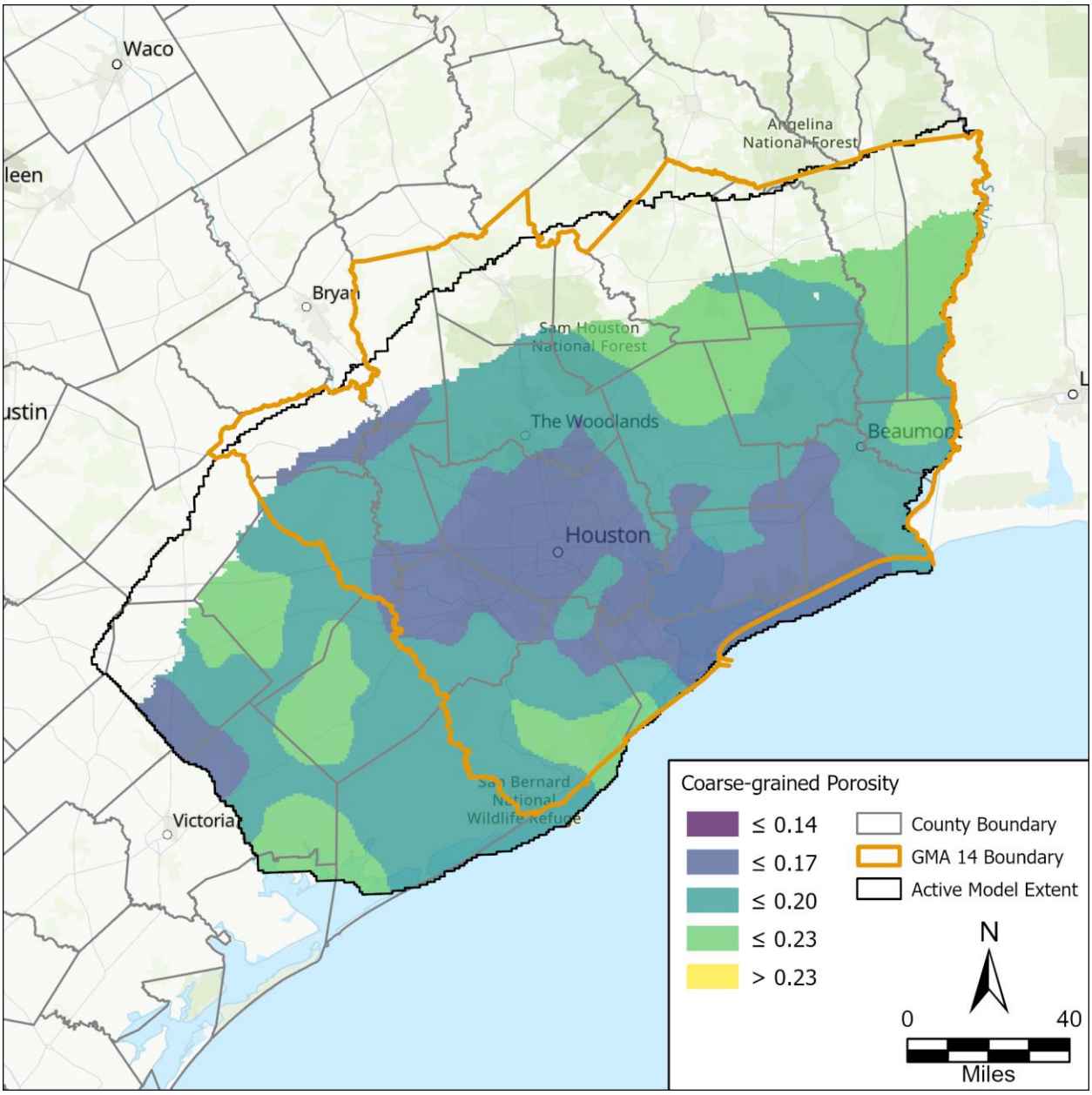

Figure 88. Layer 3 (Evangeline Aquifer) calibrated coarse-grained porosity.

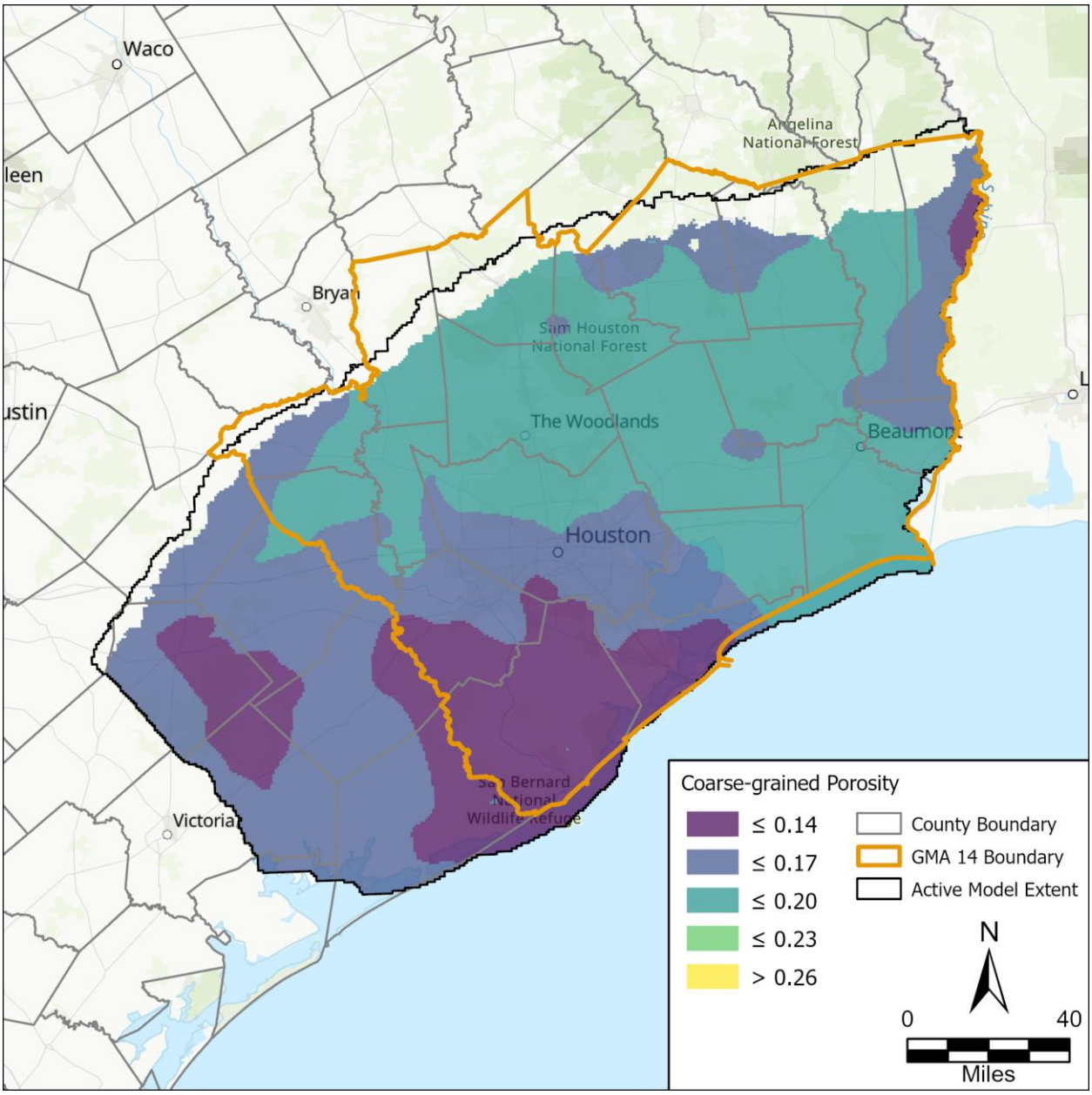

Figure 89. Layer 5 (Jasper Aquifer) calibrated coarse-grained porosity.

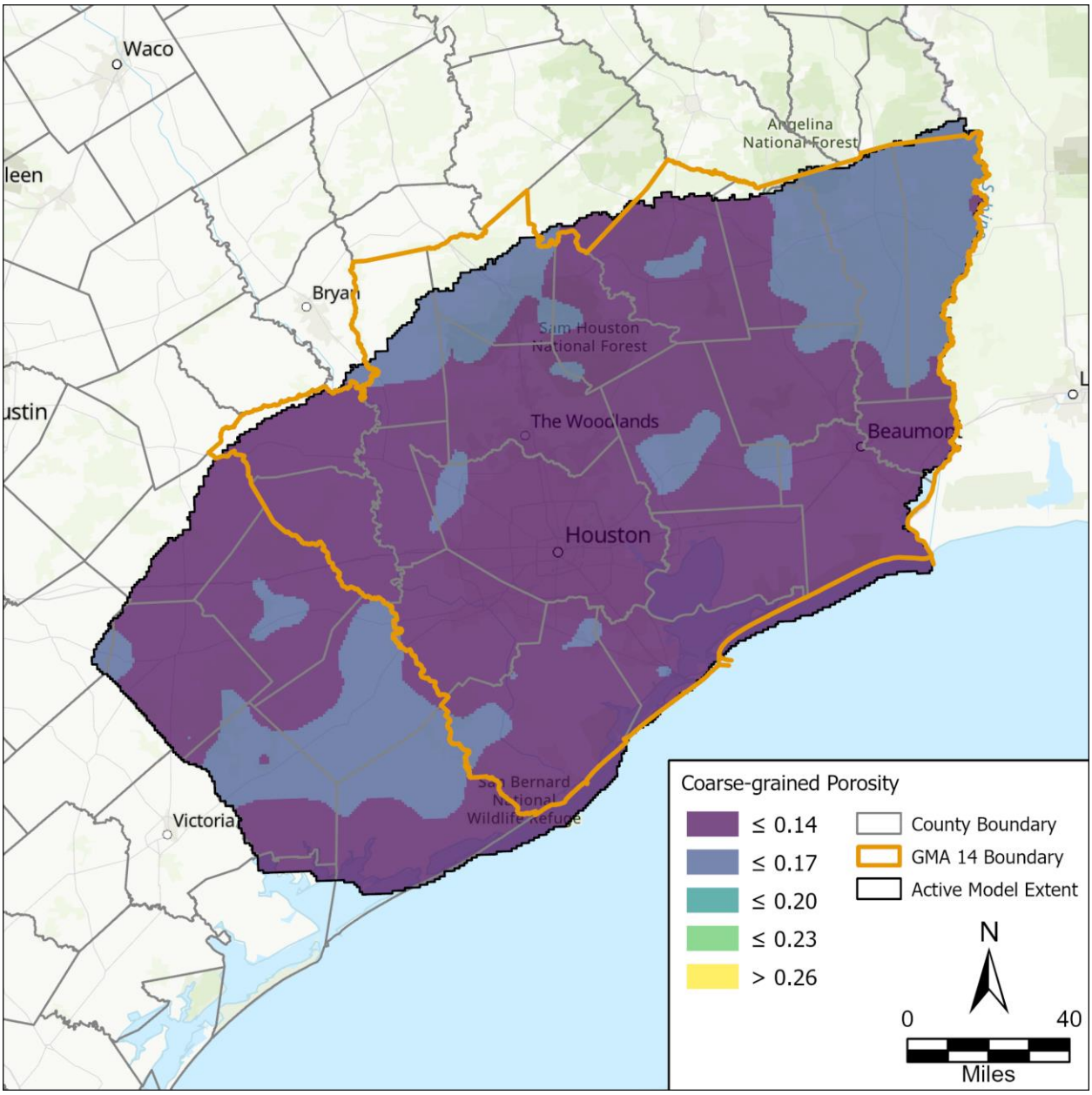

Figure 90. Layer 6 (Catahoula Aquifer) calibrated coarse-grained porosity.

4.1.5. Calibration of Boundary Conditions

We calibrated the GHB conductance using a model-wide constant which ranged from 0.1 to 10. The initial conductance value was 5.45 square feet per day and the calibrated value is 38.90 square feet per day. The GHB package simulated the flux between the model and the Gulf of Mexico. The increase in conductance during calibration allows for a less resistance flux between the model and the boundary.

We also calibrated the RIV conductance using a model-wide constant along with a cell-by-cell multiplier. The addition of the cell-by-cell multiplier allowed for different reaches of the river to vary in hydraulic conductance and thus adjust the surface water and groundwater interactions. The upper and lower limits of the multipliers were 0.1 to 10 with an ultimate upper and lower limit of 10 to 10,000 square feet per day. The initial value for the river conductance was 1,090 square feet per day for all river cells. The mean value for the calibrated base model was 2,216 square feet per day. Figure 91 illustrates the calibrated river conductance from the base model. The river conductance had the highest increases for segments of the Neches River, Brazos River, and Colorado River.

We calibrated recharge using a model-wide constant multiplier ranging from 0.75 to 1.25. Recharge is only applied to layer 1 (shallow aquifer system). Figure 92 illustrates the calibrated recharge for 2018. Recharge reached over 4 inches per year throughout the outcrop area with the largest concentration of high values in Taylor and Polk counties. Figure 93 shows the calibration recharge for the base model over time. Recharge is flat during the earlier years due to the stress periods covering multiple years (see Table 7).

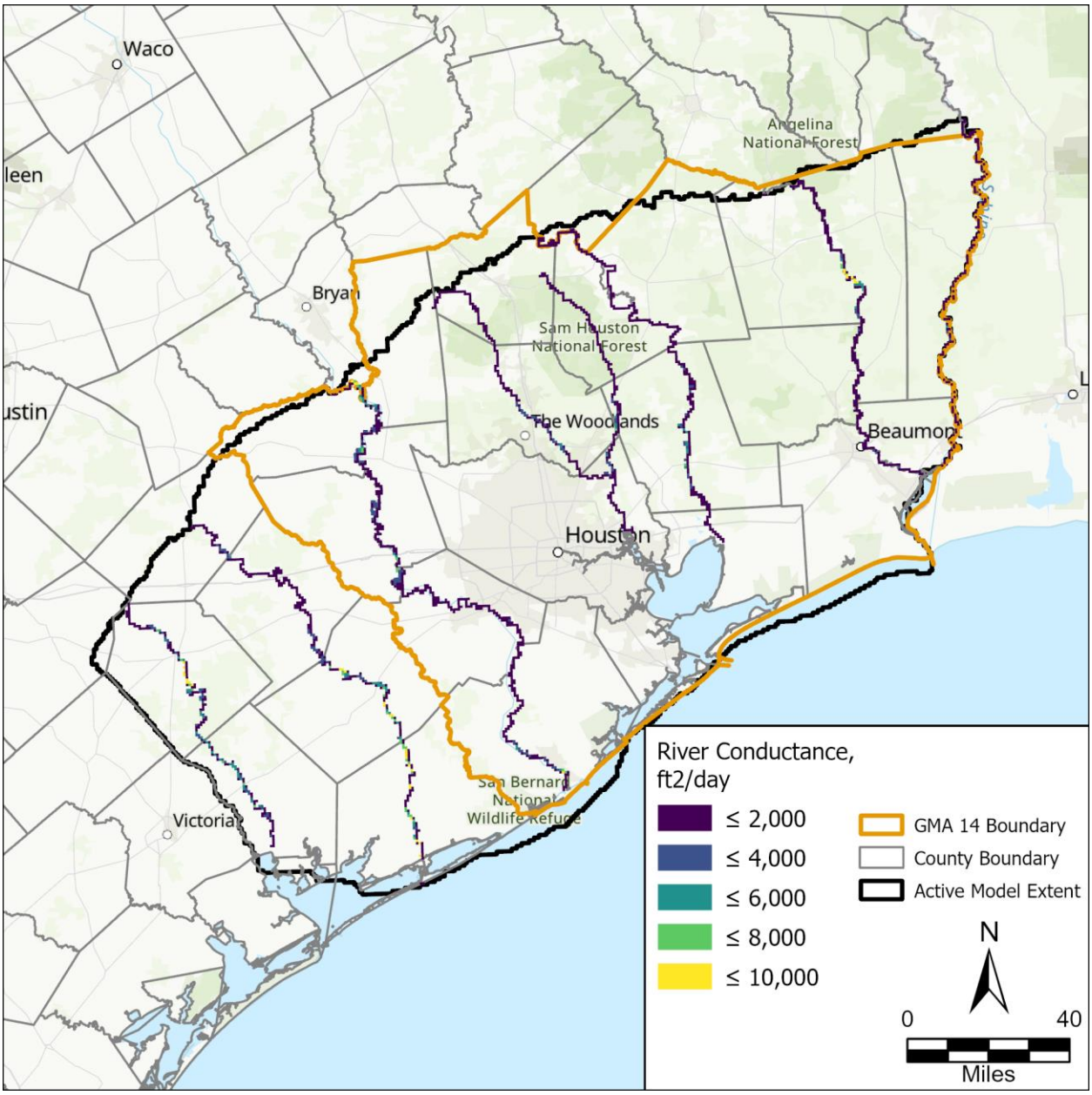

Figure 91. Calibrated river conductance.

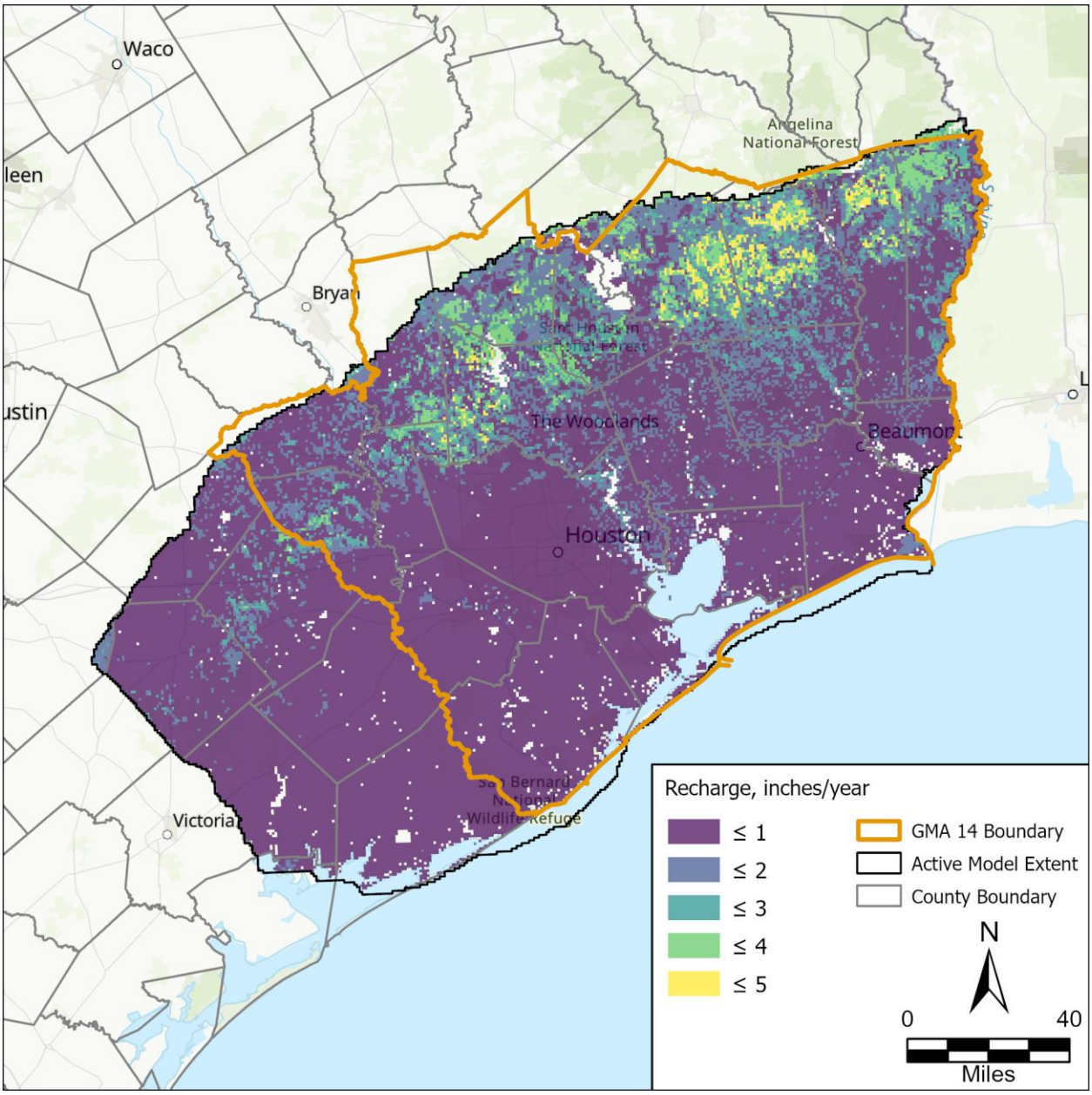

Figure 92. Layer 1 (Shallow Aquifer System) calibrated recharge.

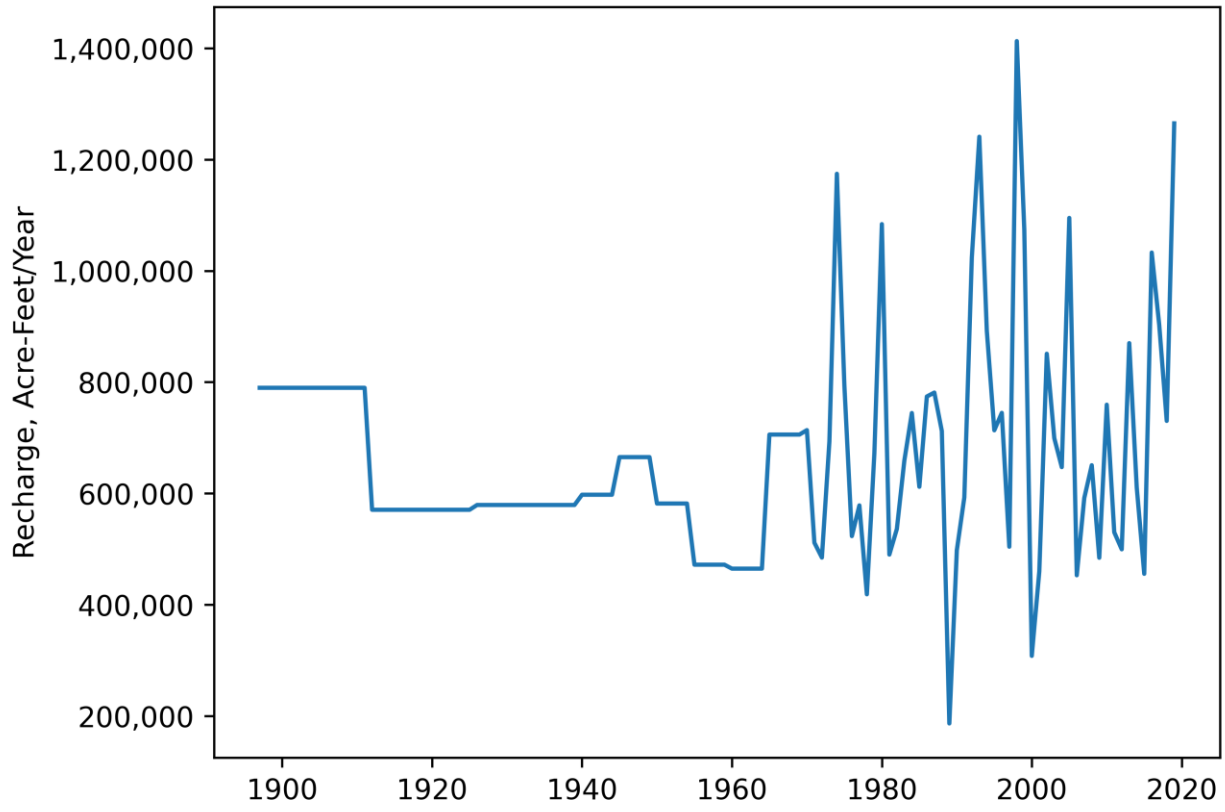

Figure 93. Calibrated recharge over time across the model.

4.2. Model Simulated Versus Measured Head

4.2.1. Water levels

We compared simulated and observed water levels to evaluate calibration results. Each calibration statistic starts with determining the residual for each target with the following equation:

$$r = target_o - target_s \quad \text{Eq. 15}$$

Where r is the residual, $target_o$ is the observation target value, and $target_s$ is the simulated target value. The residual for each target represents the difference between the observed and simulated value for that target. Using the residual, we apply the following equations to determine the Mean Error (ME), Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and Normalized RMSE (NRMSE):

$$ME = \frac{1}{N}\sum_{i=1}^{N} r_i \quad \text{Eq. 16}$$

$$MAE = \frac{1}{N}\sum_{i=1}^{N} |r_i| \quad \text{Eq. 17}$$

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N} r_i^2} \quad \text{Eq. 18}$$

$$NRMSE = \frac{1}{max_{target_o} - min_{target_o}} \sqrt{\frac{1}{N}\sum_{i=1}^{N} r_i^2} \quad \text{Eq. 19}$$

Where N is the number of targets. ME is the average difference between the observed and simulated values, indicating whether the model tends to overestimate (positive value) or underestimate (negative value) water levels. MAE measures the average magnitude of the residuals which provides an unbiased representation of model accuracy. RMSE takes the square root of the average of squared residuals making the metric more sensitive to higher residuals. The NRMSE takes the RMSE and divides by the range of observed values to evaluate the significance of RMSE to the range of observed values across the model domain. One calibration goal is to have an NRMSE less than 10 percent for each aquifer layer. Table 13 summarizes the GMA 14 Model calibration statistics for the water level targets.

Table 13. Water Level calibration statistics.

Layer	Number of targets	Mean Error, feet	Mean Absolute Error, feet	Root Mean Squared Error, feet	Range, feet	Normalized RMSE (%)
Chicot	17,634	4.1	31.3	40.9	621	6.6
Evangeline	10,627	15.3	49.5	61.3	851	7.2
Jasper	2,930	-19.1	42.2	57.5	622	9.2
Catahoula	914	-11.5	52.7	79.5	515	15.4
GMA 14 Model	**32,105**	**5.3**	**38.9**	**51.5**	**937**	**5.5**

Cross plots of the observed and simulated water level targets are illustrated in Figure 94 for each aquifer layer and Figure 95 for the entire model. The perfect fit line is represented as a black dotted line; the closer points are to the perfect fit line, the better the model fit though it is appropriate to have points distributed on either side of the line. As indicated with the mean error, the cross plots can show if the model produces over or under simulated water levels. Overall, the targets generally follow the perfect fit line except in deeper portions of the Jasper where water levels were biased to being simulated higher than observed.

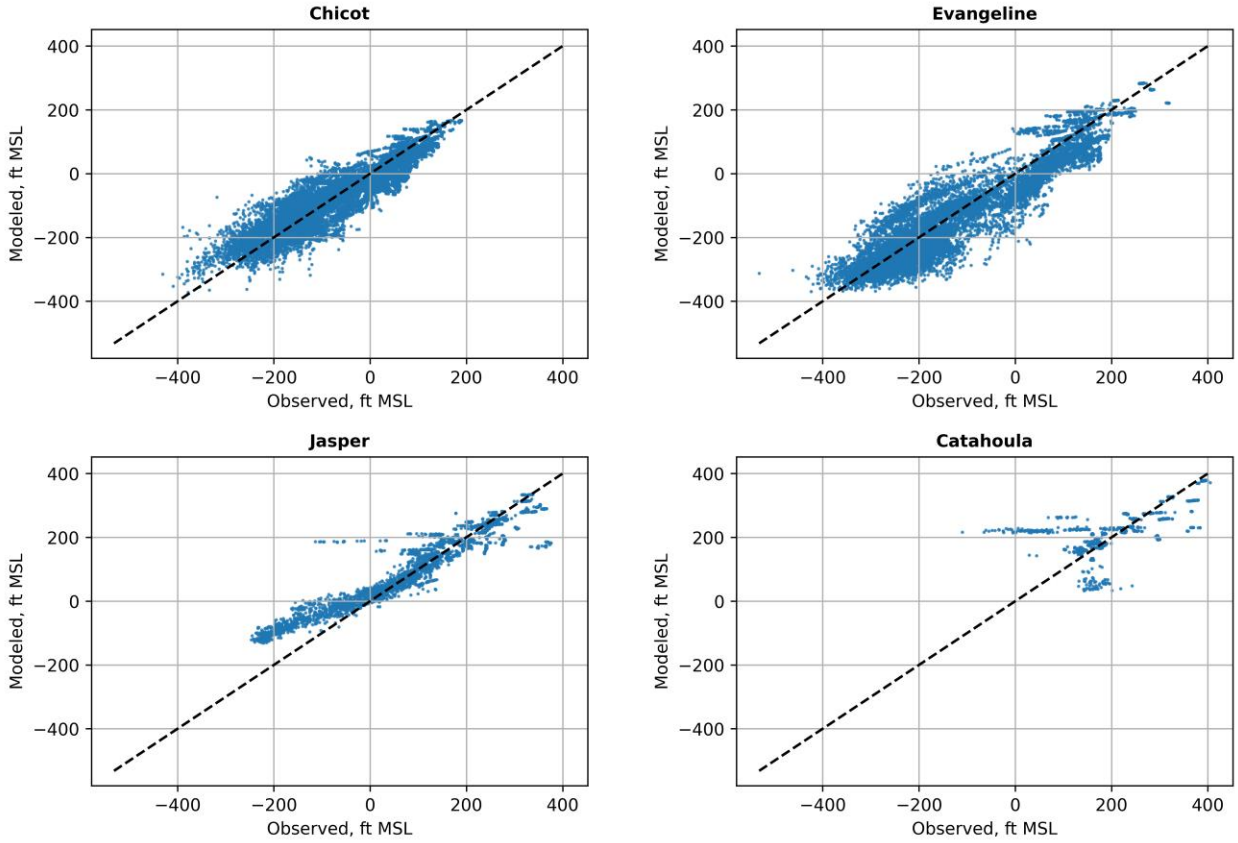

Figure 94. Measured versus modeled water level measurements for each layer.

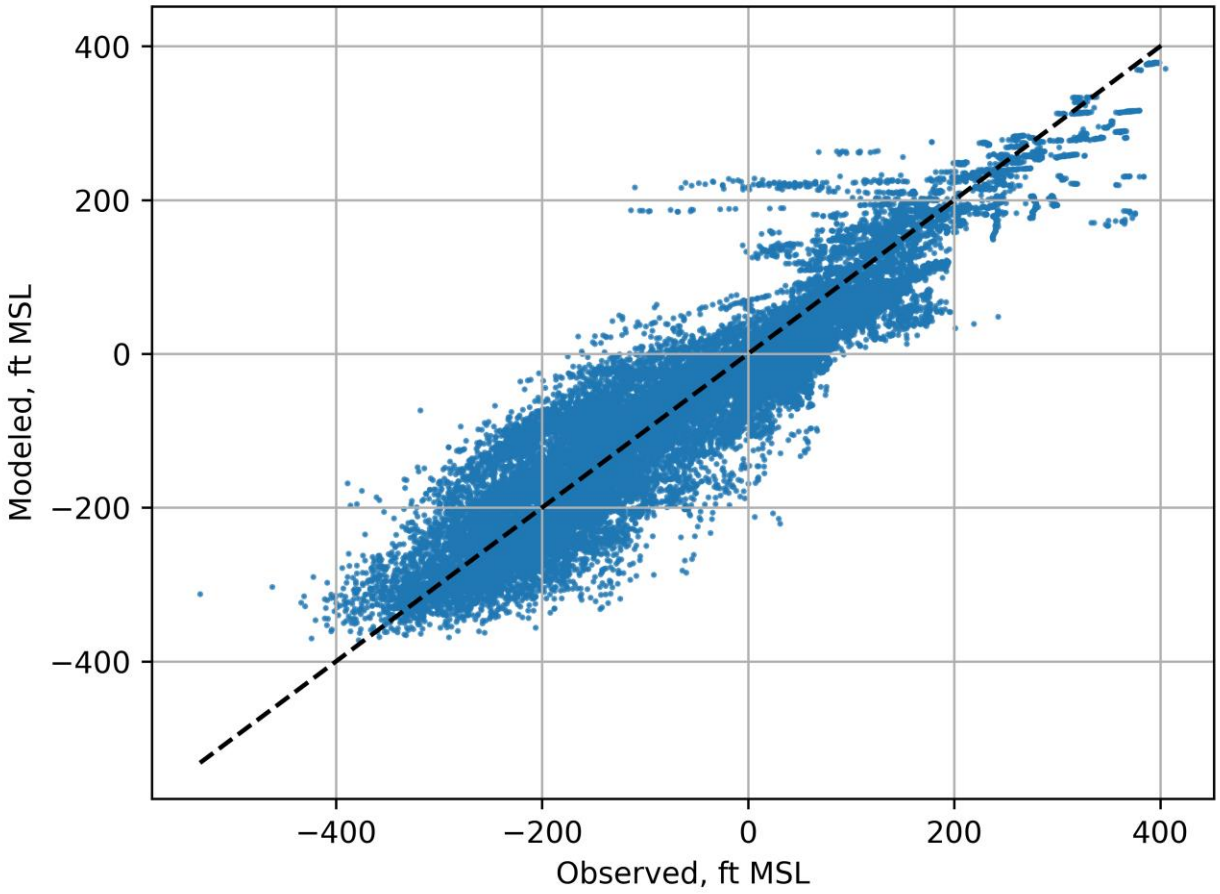

Figure 95. **Measured versus modeled water level measurements for the Chicot, Evangeline, Jasper, and Catahoula layers.**

4.2.2. Residual Distributions

Figures 96 through 99 illustrate the mean residual for each observation well by layer. The residual for each well was calculated by determining the average of all residuals throughout the history matching period for each well. Negative residuals indicate simulated water levels are greater than the observed water level (over simulated) and visa-verse for positive values (under simulated). The Chicot layer shows under simulated water levels in southwestern Harris County and Wharton County, and over simulated water levels in southeastern Harris County and The Woodlands area. Beyond these areas, simulated water levels were relatively unbiased.

Simulated water levels in the Evangeline layer were under simulated in western Harris County and southeastern Montgomery County and moving towards the western and southwestern region of the model. Over simulated water levels are in The Woodlands area in southern Montgomery County. Simulated water levels in the Jasper layer were over simulated in southern Montgomery and northern Harris Counties. The outcropping areas of the Jasper were unbiased. Within the Catahoula layer simulated water levels were under simulated in northern Mongomery County and unbiased throughout the outcropping areas.

Figures 100 through 103 illustrate the histograms of water level residuals for each aquifer layer. The ideal residual histogram would be normally distributed and centered around zero, indicating an unbiased distribution of residuals. The mean error on the histogram shows residual distribution bias. The Chicot layer water level residuals are normally distributed and have the least amount of bias with a mean error of 4.1 feet. The Evangeline layer water level residuals are also symmetrically distributed with a similar spread as the Chicot but with slightly higher frequencies near the tails. The Jasper layer water level residuals are symmetrically distributed with a few higher residuals in the -200 to -300 bins. The Catahoula layer water level residuals are less symmetrical with a left-skewed tail.

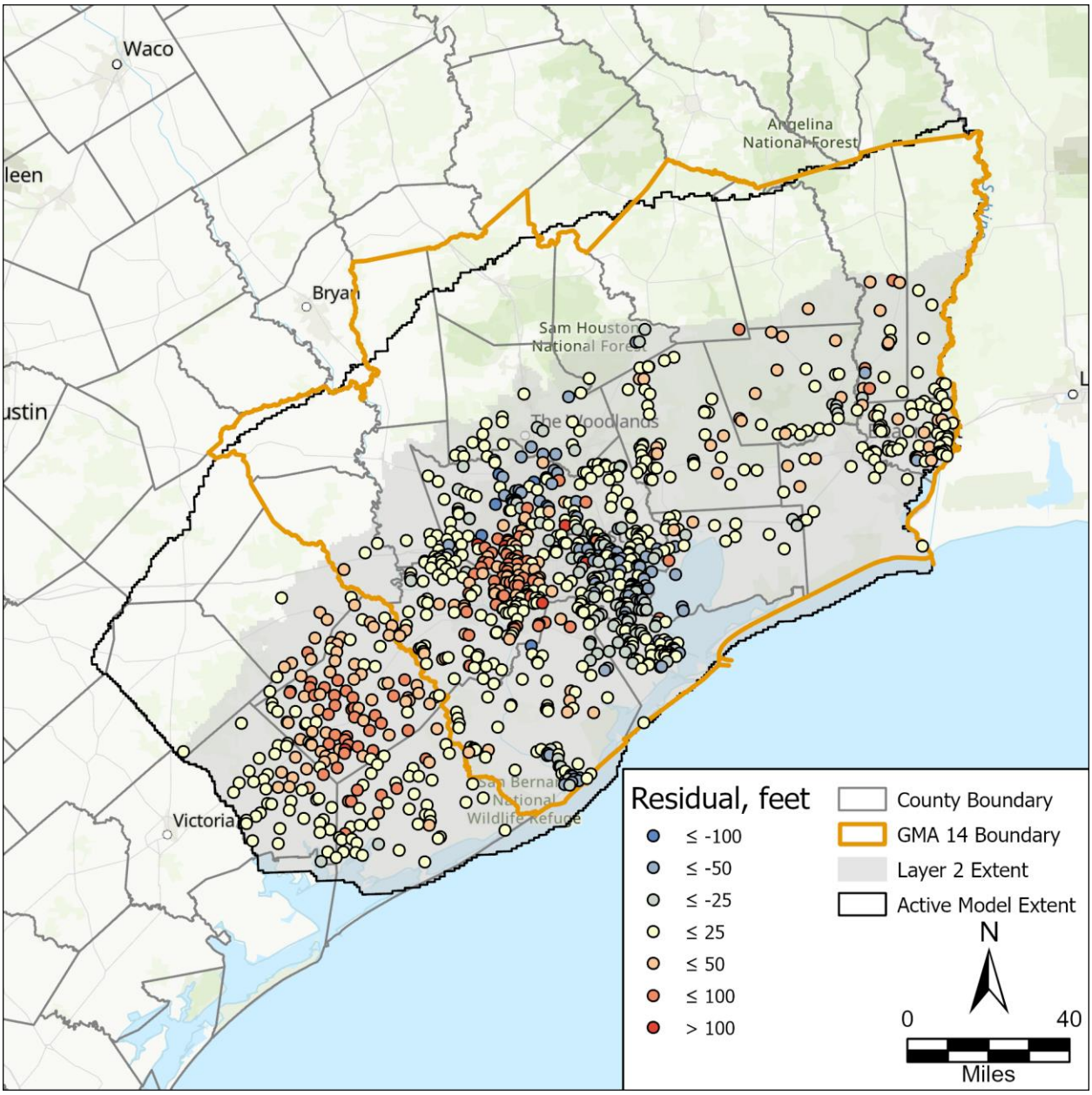

Figure 96. Layer 2 (Chicot Aquifer) mean residual by well.

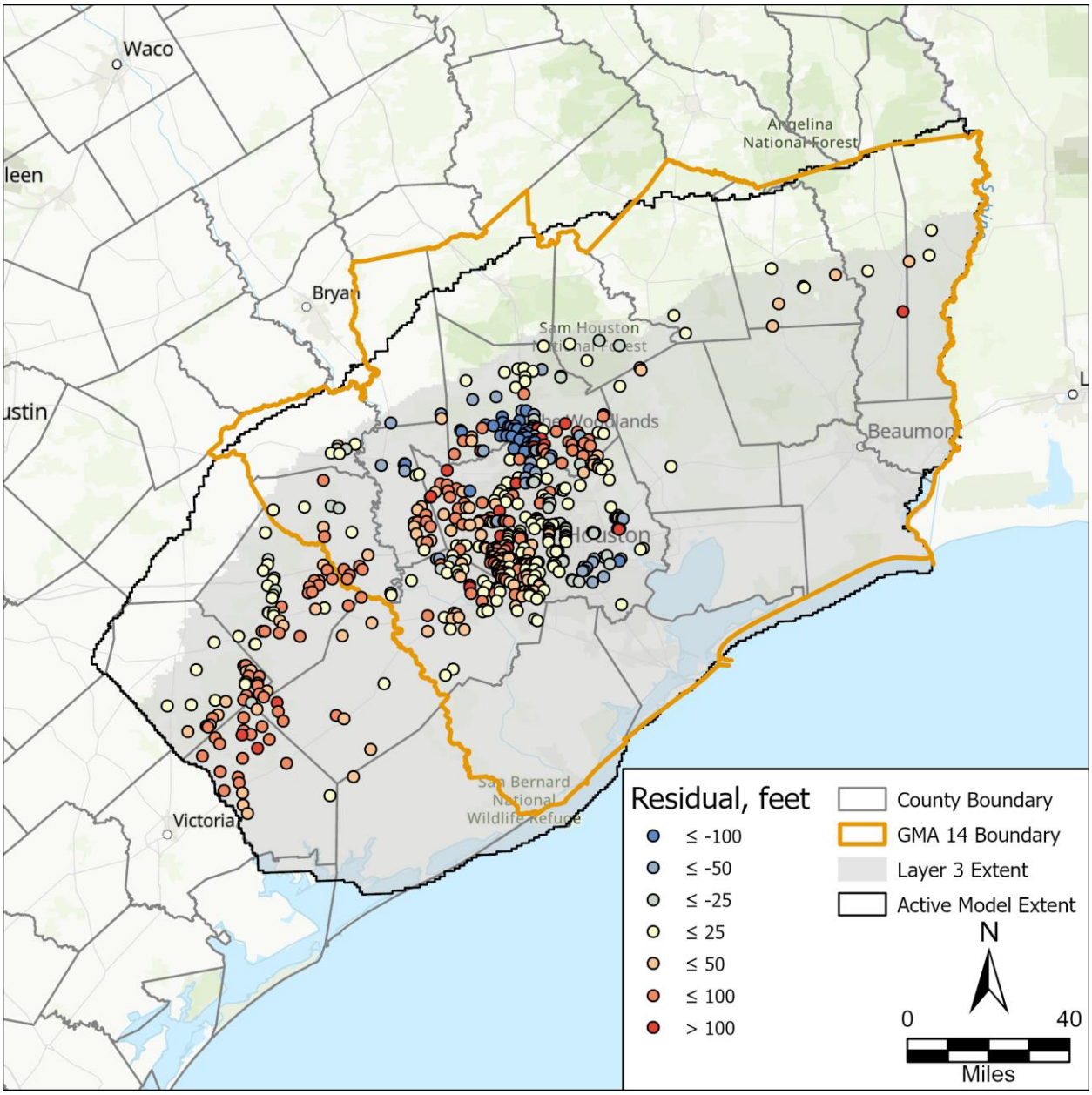

Figure 97. Layer 3 (Evangeline Aquifer) mean residual by well.

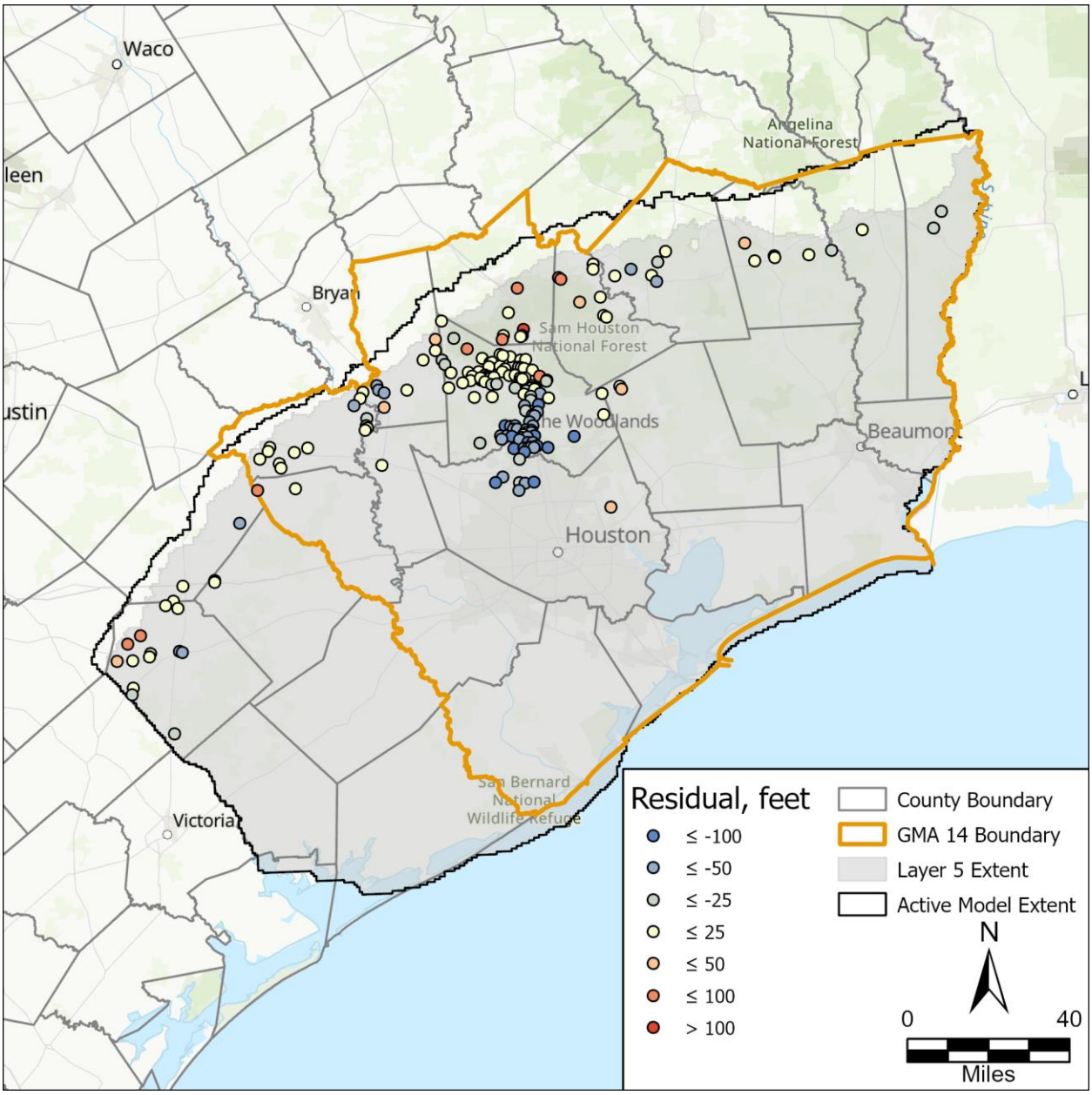

Figure 98. Layer 5 (Jasper Aquifer) mean residual by well.

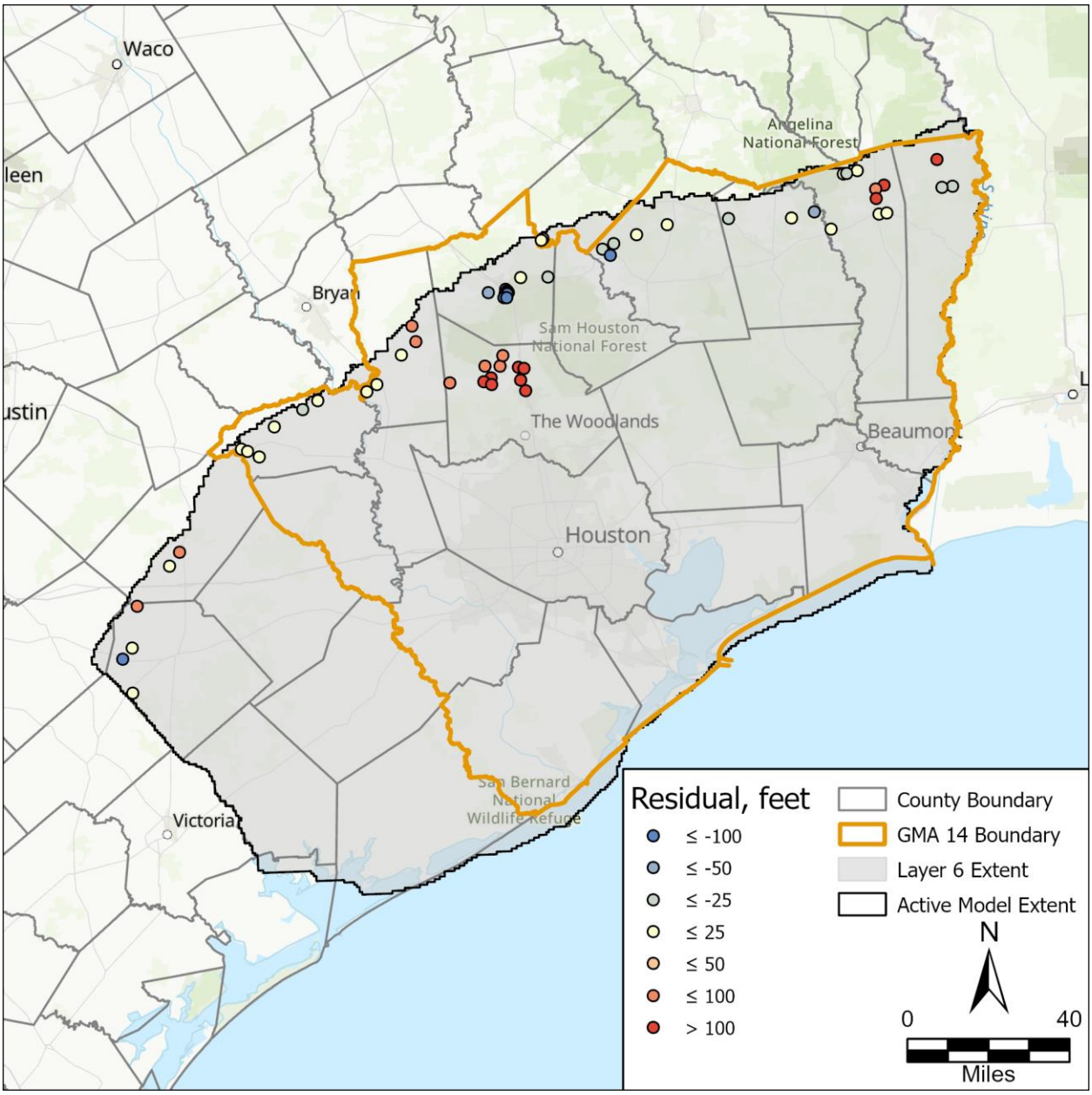

Figure 99. Layer 6 (Catahoula Aquifer) mean residual by well.

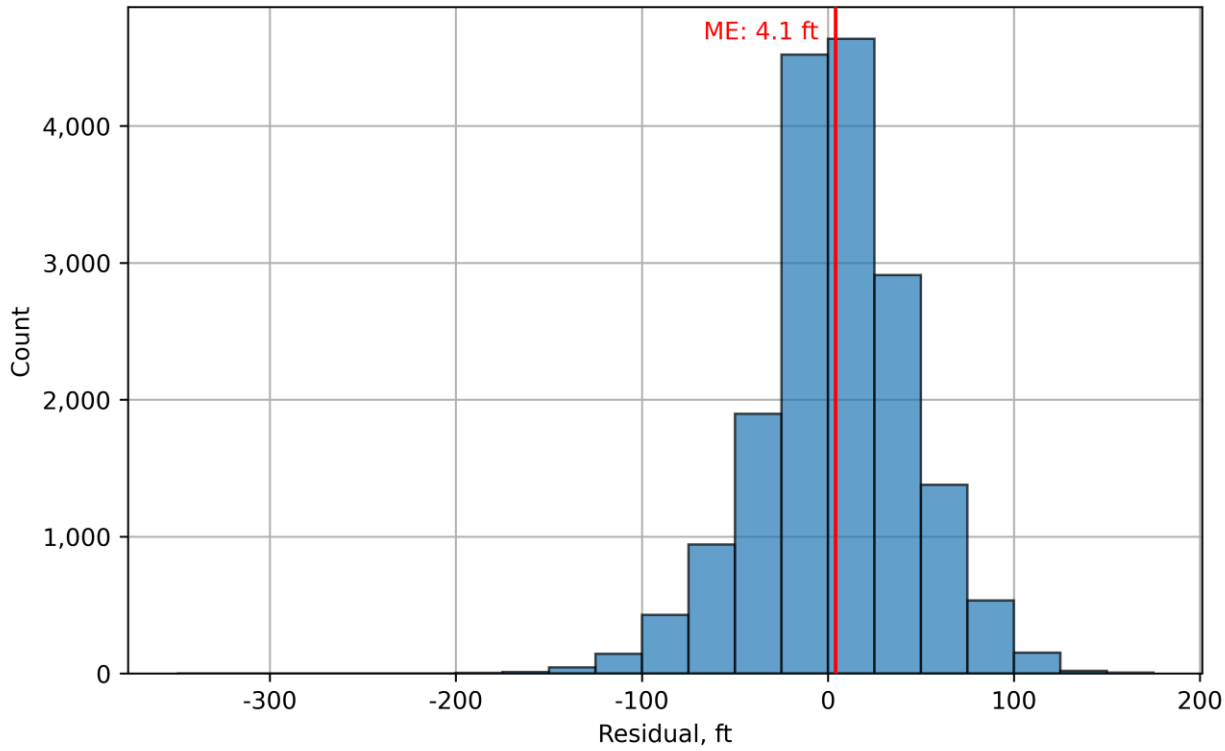

Figure 100. Layer 2 (Chicot Aquifer) residual histogram. ME = Mean Error.

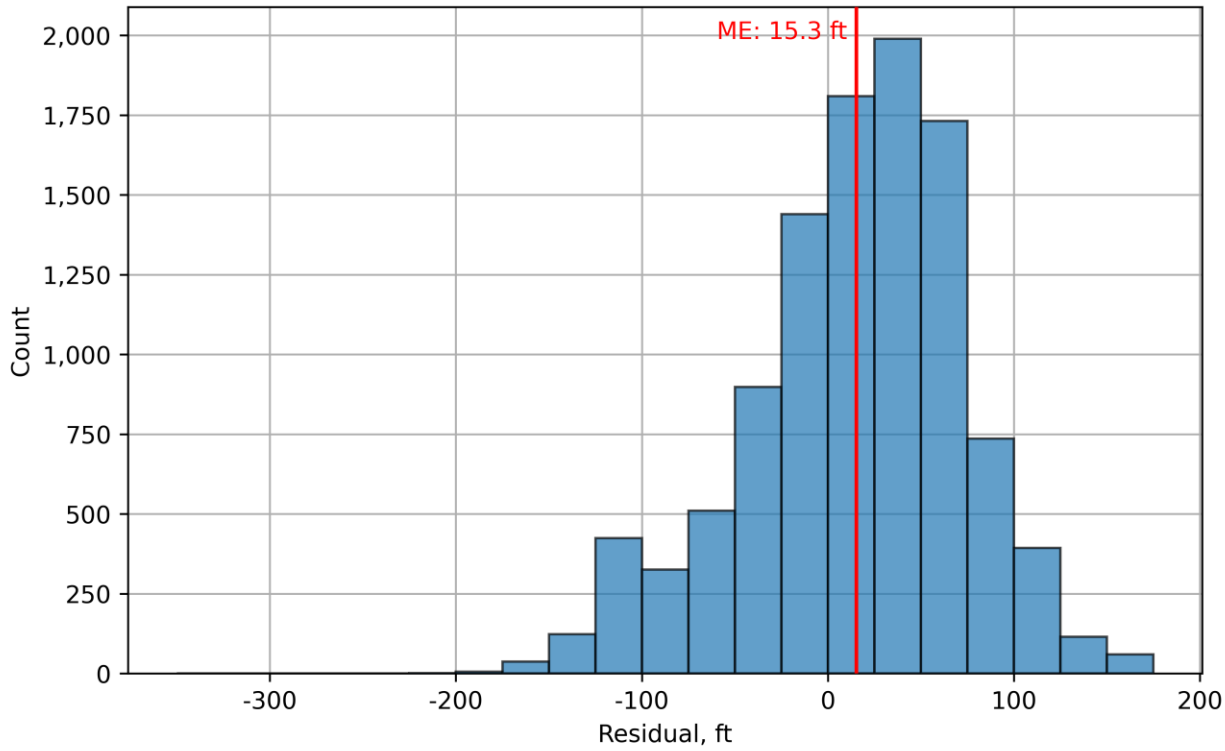

Figure 101. Layer 3 (Evangeline Aquifer) residual histogram. ME = Mean Error.

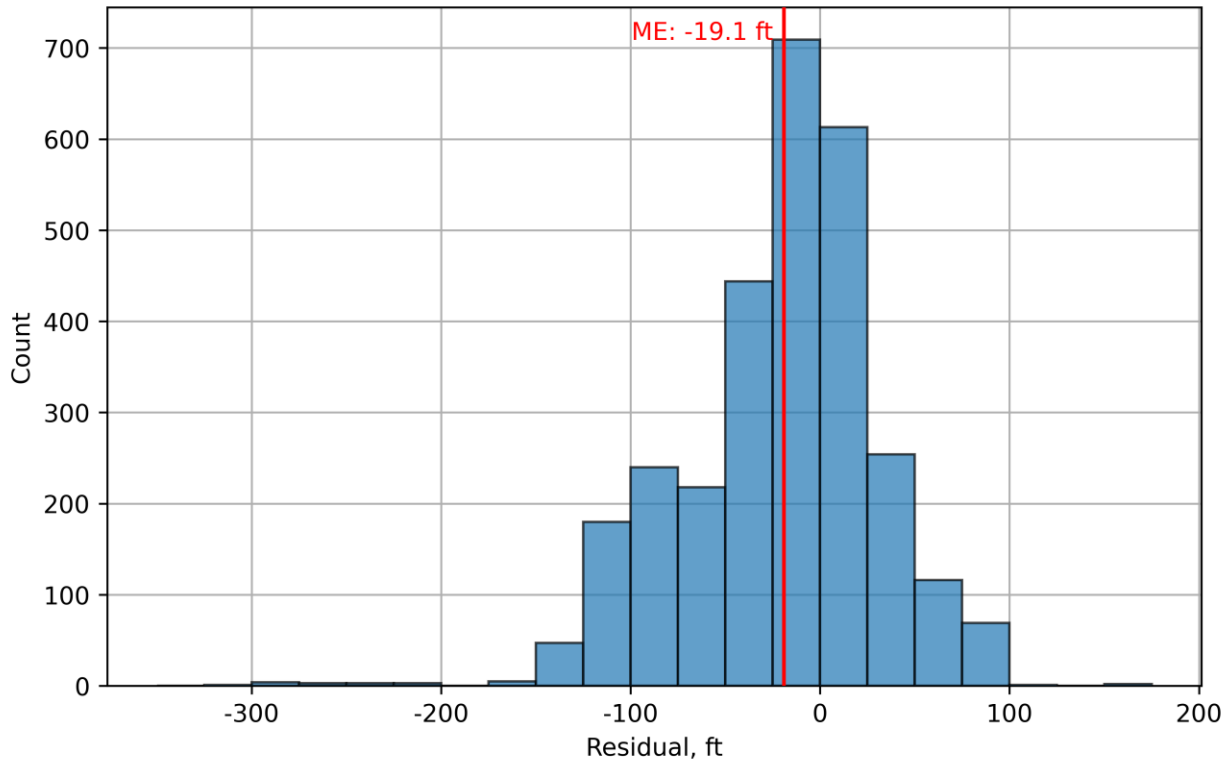

Figure 102. Layer 5 (Jasper Aquifer) residual histogram. ME = Mean Error.

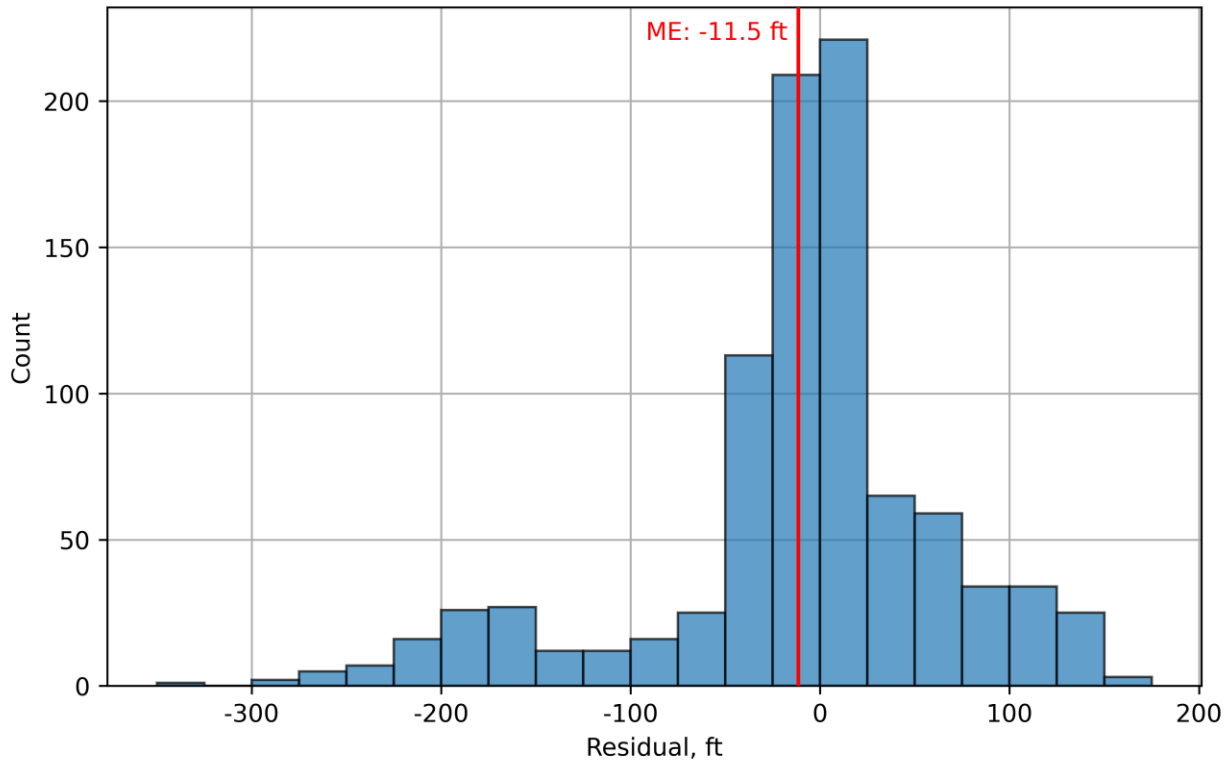

Figure 103. Layer 6 (Catahoula Aquifer) residual histogram. ME = Mean Error.

4.2.3. Water level hydrographs

Figures 104 through 106 show the simulated and observed hydrographs of the Chicot, Evangeline, and Jasper aquifers. The hydrographs indicate simulated trends are similar to observed trends throughout the model area. We also developed a series of hydrographs to compare simulated water levels with observed water levels from GULF-2023 and the GMA14 Model. Appendix 7 presents hydrographs for the Chicot, Evangeline, Jasper, and Catahoula aquifers.

The GMA 14 Model was able to capture the Chicot Aquifer observed water level trends throughout Harris County and the surrounding area. State Well Number 6514405 (see Figure 104) shows water levels were over simulated prior to 1970 but the trend is similar to the target values. After 1970, when pumping declined in the area, the simulated water levels rebounded in a similar manner to the observed values. In northern Harris County, State Well Number 6060103 (See Figure 104) was consistent with the observation values but was not able to fully capture the decreasing trend. Other areas of the model showed a similar pattern to the examples above and overall the observed water level trends were similar to the simulated trends.

Within the Evangeline Aquifer, State Well Number 6514405 (see Figure 105) was able to reflect observed water levels and both trends that were observed before and after 1970. Water levels were over simulated in southeast and southwest Montgomery County and under simulated in The Woodlands / Interstate 45 corridor area in south Montgomery County. However, the overall water level trends were similar between the observed and simulated values.

The Jasper simulated water levels throughout the outcropping area and into north Montgomery County (including the City of Conroe) had a similar water level and trends as the observation values. State Well Number 6045504 (see Figure 106) reflected the observation values and trends until about 2005 where water levels become over simulated.

The GMA 14 Model includes a larger groundwater level dataset than the GULF-2023 model. Additionally, no smoothing was applied to the GMA 14 Model water level targets, allowing the data to reflect more immediate groundwater responses compared to the smoothed GULF-2023 targets. As shown on the hydrographs in Appendix 7, while both models show similar groundwater level trends, the GMA 14 Model more accurately matches observed groundwater levels.

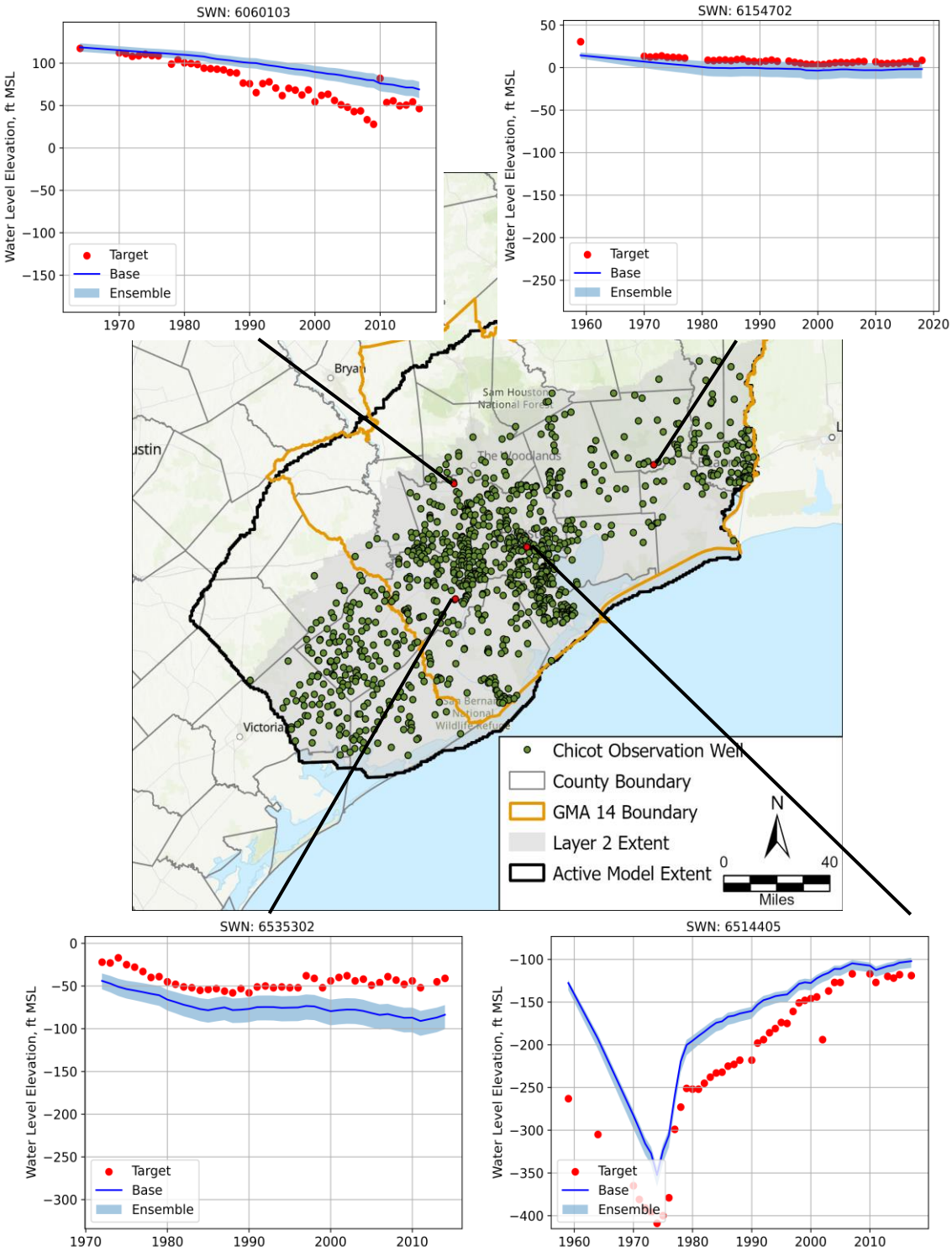

Figure 104. Layer 2 (Chicot Aquifer) simulated and observed hydrographs. SWN = State Well Number.

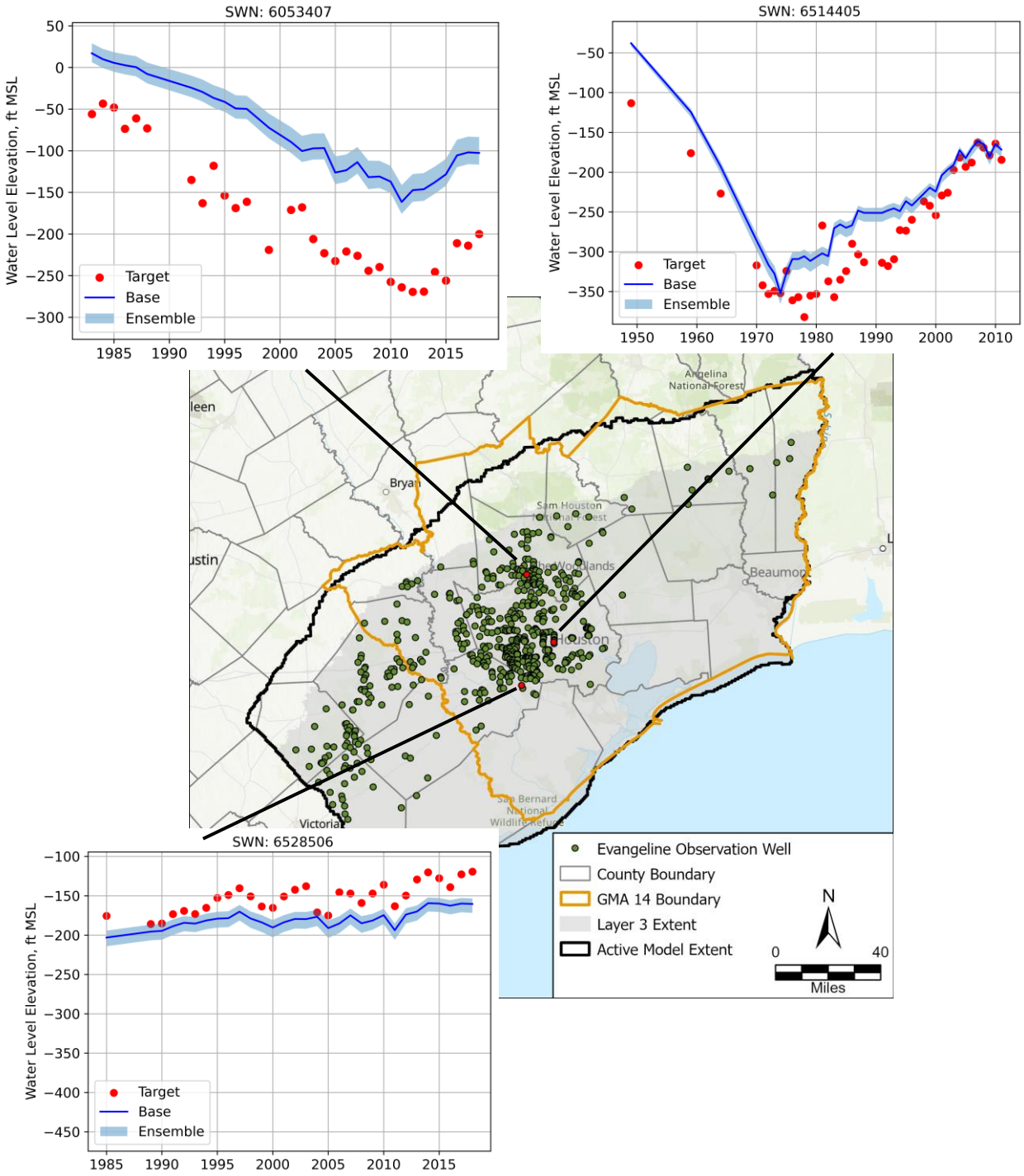

Figure 105. Layer 3 (Evangeline Aquifer) simulated and observed hydrographs. SWN = State Well Number.

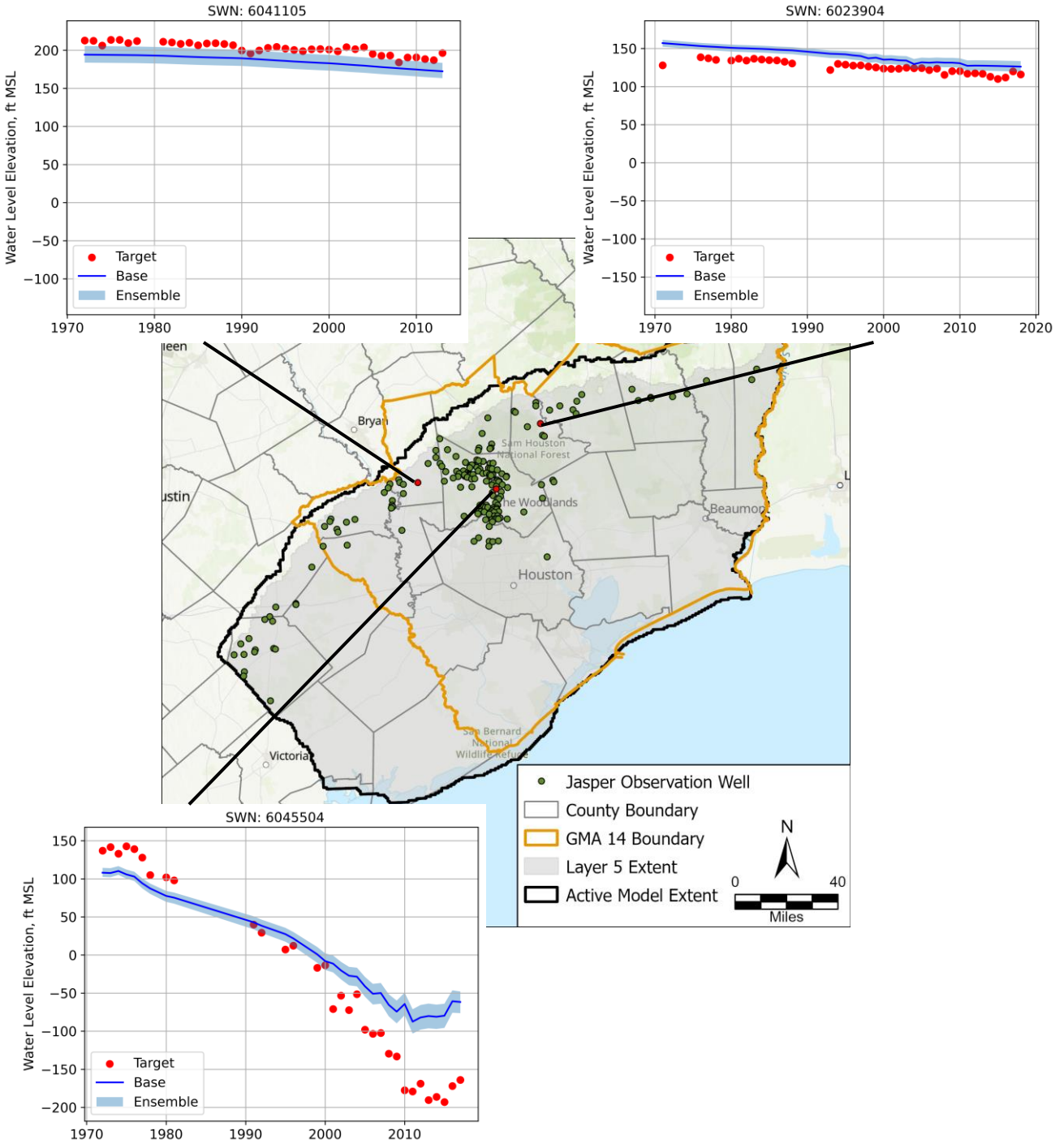

Figure 106. Layer 5 (Jasper Aquifer) simulated and observed hydrographs. SWN = State Well Number.

4.2.4. Simulated Water Levels

We prepared simulated water level contour plots for the aquifer layers to assess the flow regimes (Figures 107 through 110). Groundwater flows perpendicular to the water level contours. Regionally, the simulated water levels indicate groundwater flow is from outcropping areas in the northwest towards the Gulf of Mexico. Within the Chicot and Evangeline aquifers, there is a cone of depression focused around the Houston area, deviating groundwater from regional flow regimes towards the Houston area. The Jasper Aquifer shows a similar occurrence with groundwater being drawn to The Woodlands area.

Figures 111 through 114 illustrate the spatial distribution of the drawdown between the end of the predevelopment period (1896) and 2018. The drawdown cones focused around the Houston area in the Chicot and Evangeline. For the Jasper Aquifer, The Woodlands shows the most drawdown since the predevelopment period. The cone of depression regions reflects the pumping outlined in Section 3.5.

Figures 115 through 118 compare simulated and observed water level contours for 2018. Overall, flow patterns within the aquifer layers are similar for both simulated and observed water levels. Within the Chicot layer, the simulated water levels captured the cone of depression around the Houston area along with contours further up dip. Differences in the Chicot in the southwestern portion of the model reflect where water levels were under simulated. Similar to the Chicot, the GMA 14 Model captured the Houston and Montgomery area water levels for the Evangeline layer but the observations indicated more local drawdown from pumping centers. Water levels in the southwestern portion also were under simulated with the northeastern region being difficult to compare due to the lack of available data. The Jasper and Catahoula layers were both limited in the available observation data, but where data is available, the flow directions indicated by simulated water levels are similar to flow directions based on the observation data.

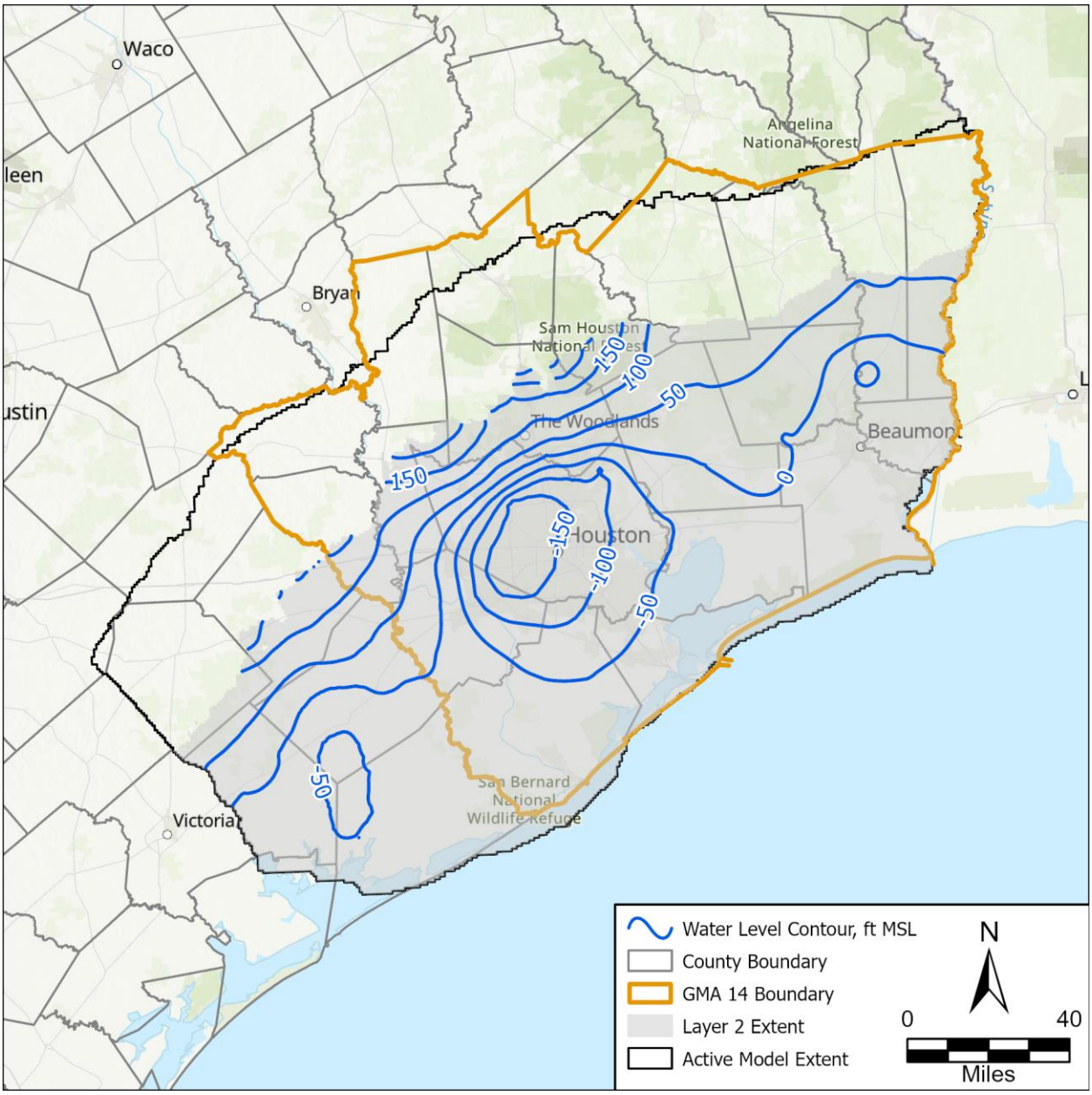

Figure 107. Layer 2 (Chicot Aquifer) simulated potentiometric surface for 2018.

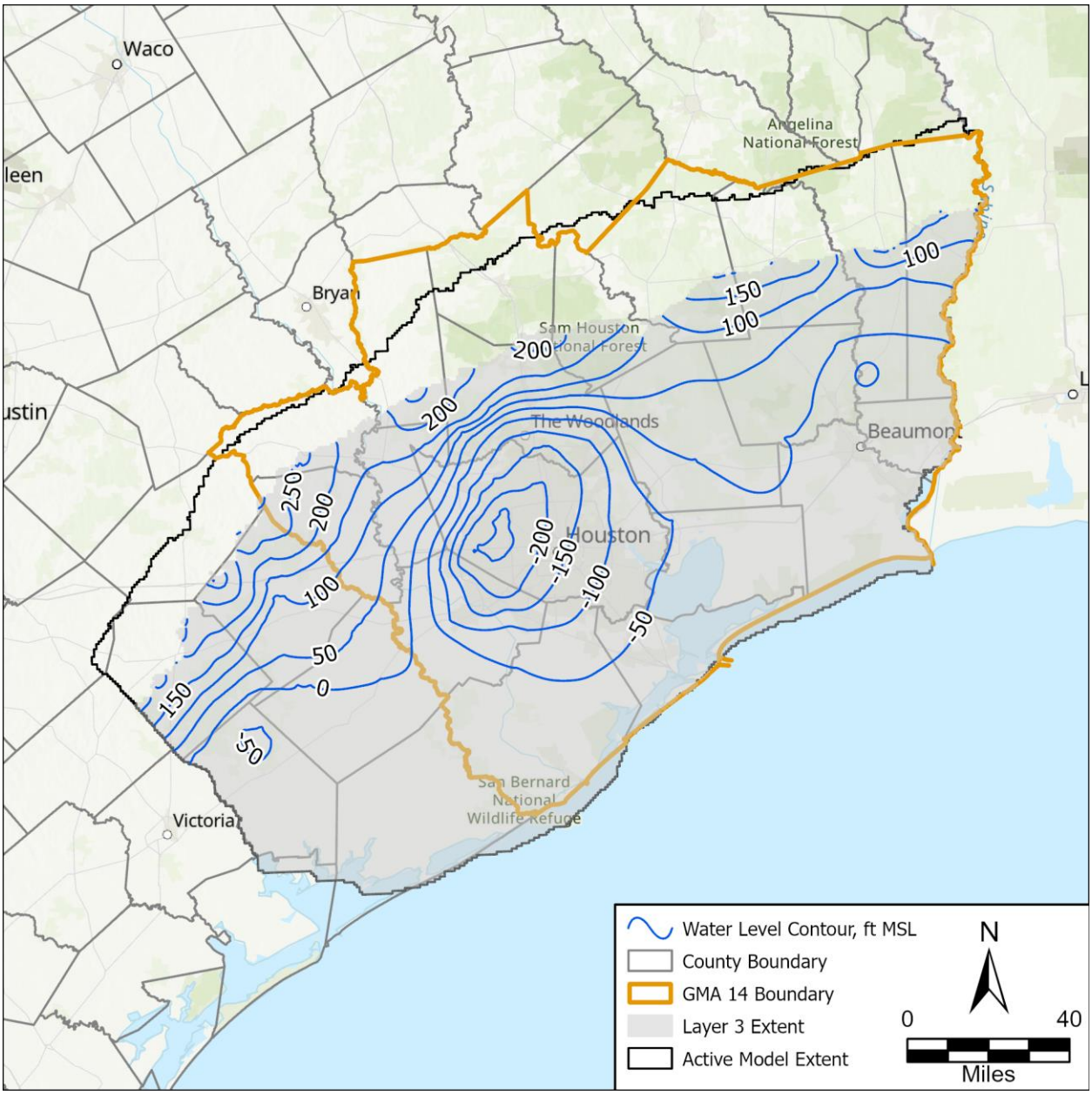

Figure 108. Layer 3 (Evangeline Aquifer) simulated potentiometric surface for 2018.

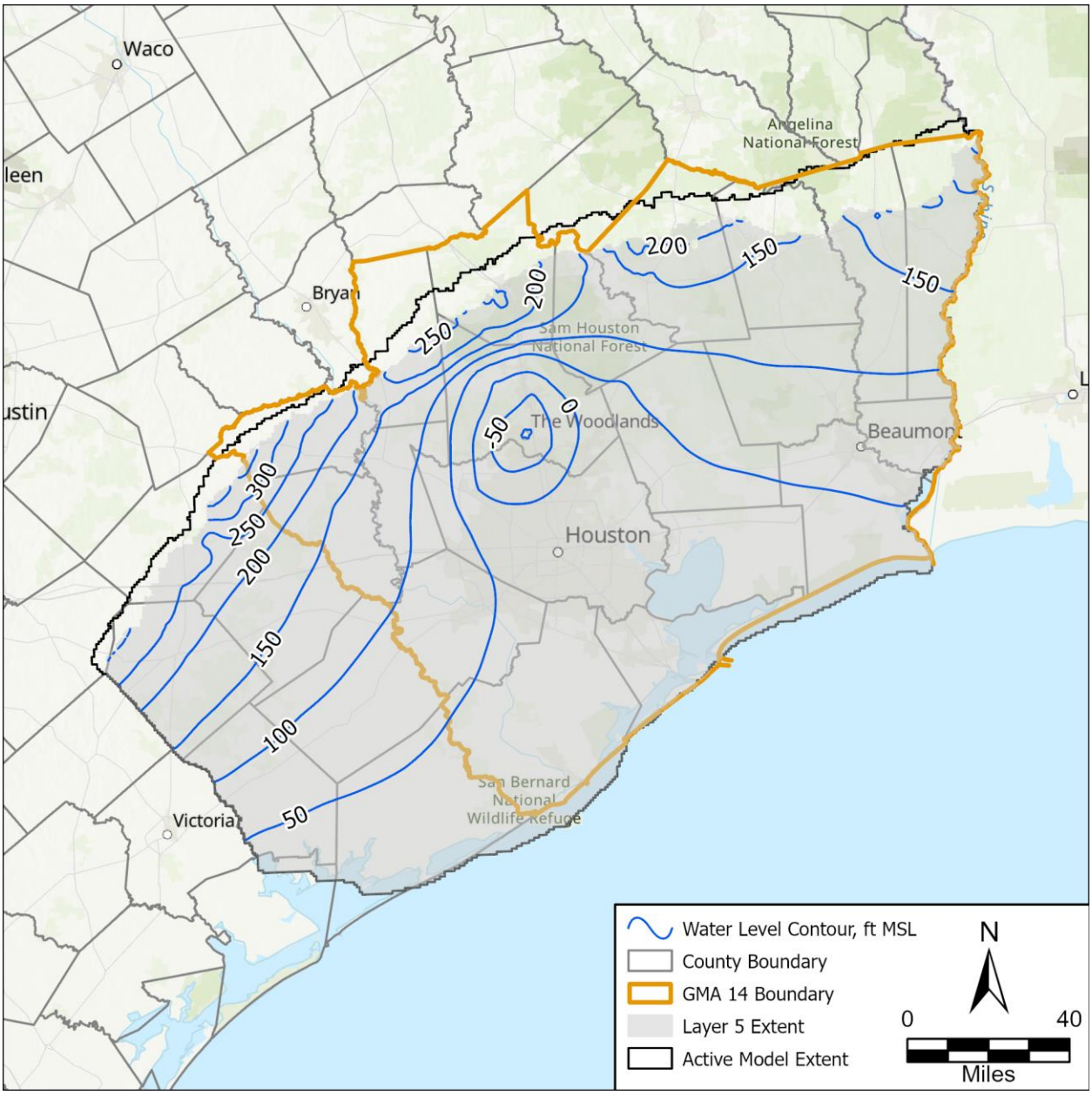

Figure 109. Layer 5 (Jasper Aquifer) simulated potentiometric surface for 2018.

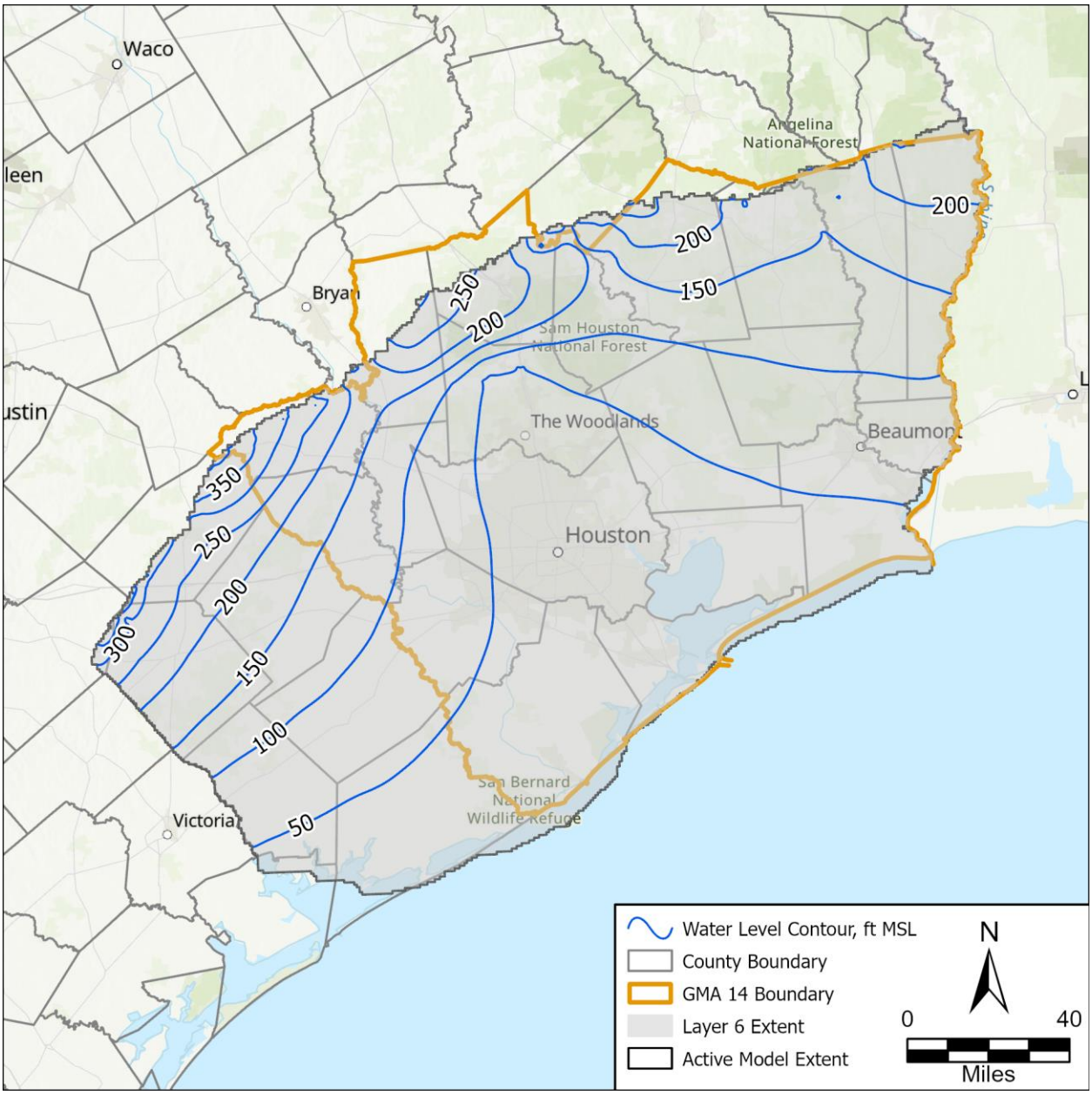

Figure 110. Layer 6 (Catahoula Aquifer) simulated potentiometric surface for 2018.

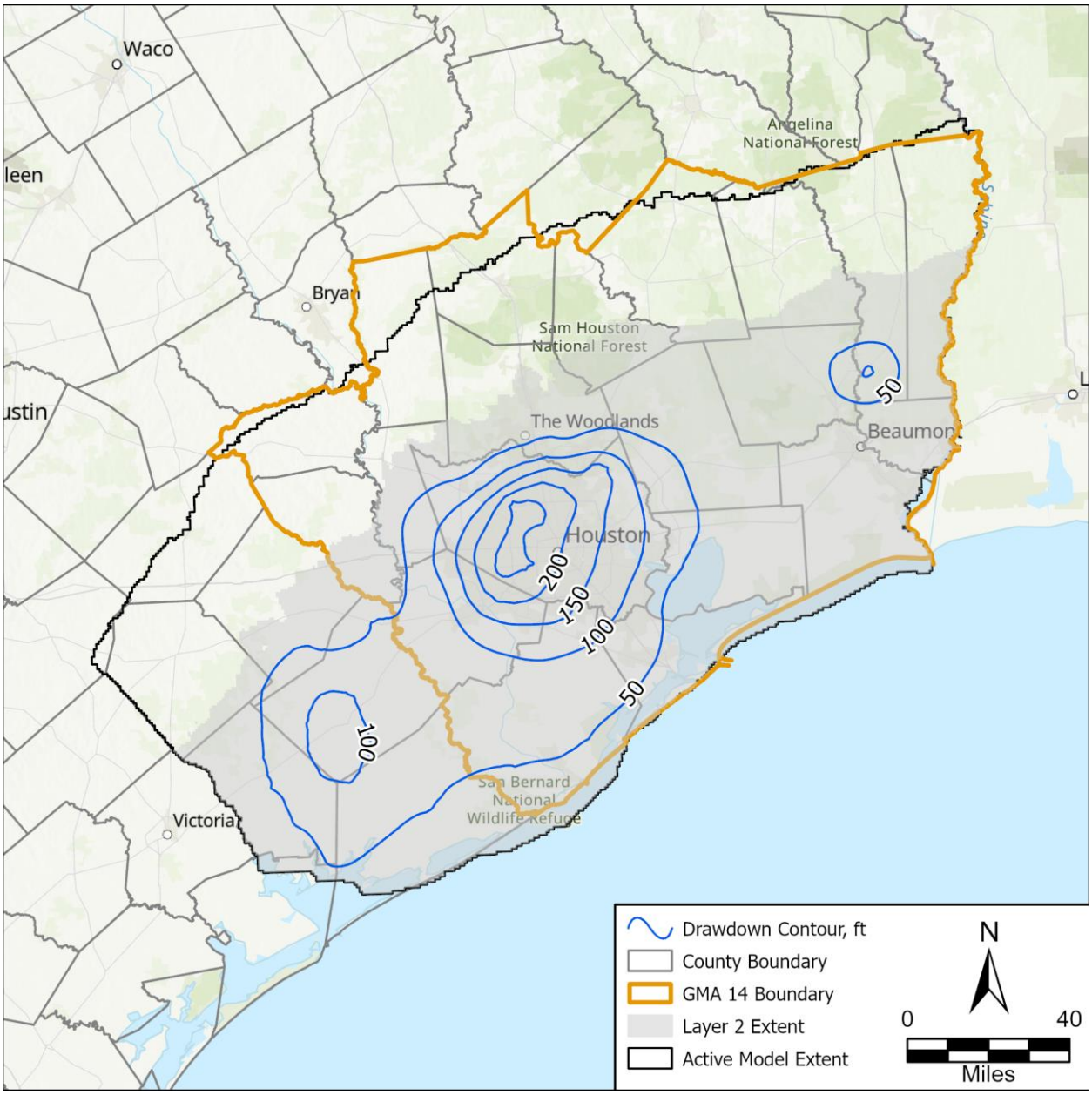

Figure 111. Layer 2 (Chicot Aquifer) simulated drawdown between predevelopment and 2018.

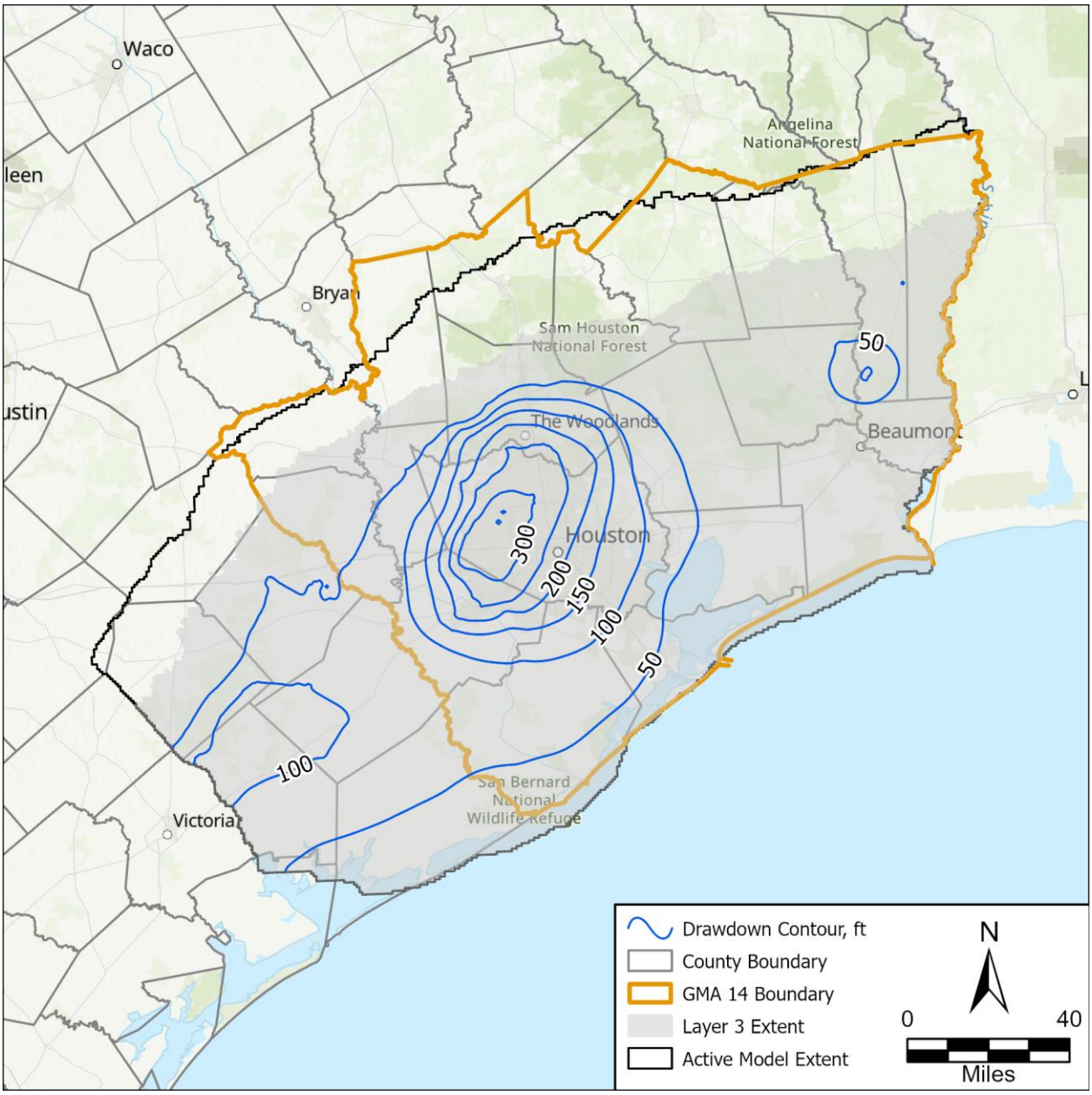

Figure 112. Layer 3 (Evangeline Aquifer) simulated drawdown between predevelopment and 2018.

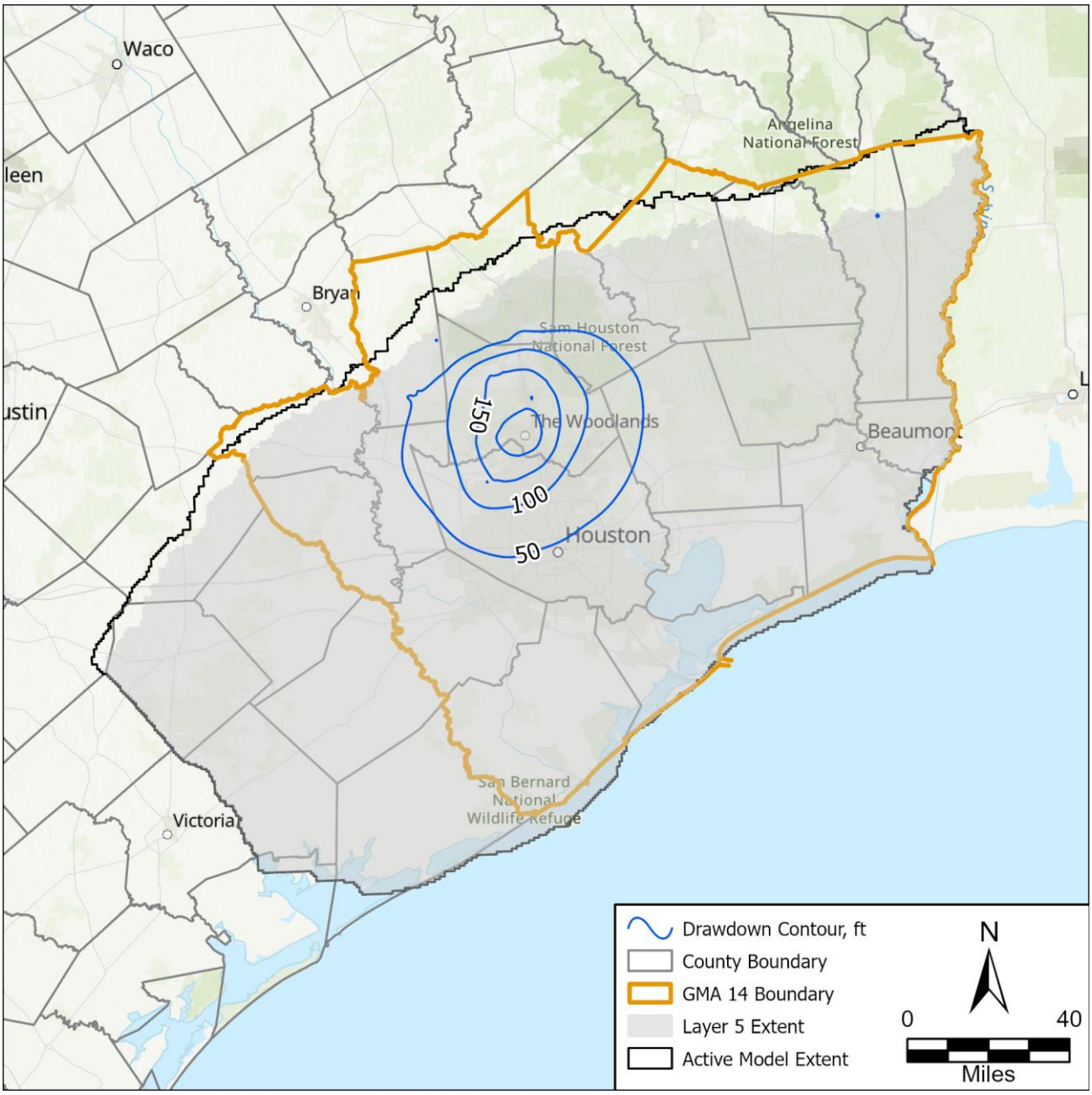

Figure 113. Layer 5 (Jasper Aquifer) simulated drawdown between predevelopment and 2018.

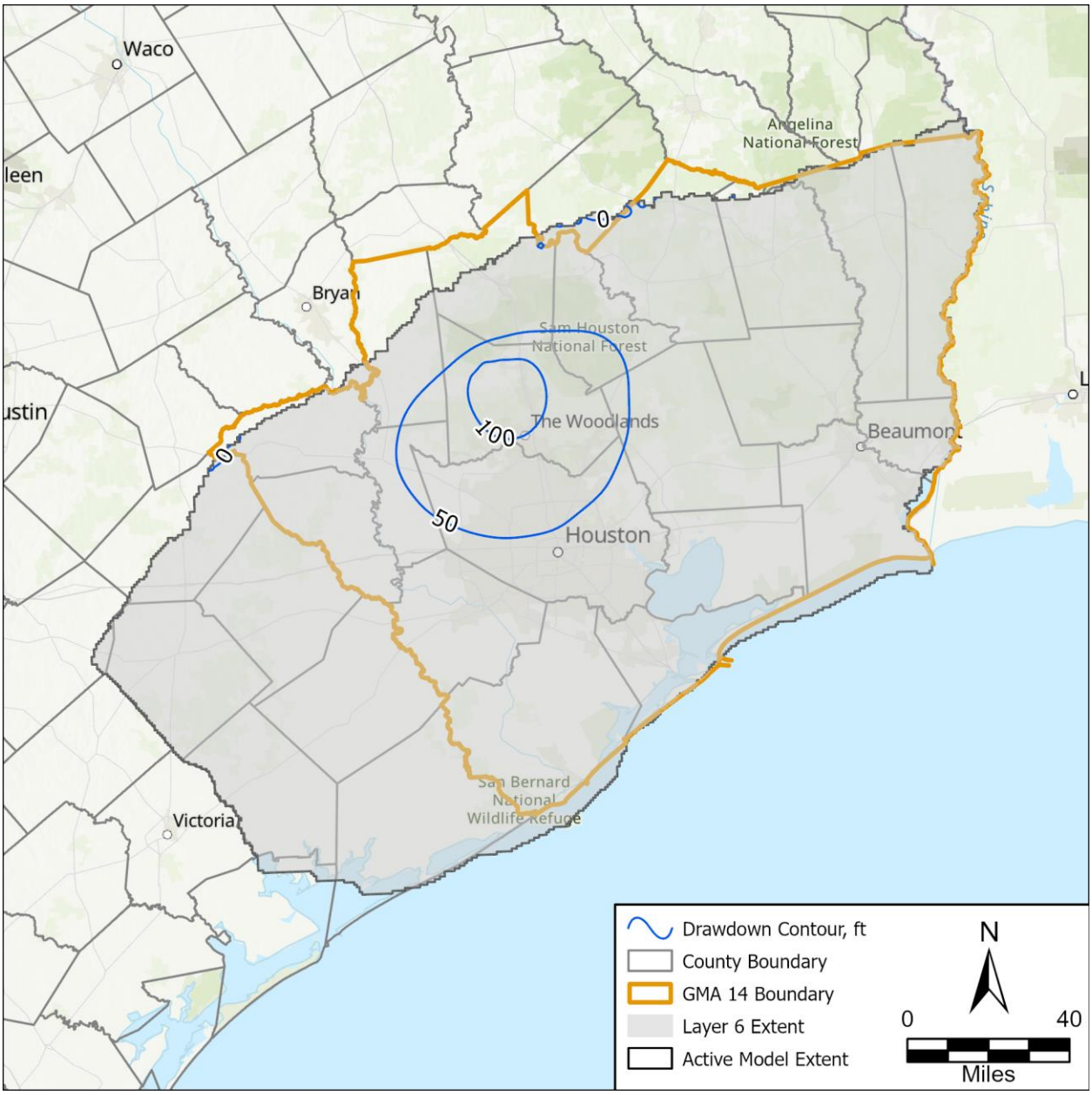

Figure 114. Layer 6 (Catahoula Aquifer) simulated drawdown between predevelopment and 2018.

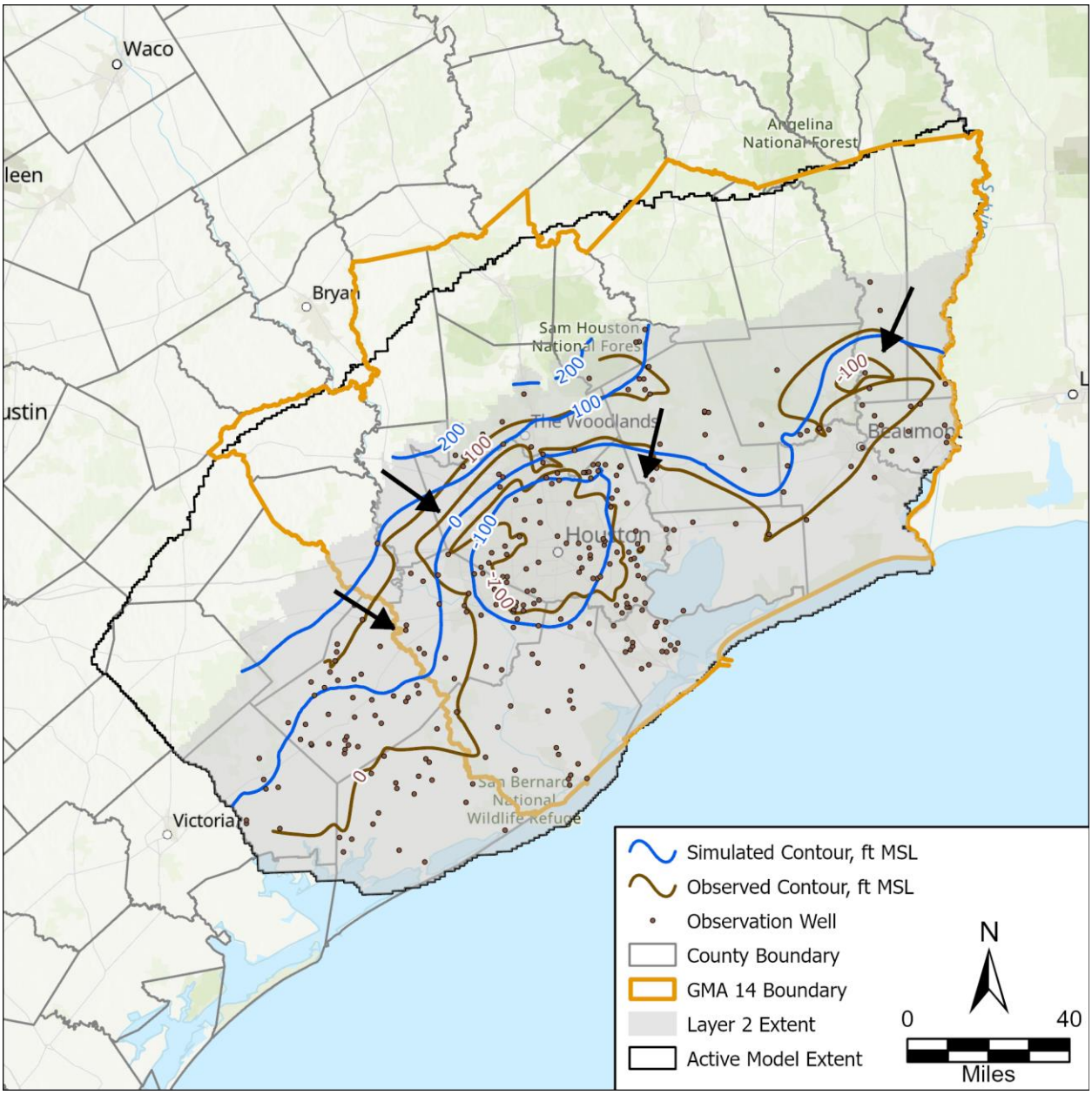

Figure 115. Layer 2 (Chicot Aquifer) simulated versus observed water levels. Arrows indicate approximate direction of regional flow.

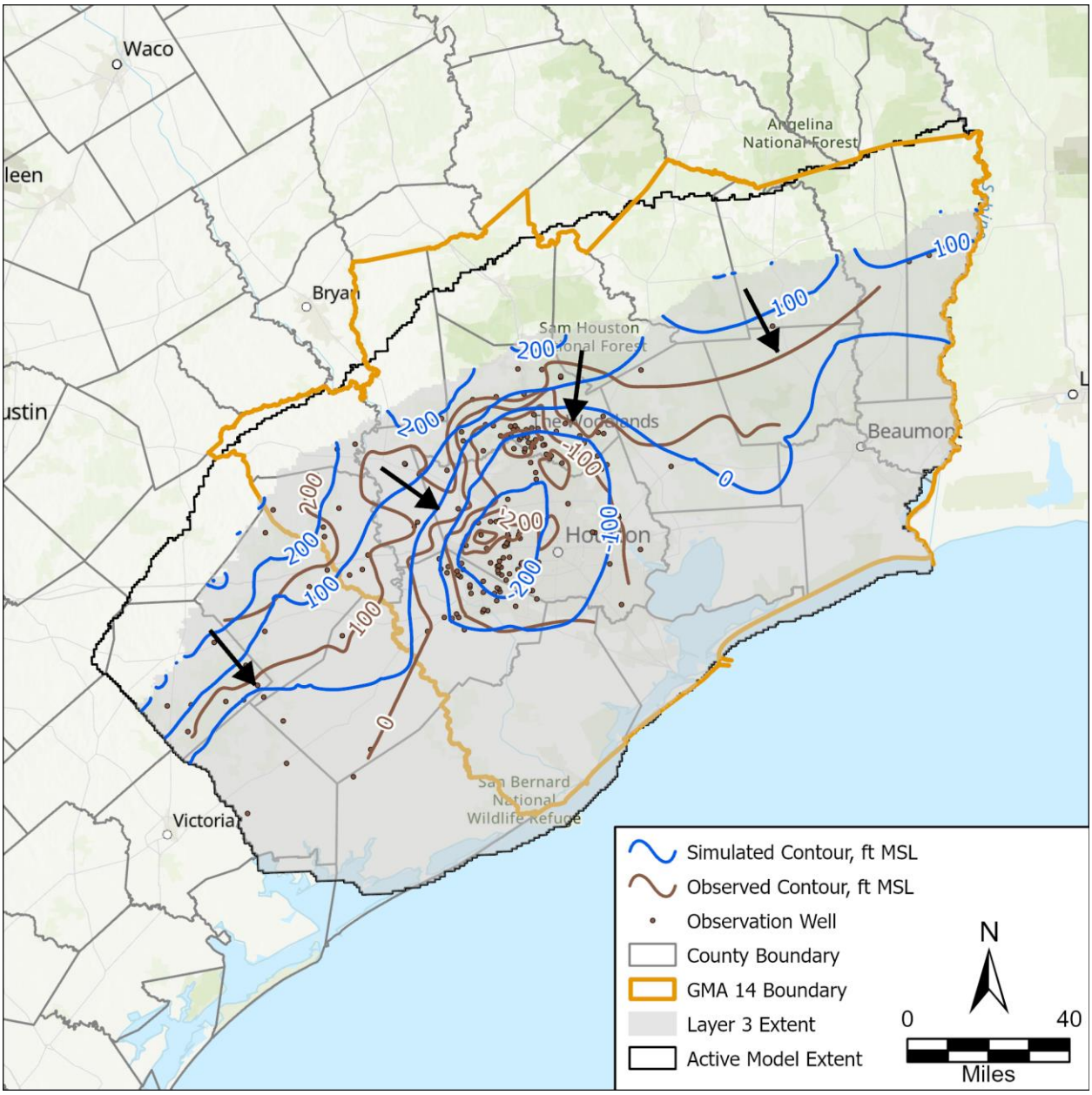

Figure 116. Layer 3 (Evangeline Aquifer) simulated versus observed water levels. Arrows indicate approximate direction of regional flow.

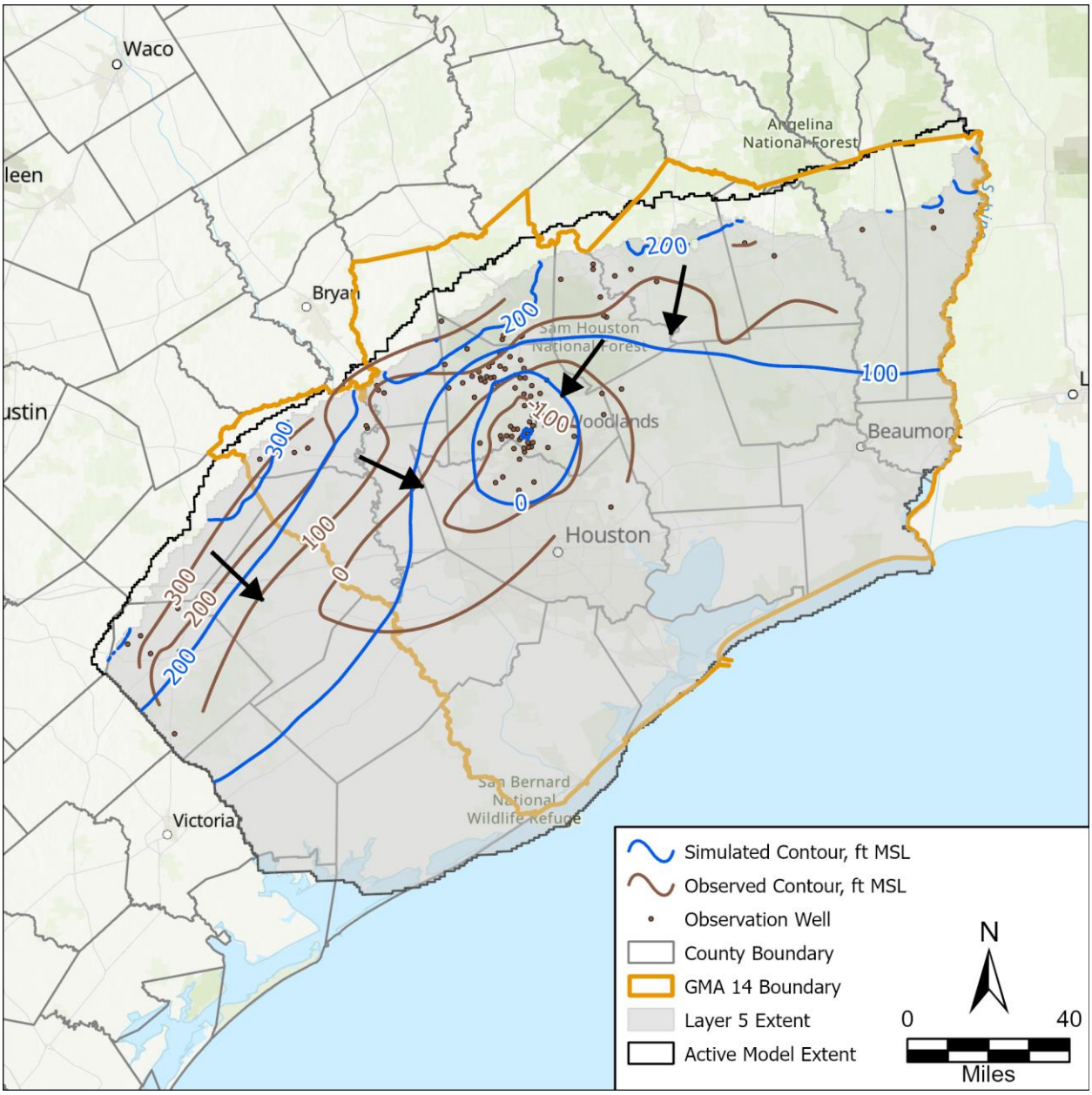

Figure 117. Layer 5 (Jasper Aquifer) simulated vs observed water levels. Arrows indicate approximate direction of regional flow.

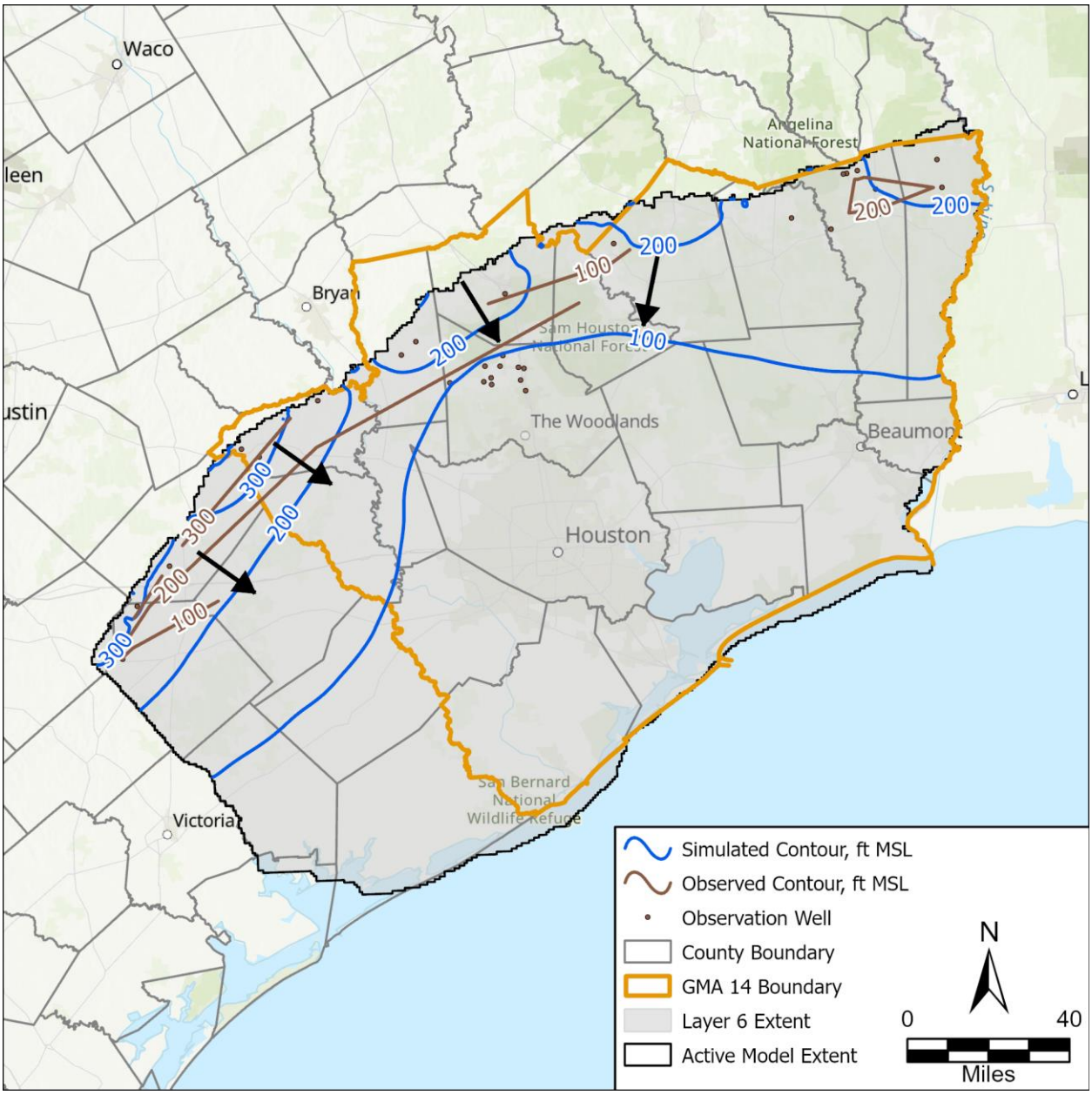

Figure 118. Layer 6 (Catahoula Aquifer) simulated vs observed water levels. Arrows indicate approximate direction of regional flow.

4.3. Model Simulated Versus Measured Compaction and Subsidence

4.3.1. Compaction and Subsidence

Table 14 summarizes the summary statistics for the compaction and subsidence targets. The calibration statistics are calculated with the same formulas outlined in Section 4.2. The Mean Residual of 0.03 feet indicates the GMA 14 Model simulated subsidence is unbiased. The Mean Absolute Residual is 0.17 feet indicating the magnitude of the residual was slightly over simulated. A Normalized RMSE less than 10 percent indicates a reasonable calibration which the GMA 14 Model achieved with a value of 3.85 percent.

Cross plots of the observed and simulated compaction and subsidence targets are illustrated in Figures 119 through 121 by station type. The perfect fit line is represented as the black dotted line in each plot with values closer to the perfect fit line indicating a perfect match between the observed and simulated value. As indicated with the mean error, the cross plots can show if the model produces over- or under- simulated compaction/subsidence.

The global positioning system ("GPS") station targets generally surround and are close to the perfect fit line, indicating a good match between observed and simulated targets and that values are not bias in either direction. The simulated compaction from the extensometer stations was generally under simulated but followed the perfect fit line. Except for a few values, the benchmark station targets also surrounded the perfect fit line, indicating an unbiased fit between the simulated and observed targets. Figure 122 shows the simulated versus observed compaction and subsidence targets from all station types.

Table 14. Calibration statistics for compaction and subsidence targets.

Calibration Statistic	Value
Number of targets	2,551
Mean Residual, feet	0.03
Mean Absolute Residual, feet	0.17
Root Mean Squared Error, feet	0.32
Range, feet	8.27
Normalized RMSE (%)	3.85

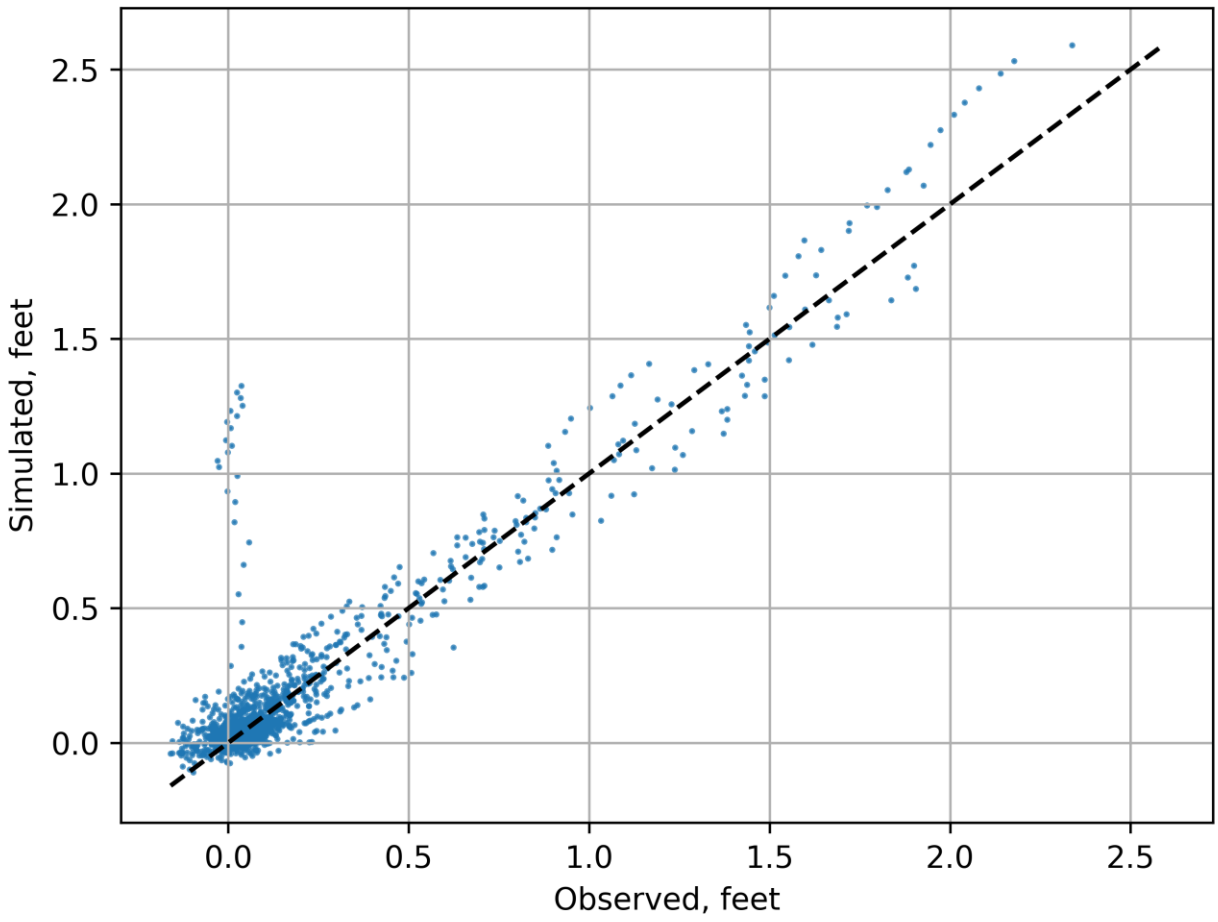

Figure 119. Observed versus simulated subsidence for global positioning system stations.

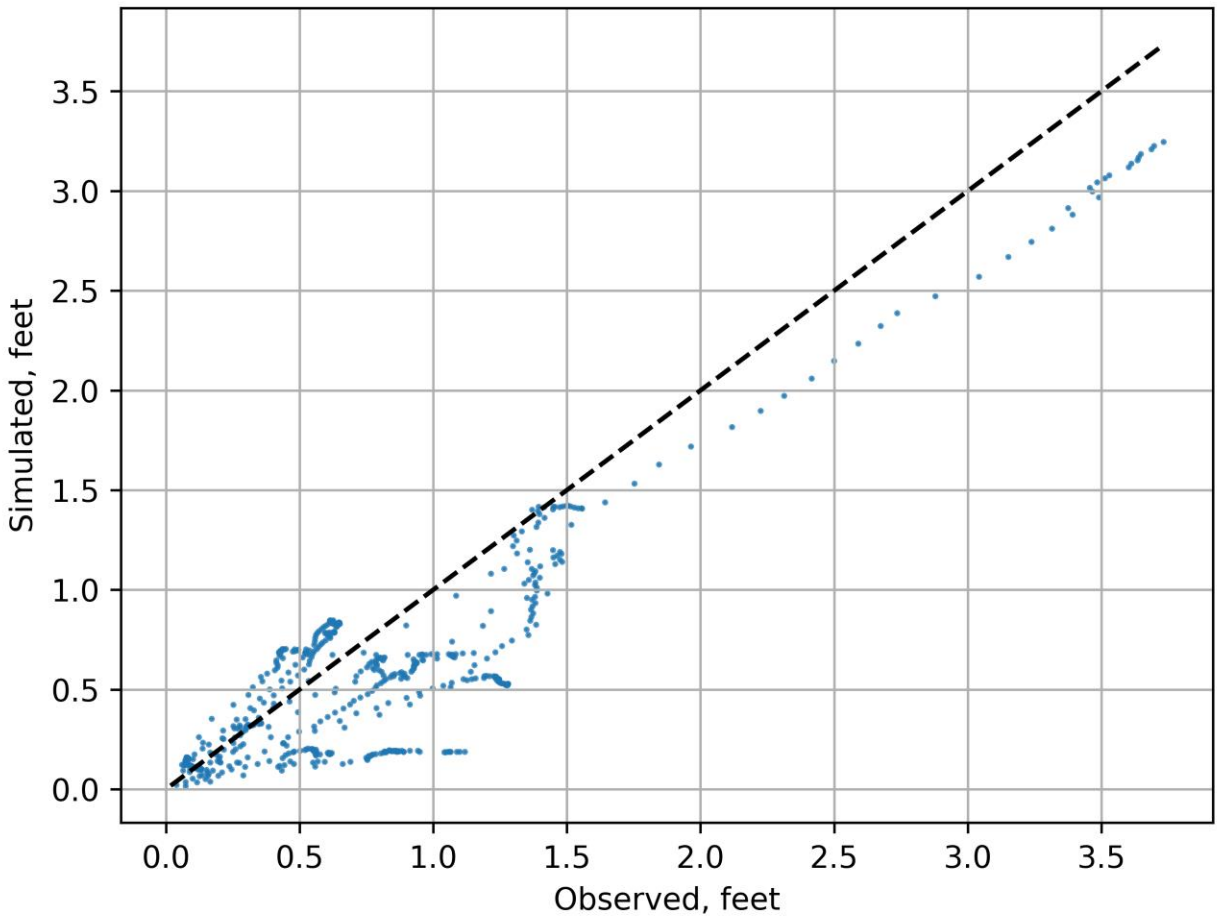

Figure 120. Observed versus simulated compaction for extensometer stations.

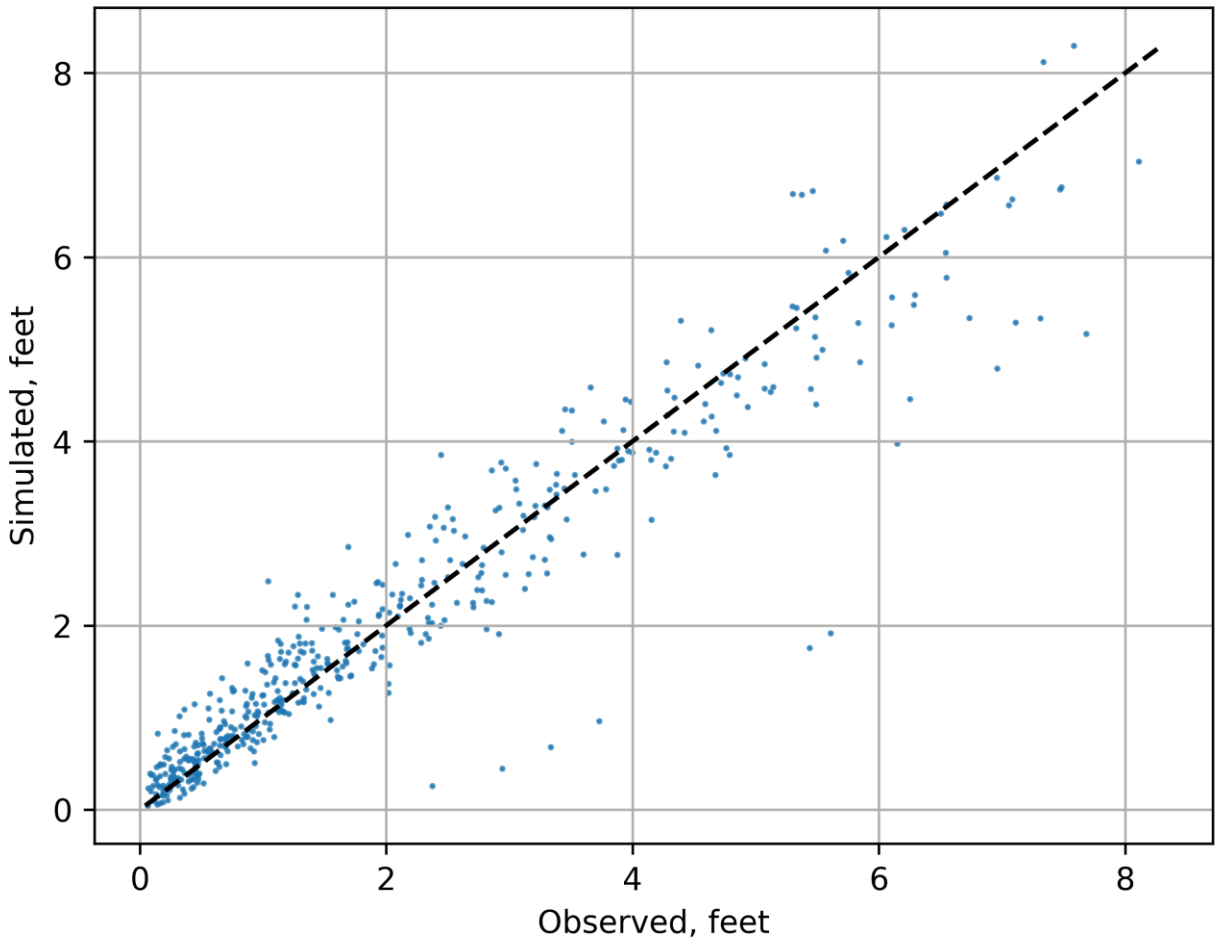

Figure 121. Observed versus simulated subsidence for benchmark locations.

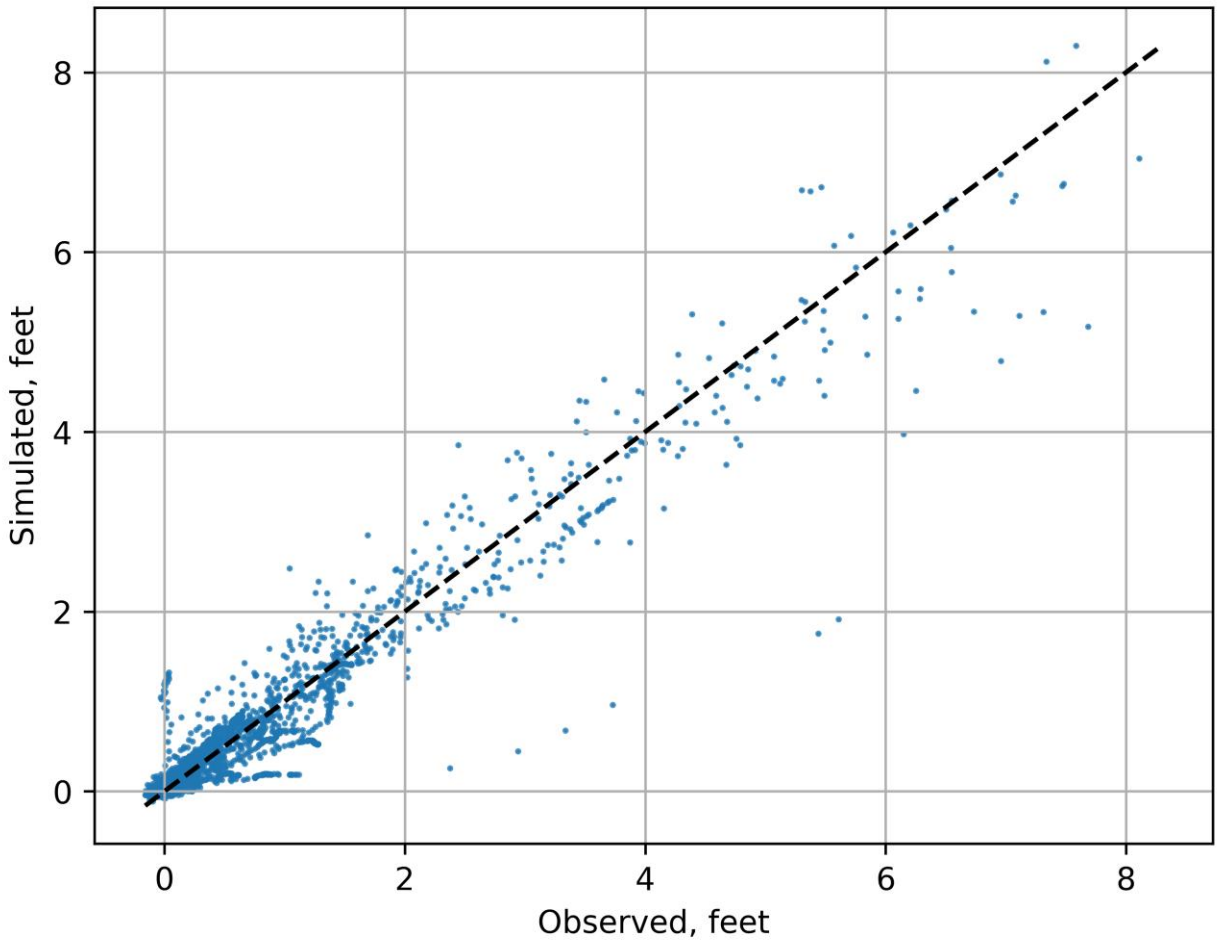

Figure 122. Observed versus simulated subsidence for all station types.

4.3.2. Residual Distribution

Figure 123 illustrates the spatial distribution of residuals for all compaction and subsidence target stations. The residuals for each station were averaged to get a mean residual per station. Overall, there is a similar amount of over simulated and under simulated mean residuals indicating no spatial bias in the simulated subsidence or compaction. Only areas with sufficient observed compaction or subsidence data can be evaluated for spatial bias. There is sparse compaction data beyond Harris County and the surrounding counties, so these areas were not evaluated.

Figure 124 illustrates the histogram of compaction and subsidence residuals for all stations. The ideal residual histogram would be symmetrical and centered around zero, indicating an unbiased distribution of residuals. Residuals were distributed around 0.03 feet with a symmetrical distribution indicating the simulated compaction and subsidence residuals were unbiased.

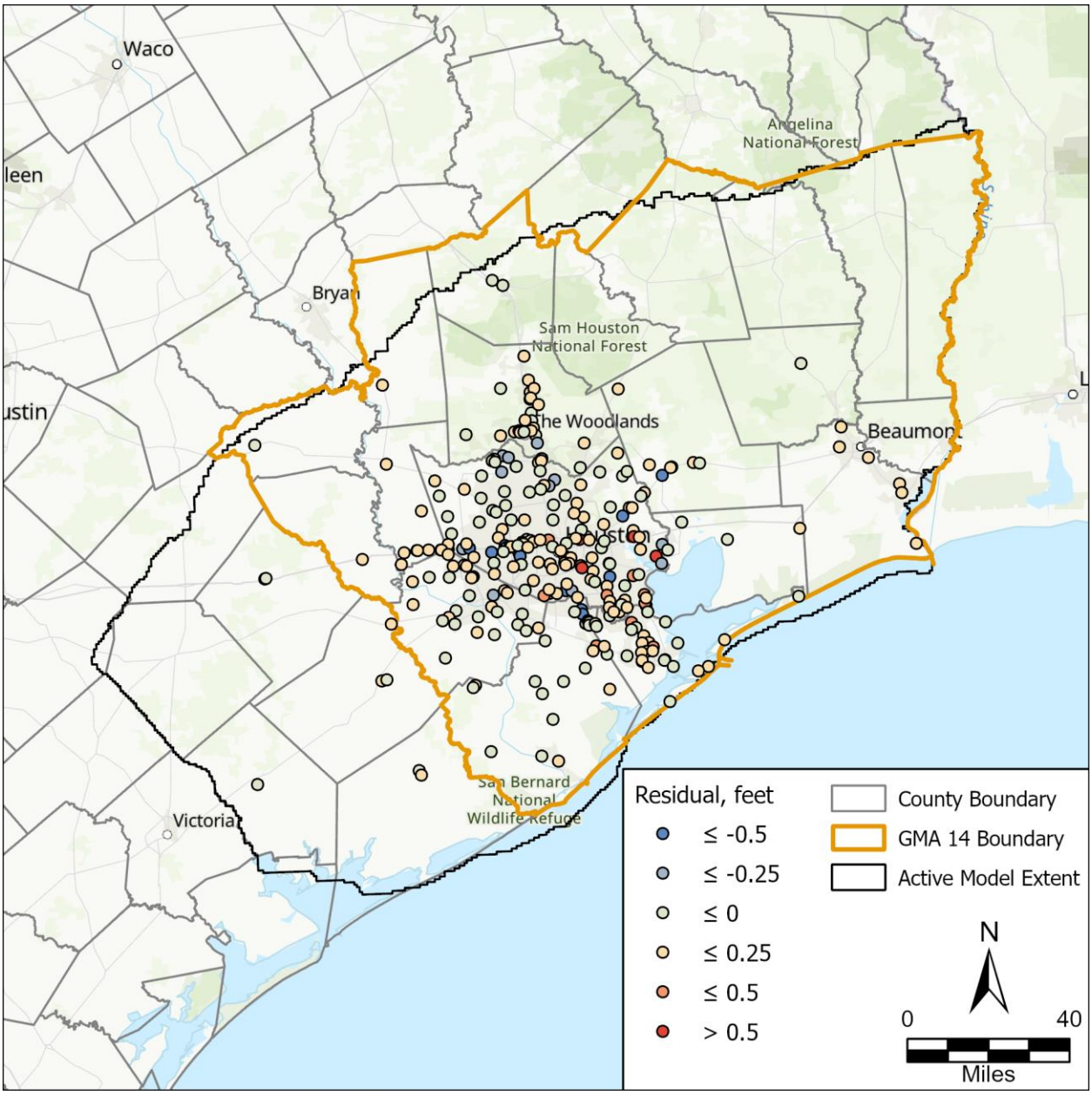

Figure 123. Compaction or subsidence mean residual by station.

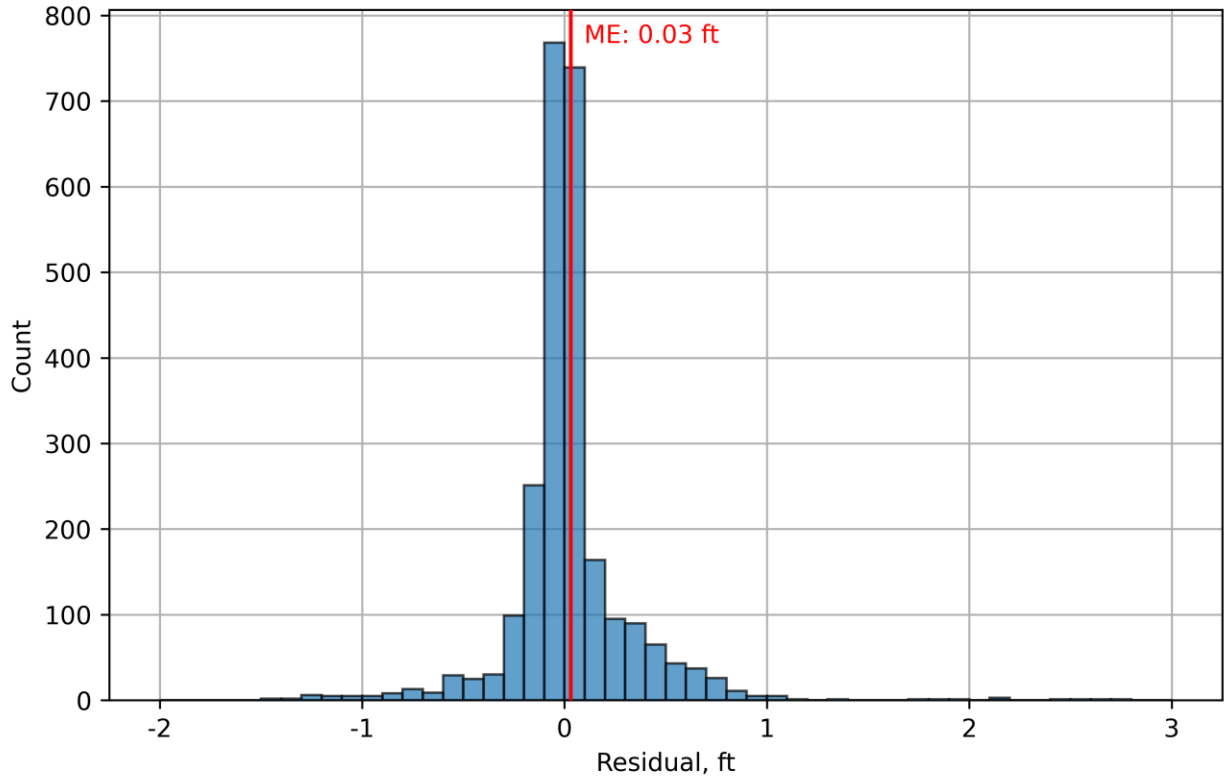

Figure 124. Residual histogram for compaction or subsidence targets. ME = mean error.

4.3.3. Compaction and Subsidence Time Series

Figure 125 show the subsidence and compaction time series of two extensometer sites and two global positioning system sites. The extensometer sites partially penetrate the Evangeline and are measuring compaction between the base of the extensometer and near land surface rather than subsidence as noted by the y-axis label. Since the global positioning system stations are recording land deformation, the y axis is labeled as subsidence. Appendix 8 contains time series charts of the measured and GMA 14 Model simulated compaction and subsidence.

The global positioning system site in northern Montgomery County matches the amount of observed subsidence and the long-term trends. Global positioning system site P014 also shows similar subsidence from the GMA 14 Model compared to the observed values. Both Extensometer sites under simulate the measured compaction.

Figure 126 illustrates GMA 14 Model results at four global positioning system stations in Montgomery and Harris counties. In central Montgomery County the GMA 14 Model under simulates the observed subsidence as shown for global positioning system station TXCN. At site P012, the model over simulates the observed subsidence while the two other stations show a relatively close match between observed and simulated subsidence.

Figure 127 illustrates GMA 14 Model results at three extensometers and one global positioning system station in Harris County. The measured versus simulated values at the extensometer stations illustrate how the GMA 14 Model over predicts in some areas and under predicts in others. Overall, the charts on Figure 126 and Figure 127 illustrate the minimal bias of the GMA 14 Model.

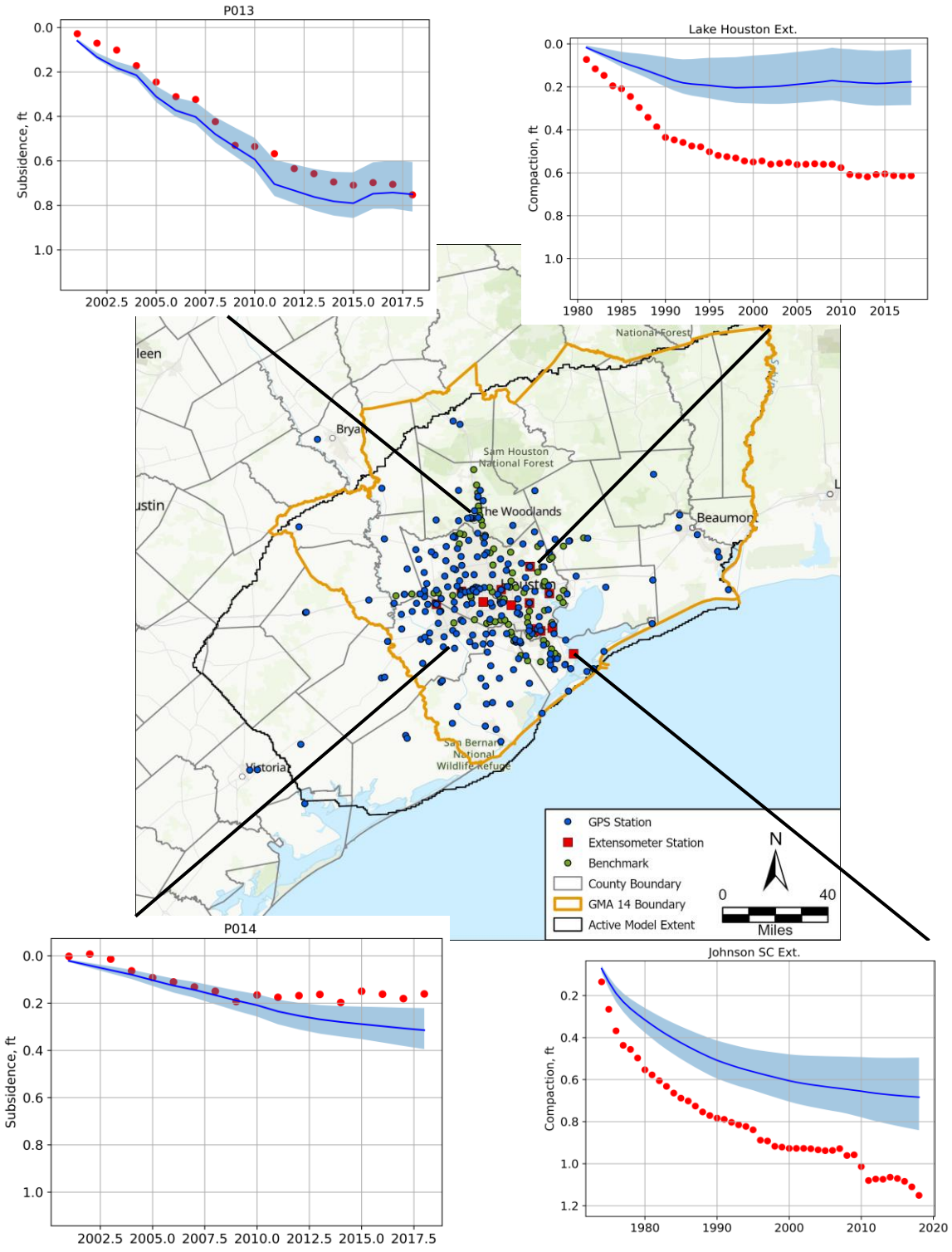

Figure 125. Compaction and subsidence simulated versus observed time series.

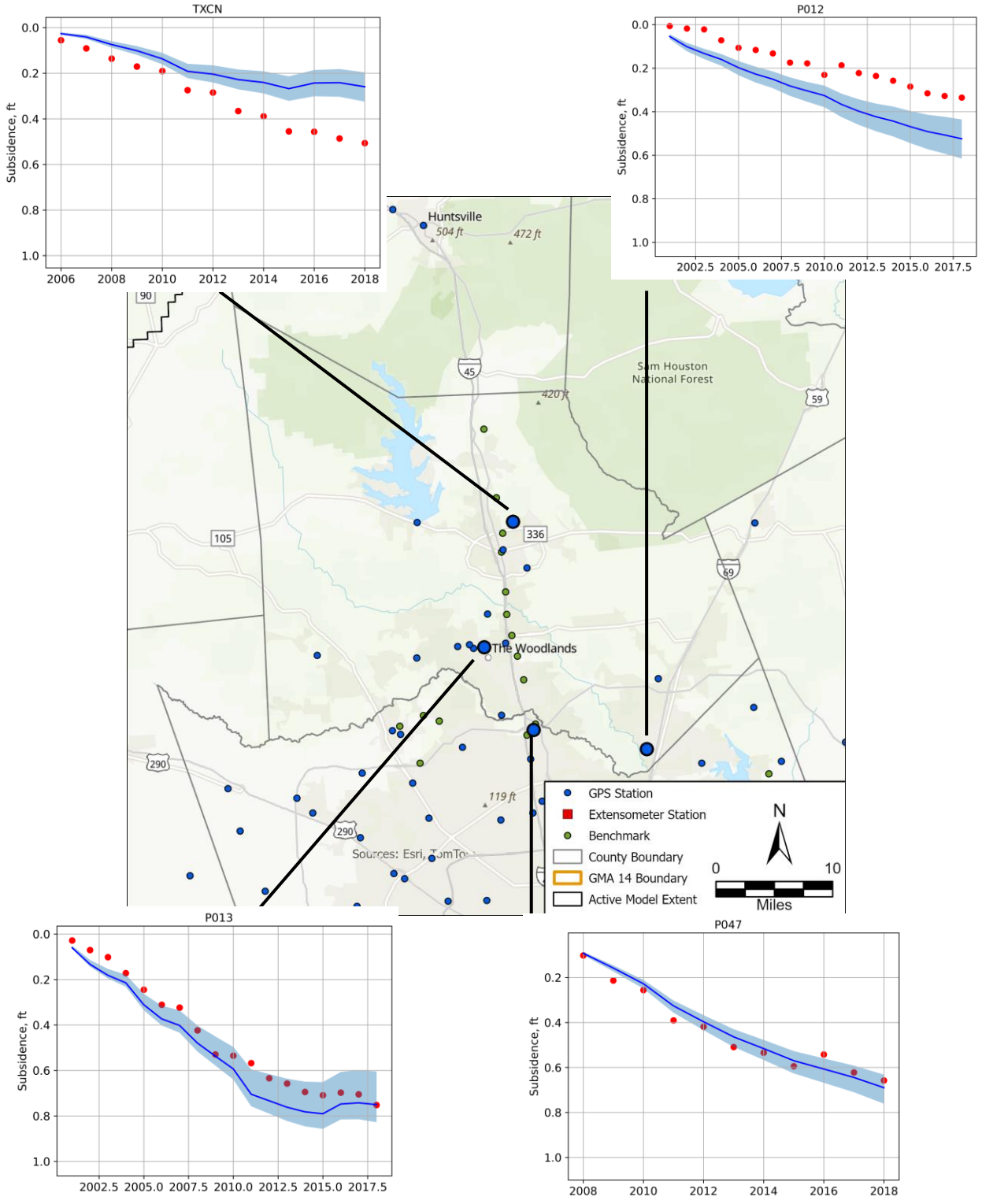

Figure 126. Subsidence simulated versus observed time series.

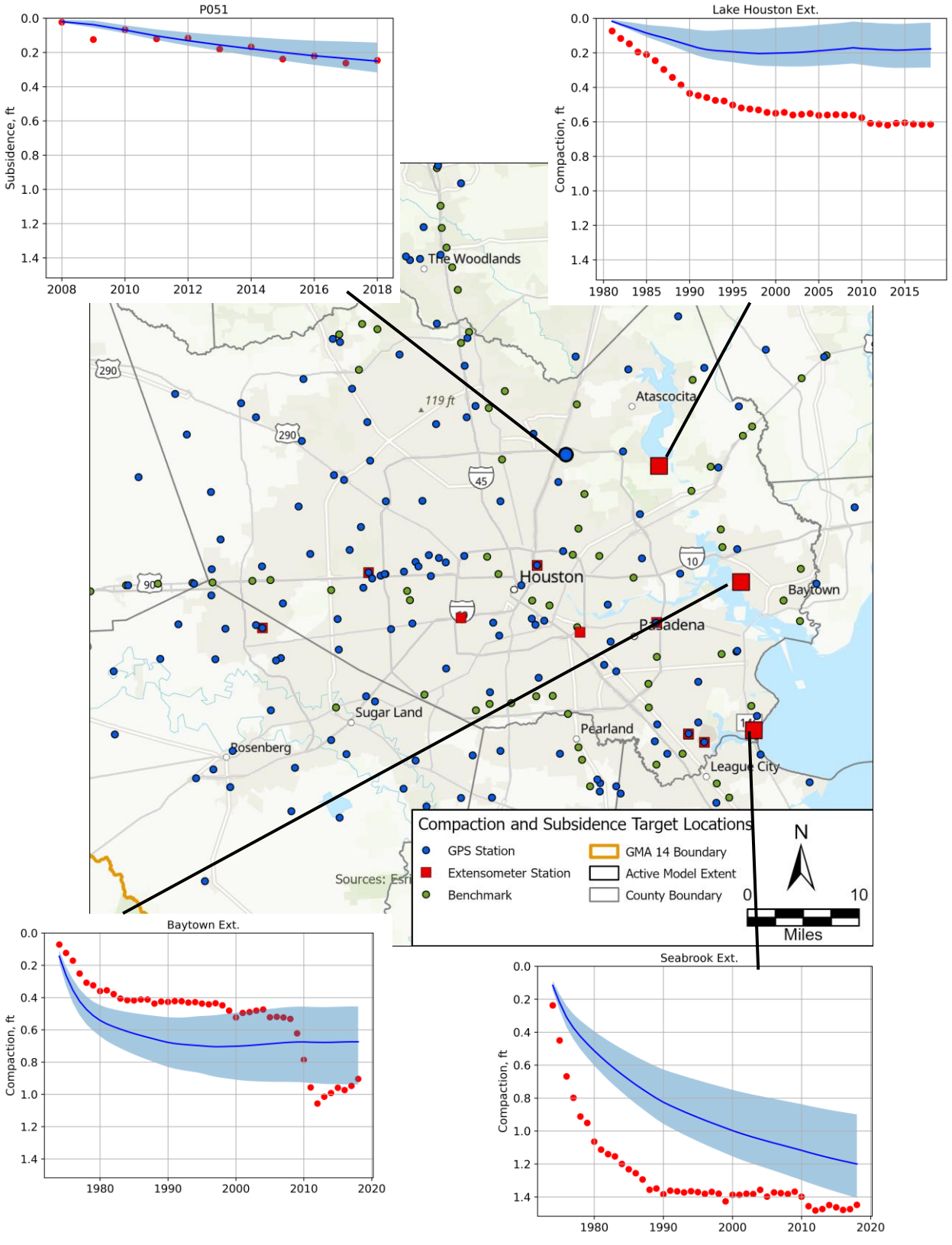

Figure 127. Compaction and Subsidence simulated versus observed time series.

4.3.4. Simulated Compaction and Subsidence

Figures 128 through 130 illustrate the compaction within the Chicot, Evangeline, and Jasper, respectively, from the end of predevelopment to 2018. The Burkeville and Catahoula layers did not have any compaction contours more than 0.5 feet and are not shown.

The simulated compaction within the Chicot was greatest around southeast Harris County reaching approximately five feet. The one-foot simulated compaction contours extend beyond Harris into neighboring counties. The GMA 14 Model also simulates compaction in the southwestern and eastern regions of model domain, but these areas did not have any benchmark or extensometer sites which were able to provide calibration data earlier than the global positioning system sites. The simulated compaction within the Evangeline centered around Harris County reaching a maximum of seven feet. The simulated compaction within the Jasper greater than 0.5 feet was contained within northern Montgomery County.

Figure 131 illustrates the subsidence due to all layers of the model from the end of predevelopment to 2018. The maximum simulated subsidence reaches approximately 10 feet in southeastern Harris County.

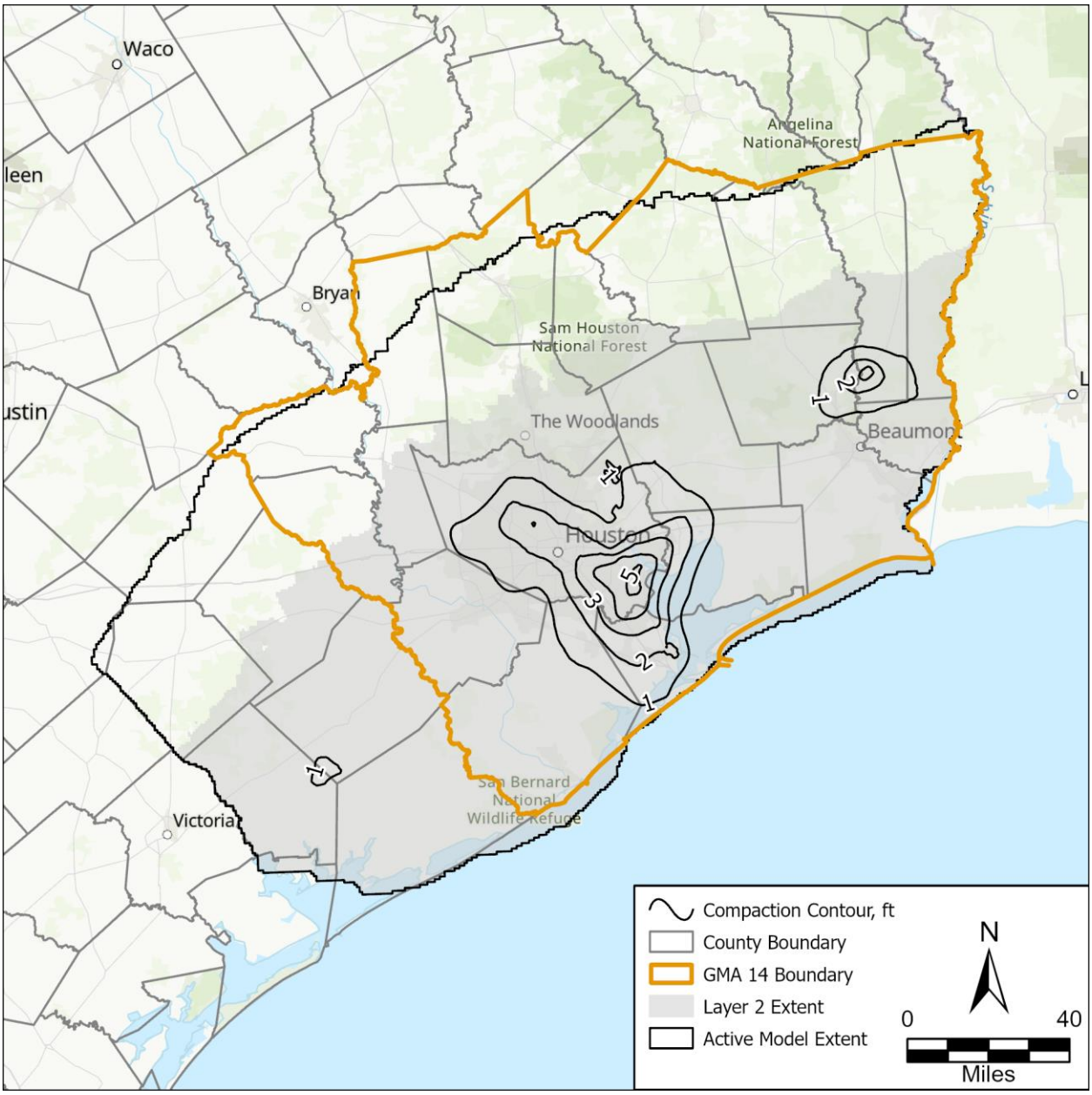

Figure 128. Simulated compaction from Layer 2 (Chicot Aquifer) between the end of predevelopment and the end of the calibration period (2018).

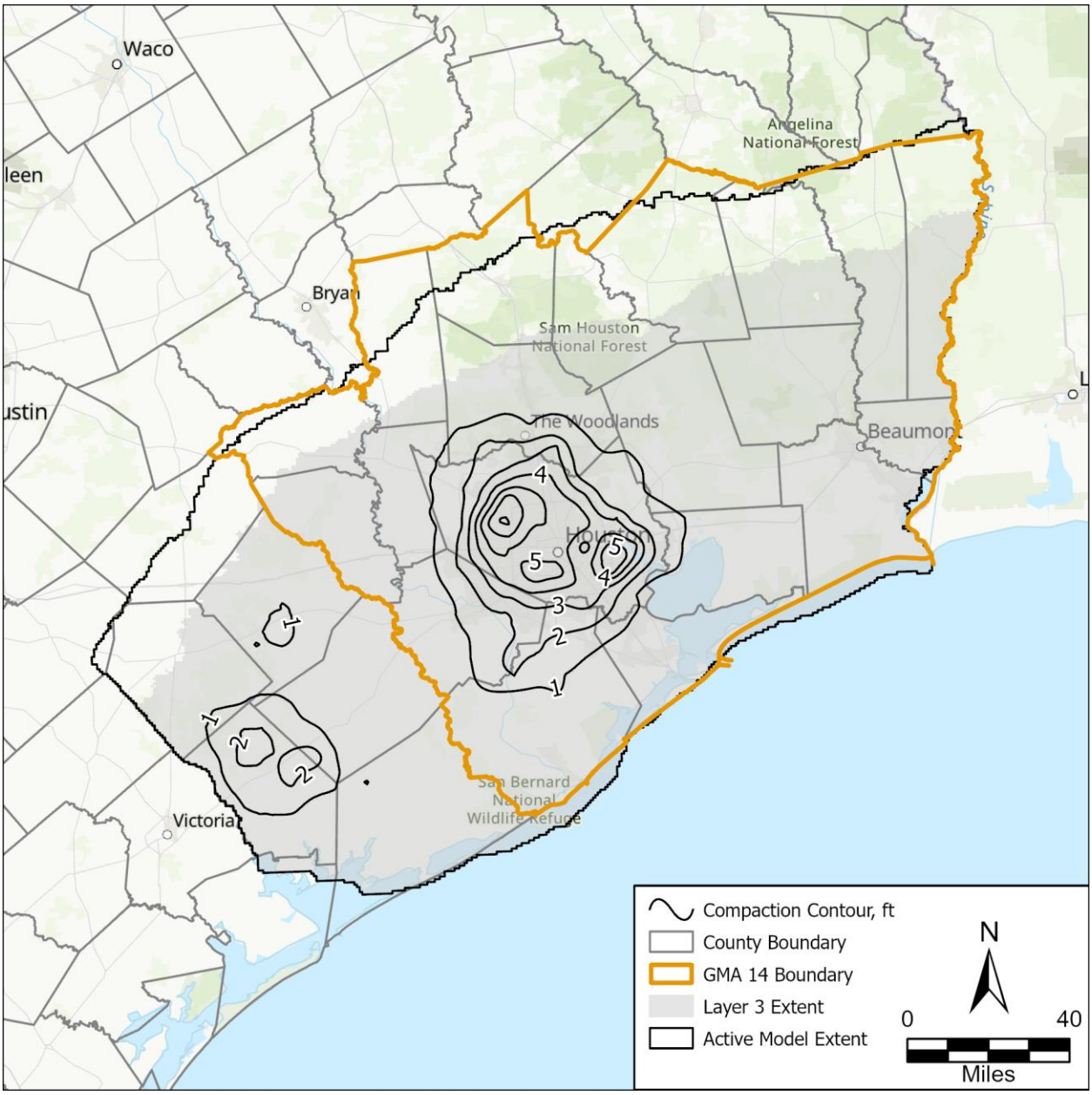

Figure 129. Simulated compaction from Layer 3 (Evangeline Aquifer) between the predevelopment period and the end of the calibration period (2018).

Figure 130. Simulated compaction from Layer 5 (Jasper Aquifer) between the predevelopment period and the end of the calibration period (2018).

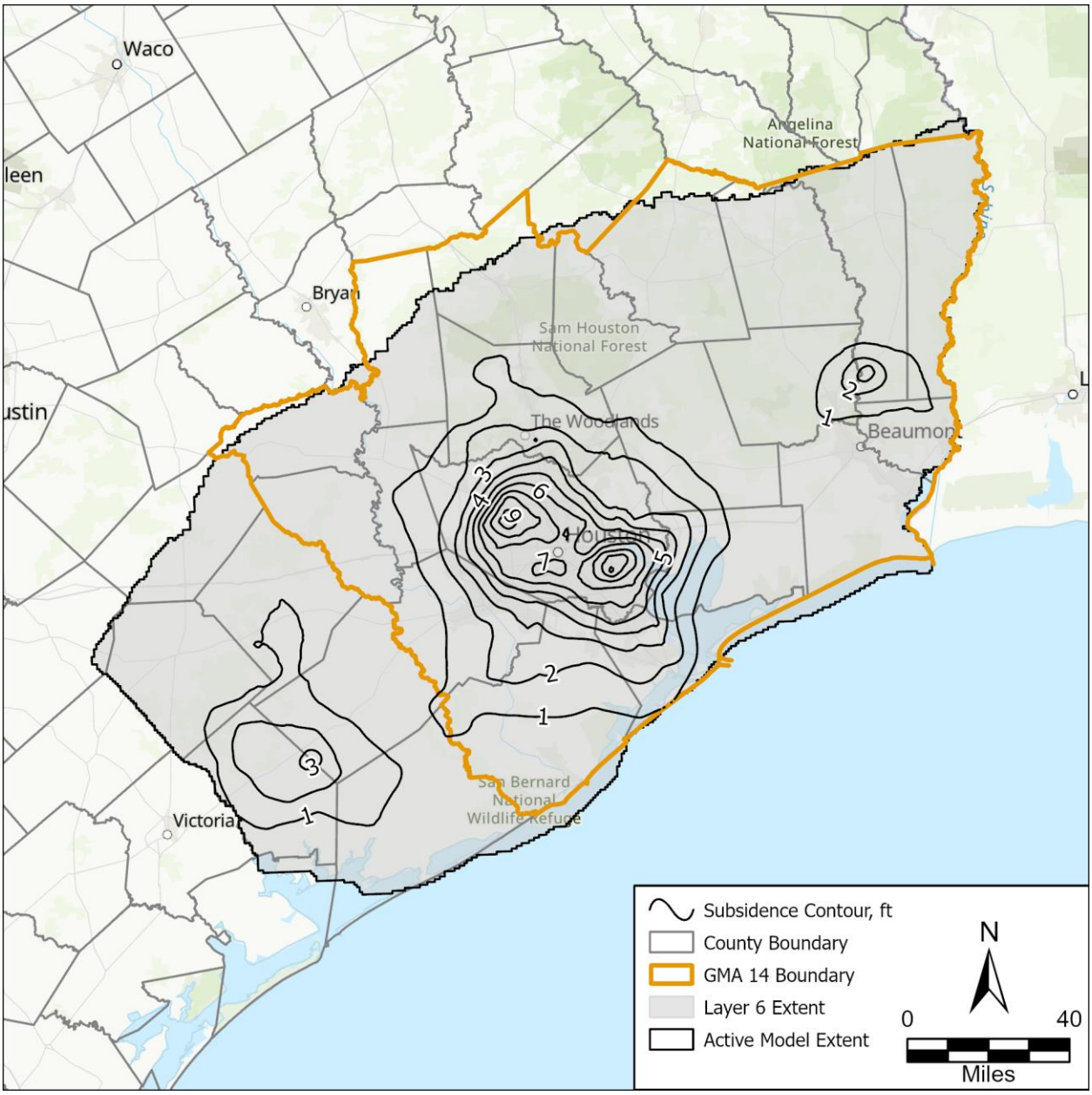

Figure 131. Simulated subsidence between the predevelopment period (1896) and the end of the calibration period (2018).

4.4. Simulated Water Budgets

We extracted the GMA 14 Model water budget results using ZONEBUDGET 6 (USGS, 2025b) and the cell-by-cell flows output from the model.

Table 15 summarizes the simulated water budget during steady state (that is, predevelopment) conditions. Table 16 summarizes the simulated net water budget during steady state conditions. Recharge contributed to the majority of the inflows to the model through layer 1. Recharge is only applied to layer 1 (shallow aquifer system) and thus is the only layer that receives recharge. Approximately 93 percent of the recharge that contributes to the shallow aquifer system exits the model via surface water simulated as drains and rivers. The remaining recharge, approximately 7 percent, contributes to layers 2 through 6. The outflow to rivers exceeded the inflow from rivers indicating that major rivers were gaining during the predevelopment period. Groundwater contributed to layers 2 through 6 then continue to deeper layers or contribute to the Gulf of Mexico through General Head Boundary cells. Layers 3 and 5, Evangeline and Jasper respectively, have a few wells and a minor amount of water is extracted through the well boundary condition. The percent difference between total inflows and total outflows is 0 percent indicating acceptable mass balance for the steady state GMA 14 Model.

Table 17 summarizes the simulated water budget for stress period 59 (2018) and Table 18 summarizes the simulated net water budget. Similar to the predevelopment period recharge was the major inflow component. Approximately 44 percent of recharge exited the model via surface water simulated with drain and river cells. Approximately 42 percent of the recharge contributed to layers 2 through 6, much higher than the 7 percent during the pre-development period. The inflow and outflows from rivers are similar, indicating that the major rivers are close to equilibrium with the groundwater system during 2018. Groundwater contributing to deeper layers is captured by wells with the Jasper and Catahoula also contributing to the Gulf of Mexico via general head boundary cells.

The storage component is divided into the contributions from coarse-grained material and fine-grained material (interbeds). The majority of the coarse-grained storage comes from areas with unconfined conditions which are most prevalent within the layer outcrops. As interbeds compact or expand, groundwater is released or added to interbed storage, respectively. The Chicot and Evangeline show the highest amount of groundwater released from interbed storage which is consistent with the majority of compaction occurring within these layers throughout the calibration period.

Table 15. Steady state simulated water budget by layer (values in acre-feet).

Budget Component	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Total
Inflows							
Coarse-grained Storage	0	0	0	0	0	0	0
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	0	0	0	0	0	0	0
Rivers	5,768	0	0	0	0	0	5,768
General Head Boundary	1,207	268	269	0	0	0	1,744
Recharge	789,188	0	0	0	0	0	789,188
Vertical Leakage (Upper)	0	80,892	50,304	334	25,461	48,647	205,638
Vertical Leakage (Lower)	114,970	36,754	344	431	16,148	0	168,647
Total Inflows	**911,133**	**117,914**	**50,917**	**765**	**41,609**	**48,647**	**1,170,985**
Outflows							
Coarse-grained Storage	0	0	0	0	0	0	0
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	1,046	0	645	0	1,691
Drains	693,026	0	0	0	0	0	693,026
Rivers	46,268	0	0	0	0	0	46,268
General Head Boundary	4,178	7,952	8,869	462	14,533	19,723	55,717
Recharge	0	0	0	0	0	0	0
Vertical Leakage (Upper)	0	90,140	40,359	232	8,990	28,926	168,647
Vertical Leakage (Lower)	167,660	19,822	644	71	17,442	0	205,639
Total Outflows	**911,132**	**117,914**	**50,918**	**765**	**41,610**	**48,649**	**1,170,988**
Total In - Total Out	1	0	-1	0	-1	-2	-3
Percent Difference	0%	0%	0%	0%	0%	0%	0%

Table 16. Steady state net simulated water budget by layer (values in acre-feet).

Budget Component	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Total
Coarse-grained Storage	0	0	0	0	0	0	0
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	-1,046	0	-645	0	-1,691
Drains	-693,026	0	0	0	0	0	-693,026
Rivers	-40,500	0	0	0	0	0	-40,500
General Head Boundary	-2,971	-7,684	-8,600	-462	-14,533	-19,723	-53,973
Recharge	789,188	0	0	0	0	0	789,188
Vertical Leakage (Upper)	0	-9,248	9,945	102	16,471	19,721	36,991
Vertical Leakage (Lower)	-52,690	16,932	-300	360	-1,294	0	-36,992

Table 17. Stress Period 59 (2018) simulated water budget by layer (values in acre-feet).

Budget Component	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Total
Inflows							
Coarse-grained Storage	127,964	212,401	38,324	421	24,212	15,292	418,614
Interbed Storage	0	19,184	34,610	410	12,245	0	66,449
Water Compressibility	6	465	2,888	141	900	1,705	6,105
Wells	0	0	0	0	0	0	0
Drains	0	0	0	0	0	0	0
Rivers	26,716	0	0	0	0	0	26,716
General Head Boundary	3,493	14,705	14,665	0	0	0	32,863
Recharge	1,264,132	0	0	0	0	0	1,264,132
Vertical Leakage (Upper)	0	436,947	255,818	283	32,698	65,198	790,944
Vertical Leakage (Lower)	19,772	39,667	1,121	298	27,271	0	88,129
Total Inflows	**1,442,083**	**723,369**	**347,426**	**1,553**	**97,326**	**82,195**	**2,693,952**
Outflows							
Coarse-grained Storage	310,040	9,558	536	1	704	594	321,433
Interbed Storage	0	1,908	1,954	16	50	0	3,928
Water Compressibility	70	179	176	0	16	7	448
Wells	0	491,486	302,576	0	51,604	30,179	875,845
Drains	560,265	0	0	0	0	0	560,265
Rivers	25,414	0	0	0	0	0	25,414
General Head Boundary	1,264	0	0	396	11,250	15,270	28,180
Recharge	0	0	0	0	0	0	0
Vertical Leakage (Upper)	0	4,688	41,257	1,130	4,908	36,146	88,129
Vertical Leakage (Lower)	545,029	215,561	1,080	480	28,793	0	790,943
Total Outflows	**1,442,082**	**723,380**	**347,579**	**2,023**	**97,325**	**82,196**	**2,694,585**
Total In - Total Out	1	-11	-153	-470	1	-1	-633
Percent Difference	0%	0%	0%	-26%	0%	0%	0%

Table 18. Stress period 59 (2018) net simulated water budget by layer (values in acre-feet).

Budget Component	Layer 1	Layer 2	Layer 3	Layer 4	Layer 5	Layer 6	Total
Coarse-grained Storage	-182,076	202,843	37,788	420	23,508	14,698	97,181
Interbed Storage	0	17,276	32,656	394	12,195	0	62,521
Water Compressibility	-64	286	2712	141	884	1698	5,557
Wells	0	-491,486	-302,576	0	-51,604	-30,179	-875,845
Drains	-560,265	0	0	0	0	0	-560,265
Rivers	1,302	0	0	0	0	0	1,302
General Head Boundary	2,229	14,705	14,665	-396	-11,250	-15,270	4,683
Recharge	1,264,132	0	0	0	0	0	1,264,132
Vertical Leakage (Upper)	0	432,259	214,561	-847	27,790	29,052	702,815
Vertical Leakage (Lower)	-525,257	-175,894	41	-182	-1,522	0	-702,814

Figures 132 and 133 illustrate the transient simulated water budget and net water budget by component for the Chicot Aquifer. The major outflow component is pumping from wells which ramp up over time. With the increase in pumping there is an increase in cross formation flow from the shallow aquifer system with a portion of this flow continuing to underlying layers. Water released from storage also increases with increasing pumping where the majority is derived from coarse-grained storage. After the predevelopment period, the model contributes to the Gulf of Mexico but as pumping increases the flux transitions to the Gulf of Mexico contributing to the model.

Figures 134 and 135 illustrate the transient simulated water budget and net water budget by component for the Evangeline Aquifer. Similar to the Chicot, the water released from storage and the vertical leakage from the above layers increase over time with pumping. Since the underlying layer is the Burkeville, leakage from the lower units is insignificant.

Figures 136 and 137 illustrate the transient simulated water budget and net water budget by component for the Jasper Aquifer. Similar to the above layers, the vertical leakage from overlying and underlying layers increases along with water from storage as pumping increases. Unlike the above layers, the Jasper losses groundwater to the Gulf of Mexico throughout the entire calibration period.

Figures 138 and 139 illustrate the transient simulated water budget and net water budget by component for the Catahoula Aquifer. The major budget component over time is the vertical leakage to overlying layers. A minor amount of pumping is within the Catahoula but is mostly offset by the water released from storage due to a decline in water levels. The Catahoula also losses groundwater to the Gulf of Mexico throughout the calibration period.

Appendix 9 summarizes the simulated water budgets by county and aquifer and by Groundwater Conservation District and aquifer for each stress period.

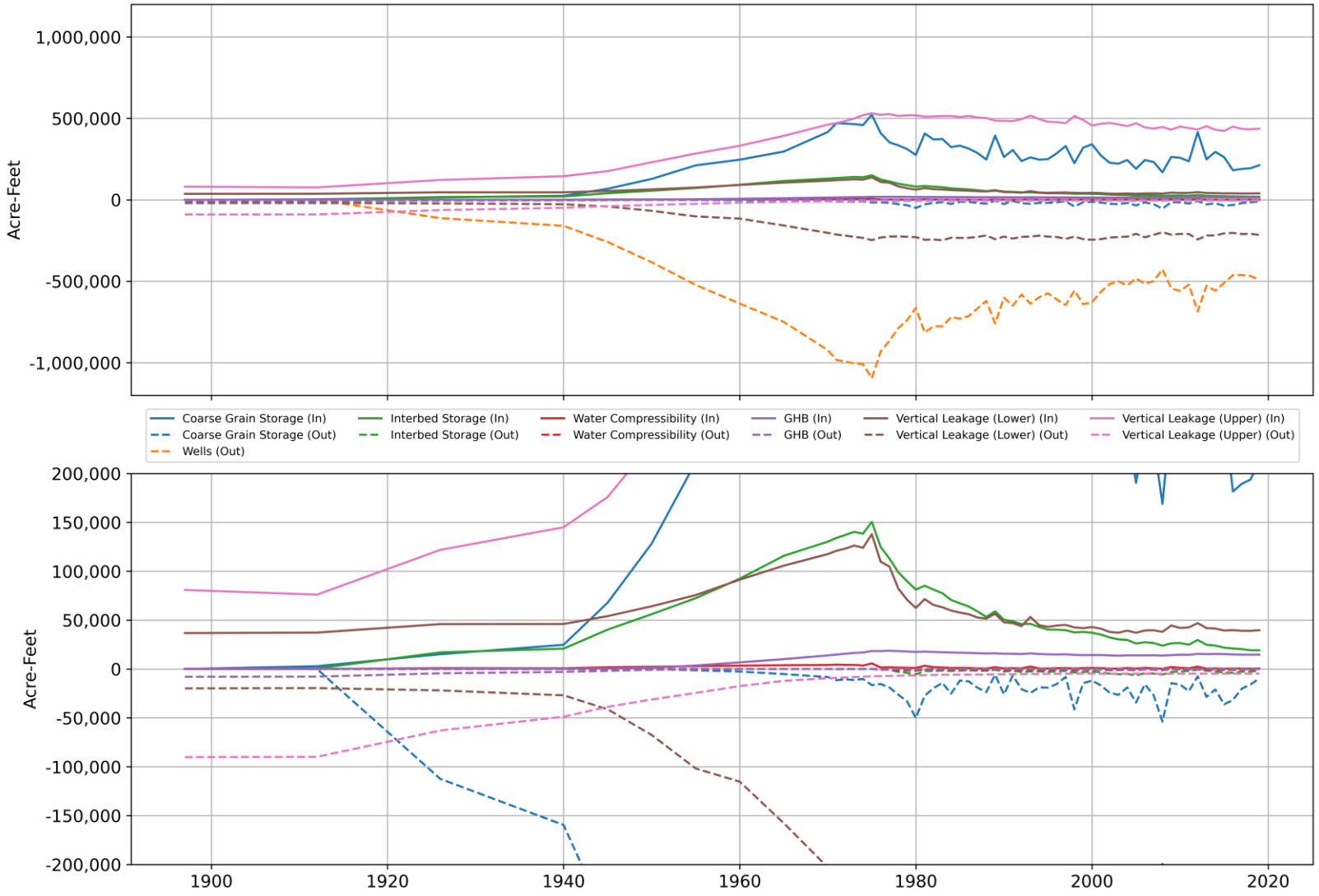

Figure 132. Layer 2 (Chicot) transient simulated water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

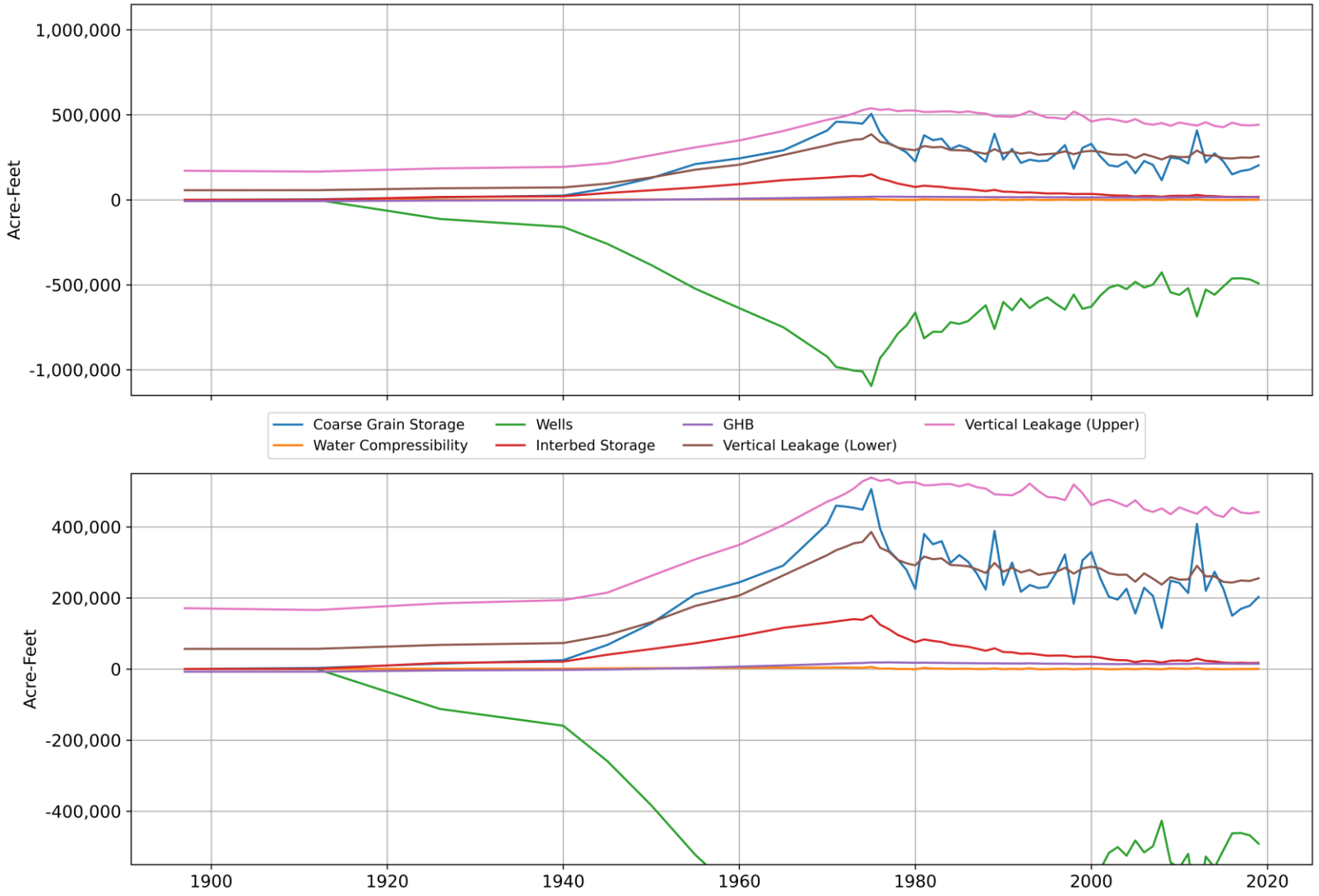

Figure 133. Layer 2 (Chicot) transient simulated net water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

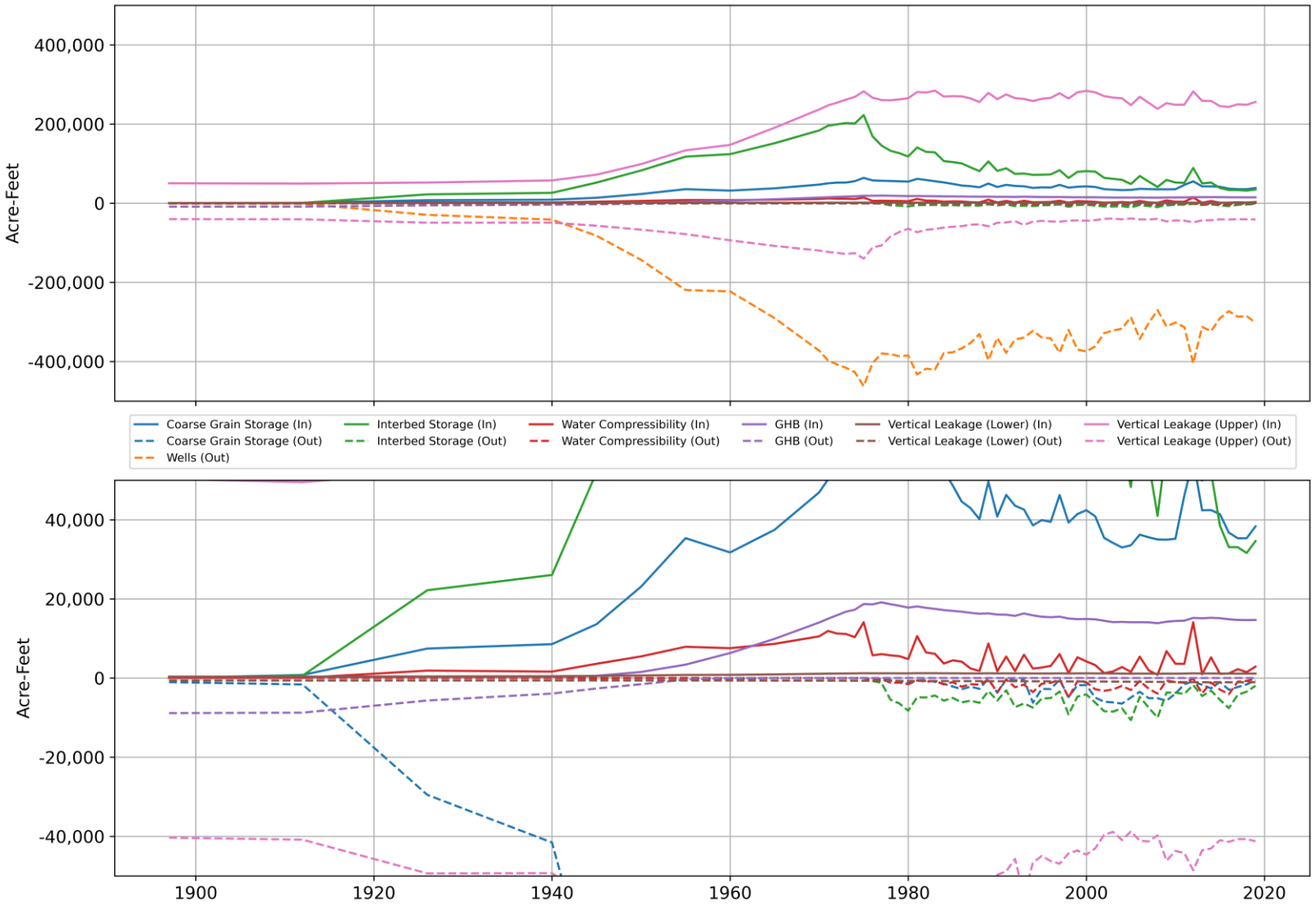

Figure 134. Layer 3 (Evangeline Aquifer) transient simulated water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

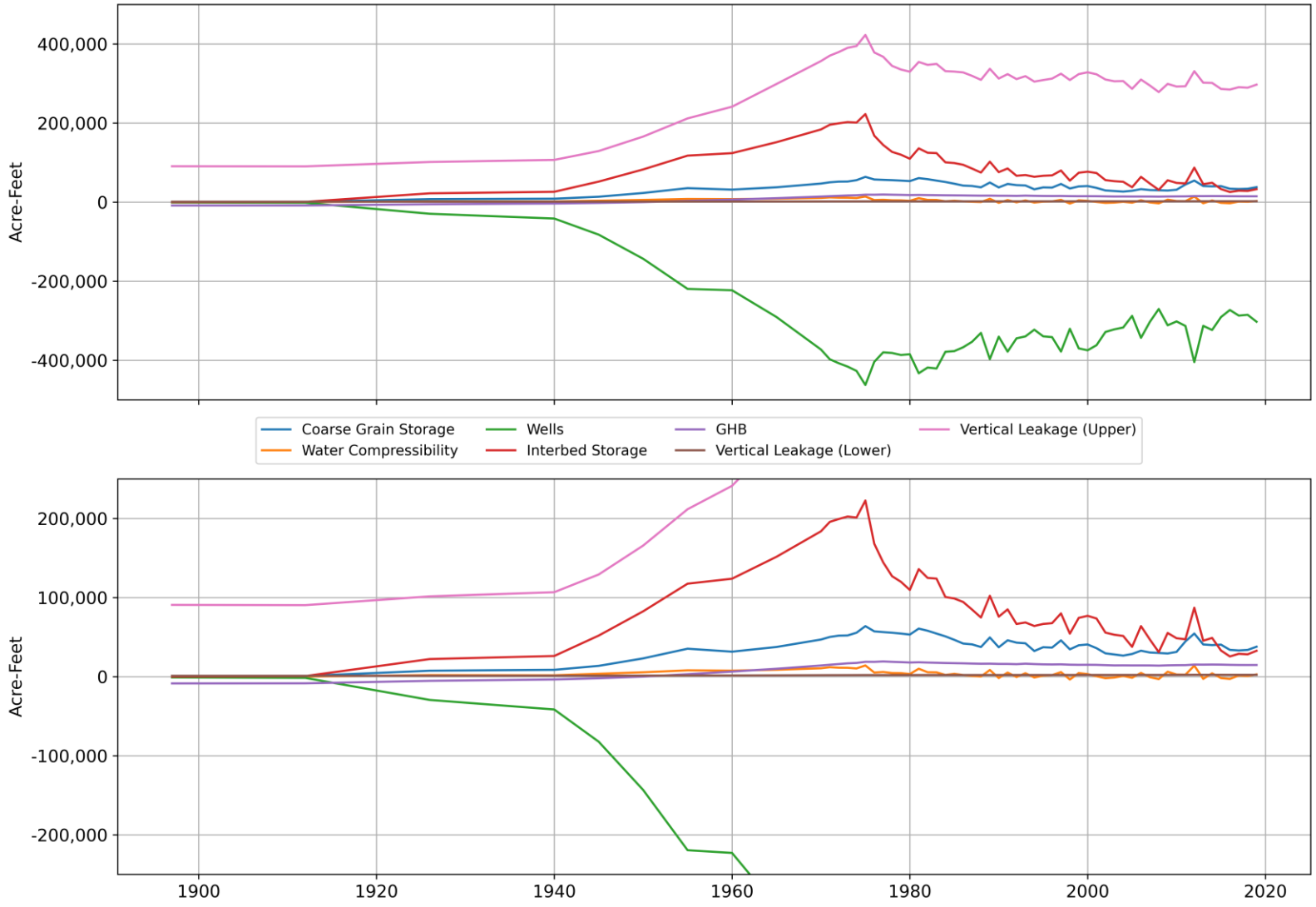

Figure 135. Layer 3 (Evangeline Aquifer) transient simulated net water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

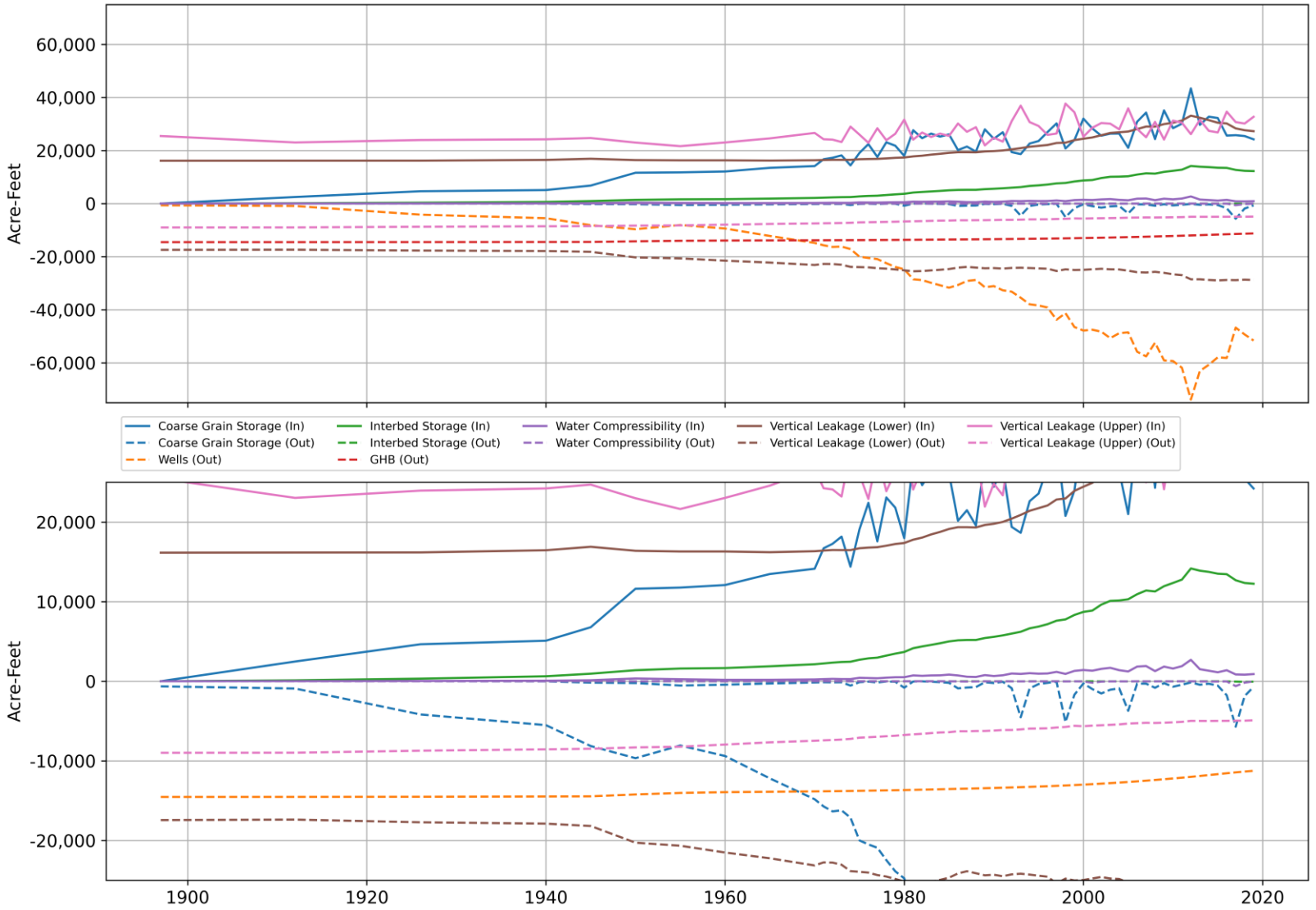

Figure 136. Layer 5 (Jasper Aquifer) transient simulated water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

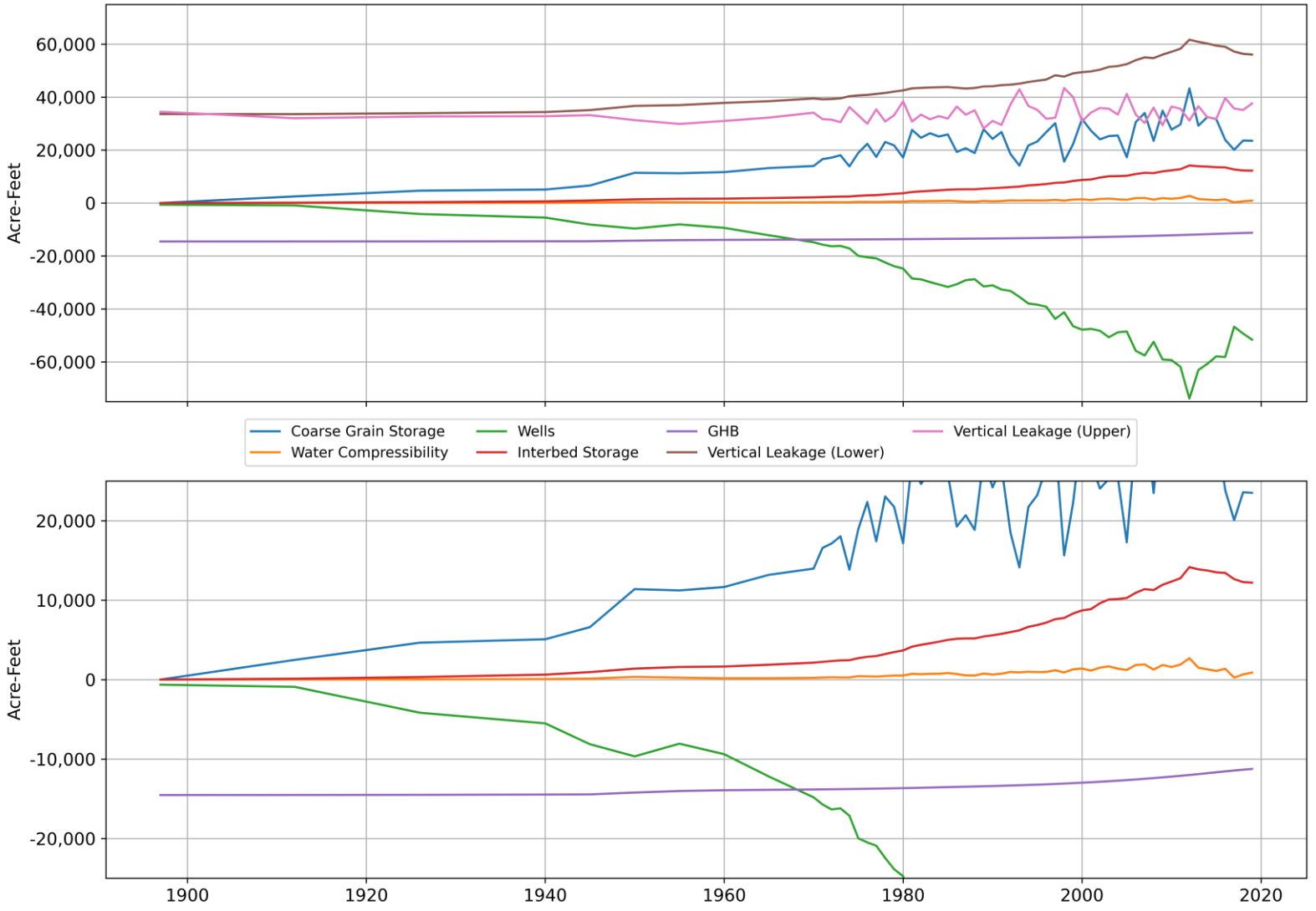

Figure 137. Layer 5 (Jasper Aquifer) transient simulated net water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

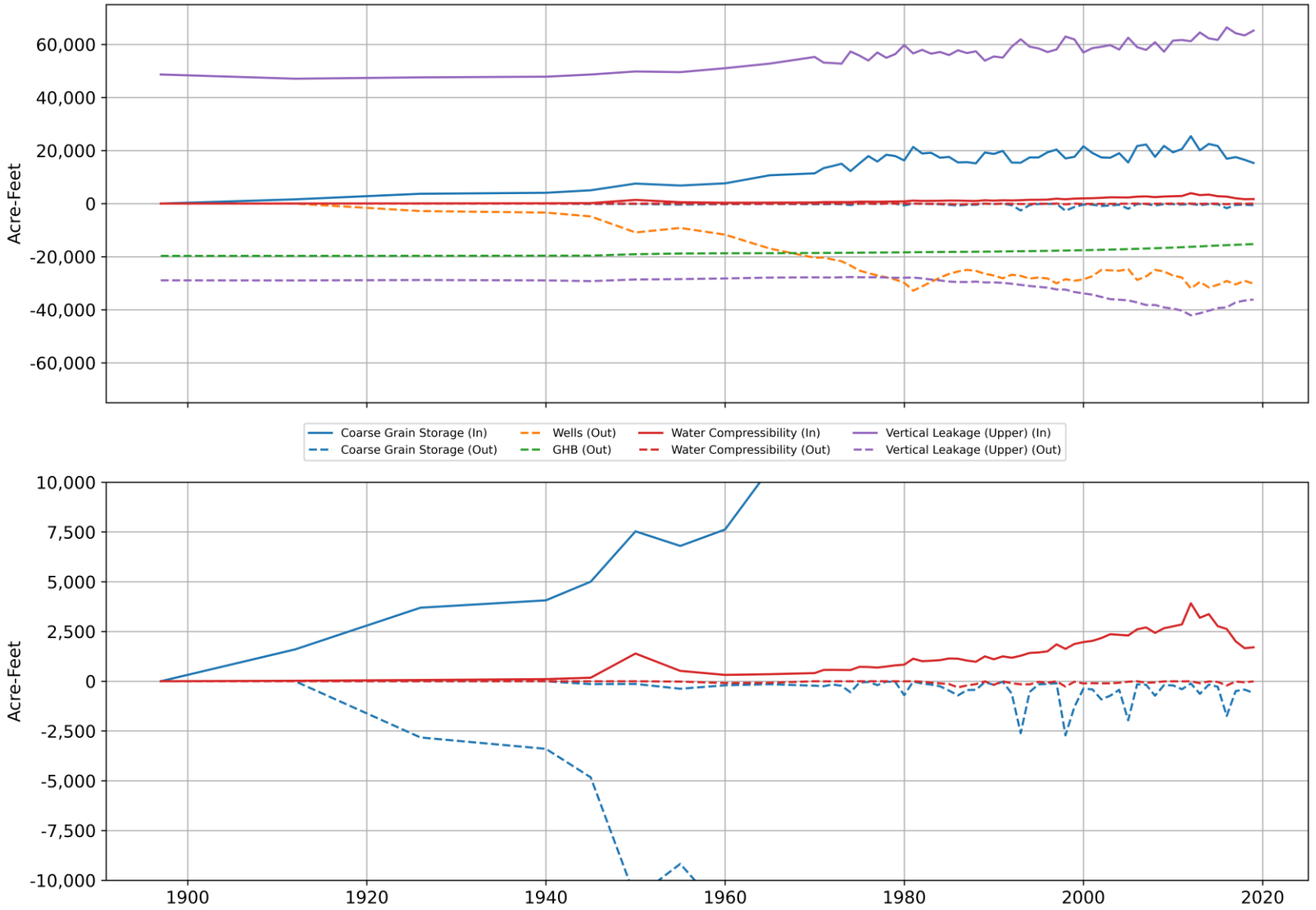

Figure 138. Layer 6 (Catahoula Aquifer) transient simulated water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

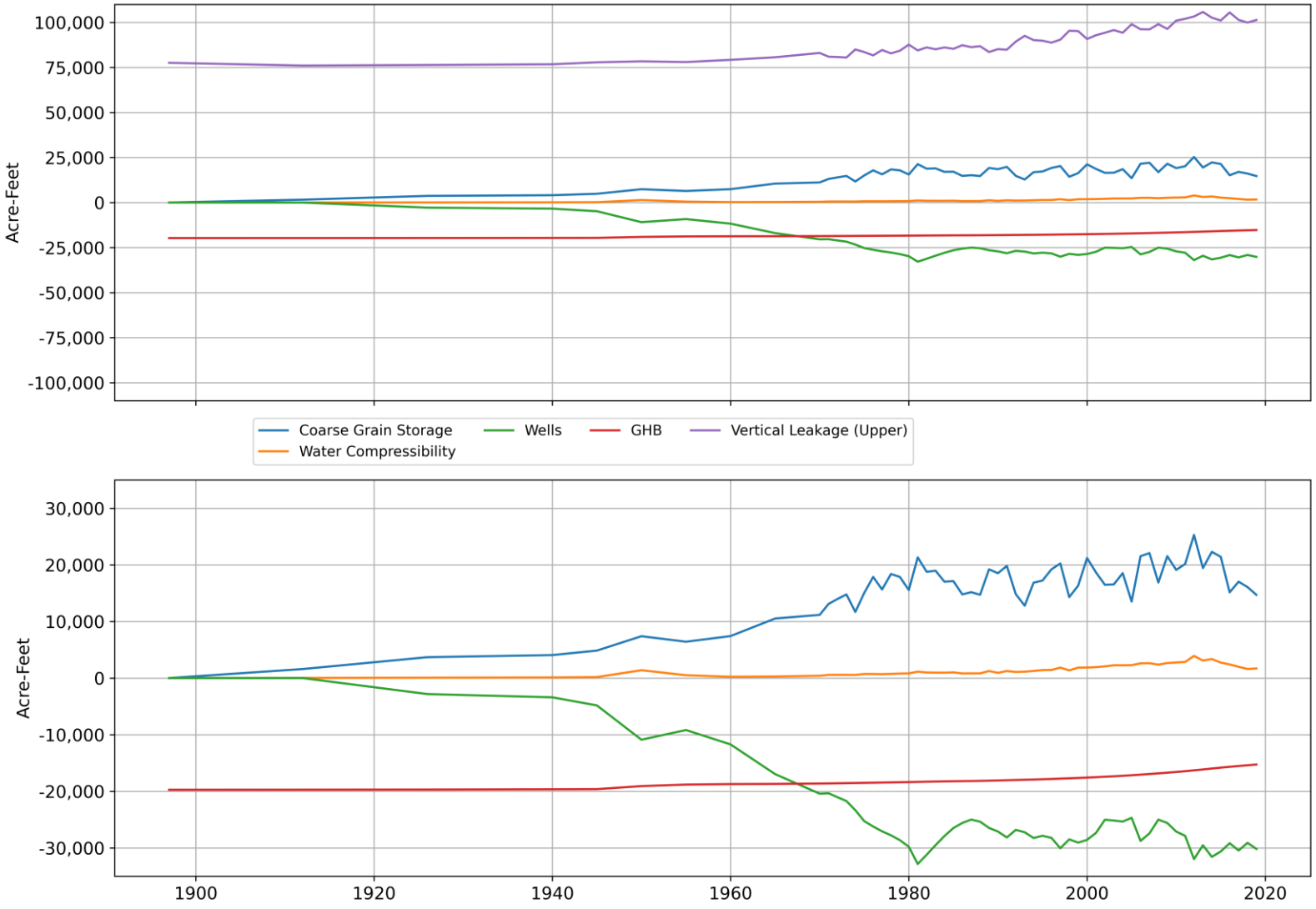

Figure 139. Layer 6 (Catahoula Aquifer) transient simulated water budget for the calibration period (1896 – 2018). Lower plot is zoomed in to visualize minor components of the simulated budget.

5. Model Limitations

We developed the GMA 14 Model as an update to GULF-2023 for Groundwater Management Area 14 joint planning purposes. As GULF-2023 is the current groundwater availability model of record, our approach was to use as much of the current model as possible so that TWDB review of the model would be expeditious, allowing Groundwater Management Area 14 to use the model for consideration of desired future conditions as part of the 2026 joint planning cycle. Many of the GULF-2023 limitations discussed by Ellis and others (2023) remain applicable. The following are additional, or expansion of, limitations applicable to both GULF-2023 and the GMA 14 Model.

5.1. Jasper Aquifer as a Single Layer

The Jasper Aquifer is a significant source of groundwater in Montgomery County. It is represented by a single layer in GULF-2023 (Ellis and others, 2023) and previous models of the Gulf Coast Aquifer System such as the Houston-Area Groundwater Model (Kasmarek, 2013). As described in Section 3.1.2, we did not alter the layer elevations from GULF-2023 for the GMA 14 Model. However, it is a common approach to separate the Jasper Aquifer into upper and lower units based on lithology (Keester and others, 2022).

Moderate to large capacity water wells screen sands of the upper Jasper Aquifer throughout Montgomery County and in parts of north and northwest Harris County. As discussed in Lone Star Groundwater Conservation District's Phase 2 Subsidence Study, there is more sand available for well screening in the upper Jasper Aquifer compared to the lower Jasper Aquifer (Keester and others, 2022). The lower Jasper Aquifer consists of mostly clay with interbedded sand through most of Montgomery County and into north Harris County.

As described above, the conceptual model for the Jasper is that it is two distinct hydrostratigraphic units. Kelley and others (2018) recognized this conceptual model in the Jasper model they developed for the Harris-Galveston Subsidence District. By simulating the Jasper as a single layer, the clays of the lower Jasper Aquifer are more directly affected in the model simulation than is expected to actually occur. Rather than only the top of the lower Jasper being affected through leakage to the upper Jasper, all clays of the lower Jasper are assumed to be affected by pumping in the upper Jasper when the Jasper is a single layer. As such, compaction results for the Jasper when simulated as a single layer may be greater than may actually occur.

5.2. Compaction and Subsidence Data Availability

We based the initial parameterization of the CSUB package on the depth-dependent compaction parameters developed from five sites in the greater Houston area (see Figure 8). The southeast Harris County and Galveston County sites only analyzed Chicot and Evangeline core samples. The Lone Star Groundwater Conservation District Porter site analyzed core samples from the Chicot, Evangeline, Burkeville, and Jasper. The limited compaction parameter data from each layer limits our ability to develop a robust spatially variable representation of the parameters affecting the simulation of subsidence. This limitation is particularly applicable to the Burkeville and Jasper where data are only available for a single location. In addition, since the compaction parameter data is only available within the greater Houston area, simulated compaction results decrease in reliability beyond the greater Houston area.

We used compaction and subsidence targets from global positioning system, benchmark, and extensometer sites during calibration to improve the model fit. Most of the compaction and subsidence stations are within the greater Houston area (see Figure 47). Beyond the greater Houston area, only global positioning system targets are available. The earliest global positioning system stations beyond the greater Houston area were installed in the early-2000s with most of the stations installed after 2010. The benchmark data set provides data going back to the 1930s and extensometers began providing data in the mid to late 1970s. Benchmark and extensometer datasets provide long-term trends and observations to help improve the model during calibration of early simulation years. Due to the limited subsidence observation data prior to 2010 beyond the greater Houston area, the long-term simulated subsidence results in the outer portions of the GMA 14 Model area are less reliable.

5.3. Subsidence District Groundwater Pumping

We did not modify pumping in counties within subsidence districts as part of the GMA 14 Model. We understand the subsidence district regulatory plans are in place and were developed in part using pumping data that is included in GULF-2023. However, a review of the GULF-2023 pumping distribution within the counties with subsidence districts, particularly the north and west parts of Harris-Galveston Subsidence District Regulatory Area 3, could help improve the performance of future groundwater flow models developed for the region.

6. Summary and Conclusions

One purpose for updating GULF-2023 to the GMA 14 Model was to create a groundwater availability model for the purpose of joint planning. GULF-2023 issues identified by Groundwater Management Area 14 members were a primary driver for undertaking the model update. The GMA 14 Model meets goals of correcting the compaction and subsidence package, incorporating new data for the compaction properties of the Gulf Coast Aquifer System, more reasonable matching aquifer testing data, and creating a more manageable model.

Conceptual model updates focused on aquifer transmissivity, groundwater pumping, and compaction. We incorporated previously unpublished pumping test results for transmissivity to define the parameter for the aquifer layers. Our approach diverged from GULF-2023 and resulted in an improved correlation between measured and modeled transmissivity values.

For groundwater pumping, we elected to rely on the estimates of groundwater production despite uncertainty that may be in some values. We did not allow the model to modify pumping during the calibration. Our approach diverged from GULF-2023 where Ellis and others (2023) allowed pumping values to change and results in historical pumping amounts that are consistent with the TWDB Water Use Survey.

For compaction, we incorporated the data collected from 18 core samples collected by the Lone Star Groundwater Conservation District. We incorporated lab results from testing of these core samples with the data from Gabrysch and Bonnet (1974; 1976a; 1976b). Porosity, compression index, and recompression index data from the core analyses were relatively consistent with previous investigations. However, the vertical hydraulic conductivity values from the newly collected core were about 10 times less that the previous investigations. The lower vertical hydraulic conductivity suggests the compaction may be slower than previously thought.

We incorporated the new conceptual model information into the GMA 14 Model. We used PEST++ (White and others, 2020) to support our calibration of the model. Specifically, we used the iterative ensemble smoother approach to generate an ensemble model. One advantage of this approach is the generation of multiple model realizations along with the base model. The resulting model calibration indicated a model with minimal bias in simulating water level decline and compaction.

Water level and subsidence trends are matched well with the GMA 14 Model. Both the decline in water level during periods of high groundwater use and subsequent recovery of water levels are simulated with the model. Overall, the model appears to be well suited for use by Groundwater Management Area 14 for joint planning.

7. Future Improvements

One improvement for the GMA 14 model would be the representation of the Jasper Aquifer as at least a two-part system. Dividing the Jasper would allow for a more practical approach to simulating groundwater pumping and subsidence in the upper part of the Jasper Aquifer where the pumping occurs. Having a lower Jasper layer available for model simulations is also important as the potential for future brackish groundwater development continues to increase.

In addition to production wells being located in the upper Jasper, on geophysical logs, there are distinct differences in the electrical resistivity signatures of the upper Jasper Aquifer and lower Jasper Aquifer sands. The water contained within the lower Jasper Aquifer sands is often brackish with higher concentrations of chloride and total dissolved solids. In addition, elevated concentrations of fluoride, methane gas, and/or hydrogen sulfide are common. The water quality and hydraulic property differences between the upper and lower Jasper are more than sufficient to justify dividing the Jasper Aquifer model layer.

Our work also identified some areas where pumping could be updated. Pumping is a difficult, but very important, value to determine for a groundwater model. A future improvement could involve updating the pumping distribution where it remains uncertain in some areas the model, particularly in northwest Harris County.

Another improvement would be the development of local sub-models for the Groundwater Management Area 14 members that is informed by the regional model. These local models would allow for the rapid incorporation of new aquifer data collected as part of district groundwater management. In addition, the local models could more easily serve district needs for permitting evaluations.

8. Acknowledgements

The authors appreciate the support of the Lone Star Groundwater Conservation District who recognized the importance of this model for Groundwater Management Area 14 joint planning efforts. Along with the Lone Star Groundwater Conservation District, we also appreciate the support and contributions from Bluebonnet Groundwater Conservation District, Brazoria County Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District toward the development of the GMA 14 Model. We also thank the Texas Water Development Board and U.S. Geological Survey for the collection and hosting of a wealth of hydrogeologic data for the Gulf Coast Aquifer System.

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Appendix 1 —
Previously Unpublished Pumping Test Results

Unpublished Pumping Test Data in the Greater Houston Area

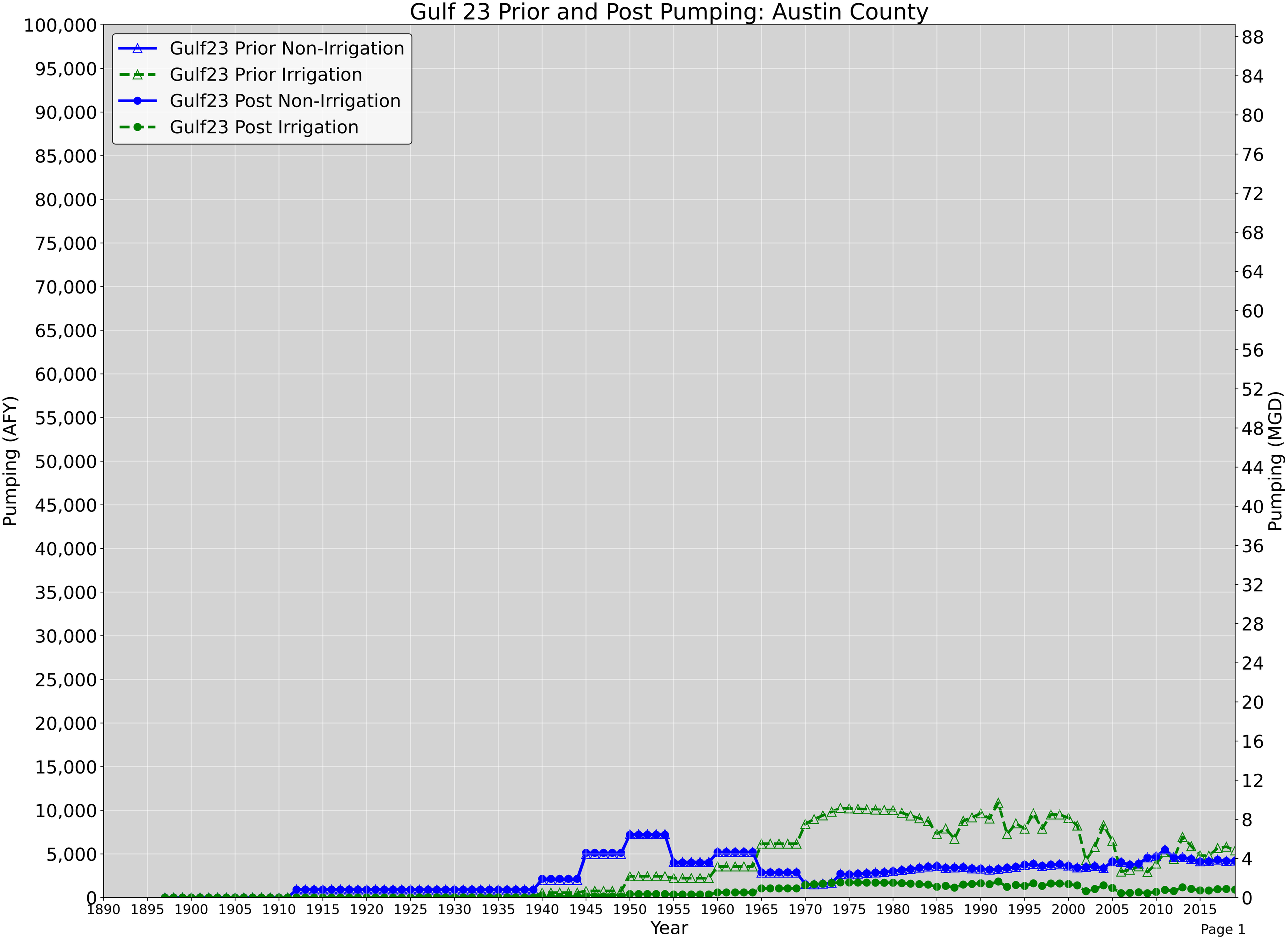
Well	Well No.	County	Latitude	Longitude	Aquifer	Screen Interval, feet	Transmissivity (gpd/ft)
Sugar Land Woodchester	Well 4	Fort Bend	29.64190	-95.62700	Evangeline	1,274-1,792	88,493
Cinco MUD 1	Well 5	Fort Bend	29.73990	-95.78220	Evangeline	854-1136	28,080
Harris County WCID 119	Well 1	Harris	30.01580	-95.56570	Evangeline	590-950	40,491
Harris County MUD 412	Well 1	Harris	29.95690	-95.17750	Evangeline	566-770	48,360
Harris County MUD 432	Well 1	Harris	29.81770	-95.76900	Evangeline	790-1,308	14,600
Harris County MUD 167	Well 2	Harris	29.85410	-95.71450	Evangeline	808-1,348	23,171
City of Houston Spring Branch	Well 4a	Harris	29.83040	-95.52740	Evangeline	1,128-1,488	22,223
City of Houston Spring Branch	Well 6a	Harris	29.84210	-95.52310	Evangeline	1,062-1,450	31,367
Harris County MUD 81	Well 6	Harris	29.76670	-95.74440	Evangeline	654-898	47,284
Harris County MUD 418	Well 2	Harris	29.96240	-95.71200	Evangeline	608-916	29,800
Lake Forest UD	Well 2	Harris	29.97840	-95.60210	Evangeline	830-1,165	72,974
Prestonwood Forest	Well 1	Harris	29.97740	-95.56120	Evangeline	695-1,105	31,431
Malcomson Road UD	Well 1	Harris	29.99280	-95.59170	Evangeline	470-920	35,500
Cypress Creek UD	Well 2	Harris	29.97150	-95.57650	Evangeline	724-994	38,690
NHCRWA - Compaq	Well 3	Harris	29.99870	-95.56110	Evangeline	556-1,030	26,845
Harris County MUD 286	Well 1	Harris	29.99600	-95.58170	Evangeline	834-1,218	27,243
Hunters Glen MUD	Well 2	Harris	30.01570	-95.33110	Evangeline	563-824	61,846
North Harris County MUD 5	Well 2	Harris	30.01810	-95.61410	Evangeline	585-850	14,520
Harris County MUD 387	Well 2	Harris	30.13930	-95.53270	Evangeline	668-920	35,200
Spring West MUD	Well 1	Harris	30.07620	-95.44020	Evangeline	834-1,090	30,473
Harris County MUD 58	Well 2	Harris	30.00150	-95.46550	Evangeline	511-1,199	46,574
Northwest Harris County MUD 30	Well 1	Harris	30.06460	-95.51660	Evangeline	538-966	67,800
Porter SUD	Well 7	Montgomery	30.12000	-95.25240	Evangeline	591-758	56,079
Montgomery County MUD 119	Well 1	Montgomery	30.10600	-95.38120	Evangeline	898-1,046	20,337
Montgomery county MUD 89	Well 1	Montgomery	30.12450	-95.39090	Evangeline	790-1,050	28,237
New Caney MUD	Well 3	Montgomery	30.14123	-95.23970	Evangeline	446-580	55,484
SJRA - The Woodlands	Well 12	Montgomery	30.16900	-95.50850	Evangeline	690-1,032	17,900
SJRA - The Woodlands	Well 26	Montgomery	30.18507	-95.56310	Evangeline	666-879	24,847
SJRA - The Woodlands	Well 18	Montgomery	30.15613	-95.45400	Evangeline	700-1,005	25,298
NW Harris CountyMUD 32	Well 2	Harris	30.06940	-95.53250	Jasper	1,354-1,776	75,429
Bridgestone MUD	Well 4	Harris	30.07350	-95.49480	Jasper	1,422-1,908	86,592
Shasla PUD	Well 2	Harris	30.08780	-95.46790	Jasper	1,450-1,888	39,198
Harris County WCID 91	Well 3	Harris	30.01490	-95.45690	Jasper	1,628-2,184	25,359
NW Harris County MUD 20	Well 2	Harris	30.00020	-95.48140	Jasper	1,652-2,038	66,066
Harris County MUD 368	Well 4	Harris	30.03680	-95.58280	Jasper	1,516-1,836	22,564
Harris County FWSD 52	Well 3	Harris	29.98710	-95.52100	Jasper	1,524-2,056	37,858
Louetta Regional Water Plant	Well 1	Harris	30.00620	-95.56300	Jasper	1,598-1,992	24,800
NW Harris County MUD 5 Water Plant 3	Well 1	Harris	30.01910	-95.65190	Jasper	1,334-1,858	22,360
Harris County MUD 386	Well 1	Harris	30.13660	-95.53860	Jasper	1266-1680	55,567
Oakmont PUD	Well 1	Harris	30.13300	-95.51250	Jasper	1340-1746	48,069
Harris County MUD 280 / NWHC MUD 15	Well 1	Harris	30.03320	-95.61550	Jasper	1,122-1,760	24,290
City of Willis	Well 5	Montgomery	30.42860	-95.49860	Jasper	749-964	64,339
City of Montgomery	Well3	Montgomery	30.40220	-95.69650	Jasper	530-650	48,400
Keenan WSC	Well 3	Montgomery	30.32520	-95.68890	Jasper	844-1,028	35,242
Montgomery County UD 8	Well 1	Montgomery	30.39420	-95.60470	Jasper	485-735	18,498
Woodtrace MUD	Well 1	Montgomery	30.16190	-95.67360	Jasper	1,202-1,624	8,774
SJRA - The Woodlands	Well 11	Montgomery	30.16920	-95.50860	Jasper	1,130-1,594	28,199
SJRA - The Woodlands	Well 25	Montgomery	30.18420	-95.56190	Jasper	1,124-1,610	38,993
SJRA - The Woodlands	Well 17	Montgomery	30.15580	-95.45420	Jasper	1,174-1,666	29,501
SJRA - The Woodlands	Well 29	Montgomery	30.18440	-95.58690	Jasper	1,261-1,506	73,237
Shenandoah	Well 3	Montgomery	30.19240	-95.45610	Jasper	1,240-1,690	59,795
City of Conroe	Well 5 (20)	Montgomery	30.35860	-95.45310	Jasper	818-1240	39,525
City of Conroe	Well 21	Montgomery	30.39470	-95.51620	Jasper	802-1,052	43,704
City of Conroe	Well 22	Montgomery	30.35070	-95.44310	Jasper	900-1264	40,186
City of Conroe	Well 3 (18)	Montgomery	30.28940	-95.42380	Jasper	986-1,468	53,333
Montgomery Co. MUD 9	Well 2	Montgomery	30.39530	-95.61440	Jasper	495-735	28,271
Montgomery Co UD 4	Well 4	Montgomery	30.37050	-95.59560	Jasper	642-825	67,432
Montgomery Co. MUD 19	Well 3	Montgomery	30.13970	-95.45180	Jasper	1,276-1,698	37,523
Montgomery Co. WC&ID 1	Well 4	Montgomery	30.12390	-95.49140	Jasper	1,318-1,741	21,208
Southern Montgomery Co. Mud	Well 5	Montgomery	30.14420	-95.44030	Jasper	1,302-1,680	42,006
East Montgomery County MUD 3	Well 1	Montgomery	30.17080	-95.28170	Jasper	1,550-1,712	34,497
Town of Cut and Shoot	Well 3	Montgomery	30.33570	-95.35230	Jasper	856-1,050	7,744
Porter SUD	Well 8	Montgomery	30.15222	-95.30667	Jasper	1,512-1,852	55,000
Montgomery County MUD 18	Well 3	Montgomery	30.43639	-95.64100	Catahoula	1,833-2,453	19,000
Stanley Lakes MUD	Well 3	Montgomery	30.38055	-95.64555	Catahoula	2,238-2,666	17,903
Dobbin-Plantersville WSC	Well 8	Montgomery	30.38080	-95.78830	Catahoula	2,022-2,582	22,734

Unpublished Pumping Test Data in the Greater Houston Area

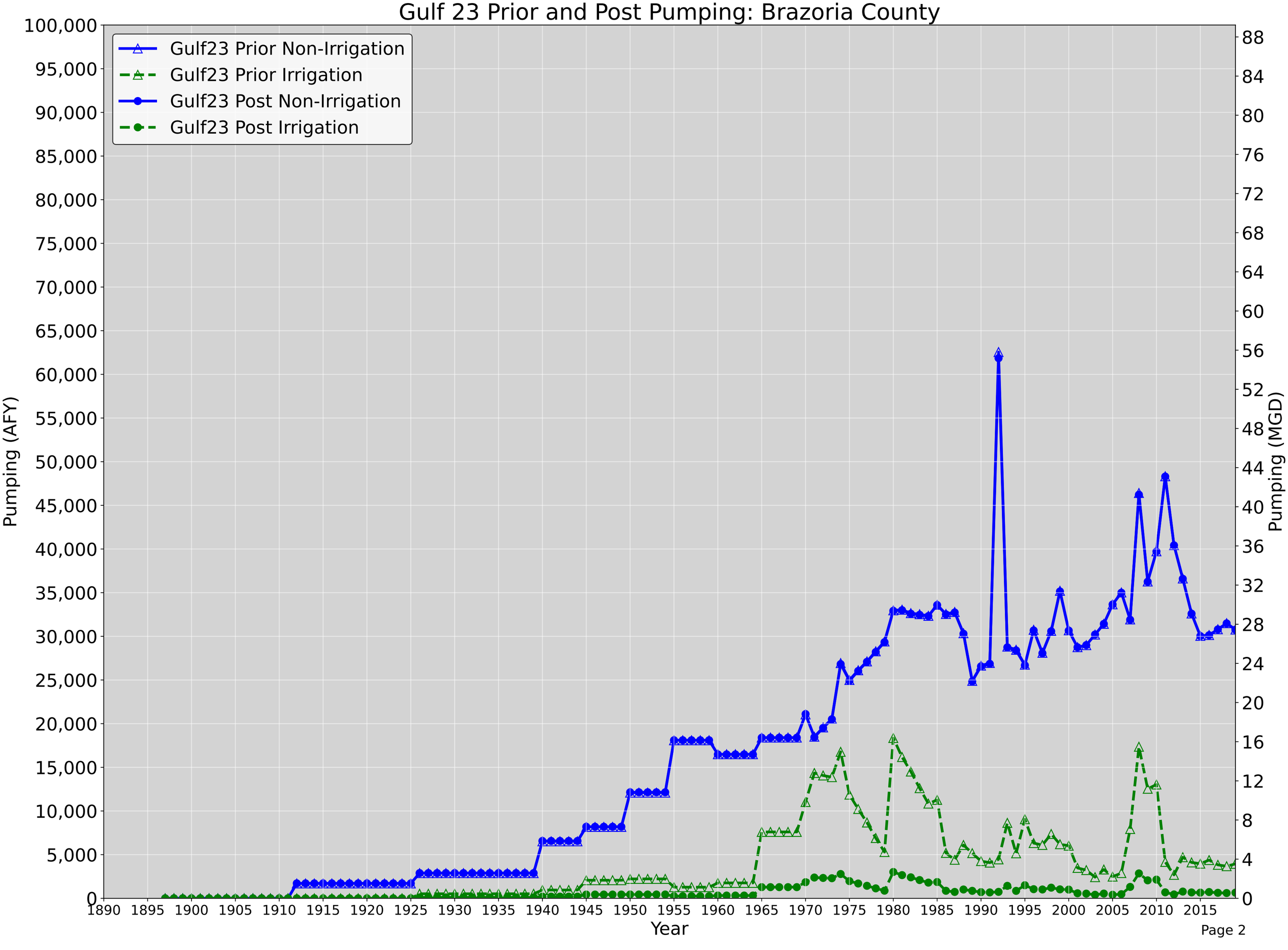
Well	Well No.	County	Latitude	Longitude	Aquifer	Screen Interval, feet	Transmissivity (gpd/ft)
City of Montgomery	Well 4	Montgomery	30.40250	-95.69500	Catahoula	2,450-2,560	5,798
City of Panorama Village	Well 4	Montgomery	30.38000	-95.49560	Catahoula	2,142-2,814	22,921
Montgomery Co UD 3	Well 3	Montgomery	30.36890	-95.61610	Catahoula	2,290-2,587	17,802
City of Conroe	Well 24	Montgomery	30.34220	-95.47500	Catahoula	2,258-2,623	28,132
City of Willis	Well 6	Montgomery	30.42610	-95.50110	Catahoula	1,898-2,665	29,985
City of Willis	Well 7	Montgomery	30.42280	-95.47860	Catahoula	2,094-2,920	28,707
Far Hills UD	Well 6	Montgomery	30.39170	-95.55660	Catahoula	2,372-2,602	9,383
Point Aquarius MUD	Well 4	Montgomery	30.43280	-95.57720	Catahoula	1,668-1,728	28,560
Corinthian Point MUD 2	Well 4	Montgomery	30.47170	-95.56330	Catahoula	1,865-2,092	6,452
City of Huntsville	Well 11	Walker	30.71417	-95.54806	Catahoula	308-890	54,154
City of Huntsville	Well 19	Walker	30.67861	-95.55028	Catahoula	682-1,252	17,284
City of Huntsville	Well 18	Walker	30.68639	-95.54972	Catahoula	675-1,395	12,954
City of Huntsville	Well 17	Walker	30.69111	-95.54472	Catahoula	755-1,270	12,014
City of Huntsville	Well 14	Walker	30.70083	-95.53389	Catahoula	723-1,205	6,355
City of Huntsville	Well 13	Walker	30.69583	-95.52972	Catahoula	790-1,260	5,294
City of Huntsville	Well 12	Walker	30.70639	-95.54111	Catahoula	730-1,178	10,306
City of Huntsville	Well 16	Walker	30.70194	-95.52750	Catahoula	708-1,218	9,123
City of Huntsville	Well 15	Walker	30.69028	-95.53611	Catahoula	770-1,296	15,219
City of Navasota	Well 6	Grimes	30.35278	-96.06194	Catahoula	356-420	5,808
City of Navasota	Well 15	Grimes	30.36244	-96.08375	Catahoula	276-343	9,090

Appendix 2 — Comparison of Prior and Posterior GULF-2023 Pumping Input

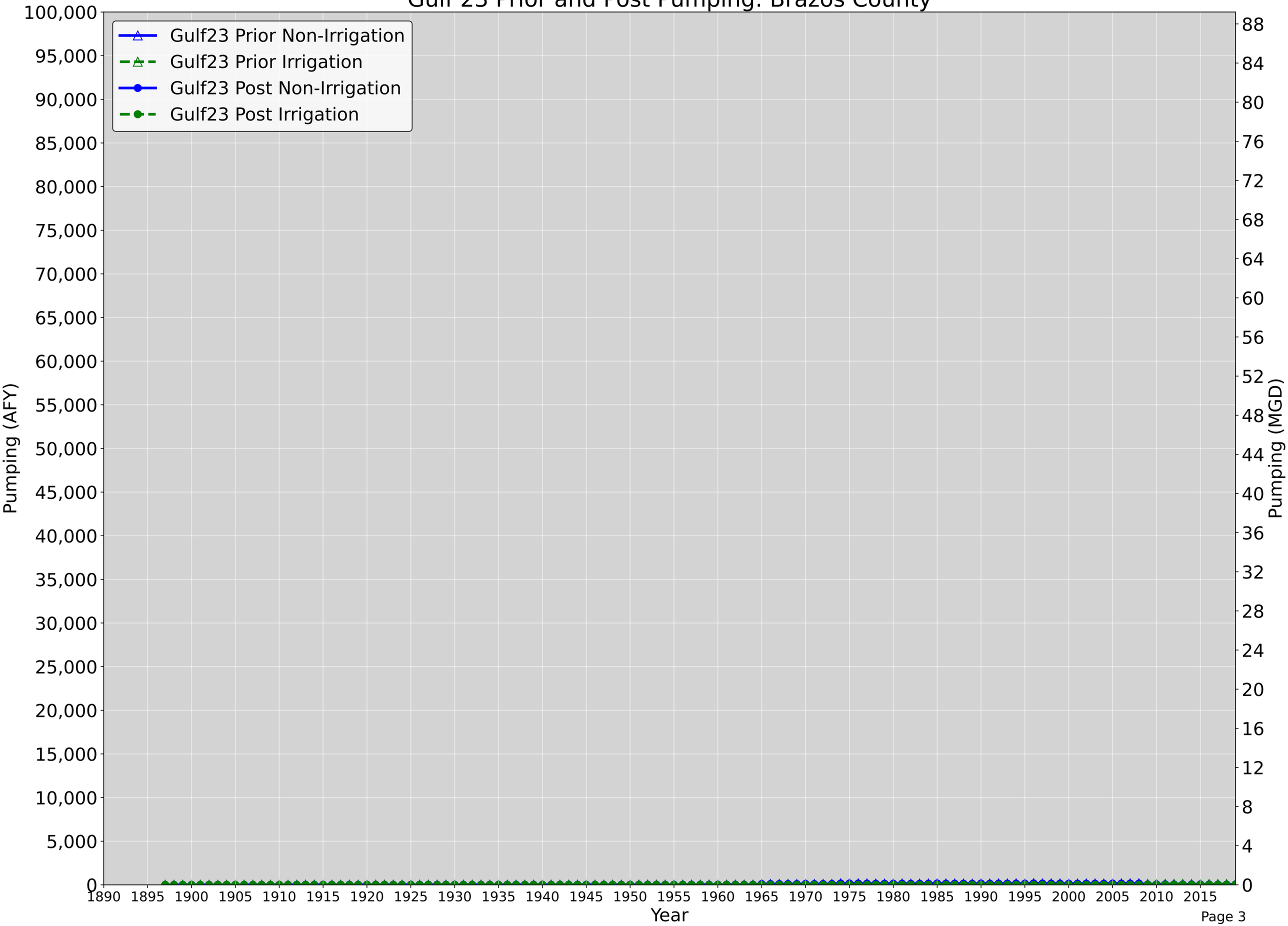
Gulf 23 Prior and Post Pumping: Austin County



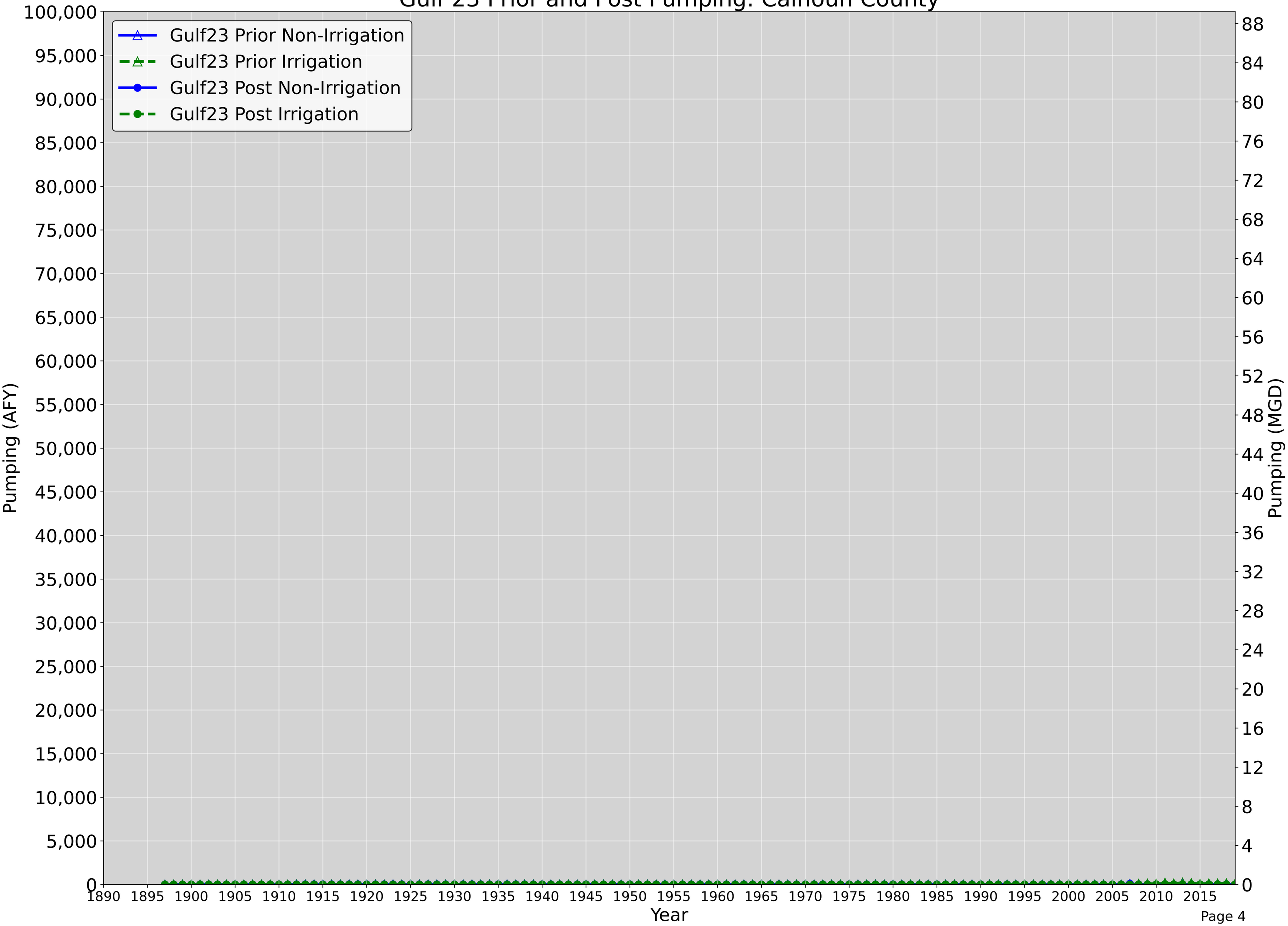
Gulf 23 Prior and Post Pumping: Brazoria County



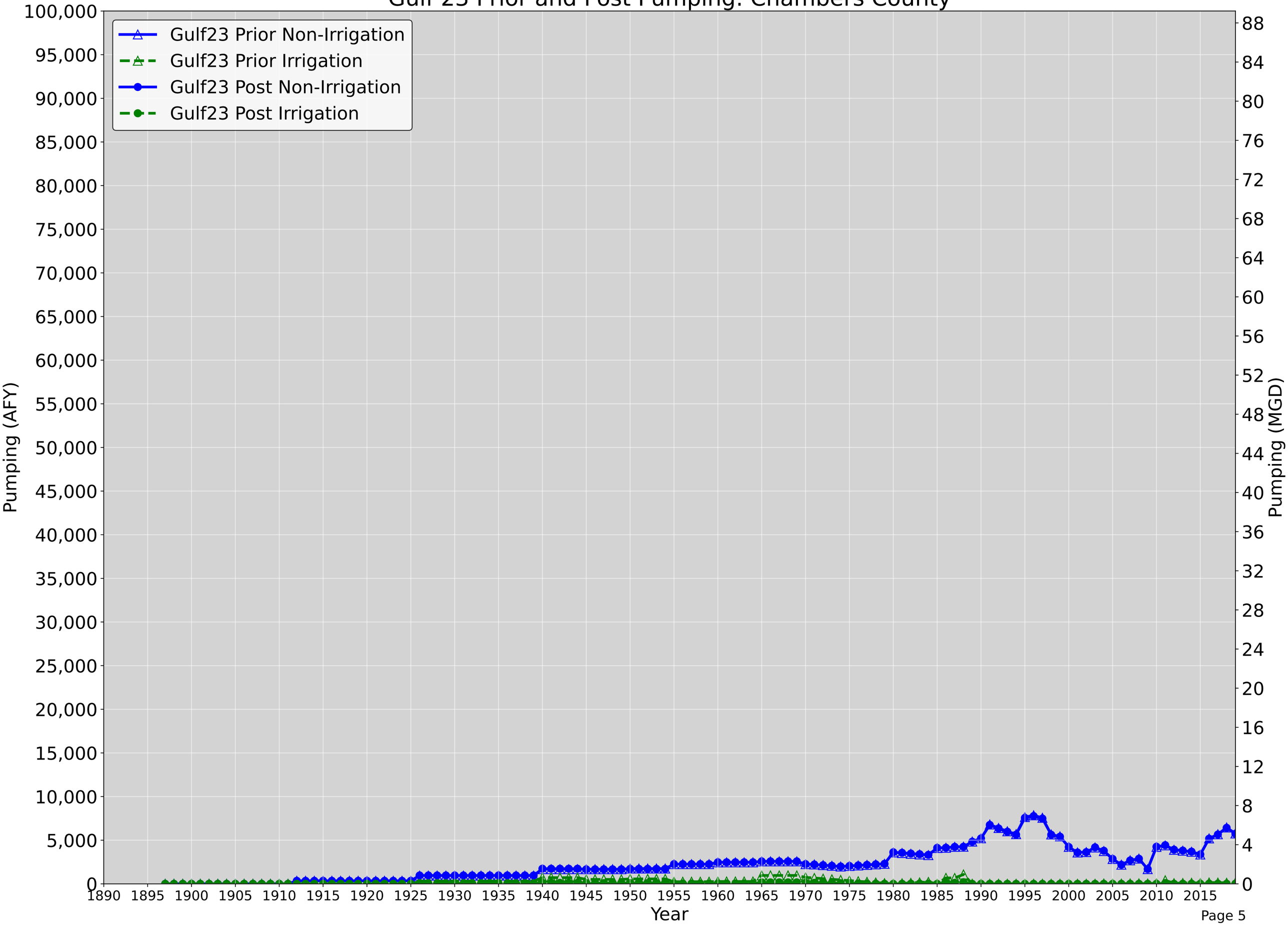
Gulf 23 Prior and Post Pumping: Brazos County



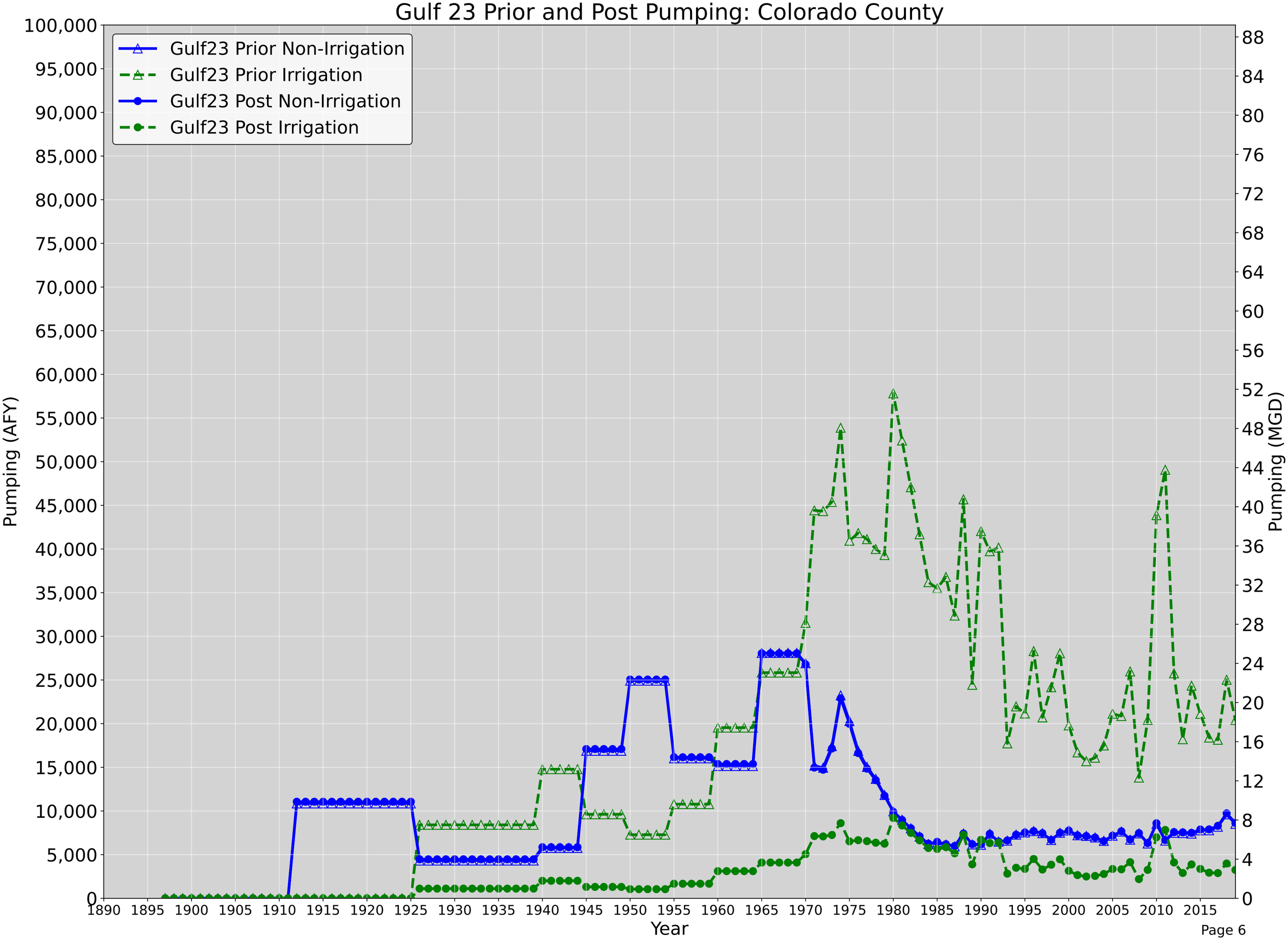
Gulf 23 Prior and Post Pumping: Calhoun County



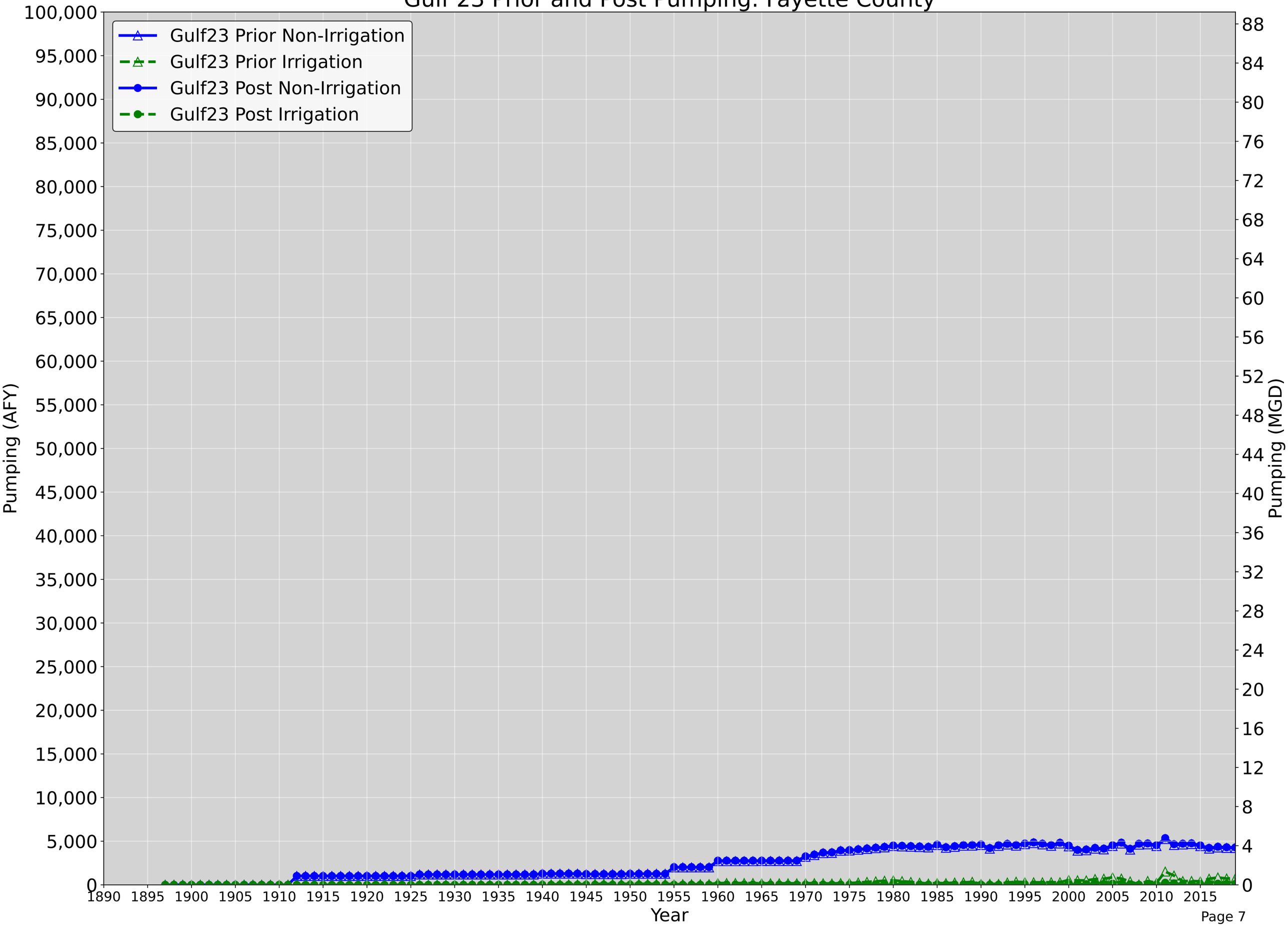
Gulf 23 Prior and Post Pumping: Chambers County



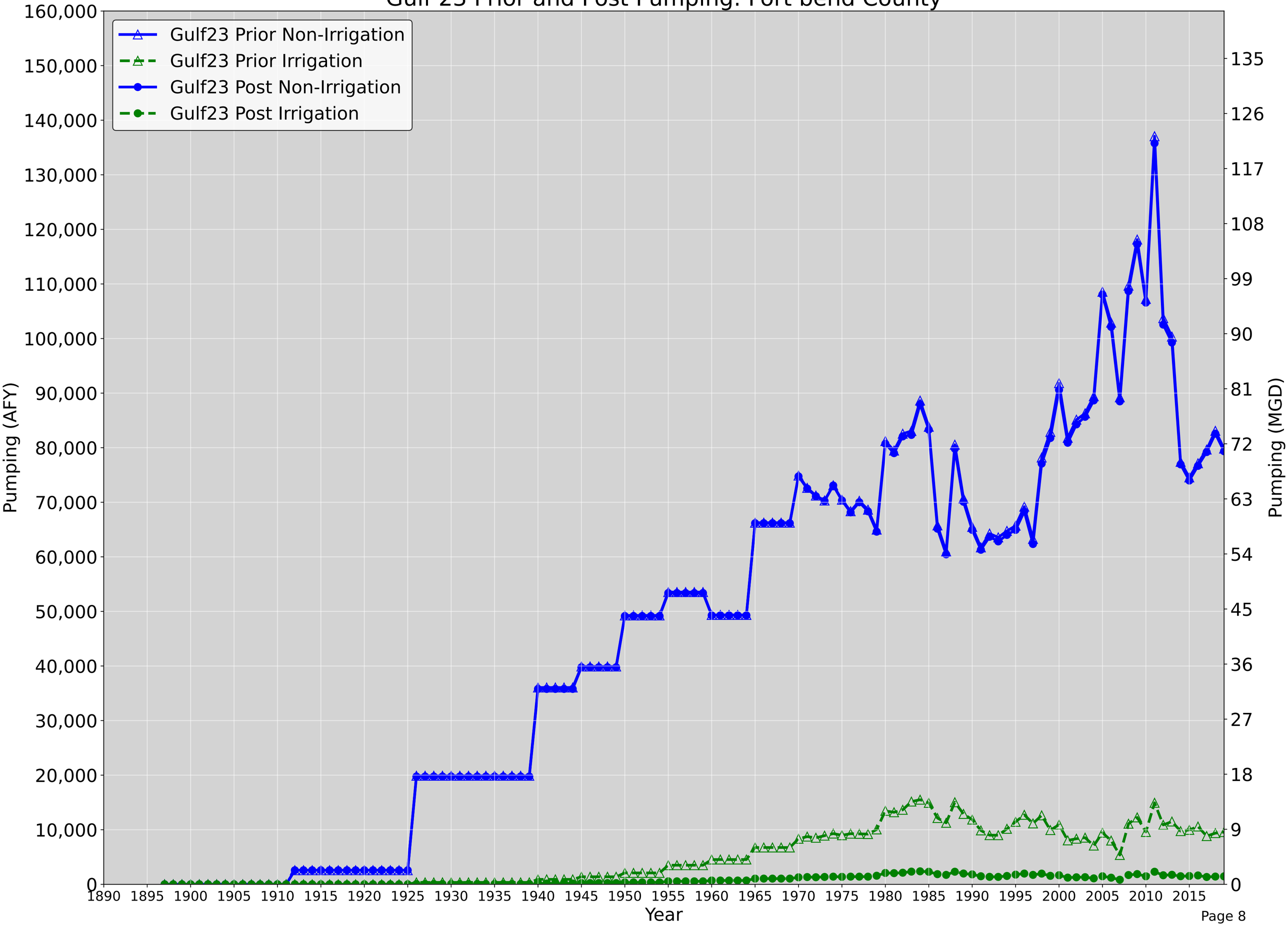
Gulf 23 Prior and Post Pumping: Colorado County



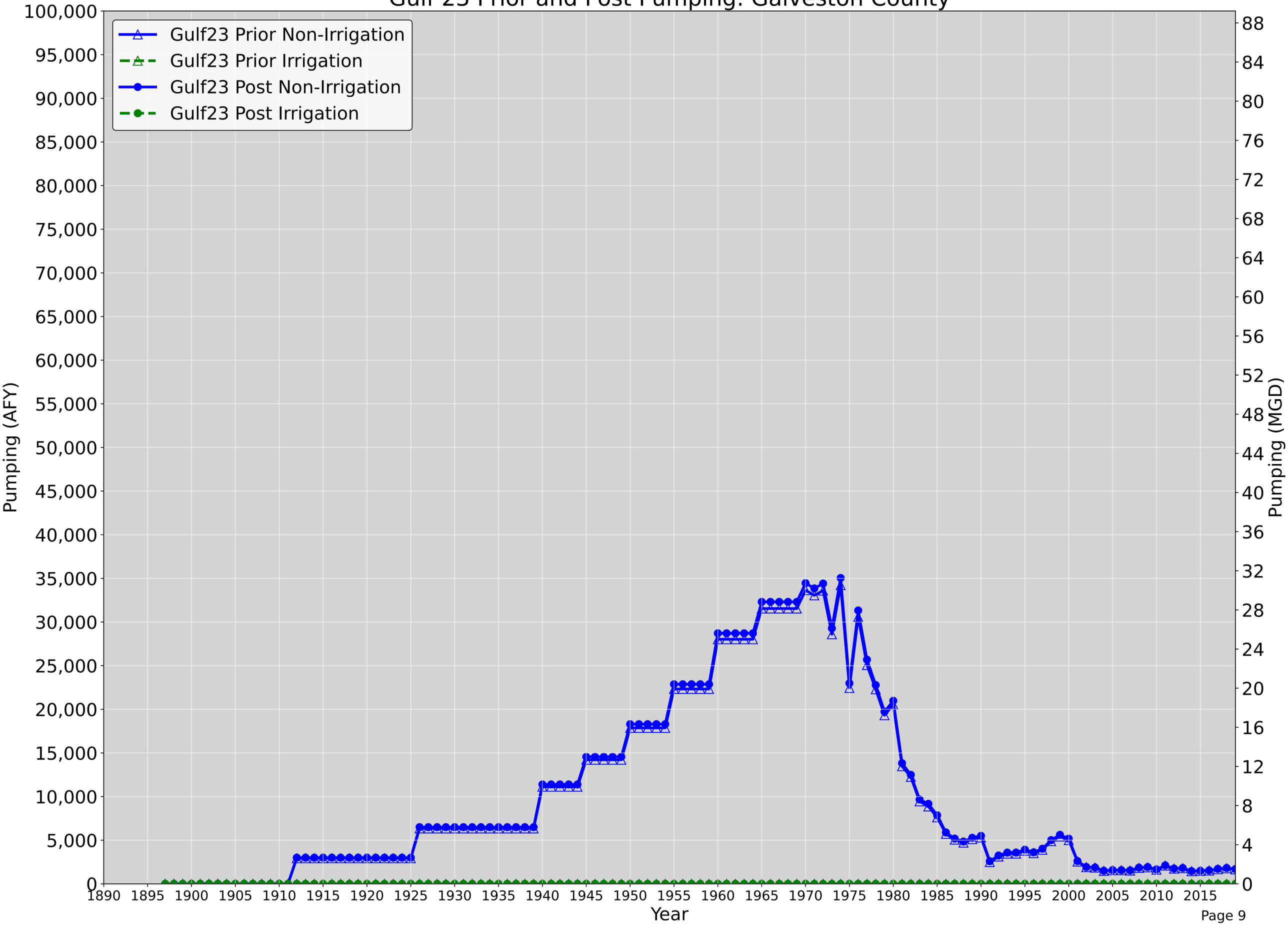
Gulf 23 Prior and Post Pumping: Fayette County



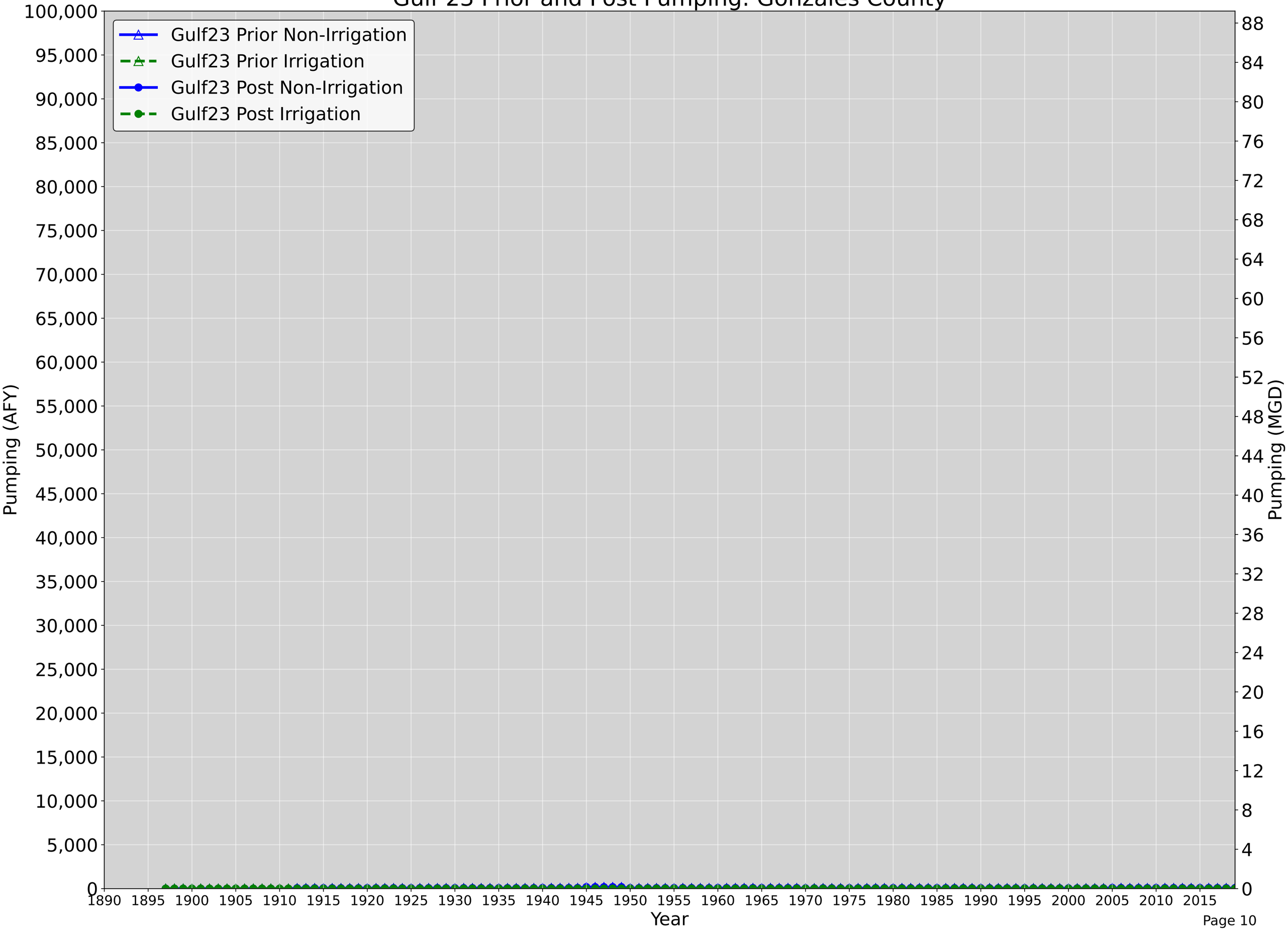
Gulf 23 Prior and Post Pumping: Fort bend County



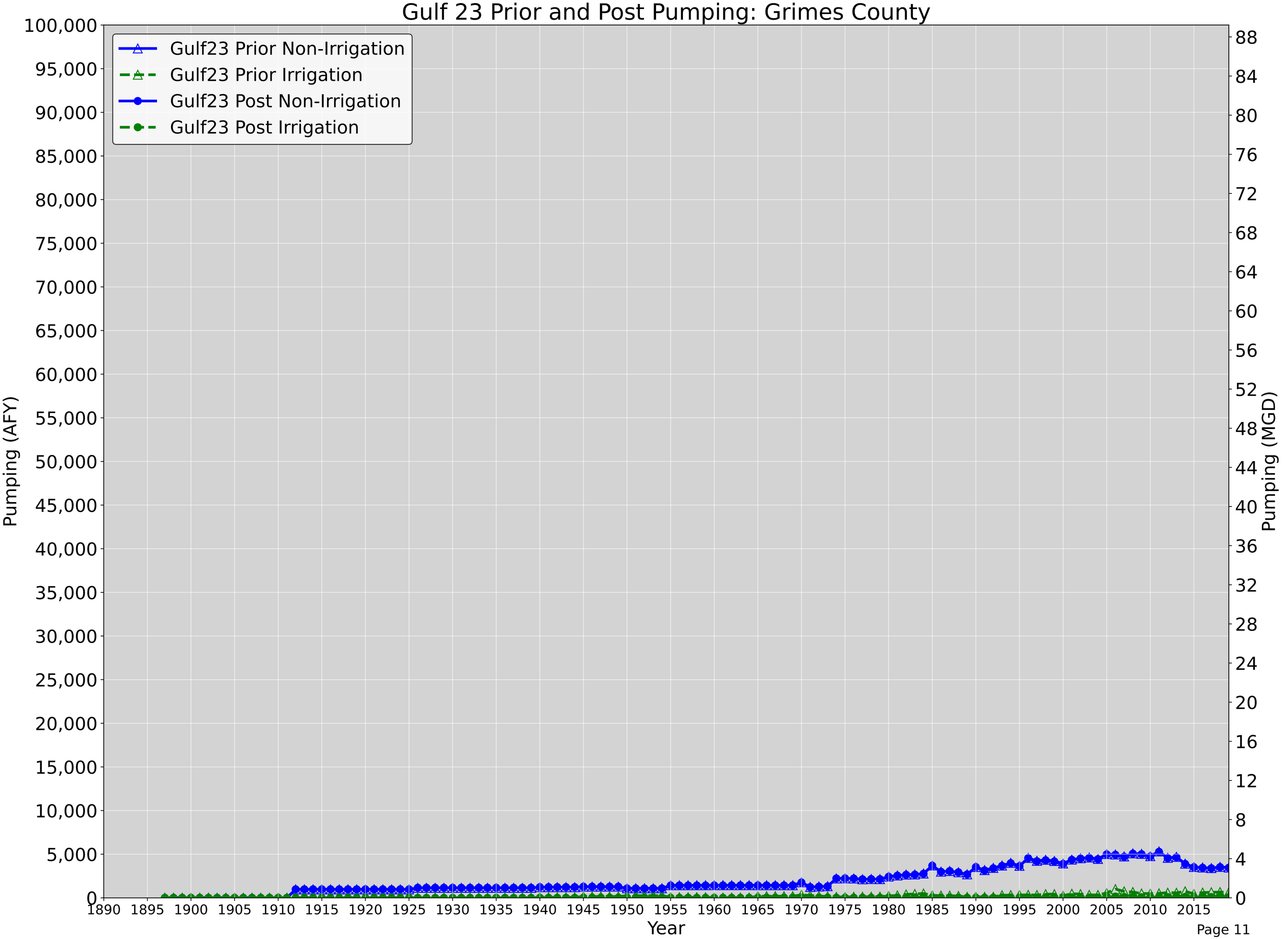
Gulf 23 Prior and Post Pumping: Galveston County



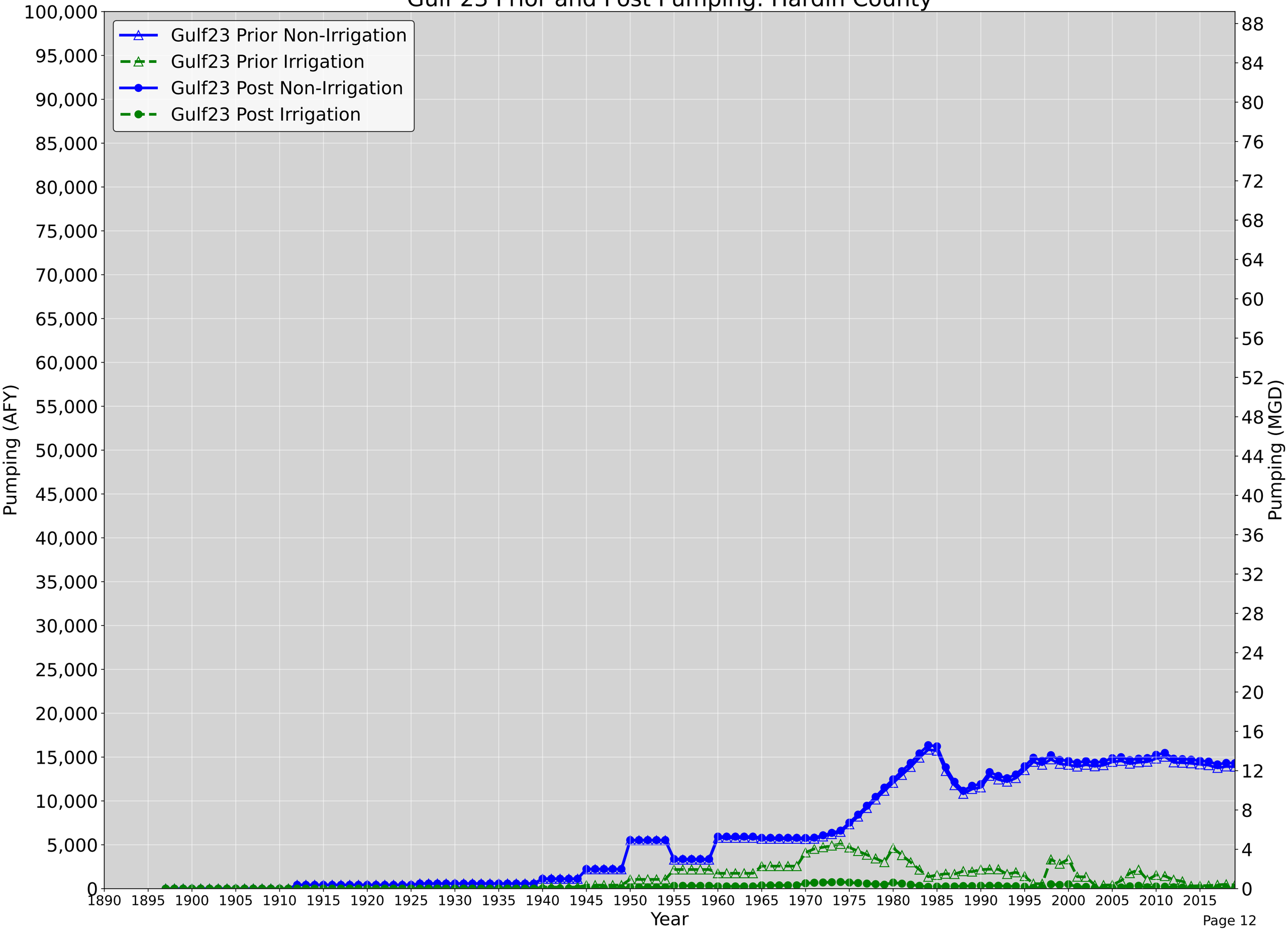
Gulf 23 Prior and Post Pumping: Gonzales County



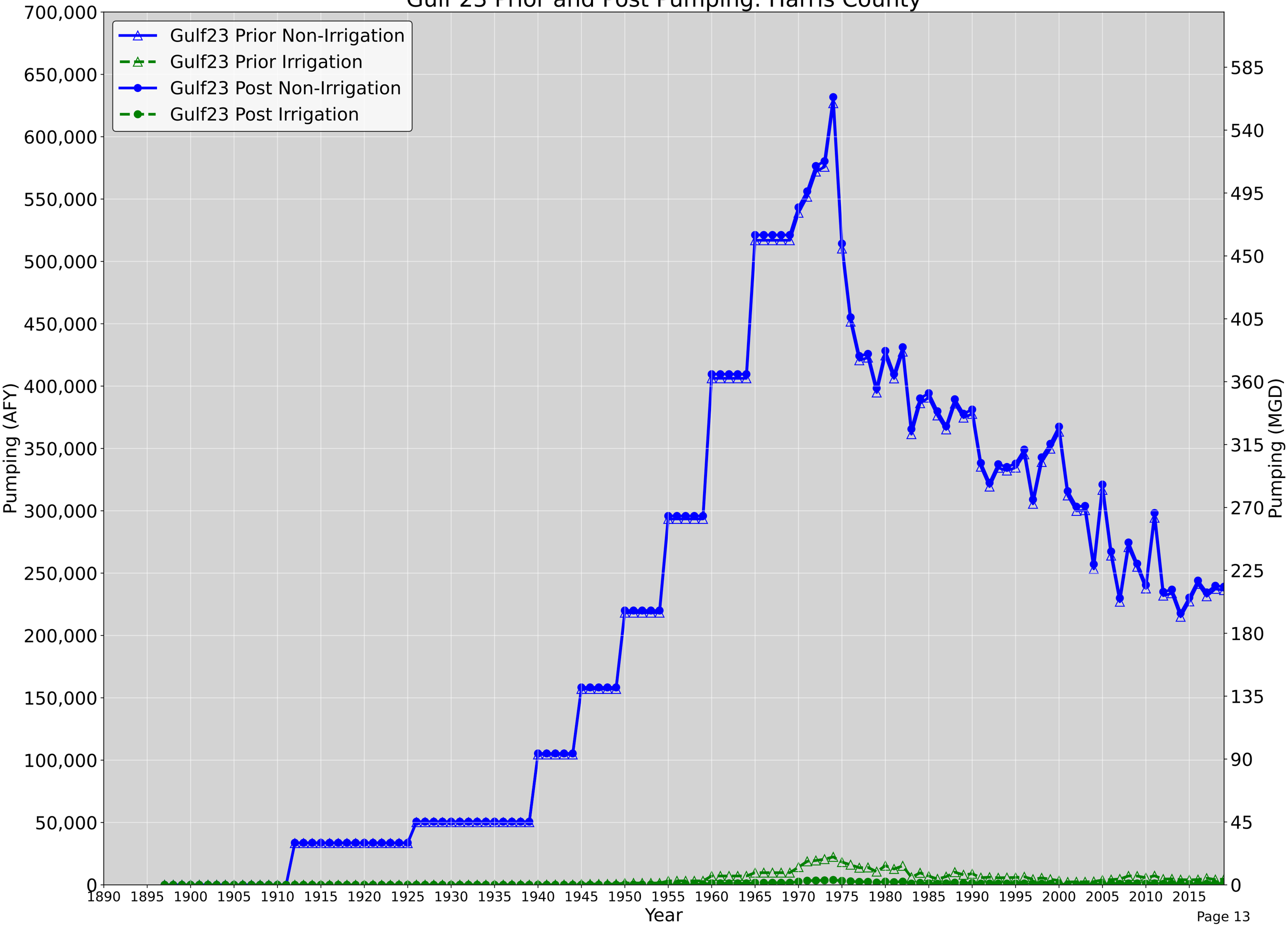
Gulf 23 Prior and Post Pumping: Grimes County



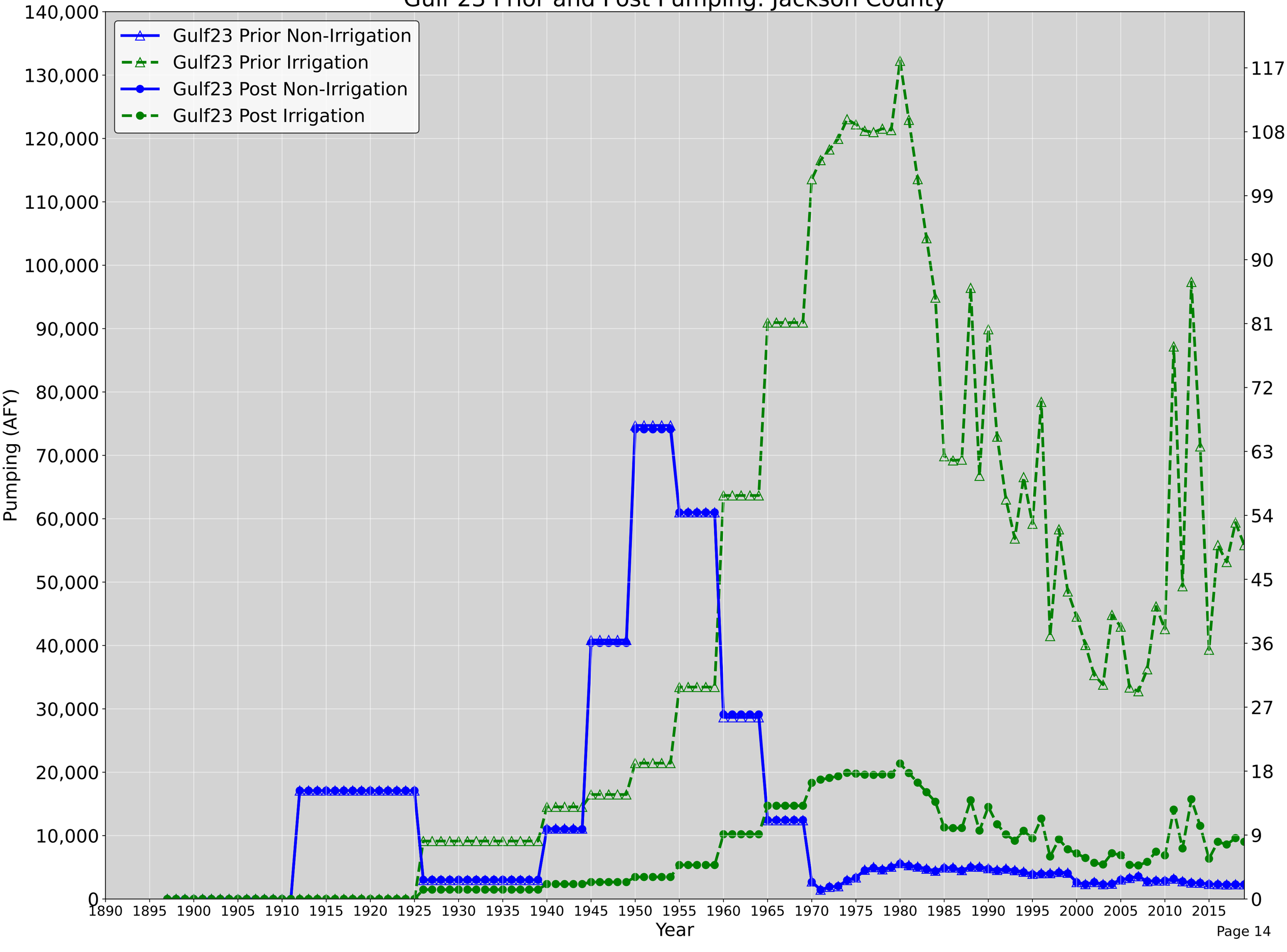
Gulf 23 Prior and Post Pumping: Hardin County



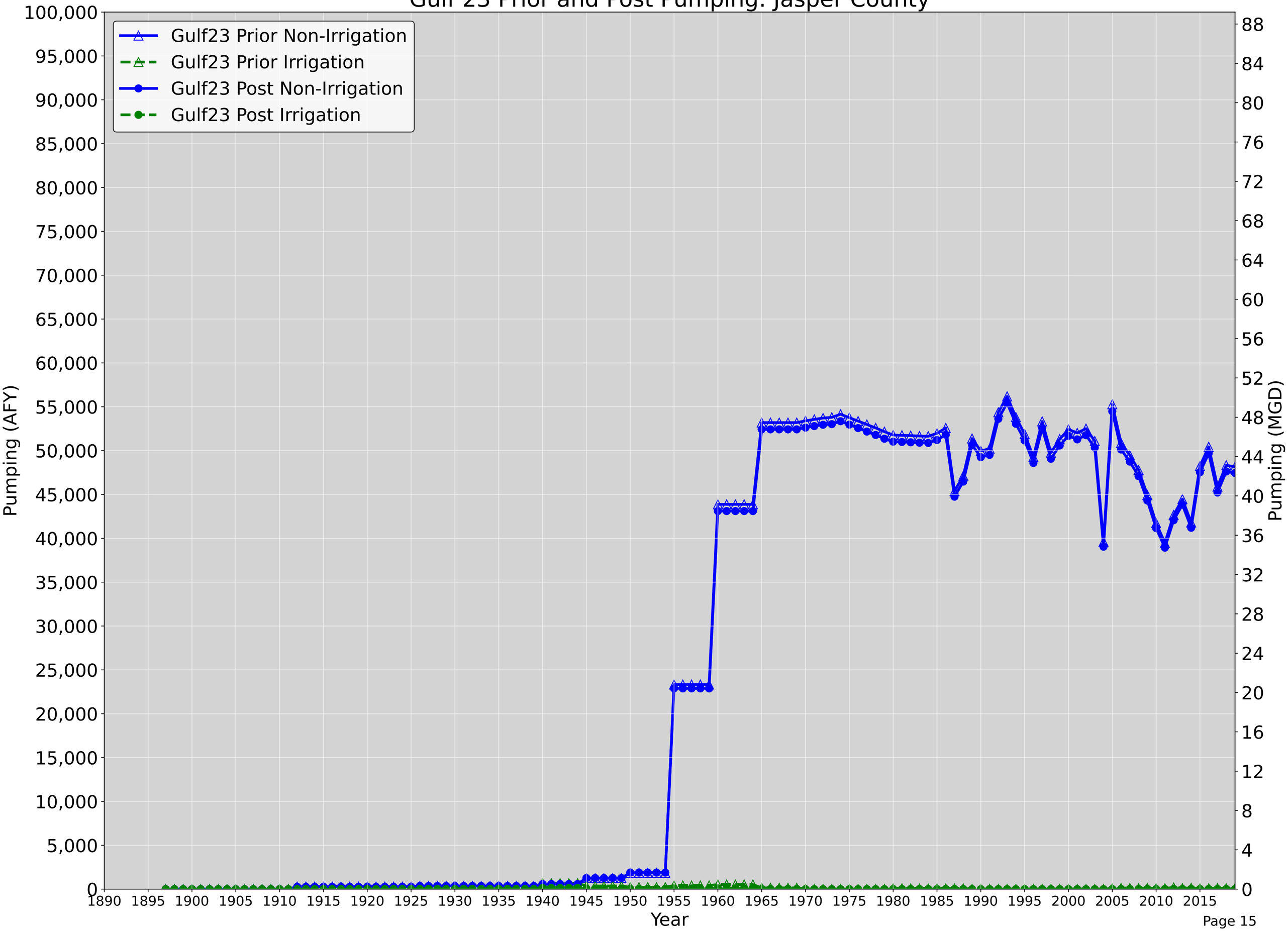
Gulf 23 Prior and Post Pumping: Harris County



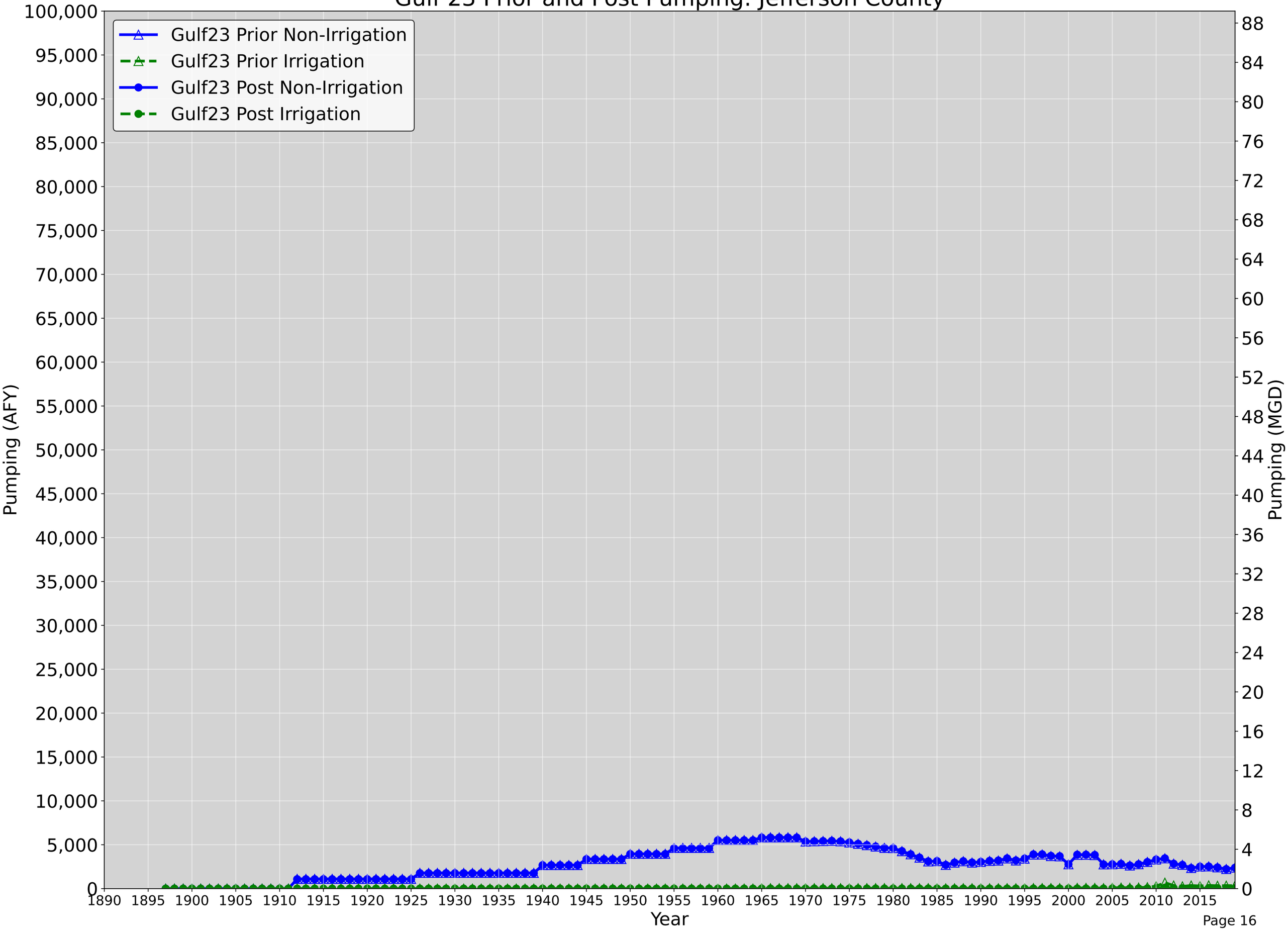
Gulf 23 Prior and Post Pumping: Jackson County



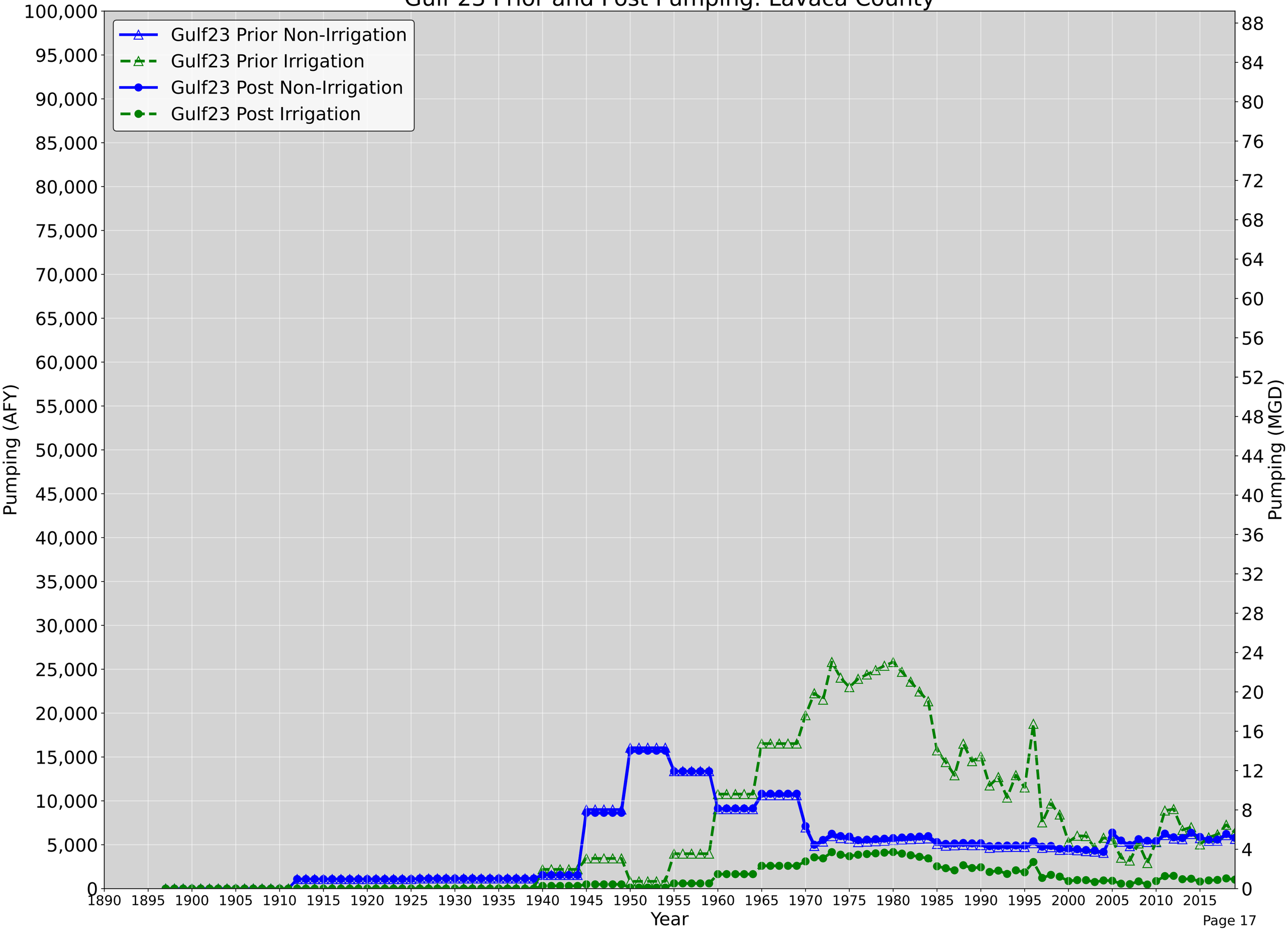
Gulf 23 Prior and Post Pumping: Jasper County



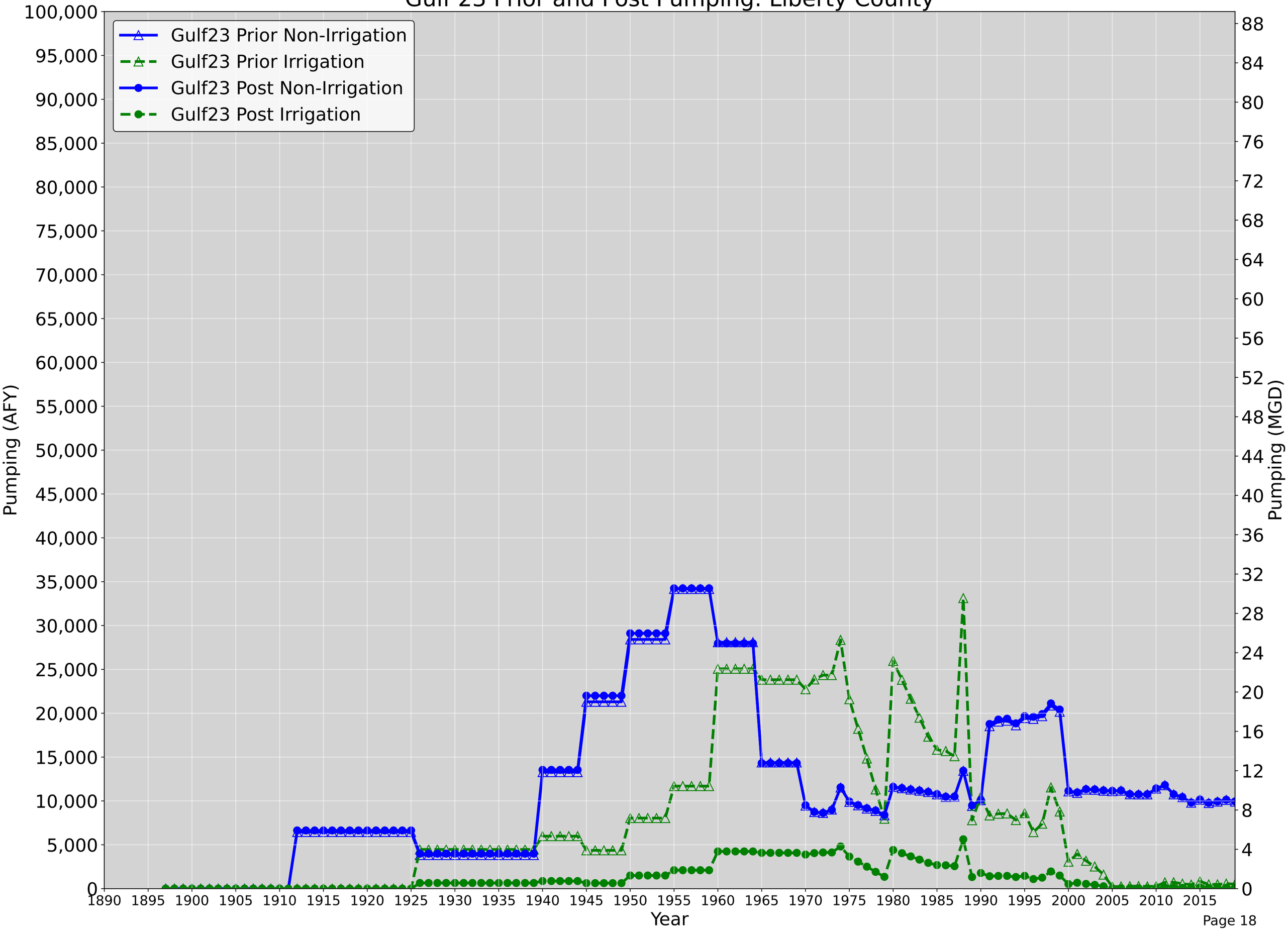
Gulf 23 Prior and Post Pumping: Jefferson County



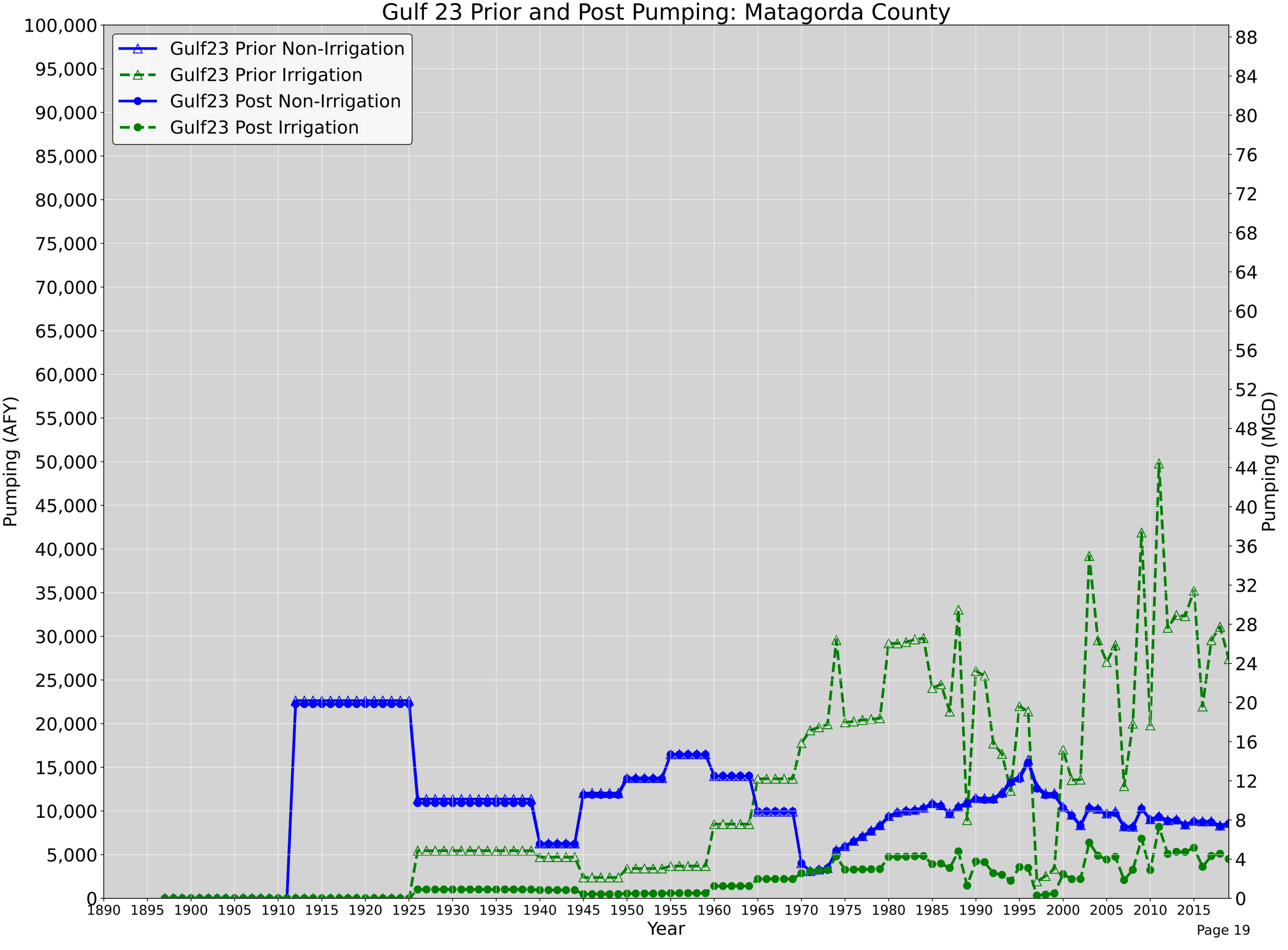
Gulf 23 Prior and Post Pumping: Lavaca County



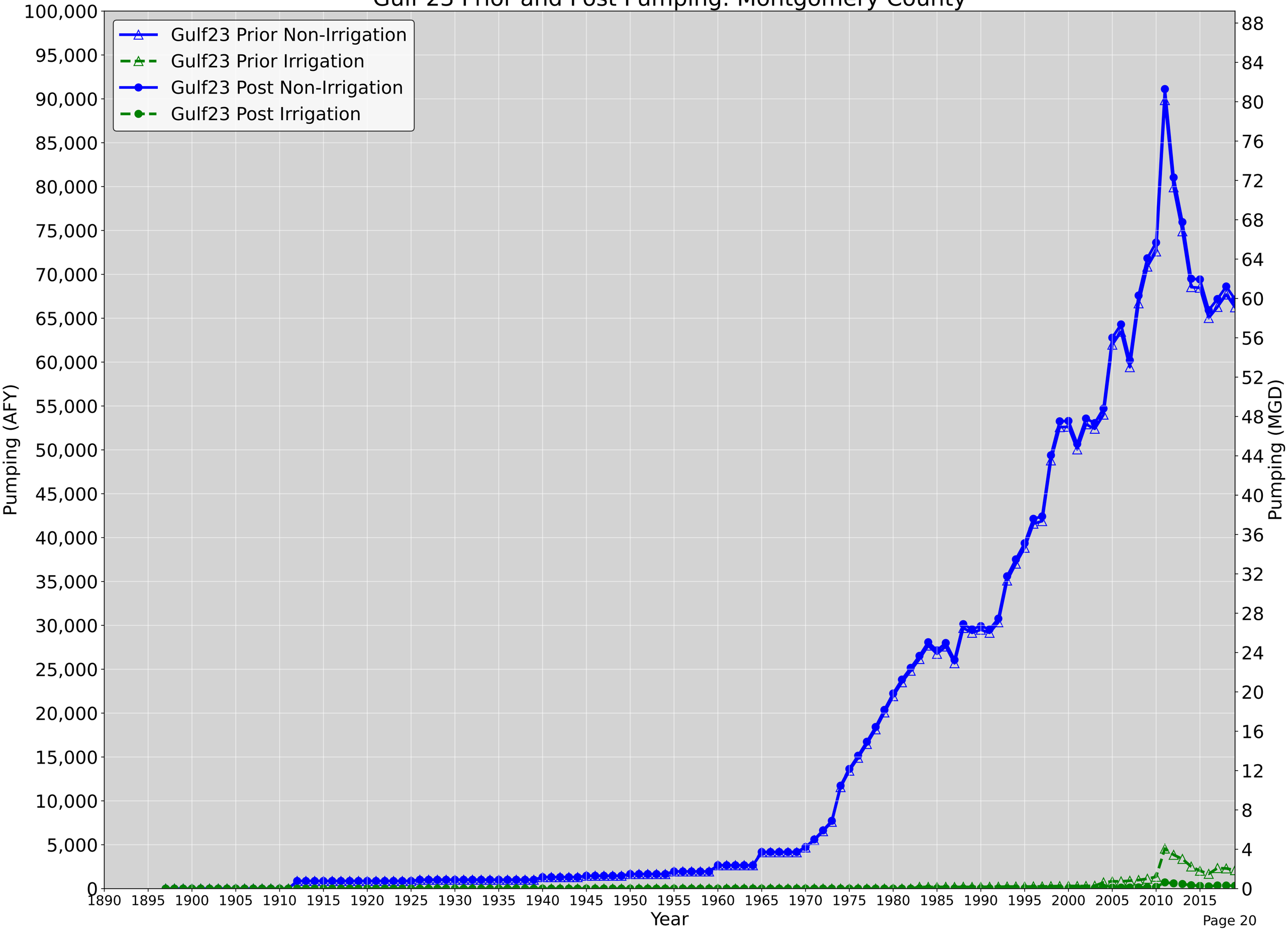
Gulf 23 Prior and Post Pumping: Liberty County



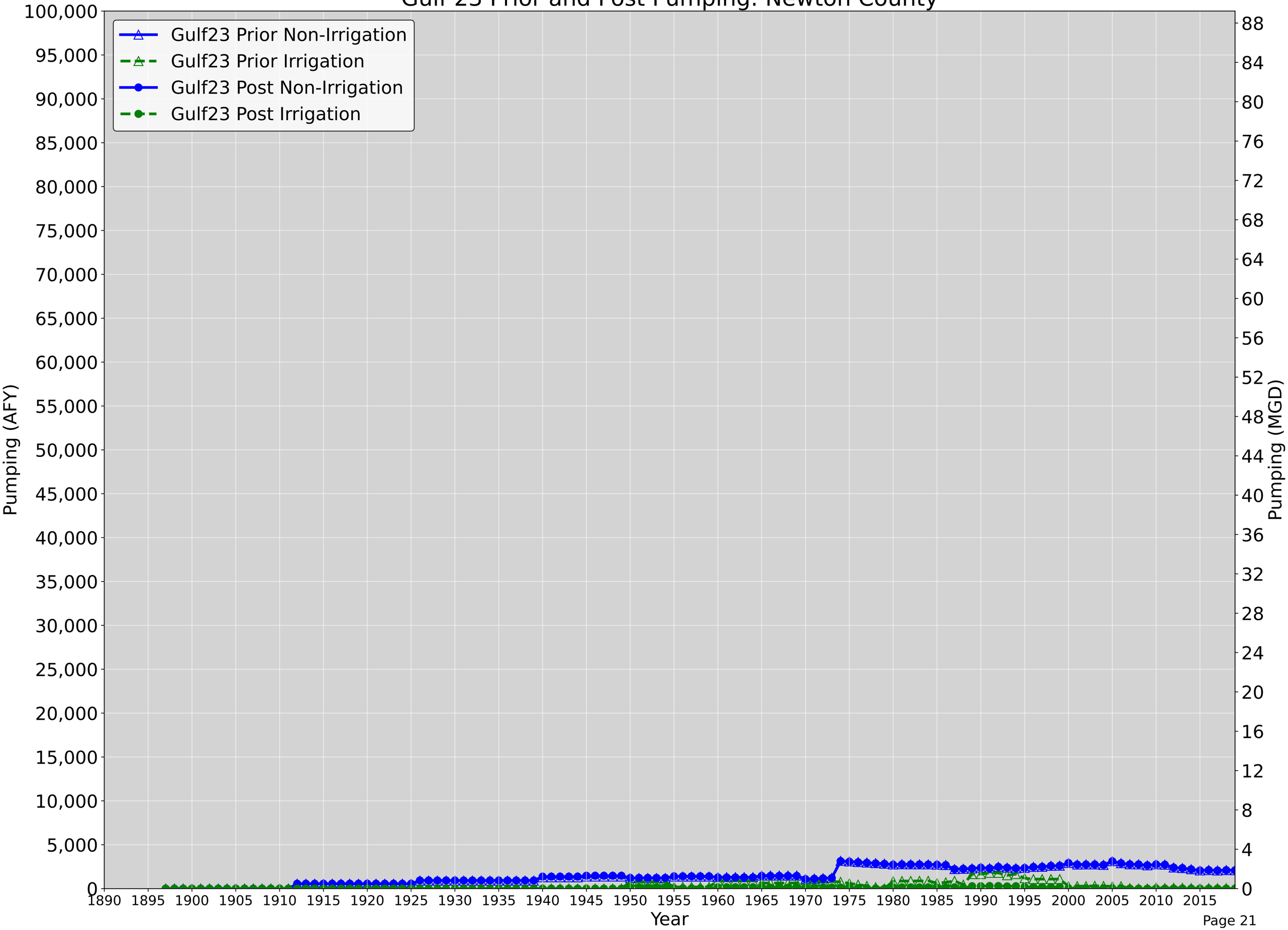
Gulf 23 Prior and Post Pumping: Matagorda County



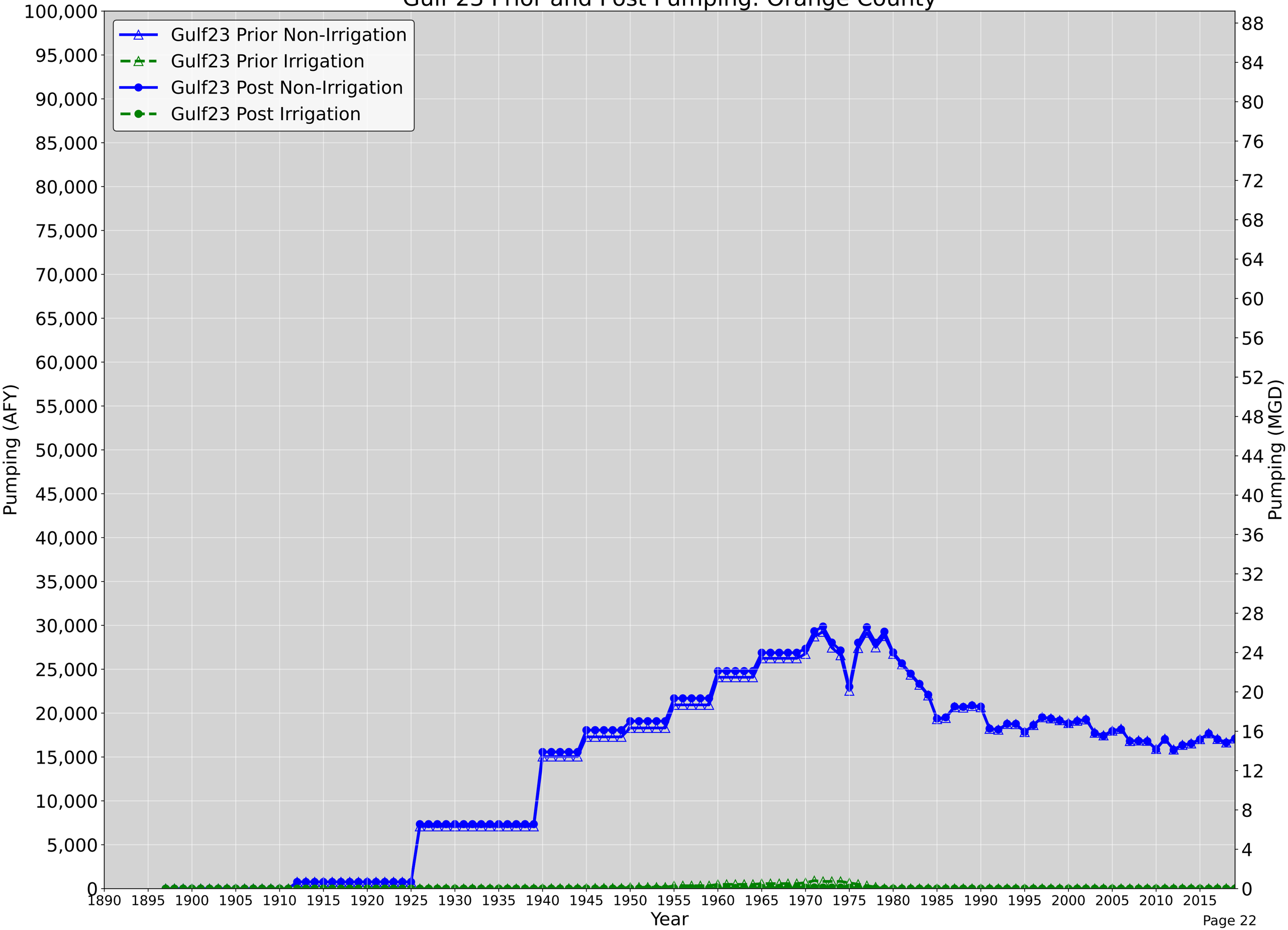
Gulf 23 Prior and Post Pumping: Montgomery County



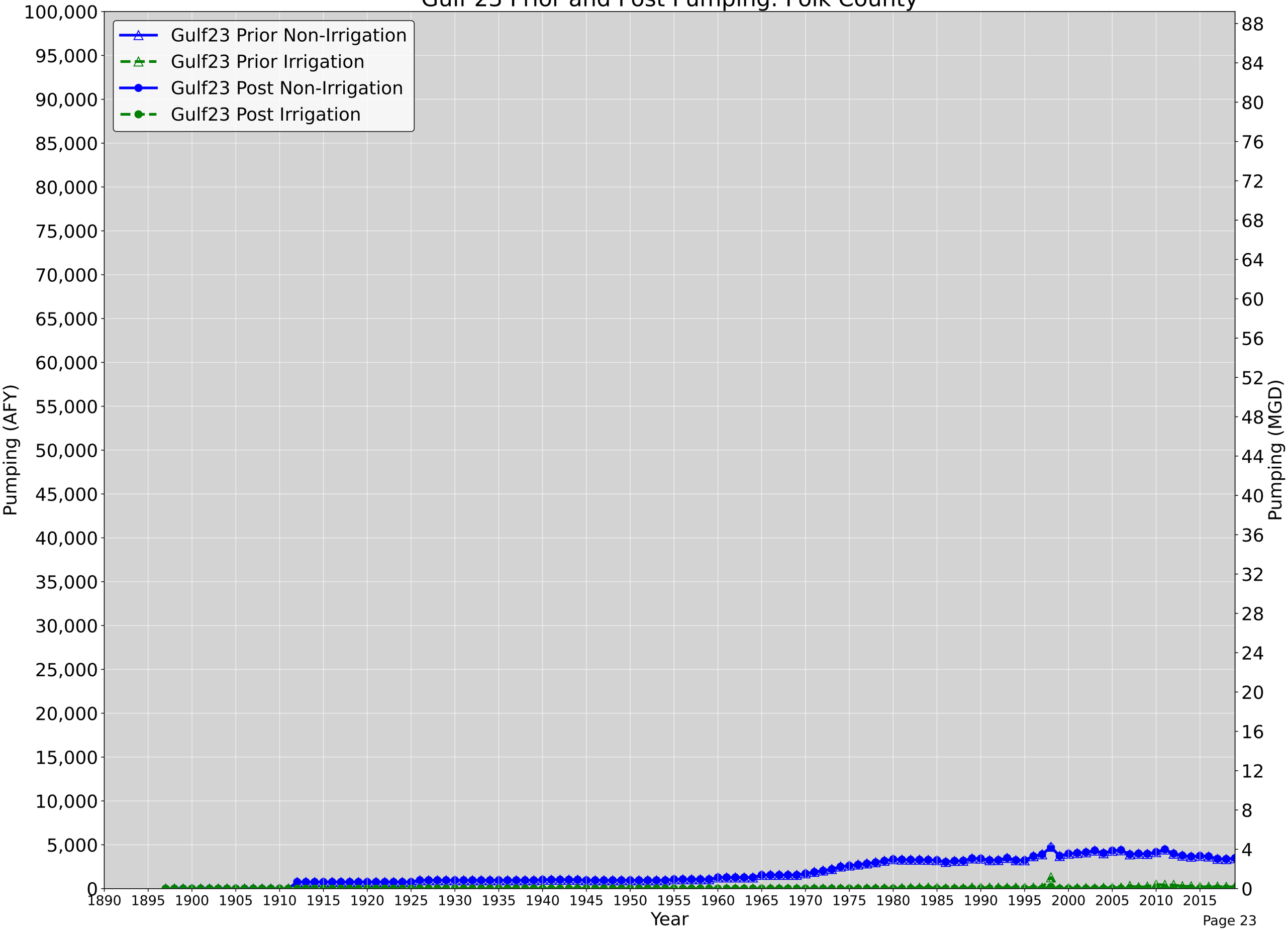
Gulf 23 Prior and Post Pumping: Newton County



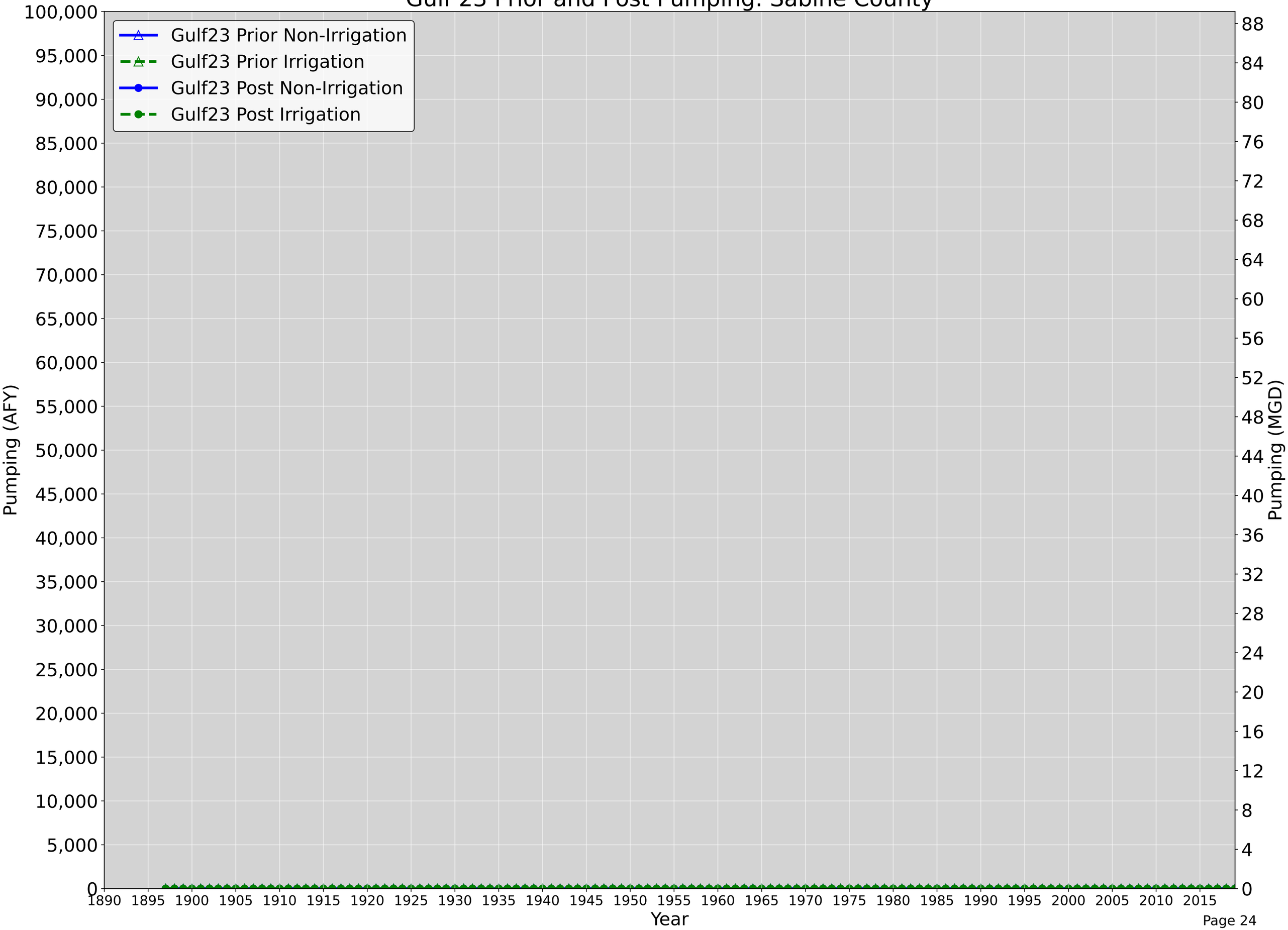
Gulf 23 Prior and Post Pumping: Orange County



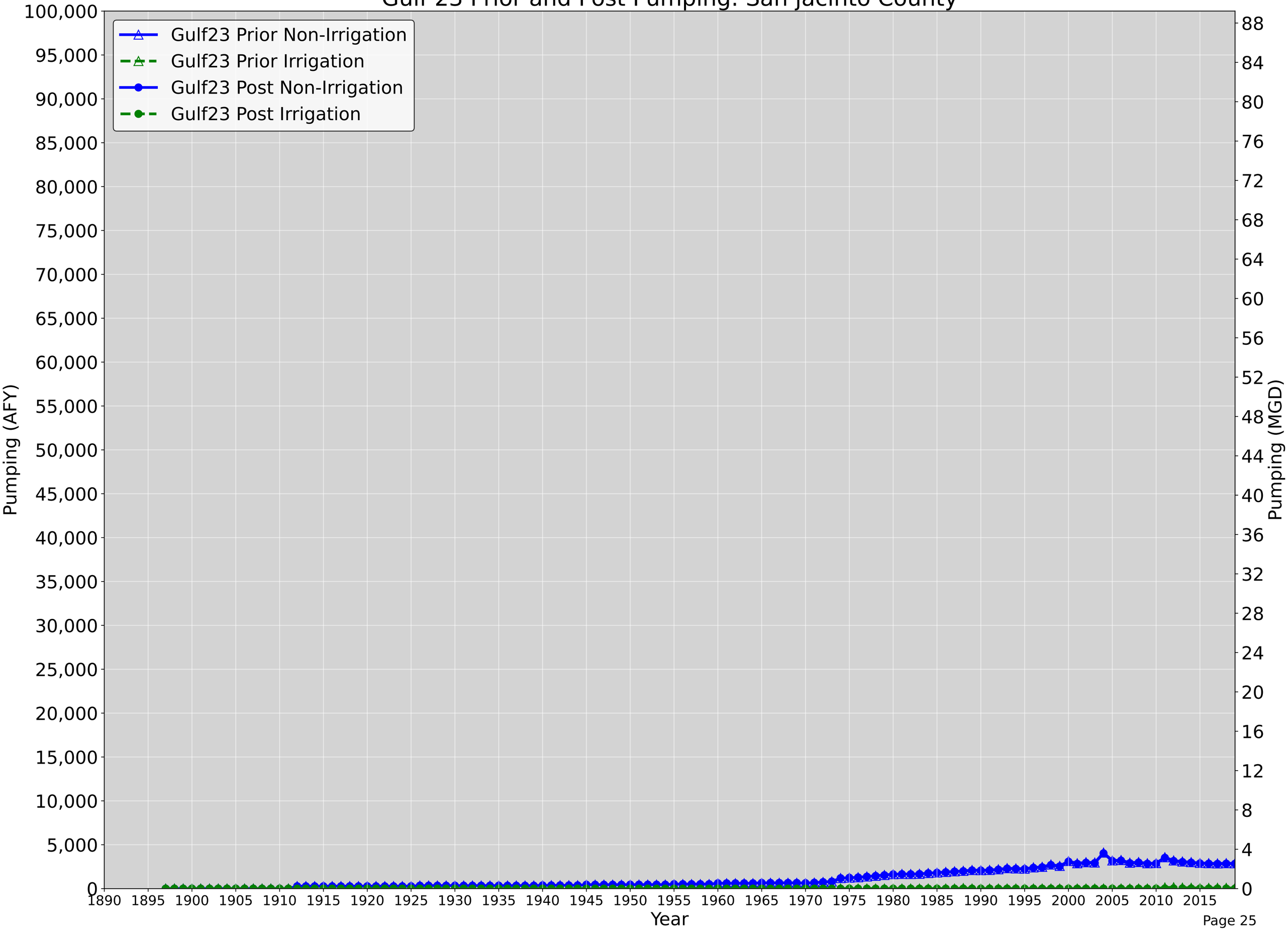
Gulf 23 Prior and Post Pumping: Polk County



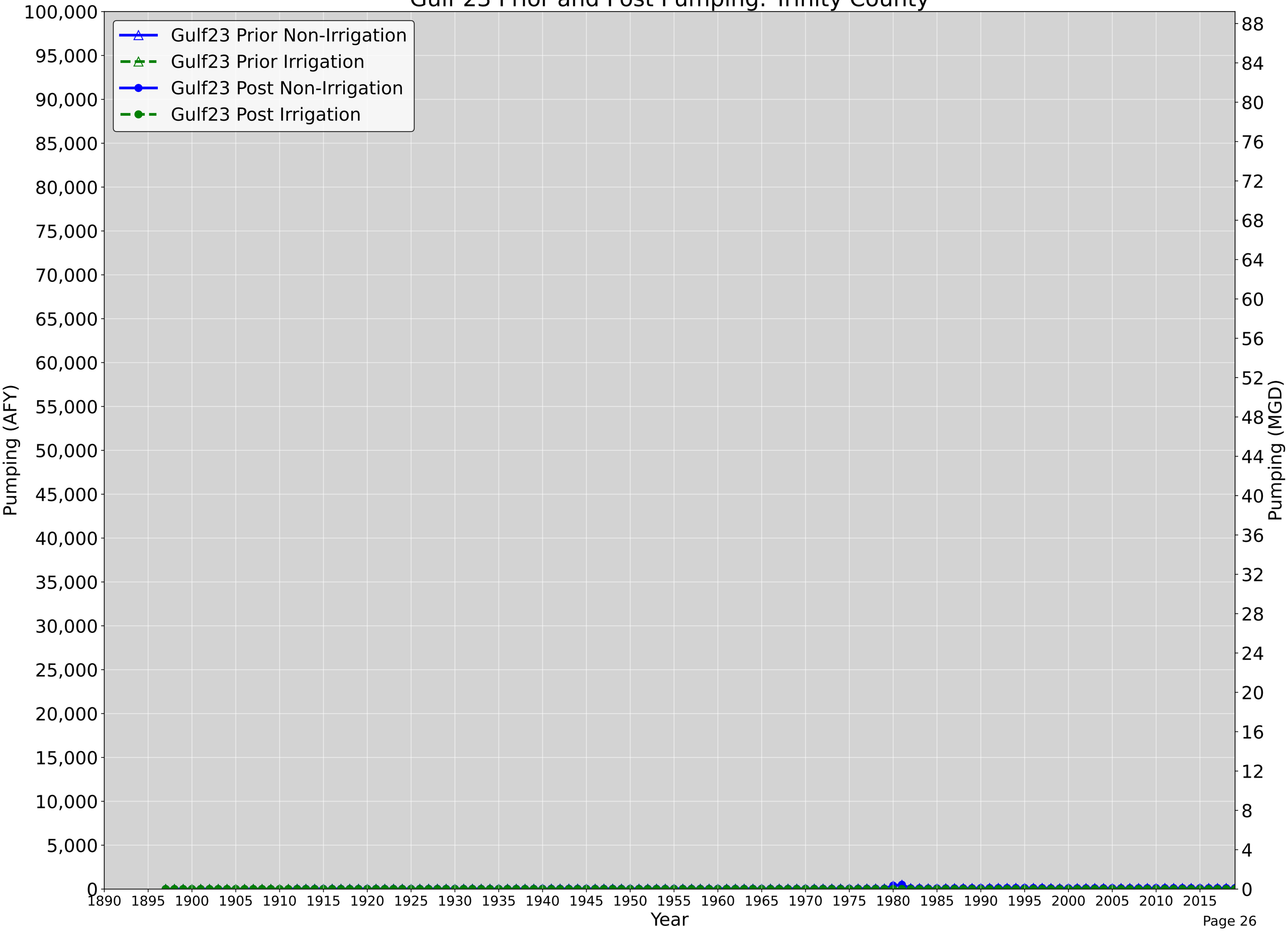
Gulf 23 Prior and Post Pumping: Sabine County



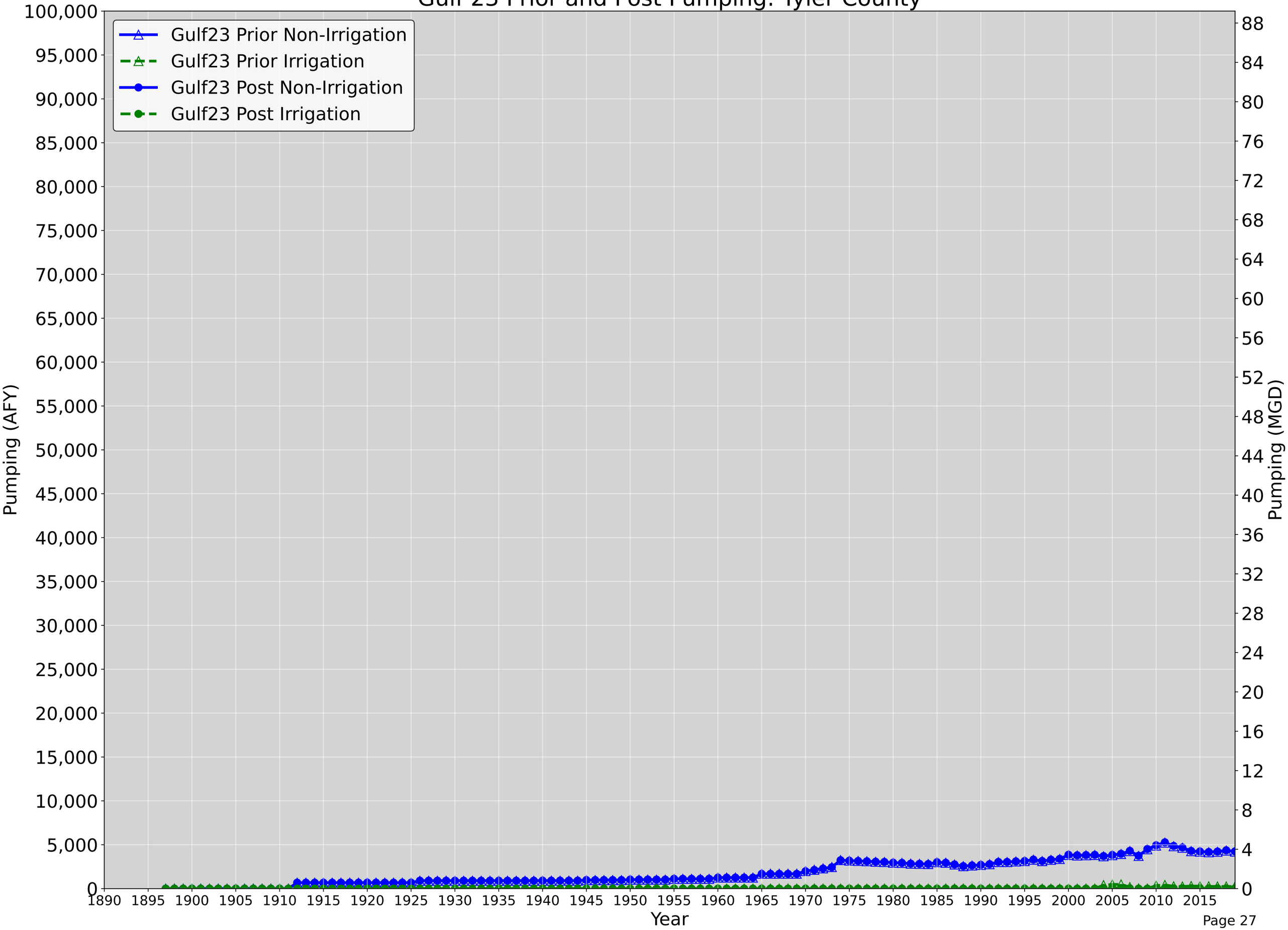
Gulf 23 Prior and Post Pumping: San jacinto County



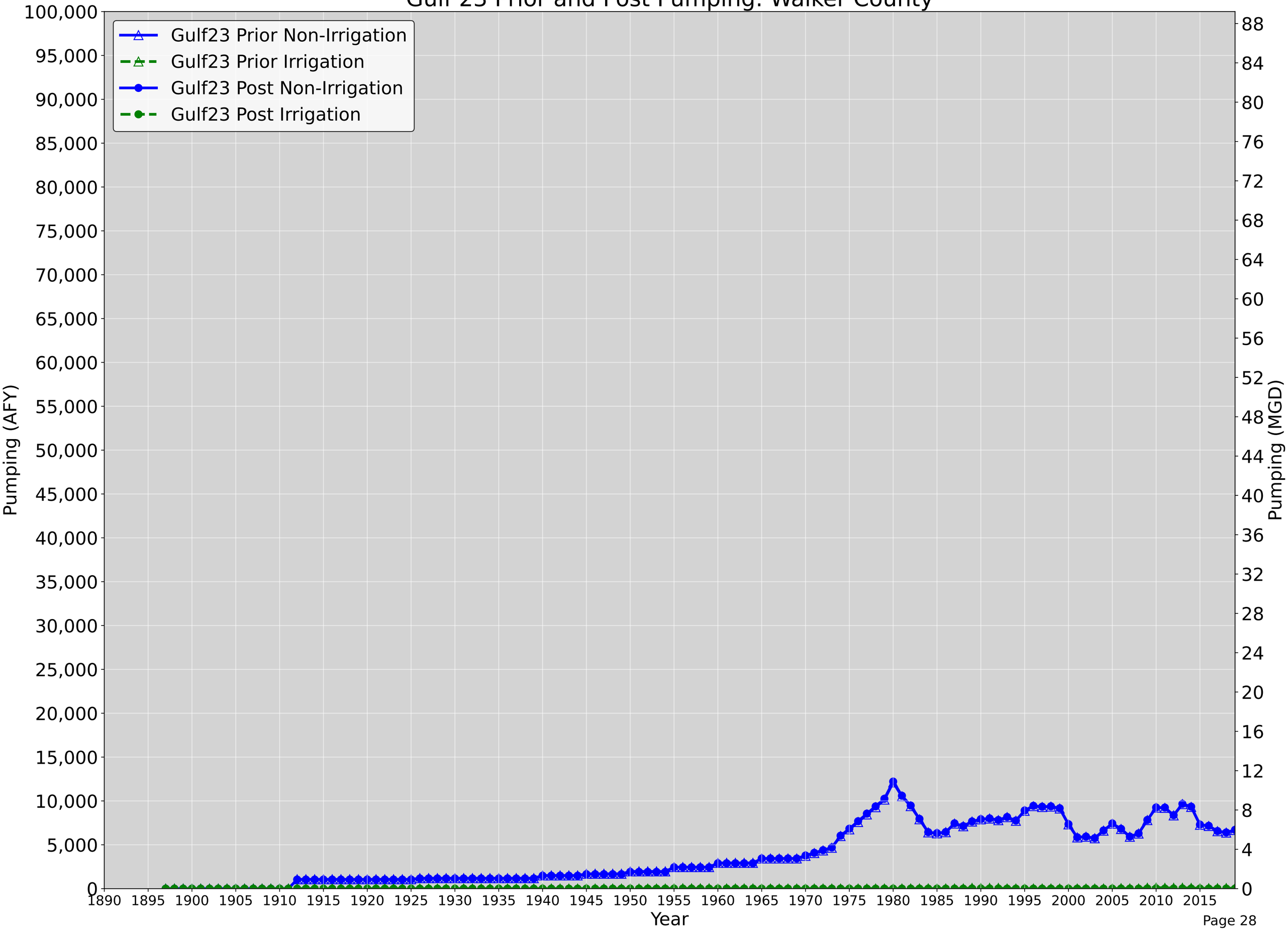
Gulf 23 Prior and Post Pumping: Trinity County



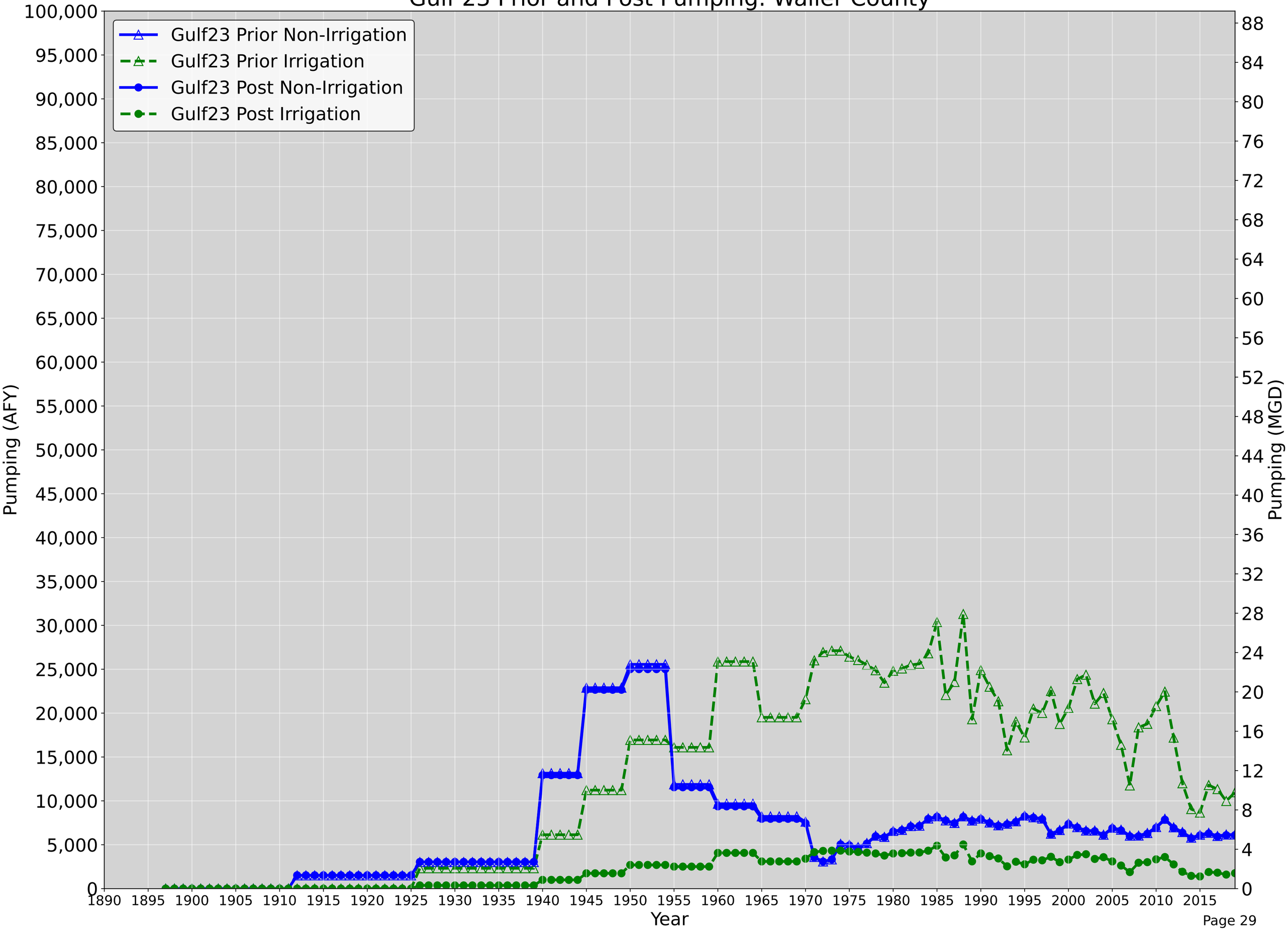
Gulf 23 Prior and Post Pumping: Tyler County



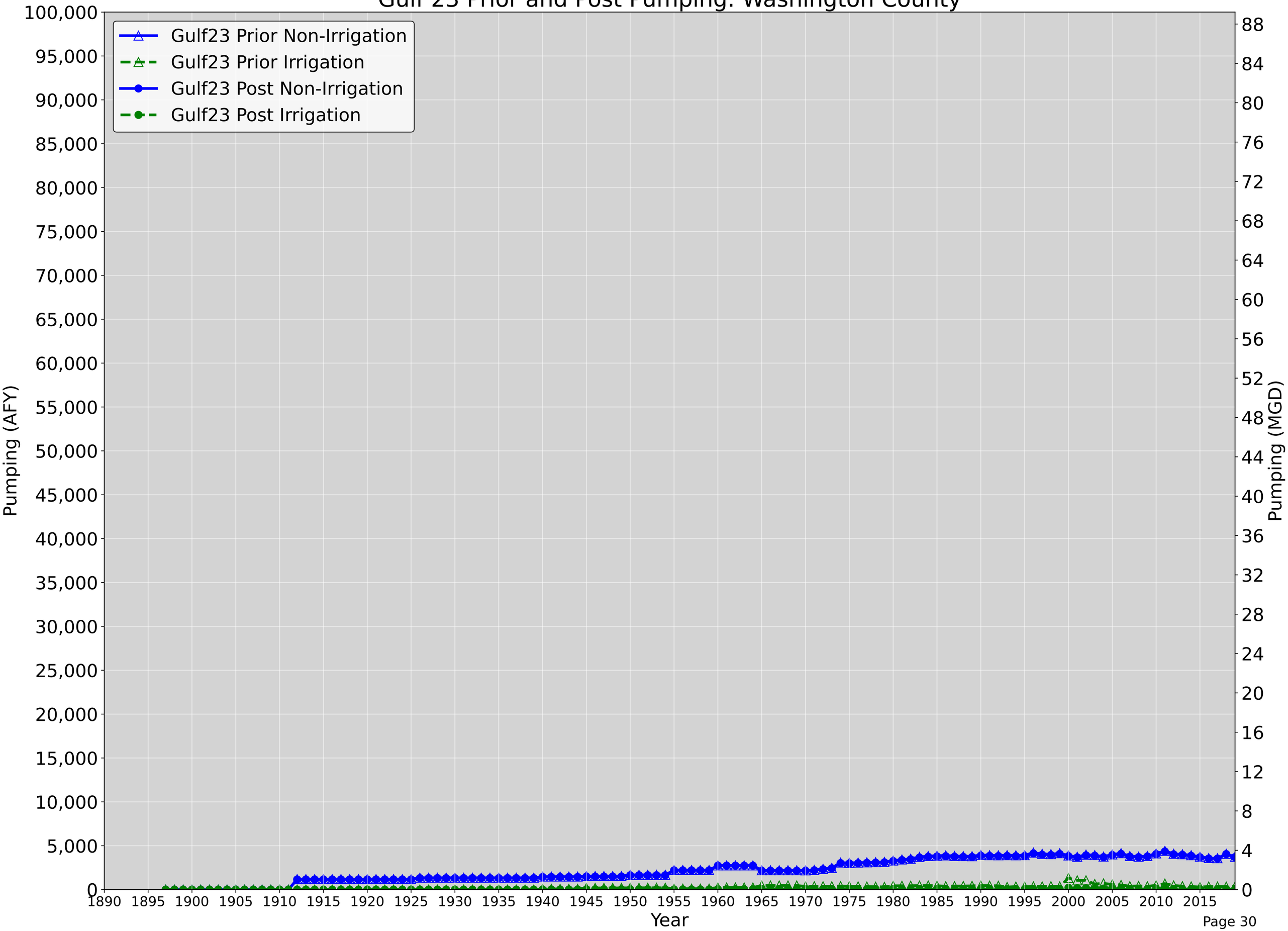
Gulf 23 Prior and Post Pumping: Walker County



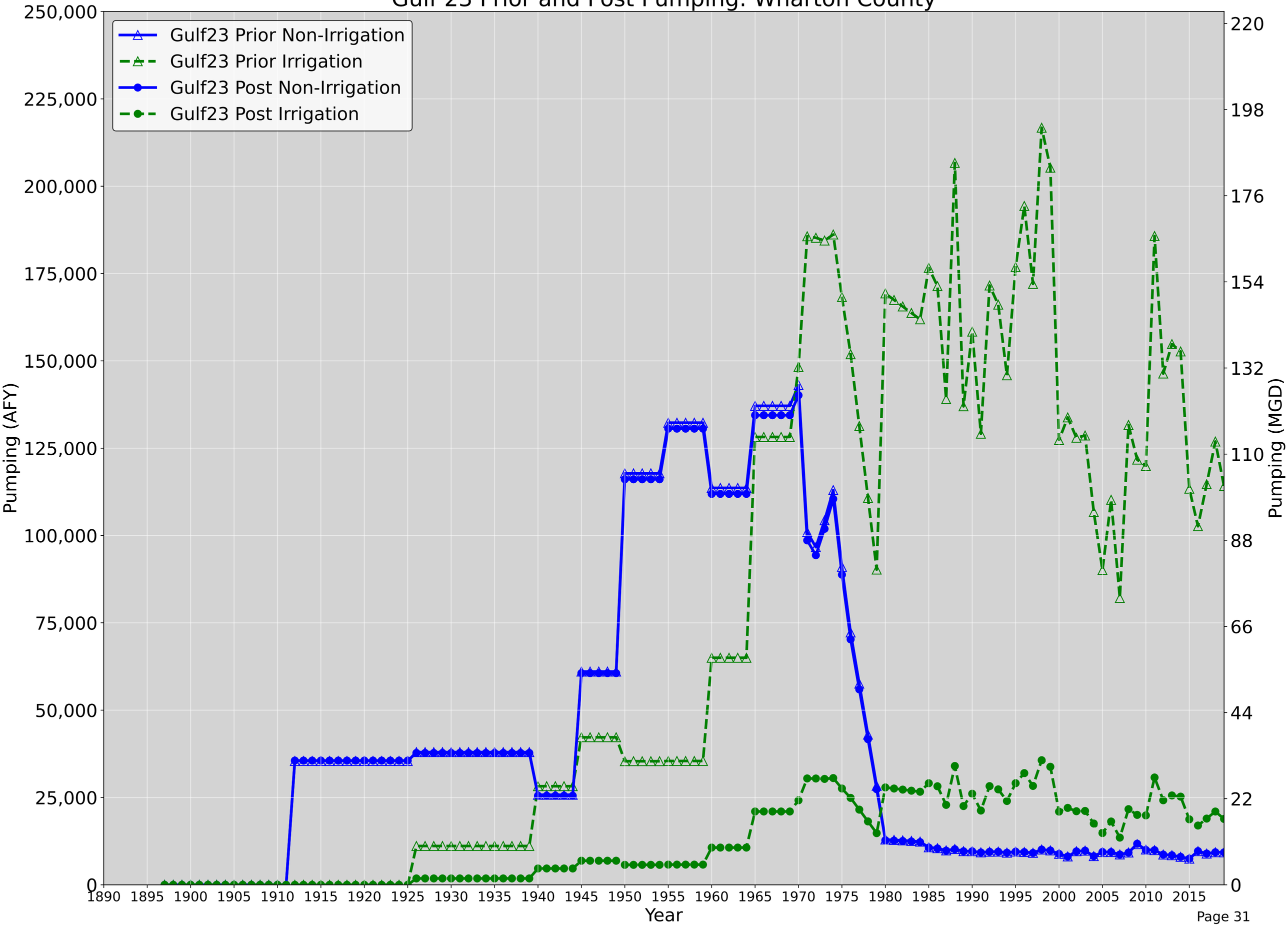
Gulf 23 Prior and Post Pumping: Waller County



Gulf 23 Prior and Post Pumping: Washington County



Gulf 23 Prior and Post Pumping: Wharton County



Appendix 3 — Comparison of GULF-2023 and Houston-Area Groundwater Model Pumping Inputs

Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Austin County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Brazoria County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

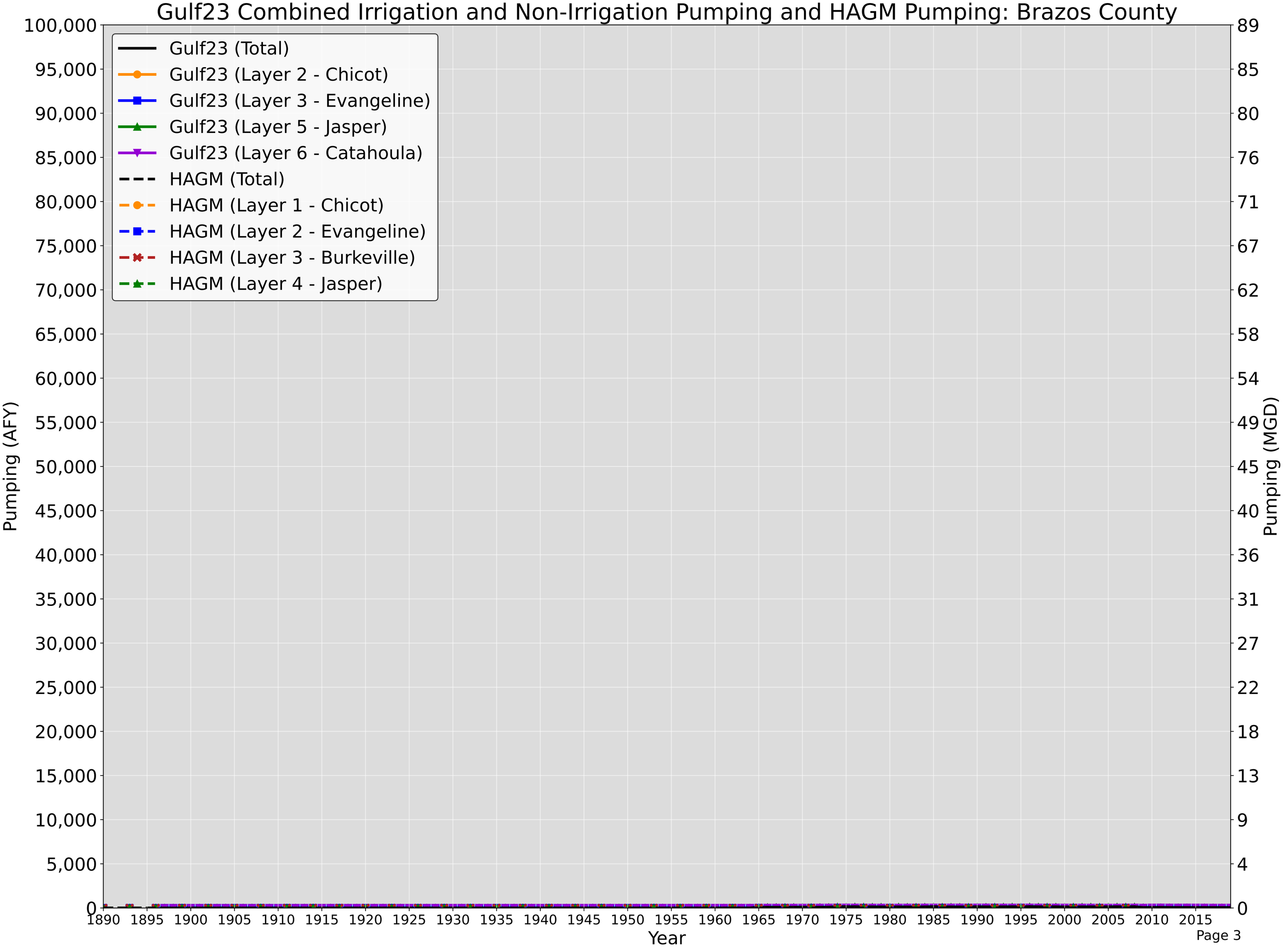
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

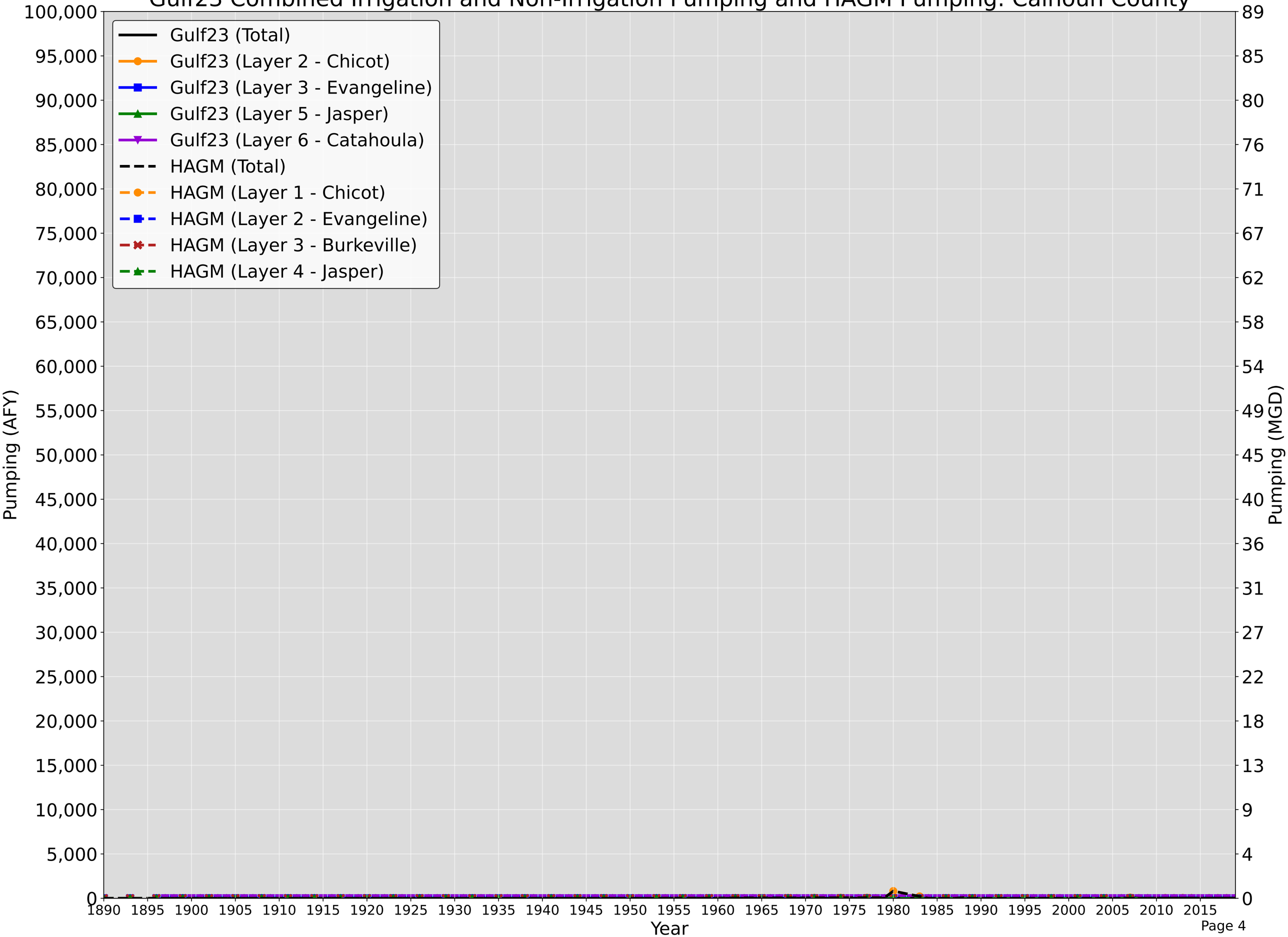
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

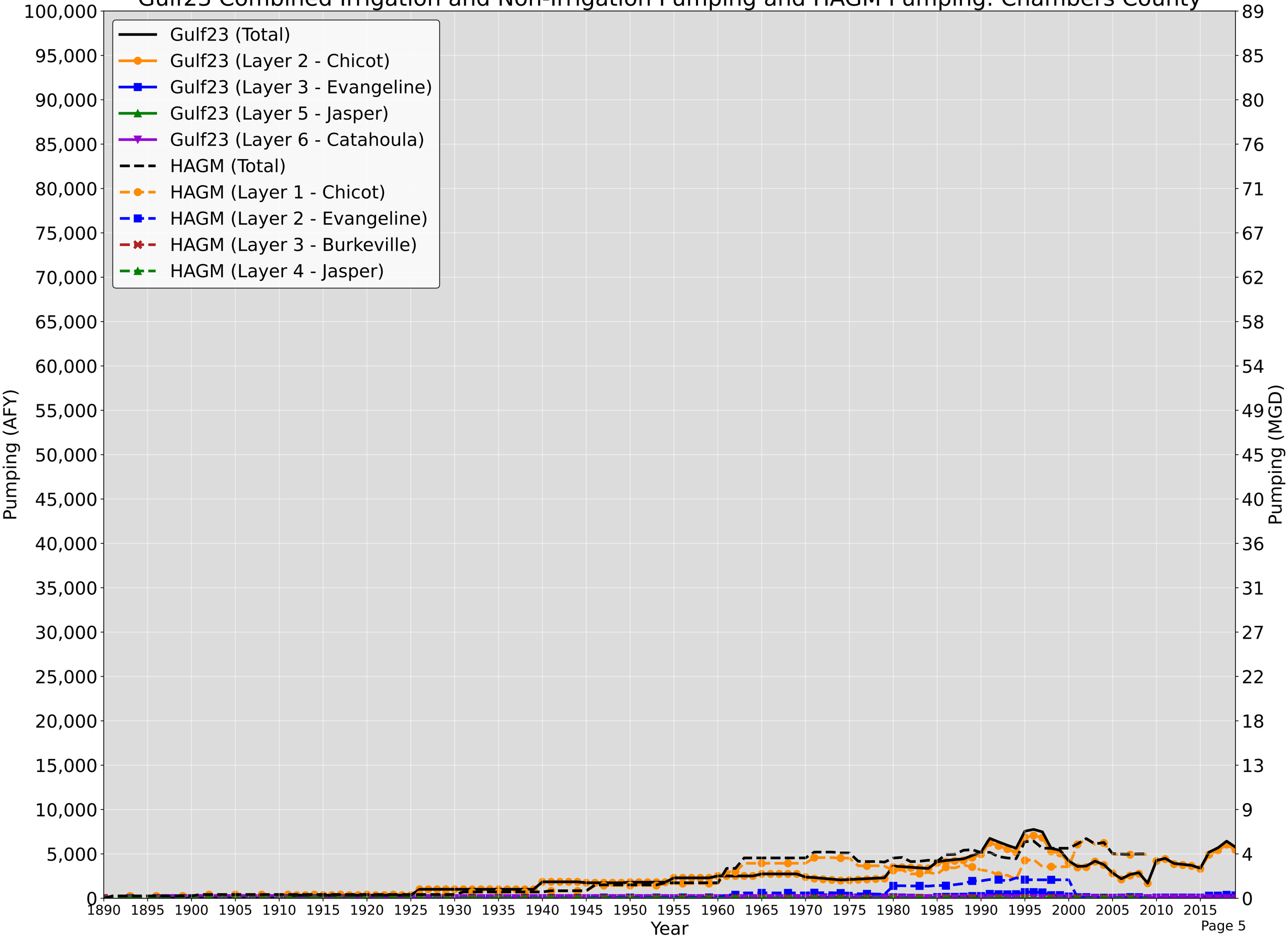
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Brazos County



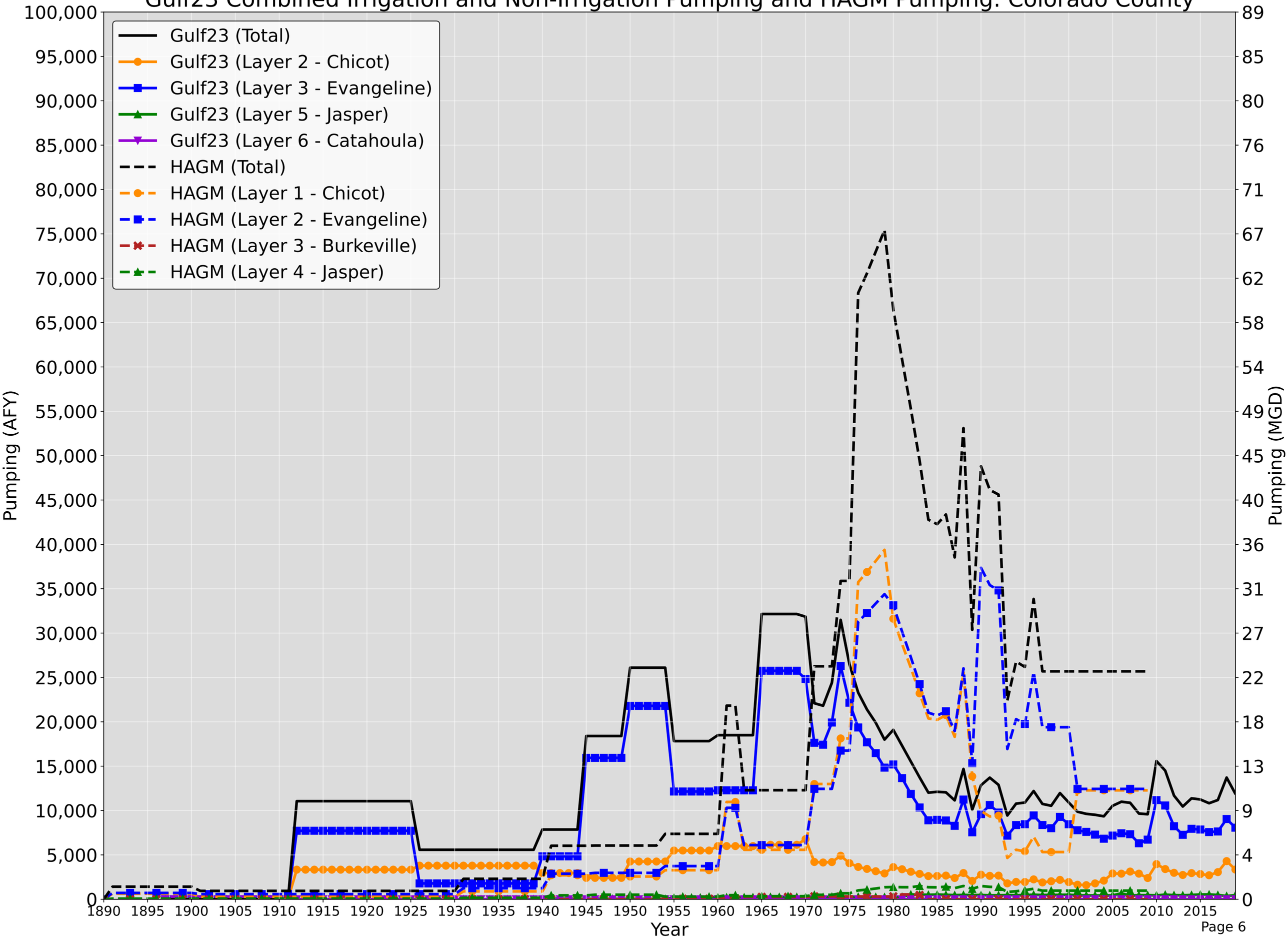
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Calhoun County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Chambers County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Colorado County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Fayette County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

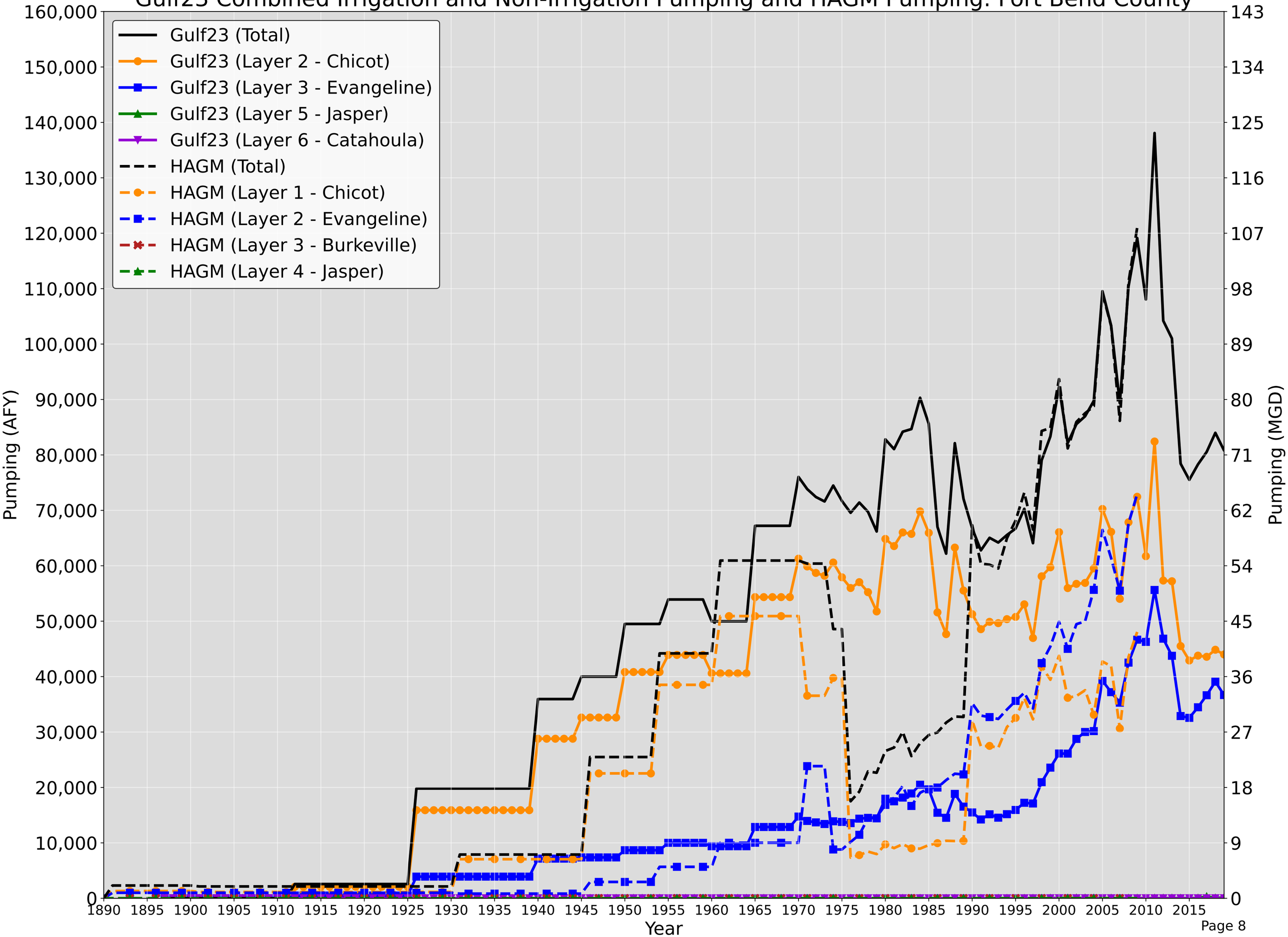
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

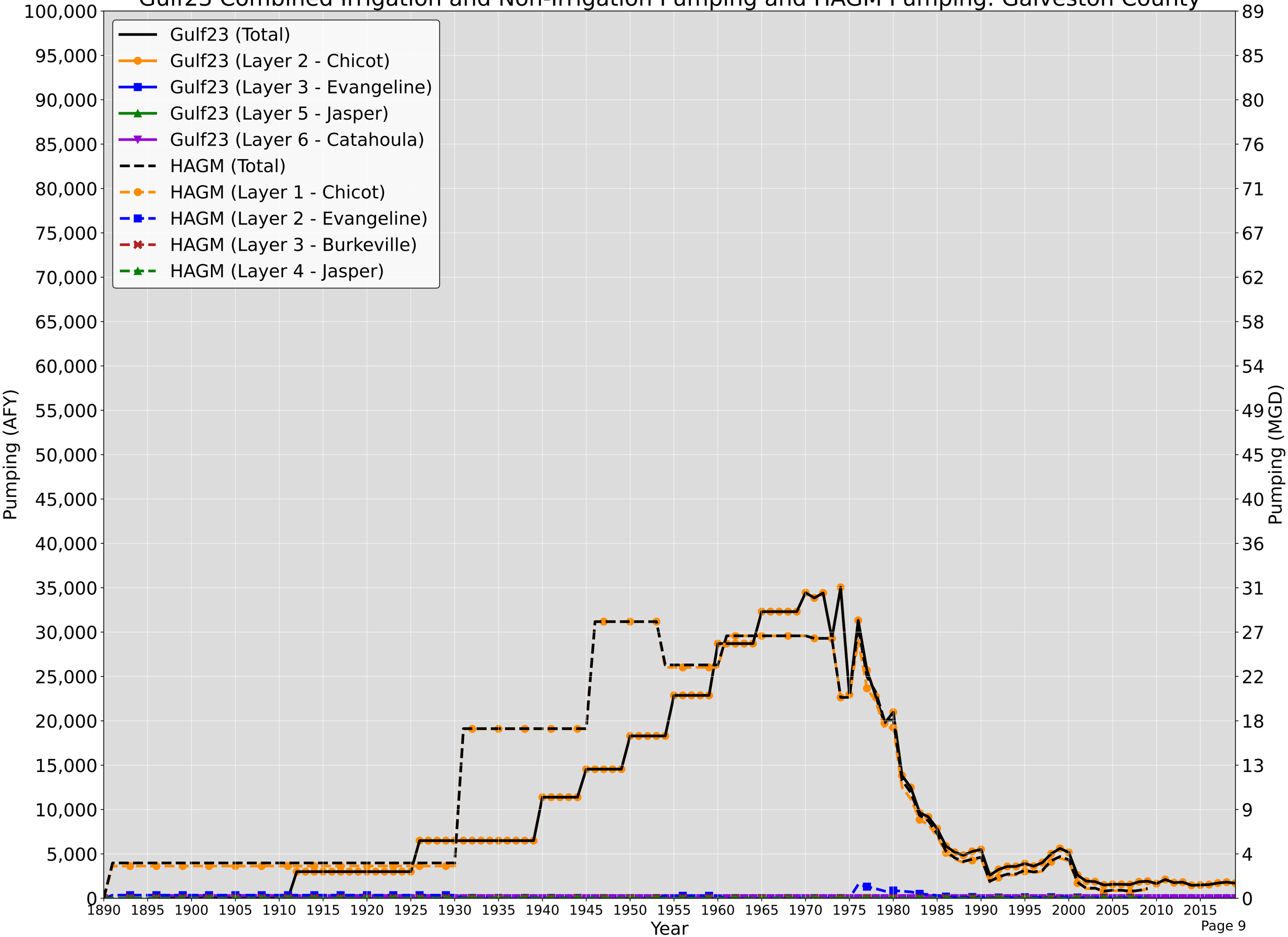
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

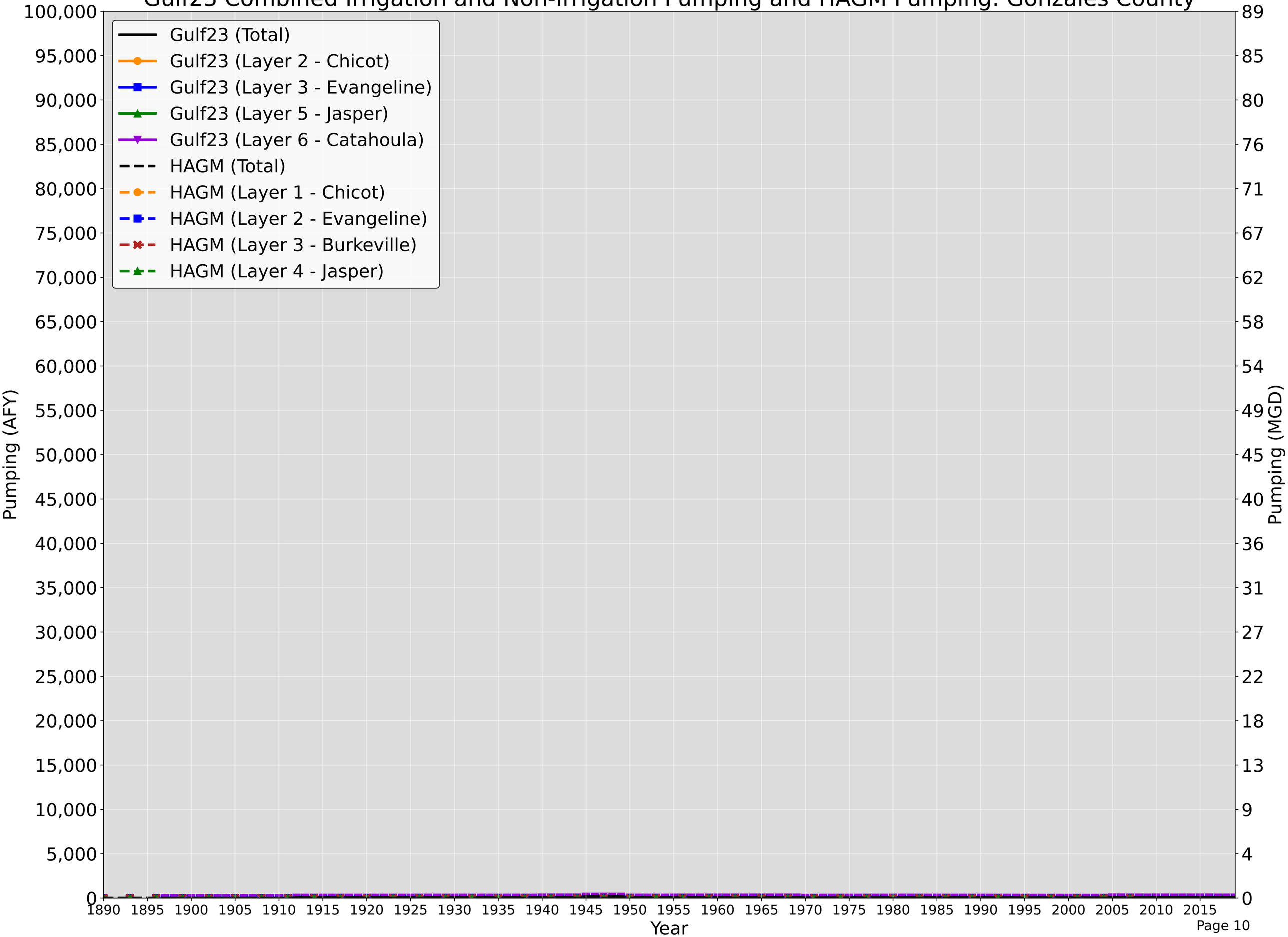
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Fort Bend County



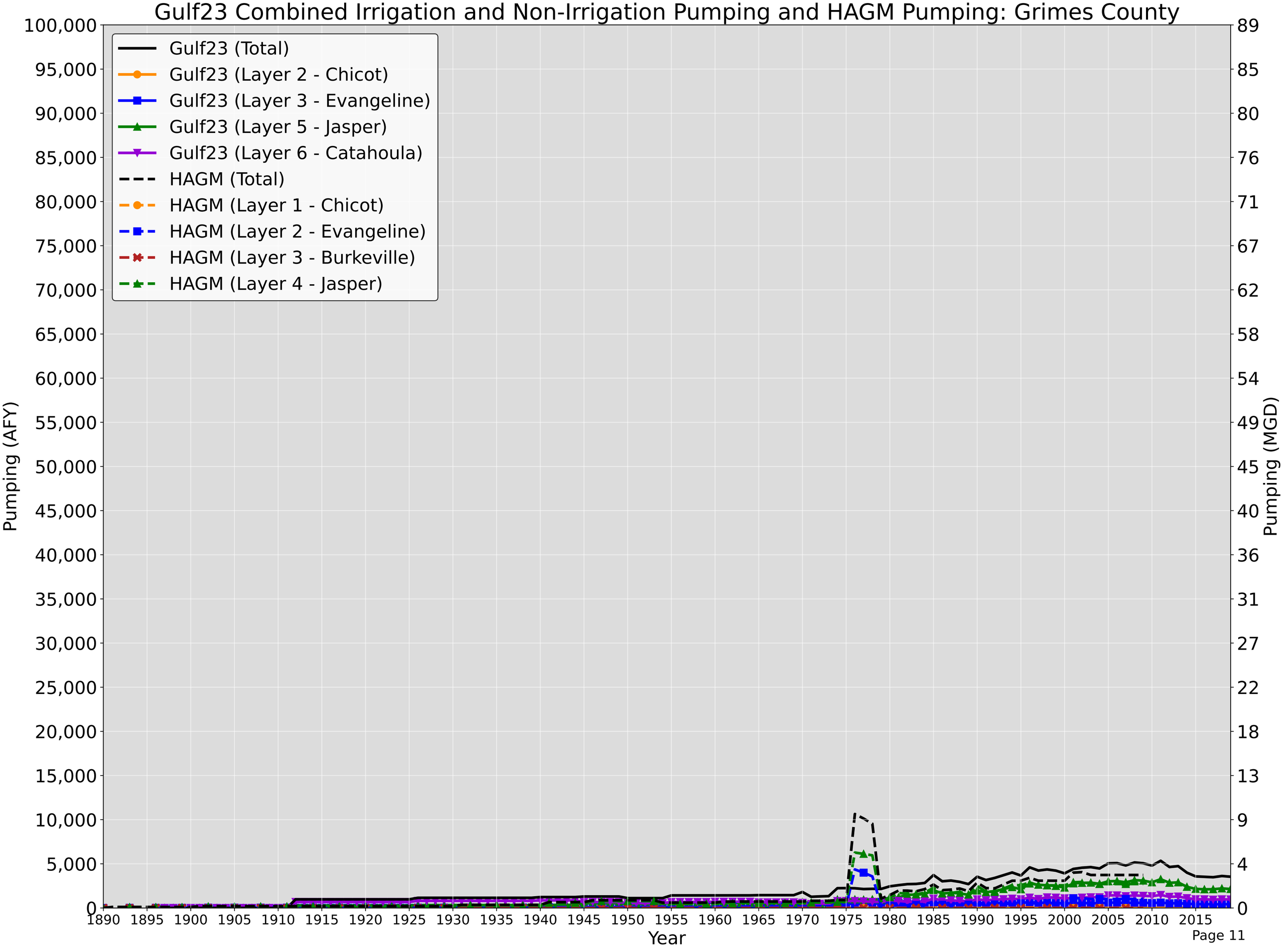
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Galveston County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Gonzales County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Grimes County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Hardin County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

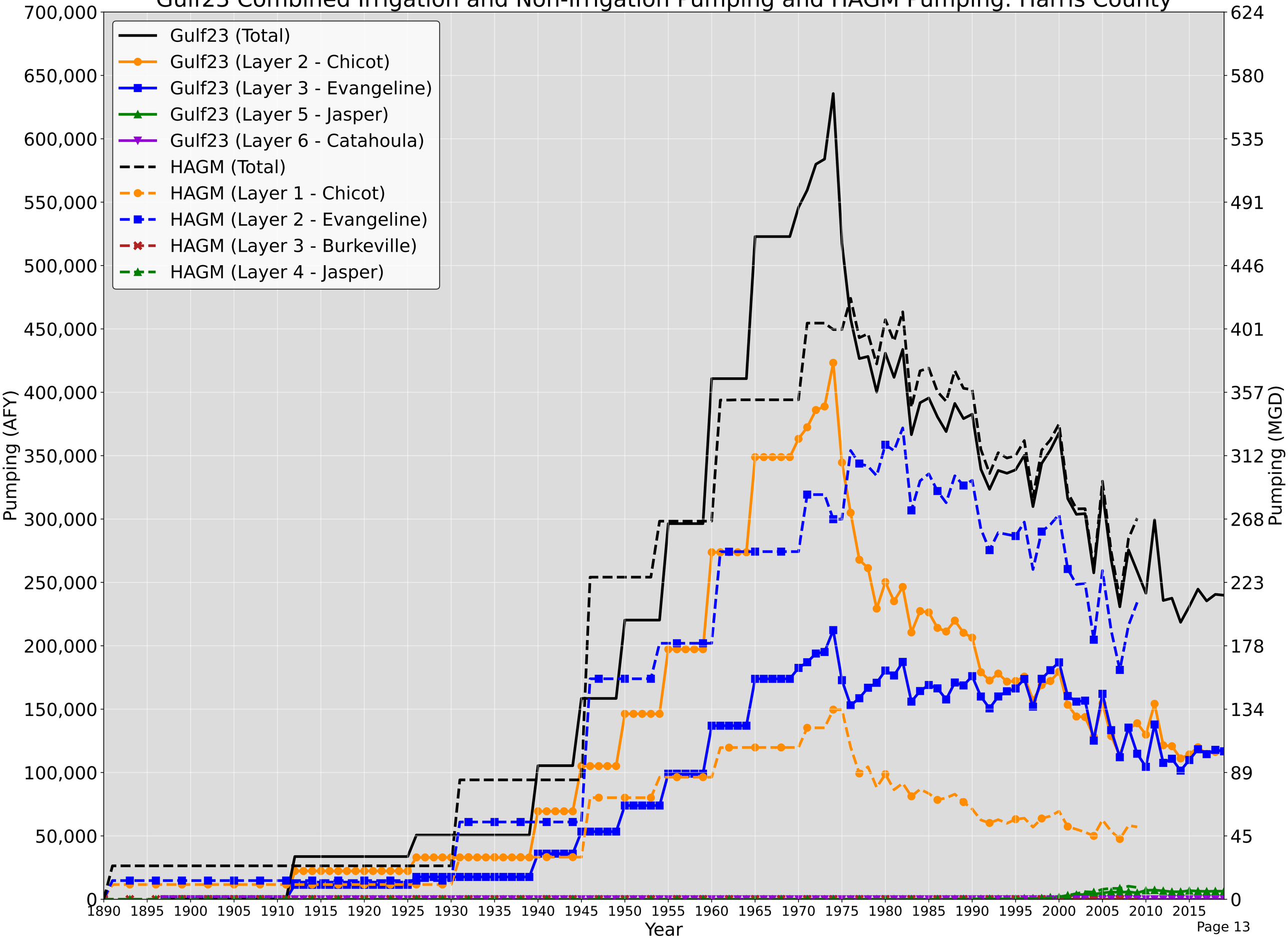
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

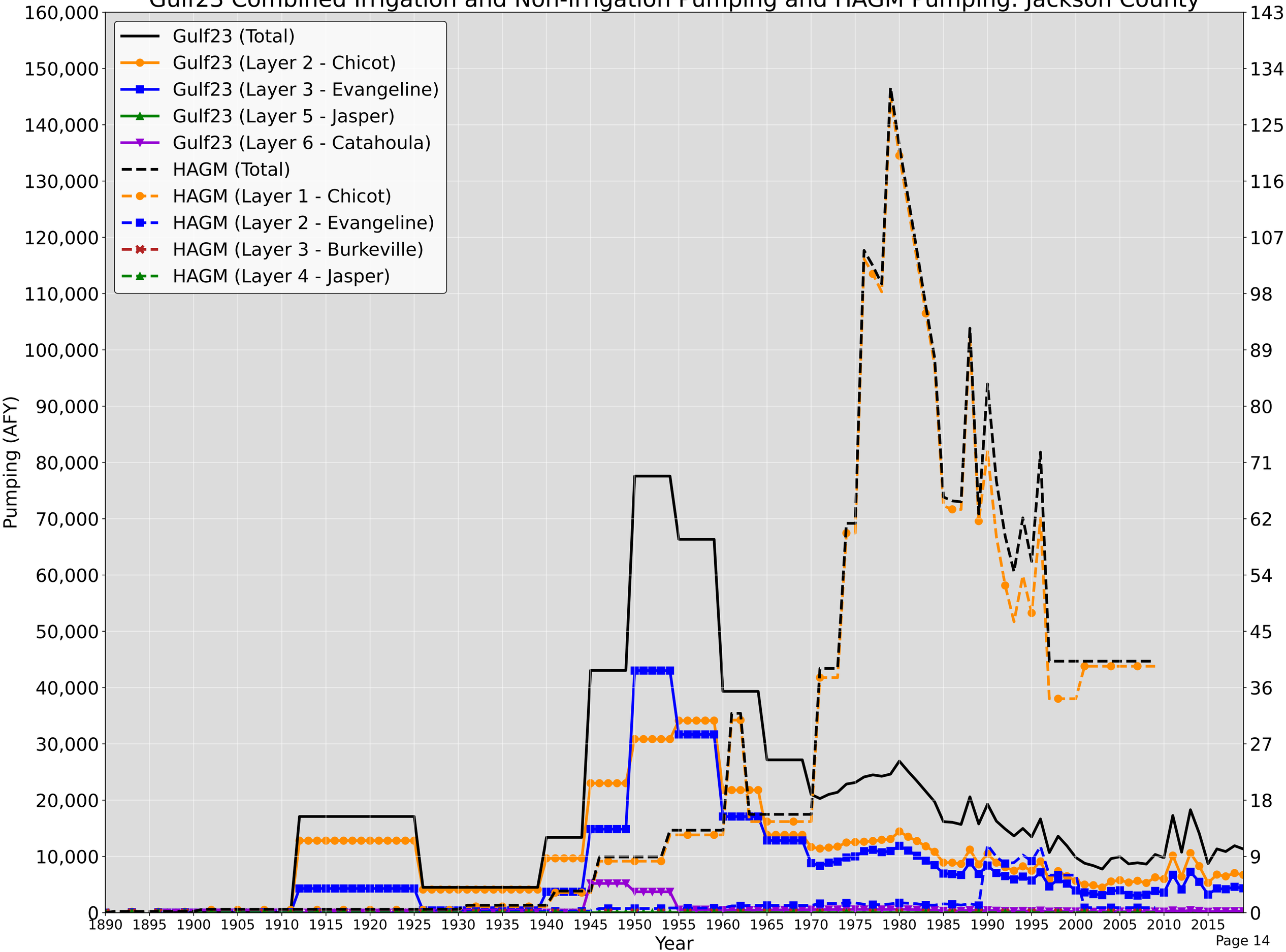
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

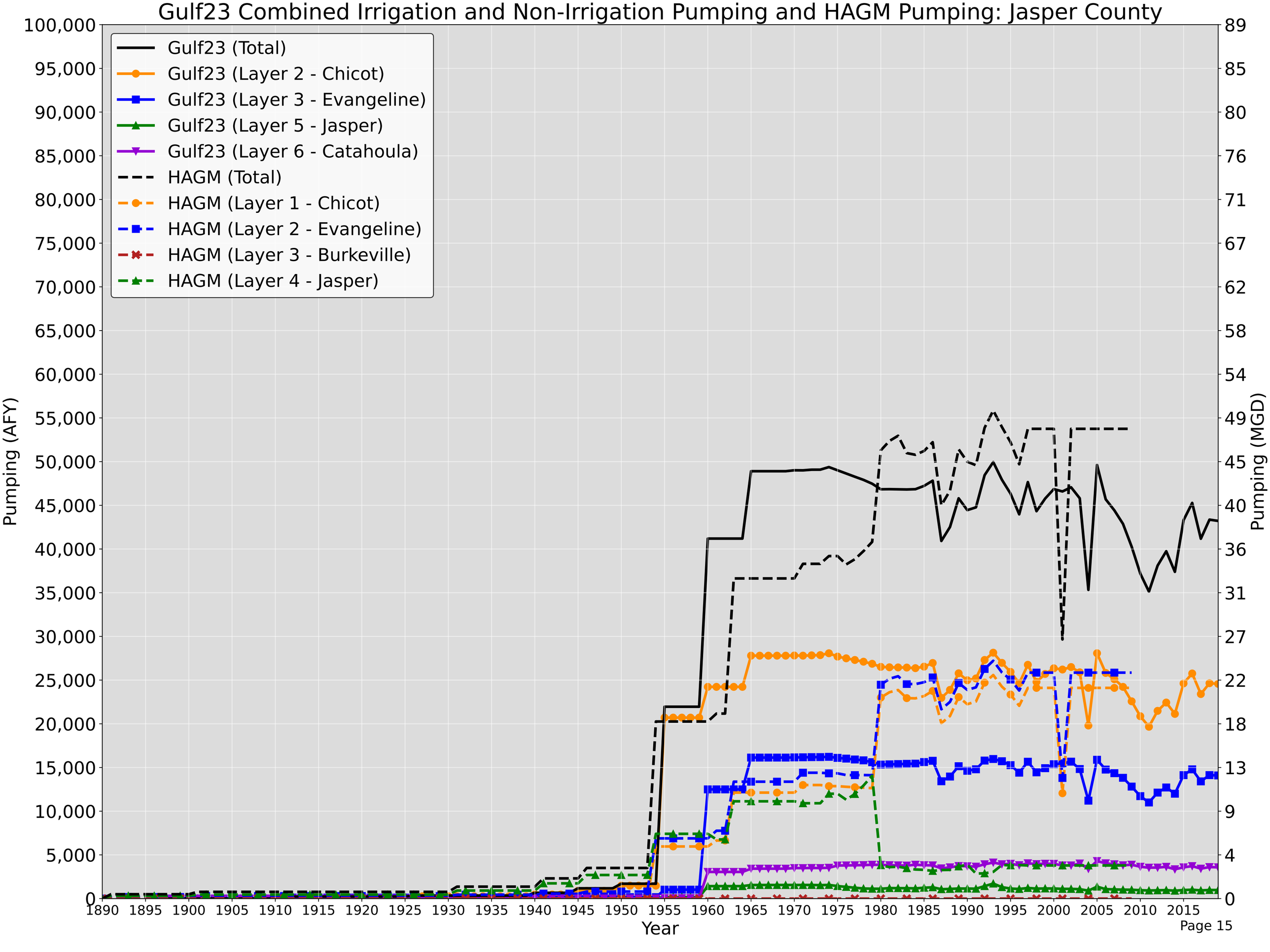
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Harris County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Jackson County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Jasper County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Jefferson County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

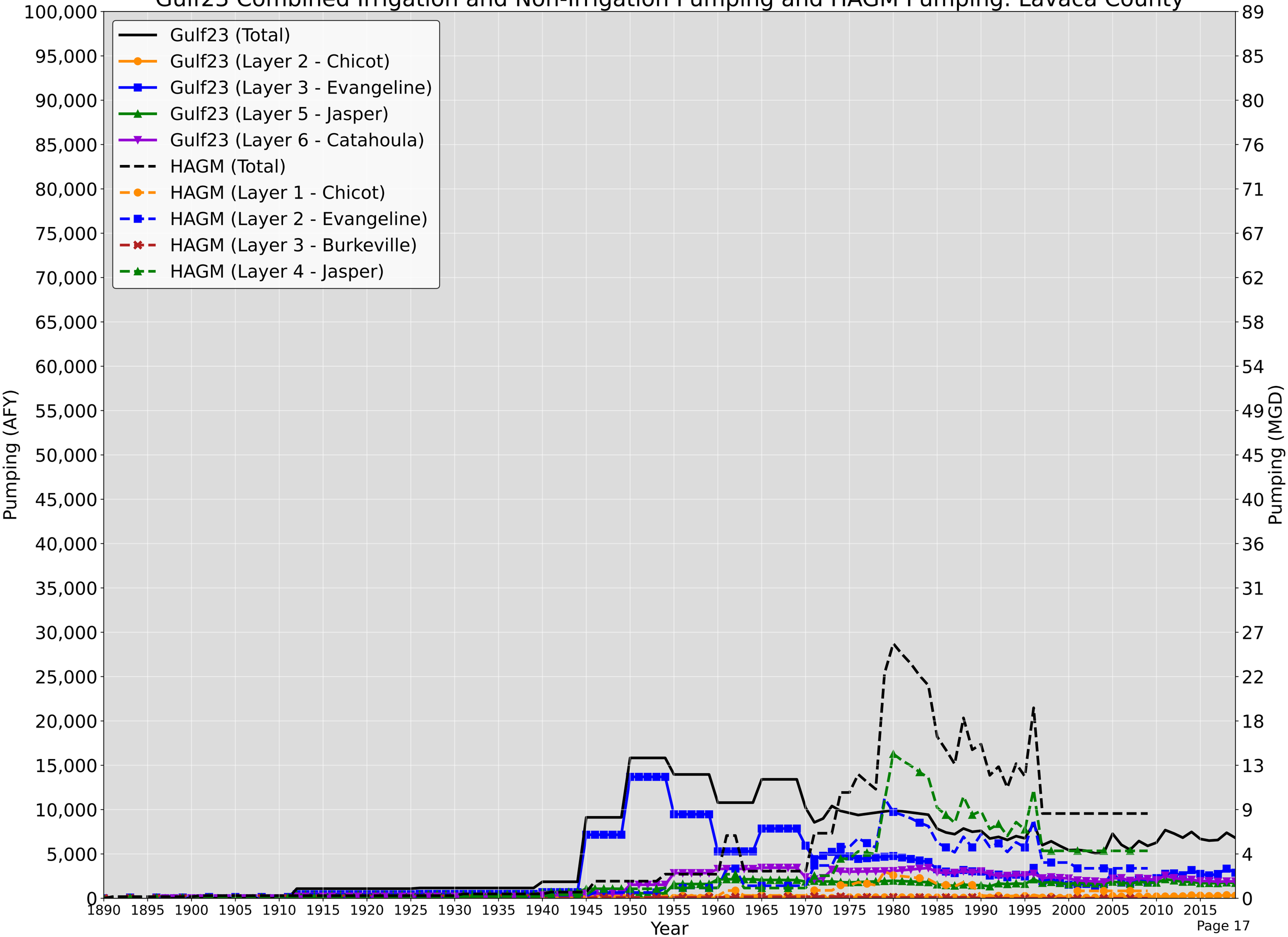
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

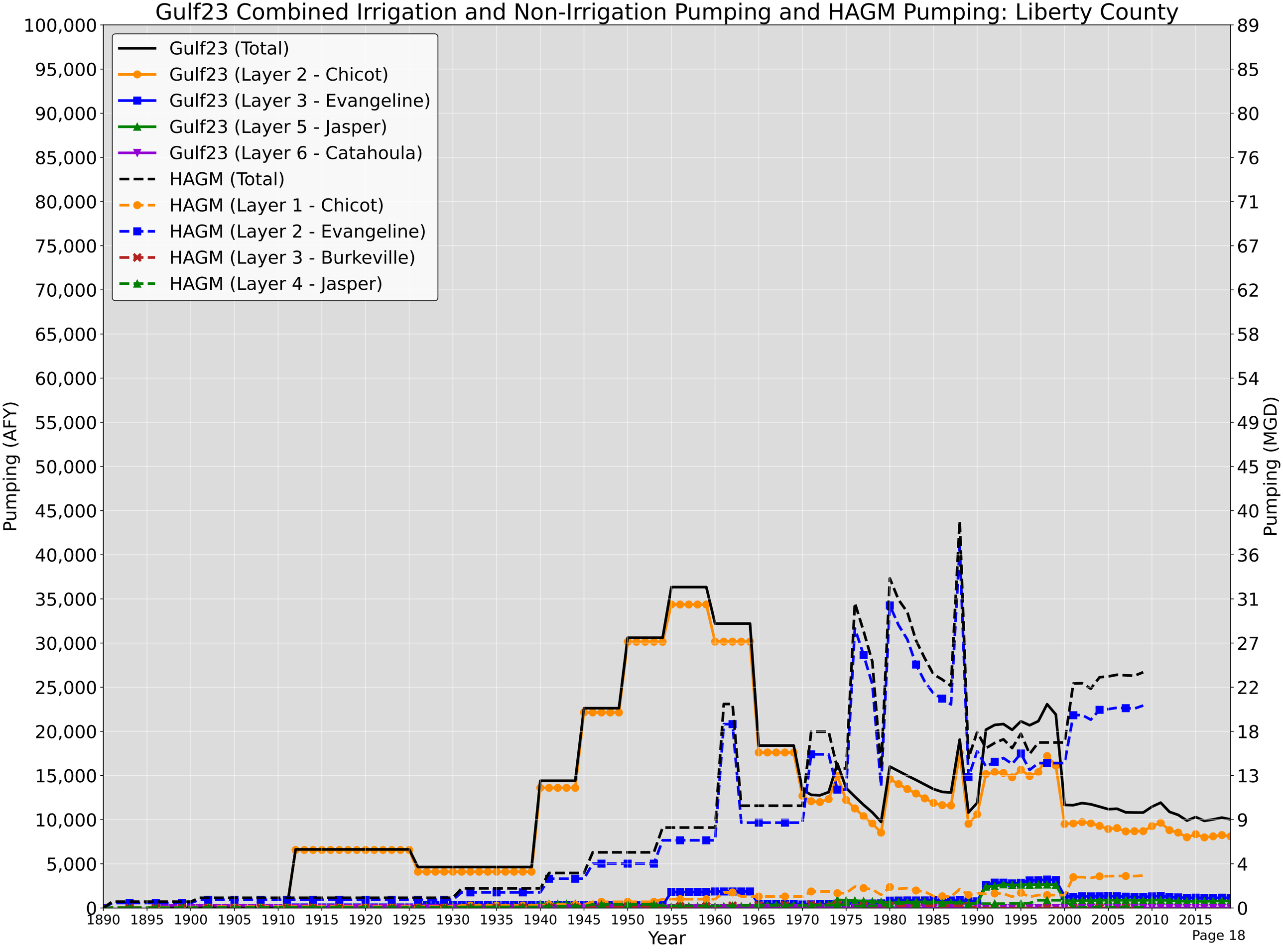
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

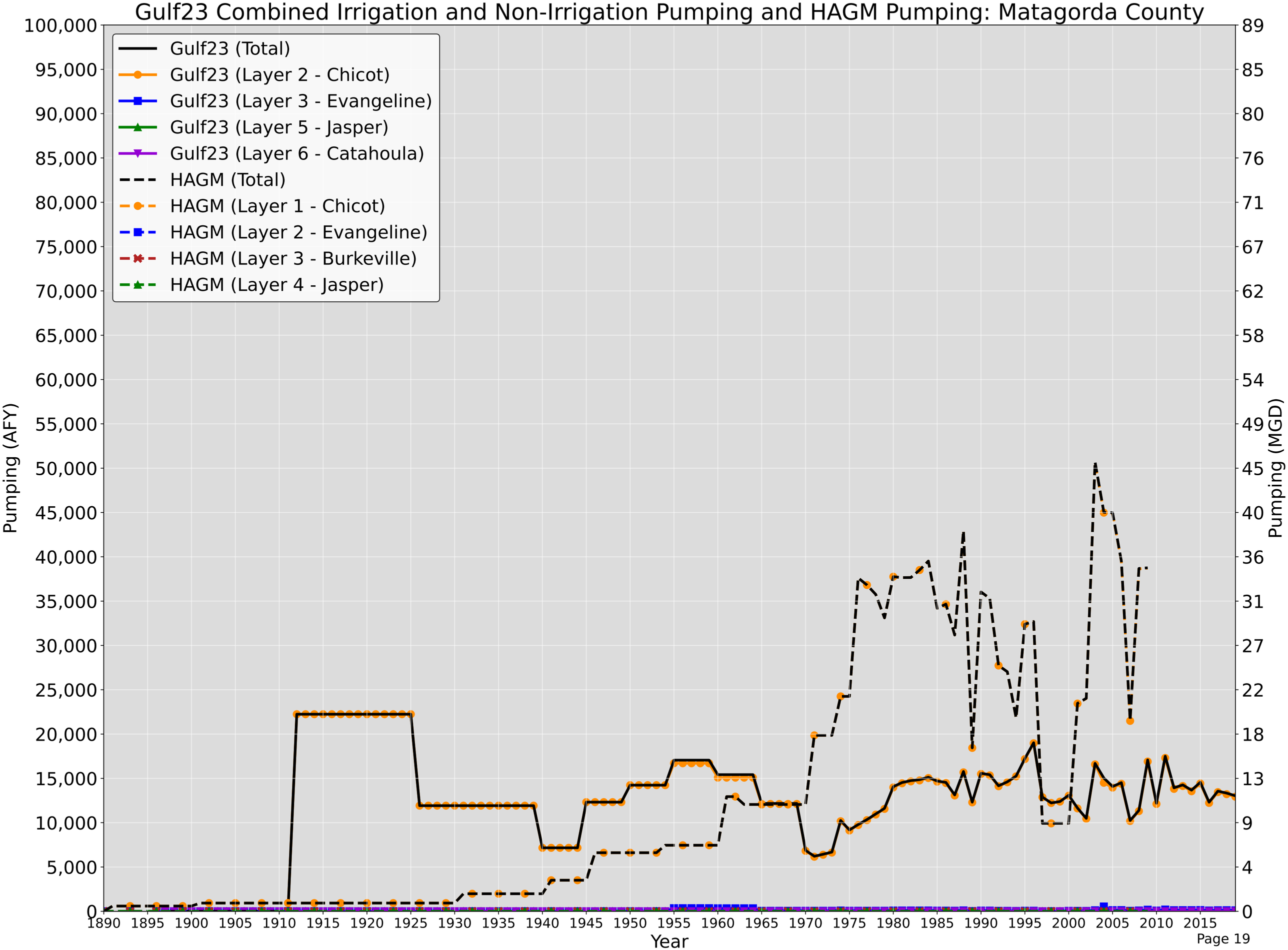
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Lavaca County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Liberty County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Matagorda County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Montgomery County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

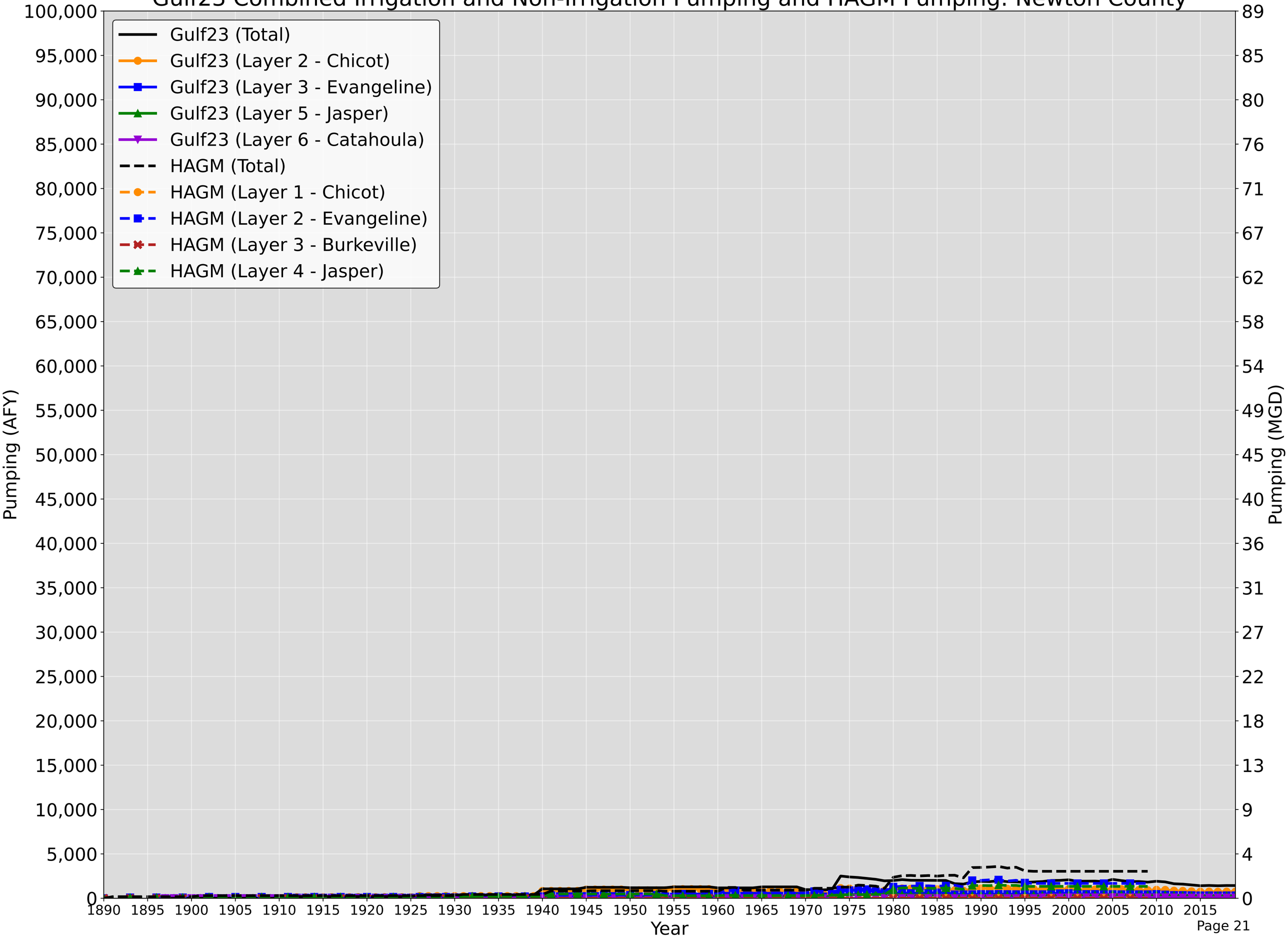
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

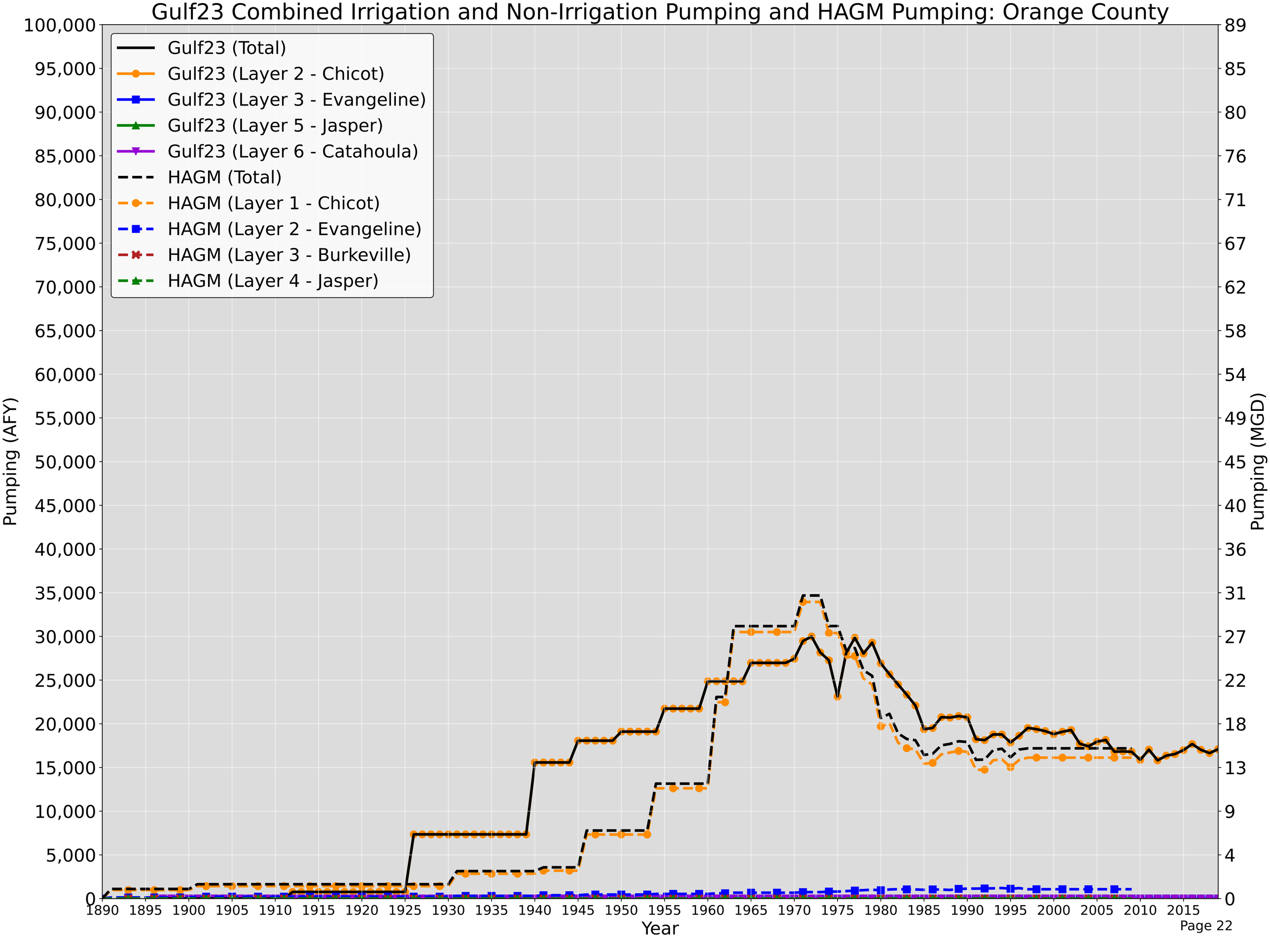
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

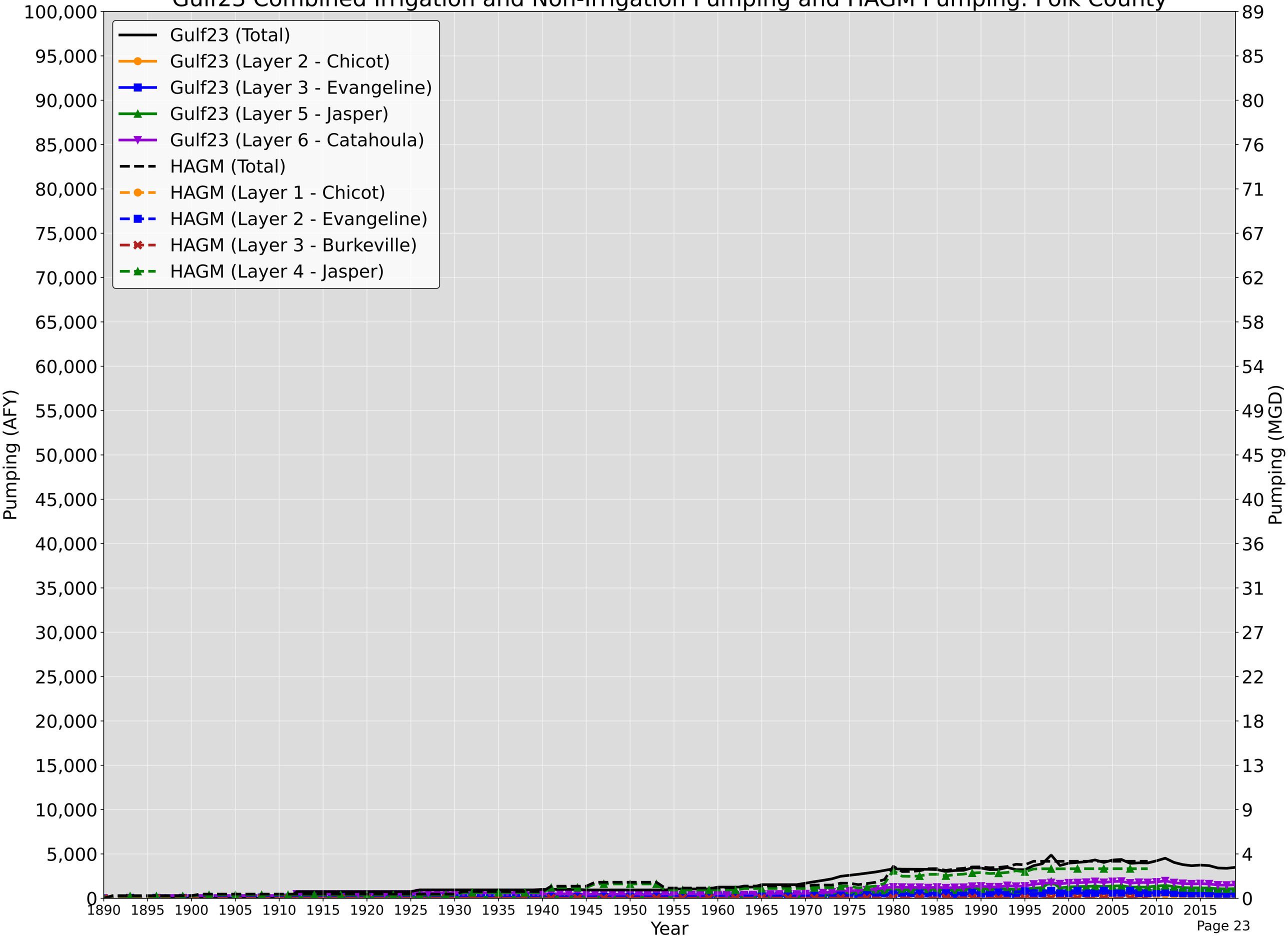
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Newton County



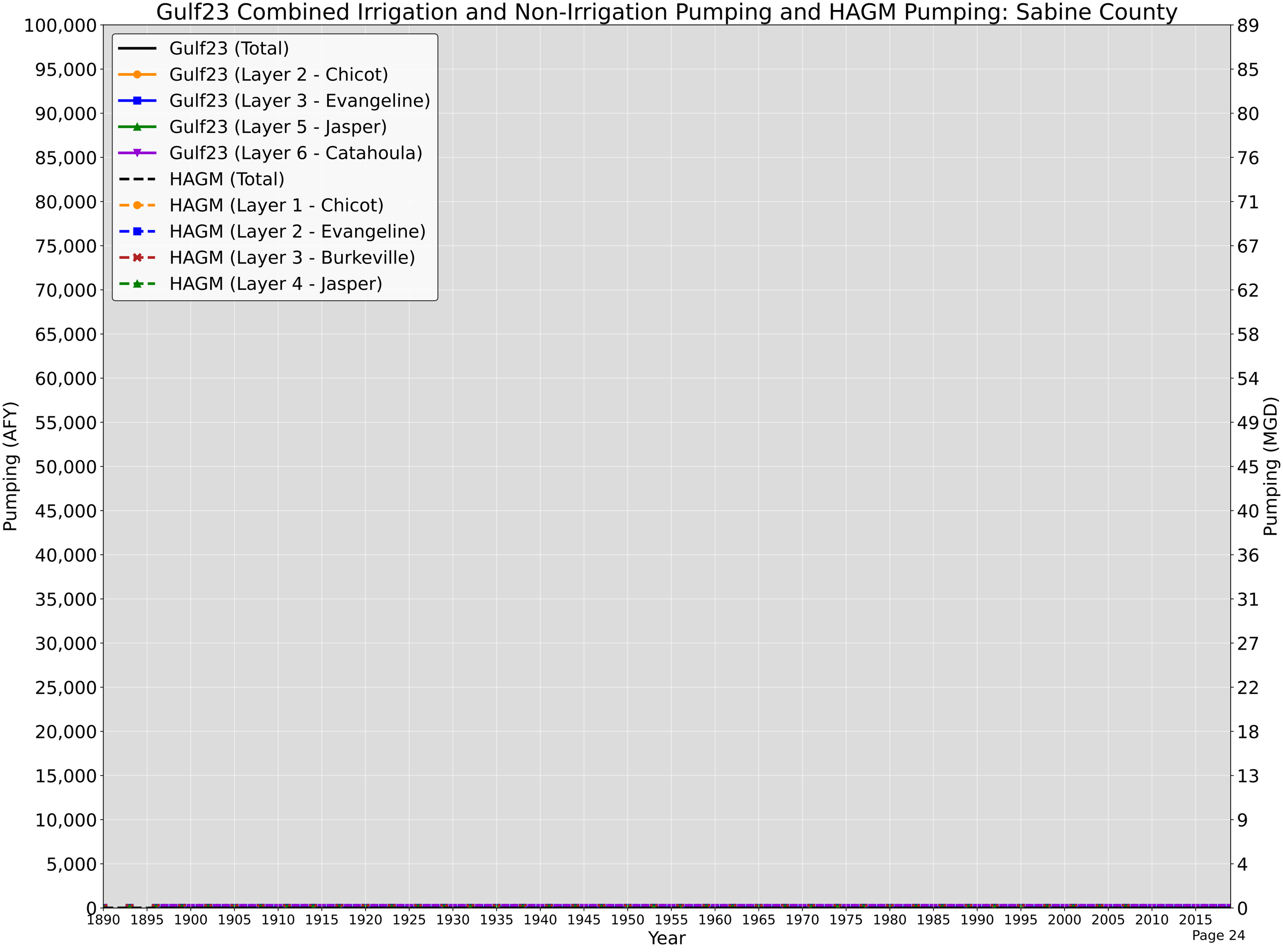
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Orange County



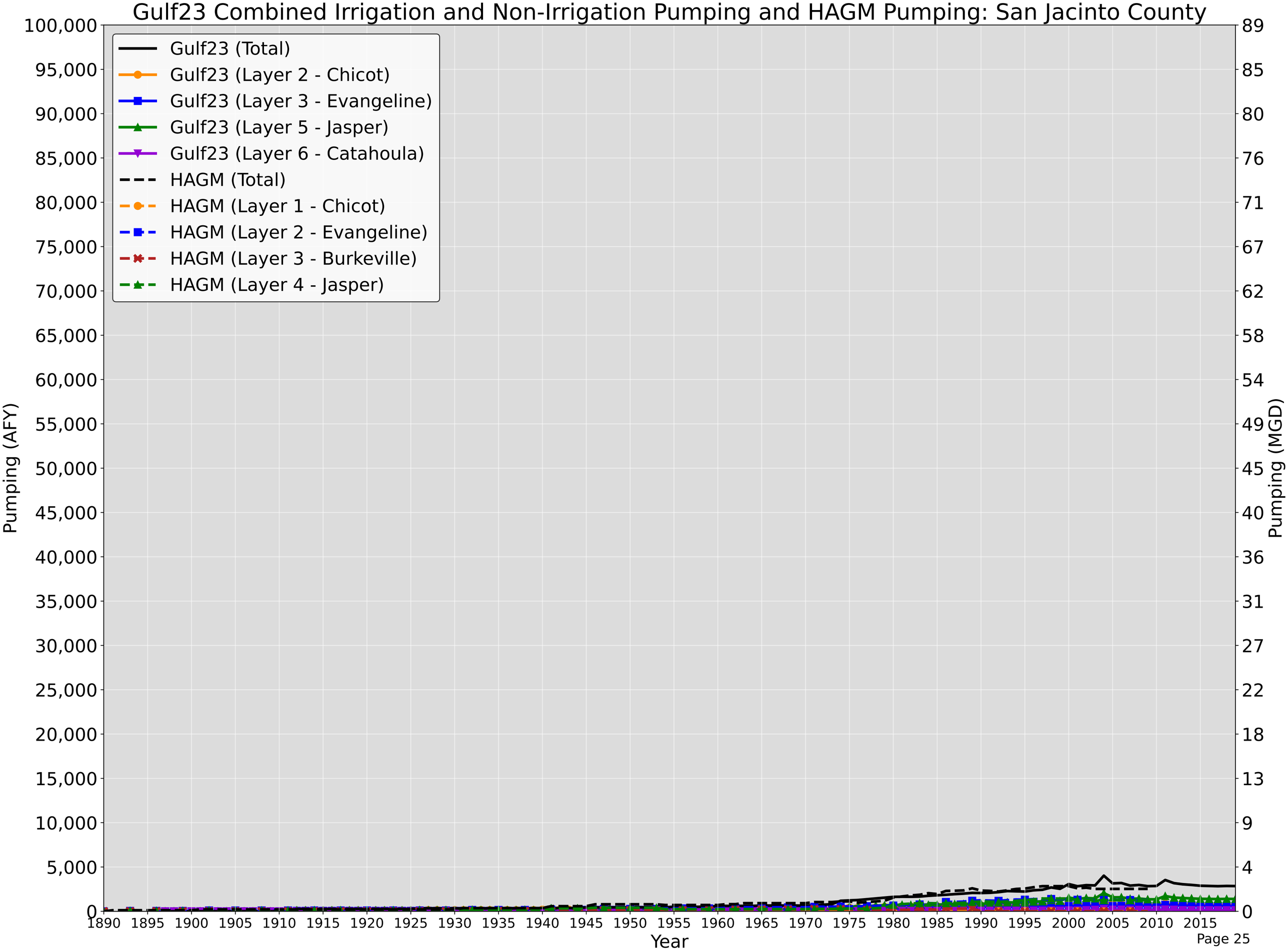
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Polk County



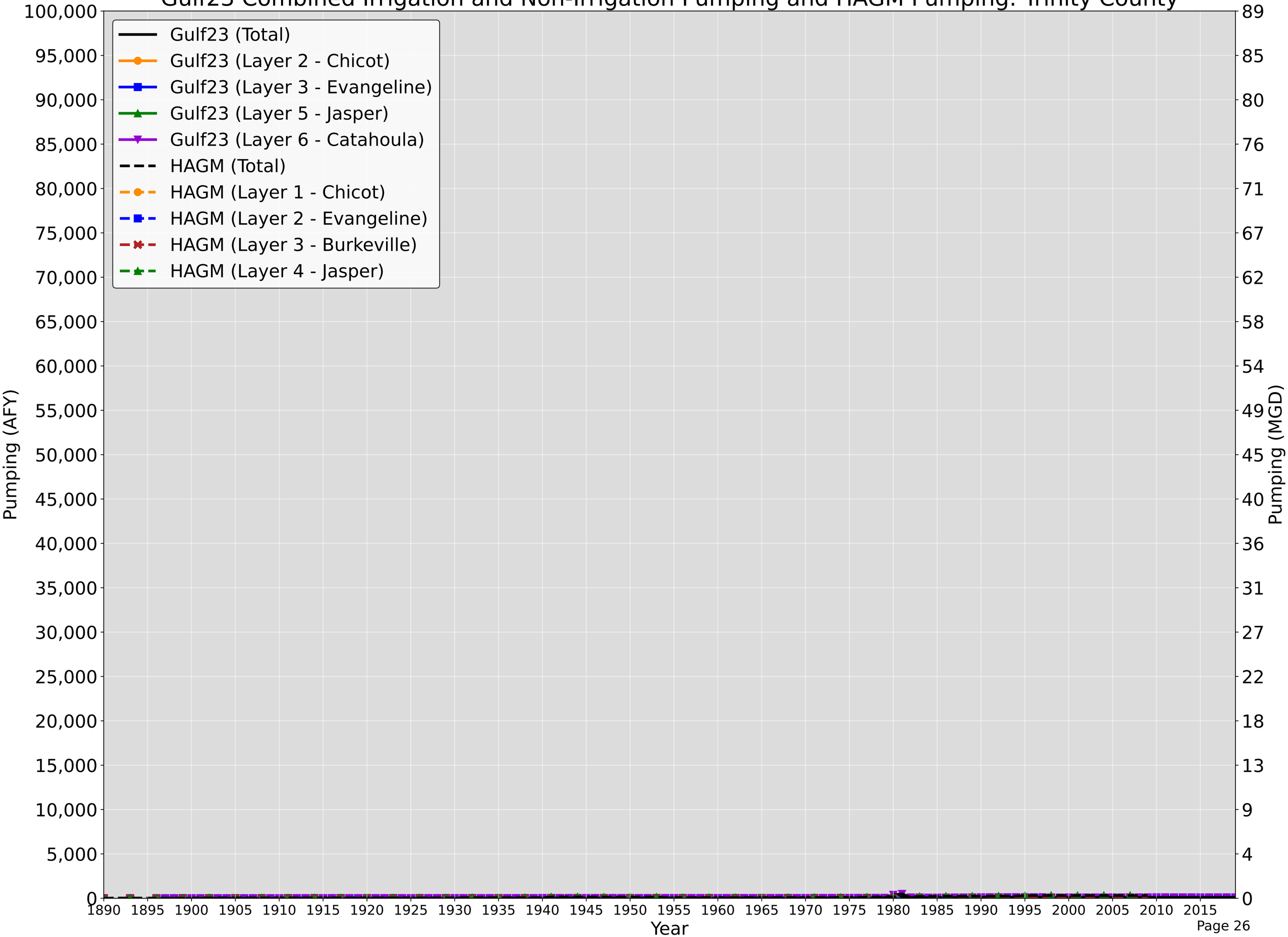
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Sabine County



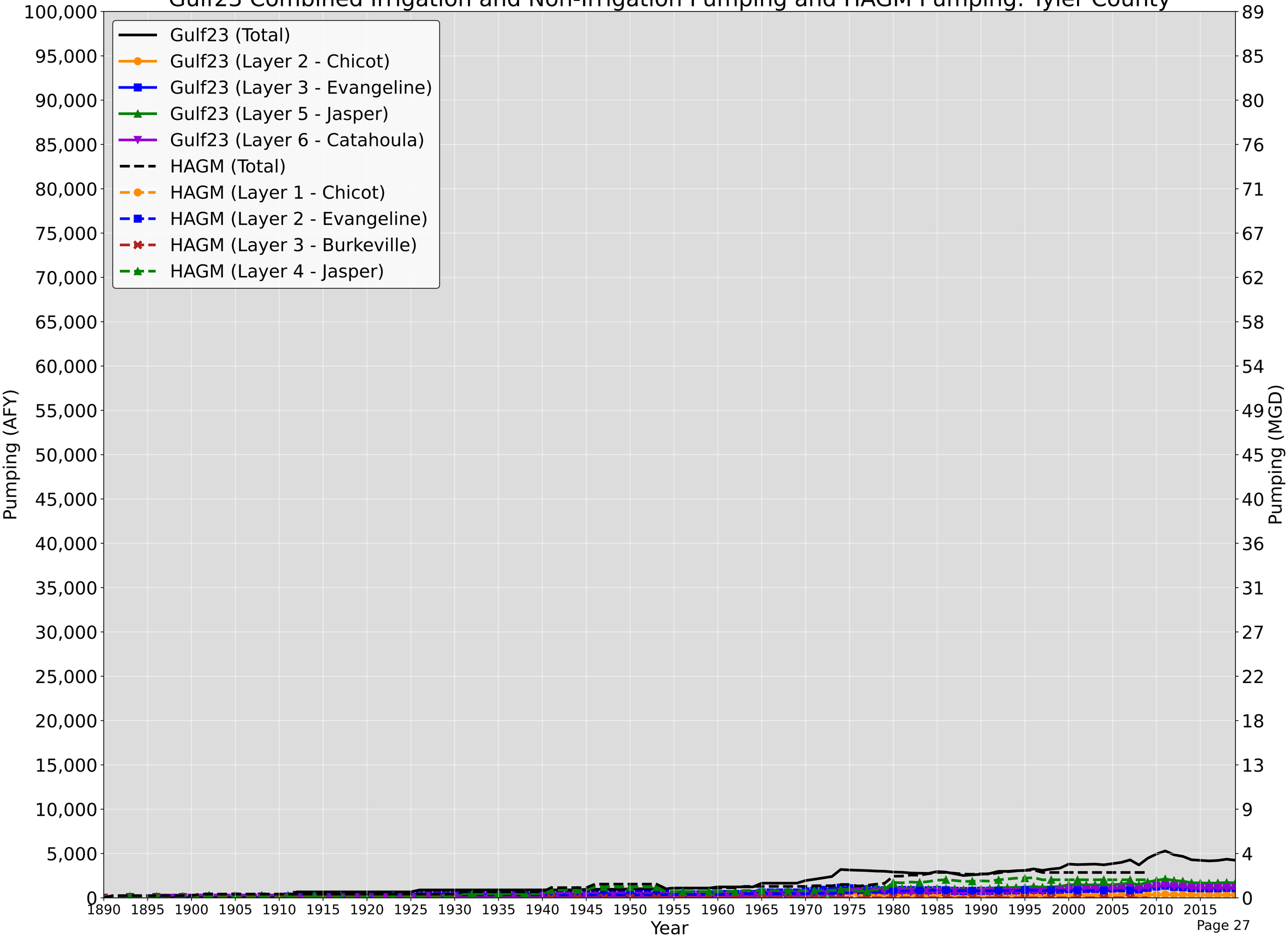
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: San Jacinto County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Trinity County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Tyler County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Walker County

Gulf23 (Total)
Gulf23 (Layer 2 - Chicot)
Gulf23 (Layer 3 - Evangeline)
Gulf23 (Layer 5 - Jasper)
Gulf23 (Layer 6 - Catahoula)
HAGM (Total)
HAGM (Layer 1 - Chicot)
HAGM (Layer 2 - Evangeline)
HAGM (Layer 3 - Burkeville)
HAGM (Layer 4 - Jasper)

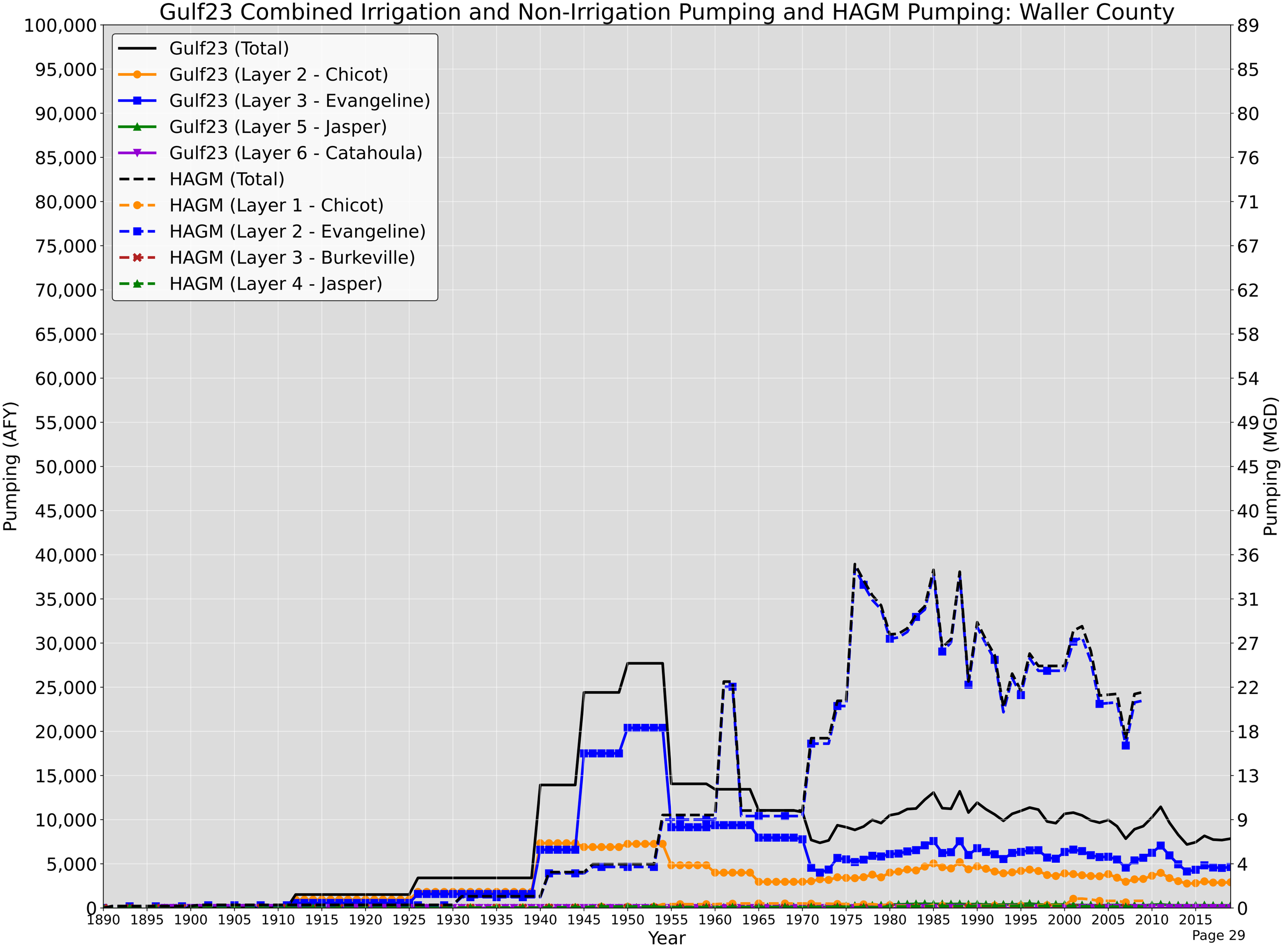
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
85
80
76
71
67
62
58
54
49
45
40
36
31
27
22
18
13
9
4
0

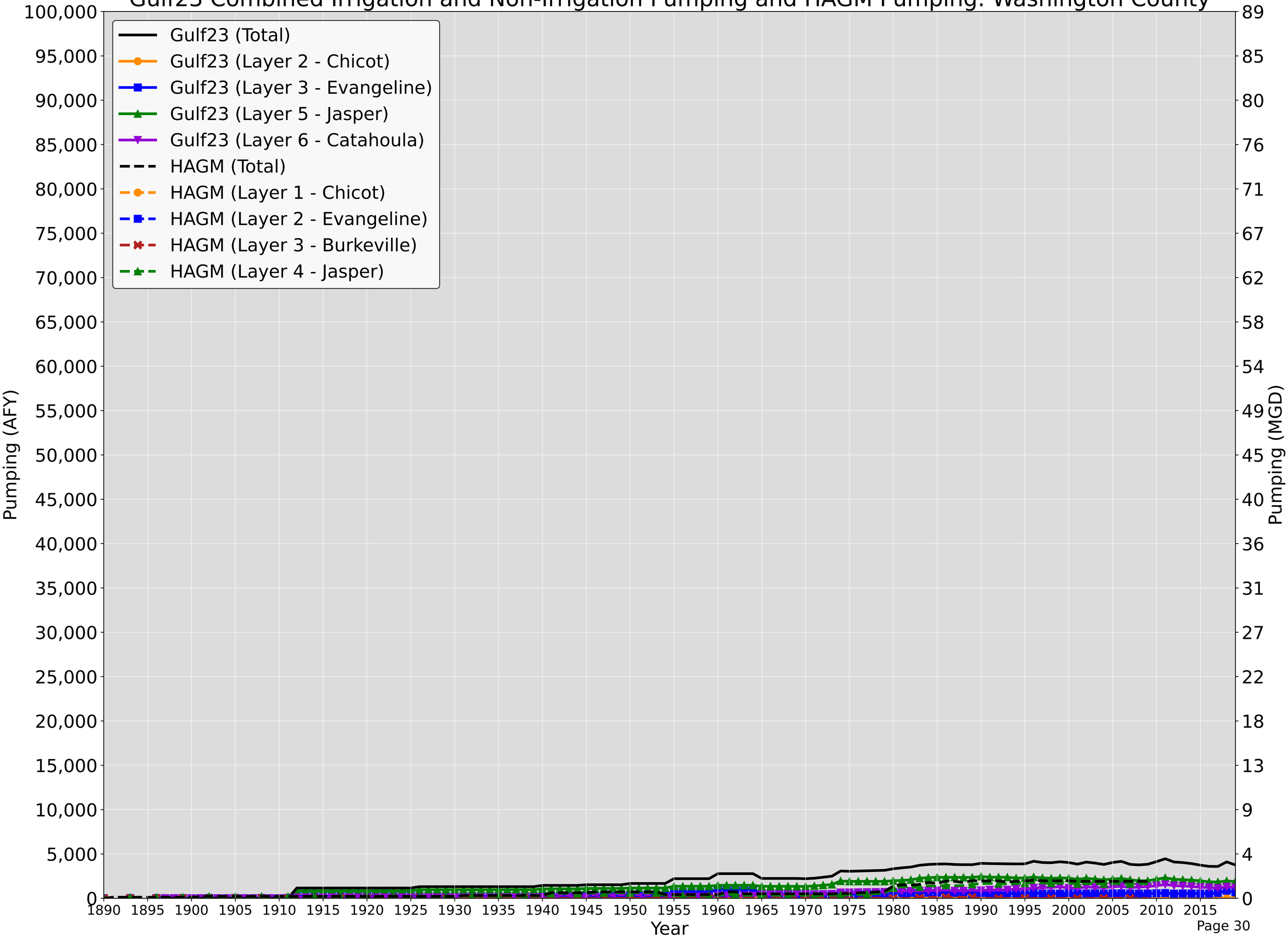
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

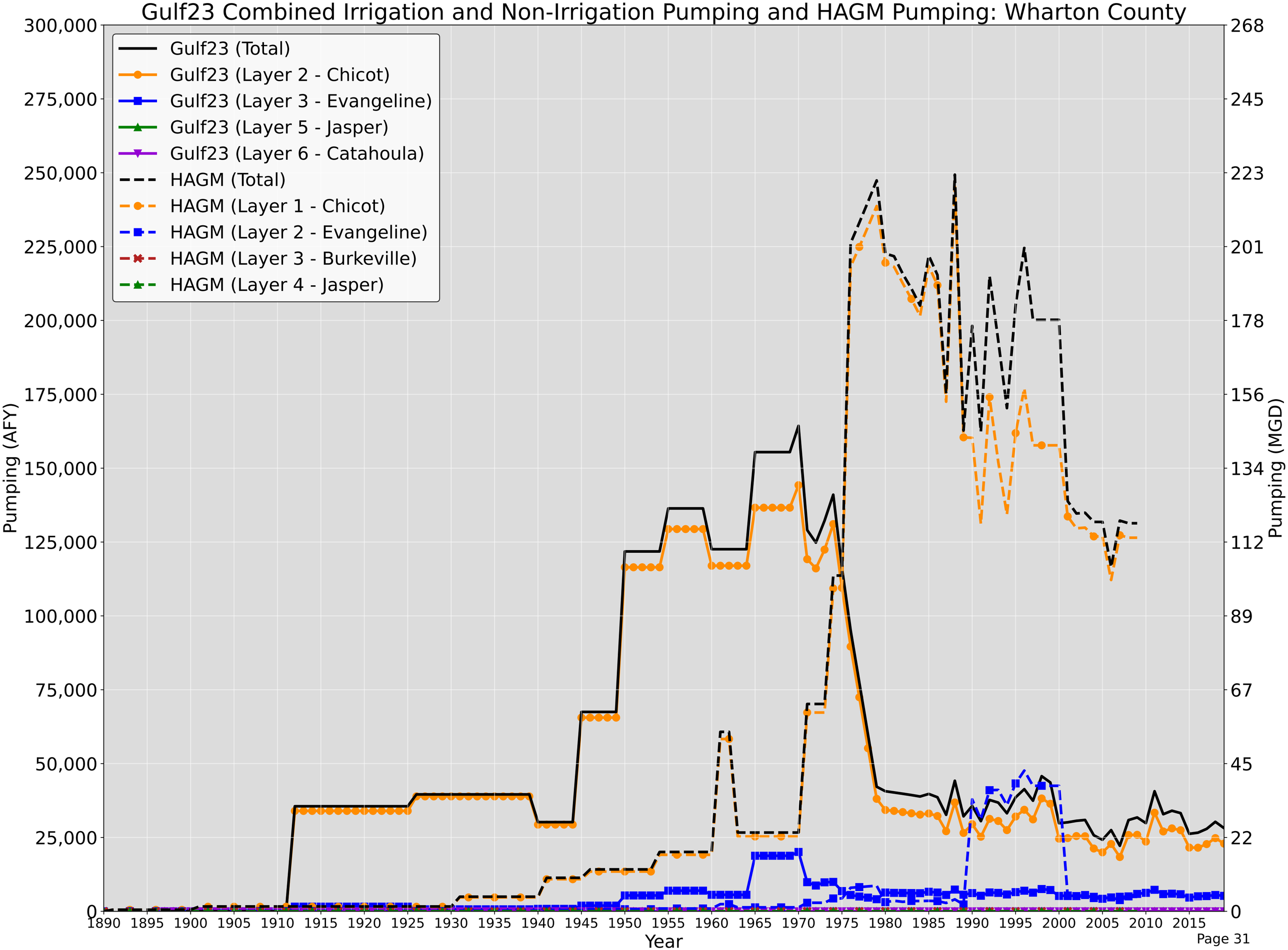
Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Waller County



Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Washington County

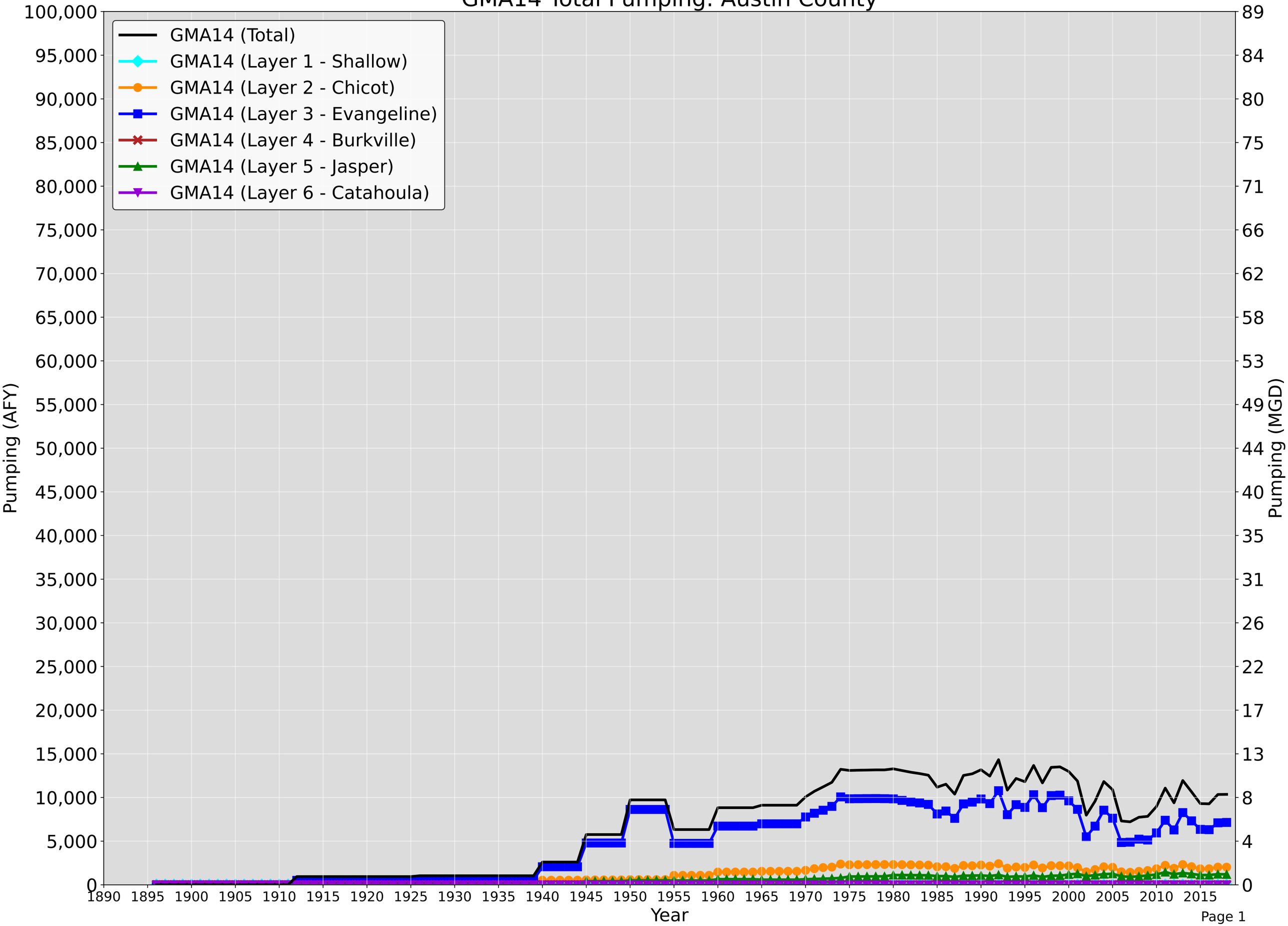


Gulf23 Combined Irrigation and Non-Irrigation Pumping and HAGM Pumping: Wharton County

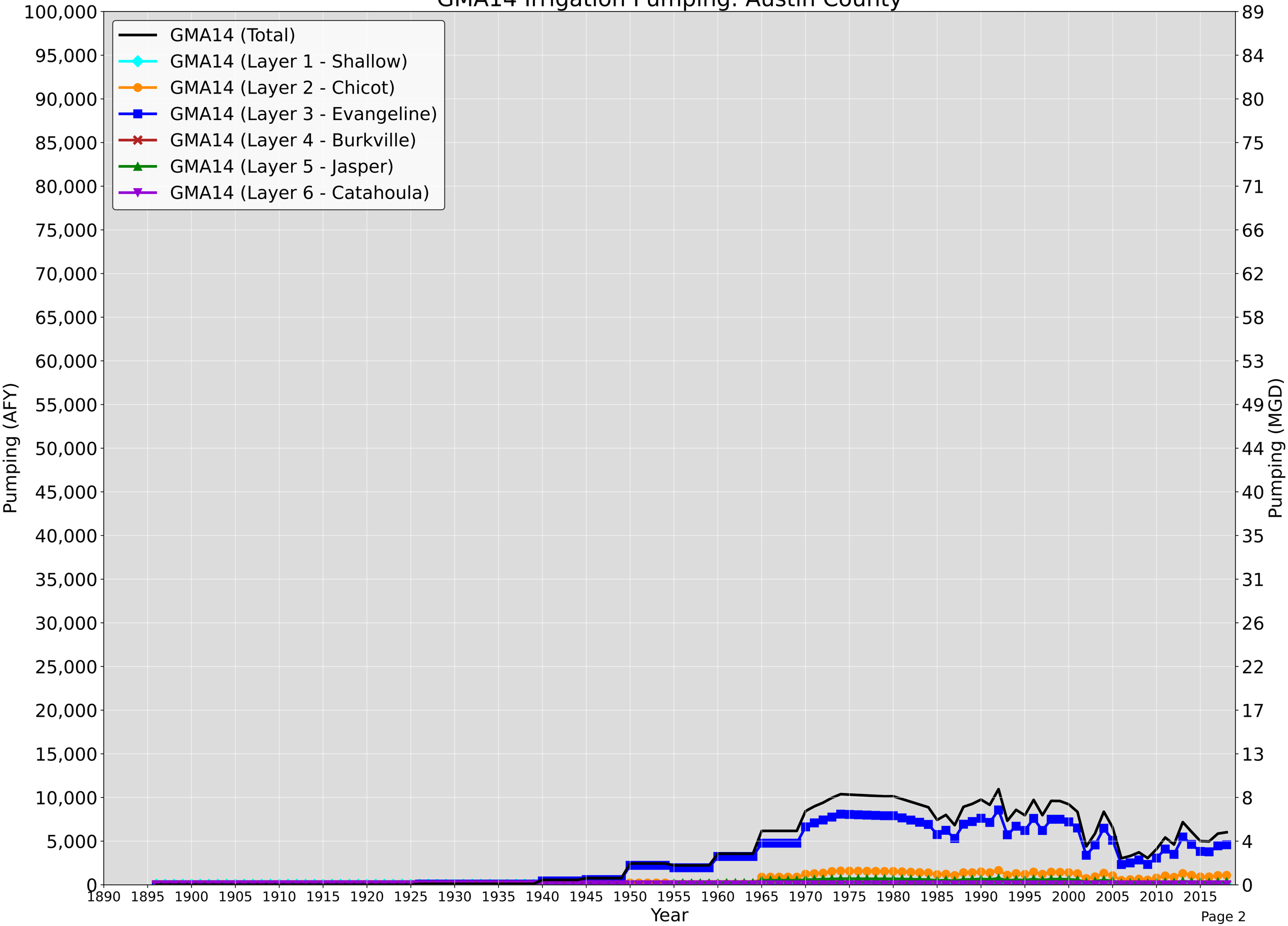


Appendix 4 —
GMA 14 Model Pumping Inputs

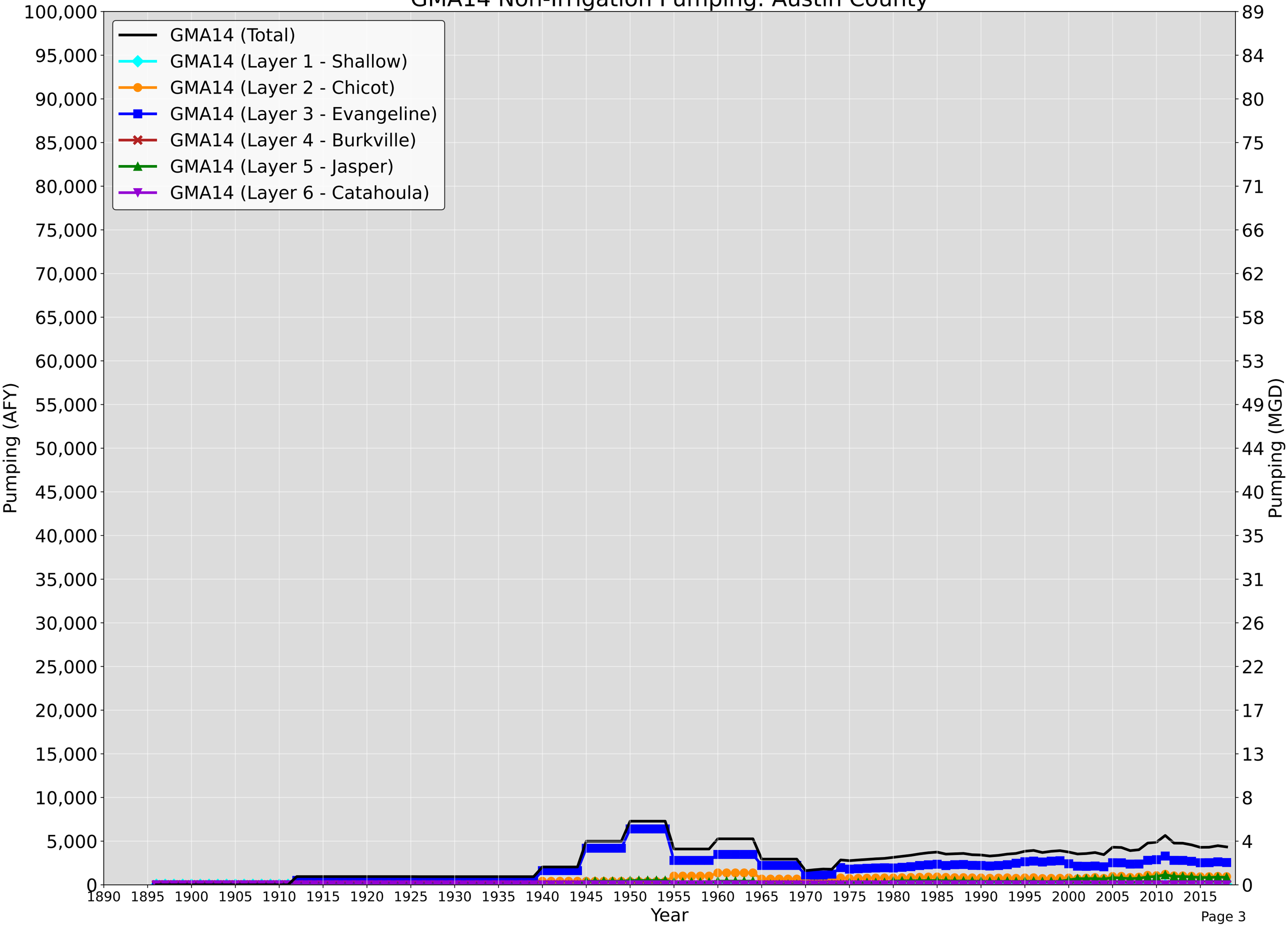
GMA14 Total Pumping: Austin County



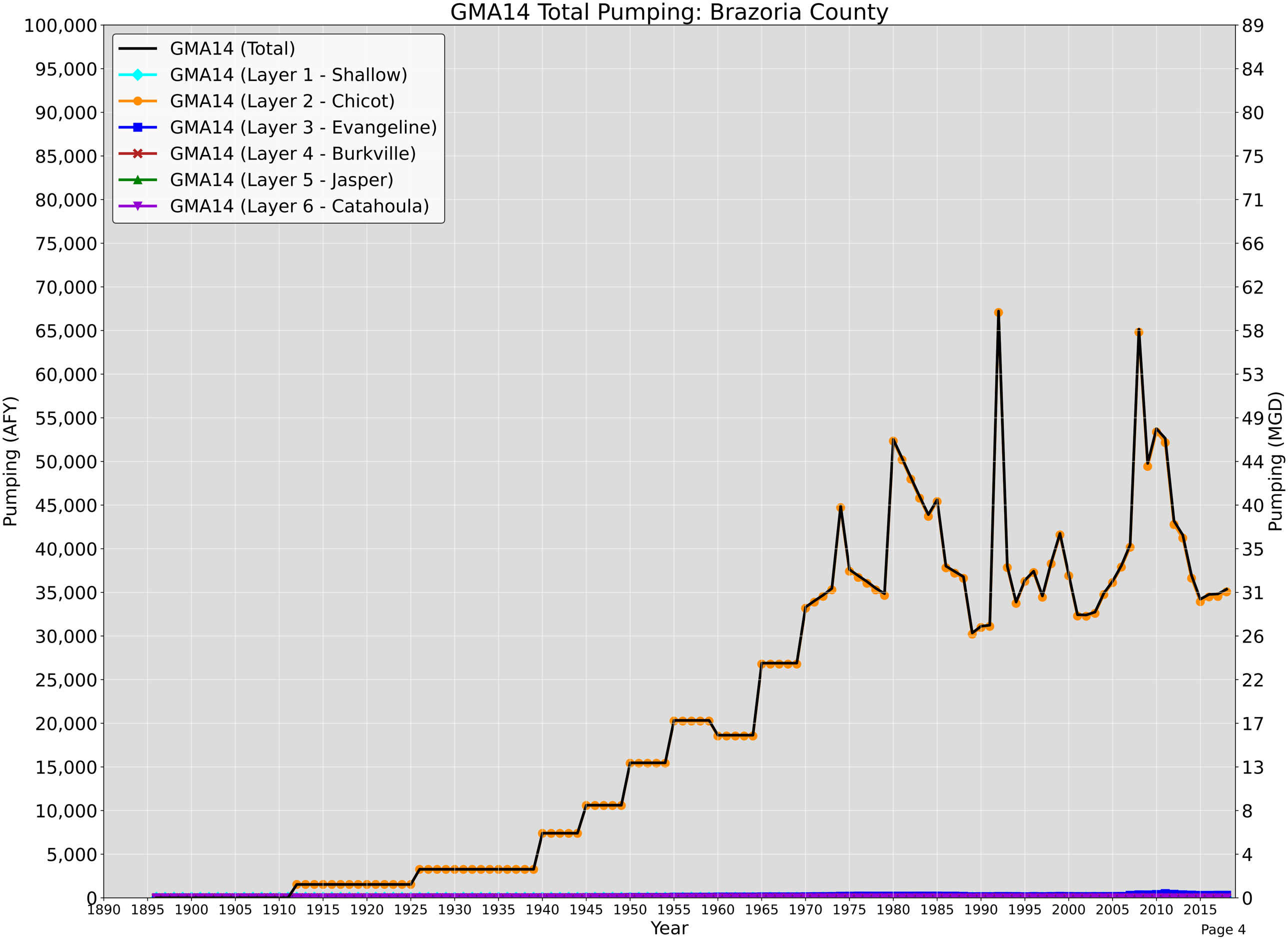
GMA14 Irrigation Pumping: Austin County



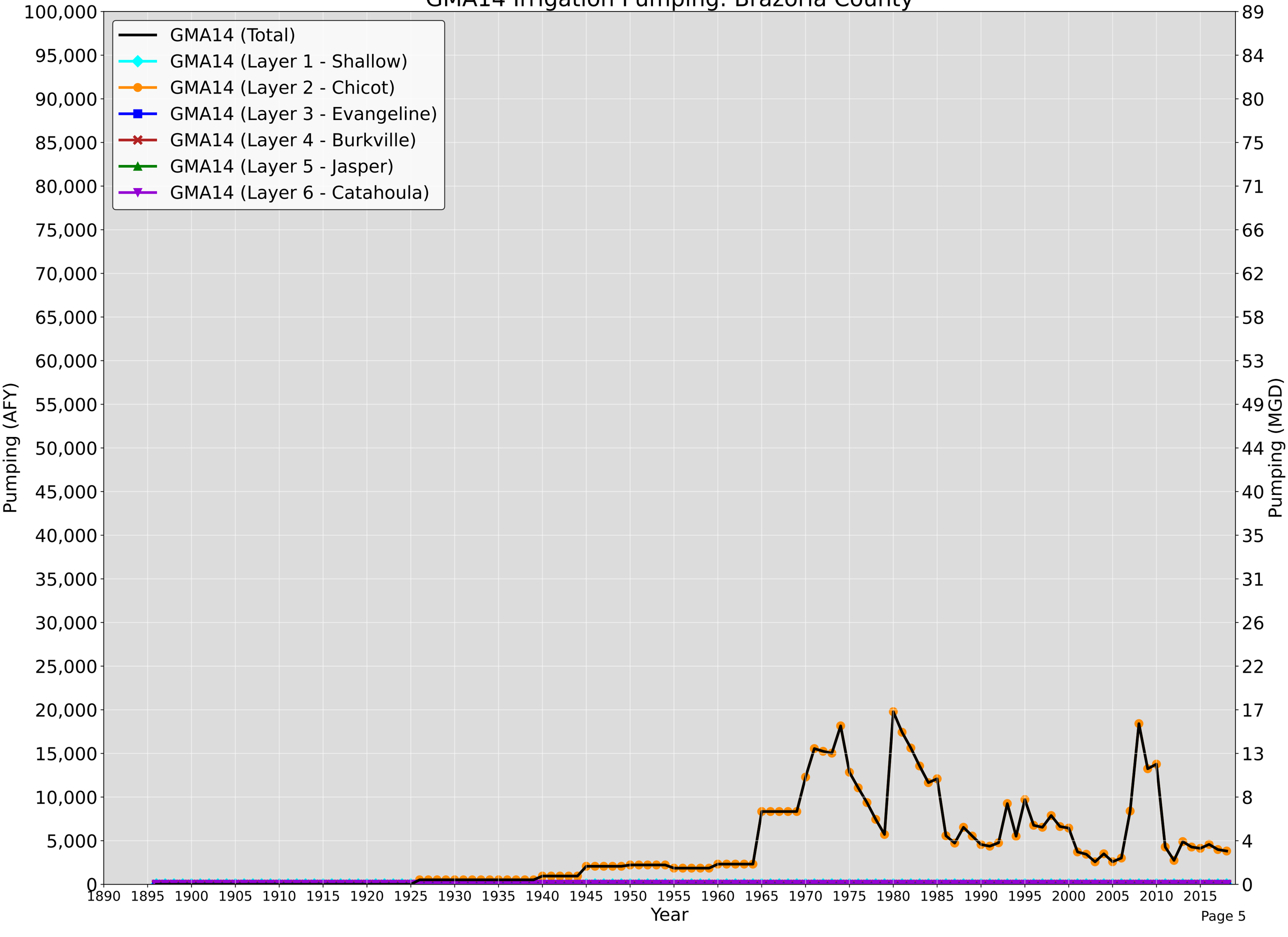
GMA14 Non-Irrigation Pumping: Austin County



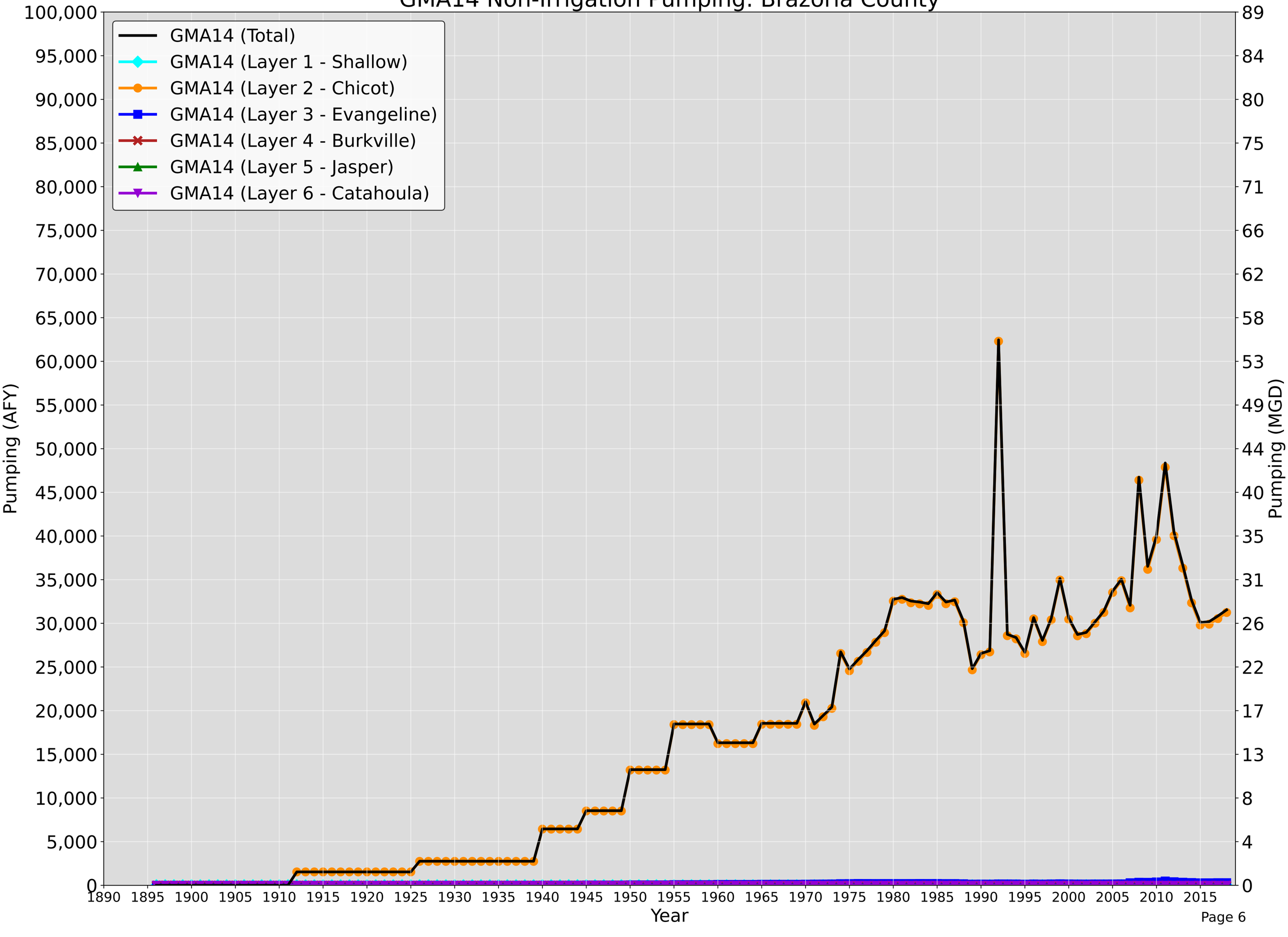
GMA14 Total Pumping: Brazoria County



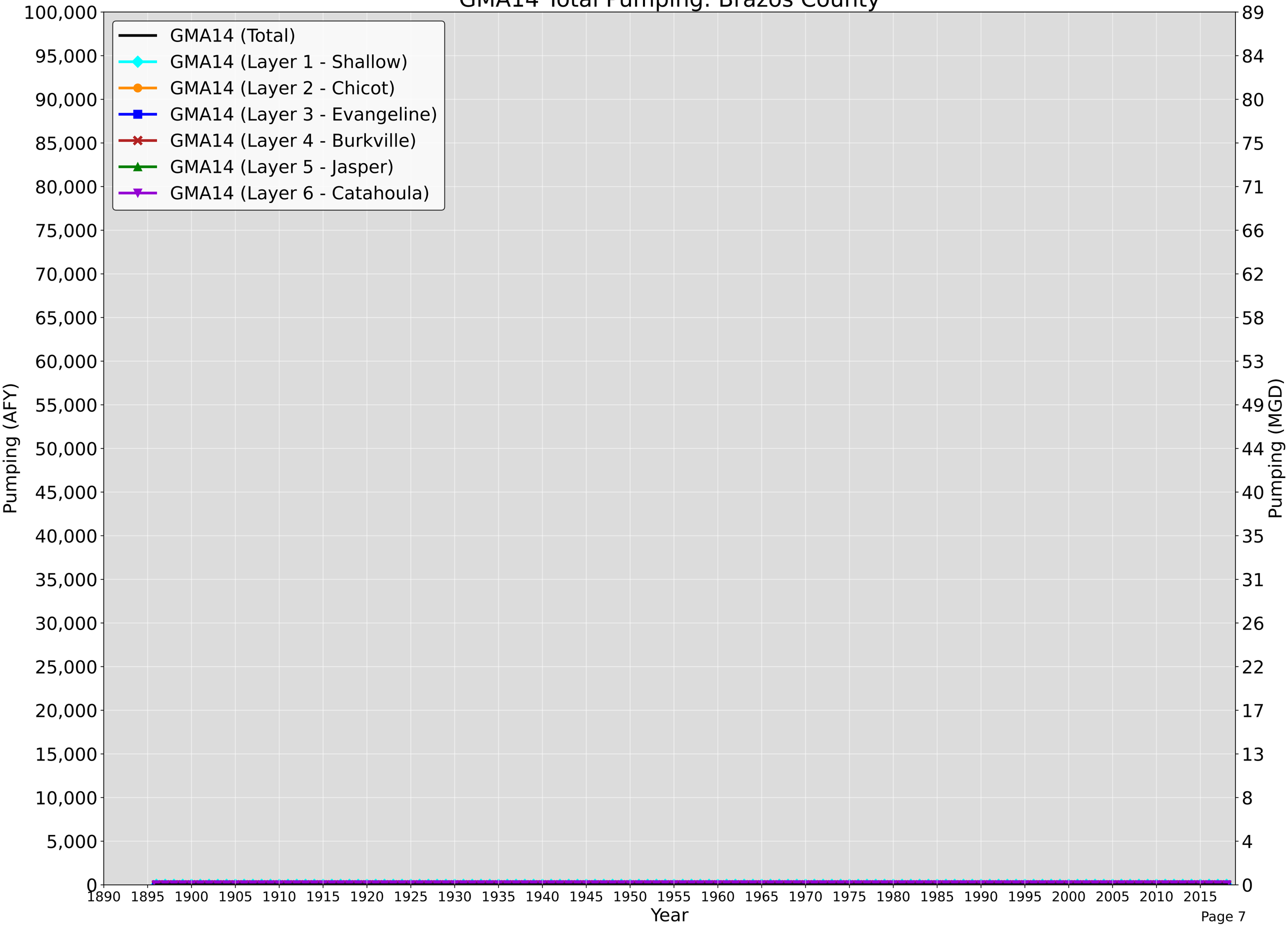
GMA14 Irrigation Pumping: Brazoria County



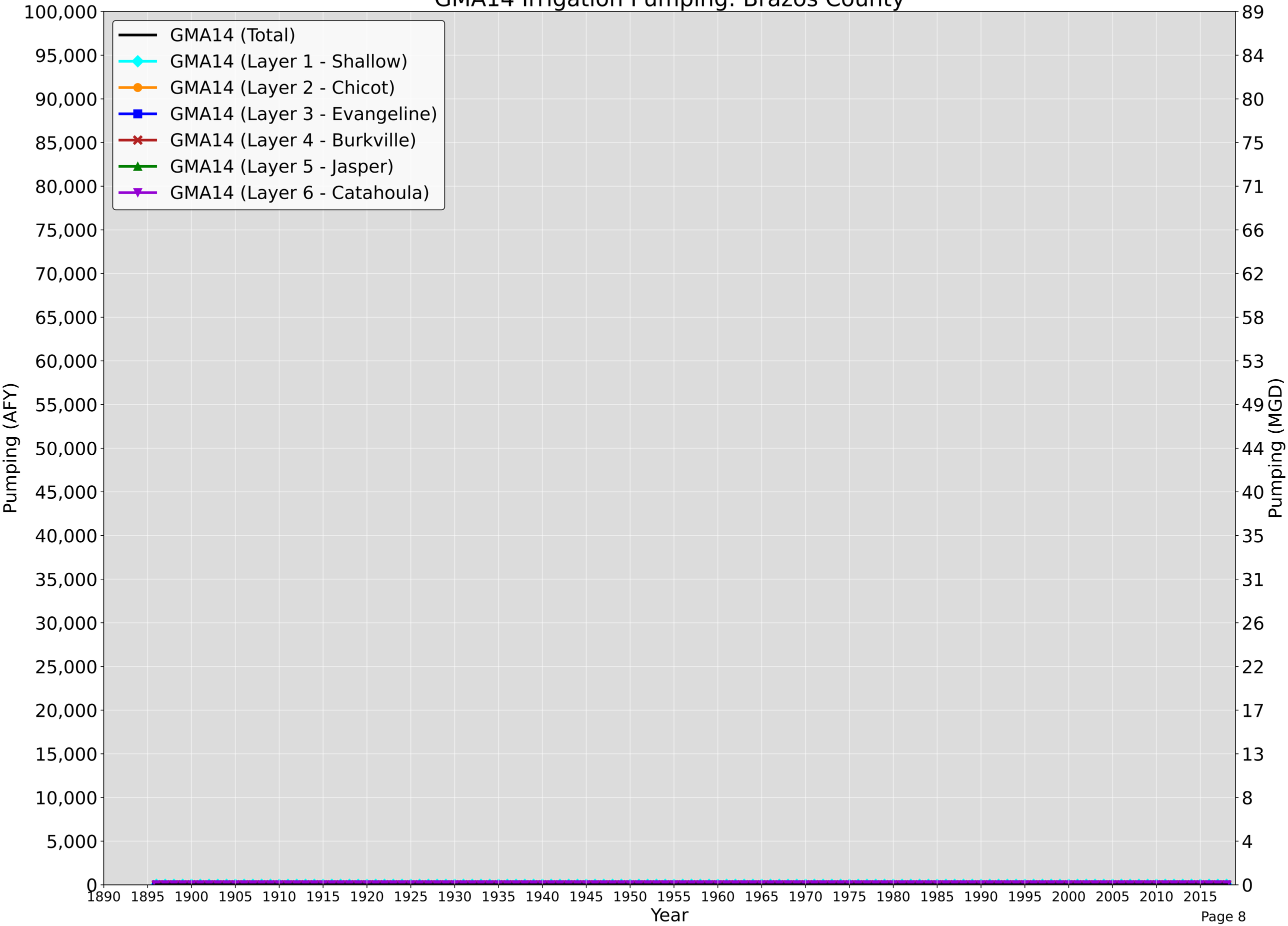
GMA14 Non-Irrigation Pumping: Brazoria County



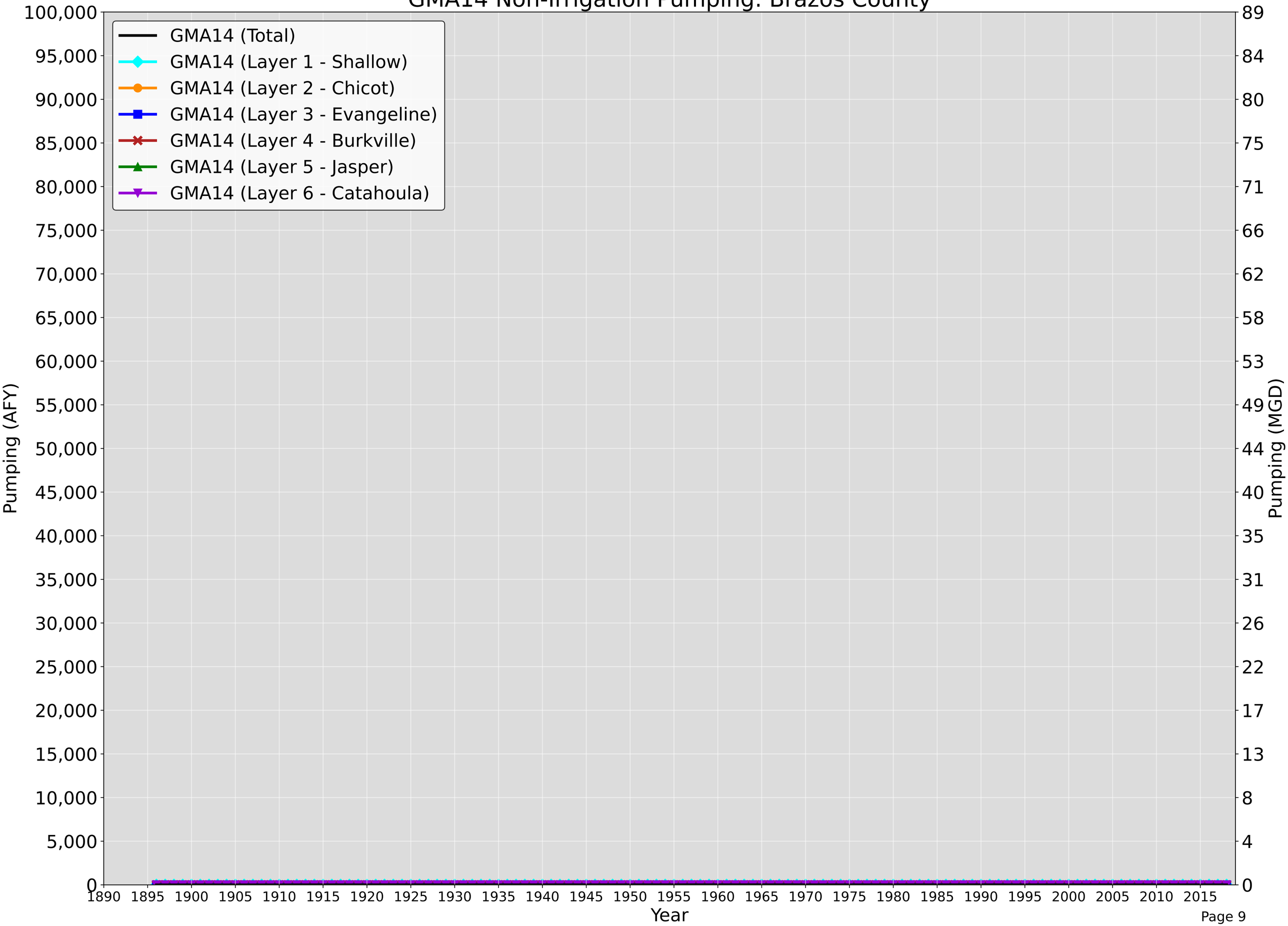
GMA14 Total Pumping: Brazos County



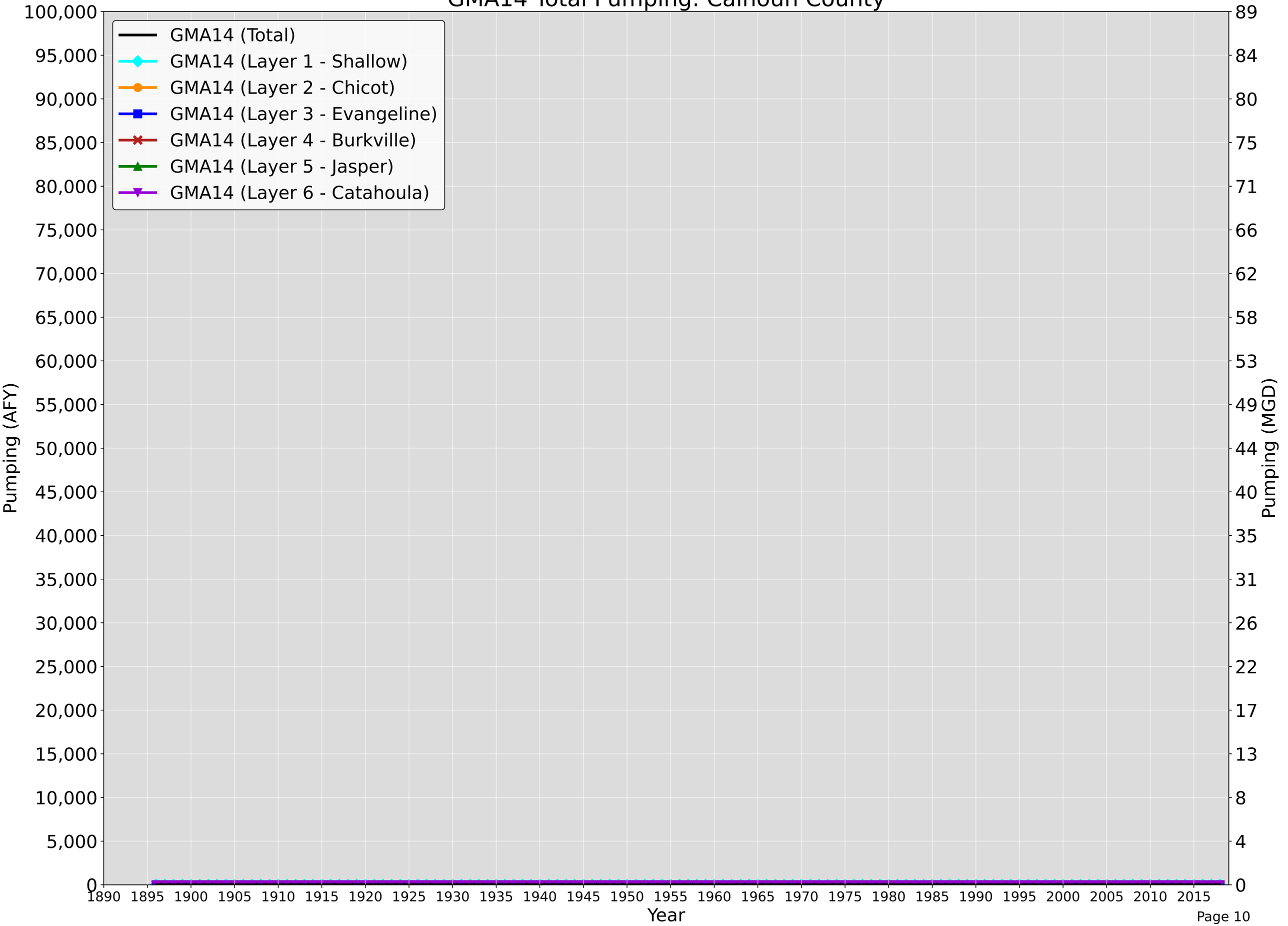
GMA14 Irrigation Pumping: Brazos County



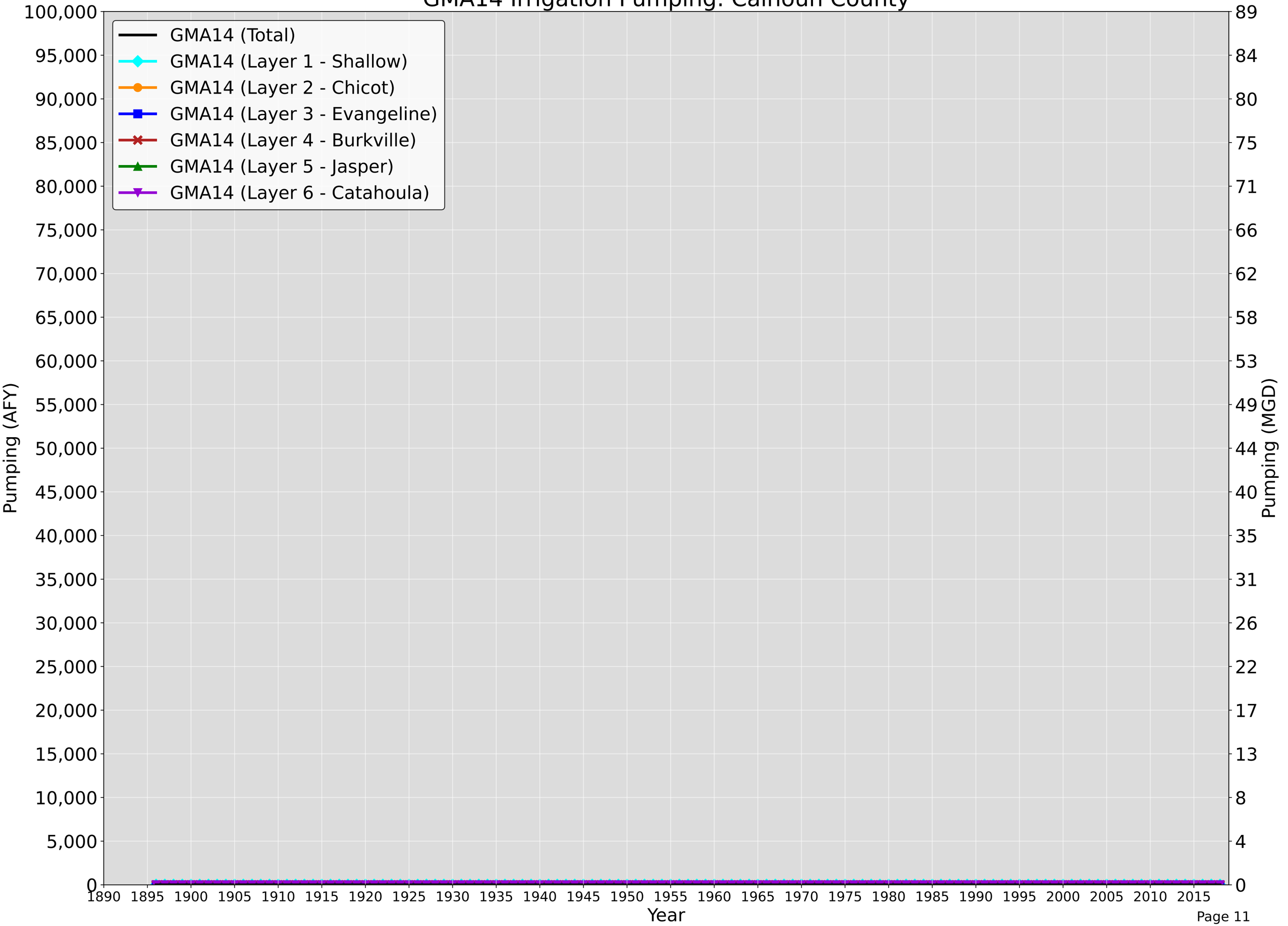
GMA14 Non-Irrigation Pumping: Brazos County



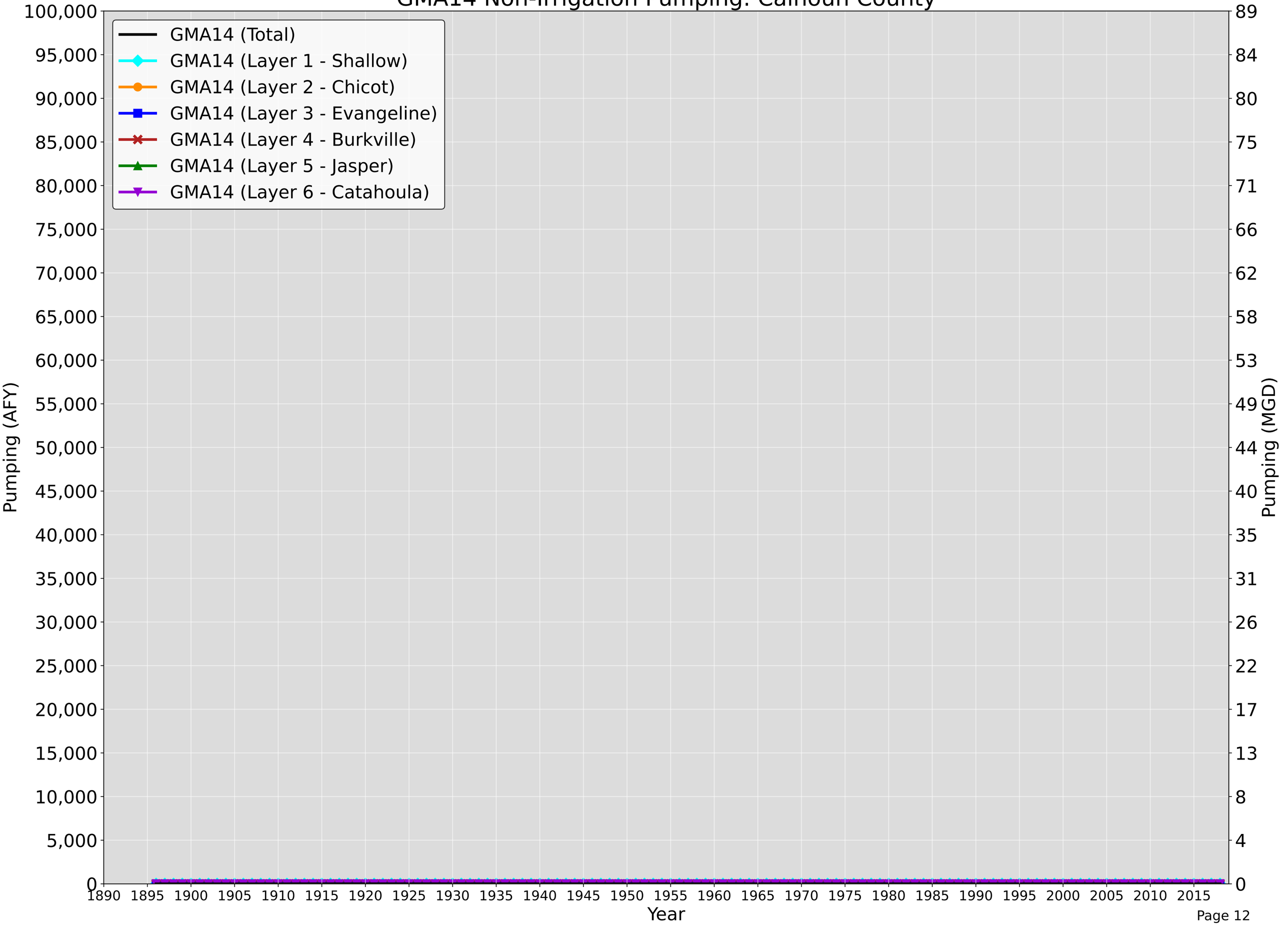
GMA14 Total Pumping: Calhoun County



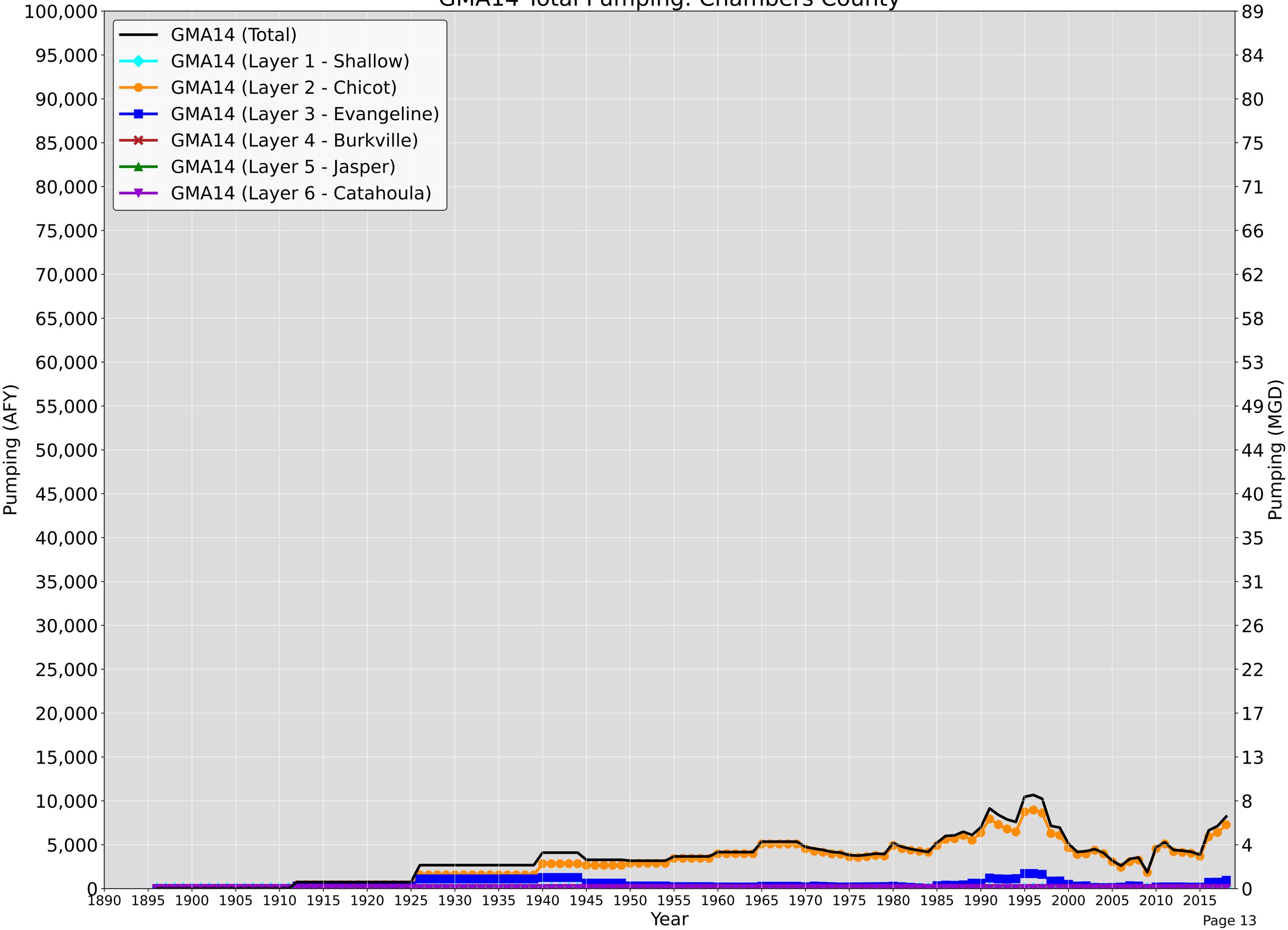
GMA14 Irrigation Pumping: Calhoun County



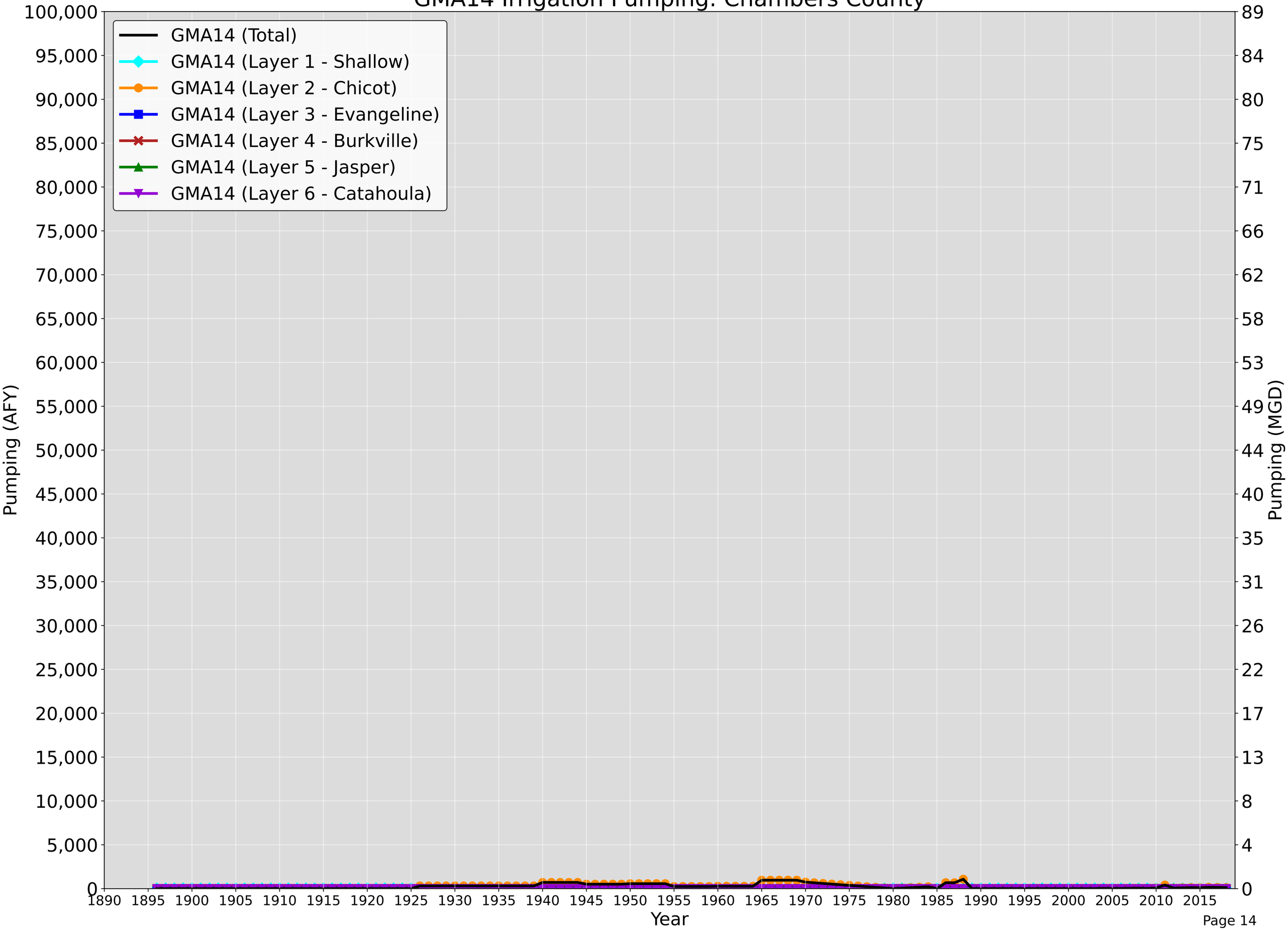
GMA14 Non-Irrigation Pumping: Calhoun County



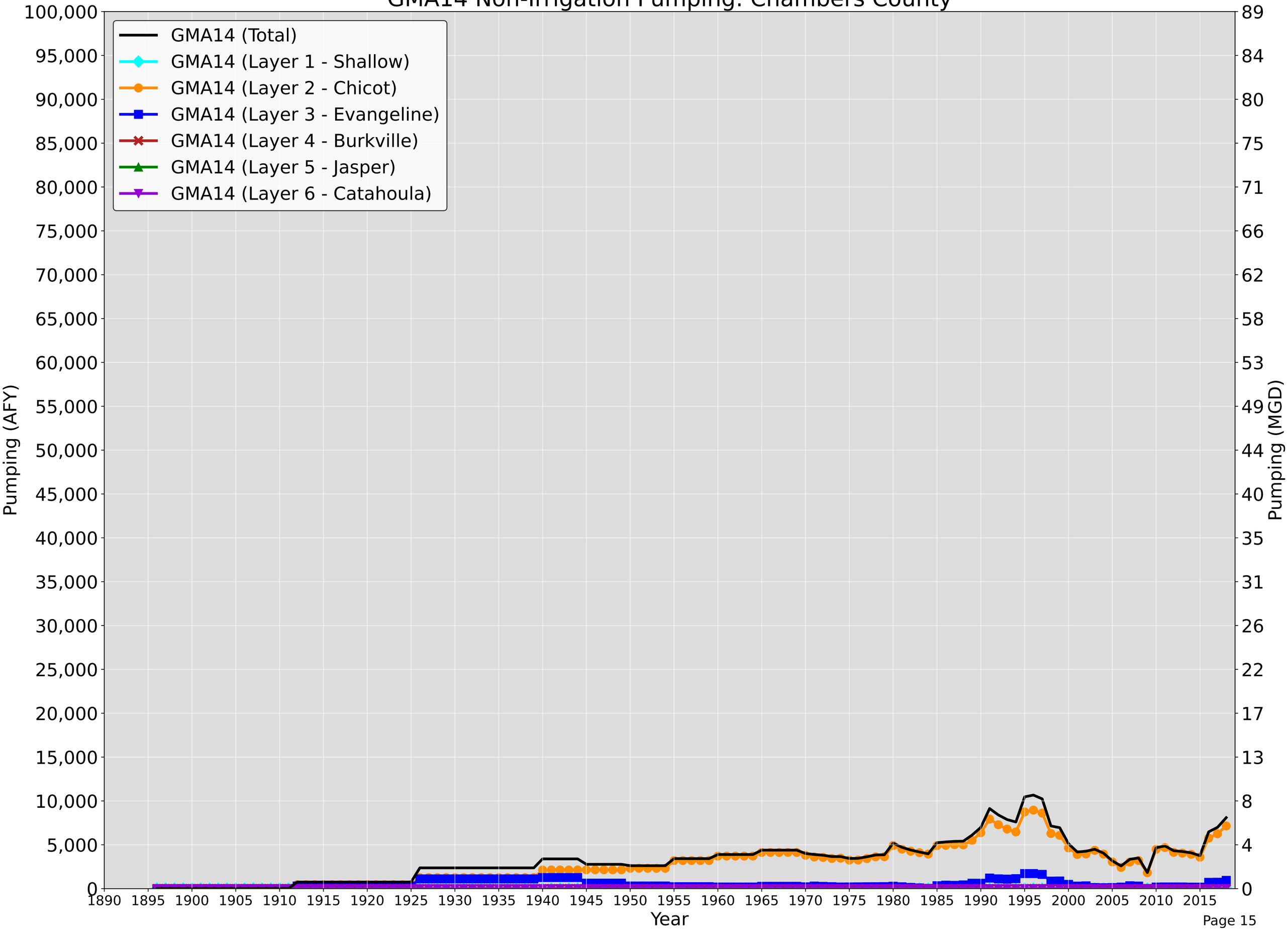
GMA14 Total Pumping: Chambers County



GMA14 Irrigation Pumping: Chambers County



GMA14 Non-Irrigation Pumping: Chambers County



GMA14 Total Pumping: Colorado County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

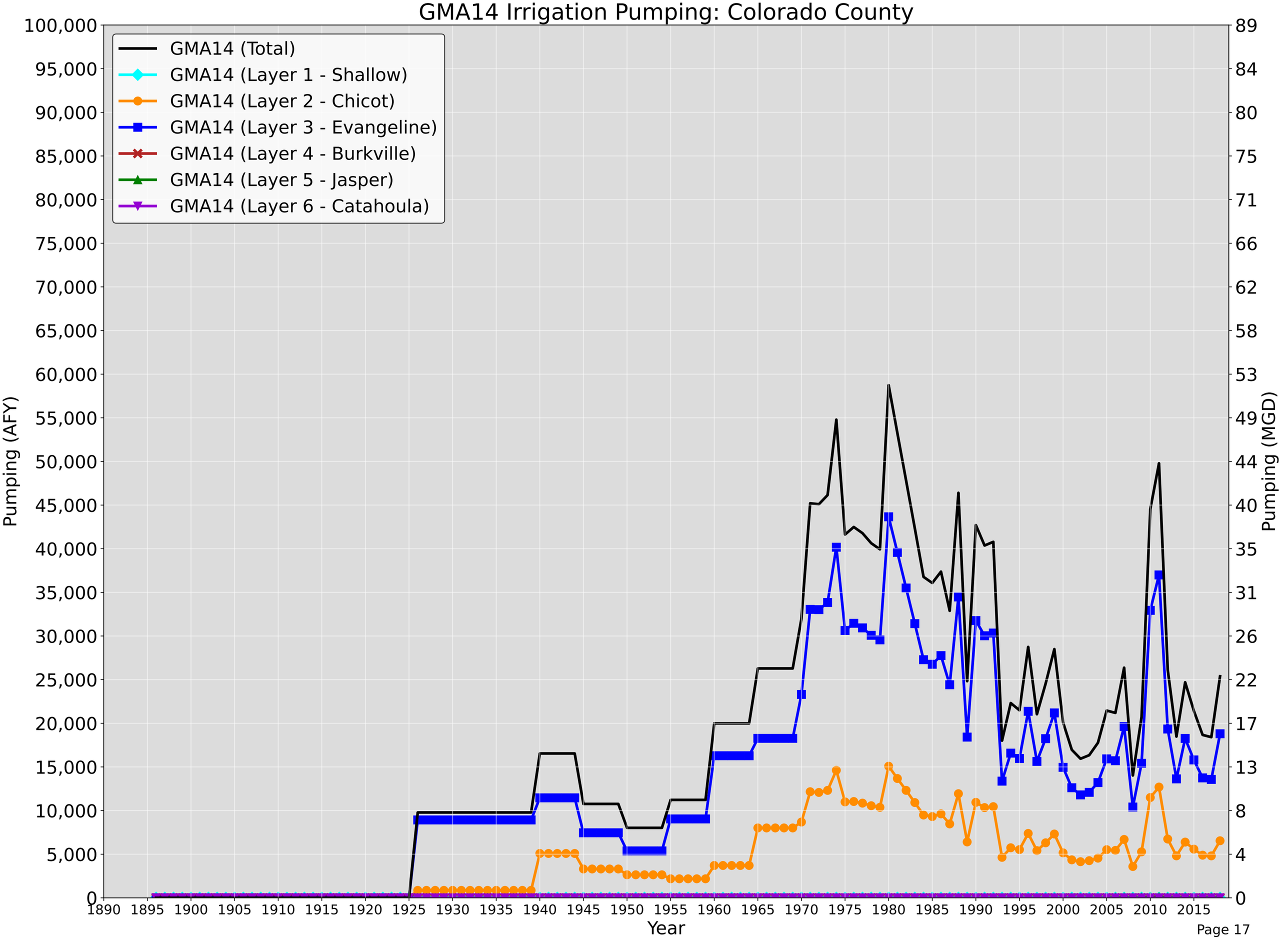
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

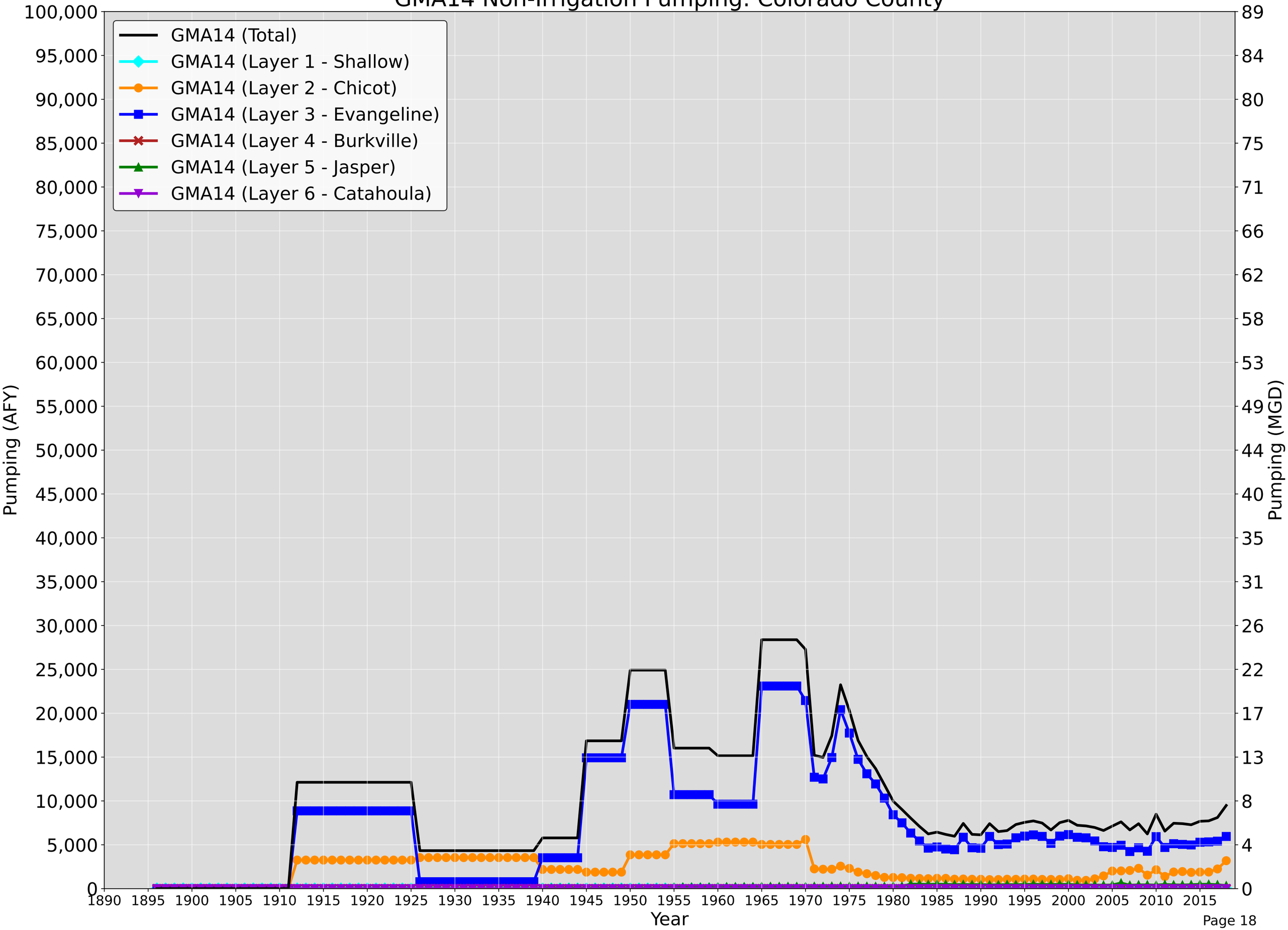
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

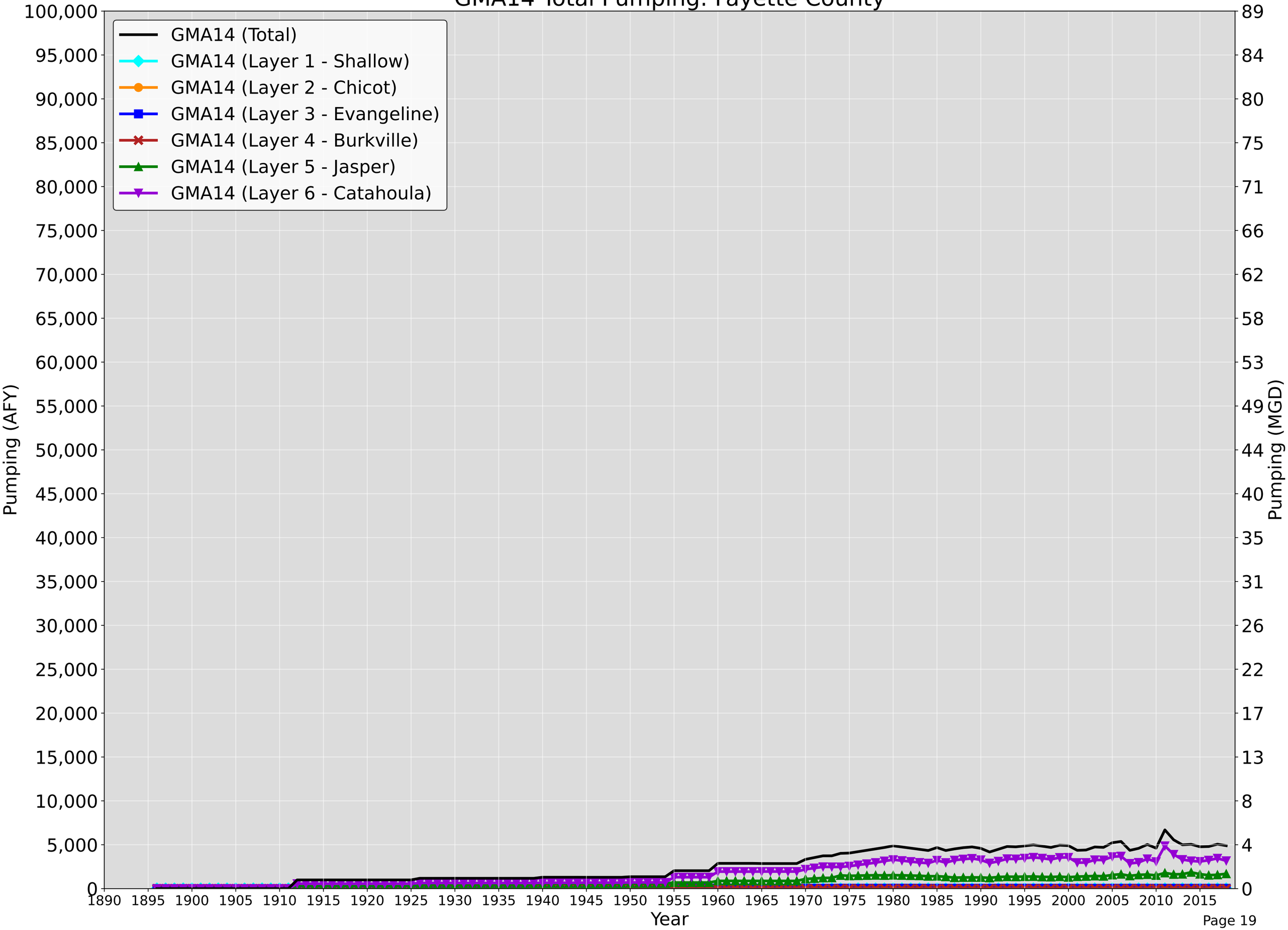
GMA14 Irrigation Pumping: Colorado County



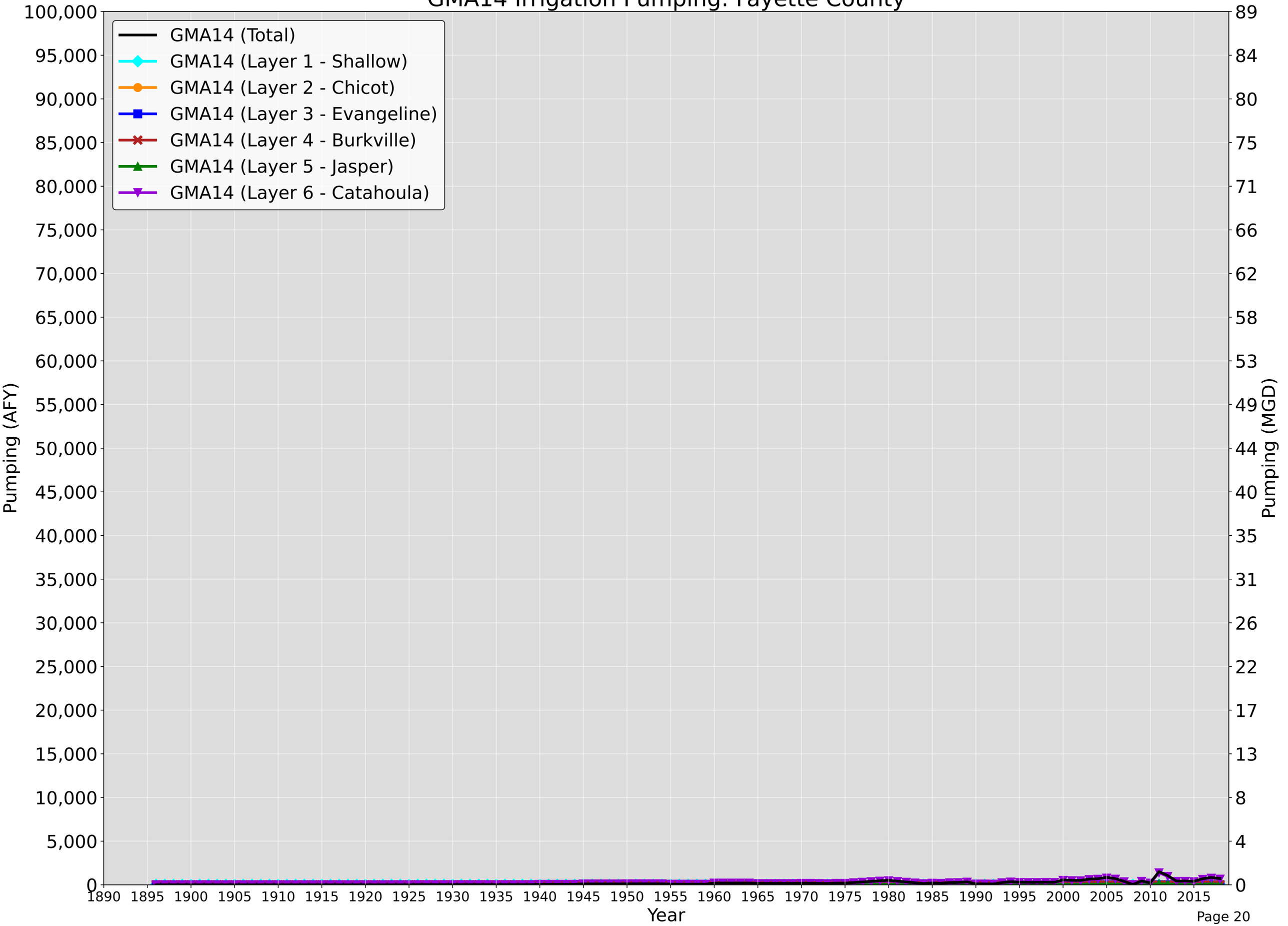
GMA14 Non-Irrigation Pumping: Colorado County



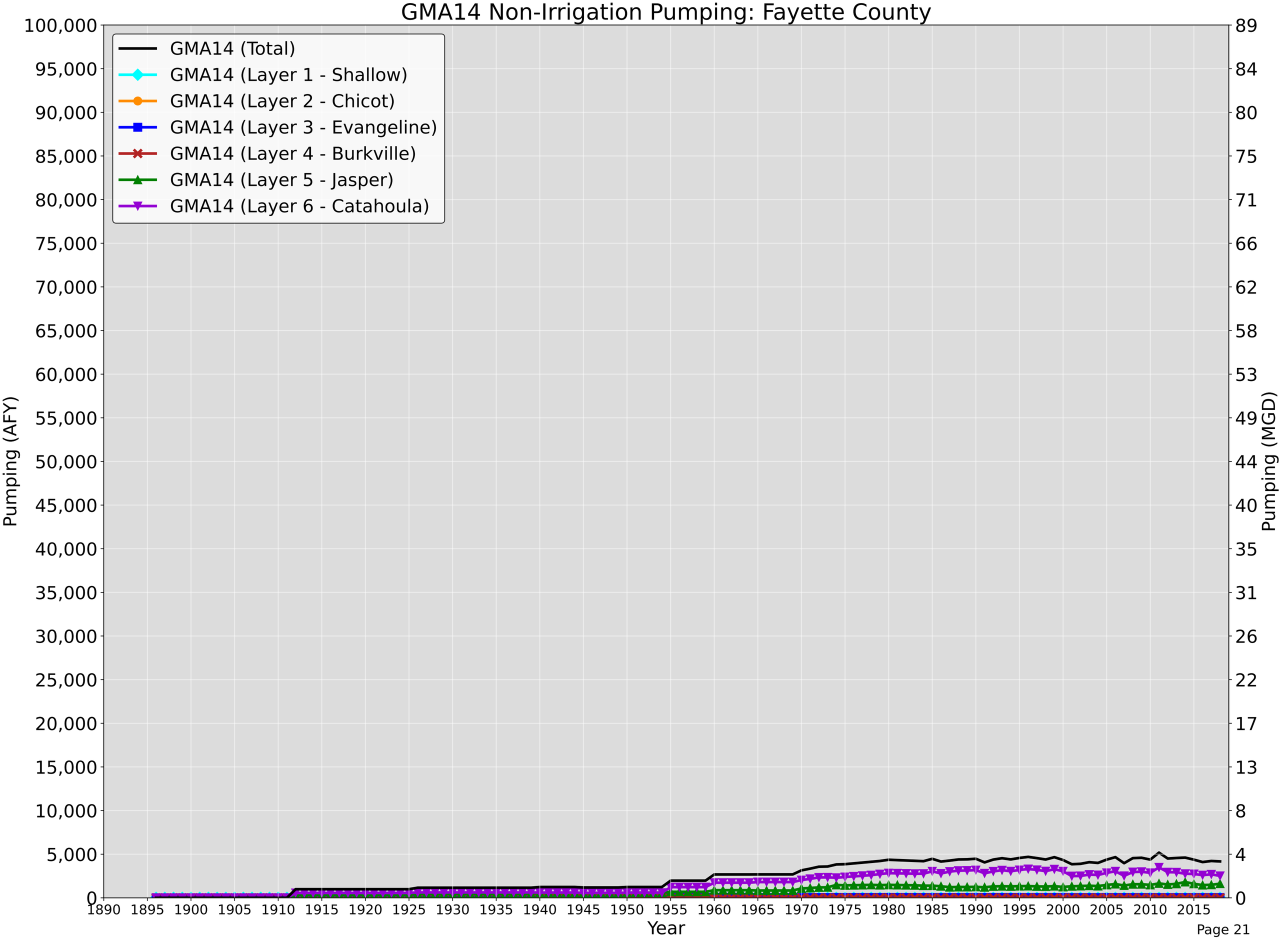
GMA14 Total Pumping: Fayette County



GMA14 Irrigation Pumping: Fayette County



GMA14 Non-Irrigation Pumping: Fayette County



GMA14 Total Pumping: Fort Bend County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

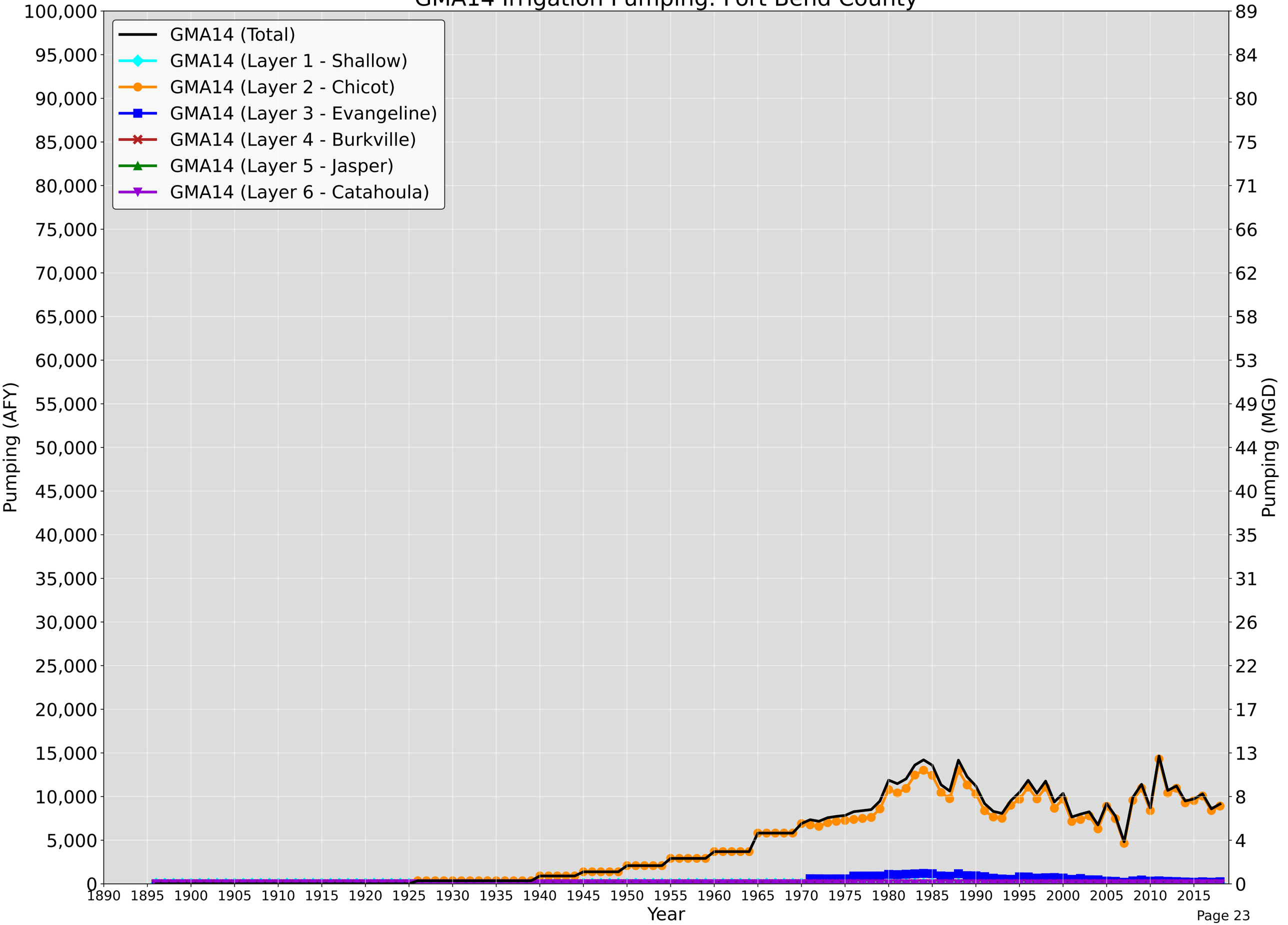
Pumping (AFY)
160,000
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Pumping (MGD)
142
133
124
116
107
98
89
80
71
62
53
44
35
26
17
8
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Irrigation Pumping: Fort Bend County



GMA14 Non-Irrigation Pumping: Fort Bend County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

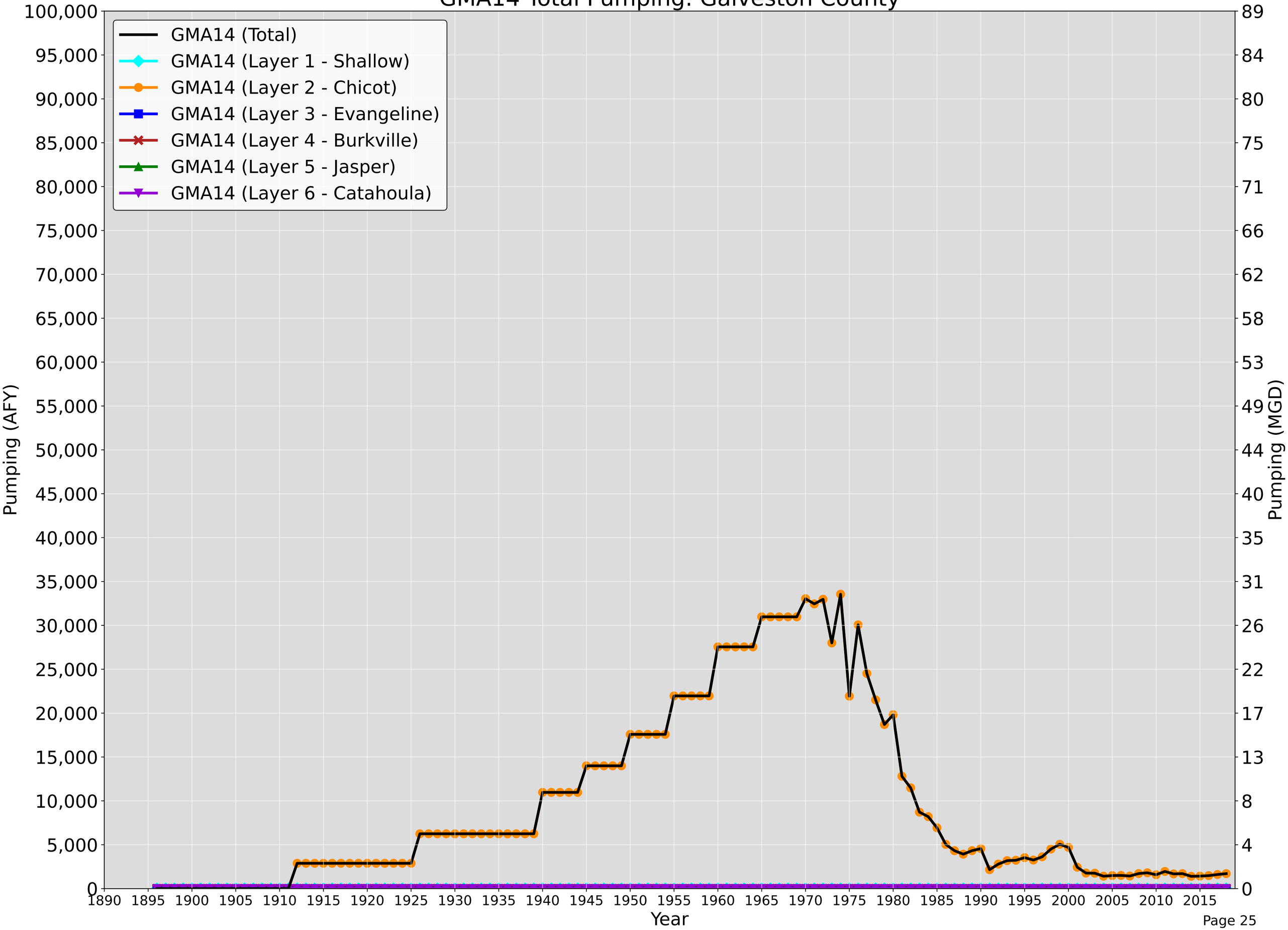
Pumping (AFY)
160,000
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Pumping (MGD)
142
133
124
116
107
98
89
80
71
62
53
44
35
26
17
8
0

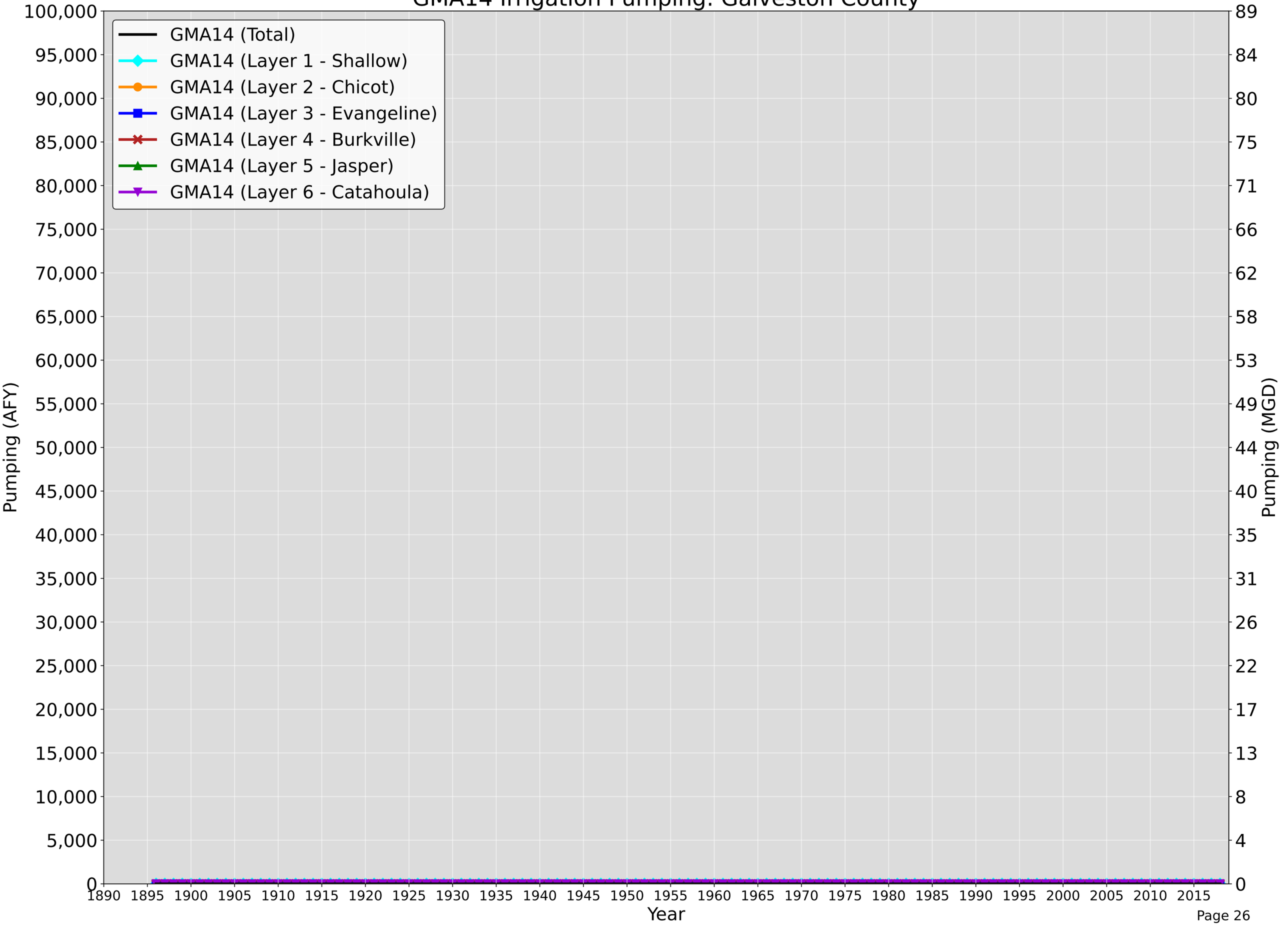
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Total Pumping: Galveston County



GMA14 Irrigation Pumping: Galveston County



GMA14 Non-Irrigation Pumping: Galveston County

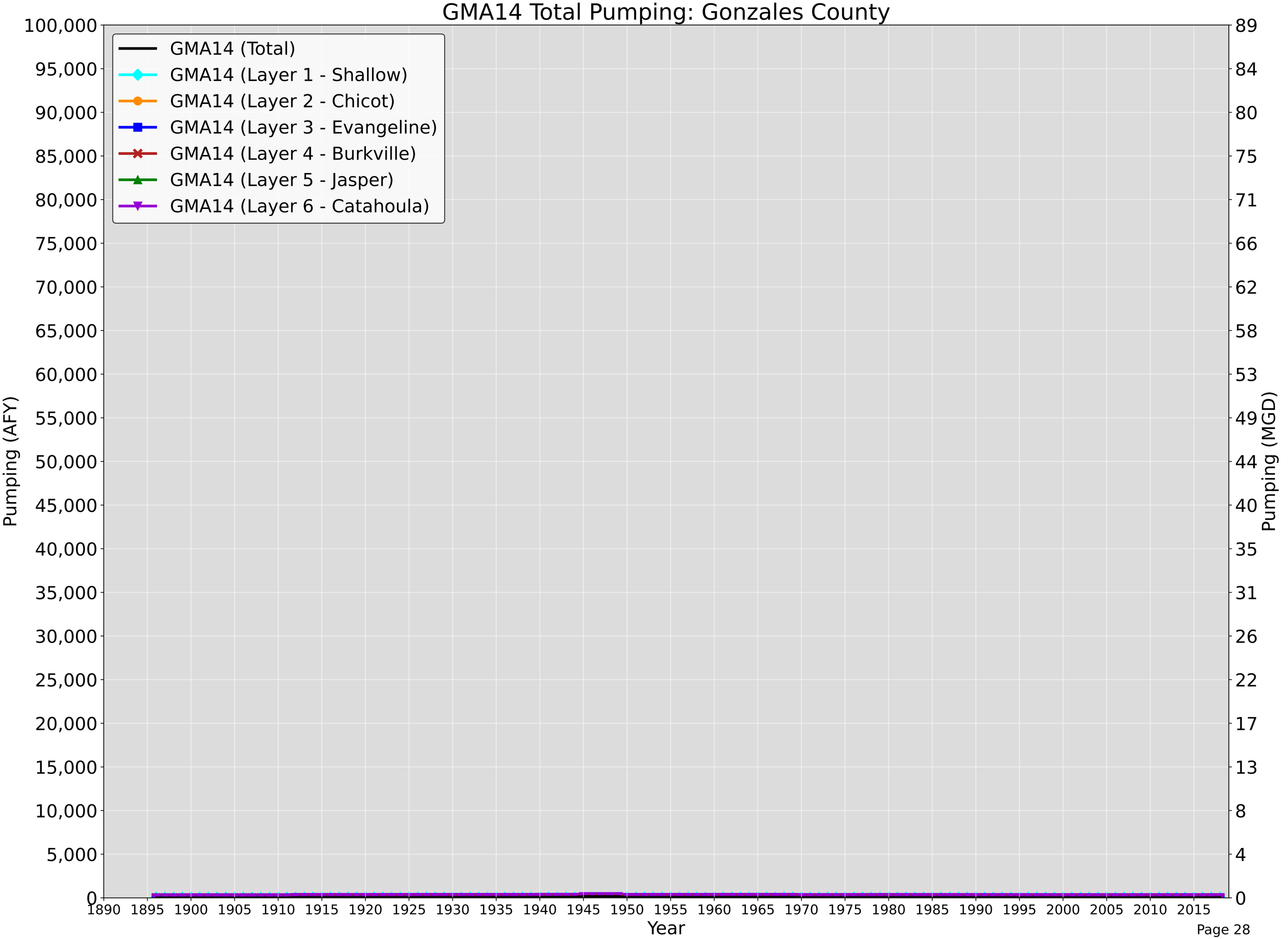
GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

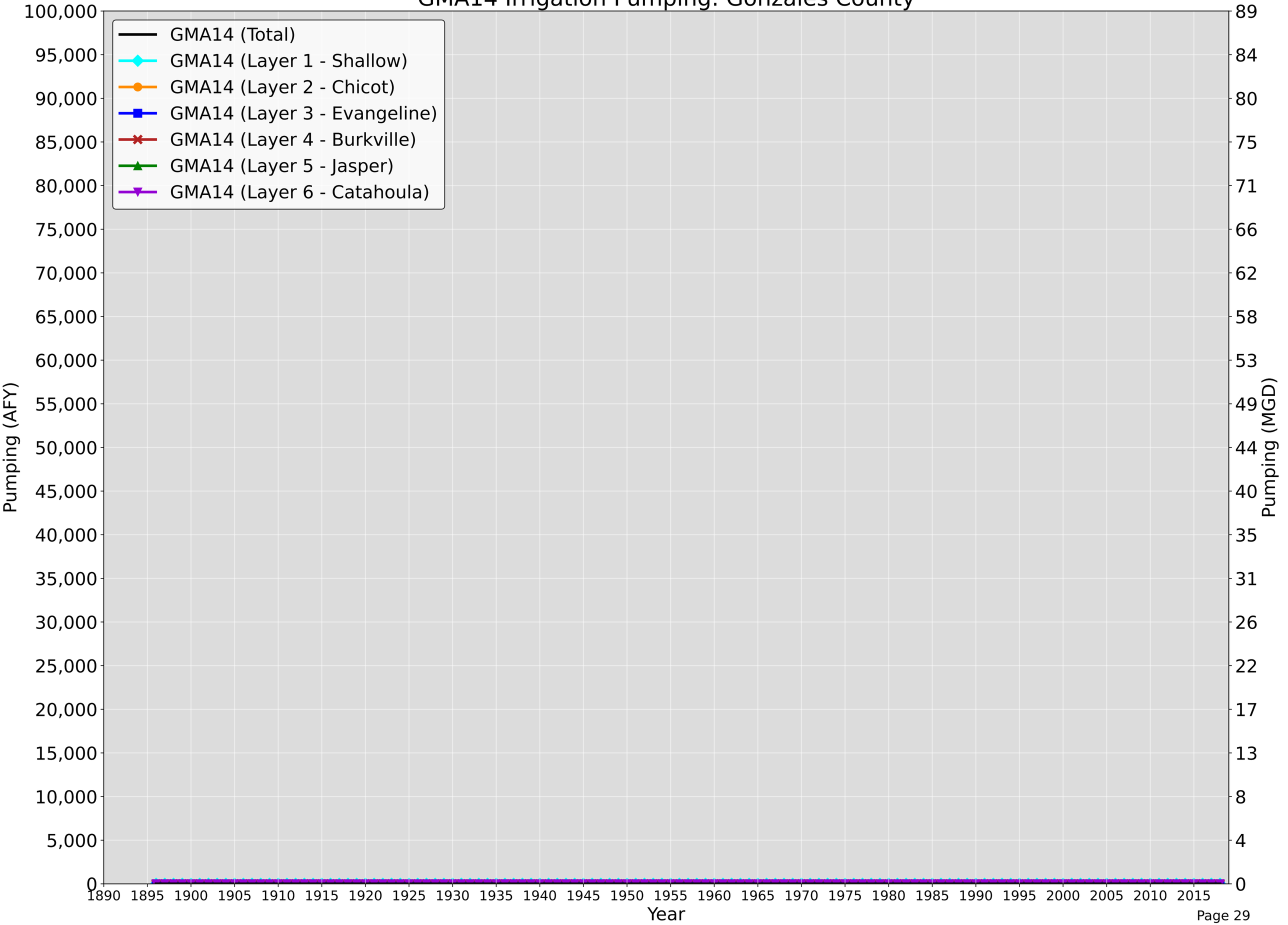
Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

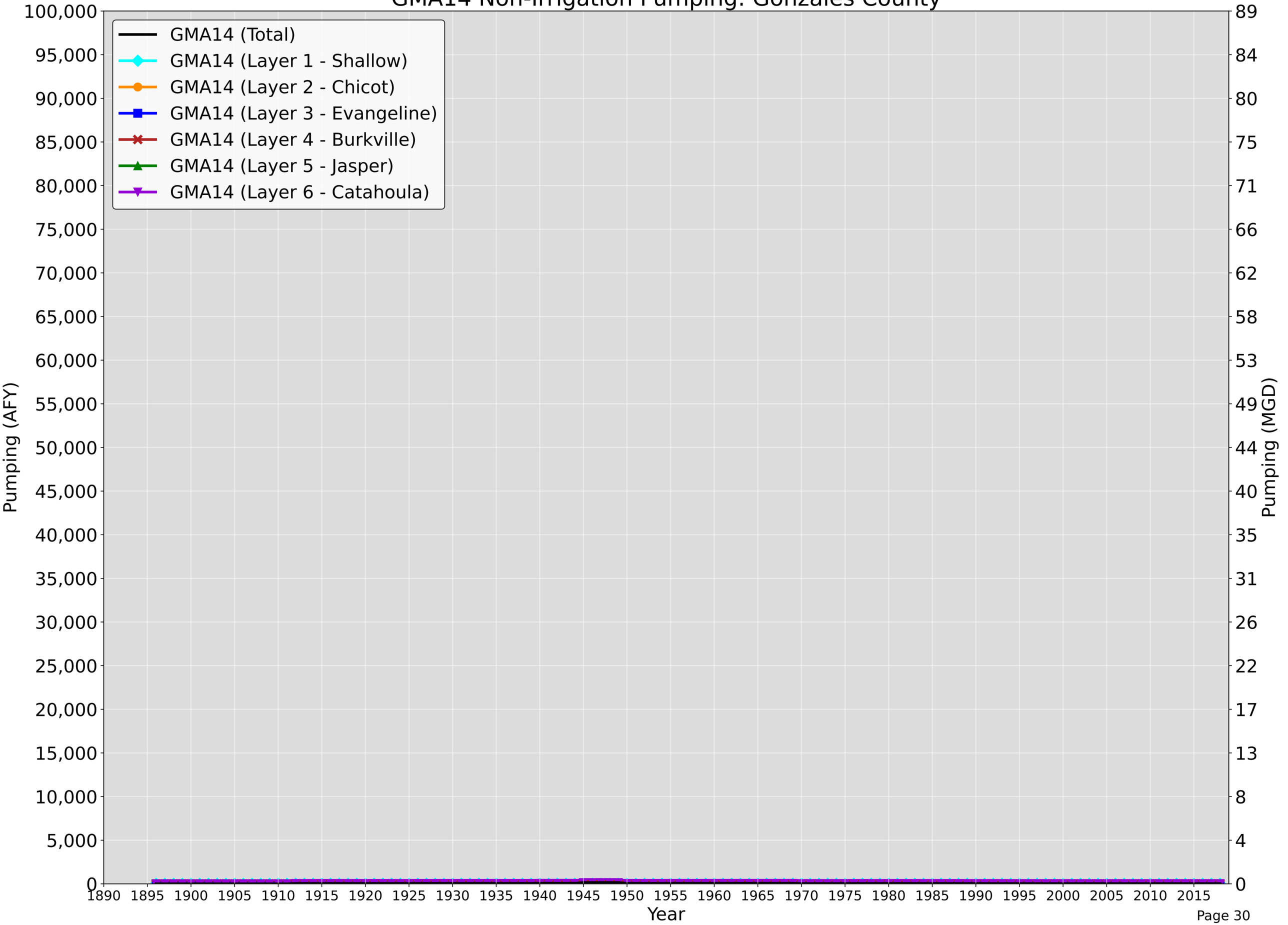
Year


GMA14 Total Pumping: Gonzales County
GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)
Pumping (AFY)
Pumping (MGD)
Year
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

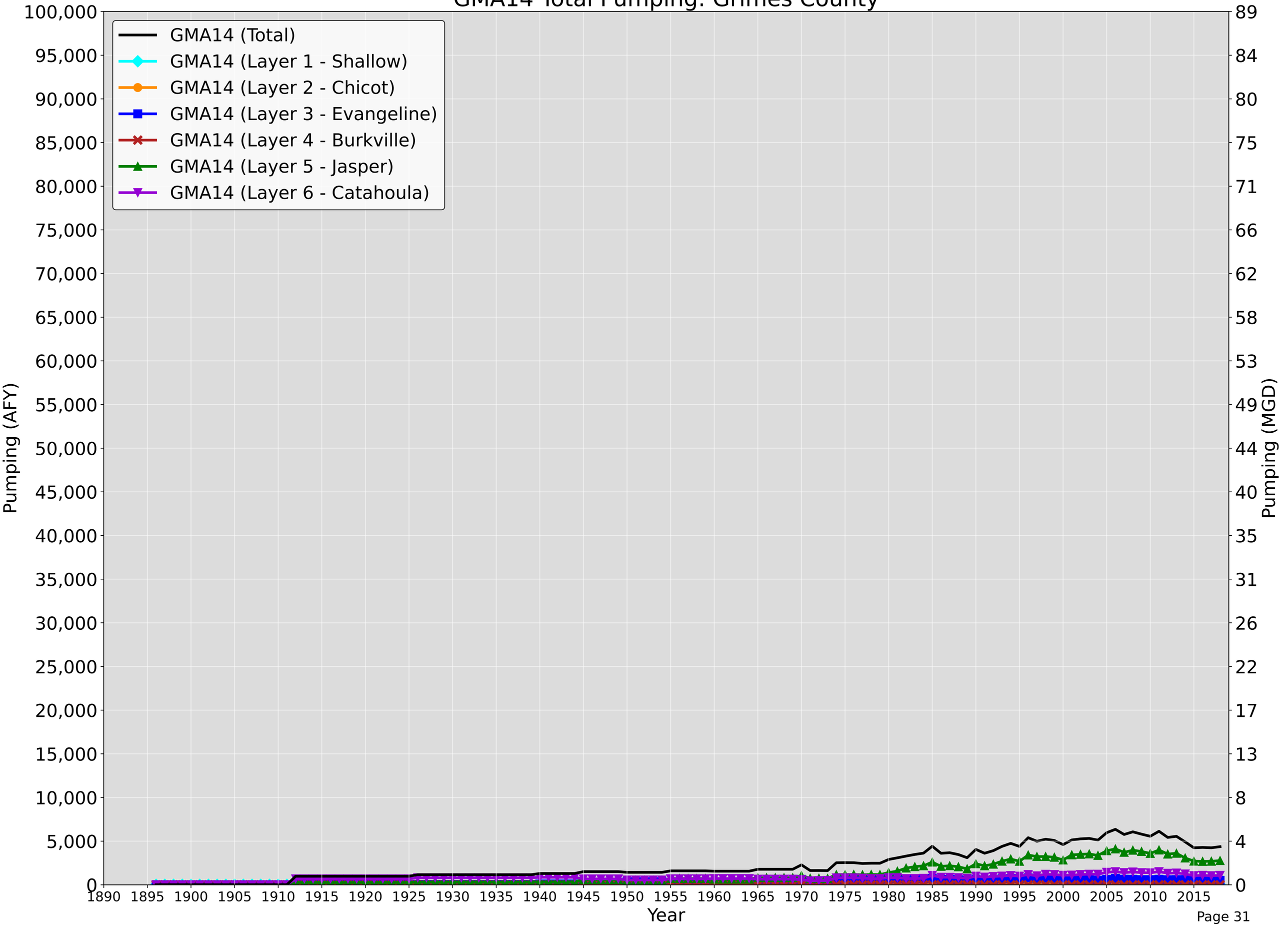
GMA14 Irrigation Pumping: Gonzales County



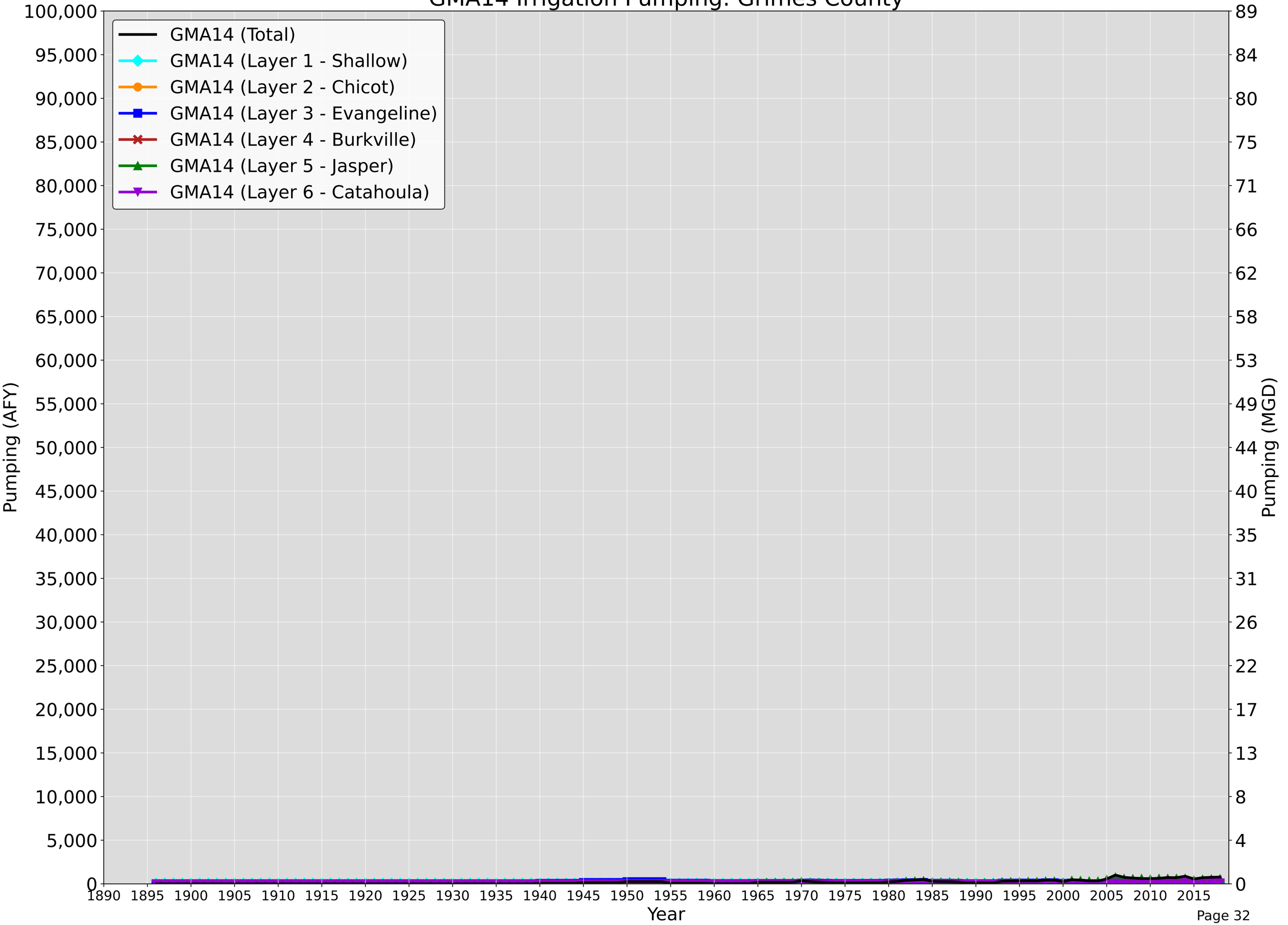
GMA14 Non-Irrigation Pumping: Gonzales County



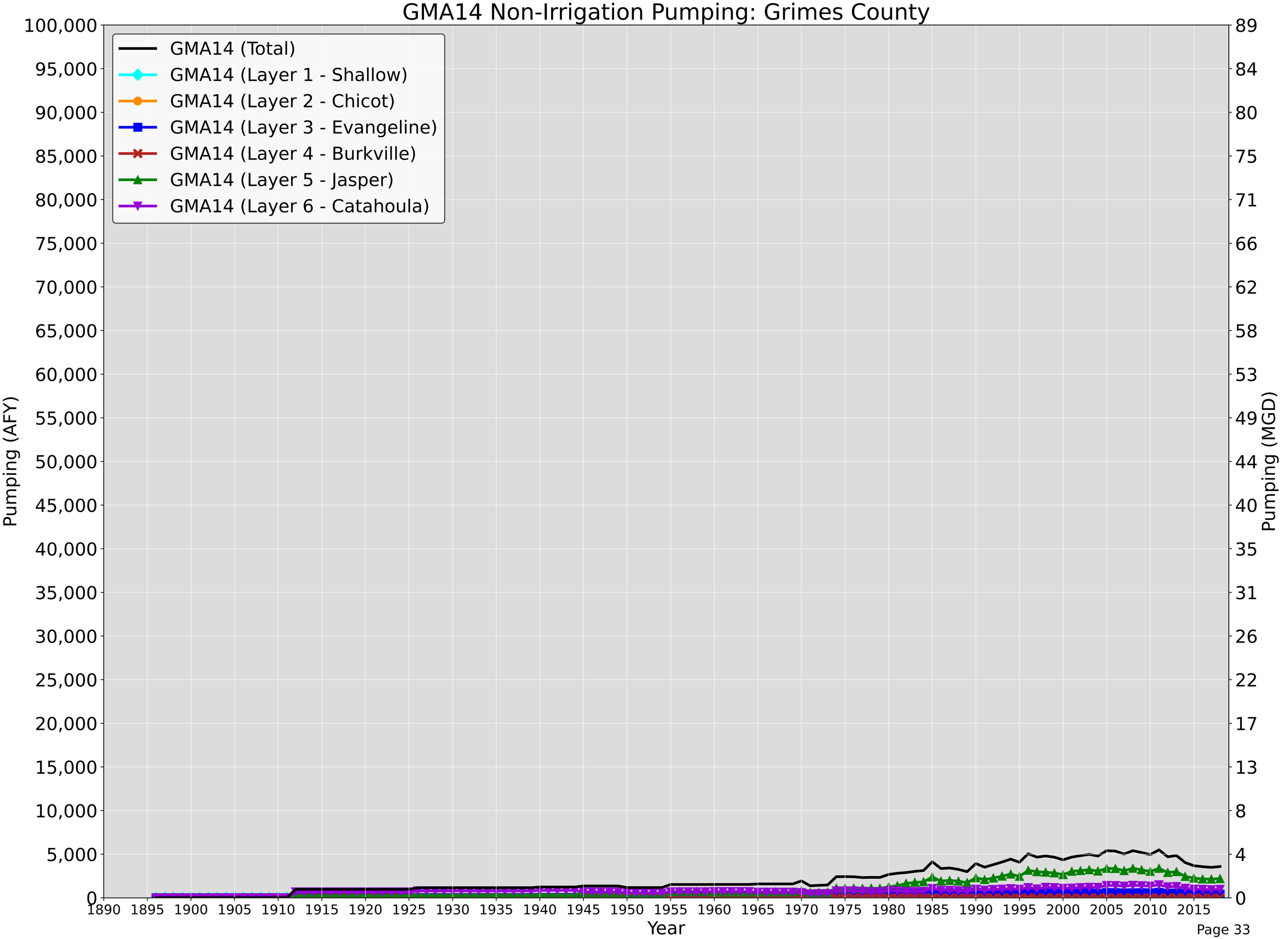
GMA14 Total Pumping: Grimes County



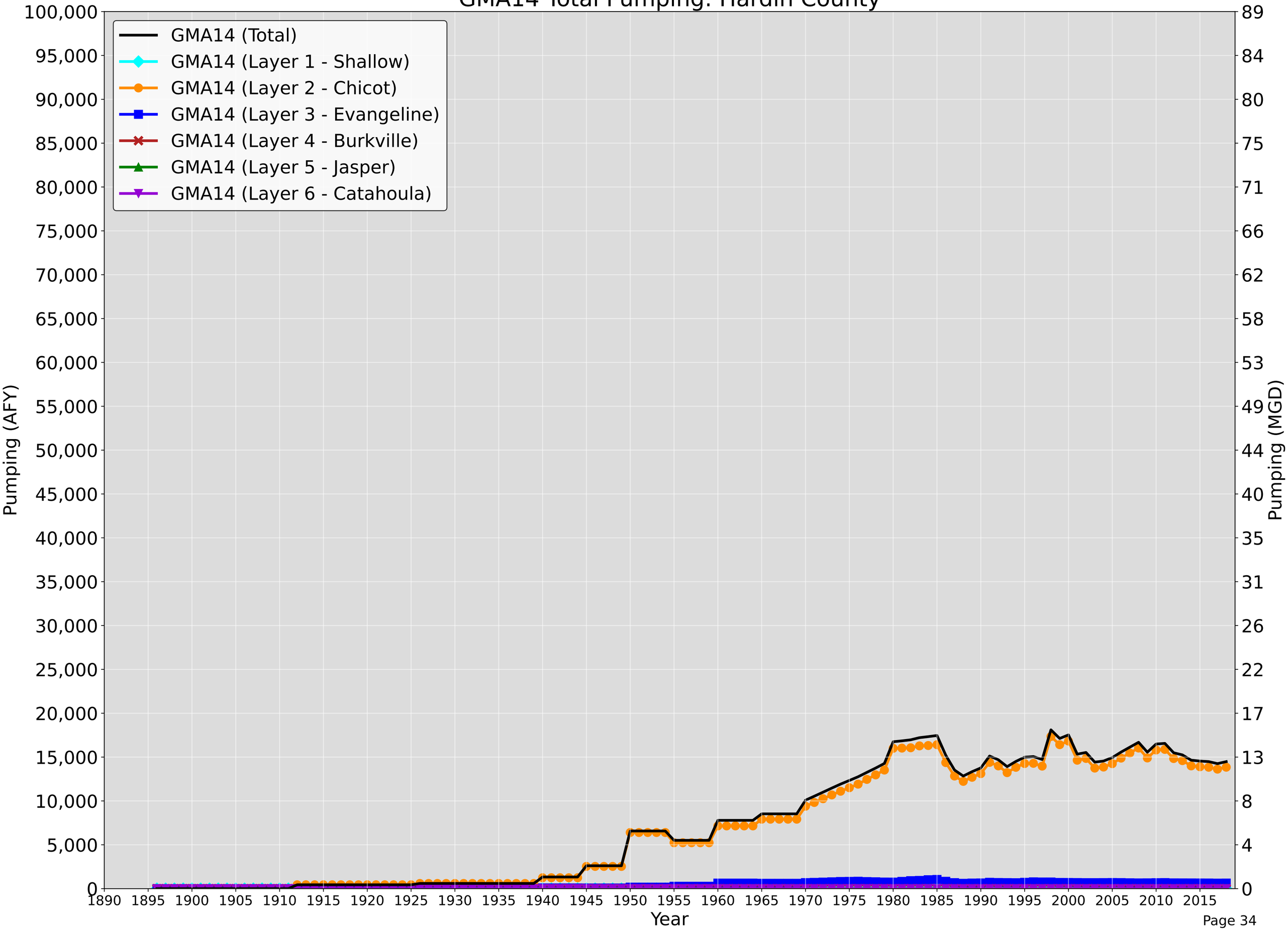
GMA14 Irrigation Pumping: Grimes County



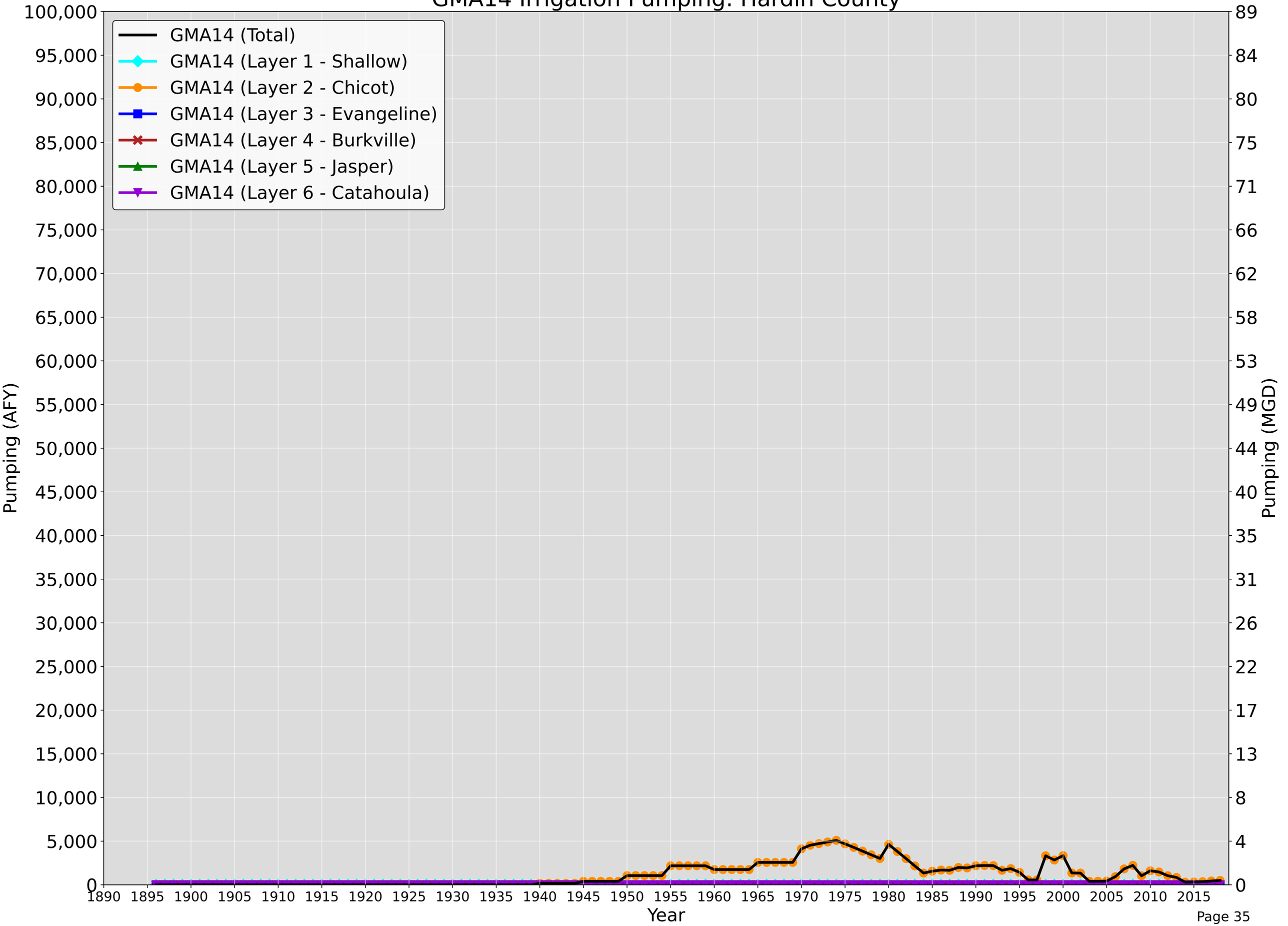
GMA14 Non-Irrigation Pumping: Grimes County



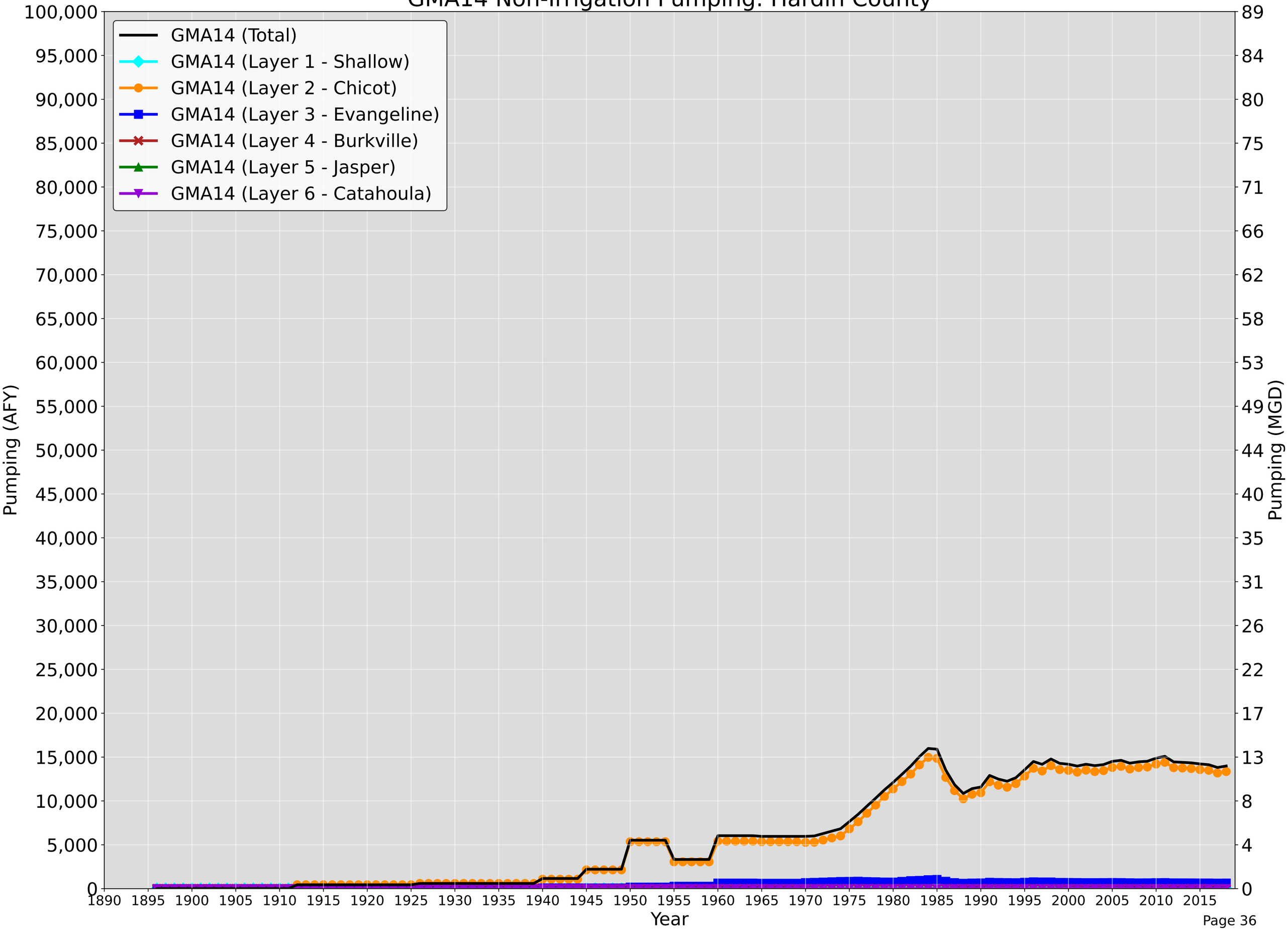
GMA14 Total Pumping: Hardin County



GMA14 Irrigation Pumping: Hardin County



GMA14 Non-Irrigation Pumping: Hardin County



GMA14 Total Pumping: Harris County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

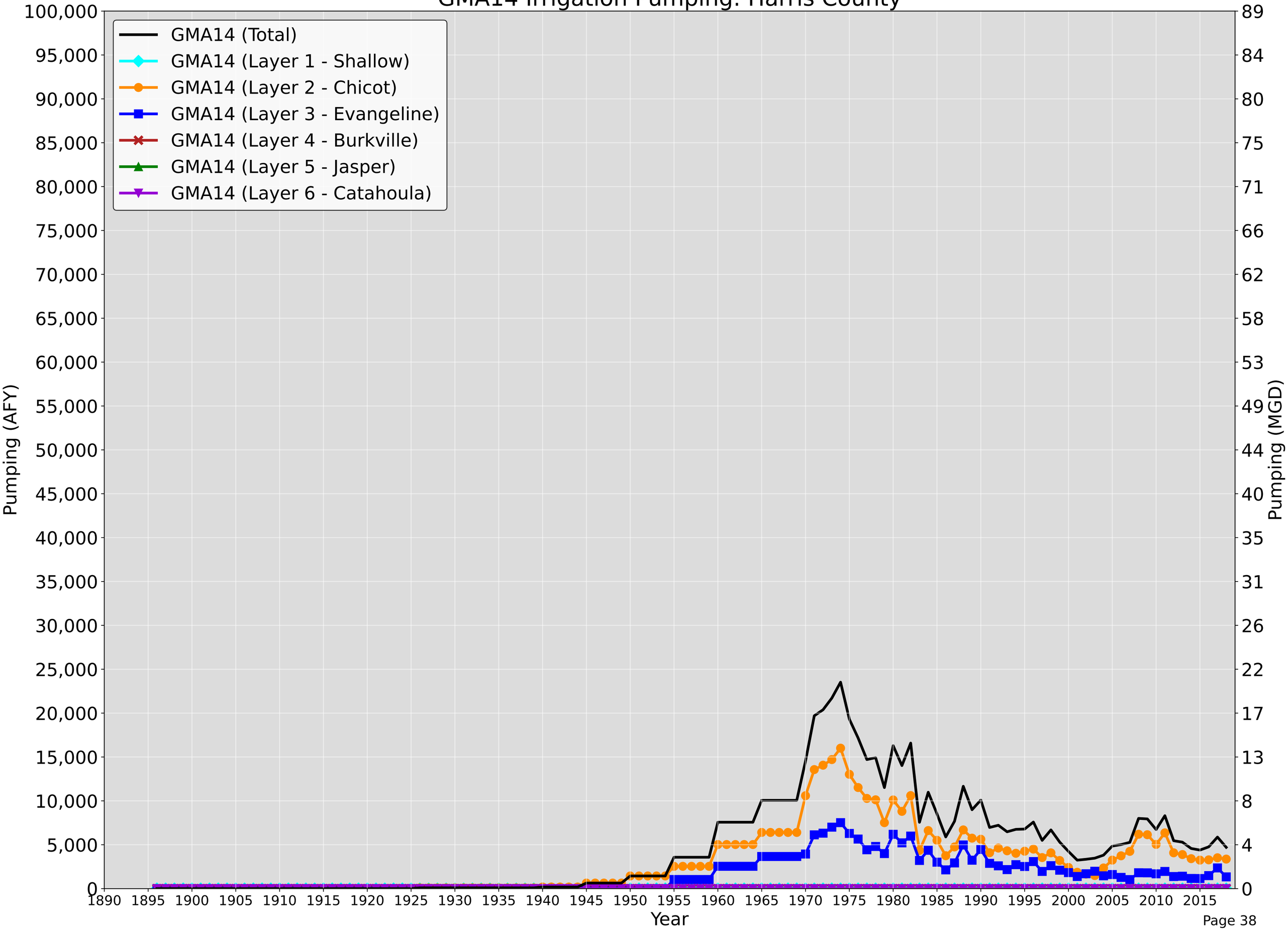
Pumping (AFY)
700,000
650,000
600,000
550,000
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0

Pumping (MGD)
624
579
535
490
446
401
356
312
267
223
178
133
89
44
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Irrigation Pumping: Harris County



GMA14 Non-Irrigation Pumping: Harris County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
700,000
650,000
600,000
550,000
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0

Pumping (MGD)
624
579
535
490
446
401
356
312
267
223
178
133
89
44
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Total Pumping: Jackson County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

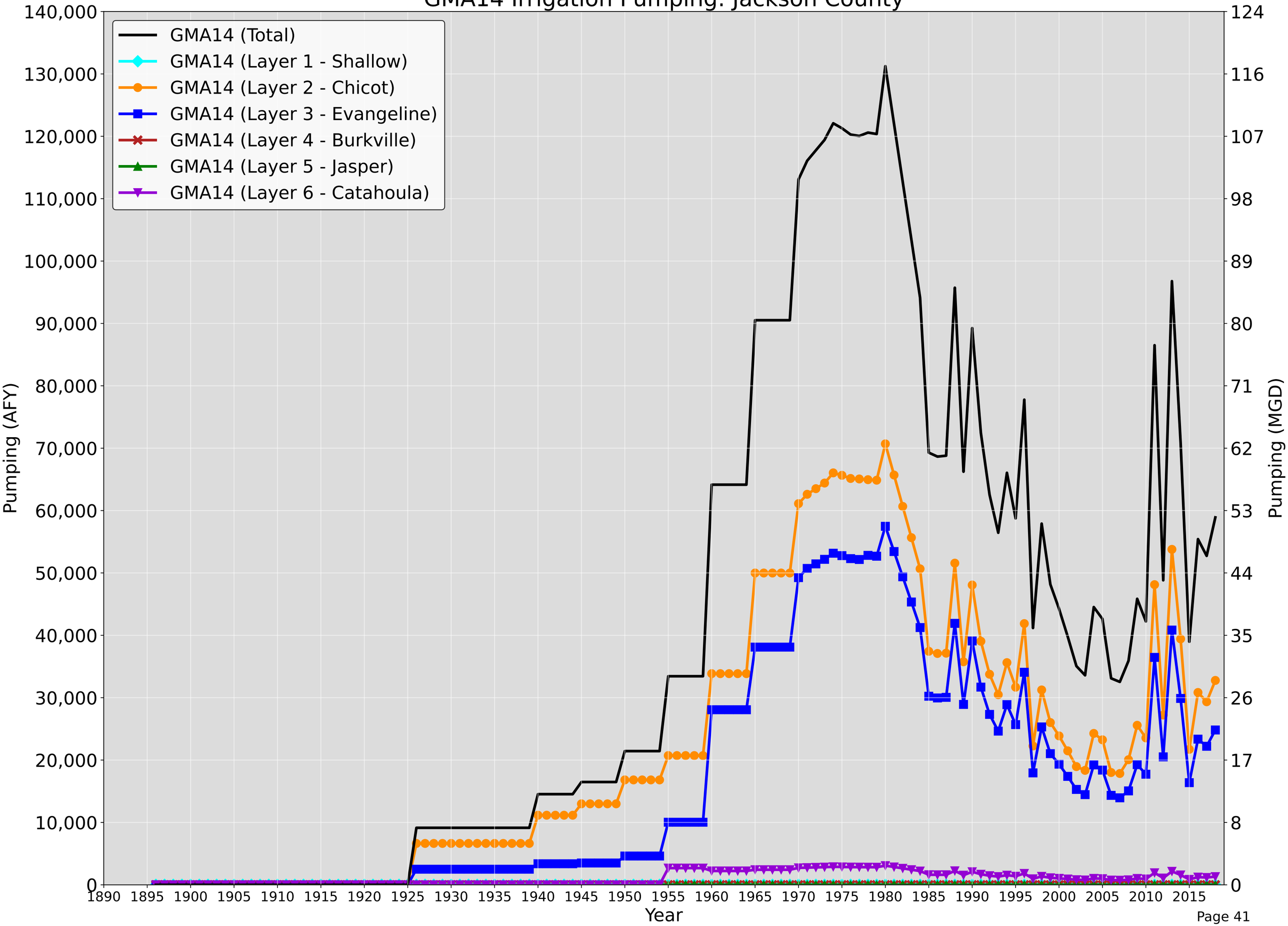
Pumping (AFY)
160,000
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Pumping (MGD)
142
133
124
116
107
98
89
80
71
62
53
44
35
26
17
8
0

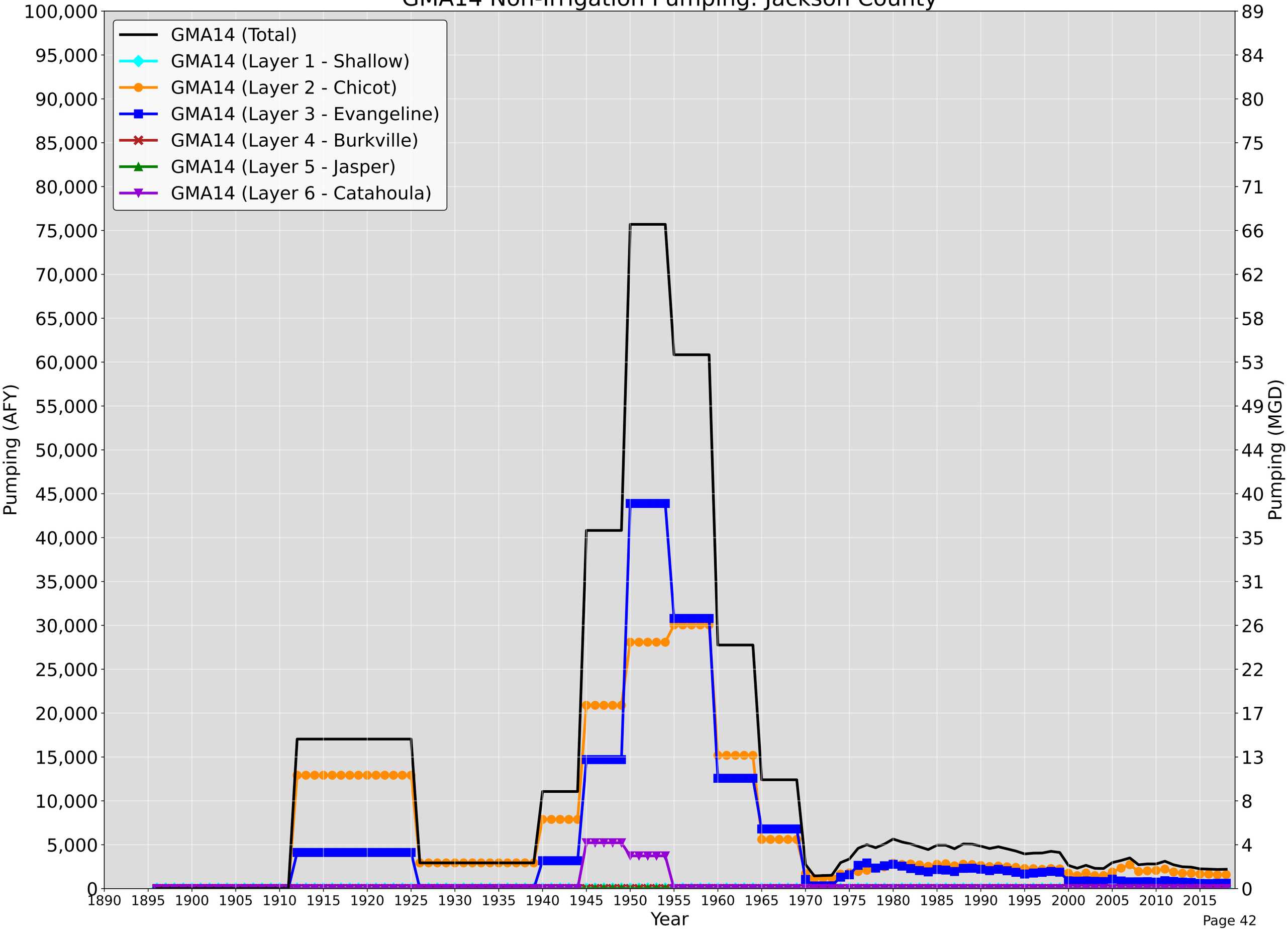
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

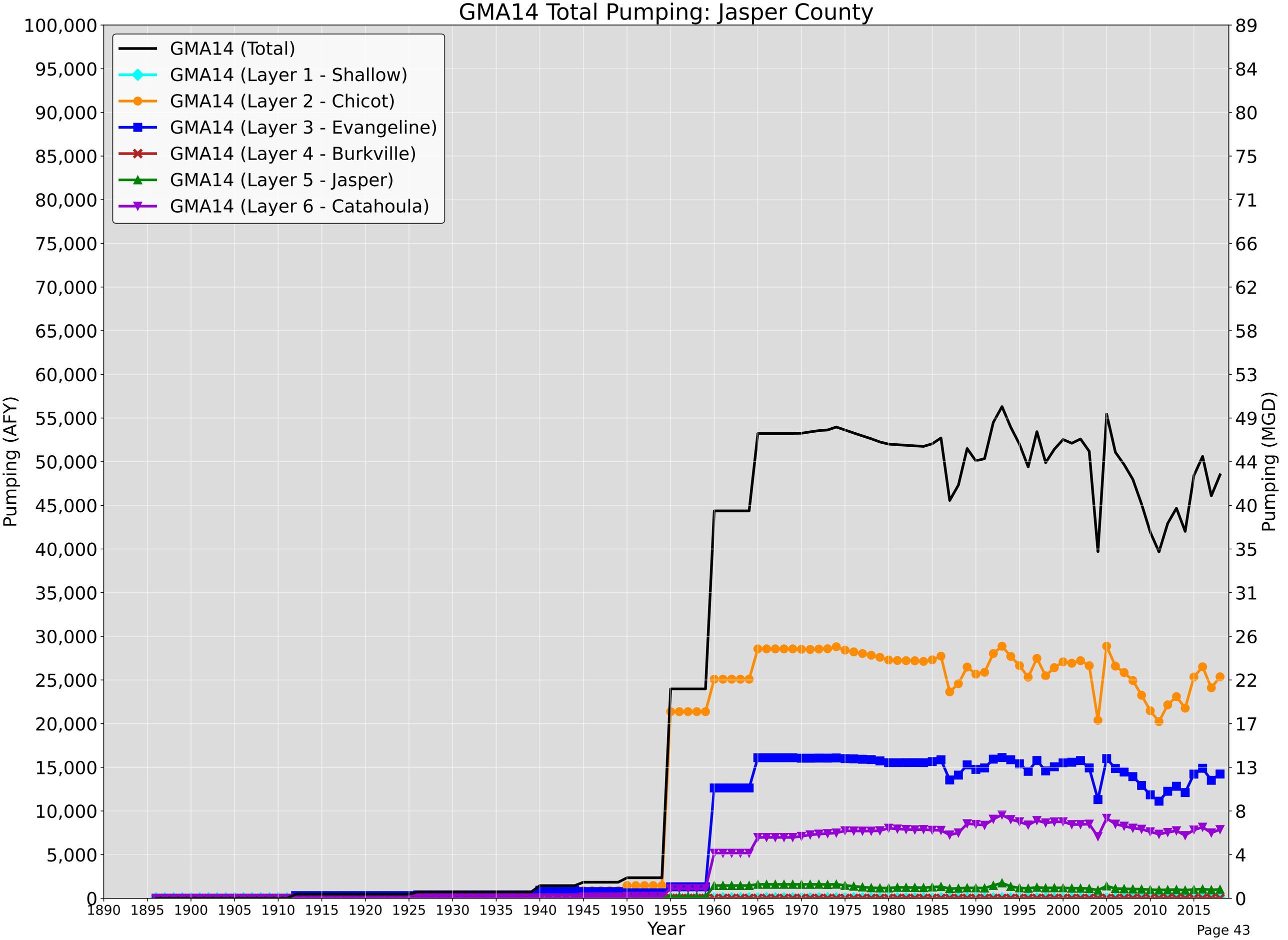
GMA14 Irrigation Pumping: Jackson County



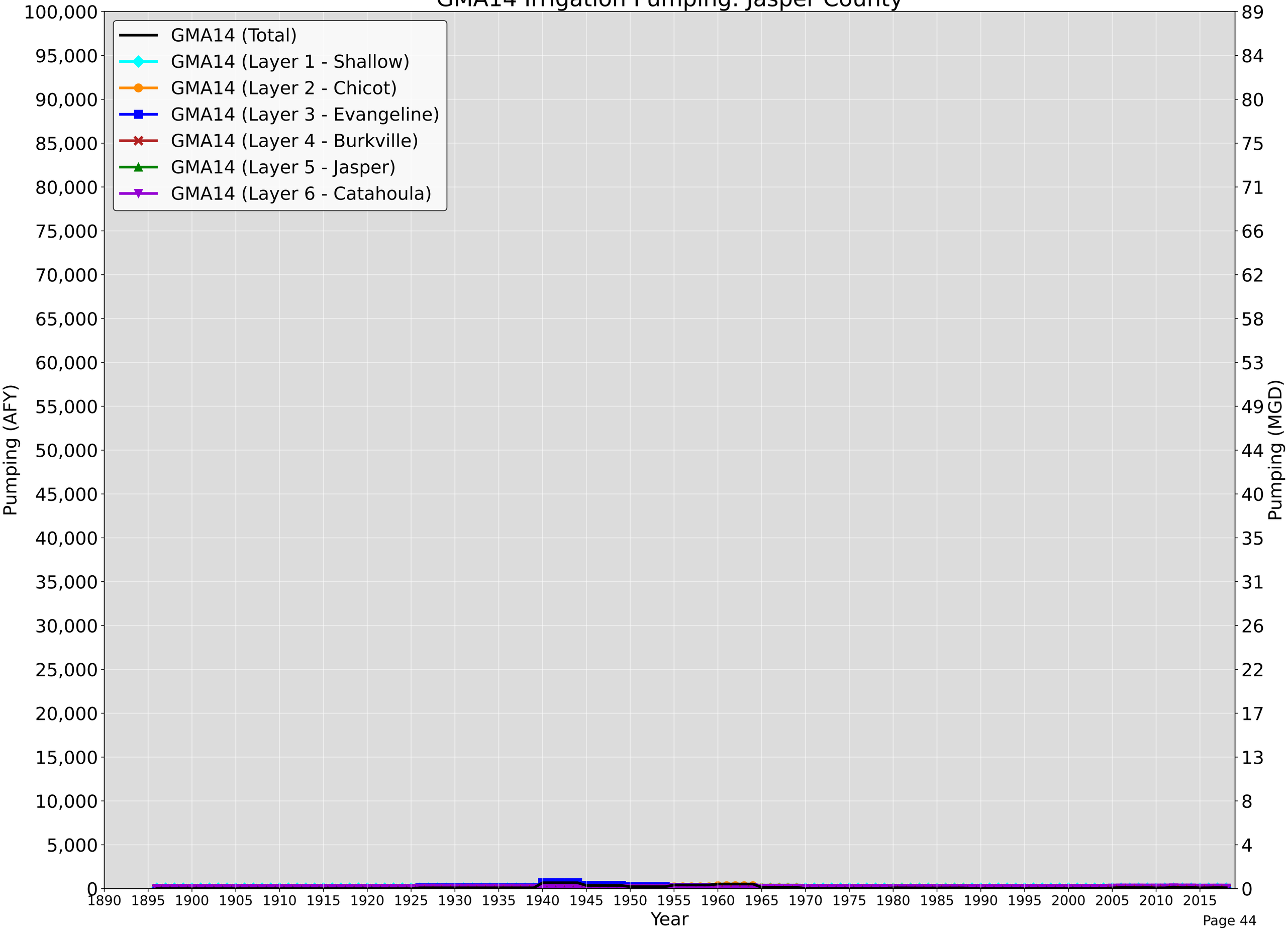
GMA14 Non-Irrigation Pumping: Jackson County



GMA14 Total Pumping: Jasper County



GMA14 Irrigation Pumping: Jasper County



GMA14 Non-Irrigation Pumping: Jasper County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

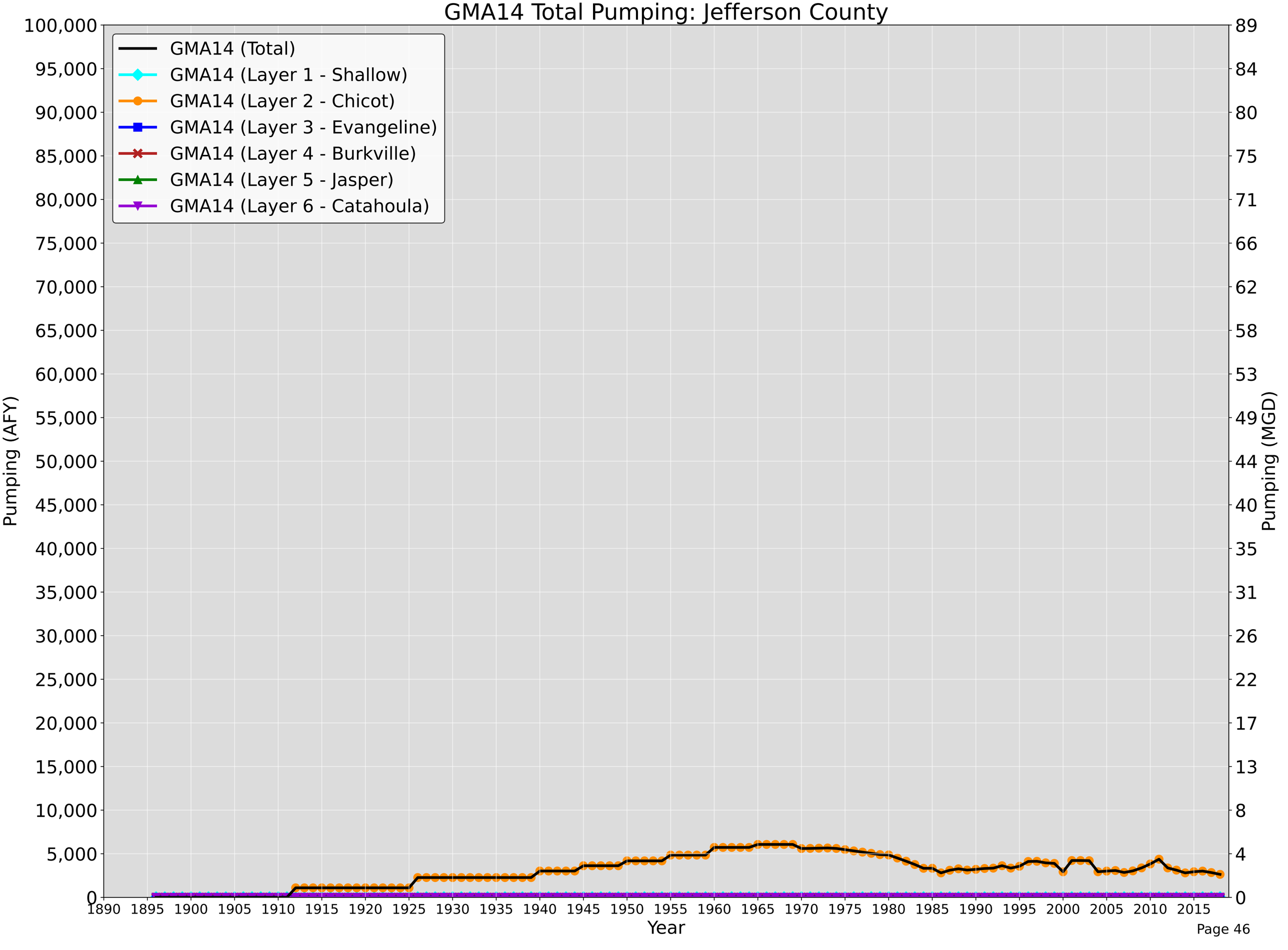
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

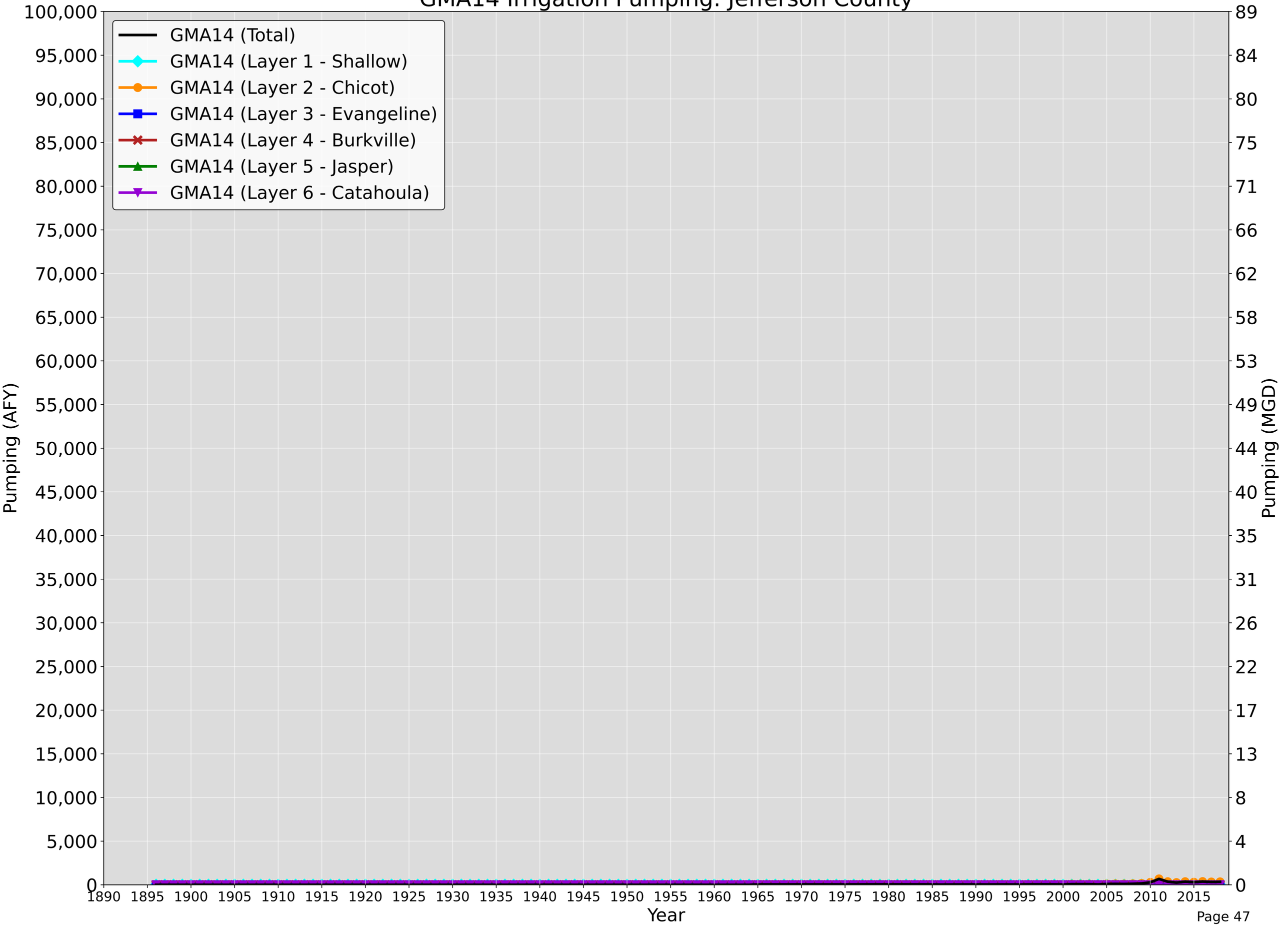
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

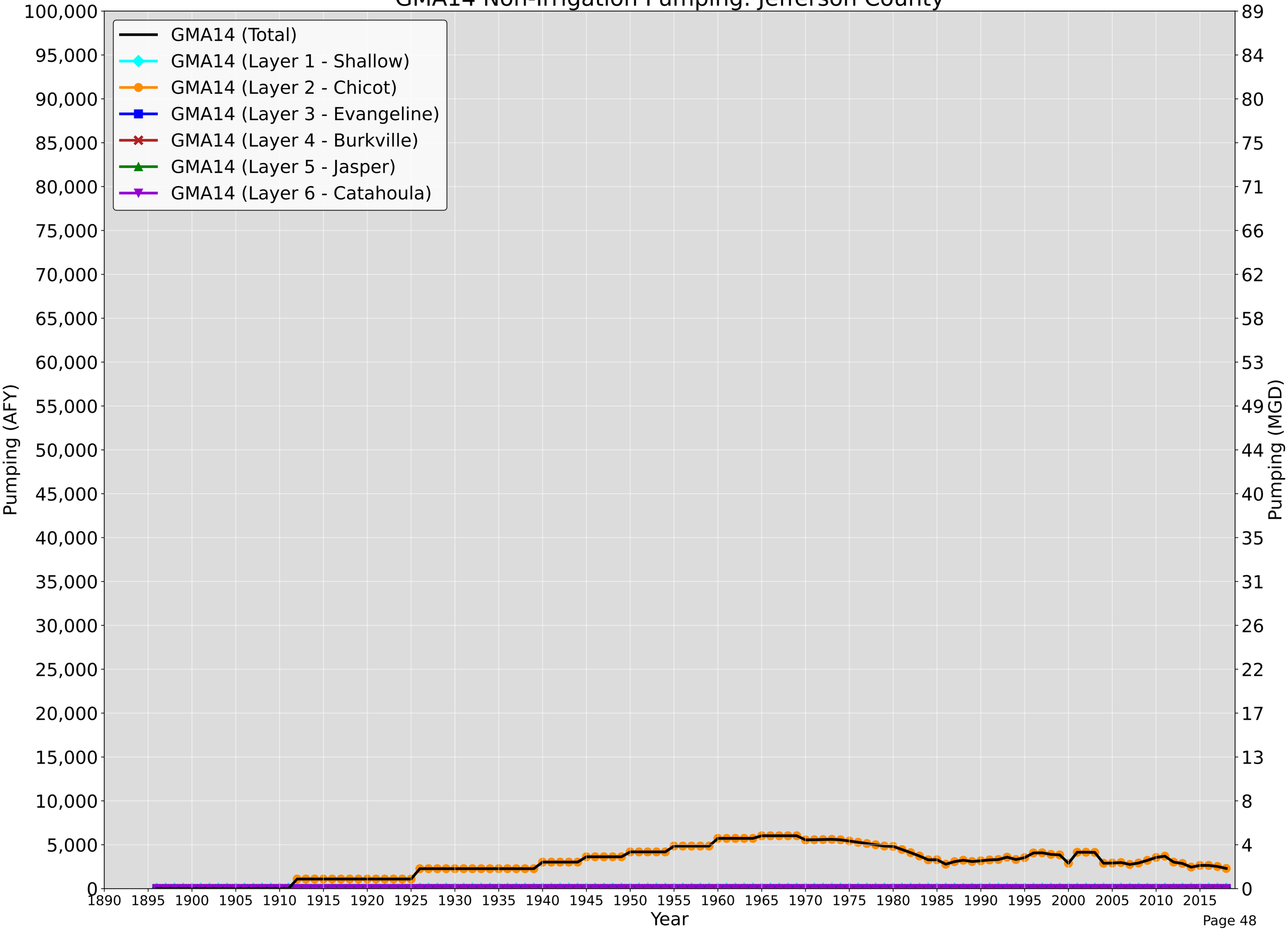
GMA14 Total Pumping: Jefferson County



GMA14 Irrigation Pumping: Jefferson County



GMA14 Non-Irrigation Pumping: Jefferson County



GMA14 Total Pumping: Lavaca County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Irrigation Pumping: Lavaca County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

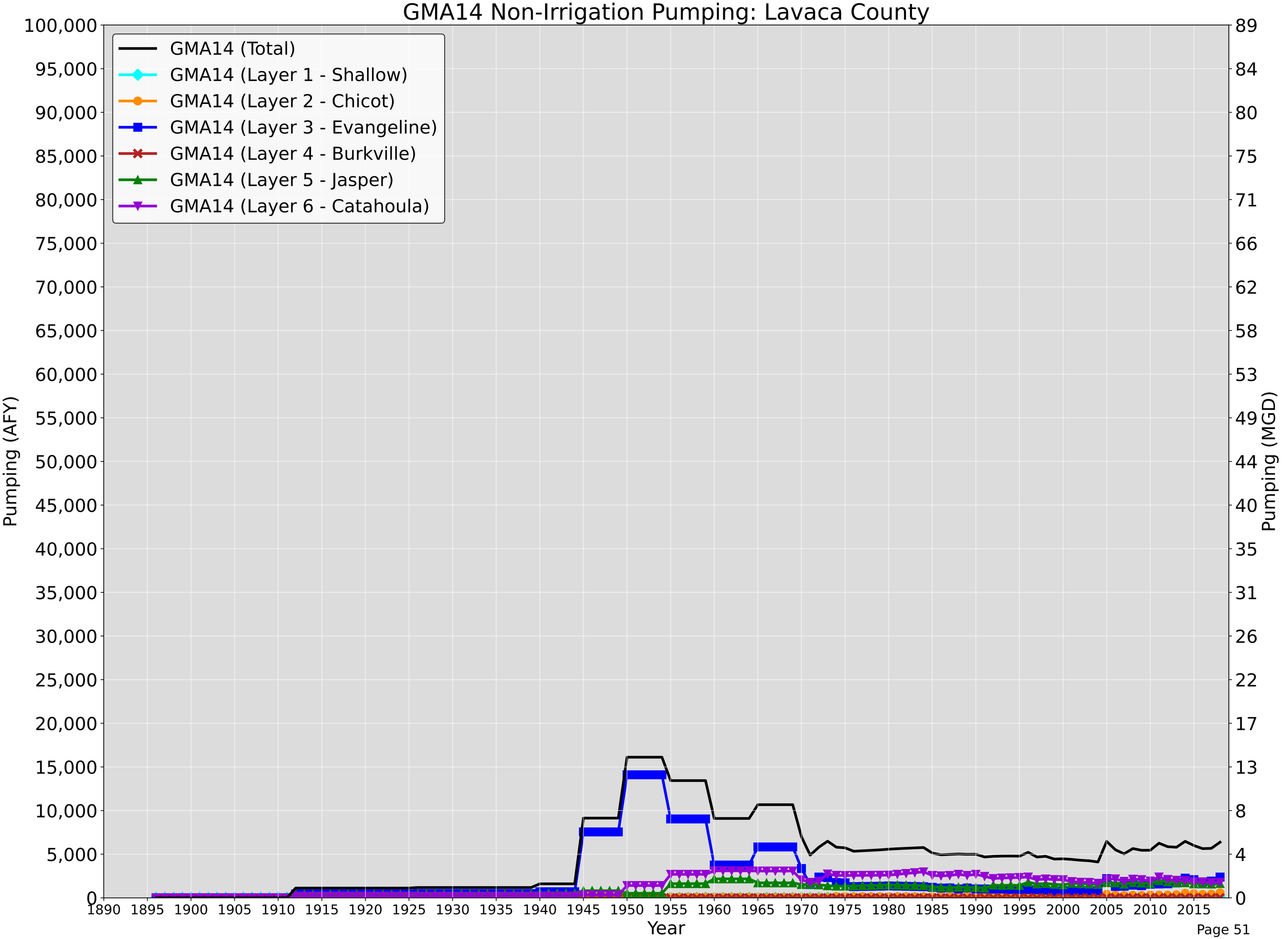
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Non-Irrigation Pumping: Lavaca County



GMA14 Total Pumping: Liberty County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Irrigation Pumping: Liberty County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
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40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Non-Irrigation Pumping: Liberty County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Total Pumping: Matagorda County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

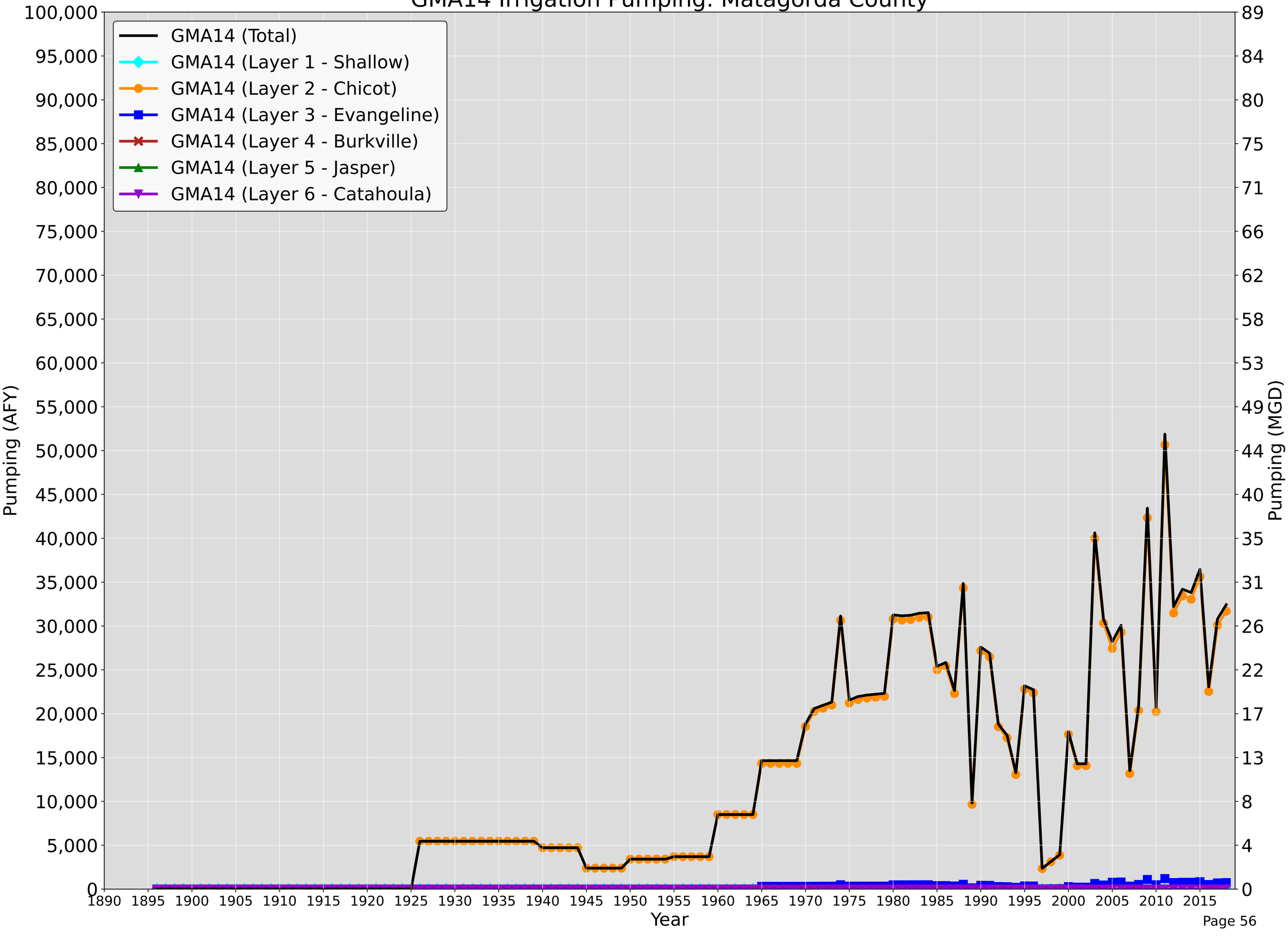
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Irrigation Pumping: Matagorda County



GMA14 Non-Irrigation Pumping: Matagorda County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Total Pumping: Montgomery County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

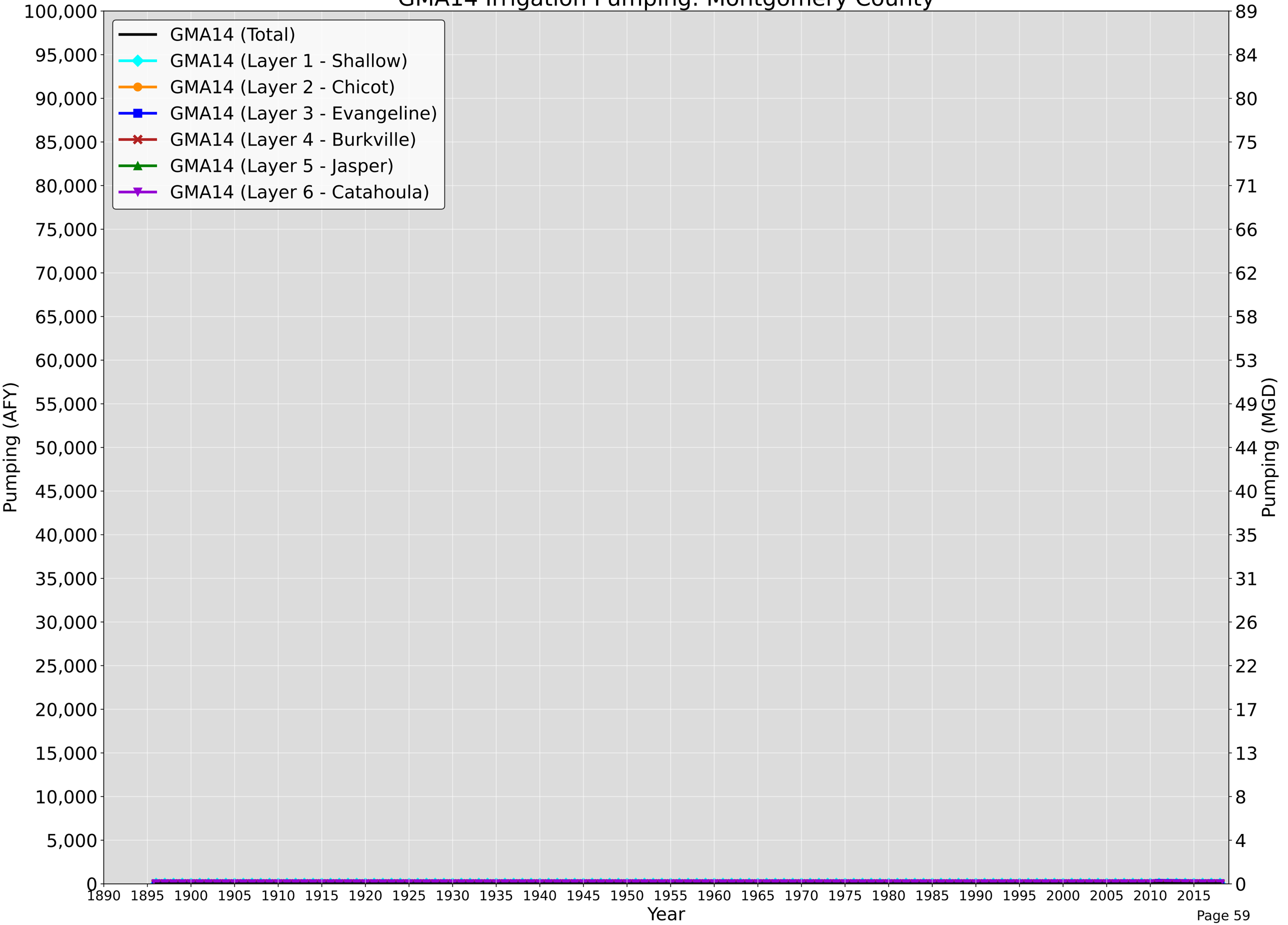
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

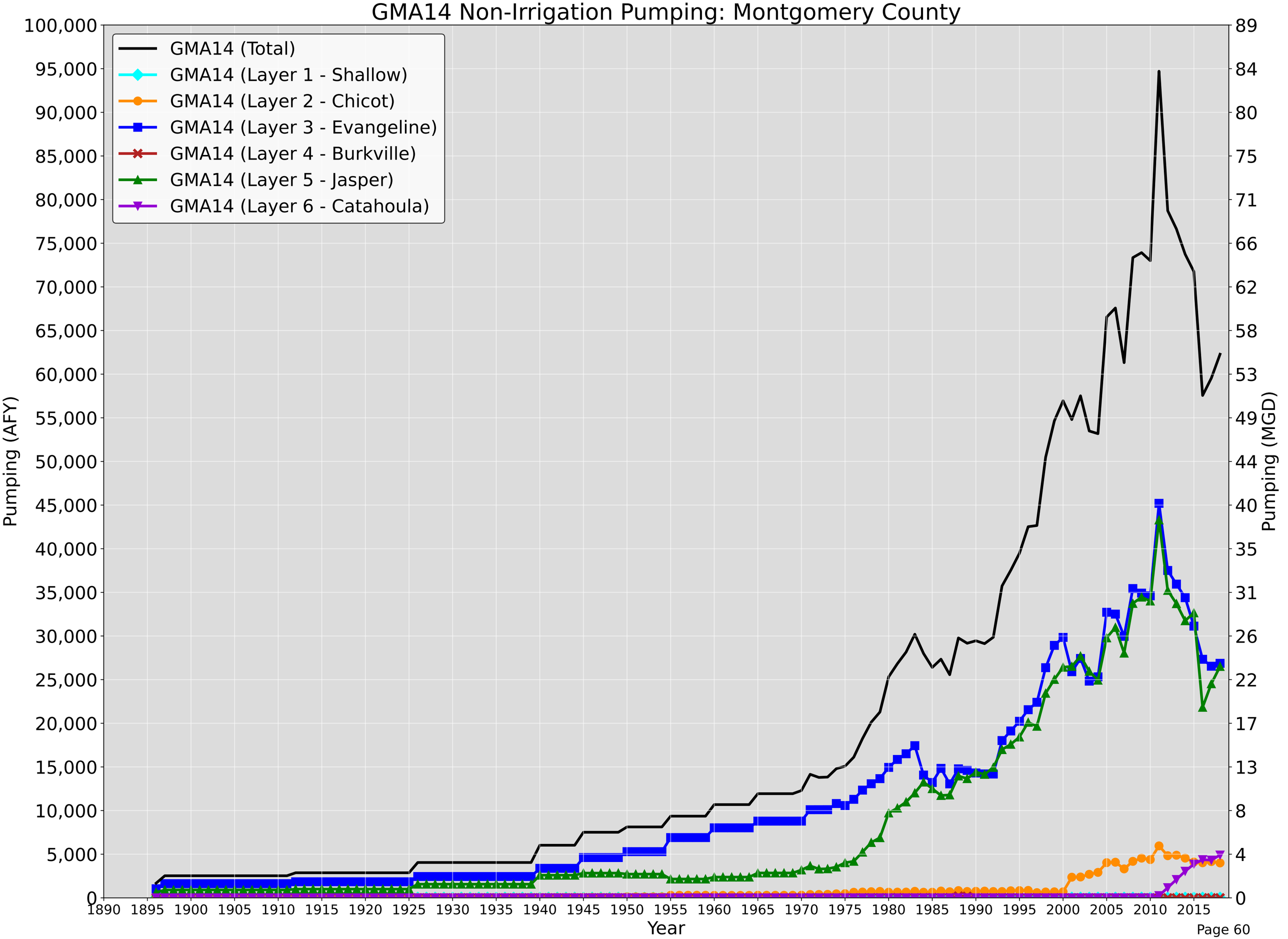
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

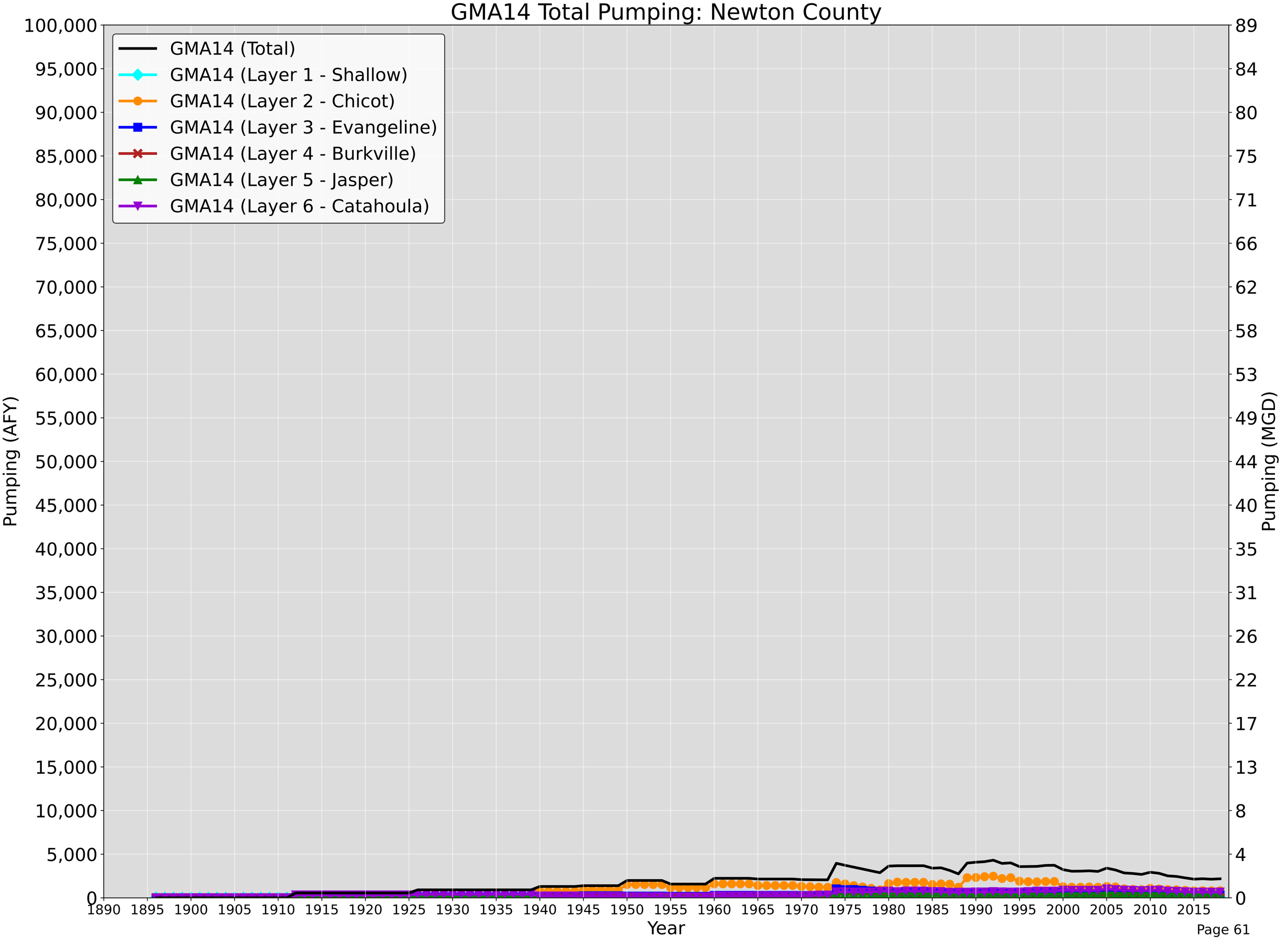
GMA14 Irrigation Pumping: Montgomery County



GMA14 Non-Irrigation Pumping: Montgomery County



GMA14 Total Pumping: Newton County



GMA14 Irrigation Pumping: Newton County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

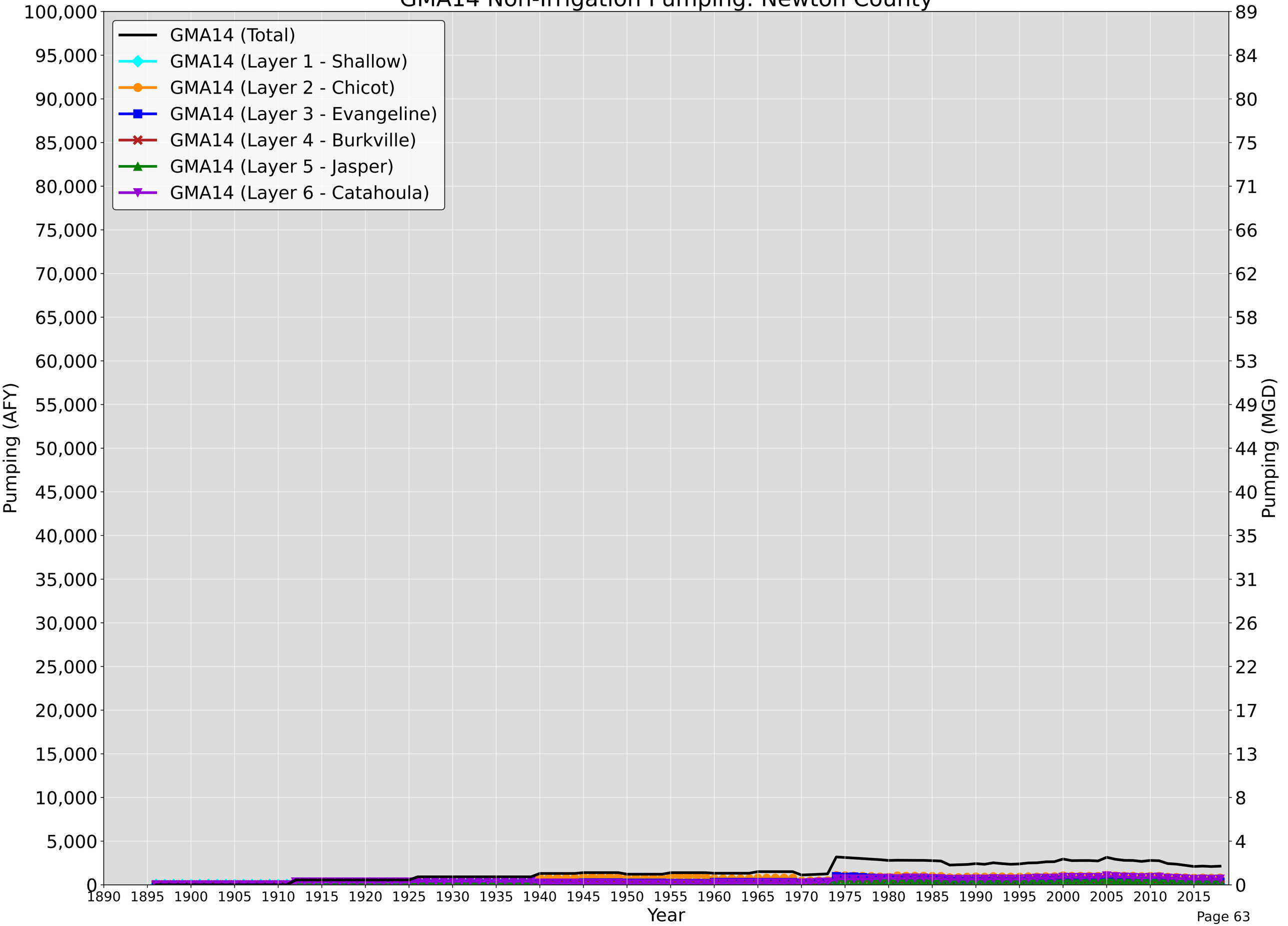
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Non-Irrigation Pumping: Newton County



GMA14 Total Pumping: Orange County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

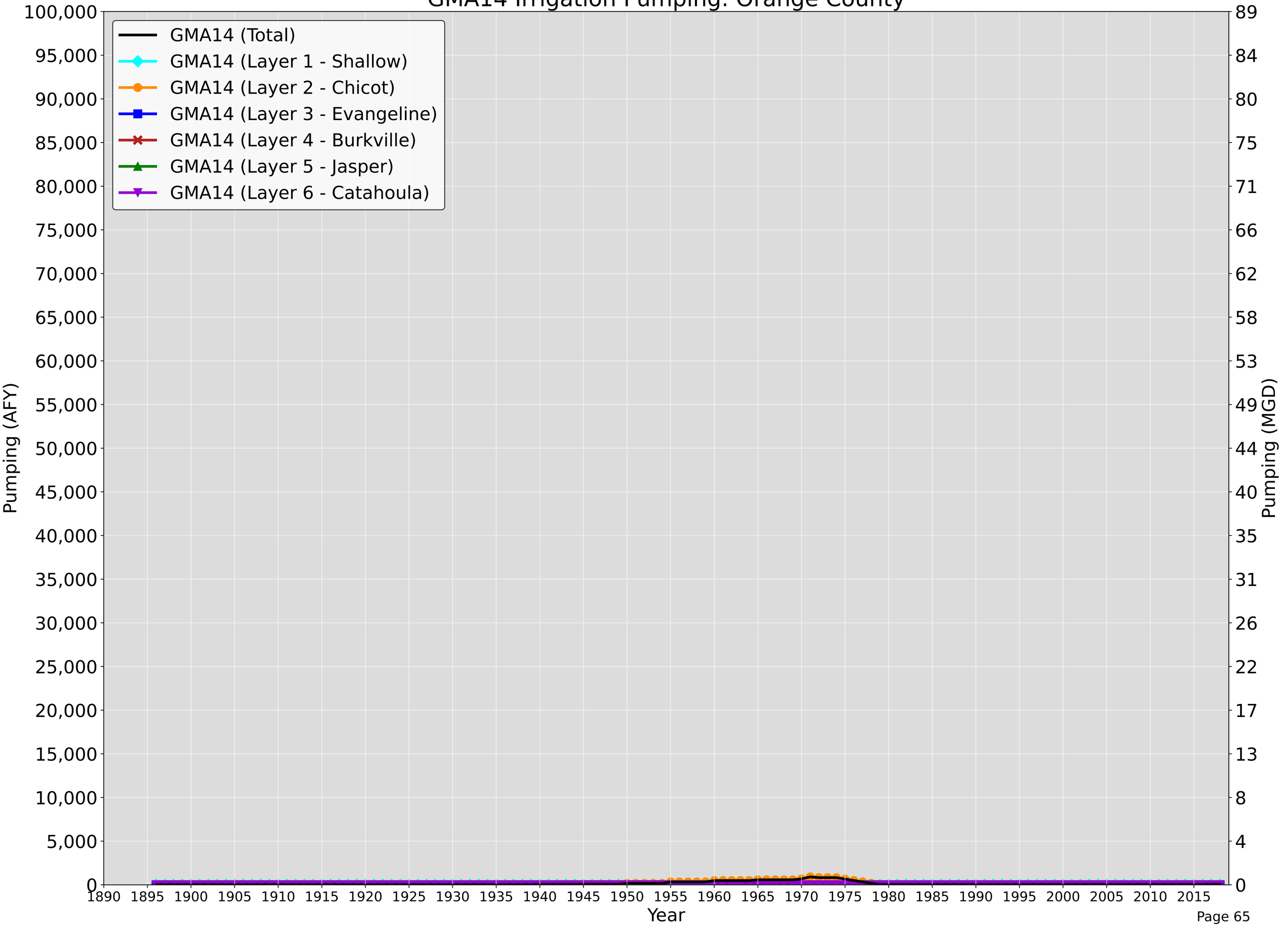
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

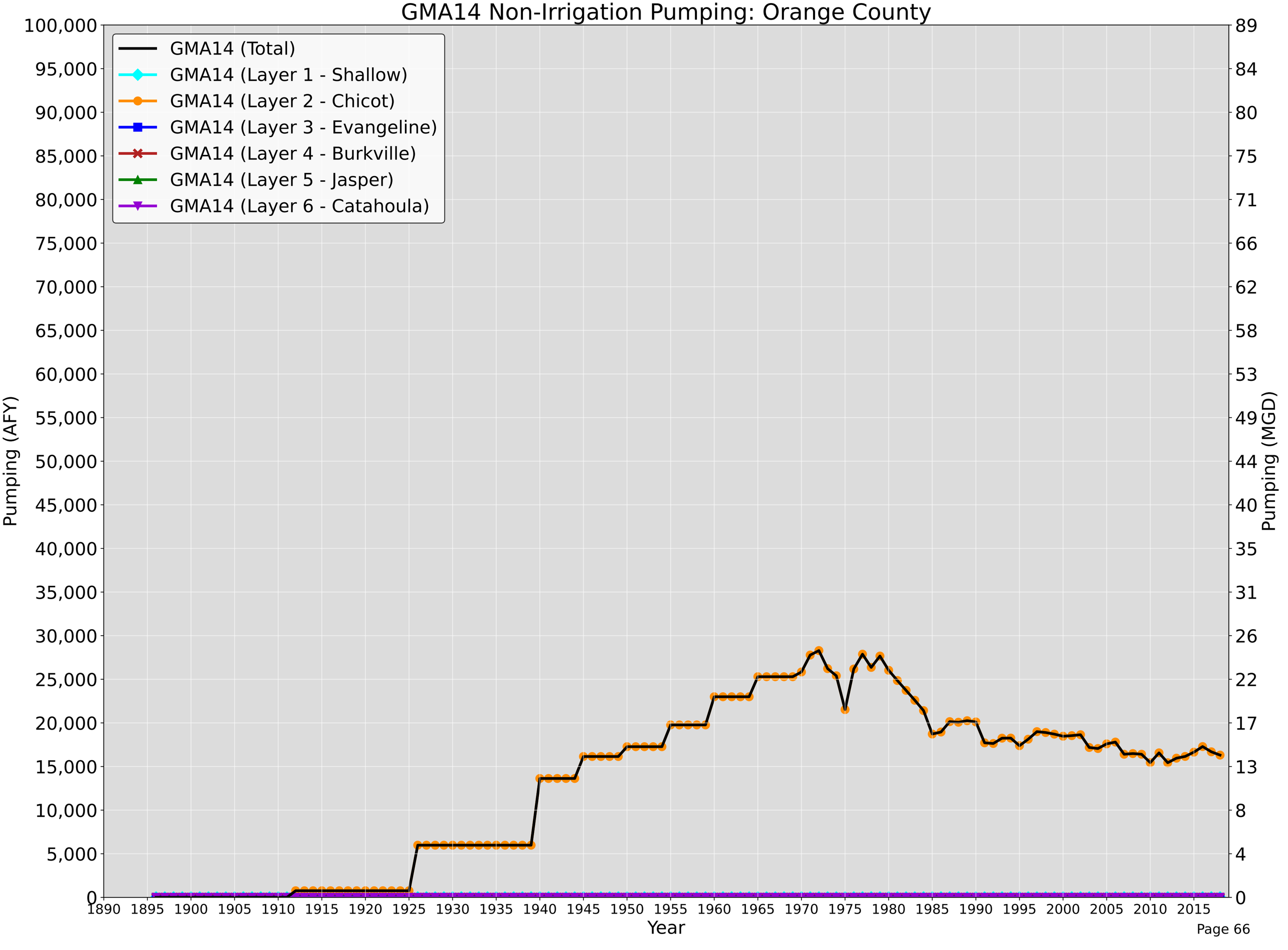
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

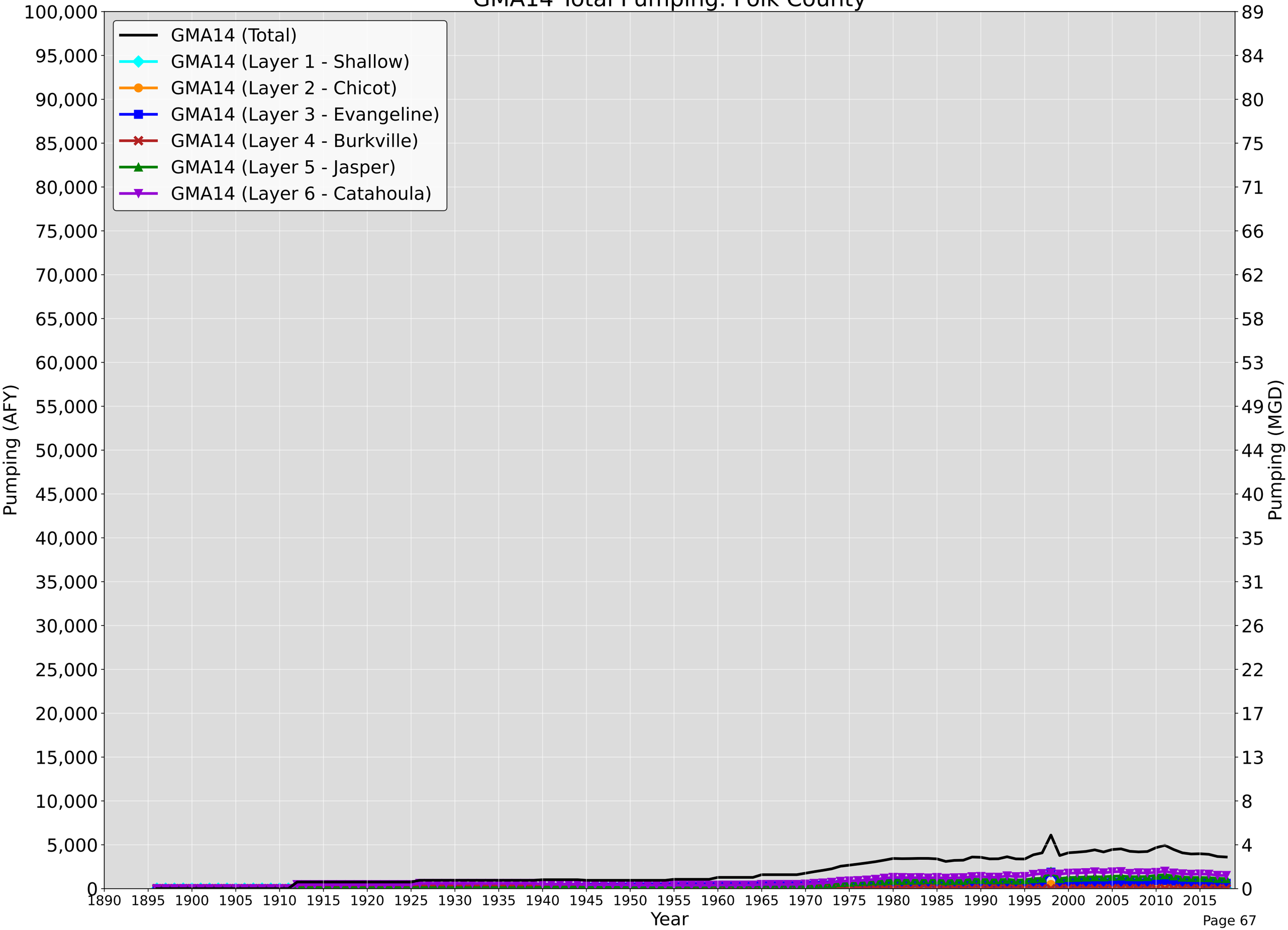
GMA14 Irrigation Pumping: Orange County



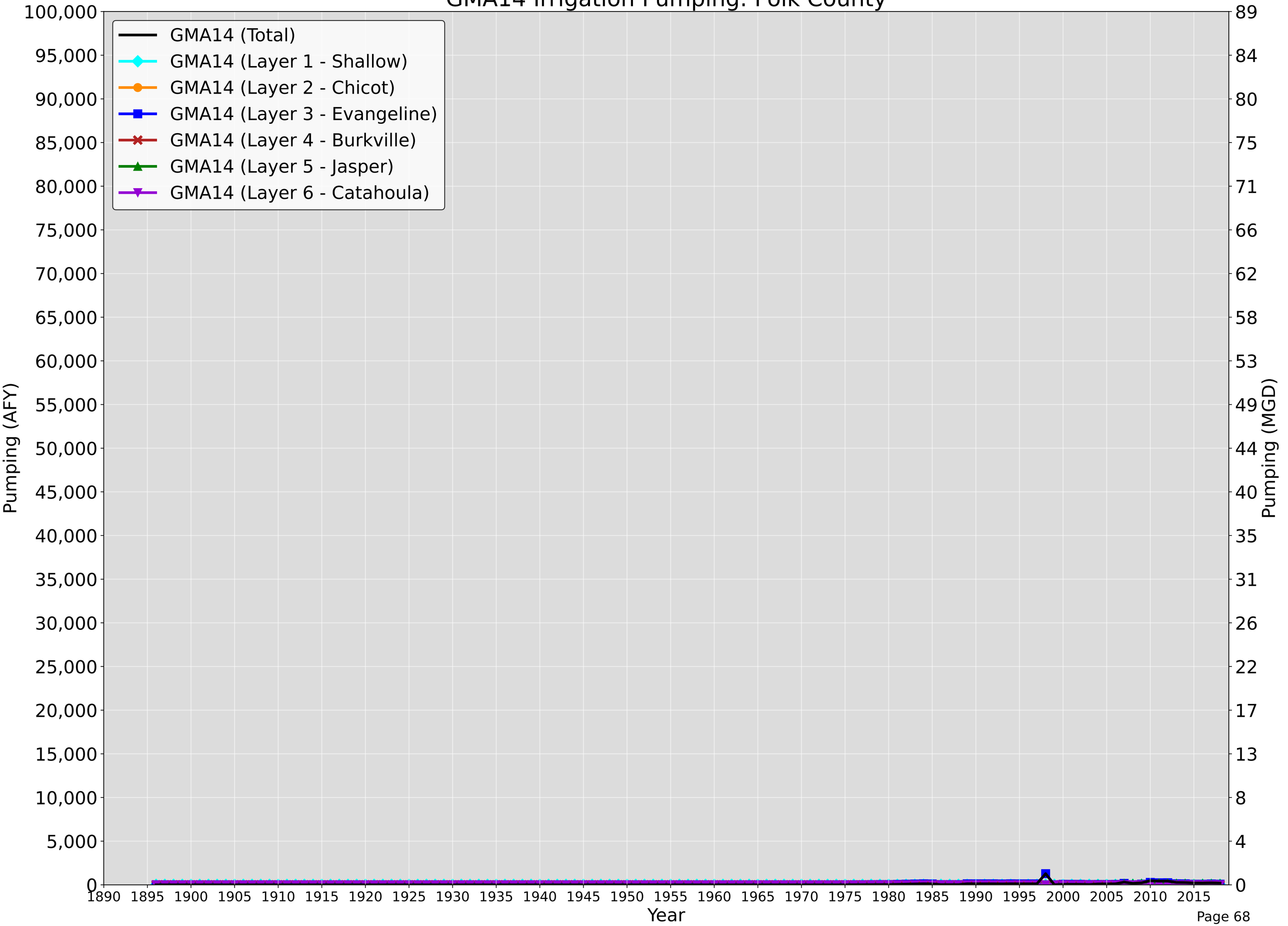
GMA14 Non-Irrigation Pumping: Orange County



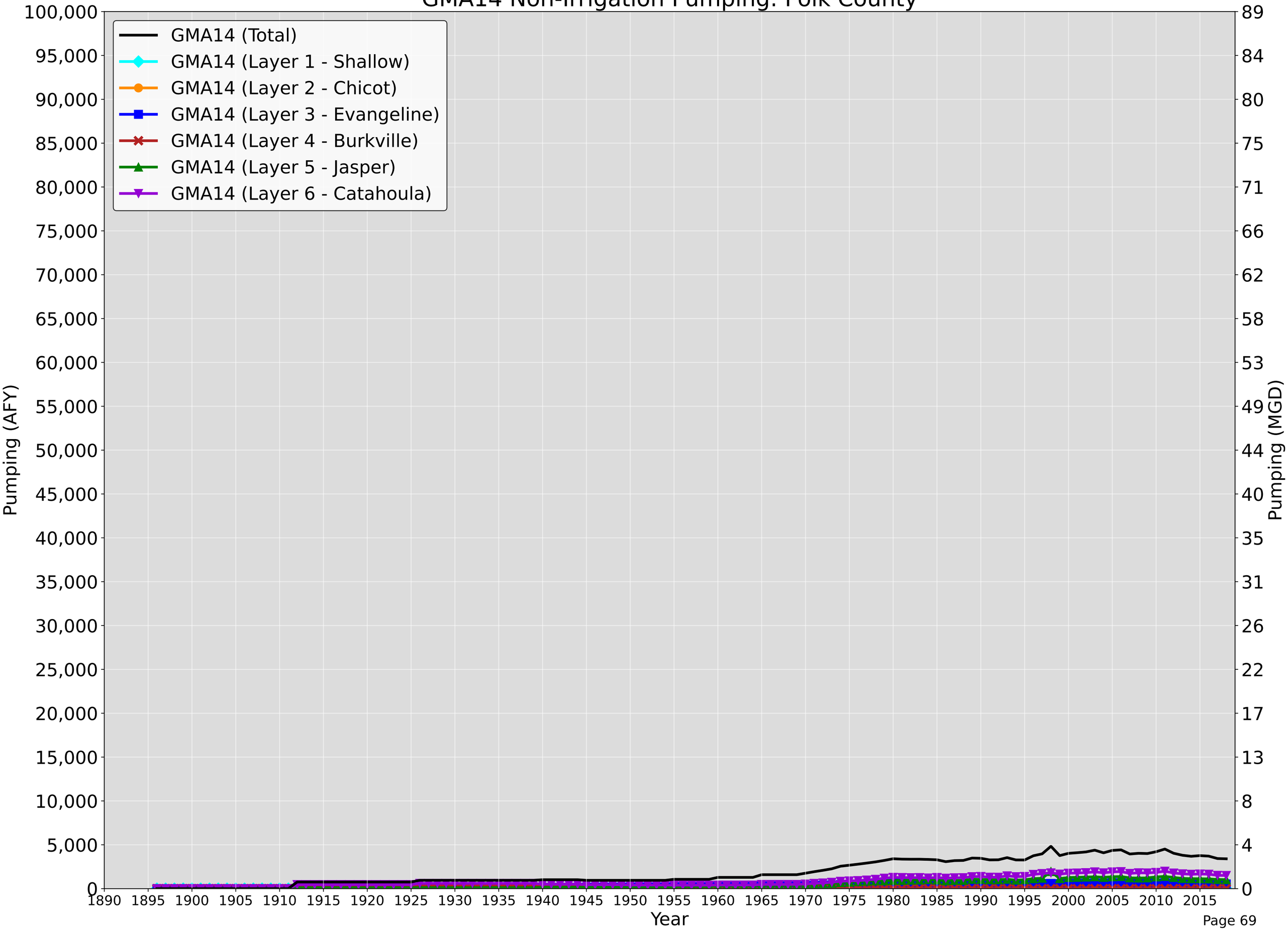
GMA14 Total Pumping: Polk County



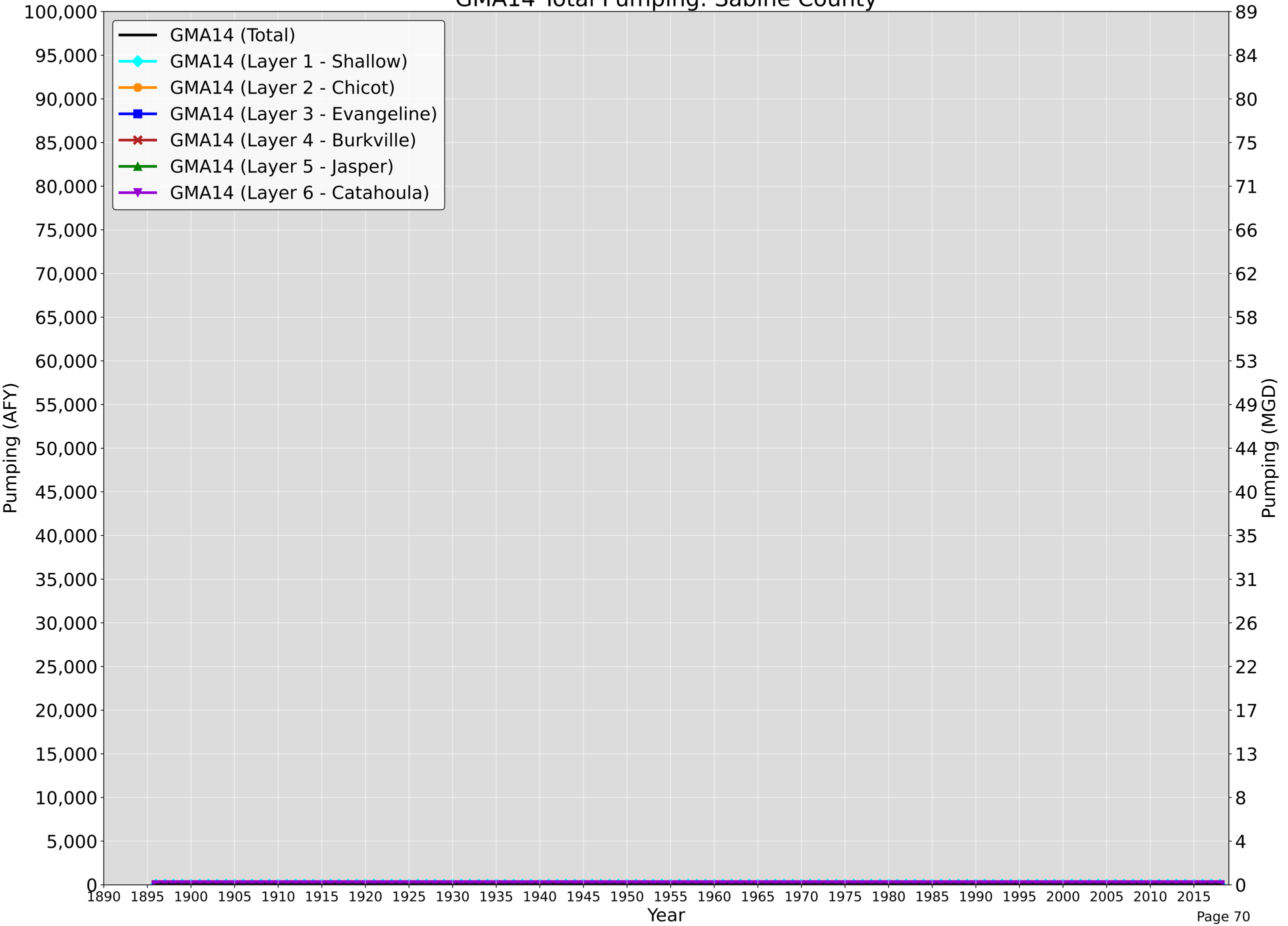
GMA14 Irrigation Pumping: Polk County



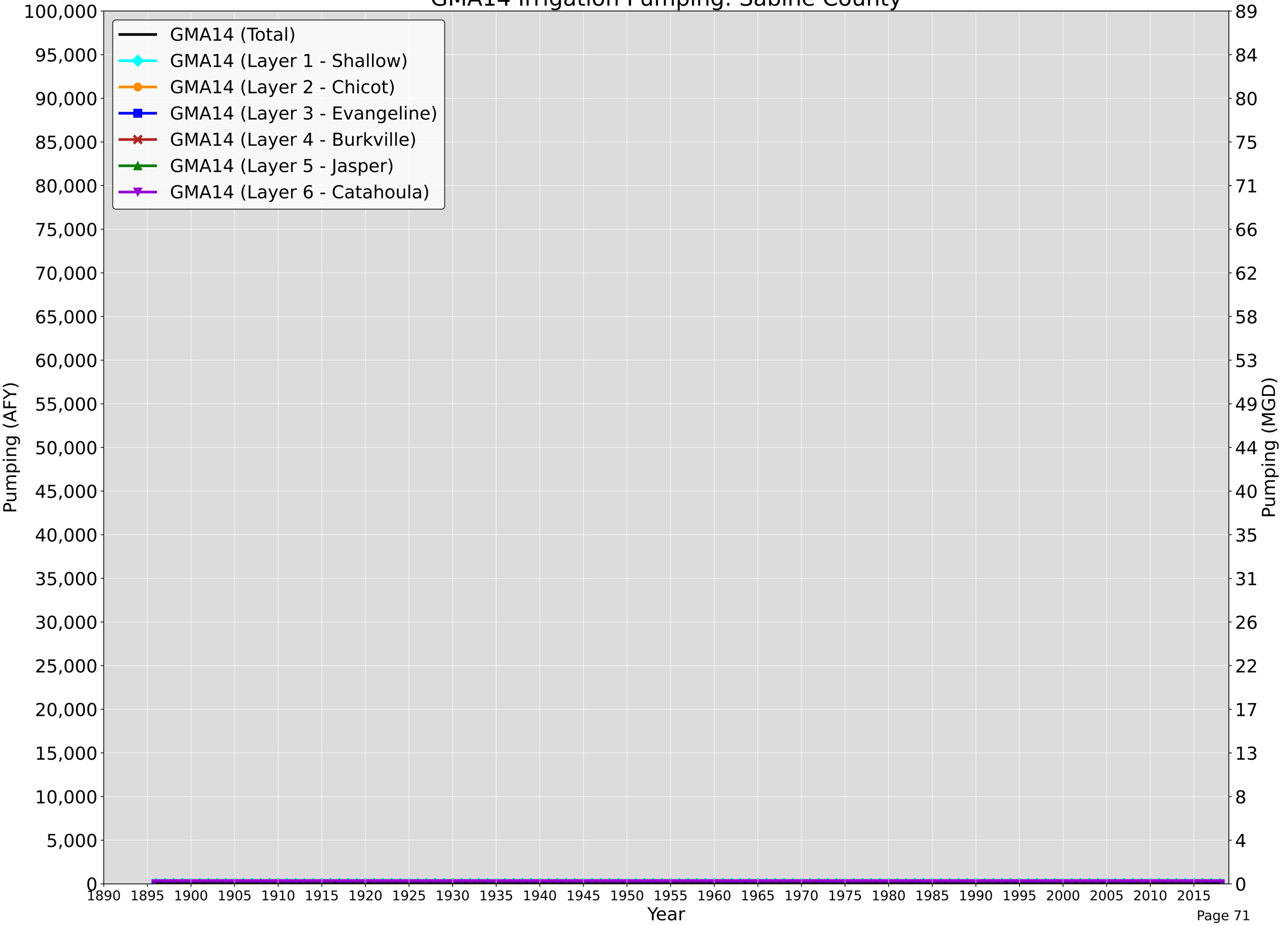
GMA14 Non-Irrigation Pumping: Polk County



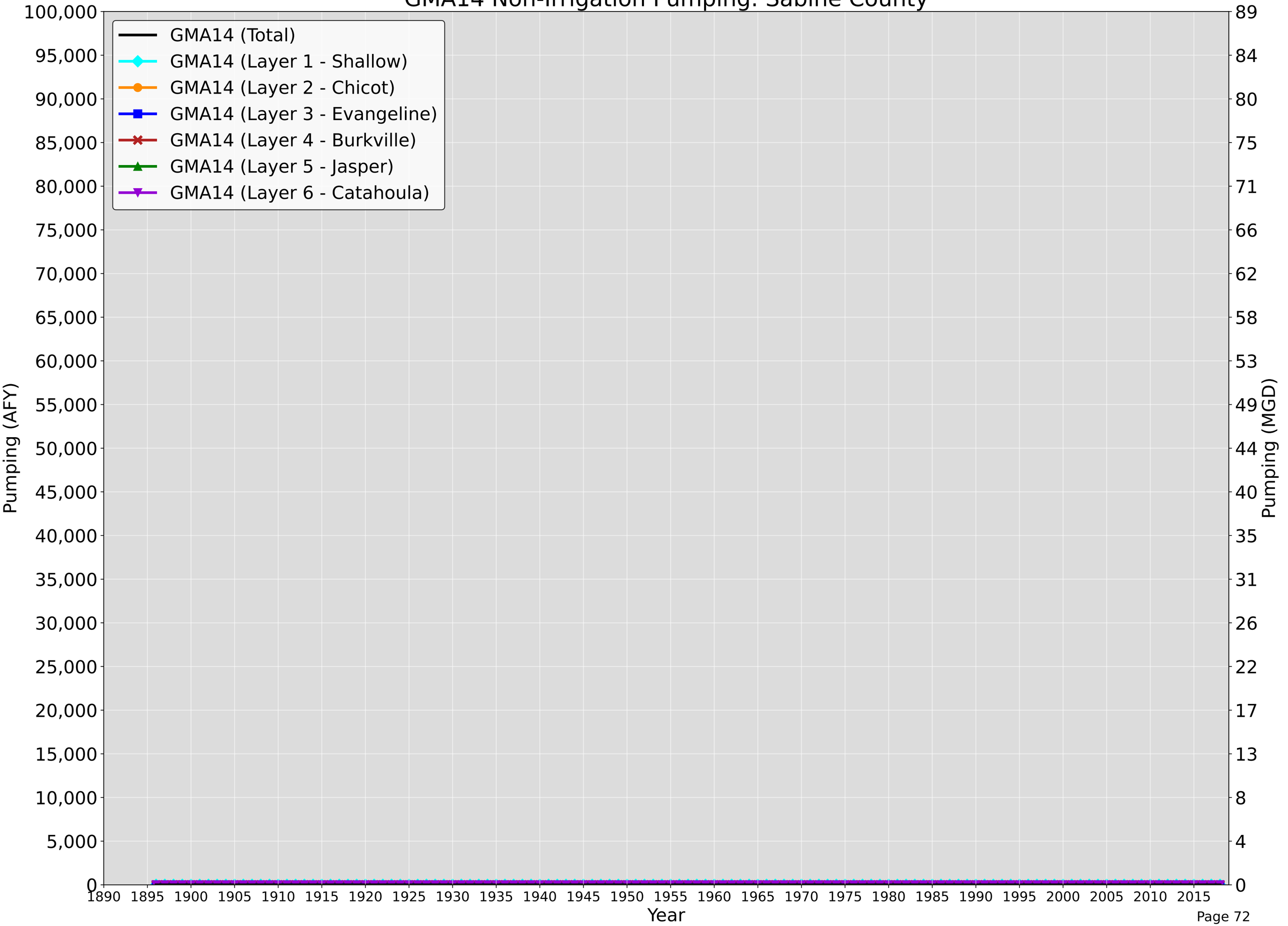
GMA14 Total Pumping: Sabine County



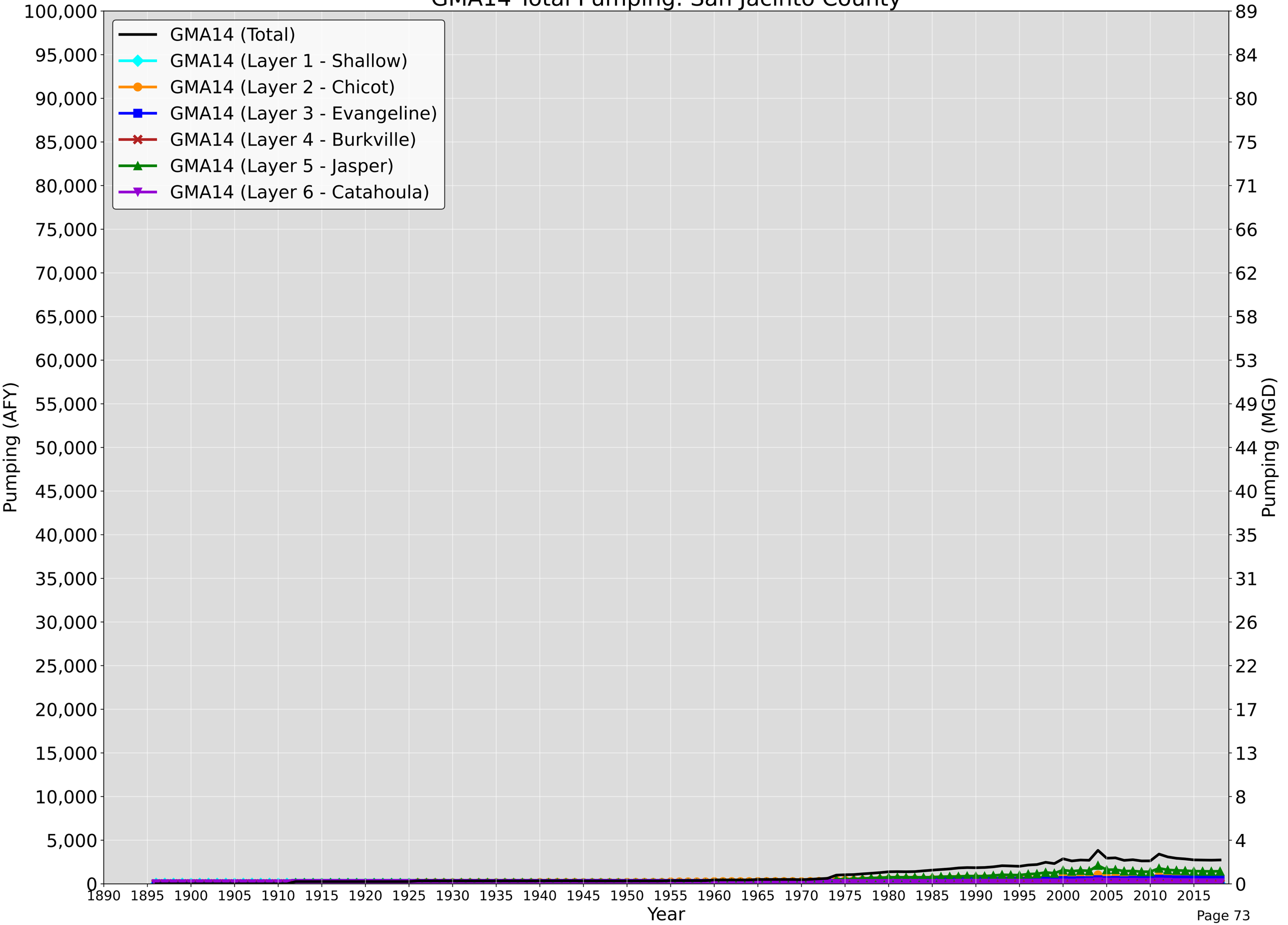
GMA14 Irrigation Pumping: Sabine County



GMA14 Non-Irrigation Pumping: Sabine County



GMA14 Total Pumping: San Jacinto County



GMA14 Irrigation Pumping: San Jacinto County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

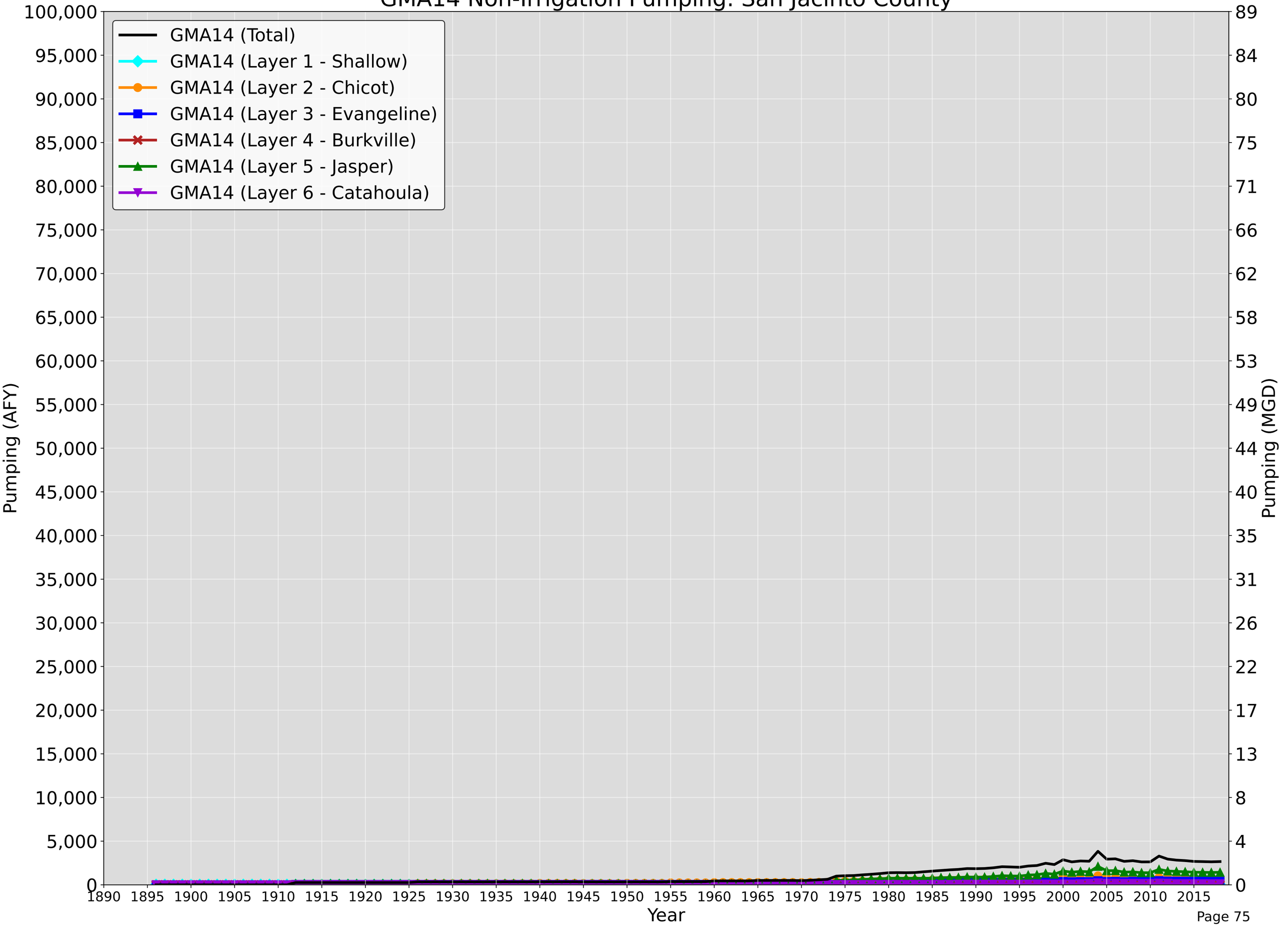
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Non-Irrigation Pumping: San Jacinto County



GMA14 Total Pumping: Trinity County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

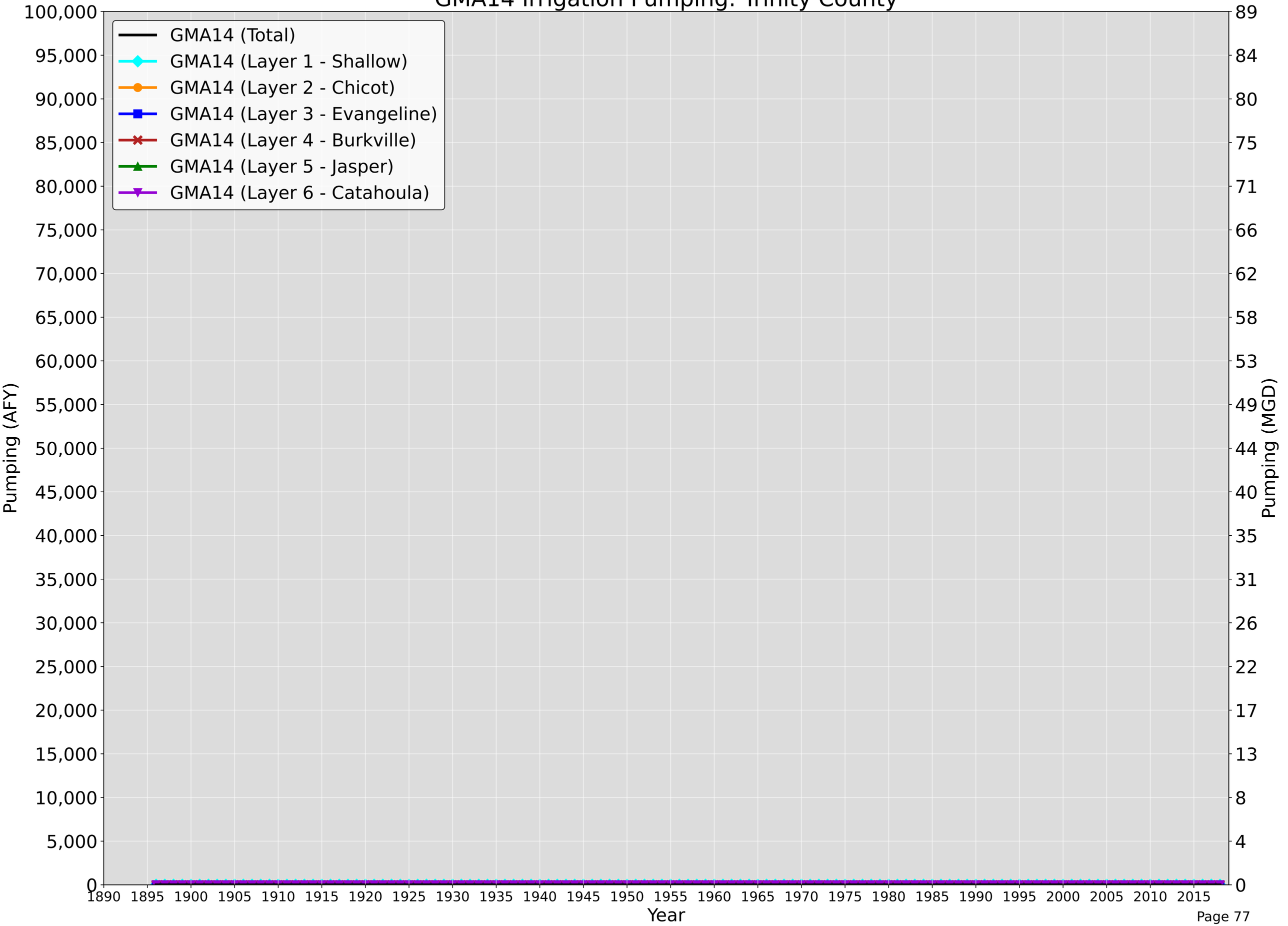
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

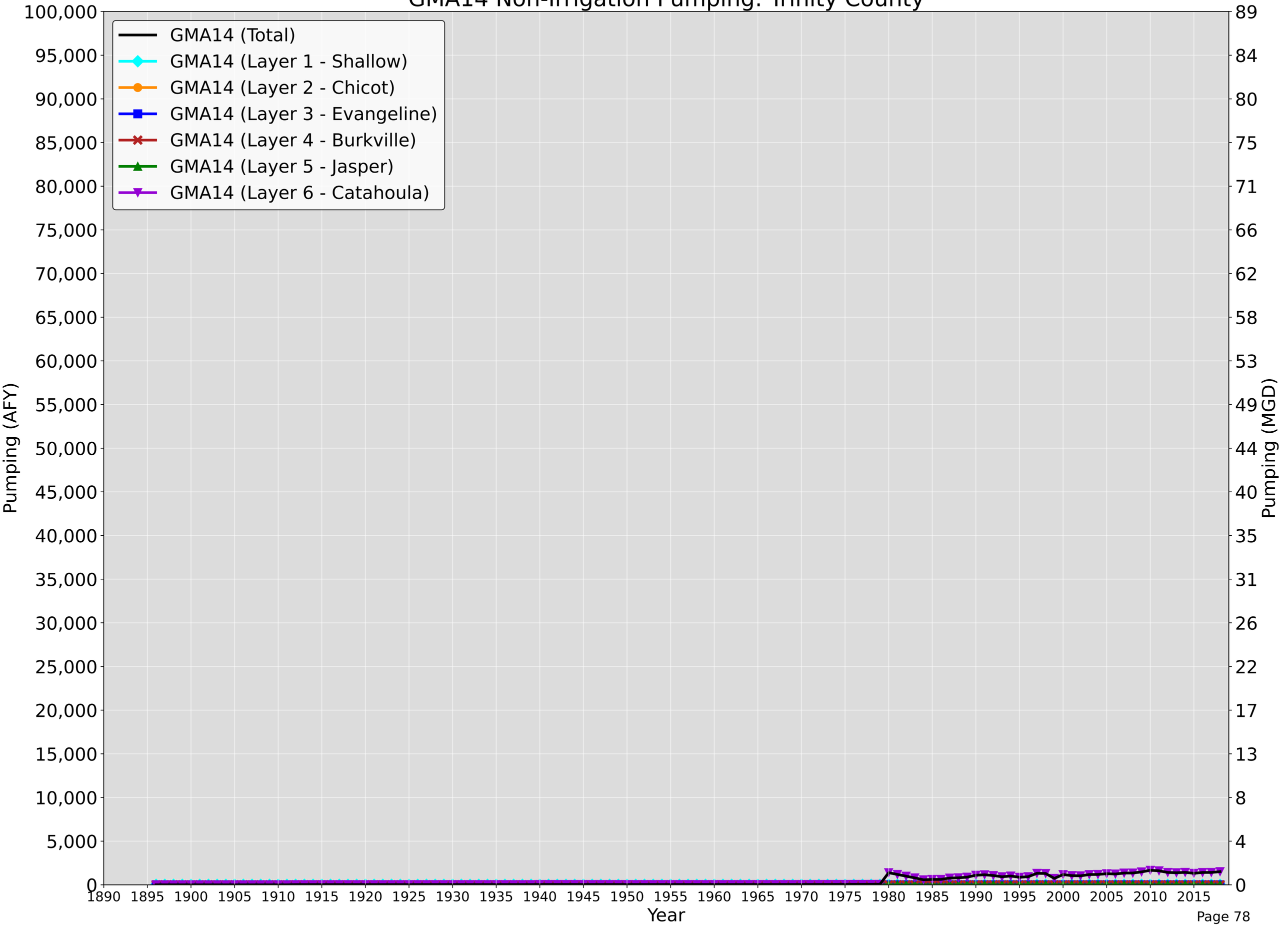
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

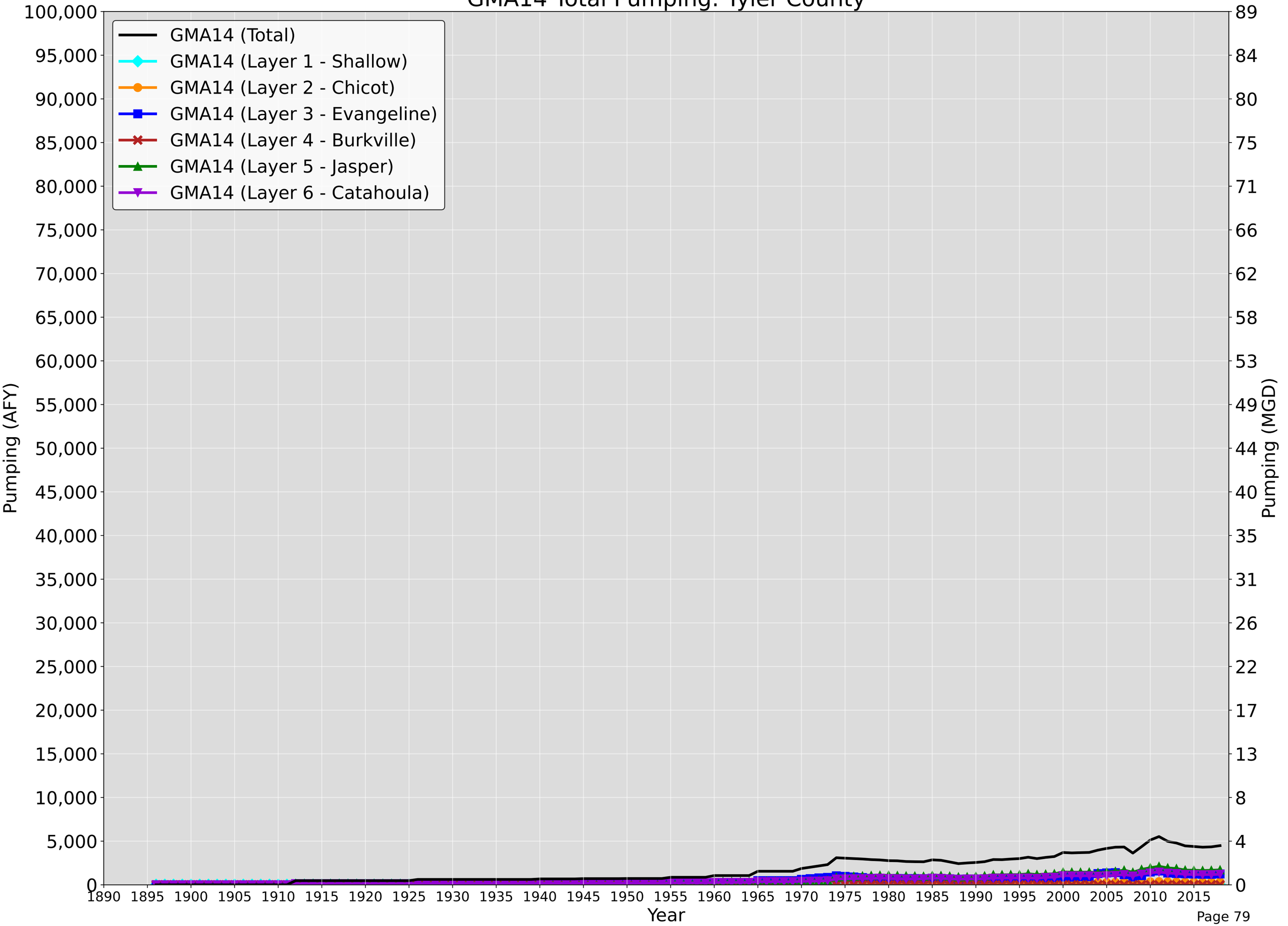
GMA14 Irrigation Pumping: Trinity County



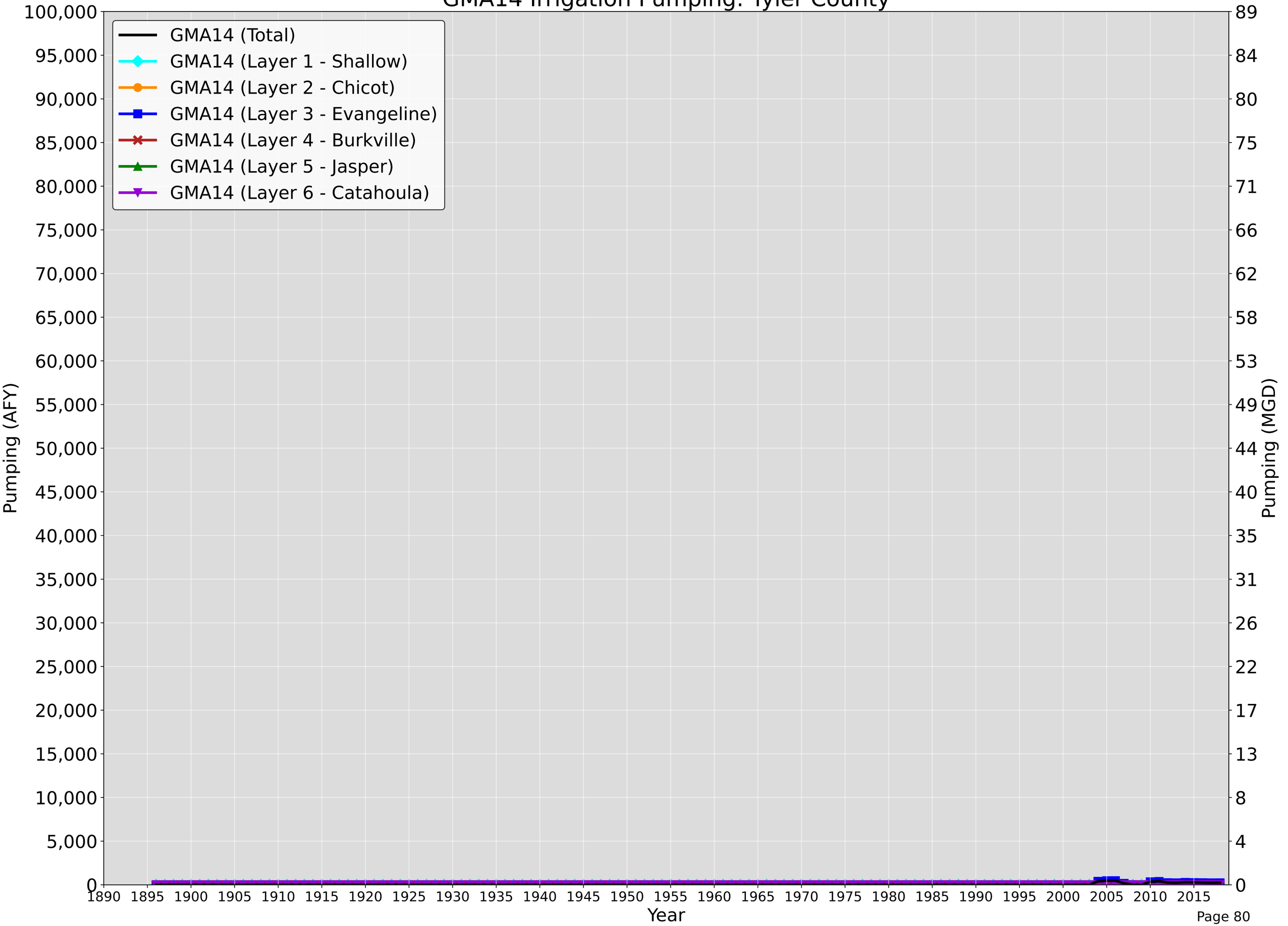
GMA14 Non-Irrigation Pumping: Trinity County



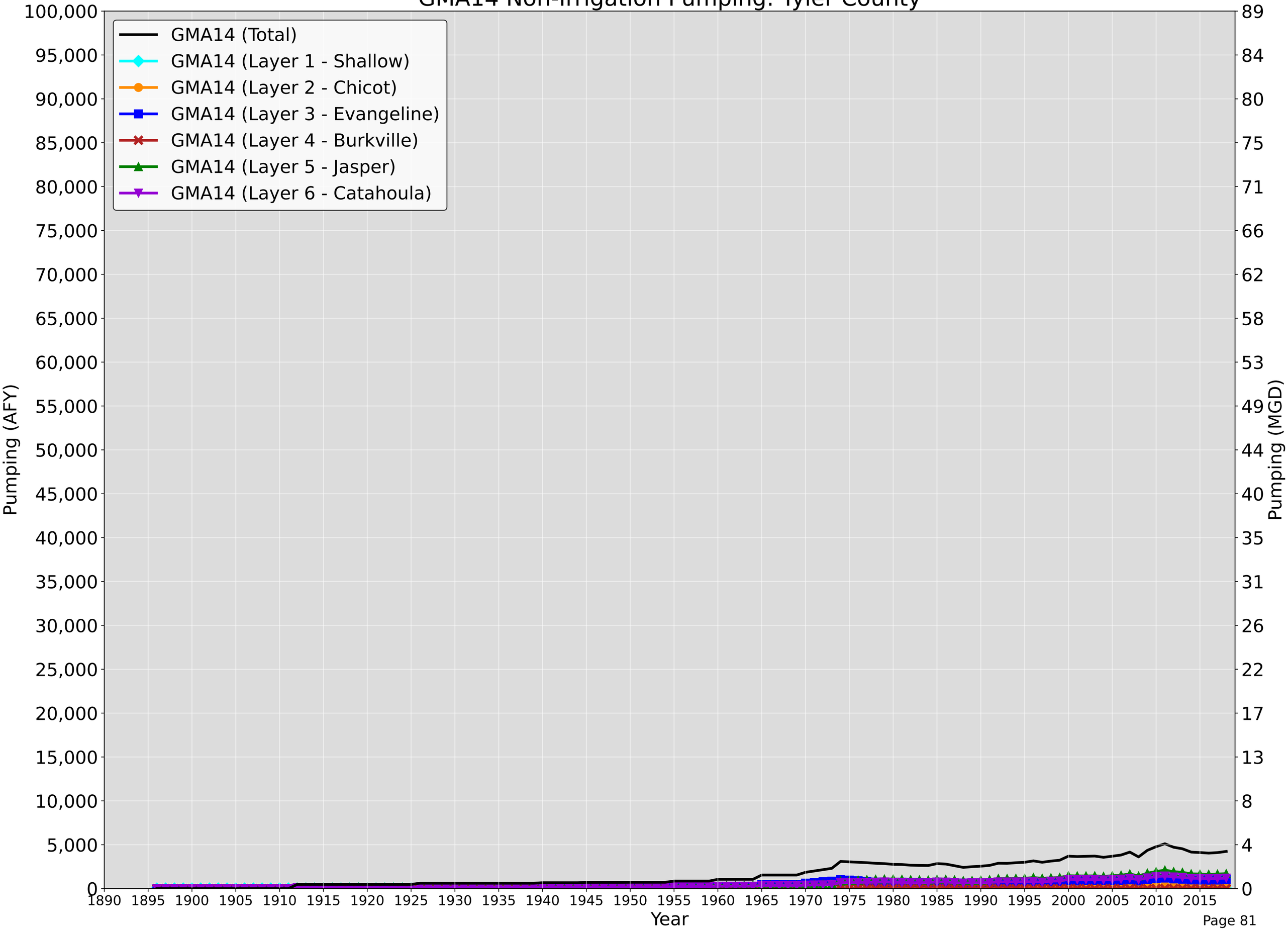
GMA14 Total Pumping: Tyler County



GMA14 Irrigation Pumping: Tyler County



GMA14 Non-Irrigation Pumping: Tyler County



GMA14 Total Pumping: Walker County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

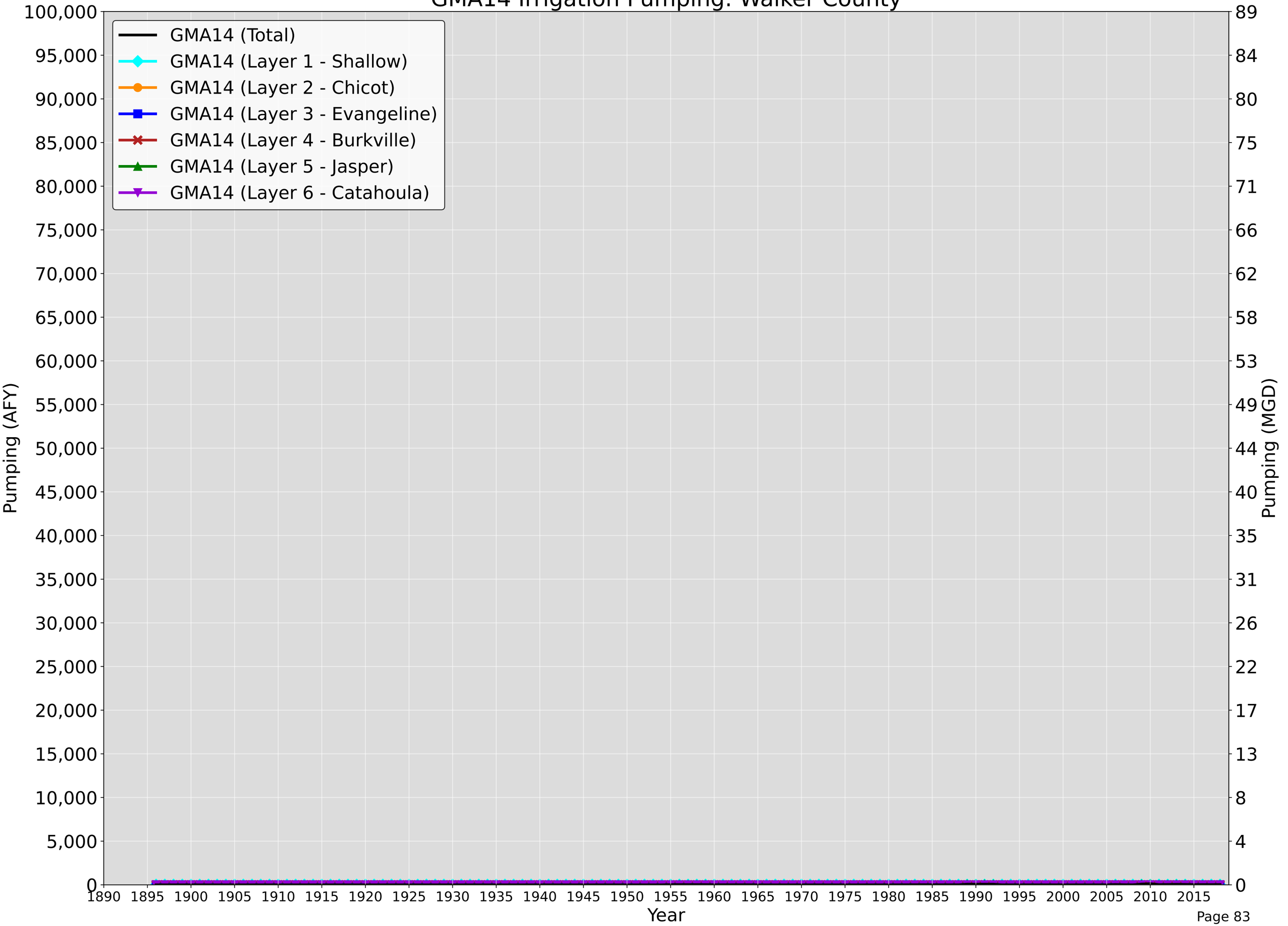
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

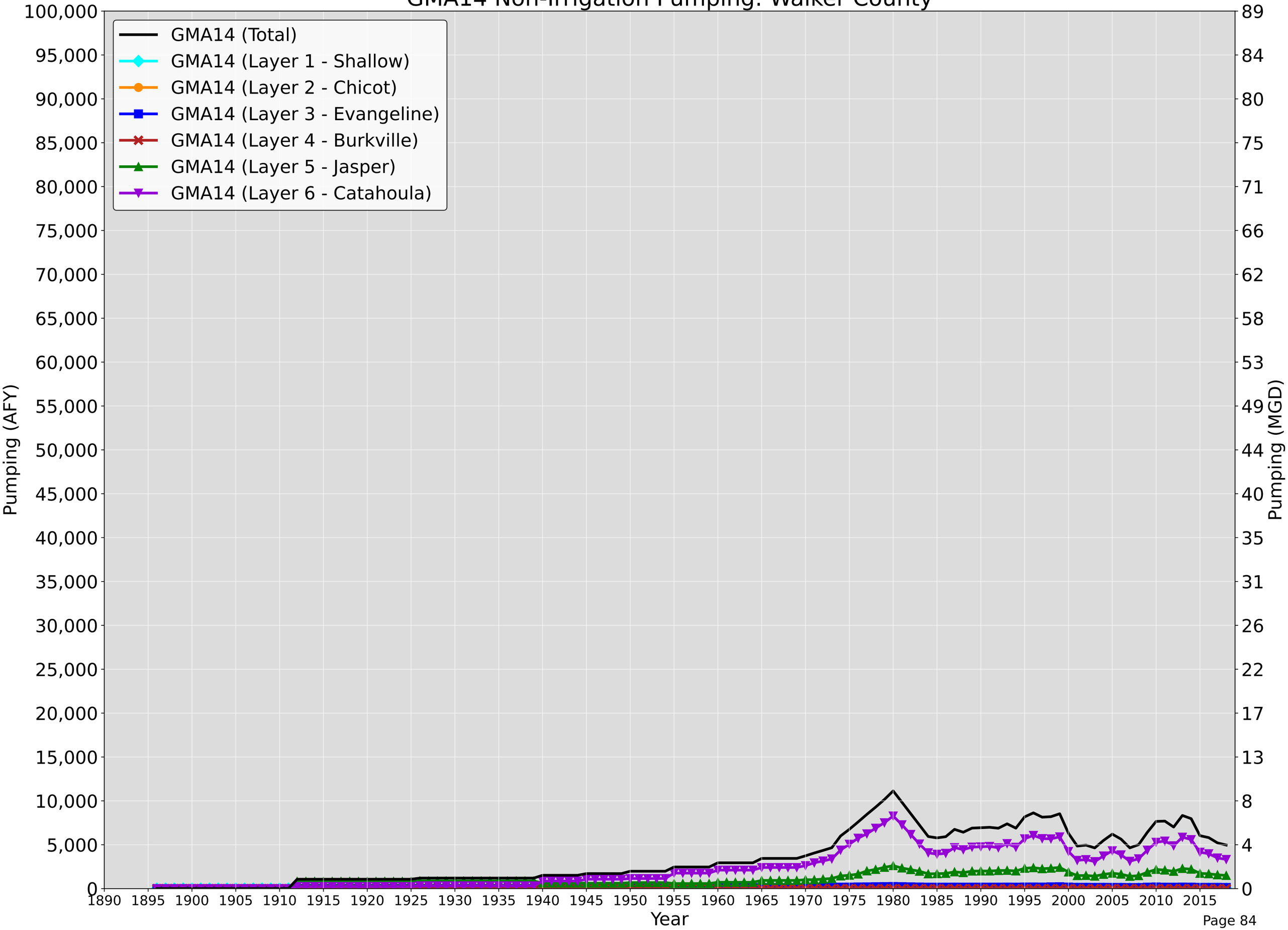
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

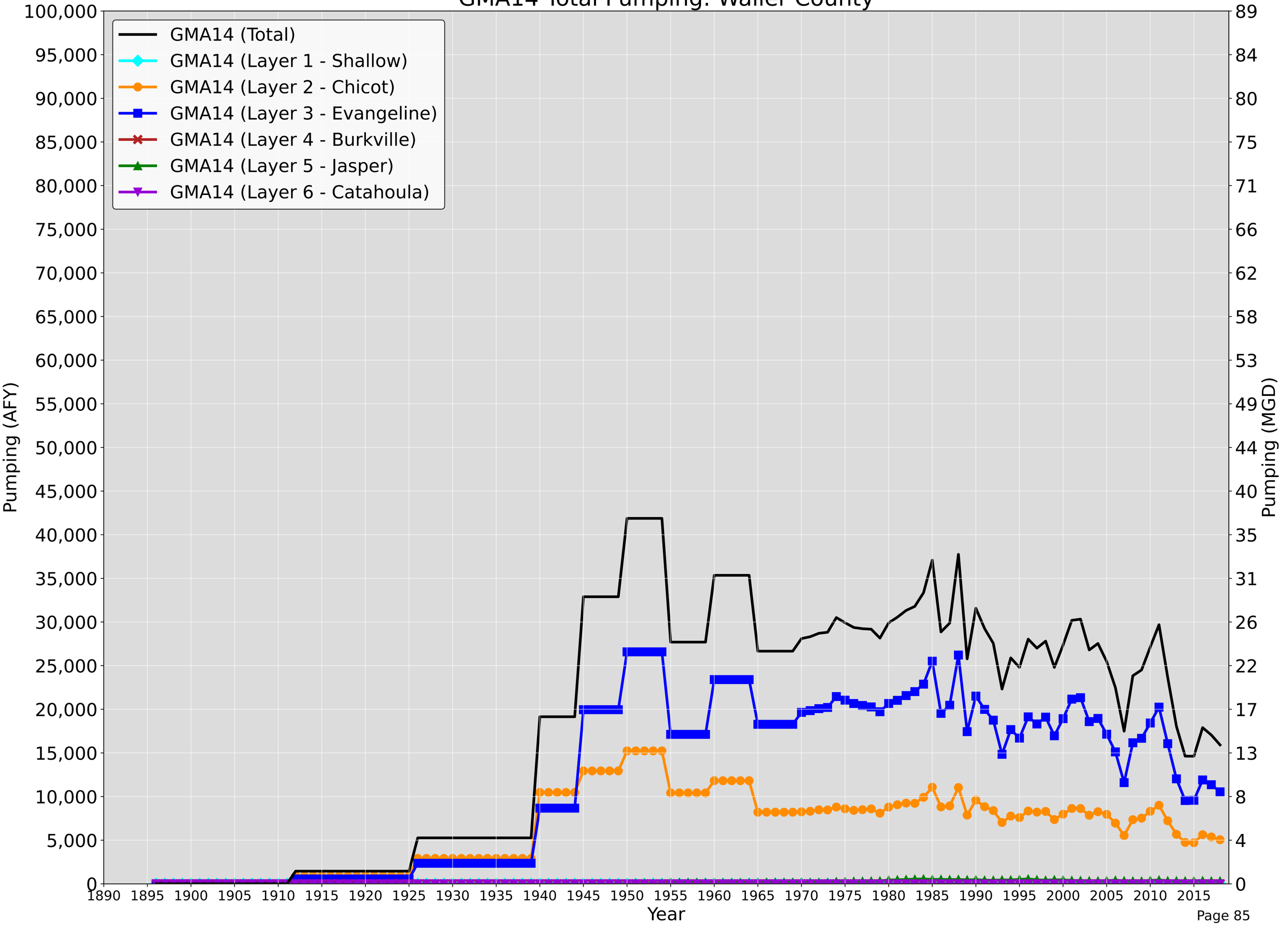
GMA14 Irrigation Pumping: Walker County



GMA14 Non-Irrigation Pumping: Walker County



GMA14 Total Pumping: Waller County



GMA14 Irrigation Pumping: Waller County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

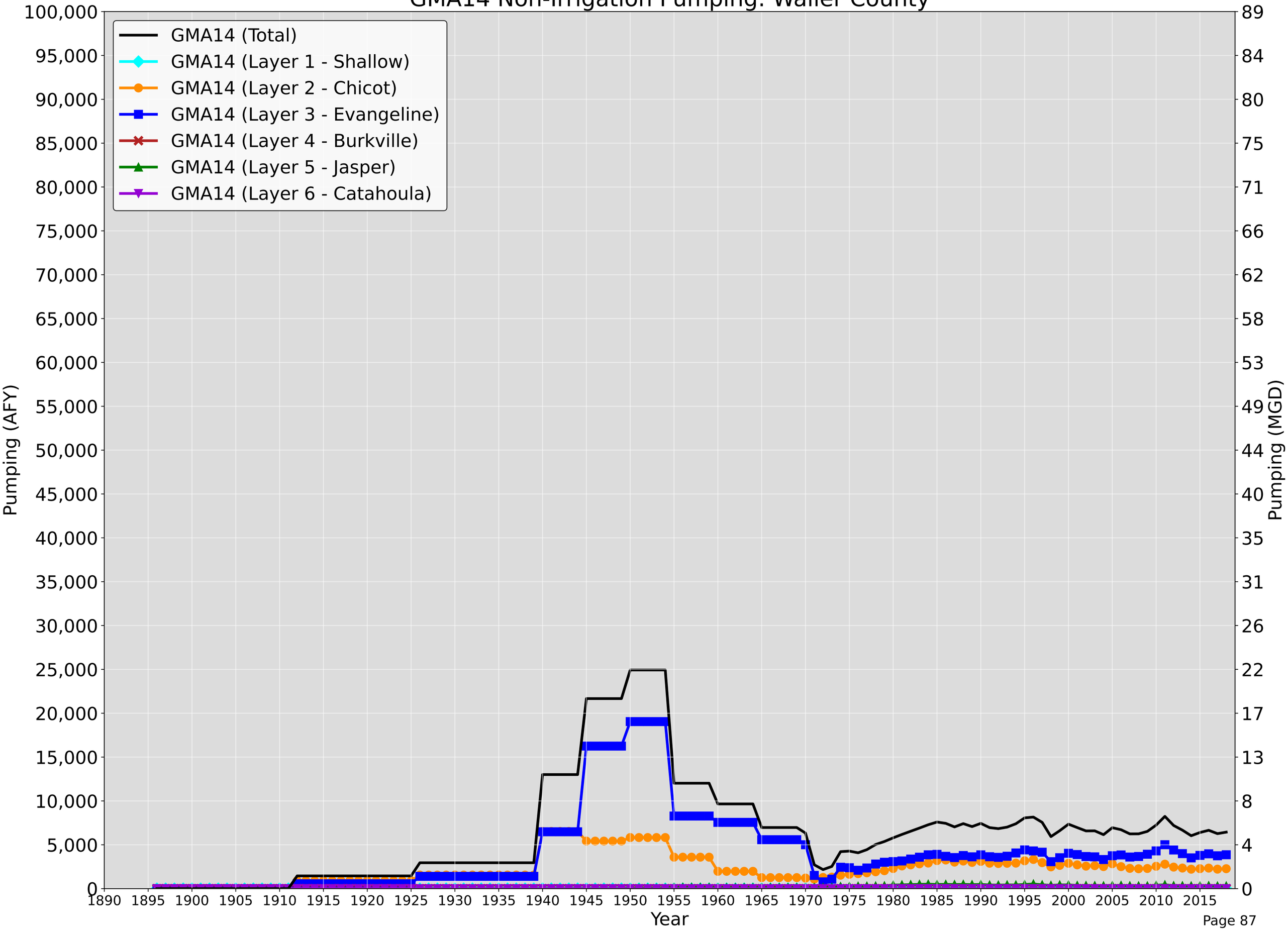
Pumping (AFY)
100,000
95,000
90,000
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0

Pumping (MGD)
89
84
80
75
71
66
62
58
53
49
44
40
35
31
26
22
17
13
8
4
0

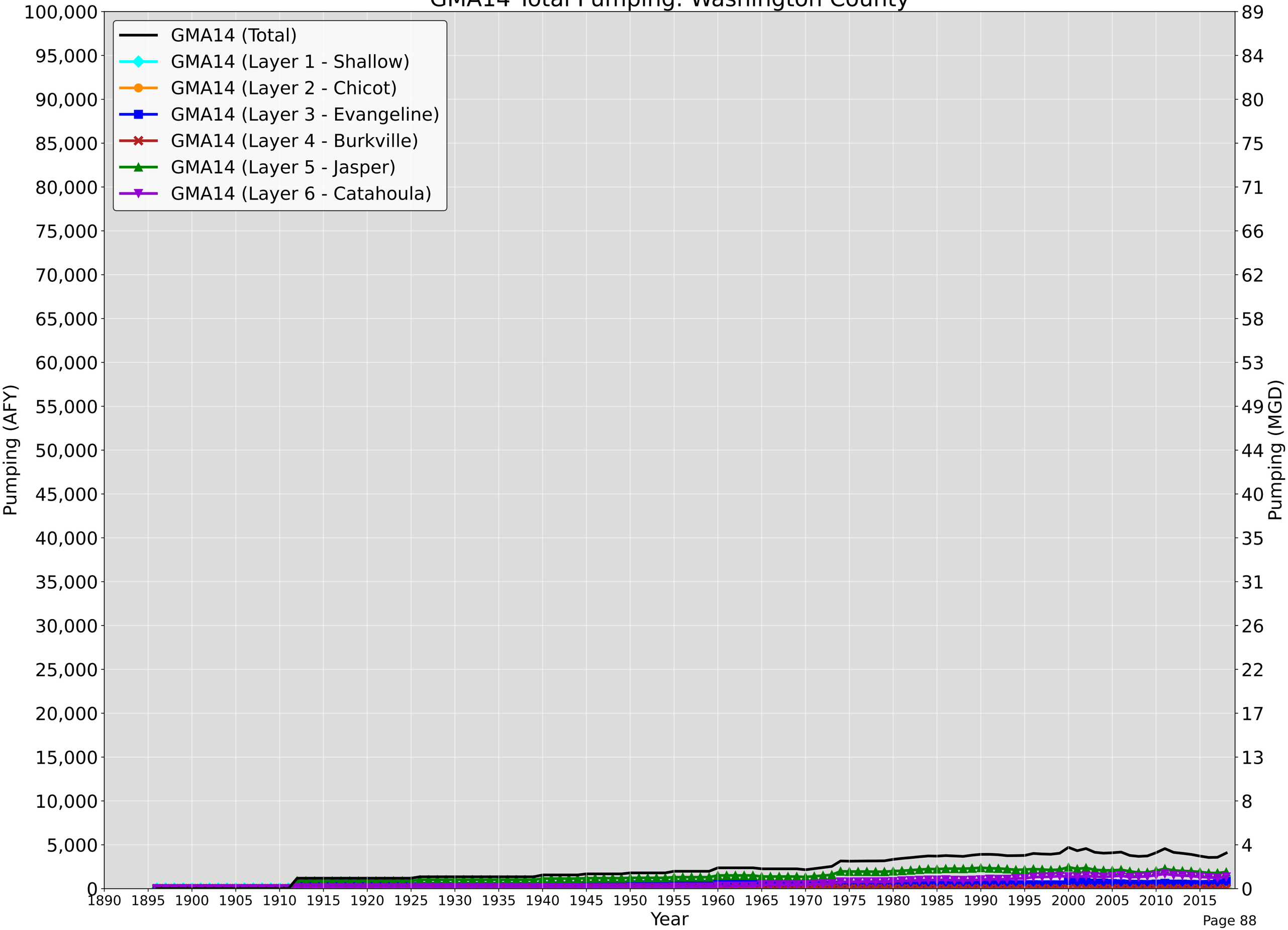
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

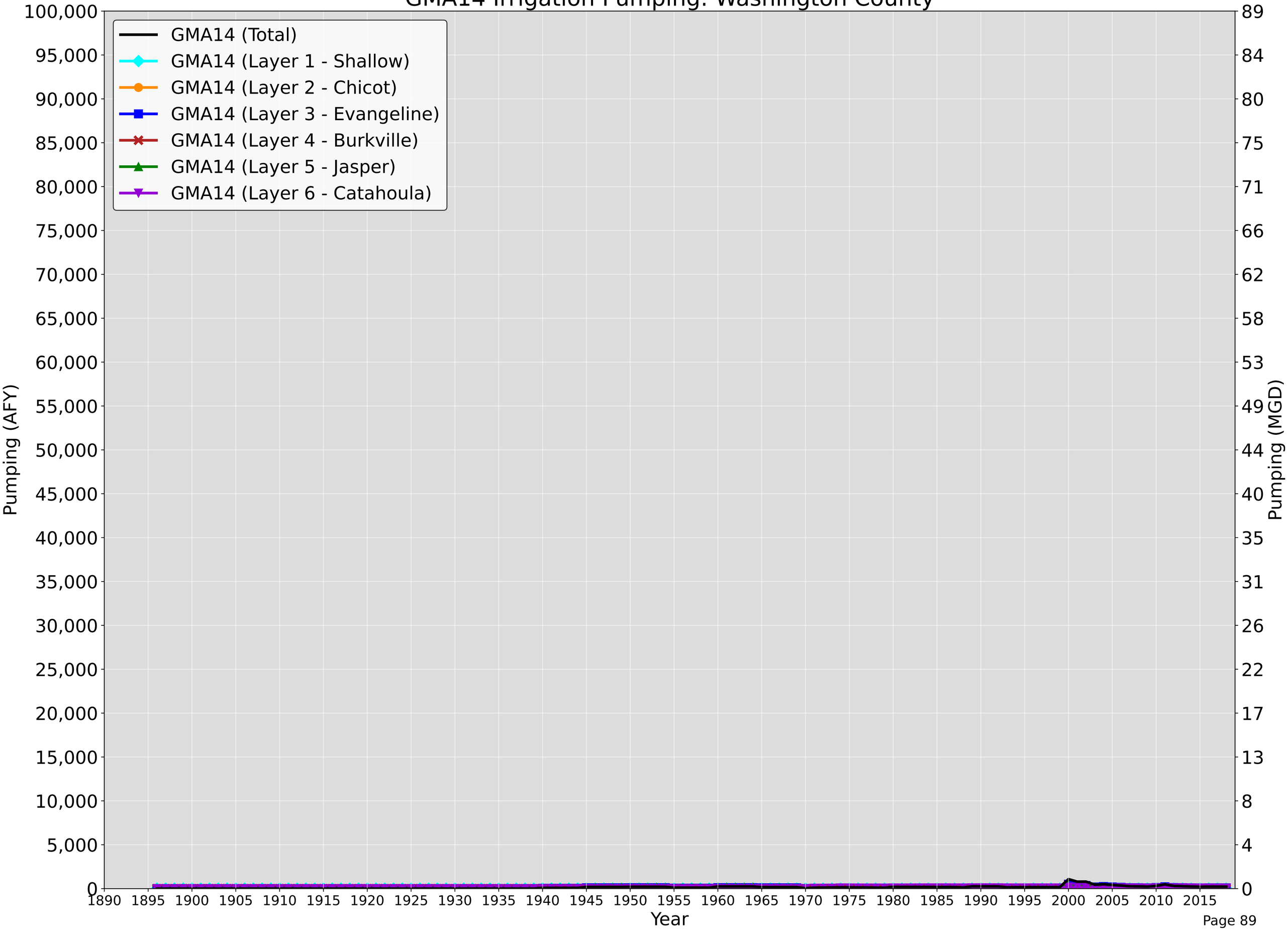
GMA14 Non-Irrigation Pumping: Waller County



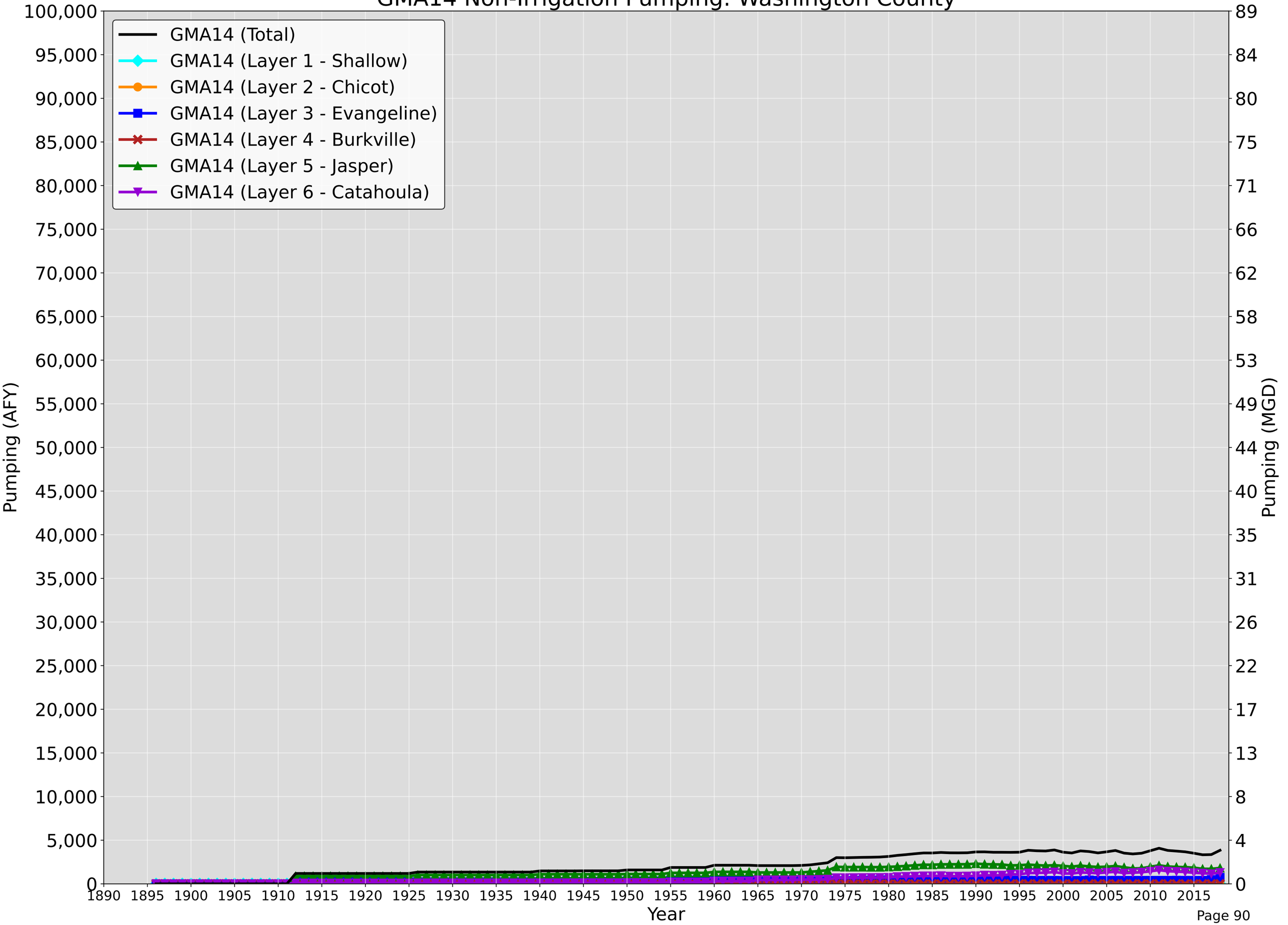
GMA14 Total Pumping: Washington County



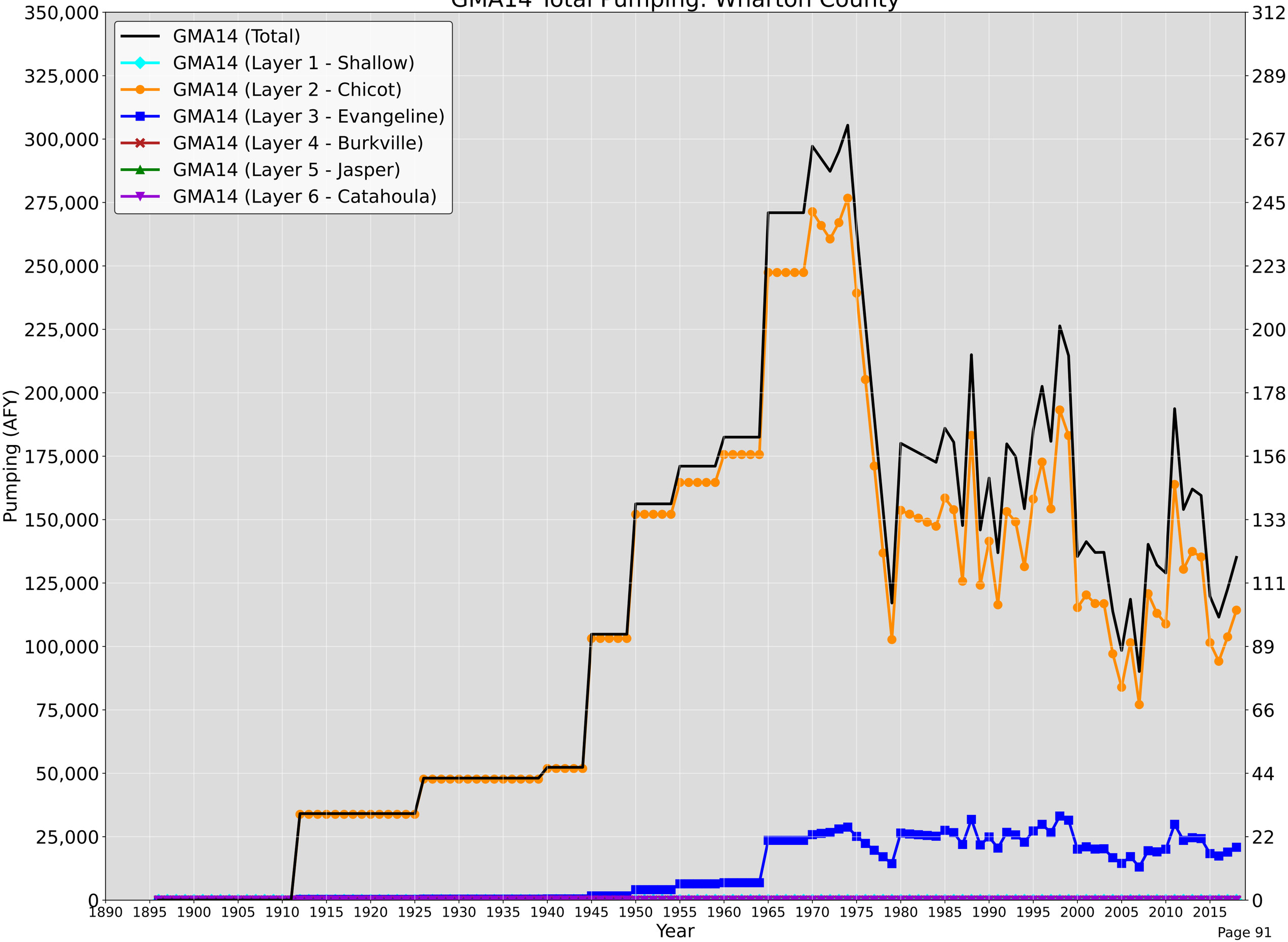
GMA14 Irrigation Pumping: Washington County



GMA14 Non-Irrigation Pumping: Washington County



GMA14 Total Pumping: Wharton County



GMA14 Irrigation Pumping: Wharton County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
250,000
225,000
200,000
175,000
150,000
125,000
100,000
75,000
50,000
25,000
0

Pumping (MGD)
223
200
178
156
133
111
89
66
44
22
0

1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Non-Irrigation Pumping: Wharton County

GMA14 (Total)
GMA14 (Layer 1 - Shallow)
GMA14 (Layer 2 - Chicot)
GMA14 (Layer 3 - Evangeline)
GMA14 (Layer 4 - Burkville)
GMA14 (Layer 5 - Jasper)
GMA14 (Layer 6 - Catahoula)

Pumping (AFY)
160,000
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0

Pumping (MGD)
142
133
124
116
107
98
89
80
71
62
53
44
35
26
17
8
0

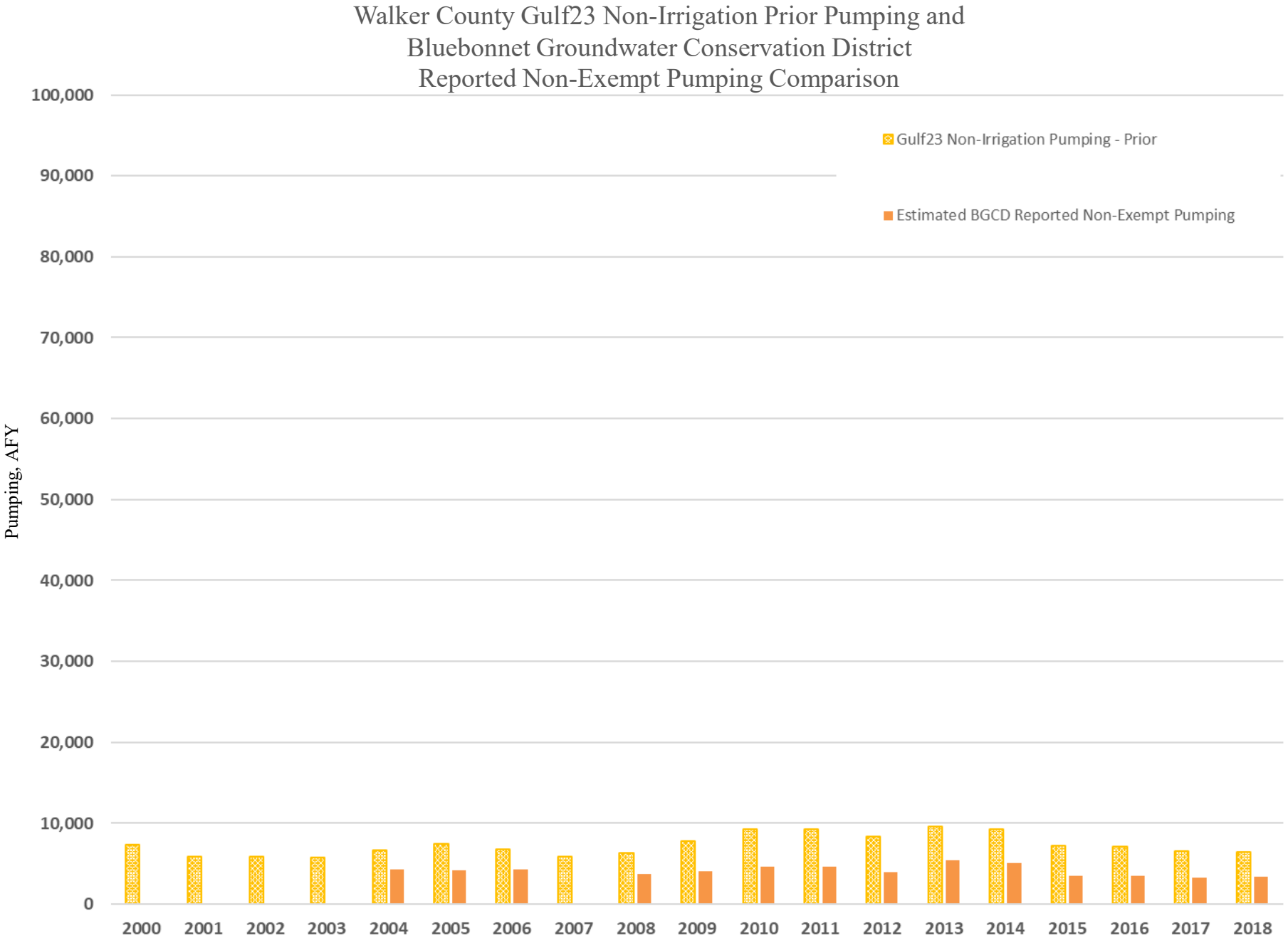
1890 1895 1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

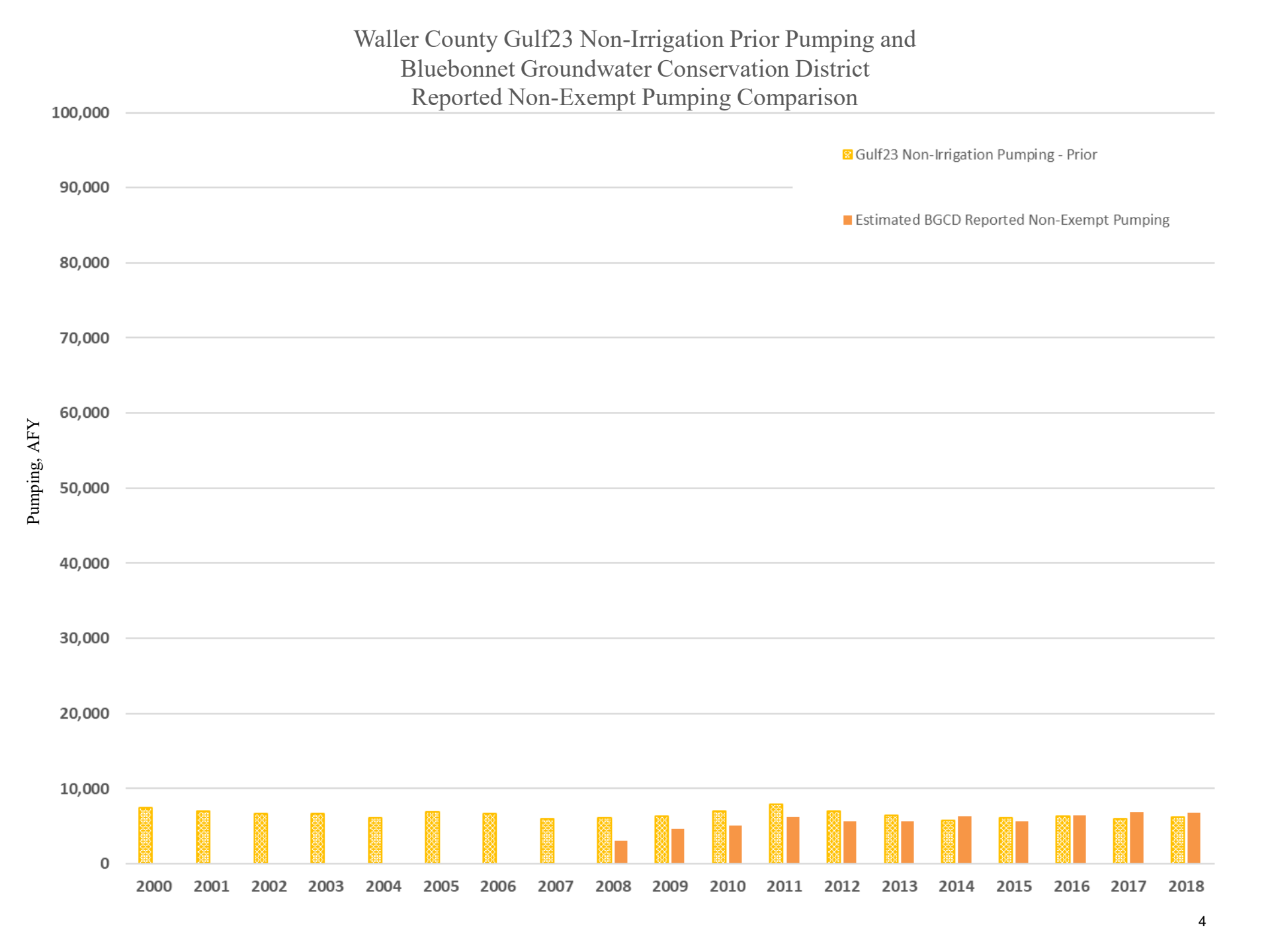
Year

Appendix 5 — Comparison of GULF-2023 Pumping Inputs and Reported Groundwater Conservation District Permitted Production Data

Austin County Gulf23 Non-Irrigation Prior Pumping and
Bluebonnet Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated BGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

Grimes County Gulf23 Non-Irrigation Prior Pumping and
Bluebonnet Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf 23 Non-Irrigation Pumping - Prior
Estimated BGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Walker County Gulf23 Non-Irrigation Prior Pumping and
Bluebonnet Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated BGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Waller County Gulf23 Non-Irrigation Prior Pumping and
Bluebonnet Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated BGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
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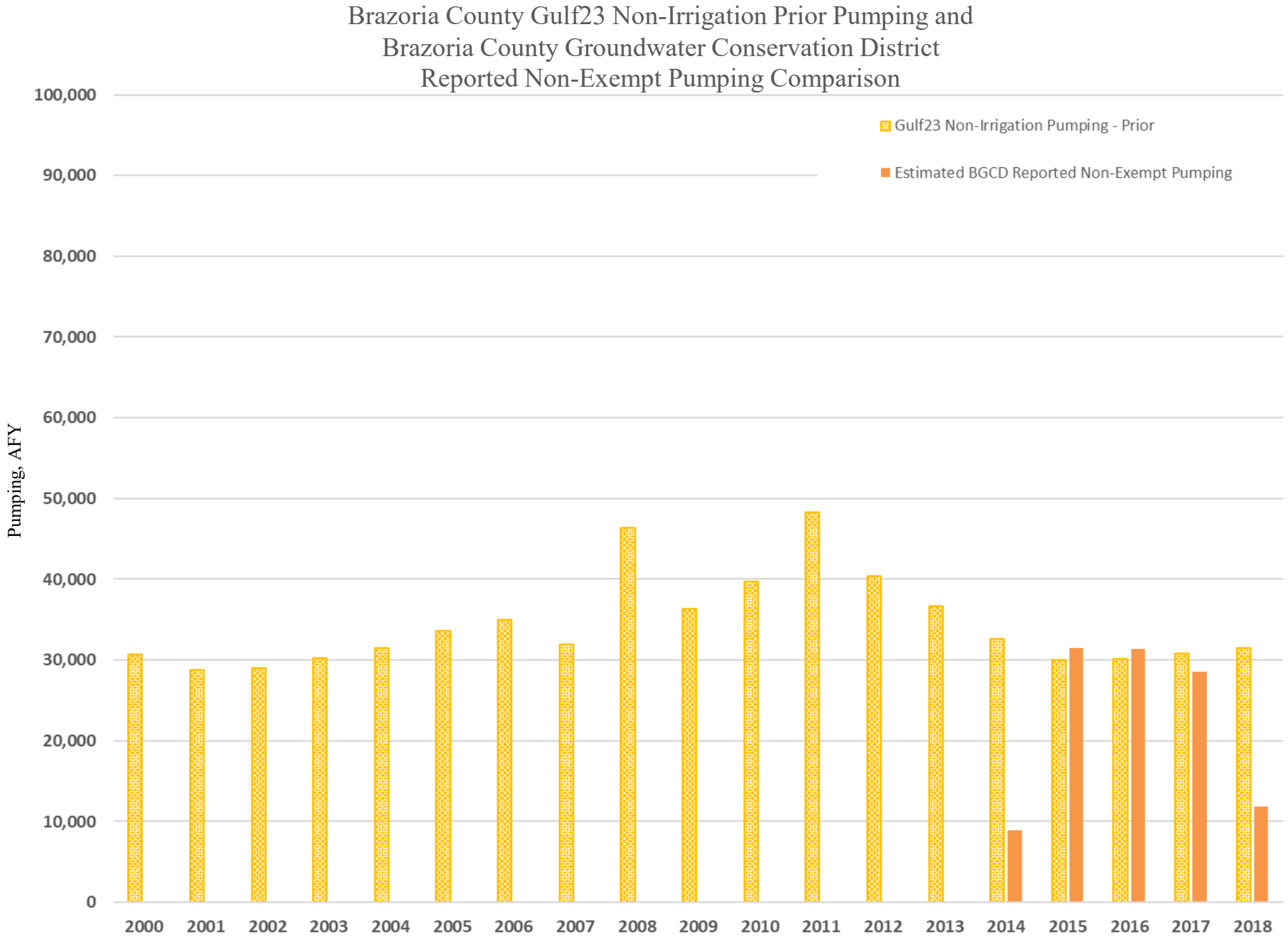
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Brazoria County Gulf23 Non-Irrigation Prior Pumping and
Brazoria County Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated BGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
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2011
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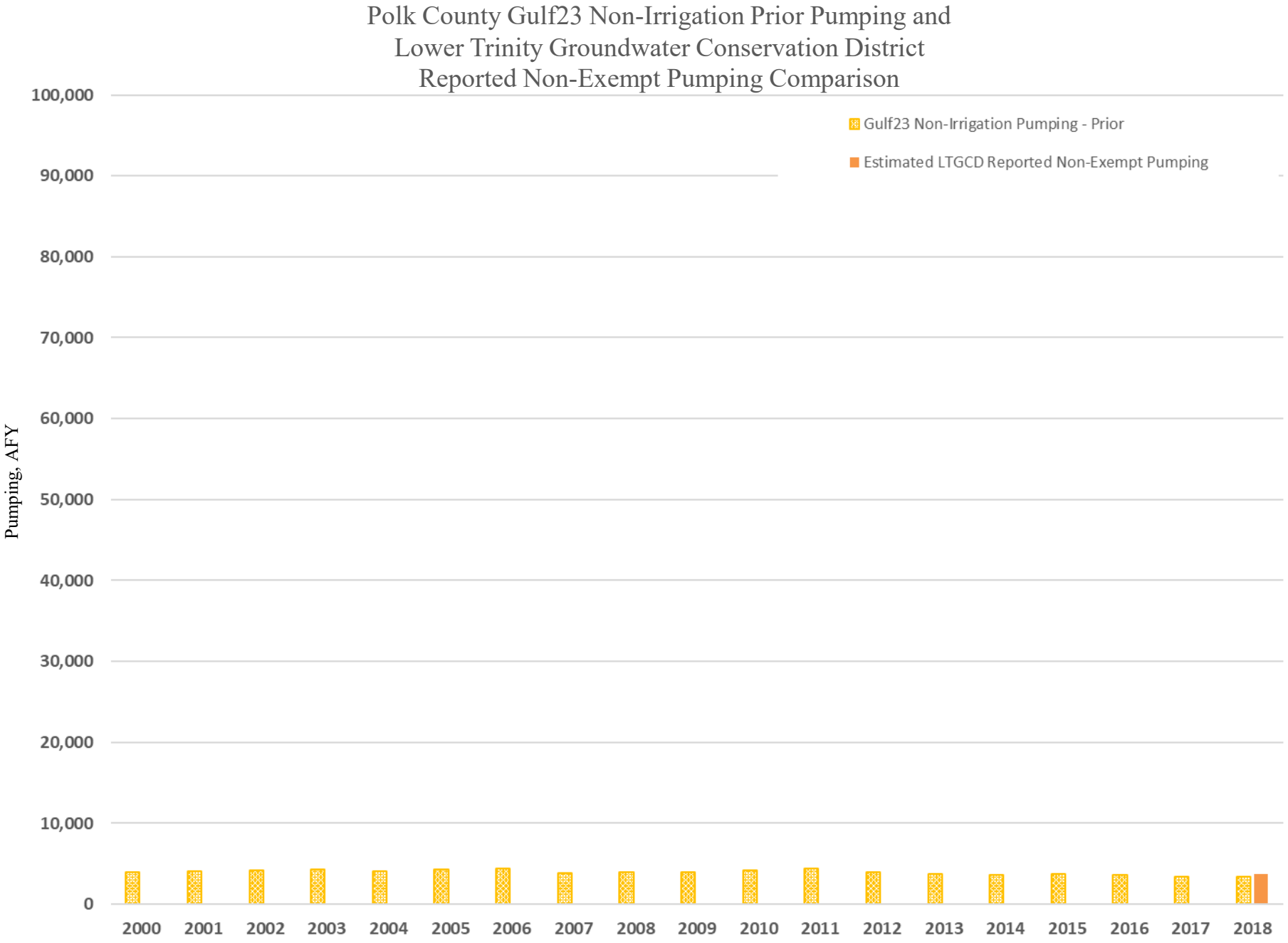
2014
2015
2016
2017
2018


Polk County Gulf23 Non-Irrigation Prior Pumping and
Lower Trinity Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated LTGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
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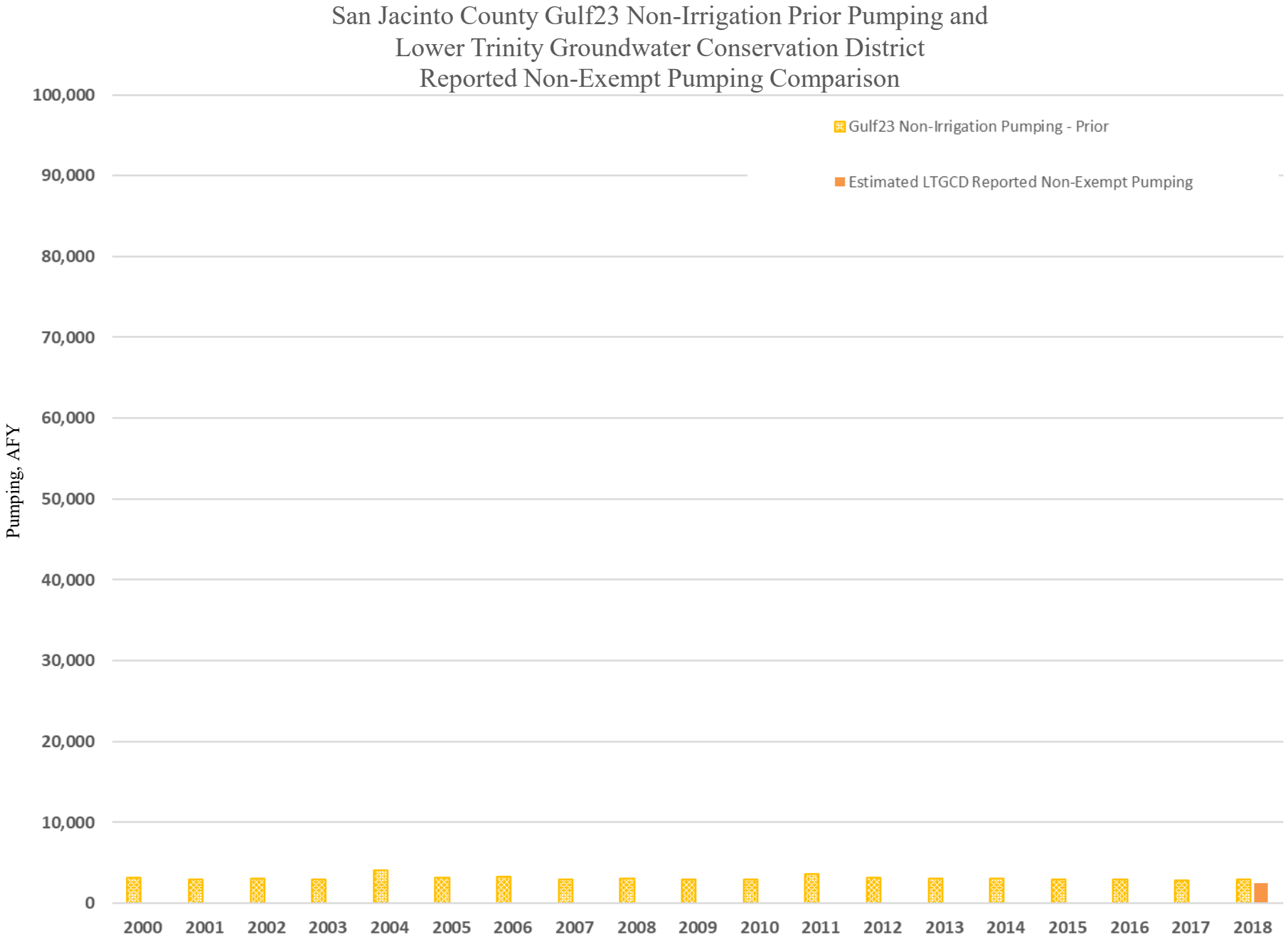
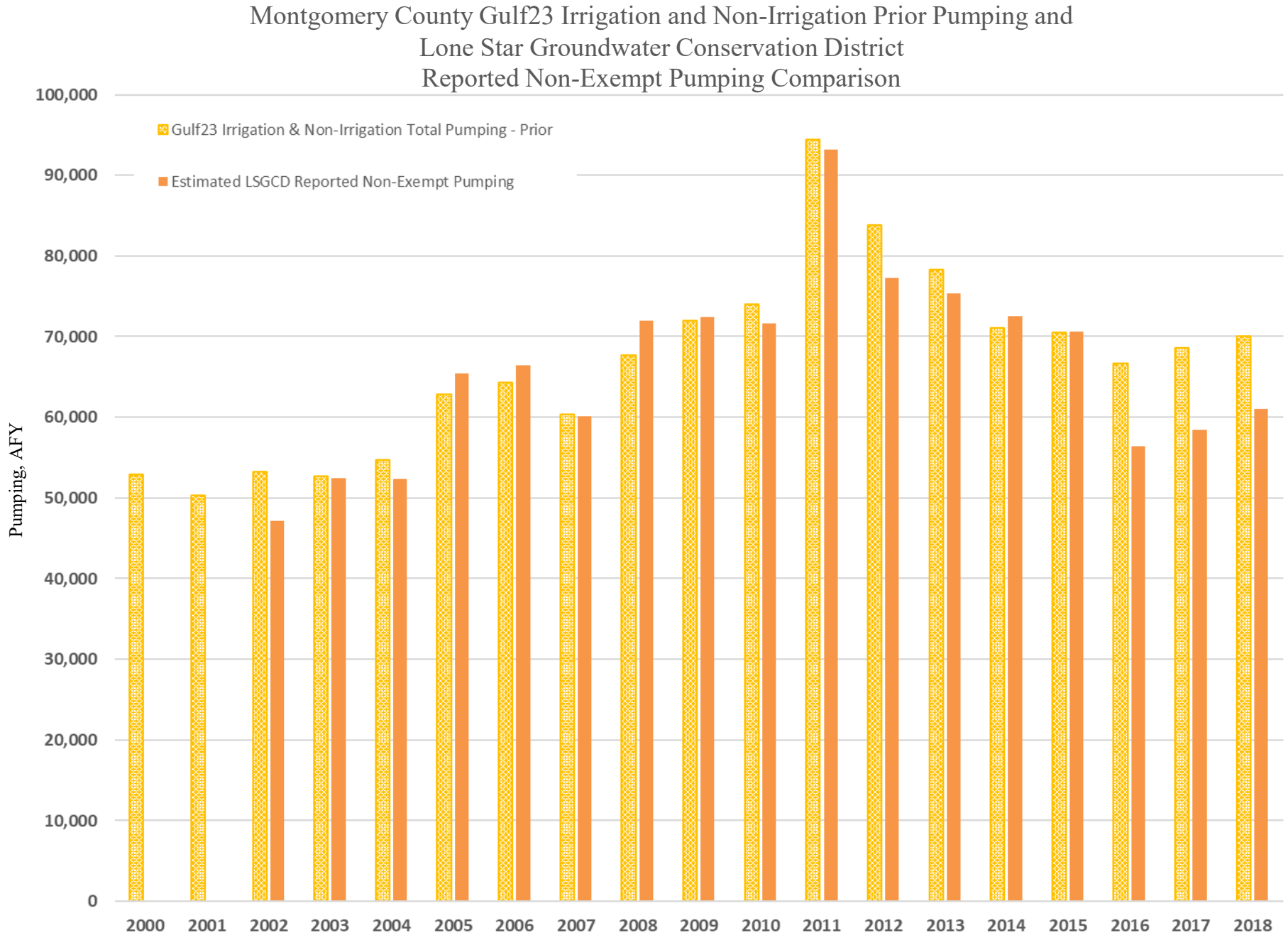
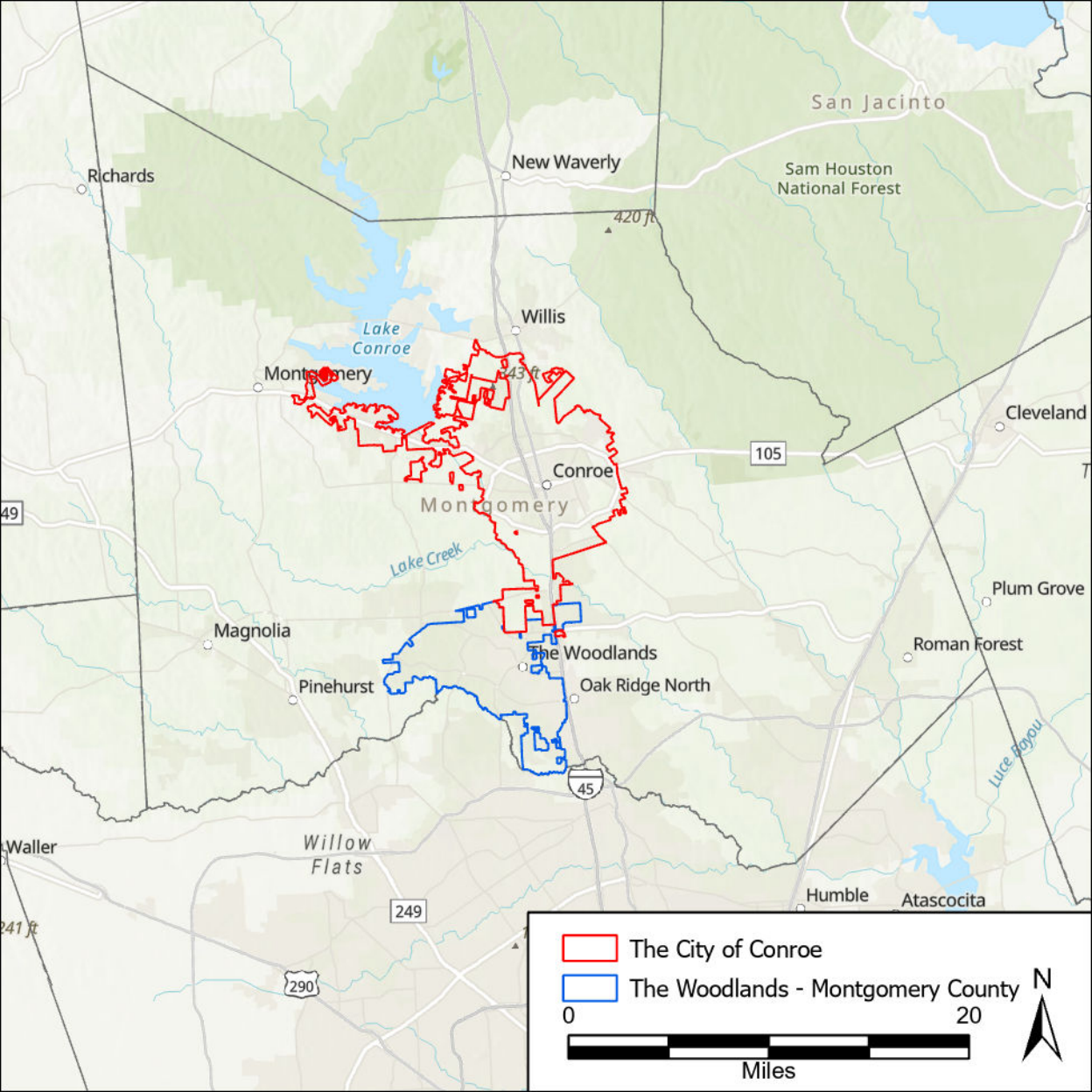
2015
2016
2017
2018

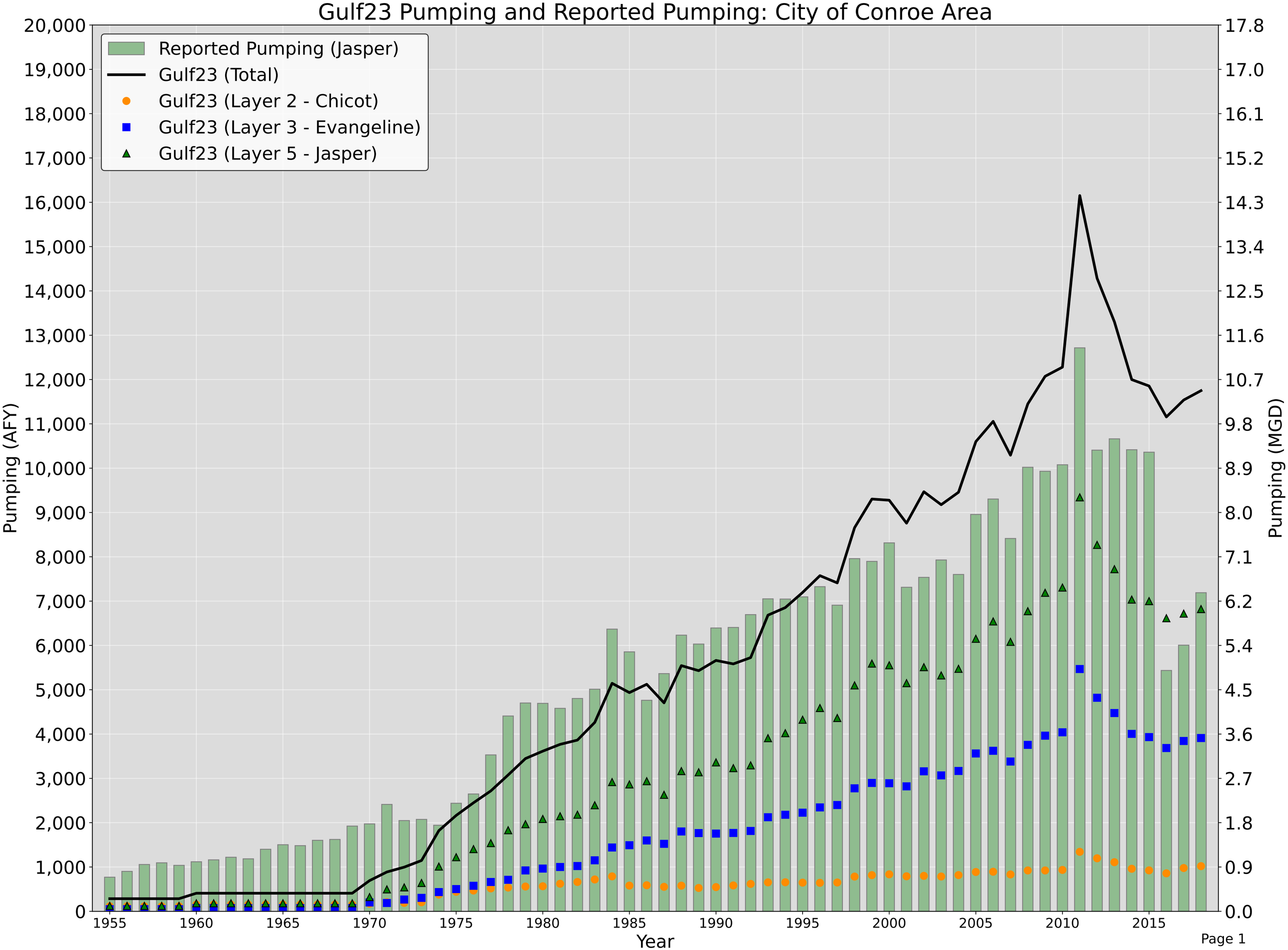

San Jacinto County Gulf23 Non-Irrigation Prior Pumping and
Lower Trinity Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Non-Irrigation Pumping - Prior
Estimated LTGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Montgomery County Gulf23 Irrigation and Non-Irrigation Prior Pumping and
Lone Star Groundwater Conservation District
Reported Non-Exempt Pumping Comparison
Gulf23 Irrigation & Non-Irrigation Total Pumping - Prior
Estimated LSGCD Reported Non-Exempt Pumping
Pumping, AFY
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

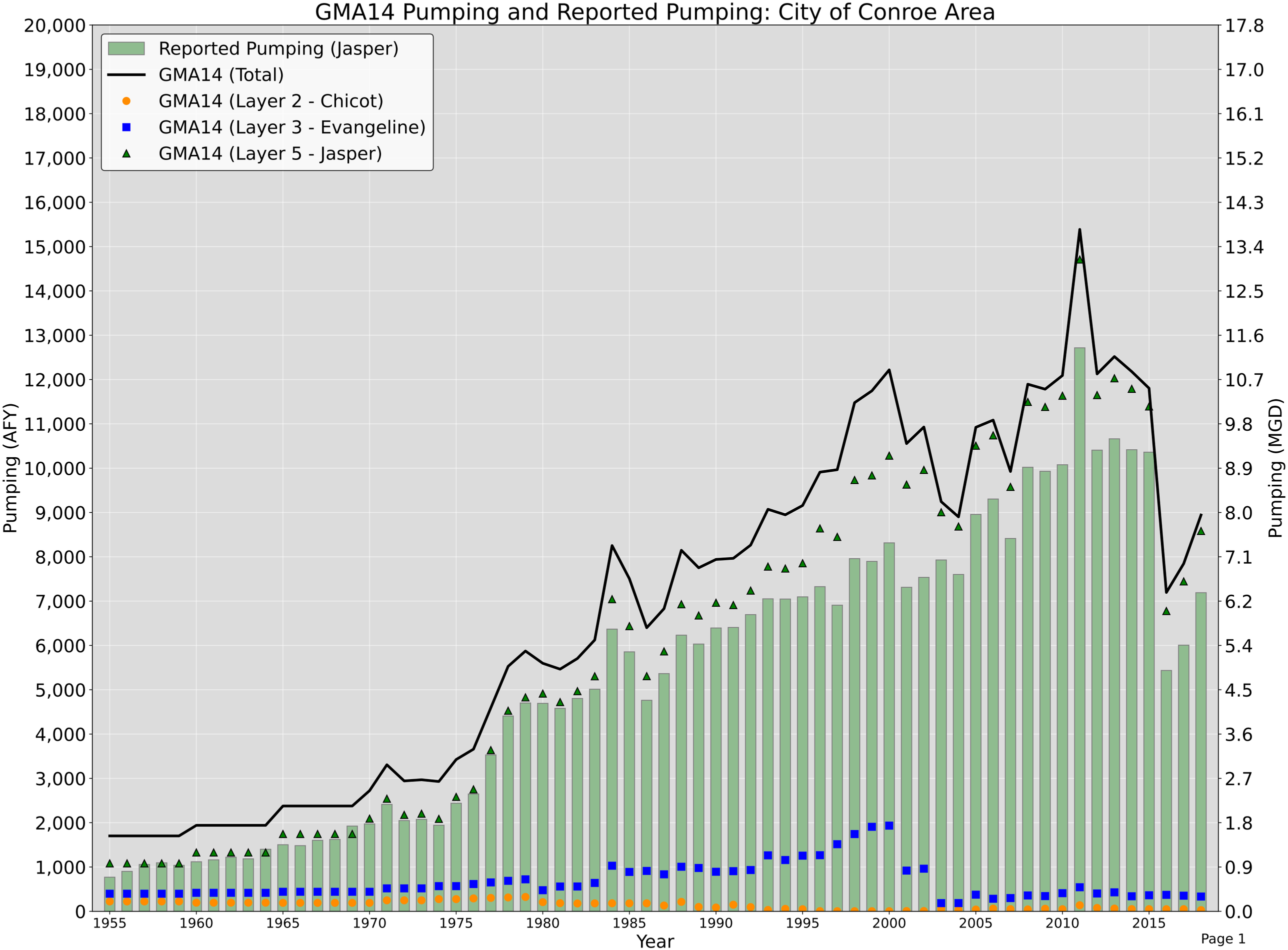
Appendix 6 — Comparison of Reported Production Data for the City of Conroe and The Woodlands to GULF-2023 and GMA 14 Model Inputs


San Jacinto
Richards
New Waverly
Sam Houston
National Forest
420 ft
Willis
Lake
Conroe
Montgomery
243 ft
Cleveland
105
Conroe
Montgomery
49
Lake Creek
Plum Grove
Magnolia
The Woodlands
Roman Forest
Pinehurst
Oak Ridge North
45
Luce Bayou
Waller
Willow
Flats
249
Humble
Atascocita
241 ft
290
The City of Conroe
The Woodlands - Montgomery County
0
20
Miles
N

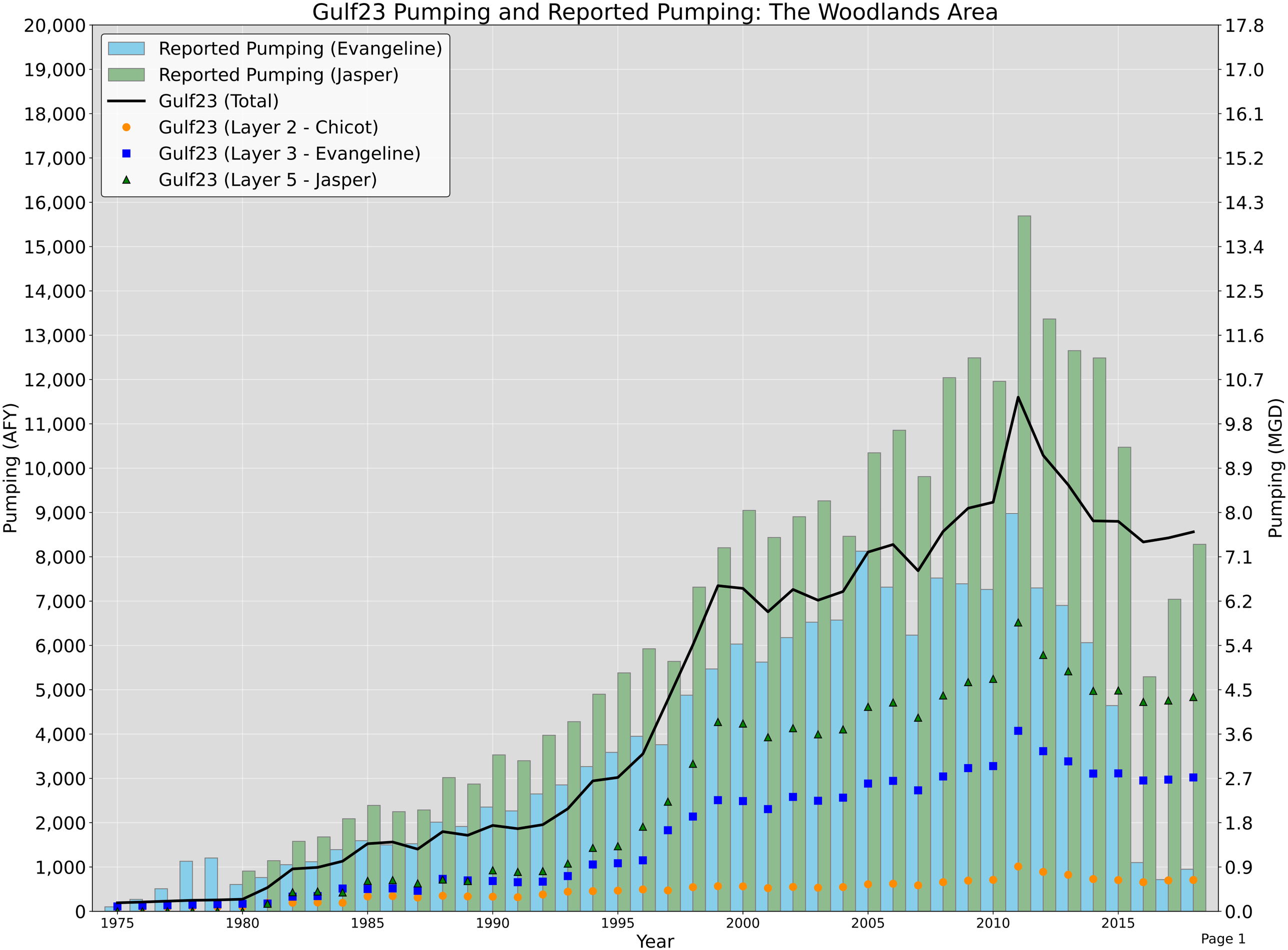
Gulf23 Pumping and Reported Pumping: City of Conroe Area



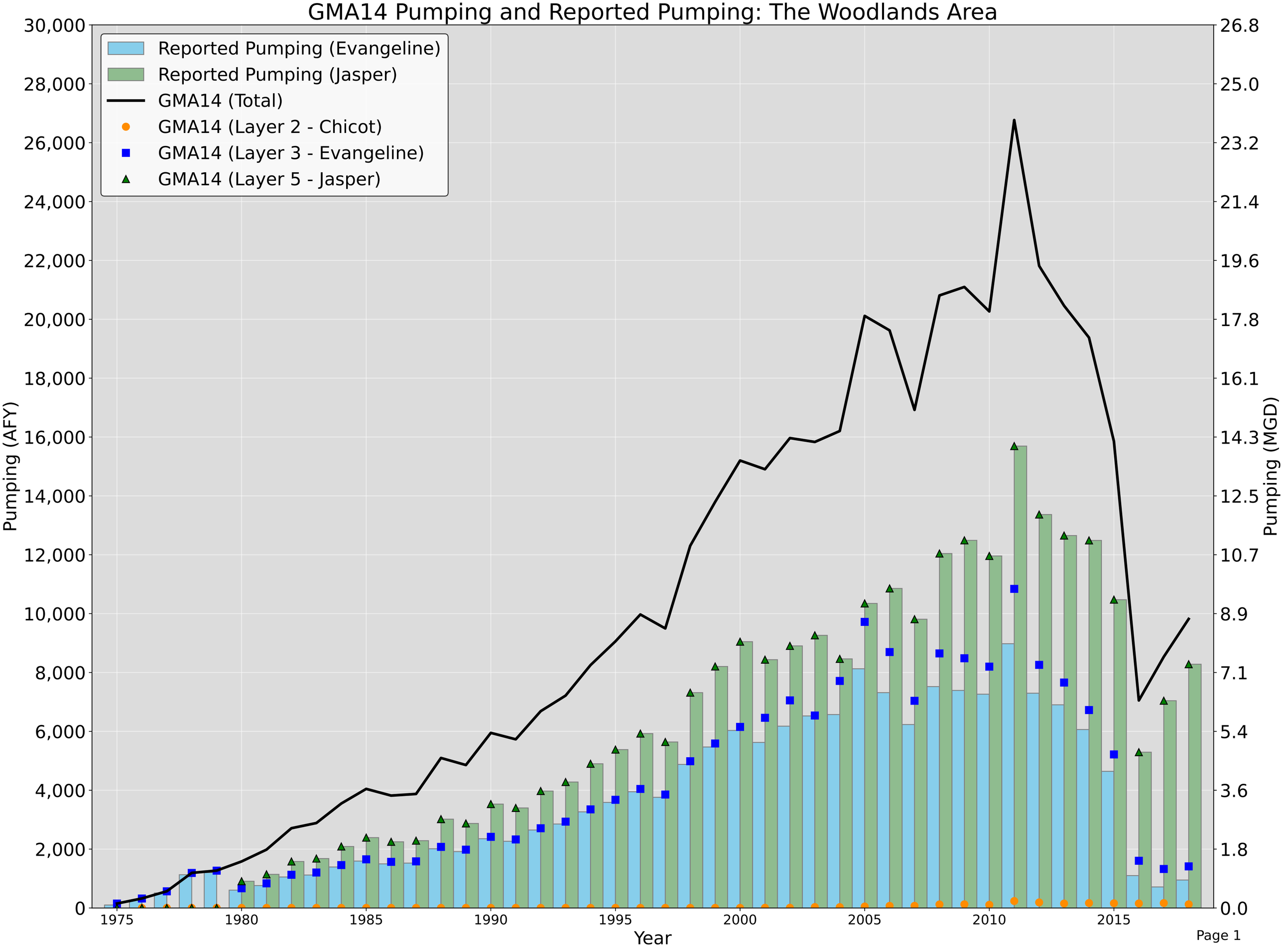
GMA14 Pumping and Reported Pumping: City of Conroe Area



Gulf23 Pumping and Reported Pumping: The Woodlands Area



GMA14 Pumping and Reported Pumping: The Woodlands Area



Appendix 7 — Comparison of GULF-2023 and GMA 14 Model Simulated Water Levels to Measured Water Levels

Austin - 6615902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6615902
Gulf Simulated - 6615902

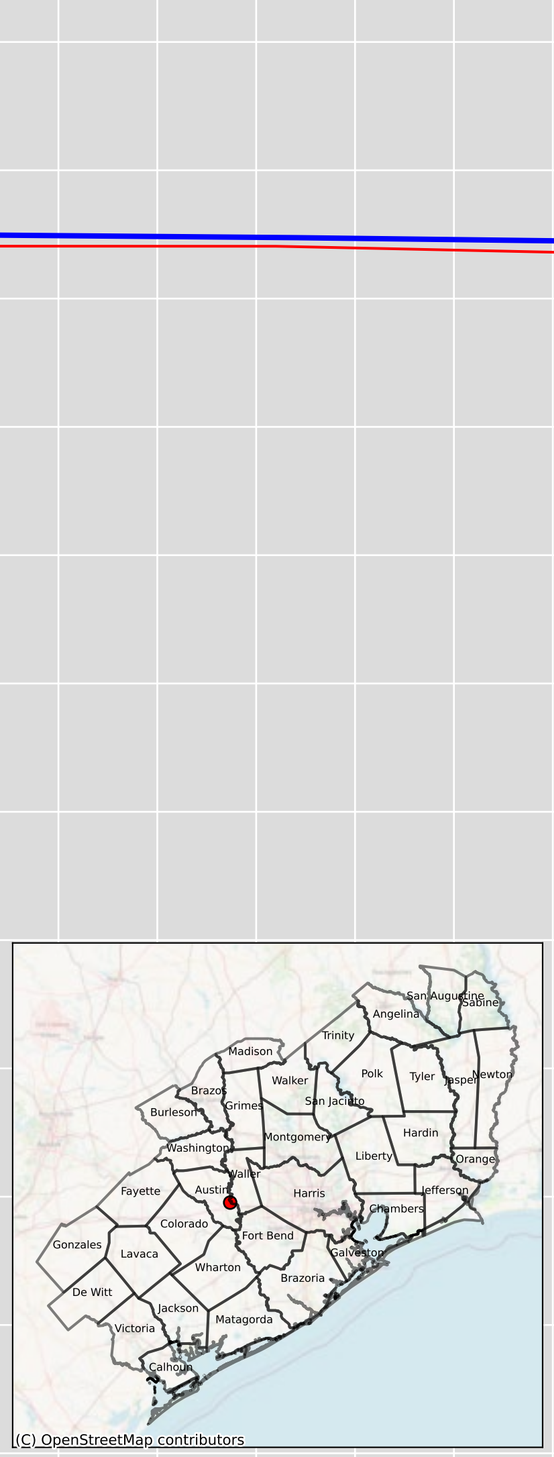
Austin - 6616407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

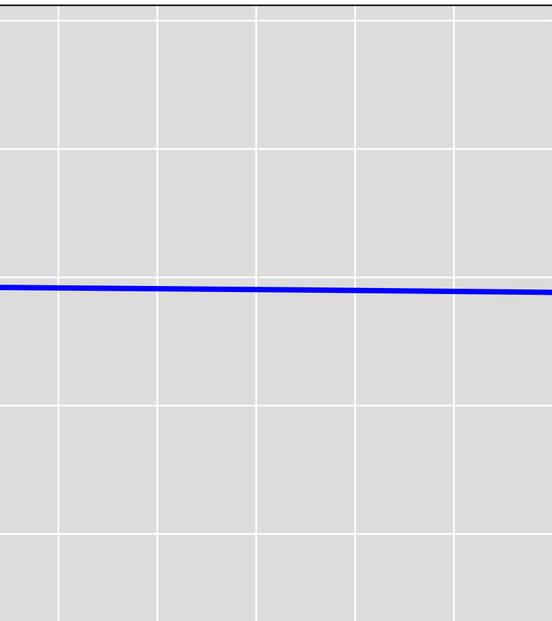
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6616407
Gulf Simulated - 6616407

Austin - 6622302 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6530731 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria & Brazoria - 6559803 & 6559804 & 6559810 & 6559812 & 6559813 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6529802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6529802
Gulf Simulated - 6529802

Brazoria - 6530503 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6530601 & 6530602 & 6530603 & 6530607 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6530601
Gulf Simulated - 6530601

Brazoria - 6530604 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6530604
Gulf Simulated - 6530604

Brazoria - 6530614 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6530615 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

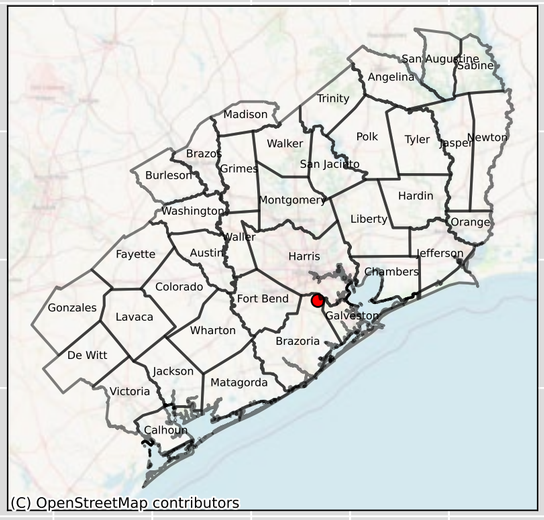
Year

GMA Measured
GMA Simulated
Gulf Measured - 6530615
Gulf Simulated - 6530615

Brazoria - 6530901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6530902 - Layer 2

Groundwater Level Elevation (ft)

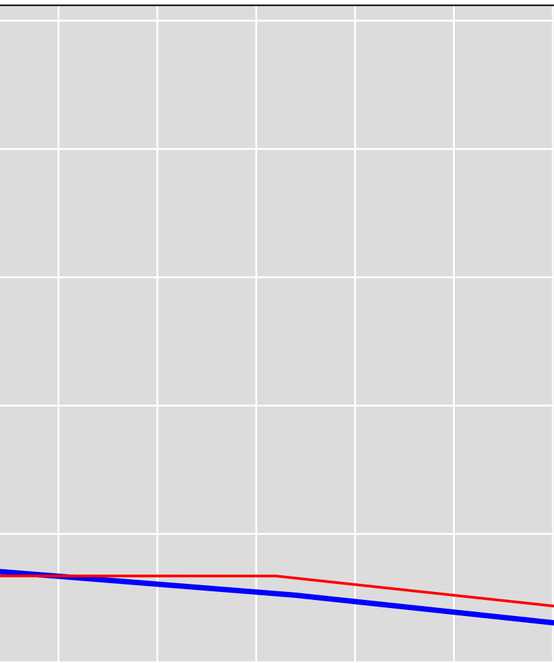
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6531402 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6531402
Gulf Simulated - 6531402

Brazoria - 6531701 & 6538301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6531704 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6537403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6537701 & 6537703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6537805 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6538201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6538201
Gulf Simulated - 6538201

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

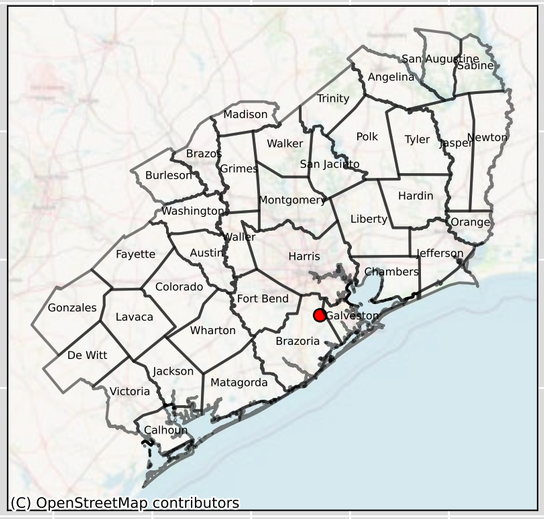
Brazoria - 6538601 & 6538602 & 6539401 & 6539402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

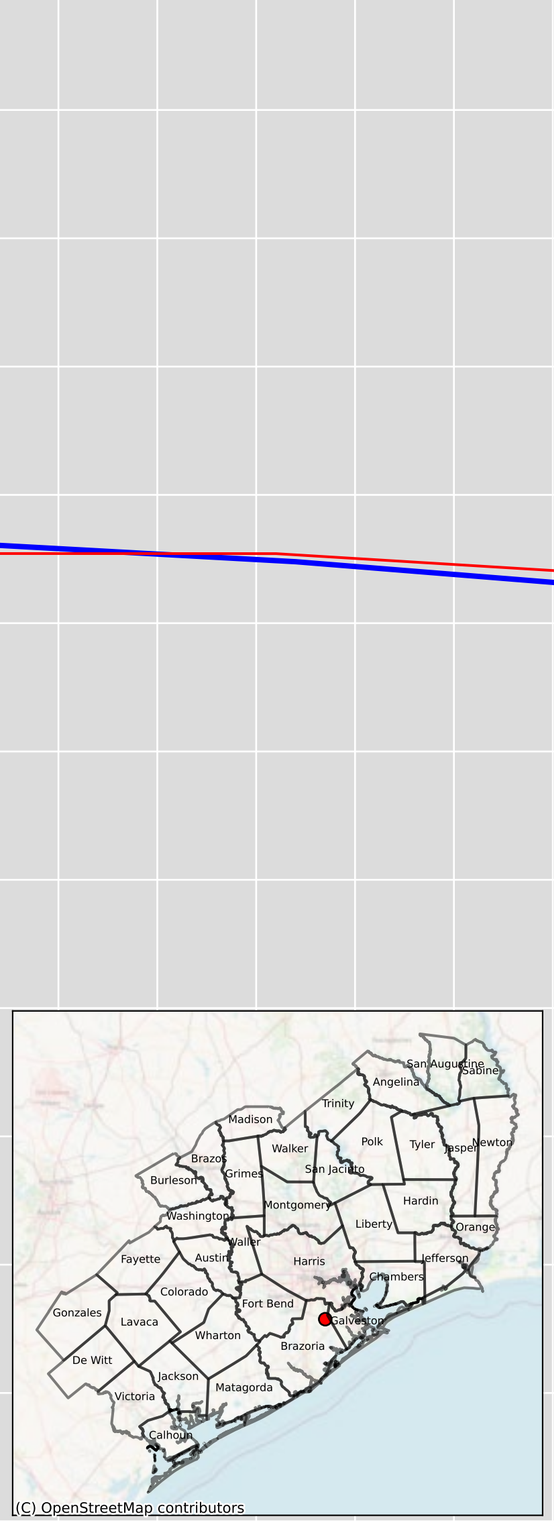
Brazoria - 6538609 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

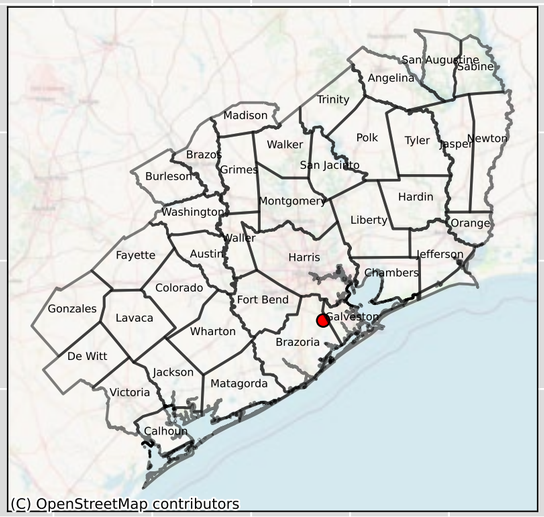


GMA Measured
GMA Simulated
Gulf Measured - 6538609
Gulf Simulated - 6538609

Brazoria - 6539705 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6539705
Gulf Simulated - 6539705

Brazoria - 6543803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6543803
Gulf Simulated - 6543803

Brazoria - 6544607 & 6544601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6544607
Gulf Simulated - 6544607

Brazoria - 6545102 & 6545107 & 6545108 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6545103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6545501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6546301 - Layer 2

Groundwater Level Elevation (ft)

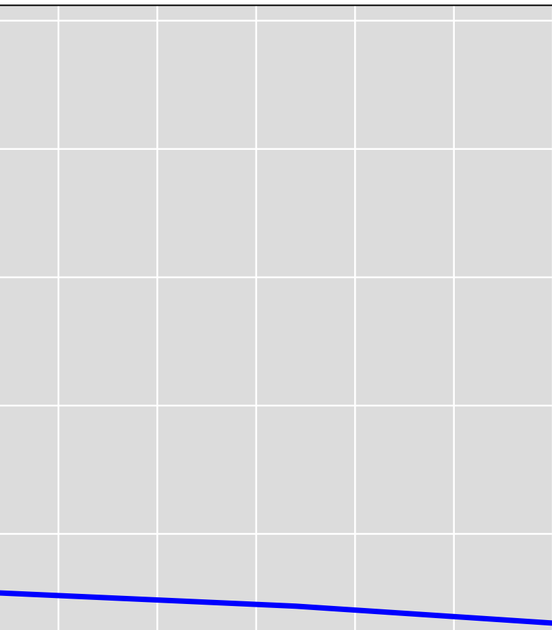
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6546301
Gulf Simulated - 6546301

Brazoria - 6546306 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6546601 & 6546610 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

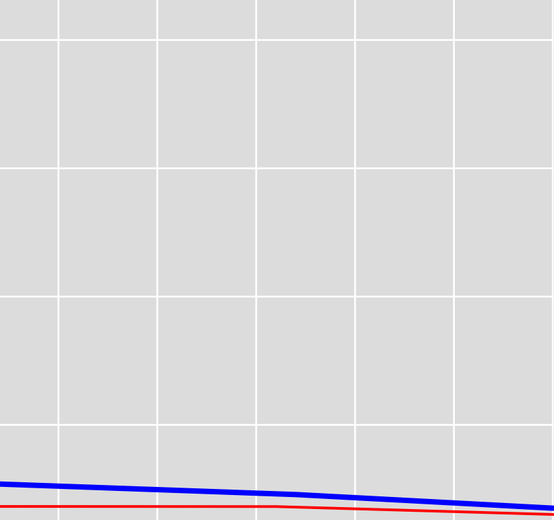
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6546702 & 6546703 & 6546704 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6546802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

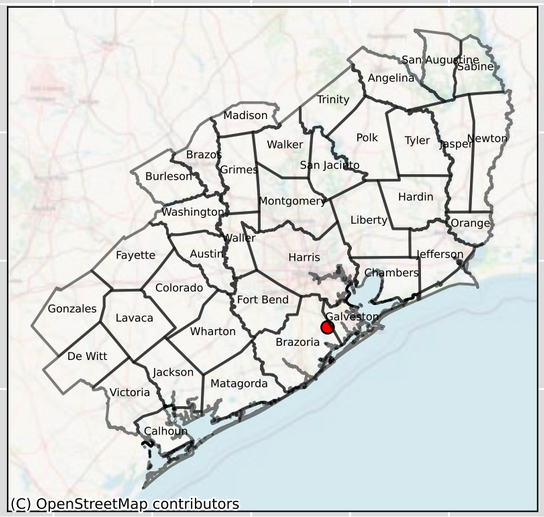
GMA Measured

GMA Simulated

Brazoria - 6547201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

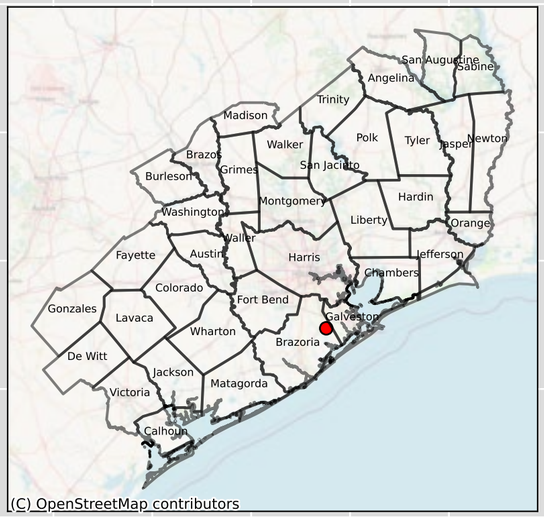
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6547501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

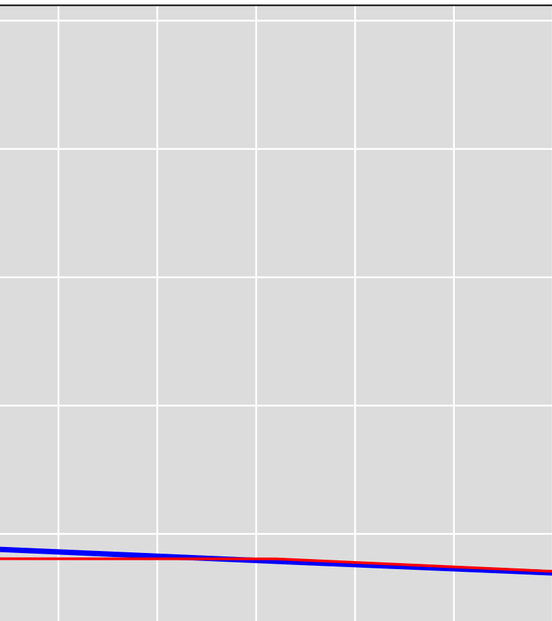


GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6550504 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6550504
Gulf Simulated - 6550504

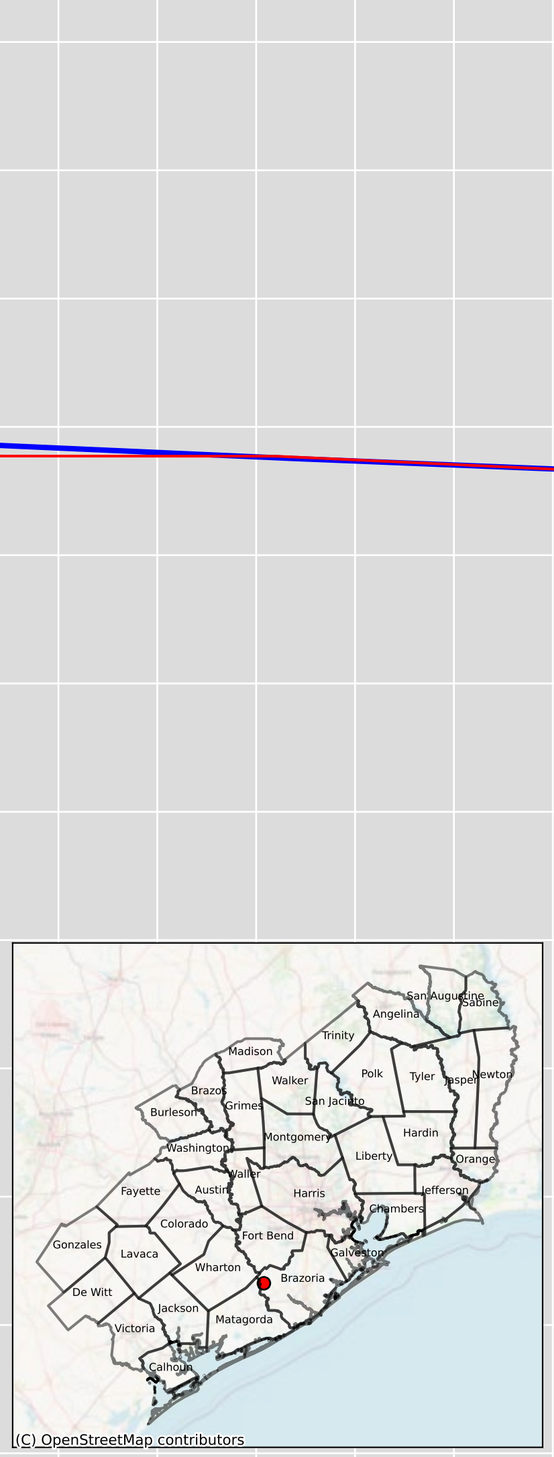
Brazoria - 6550505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6550505
Gulf Simulated - 6550505

Brazoria - 6550801 & 6550802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6550803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

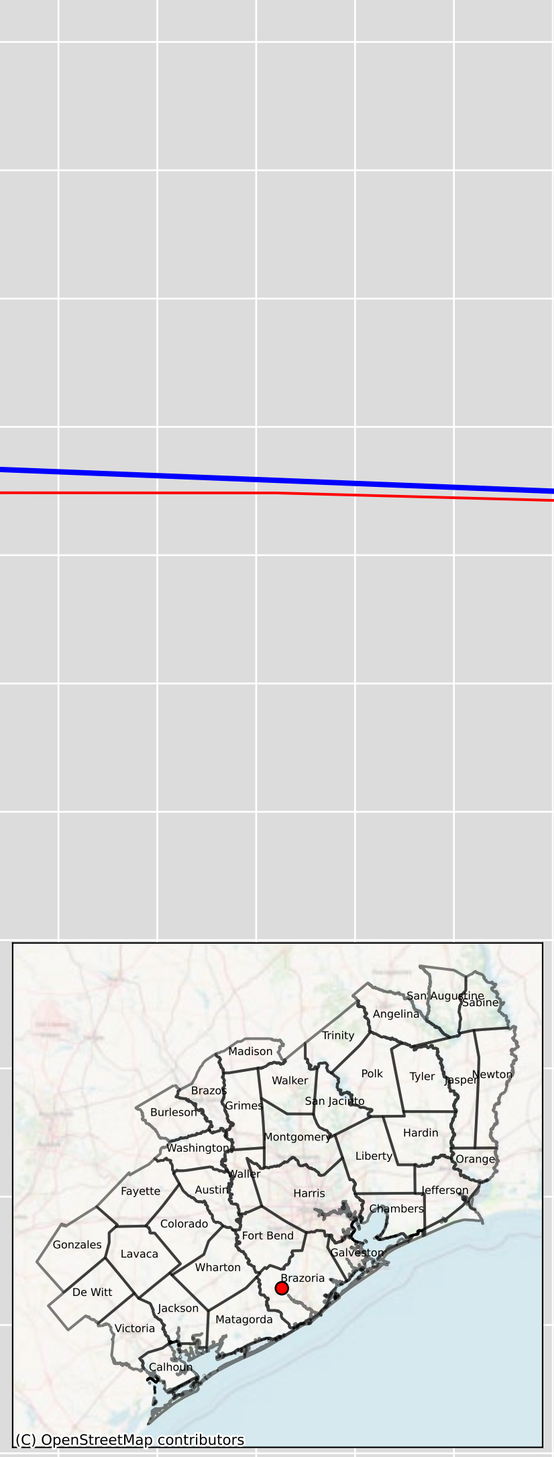
Brazoria - 6551901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6551901
Gulf Simulated - 6551901

Brazoria - 6552102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

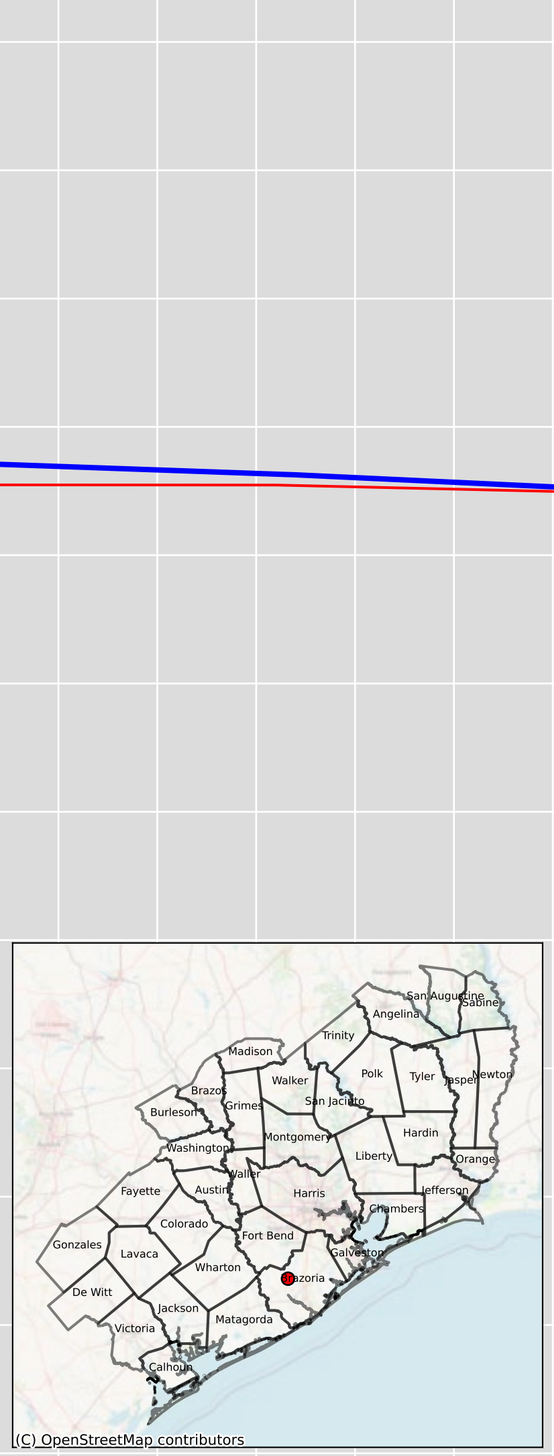
Brazoria - 6552103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6552103
Gulf Simulated - 6552103

Brazoria - 6553201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6553504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6553504
Gulf Simulated - 6553504

Brazoria - 6553505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6553513 & 6553804 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6554101 & 6554104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6554403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6554407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6554407
Gulf Simulated - 6554407

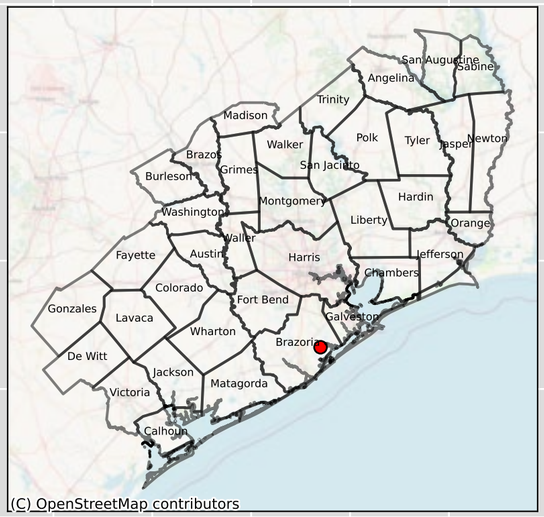
Brazoria - 6554602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

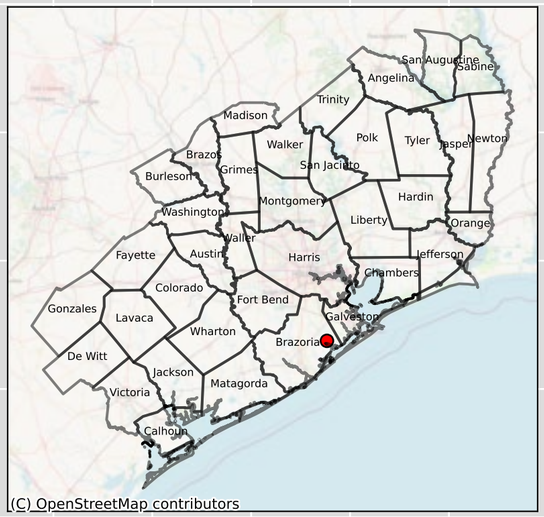
Brazoria - 6555205 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6555205
Gulf Simulated - 6555205

Brazoria - 6558606 & 6558619 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6558607 & 6559404 & 6559405 & 6559410 & 6559411 & 6559415 & 6559417 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6559406 & 6559413 & 6559414 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6559418 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6559501 & 6559502 & 6559503 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6561402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6561404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 6561504 & 6561509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6561508 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6561607 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6561801 & 6561804 & 6561805 & 6561810 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Brazoria - 6561802 & 6561806 & 6561807 & 6561809 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 6561902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 6561905 & 6561923 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

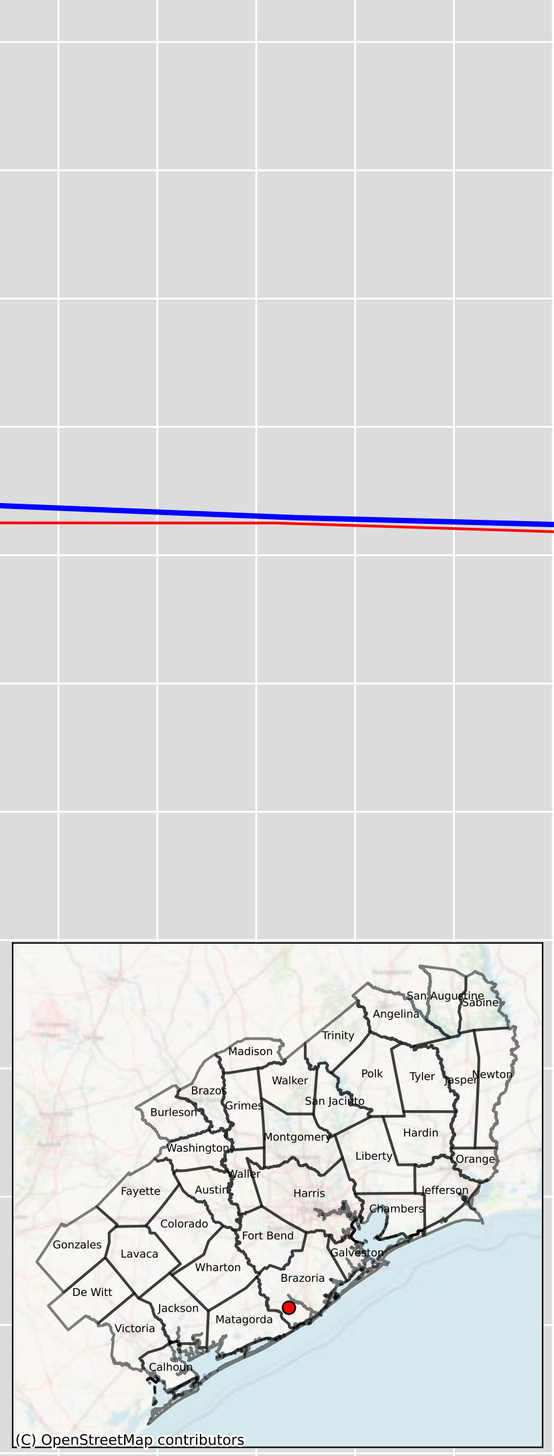
Brazoria - 8104202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 8104202
Gulf Simulated - 8104202

Brazoria - 8105303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 8105305 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8105306 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8105320 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Brazoria - 8105601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

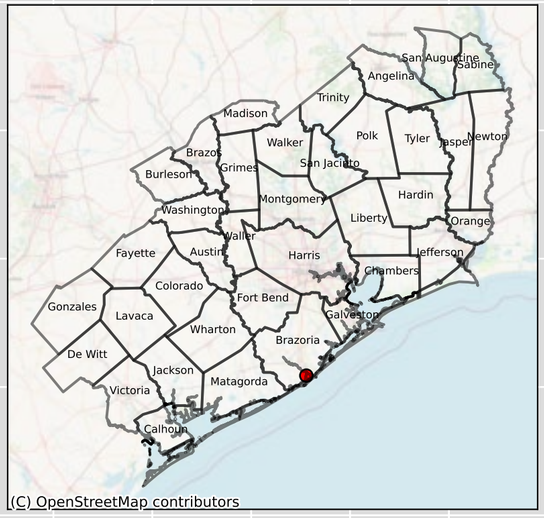
Brazoria - 8105602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Brazoria - 8106101 & 8106102 & 8106107 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Brazoria - 8106212 & 8106214 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8106301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

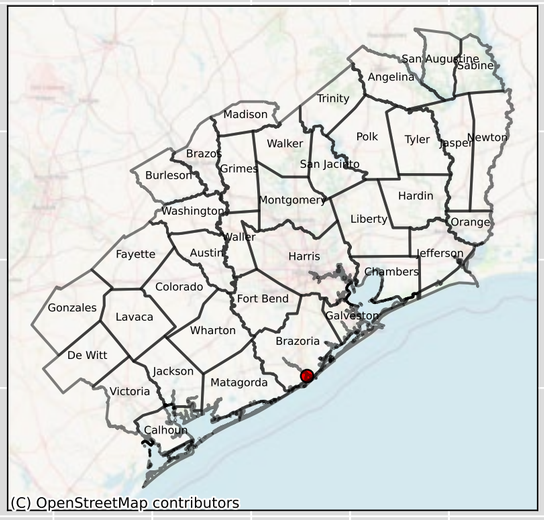
Brazoria - 8106402 & 8106406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

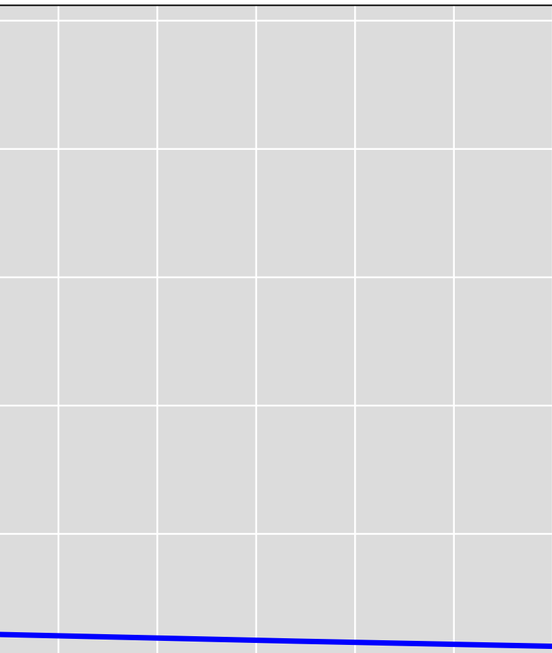
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Brazoria - 8106405 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8106407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8106408 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

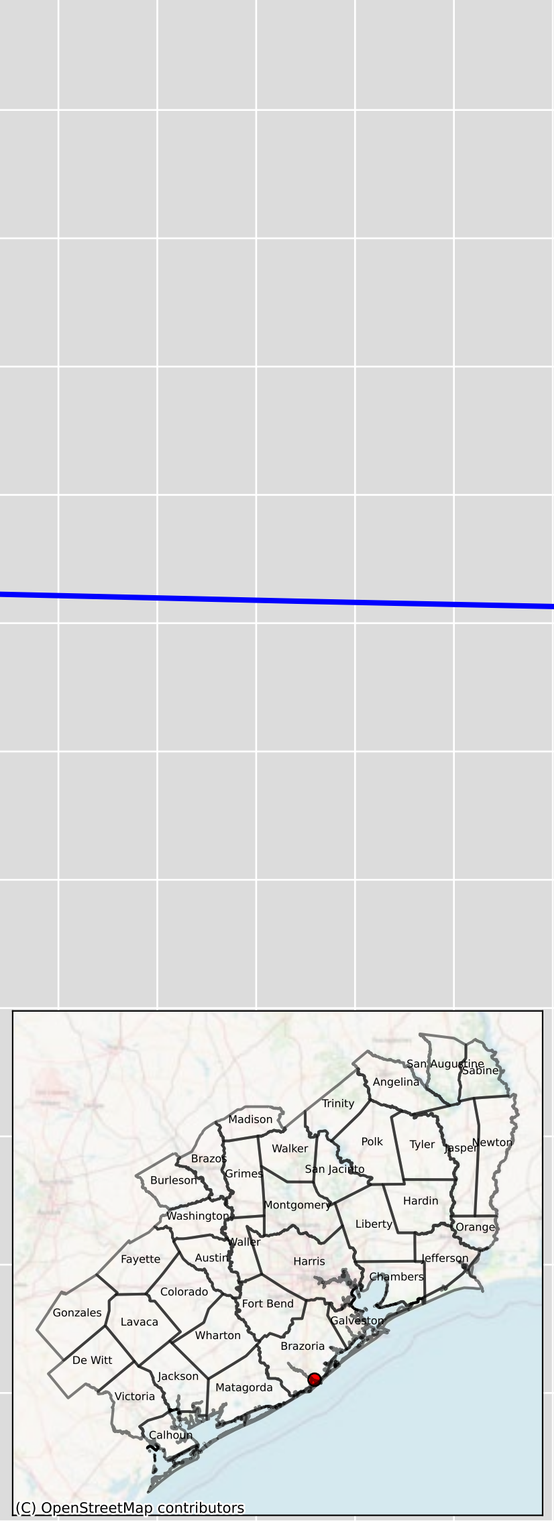
Brazoria - 8106413 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Brazoria - 8106505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8106506 - Layer 2

Groundwater Level Elevation (ft)

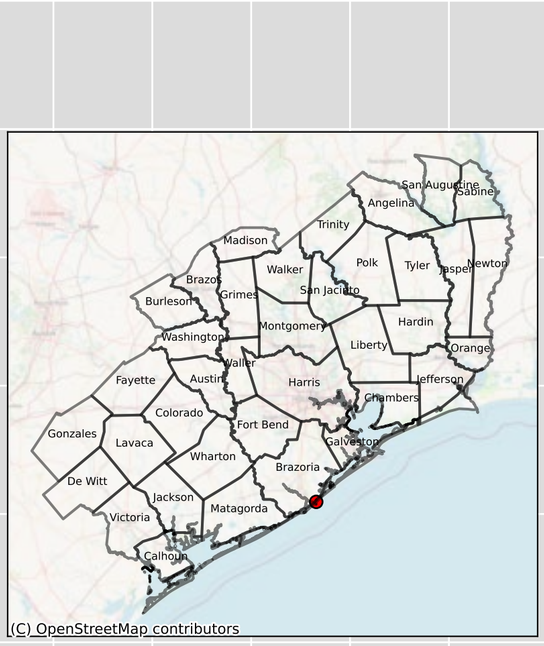
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Brazoria - 8106607 - Layer 2



Chambers - 6409302 & 6409301 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6409302
Gulf Simulated - 6409302

Chambers - 6409303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Chambers - 6409305 & 6409307 & 6409308 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Chambers - 6409336 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6409336
Gulf Simulated - 6409336

Chambers - 6409626 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6409811 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6409903 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Chambers - 6409921 & 6409924 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6410213 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6410401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6410413 - Layer 2

Groundwater Level Elevation (ft)

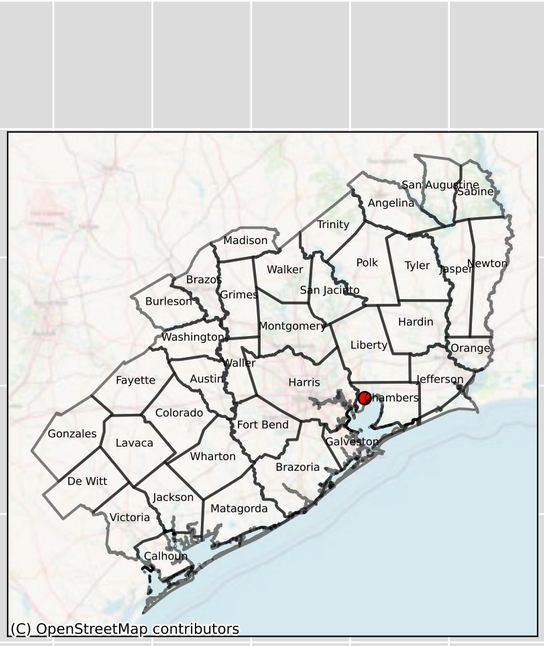
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6410703 & 6410702 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6410703
Gulf Simulated - 6410703

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Chambers - 6411401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6411611 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6411801 & 6411802 & 6411816 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6411901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6411901
Gulf Simulated - 6411901

Chambers - 6413306 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Chambers - 6413601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6413602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6413701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6417311 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

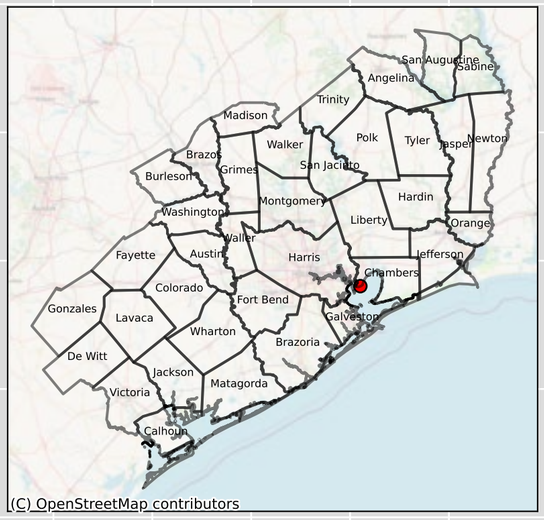
Chambers - 6417901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6417901
Gulf Simulated - 6417901

Chambers - 6421205 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Chambers - 6426401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

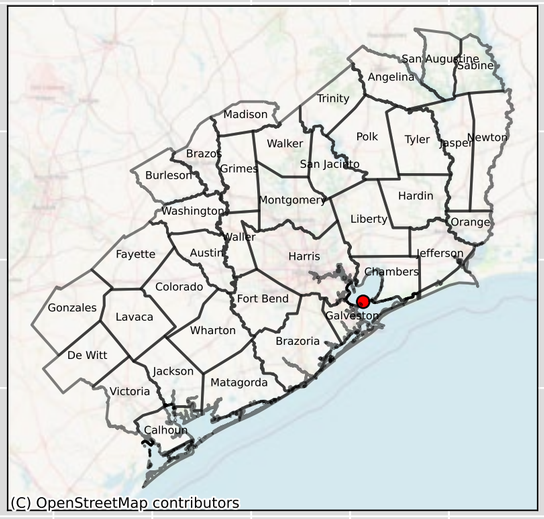
Year

GMA Measured
GMA Simulated

Chambers - 6426701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Colorado - 6620905 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6623701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6630401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6630502 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Colorado - 6636902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6637302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

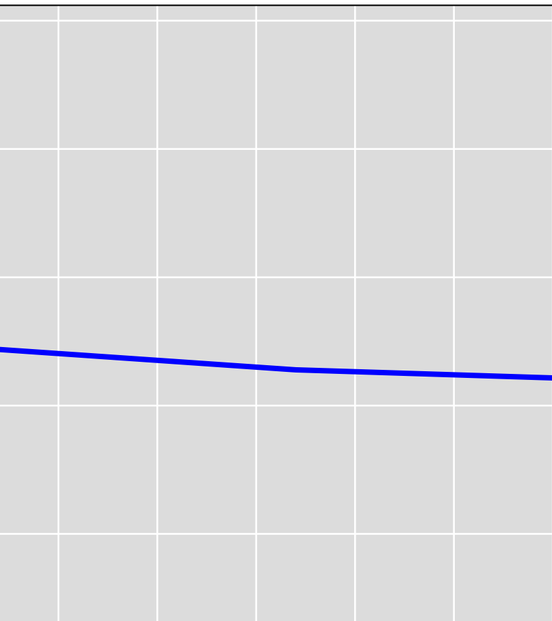
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6637601 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6637703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6637905 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6644302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6644501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

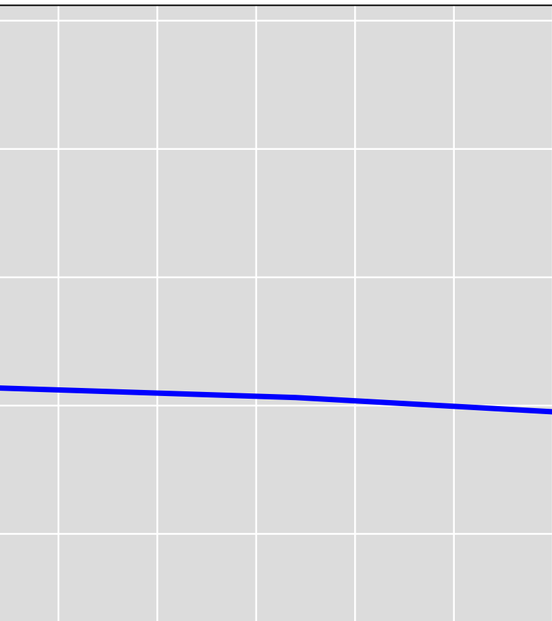
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6509906 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6510701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

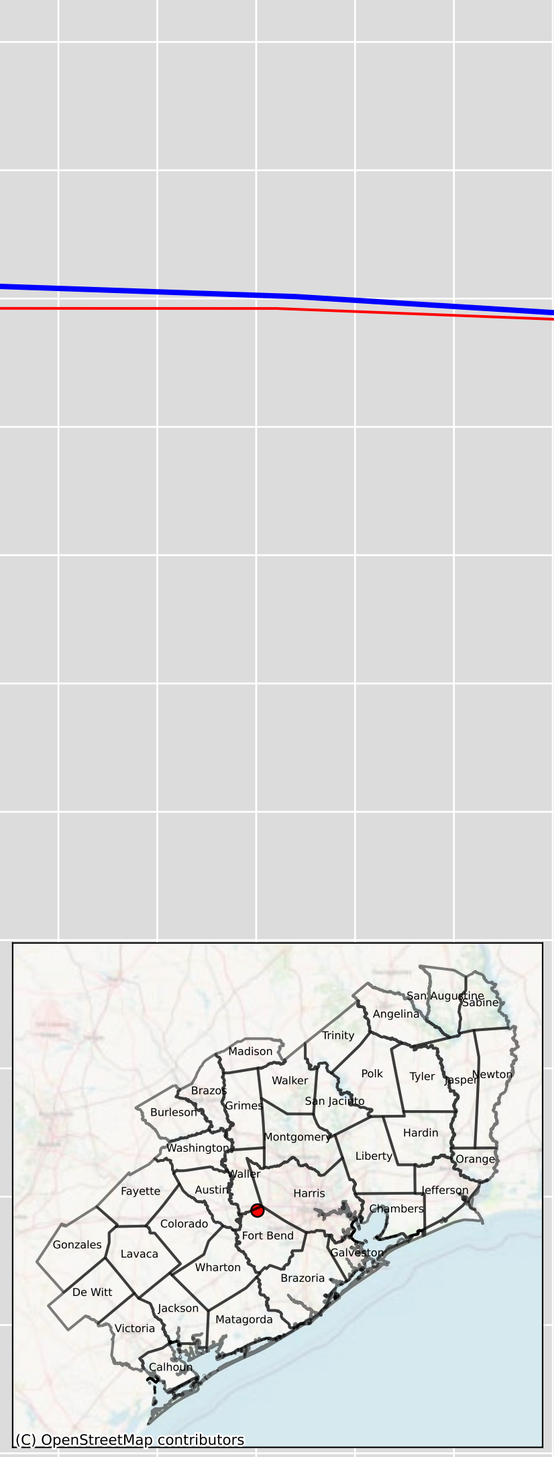
Fort Bend - 6510702 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6510702
Gulf Simulated - 6510702

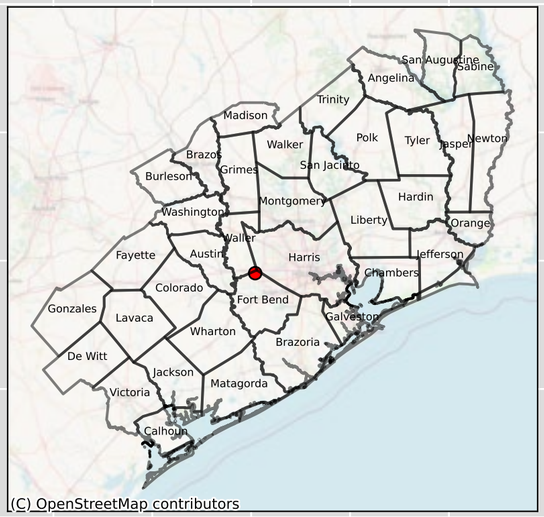
Fort Bend - 6510703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

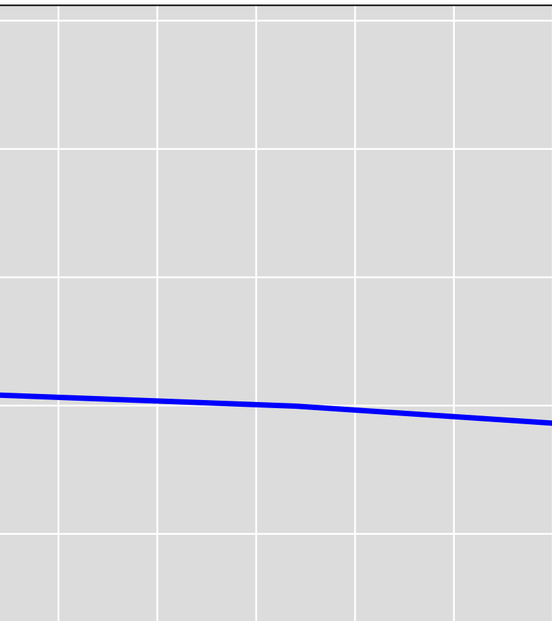
Year



GMA Measured

GMA Simulated

Fort Bend - 6510715 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

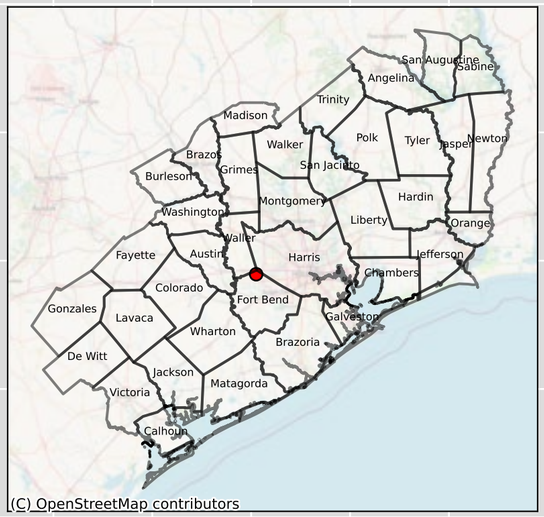
Fort Bend - 6510801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

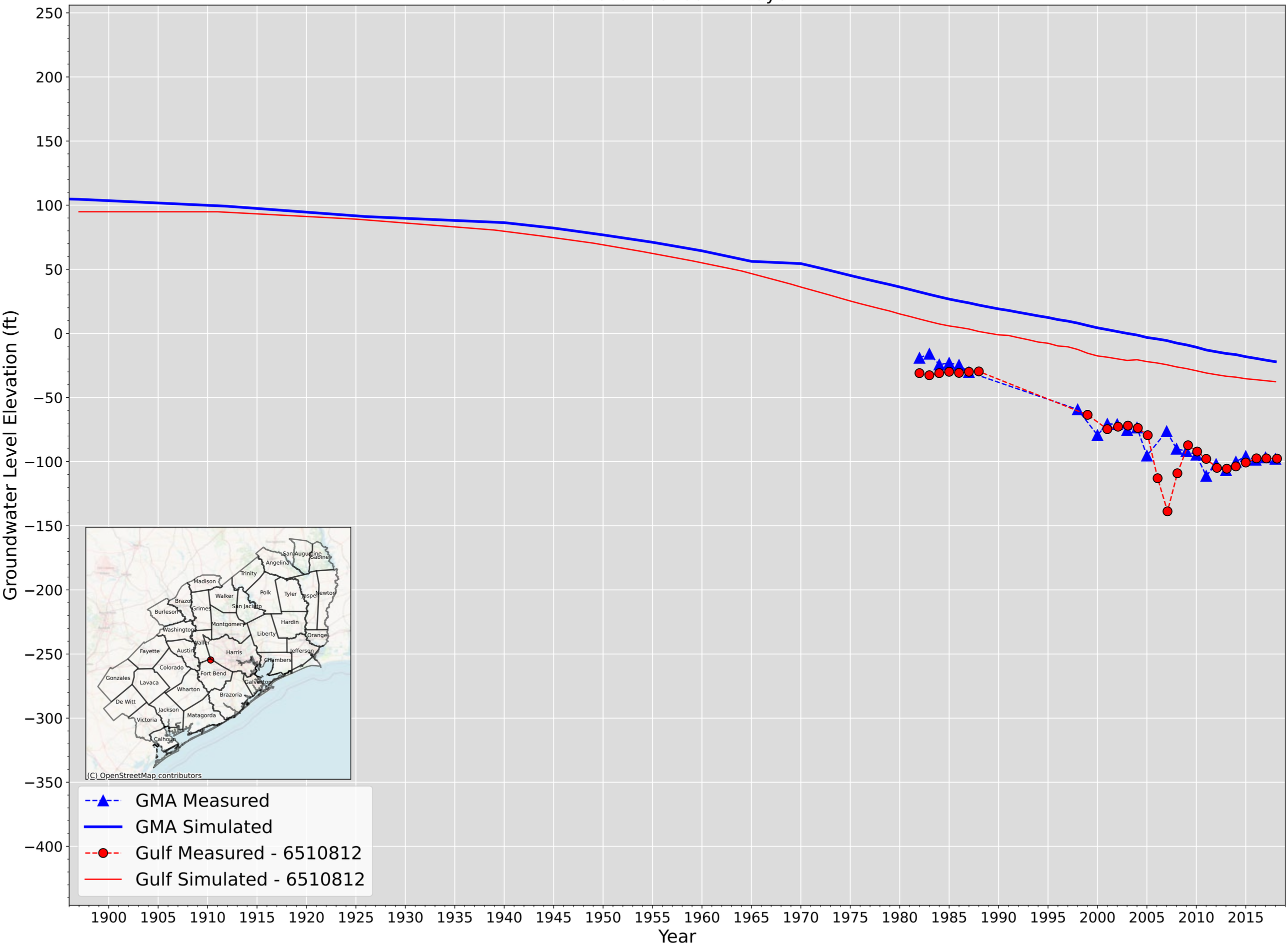
Year



GMA Measured

GMA Simulated

Fort Bend - 6510812 - Layer 2



Fort Bend - 6517201 & 6517205 & 6517206 - Layer 2

Groundwater Level Elevation (ft)

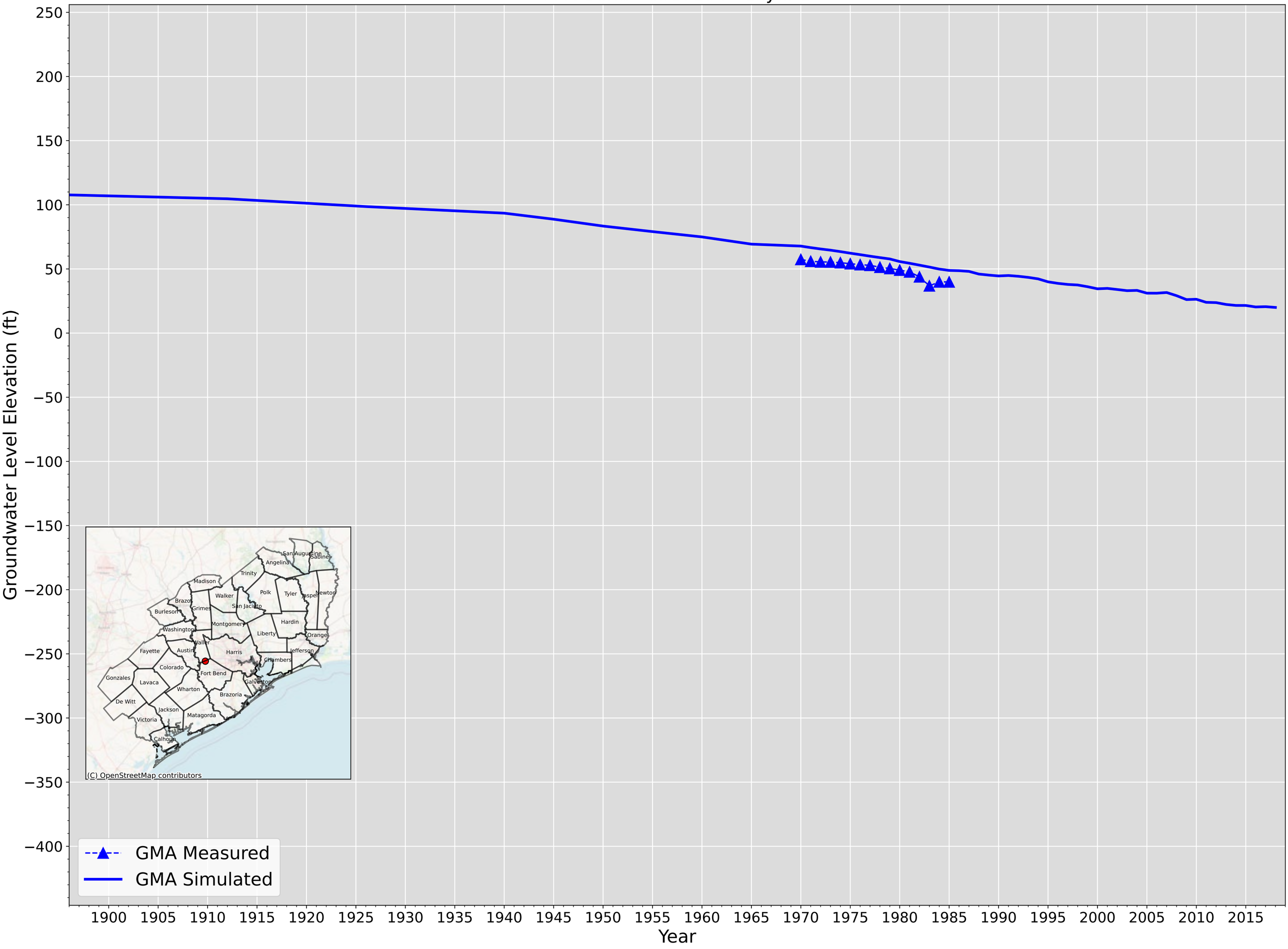
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

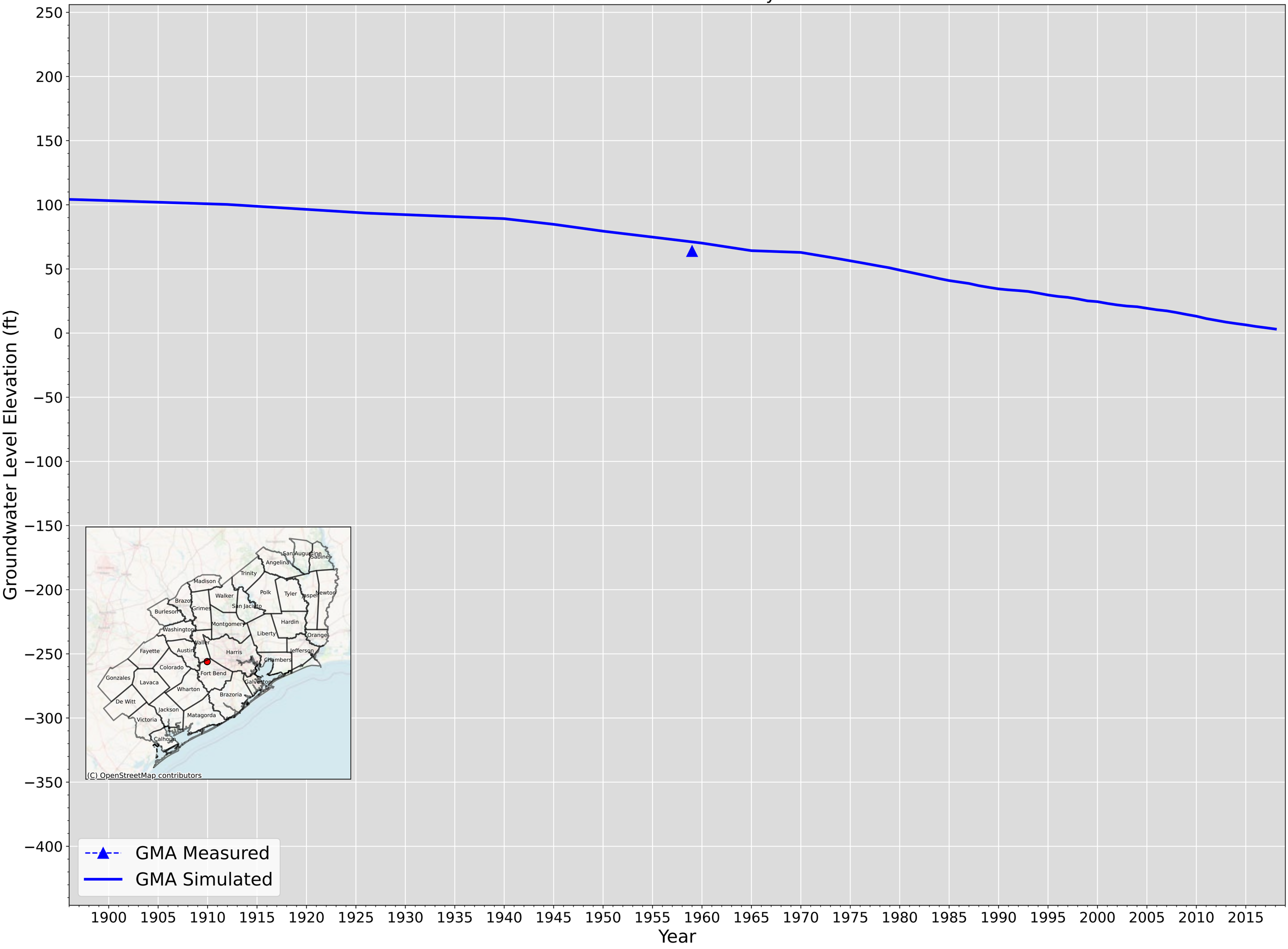
Year

GMA Measured
GMA Simulated

Fort Bend - 6517204 - Layer 2



Fort Bend - 6517303 - Layer 2



Fort Bend - 6517306 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6517306
Gulf Simulated - 6517306

Fort Bend - 6517307 & 6517304 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6517307
Gulf Simulated - 6517307

Fort Bend - 6517401 - Layer 2

Groundwater Level Elevation (ft)

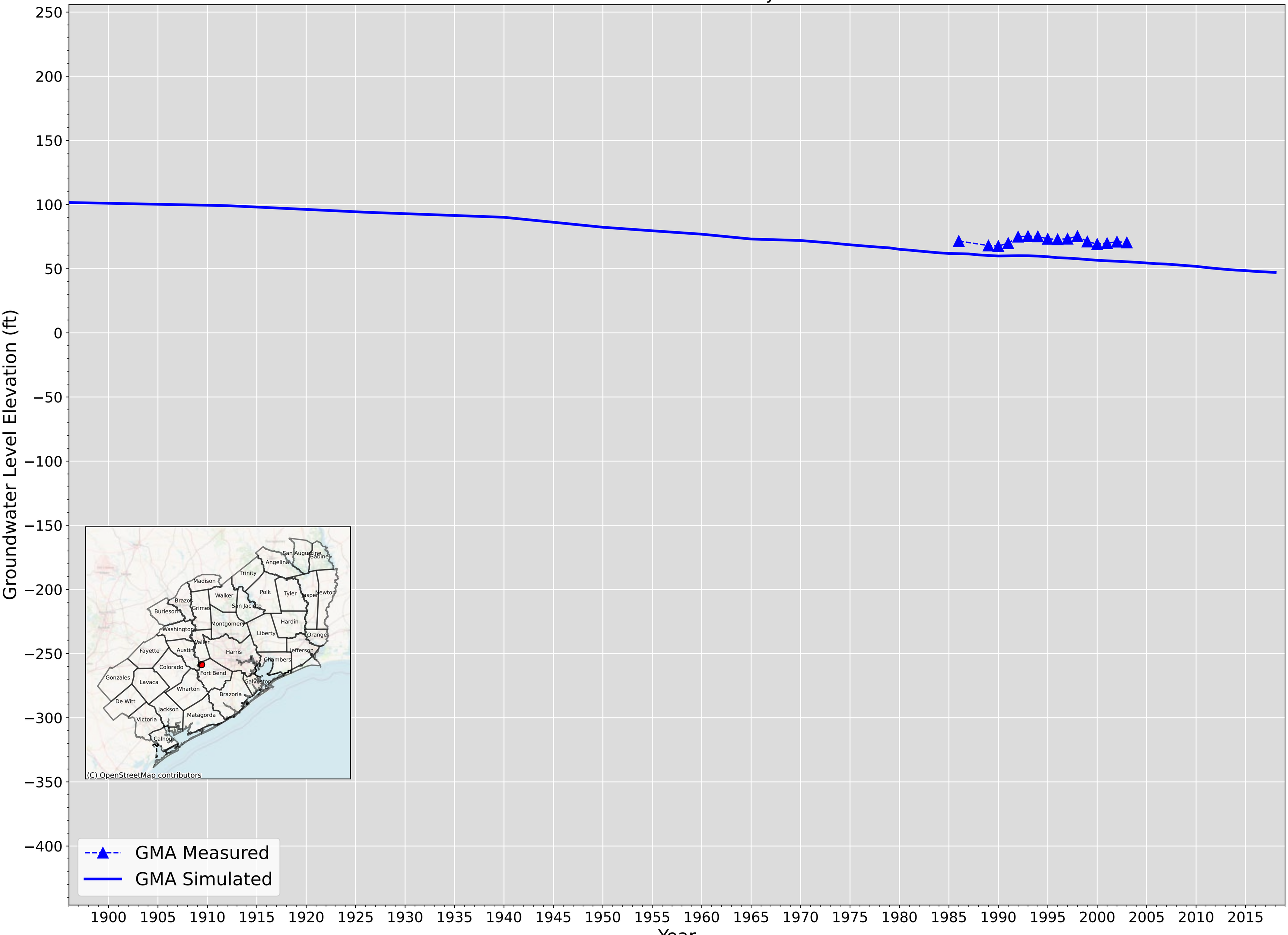
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

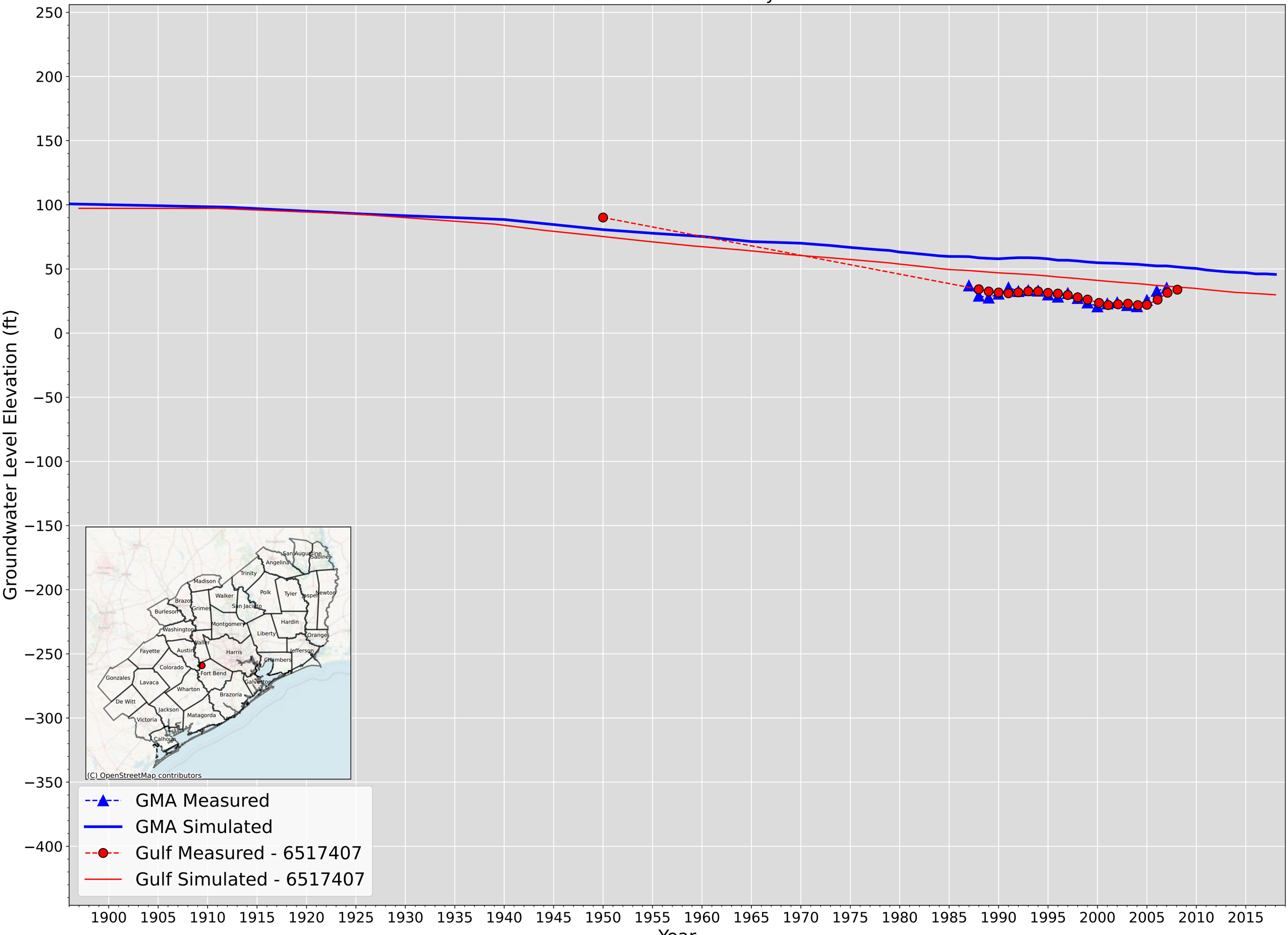
Year

GMA Measured
GMA Simulated

Fort Bend - 6517402 - Layer 2



Fort Bend - 6517407 - Layer 2



Fort Bend - 6517505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6517505
Gulf Simulated - 6517505

Fort Bend - 6518103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518103
Gulf Simulated - 6518103

Fort Bend - 6518105 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

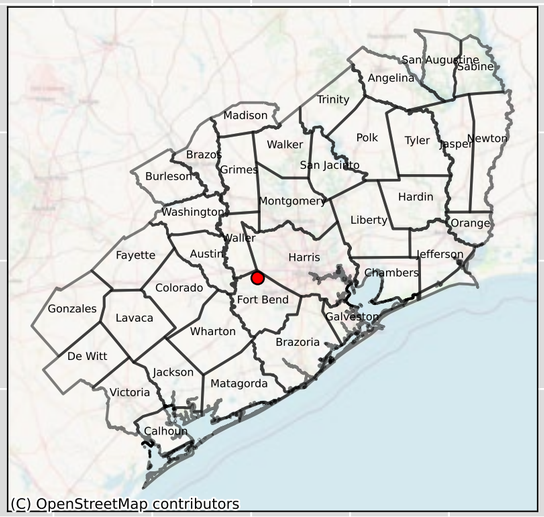
Fort Bend - 6518202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

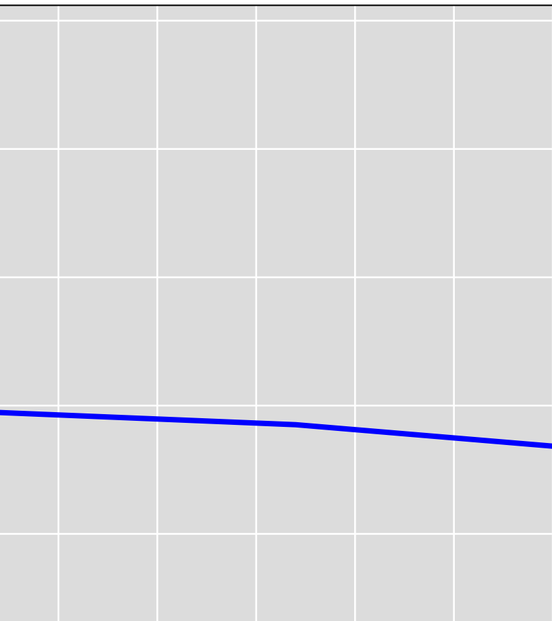
Year



GMA Measured

GMA Simulated

Fort Bend - 6518204 - Layer 2



Level Elevation (ft)

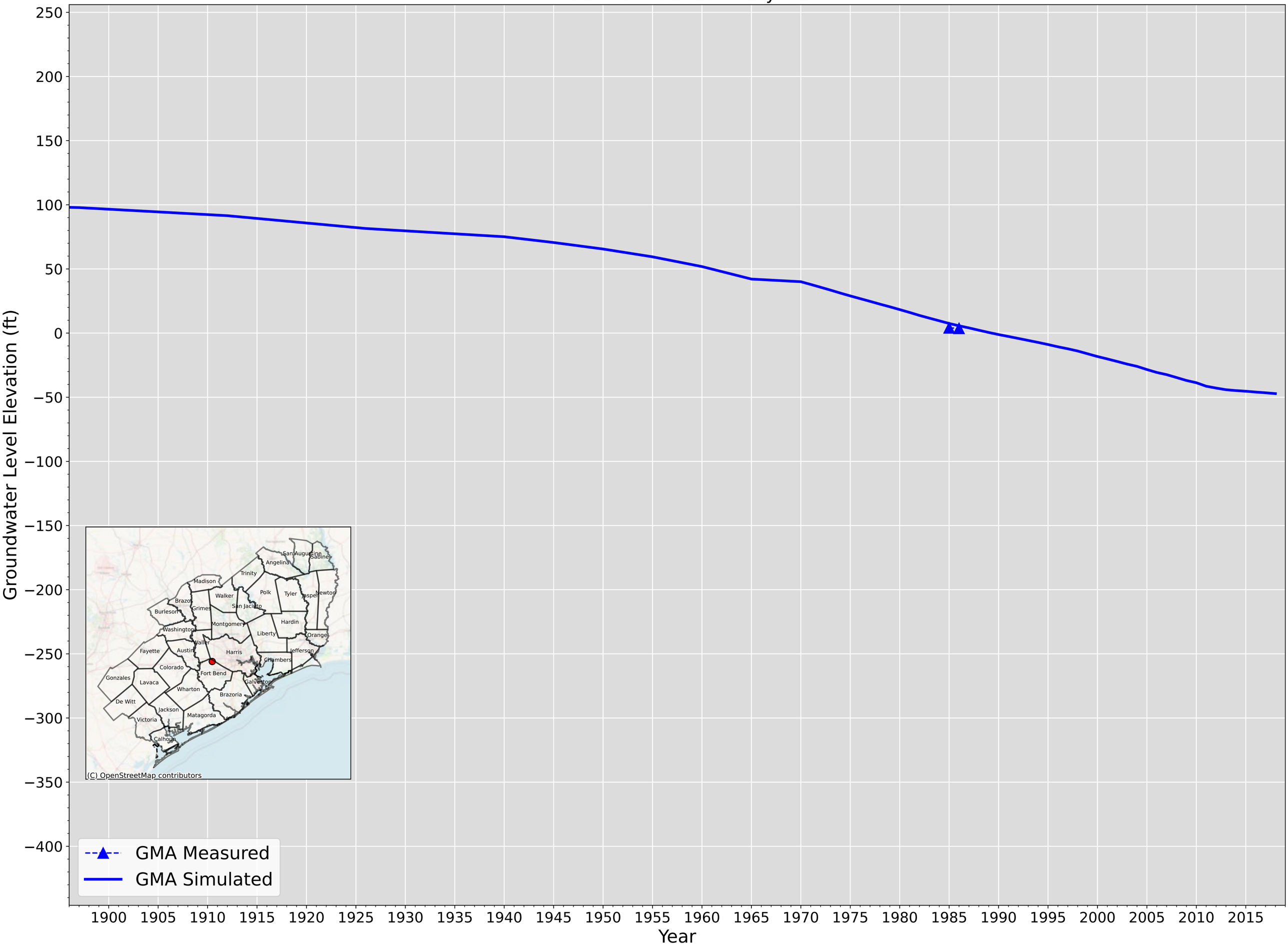
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6518207 - Layer 2



Fort Bend - 6518404 - Layer 2

Groundwater Level Elevation (ft)

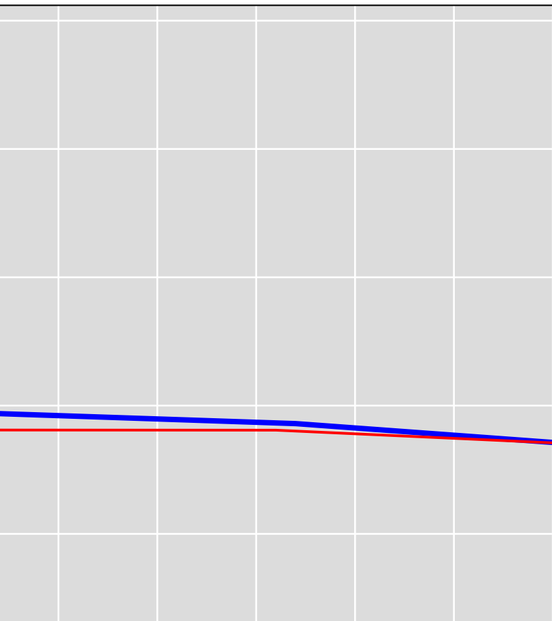
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518404
Gulf Simulated - 6518404

Fort Bend - 6518406 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518406
Gulf Simulated - 6518406

Fort Bend - 6518501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6518602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6518604 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6519407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519407
Gulf Simulated - 6519407

Fort Bend - 6519509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519509
Gulf Simulated - 6519509

Fort Bend - 6519703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6519704 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6519907 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519907
Gulf Simulated - 6519907

Fort Bend - 6519909 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6520715 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520715
Gulf Simulated - 6520715

Fort Bend - 6525201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525203 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525301 - Layer 2

Groundwater Level Elevation (ft)

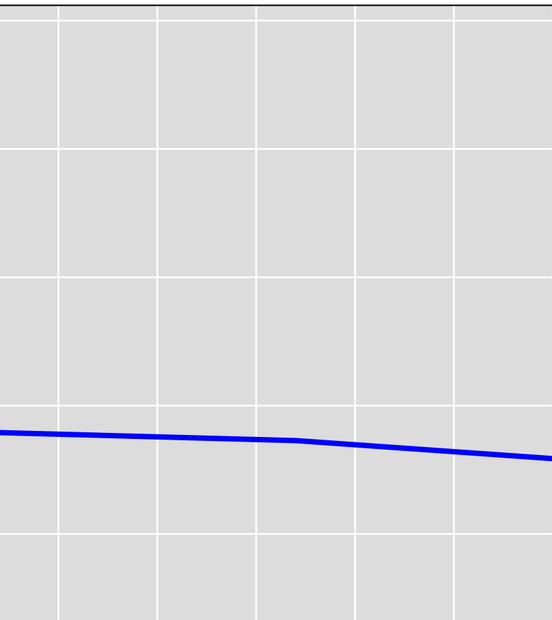
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525302 - Layer 2



Groundwater Level Elevation (ft)

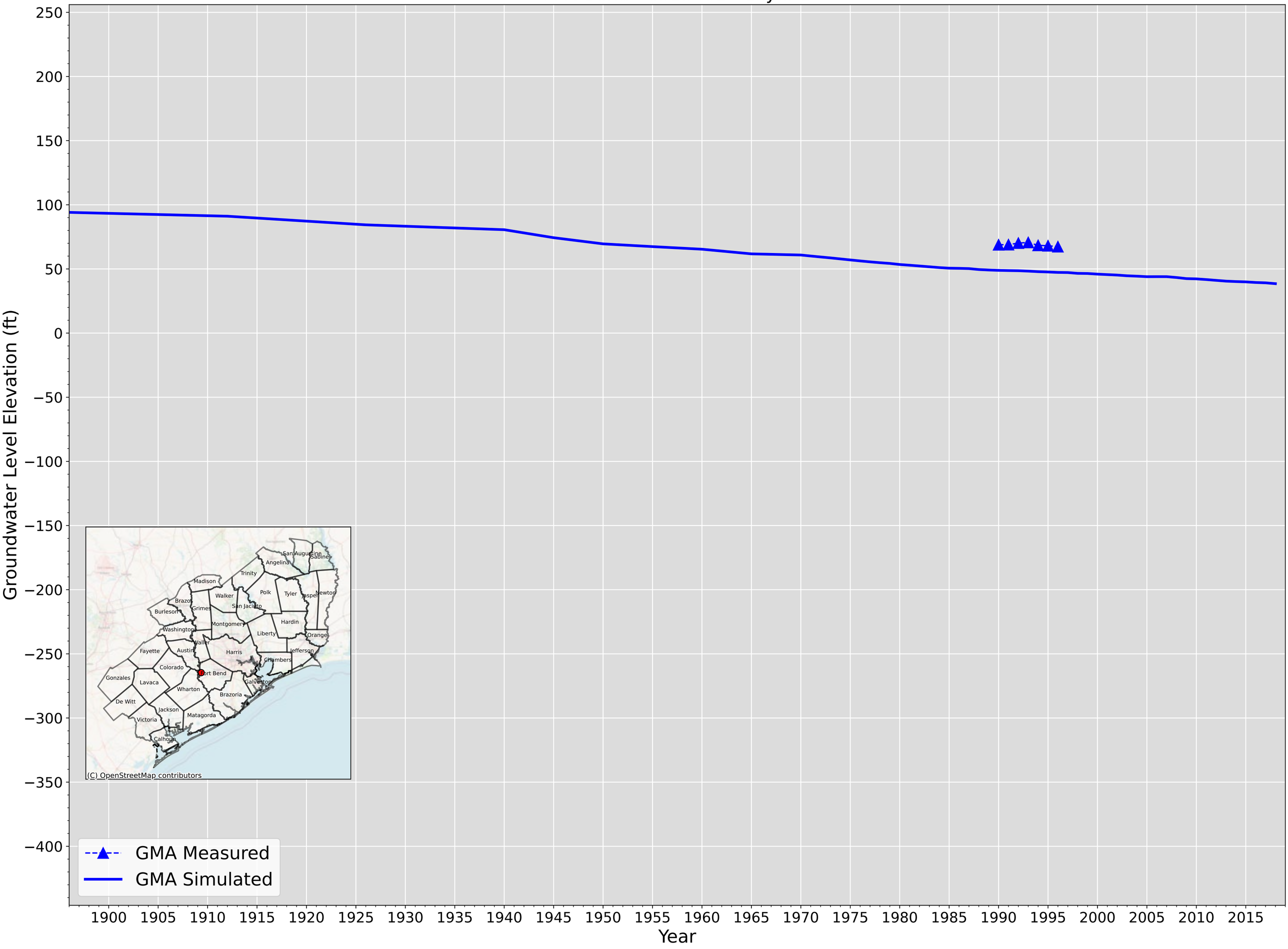
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525402 - Layer 2



Fort Bend - 6525506 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6525506
Gulf Simulated - 6525506

Fort Bend - 6526105 - Layer 2

Groundwater Level Elevation (ft)

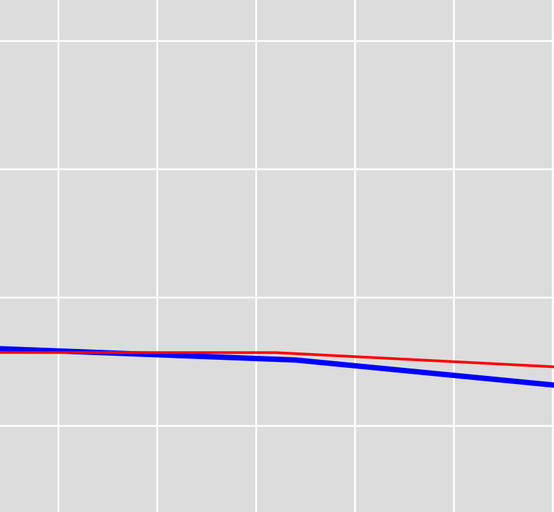
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6526105
Gulf Simulated - 6526105

Fort Bend - 6526205 & 6526202 & 6526204 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6526205
Gulf Simulated - 6526205

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6526501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6526501
Gulf Simulated - 6526501

Fort Bend - 6526601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

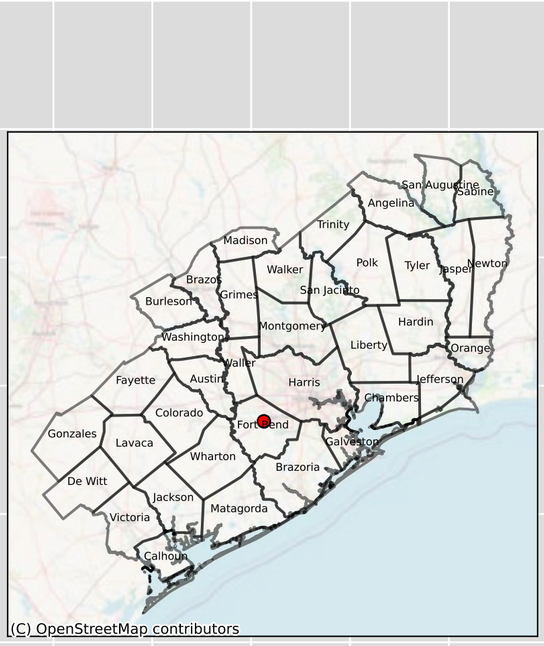
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6526603 & 6526605 - Layer 2



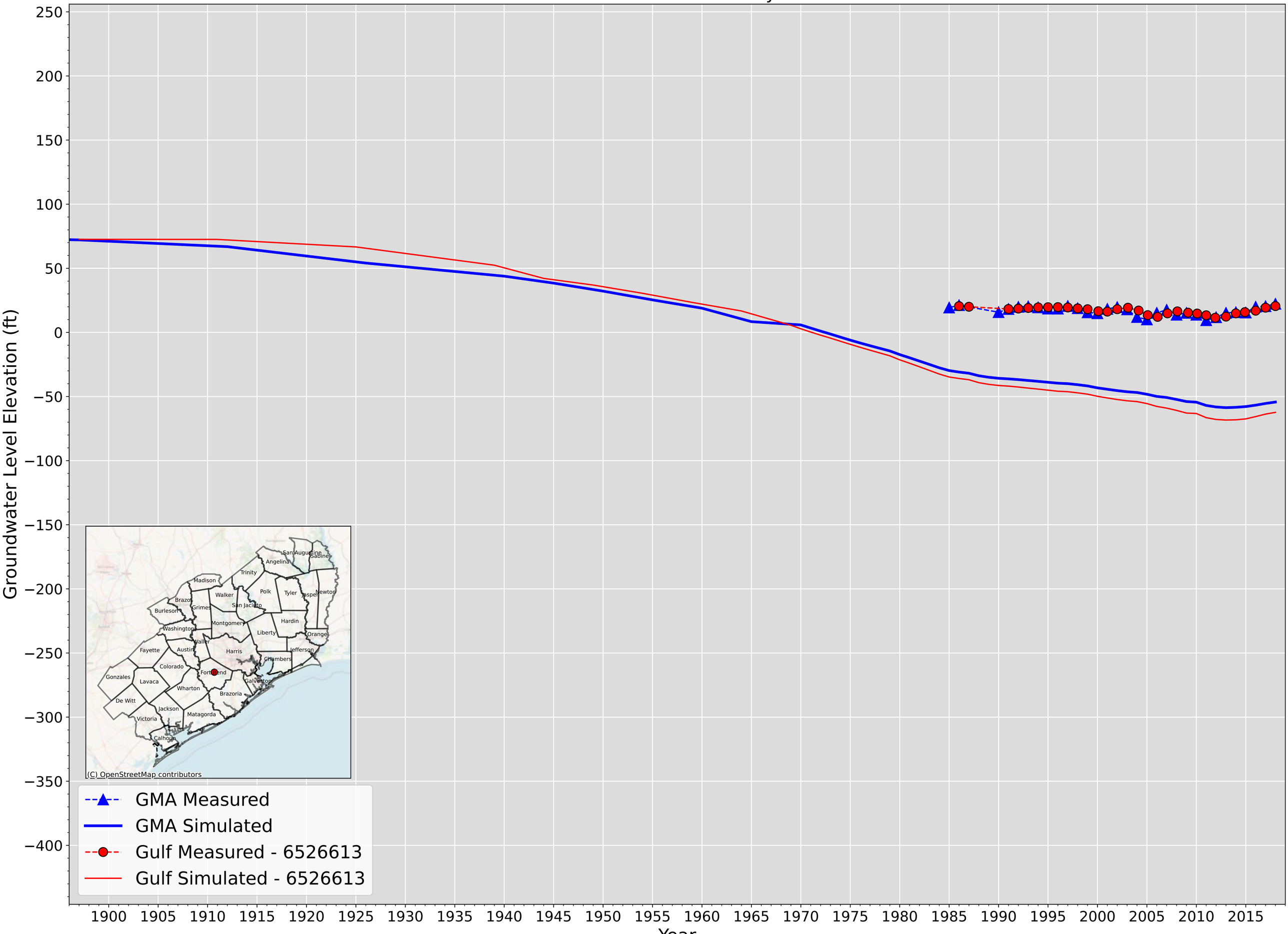
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6526613 - Layer 2



Fort Bend - 6527107 - Layer 2

Groundwater Level Elevation (ft)

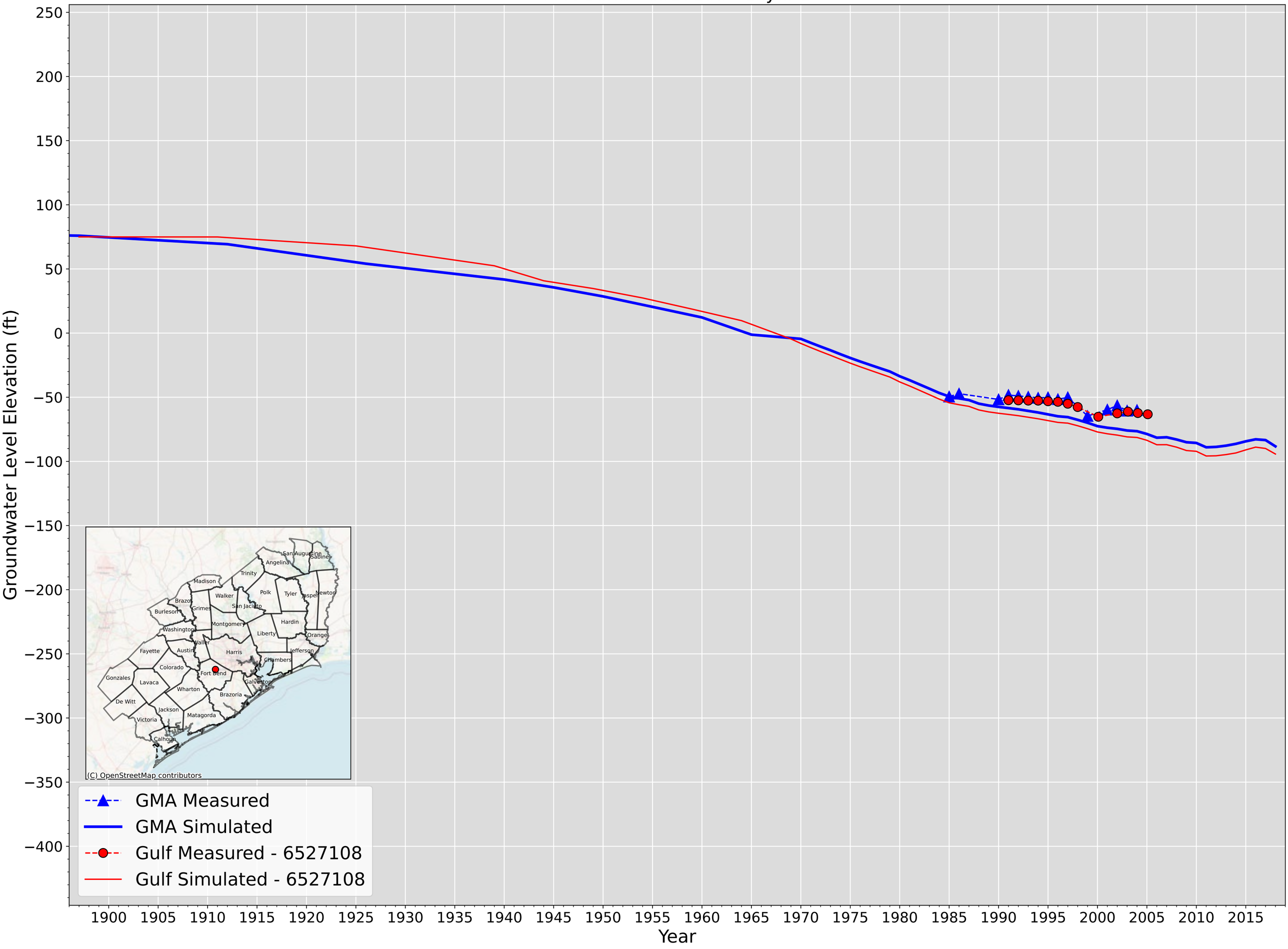
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

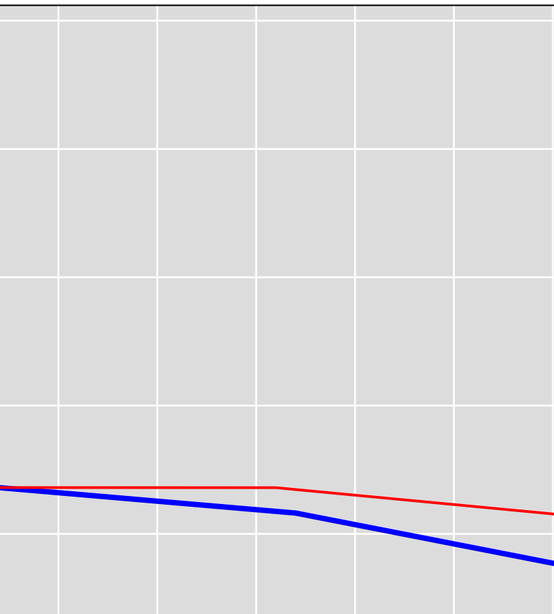
Year

GMA Measured
GMA Simulated

Fort Bend - 6527108 - Layer 2



Fort Bend - 6527303 & 6527315 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6527303
Gulf Simulated - 6527303

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6527313 - Layer 2

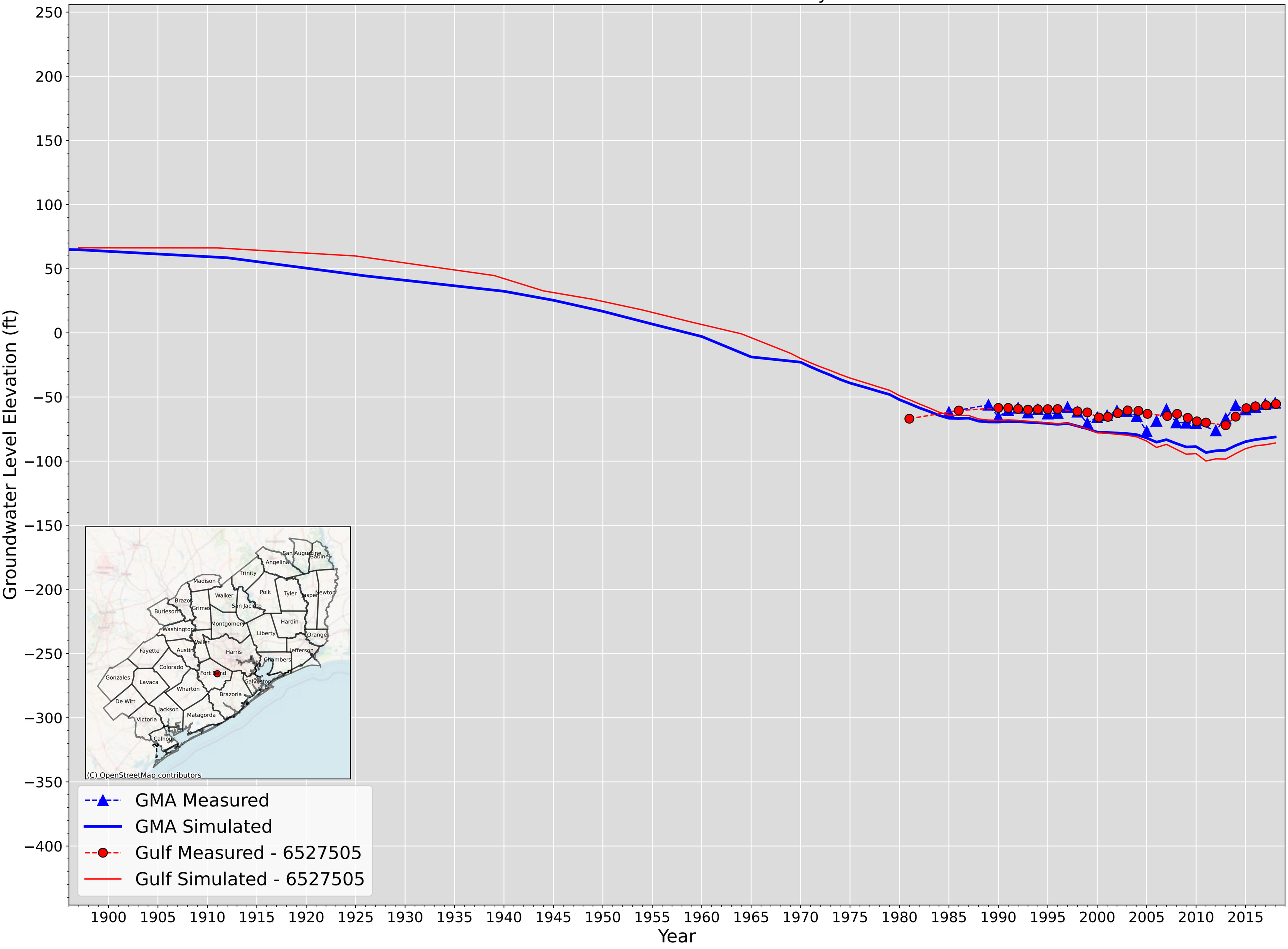
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Fort Bend - 6527505 & 6527504 - Layer 2



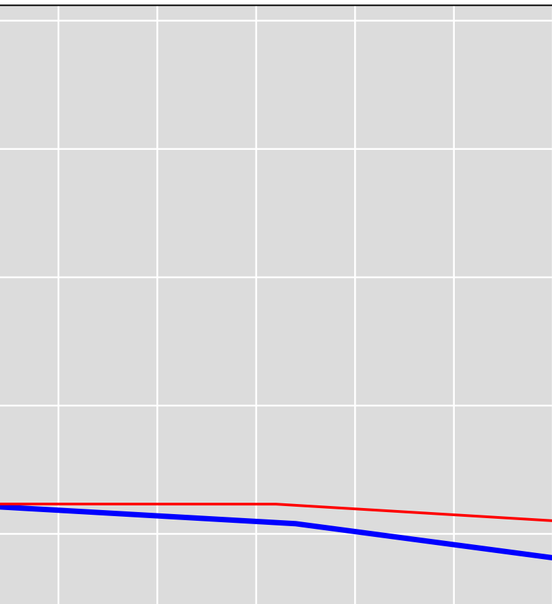
Fort Bend - 6527609 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527609
Gulf Simulated - 6527609

Fort Bend - 6527901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527901
Gulf Simulated - 6527901

Fort Bend - 6528102 - Layer 2

Groundwater Level Elevation (ft)

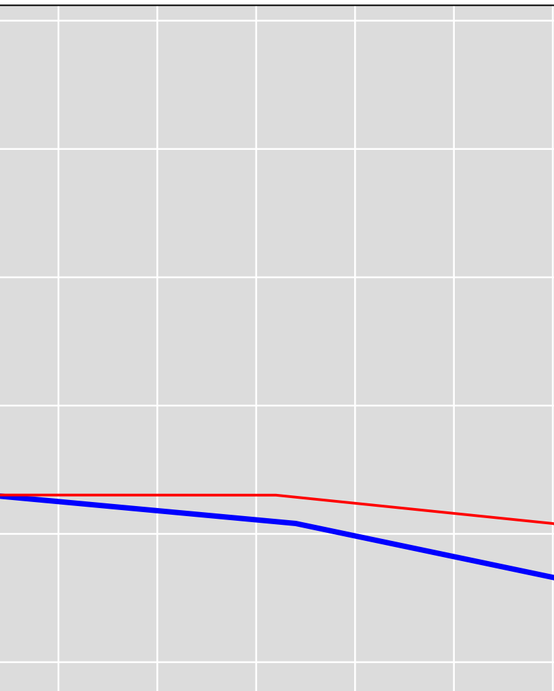
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528108 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6528201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528201
Gulf Simulated - 6528201

Fort Bend - 6528207 & 6528214 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528308 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528309 - Layer 2

Groundwater Level Elevation (ft)

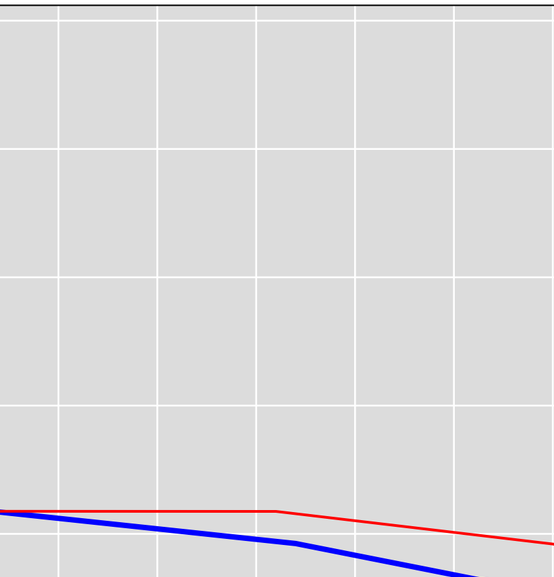
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528313 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6528313
Gulf Simulated - 6528313

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6528401 & 6528404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

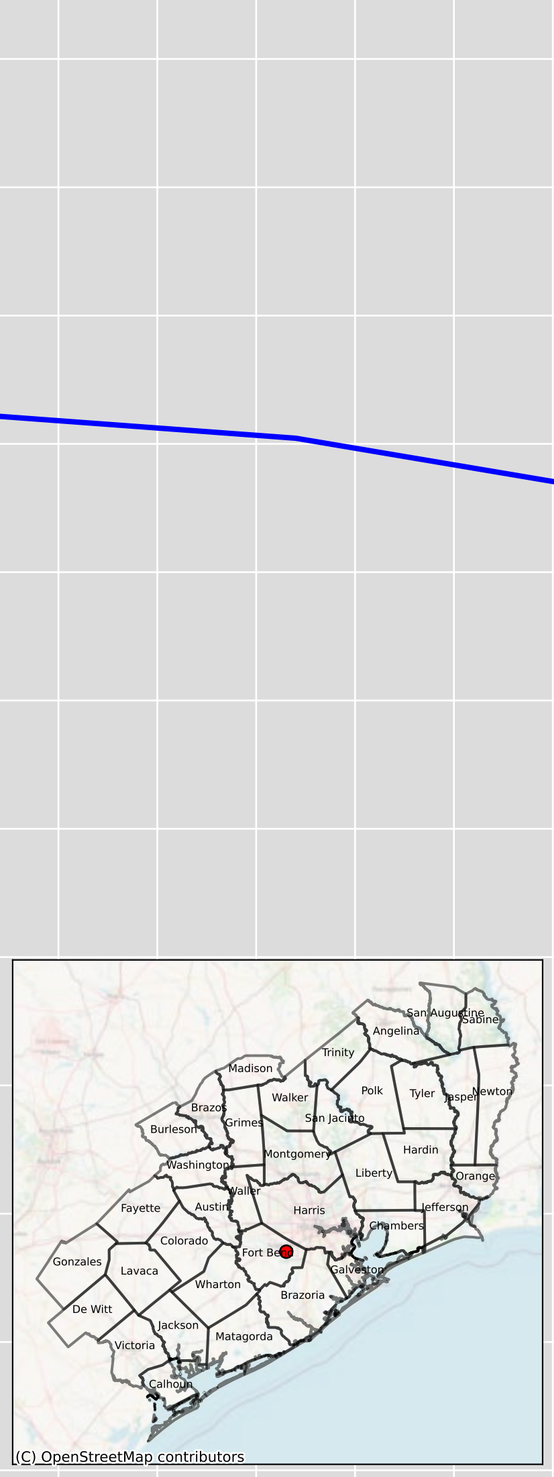
Fort Bend - 6528402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Fort Bend - 6528403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528501
Gulf Simulated - 6528501

Fort Bend - 6528505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528508 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528508
Gulf Simulated - 6528508

Fort Bend - 6528510 - Layer 2

Groundwater Level Elevation (ft)

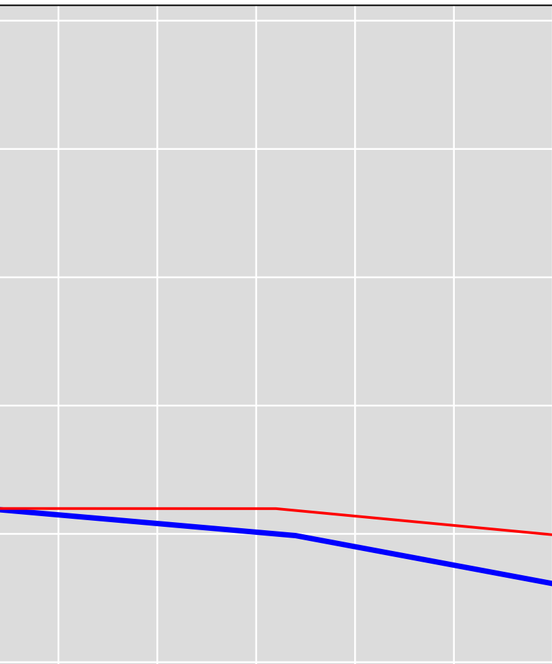
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528513 - Layer 2



Groundwater Level Elevation (ft)

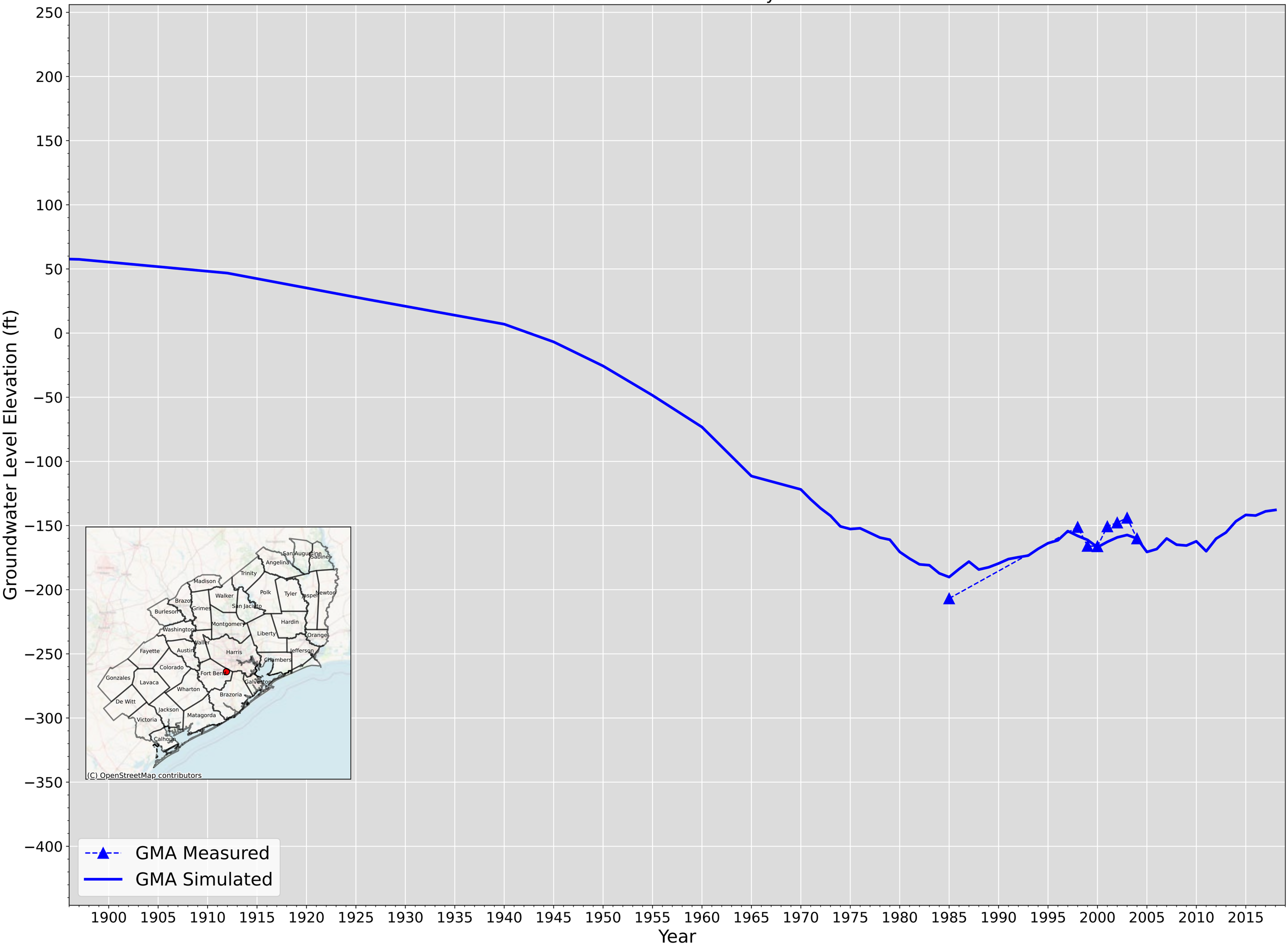
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528513
Gulf Simulated - 6528513

Fort Bend - 6528603 - Layer 2



Fort Bend - 6528604 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

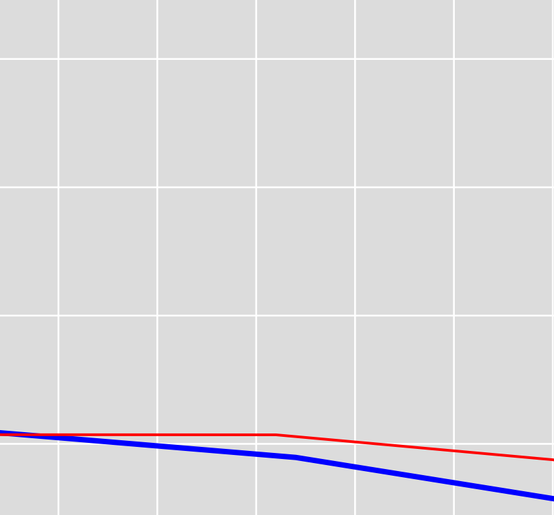
Year

GMA Measured
GMA Simulated
Gulf Measured - 6528604
Gulf Simulated - 6528604

Fort Bend - 6528607 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6528607
Gulf Simulated - 6528607

Fort Bend - 6528803 - Layer 2

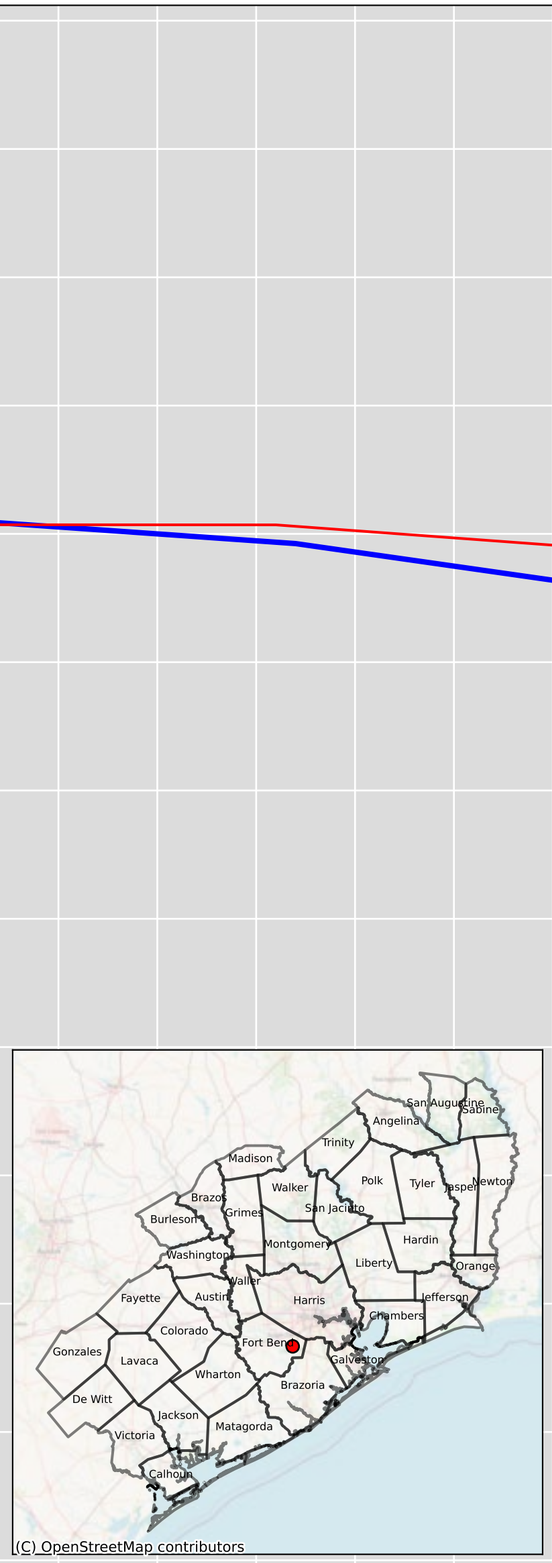
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Fort Bend - 6528810 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528810
Gulf Simulated - 6528810

Fort Bend - 6529101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6529104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

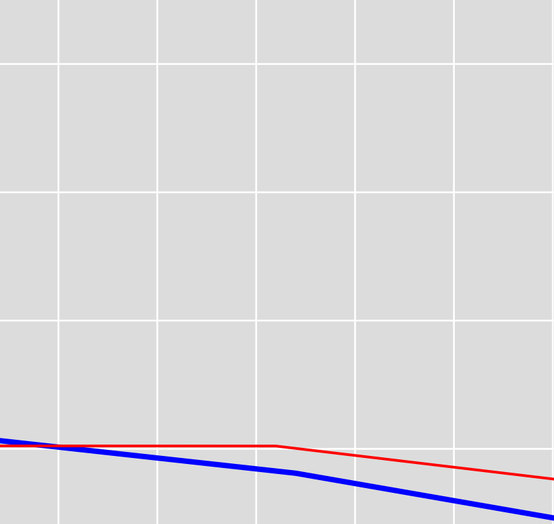
Fort Bend - 6529209 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6529209
Gulf Simulated - 6529209

Fort Bend - 6529403 & 6529407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6529405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6529405
Gulf Simulated - 6529405

Fort Bend - 6529516 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6529701 - Layer 2

Groundwater Level Elevation (ft)

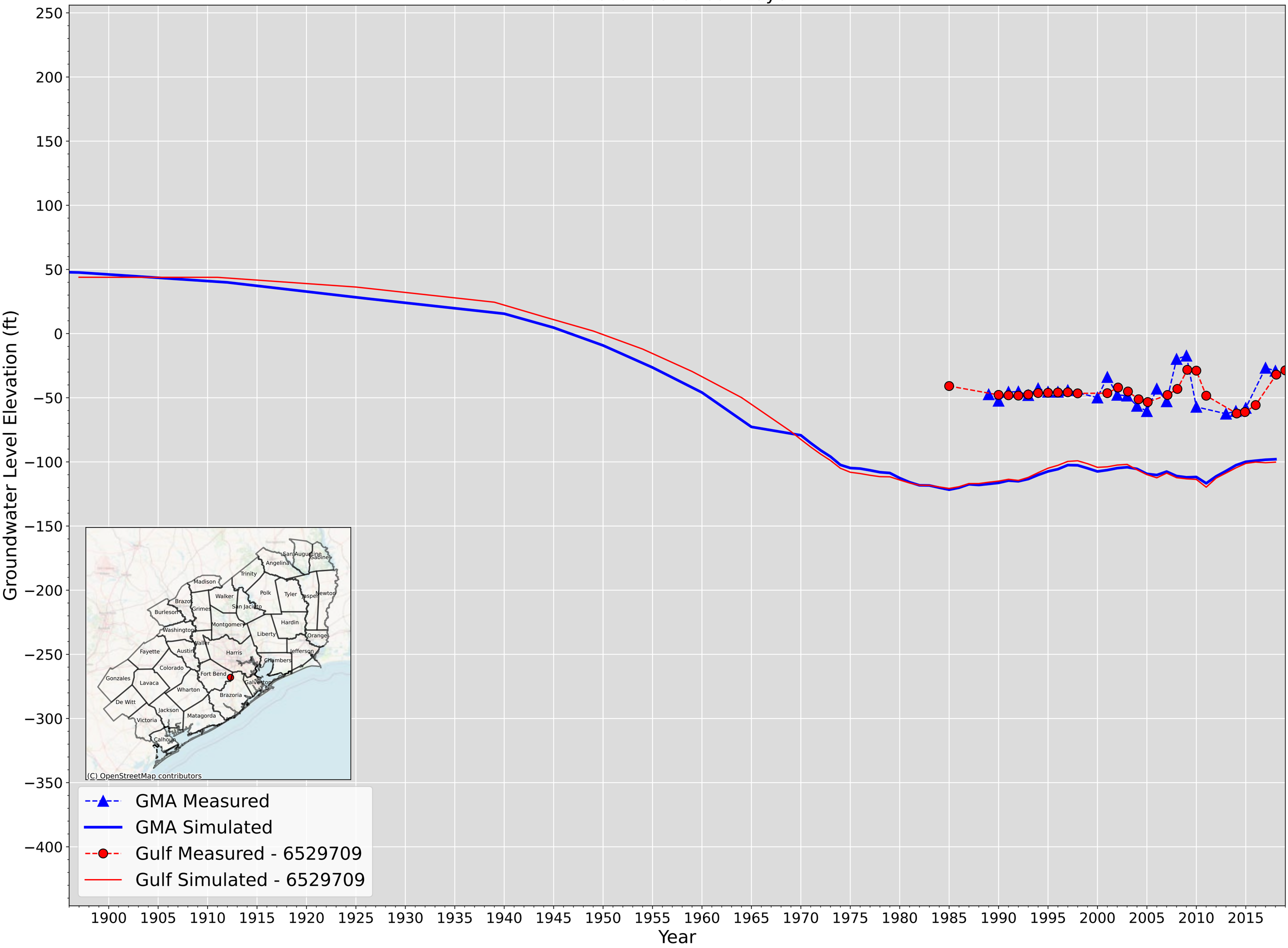
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6529709 - Layer 2



Fort Bend - 6533501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

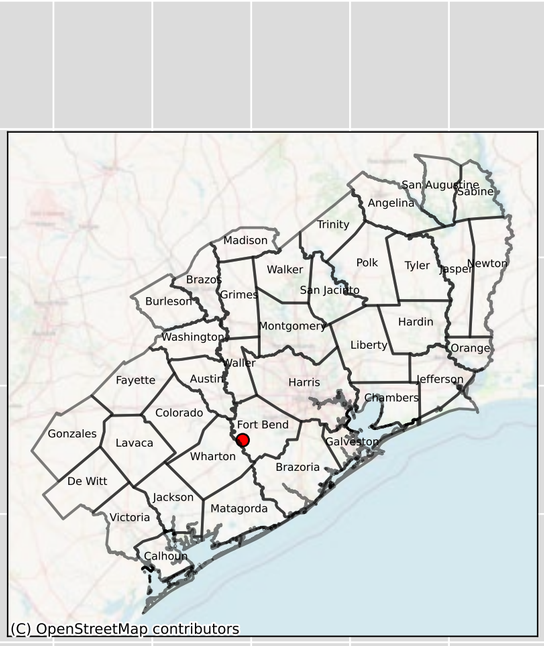
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6533502 & 6533510 - Layer 2



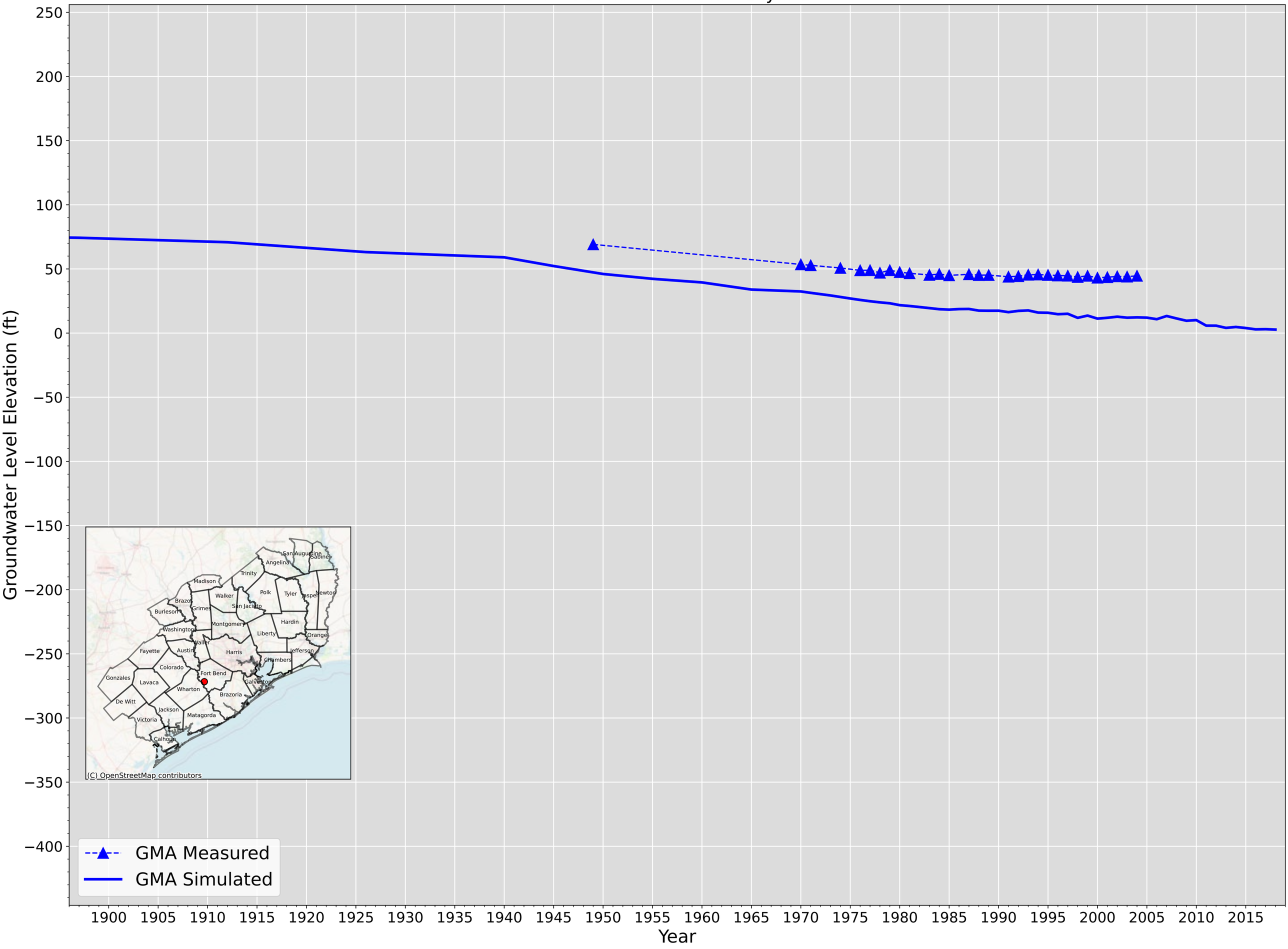
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6533503 - Layer 2



Fort Bend - 6533504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6533509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

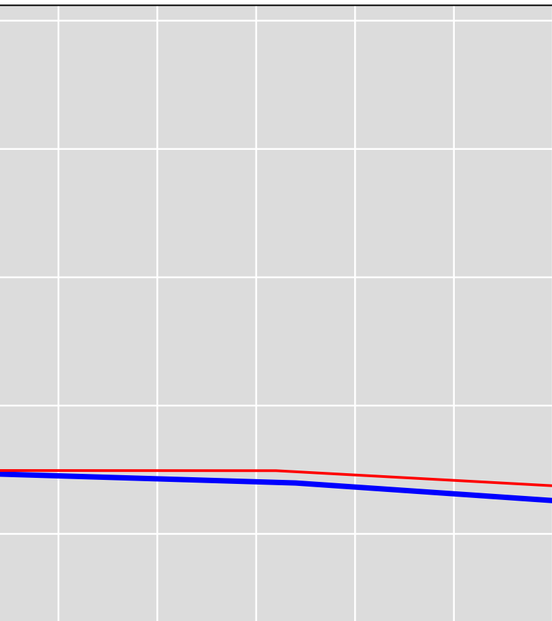
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6533801 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Groundwater Lev

GMA Measured
GMA Simulated
Gulf Measured - 6533801
Gulf Simulated - 6533801

Fort Bend - 6533803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6533803
Gulf Simulated - 6533803

Fort Bend - 6534303 - Layer 2

Groundwater Level Elevation (ft)

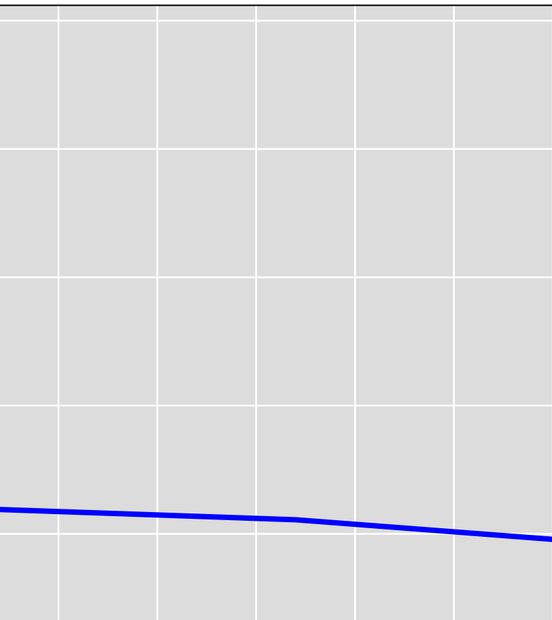
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6534604 & 6534901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6534701 & 6534710 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6534701
Gulf Simulated - 6534701

Fort Bend - 6534702 - Layer 2

Groundwater Level Elevation (ft)

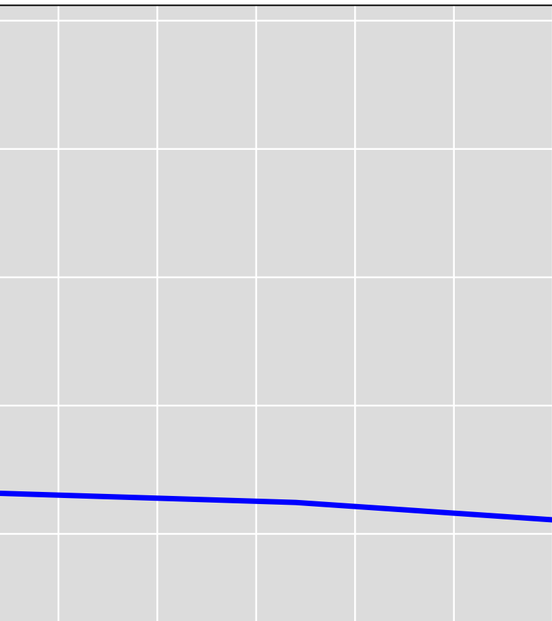
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6534718 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6535102 - Layer 2

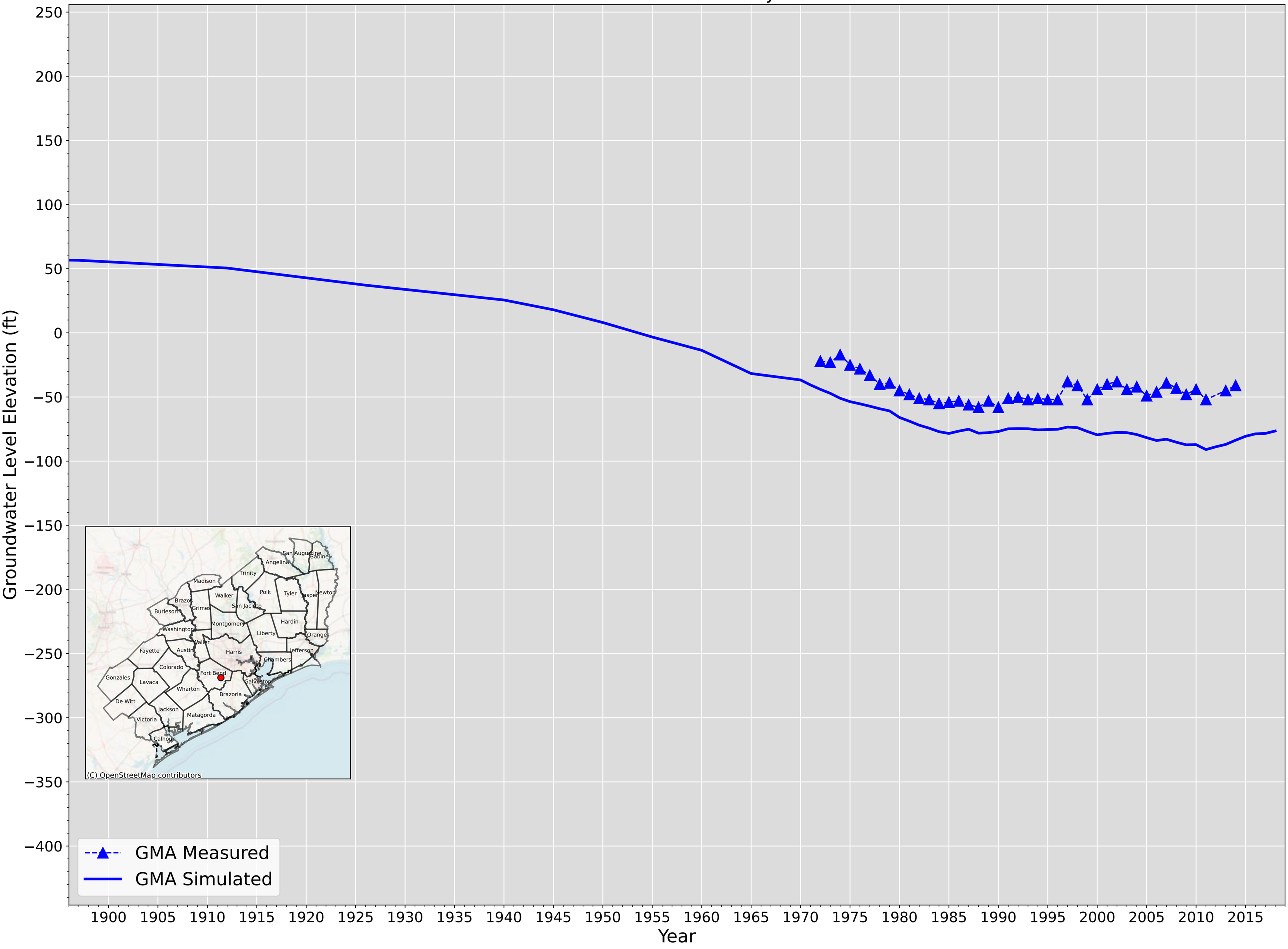
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Fort Bend - 6535302 - Layer 2



Fort Bend - 6535303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6535304 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6535304
Gulf Simulated - 6535304

Fort Bend - 6535701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6535711 & 6535702 & 6535707 & 6535709 & 6535710 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6535711
Gulf Simulated - 6535711

Fort Bend - 6535717 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6536101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

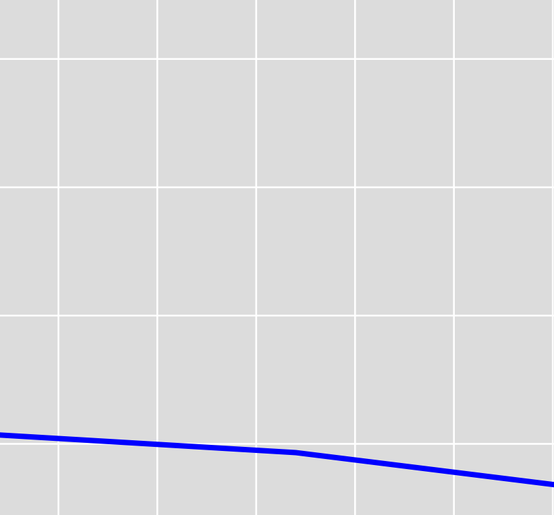
Fort Bend - 6536201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

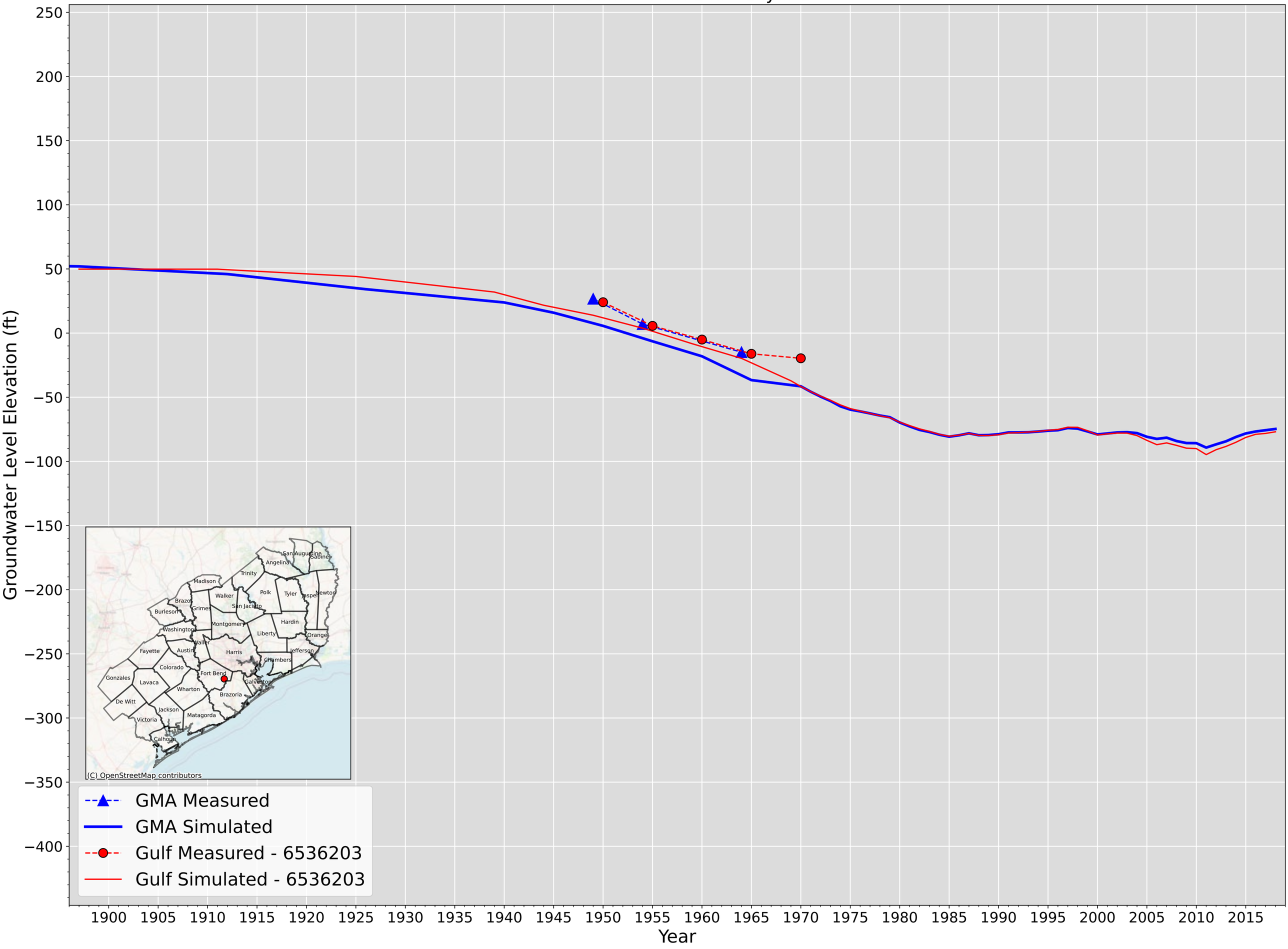
Year



GMA Measured

GMA Simulated

Fort Bend - 6536203 - Layer 2



Fort Bend - 6536204 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6536207 - Layer 2

Groundwater Level Elevation (ft)

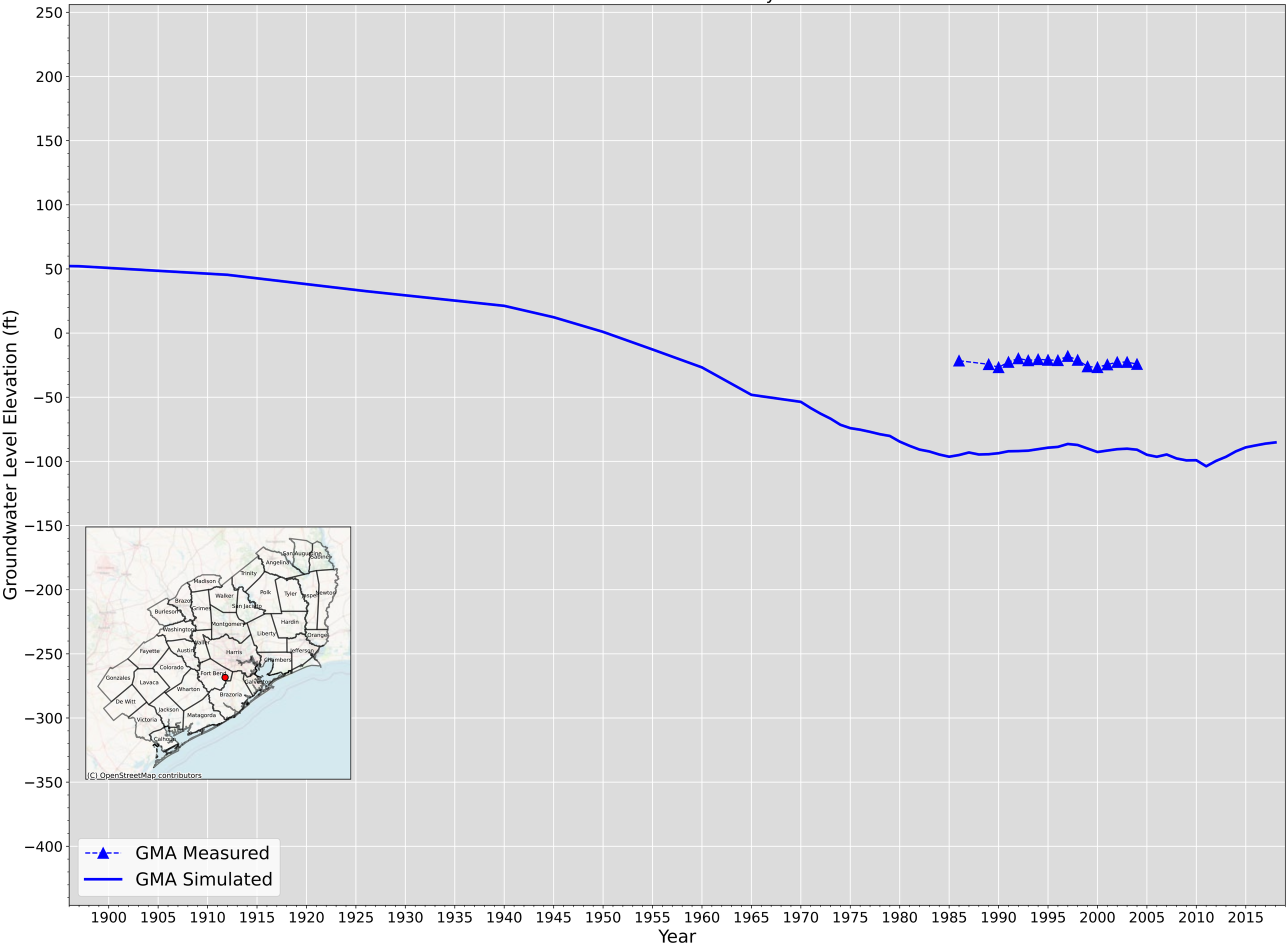
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6536209 - Layer 2



Fort Bend - 6536510 & 6536511 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6542301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6542302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

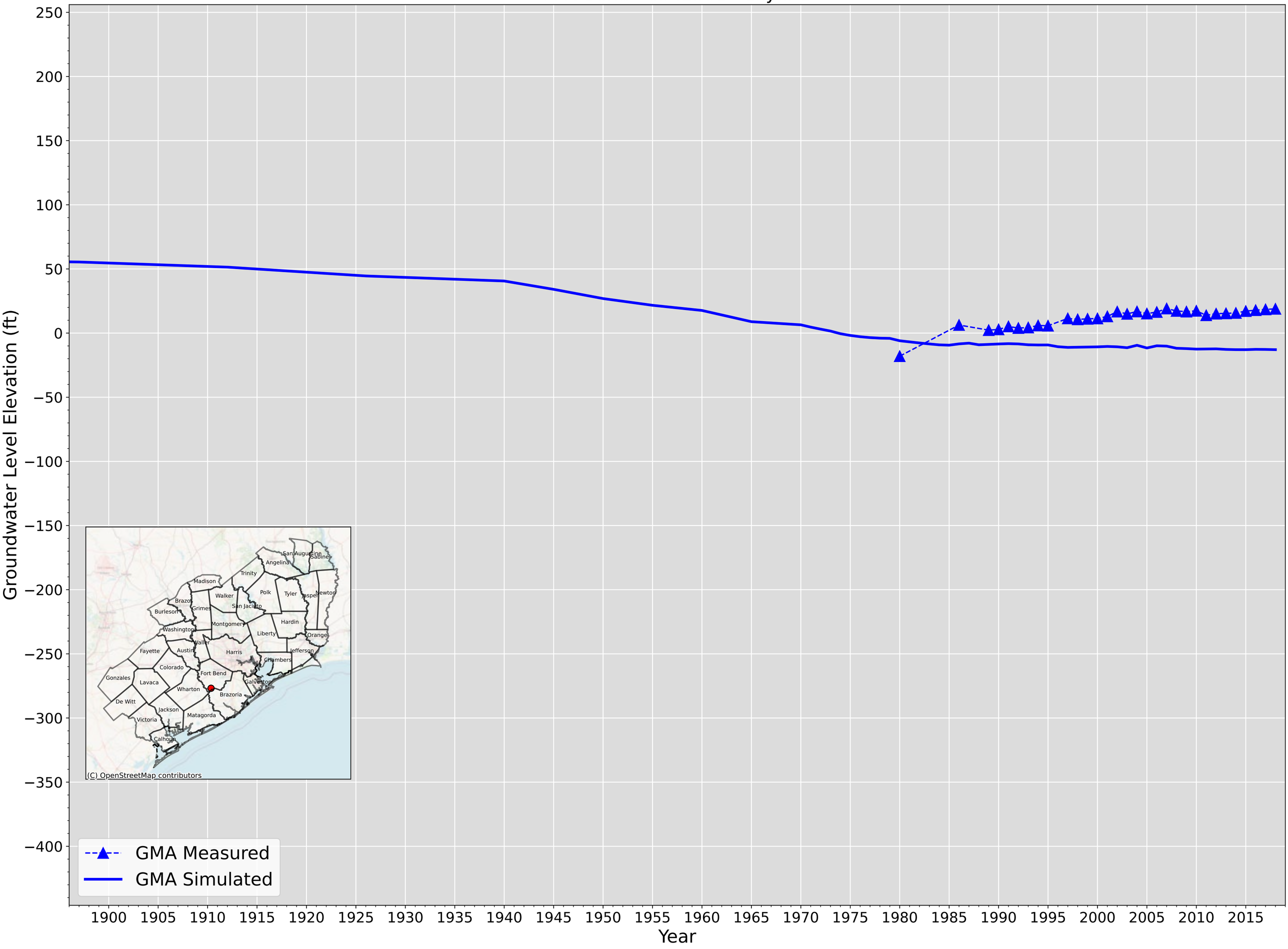
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6542501 - Layer 2



Fort Bend - 6543101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

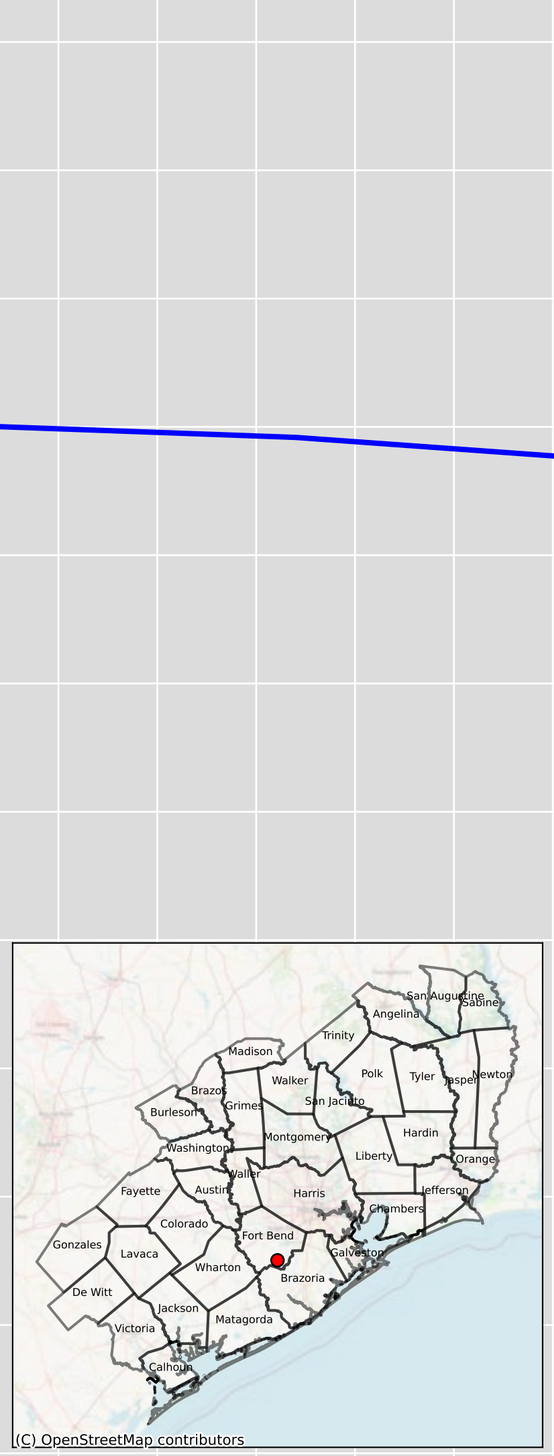
Fort Bend - 6543201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Fort Bend - 6543301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6543504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6543602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6544101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6632902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6632905 - Layer 2

Groundwater Level Elevation (ft)

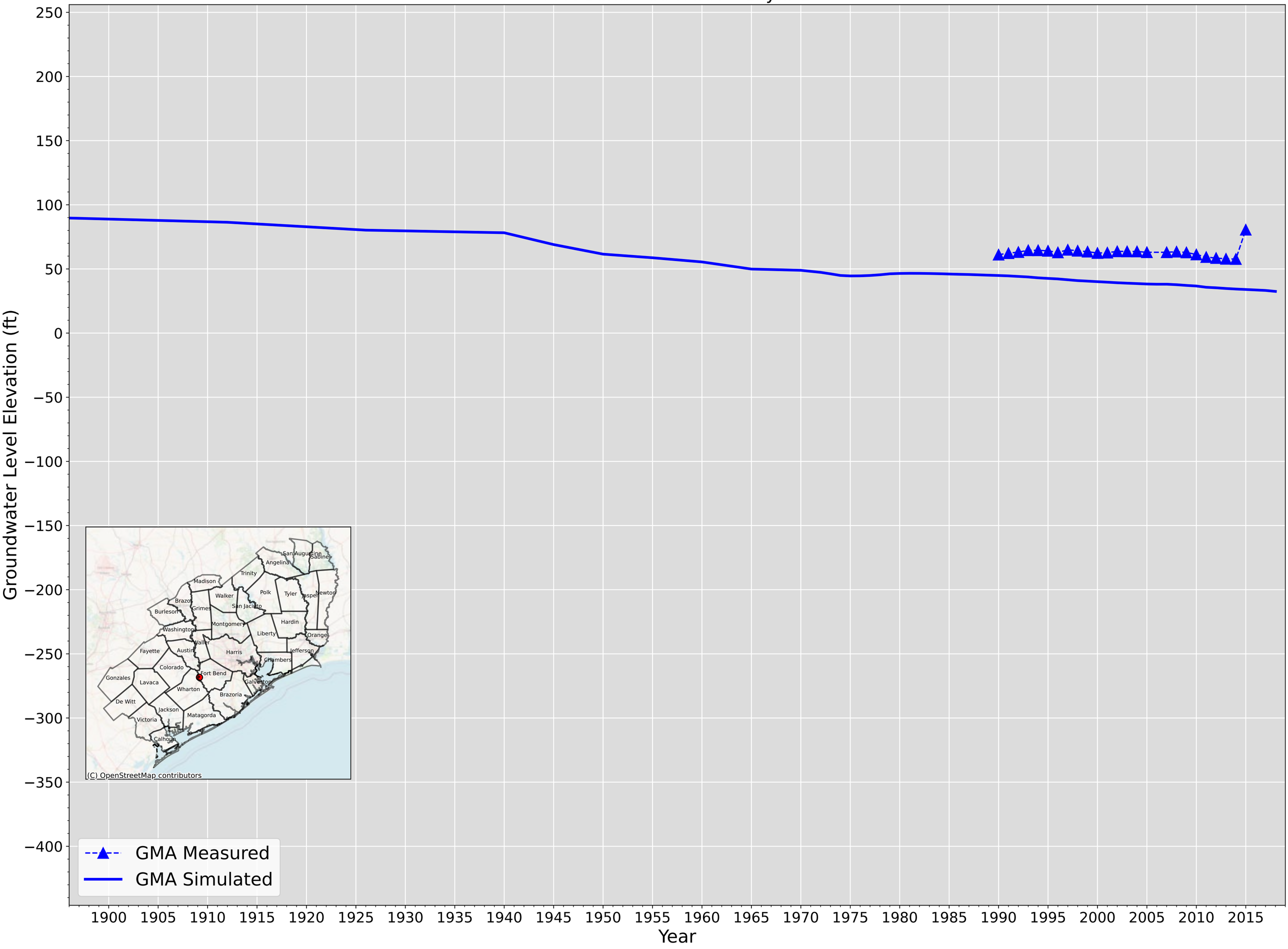
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6640307 - Layer 2



Fort Bend - 6640312 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

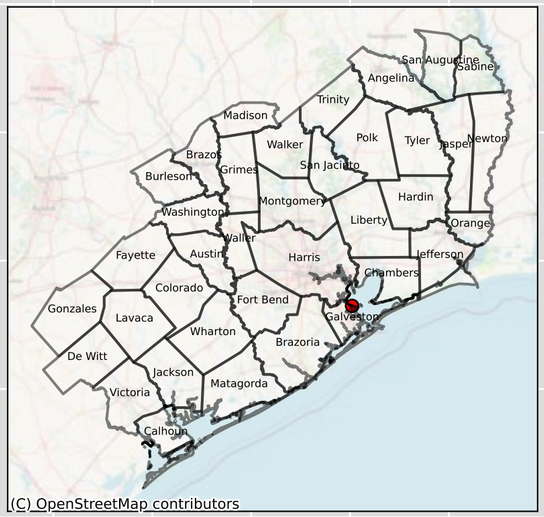
Galveston - 6425708 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

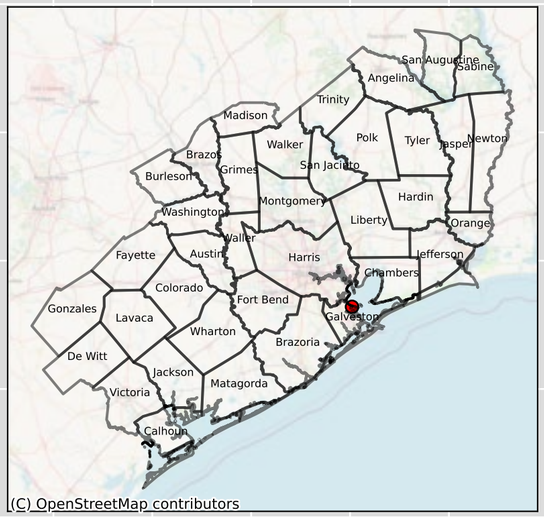
Galveston - 6425711 & 6425712 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

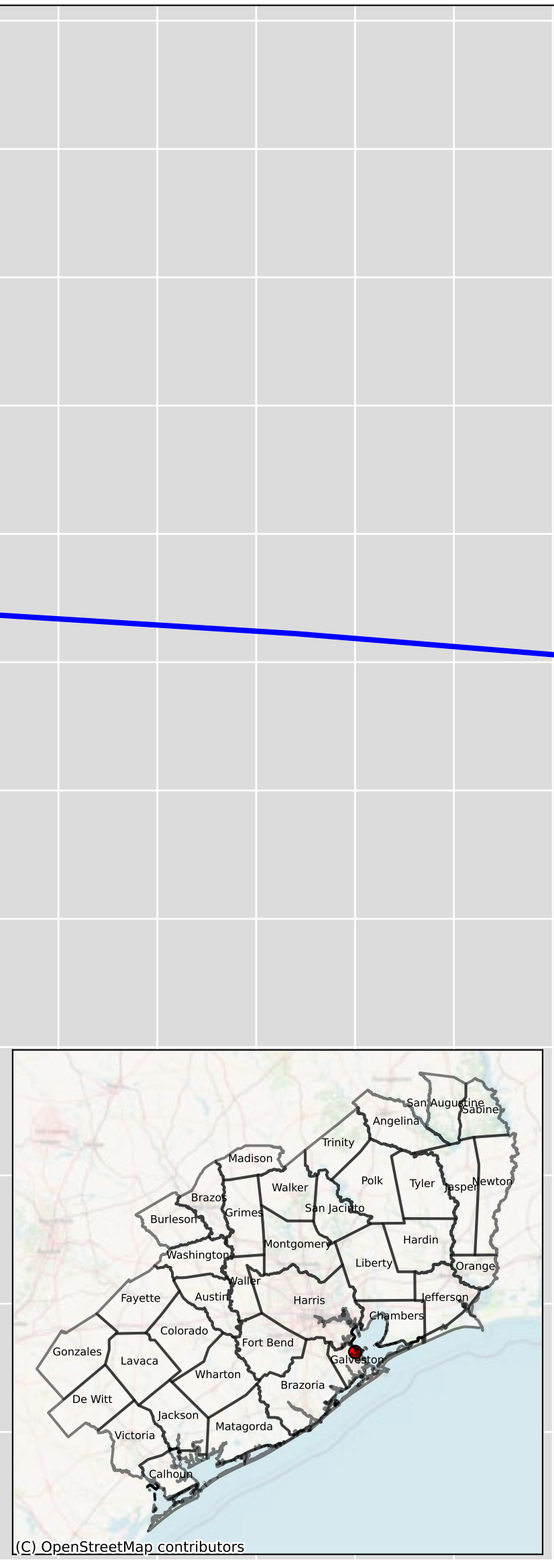
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6433101 & 6433102 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6433103 & 6433109 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

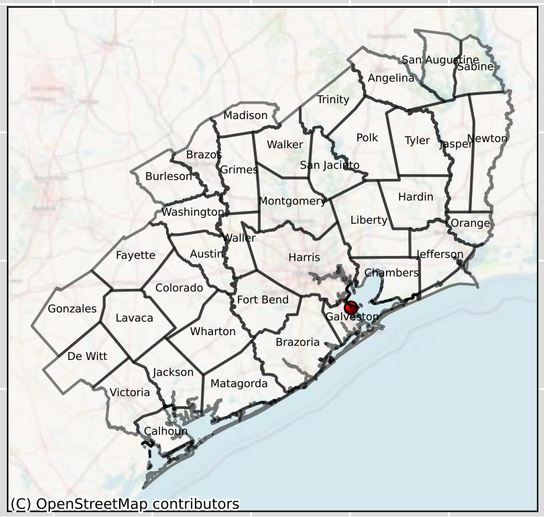
Year

GMA Measured
GMA Simulated
Gulf Measured - 6433103
Gulf Simulated - 6433103

Galveston - 6433110 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Galveston - 6433213 & 6433203 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6433213
Gulf Simulated - 6433213

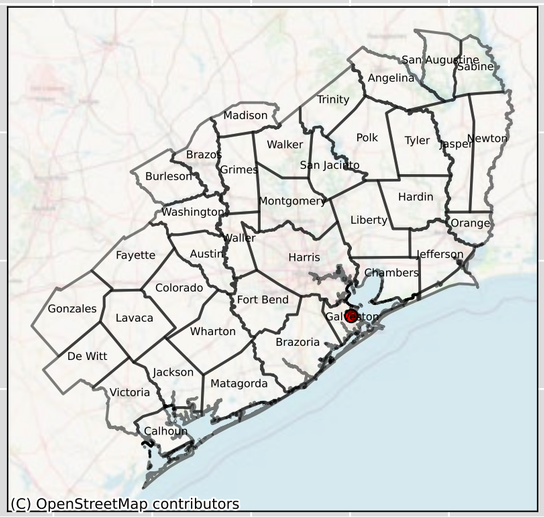
Galveston - 6433401 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated



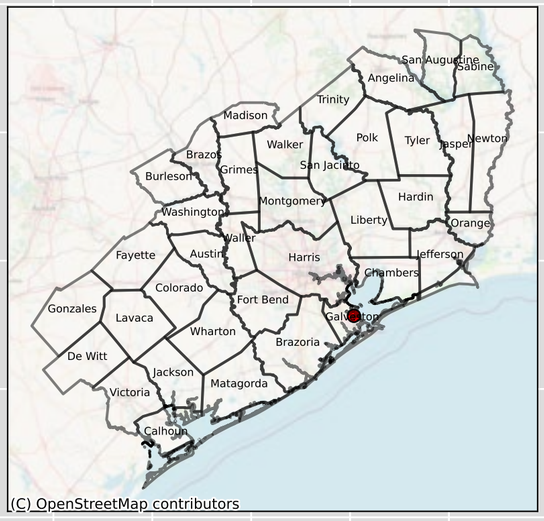
Galveston - 6433501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6433502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Galveston - 6433701 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

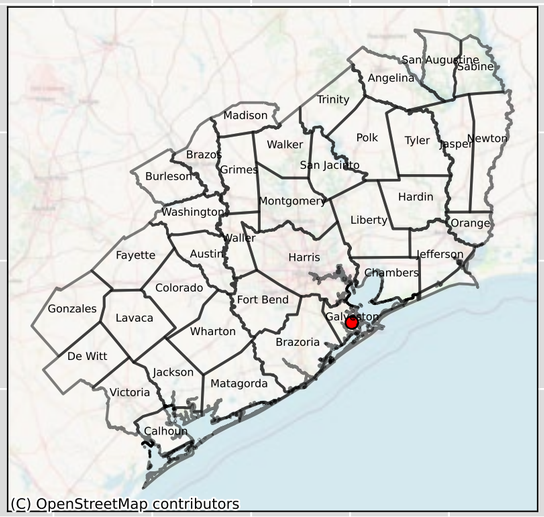
Galveston - 6433702 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

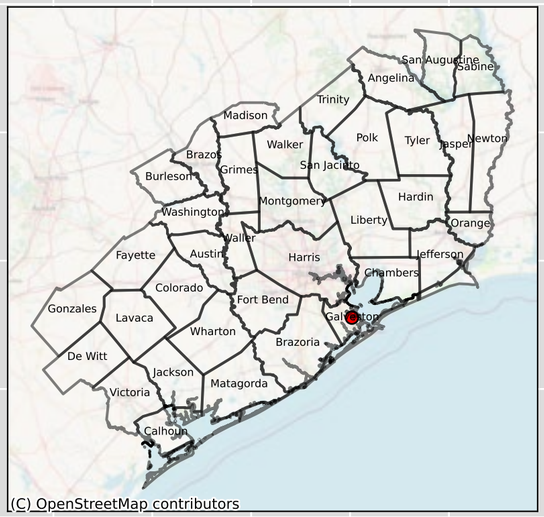


GMA Measured
GMA Simulated

Galveston - 6433703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6433710 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

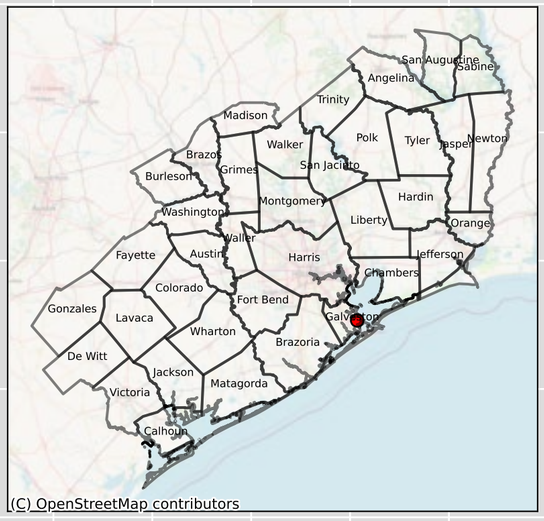
Year

GMA Measured
GMA Simulated
Gulf Measured - 6433710
Gulf Simulated - 6433710

Galveston - 6433801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6433802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

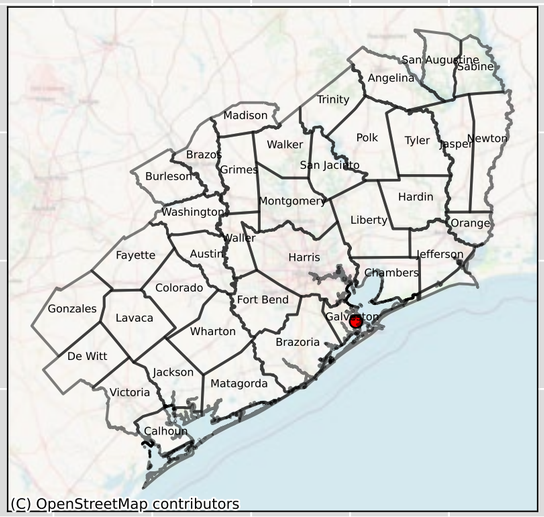
Galveston - 6433803 & 6433807 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

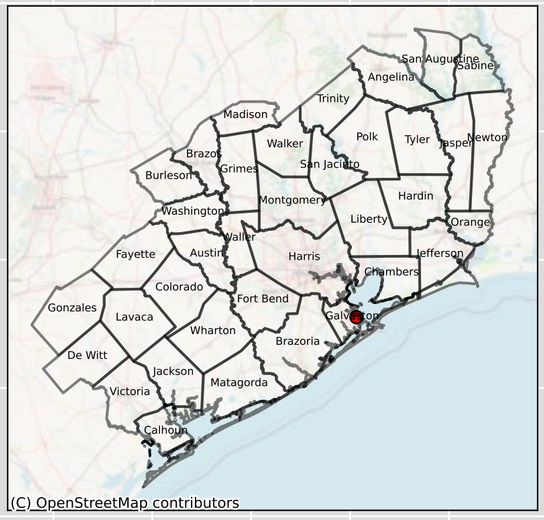
Galveston - 6433804 & 6433814 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

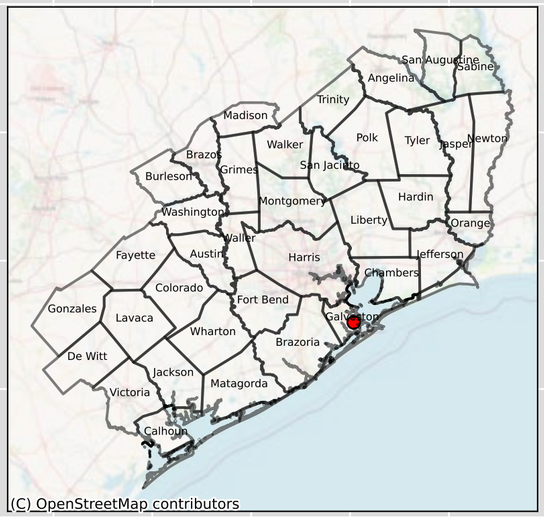
Galveston - 6433805 & 6433818 & 6433819 & 6441211 & 6441212 & 6441213 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6433810 & 6433812 & 6441216 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Galveston - 6433811 & 6433821 - Layer 2

Groundwater Level Elevation (ft)

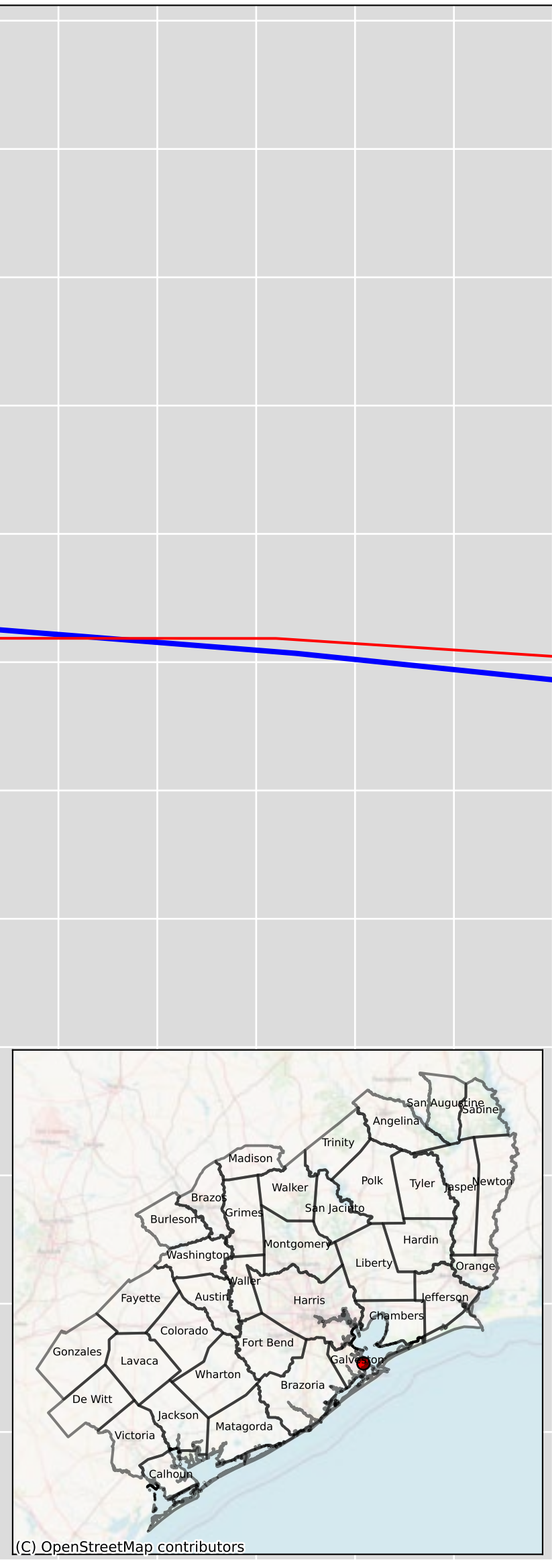
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6433901 & 6433903 & 6433904 & 6433905 & 6433909 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

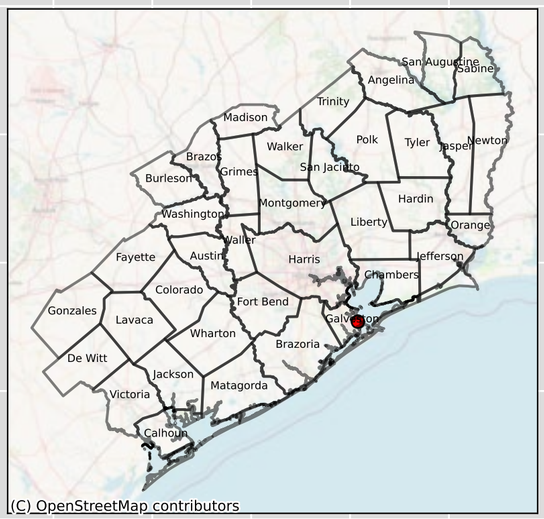
Galveston - 6433902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

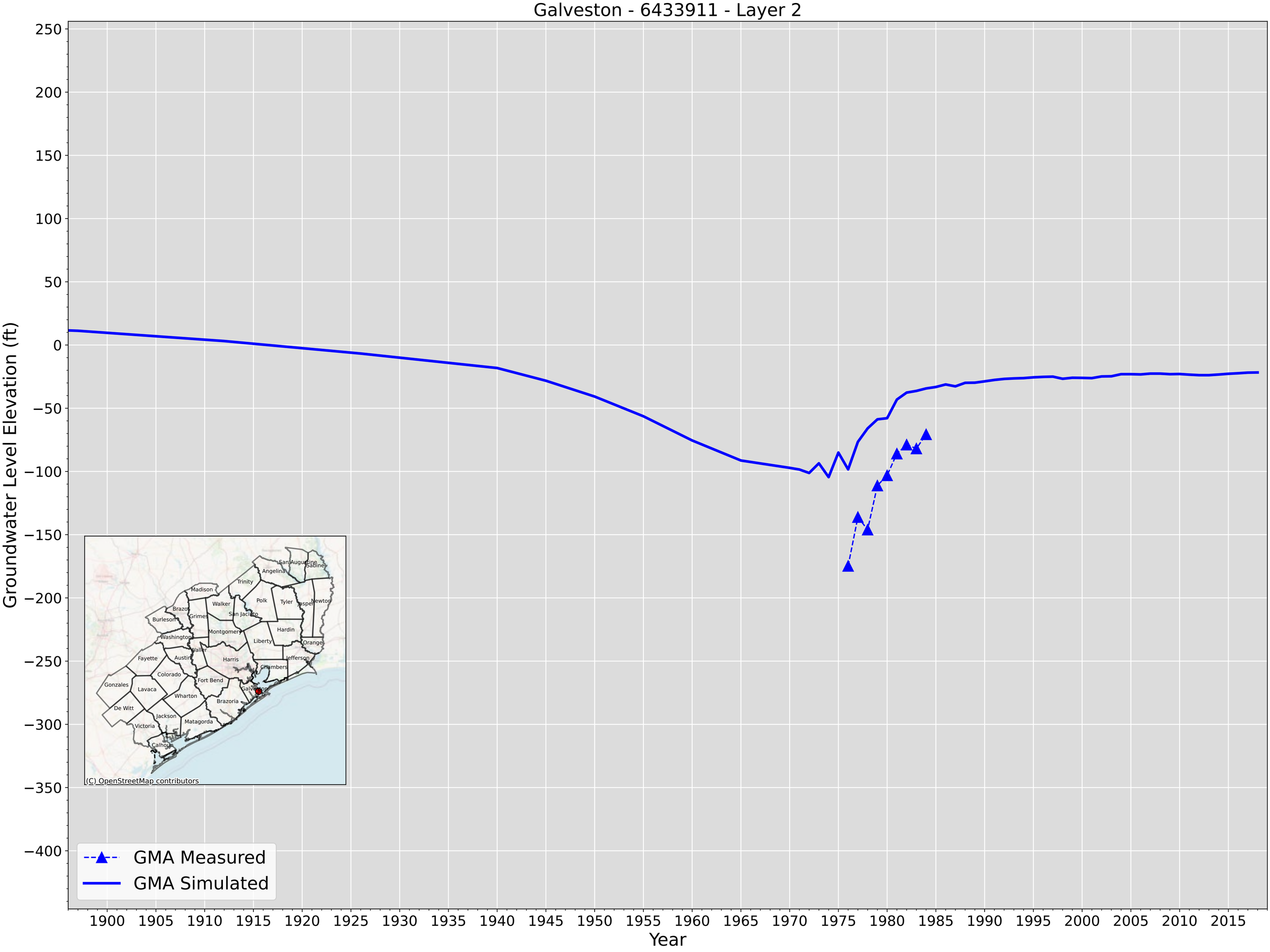
Year



GMA Measured

GMA Simulated

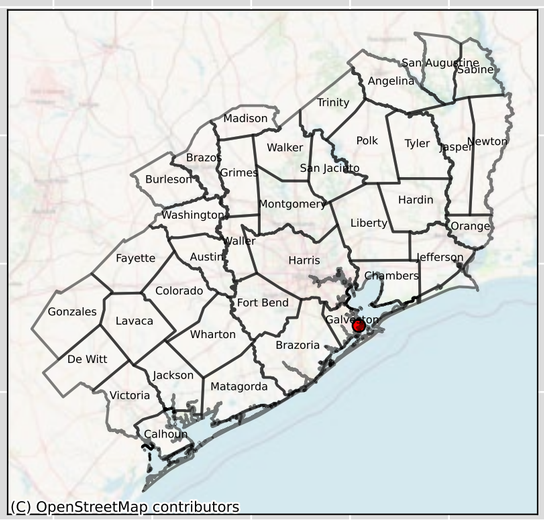
Galveston - 6433911 - Layer 2



Galveston - 6433912 & 6433906 & 6433910 & 6433914 - Layer 2

Groundwater Level Elevation (ft)

Year

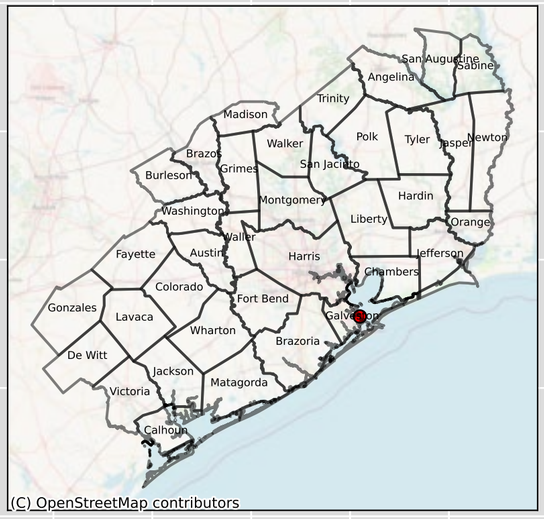


GMA Measured
GMA Simulated
Gulf Measured - 6433912
Gulf Simulated - 6433912

Galveston - 6433918 & 6433915 & 6433916 & 6433917 & 6433919 & 6433920 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated
Gulf Measured - 6433918
Gulf Simulated - 6433918

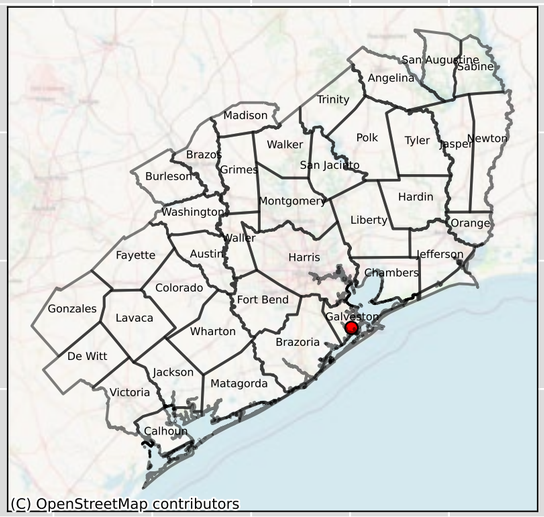
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6441113 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6441114 & 6441203 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6441114
Gulf Simulated - 6441114

Galveston - 6441204 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

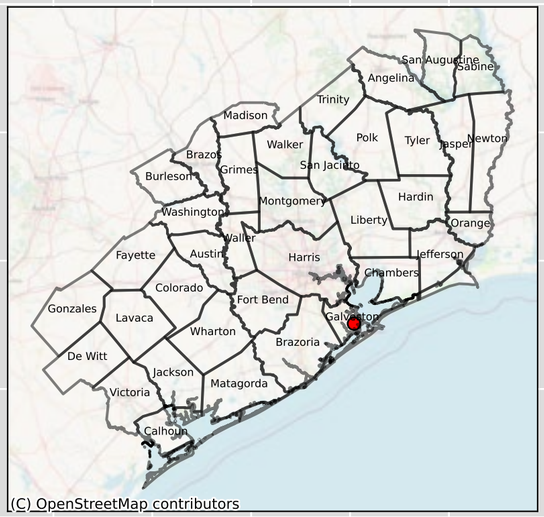
Galveston - 6441209 & 6441214 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

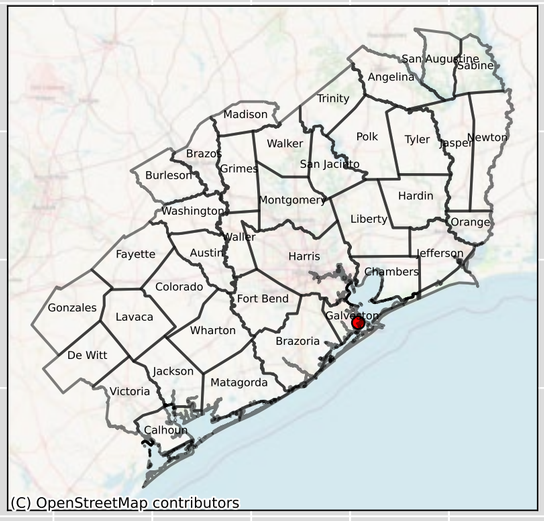


GMA Measured
GMA Simulated

Galveston - 6441302 & 6441304 & 6441305 & 6441306 & 6441311 & 6441312 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6441303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6441310 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6531703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

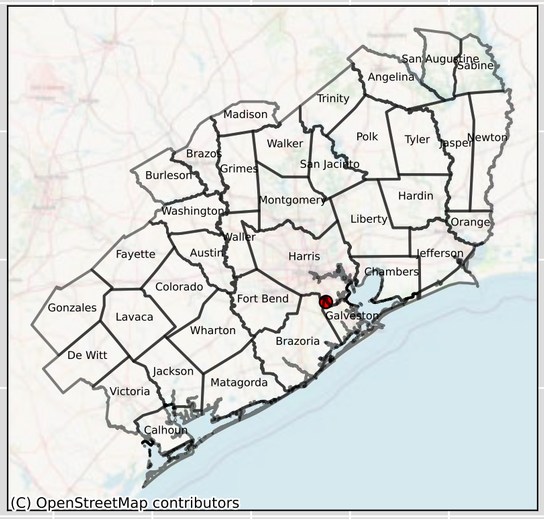
Galveston - 6531806 & 6531812 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6531809 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6532524 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6532619 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6532713 & 6532714 & 6532715 & 6532724 & 6532726 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

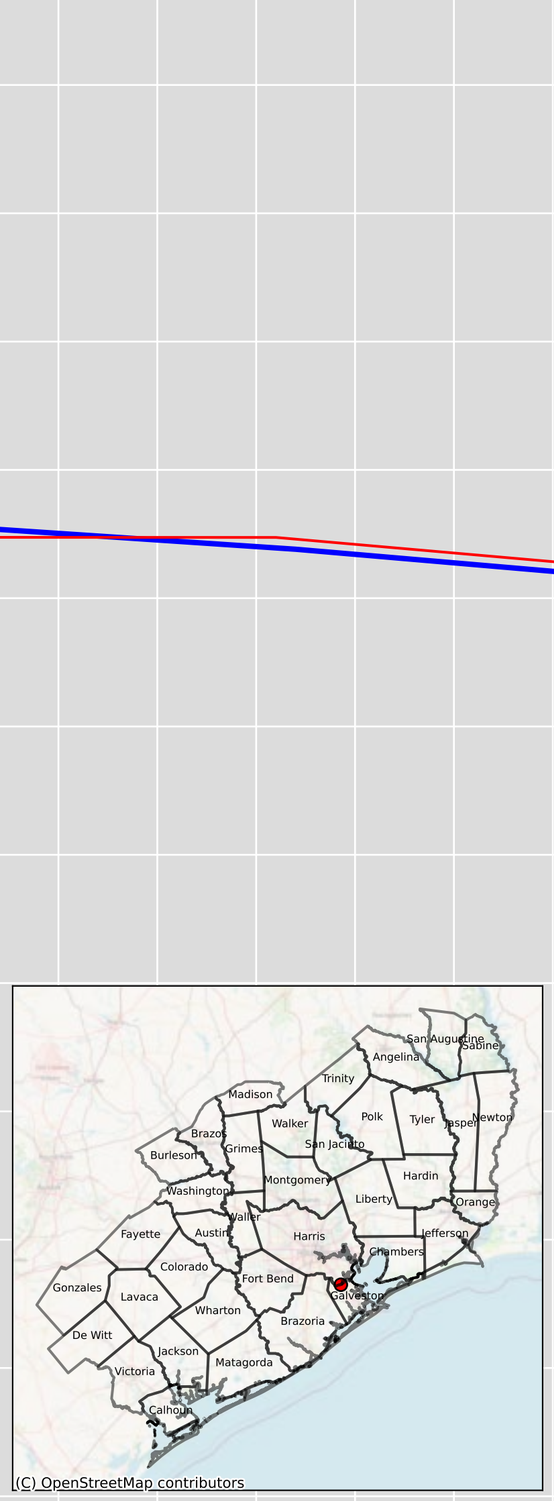
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6532716 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated
Gulf Measured - 6532716
Gulf Simulated - 6532716

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6532720 & 6532721 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

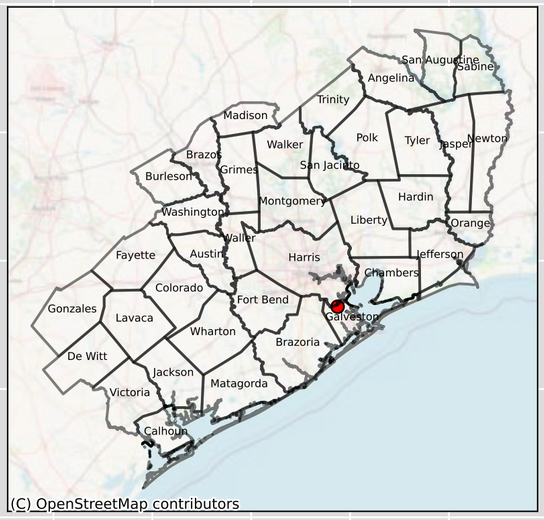
Galveston - 6532741 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

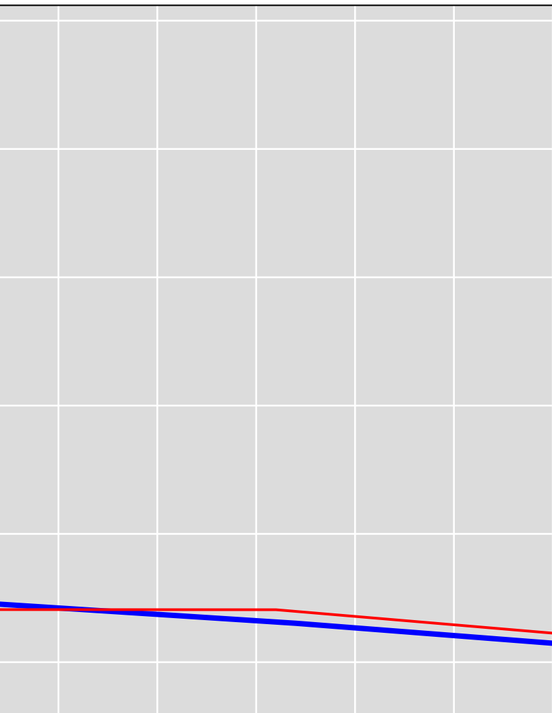
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6532901 & 6532618 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6532901
Gulf Simulated - 6532901

Galveston - 6532902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6532902
Gulf Simulated - 6532902

Galveston - 6539301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6539310 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6539310
Gulf Simulated - 6539310

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6539601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6539601
Gulf Simulated - 6539601

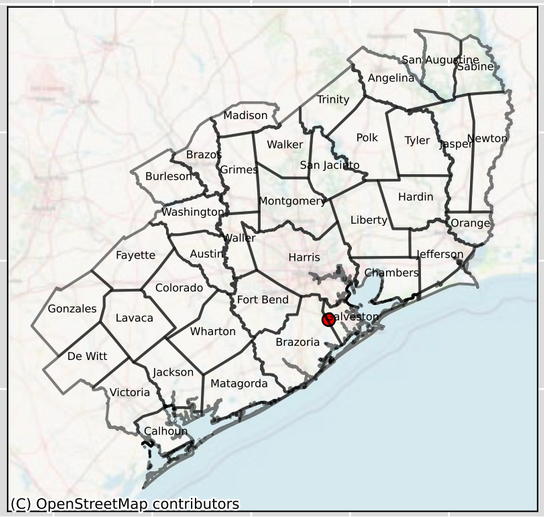
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6539804 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

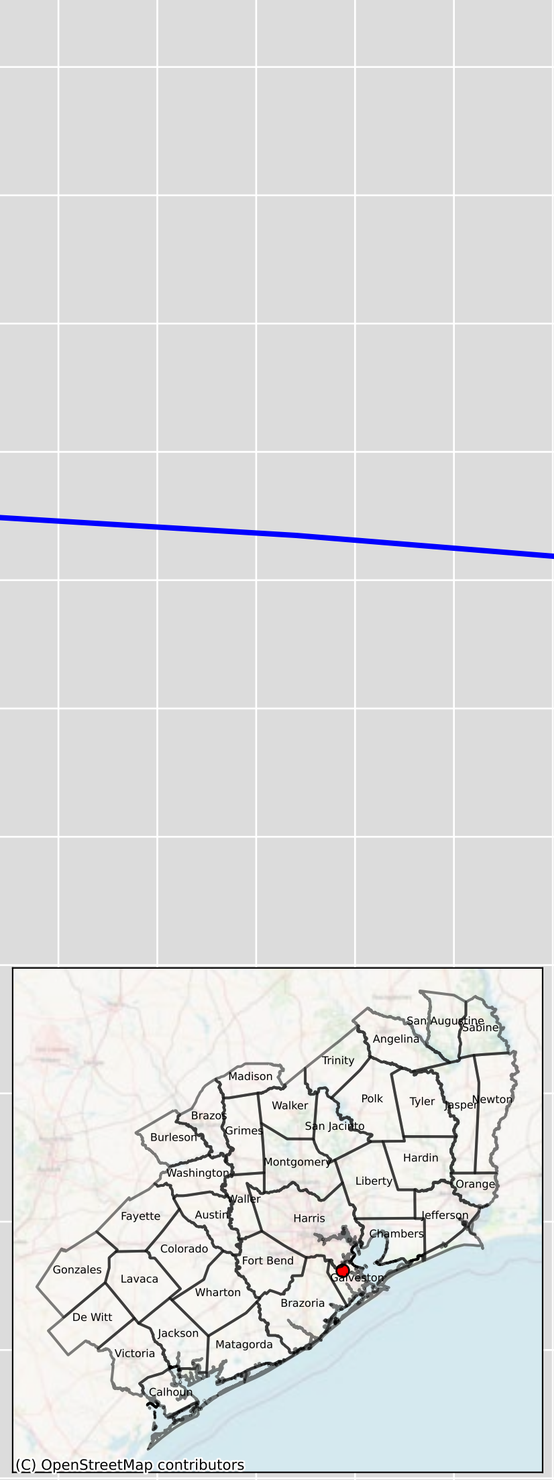
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540102 & 6540103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

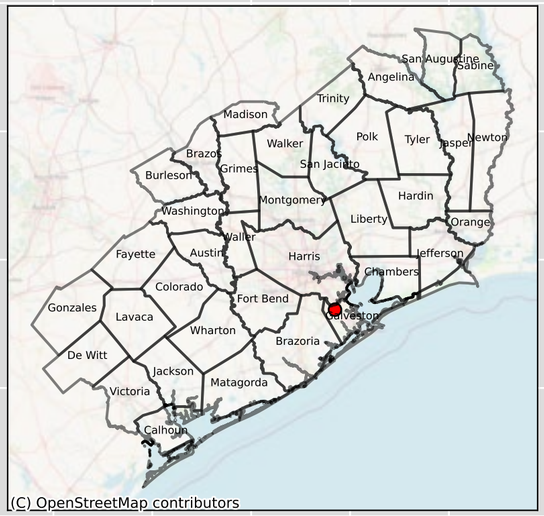
Year

GMA Measured
GMA Simulated

Galveston - 6540105 & 6540116 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

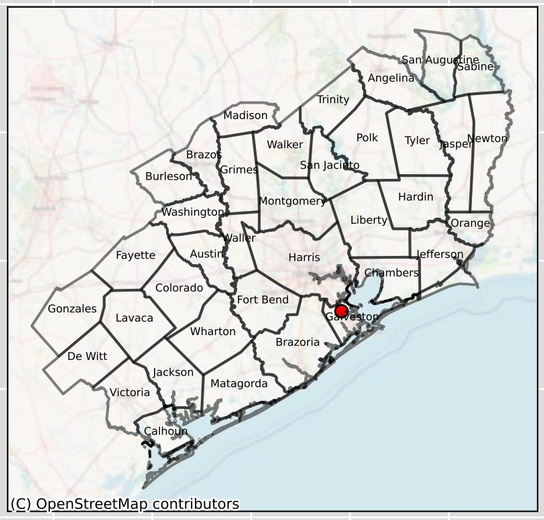
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540201 & 6540213 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540209 & 6540214 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6540210 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540212 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

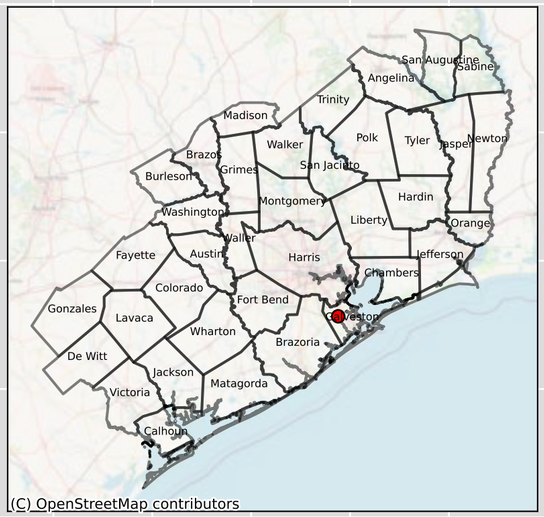
Year

GMA Measured
GMA Simulated

Galveston - 6540401 & 6540410 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

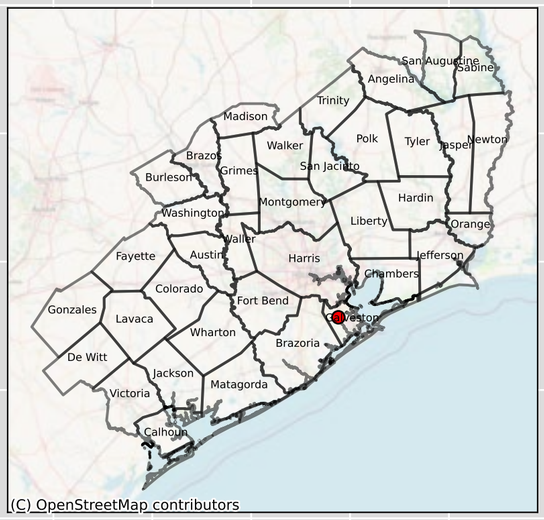
Galveston - 6540402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

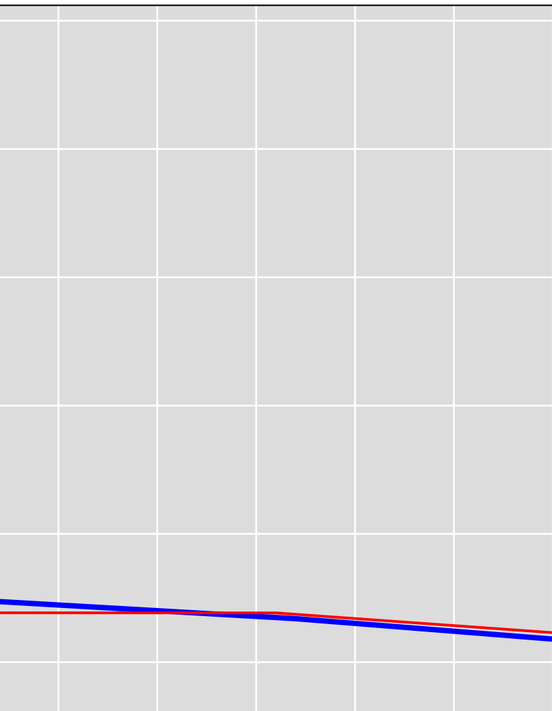
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Galveston - 6540411 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6540411
Gulf Simulated - 6540411

Galveston - 6540412 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6540412
Gulf Simulated - 6540412

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

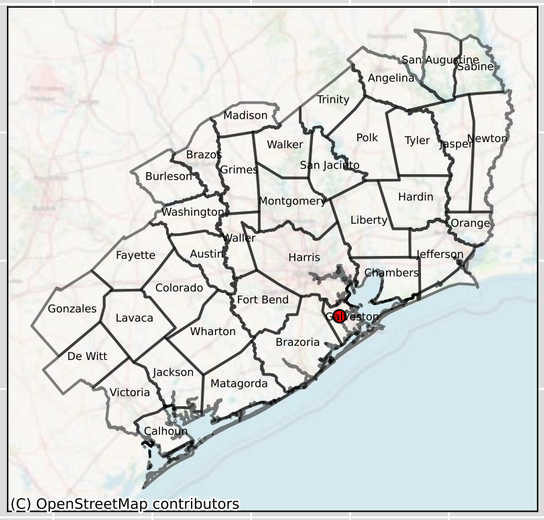
Galveston - 6540503 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Galveston - 6540509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

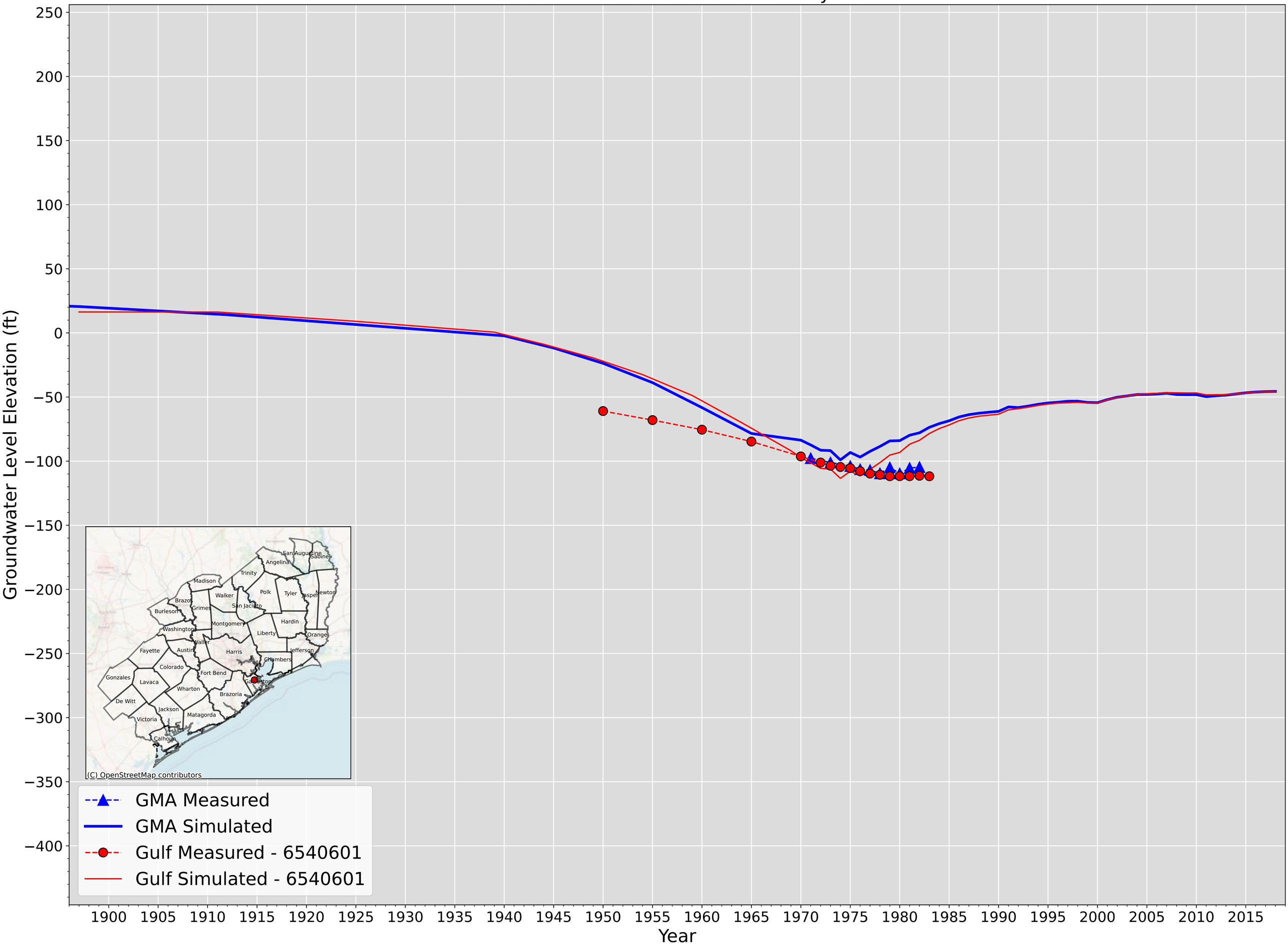
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Galveston - 6540601 & 6540612 - Layer 2



Galveston - 6540602 & 6540614 - Layer 2

Groundwater Level Elevation (ft)

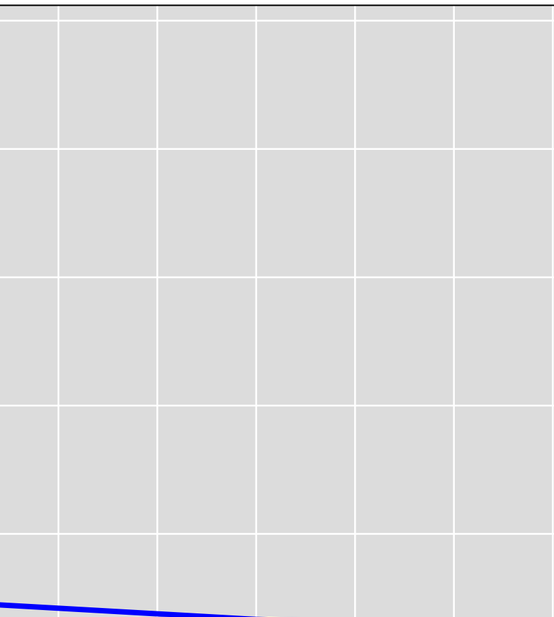
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6540703 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Galveston - 6540704 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6540704
Gulf Simulated - 6540704

Galveston - 6540705 - Layer 2

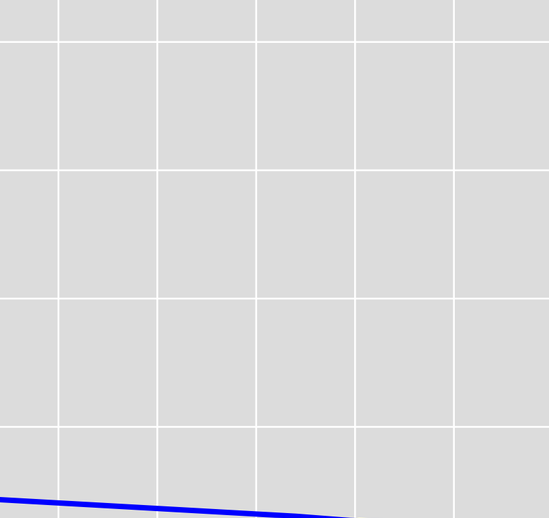
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

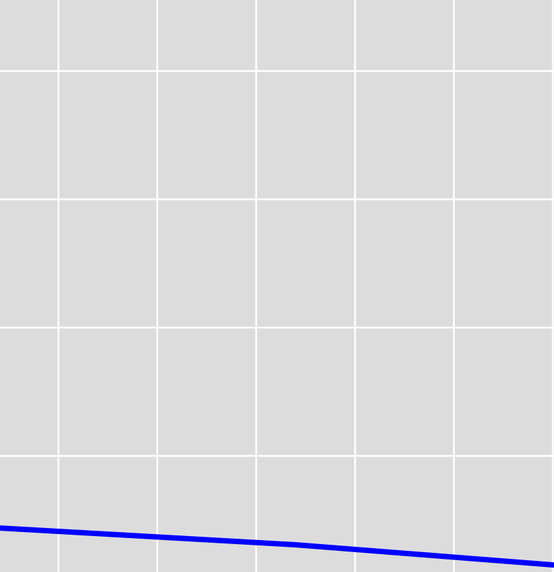


Galveston - 6540707 & 6540701 & 6540706 - Layer 2

Galveston - 6540802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

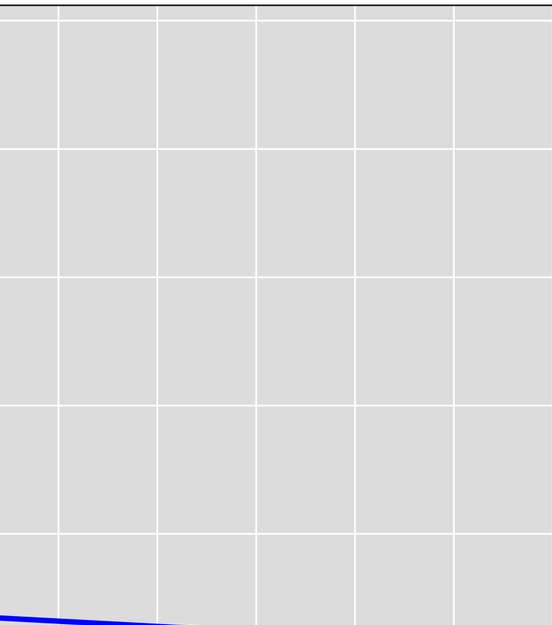


GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6540901 - Layer 2



Level Elevation (ft)

Groundwater Lev

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6540901
Gulf Simulated - 6540901

Galveston - 6540903 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6540903
Gulf Simulated - 6540903

Galveston - 6548101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

- 6548207 & 6548201 & 6548202 & 6548204 & 6548206 & 6548208 & 6548209 & 6548210 & 6548213 & 6548220 & 6548221 & 6548222 & 6

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

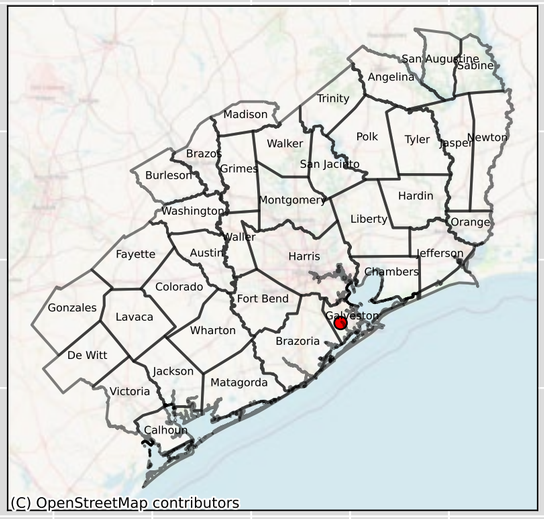
Year

GMA Measured
GMA Simulated
Gulf Measured - 6548207
Gulf Simulated - 6548207

Galveston - 6548211 & 6548212 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

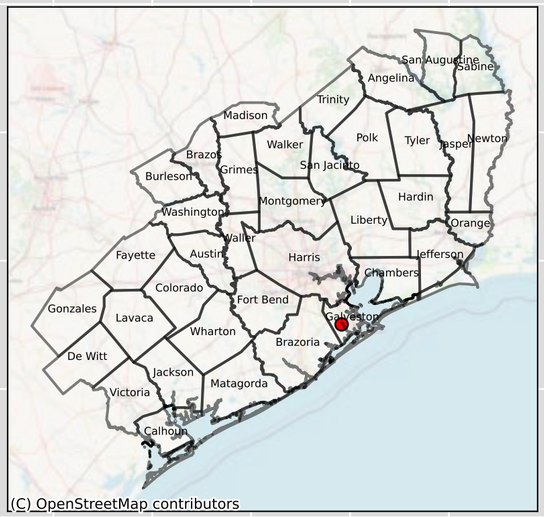
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Galveston - 6548214 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Galveston - 6548301 - Layer 2

Groundwater Level Elevation (ft)

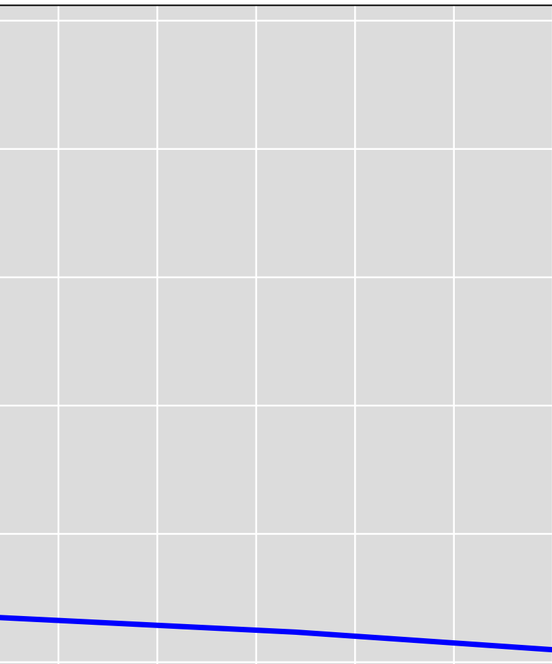
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6548301
Gulf Simulated - 6548301

Galveston - 6548302 & 6548309 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

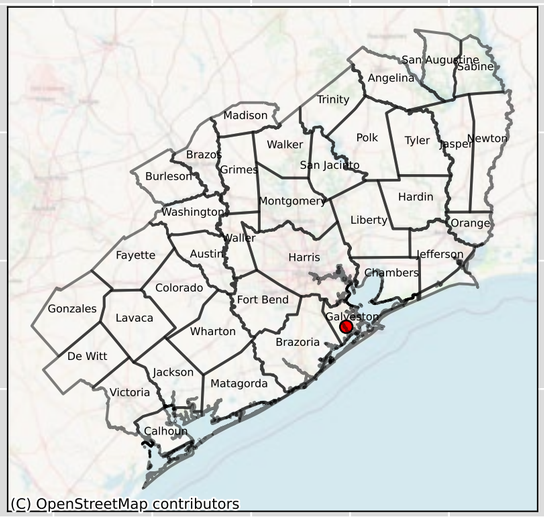
Galveston - 6548316 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

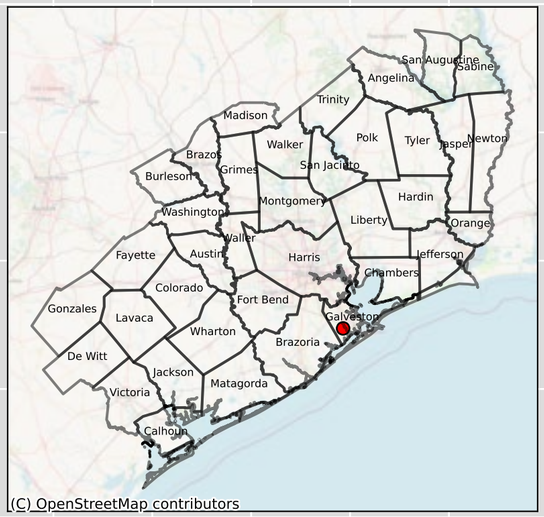
Galveston - 6548502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6548502
Gulf Simulated - 6548502

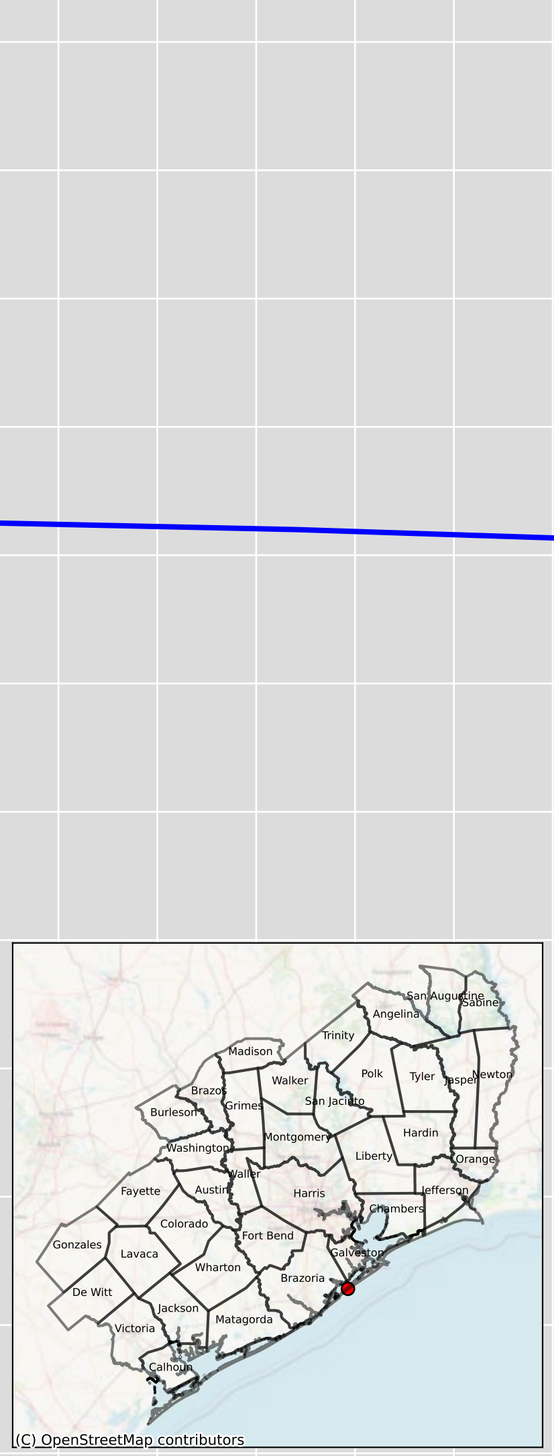
Galveston - 6556802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Hardin & Hardin - 6155513 & 6155204 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6129803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6137301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6139202 & 6139203 - Layer 2

Groundwater Level Elevation (ft)

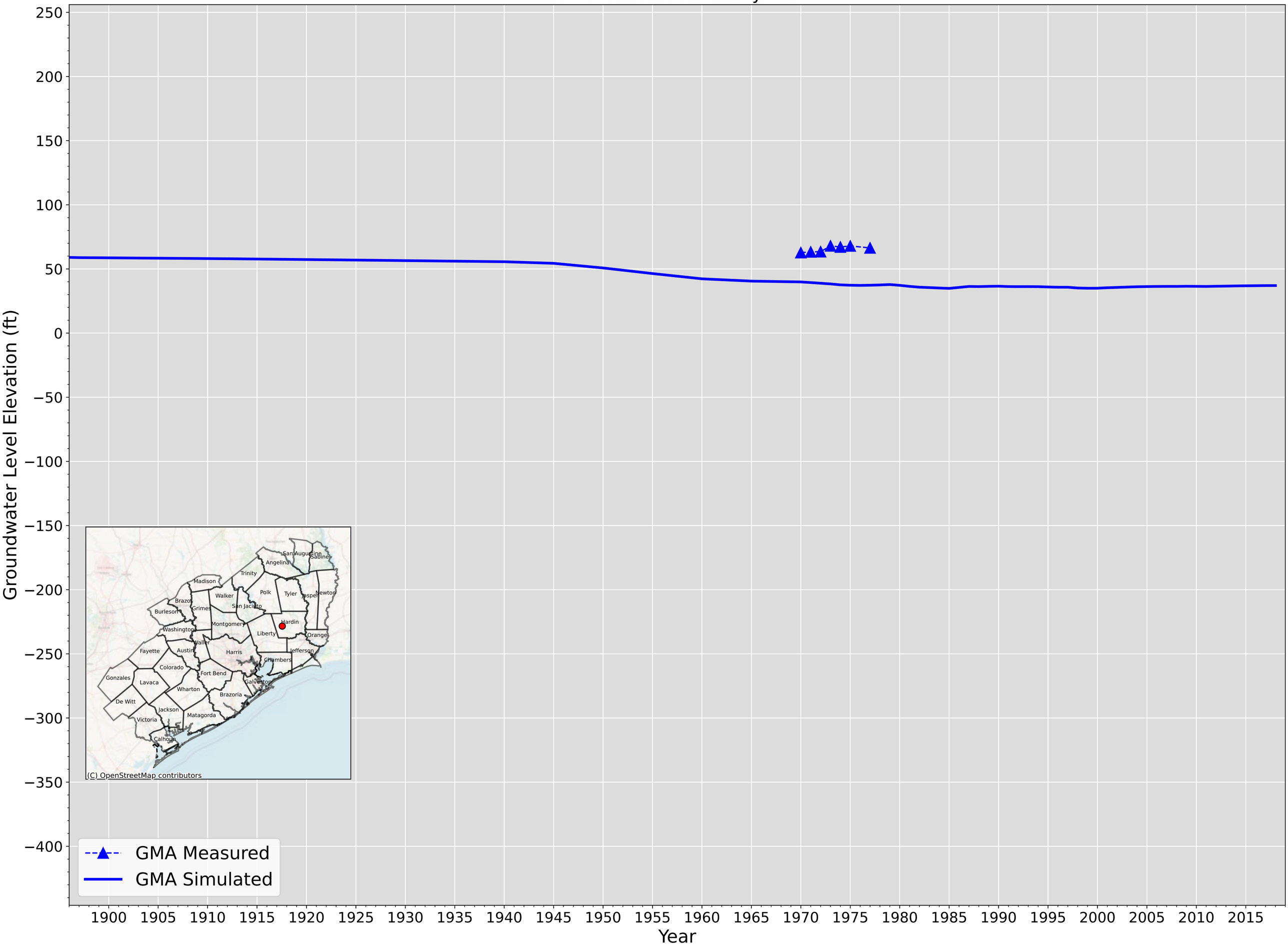
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Hardin - 6144610 - Layer 2



Hardin - 6145202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6146201 & 6146202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6146601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6147208 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

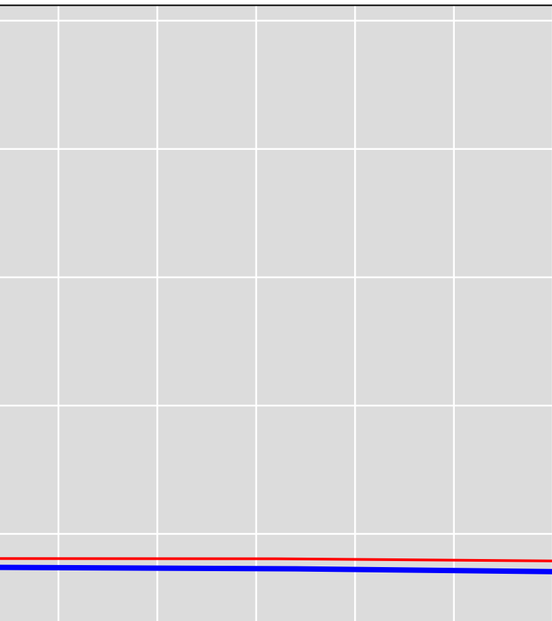
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6147210 & 6147203 & 6147204 & 6147206 & 6147207 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Hardin - 6147803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6152402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6152404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

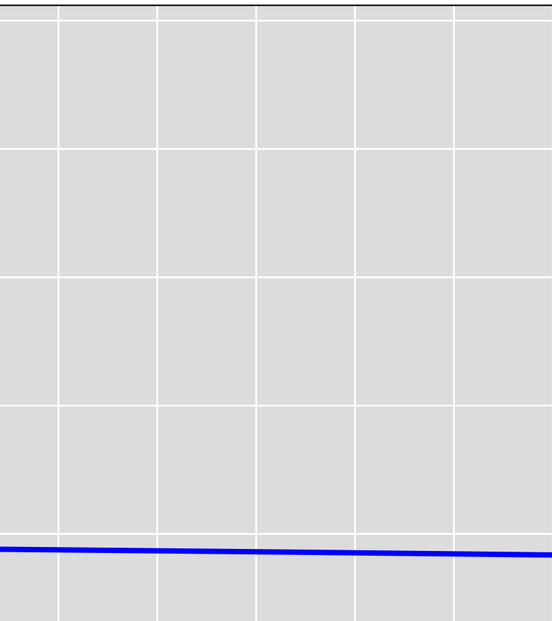
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6152601 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Hardin - 6153809 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

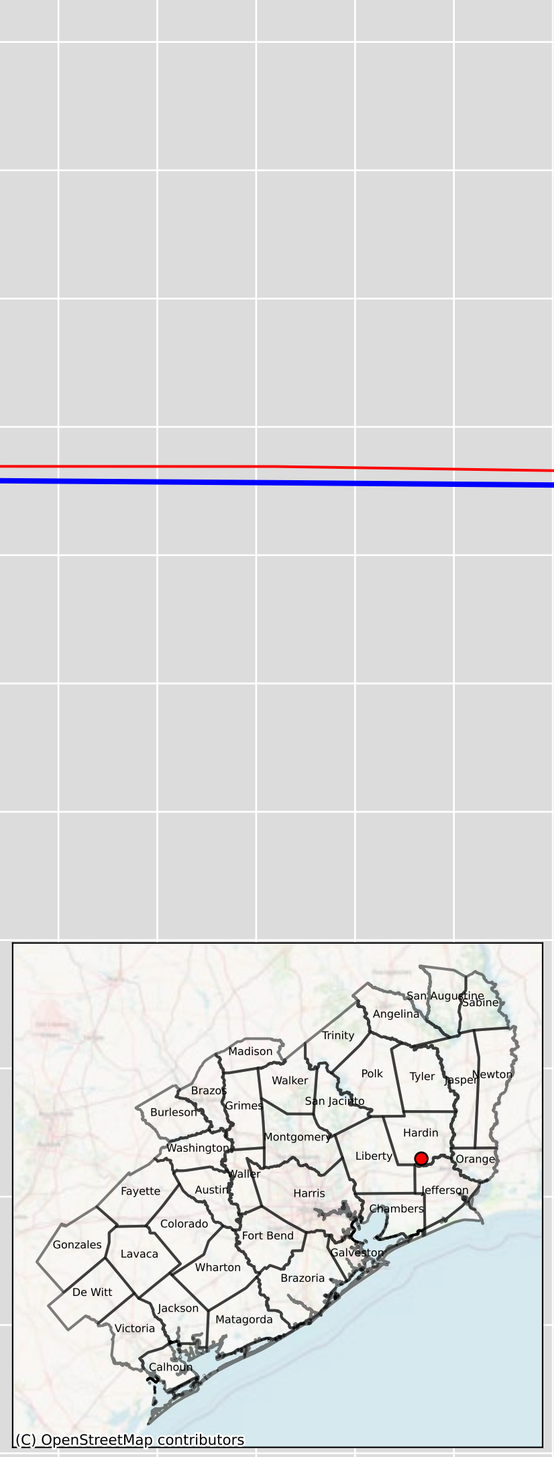
Hardin - 6153907 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

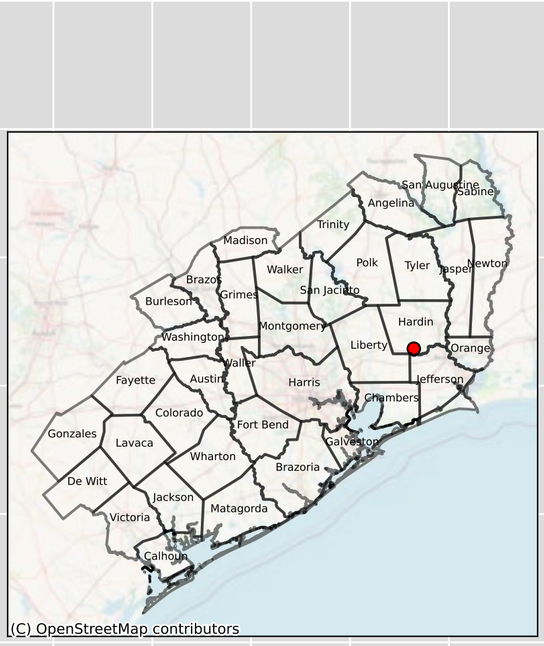
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6153907
Gulf Simulated - 6153907

Hardin - 6153908 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Hardin - 6153910 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

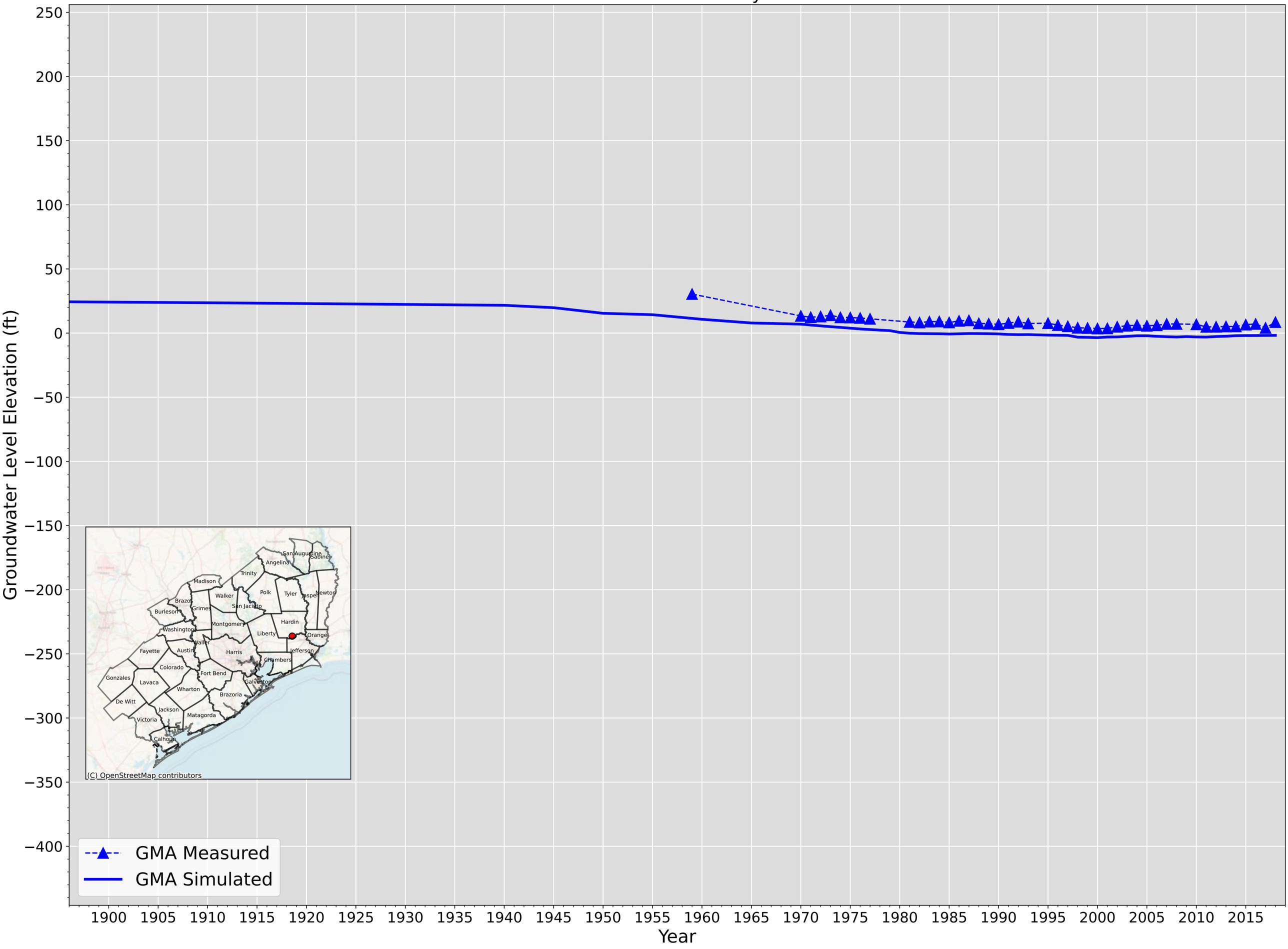
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6154702 - Layer 2



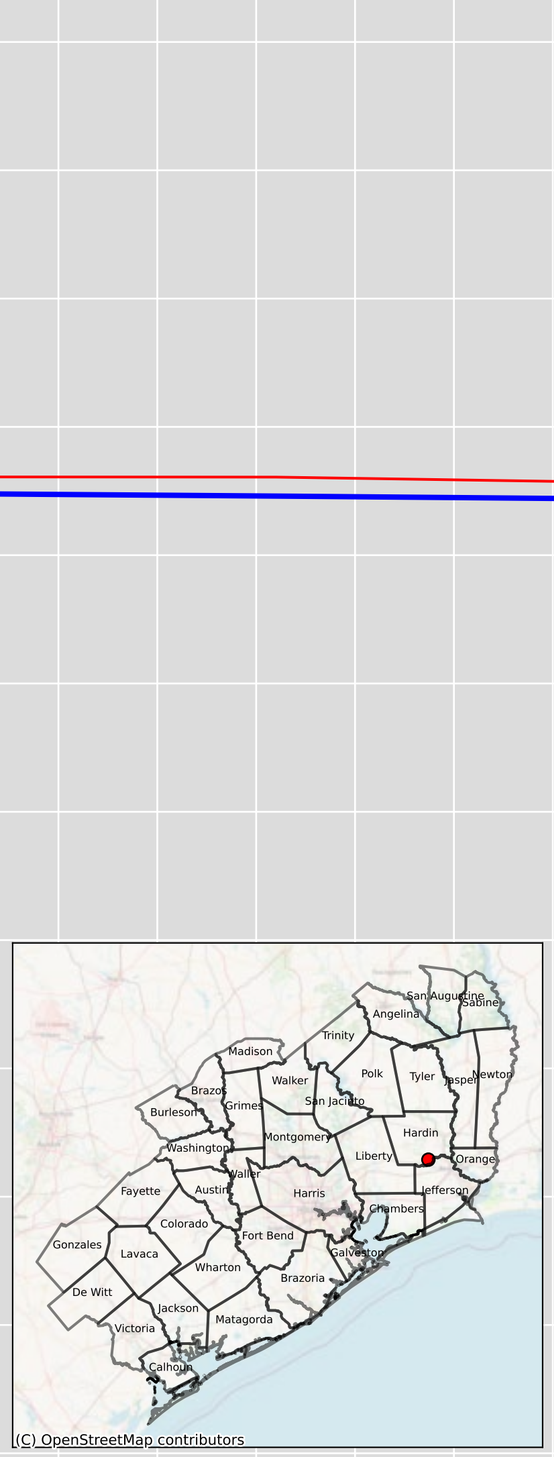
Hardin - 6154805 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6154805
Gulf Simulated - 6154805

Hardin - 6155104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Hardin - 6155203 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Hardin - 6155206 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Hardin - 6155502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6505955 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505955
Gulf Simulated - 6505955

Harris & Harris - 6063709 & 6063716 & 6063715 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris & Harris - 6512718 & 6512729 & 6512728 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris & Harris - 6516904 & 6516922 & 6516923 & 6516924 & 6516925 & 6516930 & 6516932 & 6516933 & 6516936 & 6516935 - Layer

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6516904
Gulf Simulated - 6516904

Harris - 6057607 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6058704 & 6058711 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6058704
Gulf Simulated - 6058704

Harris - 6059325 & 6059326 - Layer 2

Groundwater Level Elevation (ft)

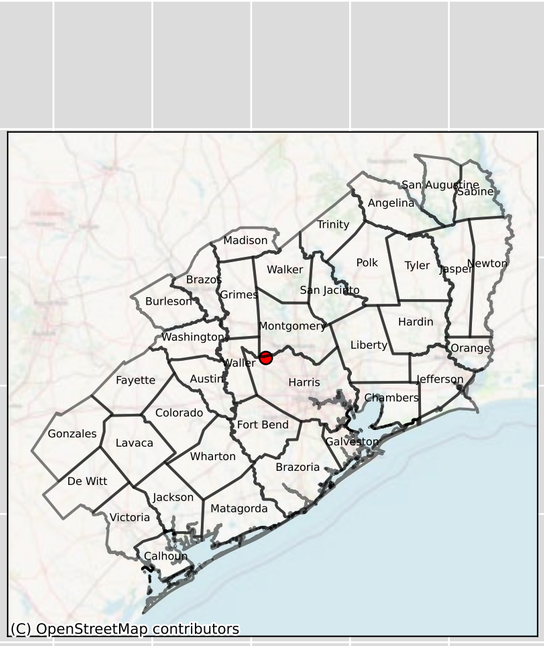
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6059405 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6060101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6060103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6060103
Gulf Simulated - 6060103

Harris - 6060307 & 6060308 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6060307
Gulf Simulated - 6060307

Harris - 6060407 & 6060406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6060407
Gulf Simulated - 6060407

Harris - 6060409 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6060409
Gulf Simulated - 6060409

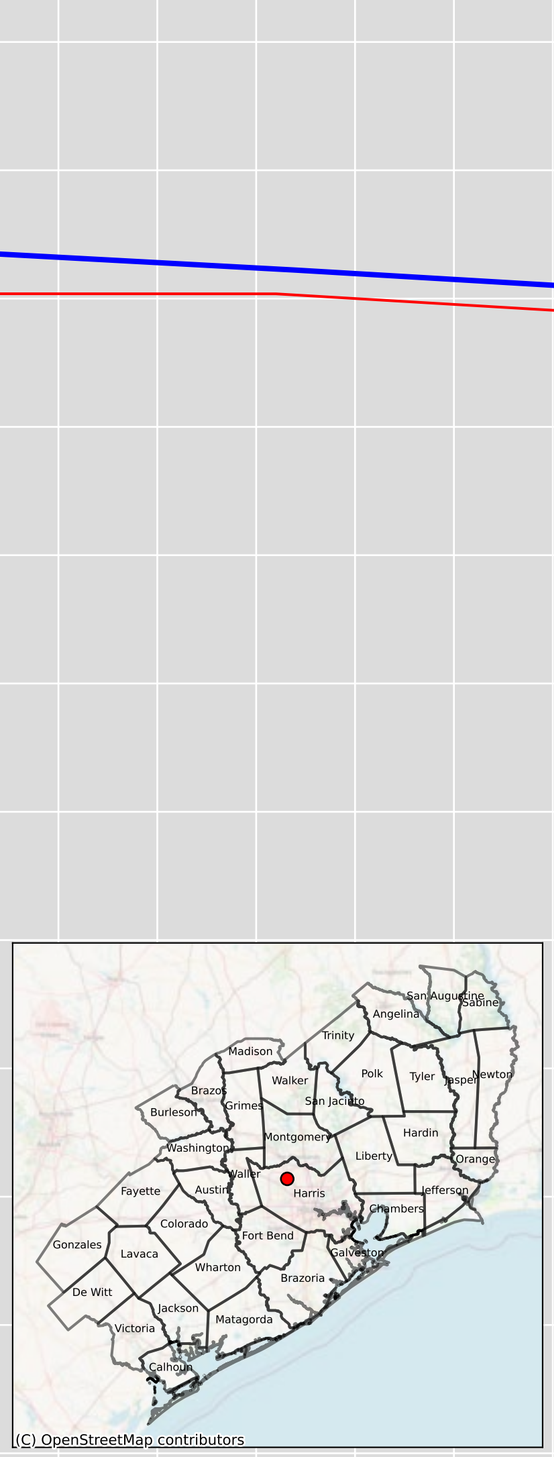
Harris - 6060712 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6060712
Gulf Simulated - 6060712

Harris - 6061601 - Layer 2

Groundwater Level Elevation (ft)

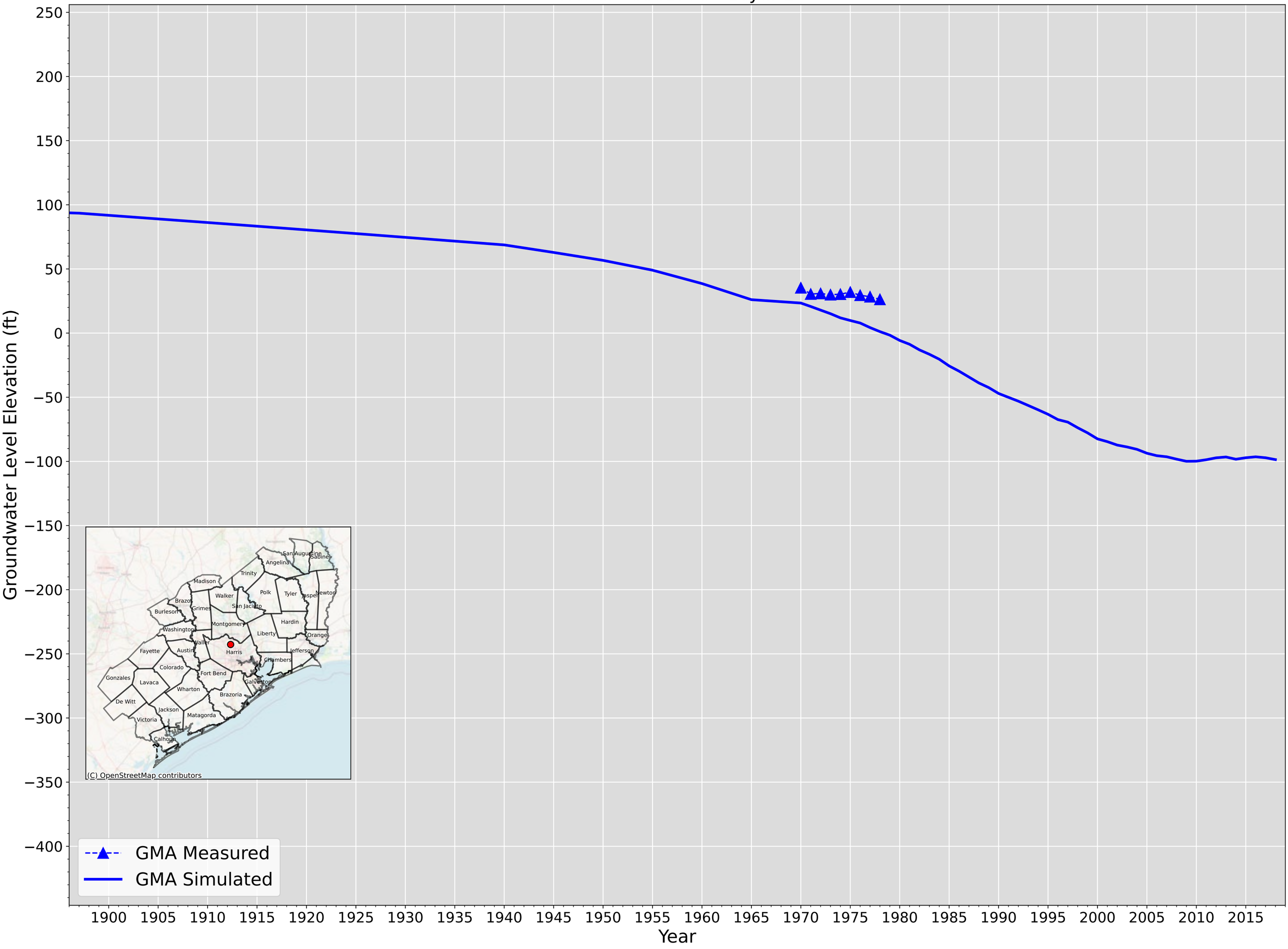
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061706 - Layer 2



Harris - 6061817 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061905 - Layer 2

Groundwater Level Elevation (ft)

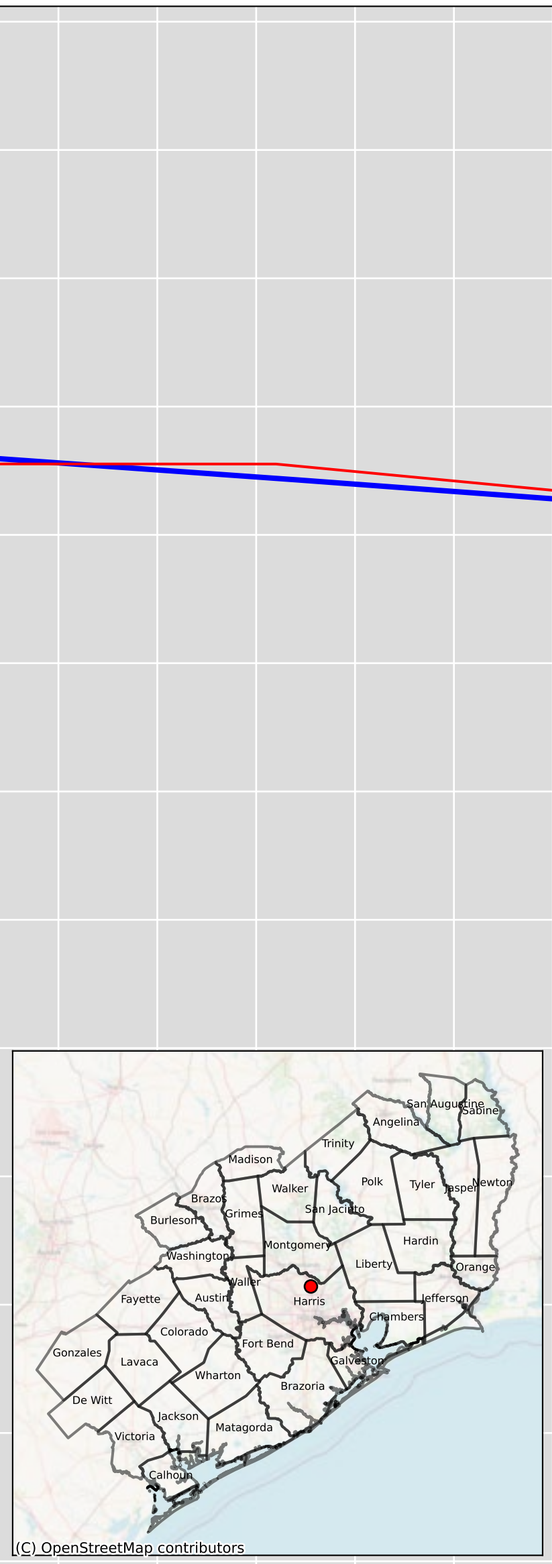
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061905
Gulf Simulated - 6061905

Harris - 6061914 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061914
Gulf Simulated - 6061914

Harris - 6062401 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6062401
Gulf Simulated - 6062401

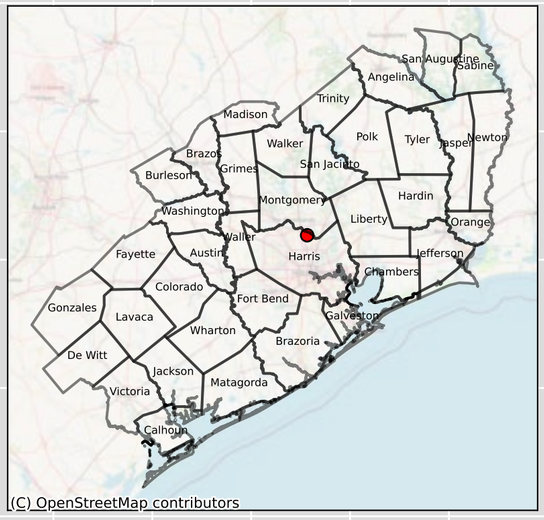
Harris - 6062403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

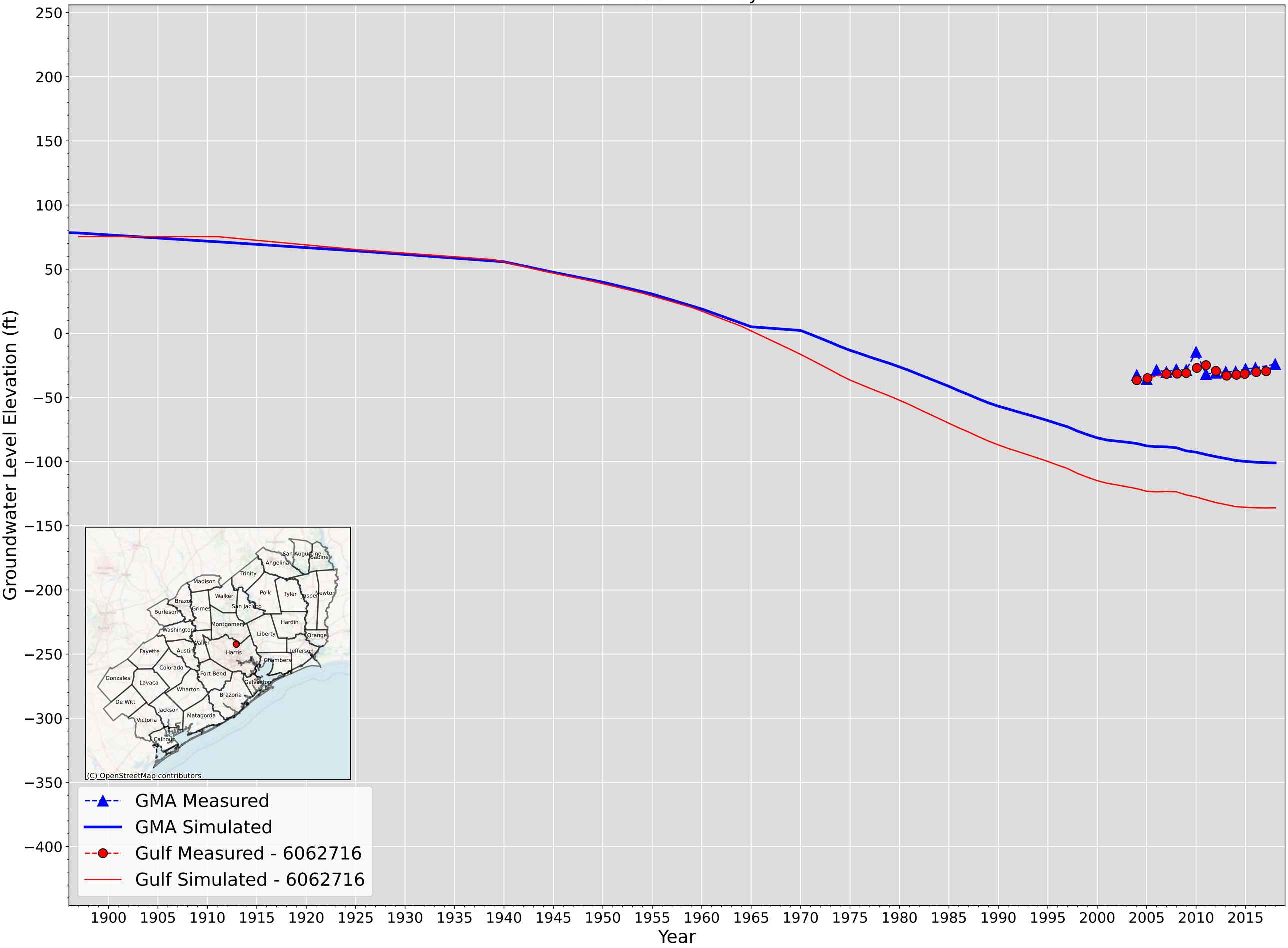
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6062716 - Layer 2



Harris - 6062910 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6063404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6063404
Gulf Simulated - 6063404

Harris - 6063414 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

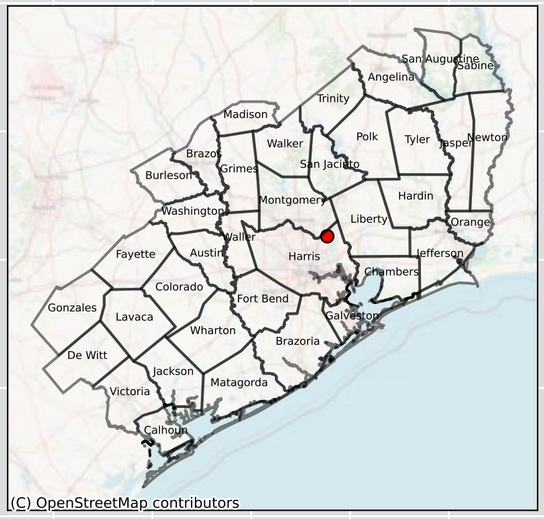
Harris - 6063508 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

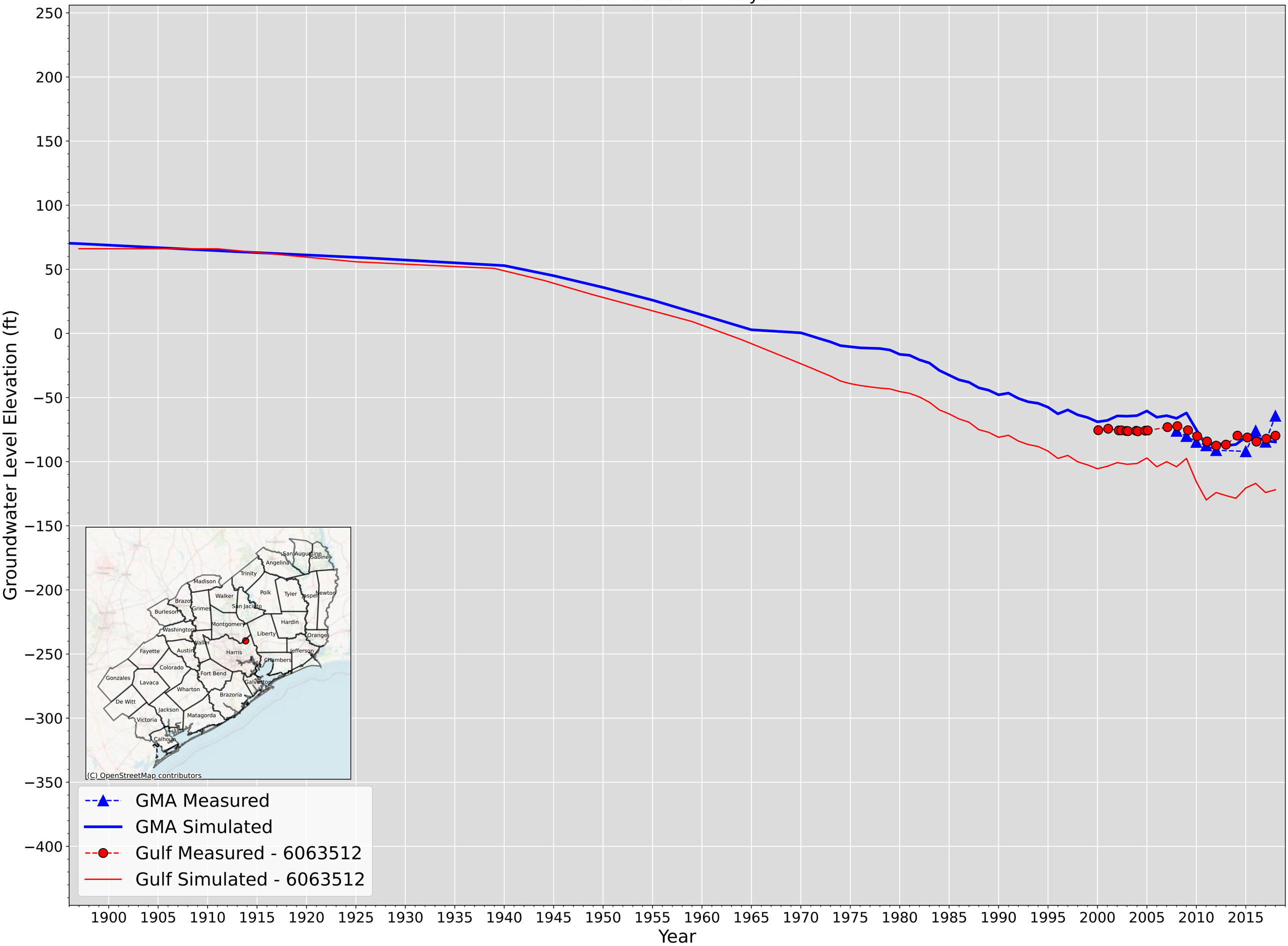
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6063512 - Layer 2



Harris - 6063513 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Gulf Measured - 6063513

Gulf Simulated - 6063513

Harris - 6063602 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Gulf Measured - 6063602

Gulf Simulated - 6063602

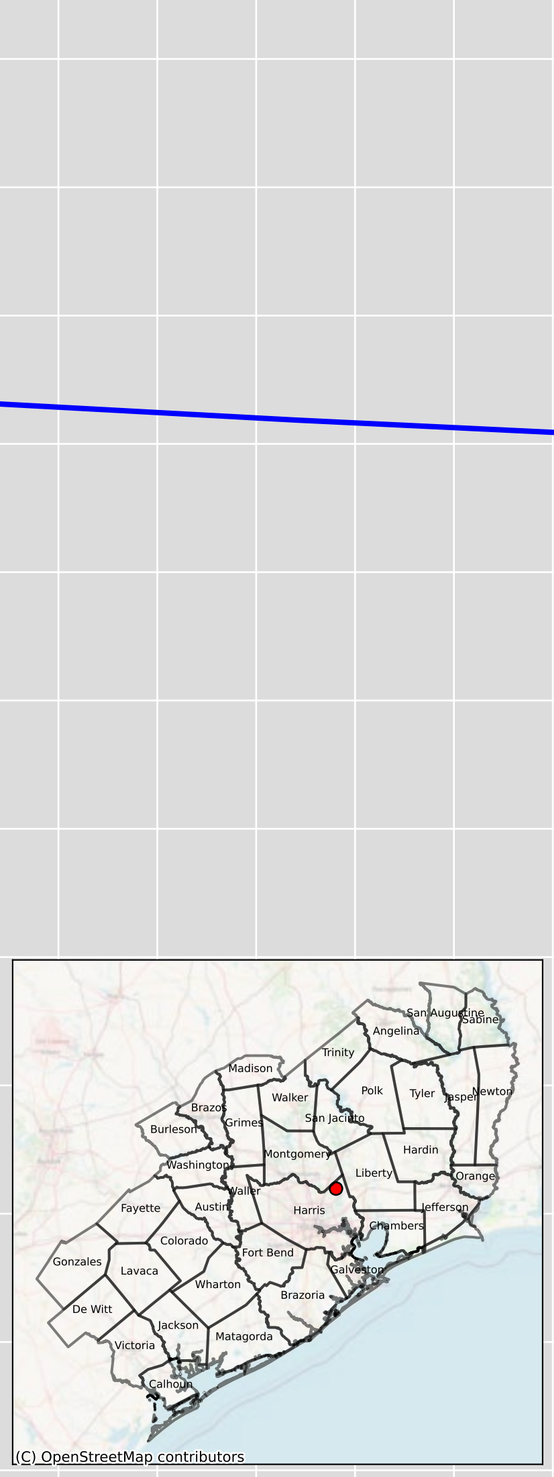
Harris - 6063603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

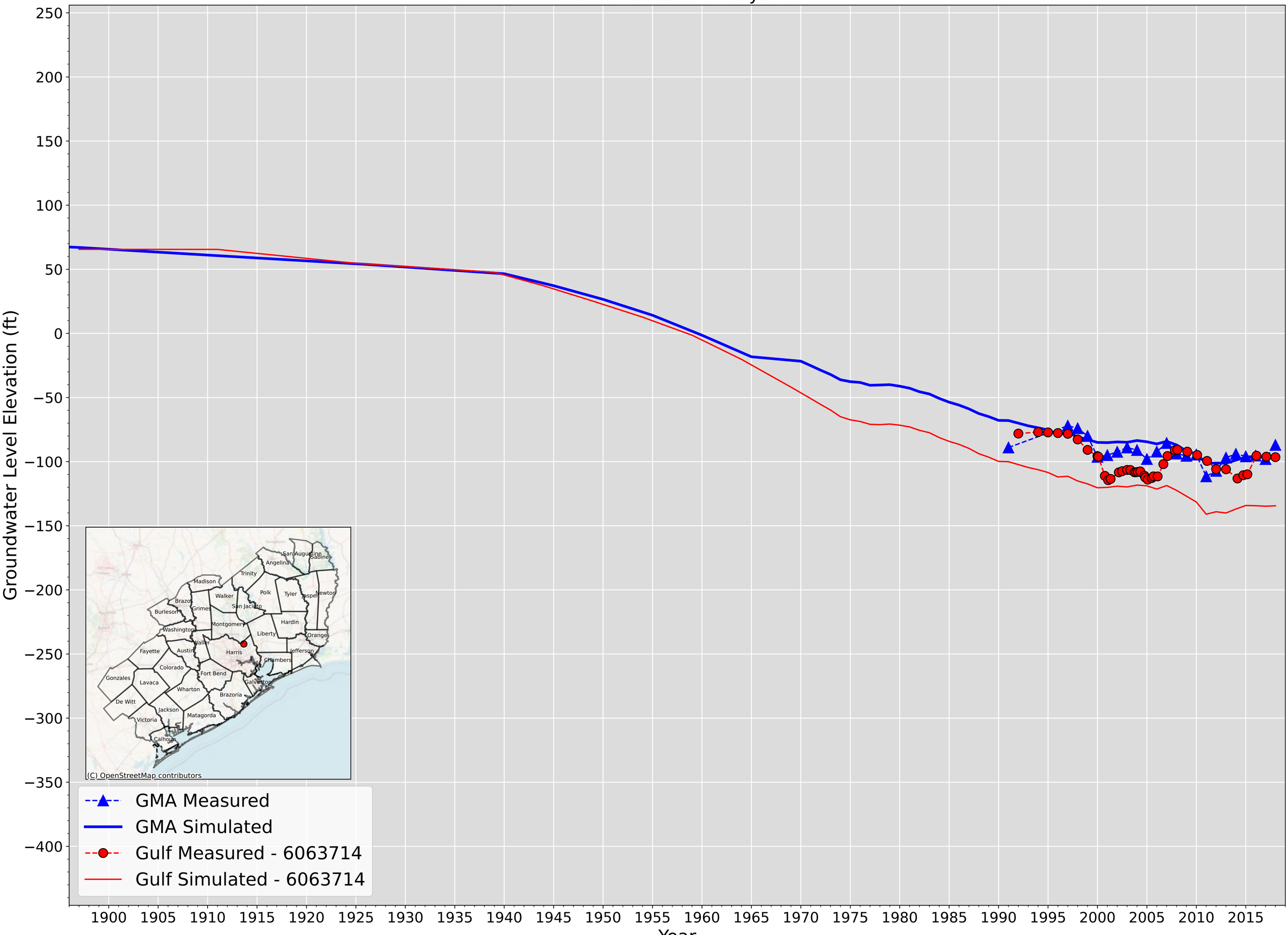
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6063714 - Layer 2



Harris - 6063901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6063901
Gulf Simulated - 6063901

Harris - 6064401 & 6064406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6064403 & 6064402 - Layer 2

Groundwater Level Elevation (ft)

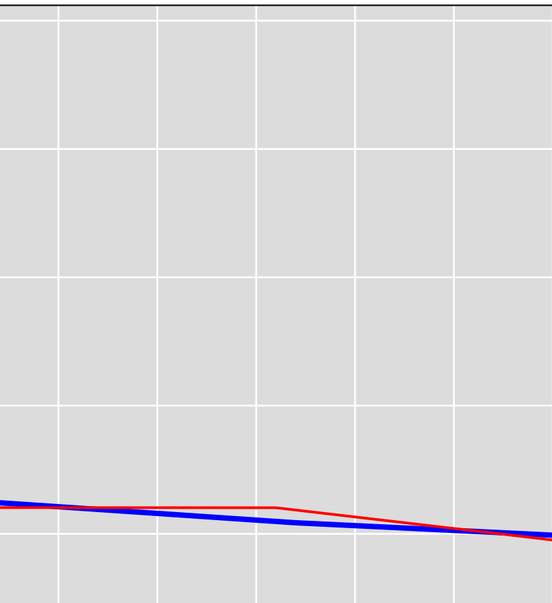
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6064403
Gulf Simulated - 6064403

Harris - 6064407 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6064407
Gulf Simulated - 6064407

Harris - 6064701 & 6064702 & 6064715 - Layer 2

Groundwater Level Elevation (ft)

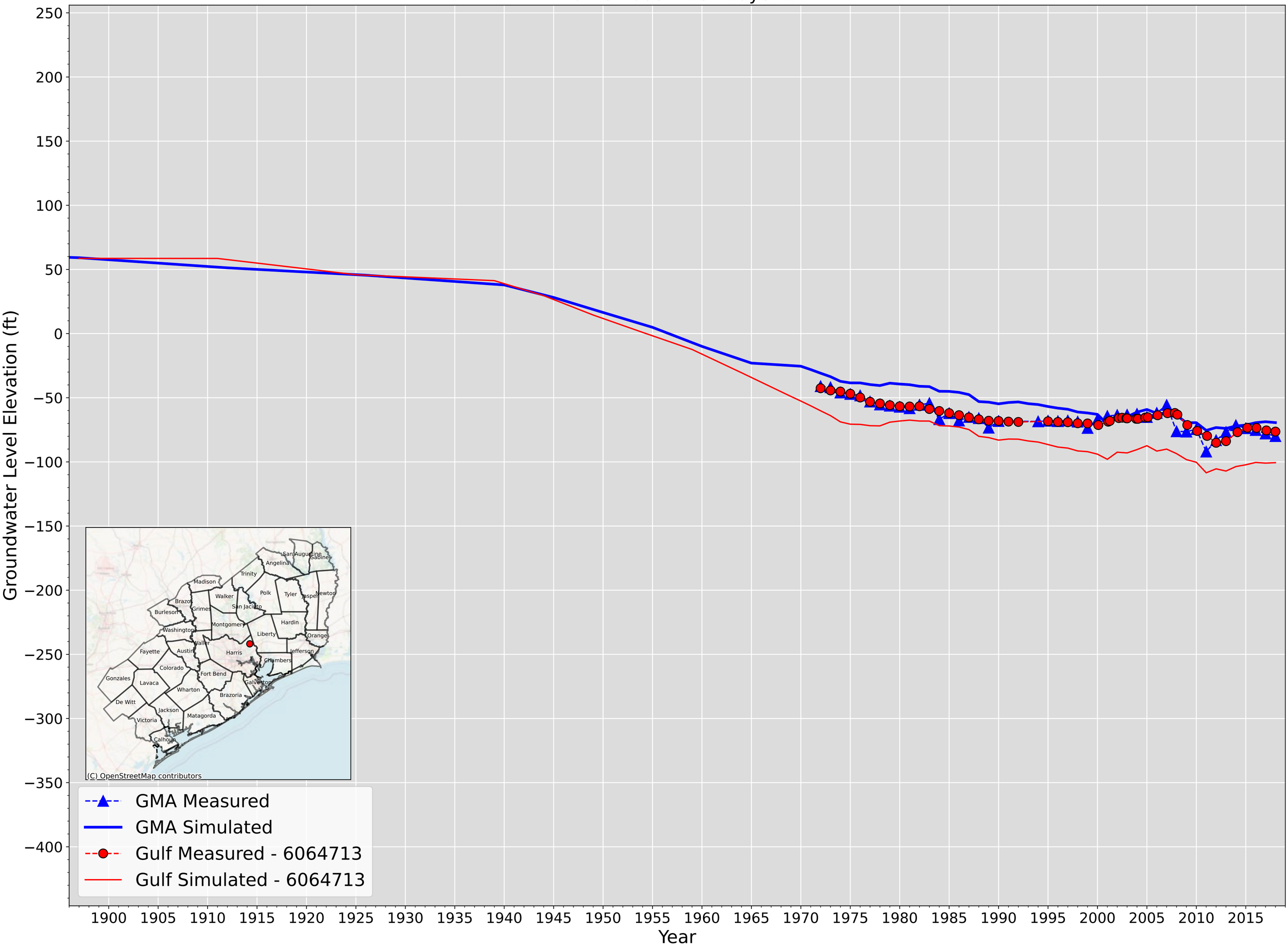
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6064713 - Layer 2



Harris - 6409401 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6409401
Gulf Simulated - 6409401

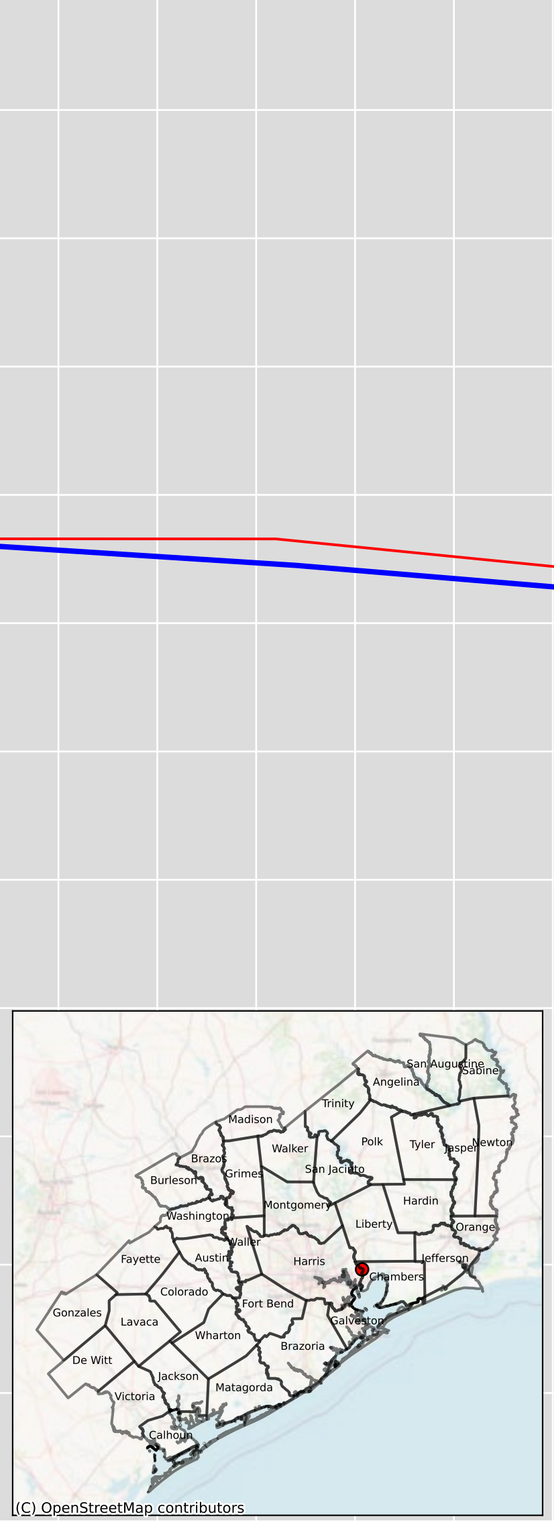
Harris - 6409505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6409505
Gulf Simulated - 6409505

Harris - 6409701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

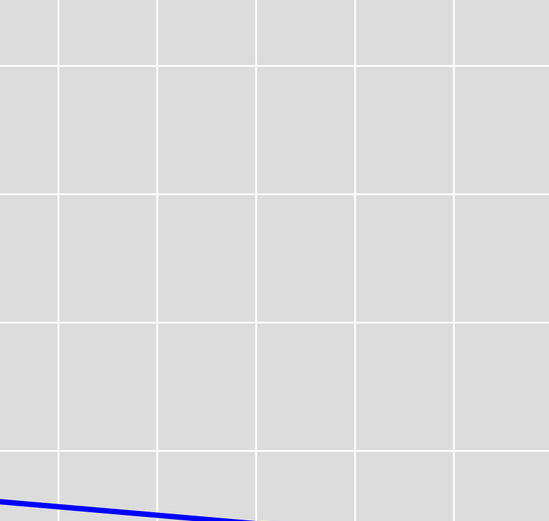
Harris - 6409703 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

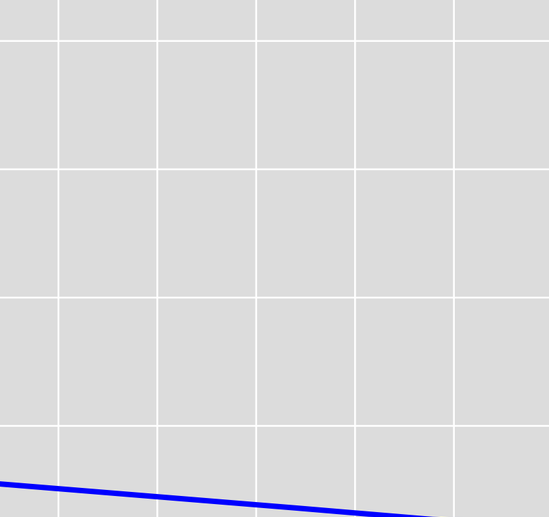
GMA Simulated



Harris - 6417102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6417105 & 6417107 & 6417108 - Layer 2

Groundwater Level Elevation (ft)

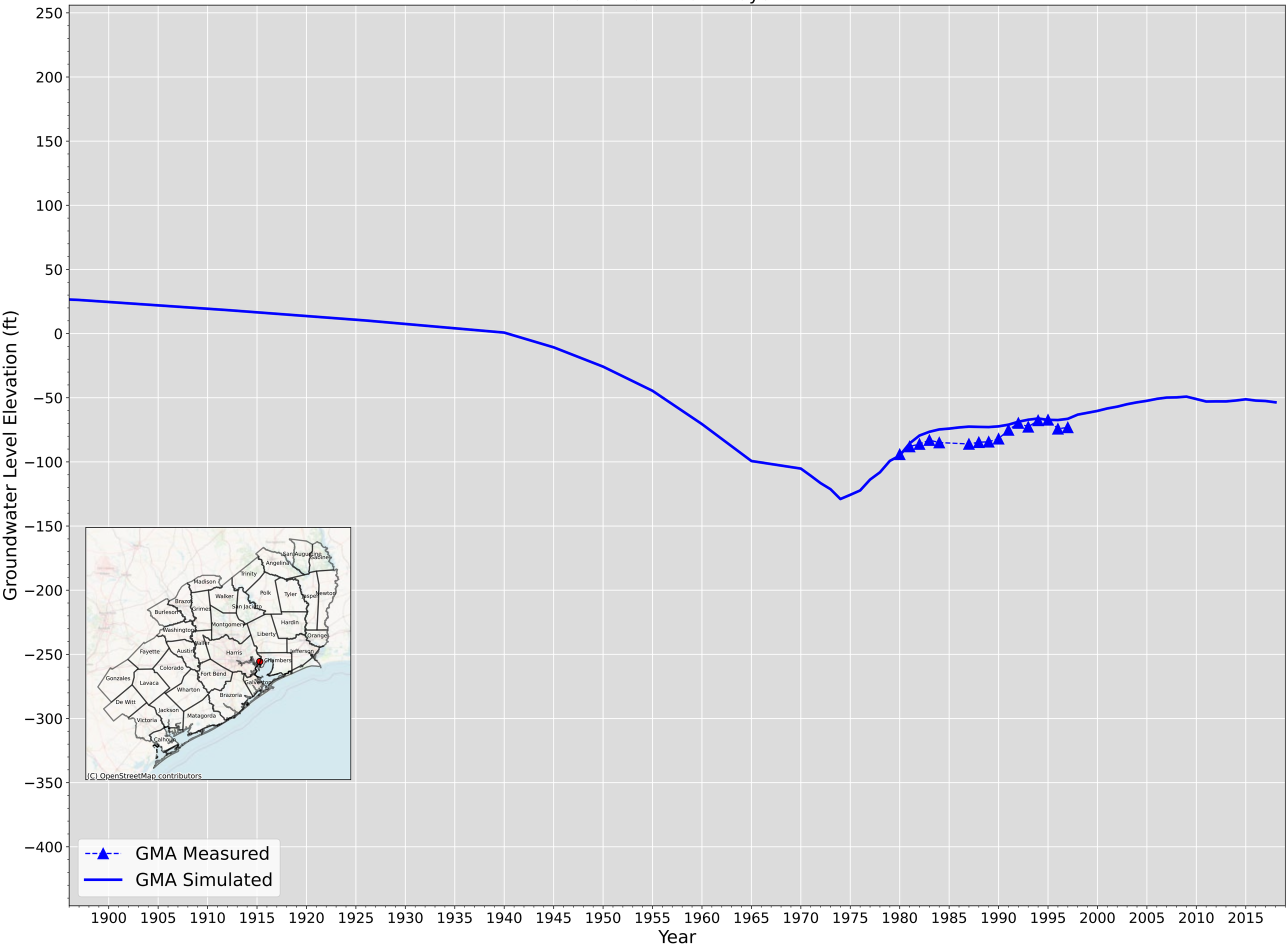
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6417201 - Layer 2



Harris - 6417401 & 6417402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6502201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6502201
Gulf Simulated - 6502201

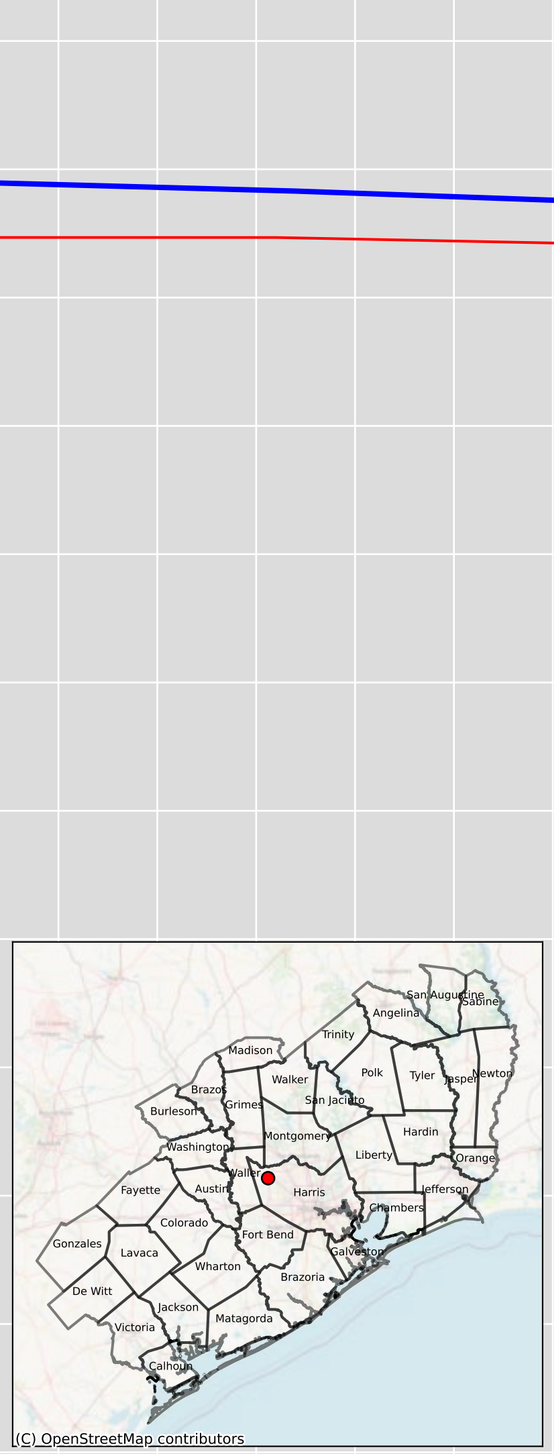
Harris - 6502312 & 6502313 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

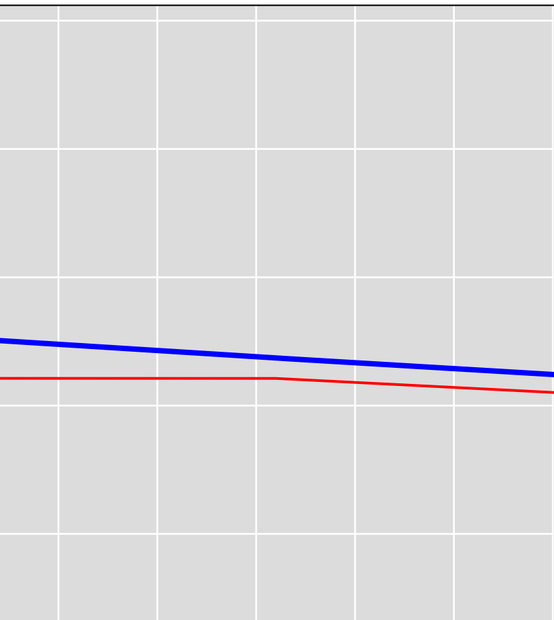
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6502312
Gulf Simulated - 6502312

Harris - 6502612 - Layer 2



Level Elevation (ft)

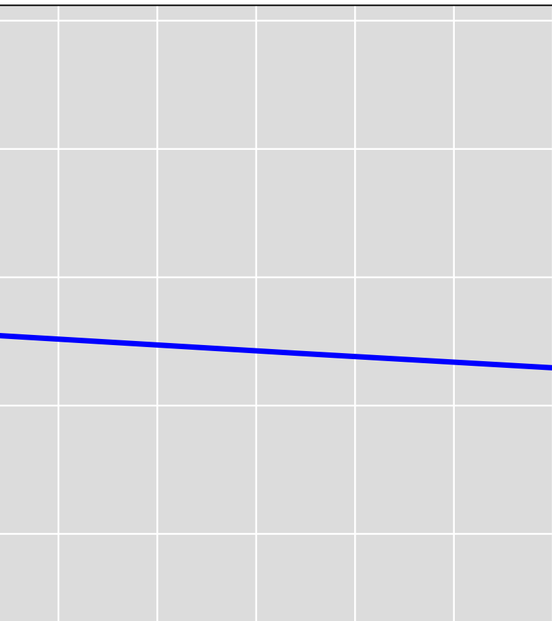
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6502612
Gulf Simulated - 6502612

Harris - 6502613 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6502811 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6502903 & 6502917 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6503101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6503104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503204 & 6503206 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503703 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6503703
Gulf Simulated - 6503703

Harris - 6503705 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

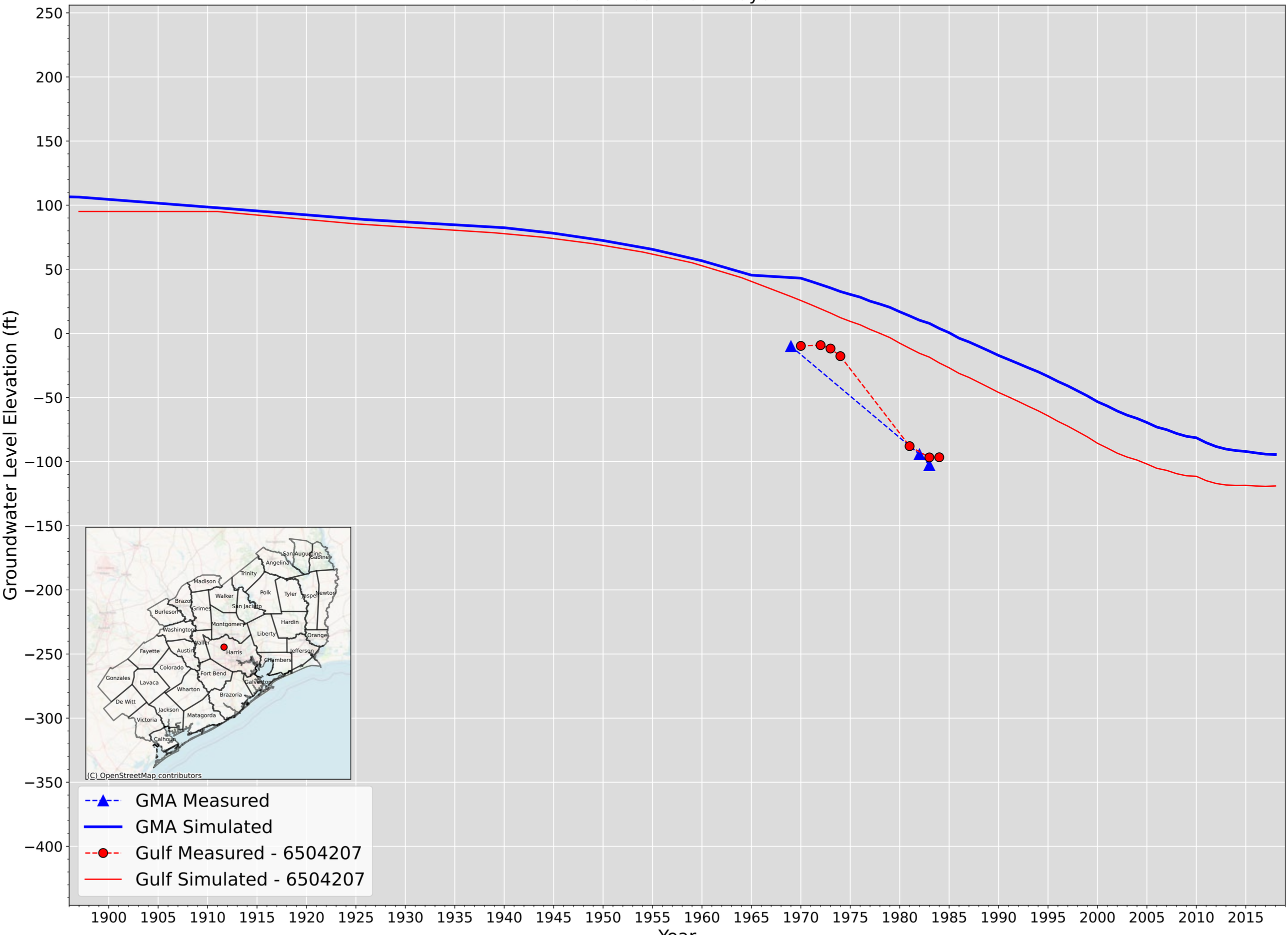
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6504207 - Layer 2



Harris - 6504301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504308 & 6504309 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504310 - Layer 2

Groundwater Level Elevation (ft)

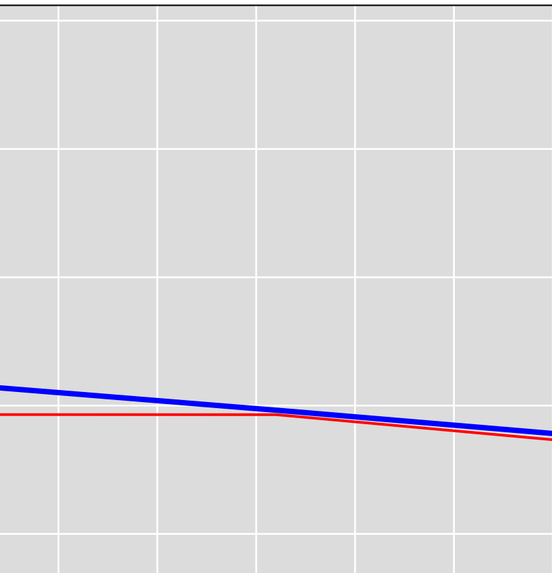
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504310
Gulf Simulated - 6504310

Harris - 6504416 - Layer 2



Groundwater Level Elevation (ft)

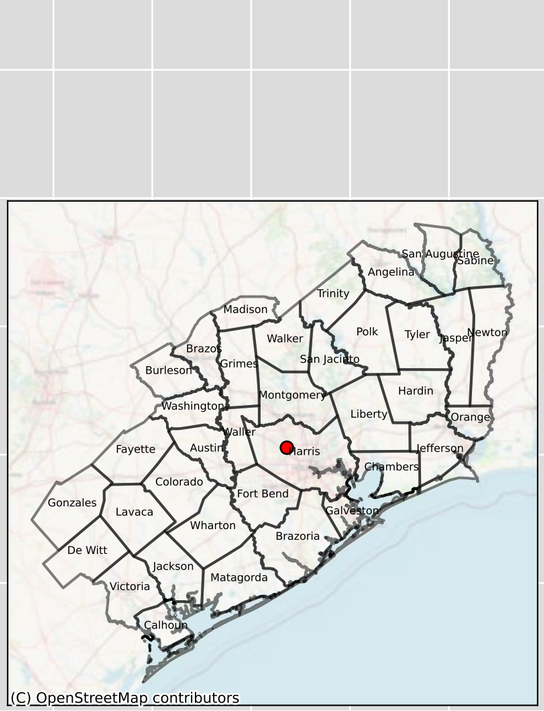
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504416
Gulf Simulated - 6504416

Harris - 6504502 & 6504504 & 6504506 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6504503 & 6504507 - Layer 2

Groundwater Level Elevation (ft)

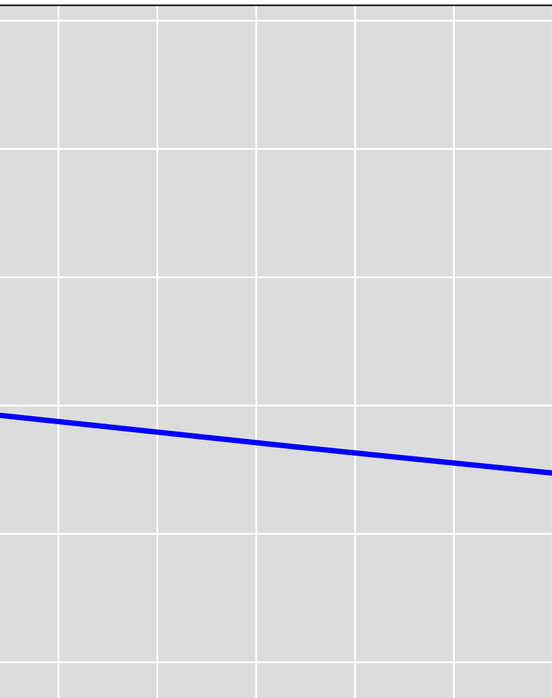
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504514 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504515 & 6504516 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504526 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504526
Gulf Simulated - 6504526

Harris - 6504601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504602 & 6504612 & 6504615 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504607 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

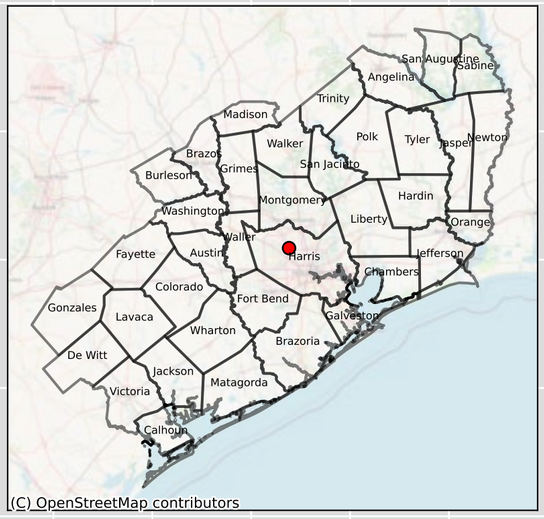
Harris - 6504614 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

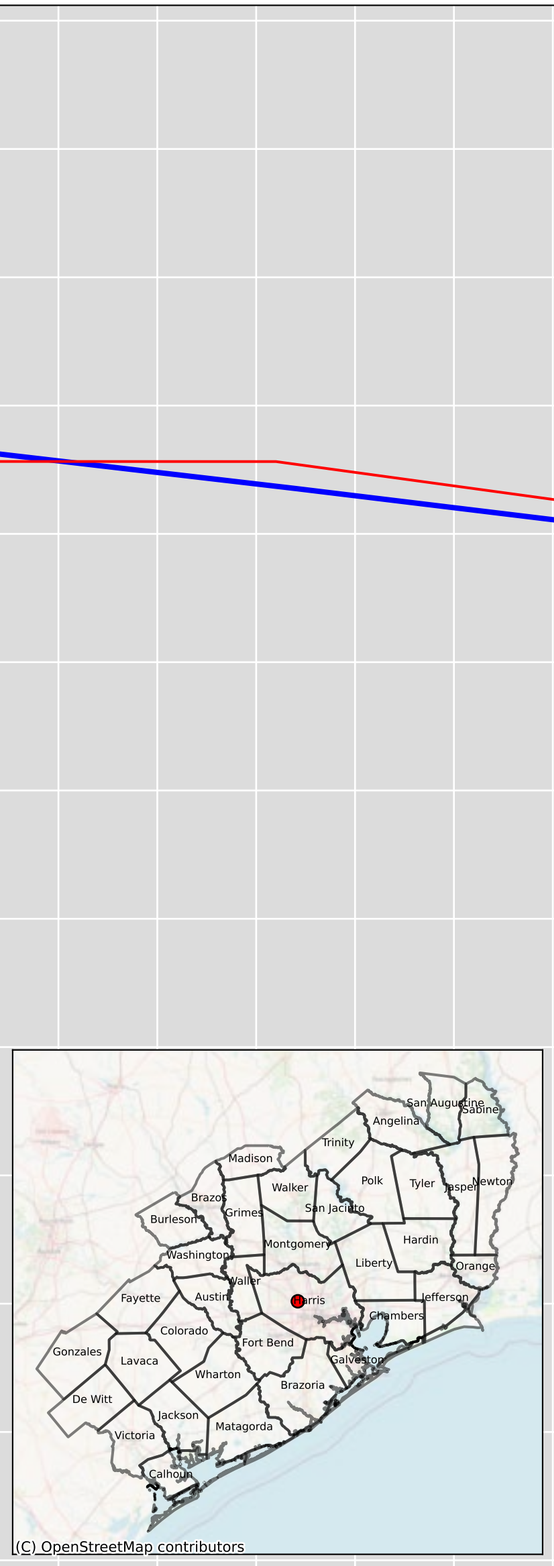
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6504901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6505104 & 6505106 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6505207 - Layer 2

Groundwater Level Elevation (ft)

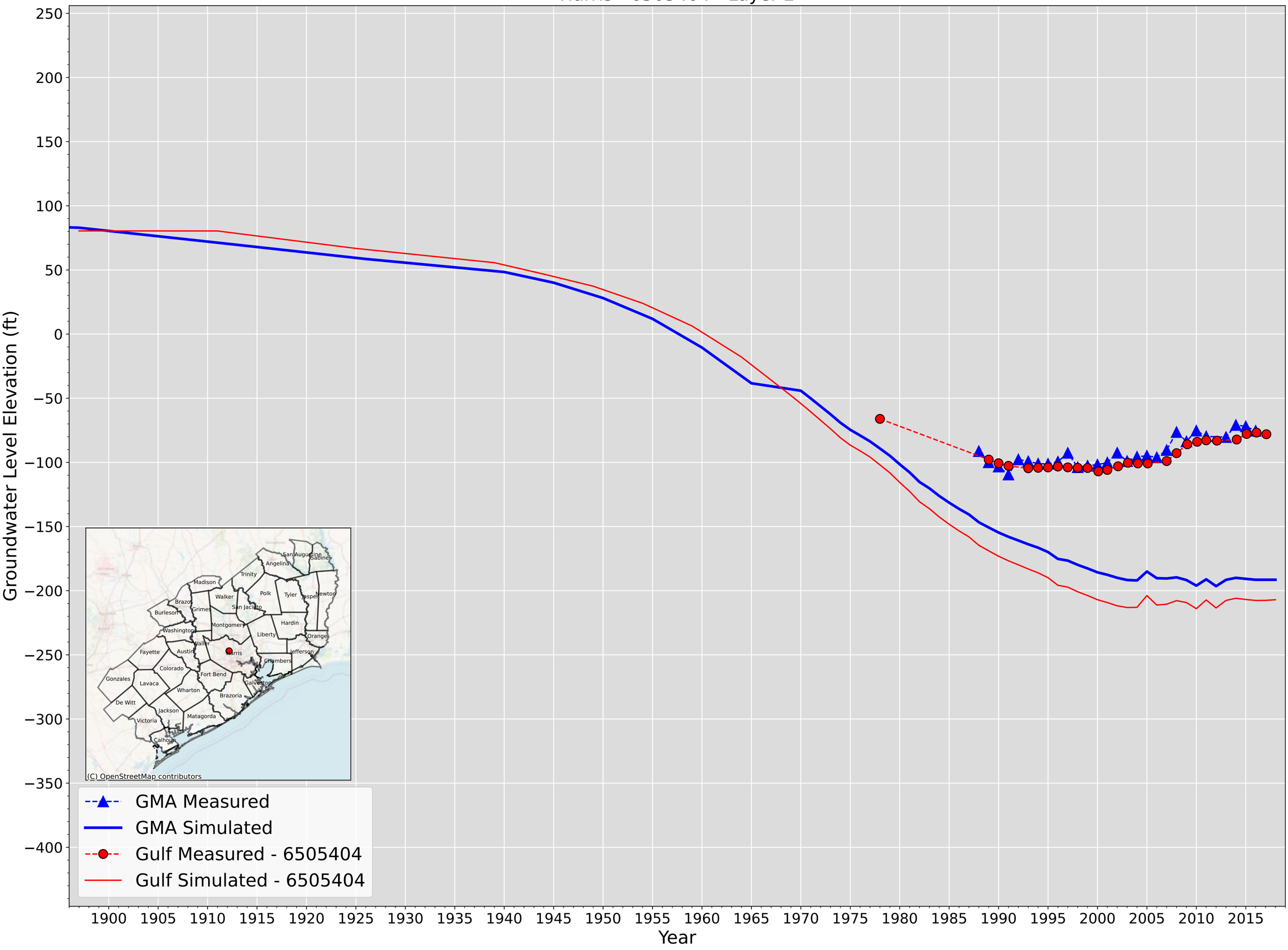
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6505404 - Layer 2



Harris - 6505517 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505517
Gulf Simulated - 6505517

Harris - 6505604 - Layer 2

Groundwater Level Elevation (ft)

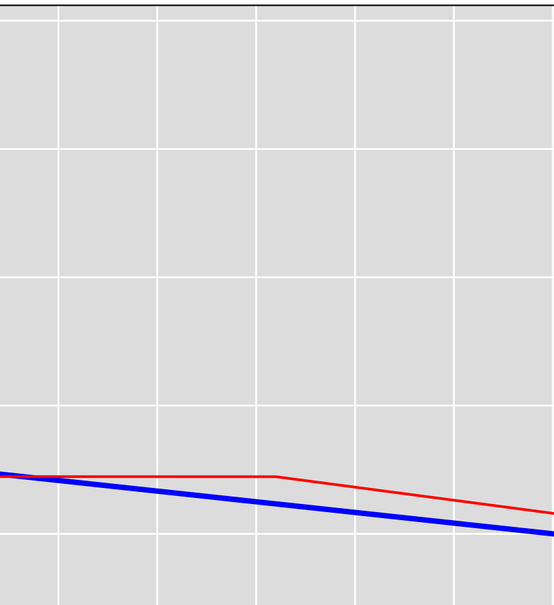
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505606 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505606
Gulf Simulated - 6505606

Harris - 6505709 - Layer 2

Groundwater Level Elevation (ft)

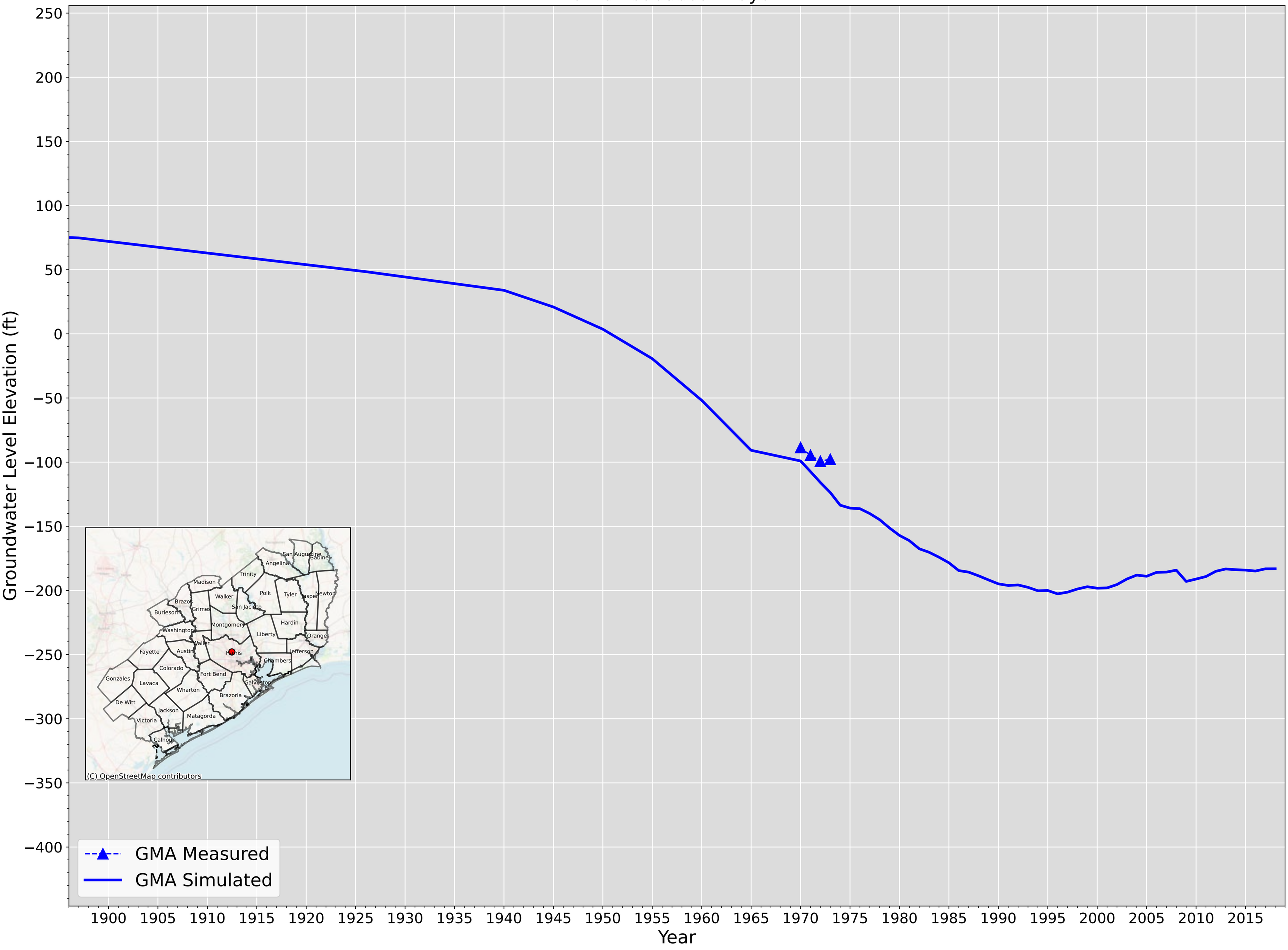
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505803 - Layer 2



Harris - 6506301 - Layer 2

Groundwater Level Elevation (ft)

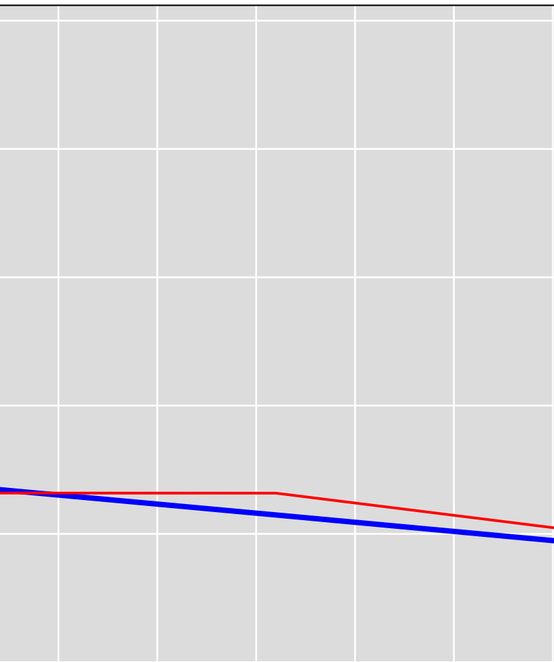
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6506530 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

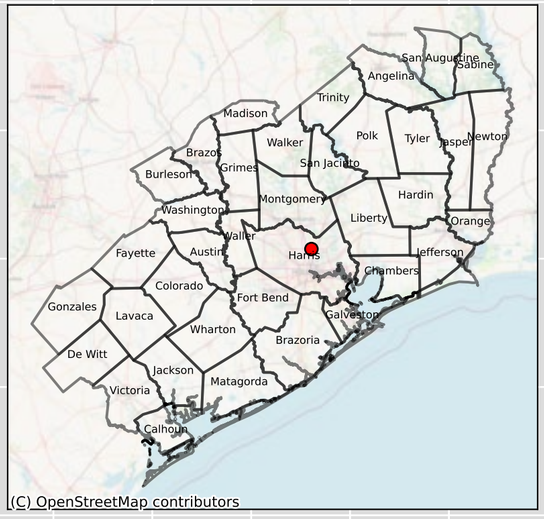
Year

GMA Measured
GMA Simulated
Gulf Measured - 6506530
Gulf Simulated - 6506530

Harris - 6506532 & 6506525 & 6506526 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6506532
Gulf Simulated - 6506532

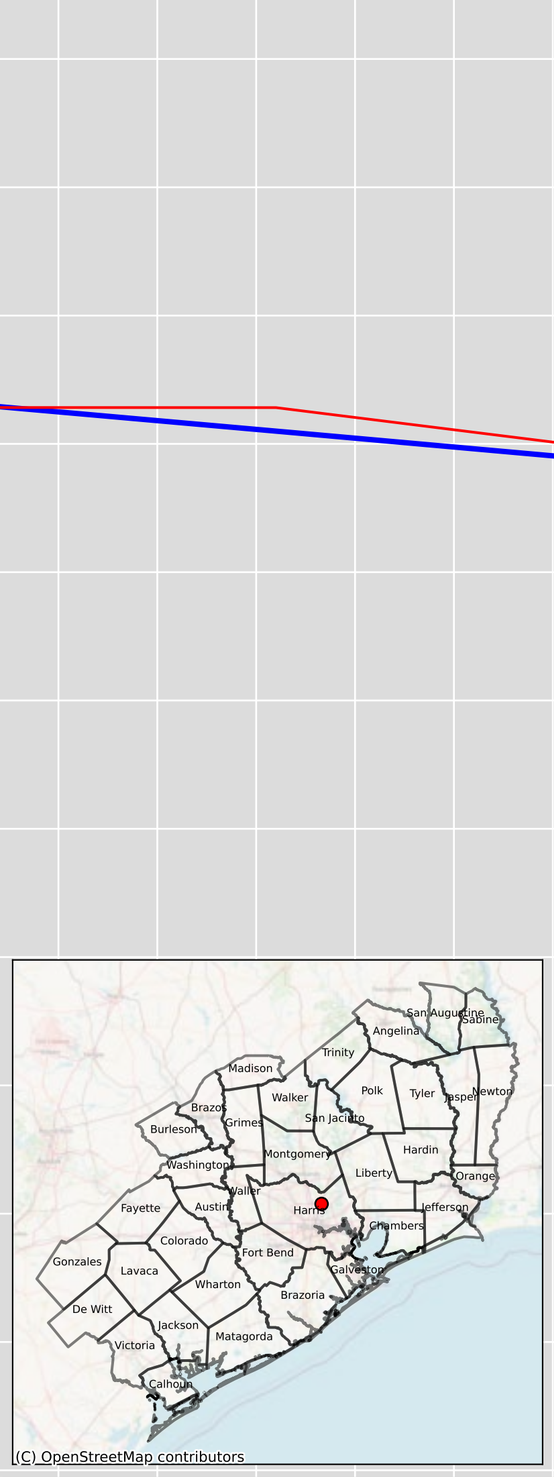
Harris - 6506616 & 6506601 & 6506612 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6506616
Gulf Simulated - 6506616

Harris - 6506802 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6506802
Gulf Simulated - 6506802

Harris - 6506804 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6506804
Gulf Simulated - 6506804

Harris - 6506907 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6507401 - Layer 2

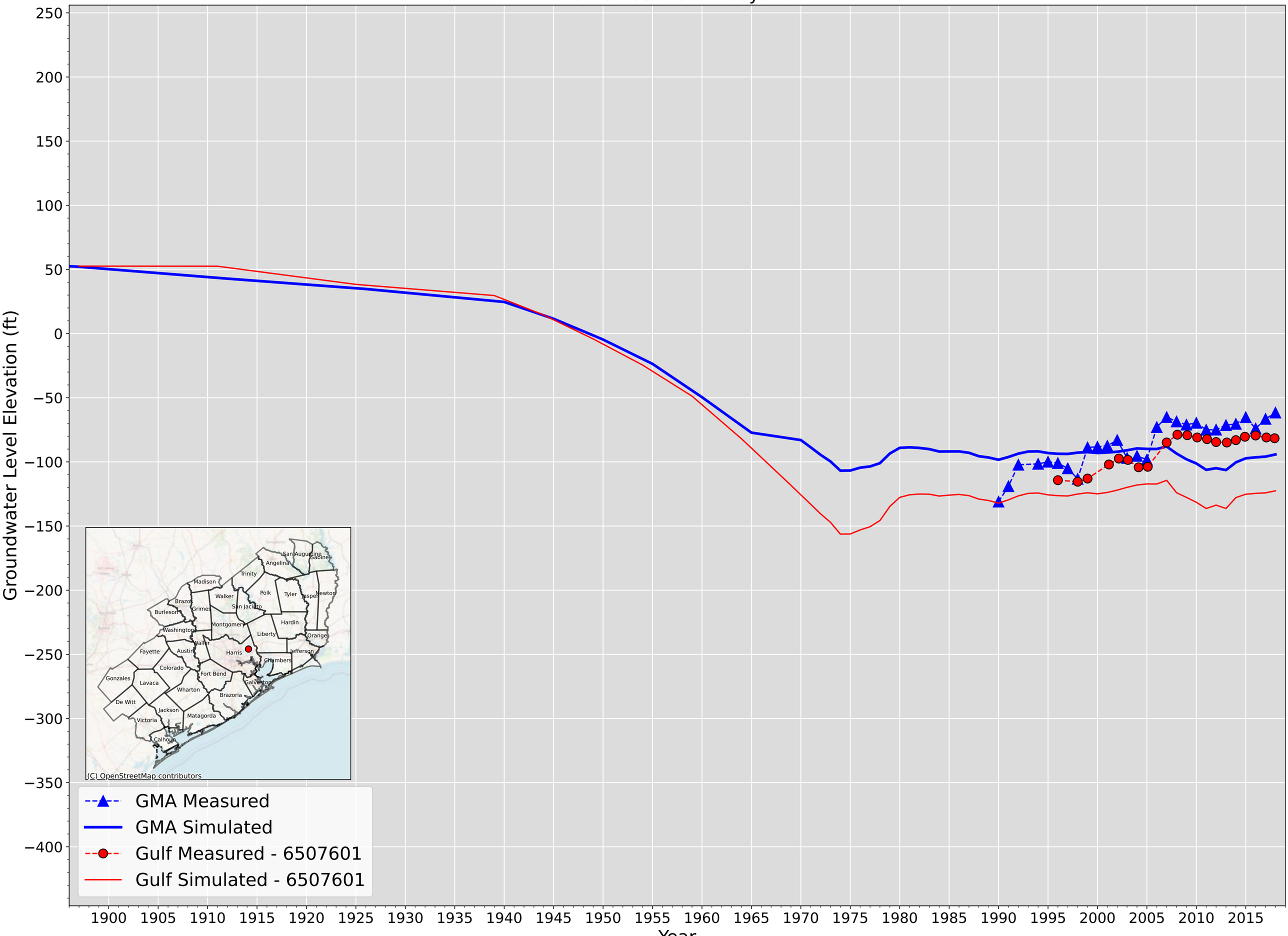
Groundwater Level Elevation (ft)

Year

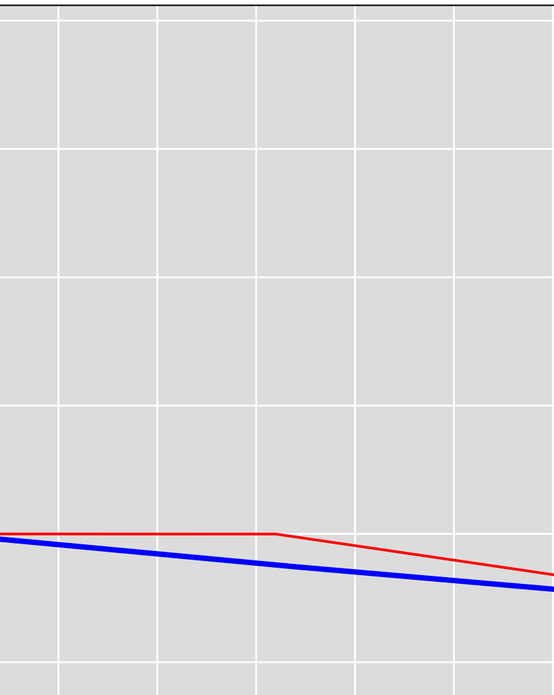
GMA Measured

GMA Simulated

Harris - 6507601 - Layer 2



Harris - 6507908 & 6507902 & 6507904 & 6507907 - Layer 2



Harris - 6508103 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6508103
Gulf Simulated - 6508103

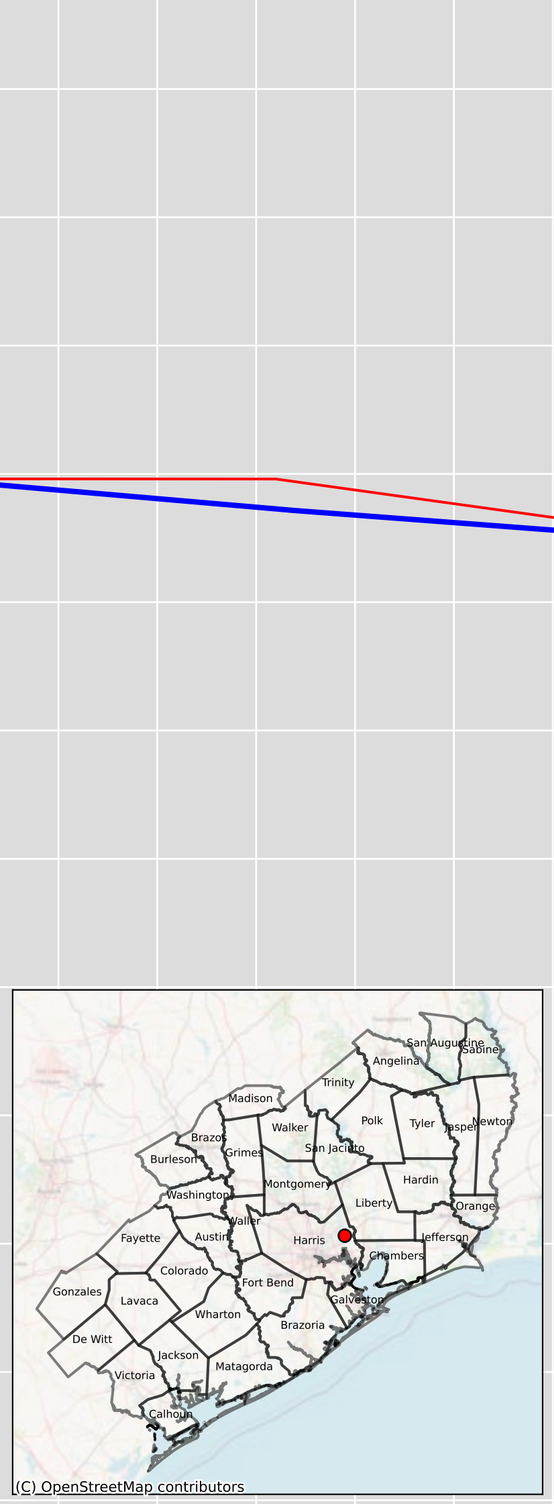
Harris - 6508506 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6508506
Gulf Simulated - 6508506

Harris - 6508809 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6510210 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

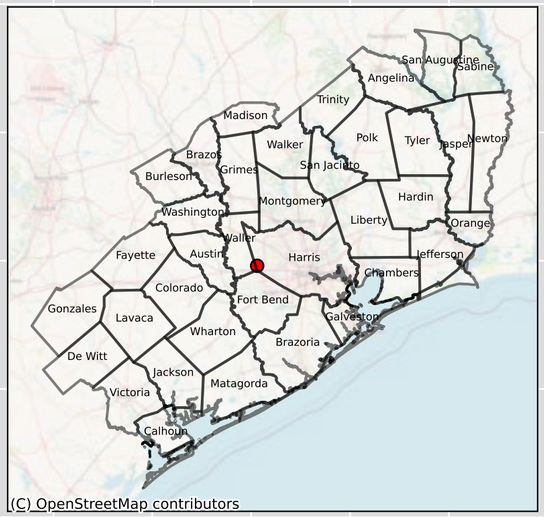
Harris - 6510501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

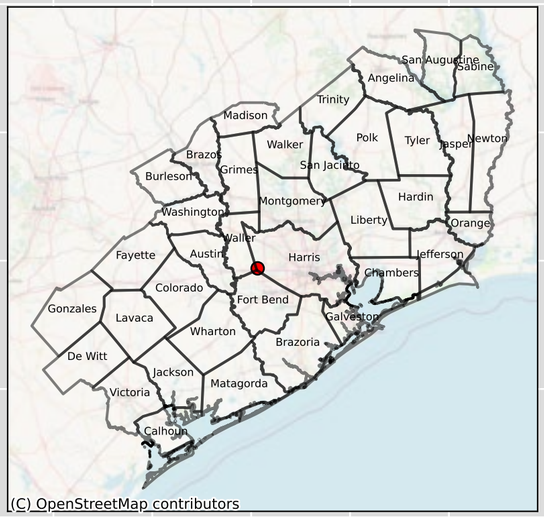
Harris - 6510516 & 6510518 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6510516
Gulf Simulated - 6510516

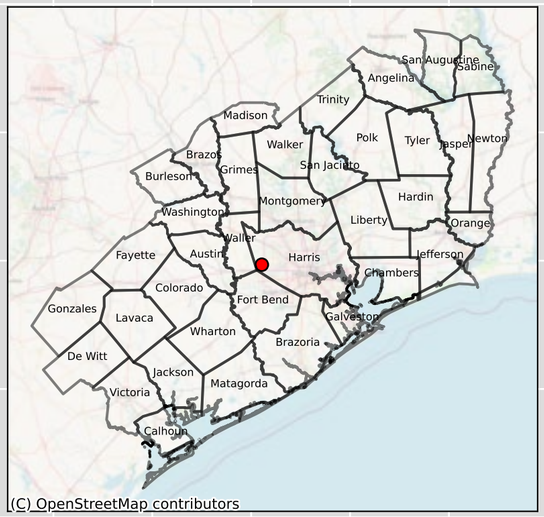
Harris - 6510606 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

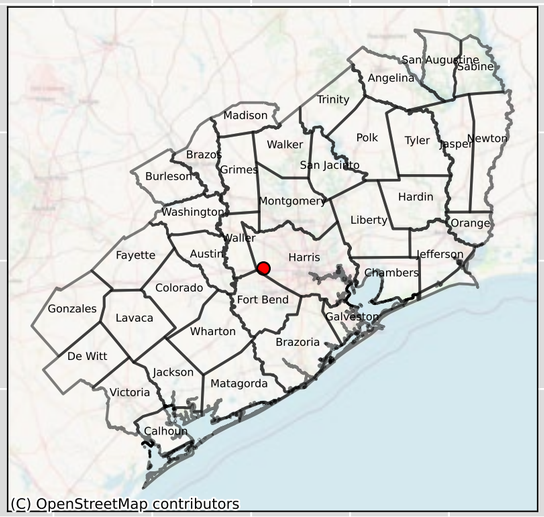
Harris - 6510608 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

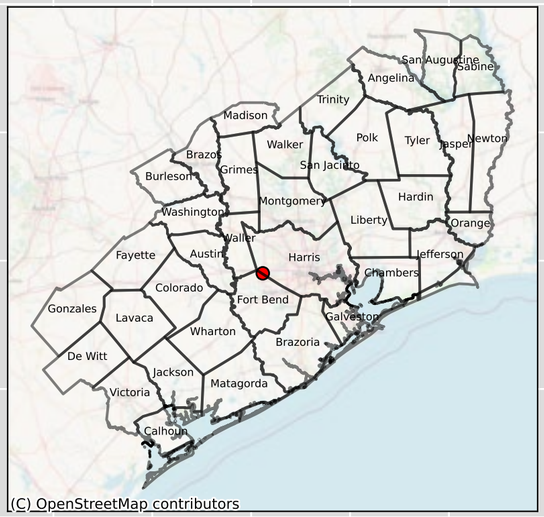
Harris - 6510904 & 6510911 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

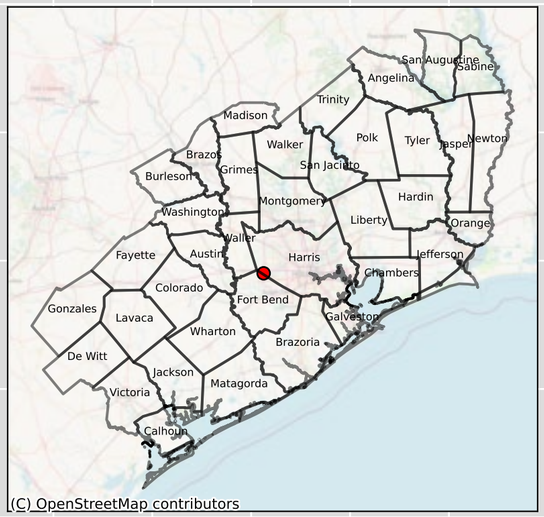
Harris - 6510906 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6510906
Gulf Simulated - 6510906

Harris - 6511405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

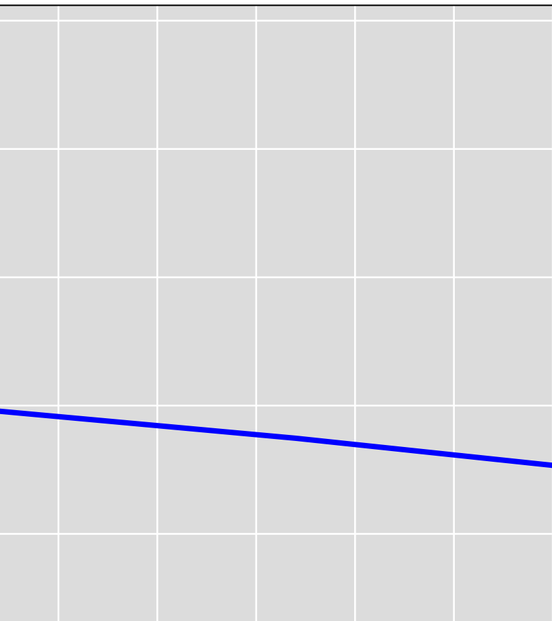
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6511511 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511516 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

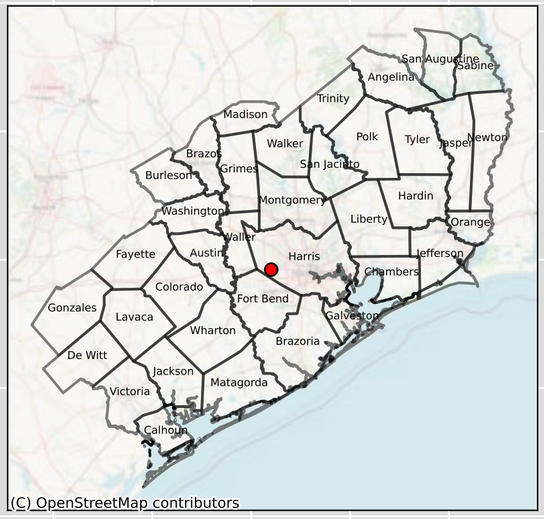
Harris - 6511802 & 6511808 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

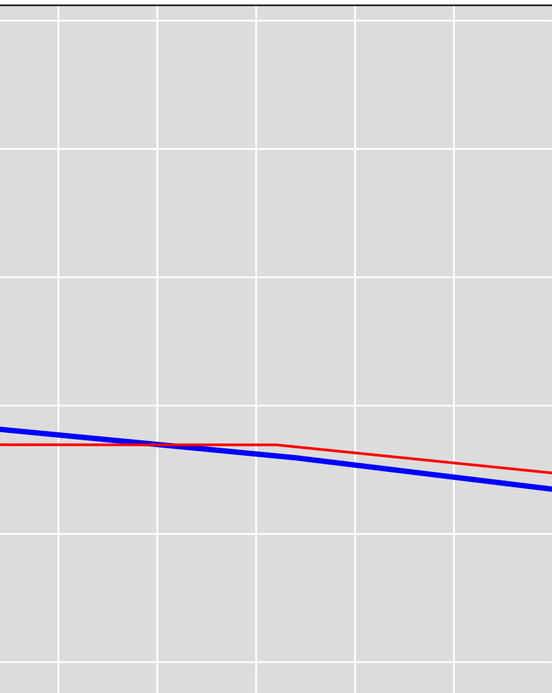
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6511809 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6511809
Gulf Simulated - 6511809

Harris - 6511901 & 6511902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511921 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6511921
Gulf Simulated - 6511921

Harris - 6512101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512101
Gulf Simulated - 6512101

Harris - 6512302 - Layer 2

Groundwater Level Elevation (ft)

Year

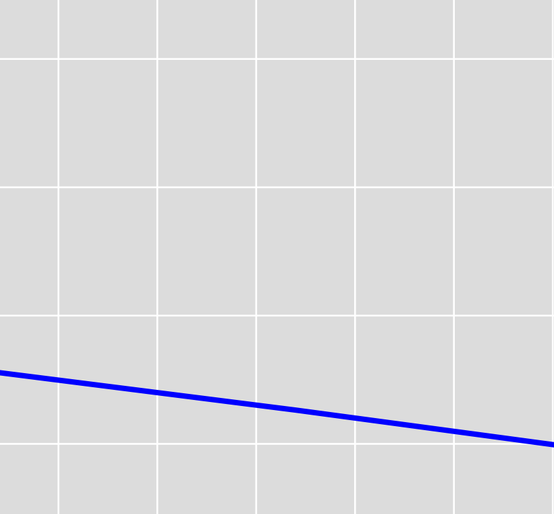
GMA Measured

GMA Simulated

Harris - 6512323 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

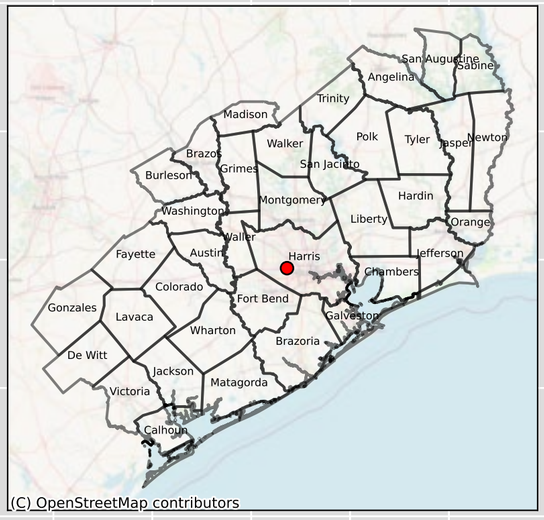
Year

GMA Measured
GMA Simulated

Harris - 6512502 & 6512501 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6512502
Gulf Simulated - 6512502

Harris - 6512513 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512522 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512522
Gulf Simulated - 6512522

Harris - 6512604 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512633 - Layer 2

Groundwater Level Elevation (ft)

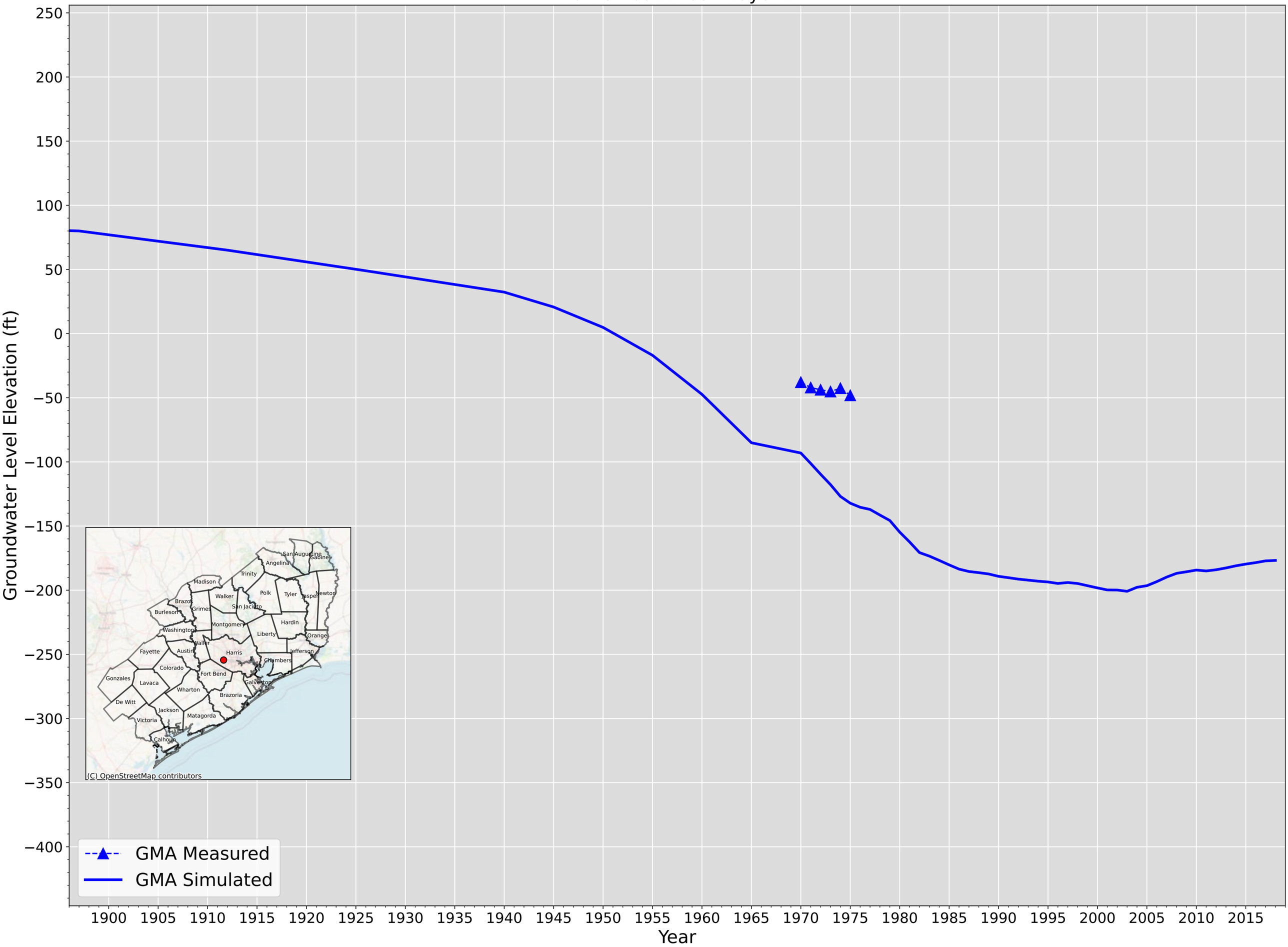
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512633
Gulf Simulated - 6512633

Harris - 6512703 - Layer 2



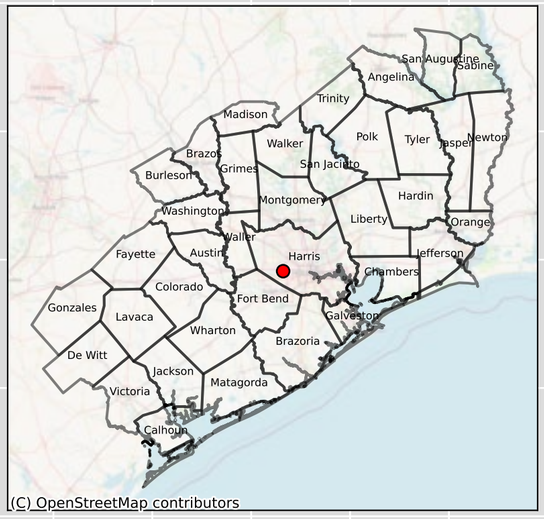
Harris - 6512705 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

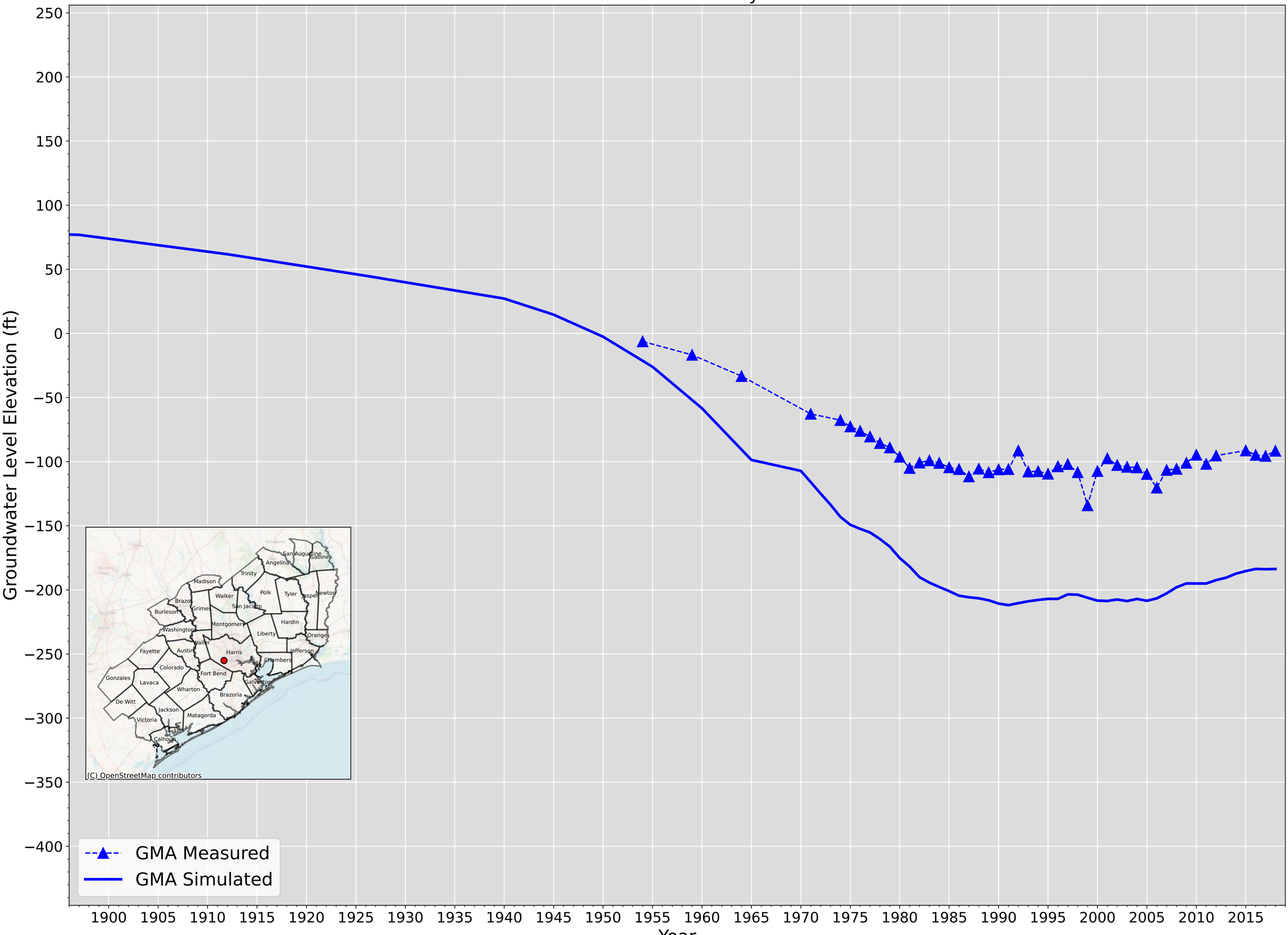
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

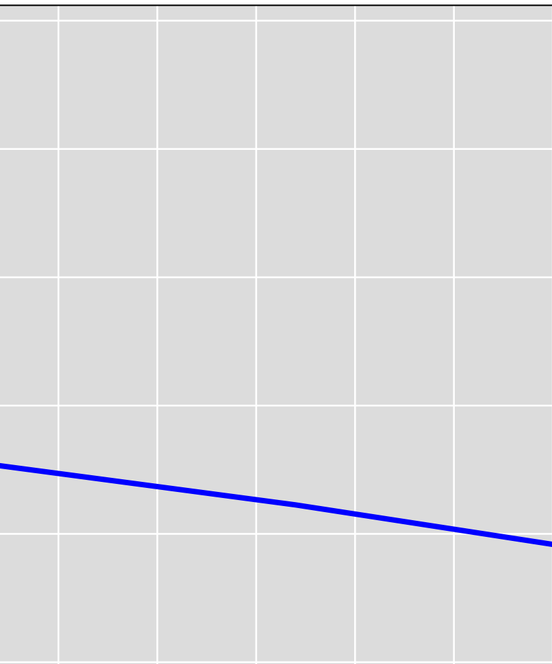


GMA Measured
GMA Simulated
Gulf Measured - 6512705
Gulf Simulated - 6512705

Harris - 6512801 - Layer 2



Harris - 6512802 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512806 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512902 - Layer 2

Groundwater Level Elevation (ft)

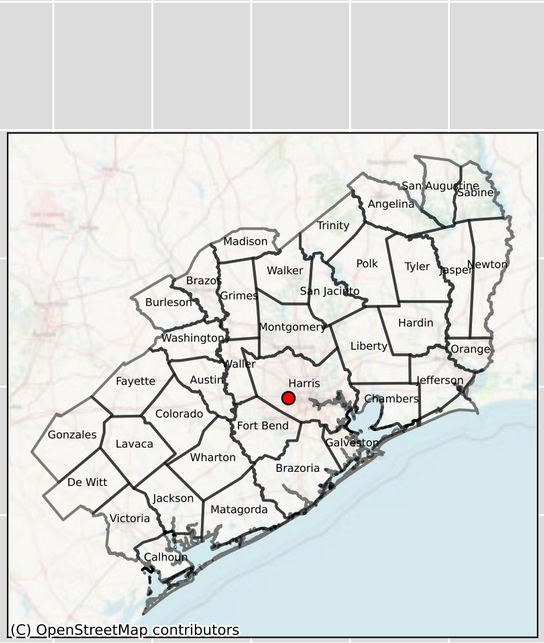
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512916 & 6512903 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512917 - Layer 2

Groundwater Level Elevation (ft)

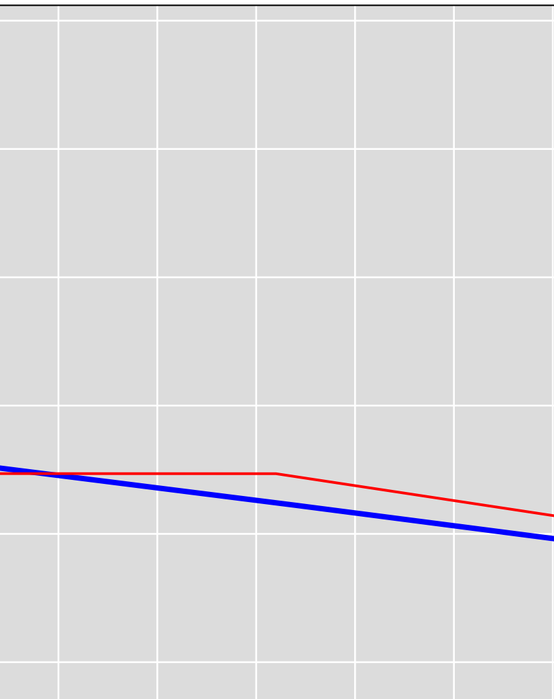
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513110 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6513110
Gulf Simulated - 6513110

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6513225 & 6513221 & 6513227 - Layer 2

Groundwater Level Elevation (ft)

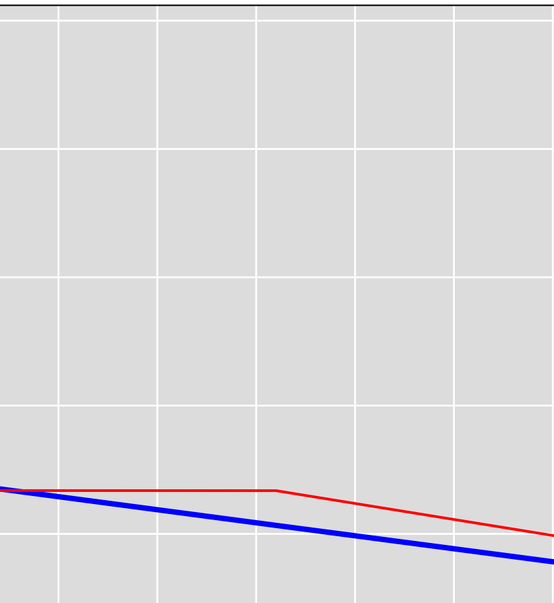
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513225
Gulf Simulated - 6513225

Harris - 6513323 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6513323
Gulf Simulated - 6513323

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6513408 - Layer 2

Groundwater Level Elevation (ft)

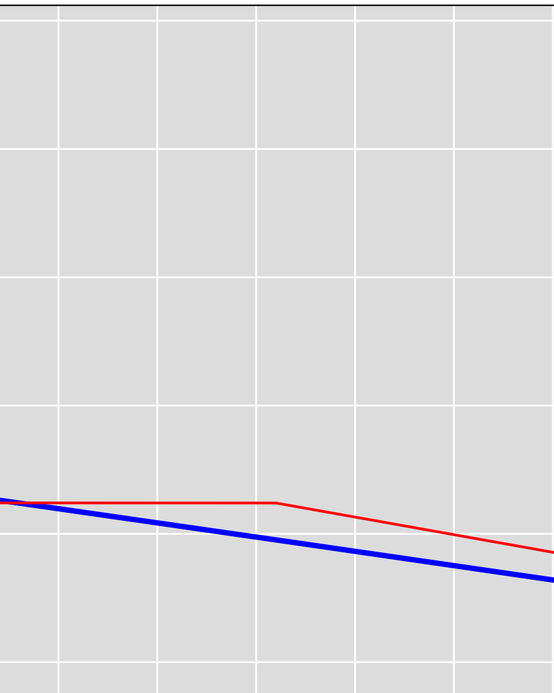
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513408
Gulf Simulated - 6513408

Harris - 6513614 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513614
Gulf Simulated - 6513614

Harris - 6513801 & 6513824 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513801
Gulf Simulated - 6513801

Harris - 6513927 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513932 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513932
Gulf Simulated - 6513932

Harris - 6514104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

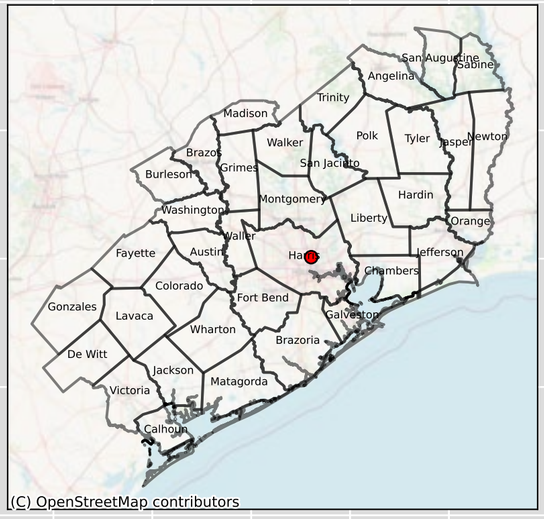
Year

GMA Measured
GMA Simulated

Harris - 6514112 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6514112
Gulf Simulated - 6514112

Harris - 6514202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514203 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514203
Gulf Simulated - 6514203

Harris - 6514301 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514301
Gulf Simulated - 6514301

Harris - 6514407 & 6514425 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514409 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514409
Gulf Simulated - 6514409

Harris - 6514413 & 6514414 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514602 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514602
Gulf Simulated - 6514602

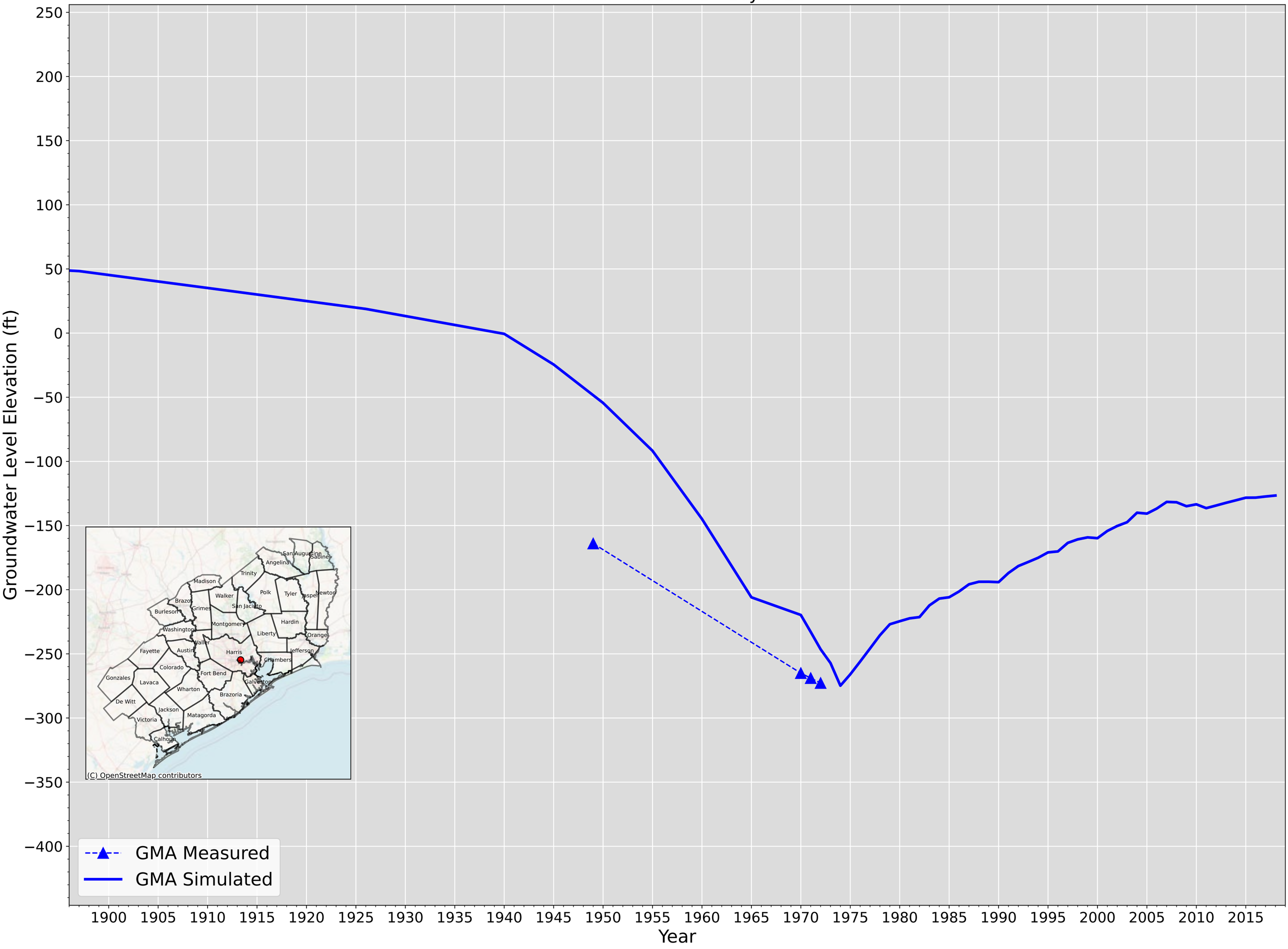
Harris - 6514742 & 6514738 & 6514745 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514742
Gulf Simulated - 6514742

Harris - 6514901 - Layer 2



Harris - 6514908 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514909 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514912 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514912
Gulf Simulated - 6514912

Harris - 6515101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515101
Gulf Simulated - 6515101

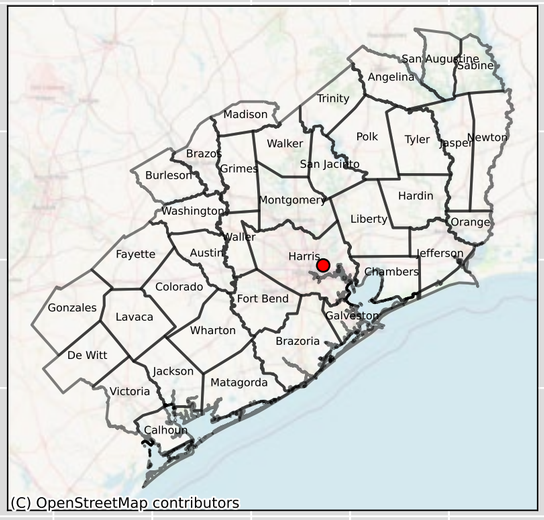
Harris - 6515403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6515403
Gulf Simulated - 6515403

Harris - 6515405 & 6515406 - Layer 2

Groundwater Level Elevation (ft)

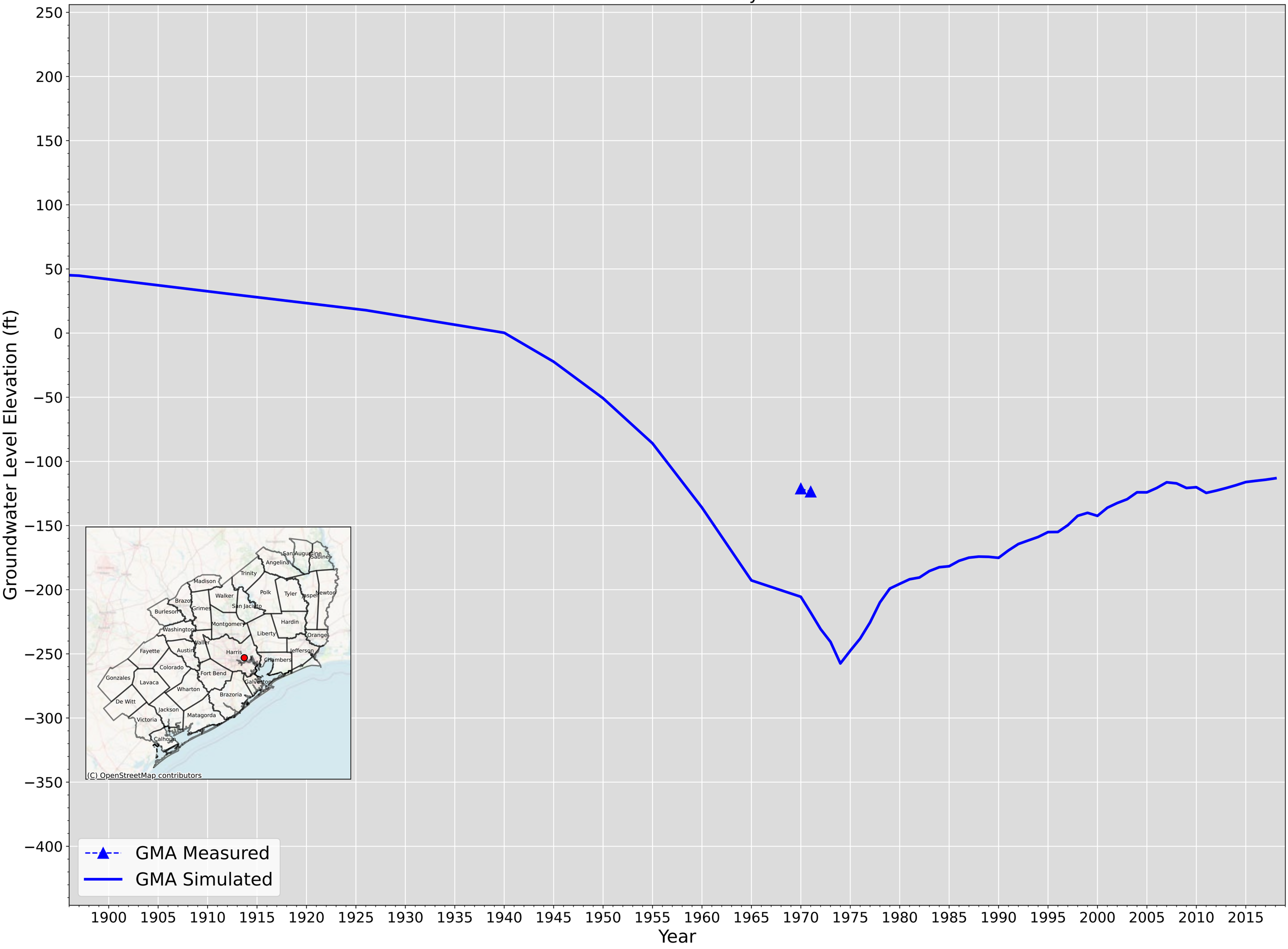
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515411 - Layer 2



Harris - 6515425 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6515501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515507 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515507
Gulf Simulated - 6515507

Harris - 6515514 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515514
Gulf Simulated - 6515514

Harris - 6515701 & 6515706 - Layer 2

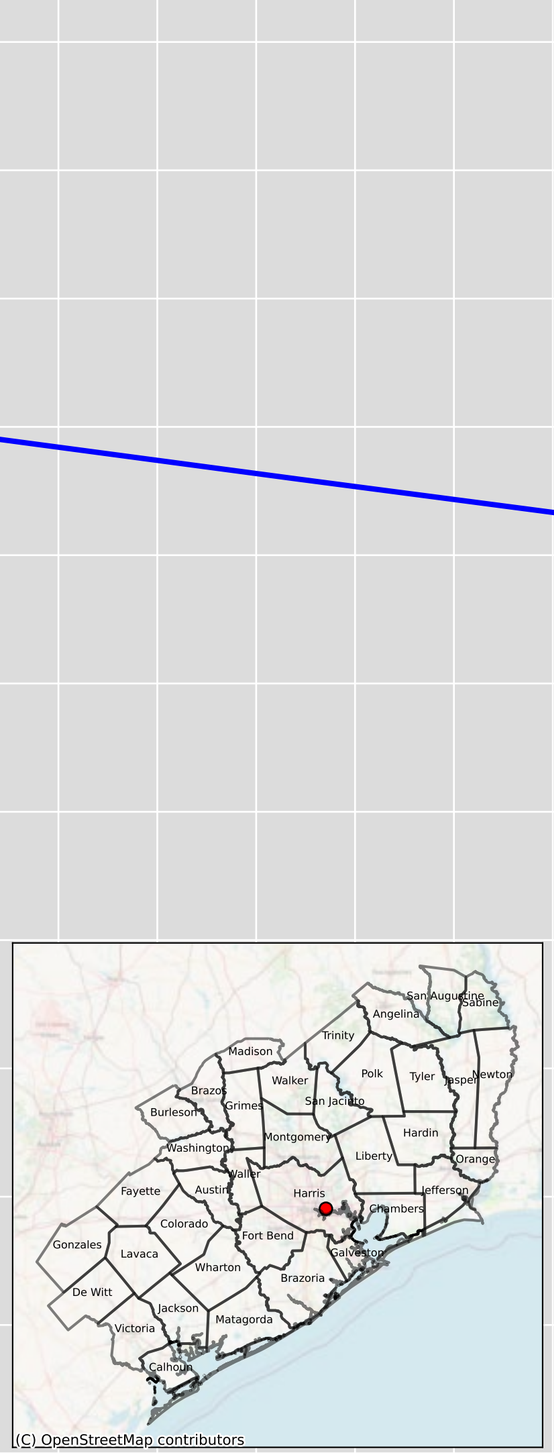
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



Harris - 6515703 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515703
Gulf Simulated - 6515703

Harris - 6515802 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515802
Gulf Simulated - 6515802

Harris - 6515803 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6515806 & 6515804 & 6515805 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515806
Gulf Simulated - 6515806

Harris - 6515901 & 6515903 & 6515916 & 6515917 & 6515918 & 6515920 - Layer 2

Groundwater Level Elevation (ft)

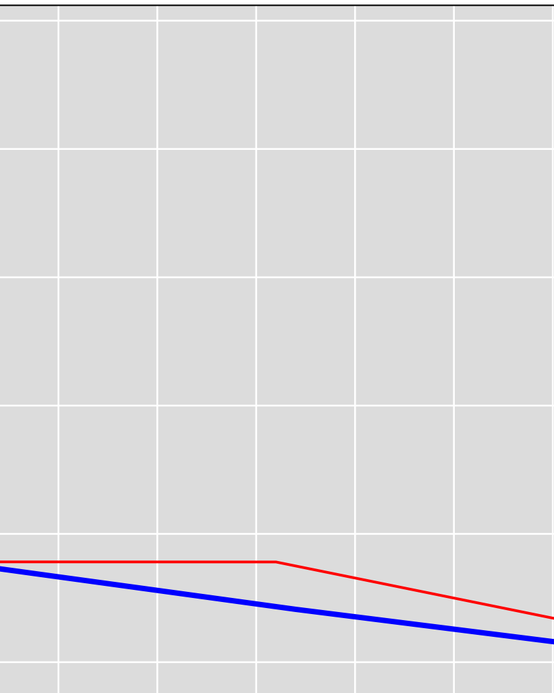
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515912 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515912
Gulf Simulated - 6515912

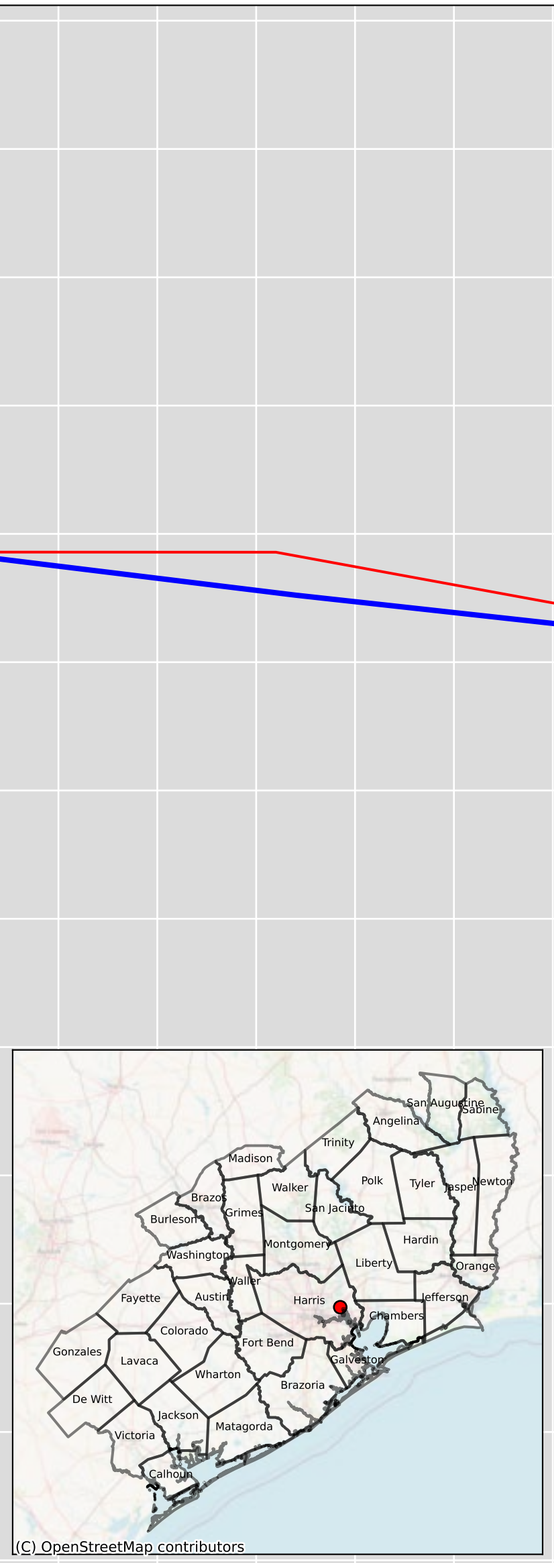
Harris - 6515914 & 6516709 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6515914
Gulf Simulated - 6515914

Harris - 6516102 - Layer 2



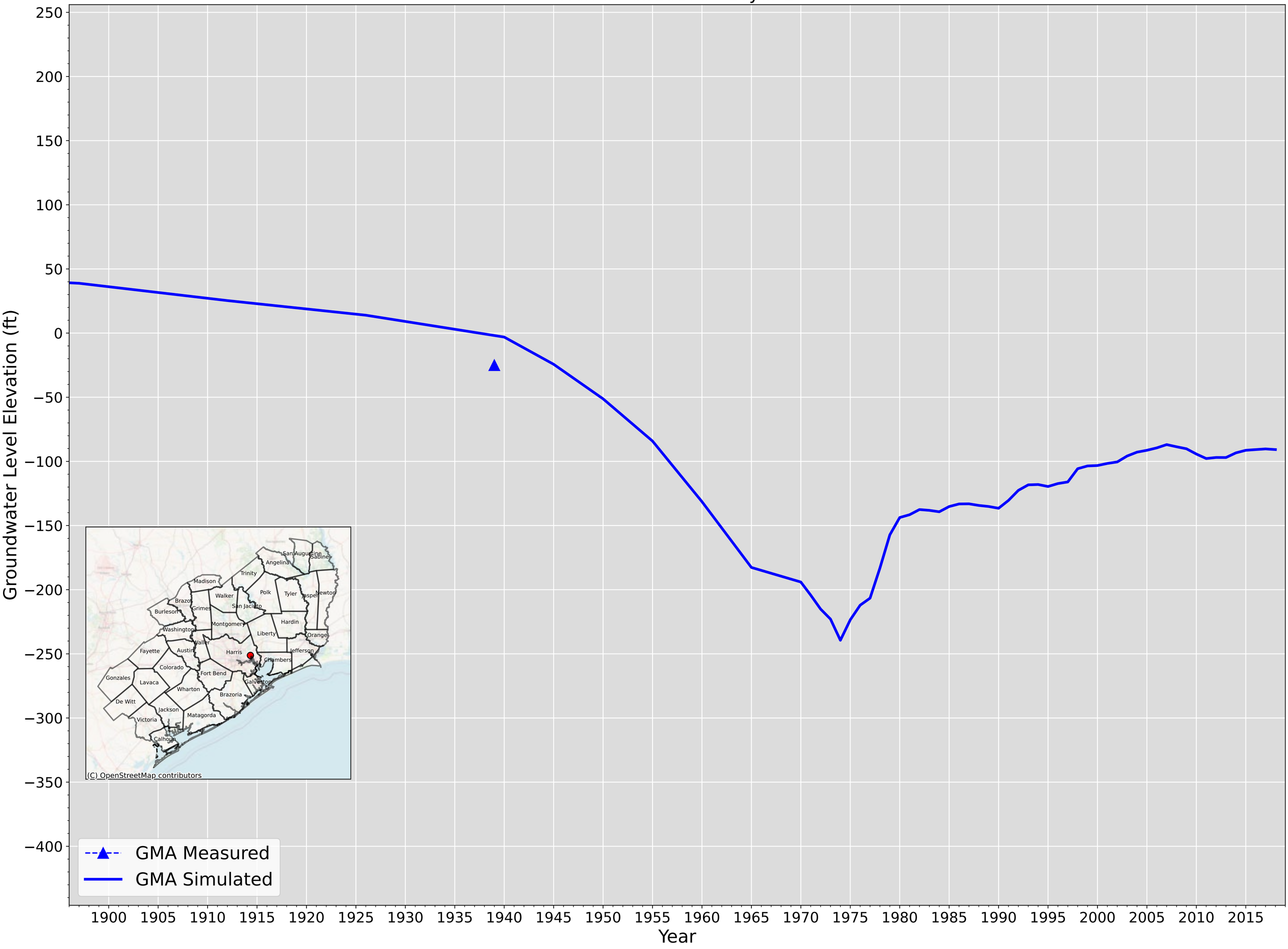
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

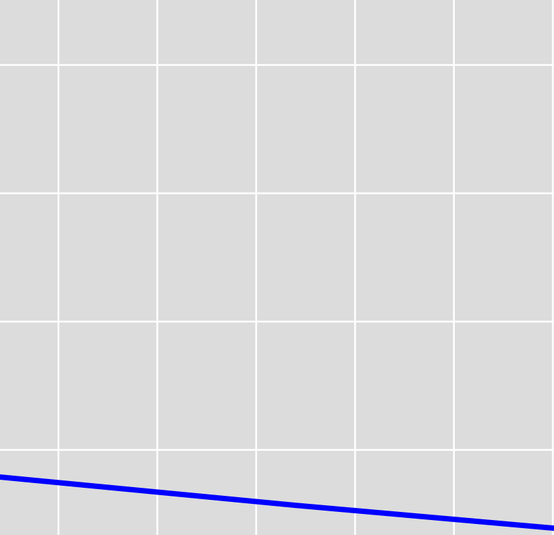
Harris - 6516106 - Layer 2



Harris - 6516201 - Layer 2

Groundwater Level Elevation (ft)

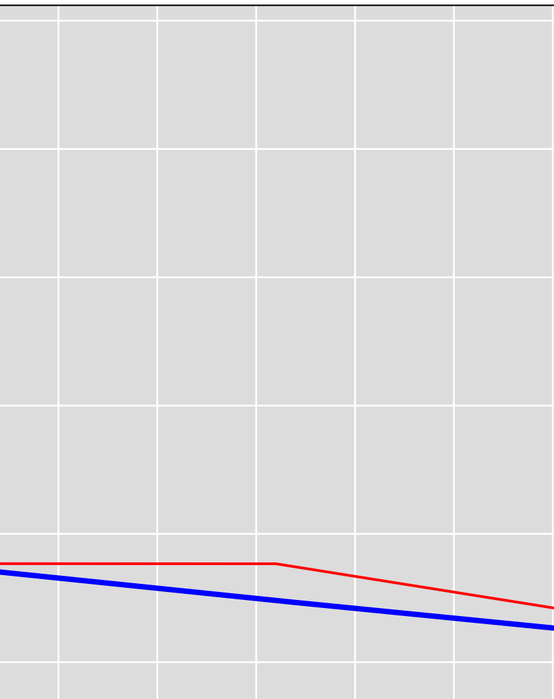
Year



GMA Measured

GMA Simulated

Harris - 6516502 & 6516503 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6516502
Gulf Simulated - 6516502

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6516504 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6516504
Gulf Simulated - 6516504

Harris - 6516509 & 6516508 - Layer 2

Groundwater Level Elevation (ft)

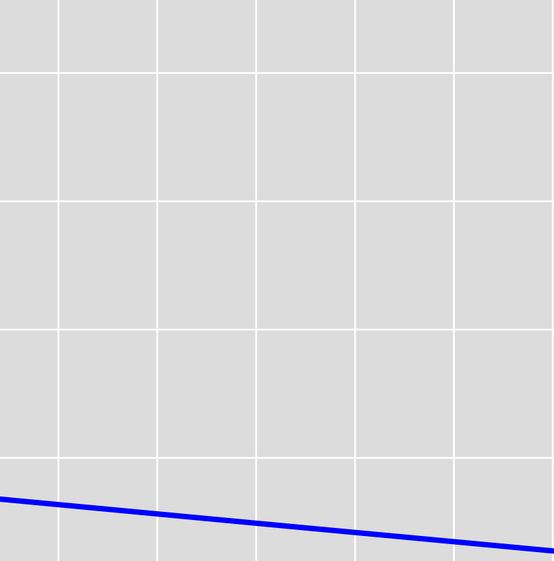
Year

GMA Measured
GMA Simulated
Gulf Measured - 6516509
Gulf Simulated - 6516509

Harris - 6516601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

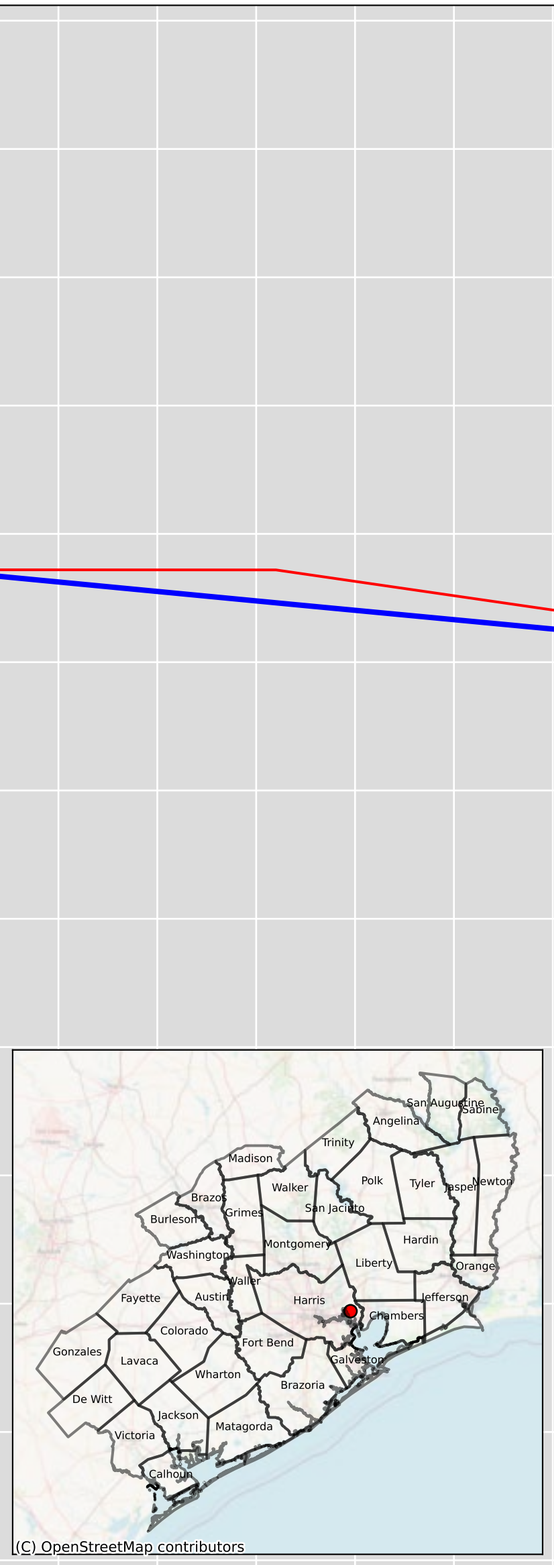


GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6516602 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6516602
Gulf Simulated - 6516602

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6516612 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

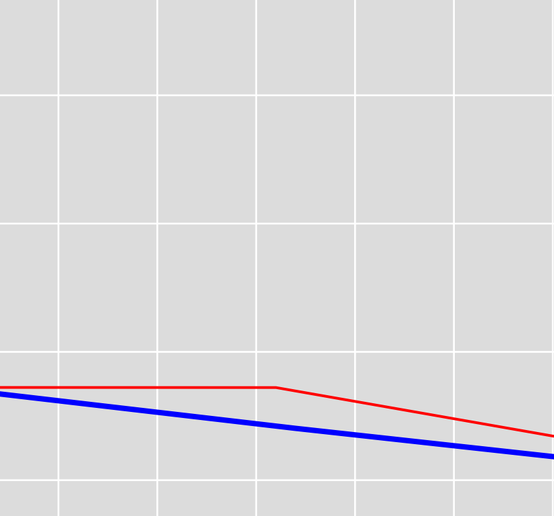
Harris - 6516814 & 6516801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

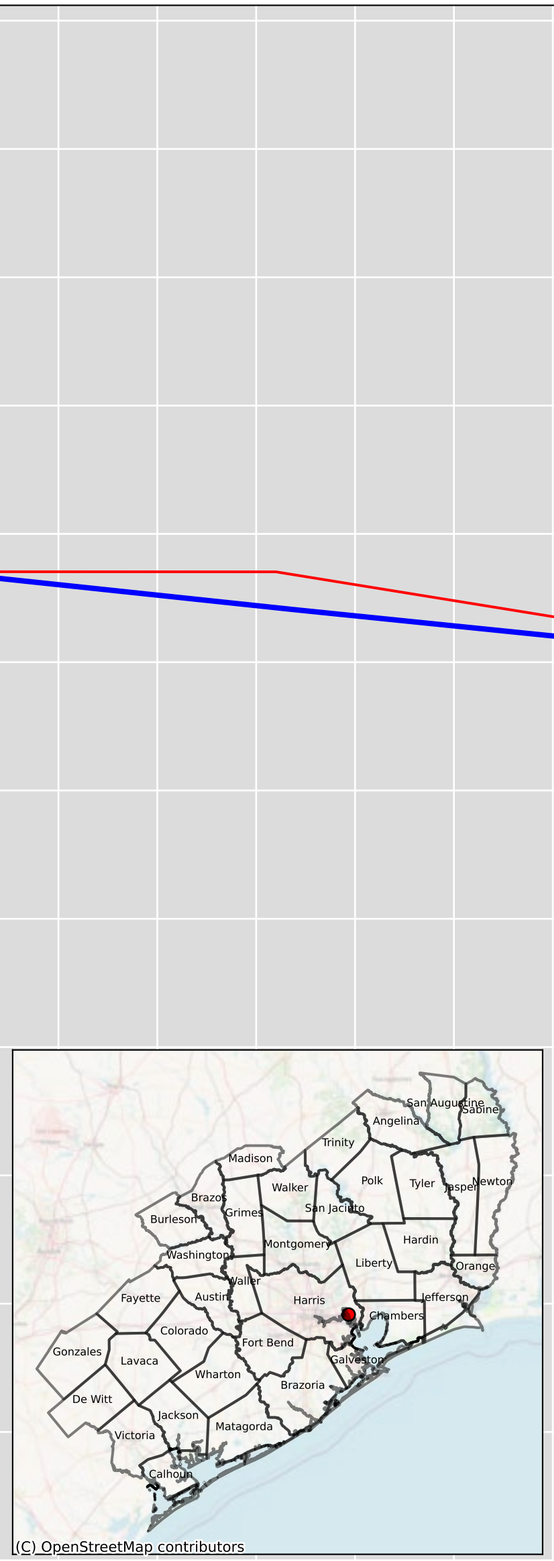
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6516814
Gulf Simulated - 6516814

Harris - 6516905 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6516905
Gulf Simulated - 6516905

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6519201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

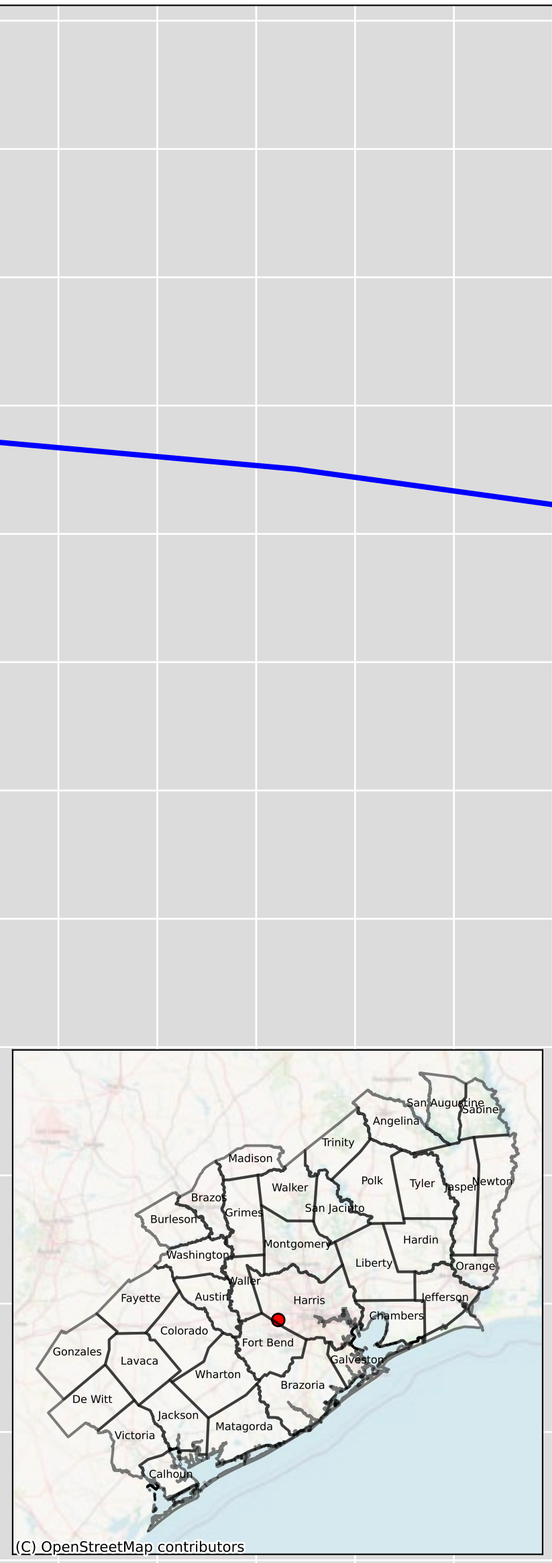
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6519203 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6519205 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

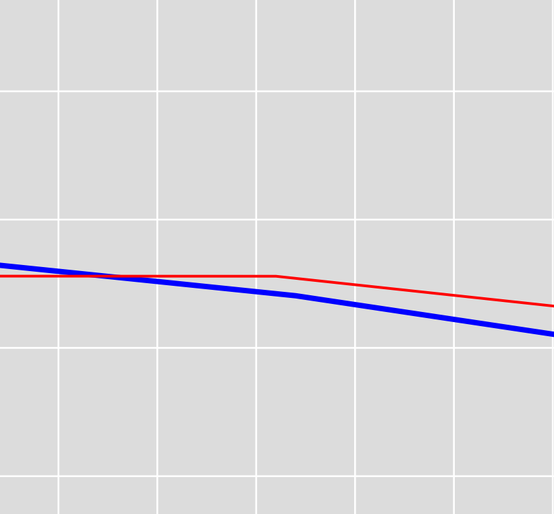
Harris - 6519317 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6519317
Gulf Simulated - 6519317

Harris - 6520111 & 6520129 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520111
Gulf Simulated - 6520111

Harris - 6520118 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520118
Gulf Simulated - 6520118

Harris - 6520203 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6520208 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

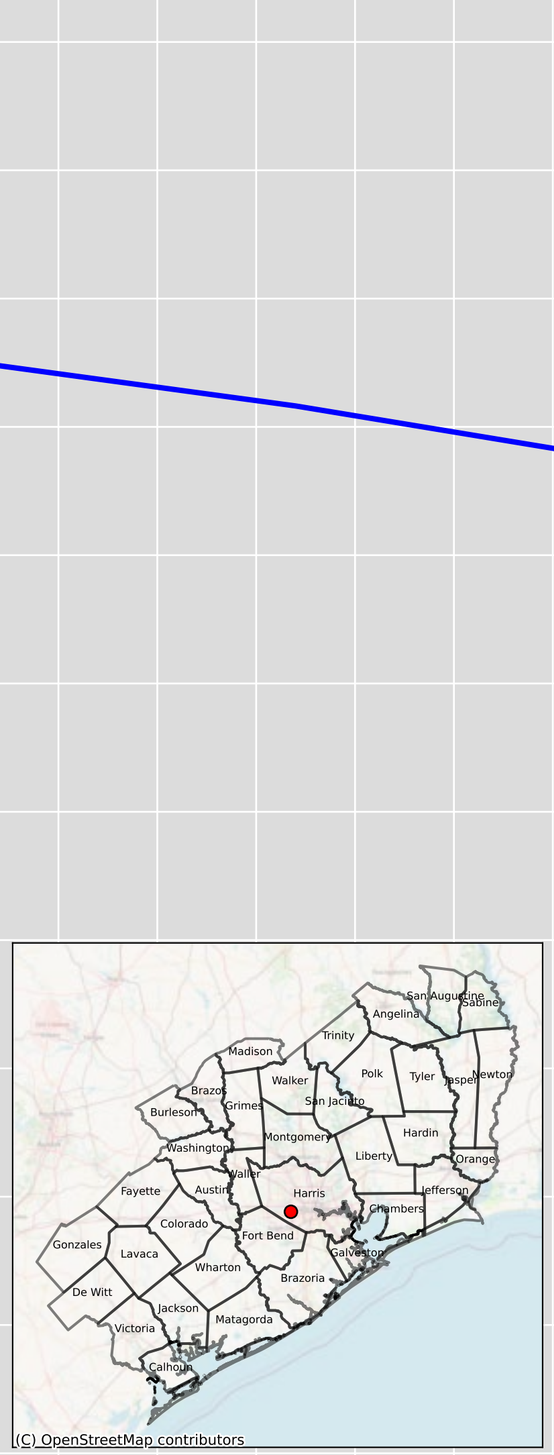
Harris - 6520210 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Harris - 6520224 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520224
Gulf Simulated - 6520224

Harris - 6520307 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520307
Gulf Simulated - 6520307

Harris - 6520309 - Layer 2

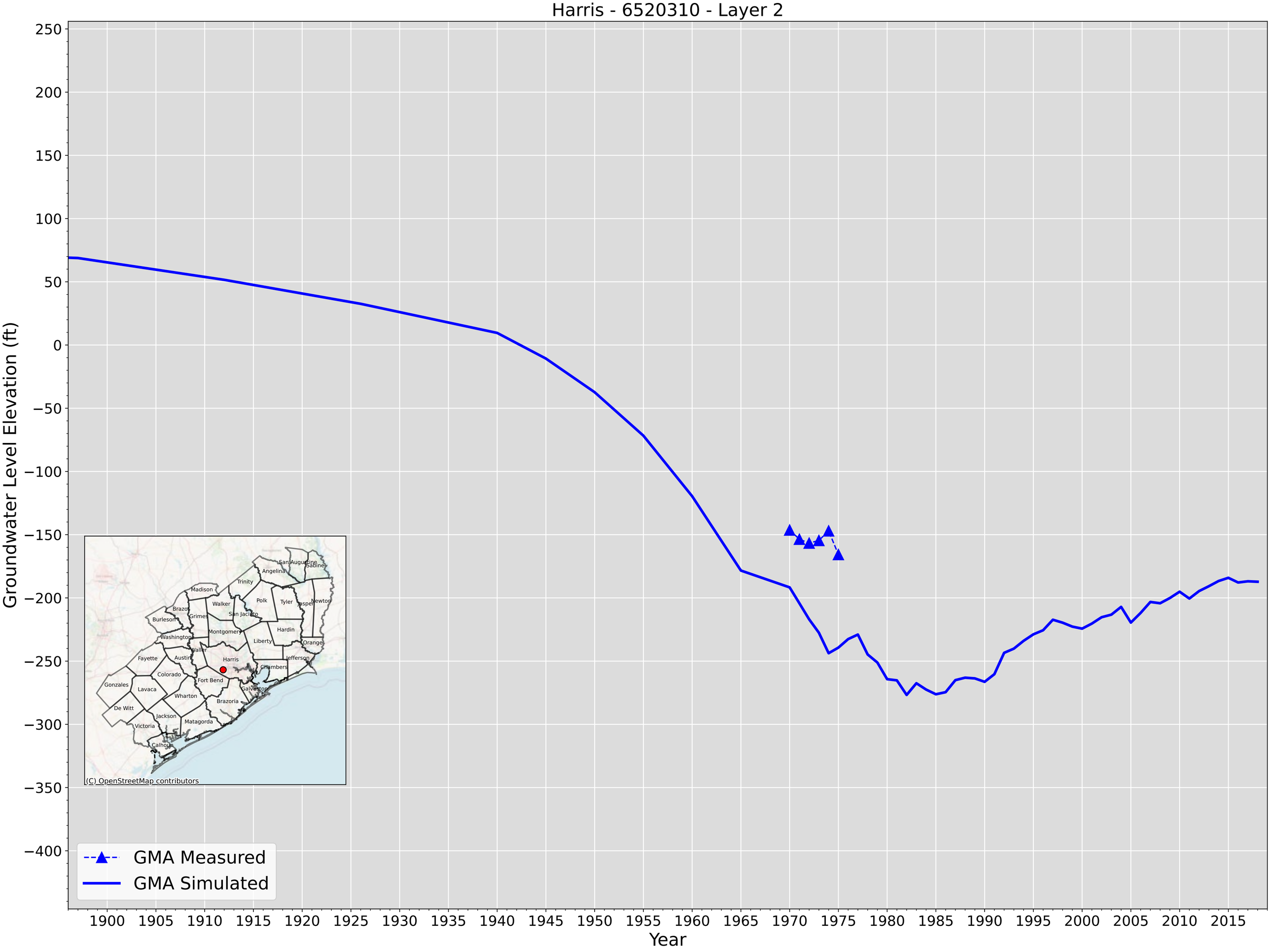
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520309
Gulf Simulated - 6520309


Harris - 6520310 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Polk
Tyler
Jasper
Newton
Walker
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Harris - 6520416 - Layer 2

Groundwater Level Elevation (ft)

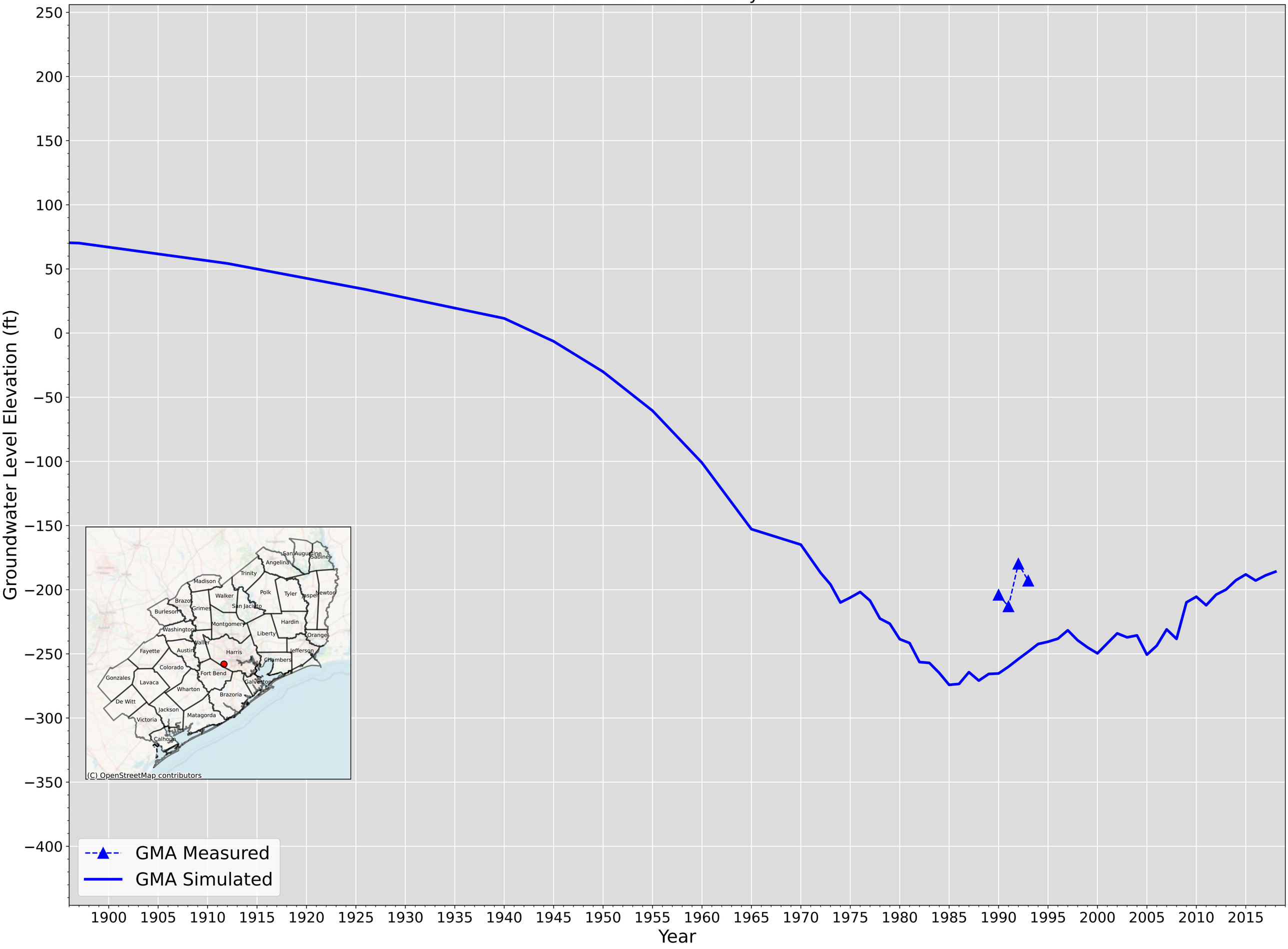
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520508 - Layer 2



Harris - 6520509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520516 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520602
Gulf Simulated - 6520602

Harris - 6520603 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520603
Gulf Simulated - 6520603

Harris - 6520605 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520617 & 6520609 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520617
Gulf Simulated - 6520617

Harris - 6520706 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520706
Gulf Simulated - 6520706

Harris - 6520803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520807 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520807
Gulf Simulated - 6520807

Harris - 6520814 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520908 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520911 & 6520916 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520911
Gulf Simulated - 6520911

Harris - 6520913 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521150 - Layer 2

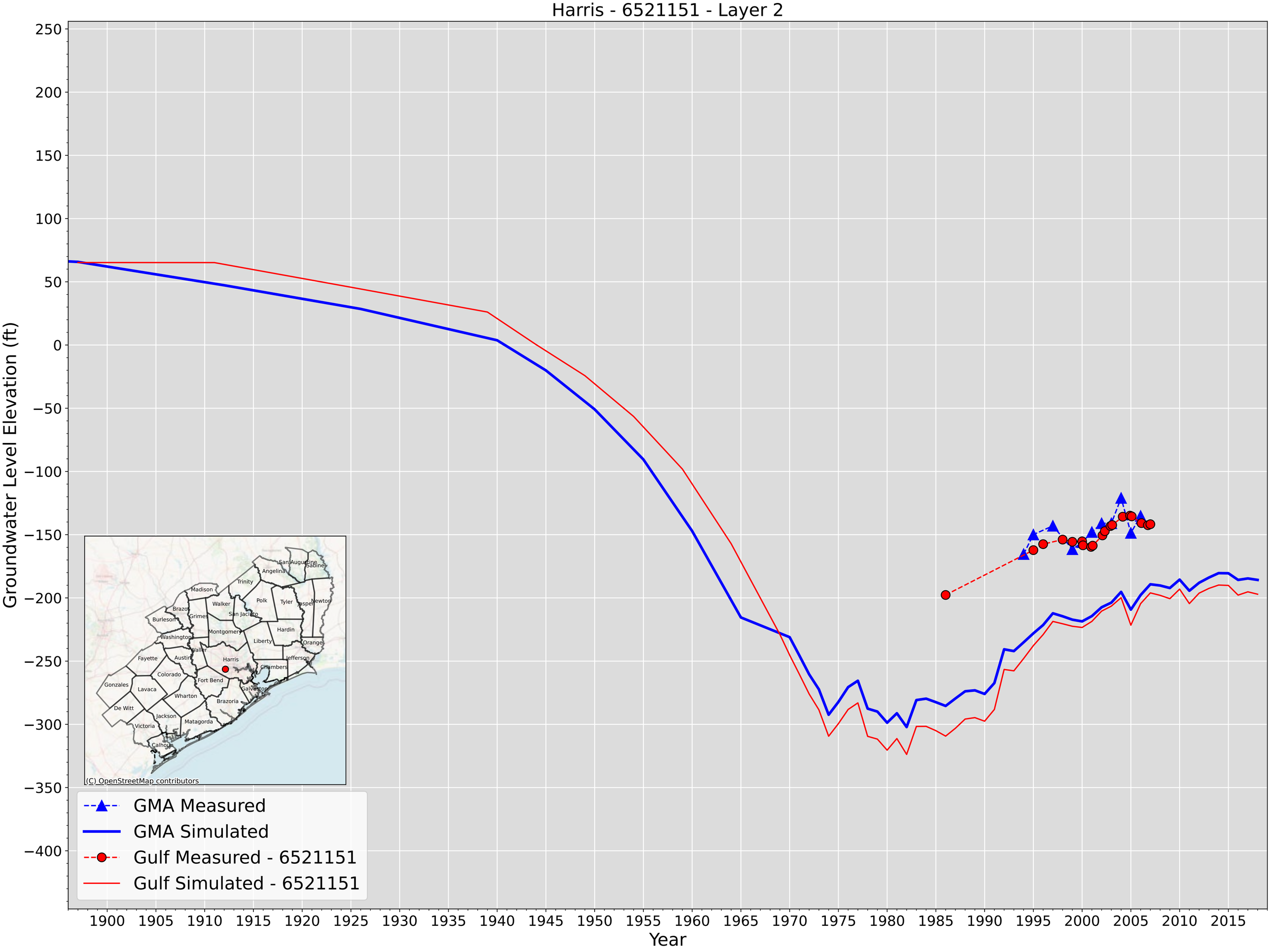
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521150
Gulf Simulated - 6521150


Harris - 6521151 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
Gulf Measured - 6521151
Gulf Simulated - 6521151
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Harris - 6521229 & 6521201 & 6521228 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521229
Gulf Simulated - 6521229

Harris - 6521404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521404
Gulf Simulated - 6521404

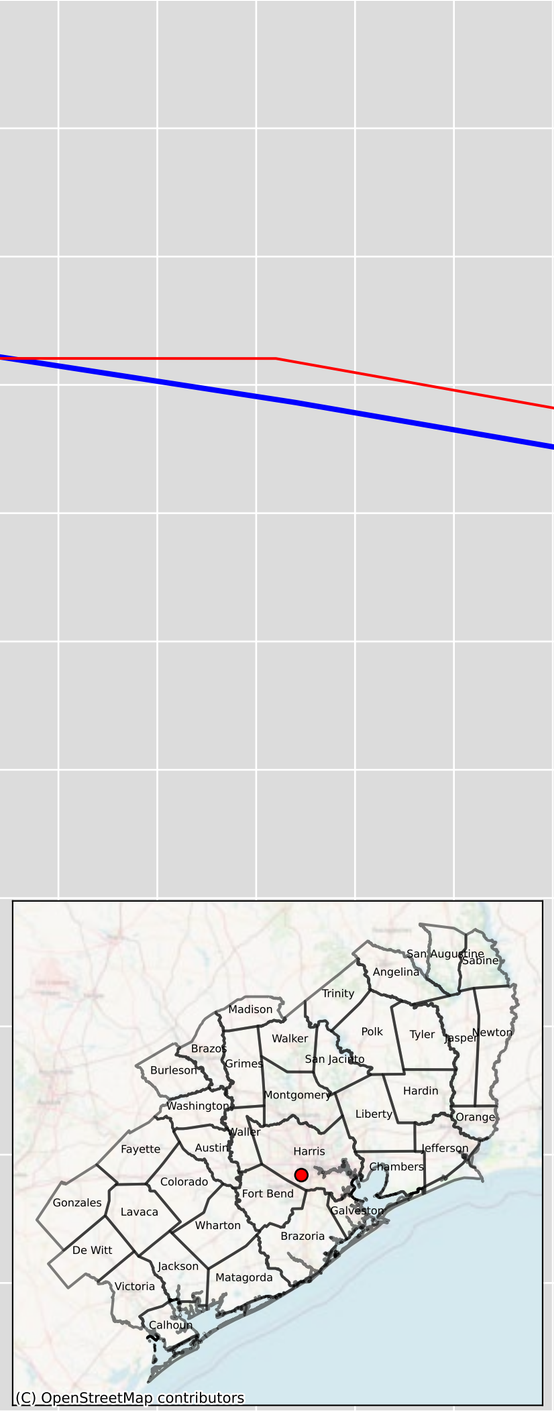
Harris - 6521413 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

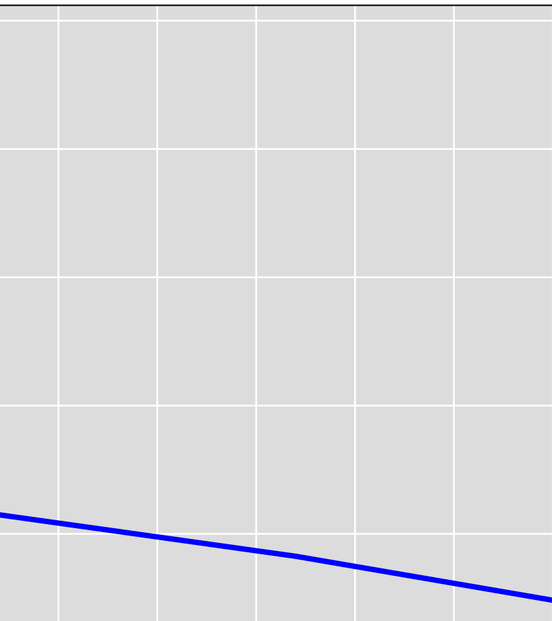
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6521413
Gulf Simulated - 6521413

Harris - 6521505 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521507 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521702 & 6521703 - Layer 2

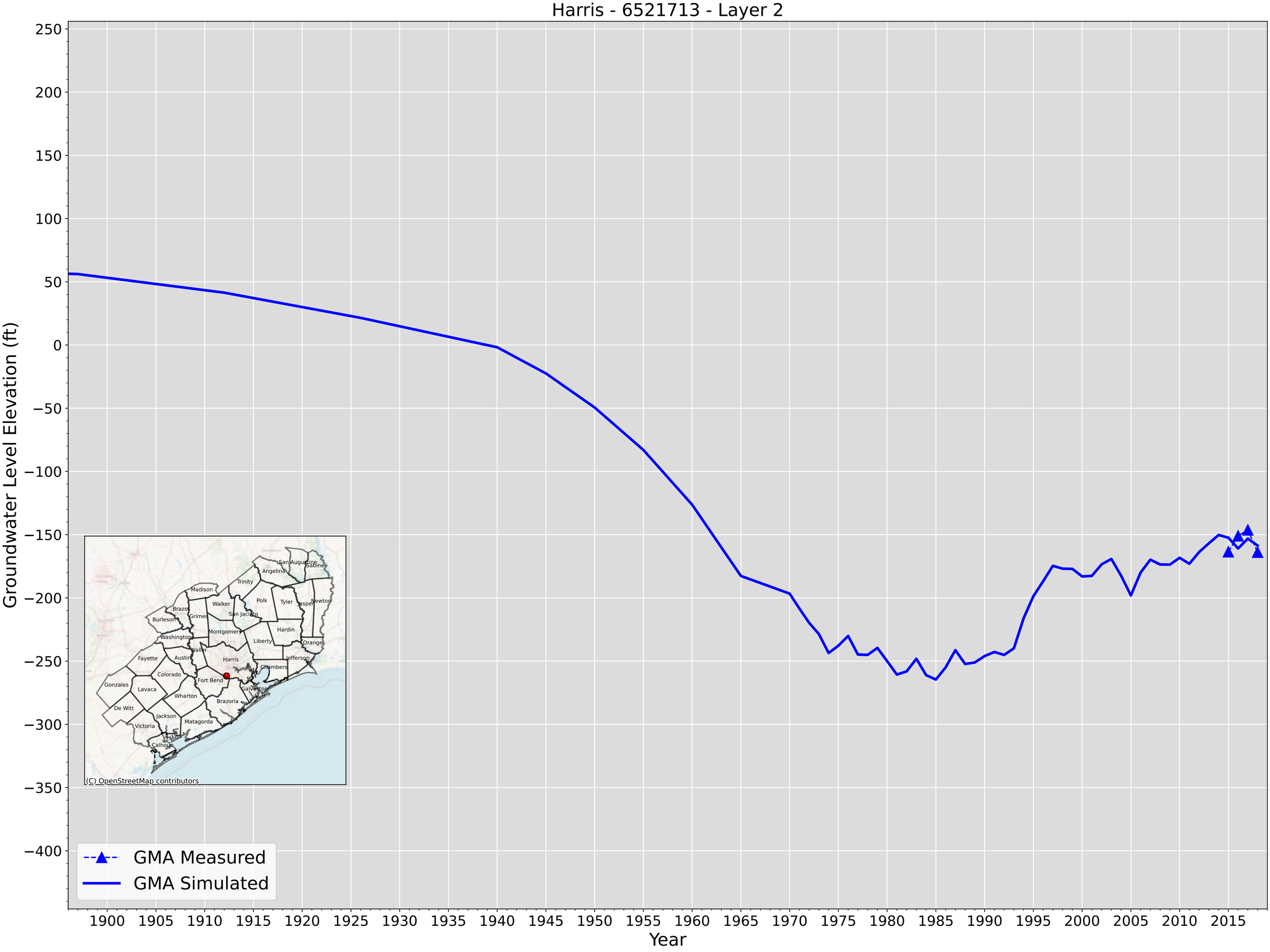
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

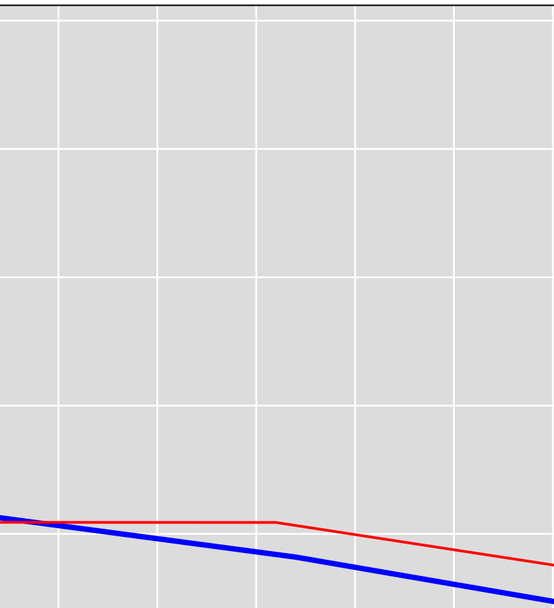
GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year


Harris - 6521713 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Galveston
Gonzales
Lavaca
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Harris - 6521805 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521805
Gulf Simulated - 6521805

Harris - 6521807 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521807
Gulf Simulated - 6521807

Harris - 6522212 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522317 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6522317
Gulf Simulated - 6522317

Harris - 6522323 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522334 & 6522335 & 6522336 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

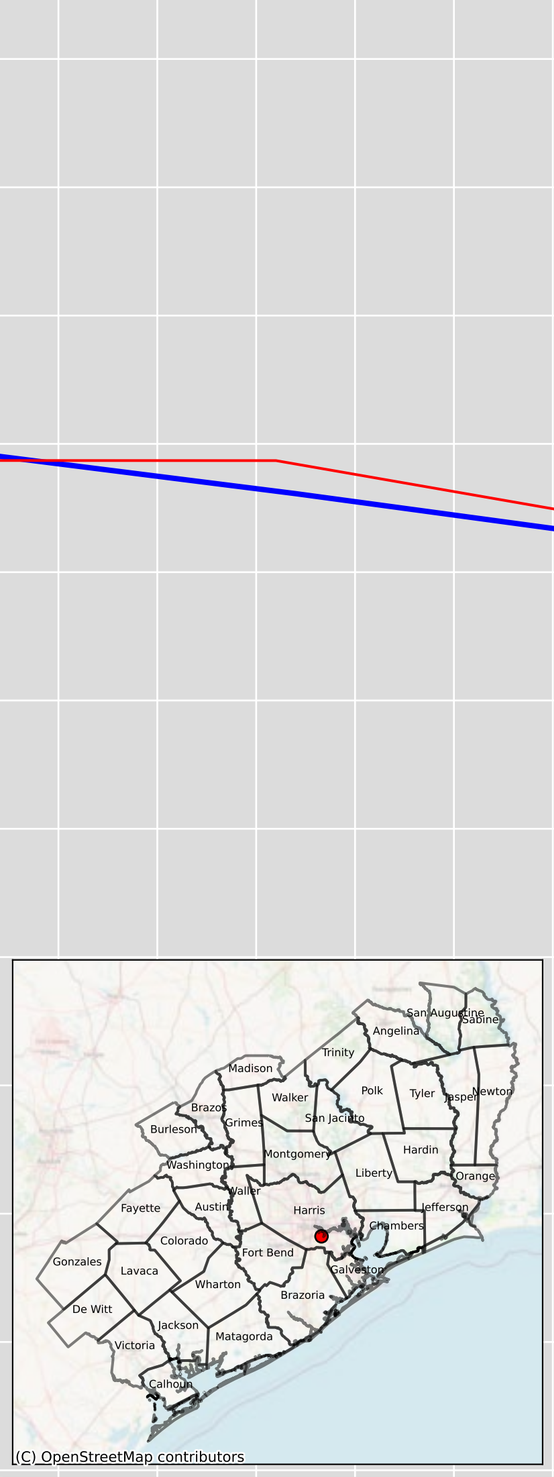
Harris - 6522618 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6522618
Gulf Simulated - 6522618

Harris - 6522622 & 6522623 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6522622
Gulf Simulated - 6522622

Harris - 6522702 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522711 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6522711
Gulf Simulated - 6522711

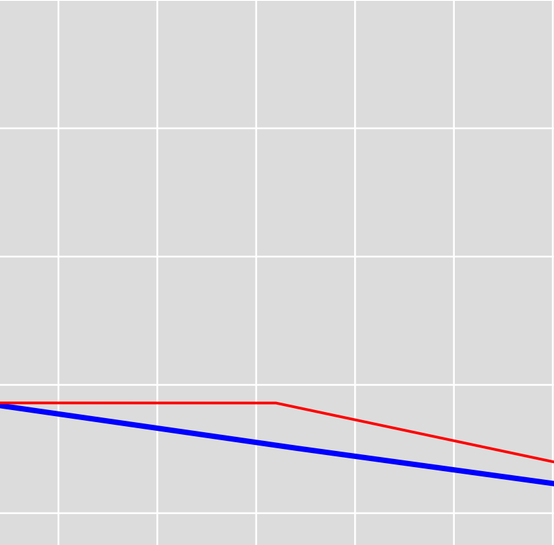
Harris - 6522803 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6522803
Gulf Simulated - 6522803

Harris - 6523103 & 6523142 & 6523152 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6523103
Gulf Simulated - 6523103

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6523104 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6523104
Gulf Simulated - 6523104

Harris - 6523106 & 6523129 & 6523130 & 6523131 & 6523136 & 6523137 & 6523139 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523148 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523215 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523218 & 6523307 - Layer 2

Groundwater Level Elevation (ft)

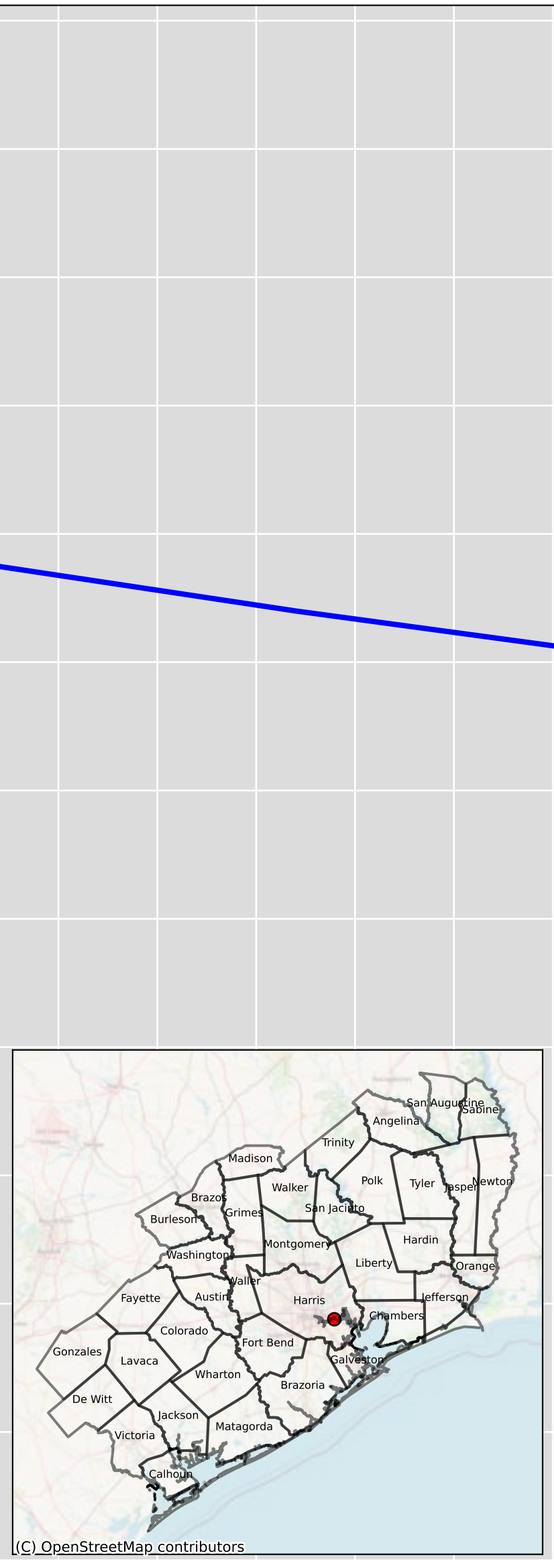
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523219 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523220 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6523244 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523247 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523301 & 6523312 & 6524111 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523302 & 6523314 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523309 & 6523310 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

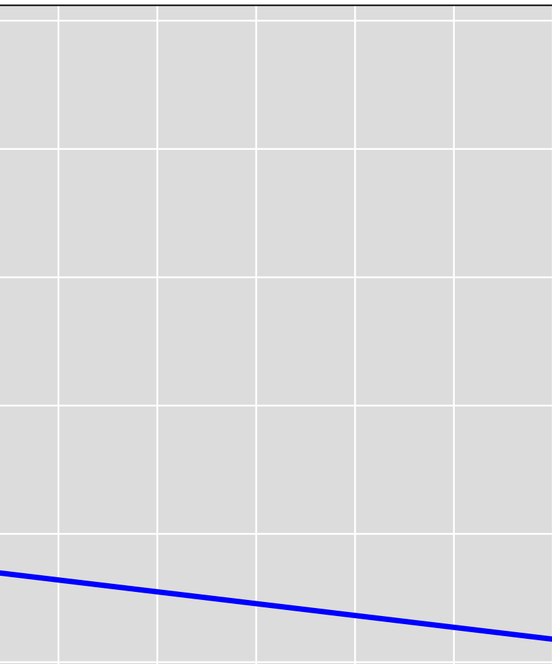
Harris - 6523324 & 6523320 & 6523321 & 6523323 & 6523326 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6523324
Gulf Simulated - 6523324

Harris - 6523602 - Layer 2



Groundwater Level Elevation (ft)

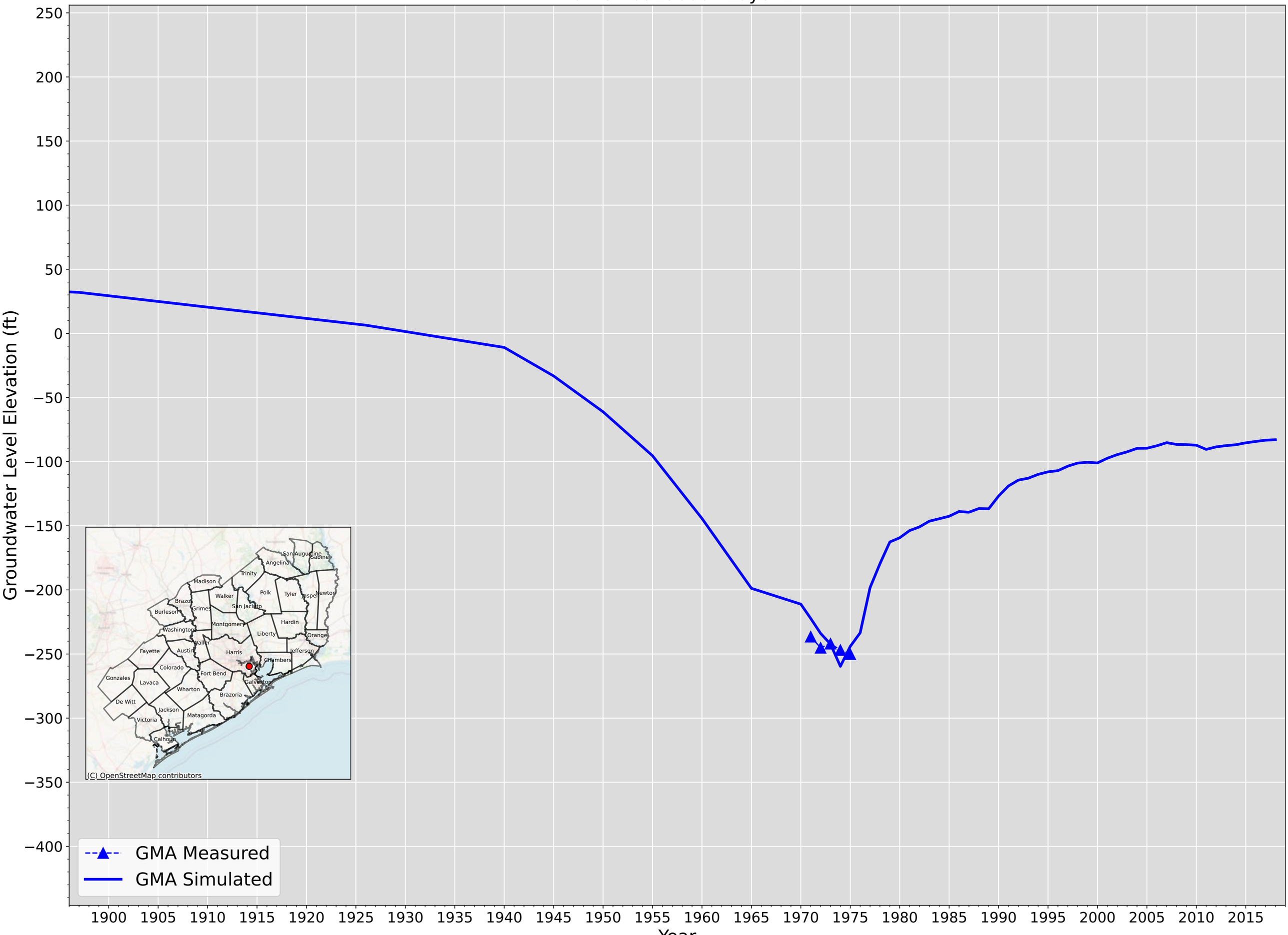
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523606 - Layer 2



Harris - 6523704 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

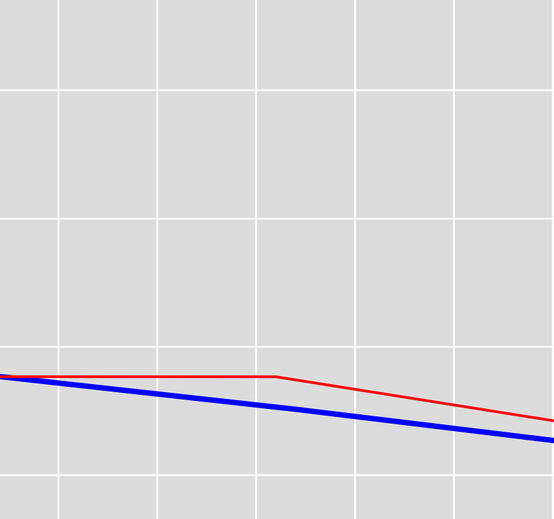
Harris - 6523708 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6523708
Gulf Simulated - 6523708

Harris - 6523709 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523710 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523727 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523801 & 6523806 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523805 - Layer 2

Groundwater Level Elevation (ft)

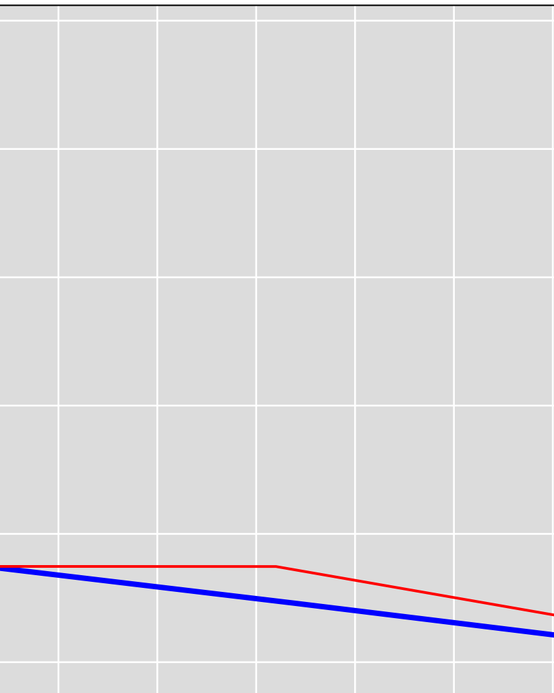
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523809 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6523809
Gulf Simulated - 6523809

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6524104 & 6524105 & 6524115 & 6524122 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

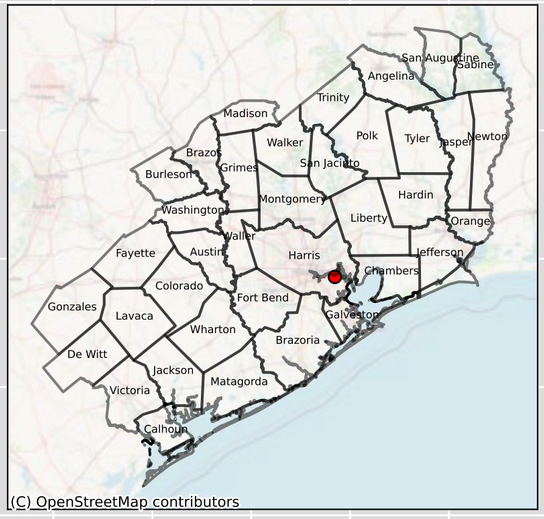
Harris - 6524114 & 6524107 & 6524112 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6524114
Gulf Simulated - 6524114

Harris - 6524201 & 6524211 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524202 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524202
Gulf Simulated - 6524202

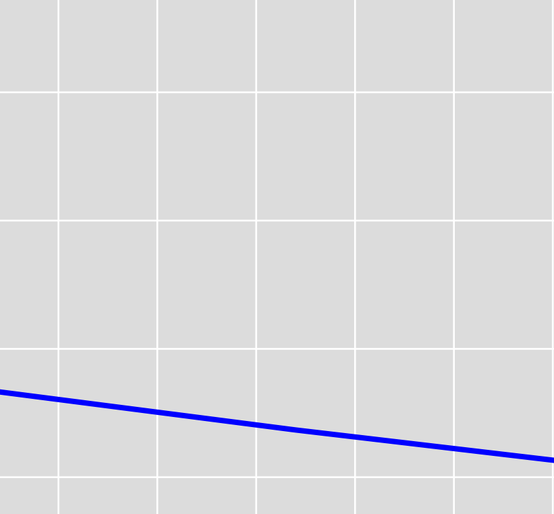
Harris - 6524209 & 6524210 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6524215 & 6524216 & 6524217 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6524401 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524401
Gulf Simulated - 6524401

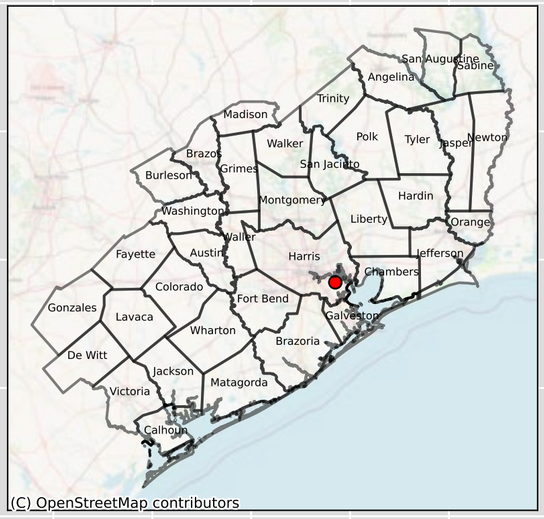
Harris - 6524404 & 6524412 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6524404
Gulf Simulated - 6524404

Harris - 6524501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524605 - Layer 2

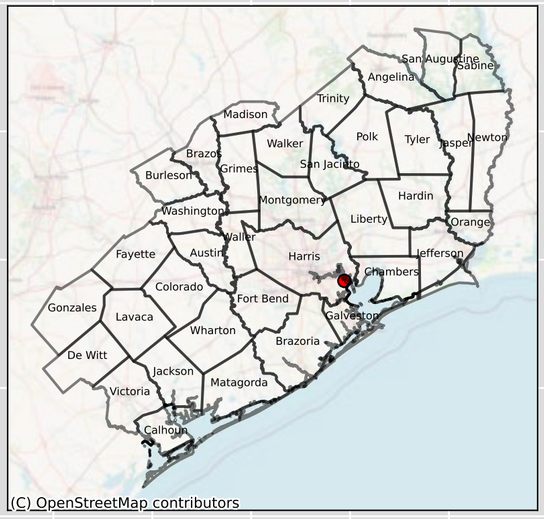
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



Harris - 6524606 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524606
Gulf Simulated - 6524606

Harris - 6524708 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524804 & 6532204 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524804
Gulf Simulated - 6524804

Harris - 6524805 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524806 & 6524807 & 6524809 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6524811 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524811
Gulf Simulated - 6524811

Harris - 6524902 - Layer 2

Groundwater Level Elevation (ft)

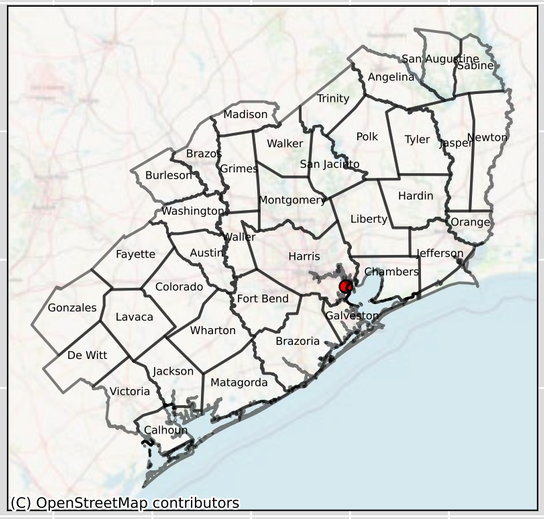
Year

GMA Measured
GMA Simulated
Gulf Measured - 6524902
Gulf Simulated - 6524902

Harris - 6524914 - Layer 2

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Harris - 6524920 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6524920
Gulf Simulated - 6524920

Harris - 6529204 - Layer 2

Groundwater Level Elevation (ft)

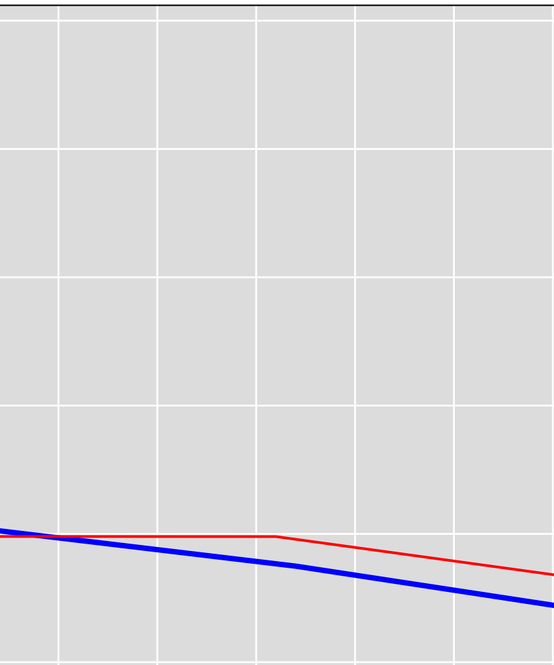
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6529301 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6529301
Gulf Simulated - 6529301

Harris - 6530301 & 6530303 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6530304 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6530304
Gulf Simulated - 6530304

Harris - 6531102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

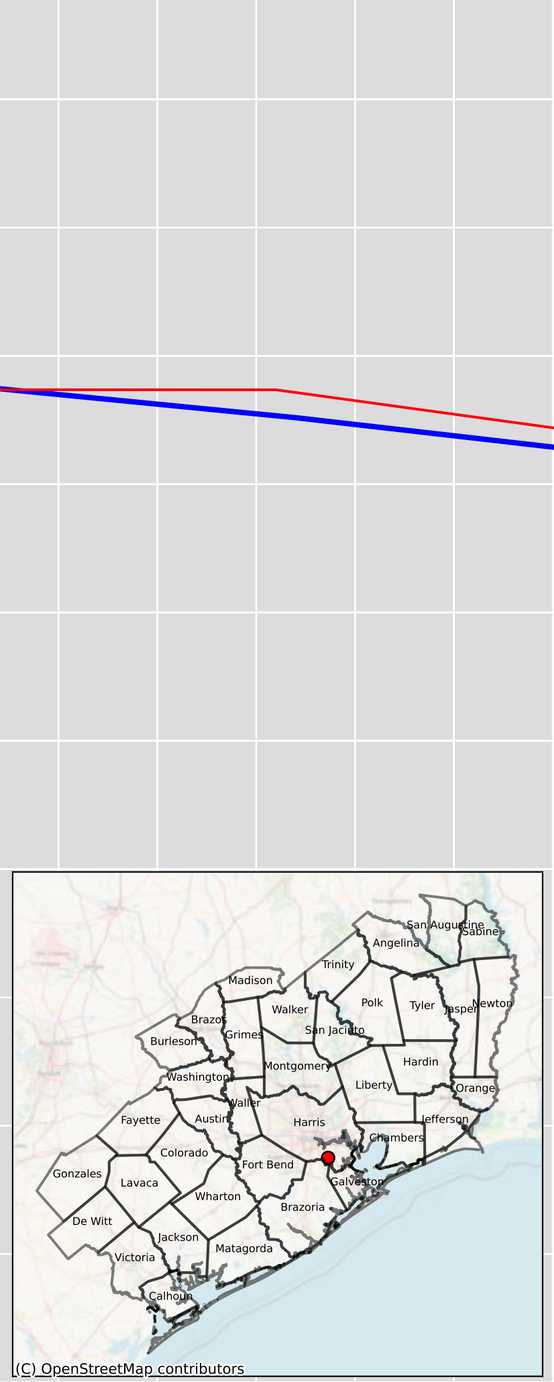
Harris - 6531108 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

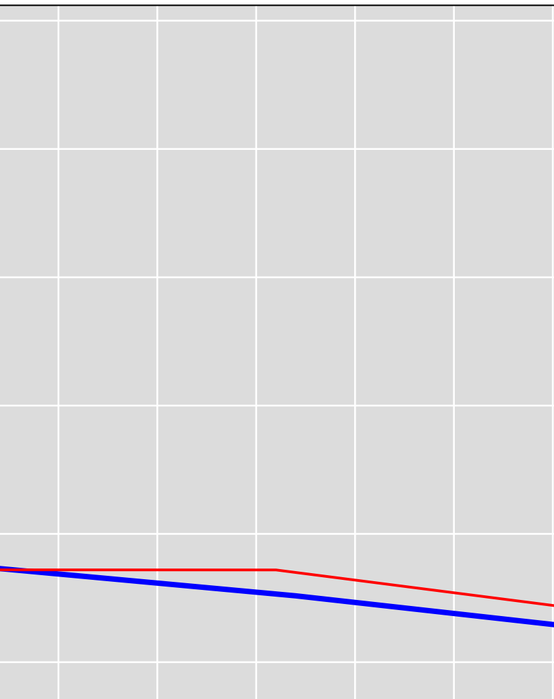
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6531108
Gulf Simulated - 6531108

Harris - 6531109 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6531109
Gulf Simulated - 6531109

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6531202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6531202
Gulf Simulated - 6531202

Harris - 6531207 & 6531206 - Layer 2

Groundwater Level Elevation (ft)

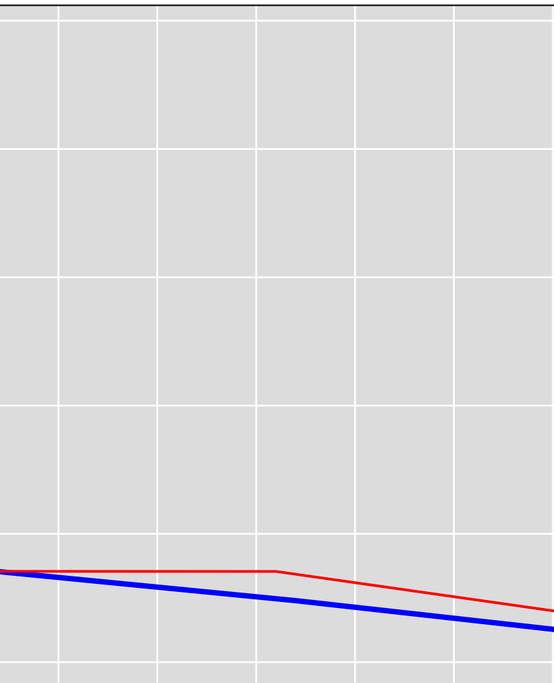
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6531207
Gulf Simulated - 6531207

Harris - 6531211 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6531211
Gulf Simulated - 6531211

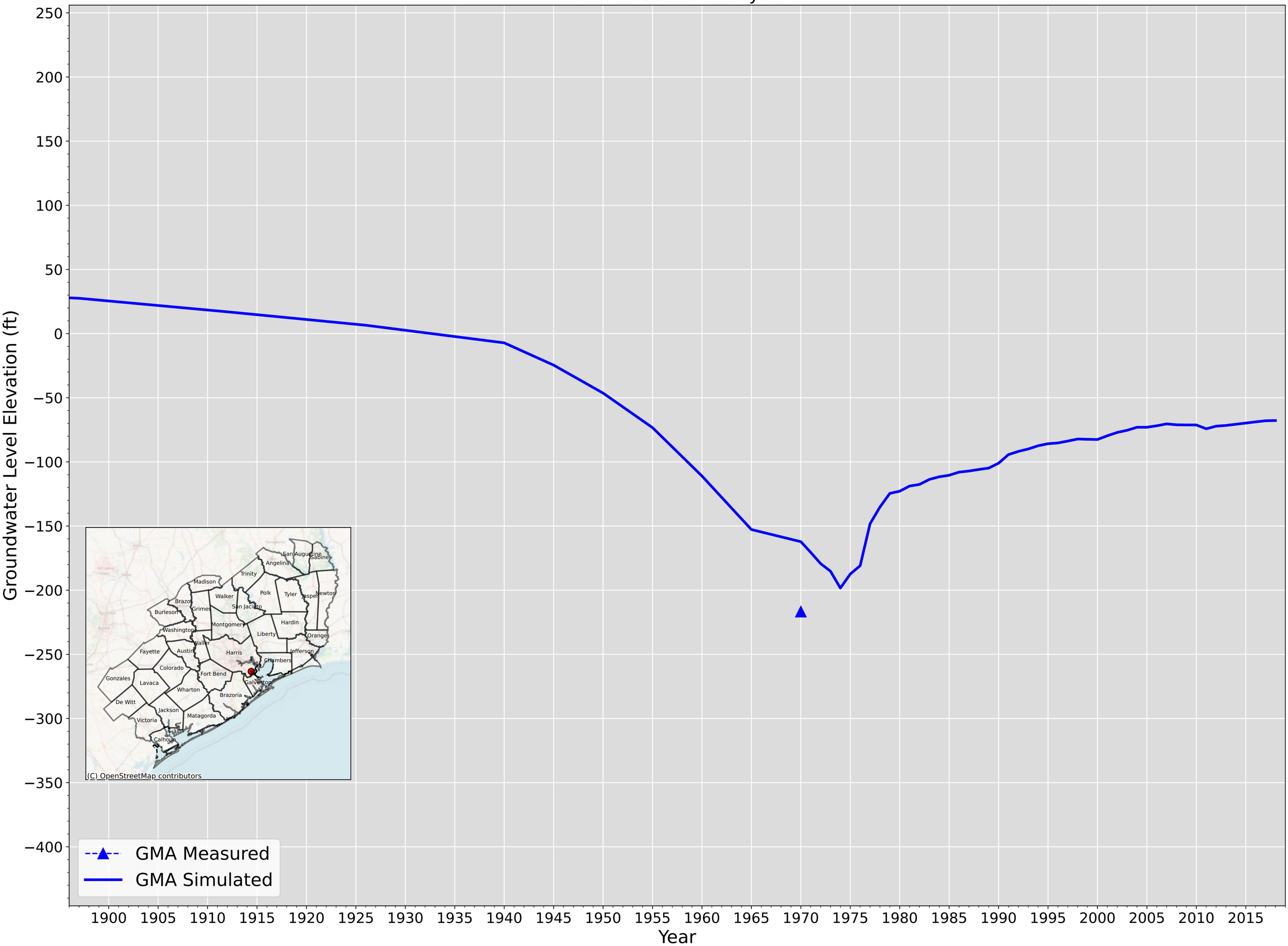
Harris - 6531605 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6531605
Gulf Simulated - 6531605

Harris - 6532101 - Layer 2



Harris - 6532102 & 6532103 - Layer 2

Groundwater Level Elevation (ft)

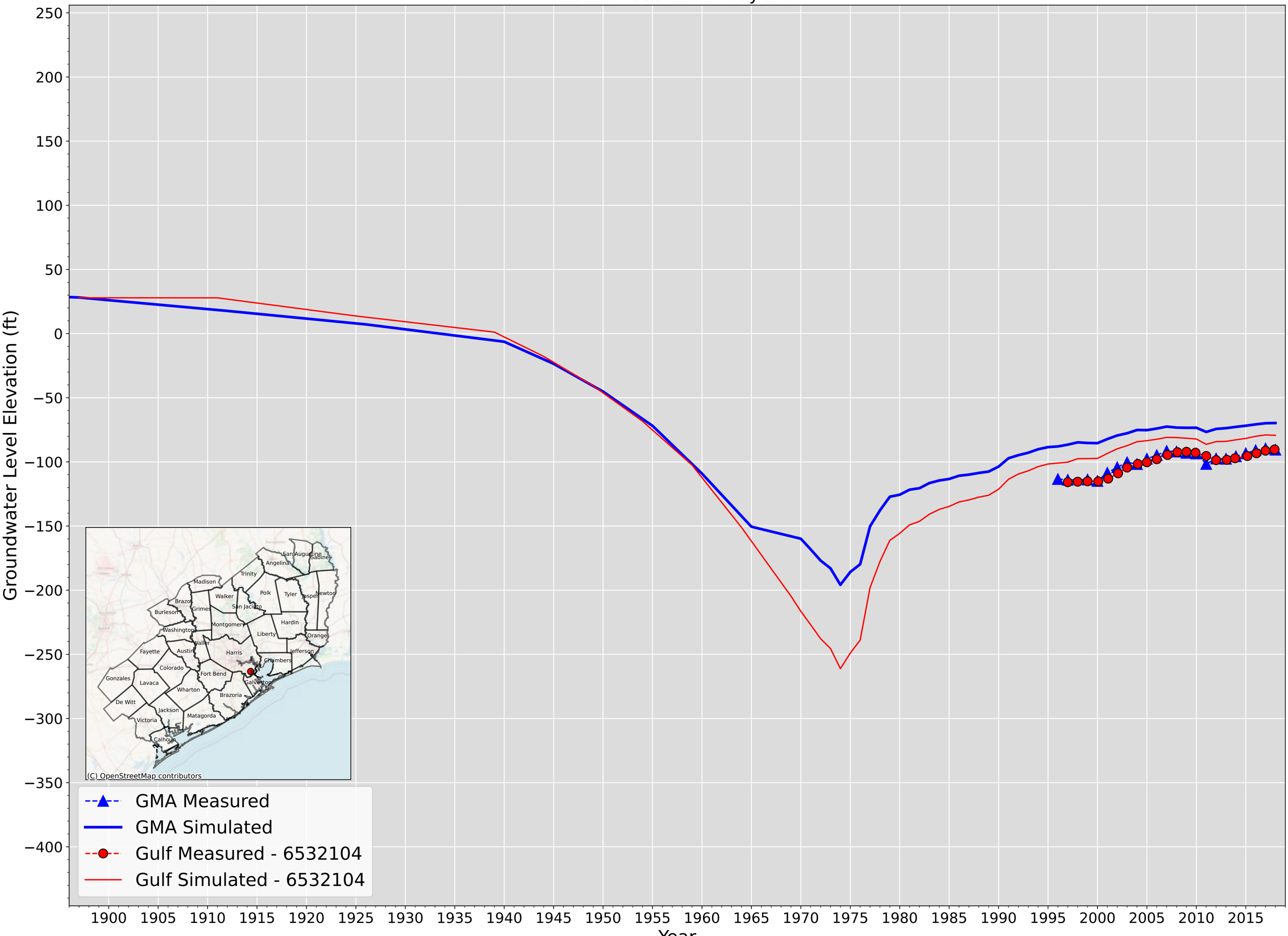
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532104 - Layer 2



Harris - 6532201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532202 - Layer 2

Groundwater Level Elevation (ft)

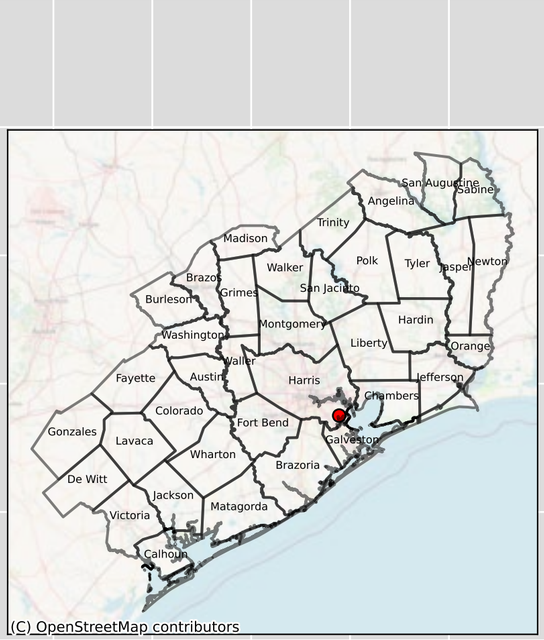
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532203 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6532203
Gulf Simulated - 6532203

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6532205 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532207 & 6532206 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6532207
Gulf Simulated - 6532207

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6532305 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532401 & 6532407 & 6532412 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

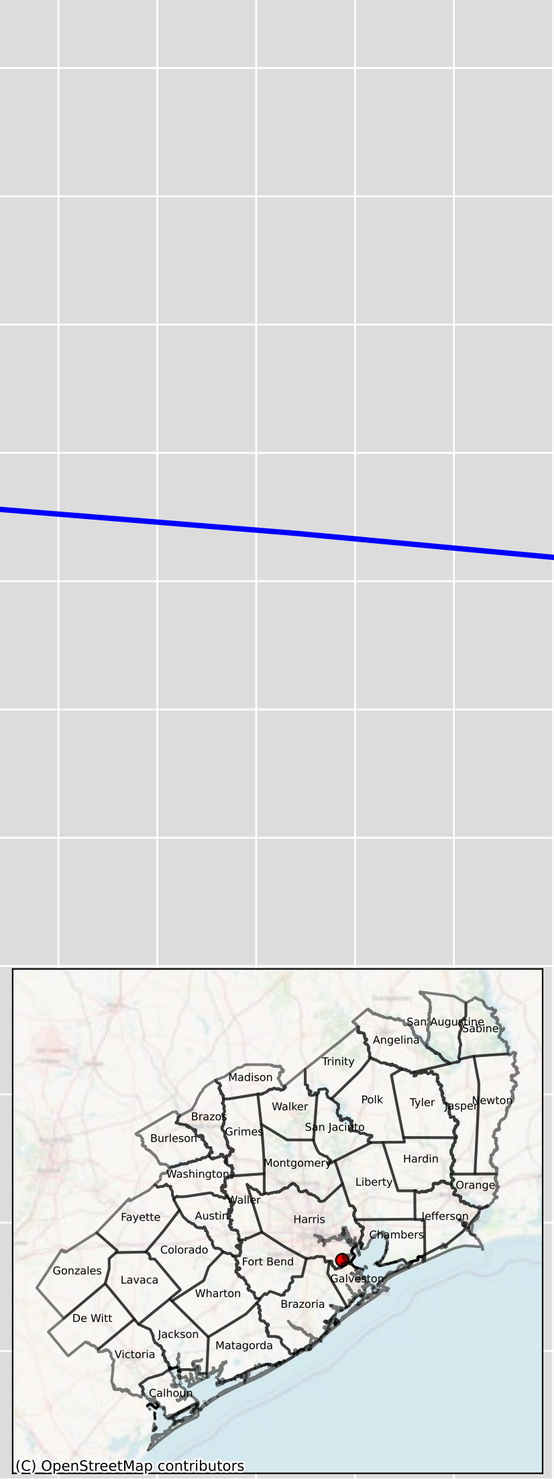
Year

GMA Measured
GMA Simulated
Gulf Measured - 6532401
Gulf Simulated - 6532401

Harris - 6532404 & 6532429 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6532405 & 6532415 - Layer 2

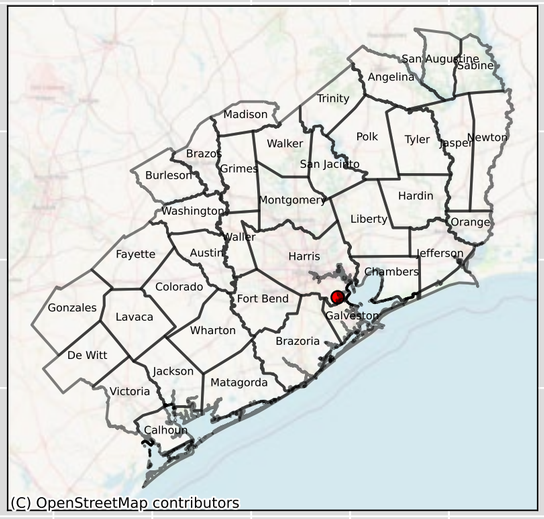
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



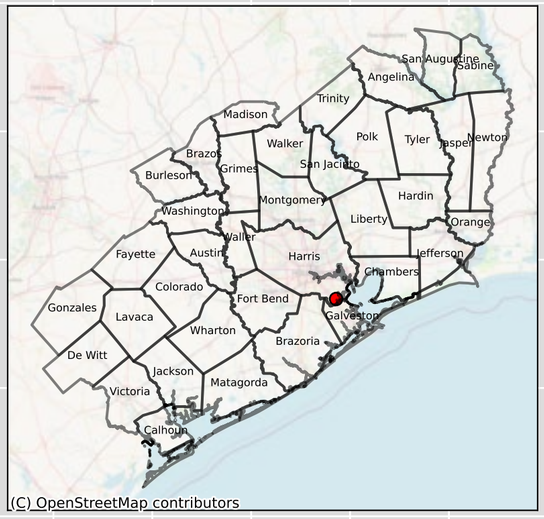
Harris - 6532406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6532410 & 6532425 & 6532426 & 6532427 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532418 & 6532430 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6532419 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6532422 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

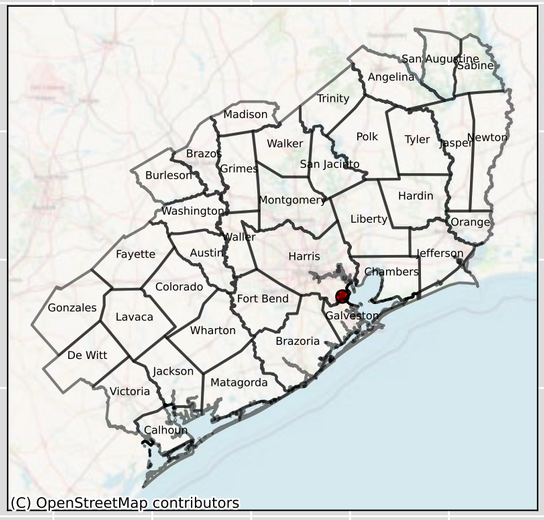
Harris - 6532502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6532519 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6532519
Gulf Simulated - 6532519

Harris - 6532602 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6532621 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6532630 & 6532601 & 6532625 & 6532626 & 6532627 & 6532628 & 6532629 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6532630
Gulf Simulated - 6532630

Harris - 6532701 & 6532739 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6532703 & 6532702 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6532703
Gulf Simulated - 6532703

Harris - 6532711 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6651507 & 6651508 - Layer 2

Groundwater Level Elevation (ft)

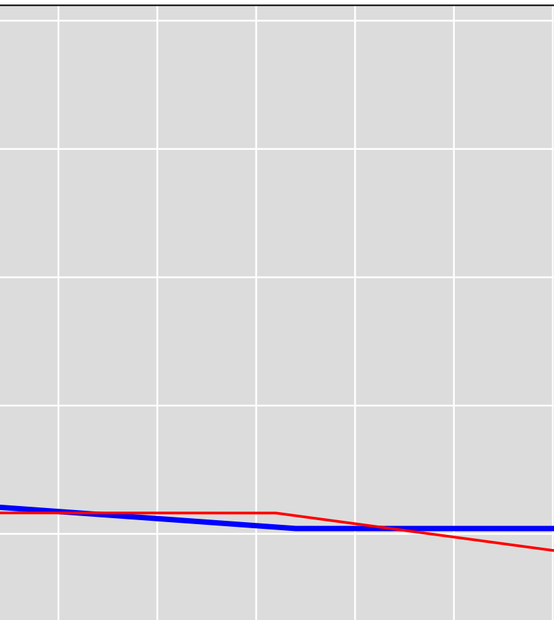
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6659901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6659901
Gulf Simulated - 6659901

Jackson - 6660205 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6660303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6660304 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6660401 - Layer 2

Groundwater Level Elevation (ft)

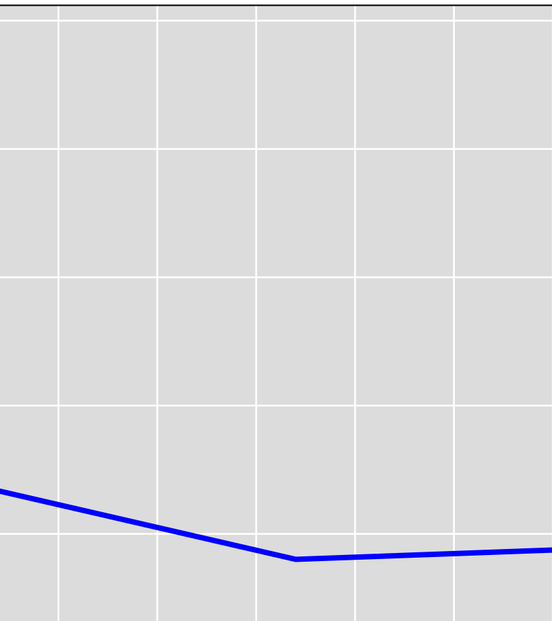
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6660501 - Layer 2



Groundwater Level Elevation (ft)

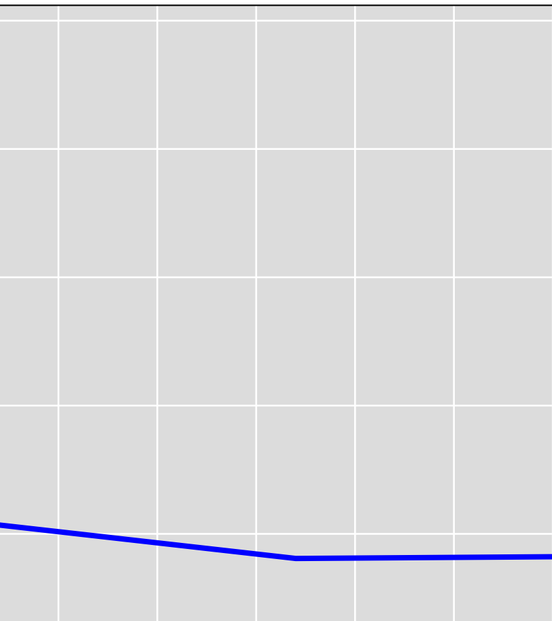
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6660704 - Layer 2



Jackson - 6660905 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

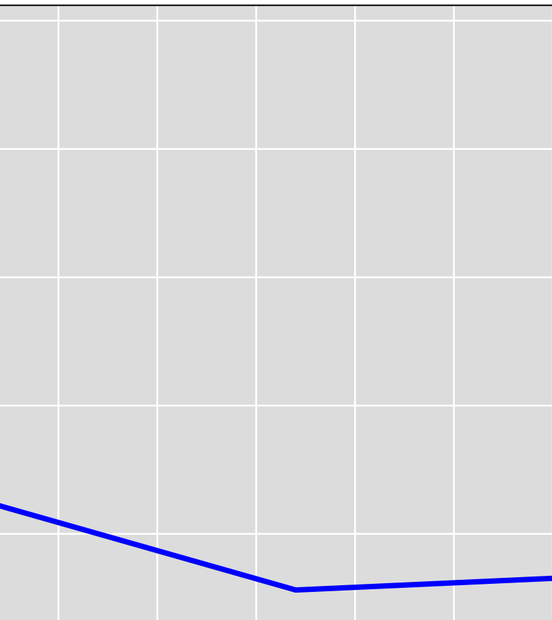
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 6661403 & 6661407 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6661803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

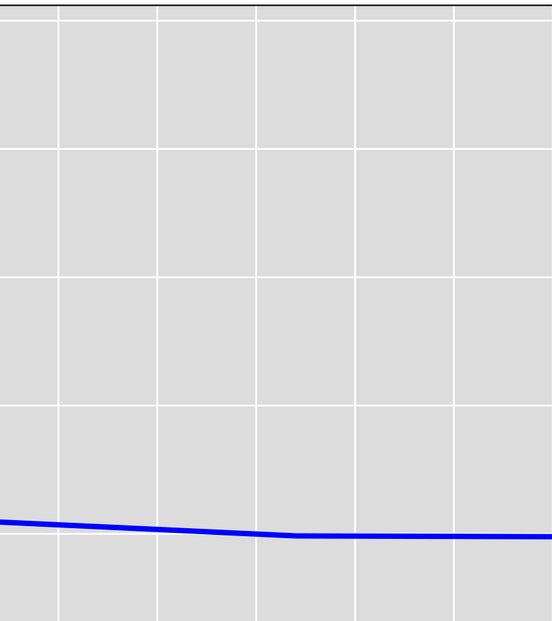
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8003201 - Layer 2



Level Elevation (ft)

Groundwater Le

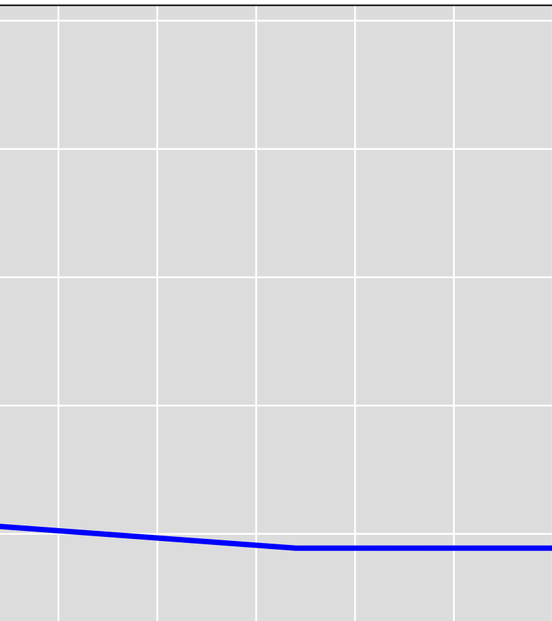
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 8003302 - Layer 2



Groundwater Level Elevation (ft)

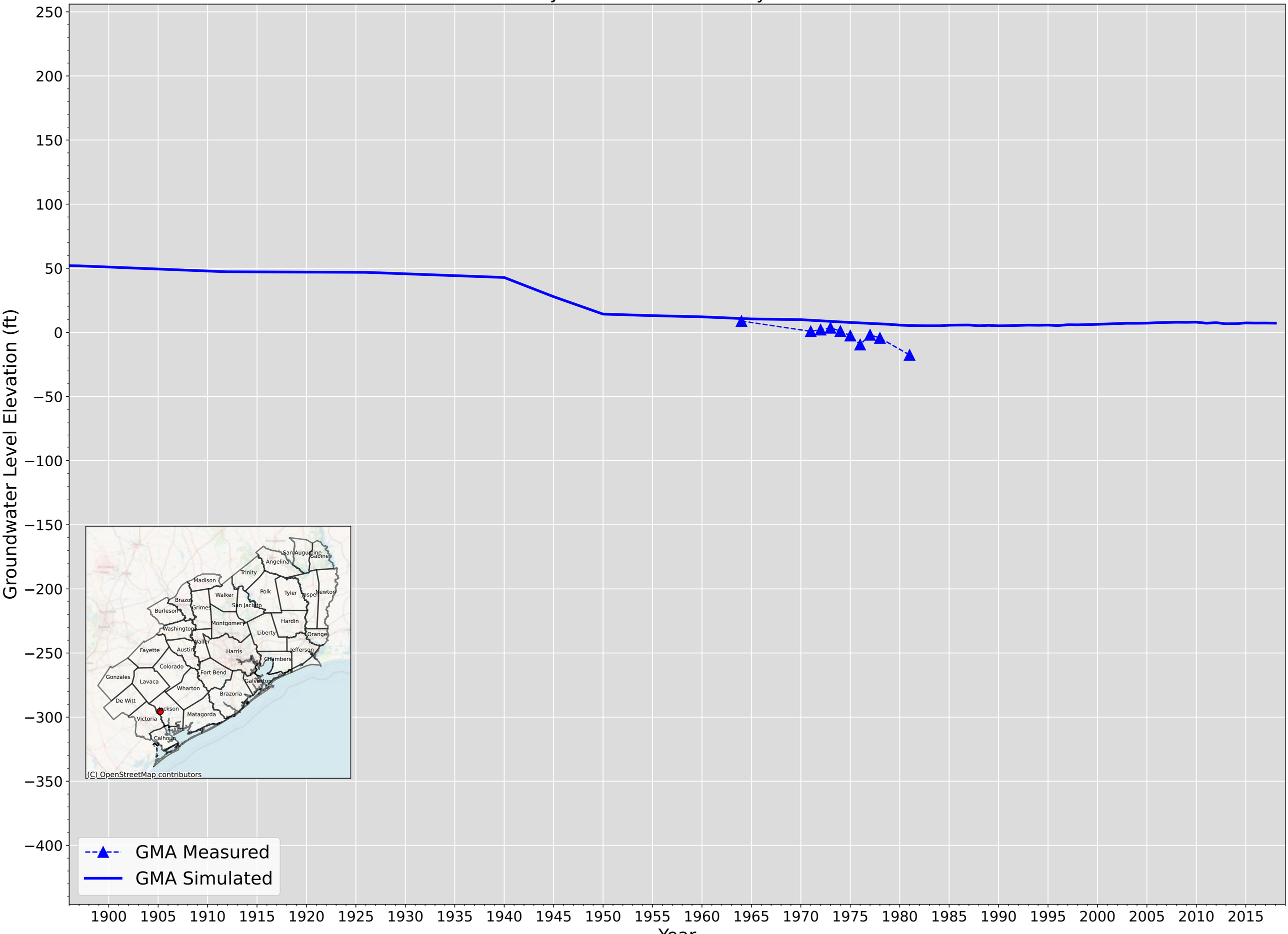
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8003403 - Layer 2



Jackson - 8004101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8004403 - Layer 2

Groundwater Level Elevation (ft)

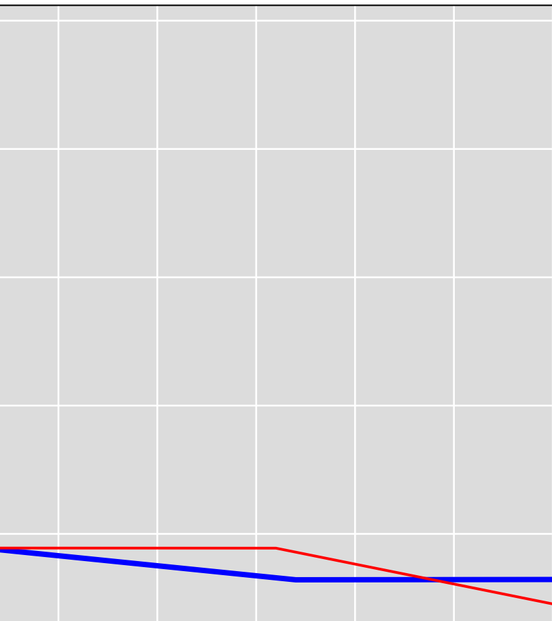
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8004403
Gulf Simulated - 8004403

Jackson - 8004504 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8004504
Gulf Simulated - 8004504

Jackson - 8004601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

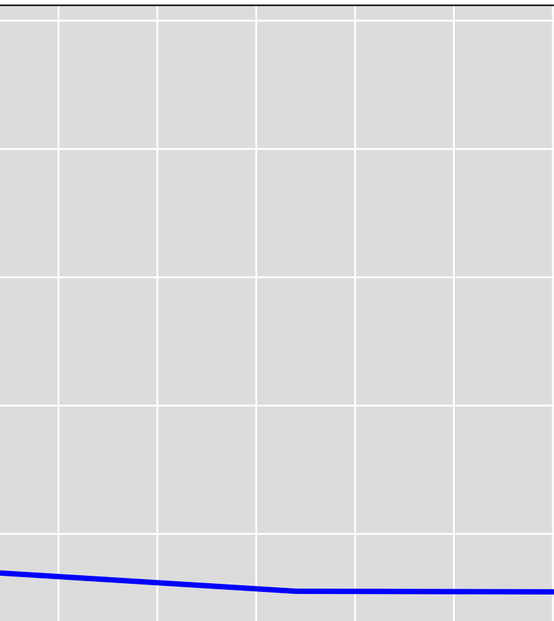
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8004701 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8004801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

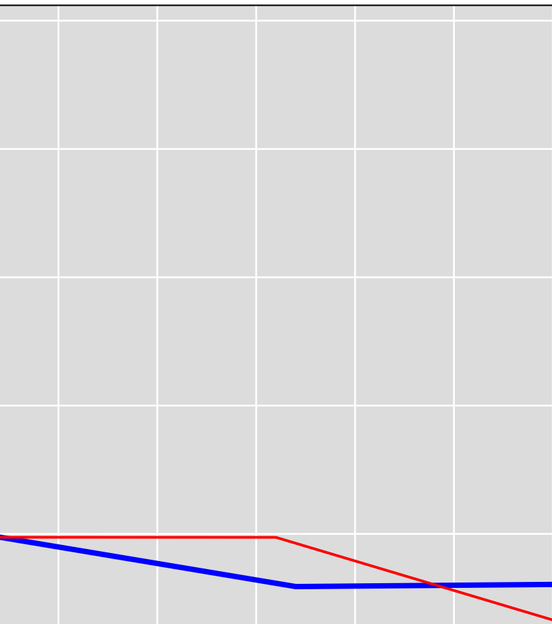
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8005102 - Layer 2



Level Elevation (ft)

Groundwater

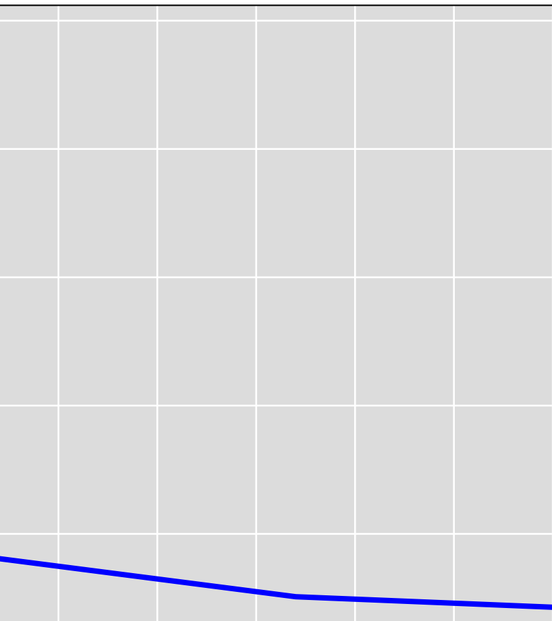
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8005102
Gulf Simulated - 8005102

Jackson - 8005501 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8005502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8005701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

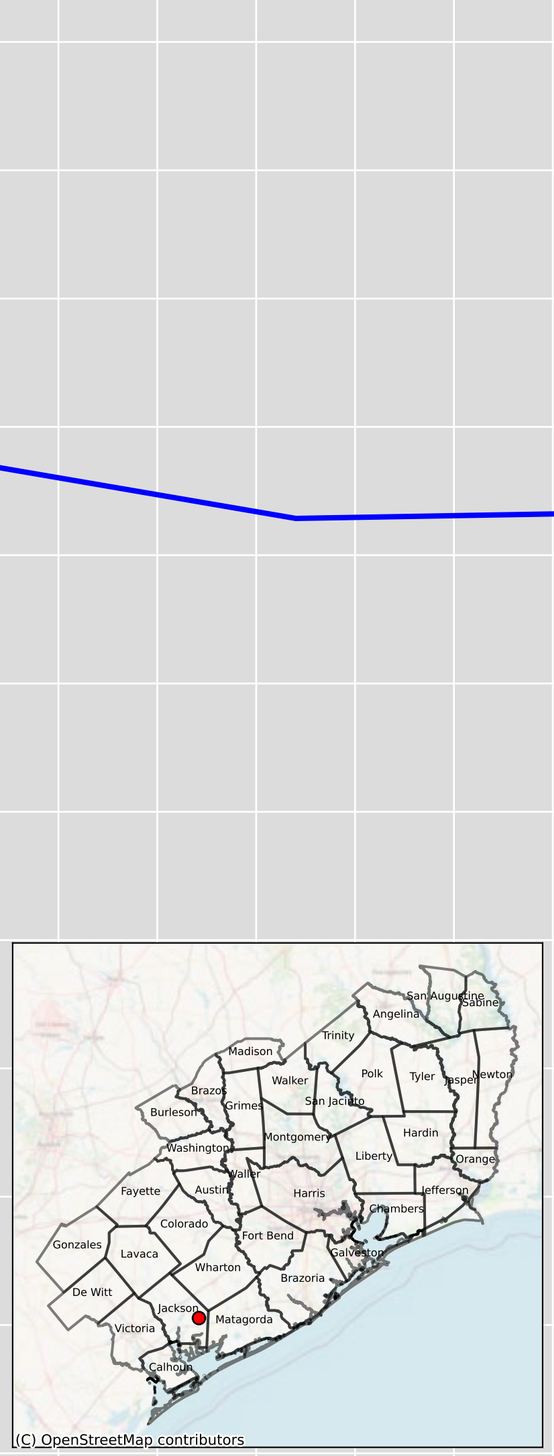
Jackson - 8005901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Jackson - 8005902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

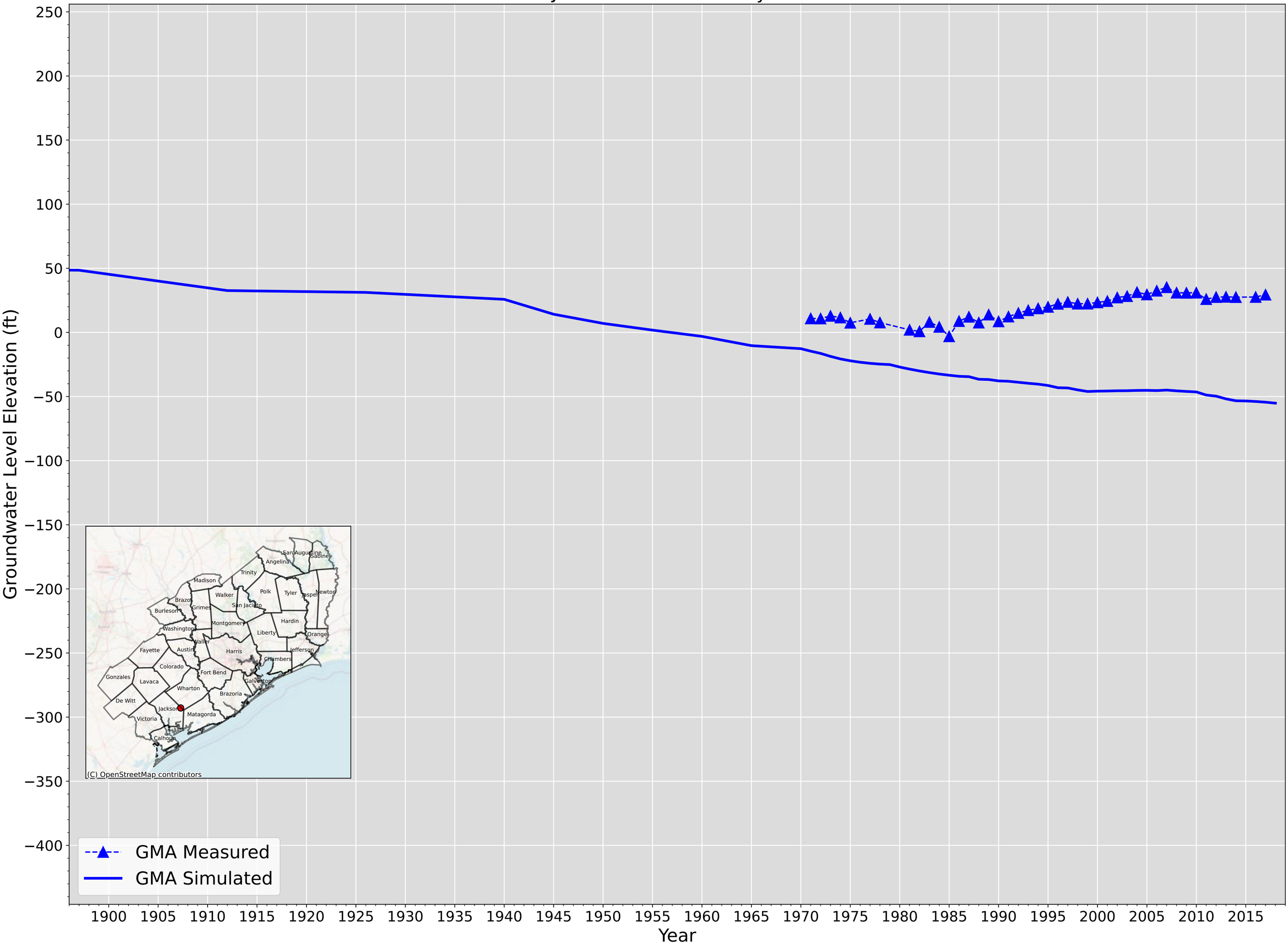
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8006101 - Layer 2



Jackson - 8006703 - Layer 2

Groundwater Level Elevation (ft)

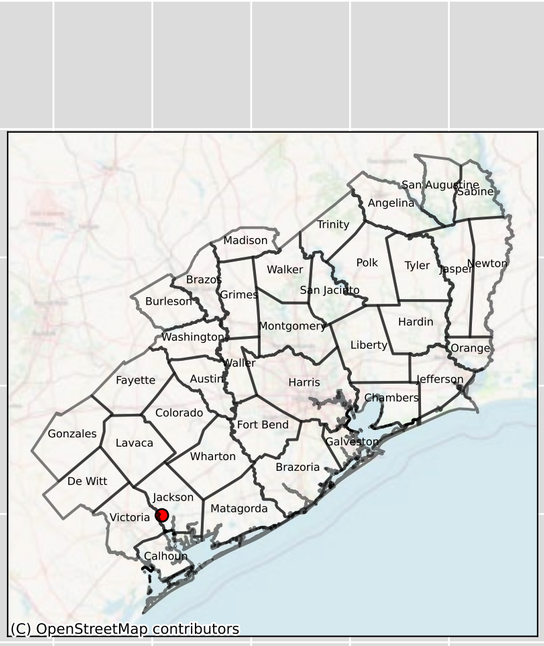
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

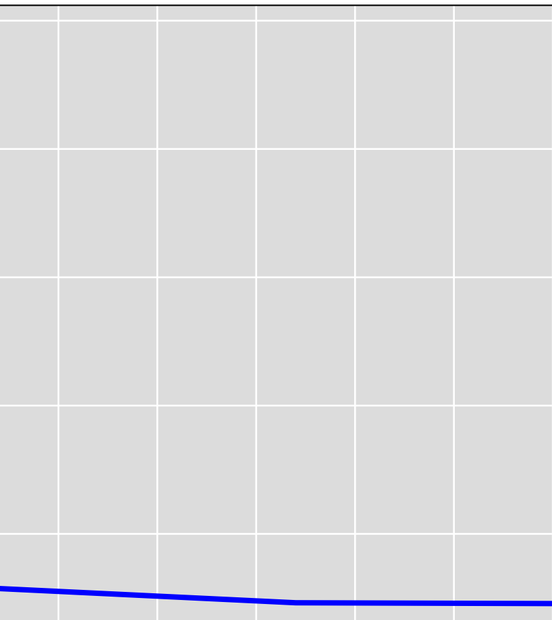
Year

GMA Measured
GMA Simulated

Jackson - 8011202 - Layer 2



Jackson - 8011301 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8011303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

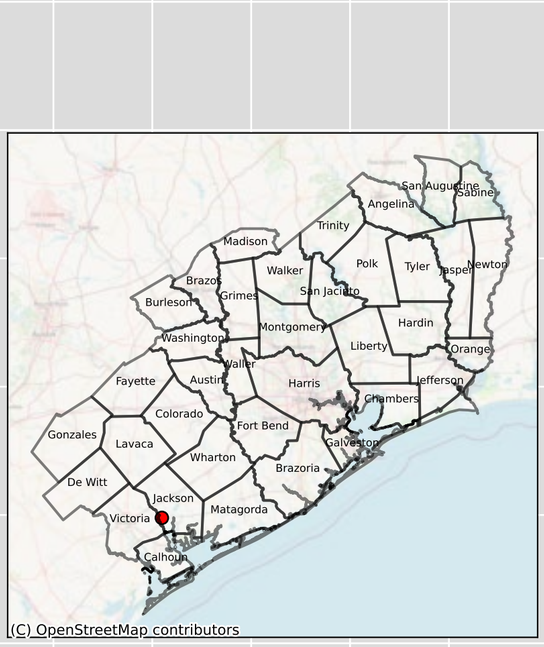
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8011501 - Layer 2



Jackson - 8011502 - Layer 2

Groundwater Level Elevation (ft)

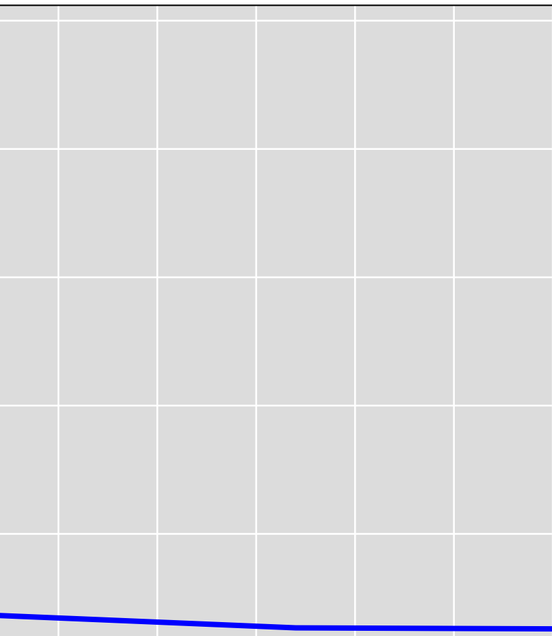
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8011902 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8012302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8012502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

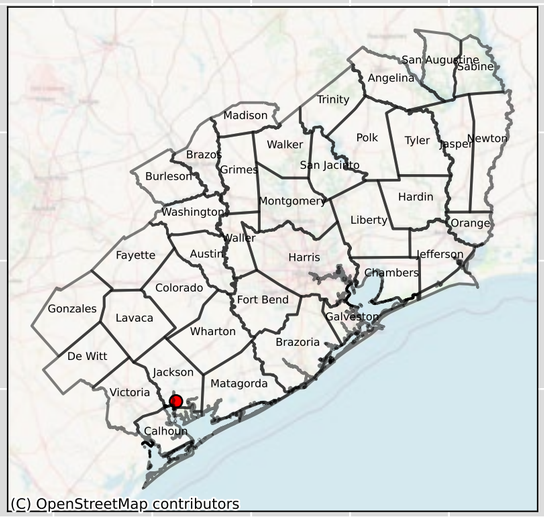
Jackson - 8012801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Jackson - 8013201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8013603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8013901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8014102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8014405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

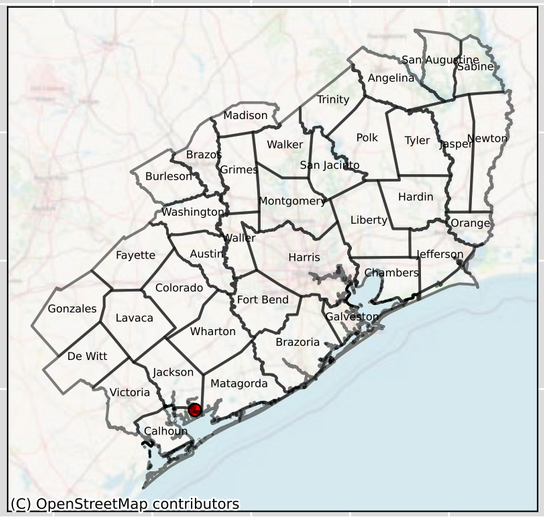
Jackson - 8021601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

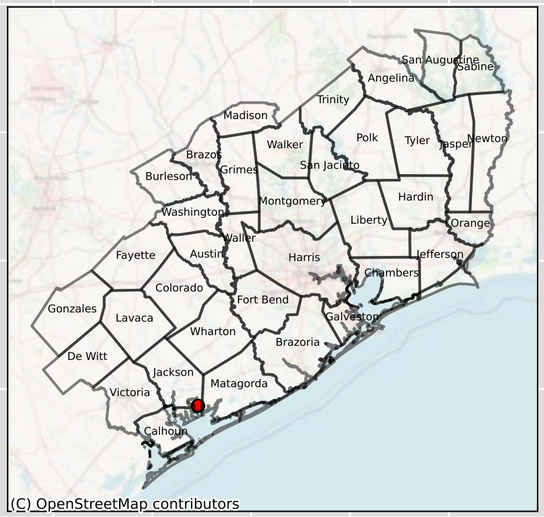
Jackson - 8022103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

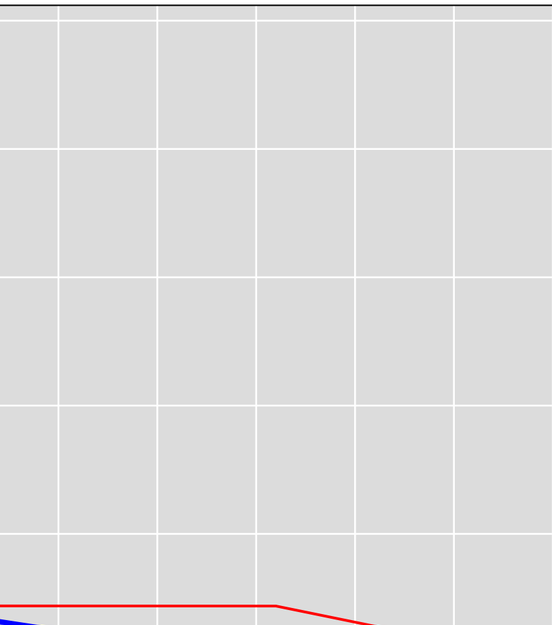
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Jackson - 8022501 - Layer 2



Level Elevation (ft)

Groundwater

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8022501
Gulf Simulated - 8022501

Jasper - 6124610 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6148209 & 6148221 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6148209
Gulf Simulated - 6148209

Jasper - 6148214 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jasper - 6148501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

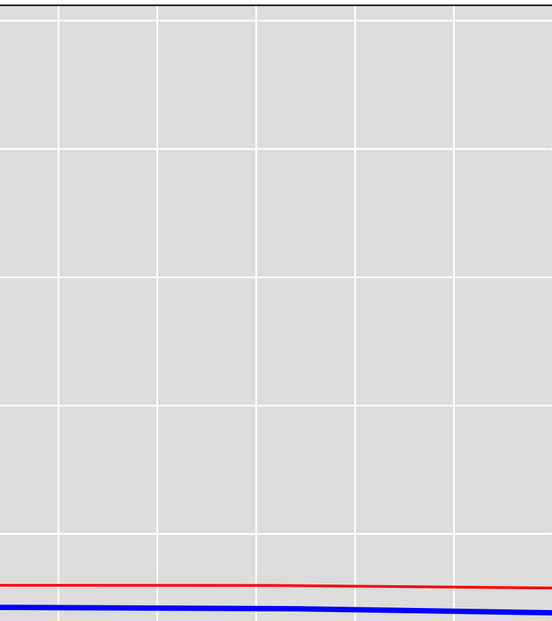
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6148701 & 6148702 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Groundwater Level

GMA Measured
GMA Simulated
Gulf Measured - 6148701
Gulf Simulated - 6148701

Jasper - 6148801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6217510 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6217902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6217902
Gulf Simulated - 6217902

Jasper - 6225405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jasper - 6233202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jasper - 6233211 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6233401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

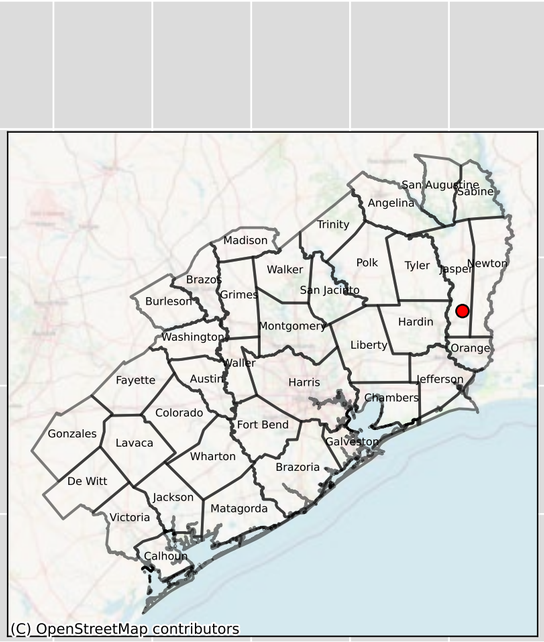
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jasper - 6233409 - Layer 2



Jasper - 6241401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

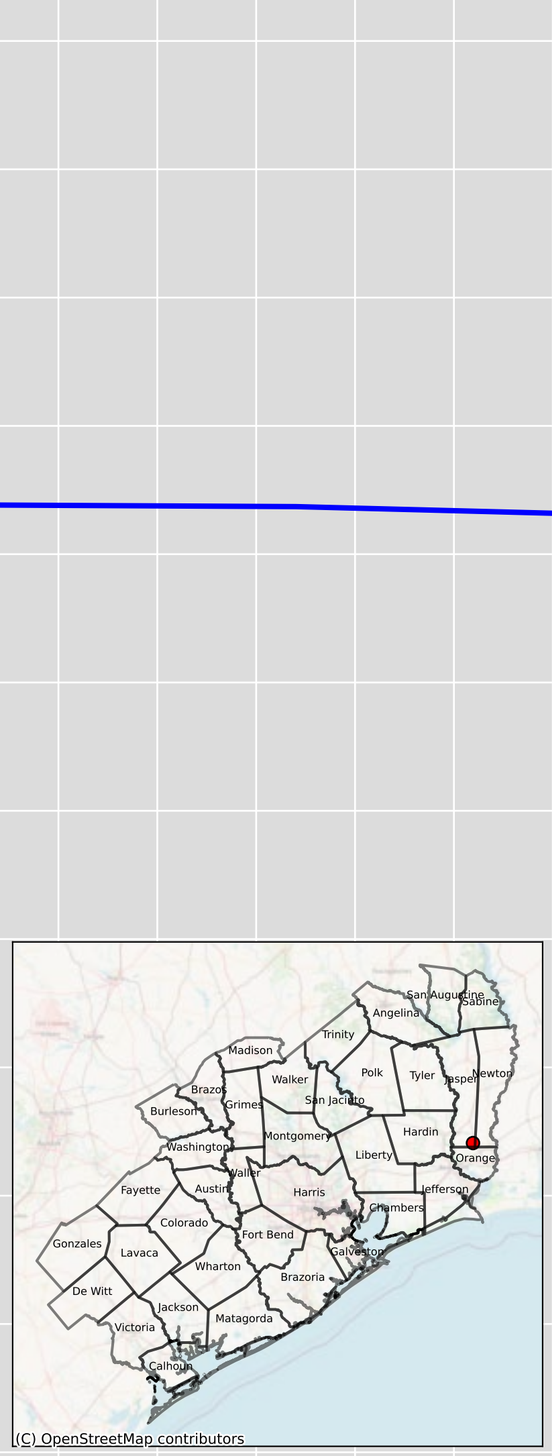
Year

GMA Measured
GMA Simulated

Jasper - 6241801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jefferson - 6154902 & 6154904 & 6154905 - Layer 2

Groundwater Level Elevation (ft)

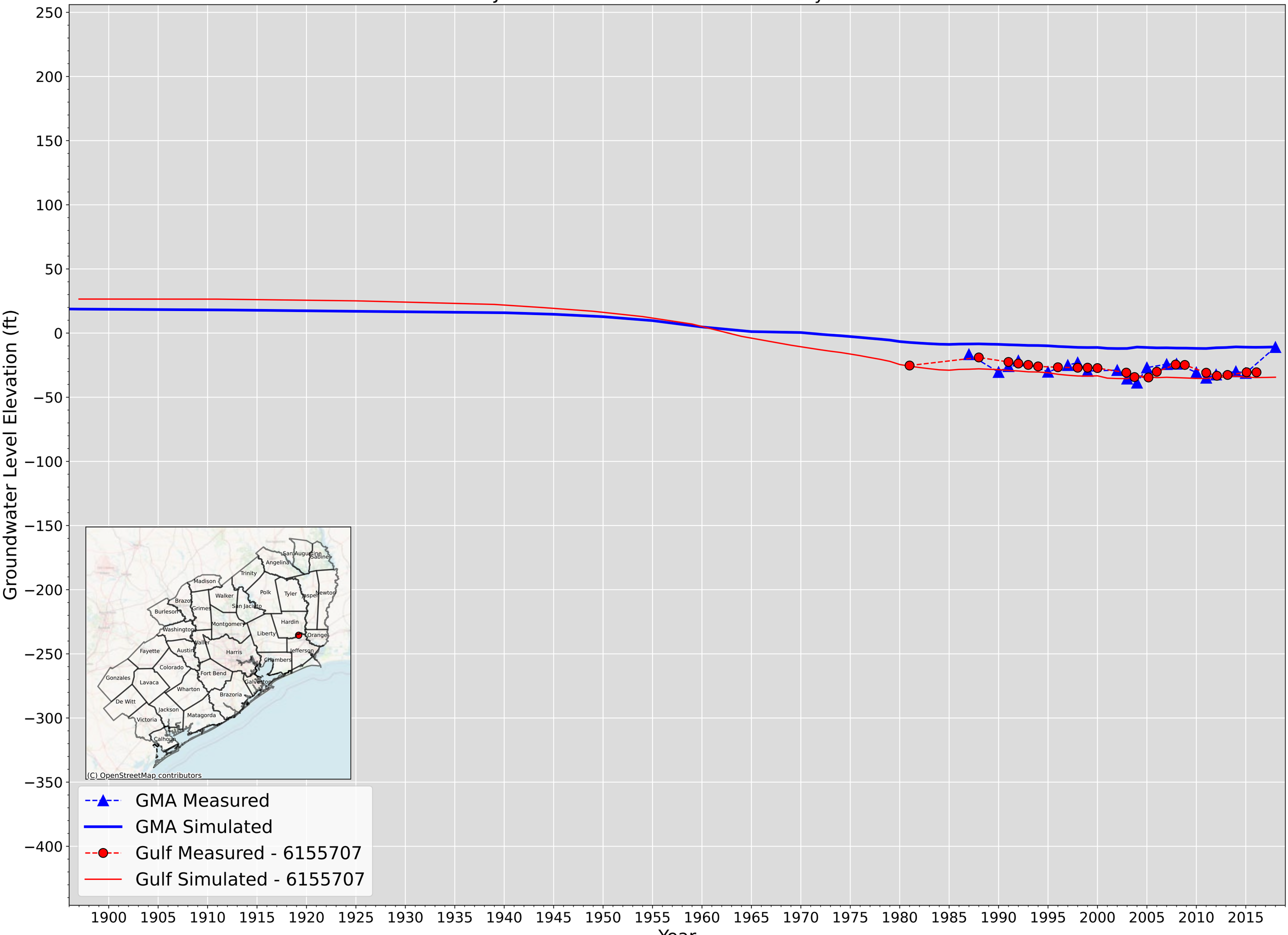
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6154902
Gulf Simulated - 6154902

Jefferson - 6155707 & 6155708 - Layer 2



Jefferson - 6161907 - Layer 2

Groundwater Level Elevation (ft)

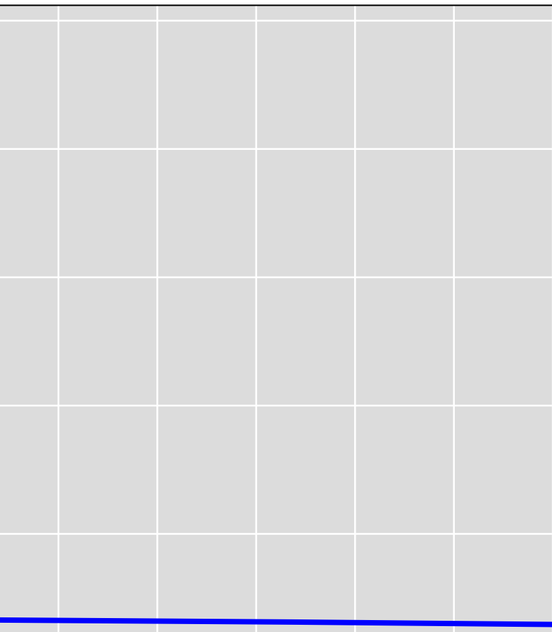
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6162415 - Layer 2



Groundwater Level Elevation (ft)

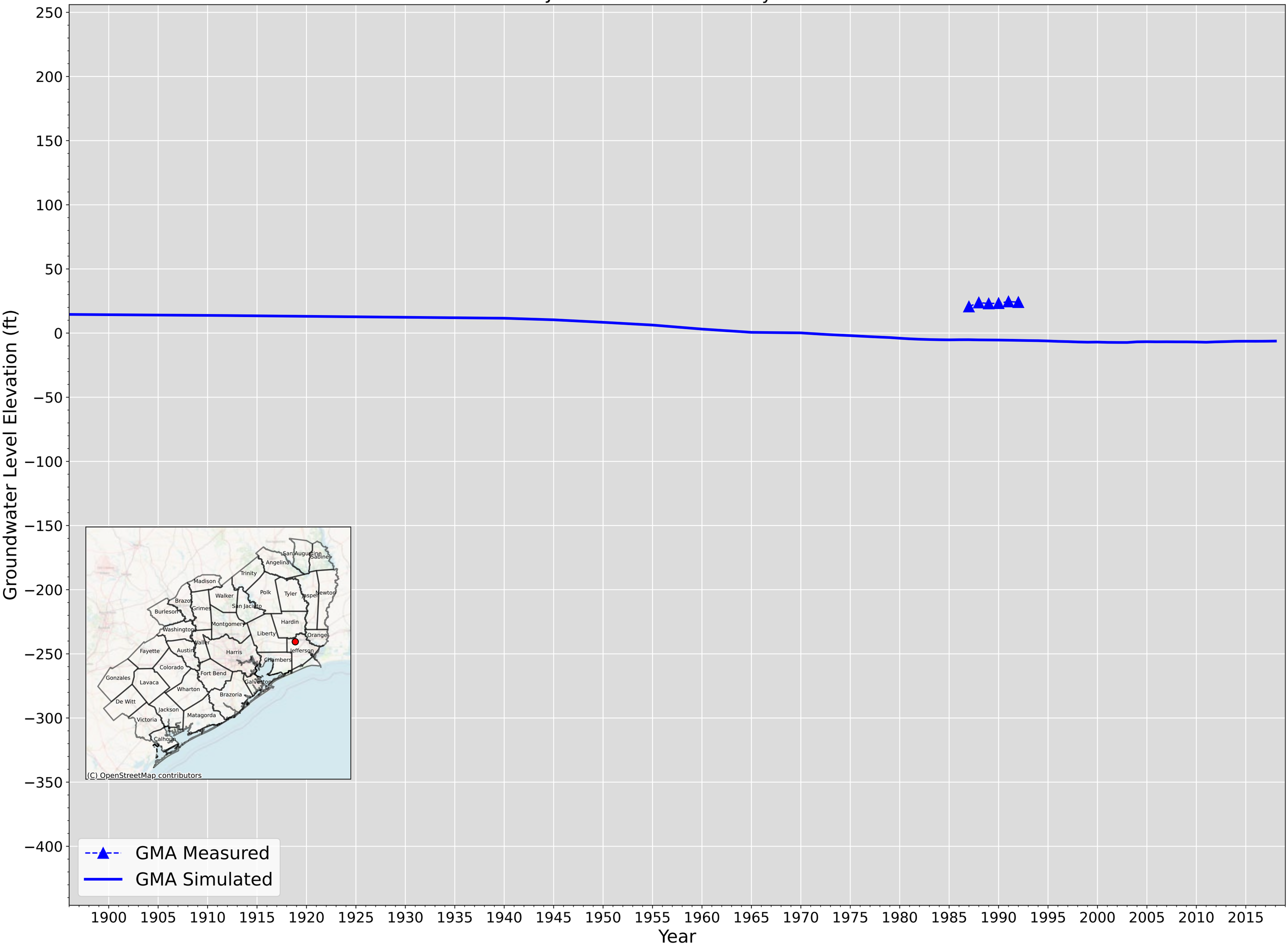
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6162508 - Layer 2



Jefferson - 6163904 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6164404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

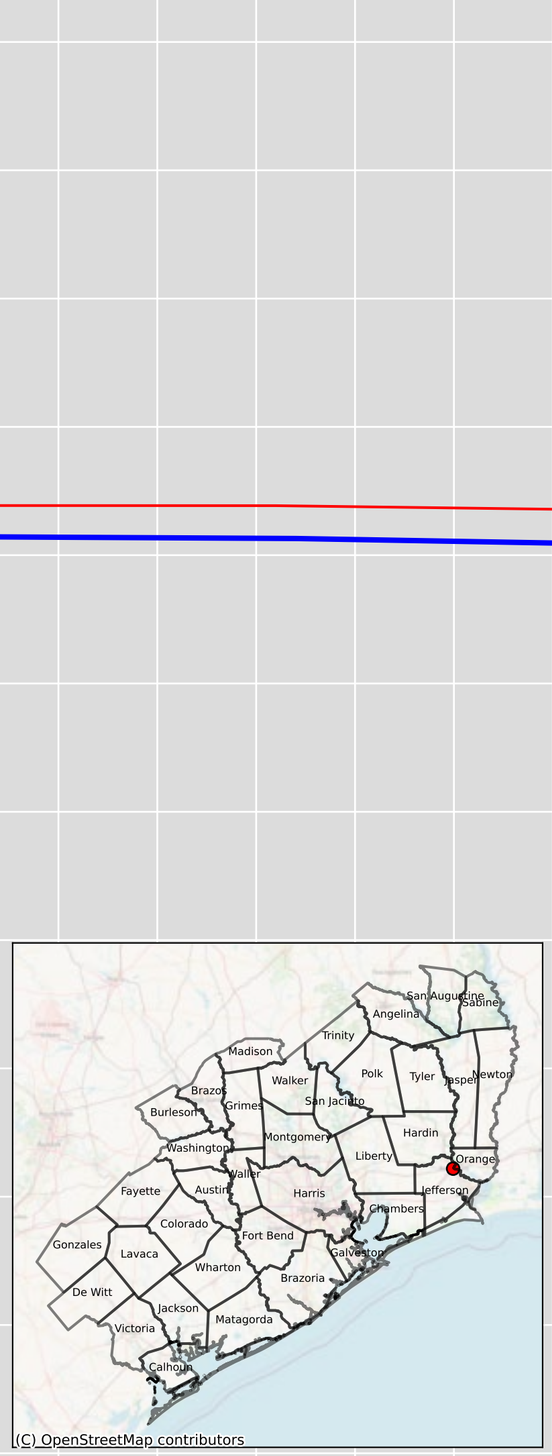
Jefferson - 6164405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6164405
Gulf Simulated - 6164405

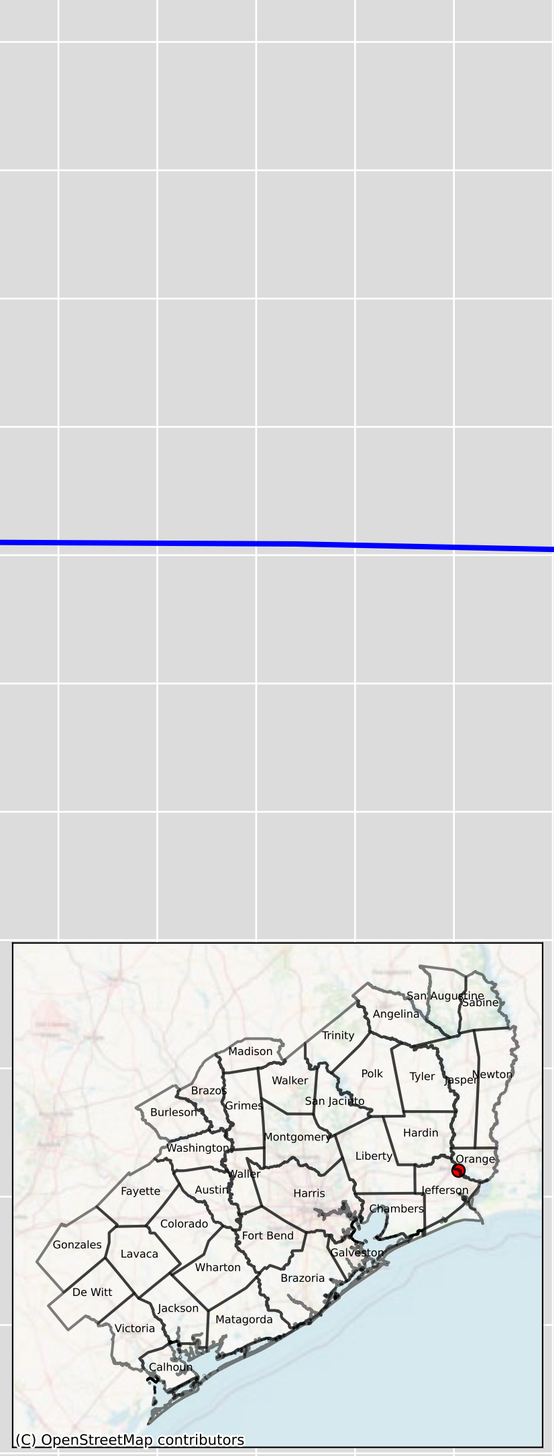
Jefferson - 6164502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Jefferson - 6164505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6164505
Gulf Simulated - 6164505

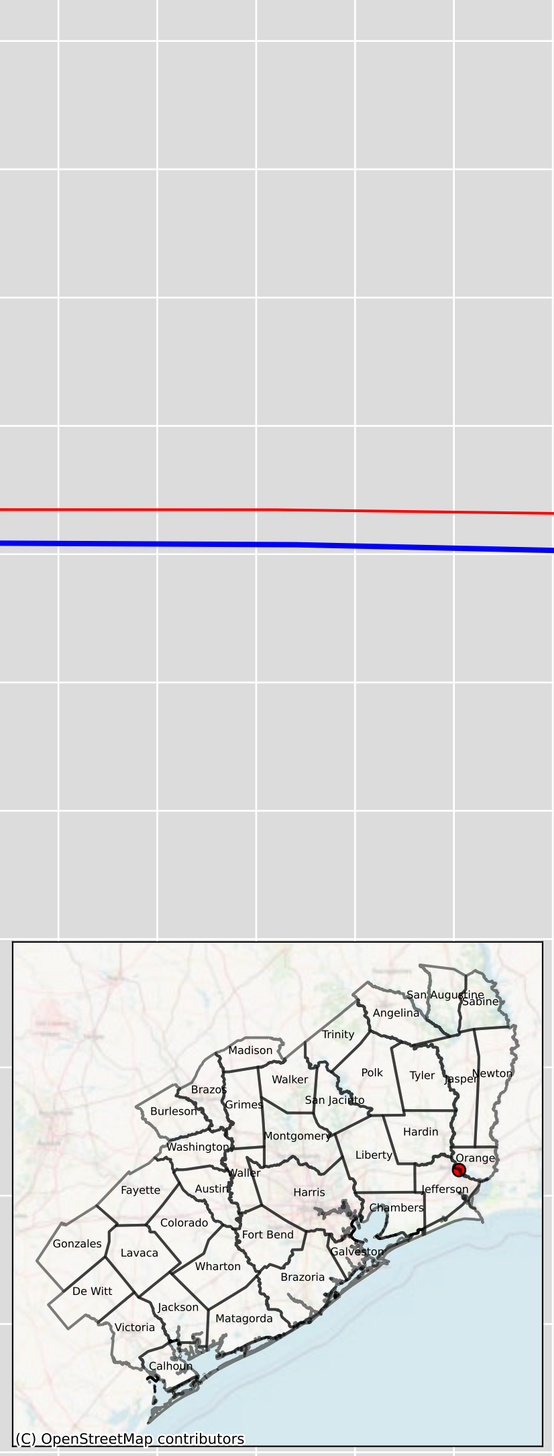
Jefferson - 6164509 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6164509
Gulf Simulated - 6164509

Jefferson - 6164806 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jefferson - 6164901 & 6164902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6301201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6318101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

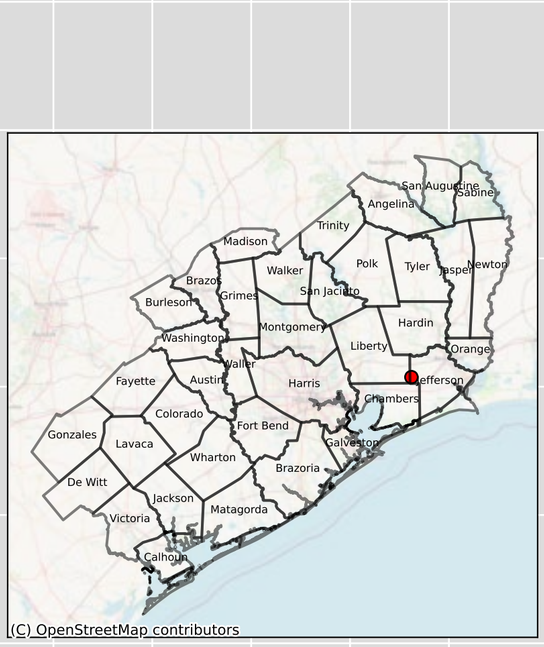
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jefferson - 6405502 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6406401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jefferson - 6408201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6408201
Gulf Simulated - 6408201

Jefferson - 6414105 & 6414407 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jefferson - 6414208 & 6414209 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jefferson - 6414406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6657203 - Layer 2

Groundwater Level Elevation (ft)

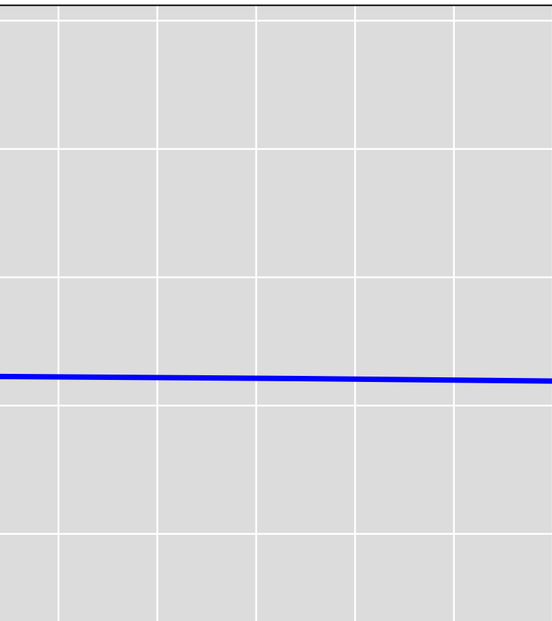
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6048302 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6048505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6048505
Gulf Simulated - 6048505

Liberty - 6056901 - Layer 2

Groundwater Level Elevation (ft)

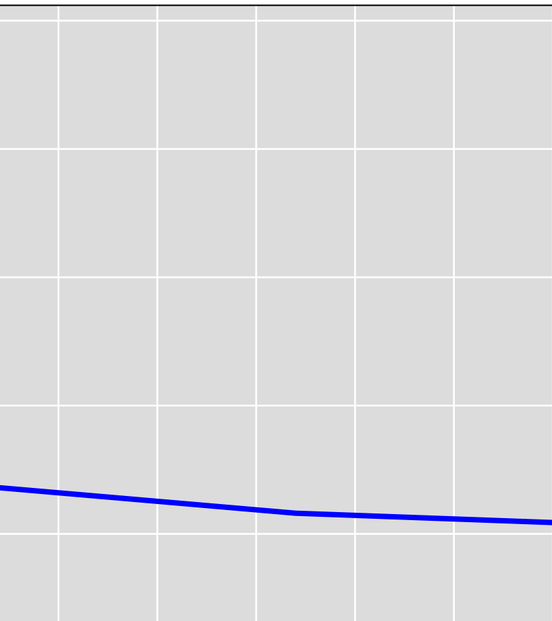
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6056902 - Layer 2



Groundwater Level Elevation (ft)

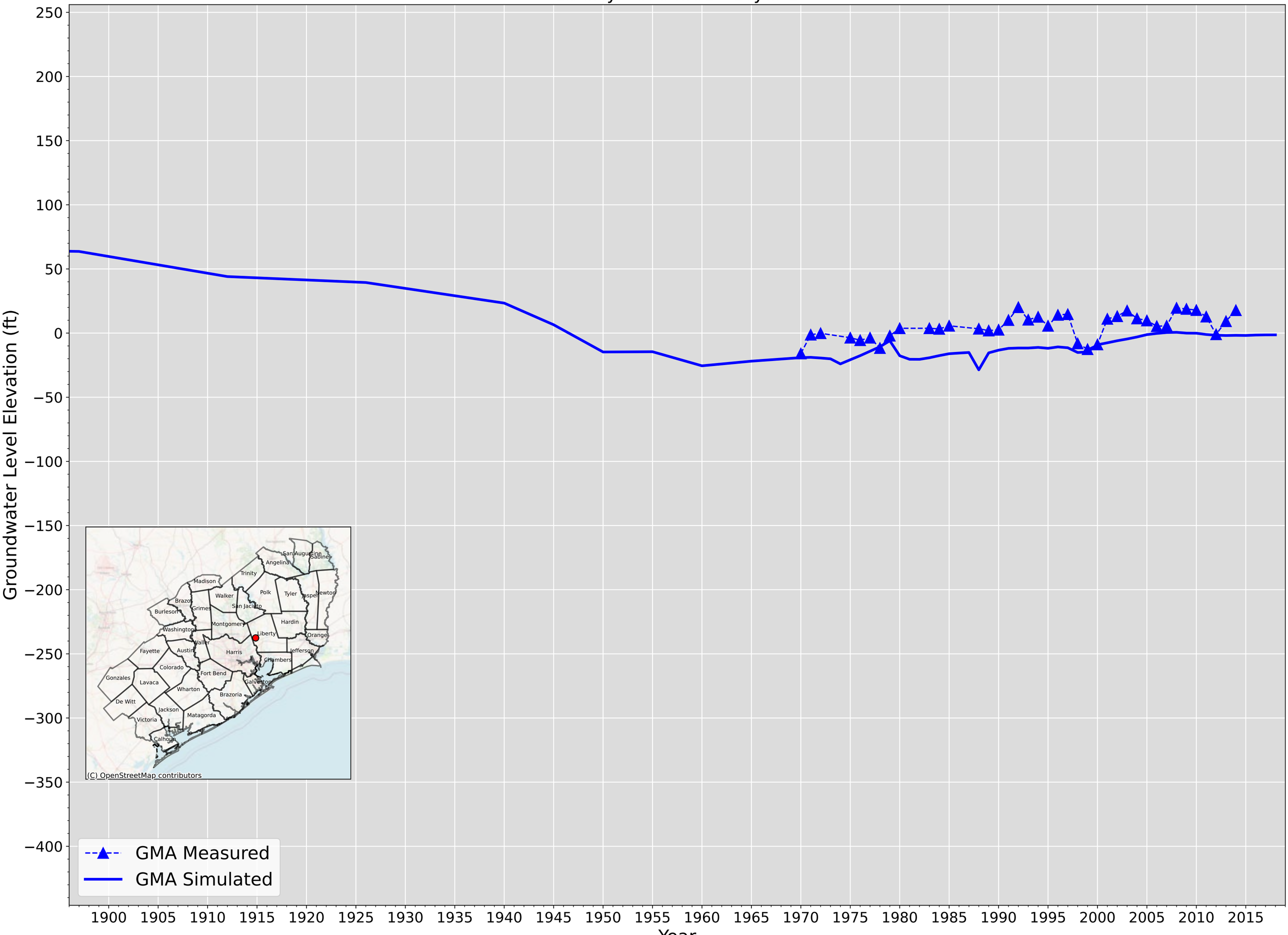
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6064301 - Layer 2



Liberty - 6064302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6064303 - Layer 2

Groundwater Level Elevation (ft)

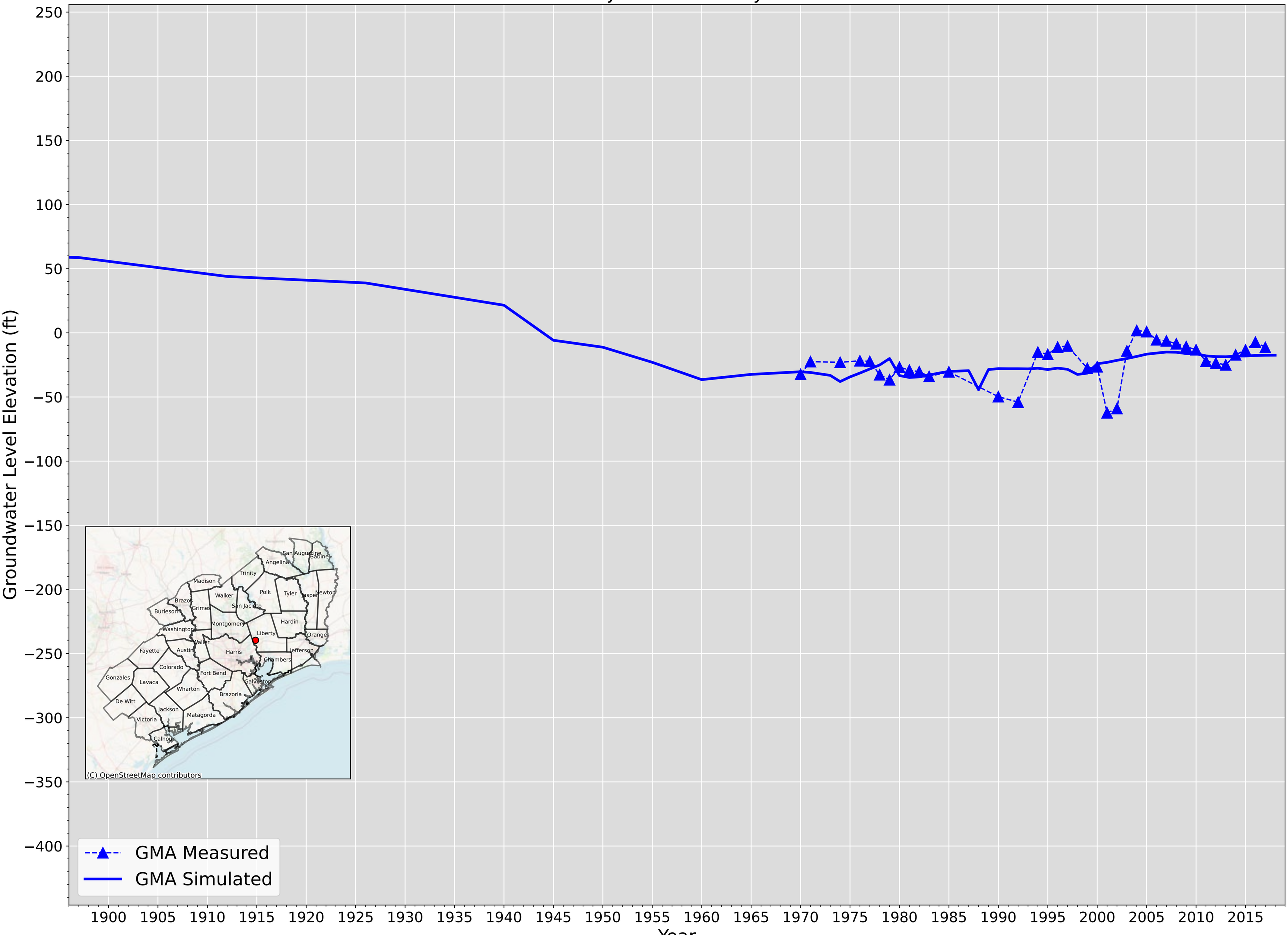
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6064602 - Layer 2



Liberty - 6064603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6064901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

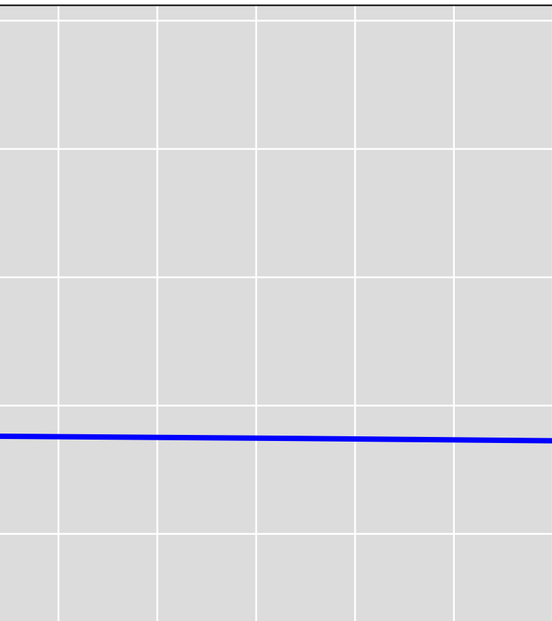
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6133601 - Layer 2



Level Elevation (ft)

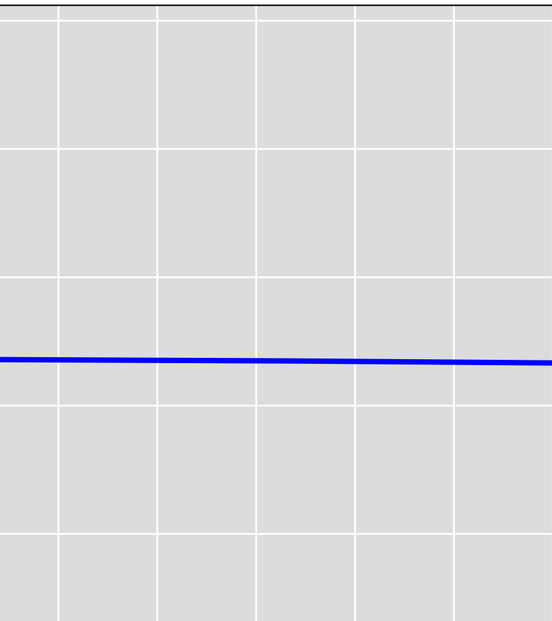
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6133706 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6133710 & 6133806 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

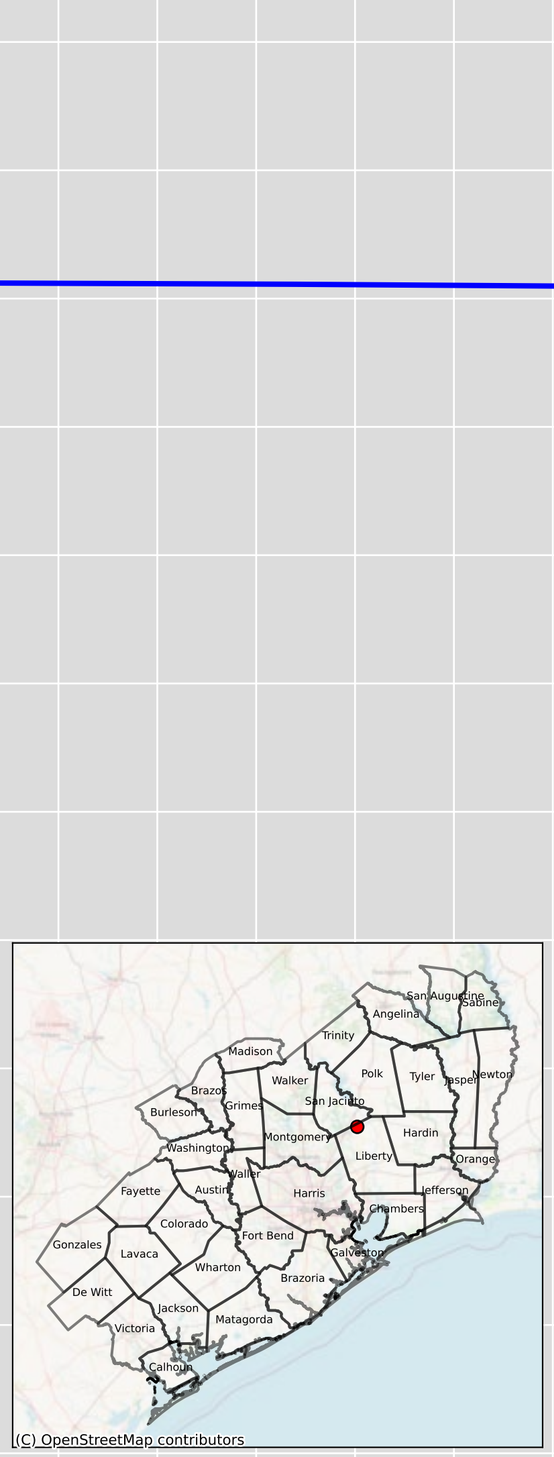
Liberty - 6133712 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



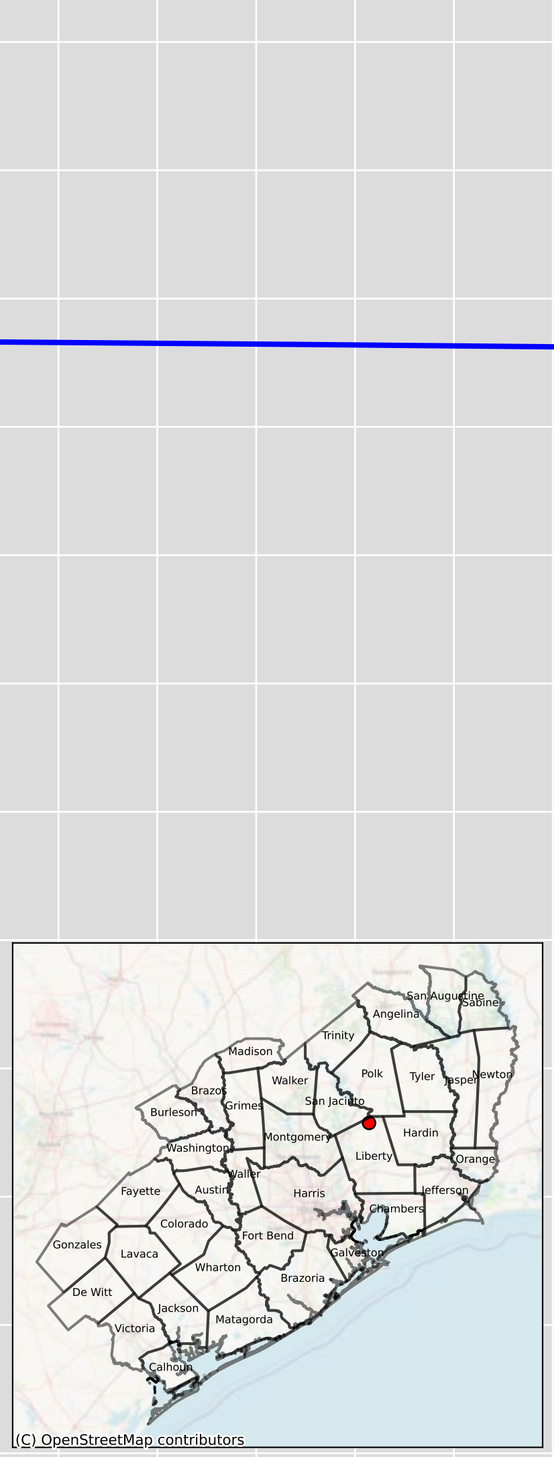
GMA Measured

GMA Simulated

Liberty - 6134403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

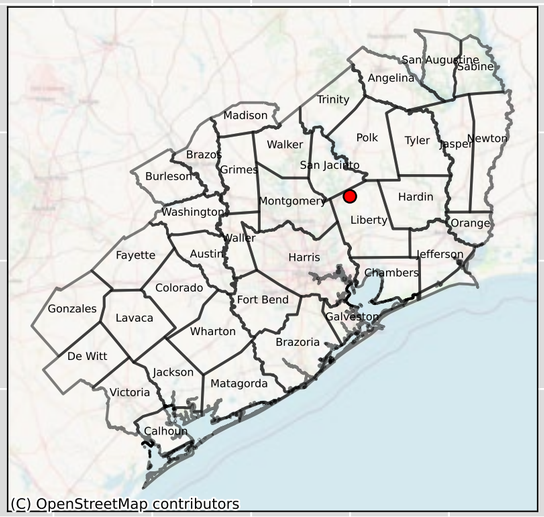
Liberty - 6141101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

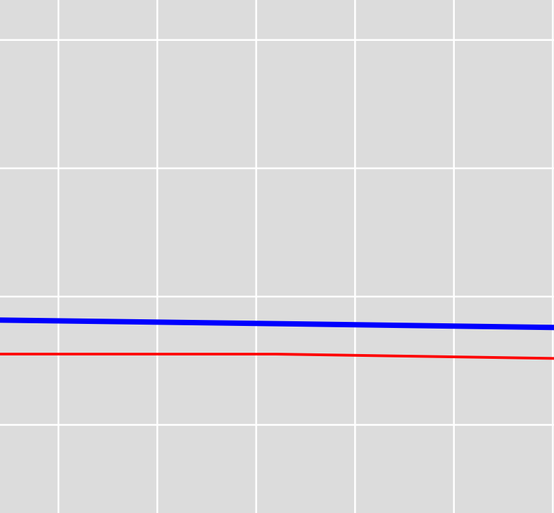
Year



GMA Measured

GMA Simulated

Liberty - 6141409 & 6141401 & 6141407 - Layer 2



Groundwater Level Elevation (ft)

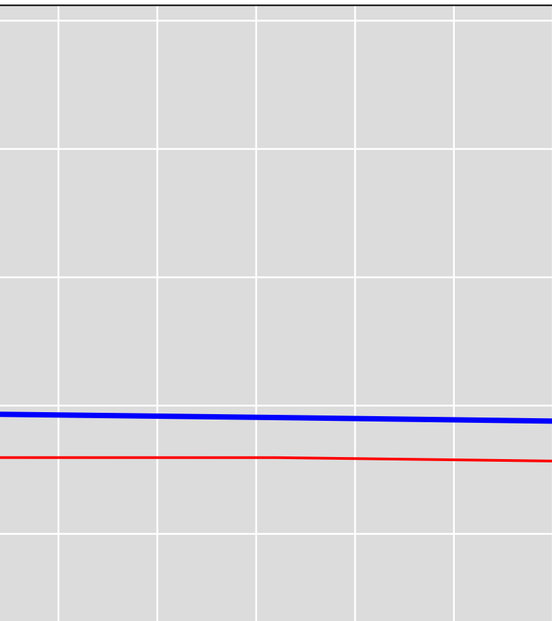
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6141409
Gulf Simulated - 6141409

Liberty - 6141411 & 6141410 - Layer 2



Groundwater Level Elevation (ft)

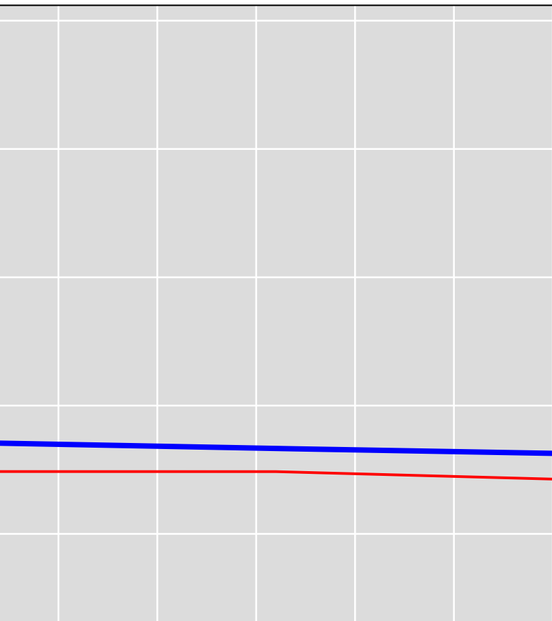
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6141411
Gulf Simulated - 6141411

Liberty - 6141701 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6141701
Gulf Simulated - 6141701

Liberty - 6143801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6149101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6149802 & 6149803 & 6149805 & 6149807 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6151101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6151102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

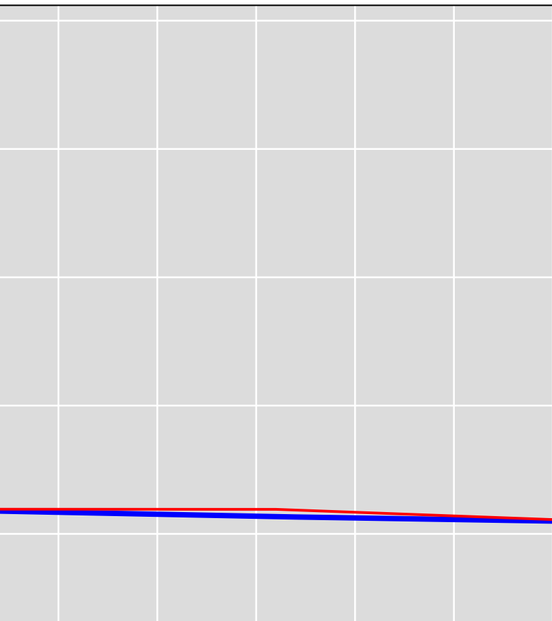
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6151111 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6151111
Gulf Simulated - 6151111

Liberty - 6151717 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6151717
Gulf Simulated - 6151717

Liberty - 6151806 & 6151901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6157202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6157204 & 6157205 & 6157206 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6157207 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6157401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6157405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6157506 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6157702 - Layer 2

Groundwater Level Elevation (ft)

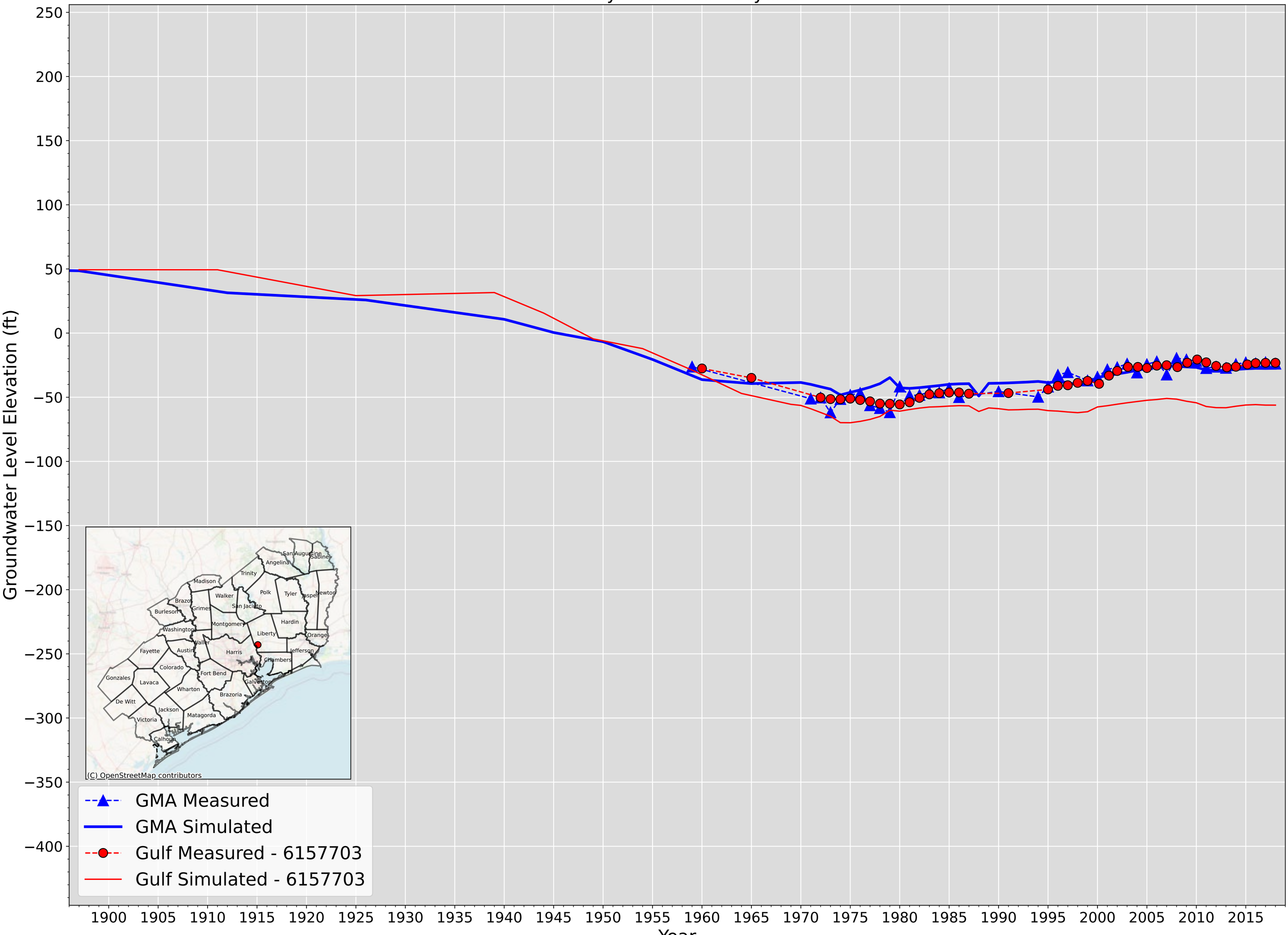
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6157703 - Layer 2



Liberty - 6157902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6158502 & 6158511 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6158504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6158505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6159106 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6159501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6159804 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6160717 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

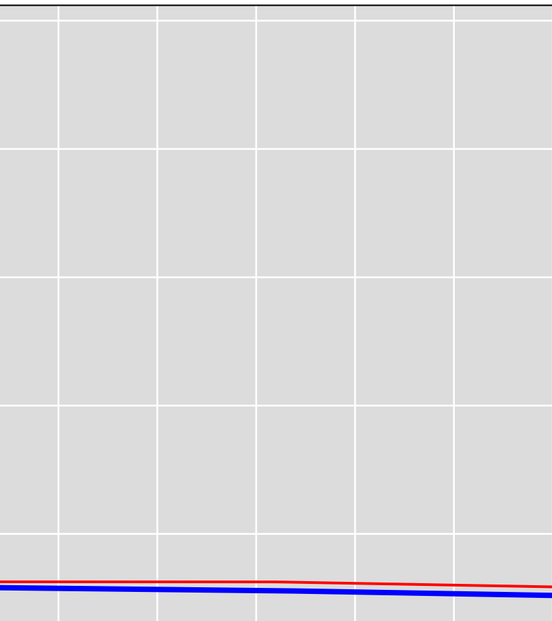
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Liberty - 6160902 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6160902
Gulf Simulated - 6160902

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6403303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

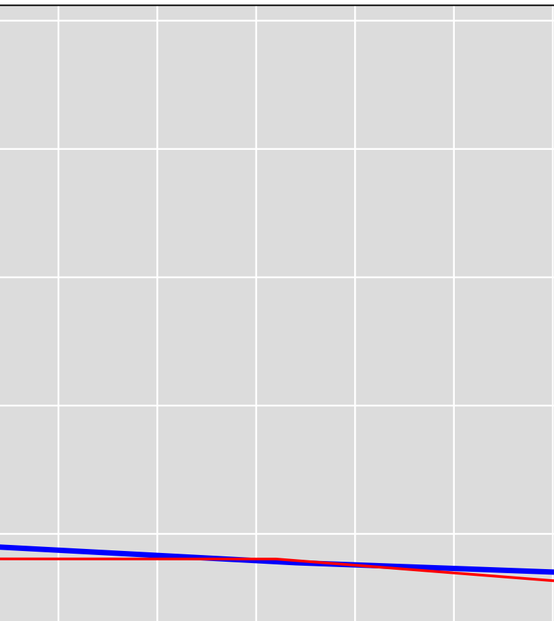
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 6549901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6549901
Gulf Simulated - 6549901

Matagorda - 6557702 - Layer 2

Groundwater Level Elevation (ft)

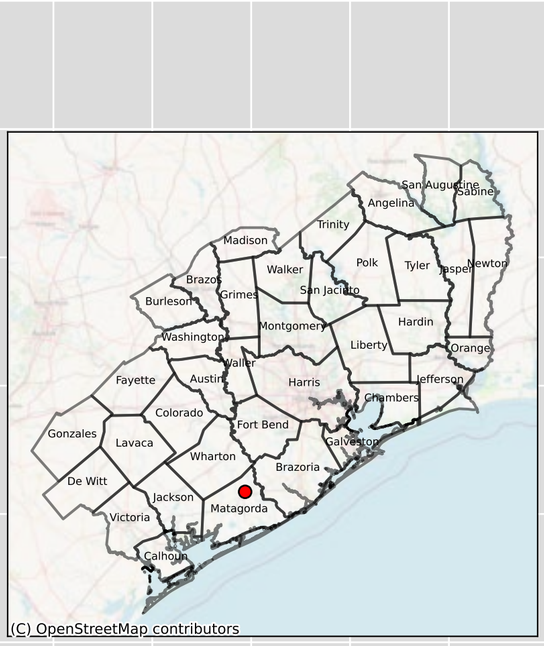
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6557702
Gulf Simulated - 6557702

Matagorda - 6557802 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6557802
Gulf Simulated - 6557802

Matagorda - 6557803 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 6558110 - Layer 2

Groundwater Level Elevation (ft)

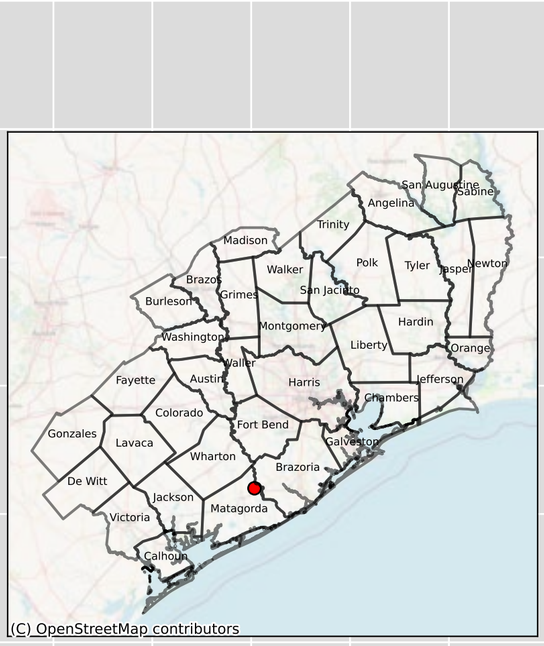
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 6558401 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Matagorda - 6558601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 6663901 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6663901
Gulf Simulated - 6663901

Matagorda - 6664401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6664401
Gulf Simulated - 6664401

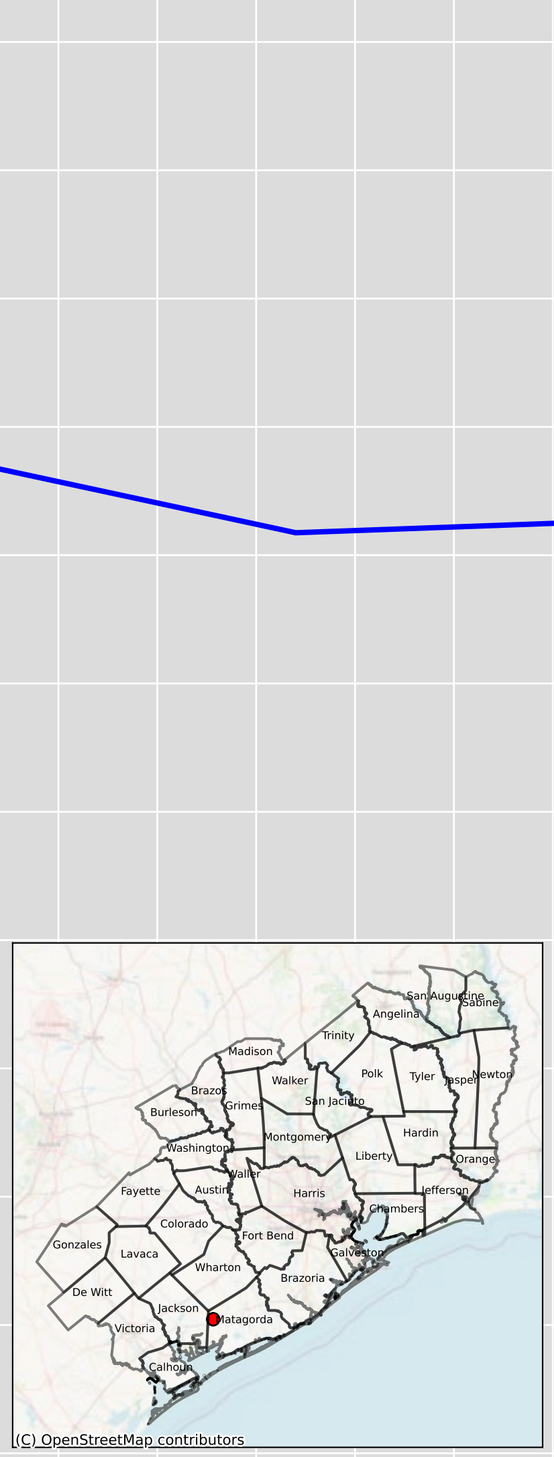
Matagorda - 8006903 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Matagorda - 8006906 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8007203 & 8007310 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8007404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8007501 - Layer 2

Groundwater Level Elevation (ft)

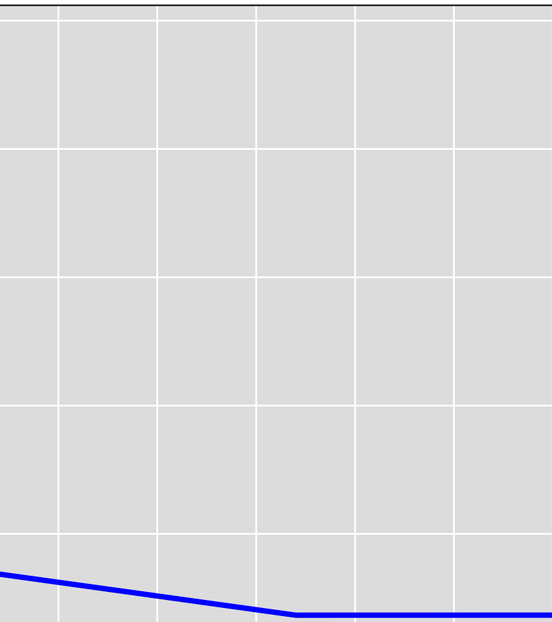
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8007901 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8008302 - Layer 2

Groundwater Level Elevation (ft)

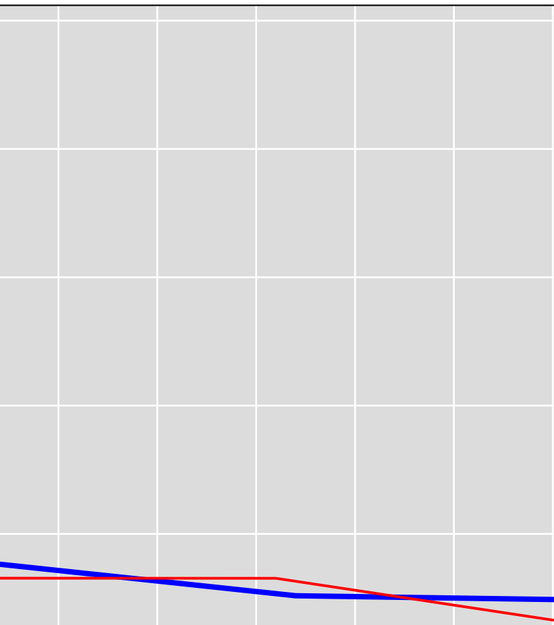
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8008302
Gulf Simulated - 8008302

Matagorda - 8008504 - Layer 2



Level Elevation (ft)

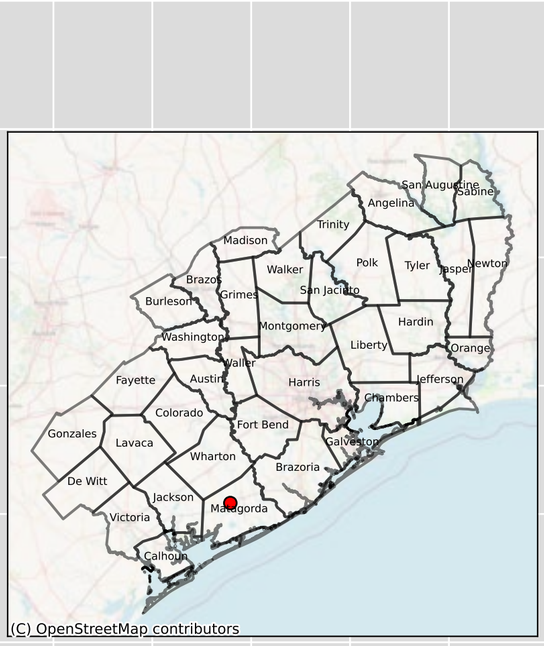
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8008504
Gulf Simulated - 8008504

Matagorda - 8008506 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

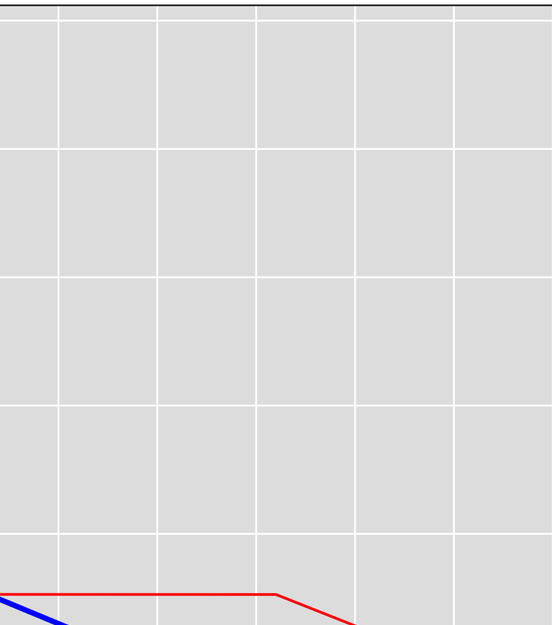
Matagorda - 8008701 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 8008701
Gulf Simulated - 8008701

Matagorda - 8014606 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8014606
Gulf Simulated - 8014606

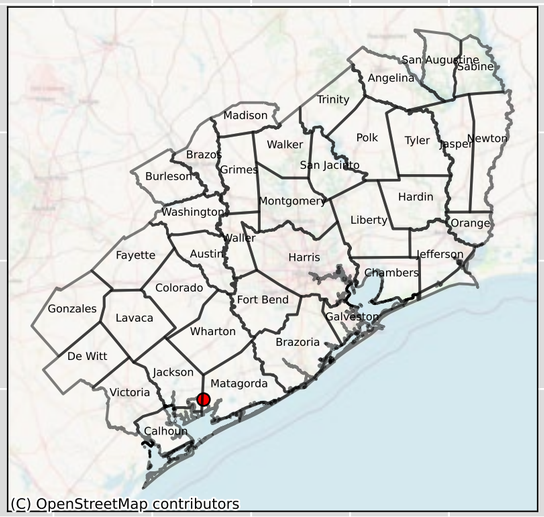
Matagorda - 8014801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Matagorda - 8014802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8014901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

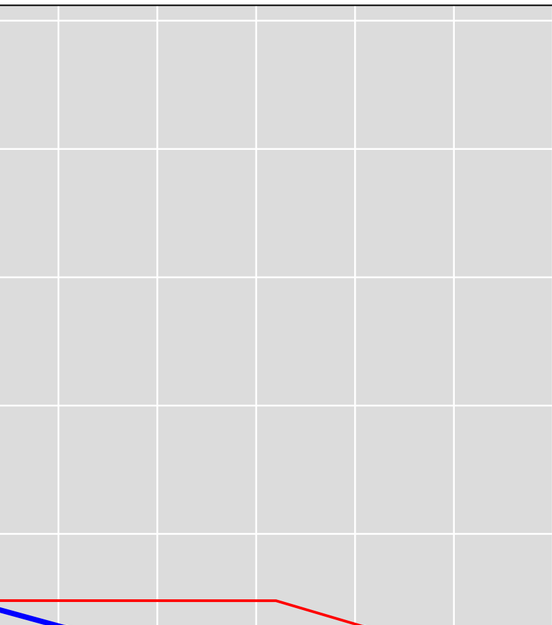
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8014903 - Layer 2



Level Elevation (ft)

Groundwater Lev

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8014903
Gulf Simulated - 8014903

Matagorda - 8015102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8015301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8015402 & 8015405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8015502 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

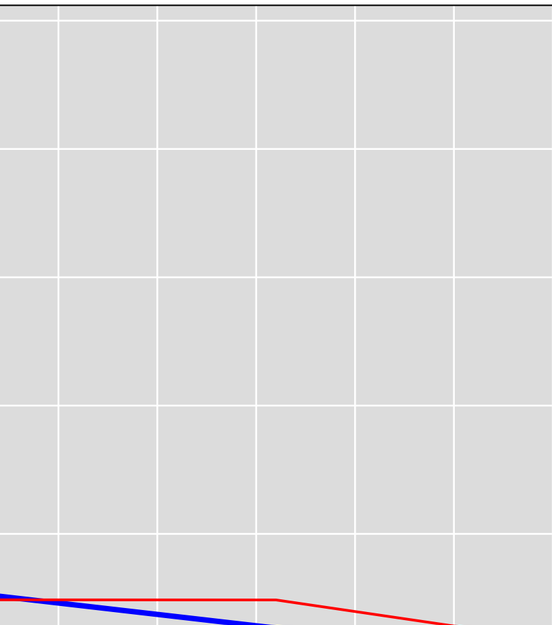
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8016301 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8016301
Gulf Simulated - 8016301

Matagorda - 8022204 & 8022301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8023101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8023103 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

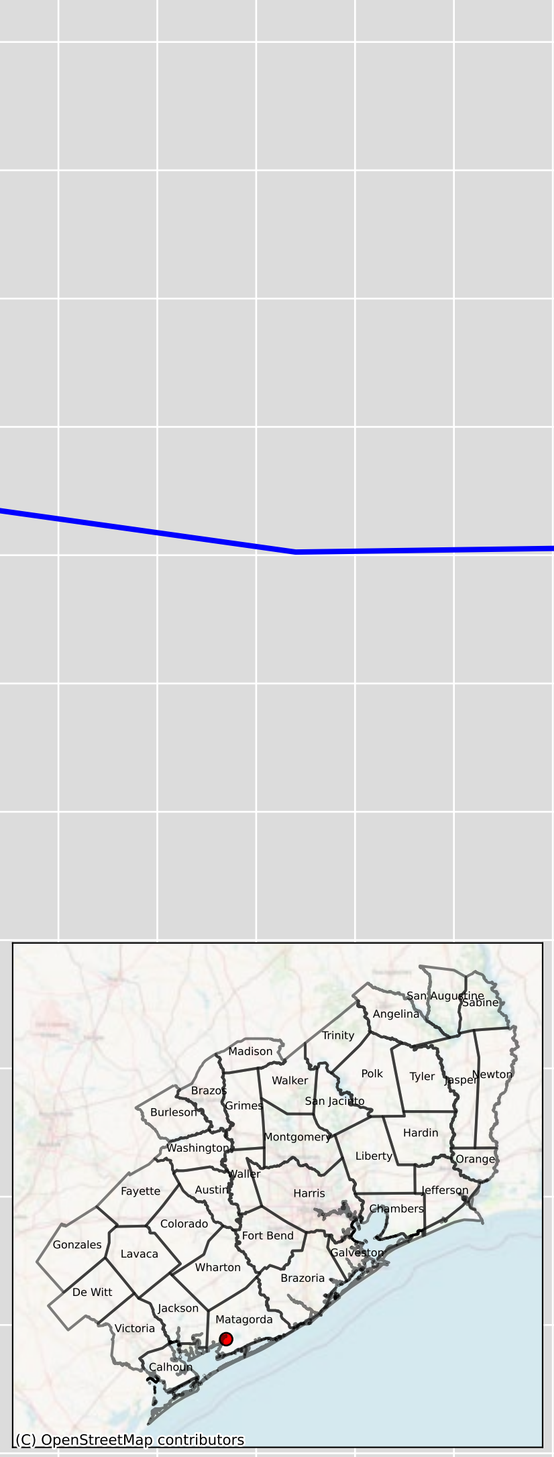
Matagorda - 8023301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Matagorda - 8023401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

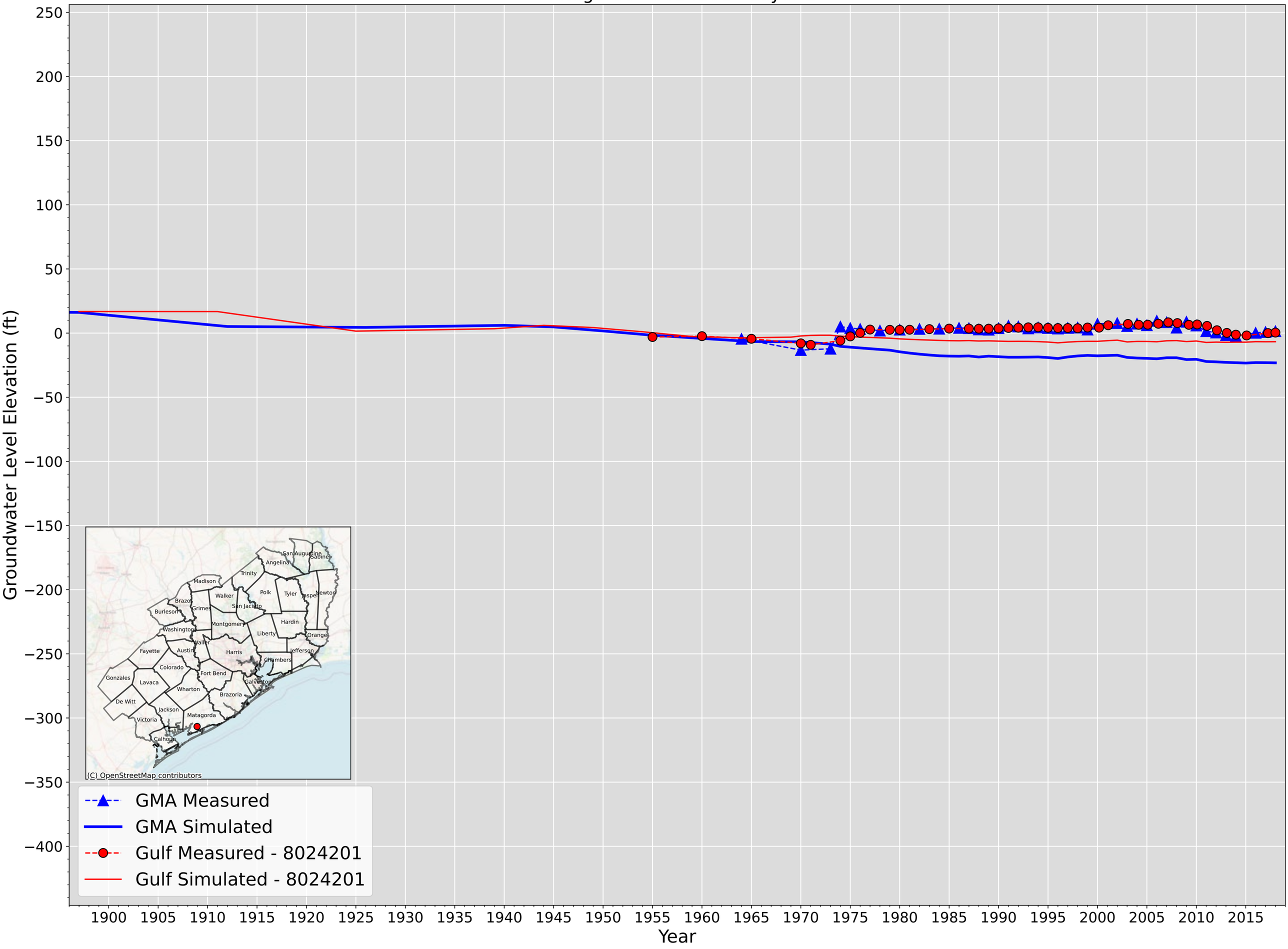
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8024201 - Layer 2



Matagorda - 8101102 & 8101101 - Layer 2

Groundwater Level Elevation (ft)

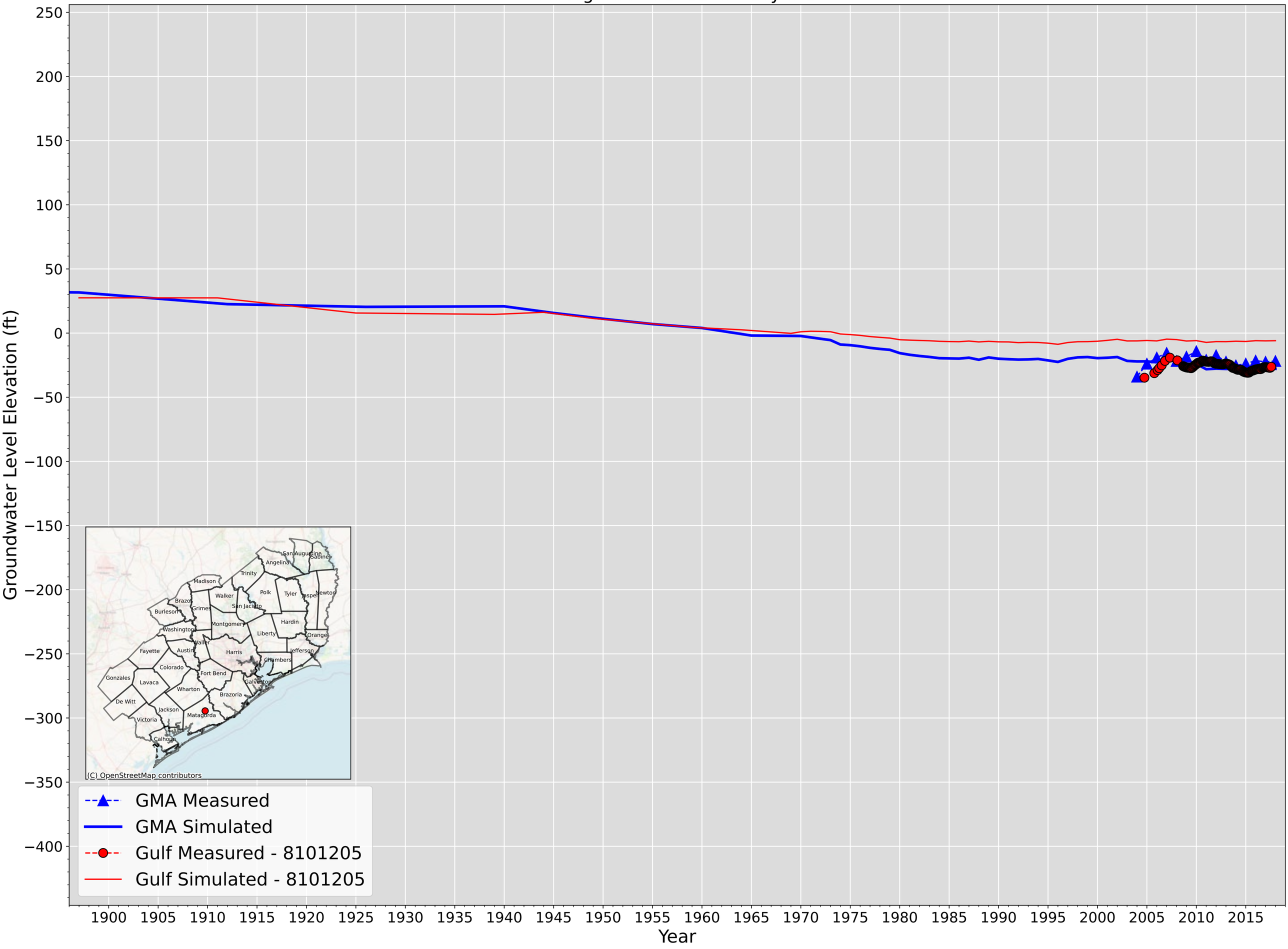
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8101102
Gulf Simulated - 8101102

Matagorda - 8101205 - Layer 2



Matagorda - 8101701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8101802 - Layer 2

Groundwater Level Elevation (ft)

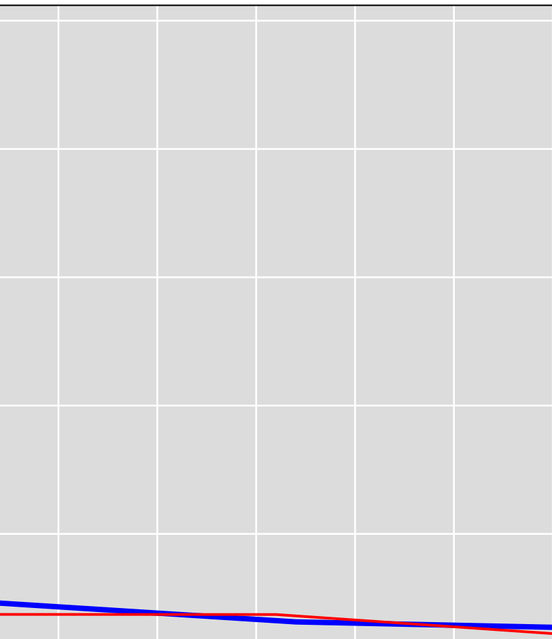
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Matagorda - 8102605 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 8102605
Gulf Simulated - 8102605

Matagorda - 8102901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Matagorda - 8103701 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

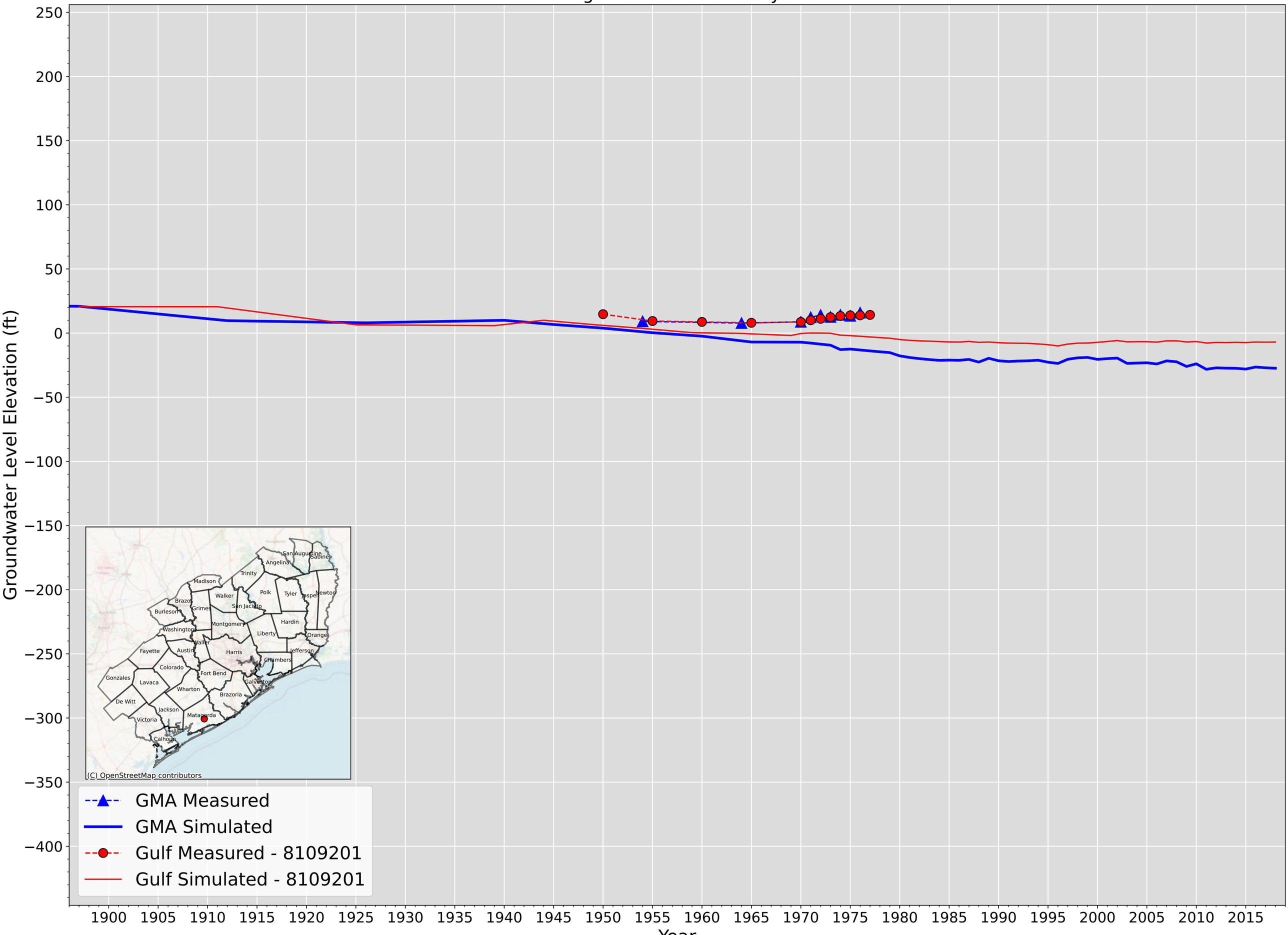
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

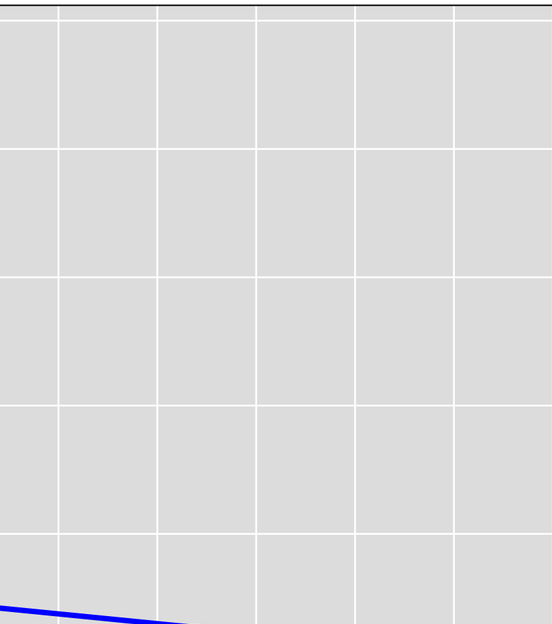
GMA Measured

GMA Simulated

Matagorda - 8109201 - Layer 2



Matagorda - 8109202 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8109401 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8109503 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Matagorda - 8109504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

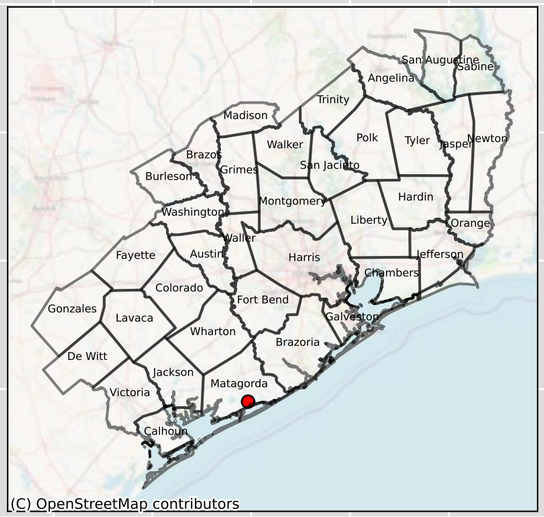
Matagorda - 8109901 & 8109903 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

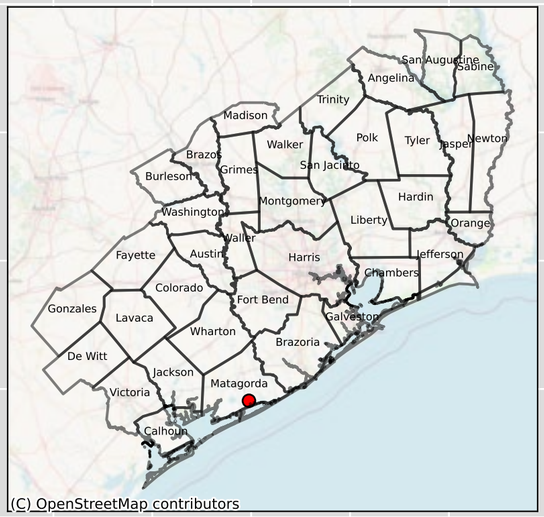
Matagorda - 8109902 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

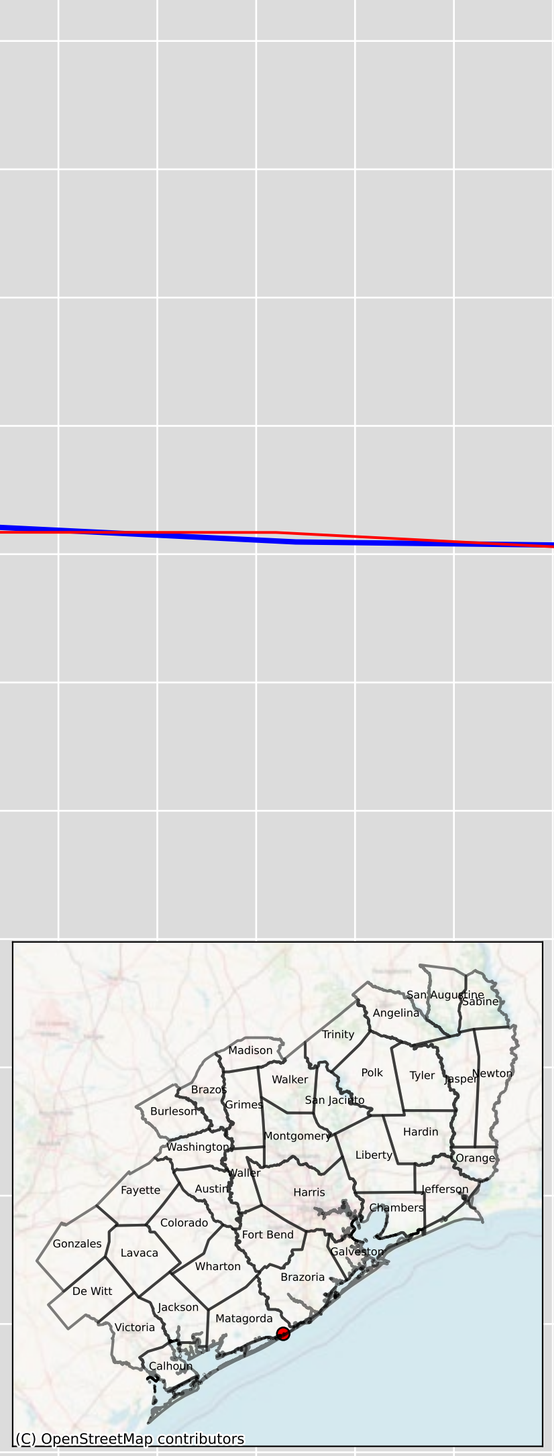
Matagorda - 8111901 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

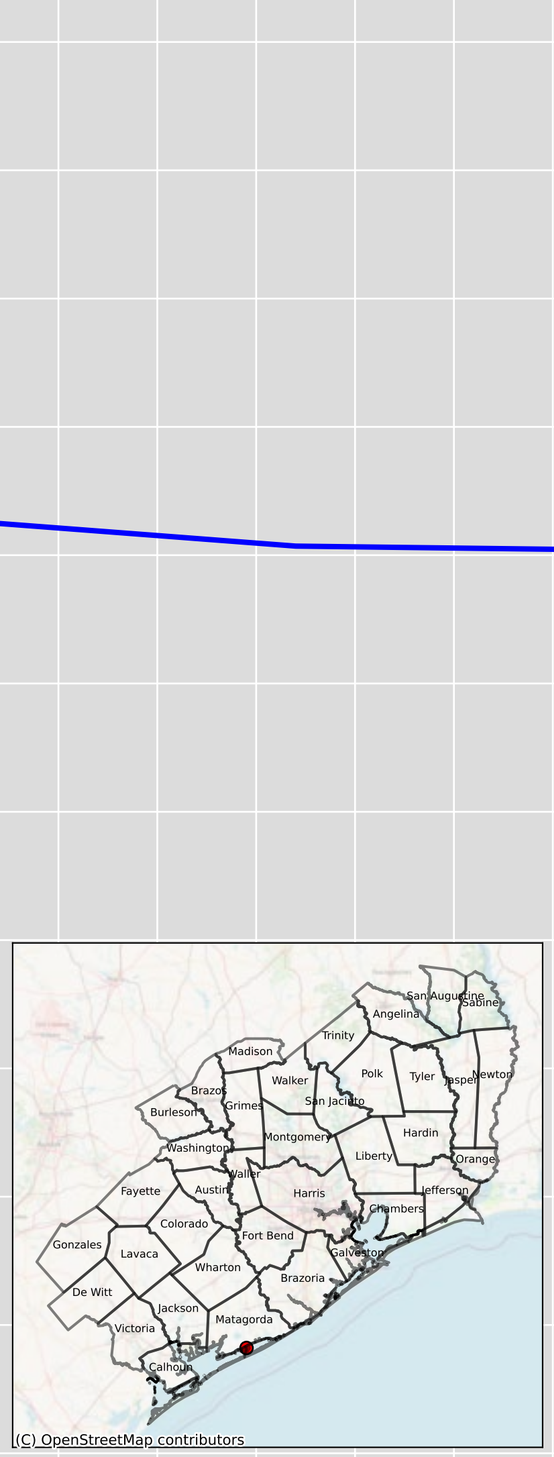


GMA Measured
GMA Simulated
Gulf Measured - 8111901
Gulf Simulated - 8111901

Matagorda - 8117405 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044804 & 6044805 & 6044806 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6045413 & 6045414 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6046505 - Layer 2

Groundwater Level Elevation (ft)

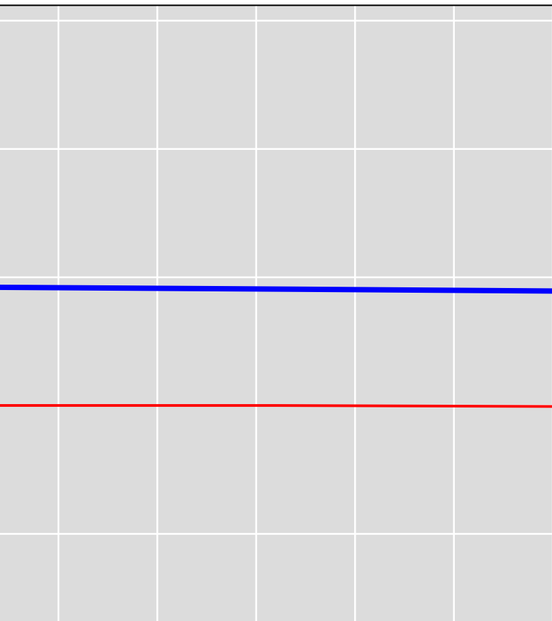
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6046505
Gulf Simulated - 6046505

Montgomery - 6047408 - Layer 2



Level Elevation (ft)

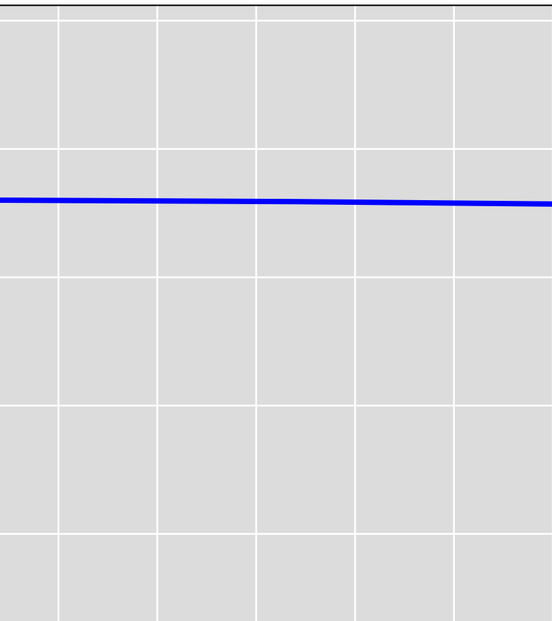
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6047408
Gulf Simulated - 6047408

Montgomery - 6050903 - Layer 2



Groundwater Level Elevation (ft)

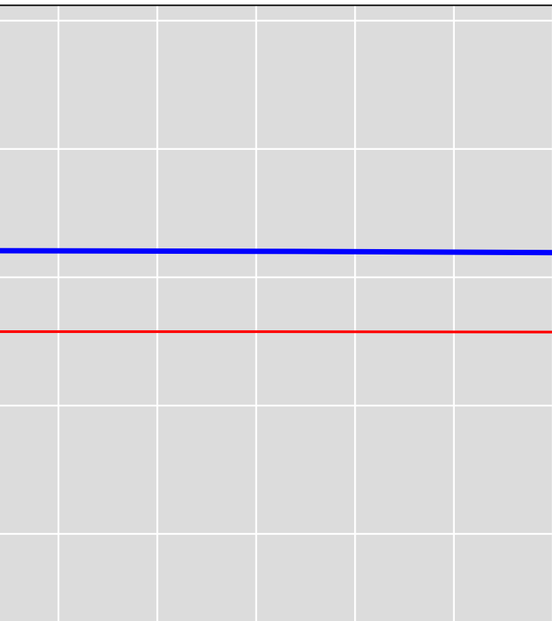
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6051308 - Layer 2



Groundwater Level Elevation (ft)

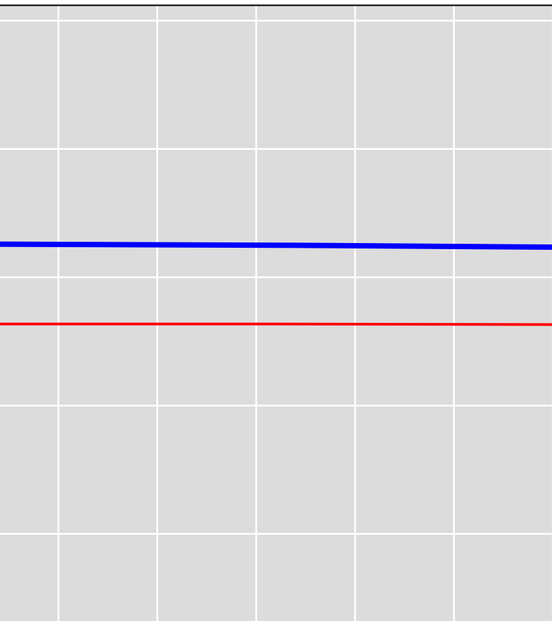
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051308
Gulf Simulated - 6051308

Montgomery - 6051603 - Layer 2



Groundwater Level Elevation (ft)

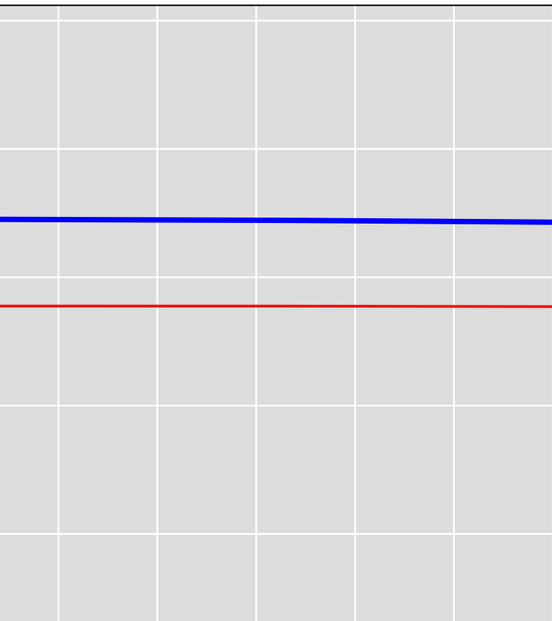
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051603
Gulf Simulated - 6051603

Montgomery - 6051816 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051816
Gulf Simulated - 6051816

Montgomery - 6051909 - Layer 2

Groundwater Level Elevation (ft)

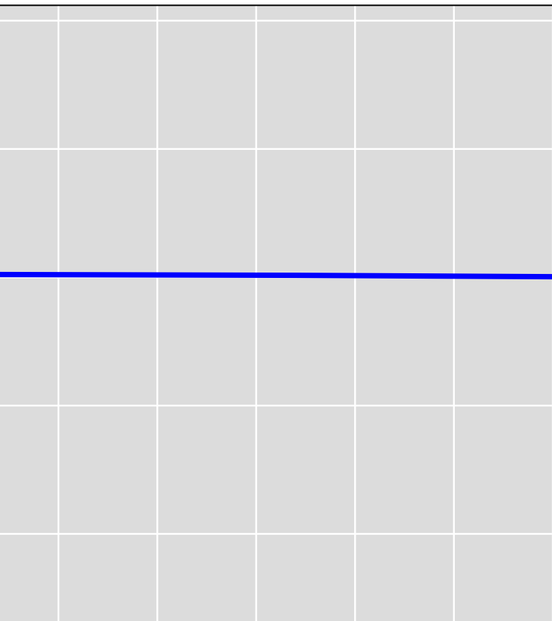
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051909
Gulf Simulated - 6051909

Montgomery - 6052206 - Layer 2



Groundwater Level Elevation (ft)

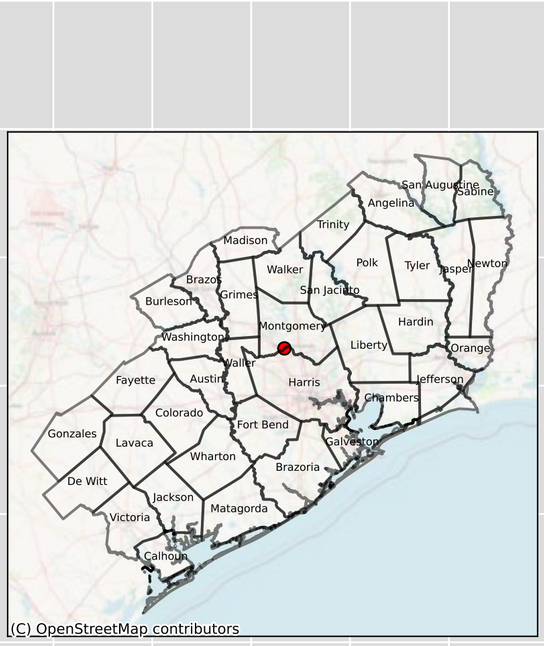
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052811 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052811
Gulf Simulated - 6052811

Montgomery - 6053215 & 6053518 - Layer 2

Groundwater Level Elevation (ft)

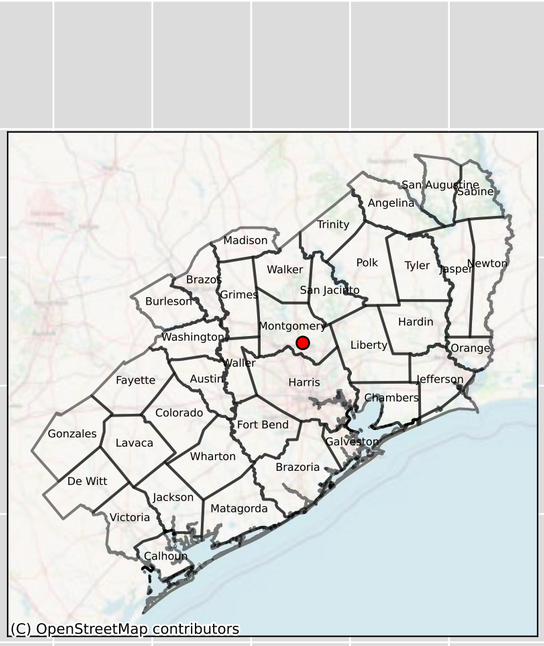
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053215
Gulf Simulated - 6053215

Montgomery - 6053609 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated
Gulf Measured - 6053609
Gulf Simulated - 6053609

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6053718 & 6053719 & 6053720 & 6053725 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6054306 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6054306
Gulf Simulated - 6054306

Montgomery - 6054611 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

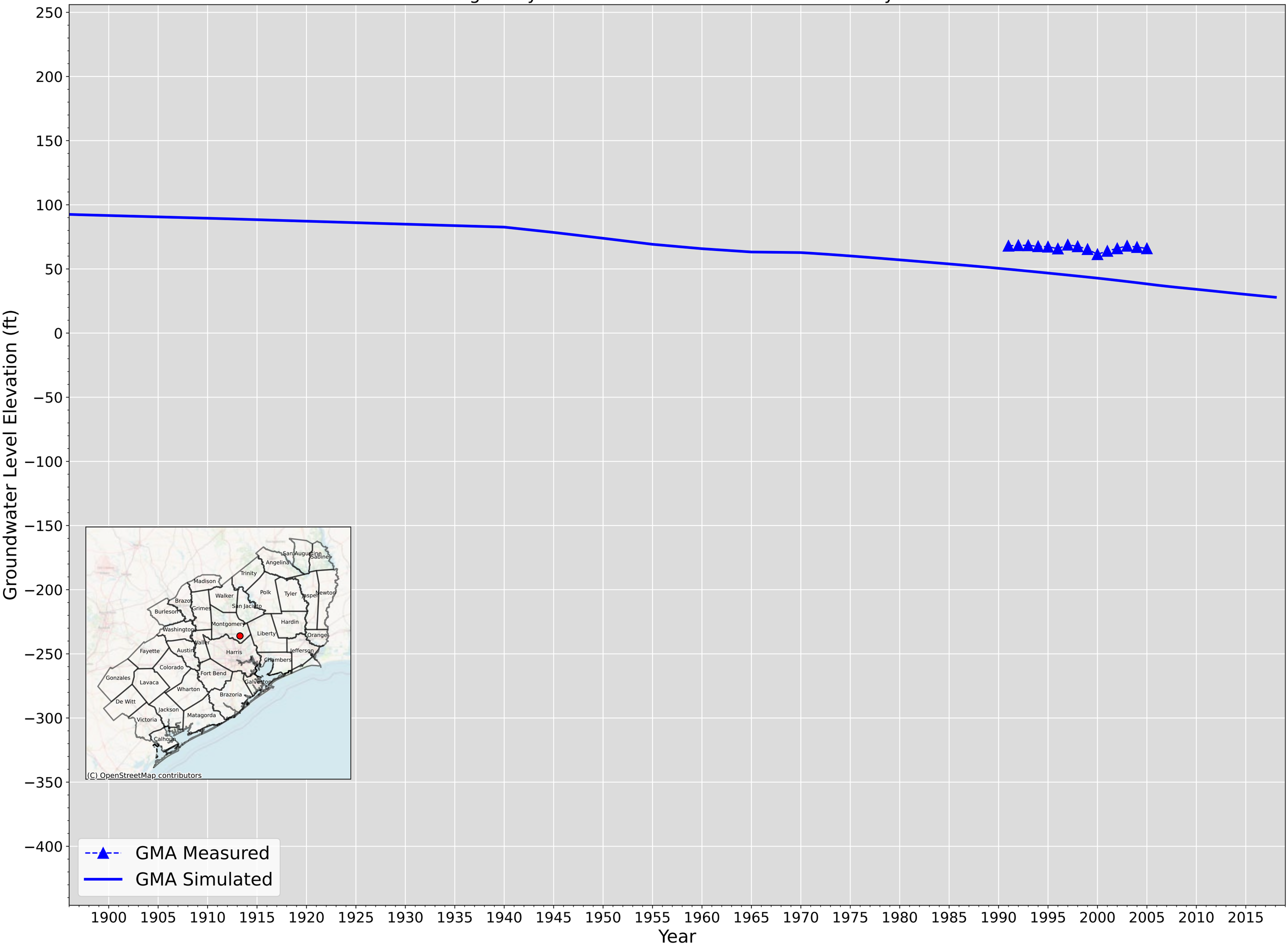
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

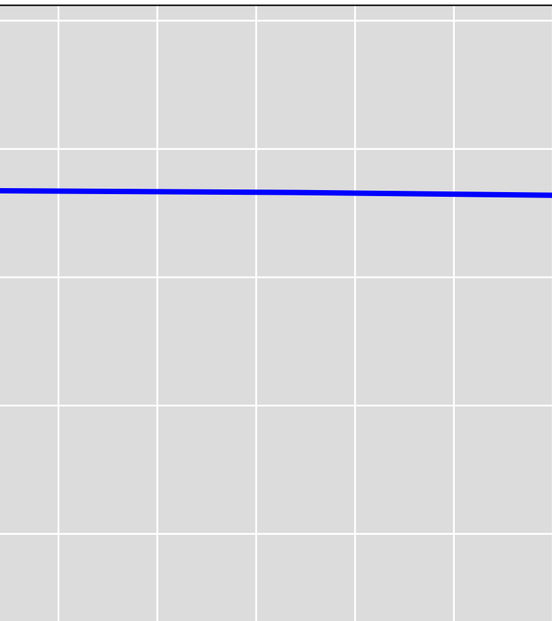
GMA Measured

GMA Simulated

Montgomery - 6054805 & 6054806 & 6054807 - Layer 2



Montgomery - 6058303 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

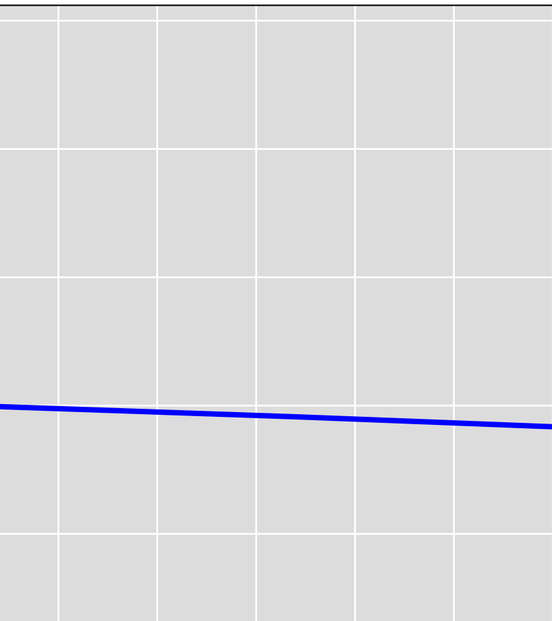
Montgomery - 6059102 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6059102
Gulf Simulated - 6059102

Montgomery - 6061311 - Layer 2



Groundwater Level Elevation (ft)

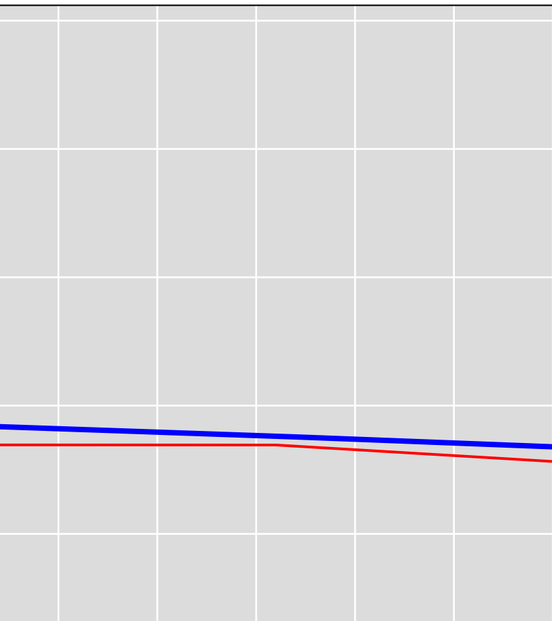
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6062101 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6062101
Gulf Simulated - 6062101

Montgomery - 6062305 & 6062306 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6062305
Gulf Simulated - 6062305

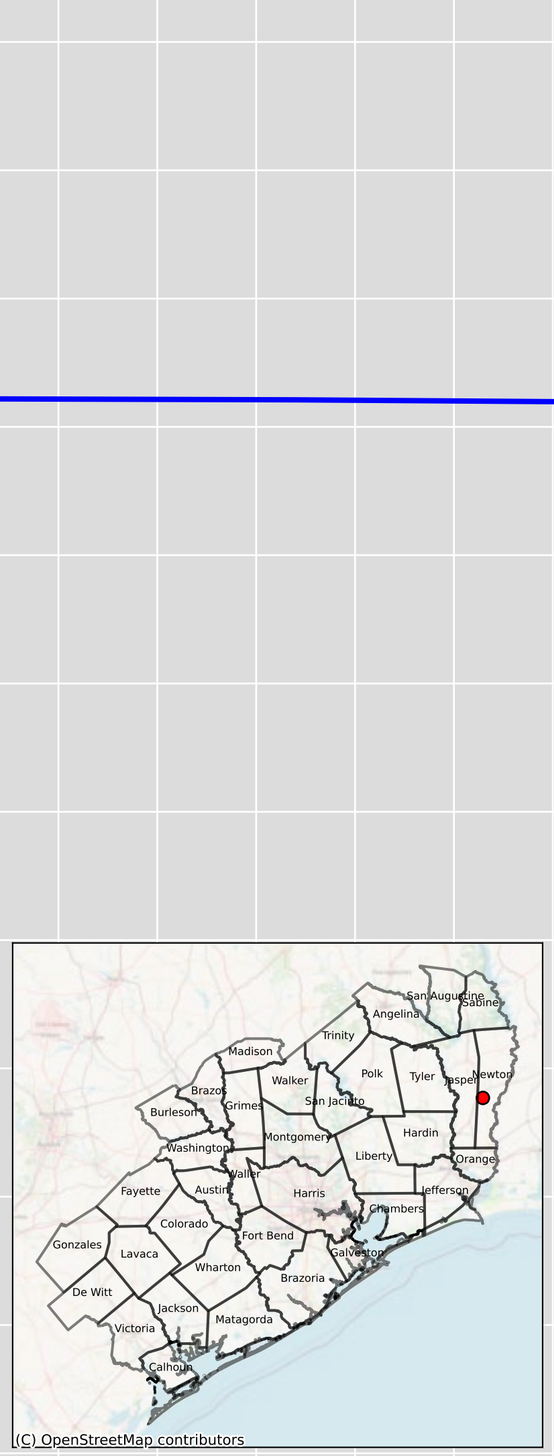
Newton - 6218801 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

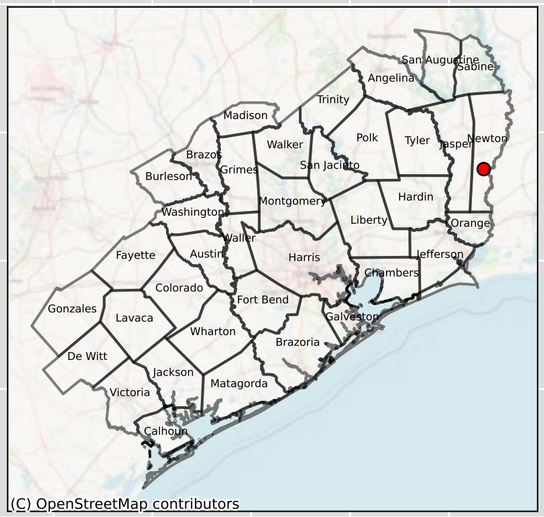
Newton - 6226611 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

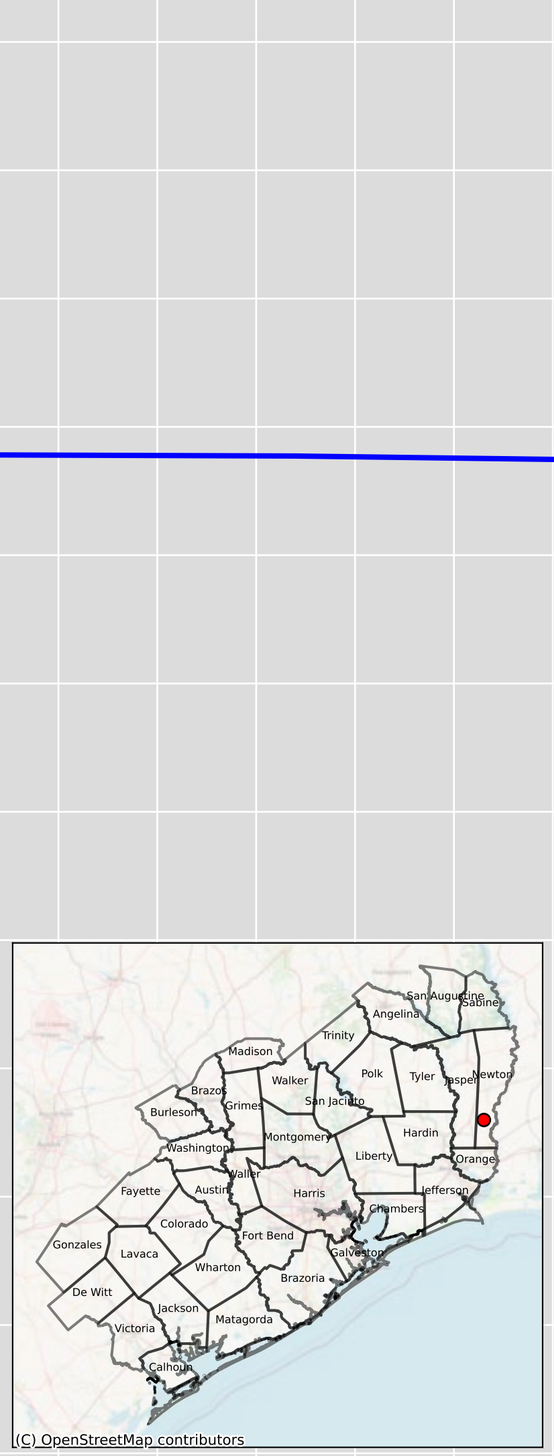
Newton - 6234201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Newton - 6242102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

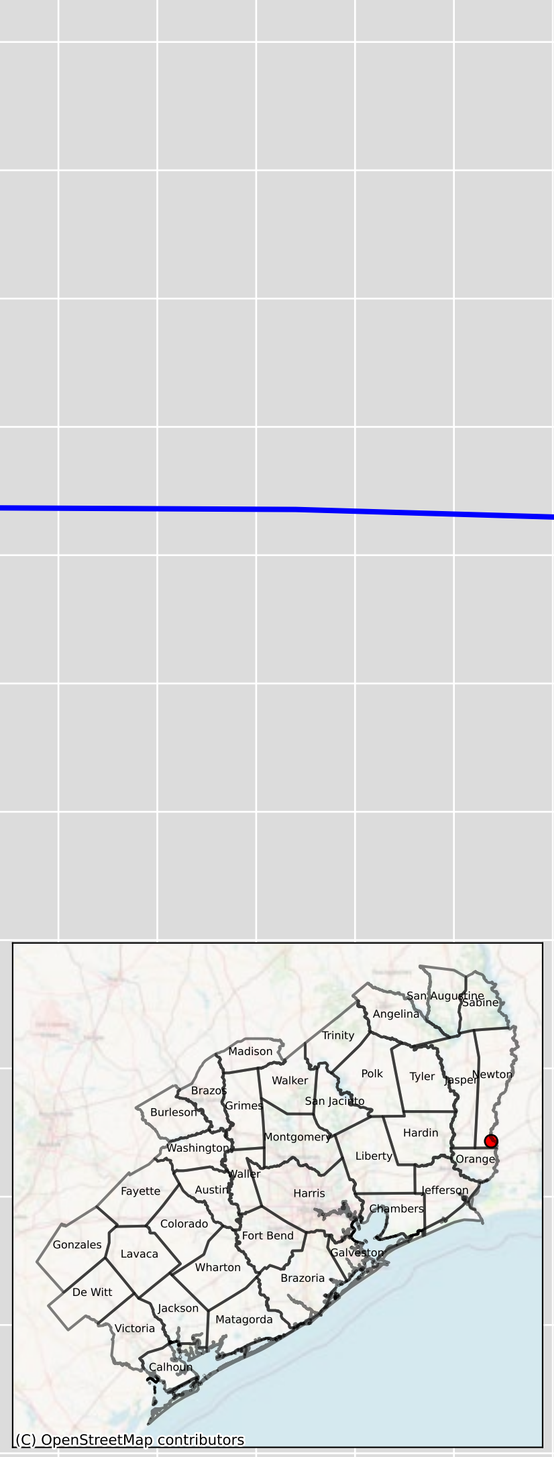
Newton - 6242603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

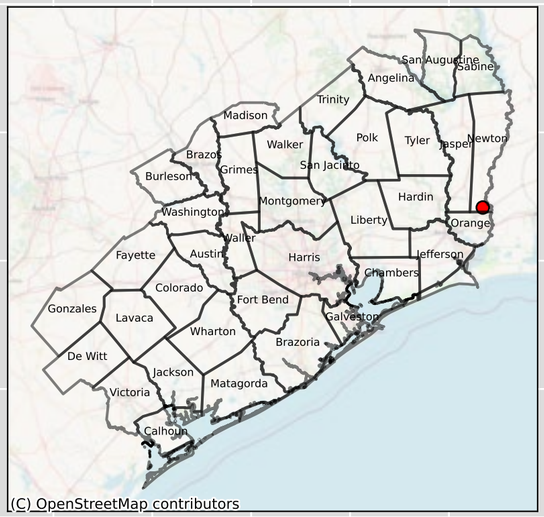
Newton - 6242904 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Newton - 6242909 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6242909
Gulf Simulated - 6242909

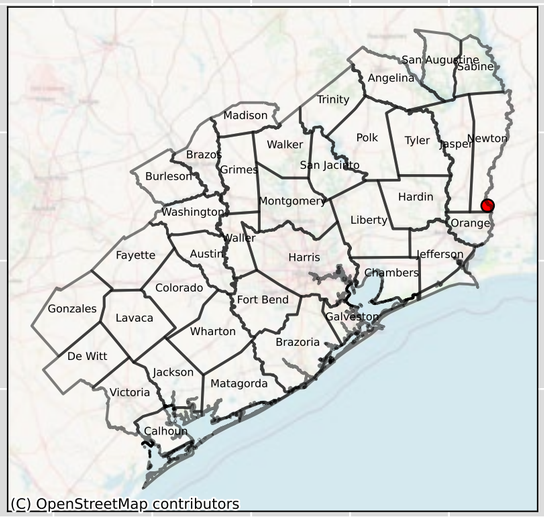
Newton - 6243406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6243406
Gulf Simulated - 6243406

Newton - 6250304 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6156116 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

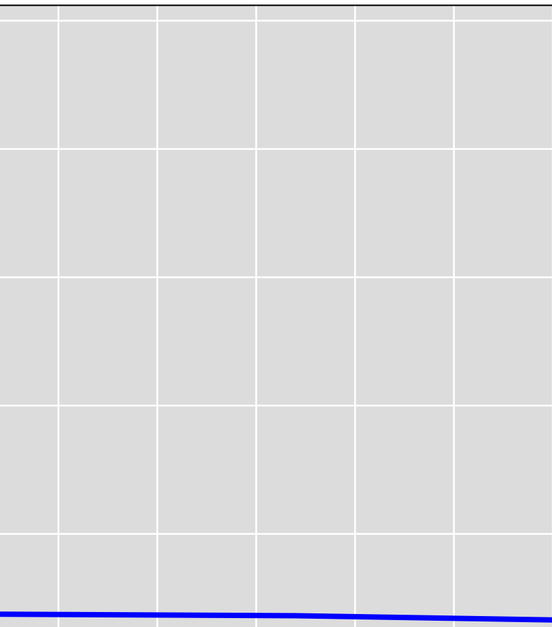
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6156117 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6156314 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6156315 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6156315
Gulf Simulated - 6156315

Orange - 6156611 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6156616 - Layer 2

Groundwater Level Elevation (ft)

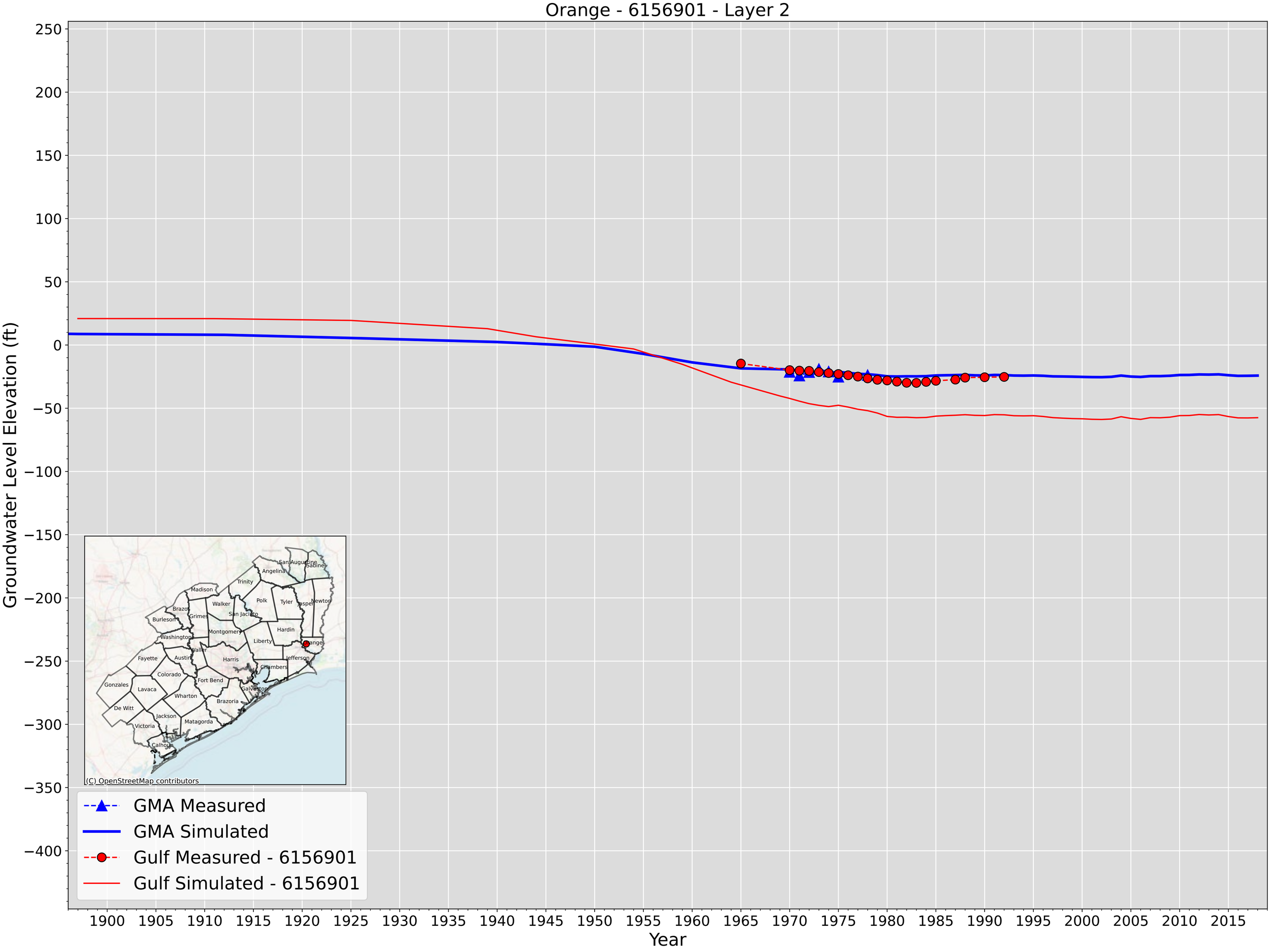
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated


Orange - 6156901 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
San Augustine
Sabine
Angelina
Trinity
Madison
Polk
Tyler
Jasper
Newton
Walker
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 6156901
Gulf Simulated - 6156901

Orange - 6156911 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6156919 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

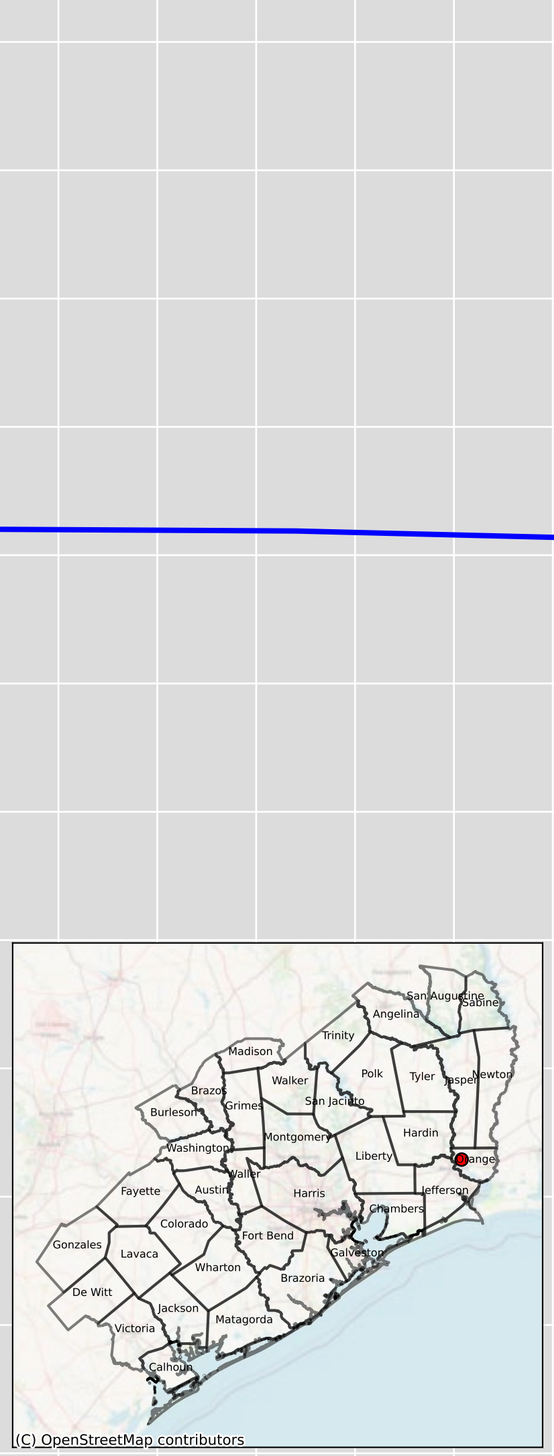
Orange - 6156920 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Orange - 6156922 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6249302 - Layer 2

Groundwater Level Elevation (ft)

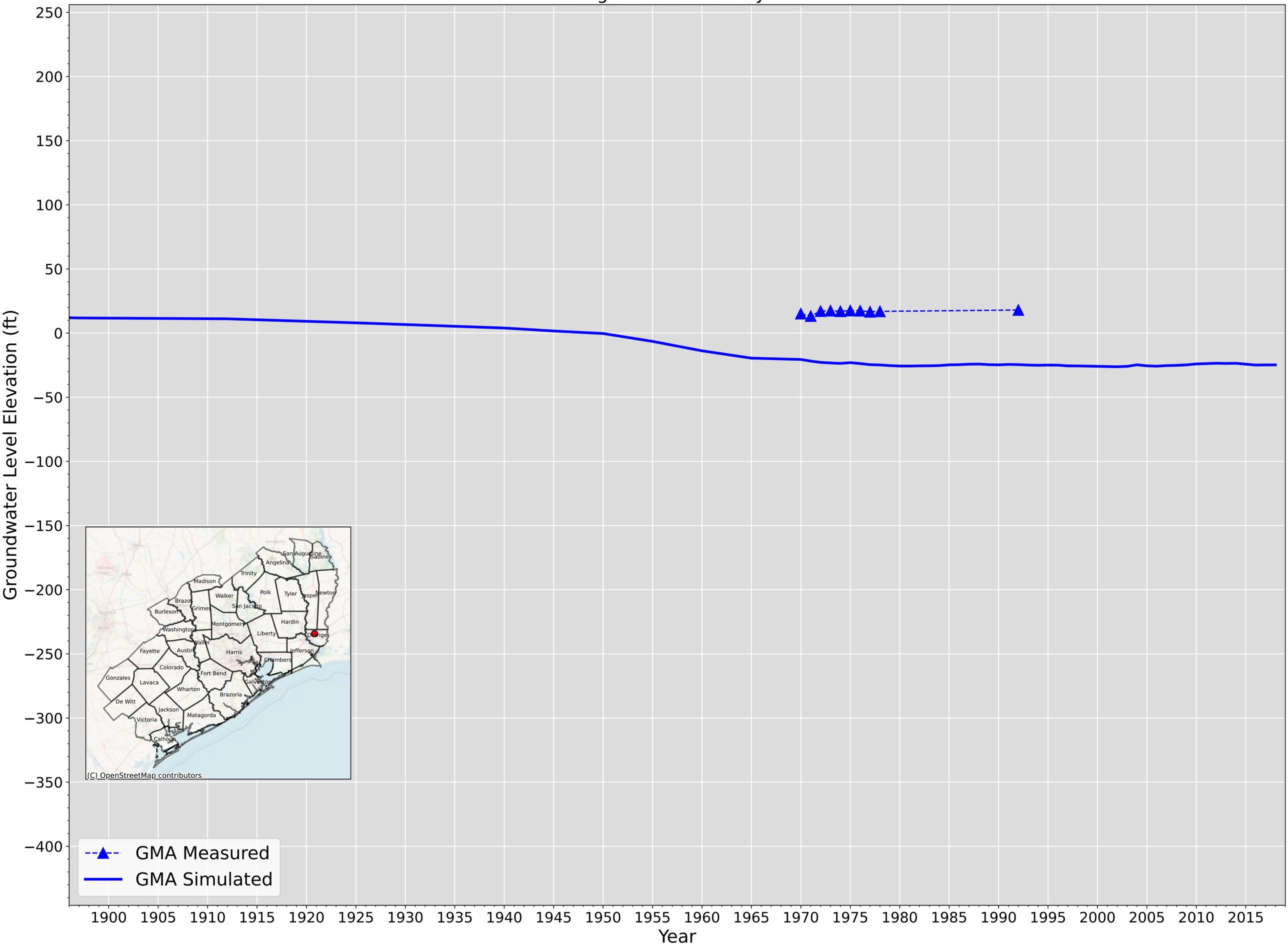
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6249503 - Layer 2



Orange - 6249601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Orange - 6249904 - Layer 2

Groundwater Level Elevation (ft)

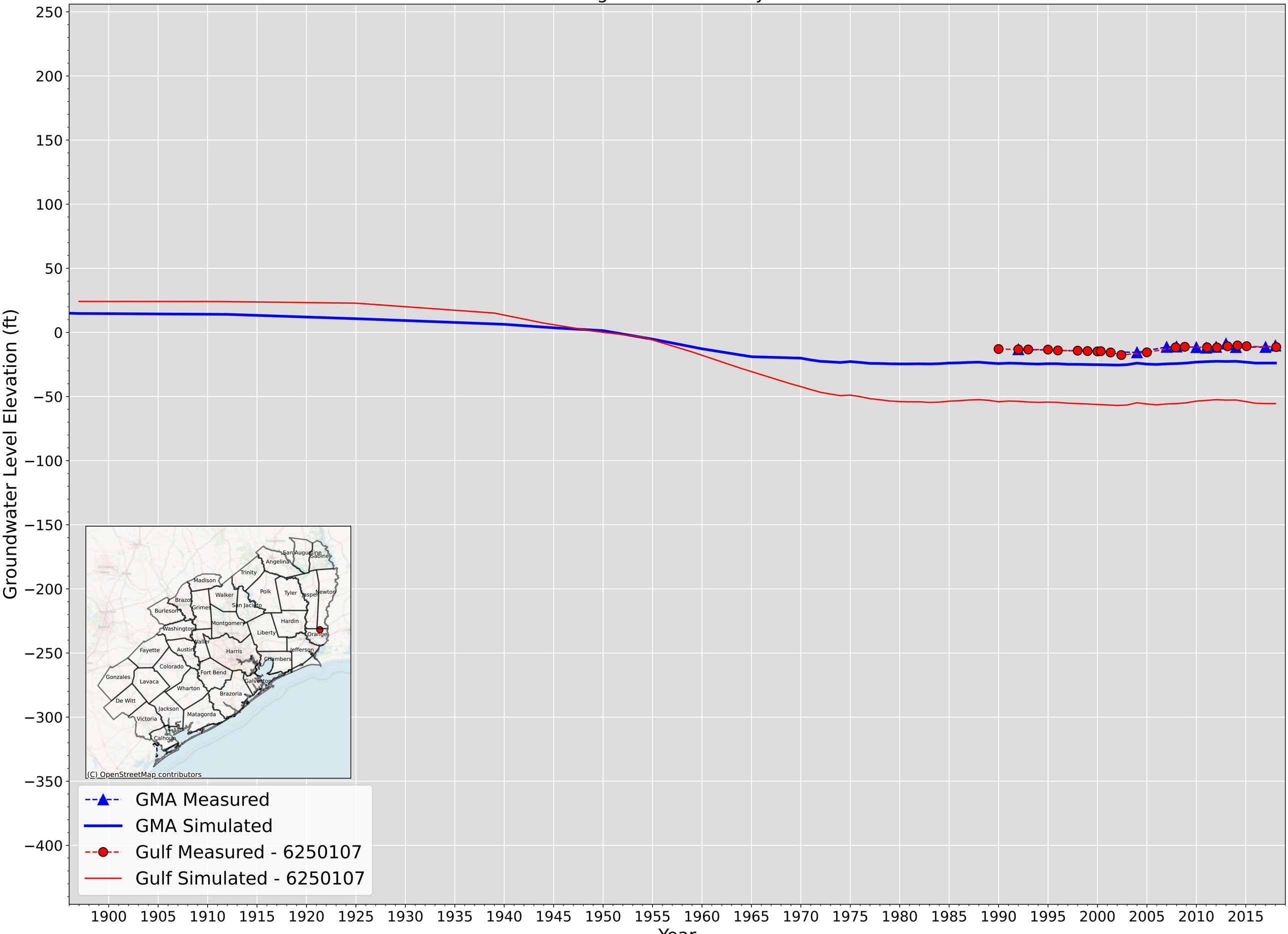
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6249904
Gulf Simulated - 6249904

Orange - 6250107 - Layer 2



Orange - 6250201 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6250201
Gulf Simulated - 6250201

Orange - 6250202 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6250602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6250807 & 6250808 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6250807
Gulf Simulated - 6250807

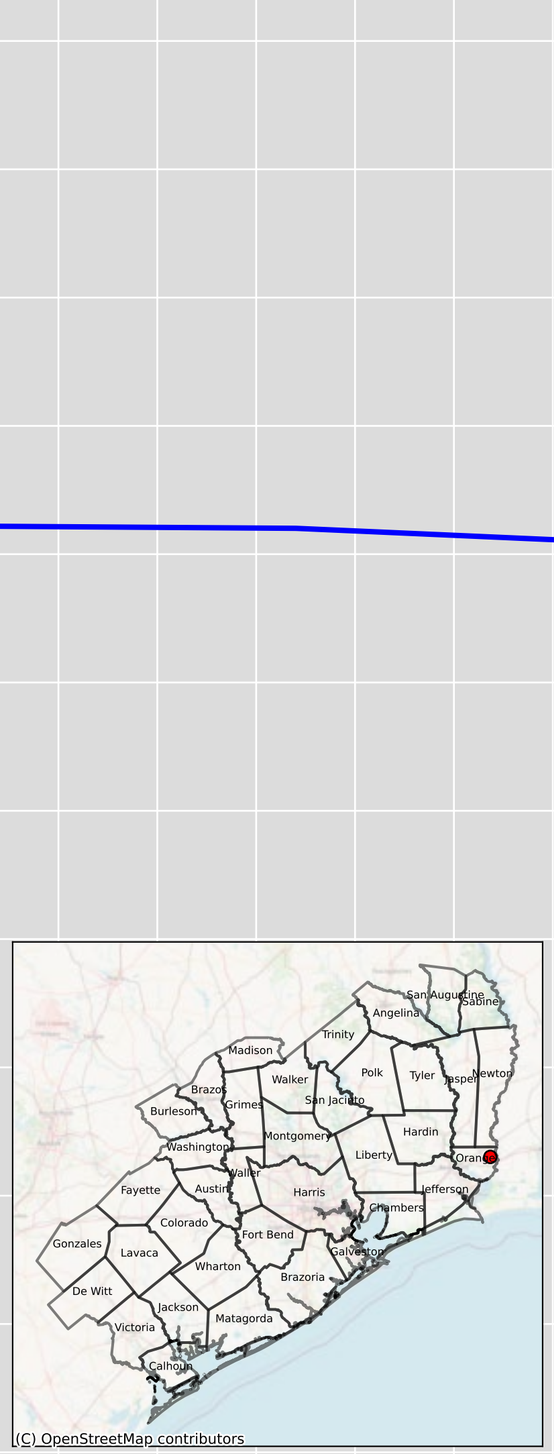
Orange - 6250904 & 6250910 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Orange - 6250908 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

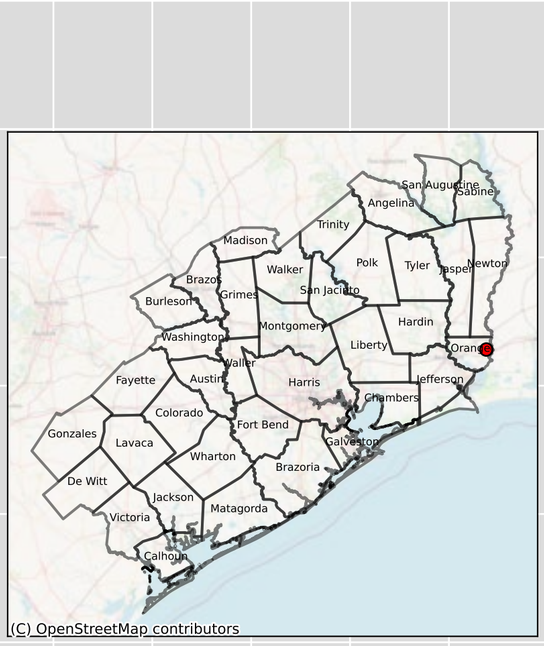
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6250911 - Layer 2



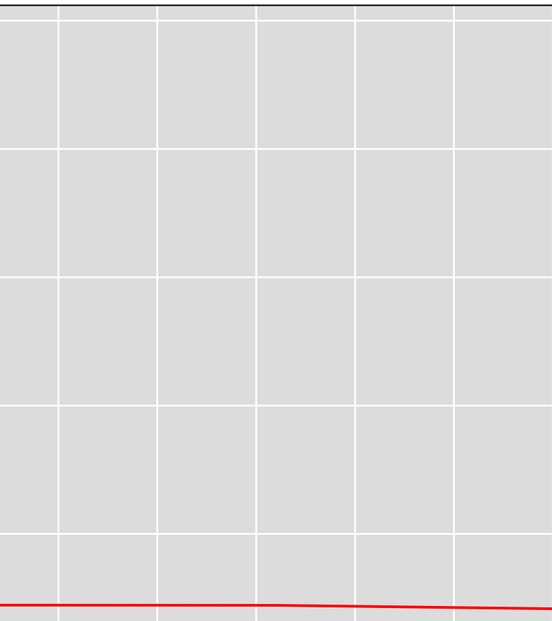
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Orange - 6251103 - Layer 2



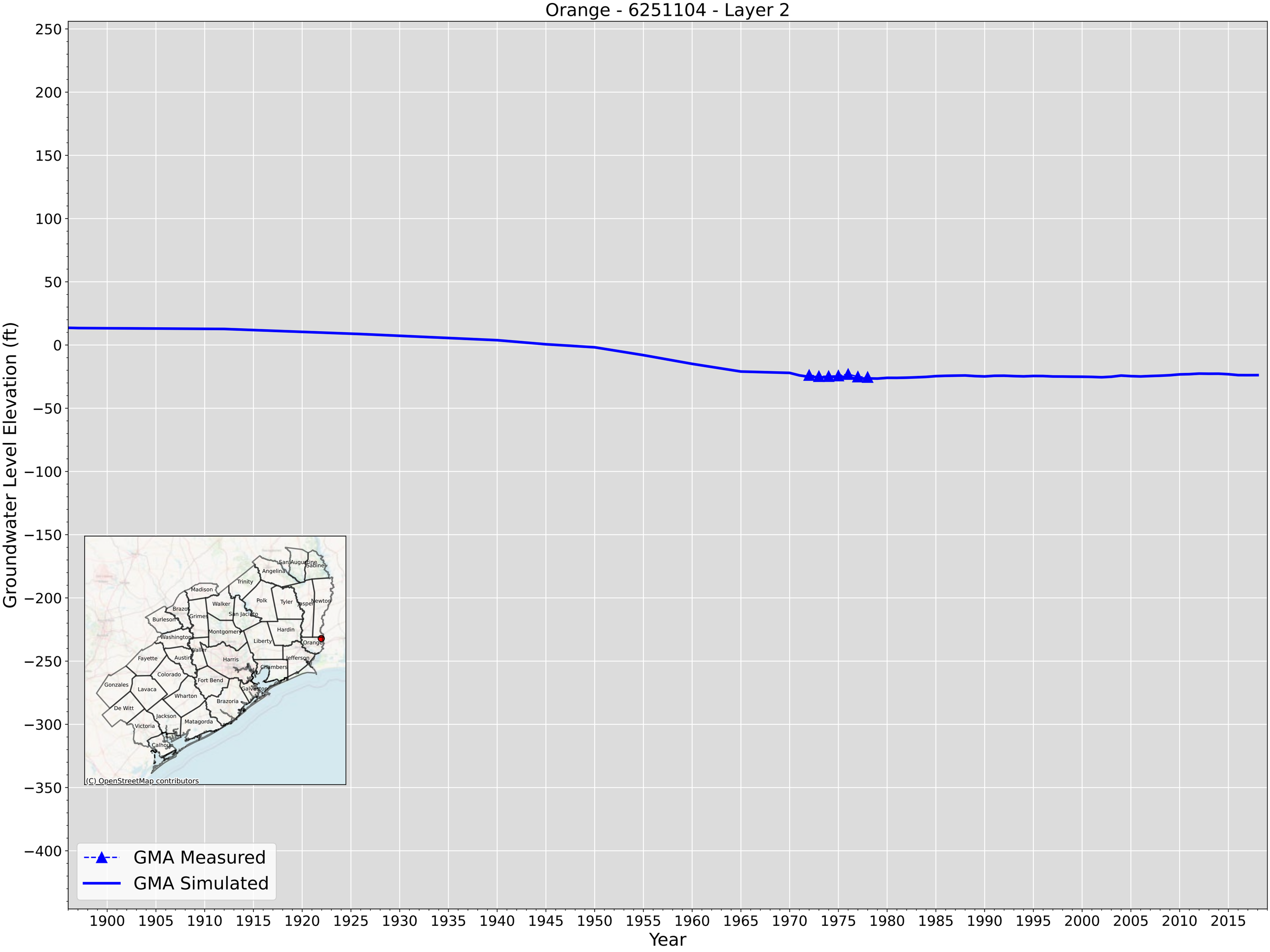
GMA Measured
GMA Simulated
Gulf Measured - 6251103
Gulf Simulated - 6251103

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year


Orange - 6251104 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Orange - 6251707 & 6251702 & 6251706 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6251707
Gulf Simulated - 6251707

Orange - 6257203 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6257401 & 6257405 & 6257406 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6257401
Gulf Simulated - 6257401

Orange - 6257403 & 6257404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6257407 & 6257408 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

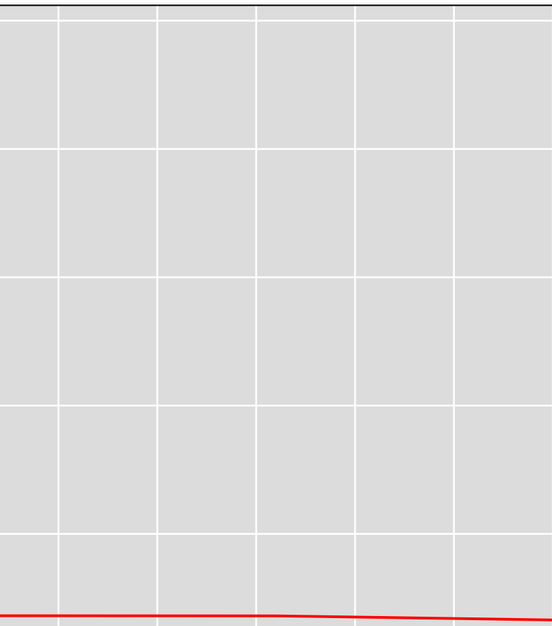
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6257409 - Layer 2



GMA Measured
GMA Simulated
Gulf Measured - 6257409
Gulf Simulated - 6257409

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Orange - 6257501 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6257904 & 6257909 & 6258701 & 6258708 - Layer 2

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6257904
Gulf Simulated - 6257904

Orange - 6257905 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6257907 & 6257908 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6258304 & 6258303 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6258304
Gulf Simulated - 6258304

Orange - 6258305 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258324 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258325 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258403 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258514 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6258602 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6258603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258605 & 6258615 & 6258616 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6258607 & 6258608 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6258609 & 6258610 & 6258611 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6258609
Gulf Simulated - 6258609

Orange - 6258612 & 6258613 & 6258614 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258618 & 6258641 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258631 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258632 & 6258633 & 6258634 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

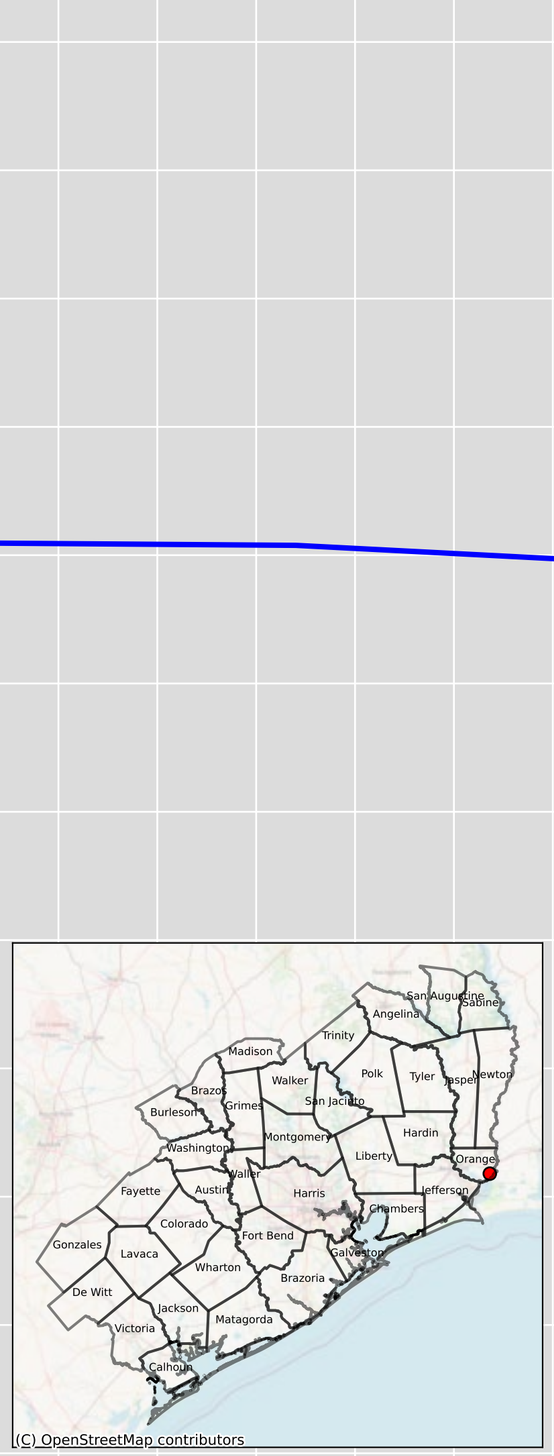
Orange - 6258639 & 6258640 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

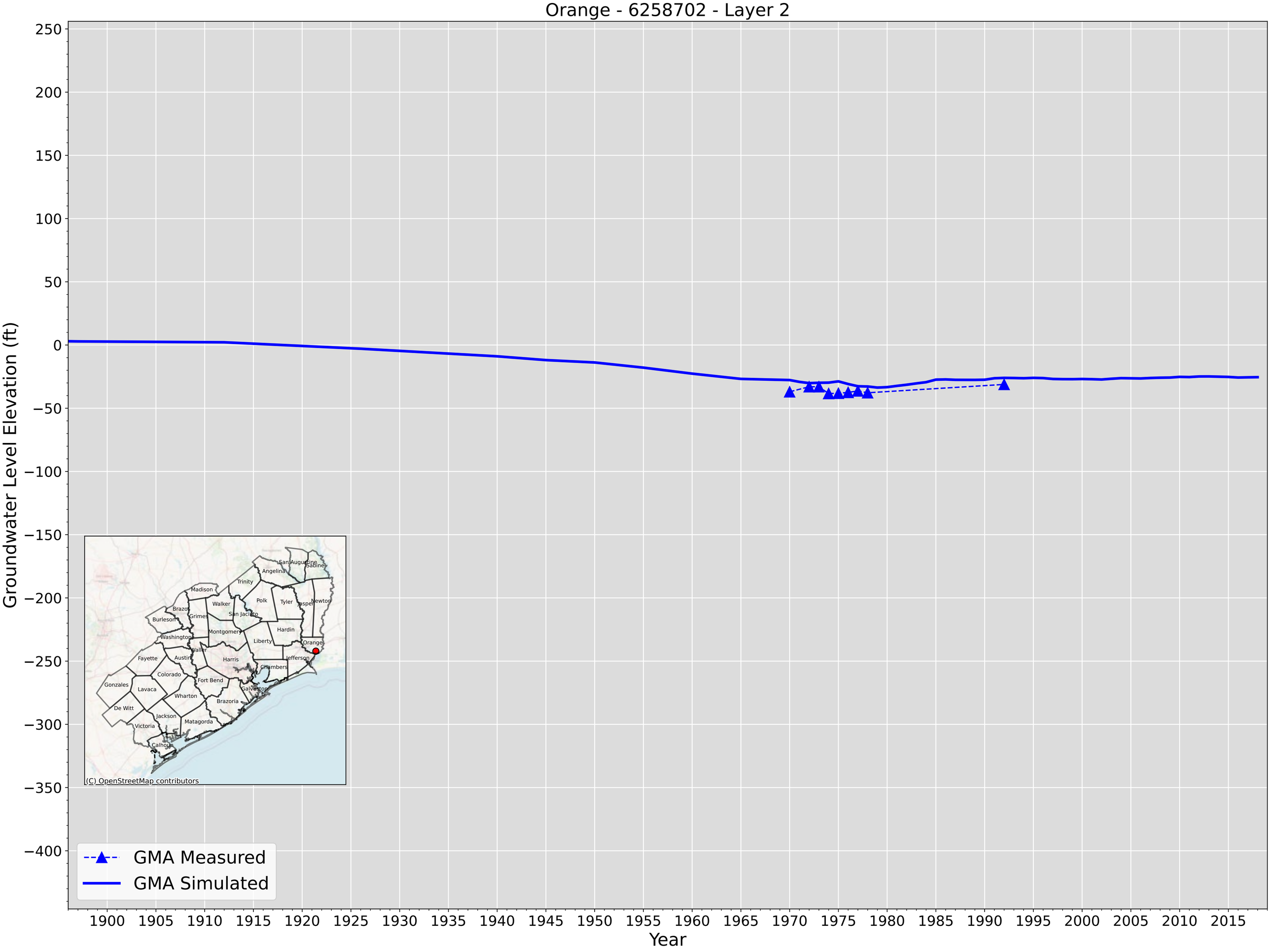
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated


Orange - 6258702 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Orange - 6258703 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Orange - 6258809 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6258809
Gulf Simulated - 6258809

Orange - 6258810 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Orange - 6259101 & 6259123 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6259101
Gulf Simulated - 6259101

Orange - 6259102 & 6259103 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

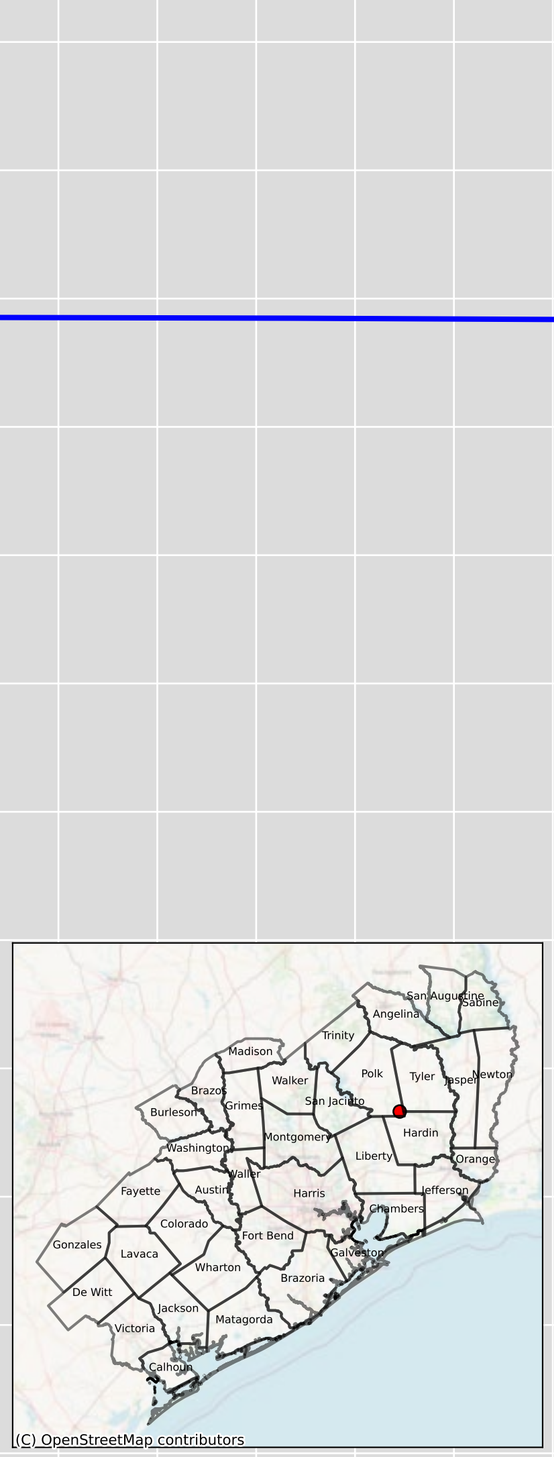
Polk - 6128802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

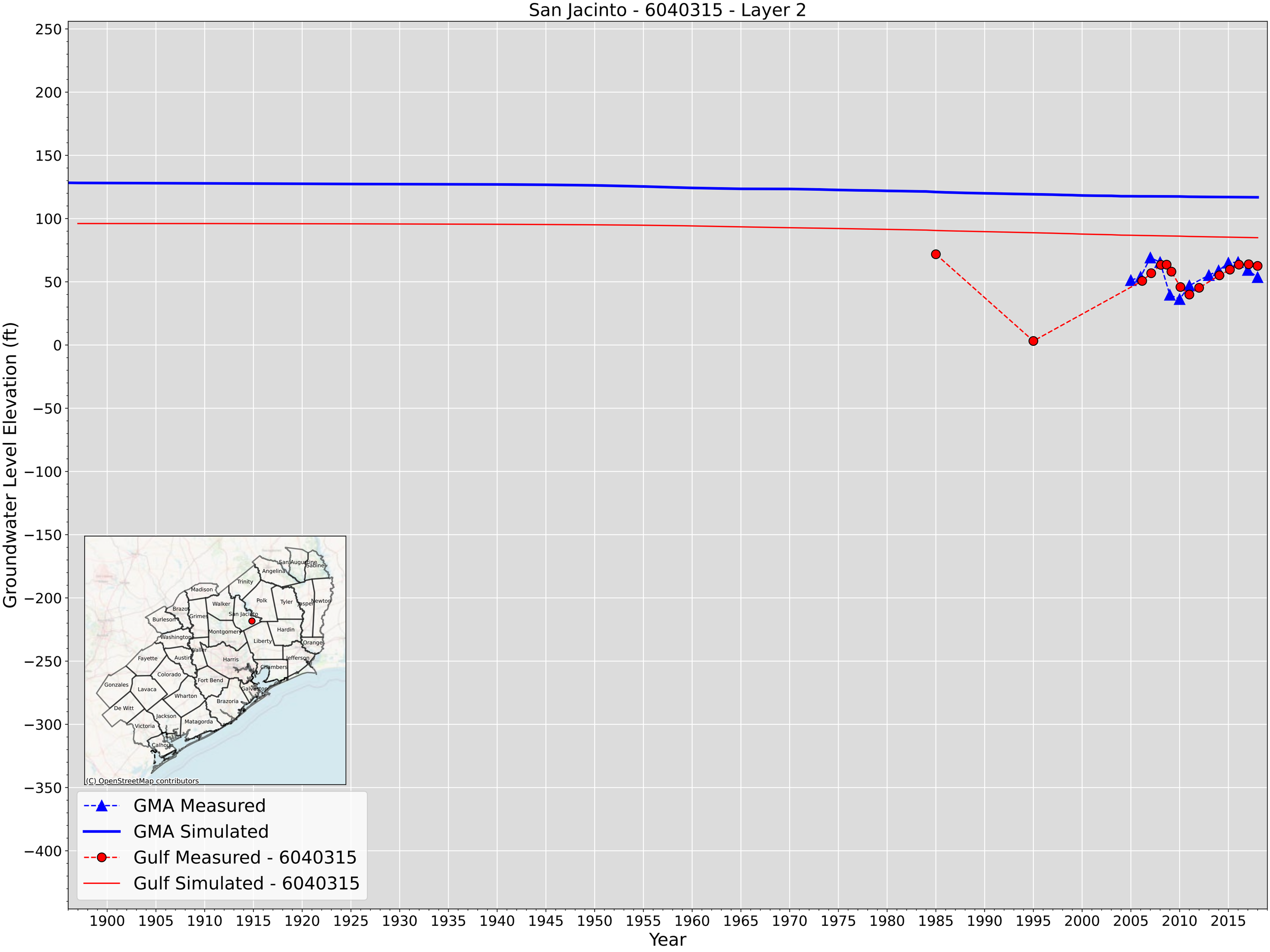
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

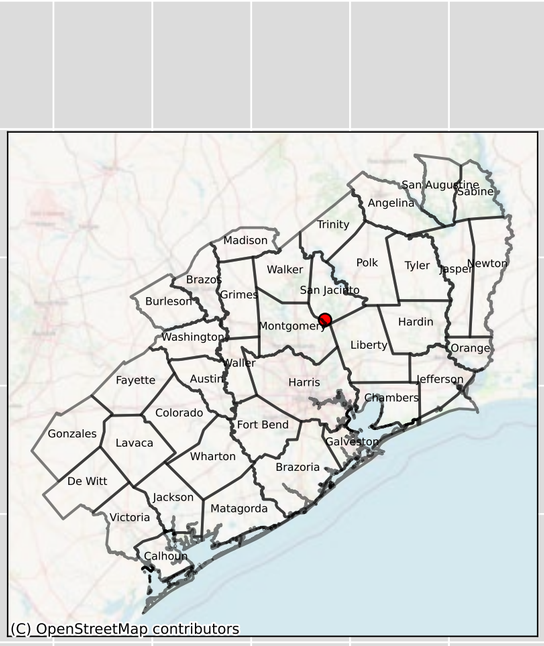


GMA Measured

GMA Simulated


San Jacinto - 6040315 - Layer 2
Groundwater Level Elevation (ft)
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
San Augustine
Sabine
Angelina
Trinity
Madison
Polk
Tyler
Jasper
Newton
Walker
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 6040315
Gulf Simulated - 6040315

San Jacinto - 6047103 - Layer 2



Groundwater Level Elevation (ft)

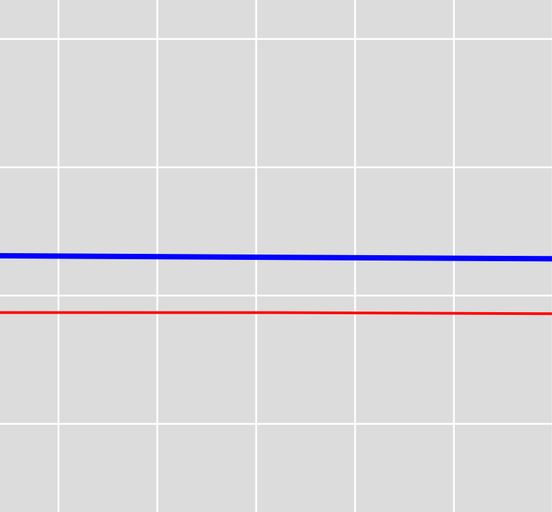
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6047103
Gulf Simulated - 6047103

San Jacinto - 6125410 - Layer 2



Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

Groundwater Le

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6125410
Gulf Simulated - 6125410

San Jacinto - 6133102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6133102
Gulf Simulated - 6133102

Tyler - 6130303 & 6130302 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6130303
Gulf Simulated - 6130303

Waller - 6509301 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Waller - 6509402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Waller - 6509604 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6510102 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Waller - 6510716 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

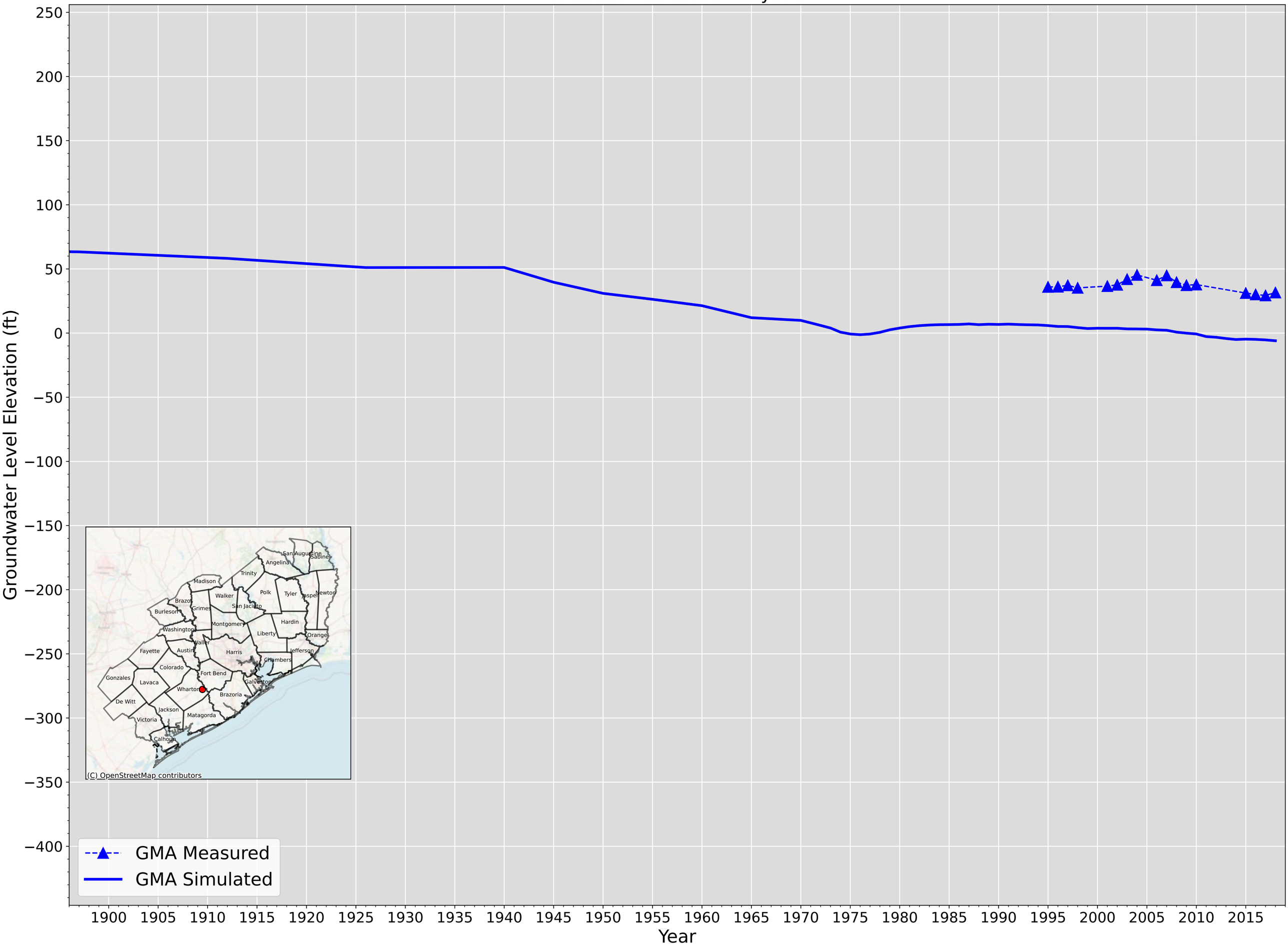
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6541402 - Layer 2



Wharton - 6541707 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6541707
Gulf Simulated - 6541707

Wharton - 6541902 & 6541905 & 6541906 & 6541909 & 6541918 & 6541920 - Layer 2

Groundwater Level Elevation (ft)

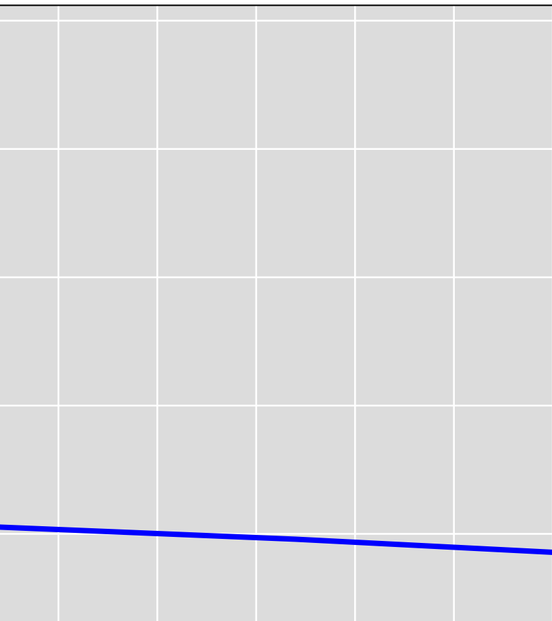
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6541912 - Layer 2



Groundwater Level Elevation (ft)

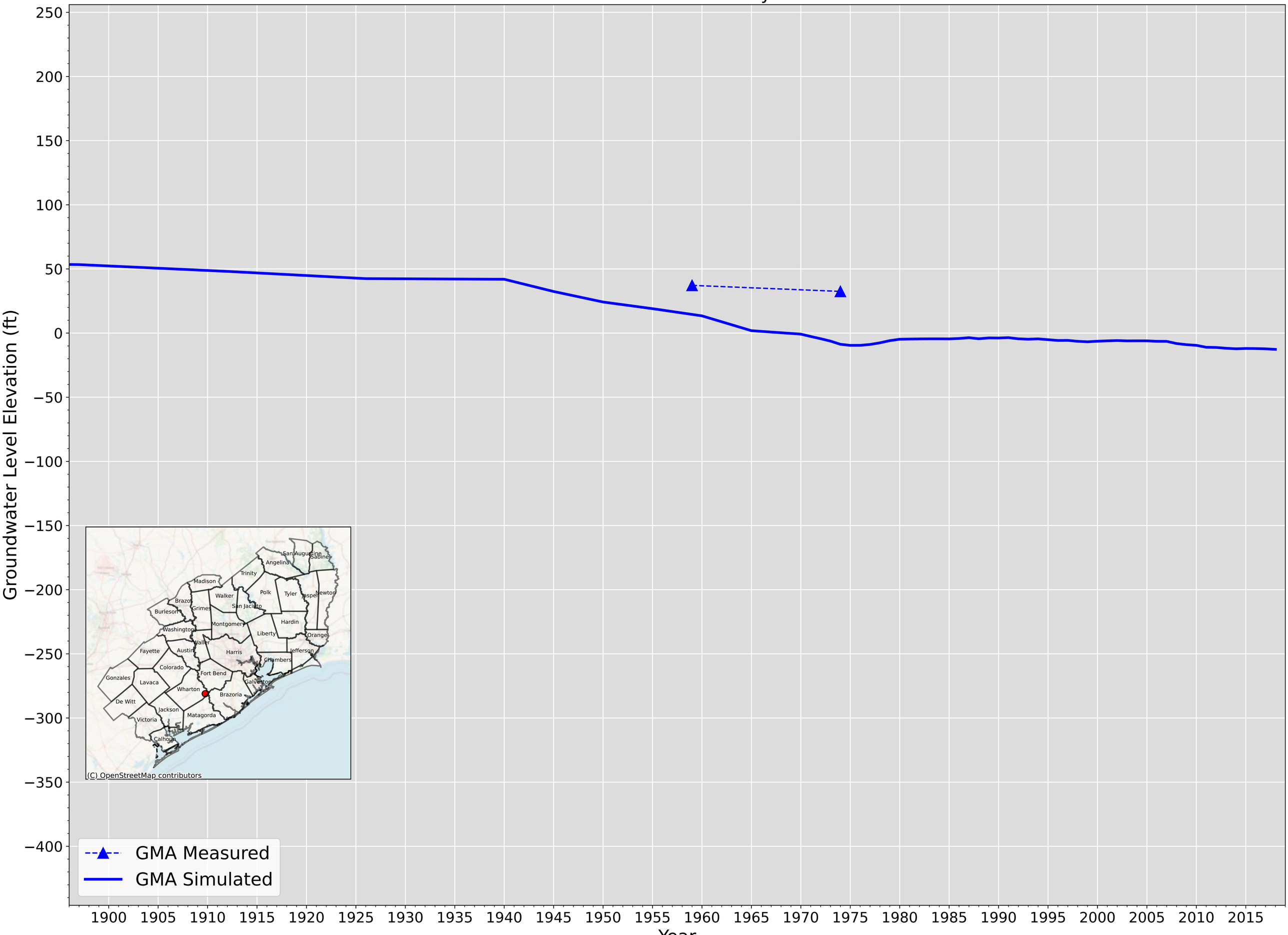
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

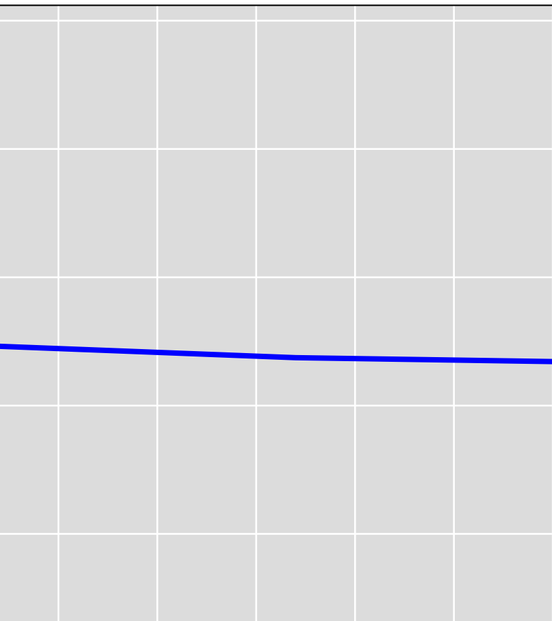
Year

GMA Measured
GMA Simulated

Wharton - 6549201 - Layer 2



Wharton - 6631107 - Layer 2



Groundwater Level Elevation (ft)

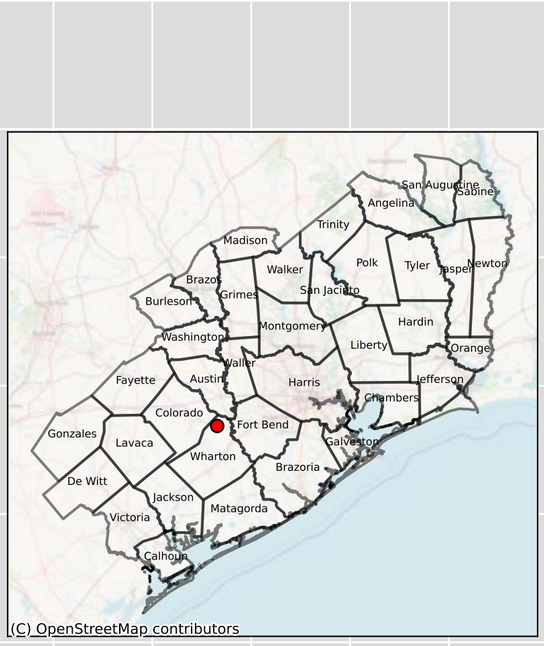
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6631504 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6631903 & 6631904 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

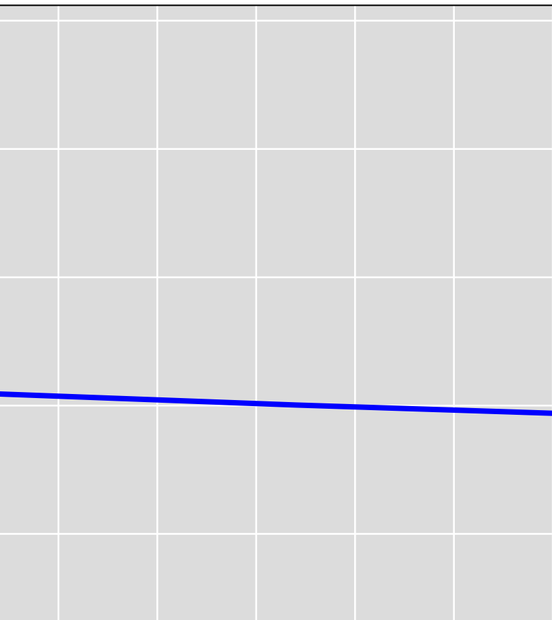
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6631909 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

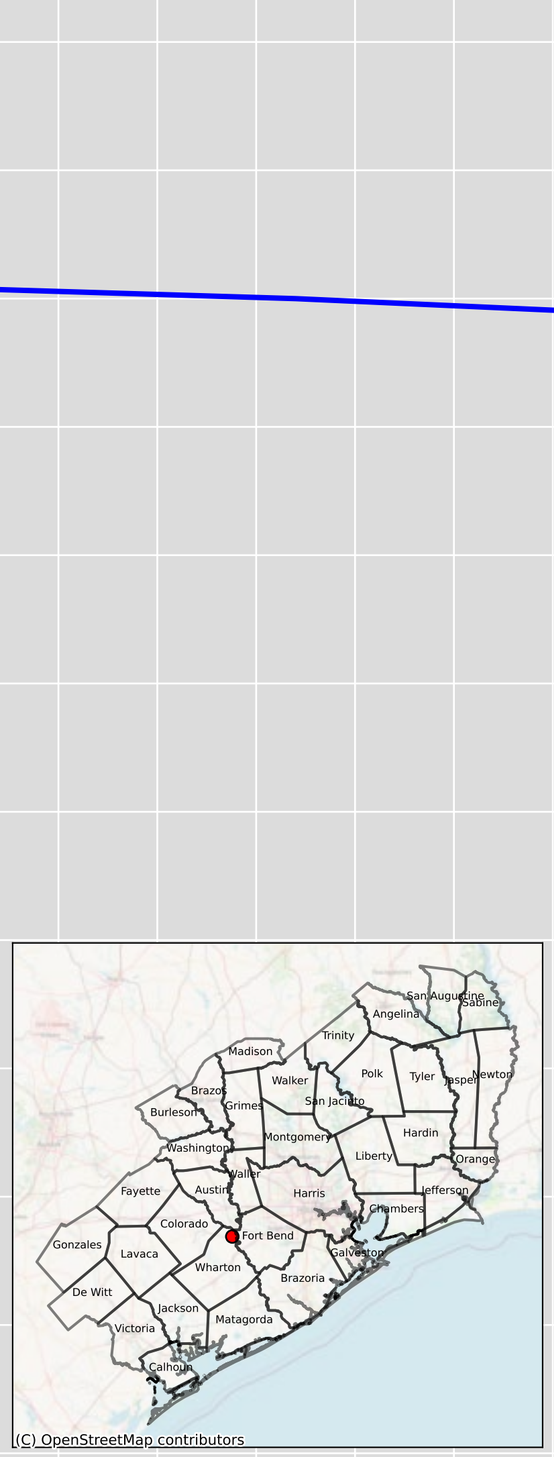
Wharton - 6632402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Wharton - 6632809 & 6632804 - Layer 2

Groundwater Level Elevation (ft)

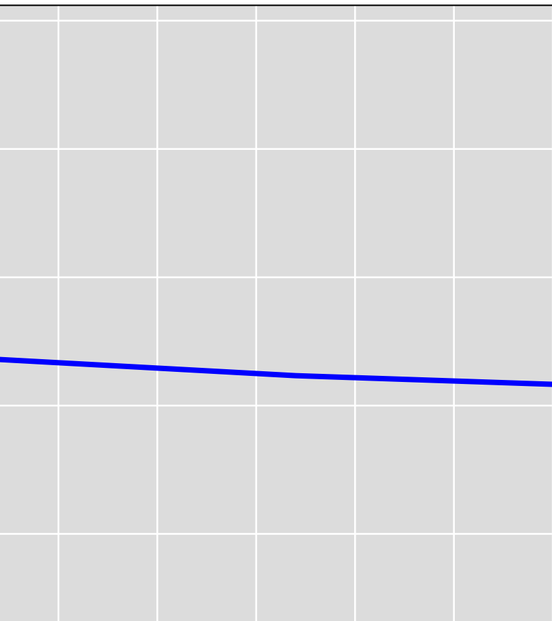
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6632809
Gulf Simulated - 6632809

Wharton - 6638201 - Layer 2



Groundwater Level Elevation (ft)

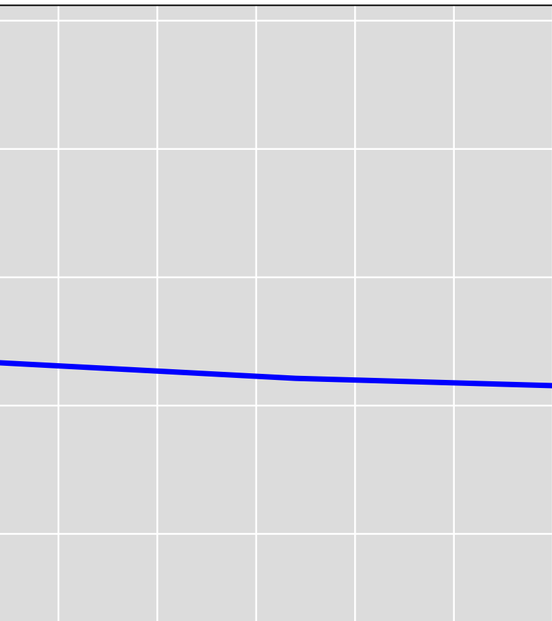
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6638301 - Layer 2



Groundwater Level Elevation (ft)

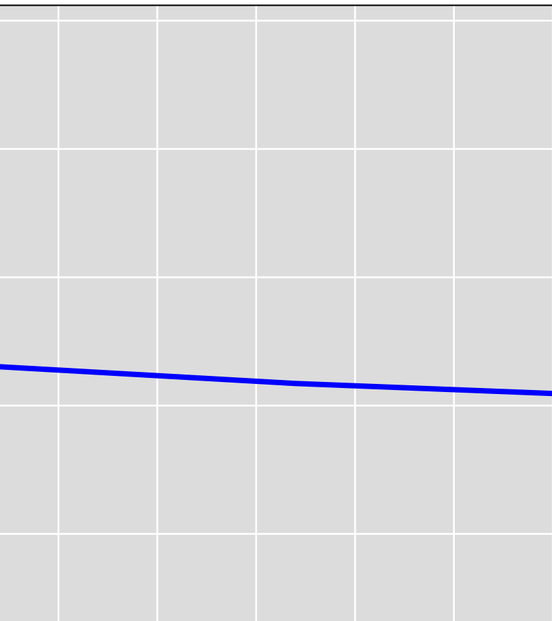
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6638304 - Layer 2



Groundwater Level Elevation (ft)

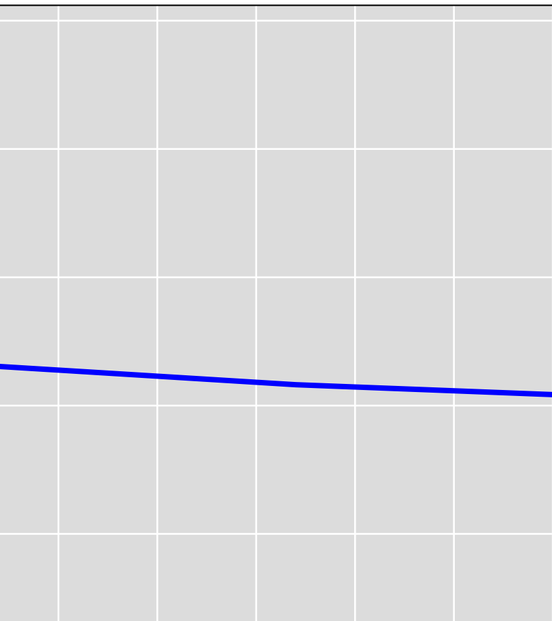
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6638501 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6638502 - Layer 2

Groundwater Level Elevation (ft)

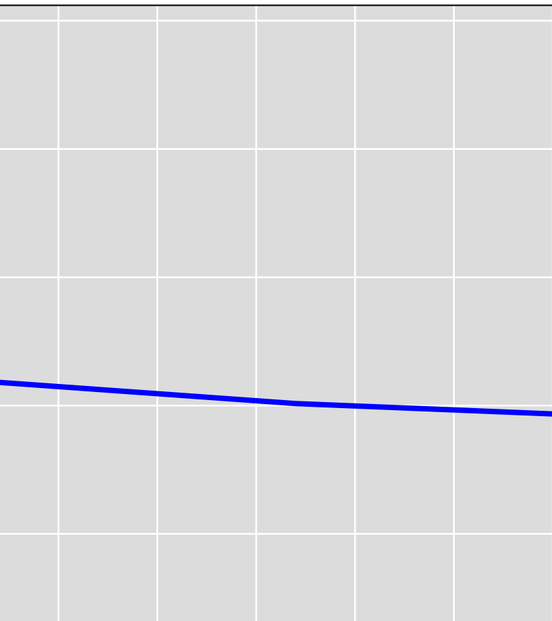
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6638801 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6639101 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

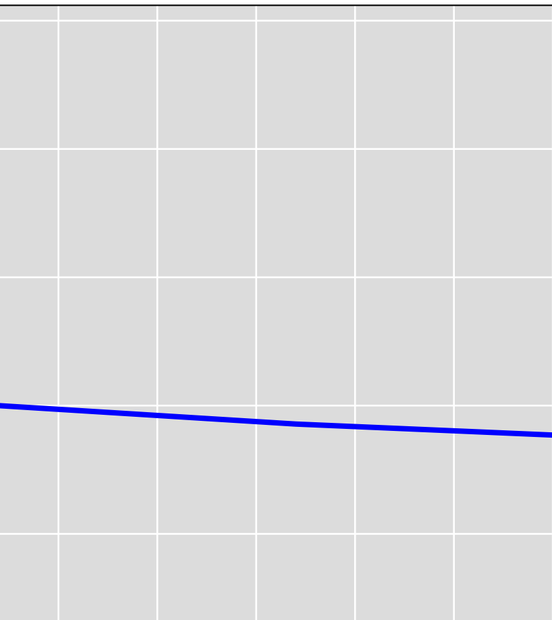
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6639701 - Layer 2



Groundwater Level Elevation (ft)

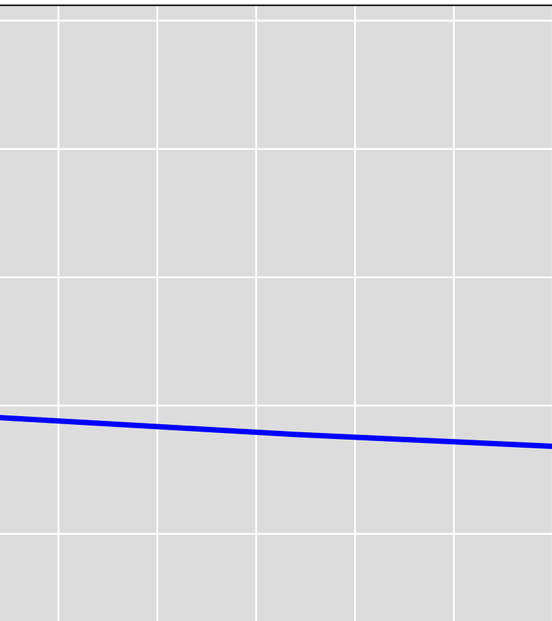
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6639801 - Layer 2



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6639904 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

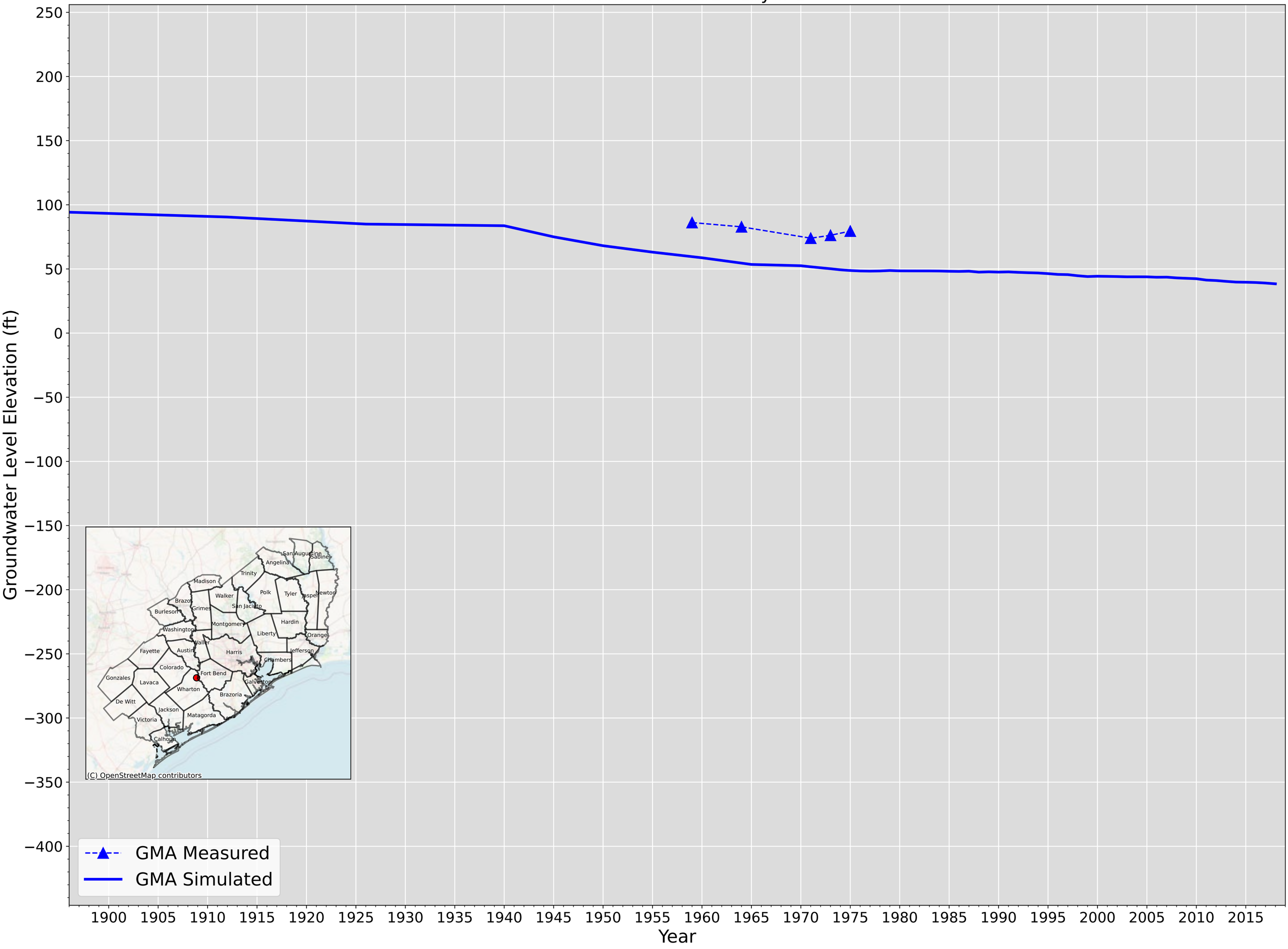
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

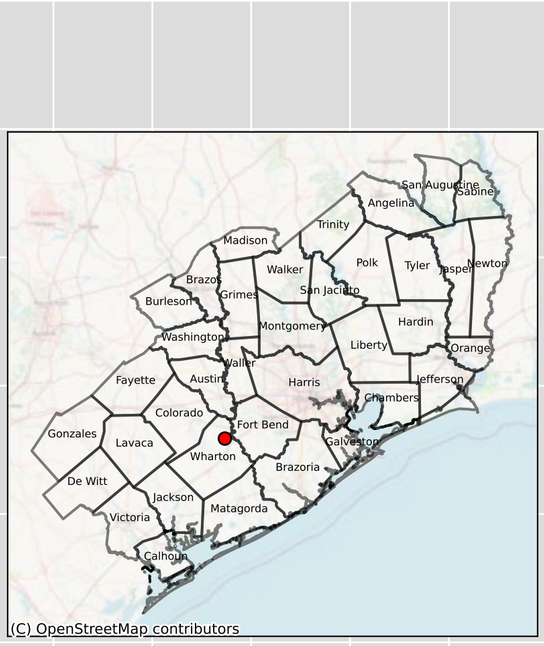
GMA Measured

GMA Simulated

Wharton - 6640202 - Layer 2



Wharton - 6640401 - Layer 2



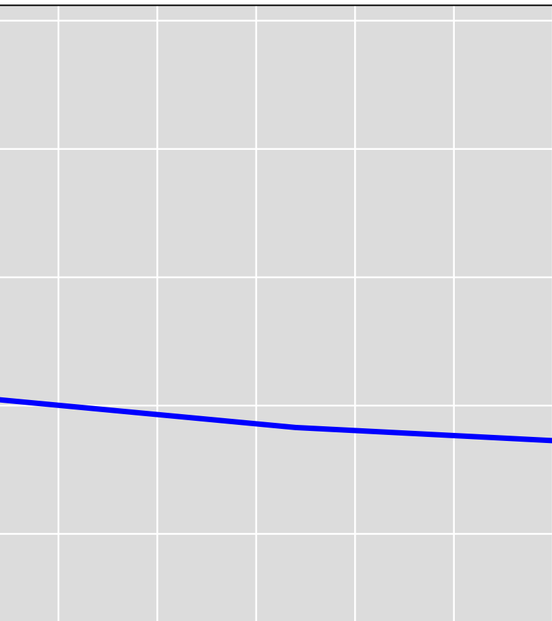
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6644804 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6645201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6645402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

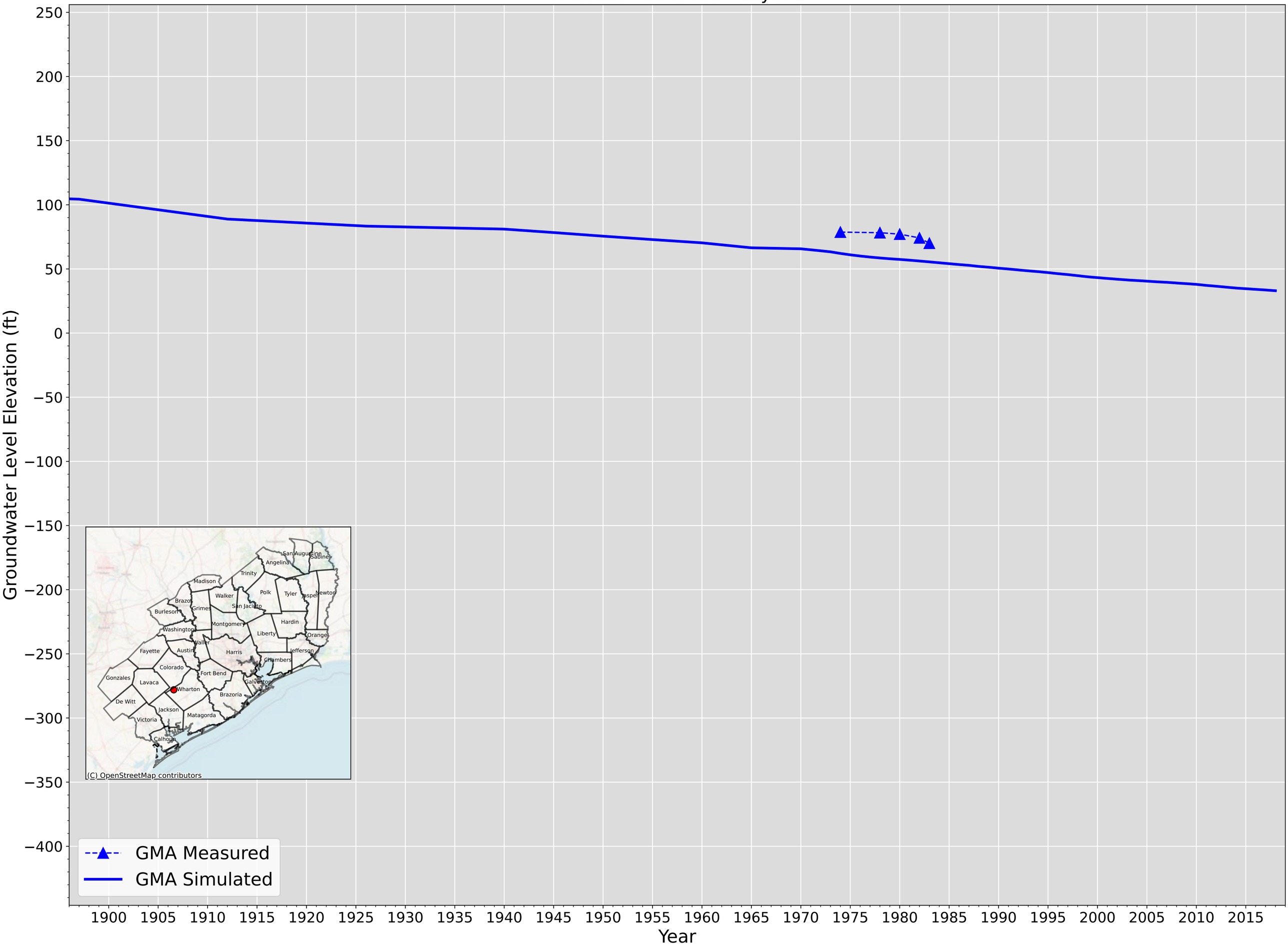
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

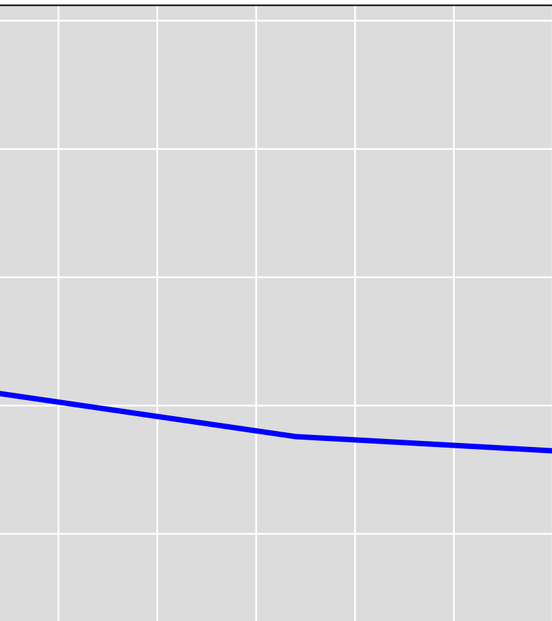
GMA Measured

GMA Simulated

Wharton - 6645403 - Layer 2



Wharton - 6645601 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6645605 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

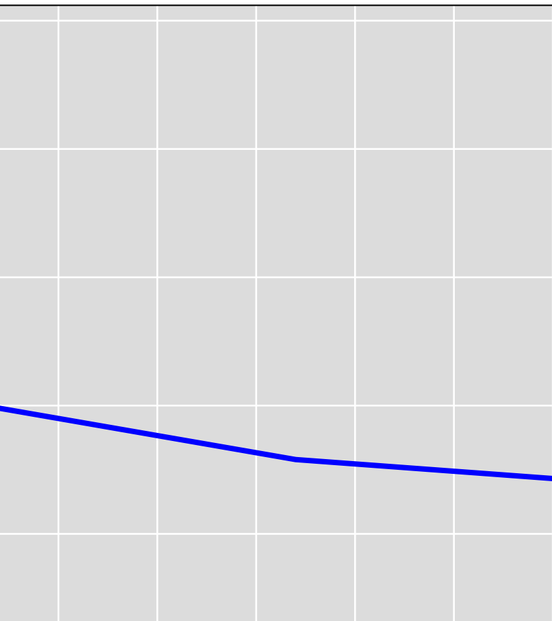
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6645802 - Layer 2



Groundwater Level Elevation (ft)

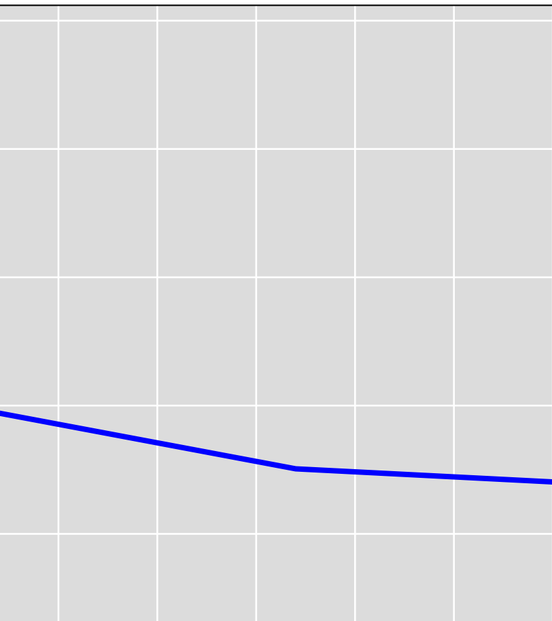
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6645916 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6646201 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

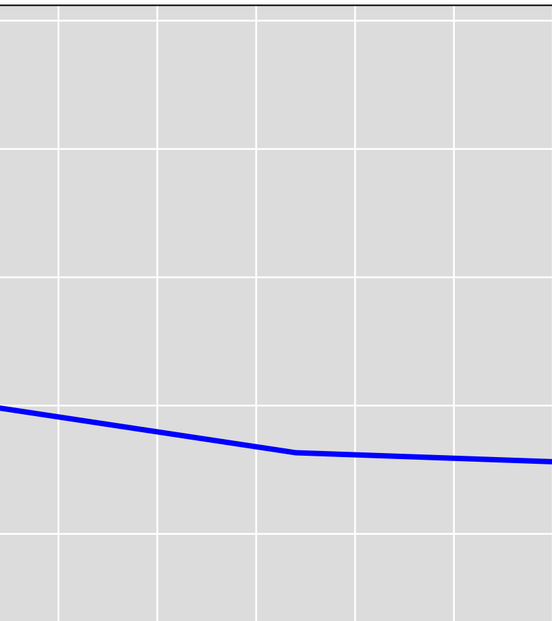
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6646402 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

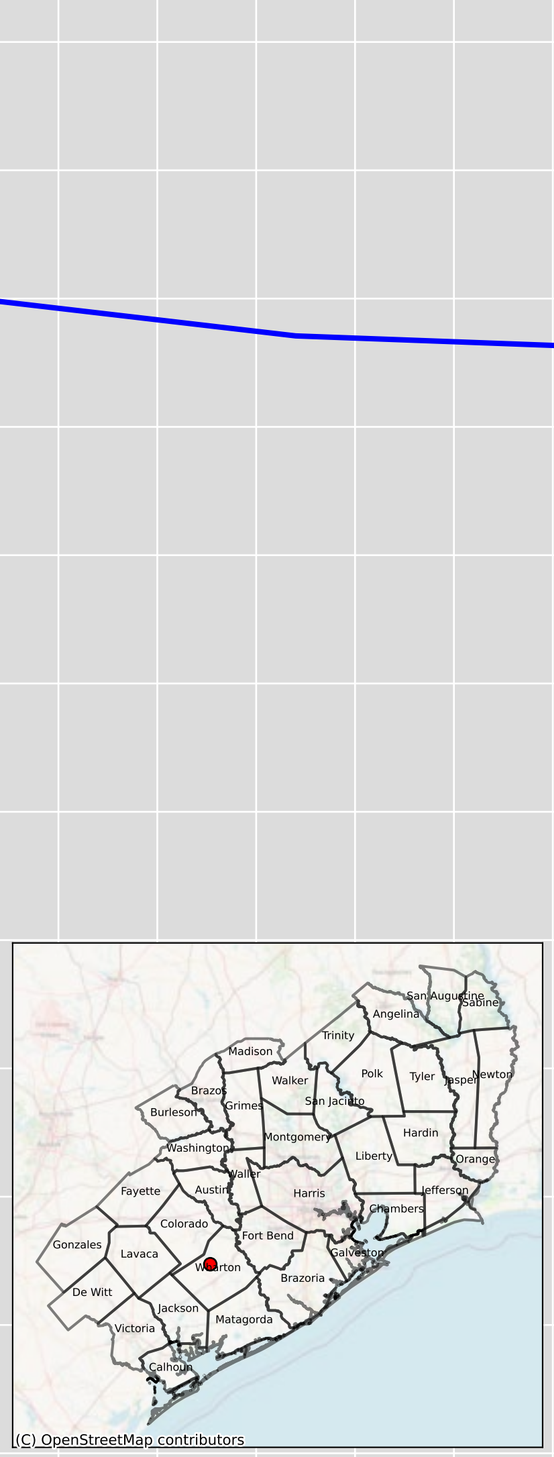
Wharton - 6646601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

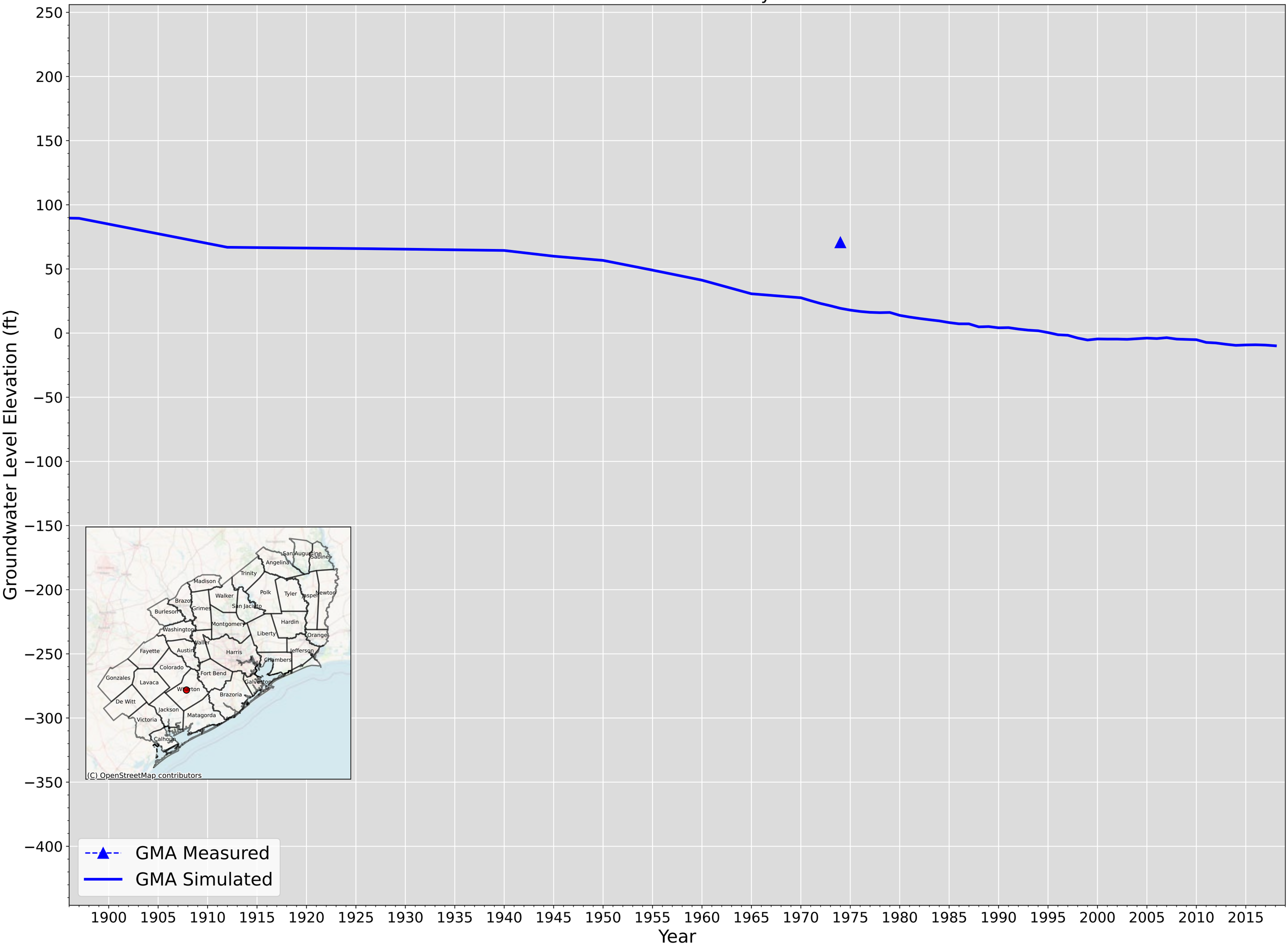
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

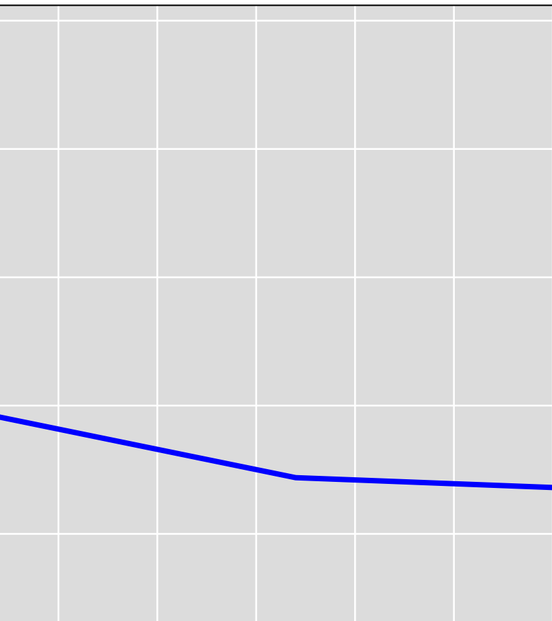


GMA Measured
GMA Simulated

Wharton - 6646605 - Layer 2



Wharton - 6646703 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6646802 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6647101 - Layer 2

Groundwater Level Elevation (ft)

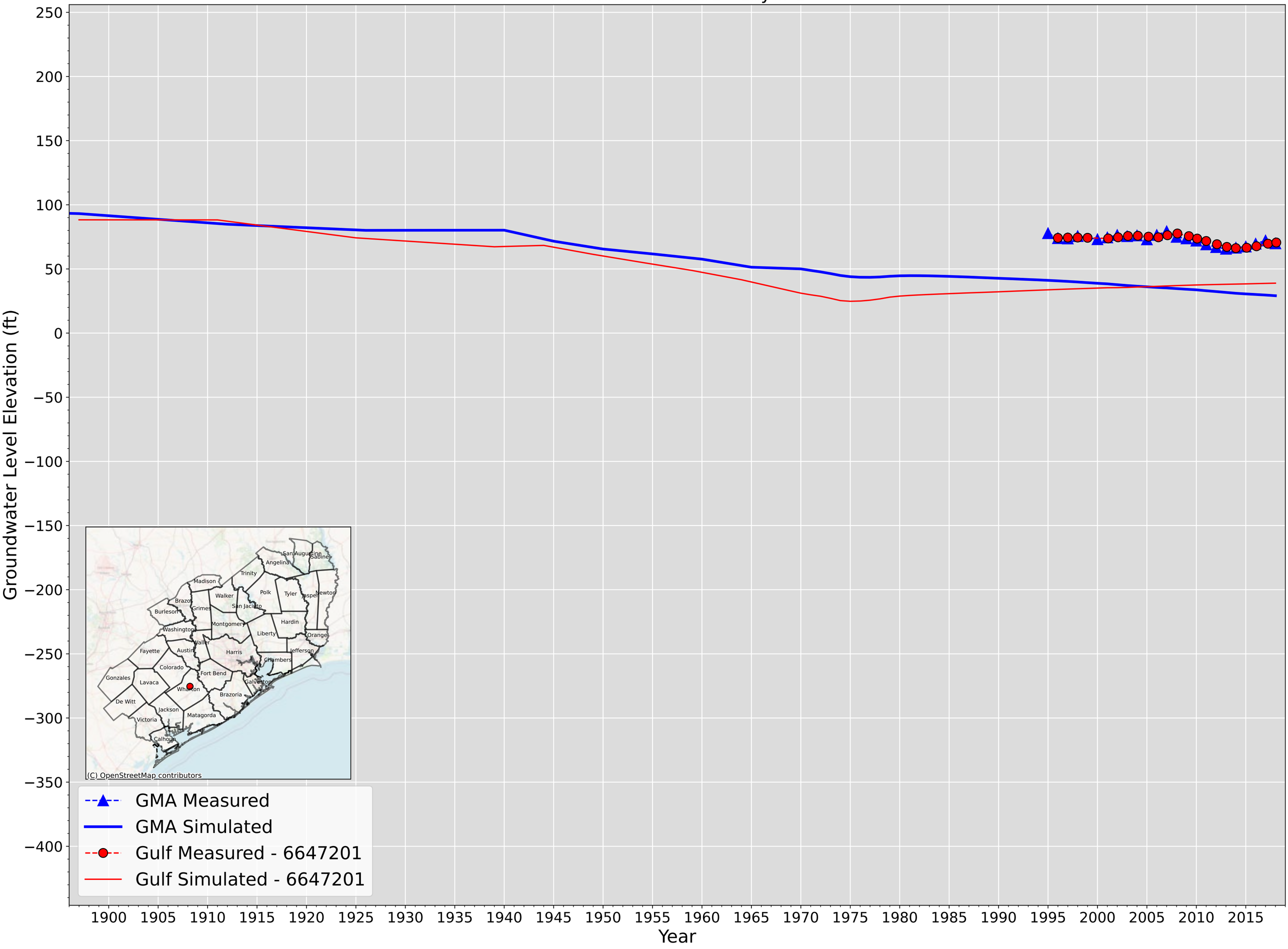
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

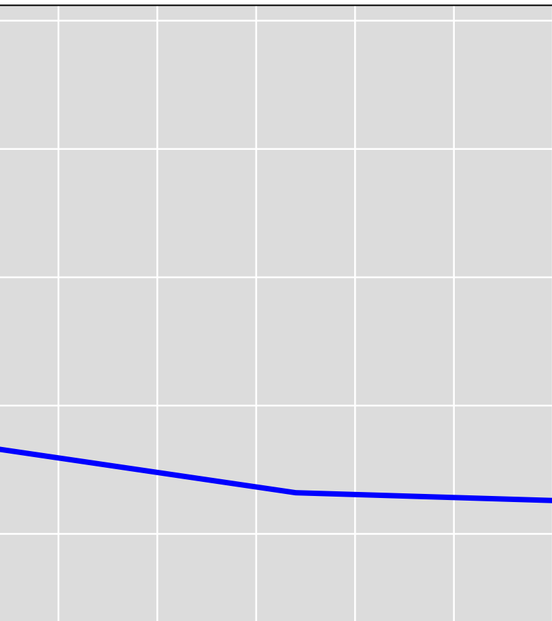
Year

GMA Measured
GMA Simulated

Wharton - 6647201 - Layer 2



Wharton - 6647703 - Layer 2



Groundwater Level Elevation (ft)

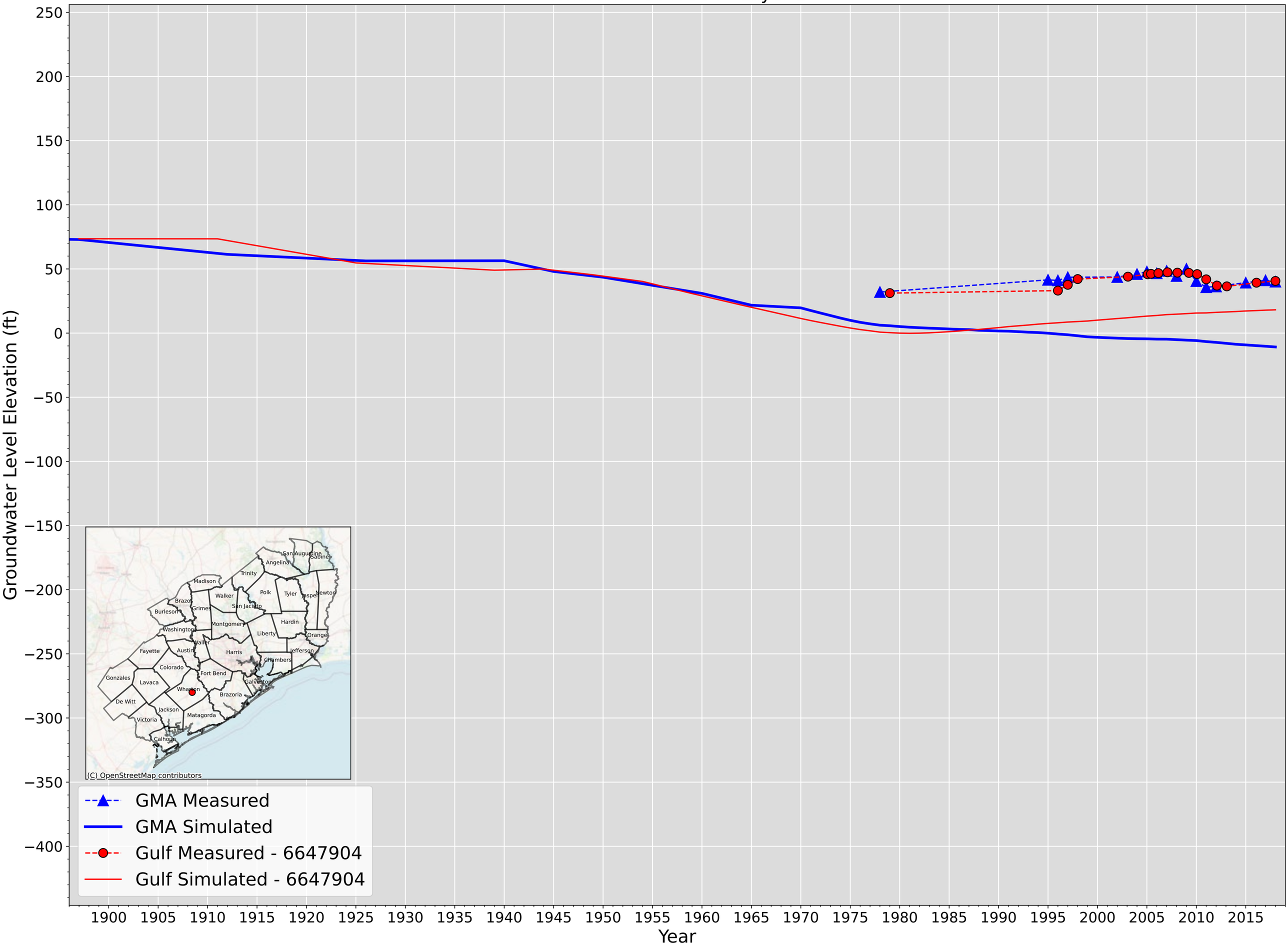
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6647904 - Layer 2



Wharton - 6648402 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

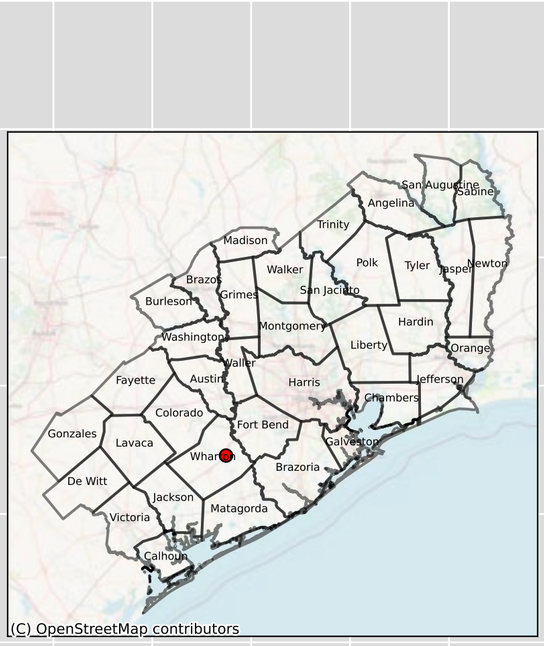
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6648404 - Layer 2



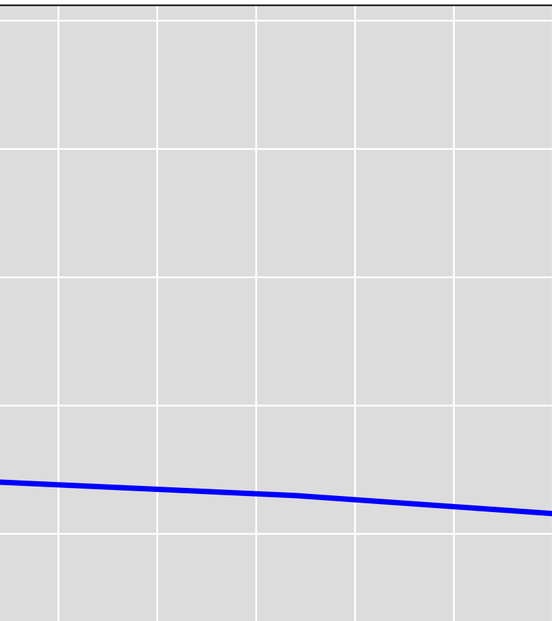
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6648601 - Layer 2



Groundwater Level Elevation (ft)

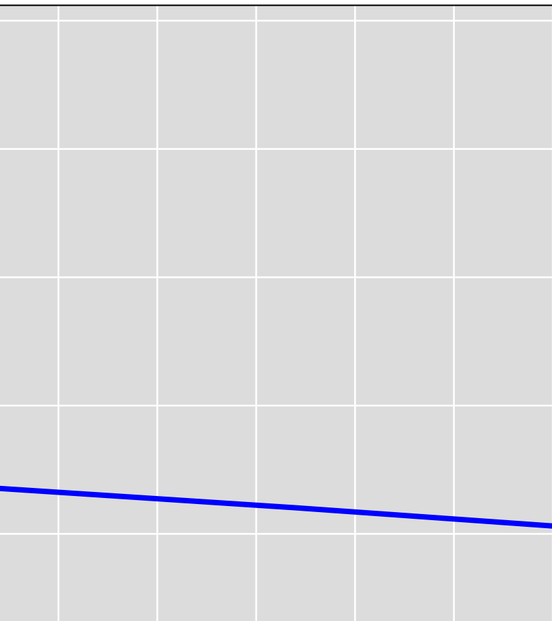
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6648802 - Layer 2



Groundwater Level Elevation (ft)

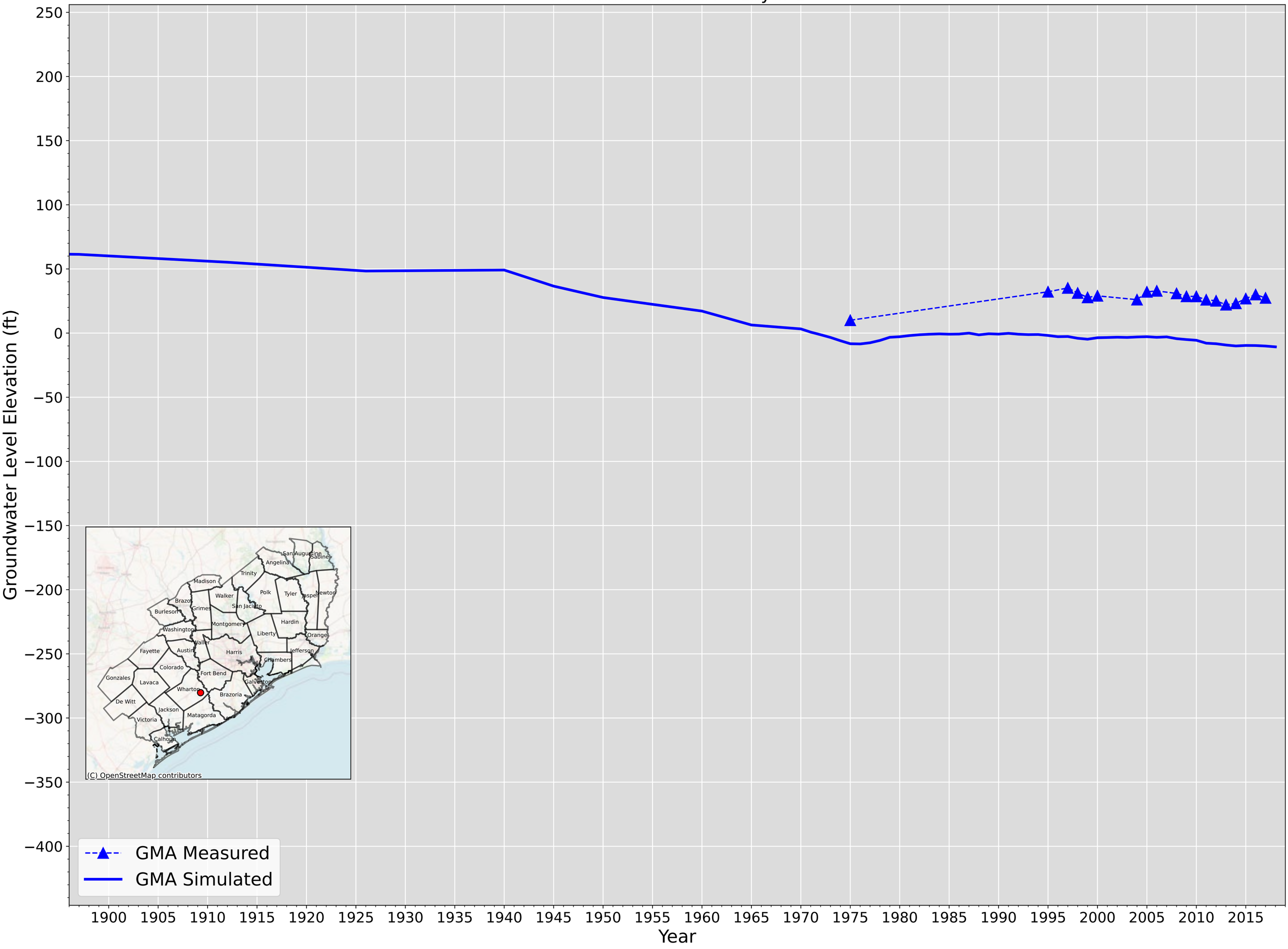
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6648907 - Layer 2



Wharton - 6648908 & 6648909 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6652202 - Layer 2

Groundwater Level Elevation (ft)

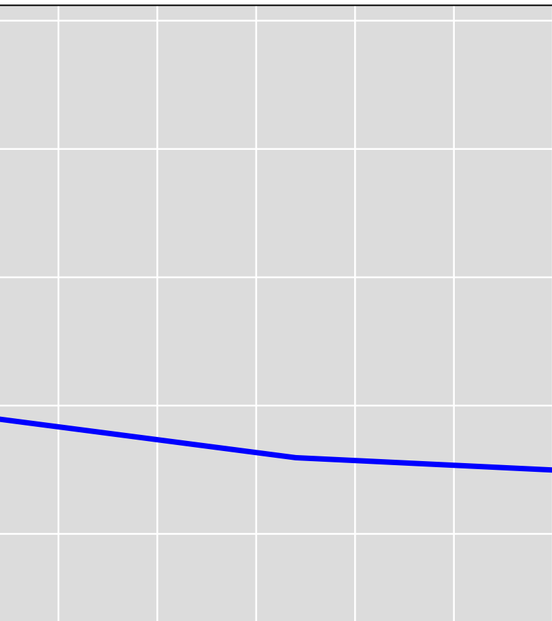
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6652207 - Layer 2



Groundwater Level Elevation (ft)

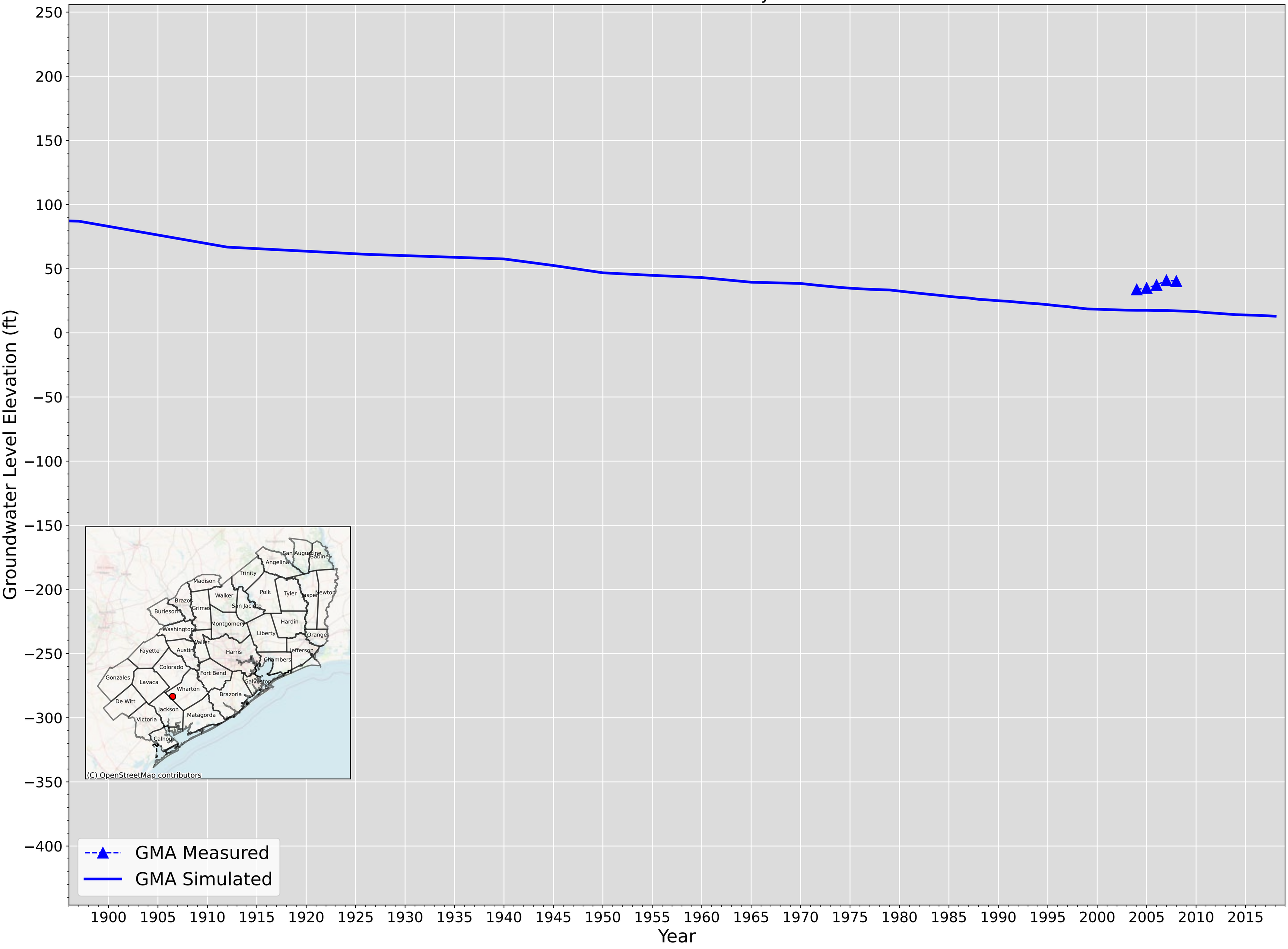
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6652604 - Layer 2



Wharton - 6653106 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

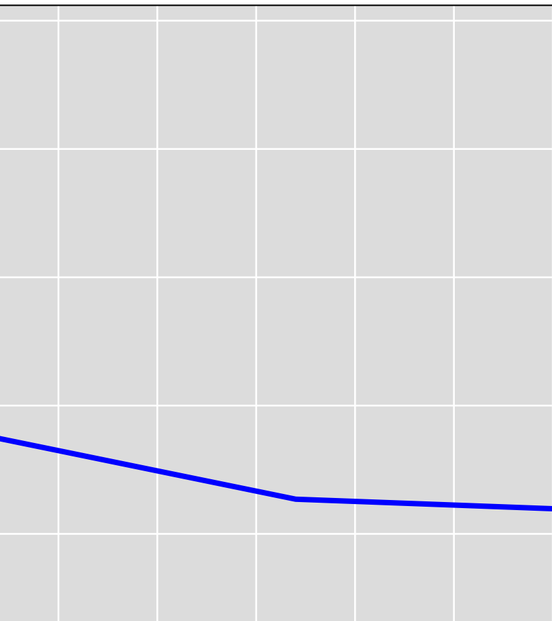
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6653307 - Layer 2



Groundwater Level Elevation (ft)

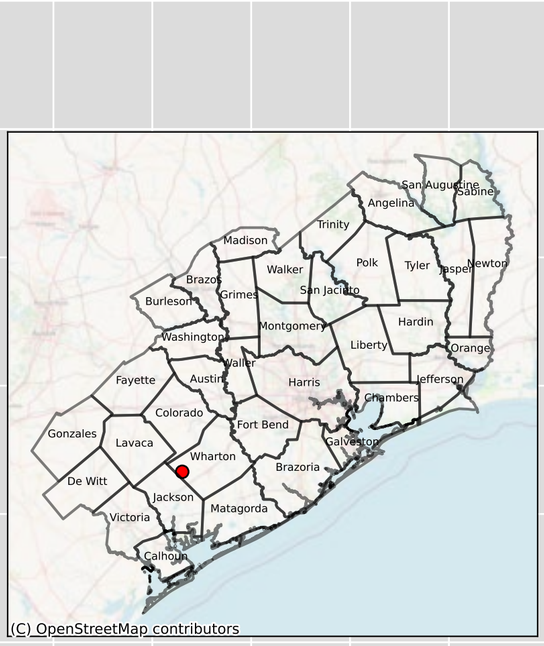
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6653406 - Layer 2



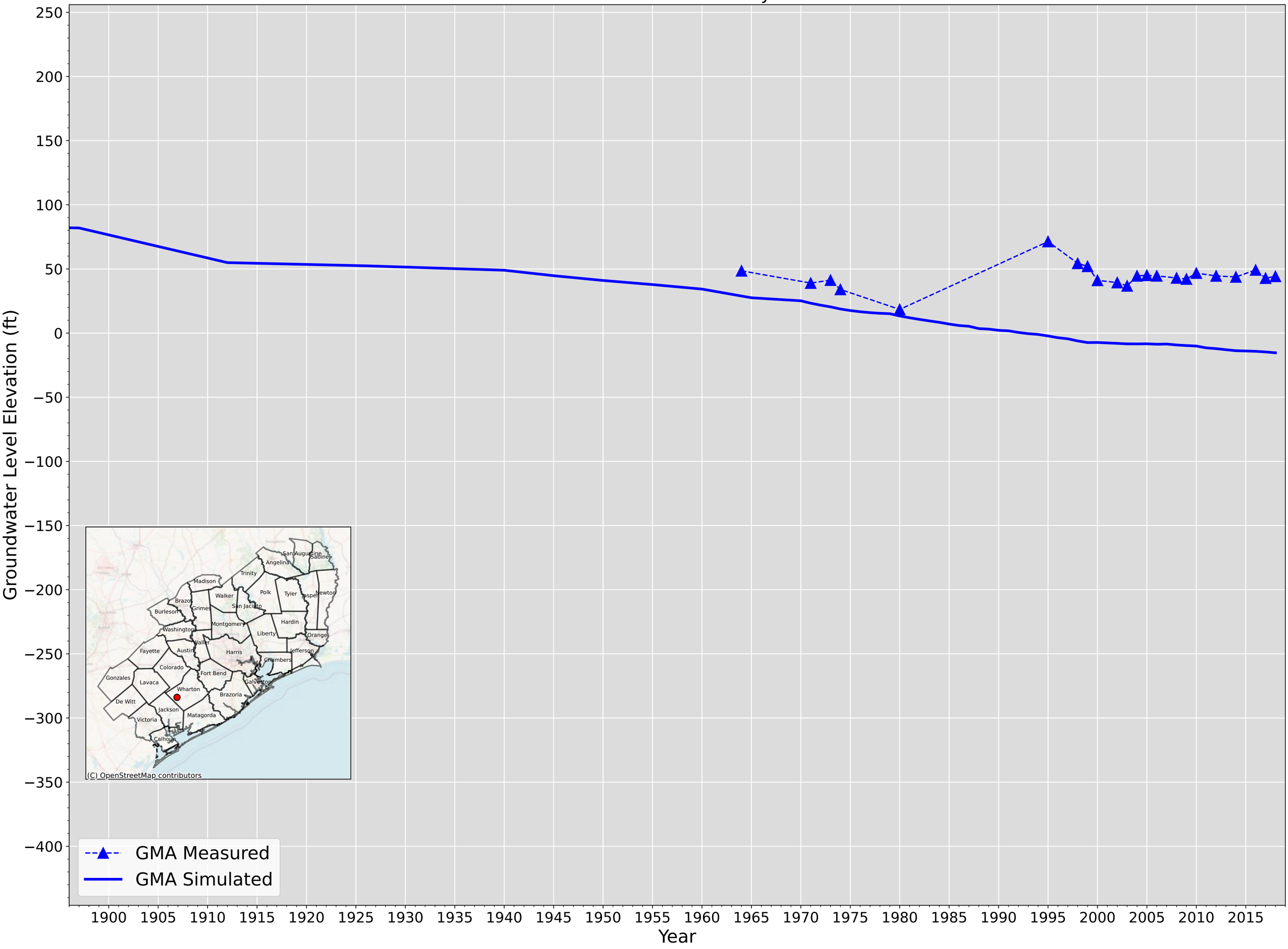
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

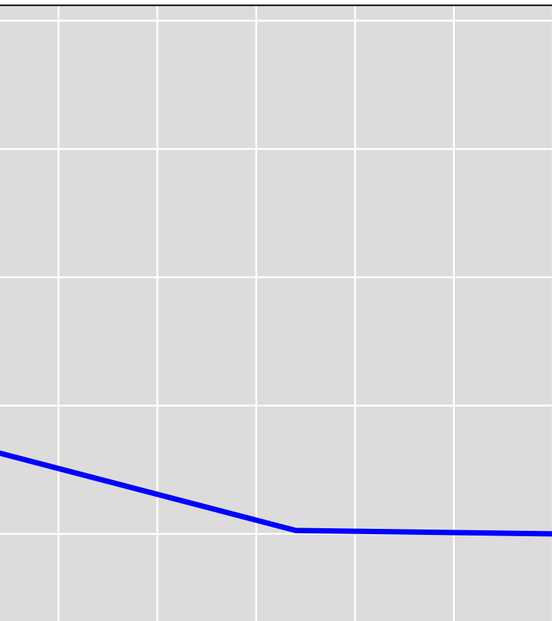
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6653503 - Layer 2



Wharton - 6653504 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6653603 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

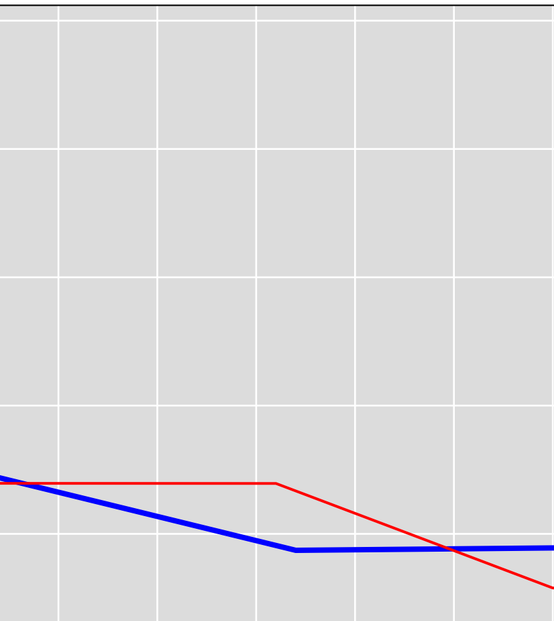
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6653804 - Layer 2



Level Elevation (ft)

Groundwater

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6653804
Gulf Simulated - 6653804

Wharton - 6653903 - Layer 2

Groundwater Level Elevation (ft)

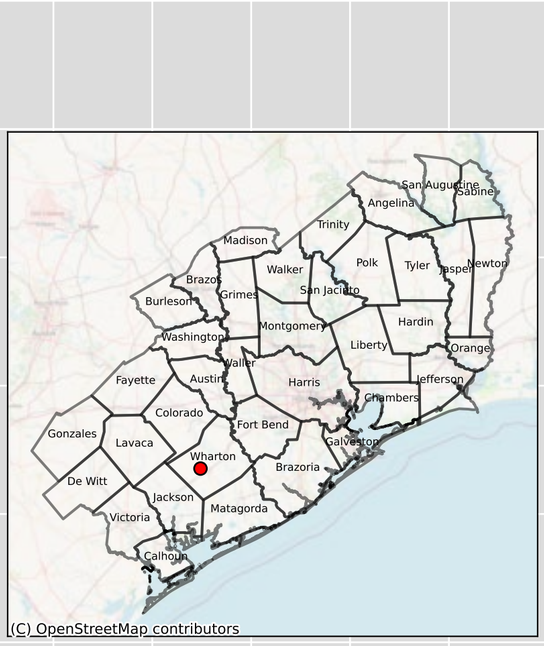
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6654108 - Layer 2



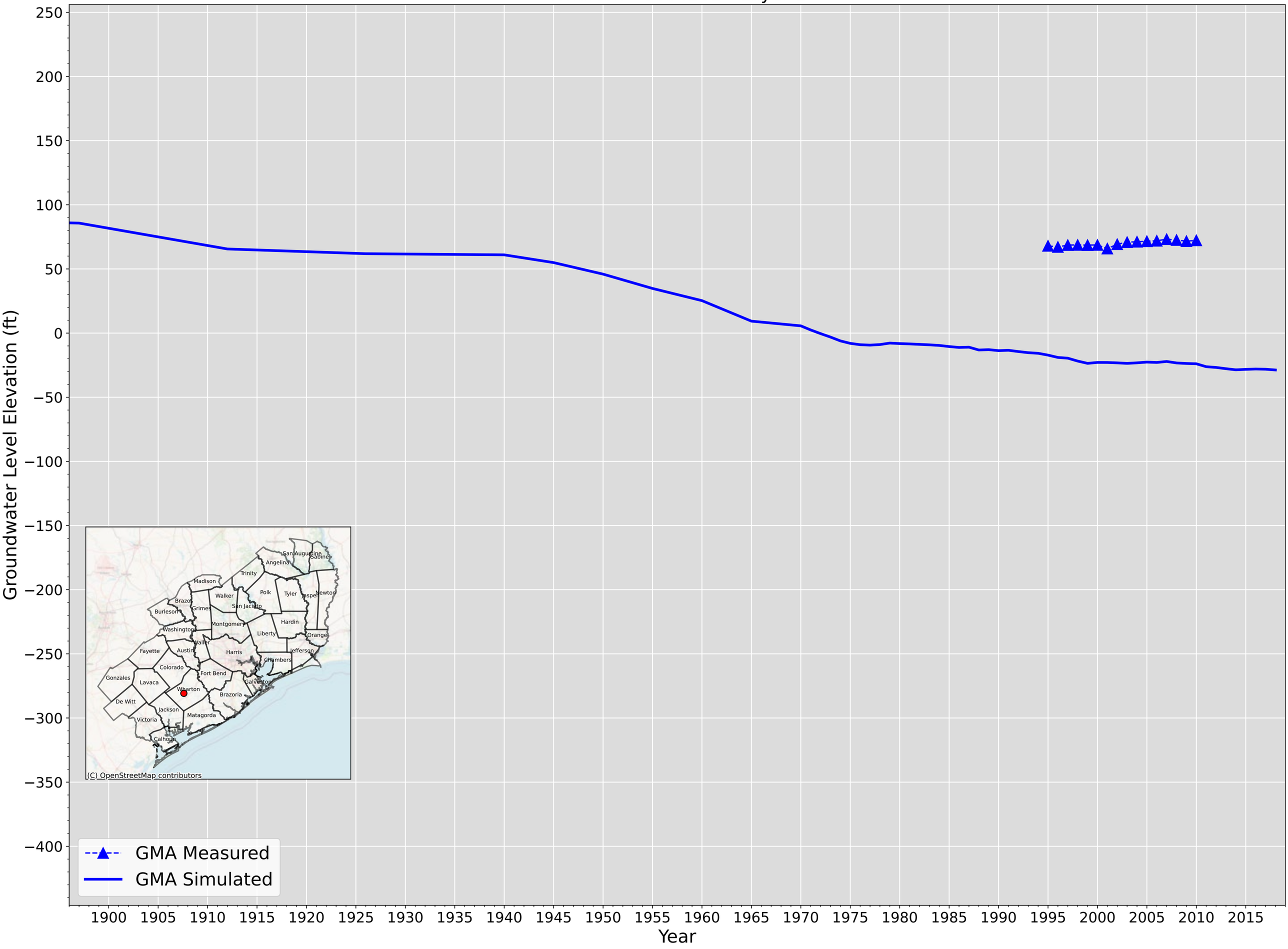
Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

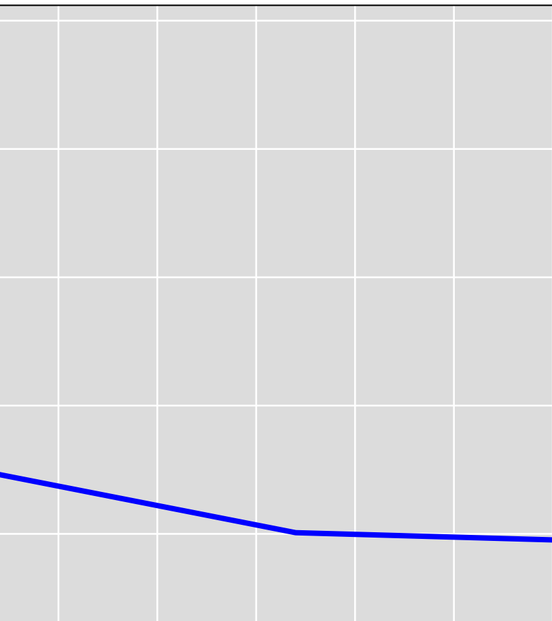
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6654202 - Layer 2



Wharton - 6654701 - Layer 2



Groundwater Level Elevation (ft)

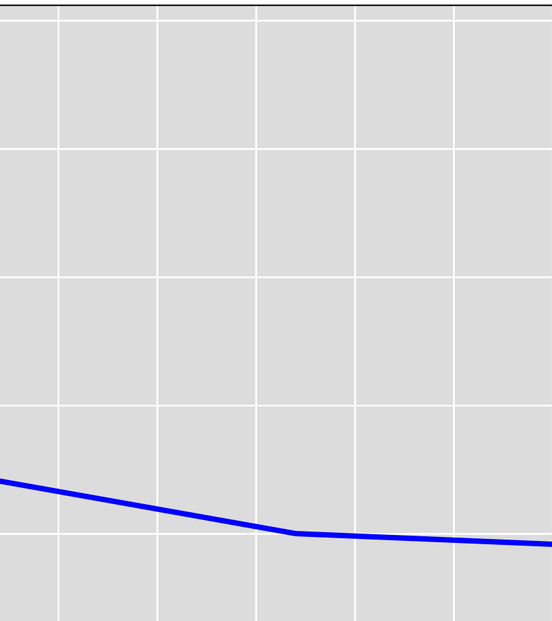
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6654807 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6654906 - Layer 2

Groundwater Level Elevation (ft)

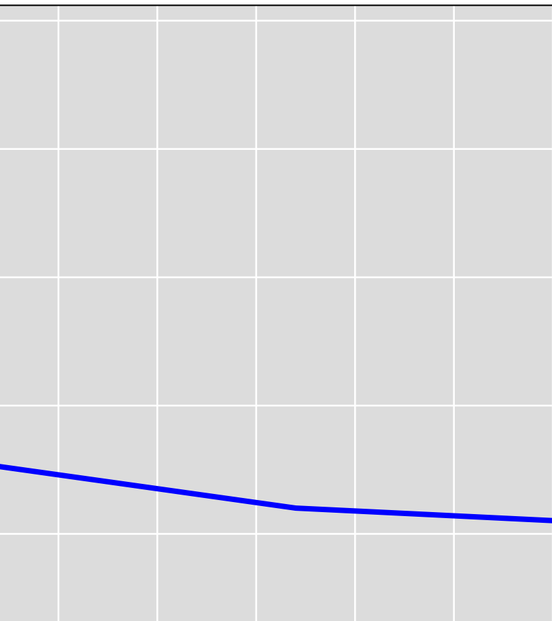
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6654906
Gulf Simulated - 6654906

Wharton - 6655104 - Layer 2



Groundwater Level Elevation (ft)

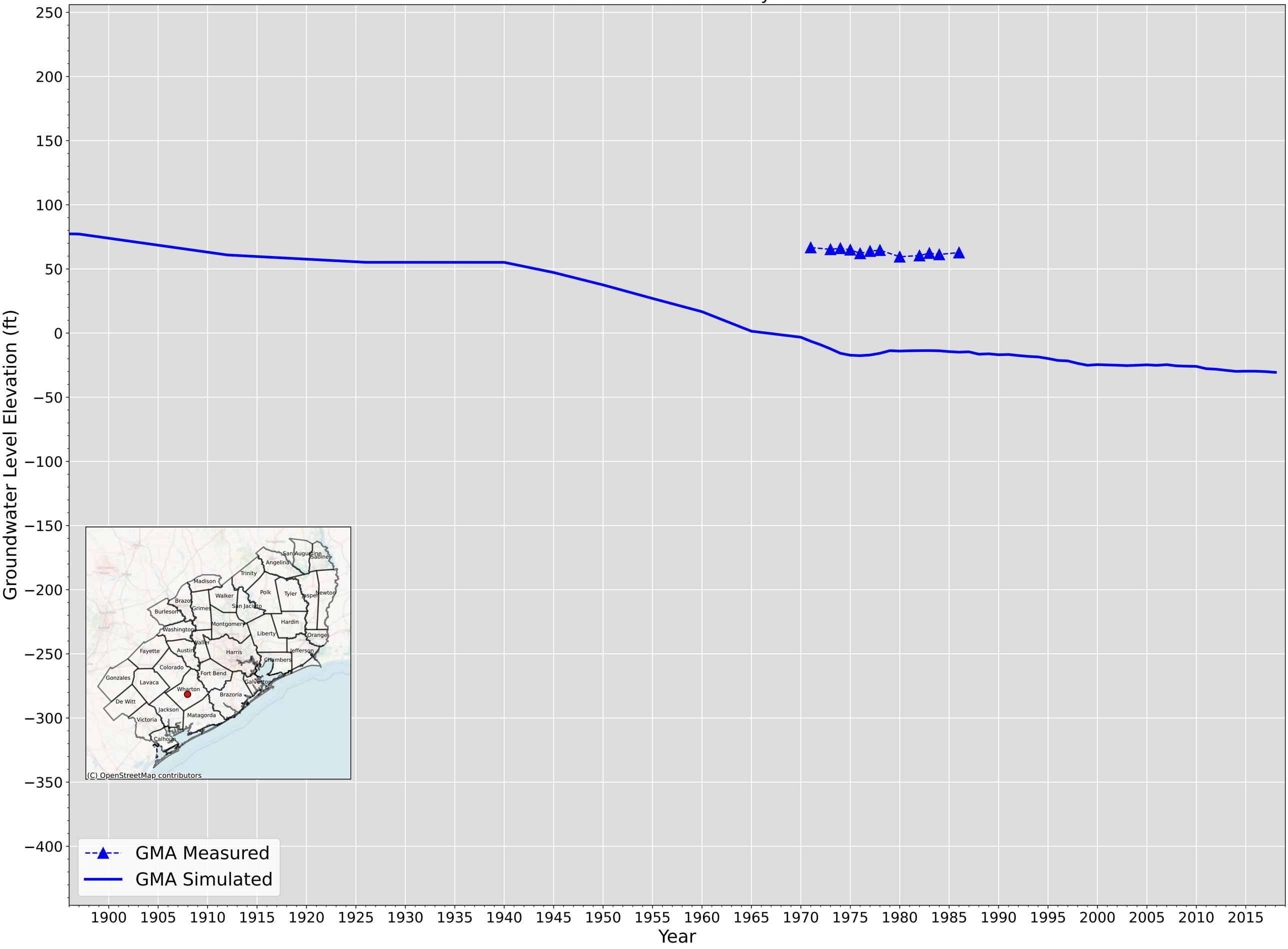
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

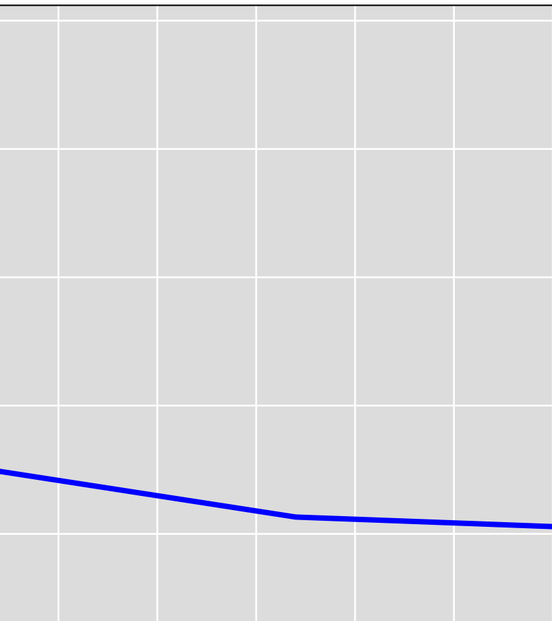
Year

GMA Measured
GMA Simulated

Wharton - 6655105 - Layer 2



Wharton - 6655109 - Layer 2



Groundwater Level Elevation (ft)

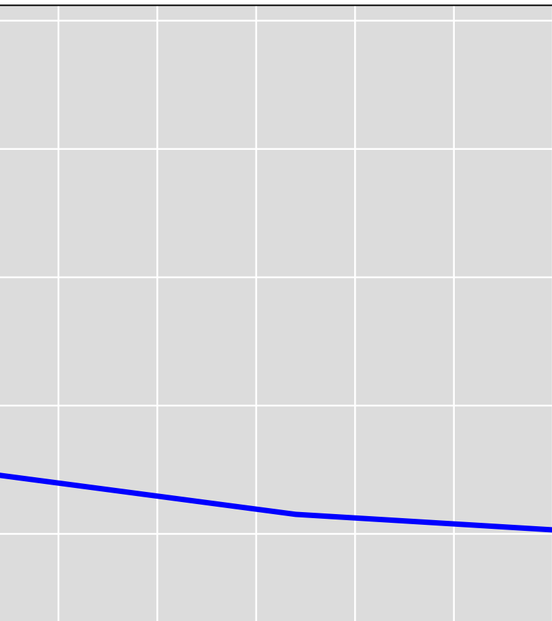
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6655412 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6655501 - Layer 2

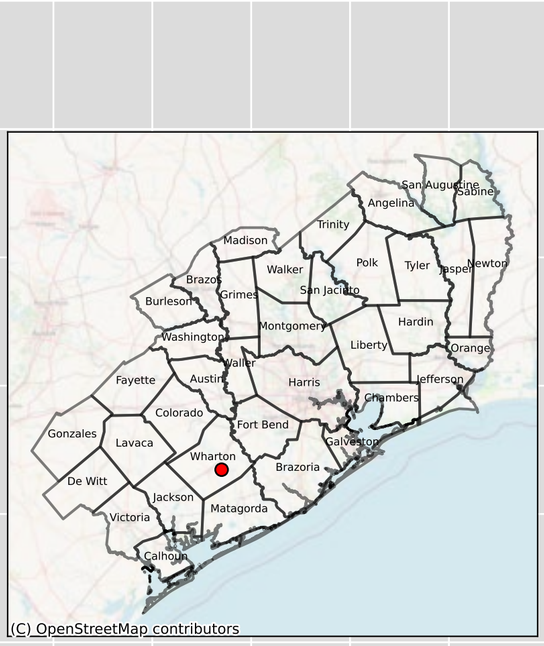
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Wharton - 6655603 - Layer 2



Level Elevation (ft)

Groundwater

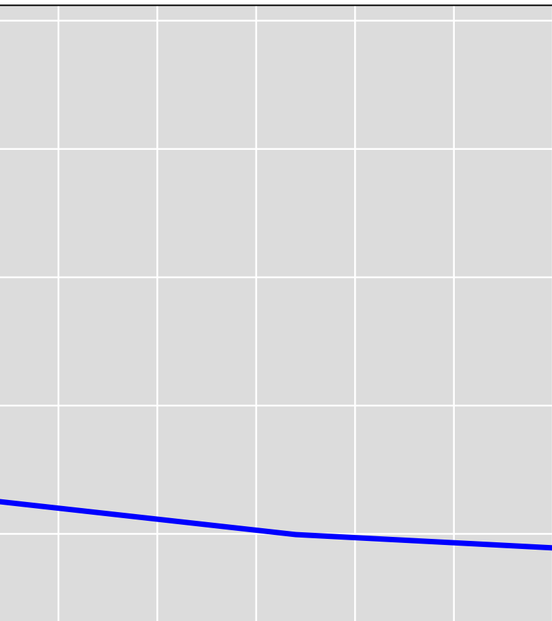
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6655804 - Layer 2



Groundwater Level Elevation (ft)

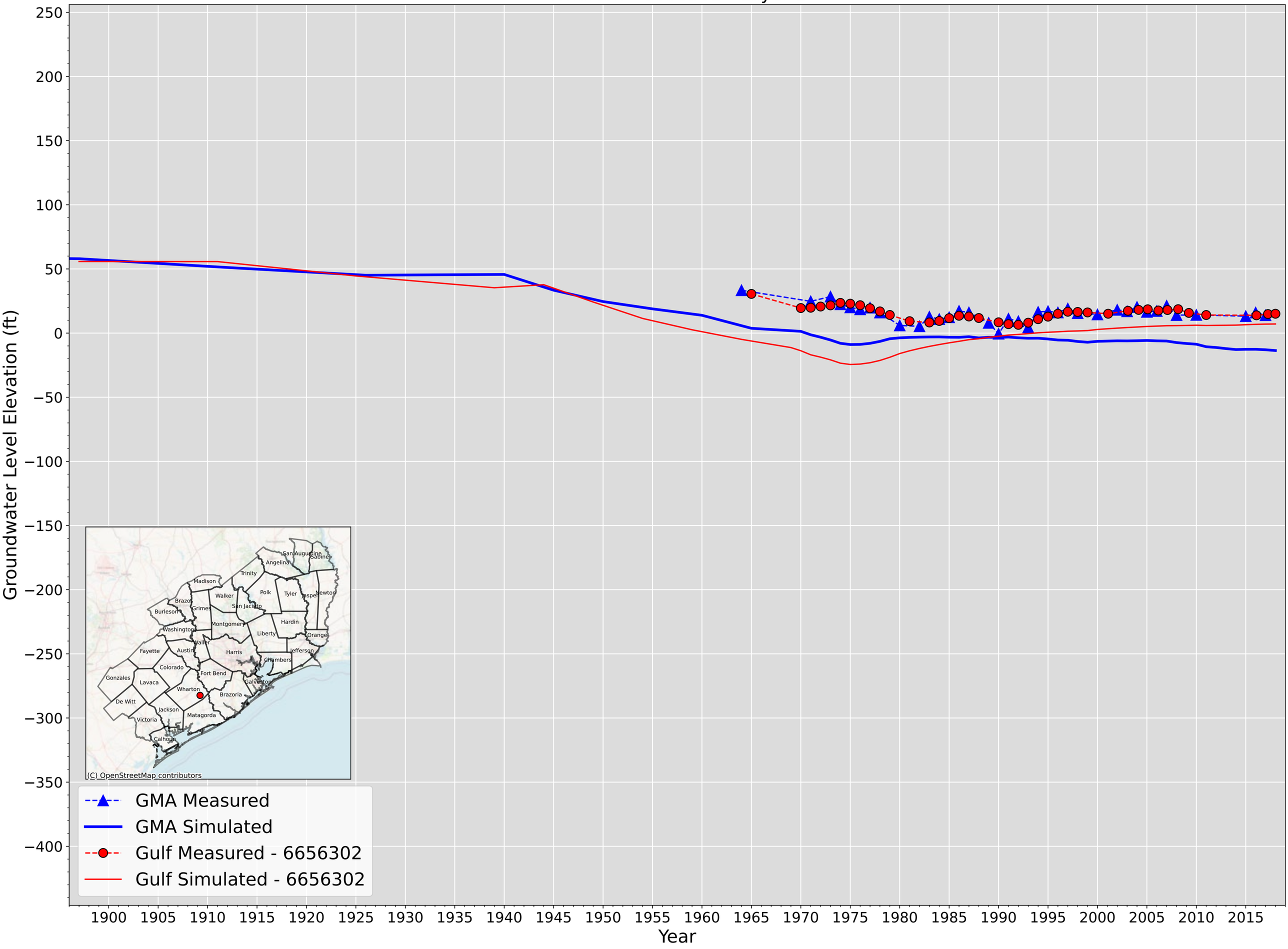
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

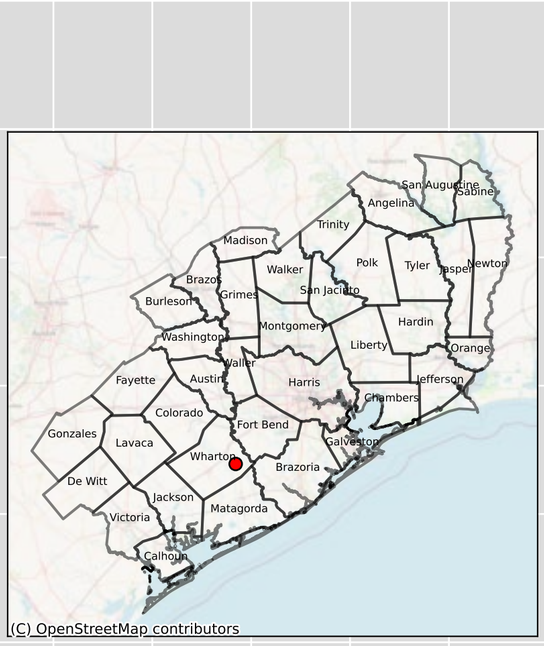
Year

GMA Measured
GMA Simulated

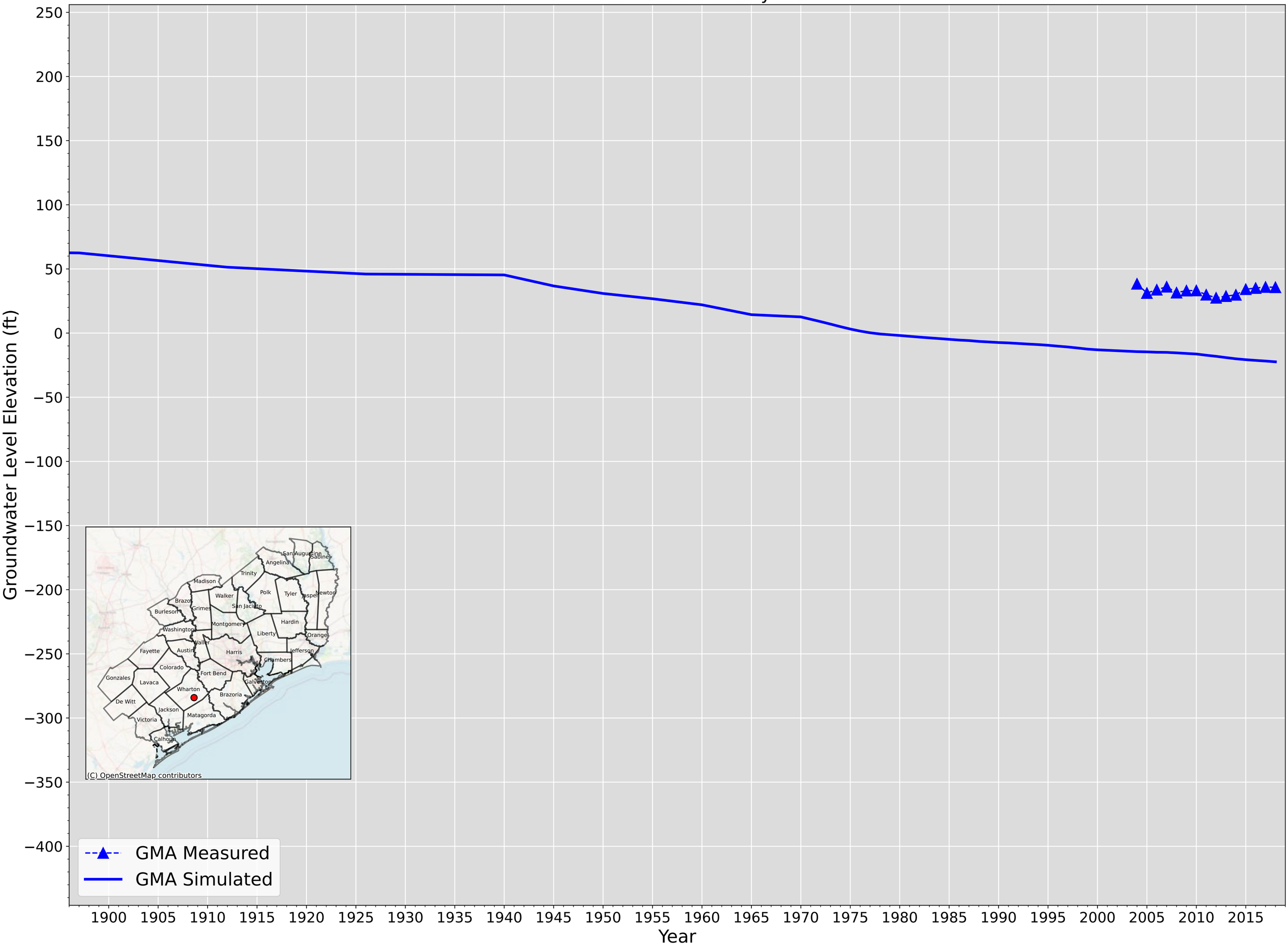
Wharton - 6656302 - Layer 2



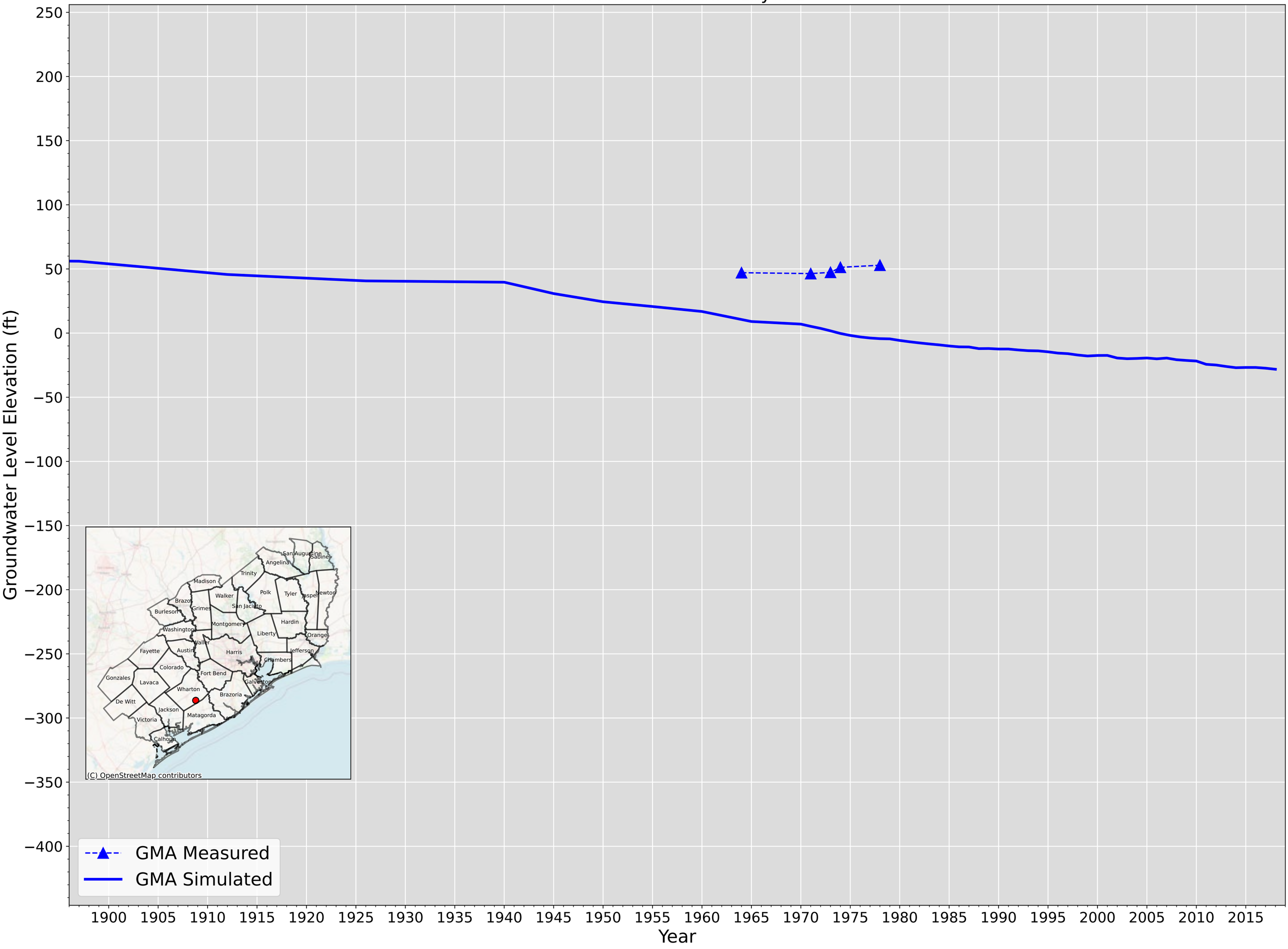
Wharton - 6656304 - Layer 2



Wharton - 6656403 - Layer 2



Wharton - 6656703 - Layer 2



Wharton - 6656901 - Layer 2

Groundwater Level Elevation (ft)

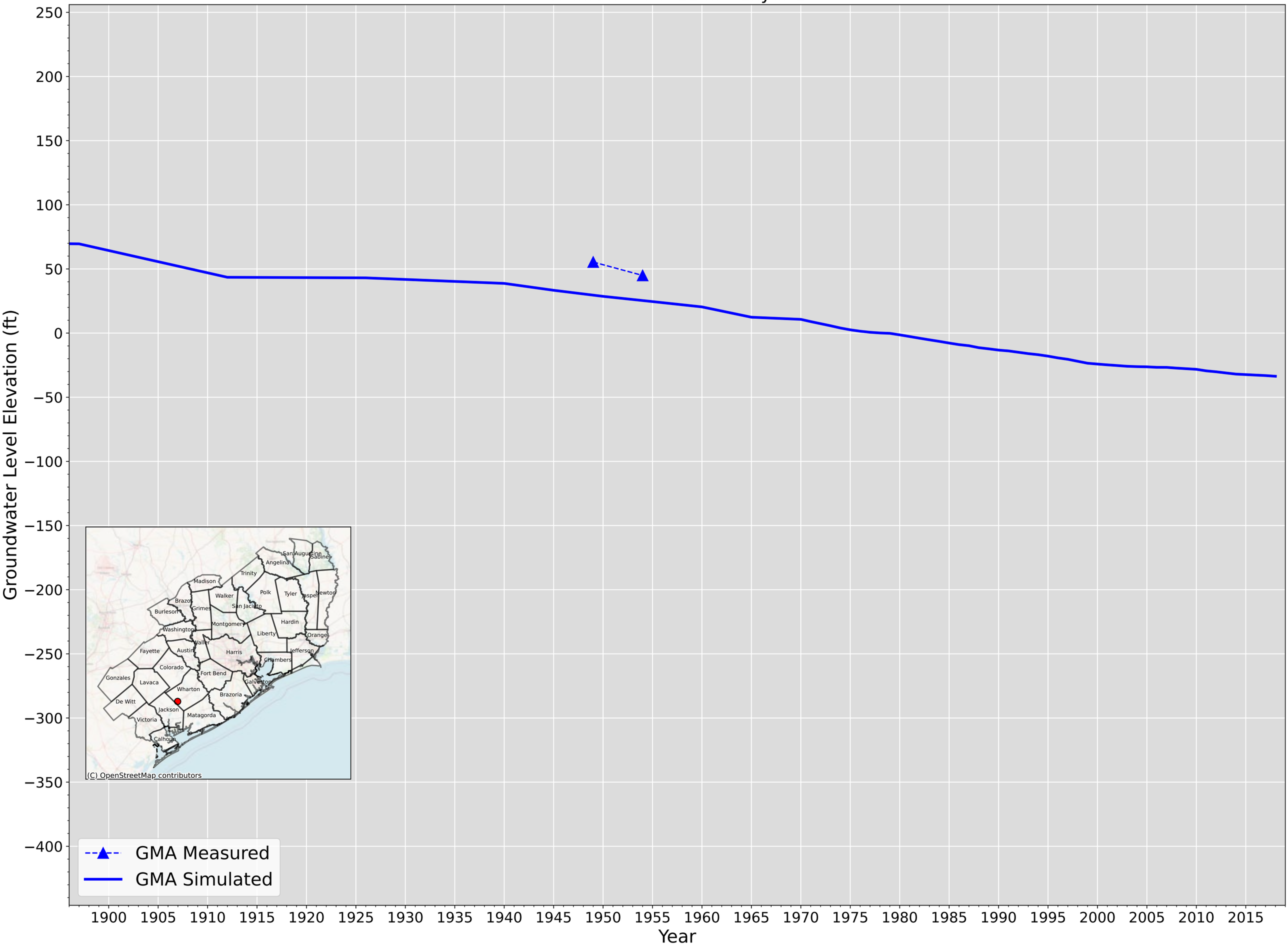
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

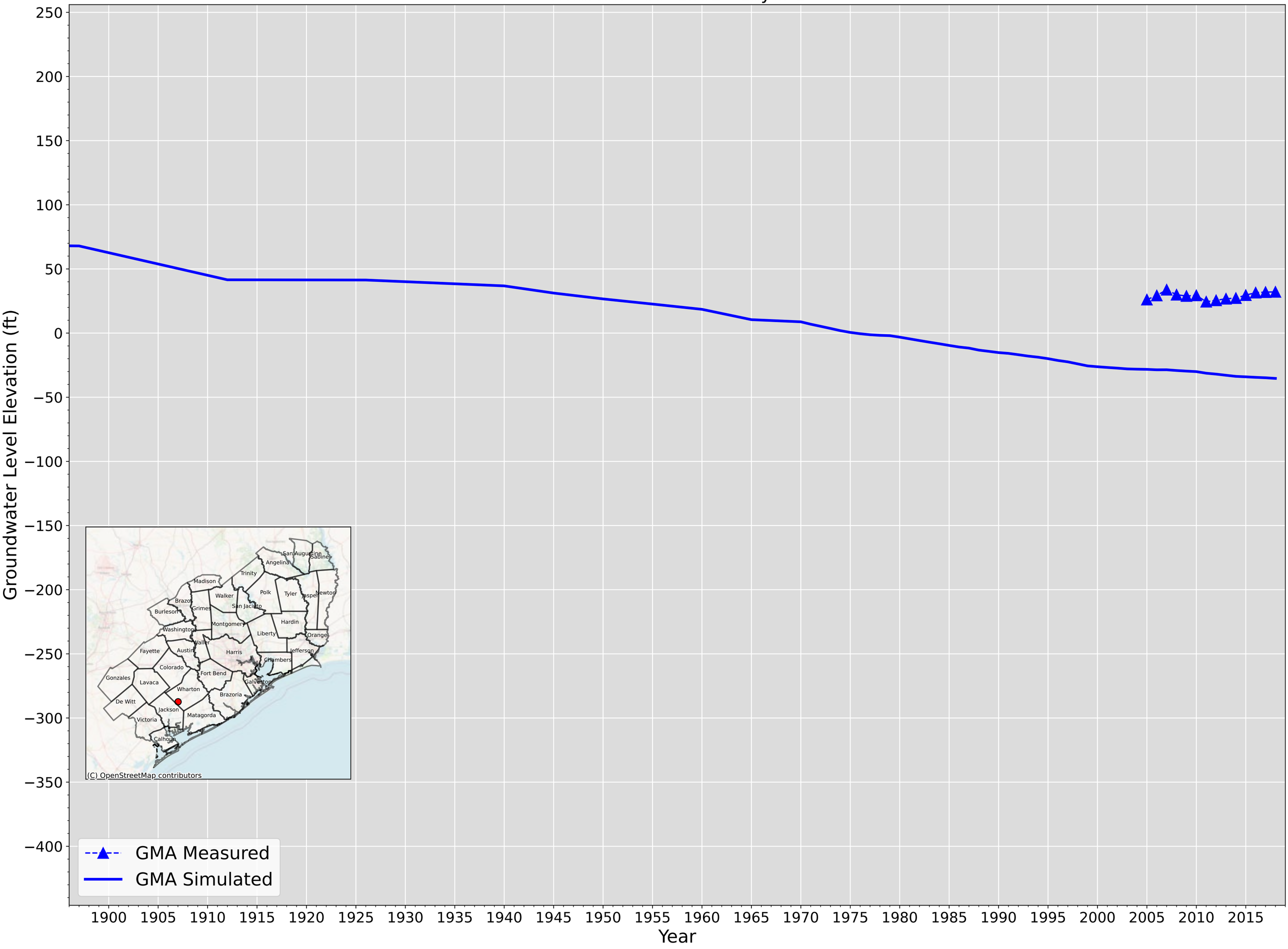
Year

GMA Measured
GMA Simulated

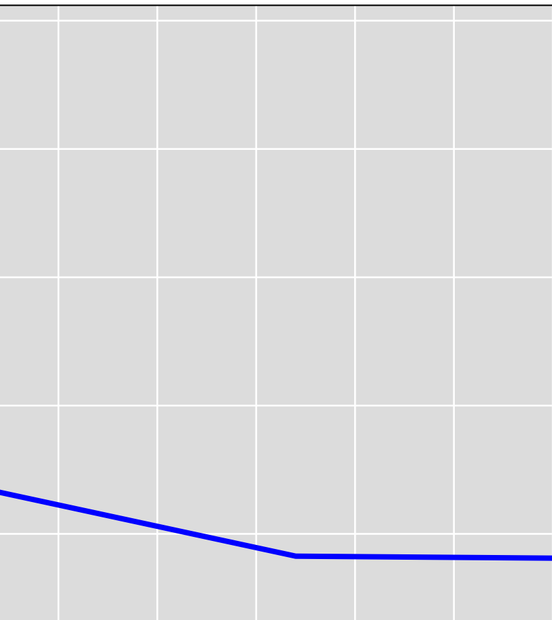
Wharton - 6661205 - Layer 2



Wharton - 6661302 - Layer 2



Wharton - 6661305 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6661905 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662104 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662206 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

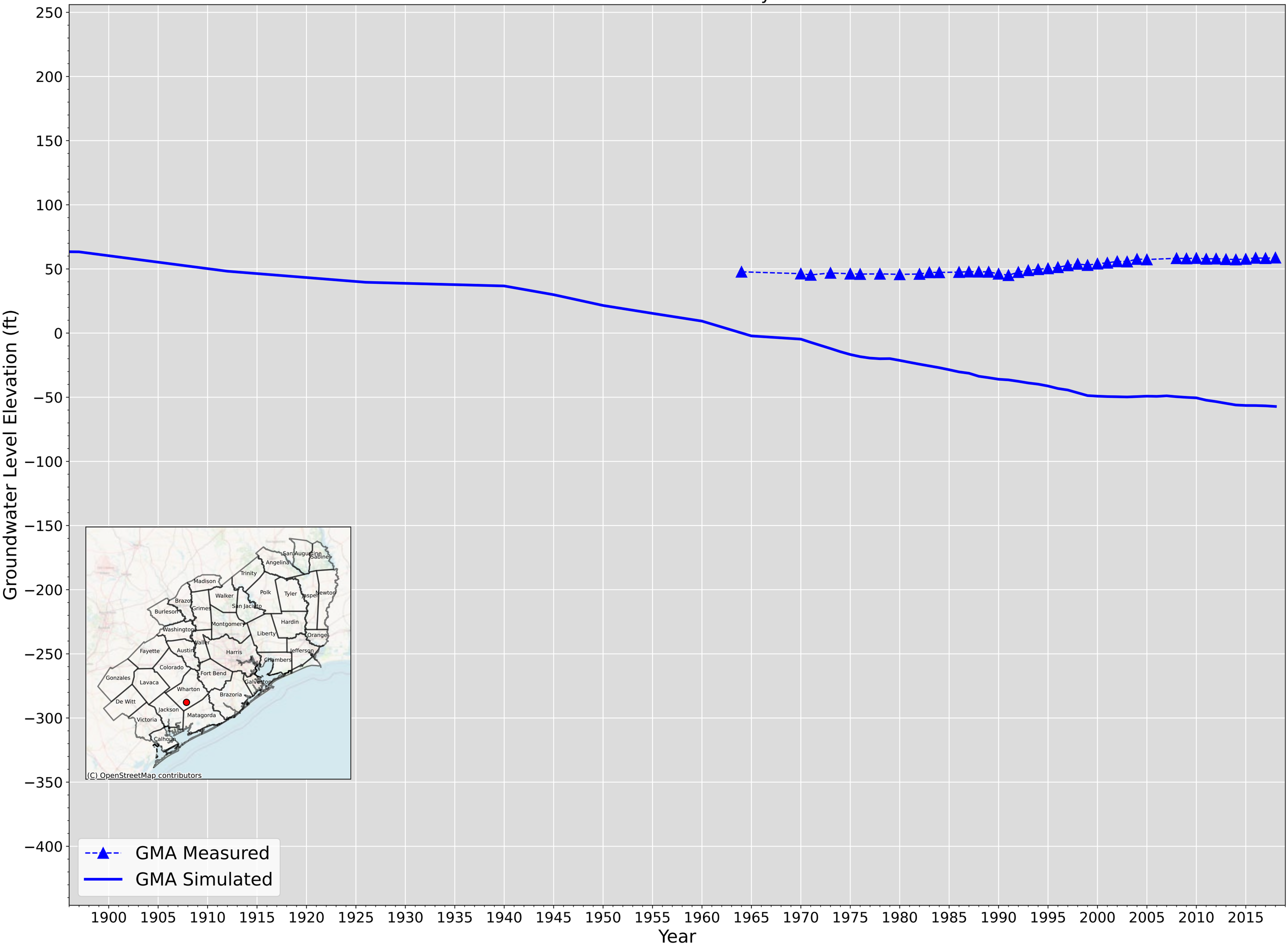
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6662307 - Layer 2



Wharton - 6662309 & 6662601 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662313 - Layer 2

Groundwater Level Elevation (ft)

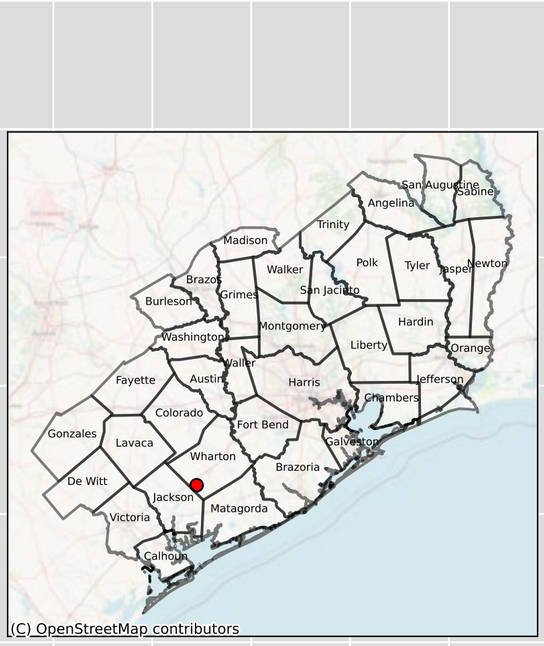
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662401 - Layer 2



Wharton - 6662404 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6662415 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662505 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6662603 - Layer 2

Groundwater Level Elevation (ft)

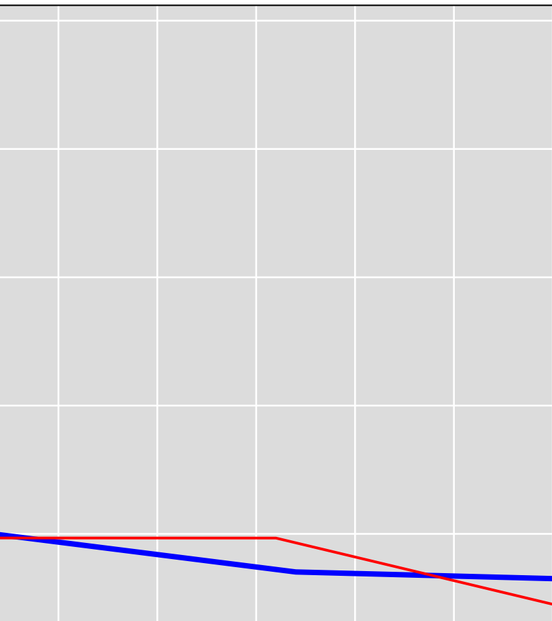
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6662805 - Layer 2



Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6662805
Gulf Simulated - 6662805

Wharton - 6663105 & 6663106 - Layer 2

Groundwater Level Elevation (ft)

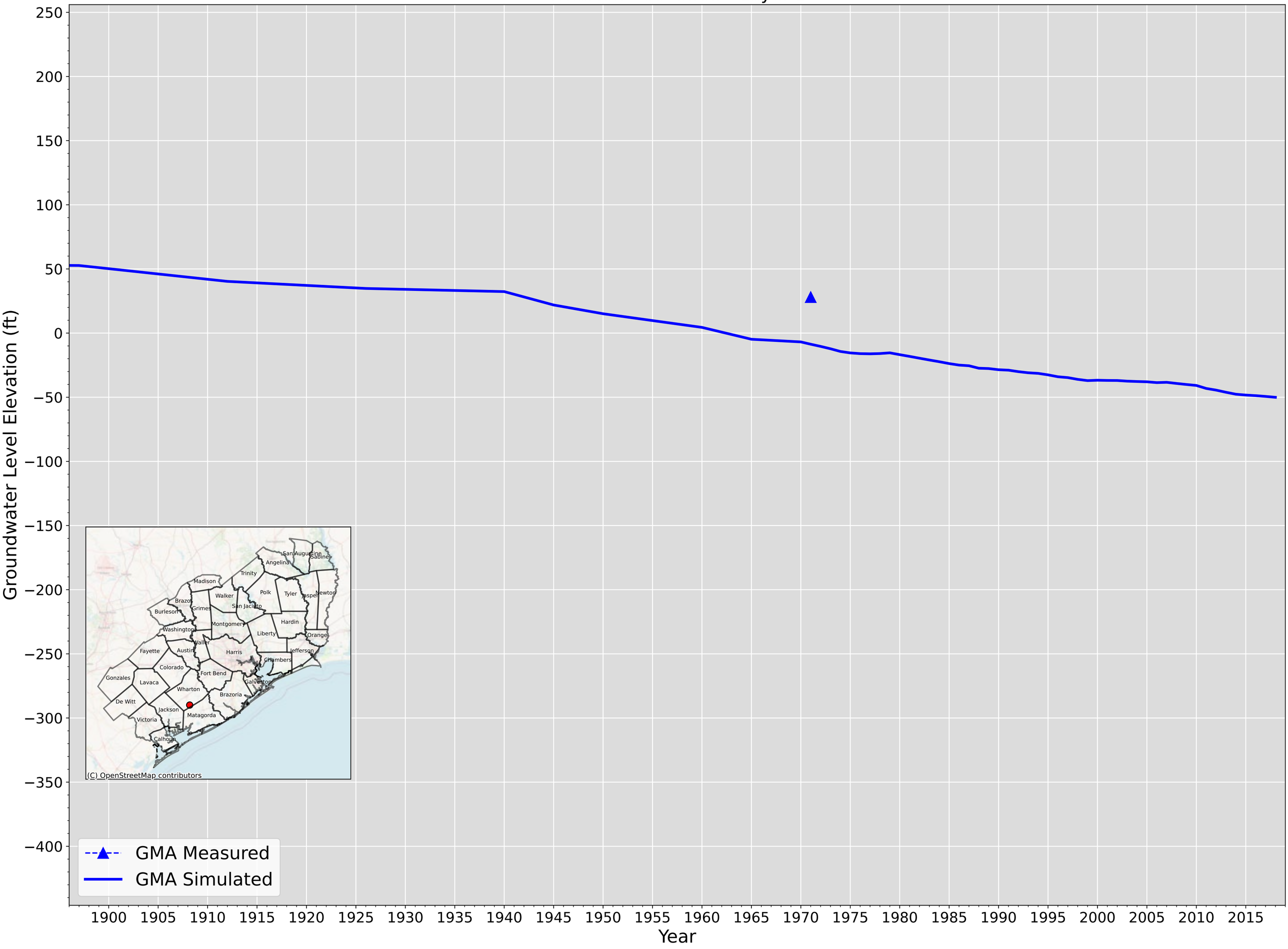
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6663503 - Layer 2



Wharton - 6663504 - Layer 2

Groundwater Level Elevation (ft)

250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Wharton - 6663605 - Layer 2

Groundwater Level Elevation (ft)

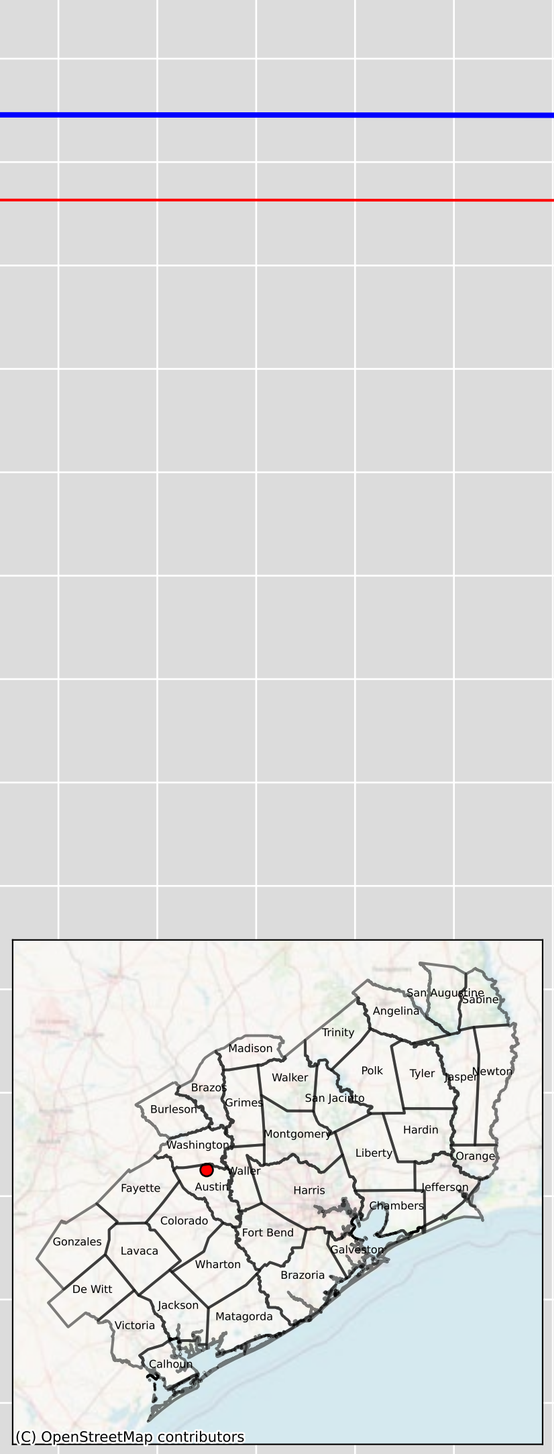
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 5962501 - Layer 3



Groundwater Level Elevation (ft)

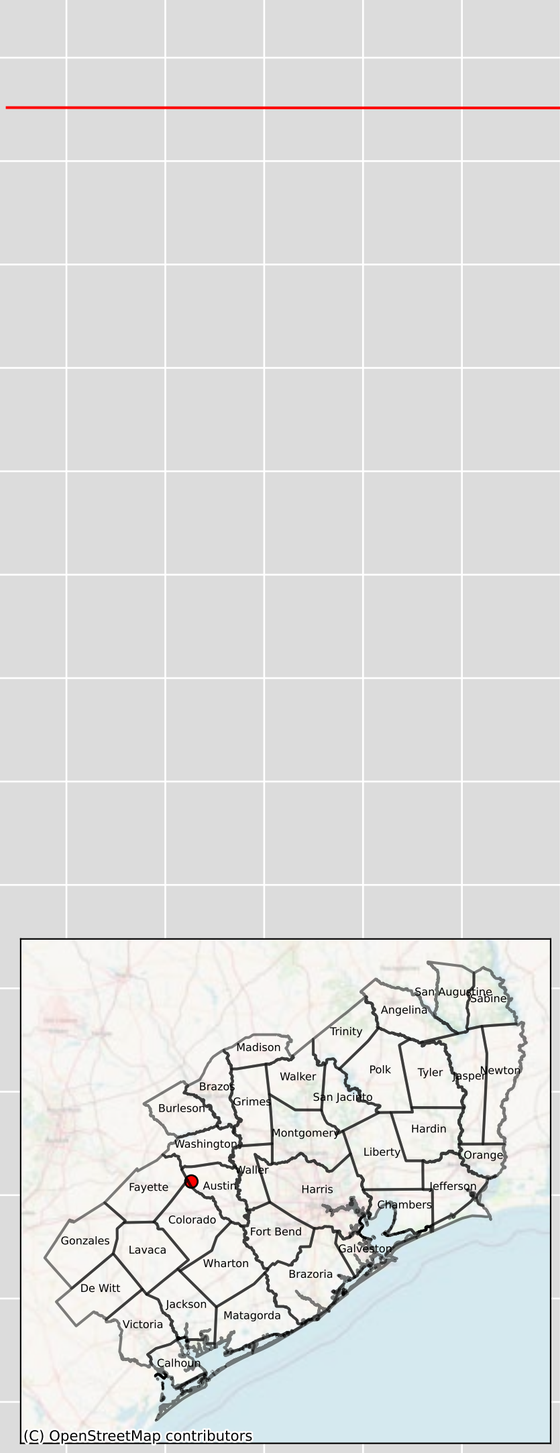
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 5962501
Gulf Simulated - 5962501

Austin - 6604601 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6604601
Gulf Simulated - 6604601

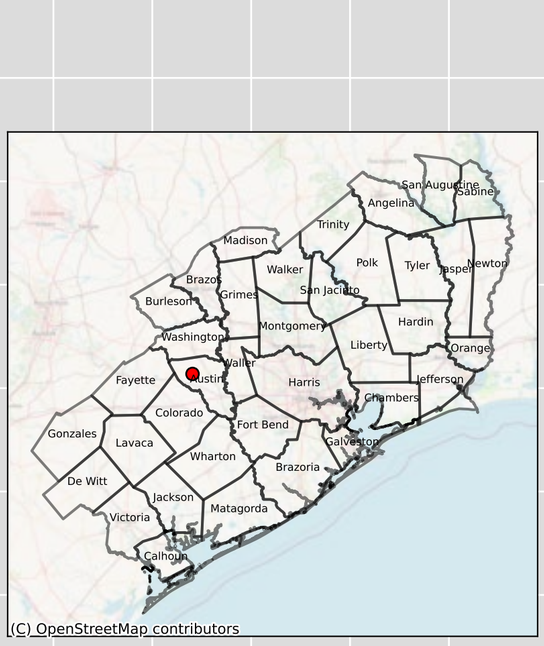
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6605604 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6605604
Gulf Simulated - 6605604

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6606501 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6606501
Gulf Simulated - 6606501

Austin - 6606614 & 6606602 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6606614
Gulf Simulated - 6606614

Austin - 6606802 - Layer 3

Groundwater Level Elevation (ft)

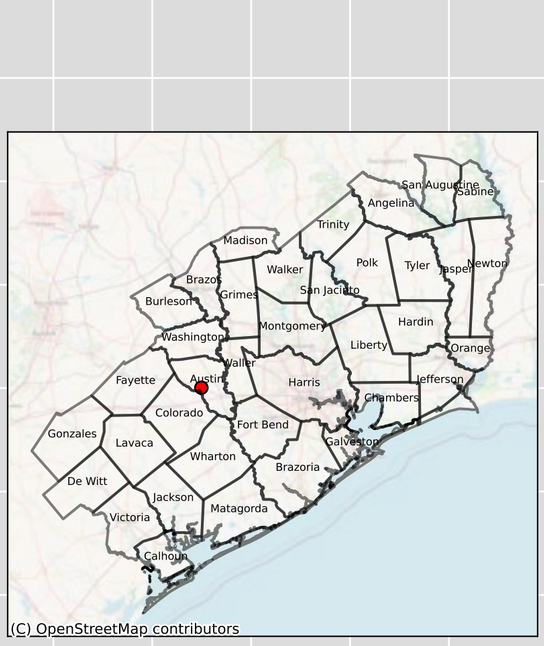
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6606802
Gulf Simulated - 6606802

Austin - 6614204 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6614204
Gulf Simulated - 6614204

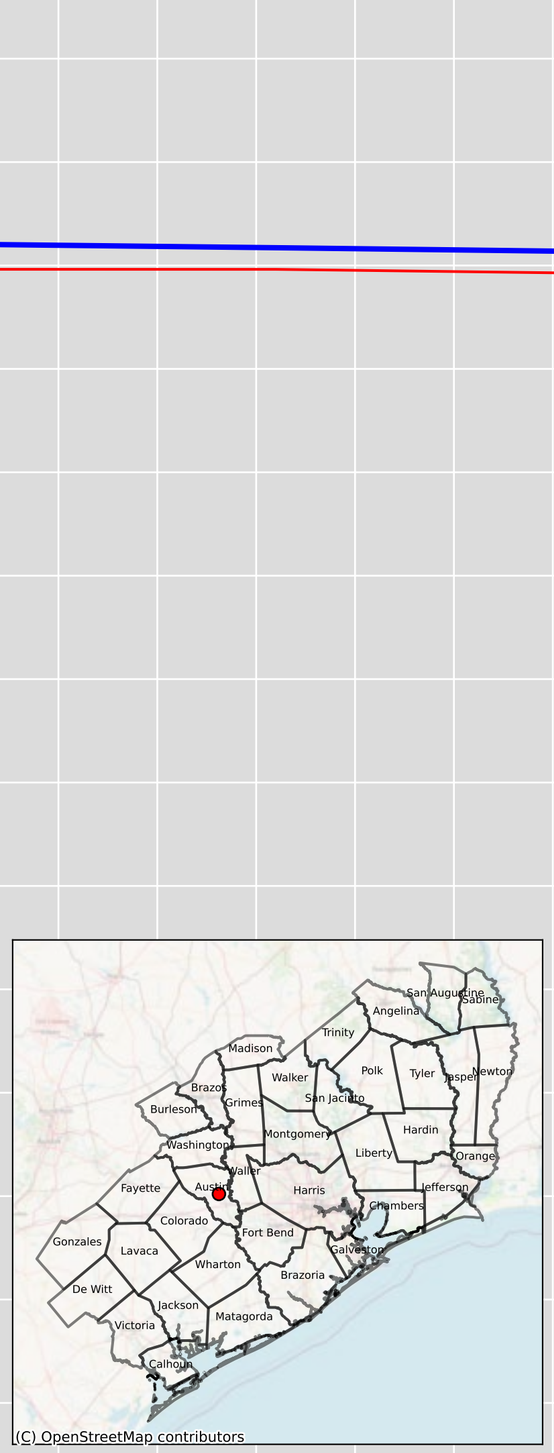
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6615101 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6615101
Gulf Simulated - 6615101

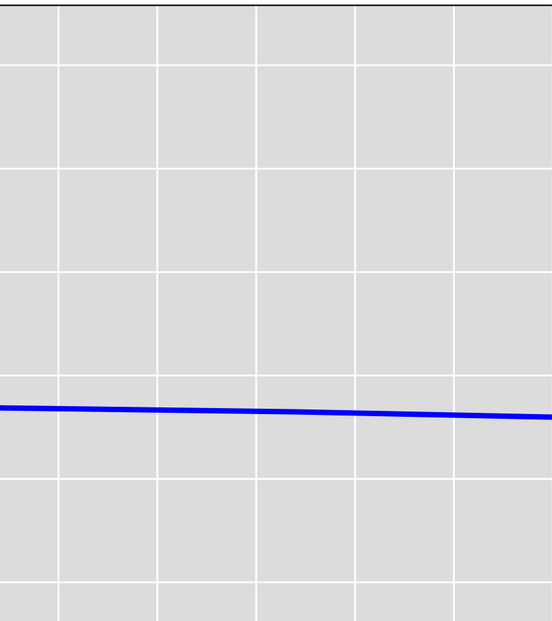
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6615905 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 6623101 & 6622301 - Layer 3

Groundwater Level Elevation (ft)

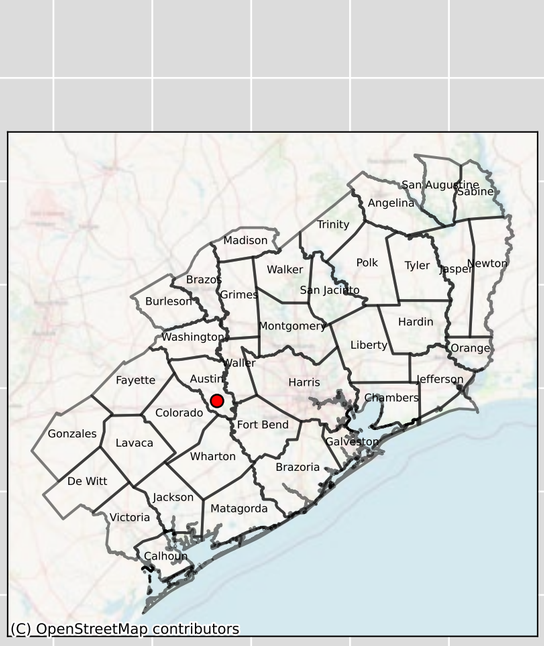
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6623101
Gulf Simulated - 6623101

Austin - 6623201 & 6623202 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6623201
Gulf Simulated - 6623201

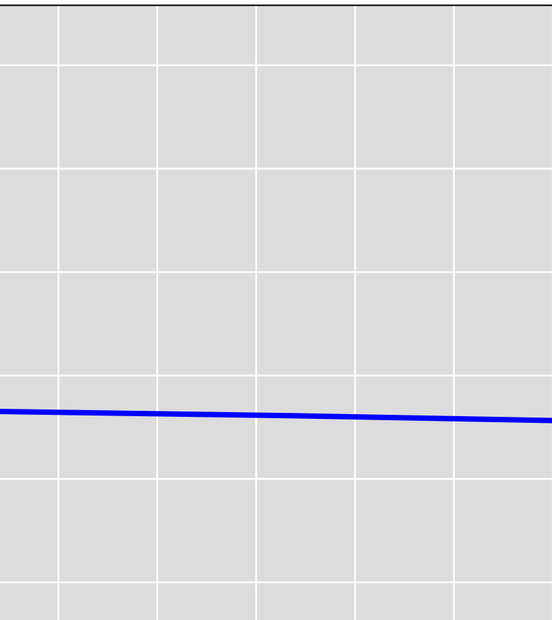
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6623203 - Layer 3



Groundwater Level Elevation (ft)

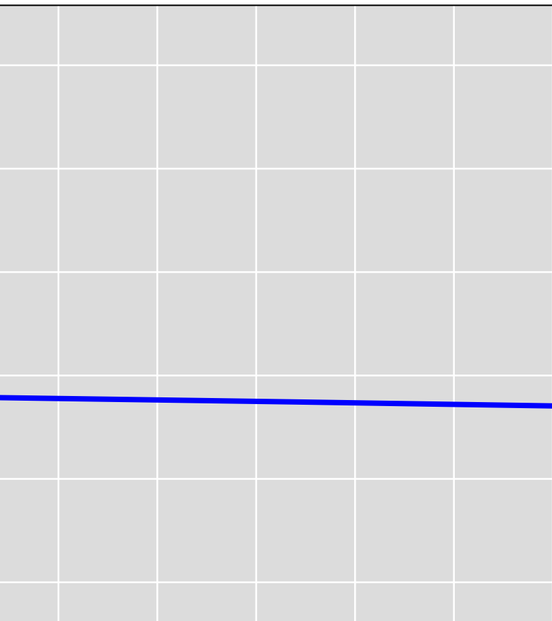
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 6623401 - Layer 3



Groundwater Level Elevation (ft)

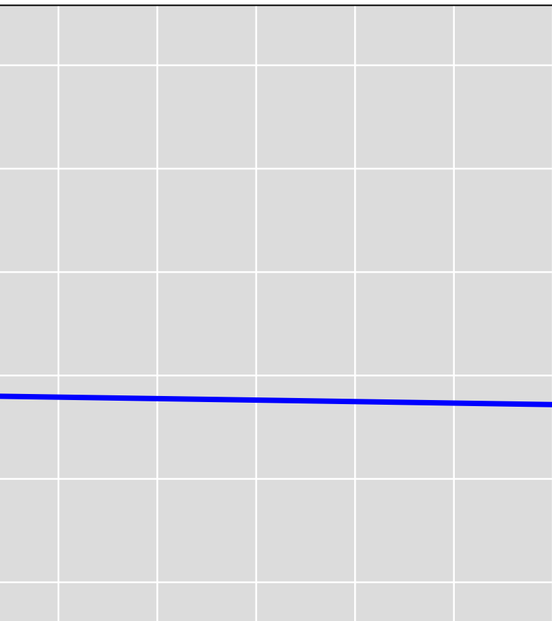
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 6623402 - Layer 3



Groundwater Level Elevation (ft)

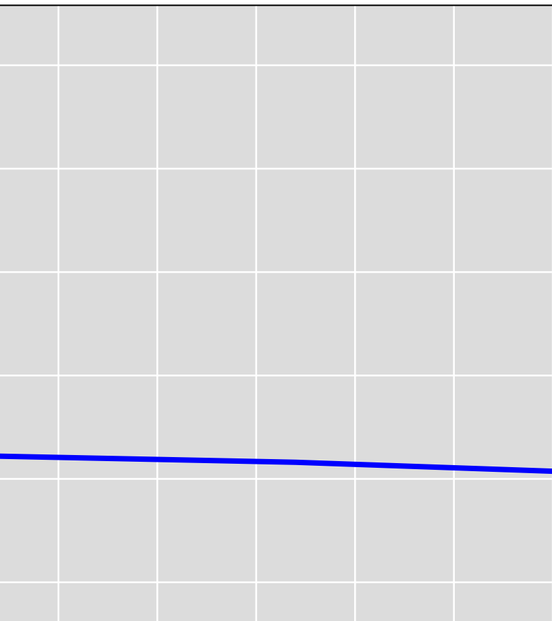
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 6624801 - Layer 3



Groundwater Level Elevation (ft)

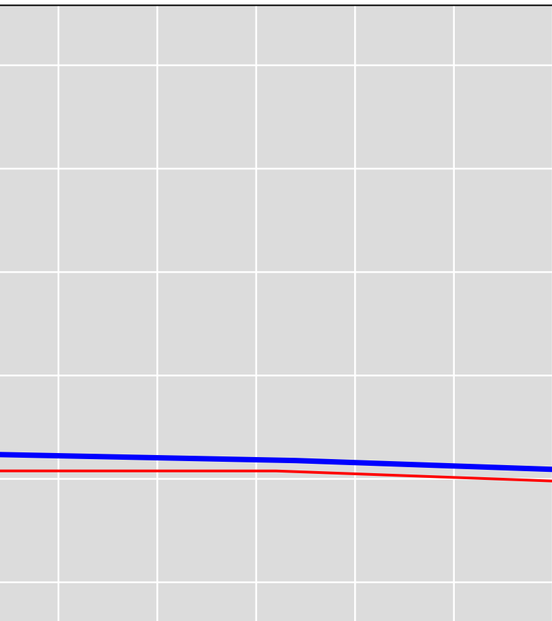
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 6624805 - Layer 3



Groundwater Level Elevation (ft)

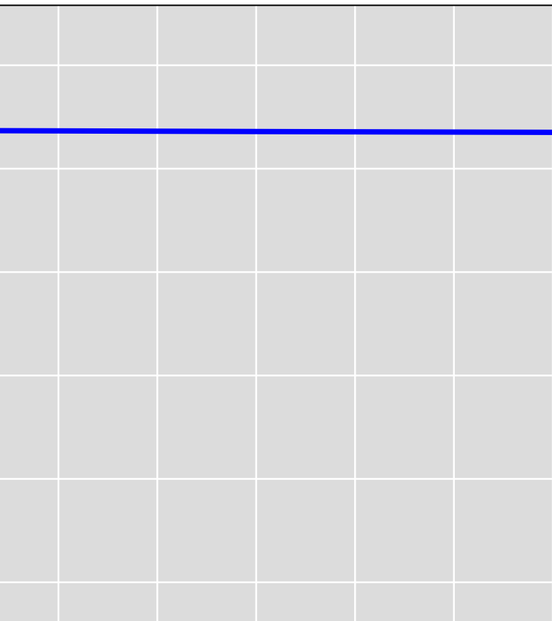
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6624805
Gulf Simulated - 6624805

Colorado - 6612204 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6612801 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6612803 - Layer 3

GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Colorado - 6620204 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6620503 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6620507 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6620601 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6620801 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6620802 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6620907 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6621603 & 6621604 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6621902 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6621903 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6622101 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6622201 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6622401 - Layer 3

Groundwater Level Elevation (ft)

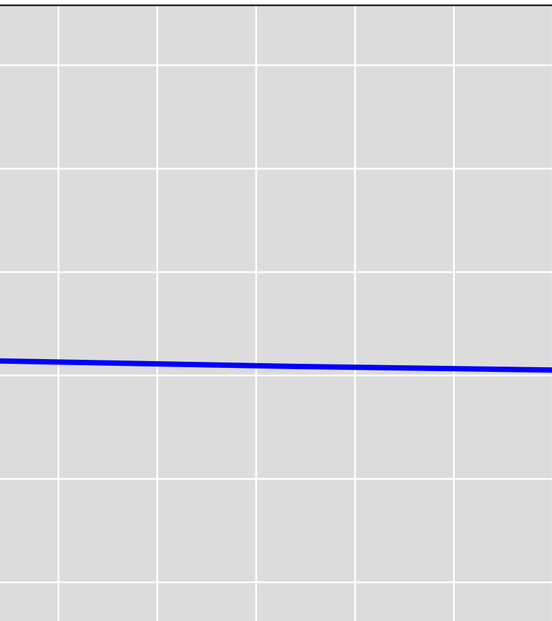
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6622403 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6622404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6622501 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6627801 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6628302 & 6628303 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6628501 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6628503 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6628505 & 6628507 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6628506 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6628603 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6628701 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6628702 & 6628802 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6628902 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6628907 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6630102 & 6630202 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6630103 & 6630104 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6631106 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6635302 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Colorado - 6635304 & 6636102 & 6636107 - Layer 3

Groundwater Level Elevation (ft)

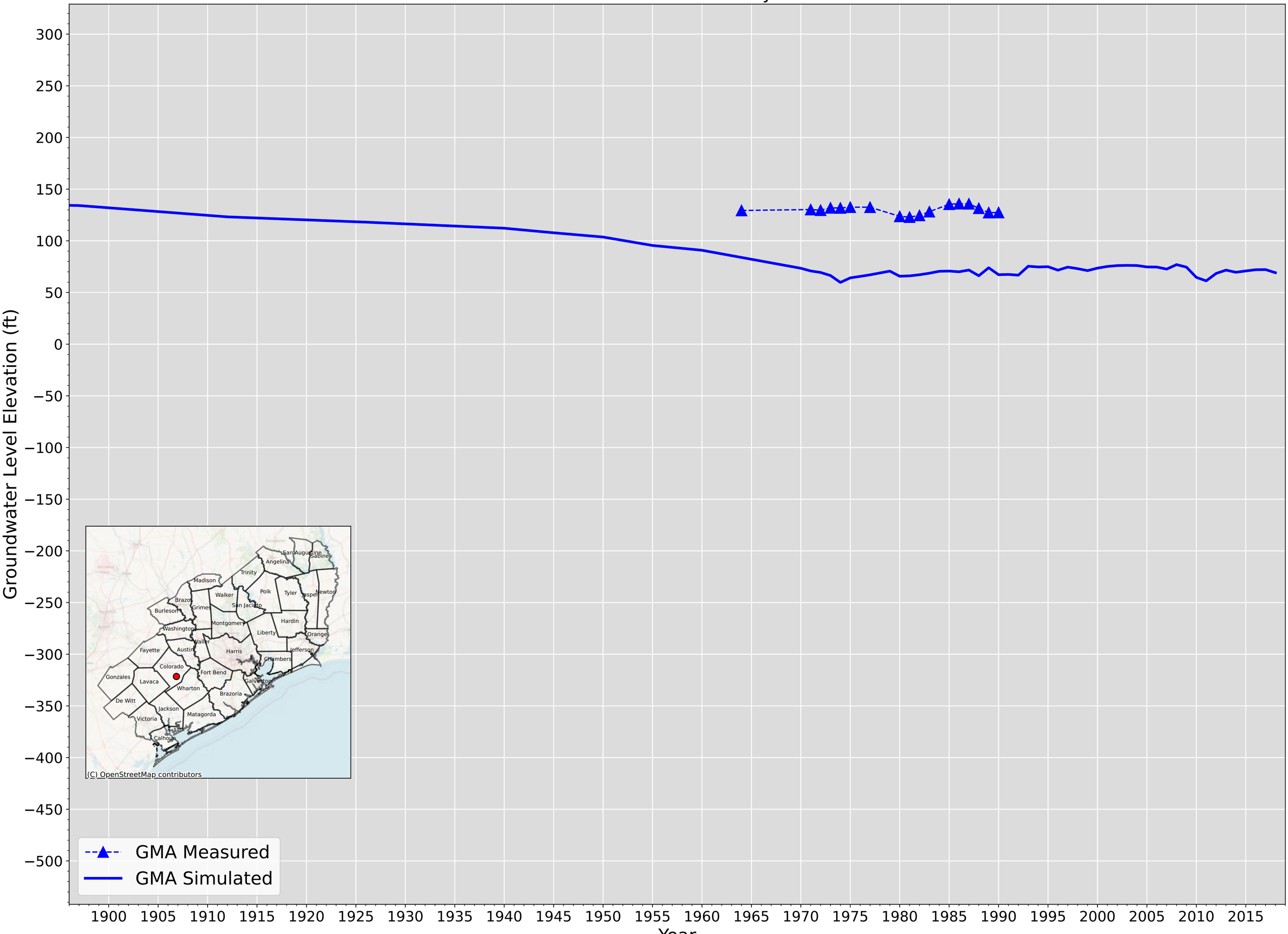
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6637203 - Layer 3



Colorado - 6643901 & 6643907 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6644407 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6644502 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Colorado - 6644702 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6510714 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6510714
Gulf Simulated - 6510714

Fort Bend - 6510717 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6510811 - Layer 3

Groundwater Level Elevation (ft)

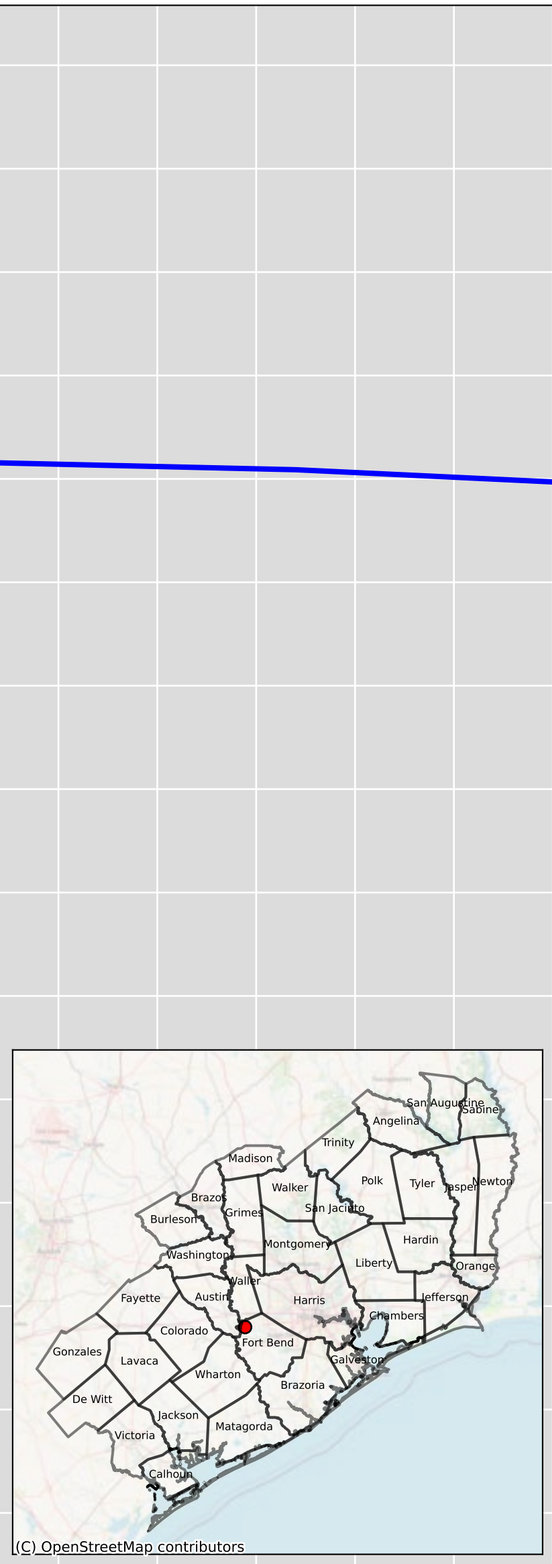
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

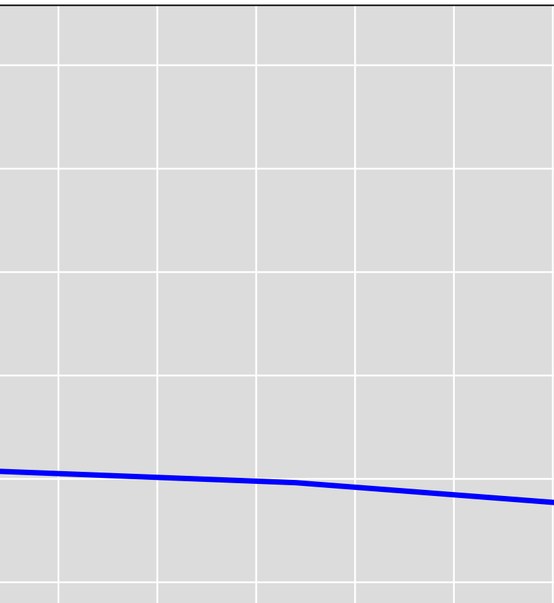
Year

GMA Measured
GMA Simulated
Gulf Measured - 6510811
Gulf Simulated - 6510811

Fort Bend - 6517404 - Layer 3



Fort Bend - 6518101 & 6518111 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

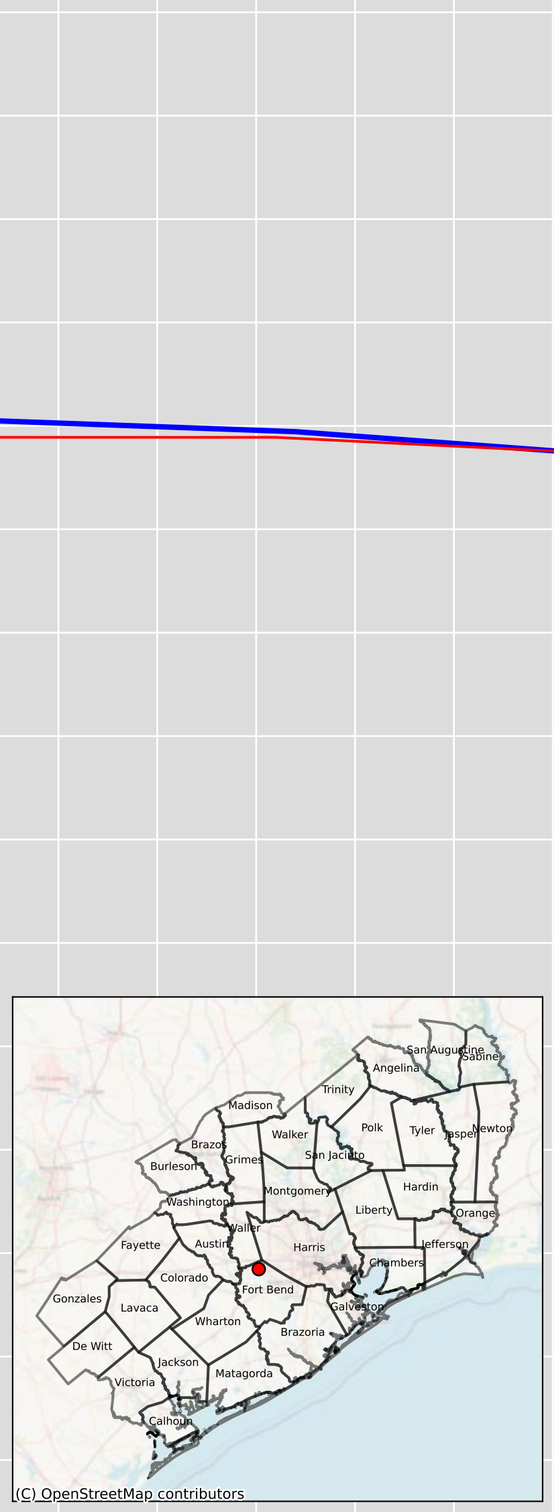
Fort Bend - 6518114 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

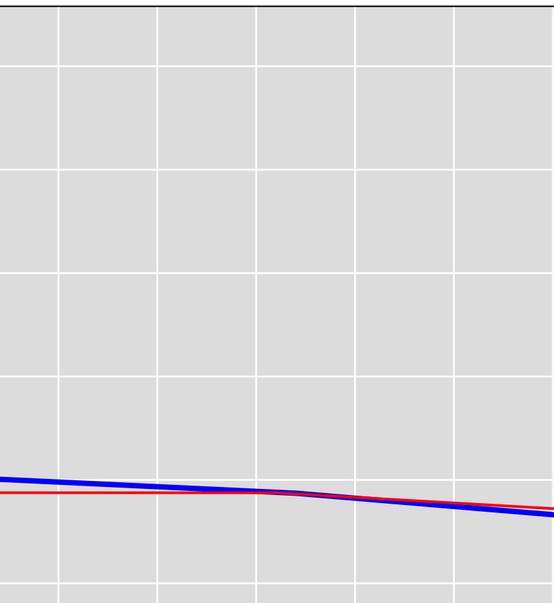
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6518114
Gulf Simulated - 6518114

Fort Bend - 6518211 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518211
Gulf Simulated - 6518211

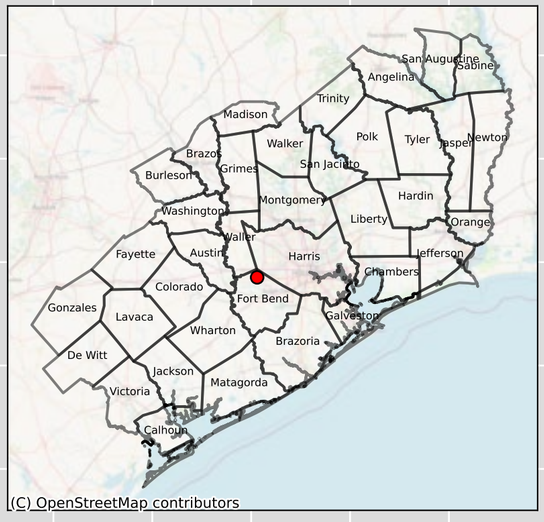
Fort Bend - 6518212 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

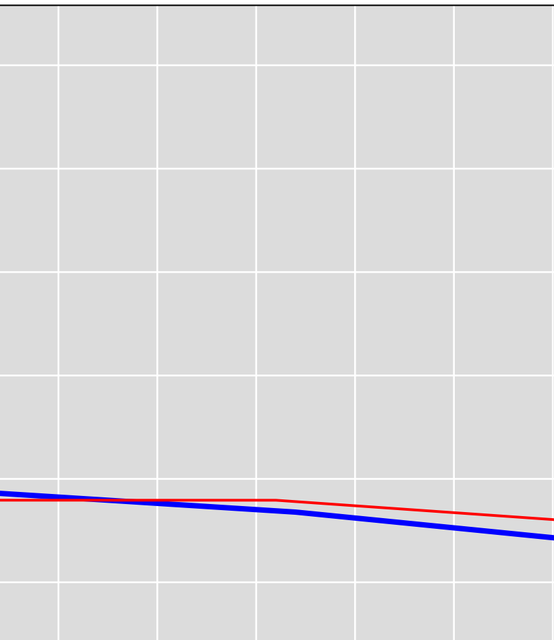
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6518212
Gulf Simulated - 6518212

Fort Bend - 6518309 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518309
Gulf Simulated - 6518309

Fort Bend - 6518311 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

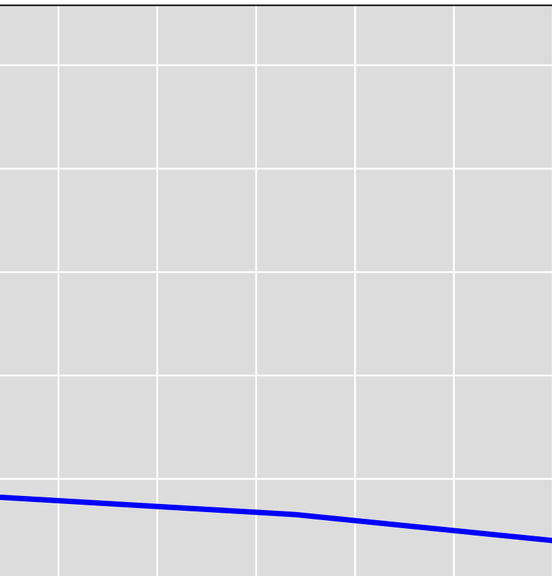
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6518312 - Layer 3



Groundwater Level Elevation (ft)

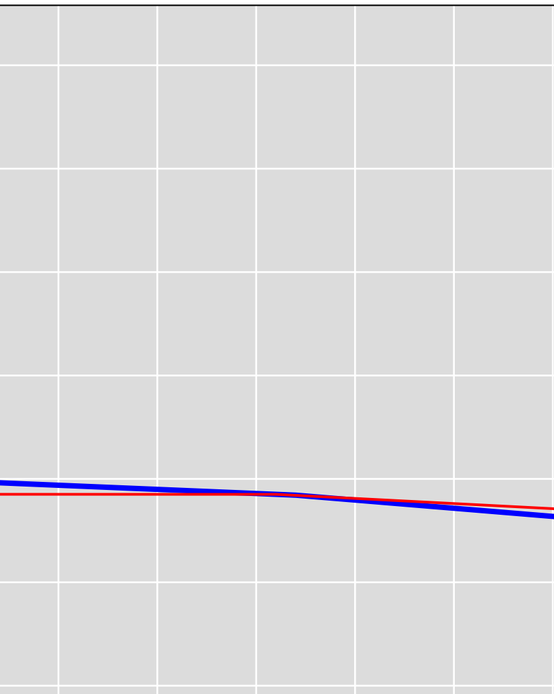
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6518505 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518505
Gulf Simulated - 6518505

Fort Bend - 6518609 - Layer 3

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6518609
Gulf Simulated - 6518609

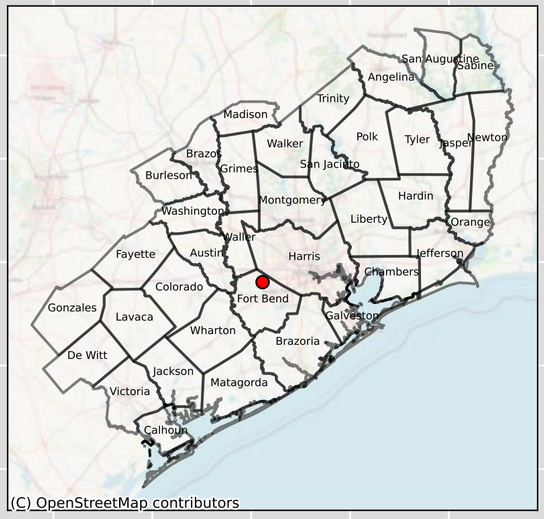
Fort Bend - 6518611 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Fort Bend - 6518612 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

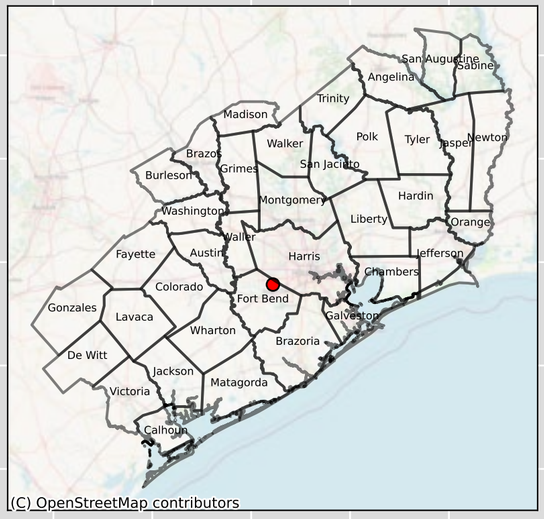
Fort Bend - 6519517 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6519517
Gulf Simulated - 6519517

Fort Bend - 6519707 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6519708 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519708
Gulf Simulated - 6519708

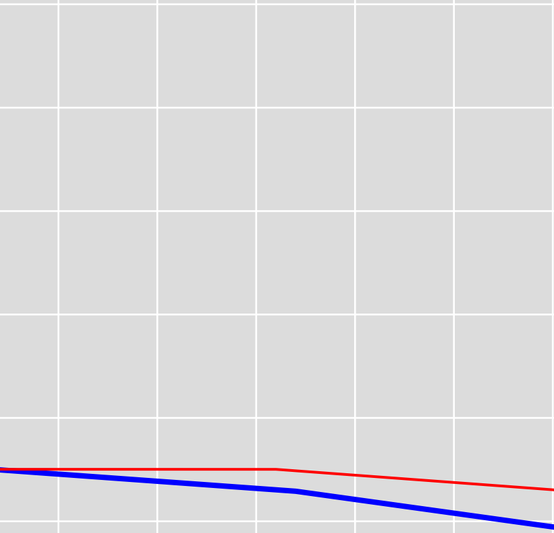
Fort Bend - 6519811 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6519811
Gulf Simulated - 6519811

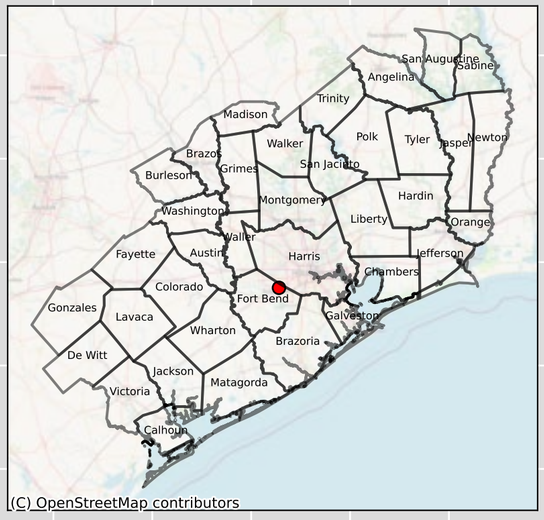
Fort Bend - 6519904 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6519904
Gulf Simulated - 6519904

Fort Bend - 6519906 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519906
Gulf Simulated - 6519906

Fort Bend - 6520711 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520711
Gulf Simulated - 6520711

Fort Bend - 6520712 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6525606 - Layer 3

Groundwater Level Elevation (ft)

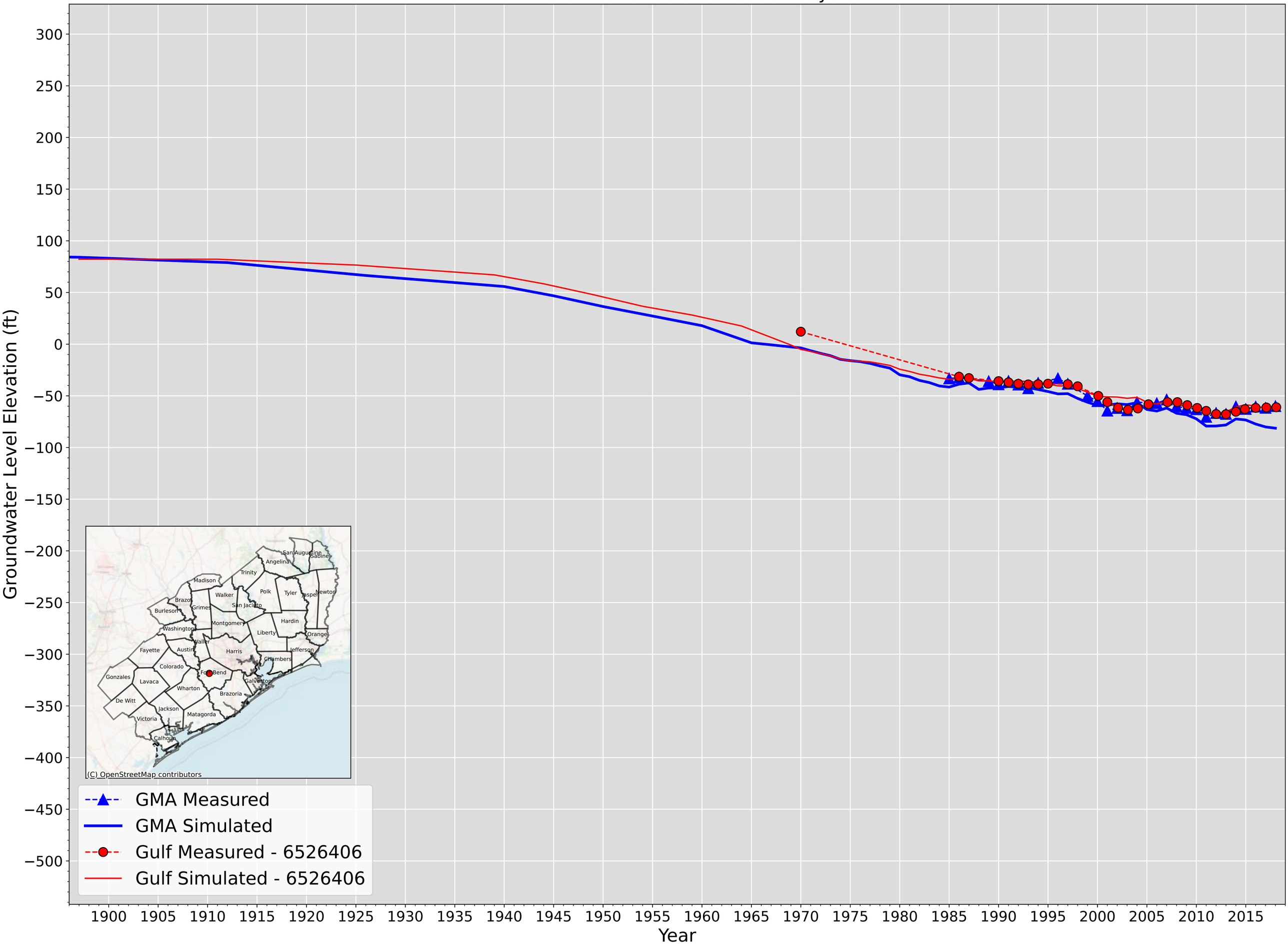
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6526406 & 6526403 - Layer 3



Fort Bend - 6526502 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6526520 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6526812 - Layer 3

Groundwater Level Elevation (ft)

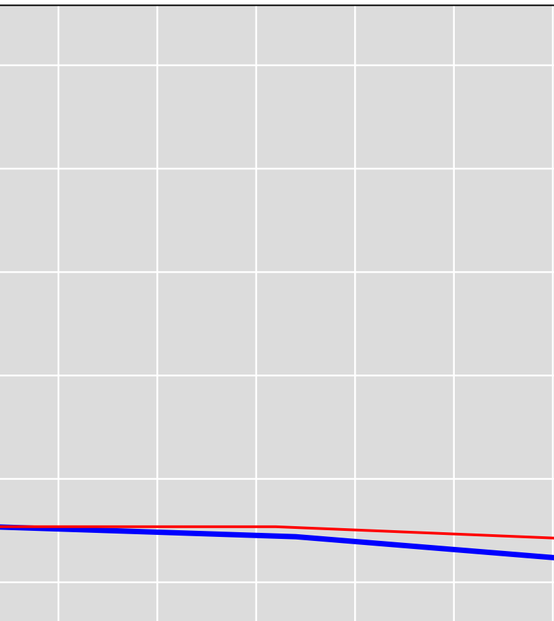
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6526812
Gulf Simulated - 6526812

Fort Bend - 6526817 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6526817
Gulf Simulated - 6526817

Fort Bend - 6526908 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6526908
Gulf Simulated - 6526908

Fort Bend - 6527106 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527106
Gulf Simulated - 6527106

Fort Bend - 6527213 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6527302 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527302
Gulf Simulated - 6527302

Fort Bend - 6527324 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6527326 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527326
Gulf Simulated - 6527326

Fort Bend - 6527506 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527506
Gulf Simulated - 6527506

Fort Bend - 6527507 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6527507
Gulf Simulated - 6527507

Fort Bend - 6527509 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528202 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6528202
Gulf Simulated - 6528202

Fort Bend - 6528311 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528312 - Layer 3

Groundwater Level Elevation (ft)

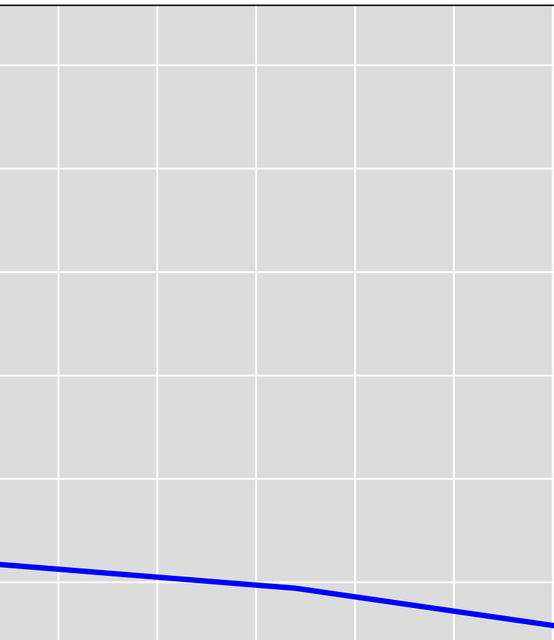
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6528506 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

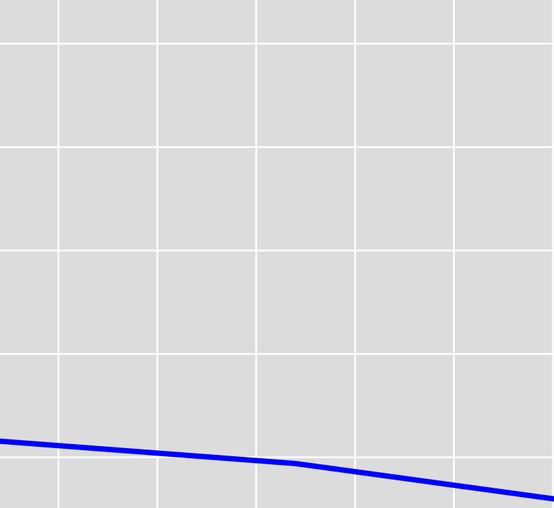
Fort Bend - 6528509 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Fort Bend - 6529107 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Fort Bend - 6529109 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6529706 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6529714 - Layer 3

Groundwater Level Elevation (ft)

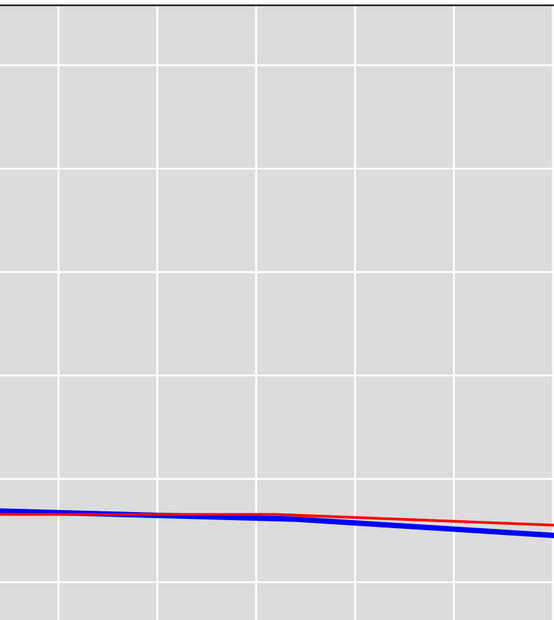
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6533210 - Layer 3



Groundwater Level Elevation (ft)

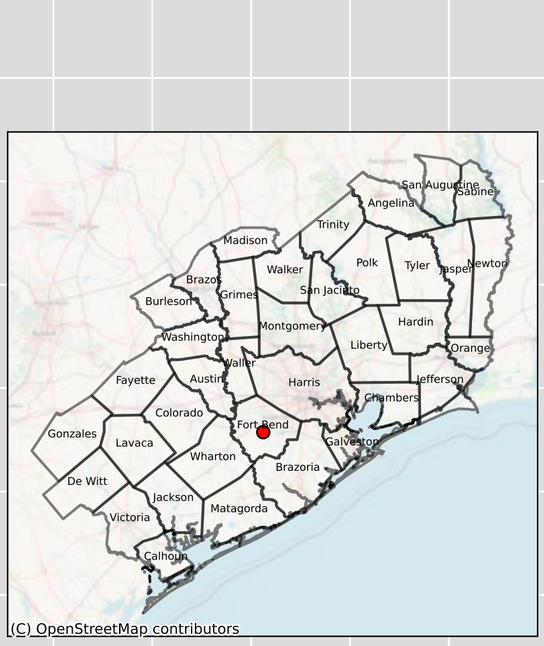
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6533210
Gulf Simulated - 6533210

Fort Bend - 6534309 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6534309
Gulf Simulated - 6534309

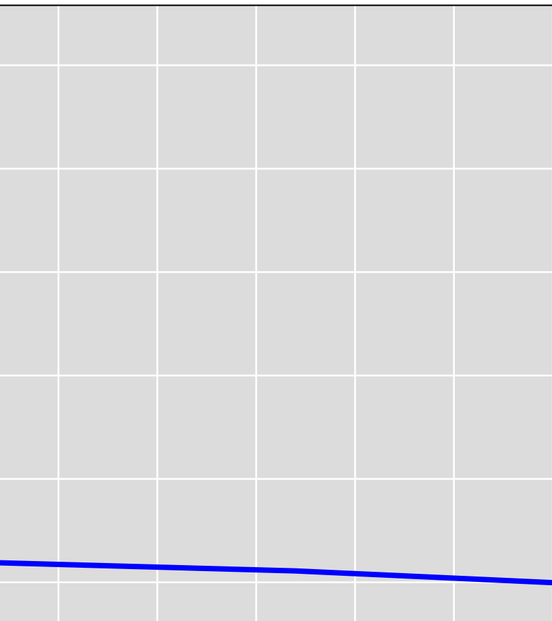
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Fort Bend - 6542105 - Layer 3



Groundwater Level Elevation (ft)

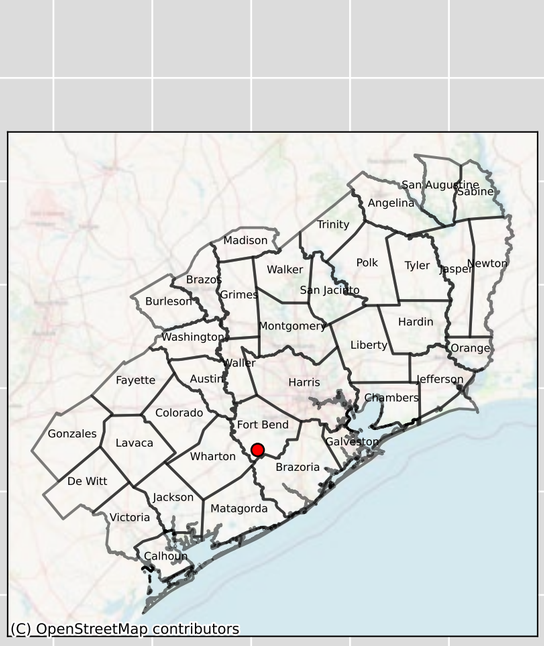
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Fort Bend - 6542206 - Layer 3



Groundwater Level Elevation (ft)

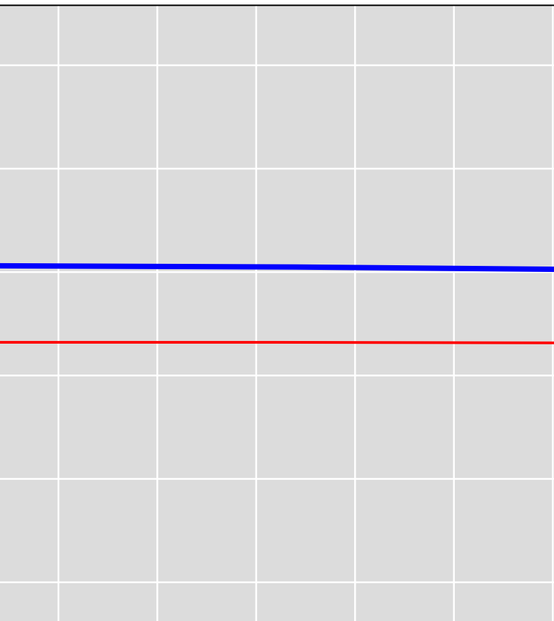
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 5956301 - Layer 3



Groundwater Level Elevation (ft)

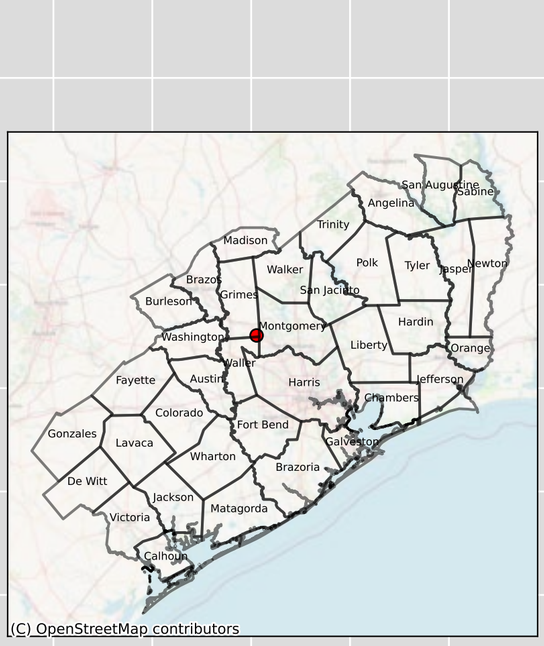
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 5956301
Gulf Simulated - 5956301

Grimes - 6042803 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6042803
Gulf Simulated - 6042803

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6042804 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505726 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6529210 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6052903 - Layer 3

Groundwater Level Elevation (ft)

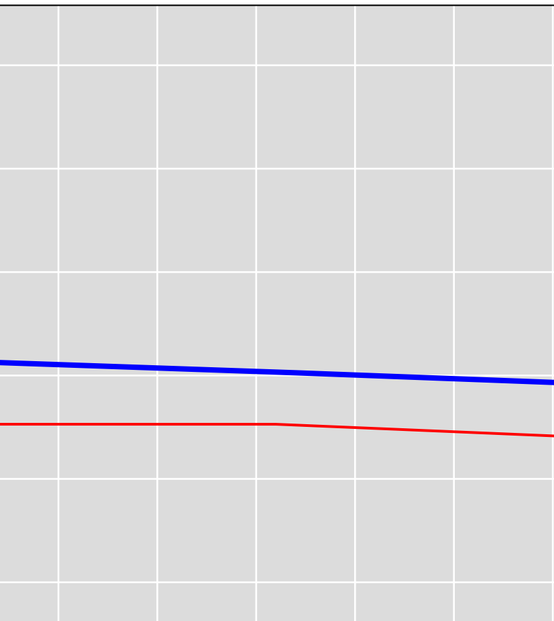
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052903
Gulf Simulated - 6052903

Harris - 6058501 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6058501
Gulf Simulated - 6058501

Harris - 6058705 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6058802 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6058901 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

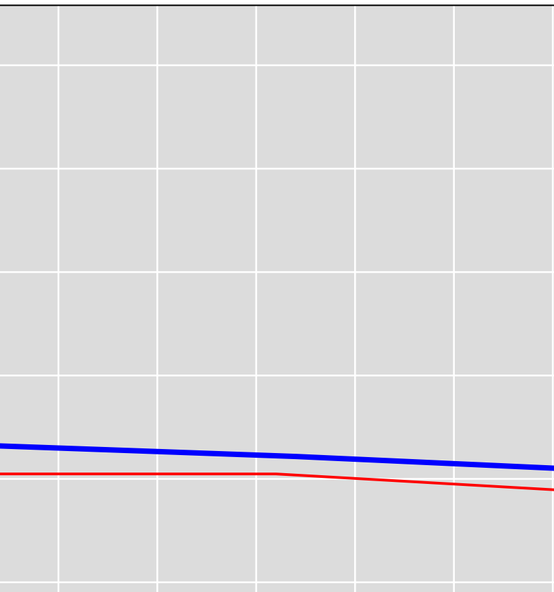
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6060203 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated
Gulf Measured - 6060203
Gulf Simulated - 6060203

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6060304 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

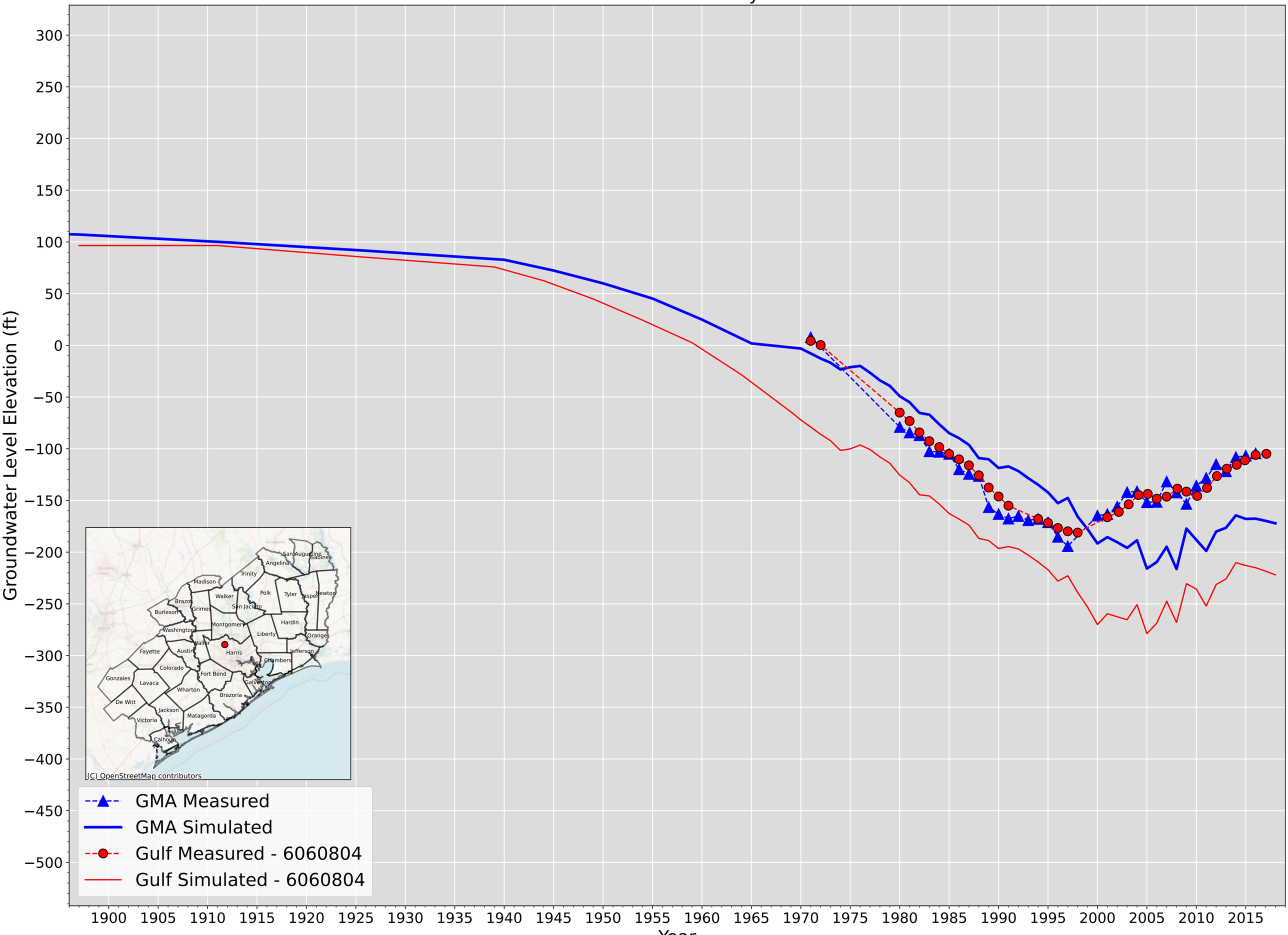
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6060804 - Layer 3



Harris - 6060912 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6060912
Gulf Simulated - 6060912

Harris - 6060920 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061101 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061415 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061415
Gulf Simulated - 6061415

Harris - 6061504 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6061528 - Layer 3

Groundwater Level Elevation (ft)

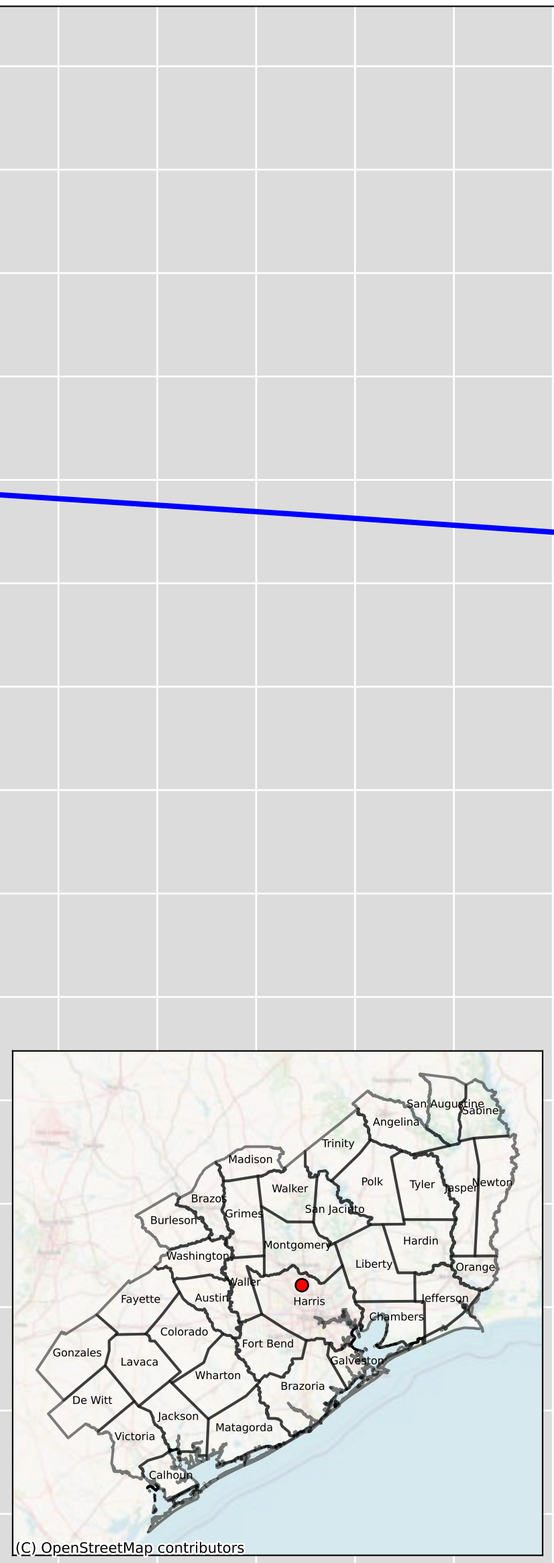
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061528
Gulf Simulated - 6061528

Harris - 6061713 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6061715 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061715
Gulf Simulated - 6061715

Harris - 6061728 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061728
Gulf Simulated - 6061728

Harris - 6061819 - Layer 3

Groundwater Level Elevation (ft)

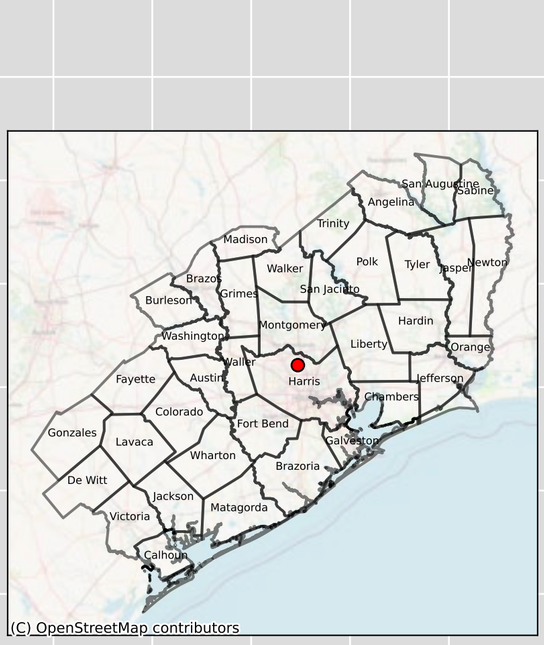
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6061824 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6061824
Gulf Simulated - 6061824

Harris - 6061826 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

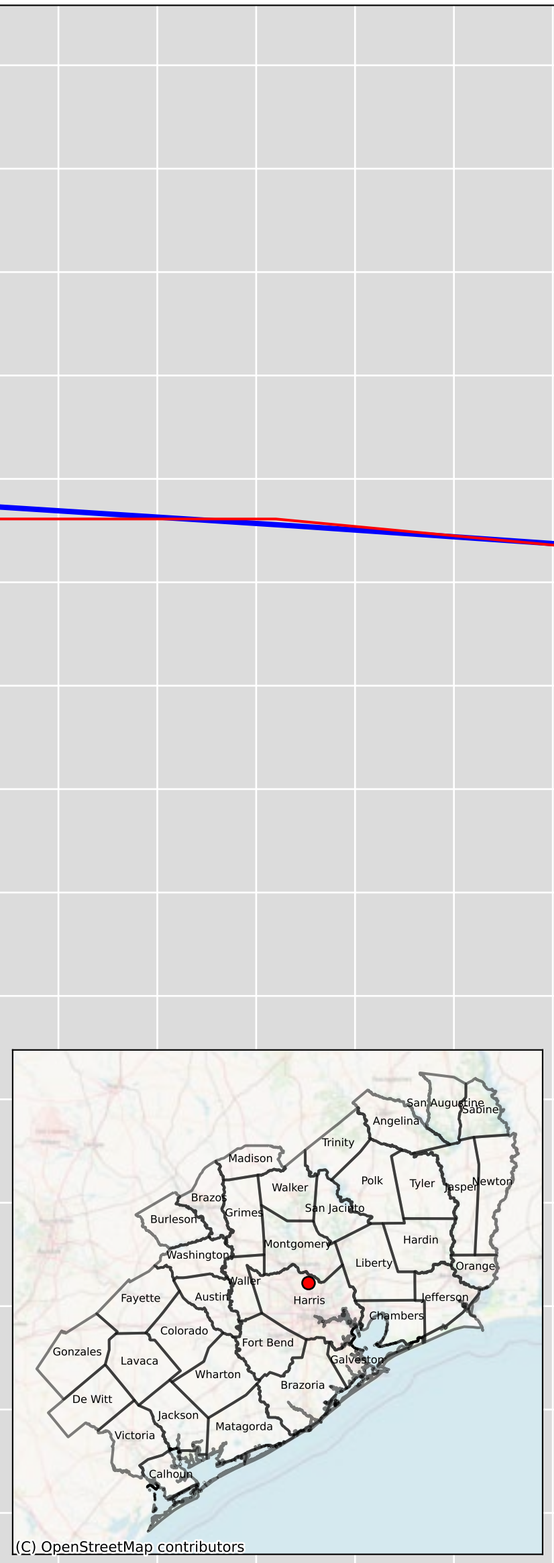
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6061903 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6061903
Gulf Simulated - 6061903

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

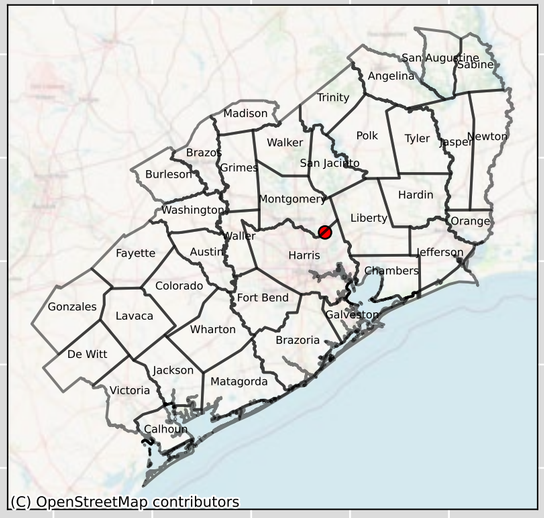
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6063407 & 6063411 - Layer 3

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Harris - 6063502 & 6063504 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6063503 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6063505 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6063510 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

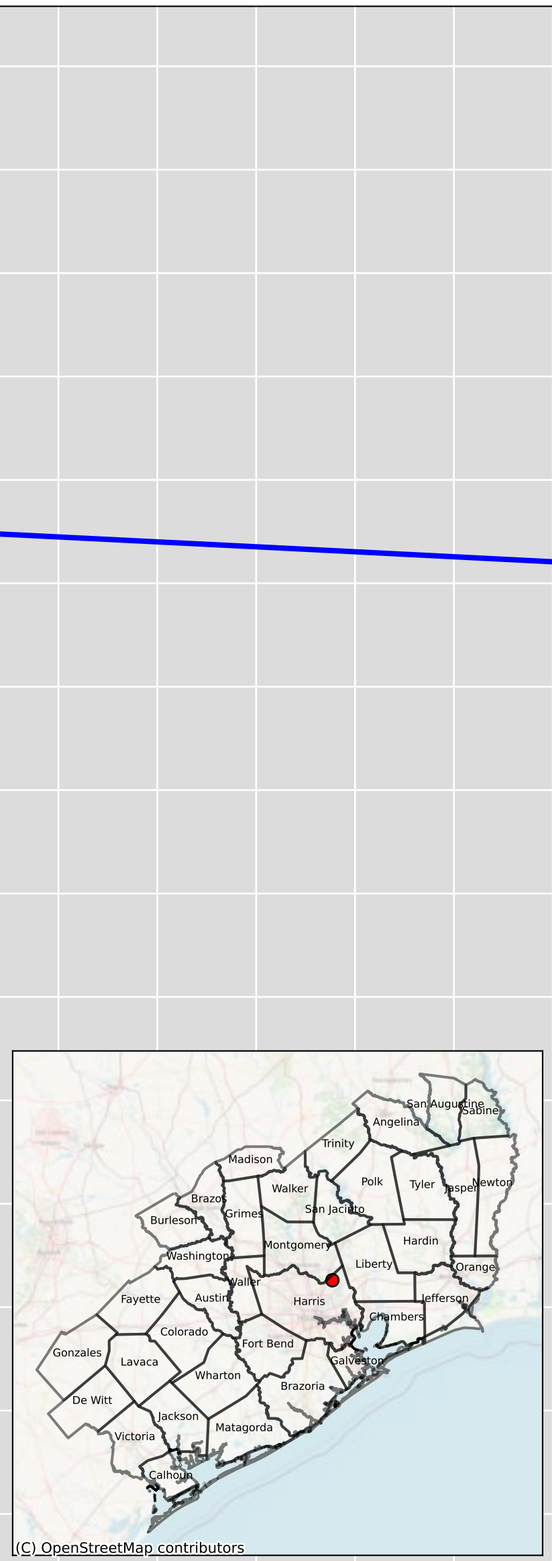
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6063511 - Layer 3



Groundwater Level Elevation (ft)

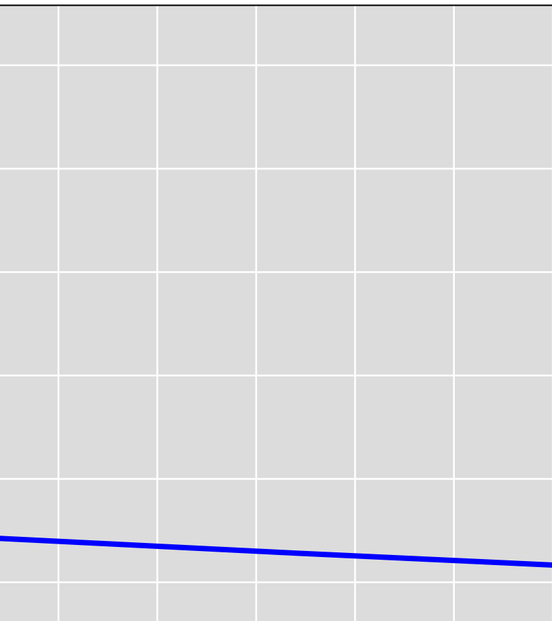
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6063604 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6063712 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6063904 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6501301 & 6501303 - Layer 3

Groundwater Level Elevation (ft)

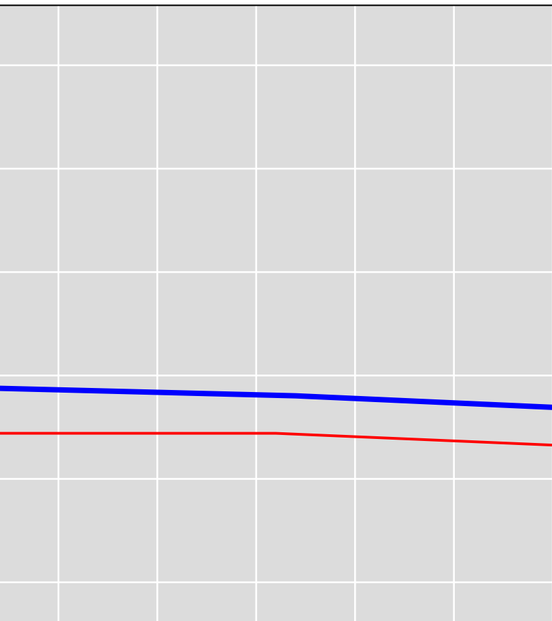
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6501302 - Layer 3



Level Elevation (ft)

Groundwater Le

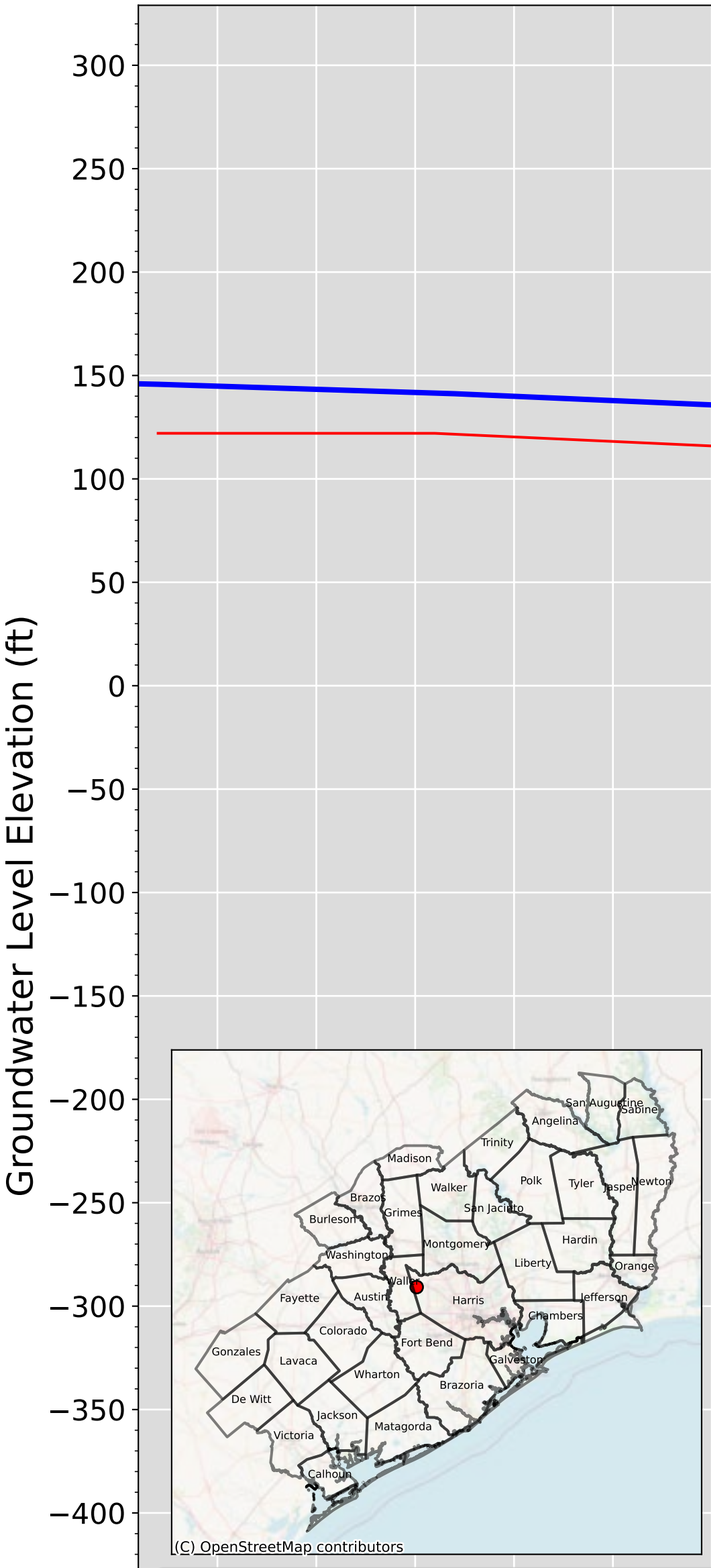
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6501302
Gulf Simulated - 6501302

Harris - 6502101 - Layer 3



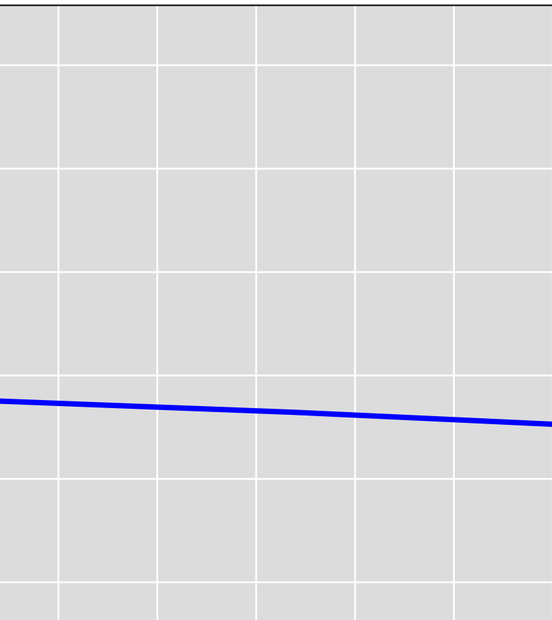
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6502202 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6502208 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6502208
Gulf Simulated - 6502208

Harris - 6502308 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6502603 - Layer 3

Groundwater Level Elevation (ft)

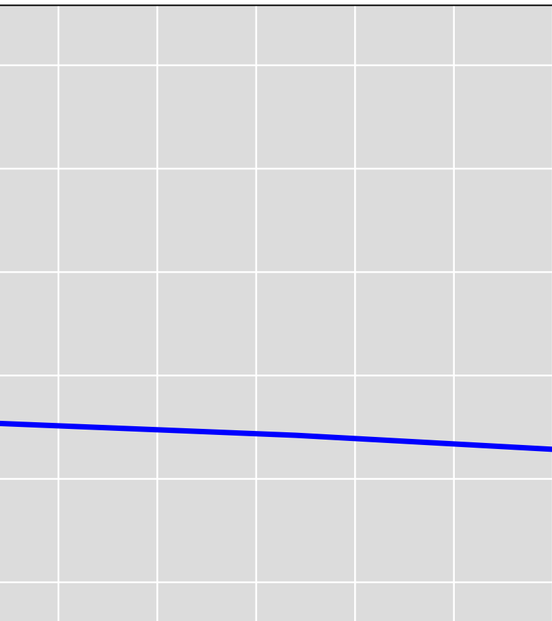
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6502603
Gulf Simulated - 6502603

Harris - 6502802 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6502901 & 6502916 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503111 - Layer 3

Groundwater Level Elevation (ft)

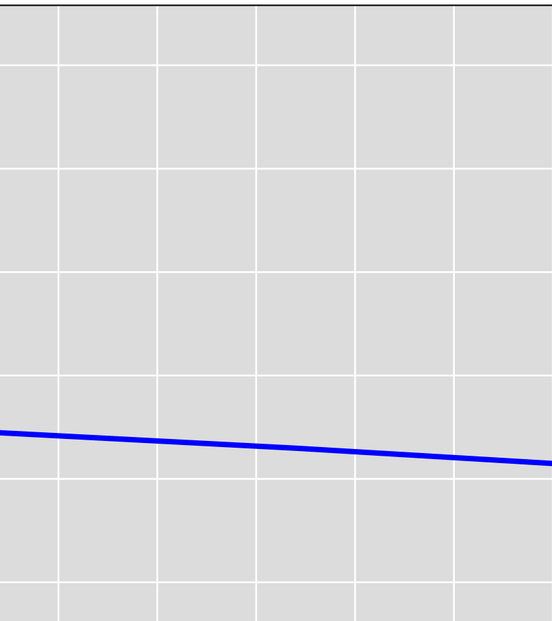
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6503111
Gulf Simulated - 6503111

Harris - 6503401 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503403 & 6503404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6503405 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503502 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6503810 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6503811 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503906 - Layer 3

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6503906
Gulf Simulated - 6503906

Harris - 6503907 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6503915 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6503915
Gulf Simulated - 6503915

Harris - 6503916 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6504102 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6504109 - Layer 3

GMA Measured
GMA Simulated
Gulf Measured - 6504109
Gulf Simulated - 6504109

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6504210 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504210
Gulf Simulated - 6504210

Harris - 6504212 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504218 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6504402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

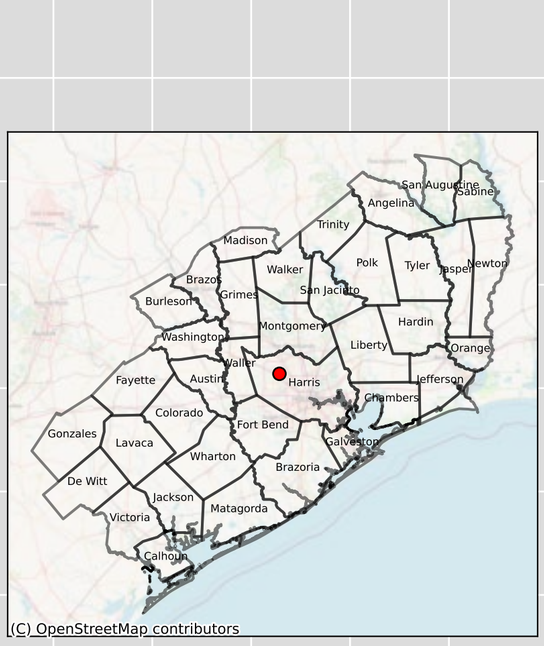
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6504415 & 6504423 - Layer 3



Groundwater Level Elevation (ft)

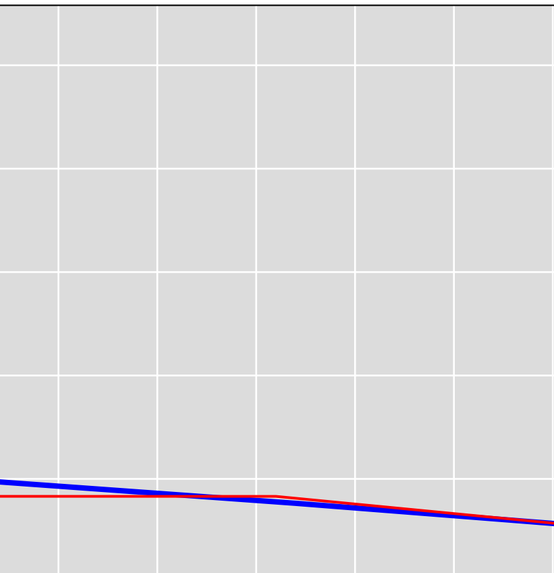
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504518 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504518
Gulf Simulated - 6504518

Harris - 6504522 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504608 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6504701 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504718 & 6504727 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504719 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6504719
Gulf Simulated - 6504719

Harris - 6504723 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504728 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504729 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6504811 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6504812 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505216 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505309 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505309
Gulf Simulated - 6505309

Harris - 6505502 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505611 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6505615 & 6505616 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505618 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505618
Gulf Simulated - 6505618

Harris - 6505619 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6505619
Gulf Simulated - 6505619

Harris - 6505623 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505727 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505813 & 6505829 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6505814 & 6505828 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6506102 - Layer 3

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Harris - 6506103 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

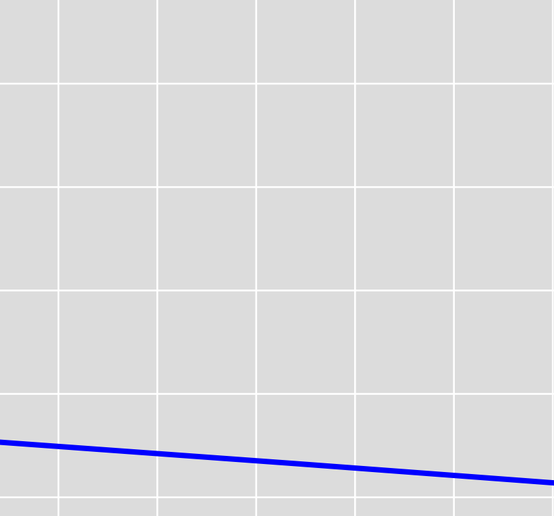
Year

GMA Measured
GMA Simulated

Harris - 6506202 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6506302 - Layer 3

Groundwater Level Elevation (ft)

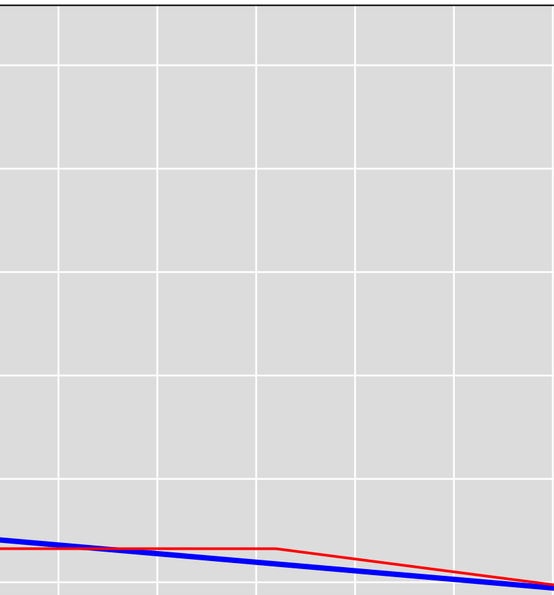
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6506302
Gulf Simulated - 6506302

Harris - 6506528 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6506528
Gulf Simulated - 6506528

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6507906 & 6507909 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6507906
Gulf Simulated - 6507906

Harris - 6508708 - Layer 3

Groundwater Level Elevation (ft)

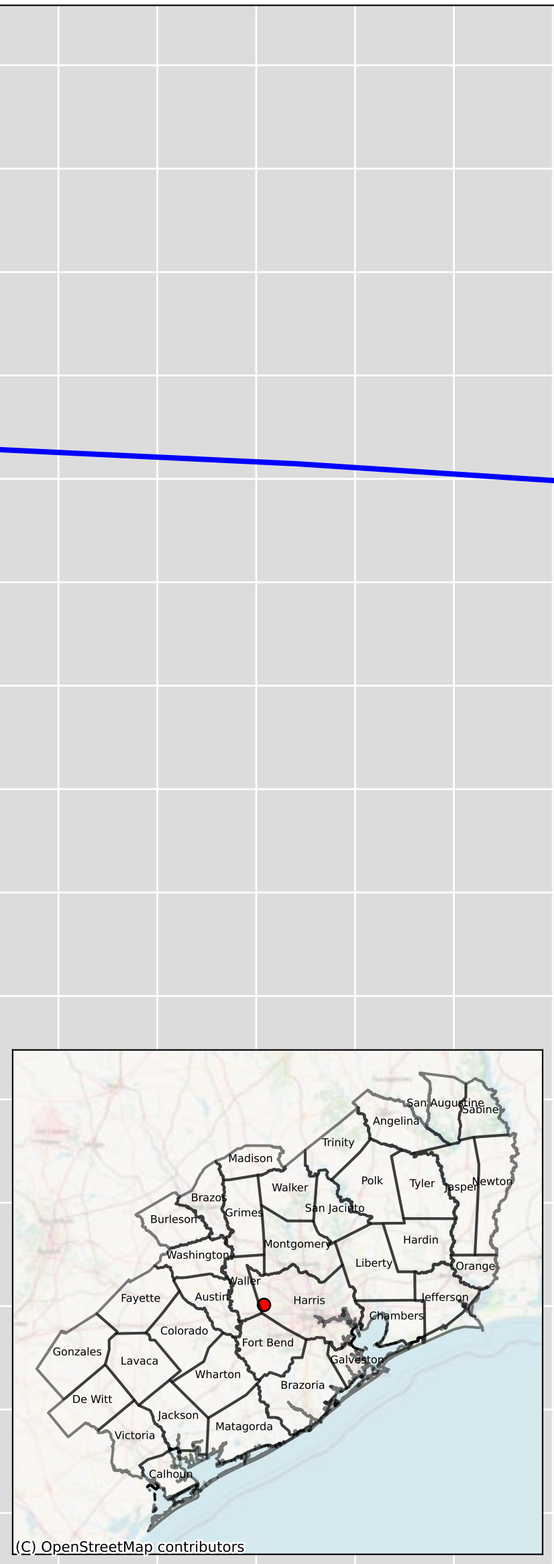
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6510203 - Layer 3



Harris - 6510301 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

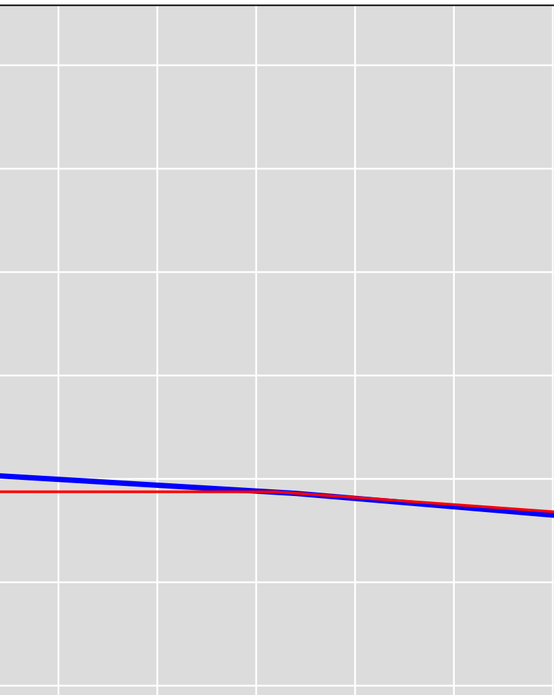
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6510611 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6510611
Gulf Simulated - 6510611

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

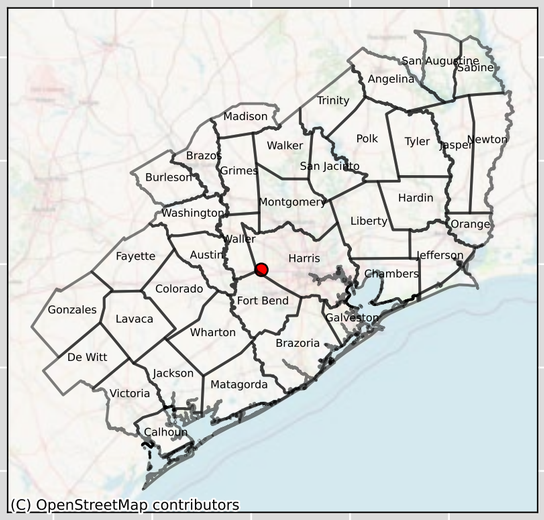
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6510612 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6510902 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511108 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511407 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511508 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511514 - Layer 3

Groundwater Level Elevation (ft)

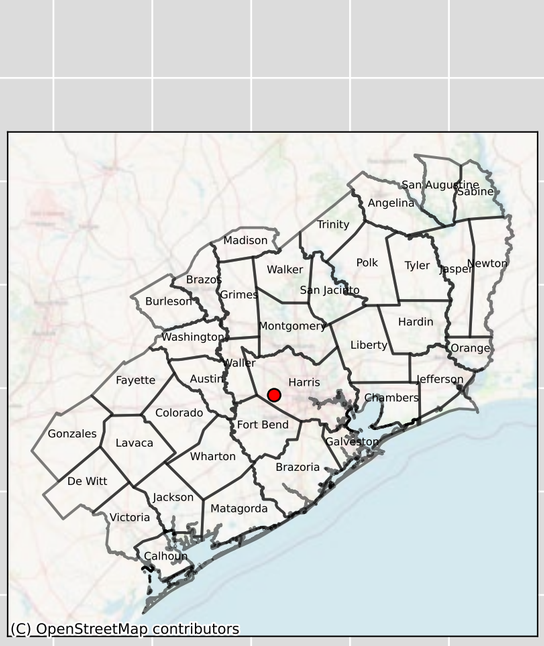
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6511514
Gulf Simulated - 6511514

Harris - 6511804 & 6511803 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6511804
Gulf Simulated - 6511804

Harris - 6511913 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

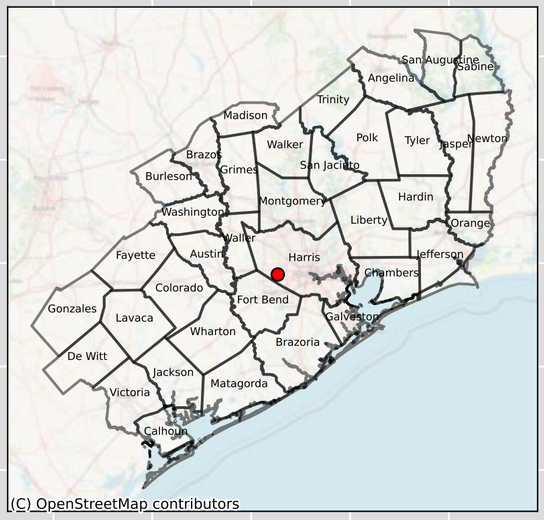
Year

GMA Measured
GMA Simulated
Gulf Measured - 6511913
Gulf Simulated - 6511913

Harris - 6511914 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6511915 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6511916 & 6511920 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511917 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6511918 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6512215 & 6512216 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512328 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512328
Gulf Simulated - 6512328

Harris - 6512402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512516 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512517 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512518 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512519 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512520 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512520
Gulf Simulated - 6512520

Harris - 6512521 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512618 & 6512621 & 6512634 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512619 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512622 & 6512635 - Layer 3

Groundwater Level Elevation (ft)

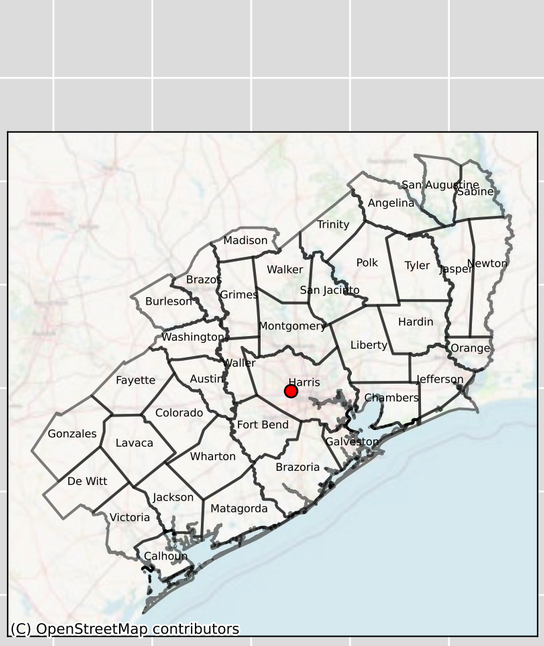
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512625 - Layer 3



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512704 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512714 & 6512724 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

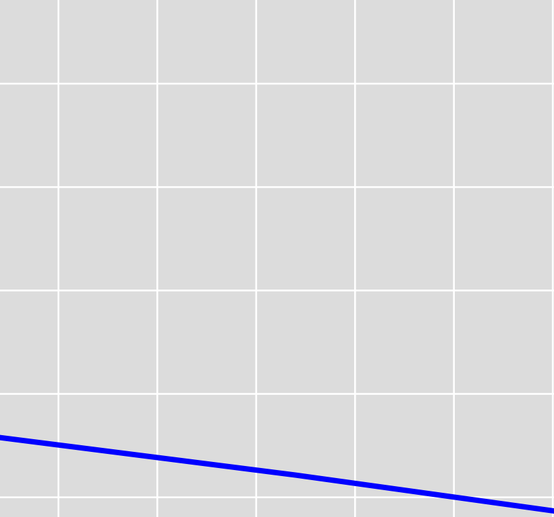
Year

GMA Measured
GMA Simulated

Harris - 6512715 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512717 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6512719 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

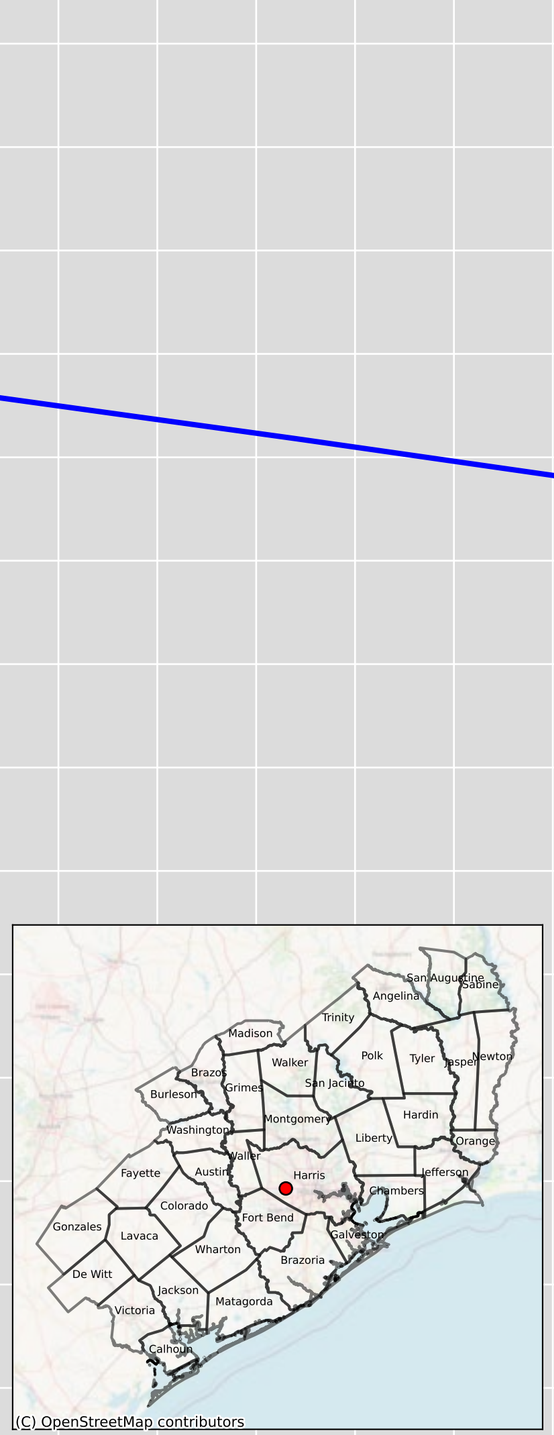
Harris - 6512720 & 6512721 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6512726 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512726
Gulf Simulated - 6512726

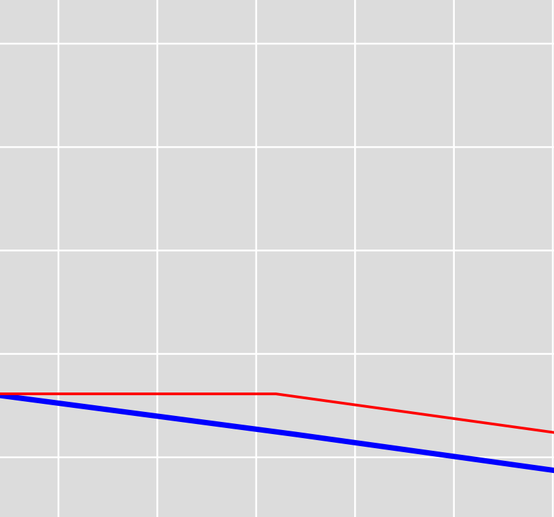
Harris - 6512730 & 6512722 & 6512723 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6512730
Gulf Simulated - 6512730

Harris - 6512731 & 6512735 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512803 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6512817 & 6520225 - Layer 3

Groundwater Level Elevation (ft)

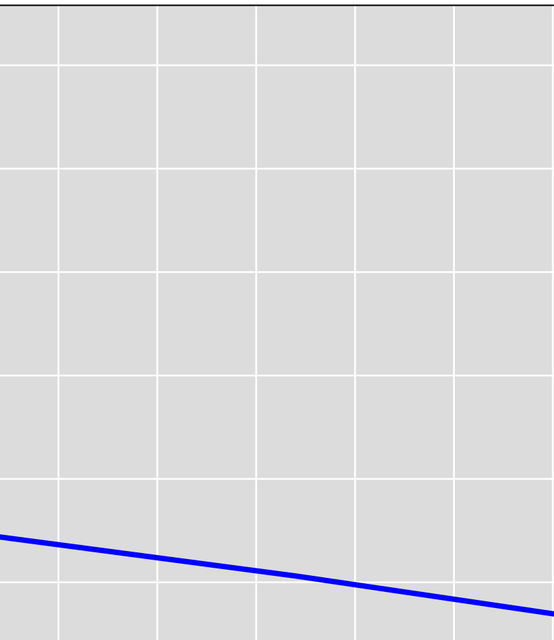
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512820 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6512904 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512904
Gulf Simulated - 6512904

Harris - 6512930 - Layer 3

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6512930
Gulf Simulated - 6512930

Harris - 6513111 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513111
Gulf Simulated - 6513111

Harris - 6513119 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513214 & 6513219 & 6513224 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513222 & 6513220 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513222
Gulf Simulated - 6513222

Harris - 6513302 & 6513303 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513304 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6513304
Gulf Simulated - 6513304

Harris - 6513305 & 6513324 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513306 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513322 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513601 & 6513602 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513604 & 6513606 & 6513607 & 6513613 & 6513624 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513605 & 6513626 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513608 & 6513627 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513701 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513716 - Layer 3

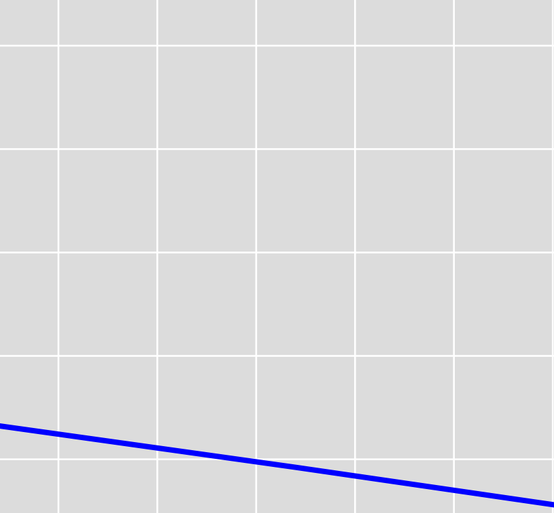
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



Harris - 6513903 & 6513905 & 6513926 - Layer 3

Groundwater Level Elevation (ft)

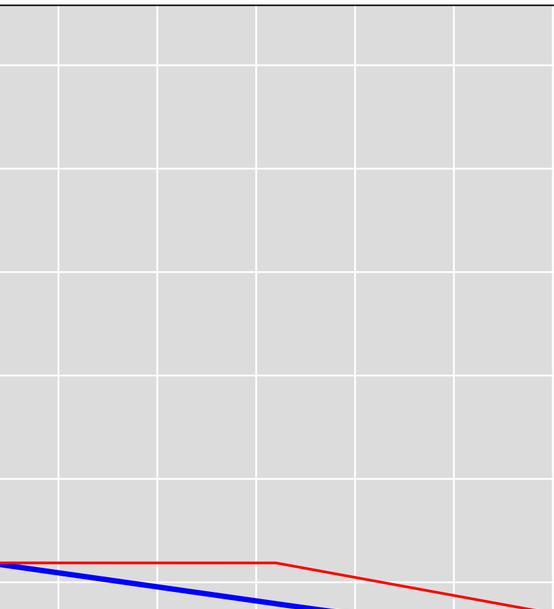
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6513904 & 6513924 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6513904
Gulf Simulated - 6513904

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

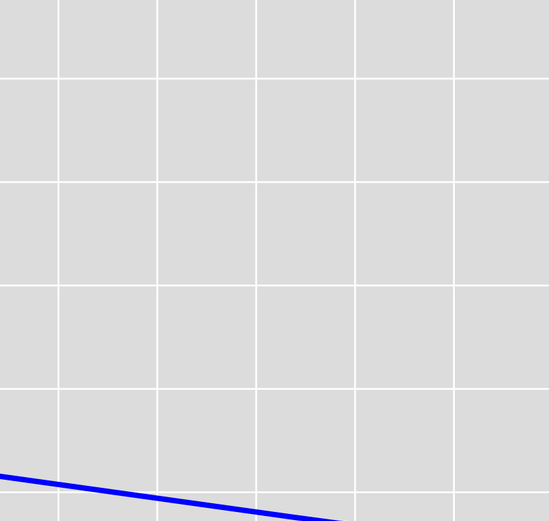
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6513925 & 6514707 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6513944 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

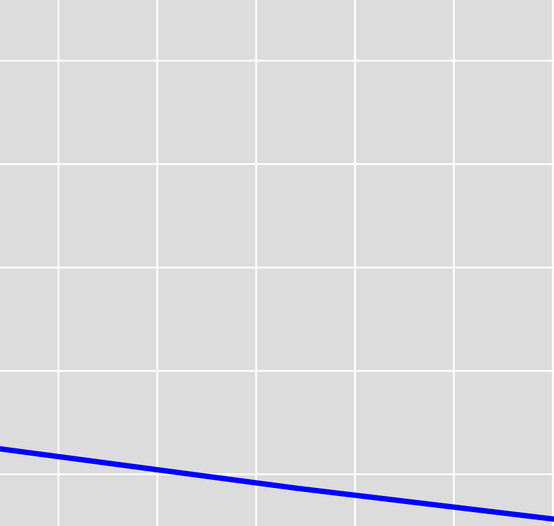
GMA Measured

GMA Simulated

Harris - 6514102 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

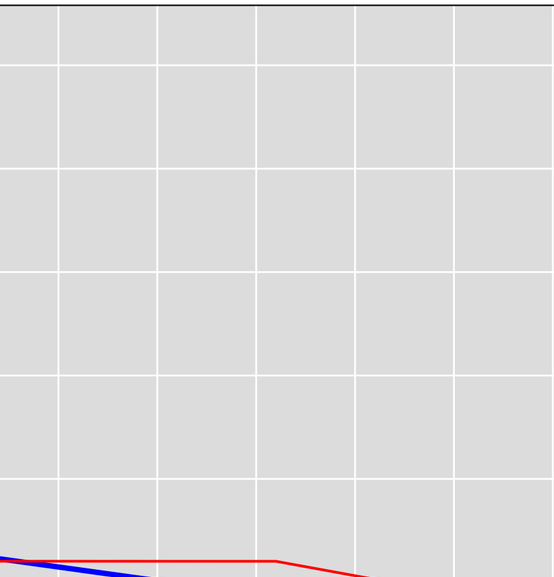


GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6514103 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6514103
Gulf Simulated - 6514103

Harris - 6514107 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514109 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514401 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

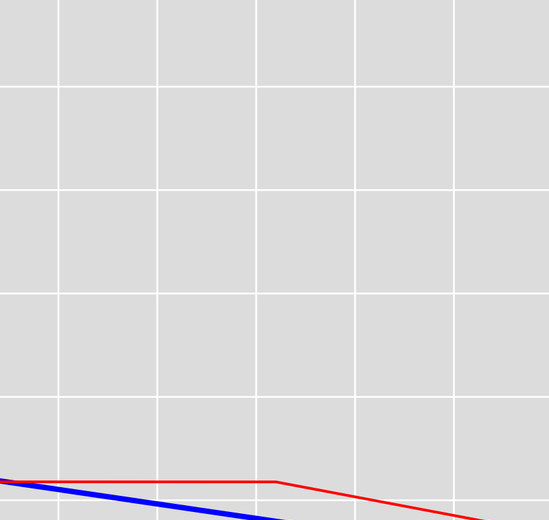
Harris - 6514403 & 6514402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

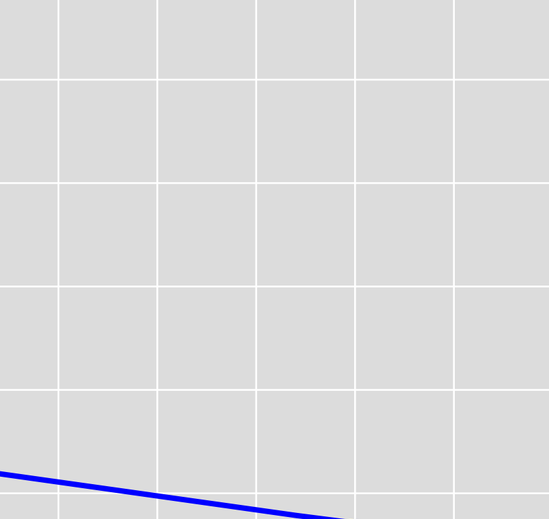


GMA Measured
GMA Simulated
Gulf Measured - 6514403
Gulf Simulated - 6514403

Harris - 6514404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6514405 - Layer 3

Groundwater Level Elevation (ft)

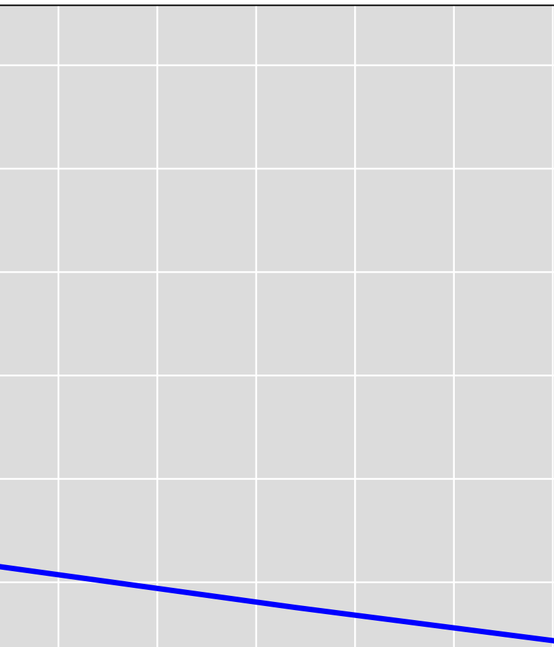
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6514406 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515304 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515401 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6515404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516101 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516109 & 6516111 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516110 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516112 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516113 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516114 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

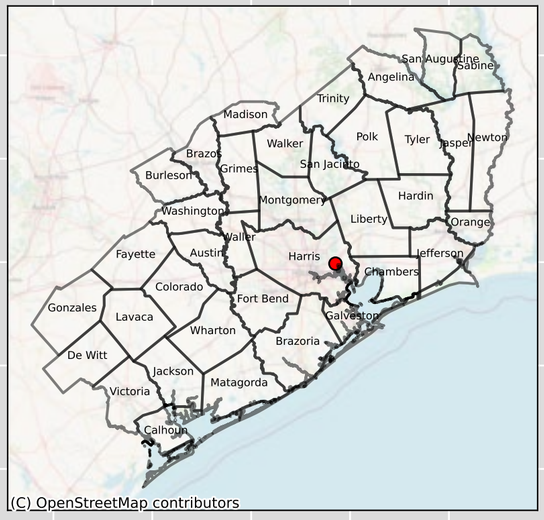
Harris - 6516401 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6516907 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6516931 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6516931
Gulf Simulated - 6516931

Harris - 6519305 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6519319 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6519319
Gulf Simulated - 6519319

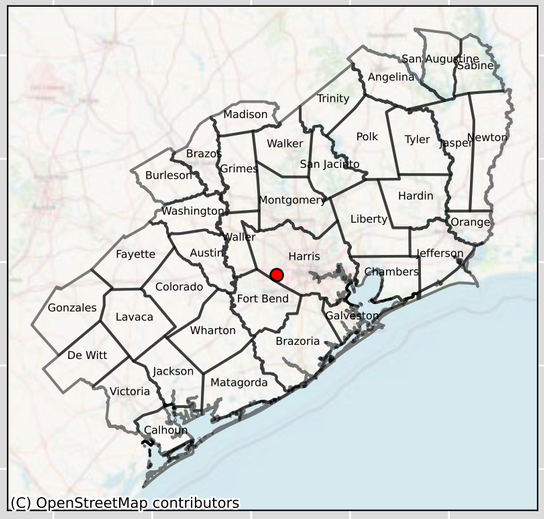
Harris - 6519320 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6519322 - Layer 3

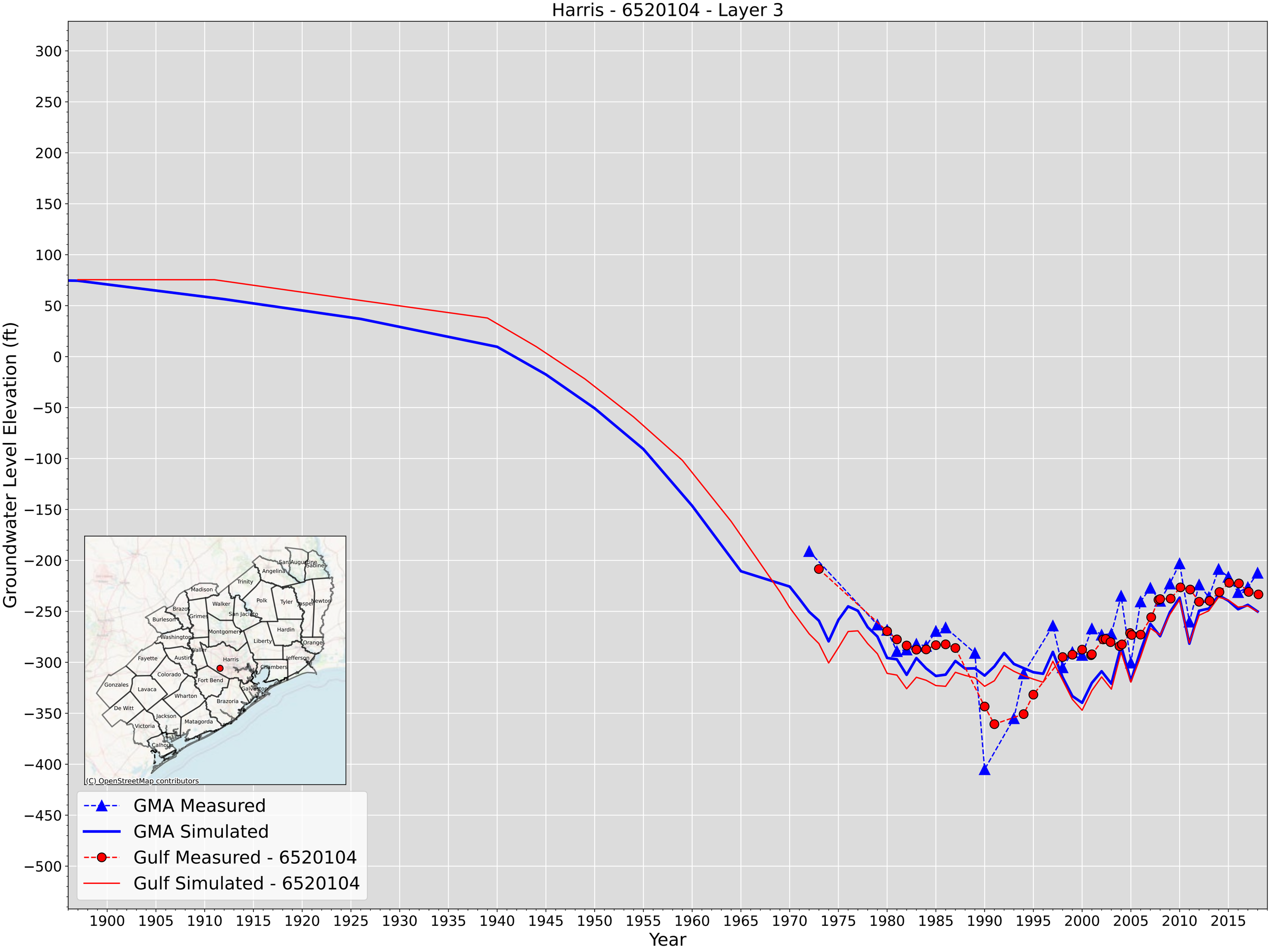
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated


Harris - 6520104 - Layer 3
Groundwater Level Elevation (ft)
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 6520104
Gulf Simulated - 6520104

Harris - 6520110 - Layer 3

GMA Measured
GMA Simulated
Gulf Measured - 6520110
Gulf Simulated - 6520110

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520122 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520123 & 6520127 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520123
Gulf Simulated - 6520123

Harris - 6520124 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520125 - Layer 3

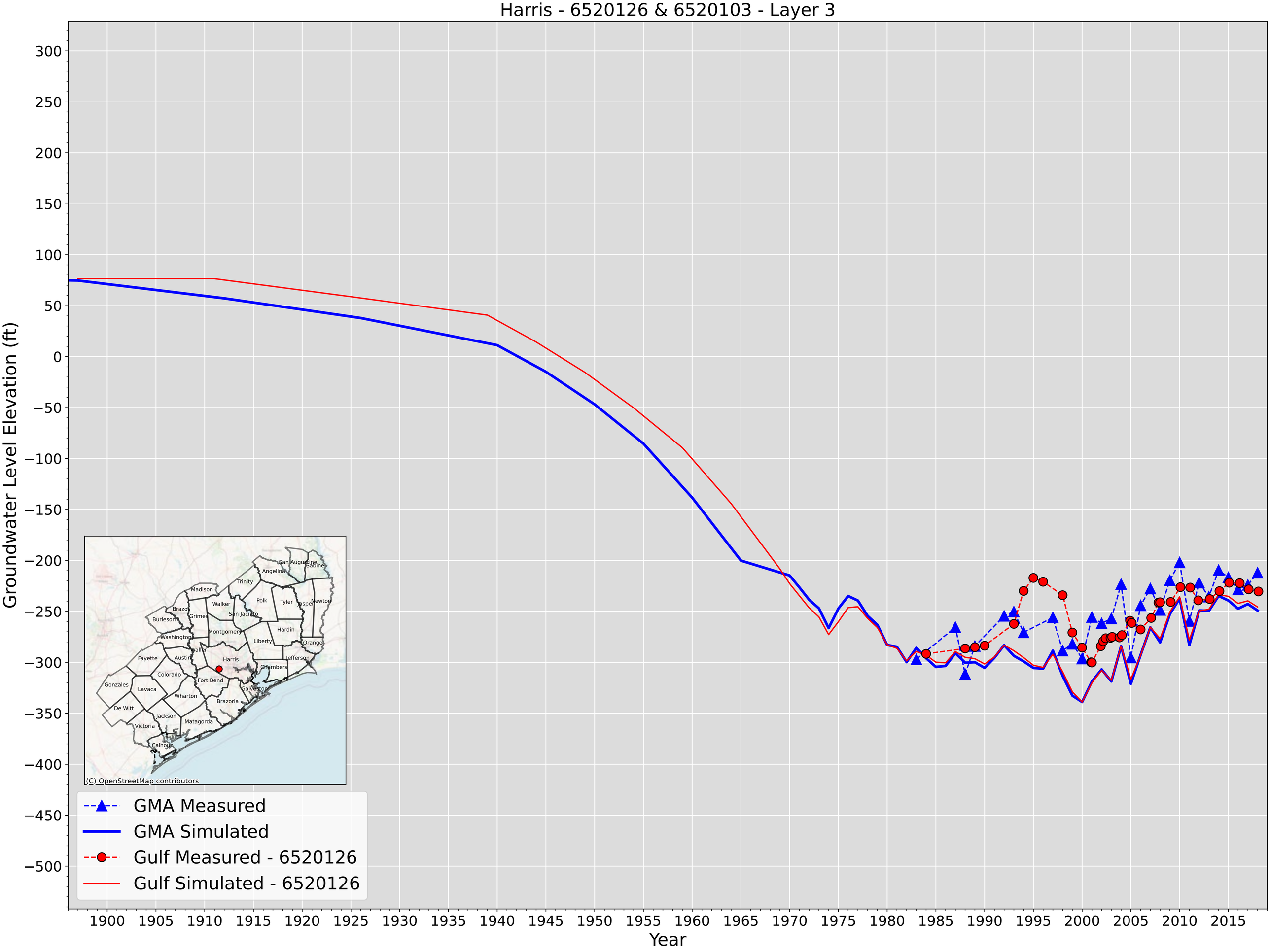
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated


Harris - 6520126 & 6520103 - Layer 3
Groundwater Level Elevation (ft)
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Galveston
Gonzales
Lavaca
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 6520126
Gulf Simulated - 6520126

Harris - 6520128 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520216 & 6520218 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520226 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520226
Gulf Simulated - 6520226

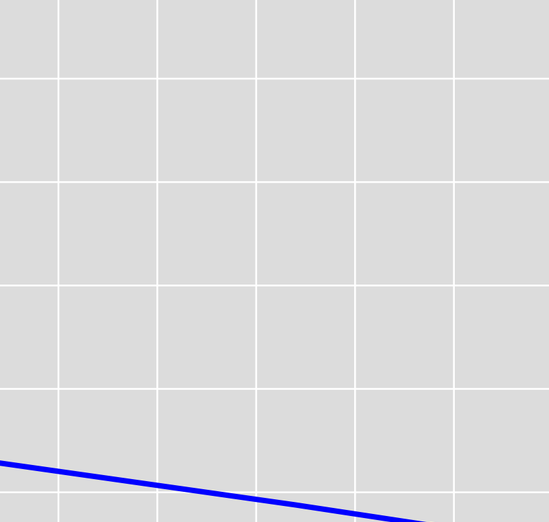
Harris - 6520301 & 6520324 & 6521105 & 6521144 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6520302 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520303 - Layer 3

Groundwater Level Elevation (ft)

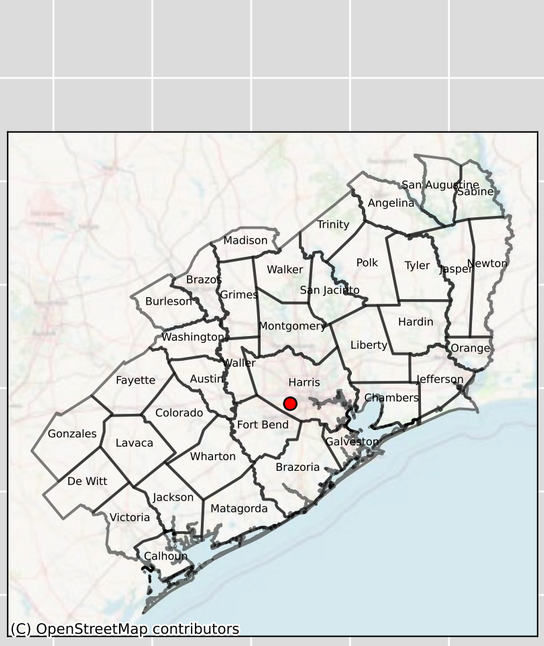
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520304 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520319 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520321 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520322 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520322
Gulf Simulated - 6520322

Harris - 6520405 & 6520407 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520408 & 6520424 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520409 & 6520423 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520410 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520412 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520414 & 6520417 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520418 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520419 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520421 & 6520422 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6520421
Gulf Simulated - 6520421

Harris - 6520512 & 6520513 & 6520521 & 6520522 - Layer 3

Groundwater Level Elevation (ft)

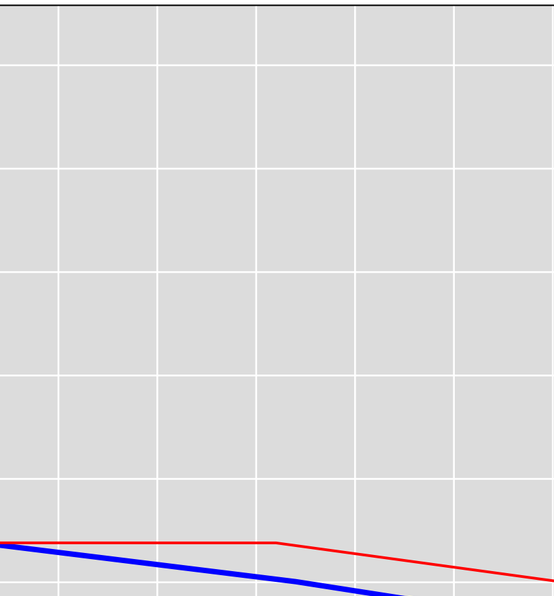
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520519 & 6520518 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6520519
Gulf Simulated - 6520519

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520614 - Layer 3

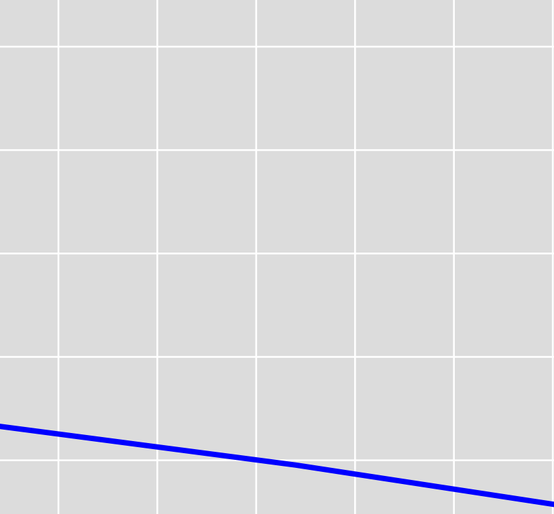
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



Harris - 6520618 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520619 - Layer 3

Groundwater Level Elevation (ft)

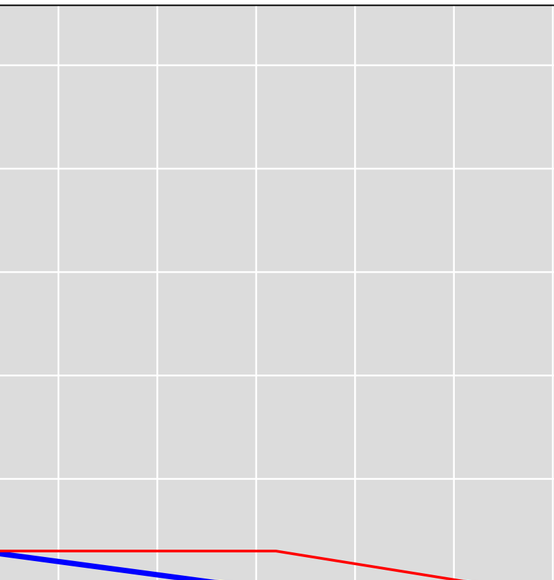
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520626 & 6520608 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6520626
Gulf Simulated - 6520626

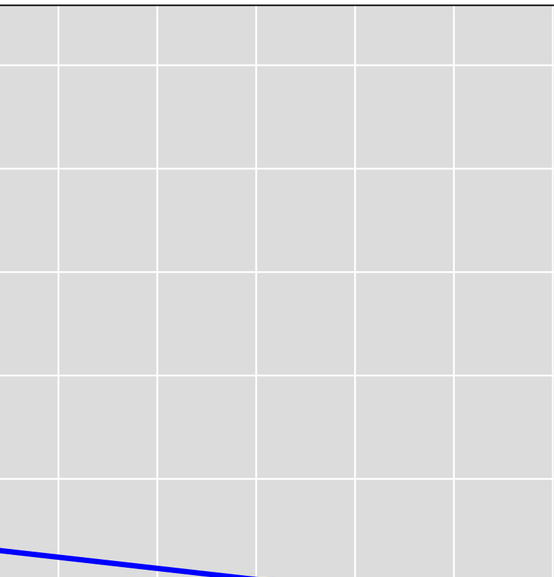
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6520808 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6520813 & 6520811 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

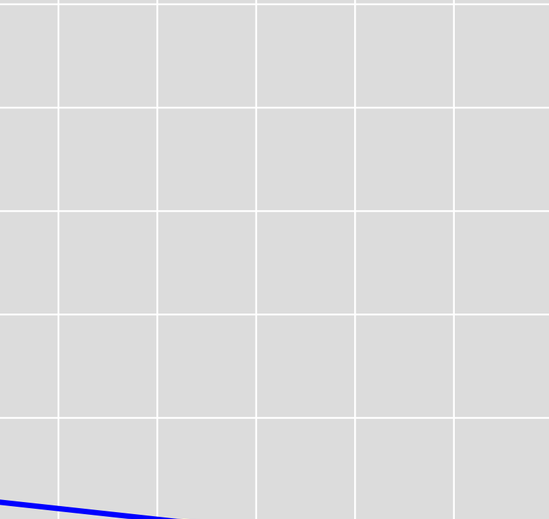
Year

GMA Measured
GMA Simulated
Gulf Measured - 6520813
Gulf Simulated - 6520813

Harris - 6520910 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521101 & 6521143 - Layer 3

Groundwater Level Elevation (ft)

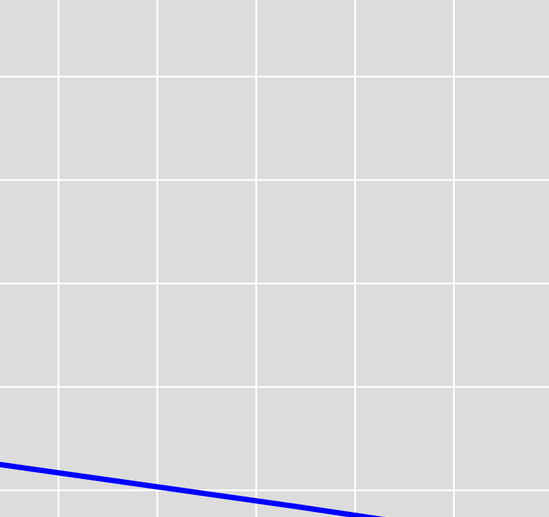
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521102 & 6521103 & 6521148 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521104 & 6521149 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521106 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521152 - Layer 3

Groundwater Level Elevation (ft)

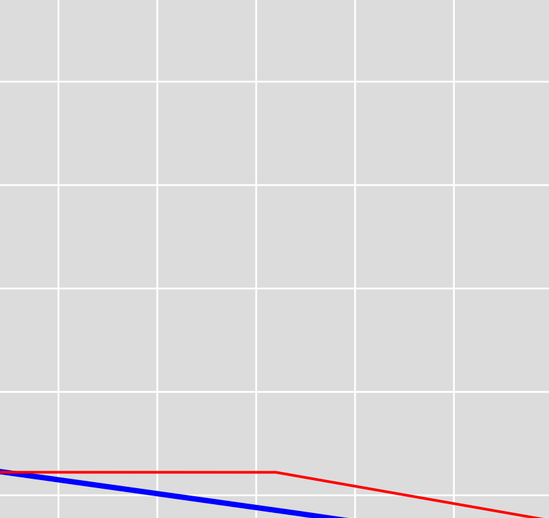
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521230 & 6521202 & 6521227 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6521230
Gulf Simulated - 6521230

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521301 & 6521327 & 6521330 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521302 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

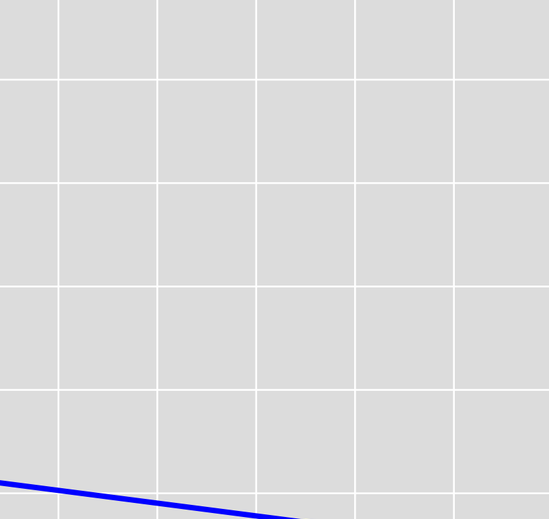
Year

GMA Measured
GMA Simulated

Harris - 6521303 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

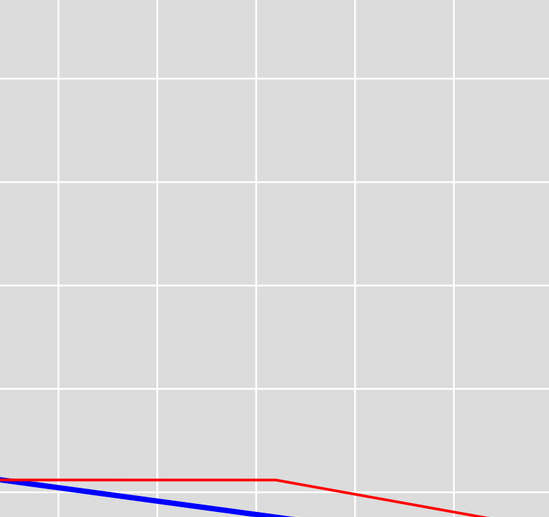


GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521304 & 6521306 & 6521320 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521304
Gulf Simulated - 6521304

Harris - 6521402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521402
Gulf Simulated - 6521402

Harris - 6521403 & 6521417 - Layer 3

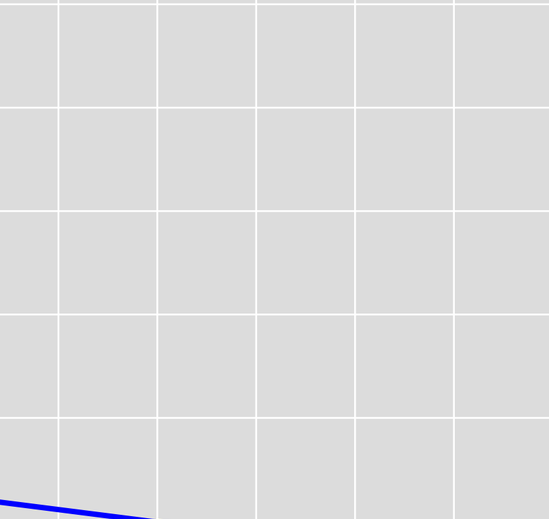
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated



Harris - 6521414 - Layer 3

Groundwater Level Elevation (ft)

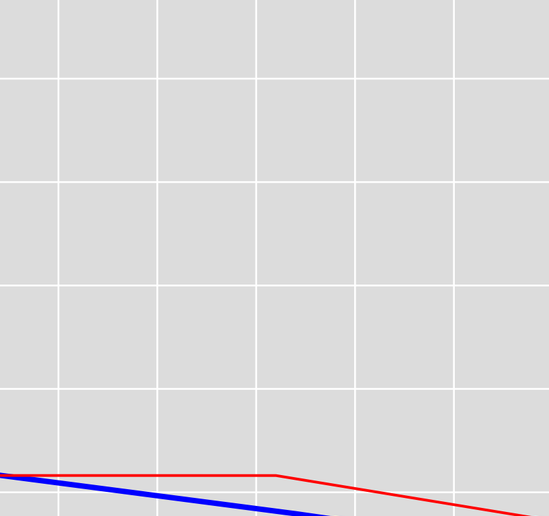
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521504 & 6521503 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6521504
Gulf Simulated - 6521504

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

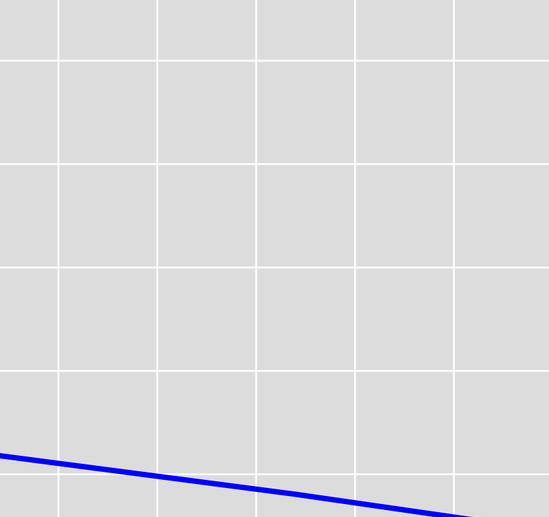
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521509 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500



GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6521701 - Layer 3

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521701
Gulf Simulated - 6521701

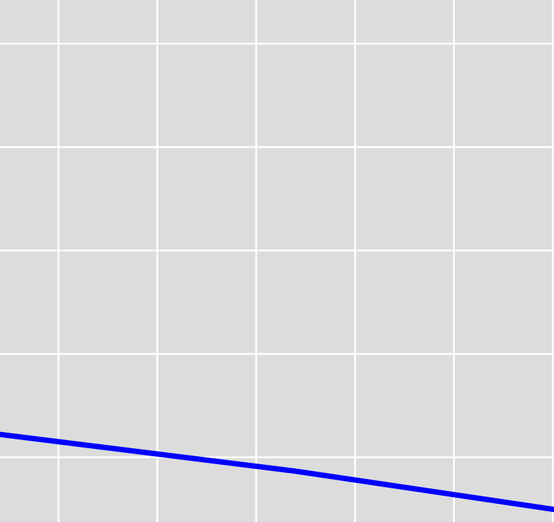
Harris - 6521707 & 6521712 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6521708 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521709 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521803 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6521804 & 6521802 & 6521816 & 6521817 & 6521818 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6521804
Gulf Simulated - 6521804

Harris - 6521812 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6522103 & 6522120 & 6522121 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522118 & 6522130 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

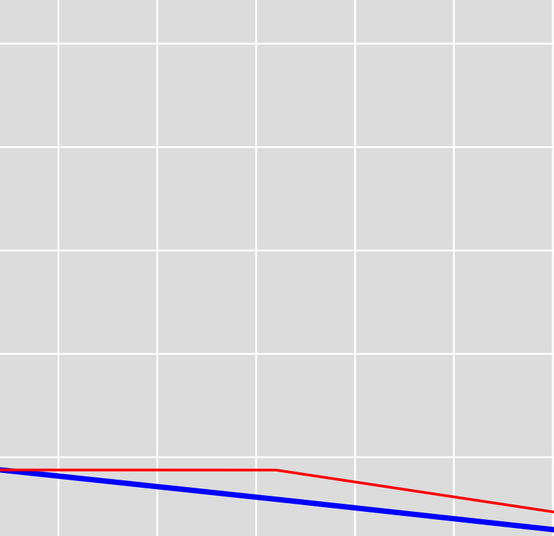
Harris - 6522602 & 6522601 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6522602
Gulf Simulated - 6522602

Harris - 6522604 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6522605 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522606 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522801 & 6522804 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522802 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6522901 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523102 & 6523147 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523128 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523214 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6523214
Gulf Simulated - 6523214

Harris - 6523221 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6523325 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6523325
Gulf Simulated - 6523325

Harris - 6523722 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

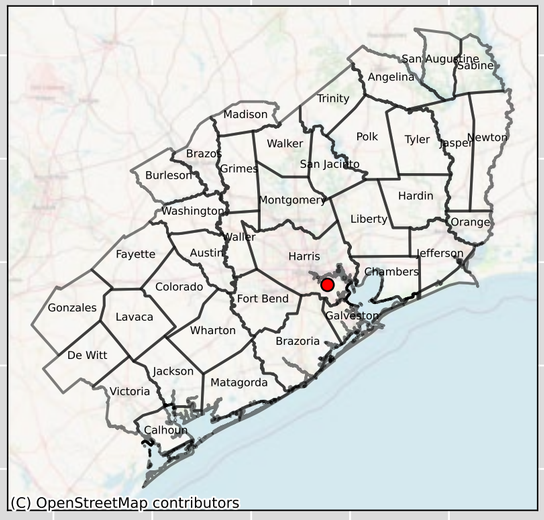
Harris - 6523804 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

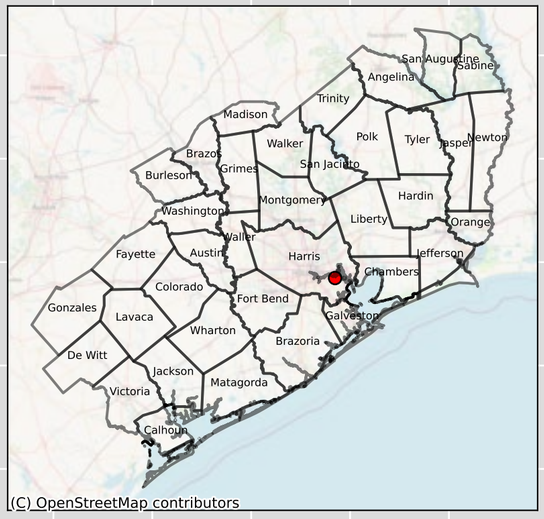
Harris - 6524108 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

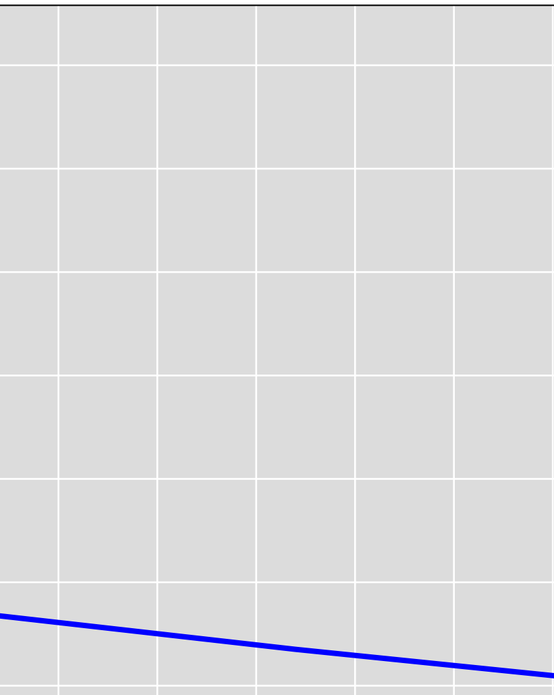
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Harris - 6524132 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6529106 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Harris - 6529108 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Harris - 6532424 & 6532428 - Layer 3

GMA Measured
GMA Simulated
Gulf Measured - 6532424
Gulf Simulated - 6532424

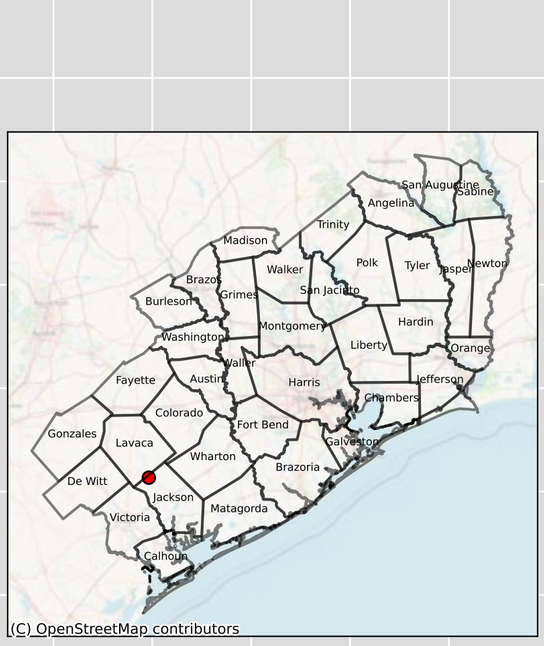
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6650801 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6650801
Gulf Simulated - 6650801

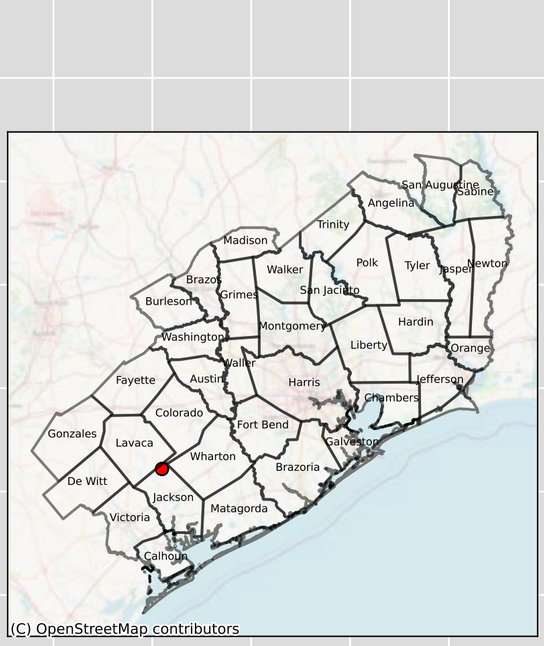
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6651505 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6651505
Gulf Simulated - 6651505

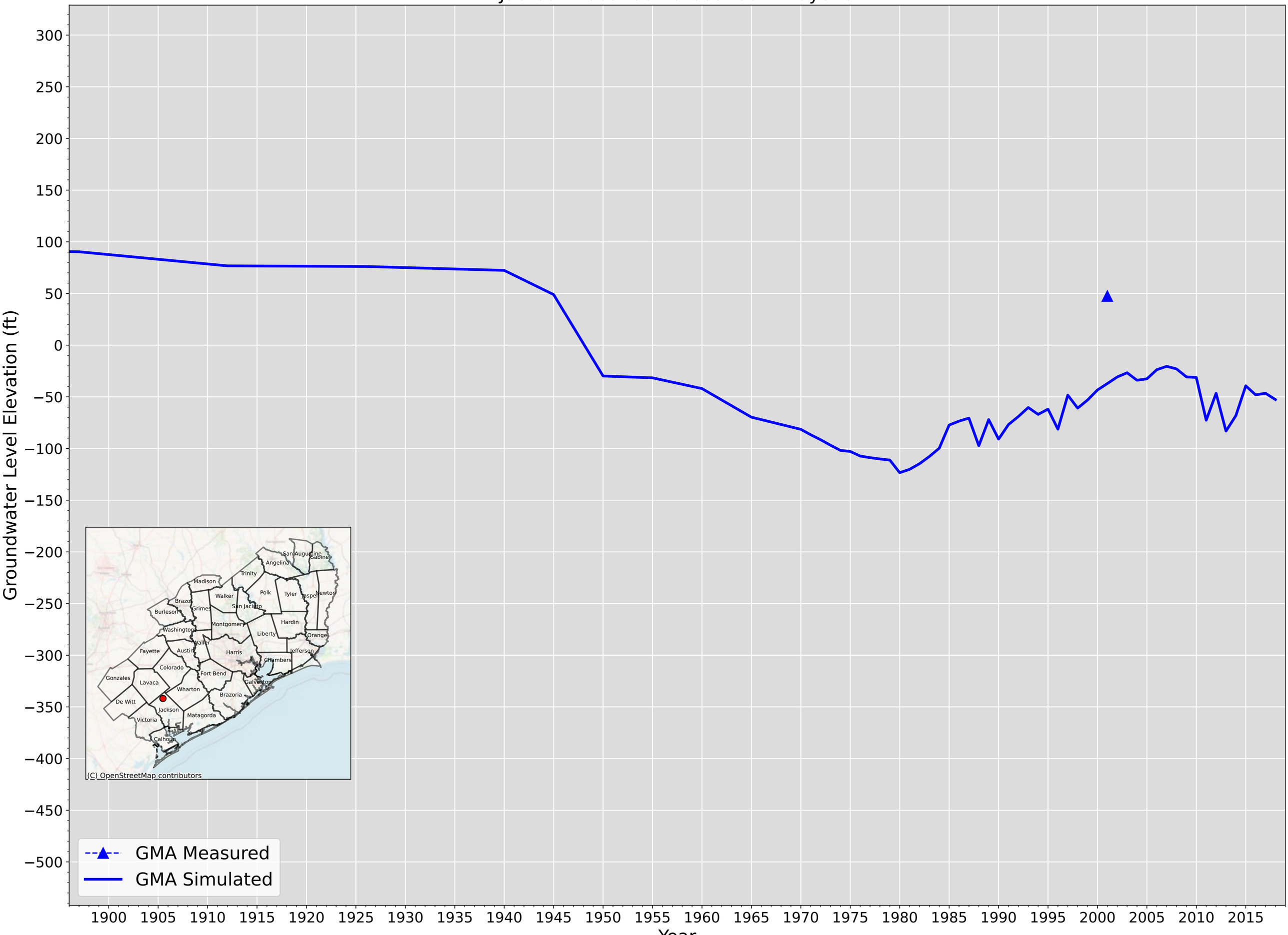
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6651801 & 6651802 - Layer 3



Jackson - 6651804 - Layer 3

Groundwater Level Elevation (ft)

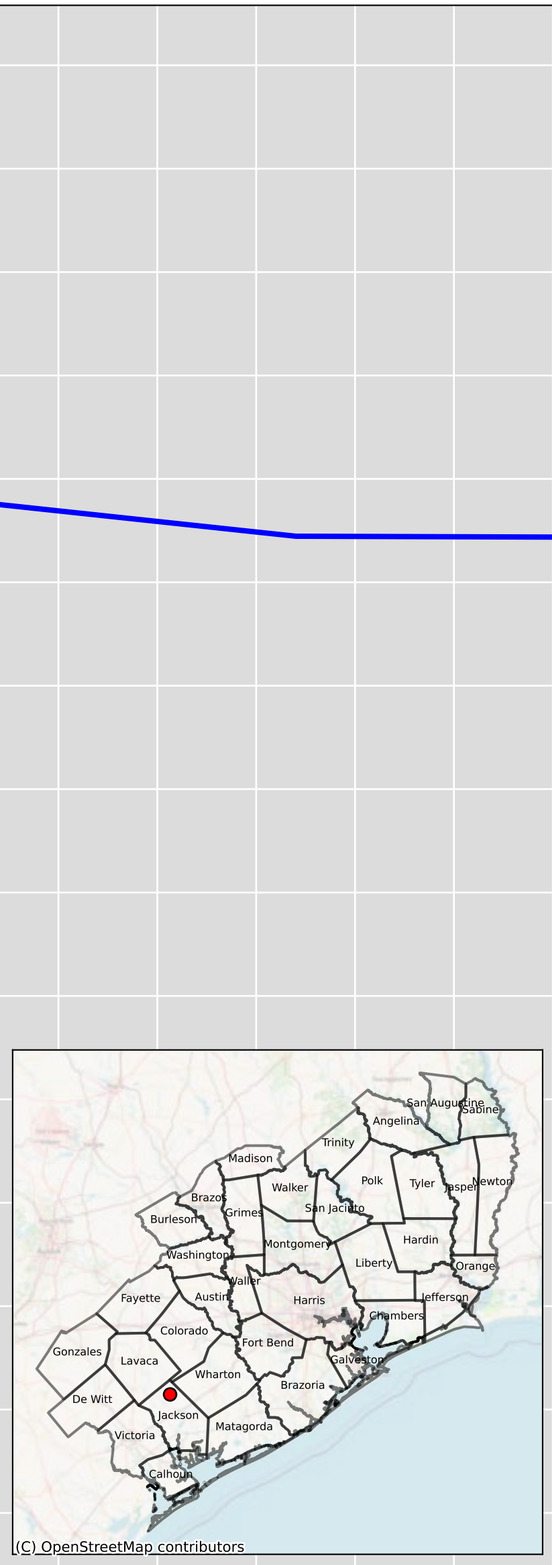
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6651903 - Layer 3



Groundwater Level Elevation (ft)

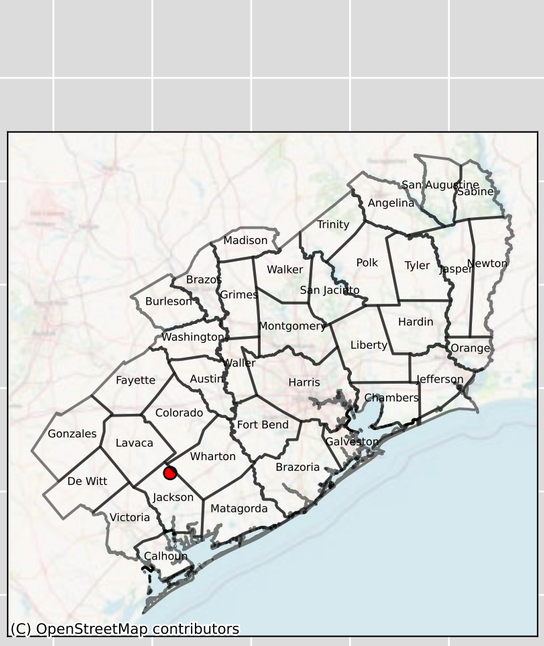
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6652407 - Layer 3



Level Elevation (ft)

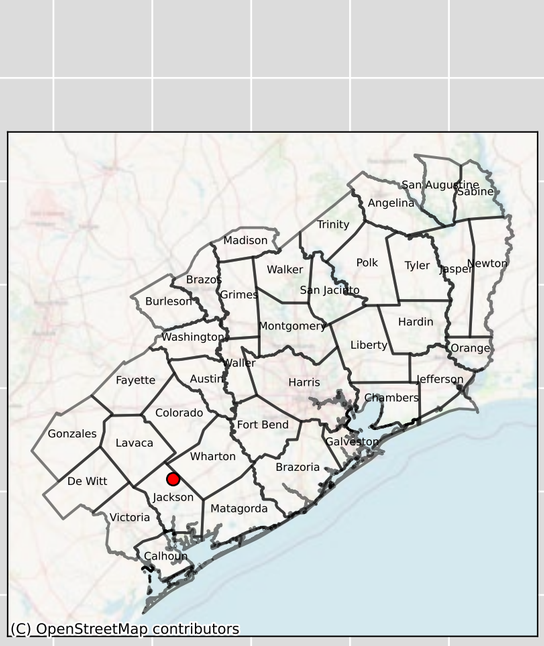
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6652407
Gulf Simulated - 6652407

Jackson - 6652801 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6658301 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

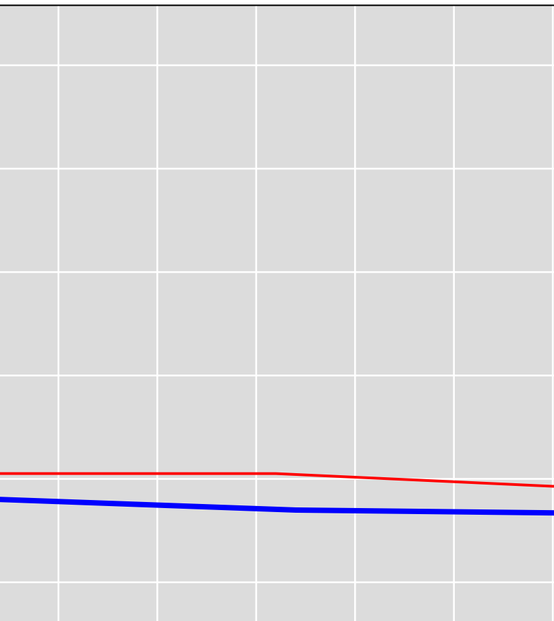
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 6658402 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6658402
Gulf Simulated - 6658402

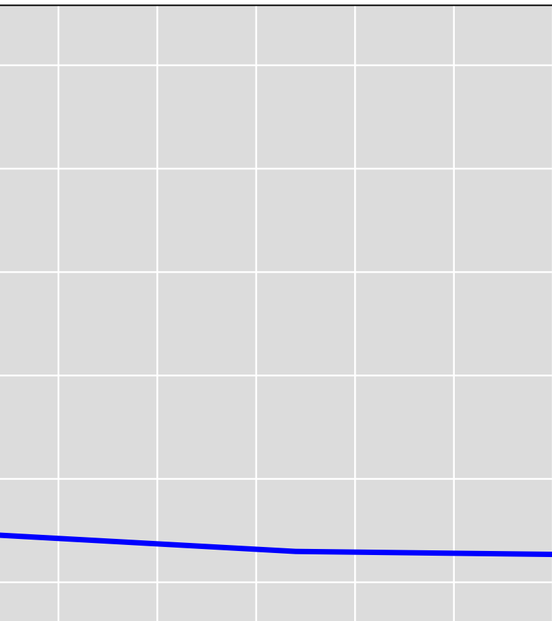
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jackson - 6658903 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6659304 & 6659307 - Layer 3

Groundwater Level Elevation (ft)

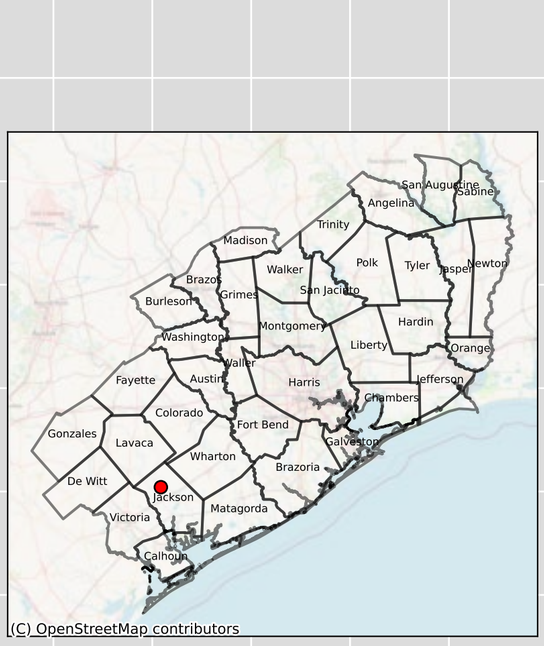
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 6659501 - Layer 3



Jackson - 6660613 & 6660607 - Layer 3

Groundwater Level Elevation (ft)

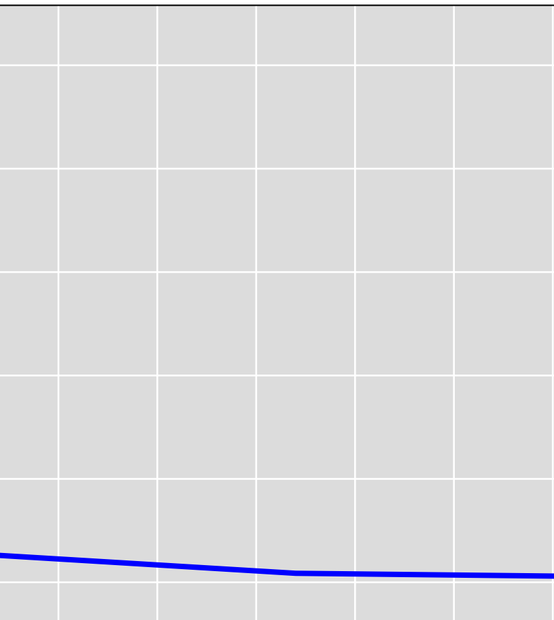
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6660613
Gulf Simulated - 6660613

Jackson - 8002601 - Layer 3



Groundwater Level Elevation (ft)

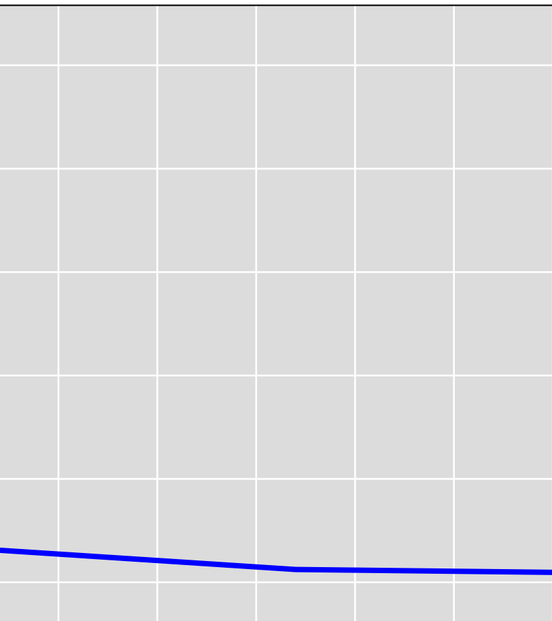
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8003101 - Layer 3



Groundwater Level Elevation (ft)

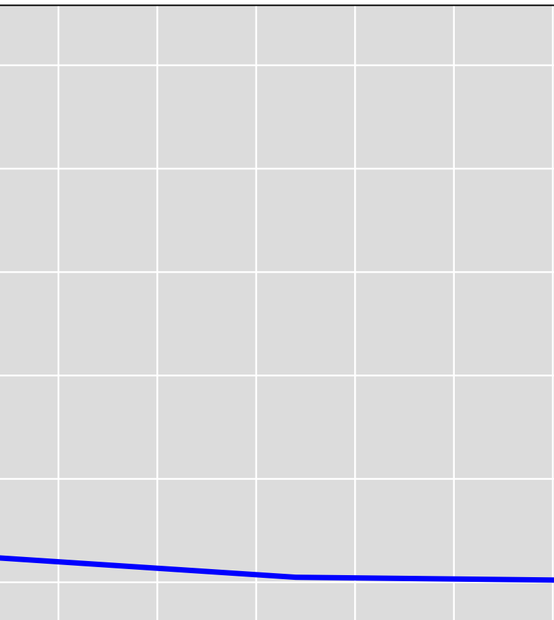
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8003202 - Layer 3



Groundwater Level Elevation (ft)

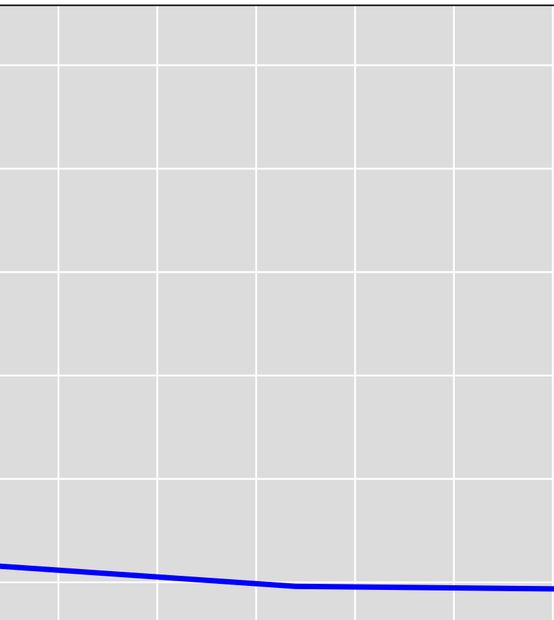
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8003503 - Layer 3



Groundwater Level Elevation (ft)

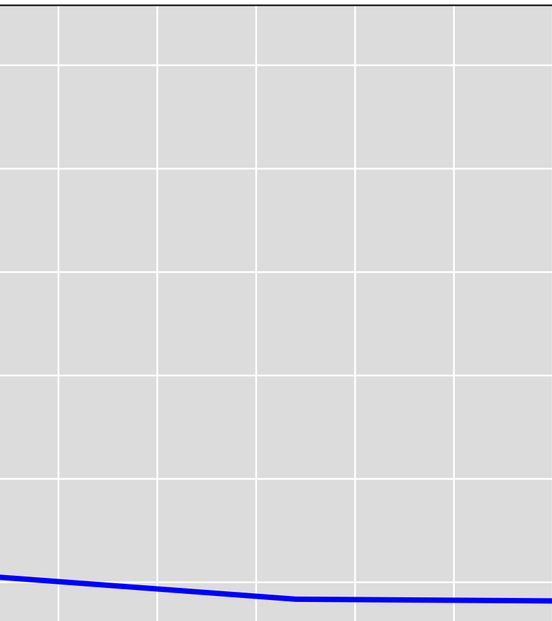
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8003803 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jackson - 8006407 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

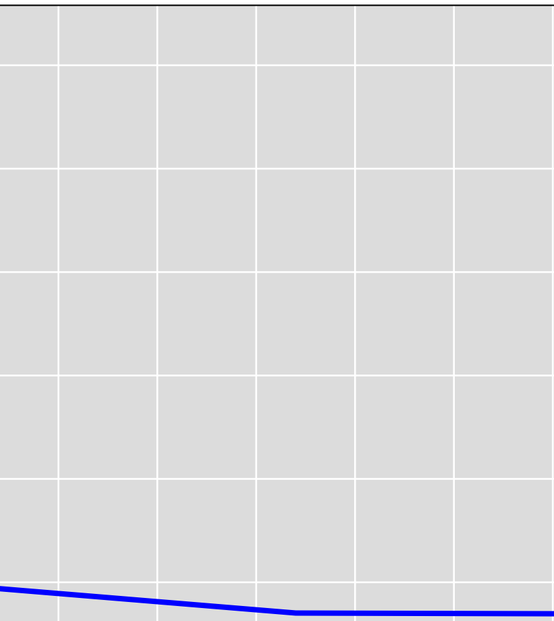
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Jackson - 8011201 - Layer 3



Groundwater Level Elevation (ft)

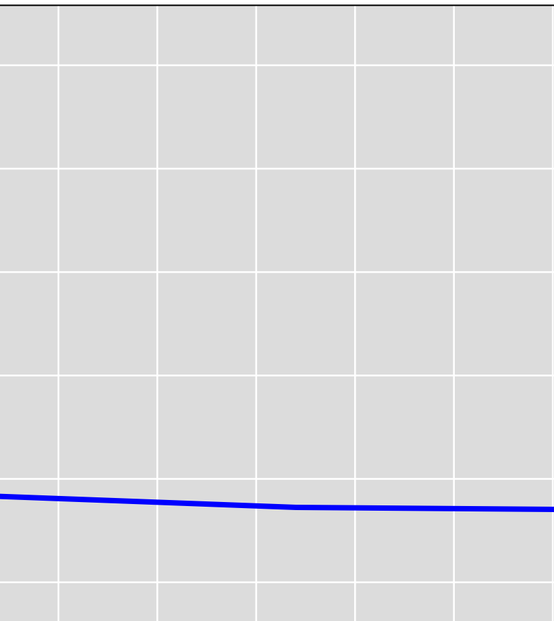
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Jasper - 6124302 - Layer 3



Groundwater Level Elevation (ft)

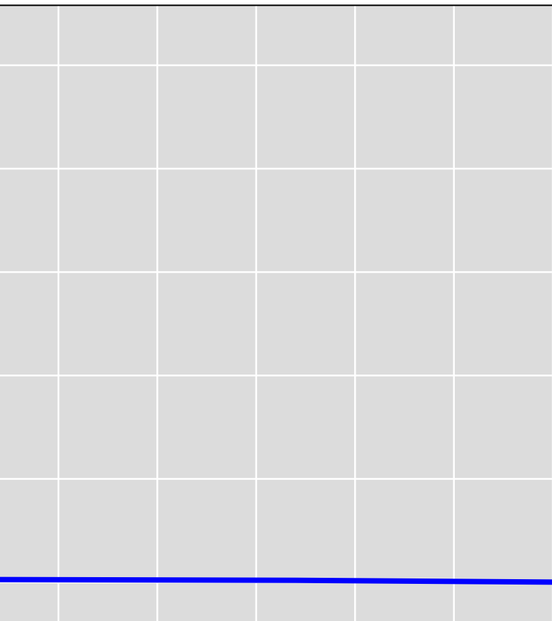
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Jasper - 6225601 - Layer 3



Groundwater Level Elevation (ft)

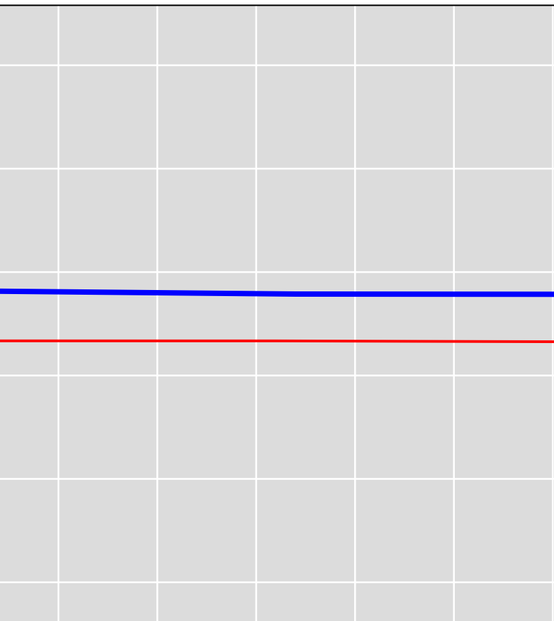
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6634207 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6634207
Gulf Simulated - 6634207

Lavaca - 6634702 - Layer 3

Groundwater Level Elevation (ft)

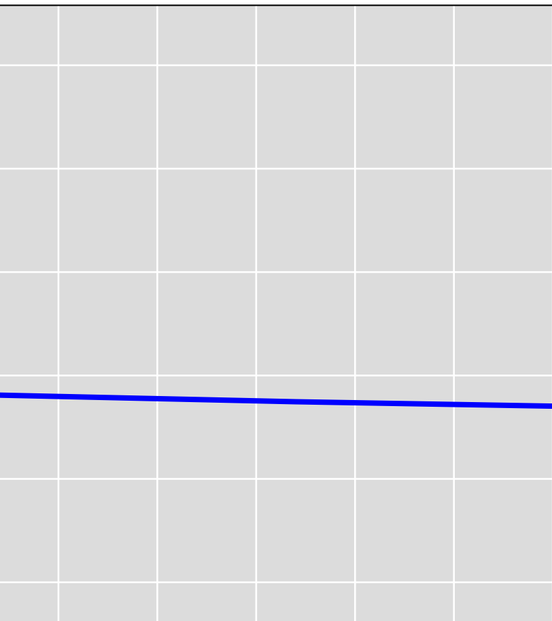
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6635801 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6635901 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6635901
Gulf Simulated - 6635901

Lavaca - 6635902 - Layer 3

Groundwater Level Elevation (ft)

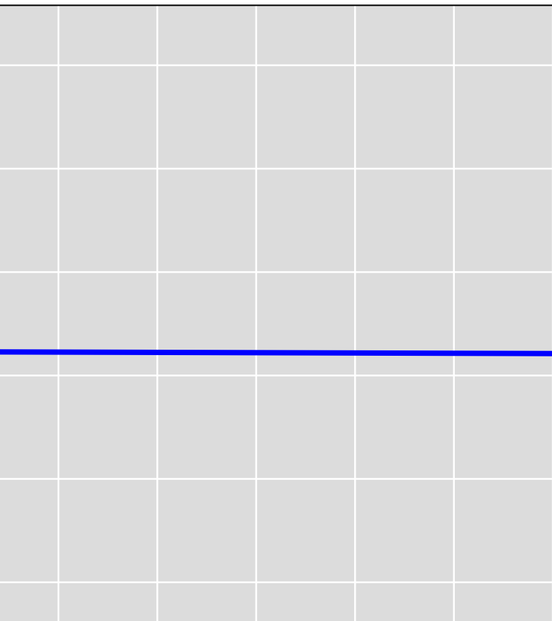
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6635902
Gulf Simulated - 6635902

Lavaca - 6641703 - Layer 3



Groundwater Level Elevation (ft)

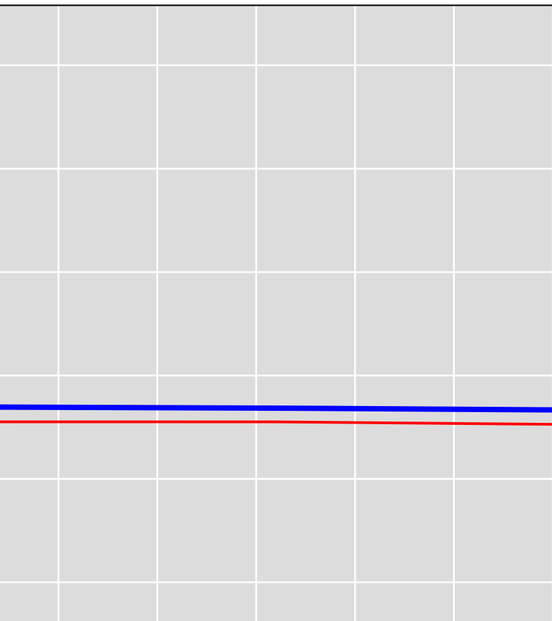
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6641903 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6641903
Gulf Simulated - 6641903

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6642802 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6642902 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6643201 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6643301 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6643302 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6643504 - Layer 3

Groundwater Level Elevation (ft)

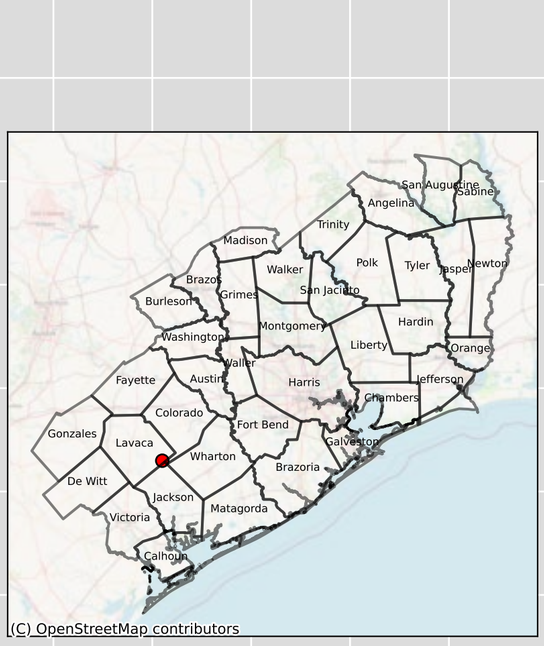
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6643803 & 6643801 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6643803
Gulf Simulated - 6643803

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6643805 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Lavaca - 6644104 - Layer 3

Groundwater Level Elevation (ft)

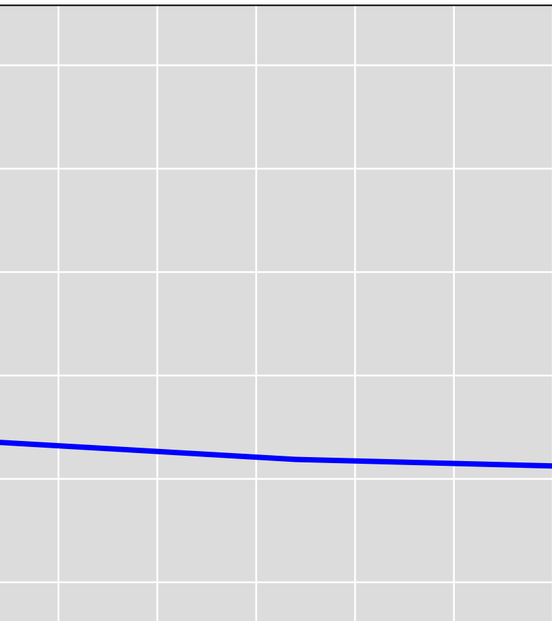
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6644401 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6644402 - Layer 3

GMA Measured
GMA Simulated
Gulf Measured - 6644402
Gulf Simulated - 6644402

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6649901 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6650202 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

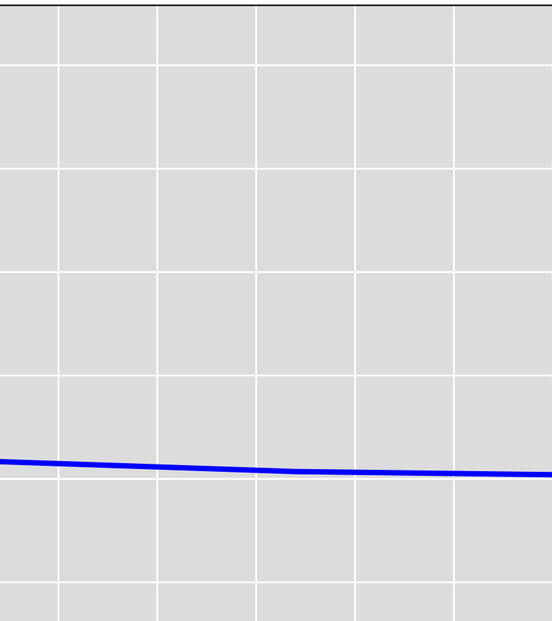
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Lavaca - 6650303 - Layer 3



Groundwater Level Elevation (ft)

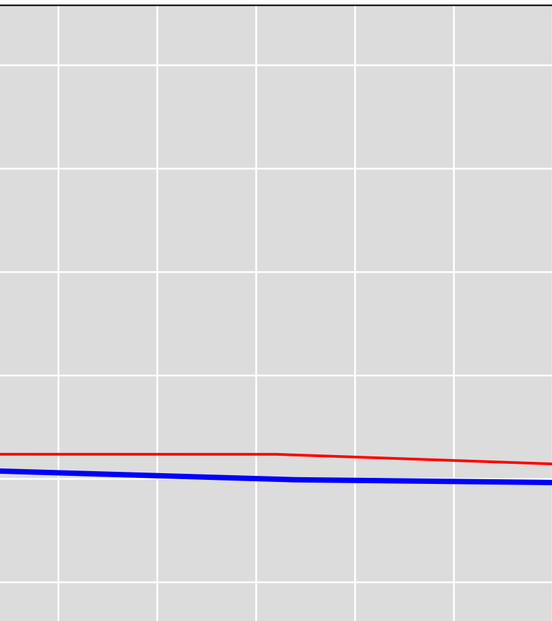
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6650401 - Layer 3



Groundwater Level Elevation (ft)

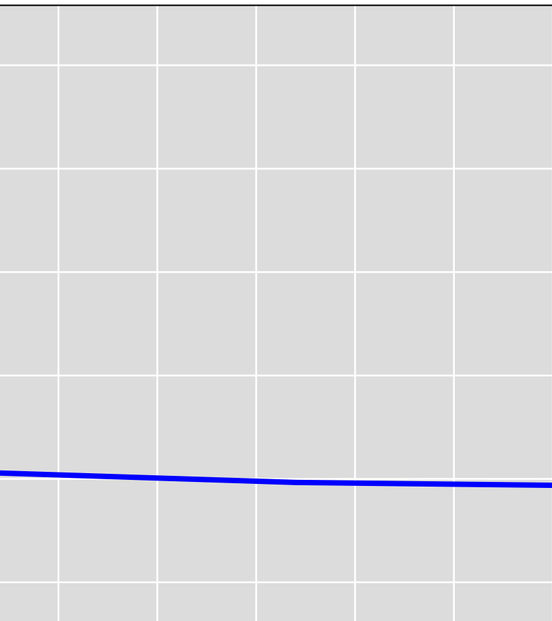
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6650401
Gulf Simulated - 6650401

Lavaca - 6650505 - Layer 3



Groundwater Level Elevation (ft)

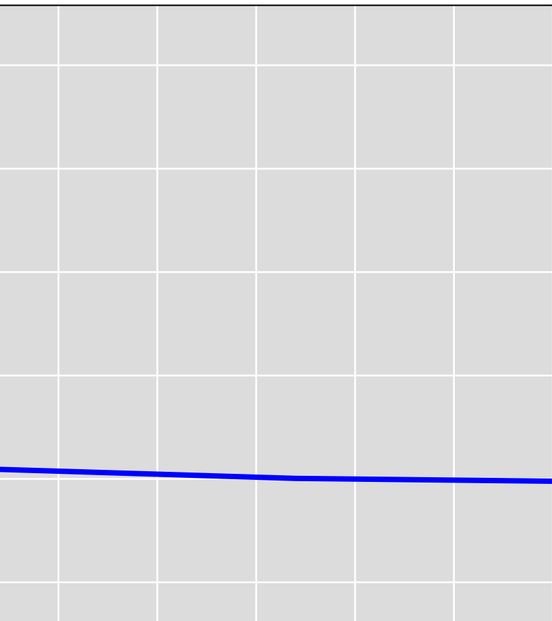
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6650506 - Layer 3



Groundwater Level Elevation (ft)

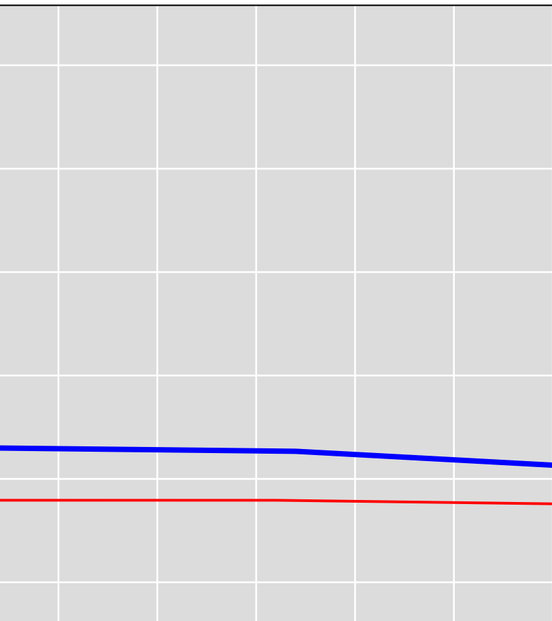
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6048102 & 6048103 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6048102
Gulf Simulated - 6048102

Liberty - 6133701 - Layer 3

Groundwater Level Elevation (ft)

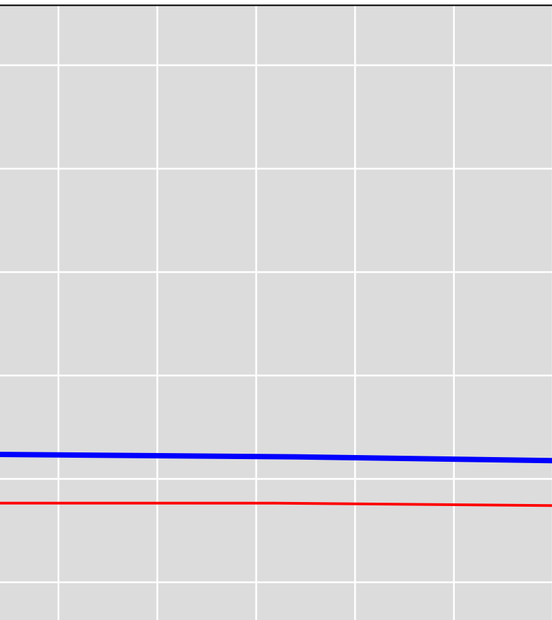
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Liberty - 6133708 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6133708
Gulf Simulated - 6133708

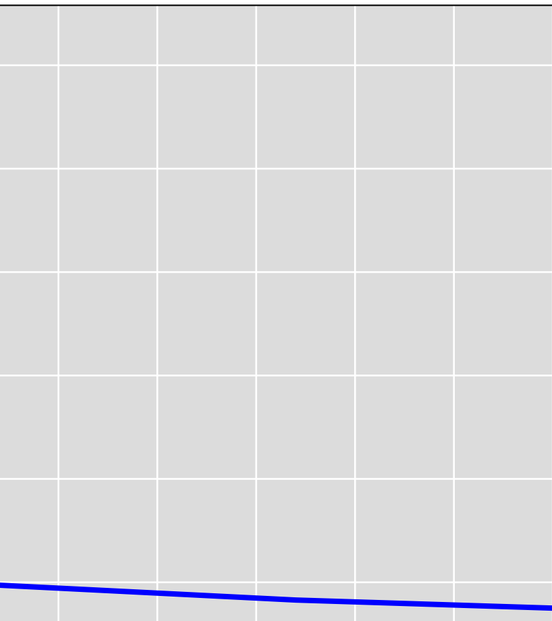
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Liberty - 6157611 - Layer 3



Groundwater Level Elevation (ft)

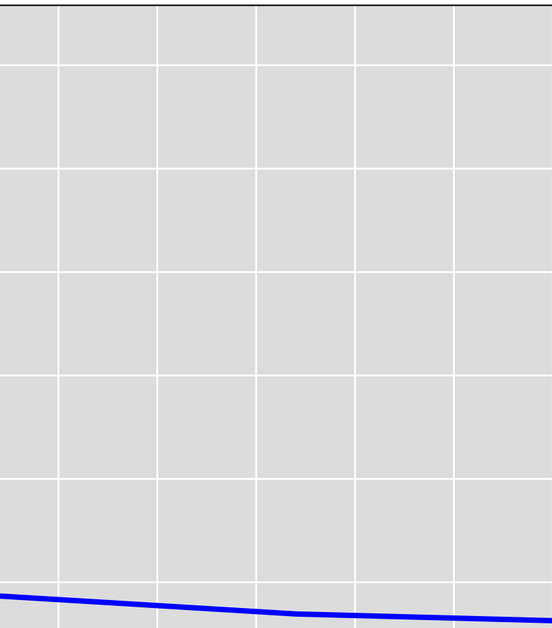
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Matagorda - 8007102 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

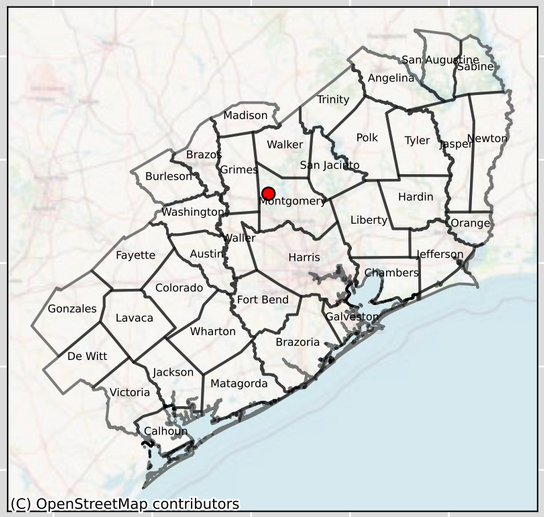
Montgomery - 6035704 & 6035705 & 6035706 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

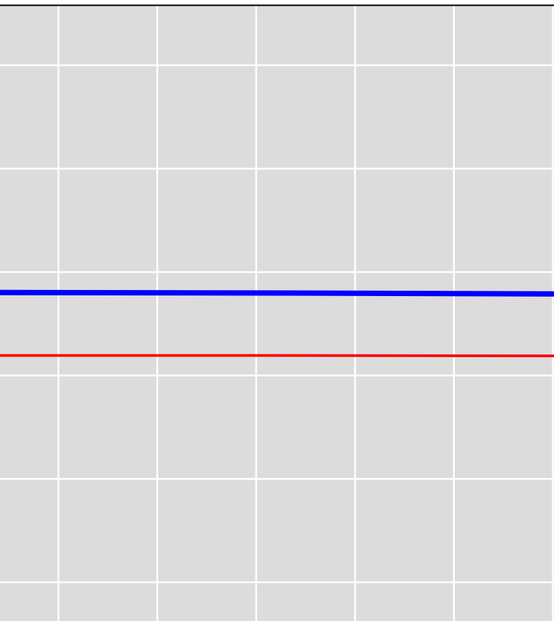
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6035704
Gulf Simulated - 6035704

Montgomery - 6036611 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6036611
Gulf Simulated - 6036611

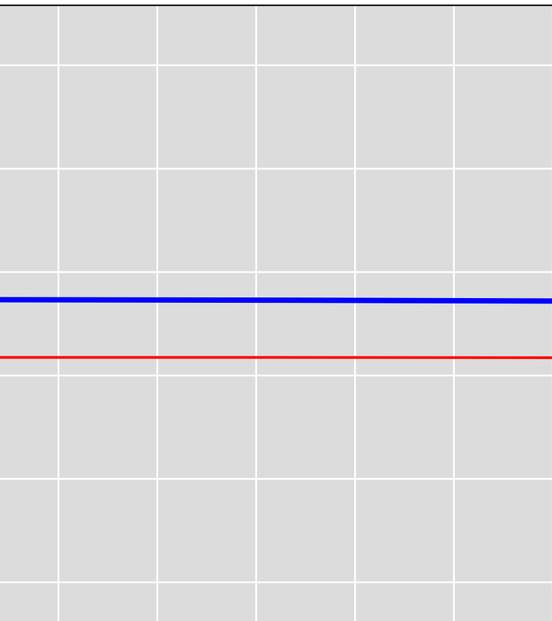
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6036811 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6036811
Gulf Simulated - 6036811

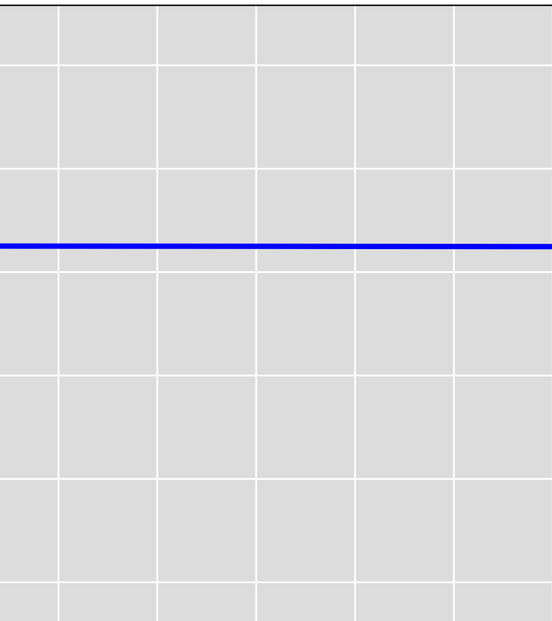
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6037311 - Layer 3



Groundwater Level Elevation (ft)

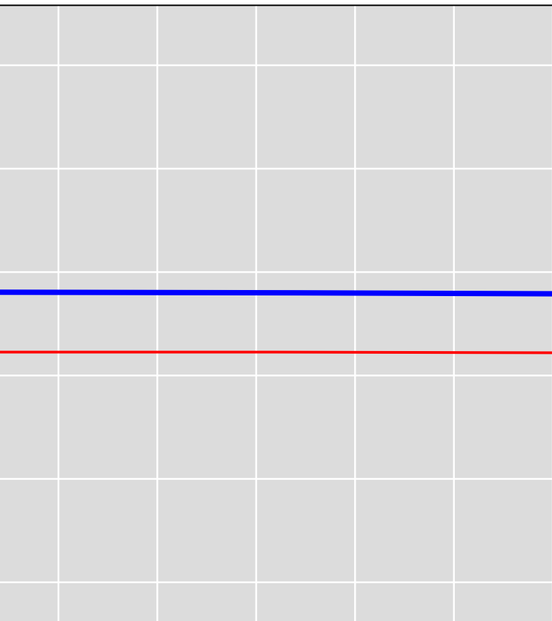
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6037401 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6037401
Gulf Simulated - 6037401

Montgomery - 6037712 - Layer 3

Groundwater Level Elevation (ft)

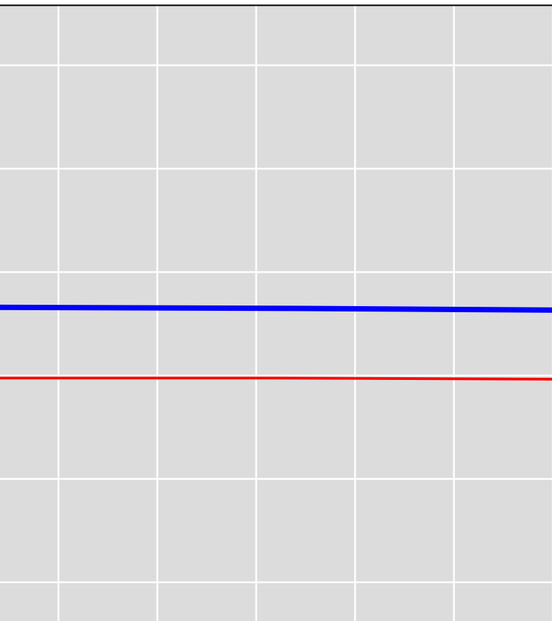
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6037713 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6037713
Gulf Simulated - 6037713

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6037907 & 6037909 - Layer 3

Groundwater Level Elevation (ft)

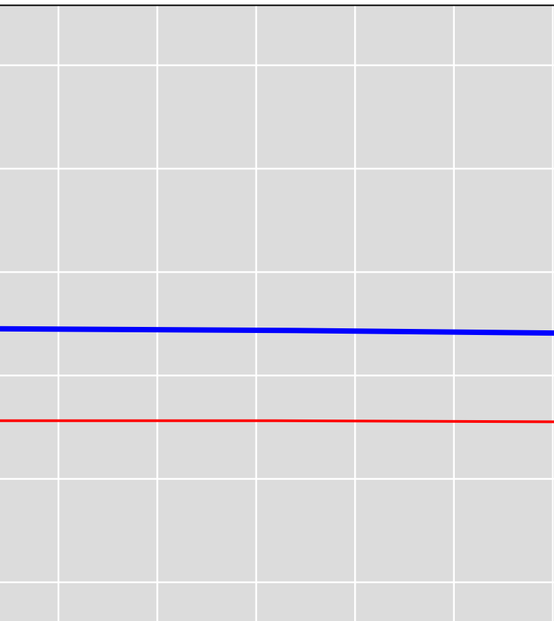
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6038806 - Layer 3



Groundwater Level Elevation (ft)

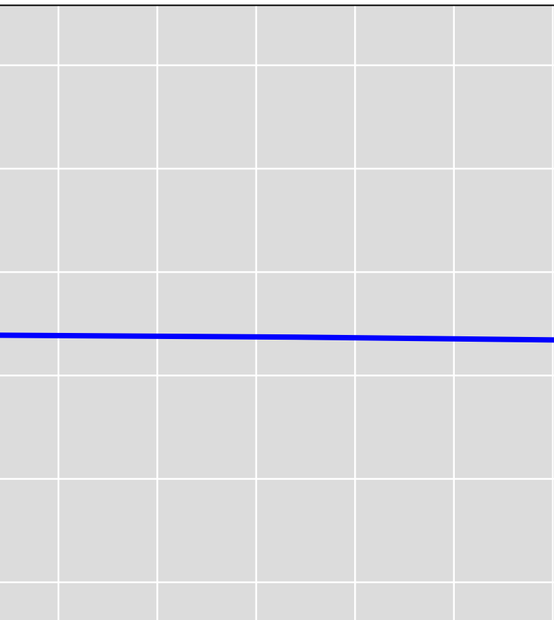
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6038806
Gulf Simulated - 6038806

Montgomery - 6038807 - Layer 3



Groundwater Level Elevation (ft)

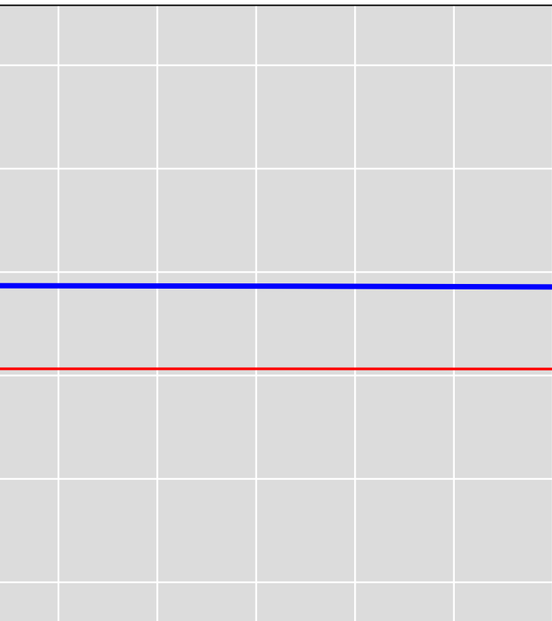
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6043511 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6043511
Gulf Simulated - 6043511

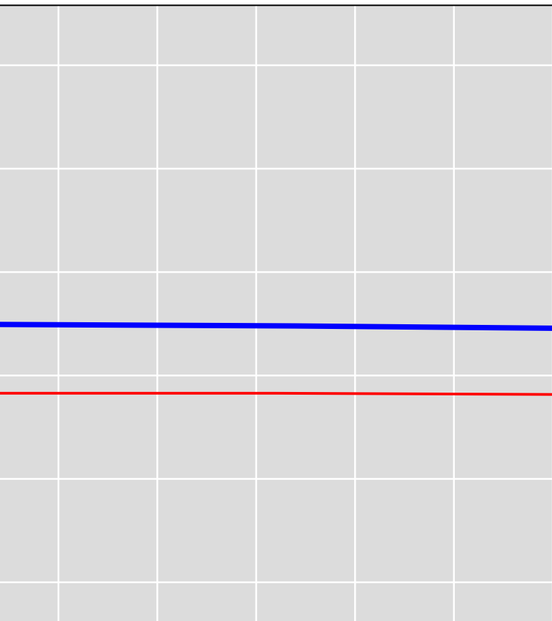
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044315 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6044315
Gulf Simulated - 6044315

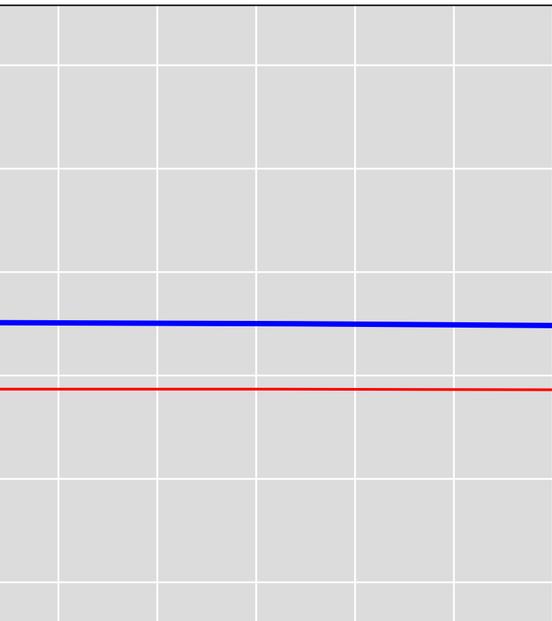
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044411 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6044411
Gulf Simulated - 6044411

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044807 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6045412 - Layer 3

Groundwater Level Elevation (ft)

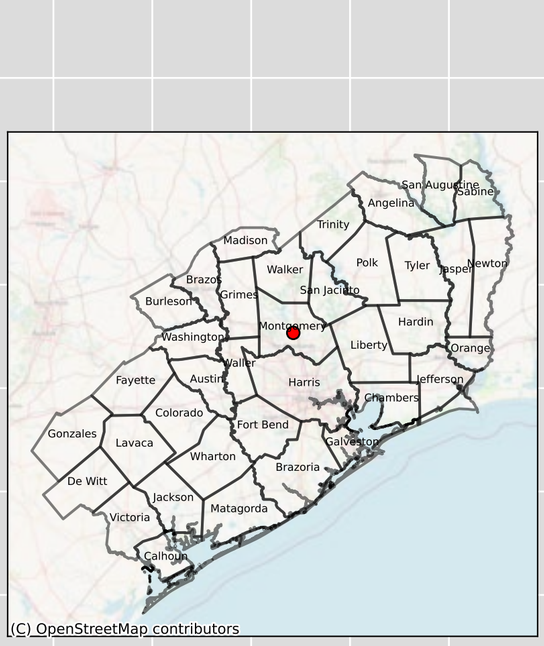
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6045702 & 6045714 - Layer 3



GMA Measured
GMA Simulated

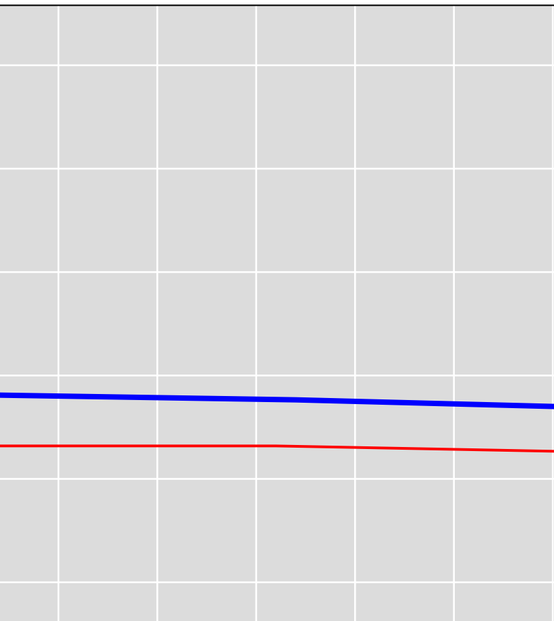
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6045716 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6045716
Gulf Simulated - 6045716

Montgomery - 6045805 - Layer 3

Groundwater Level Elevation (ft)

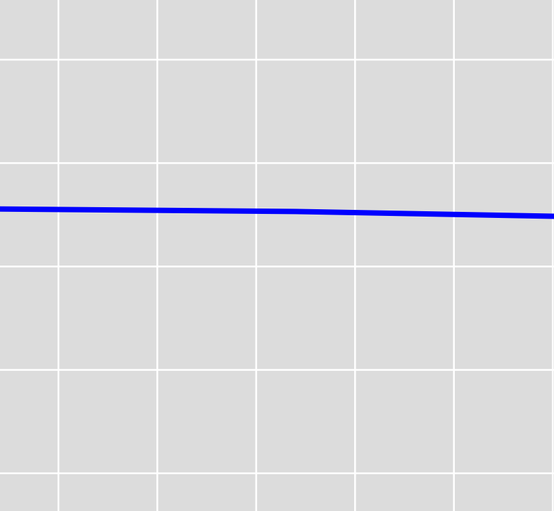
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6045805
Gulf Simulated - 6045805

Montgomery - 6050303 & 6050305 - Layer 3



Groundwater Level Elevation (ft)

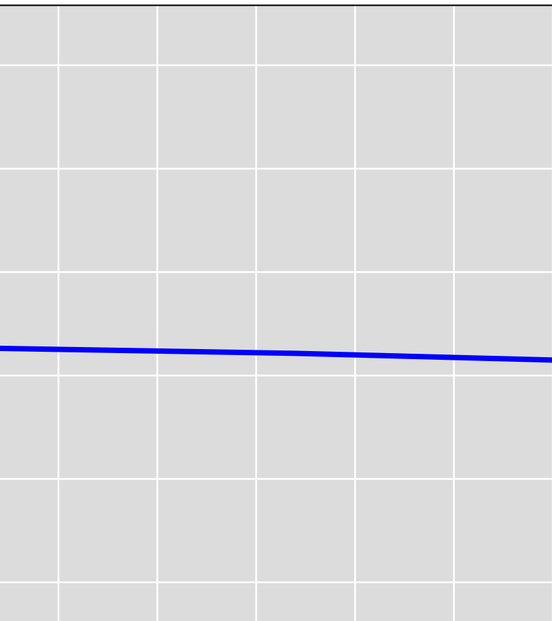
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6050904 - Layer 3



GMA Measured

GMA Simulated

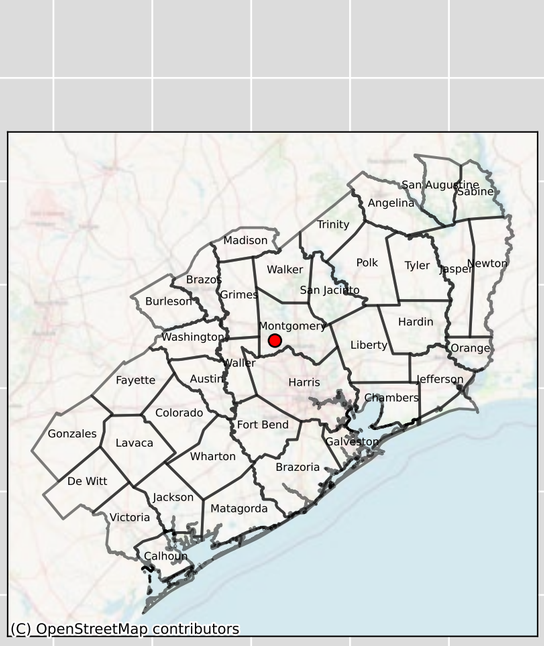
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6051310 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051310
Gulf Simulated - 6051310

Montgomery - 6051311 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051311
Gulf Simulated - 6051311

Montgomery - 6051409 & 6051410 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051409
Gulf Simulated - 6051409

Montgomery - 6051415 - Layer 3

Groundwater Level Elevation (ft)

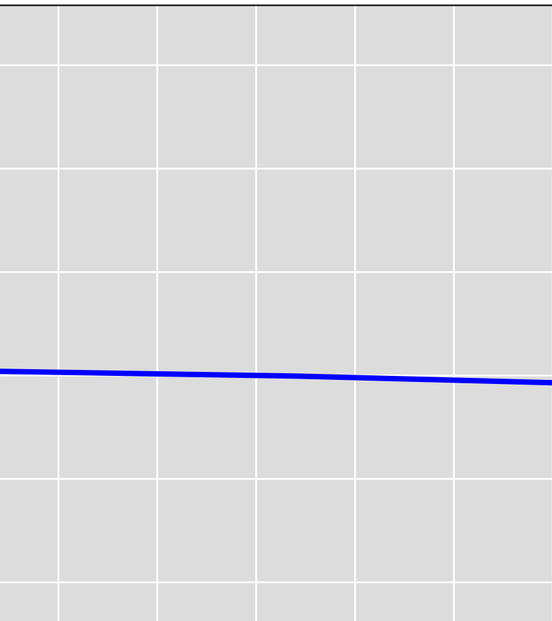
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051415
Gulf Simulated - 6051415

Montgomery - 6051503 - Layer 3



Groundwater Level Elevation (ft)

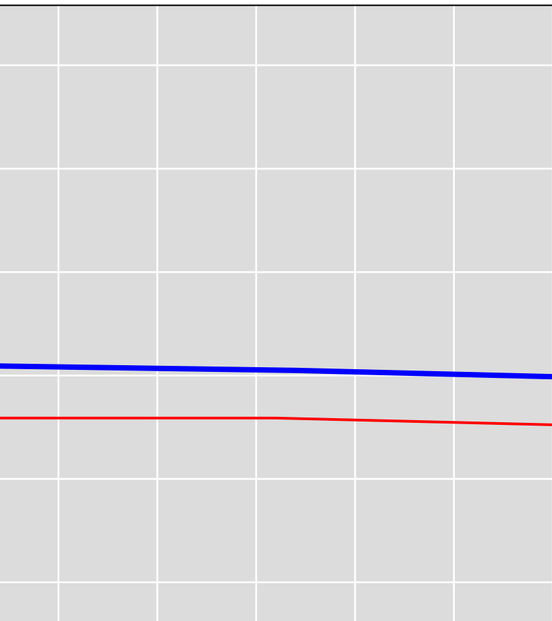
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6051513 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6051513
Gulf Simulated - 6051513

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6051810 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6051906 & 6051907 - Layer 3

Groundwater Level Elevation (ft)

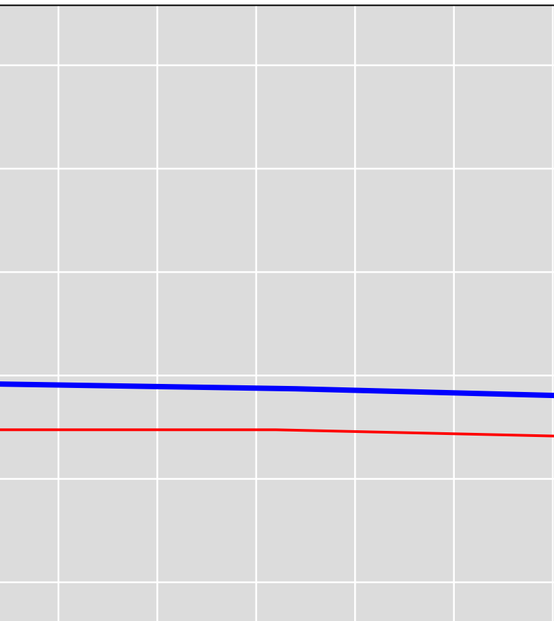
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052113 - Layer 3



Groundwater Level Elevation (ft)

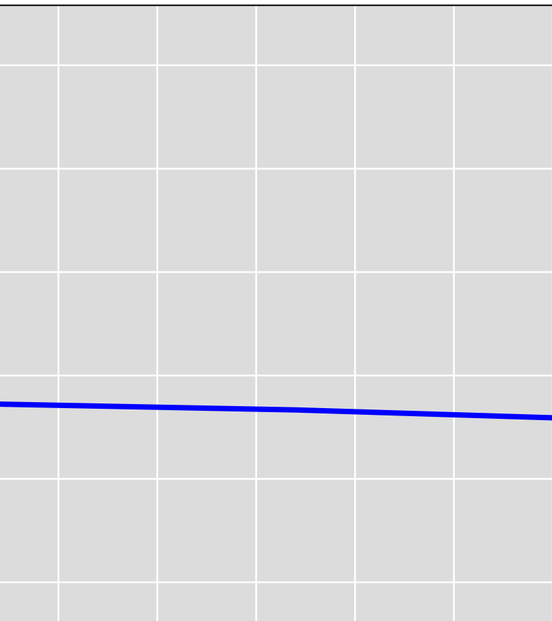
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052113
Gulf Simulated - 6052113

Montgomery - 6052208 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052210 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052212 - Layer 3

Groundwater Level Elevation (ft)

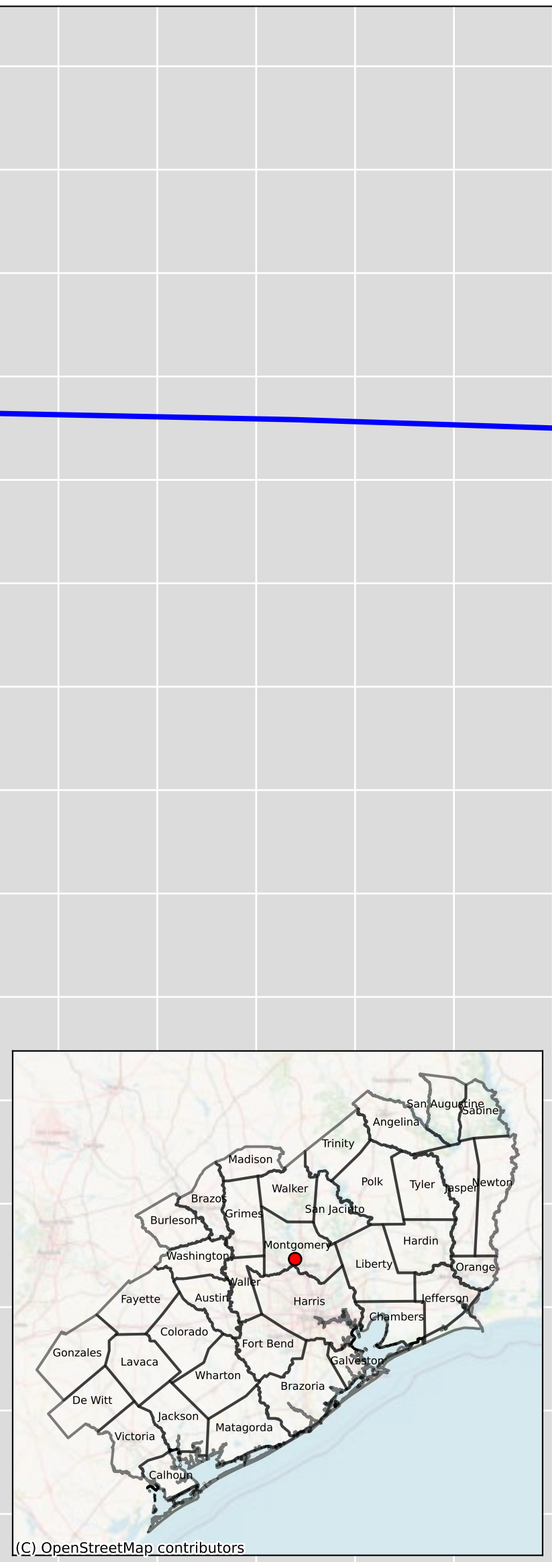
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052307 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052309 - Layer 3

Groundwater Level Elevation (ft)

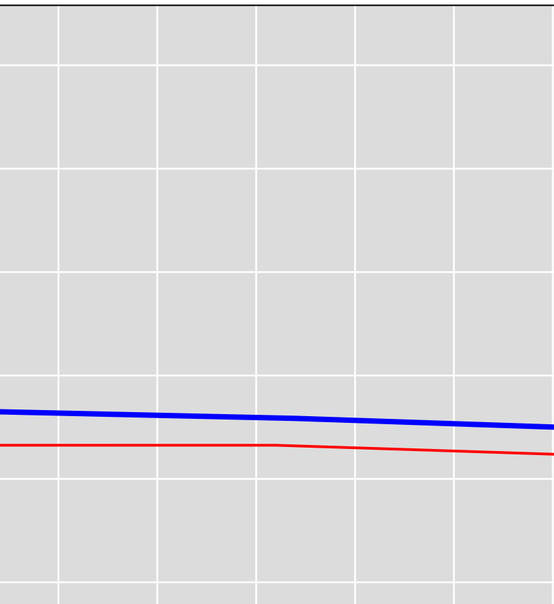
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052309
Gulf Simulated - 6052309

Montgomery - 6052410 - Layer 3



Groundwater Level Elevation (ft)

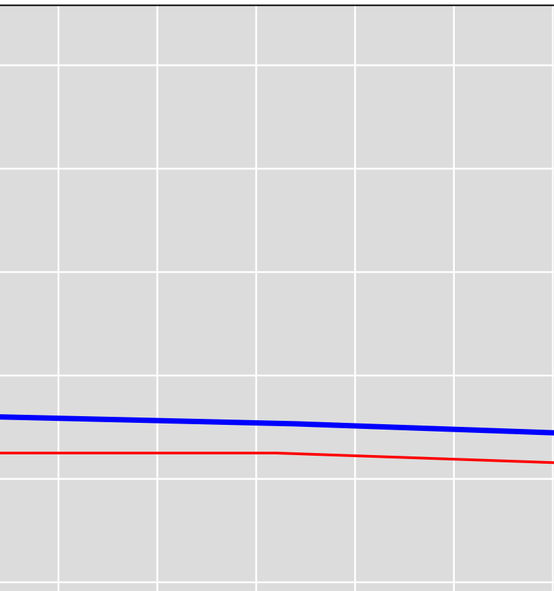
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052410
Gulf Simulated - 6052410

Montgomery - 6052502 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6052502
Gulf Simulated - 6052502

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6052602 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Montgomery - 6052605 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052605
Gulf Simulated - 6052605

Montgomery - 6052607 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052609 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6052613 - Layer 3

Groundwater Level Elevation (ft)

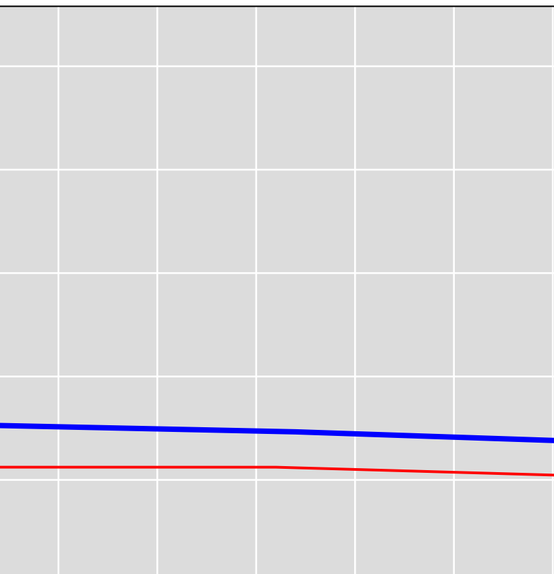
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6052613
Gulf Simulated - 6052613

Montgomery - 6053205 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053205
Gulf Simulated - 6053205

Montgomery - 6053208 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053208
Gulf Simulated - 6053208

Montgomery - 6053209 & 6053212 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053209
Gulf Simulated - 6053209

Montgomery - 6053407 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053407
Gulf Simulated - 6053407

Montgomery - 6053409 - Layer 3

Groundwater Level Elevation (ft)

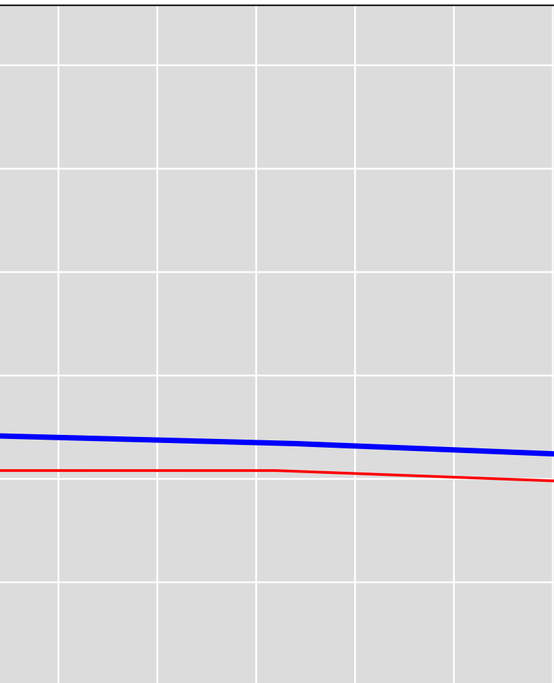
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053409
Gulf Simulated - 6053409

Montgomery - 6053417 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053417
Gulf Simulated - 6053417

Montgomery - 6053419 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053421 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

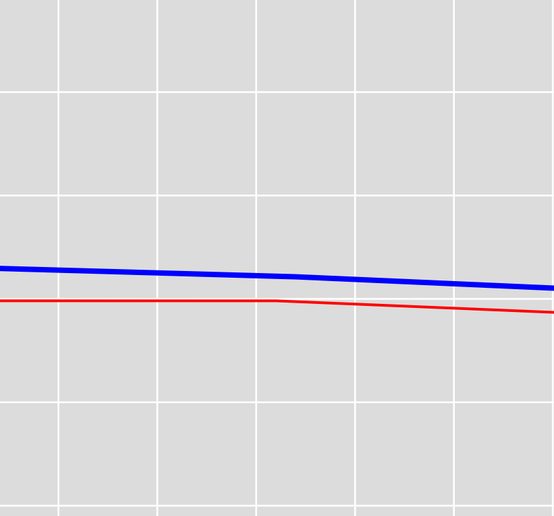
Montgomery - 6053514 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6053514
Gulf Simulated - 6053514

Montgomery - 6053516 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

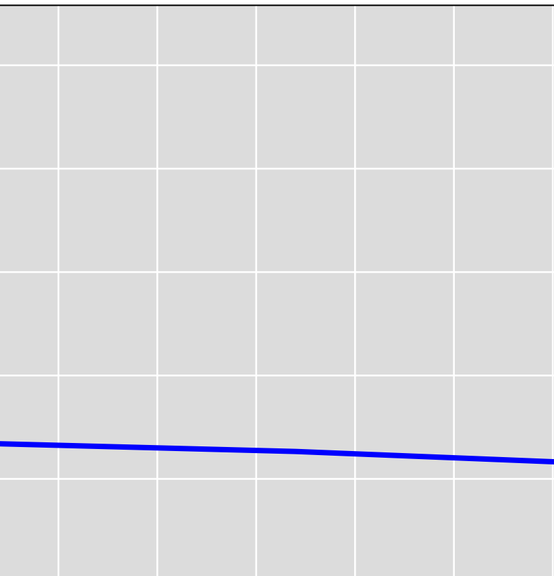
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Montgomery - 6053517 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6053520 - Layer 3

Groundwater Level Elevation (ft)

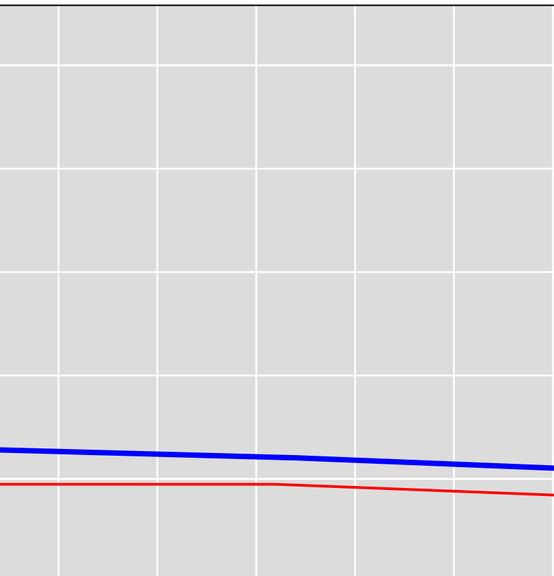
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053608 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053608
Gulf Simulated - 6053608

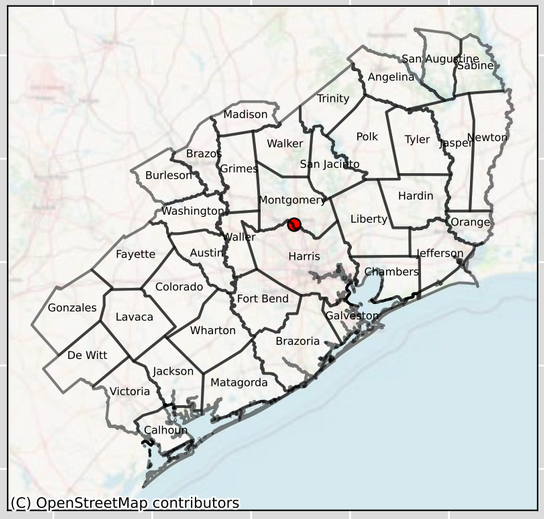
Montgomery - 6053708 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6053708
Gulf Simulated - 6053708

Montgomery - 6053709 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053709
Gulf Simulated - 6053709

Montgomery - 6053714 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053715 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053727 - Layer 3

Groundwater Level Elevation (ft)

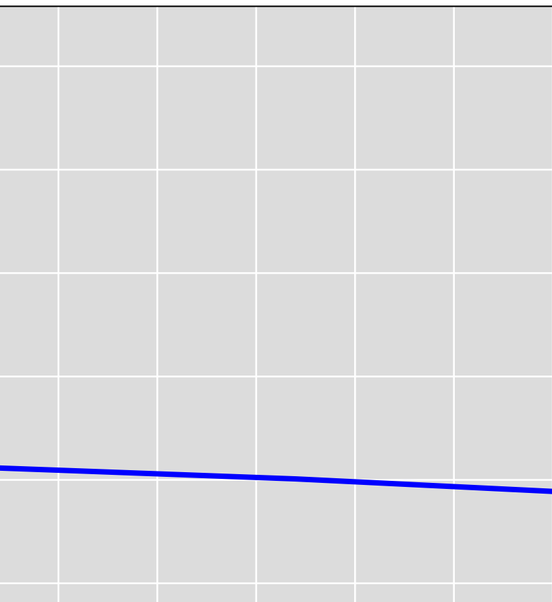
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053727
Gulf Simulated - 6053727

Montgomery - 6053813 & 6053820 - Layer 3



Groundwater Level Elevation (ft)

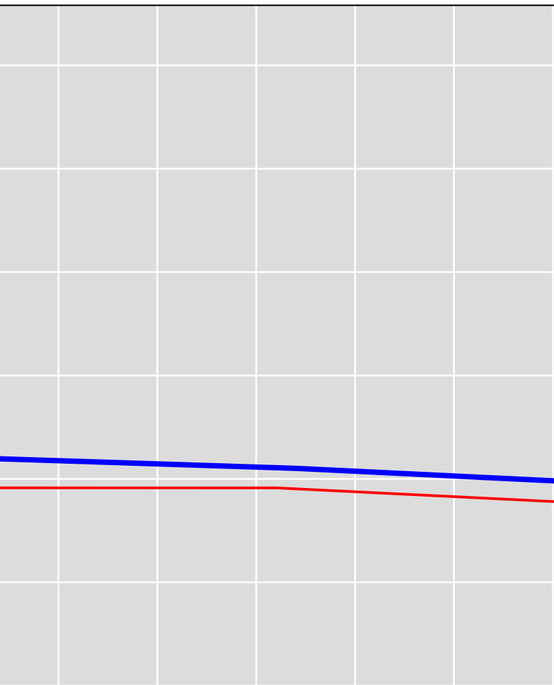
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6053814 & 6053817 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053814
Gulf Simulated - 6053814

Montgomery - 6053816 & 6053826 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053821 & 6053831 & 6061214 - Layer 3

Groundwater Level Elevation (ft)

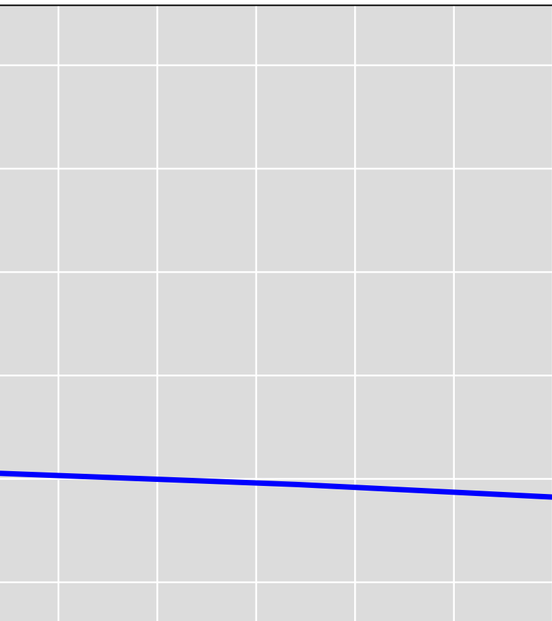
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053825 - Layer 3



Groundwater Level Elevation (ft)

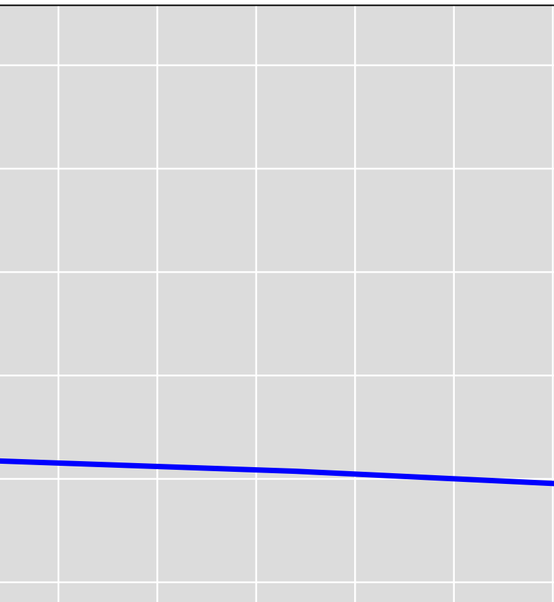
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053827 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053830 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053902 - Layer 3

Groundwater Level Elevation (ft)

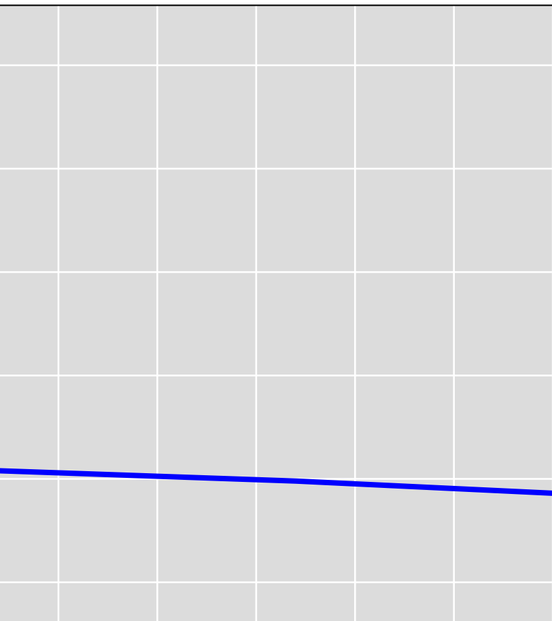
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053903 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6053904 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6054209 - Layer 3

Groundwater Level Elevation (ft)

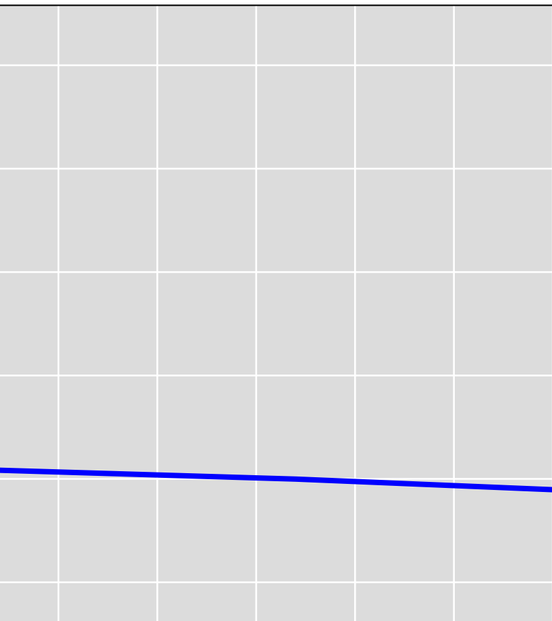
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6054406 - Layer 3



Groundwater Level Elevation (ft)

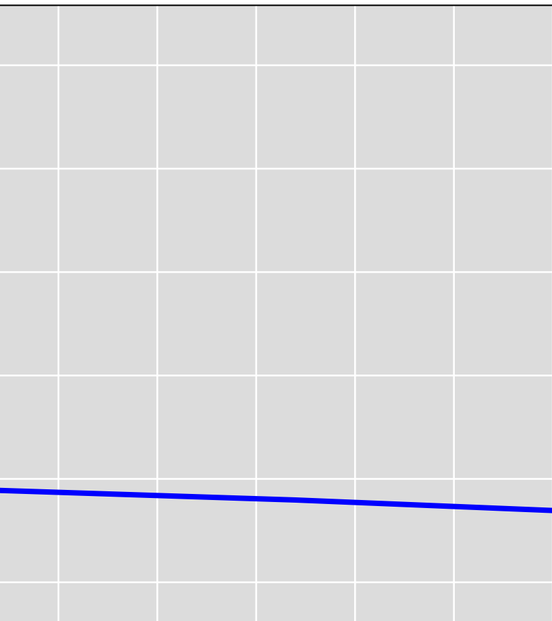
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6054612 - Layer 3



Level Elevation (ft)

Groundwater Le

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6054614 - Layer 3

Groundwater Level Elevation (ft)

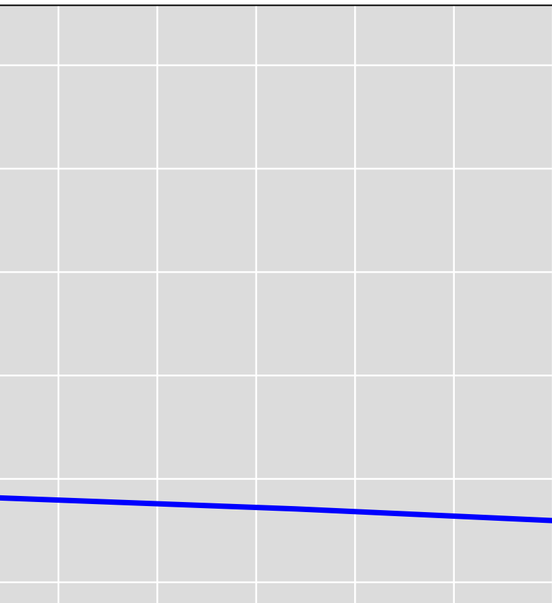
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6054614
Gulf Simulated - 6054614

Montgomery - 6054804 - Layer 3



GMA Measured

GMA Simulated

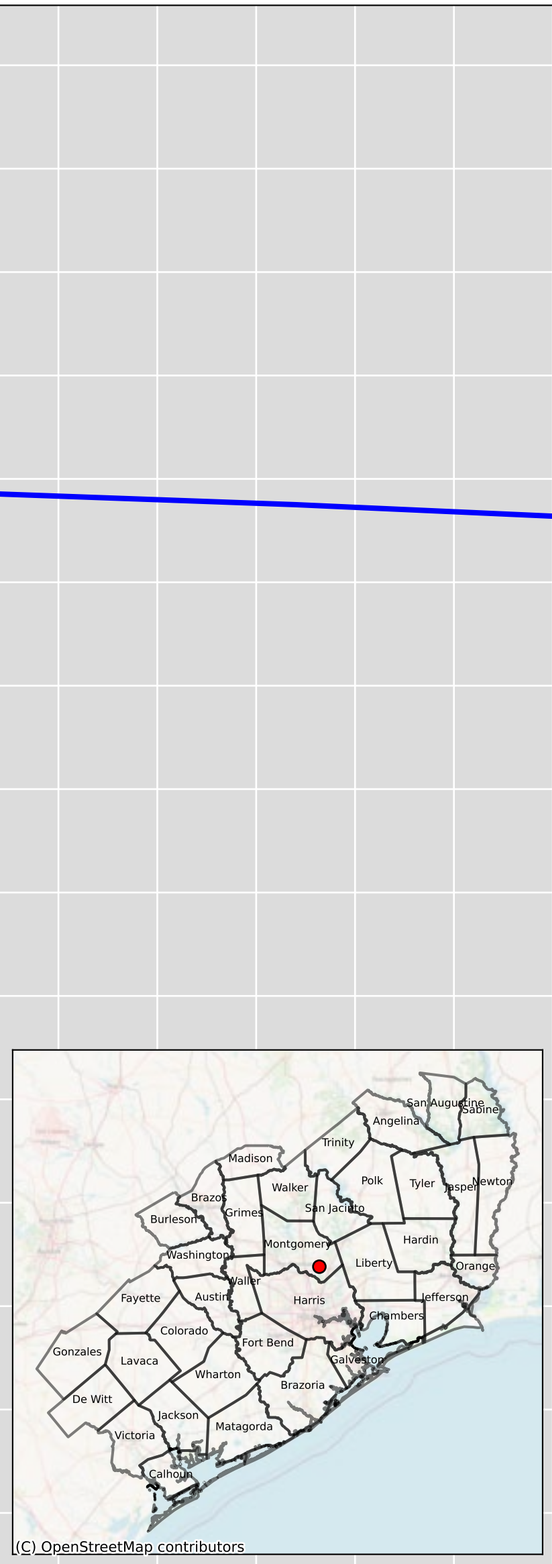
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6054808 - Layer 3



Groundwater Level Elevation (ft)

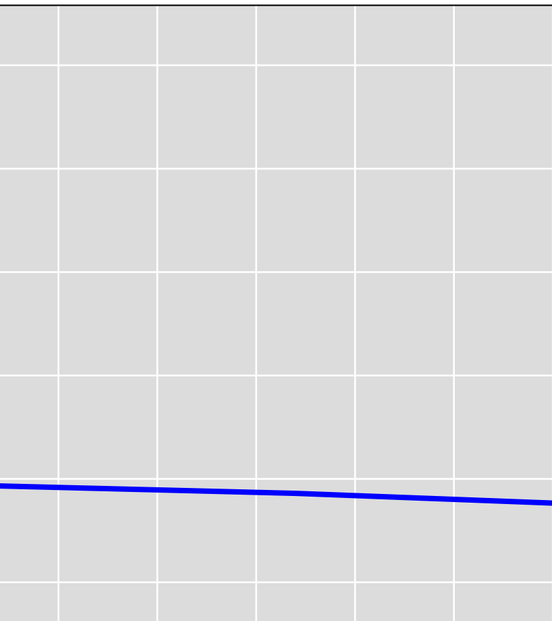
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6055314 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6055315 - Layer 3

Groundwater Level Elevation (ft)

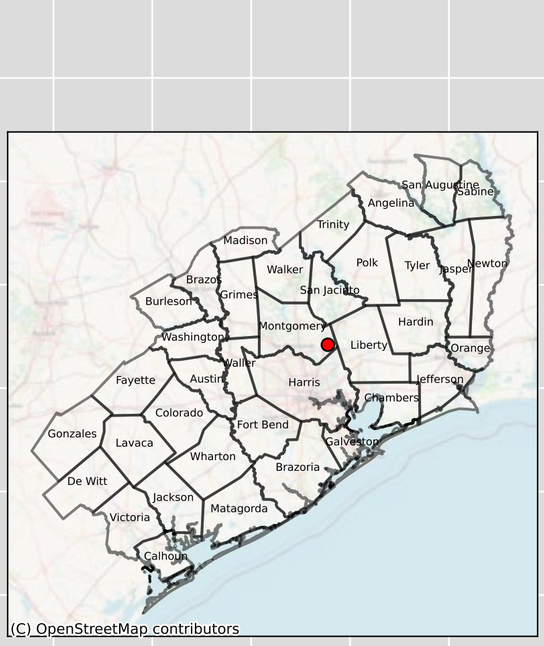
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6055512 - Layer 3



Groundwater Level Elevation (ft)

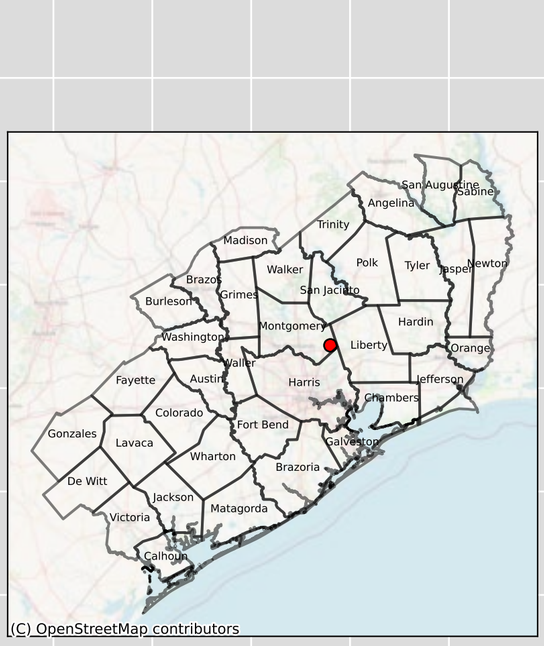
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6055605 - Layer 3



Groundwater Level Elevation (ft)

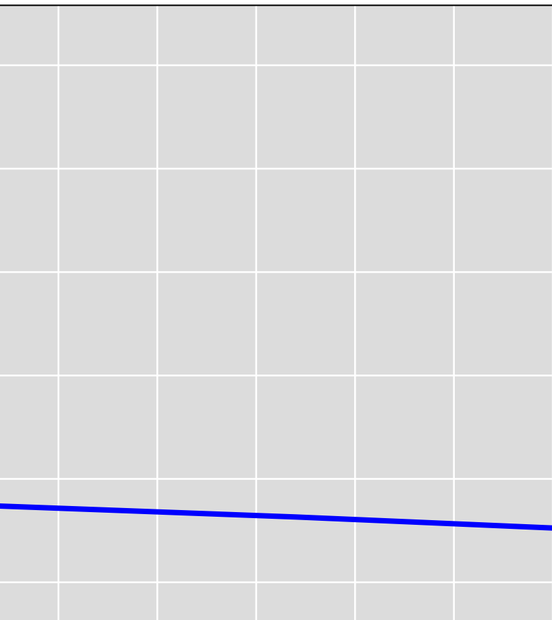
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated
Gulf Measured - 6055605
Gulf Simulated - 6055605

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6055708 - Layer 3



Level Elevation (ft)

Groundwater Le

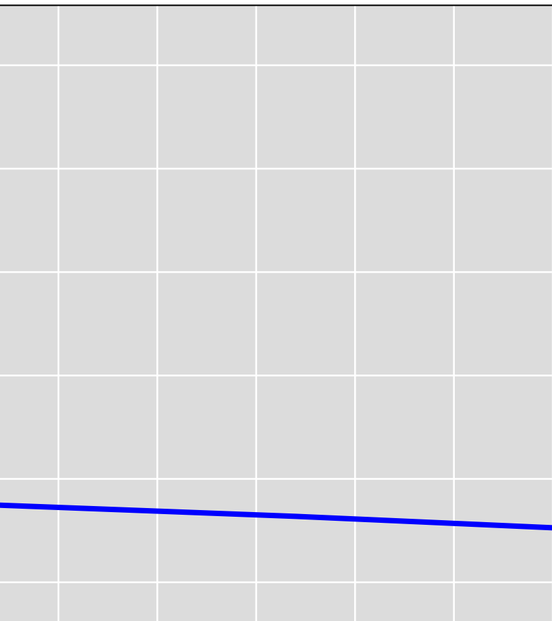
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6055710 - Layer 3



Groundwater Level Elevation (ft)

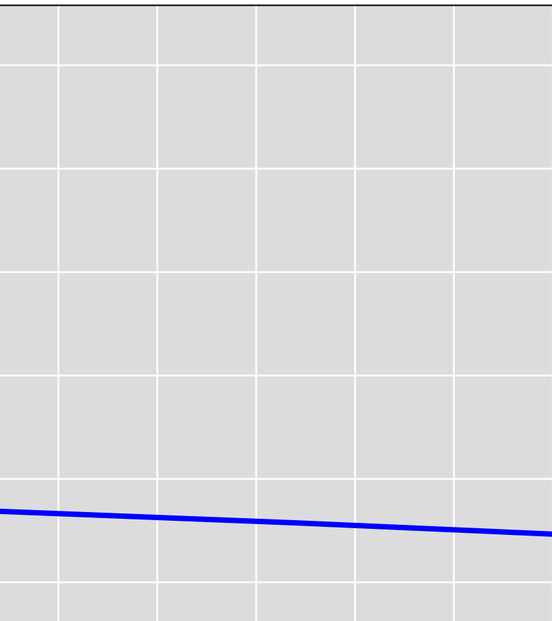
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6055712 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6061307 - Layer 3

Groundwater Level Elevation (ft)

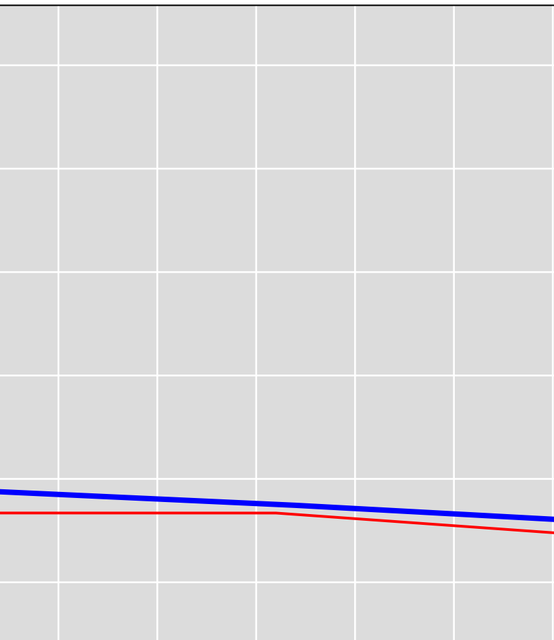
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6061308 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6061308
Gulf Simulated - 6061308

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

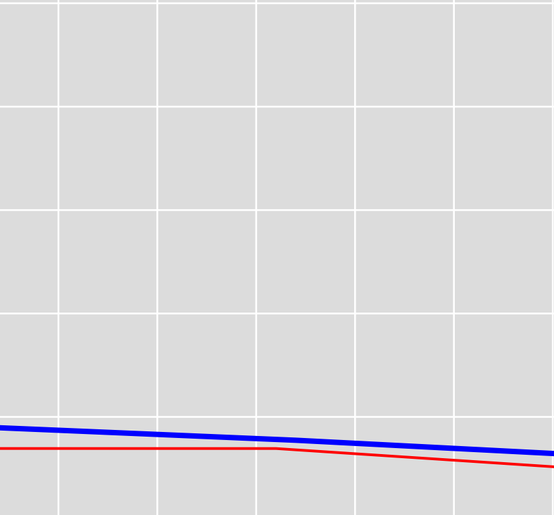
Montgomery - 6061309 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6061309
Gulf Simulated - 6061309

Montgomery - 6062201 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6062404 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6062604 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6062604
Gulf Simulated - 6062604

Montgomery - 6063109 - Layer 3

Groundwater Level Elevation (ft)

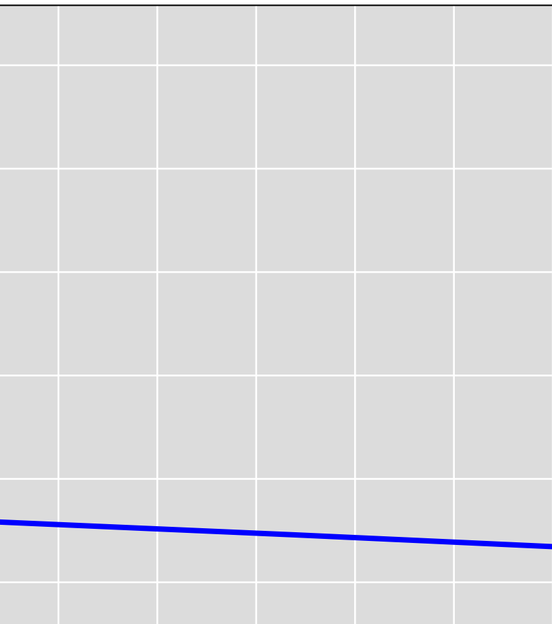
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6063205 - Layer 3



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6063507 - Layer 3

Groundwater Level Elevation (ft)

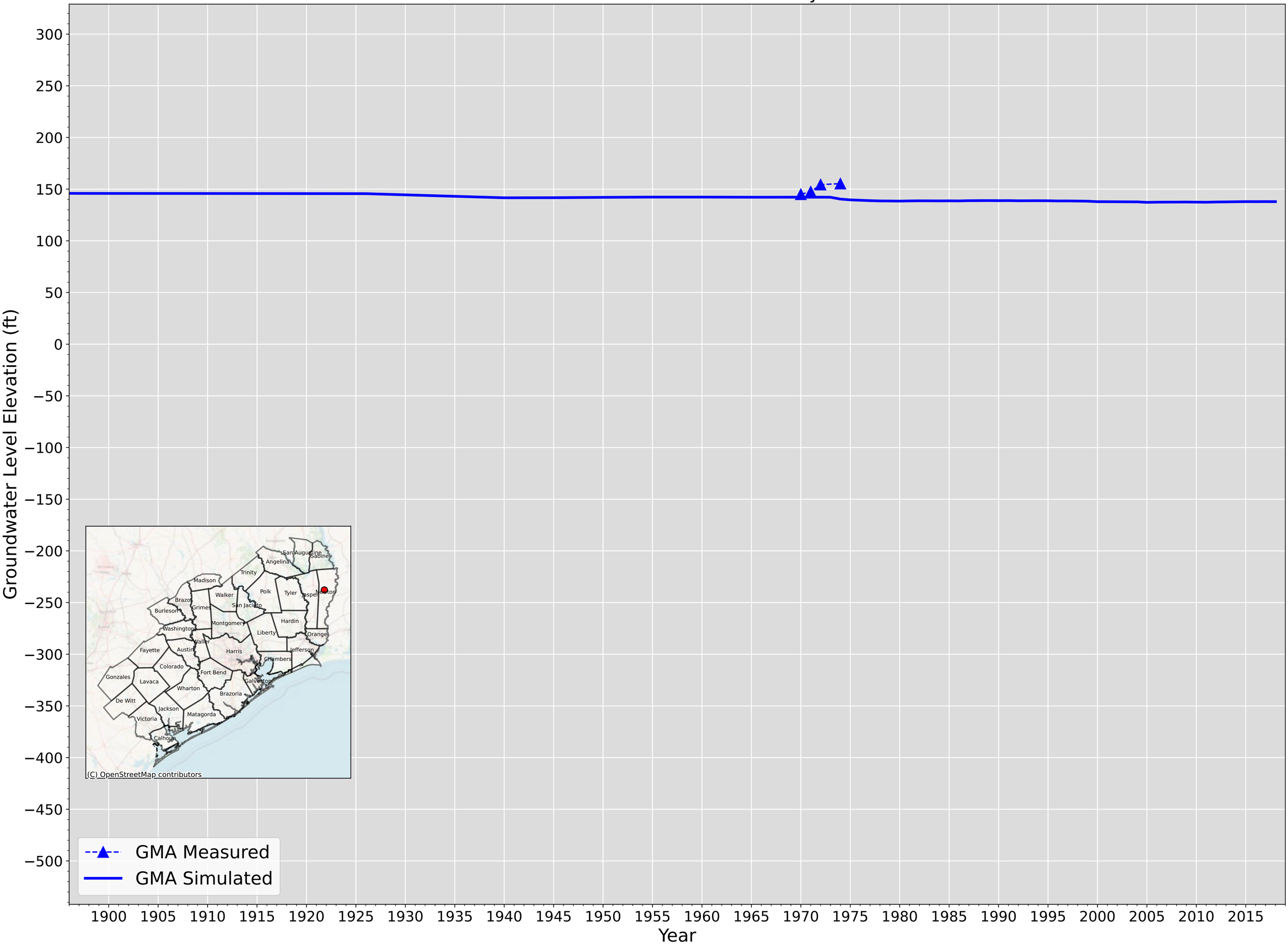
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

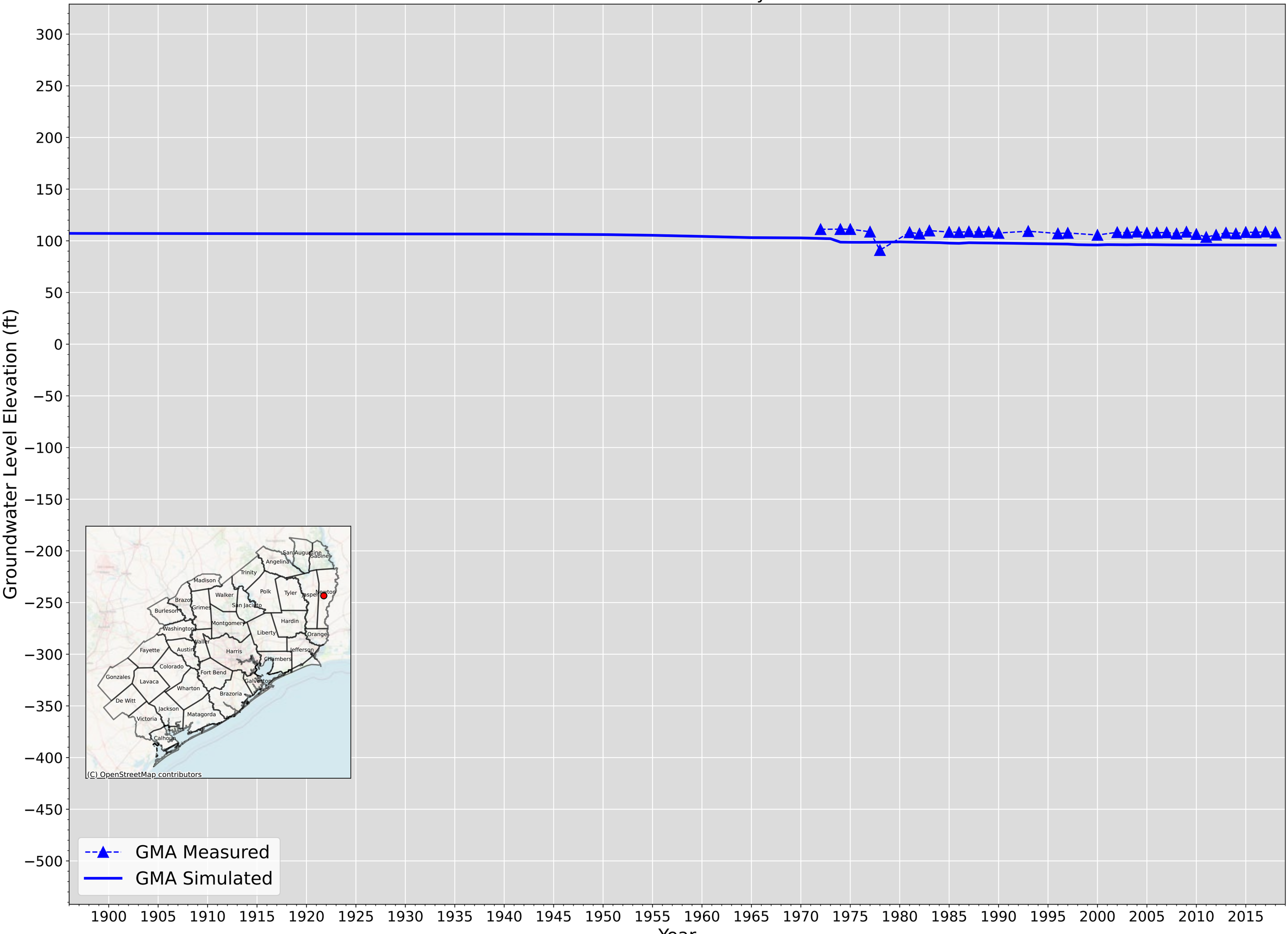
Year

GMA Measured
GMA Simulated
Gulf Measured - 6063507
Gulf Simulated - 6063507

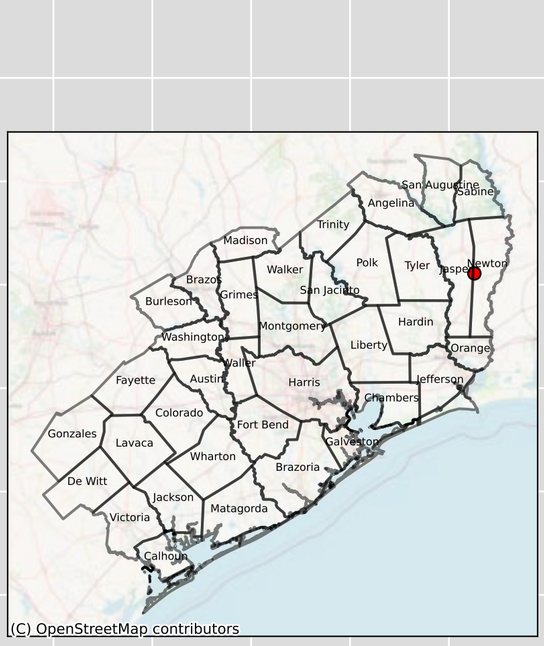
Newton - 6210301 & 6210303 - Layer 3



Newton - 6210901 - Layer 3



Newton - 6218103 - Layer 3



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Polk - 6126102 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Polk - 6126807 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

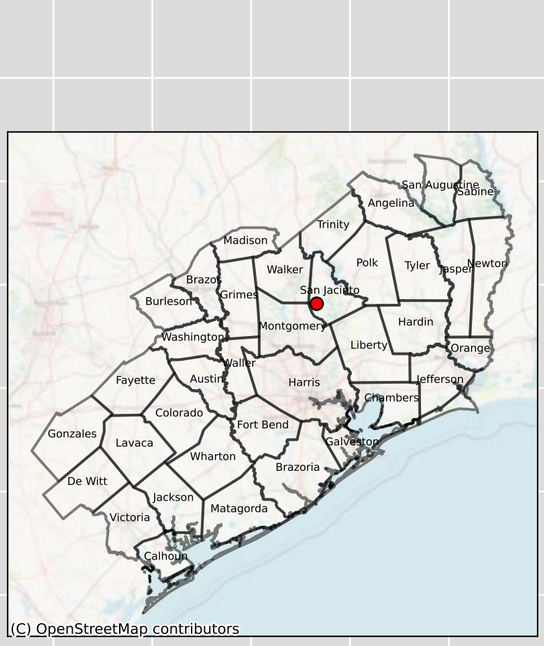
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

San Jacinto - 6030905 - Layer 3



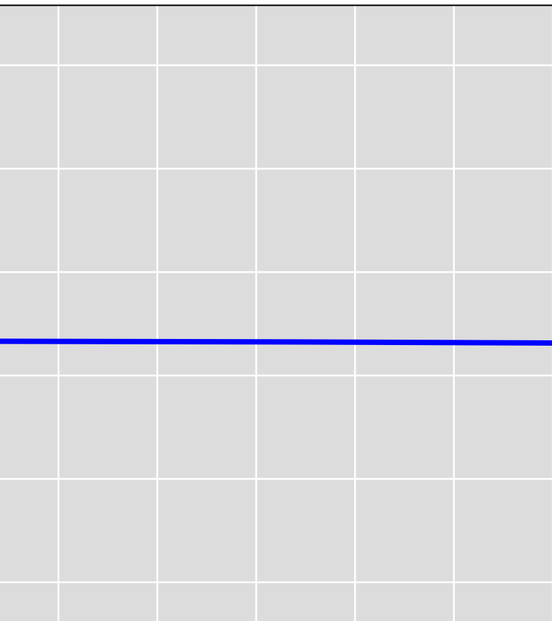
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

San Jacinto - 6031906 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

San Jacinto - 6039404 - Layer 3

Groundwater Level Elevation (ft)

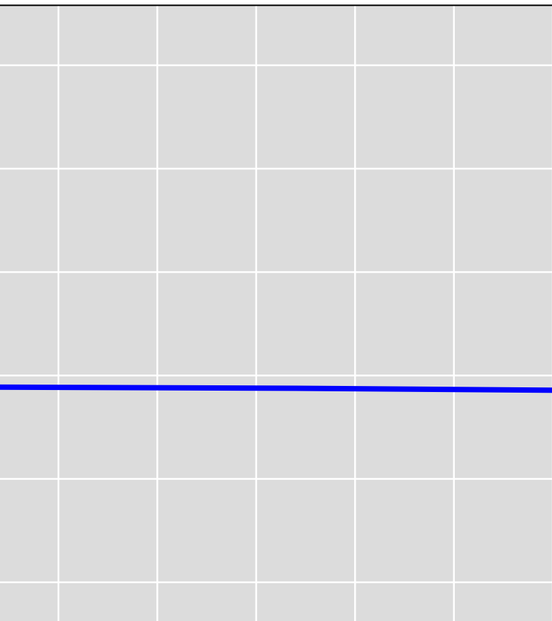
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

San Jacinto - 6040204 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Tyler - 6121213 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

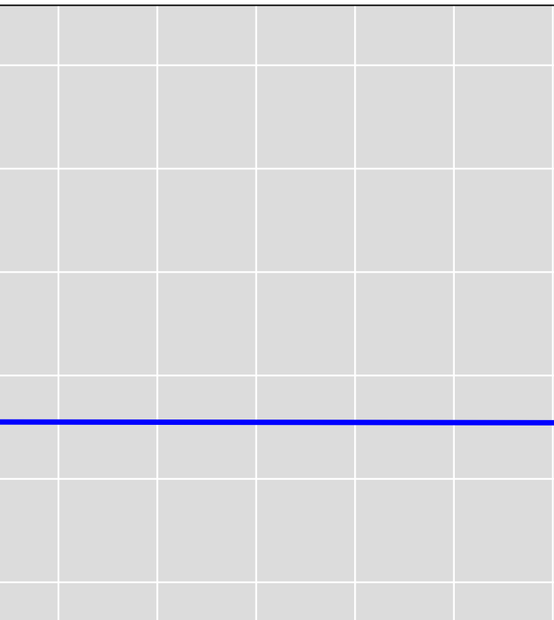
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Tyler - 6122502 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Tyler - 6122801 - Layer 3

Groundwater Level Elevation (ft)

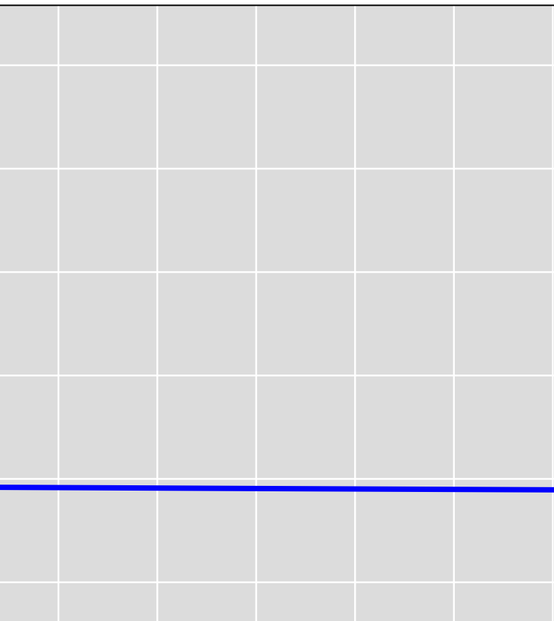
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Tyler - 6123504 - Layer 3



Groundwater Level Elevation (ft)

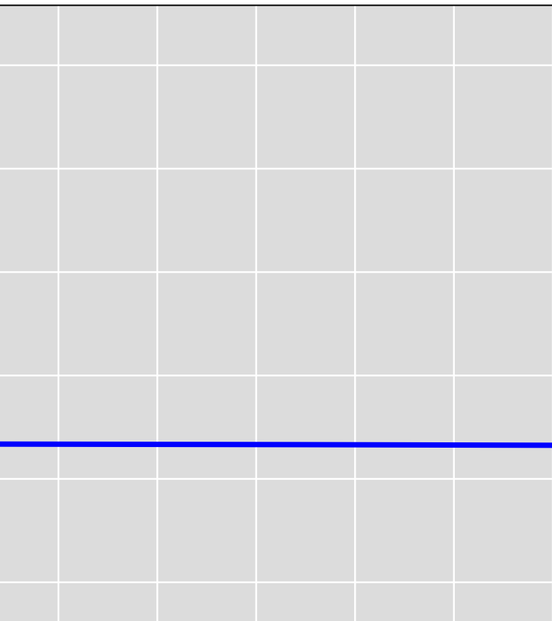
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Tyler - 6129301 - Layer 3



Groundwater Level Elevation (ft)

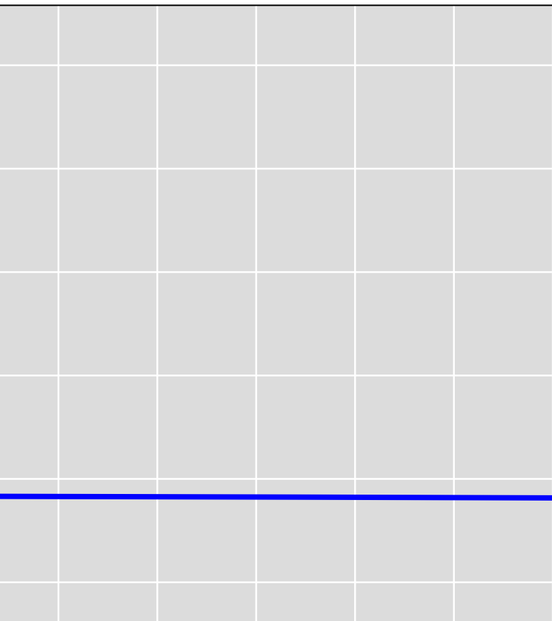
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Tyler - 6129804 - Layer 3



Level Elevation (ft)

Groundwater

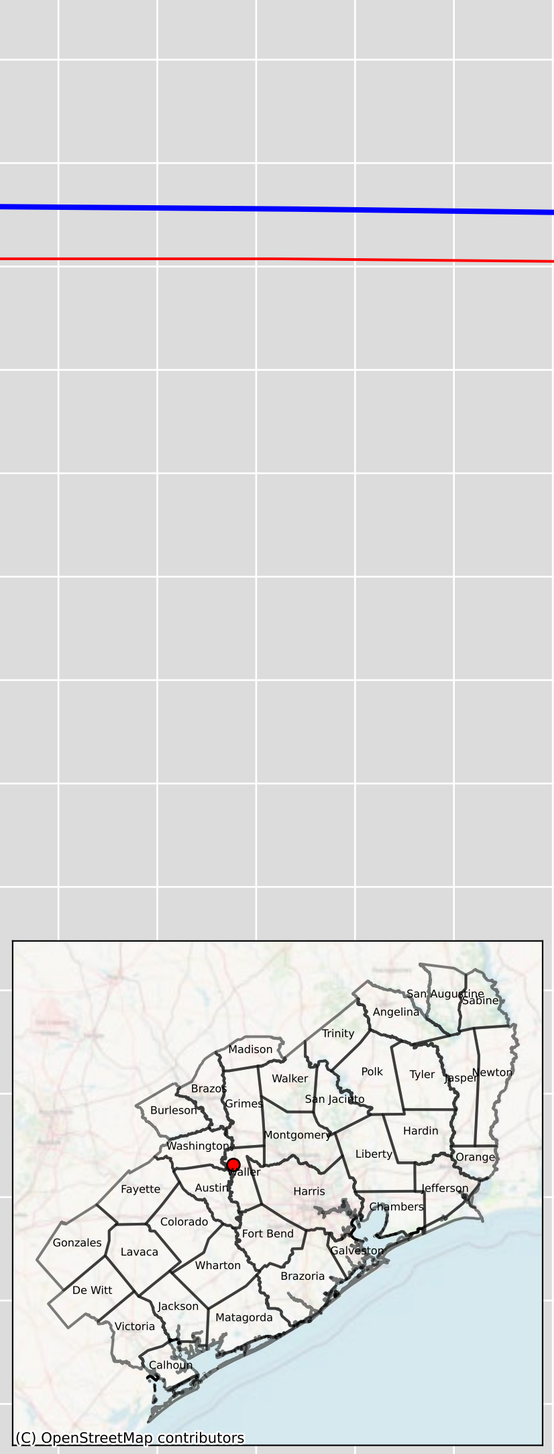
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller & Waller - 5964207 & 5964201 & 5964202 & 5964208 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 5964207
Gulf Simulated - 5964207

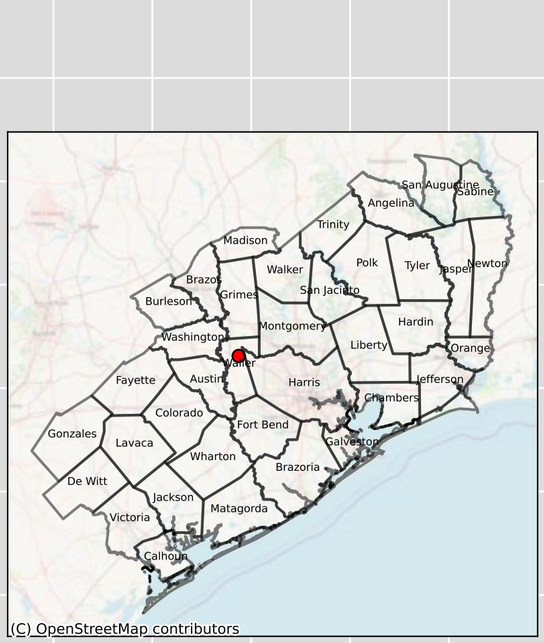
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6057103 & 6057112 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6057103
Gulf Simulated - 6057103

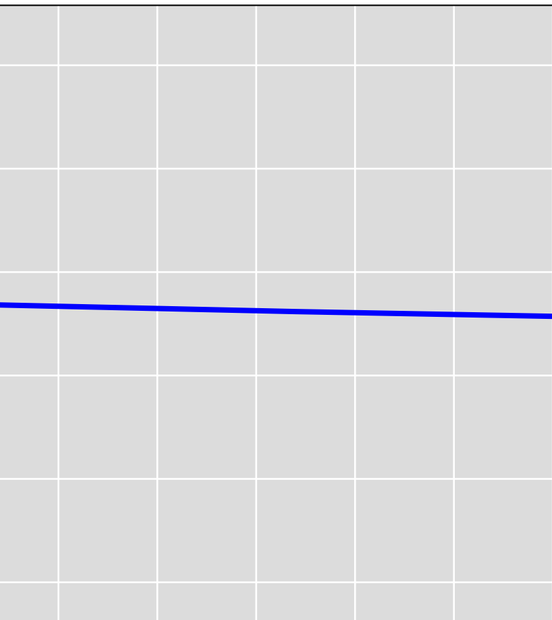
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6057109 - Layer 3



Groundwater Level Elevation (ft)

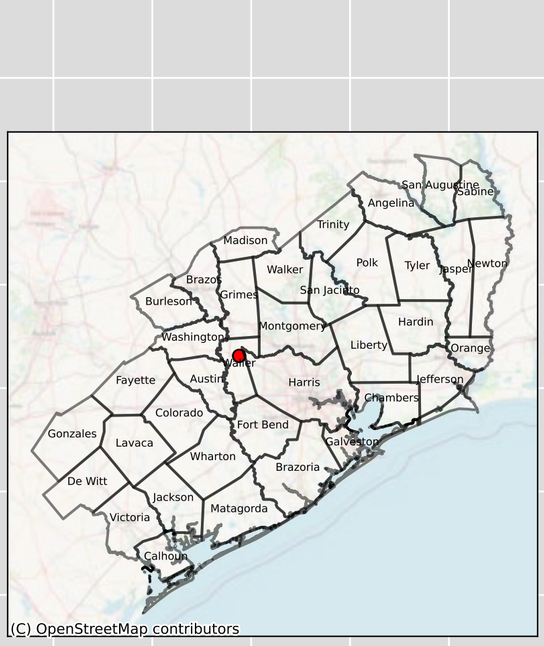
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6057110 & 6057113 - Layer 3



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6057402 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6057402
Gulf Simulated - 6057402

Waller - 6057505 & 6057509 - Layer 3

Groundwater Level Elevation (ft)

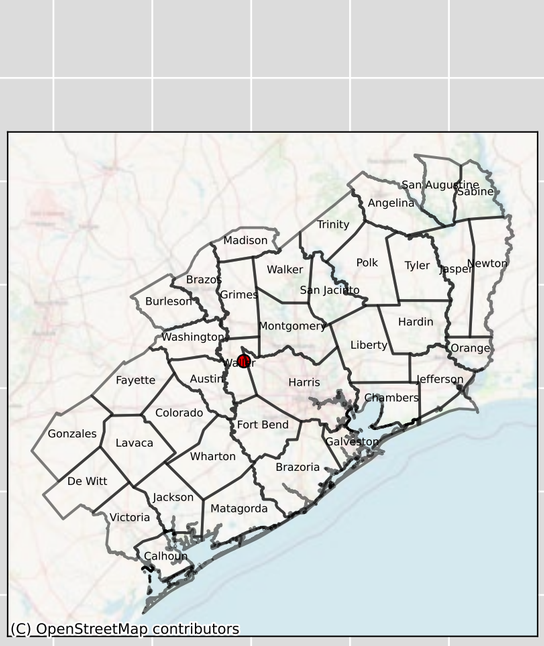
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6057506 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6057506
Gulf Simulated - 6057506

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6501501 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6501502 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

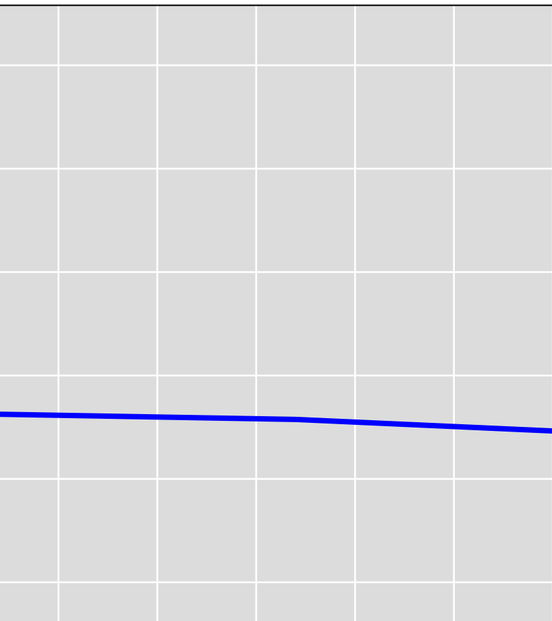
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

Waller - 6501814 - Layer 3



Groundwater Level Elevation (ft)

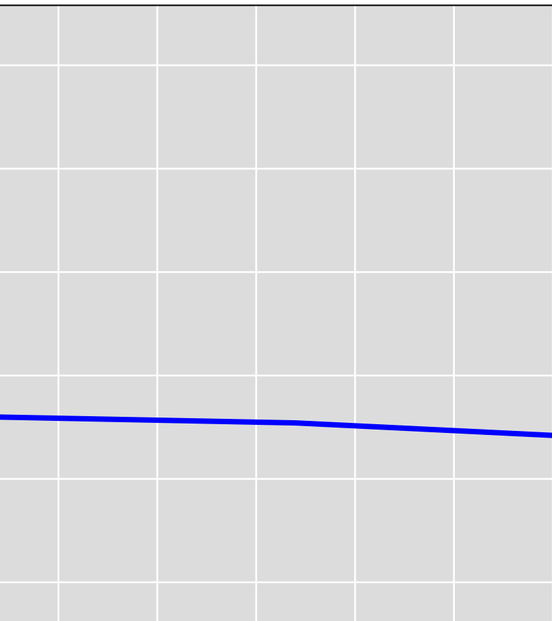
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6501816 - Layer 3



Groundwater Level Elevation (ft)

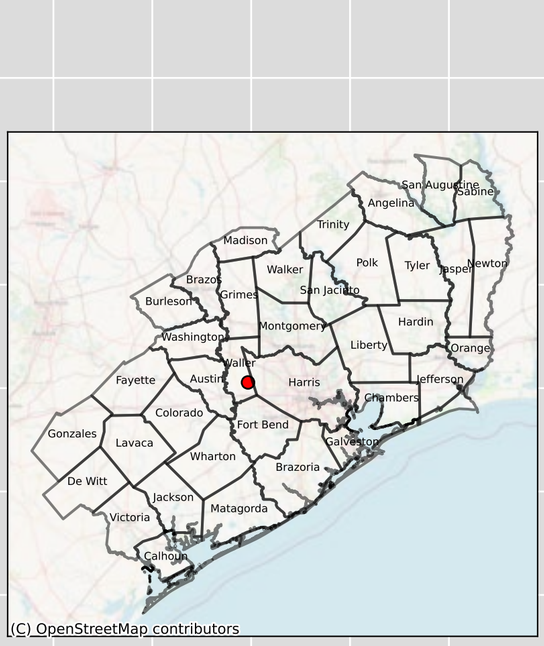
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

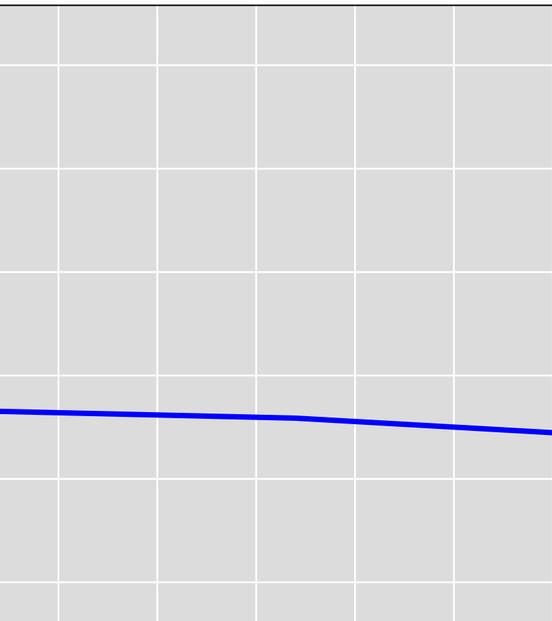
Year

GMA Measured
GMA Simulated

Waller - 6501904 - Layer 3



Waller - 6501905 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6509203 & 6509208 & 6509213 - Layer 3

Groundwater Level Elevation (ft)

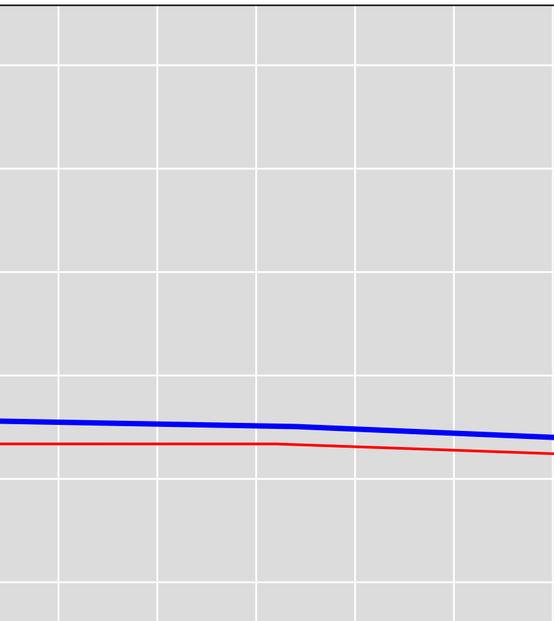
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6509204 - Layer 3



GMA Measured
GMA Simulated
Gulf Measured - 6509204
Gulf Simulated - 6509204

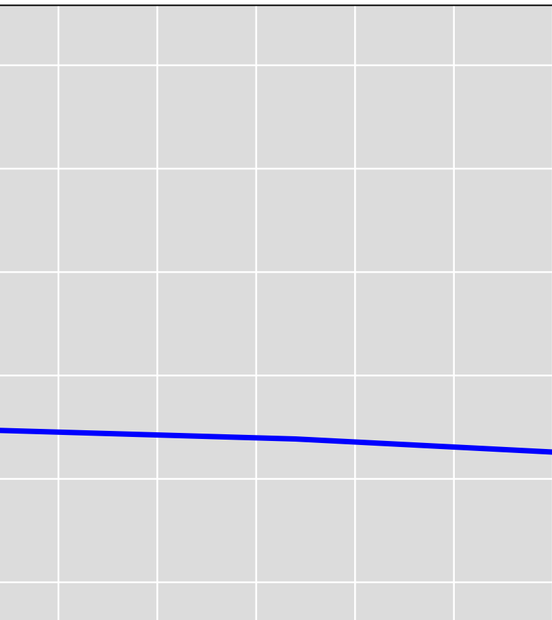
Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6509307 - Layer 3



Groundwater Level Elevation (ft)

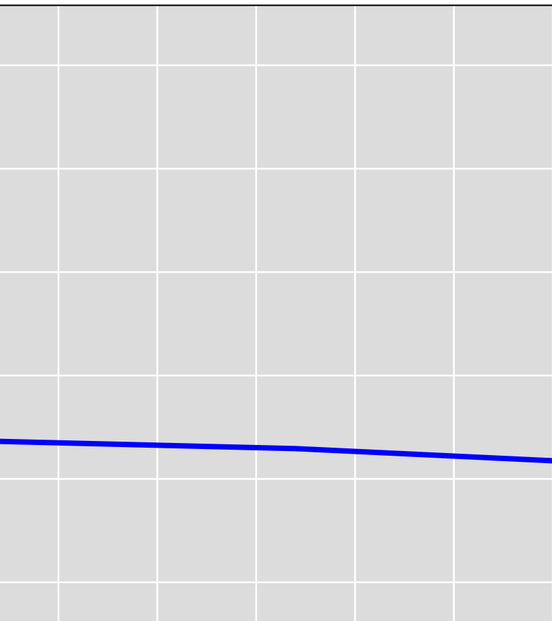
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6509509 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Waller - 6509605 - Layer 3

Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6509616 - Layer 3

Groundwater Level Elevation (ft)

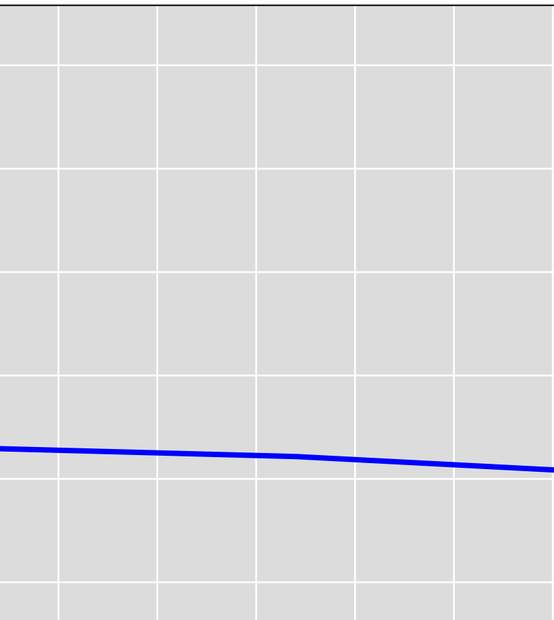
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Waller - 6509801 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Washington - 5954601 - Layer 3

Groundwater Level Elevation (ft)

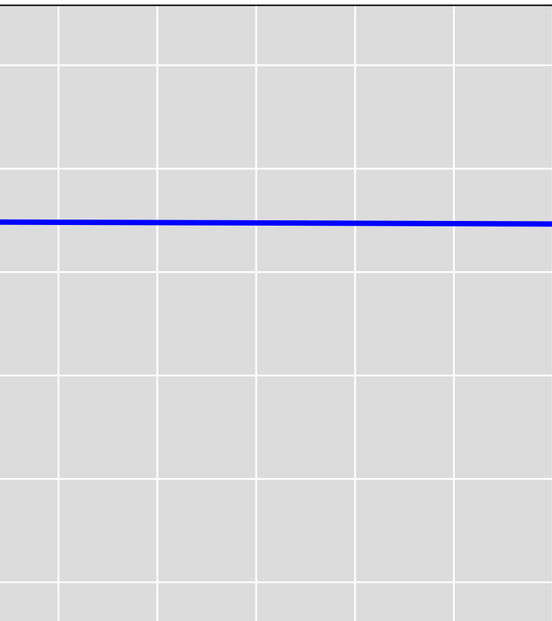
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Washington - 5954901 - Layer 3



Groundwater Level Elevation (ft)

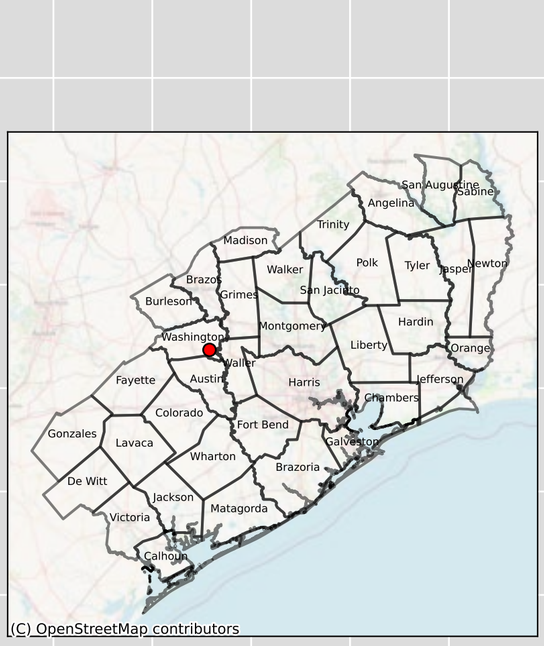
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Washington - 5954904 - Layer 3



Groundwater Level Elevation (ft)

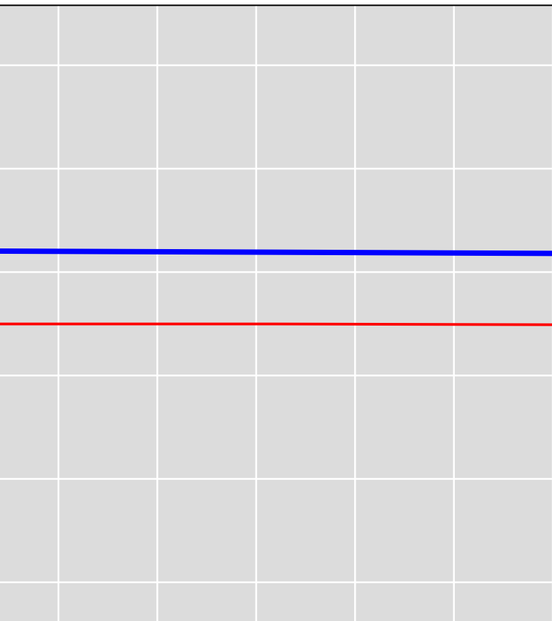
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

GMA Measured
GMA Simulated

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Washington - 5954913 - Layer 3



Level Elevation (ft)

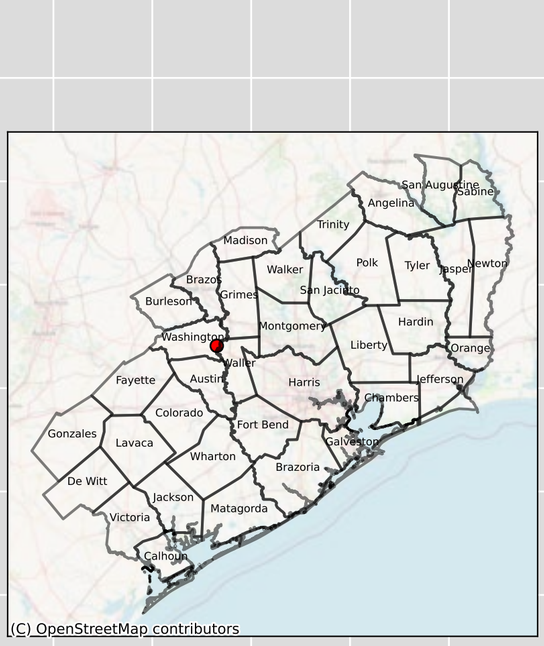
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 5954913
Gulf Simulated - 5954913

Washington - 5955501 - Layer 3



GMA Measured

GMA Simulated

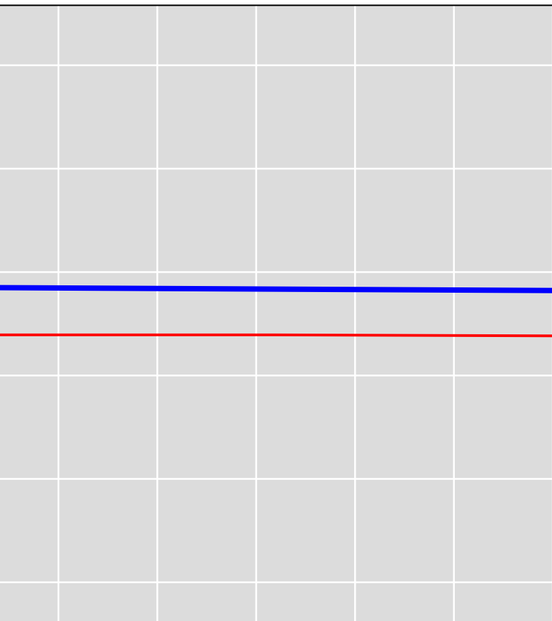
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Washington - 5955705 - Layer 3



Groundwater Level Elevation (ft)

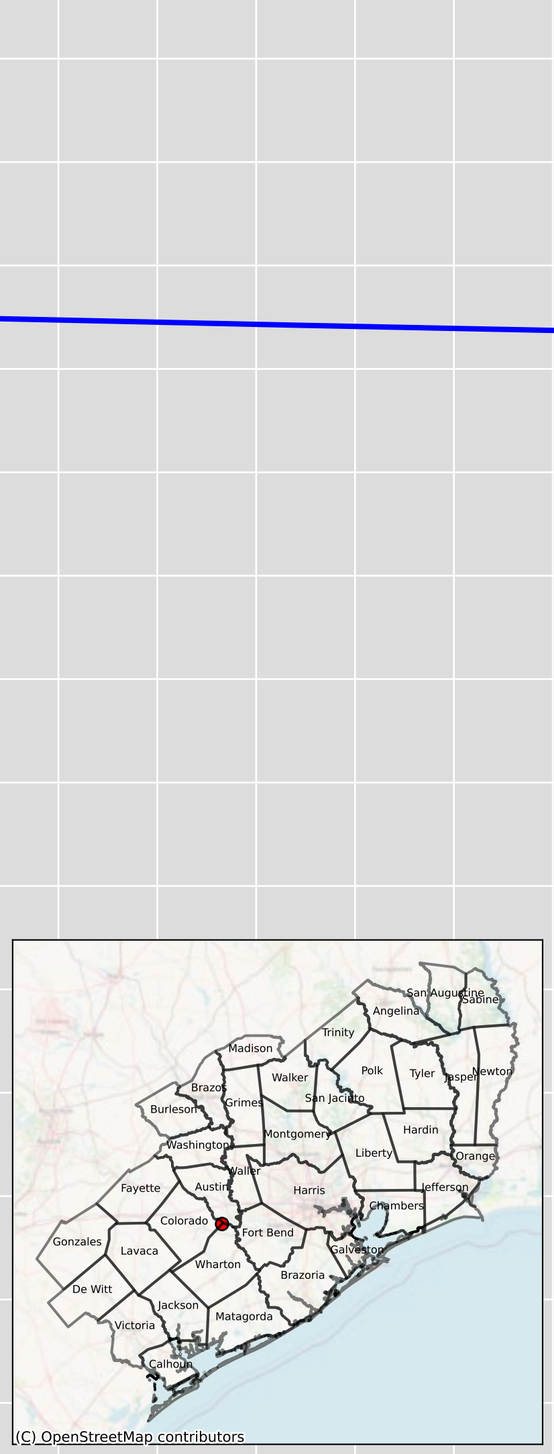
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 5955705
Gulf Simulated - 5955705

Wharton - 6631201 - Layer 3



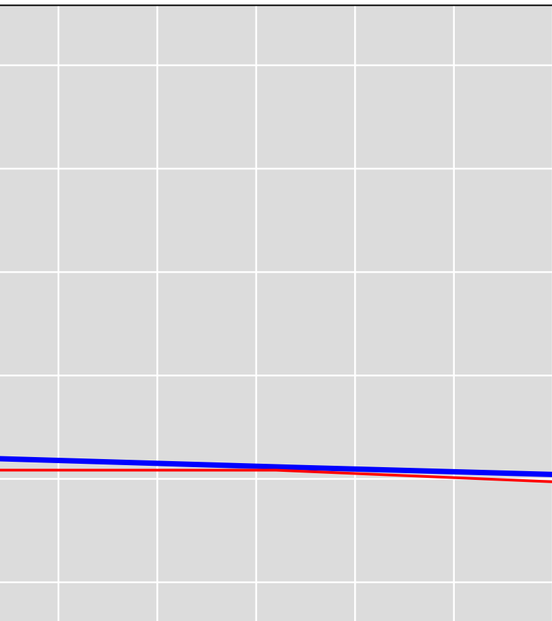
Groundwater Level Elevation (ft)

300 250 200 150 100 50 0 −50 −100 −150 −200 −250 −300 −350 −400 −450 −500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Wharton - 6631906 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6631906
Gulf Simulated - 6631906

Wharton - 6638302 - Layer 3

Groundwater Level Elevation (ft)

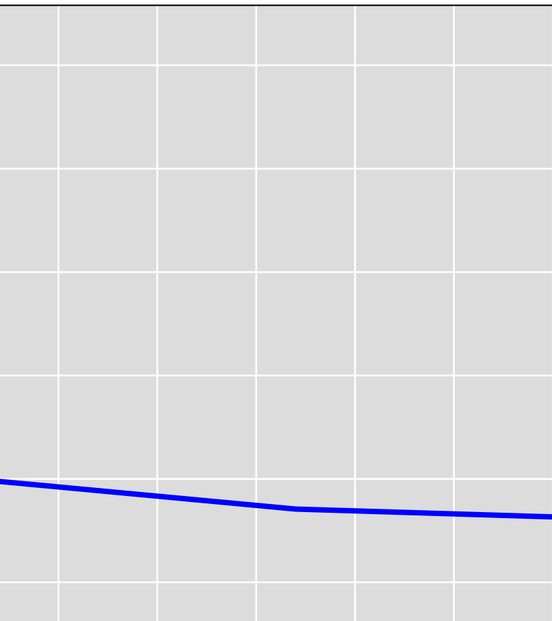
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6644808 - Layer 3



Groundwater Level Elevation (ft)

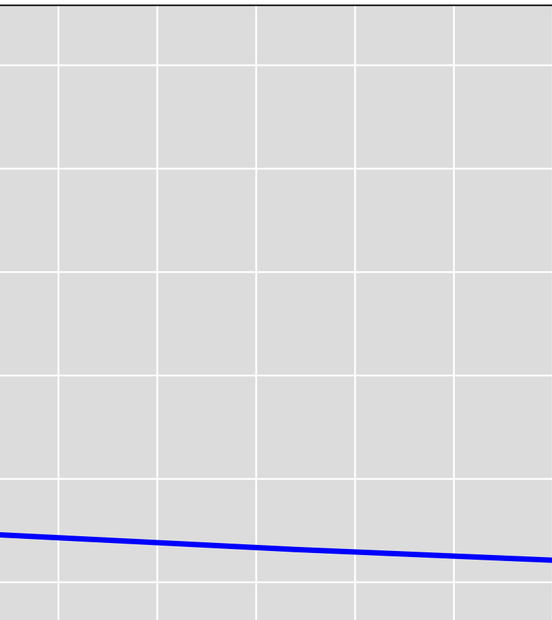
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6648403 - Layer 3



Groundwater Level Elevation (ft)

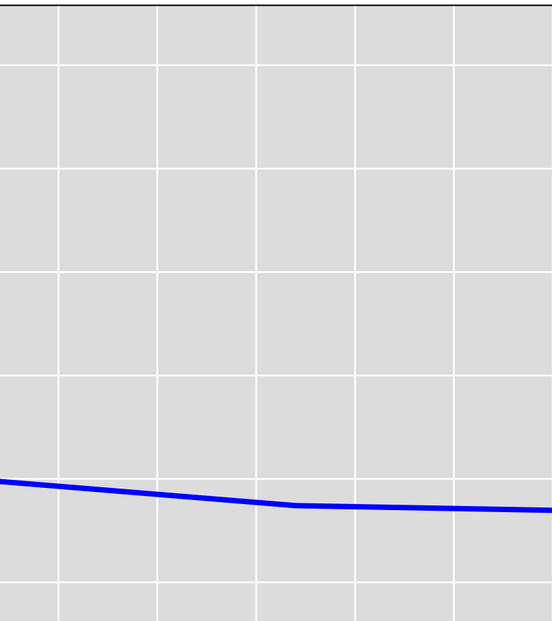
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6651306 - Layer 3



Groundwater Level Elevation (ft)

300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6652304 - Layer 3

Groundwater Level Elevation (ft)

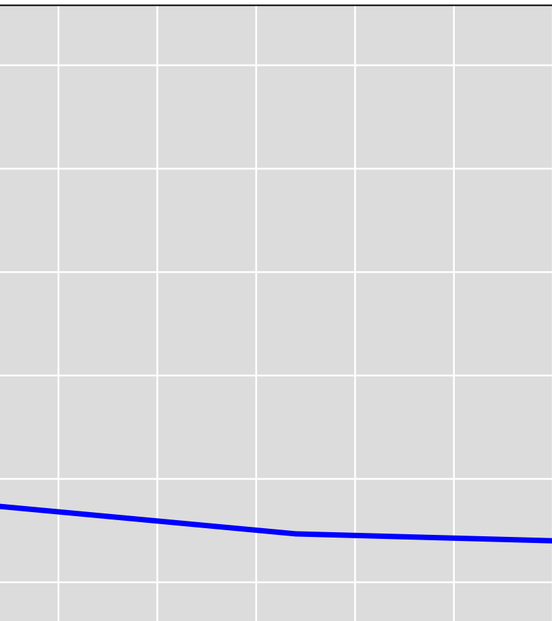
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6652603 - Layer 3



Groundwater Level Elevation (ft)

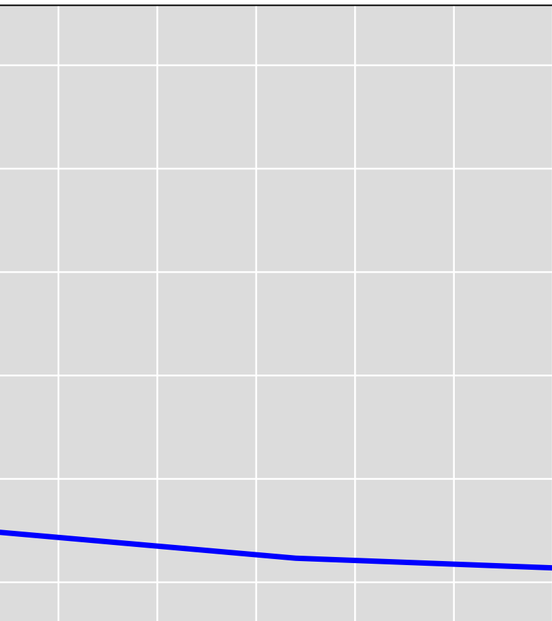
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Wharton - 6654511 - Layer 3



Groundwater Level Elevation (ft)

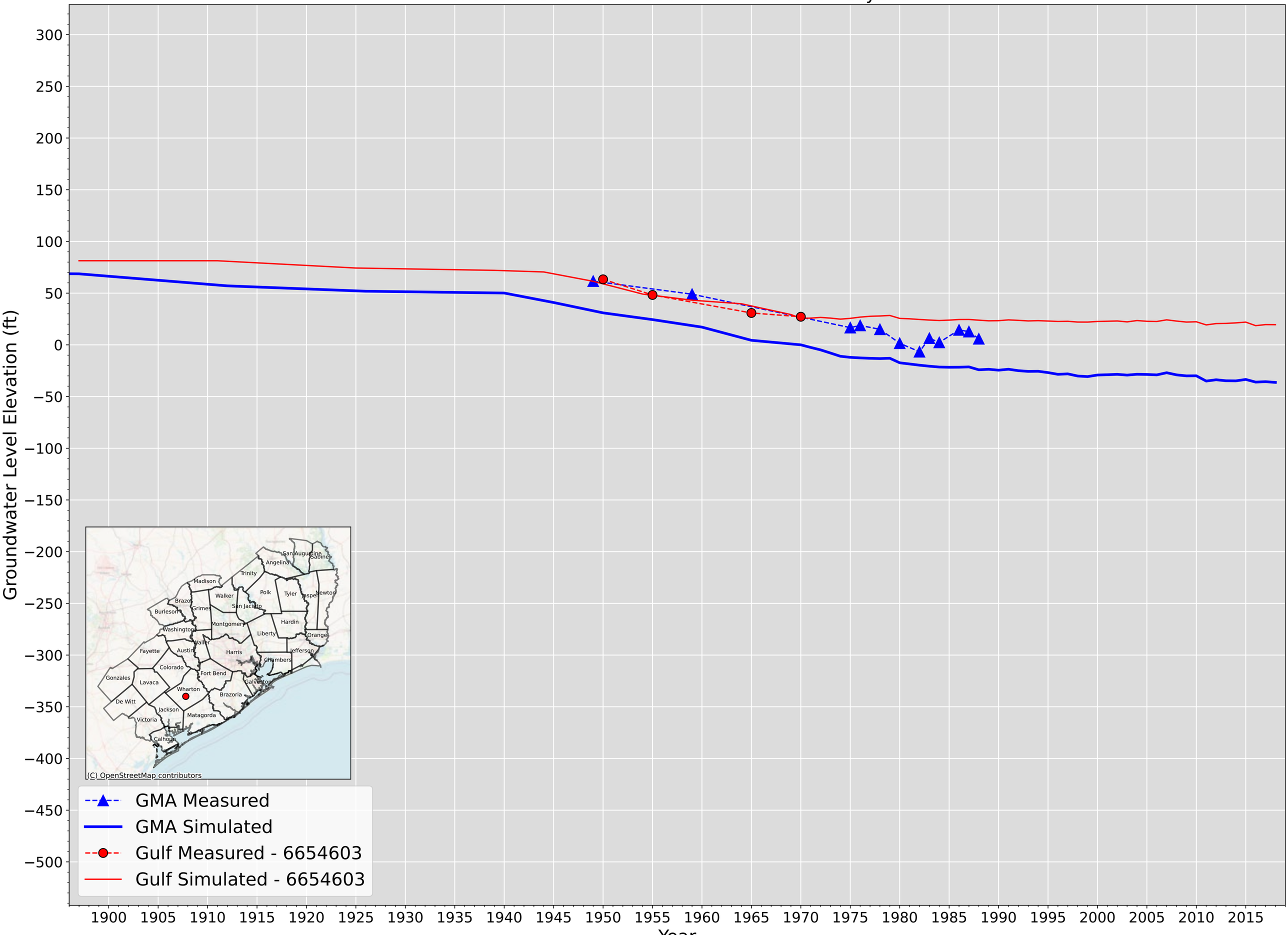
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

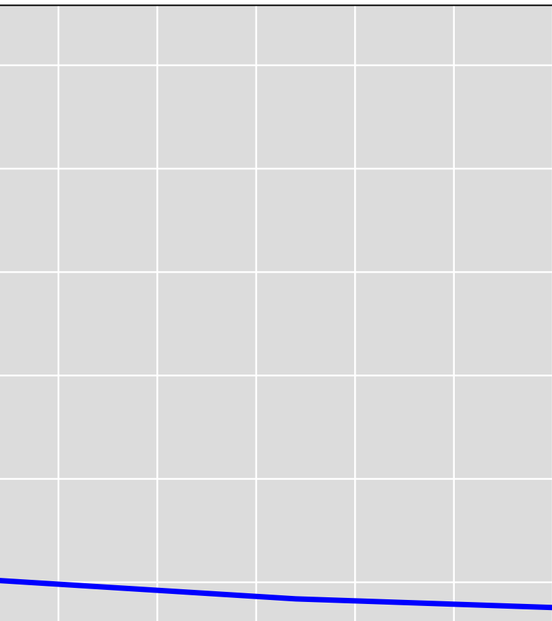
Year

GMA Measured
GMA Simulated

Wharton - 6654603 & 6654604 & 6654609 - Layer 3



Wharton - 6663505 - Layer 3



Groundwater Level Elevation (ft)

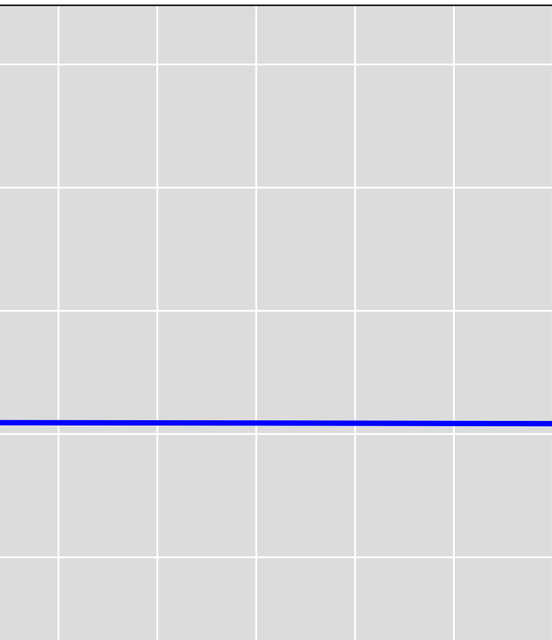
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
−300
−350
−400
−450
−500

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Austin - 5960702 - Layer 5



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

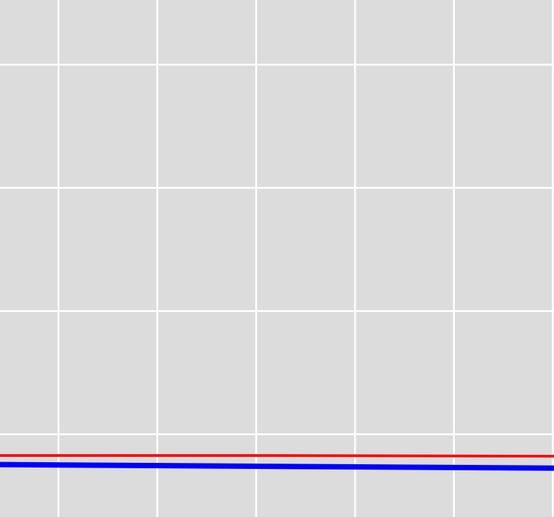
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Austin - 5961803 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 5961803
Gulf Simulated - 5961803

Brazos - 5947304 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Colorado - 6618602 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Colorado - 6618604 - Layer 5

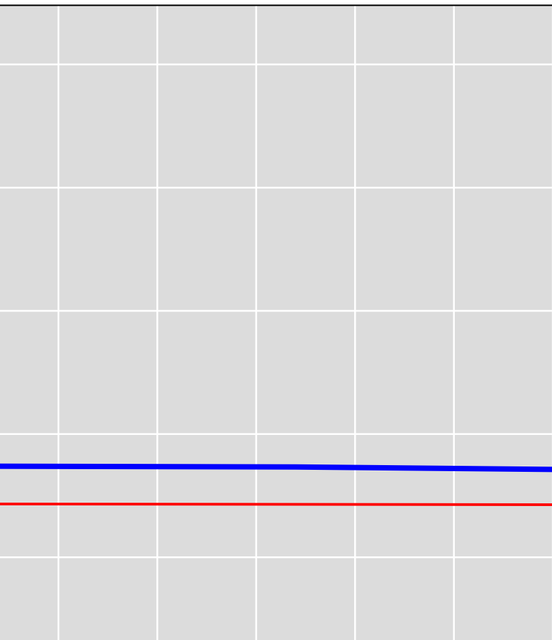
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Fayette - 6603804 & 6603807 - Layer 5

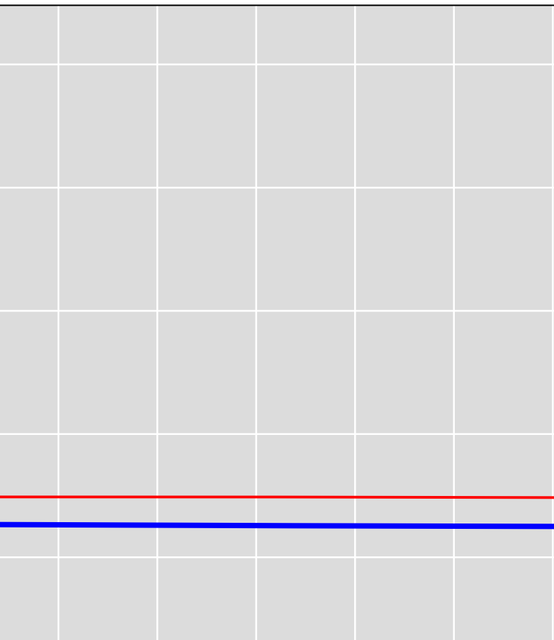


Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6603804
Gulf Simulated - 6603804

Fayette - 6617602 & 6617601 - Layer 5



GMA Measured
GMA Simulated
Gulf Measured - 6617602
Gulf Simulated - 6617602

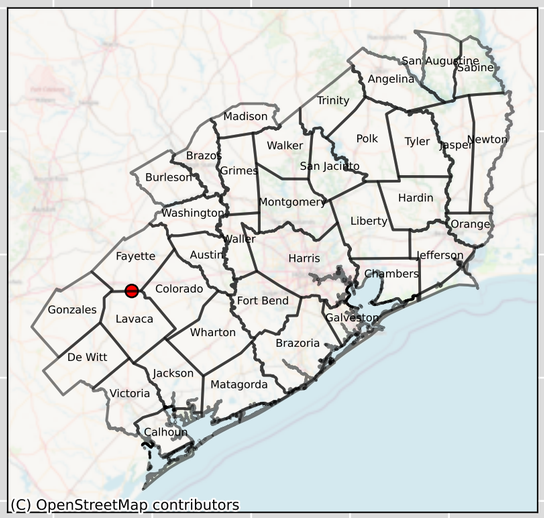
Groundwater Level Elevation (ft)

Year

Fayette - 6617807 & 6617802 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

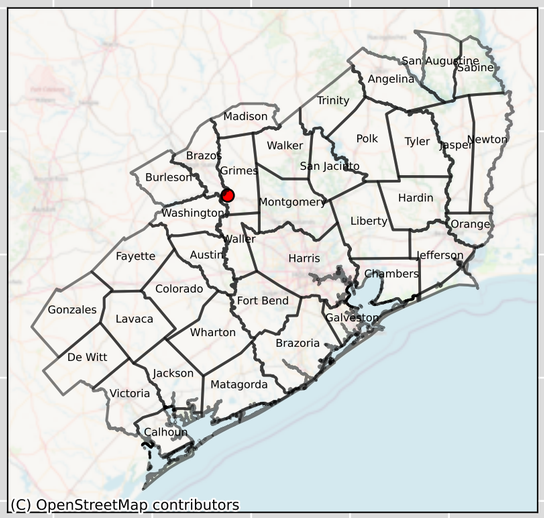
Gulf Measured - 6617807

Gulf Simulated - 6617807

Grimes - 5940707 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 5940707
Gulf Simulated - 5940707

Grimes - 5948106 & 5948111 - Layer 5

Groundwater Level Elevation (ft)

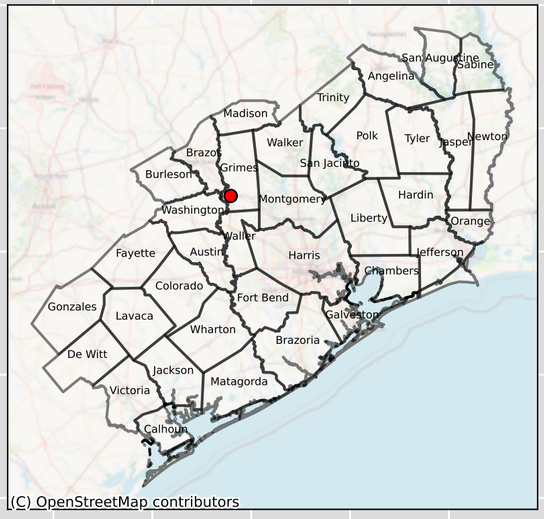
Year

GMA Measured
GMA Simulated
Gulf Measured - 5948106
Gulf Simulated - 5948106

Grimes - 5948207 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 5948207
Gulf Simulated - 5948207

Grimes - 5948503 - Layer 5

GMA Measured

GMA Simulated

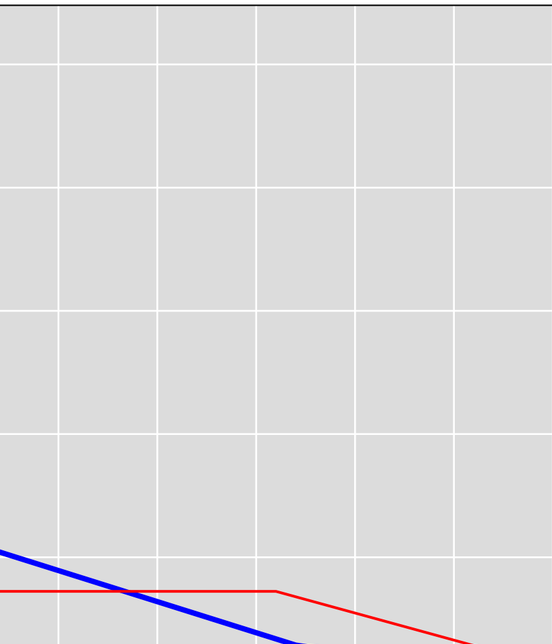
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6026707 & 6026704 - Layer 5



GMA Measured
GMA Simulated
Gulf Measured - 6026707
Gulf Simulated - 6026707

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

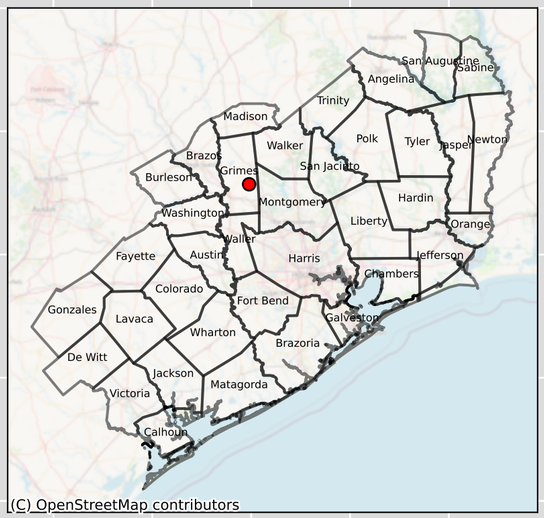
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6033302 - Layer 5

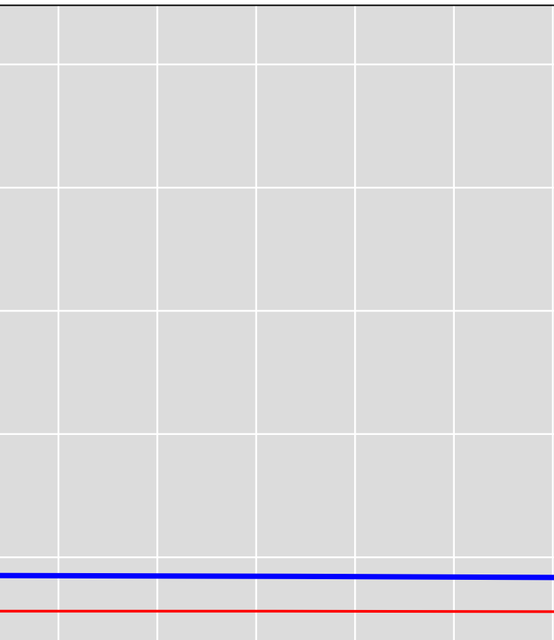
Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6033302
Gulf Simulated - 6033302

Grimes - 6034102 - Layer 5



GMA Measured
GMA Simulated
Gulf Measured - 6034102
Gulf Simulated - 6034102

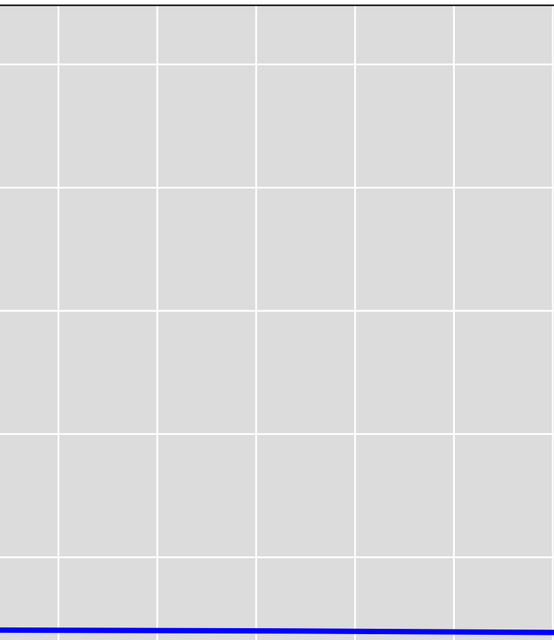
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6034201 - Layer 5



GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6041105 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6041105
Gulf Simulated - 6041105

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

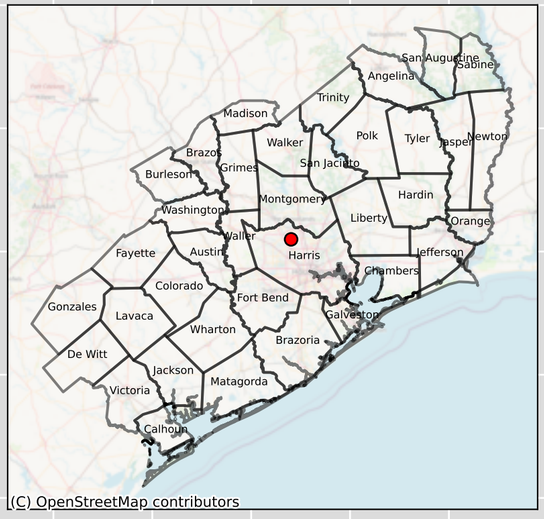
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Harris - 6060921 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

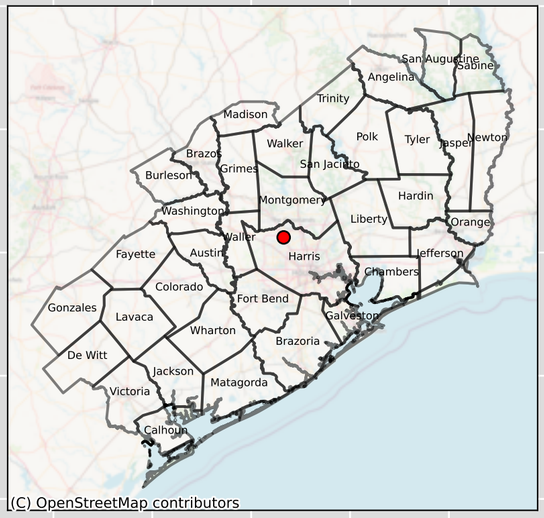
Gulf Measured - 6060921

Gulf Simulated - 6060921

Harris & Harris - 6060716 & 6060408 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Harris - 6052902 - Layer 5

Groundwater Level Elevation (ft)

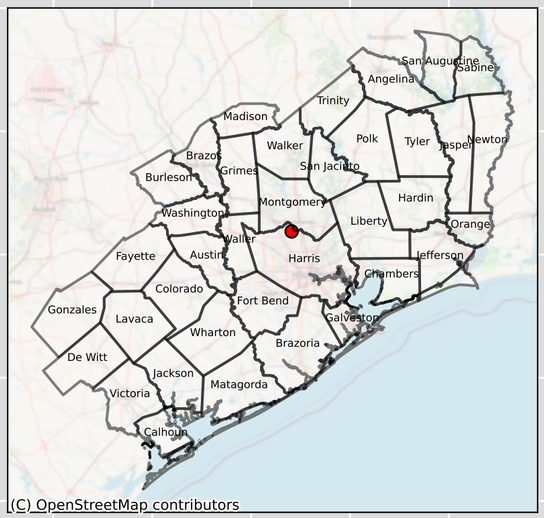
Year

GMA Measured
GMA Simulated
Gulf Measured - 6052902
Gulf Simulated - 6052902

Harris - 6060306 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6060306
Gulf Simulated - 6060306

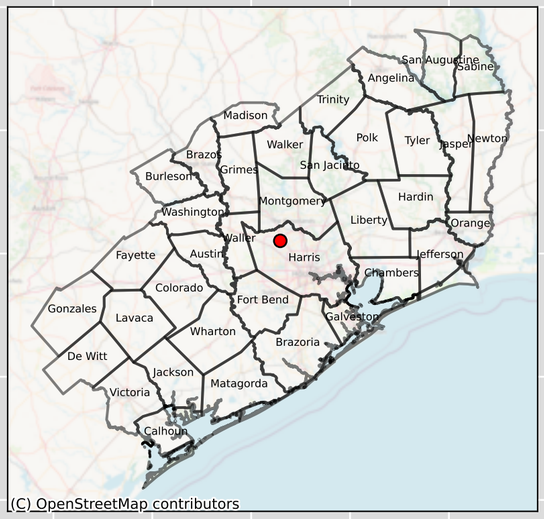
Harris - 6060715 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

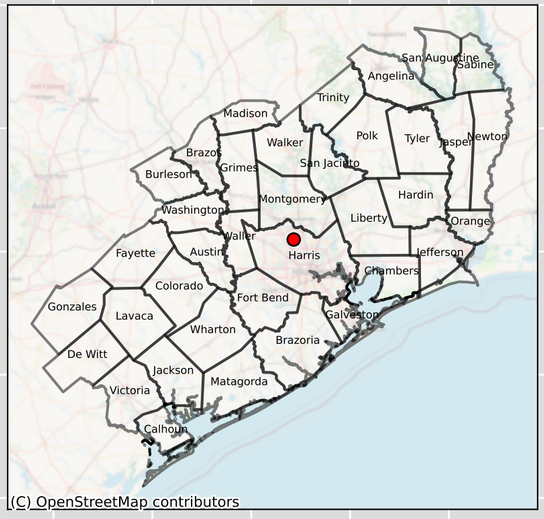
GMA Simulated



Harris - 6061727 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6061727
Gulf Simulated - 6061727

Harris - 6061841 - Layer 5

Groundwater Level Elevation (ft)

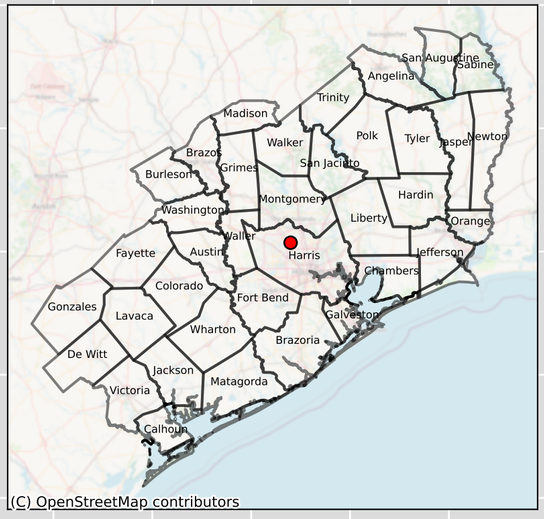
Year

GMA Measured
GMA Simulated
Gulf Measured - 6061841
Gulf Simulated - 6061841

Harris - 6504320 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6504320
Gulf Simulated - 6504320

Harris - 6507905 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Jasper - 6116204 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

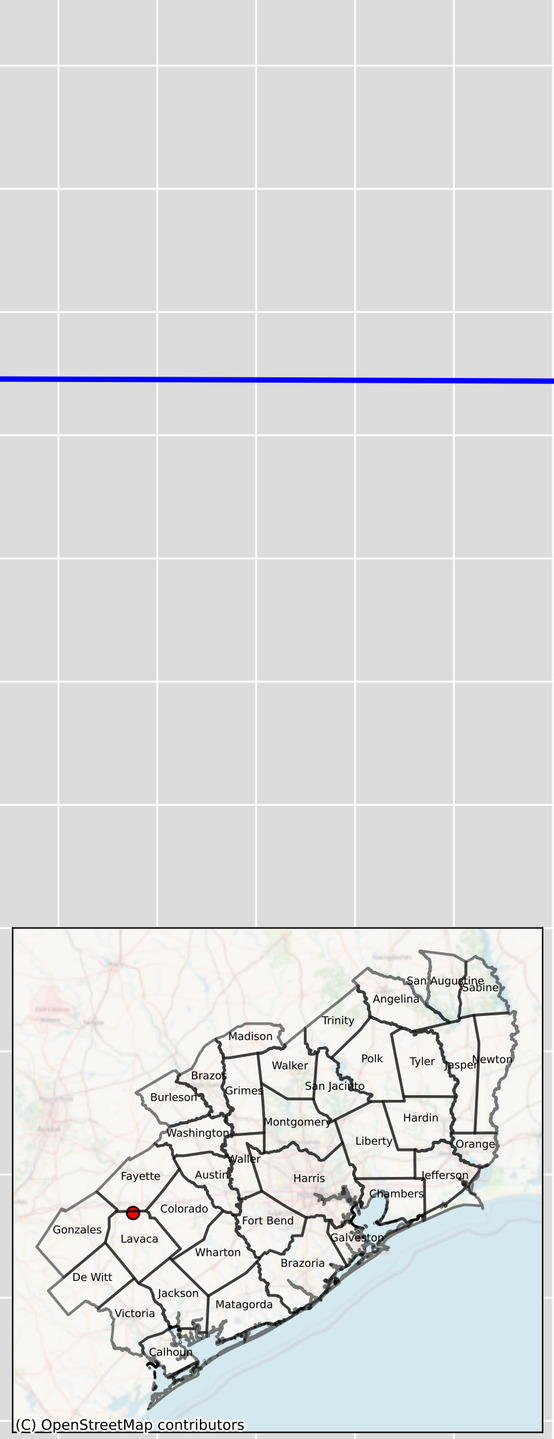
Lavaca - 6625102 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

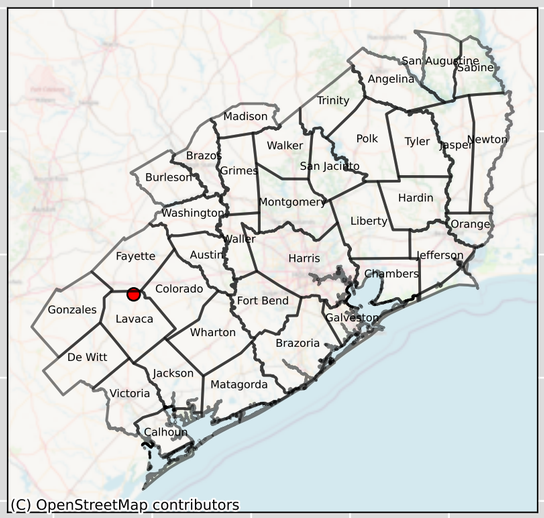
Lavaca - 6625203 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

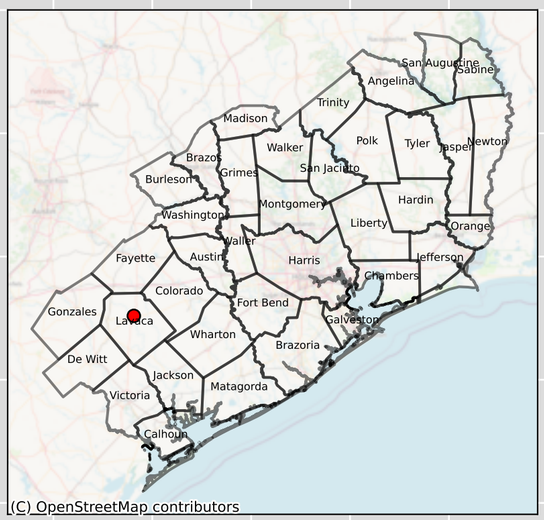


GMA Measured
GMA Simulated
Gulf Measured - 6625203
Gulf Simulated - 6625203

Lavaca - 6633507 & 6633503 & 6633510 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6633507
Gulf Simulated - 6633507

Lavaca - 6633513 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Lavaca - 6649701 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6732704 - Layer 5

Groundwater Level Elevation (ft)

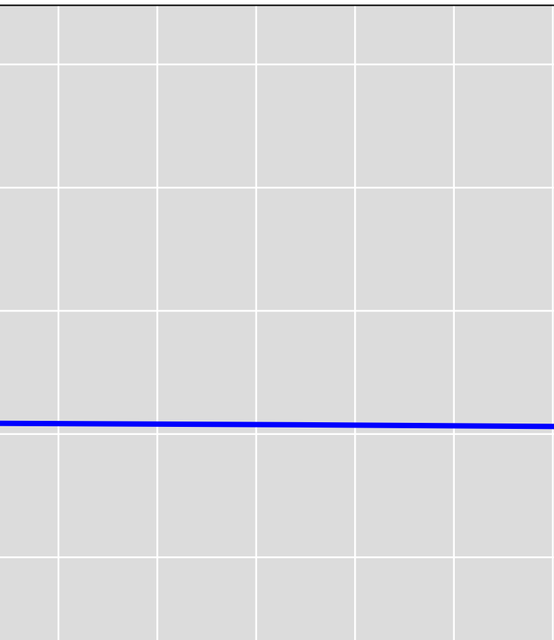
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6739306 - Layer 5



Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

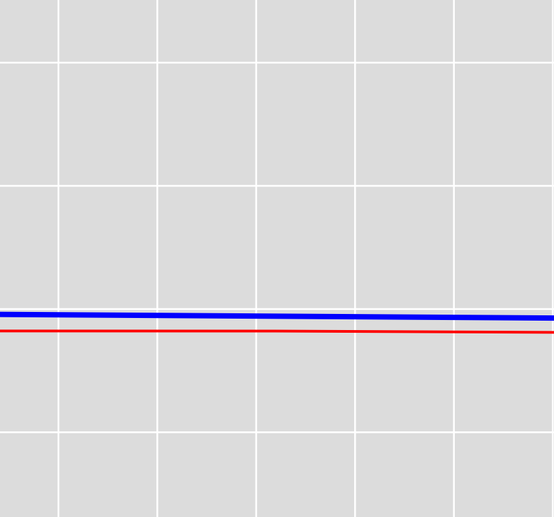
Year

GMA Measured
GMA Simulated

Lavaca - 6739507 - Layer 5

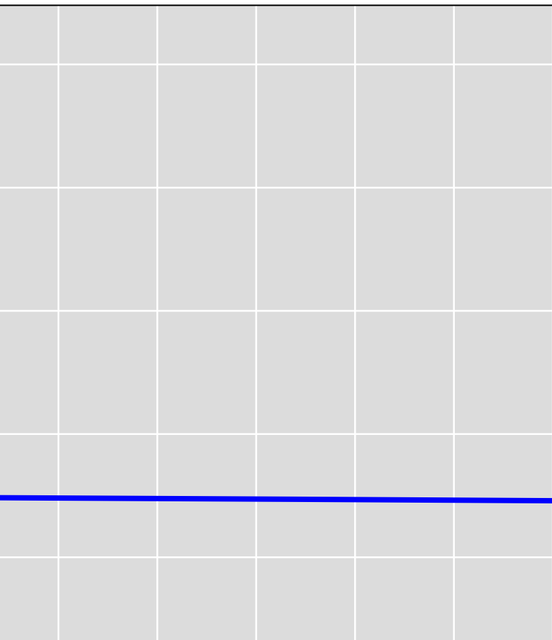
Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6739507
Gulf Simulated - 6739507

Lavaca - 6739603 - Layer 5



Groundwater Level Elevation (ft)

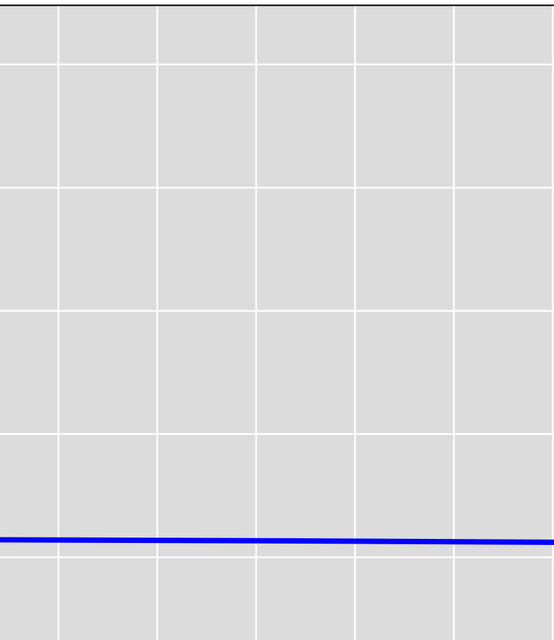
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Lavaca - 6740501 - Layer 5



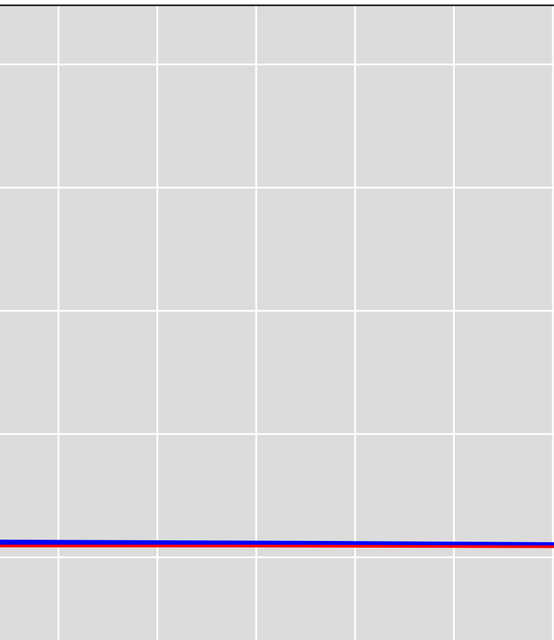
Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Lavaca - 6740503 & 6740504 - Layer 5



GMA Measured
GMA Simulated
Gulf Measured - 6740503
Gulf Simulated - 6740503

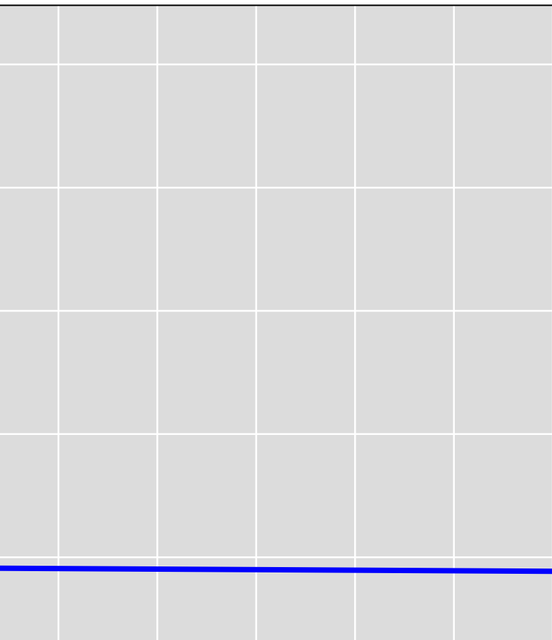
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6747603 - Layer 5



Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

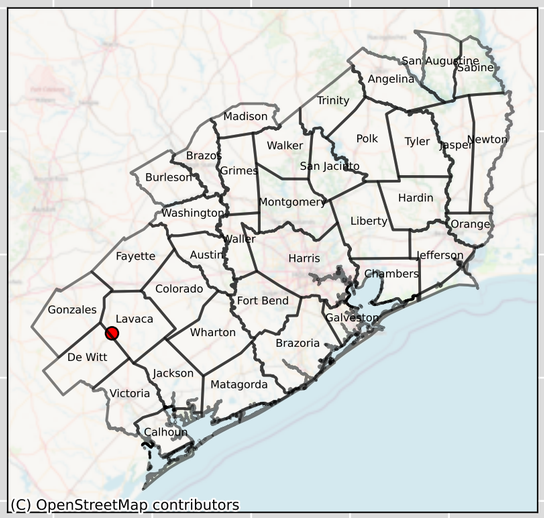
Year

GMA Measured
GMA Simulated

Lavaca - 6747607 & 6747604 & 6747606 - Layer 5

Groundwater Level Elevation (ft)

Year

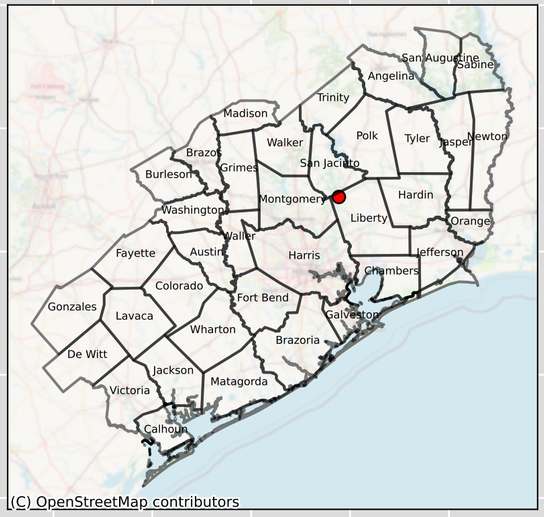


GMA Measured
GMA Simulated
Gulf Measured - 6747607
Gulf Simulated - 6747607

Liberty - 6048101 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

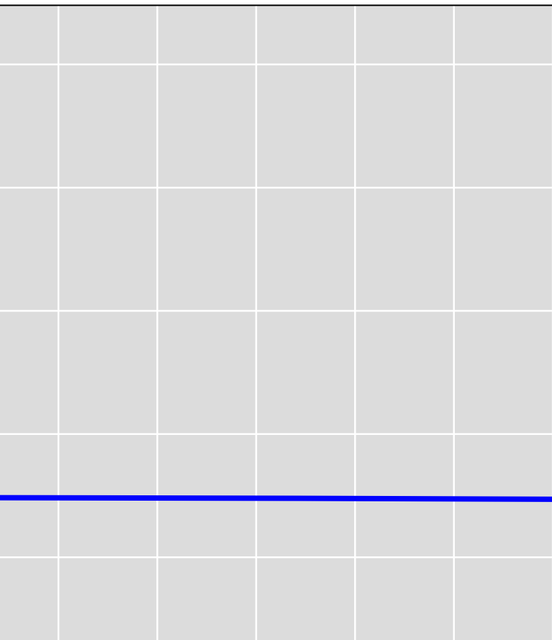
Liberty - 6048202 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6048202
Gulf Simulated - 6048202

Montgomery - 6026208 - Layer 5



GMA Measured

GMA Simulated

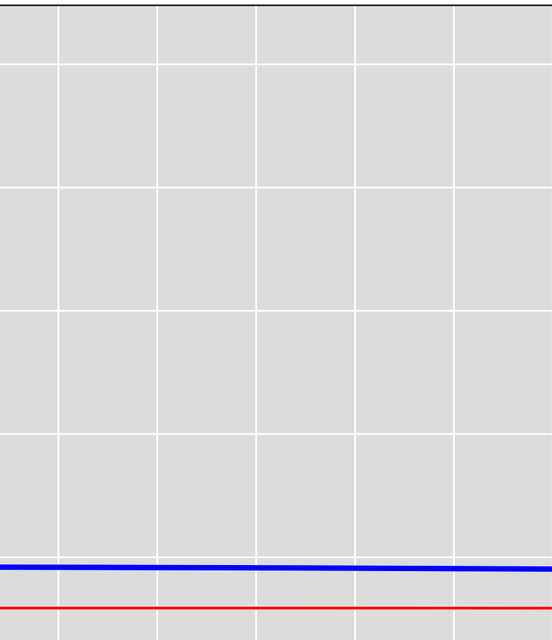
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6026901 - Layer 5



GMA Measured
GMA Simulated
Gulf Measured - 6026901
Gulf Simulated - 6026901

Groundwater Level Elevation (ft)

450 400 350 300 250 200 150 100 50 0 −50 −100 −150 −200 −250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

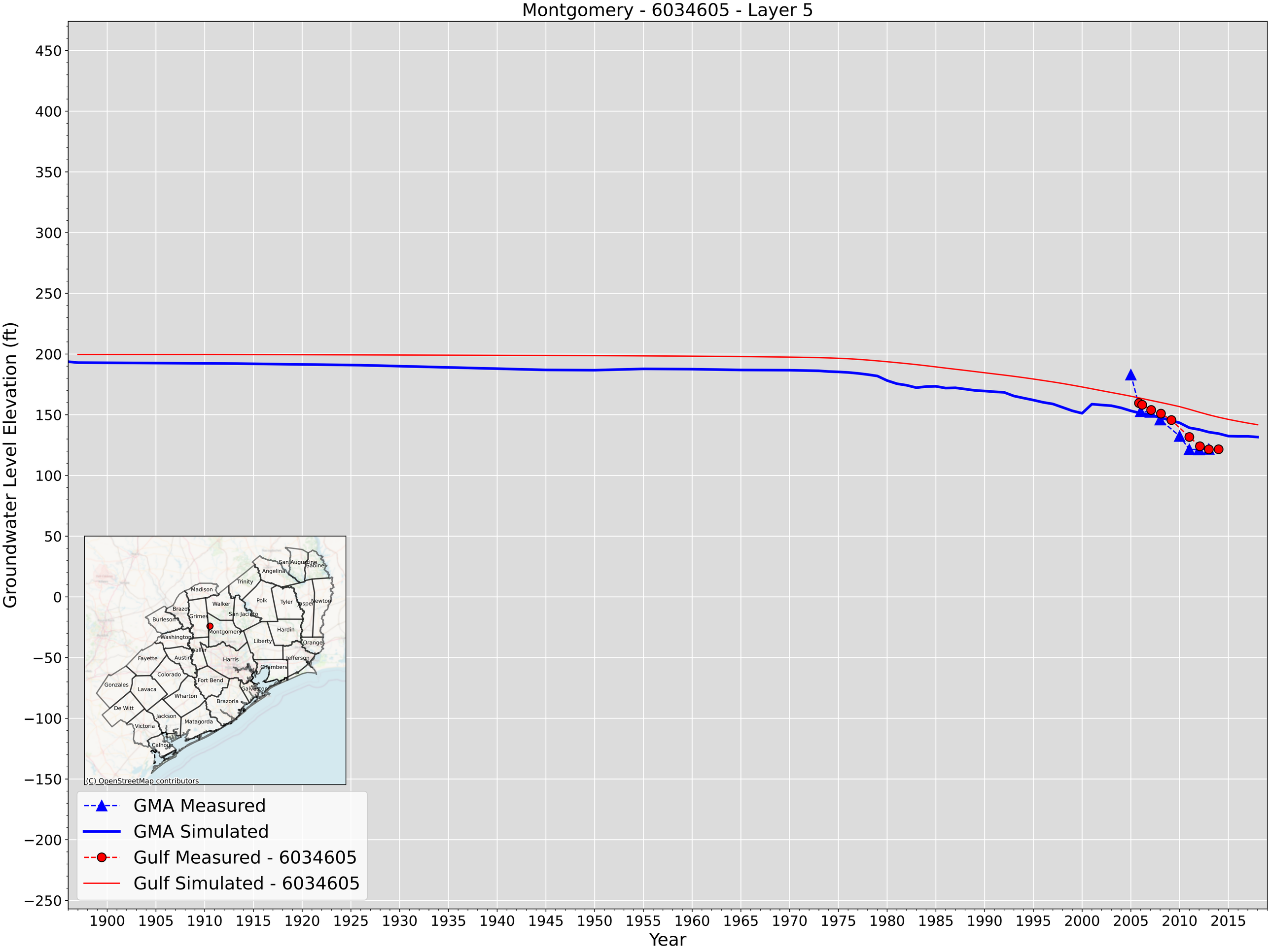
Montgomery - 6034503 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated


Montgomery - 6034605 - Layer 5
Groundwater Level Elevation (ft)
Year
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 6034605
Gulf Simulated - 6034605

Montgomery - 6035201 & 6035202 - Layer 5

Groundwater Level Elevation (ft)

Year

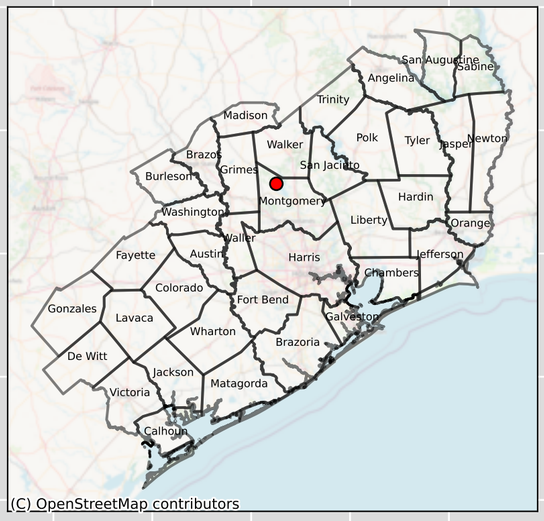
GMA Measured

GMA Simulated

Montgomery - 6035303 - Layer 5

Groundwater Level Elevation (ft)

Year

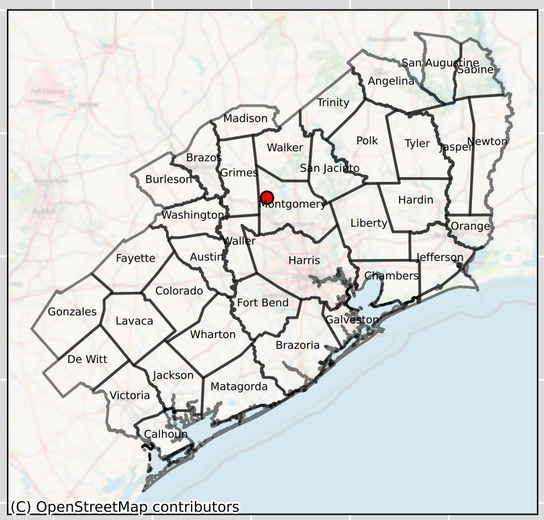


GMA Measured
GMA Simulated
Gulf Measured - 6035303
Gulf Simulated - 6035303

Montgomery - 6035703 - Layer 5

Groundwater Level Elevation (ft)

Year

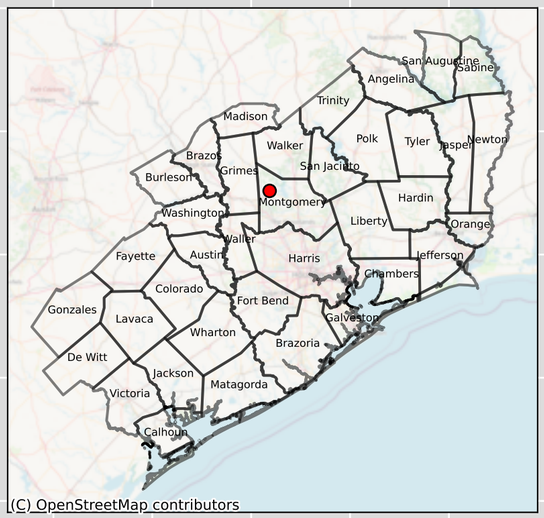


GMA Measured
GMA Simulated
Gulf Measured - 6035703
Gulf Simulated - 6035703

Montgomery - 6035707 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6035707
Gulf Simulated - 6035707

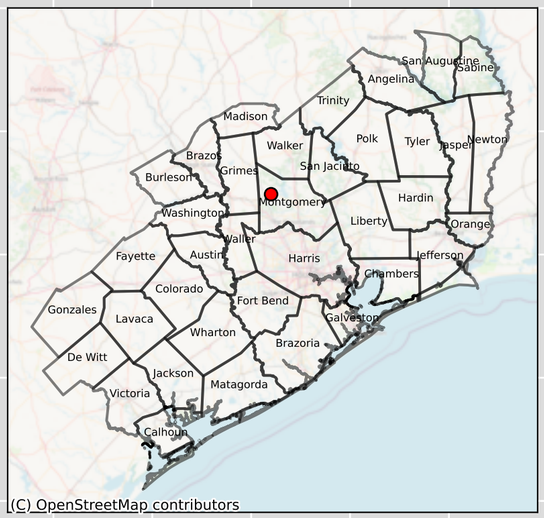
Montgomery - 6035811 & 6035812 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

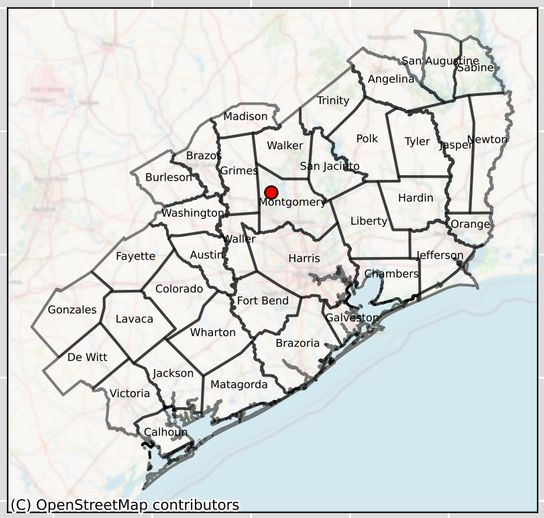


GMA Measured
GMA Simulated

Montgomery - 6035813 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

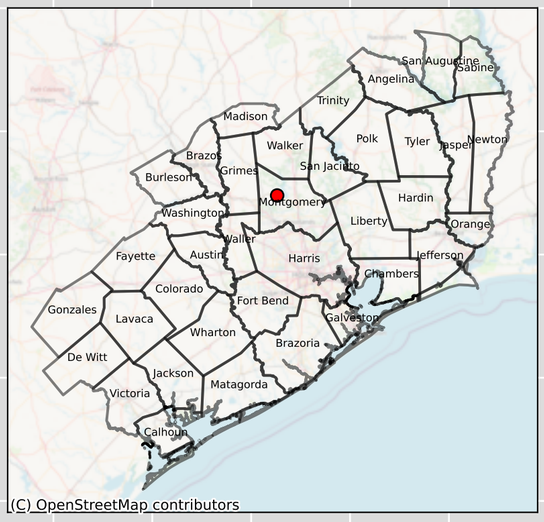
Montgomery - 6035905 & 6035909 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

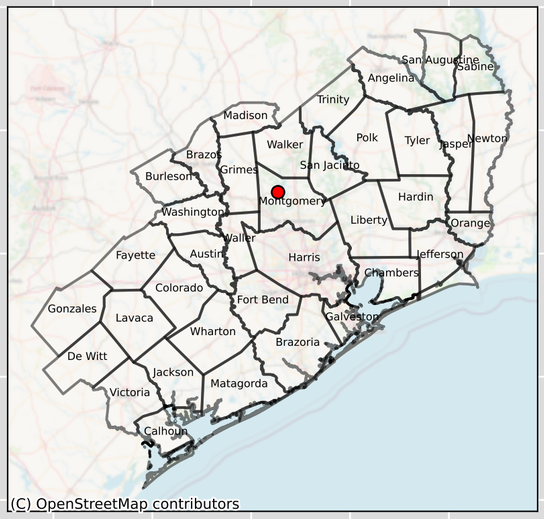


GMA Measured
GMA Simulated

Montgomery - 6035908 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6035910 & 6035912 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

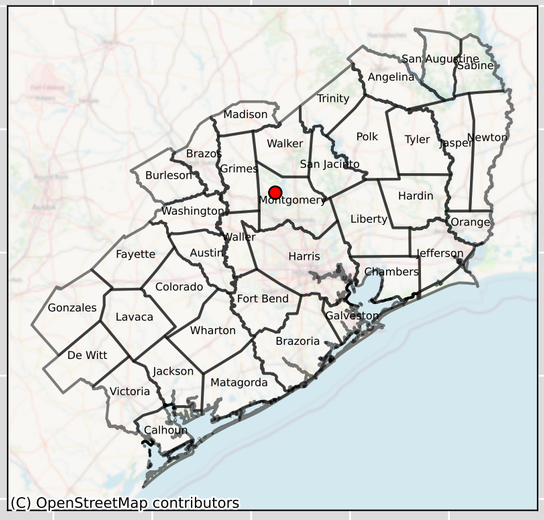
Year

GMA Measured
GMA Simulated

Montgomery - 6035911 - Layer 5

Groundwater Level Elevation (ft)

Year



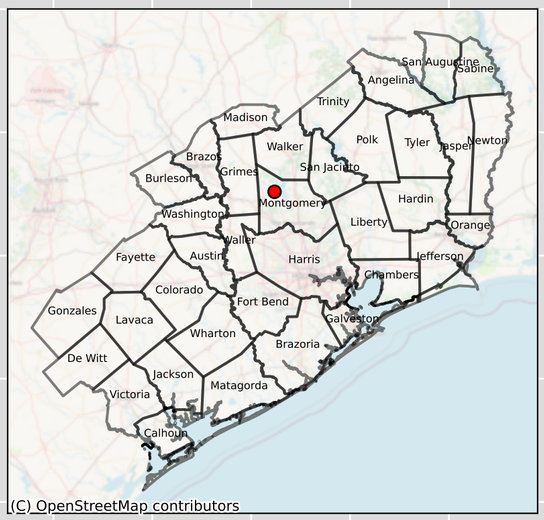
GMA Measured

GMA Simulated

Montgomery - 6035913 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6035913
Gulf Simulated - 6035913

Montgomery - 6036205 & 6036206 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6036205
Gulf Simulated - 6036205

Groundwater Level Elevation (ft)

450 400 350 300 250 200 150 100 50 0 −50 −100 −150 −200 −250

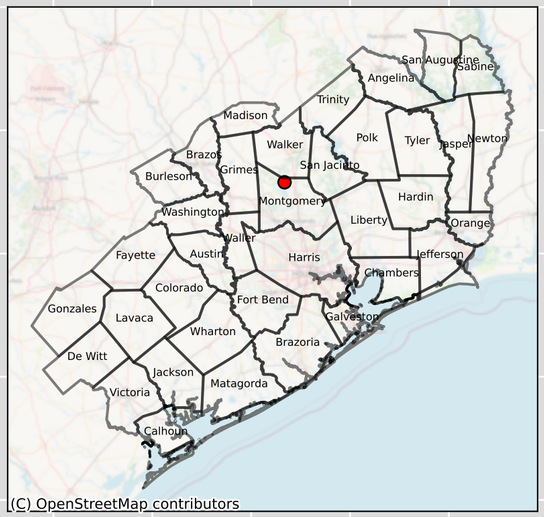
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6036207 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6036210 - Layer 5

Groundwater Level Elevation (ft)

Year

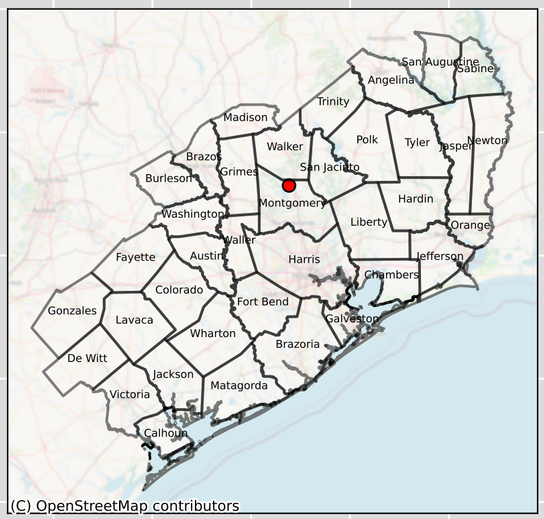
GMA Measured

GMA Simulated

Montgomery - 6036305 - Layer 5

Groundwater Level Elevation (ft)

Year

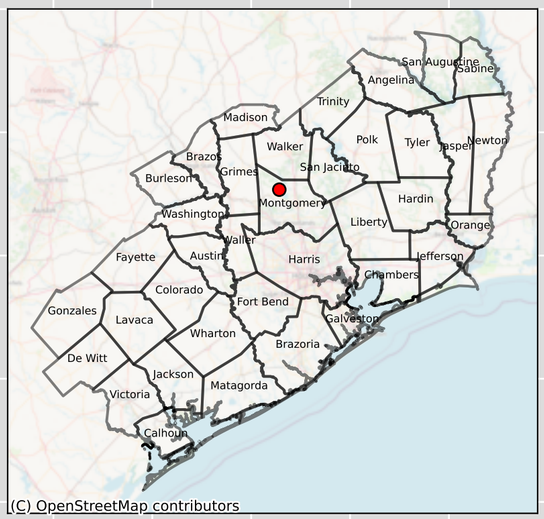


GMA Measured
GMA Simulated
Gulf Measured - 6036305
Gulf Simulated - 6036305

Montgomery - 6036409 - Layer 5

Groundwater Level Elevation (ft)

Year

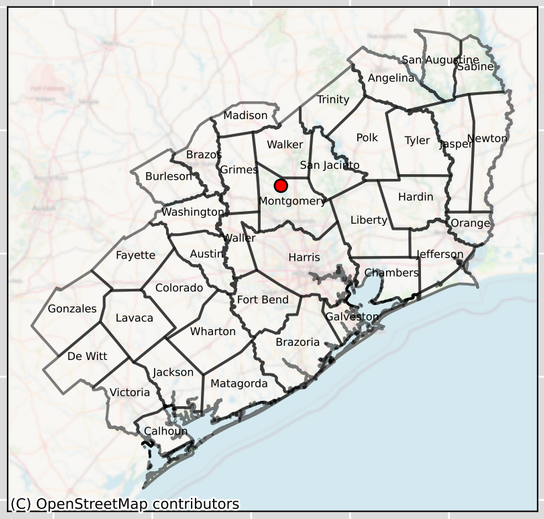


GMA Measured
GMA Simulated
Gulf Measured - 6036409
Gulf Simulated - 6036409

Montgomery - 6036410 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

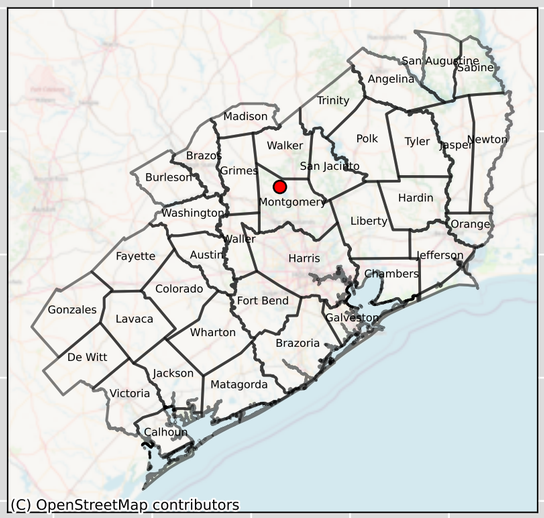
Montgomery - 6036413 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

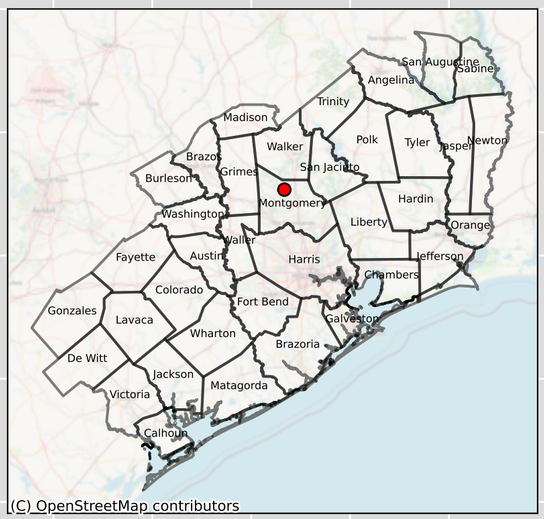


GMA Measured
GMA Simulated

Montgomery - 6036505 & 6036508 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6036505
Gulf Simulated - 6036505

Montgomery - 6036506 - Layer 5

Groundwater Level Elevation (ft)

Year

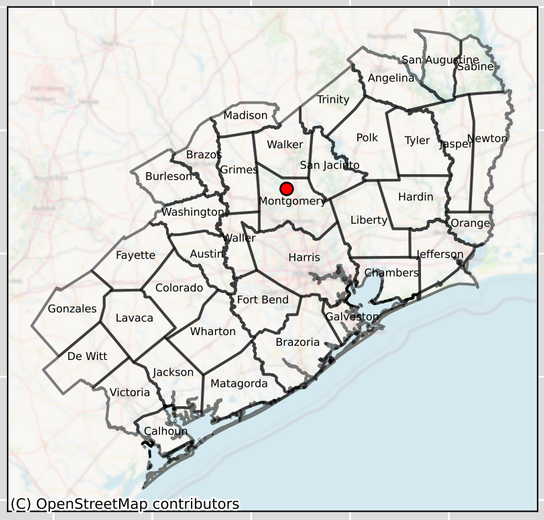
GMA Measured

GMA Simulated

Montgomery - 6036507 & 6036509 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6036612 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

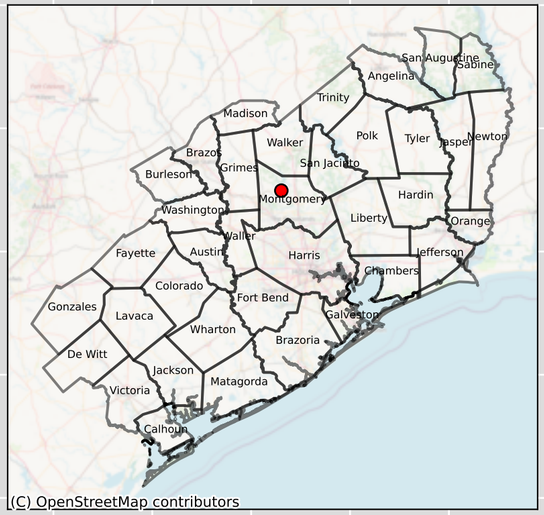
Year

GMA Measured
GMA Simulated

Montgomery - 6036705 - Layer 5

Groundwater Level Elevation (ft)

Year

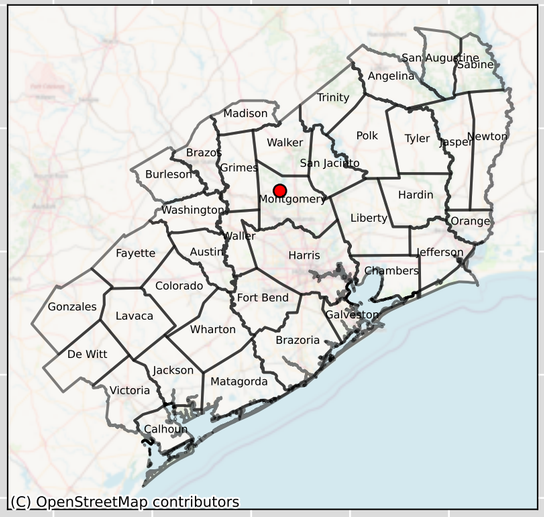


GMA Measured
GMA Simulated
Gulf Measured - 6036705
Gulf Simulated - 6036705

Montgomery - 6036706 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6036709 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

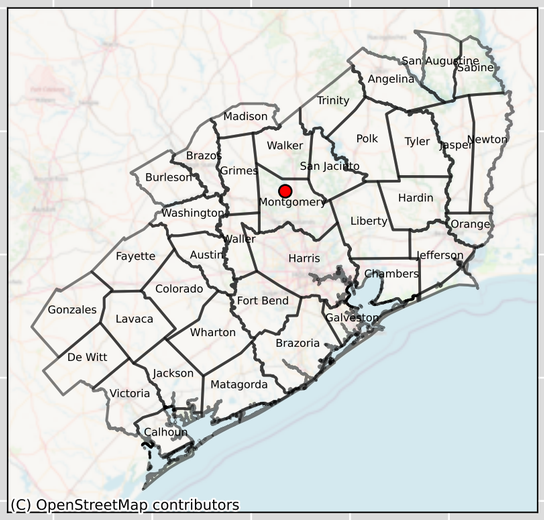
Montgomery - 6036809 & 6036810 & 6036812 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

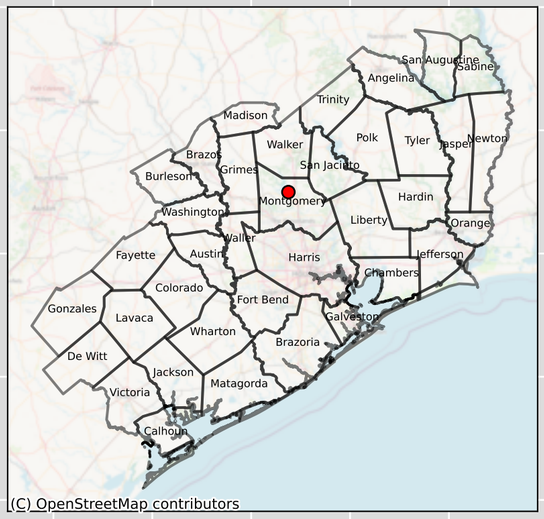


GMA Measured
GMA Simulated

Montgomery - 6036907 - Layer 5

Groundwater Level Elevation (ft)

Year



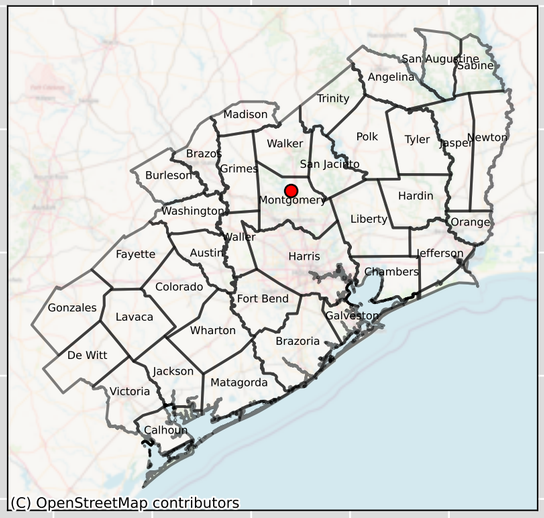
GMA Measured

GMA Simulated

Montgomery - 6036908 - Layer 5

Groundwater Level Elevation (ft)

Year

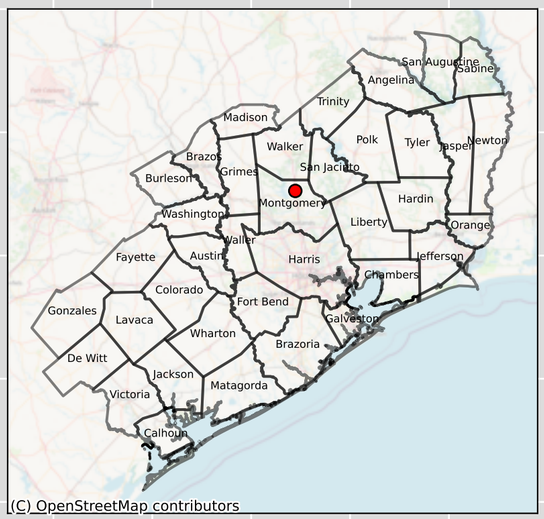


GMA Measured
GMA Simulated
Gulf Measured - 6036908
Gulf Simulated - 6036908

Montgomery - 6037402 & 6037403 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6037402
Gulf Simulated - 6037402

Montgomery - 6037412 - Layer 5

Groundwater Level Elevation (ft)

Year

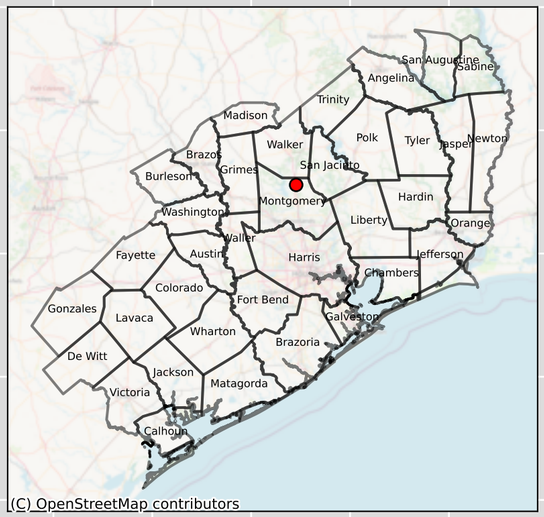
GMA Measured

GMA Simulated

Montgomery - 6037416 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6037416
Gulf Simulated - 6037416

Montgomery - 6037417 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6037417
Gulf Simulated - 6037417

Montgomery - 6037711 & 6037717 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6037711
Gulf Simulated - 6037711

Montgomery - 6037714 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

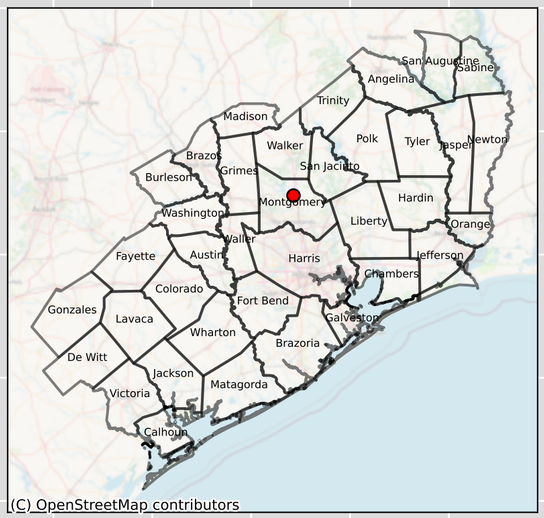
Year

GMA Measured
GMA Simulated

Montgomery - 6037715 - Layer 5

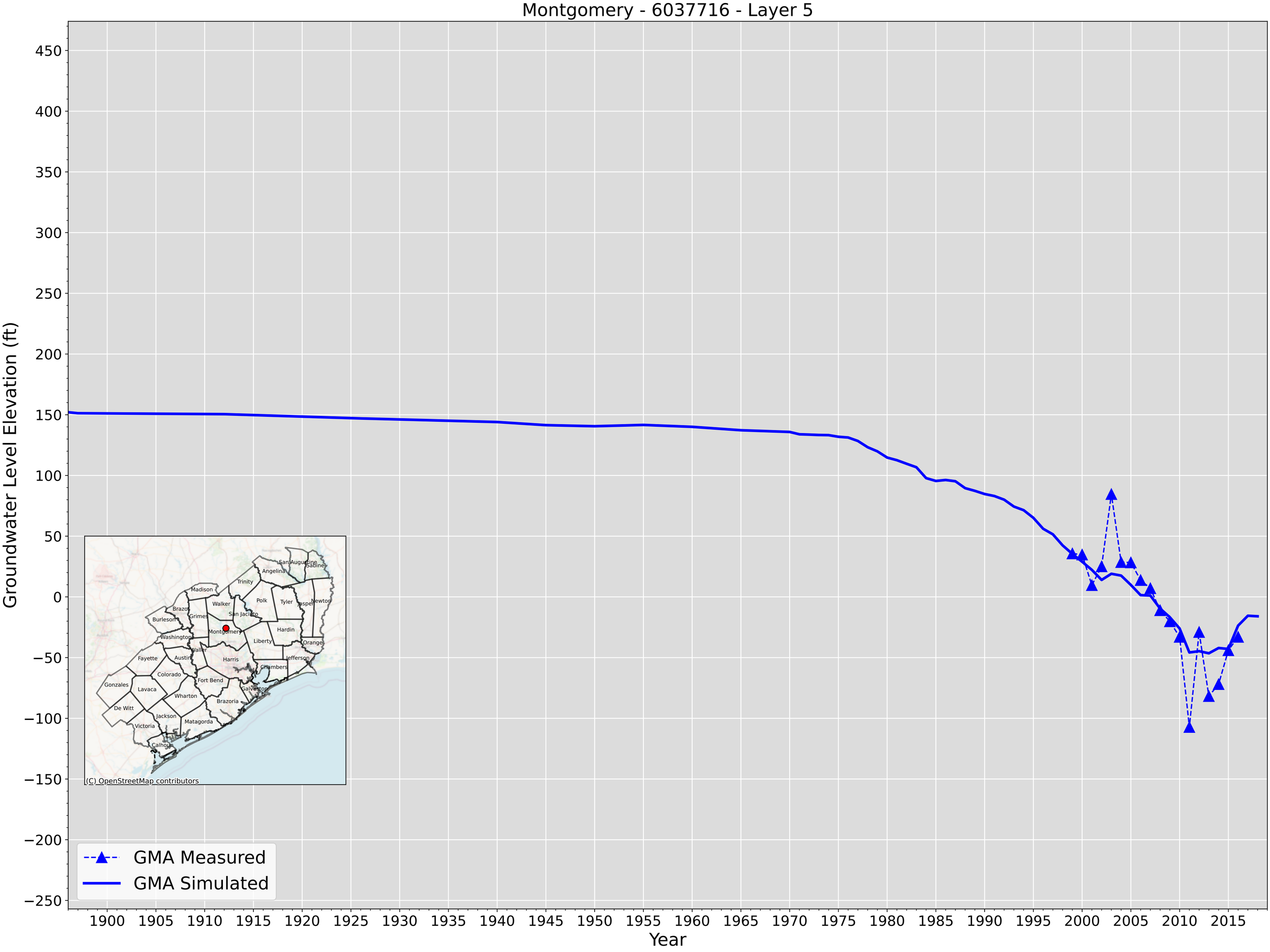
Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated


Montgomery - 6037716 - Layer 5
Groundwater Level Elevation (ft)
Year
GMA Measured
GMA Simulated
(C) OpenStreetMap contributors
Madison
Trinity
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
San Augustine
Sabine
Angelina

Montgomery - 6037805 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6037805
Gulf Simulated - 6037805

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6037910 - Layer 5

Groundwater Level Elevation (ft)

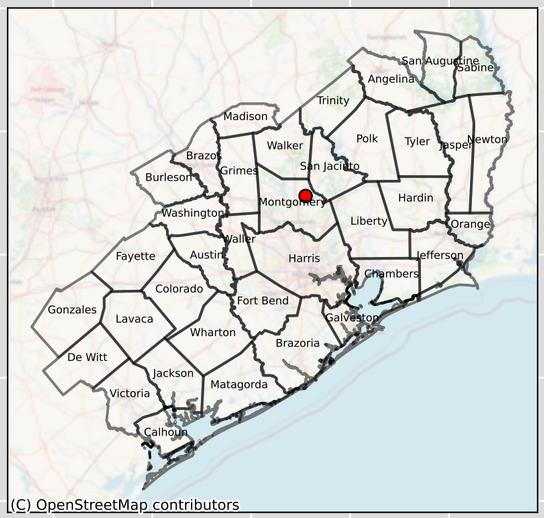
Year

GMA Measured
GMA Simulated
Gulf Measured - 6037910
Gulf Simulated - 6037910

Montgomery - 6037911 - Layer 5

Groundwater Level Elevation (ft)

Year

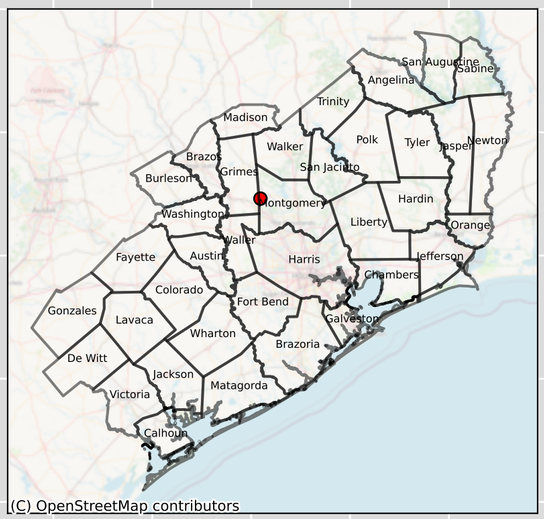


GMA Measured
GMA Simulated
Gulf Measured - 6037911
Gulf Simulated - 6037911

Montgomery - 6042206 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6042206
Gulf Simulated - 6042206

Montgomery - 6043514 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6043514
Gulf Simulated - 6043514

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

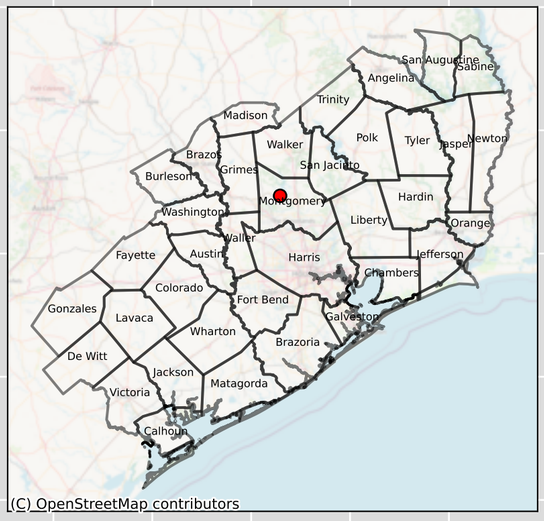
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044115 & 6044125 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6044115
Gulf Simulated - 6044115

Montgomery - 6044122 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6044122
Gulf Simulated - 6044122

Groundwater Level Elevation (ft)

Year

Montgomery - 6044318 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6044318
Gulf Simulated - 6044318

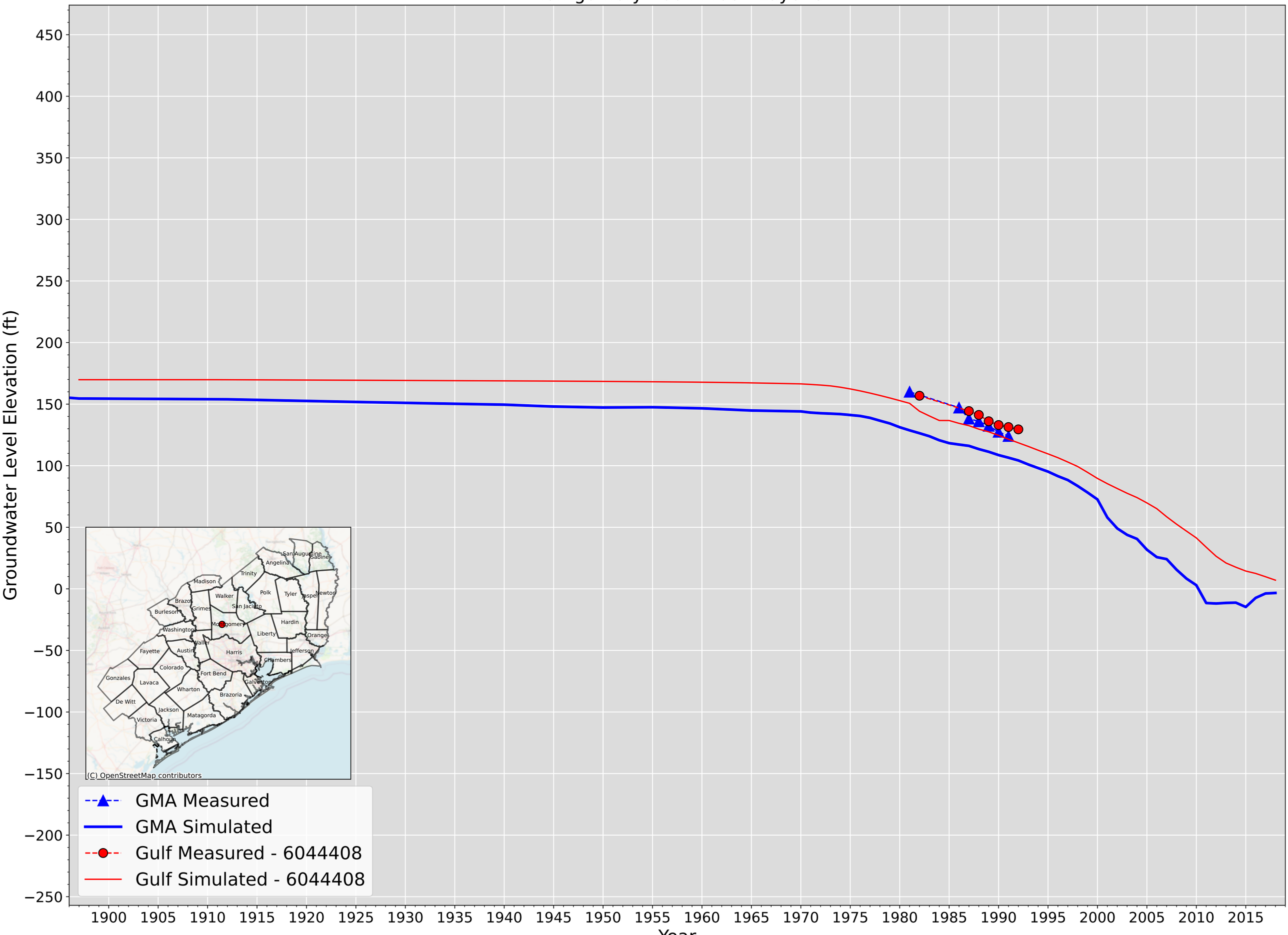
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6044408 - Layer 5



Montgomery - 6045111 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6045111
Gulf Simulated - 6045111

Montgomery - 6045207 - Layer 5

Groundwater Level Elevation (ft)

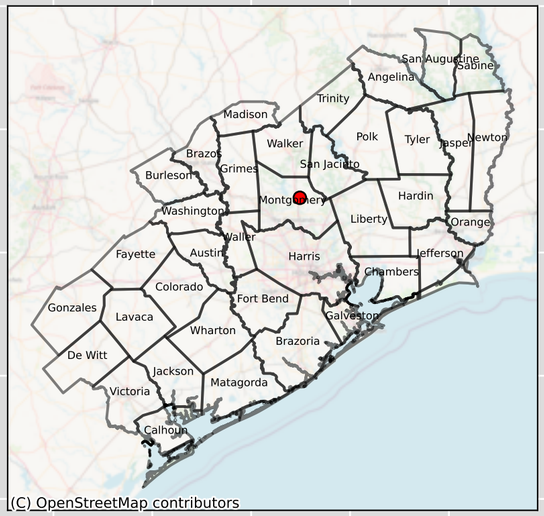
Year

GMA Measured
GMA Simulated
Gulf Measured - 6045207
Gulf Simulated - 6045207

Montgomery - 6045208 - Layer 5

Groundwater Level Elevation (ft)

Year



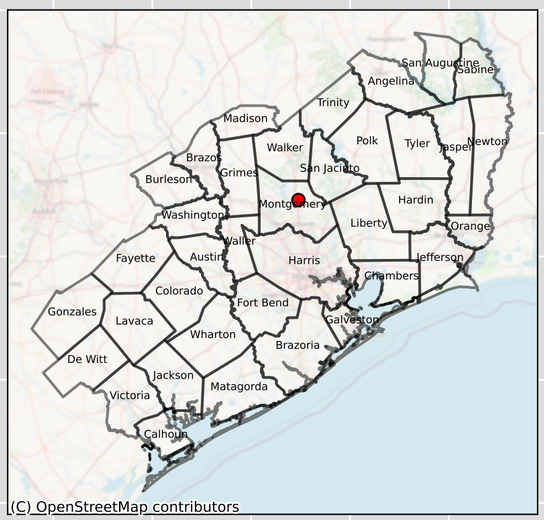
GMA Measured

GMA Simulated

Montgomery - 6045213 - Layer 5

Groundwater Level Elevation (ft)

Year

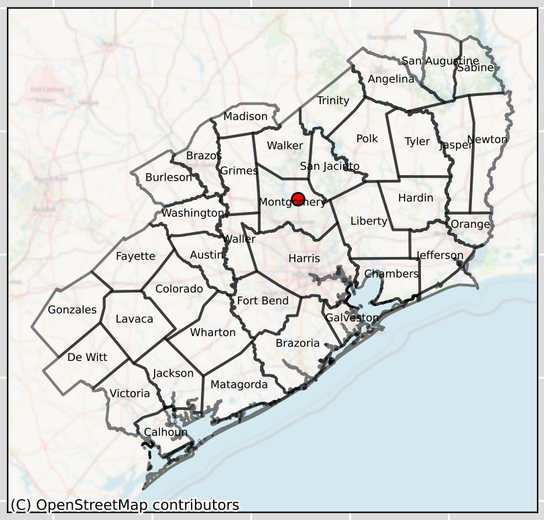


GMA Measured
GMA Simulated
Gulf Measured - 6045213
Gulf Simulated - 6045213

Montgomery - 6045214 - Layer 5

Groundwater Level Elevation (ft)

Year



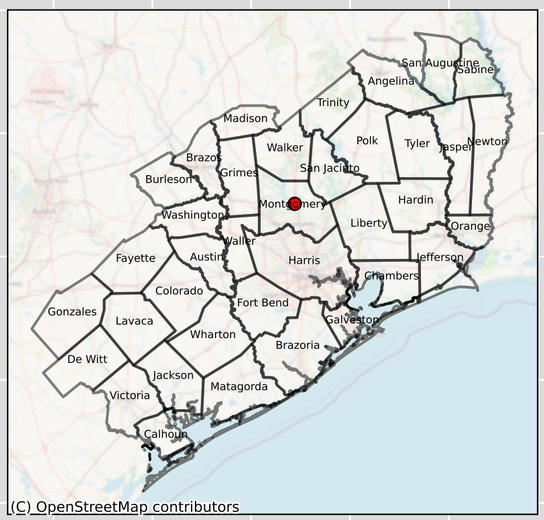
GMA Measured

GMA Simulated

Montgomery - 6045402 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

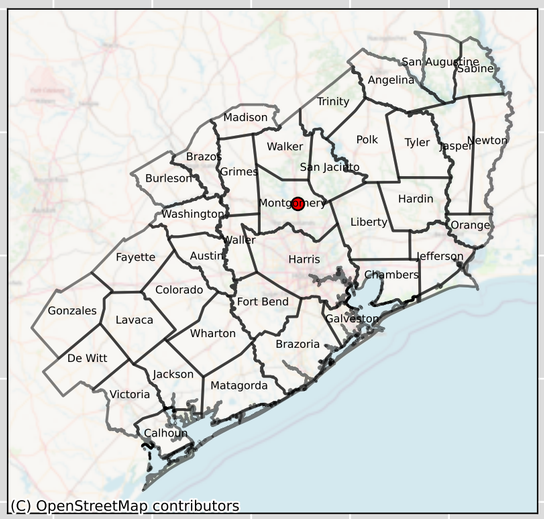
Gulf Measured - 6045402

Gulf Simulated - 6045402

Montgomery - 6045501 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

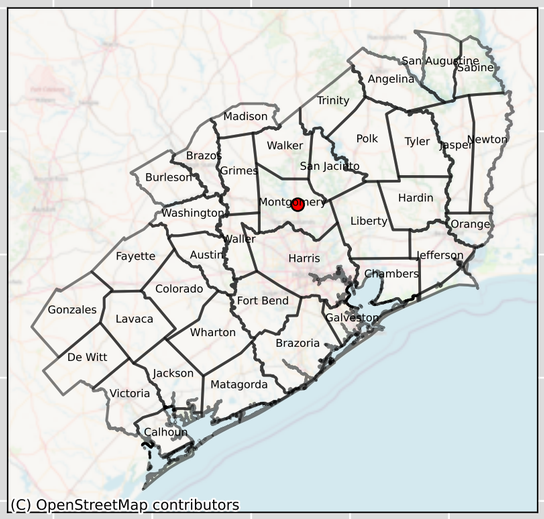
Montgomery - 6045503 & 6045504 & 6045505 & 6045507 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

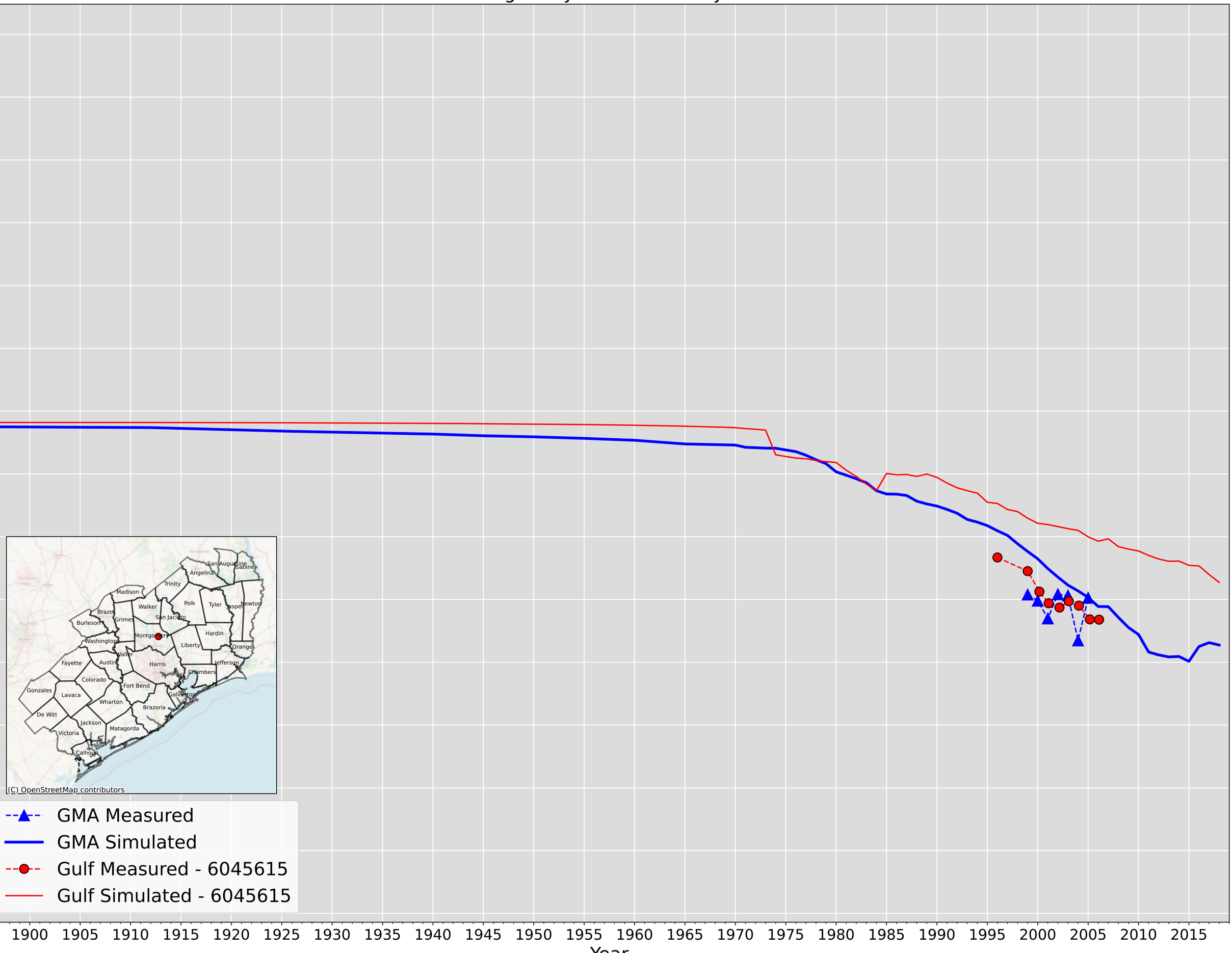
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Montgomery - 6045615 - Layer 5



Montgomery - 6045616 - Layer 5

Groundwater Level Elevation (ft)

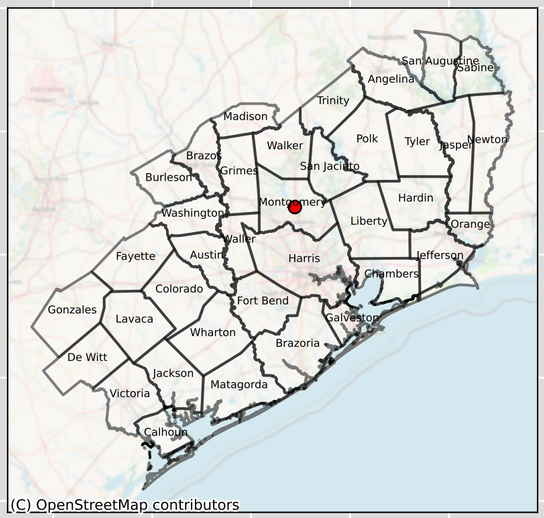
Year

GMA Measured
GMA Simulated
Gulf Measured - 6045616
Gulf Simulated - 6045616

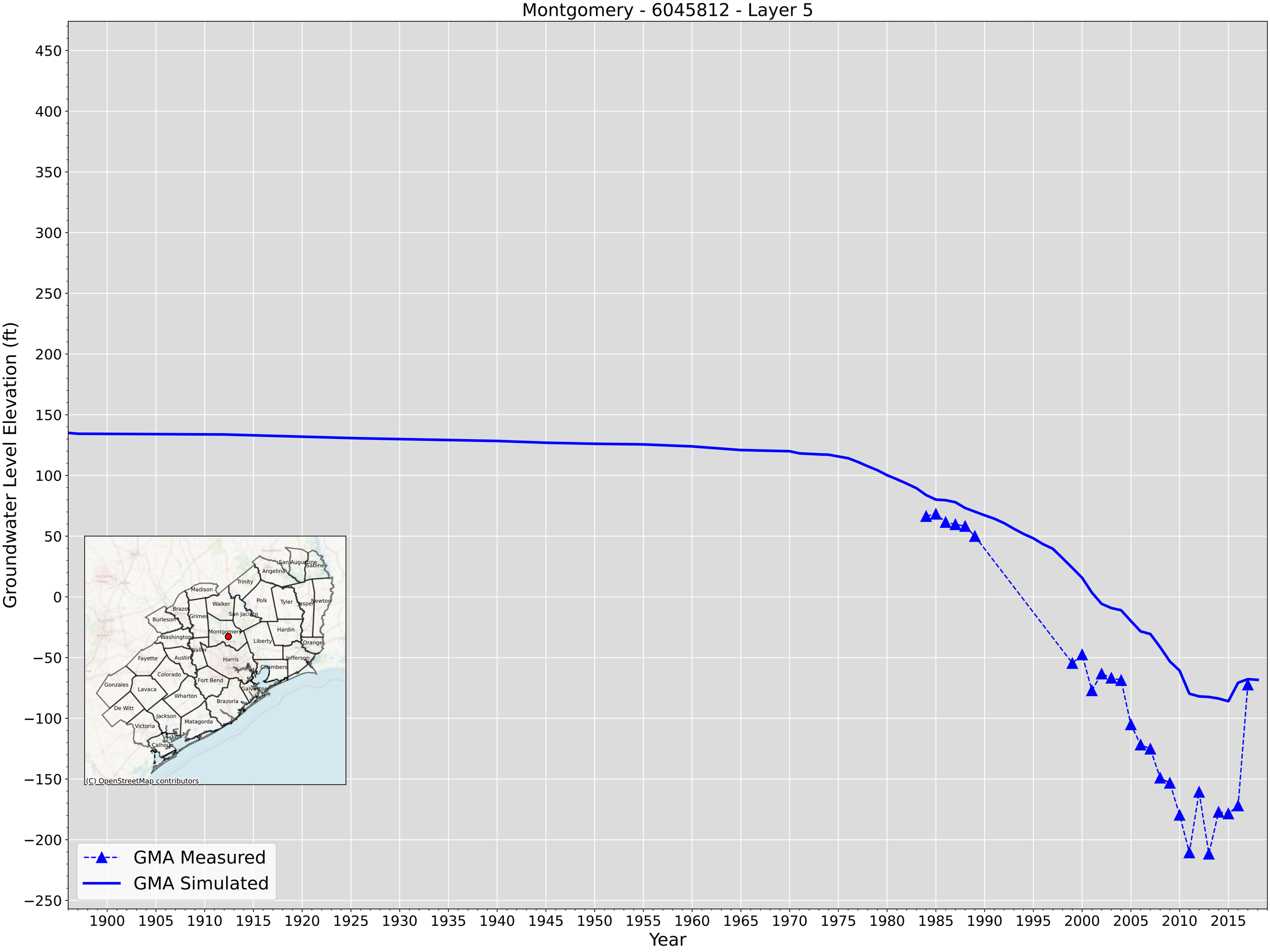
Montgomery - 6045712 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6045712
Gulf Simulated - 6045712


Montgomery - 6045812 - Layer 5
Groundwater Level Elevation (ft)
Year
GMA Measured
GMA Simulated
(C) OpenStreetMap contributors
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun

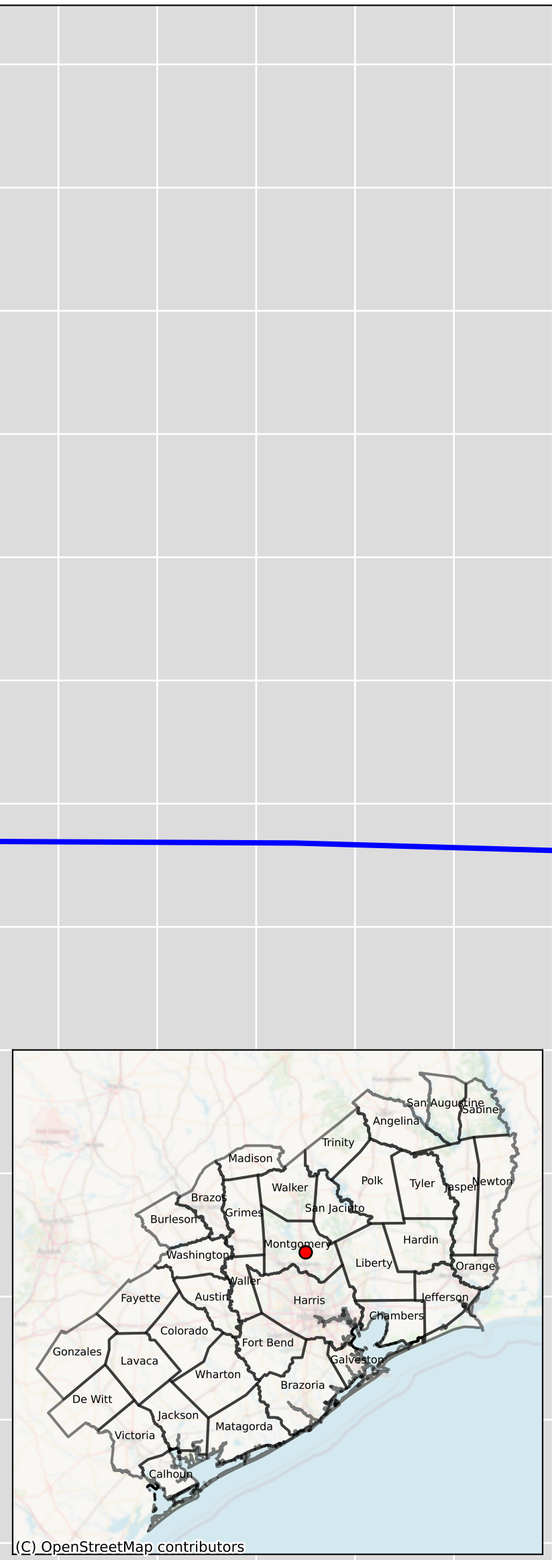
Montgomery - 6045813 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6045813
Gulf Simulated - 6045813

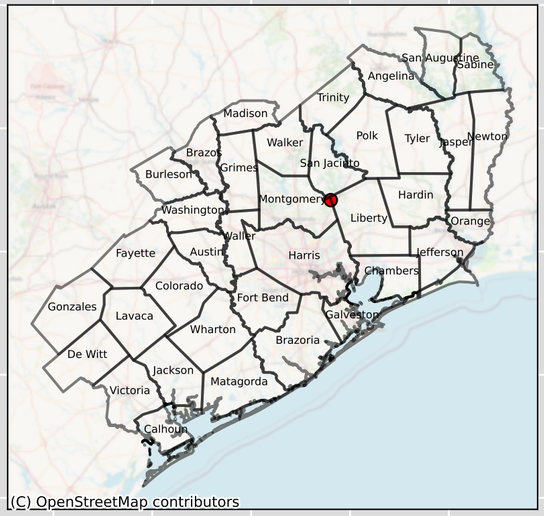
Montgomery - 6045814 - Layer 5



Montgomery - 6047602 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

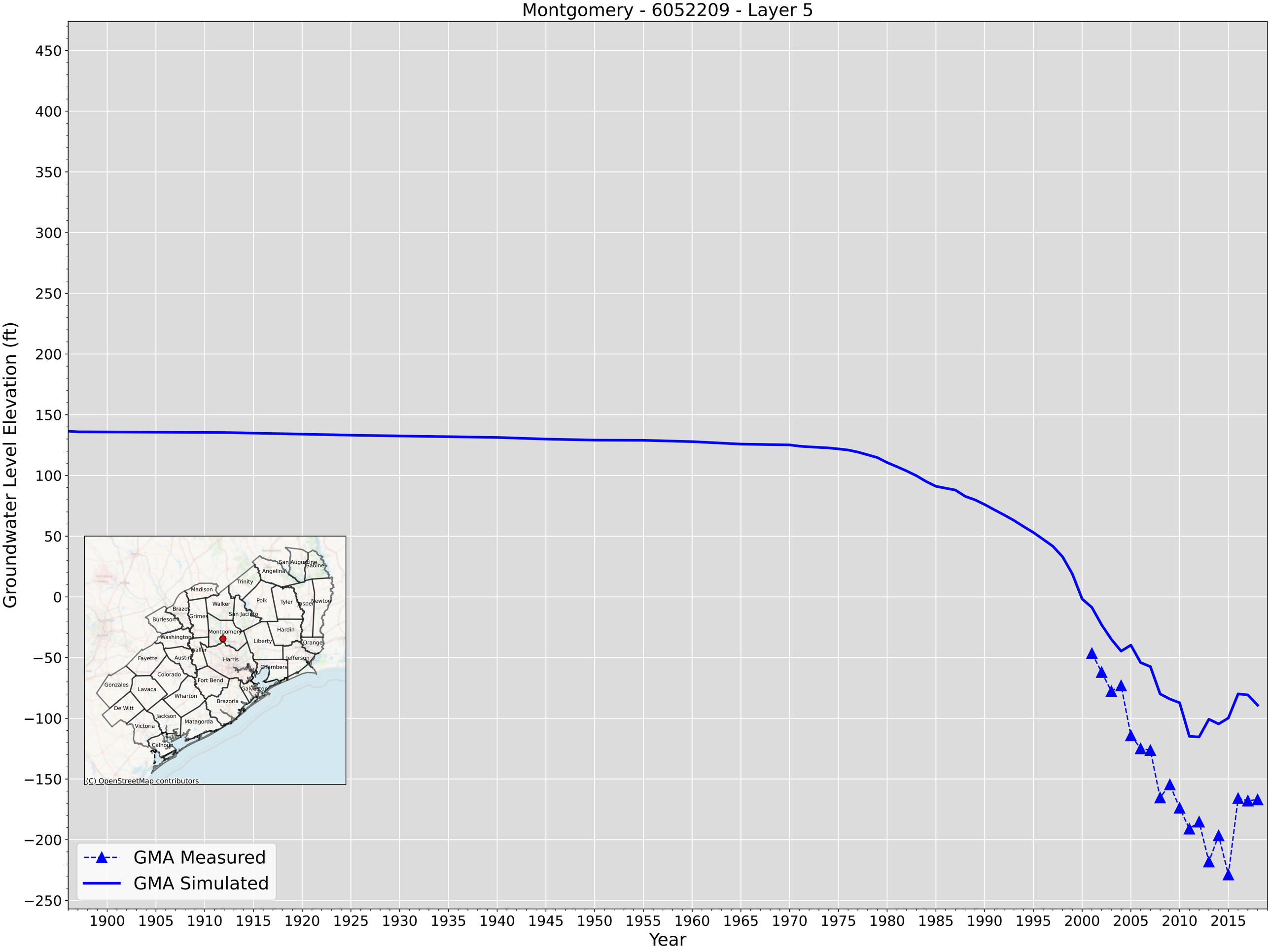
GMA Simulated

Montgomery - 6051815 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6051815
Gulf Simulated - 6051815


Montgomery - 6052209 - Layer 5
Groundwater Level Elevation (ft)
Year
GMA Measured
GMA Simulated
(C) OpenStreetMap contributors
Madison
Trinity
Angelina
San Augustine
Sabine
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Harris
Jefferson
Chambers
Fayette
Austin
Colorado
Fort Bend
Gonzales
Lavaca
Wharton
Galveston
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun

Montgomery - 6052306 - Layer 5

Groundwater Level Elevation (ft)

Year

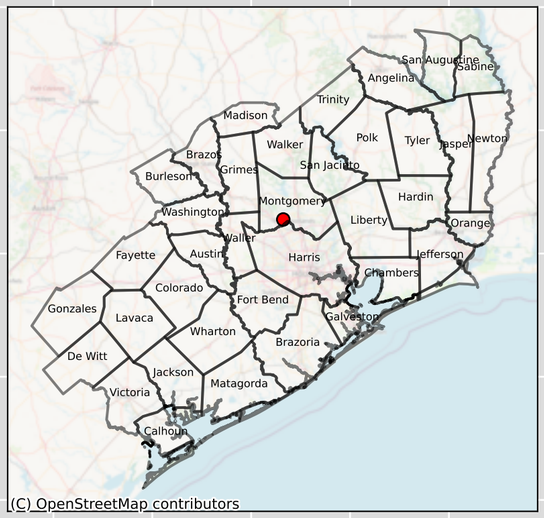
GMA Measured

GMA Simulated

Montgomery - 6052409 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6052409
Gulf Simulated - 6052409

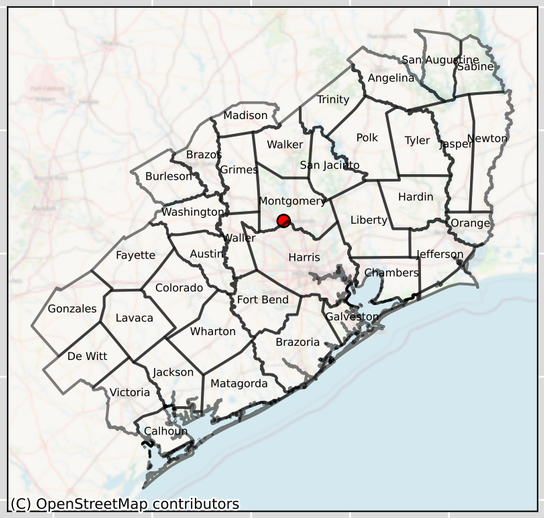
Montgomery - 6052411 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Montgomery - 6052501 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6052501
Gulf Simulated - 6052501

Groundwater Level Elevation (ft)

450 400 350 300 250 200 150 100 50 0 −50 −100 −150 −200 −250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Montgomery - 6052603 & 6052606 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Montgomery - 6052604 - Layer 5

Groundwater Level Elevation (ft)

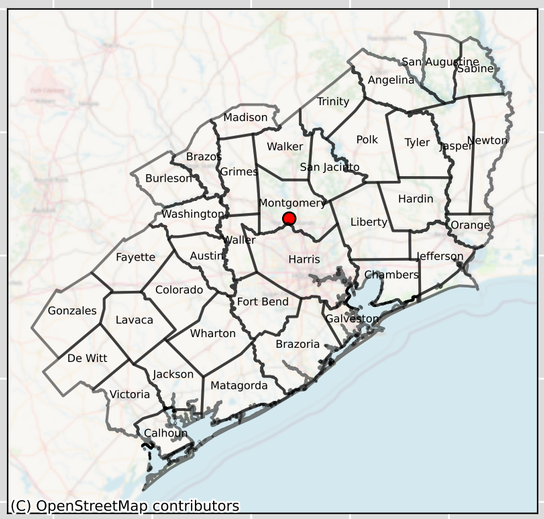
Year

GMA Measured
GMA Simulated
Gulf Measured - 6052604
Gulf Simulated - 6052604

Montgomery - 6052608 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

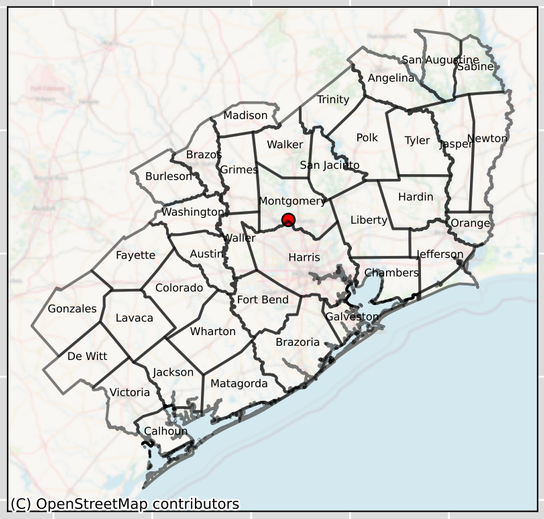
Montgomery - 6052612 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

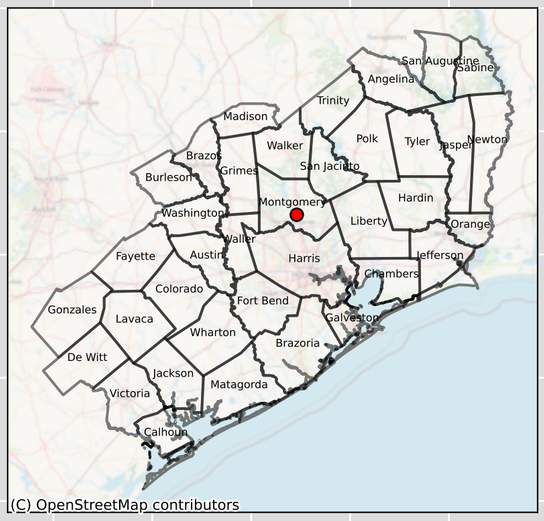
GMA Simulated



Montgomery - 6053111 - Layer 5

Groundwater Level Elevation (ft)

Year



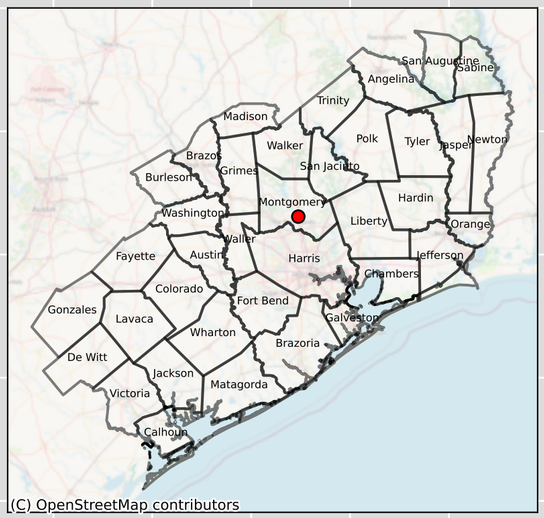
GMA Measured

GMA Simulated

Montgomery - 6053217 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6053217
Gulf Simulated - 6053217

Montgomery - 6053406 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053406
Gulf Simulated - 6053406

Montgomery - 6053408 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Gulf Measured - 6053408

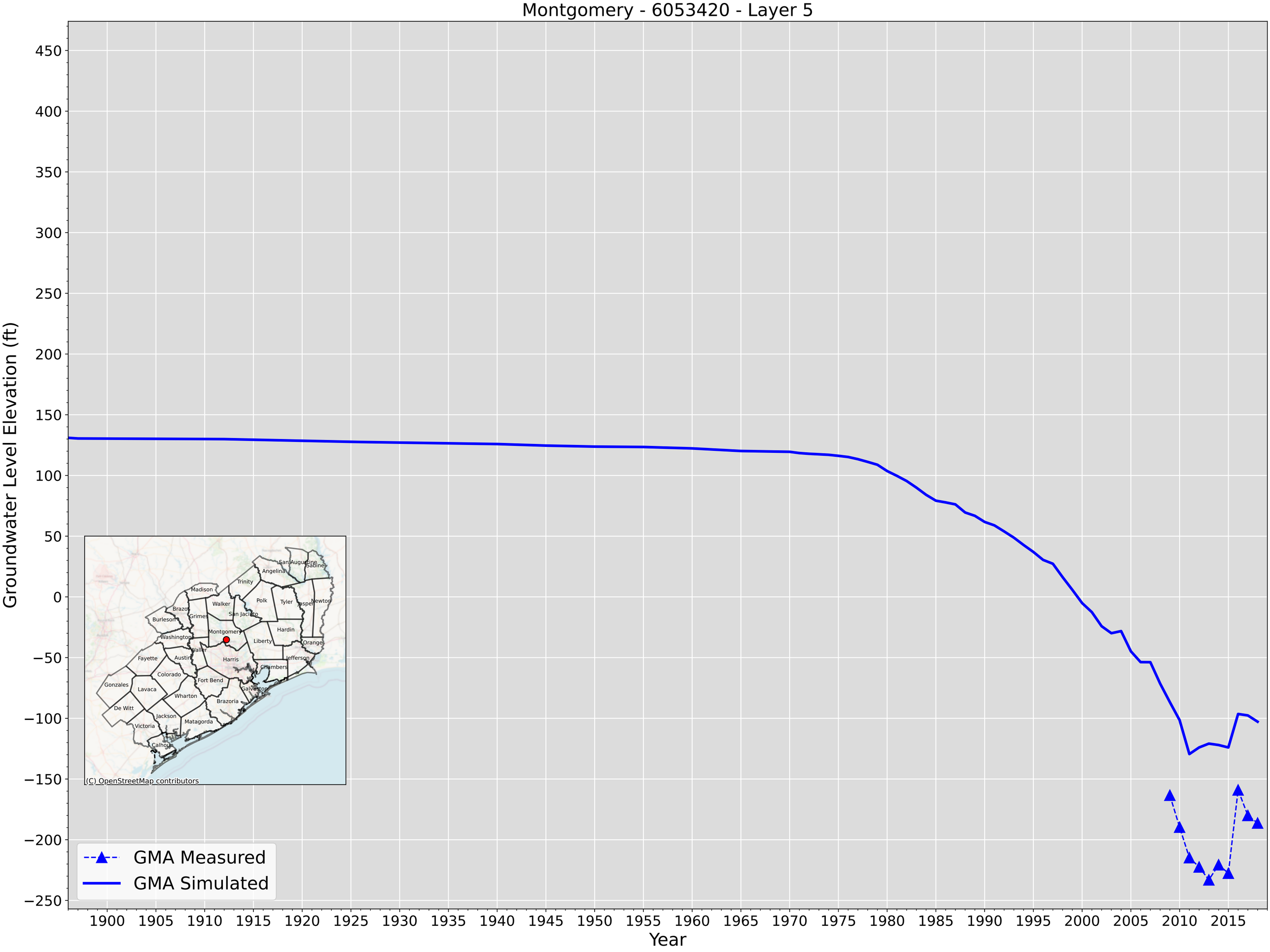
Gulf Simulated - 6053408

Montgomery - 6053418 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6053418
Gulf Simulated - 6053418


Montgomery - 6053420 - Layer 5
Groundwater Level Elevation (ft)
Year
GMA Measured
GMA Simulated
(C) OpenStreetMap contributors
San Augustine
Sabine
Angelina
Trinity
Madison
Polk
Tyler
Jasper
Newton
Walker
Brazos
Grimes
San Jacinto
Burleson
Washington
Montgomery
Hardin
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun

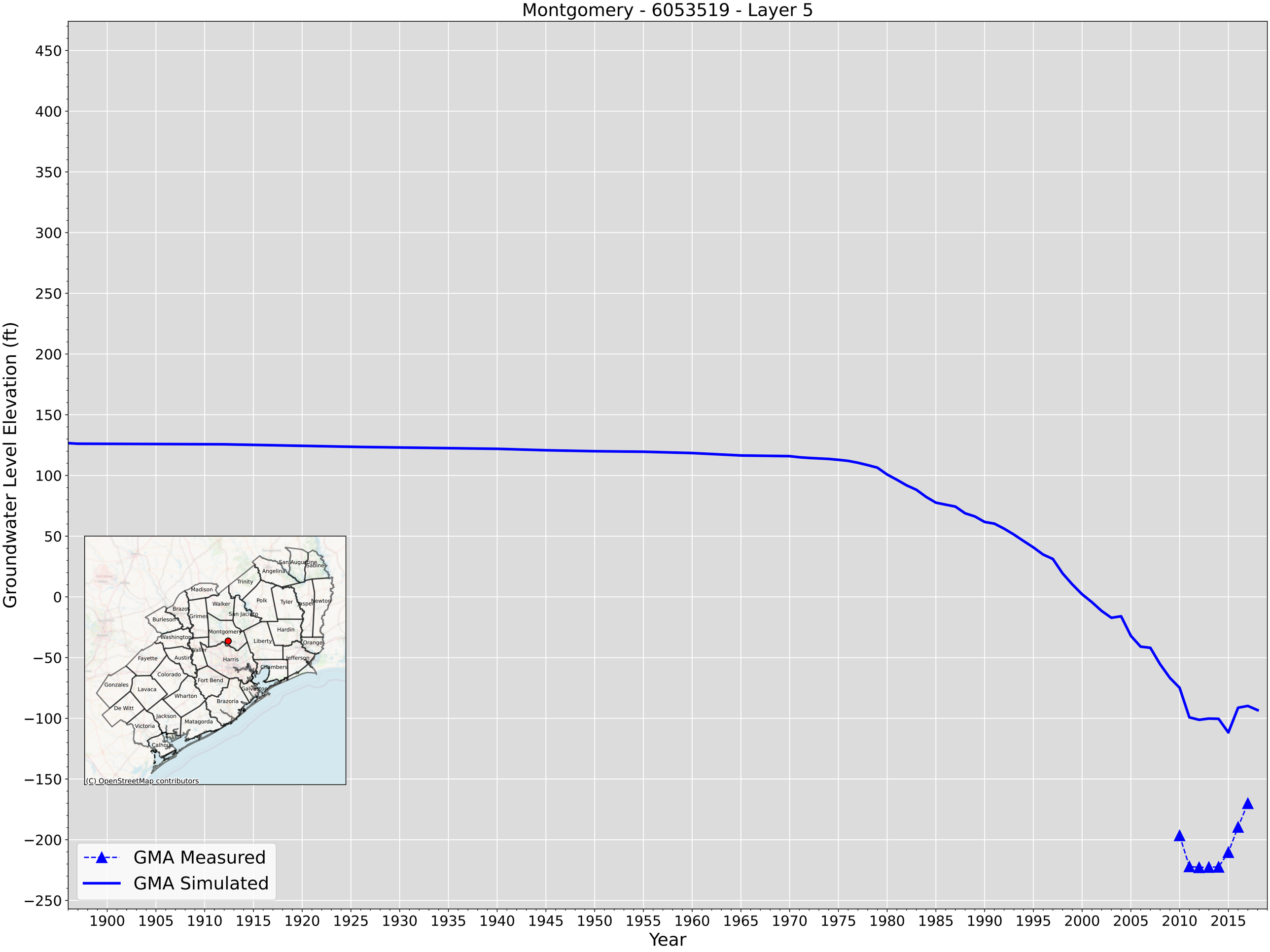
Montgomery - 6053422 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated


Montgomery - 6053519 - Layer 5
Groundwater Level Elevation (ft)
Year
GMA Measured
GMA Simulated
(C) OpenStreetMap contributors
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun

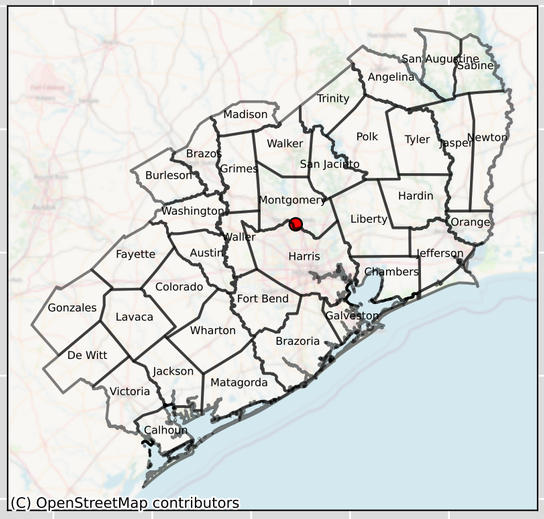
Montgomery - 6053712 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

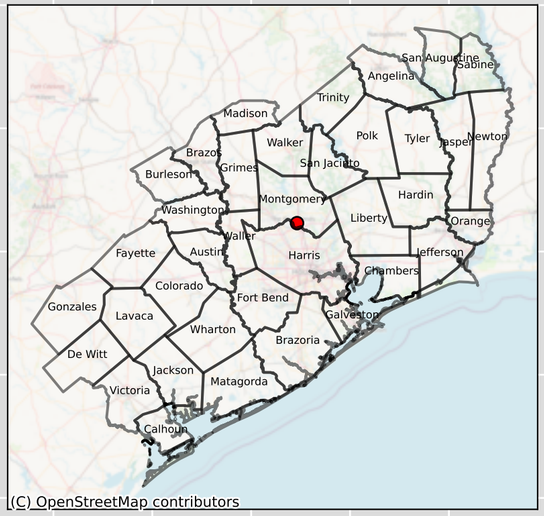
GMA Simulated



Montgomery - 6053713 - Layer 5

Groundwater Level Elevation (ft)

Year

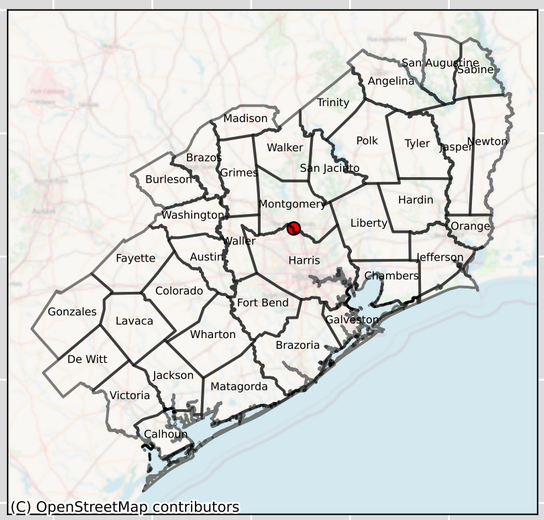


GMA Measured
GMA Simulated
Gulf Measured - 6053713
Gulf Simulated - 6053713

Montgomery - 6053722 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6053726 - Layer 5

Groundwater Level Elevation (ft)

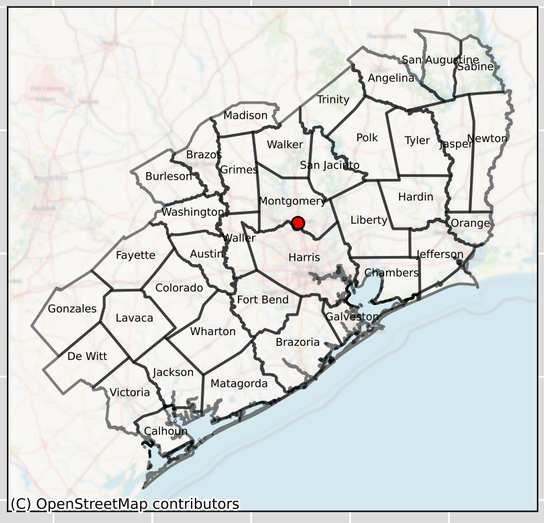
Year

GMA Measured
GMA Simulated
Gulf Measured - 6053726
Gulf Simulated - 6053726

Montgomery - 6053829 - Layer 5

Groundwater Level Elevation (ft)

Year

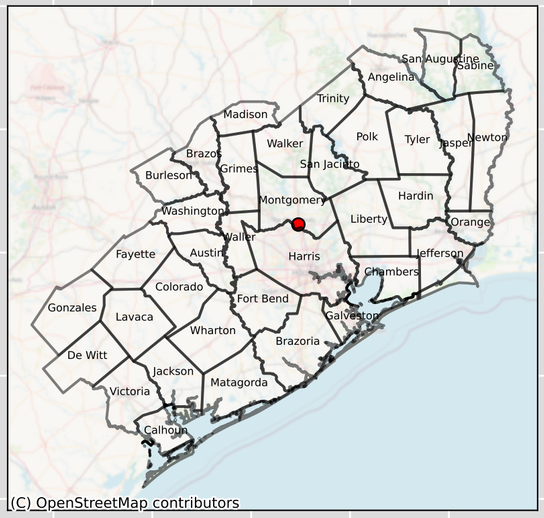


GMA Measured
GMA Simulated
Gulf Measured - 6053829
Gulf Simulated - 6053829

Montgomery - 6053832 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

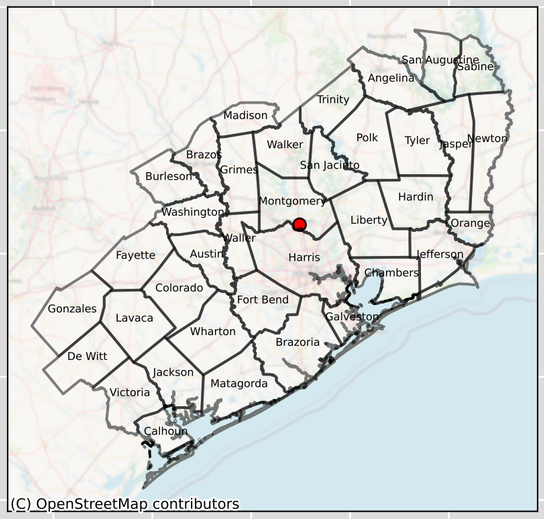
Montgomery - 6053834 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

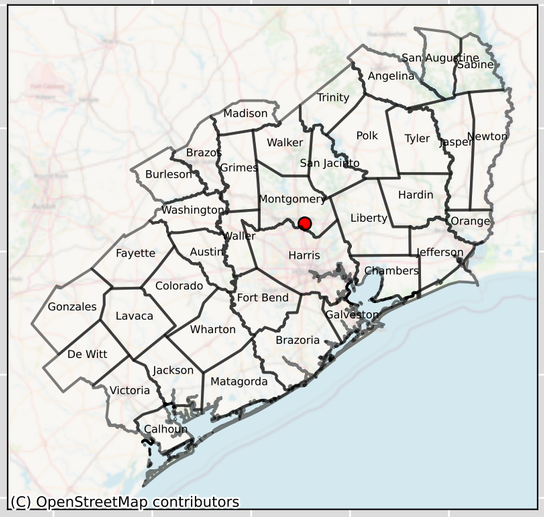
GMA Simulated



Montgomery - 6053905 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Montgomery - 6054613 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6054613
Gulf Simulated - 6054613

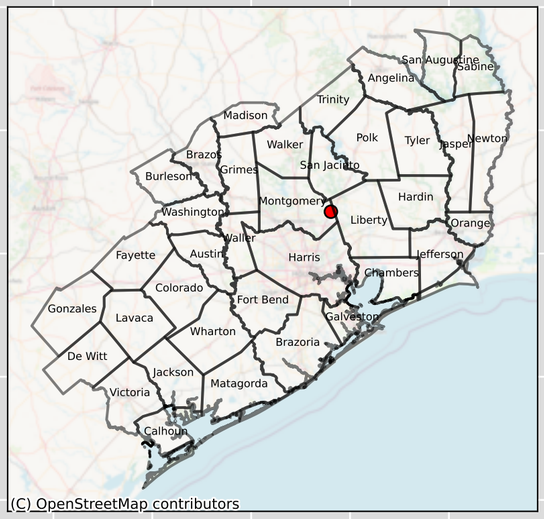
Montgomery - 6055313 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

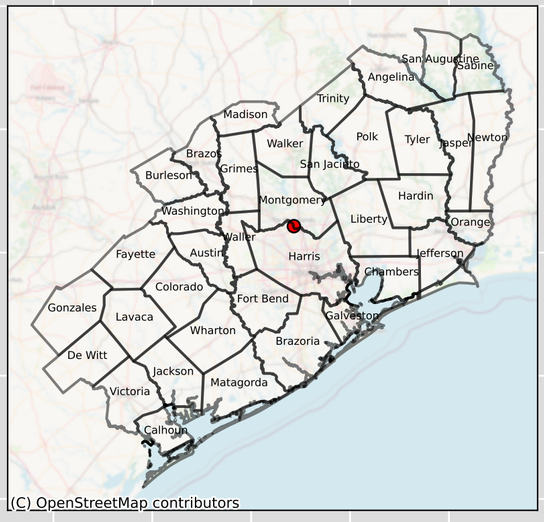
GMA Simulated



Montgomery - 6061104 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6061104
Gulf Simulated - 6061104

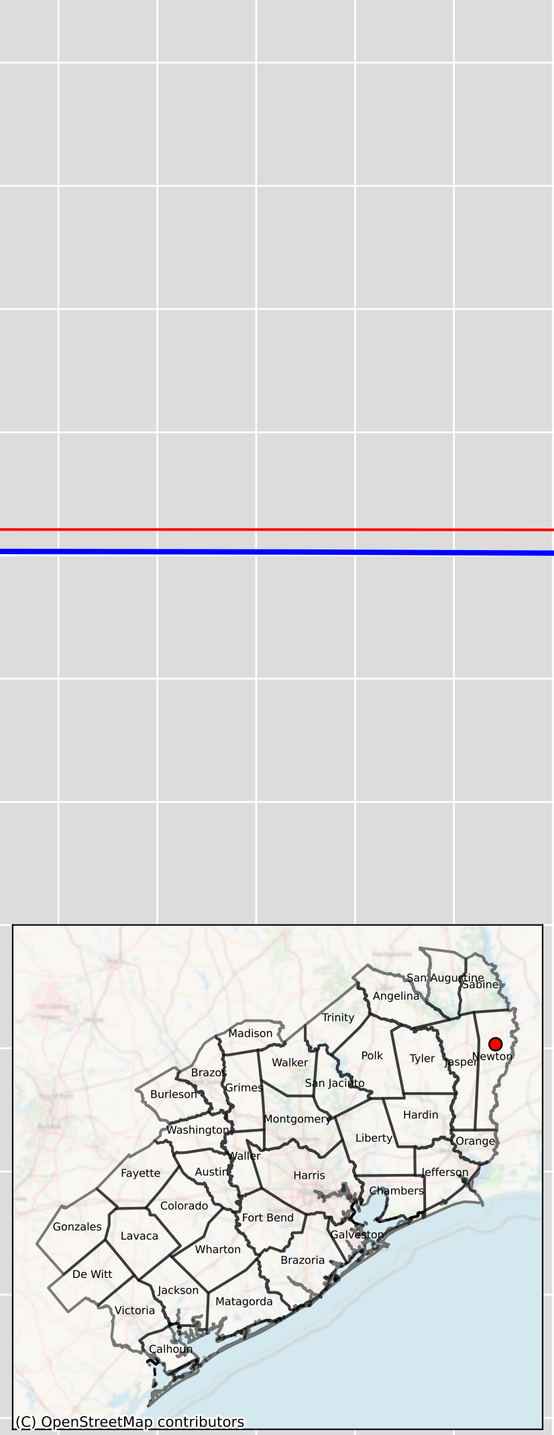
Newton - 6203704 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

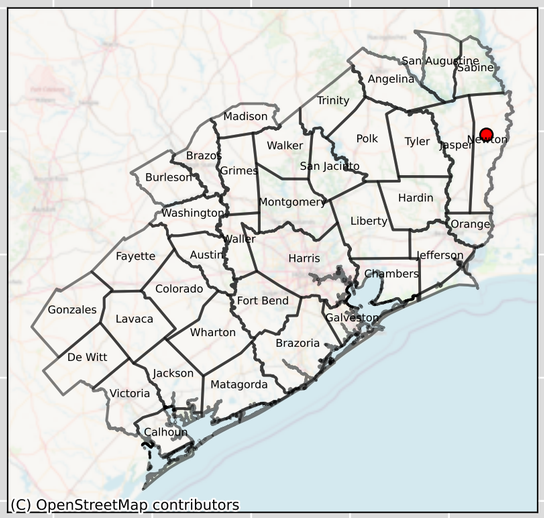


GMA Measured
GMA Simulated
Gulf Measured - 6203704
Gulf Simulated - 6203704

Newton - 6210309 & 6210302 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6210309
Gulf Simulated - 6210309

Polk - 6016902 - Layer 5

Groundwater Level Elevation (ft)

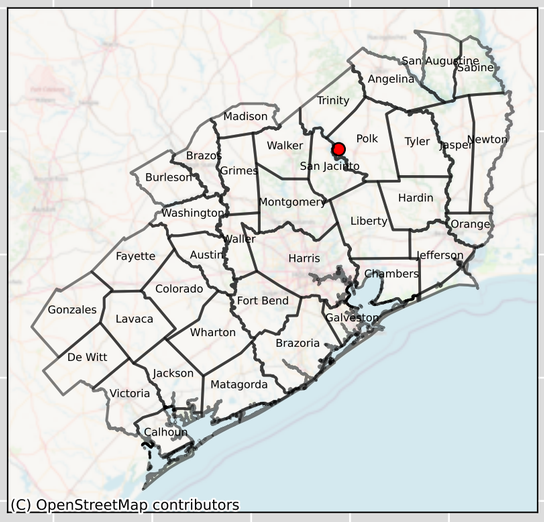
Year

GMA Measured
GMA Simulated
Gulf Measured - 6016902
Gulf Simulated - 6016902

Polk - 6024109 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

Polk - 6109901 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Polk - 6110402 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Polk - 6117219 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6117219
Gulf Simulated - 6117219

Polk - 6117302 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

San Jacinto - 6015803 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6015803
Gulf Simulated - 6015803

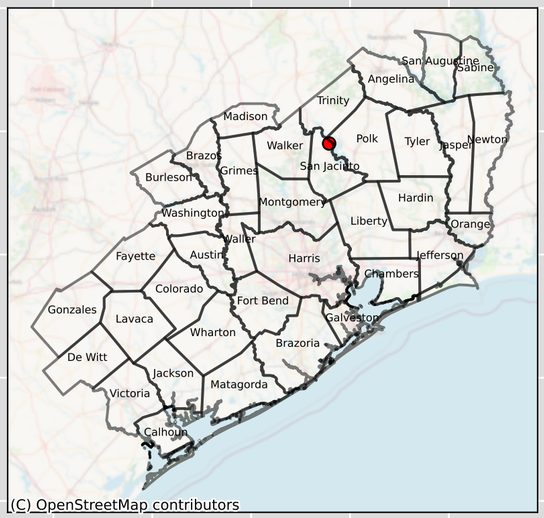
San Jacinto - 6015810 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6015810
Gulf Simulated - 6015810

San Jacinto - 6022213 - Layer 5

GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

450 400 350 300 250 200 150 100 50 0 −50 −100 −150 −200 −250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

San Jacinto - 6022215 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6022215
Gulf Simulated - 6022215

San Jacinto - 6023704 - Layer 5

GMA Measured

GMA Simulated

Groundwater Level Elevation (ft)

450 400 350 300 250 200 150 100 50 0 −50 −100 −150 −200 −250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

San Jacinto - 6023904 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

San Jacinto - 6031317 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6031317
Gulf Simulated - 6031317

San Jacinto - 6031320 - Layer 5

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

Tyler - 6112606 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

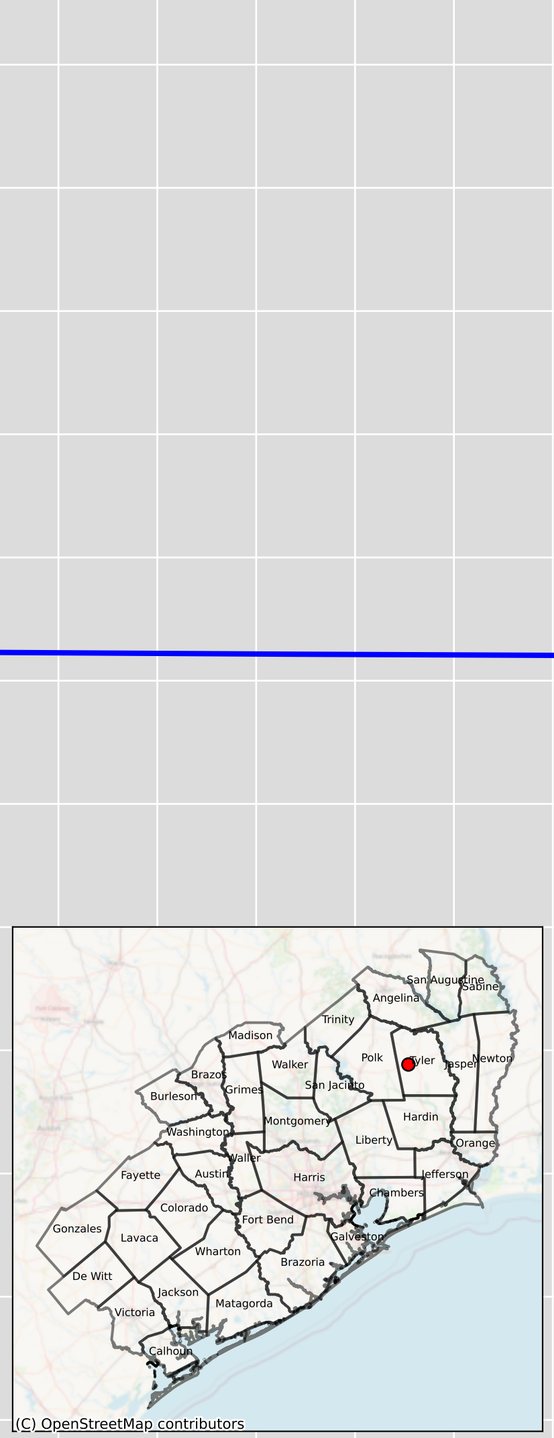
Tyler - 6112902 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Tyler - 6113802 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6113802
Gulf Simulated - 6113802

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Tyler - 6113804 - Layer 5

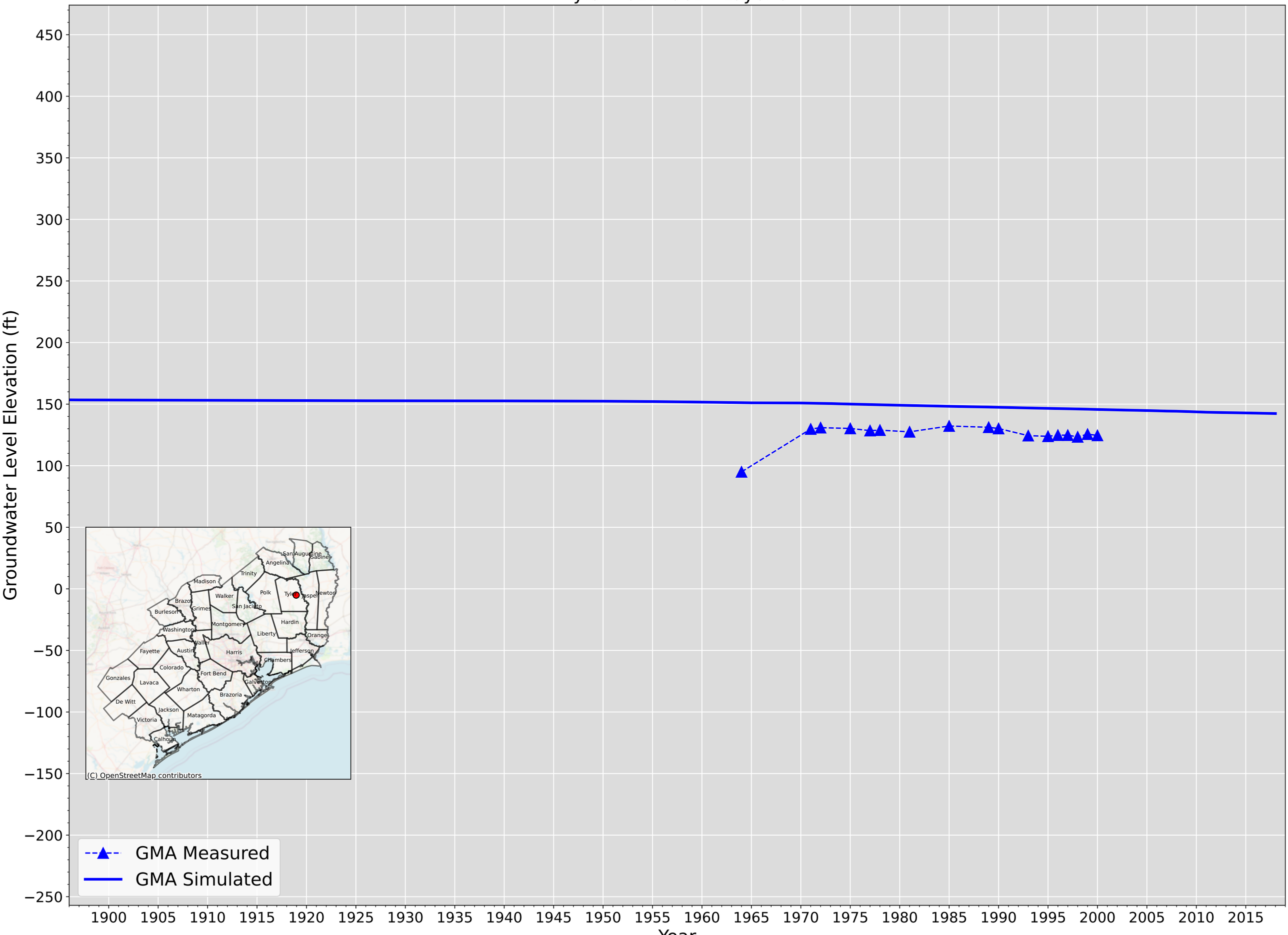
Groundwater Level Elevation (ft)

Year

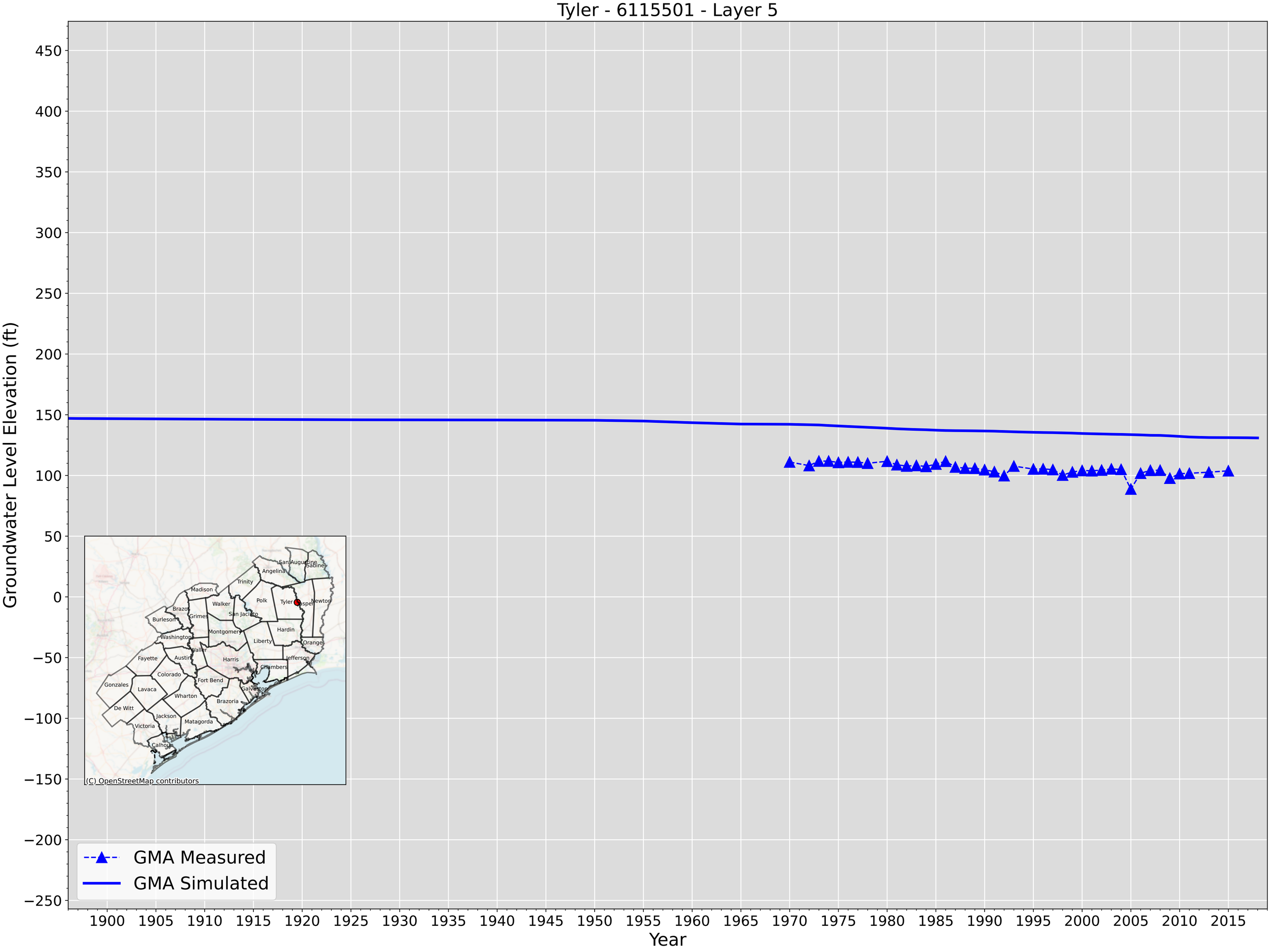
GMA Measured

GMA Simulated

Tyler - 6114902 - Layer 5



Tyler - 6115501 - Layer 5



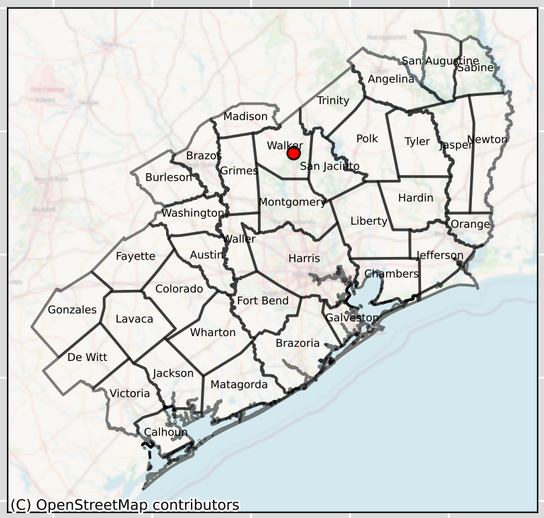
Walker - 6021103 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

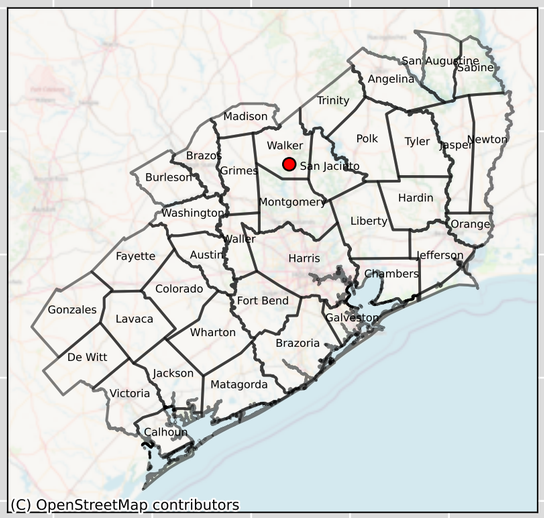
Walker - 6028301 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Walker - 6028802 & 6028803 - Layer 5

GMA Measured
GMA Simulated
Gulf Measured - 6028802
Gulf Simulated - 6028802

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

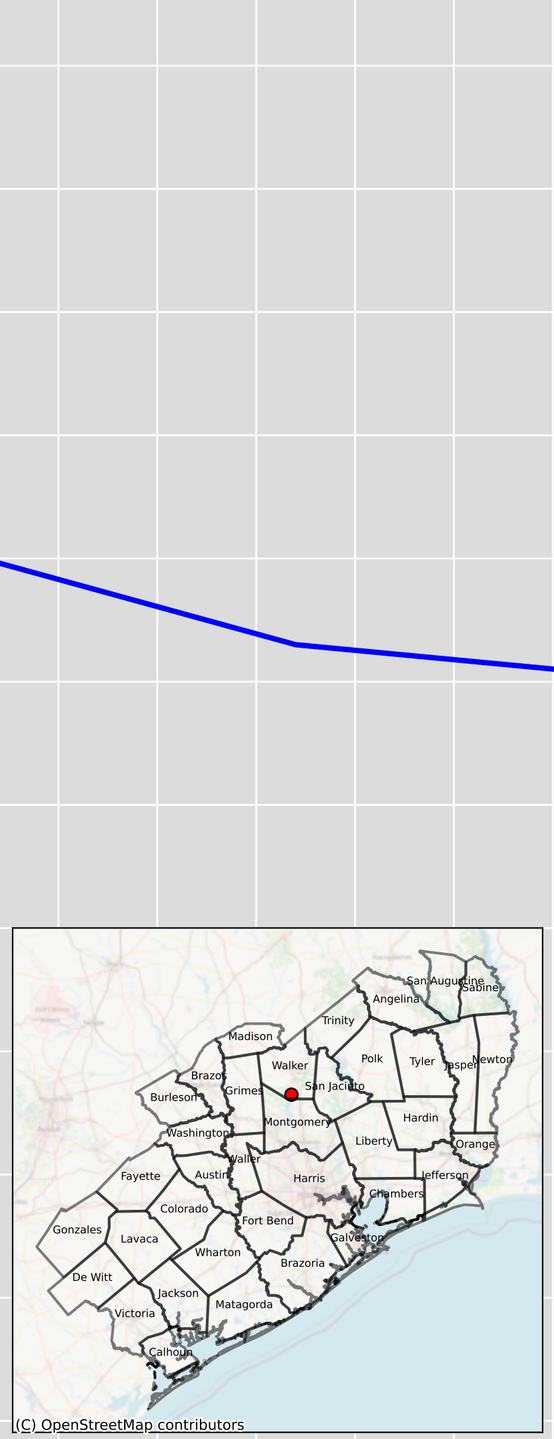
Walker - 6028805 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

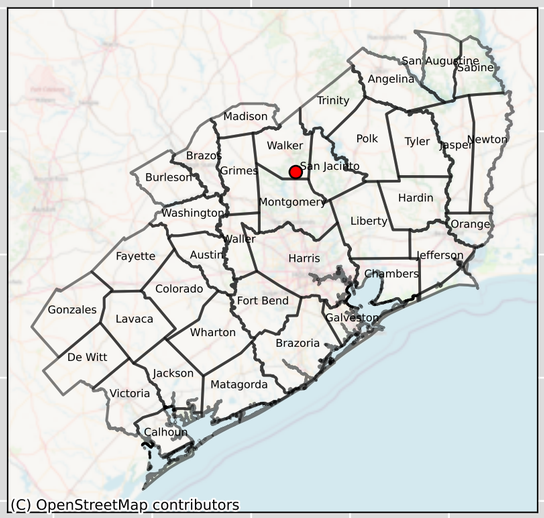
Walker - 6029403 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Walker - 6029707 & 6029704 - Layer 5

Groundwater Level Elevation (ft)

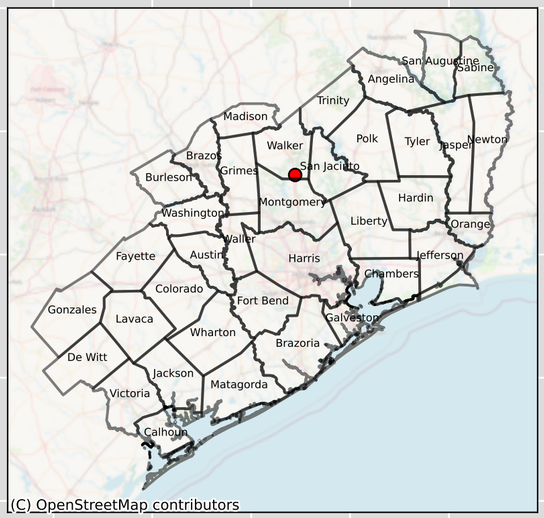
Year

GMA Measured
GMA Simulated
Gulf Measured - 6029707
Gulf Simulated - 6029707

Walker - 6029708 - Layer 5

Groundwater Level Elevation (ft)

Year



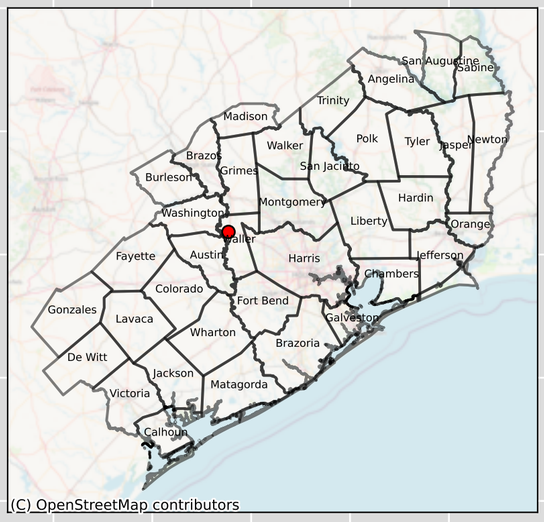
GMA Measured

GMA Simulated

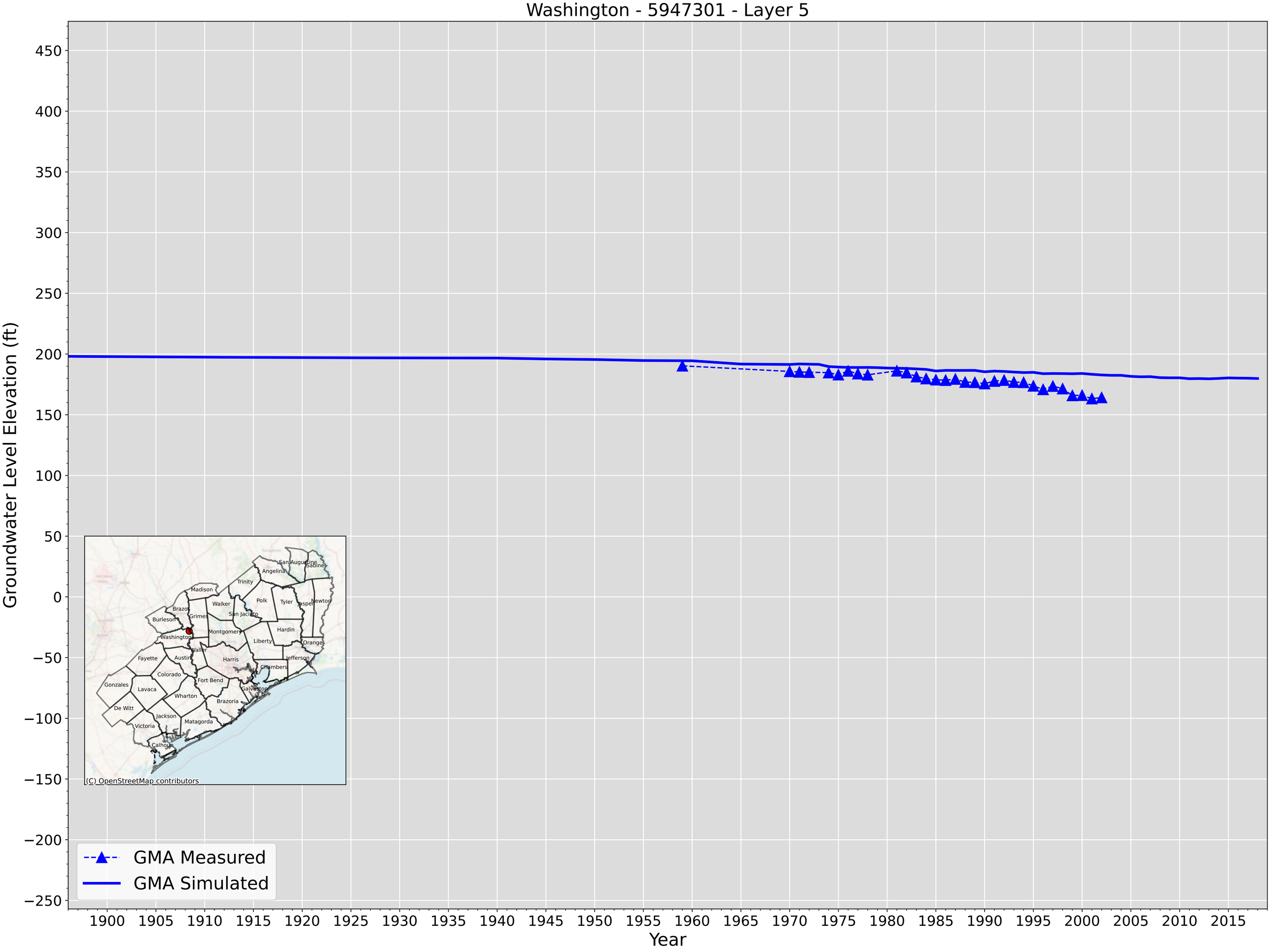
Waller - 5964206 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 5964206
Gulf Simulated - 5964206


Washington - 5947301 - Layer 5
Groundwater Level Elevation (ft)
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

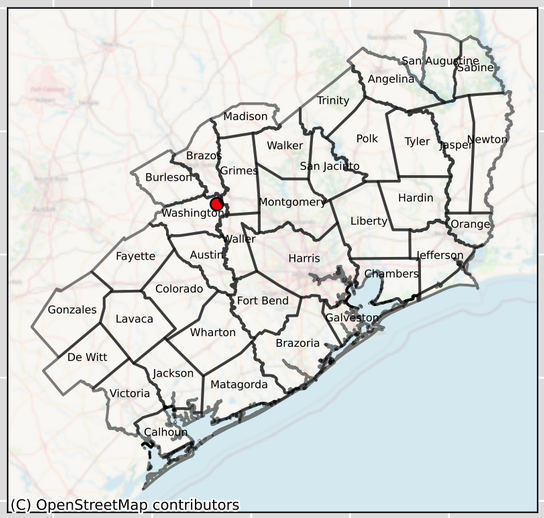
Washington - 5947505 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 5947505
Gulf Simulated - 5947505

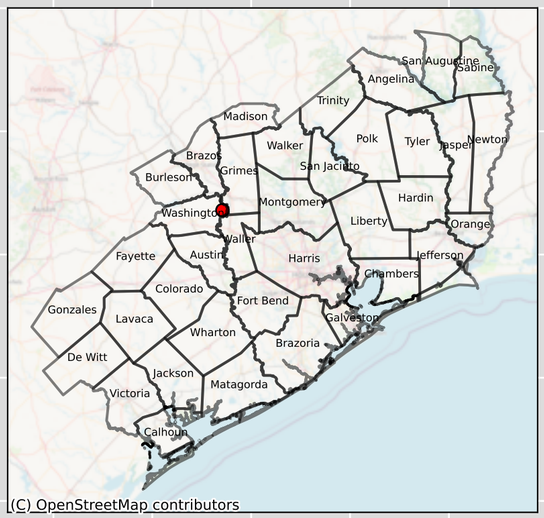
Washington - 5947902 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Washington - 5952603 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured

GMA Simulated

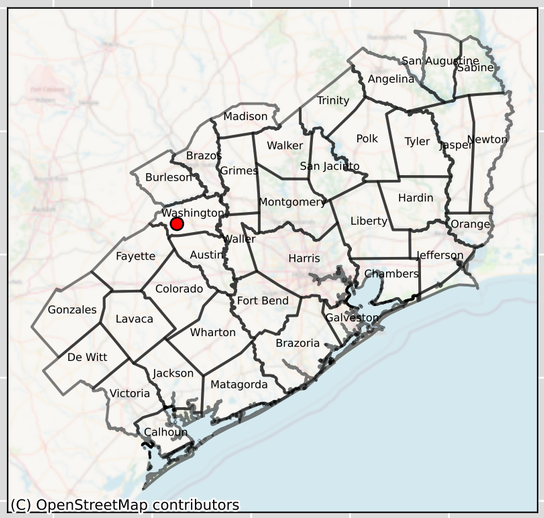
Washington - 5952804 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

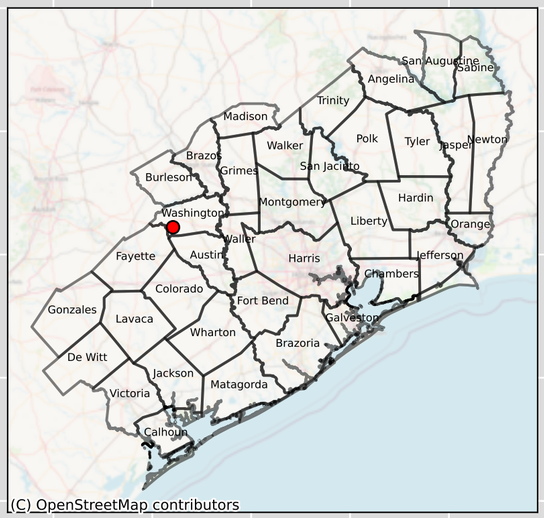


GMA Measured
GMA Simulated

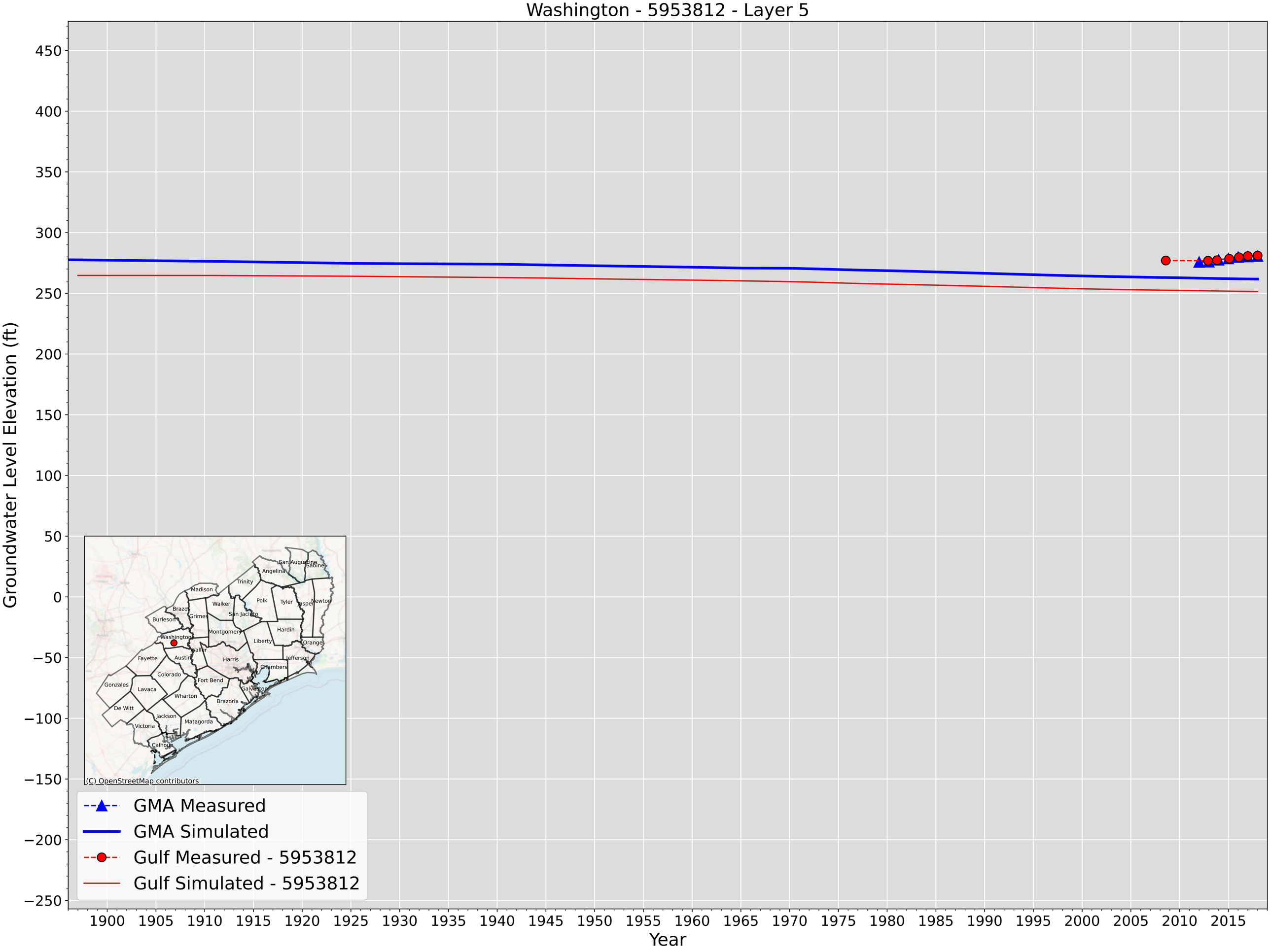
Washington - 5952806 - Layer 5

Groundwater Level Elevation (ft)

Year



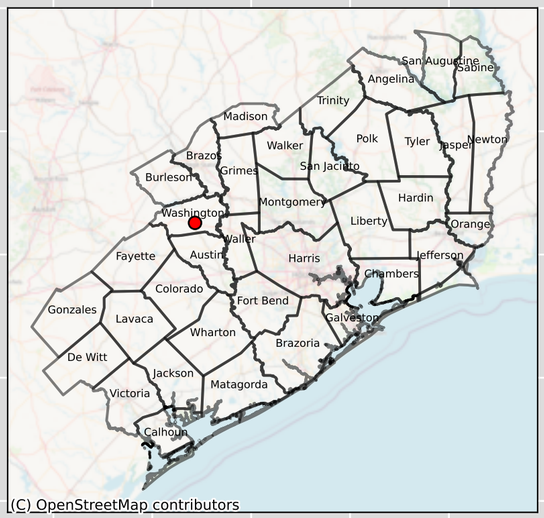
GMA Measured
GMA Simulated
Gulf Measured - 5952806
Gulf Simulated - 5952806


Washington - 5953812 - Layer 5
Groundwater Level Elevation (ft)
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors
GMA Measured
GMA Simulated
Gulf Measured - 5953812
Gulf Simulated - 5953812

Washington - 5953915 & 5953921 - Layer 5

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 5953915
Gulf Simulated - 5953915

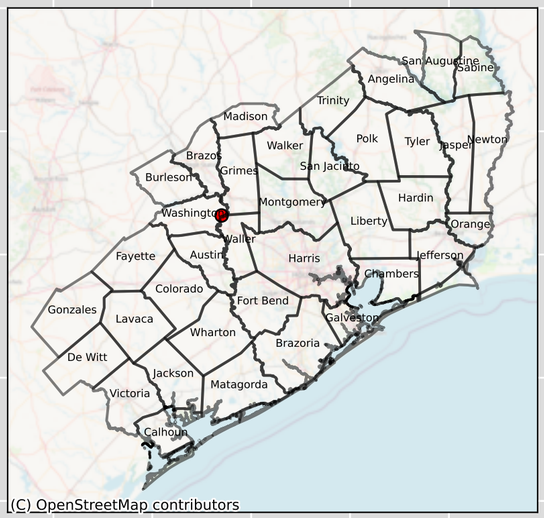
Washington - 5955301 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 5955301
Gulf Simulated - 5955301

Washington - 5955307 - Layer 5

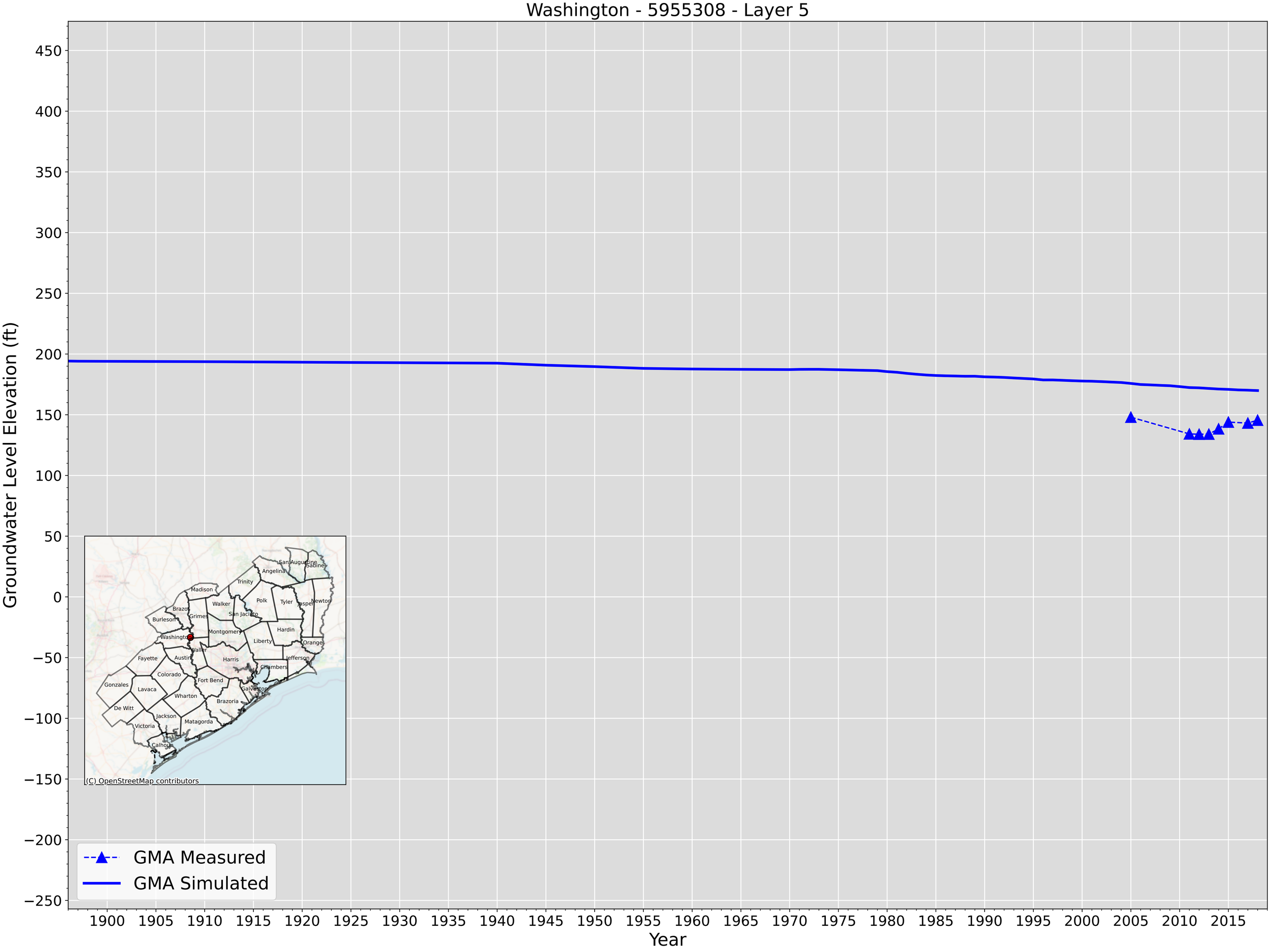
Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

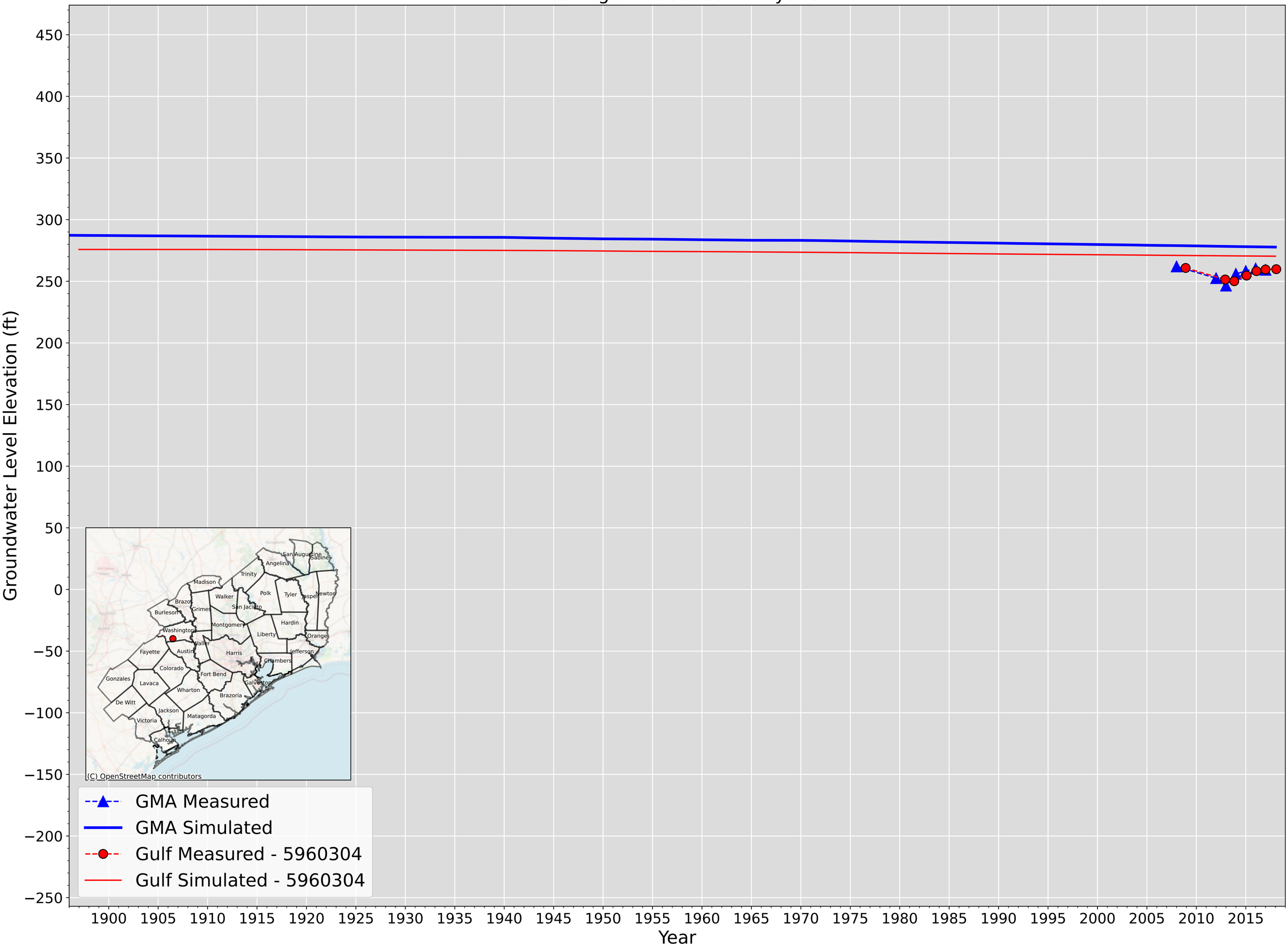
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated


Washington - 5955308 - Layer 5
Groundwater Level Elevation (ft)
450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

Washington - 5960304 - Layer 5



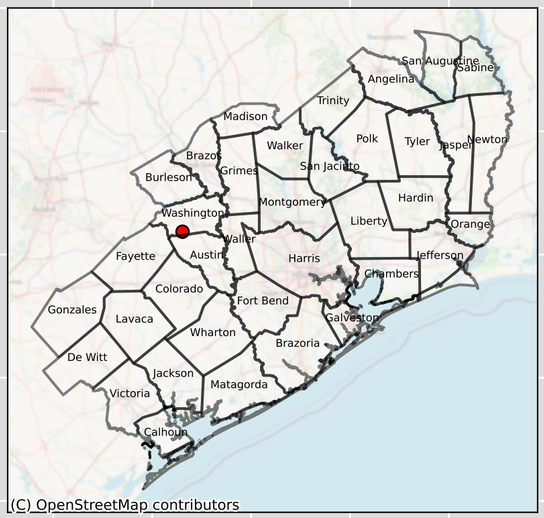
Washington - 5961103 - Layer 5

Groundwater Level Elevation (ft)

450
400
350
300
250
200
150
100
50
0
−50
−100
−150
−200
−250

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

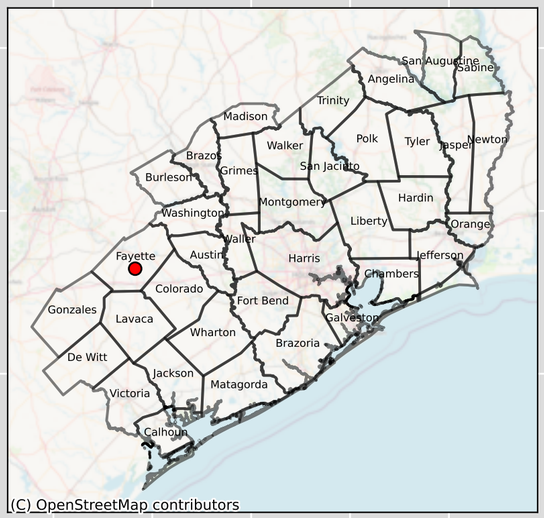
Fayette - 6609502 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6609502
Gulf Simulated - 6609502

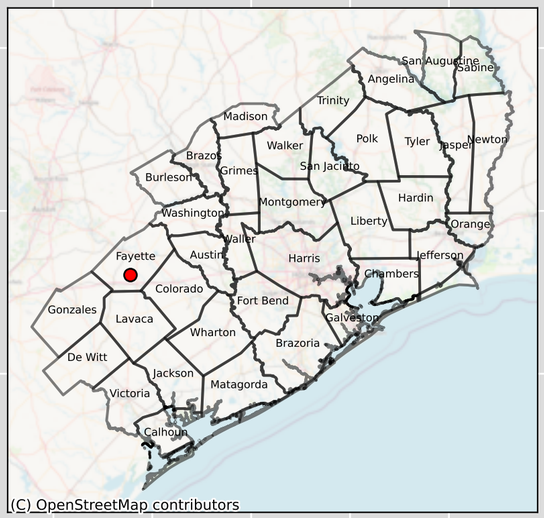
Fayette - 6609707 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6609707
Gulf Simulated - 6609707

Grimes - 5940708 & 5940701 - Layer 6

GMA Measured
GMA Simulated
Gulf Measured - 5940708
Gulf Simulated - 5940708

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 5947303 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

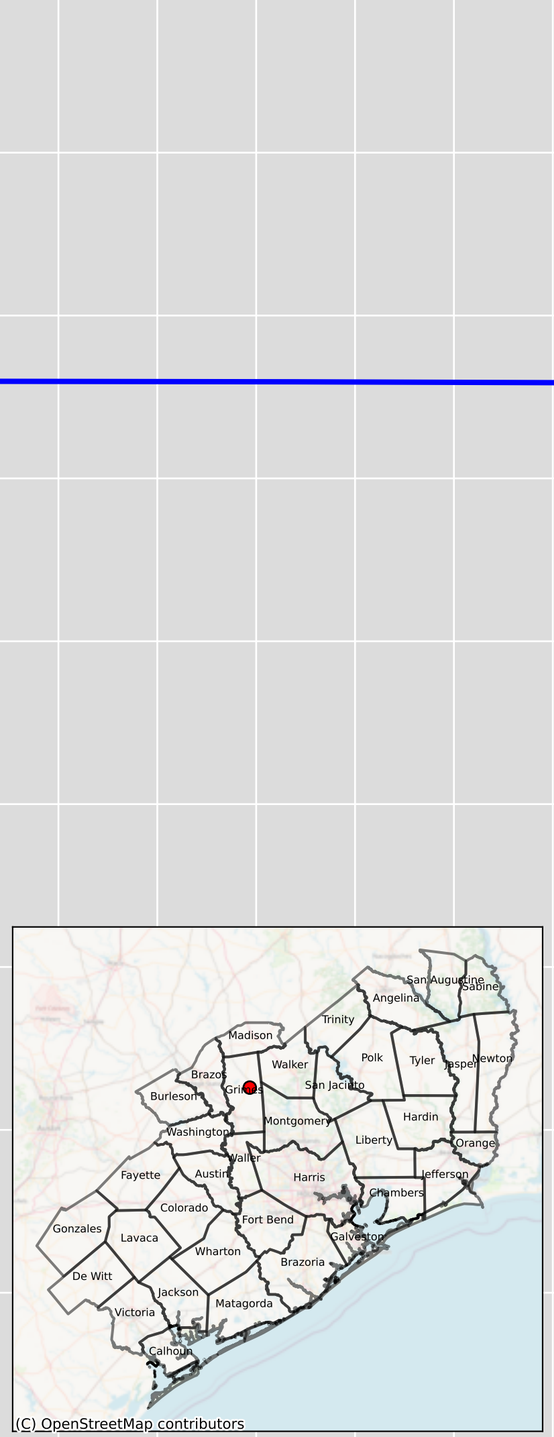
Grimes - 6025202 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

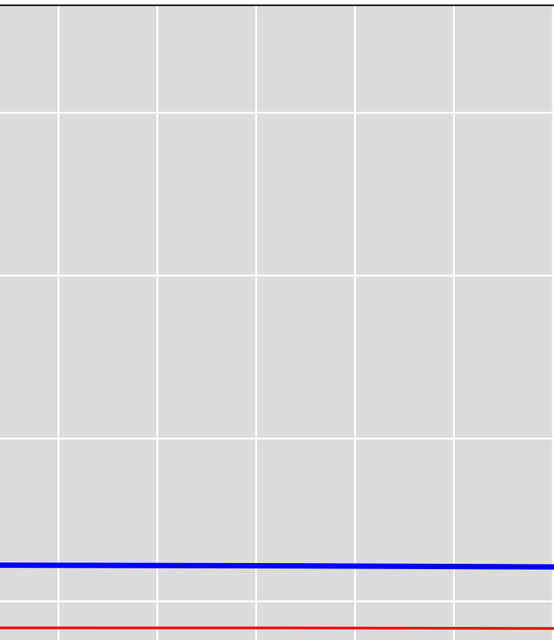
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Grimes - 6025804 - Layer 6



GMA Measured
GMA Simulated
Gulf Measured - 6025804
Gulf Simulated - 6025804

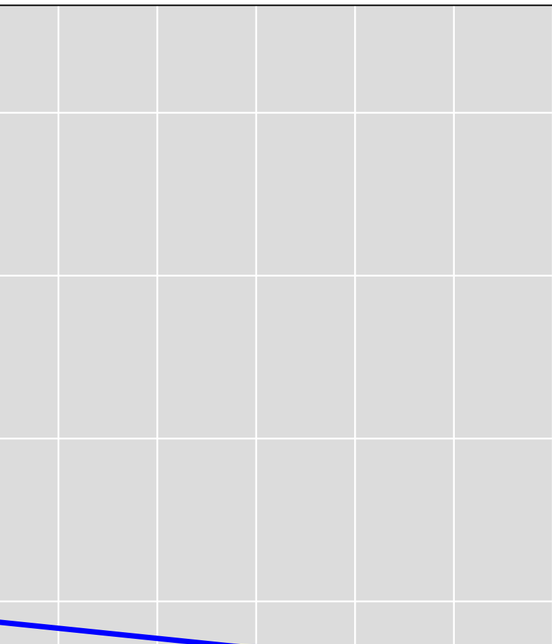
Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Grimes - 6033103 & 6033101 - Layer 6



GMA Measured
GMA Simulated
Gulf Measured - 6033103
Gulf Simulated - 6033103

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

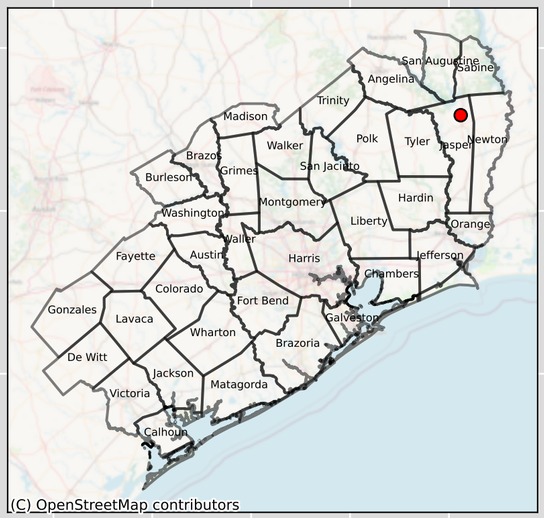
Jasper - 3657702 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

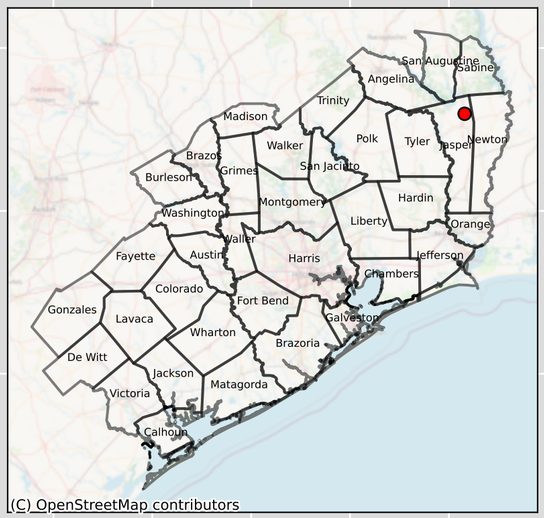
Jasper - 3657801 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

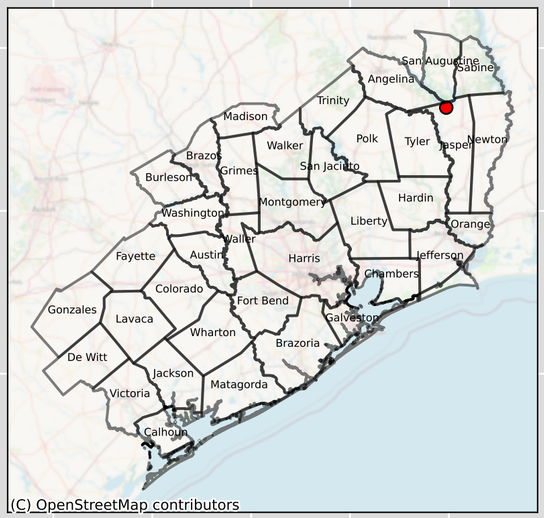
Jasper - 3764402 - Layer 6

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated



Jasper - 3764403 & 3764404 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

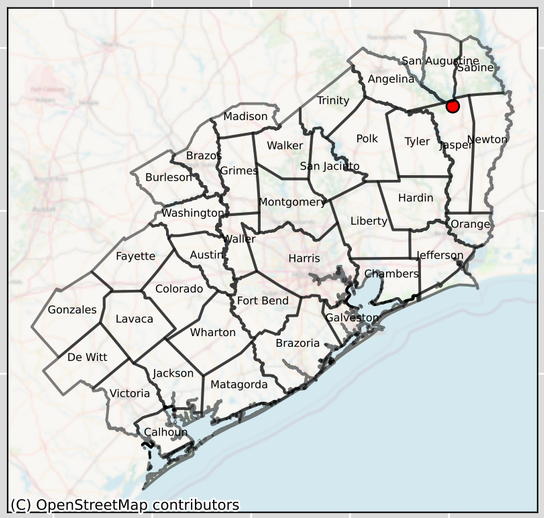
Jasper - 3764503 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

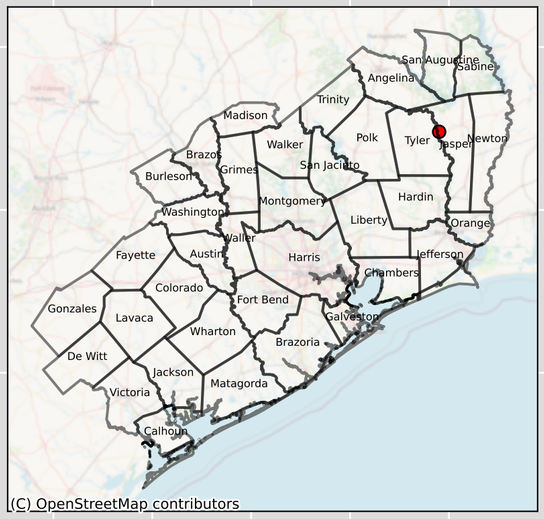


GMA Measured
GMA Simulated

Jasper - 6115201 & 6115205 - Layer 6

Groundwater Level Elevation (ft)

Year



GMA Measured

GMA Simulated

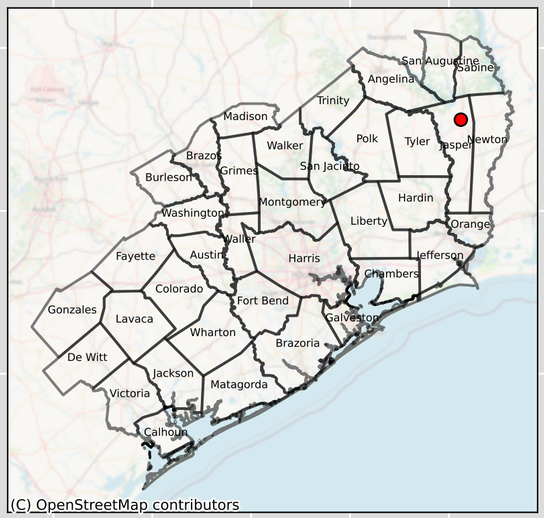
Jasper - 6201105 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Jasper - 6201701 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6201701
Gulf Simulated - 6201701

Jasper - 6201803 - Layer 6

GMA Measured
GMA Simulated
Gulf Measured - 6201803
Gulf Simulated - 6201803

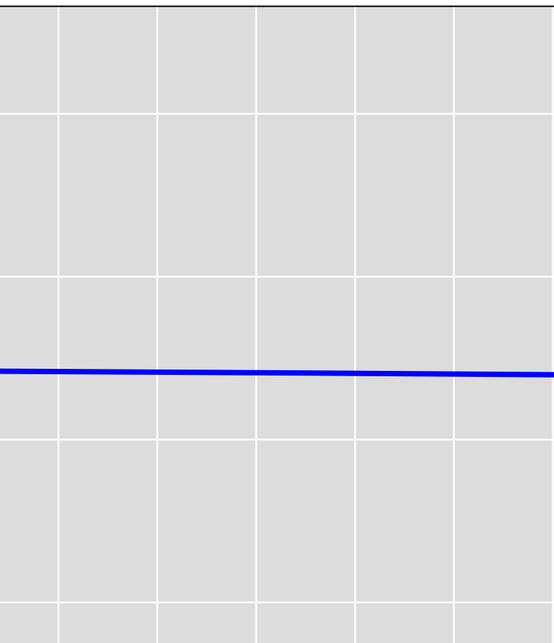
Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Lavaca - 6732105 - Layer 6



GMA Measured
GMA Simulated

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

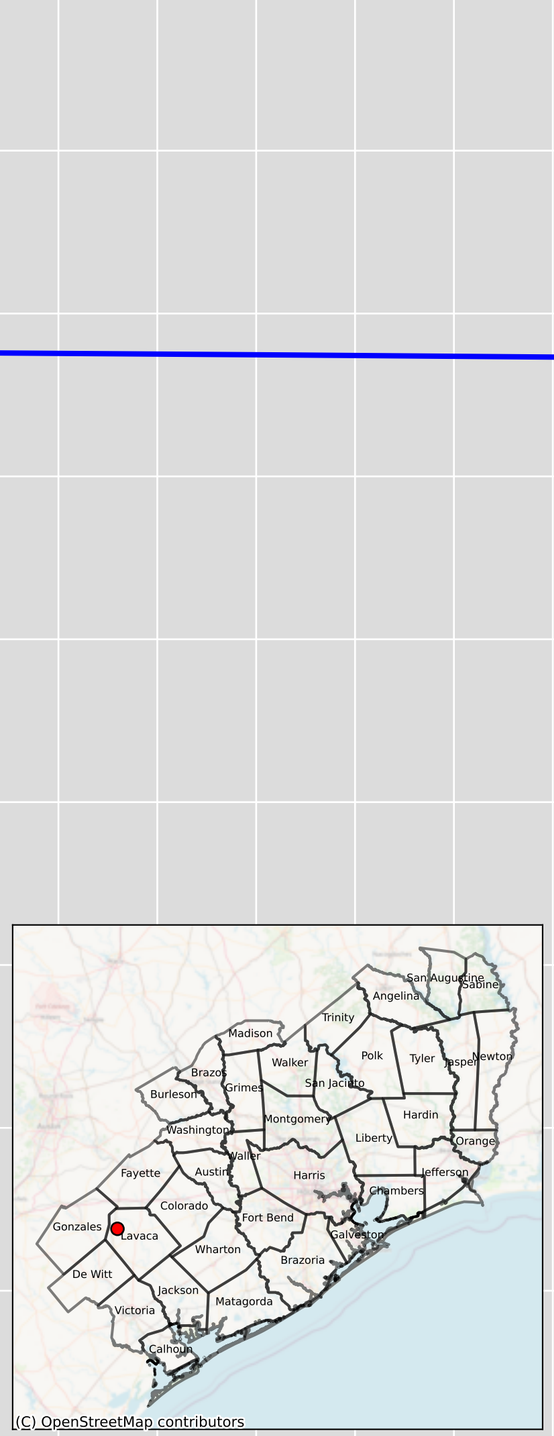
Lavaca - 6739302 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

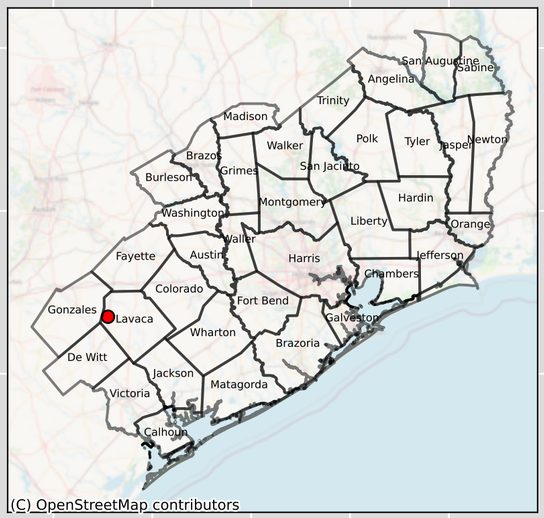
Lavaca - 6739517 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6739517
Gulf Simulated - 6739517

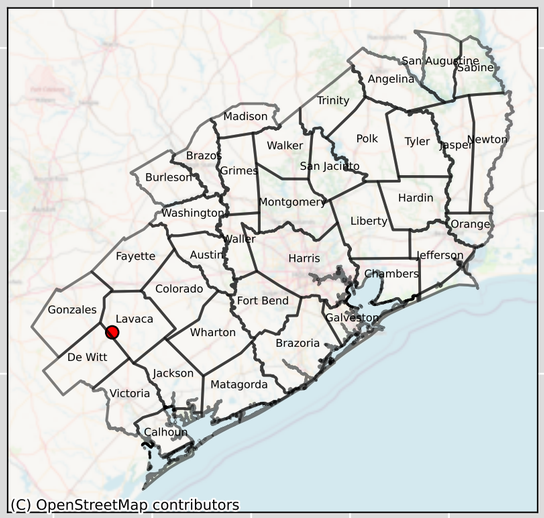
Lavaca - 6747608 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

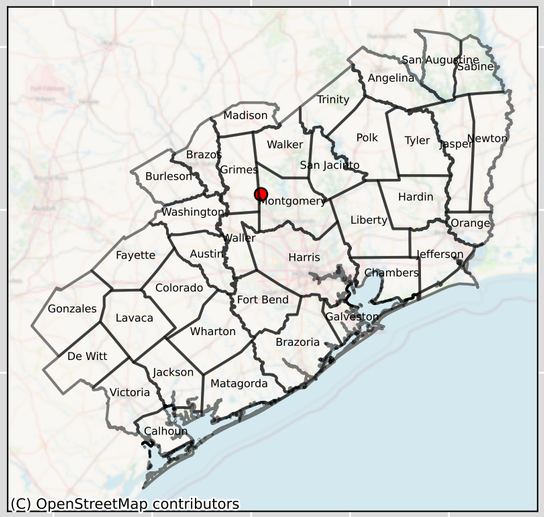
Montgomery - 6034905 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Montgomery - 6035604 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6035604
Gulf Simulated - 6035604

Montgomery - 6035915 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6035915
Gulf Simulated - 6035915

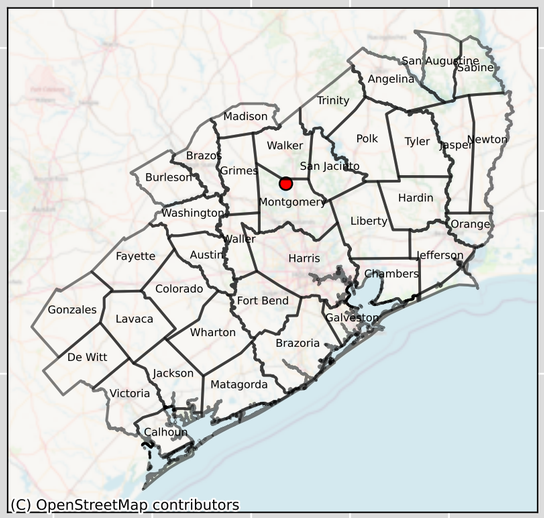
Montgomery - 6036211 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Montgomery - 6036514 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Montgomery - 6036615 - Layer 6

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6036615
Gulf Simulated - 6036615

Montgomery - 6036710 - Layer 6

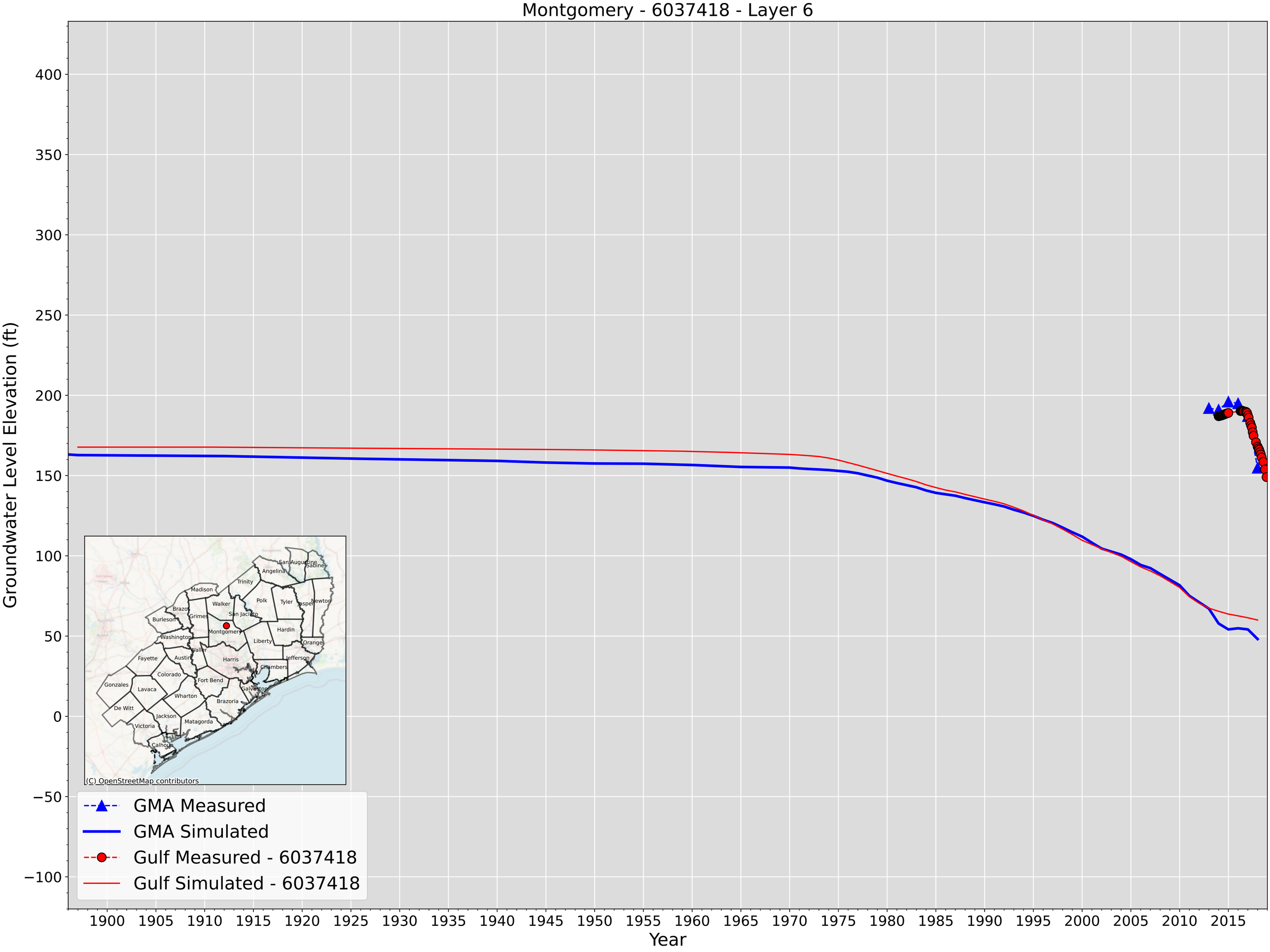
Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated
Gulf Measured - 6036710
Gulf Simulated - 6036710


Montgomery - 6037418 - Layer 6
Groundwater Level Elevation (ft)
Year
400
350
300
250
200
150
100
50
0
−50
−100
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
GMA Measured
GMA Simulated
Gulf Measured - 6037418
Gulf Simulated - 6037418
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

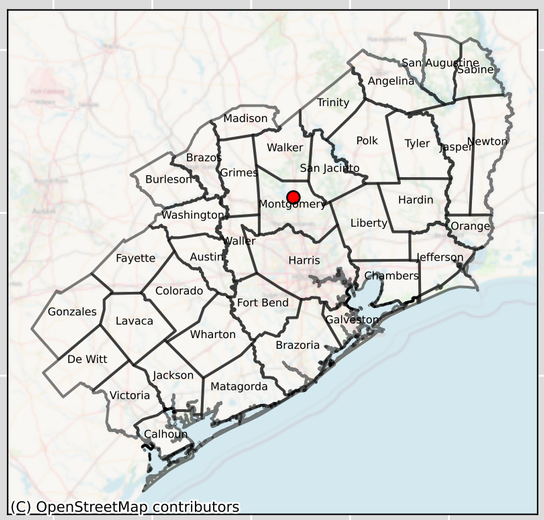
Montgomery - 6037718 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

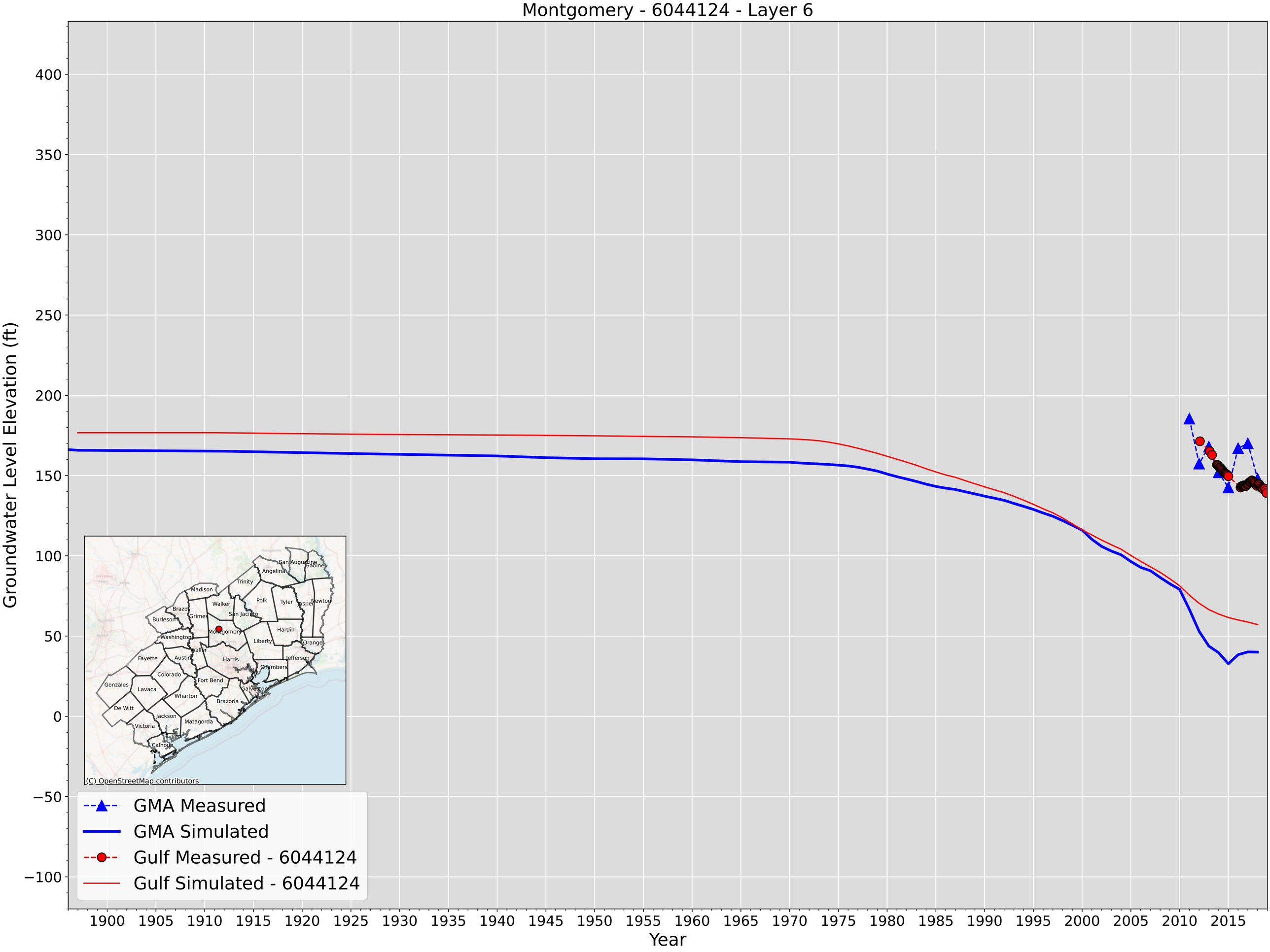
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6037718
Gulf Simulated - 6037718

Montgomery - 6044124 - Layer 6



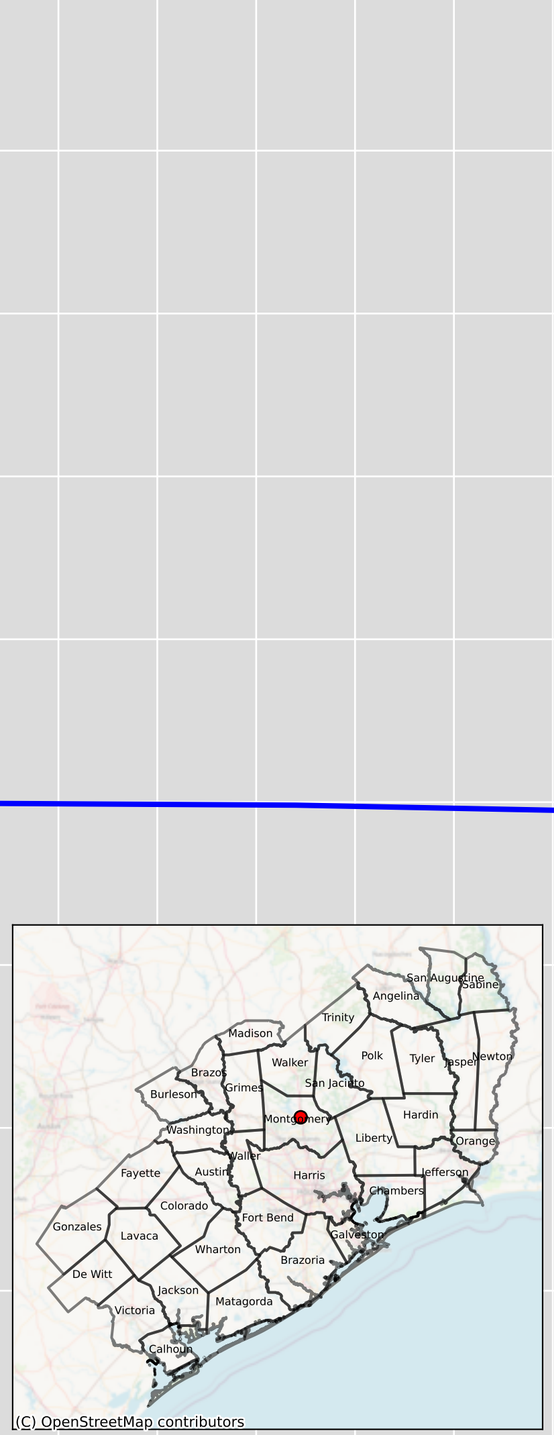
Montgomery - 6045122 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

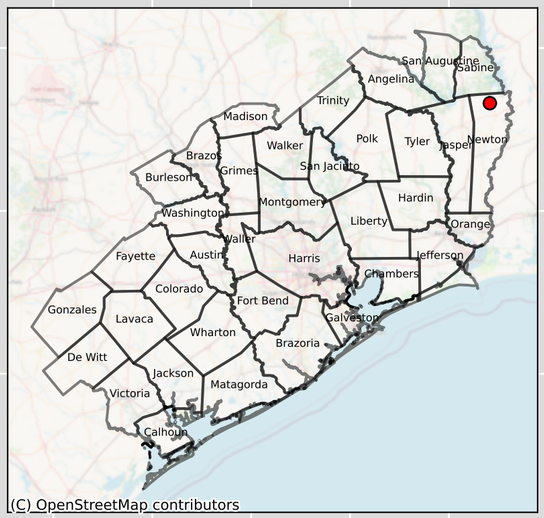
Newton - 3659102 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

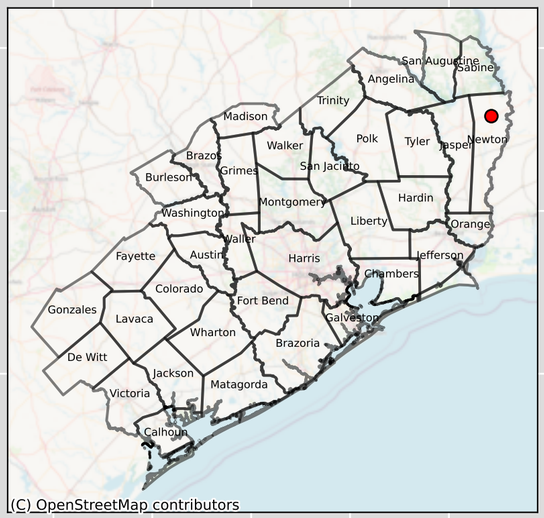
Newton - 6203204 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

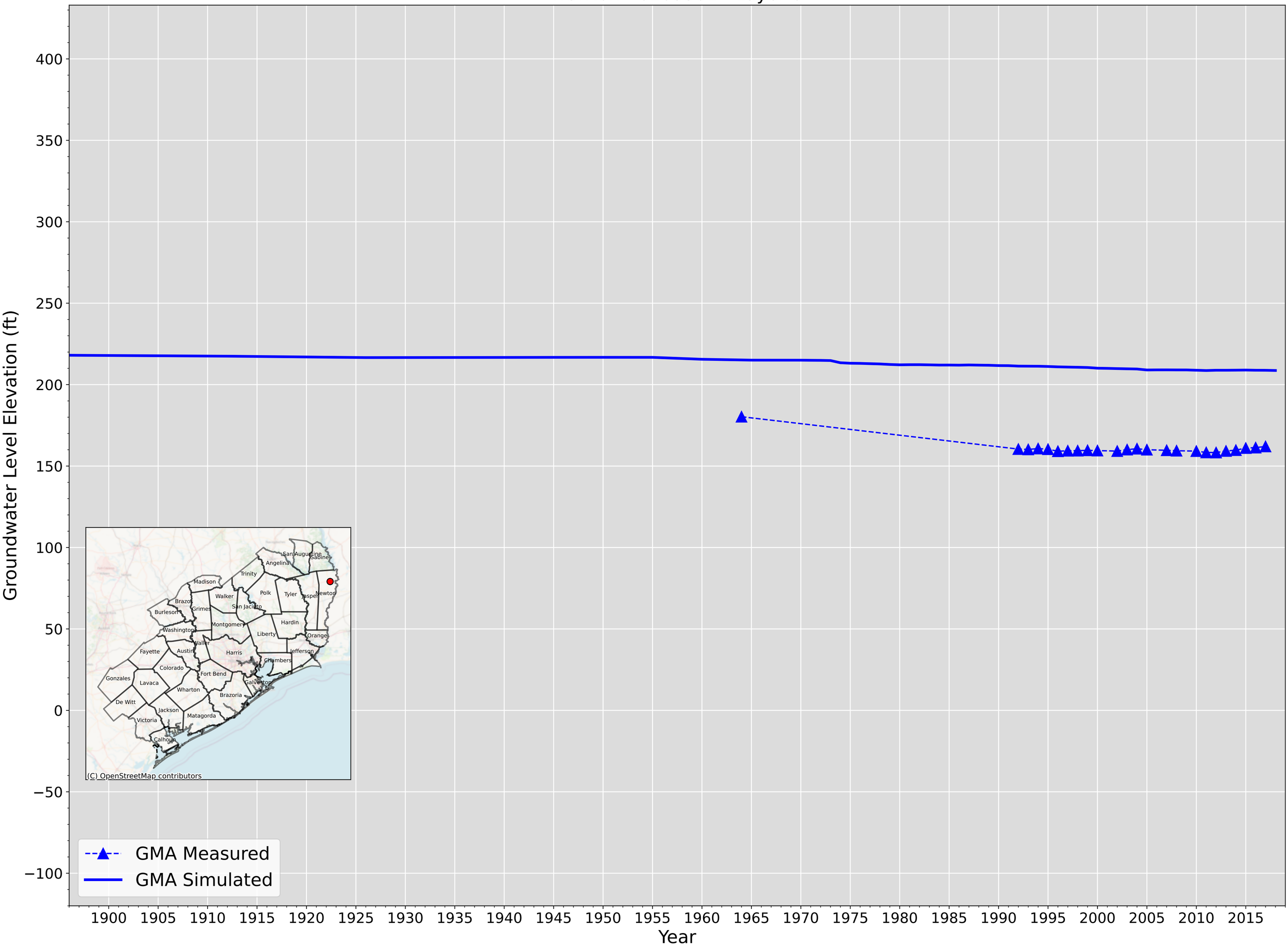
1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Newton - 6203301 - Layer 6



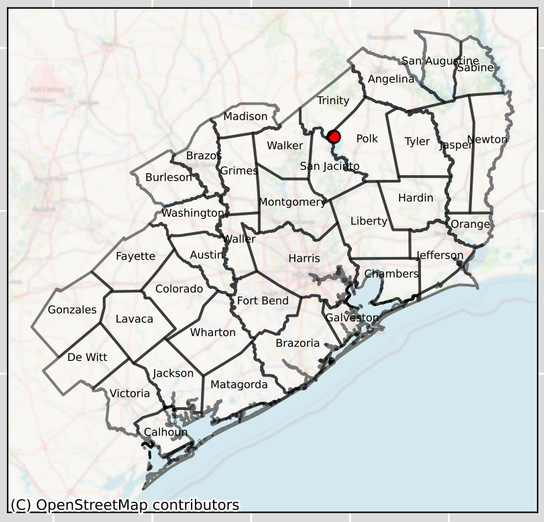
Polk - 6015304 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

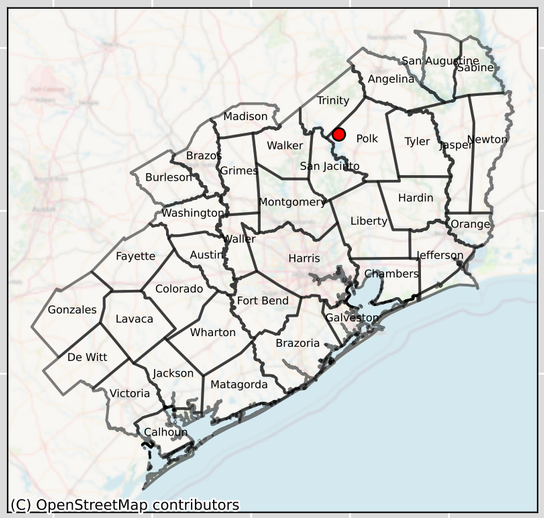
Polk - 6016103 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6016103
Gulf Simulated - 6016103

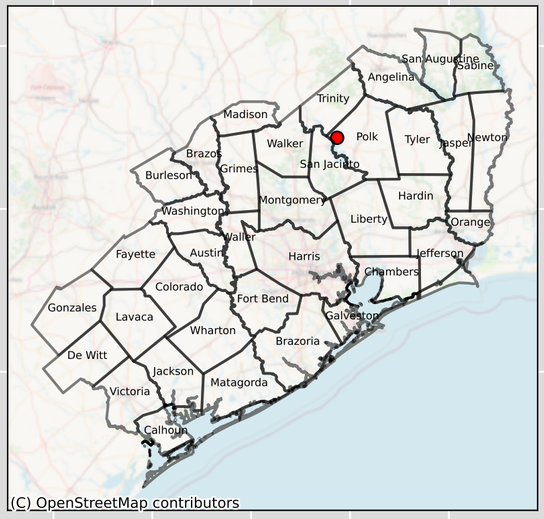
Polk - 6016422 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

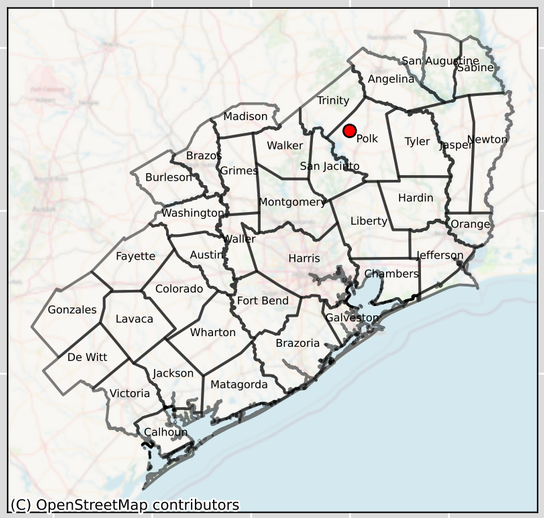
Polk - 6101706 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 6101706
Gulf Simulated - 6101706

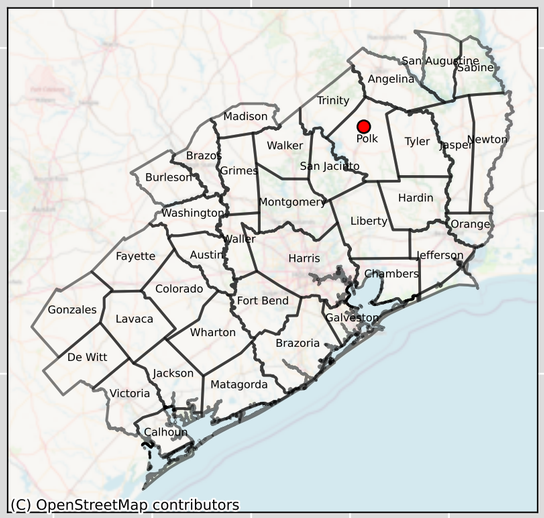
Polk - 6102703 & 6102707 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

Trinity - 6005903 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

Trinity - 6005905 - Layer 6

Groundwater Level Elevation (ft)

Year

GMA Measured

GMA Simulated

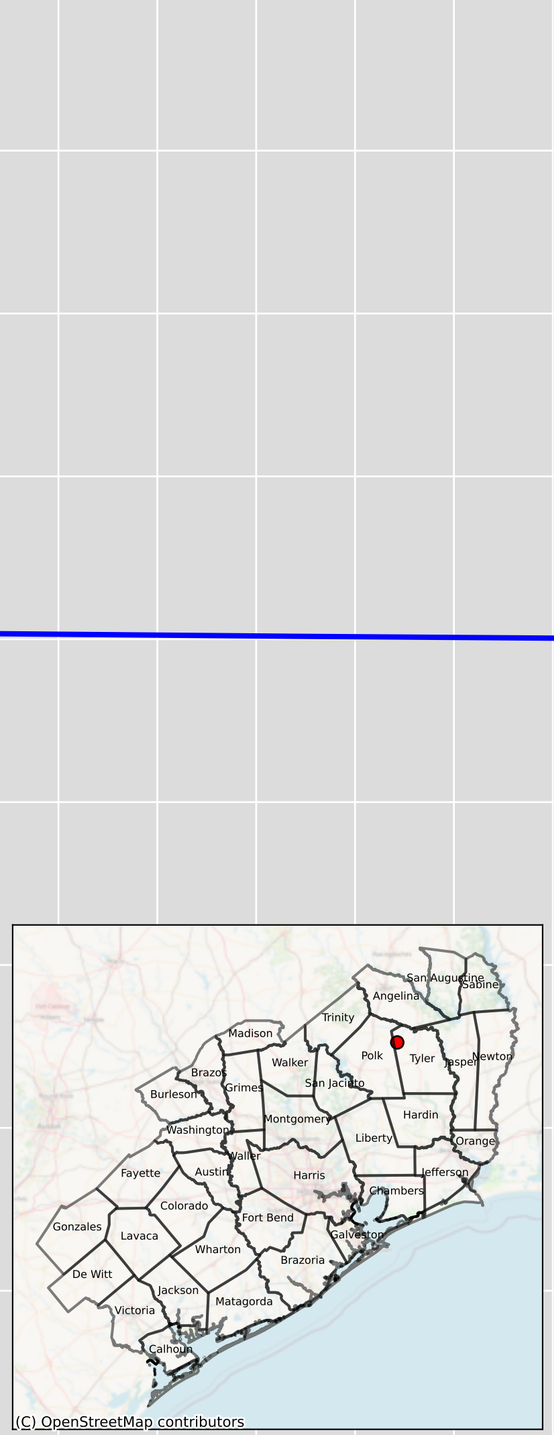
Tyler - 6104410 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Tyler - 6106705 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA Measured
GMA Simulated

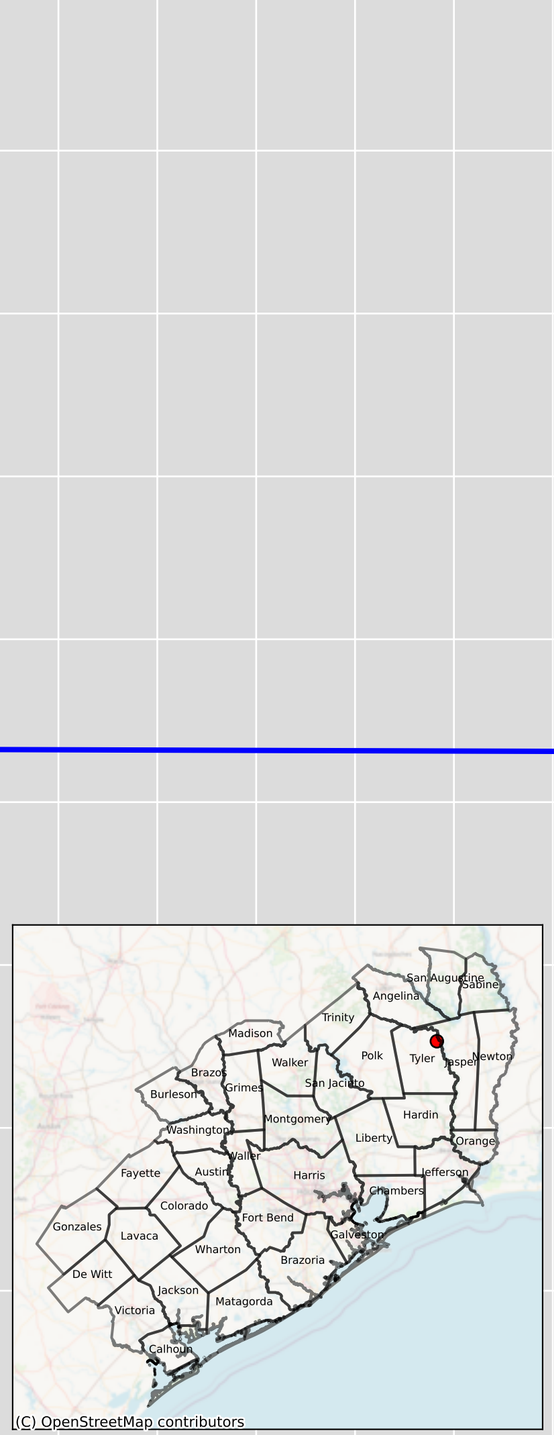
Tyler - 6107401 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

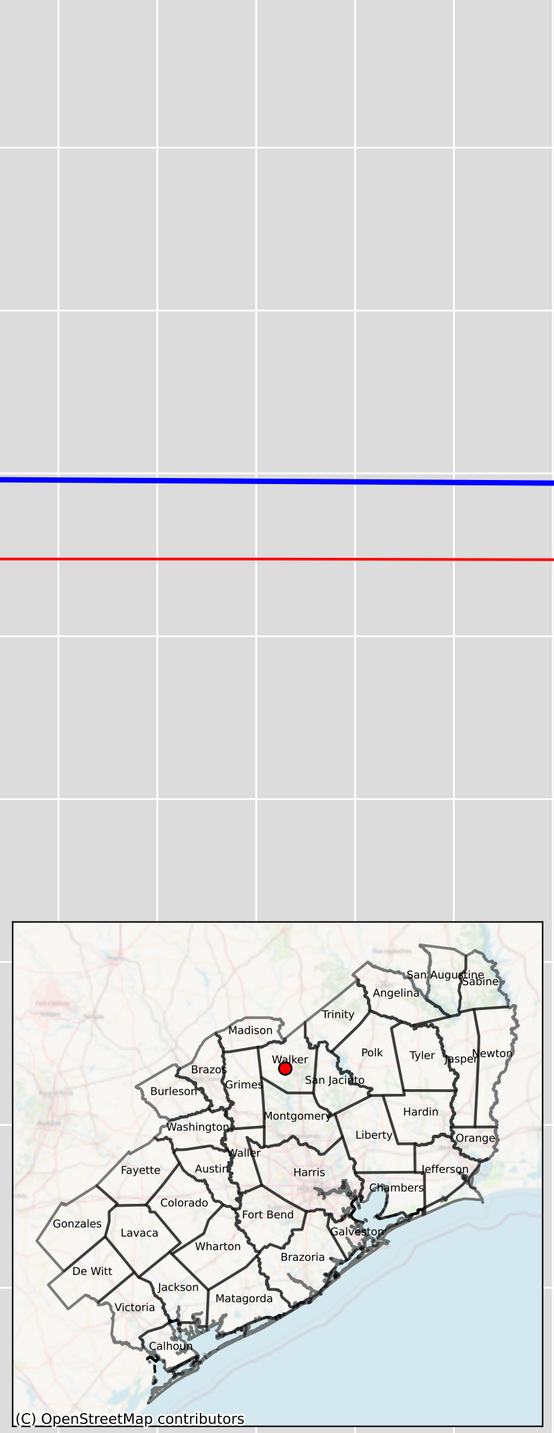
Walker - 6020401 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

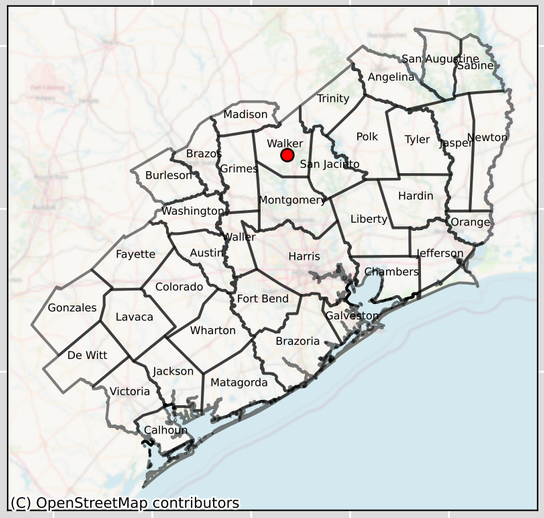


GMA Measured
GMA Simulated
Gulf Measured - 6020401
Gulf Simulated - 6020401

Walker - 6020503 - Layer 6

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6020503
Gulf Simulated - 6020503

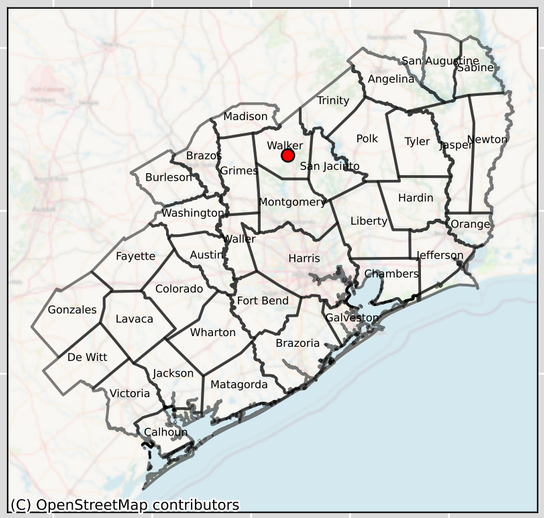
Walker - 6020505 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

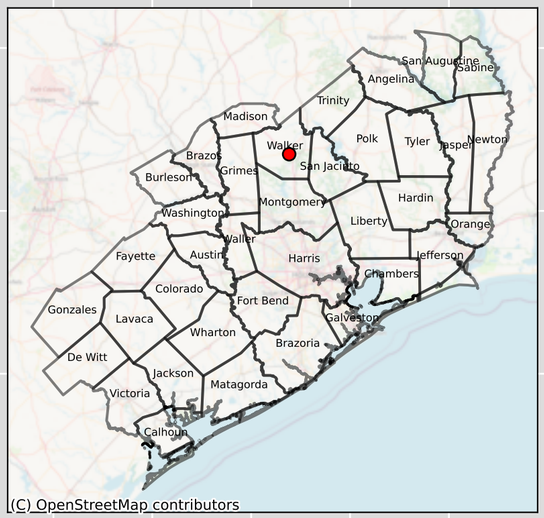
Walker - 6020601 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

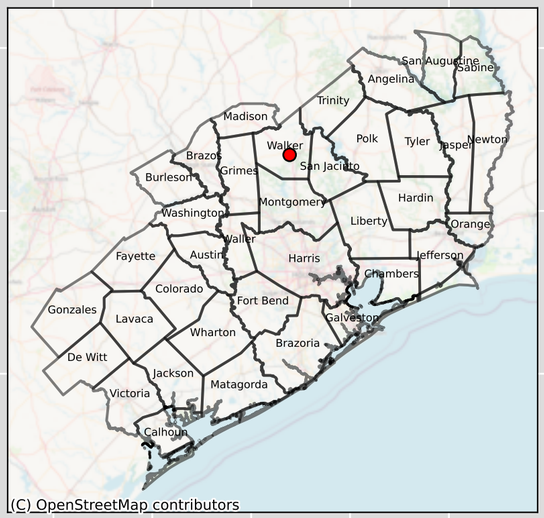
Walker - 6020602 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

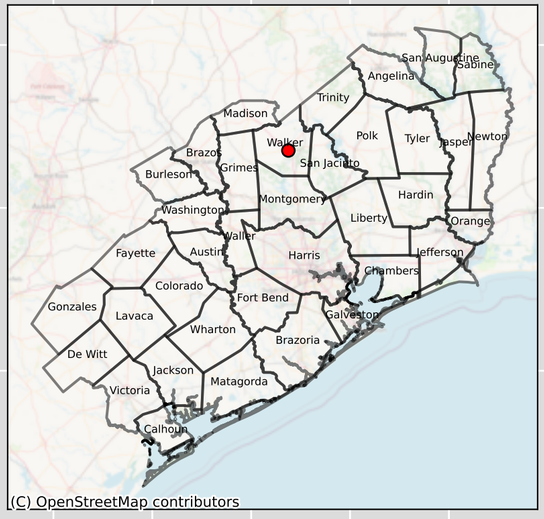


GMA Measured
GMA Simulated

Walker - 6020603 - Layer 6

Groundwater Level Elevation (ft)

Year



GMA Measured
GMA Simulated
Gulf Measured - 6020603
Gulf Simulated - 6020603

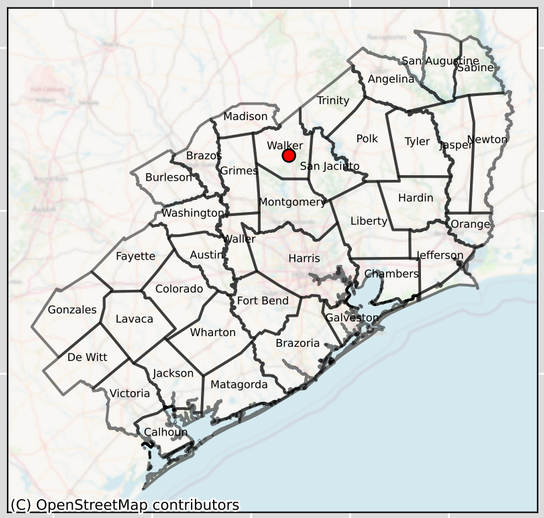
Walker - 6020611 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

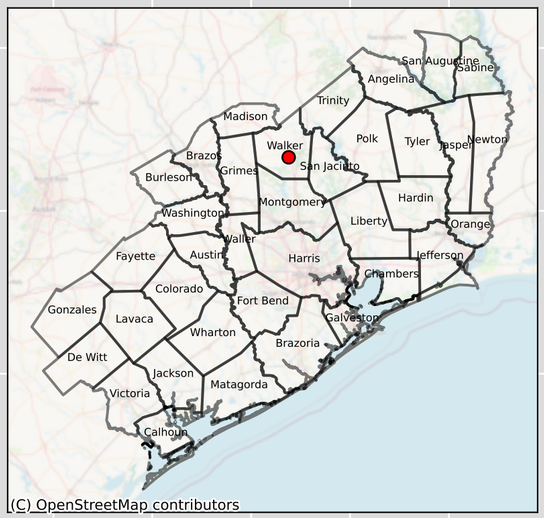
Walker - 6020612 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

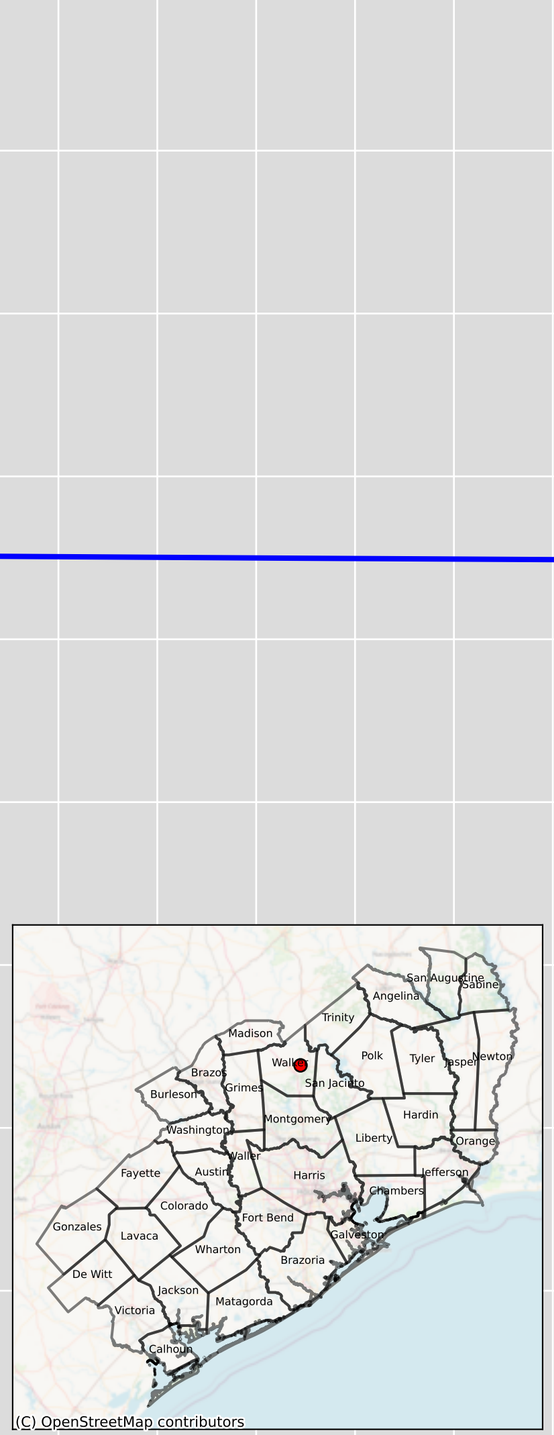
Walker - 6021102 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured

GMA Simulated

Walker - 6022101 - Layer 6

Groundwater Level Elevation (ft)

Year

GMA Measured
GMA Simulated
Gulf Measured - 6022101
Gulf Simulated - 6022101

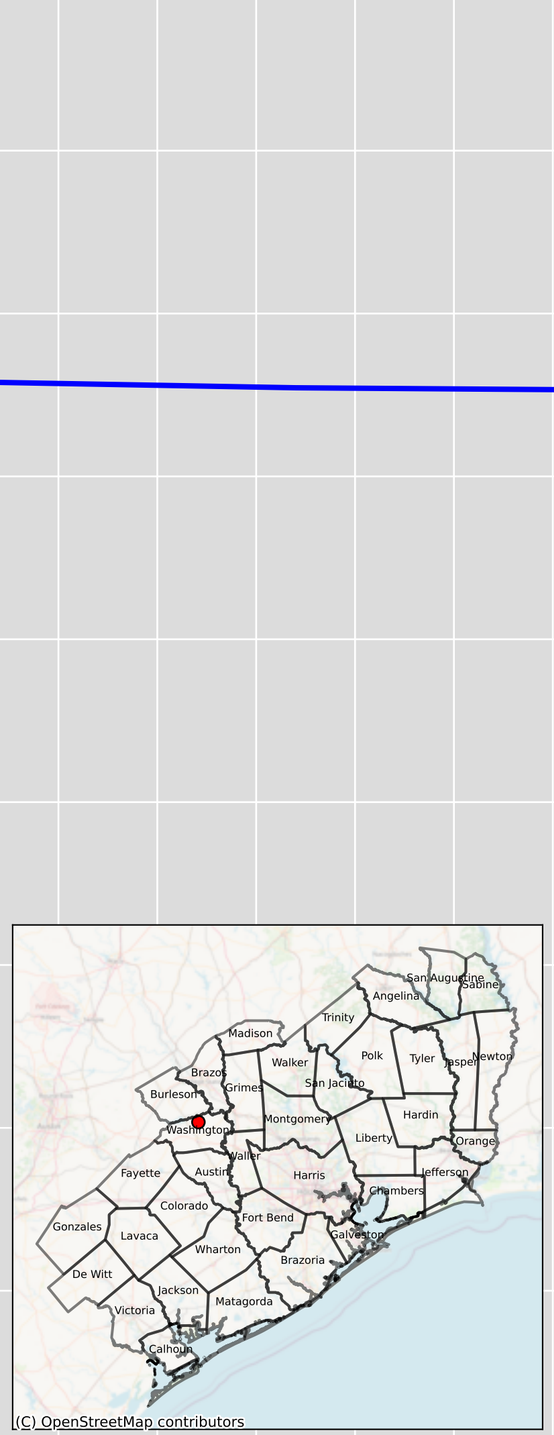
Washington - 5945608 - Layer 6

Groundwater Level Elevation (ft)

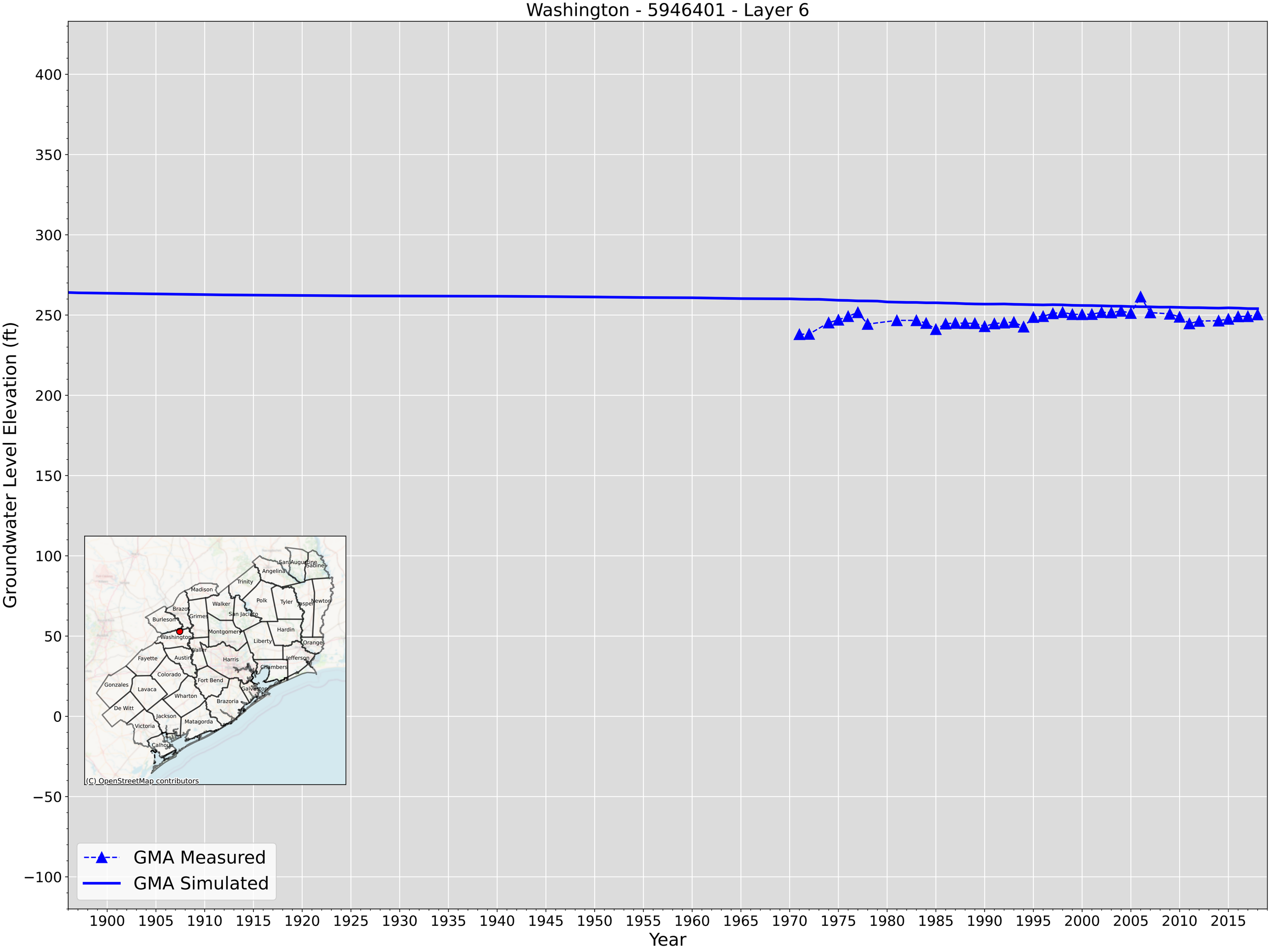
400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated


Washington - 5946401 - Layer 6
Groundwater Level Elevation (ft)
400
350
300
250
200
150
100
50
0
−50
−100
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
GMA Measured
GMA Simulated
San Augustine
Sabine
Angelina
Trinity
Madison
Walker
Polk
Tyler
Jasper
Newton
Brazos
Grimes
San Jacinto
Burleson
Montgomery
Hardin
Washington
Liberty
Orange
Waller
Fayette
Austin
Harris
Jefferson
Chambers
Colorado
Fort Bend
Gonzales
Lavaca
Galveston
Wharton
Brazoria
De Witt
Jackson
Matagorda
Victoria
Calhoun
(C) OpenStreetMap contributors

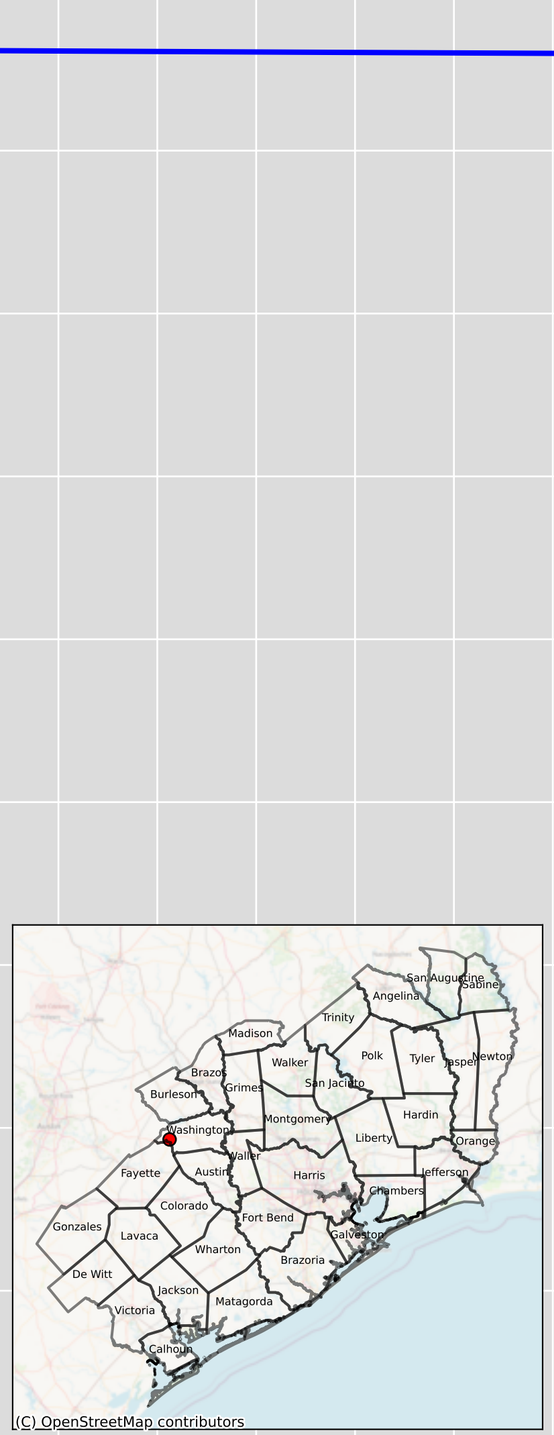
Washington - 5951607 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated

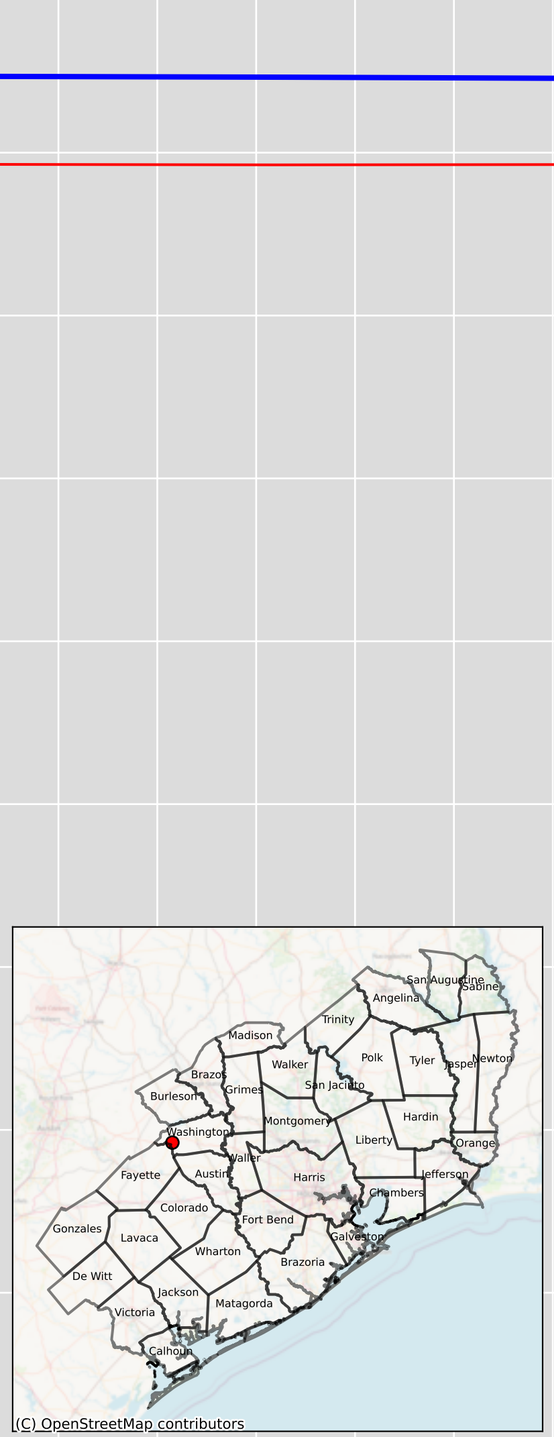
Washington - 5951904 & 5951909 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 5951904
Gulf Simulated - 5951904

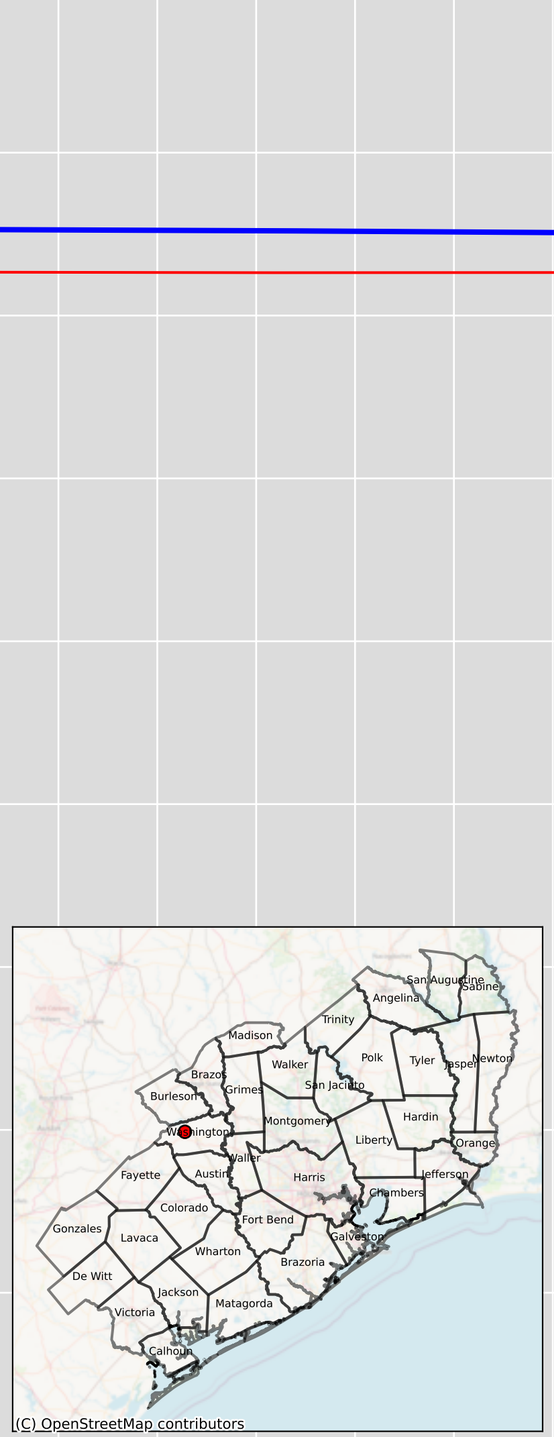
Washington - 5952308 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA Measured
GMA Simulated
Gulf Measured - 5952308
Gulf Simulated - 5952308

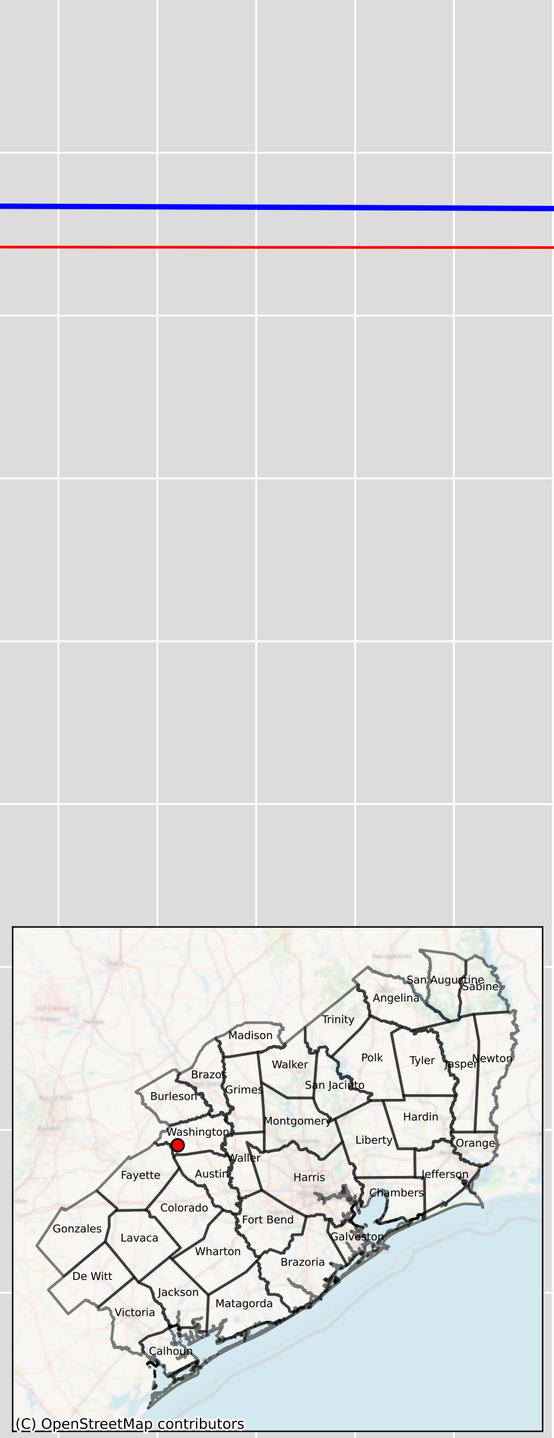
Washington - 5952706 - Layer 6

Groundwater Level Elevation (ft)

400
350
300
250
200
150
100
50
0
−50
−100

1900 1905 1910 1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

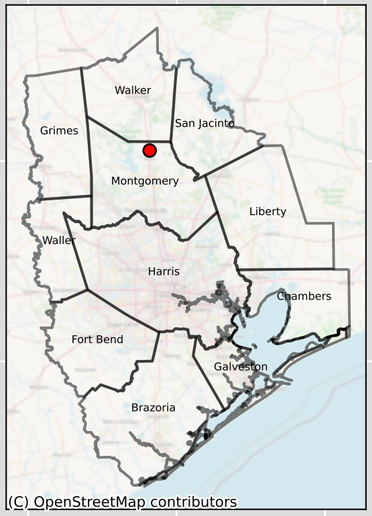
Year



GMA Measured
GMA Simulated
Gulf Measured - 5952706
Gulf Simulated - 5952706

Appendix 8 — Comparison of GMA 14 Model Simulated Compaction and Subsidence to Measured Values

Benchmark Station - E_88



GMA14 Measured
GMA14 Simulated

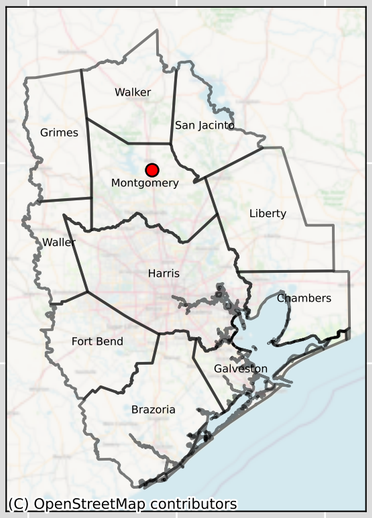
Subsidence (ft)

Year

Benchmark Station - J_88

Subsidence (ft)

Year



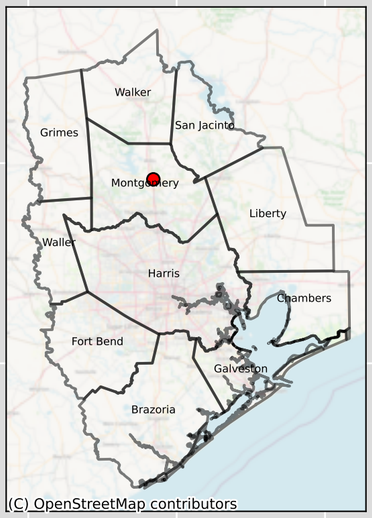
GMA14 Measured

GMA14 Simulated

Benchmark Station - K_88

Subsidence (ft)

Year



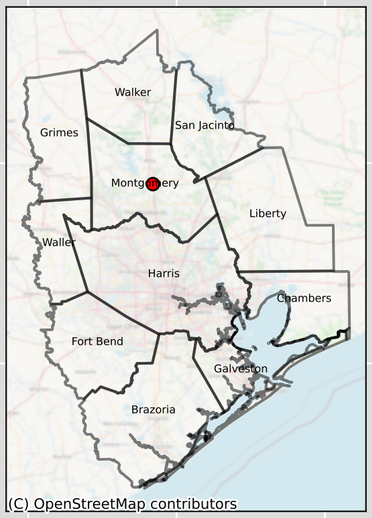
GMA14 Measured

GMA14 Simulated

Benchmark Station - CONROE_RM_1

Subsidence (ft)

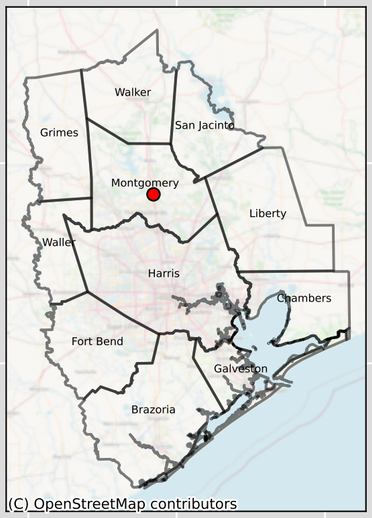
Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - Q_88



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0 1 2 3 4 5 6 7 8 9

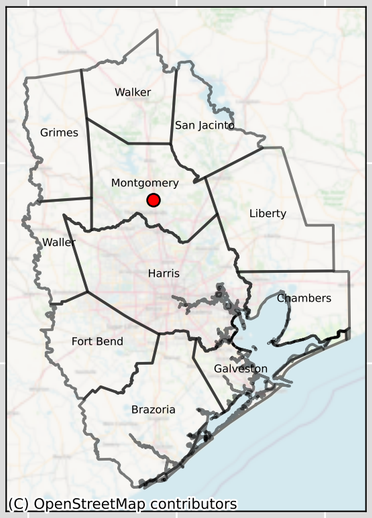
1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Benchmark Station - R_88

Subsidence (ft)

Year



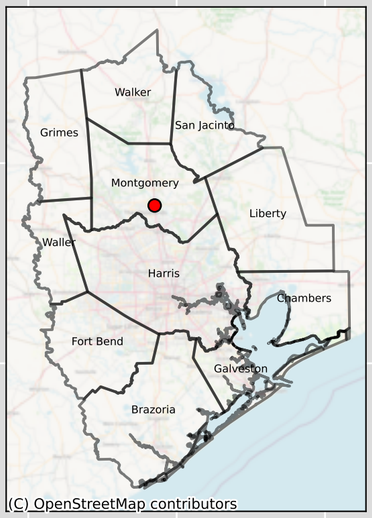
GMA14 Measured

GMA14 Simulated

Benchmark Station - S_88

Subsidence (ft)

Year



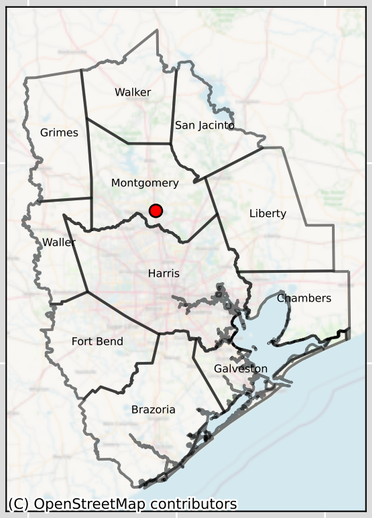
GMA14 Measured

GMA14 Simulated

Benchmark Station - T_88

Subsidence (ft)

Year



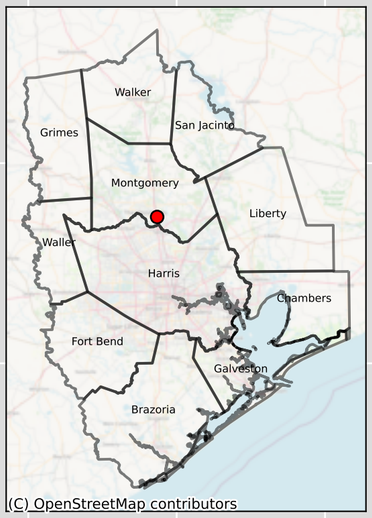
GMA14 Measured

GMA14 Simulated

Benchmark Station - U_88

Subsidence (ft)

Year



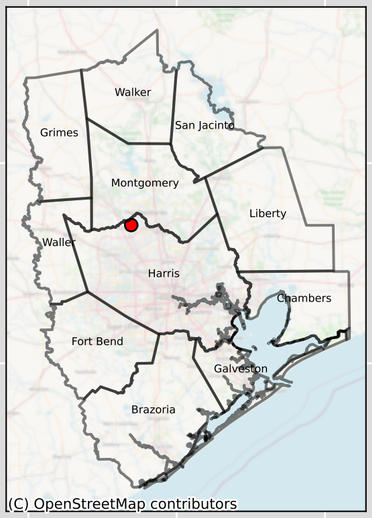
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_1252

Subsidence (ft)

Year



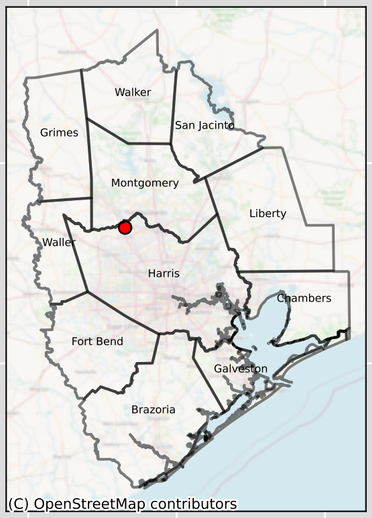
GMA14 Measured

GMA14 Simulated

Benchmark Station - N_279

Subsidence (ft)

Year



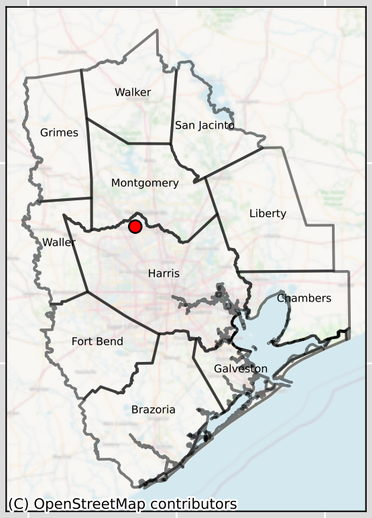
GMA14 Measured

GMA14 Simulated

Benchmark Station - PTS_101

Subsidence (ft)

Year



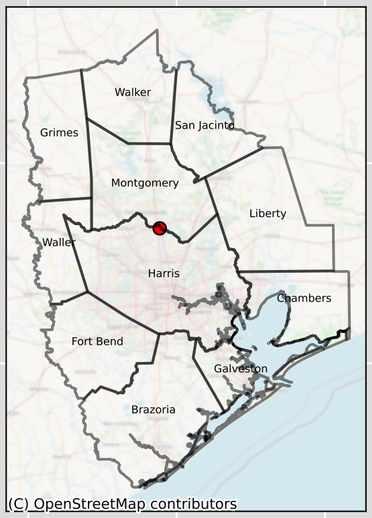
GMA14 Measured

GMA14 Simulated

Benchmark Station - W_88

Subsidence (ft)

Year



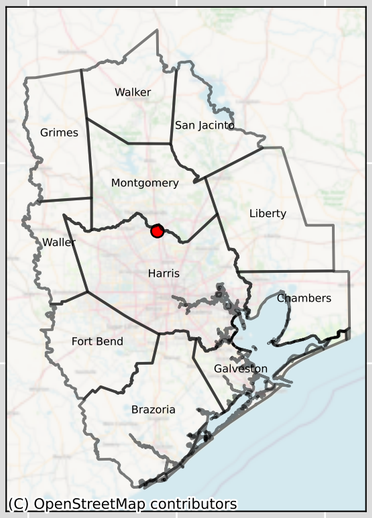
GMA14 Measured

GMA14 Simulated

Benchmark Station - SPRING_RM_1

Subsidence (ft)

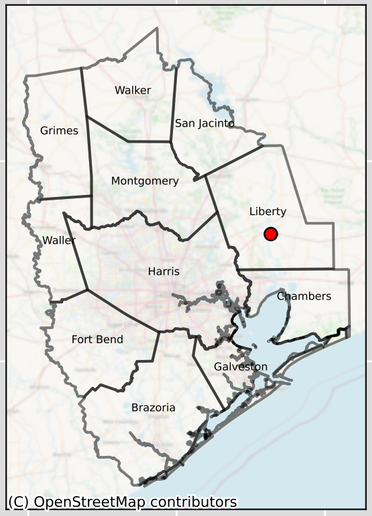
Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - B_56



GMA14 Measured
GMA14 Simulated

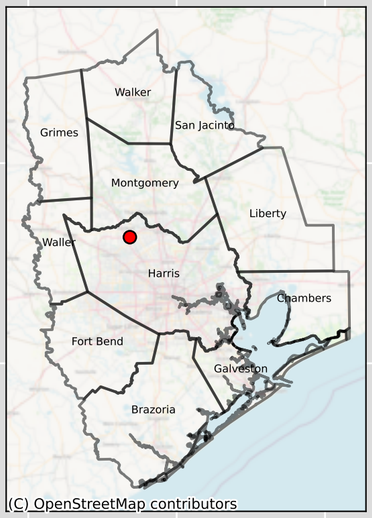
Subsidence (ft)

Year

Benchmark Station - L_279

Subsidence (ft)

Year



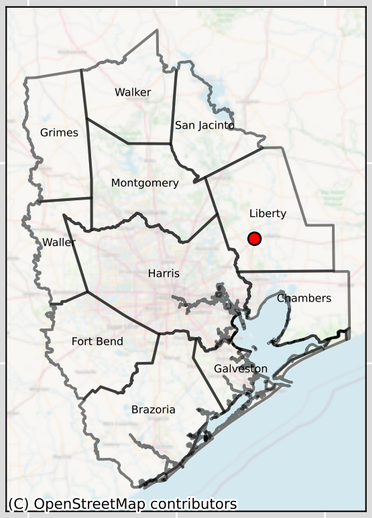
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_55

Subsidence (ft)

Year



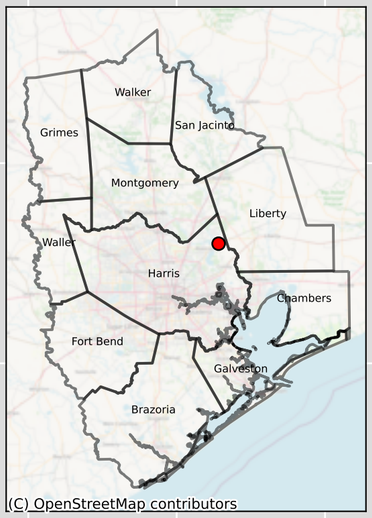
GMA14 Measured

GMA14 Simulated

Benchmark Station - W_661

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

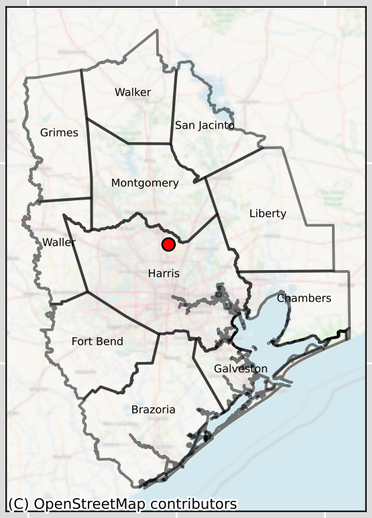
Benchmark Station - E_666

Subsidence (ft)

0
1
2
3
4
5
6
7
8
9

1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

Year

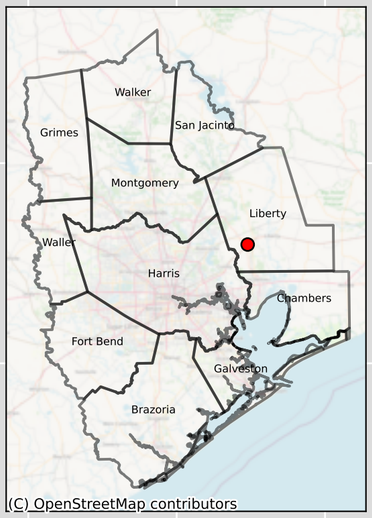


GMA14 Measured
GMA14 Simulated

Benchmark Station - P_55

Subsidence (ft)

Year



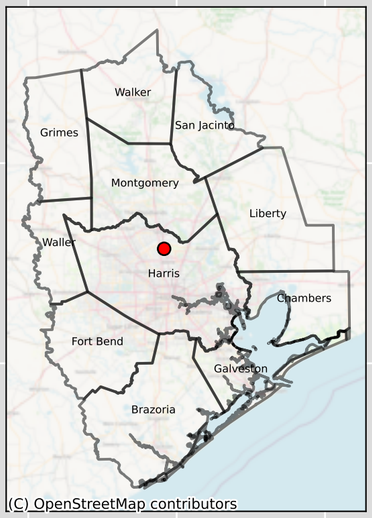
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_660

Subsidence (ft)

Year



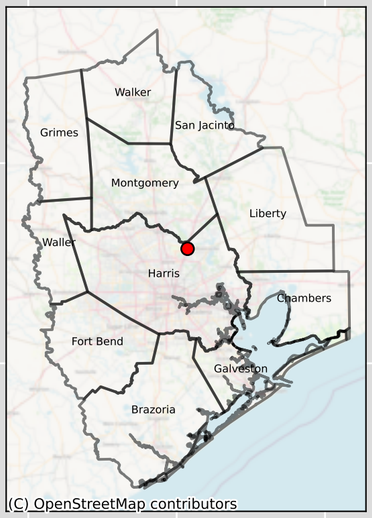
GMA14 Measured

GMA14 Simulated

Benchmark Station - W_662

Subsidence (ft)

Year



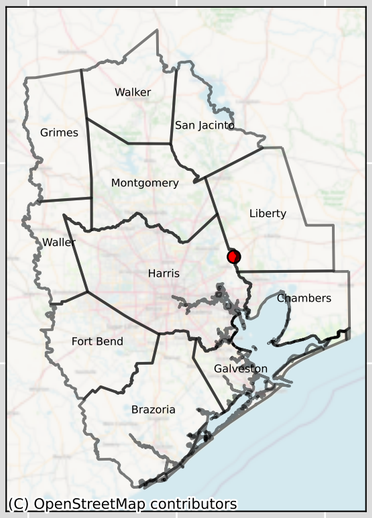
GMA14 Measured

GMA14 Simulated

Benchmark Station - M_664

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - L_664

Subsidence (ft)

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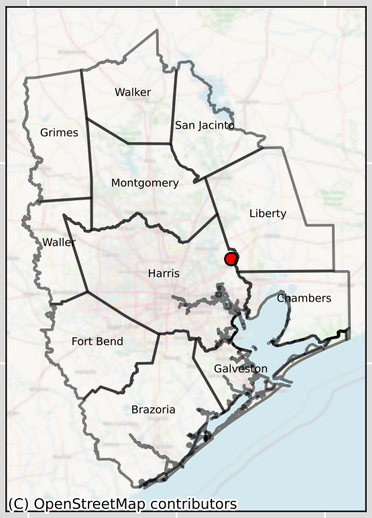
Year



GMA14 Measured
GMA14 Simulated

Benchmark Station - D_89

Subsidence (ft)

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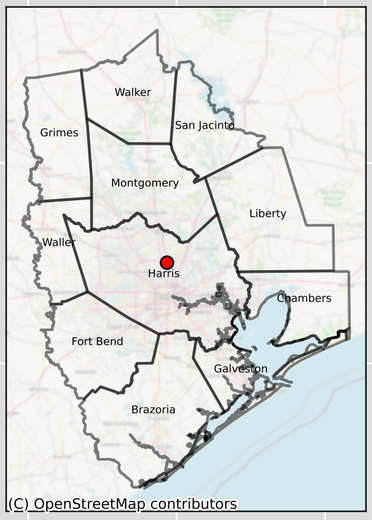
Year

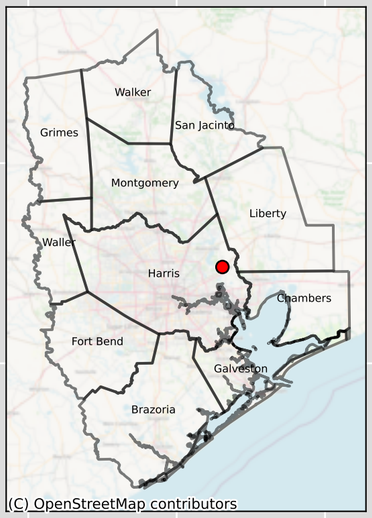


GMA14 Measured
GMA14 Simulated

Benchmark Station - F_55

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - S_666

Subsidence (ft)

Year

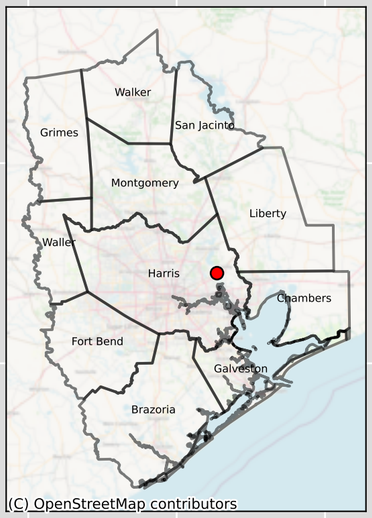
GMA14 Measured

GMA14 Simulated

Benchmark Station - D_690

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - W_666

Subsidence (ft)

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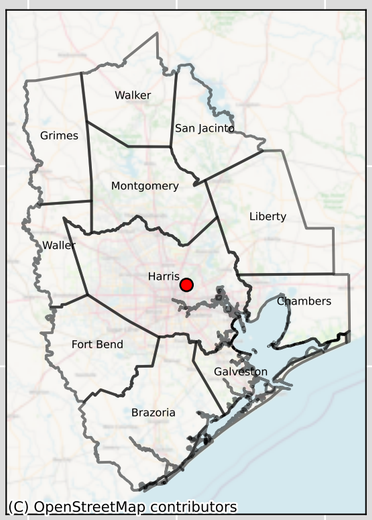
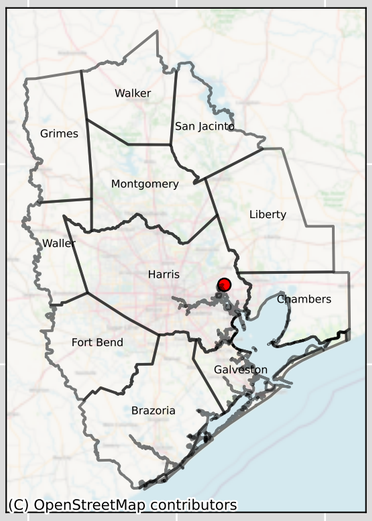


GMA14 Measured
GMA14 Simulated

Benchmark Station - J_659

Subsidence (ft)

Year



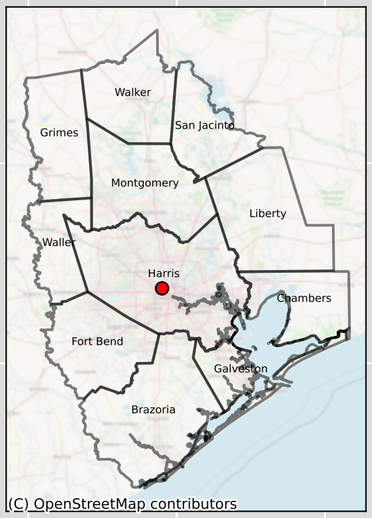
GMA14 Measured

GMA14 Simulated

Benchmark Station - G_755

Subsidence (ft)

Year



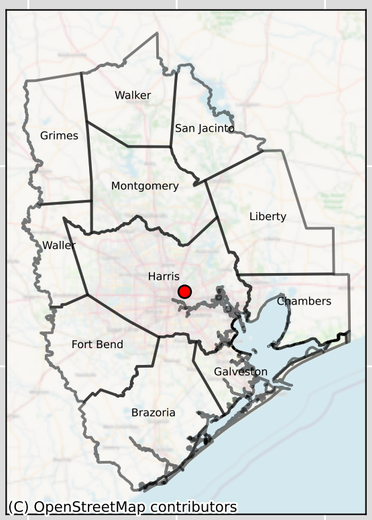
GMA14 Measured

GMA14 Simulated

Benchmark Station - B_659

Subsidence (ft)

Year



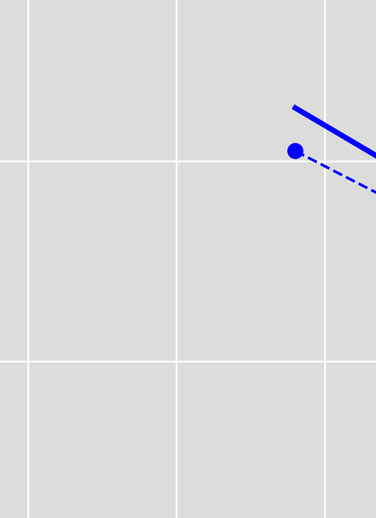
GMA14 Measured

GMA14 Simulated

Benchmark Station - W_658

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - G_659

GMA14 Measured
GMA14 Simulated

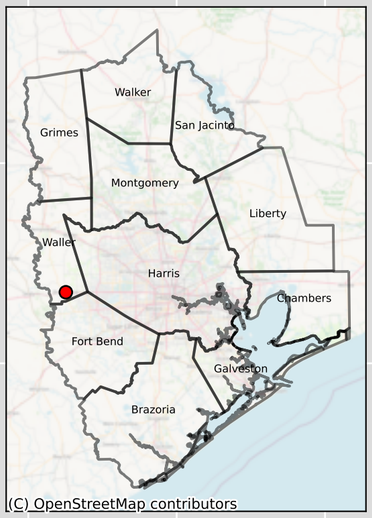
Subsidence (ft)

Year

Benchmark Station - H_768

Subsidence (ft)

Year



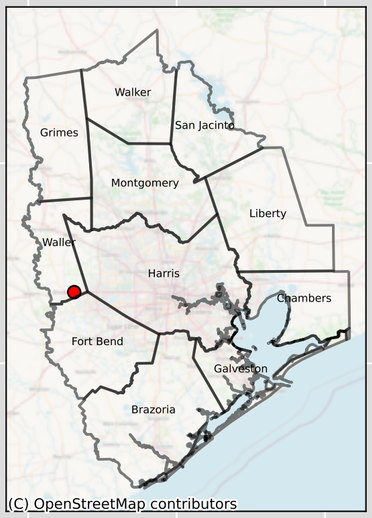
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_7

Subsidence (ft)

Year



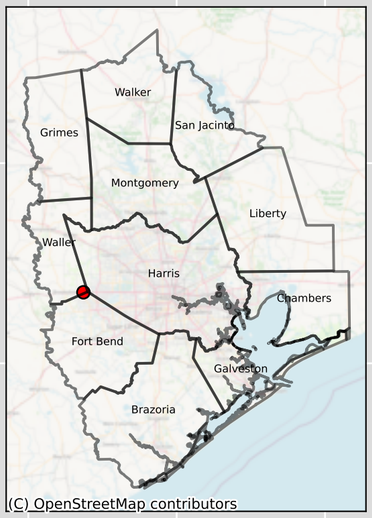
GMA14 Measured

GMA14 Simulated

Benchmark Station - N_768

Subsidence (ft)

Year



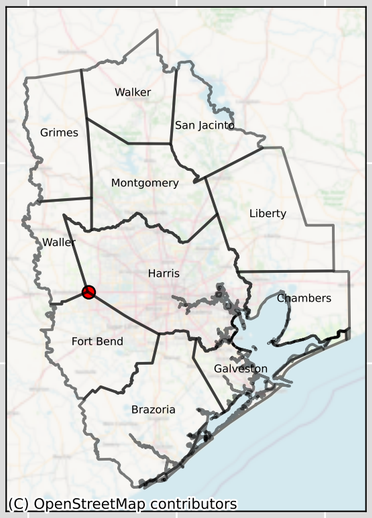
GMA14 Measured

GMA14 Simulated

Benchmark Station - Y_7

Subsidence (ft)

Year



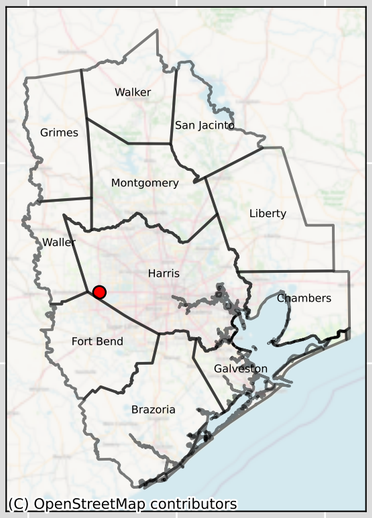
GMA14 Measured

GMA14 Simulated

Benchmark Station - T_768

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - V_768

Subsidence (ft)

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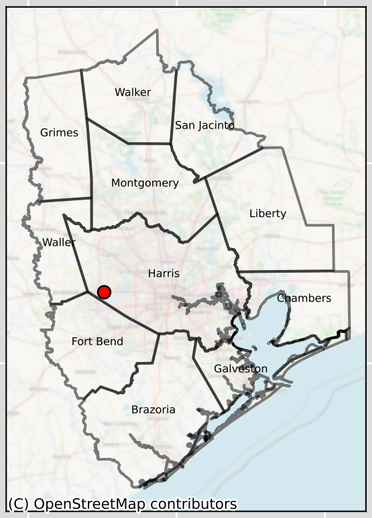
Year



GMA14 Measured
GMA14 Simulated

Benchmark Station - C_760

Subsidence (ft)

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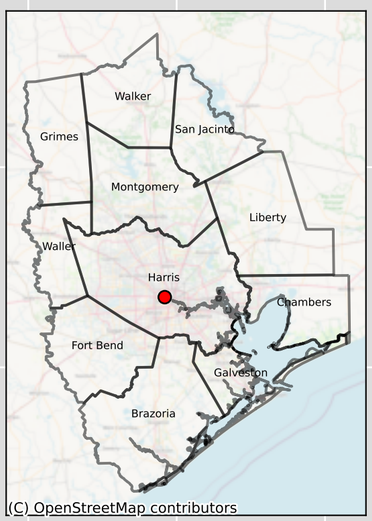
Year

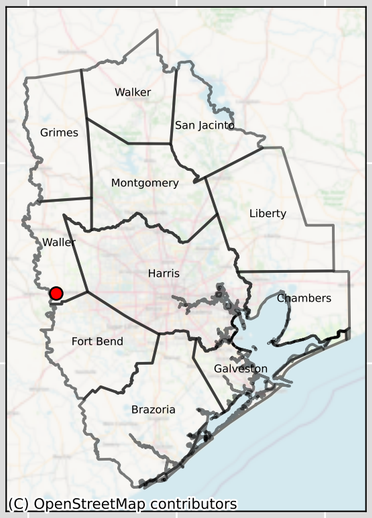


GMA14 Measured
GMA14 Simulated

Benchmark Station - T_7

Subsidence (ft)

Year



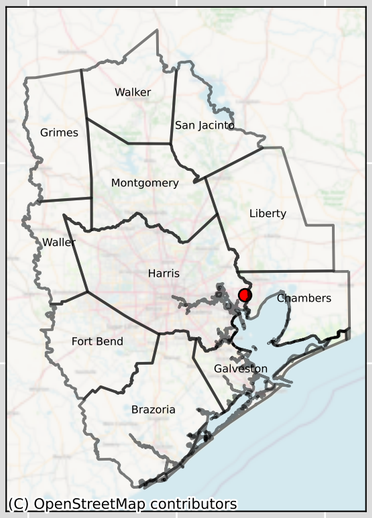
GMA14 Measured

GMA14 Simulated

Benchmark Station - C_660

Subsidence (ft)

Year



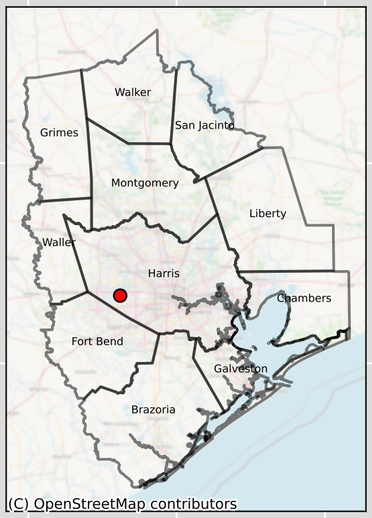
GMA14 Measured

GMA14 Simulated

Benchmark Station - F_804

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - S_669

Subsidence (ft)

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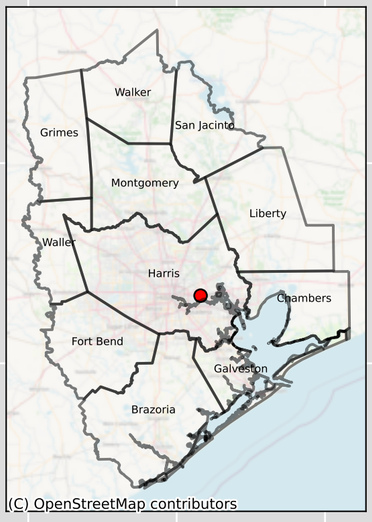
Year

GMA14 Measured
GMA14 Simulated

Benchmark Station - Q_658

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - R_669

Subsidence (ft)

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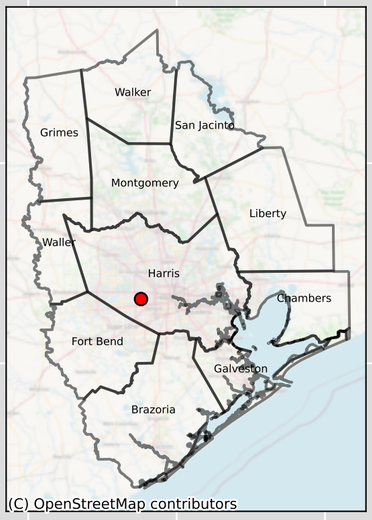
Year

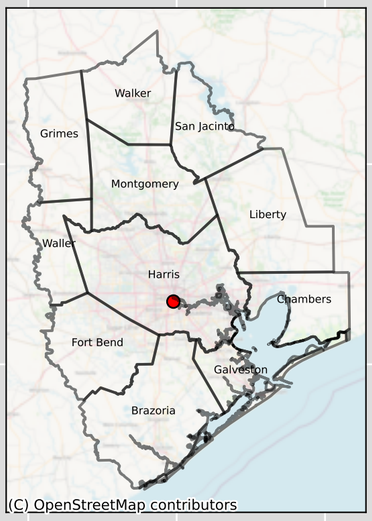


GMA14 Measured
GMA14 Simulated

Benchmark Station - L_54

Subsidence (ft)

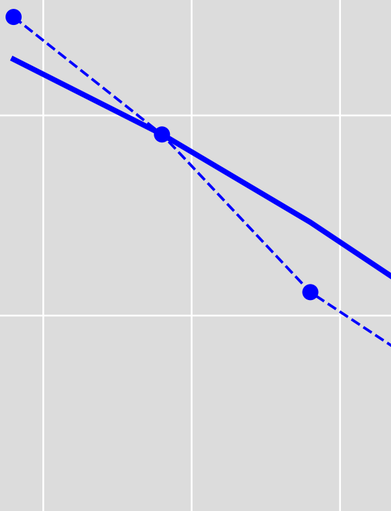
Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - M_8



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

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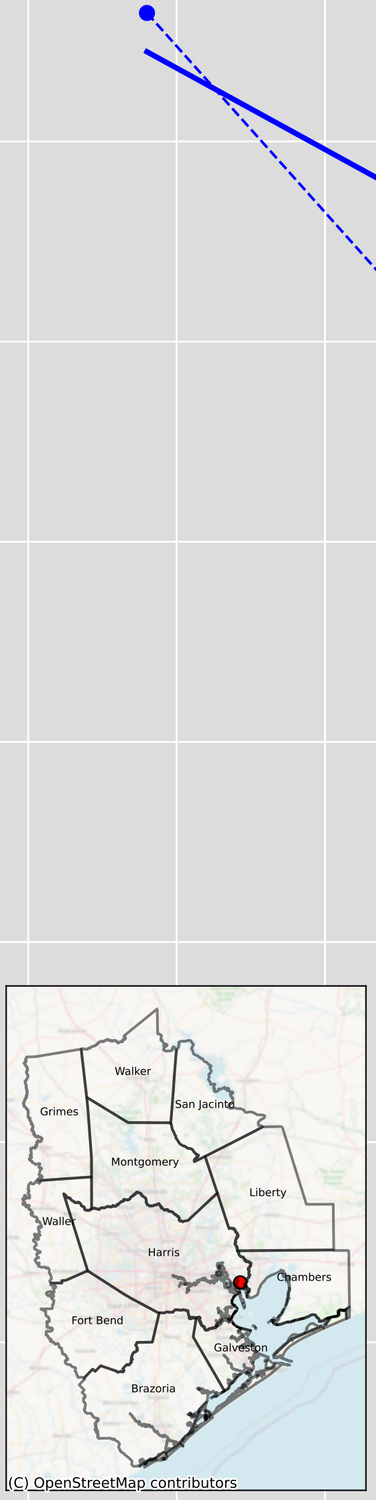
Year

Benchmark Station - F_173

Subsidence (ft)

Year



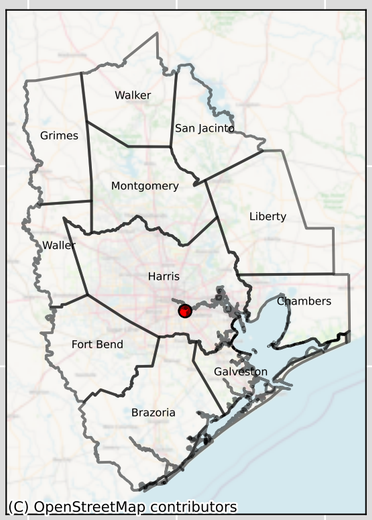
GMA14 Measured

GMA14 Simulated

Benchmark Station - O_8

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - B_1147

Subsidence (ft)

Year

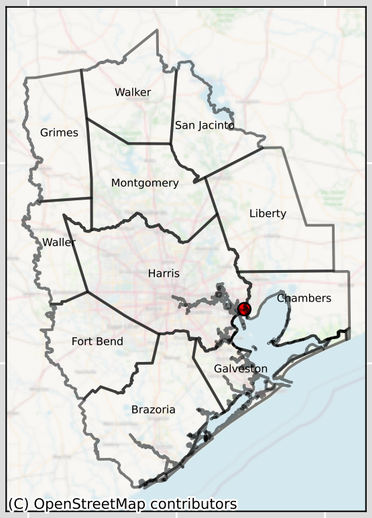
GMA14 Measured

GMA14 Simulated

Benchmark Station - G_660

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - Q_170

Subsidence (ft)

Year

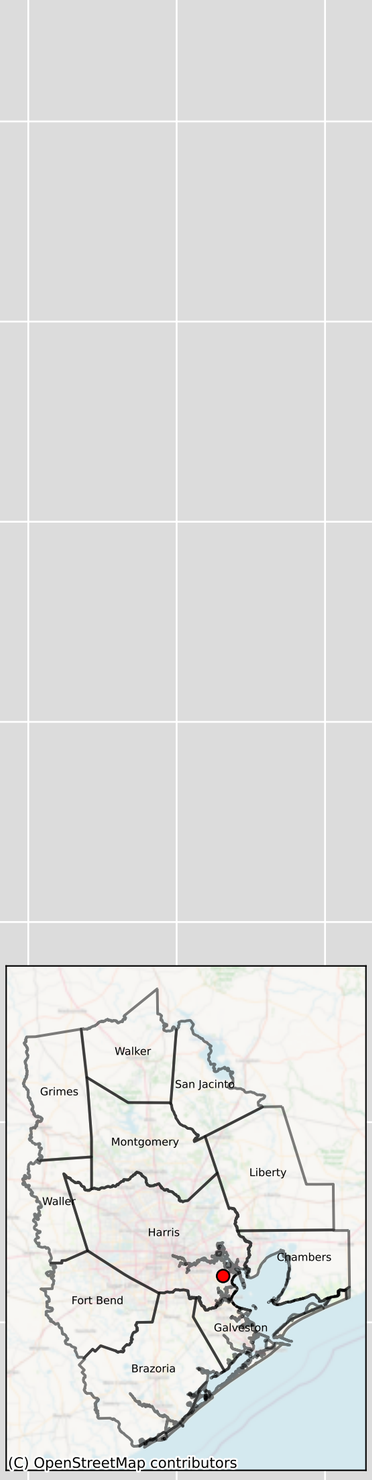
GMA14 Measured

GMA14 Simulated

Benchmark Station - J_640

Subsidence (ft)

Year



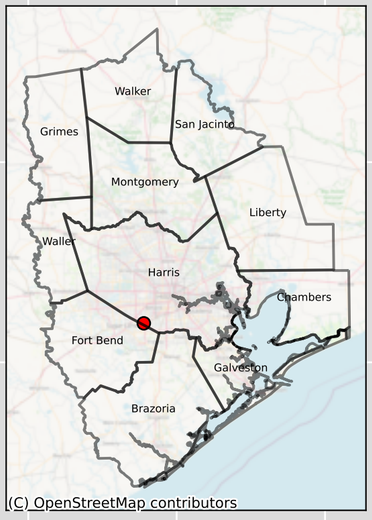
GMA14 Measured

GMA14 Simulated

Benchmark Station - L_805

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - V_640

Subsidence (ft)

Year

GMA14 Measured

GMA14 Simulated

Benchmark Station - Y_668

Subsidence (ft)

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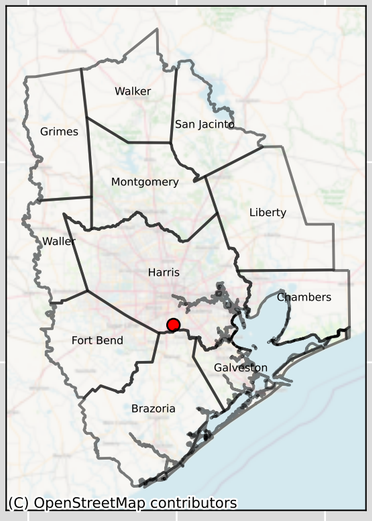
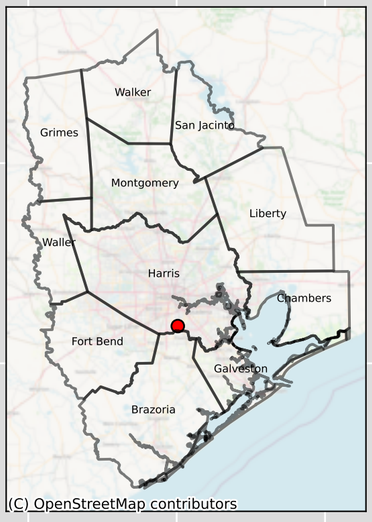


GMA14 Measured
GMA14 Simulated

Benchmark Station - Z_668

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - B_805

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0 1 2 3 4 5 6 7 8 9

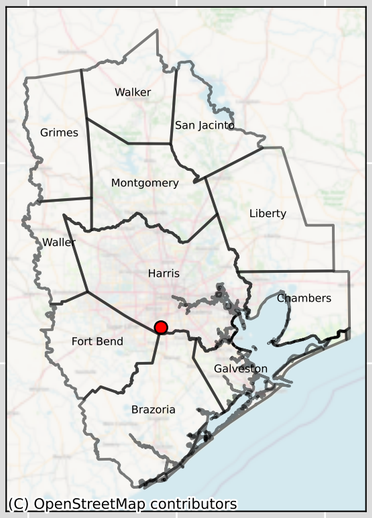
1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Benchmark Station - U_668

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - W_668

Subsidence (ft)

Year

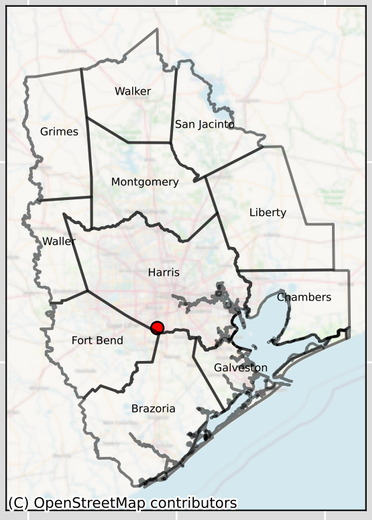
GMA14 Measured

GMA14 Simulated

Benchmark Station - A_669

Subsidence (ft)

Year



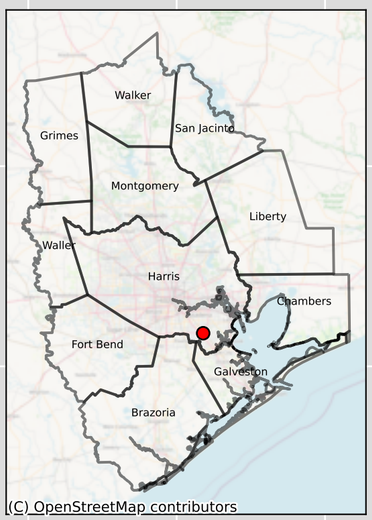
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_639

Subsidence (ft)

Year



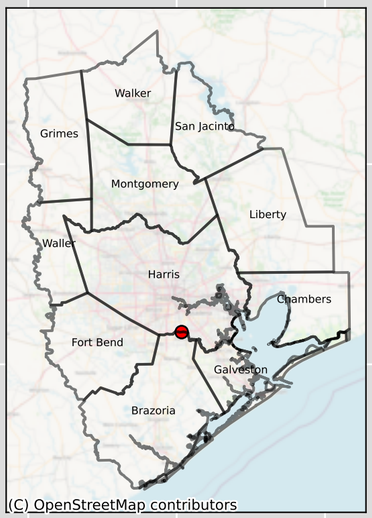
GMA14 Measured

GMA14 Simulated

Benchmark Station - F_760

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - F_170

Subsidence (ft)

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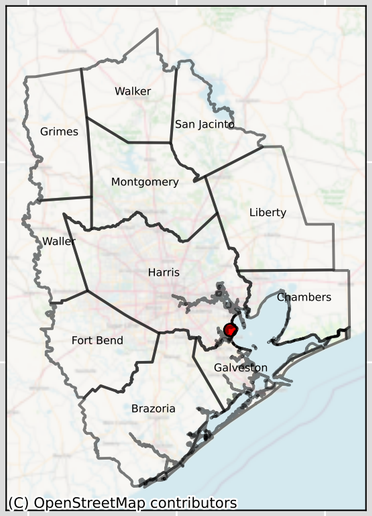
Year



GMA14 Measured
GMA14 Simulated

Benchmark Station - C_170

Subsidence (ft)

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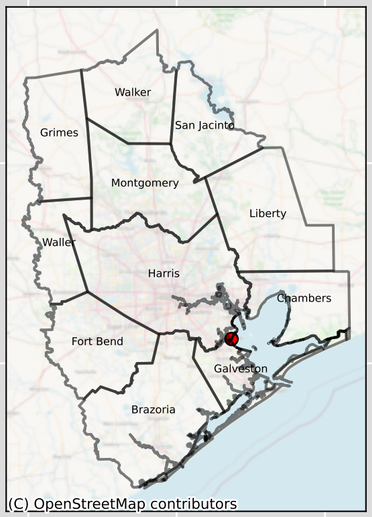
Year

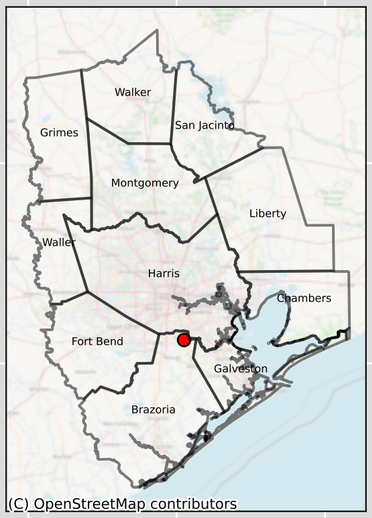


GMA14 Measured
GMA14 Simulated

Benchmark Station - P_693

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

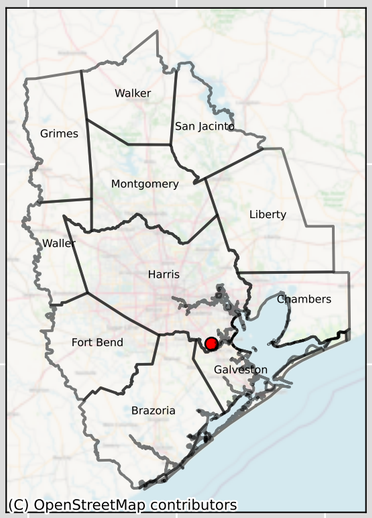
Benchmark Station - P_646

Subsidence (ft)

0
1
2
3
4
5
6
7
8
9

1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015

Year

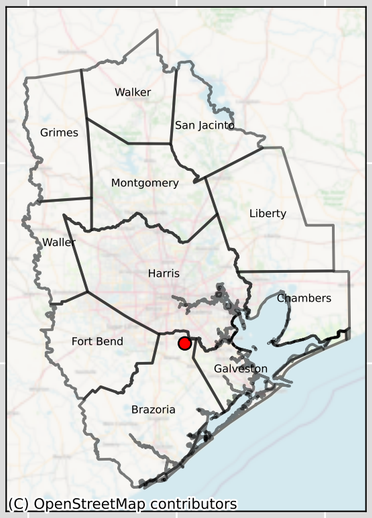


GMA14 Measured
GMA14 Simulated

Benchmark Station - D_54

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - S_646

Subsidence (ft)

0
1
2
3
4
5
6
7
8
9

1935
1940
1945
1950
1955
1960
1965
1970
1975
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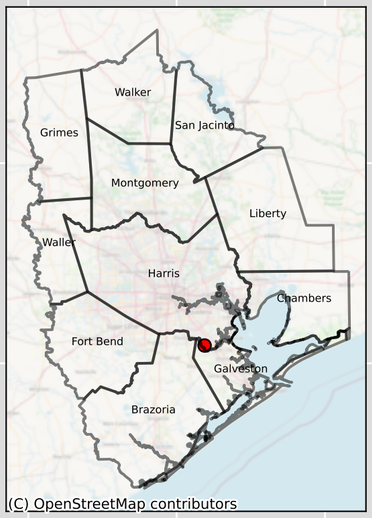
1990
1995
2000
2005
2010
2015

Year

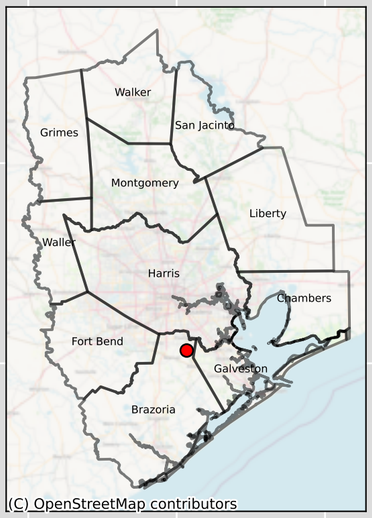


GMA14 Measured
GMA14 Simulated

Benchmark Station - C_54

Subsidence (ft)

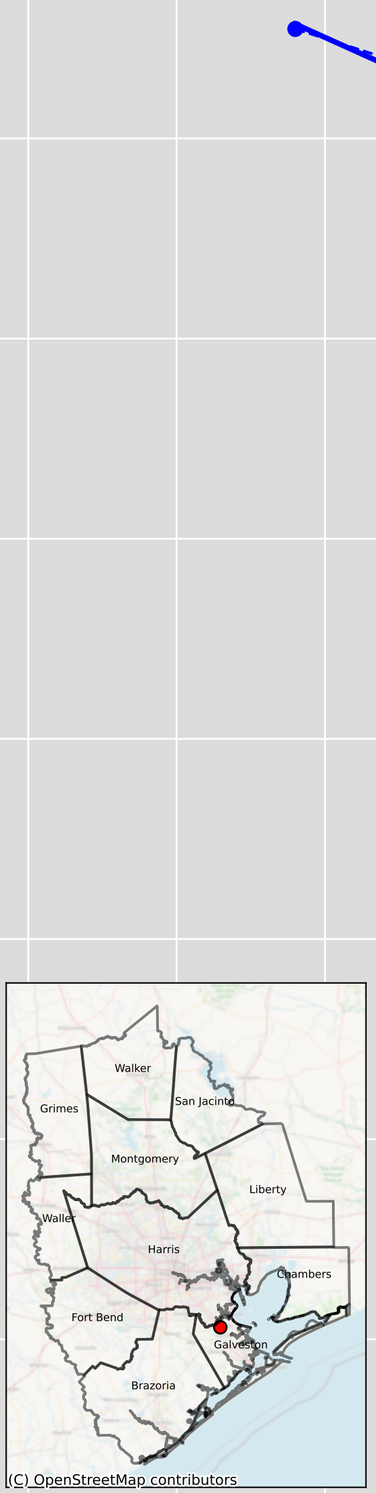
Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - M_639



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0
1
2
3
4
5
6
7
8
9

1935
1940
1945
1950
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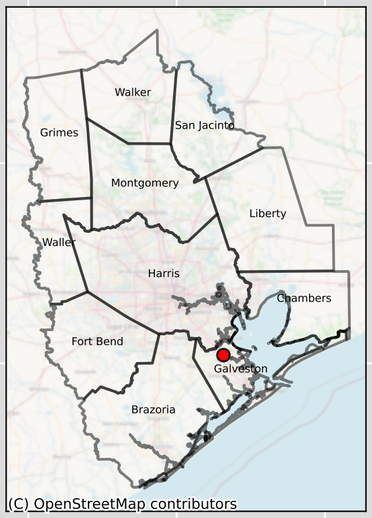
1985
1990
1995
2000
2005
2010
2015

Year

Benchmark Station - L_639

Subsidence (ft)

Year



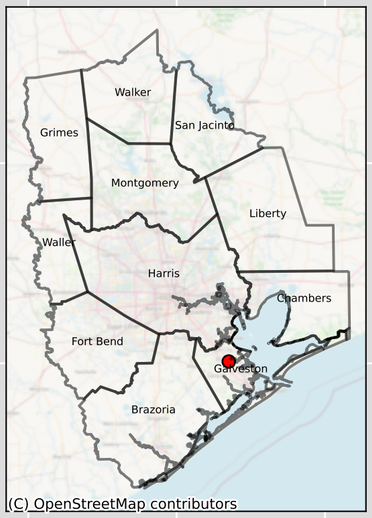
GMA14 Measured

GMA14 Simulated

Benchmark Station - J_639

Subsidence (ft)

Year



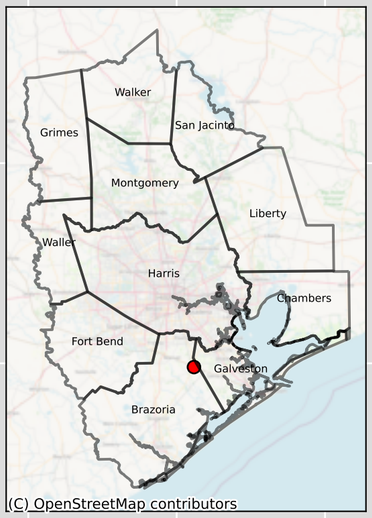
GMA14 Measured

GMA14 Simulated

Benchmark Station - W_53

Subsidence (ft)

Year



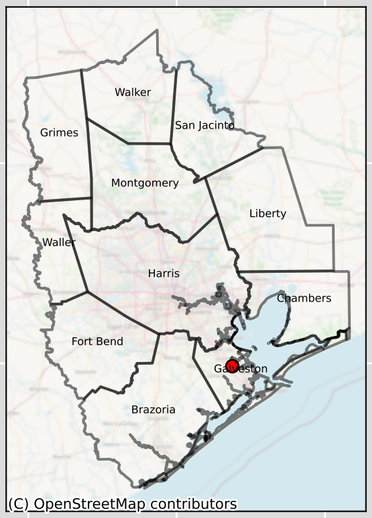
GMA14 Measured

GMA14 Simulated

Benchmark Station - G_639

Subsidence (ft)

Year



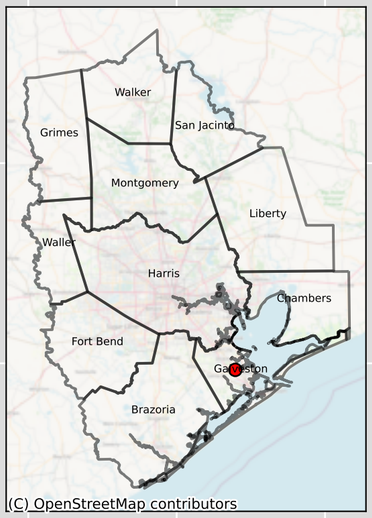
GMA14 Measured

GMA14 Simulated

Benchmark Station - E_639

Subsidence (ft)

Year



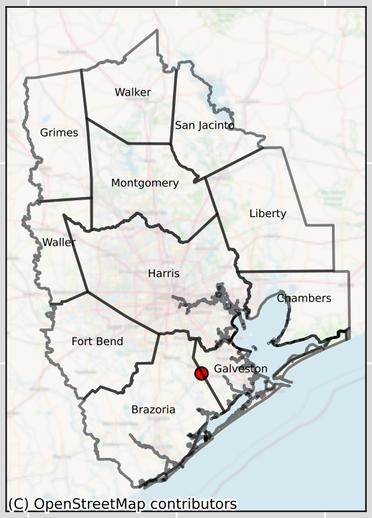
GMA14 Measured

GMA14 Simulated

Benchmark Station - N_691

Subsidence (ft)

Year



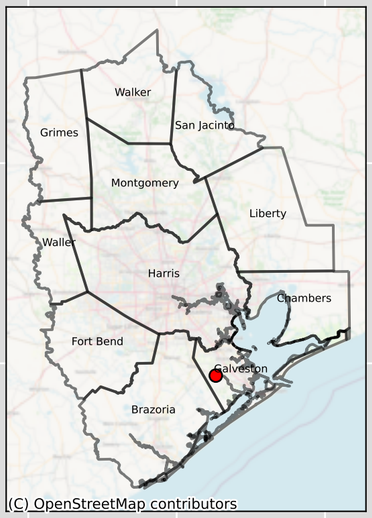
GMA14 Measured

GMA14 Simulated

Benchmark Station - V_305

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Benchmark Station - B_901

Subsidence (ft)

Year

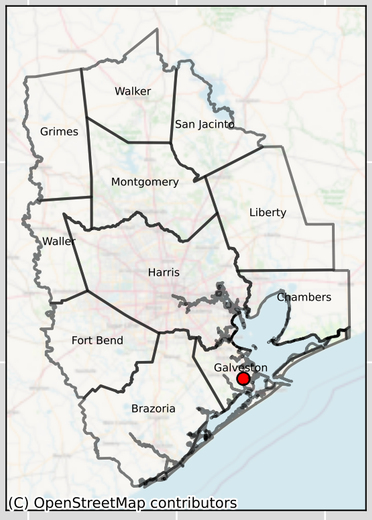
GMA14 Measured

GMA14 Simulated

Benchmark Station - A_639

Subsidence (ft)

Year



GMA14 Measured

GMA14 Simulated

Extensometer Station - LakeHouston

GMA14 Measured
GMA14 Simulated

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
1950
1955
1960
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1995
2000
2005
2010
2015

Year

Extensometer Station - Northeast

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
1950
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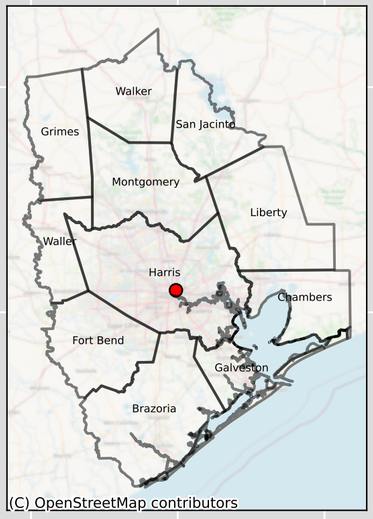
1990
1995
2000
2005
2010
2015

Year



GMA14 Measured
GMA14 Simulated

Extensometer Station - Addicks

GMA14 Measured
GMA14 Simulated

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
1950
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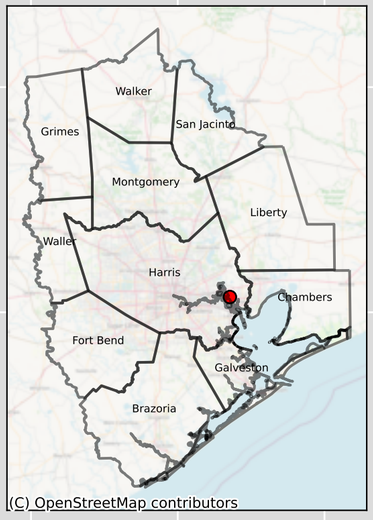
2005
2010
2015

Year

Extensometer Station - BaytownC1

Compaction (ft)

Year



GMA14 Measured

GMA14 Simulated

Extensometer Station - BaytownC2

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
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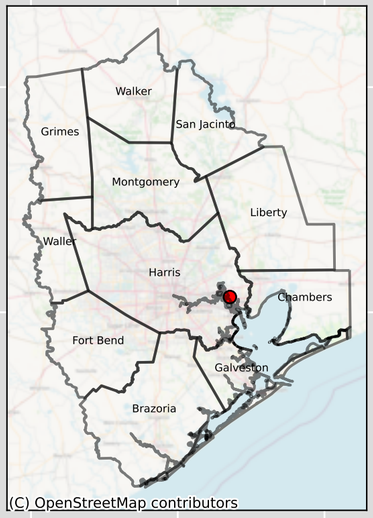
2005
2010
2015

Year



GMA14 Measured
GMA14 Simulated

Extensometer Station - Southwest

GMA14 Measured
GMA14 Simulated

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
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1995
2000
2005
2010
2015

Year

Extensometer Station - Pasadena

GMA14 Measured
GMA14 Simulated

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
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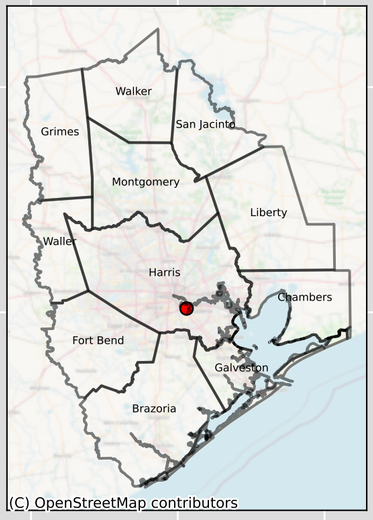
2000
2005
2010
2015

Year

Extensometer Station - EastEnd

Compaction (ft)

Year



GMA14 Measured

GMA14 Simulated

Extensometer Station - ClearLakeDeep

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
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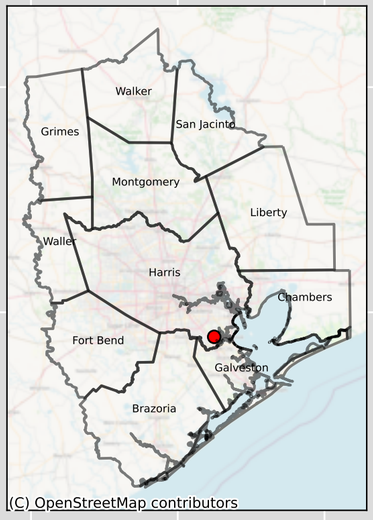
2005
2010
2015

Year

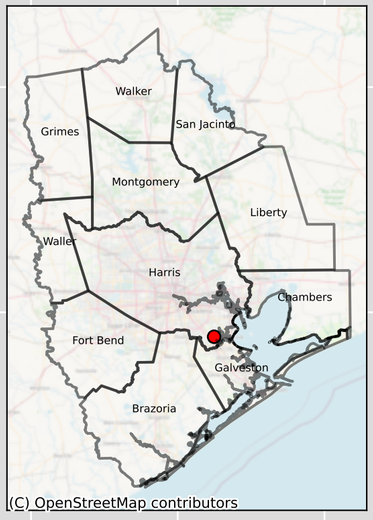


GMA14 Measured
GMA14 Simulated

Extensometer Station - ClearLakeShallow

Compaction (ft)

Year



GMA14 Measured

GMA14 Simulated

Extensometer Station - Seabrook

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
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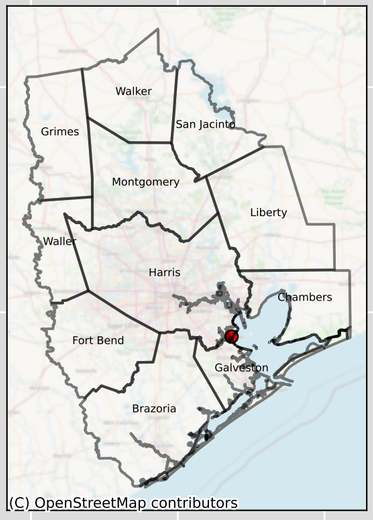
2010
2015

Year



GMA14 Measured
GMA14 Simulated

Extensometer Station - JohnsonSpaceCenter

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
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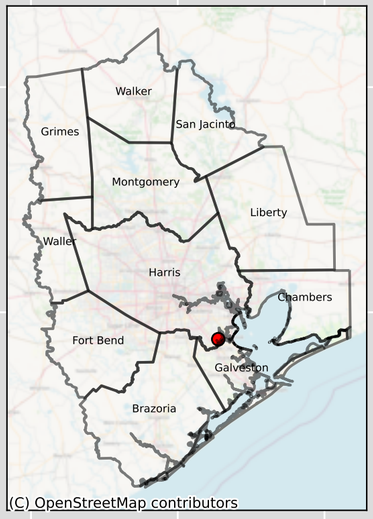
1995
2000
2005
2010
2015

Year



GMA14 Measured
GMA14 Simulated

Extensometer Station - TexasCity

Compaction (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

1935
1940
1945
1950
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1990
1995
2000
2005
2010
2015

Year

GMA14 Measured
GMA14 Simulated

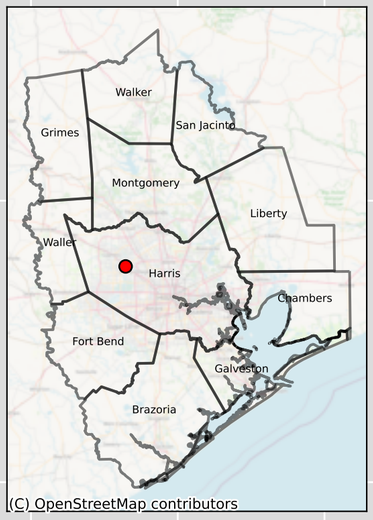
Global Positioning System Station - P001

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

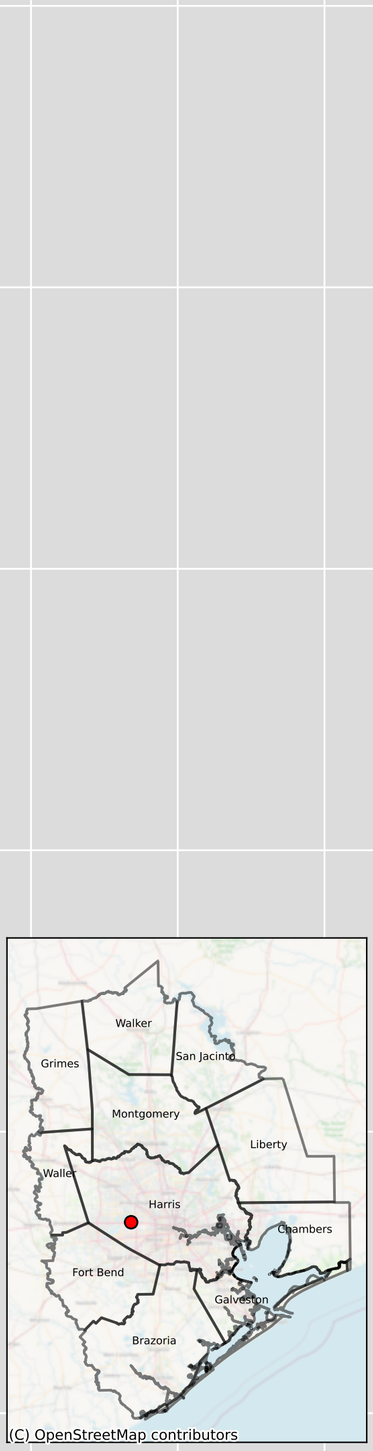
Global Positioning System Station - ADKS

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

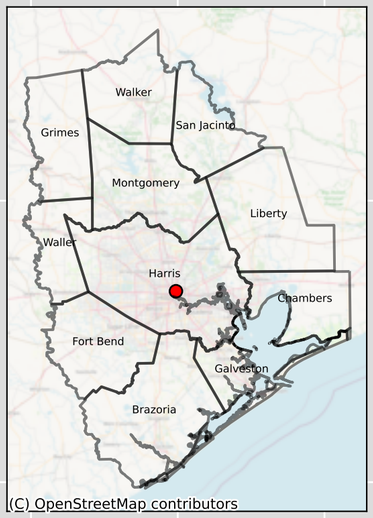
Global Positioning System Station - NETP

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

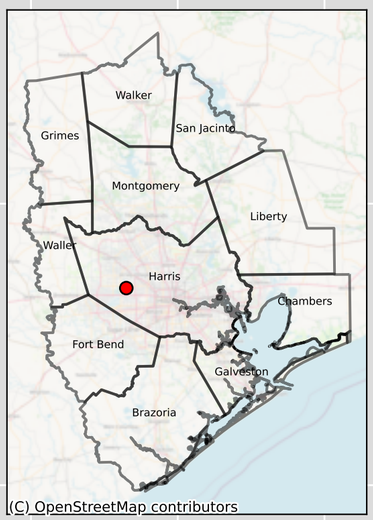
Global Positioning System Station - P003

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

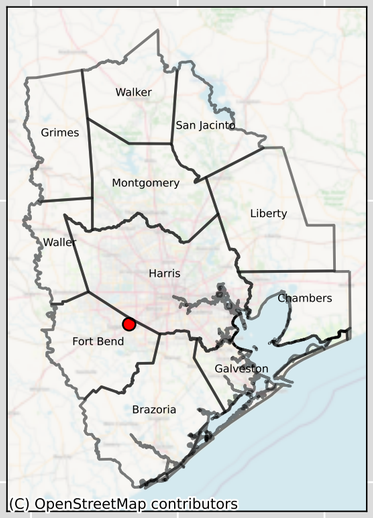
Global Positioning System Station - P004

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

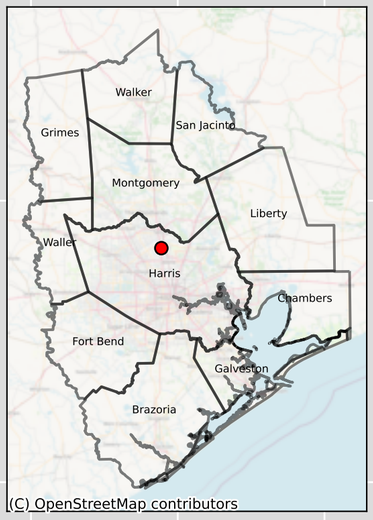
Global Positioning System Station - P002

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P000

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - LKHU

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P005

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

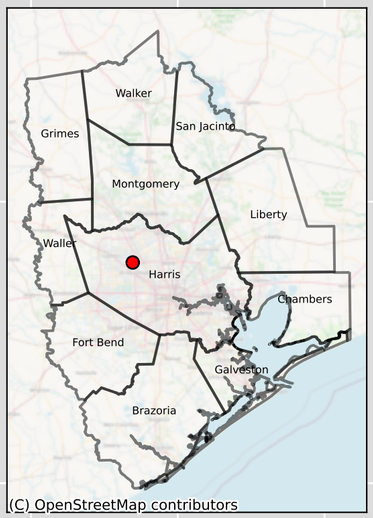
Global Positioning System Station - P007

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P008

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P011

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P010

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P009

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P018

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P014

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

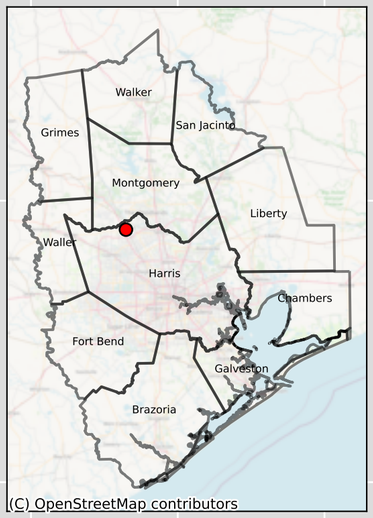
Global Positioning System Station - P017

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P019

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P013

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P016

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P012

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P026

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P021

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P028

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P024

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P023

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P020

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P022

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - ZHU1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P027

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - ANG6

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

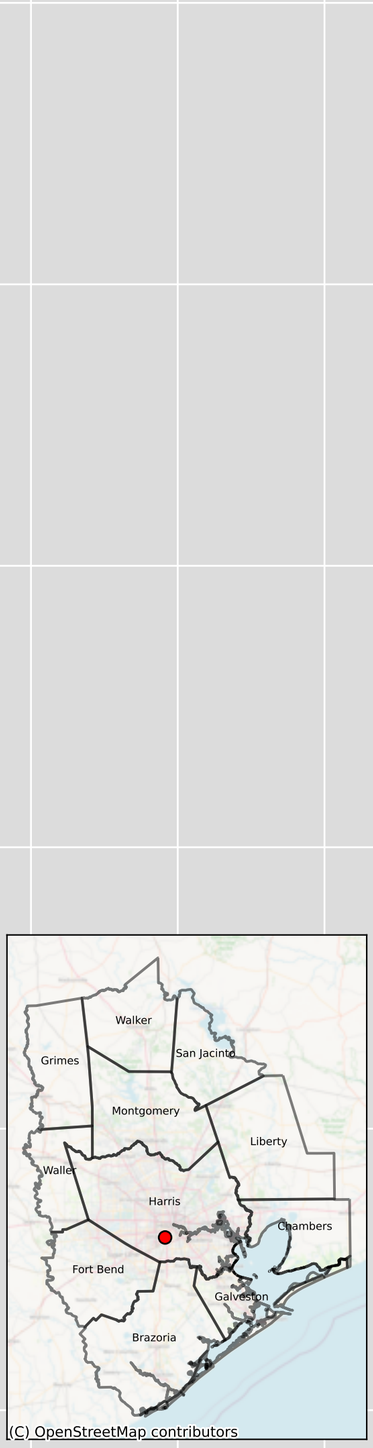
Global Positioning System Station - TMCC

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - ANG5

GMA14 Measured
GMA14 Simulated

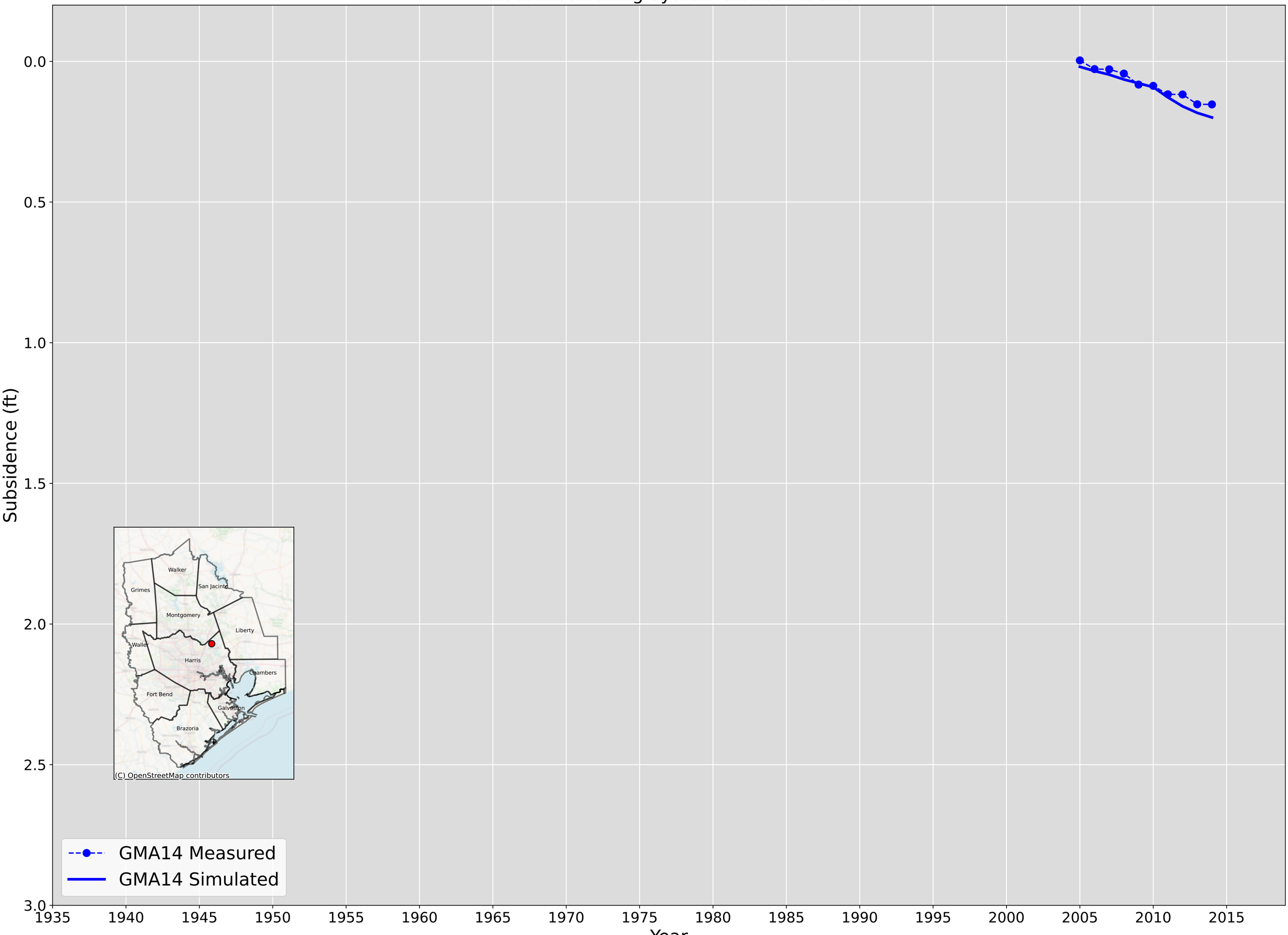
Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - COH6



Global Positioning System Station - TXCN

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXGA

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXLI

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXLM

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXHE

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXAG

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P050

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P049

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P035

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P033

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P036

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P054

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - ROD1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P055

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

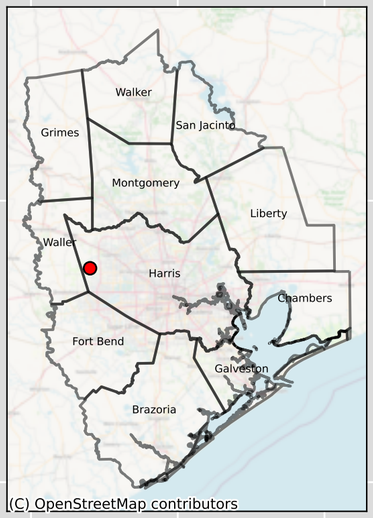
Global Positioning System Station - P056

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P038

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P031

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P053

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P044

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P029

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P045

GMA14 Measured
GMA14 Simulated

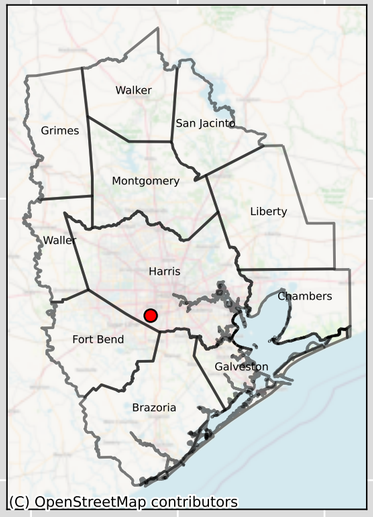
Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P041



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P052

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P030

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

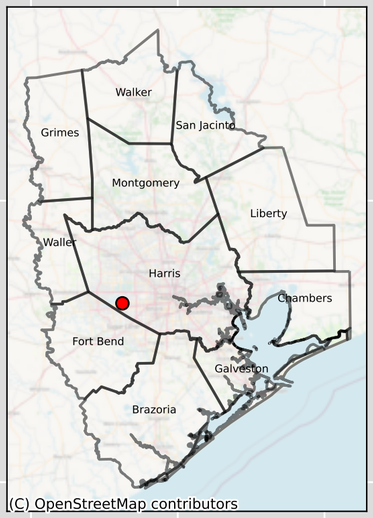
Global Positioning System Station - P042

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P040

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P032

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P037

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P051

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P047

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P048

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P057

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - COH2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXBC

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - DWI1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXED

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXHN

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXWH

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P061

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P062

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXEX

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P067

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXAC

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P034

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P059

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P058

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

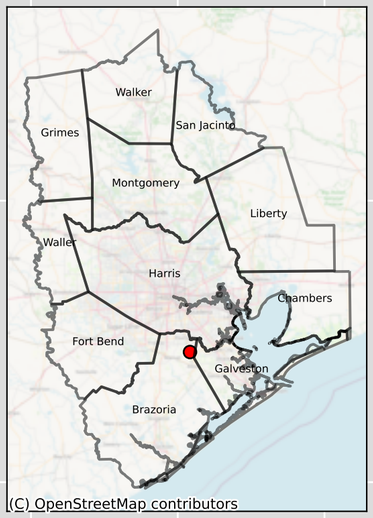
Global Positioning System Station - DEN3

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXRS

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P071

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXKO

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P068

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P063

GMA14 Measured

GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - DEN2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P073

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P072

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P069

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXPT

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P070

GMA14 Measured

GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - DEN1

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P074

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXLQ

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P039

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P076

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UH01

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

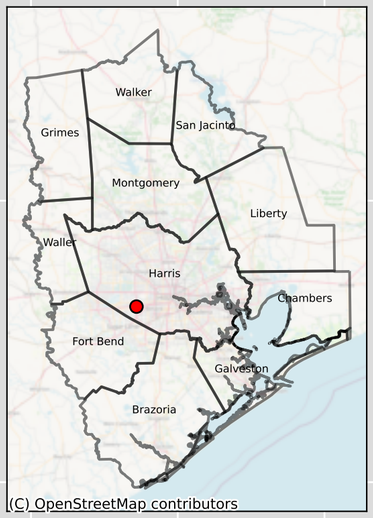
Global Positioning System Station - TXHS

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - THSU

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P077

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P060

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXNV

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXCV

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P075

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

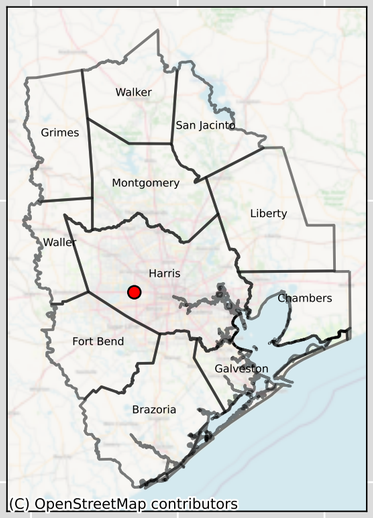
Global Positioning System Station - UTEX

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXB2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXB1

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P065

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

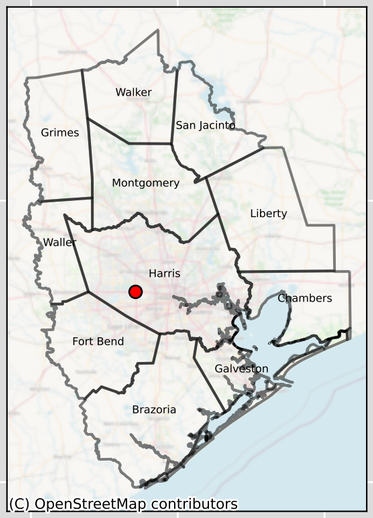
Global Positioning System Station - HCC1

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - JGS2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXMG

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

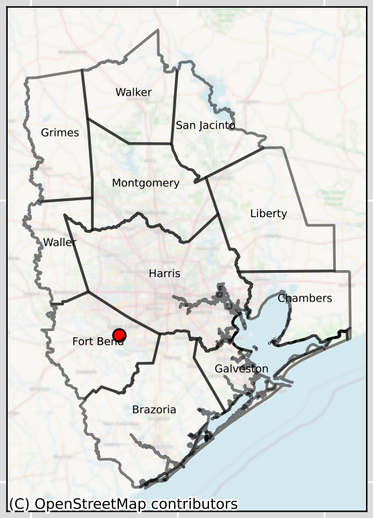
Global Positioning System Station - UHSL

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

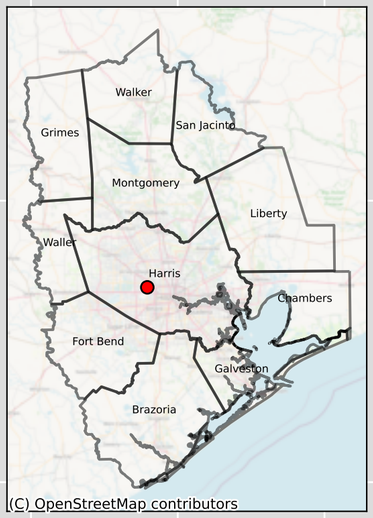
Global Positioning System Station - RDCT

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TSFT

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - LCI1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHC2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHCL

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - HSMN

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

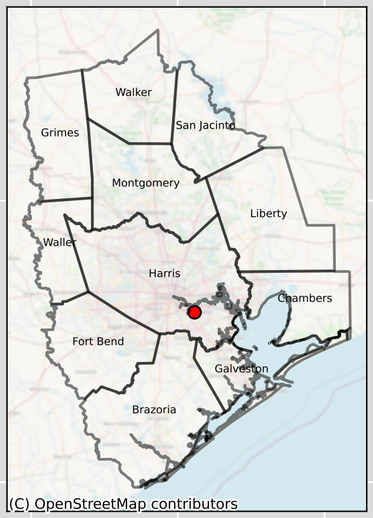
Global Positioning System Station - WEPD

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - UHC1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHC3

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TDAM

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

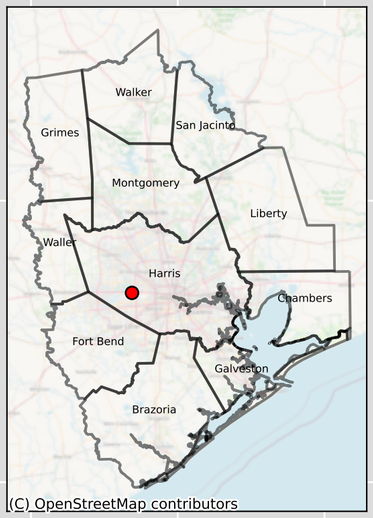
Global Positioning System Station - WCHT

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - MEPD

GMA14 Measured
GMA14 Simulated

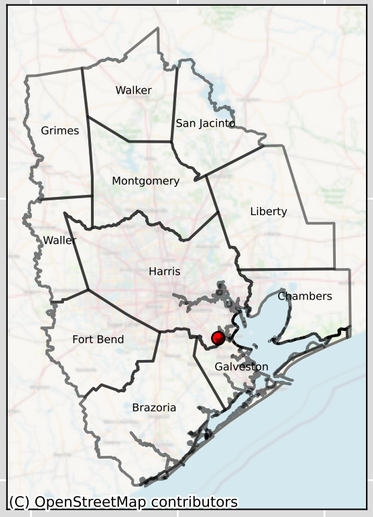
Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - NASA



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - HCC2

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

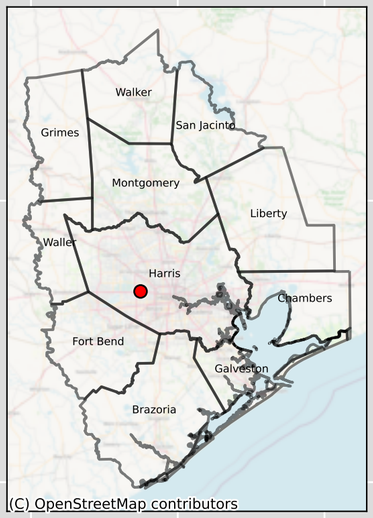
Global Positioning System Station - WDVW

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - UHCR

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - MDWD

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHDT

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHC0

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - LGC1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - COTM

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P080

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P081

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - FSFB

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXRN

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P079

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXWN

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

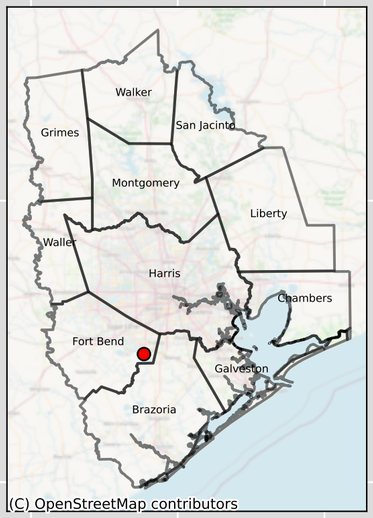
Global Positioning System Station - RPFB

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

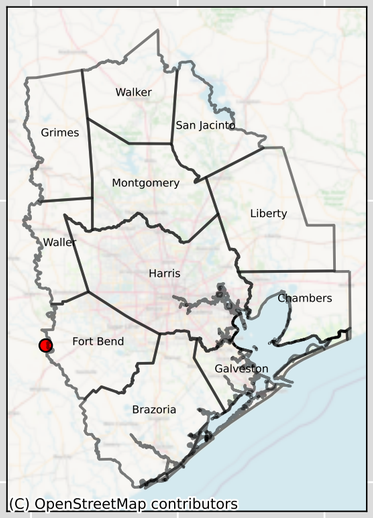
Global Positioning System Station - UHEB

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - OKEK

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - DMFB

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

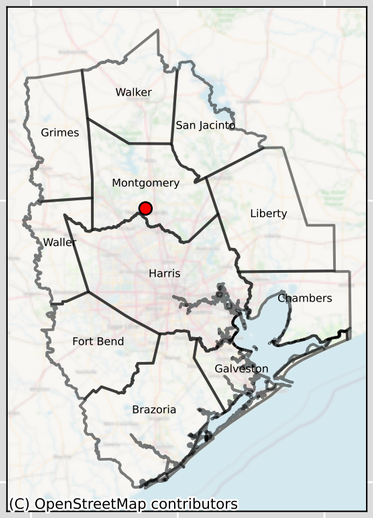
Global Positioning System Station - WHCR

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - SHSG

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHWL

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHL1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

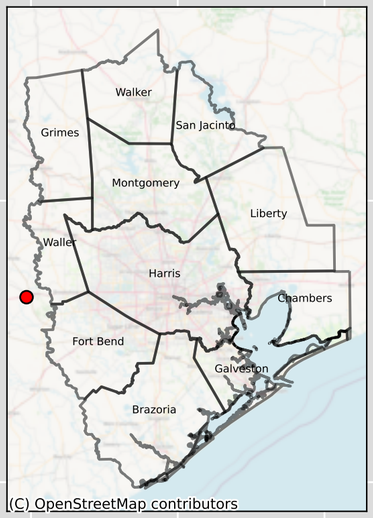
Global Positioning System Station - SISD

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

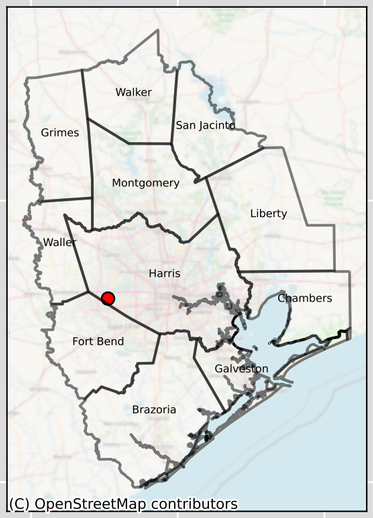
Global Positioning System Station - HPEK

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P078

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - MRHK

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - SESG

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured

GMA14 Simulated

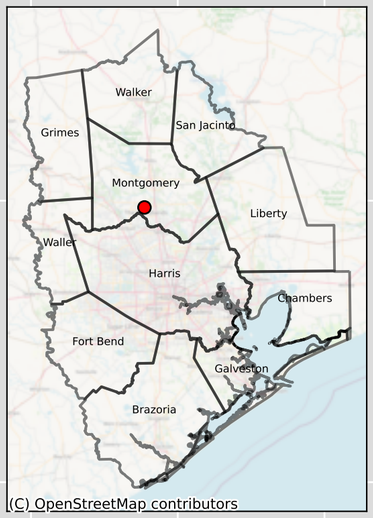
Global Positioning System Station - PWES

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - UHRI

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

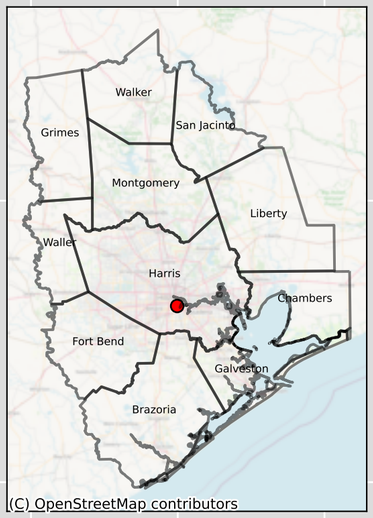
Global Positioning System Station - UHEP

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

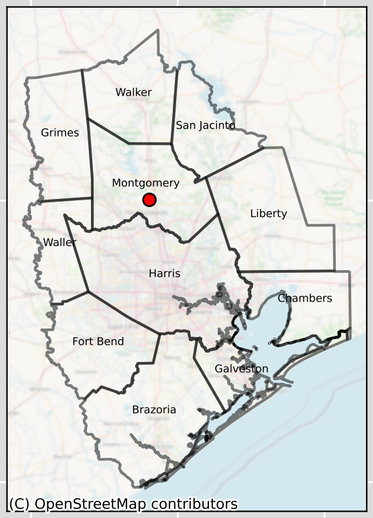
Global Positioning System Station - UHJF

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - UHF1

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

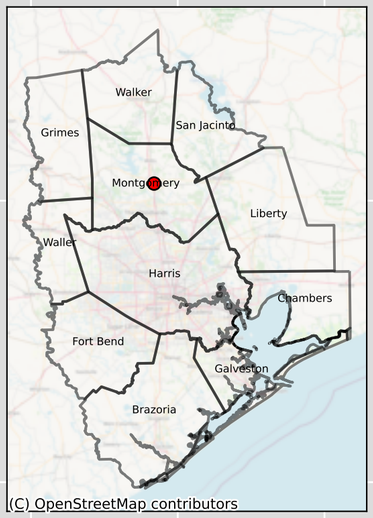
Global Positioning System Station - UH02

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - ALEF

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - CMFB

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - SPBH

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - KKES

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

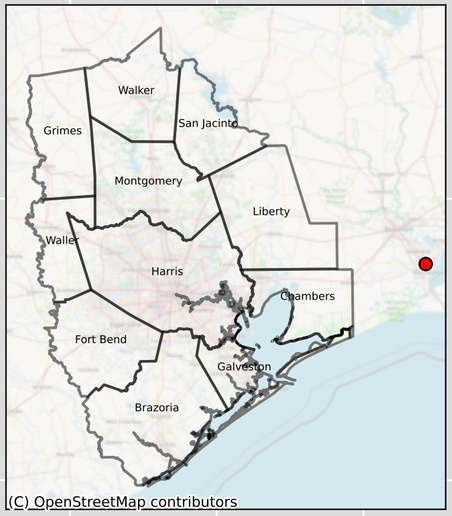
Global Positioning System Station - TXPH

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - CSTE

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured

GMA14 Simulated

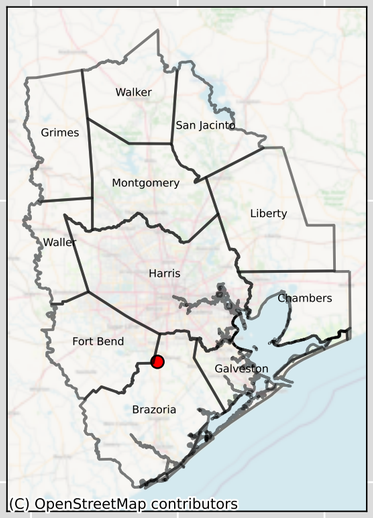
Global Positioning System Station - P088

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

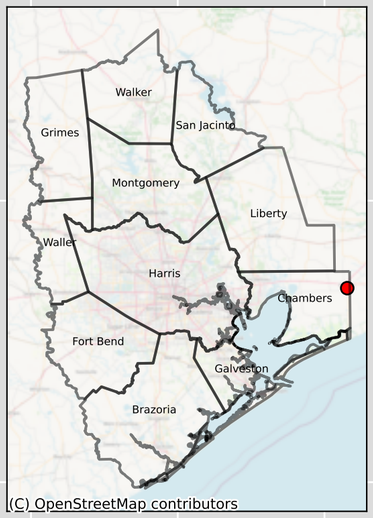
Global Positioning System Station - TXWI

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P085

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

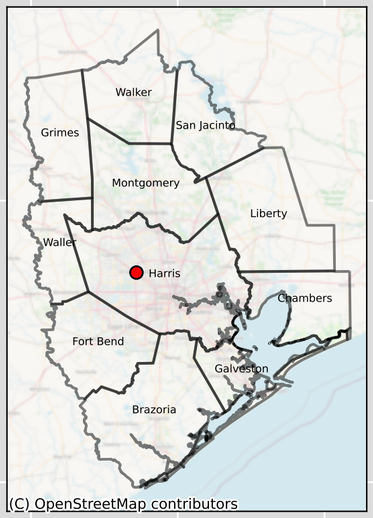
Global Positioning System Station - CFJV

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - DEN4

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

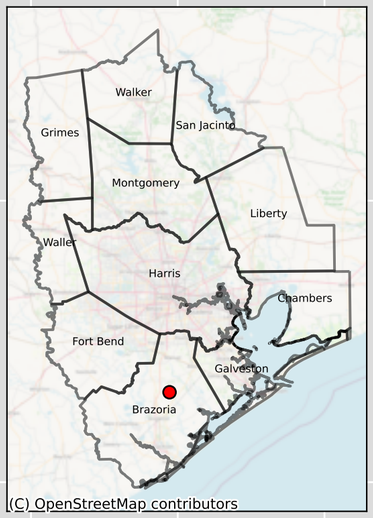
Global Positioning System Station - P084

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

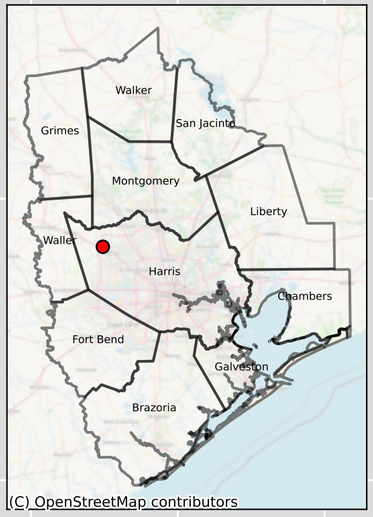
1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - AULT



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

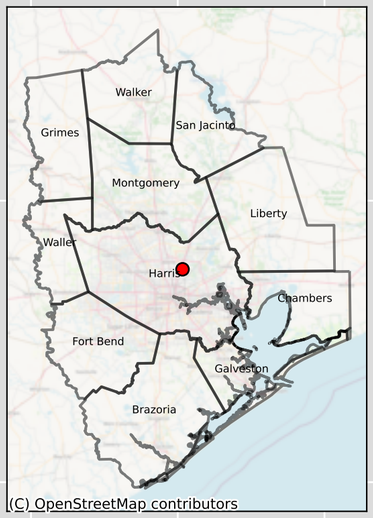
Global Positioning System Station - TXTG

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured

GMA14 Simulated

Global Positioning System Station - DISD

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured

GMA14 Simulated

Global Positioning System Station - TXHV

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

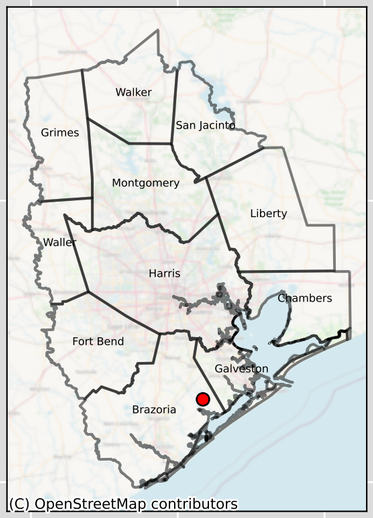
Global Positioning System Station - P083

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

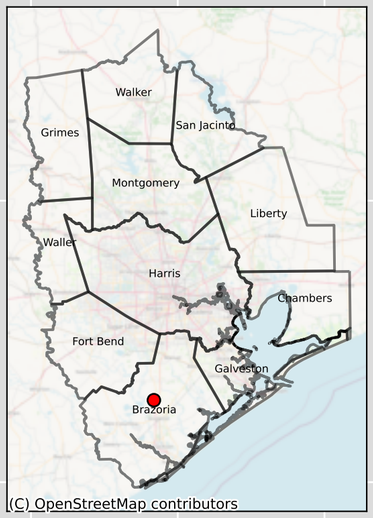
Global Positioning System Station - P086

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P087

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - GSEC

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - TXH2

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P089

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

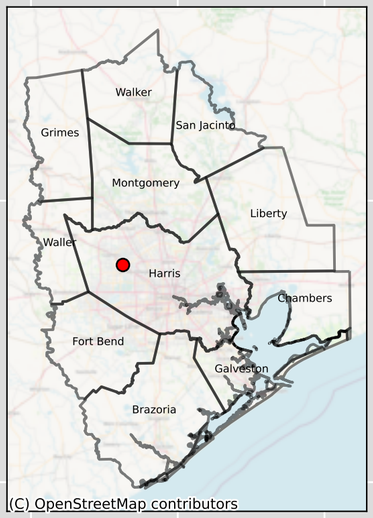
Global Positioning System Station - CFHS

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - KPCD

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - KPCS

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

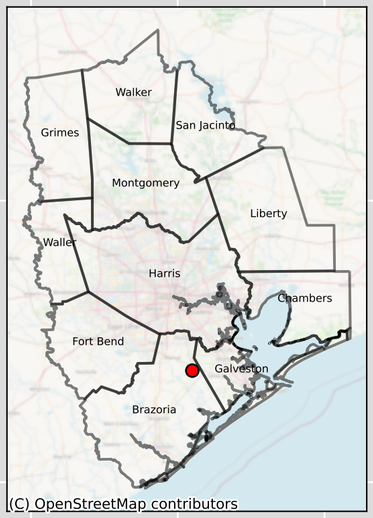
Global Positioning System Station - TXAV

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - TXSP

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P093

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P091

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P090

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

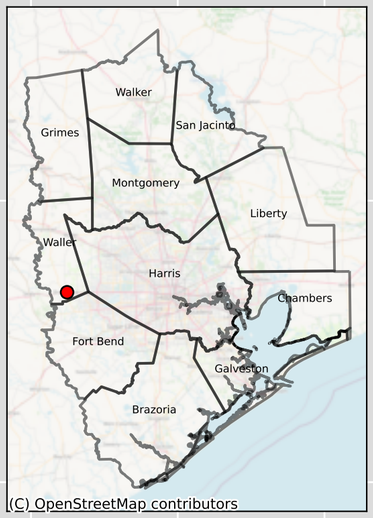
Global Positioning System Station - TXBH

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured

GMA14 Simulated

Global Positioning System Station - P095

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P092

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P099

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

GMA14 Measured
GMA14 Simulated

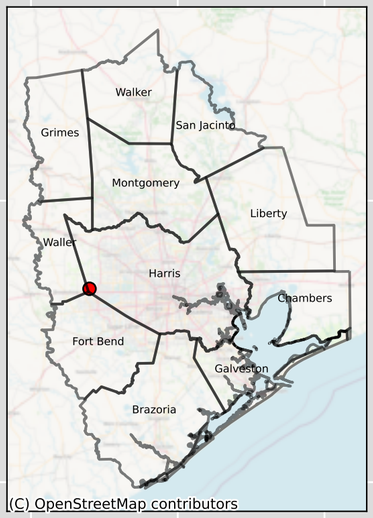
Global Positioning System Station - P098

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P094

GMA14 Measured
GMA14 Simulated

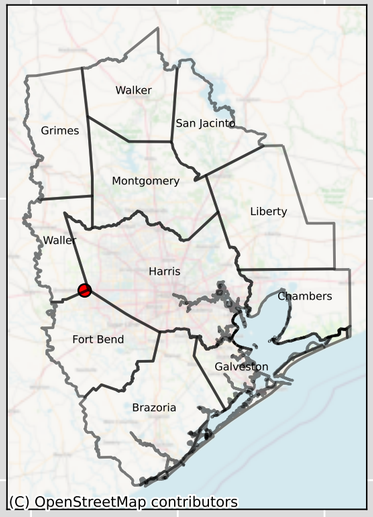
Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - P097



GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

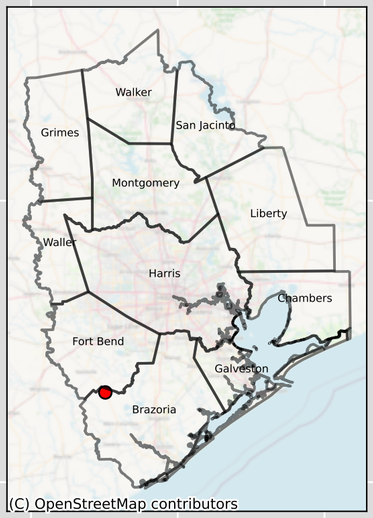
Global Positioning System Station - P082

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

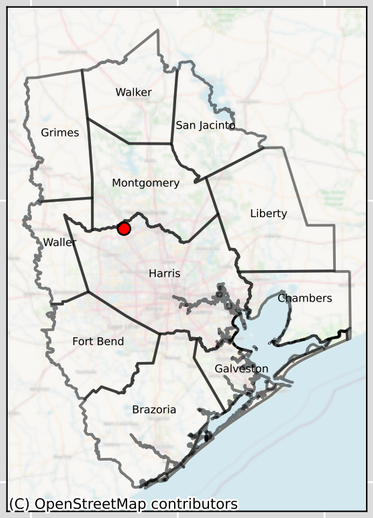
Global Positioning System Station - TXCY

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured
GMA14 Simulated

Global Positioning System Station - P096

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Global Positioning System Station - UHKD

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

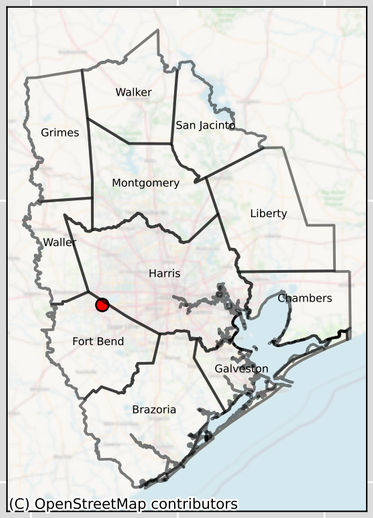
Global Positioning System Station - UHKS

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year



GMA14 Measured

GMA14 Simulated

Global Positioning System Station - TXP5

GMA14 Measured
GMA14 Simulated

Subsidence (ft)

0.0
0.5
1.0
1.5
2.0
2.5
3.0

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

Year

Appendix 9 —
GMA 14 Model Net Water Budgets
for Year 2018 for each County by Aquifer

County:	Angelina						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-382	0	0	0	0	8	-374
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	-324	0	0	0	0	0	-324
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	1,480	0	0	0	0	0	1,480
Vertical Leakage (Upper)	0	0	0	0	0	253	253
Vertical Leakage (Lower)	-253	0	0	0	0	0	-253
*All values in acre-feet							

County:	Austin						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-3,000	6,309	4,334	4	208	94	7,949
Interbed Storage	0	107	563	15	352	0	1,037
Water Compressibility	-1	4	49	4	27	34	117
Wells	0	-2,020	-7,138	0	-1,193	0	-10,351
Drains	-16,218	0	0	0	0	0	-16,218
Rivers	891	0	0	0	0	0	891
General Head Boundary	0	0	0	0	0	0	0
Recharge	34,344	0	0	0	0	0	34,344
Vertical Leakage (Upper)	0	11,402	10,379	-7	429	120	22,323
Vertical Leakage (Lower)	-15,807	-6,307	-81	-6	-120	0	-22,321
*All values in acre-feet							

County:	Brazoria						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-2,844	-115	-1	34	164	142	-2,620
Interbed Storage	0	2,130	3,078	4	106	0	5,318
Water Compressibility	-2	15	129	4	55	153	354
Wells	0	-35,033	-300	0	0	0	-35,333
Drains	-13,788	0	0	0	0	0	-13,788
Rivers	59	0	0	0	0	0	59
General Head Boundary	-36	624	626	-20	-274	-340	580
Recharge	41,479	0	0	0	0	0	41,479
Vertical Leakage (Upper)	0	24,990	-1,392	-24	-1	-107	23,466
Vertical Leakage (Lower)	-24,990	1,392	24	1	107	0	-23,466
*All values in acre-feet							

County:	Brazos						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-613	0	0	0	0	9	-604
Interbed Storage	0	0	0	0	1	0	1
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	-7	-7
Drains	-2,097	0	0	0	0	0	-2,097
Rivers	-612	0	0	0	0	0	-612
General Head Boundary	0	0	0	0	0	0	0
Recharge	3,001	0	0	0	0	0	3,001
Vertical Leakage (Upper)	0	0	0	0	-12	-43	-55
Vertical Leakage (Lower)	54	0	0	0	1	0	55
*All values in acre-feet							

County:	Calhoun						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-173	7	0	1	6	4	-155
Interbed Storage	0	19	11	0	1	0	31
Water Compressibility	-1	3	13	0	1	2	18
Wells	0	-2	0	0	0	0	-2
Drains	-754	0	0	0	0	0	-754
Rivers	0	0	0	0	0	0	0
General Head Boundary	-11	1,285	1,350	-83	-1,451	-2,002	-912
Recharge	2,123	0	0	0	0	0	2,123
Vertical Leakage (Upper)	0	1,117	124	-1	-1	-155	1,084
Vertical Leakage (Lower)	-1,117	-124	1	1	155	0	-1,084
*All values in acre-feet							

County:	Chambers						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-6,890	140	10	3	55	187	-6,495
Interbed Storage	0	1,451	232	6	59	0	1,748
Water Compressibility	-1	49	49	3	42	84	226
Wells	0	-7,267	-942	0	0	0	-8,209
Drains	-17,942	0	0	0	0	0	-17,942
Rivers	-70	0	0	0	0	0	-70
General Head Boundary	650	3,113	3,222	-34	-1,838	-2,098	3,015
Recharge	28,963	0	0	0	0	0	28,963
Vertical Leakage (Upper)	0	4,859	-706	-22	-11	-276	3,844
Vertical Leakage (Lower)	-4,859	706	22	11	276	0	-3,844
*All values in acre-feet							

County:	Colorado						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-2,763	24,774	7,321	6	68	75	29,481
Interbed Storage	0	352	815	24	496	0	1,687
Water Compressibility	-1	9	262	6	22	34	332
Wells	0	-9,720	-24,731	0	-393	0	-34,844
Drains	-10,126	0	0	0	0	0	-10,126
Rivers	587	0	0	0	0	0	587
General Head Boundary	0	0	0	0	0	0	0
Recharge	37,801	0	0	0	0	0	37,801
Vertical Leakage (Upper)	0	17,052	25,478	-58	259	-16	42,715
Vertical Leakage (Lower)	-25,474	-17,082	-199	25	16	0	-42,714
*All values in acre-feet							

County:	De Witt						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-1	0	0	0	0	0	-1
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	-1	-1
Drains	-30	0	0	0	0	0	-30
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	7	0	0	0	0	0	7
Vertical Leakage (Upper)	0	0	0	0	0	2	2
Vertical Leakage (Lower)	-2	0	0	0	0	0	-2
*All values in acre-feet							

County:	Fayette						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-3,728	0	39	0	2,020	959	-710
Interbed Storage	0	0	0	0	103	0	103
Water Compressibility	-2	0	0	0	3	0	1
Wells	0	0	-34	0	-1,689	-3,021	-4,744
Drains	-6,472	0	0	0	0	0	-6,472
Rivers	-1,037	0	0	0	0	0	-1,037
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,519	0	0	0	0	0	20,519
Vertical Leakage (Upper)	0	0	223	14	5,560	8,146	13,943
Vertical Leakage (Lower)	-9,395	0	-171	0	-4,379	0	-13,945
*All values in acre-feet							

County:	Fort Bend						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	35,568	12,727	1	11	20	89	48,416
Interbed Storage	0	815	3,997	26	355	0	5,193
Water Compressibility	2	-7	406	8	30	102	541
Wells	0	-50,138	-38,122	0	-51	-8	-88,319
Drains	-11	0	0	0	0	0	-11
Rivers	3,856	0	0	0	0	0	3,856
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,118	0	0	0	0	0	20,118
Vertical Leakage (Upper)	0	59,590	24,284	-20	0	229	84,083
Vertical Leakage (Lower)	-59,590	-24,284	20	0	-229	0	-84,083
*All values in acre-feet							

County:	Galveston						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-1,562	-76	-1	5	31	46	-1,557
Interbed Storage	0	1,517	404	0	29	0	1,950
Water Compressibility	-5	-14	-8	1	26	57	57
Wells	0	-1,706	0	0	0	0	-1,706
Drains	-6,670	0	0	0	0	0	-6,670
Rivers	0	0	0	0	0	0	0
General Head Boundary	-271	2,858	3,115	-17	-1,726	-2,081	1,878
Recharge	12,624	0	0	0	0	0	12,624
Vertical Leakage (Upper)	0	3,689	1,235	-18	-5	-331	4,570
Vertical Leakage (Lower)	-3,689	-1,235	18	5	331	0	-4,570
*All values in acre-feet							

County:	gom						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	2,027	-3	-1	1	24	49	2,097
Interbed Storage	0	97	95	0	6	0	198
Water Compressibility	0	3	8	0	9	20	40
Wells	0	-456	0	0	0	0	-456
Drains	-573	0	0	0	0	0	-573
Rivers	-288	0	0	0	0	0	-288
General Head Boundary	1,013	3,497	3,486	-145	-3,943	-5,400	-1,492
Recharge	743	0	0	0	0	0	743
Vertical Leakage (Upper)	0	3,567	599	-3	-30	-657	3,476
Vertical Leakage (Lower)	-3,464	-604	3	8	581	0	-3,476
*All values in acre-feet							

County:	Gonzales						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-354	0	0	0	11	-1	-344
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	-2	-24	-26
Drains	-910	0	0	0	0	0	-910
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	3,427	0	0	0	0	0	3,427
Vertical Leakage (Upper)	0	0	0	0	71	2,094	2,165
Vertical Leakage (Lower)	-2,104	0	0	0	-61	0	-2,165
*All values in acre-feet							

County:	Grimes						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-10,499	6	1,313	1	3,526	1,082	-4,571
Interbed Storage	0	0	81	3	489	0	573
Water Compressibility	-3	0	2	0	11	23	33
Wells	0	0	-514	0	-2,768	-1,083	-4,365
Drains	-19,874	0	0	0	0	0	-19,874
Rivers	-343	0	0	0	0	0	-343
General Head Boundary	0	0	0	0	0	0	0
Recharge	36,049	0	0	0	0	0	36,049
Vertical Leakage (Upper)	0	46	1,461	11	2,164	4,053	7,735
Vertical Leakage (Lower)	-5,134	-6	-49	-16	-2,531	0	-7,736
*All values in acre-feet							

County:	Hardin						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-20,757	351	0	27	121	244	-20,014
Interbed Storage	0	549	-27	10	103	0	635
Water Compressibility	-1	12	6	3	35	58	113
Wells	0	-13,836	-636	0	0	0	-14,472
Drains	-18,142	0	0	0	0	0	-18,142
Rivers	-135	0	0	0	0	0	-135
General Head Boundary	0	0	0	0	0	0	0
Recharge	54,994	0	0	0	0	0	54,994
Vertical Leakage (Upper)	0	16,593	3,499	-74	-17	64	20,065
Vertical Leakage (Lower)	-16,593	-3,499	74	17	-64	0	-20,065
*All values in acre-feet							

County:	Harris						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	21,796	36,446	16	73	220	336	58,887
Interbed Storage	0	2,185	12,491	106	999	0	15,781
Water Compressibility	1	-36	441	47	133	260	846
Wells	0	-117,886	-118,094	0	-6,366	0	-242,346
Drains	-3,654	0	0	0	0	0	-3,654
Rivers	865	0	0	0	0	0	865
General Head Boundary	4	16	17	-1	-6	-6	24
Recharge	65,679	0	0	0	0	0	65,679
Vertical Leakage (Upper)	0	84,688	62,534	-228	43	-4,669	142,368
Vertical Leakage (Lower)	-84,688	-62,534	228	-43	4,669	0	-142,368
*All values in acre-feet							

County:	Jackson						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	12,935	15,979	17	45	84	45	29,105
Interbed Storage	0	1,121	1,184	9	67	0	2,381
Water Compressibility	0	26	451	7	14	72	570
Wells	0	-34,338	-25,417	0	0	-1,312	-61,067
Drains	-692	0	0	0	0	0	-692
Rivers	1,277	0	0	0	0	0	1,277
General Head Boundary	-4	132	104	-18	-120	-159	-65
Recharge	14,654	0	0	0	0	0	14,654
Vertical Leakage (Upper)	0	28,220	10,086	-86	-18	371	38,573
Vertical Leakage (Lower)	-28,220	-10,086	86	18	-371	0	-38,573
*All values in acre-feet							

County:	Jasper						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-19,756	1,579	466	12	461	3,029	-14,209
Interbed Storage	0	1,025	221	5	92	0	1,343
Water Compressibility	-3	33	38	1	17	33	119
Wells	0	-25,350	-14,221	0	-1,020	-7,877	-48,468
Drains	-46,665	0	0	0	0	0	-46,665
Rivers	-1,284	0	0	0	0	0	-1,284
General Head Boundary	0	0	0	0	0	0	0
Recharge	83,463	0	0	0	0	0	83,463
Vertical Leakage (Upper)	0	11,204	4,857	-29	-106	2,502	18,428
Vertical Leakage (Lower)	-16,355	-3,110	31	14	992	0	-18,428
*All values in acre-feet							

County:	Jefferson						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-12,163	-39	-1	14	145	93	-11,951
Interbed Storage	0	72	27	4	13	0	116
Water Compressibility	0	-9	-10	2	48	47	78
Wells	0	-2,635	0	0	0	0	-2,635
Drains	-23,911	0	0	0	0	0	-23,911
Rivers	1	0	0	0	0	0	1
General Head Boundary	0	0	0	0	0	0	0
Recharge	42,878	0	0	0	0	0	42,878
Vertical Leakage (Upper)	0	6,541	1,187	-54	-41	-115	7,518
Vertical Leakage (Lower)	-6,541	-1,187	54	41	115	0	-7,518
*All values in acre-feet							

County:	Lavaca						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-1,116	7,052	8,331	7	1,940	510	16,724
Interbed Storage	0	70	417	17	256	0	760
Water Compressibility	0	2	93	4	12	14	125
Wells	0	-587	-8,562	0	-2,459	-2,275	-13,883
Drains	-9,158	0	0	0	0	0	-9,158
Rivers	991	0	0	0	0	0	991
General Head Boundary	0	0	0	0	0	0	0
Recharge	27,714	0	0	0	0	0	27,714
Vertical Leakage (Upper)	0	4,128	11,255	-25	5,741	4,655	25,754
Vertical Leakage (Lower)	-18,471	-4,308	43	71	-3,091	0	-25,756
*All values in acre-feet							

County:	Liberty						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-23,374	914	3	19	289	1,284	-20,865
Interbed Storage	0	1	17	30	650	0	698
Water Compressibility	-1	6	1	15	87	212	320
Wells	0	-8,595	-1,344	0	-750	0	-10,689
Drains	-15,143	0	0	0	0	0	-15,143
Rivers	-2,539	0	0	0	0	0	-2,539
General Head Boundary	0	0	0	0	0	0	0
Recharge	57,959	0	0	0	0	0	57,959
Vertical Leakage (Upper)	0	16,941	6,818	-81	17	-302	23,393
Vertical Leakage (Lower)	-16,941	-6,818	81	-17	302	0	-23,393
*All values in acre-feet							

County:	Matagorda						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	7,087	2,940	2	27	57	91	10,204
Interbed Storage	0	1,873	1,646	4	26	0	3,549
Water Compressibility	0	101	216	3	20	75	415
Wells	0	-40,095	-744	0	0	0	-40,839
Drains	-7,314	0	0	0	0	0	-7,314
Rivers	714	0	0	0	0	0	714
General Head Boundary	882	3,179	2,745	-79	-1,892	-3,184	1,651
Recharge	27,561	0	0	0	0	0	27,561
Vertical Leakage (Upper)	0	28,710	-3,802	-15	0	-733	24,160
Vertical Leakage (Lower)	-28,710	3,802	15	0	733	0	-24,160
*All values in acre-feet							

County:	Montgomery						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-21,665	17,703	9,025	38	2,955	278	8,334
Interbed Storage	0	699	3,969	43	4,580	0	9,291
Water Compressibility	-4	17	108	14	119	146	400
Wells	0	-4,002	-26,869	0	-26,494	-4,901	-62,266
Drains	-55,910	0	0	0	0	0	-55,910
Rivers	-1,458	0	0	0	0	0	-1,458
General Head Boundary	0	0	0	0	0	0	0
Recharge	100,227	0	0	0	0	0	100,227
Vertical Leakage (Upper)	0	17,633	14,555	-58	1,527	-7,176	26,481
Vertical Leakage (Lower)	-21,124	-12,286	-125	-193	7,247	0	-26,481
*All values in acre-feet							

County:	Newton						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-15,440	396	421	7	282	1,799	-12,535
Interbed Storage	0	364	70	3	65	0	502
Water Compressibility	-4	5	12	0	13	25	51
Wells	0	-816	-324	0	-380	-661	-2,181
Drains	-54,729	0	0	0	0	0	-54,729
Rivers	-1,306	0	0	0	0	0	-1,306
General Head Boundary	0	0	0	0	0	0	0
Recharge	84,176	0	0	0	0	0	84,176
Vertical Leakage (Upper)	0	6,556	3,280	-14	373	2,985	13,180
Vertical Leakage (Lower)	-12,875	-1,180	15	12	847	0	-13,181
*All values in acre-feet							

County:	Orange						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-5,795	-36	0	12	120	112	-5,587
Interbed Storage	0	355	38	0	7	0	400
Water Compressibility	0	-2	-3	0	14	13	22
Wells	0	-16,330	0	0	0	0	-16,330
Drains	-1,958	0	0	0	0	0	-1,958
Rivers	75	0	0	0	0	0	75
General Head Boundary	0	0	0	0	0	0	0
Recharge	16,267	0	0	0	0	0	16,267
Vertical Leakage (Upper)	0	8,653	-2,714	-25	-8	123	6,029
Vertical Leakage (Lower)	-8,653	2,714	25	8	-123	0	-6,029
*All values in acre-feet							

County:	Polk						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-41,893	653	1,129	14	721	388	-38,988
Interbed Storage	0	8	18	1	279	0	306
Water Compressibility	-16	0	1	1	12	21	19
Wells	0	-342	-614	0	-1,145	-1,501	-3,602
Drains	-68,333	0	0	0	0	0	-68,333
Rivers	-775	0	0	0	0	0	-775
General Head Boundary	0	0	0	0	0	0	0
Recharge	120,090	0	0	0	0	0	120,090
Vertical Leakage (Upper)	0	2,042	1,656	20	1,073	1,835	6,626
Vertical Leakage (Lower)	-8,755	1,827	6	-34	329	0	-6,627
*All values in acre-feet							

County:	Sabine						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-378	0	0	0	0	0	-378
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	-1	0	0	0	0	0	-1
Wells	0	0	0	0	0	0	0
Drains	-4,261	0	0	0	0	0	-4,261
Rivers	-55	0	0	0	0	0	-55
General Head Boundary	0	0	0	0	0	0	0
Recharge	5,008	0	0	0	0	0	5,008
Vertical Leakage (Upper)	0	0	0	0	0	154	154
Vertical Leakage (Lower)	-154	0	0	0	0	0	-154
*All values in acre-feet							

County:	San Jacinto						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-15,835	1,447	784	23	1,060	99	-12,422
Interbed Storage	0	26	36	4	1,330	0	1,396
Water Compressibility	-3	1	3	2	31	44	78
Wells	0	-739	-429	0	-1,443	-121	-2,732
Drains	-28,579	0	0	0	0	0	-28,579
Rivers	-1,587	0	0	0	0	0	-1,587
General Head Boundary	0	0	0	0	0	0	0
Recharge	52,315	0	0	0	0	0	52,315
Vertical Leakage (Upper)	0	5,102	4,121	20	956	-20	10,179
Vertical Leakage (Lower)	-6,683	-3,031	7	-74	-398	0	-10,179
*All values in acre-feet							

County:	Trinity						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-2,403	0	0	0	0	-18	-2,421
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	-2	0	0	0	0	-1	-3
Wells	0	0	0	0	0	-1,509	-1,509
Drains	-6,015	0	0	0	0	0	-6,015
Rivers	-248	0	0	0	0	0	-248
General Head Boundary	0	0	0	0	0	0	0
Recharge	9,725	0	0	0	0	0	9,725
Vertical Leakage (Upper)	0	0	0	0	0	1,107	1,107
Vertical Leakage (Lower)	-1,107	0	0	0	0	0	-1,107
*All values in acre-feet							

County:	Tyler						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-38,289	1,899	1,409	9	912	1,209	-32,851
Interbed Storage	0	161	30	3	134	0	328
Water Compressibility	-7	3	5	0	11	30	42
Wells	0	-323	-1,243	0	-1,711	-1,207	-4,484
Drains	-61,689	0	0	0	0	0	-61,689
Rivers	-1,193	0	0	0	0	0	-1,193
General Head Boundary	0	0	0	0	0	0	0
Recharge	113,356	0	0	0	0	0	113,356
Vertical Leakage (Upper)	0	4,749	1,751	11	592	1,184	8,287
Vertical Leakage (Lower)	-11,970	2,175	10	8	1,491	0	-8,286
*All values in acre-feet							

County:	Victoria						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	2	0	0	0	0	0	2
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	0	0	0	0	0	0	0
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	15	0	0	0	0	0	15
Vertical Leakage (Upper)	0	14	7	0	0	-1	20
Vertical Leakage (Lower)	-14	-7	0	0	1	0	-20
*All values in acre-feet							

County:	Walker						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-15,845	0	164	4	5,592	1,562	-8,523
Interbed Storage	0	0	1	1	679	0	681
Water Compressibility	-5	0	0	0	11	12	18
Wells	0	0	-122	0	-1,527	-3,325	-4,974
Drains	-37,637	0	0	0	0	0	-37,637
Rivers	-1,401	0	0	0	0	0	-1,401
General Head Boundary	0	0	0	0	0	0	0
Recharge	64,537	0	0	0	0	0	64,537
Vertical Leakage (Upper)	0	0	376	23	4,800	9,843	15,042
Vertical Leakage (Lower)	-9,372	0	-22	-25	-5,623	0	-15,042
*All values in acre-feet							

County:	Waller						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-4,082	14,431	2,171	8	117	135	12,780
Interbed Storage	0	509	1,030	38	560	0	2,137
Water Compressibility	-1	8	31	5	44	46	133
Wells	0	-5,050	-10,531	0	-328	0	-15,909
Drains	-8,406	0	0	0	0	0	-8,406
Rivers	-257	0	0	0	0	0	-257
General Head Boundary	0	0	0	0	0	0	0
Recharge	32,546	0	0	0	0	0	32,546
Vertical Leakage (Upper)	0	18,185	19,579	-27	35	345	38,117
Vertical Leakage (Lower)	-19,814	-17,950	27	-35	-345	0	-38,117
*All values in acre-feet							

County:	Washington						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-8,153	0	836	1	2,230	648	-4,438
Interbed Storage	0	0	71	2	176	0	249
Water Compressibility	-3	0	2	0	7	5	11
Wells	0	0	-828	0	-1,883	-1,346	-4,057
Drains	-12,279	0	0	0	0	0	-12,279
Rivers	-1,032	0	0	0	0	0	-1,032
General Head Boundary	0	0	0	0	0	0	0
Recharge	28,165	0	0	0	0	0	28,165
Vertical Leakage (Upper)	0	0	958	-2	4,425	3,259	8,640
Vertical Leakage (Lower)	-6,407	0	-178	-3	-2,053	0	-8,641
*All values in acre-feet							

County:	Wharton						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	18,261	57,360	3	20	70	109	75,823
Interbed Storage	0	1,769	2,137	37	182	0	4,125
Water Compressibility	1	57	405	10	32	77	582
Wells	0	-114,221	-20,819	0	0	0	-135,040
Drains	0	0	0	0	0	0	0
Rivers	7,609	0	0	0	0	0	7,609
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,127	0	0	0	0	0	20,127
Vertical Leakage (Upper)	0	45,987	12,873	-74	-25	329	59,090
Vertical Leakage (Lower)	-45,987	-12,873	74	25	-329	0	-59,090
*All values in acre-feet							

Appendix 10 —
GMA 14 Model Net Water Budgets for Year 2018 for each Groundwater Conservation District by Aquifer

GCD:	Bluebonnet Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-33,413	20,730	7,981	16	9,406	2,874	7,594
Interbed Storage	0	617	1,679	57	2,080	0	4,433
Water Compressibility	-10	11	81	10	94	115	301
Wells	0	-7,078	-18,305	0	-5,818	-4,408	-35,609
Drains	-81,972	0	0	0	0	0	-81,972
Rivers	-1,267	0	0	0	0	0	-1,267
General Head Boundary	0	0	0	0	0	0	0
Recharge	167,317	0	0	0	0	0	167,317
Vertical Leakage (Upper)	0	29,661	31,801	1	7,427	14,358	83,248
Vertical Leakage (Lower)	-50,148	-24,273	-128	-82	-8,616	0	-83,247
*All values in acre-feet							

GCD:	Brazoria County Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-2,845	-115	-1	34	164	142	-2,621
Interbed Storage	0	2,129	3,075	4	106	0	5,314
Water Compressibility	-2	15	129	4	55	153	354
Wells	0	-35,033	-300	0	0	0	-35,333
Drains	-13,777	0	0	0	0	0	-13,777
Rivers	59	0	0	0	0	0	59
General Head Boundary	-36	616	618	-20	-270	-335	573
Recharge	41,459	0	0	0	0	0	41,459
Vertical Leakage (Upper)	0	24,968	-1,393	-24	-1	-106	23,444
Vertical Leakage (Lower)	-24,968	1,393	24	1	106	0	-23,444
*All values in acre-feet							

GCD:	Brazos Valley Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-610	0	0	0	0	9	-601
Interbed Storage	0	0	0	0	1	0	1
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	-7	-7
Drains	-2,093	0	0	0	0	0	-2,093
Rivers	-612	0	0	0	0	0	-612
General Head Boundary	0	0	0	0	0	0	0
Recharge	3,003	0	0	0	0	0	3,003
Vertical Leakage (Upper)	0	0	0	0	-12	-42	-54
Vertical Leakage (Lower)	53	0	0	0	1	0	54
*All values in acre-feet							

GCD:	Calhoun Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-173	7	0	1	6	4	-155
Interbed Storage	0	19	11	0	1	0	31
Water Compressibility	-1	3	13	0	1	2	18
Wells	0	-2	0	0	0	0	-2
Drains	-754	0	0	0	0	0	-754
Rivers	0	0	0	0	0	0	0
General Head Boundary	-11	1,285	1,350	-83	-1,451	-2,002	-912
Recharge	2,123	0	0	0	0	0	2,123
Vertical Leakage (Upper)	0	1,117	124	-1	-1	-155	1,084
Vertical Leakage (Lower)	-1,117	-124	1	1	155	0	-1,084
*All values in acre-feet							

GCD:	Coastal Bend Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	18,261	57,360	3	20	70	109	75,823
Interbed Storage	0	1,769	2,137	37	182	0	4,125
Water Compressibility	1	57	405	10	32	77	582
Wells	0	-114,221	-20,819	0	0	0	-135,040
Drains	0	0	0	0	0	0	0
Rivers	7,609	0	0	0	0	0	7,609
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,127	0	0	0	0	0	20,127
Vertical Leakage (Upper)	0	45,987	12,873	-74	-25	329	59,090
Vertical Leakage (Lower)	-45,987	-12,873	74	25	-329	0	-59,090
*All values in acre-feet							

GCD:	Coastal Plains Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	7,096	2,940	2	27	57	91	10,213
Interbed Storage	0	1,874	1,647	4	26	0	3,551
Water Compressibility	0	101	216	3	20	75	415
Wells	0	-40,095	-744	0	0	0	-40,839
Drains	-7,314	0	0	0	0	0	-7,314
Rivers	714	0	0	0	0	0	714
General Head Boundary	882	3,179	2,745	-79	-1,892	-3,184	1,651
Recharge	27,577	0	0	0	0	0	27,577
Vertical Leakage (Upper)	0	28,731	-3,802	-15	0	-733	24,181
Vertical Leakage (Lower)	-28,731	3,802	15	0	733	0	-24,181
*All values in acre-feet							

GCD:	Colorado County Underground Water Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-2,760	24,791	7,321	6	68	75	29,501
Interbed Storage	0	353	815	24	496	0	1,688
Water Compressibility	-1	9	262	6	22	34	332
Wells	0	-9,720	-24,731	0	-393	0	-34,844
Drains	-10,126	0	0	0	0	0	-10,126
Rivers	587	0	0	0	0	0	587
General Head Boundary	0	0	0	0	0	0	0
Recharge	37,803	0	0	0	0	0	37,803
Vertical Leakage (Upper)	0	17,059	25,492	-58	259	-17	42,735
Vertical Leakage (Lower)	-25,482	-17,096	-199	25	17	0	-42,735
*All values in acre-feet							

GCD:	Fayette County Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-3,730	0	39	0	2,020	959	-712
Interbed Storage	0	0	0	0	103	0	103
Water Compressibility	-2	0	0	0	3	0	1
Wells	0	0	-34	0	-1,689	-3,021	-4,744
Drains	-6,472	0	0	0	0	0	-6,472
Rivers	-1,037	0	0	0	0	0	-1,037
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,524	0	0	0	0	0	20,524
Vertical Leakage (Upper)	0	0	223	14	5,560	8,147	13,944
Vertical Leakage (Lower)	-9,395	0	-171	0	-4,380	0	-13,946
*All values in acre-feet							

GCD:	Fort Bend Subsidence District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	35,564	12,727	1	11	20	89	48,412
Interbed Storage	0	814	3,997	26	355	0	5,192
Water Compressibility	2	-7	406	8	30	102	541
Wells	0	-50,131	-38,122	0	-51	-8	-88,312
Drains	-23	0	0	0	0	0	-23
Rivers	3,849	0	0	0	0	0	3,849
General Head Boundary	0	0	0	0	0	0	0
Recharge	20,131	0	0	0	0	0	20,131
Vertical Leakage (Upper)	0	59,574	24,268	-20	0	229	84,051
Vertical Leakage (Lower)	-59,574	-24,268	20	0	-229	0	-84,051
*All values in acre-feet							

GCD:	Gonzales County Underground Water Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	0	0	0	0	0	8	8
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	0	0	0	0	0	0	0
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	94	0	0	0	0	0	94
Vertical Leakage (Upper)	0	0	0	0	0	85	85
Vertical Leakage (Lower)	-85	0	0	0	0	0	-85
*All values in acre-feet							

GCD:	Harris-Galveston Subsidence District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	20,234	36,368	14	79	250	382	57,327
Interbed Storage	0	3,701	12,895	106	1,027	0	17,729
Water Compressibility	-4	-50	433	48	159	317	903
Wells	0	-119,592	-118,094	0	-6,366	0	-244,052
Drains	-10,323	0	0	0	0	0	-10,323
Rivers	865	0	0	0	0	0	865
General Head Boundary	-267	2,875	3,132	-18	-1,732	-2,087	1,903
Recharge	78,290	0	0	0	0	0	78,290
Vertical Leakage (Upper)	0	88,360	63,759	-247	38	-5,000	146,910
Vertical Leakage (Lower)	-88,360	-63,759	247	-38	5,000	0	-146,910
*All values in acre-feet							

GCD:	Lone Star Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-21,682	17,703	9,033	38	2,967	278	8,337
Interbed Storage	0	699	3,970	43	4,583	0	9,295
Water Compressibility	-4	17	108	14	119	146	400
Wells	0	-4,002	-26,869	0	-26,494	-4,901	-62,266
Drains	-56,183	0	0	0	0	0	-56,183
Rivers	-1,458	0	0	0	0	0	-1,458
General Head Boundary	0	0	0	0	0	0	0
Recharge	100,347	0	0	0	0	0	100,347
Vertical Leakage (Upper)	0	17,633	14,560	-58	1,527	-7,173	26,489
Vertical Leakage (Lower)	-21,129	-12,286	-125	-194	7,244	0	-26,490
*All values in acre-feet							

GCD:	Lower Trinity Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-57,732	2,104	1,904	37	1,807	487	-51,393
Interbed Storage	0	33	55	5	1,608	0	1,701
Water Compressibility	-19	1	5	3	43	65	98
Wells	0	-1,081	-1,043	0	-2,588	-1,622	-6,334
Drains	-96,790	0	0	0	0	0	-96,790
Rivers	-2,362	0	0	0	0	0	-2,362
General Head Boundary	0	0	0	0	0	0	0
Recharge	172,459	0	0	0	0	0	172,459
Vertical Leakage (Upper)	0	7,157	5,761	40	2,029	1,816	16,803
Vertical Leakage (Lower)	-15,446	-1,192	13	-107	-70	0	-16,802
*All values in acre-feet							

GCD:	Pecan Valley Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-1	0	0	0	0	0	-1
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	-1	-1
Drains	-30	0	0	0	0	0	-30
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	7	0	0	0	0	0	7
Vertical Leakage (Upper)	0	0	0	0	0	2	2
Vertical Leakage (Lower)	-2	0	0	0	0	0	-2
*All values in acre-feet							

GCD:	Pineywoods Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-382	0	0	0	0	8	-374
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	-324	0	0	0	0	0	-324
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	1,480	0	0	0	0	0	1,480
Vertical Leakage (Upper)	0	0	0	0	0	253	253
Vertical Leakage (Lower)	-253	0	0	0	0	0	-253
*All values in acre-feet							

GCD:	Southeast Texas Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	-94,185	4,222	2,296	54	1,775	6,280	-79,558
Interbed Storage	0	2,100	295	21	394	0	2,810
Water Compressibility	-16	53	62	4	75	145	323
Wells	0	-40,323	-16,424	0	-3,111	-9,745	-69,603
Drains	-181,187	0	0	0	0	0	-181,187
Rivers	-3,908	0	0	0	0	0	-3,908
General Head Boundary	0	0	0	0	0	0	0
Recharge	335,870	0	0	0	0	0	335,870
Vertical Leakage (Upper)	0	39,049	13,378	-106	842	6,735	59,898
Vertical Leakage (Lower)	-57,740	-5,604	130	51	3,266	0	-59,897
*All values in acre-feet							

GCD:	Texana Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	12,931	15,968	17	45	84	45	29,090
Interbed Storage	0	1,121	1,184	9	67	0	2,381
Water Compressibility	0	26	451	7	14	72	570
Wells	0	-34,338	-25,417	0	0	-1,312	-61,067
Drains	-692	0	0	0	0	0	-692
Rivers	1,277	0	0	0	0	0	1,277
General Head Boundary	-4	132	104	-18	-120	-159	-65
Recharge	14,642	0	0	0	0	0	14,642
Vertical Leakage (Upper)	0	28,202	10,061	-86	-18	371	38,530
Vertical Leakage (Lower)	-28,202	-10,061	86	18	-371	0	-38,530
*All values in acre-feet							

GCD:	Victoria County Groundwater Conservation District						
Budget Component*	**Layer 1**	**Layer 2**	**Layer 3**	**Layer 4**	**Layer 5**	**Layer 6**	**Total**
Coarse-grained Storage	2	0	0	0	0	0	2
Interbed Storage	0	0	0	0	0	0	0
Water Compressibility	0	0	0	0	0	0	0
Wells	0	0	0	0	0	0	0
Drains	0	0	0	0	0	0	0
Rivers	0	0	0	0	0	0	0
General Head Boundary	0	0	0	0	0	0	0
Recharge	15	0	0	0	0	0	15
Vertical Leakage (Upper)	0	14	7	0	0	-1	20
Vertical Leakage (Lower)	-14	-7	0	0	1	0	-20
*All values in acre-feet							

Appendix 11 — Review of Updated GMA 14 Joint Planning Groundwater Model prepared by Vivek Bedekar, Ph.D, P.E with S.S. Papadopulos & Associates, Inc (March 31, 2025)

Review of Updated GMA 14 Joint Planning Groundwater Model

Prepared for:

Lone Star Groundwater Conservation District

Prepared by:

Vivek Bedekar, Ph.D., P.E.
Associate

March 31, 2025

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Appendices

Appendix A. Scatterplots comparing groundwater level and subsidence observations

Appendix B. Aquifer and interbed properties

Appendix C. Groundwater pumping

Appendix D. Scatterplots comparing groundwater level and subsidence observations used for GULF model calibration

Appendix E. Time series plots comparing GULF model groundwater level observations with the two models

Appendix F. Time series plots comparing GULF model subsidence observations with the two models

Acronyms

GMA	Groundwater Management Area
GMA 14 model	Updated Groundwater Management Area 14 Joint Planning model
GULF model	Gulf Coast land subsidence and groundwater flow model (2023)
LSGCD	Lone Star Groundwater Conservation District
SSP&A	S.S. Papadopulos & Associates, Inc.
TWDB	Texas Water Development Board
USGS	United States Geological Survey

Executive Summary

The Gulf Coast land subsidence and groundwater flow model (GULF model) was released in 2023. The model is being further developed and calibrated by the Lone Star Groundwater Conservation District (LSGCD) for use by the groundwater conservation districts in GMA 14 for joint planning purposes. This report summarizes the review of the GULF model and the updated model that is currently under development (GMA 14 model). The review focused on assessing the model calibration that primarily relied on groundwater level data and subsidence data.

A few aspects were identified during the review of the GULF model which can be improved. The salient points are noted here. The lower simulated groundwater levels in the Jasper aquifer were substantially overestimated as compared to the observed values; groundwater pumping was simulated lower in several counties as compared to estimated groundwater use; and the compaction values based on the extensometer measurements were generally underestimated by the model. There are additional aspects in the GULF model that were also noted.

The changes to the GULF model that result in the GMA 14 model satisfactorily improve the model performance. In particular, the model addresses the issues identified during the GULF model review. In addition, the model improves the history-matching of the subsidence data. Several recommendations are made to consider during future modeling efforts.

Introduction

Lone Star Groundwater Conservation District (LSGCD) retained S.S. Papadopulos & Associates, Inc. (SSP&A) to perform a third-party review of the development and calibration of the updated Groundwater Management Area (GMA) 14 Joint Planning Groundwater Model. The U.S. Geological Survey (USGS) in cooperation with the Harris-Galveston Subsidence District and the Fort Bend Subsidence District developed the Guld Coast land subsidence and groundwater flow model (GULF model) that was released in 2023 (Ellis et al, 2023; Knight et al, 2023). LSGCD's consultants Advanced Groundwater Solutions, LLC and KT Groundwater further developed and recalibrated the GULF model. The updated model (GMA 14 model) is intended to be used by GMA 14 for joint groundwater planning purposes. SSP&A reviewed the GULF model and the updated development and calibration being performed by LSGCD's team. This report documents the findings from the review.

Objectives

The primary objective was to review the GMA 14 model developed by LSGCD. The review was conducted in two stages:

1. Review of the GULF model. The purpose of this review was to identify the areas that could be improved.
2. Review the GMA 14 model changes, calibration, and results, and make recommendations for future modeling efforts.

Review Approach

The model review primarily focused on model calibration. Generally model calibration relies on history matching. However, in addition to history matching, calibrated values of aquifer properties and model boundary conditions were also assessed. Ensuring that the calibrated aquifer properties are within a plausible range improves the predictive capabilities of the model. In addition to assessing the model performance, recommendations are also made to further improve the model in the future.

GULF Model Review

Background

The GULF model is a numerical groundwater model developed to support the Texas Water Development Board's (TWDB's) groundwater availability modeling program. The numerical model is well documented, and a complete set of model files are easily accessible (Knight et al, 2023). The model covers the Gulf Coast aquifer system, which encompasses the majority of the Groundwater Management Area 14. The GULF model is a regional scale model covering 28 counties with an area of 22,770 square miles (Ellis et al, 2023). The GULF model extents are shown in **Figure 1**.

The model was developed using the numerical simulator MODFLOW 6 (Langevin et al, 2017) and was calibrated using the parameter estimation software with iterative ensemble smoother, PESTPP-IES (White, 2018). As documented by Ellis et al (2023), model calibration was performed by changing model inputs such as parameters and boundary conditions to match historical field measurements or observations. The calibration process of history-matching relied on two primary data sets: groundwater level observations and subsidence observations. The model parameters and boundary conditions changed for history-matching included recharge, groundwater pumping, conductance for general-head, drain, and river boundaries, aquifer properties, and clay interbed properties.

A regional scale model cannot represent all the details in the hydrogeologic system at the spatial and temporal scale at which observations are typically available. For example, individual observations represent a point in space and time, whereas the model approximates large spatial areas at a grid block scale and large temporal durations at a time-step scale. Besides spatial and temporal scale issues, there are several other approximations inherent in a model such as aquifer geometry, flow processes, simplified representation of boundary conditions, among others. Despite these limitations, a model is expected to represent general spatial patterns and temporal trends that match the observed data. The GULF model review was conducted by taking into account these modeling challenges and considering the model as a practical tool for making future decisions.

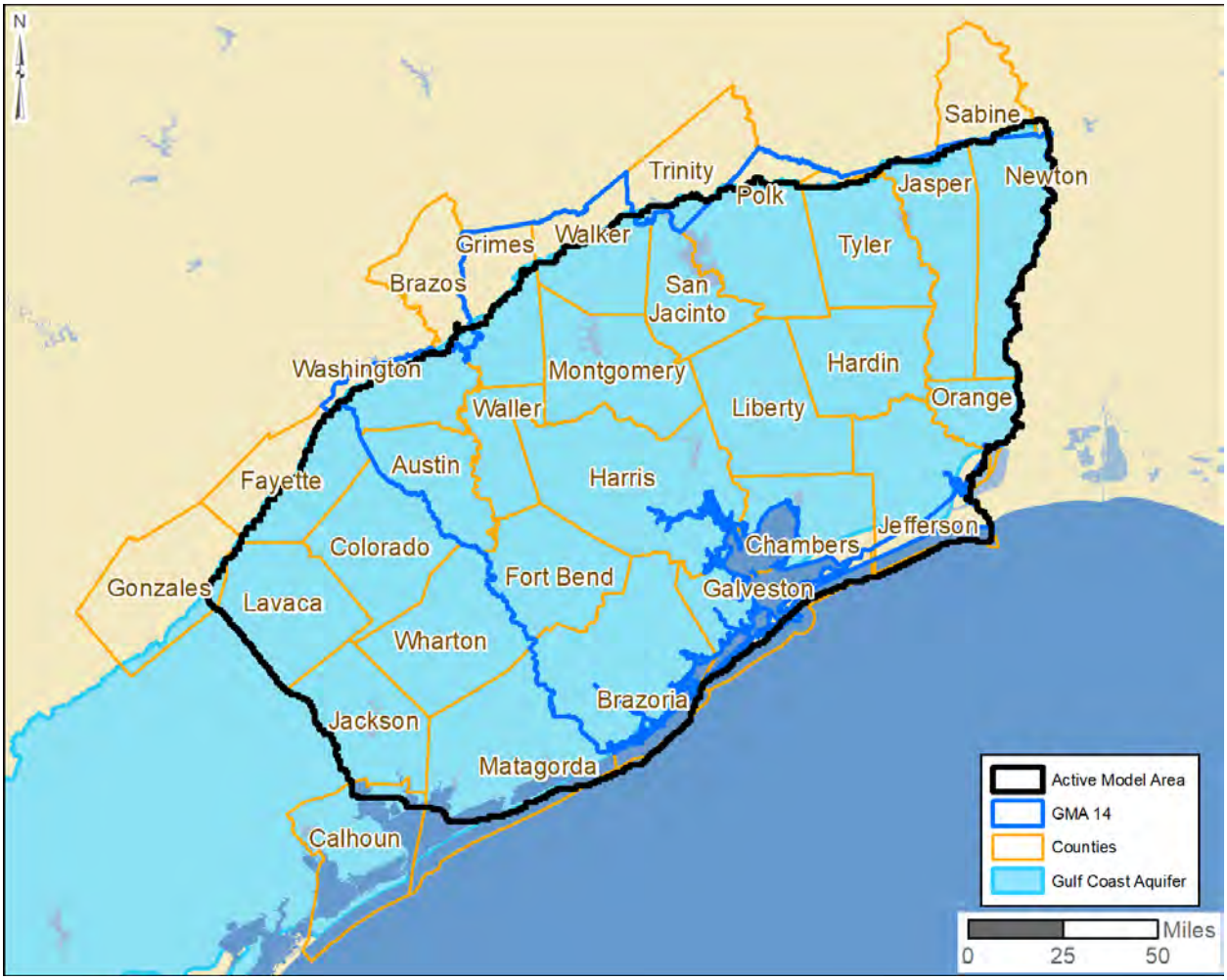


Figure 1. The GULF model extents.

Model Review

The GULF model incorporates relevant groundwater flow processes, aquifer geometry, aquifer properties, interbed clay flow and compaction processes, interbed clay properties, groundwater recharge, and groundwater pumping. The complexities of the Gulf Coast aquifer system are well represented in the model. This section highlights only the salient aspects noted in the GULF model that can be further improved with model recalibration.

As shown in **Figure 2**, the general patterns of groundwater head distribution are relatively unbiased for the Chicot and the Evangeline Aquifers. The scatterplots and histograms show a uniform distribution of error throughout the range of groundwater head observations. However, in the case of the Jasper aquifer, simulated groundwater levels are consistently higher than the observed values, when observed groundwater levels are less than zero feet above NAVD 88. The simulated groundwater heads in that range for the Jasper aquifer are greater than the observed heads by 100-200 feet. The bias in the Jasper aquifer also reflects spatial bias as

the majority of groundwater use in the Jasper aquifer is located within Montgomery County and northern Harris County.

Note that **Figure 2** shows the scatterplot of groundwater heads only for the nonzero-weighted groundwater head observations. Ellis et al (2023) note that some data were not used, and the review was performed by only considering the nonzero-weighted observations. It is worth mentioning here that a description of why some observations were eliminated (or zero-weighted) from the calibration dataset would have been helpful in assessing the quality of model calibration.

Groundwater pumping was estimated during the calibration process. The prescribed flux boundary condition implemented as a MODFLOW well (WEL) package was calibrated using PESTPP-IES. Figure 2.1 of the GULF model report (Ellis et al, 2023) compares the simulated groundwater use and estimated actual groundwater use documented by Oliver and Harmon (2022), a study specifically conducted to develop historical groundwater pumping estimates within the GULF model extents. The calibration process in the GULF model underrepresents groundwater pumping in several counties. The largest differences in which modeled groundwater is lower than actual estimates in the order of tens of millions of gallons per day (MGD) up to 100 MGD are seen in Jackson, Wharton, Colorado, Lavaca, Liberty, Matagorda, and Waller counties.

The GULF model simulated the subsidence at benchmarks, compaction at extensometers, and vertical displacement at Global Positioning System (GPS) stations. The simulated values for the benchmark and GPS observations were unbiased with positive and negative residuals relatively well balanced. The compaction values based on the extensometer measurements were generally underestimated by the model.

The GULF model's calibration process, in addition to history-matching, quantified uncertainty using the PESTPP-IES software. Uncertainty was presented as a range of model results calculated using an ensemble of 300 realizations. **Figure 3** shows one example of observed and simulated groundwater levels from the Chicot, Evangeline, and Jasper aquifers for wells located in the northern Harris County. The range of simulated groundwater levels is tens of feet at the beginning of the model simulation and increases to 100-200 feet by 2020. Despite the large range of simulated values that indicate model uncertainty, several real-world observations fall outside of the extreme bounds of the simulated range of values by more than 50 feet.

The fact that observations fall outside the range indicate that either the parameter non-uniqueness is not fully captured, or that there are other sources of uncertainty that were not considered. In either case, it is clear that the ensemble range does not capture many of the observations, indicating that the model is not representing the aquifer system well in that area during the calibration period. The difference between the uncertainty range and the observed data highlights that there are calibration issues in this area and that model changes may be needed to improve the model calibration and predictive capability. The value of quantifying uncertainty, the reliability of quantified uncertainty, and how these uncertainty estimates will be used for decision-making are unclear. If the uncertainty is unreliable, then presenting the ranges is potentially misleading. Removing the uncertainty estimates may far outweigh the benefits of presenting these unreliable ranges.

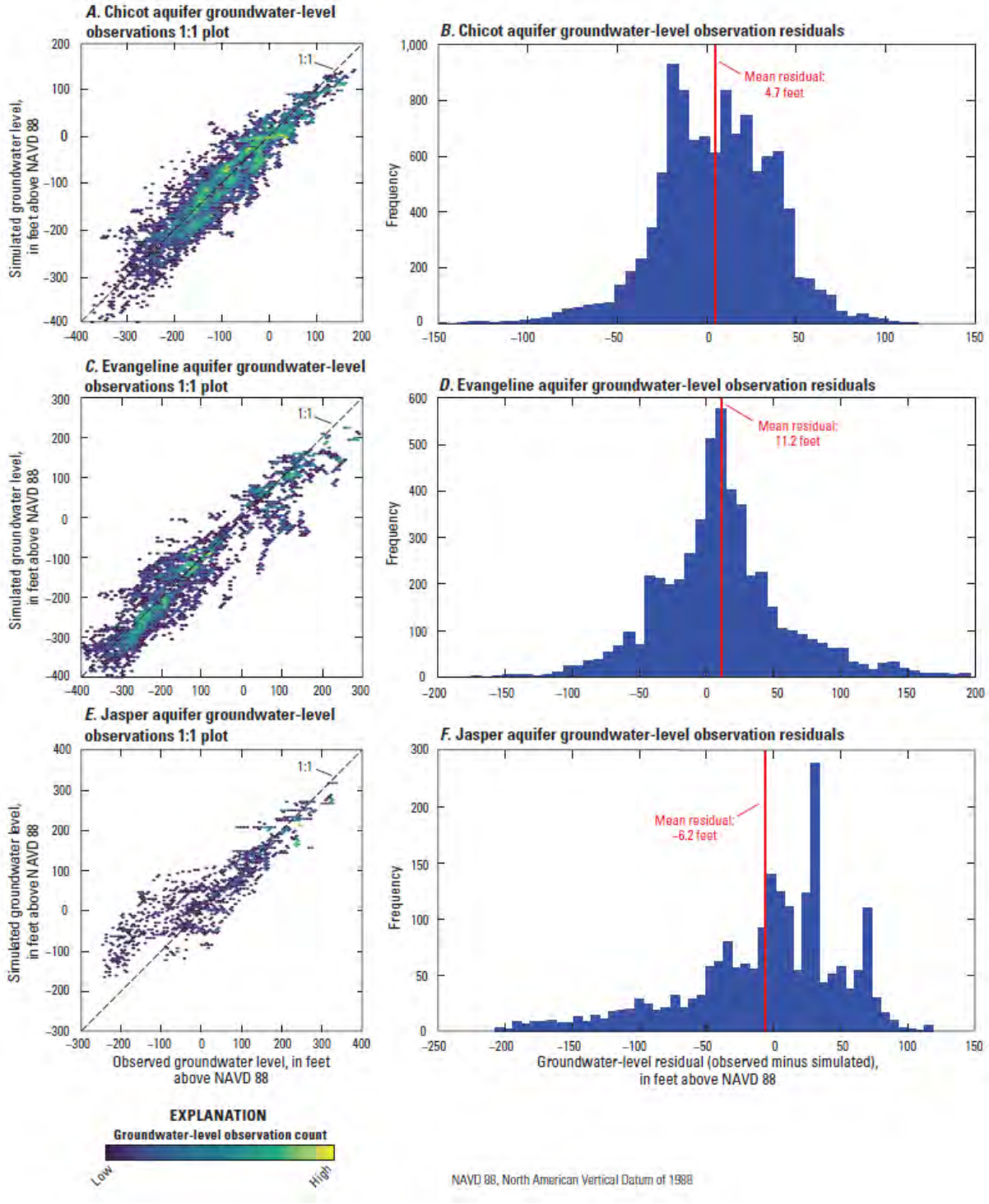


Figure 2. Scatterplots and histograms comparing observed and simulated groundwater levels and histograms showing groundwater head residuals for the Chicot, Evangeline, and Jasper aquifers (*reproduced from Figure 117 of Ellis et al, 2023*).

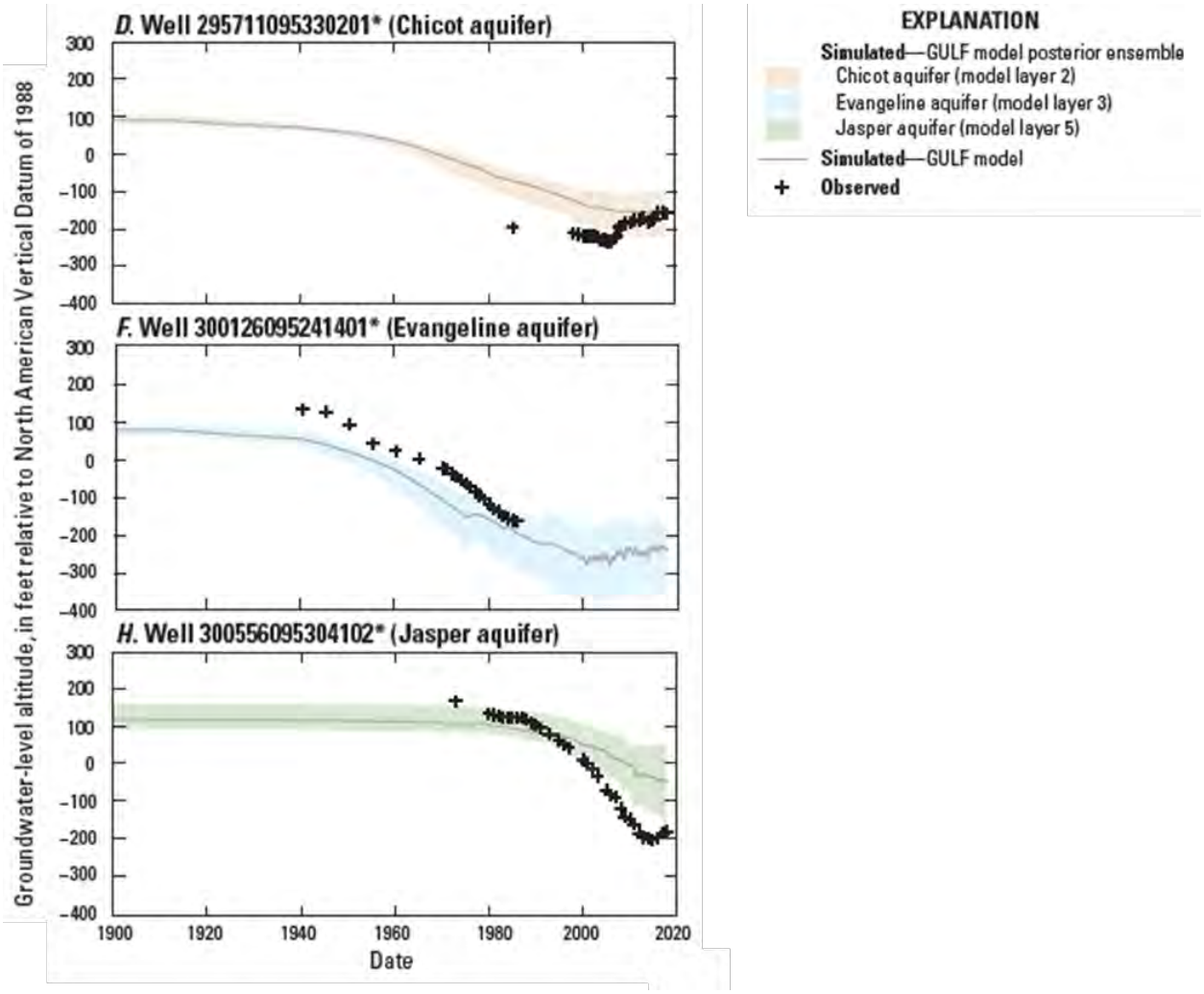


Figure 3. An example of observed and simulated groundwater levels in northern Harris County (*reproduced from Figure 121 of Ellis et al, 2023*).

GMA 14 Model Review

The GMA 14 model obtained and reviewed for the report was labeled "Calibrated_Model_Files_Test16". Only the base simulation, and not the ensemble of simulations, was reviewed. The supporting modeling report was not reviewed. The GULF model was the starting point for the development of the GMA 14 model. Several changes were made to the GULF model and the model was recalibrated. Changes in grid discretization include reprojection of the grid and the use of feet as units for length, while GULF model used meters. The reprojection utilized the same offset at the southwest corner of the model and has shifted the grid by approximately one half of a mile at the other end in the northeast, resulting from small cumulative changes in each grid cell. The number of model cells is consistent between the two models and the spatial extents of the model are practically the same.

Temporal discretization in the GMA 14 model was changed from monthly stress periods beginning in the Year 2000 to annual stress periods. Given that the modeling purpose is to estimate future conditions on an annual time scale, changing the model stress periods to annual is coherent with the modeling needs. The use of annual stress periods is also supported by the time scale of the groundwater level data used for model calibration by the GULF model. For calibration, a 5-year and a 2-year moving average was used for different simulation periods in the GULF model calibration. The moving average attenuated the variation caused by monthly stresses and effectively calibrated on long term average values. Overall, therefore, the use of annual stress periods during the calibration period in the GMA 14 model is a reasonable approach.

Groundwater observations used for calibrating the GMA 14 model were revised. A number of new groundwater level data were incorporated in the calibration dataset. Almost all the groundwater data used for calibration were active (nonzero-weighted), and any zero-weighted groundwater level data were documented. The groundwater level data were used without averaging and the data that were close to the end of stress period were used as calibration targets instead of the moving averages in the case of GULF model. The observations used for calibration were not checked for correctness as part of this review.

The changes that were made in the GMA 14 model, particularly the revised stress period duration and the use of a different calibration dataset, makes it challenging to readily compare the model performance of the GULF model with the GMA 14 model. Therefore, the performance of GMA 14 model with respect to the GULF model was first assessed qualitatively. A more quantitative comparison was also performed and is discussed later in this section. The review of GMA 14 model was conducted considering its intended use, i.e., for joint planning purposes which, among other things, includes the development of desired future conditions.

A comparison of groundwater level observations between the two models indicates an improved performance particularly within the Jasper aquifer, as shown in **Figure 4**. Although the issues identified in the GULF model have not been fully resolved, the improvement in groundwater levels with the GMA 14 model are in the right direction. **Figure 5** compares the observed and simulated subsidence, vertical displacement, and compaction at benchmarks, Global Positioning System stations, and extensometers, respectively. The simulated values with the GMA 14 model generally show an overall improvement in the subsidence results.

Note that the GMA 14 model incorporated additional compaction observations within the model calibration process. Additional scatterplots for groundwater and subsidence observations are provided in **Appendix A**.

The aquifer properties specified in the Node Property Flow (NPF) and the Storage (STO) packages include the horizontal and vertical hydraulic conductivity and specific yield. The course-grained and interbed properties specified in the Skeletal Storage, Compaction, and Subsidence (CSUB) Package include the coarse-grained elastic storage, coarse-grained porosity, interbed vertical hydraulic conductivity, interbed elastic and inelastic specific storage, and interbed porosity. All the aquifer and interbed properties were updated during the calibration process. In addition to history-matching based on groundwater level and subsidence data, aquifer and interbed properties were reviewed to ensure that the properties used in the GMA 14 model were within a reasonable range. The model-wide distribution of properties comparing the two models are presented in **Appendix B**.

The horizontal and vertical hydraulic conductivity values are within a similar range and differ on the extreme ends, resulting in a large anisotropy, calculated as the ratio between the horizontal and vertical hydraulic conductivity. These large changes are located in the outcrop areas and are very likely insensitive in the model. Lowering these extremely high anisotropy numbers is recommended.

As seen in **Appendix B**, specific yield, coarse-grained porosity, and interbed porosity between the two models is similar in majority of the model cells. It is noted that the interbed porosity of approximately 5% of the interbeds is set to 60%, an upper limit that is consistent between the two models. In future model calibration efforts, it is recommended to examine the cause of these high interbed porosity values, which may be compensating for uncertainties in the model, unless these values can be validated using field measurements.

In the GMA 14 model, approximately 10% of the model cells have a coarse-grained elastic specific storage value less than 10^{-7} $feet^{-1}$ and close to 35% model cells have a value less than 10^{-6} $feet^{-1}$ with a minimum value as low as 2×10^{-9} $feet^{-1}$. The upper range in both models is in the same order of magnitude, 10^{-5} $feet^{-1}$. The interbed elastic and inelastic specific storage values are between 10^{-6} to 10^{-4} $feet^{-1}$, and between 10^{-7} to 10^{-4} $feet^{-1}$, respectively. Generally, the lower limit for specific storage values in the literature is in the order of 10^{-6} $feet^{-1}$. It is recommended that the specific storage values lower than 10^{-6} $feet^{-1}$ be reassessed in future calibration efforts.

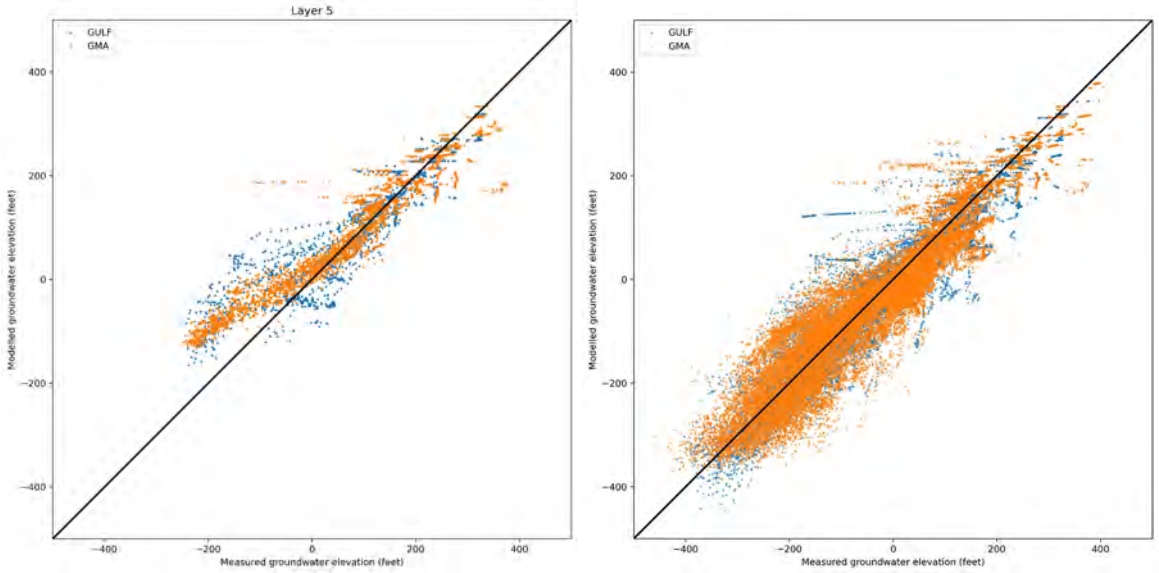
The interbed vertical hydraulic conductivity in the GMA 14 model ranges from 10^{-8} to 10^{-4} feet/day. At the scale of interbeds these values are reasonable. The low conductivity values within the interbeds are supported by the delayed effect of compaction illustrated by the field measurements, where water levels have stabilized, but subsidence continues to occur (see for instance, Figure 96 from Ellis et al, 2023). Given the uncertainty of the delay interbed count and thicknesses within each model layer, these low interbed hydraulic conductivity values were deemed reasonable.

In addition to the interbed properties, the definition of delay/no-delay interbed systems was changed in the CSUB package. Out of a total of 197,709 interbed systems 41,995 interbed systems were converted from no-delay interbed systems in the GULF model to delay interbeds in the GMA 14 model. The total number of delay and no-delay interbeds in the GMA 14 model was 196,568 and 1,141, respectively.

The GMA 14 model addresses the issues with groundwater pumping by increasing the pumping rates. A visual inspection suggests that the pumping rates implemented in the GMA 14 model are closer to the estimated values provided by Oliver and Harmon (2022). Groundwater pumping comparison between the two models, broken down by county and by model layer is presented in **Appendix C**.

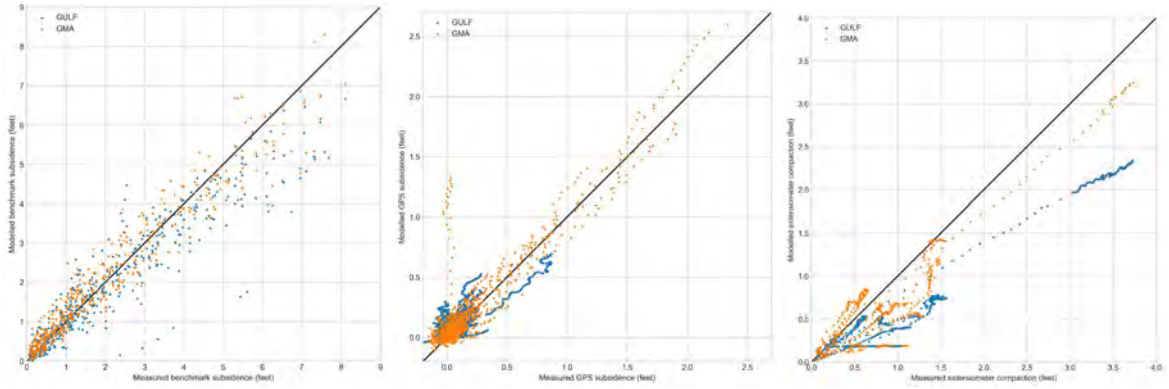
To provide a more quantitative assessment for GMA 14 model, the GMA 14 model was rerun using the stress periods and calibration targets used by the GULF model, keeping discretization, initial conditions, properties, and boundary conditions the same as the GMA 14 model. The only items retained from the GULF model were the stress periods and the observations used as calibration targets. This approach helped align the observations between the two models enabling a quantitative comparison. This simulation provides equivalence between the GULF and the GMA 14 models as both the models use the same set of observations. Statistics were calculated for the scatterplots generated for this simulation and are shown in **Figures 6 and 7**. As shown in **Figure 6**, the mean absolute error for model-wide groundwater level data increased from 34 feet (GULF) to 36 feet (GMA). However, the Jasper aquifer improved by 8 feet (GMA), lowering the mean absolute error from 44 feet to 36 feet. **Figure 7** indicates that the subsidence observations consistently improved with the GMA 14 model. All the scatterplots are presented in **Appendix D**.

The corresponding time series plots for groundwater levels are provided in **Appendix E** and time series plots for subsidence observations are provided in **Appendix F**. Note that the observations used for calibration of the GULF model were used for comparison purposes. The GULF model calibration observations include monthly values whereas the GMA 14 model simulates a constant stress for all months within a year to conform to the GULF model stress period setup. For expediency, the observation locations from the GULF model were reused for the temporary GMA 14 model setup based on the layer, row, and column numbers of the model, without fully projecting the actual locations of these observation locations. The time series plots presented in **Appendix E** and **Appendix F** are only for comparison purposes and should not be used for evaluating the GMA 14 model in isolation. For examining GMA 14 model performance, the respective reports and results that document the GMA 14 model should be reviewed.



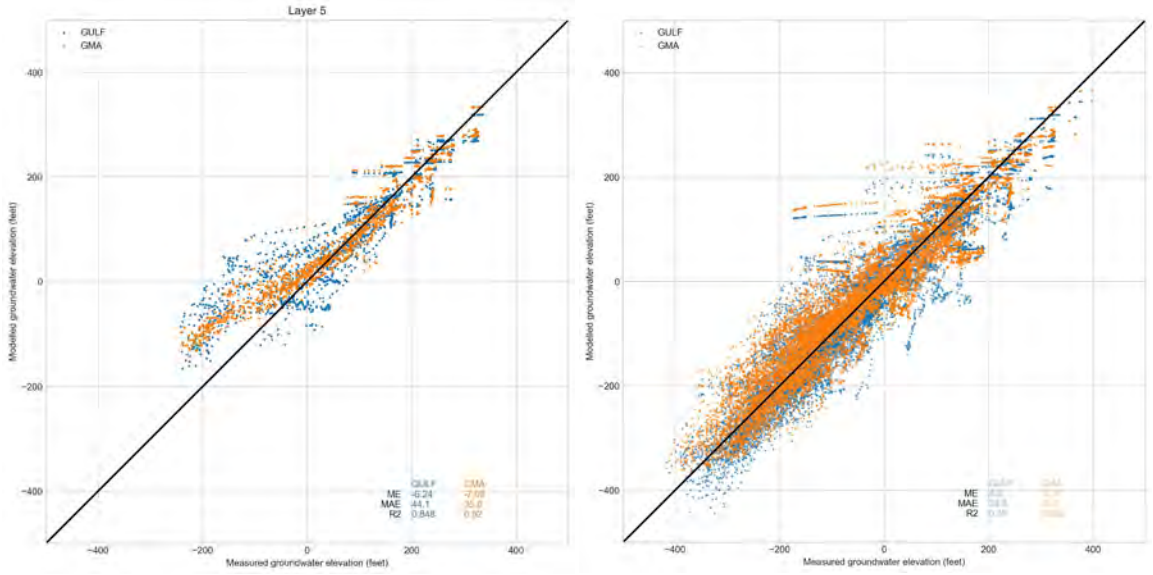
(a) (b)

Figure 4. Scatterplot with observed and simulated (a) Jasper aquifer; and (b) model-wide groundwater levels comparing the GULF and the GMA 14 models. Note that the observations are different between the two models.



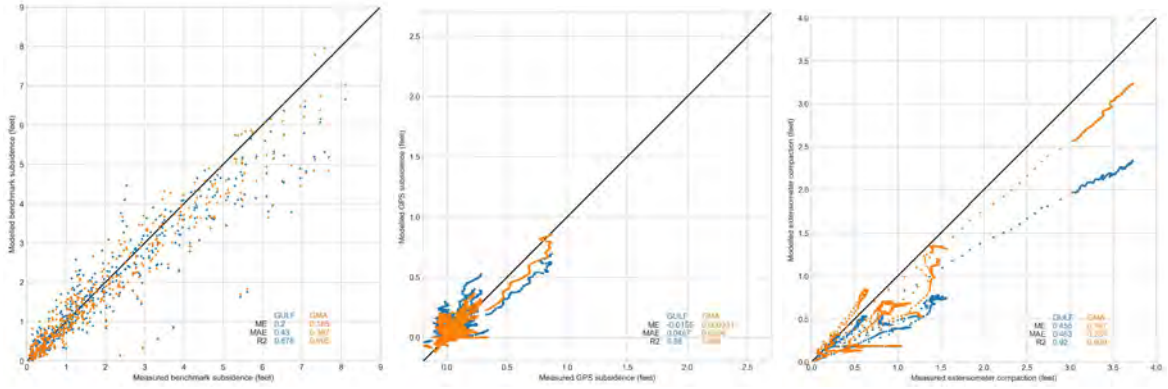
(a) (b) (c)

Figure 5. Scatterplot showing observed and simulated GULF and GMA 14 model values for: (a) subsidence at benchmarks; (b) vertical displacement at Global Positioning System stations; and (c) compaction at extensometers. Note that the observations are different between the two models.



(a) (b)

Figure 6. Scatterplot with observed and simulated (a) Jasper aquifer; and (b) model-wide groundwater levels comparing the GULF and the GMA 14 models using the same stress periods and calibration targets that were used for the GULF model calibration.



(a) (b) (c)

Figure 7. Scatterplot showing observed and simulated GULF and GMA 14 model values for: (a) subsidence at benchmarks; (b) vertical displacement at Global Positioning System stations; and (c) compaction at extensometers, using the same stress periods and calibration targets that were used for the GULF model calibration.

Conclusions

Review of the GMA 14 model indicates that the model improves upon the development and calibration of the GULF model. The GMA 14 model can be used for its intended use. Acknowledging that model development is an evolving process with continual improvement, several recommendations were noted during the review. These recommendations are listed below for consideration during future modeling efforts.

- Simulated groundwater levels, particularly the lower values, are higher than observed values in the Jasper aquifer. These differences may be caused by, but not limited to, conceptualization of the Jasper aquifer, excess incoming water, underestimated pumping, or issues with aquifer or interbed parameters.
- It is recommended that a few extreme aquifer and interbed parameter values be either validated using field measurements or reassessed during future modeling efforts.
- The ensemble in the GULF model is presented as a means of estimating uncertainty in the model. It was noted that observed data were outside of the ensemble of the simulations. The ensemble was not reviewed for the GMA 14 model and only the base model was reviewed. Given that the observed values were outside of the range of simulated values of the GULF model, the utility of using the range as an estimate of uncertainty is questionable. It is recommended that an ensemble not be used because using an incorrect range of uncertainty can mislead the decision-making process.
- Large model errors can be used as a guide to highlight areas where model conceptualization, parameterization, and boundary conditions should be assessed for potential future improvements.

References

Ellis, J.H., Knight, J.E., White, J.T., Sneed, M., Hughes, J.D., Ramage, J.K., Braun, C.L., Teeple, A., Foster, L., Rendon, S.H., and Brandt, J., 2023, Hydrogeology, land-surface subsidence, and documentation of the Gulf Coast Land Subsidence and Groundwater-Flow (GULF) model, southeast Texas, 1897–2018 (ver. 1.1, November 2023): U.S. Geological Survey Professional Paper 1877, 425 p., https://doi.org/10.3133/pp1877.

Knight, J.E., Ellis, J.H., White, J.T., Sneed, M., Hughes, J.D., Ramage, J.K., Braun, C.L., Teeple, A.P., Foster, L., Rendon, S.H., Brandt, J., Duncan, L.L., Traylor, J.P., and Pattison, C.N., 2023, MODFLOW 6 model and ensemble used in the simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast aquifer system, 1897–2018: U.S. Geological Survey data release, https://doi.org/10.5066/P9XM8A1P.

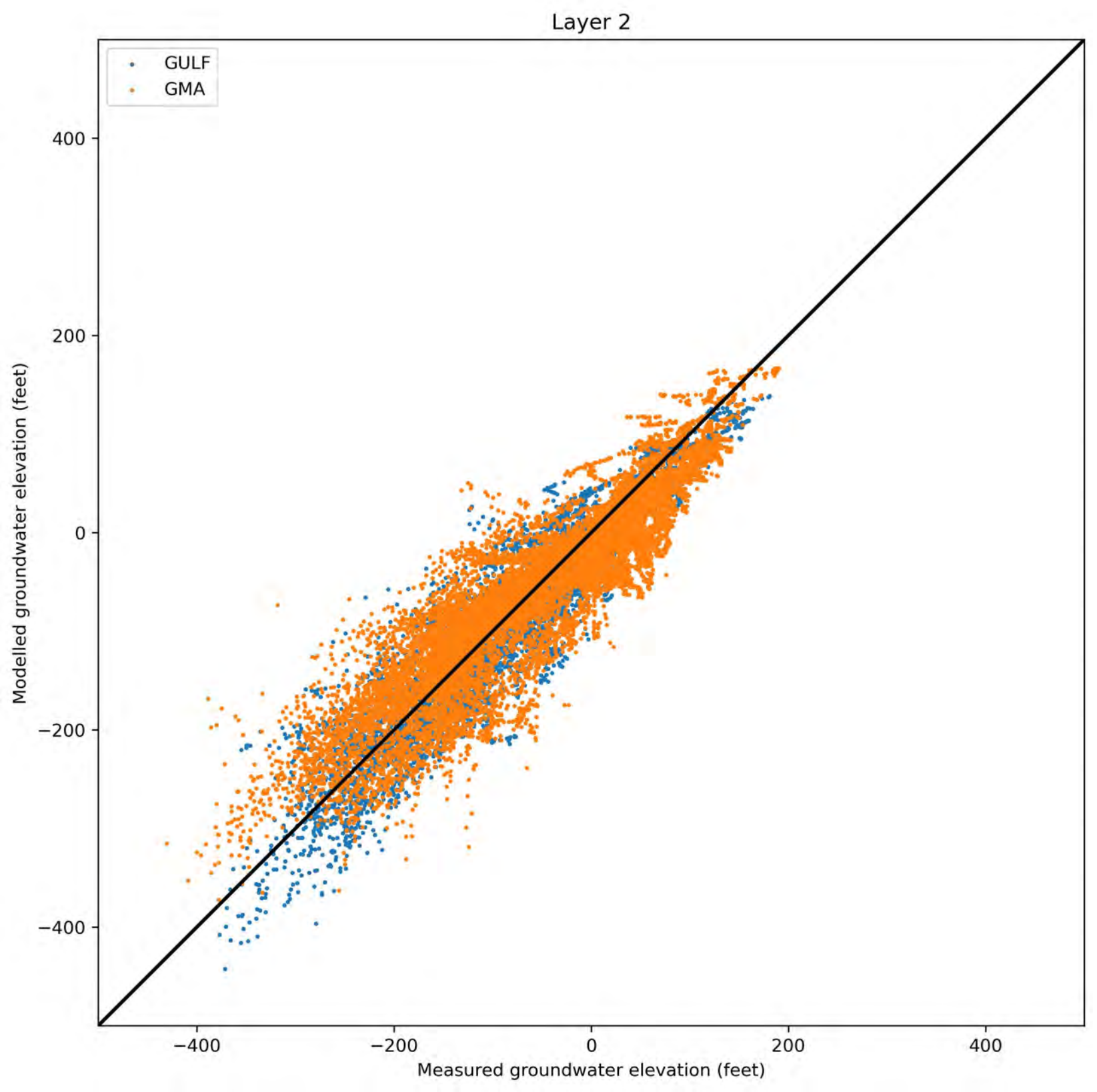
Langevin, C., Hughes, J., Banta, E., Niswonger, R., Panday, S., Provost, A. 2017. Documentation for the MODFLOW 6 groundwater flow model (No. 6-A55). US Geological Survey.

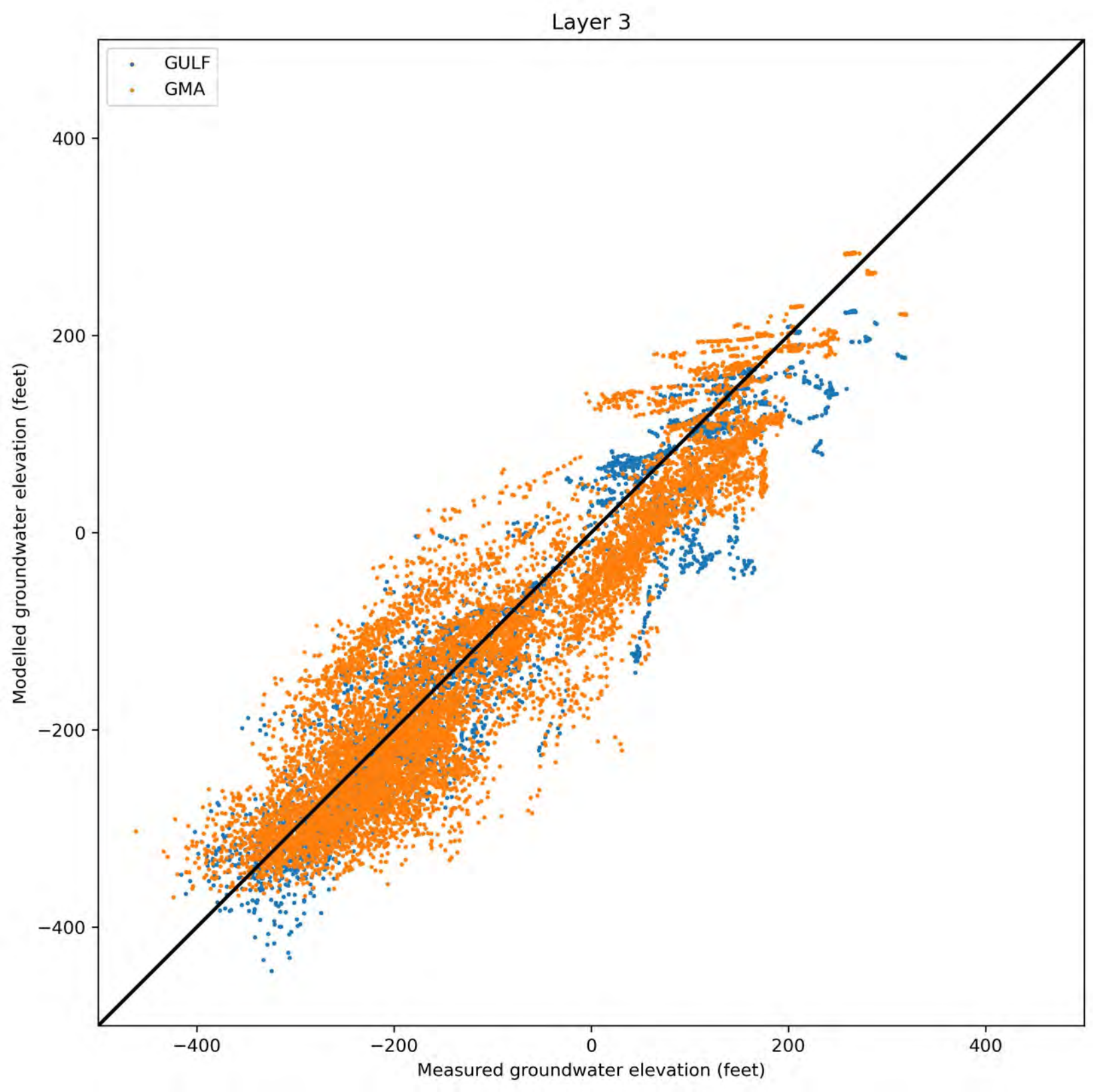
Oliver, W., and Harmon, R., 2022, Estimation of historical pumping for the northern part of the Gulf Coast aquifer, 1900 to 2018, prepared for the Harris–Galveston Subsidence District, 81 p., accessed July 22, 2022, at https://hgsubsidence.org/wp-content/uploads/2022/10/GULF2023_PumpingFile_Report_2022-07-03_FINAL.pdf

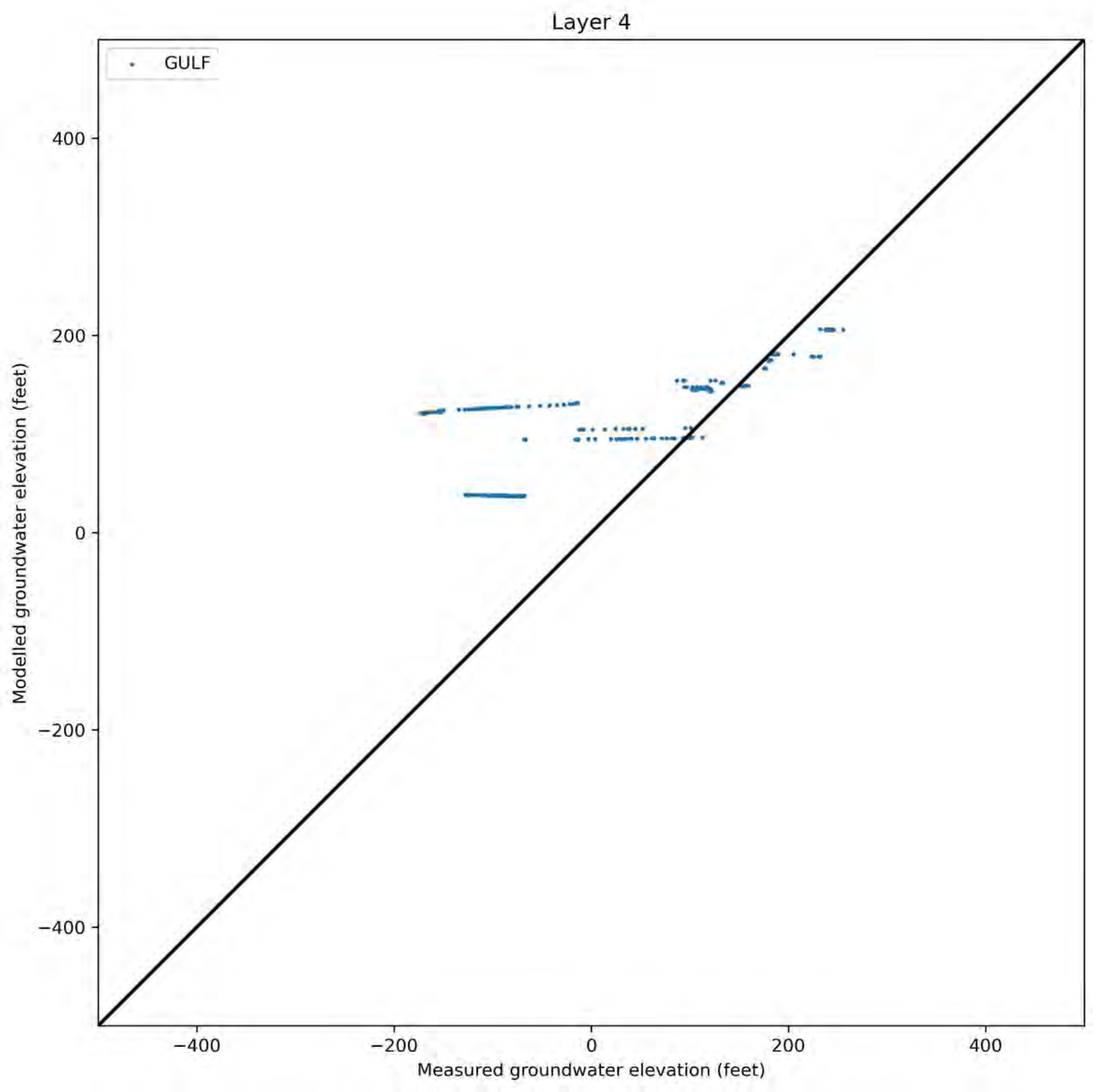
White, J.T., 2018, A model-independent iterative ensemble smoother for efficient history-matching and uncertainty quantification in very high dimensions: Environmental Modelling & Software, v. 109, p. 191–201, accessed October 17, 2019, at https://doi.org/10.1016/j.envsoft.2018.06.009.

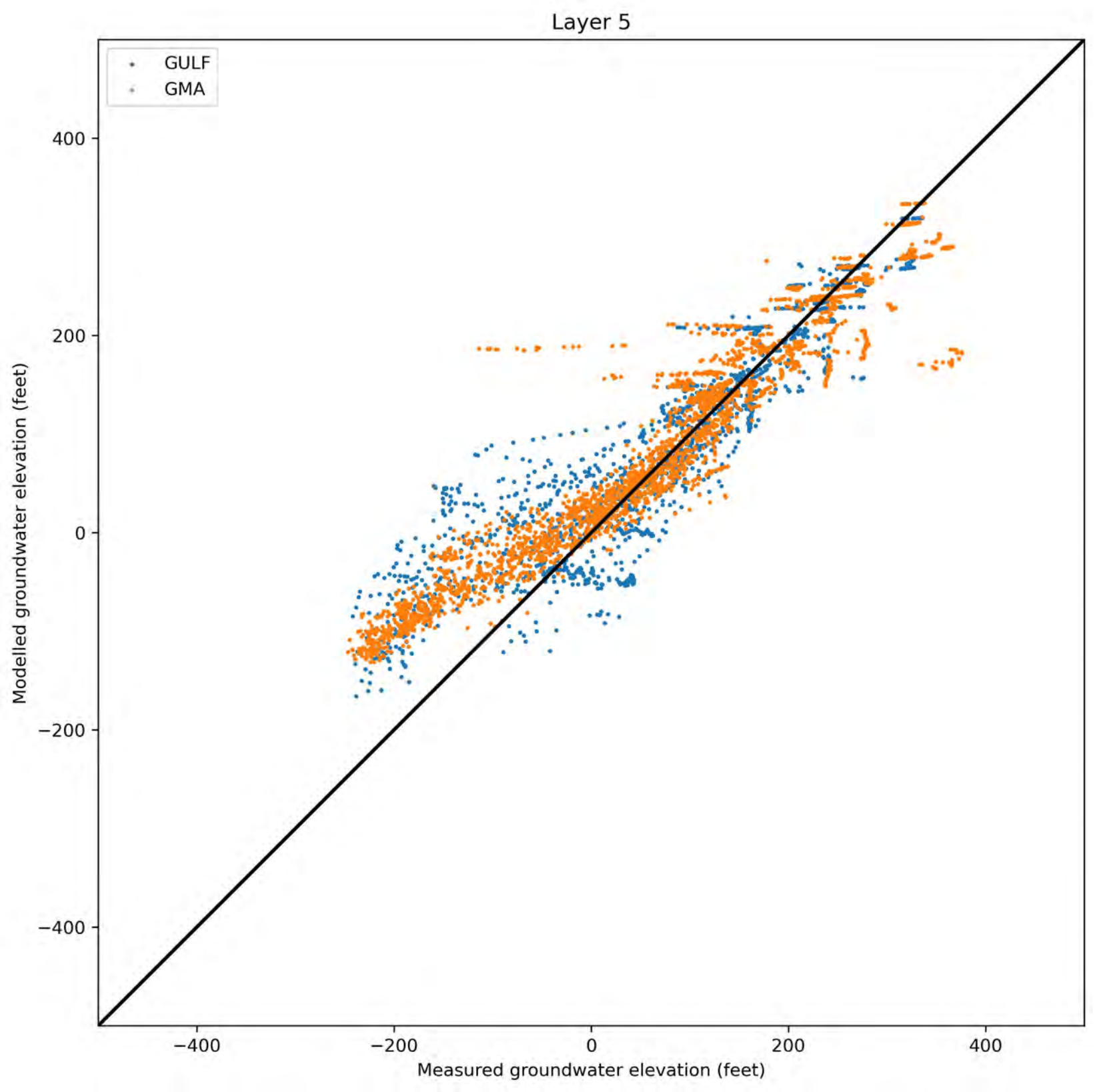
Appendix A

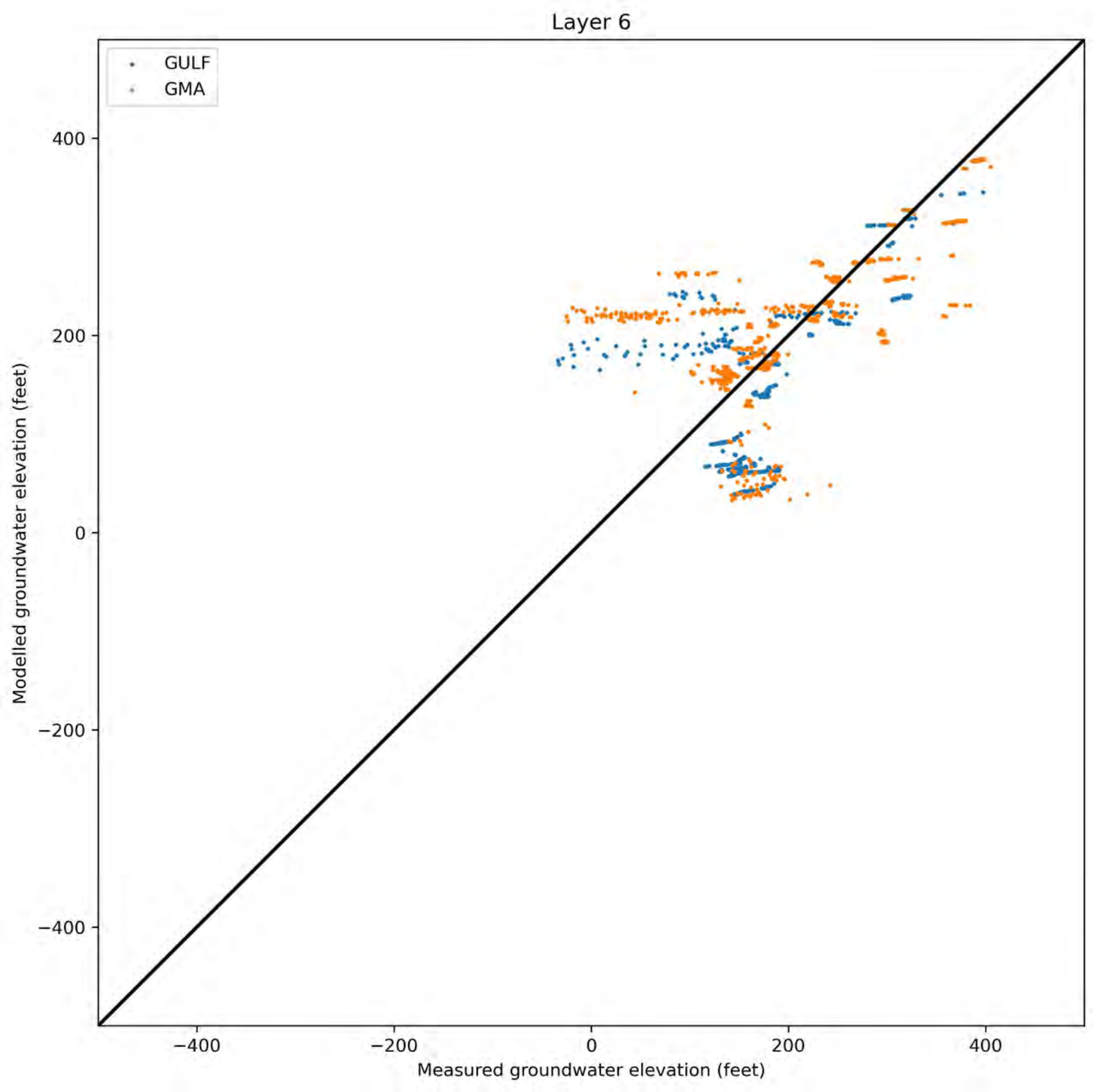
Scatterplots comparing groundwater level and subsidence observations

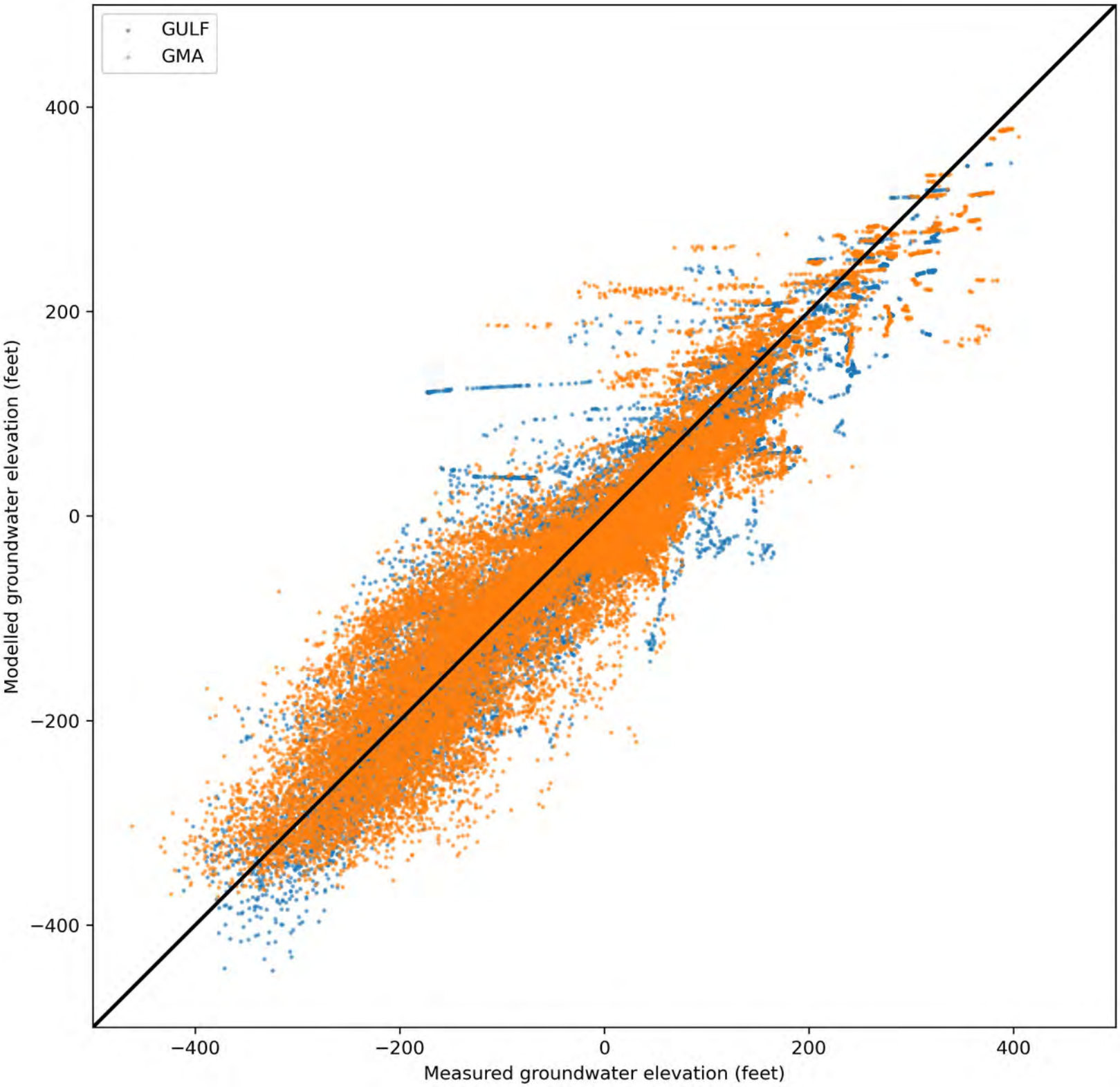

Layer 2
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)

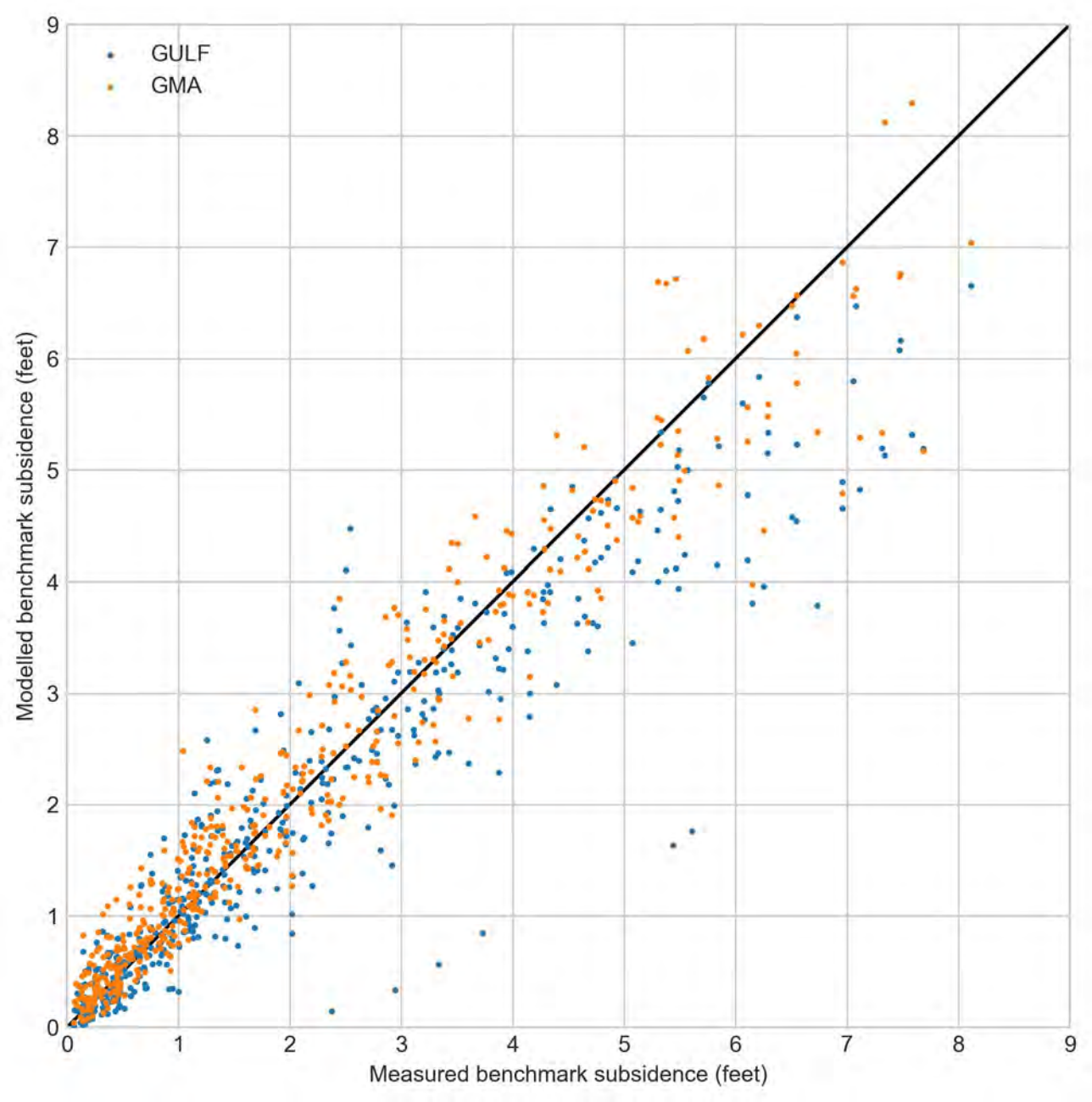

Layer 3
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)

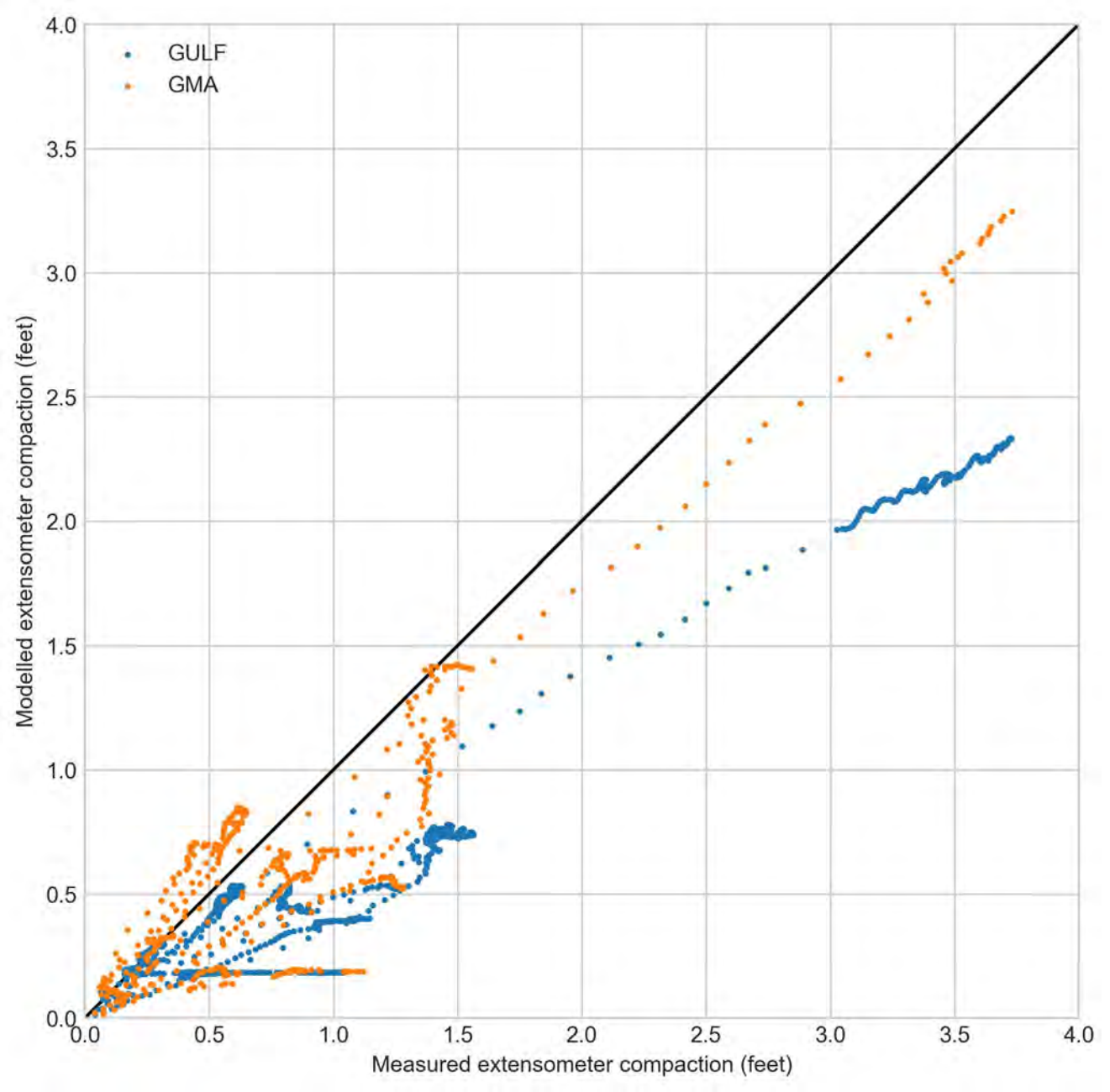

Layer 4
GULF
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)

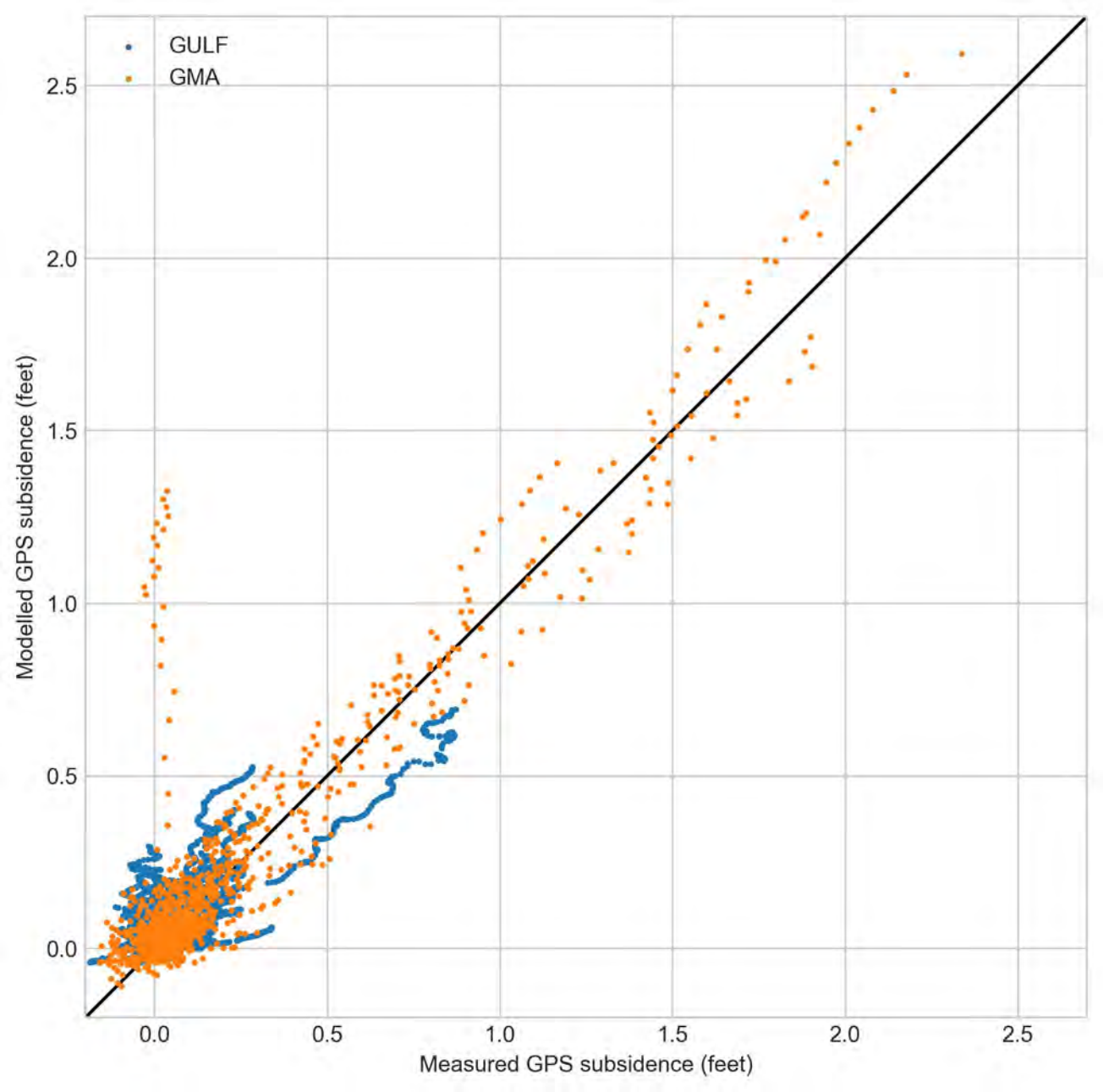

Layer 5
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)


Layer 6
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)


GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)

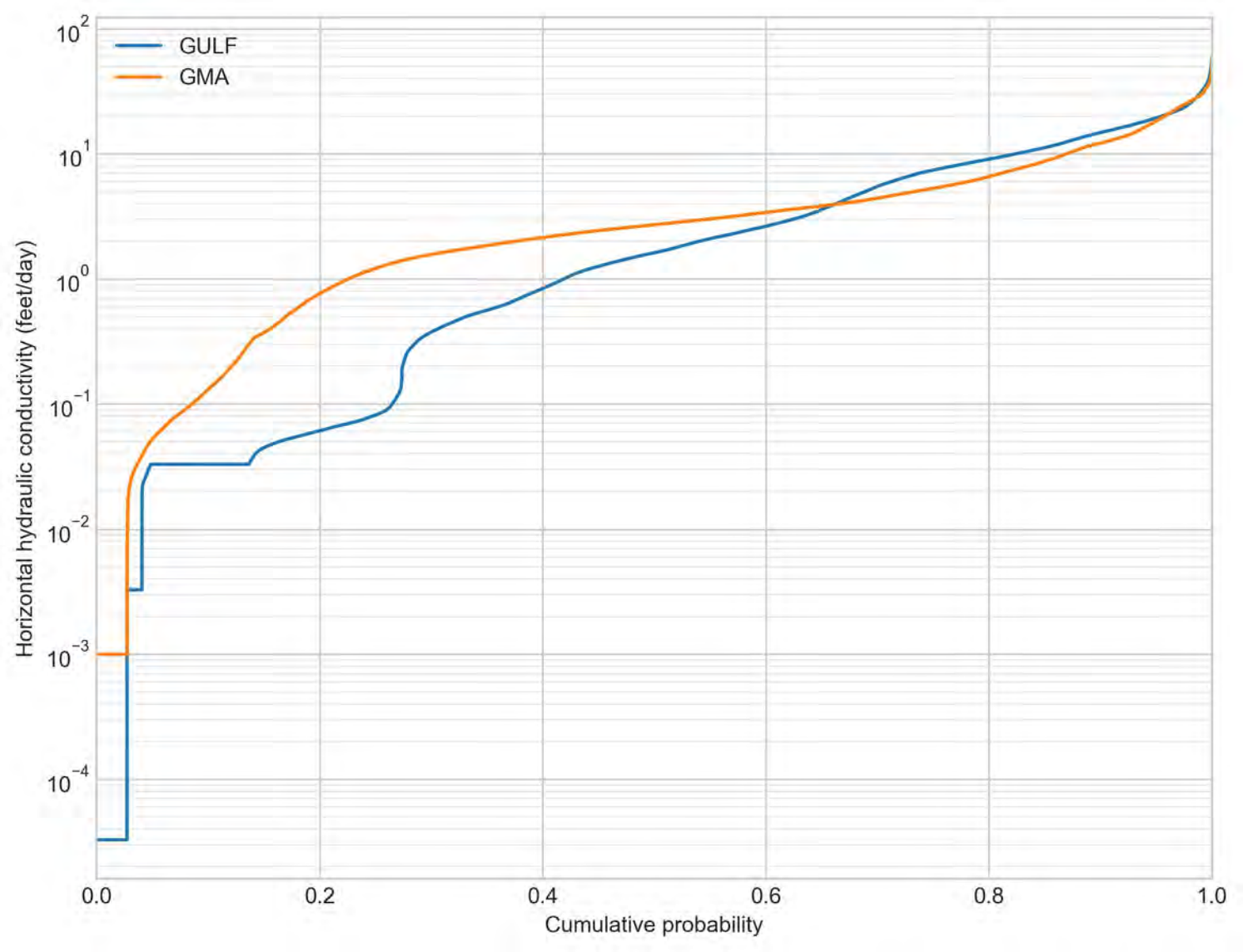

GULF
GMA
Modelled benchmark subsidence (feet)
Measured benchmark subsidence (feet)
0
1
2
3
4
5
6
7
8
9

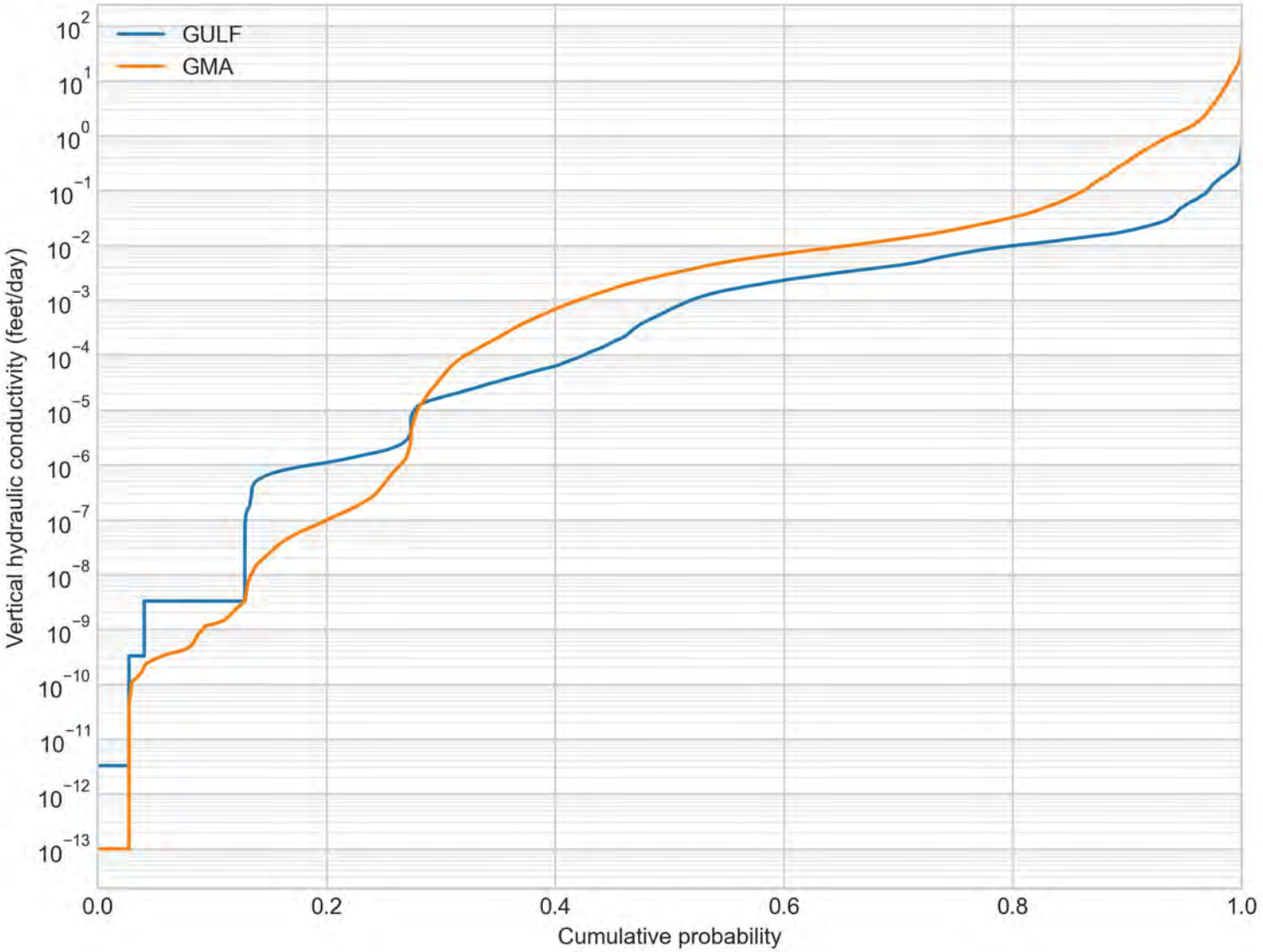

GULF
GMA
Modelled extensometer compaction (feet)
Measured extensometer compaction (feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0

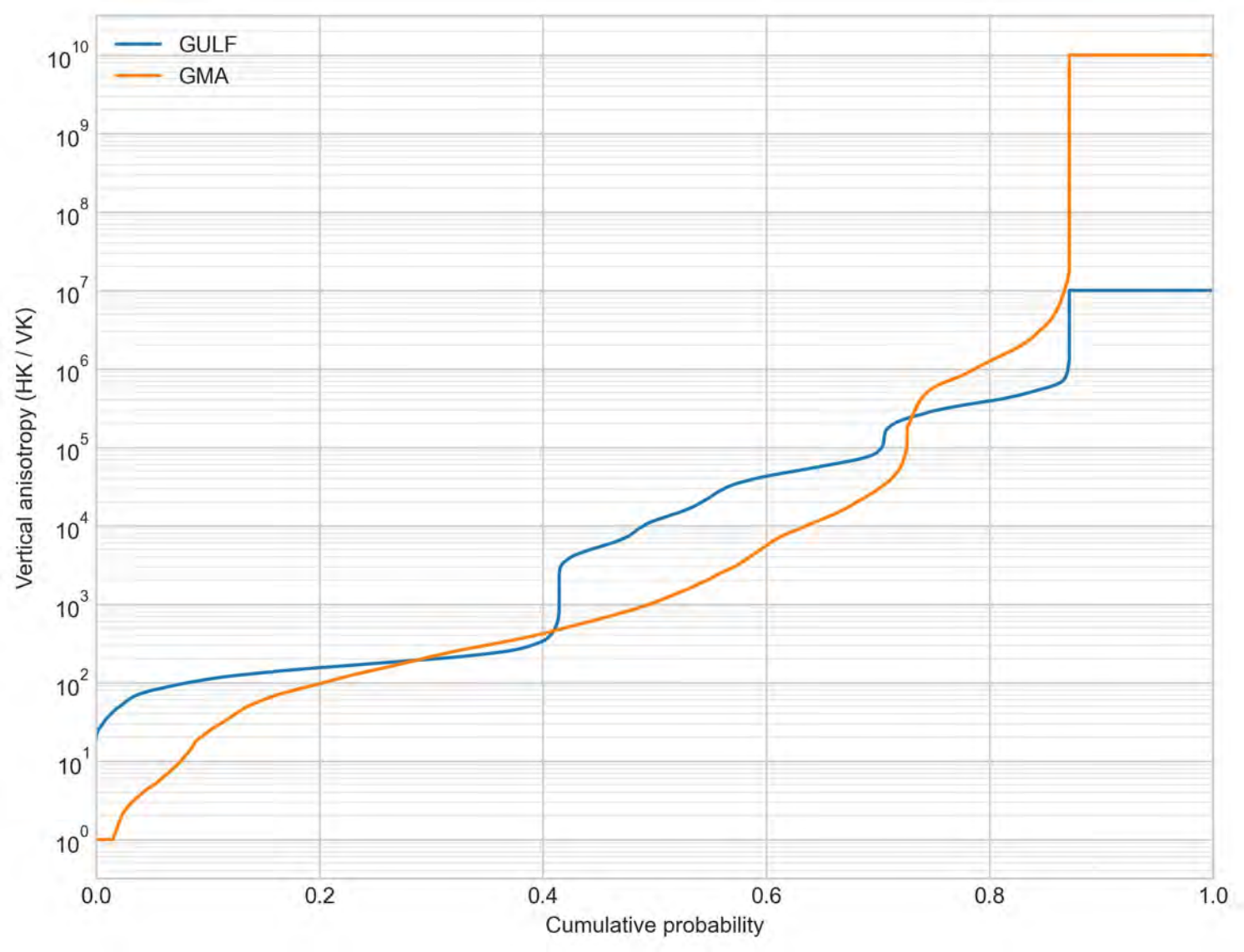

GULF
GMA
2.5
2.0
1.5
1.0
0.5
0.0
Modelled GPS subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
Measured GPS subsidence (feet)

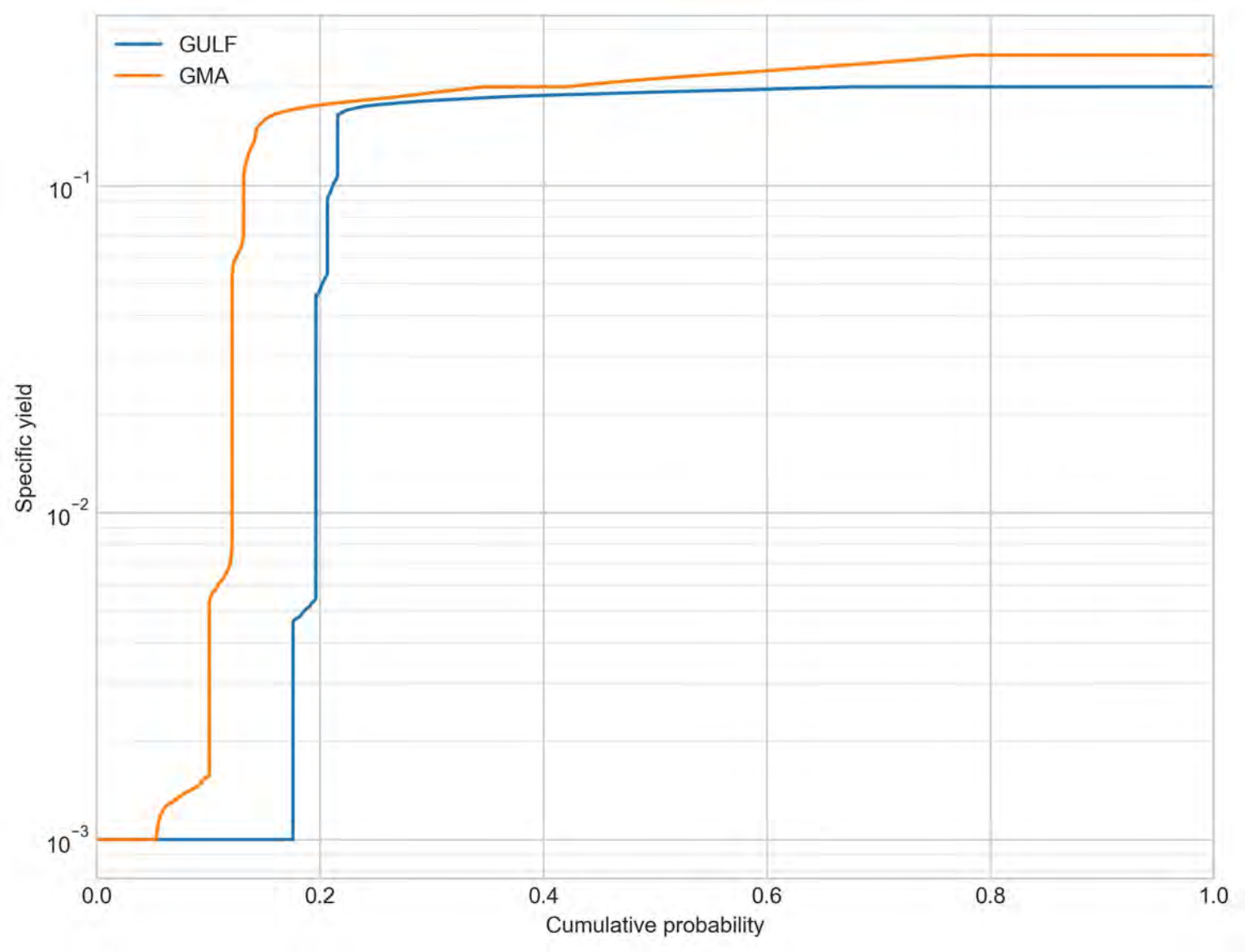
Appendix B

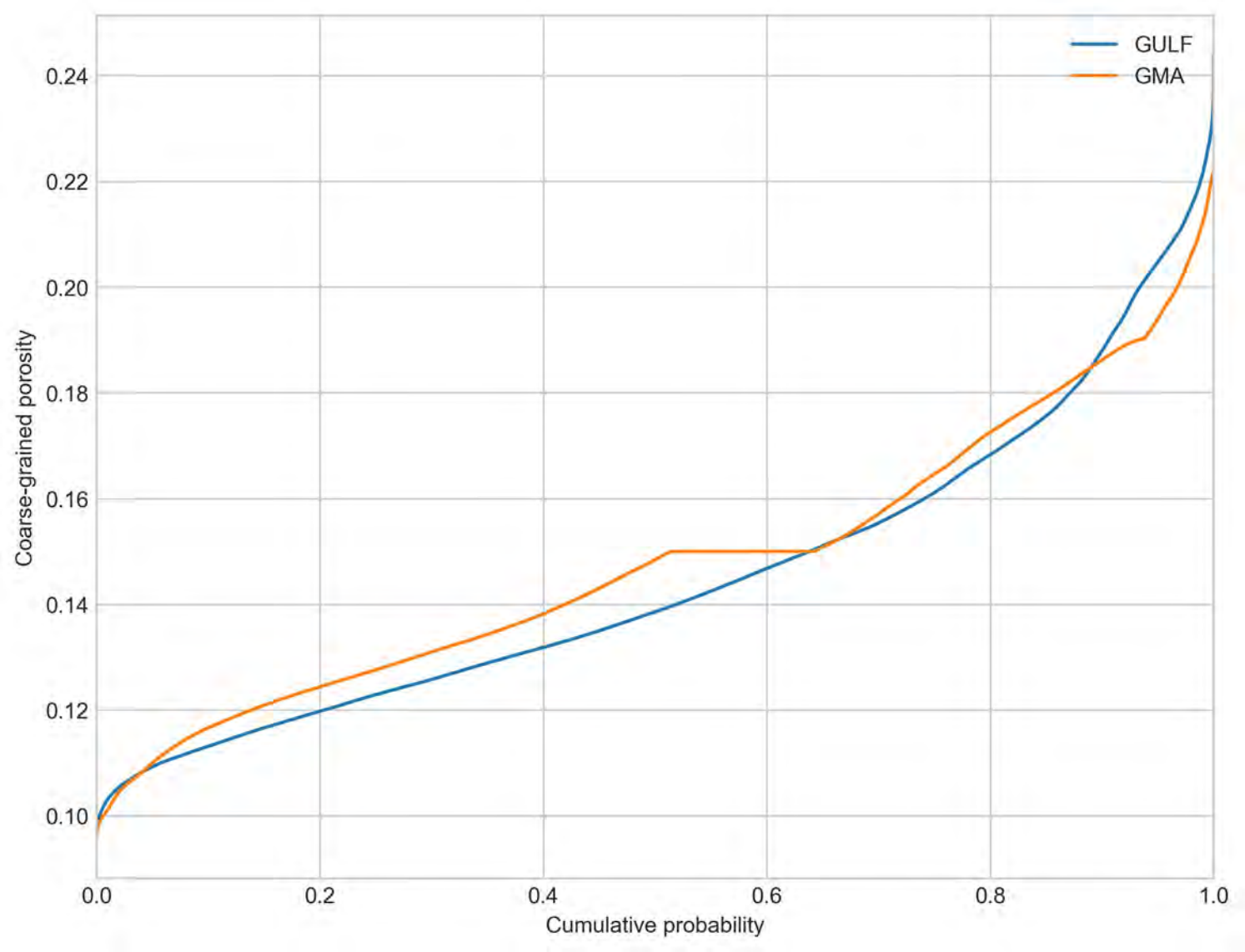
Aquifer and interbed properties

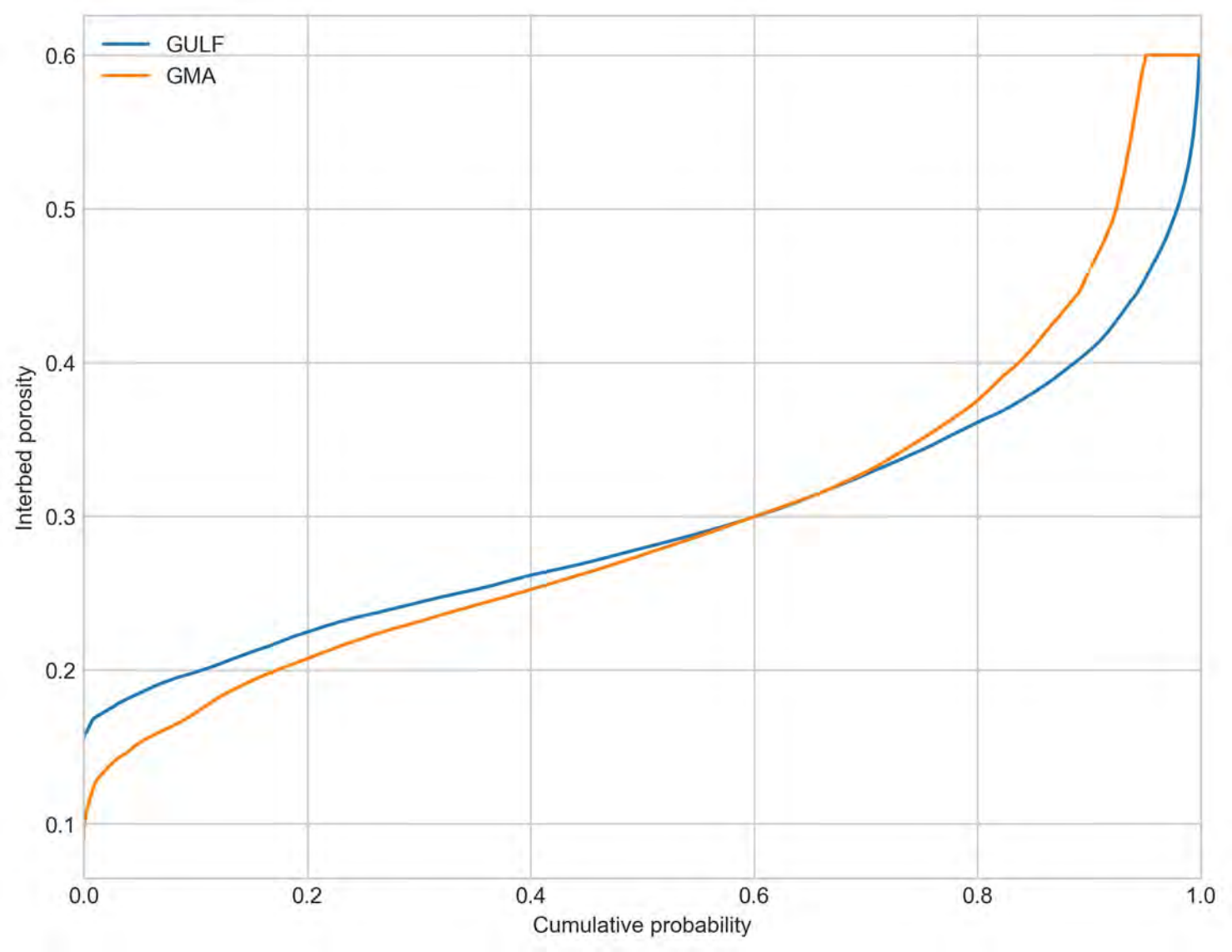

GULF
GMA
Horizontal hydraulic conductivity (feet/day)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

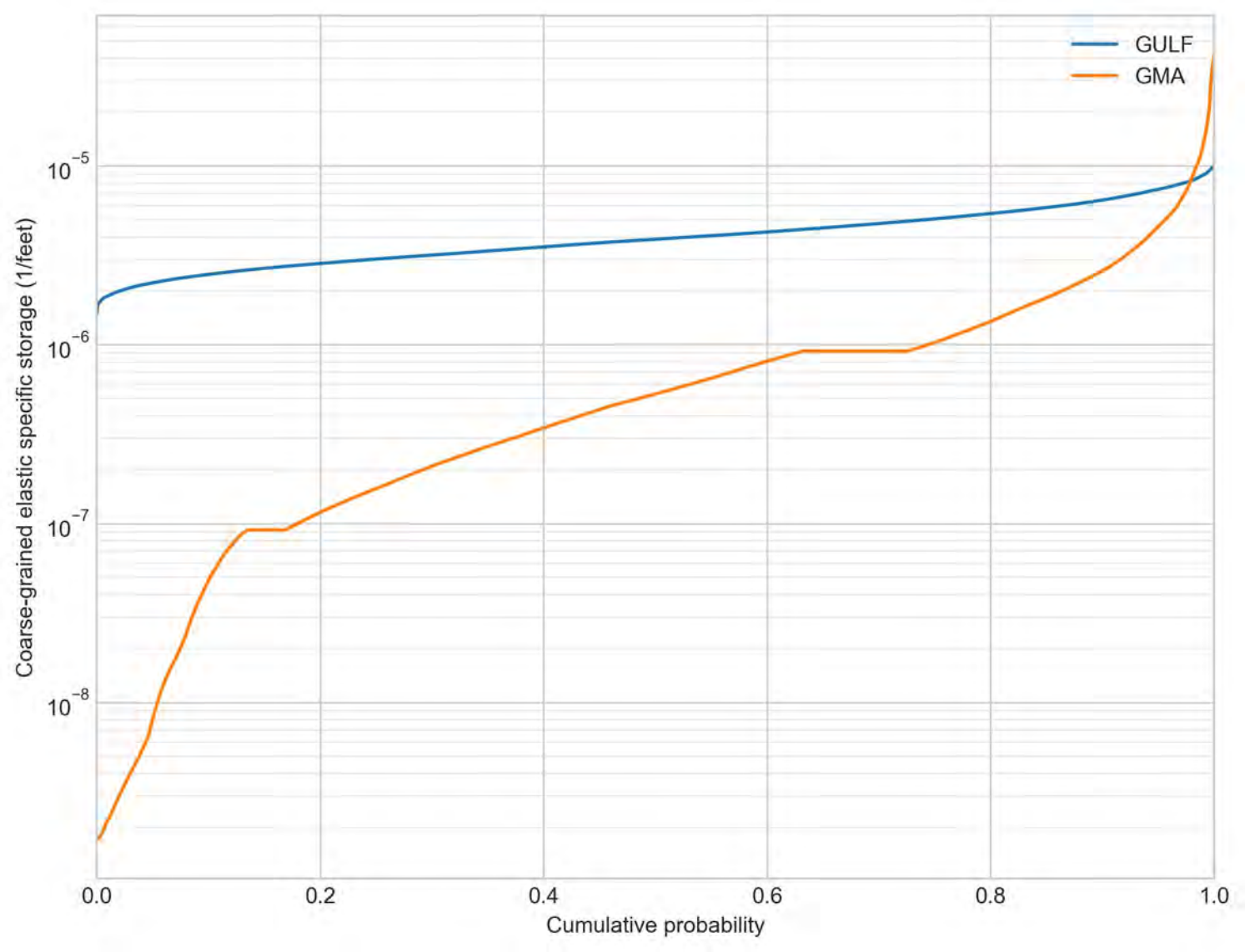

GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
10^{-11}
10^{-12}
10^{-13}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

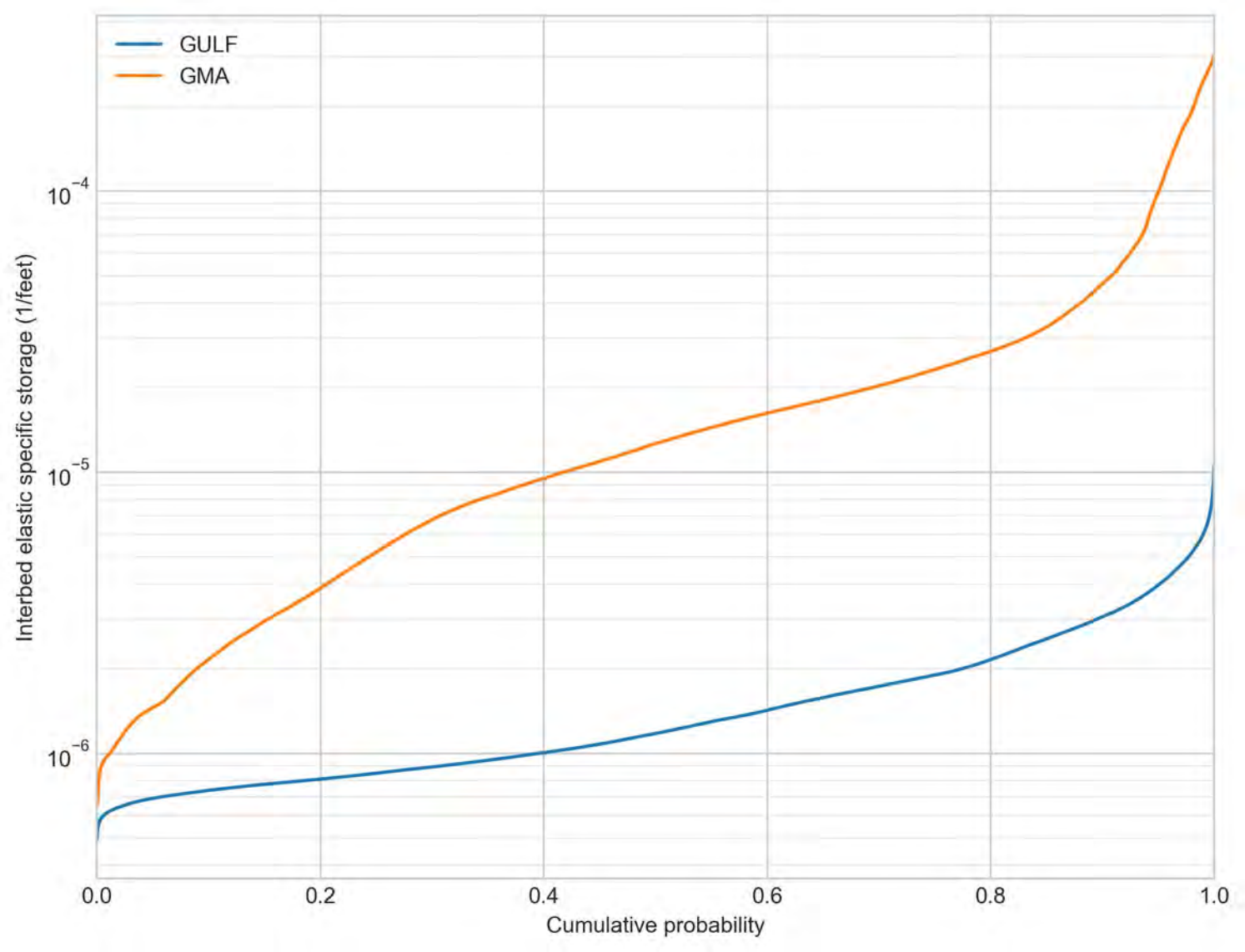

GULF
GMA
Vertical anisotropy (HK / VK)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

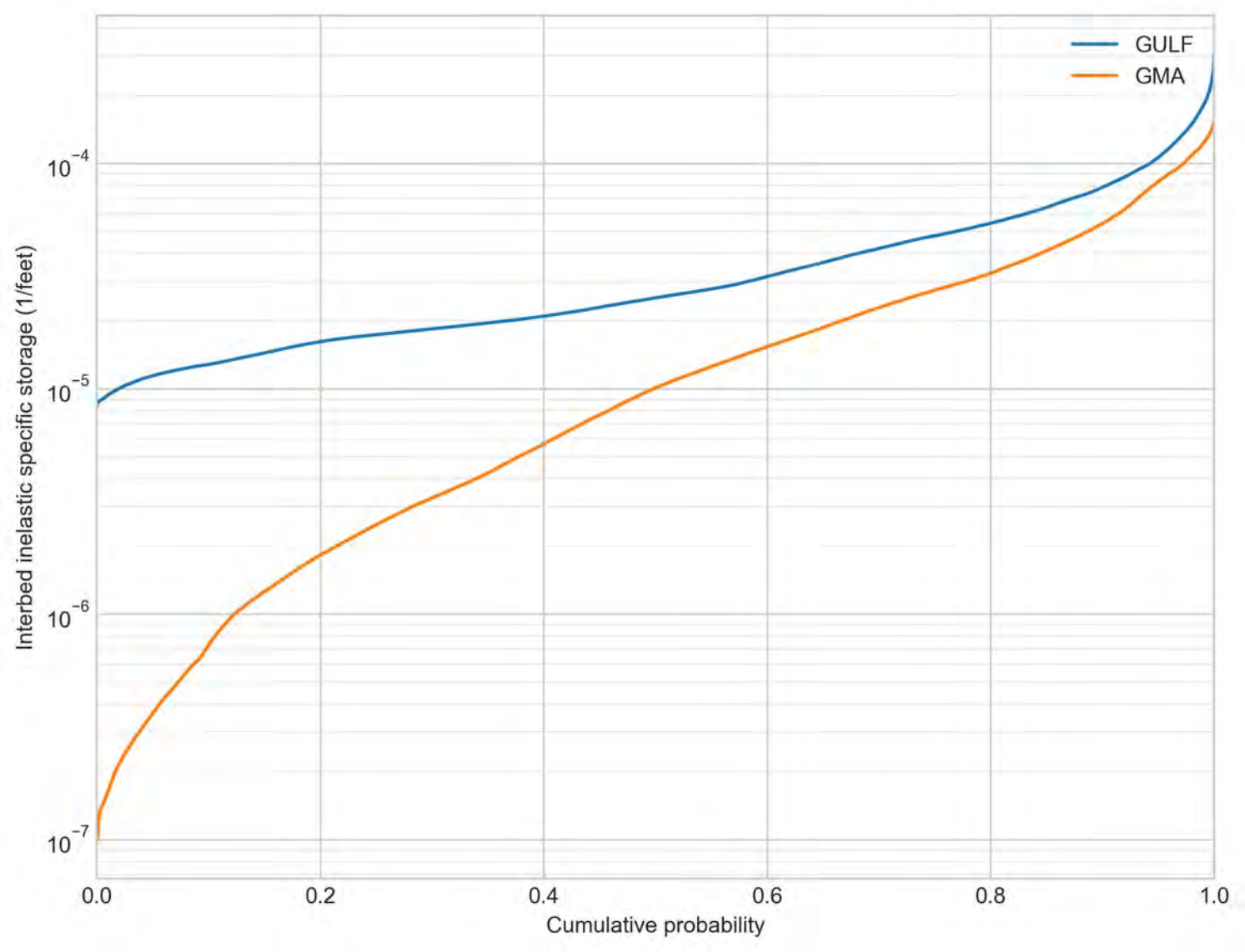

GULF
GMA
10^{-1}
10^{-2}
10^{-3}
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

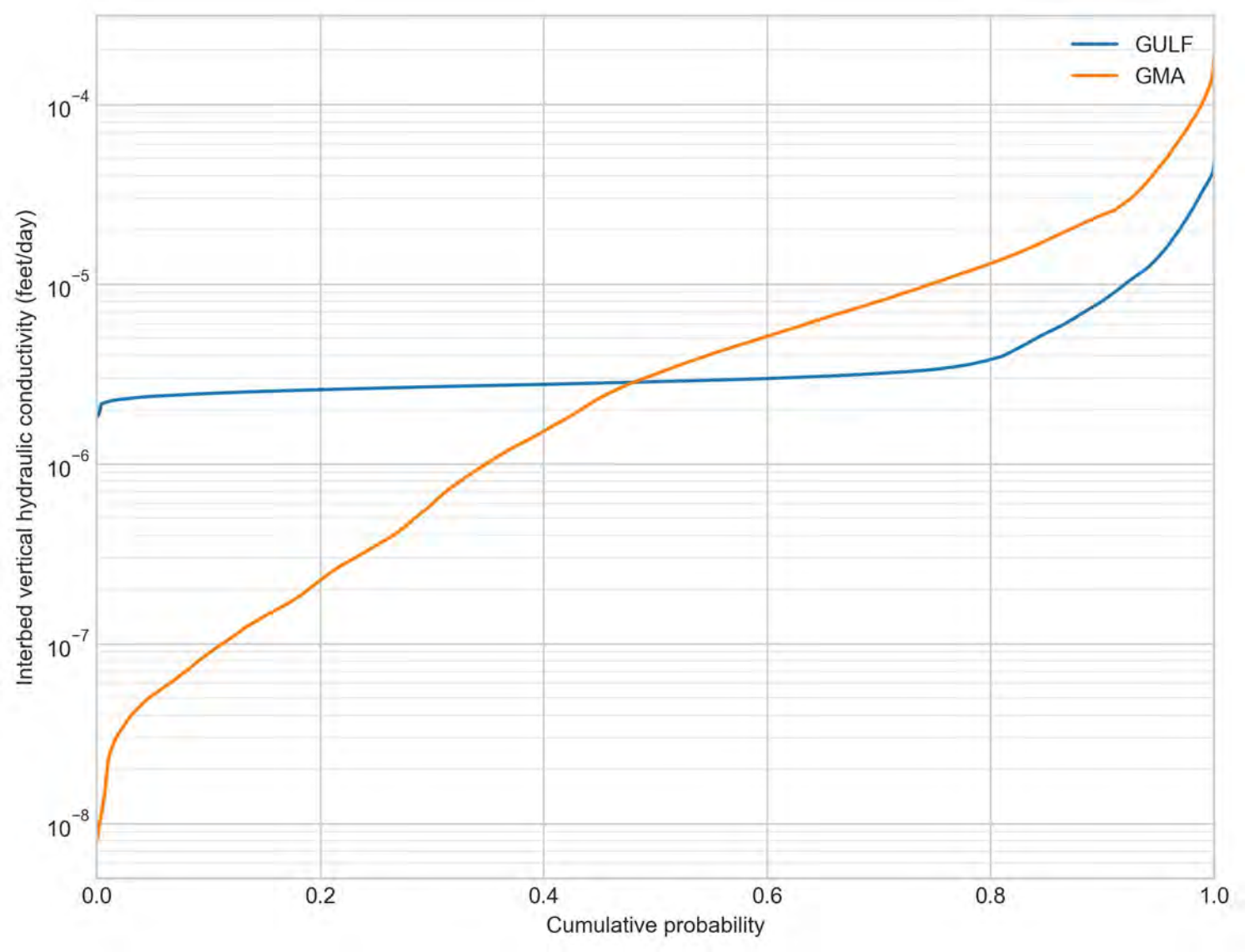

GULF
GMA
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
Coarse-grained porosity
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

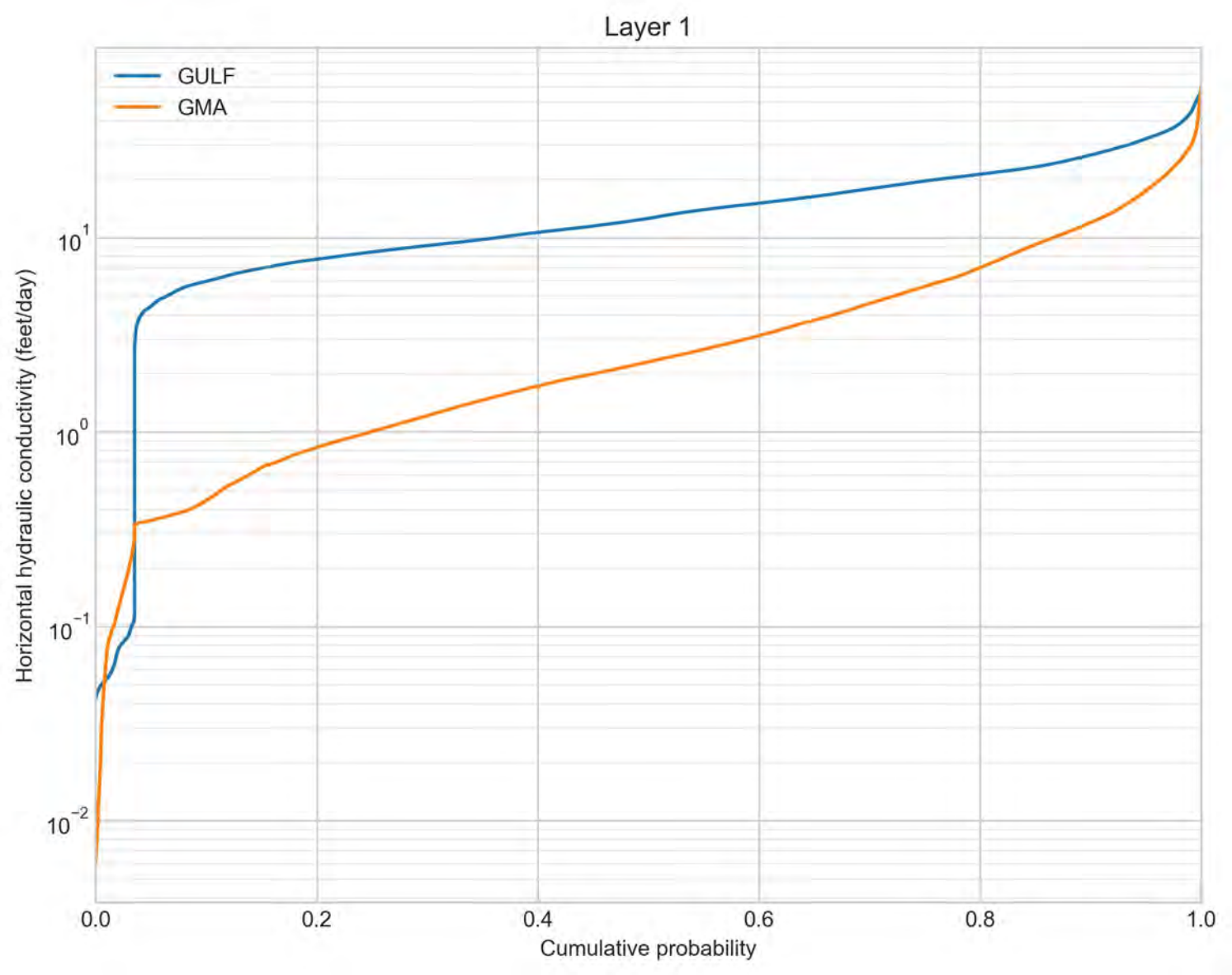

GULF
GMA
Interbed porosity
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

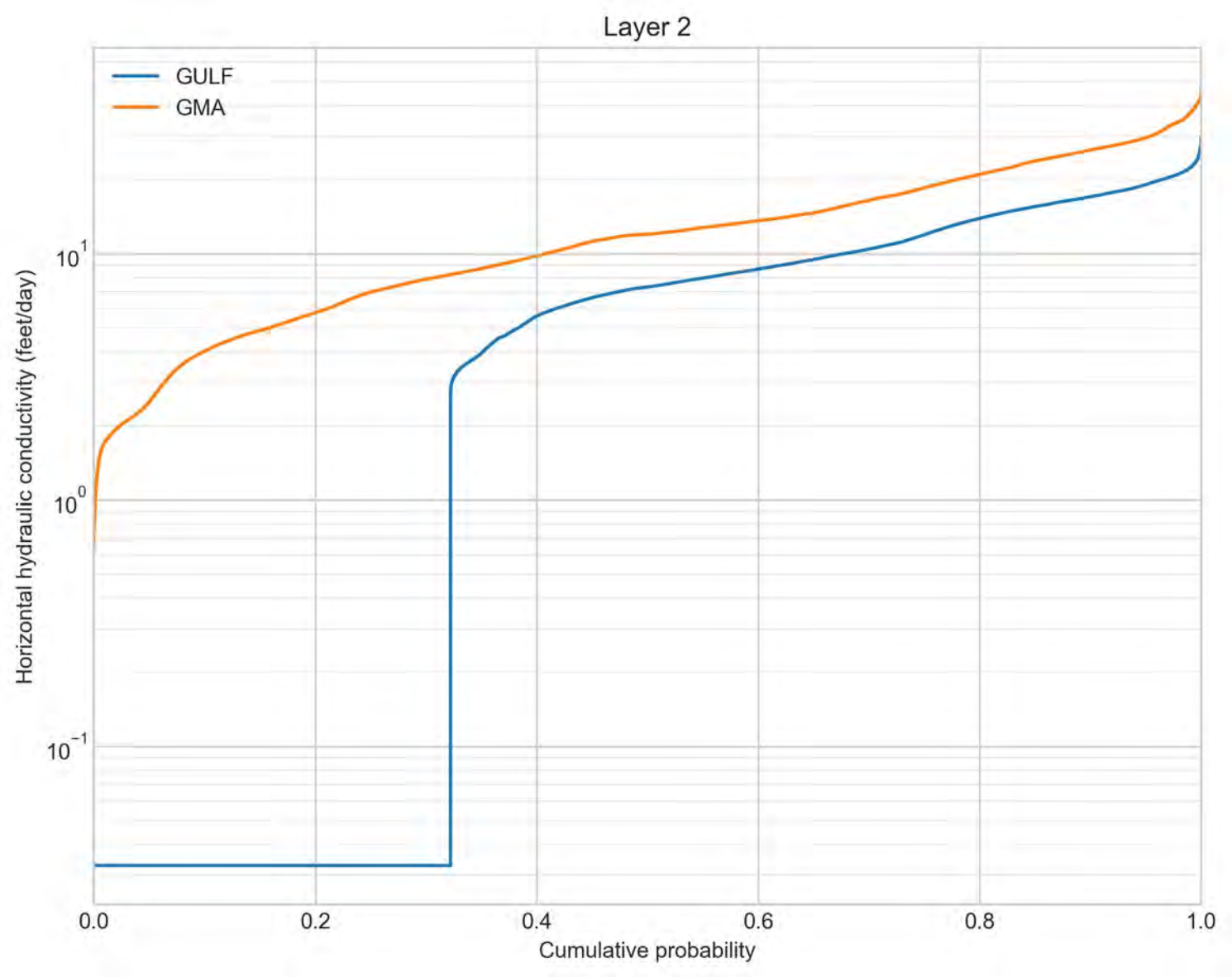

GULF
GMA
10^{-5}
10^{-6}
10^{-7}
10^{-8}
Coarse-grained elastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

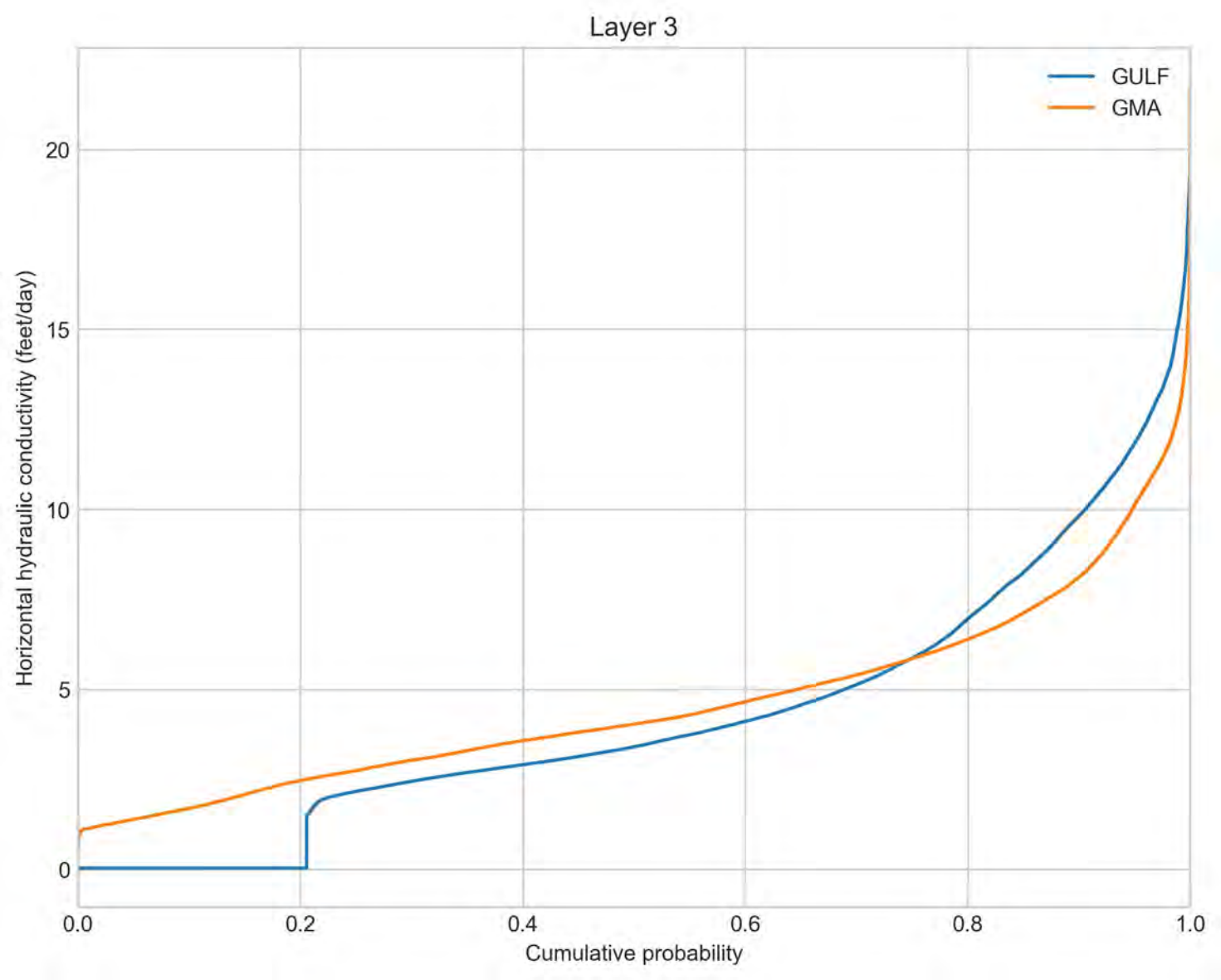

GULF
GMA
Interbed elastic specific storage (1/feet)
10^{-4}
10^{-5}
10^{-6}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

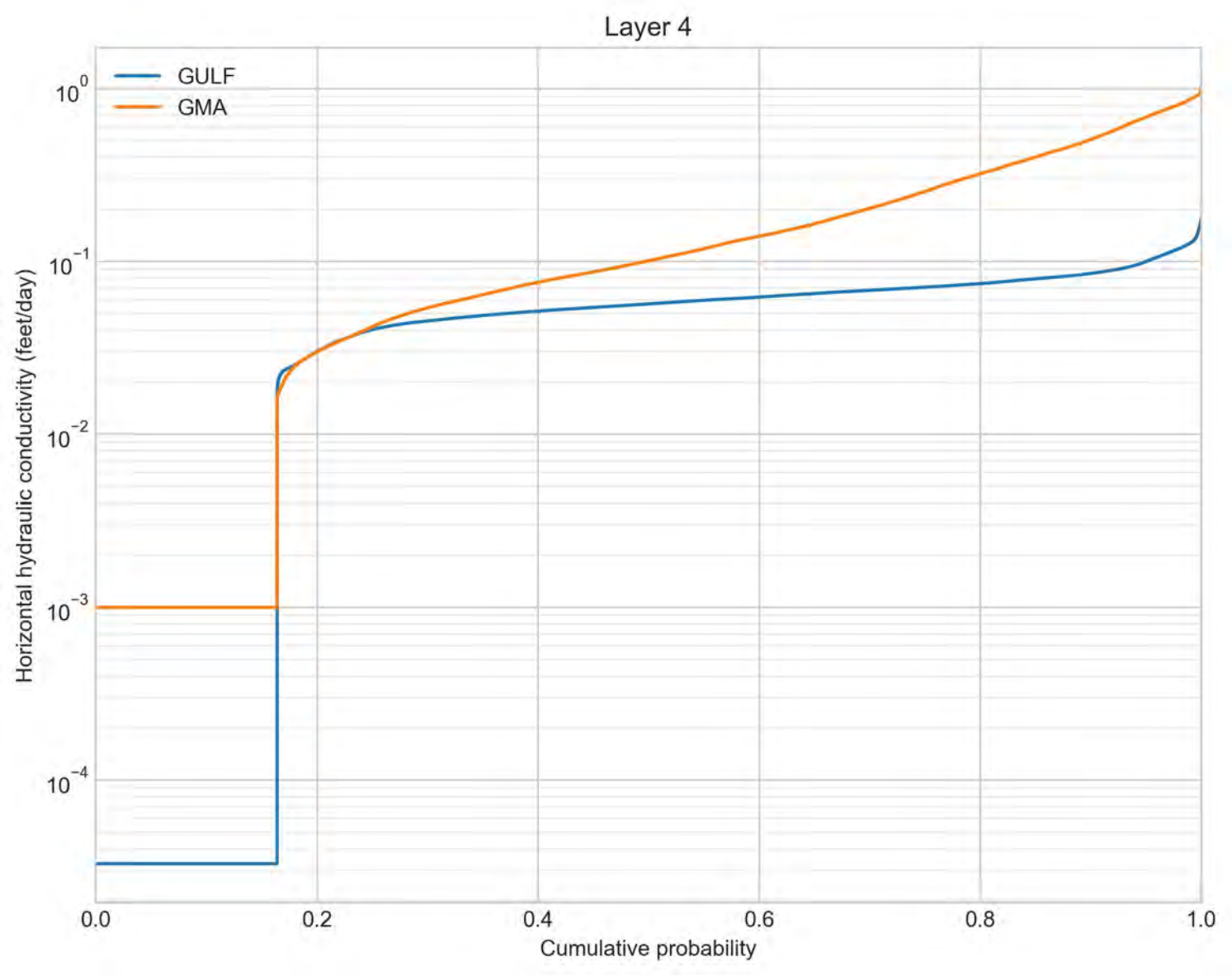

GULF
GMA
Interbed inelastic specific storage (1/feet)
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

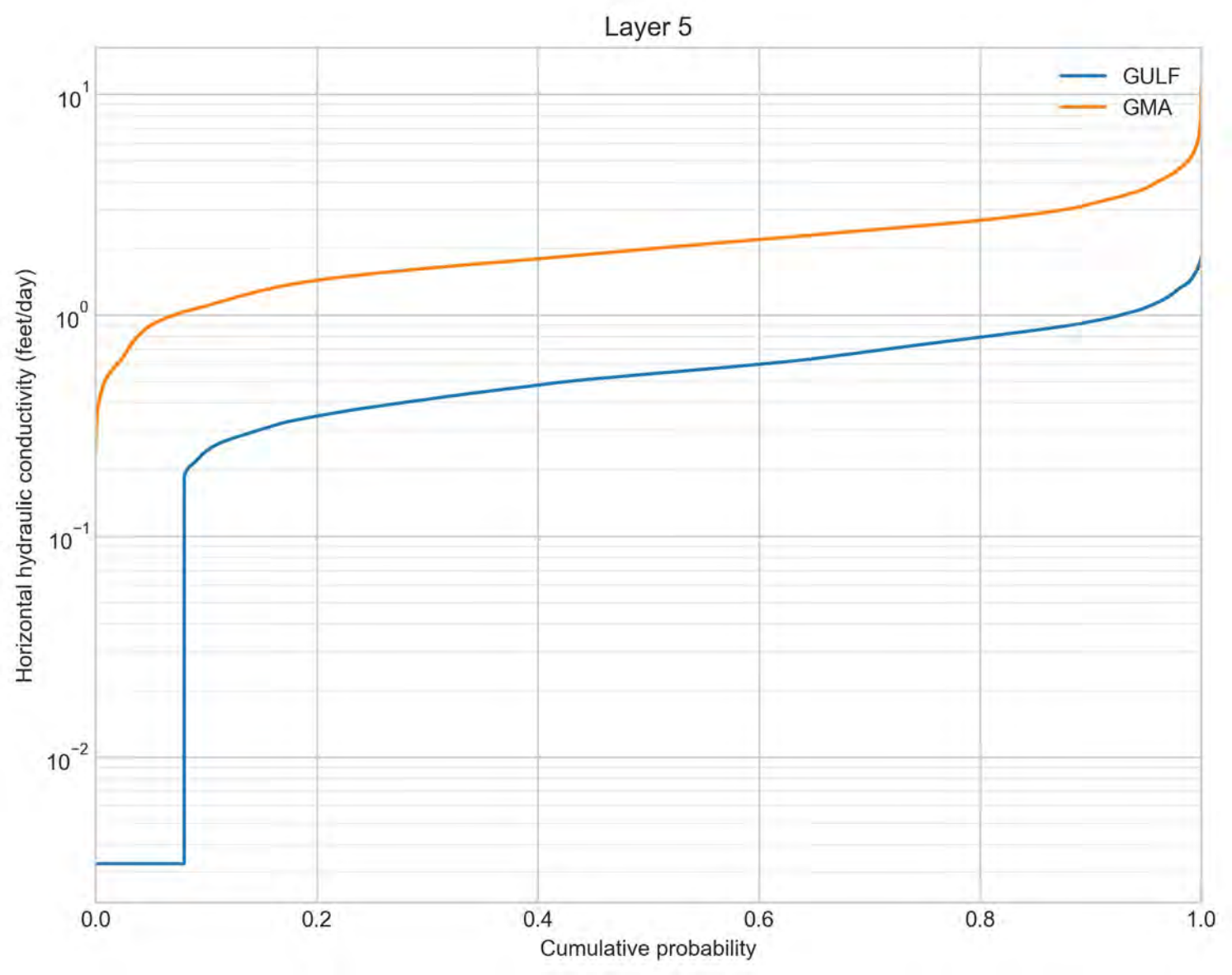

GULF
GMA
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
Interbed vertical hydraulic conductivity (feet/day)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

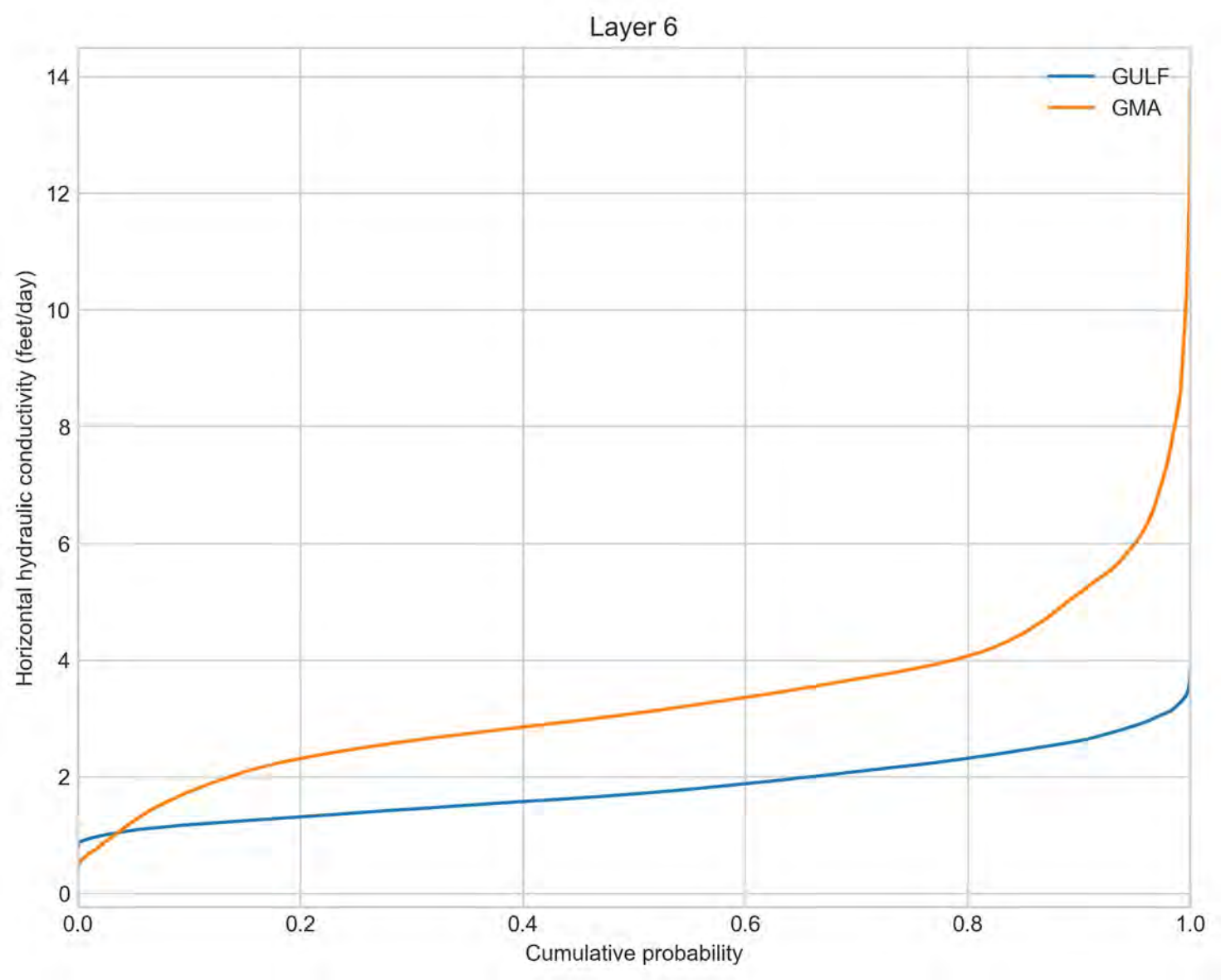

Layer 1
GULF
GMA
Horizontal hydraulic conductivity (feet/day)
10^{1}
10^{0}
10^{-1}
10^{-2}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

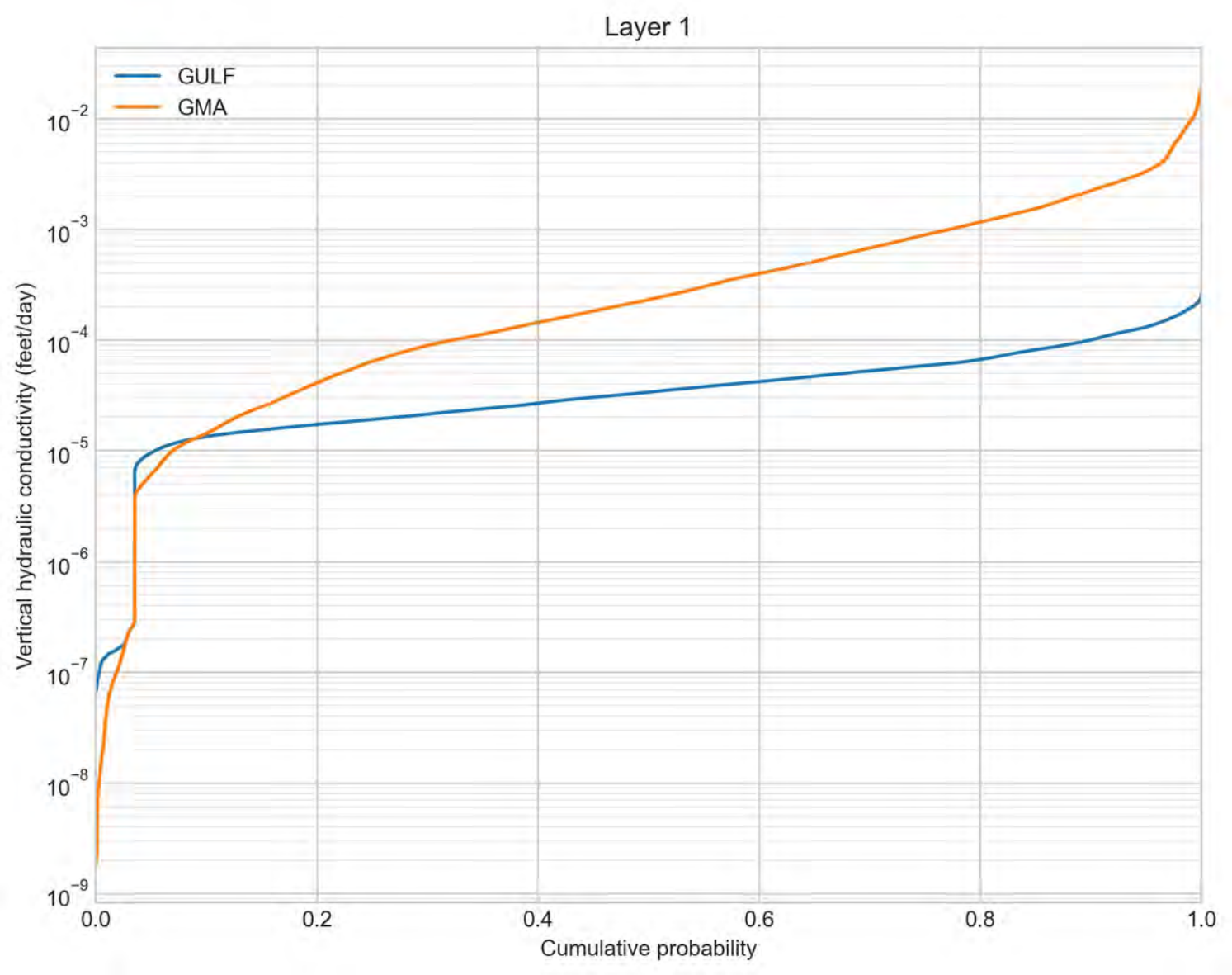

Layer 2
GULF
GMA
Horizontal hydraulic conductivity (feet/day)
10^{1}
10^{0}
10^{-1}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

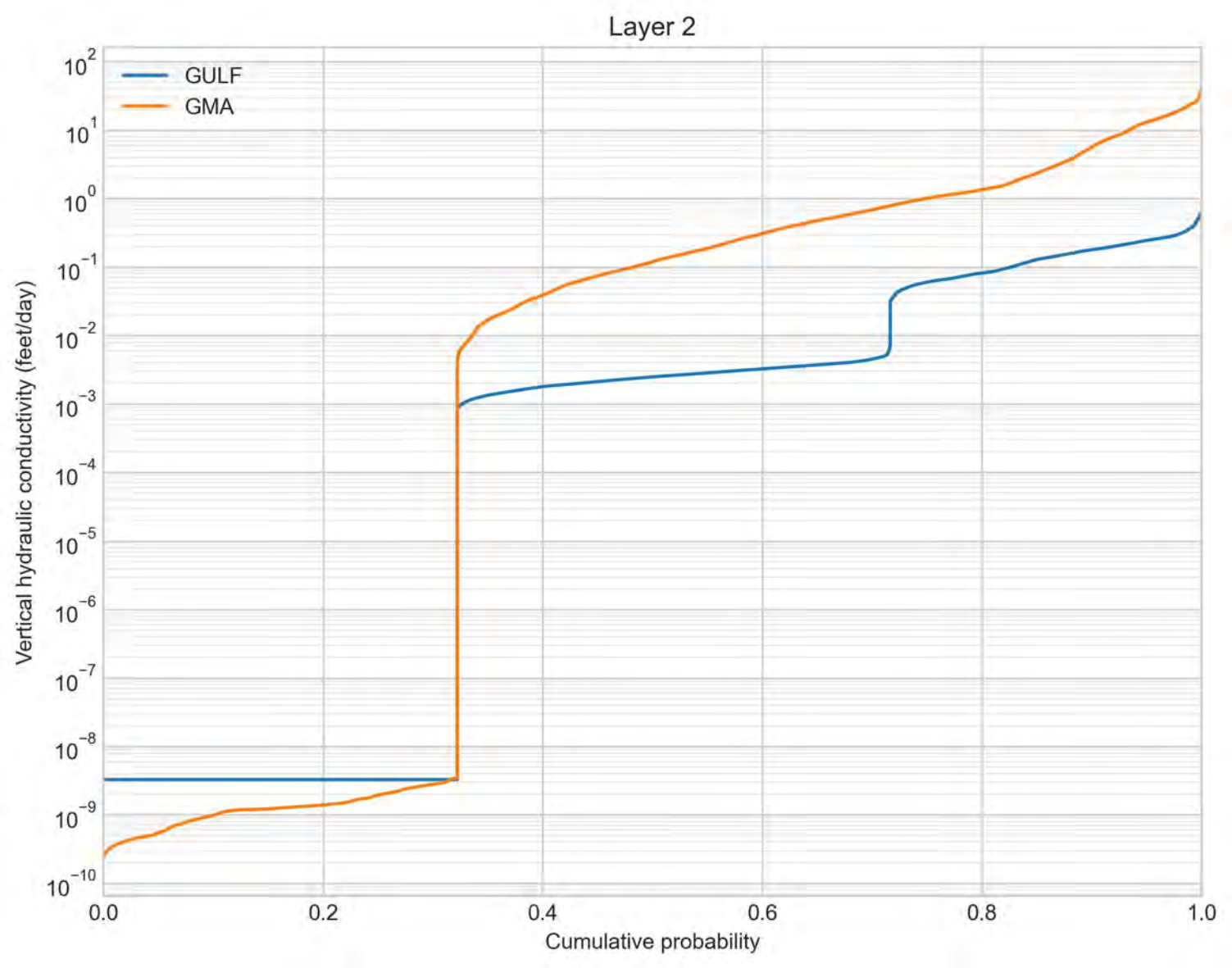

Layer 3
GULF
GMA
Horizontal hydraulic conductivity (feet/day)
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

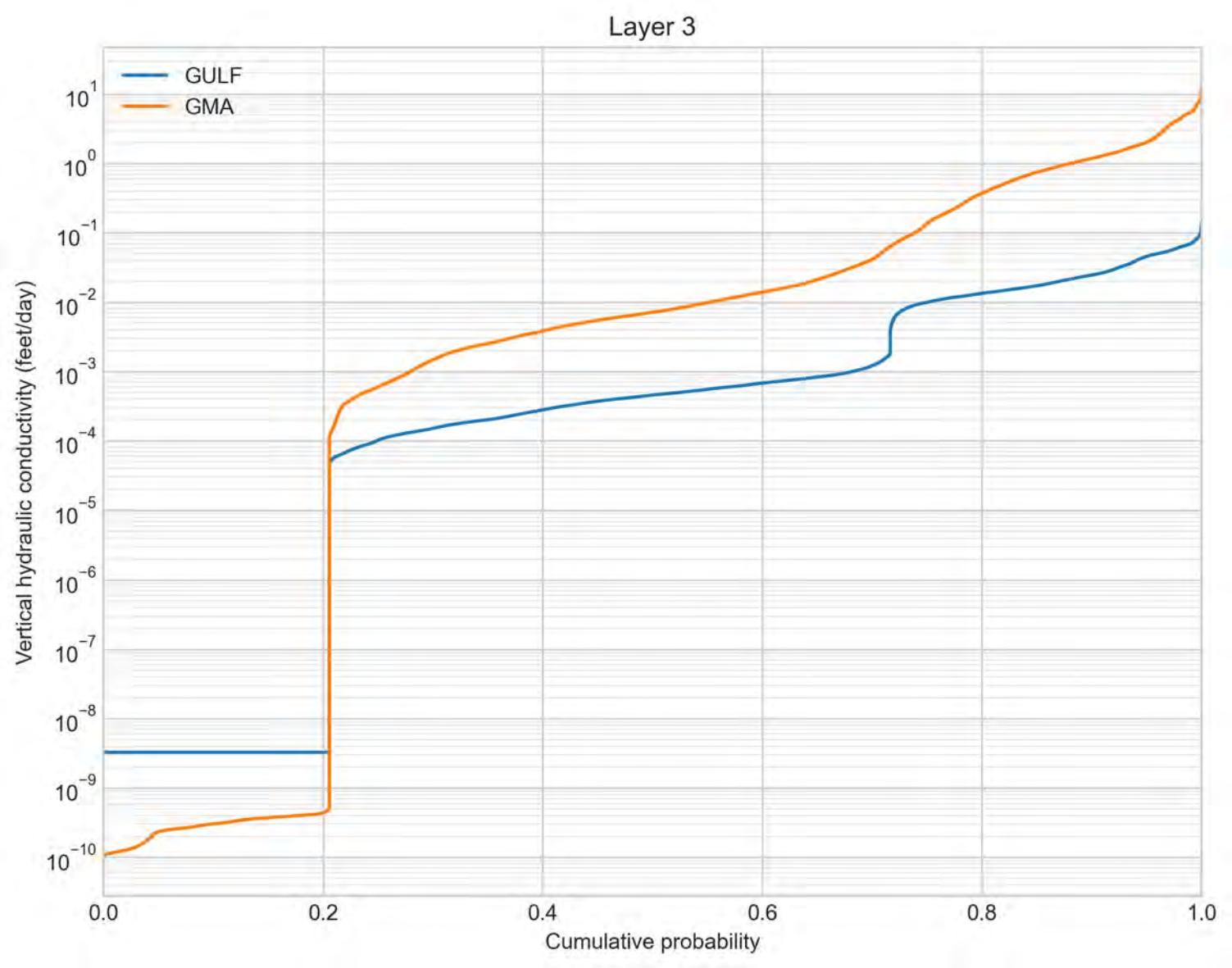

Layer 4
GULF
GMA
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
Horizontal hydraulic conductivity (feet/day)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

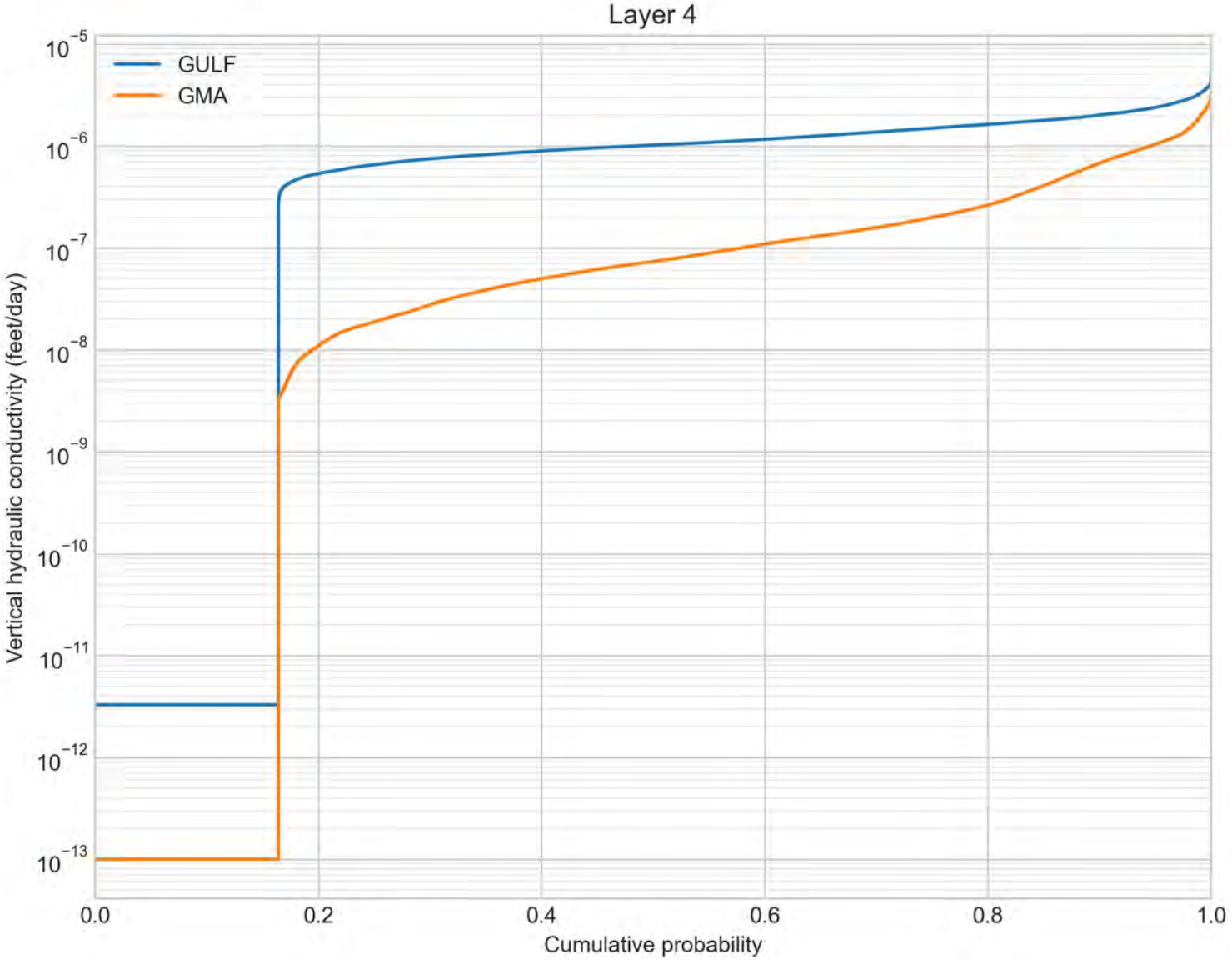

Layer 5
GULF
GMA
Horizontal hydraulic conductivity (feet/day)
10^{1}
10^{0}
10^{-1}
10^{-2}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

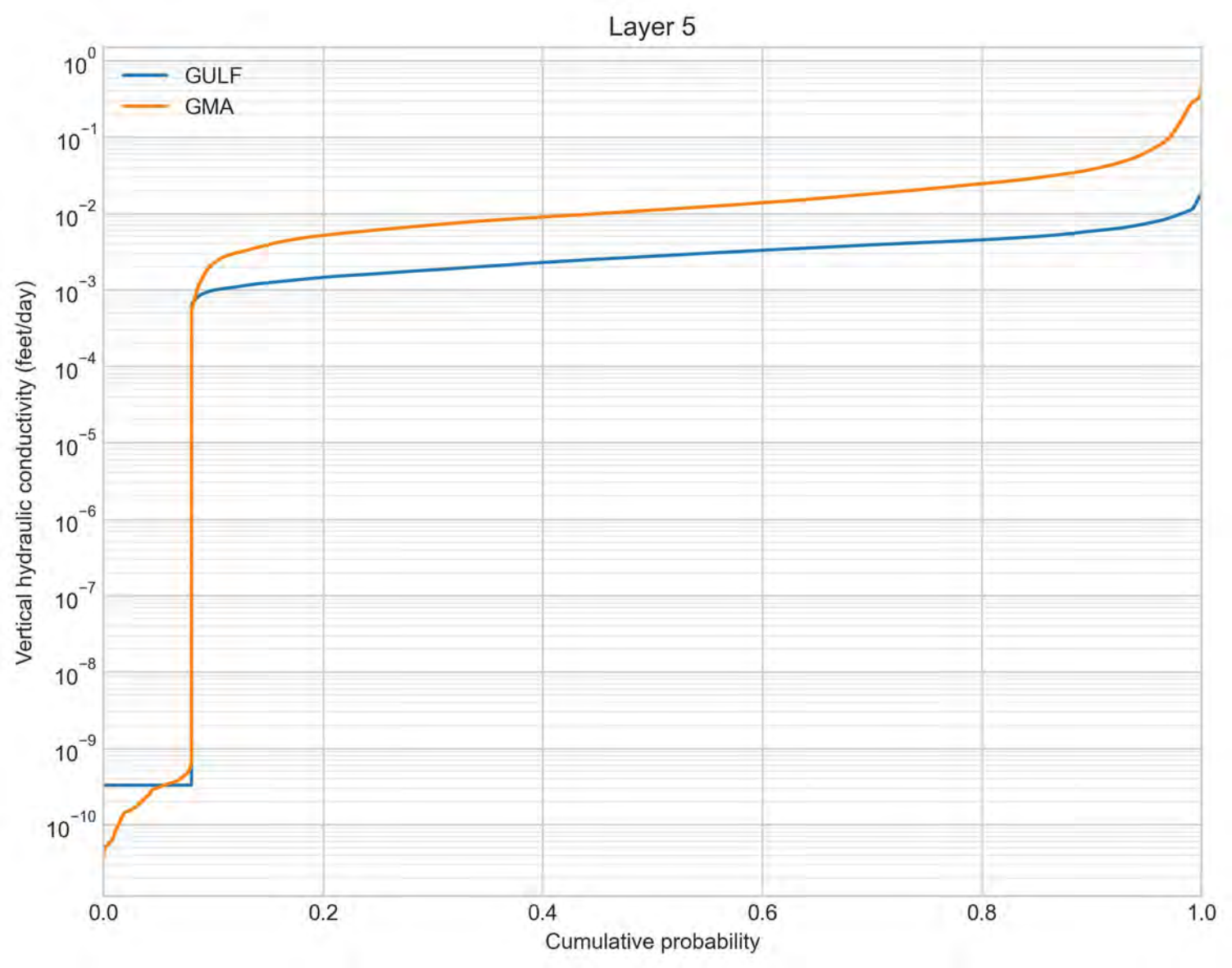

Layer 6
GULF
GMA
Horizontal hydraulic conductivity (feet/day)
0
2
4
6
8
10
12
14
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

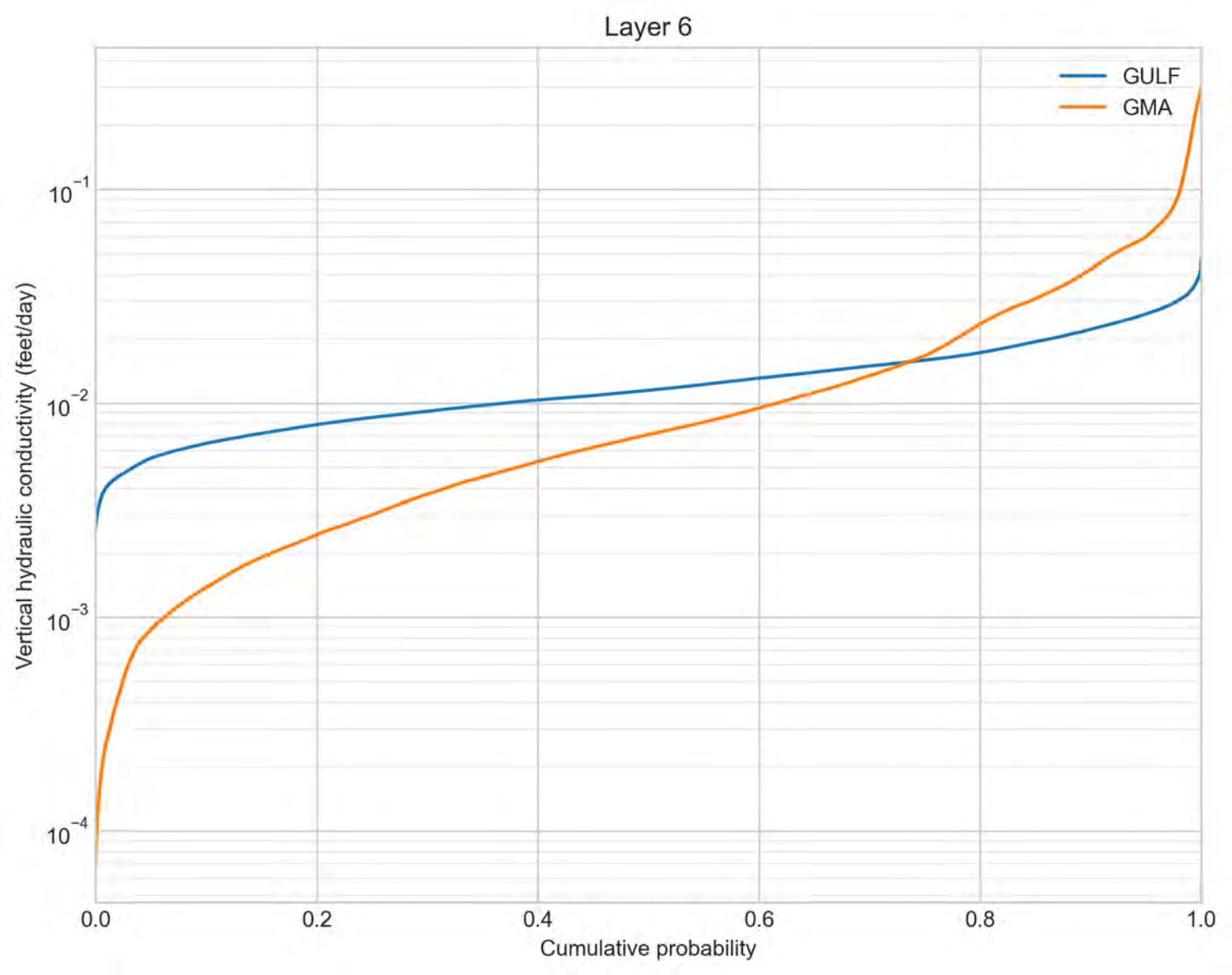

Layer 1
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

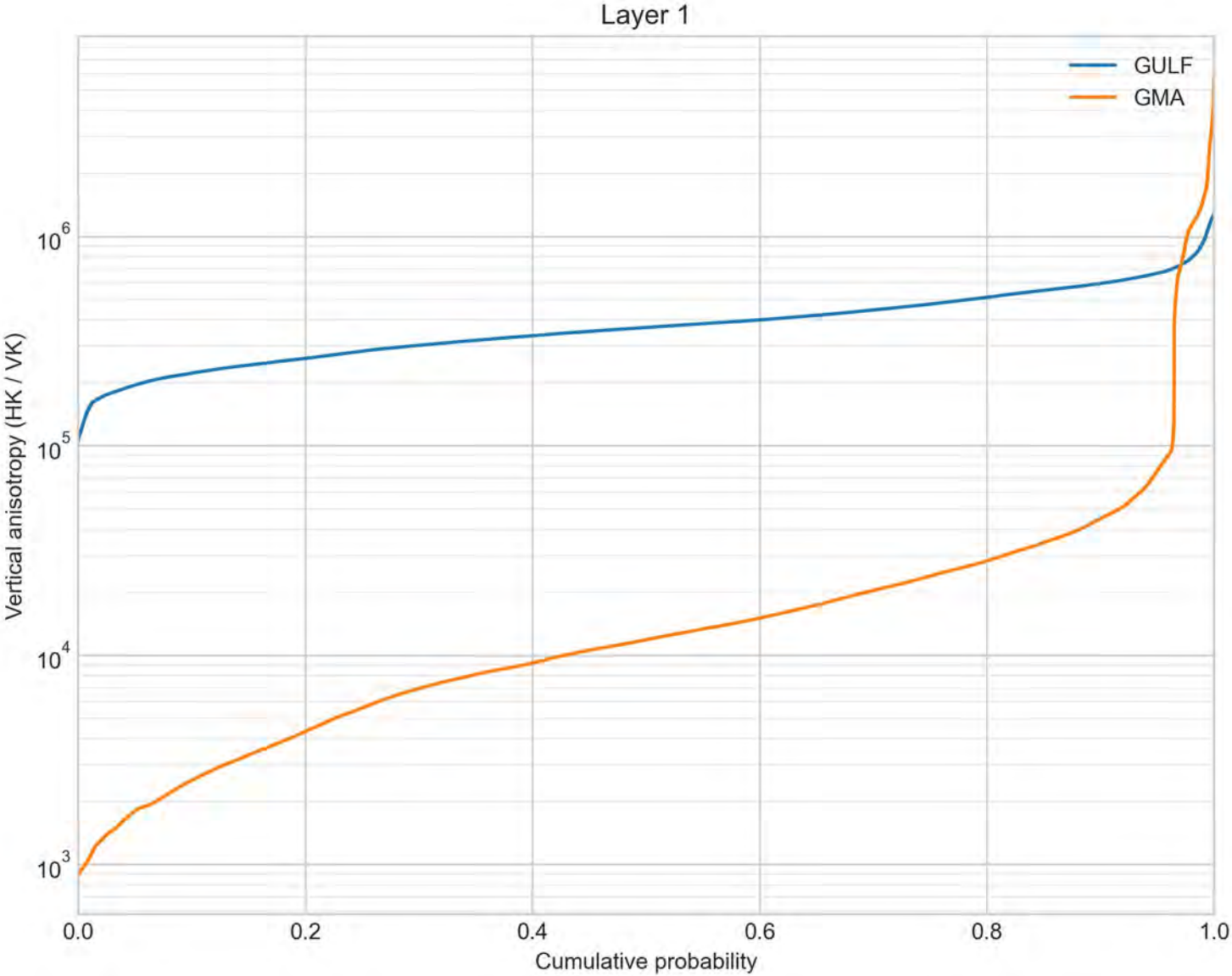

Layer 2
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

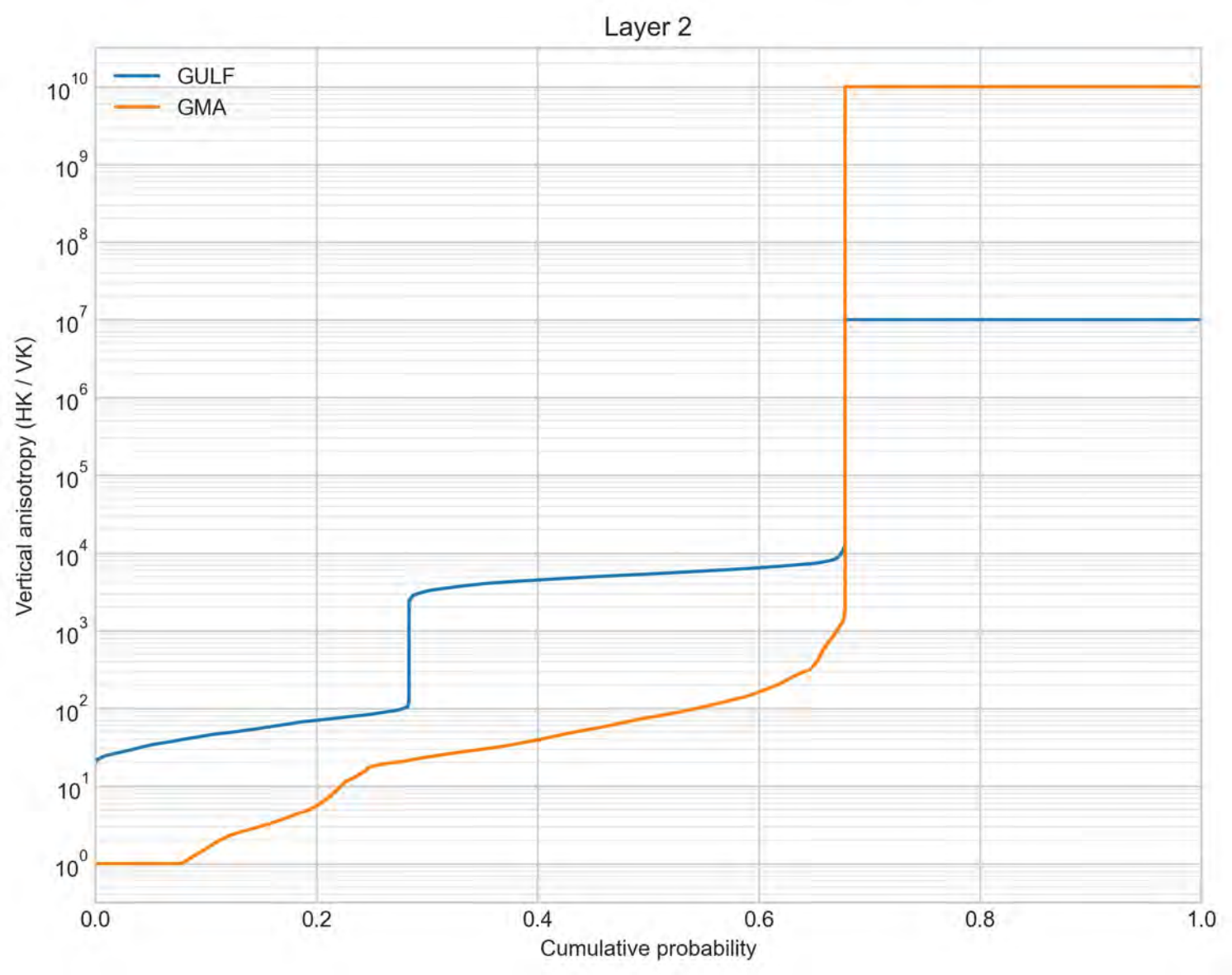

Layer 3
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

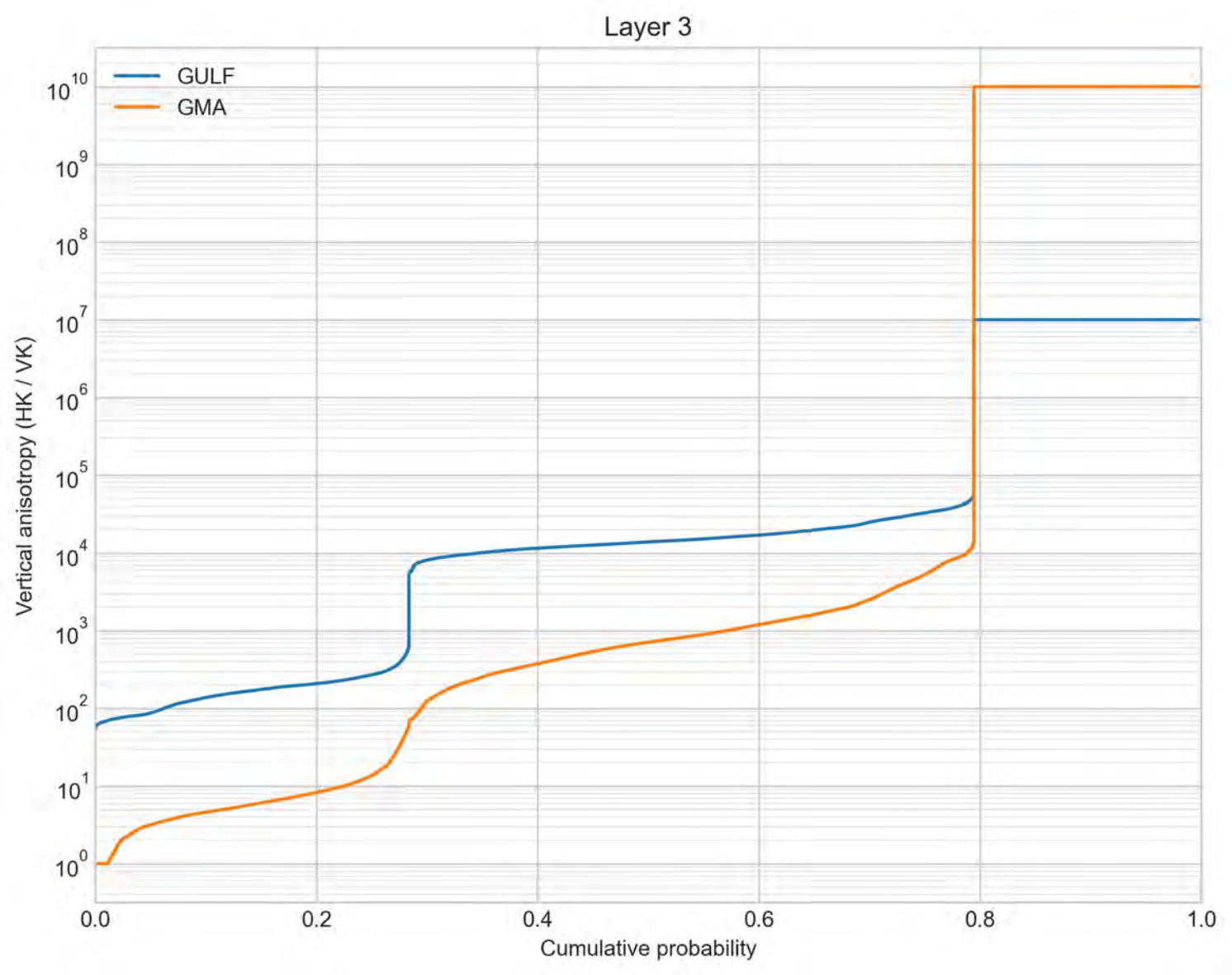

Layer 4
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
10^{-11}
10^{-12}
10^{-13}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

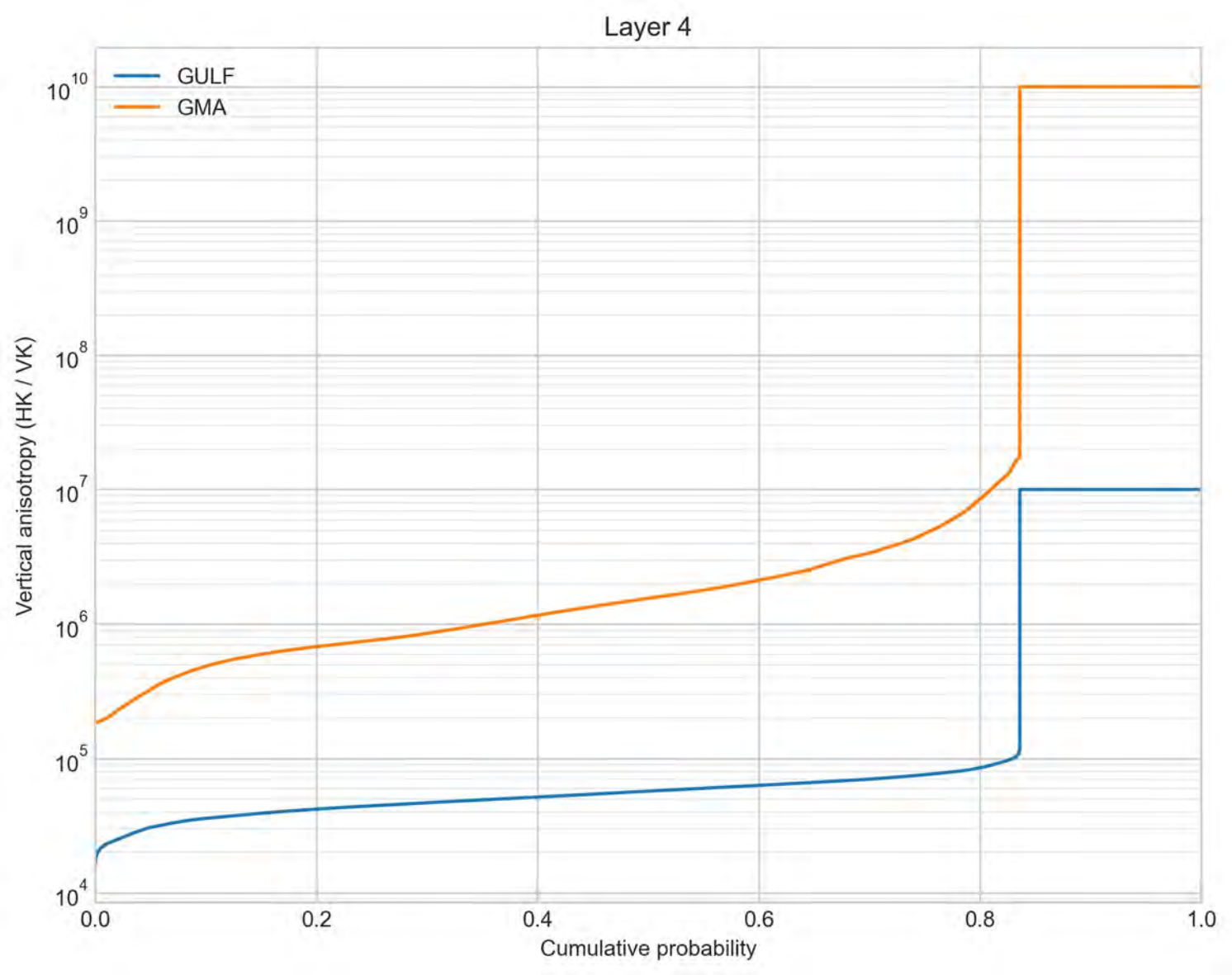

Layer 5
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
10^{-9}
10^{-10}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

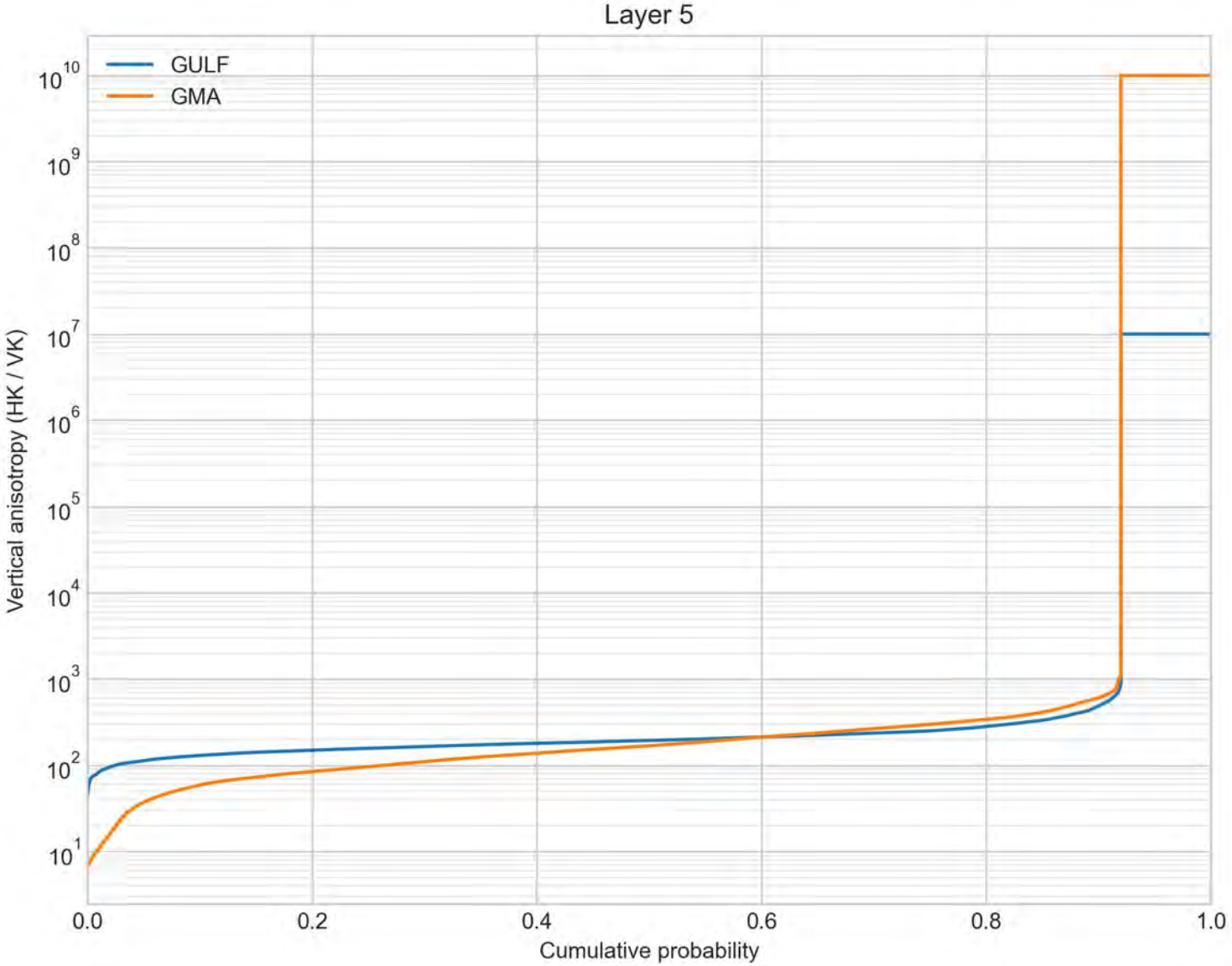

Layer 6
GULF
GMA
Vertical hydraulic conductivity (feet/day)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

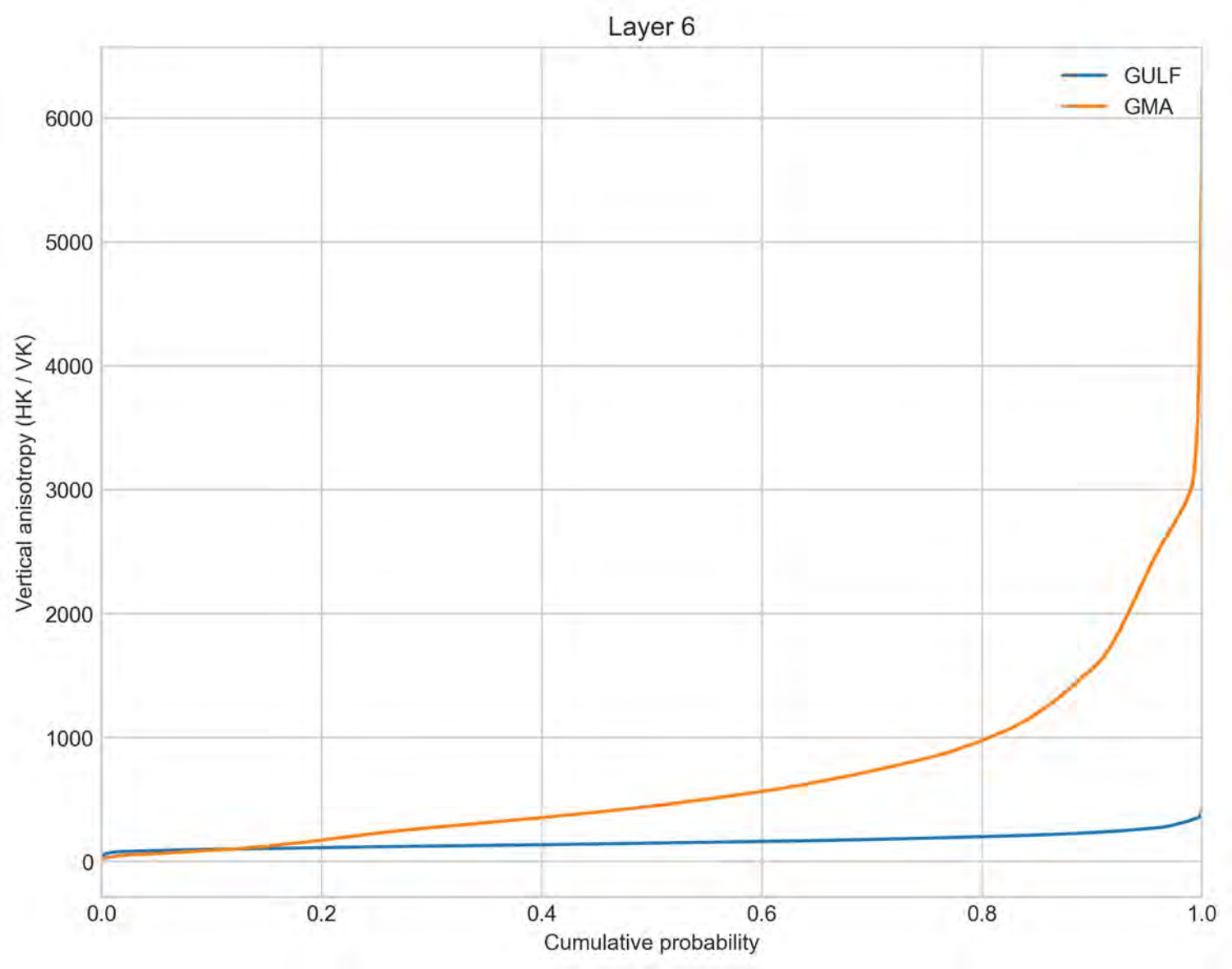

Layer 1
GULF
GMA
Vertical anisotropy (HK / VK)
10^6
10^5
10^4
10^3
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

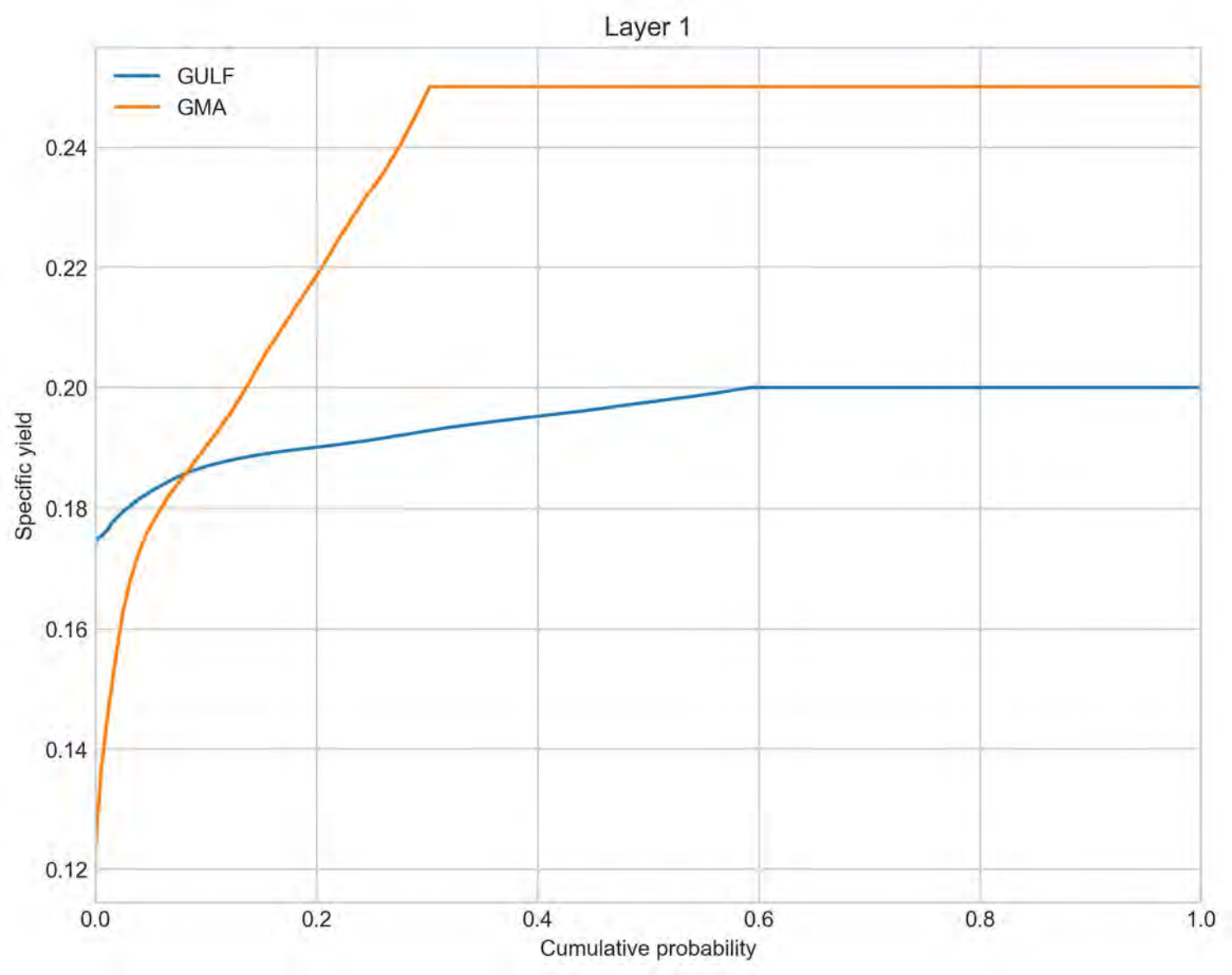

Layer 2
GULF
GMA
Vertical anisotropy (HK / VK)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

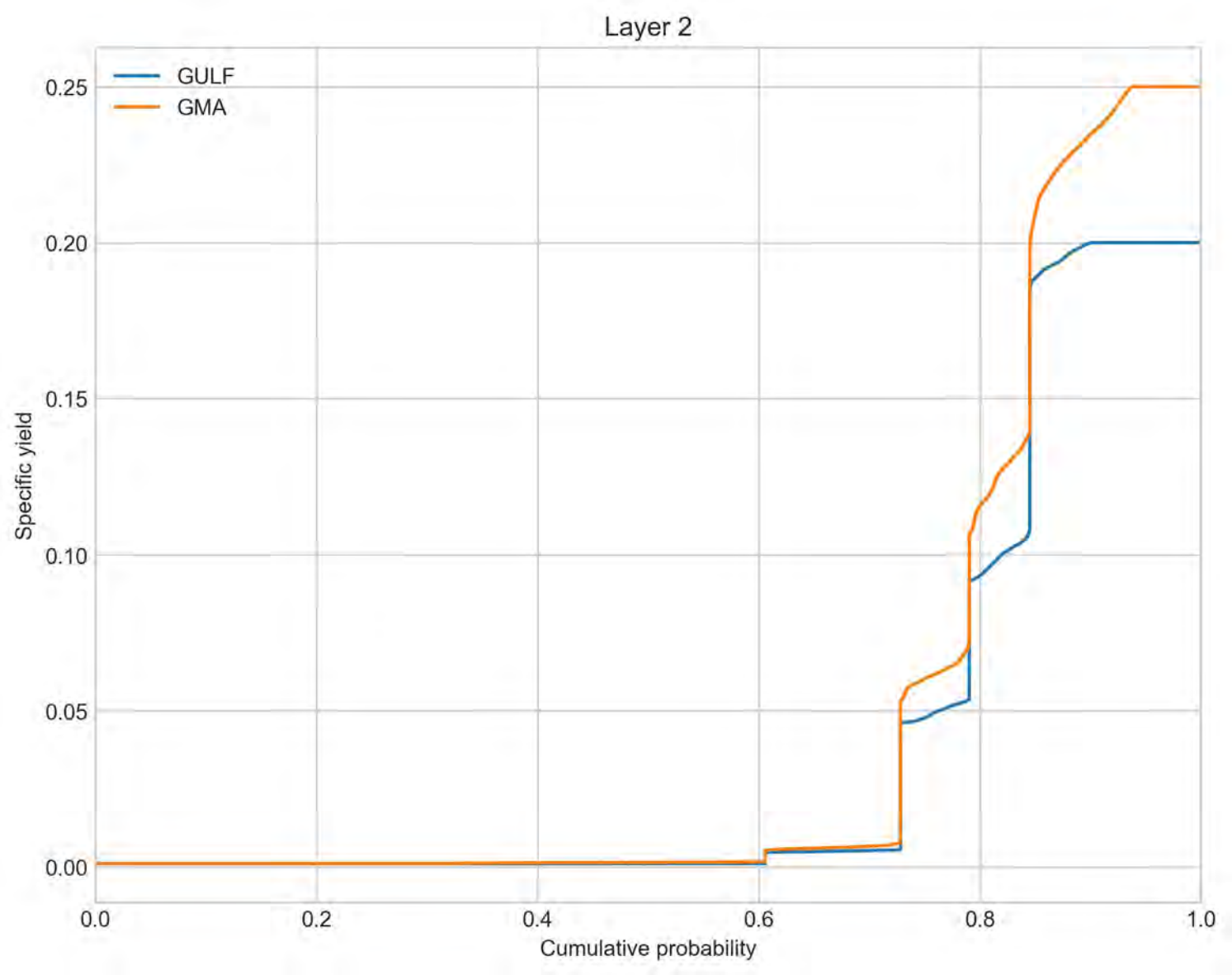

Layer 3
GULF
GMA
Vertical anisotropy (HK / VK)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
10^{1}
10^{0}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

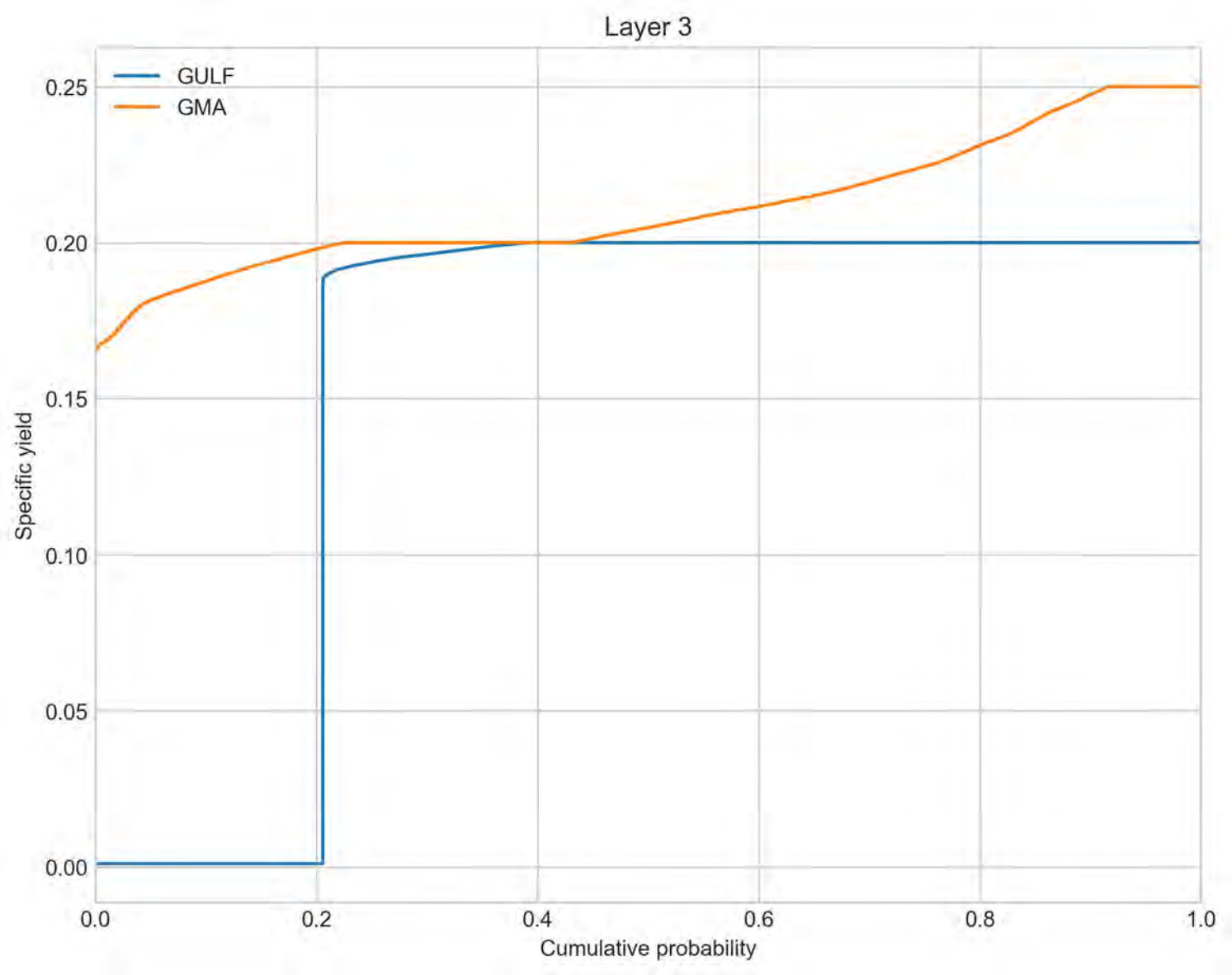

Layer 4
GULF
GMA
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
Vertical anisotropy (HK / VK)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

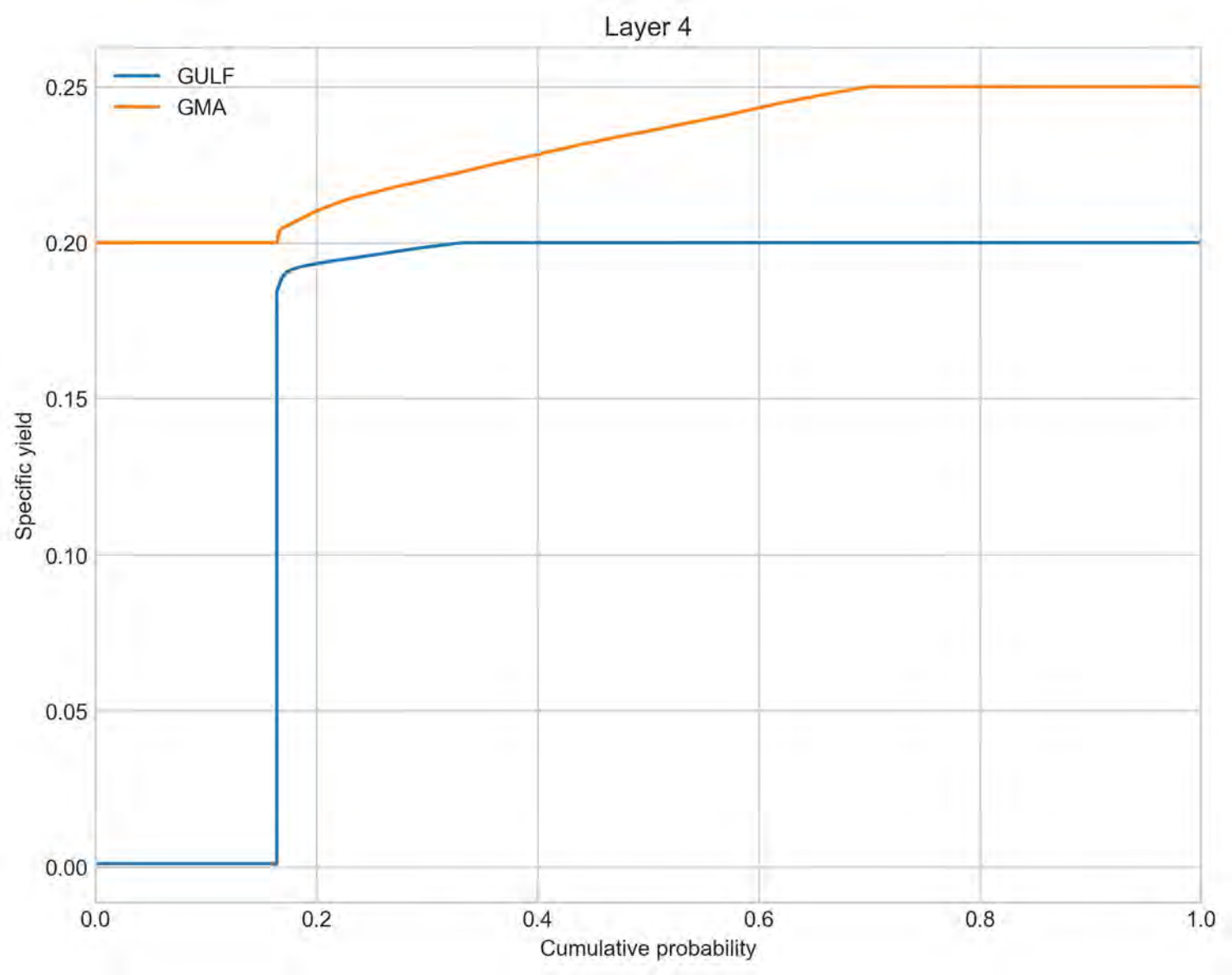

Layer 5
GULF
GMA
Vertical anisotropy (HK / VK)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
10^{5}
10^{4}
10^{3}
10^{2}
10^{1}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

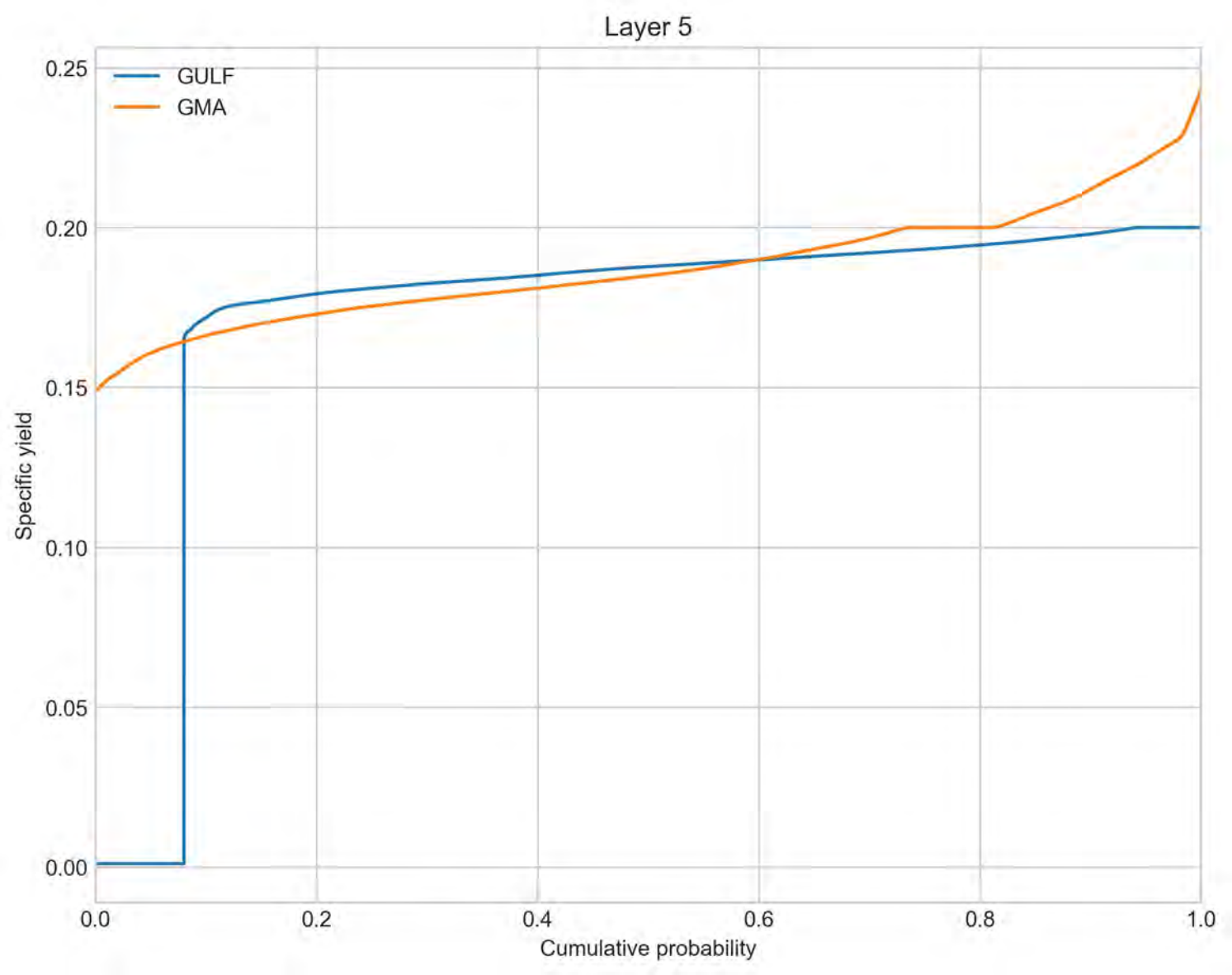

Layer 6
GULF
GMA
6000
5000
4000
3000
2000
1000
0
Vertical anisotropy (HK / VK)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

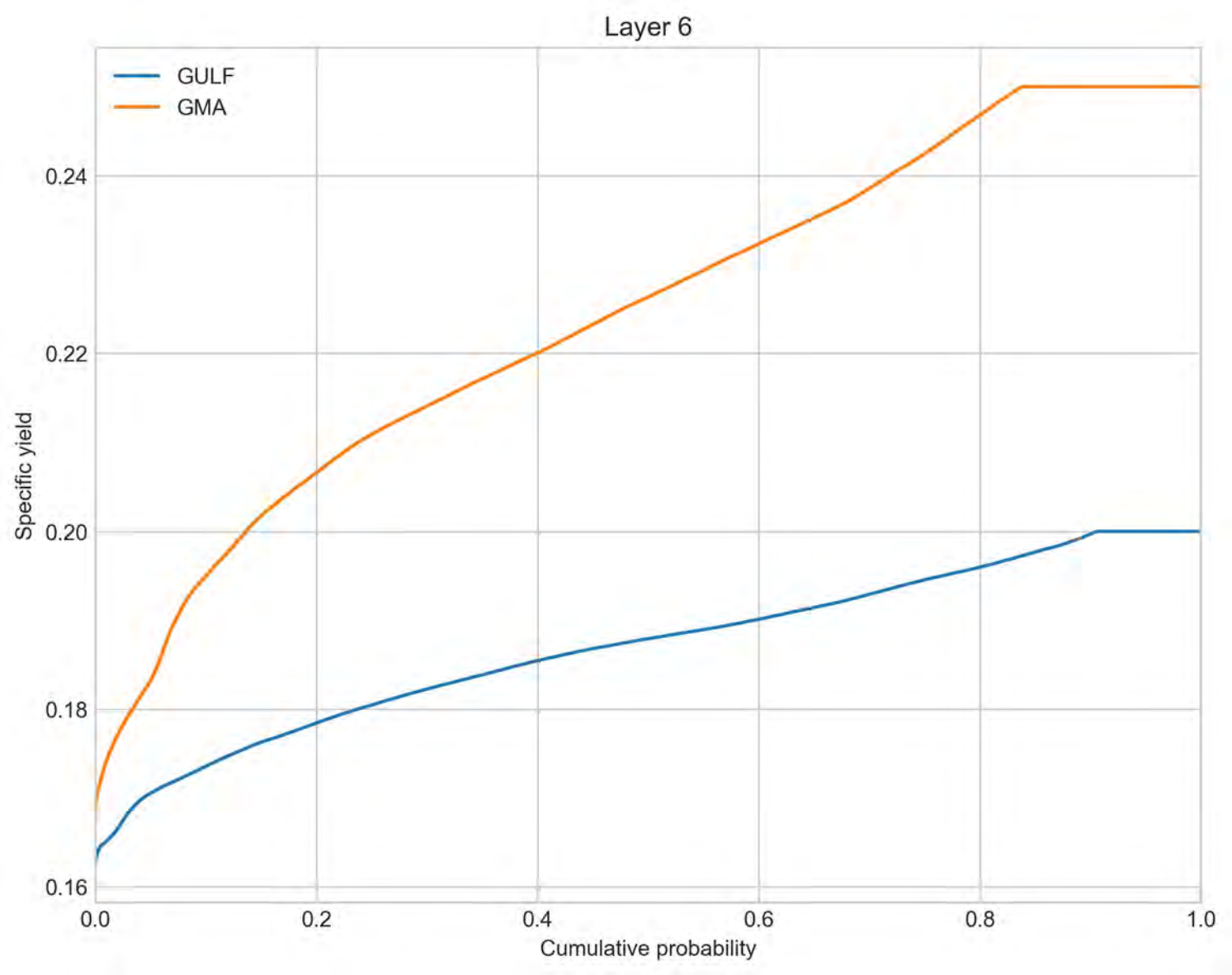

Layer 1
GULF
GMA
0.24
0.22
0.20
0.18
0.16
0.14
0.12
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

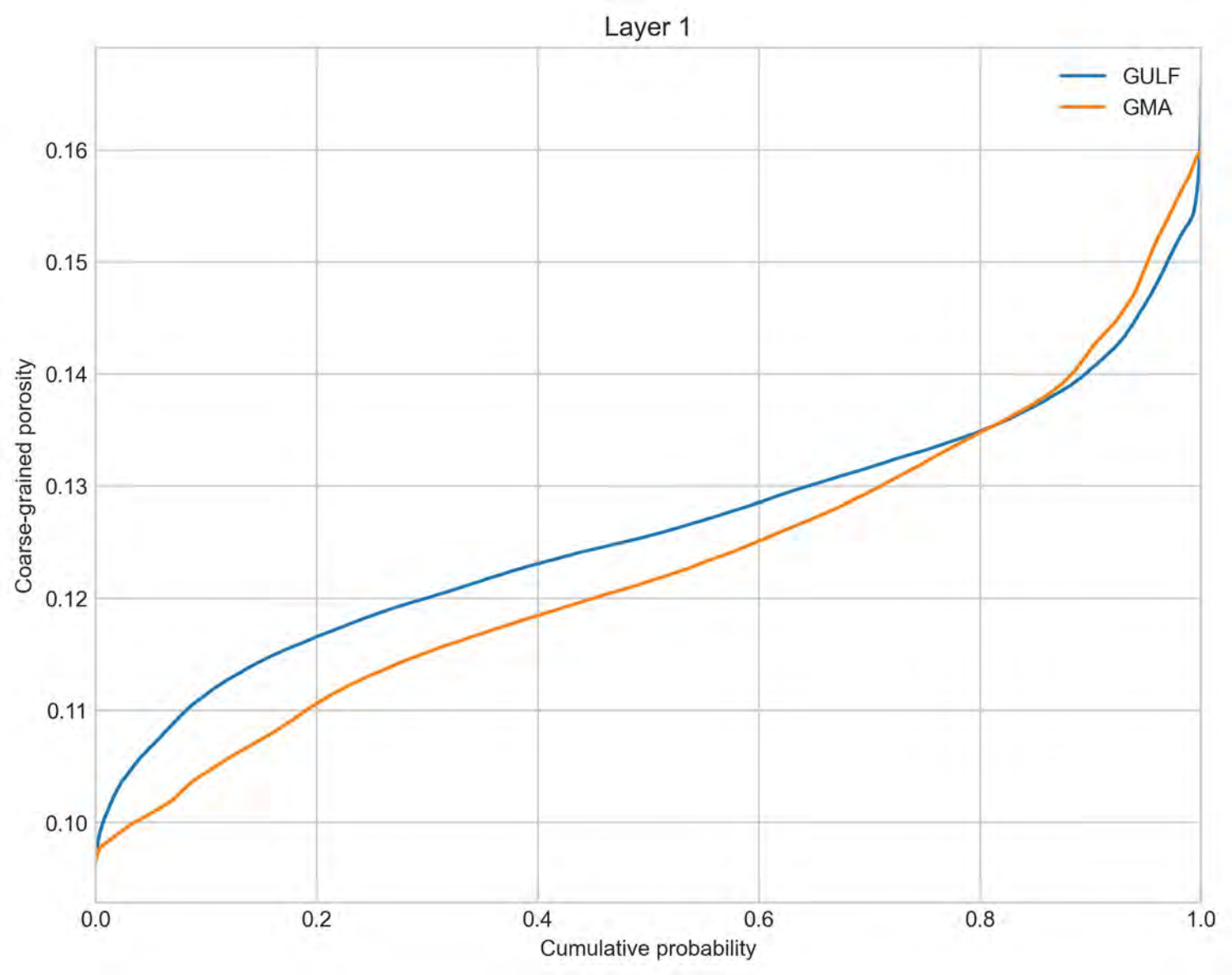

Layer 2
GULF
GMA
0.25
0.20
0.15
0.10
0.05
0.00
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

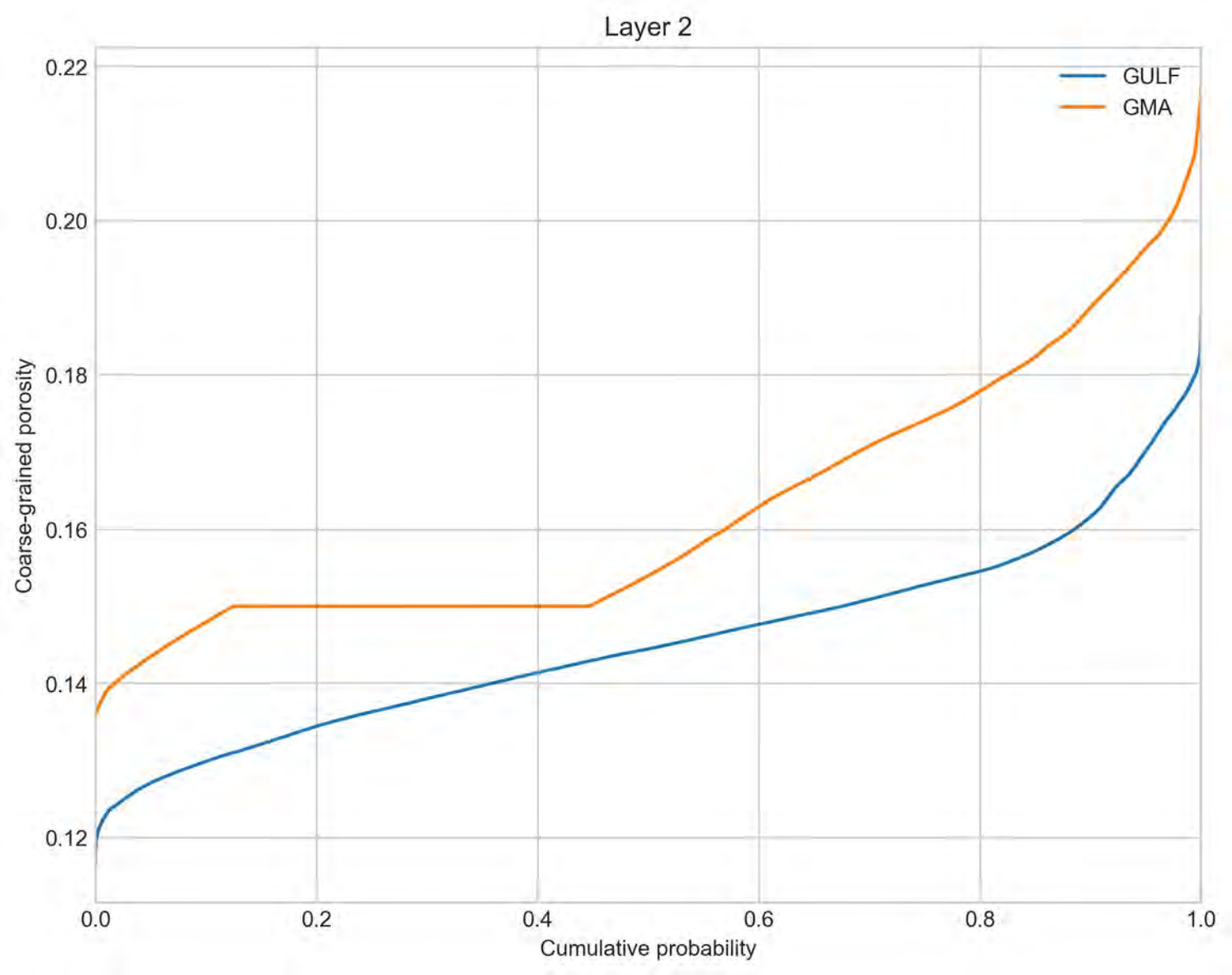

Layer 3
GULF
GMA
0.25
0.20
0.15
0.10
0.05
0.00
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

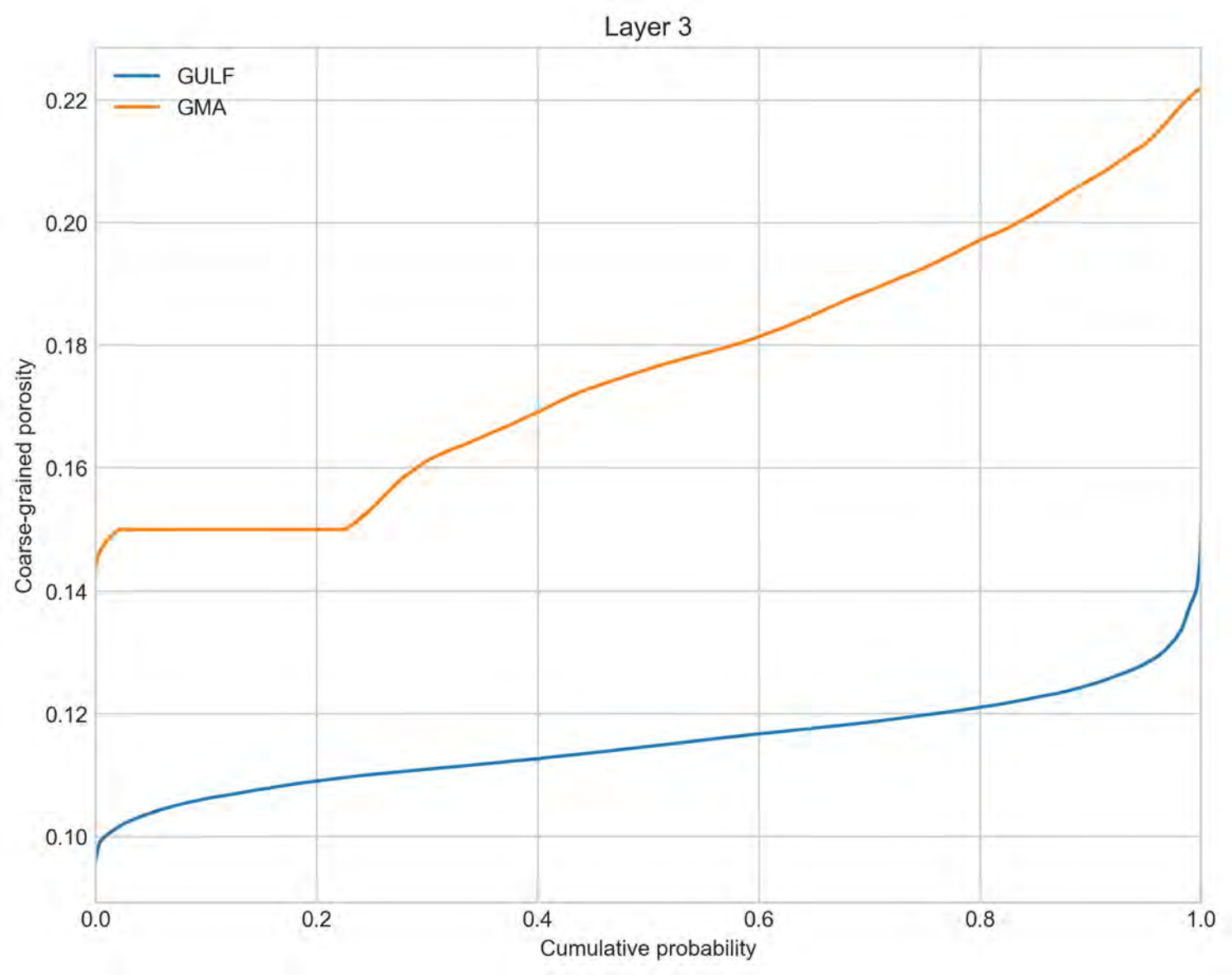

Layer 4
GULF
GMA
0.25
0.20
0.15
0.10
0.05
0.00
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

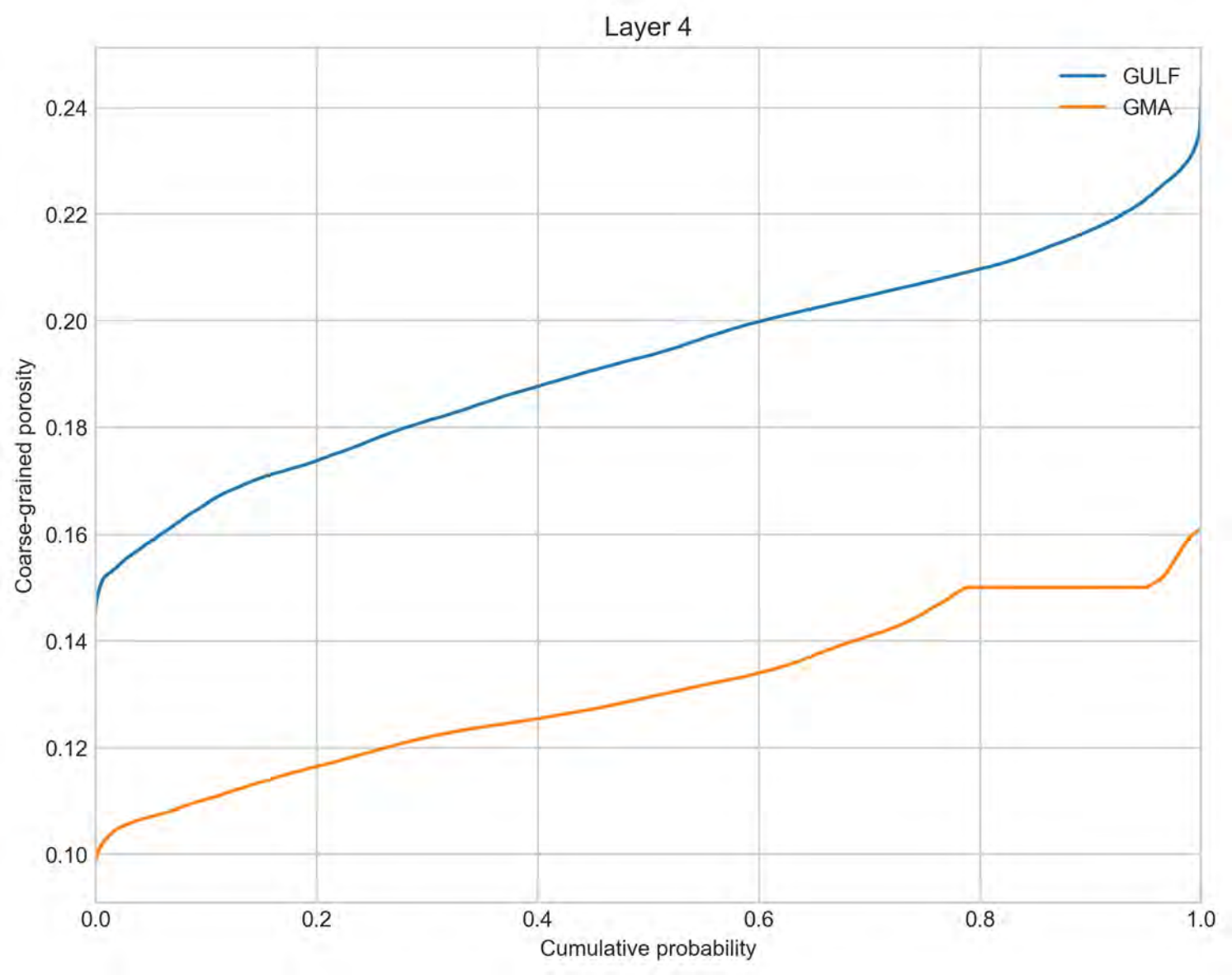

Layer 5
GULF
GMA
0.25
0.20
0.15
0.10
0.05
0.00
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

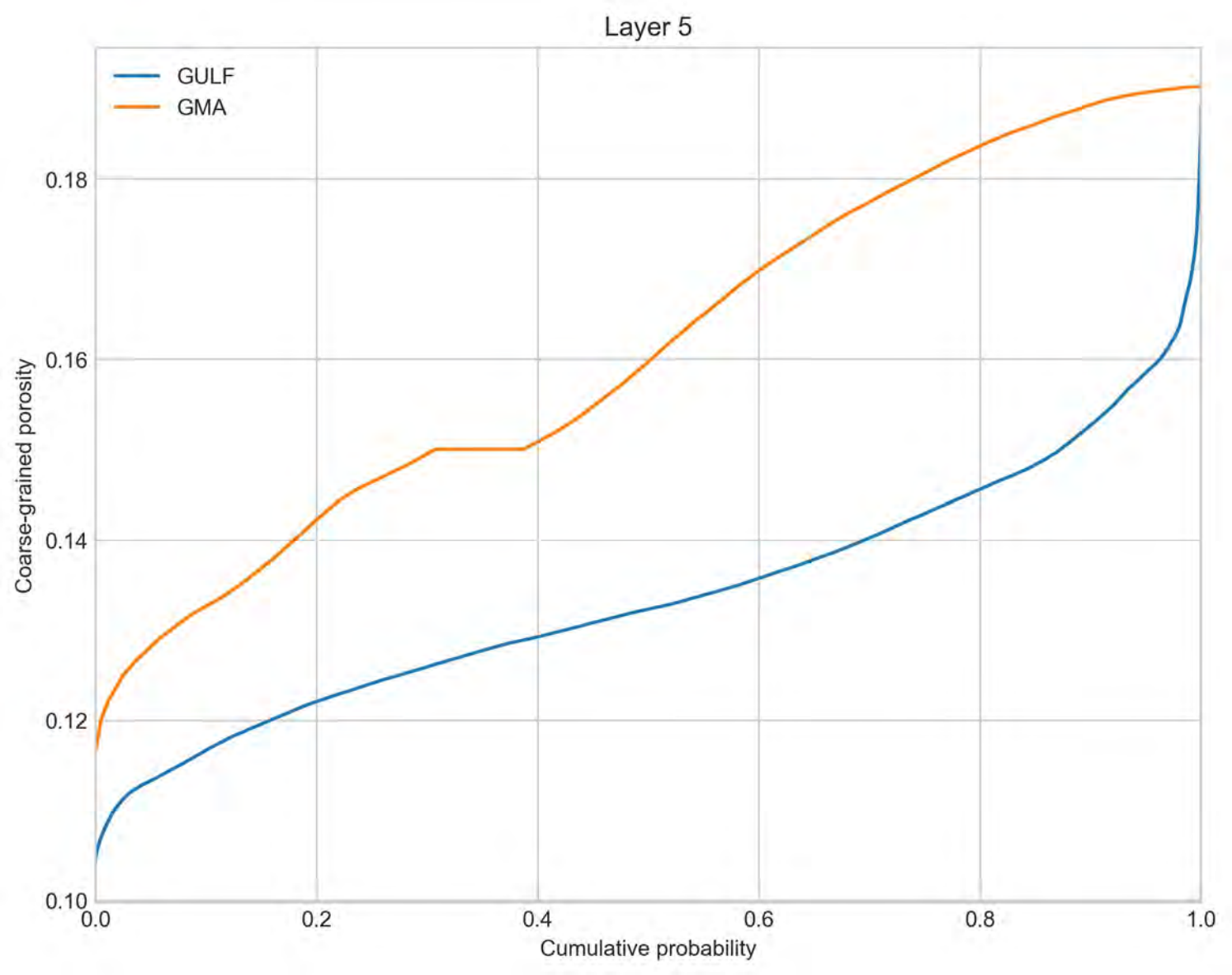

Layer 6
GULF
GMA
0.24
0.22
0.20
0.18
0.16
Specific yield
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

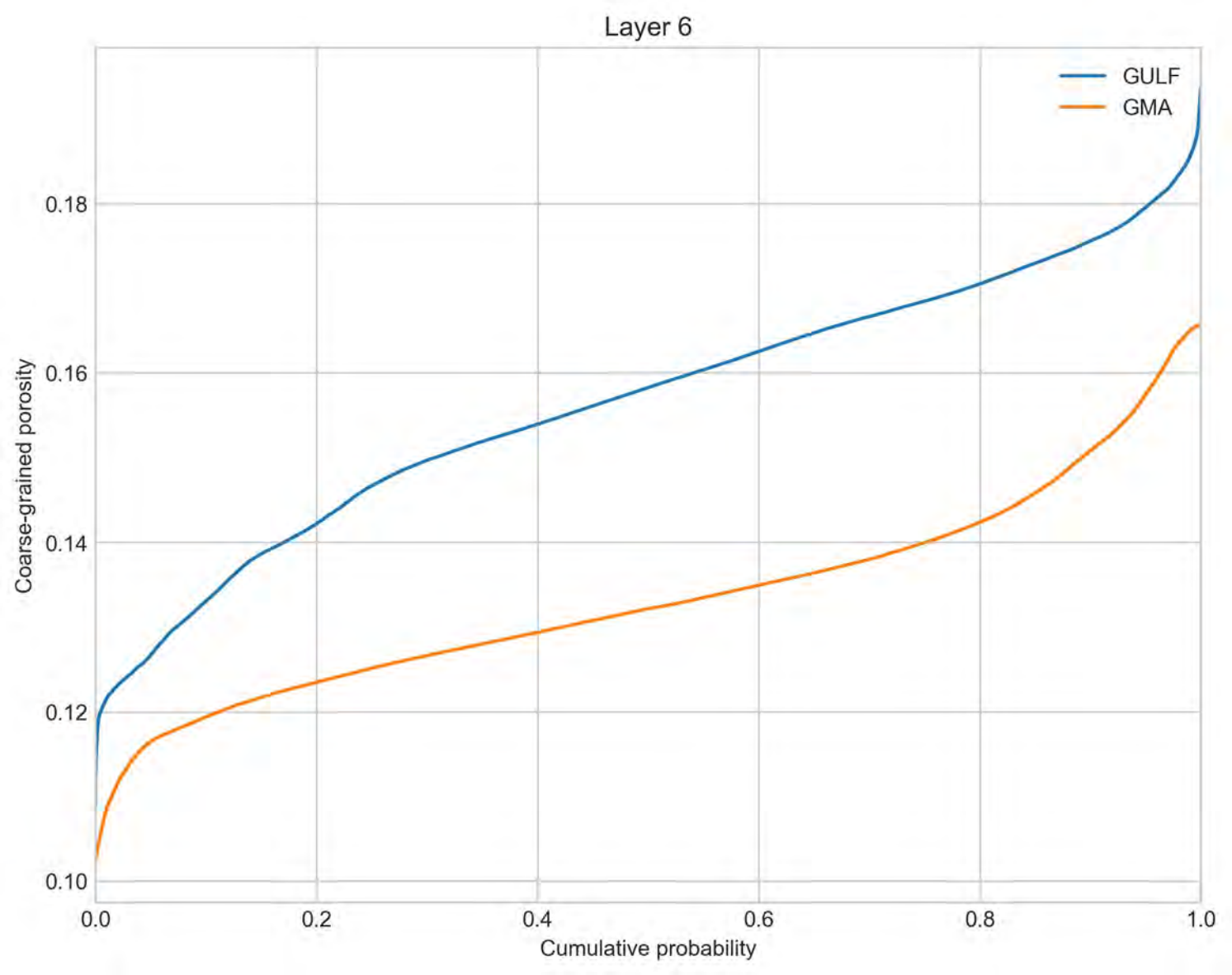

Layer 1
GULF
GMA
0.16
0.15
0.14
0.13
0.12
0.11
0.10
Coarse-grained porosity
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

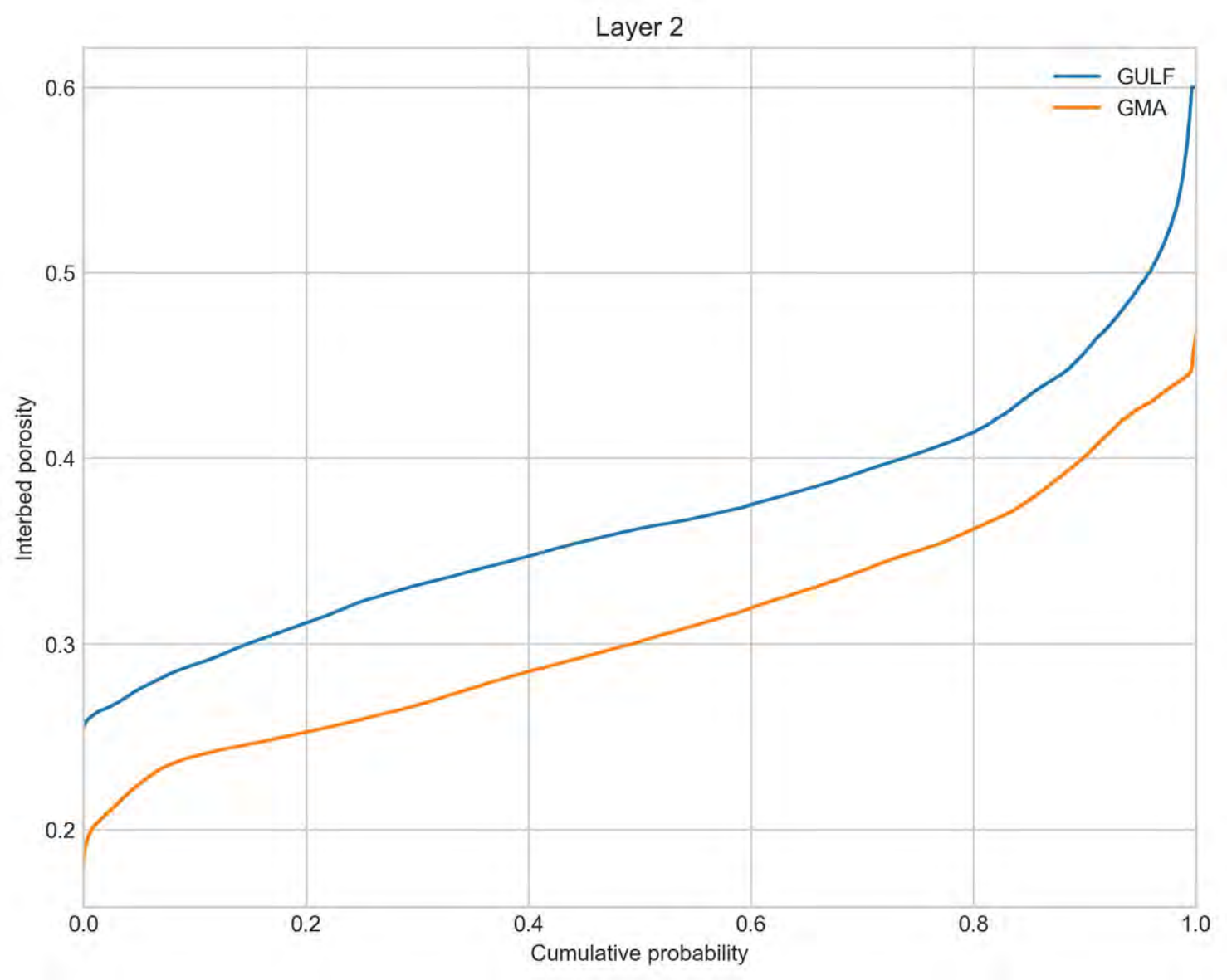

Layer 2
GULF
GMA
0.22
0.20
0.18
0.16
0.14
0.12
Coarse-grained porosity
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

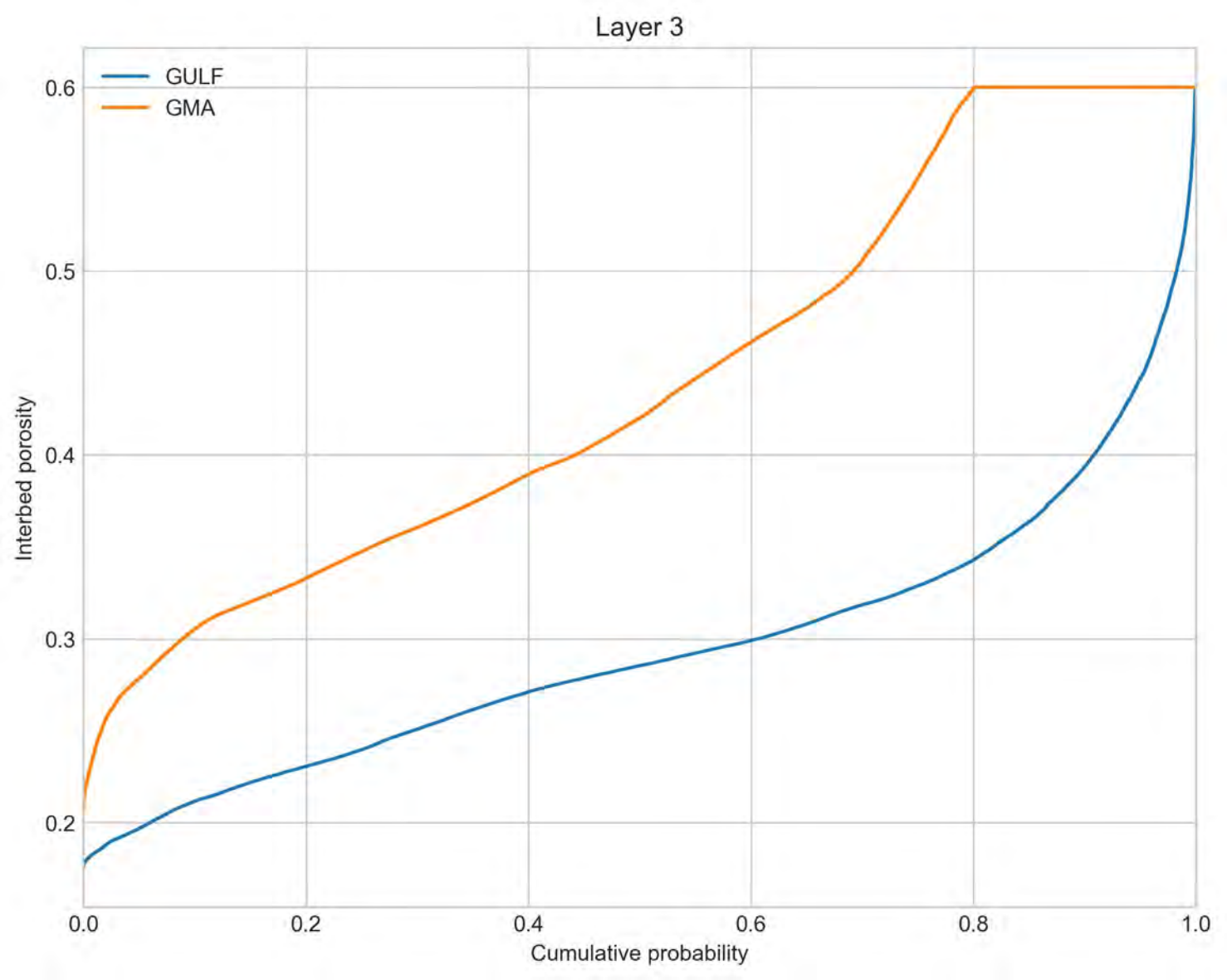

Layer 3
GULF
GMA
0.22
0.20
0.18
0.16
0.14
0.12
0.10
Coarse-grained porosity
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

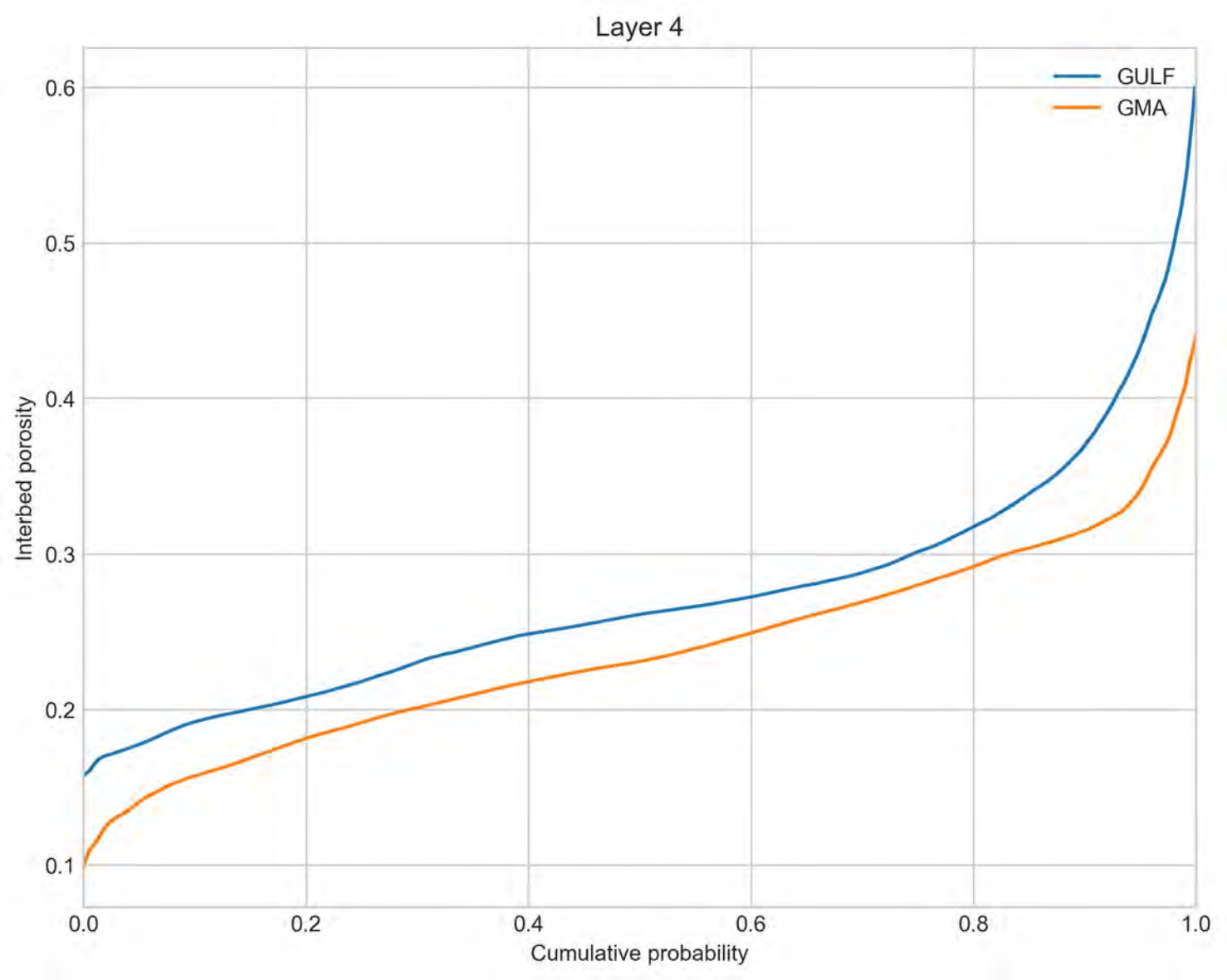

Layer 4
GULF
GMA
Coarse-grained porosity
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

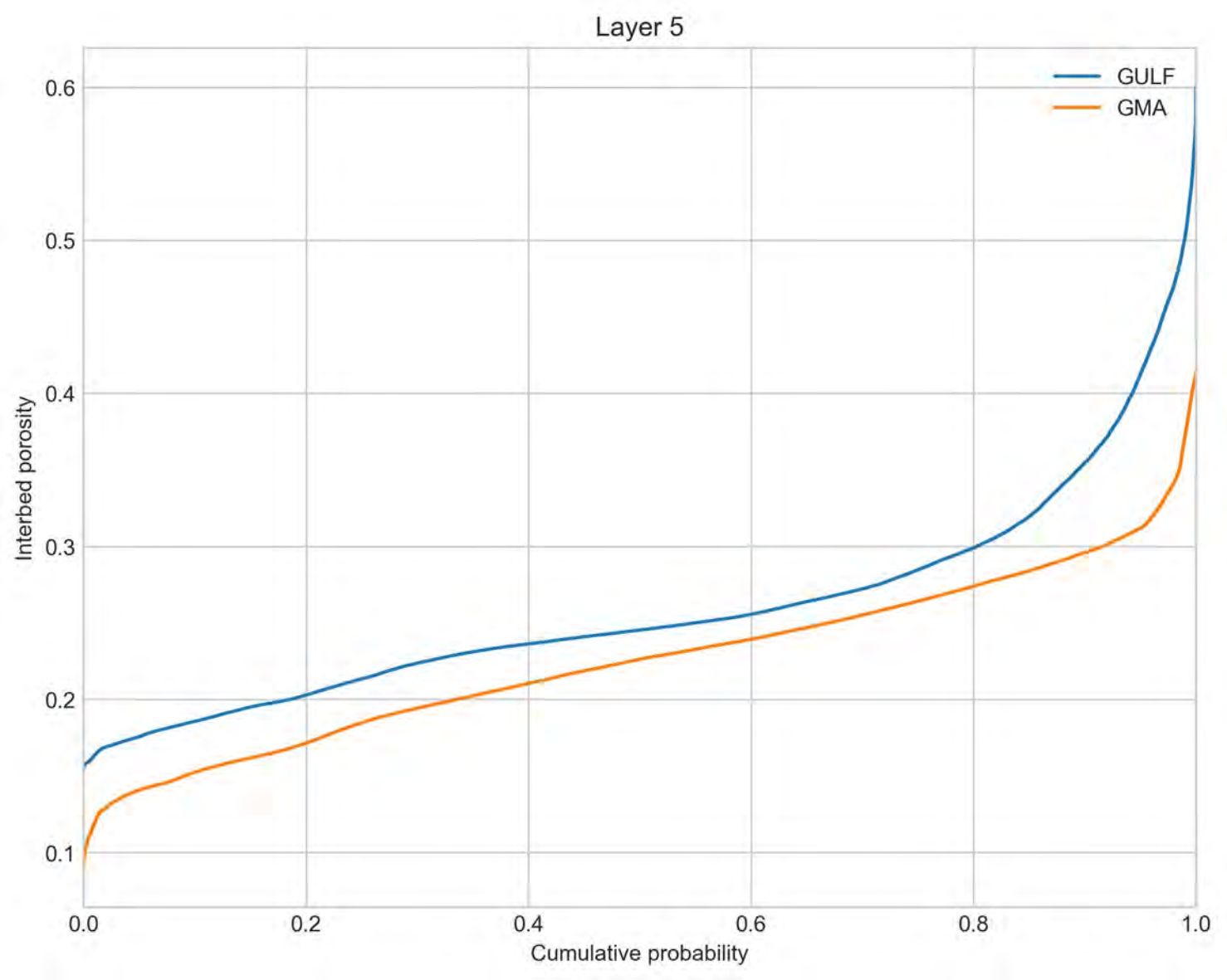

Layer 5
GULF
GMA
0.18
0.16
0.14
0.12
0.10
Coarse-grained porosity
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

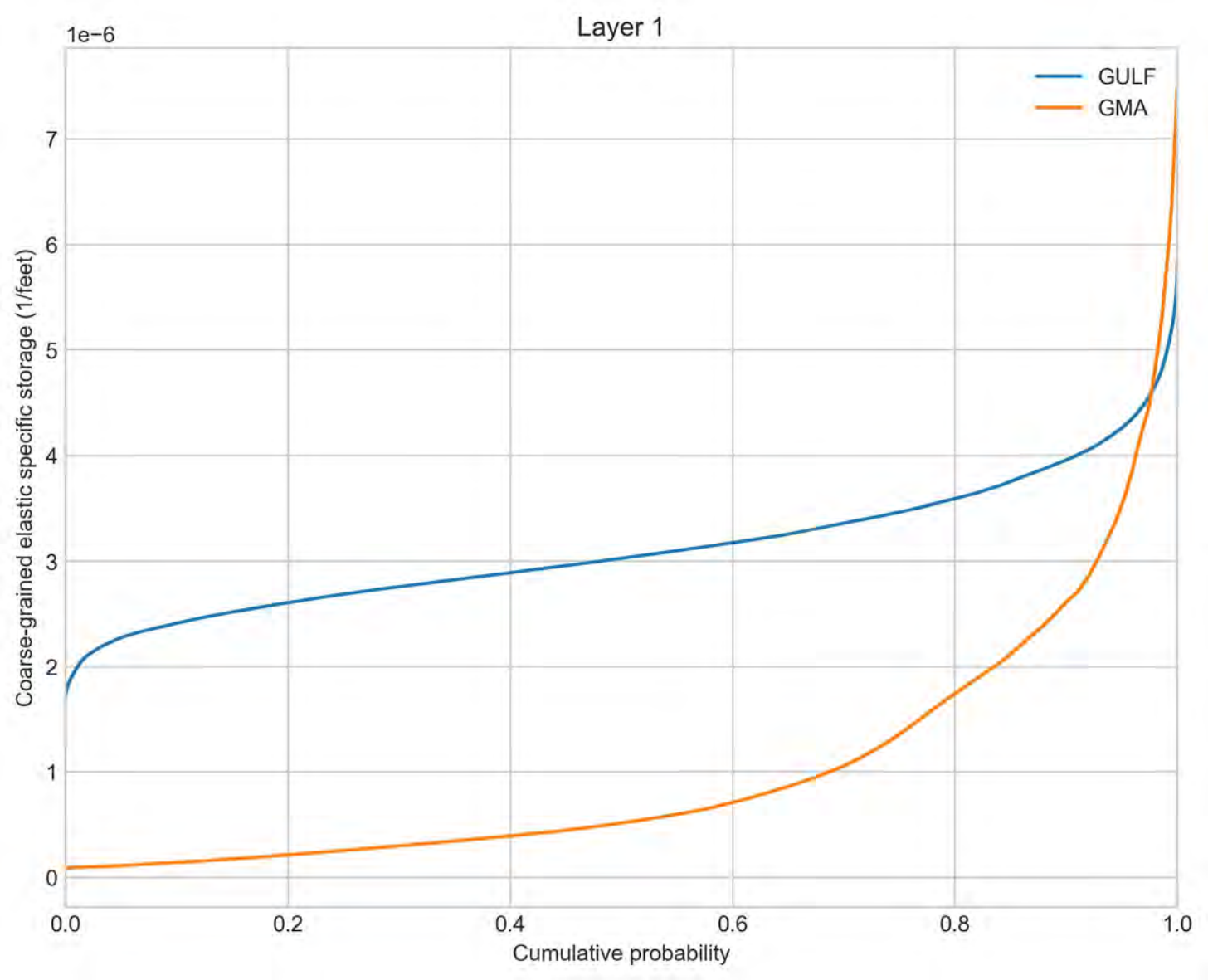

Layer 6
GULF
GMA
Coarse-grained porosity
0.10
0.12
0.14
0.16
0.18
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

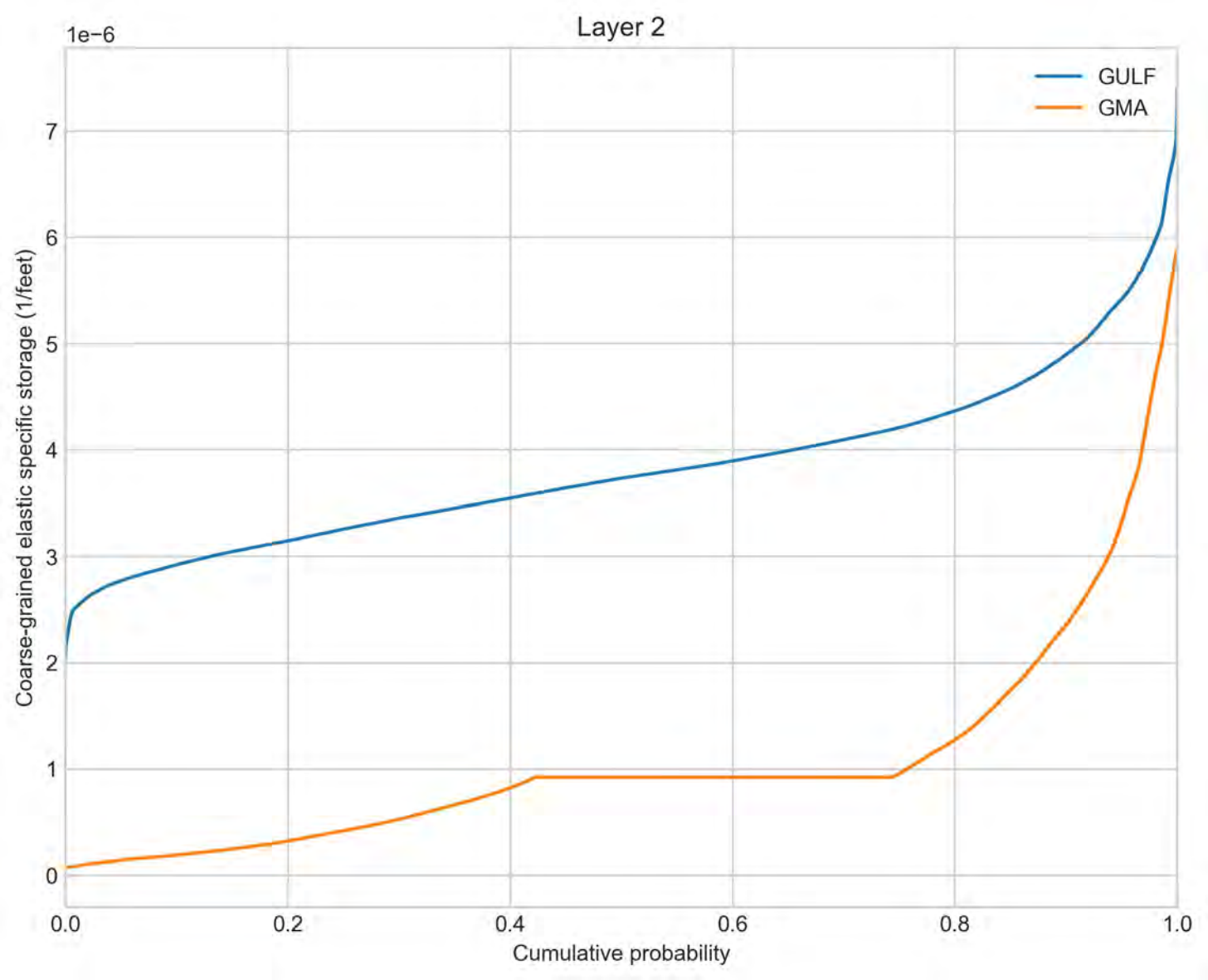

Layer 2
GULF
GMA
Interbed porosity
0.6
0.5
0.4
0.3
0.2
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

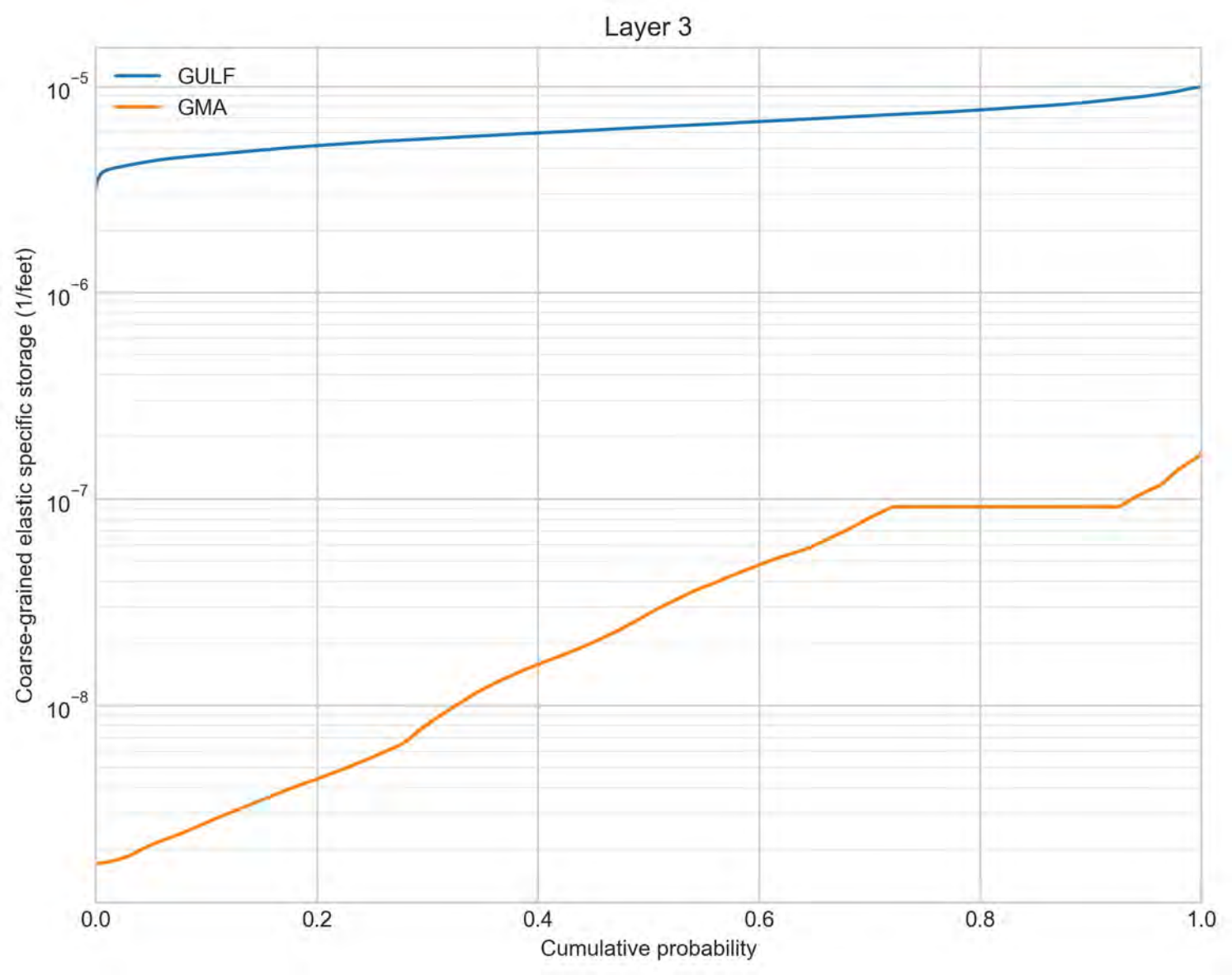

Layer 3
GULF
GMA
Interbed porosity
0.2
0.3
0.4
0.5
0.6
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

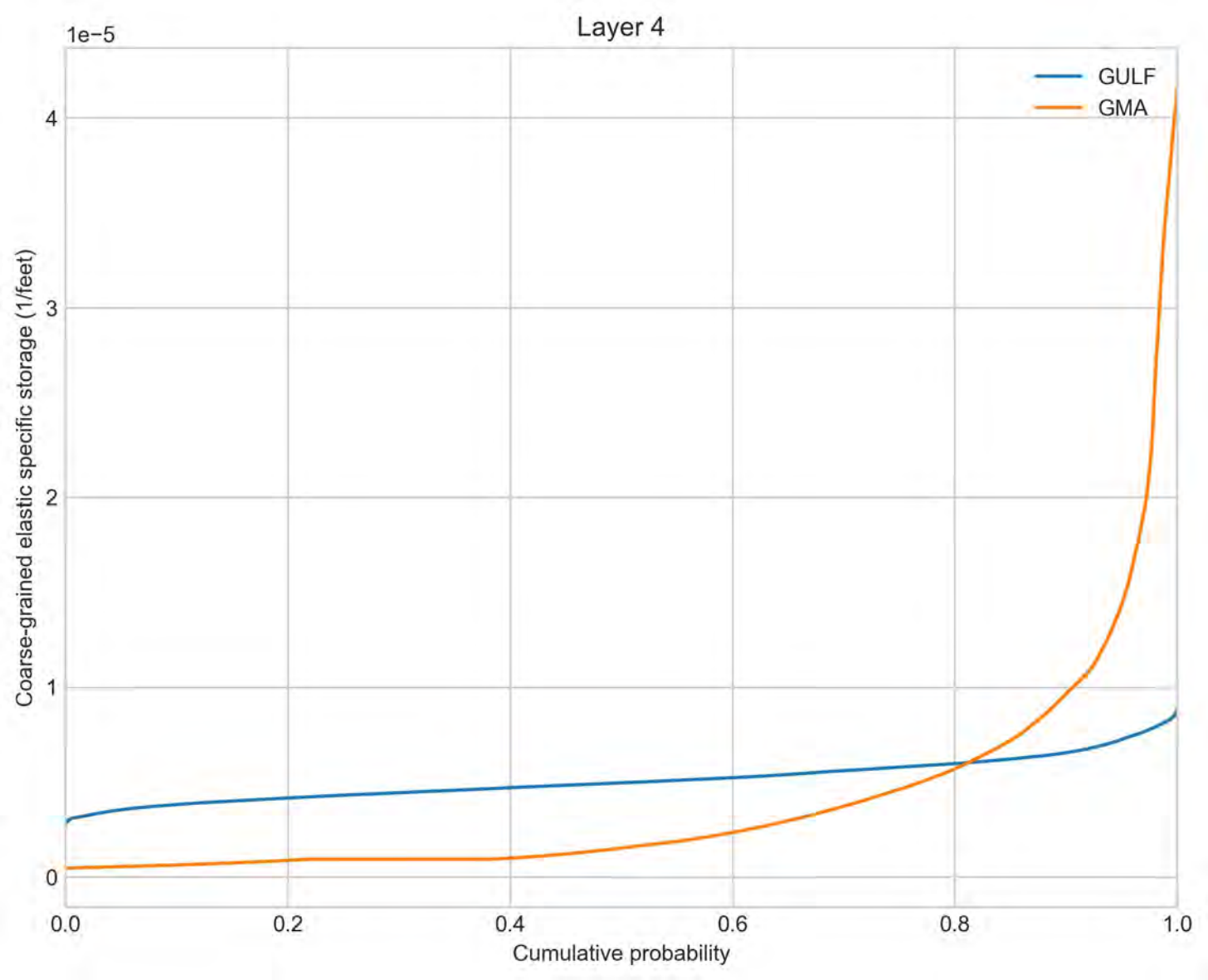

Layer 4
GULF
GMA
Interbed porosity
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

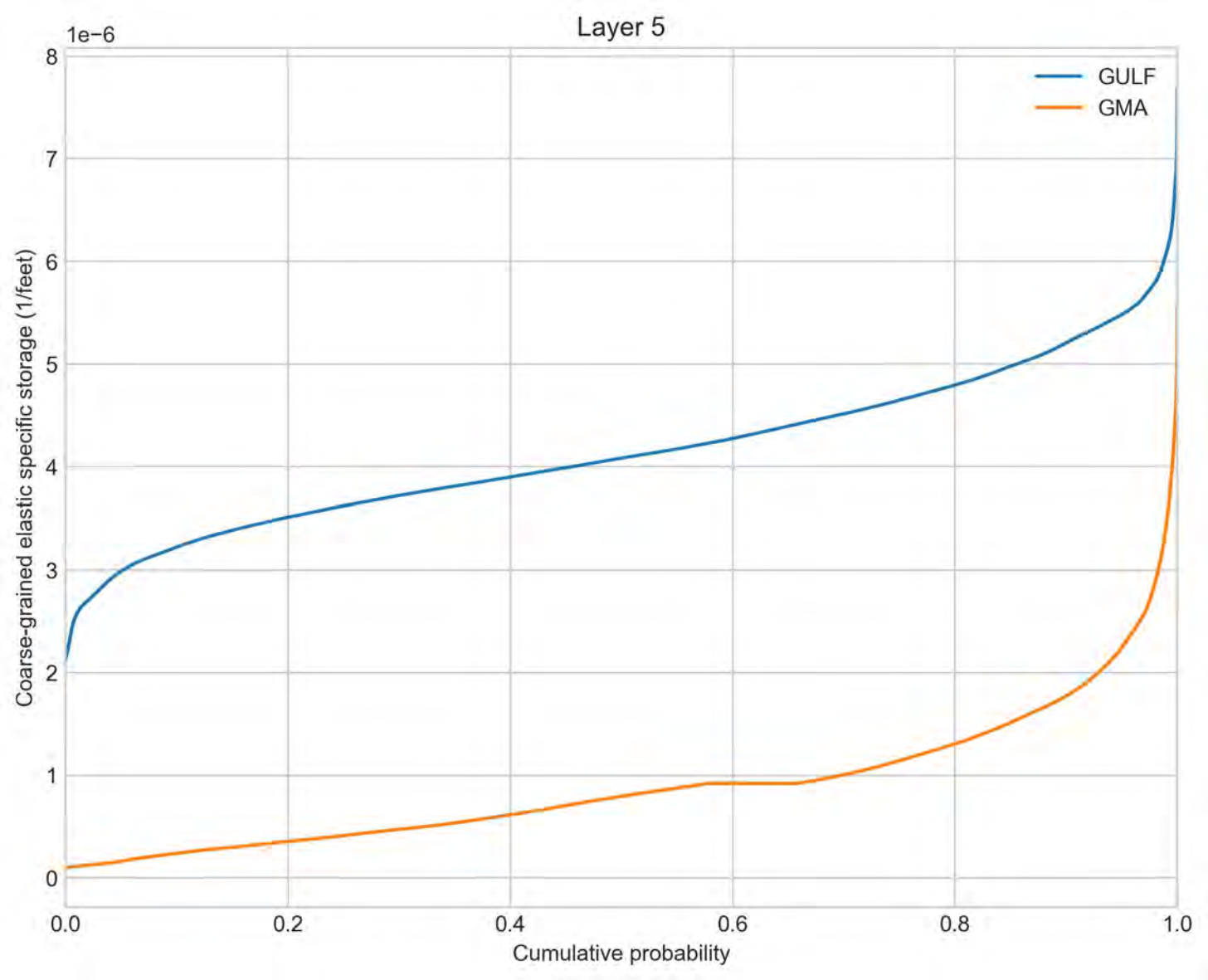

Layer 5
GULF
GMA
Interbed porosity
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

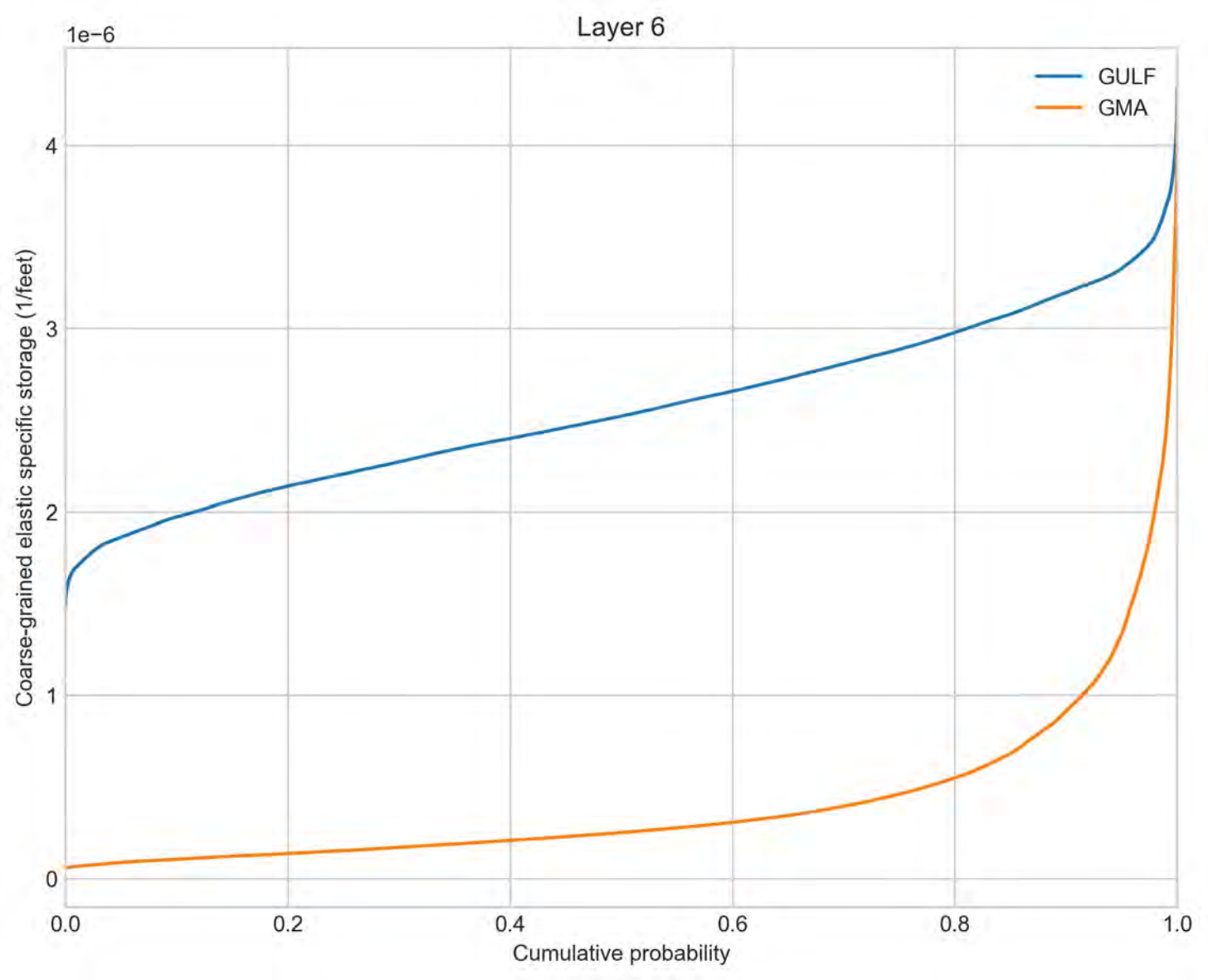

Layer 1
1e−6
GULF
GMA
Coarse-grained elastic specific storage (1/feet)
0
1
2
3
4
5
6
7
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

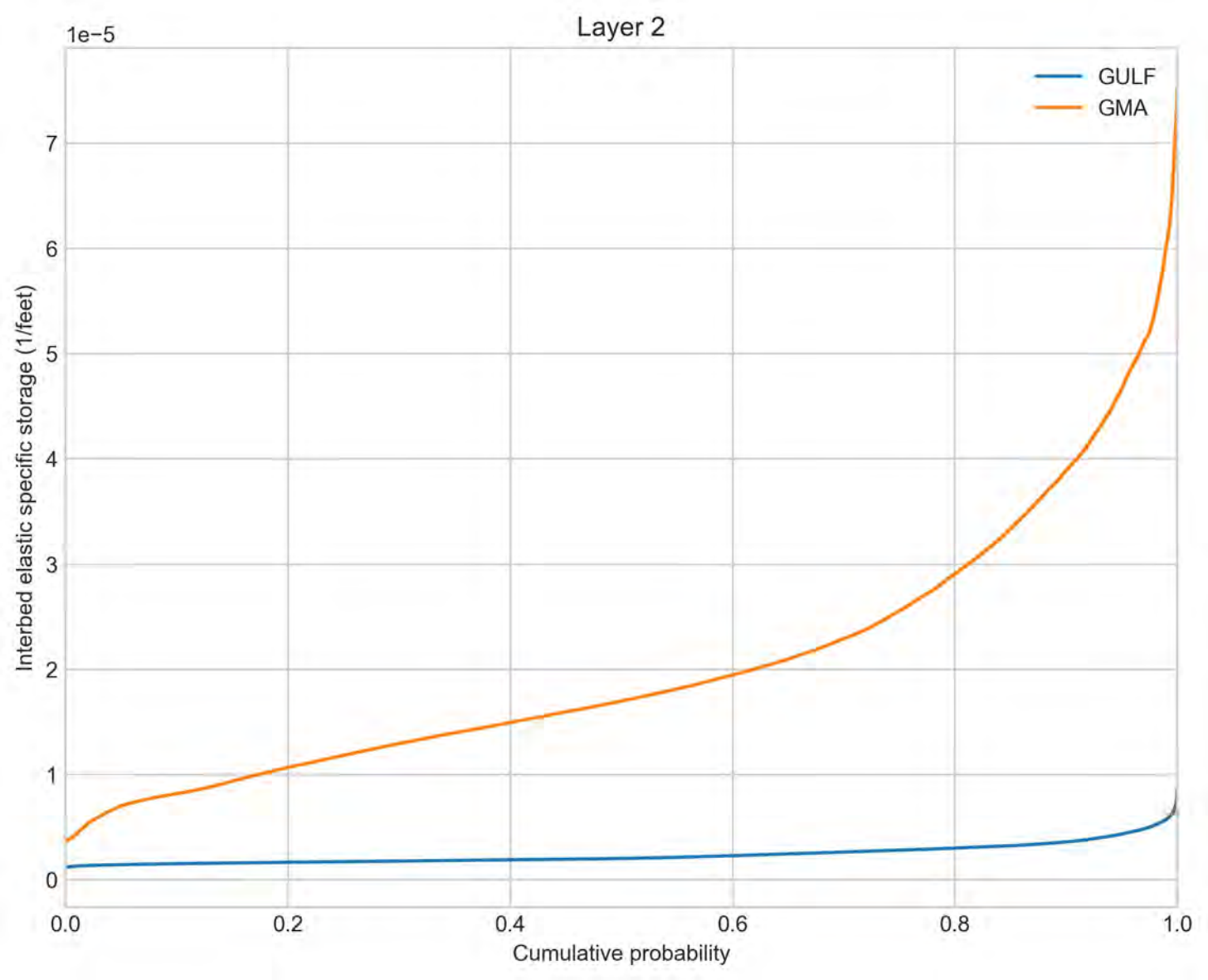

Layer 2
1e−6
GULF
GMA
Coarse-grained elastic specific storage (1/feet)
0
1
2
3
4
5
6
7
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

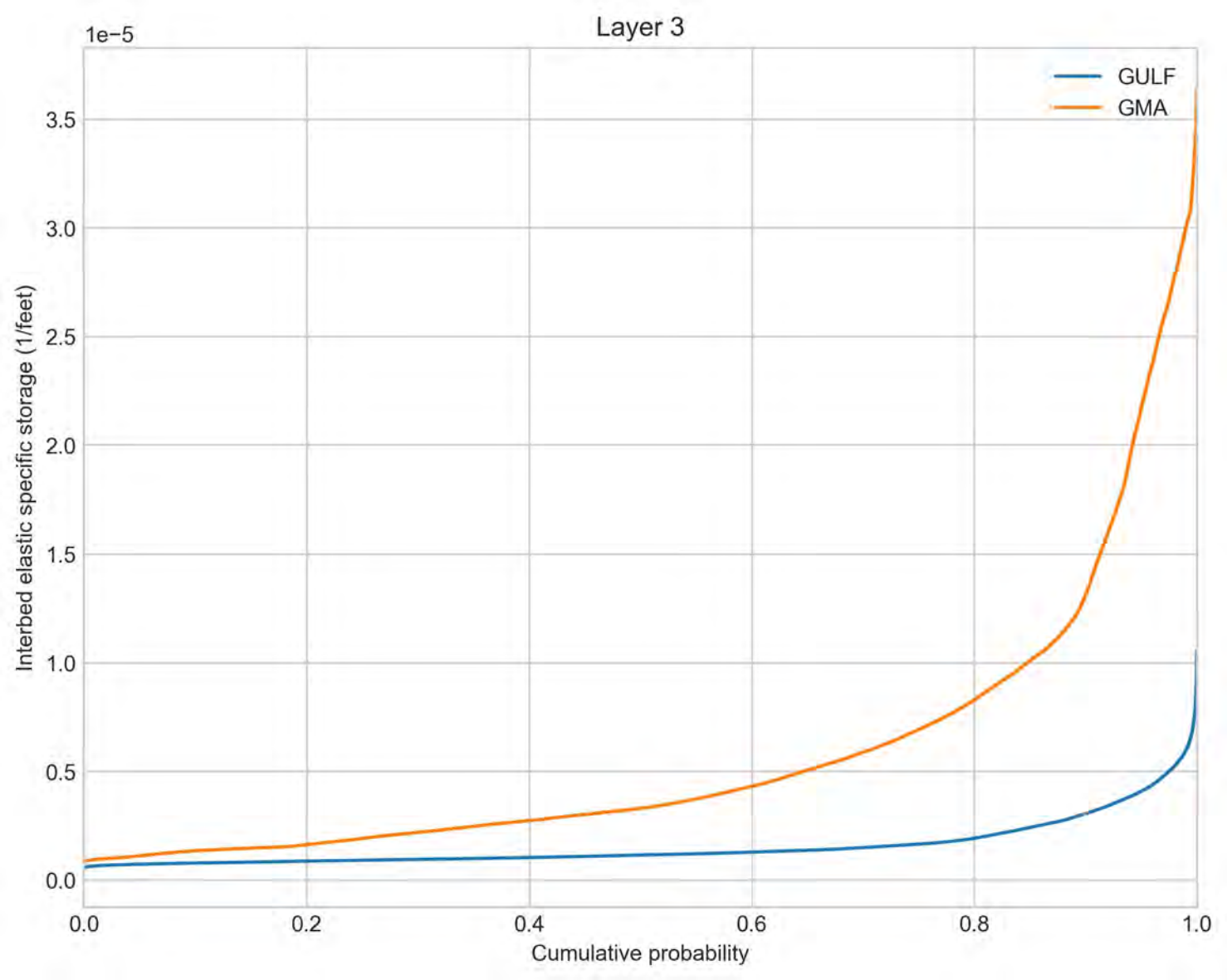

Layer 3
GULF
GMA
10^{-5}
10^{-6}
10^{-7}
10^{-8}
Coarse-grained elastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

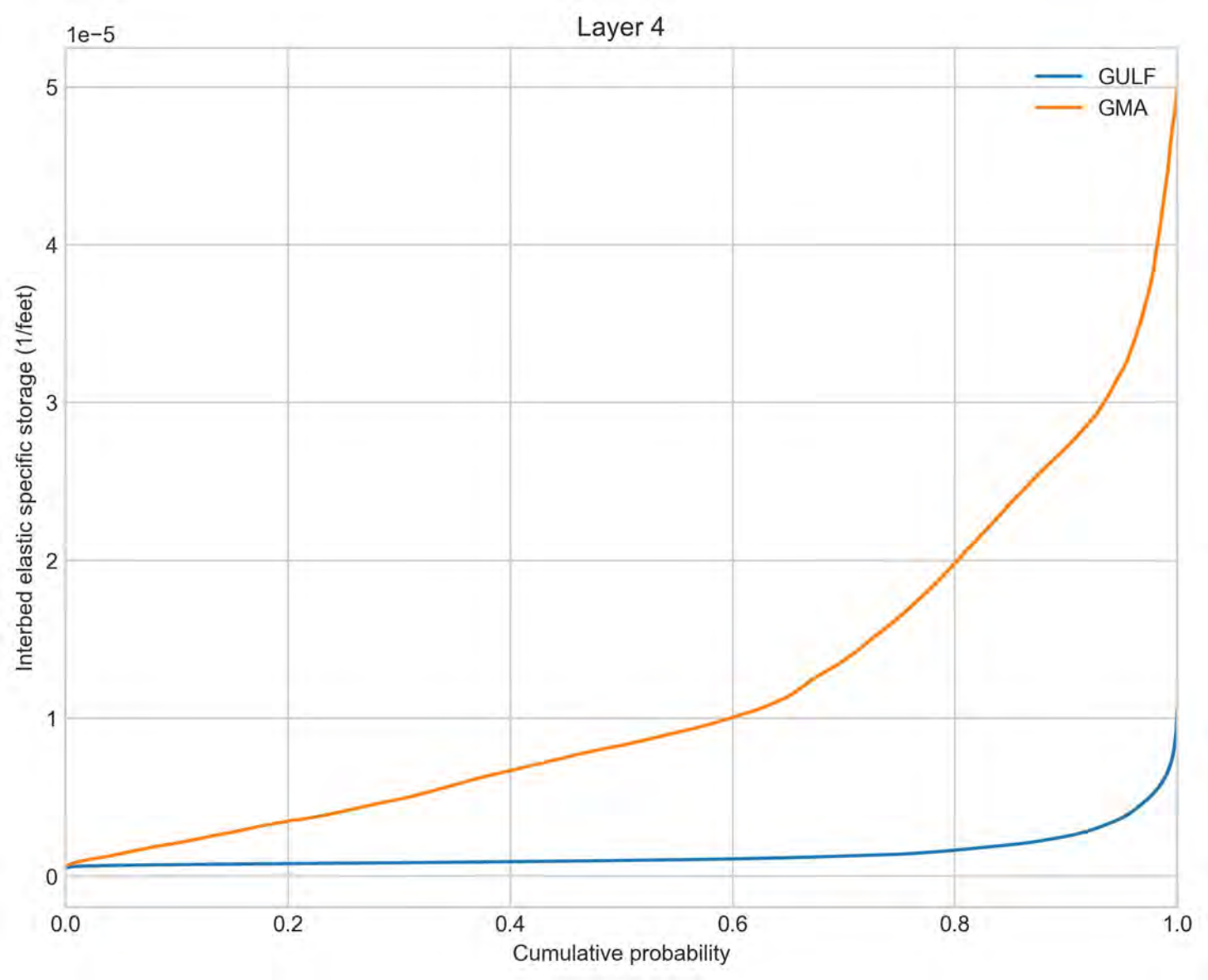

Layer 4
1e−5
GULF
GMA
Coarse-grained elastic specific storage (1/feet)
0
1
2
3
4
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

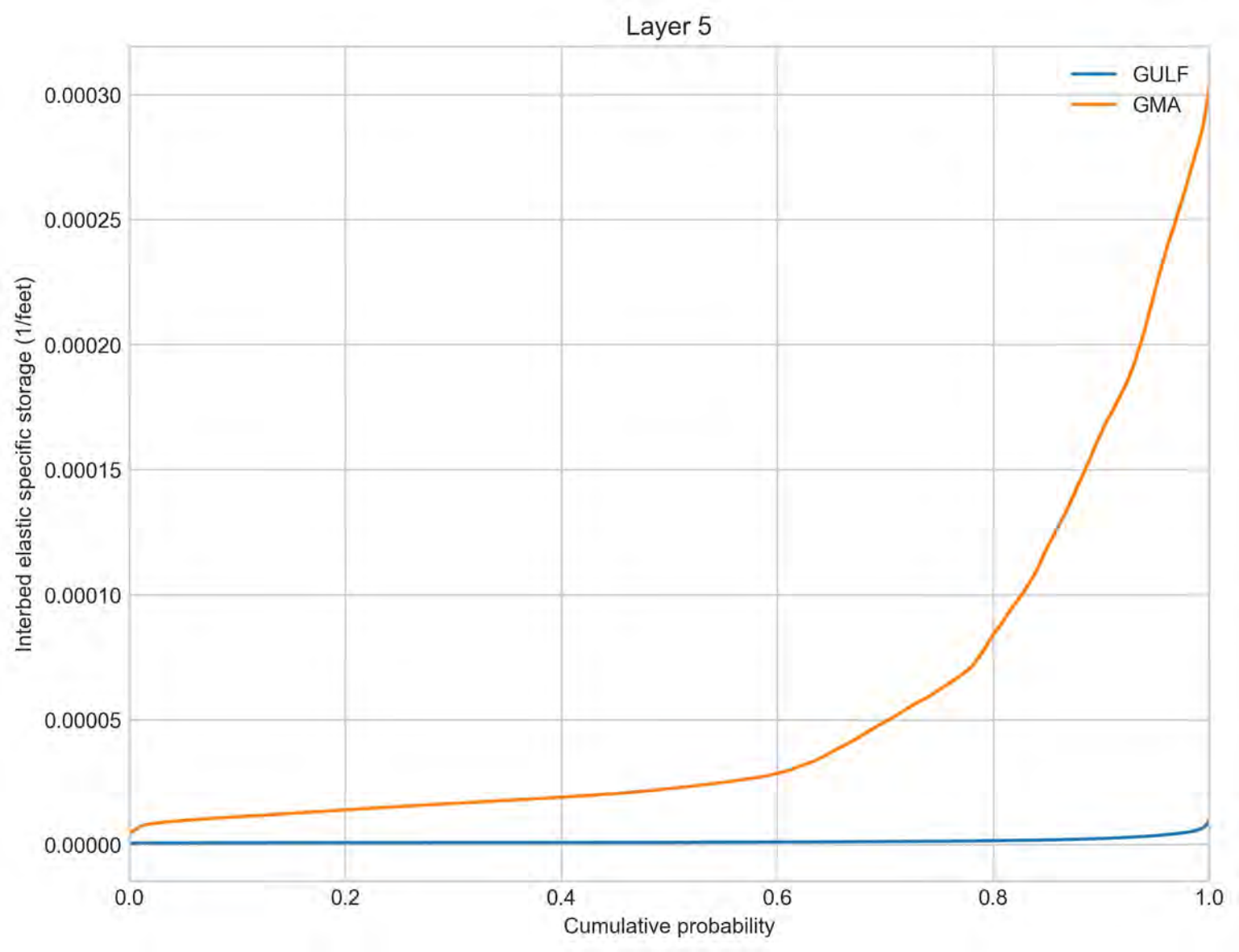

Layer 5
1e−6
8
7
6
5
4
3
2
1
0
Coarse-grained elastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability
GULF
GMA

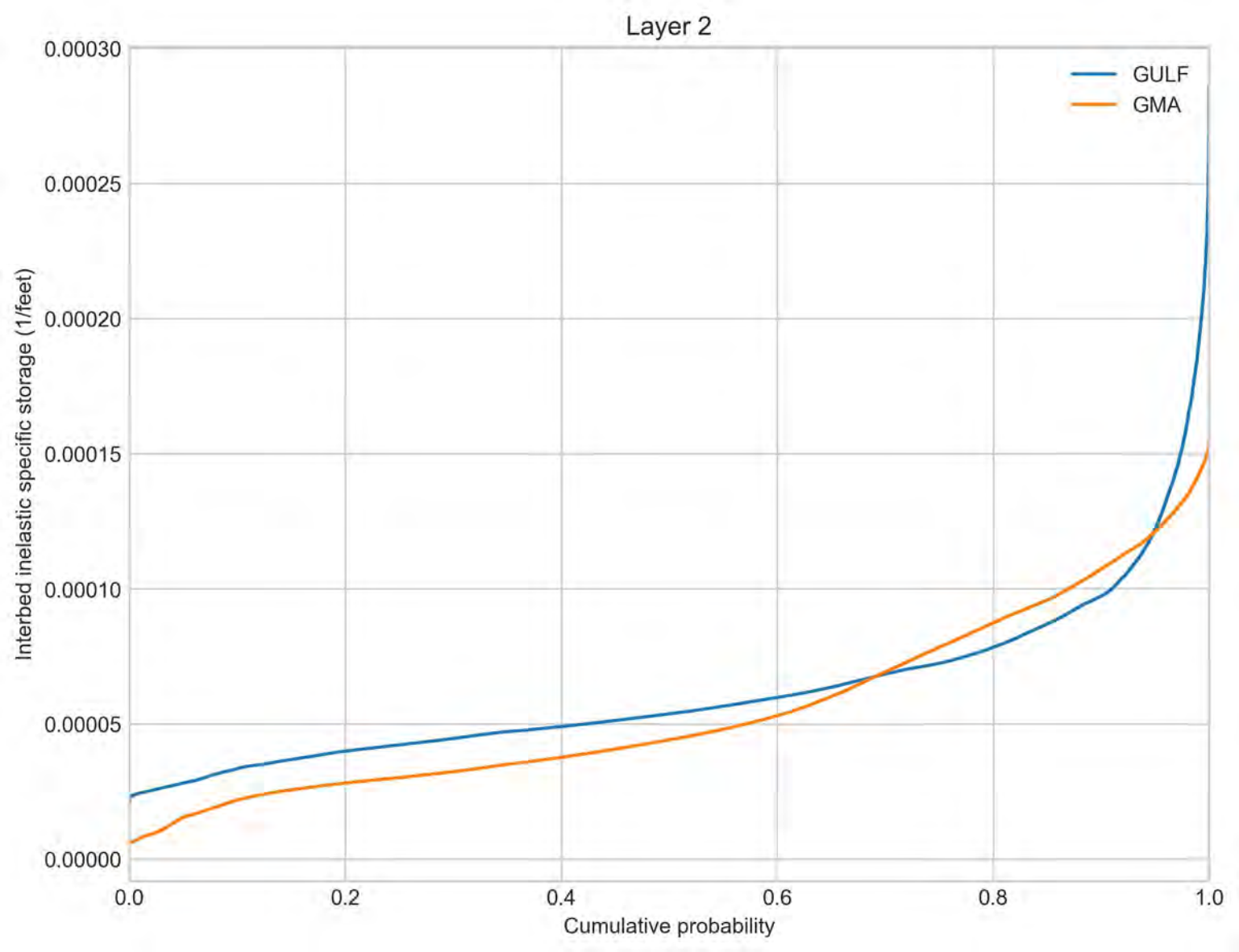

Layer 6
1e−6
GULF
GMA
Coarse-grained elastic specific storage (1/feet)
0
1
2
3
4
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

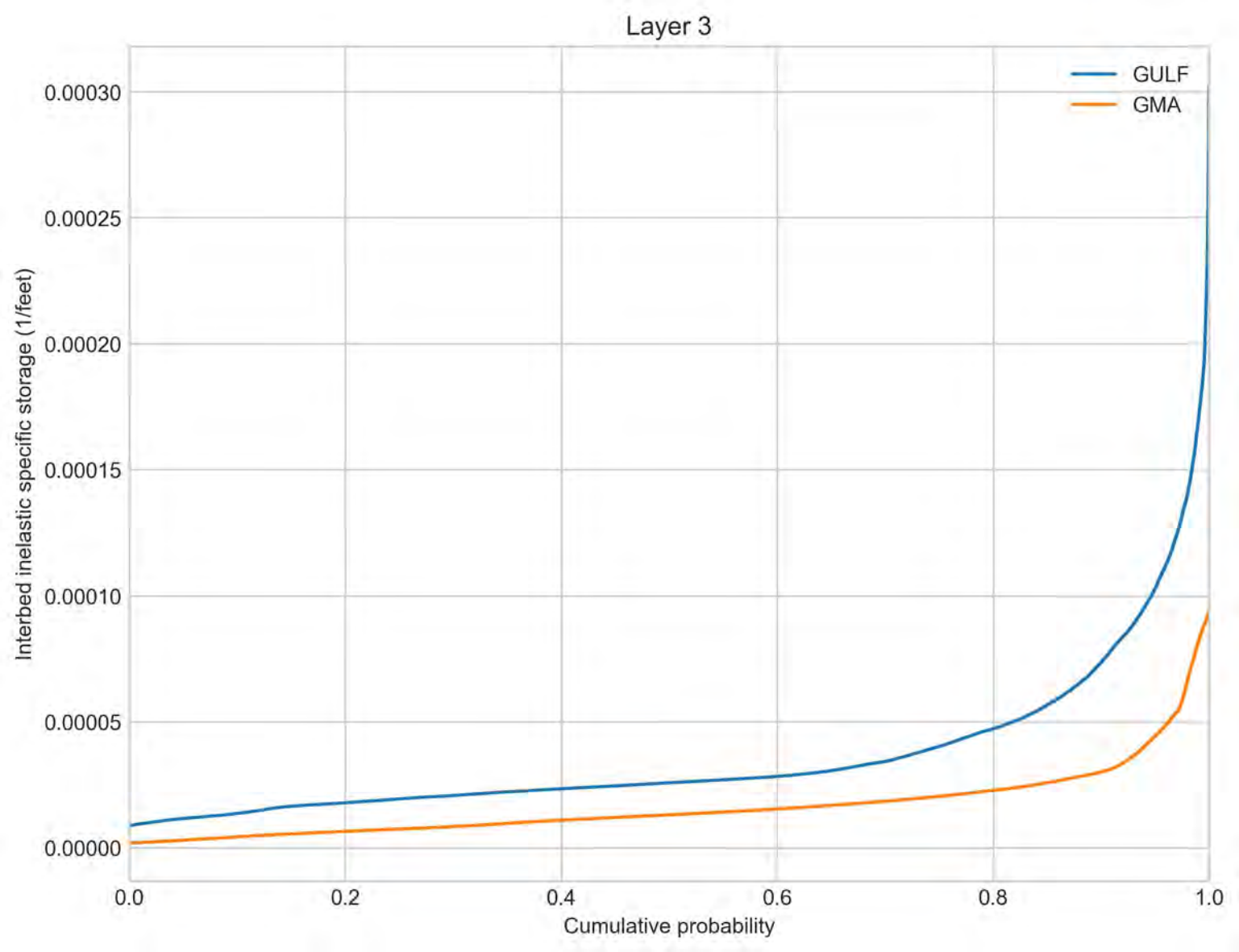

Layer 2
1e−5
GULF
GMA
Interbed elastic specific storage (1/feet)
0
1
2
3
4
5
6
7
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

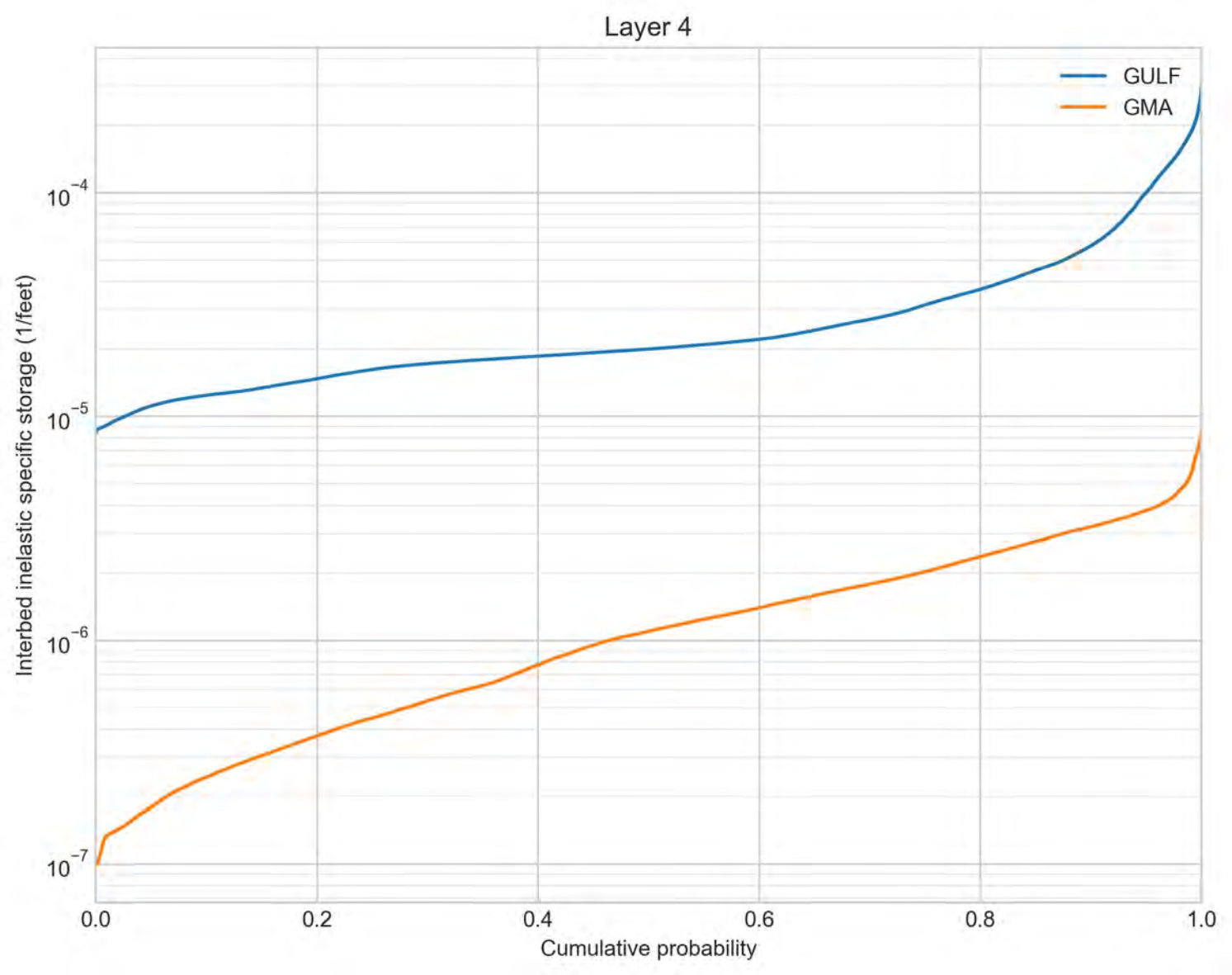

Layer 3
1e−5
GULF
GMA
Interbed elastic specific storage (1/feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

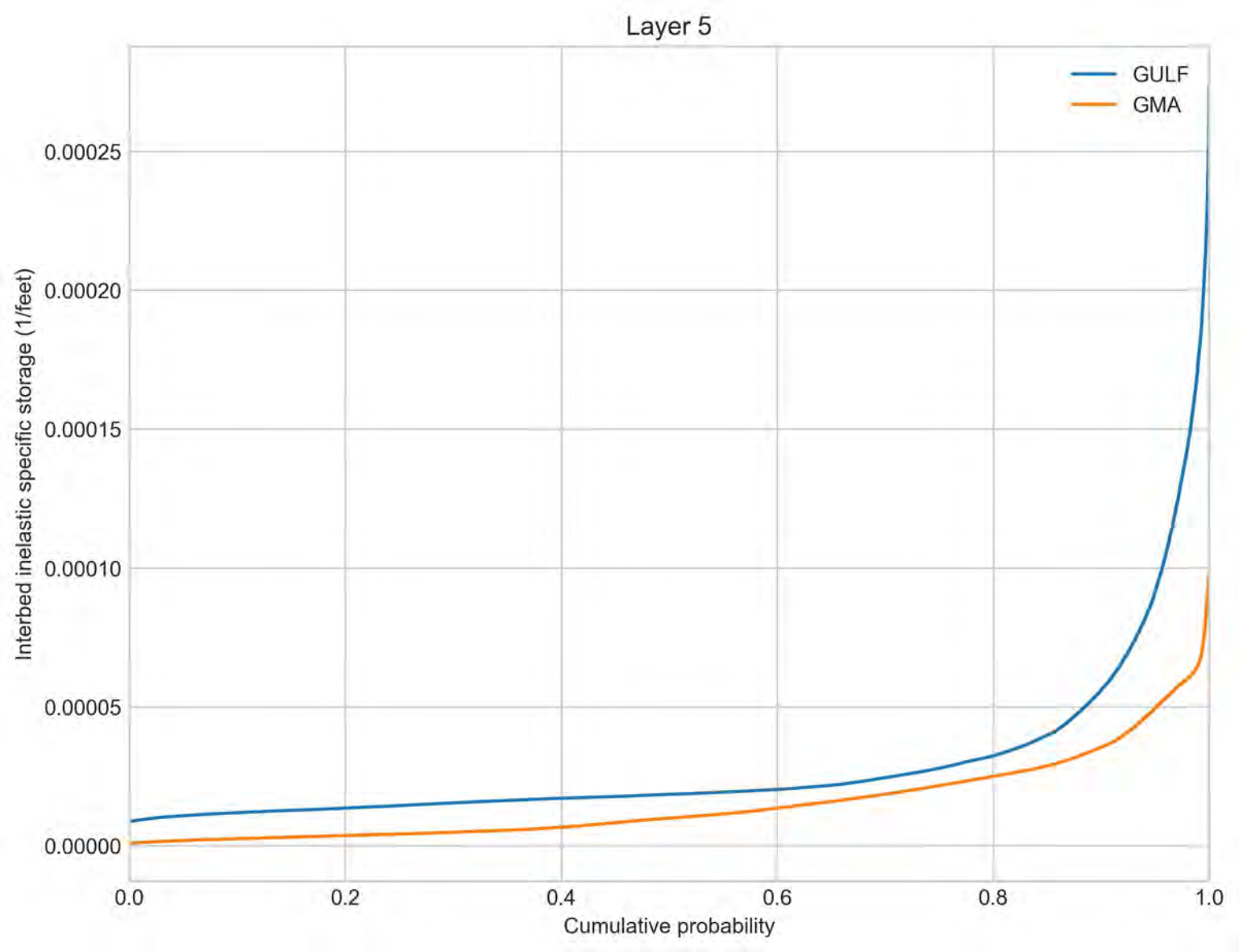

Layer 4
1e−5
GULF
GMA
Interbed elastic specific storage (1/feet)
Cumulative probability
0
1
2
3
4
5
0.0
0.2
0.4
0.6
0.8
1.0

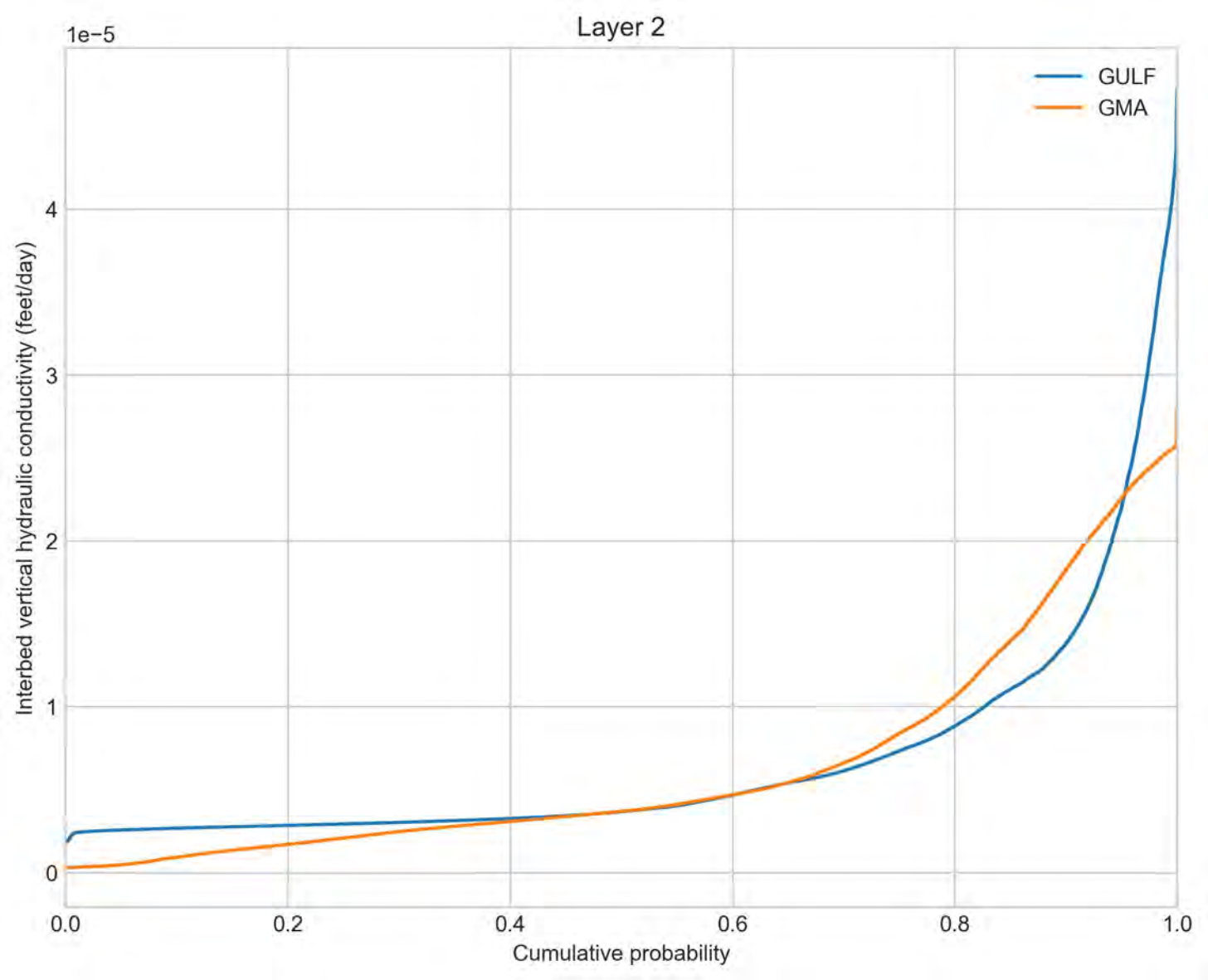

Layer 5
GULF
GMA
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
Interbed elastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

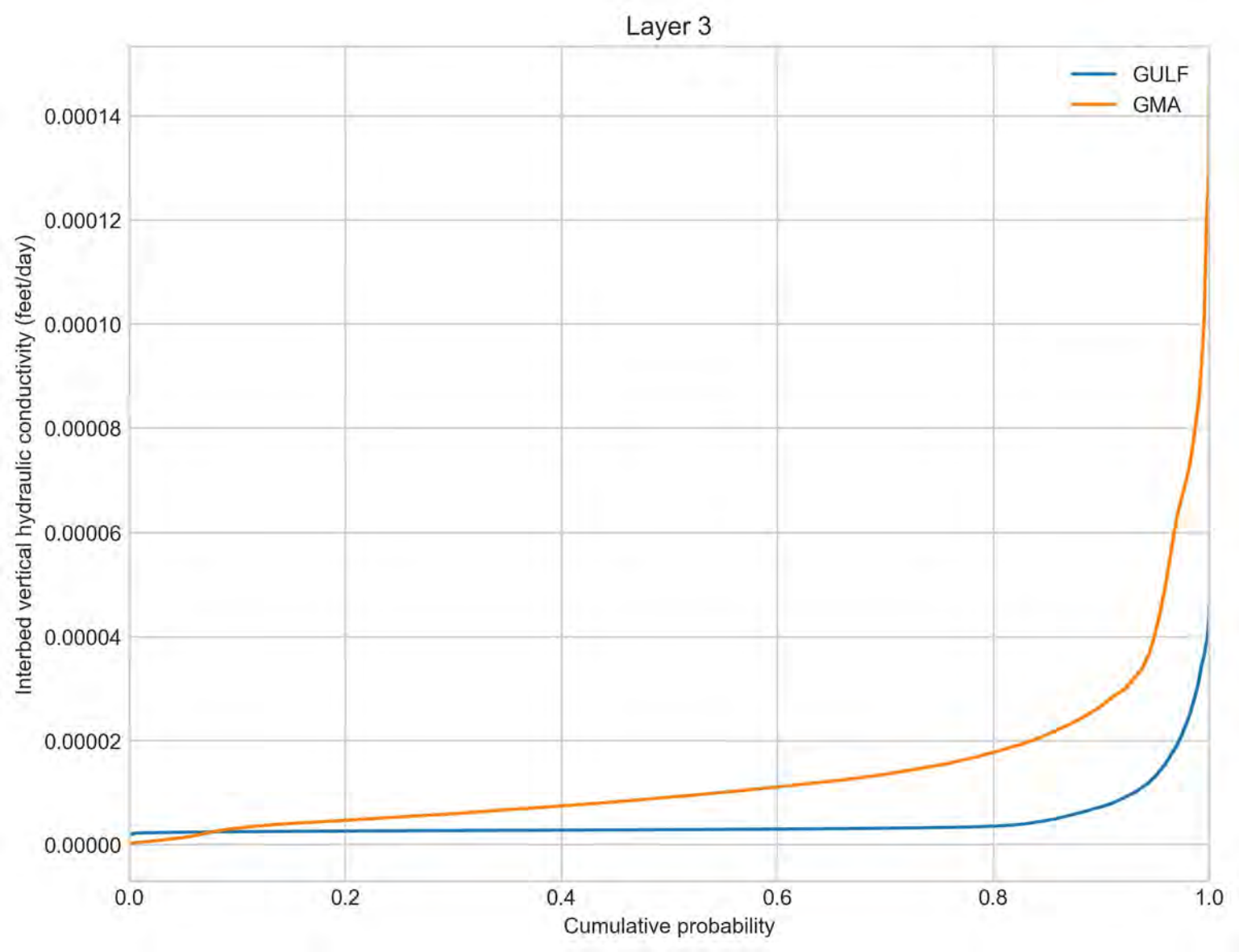

Layer 2
GULF
GMA
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
Interbed inelastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

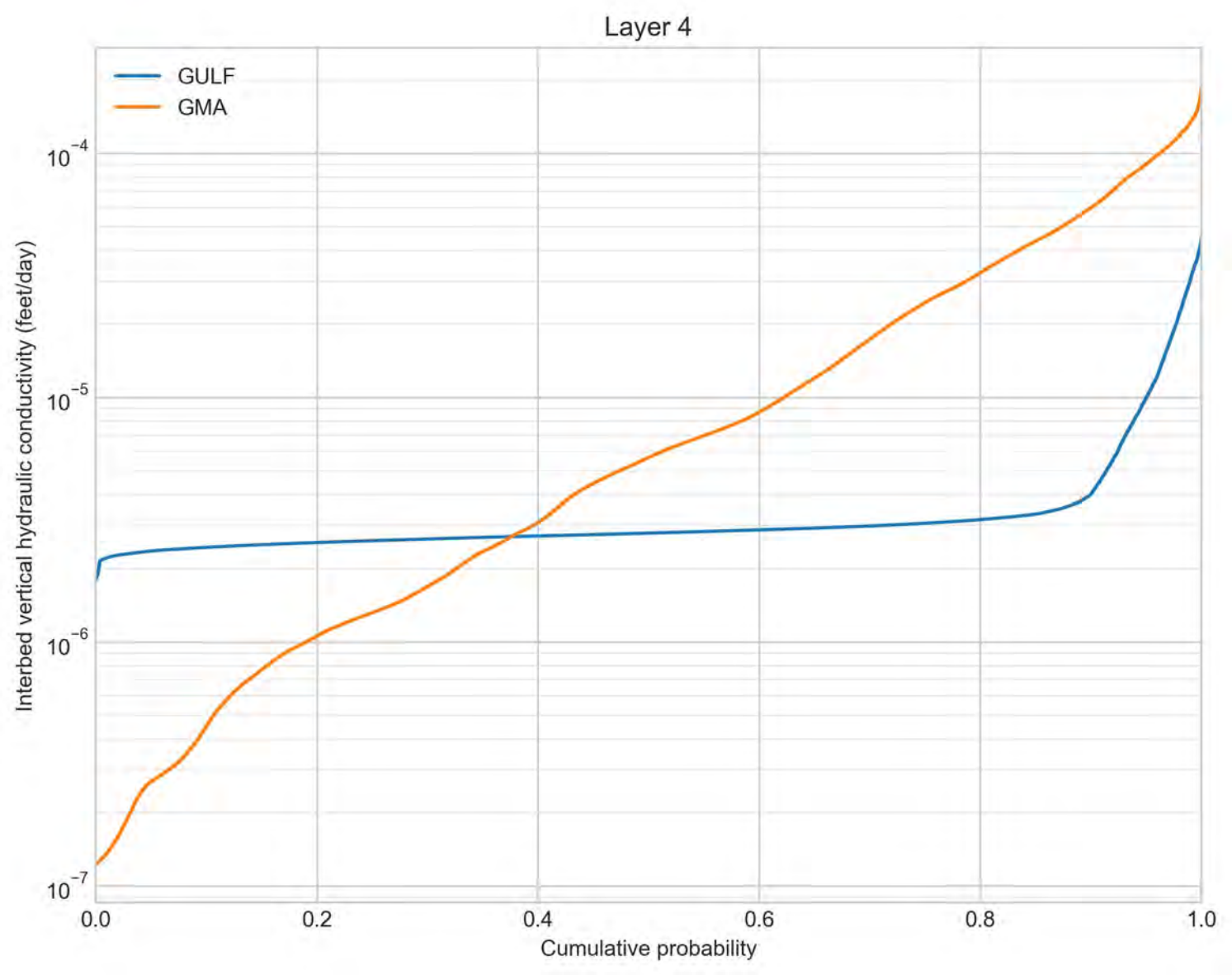

Layer 3
GULF
GMA
0.00030
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
Interbed inelastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

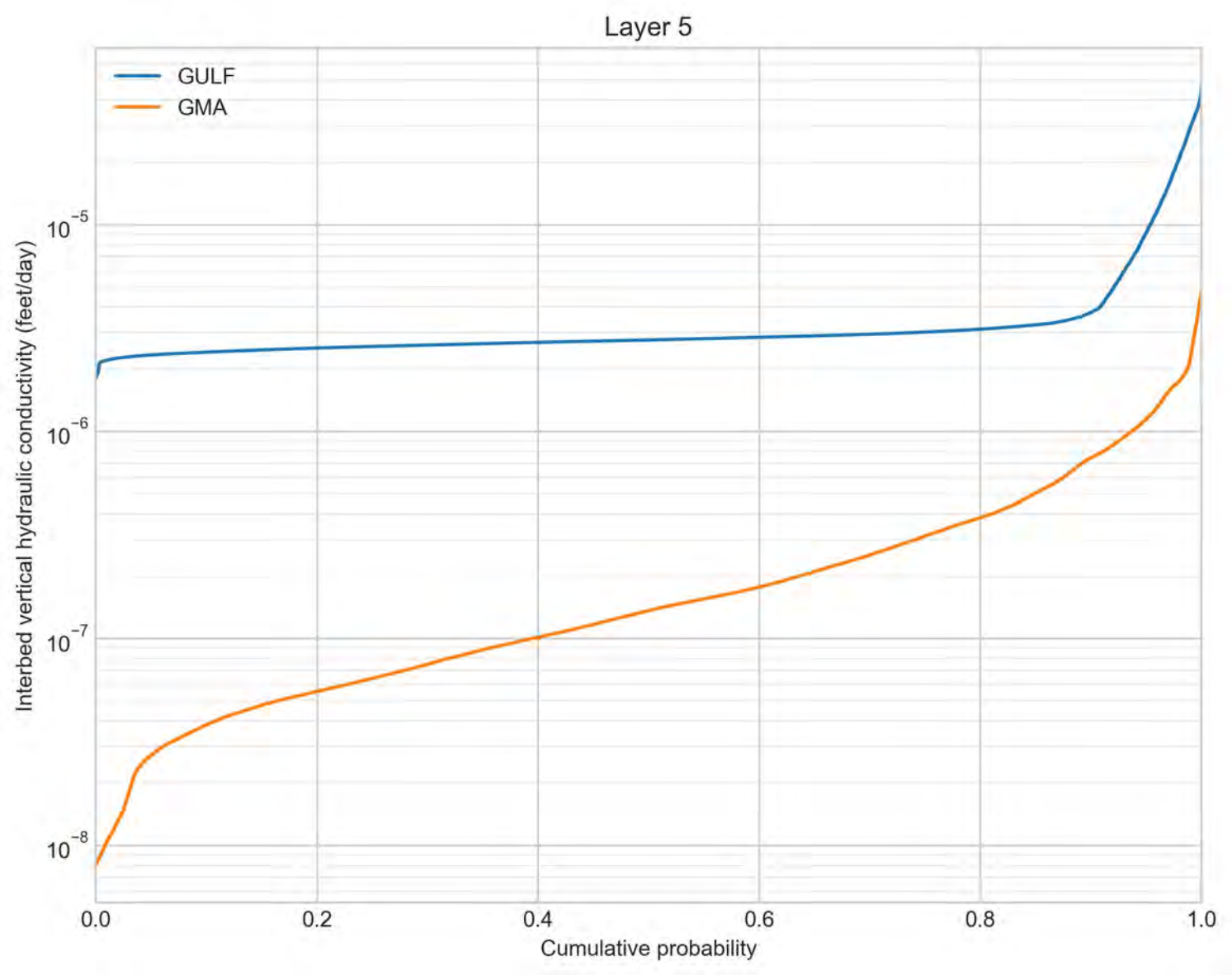

Layer 4
GULF
GMA
Interbed inelastic specific storage (1/feet)
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability


Layer 5
GULF
GMA
0.00025
0.00020
0.00015
0.00010
0.00005
0.00000
Interbed inelastic specific storage (1/feet)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability


Layer 2
1e−5
GULF
GMA
Interbed vertical hydraulic conductivity (feet/day)
0
1
2
3
4
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

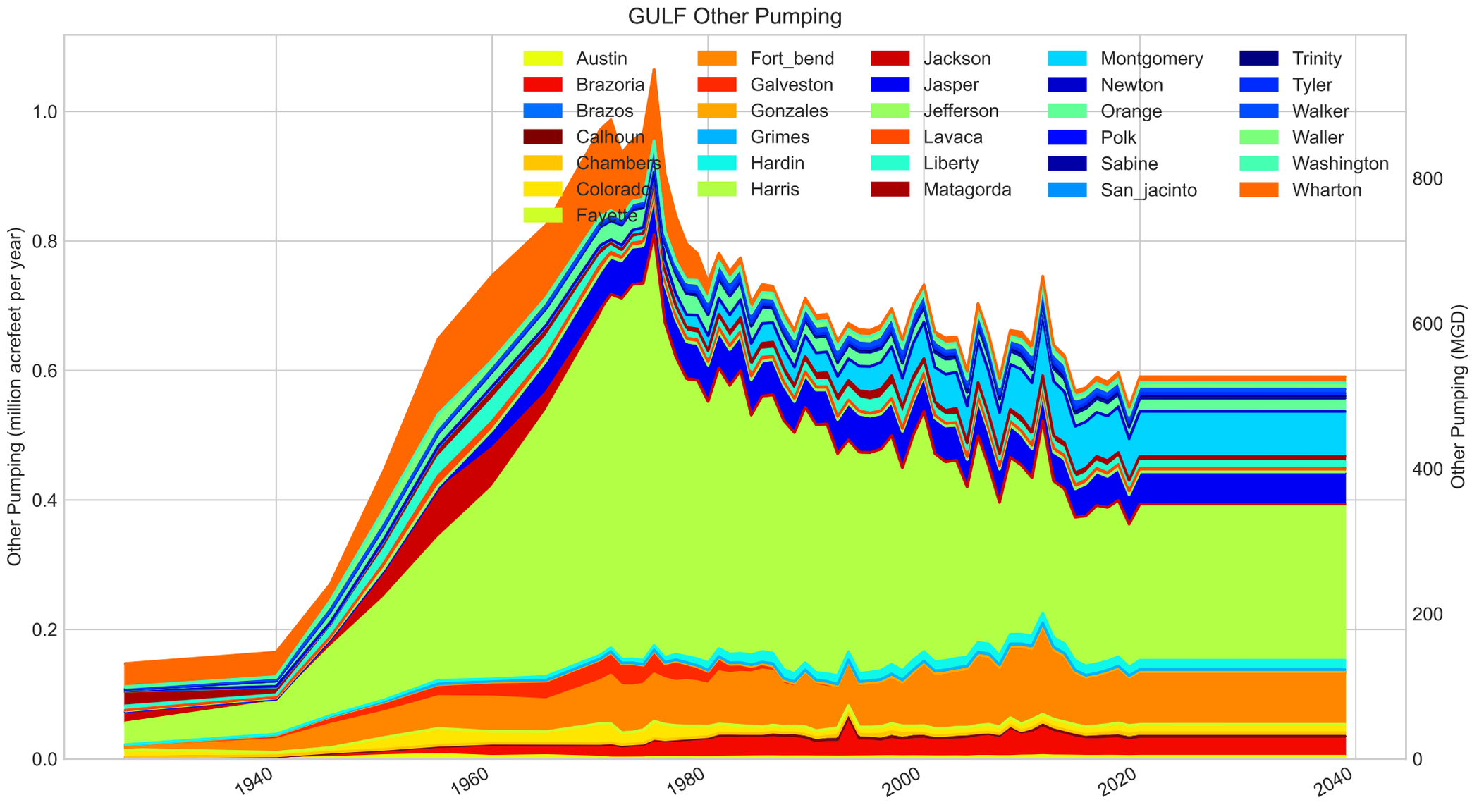

Layer 3
GULF
GMA
0.00014
0.00012
0.00010
0.00008
0.00006
0.00004
0.00002
0.00000
Interbed vertical hydraulic conductivity (feet/day)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

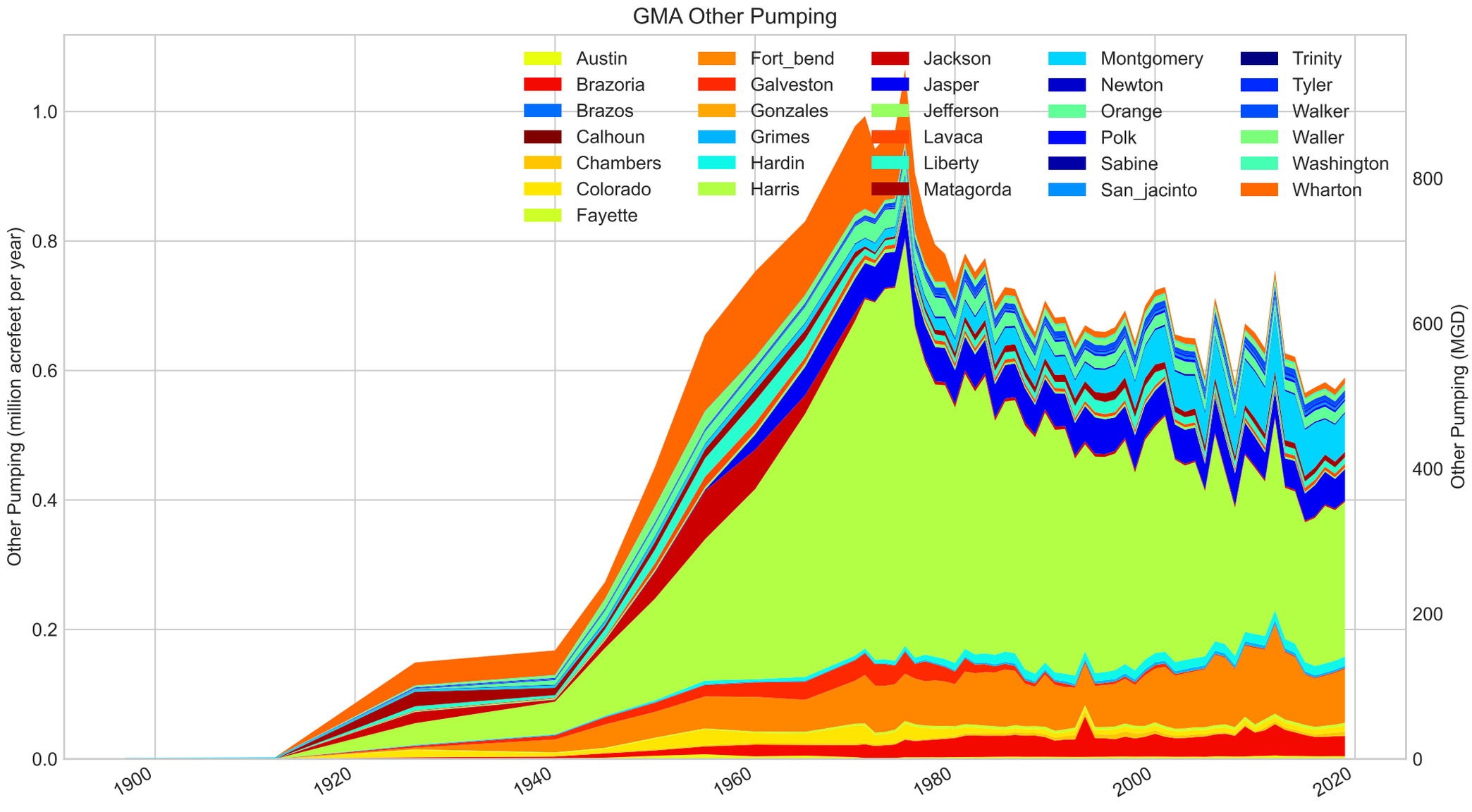

Layer 4
GULF
GMA
10^{-4}
10^{-5}
10^{-6}
10^{-7}
Interbed vertical hydraulic conductivity (feet/day)
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

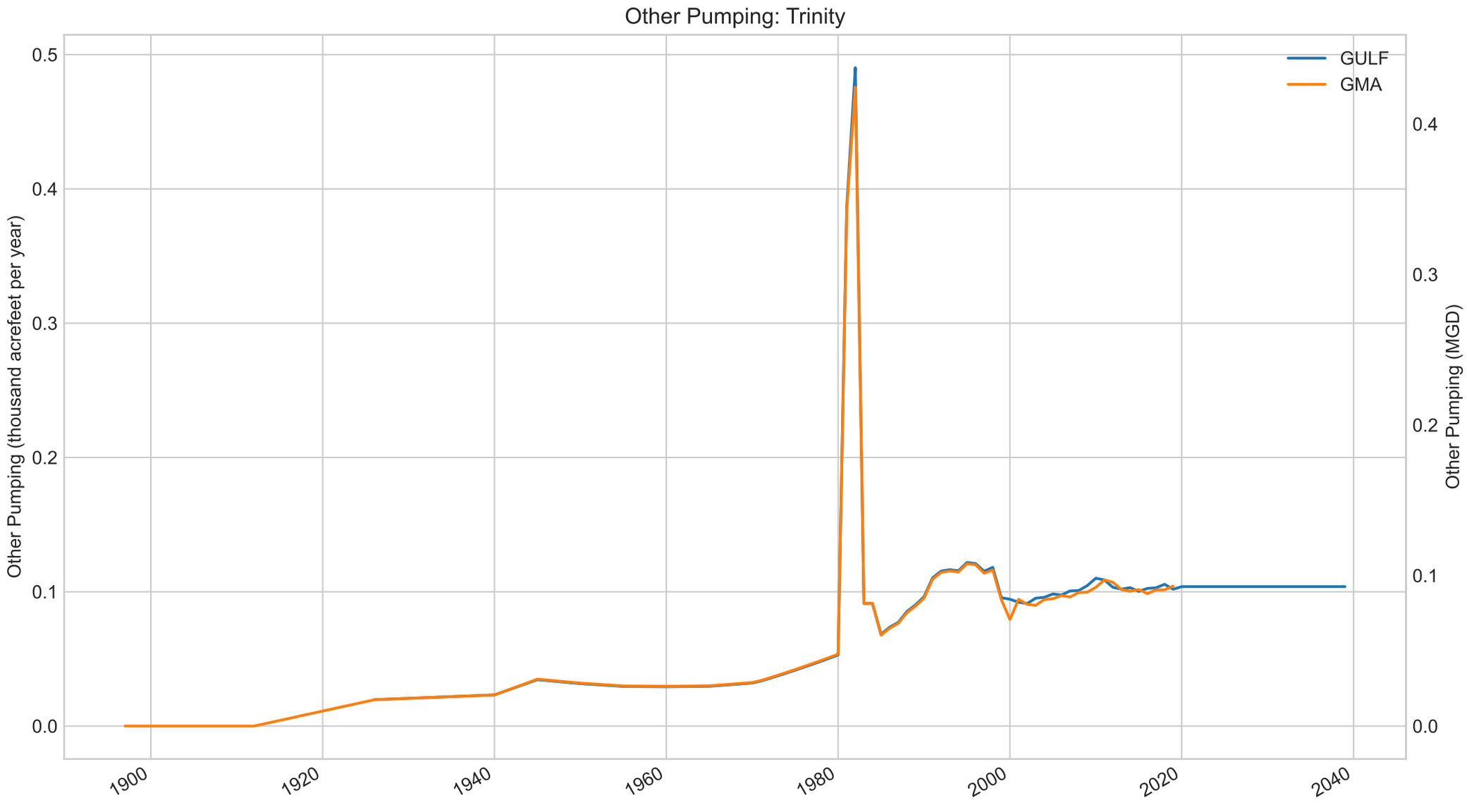

Layer 5
GULF
GMA
Interbed vertical hydraulic conductivity (feet/day)
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0.0
0.2
0.4
0.6
0.8
1.0
Cumulative probability

Appendix C

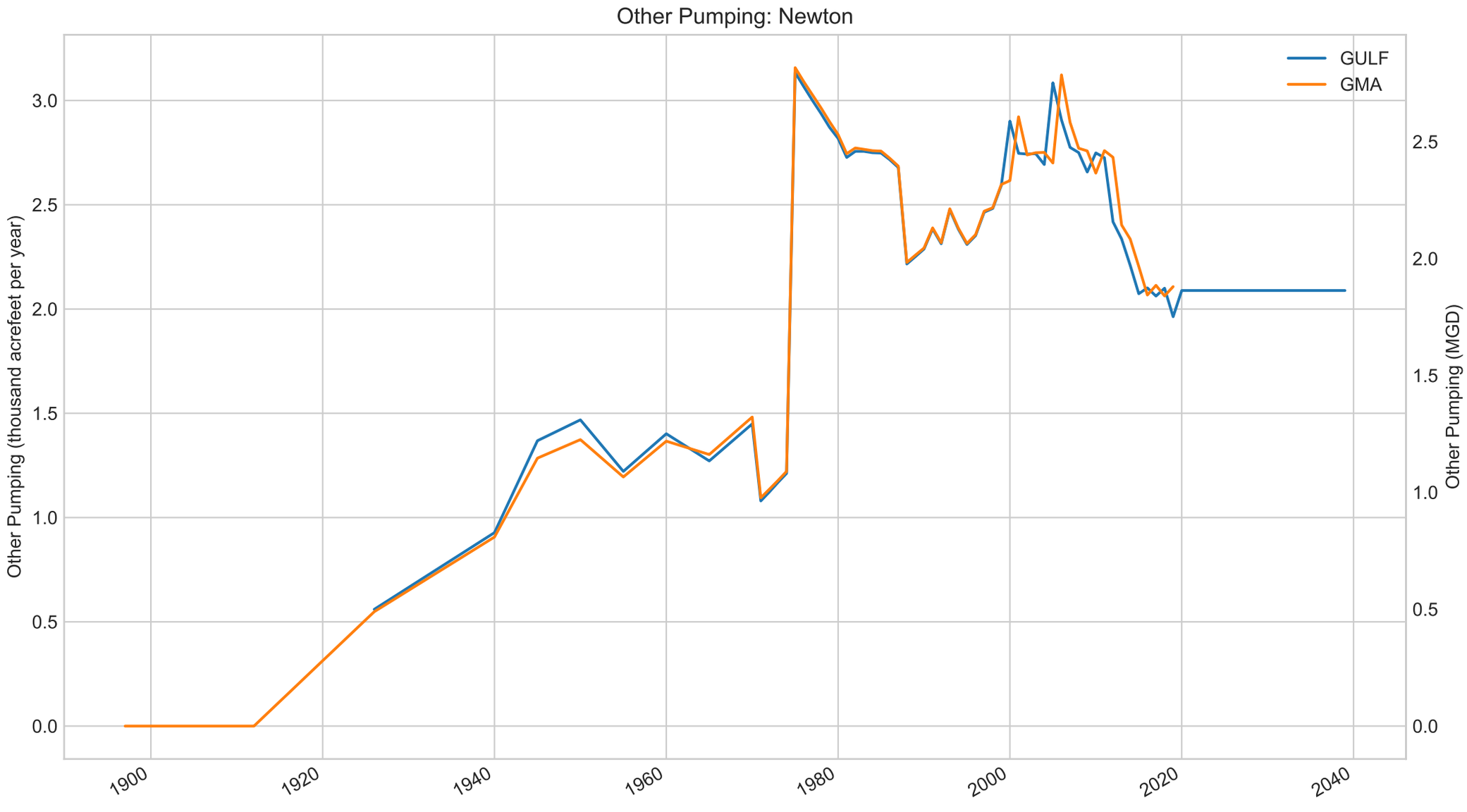
Groundwater pumping

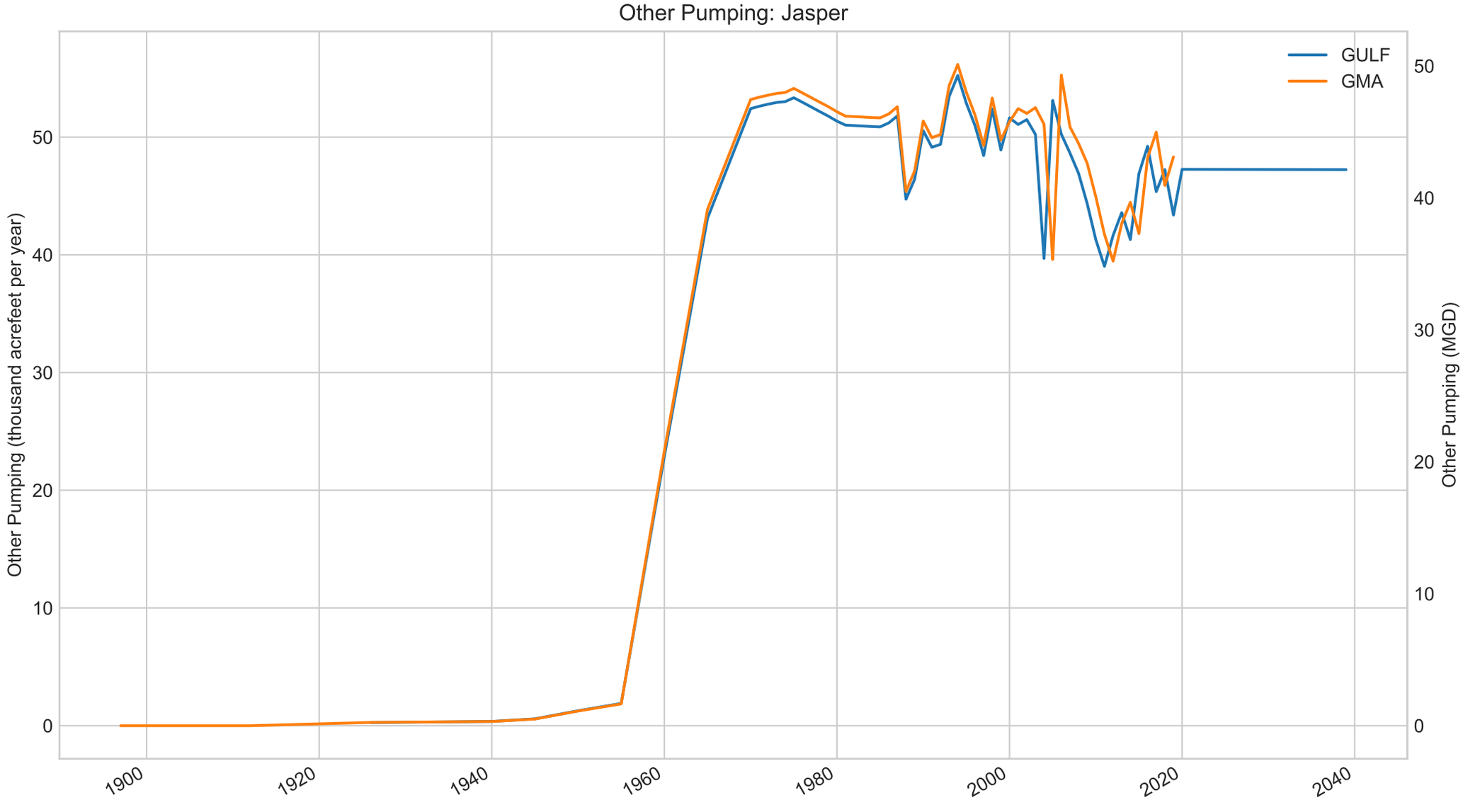

GULF Other Pumping
Austin
Brazoria
Brazos
Calhoun
Chambers
Colorado
Fayette
Fort_bend
Galveston
Gonzales
Grimes
Hardin
Harris
Jackson
Jasper
Jefferson
Lavaca
Liberty
Matagorda
Montgomery
Newton
Orange
Polk
Sabine
San_jacinto
Trinity
Tyler
Walker
Waller
Washington
Wharton
Other Pumping (million acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
0
200
400
600
800
1940
1960
1980
2000
2020
2040

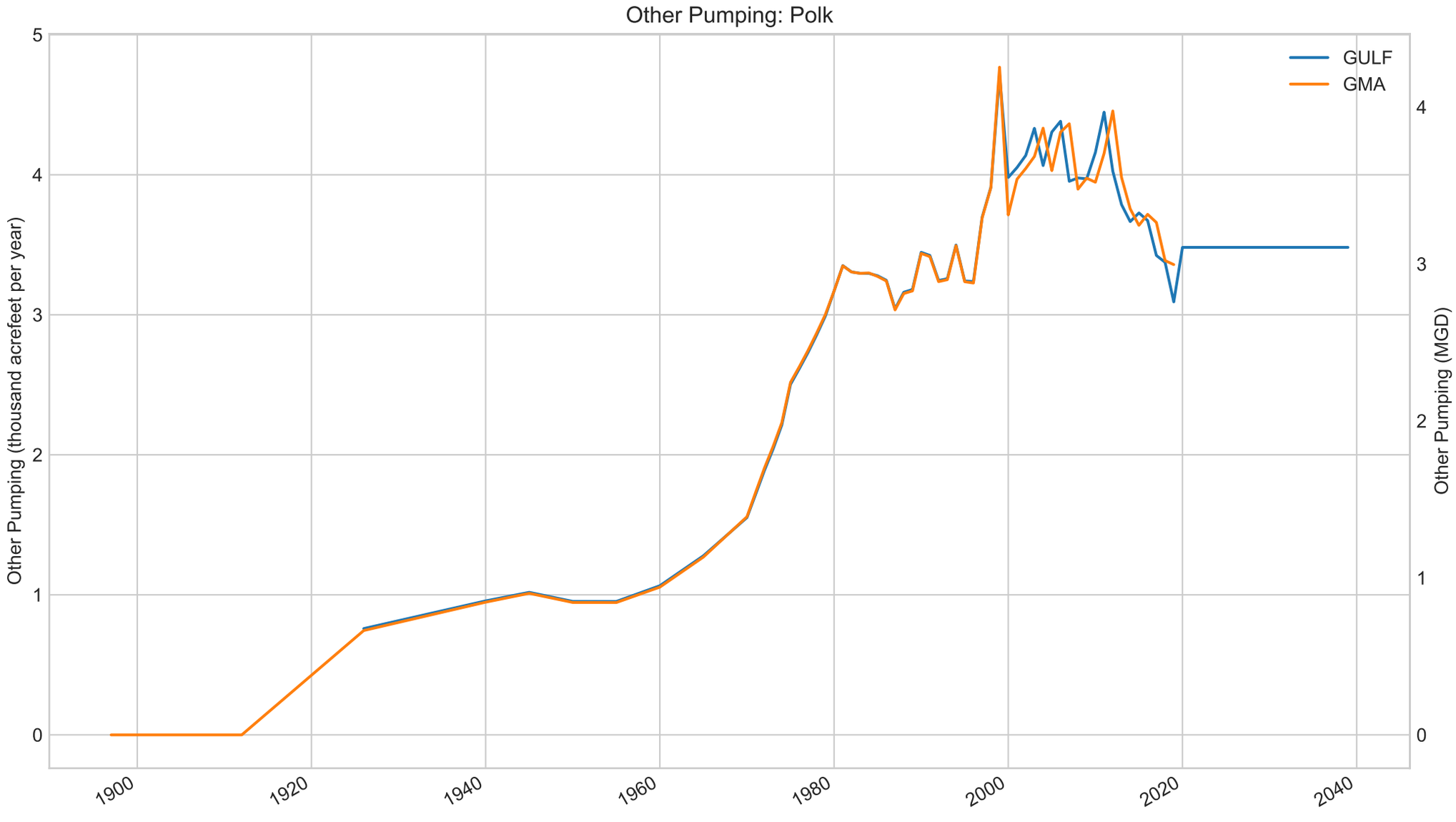

GMA Other Pumping
Austin
Brazoria
Brazos
Calhoun
Chambers
Colorado
Fayette
Fort_bend
Galveston
Gonzales
Grimes
Hardin
Harris
Jackson
Jasper
Jefferson
Lavaca
Liberty
Matagorda
Montgomery
Newton
Orange
Polk
Sabine
San_jacinto
Trinity
Tyler
Walker
Waller
Washington
Wharton
Other Pumping (million acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
0
200
400
600
800
1900
1920
1940
1960
1980
2000
2020

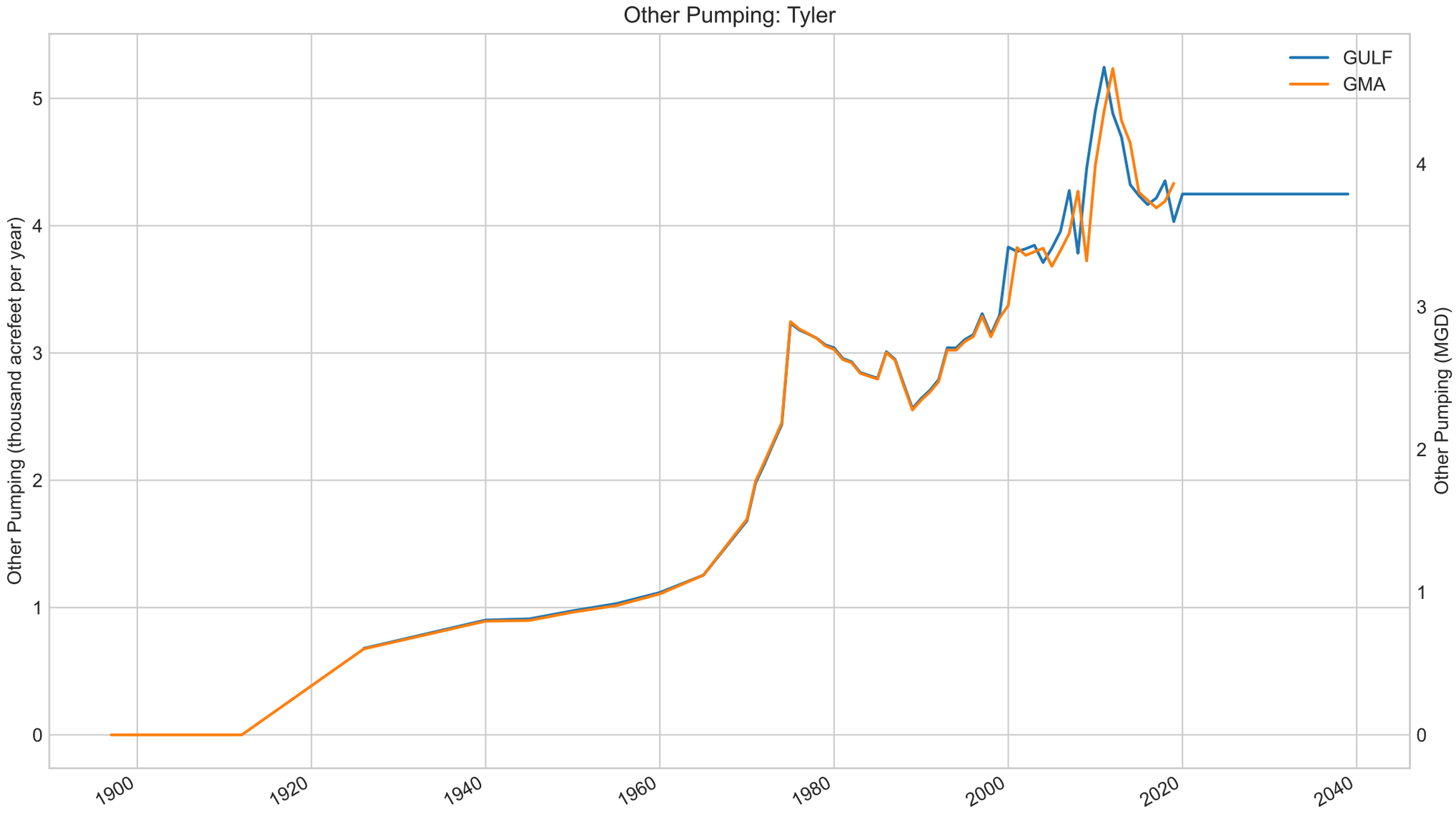

Other Pumping: Trinity
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

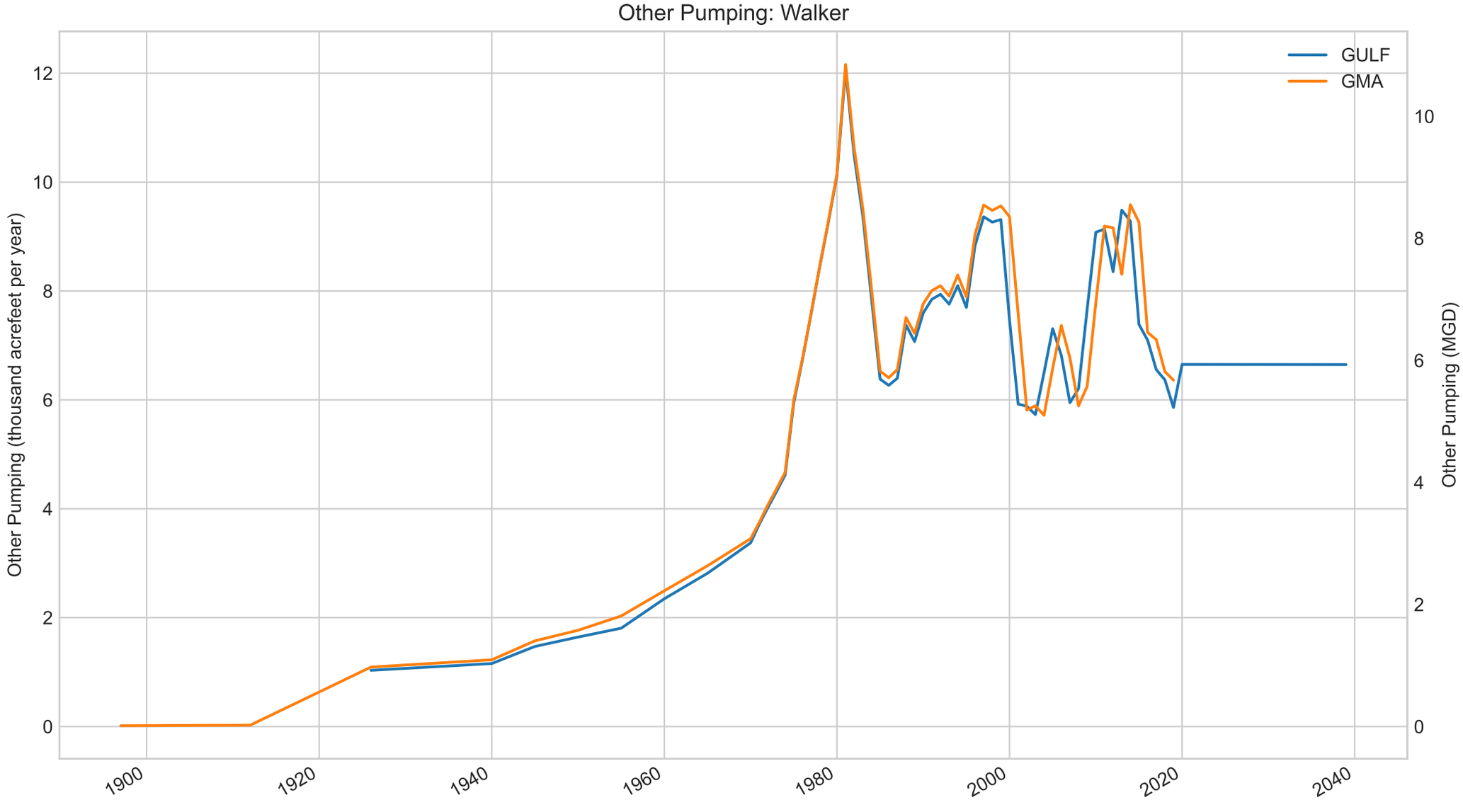
Other Pumping: Sabine
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.000200
0.000175
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
0.000000
1900
1920
1940
1960
1980
2000
2020
2040

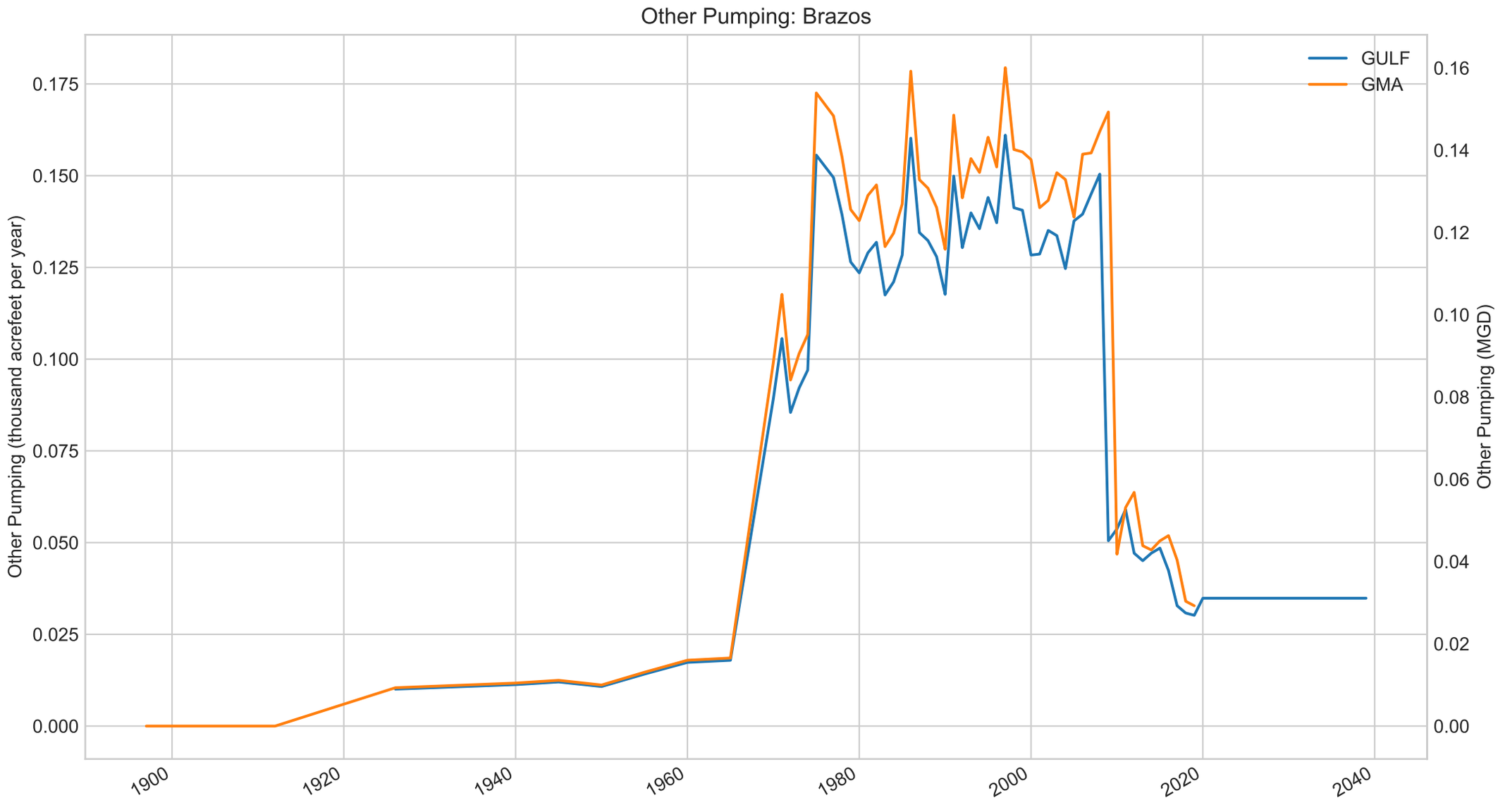

Other Pumping: Newton
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1900
1920
1940
1960
1980
2000
2020
2040

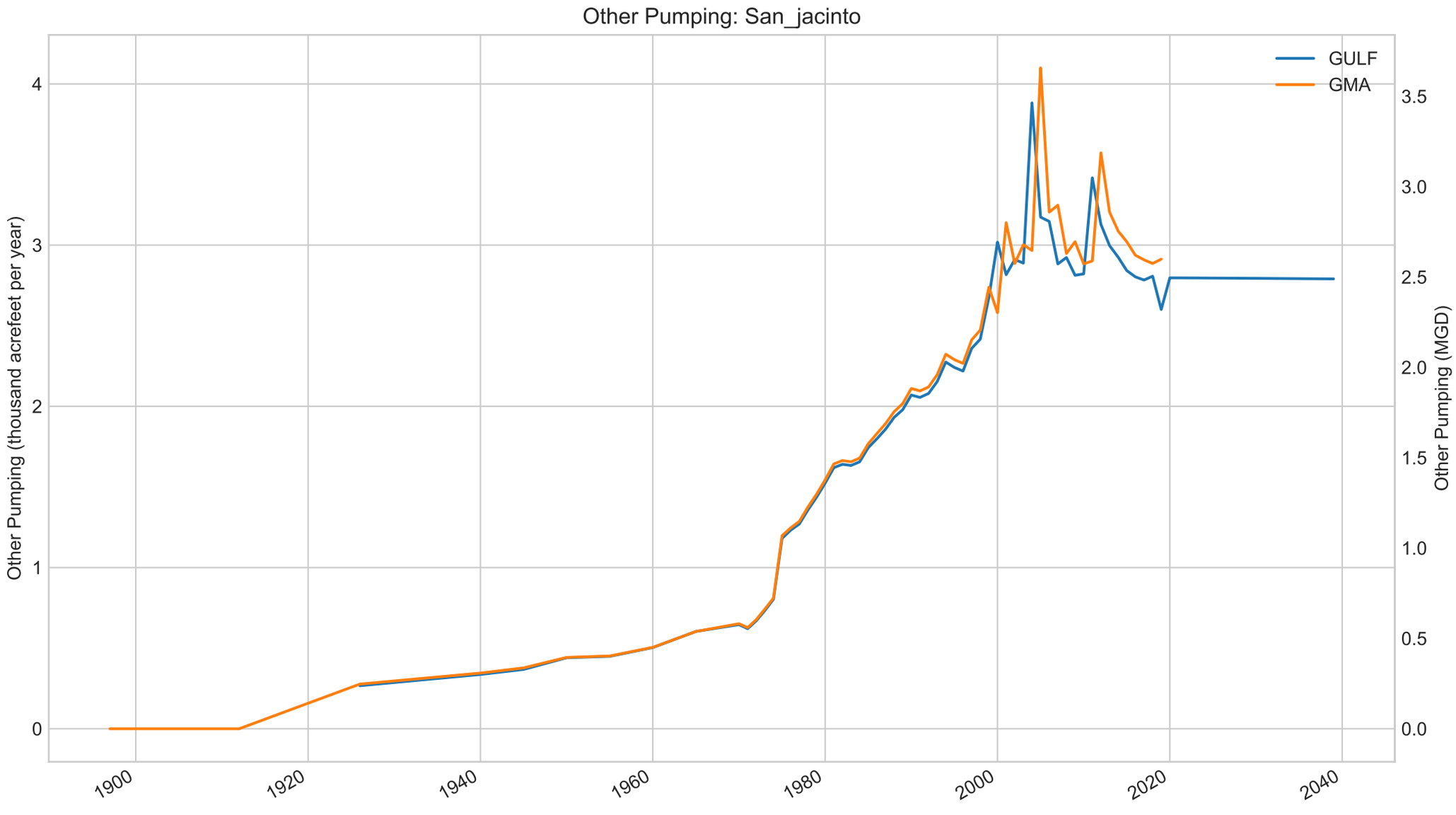

Other Pumping: Jasper
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
1900
1920
1940
1960
1980
2000
2020
2040

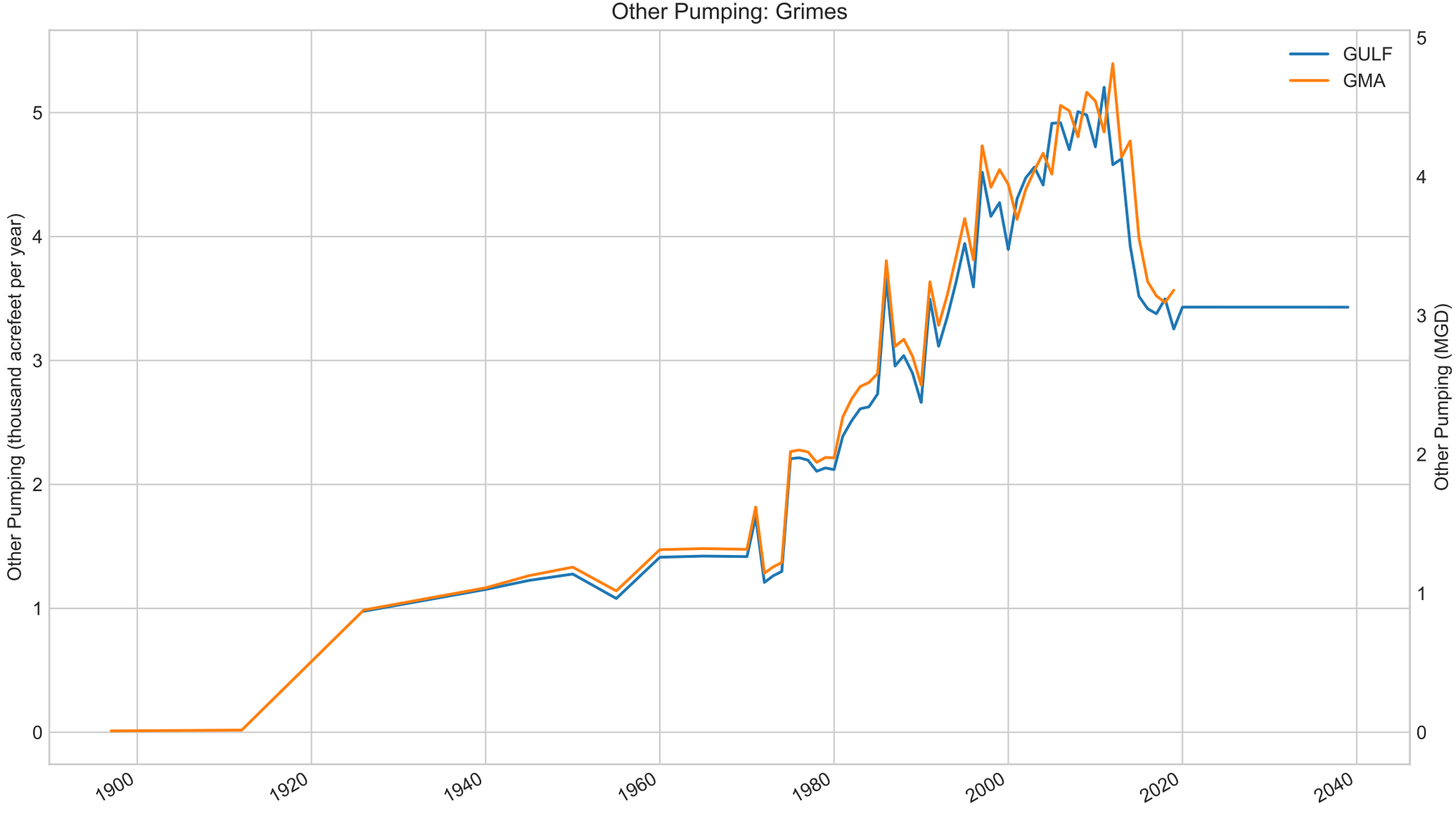

Other Pumping: Polk
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

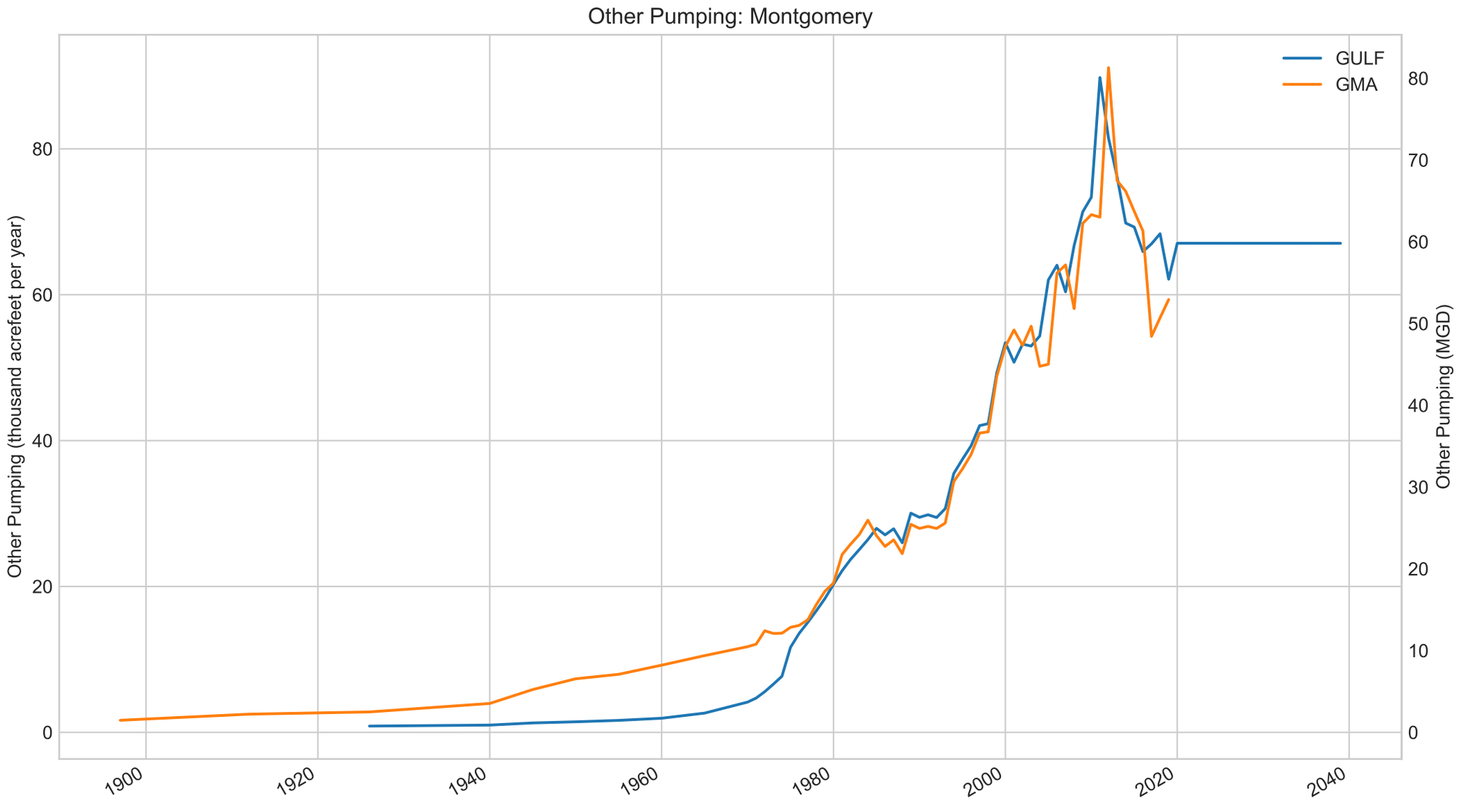

Other Pumping: Tyler
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

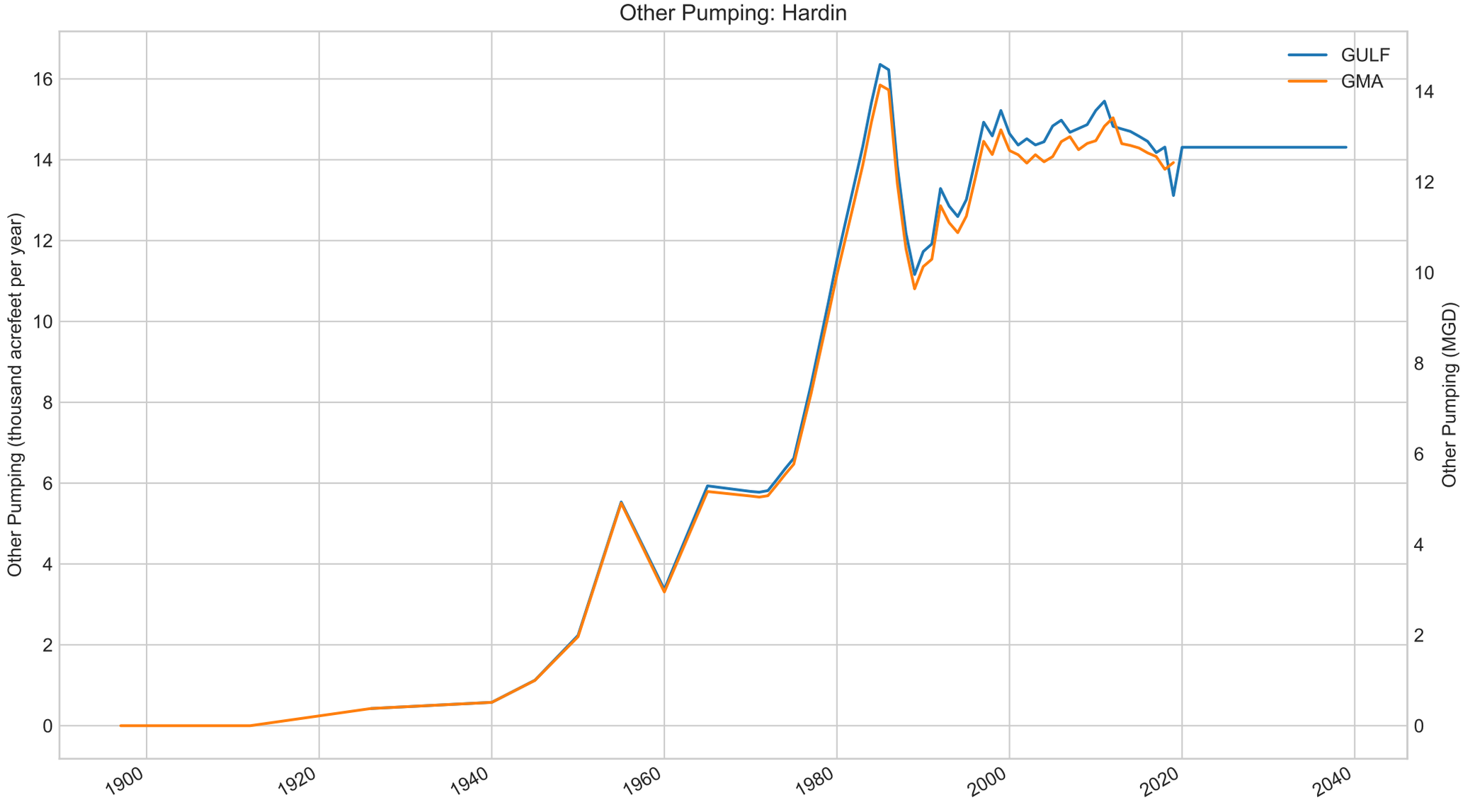

Other Pumping: Walker
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
10
12
0
2
4
6
8
10
1900
1920
1940
1960
1980
2000
2020
2040

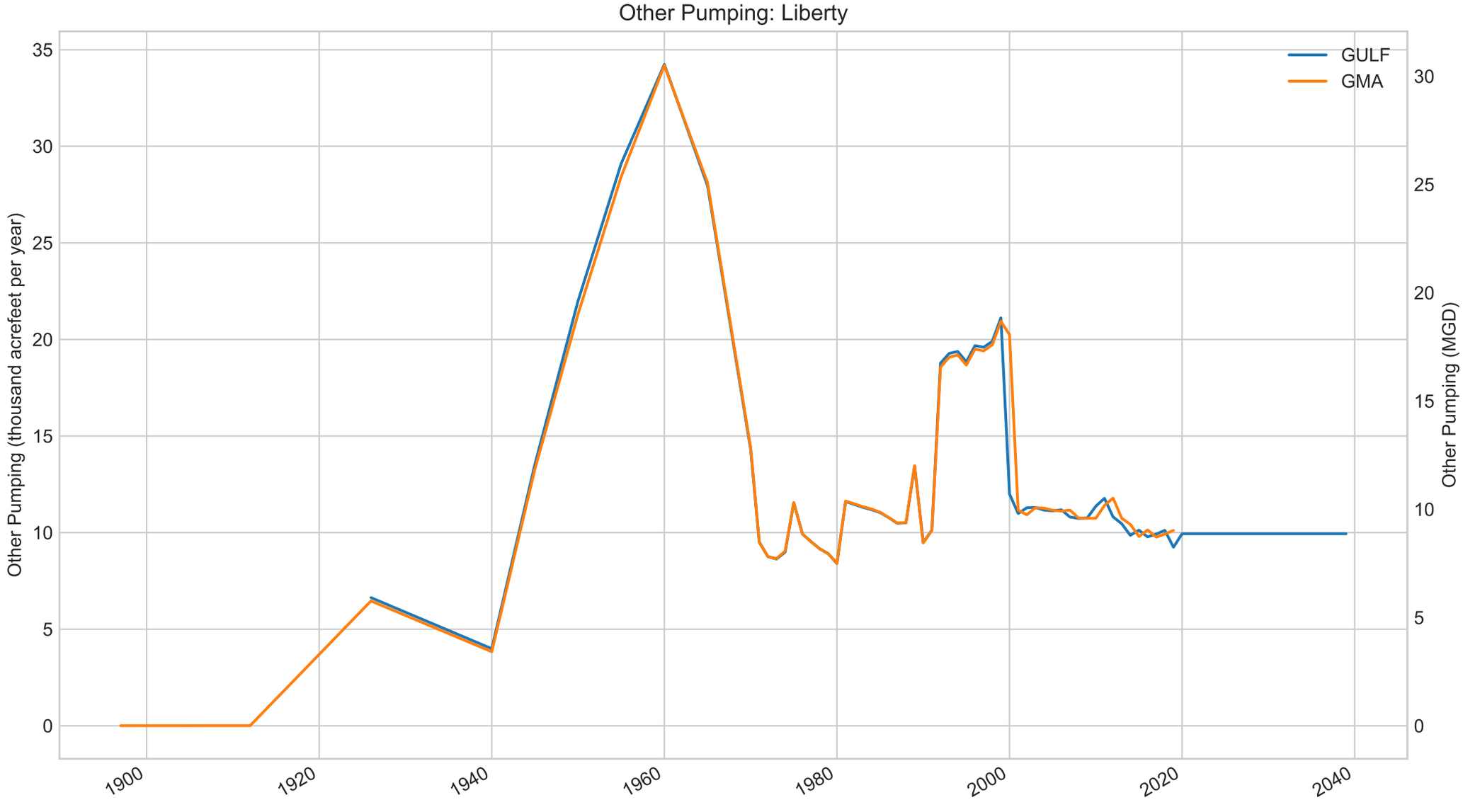

Other Pumping: Brazos
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

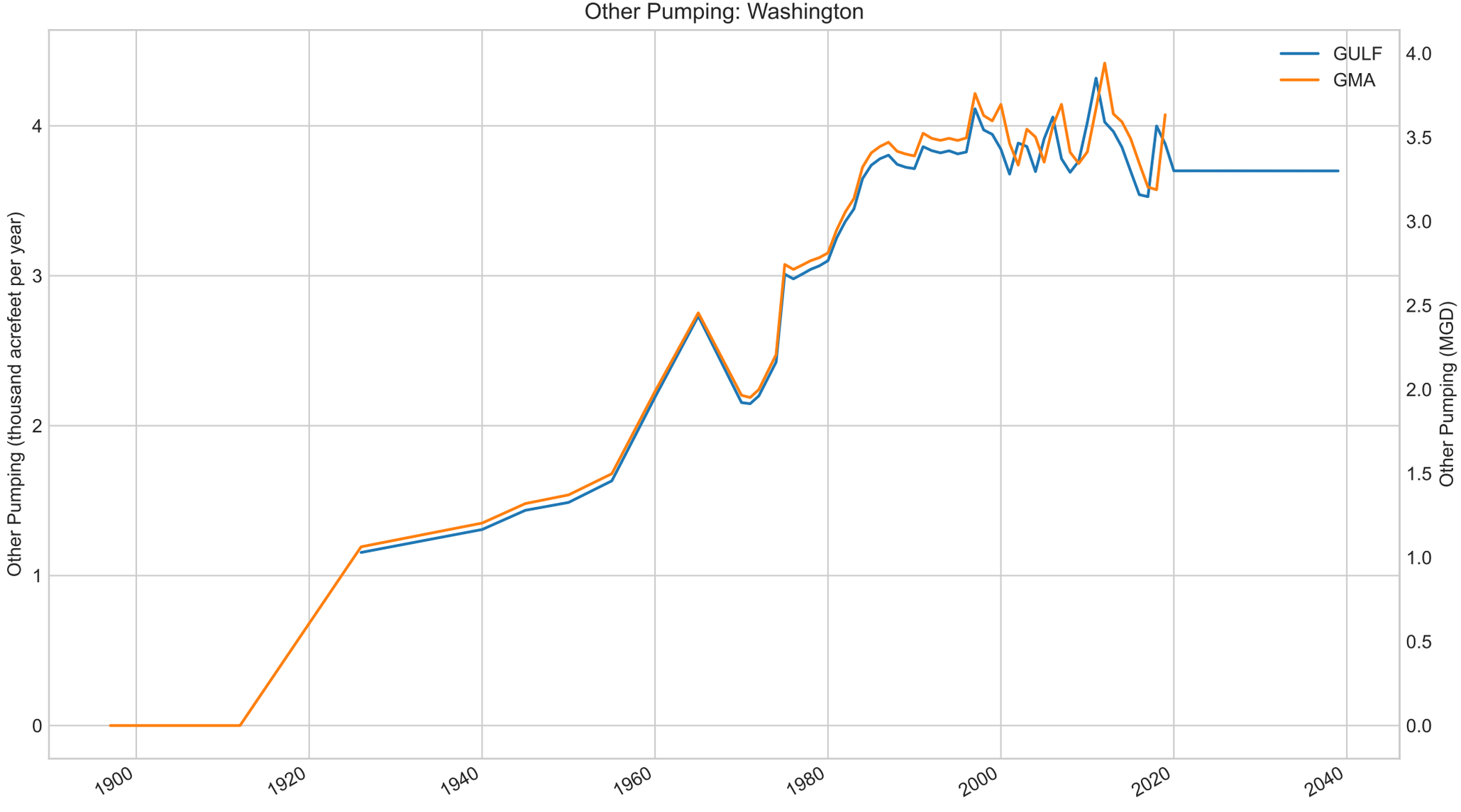

Other Pumping: San_jacinto
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1900
1920
1940
1960
1980
2000
2020
2040

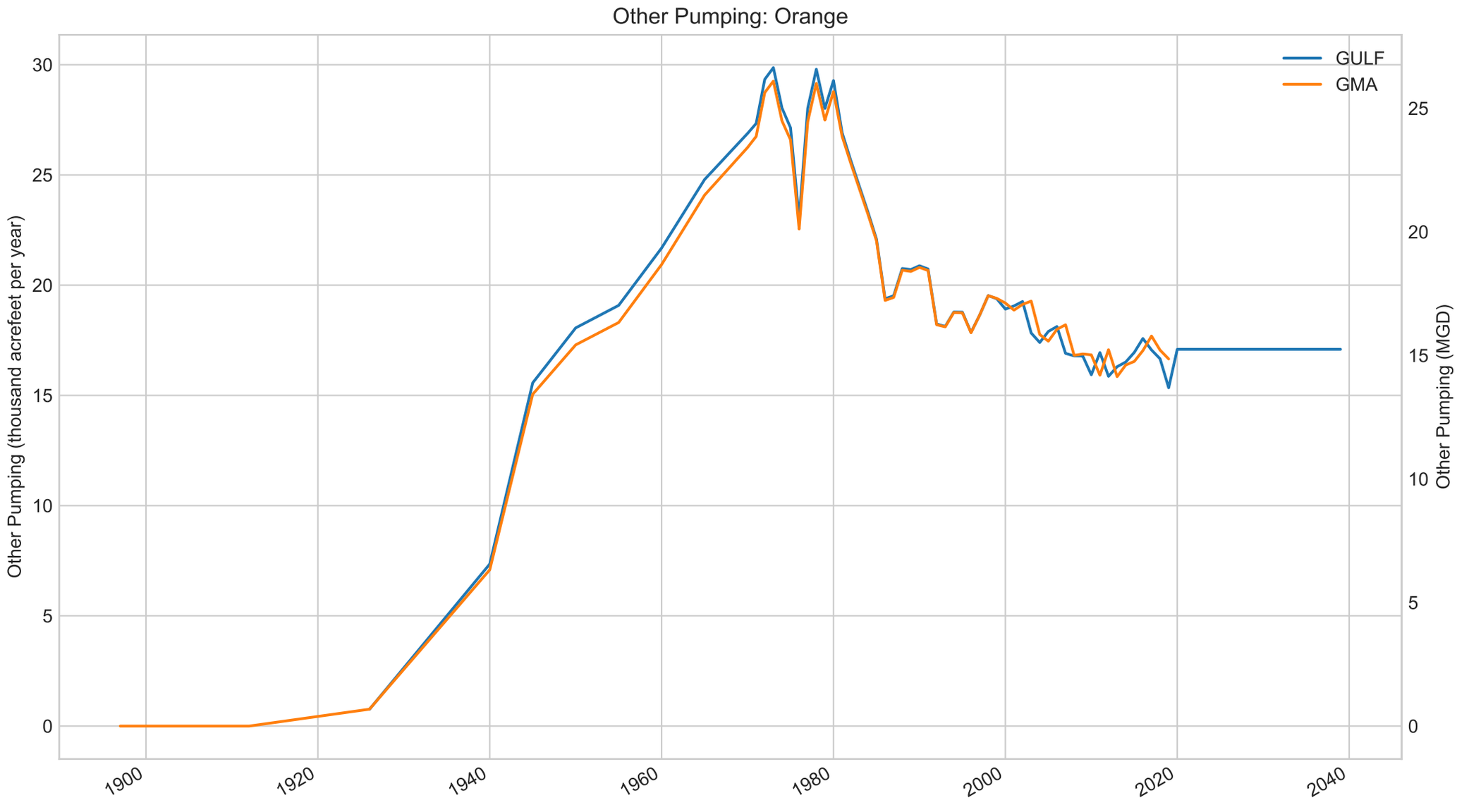

Other Pumping: Grimes
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

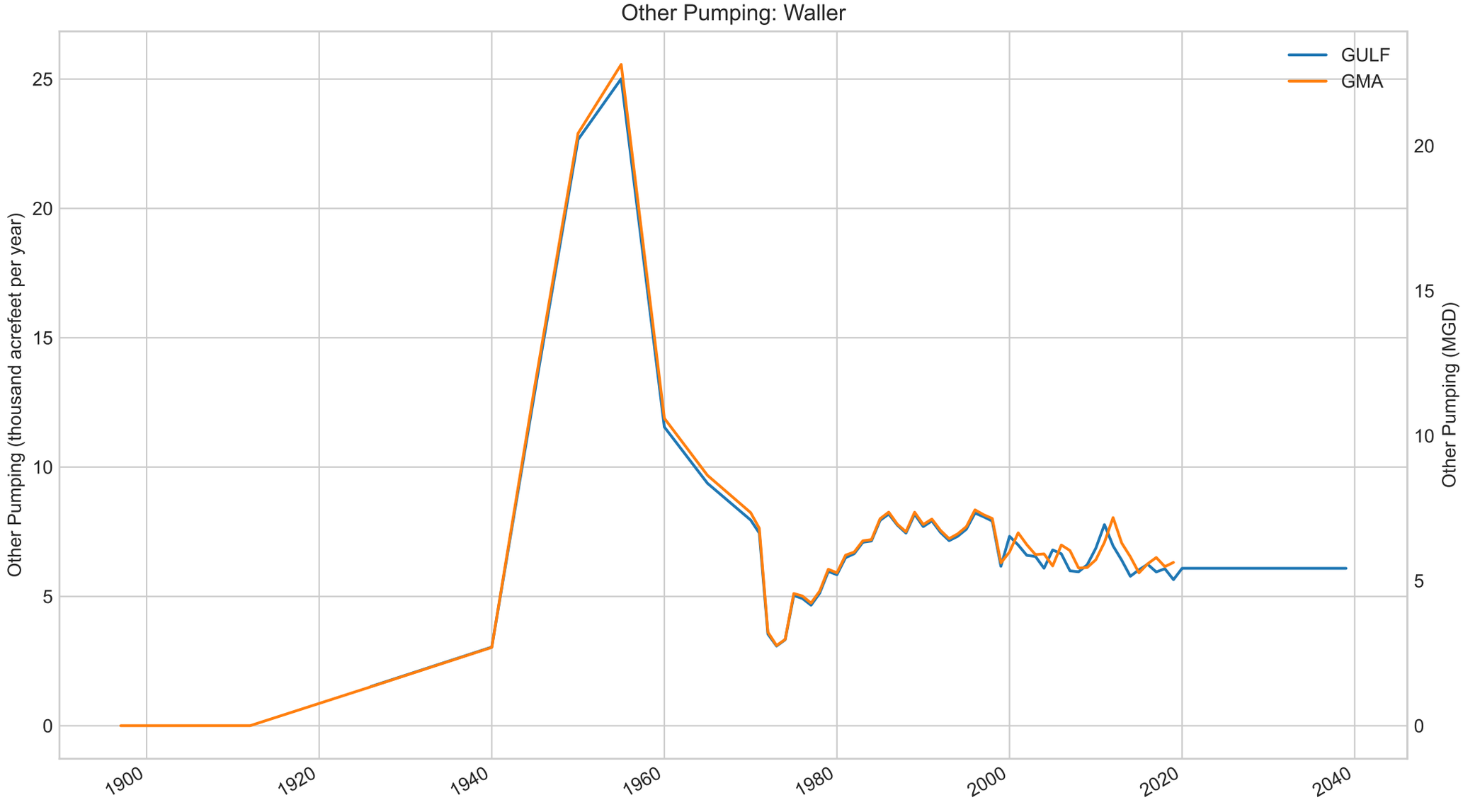

Other Pumping: Montgomery
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
20
40
60
80
0
10
20
30
40
50
60
70
80
1900
1920
1940
1960
1980
2000
2020
2040

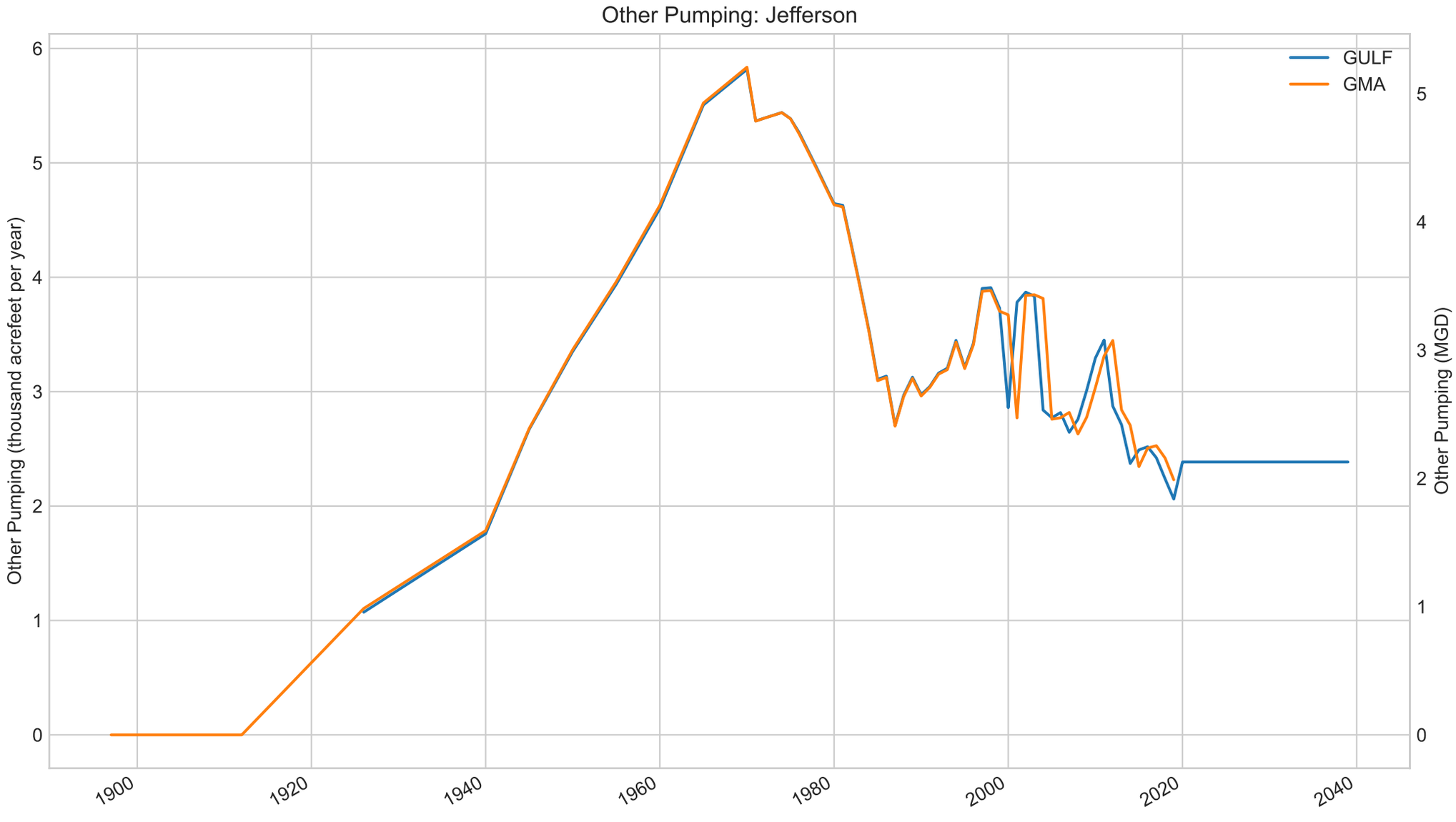

Other Pumping: Hardin
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
10
12
14
16
1900
1920
1940
1960
1980
2000
2020
2040

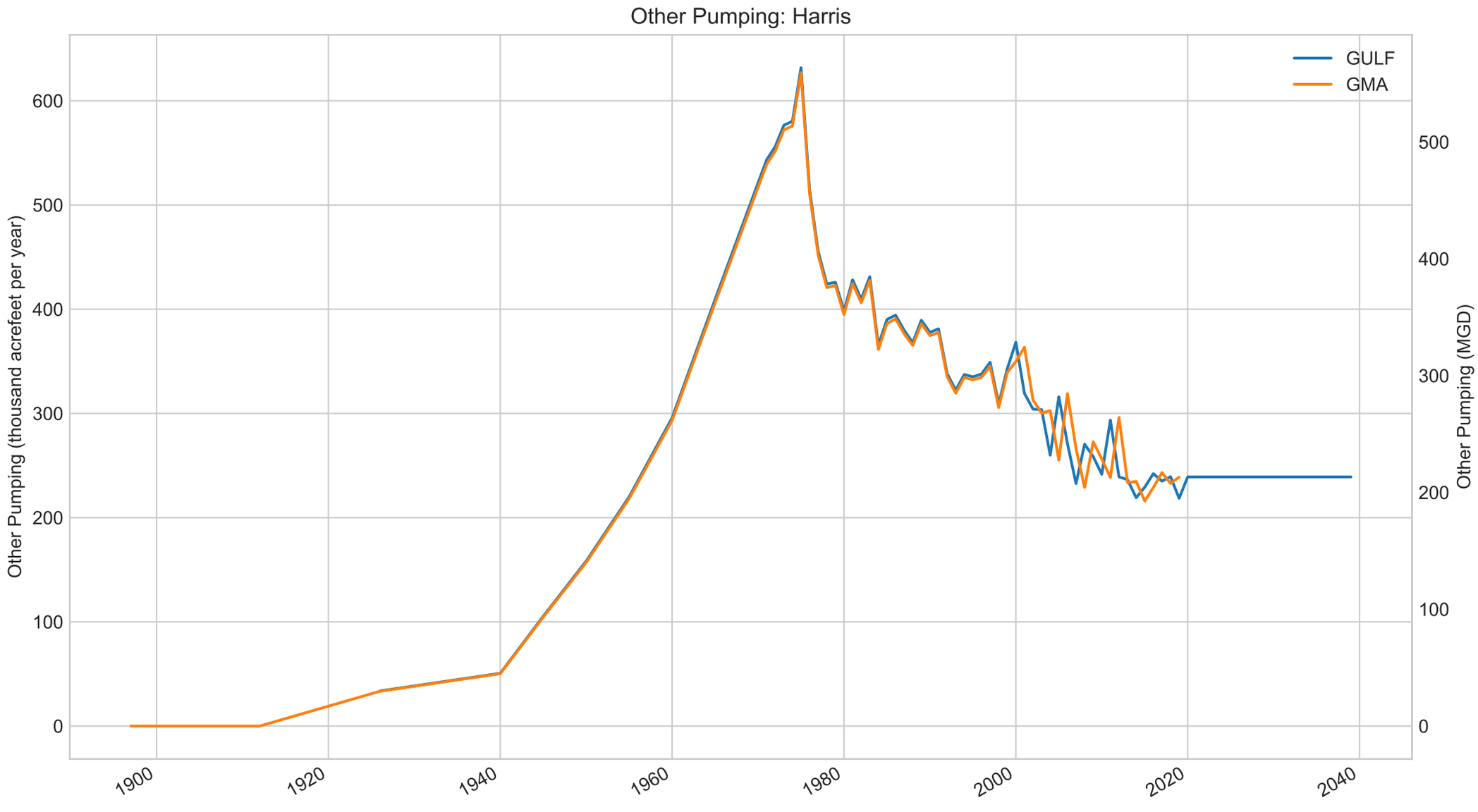

Other Pumping: Liberty
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
35
1900
1920
1940
1960
1980
2000
2020
2040

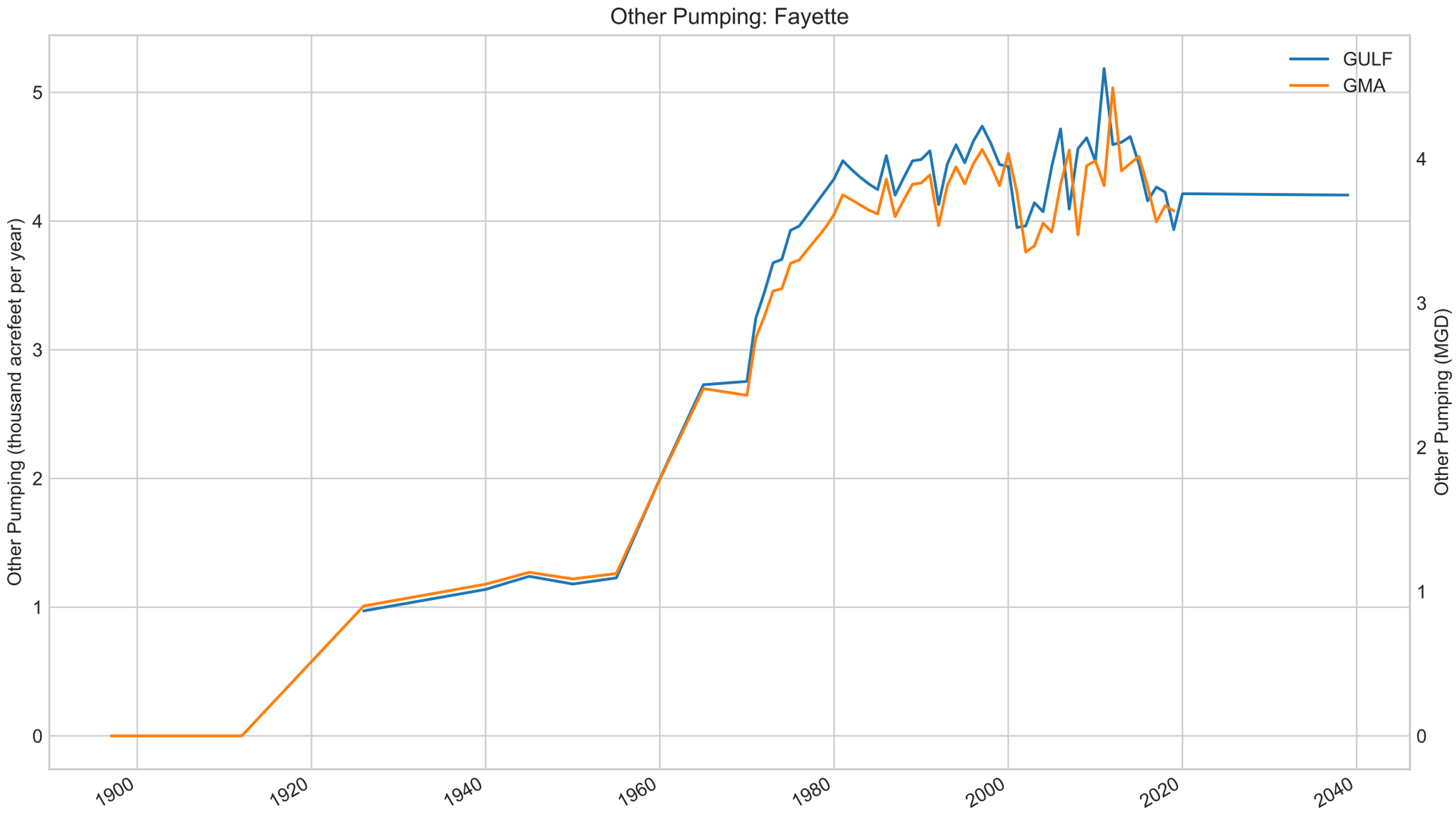

Other Pumping: Washington
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
1900
1920
1940
1960
1980
2000
2020
2040

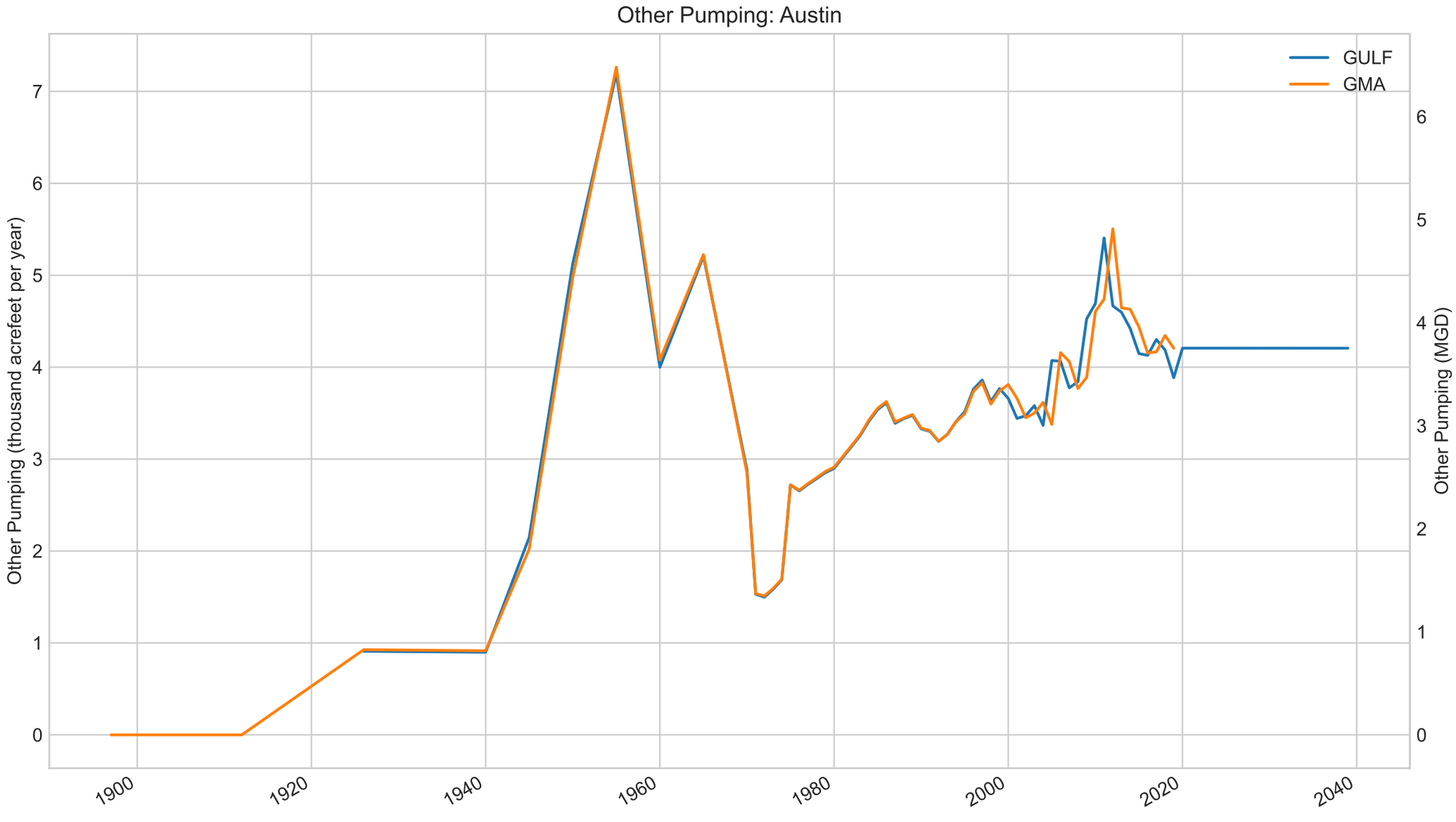

Other Pumping: Orange
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

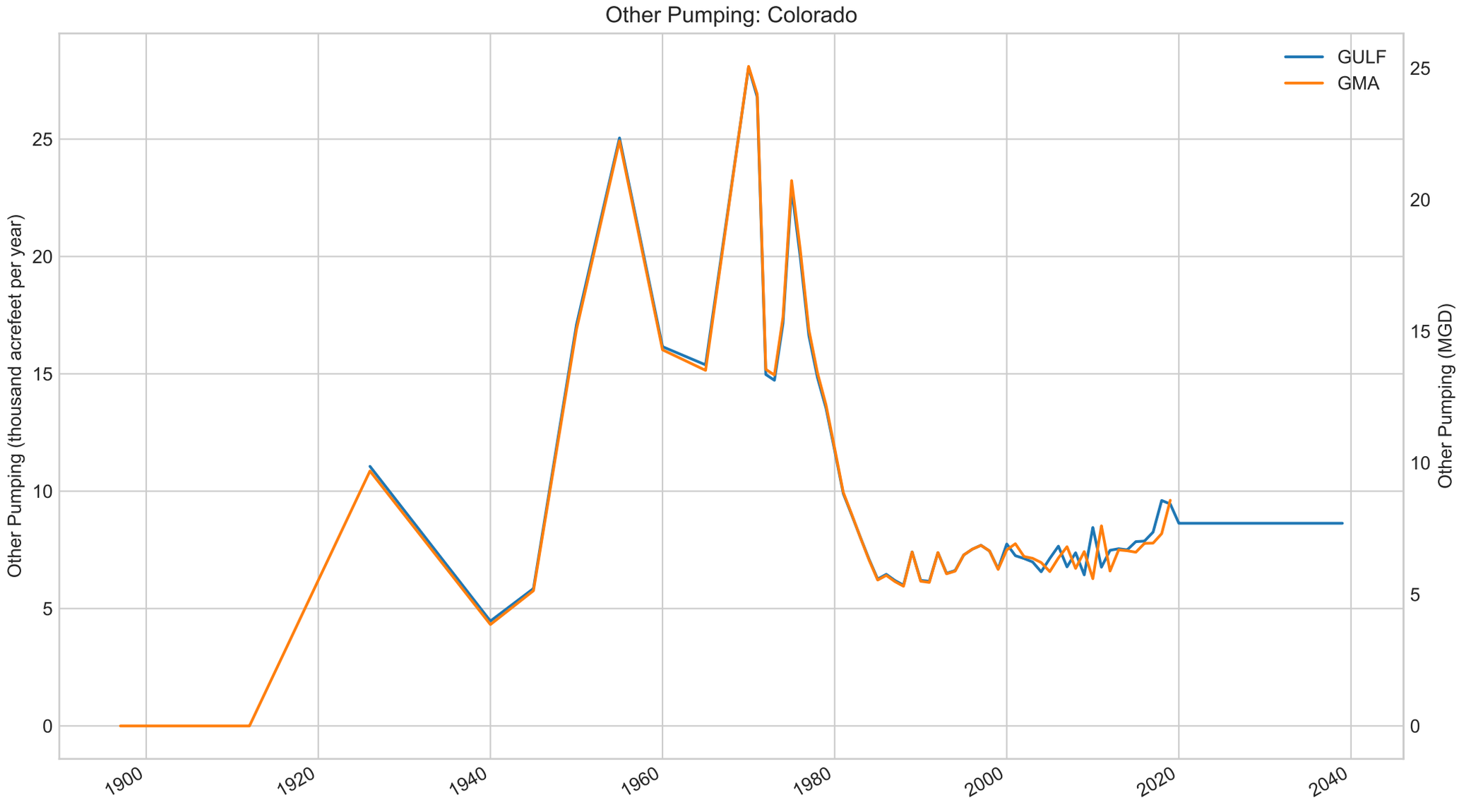

Other Pumping: Waller
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
0
5
10
15
20
1900
1920
1940
1960
1980
2000
2020
2040

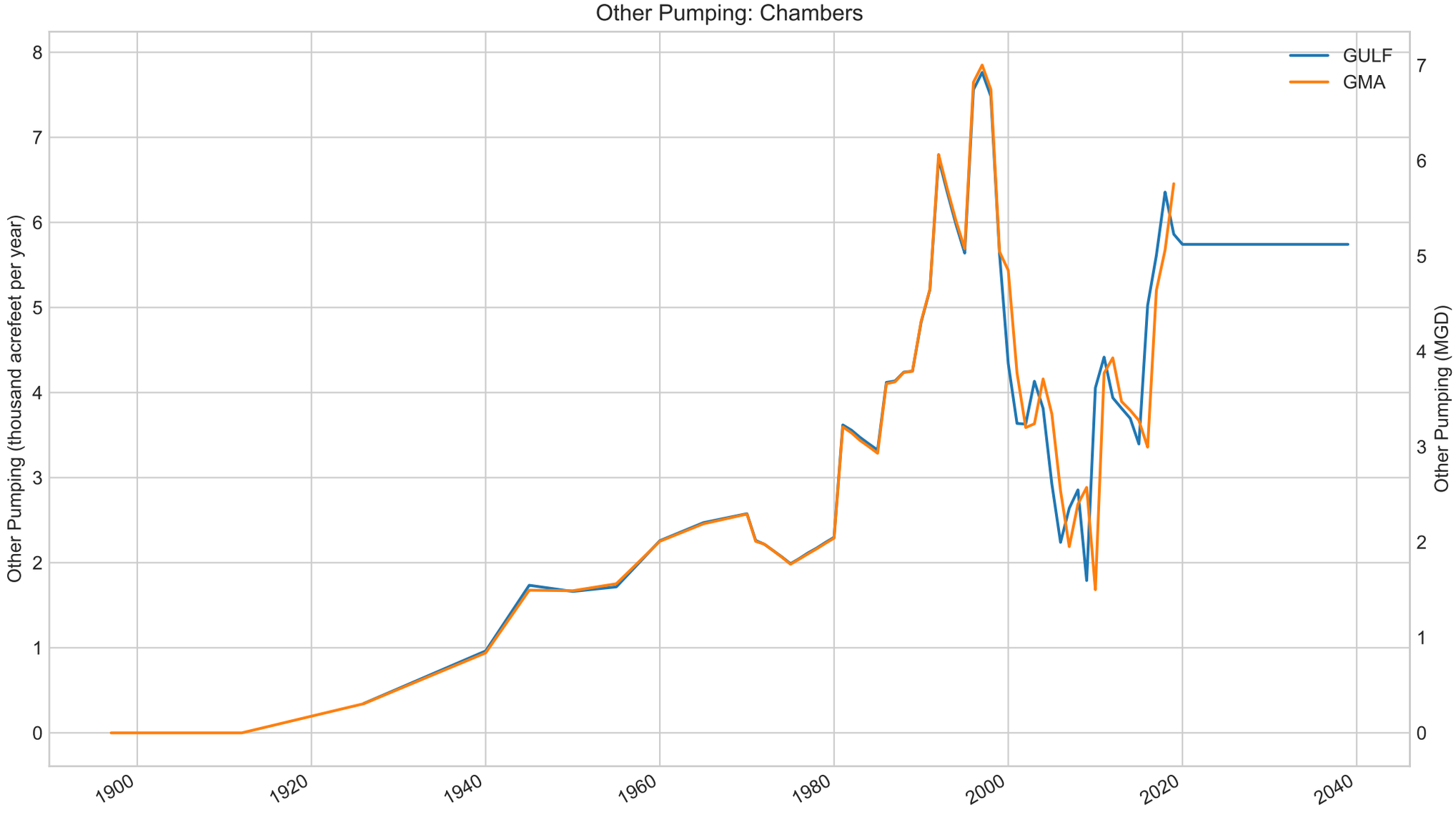

Other Pumping: Jefferson
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
1900
1920
1940
1960
1980
2000
2020
2040

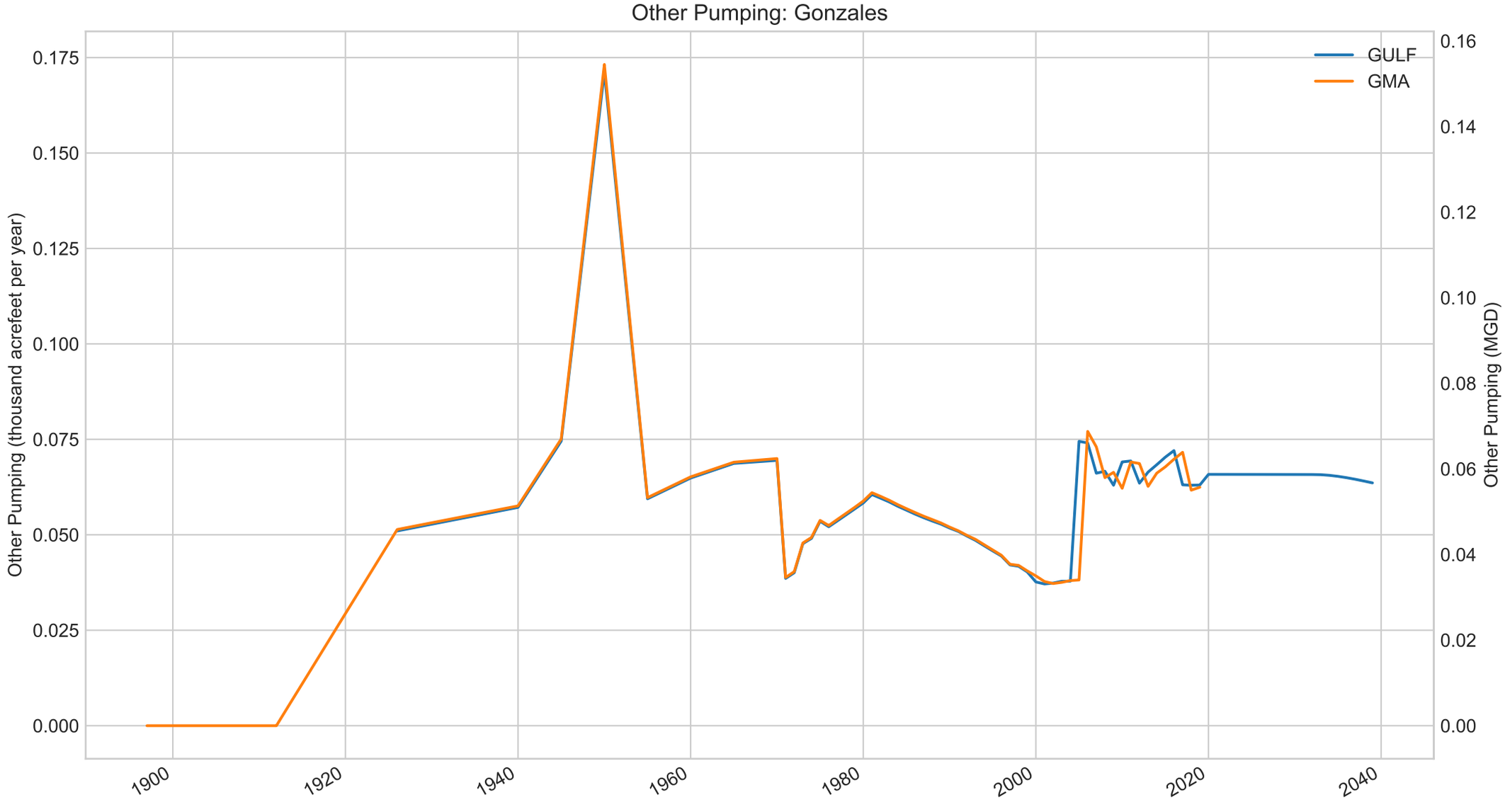

Other Pumping: Harris
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
100
200
300
400
500
600
1900
1920
1940
1960
1980
2000
2020
2040

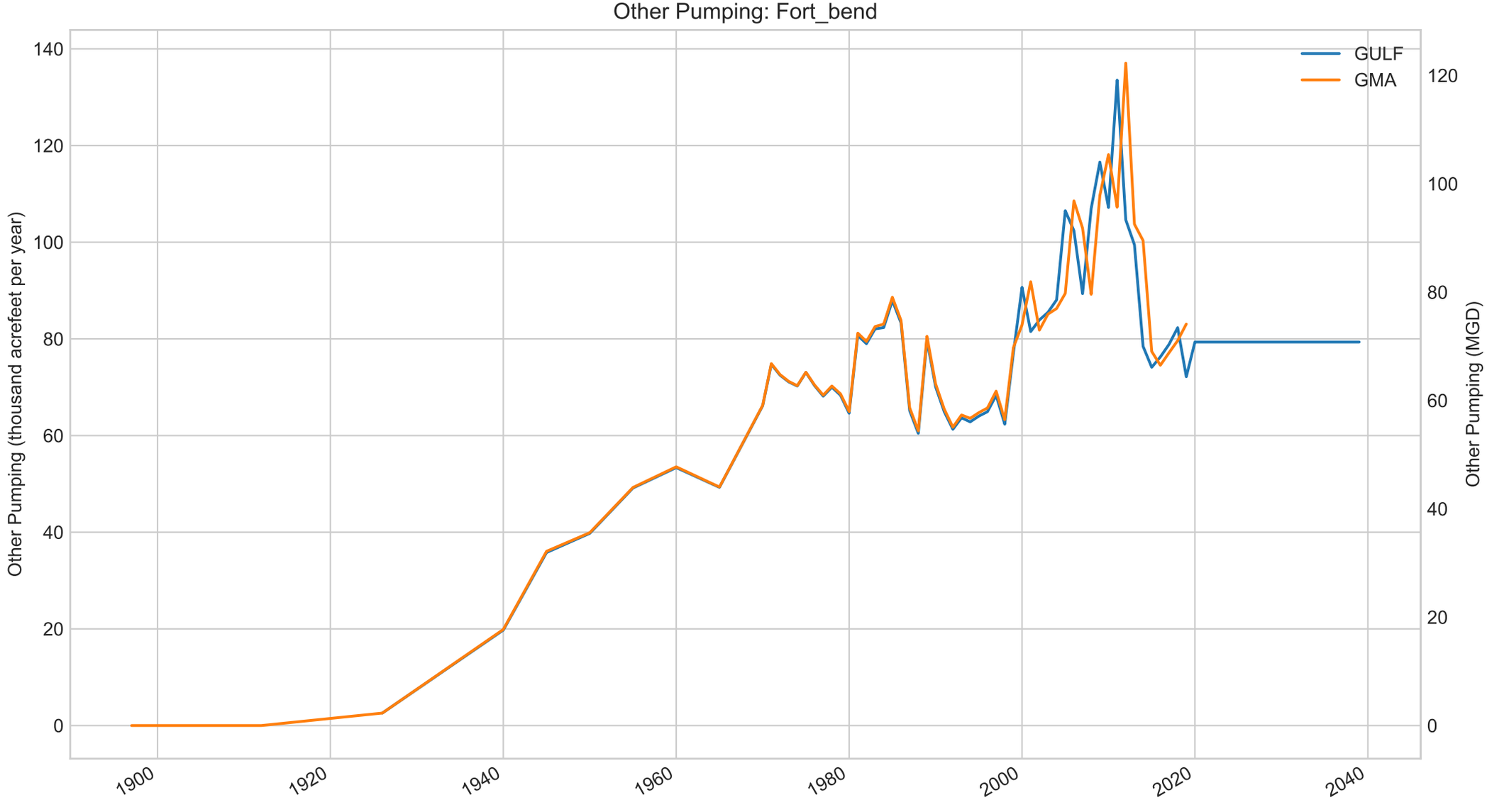

Other Pumping: Fayette
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

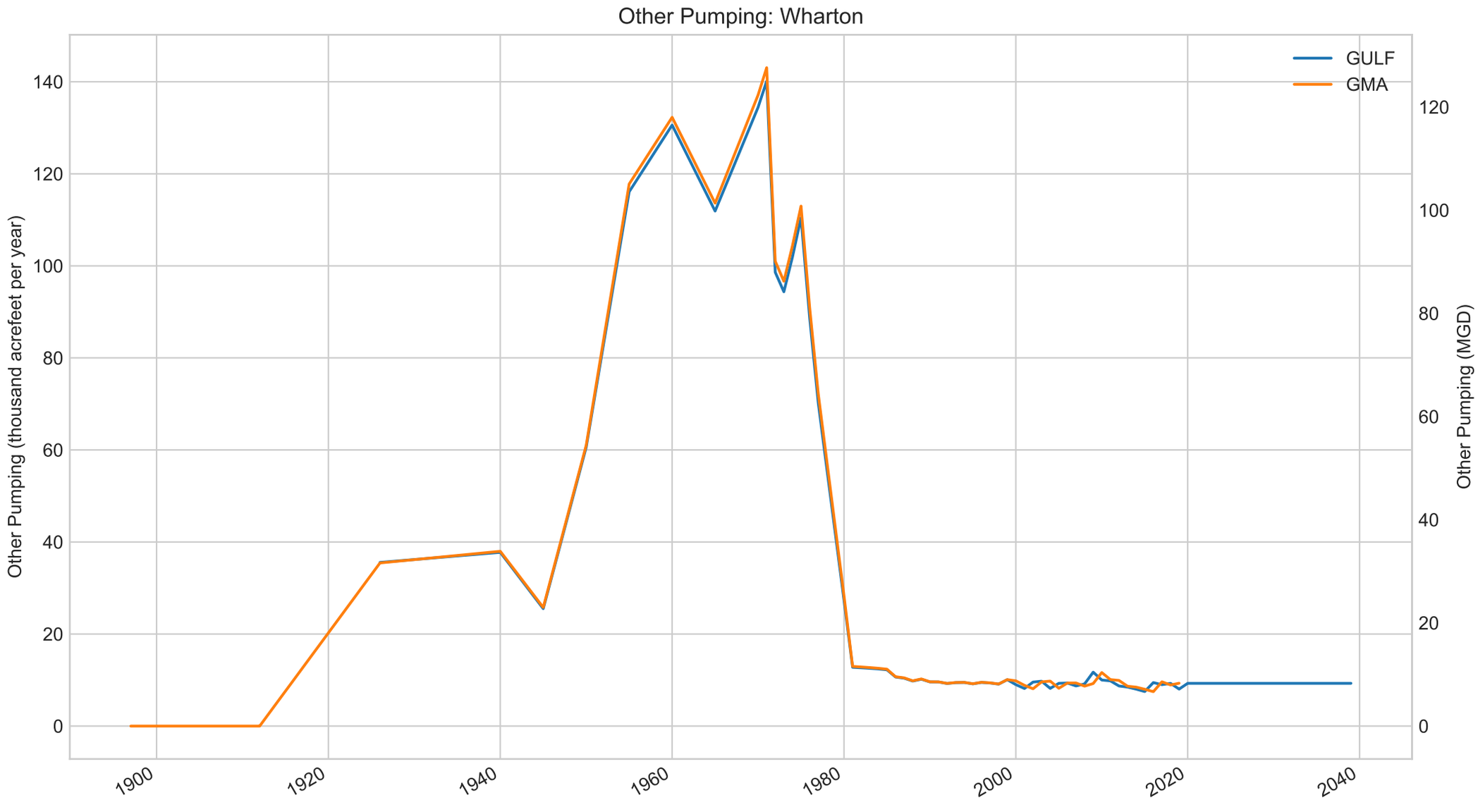

Other Pumping: Austin
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
7
1900
1920
1940
1960
1980
2000
2020
2040

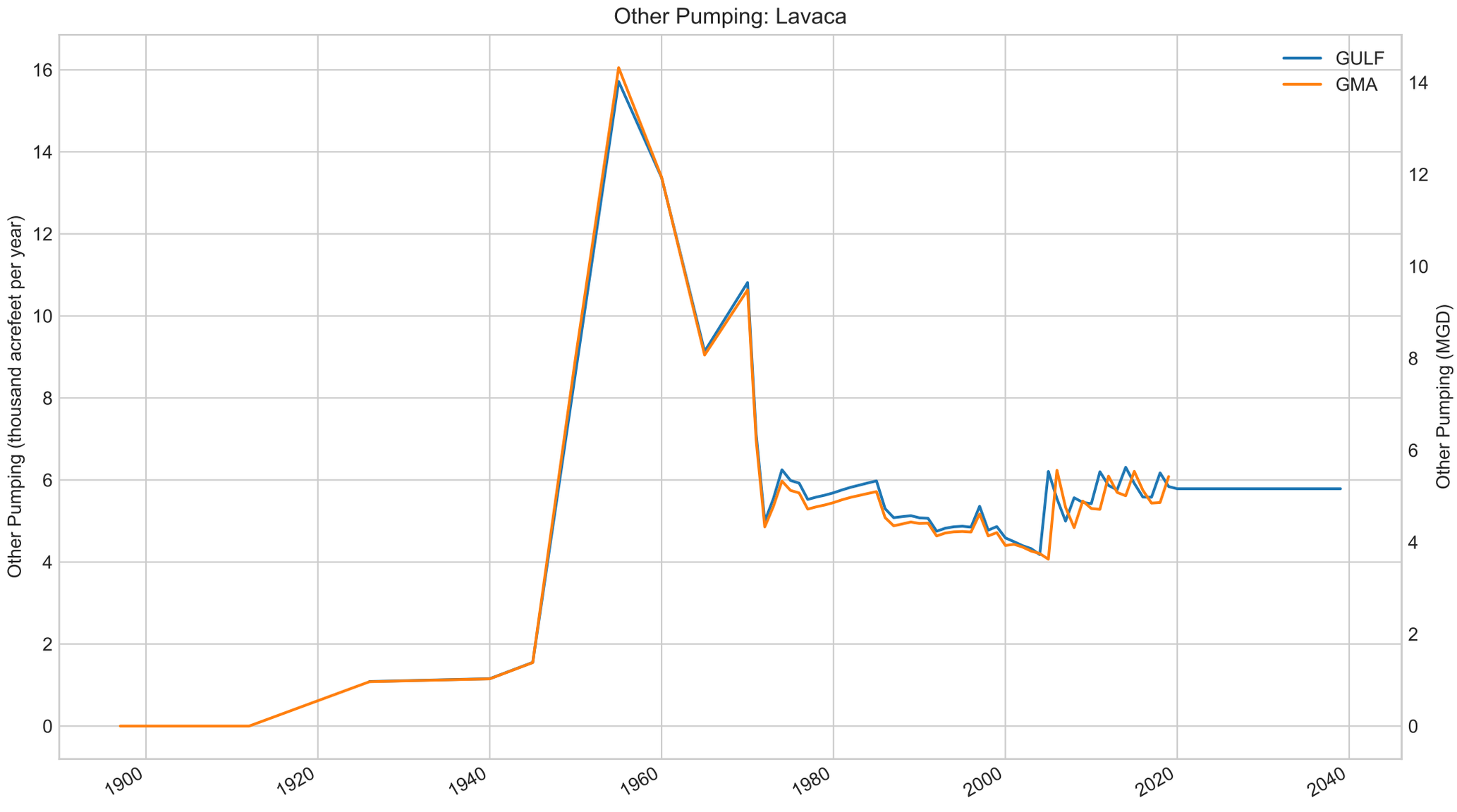

Other Pumping: Colorado
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
1900
1920
1940
1960
1980
2000
2020
2040

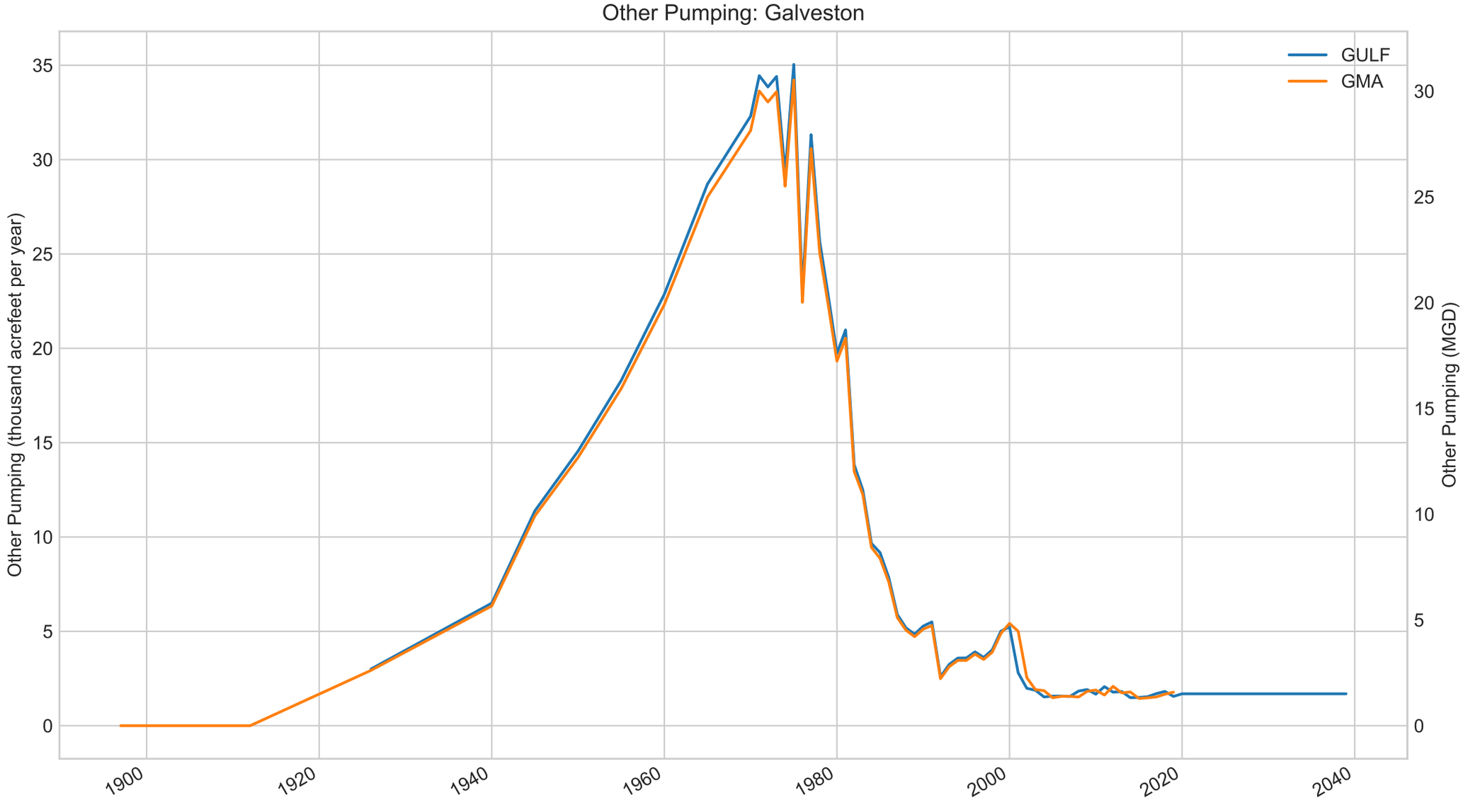

Other Pumping: Chambers
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
1
2
3
4
5
6
7
8
1900
1920
1940
1960
1980
2000
2020
2040

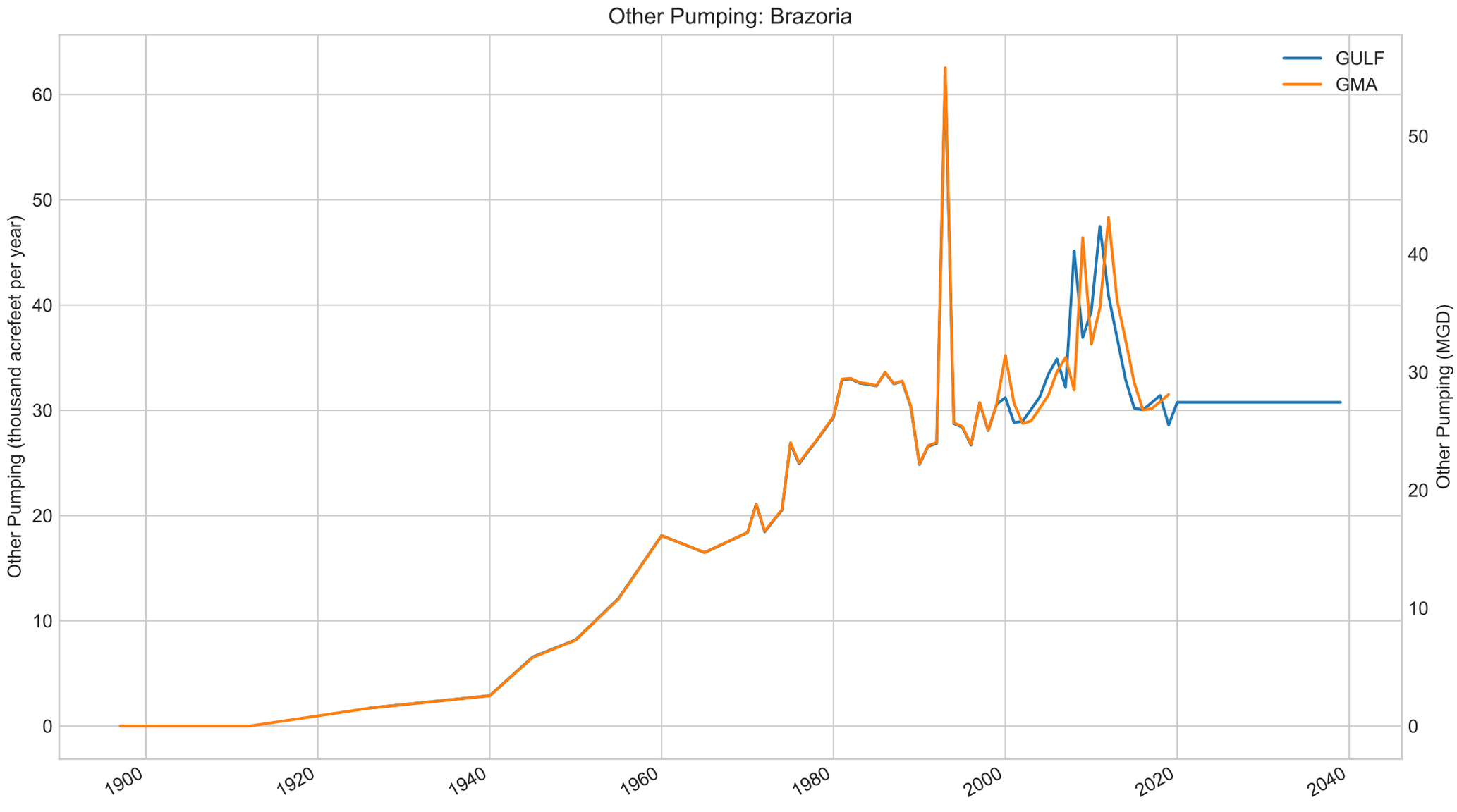

Other Pumping: Gonzales
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

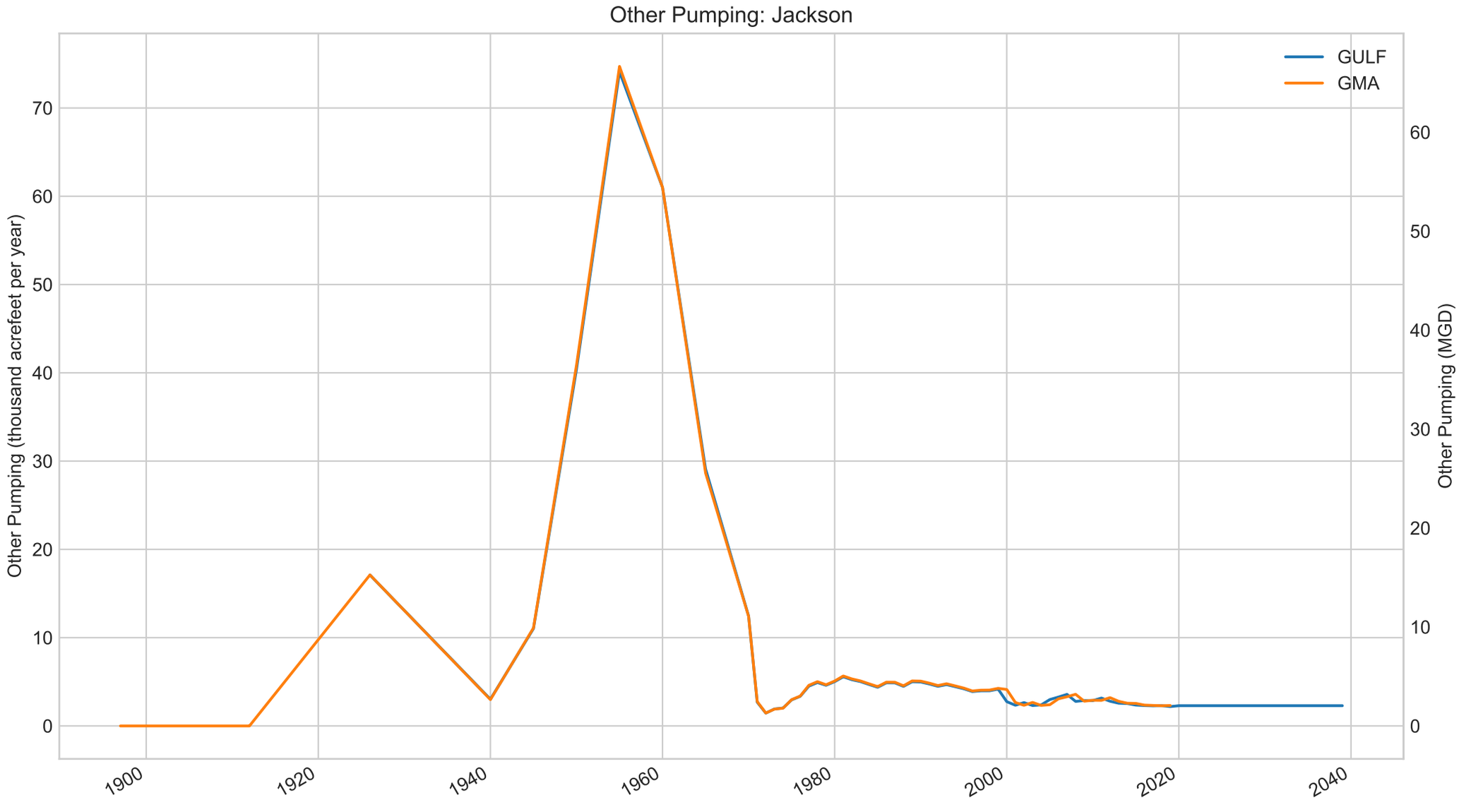

Other Pumping: Fort_bend
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
20
40
60
80
100
120
140
1900
1920
1940
1960
1980
2000
2020
2040

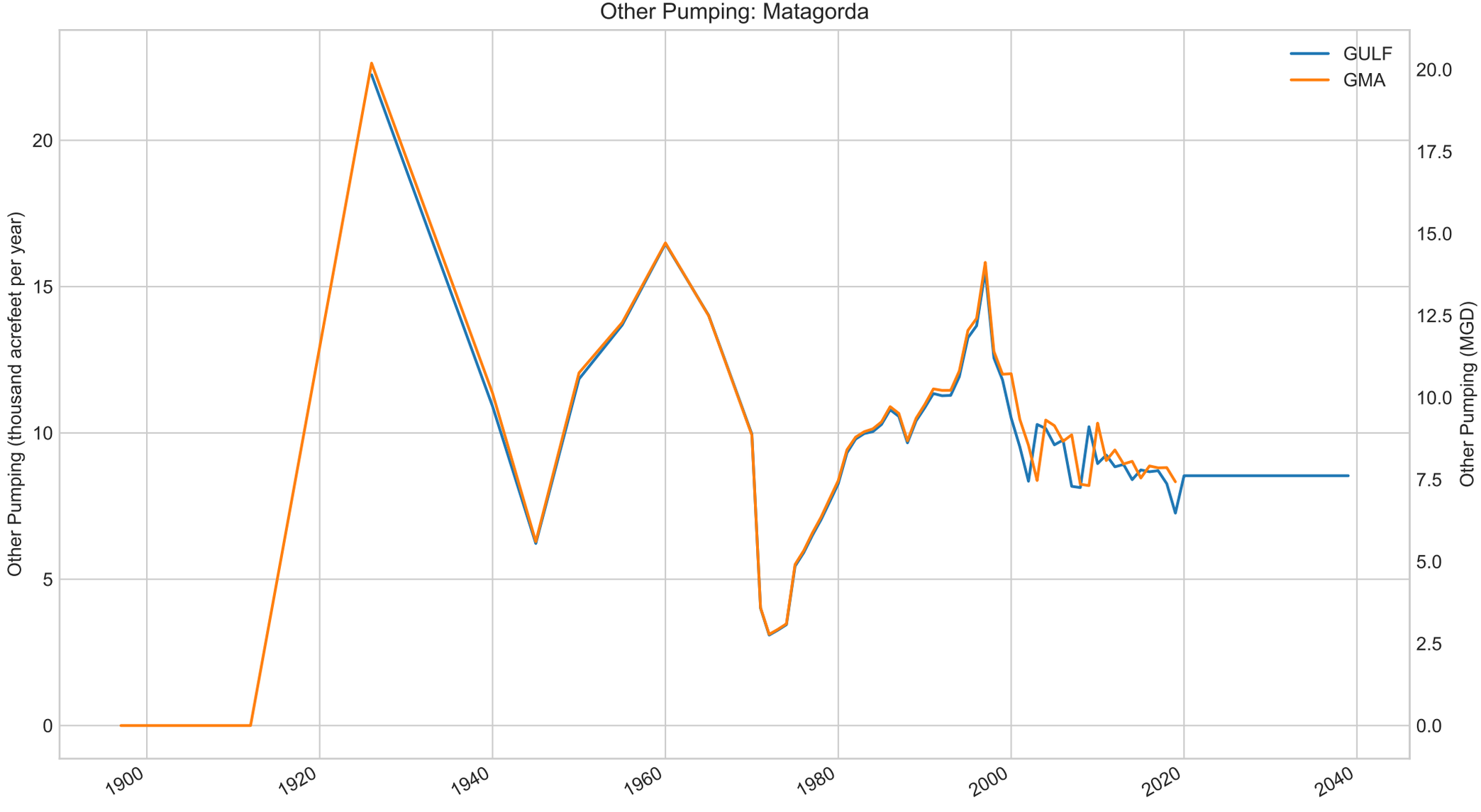

Other Pumping: Wharton
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
20
40
60
80
100
120
140
1900
1920
1940
1960
1980
2000
2020
2040

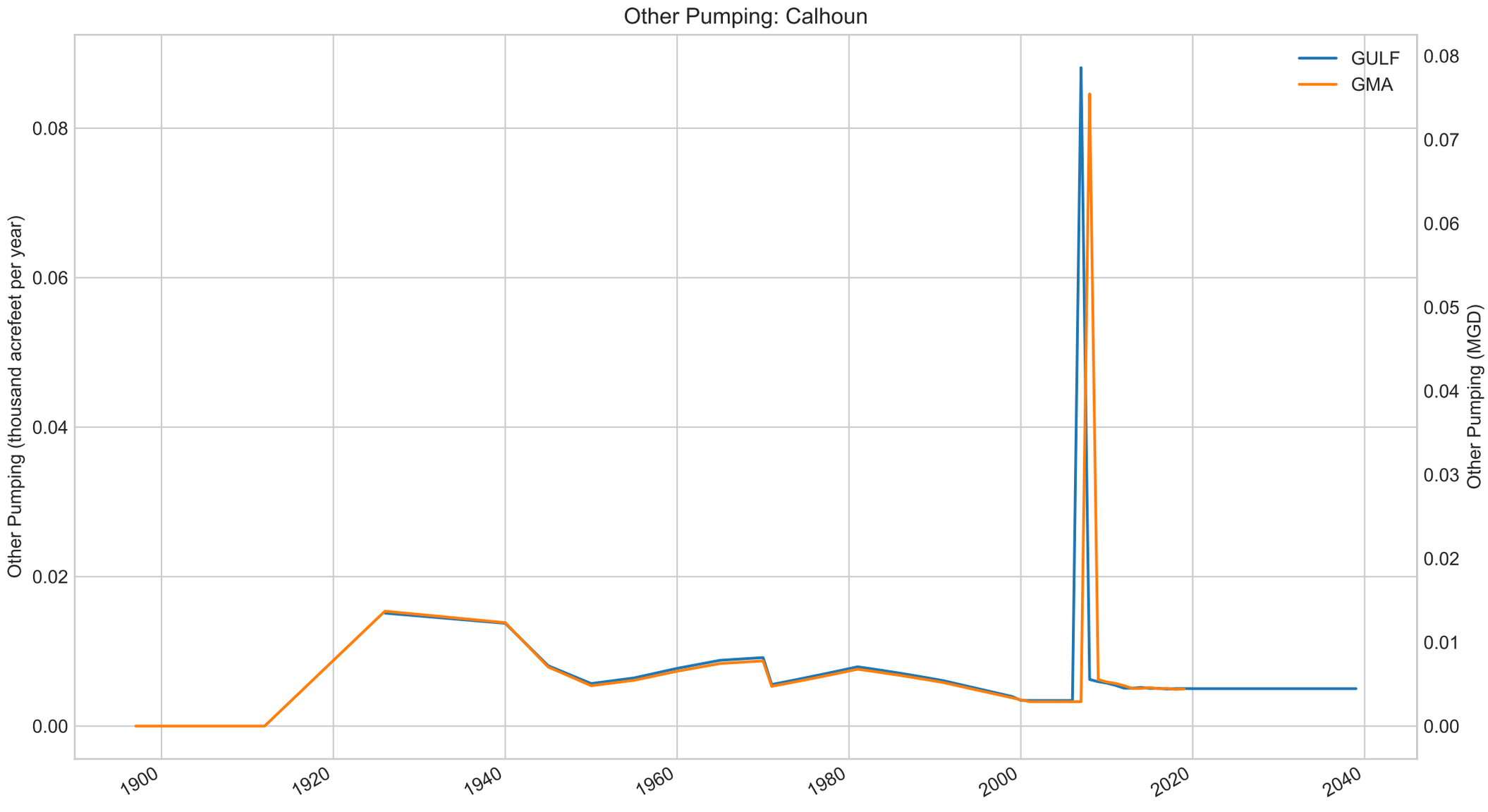

Other Pumping: Lavaca
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
10
12
14
16
0
2
4
6
8
10
12
14
1900
1920
1940
1960
1980
2000
2020
2040

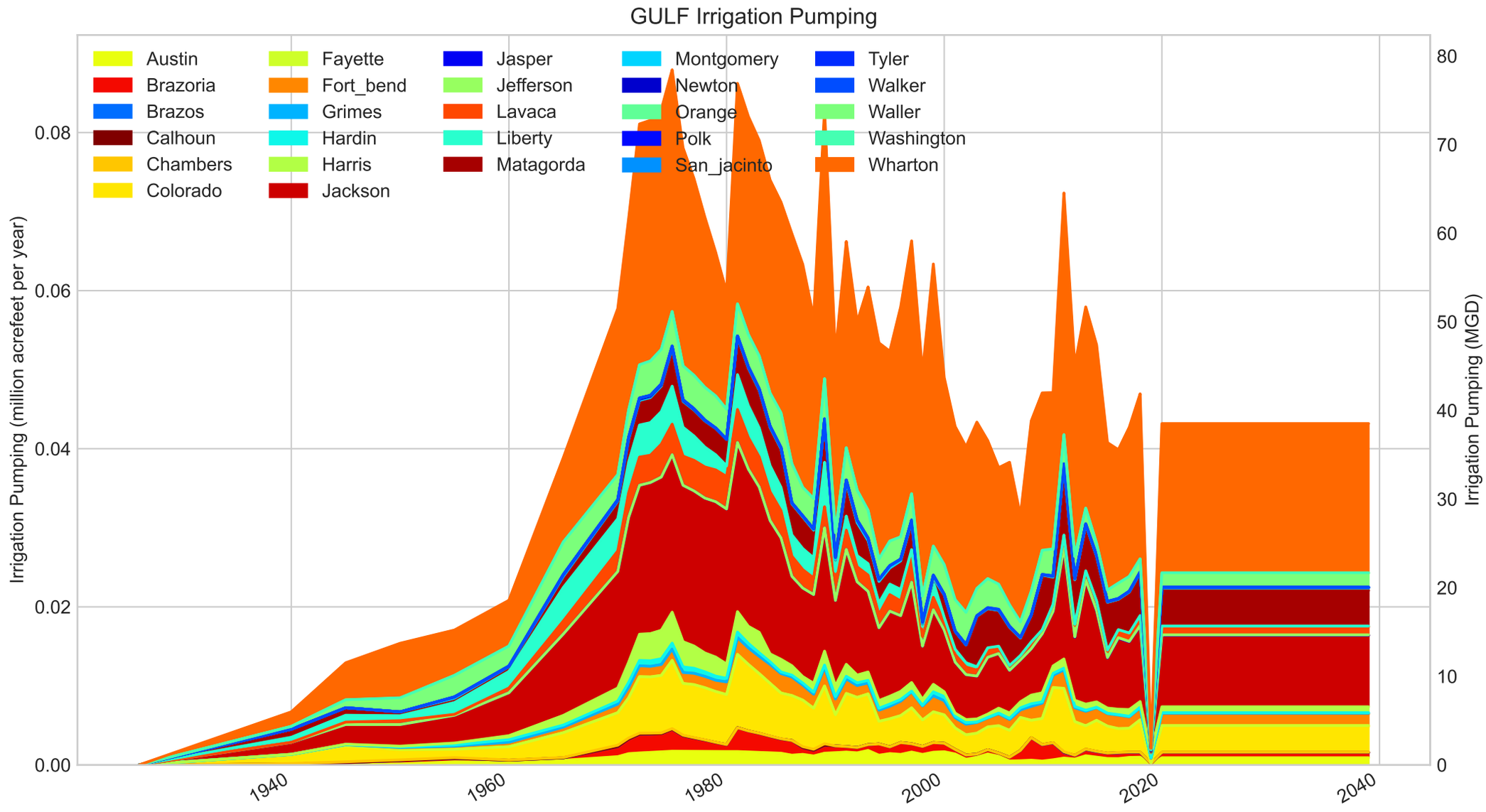

Other Pumping: Galveston
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
35
1900
1920
1940
1960
1980
2000
2020
2040

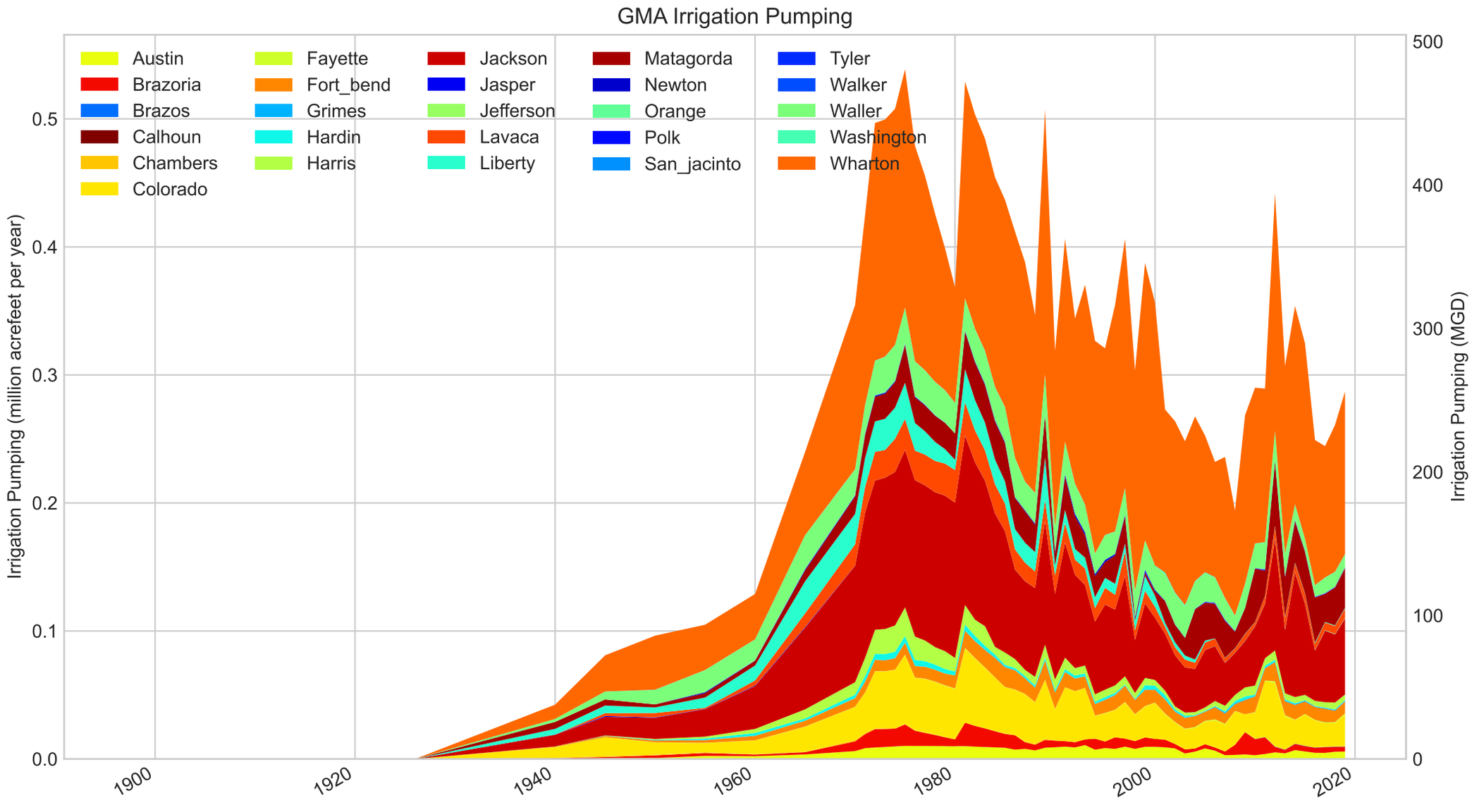

Other Pumping: Brazoria
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
60
1900
1920
1940
1960
1980
2000
2020
2040

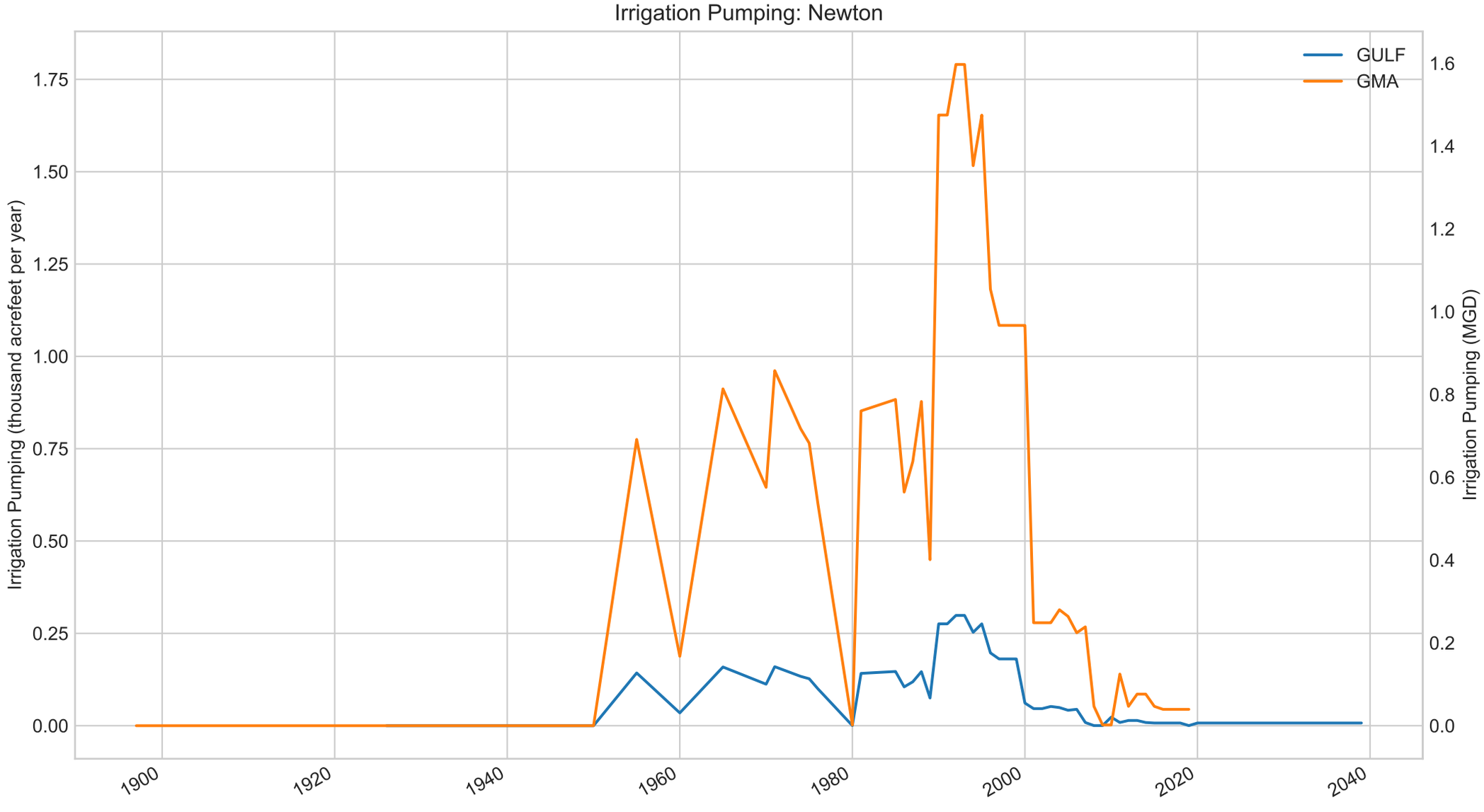

Other Pumping: Jackson
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
60
70
1900
1920
1940
1960
1980
2000
2020
2040

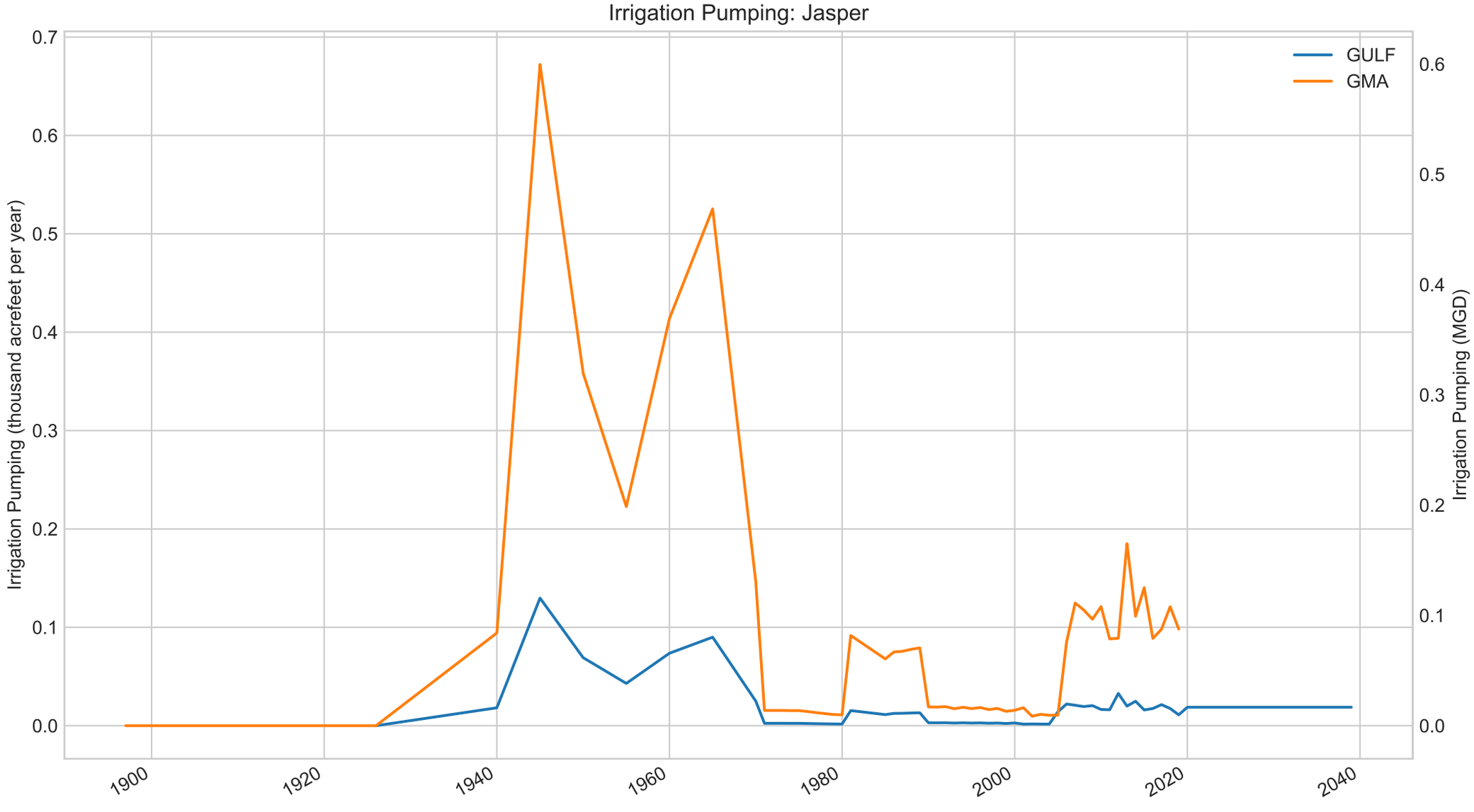

Other Pumping: Matagorda
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
1900
1920
1940
1960
1980
2000
2020
2040

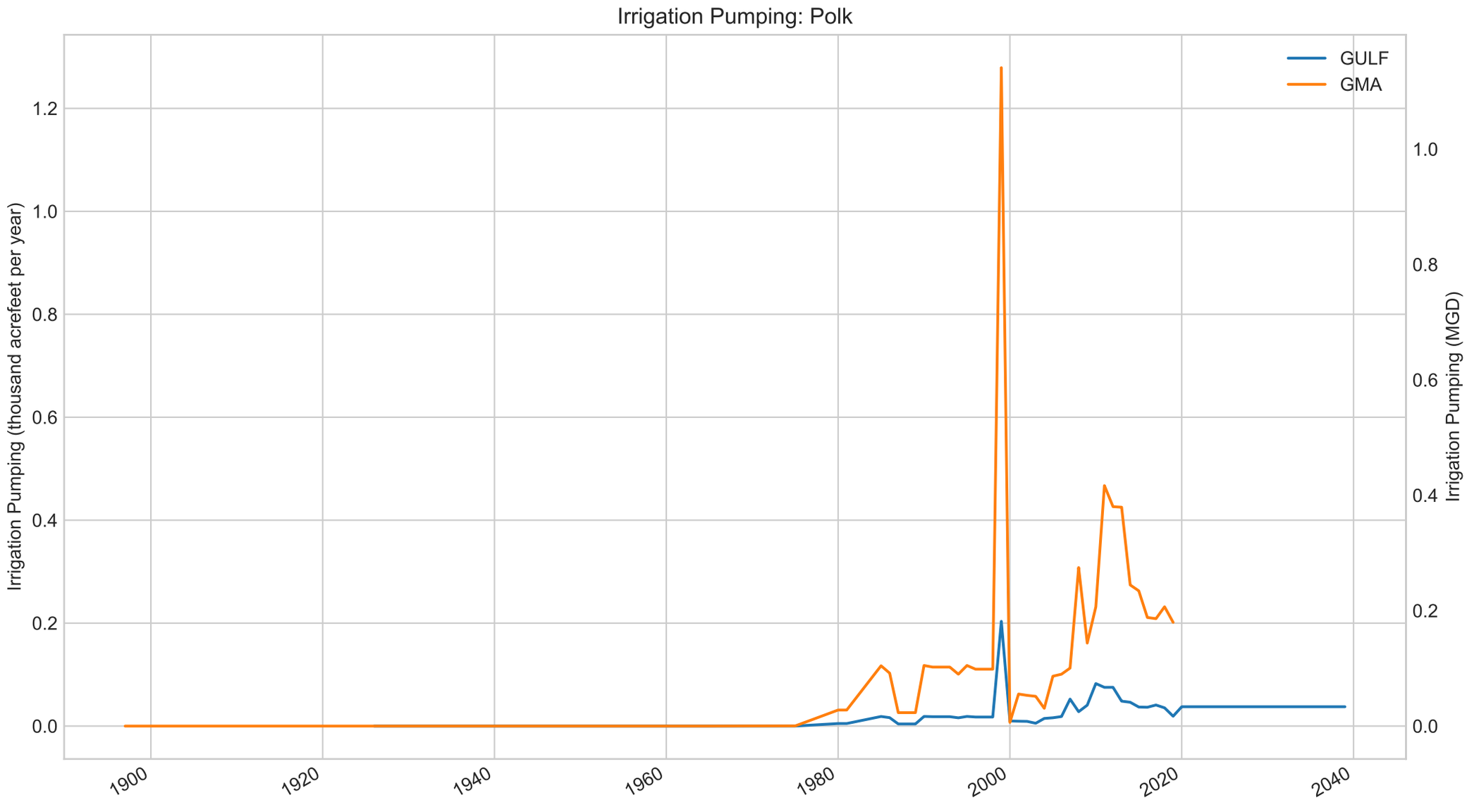

Other Pumping: Calhoun
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.01
0.03
0.05
0.07
1900
1920
1940
1960
1980
2000
2020
2040

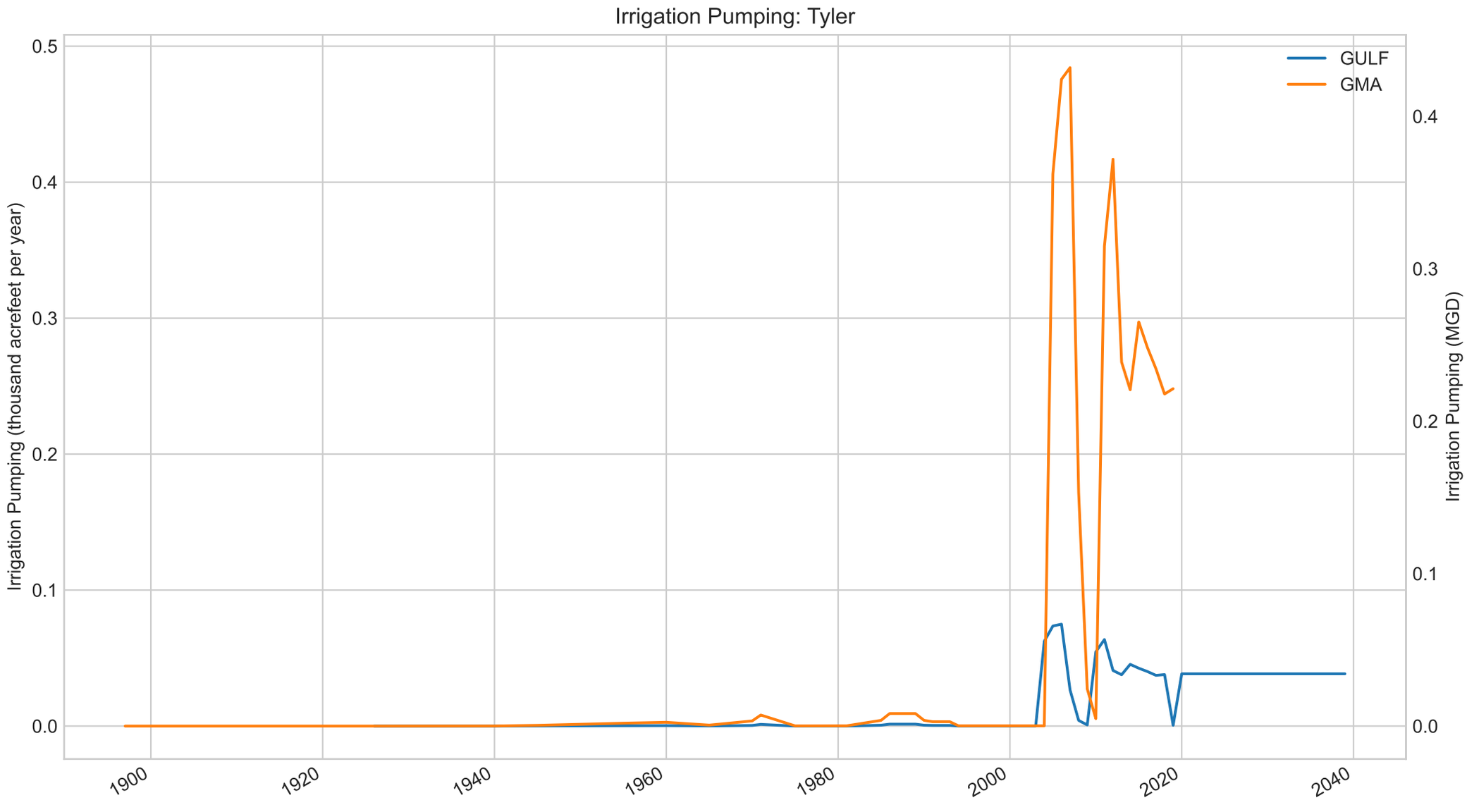

GULF Irrigation Pumping
Austin
Brazoria
Brazos
Calhoun
Chambers
Colorado
Fayette
Fort_bend
Grimes
Hardin
Harris
Jackson
Jasper
Jefferson
Lavaca
Liberty
Matagorda
Montgomery
Newton
Orange
Polk
San_jacinto
Tyler
Walker
Waller
Washington
Wharton
Irrigation Pumping (million acrefeet per year)
0.00
0.02
0.04
0.06
0.08
Irrigation Pumping (MGD)
0
10
20
30
40
50
60
70
80
1940
1960
1980
2000
2020
2040

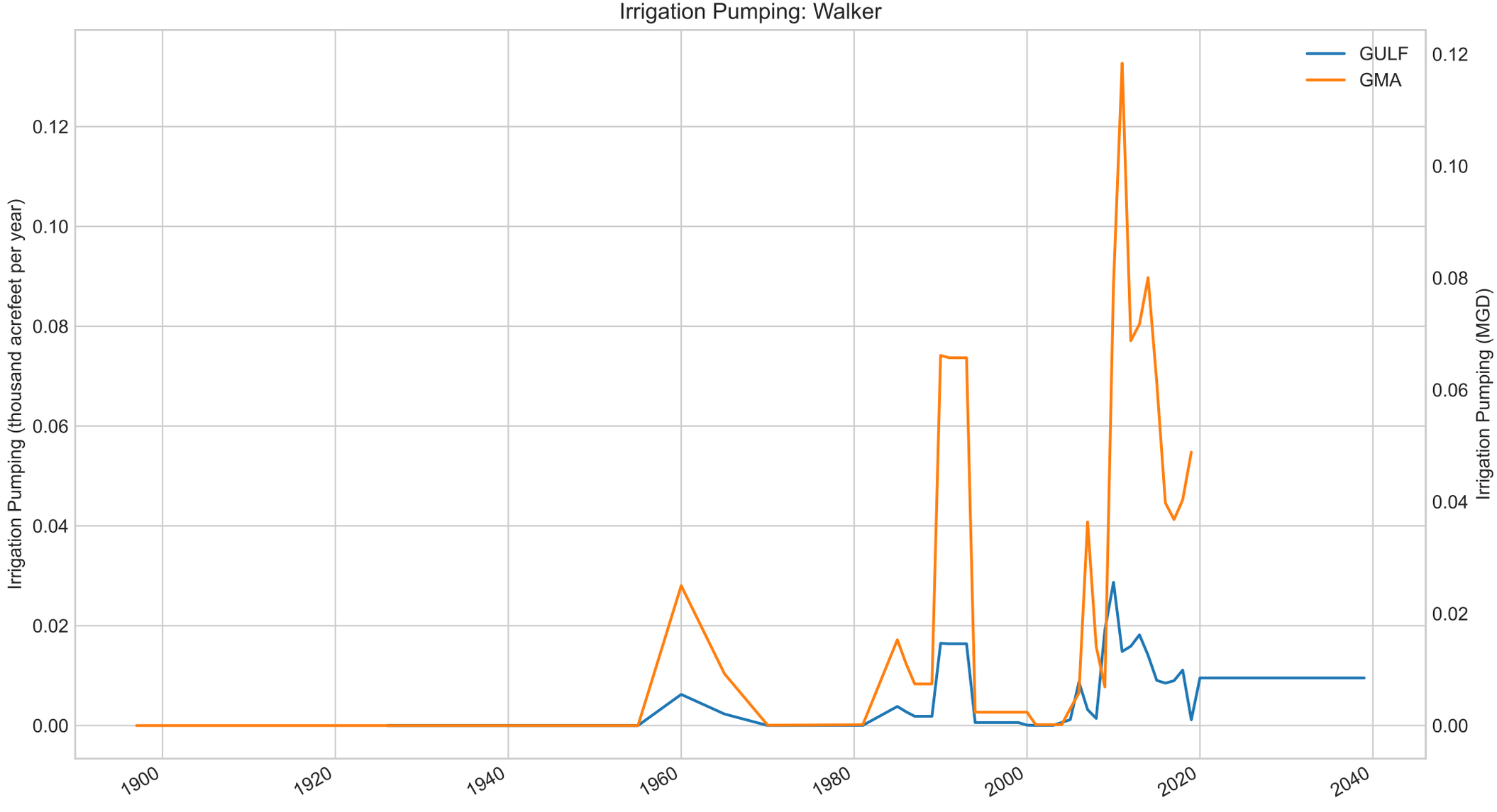

GMA Irrigation Pumping
Austin
Brazoria
Brazos
Calhoun
Chambers
Colorado
Fayette
Fort_bend
Grimes
Hardin
Harris
Jackson
Jasper
Jefferson
Lavaca
Liberty
Matagorda
Newton
Orange
Polk
San_jacinto
Tyler
Walker
Waller
Washington
Wharton
Irrigation Pumping (million acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0
100
200
300
400
500
1900
1920
1940
1960
1980
2000
2020

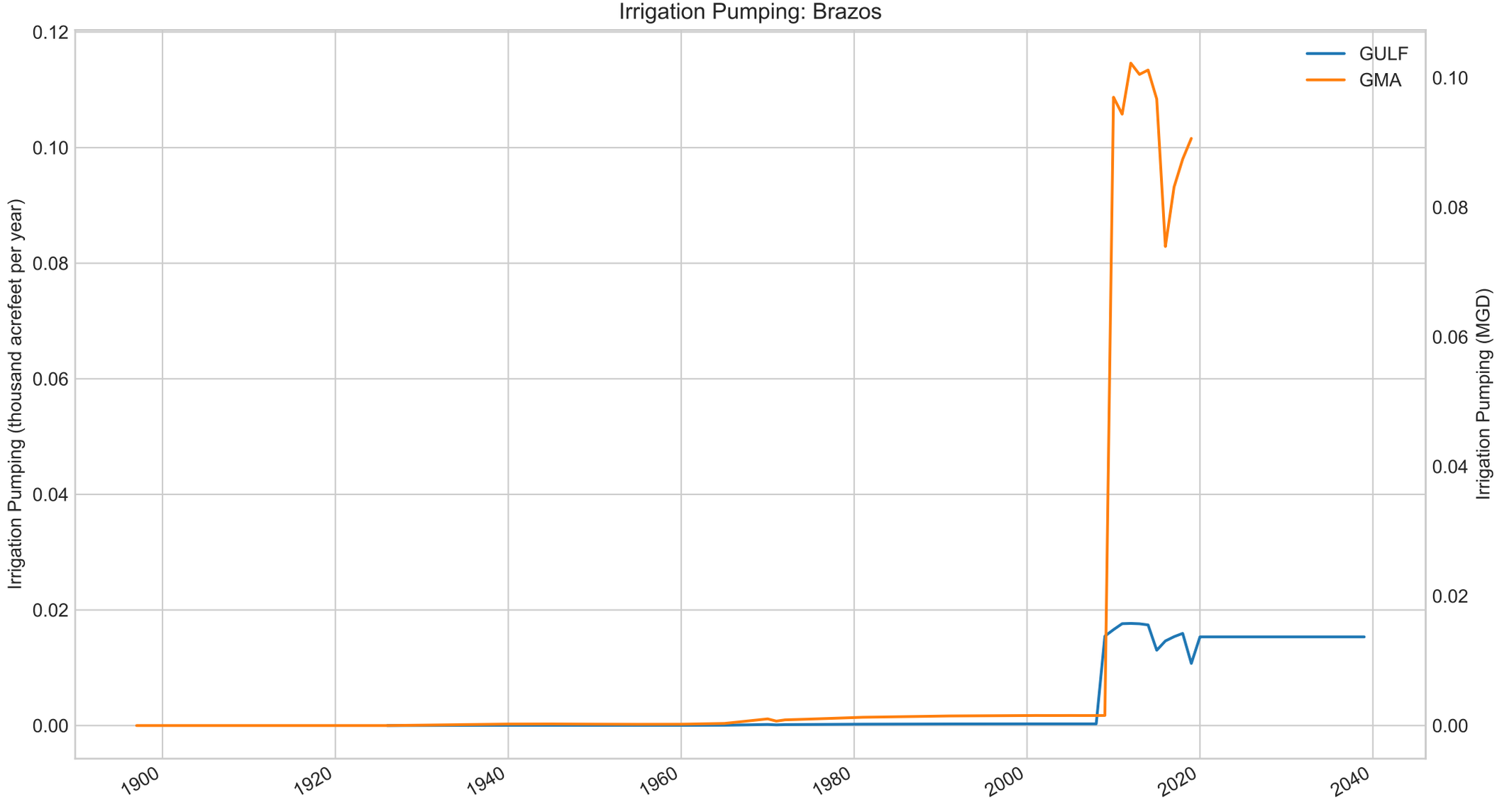

Irrigation Pumping: Newton
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1900
1920
1940
1960
1980
2000
2020
2040

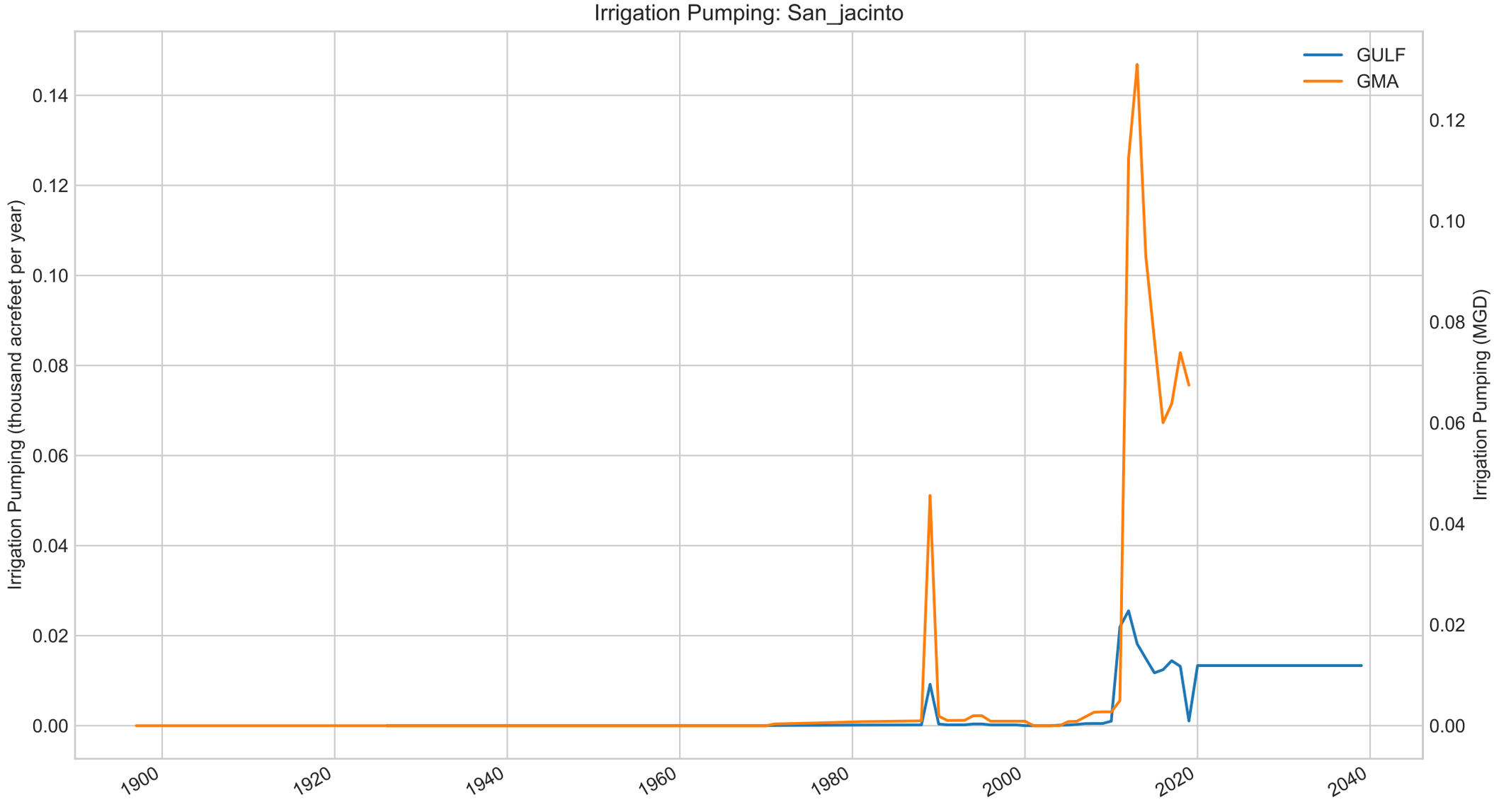

Irrigation Pumping: Jasper
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1900
1920
1940
1960
1980
2000
2020
2040

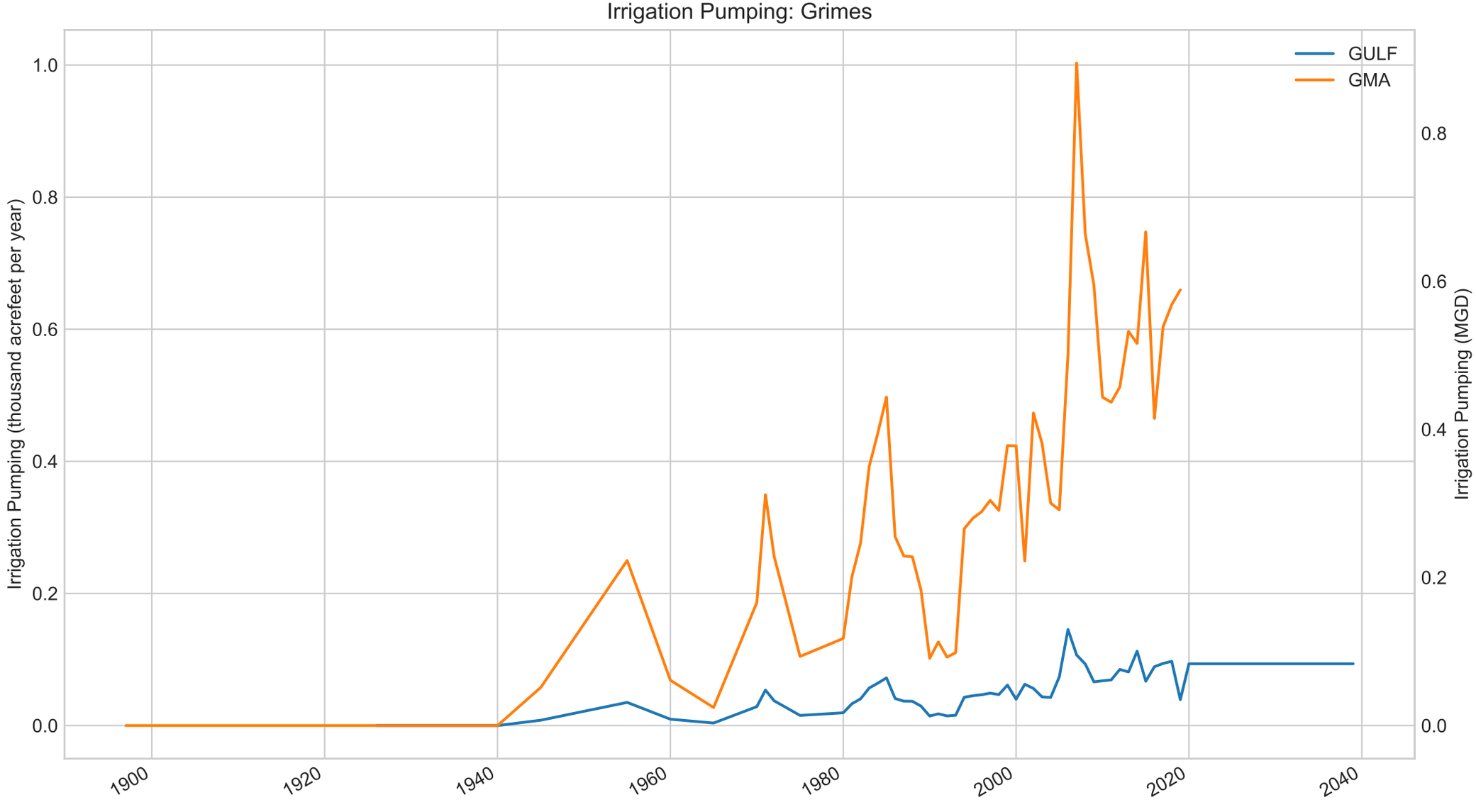

Irrigation Pumping: Polk
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

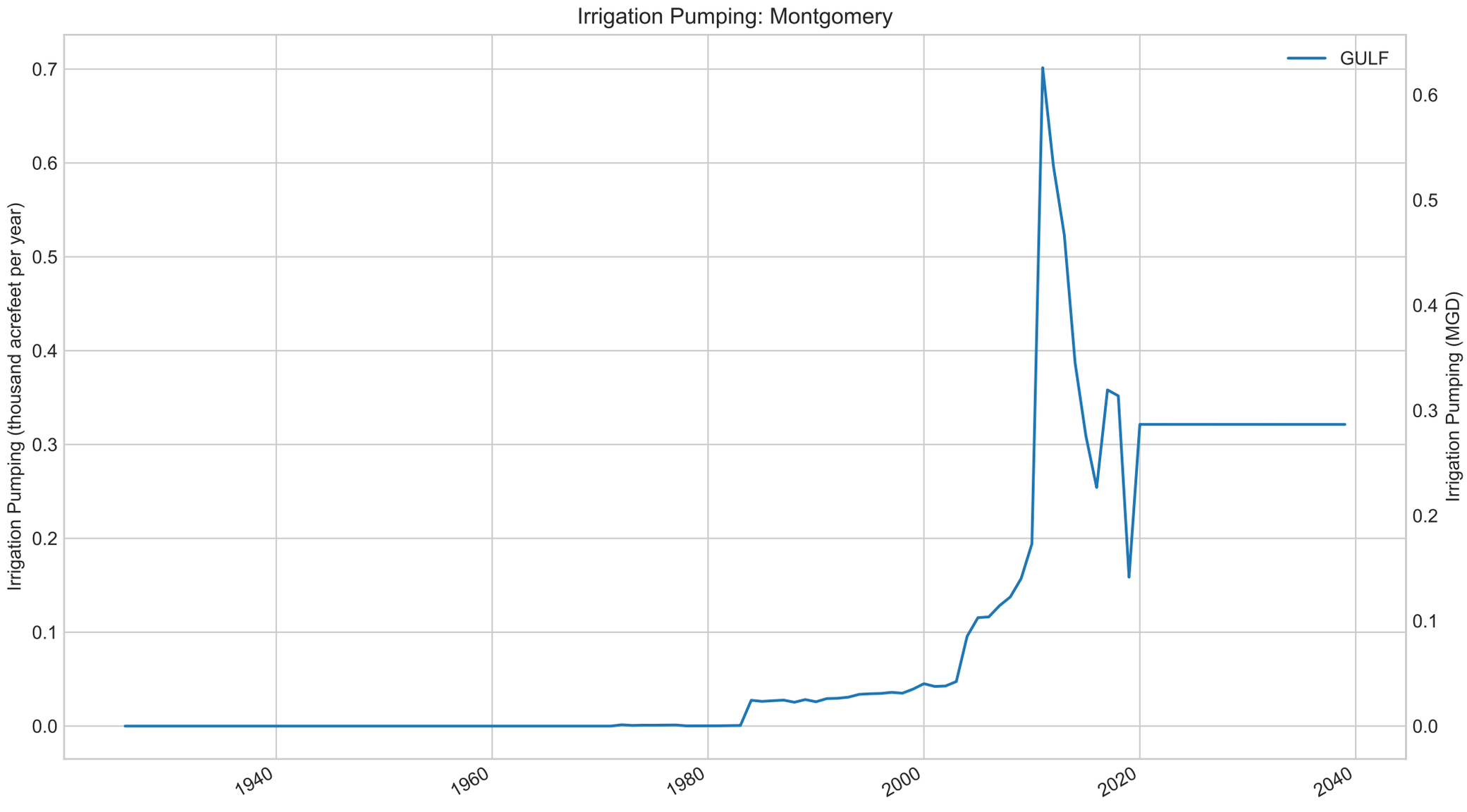

Irrigation Pumping: Tyler
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

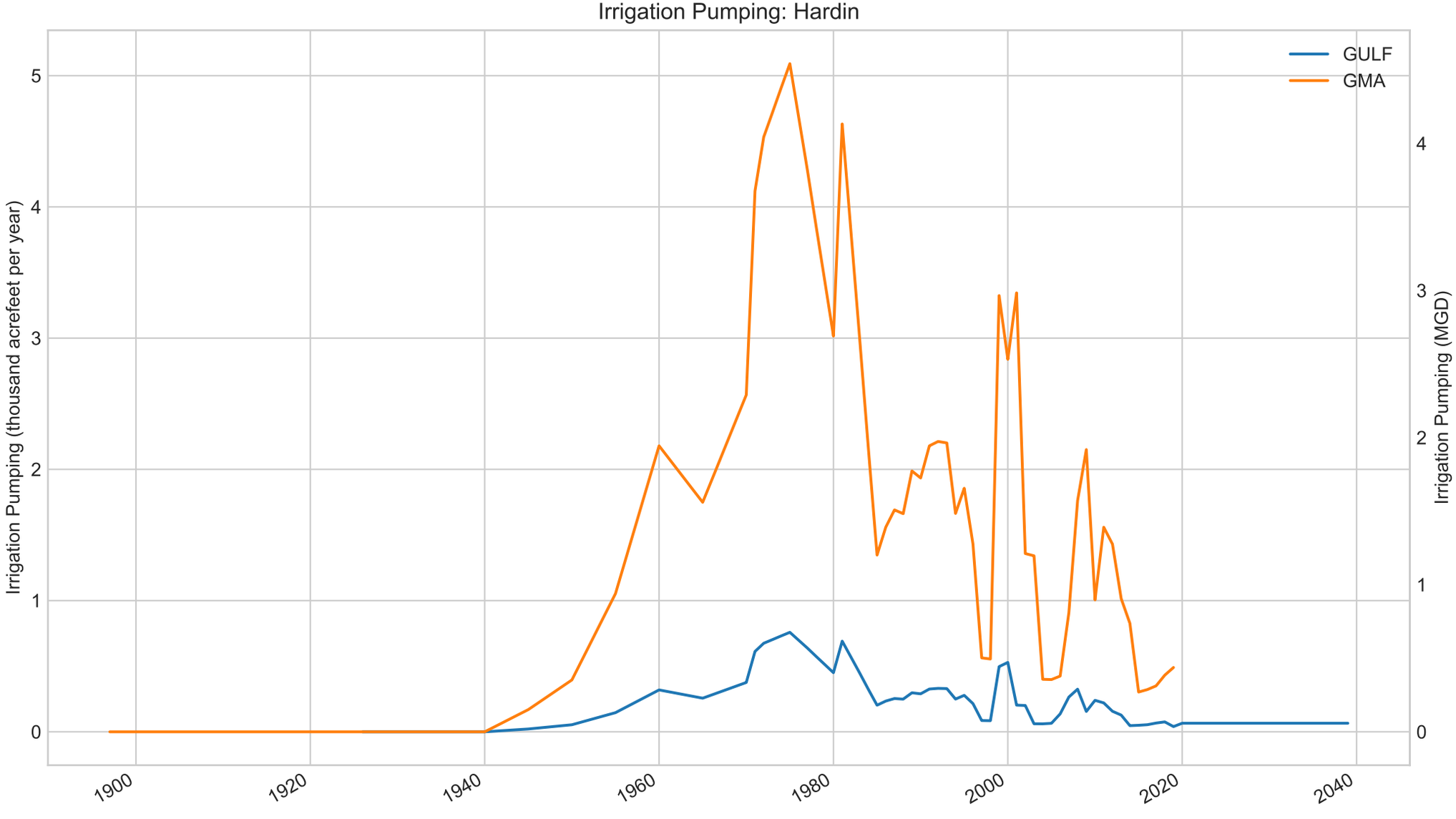

Irrigation Pumping: Walker
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
1900
1920
1940
1960
1980
2000
2020
2040

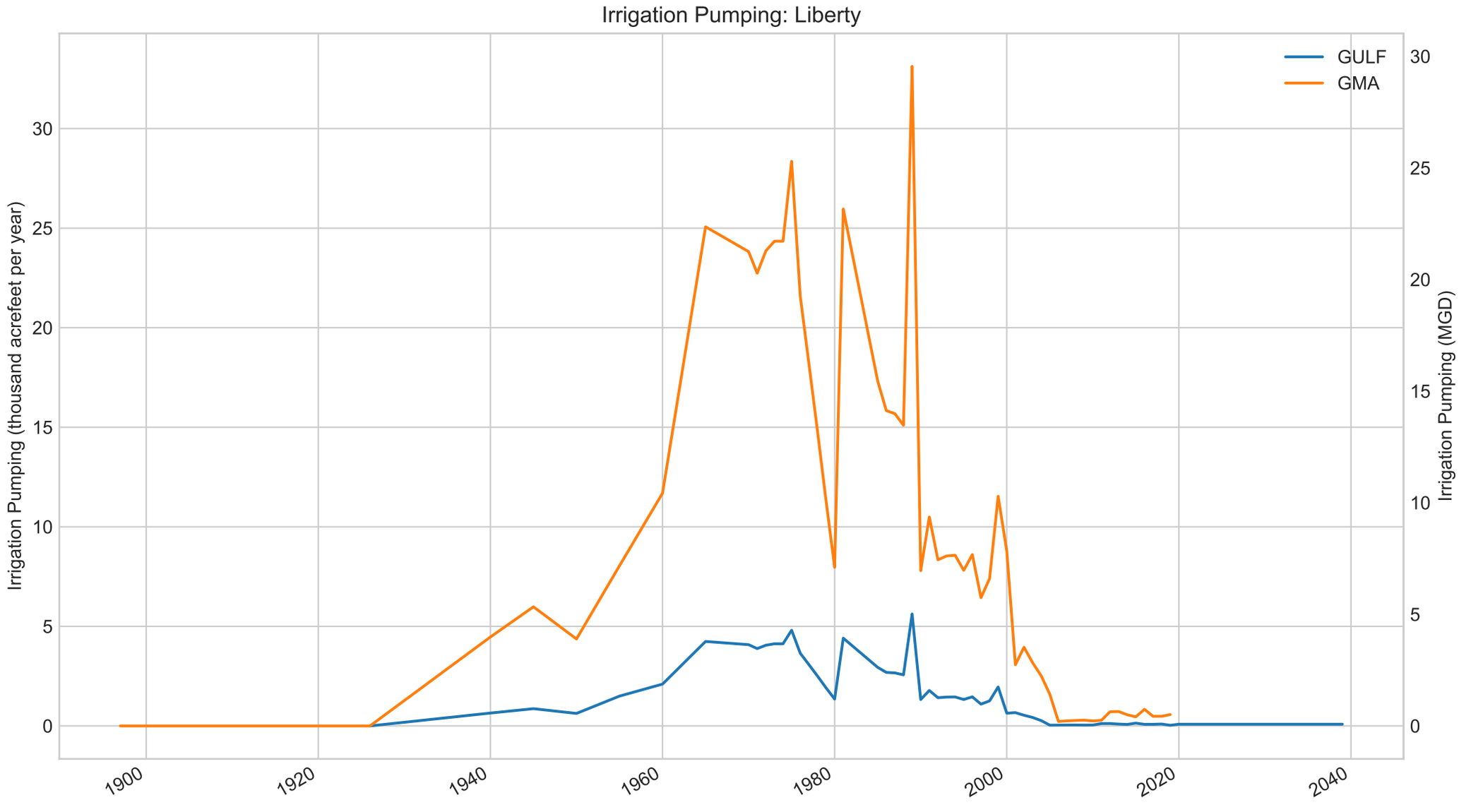

Irrigation Pumping: Brazos
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

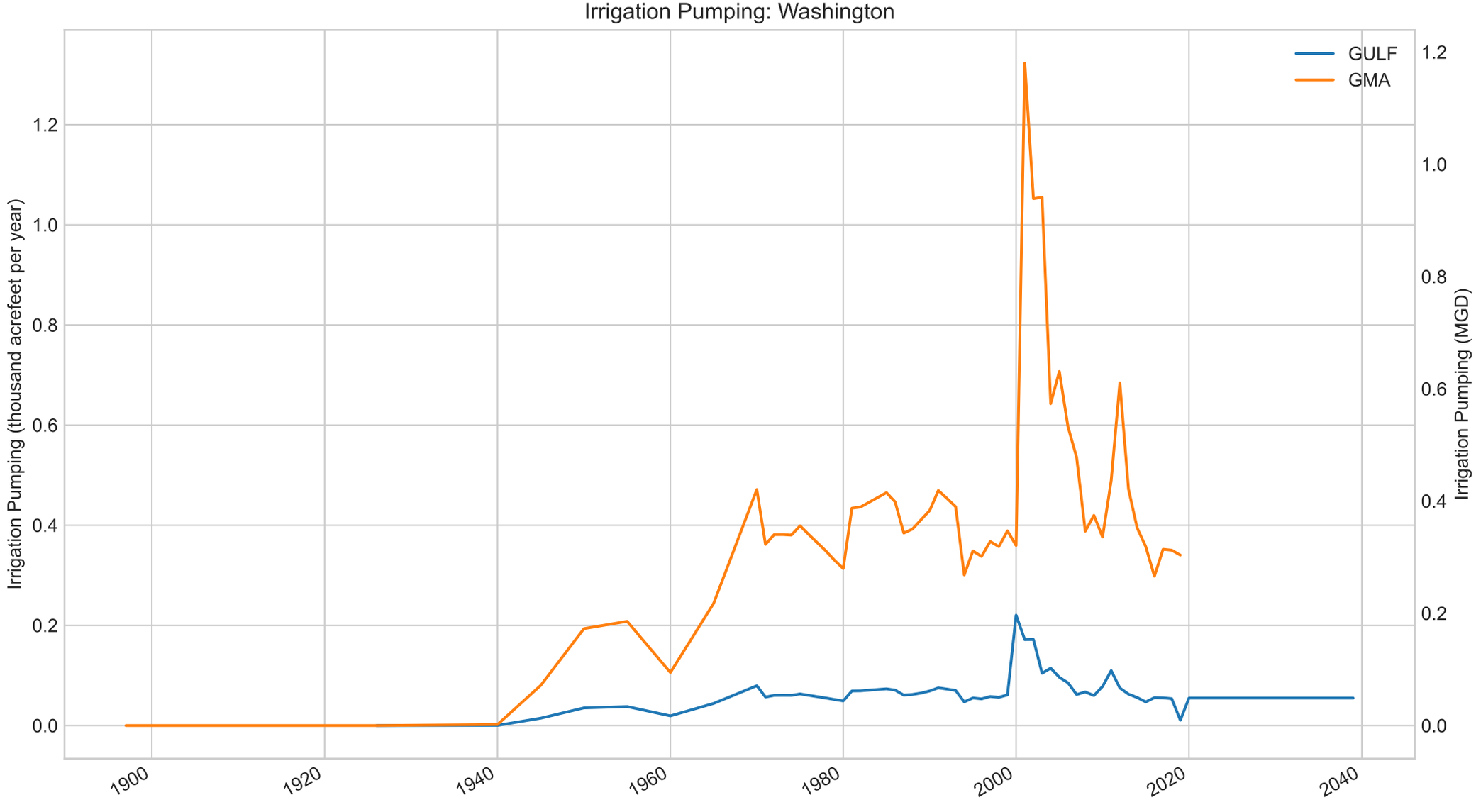

Irrigation Pumping: San_jacinto
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

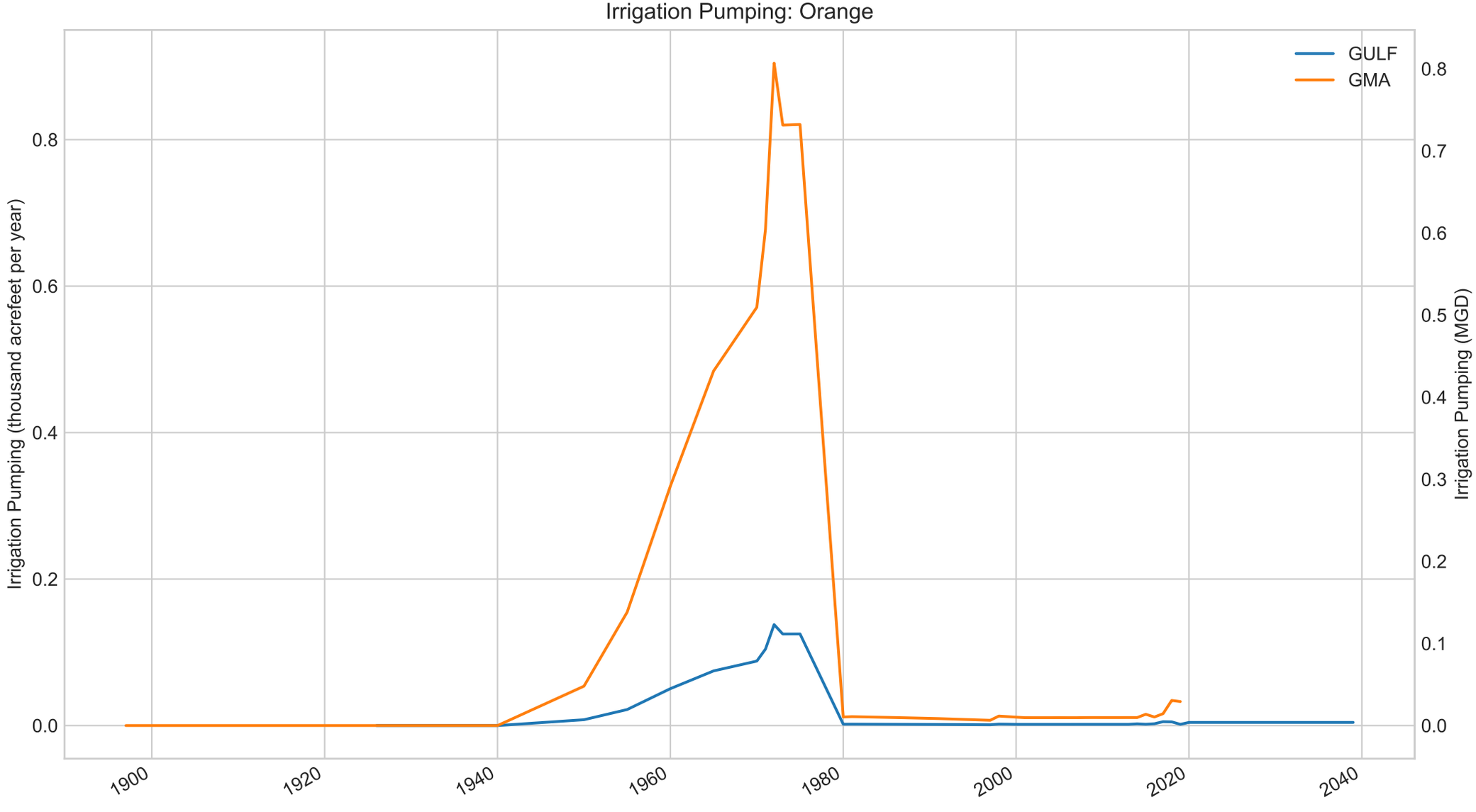

Irrigation Pumping: Grimes
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
1.0
0.8
0.6
0.4
0.2
0.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

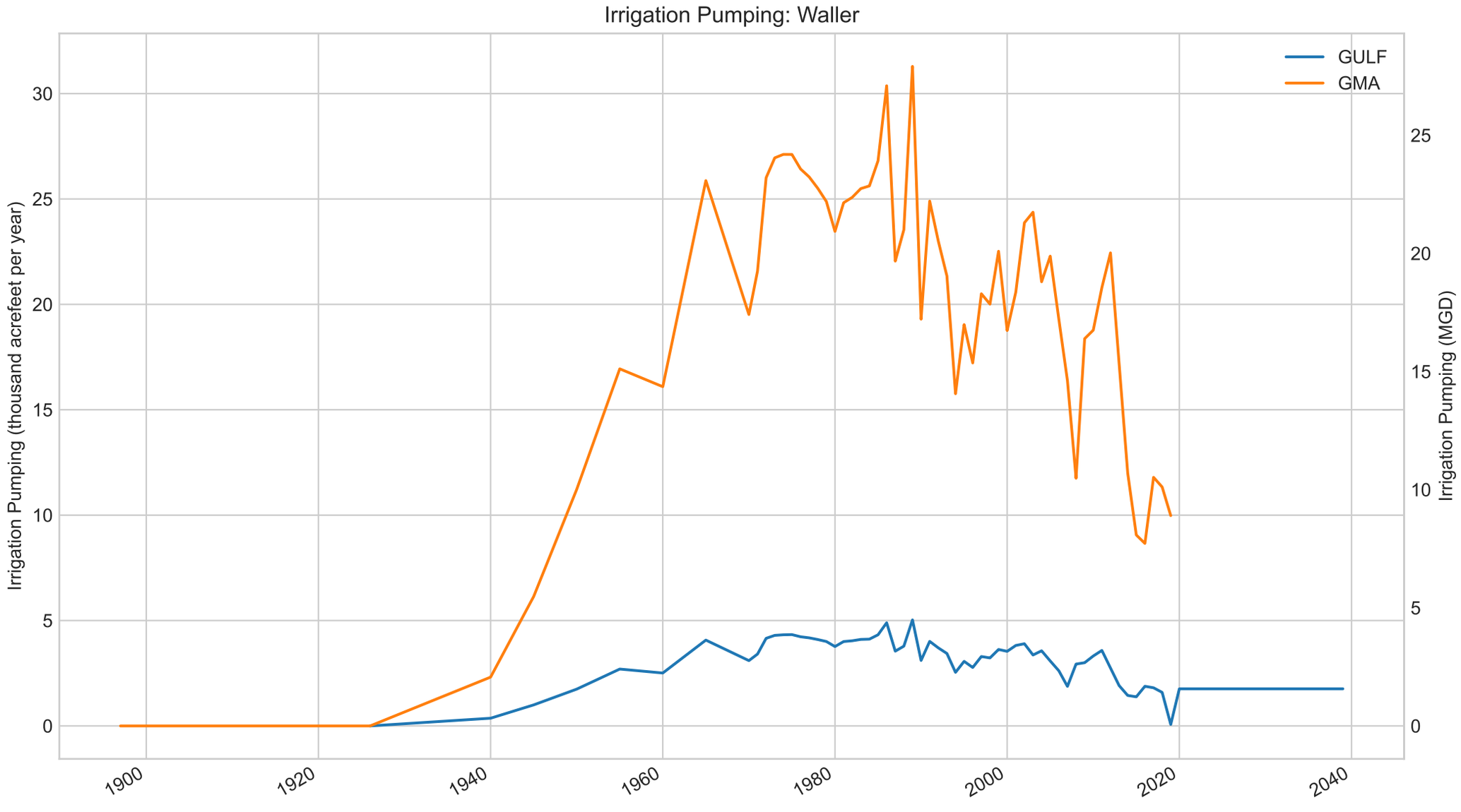

Irrigation Pumping: Montgomery
GULF
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1940
1960
1980
2000
2020
2040

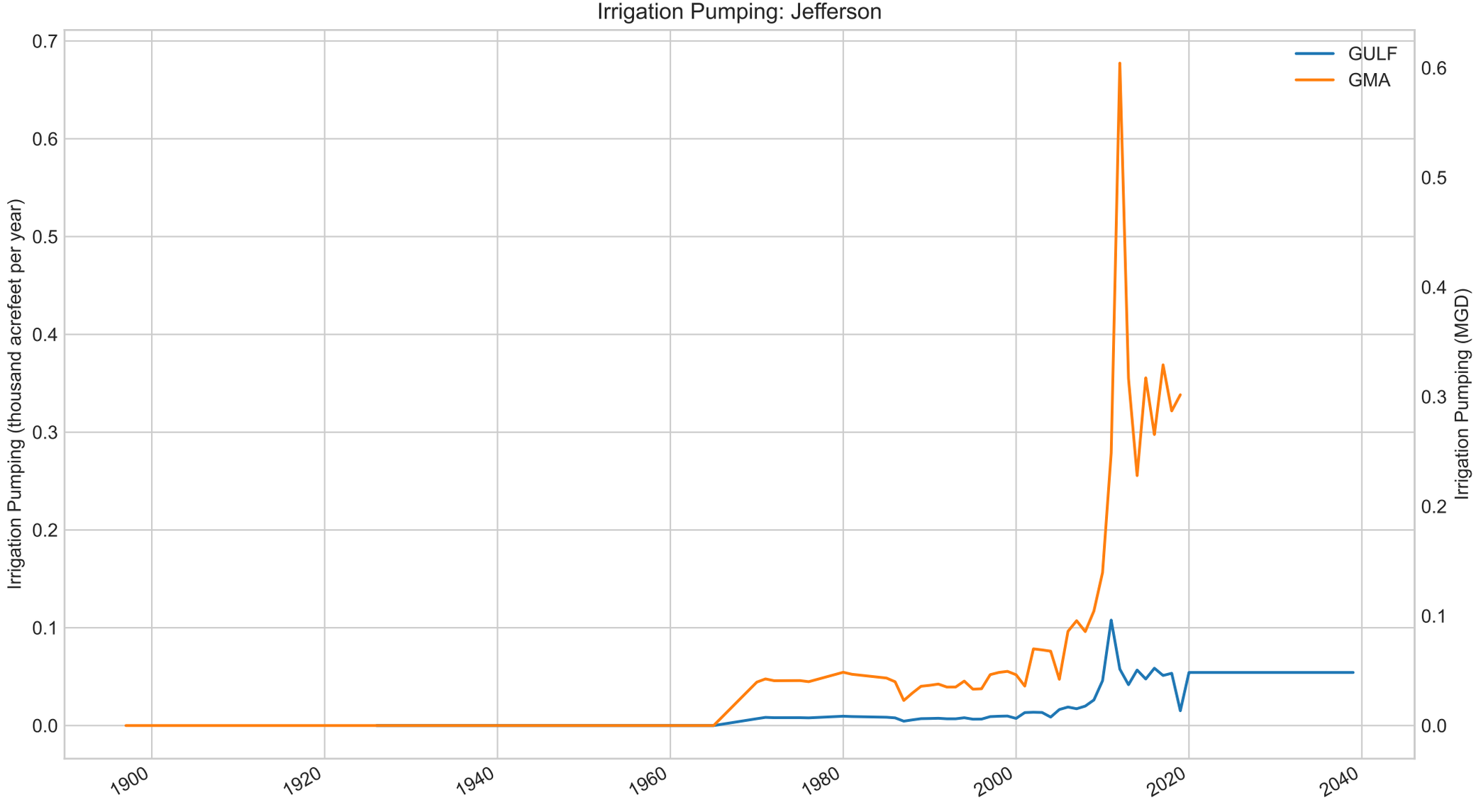

Irrigation Pumping: Hardin
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

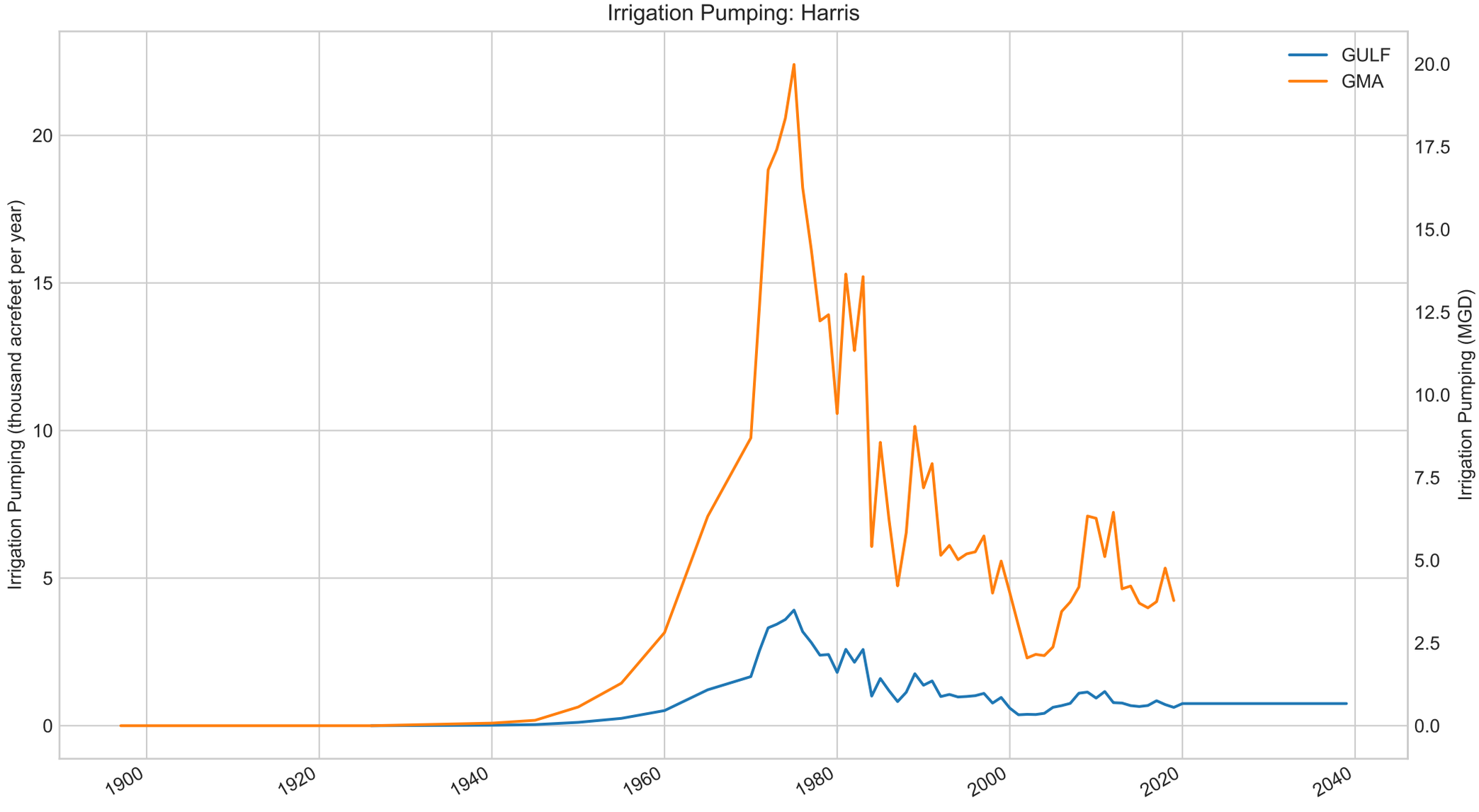

Irrigation Pumping: Liberty
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

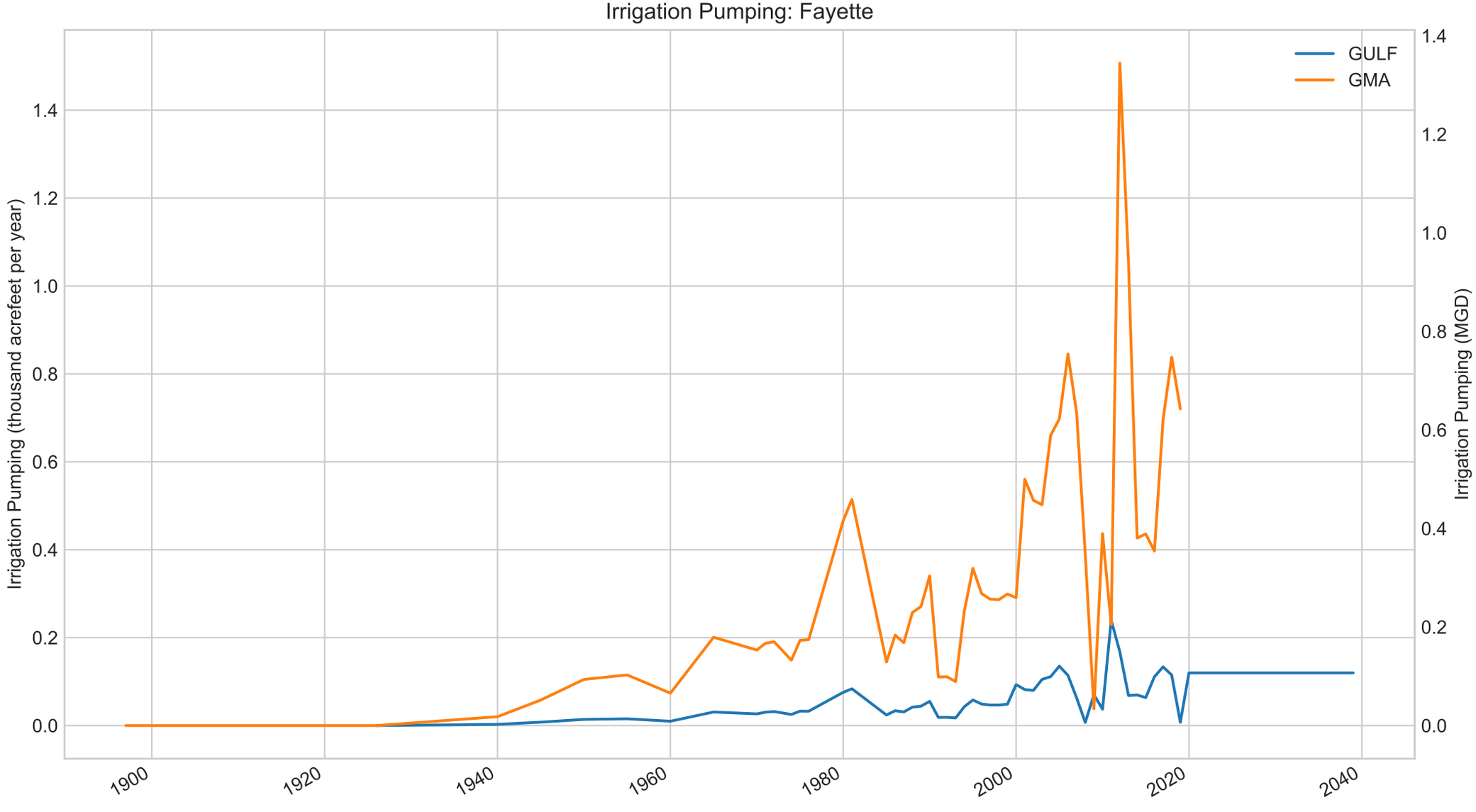

Irrigation Pumping: Washington
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

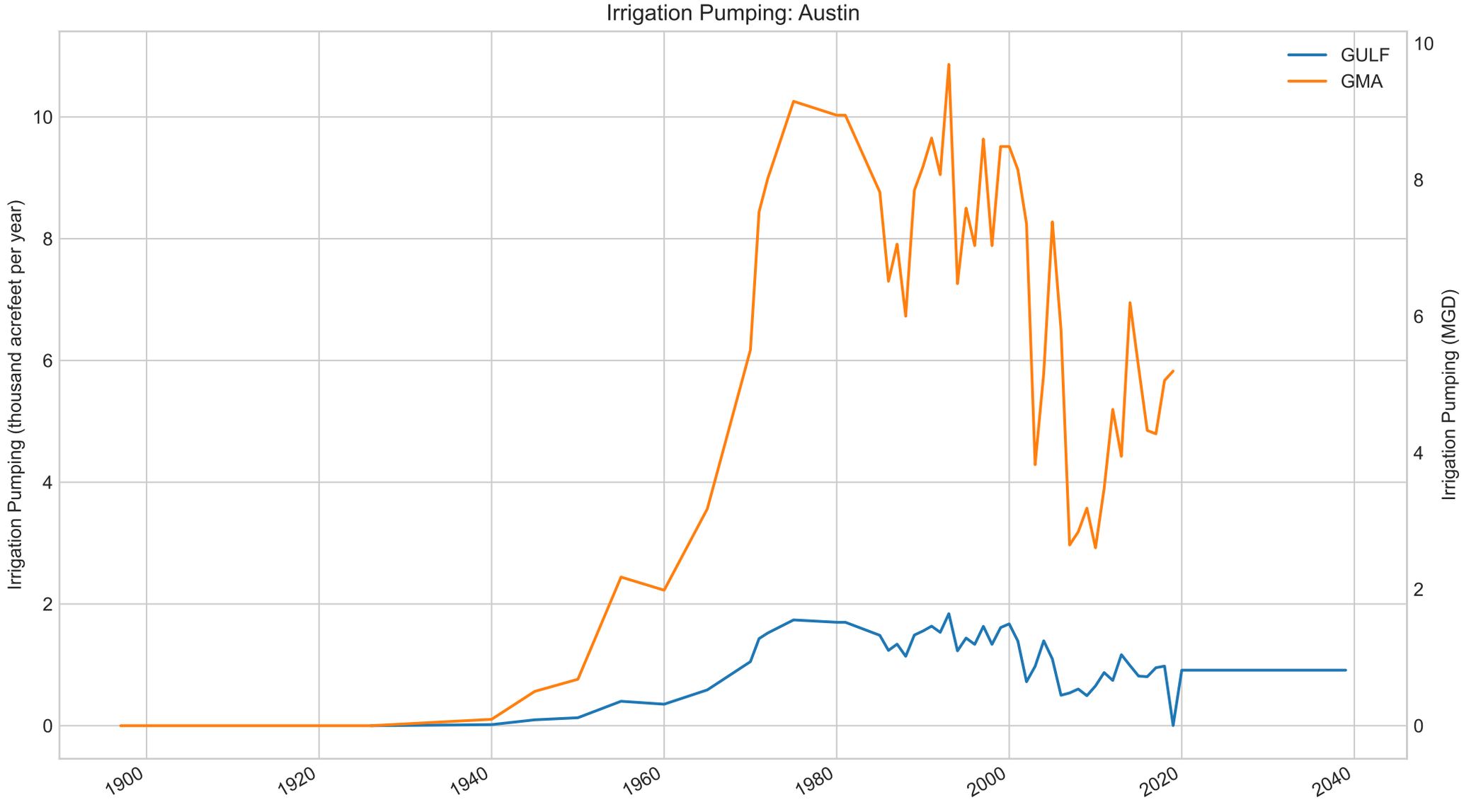

Irrigation Pumping: Orange
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
0.1
0.3
0.5
0.7
1900
1920
1940
1960
1980
2000
2020
2040

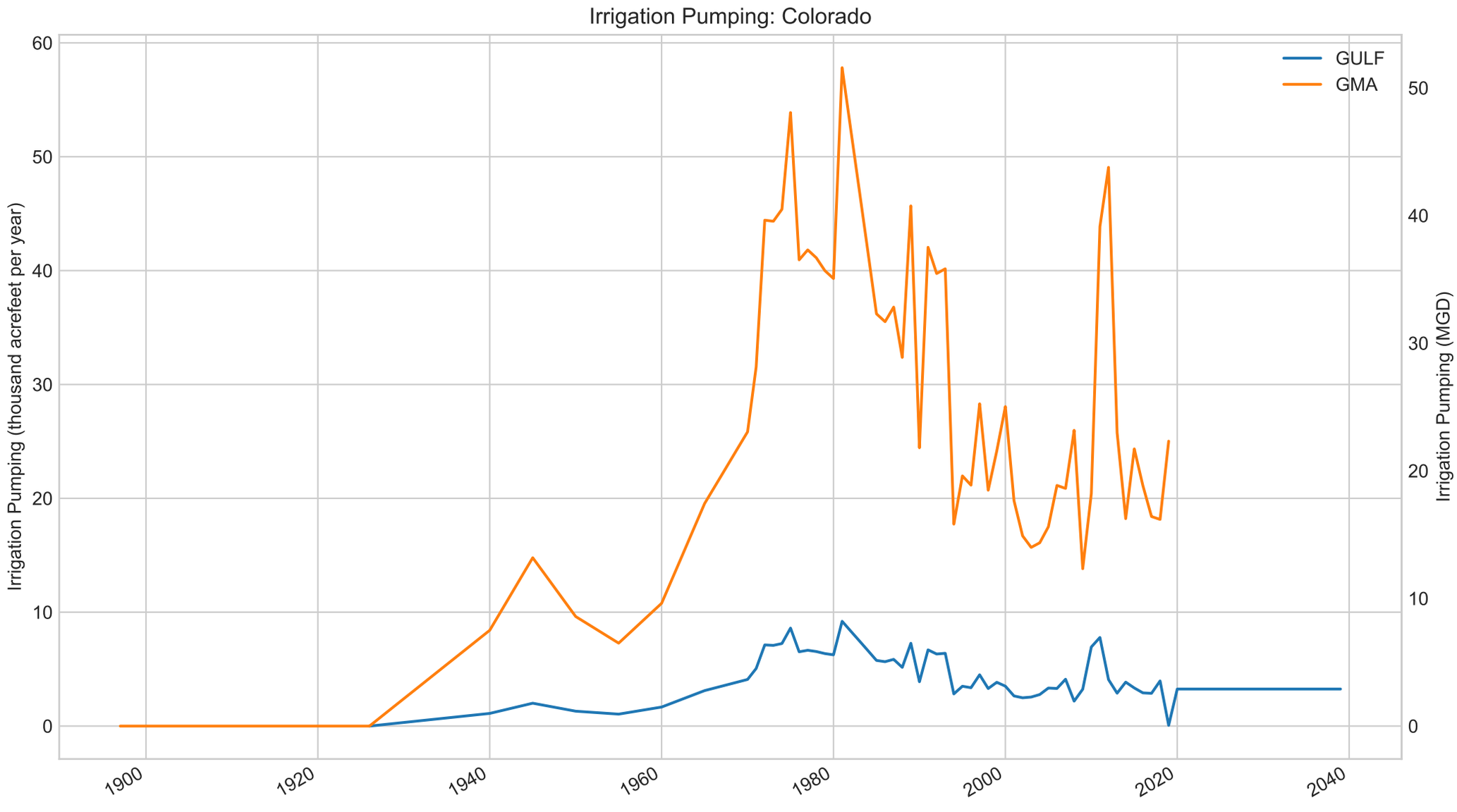

Irrigation Pumping: Waller
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

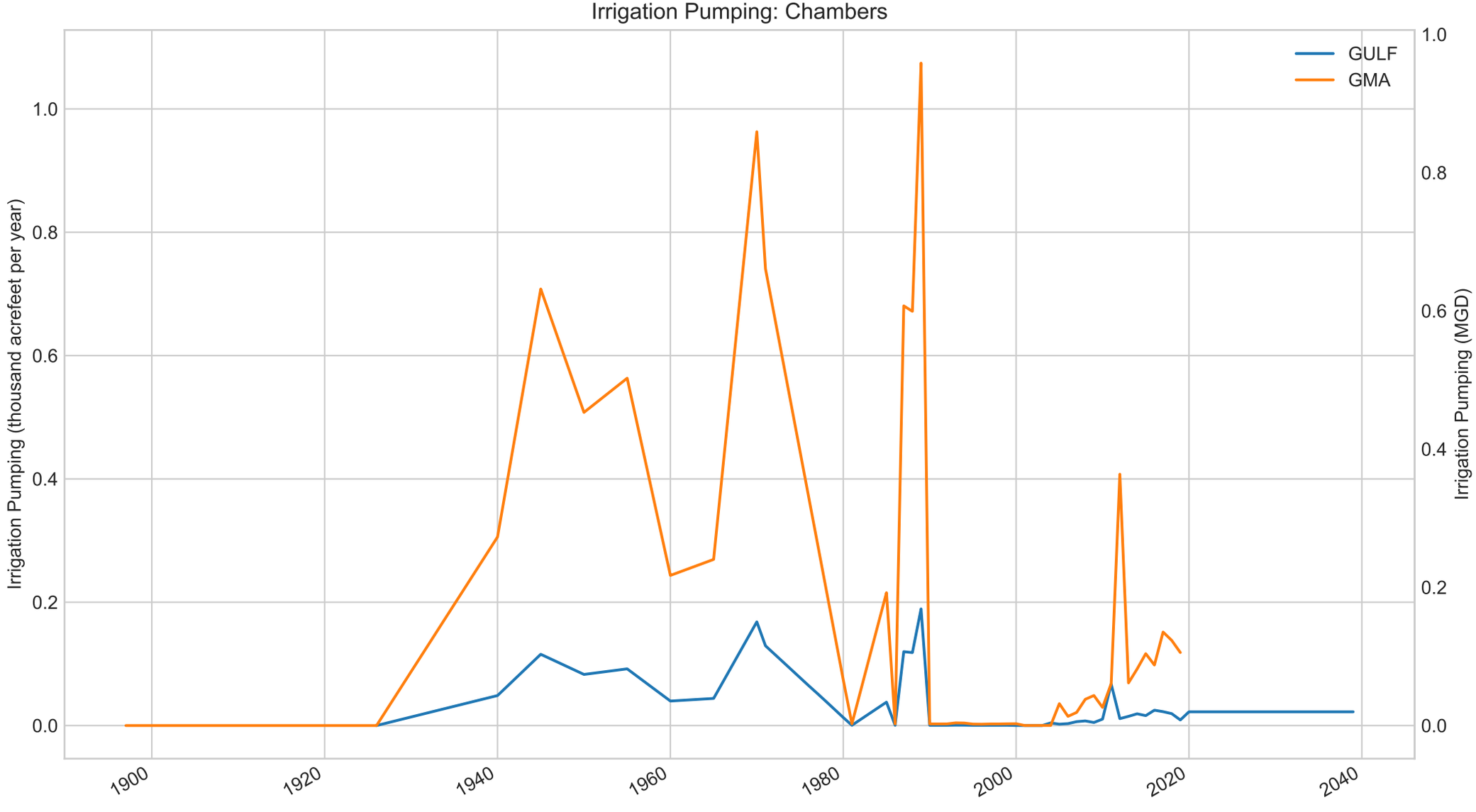

Irrigation Pumping: Jefferson
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

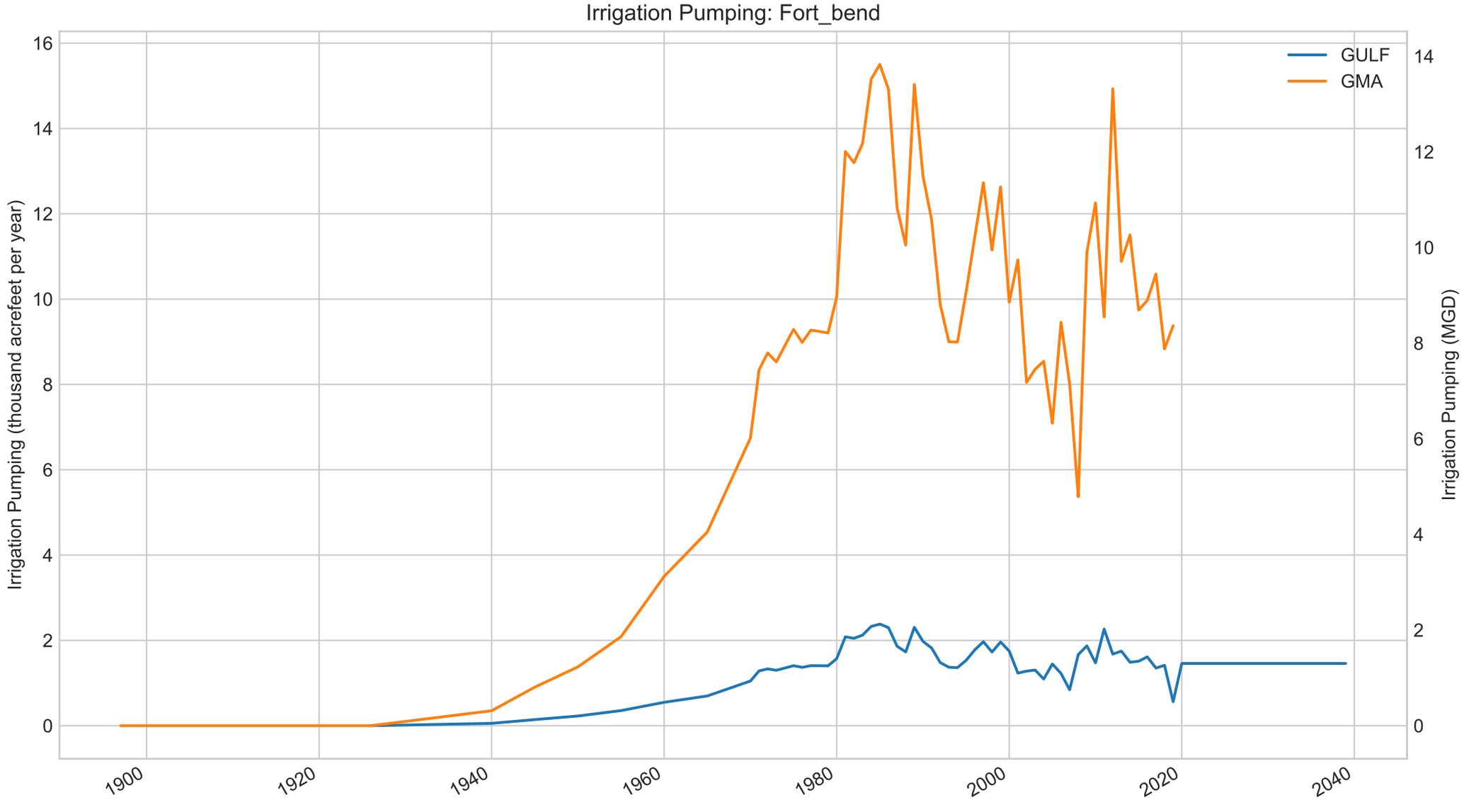

Irrigation Pumping: Harris
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
1900
1920
1940
1960
1980
2000
2020
2040

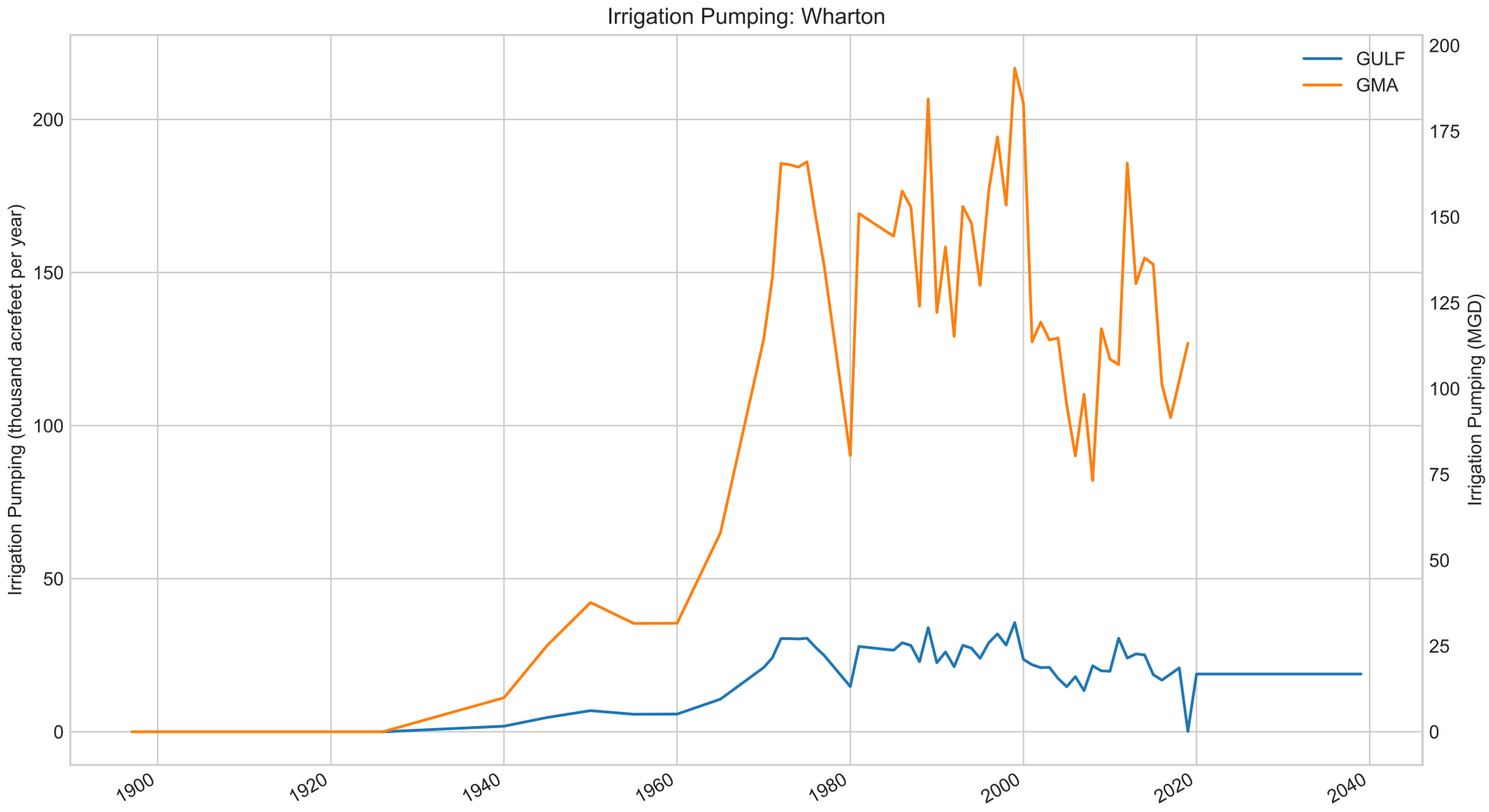

Irrigation Pumping: Fayette
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1900
1920
1940
1960
1980
2000
2020
2040

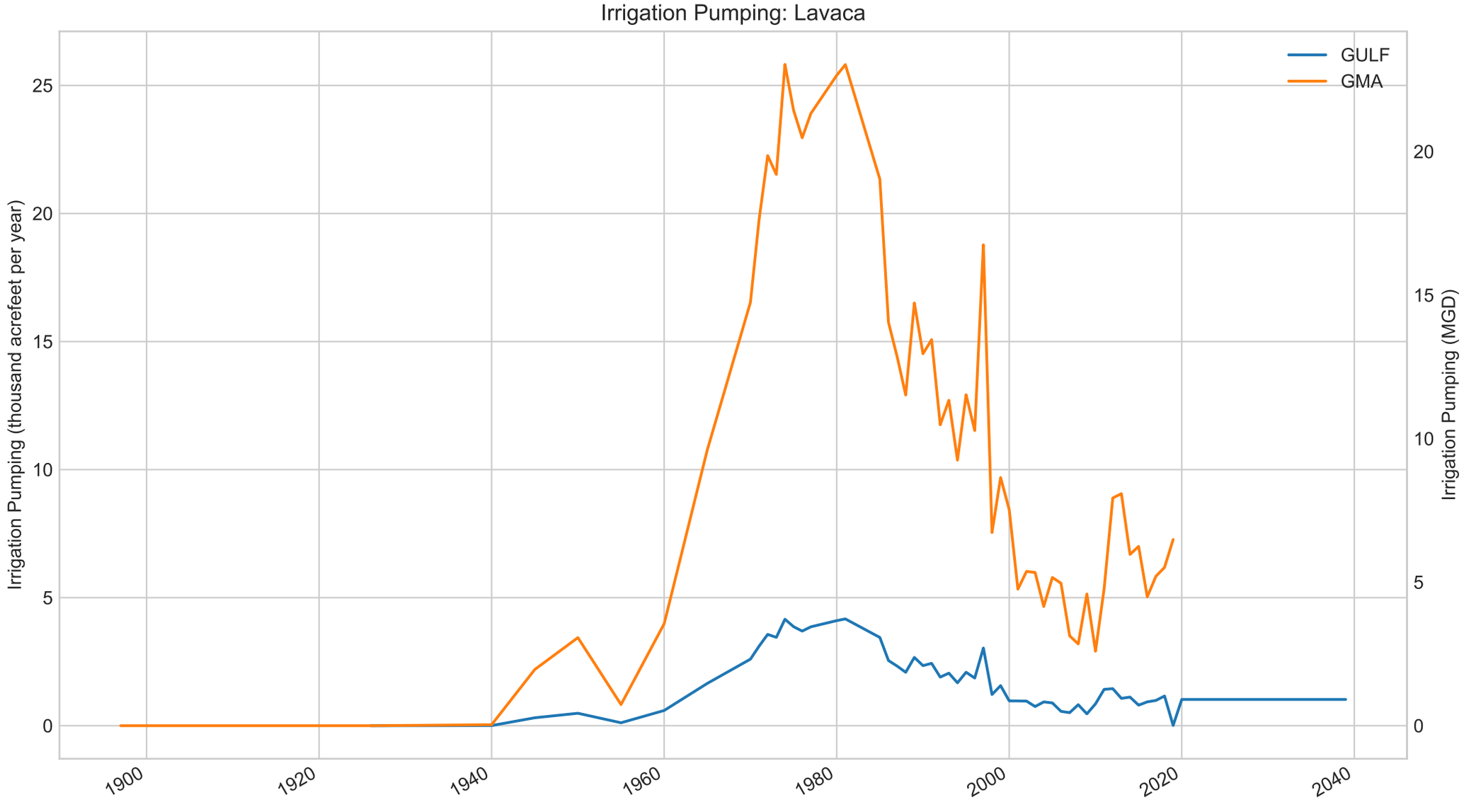

Irrigation Pumping: Austin
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
10
1900
1920
1940
1960
1980
2000
2020
2040

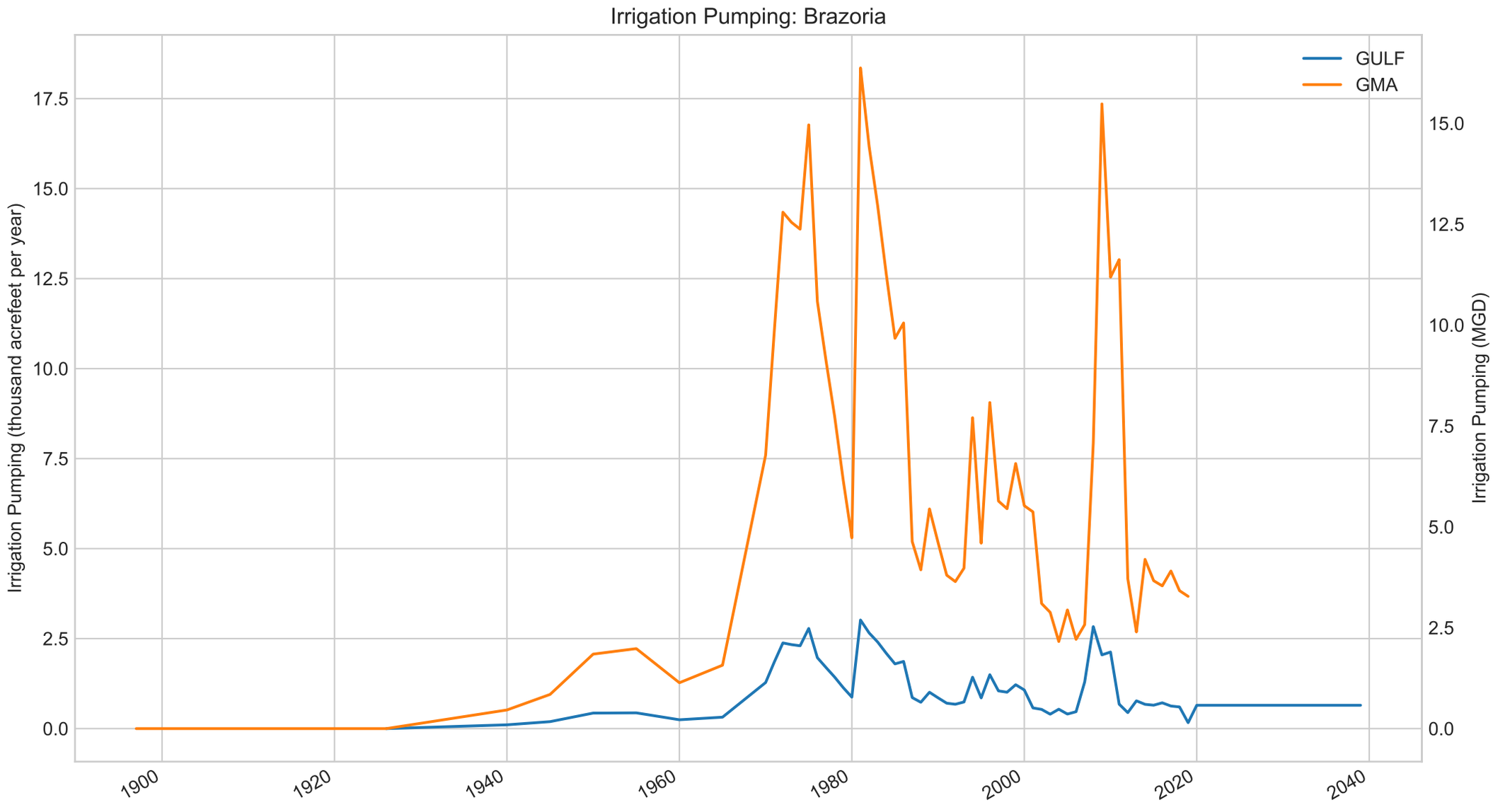

Irrigation Pumping: Colorado
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0
10
20
30
40
50
60
1900
1920
1940
1960
1980
2000
2020
2040

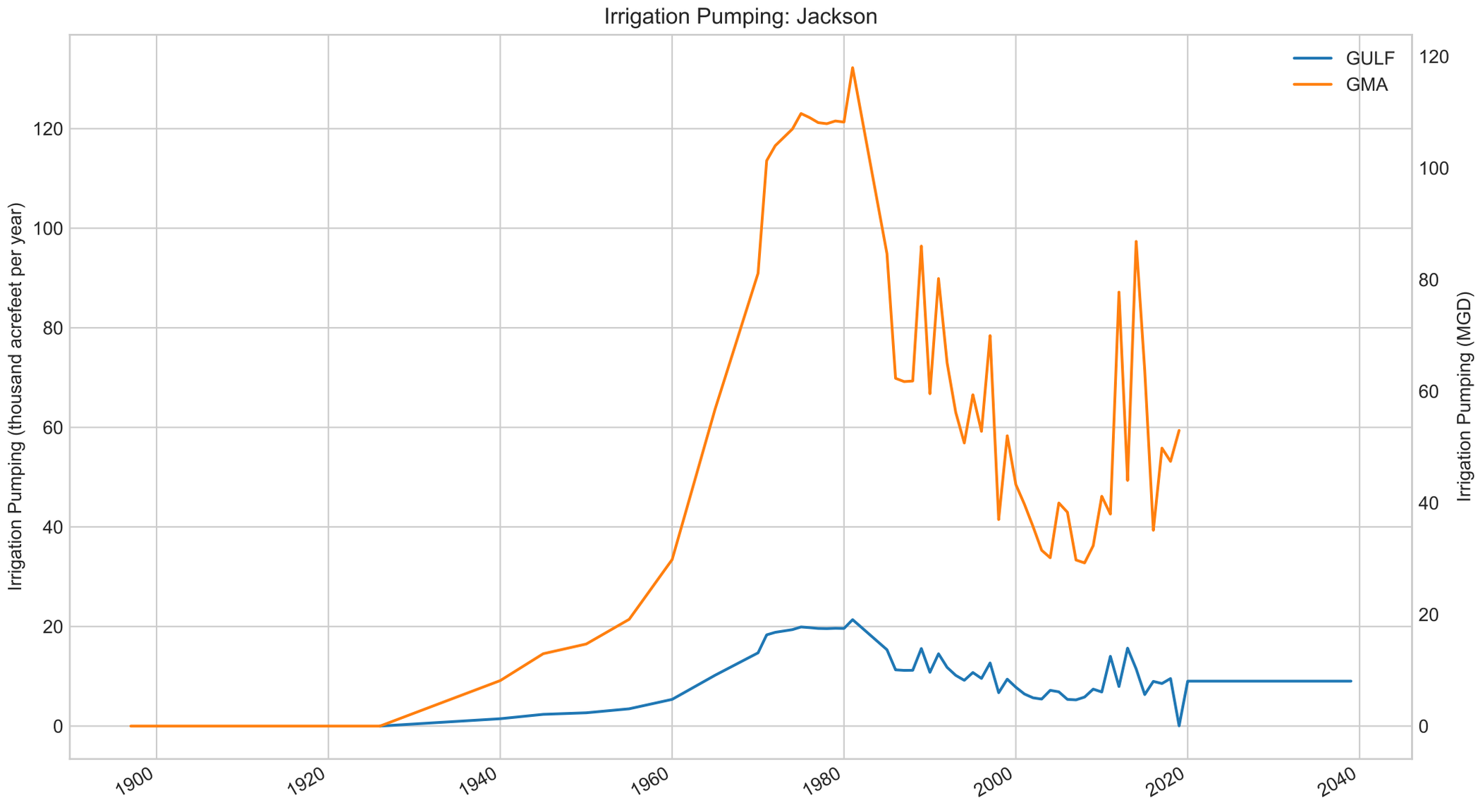

Irrigation Pumping: Chambers
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1900
1920
1940
1960
1980
2000
2020
2040

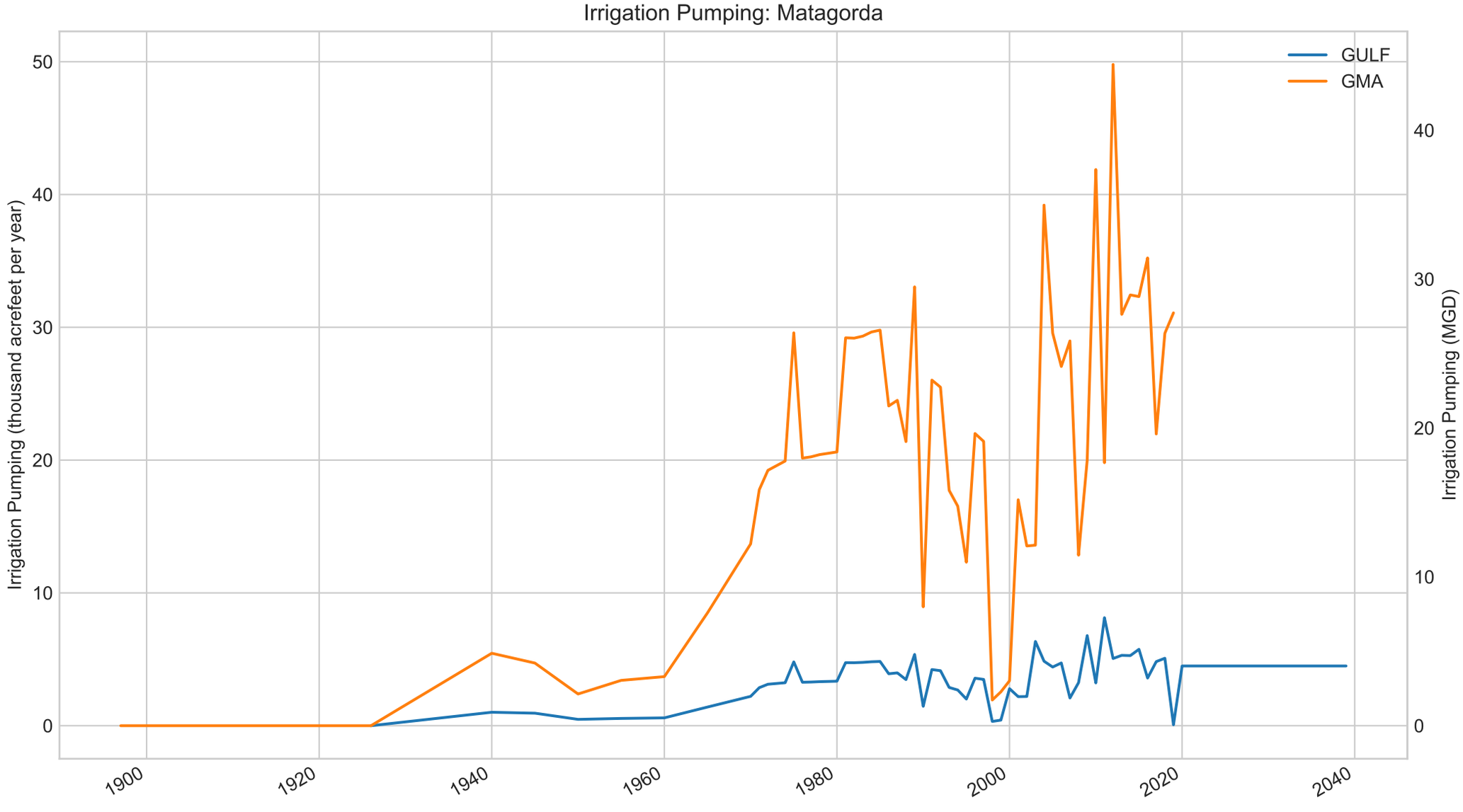

Irrigation Pumping: Fort_bend
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0
2
4
6
8
10
12
14
16
1900
1920
1940
1960
1980
2000
2020
2040

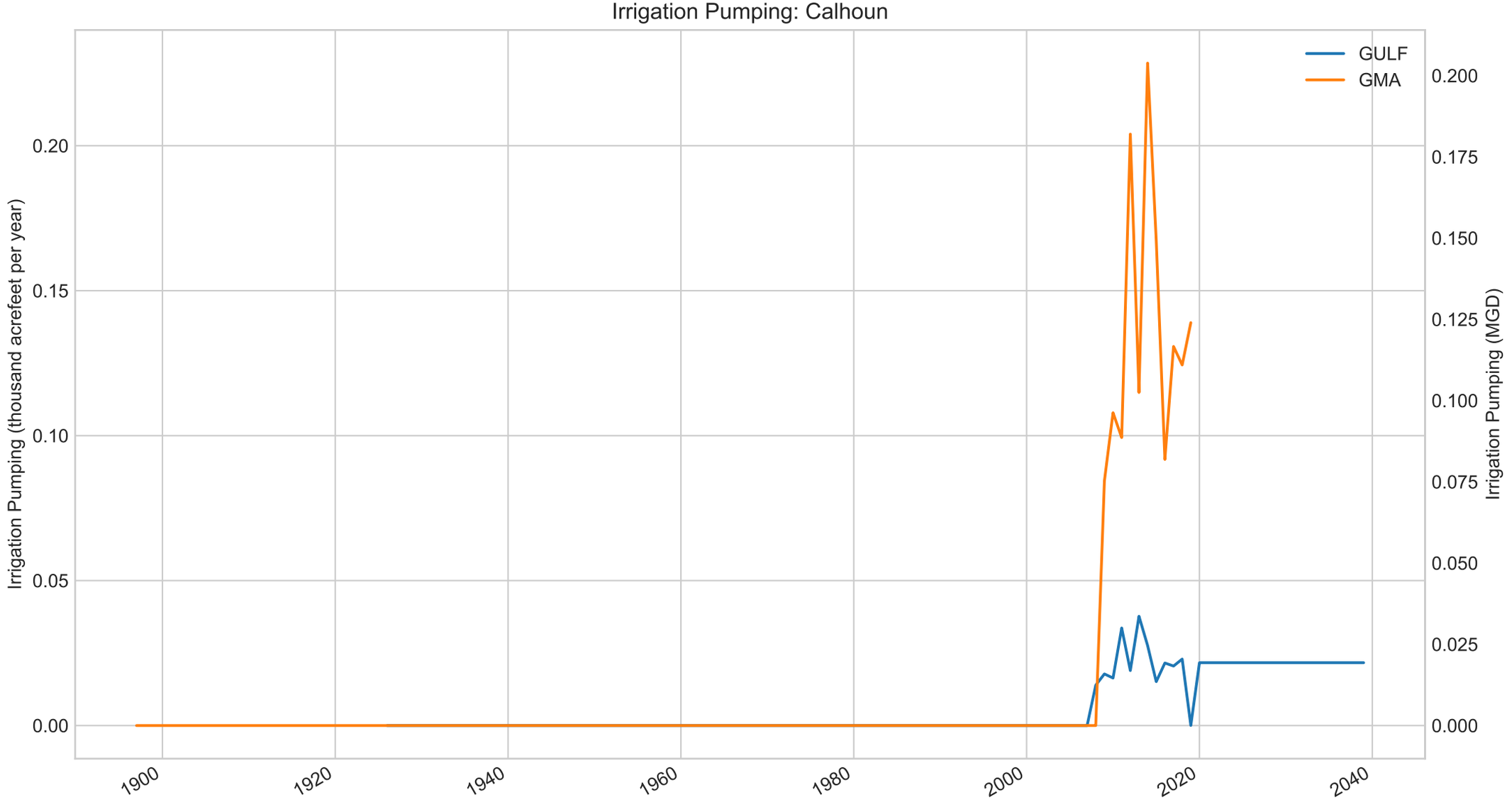

Irrigation Pumping: Wharton
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
50
100
150
200
0
25
50
75
100
125
150
175
200
1900
1920
1940
1960
1980
2000
2020
2040

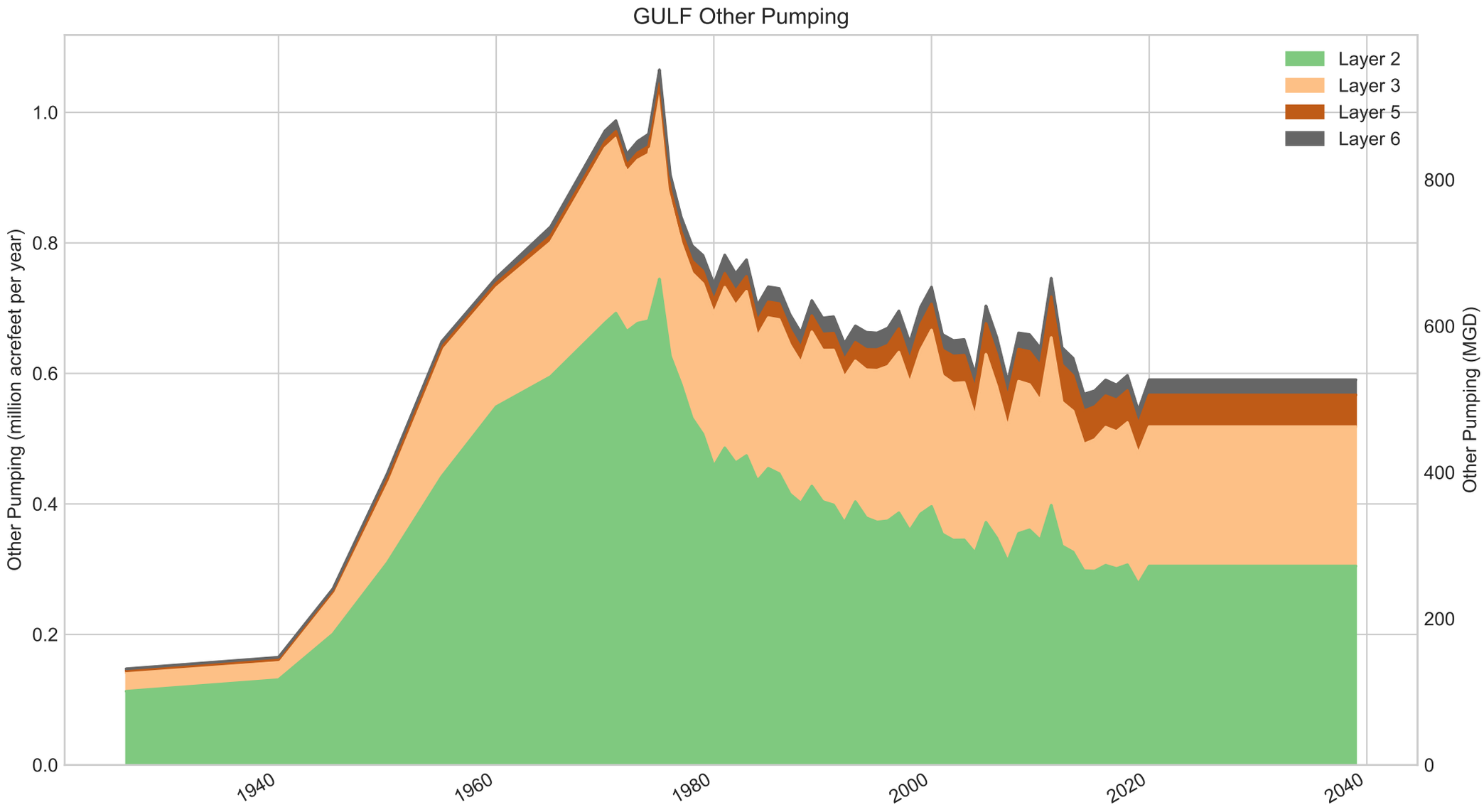

Irrigation Pumping: Lavaca
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
25
0
5
10
15
20
1900
1920
1940
1960
1980
2000
2020
2040

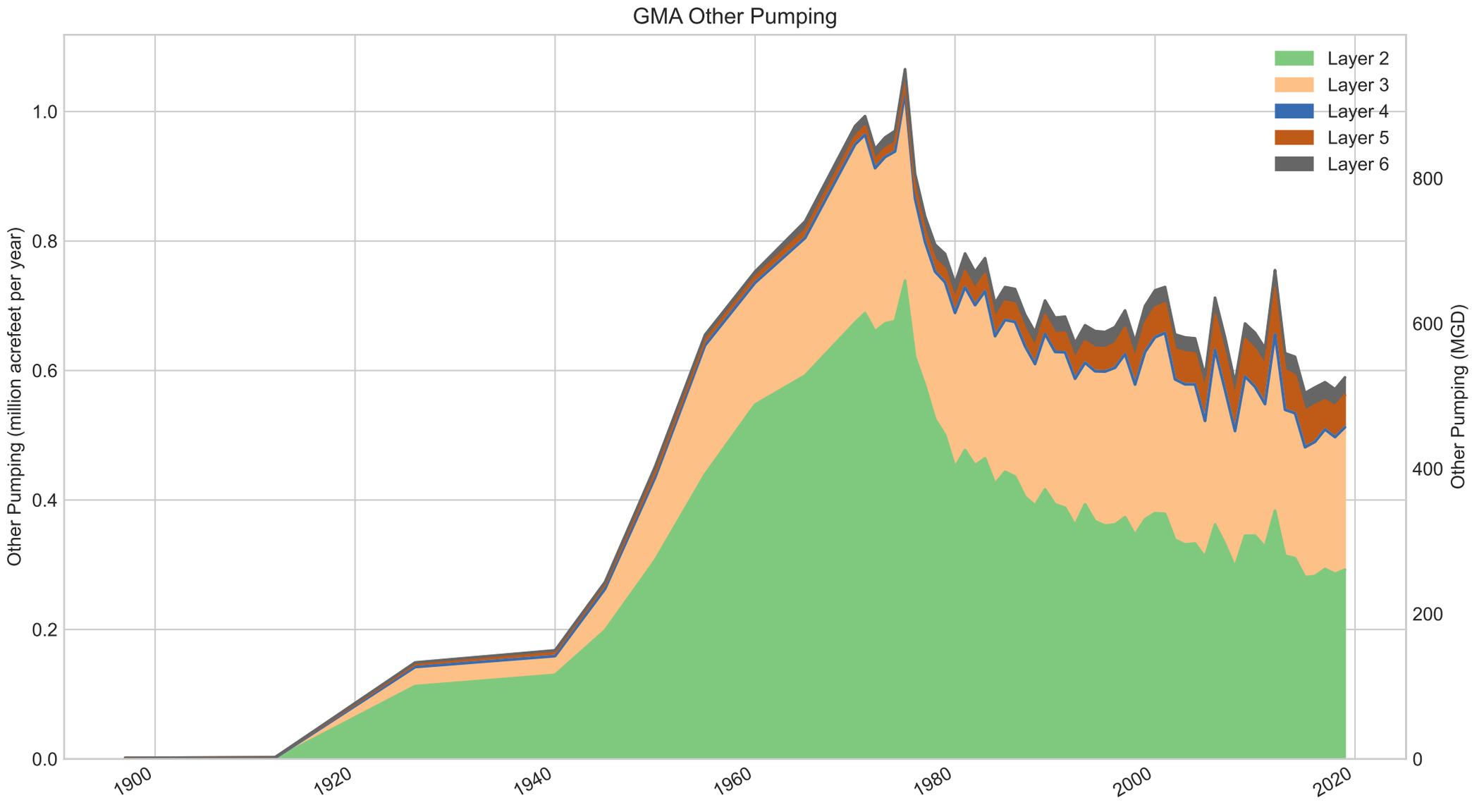

Irrigation Pumping: Brazoria
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
1900
1920
1940
1960
1980
2000
2020
2040

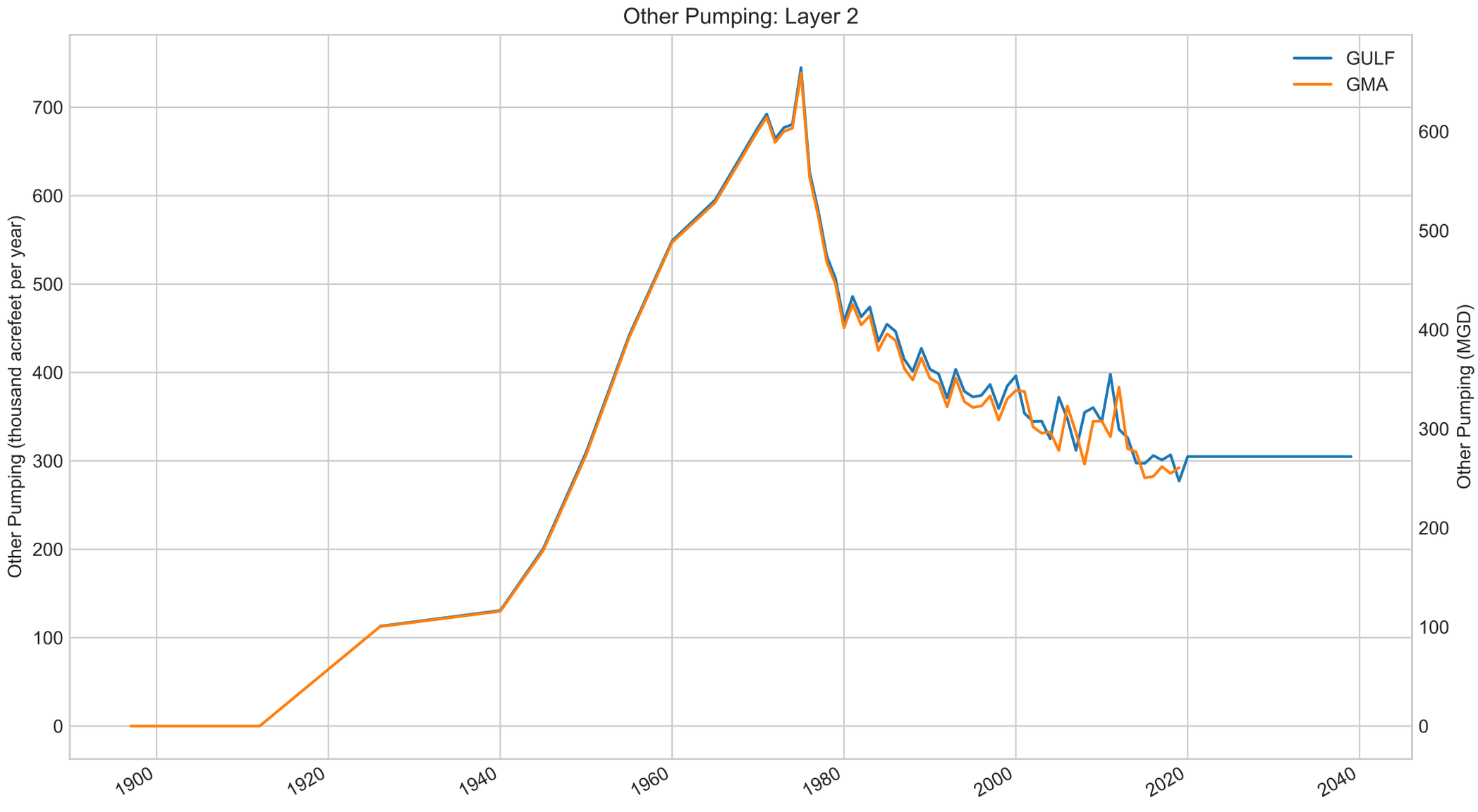

Irrigation Pumping: Jackson
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
20
40
60
80
100
120
1900
1920
1940
1960
1980
2000
2020
2040

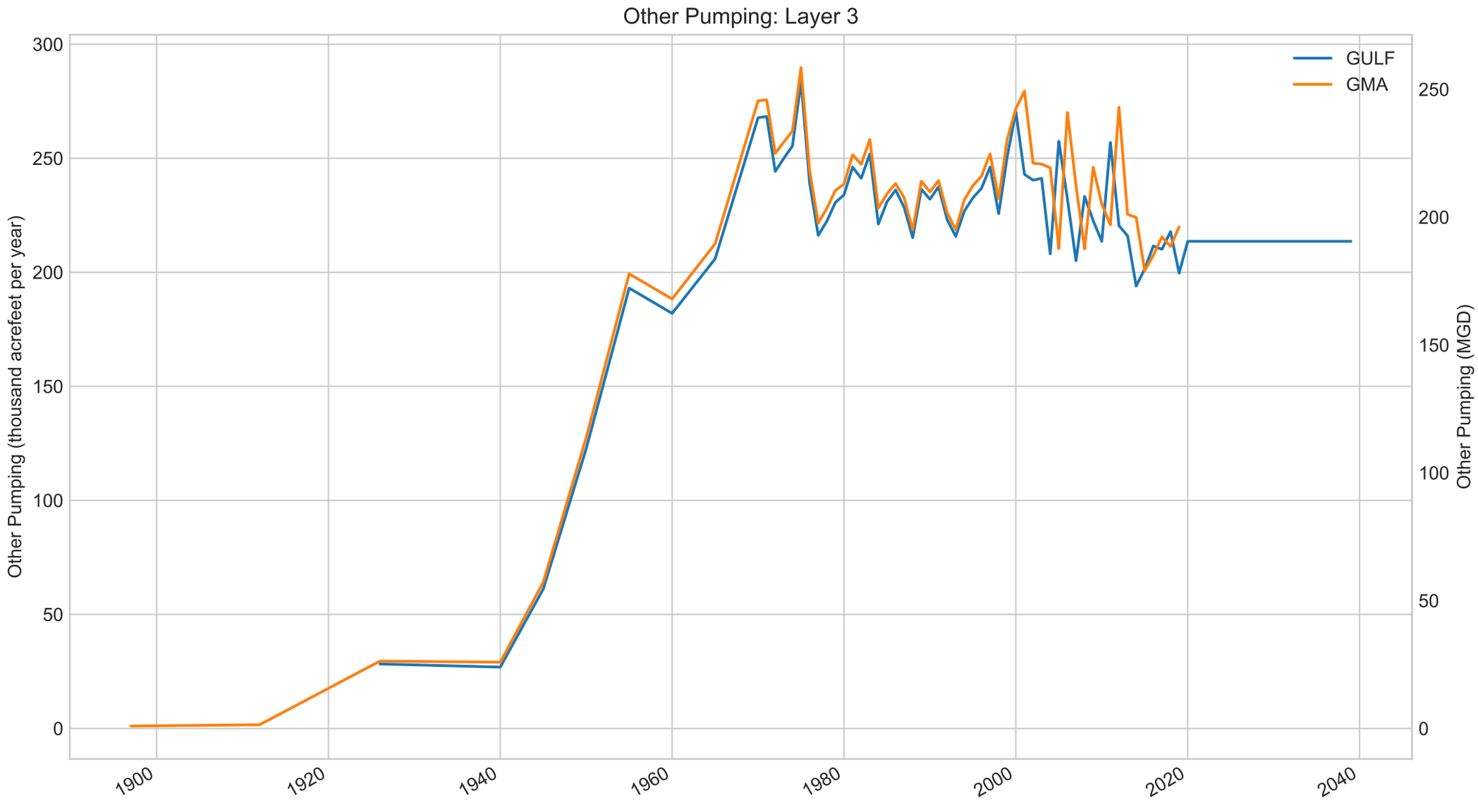

Irrigation Pumping: Matagorda
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
10
20
30
40
50
0
10
20
30
40
1900
1920
1940
1960
1980
2000
2020
2040

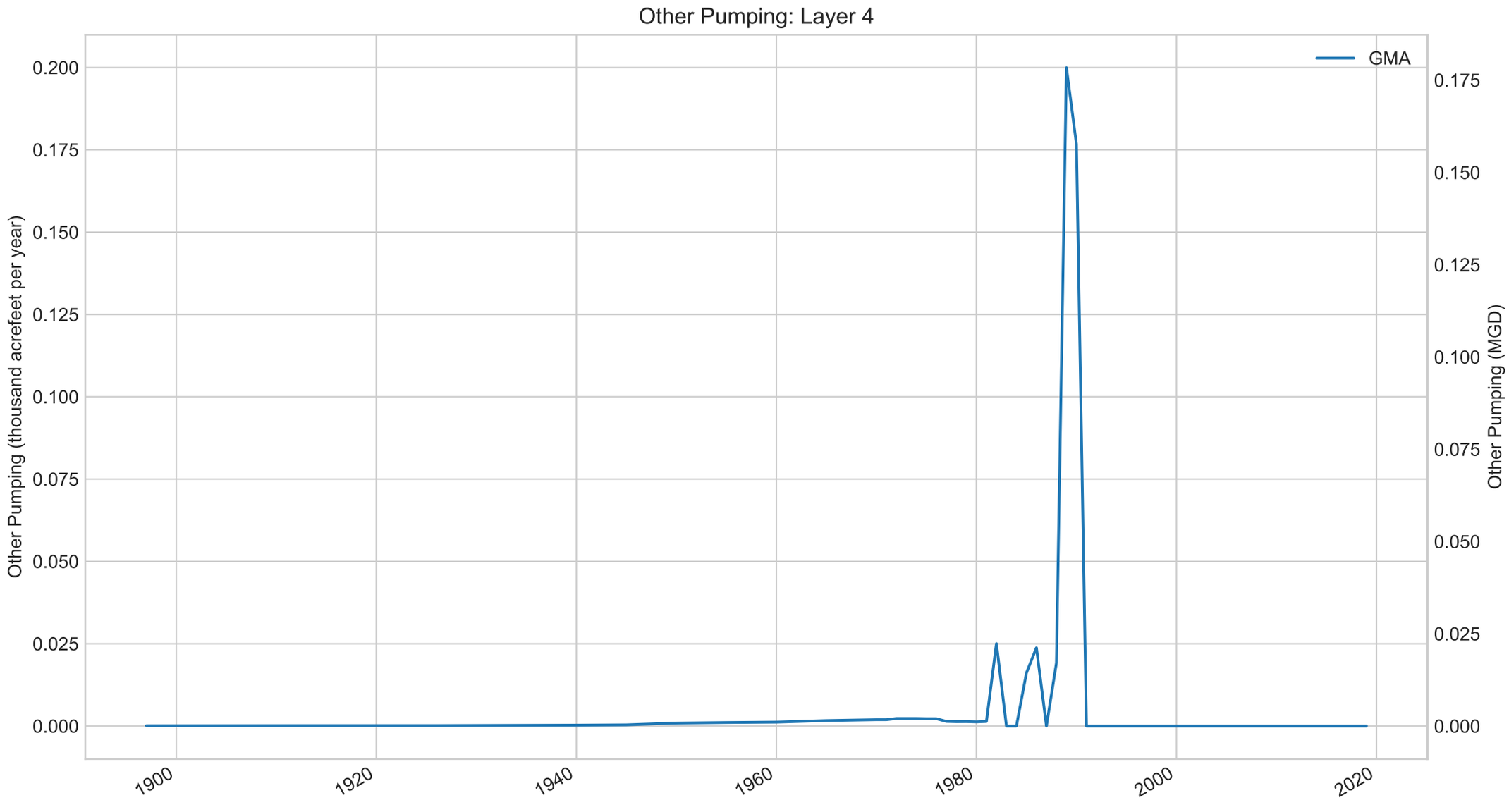

Irrigation Pumping: Calhoun
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
0.000
0.025
0.050
0.075
0.100
0.125
0.150
0.175
0.200
1900
1920
1940
1960
1980
2000
2020
2040

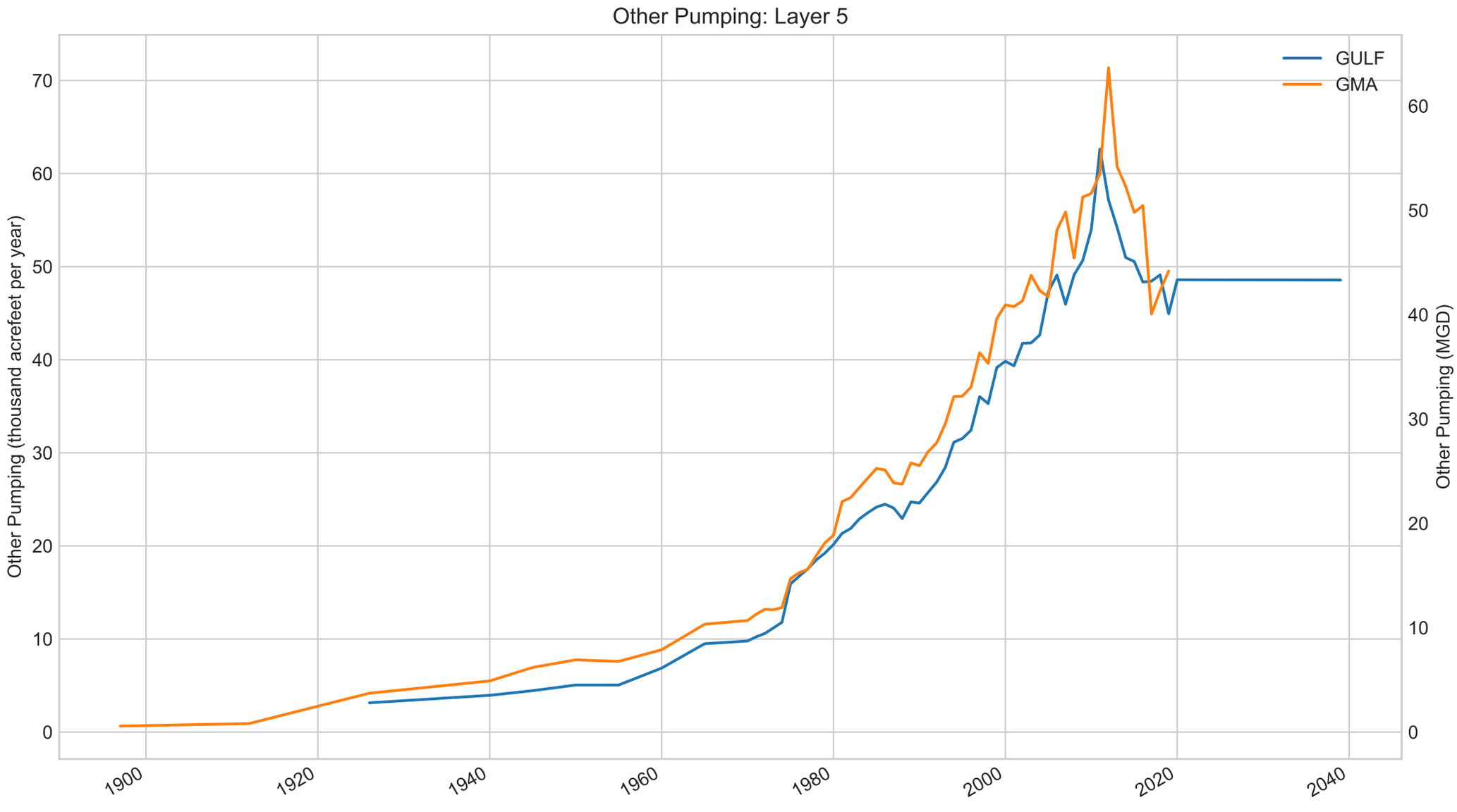

GULF Other Pumping
Layer 2
Layer 3
Layer 5
Layer 6
Other Pumping (million acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
0
200
400
600
800
1940
1960
1980
2000
2020
2040

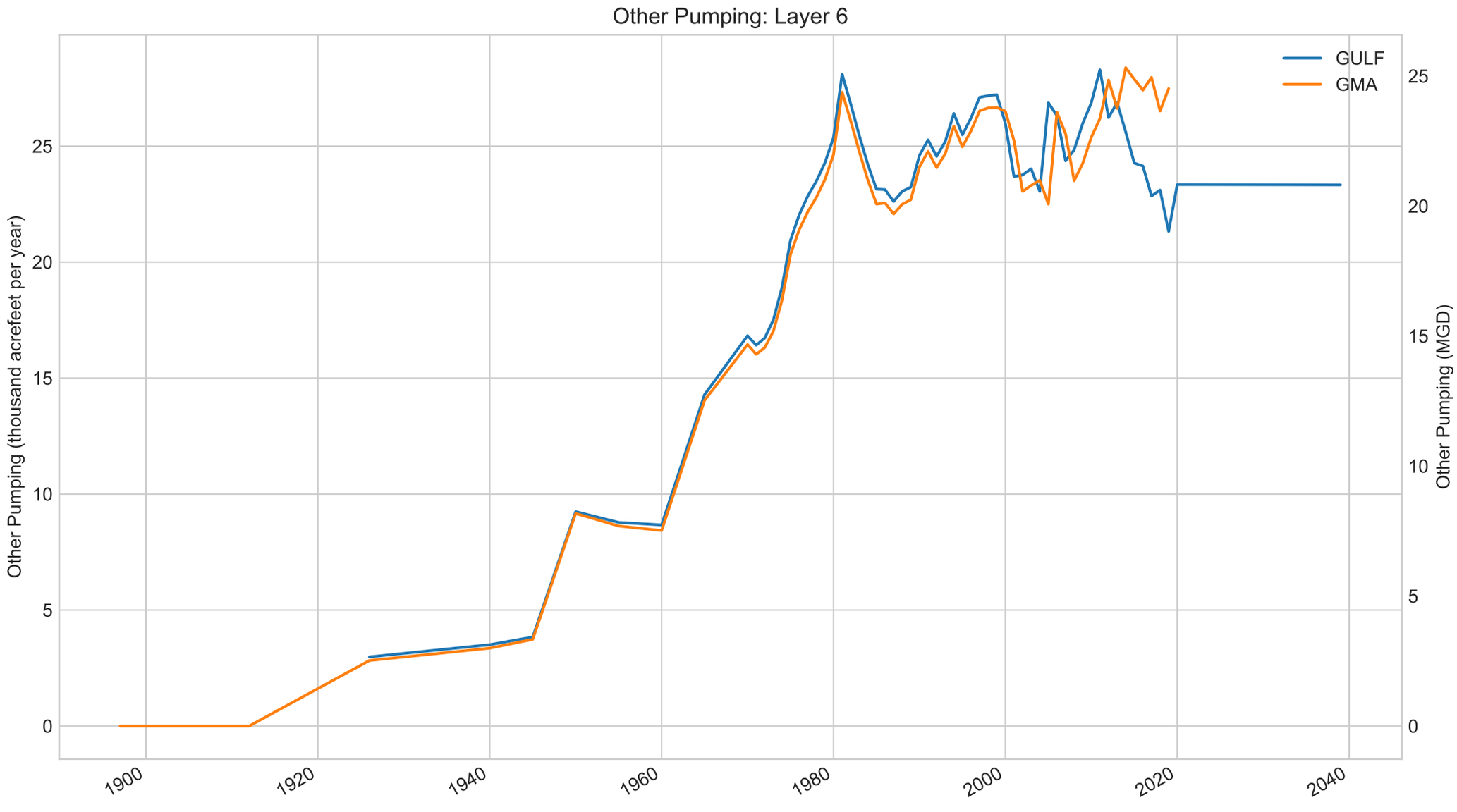

GMA Other Pumping
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Other Pumping (million acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
0
200
400
600
800
1900
1920
1940
1960
1980
2000
2020

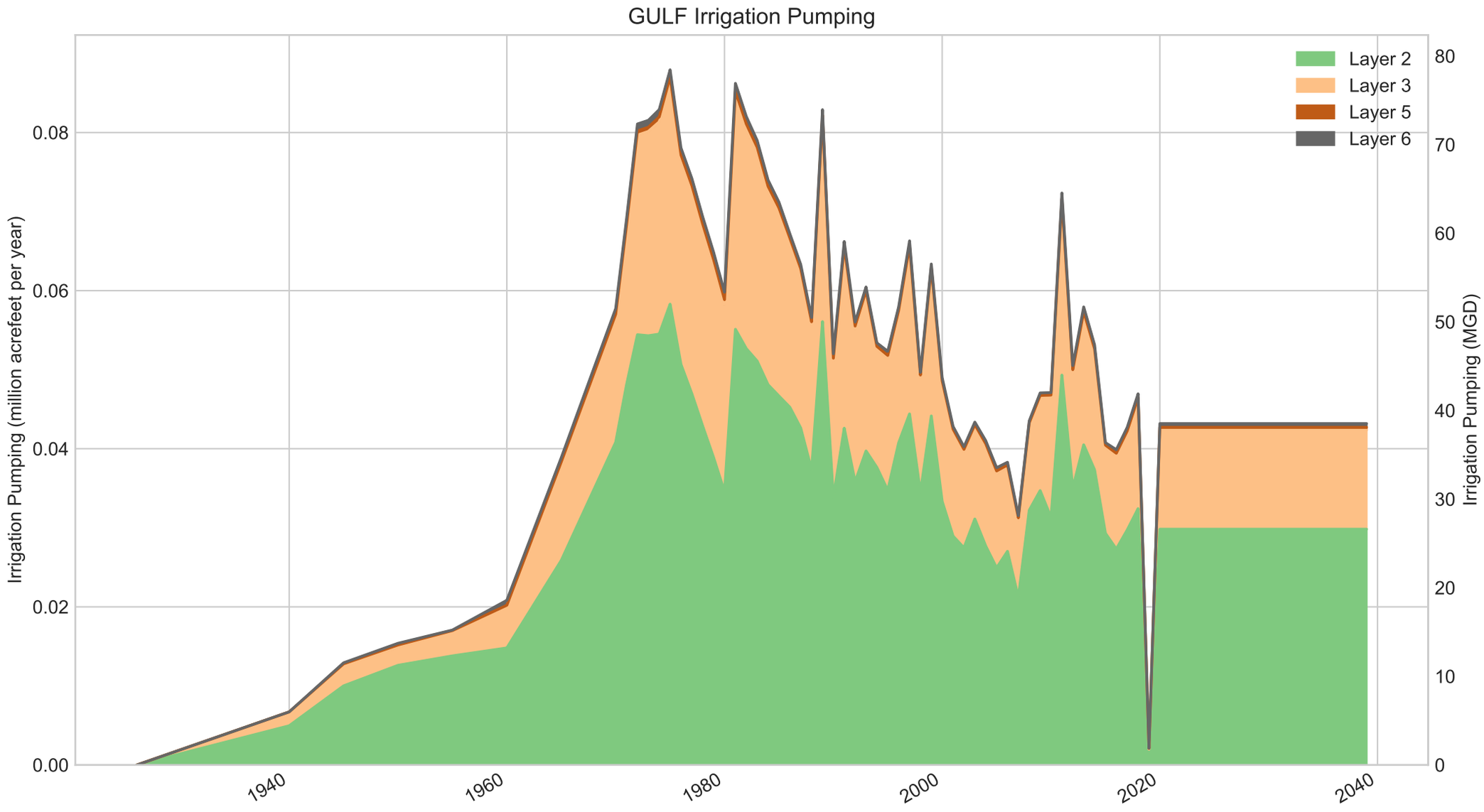

Other Pumping: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
100
200
300
400
500
600
700
0
100
200
300
400
500
600
1900
1920
1940
1960
1980
2000
2020
2040

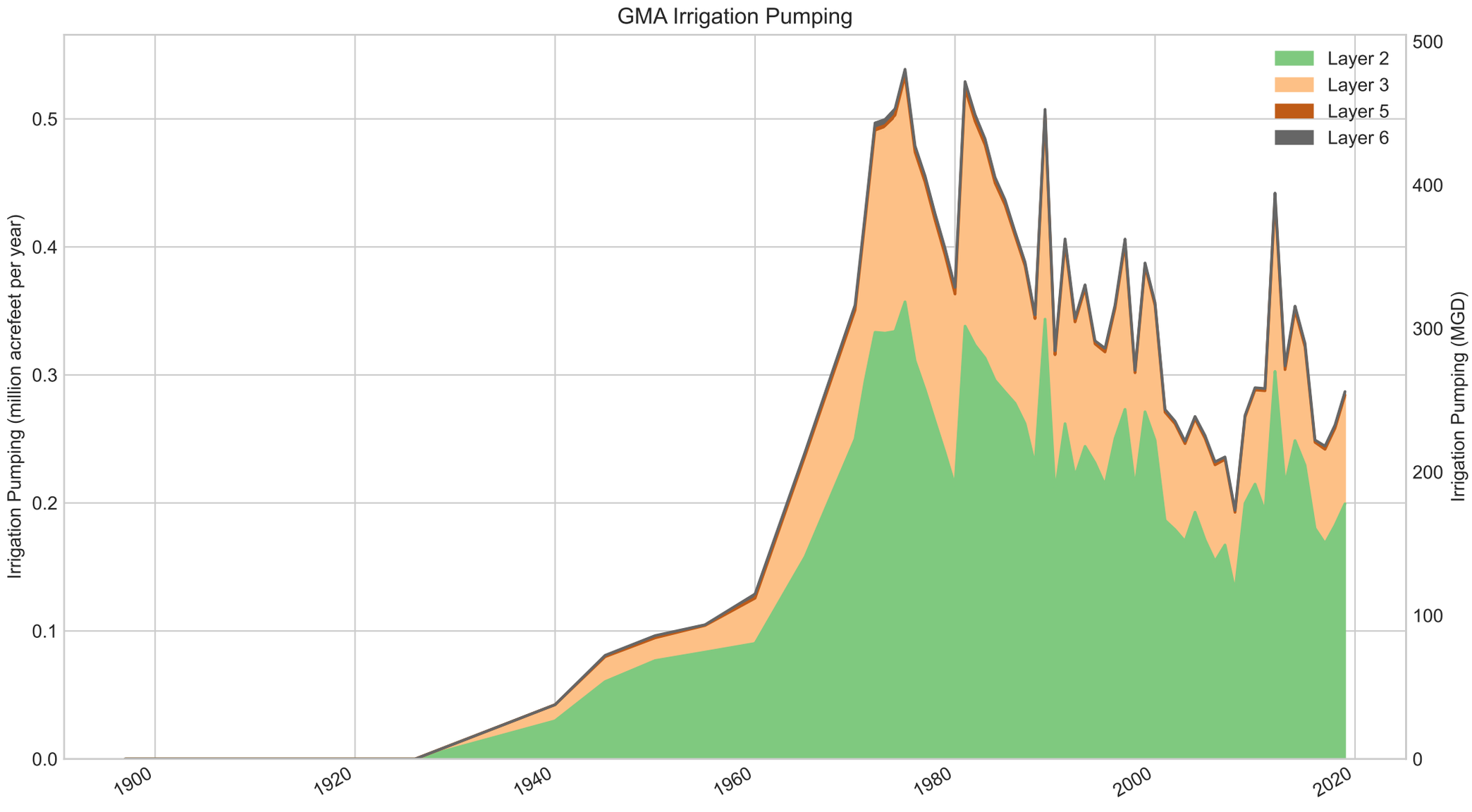

Other Pumping: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
300
250
200
150
100
50
0
250
200
150
100
50
0
1900
1920
1940
1960
1980
2000
2020
2040

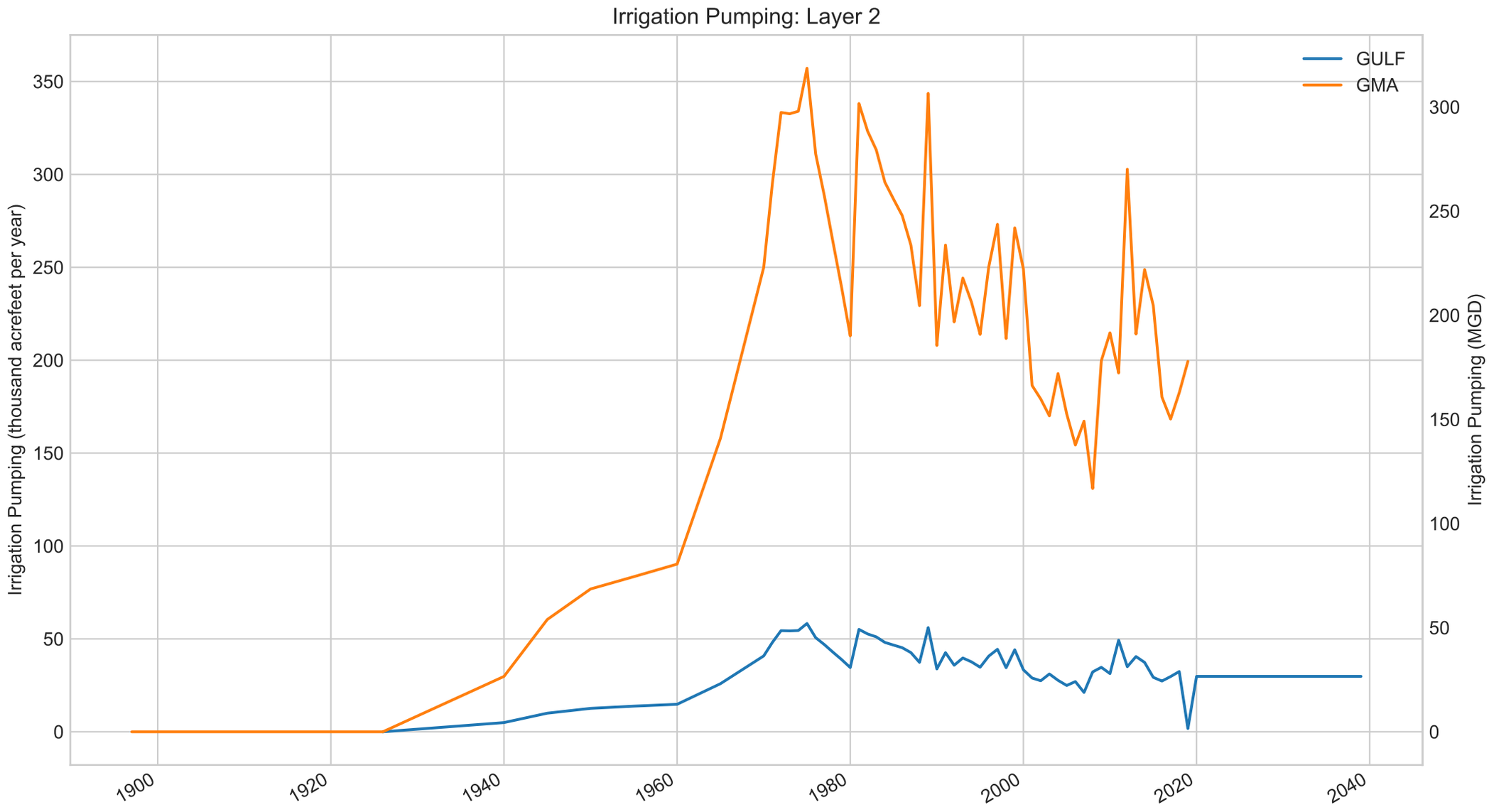

Other Pumping: Layer 4
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1900
1920
1940
1960
1980
2000
2020

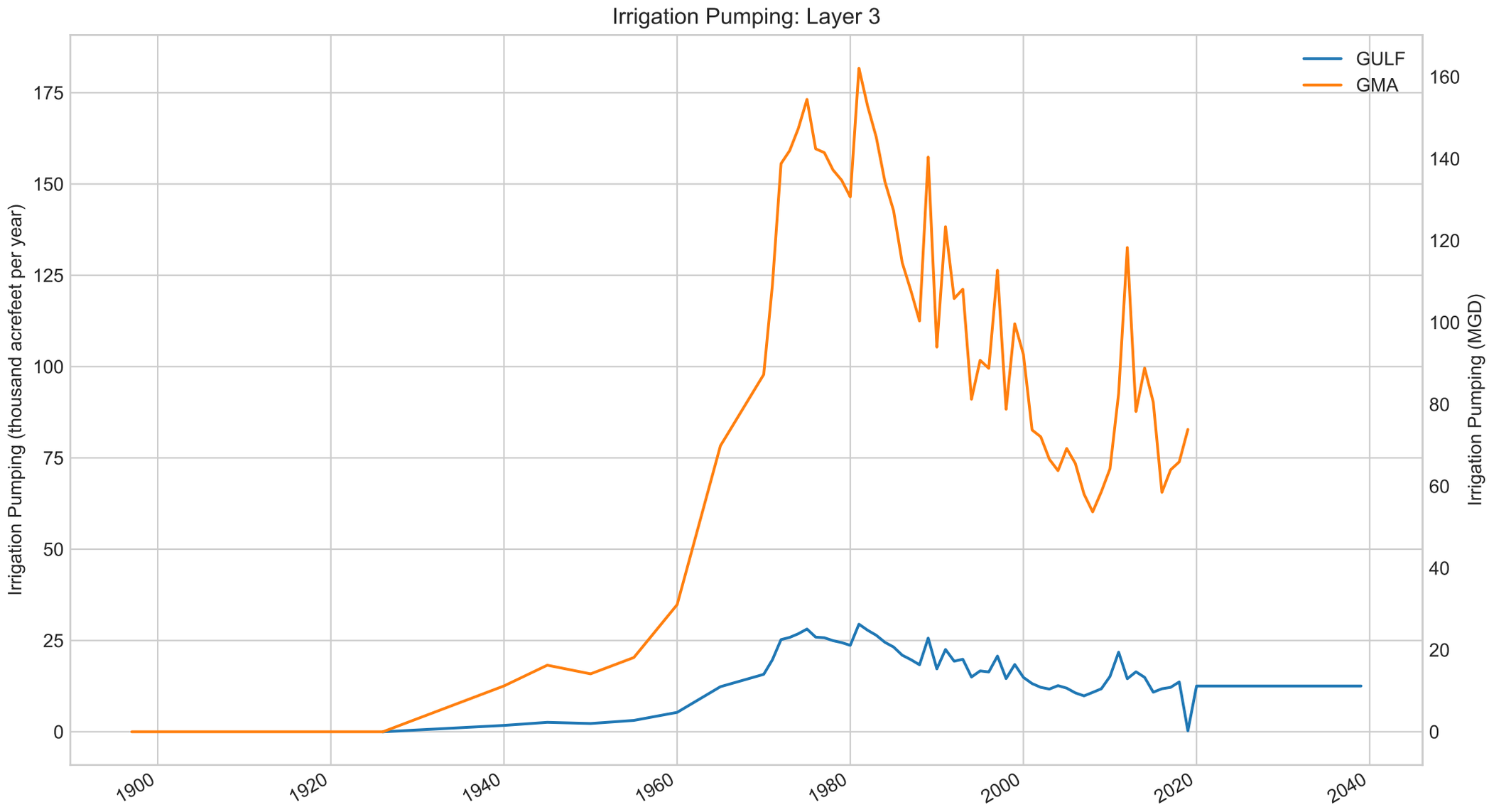

Other Pumping: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
60
70
1900
1920
1940
1960
1980
2000
2020
2040

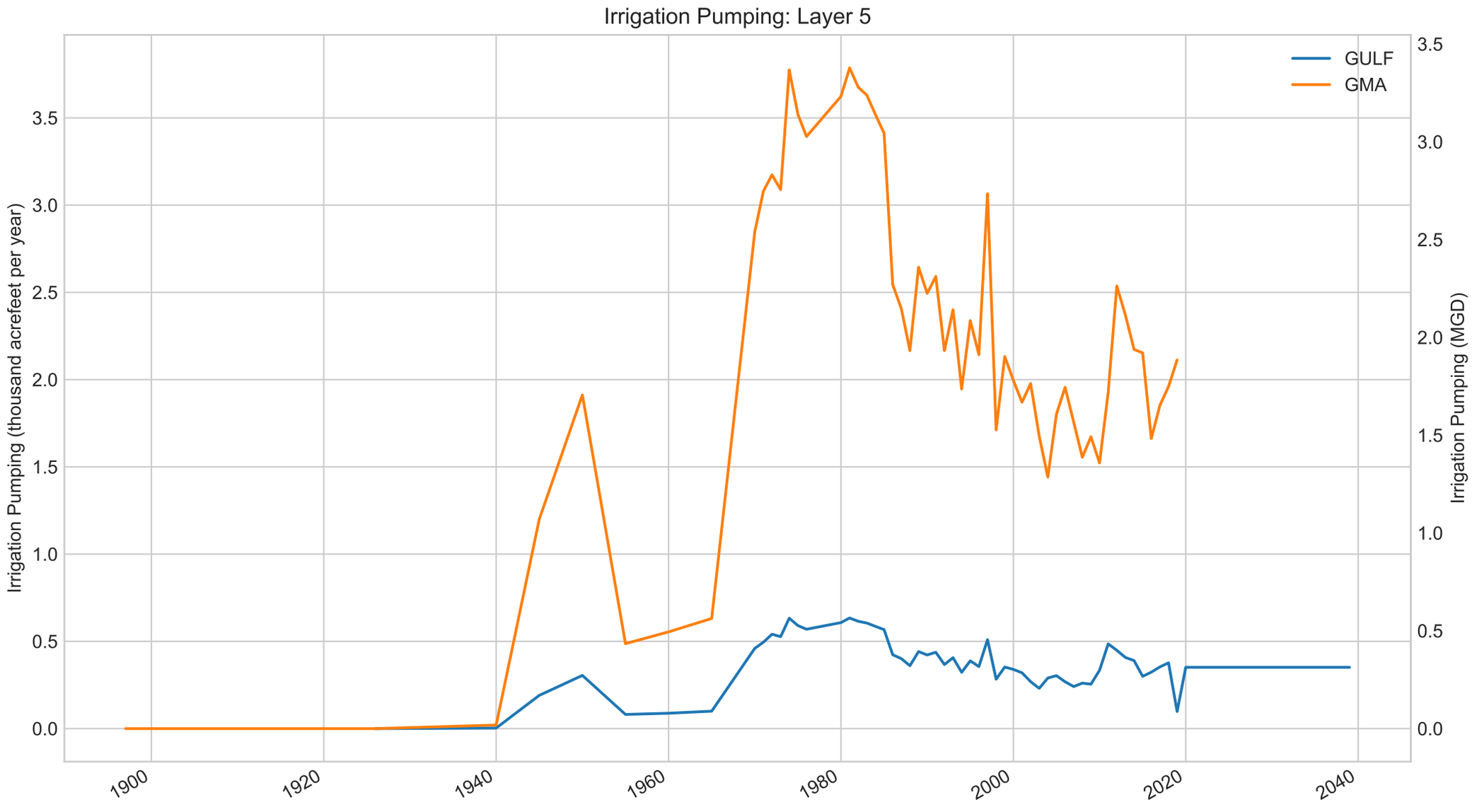

Other Pumping: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
1900
1920
1940
1960
1980
2000
2020
2040

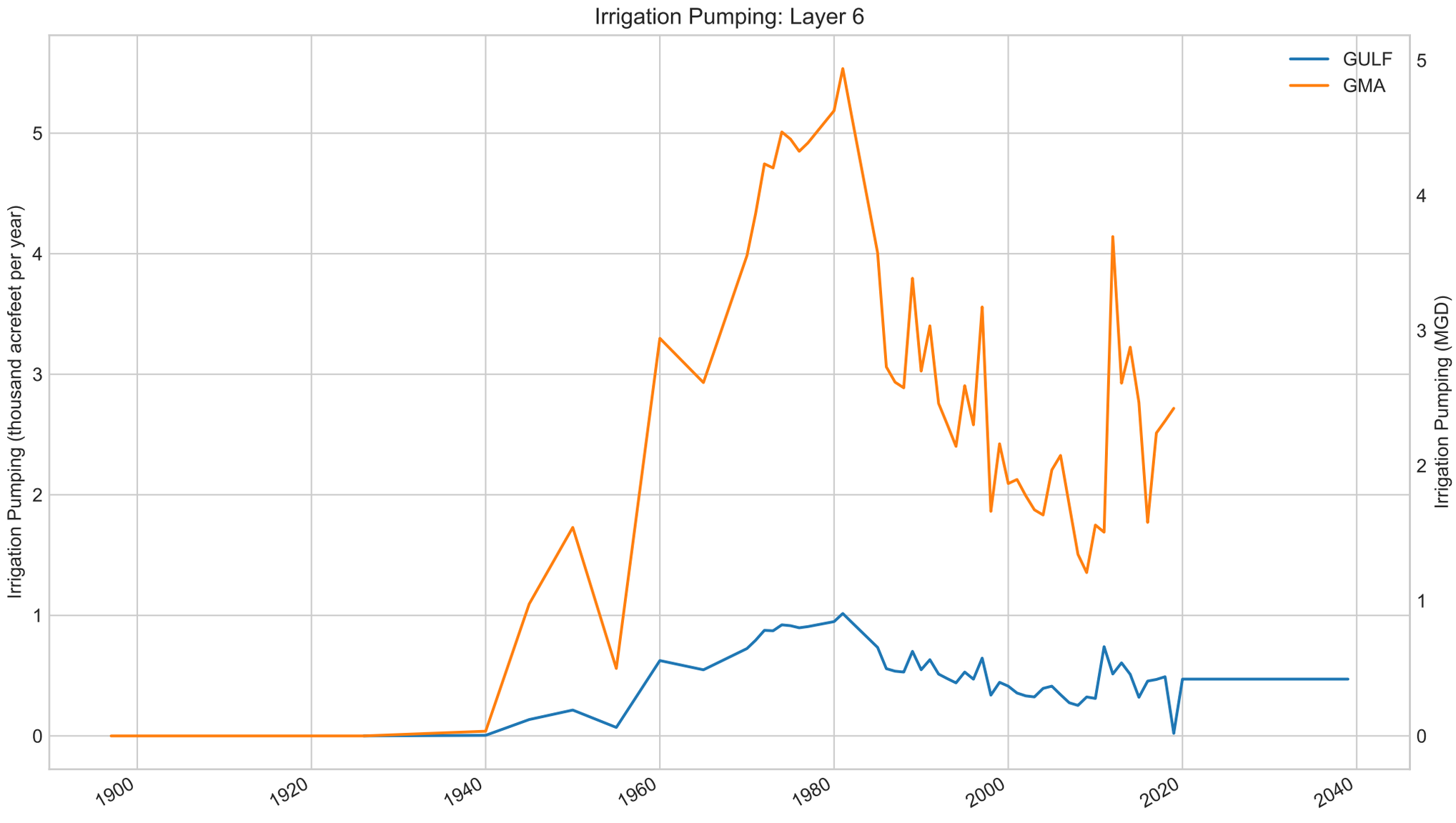

GULF Irrigation Pumping
Layer 2
Layer 3
Layer 5
Layer 6
Irrigation Pumping (million acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0
10
20
30
40
50
60
70
80
1940
1960
1980
2000
2020
2040

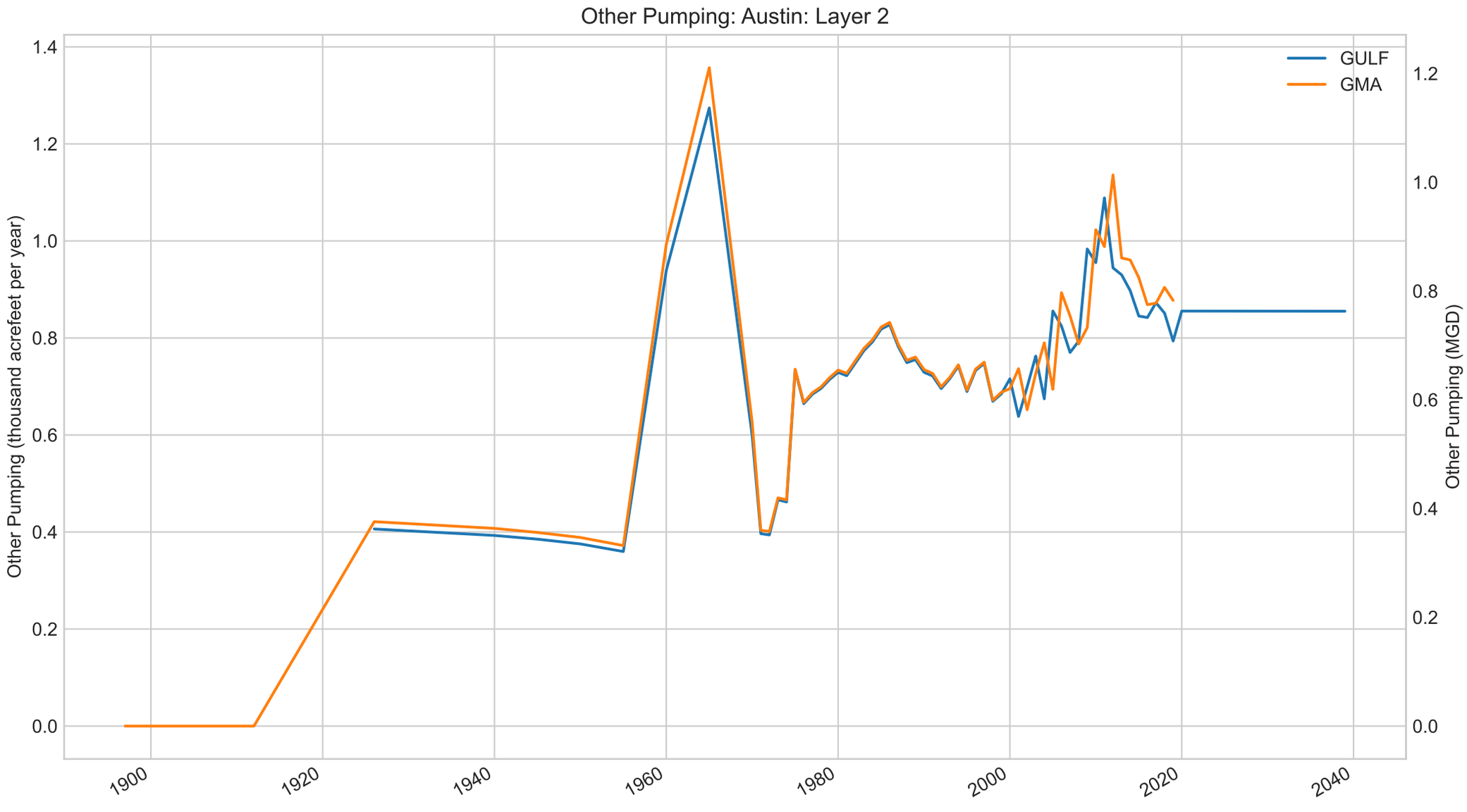

GMA Irrigation Pumping
Layer 2
Layer 3
Layer 5
Layer 6
Irrigation Pumping (million acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0
100
200
300
400
500
1900
1920
1940
1960
1980
2000
2020

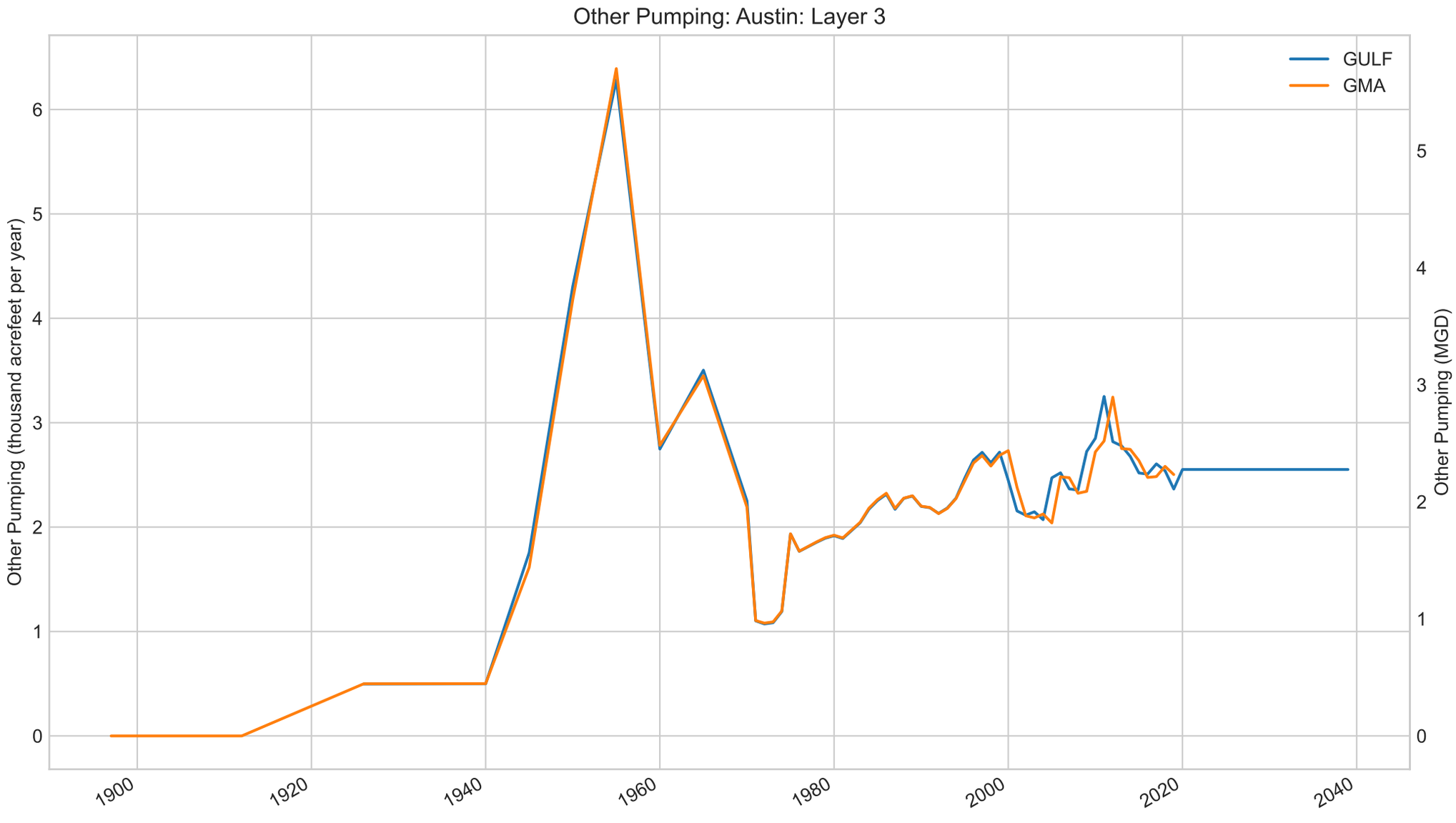

Irrigation Pumping: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
50
100
150
200
250
300
350
1900
1920
1940
1960
1980
2000
2020
2040

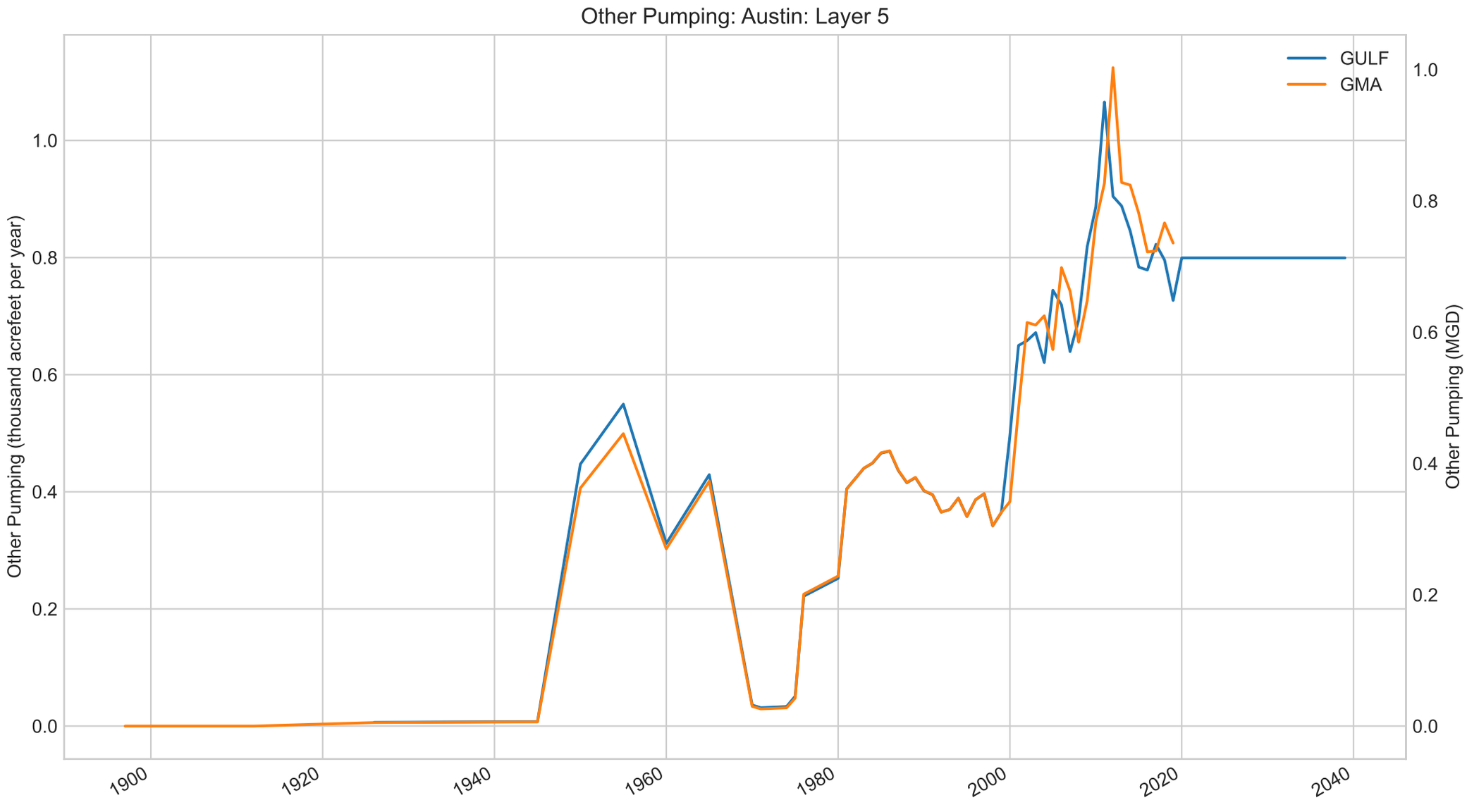

Irrigation Pumping: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
25
50
75
100
125
150
175
0
20
40
60
80
100
120
140
160
1900
1920
1940
1960
1980
2000
2020
2040

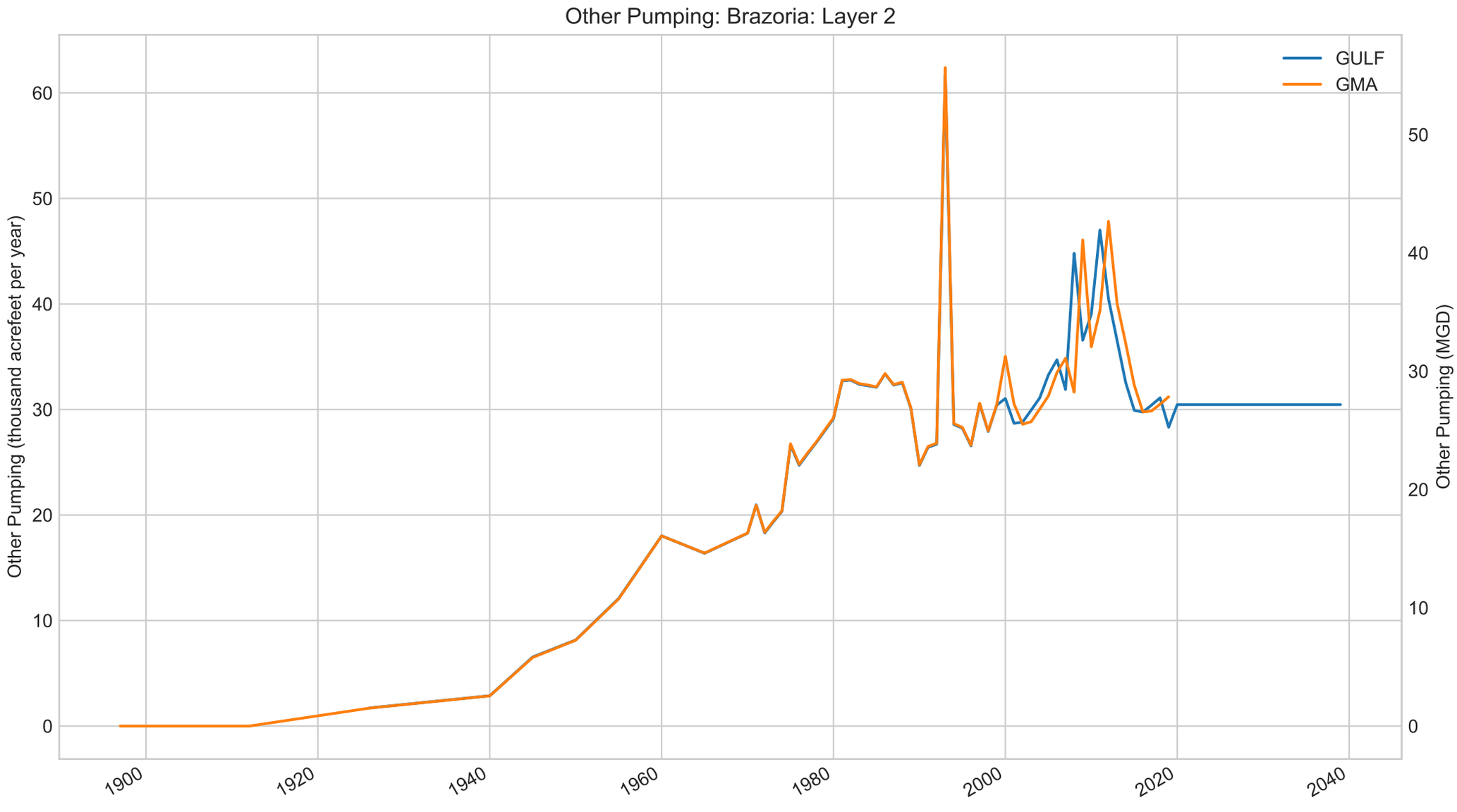

Irrigation Pumping: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1900
1920
1940
1960
1980
2000
2020
2040

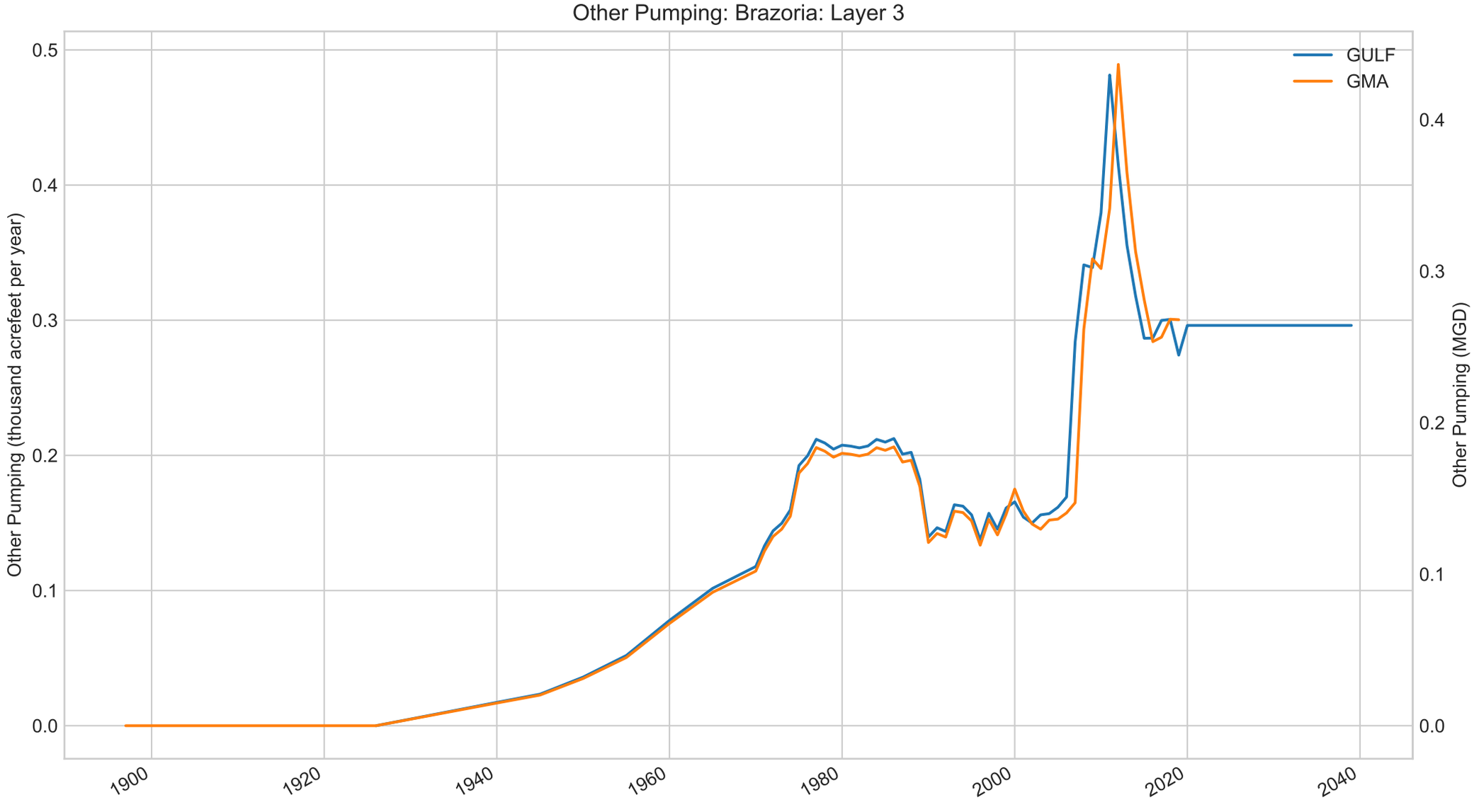

Irrigation Pumping: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

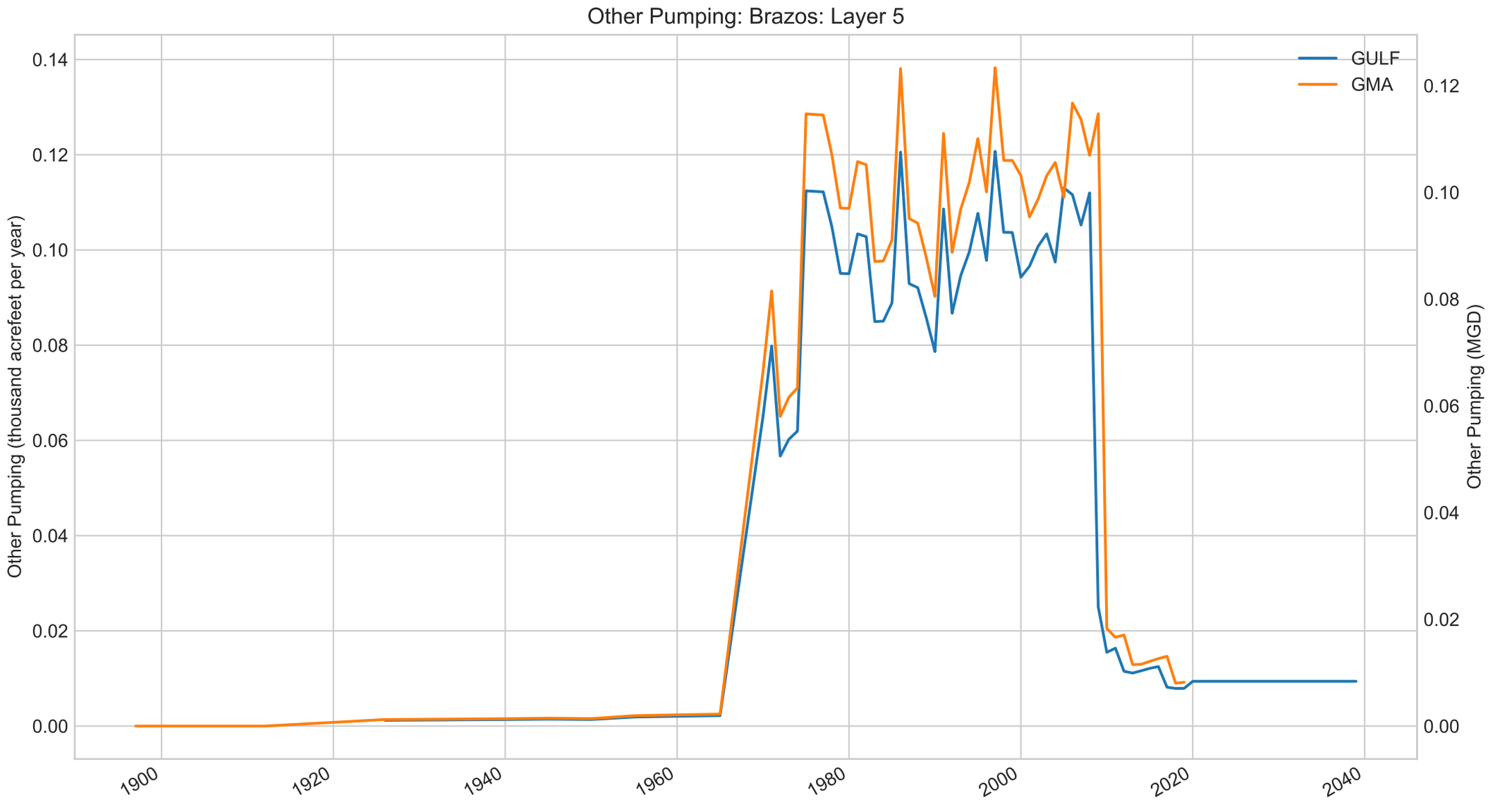

Other Pumping: Austin: Layer 2
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

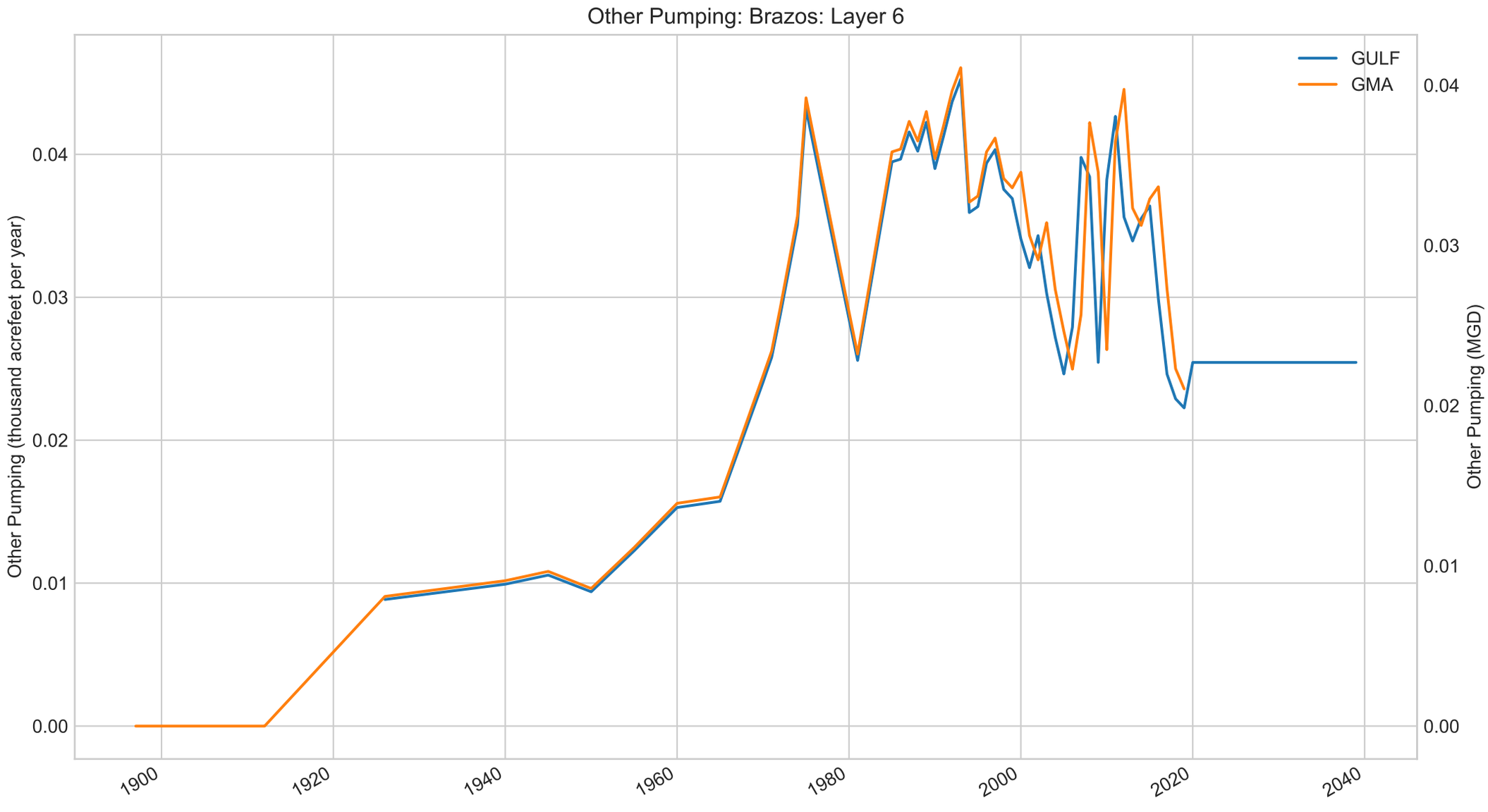

Other Pumping: Austin: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
1900
1920
1940
1960
1980
2000
2020
2040

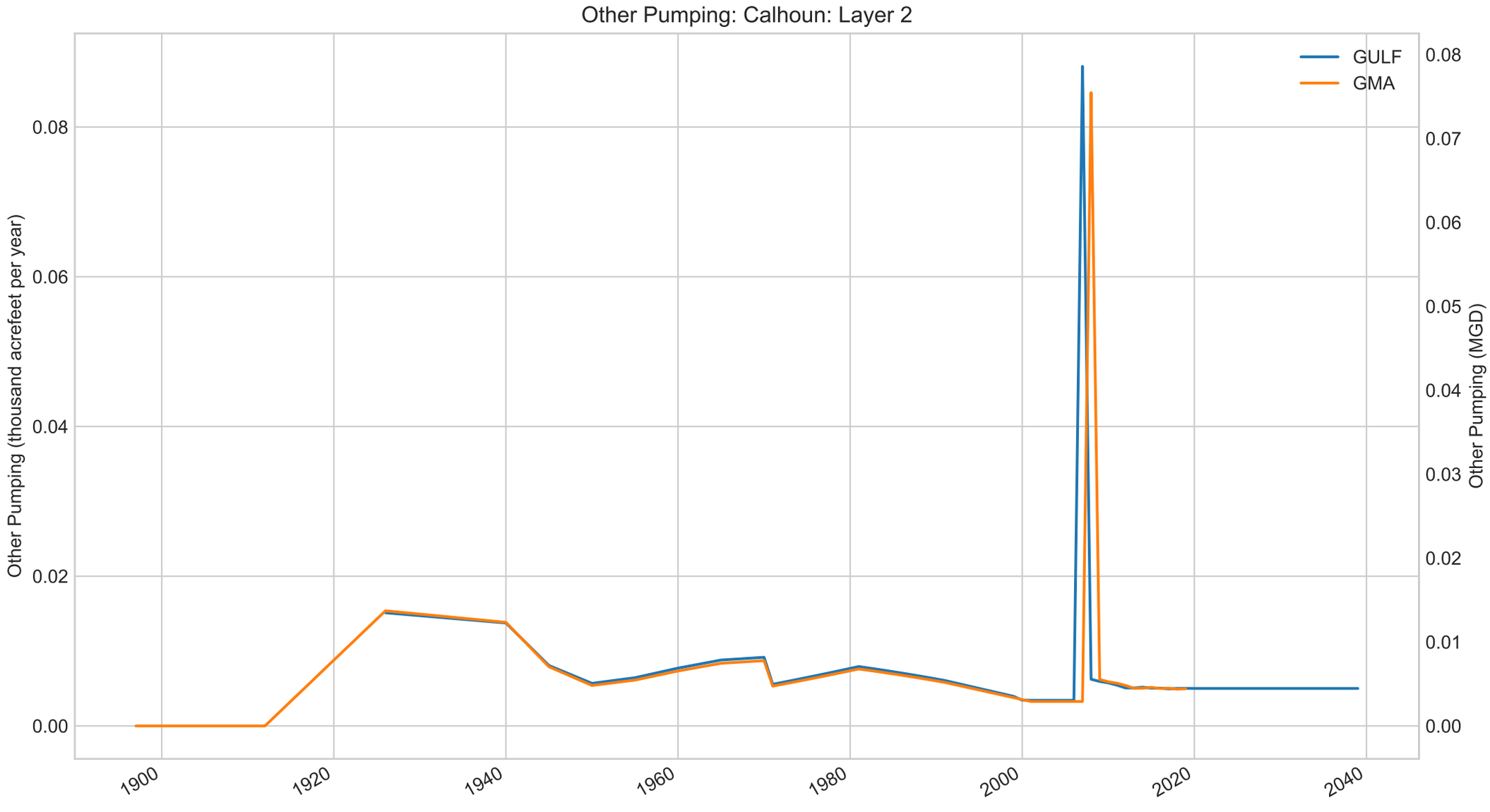

Other Pumping: Austin: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1900
1920
1940
1960
1980
2000
2020
2040

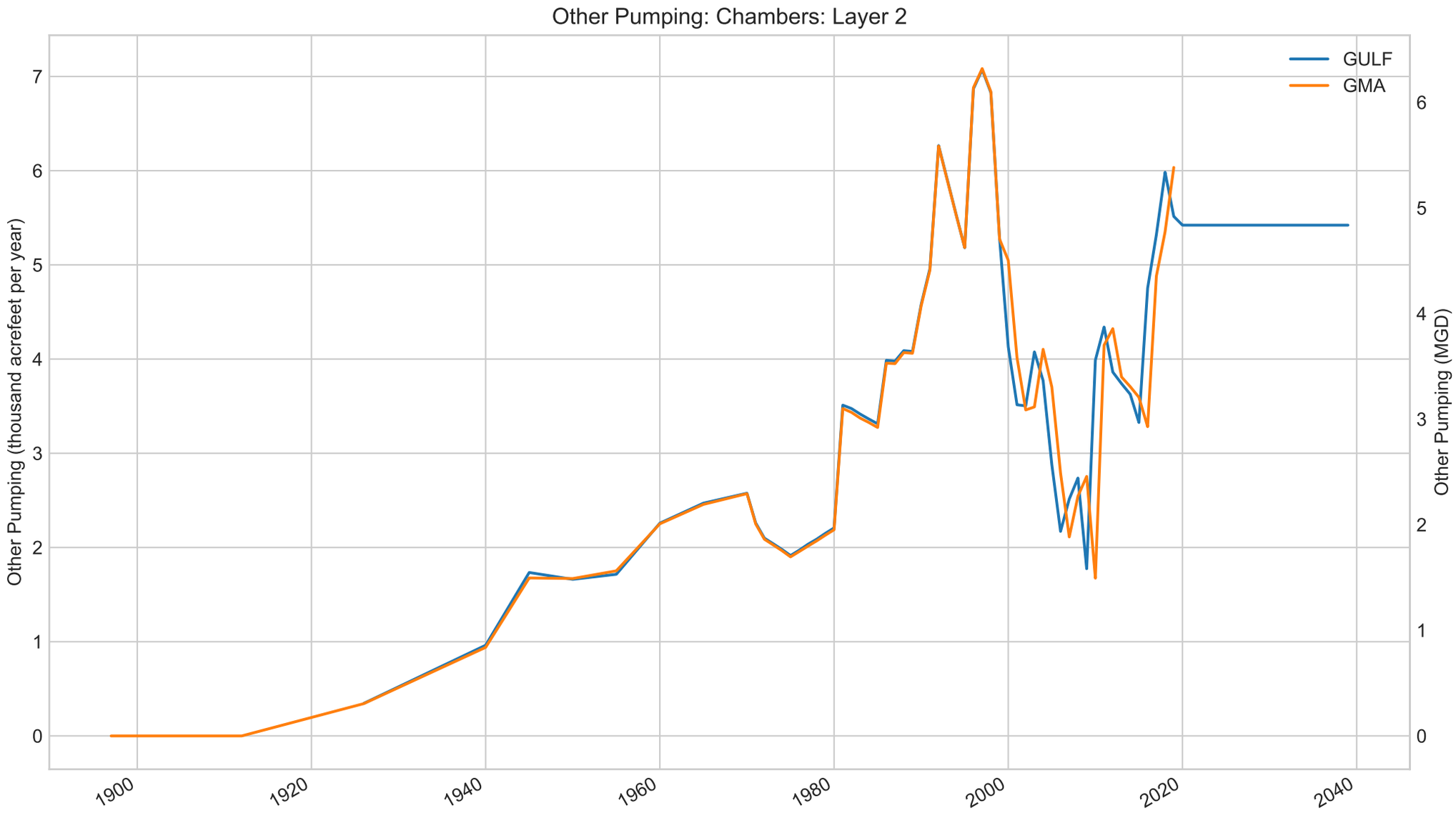

Other Pumping: Brazoria: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
60
1900
1920
1940
1960
1980
2000
2020
2040

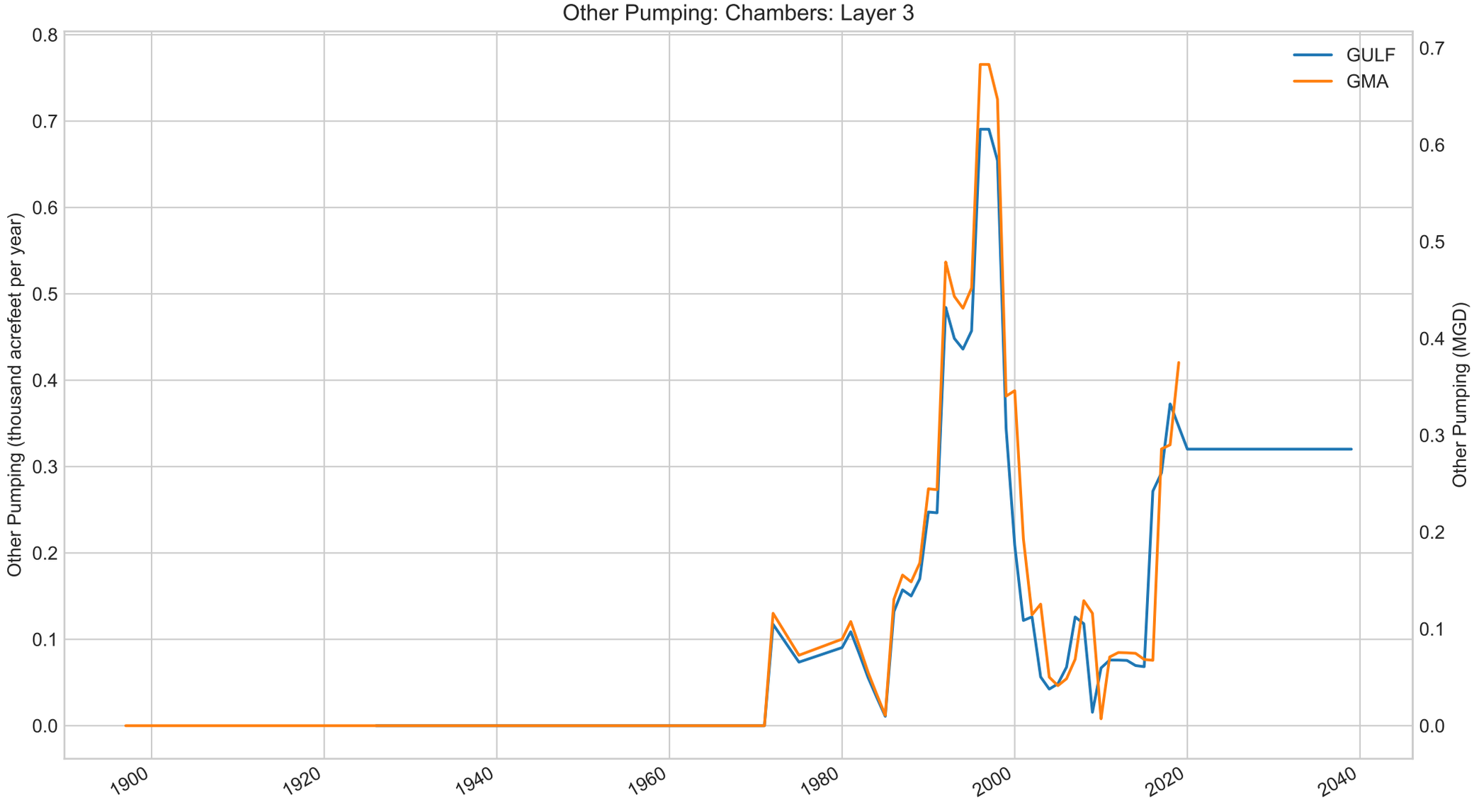

Other Pumping: Brazoria: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

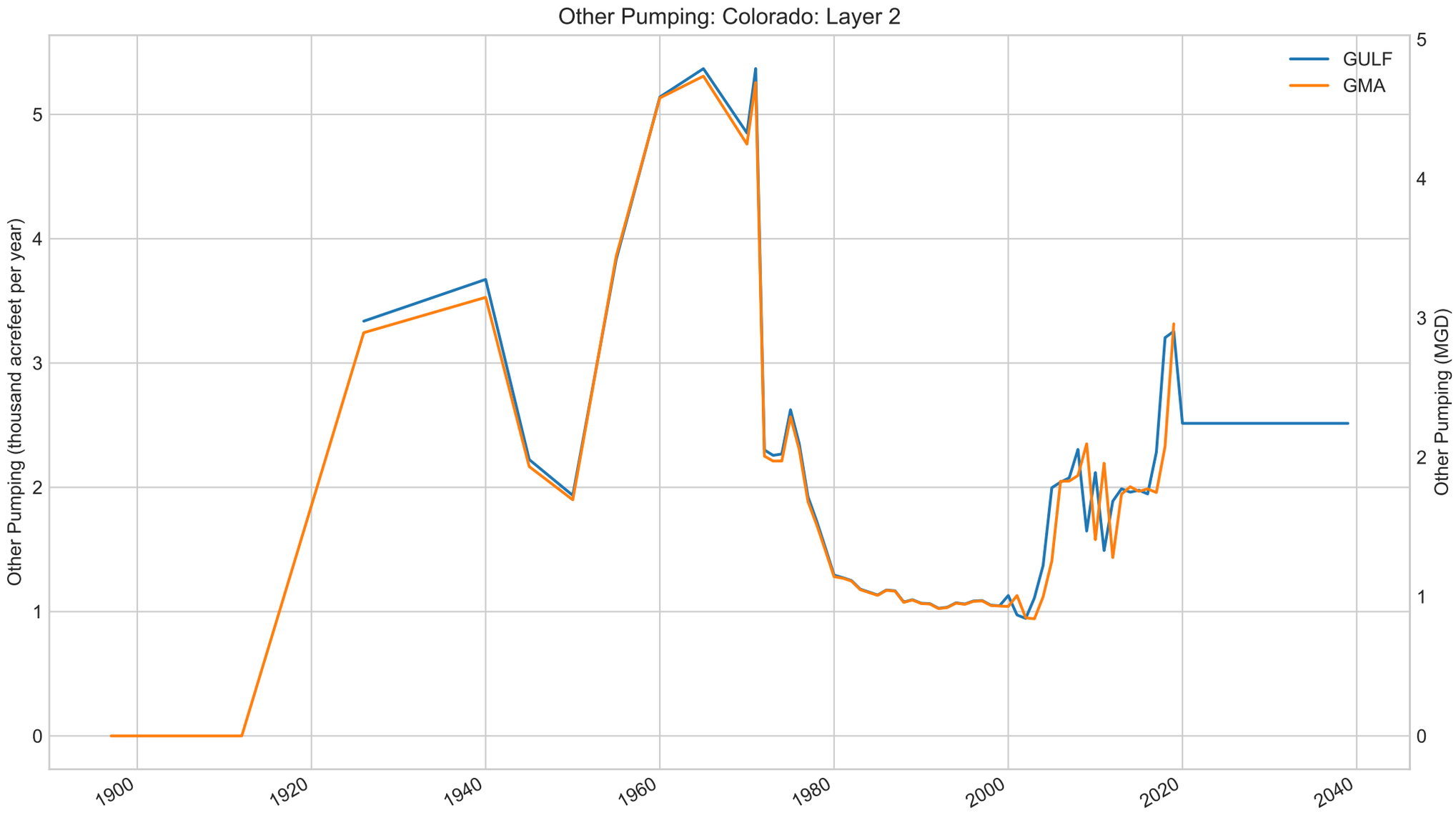

Other Pumping: Brazos: Layer 5
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

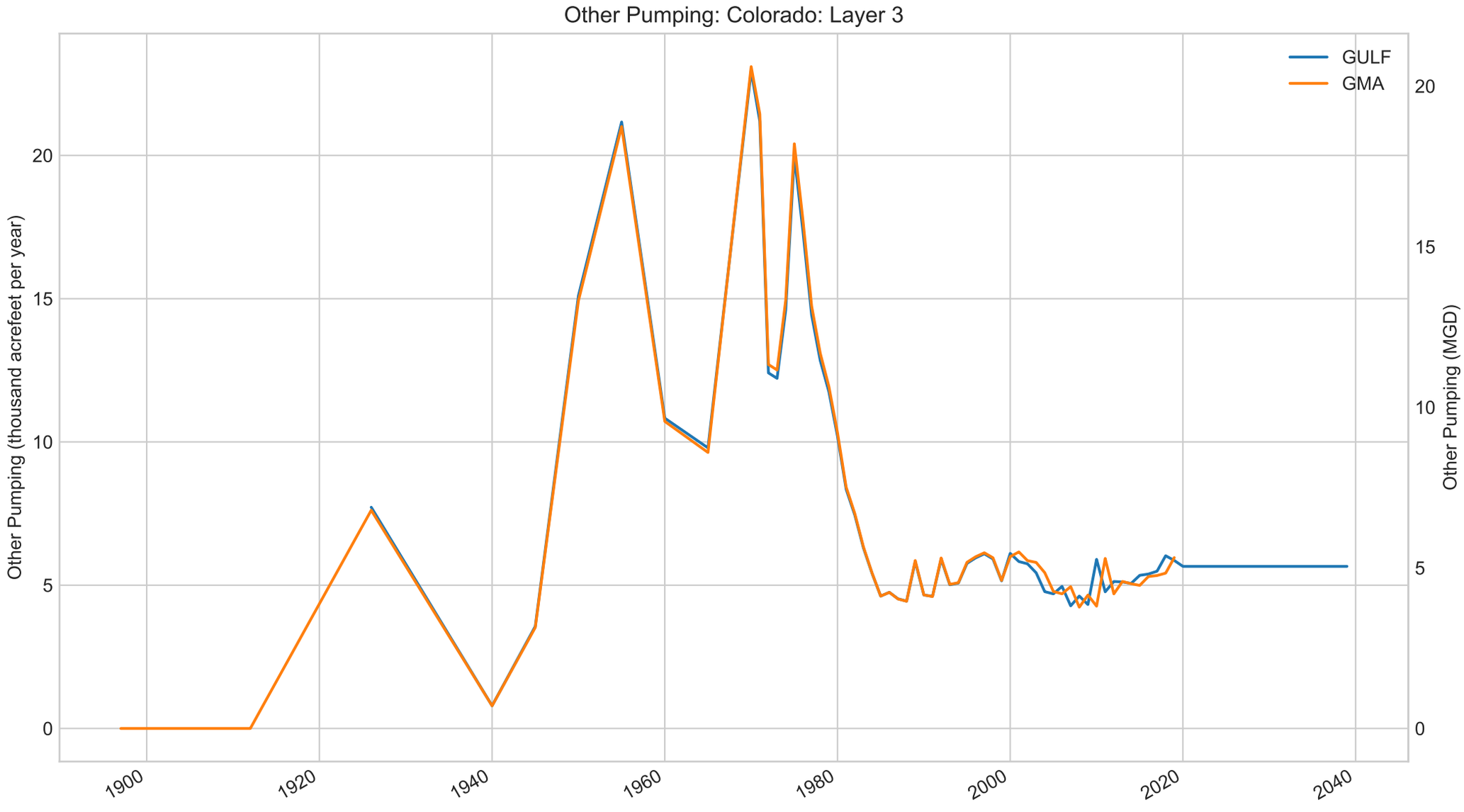

Other Pumping: Brazos: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.01
0.02
0.03
0.04
1900
1920
1940
1960
1980
2000
2020
2040

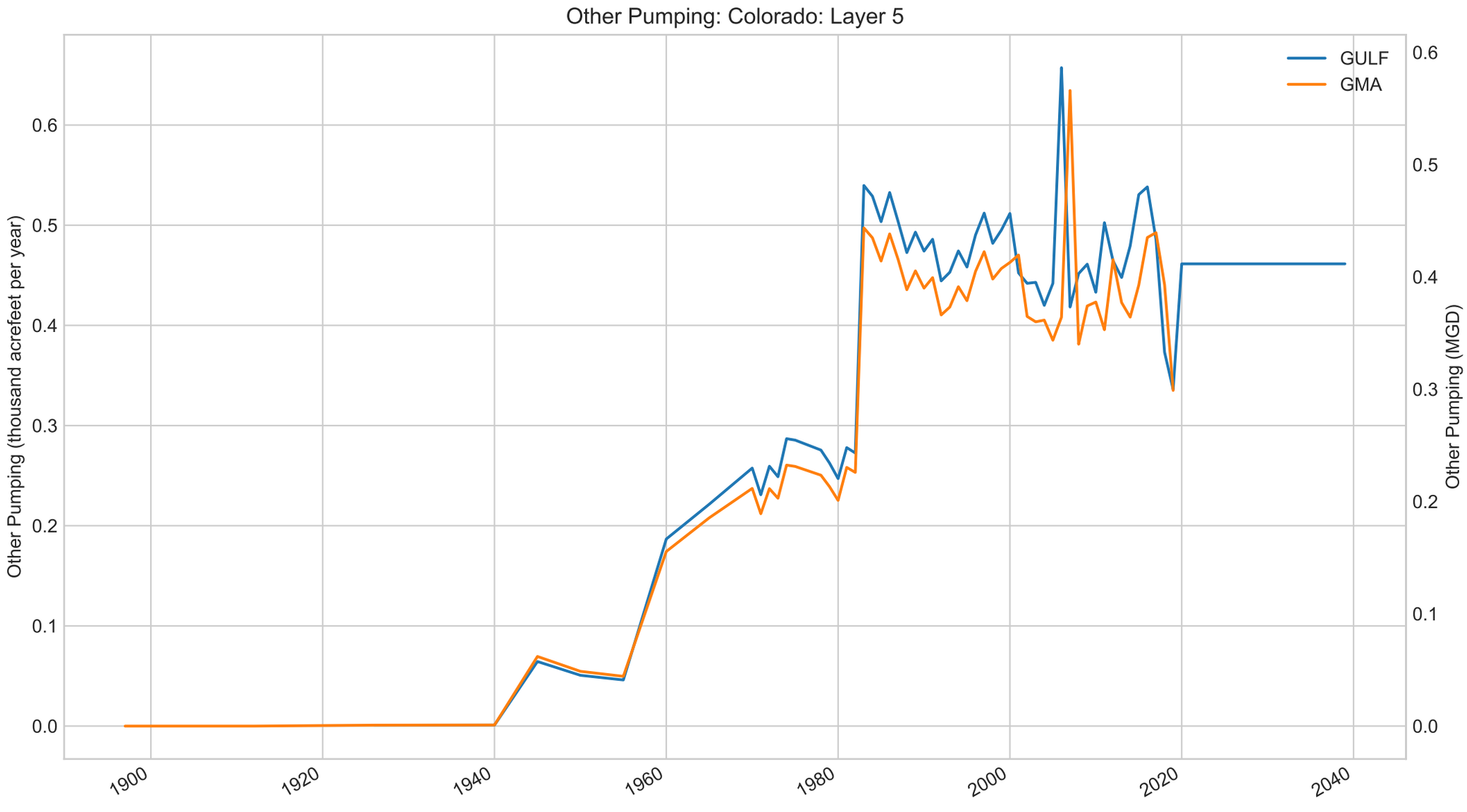

Other Pumping: Calhoun: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.01
0.03
0.05
0.07
1900
1920
1940
1960
1980
2000
2020
2040

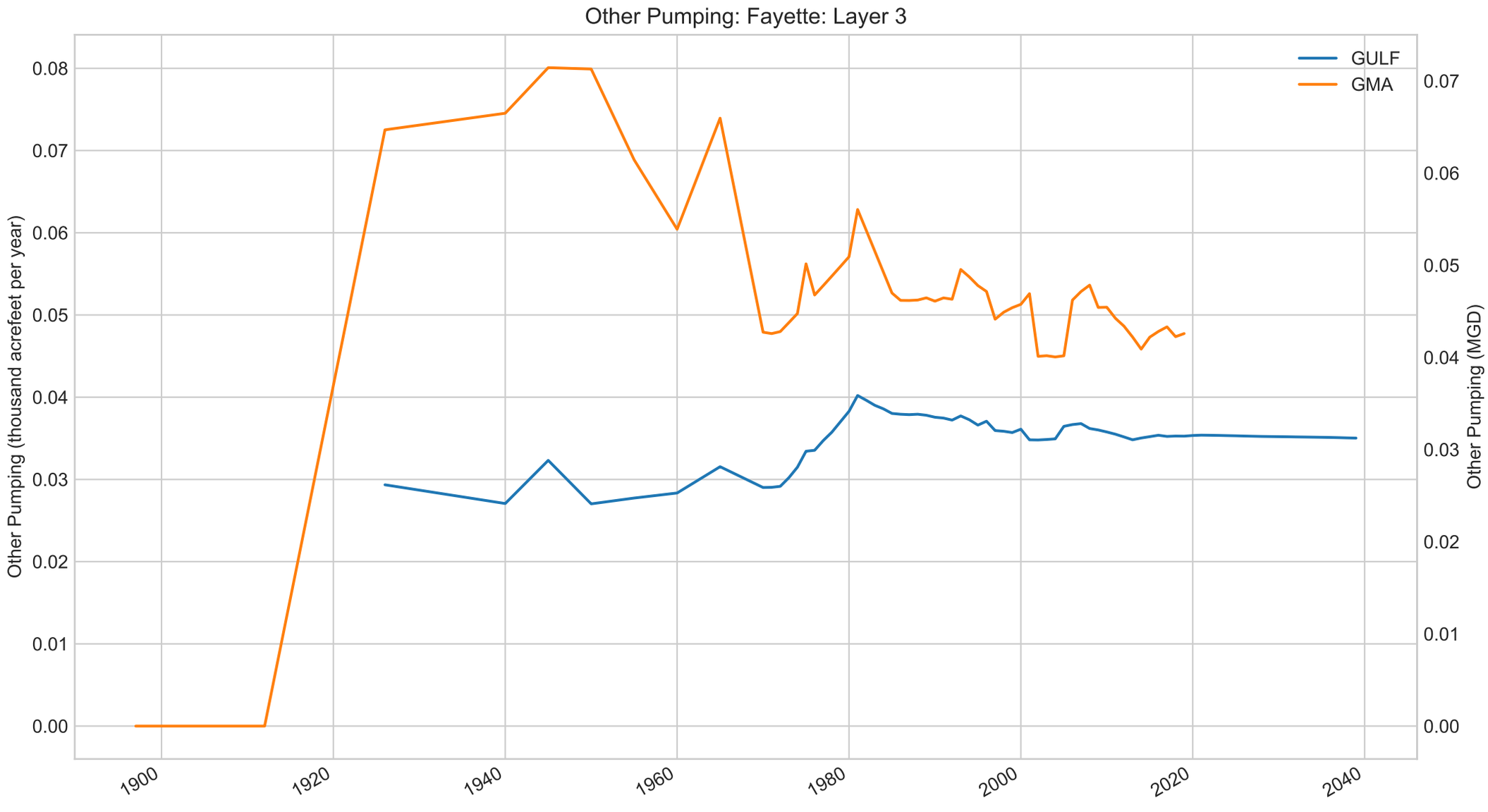

Other Pumping: Chambers: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
7
1900
1920
1940
1960
1980
2000
2020
2040

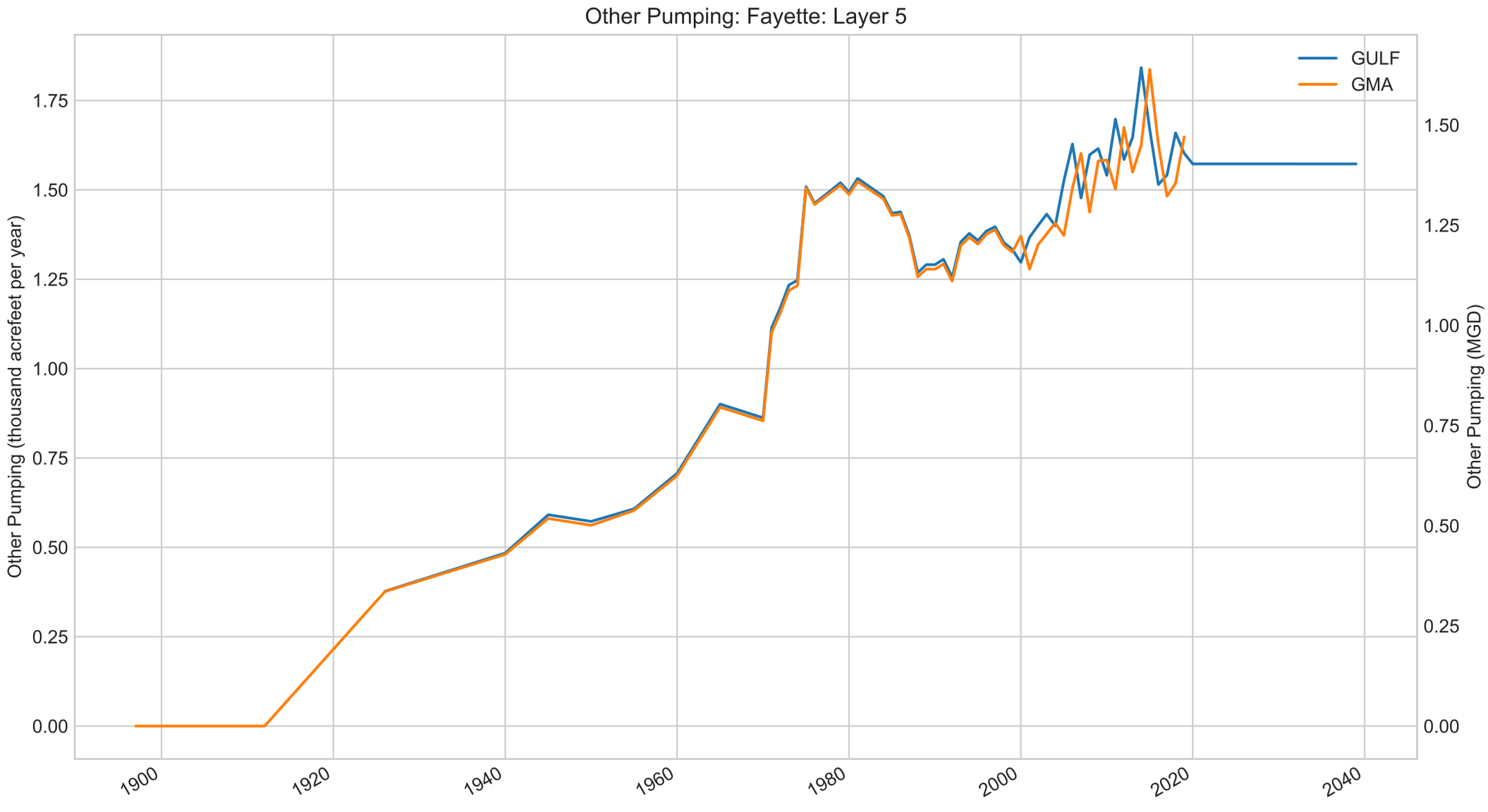

Other Pumping: Chambers: Layer 3
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
1900
1920
1940
1960
1980
2000
2020
2040

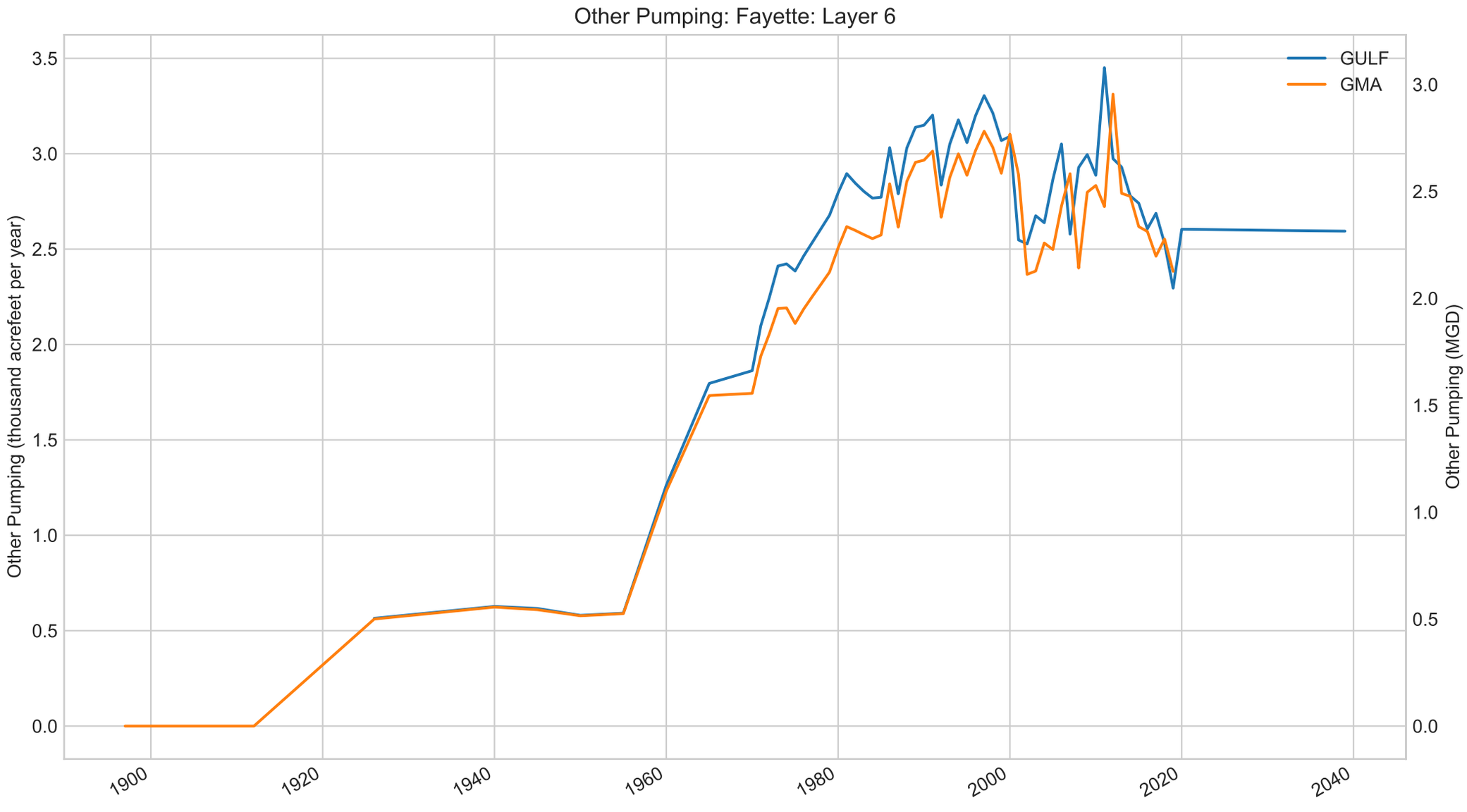

Other Pumping: Colorado: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

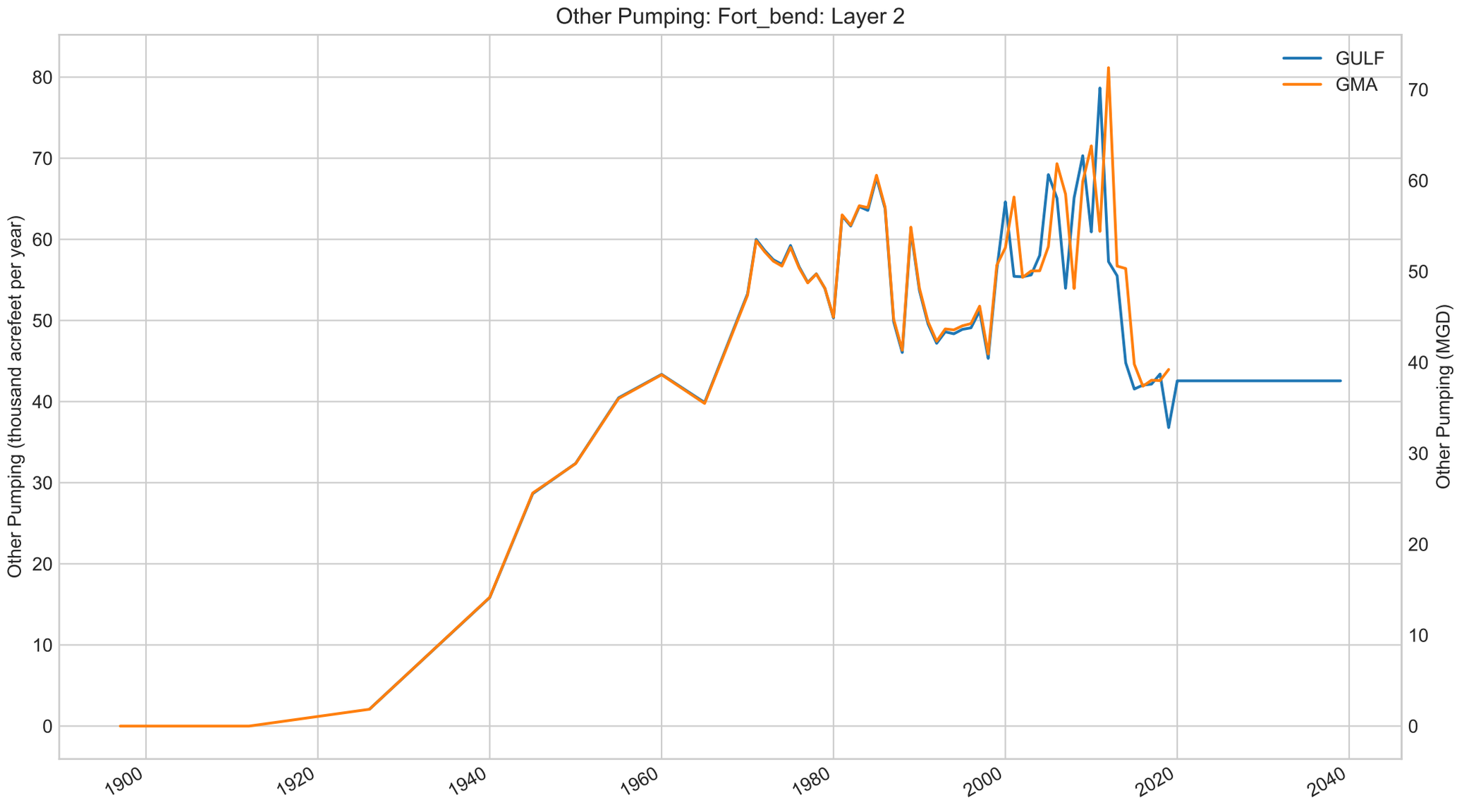

Other Pumping: Colorado: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
1900
1920
1940
1960
1980
2000
2020
2040

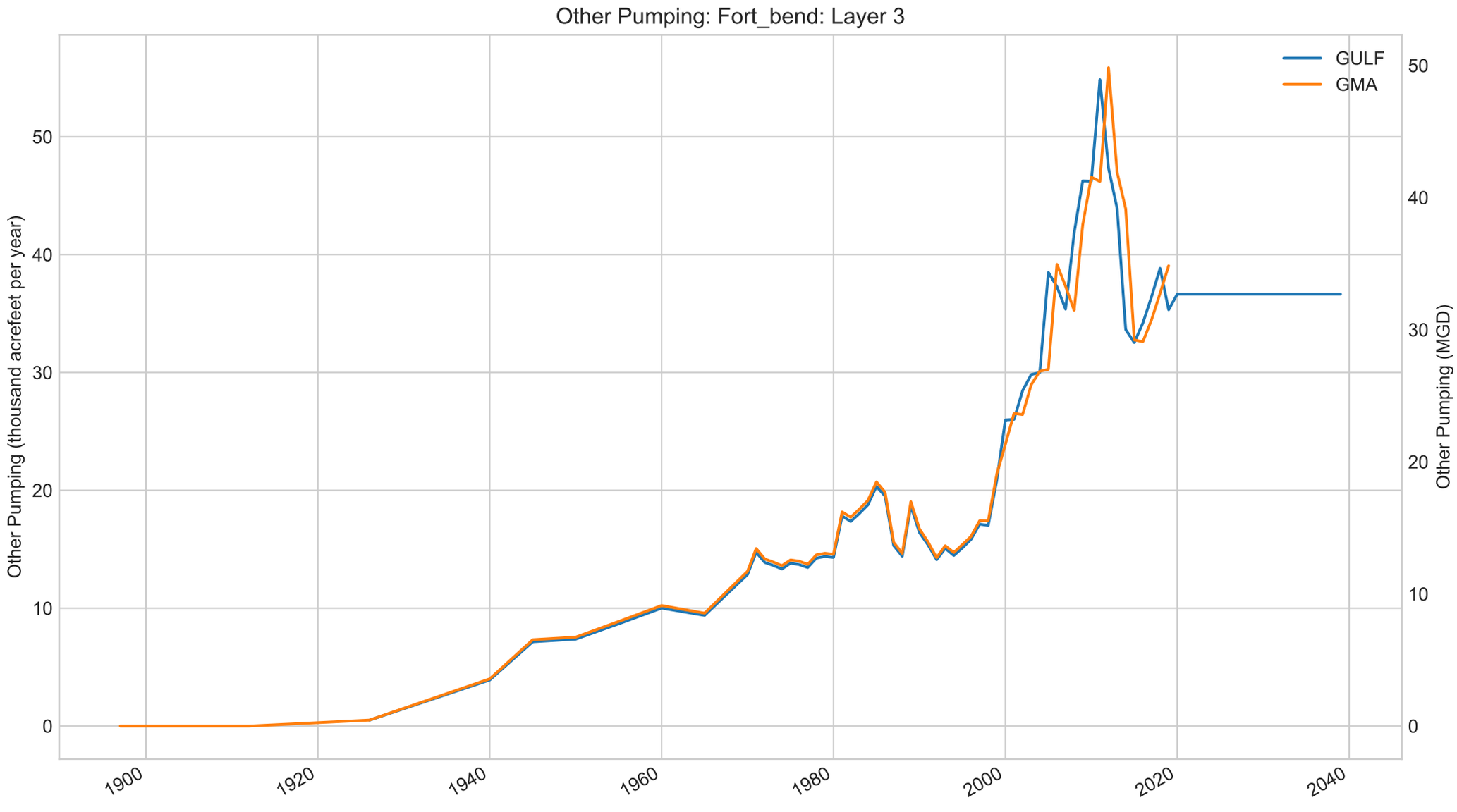

Other Pumping: Colorado: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1900
1920
1940
1960
1980
2000
2020
2040

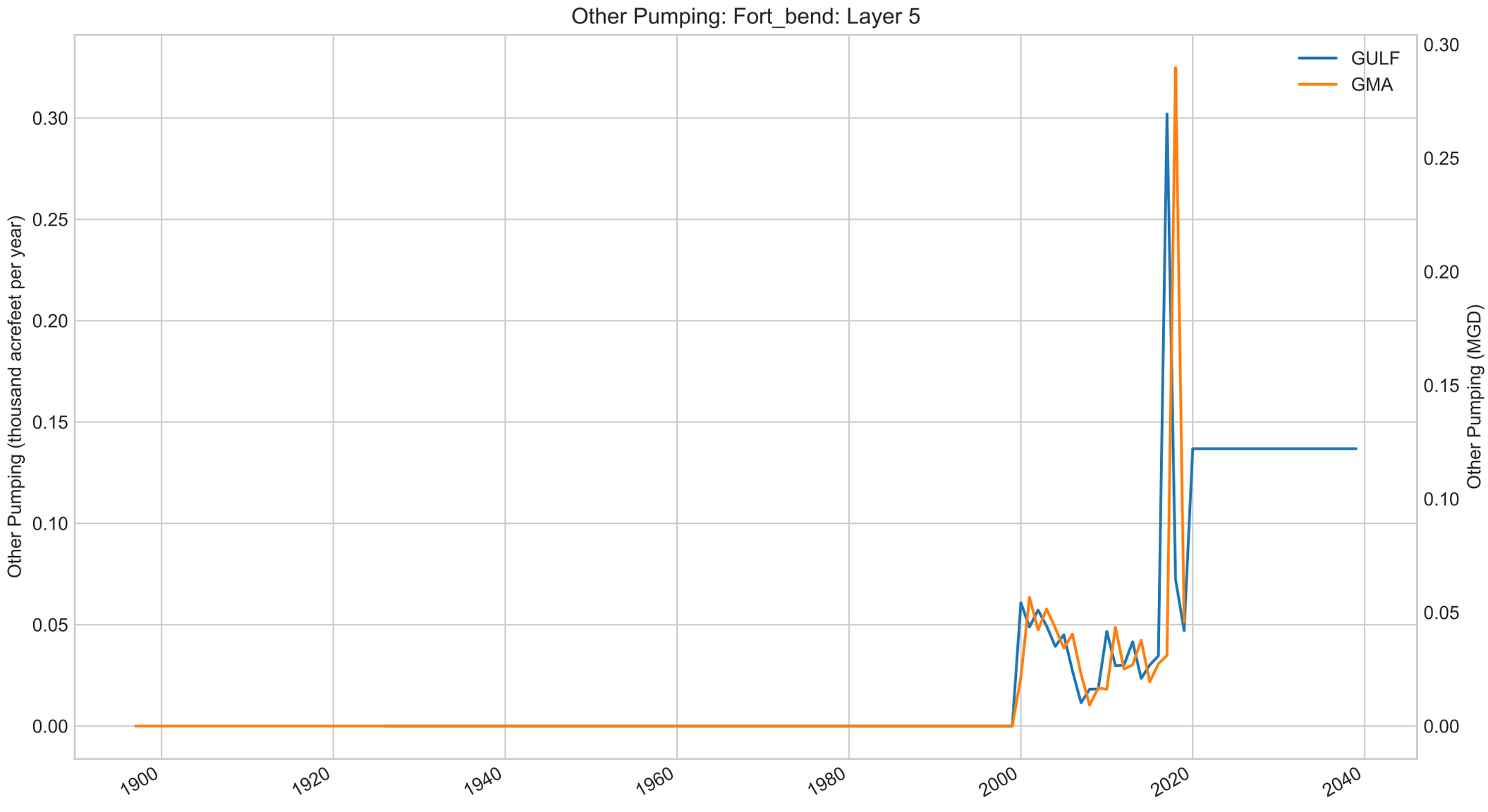

Other Pumping: Fayette: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
1900
1920
1940
1960
1980
2000
2020
2040

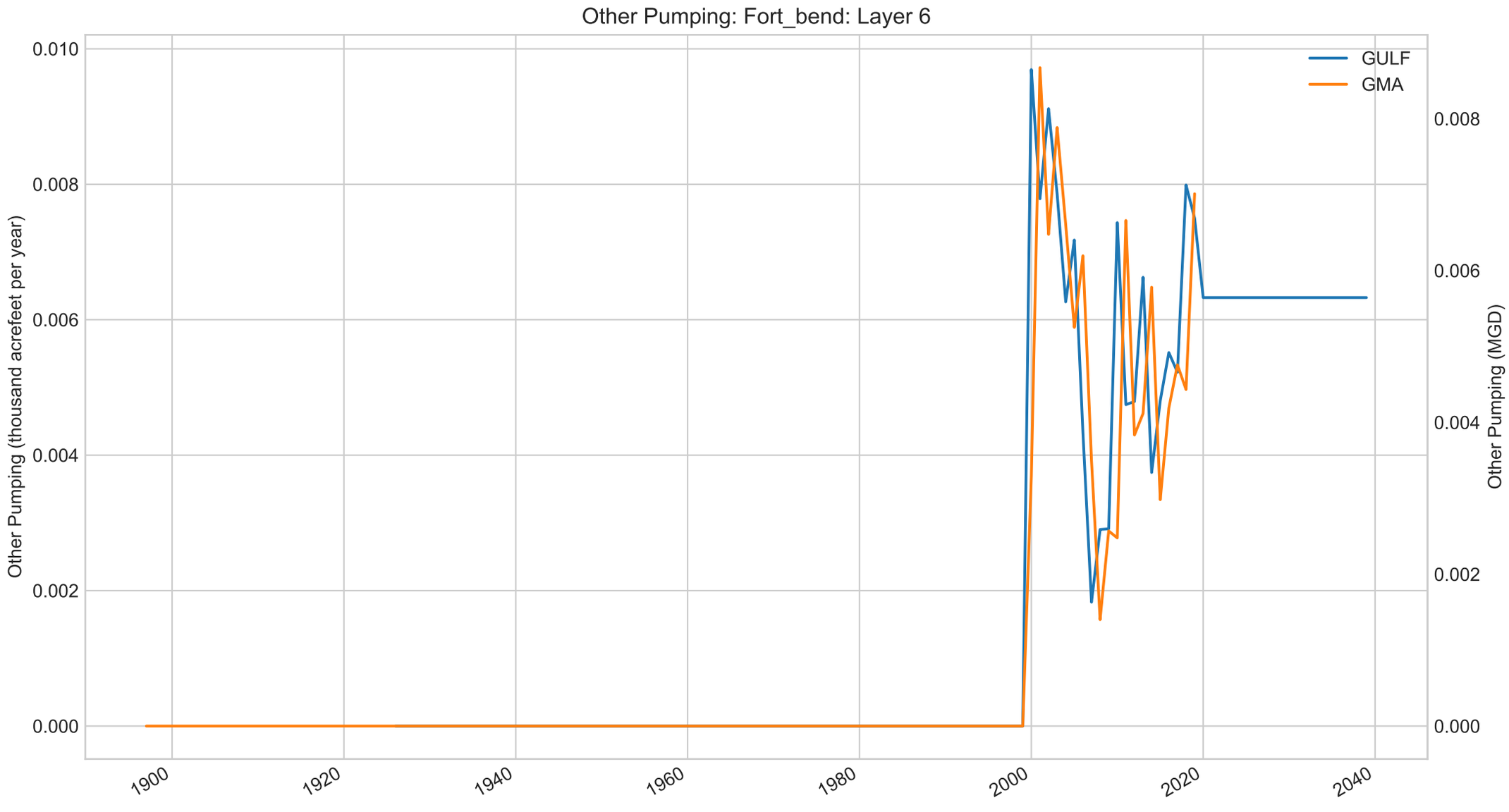

Other Pumping: Fayette: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
1900
1920
1940
1960
1980
2000
2020
2040

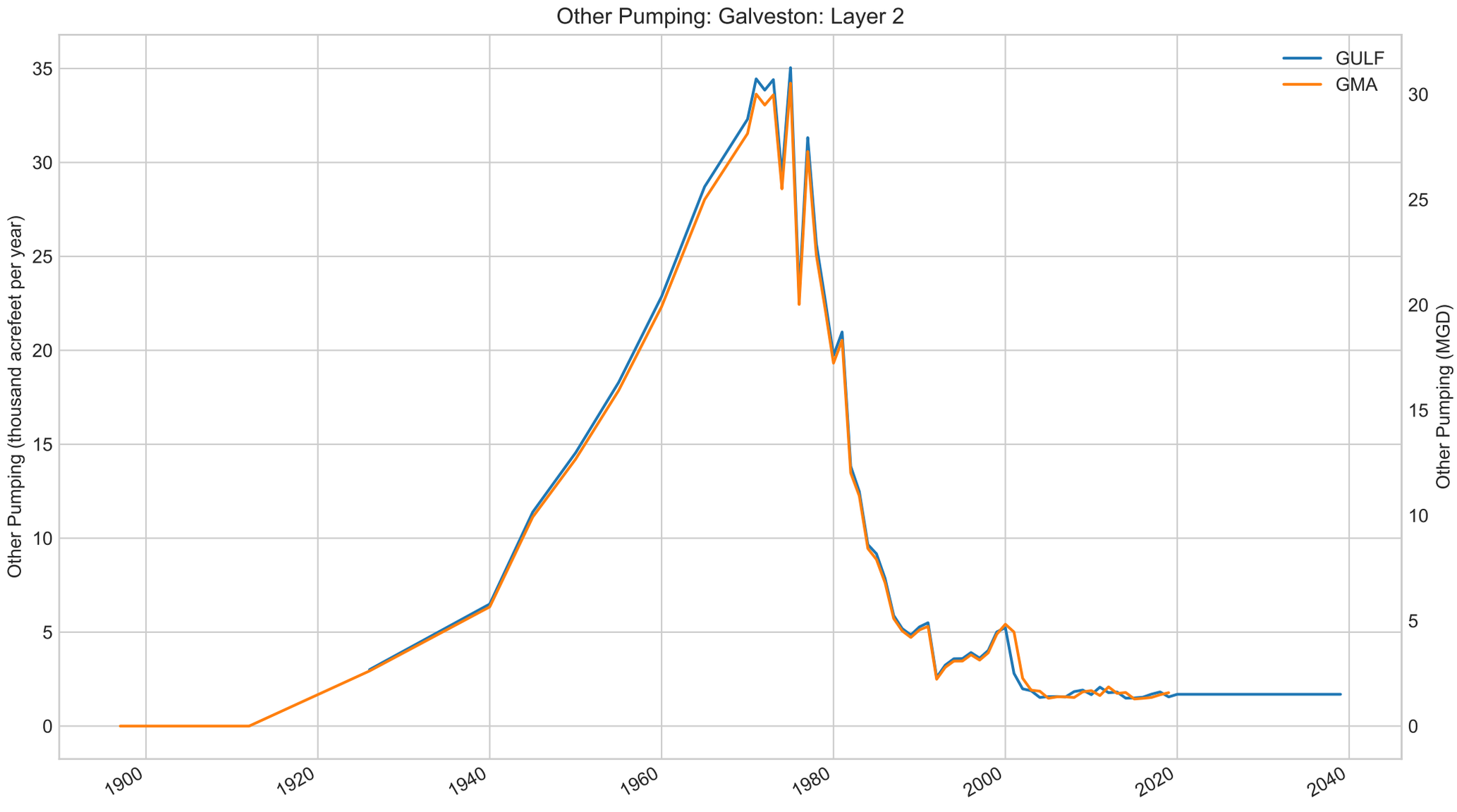

Other Pumping: Fayette: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1900
1920
1940
1960
1980
2000
2020
2040

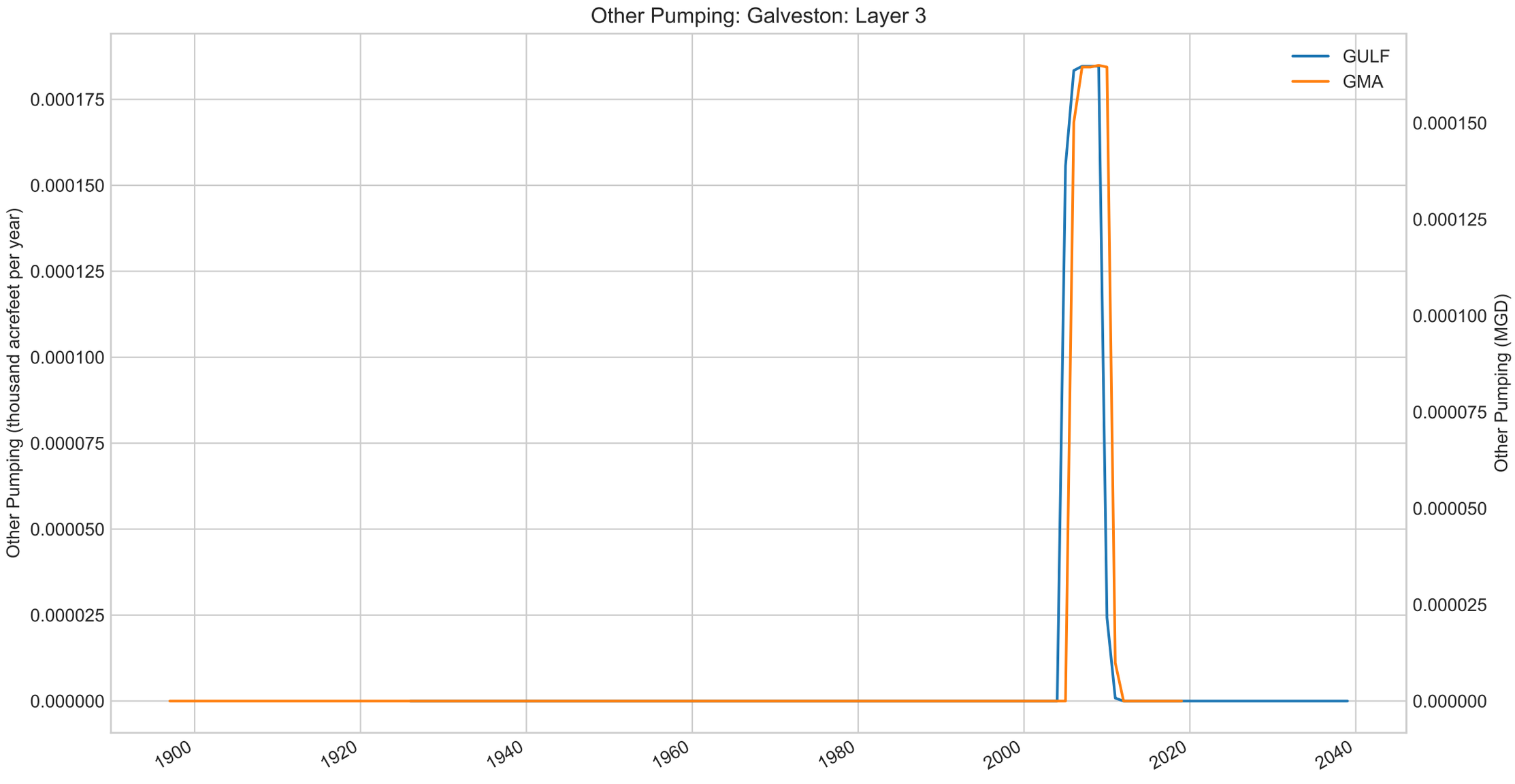

Other Pumping: Fort_bend: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
60
70
80
0
10
20
30
40
50
60
70
1900
1920
1940
1960
1980
2000
2020
2040

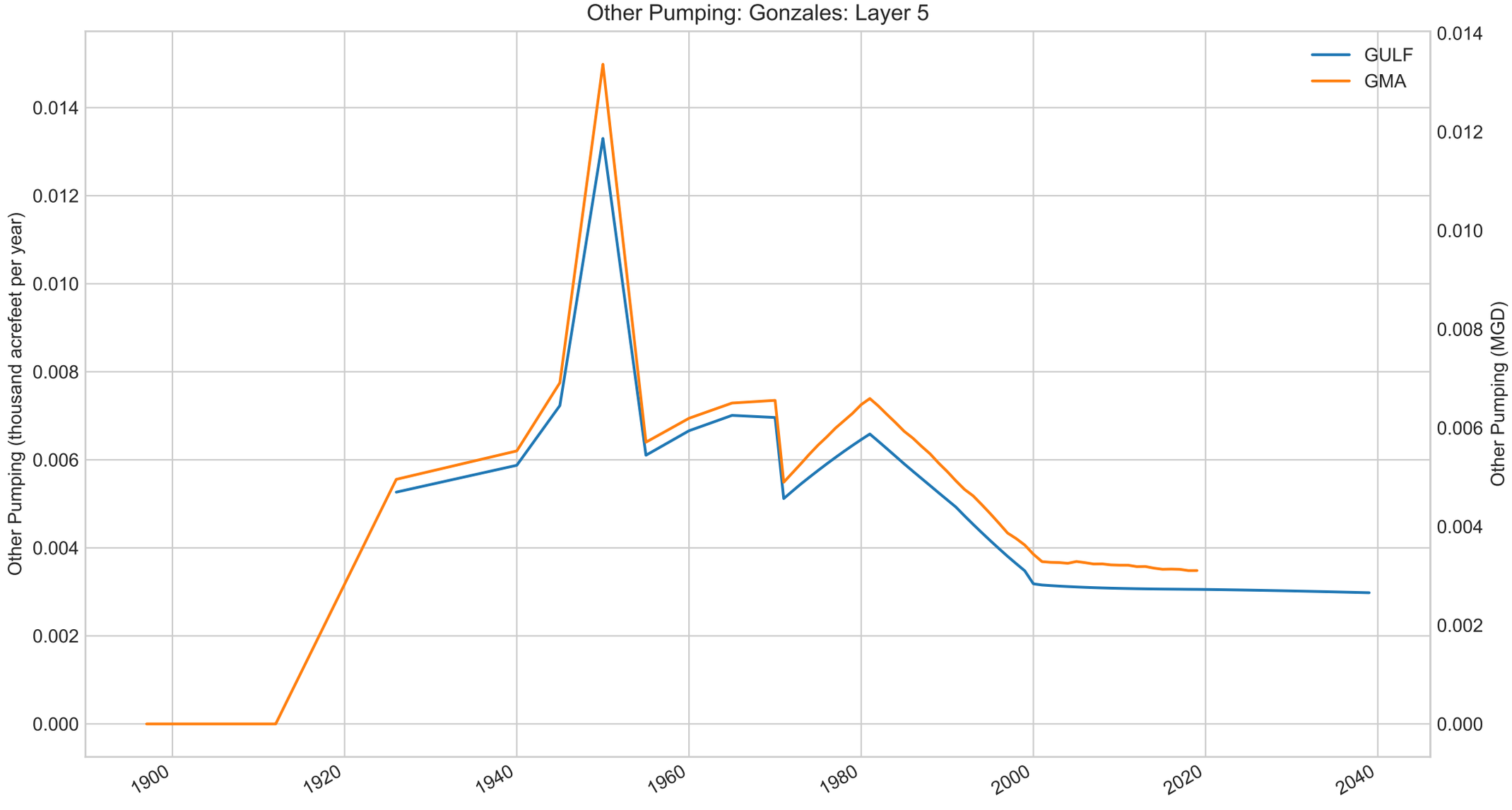

Other Pumping: Fort_bend: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
50
1900
1920
1940
1960
1980
2000
2020
2040

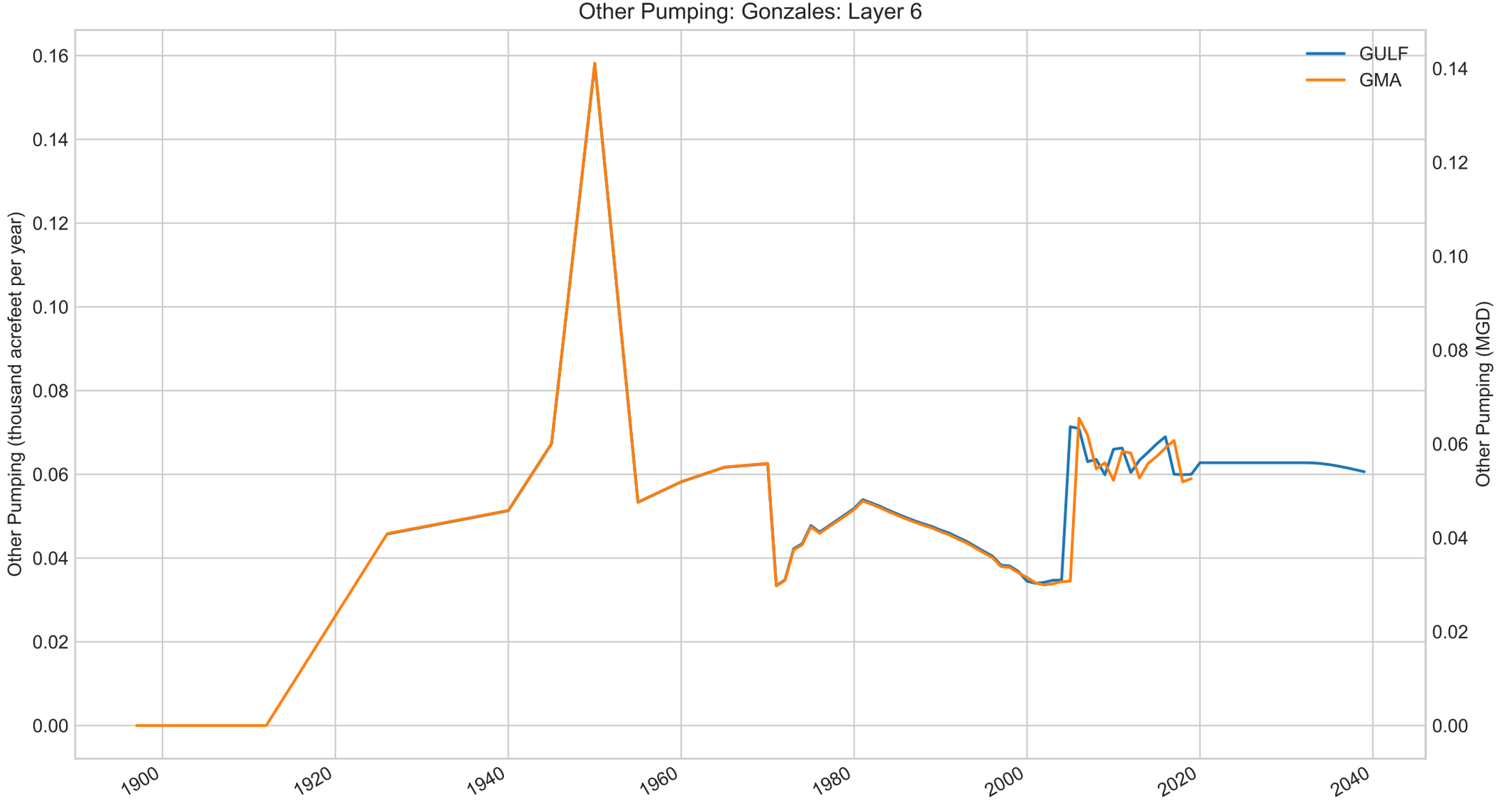

Other Pumping: Fort_bend: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1900
1920
1940
1960
1980
2000
2020
2040

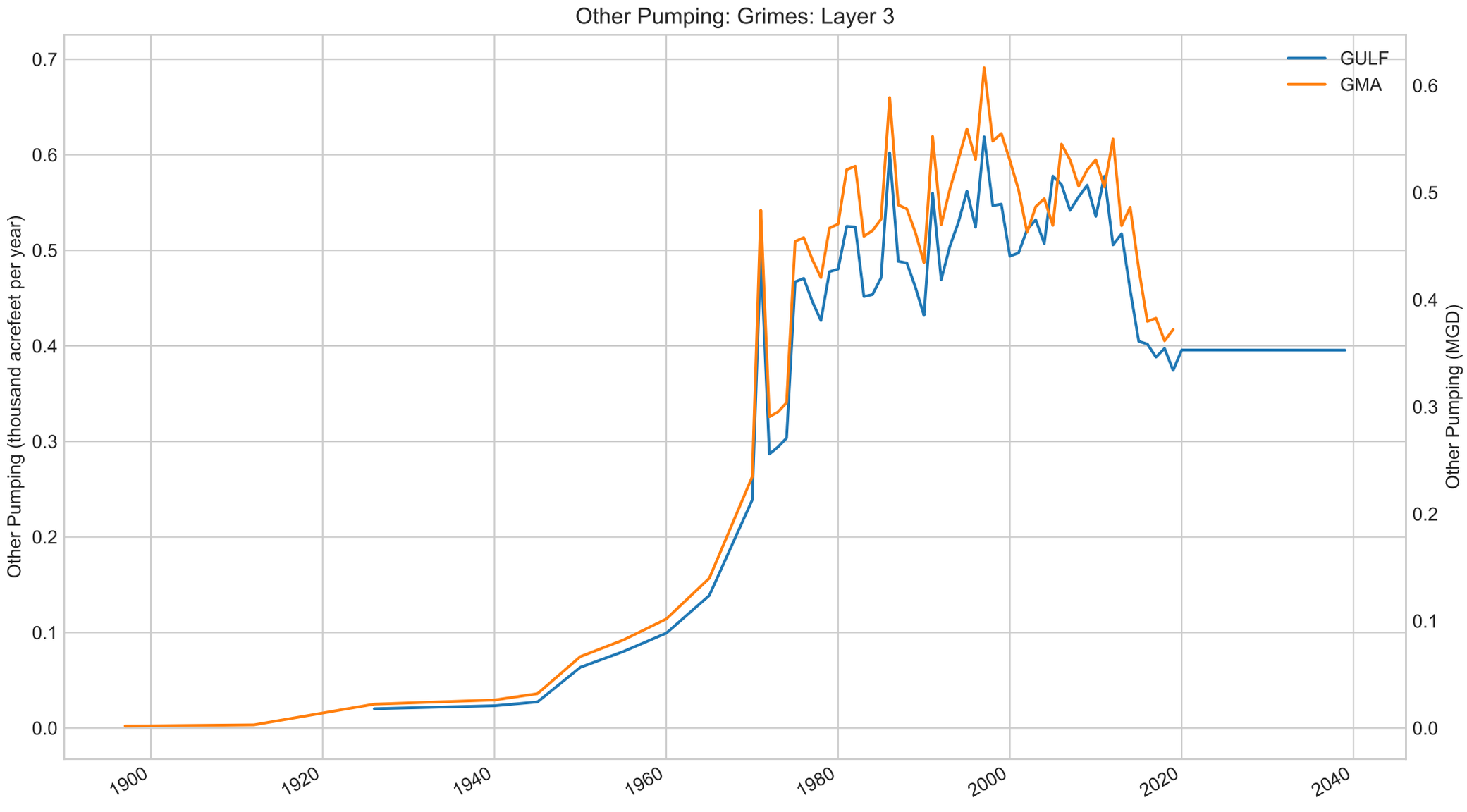

Other Pumping: Fort_bend: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.010
0.008
0.006
0.004
0.002
0.000
0.008
0.006
0.004
0.002
0.000
1900
1920
1940
1960
1980
2000
2020
2040

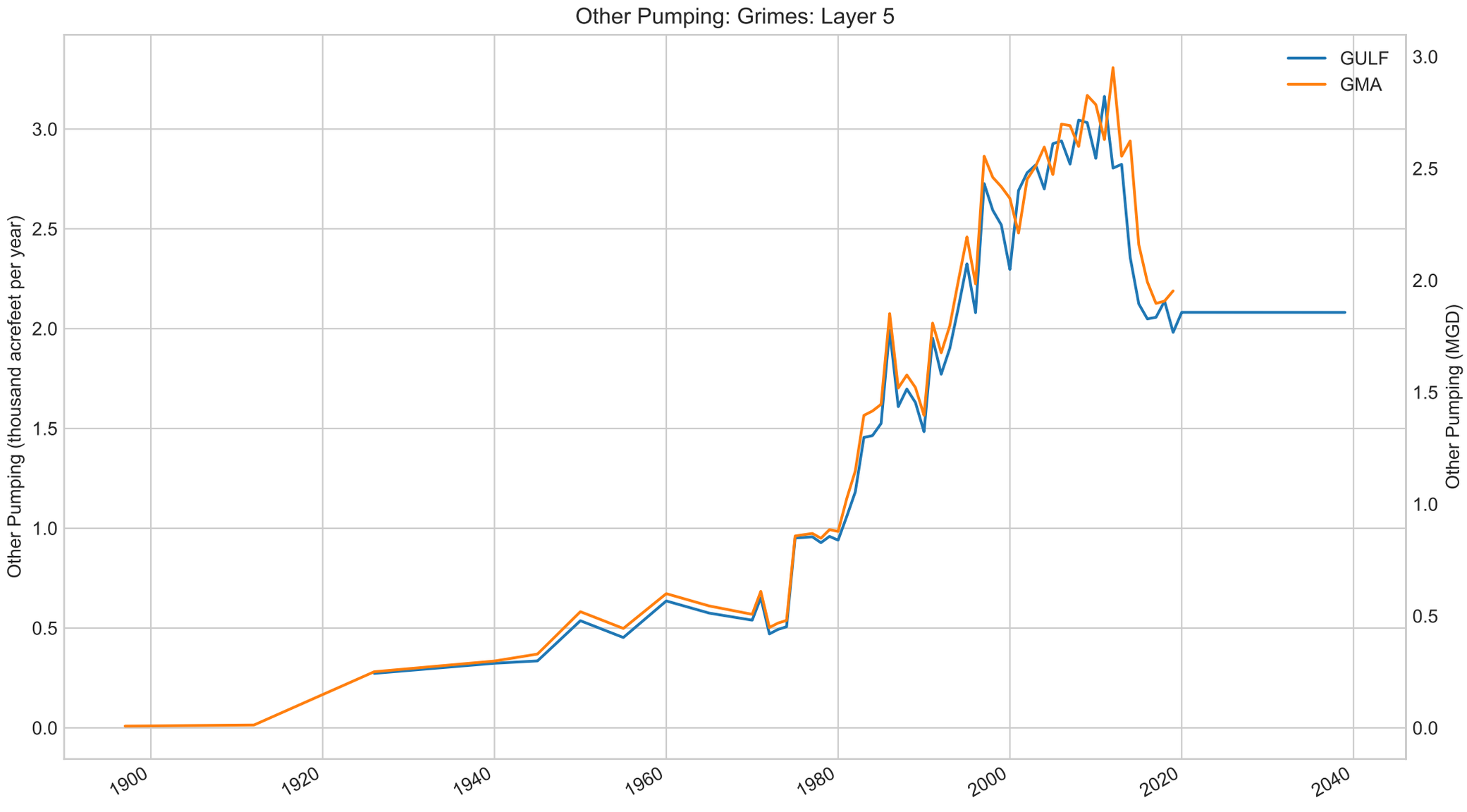

Other Pumping: Galveston: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
35
1900
1920
1940
1960
1980
2000
2020
2040

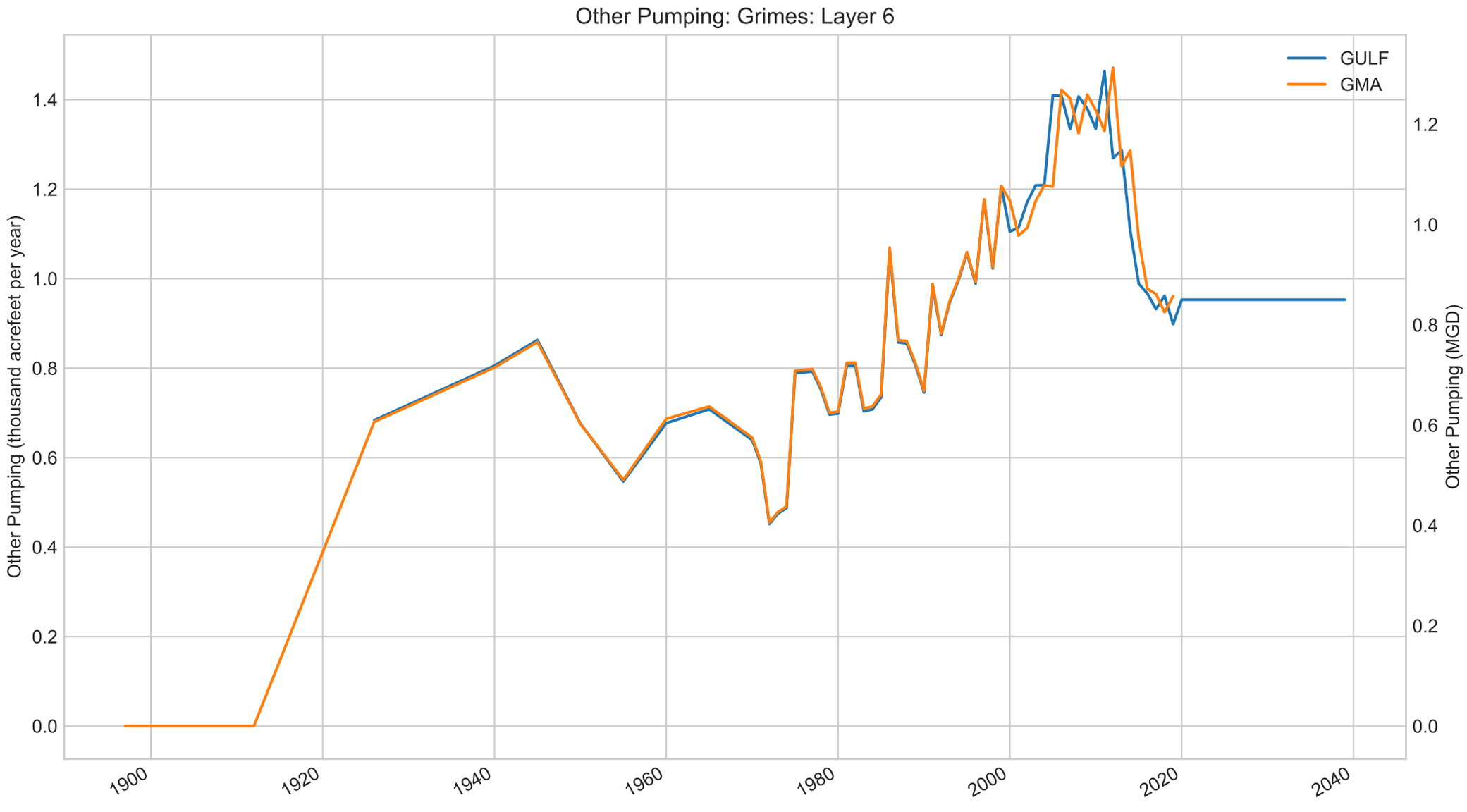

Other Pumping: Galveston: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.000175
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
0.000000
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
0.000000
1900
1920
1940
1960
1980
2000
2020
2040

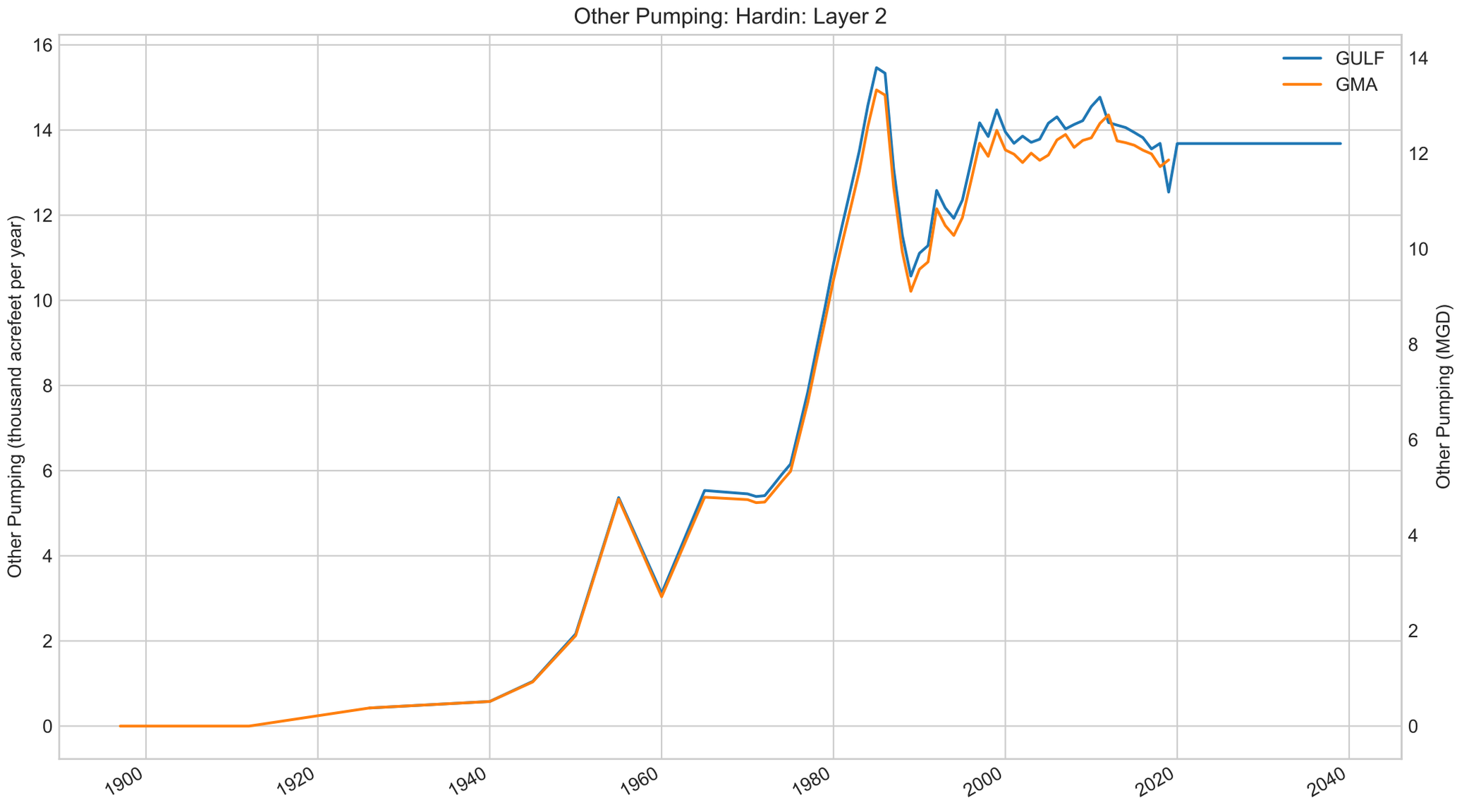

Other Pumping: Gonzales: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.000
0.002
0.004
0.006
0.008
0.010
0.012
0.014
1900
1920
1940
1960
1980
2000
2020
2040

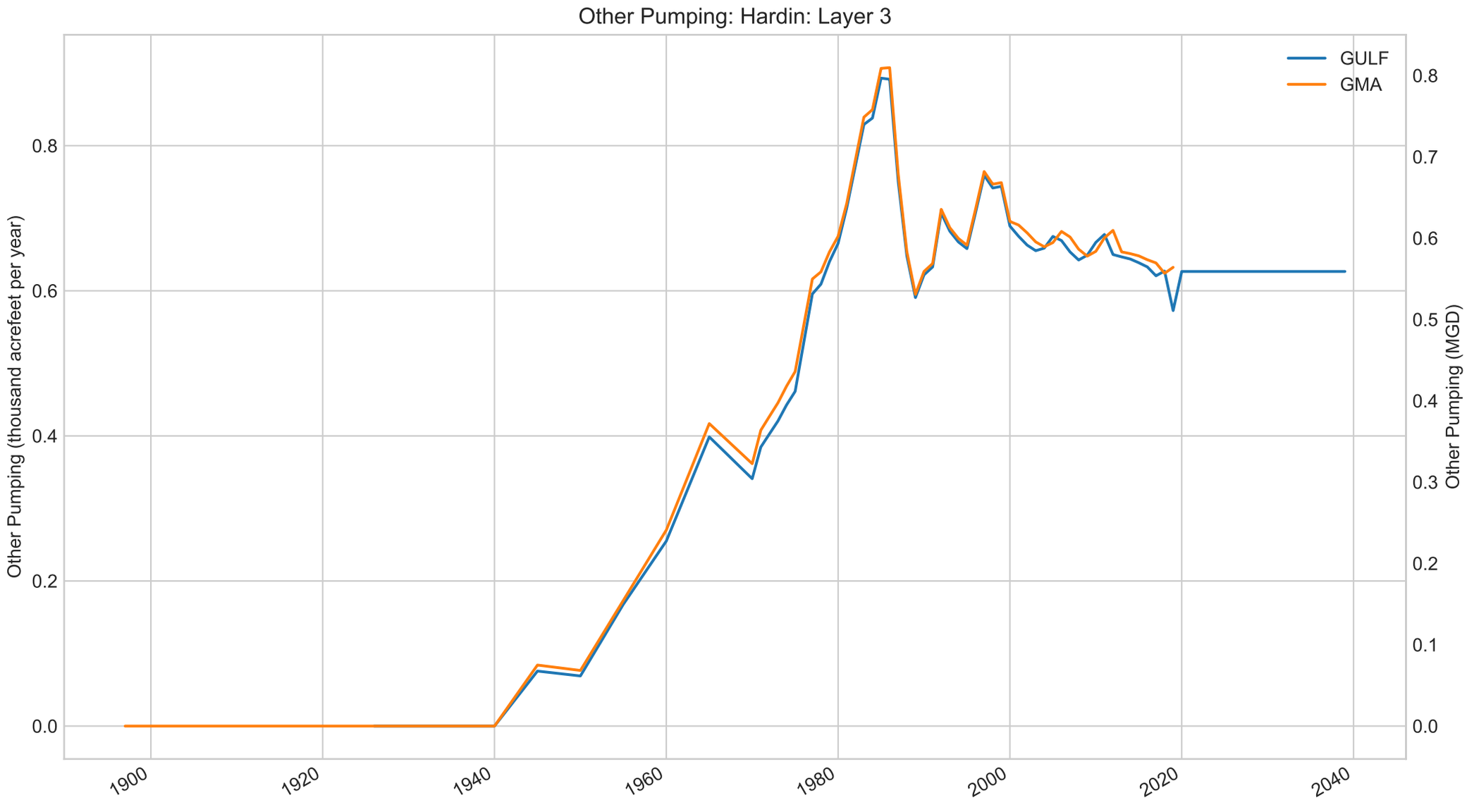

Other Pumping: Gonzales: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

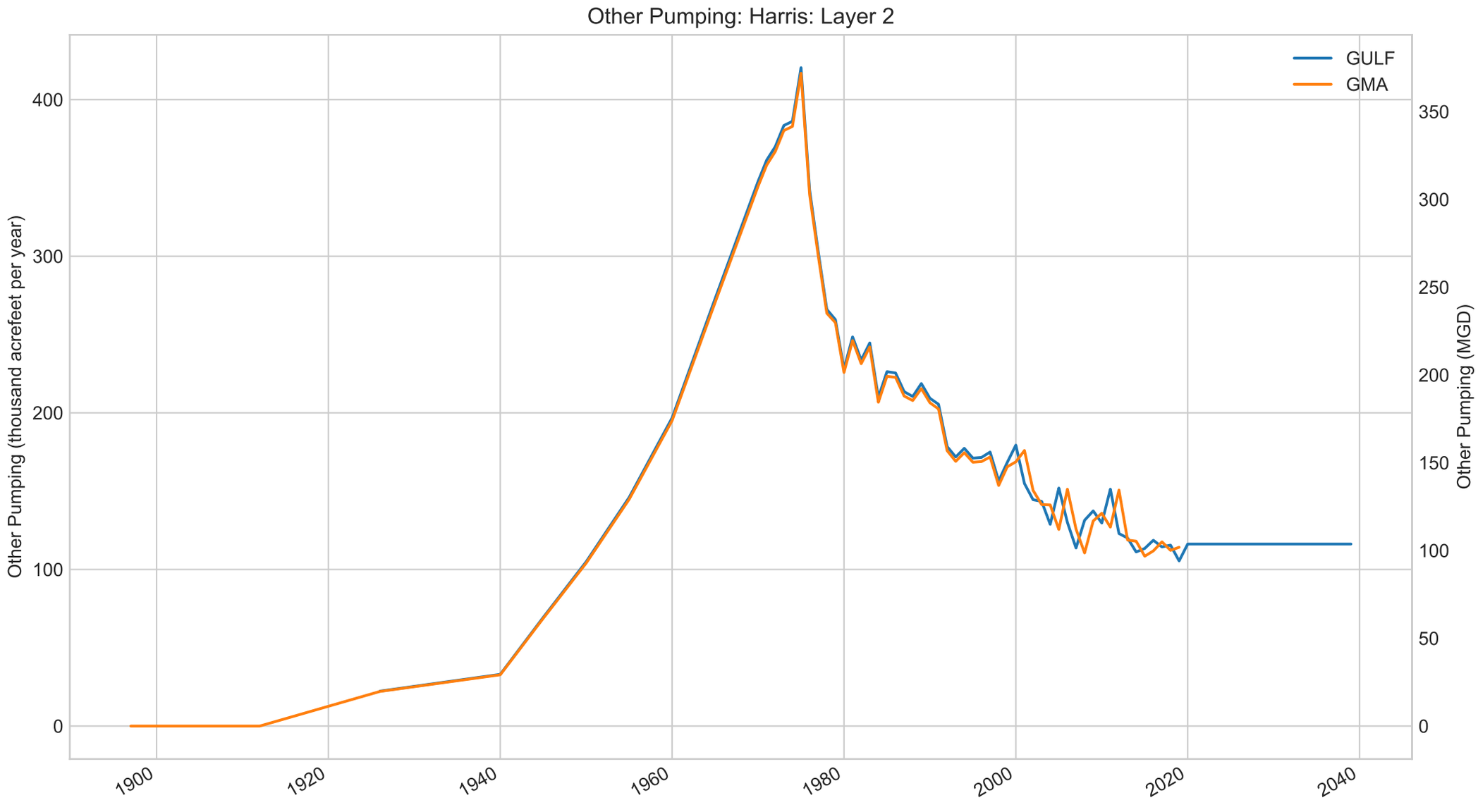

Other Pumping: Grimes: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

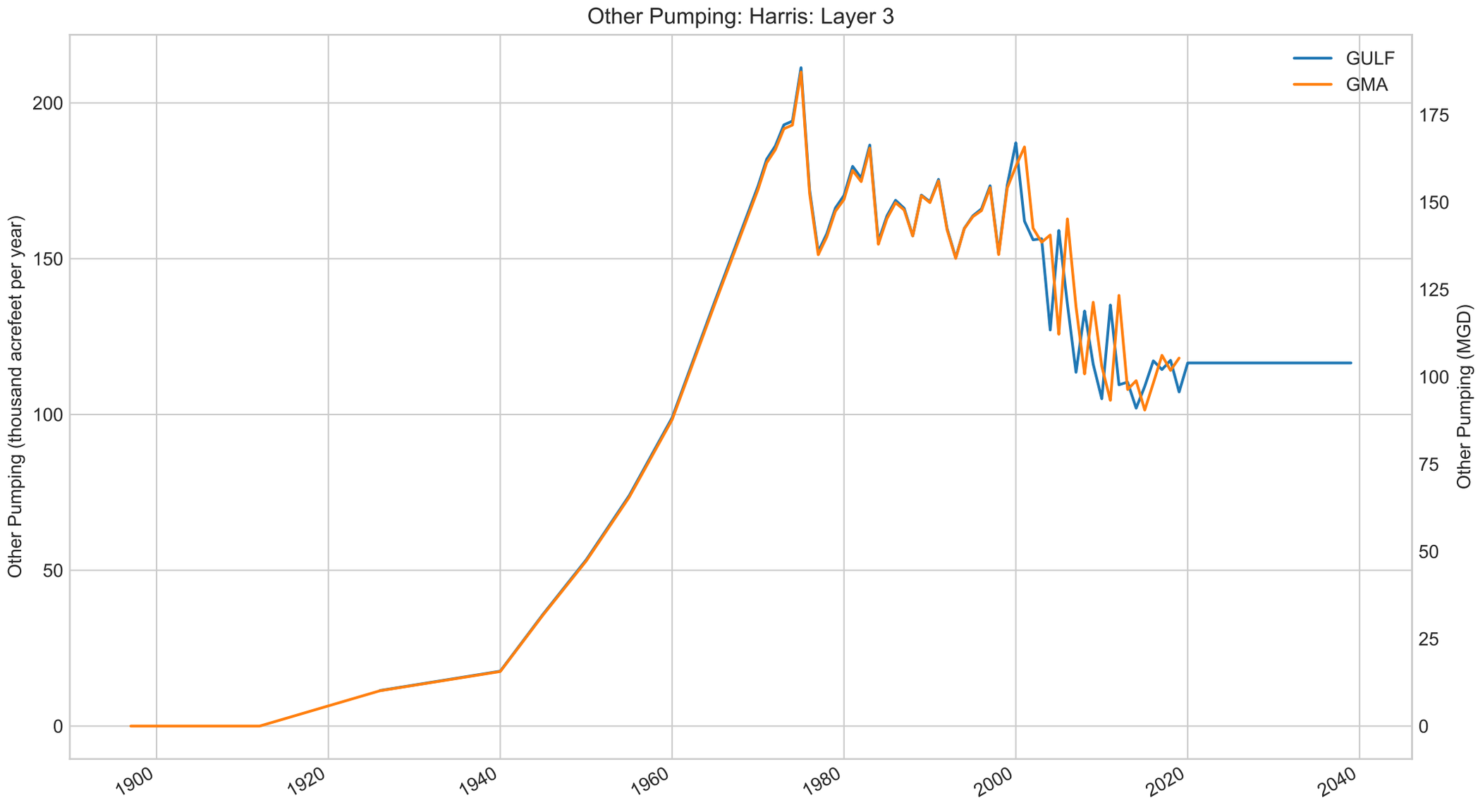

Other Pumping: Grimes: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1900
1920
1940
1960
1980
2000
2020
2040

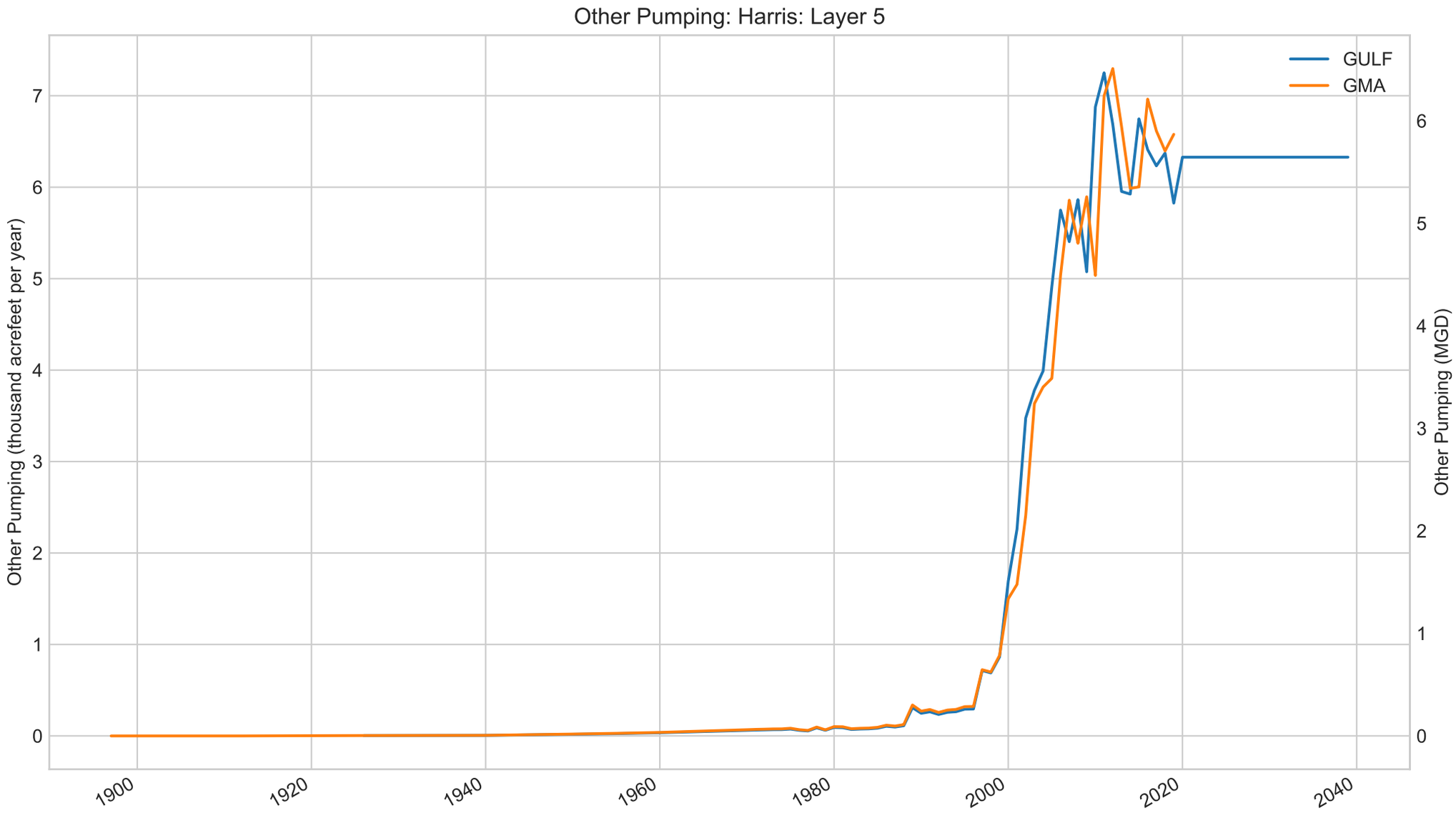

Other Pumping: Grimes: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1900
1920
1940
1960
1980
2000
2020
2040

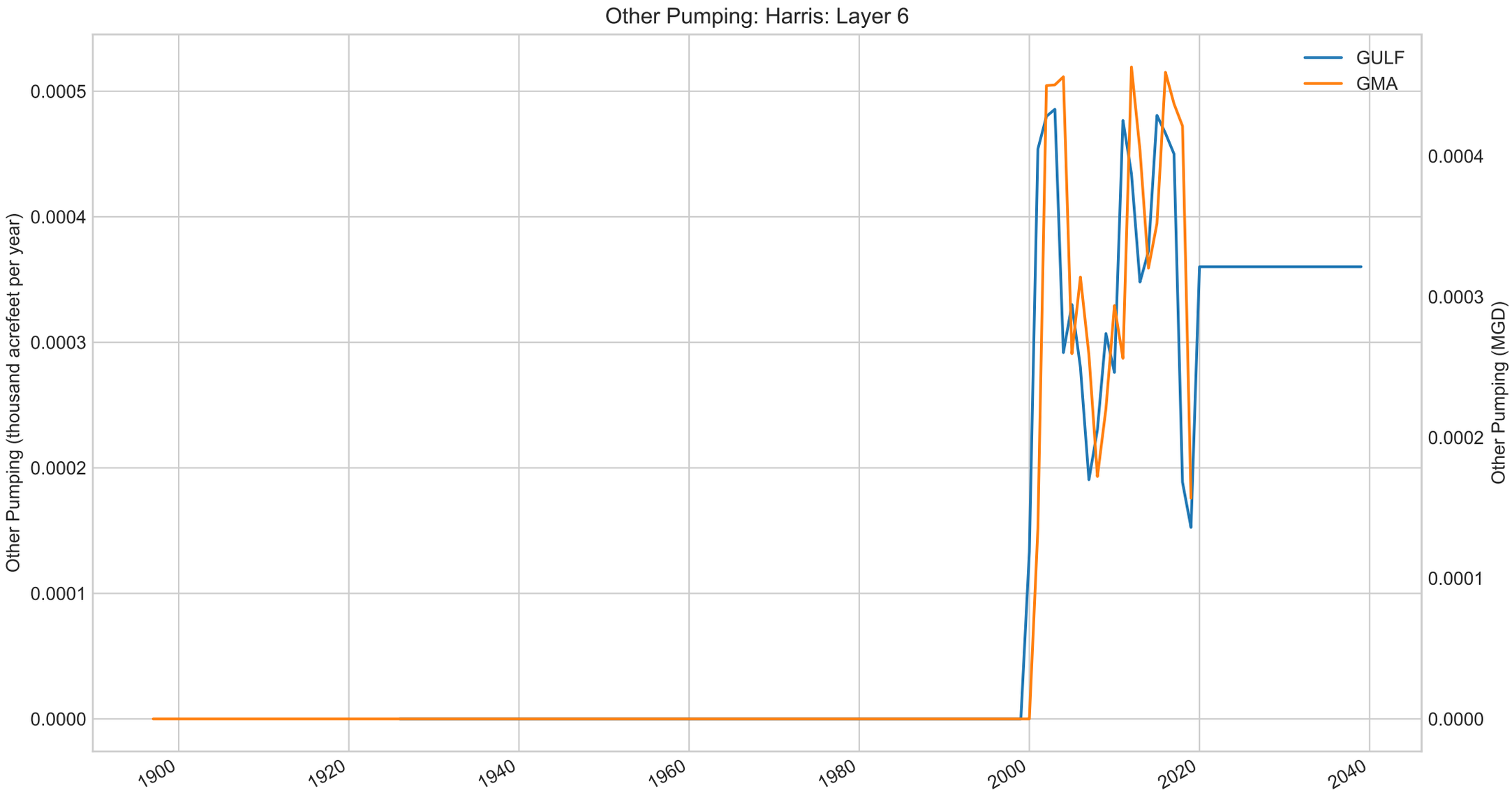

Other Pumping: Hardin: Layer 2
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
2
4
6
8
10
12
14
16
1900
1920
1940
1960
1980
2000
2020
2040

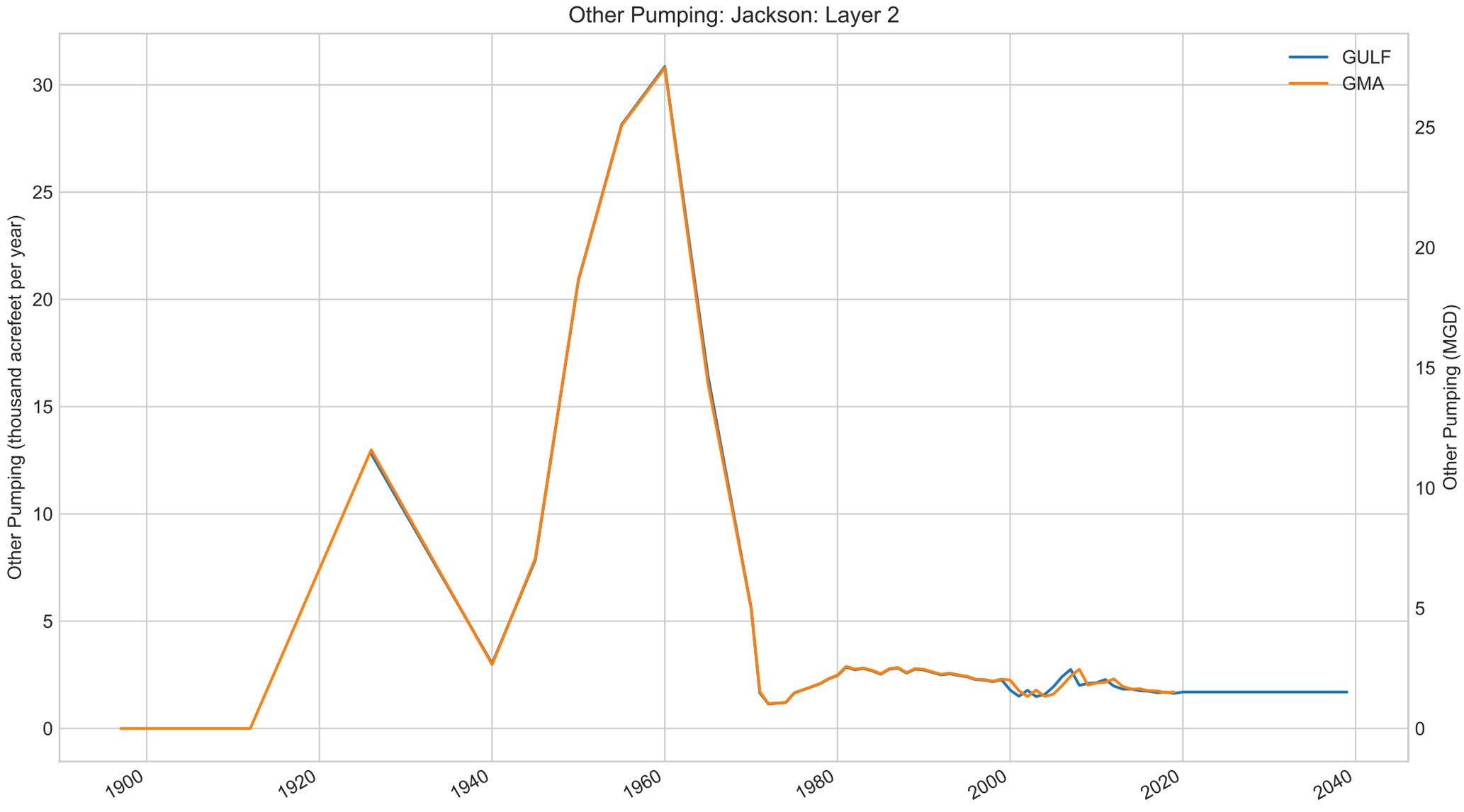

Other Pumping: Hardin: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
0.1
0.3
0.5
0.7
1900
1920
1940
1960
1980
2000
2020
2040

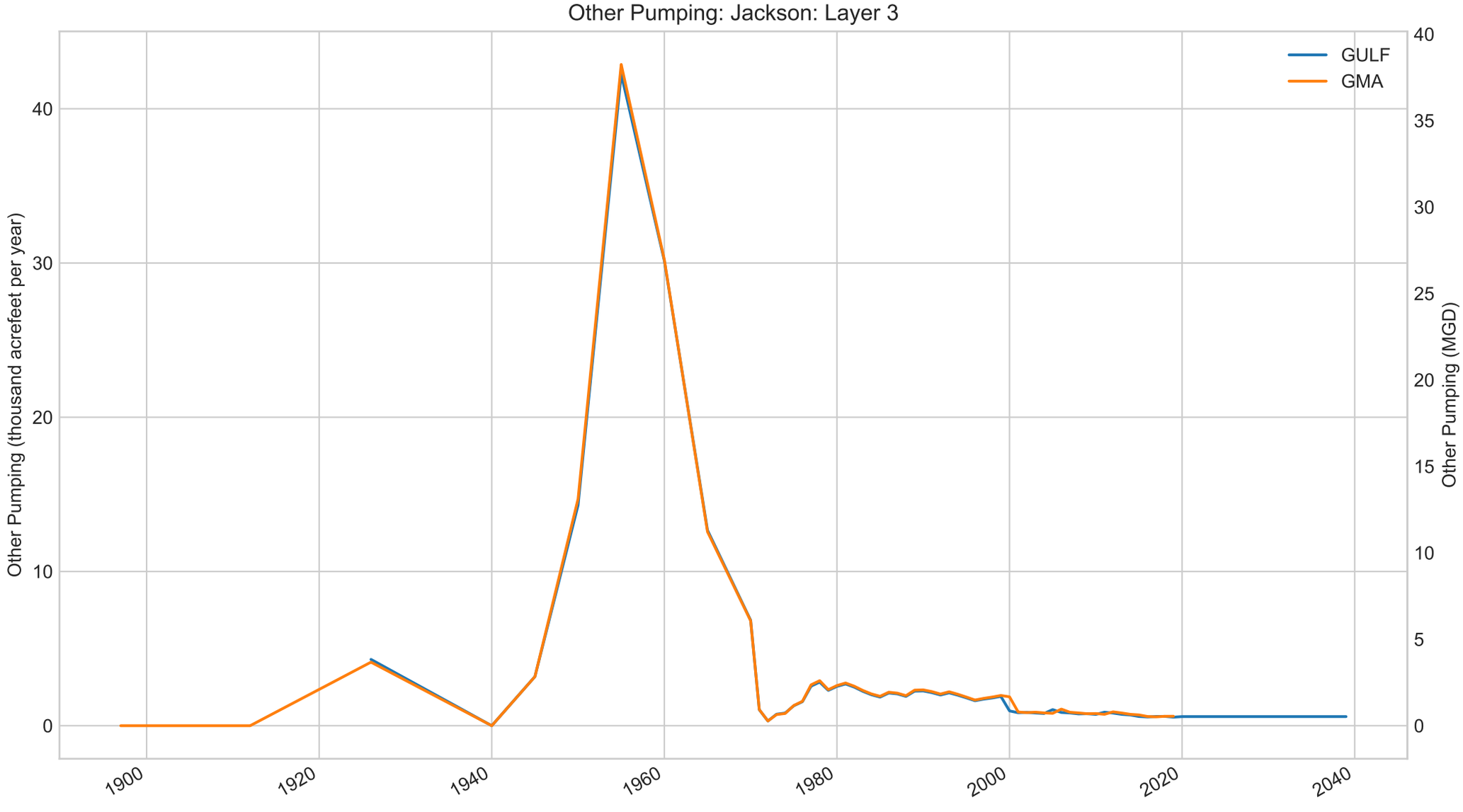

Other Pumping: Harris: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
100
200
300
400
0
50
100
150
200
250
300
350
1900
1920
1940
1960
1980
2000
2020
2040

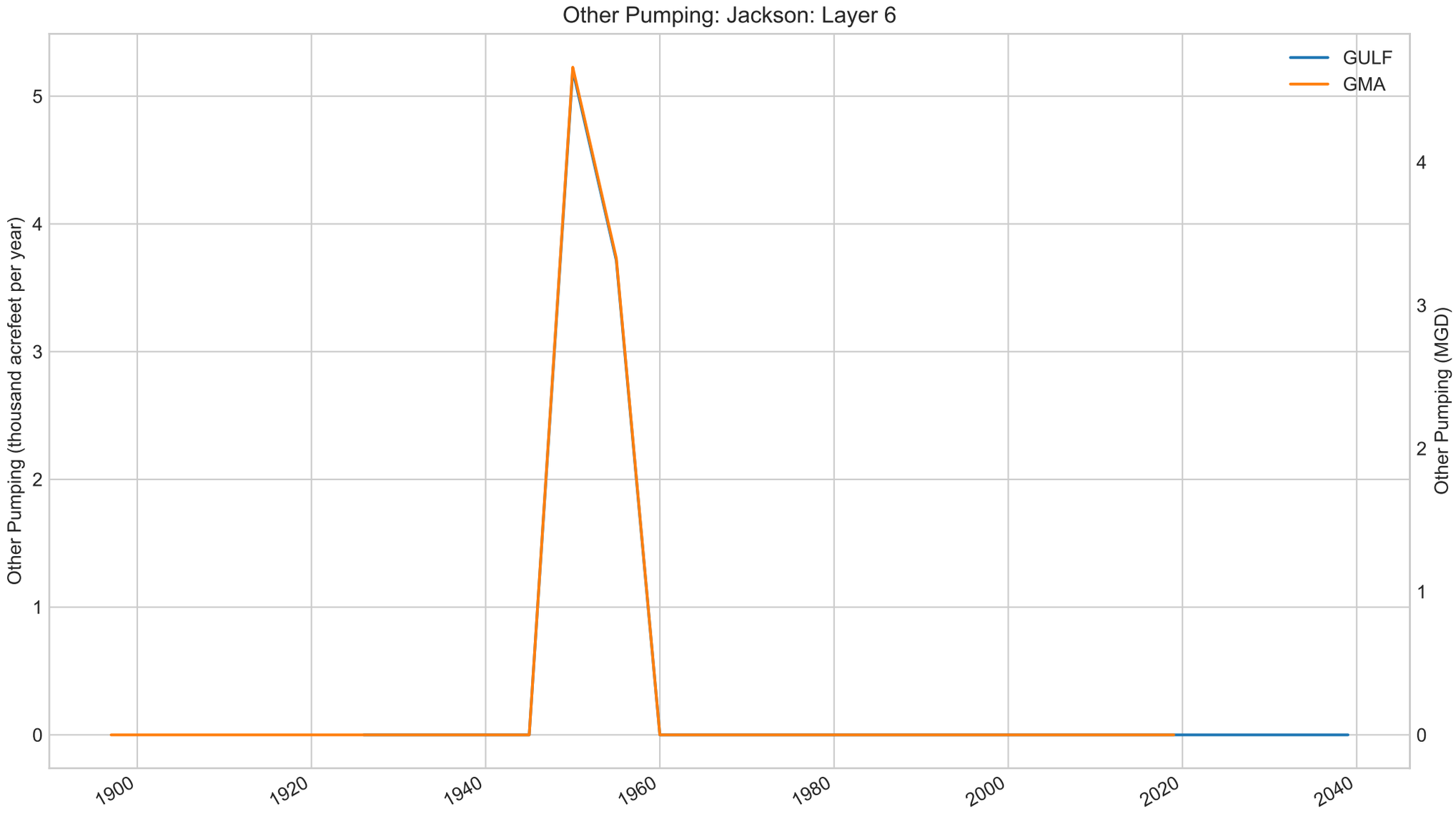

Other Pumping: Harris: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
50
100
150
200
0
25
50
75
100
125
150
175
1900
1920
1940
1960
1980
2000
2020
2040

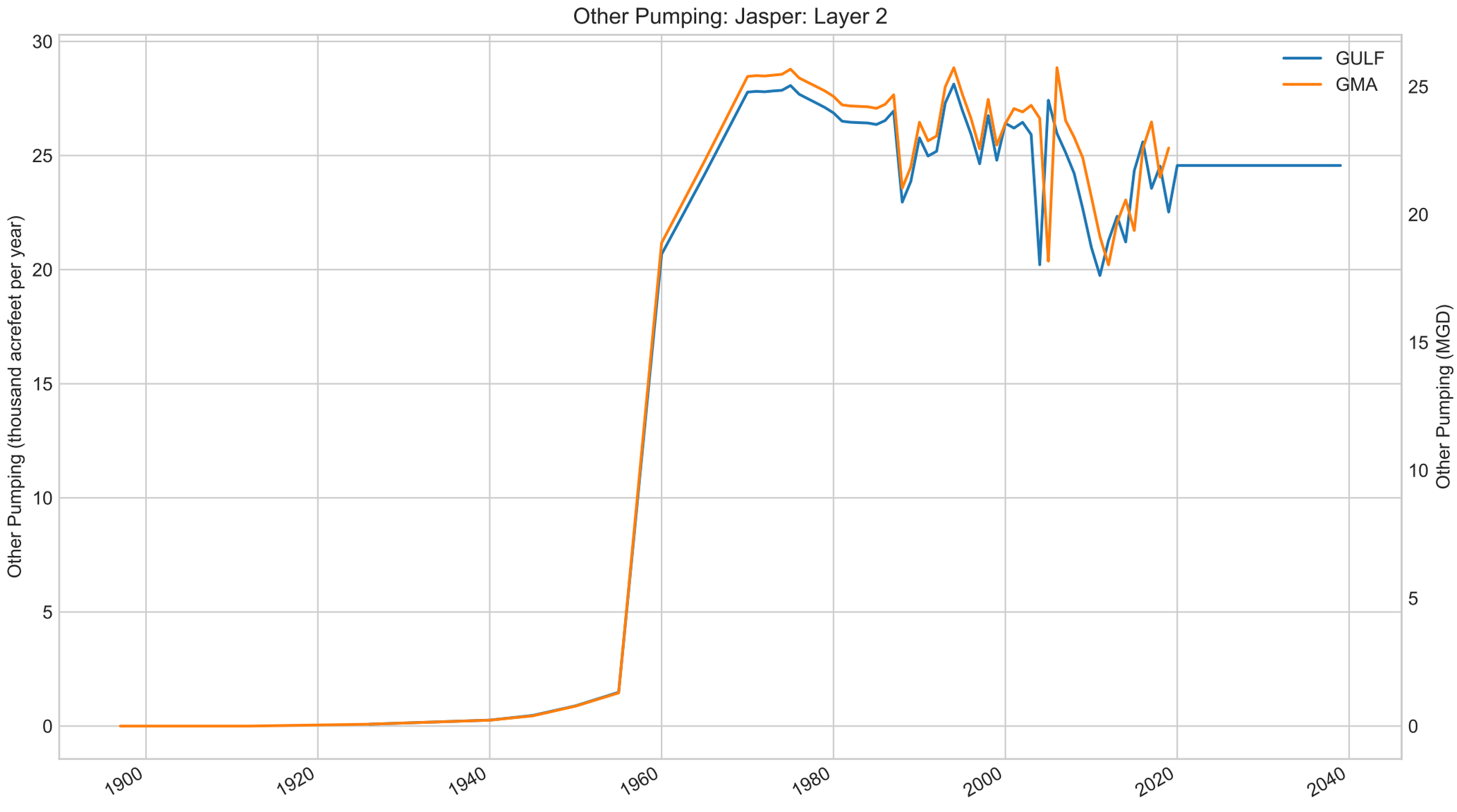

Other Pumping: Harris: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
7
1900
1920
1940
1960
1980
2000
2020
2040

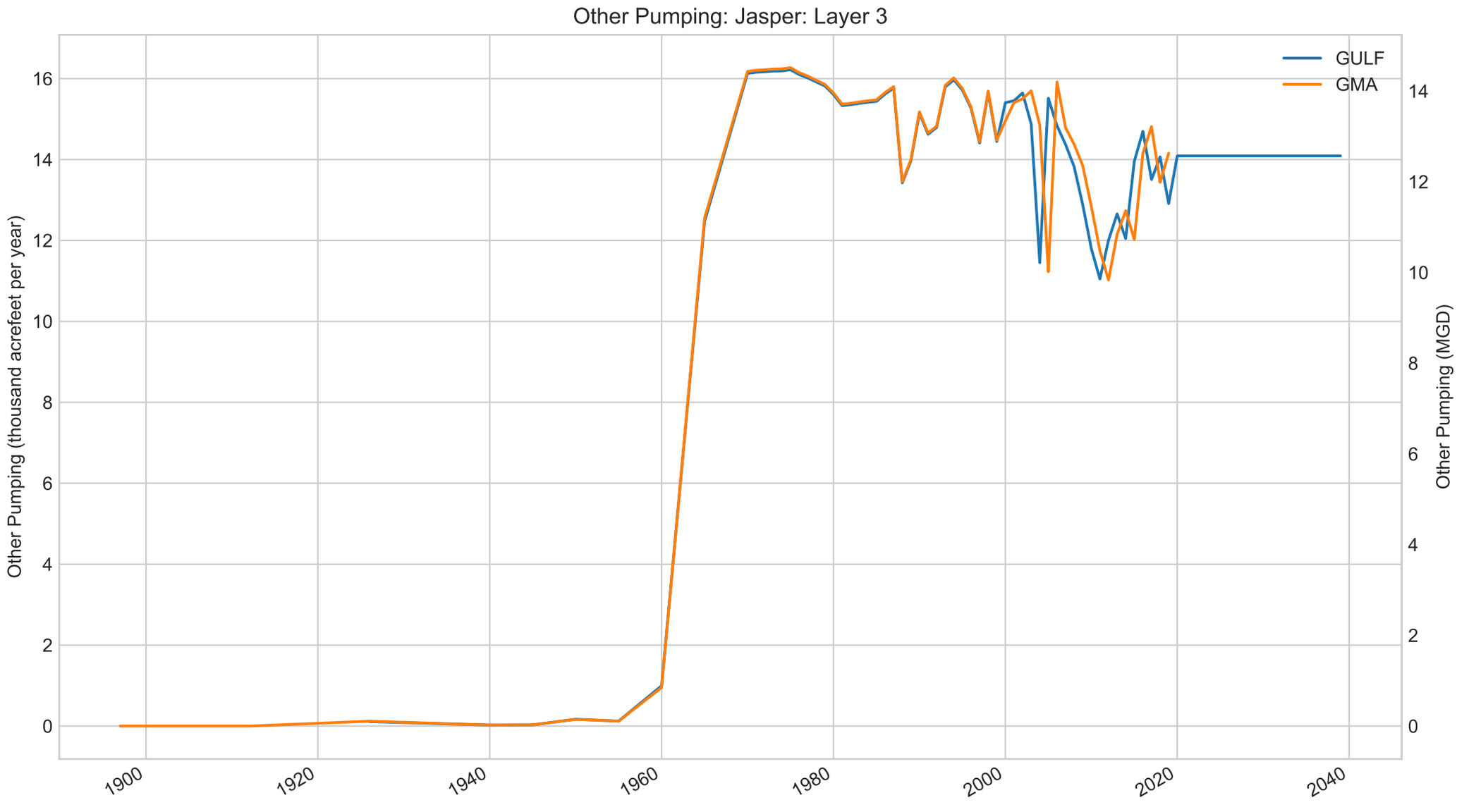

Other Pumping: Harris: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
0.0004
0.0003
0.0002
0.0001
0.0000
1900
1920
1940
1960
1980
2000
2020
2040

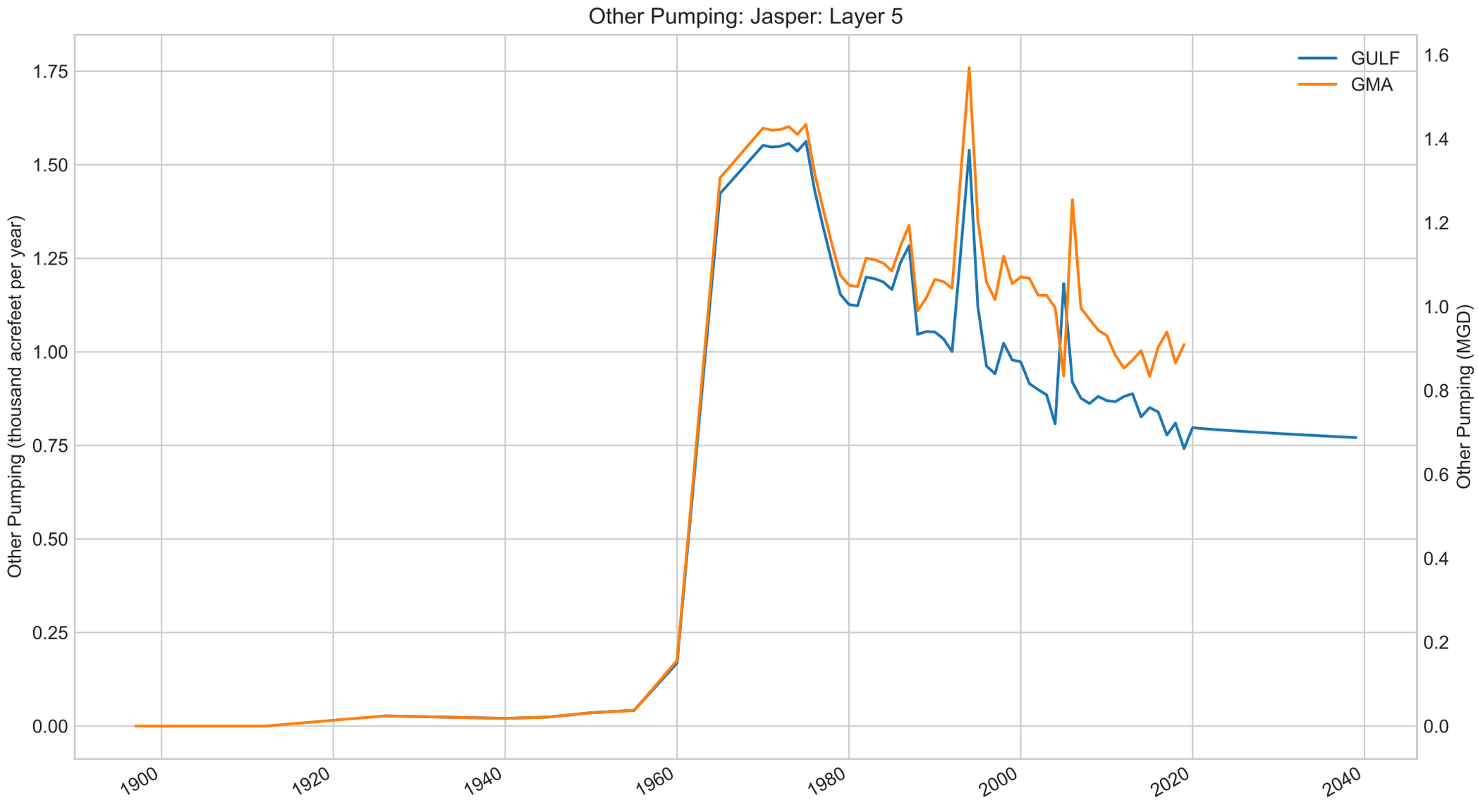

Other Pumping: Jackson: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

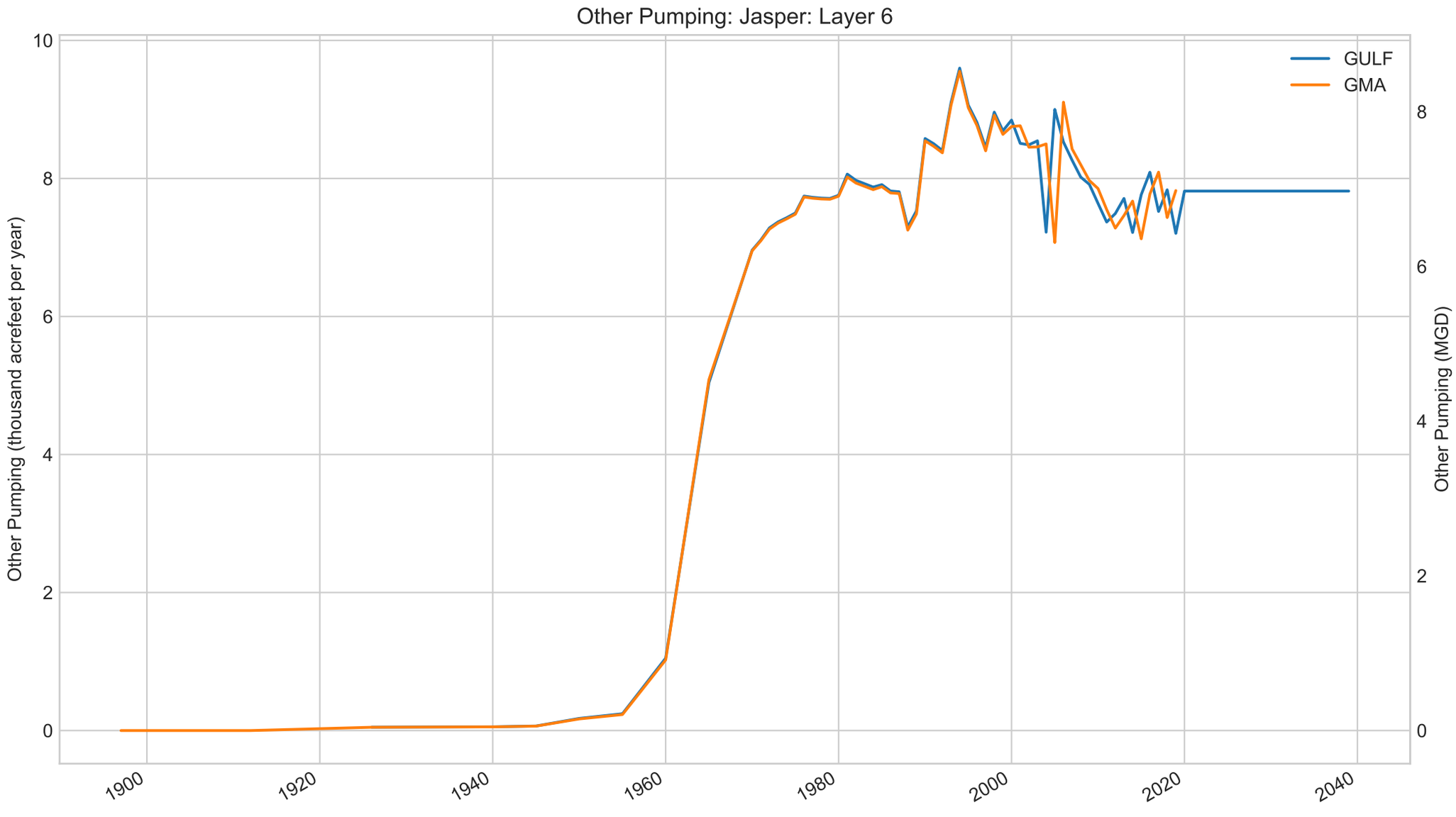

Other Pumping: Jackson: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
10
20
30
40
0
5
10
15
20
25
30
35
40
1900
1920
1940
1960
1980
2000
2020
2040

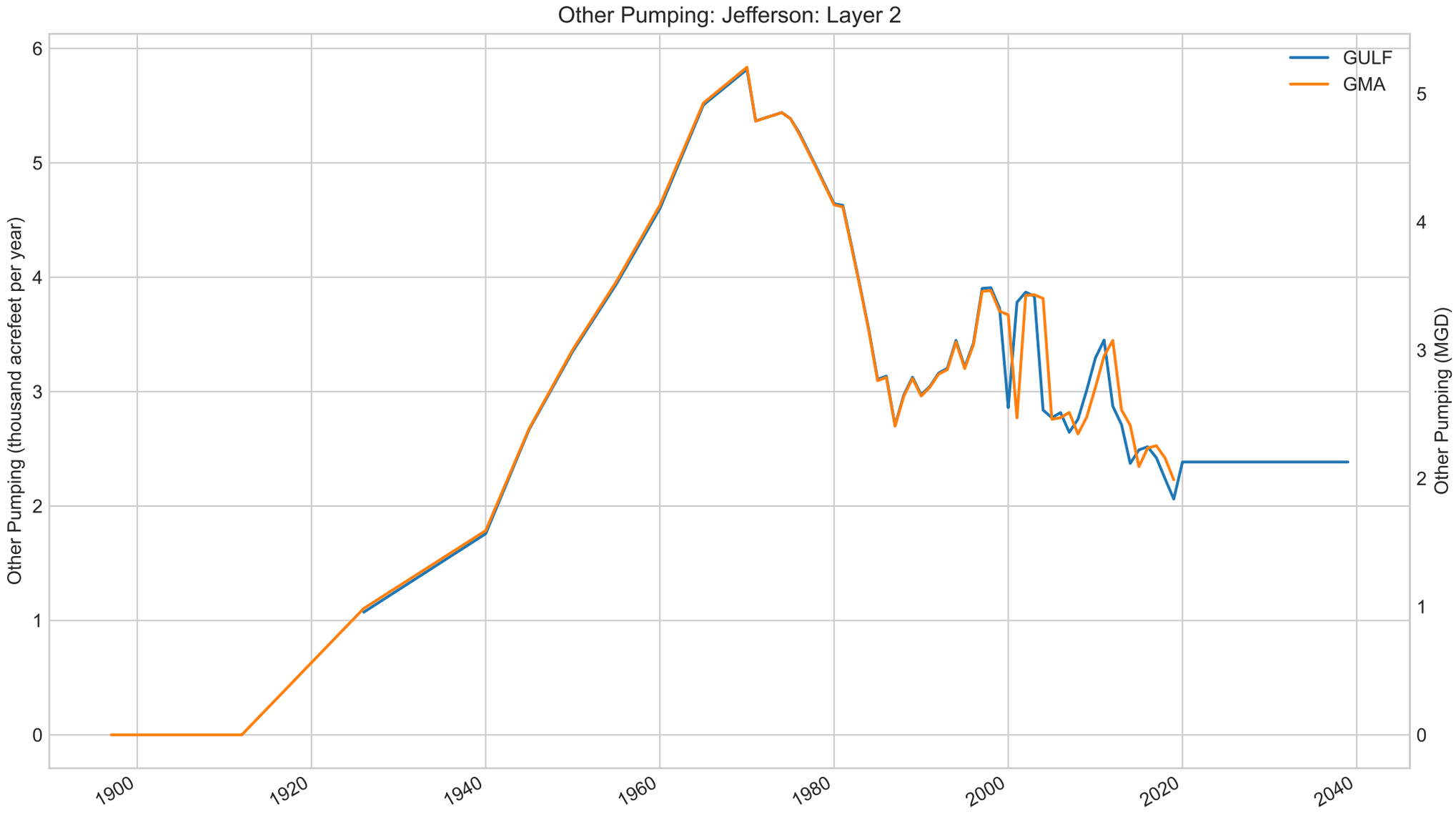

Other Pumping: Jackson: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
0
1
2
3
4
1900
1920
1940
1960
1980
2000
2020
2040

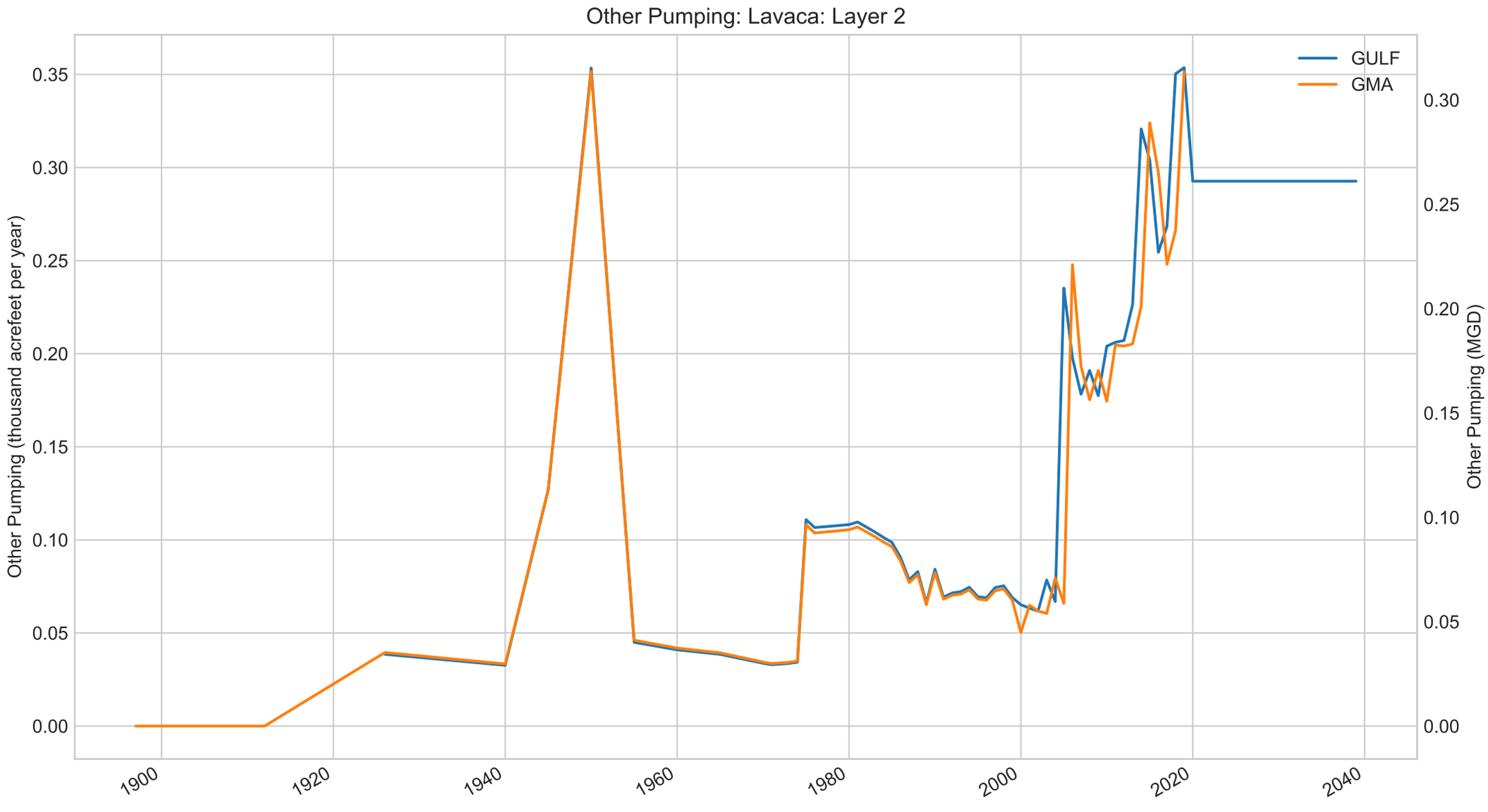

Other Pumping: Jasper: Layer 2
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

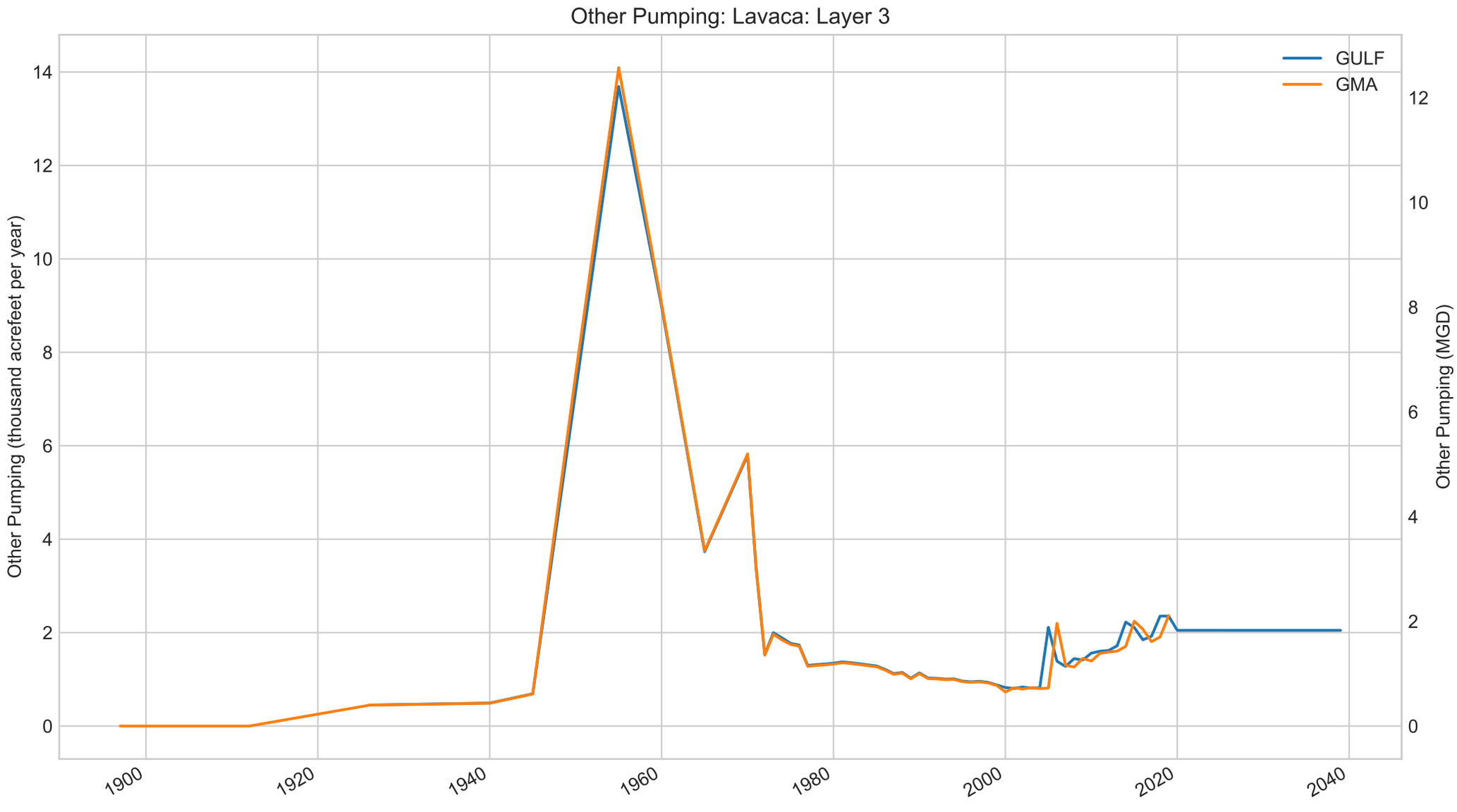

Other Pumping: Jasper: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
10
12
14
16
0
2
4
6
8
10
12
14
1900
1920
1940
1960
1980
2000
2020
2040

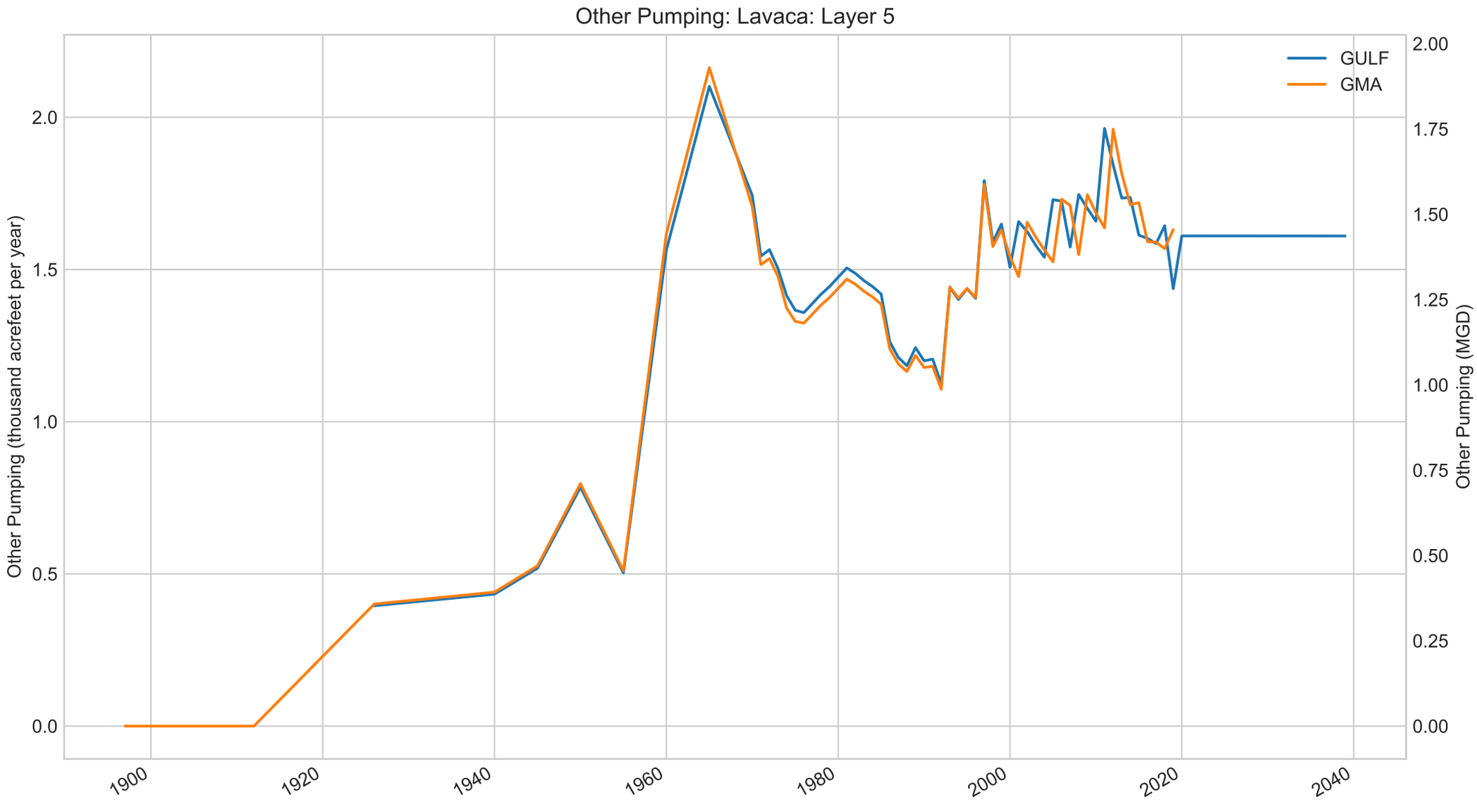

Other Pumping: Jasper: Layer 5
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

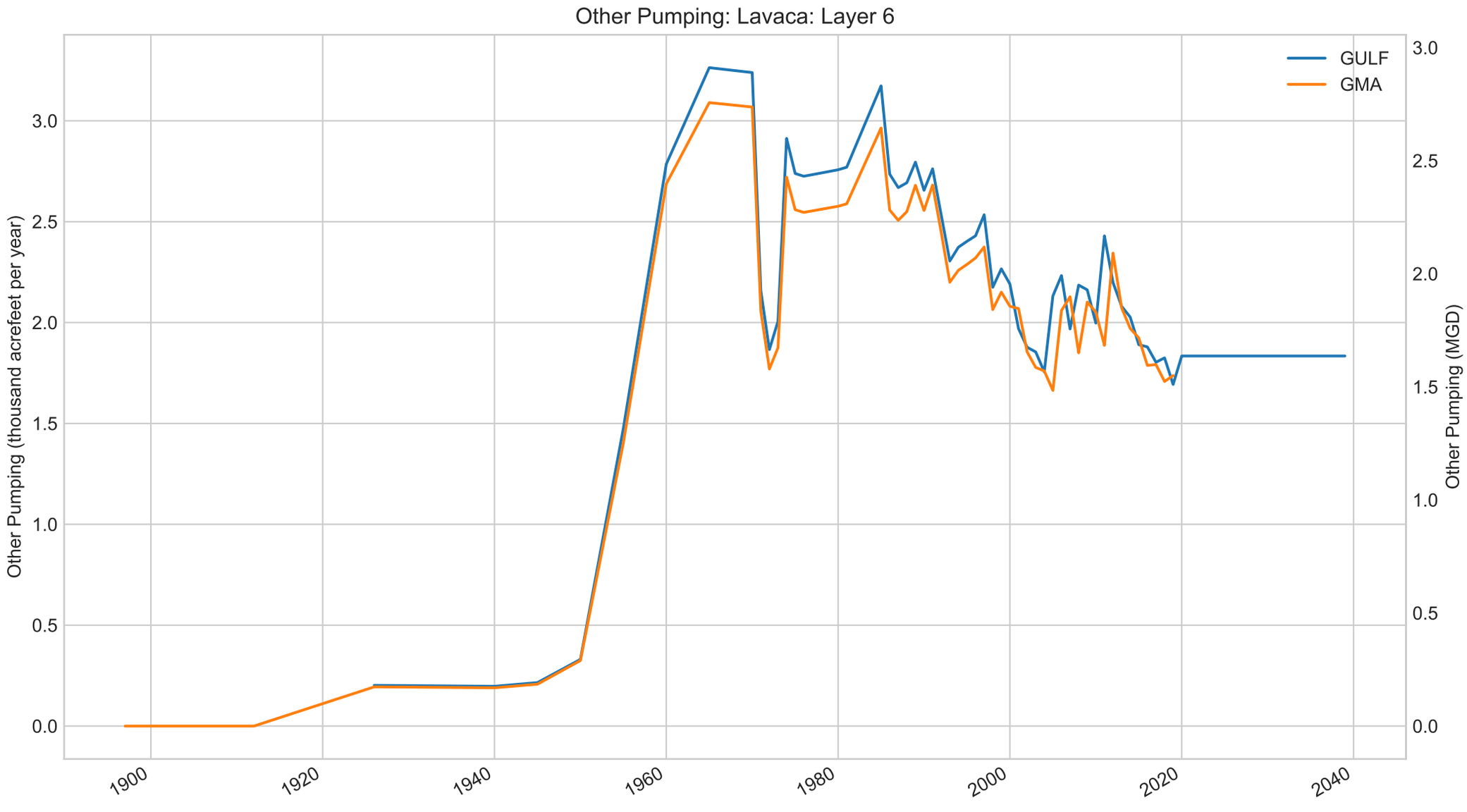

Other Pumping: Jasper: Layer 6
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
2
4
6
8
10
1900
1920
1940
1960
1980
2000
2020
2040

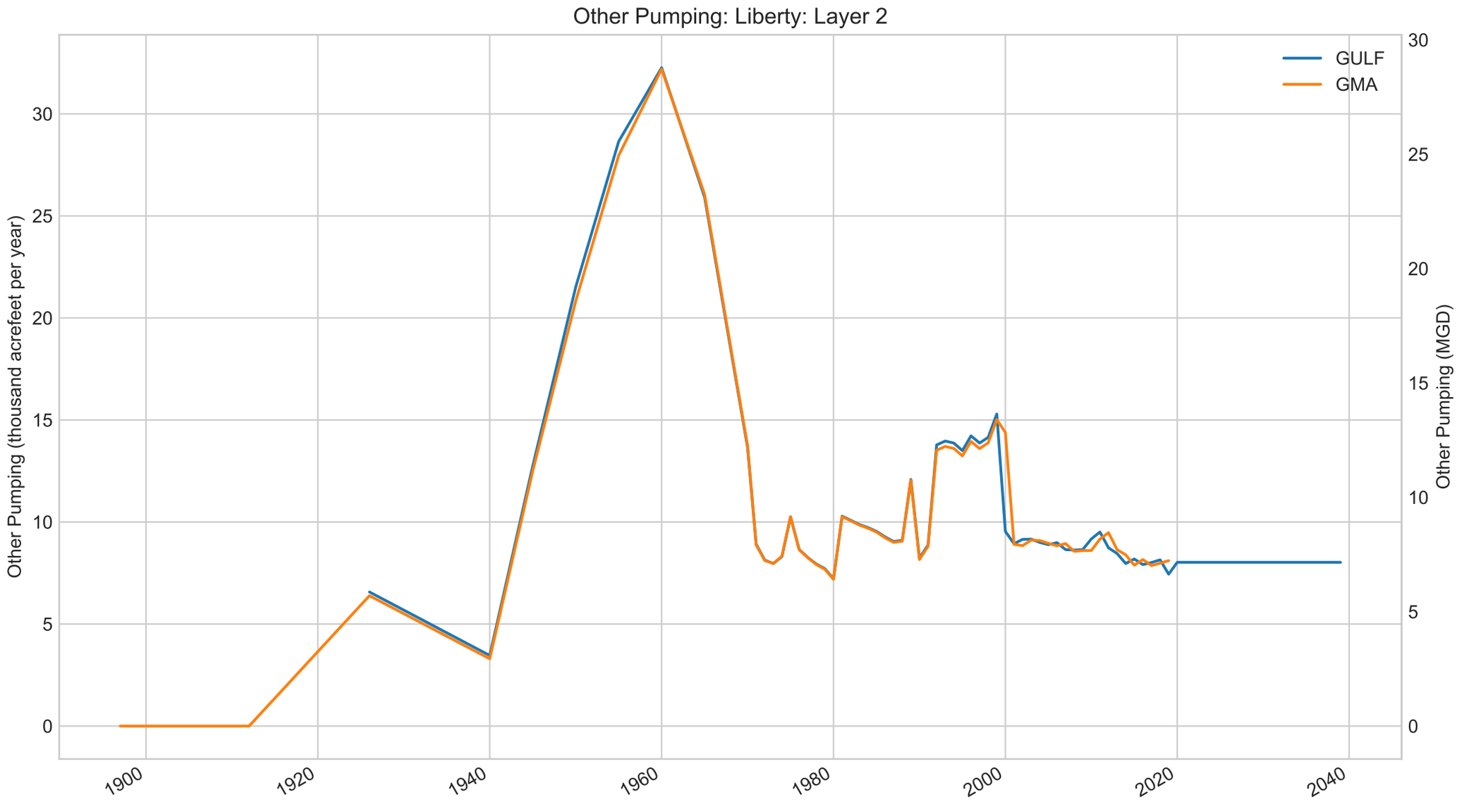

Other Pumping: Jefferson: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
1900
1920
1940
1960
1980
2000
2020
2040

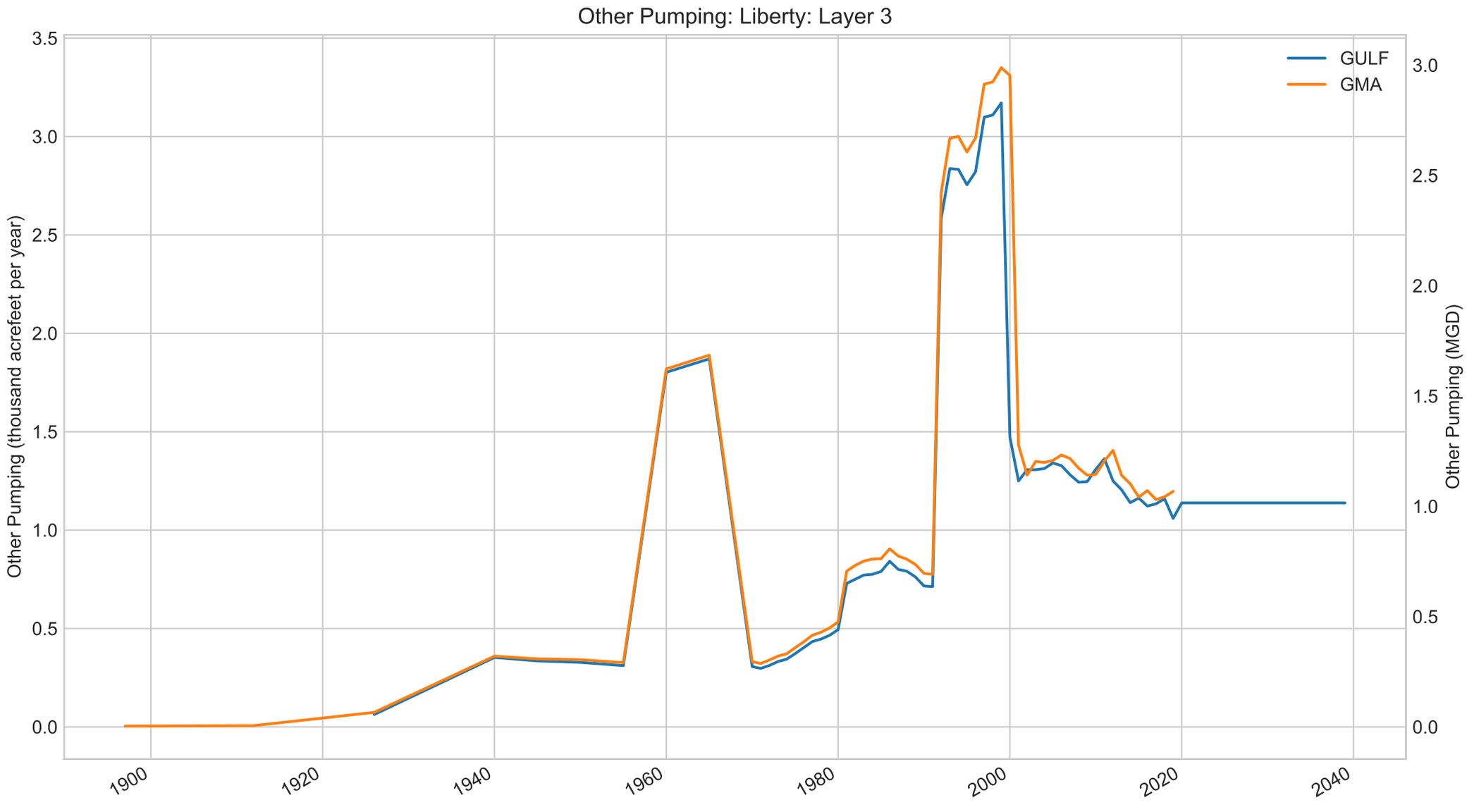

Other Pumping: Lavaca: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1900
1920
1940
1960
1980
2000
2020
2040

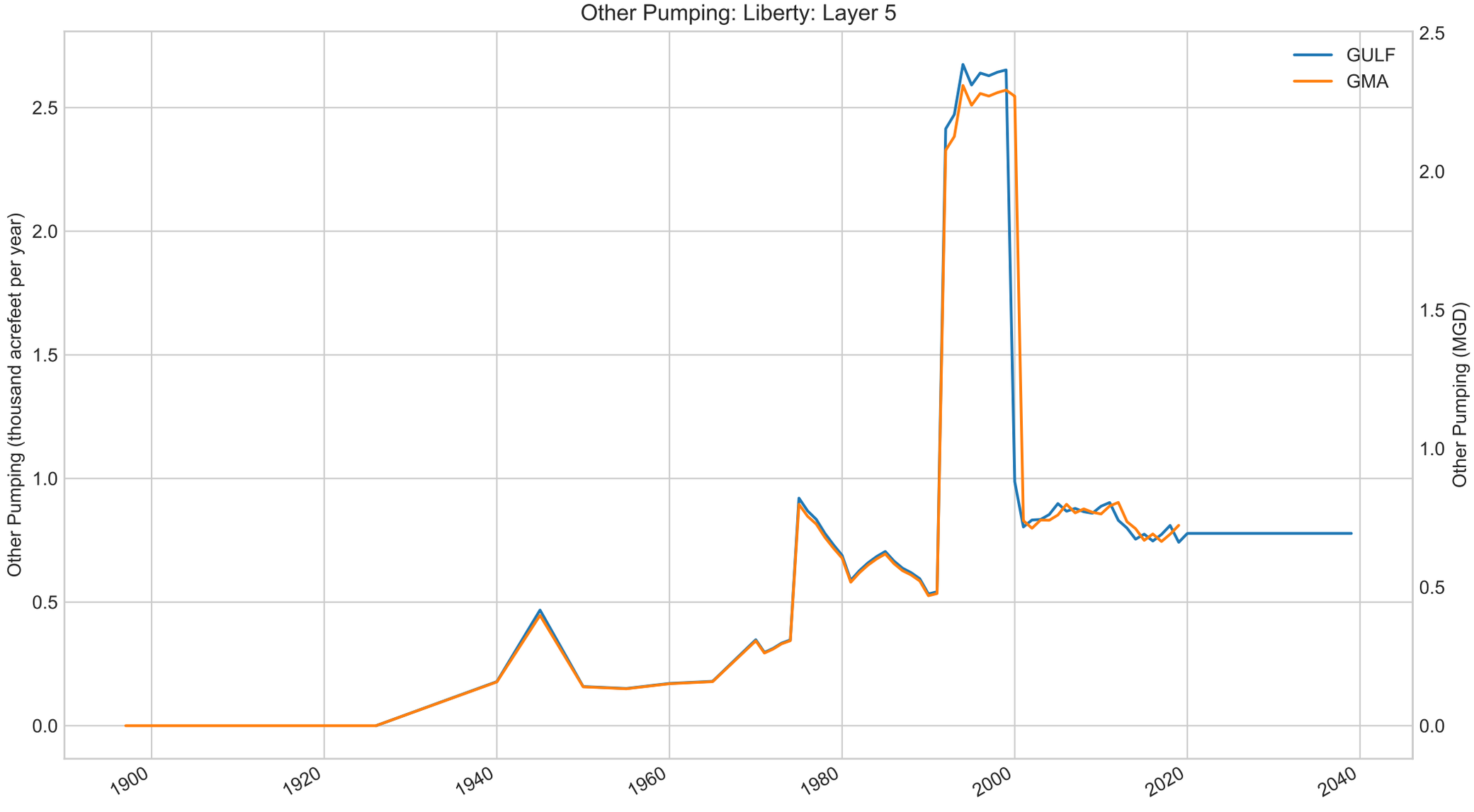

Other Pumping: Lavaca: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
10
12
14
0
2
4
6
8
10
12
1900
1920
1940
1960
1980
2000
2020
2040

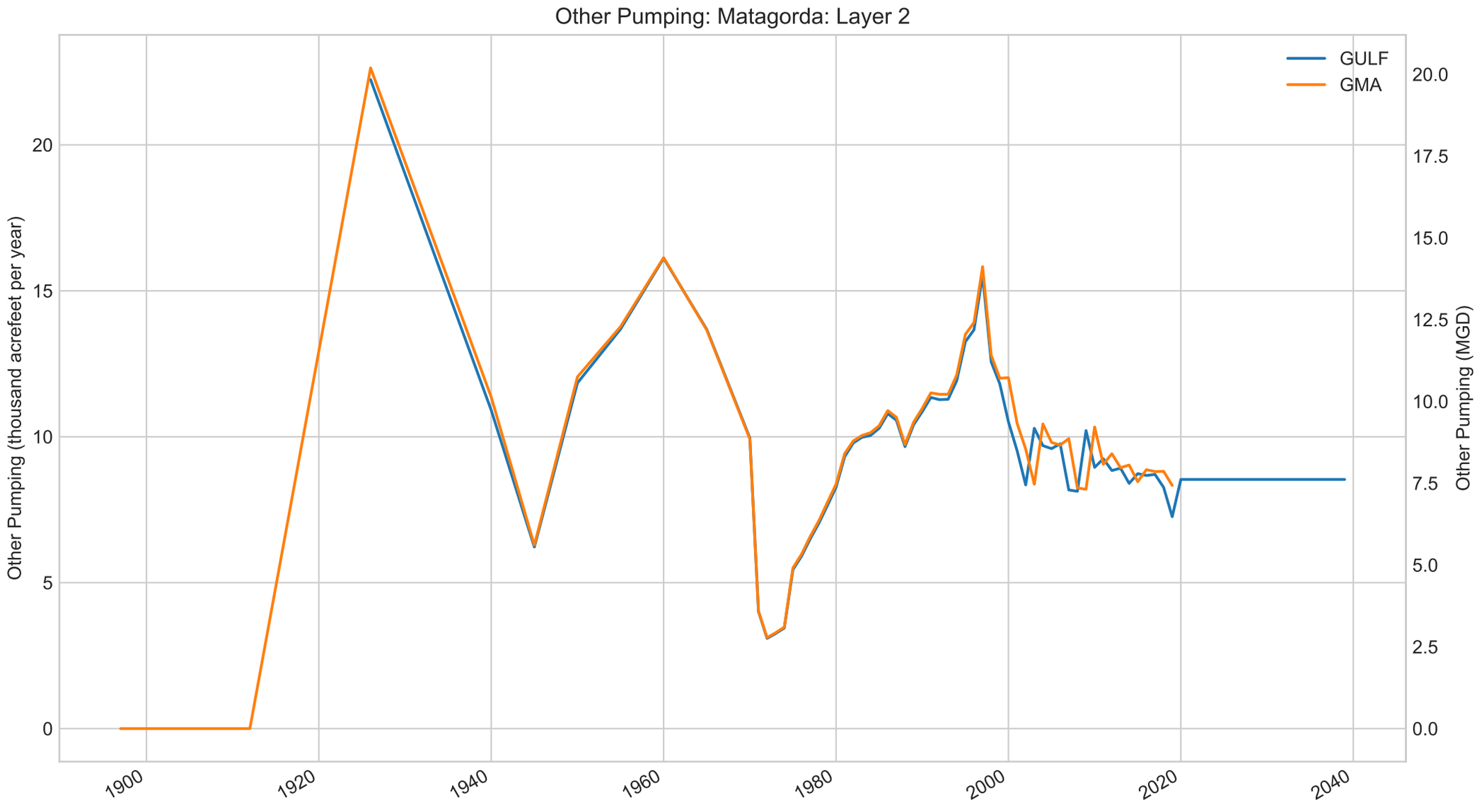

Other Pumping: Lavaca: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
1900
1920
1940
1960
1980
2000
2020
2040

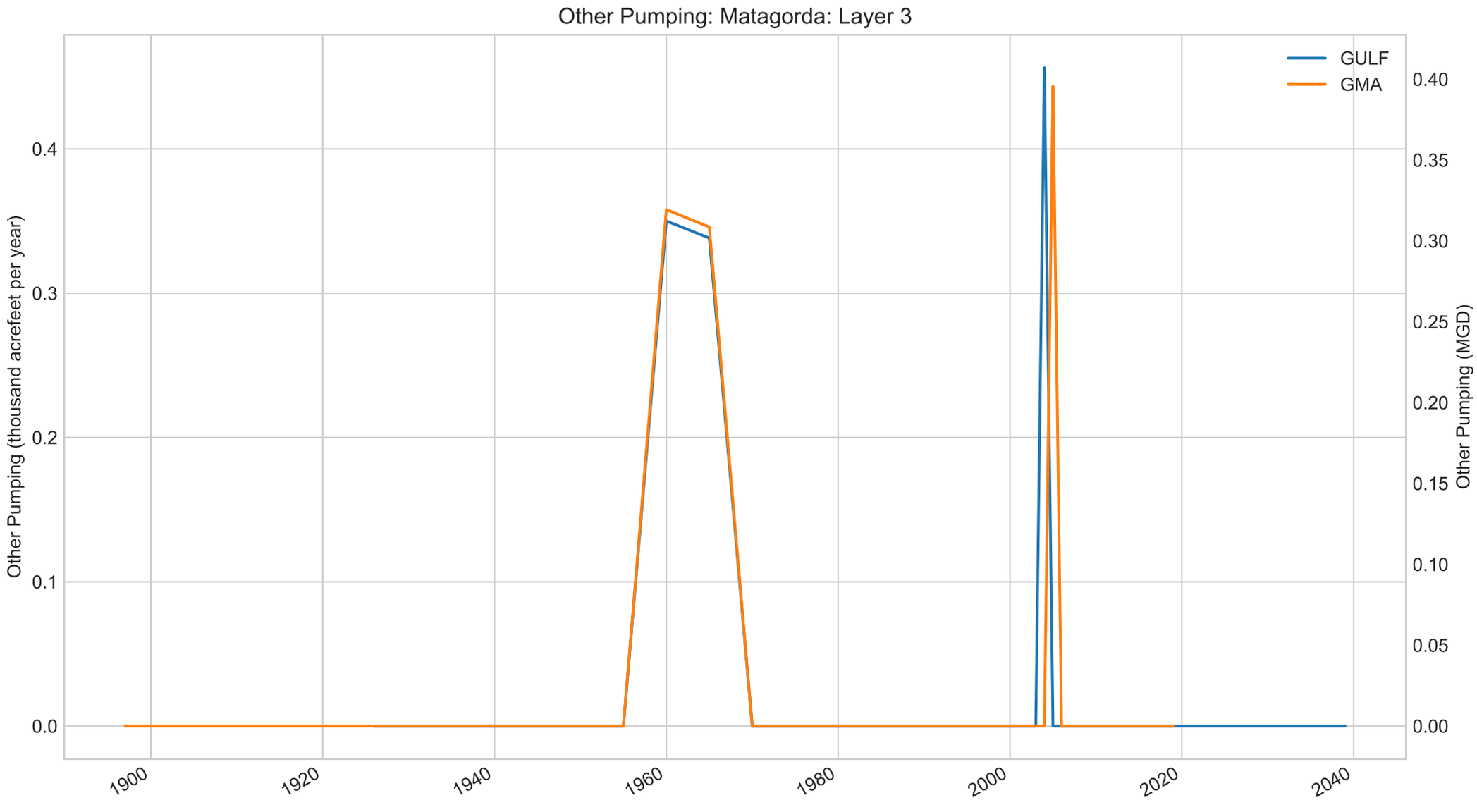

Other Pumping: Lavaca: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1900
1920
1940
1960
1980
2000
2020
2040

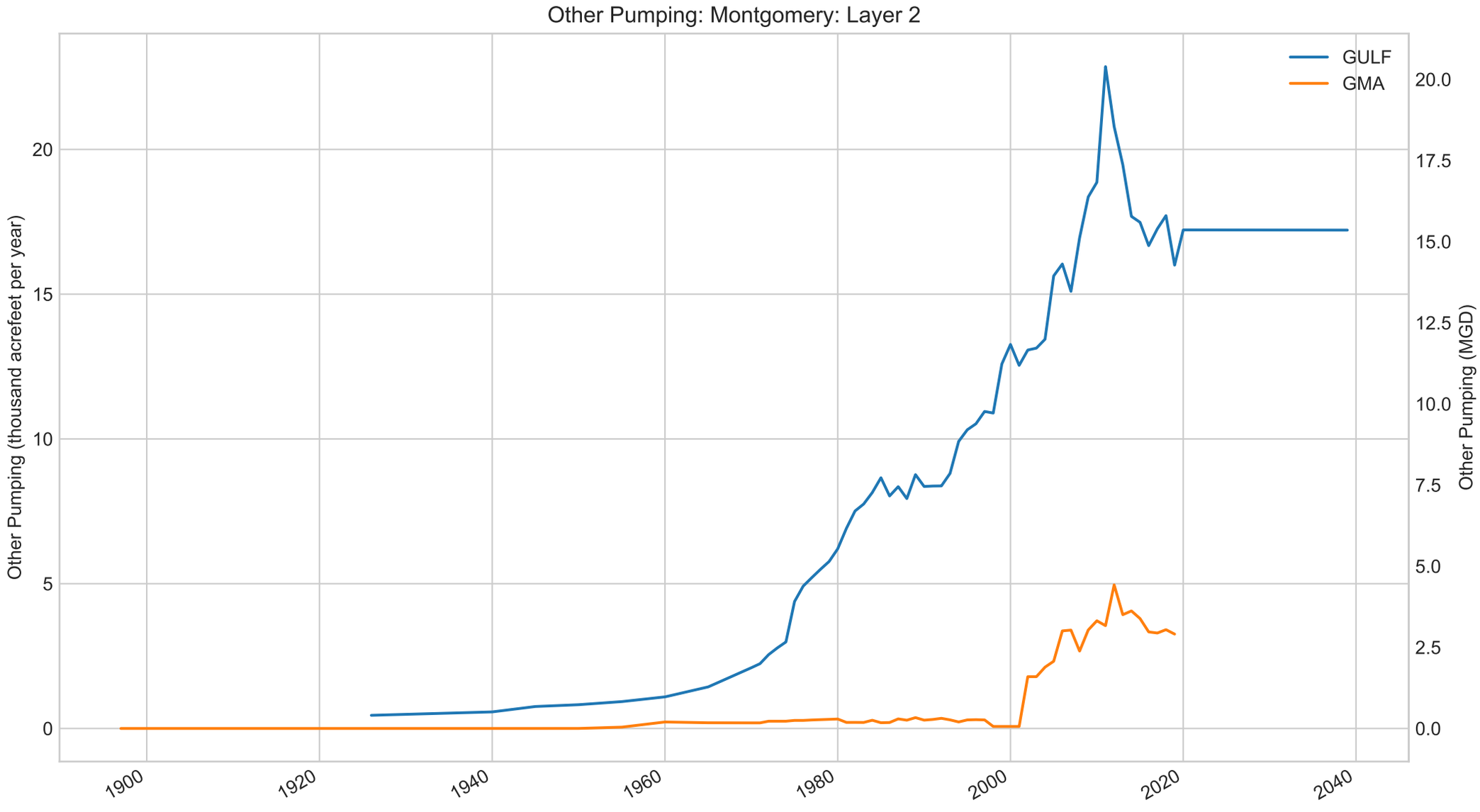

Other Pumping: Liberty: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

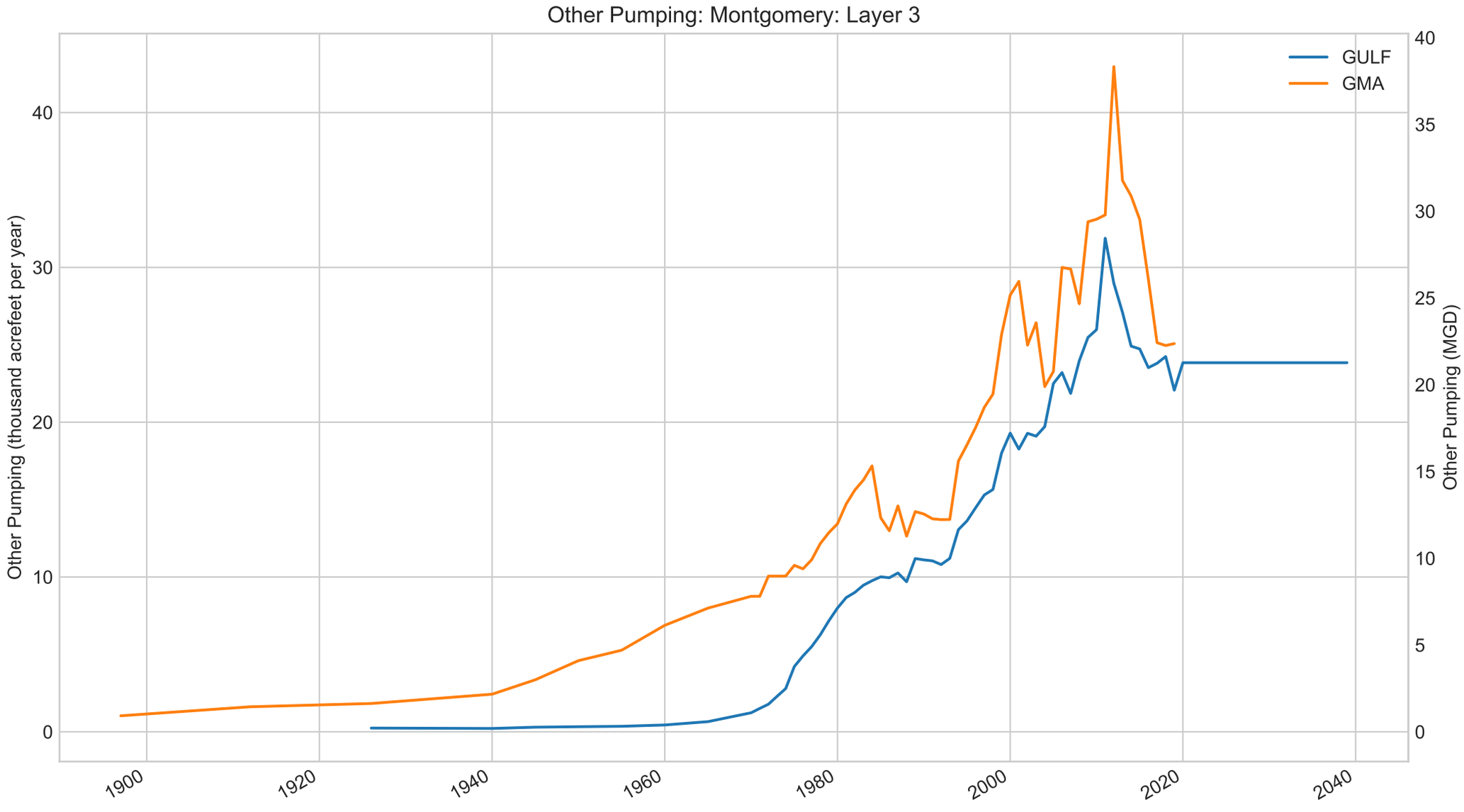

Other Pumping: Liberty: Layer 3
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1900
1920
1940
1960
1980
2000
2020
2040

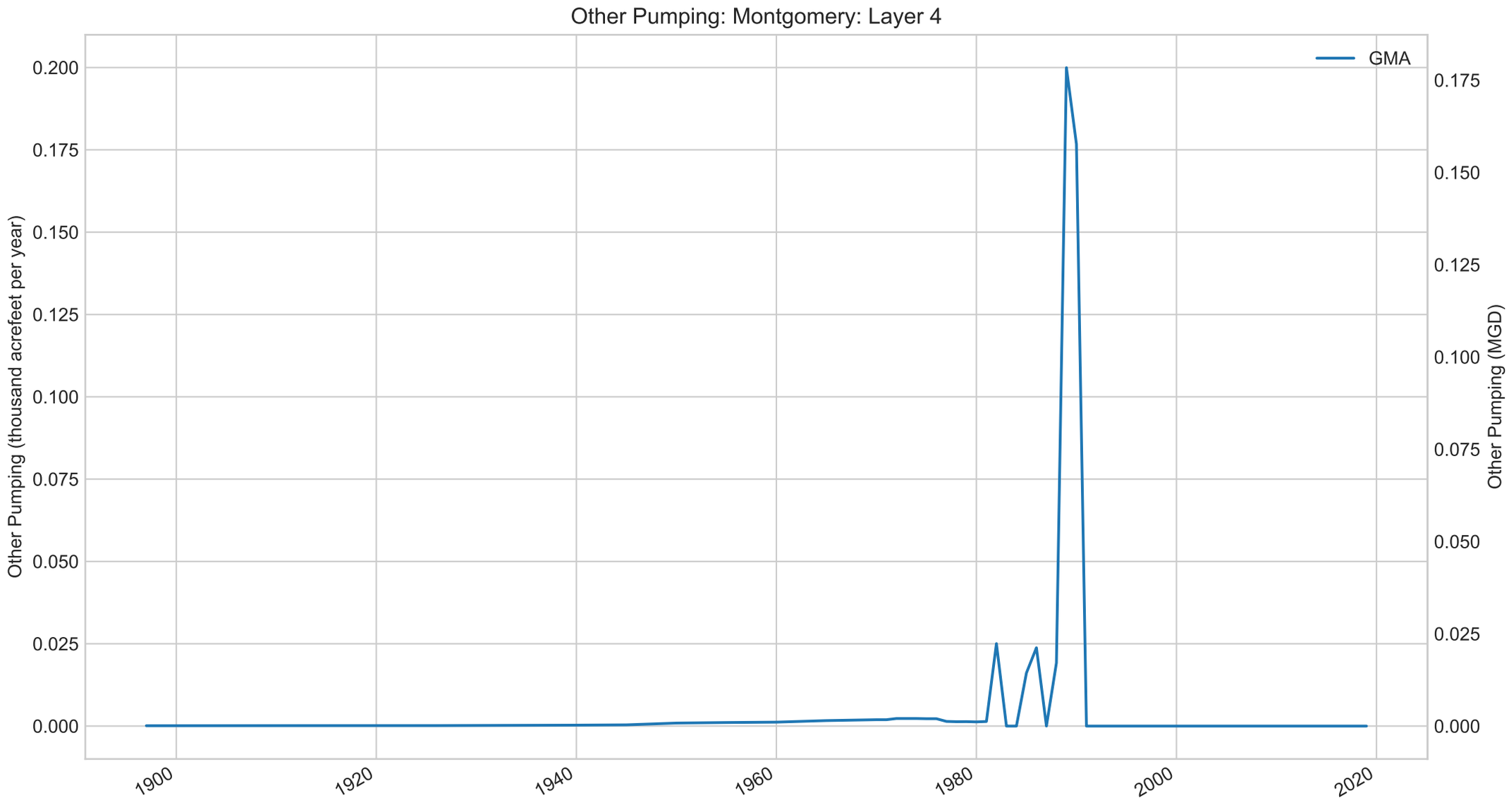

Other Pumping: Liberty: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
1900
1920
1940
1960
1980
2000
2020
2040

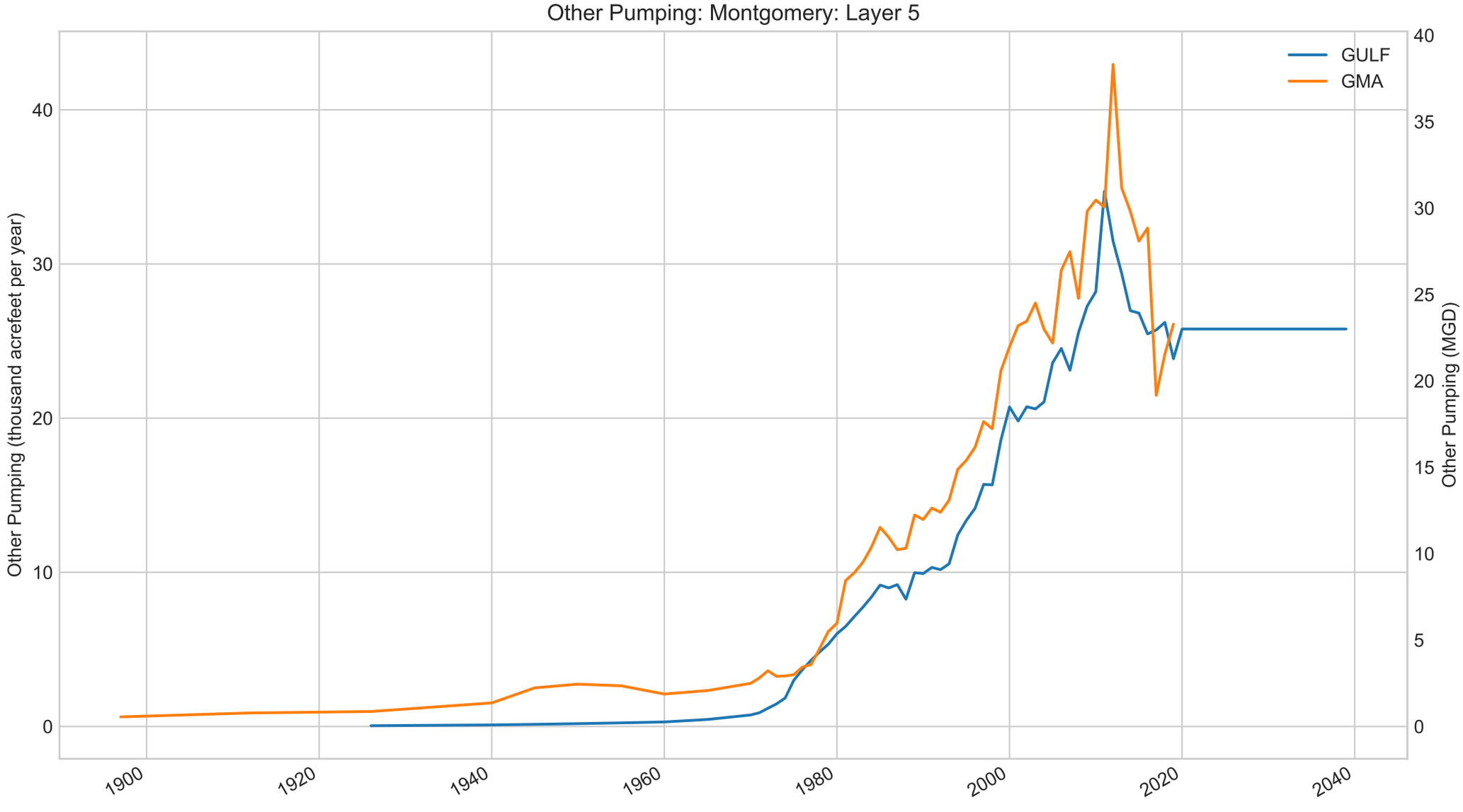

Other Pumping: Matagorda: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
1900
1920
1940
1960
1980
2000
2020
2040

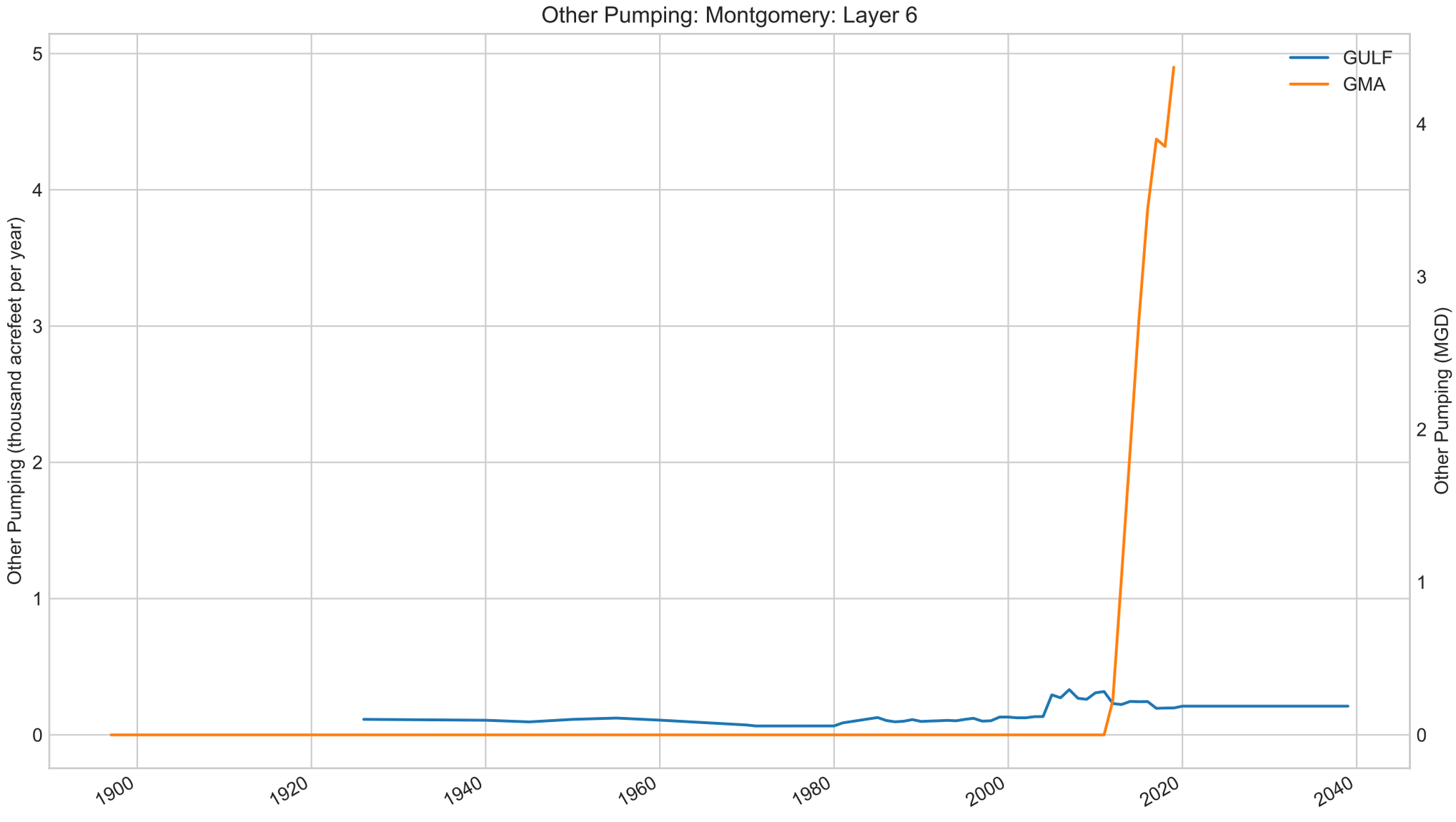

Other Pumping: Matagorda: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
1900
1920
1940
1960
1980
2000
2020
2040

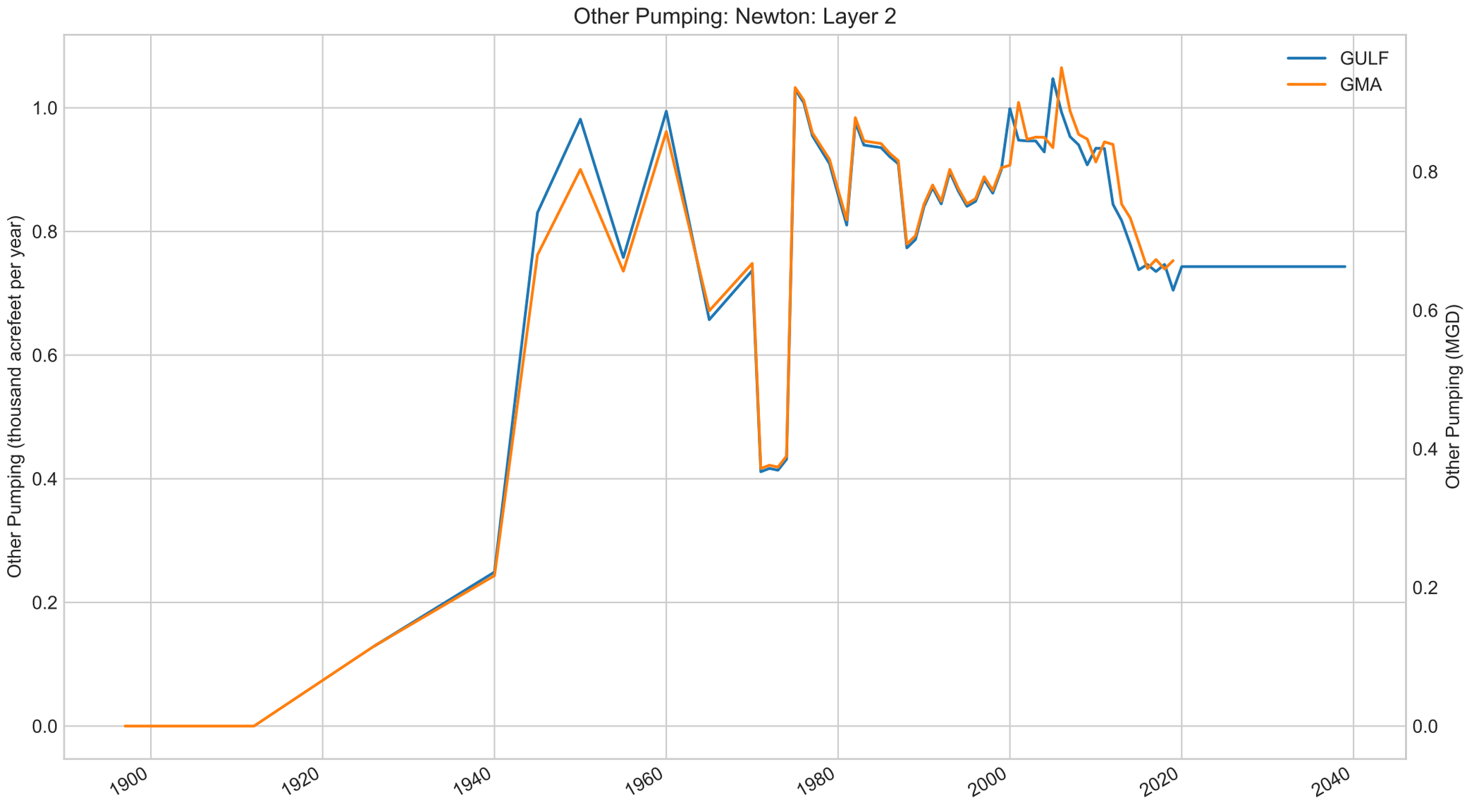

Other Pumping: Montgomery: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
1900
1920
1940
1960
1980
2000
2020
2040

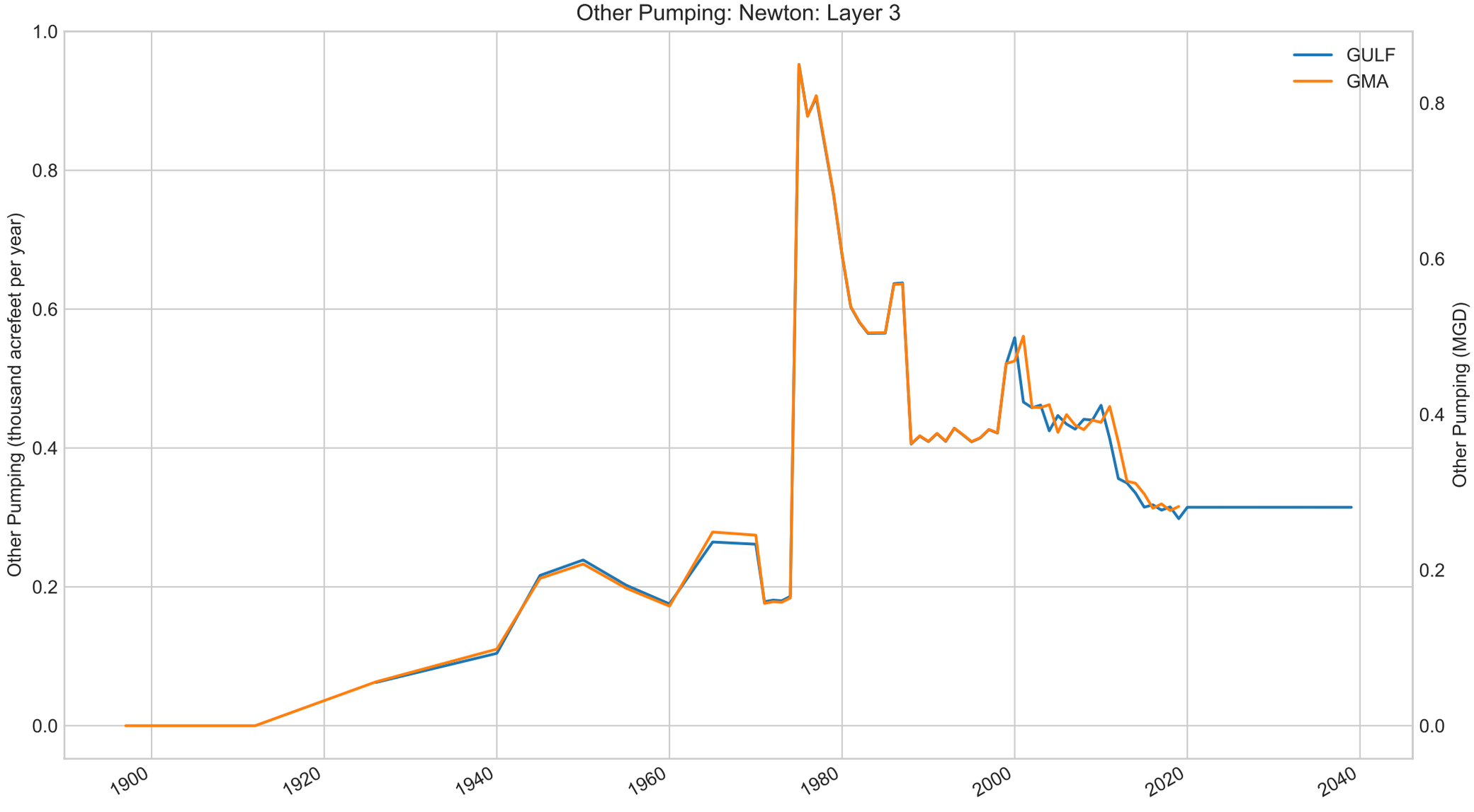

Other Pumping: Montgomery: Layer 3
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
10
20
30
40
0
5
10
15
20
25
30
35
40
1900
1920
1940
1960
1980
2000
2020
2040

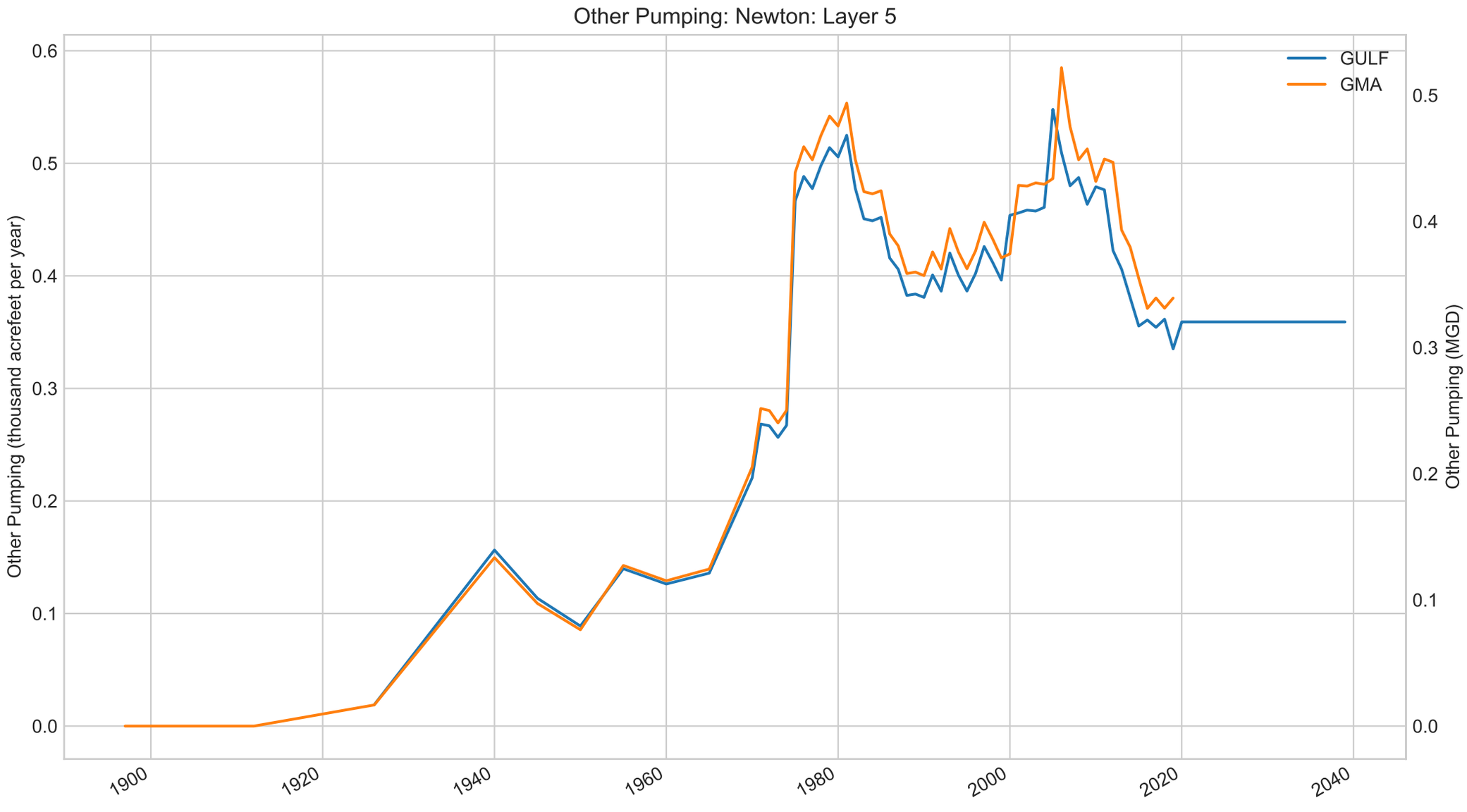

Other Pumping: Montgomery: Layer 4
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1900
1920
1940
1960
1980
2000
2020

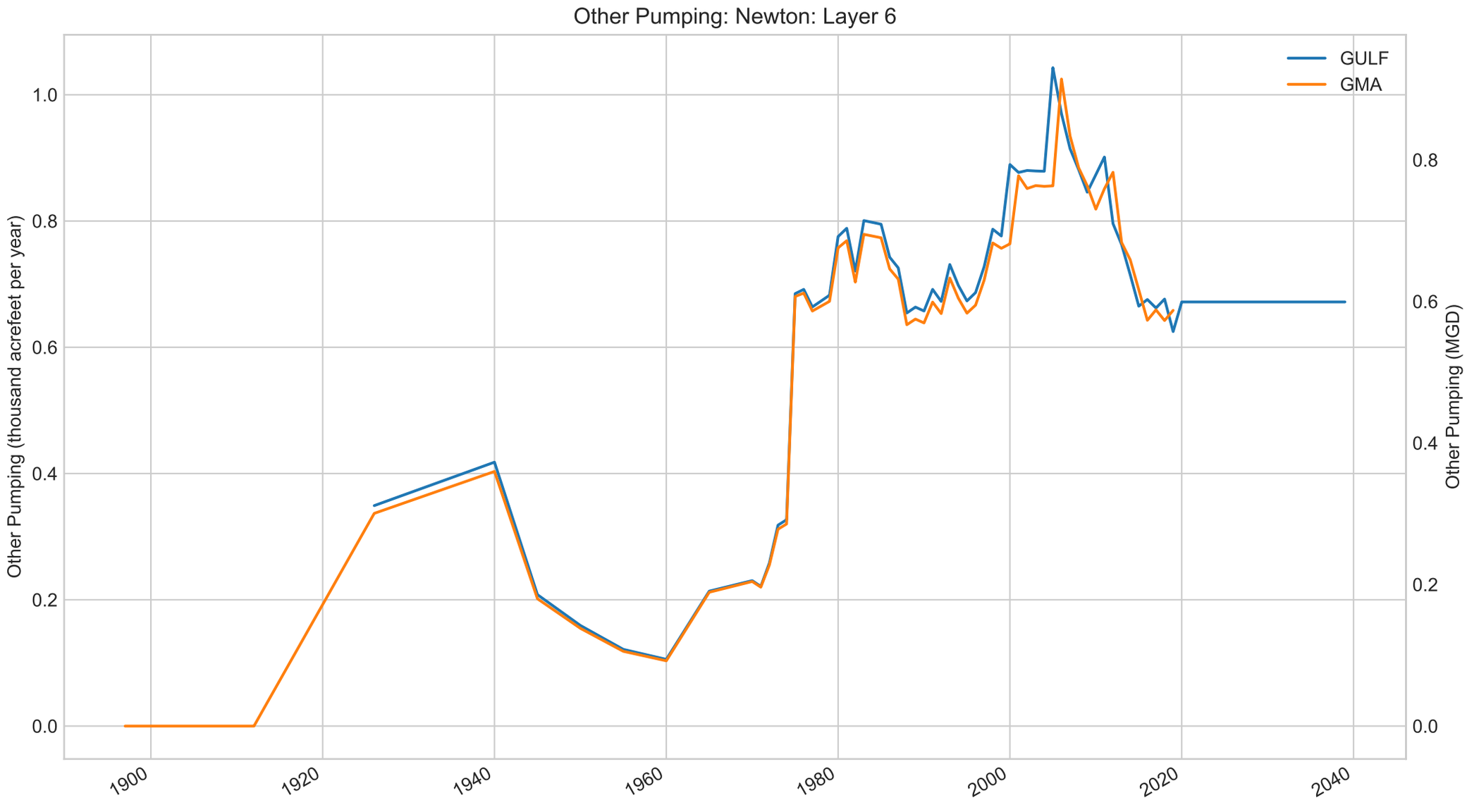

Other Pumping: Montgomery: Layer 5
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0
10
20
30
40
0
5
10
15
20
25
30
35
40
1900
1920
1940
1960
1980
2000
2020
2040

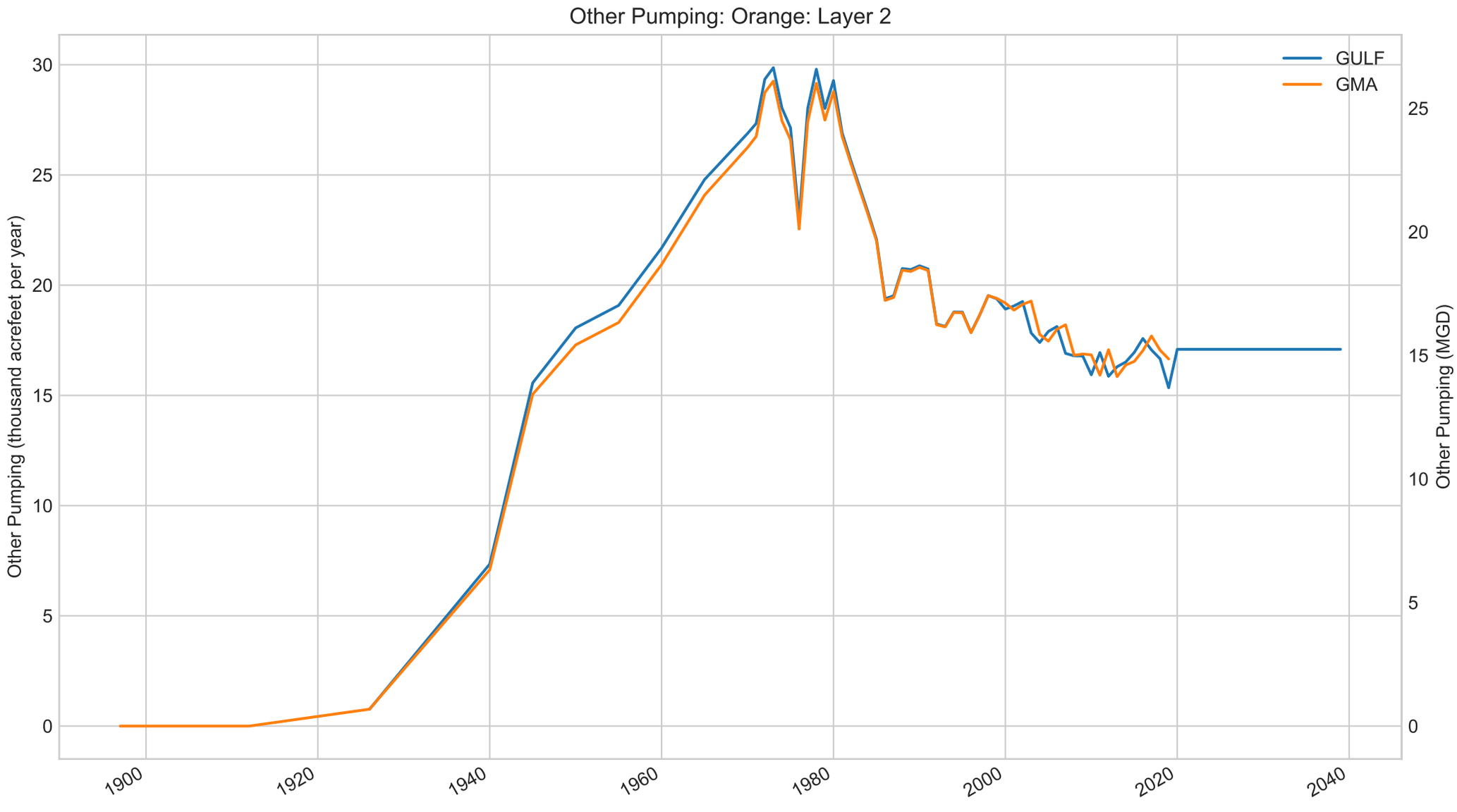

Other Pumping: Montgomery: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

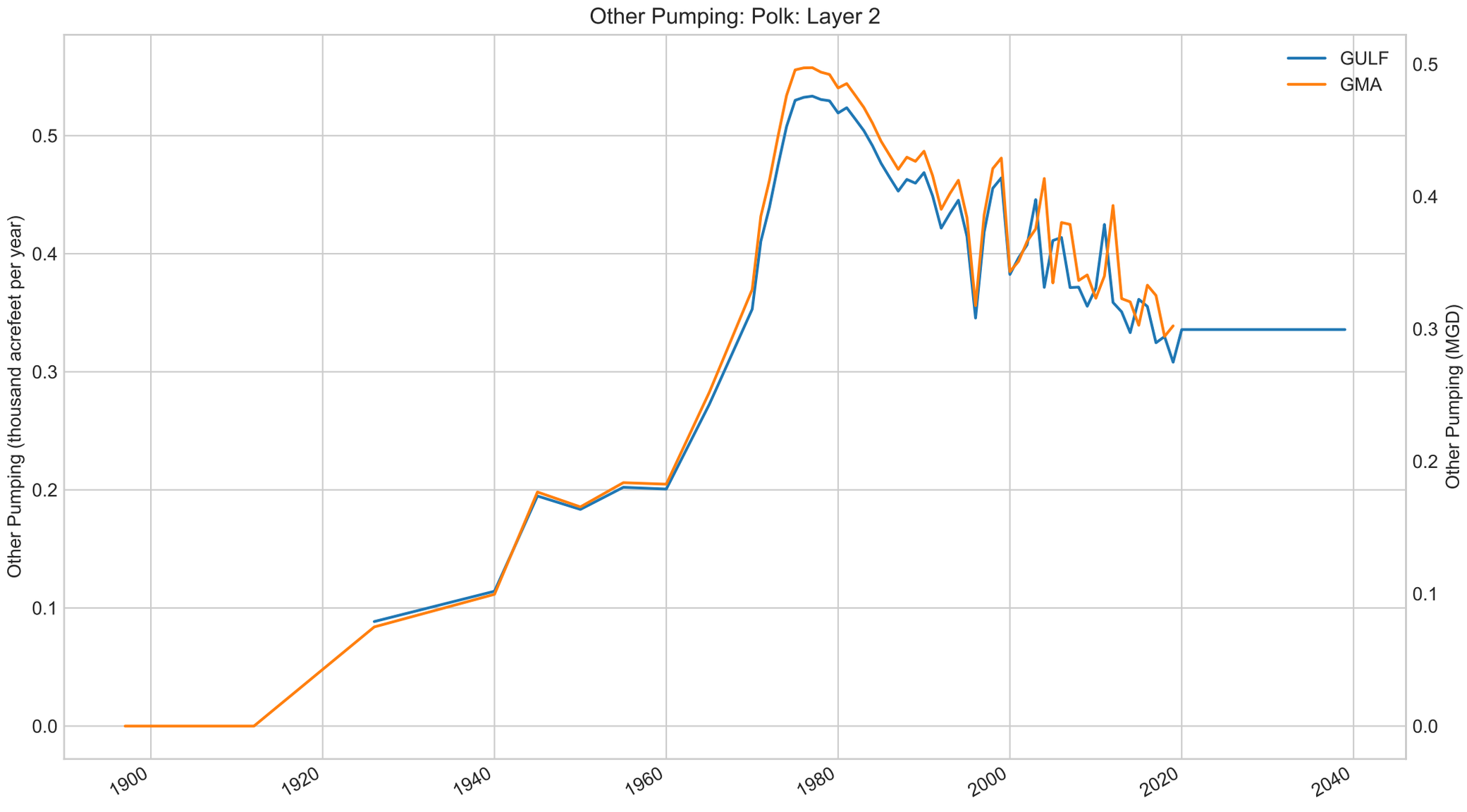

Other Pumping: Newton: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1900
1920
1940
1960
1980
2000
2020
2040

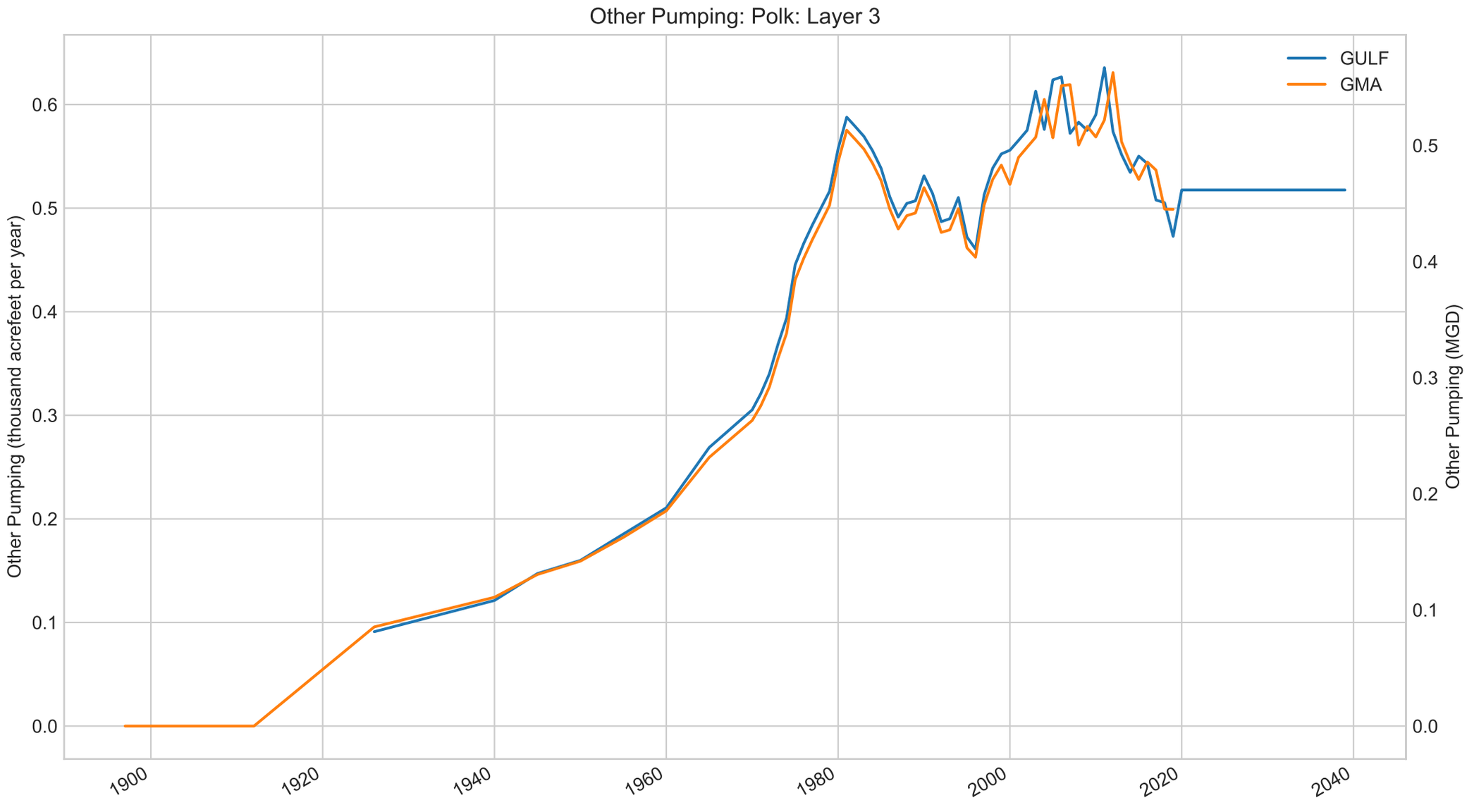

Other Pumping: Newton: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
1.0
0.8
0.6
0.4
0.2
0.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

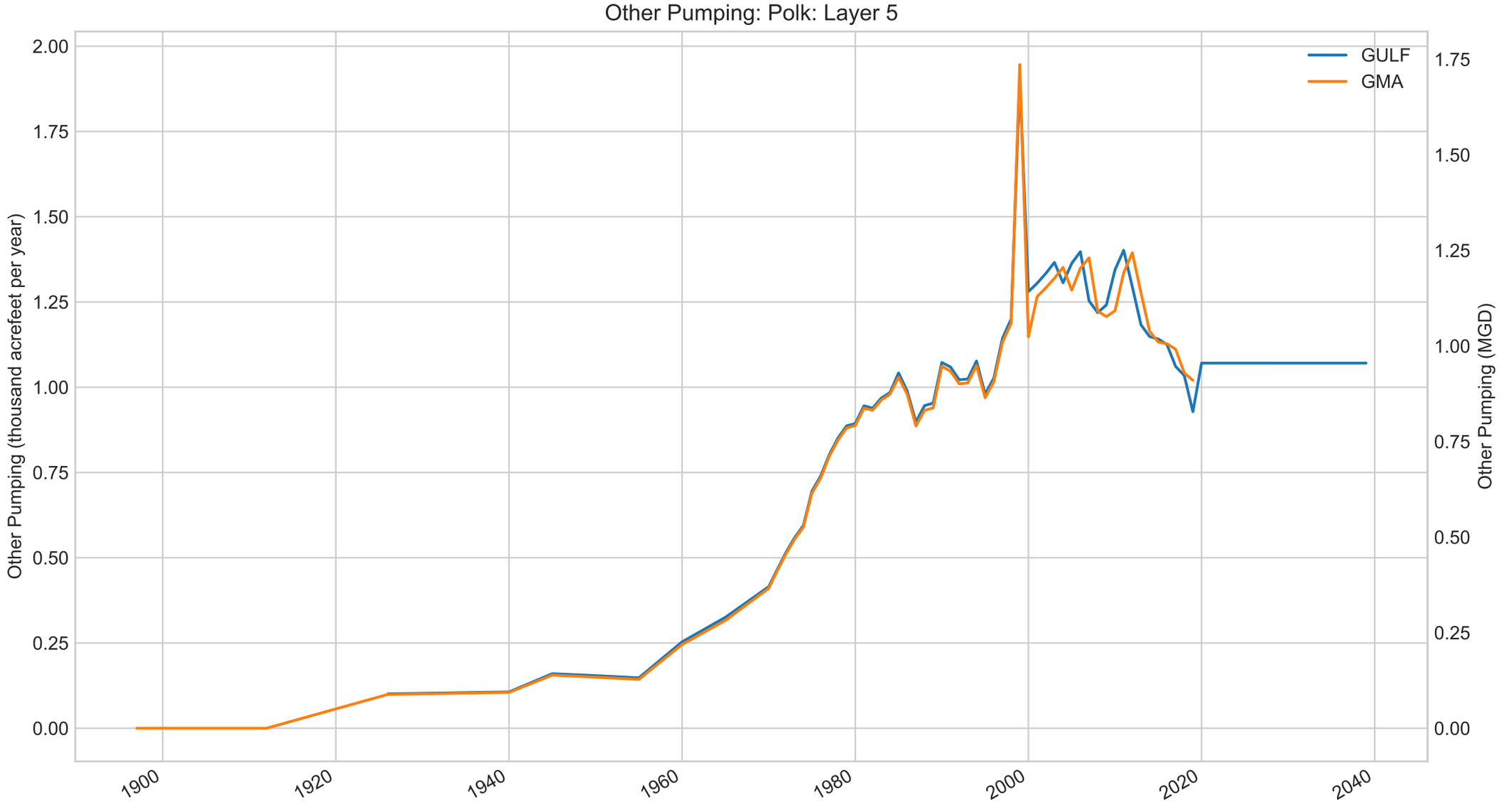

Other Pumping: Newton: Layer 5
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1900
1920
1940
1960
1980
2000
2020
2040

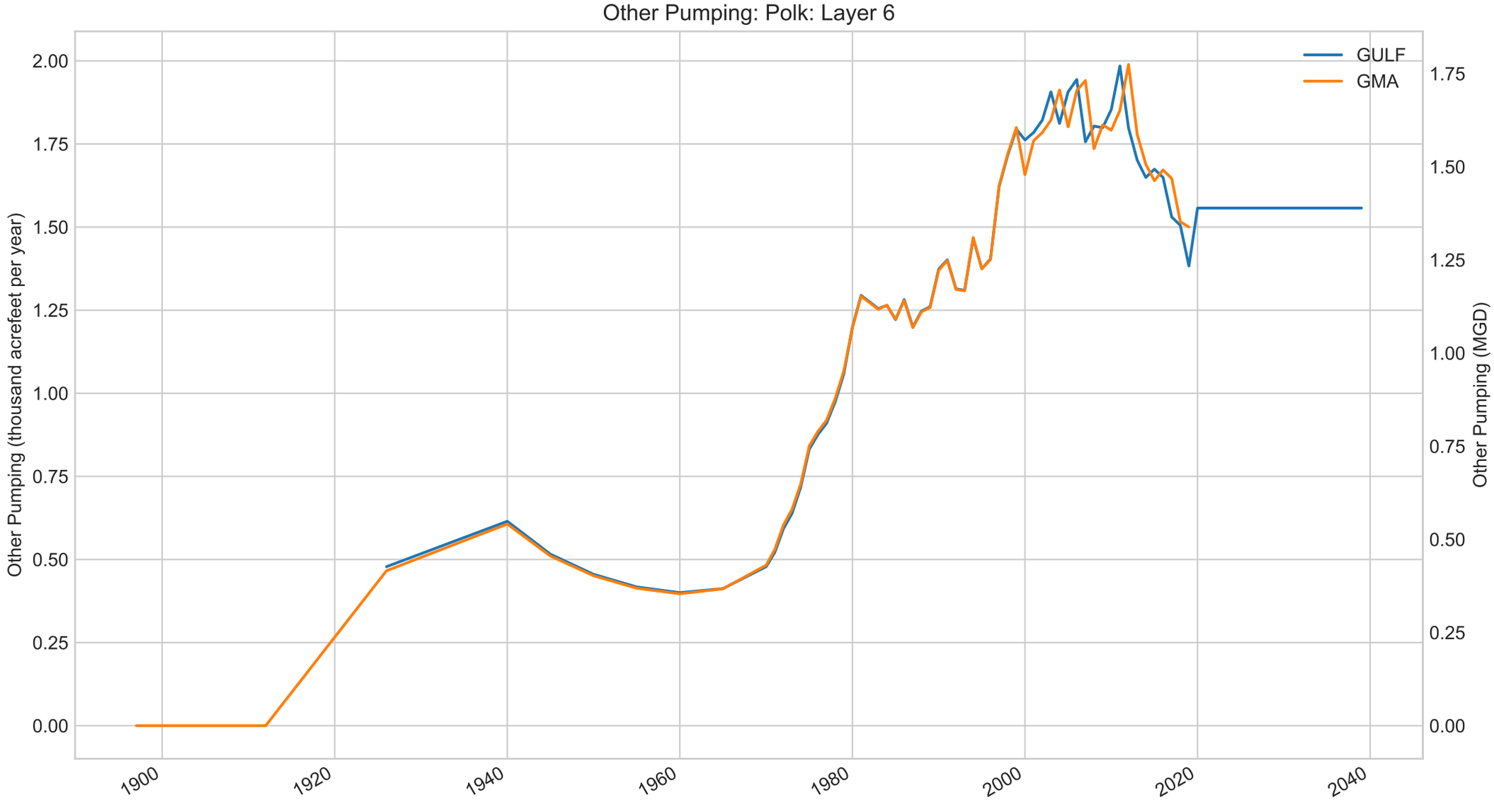

Other Pumping: Newton: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1900
1920
1940
1960
1980
2000
2020
2040

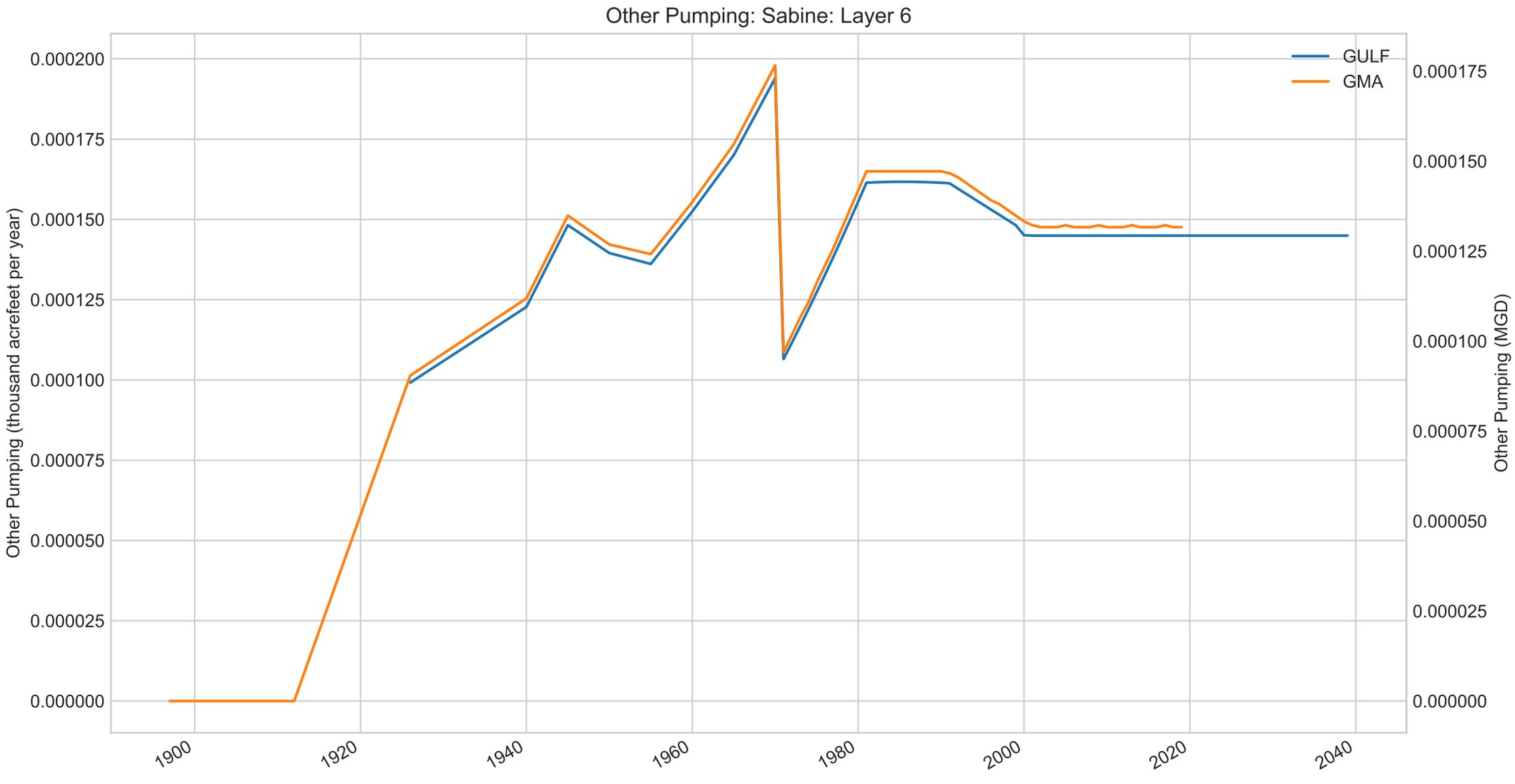

Other Pumping: Orange: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

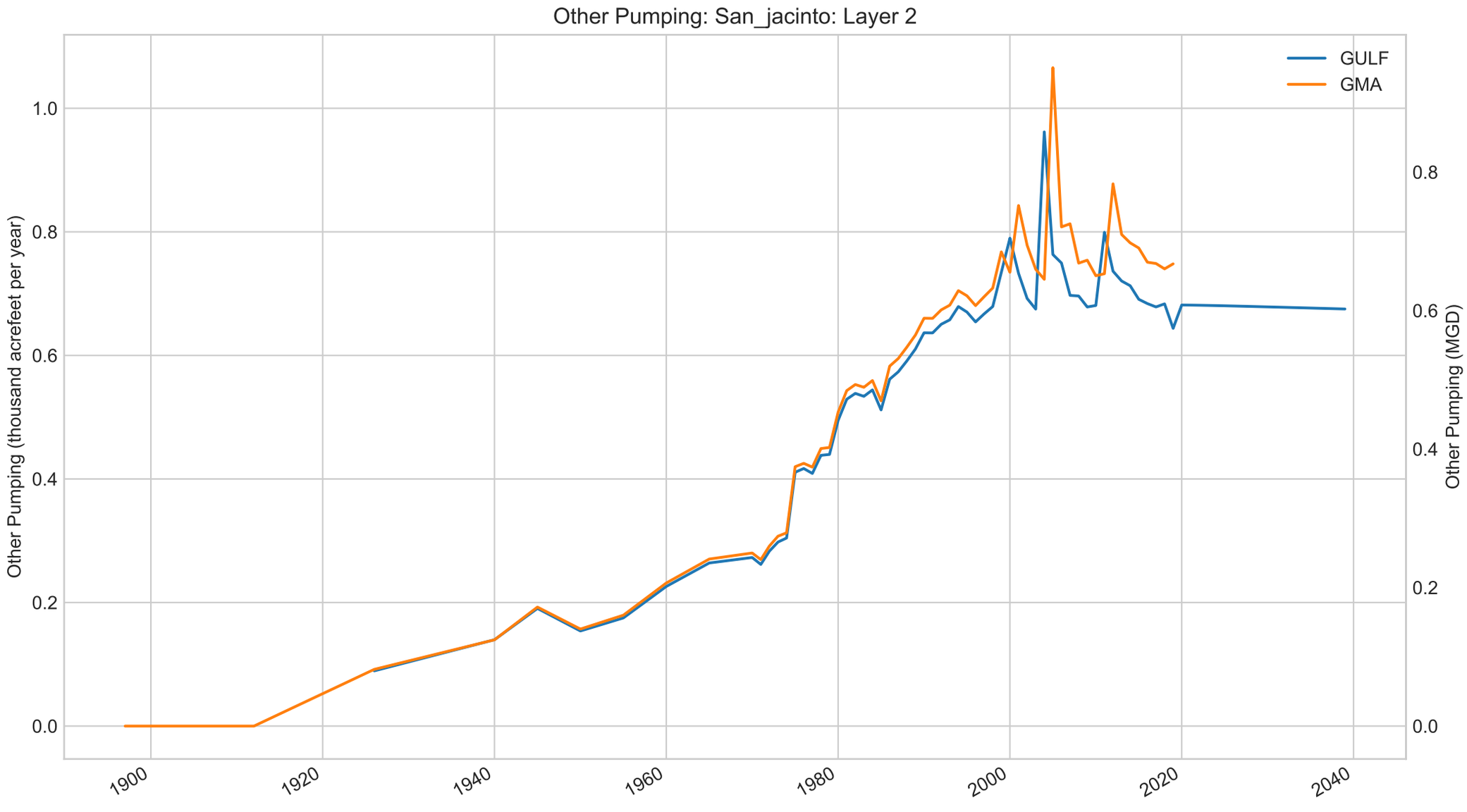

Other Pumping: Polk: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

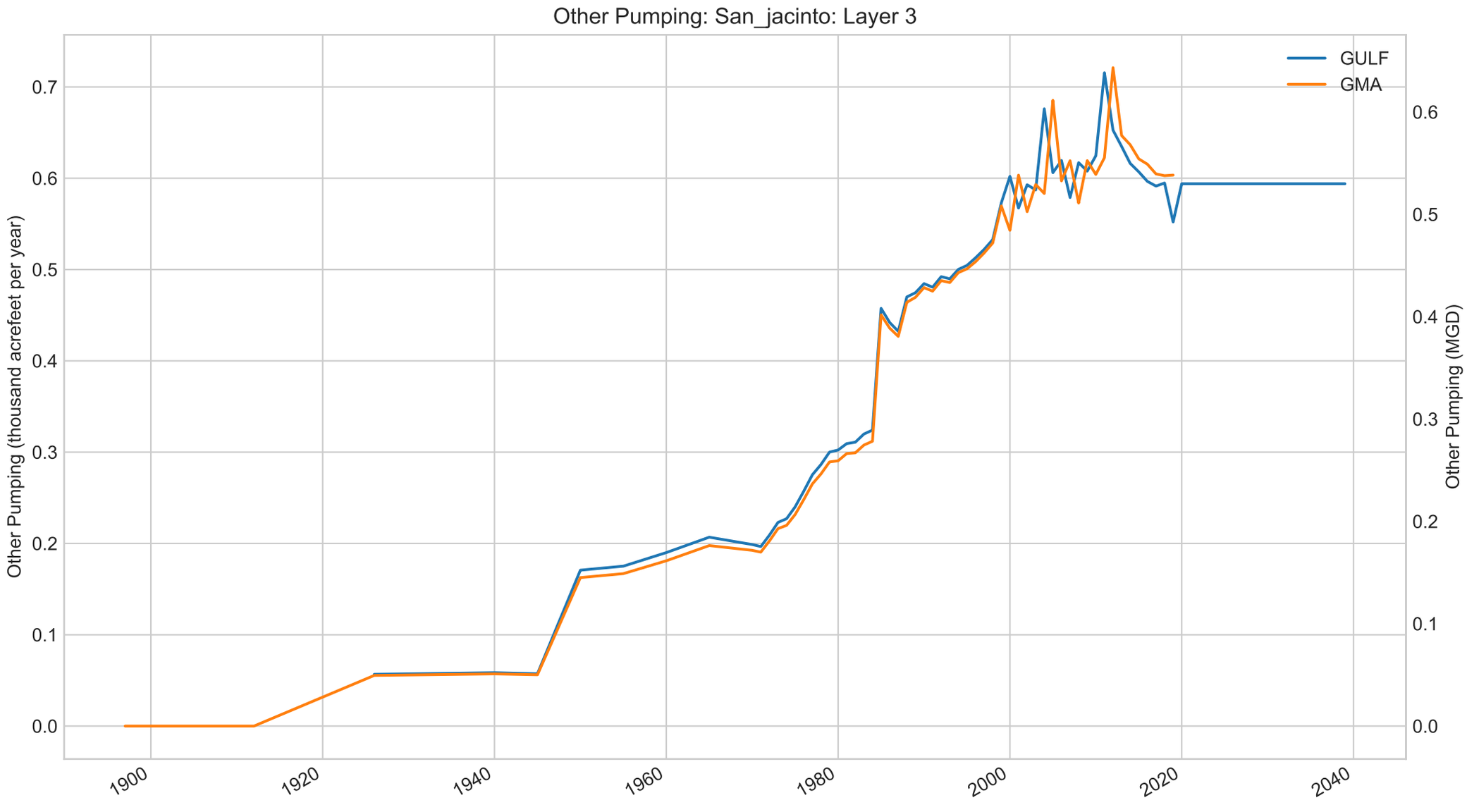

Other Pumping: Polk: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1900
1920
1940
1960
1980
2000
2020
2040

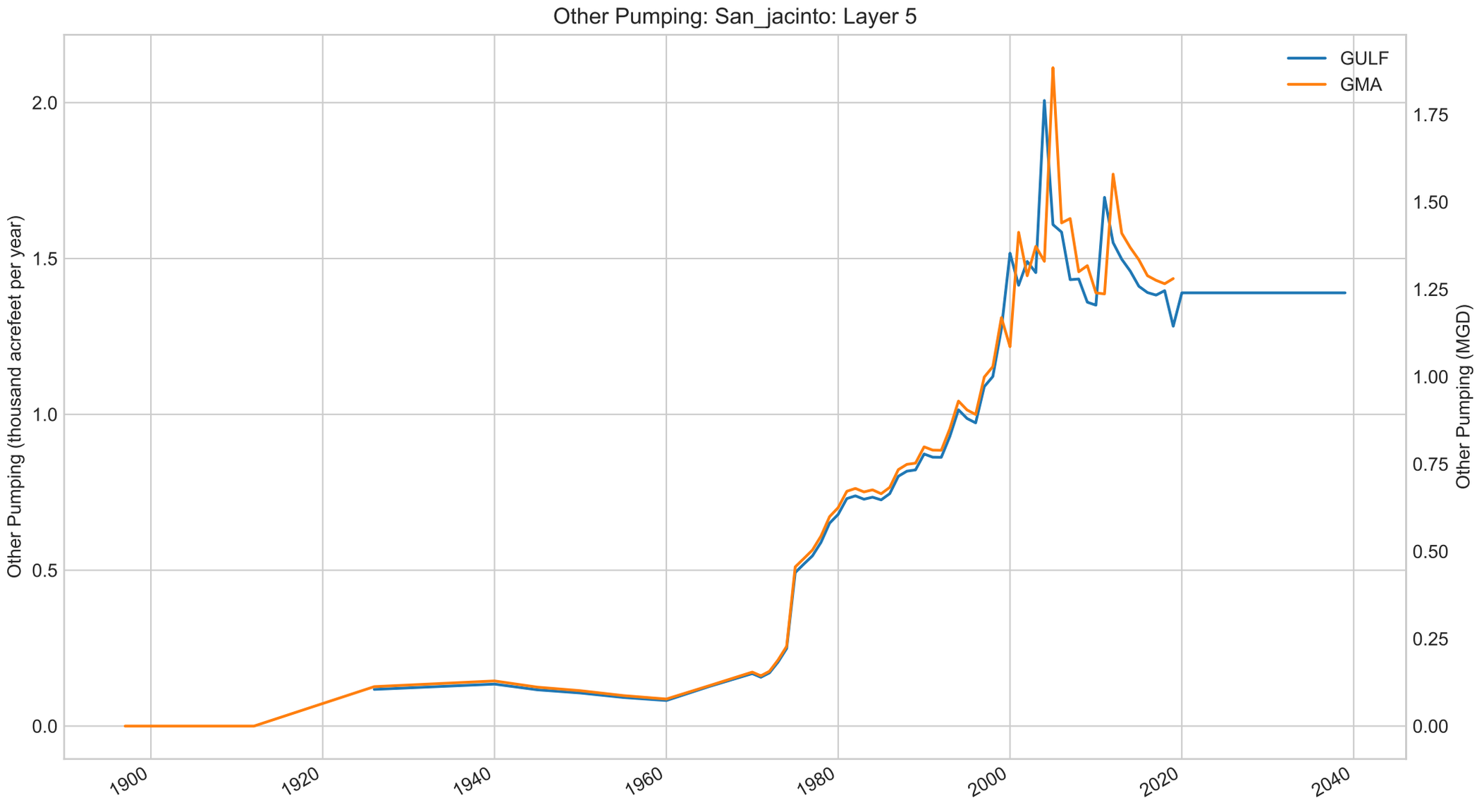

Other Pumping: Polk: Layer 5
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1900
1920
1940
1960
1980
2000
2020
2040

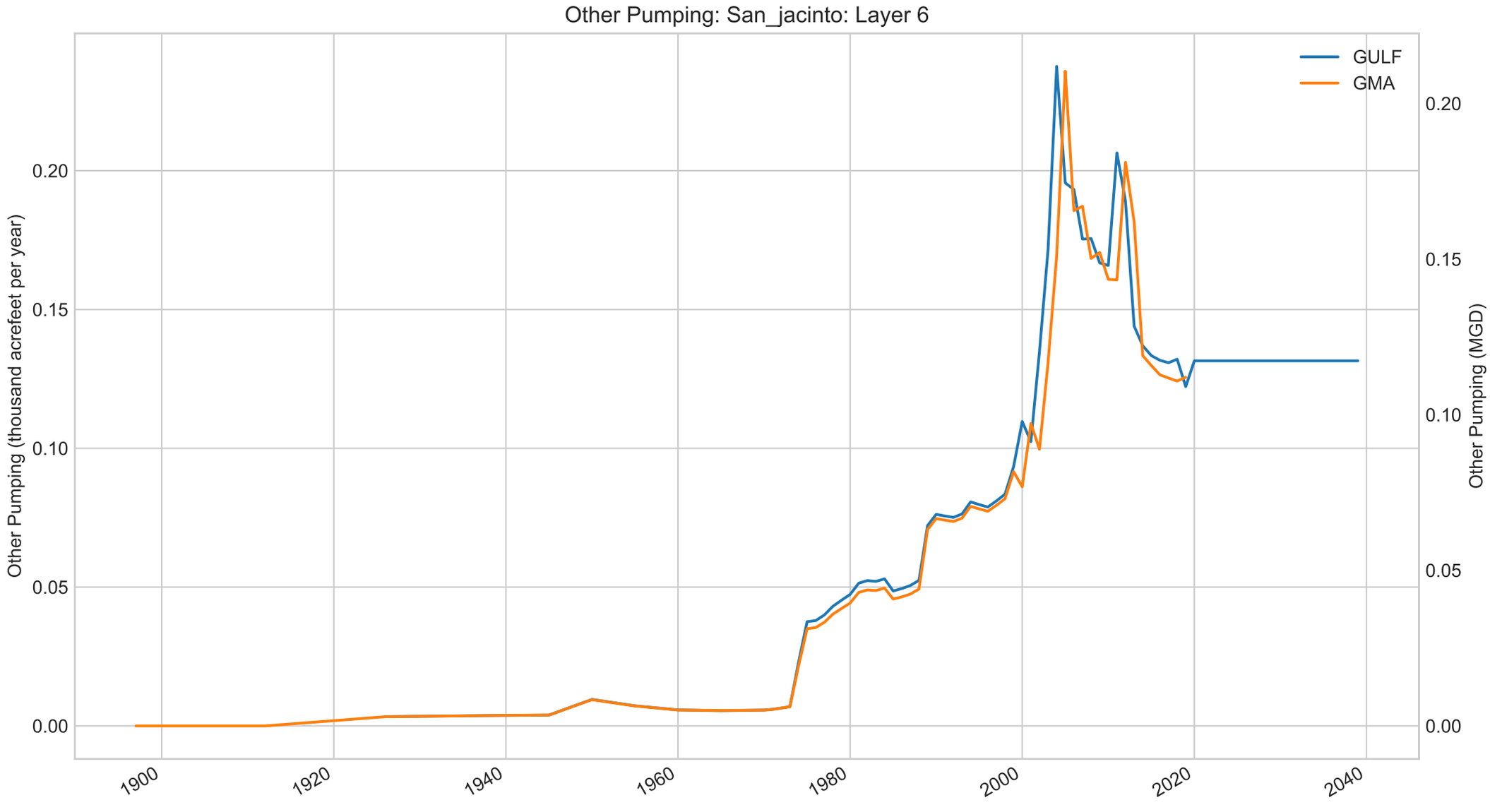

Other Pumping: Polk: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1900
1920
1940
1960
1980
2000
2020
2040

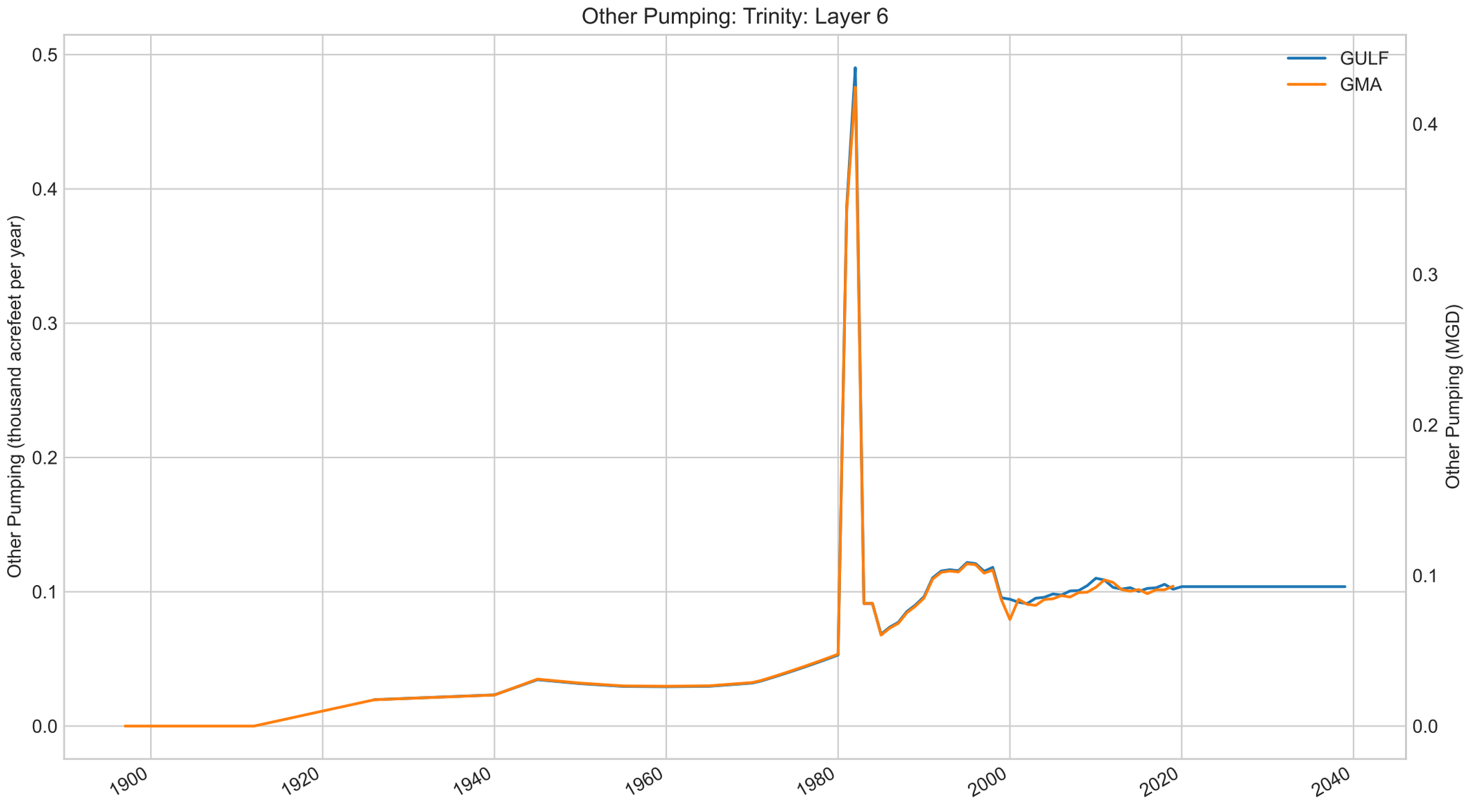

Other Pumping: Sabine: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.000200
0.000175
0.000150
0.000125
0.000100
0.000075
0.000050
0.000025
0.000000
1900
1920
1940
1960
1980
2000
2020
2040

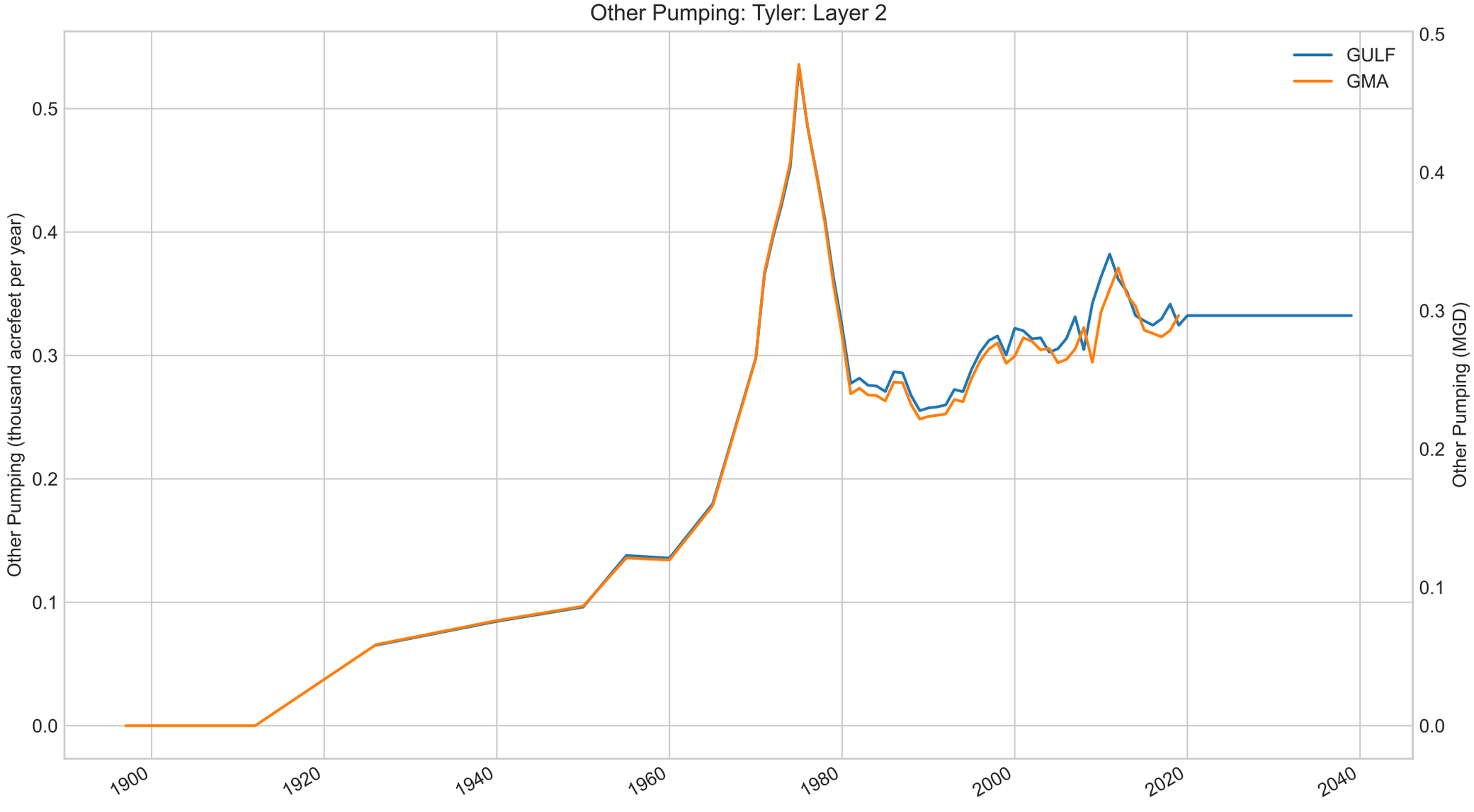

Other Pumping: San_jacinto: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
0.0
0.2
0.4
0.6
0.8
1900
1920
1940
1960
1980
2000
2020
2040

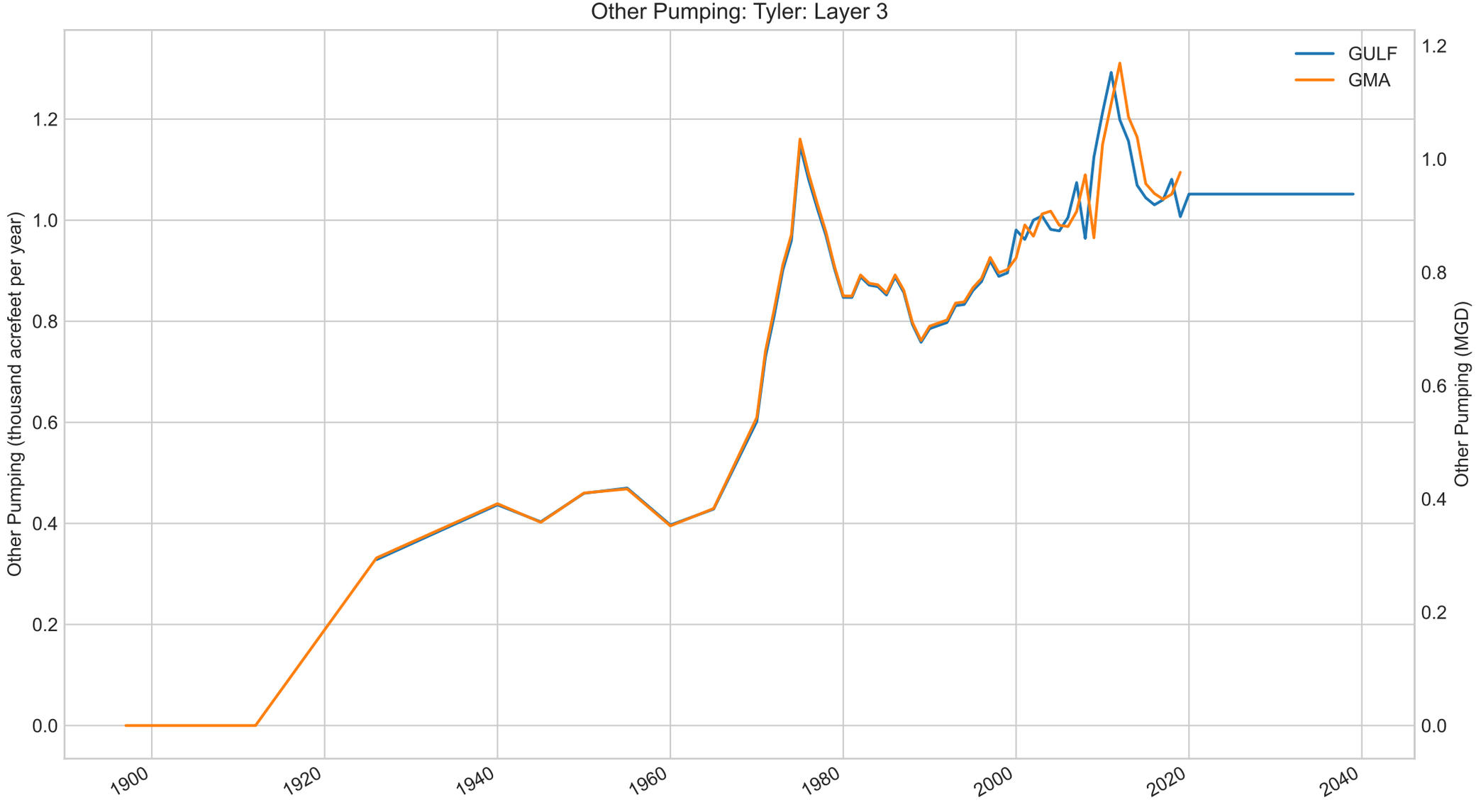

Other Pumping: San_jacinto: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

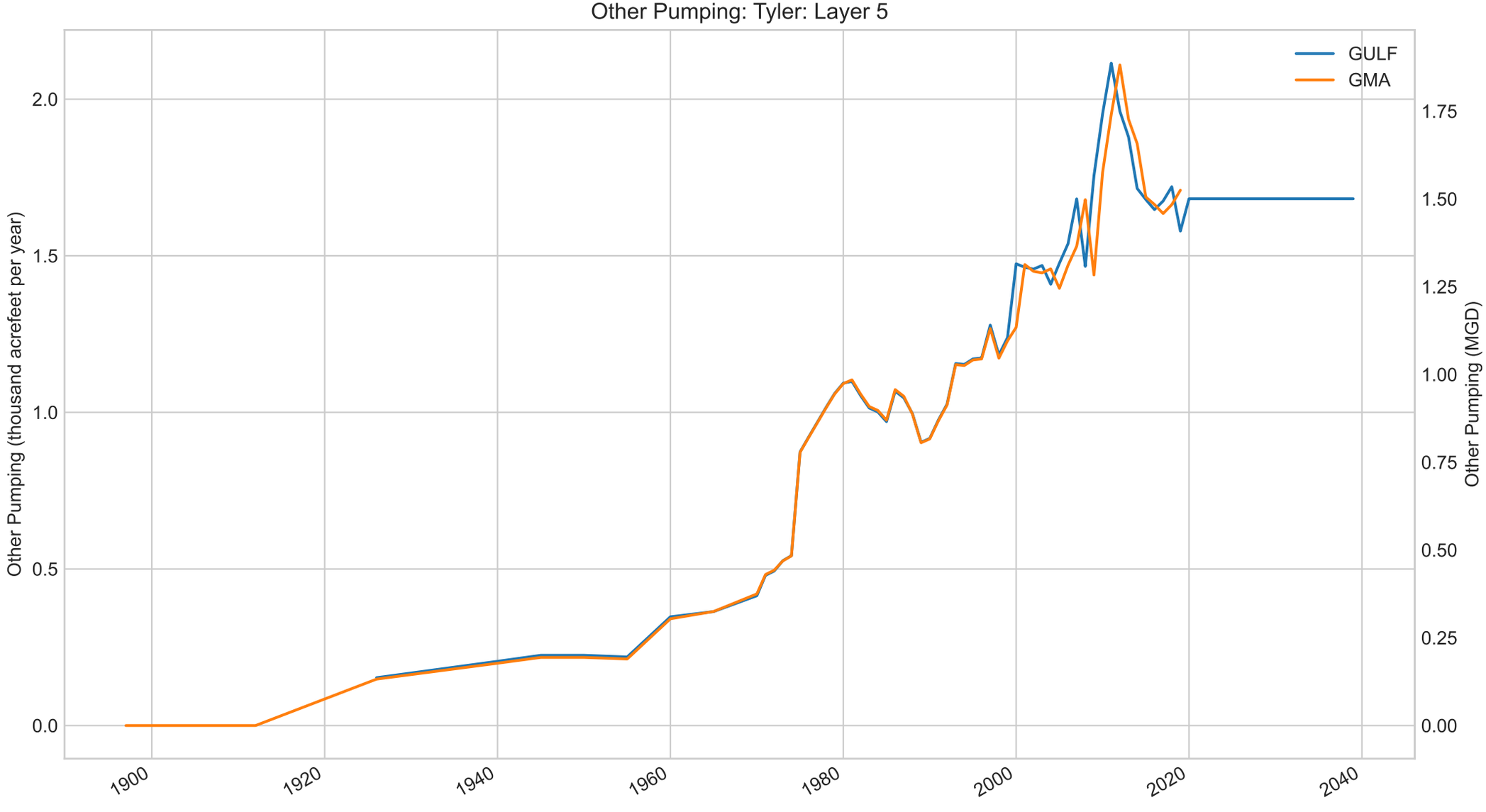

Other Pumping: San_jacinto: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
1900
1920
1940
1960
1980
2000
2020
2040

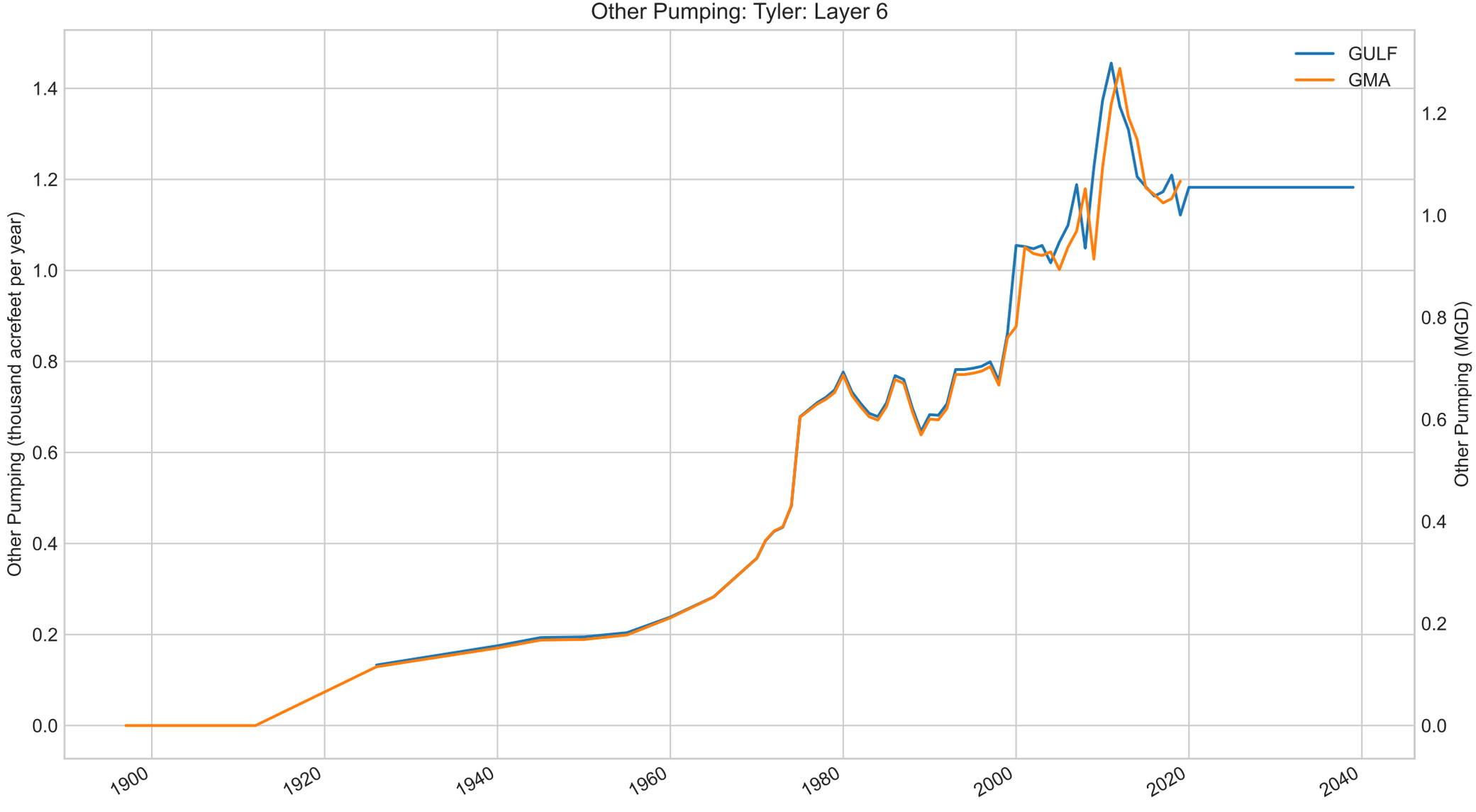

Other Pumping: San_jacinto: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
1900
1920
1940
1960
1980
2000
2020
2040

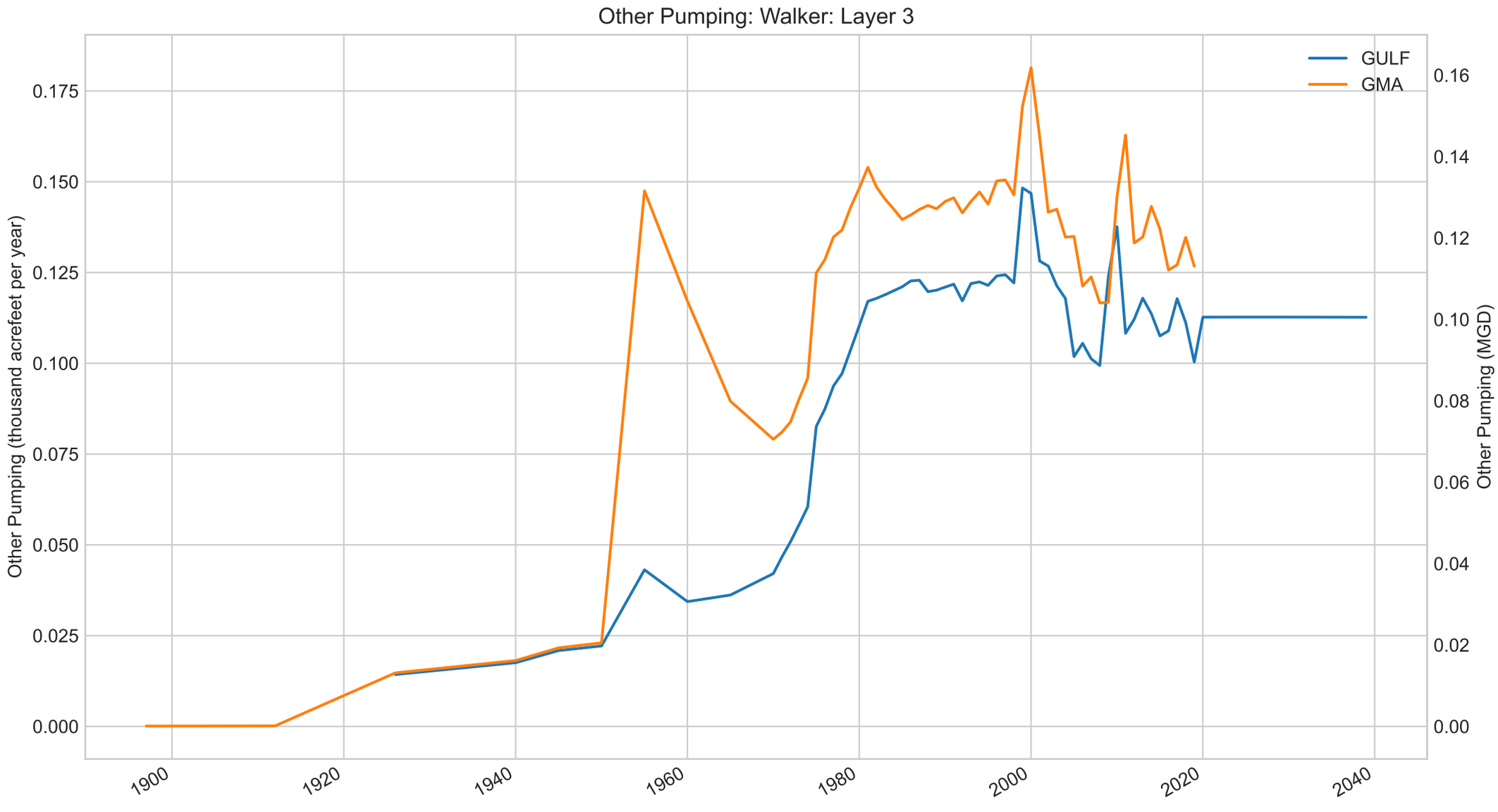

Other Pumping: Trinity: Layer 6
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

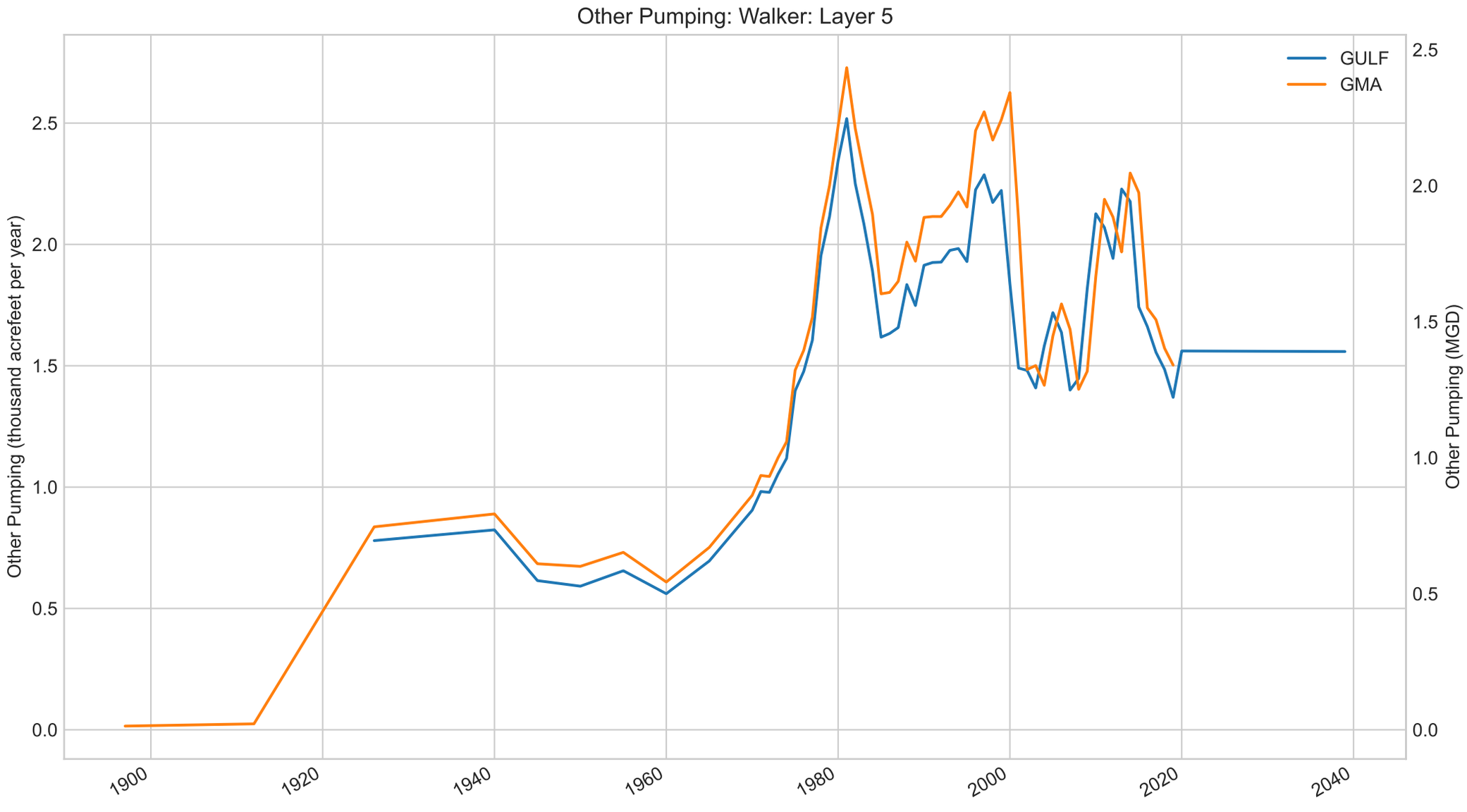

Other Pumping: Tyler: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

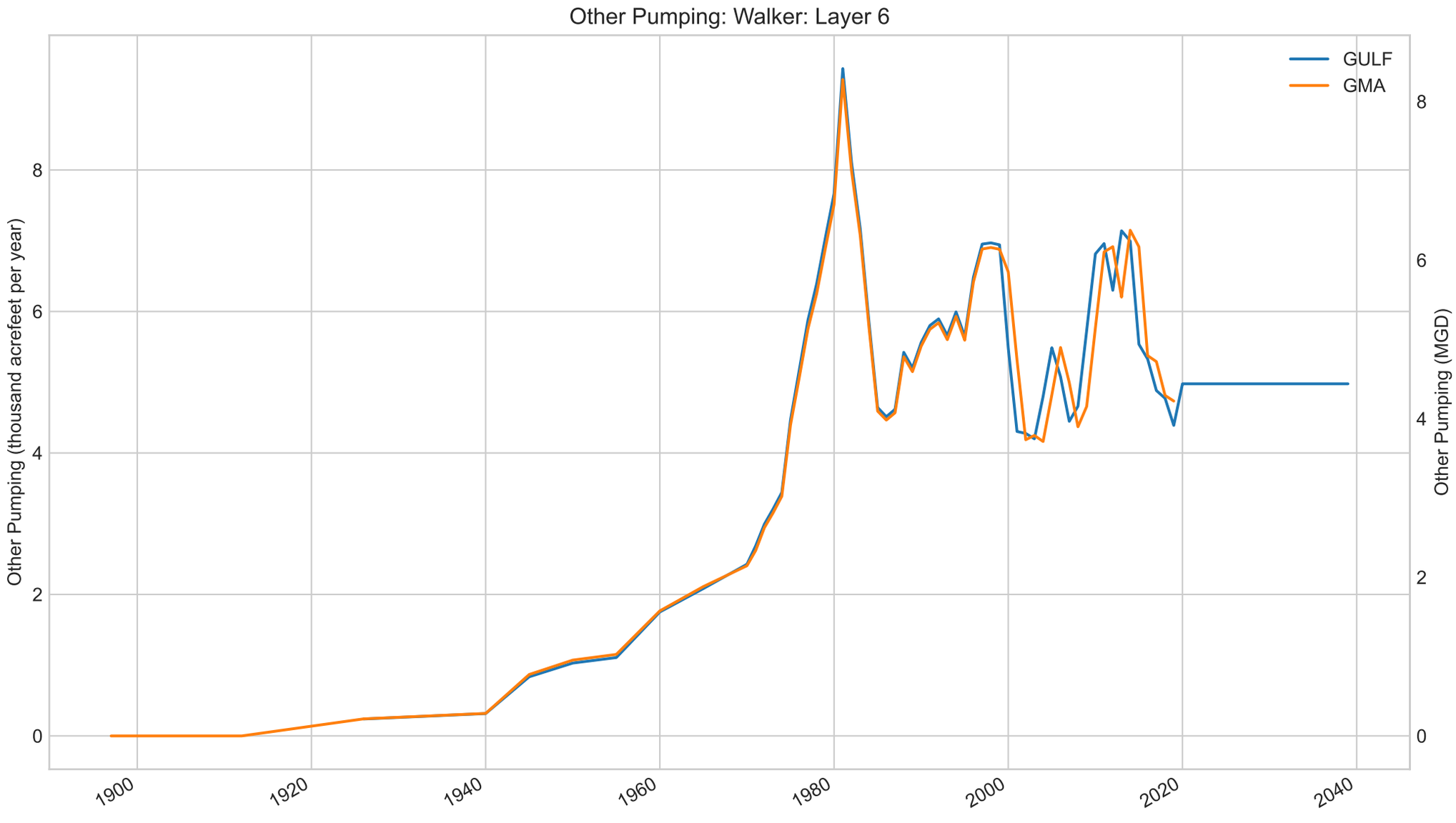

Other Pumping: Tyler: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

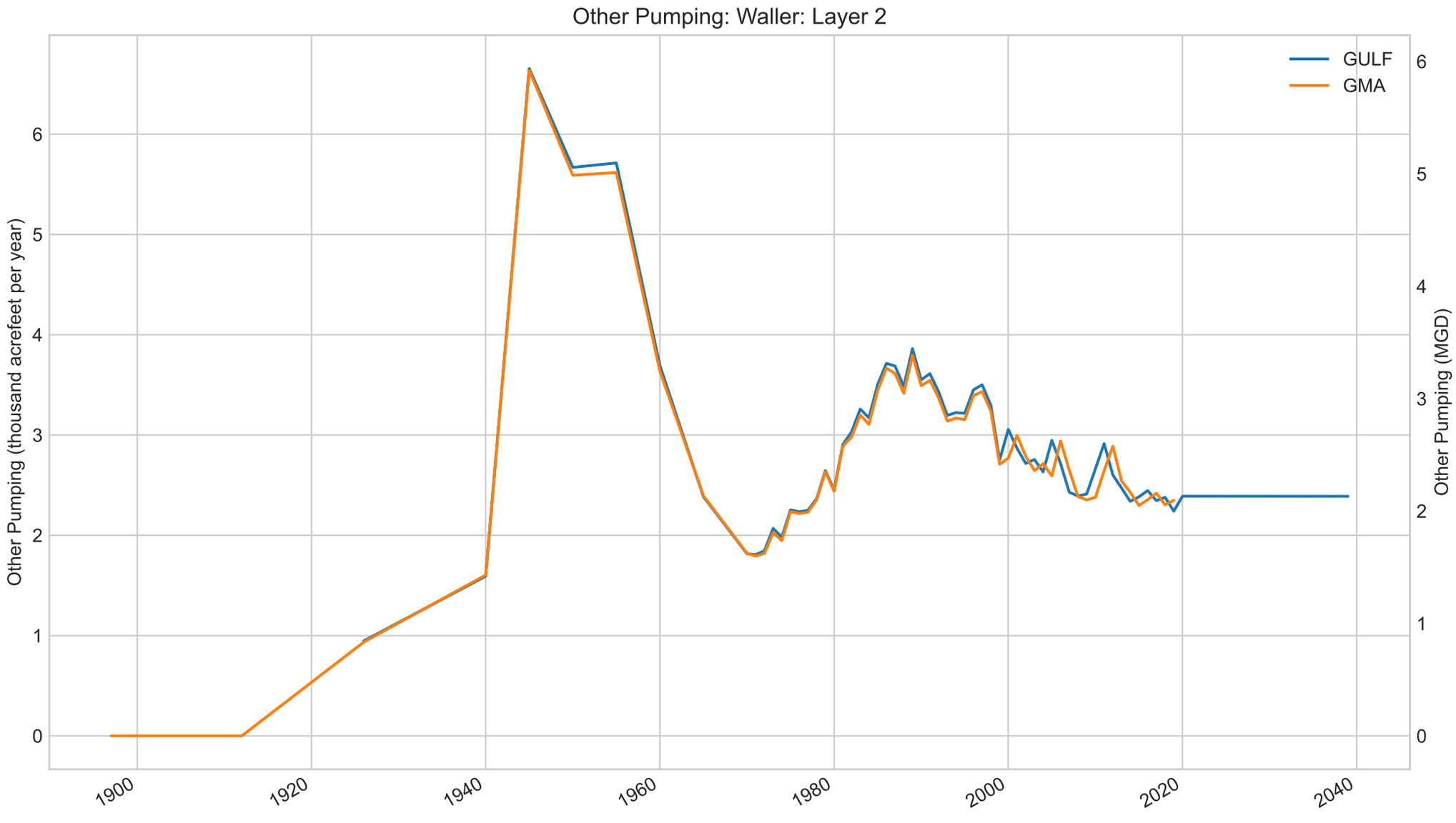

Other Pumping: Tyler: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
1900
1920
1940
1960
1980
2000
2020
2040

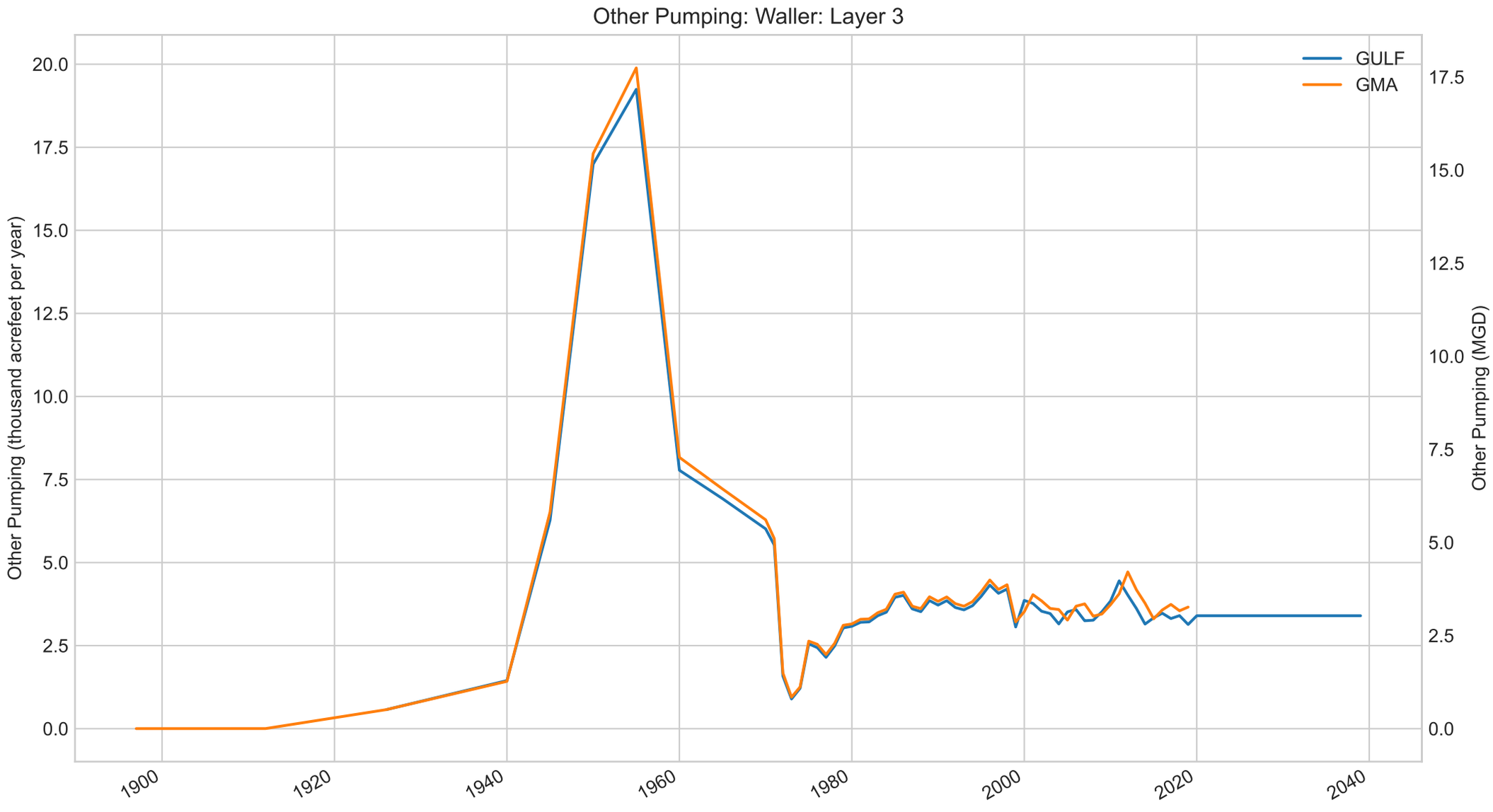

Other Pumping: Tyler: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1900
1920
1940
1960
1980
2000
2020
2040

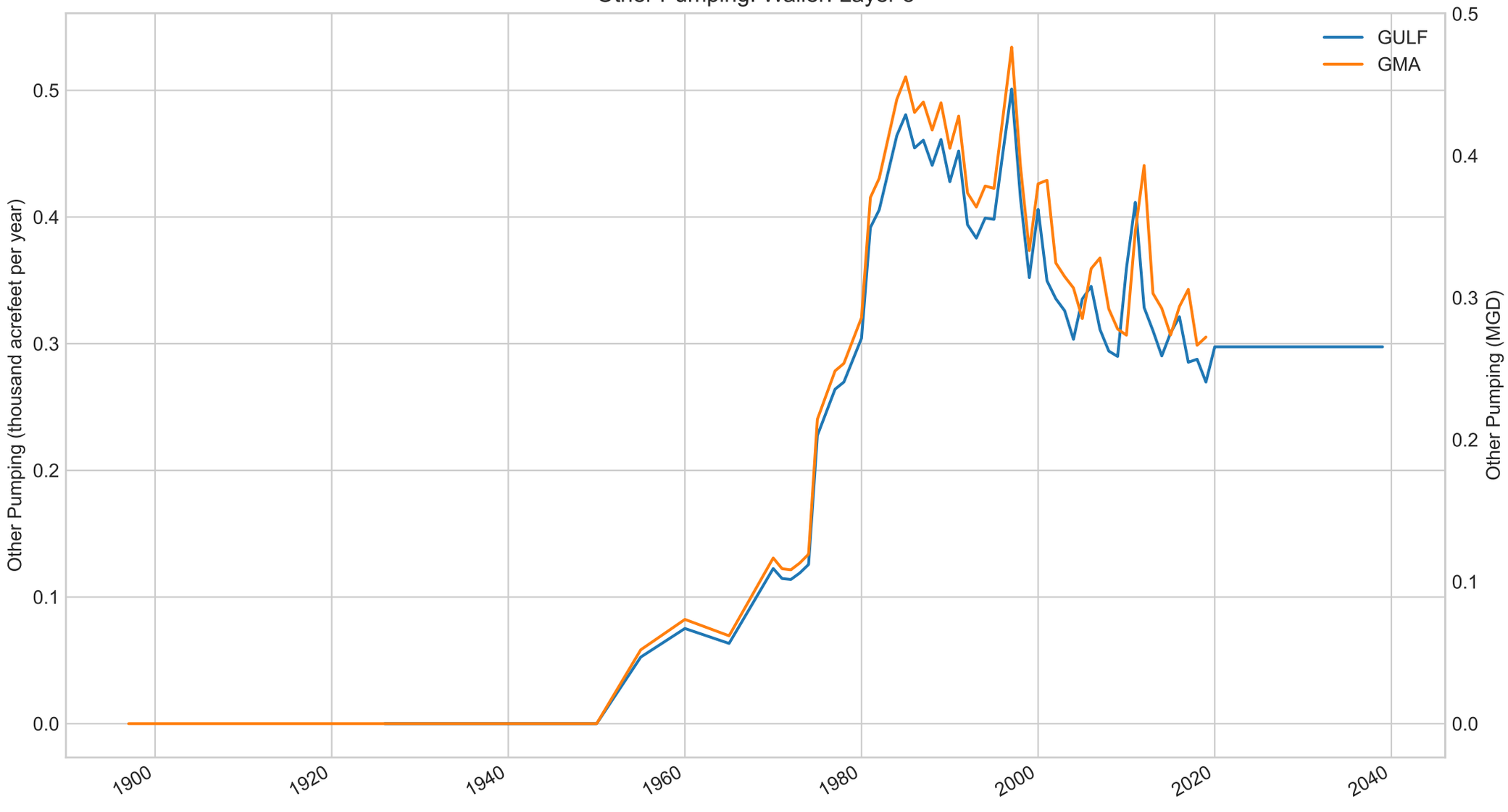

Other Pumping: Walker: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

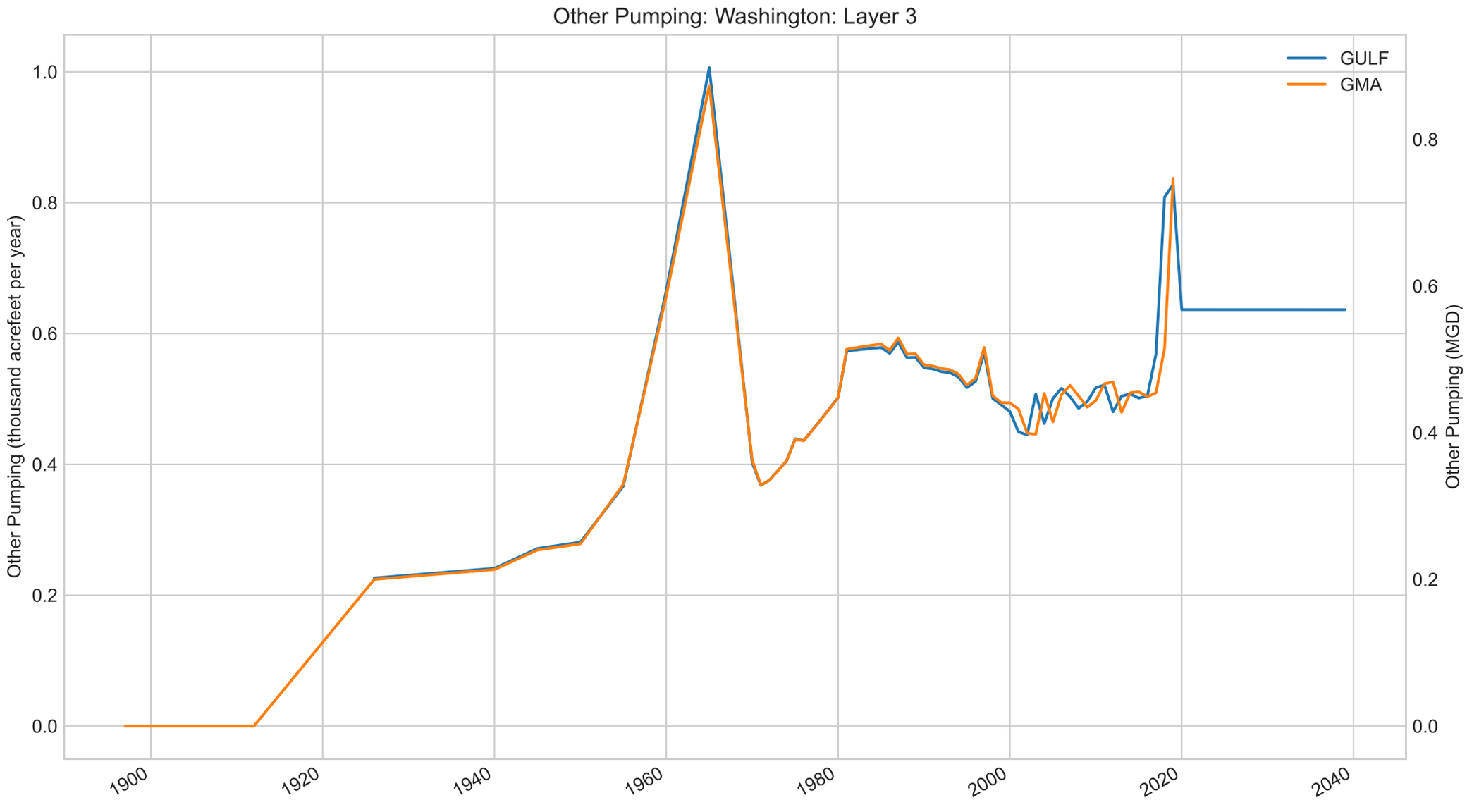

Other Pumping: Walker: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
1900
1920
1940
1960
1980
2000
2020
2040

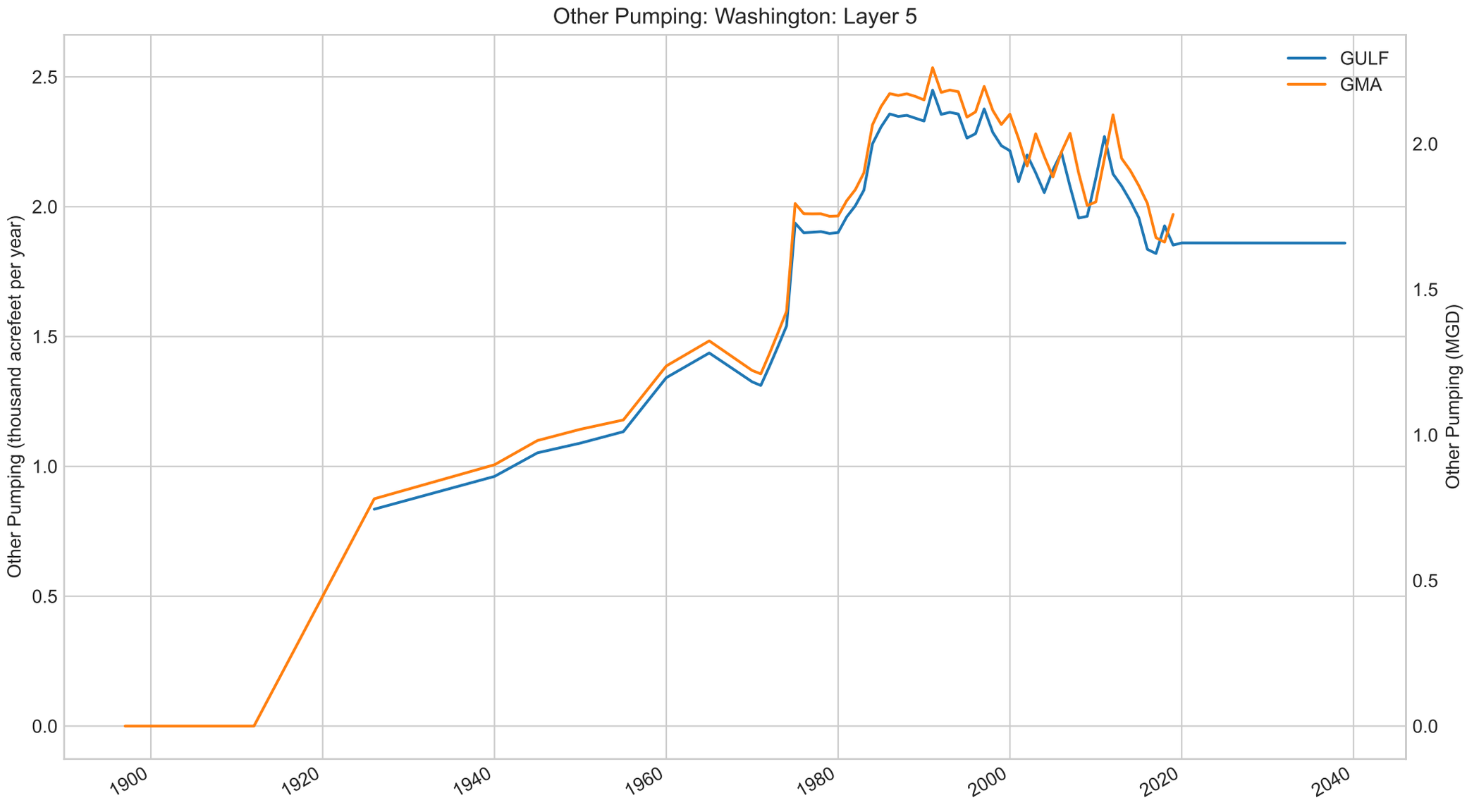

Other Pumping: Walker: Layer 6
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
2
4
6
8
1900
1920
1940
1960
1980
2000
2020
2040

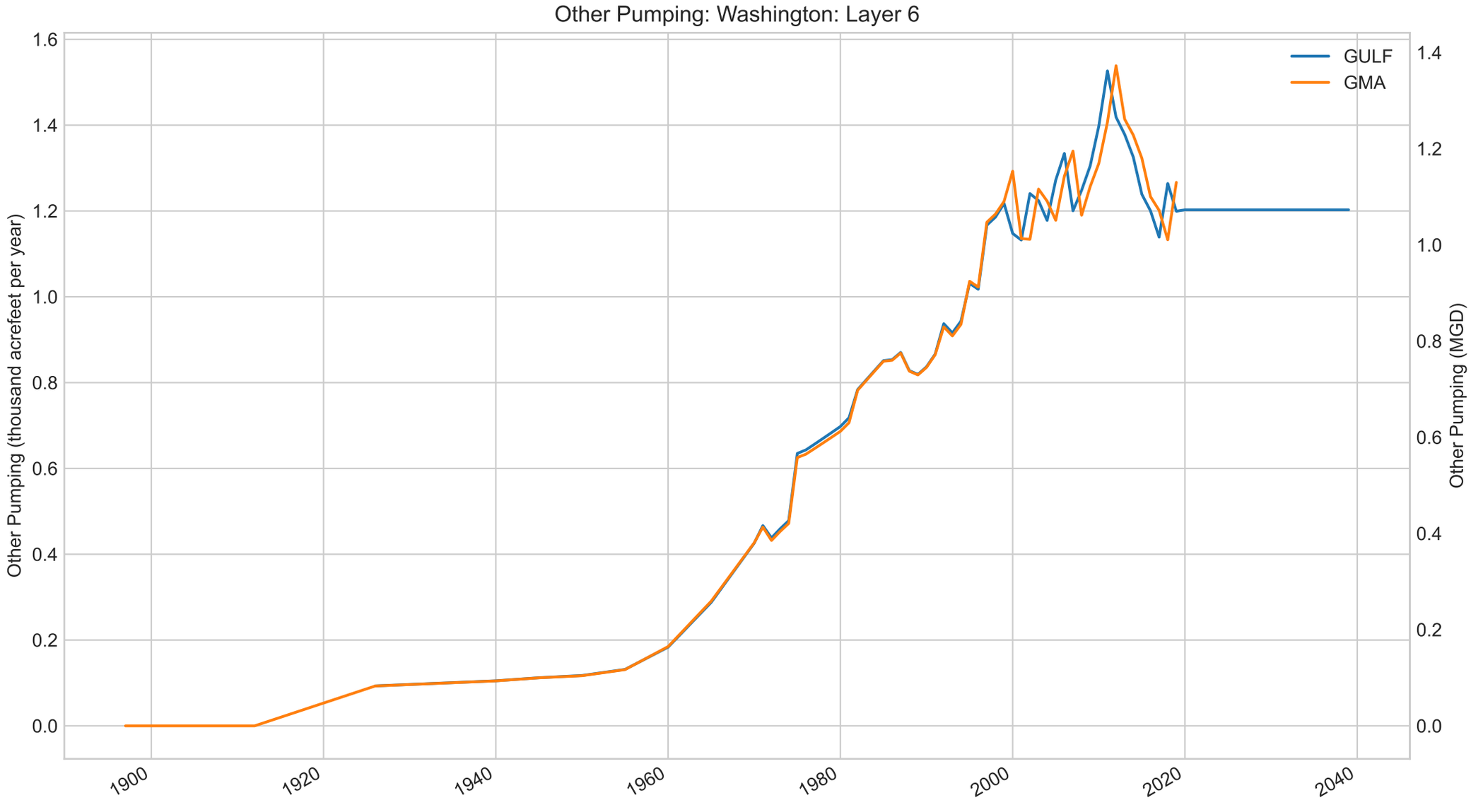

Other Pumping: Waller: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
1
2
3
4
5
6
1900
1920
1940
1960
1980
2000
2020
2040

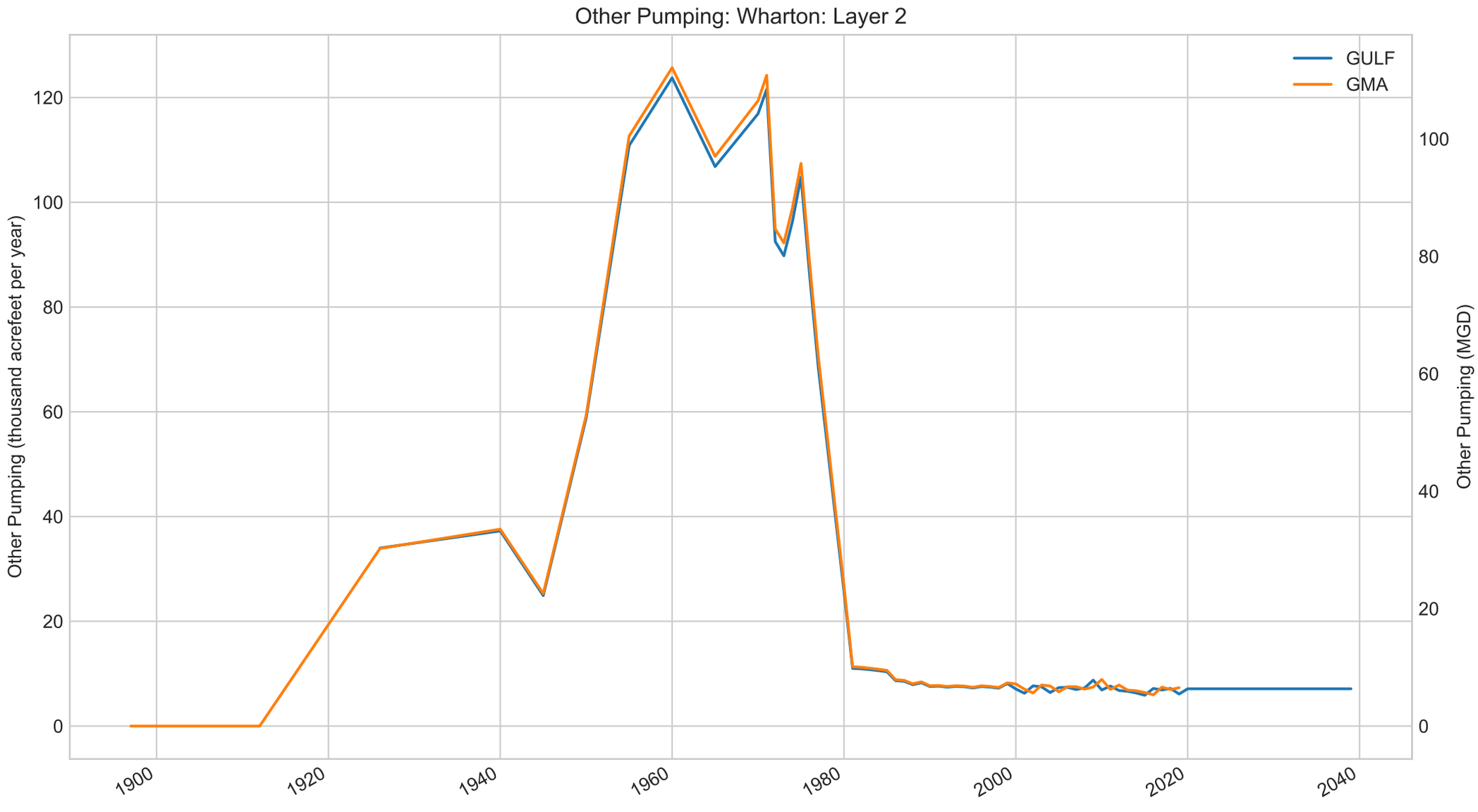

Other Pumping: Waller: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1900
1920
1940
1960
1980
2000
2020
2040

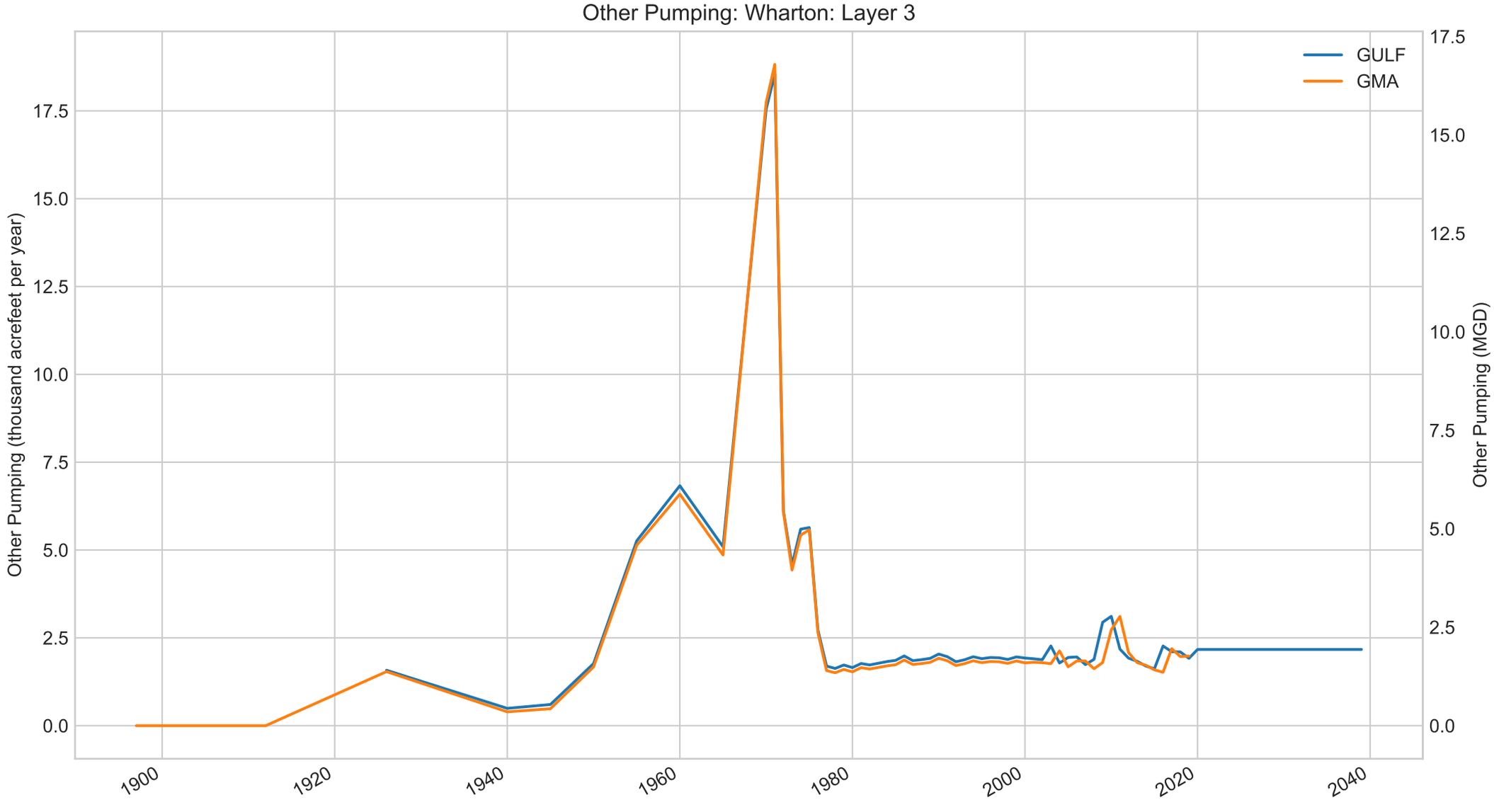

Other Pumping: Waller: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
1900
1920
1940
1960
1980
2000
2020
2040

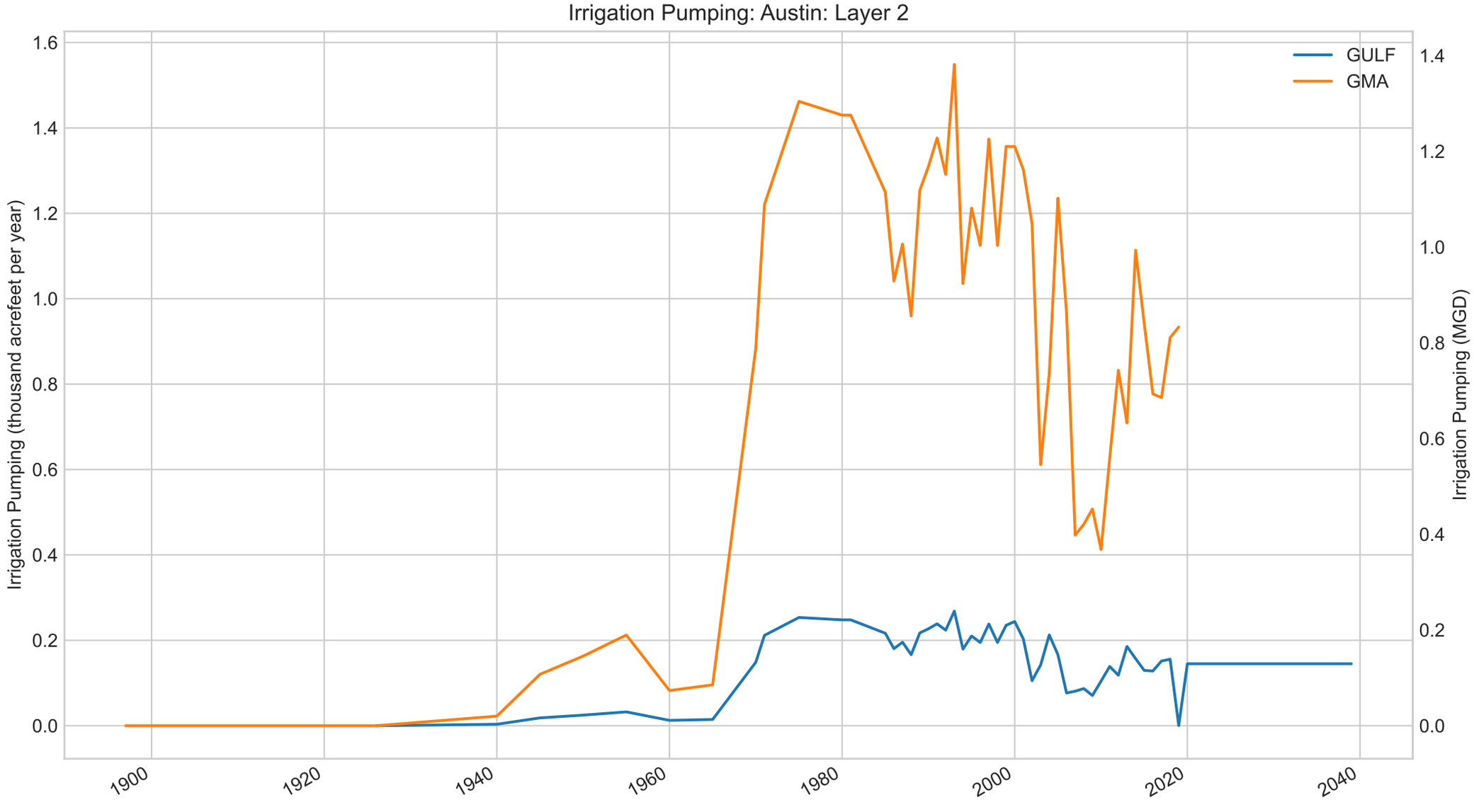

Other Pumping: Washington: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
1.0
0.8
0.6
0.4
0.2
0.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

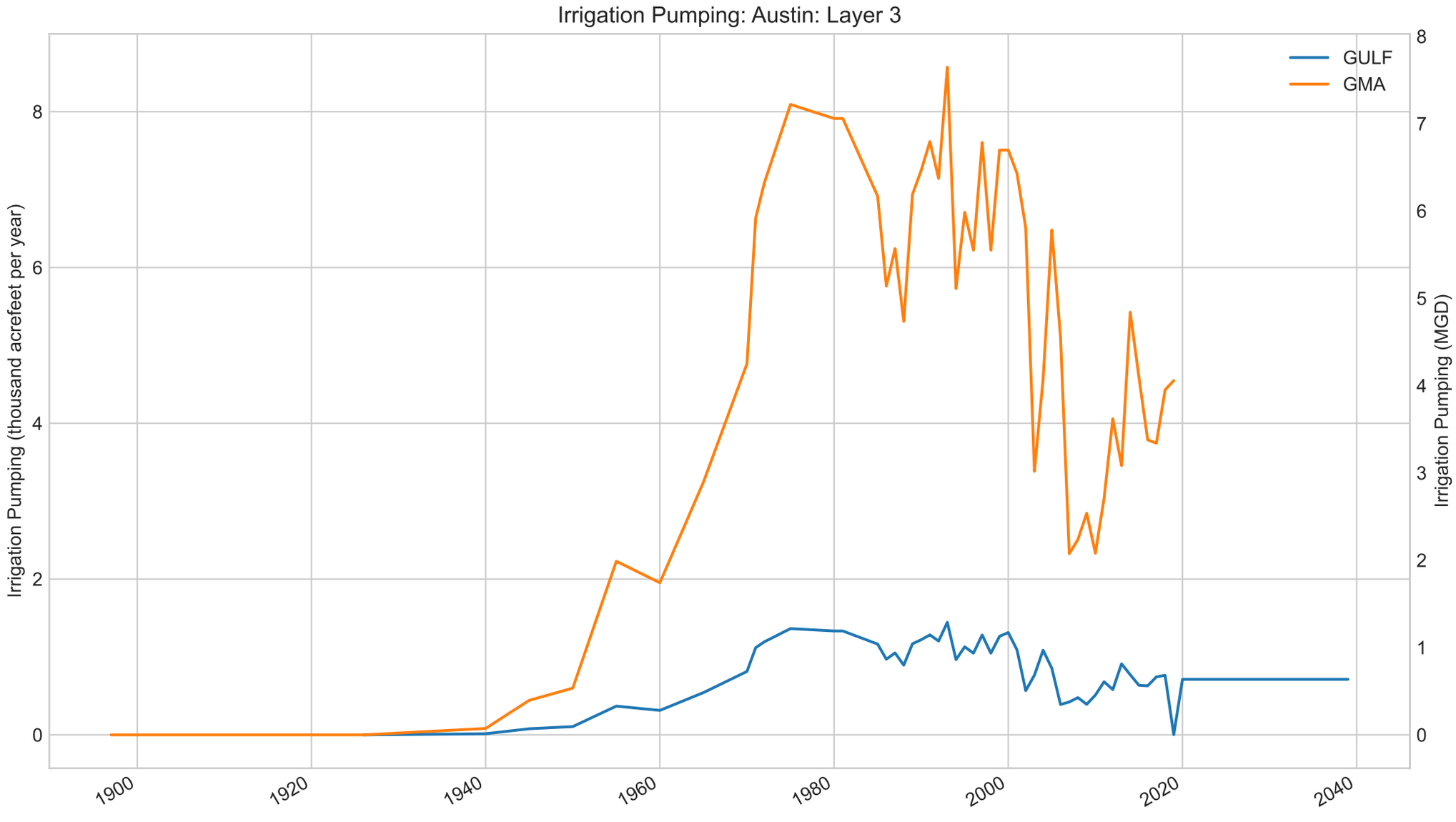

Other Pumping: Washington: Layer 5
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
0.5
1.0
1.5
2.0
2.5
1900
1920
1940
1960
1980
2000
2020
2040

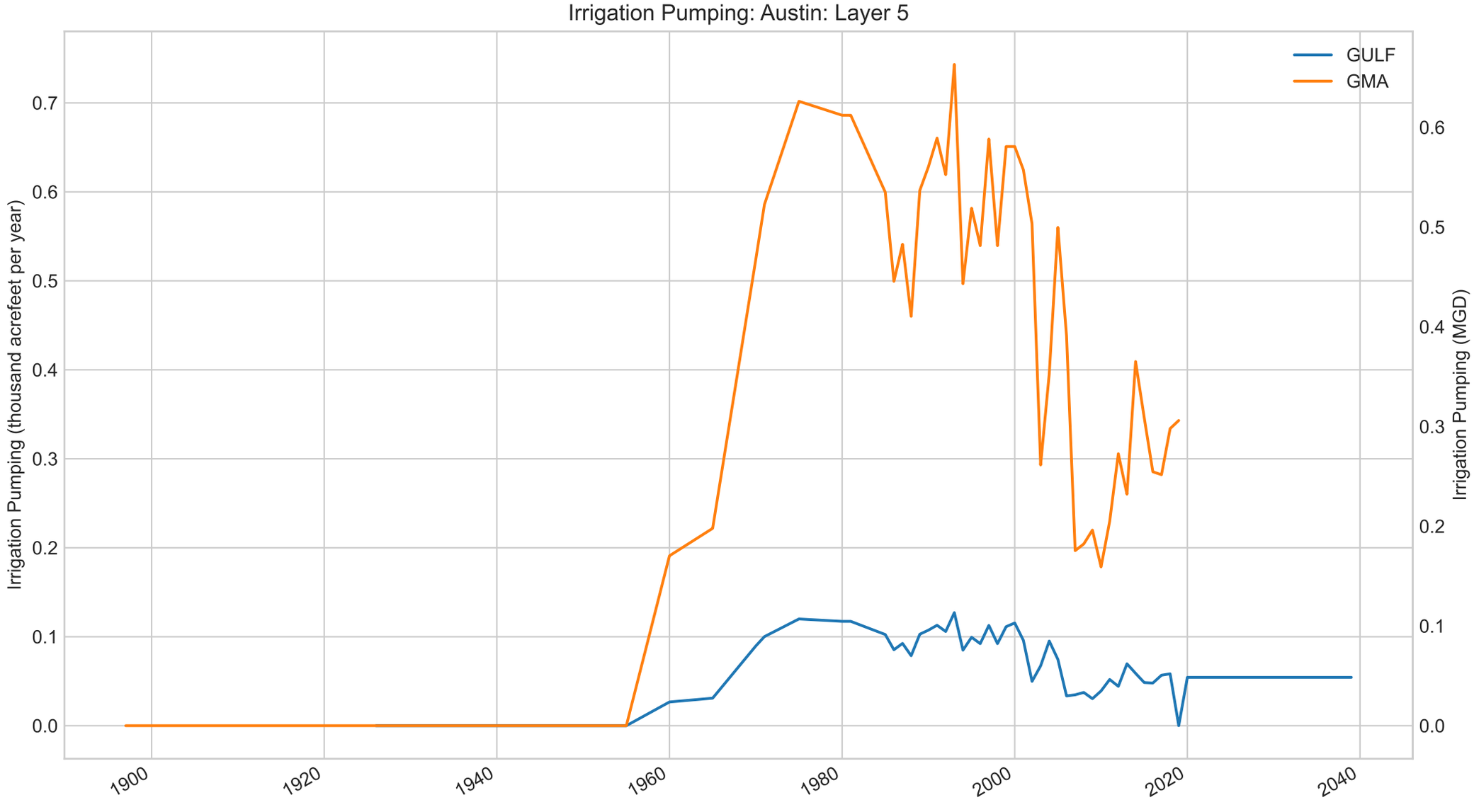

Other Pumping: Washington: Layer 6
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
GULF
GMA
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

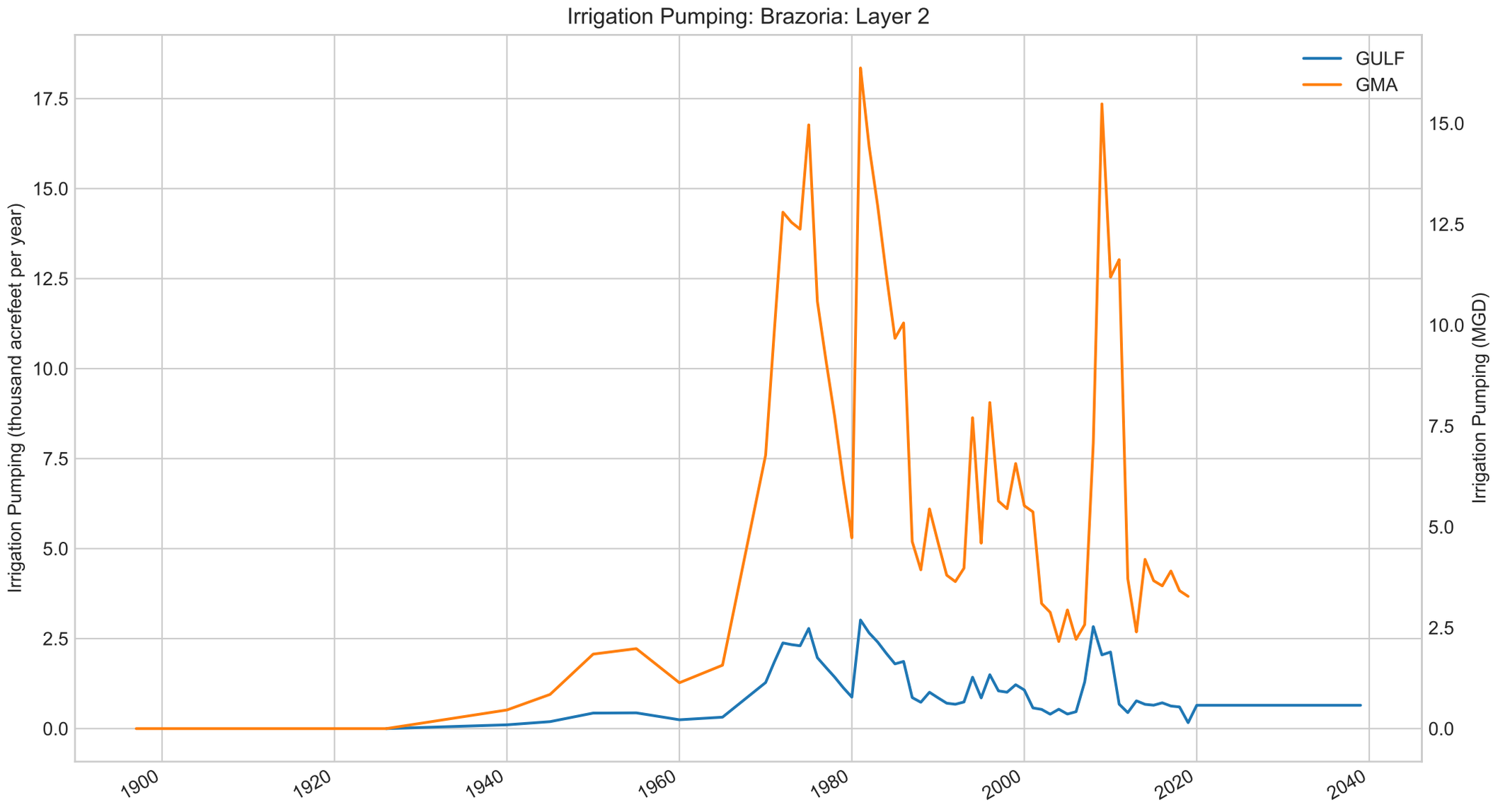

Other Pumping: Wharton: Layer 2
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0
20
40
60
80
100
120
0
20
40
60
80
100
1900
1920
1940
1960
1980
2000
2020
2040

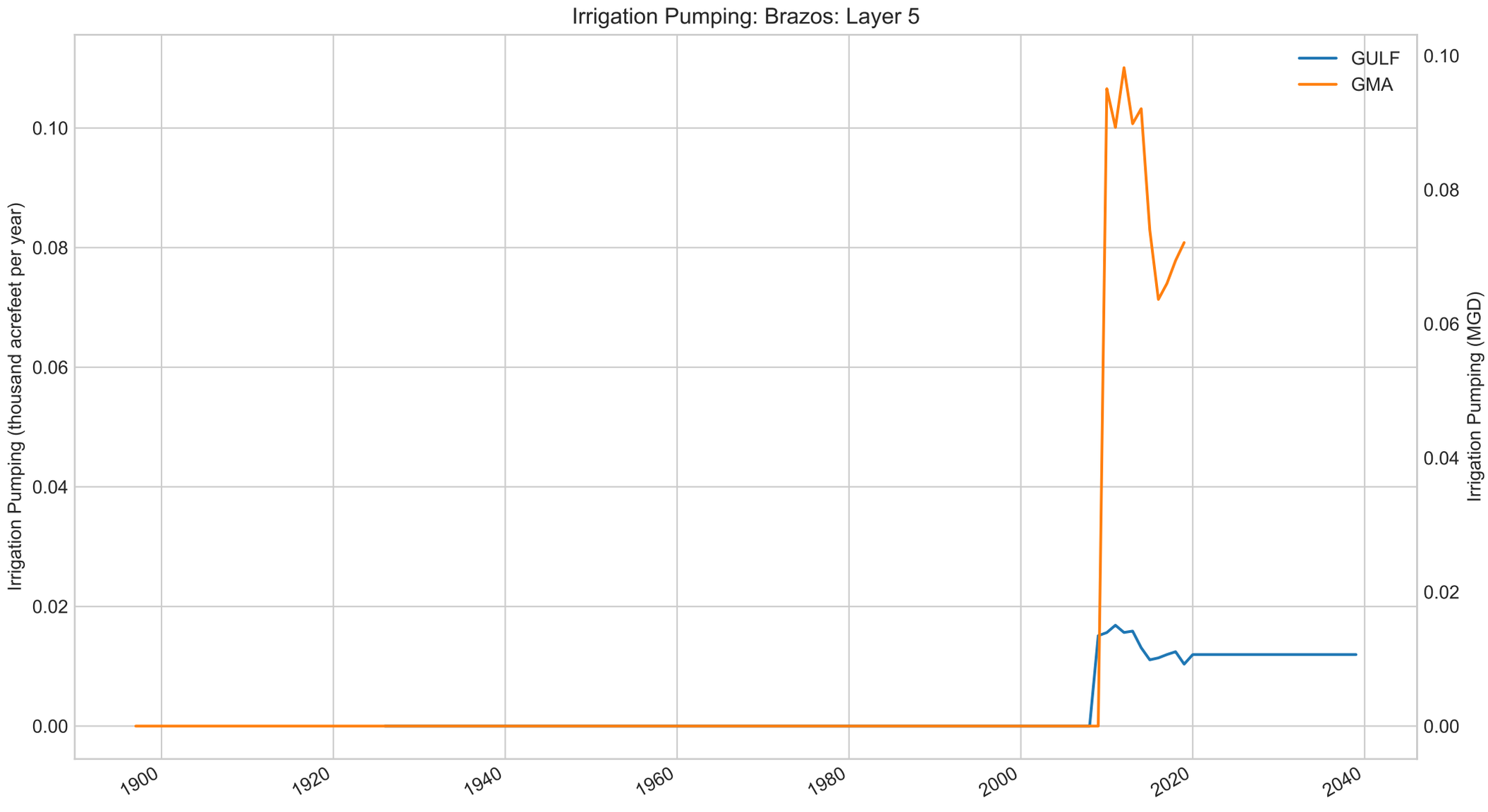

Other Pumping: Wharton: Layer 3
GULF
GMA
Other Pumping (thousand acrefeet per year)
Other Pumping (MGD)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
1900
1920
1940
1960
1980
2000
2020
2040

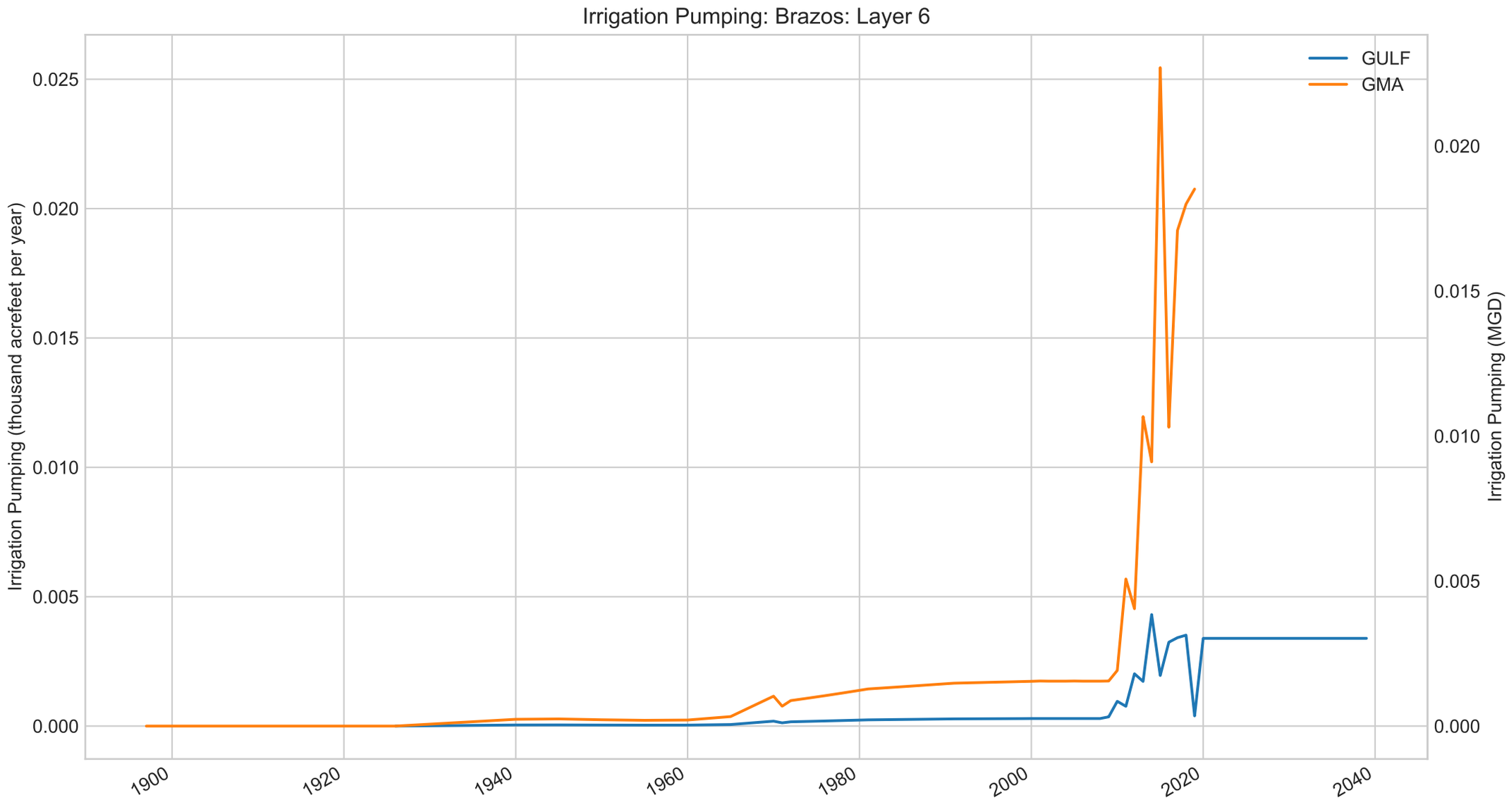

Irrigation Pumping: Austin: Layer 2
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

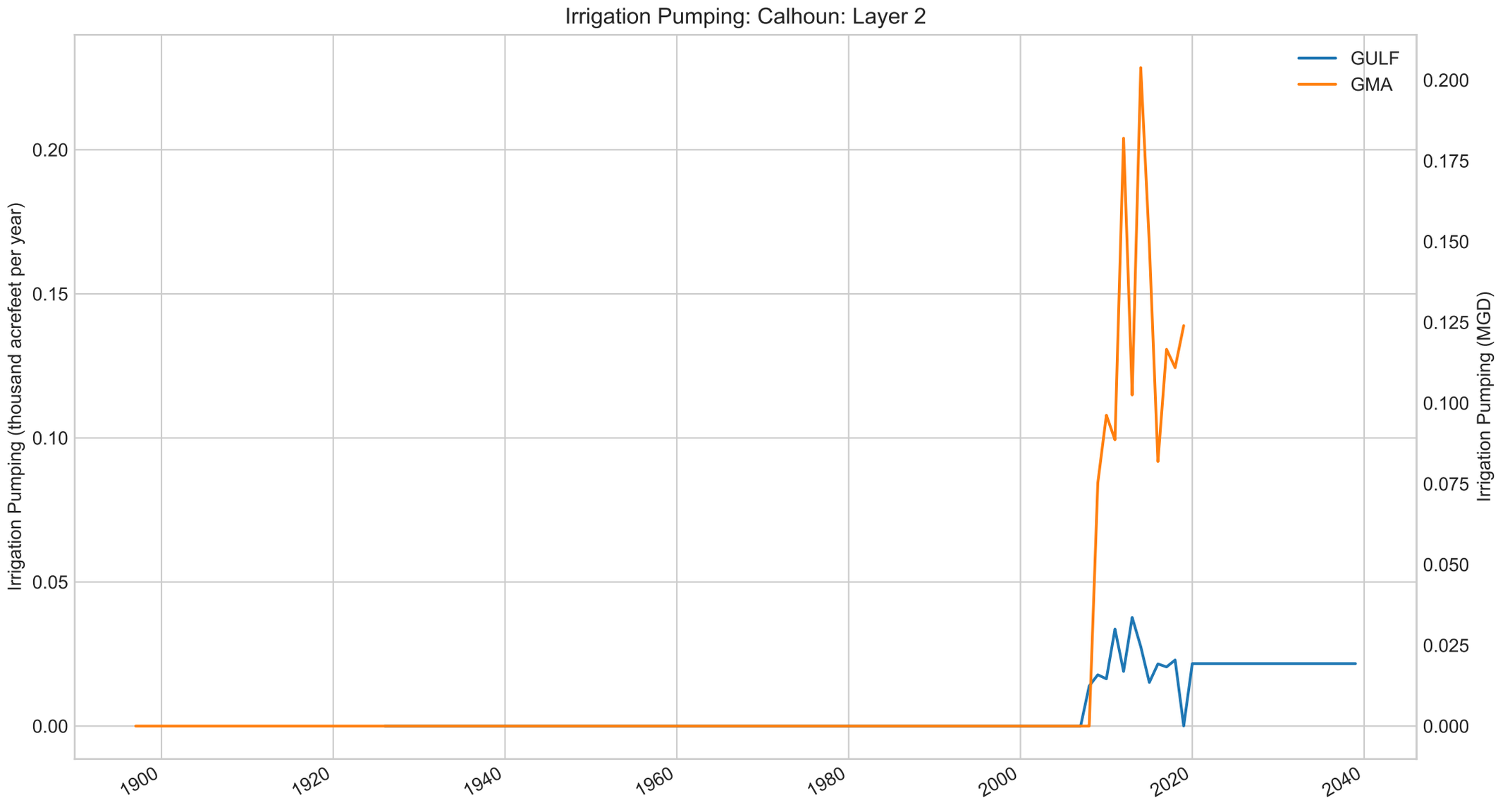

Irrigation Pumping: Austin: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
0
1
2
3
4
5
6
7
8
1900
1920
1940
1960
1980
2000
2020
2040

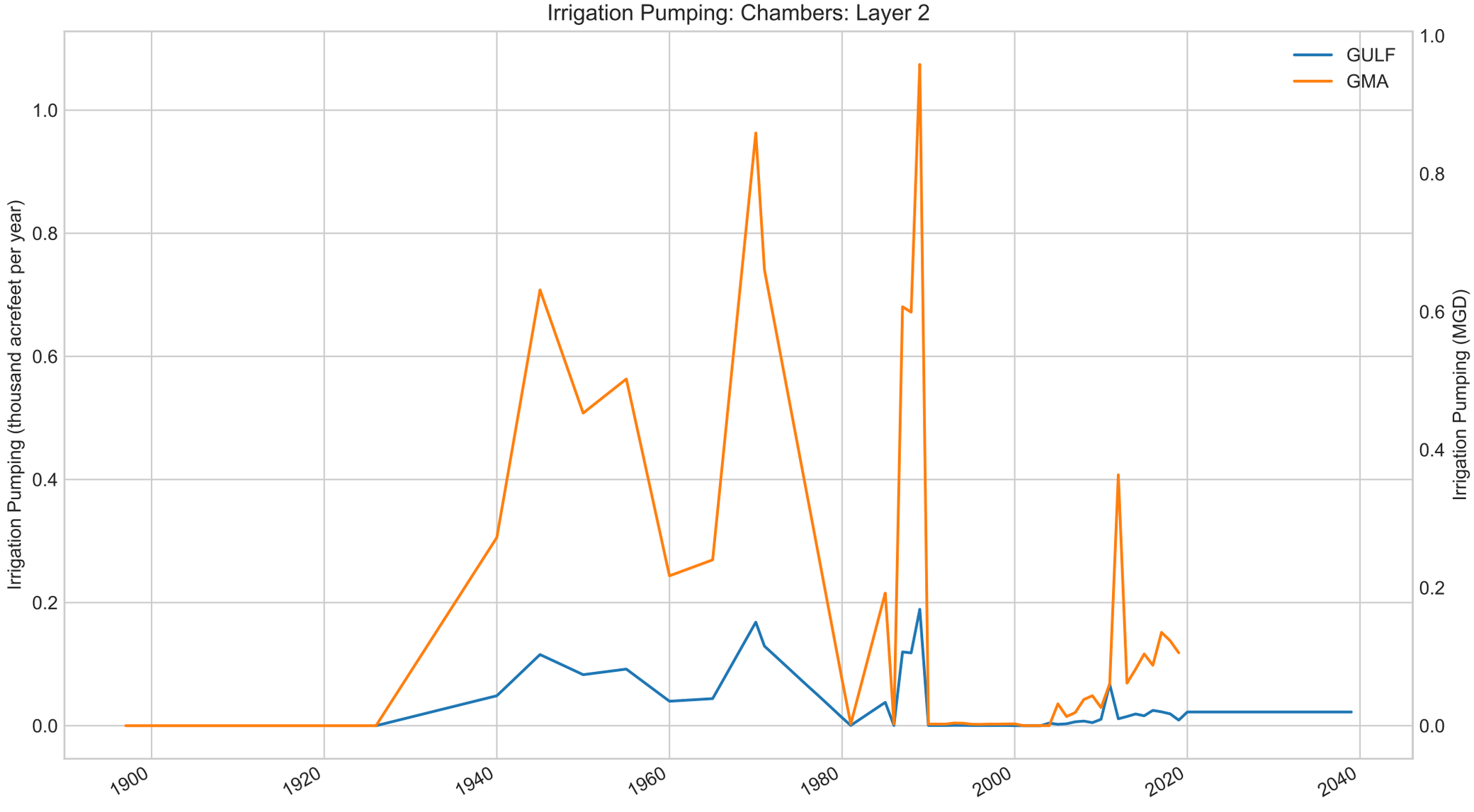

Irrigation Pumping: Austin: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

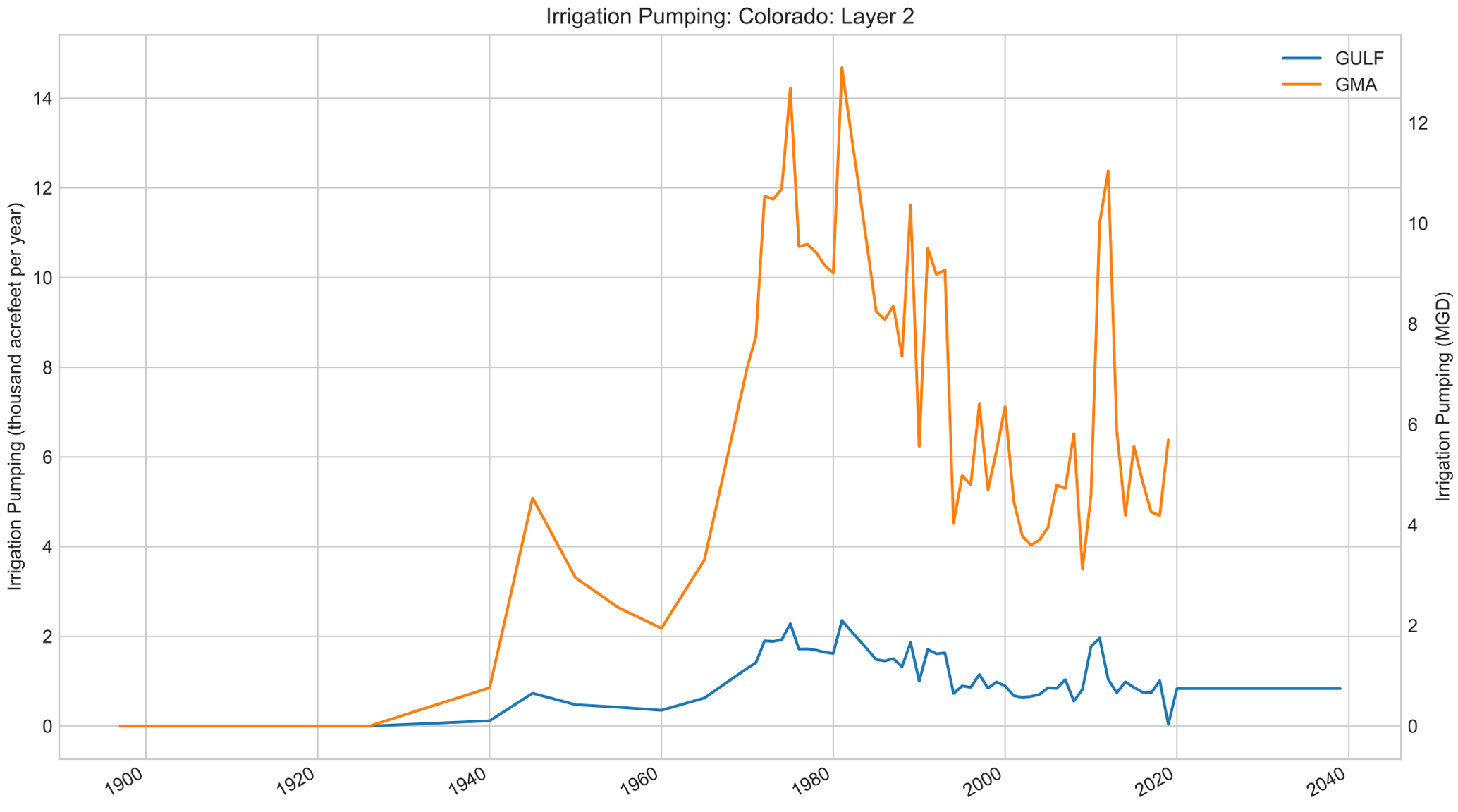

Irrigation Pumping: Brazoria: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
0.0
2.5
5.0
7.5
10.0
12.5
15.0
1900
1920
1940
1960
1980
2000
2020
2040

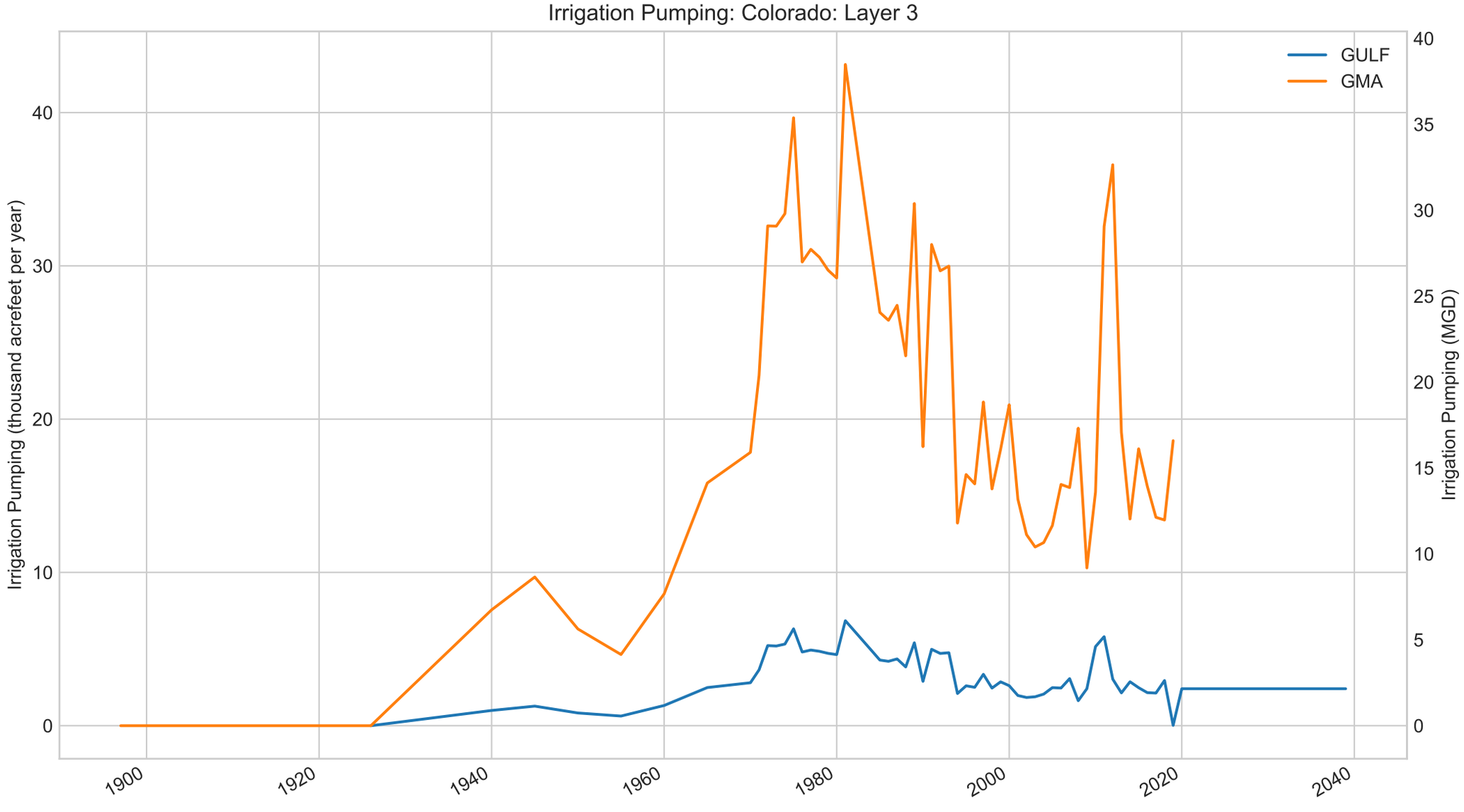

Irrigation Pumping: Brazos: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.10
1900
1920
1940
1960
1980
2000
2020
2040

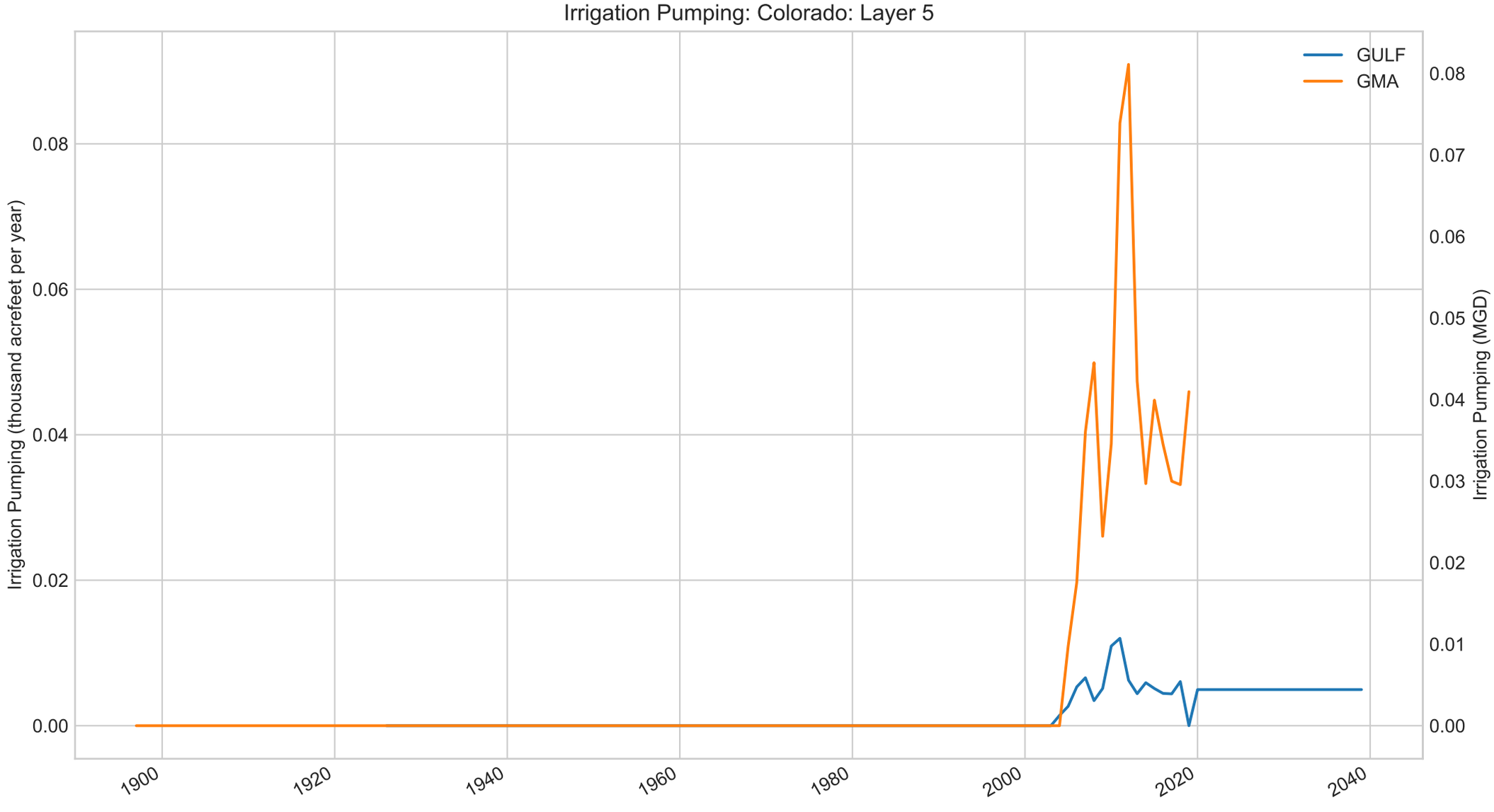

Irrigation Pumping: Brazos: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.025
0.020
0.015
0.010
0.005
0.000
0.020
0.015
0.010
0.005
0.000
1900
1920
1940
1960
1980
2000
2020
2040

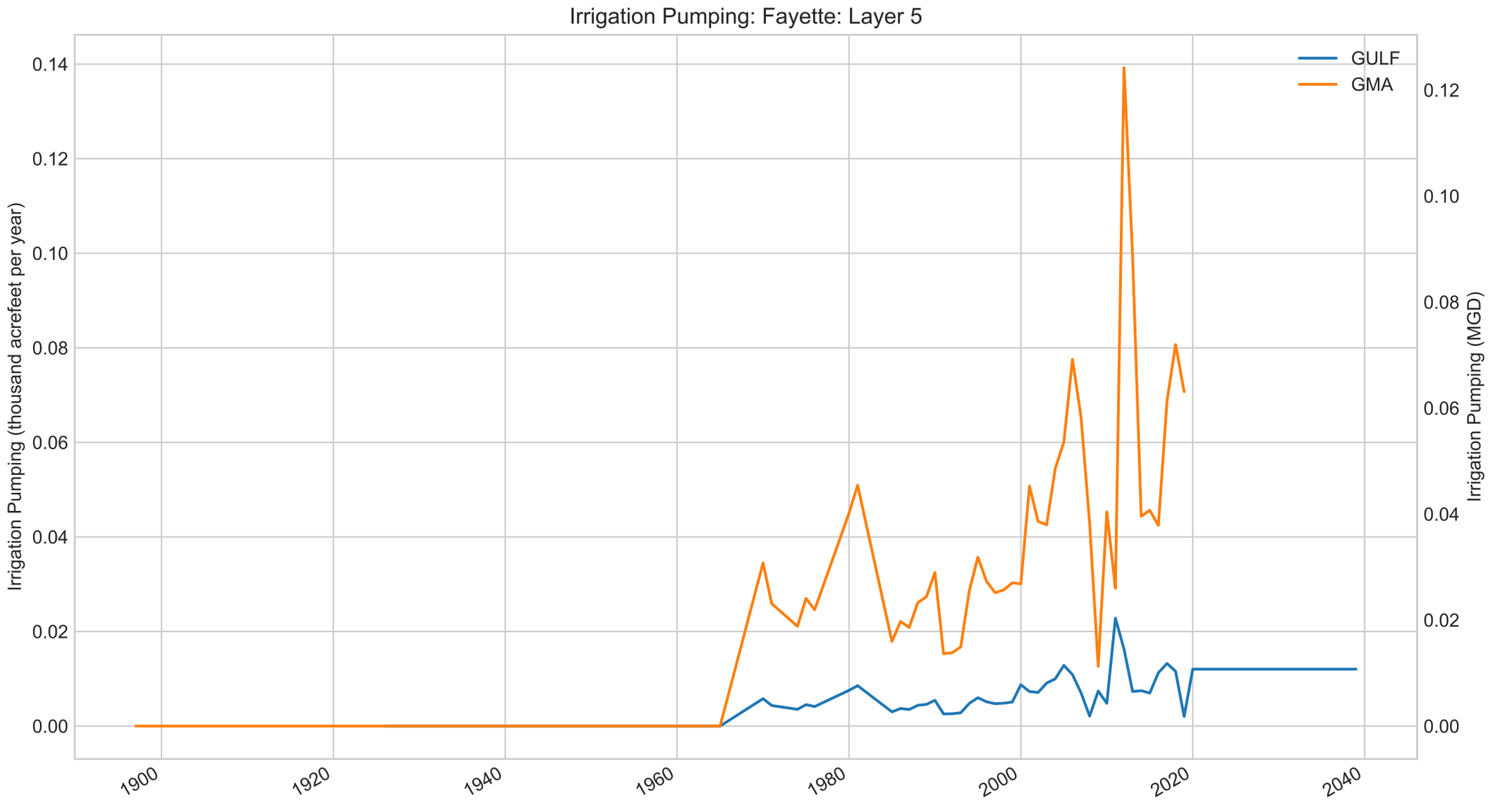

Irrigation Pumping: Calhoun: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
0.000
0.025
0.050
0.075
0.100
0.125
0.150
0.175
0.200
1900
1920
1940
1960
1980
2000
2020
2040

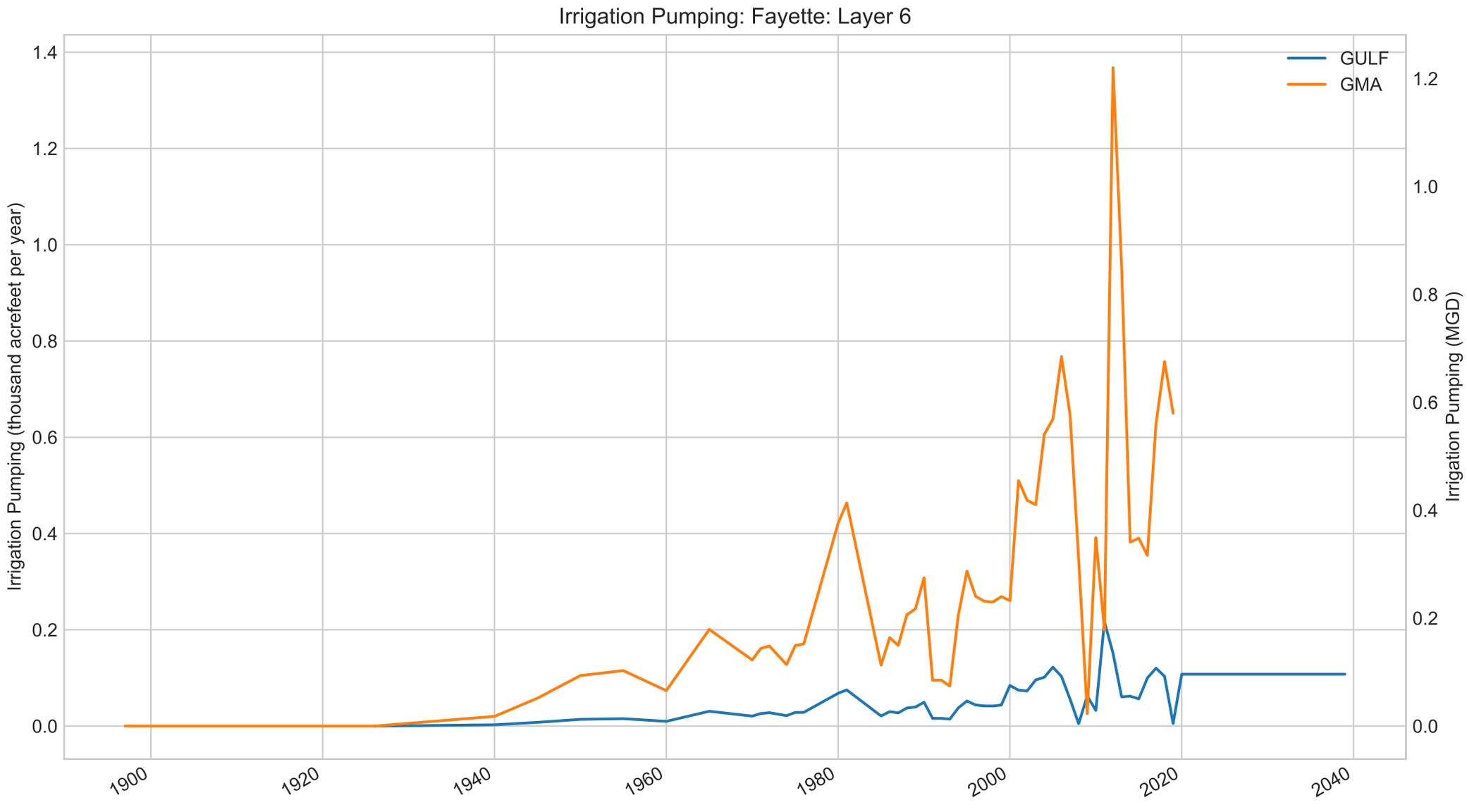

Irrigation Pumping: Chambers: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1900
1920
1940
1960
1980
2000
2020
2040

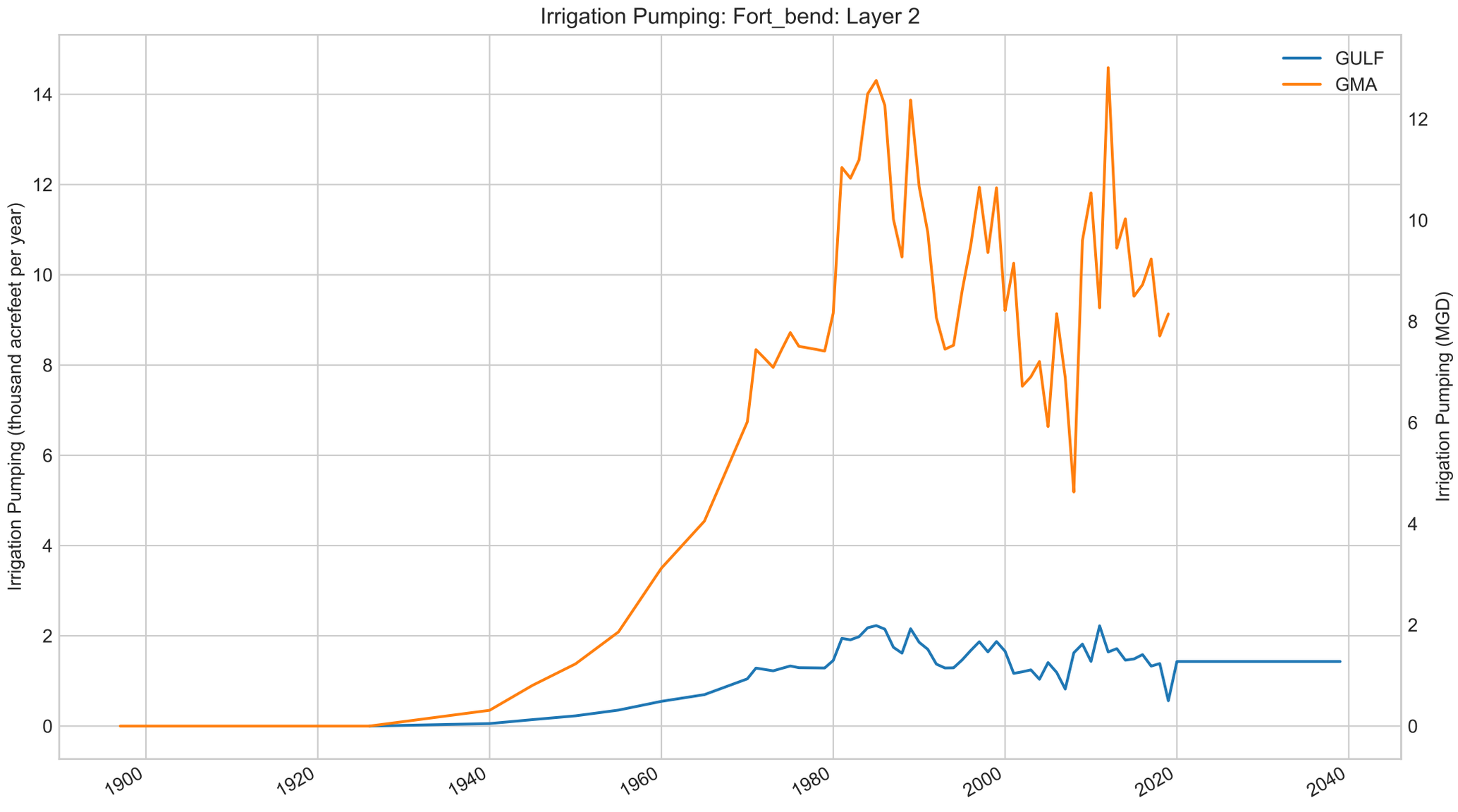

Irrigation Pumping: Colorado: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
10
12
14
1900
1920
1940
1960
1980
2000
2020
2040

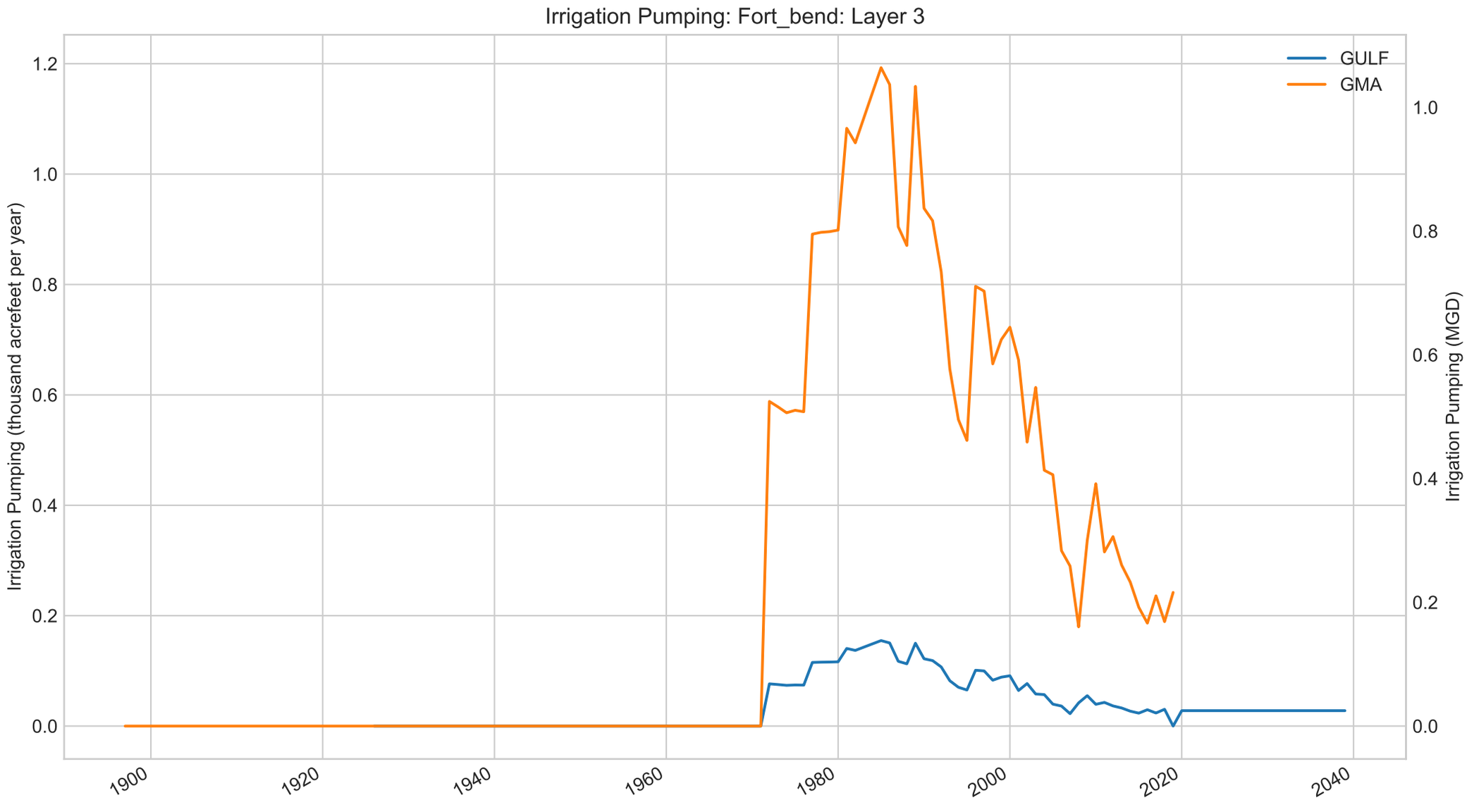

Irrigation Pumping: Colorado: Layer 3
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0
10
20
30
40
0
5
10
15
20
25
30
35
40
1900
1920
1940
1960
1980
2000
2020
2040

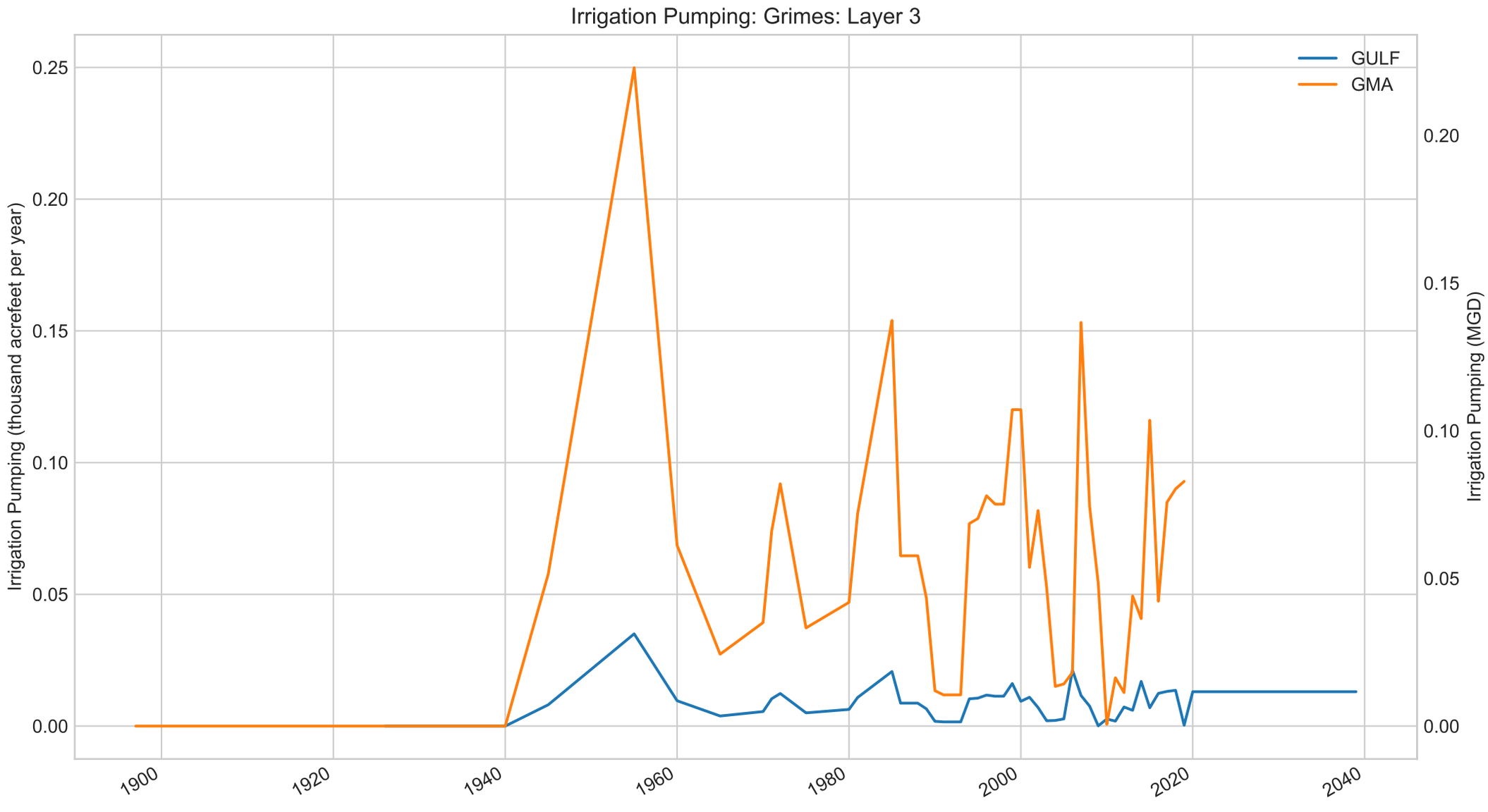

Irrigation Pumping: Colorado: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.01
0.03
0.05
0.07
1900
1920
1940
1960
1980
2000
2020
2040

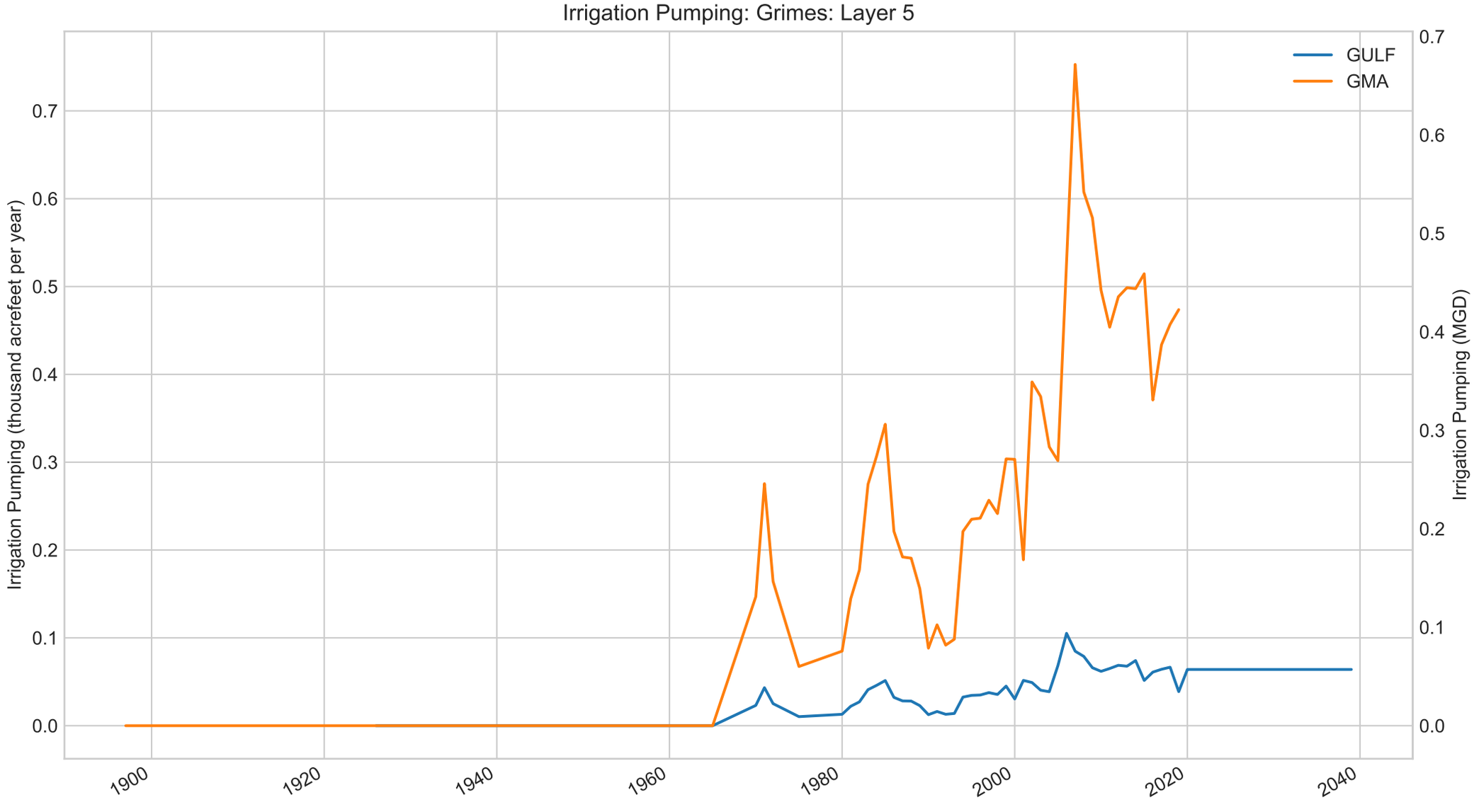

Irrigation Pumping: Fayette: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

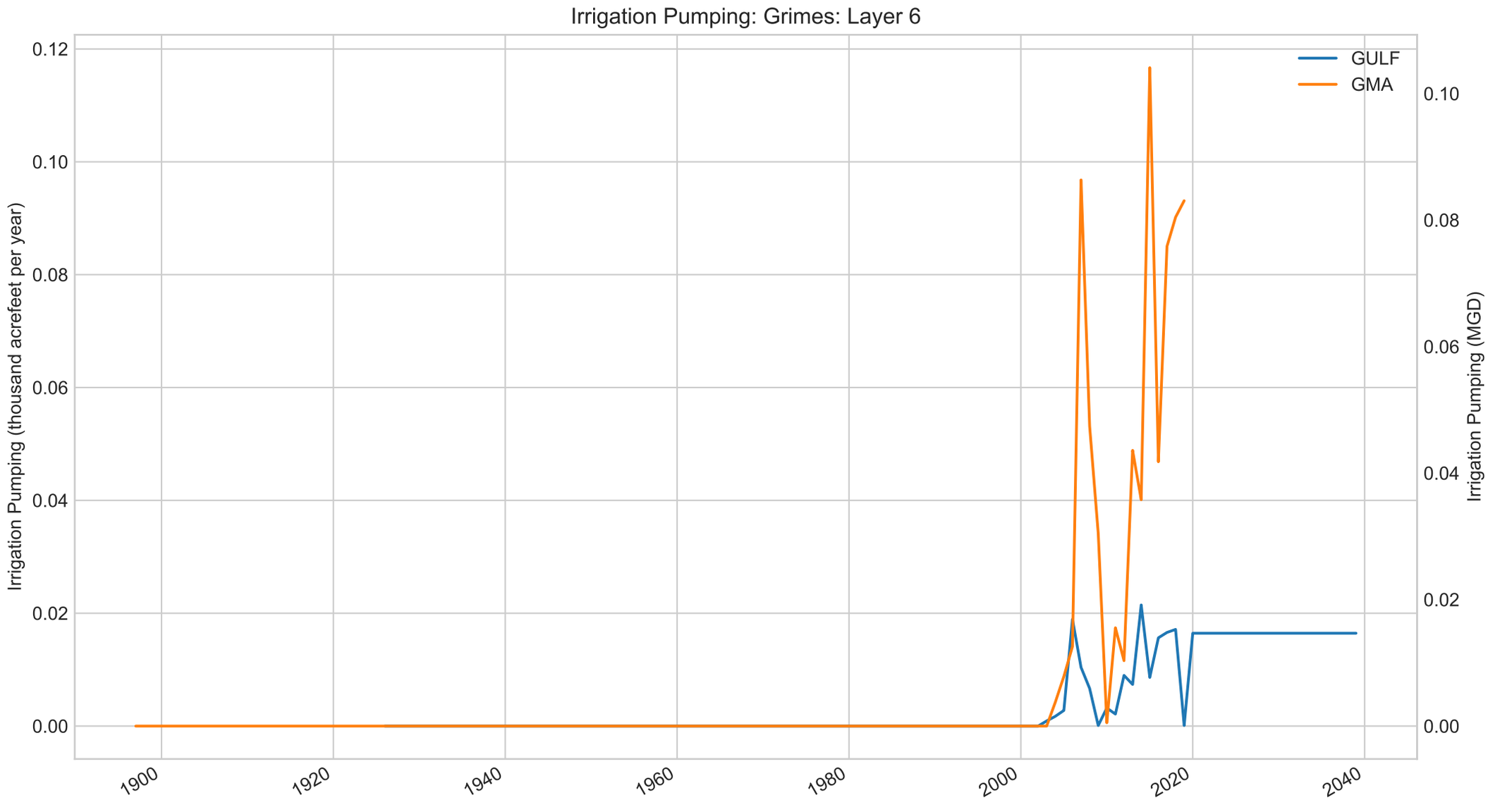

Irrigation Pumping: Fayette: Layer 6
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

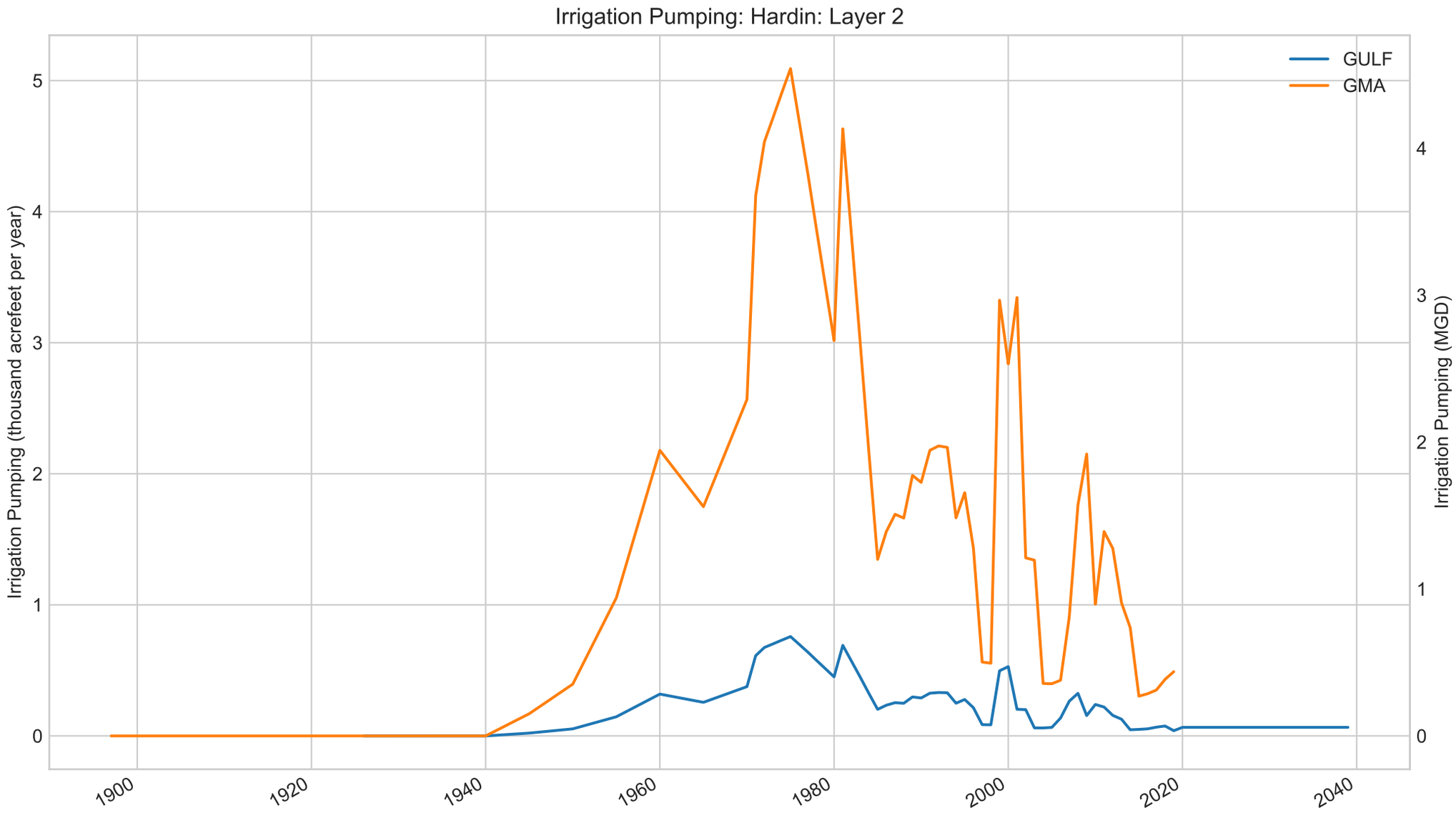

Irrigation Pumping: Fort_bend: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
10
12
14
0
2
4
6
8
10
12
1900
1920
1940
1960
1980
2000
2020
2040

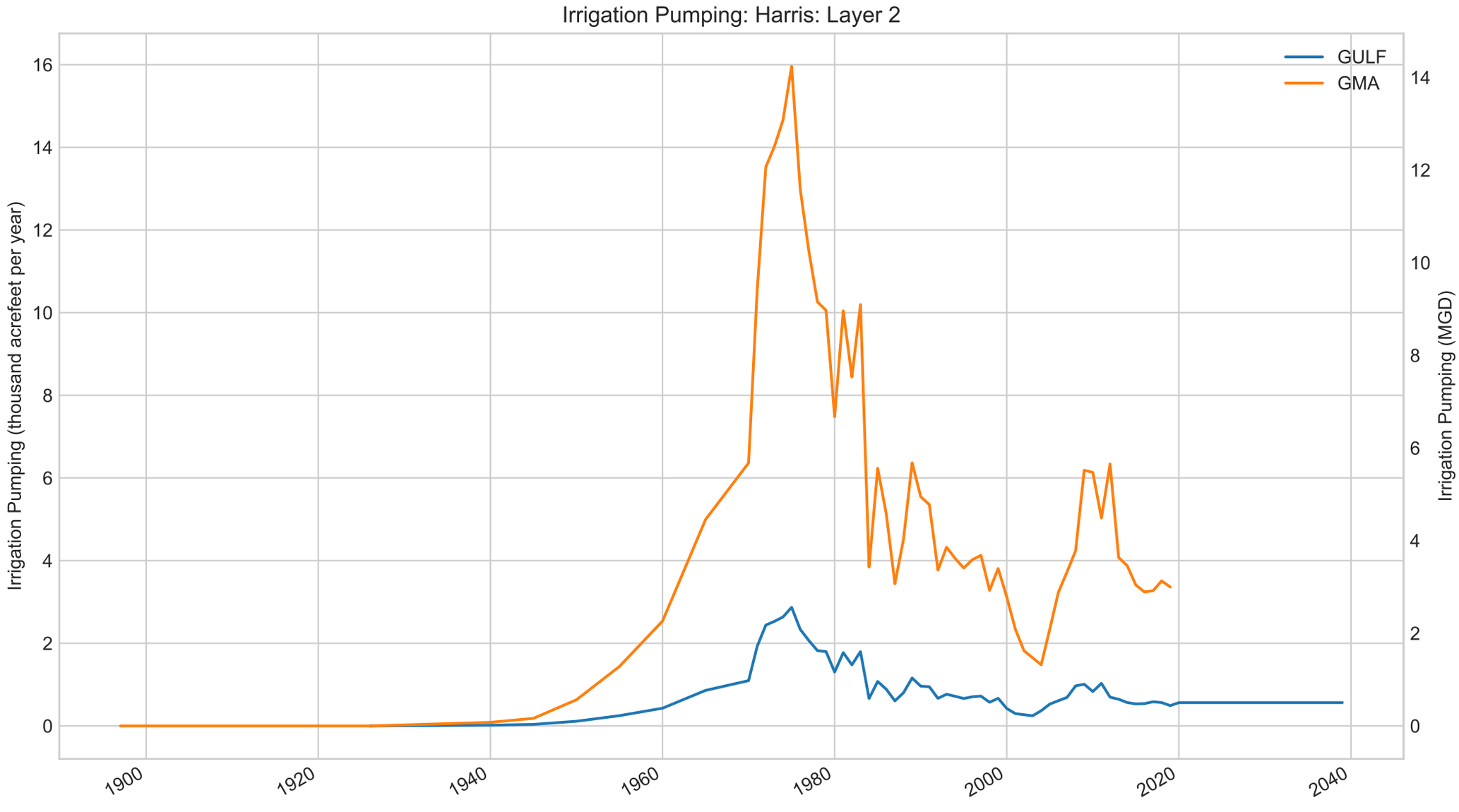

Irrigation Pumping: Fort_bend: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

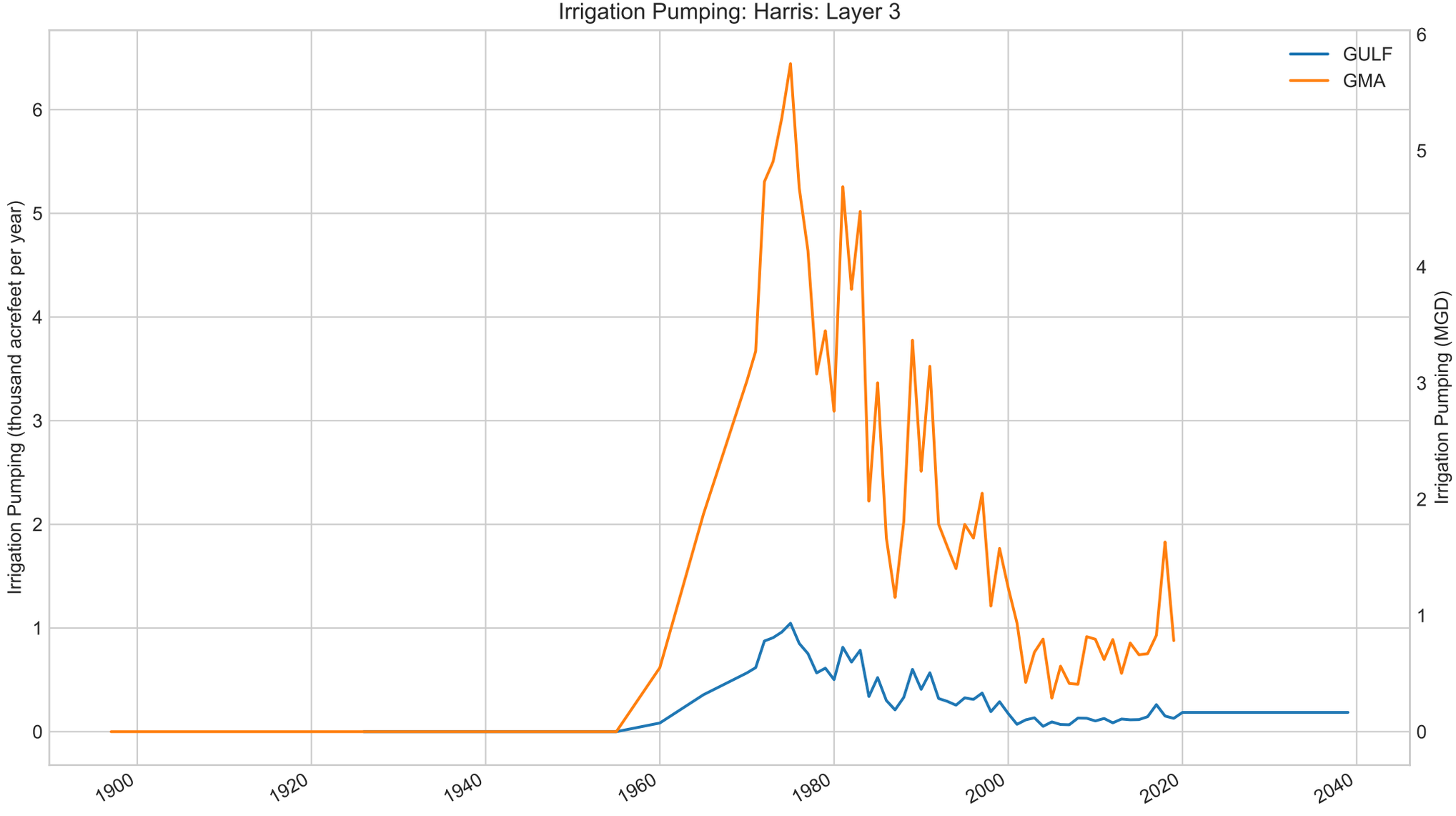

Irrigation Pumping: Grimes: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.25
0.20
0.15
0.10
0.05
0.00
0.20
0.15
0.10
0.05
0.00
1900
1920
1940
1960
1980
2000
2020
2040

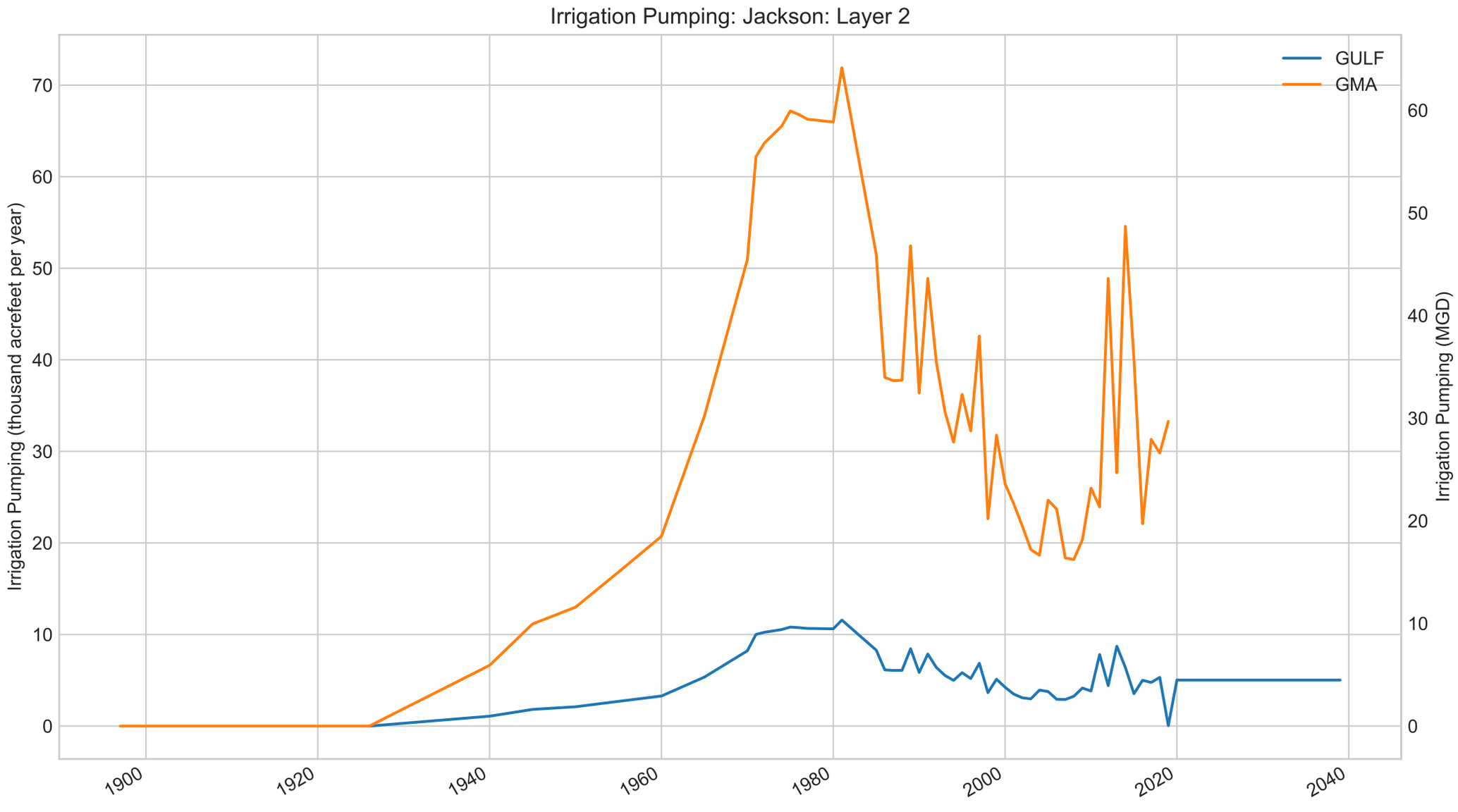

Irrigation Pumping: Grimes: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

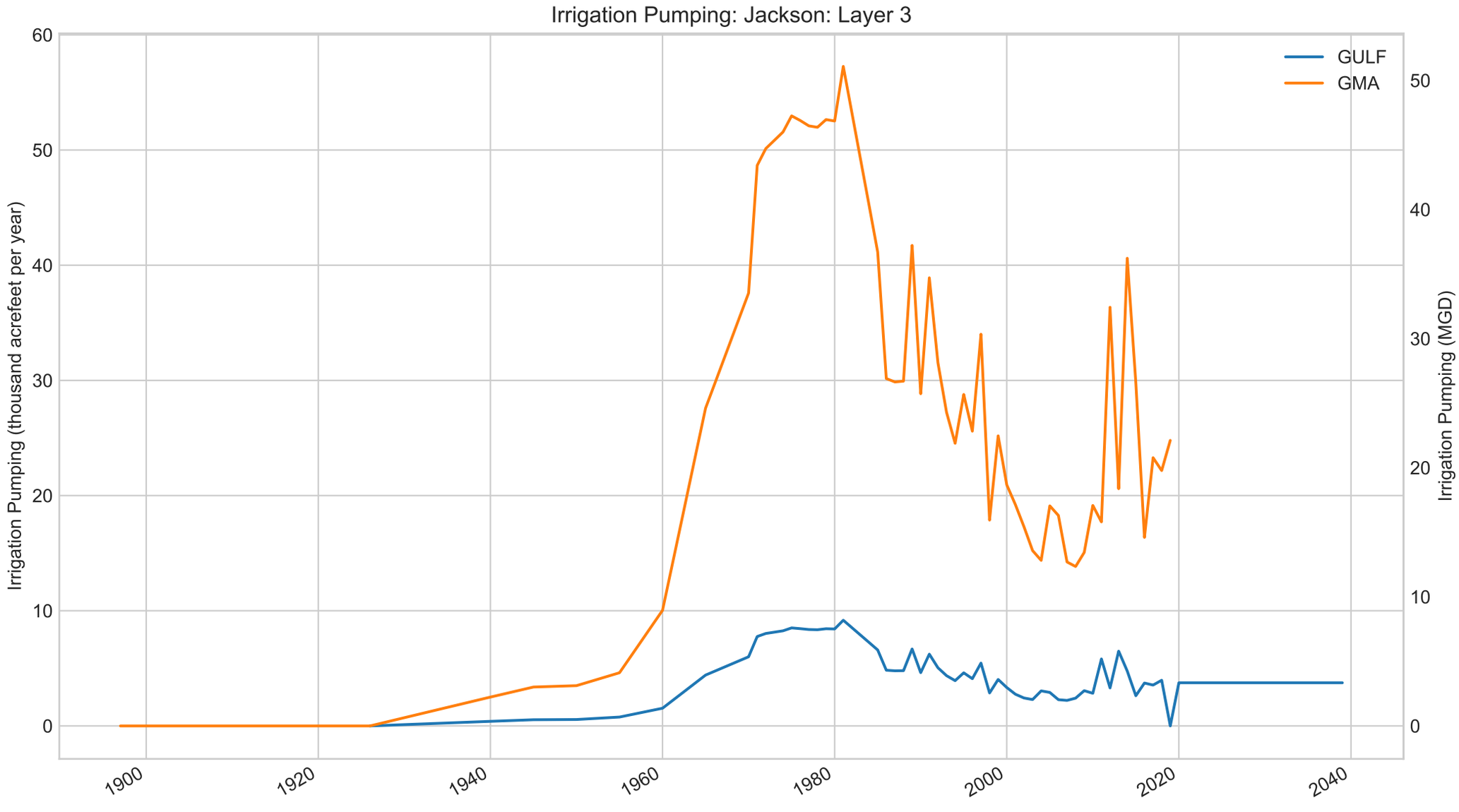

Irrigation Pumping: Grimes: Layer 6
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1900
1920
1940
1960
1980
2000
2020
2040

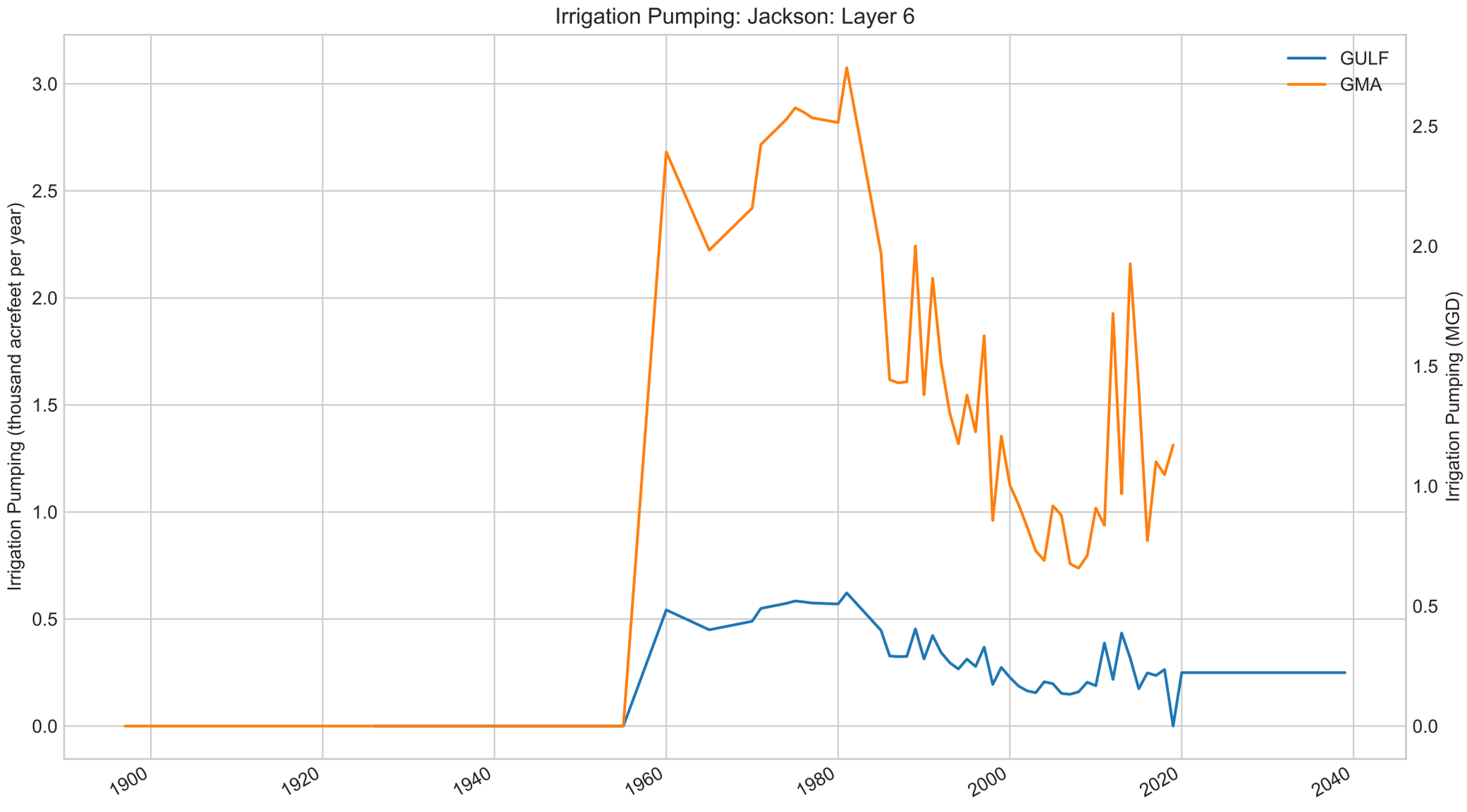

Irrigation Pumping: Hardin: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
1
2
3
4
5
1900
1920
1940
1960
1980
2000
2020
2040

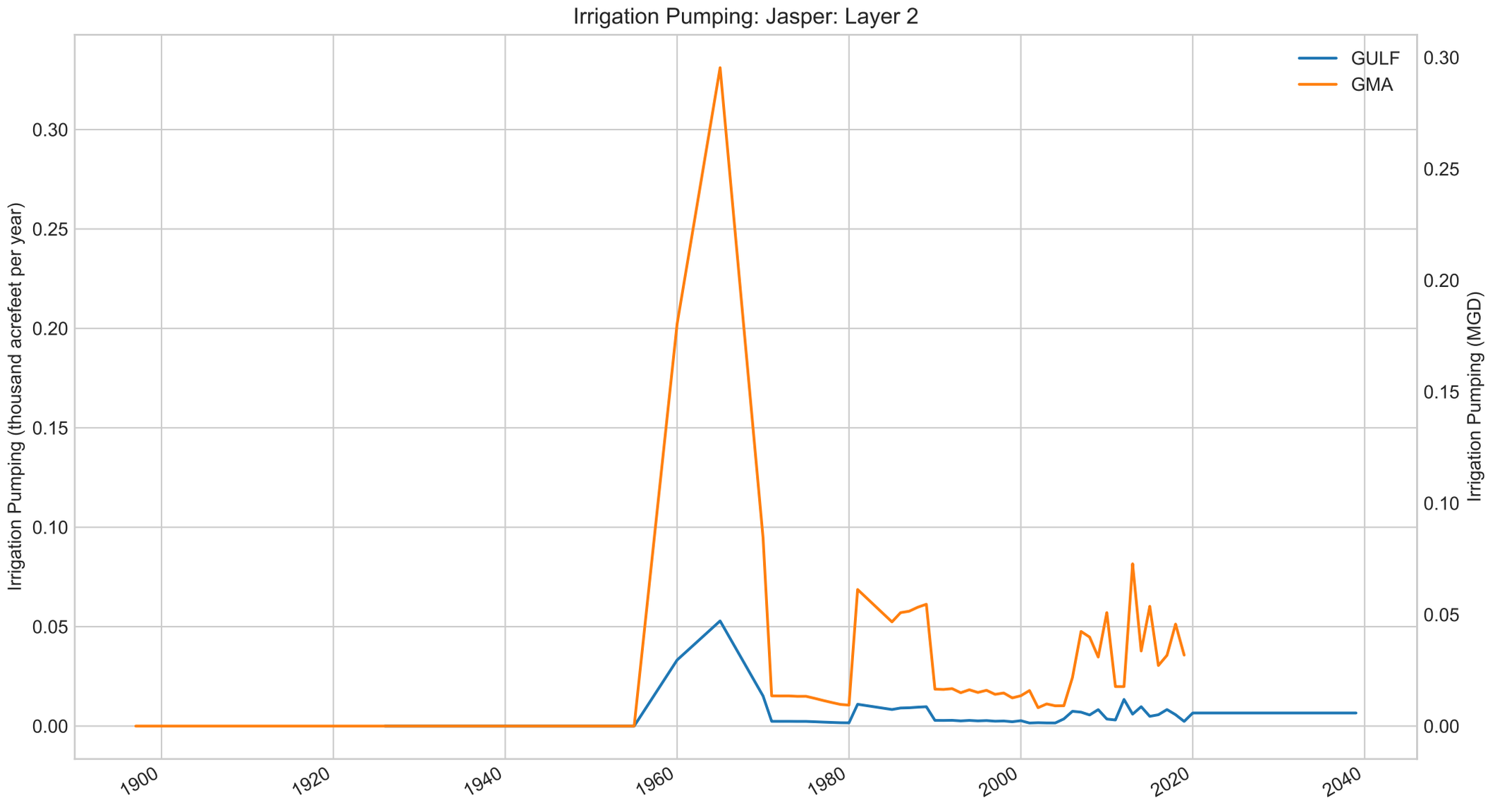

Irrigation Pumping: Harris: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
10
12
14
16
0
2
4
6
8
10
12
14
1900
1920
1940
1960
1980
2000
2020
2040

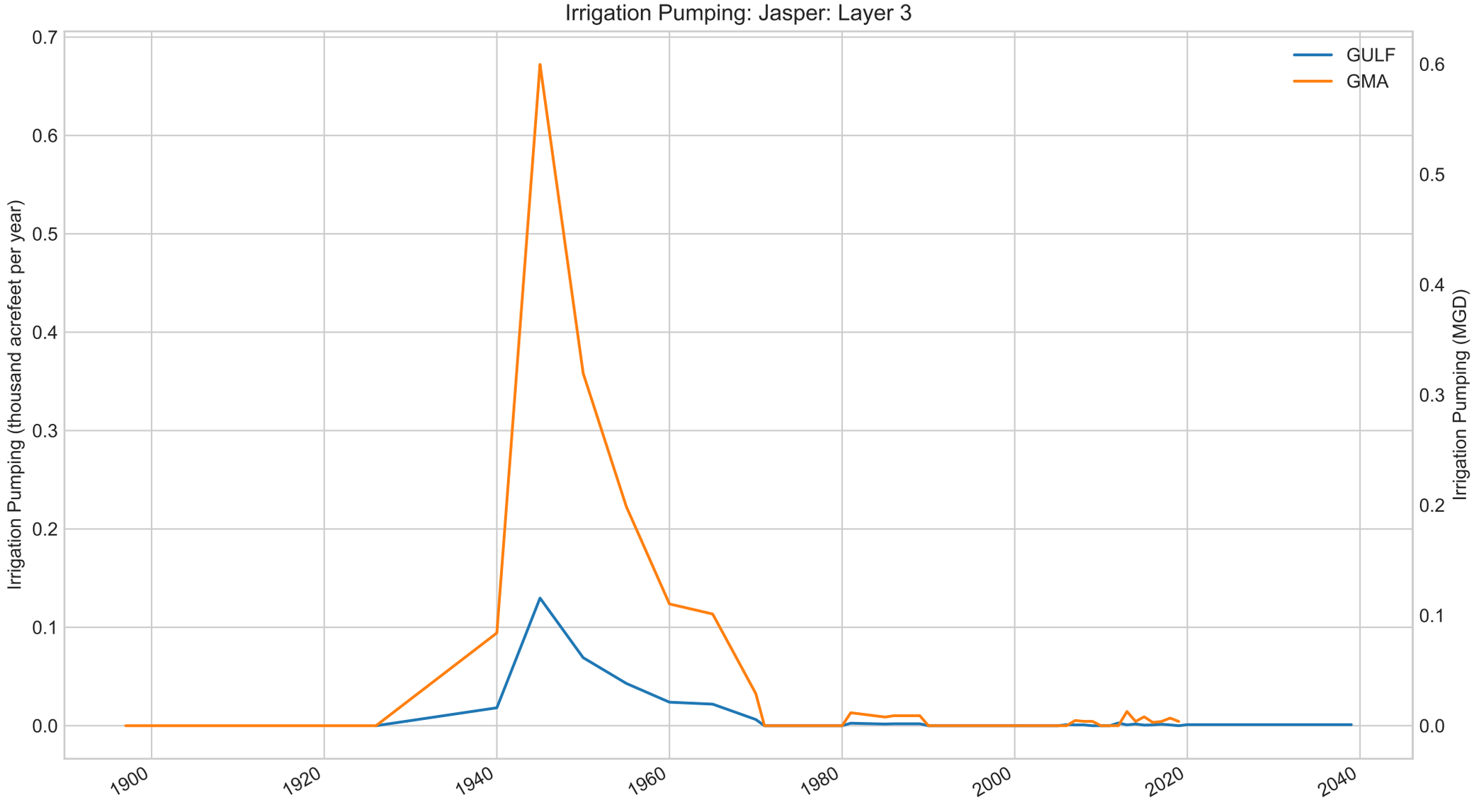

Irrigation Pumping: Harris: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
1
2
3
4
5
6
1900
1920
1940
1960
1980
2000
2020
2040

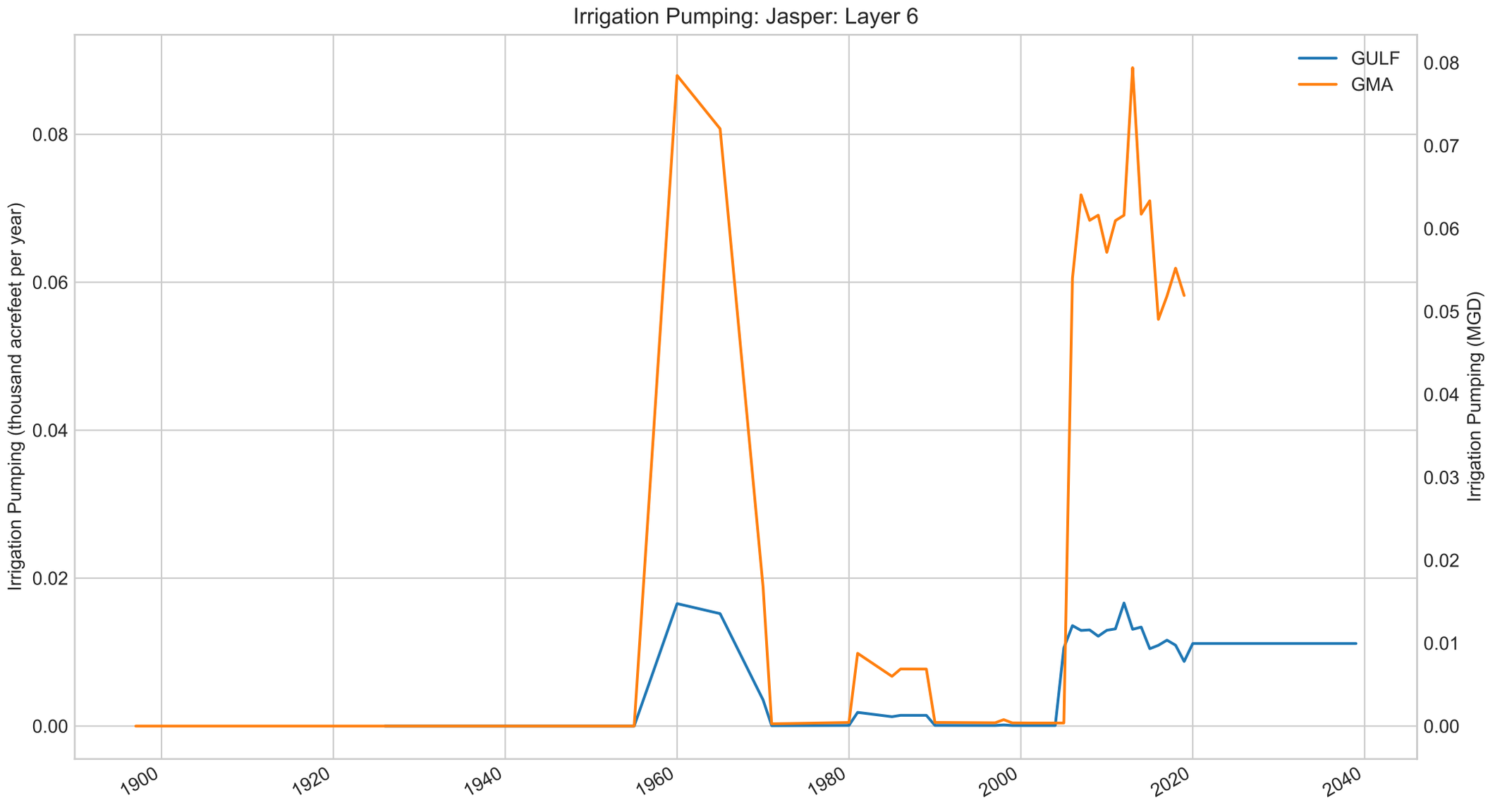

Irrigation Pumping: Jackson: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
10
20
30
40
50
60
70
1900
1920
1940
1960
1980
2000
2020
2040

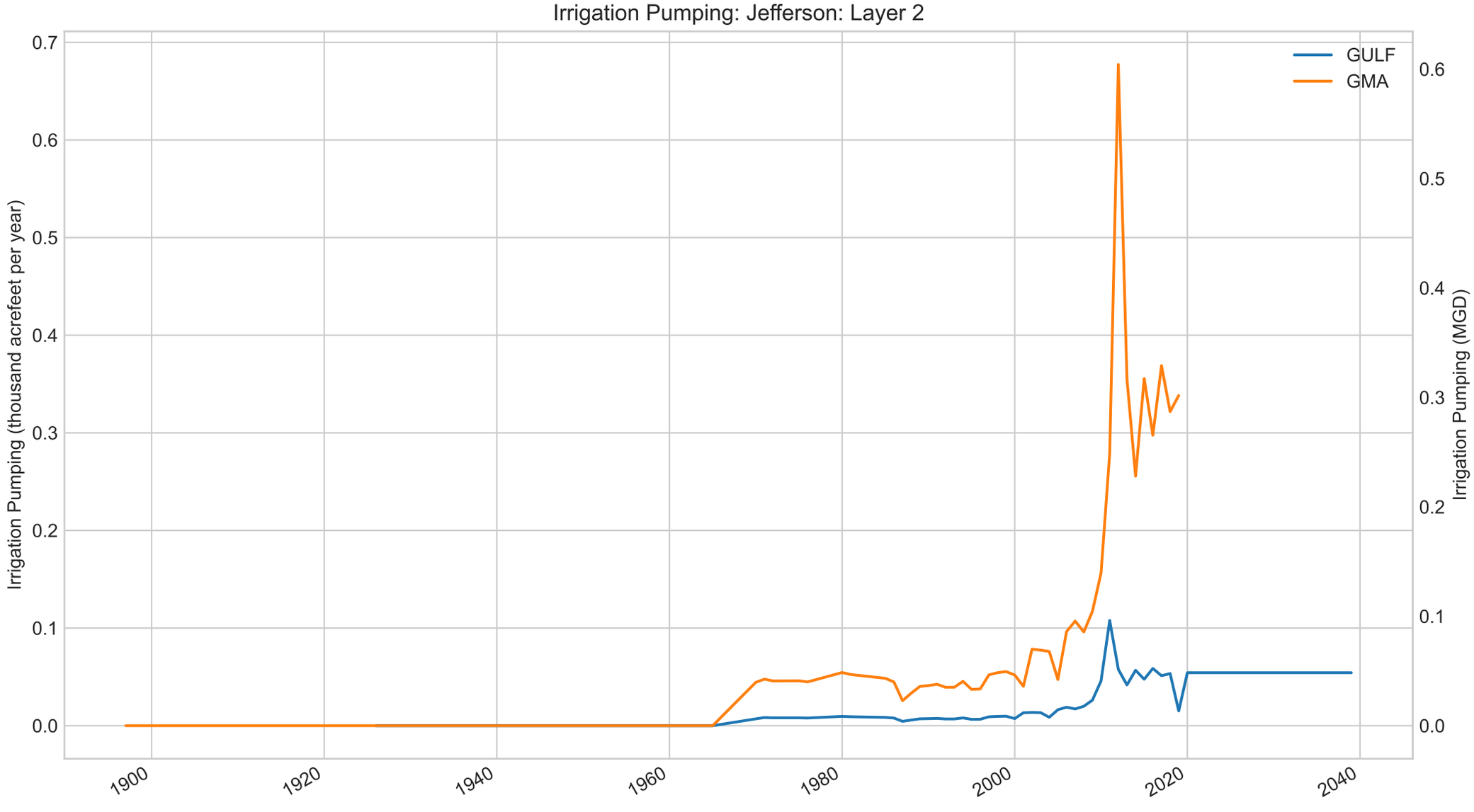

Irrigation Pumping: Jackson: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
10
20
30
40
50
60
1900
1920
1940
1960
1980
2000
2020
2040

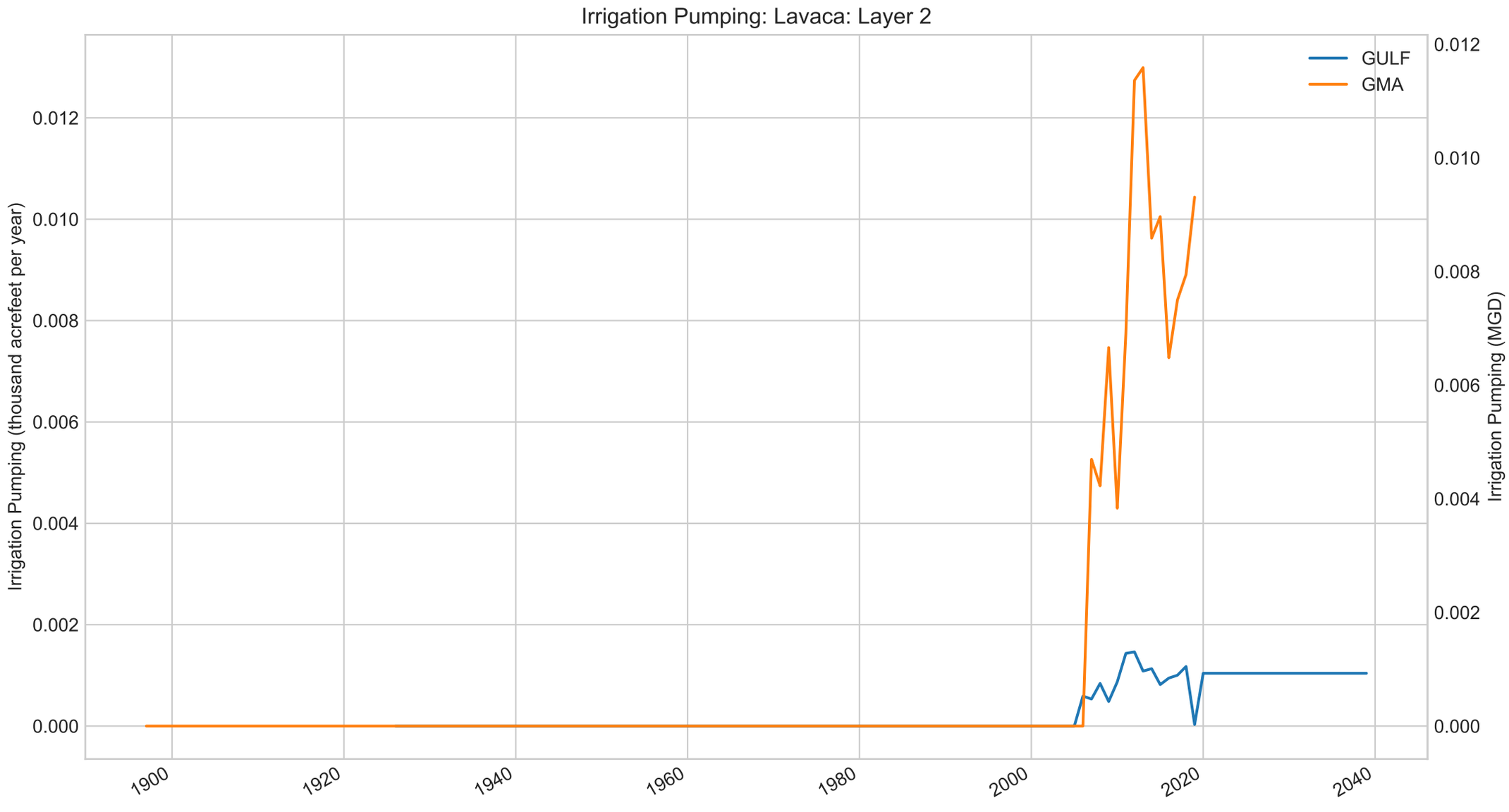

Irrigation Pumping: Jackson: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.5
2.0
1.5
1.0
0.5
0.0
1900
1920
1940
1960
1980
2000
2020
2040

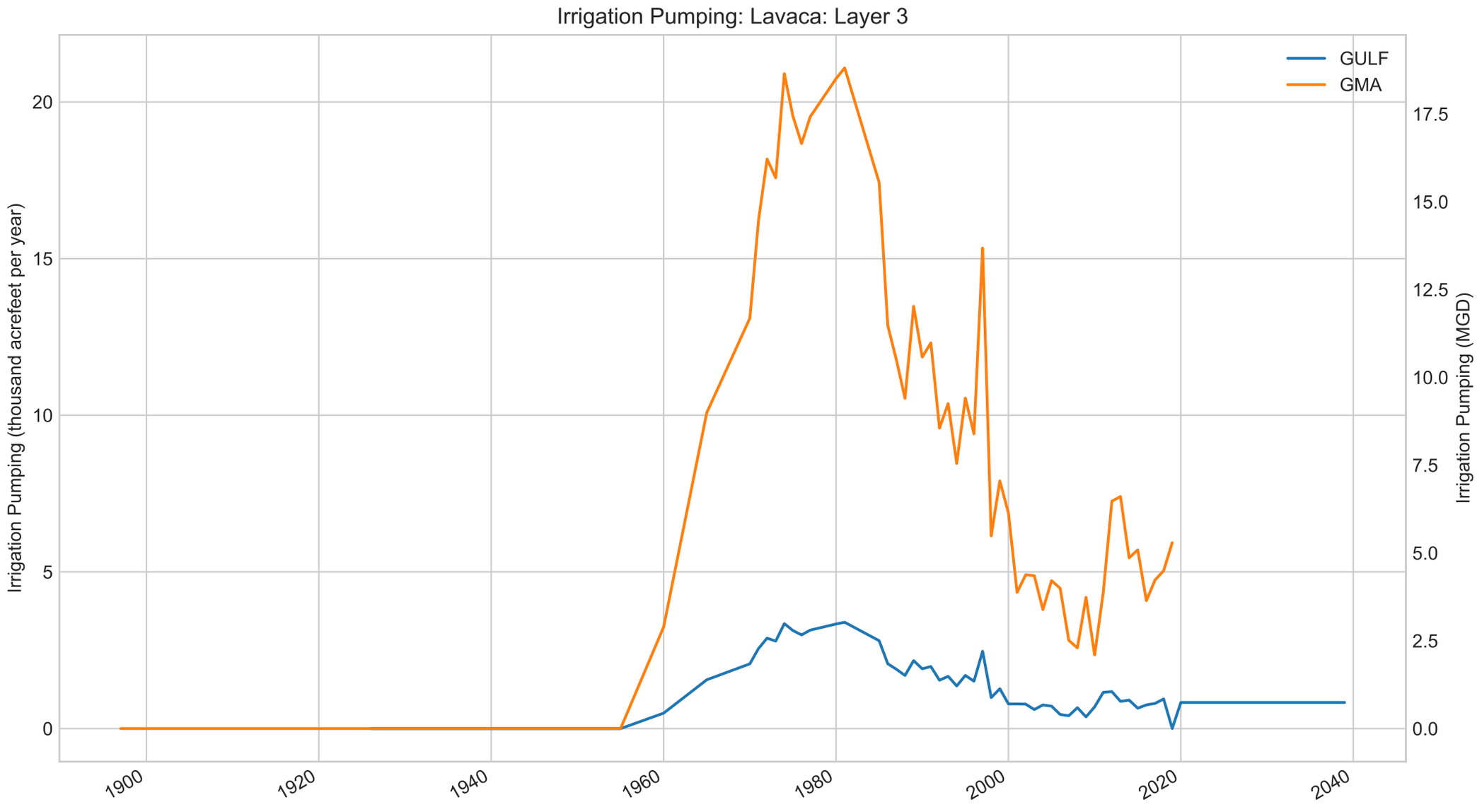

Irrigation Pumping: Jasper: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1900
1920
1940
1960
1980
2000
2020
2040

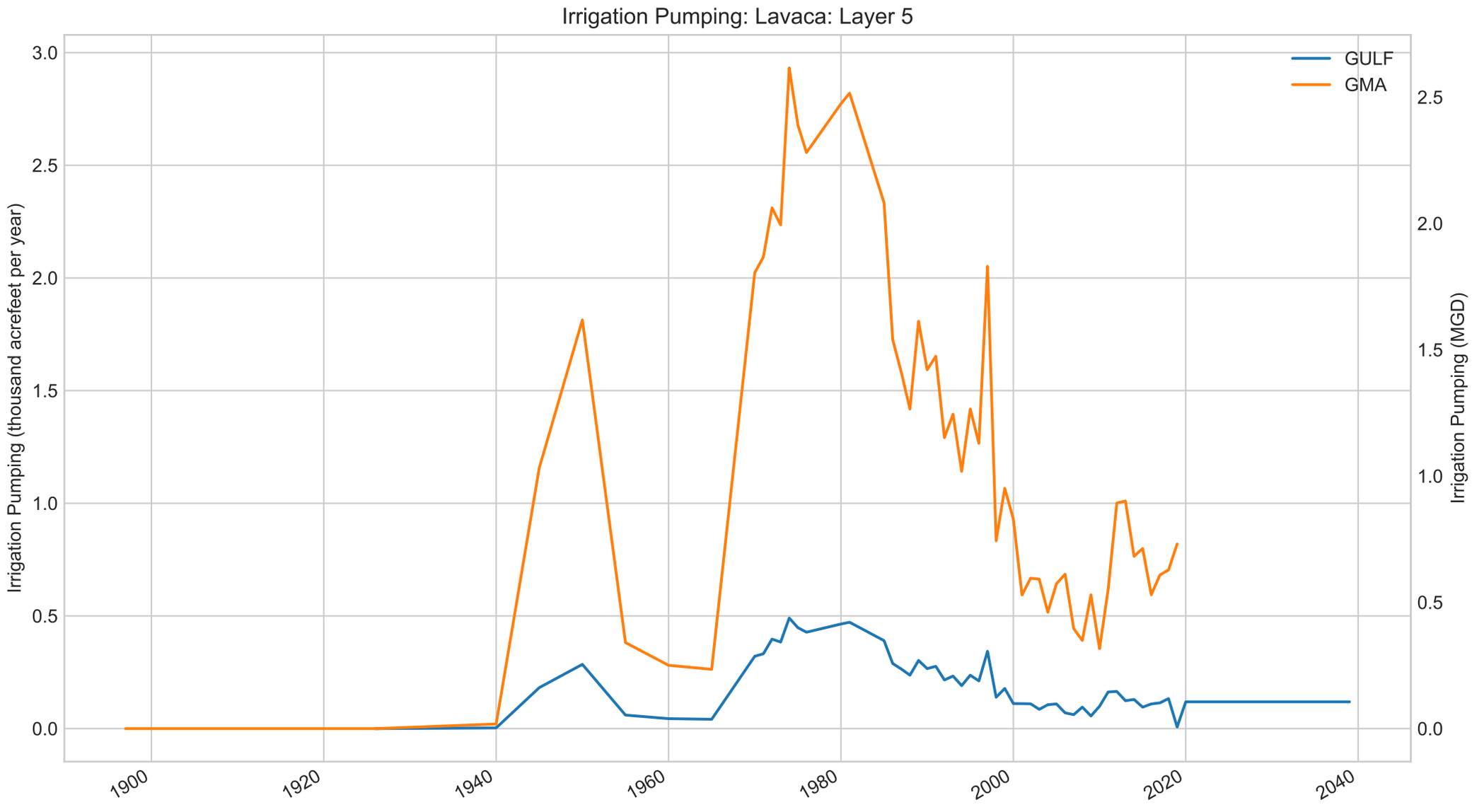

Irrigation Pumping: Jasper: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

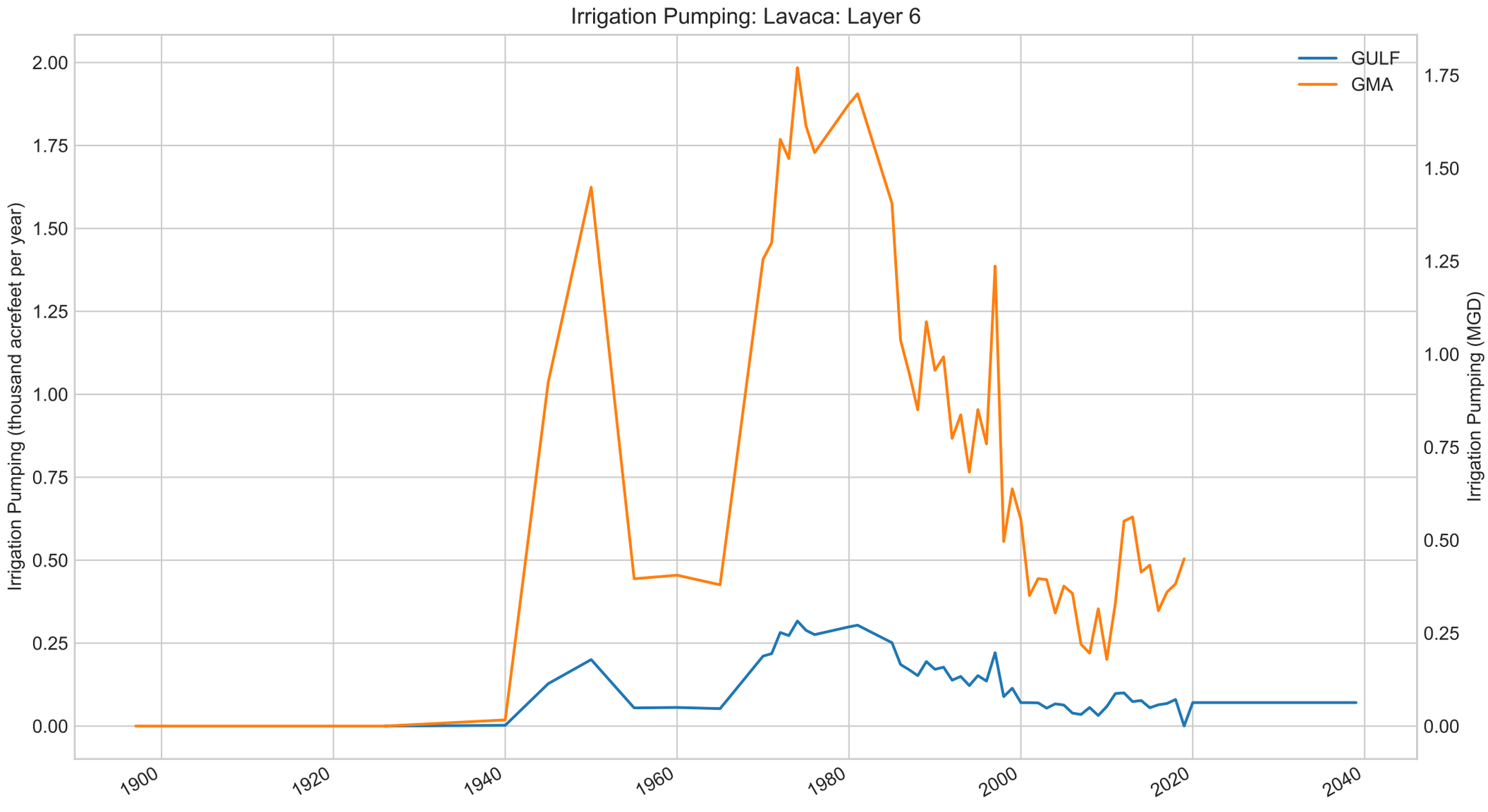

Irrigation Pumping: Jasper: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.01
0.03
0.05
0.07
1900
1920
1940
1960
1980
2000
2020
2040

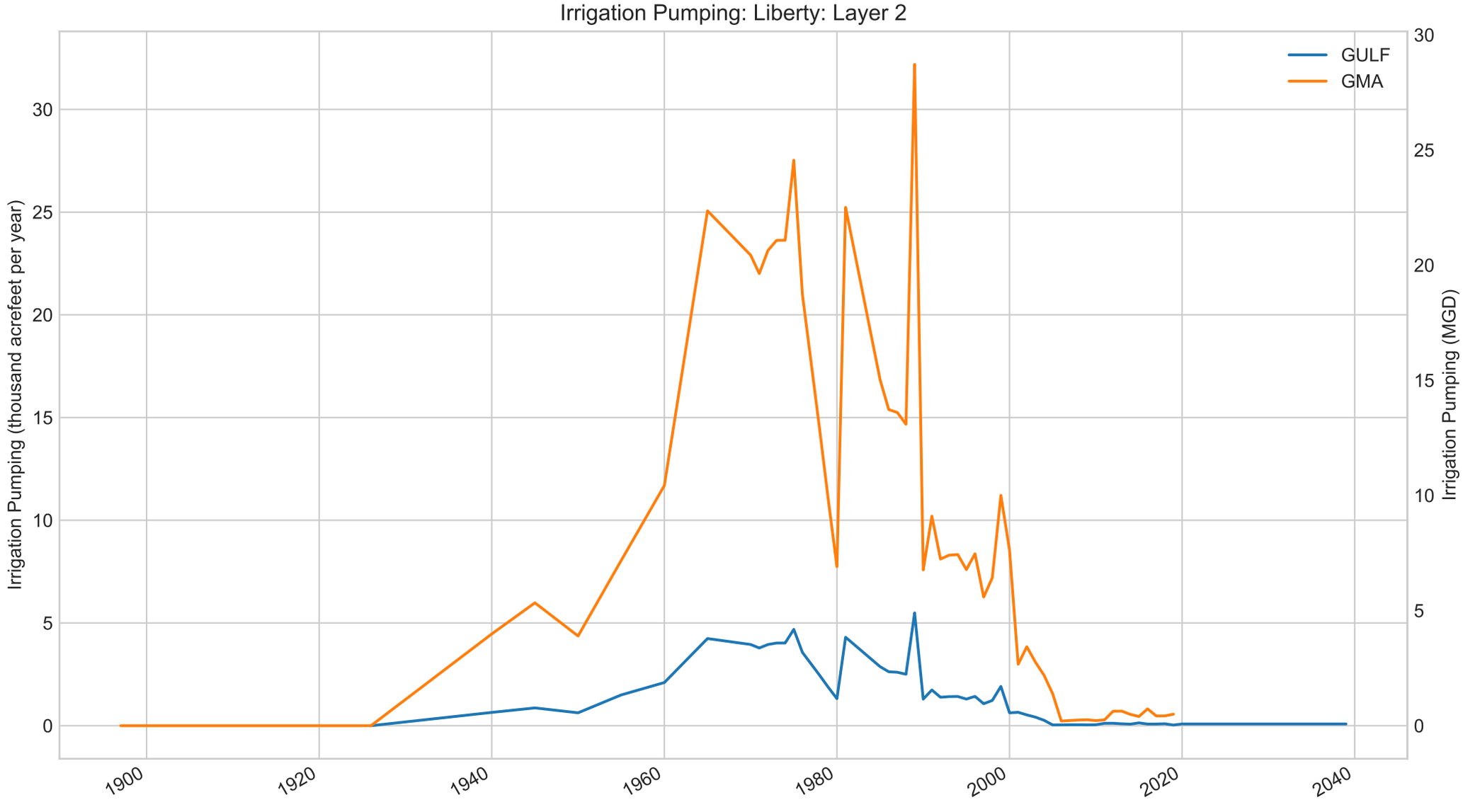

Irrigation Pumping: Jefferson: Layer 2
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040

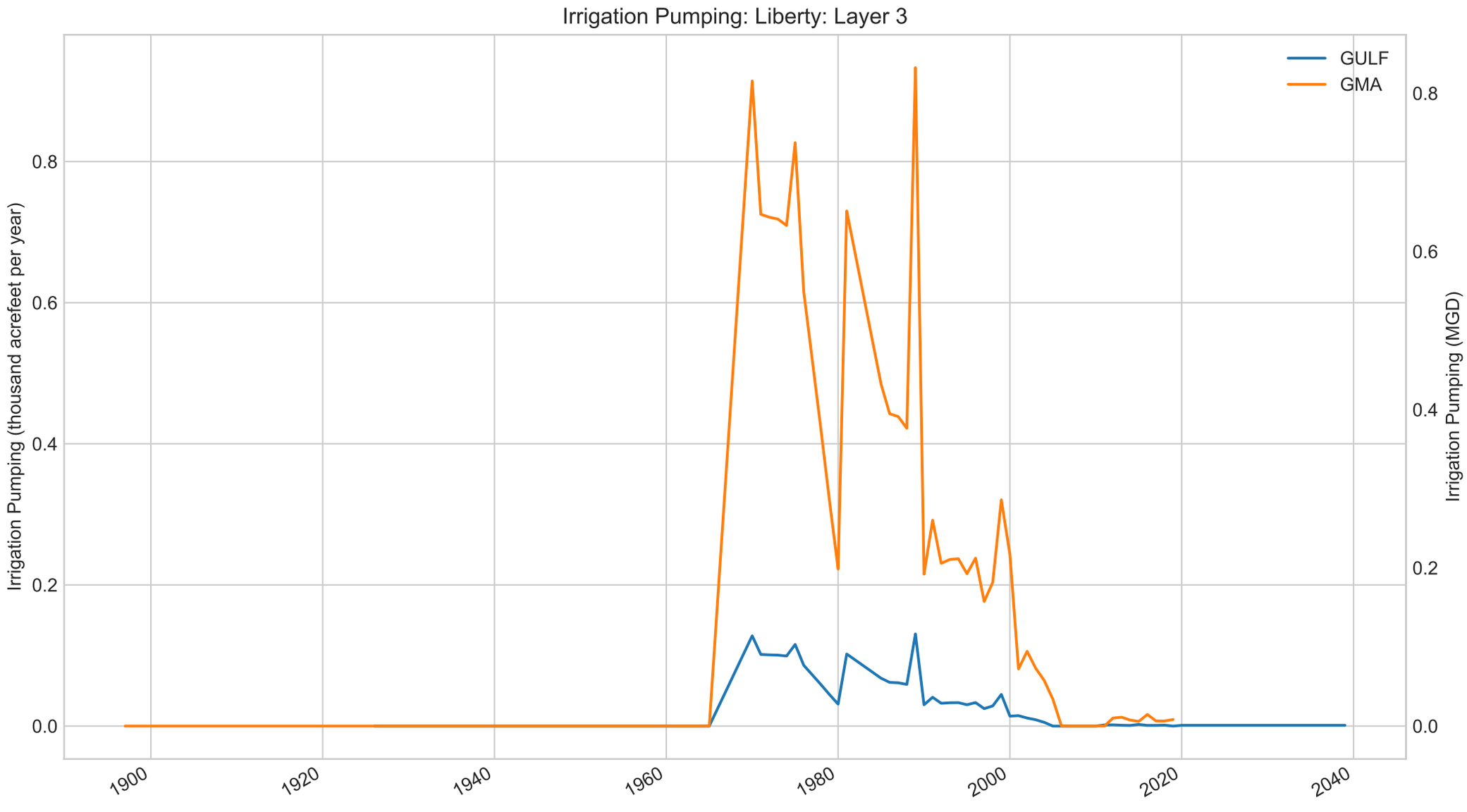

Irrigation Pumping: Lavaca: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.000
0.002
0.004
0.006
0.008
0.010
0.012
1900
1920
1940
1960
1980
2000
2020
2040

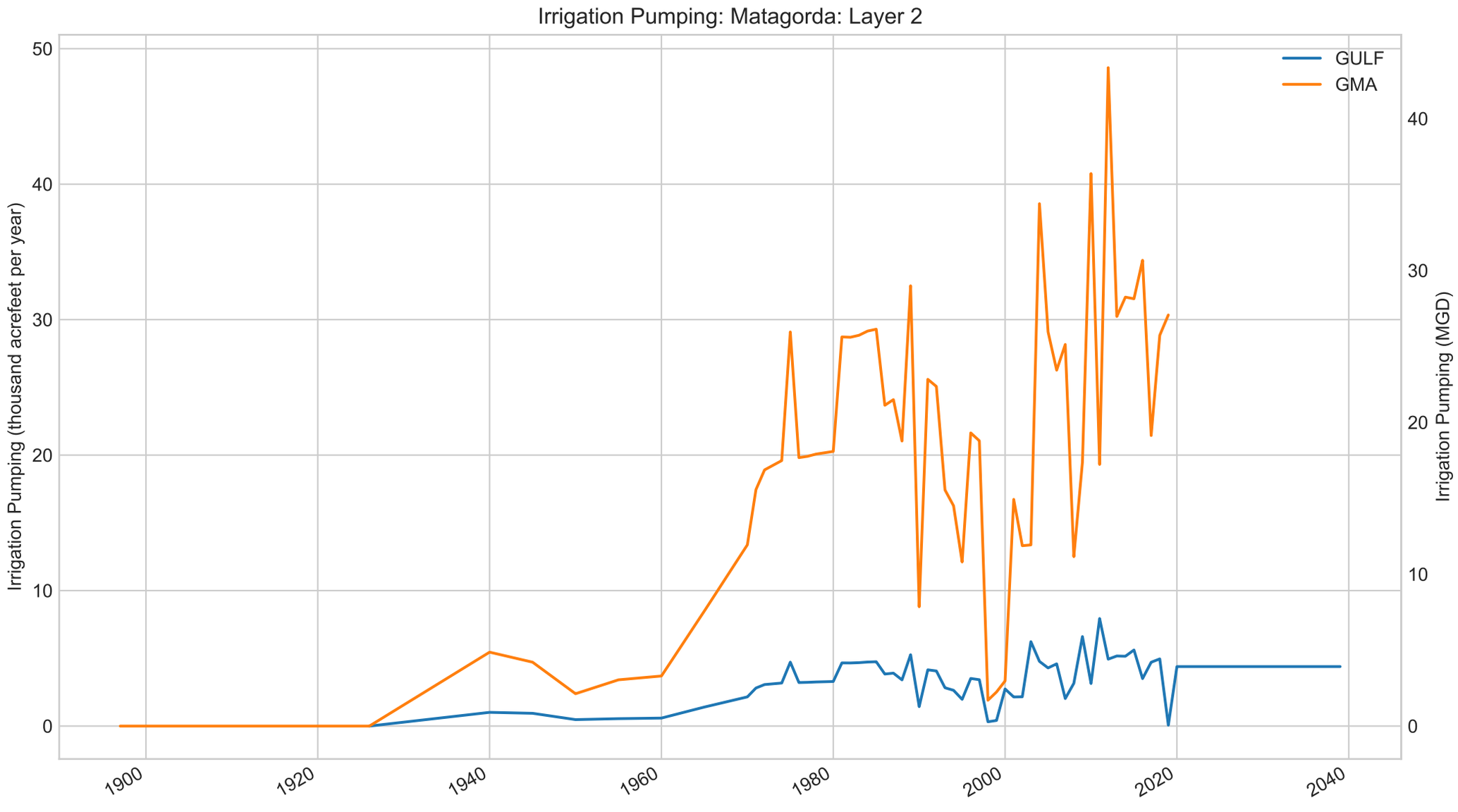

Irrigation Pumping: Lavaca: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
1900
1920
1940
1960
1980
2000
2020
2040

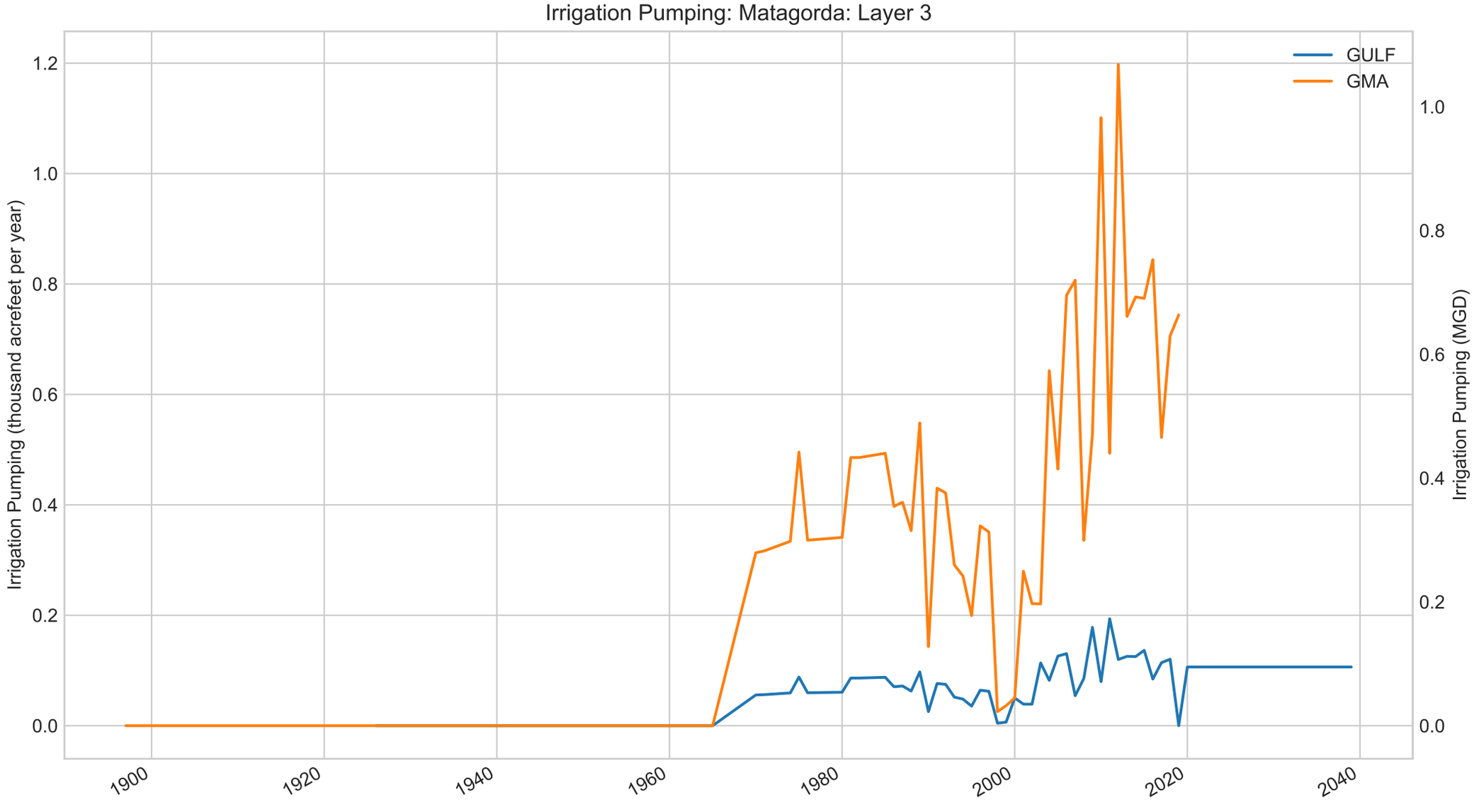

Irrigation Pumping: Lavaca: Layer 5
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2.5
2.0
1.5
1.0
0.5
0.0
1900
1920
1940
1960
1980
2000
2020
2040

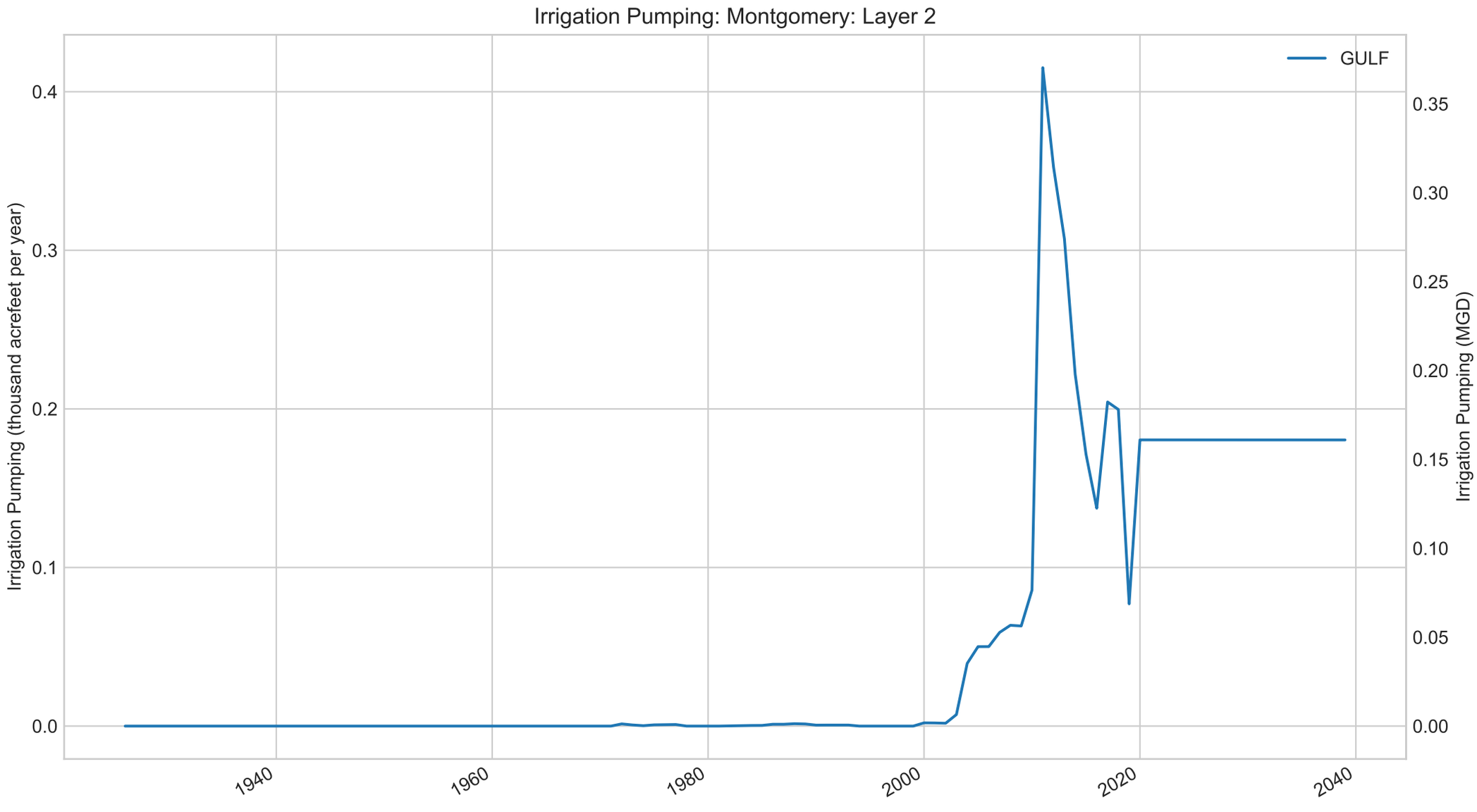

Irrigation Pumping: Lavaca: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1900
1920
1940
1960
1980
2000
2020
2040

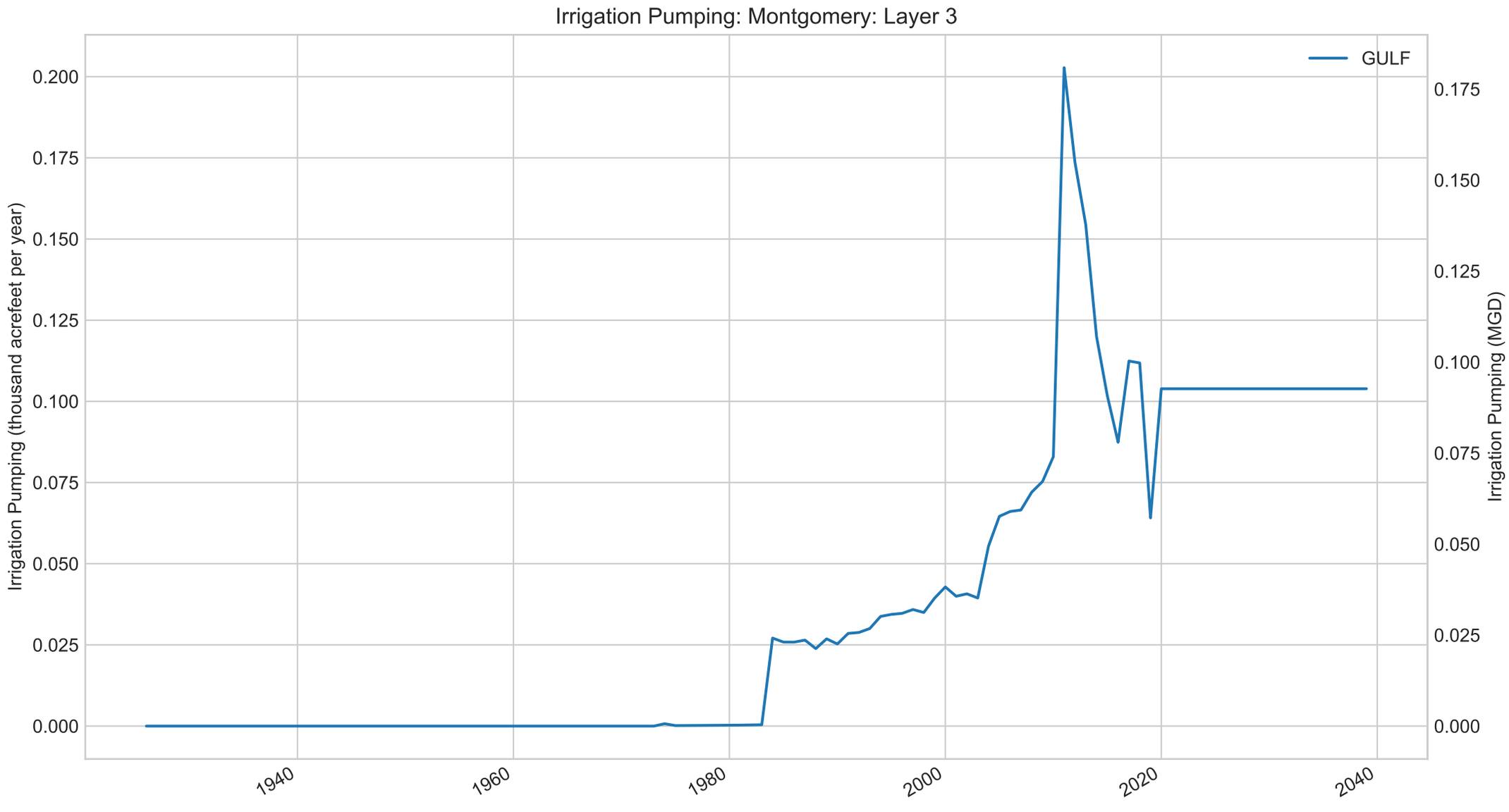

Irrigation Pumping: Liberty: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

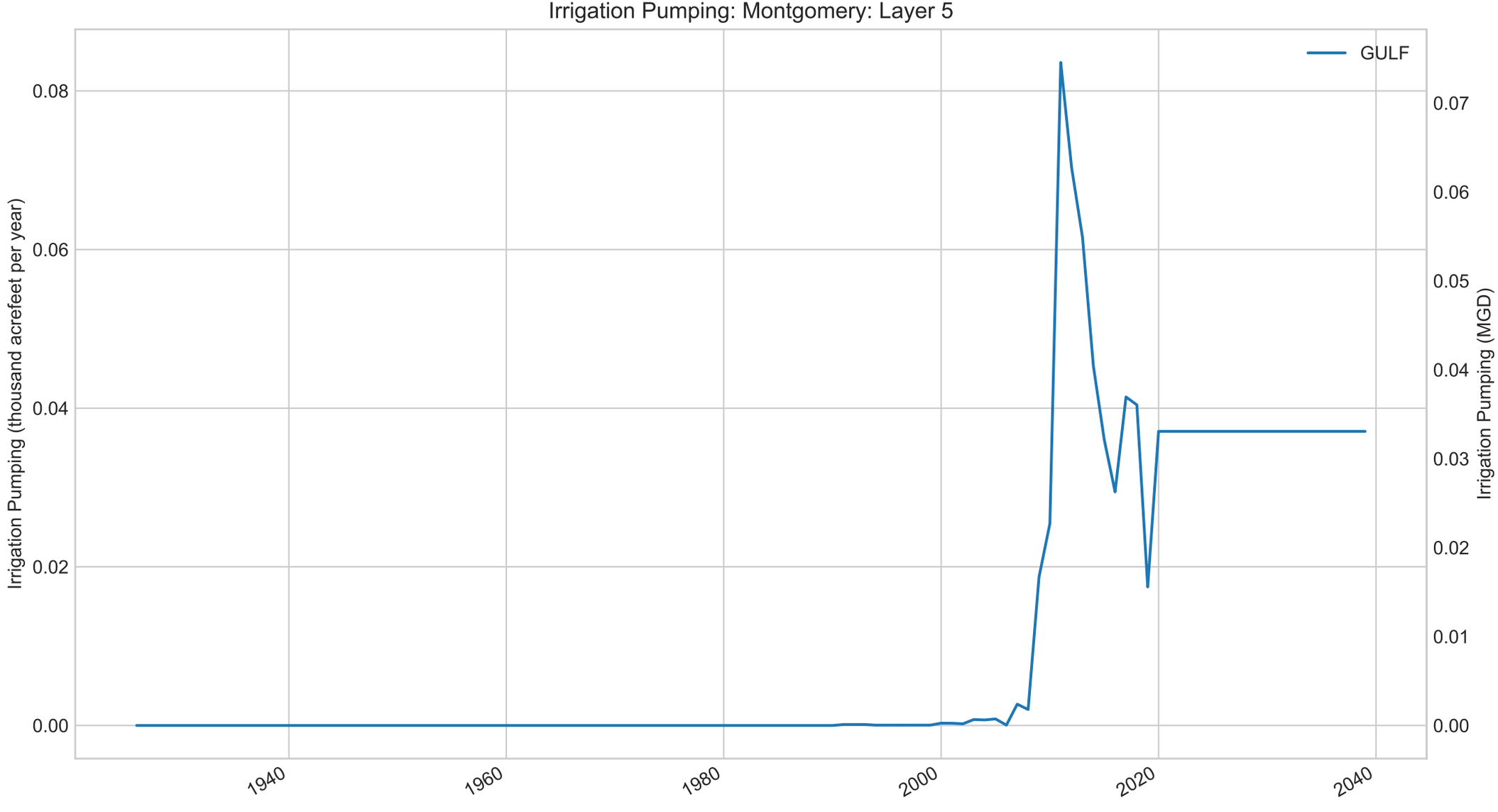

Irrigation Pumping: Liberty: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1900
1920
1940
1960
1980
2000
2020
2040

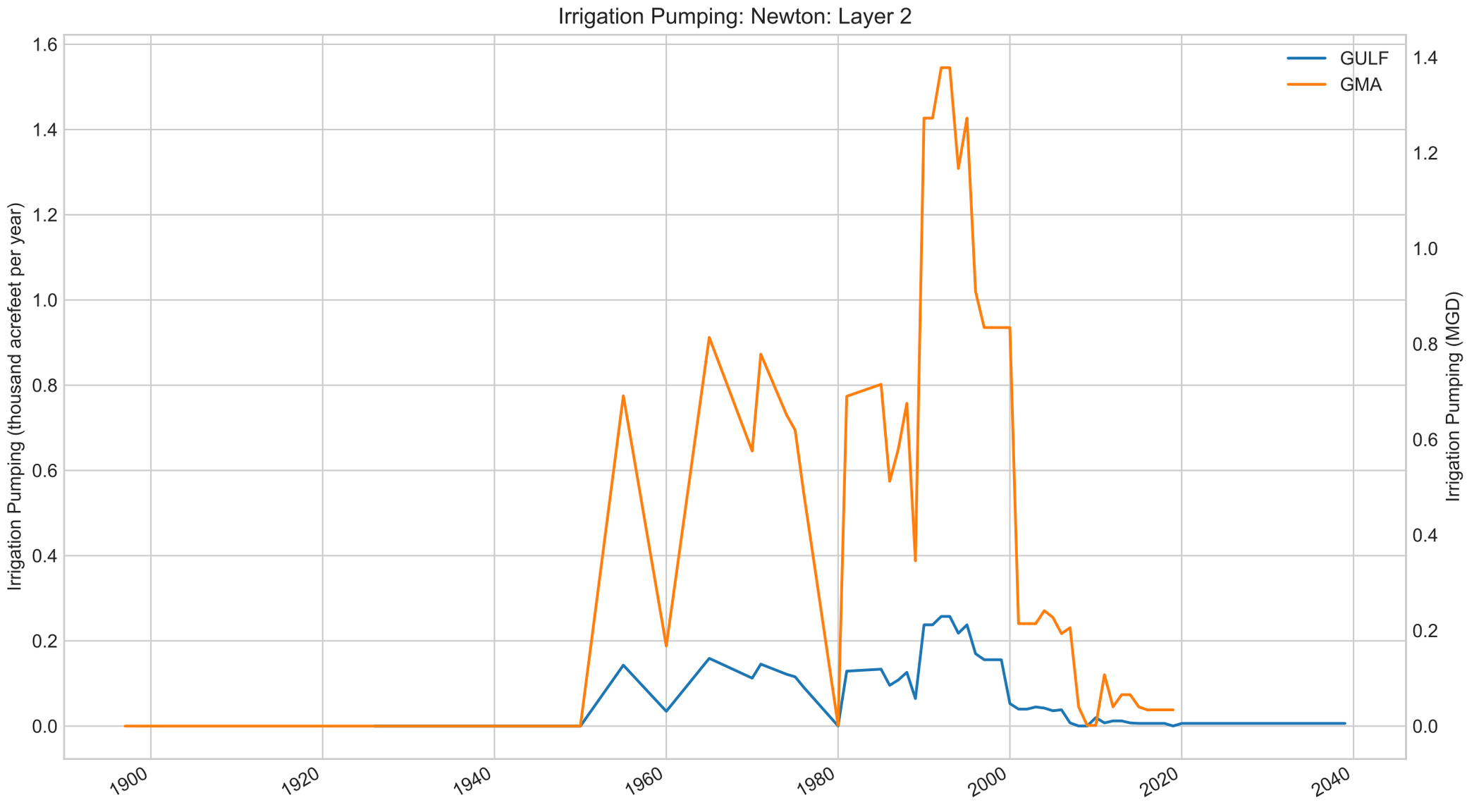

Irrigation Pumping: Matagorda: Layer 2
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0
10
20
30
40
50
0
10
20
30
40
1900
1920
1940
1960
1980
2000
2020
2040

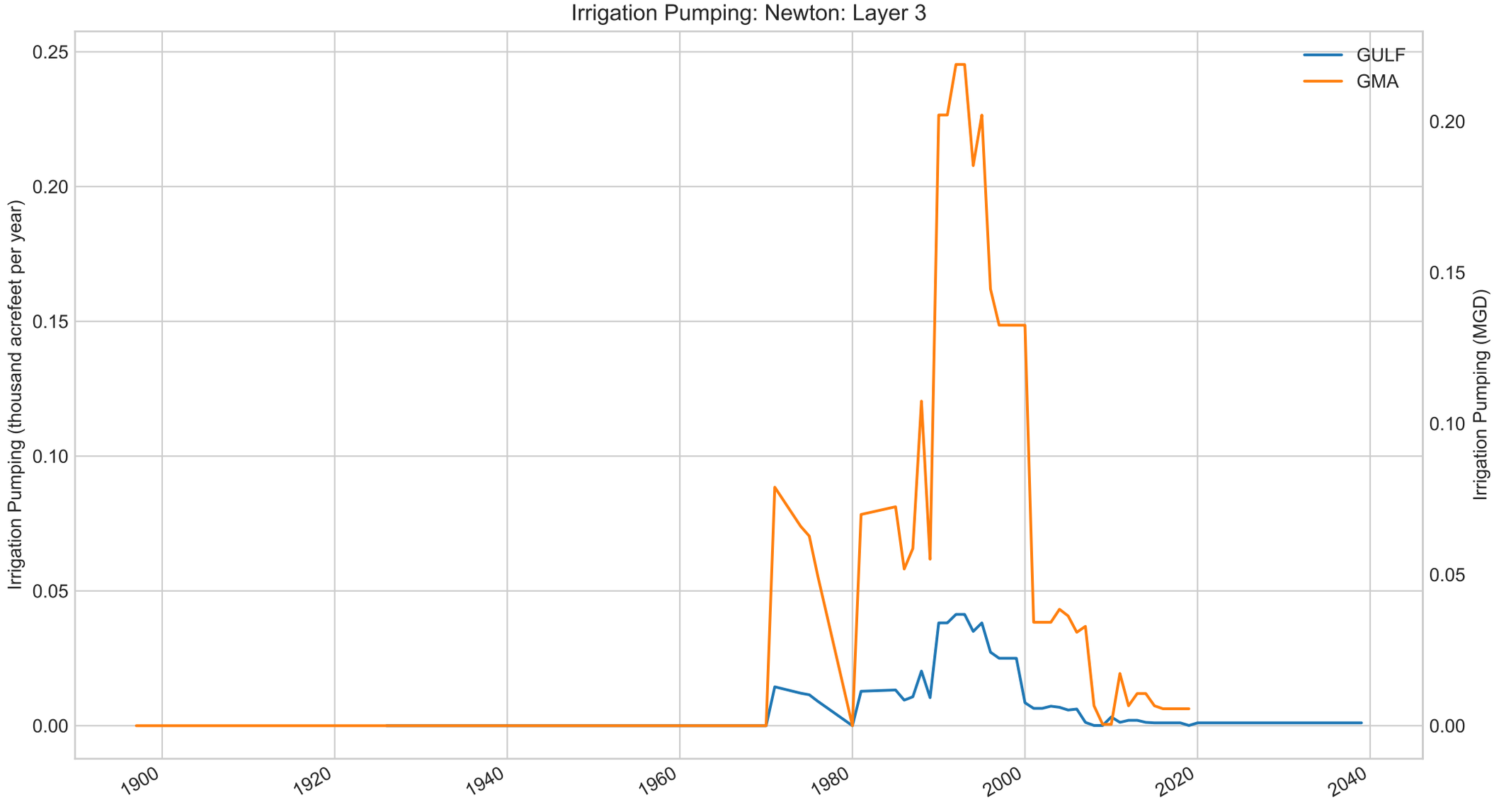

Irrigation Pumping: Matagorda: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

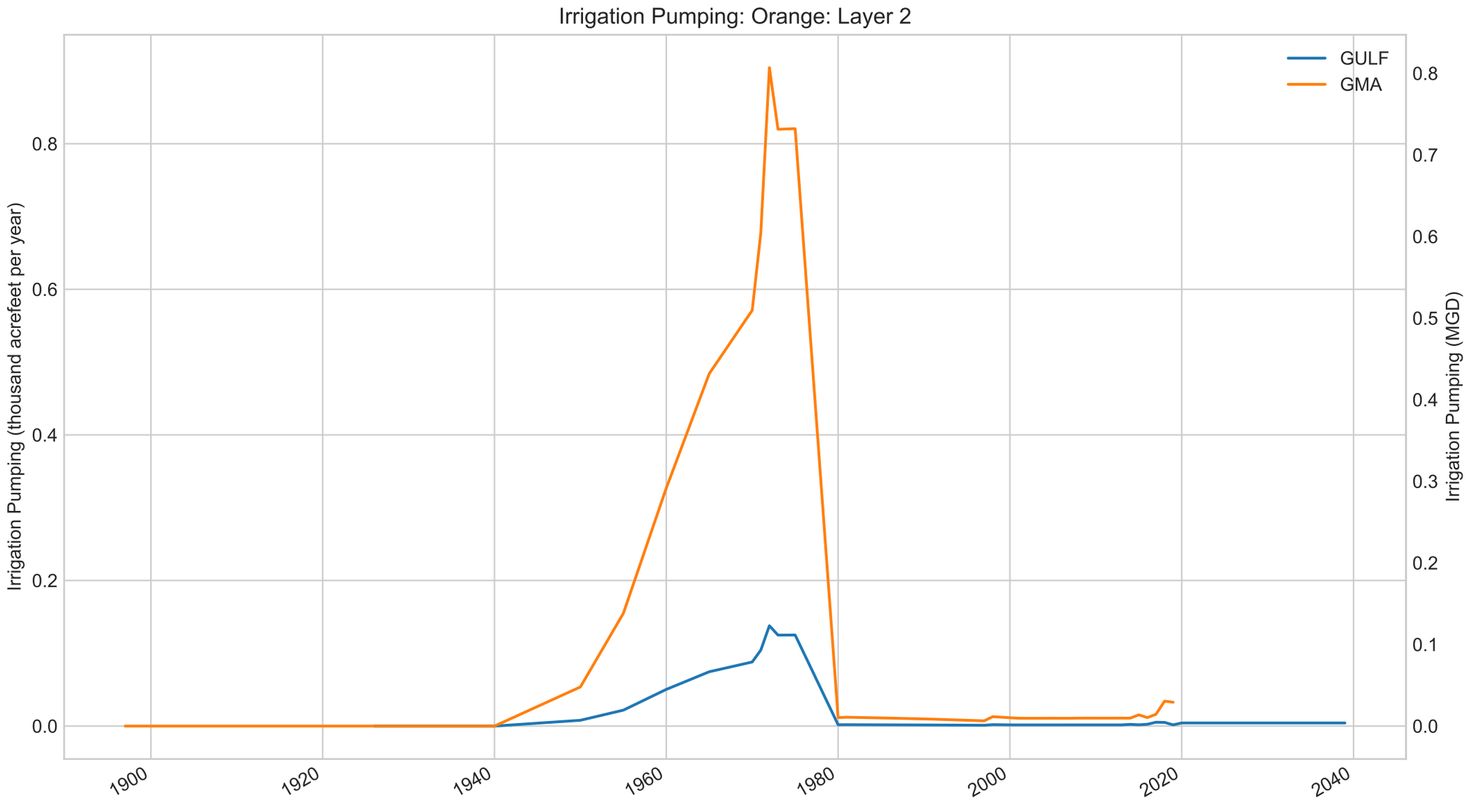

Irrigation Pumping: Montgomery: Layer 2
GULF
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1940
1960
1980
2000
2020
2040

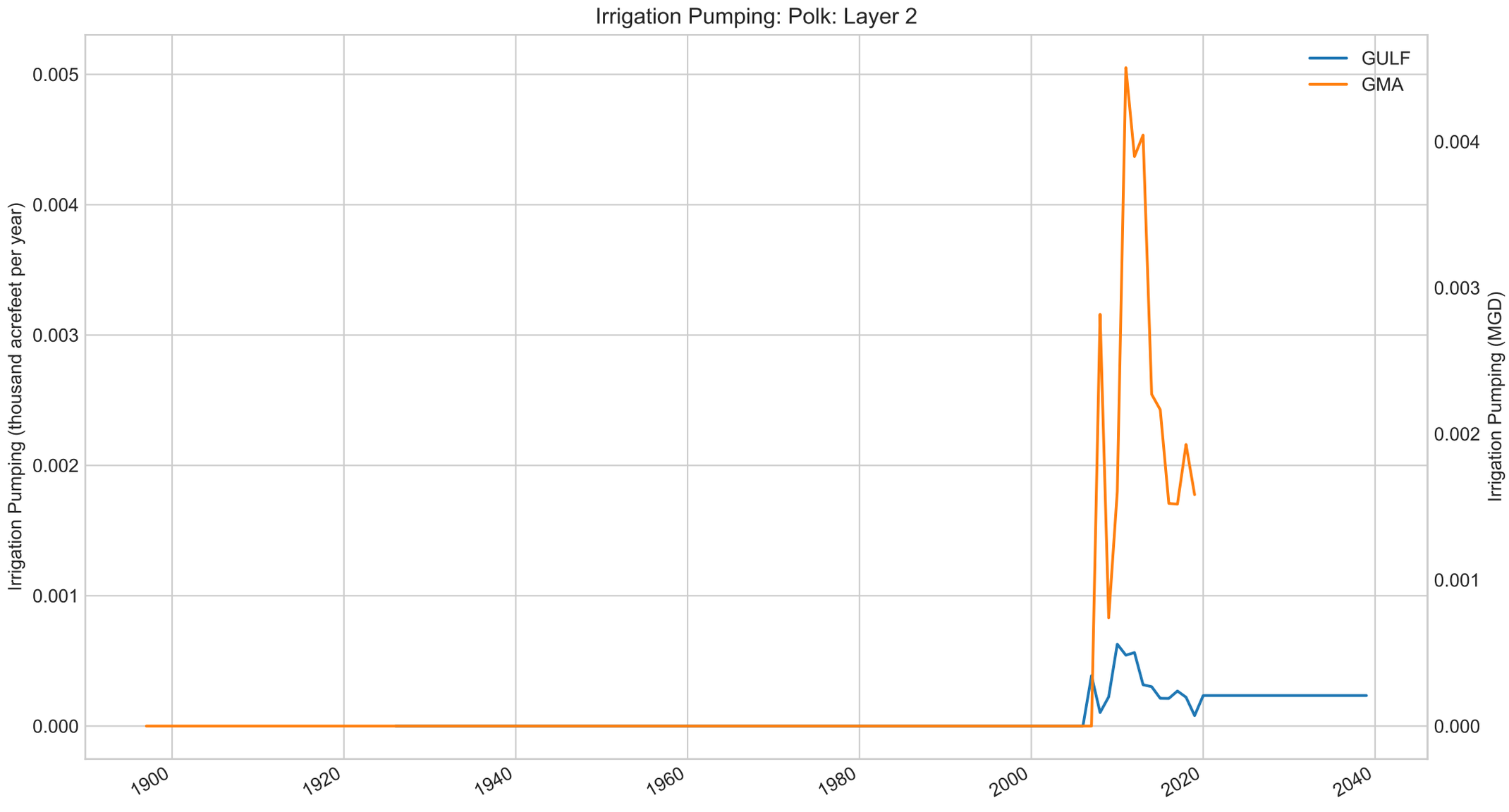

Irrigation Pumping: Montgomery: Layer 3
GULF
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1940
1960
1980
2000
2020
2040

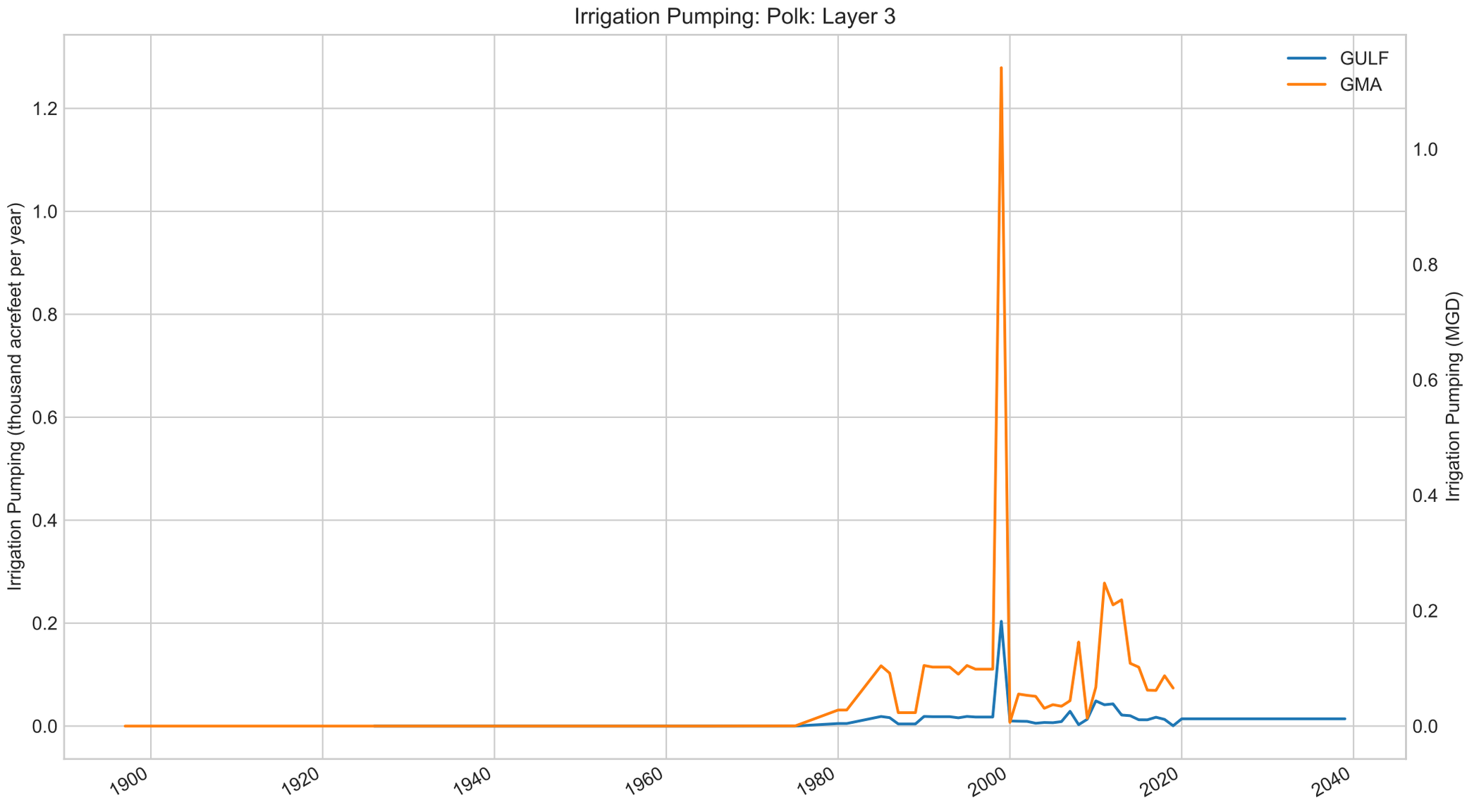

Irrigation Pumping: Montgomery: Layer 5
GULF
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
1940
1960
1980
2000
2020
2040

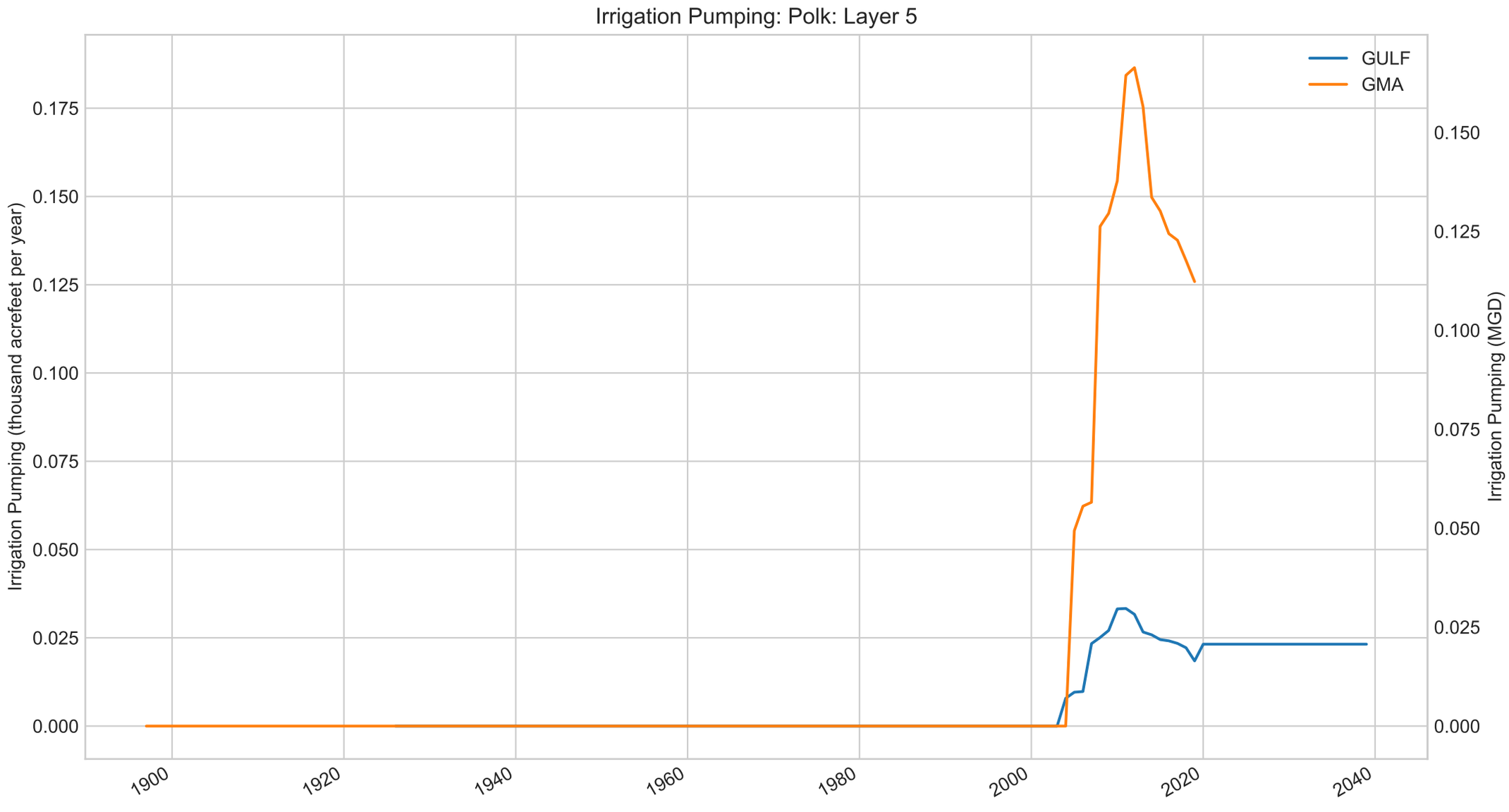

Irrigation Pumping: Newton: Layer 2
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1900
1920
1940
1960
1980
2000
2020
2040

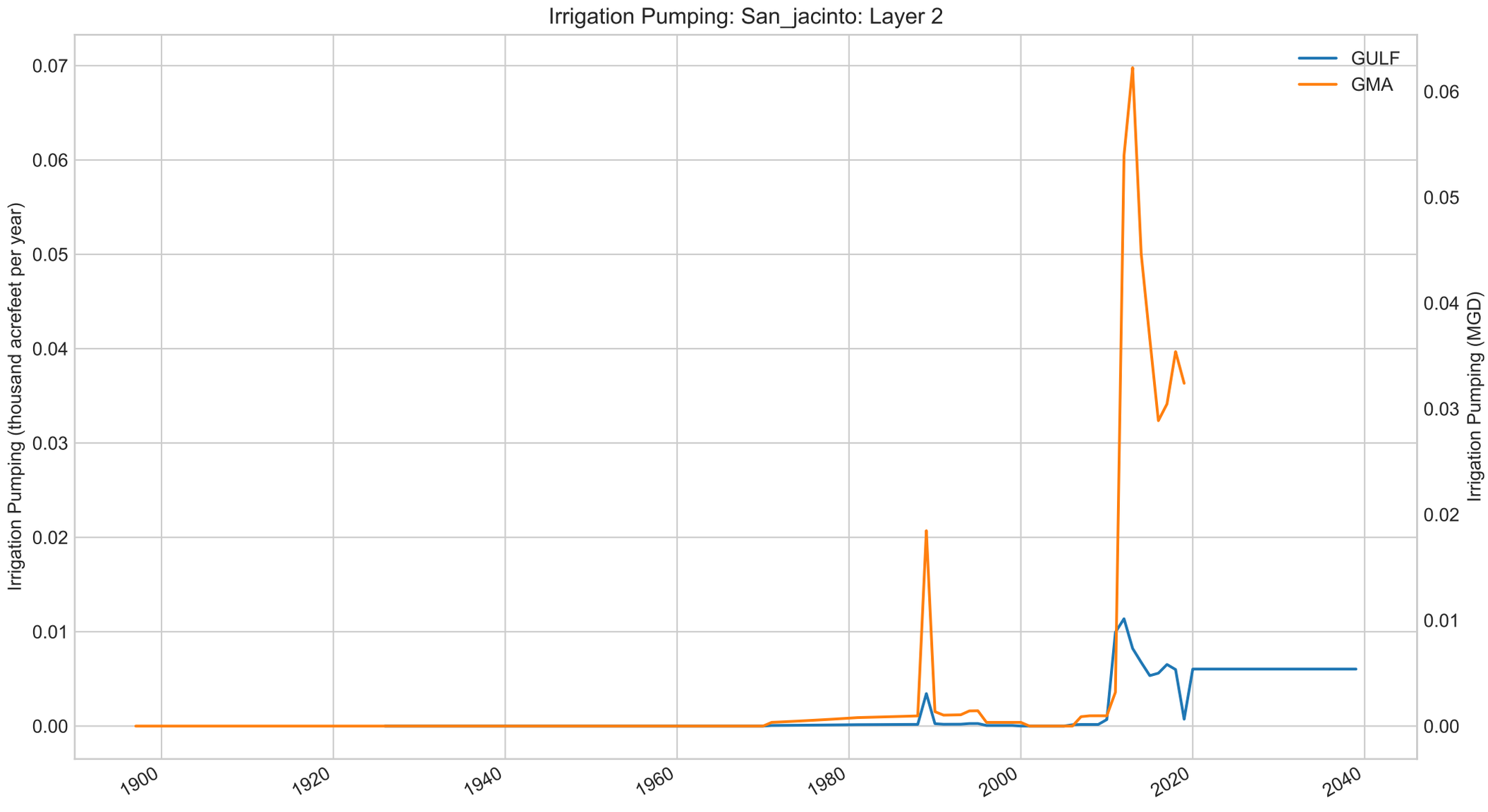

Irrigation Pumping: Newton: Layer 3
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.25
0.20
0.15
0.10
0.05
0.00
0.20
0.15
0.10
0.05
0.00
1900
1920
1940
1960
1980
2000
2020
2040

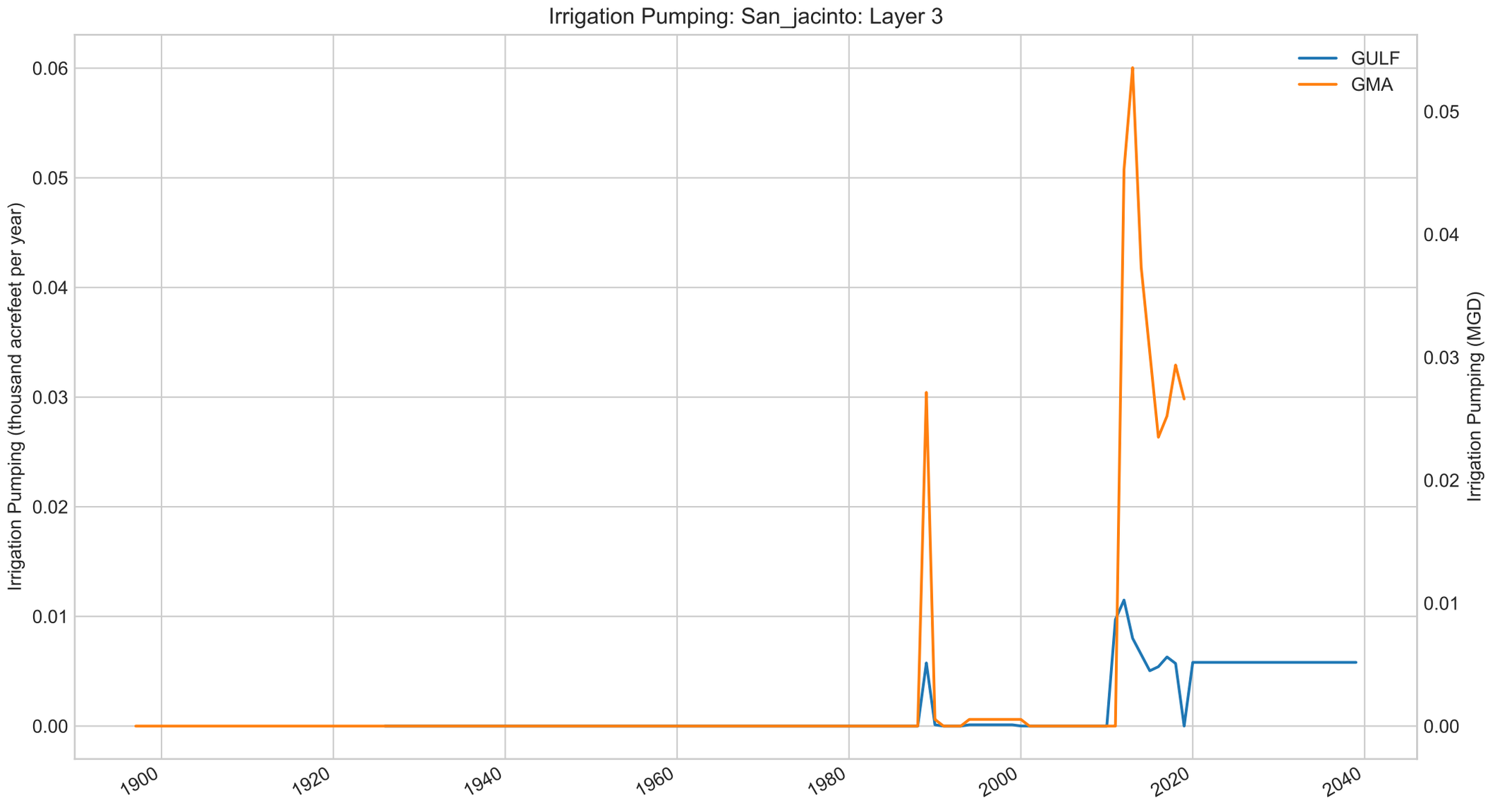

Irrigation Pumping: Orange: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
0.1
0.3
0.5
0.7
1900
1920
1940
1960
1980
2000
2020
2040

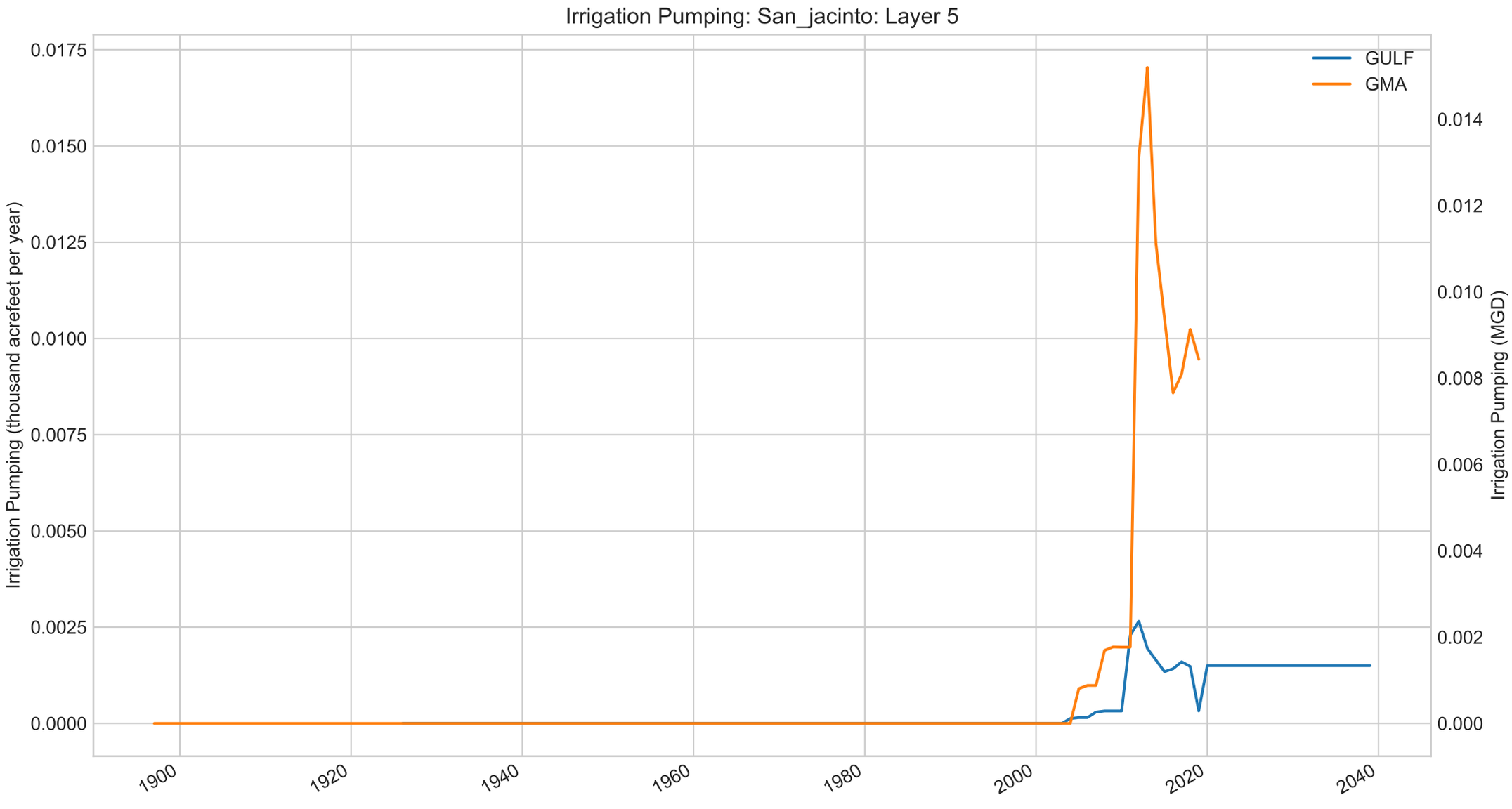

Irrigation Pumping: Polk: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.005
0.004
0.003
0.002
0.001
0.000
0.004
0.003
0.002
0.001
0.000
1900
1920
1940
1960
1980
2000
2020
2040

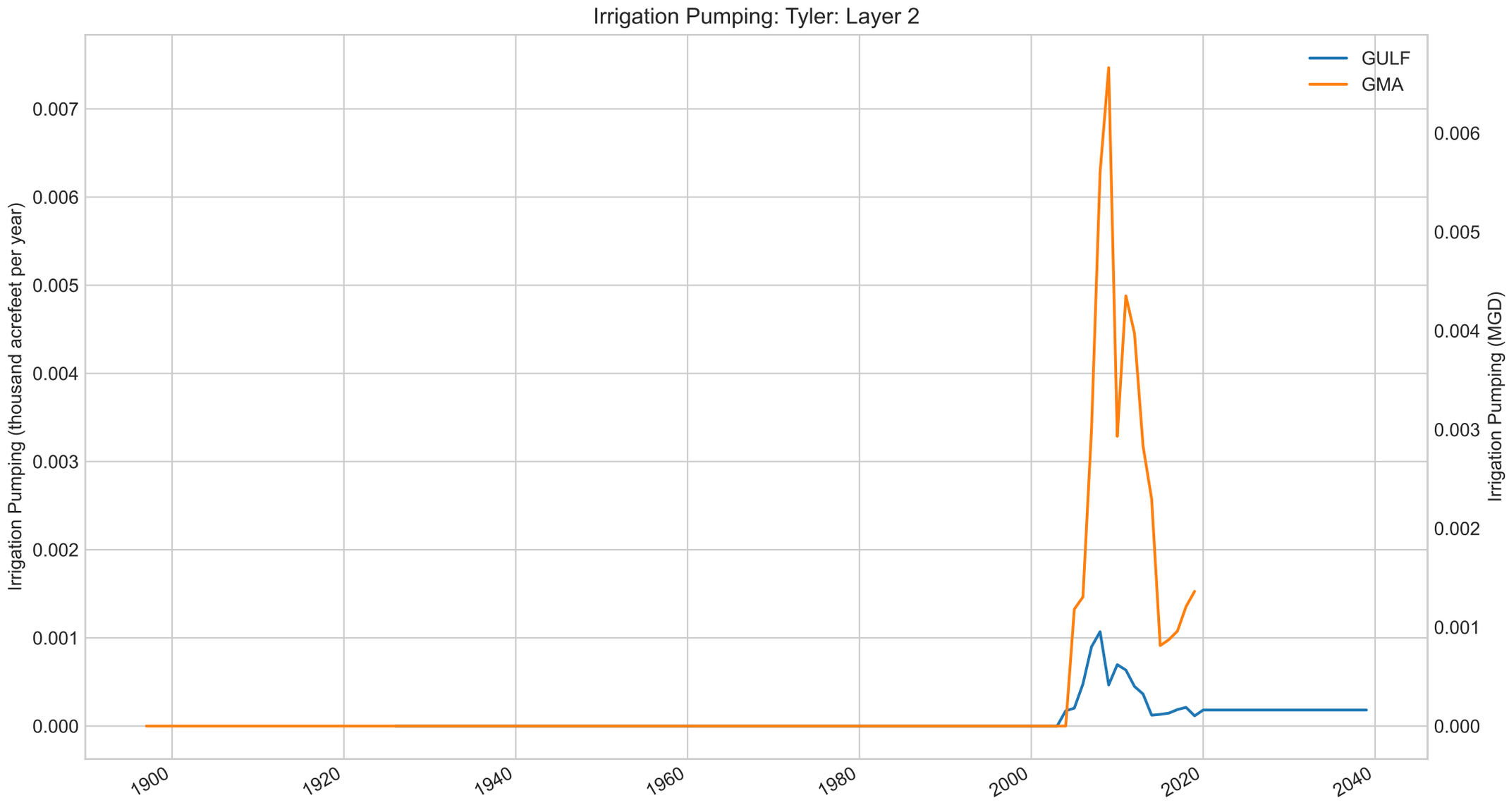

Irrigation Pumping: Polk: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1900
1920
1940
1960
1980
2000
2020
2040

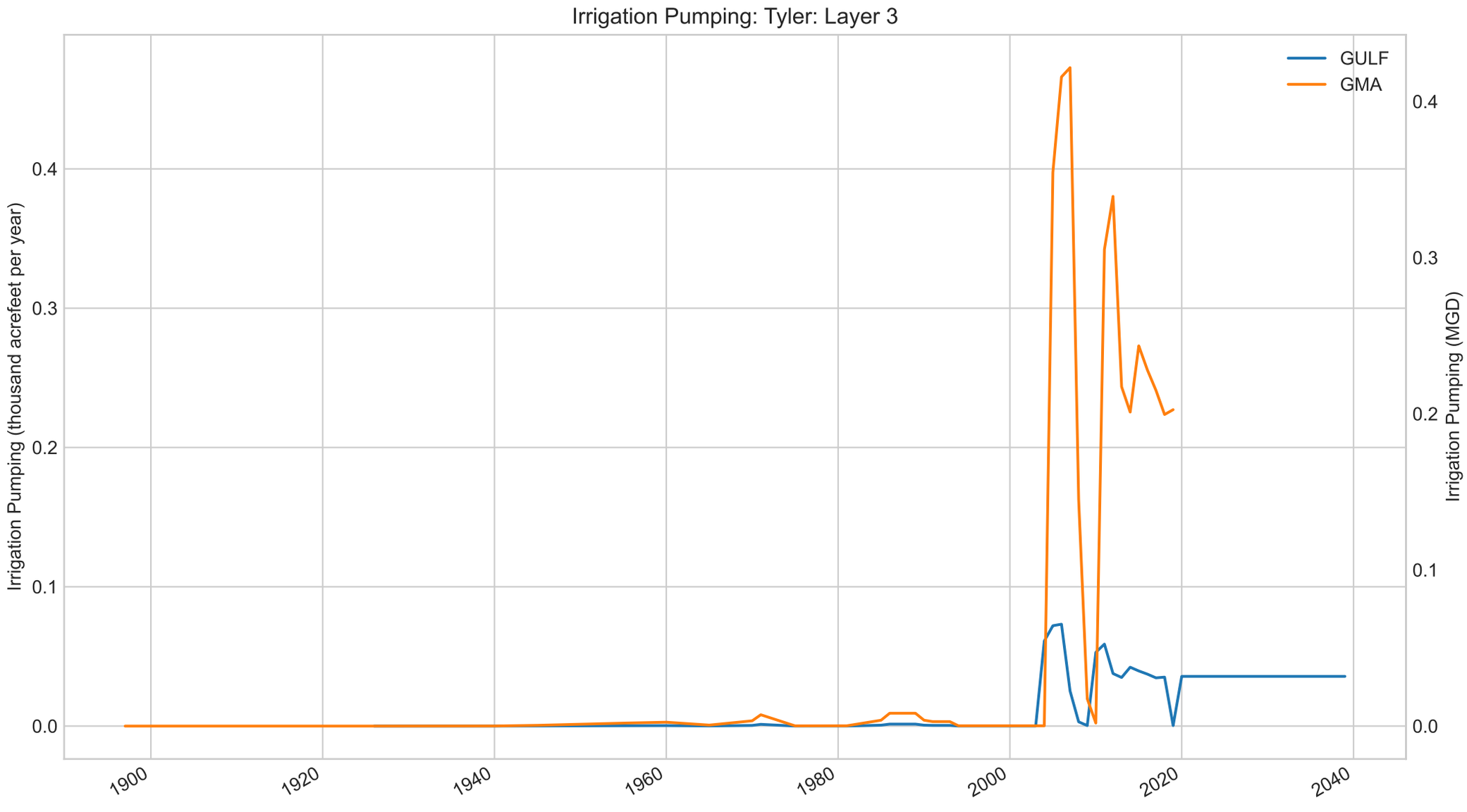

Irrigation Pumping: Polk: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
0.150
0.125
0.100
0.075
0.050
0.025
0.000
1900
1920
1940
1960
1980
2000
2020
2040

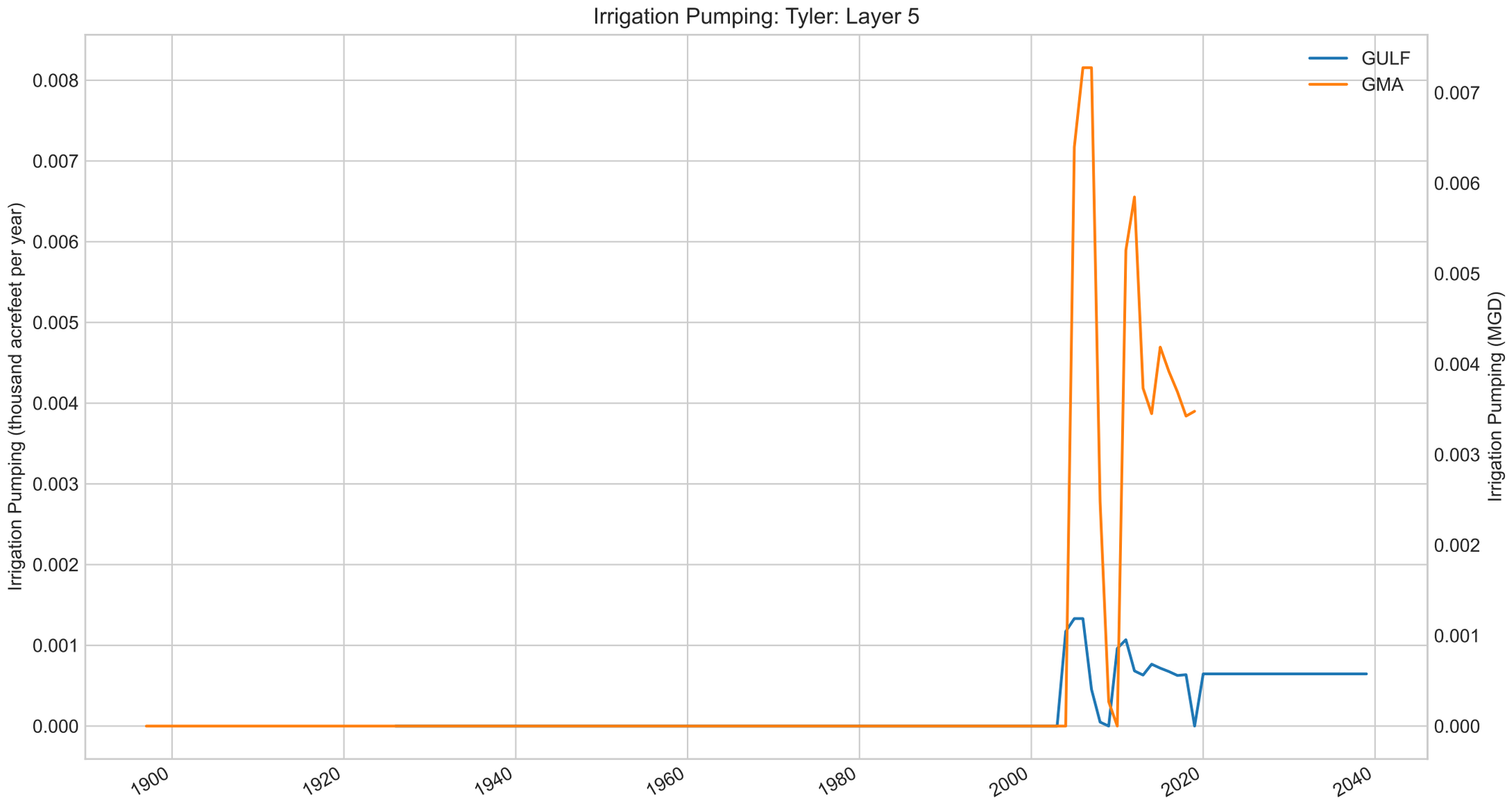

Irrigation Pumping: San_jacinto: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.01
0.02
0.03
0.04
0.05
0.06
0.07
1900
1920
1940
1960
1980
2000
2020
2040

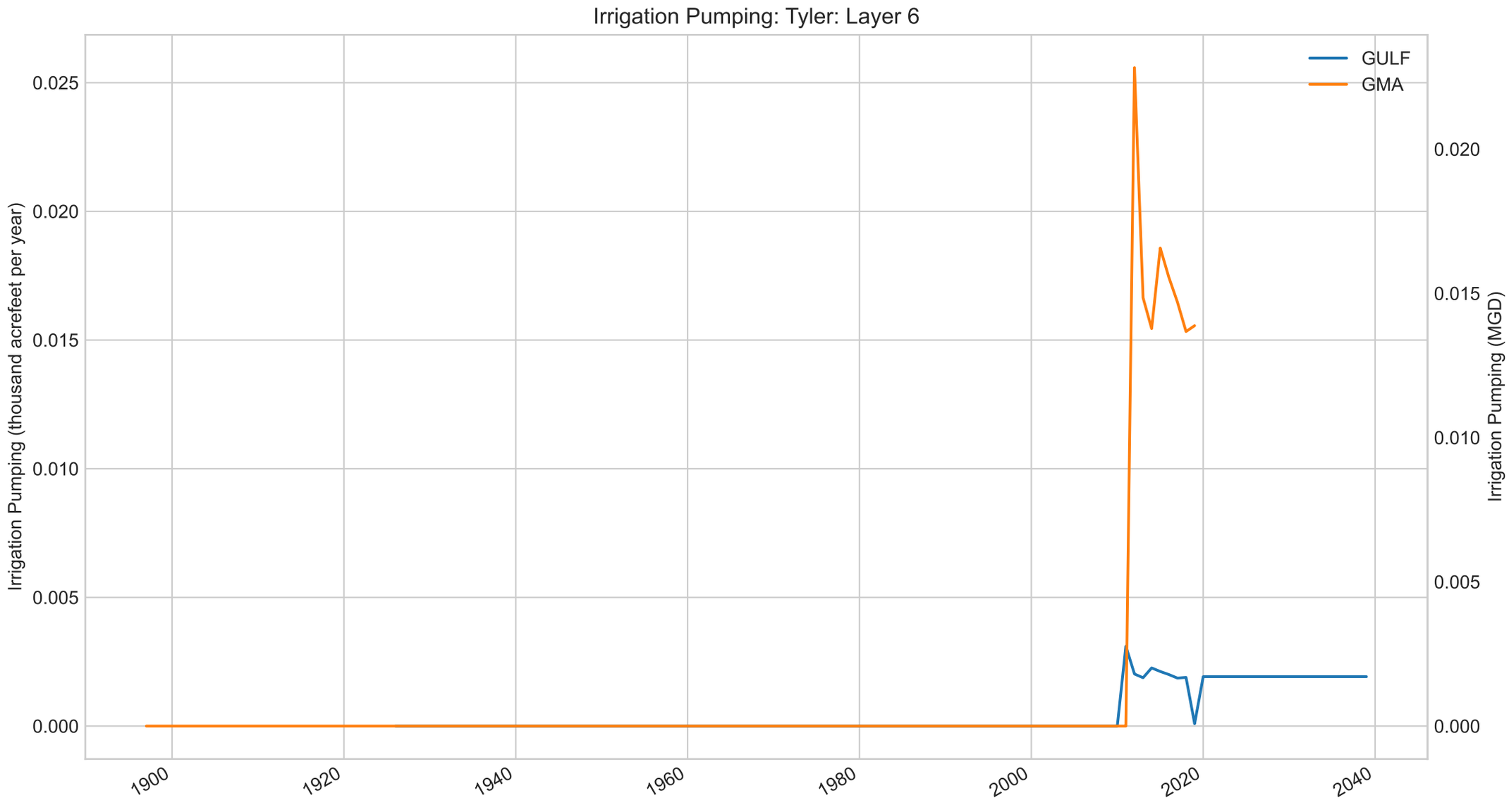

Irrigation Pumping: San_jacinto: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.05
0.04
0.03
0.02
0.01
0.00
1900
1920
1940
1960
1980
2000
2020
2040

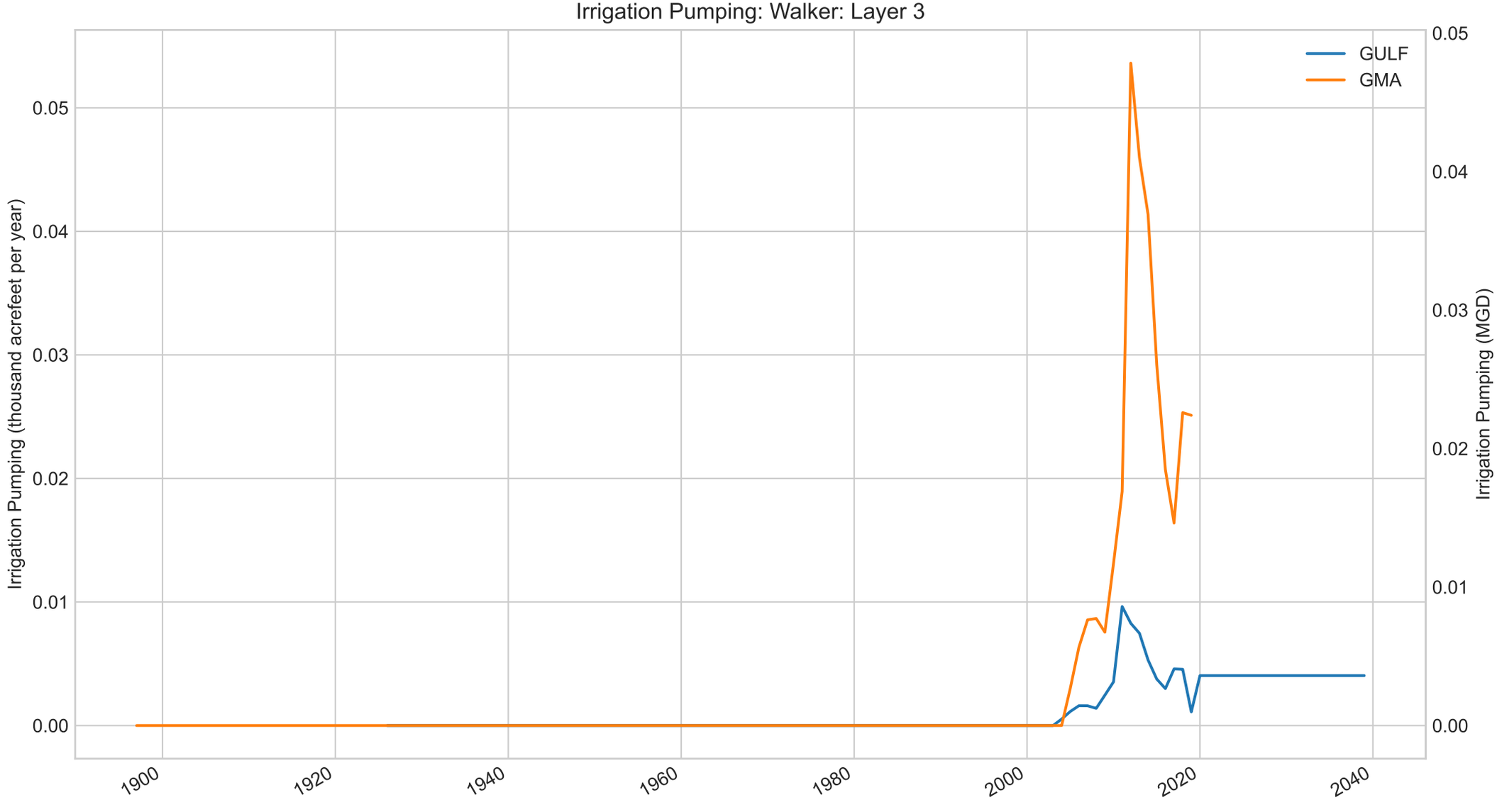

Irrigation Pumping: San_jacinto: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0175
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
1900
1920
1940
1960
1980
2000
2020
2040

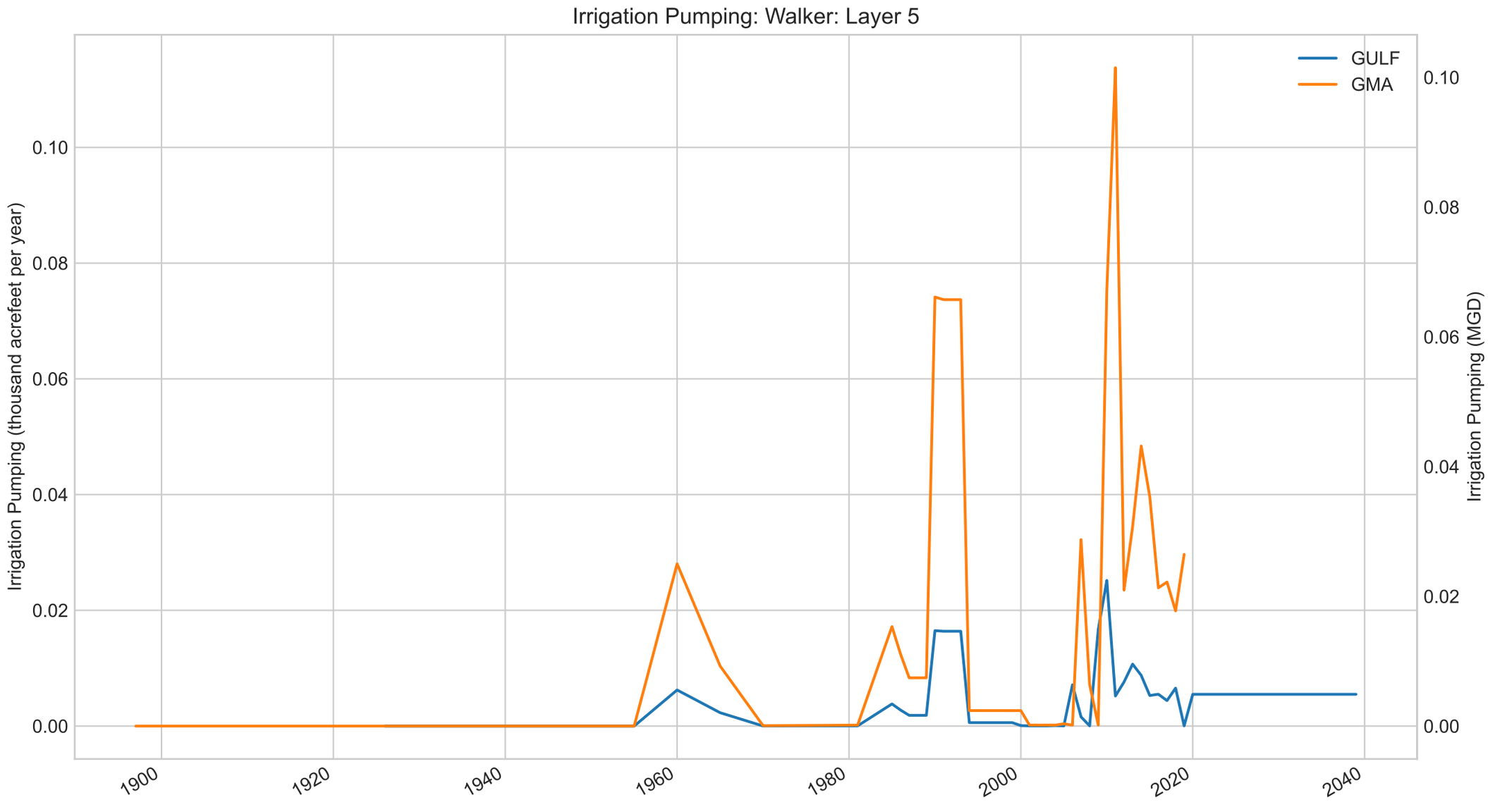

Irrigation Pumping: Tyler: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.000
0.001
0.002
0.003
0.004
0.005
0.006
0.007
1900
1920
1940
1960
1980
2000
2020
2040

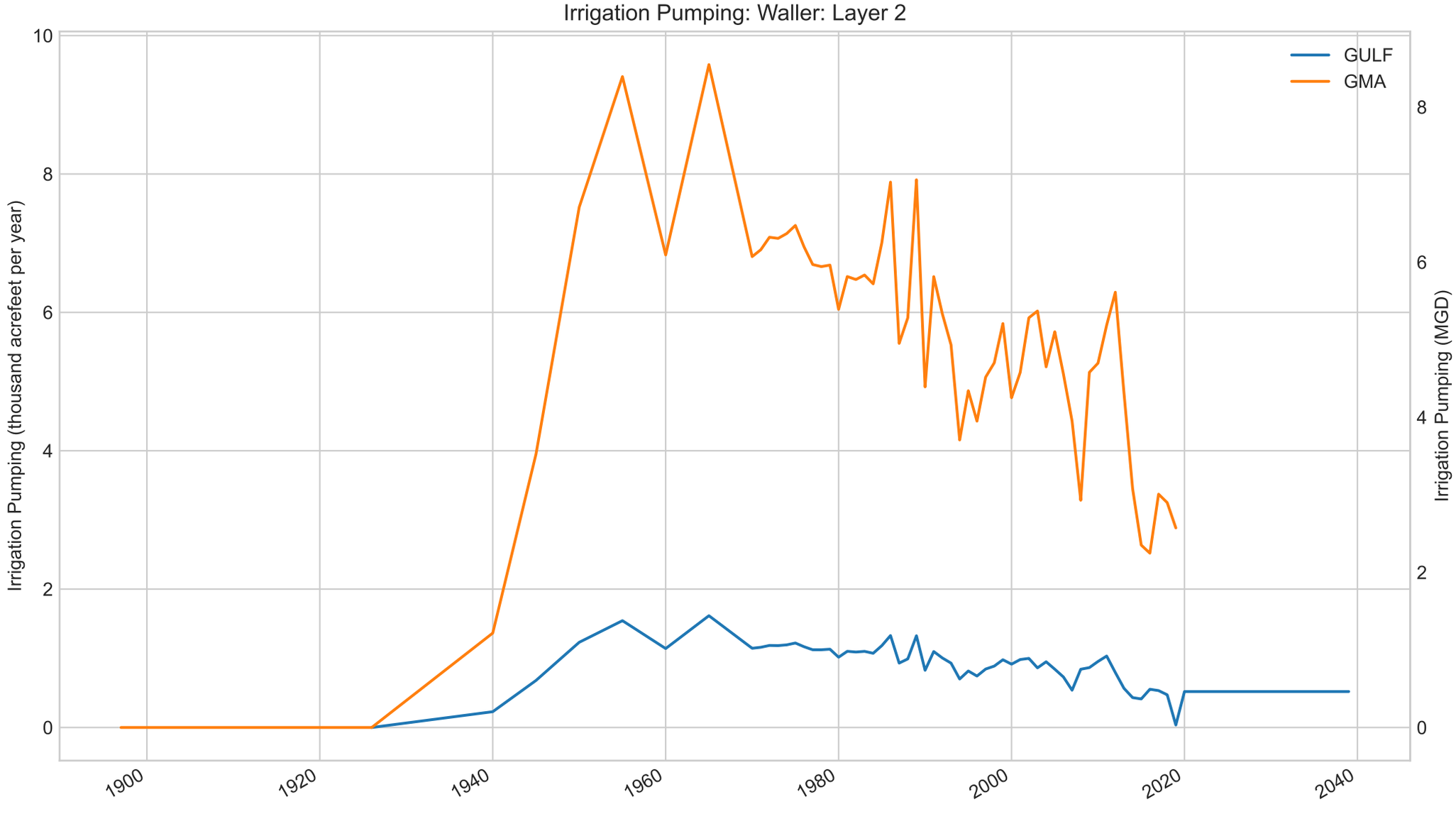

Irrigation Pumping: Tyler: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
1900
1920
1940
1960
1980
2000
2020
2040

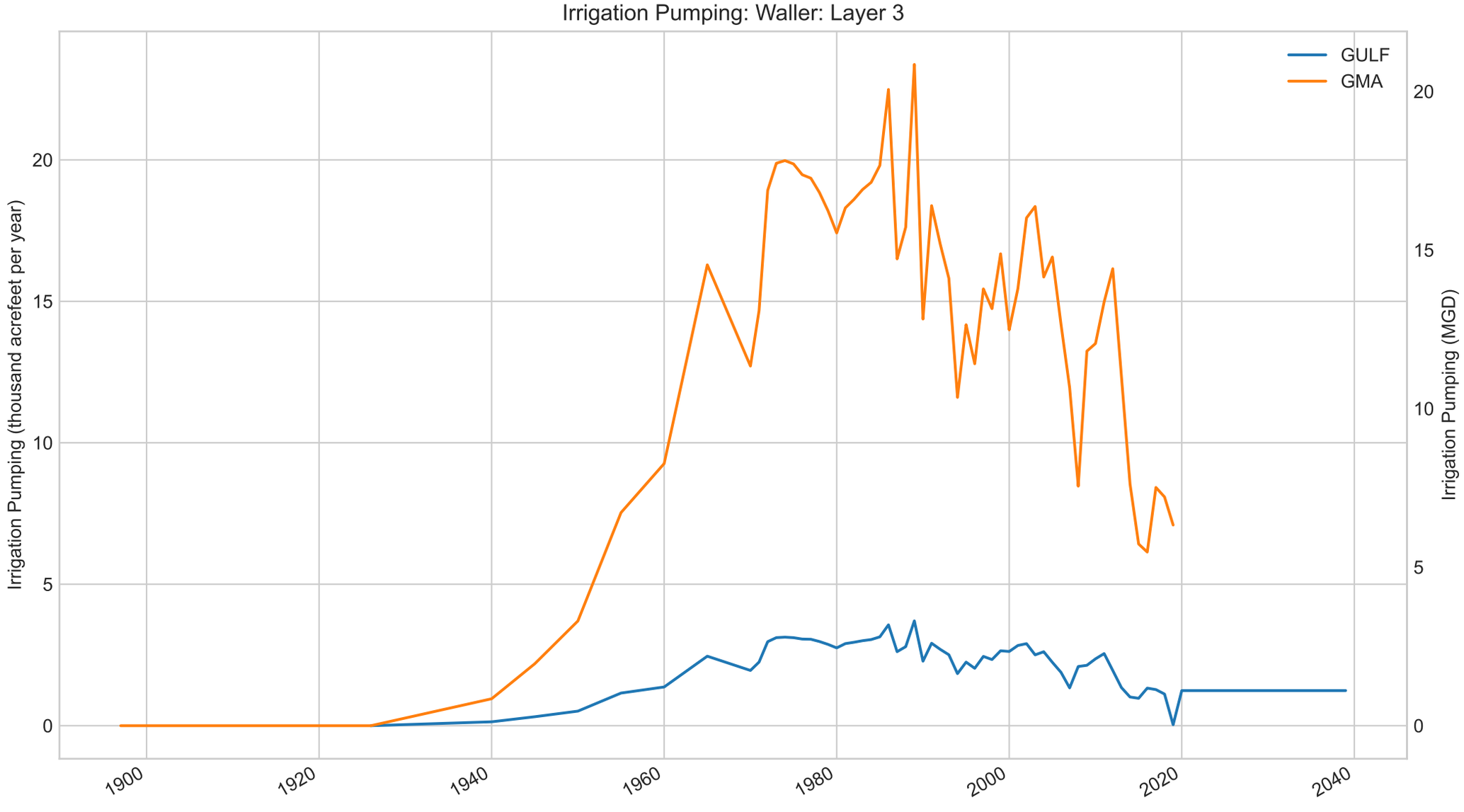

Irrigation Pumping: Tyler: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.000
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
1900
1920
1940
1960
1980
2000
2020
2040

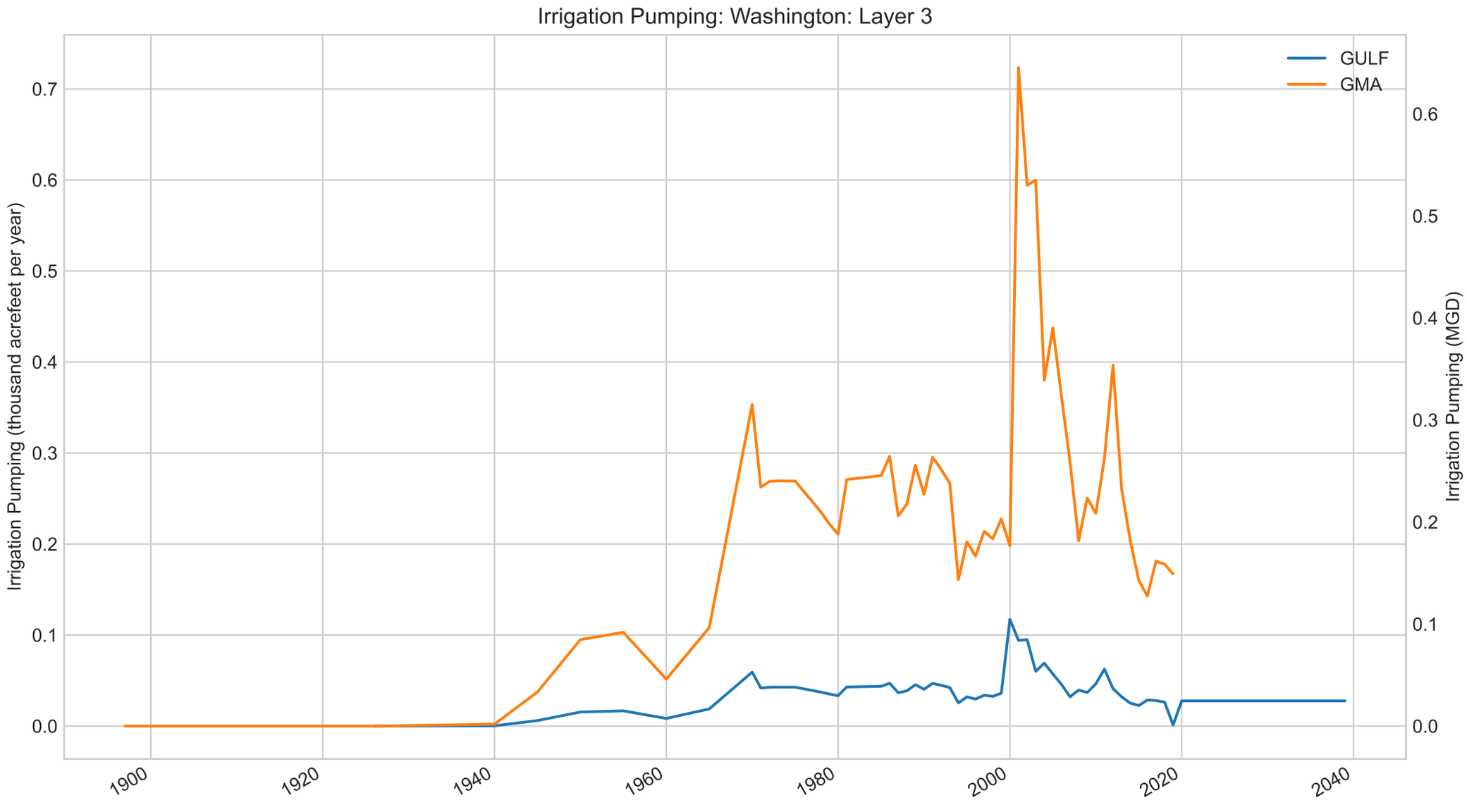

Irrigation Pumping: Tyler: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.025
0.020
0.015
0.010
0.005
0.000
0.020
0.015
0.010
0.005
0.000
1900
1920
1940
1960
1980
2000
2020
2040

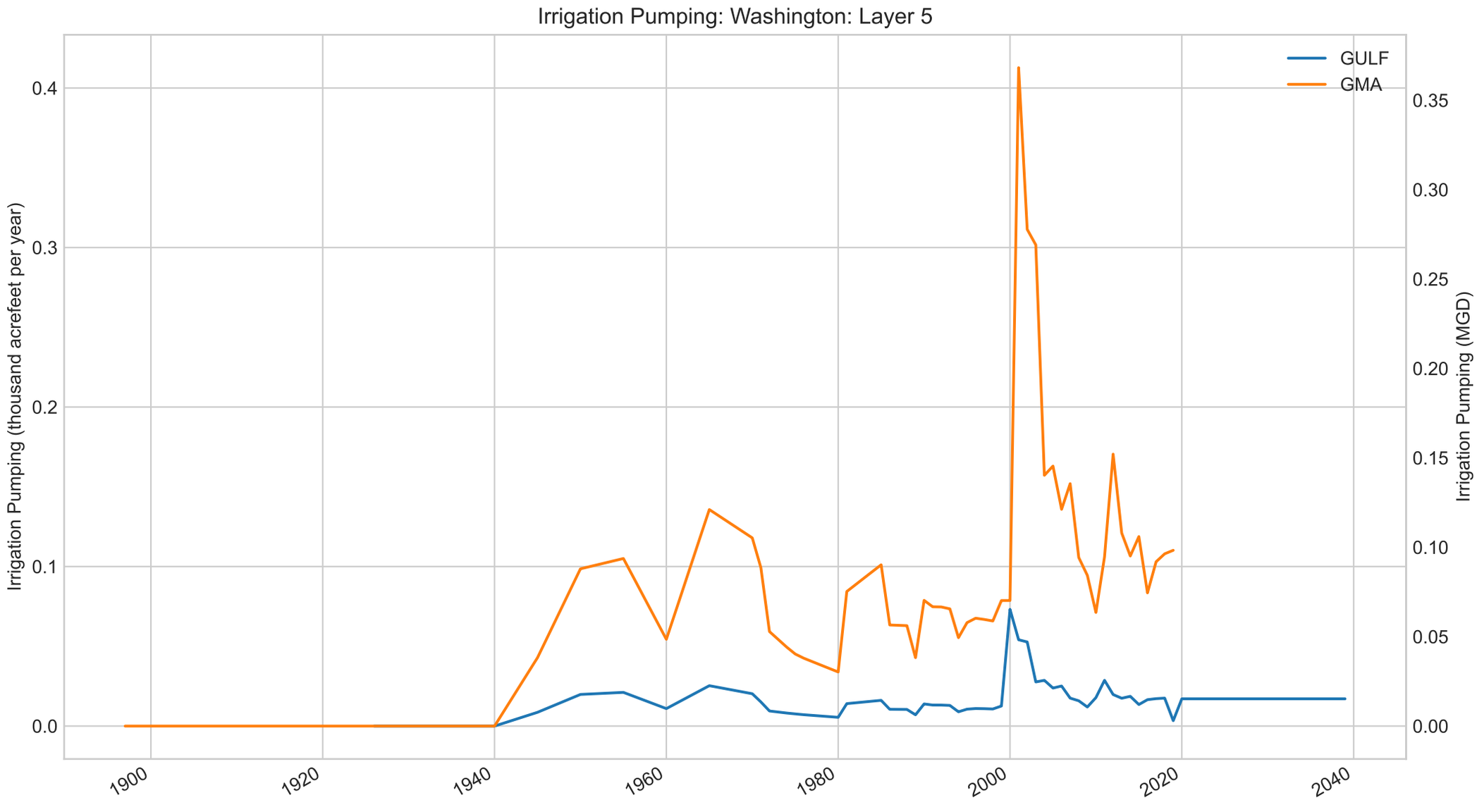

Irrigation Pumping: Walker: Layer 3
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
GULF
GMA
0.00
0.01
0.02
0.03
0.04
0.05
1900
1920
1940
1960
1980
2000
2020
2040

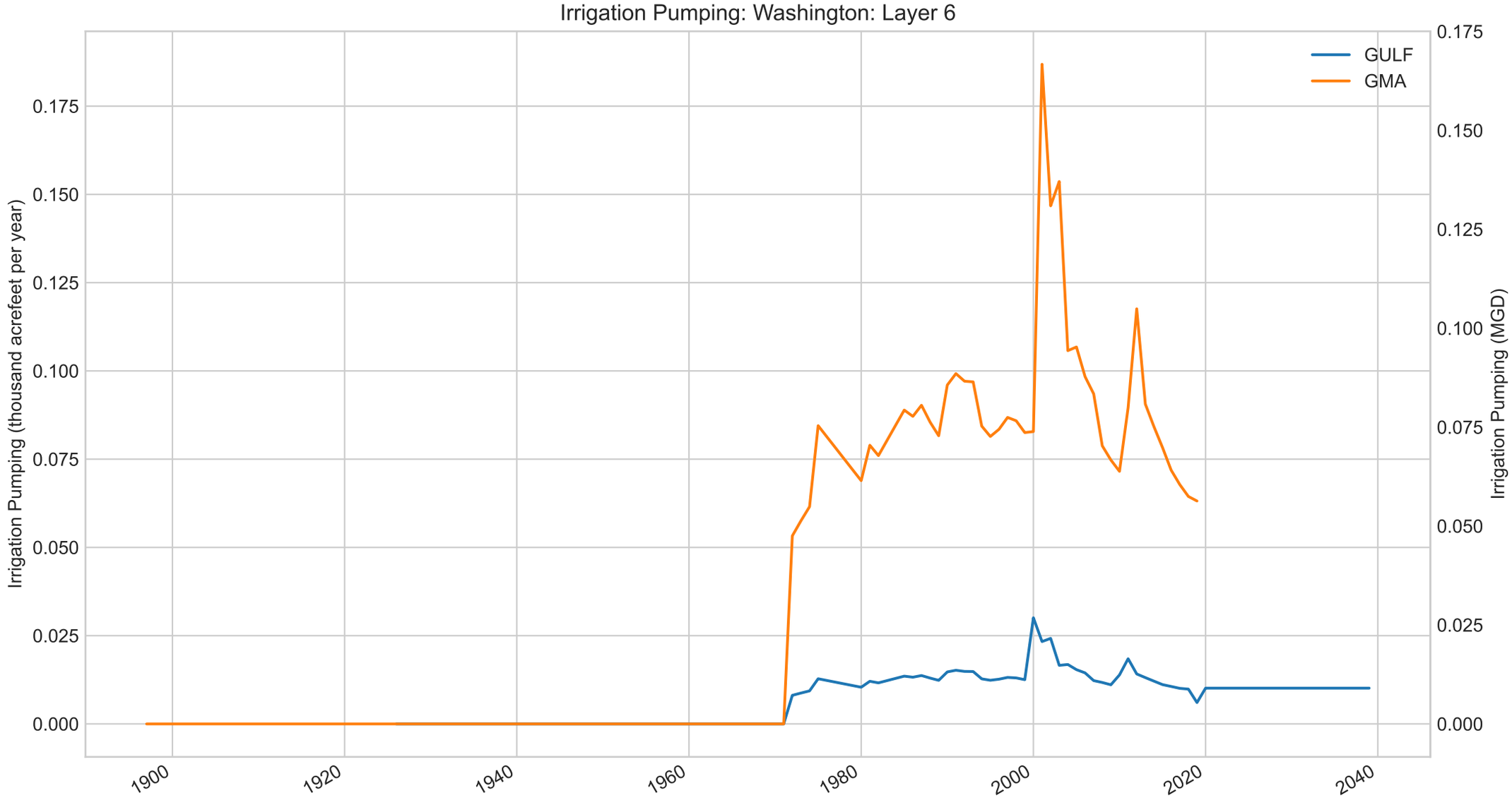

Irrigation Pumping: Walker: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.00
0.02
0.04
0.06
0.08
0.10
1900
1920
1940
1960
1980
2000
2020
2040

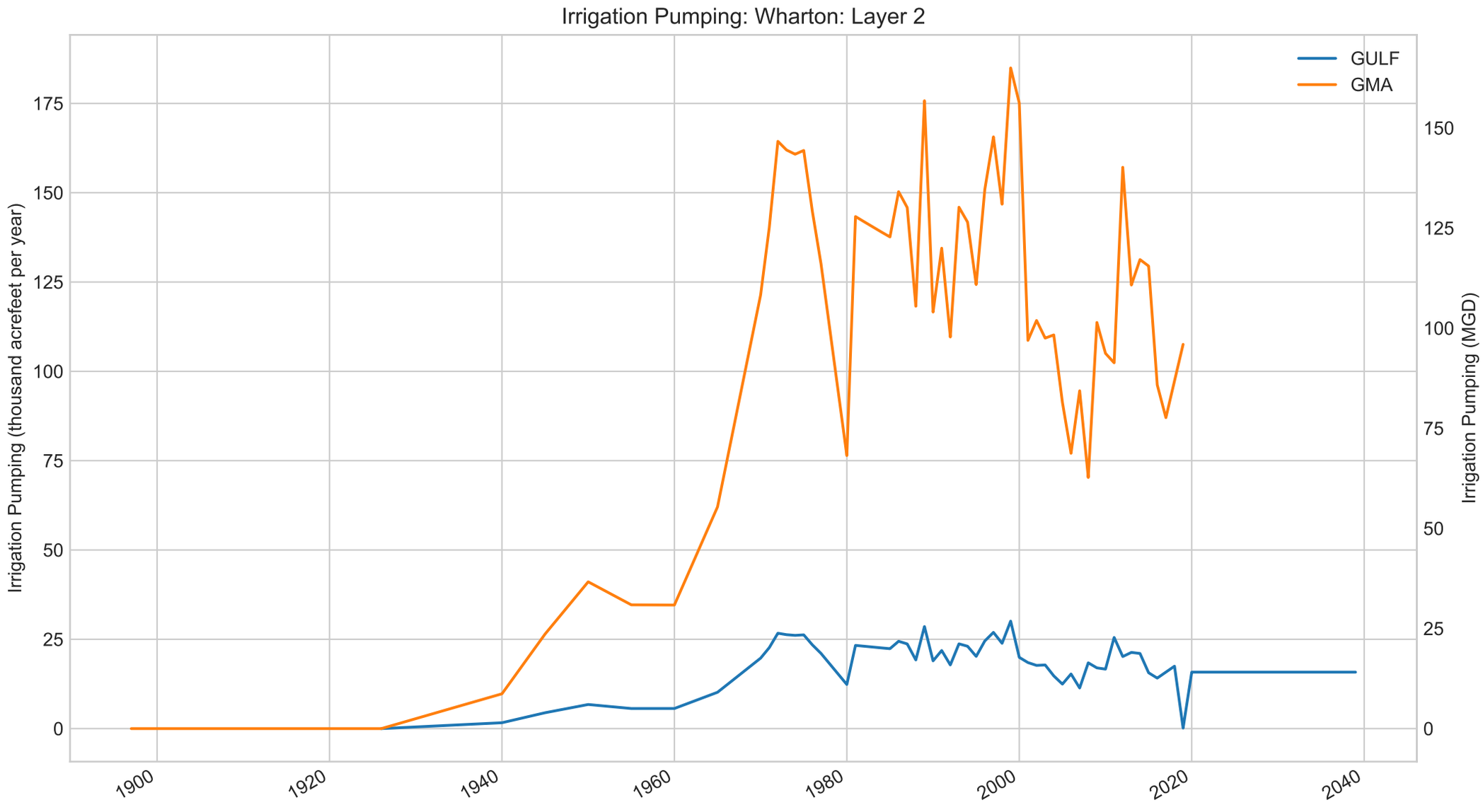

Irrigation Pumping: Waller: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
2
4
6
8
10
1900
1920
1940
1960
1980
2000
2020
2040

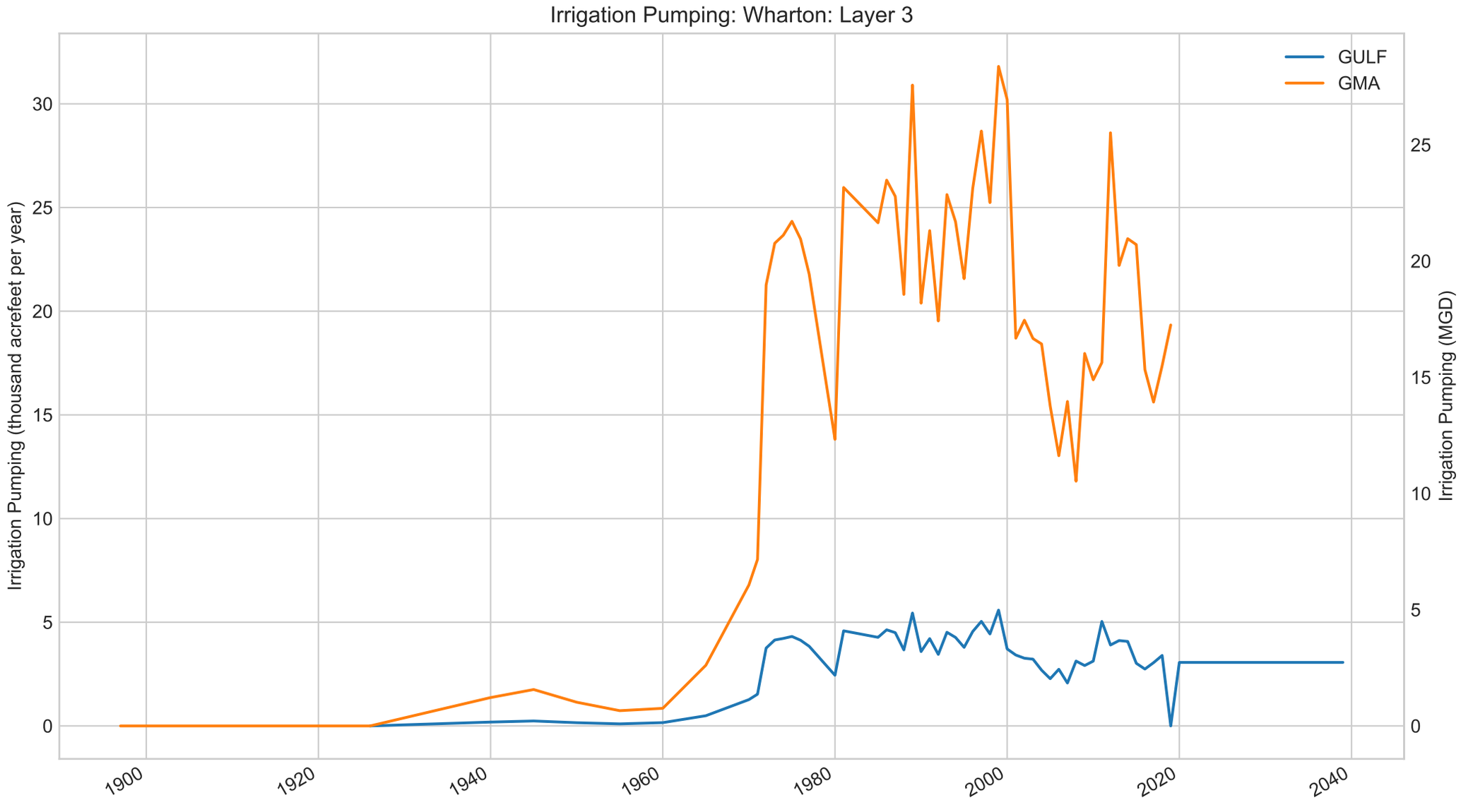

Irrigation Pumping: Waller: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
1900
1920
1940
1960
1980
2000
2020
2040


Irrigation Pumping: Washington: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1900
1920
1940
1960
1980
2000
2020
2040


Irrigation Pumping: Washington: Layer 5
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.0
0.1
0.2
0.3
0.4
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1900
1920
1940
1960
1980
2000
2020
2040

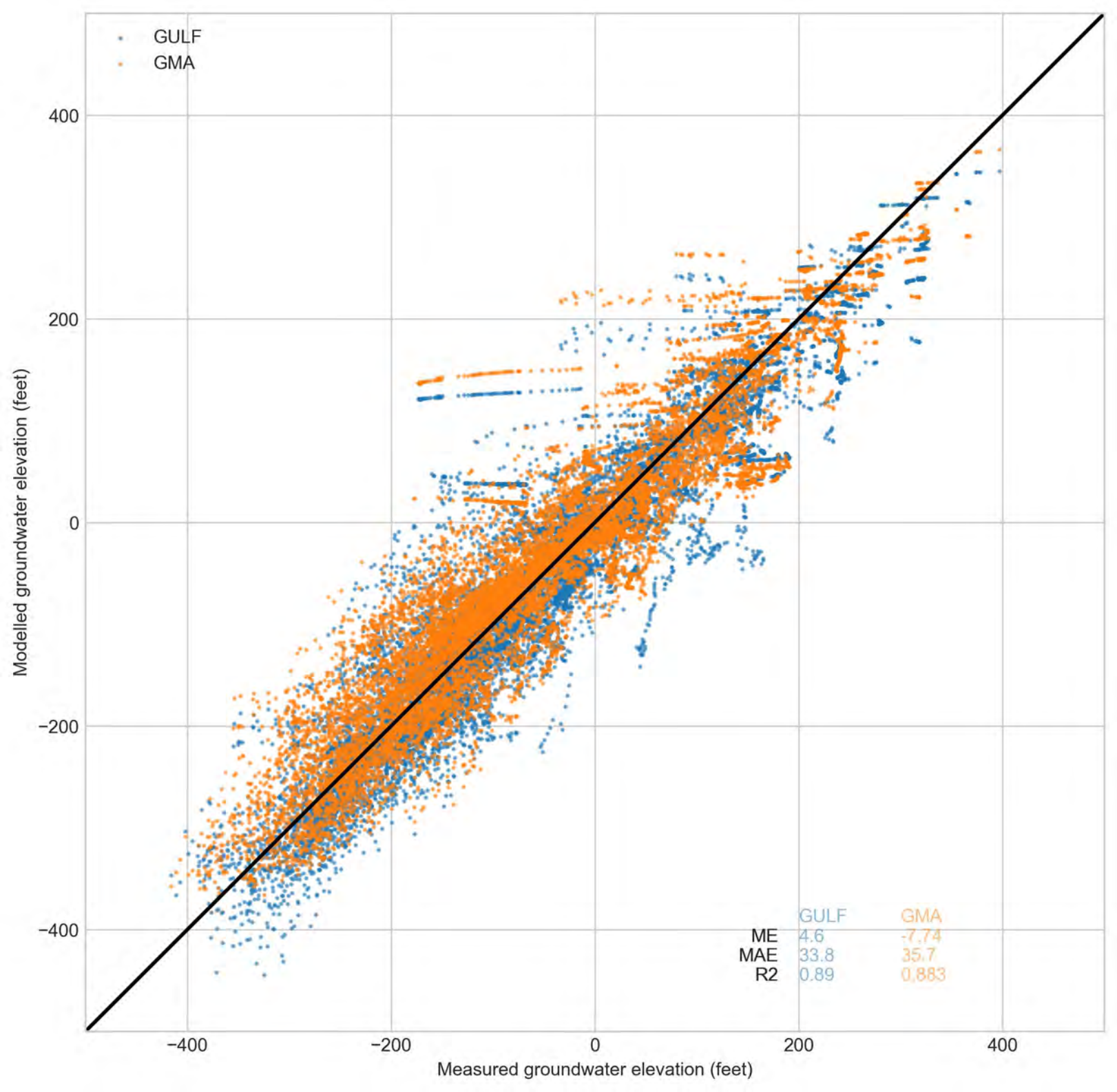

Irrigation Pumping: Washington: Layer 6
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0.000
0.025
0.050
0.075
0.100
0.125
0.150
0.175
1900
1920
1940
1960
1980
2000
2020
2040

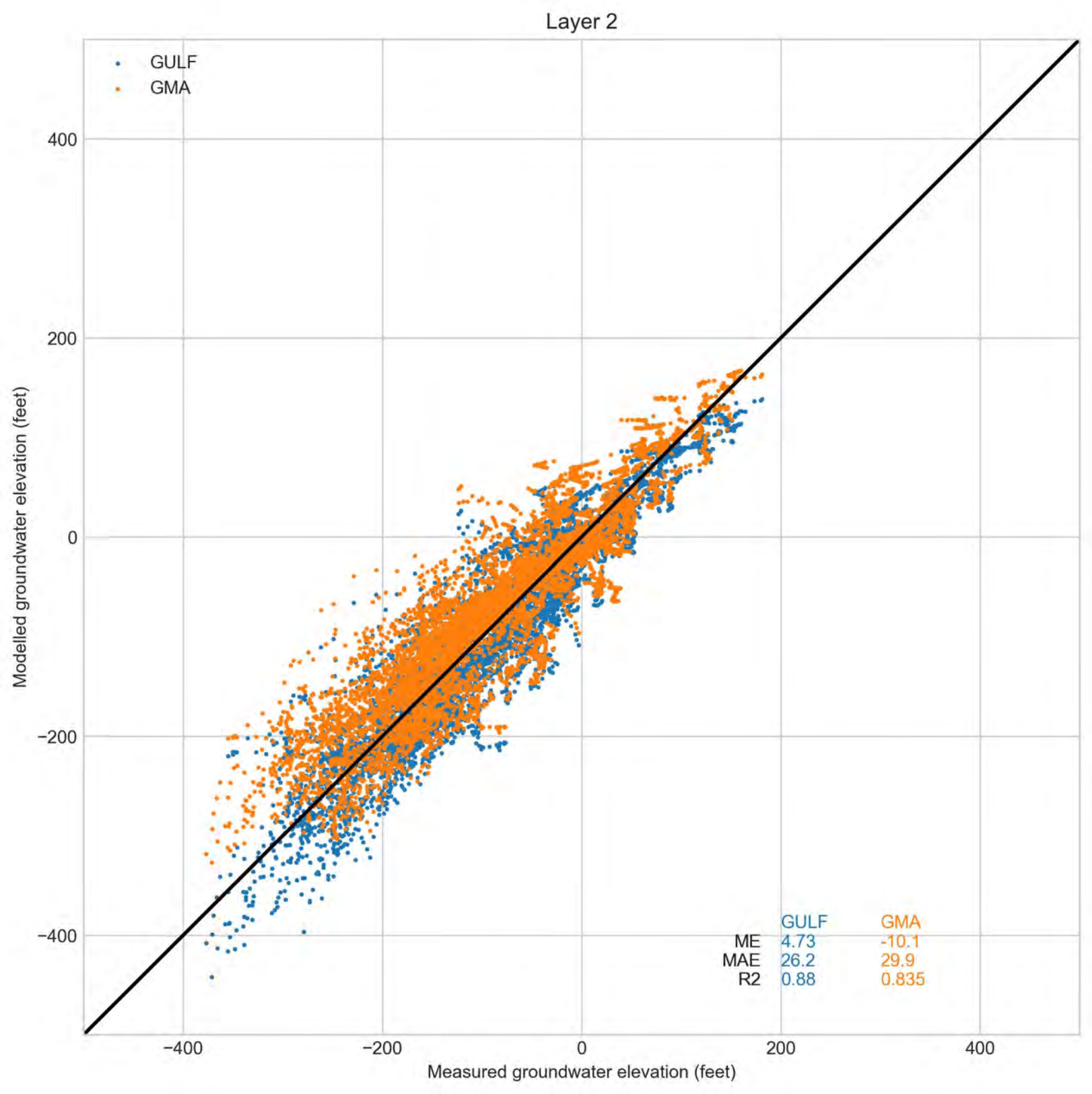

Irrigation Pumping: Wharton: Layer 2
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
25
50
75
100
125
150
175
0
25
50
75
100
125
150
1900
1920
1940
1960
1980
2000
2020
2040

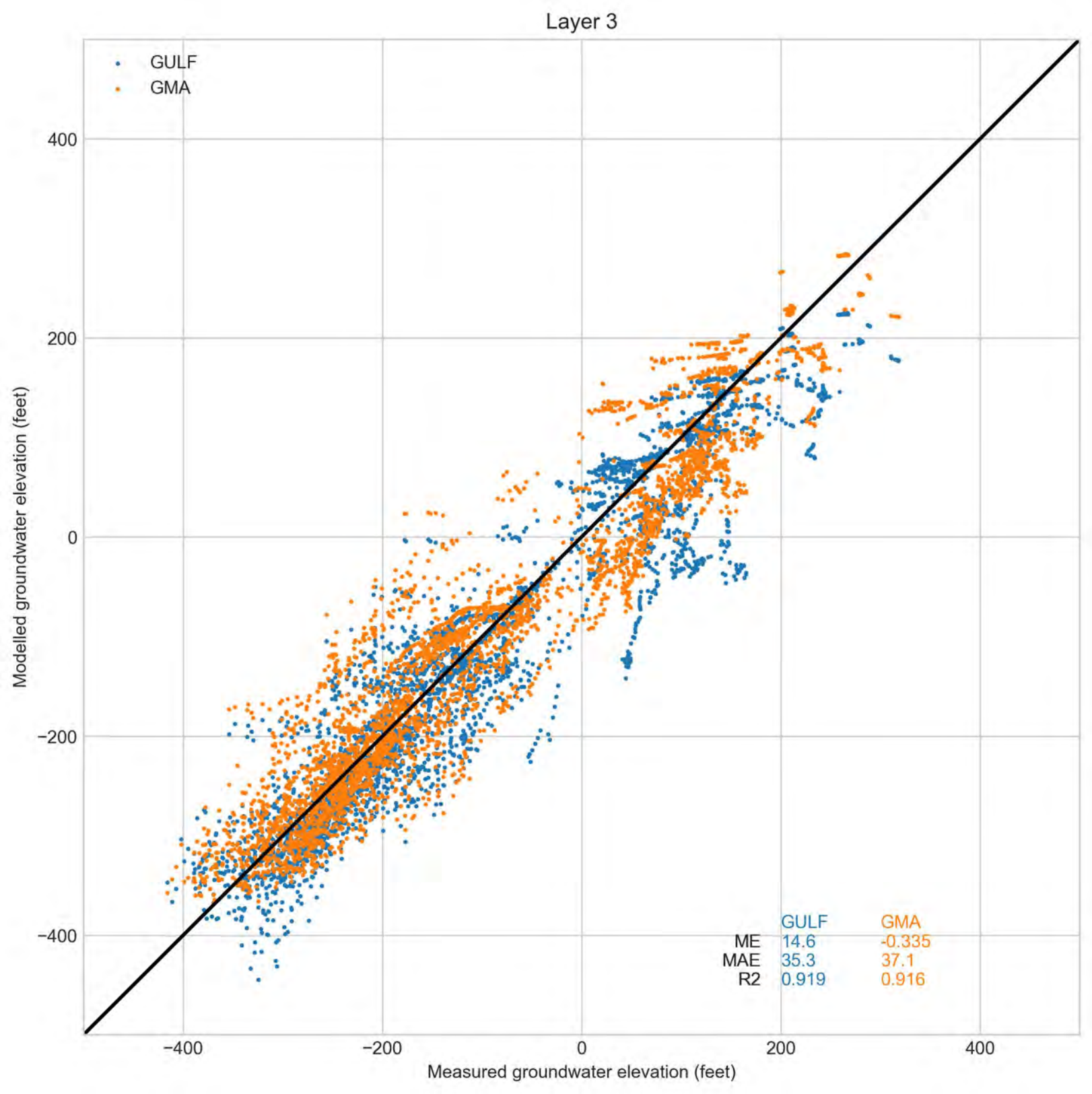

Irrigation Pumping: Wharton: Layer 3
GULF
GMA
Irrigation Pumping (thousand acrefeet per year)
Irrigation Pumping (MGD)
0
5
10
15
20
25
30
1900
1920
1940
1960
1980
2000
2020
2040

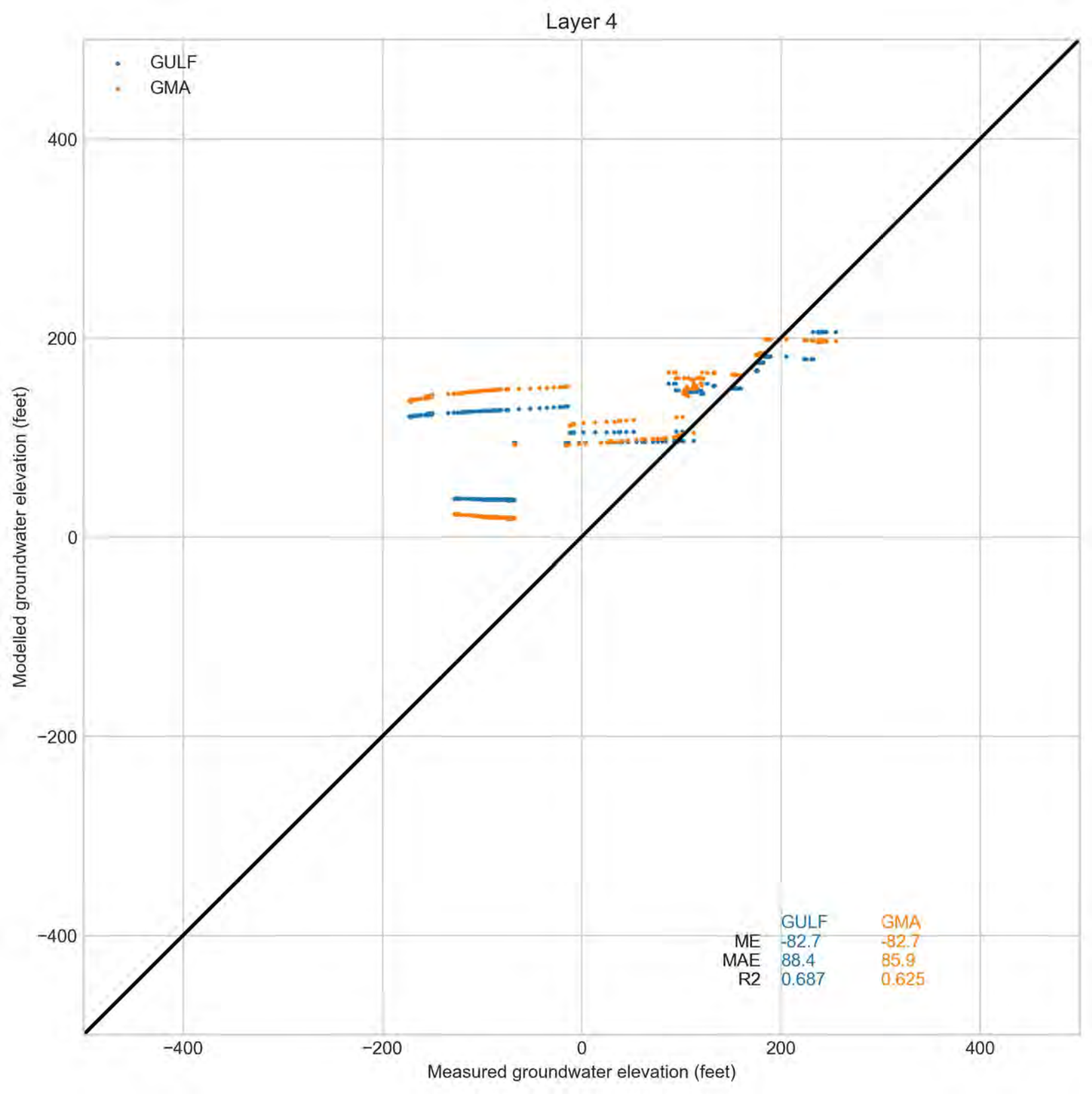
Appendix D

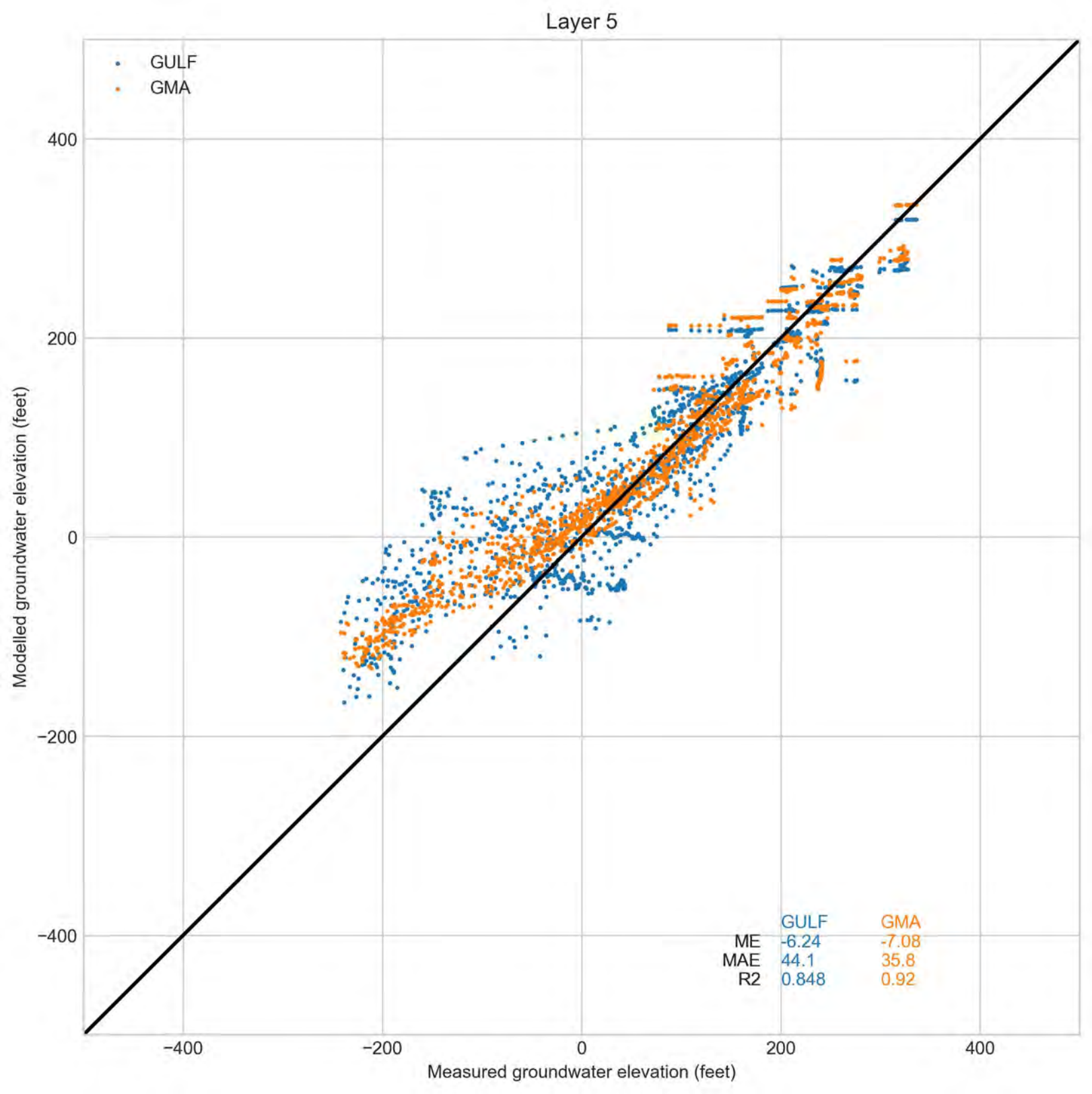
Scatterplots comparing groundwater level and subsidence observations used for GULF model calibration

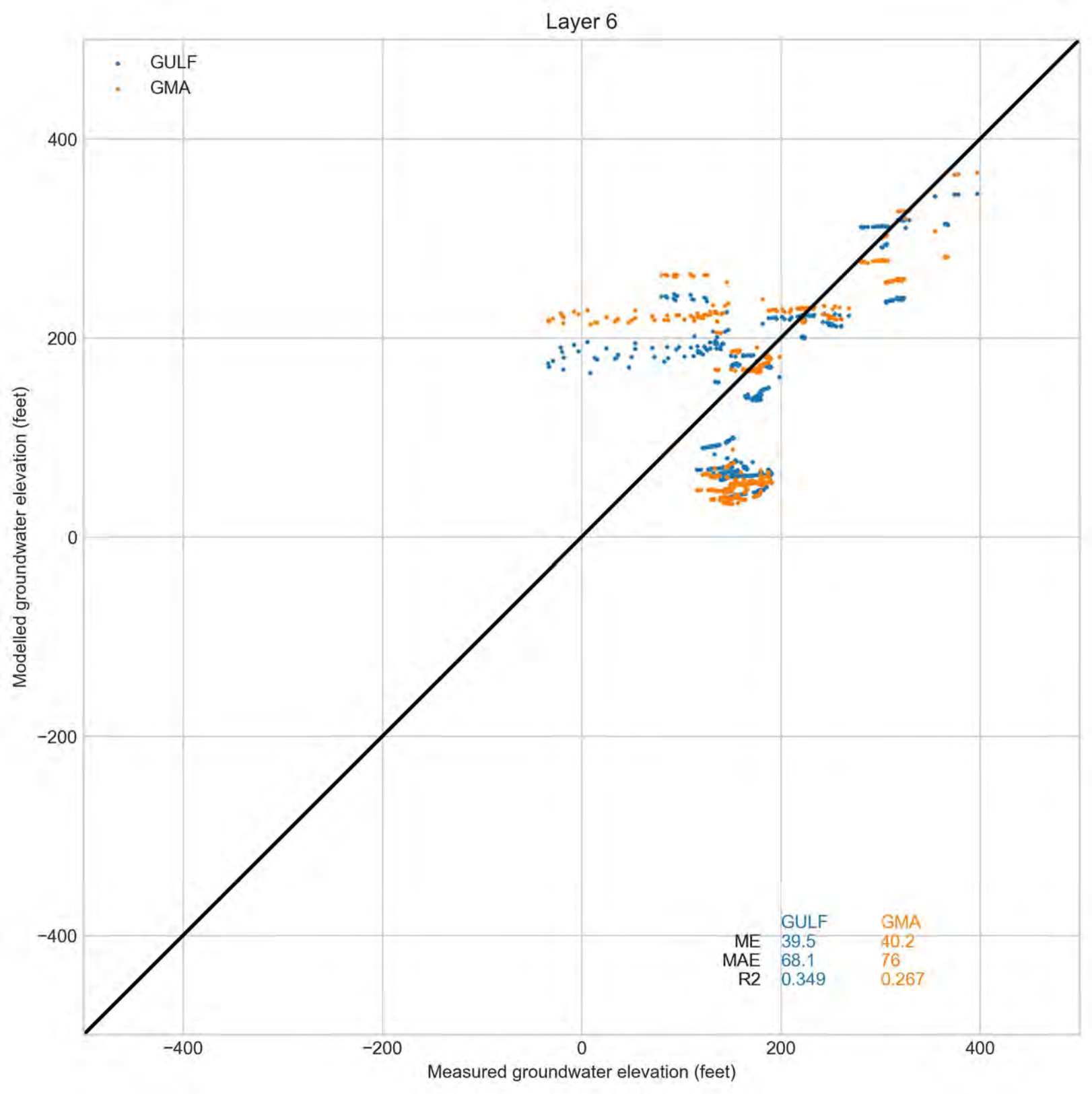

GULF
GMA
400
200
0
−200
−400
−400
−200
0
200
400
Modelled groundwater elevation (feet)
Measured groundwater elevation (feet)
GULF GMA
ME 4.6 -7.74
MAE 33.8 35.7
R2 0.89 0.883

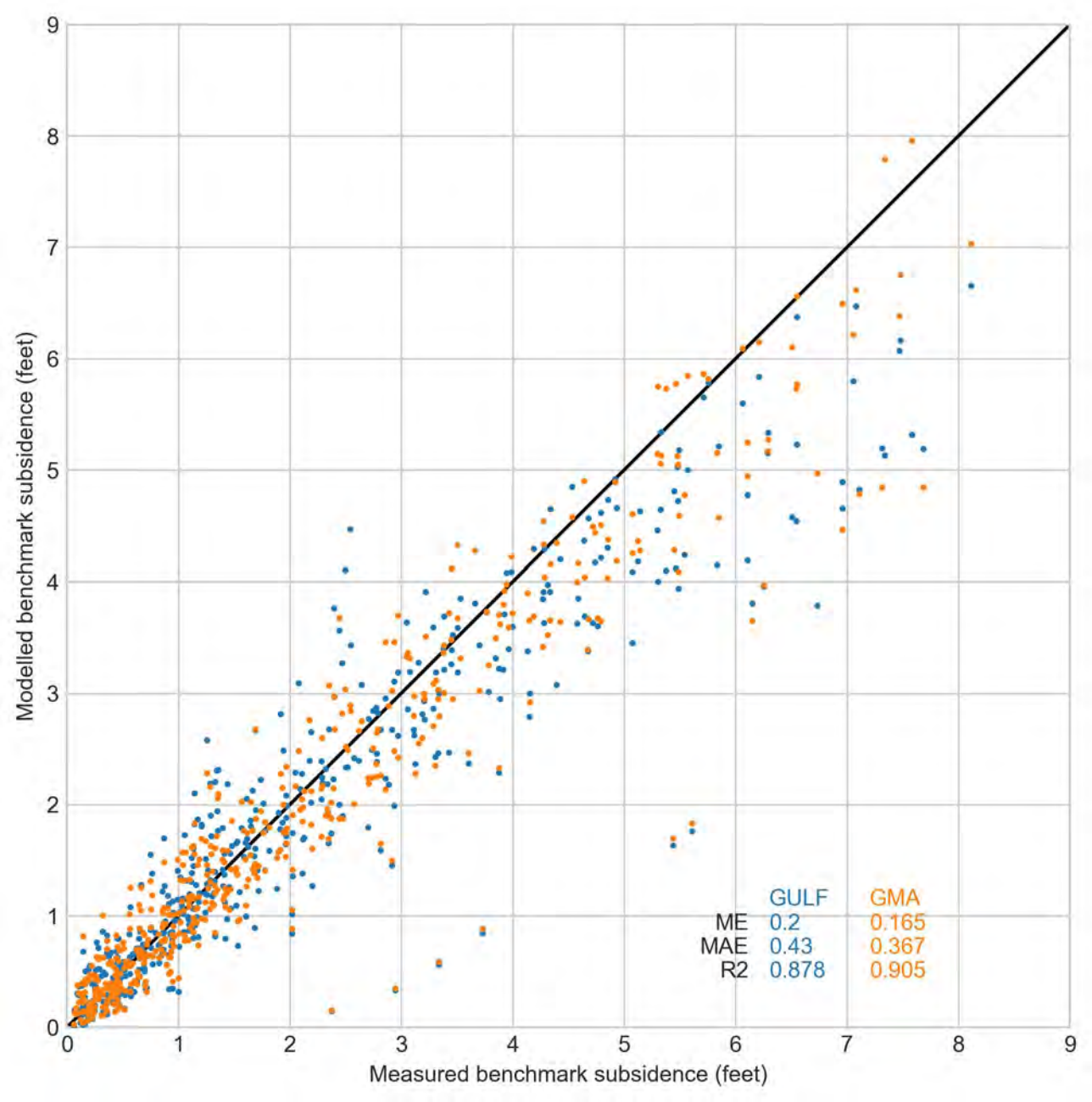

Layer 2
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)
GULF GMA
ME 4.73 -10.1
MAE 26.2 29.9
R2 0.88 0.835

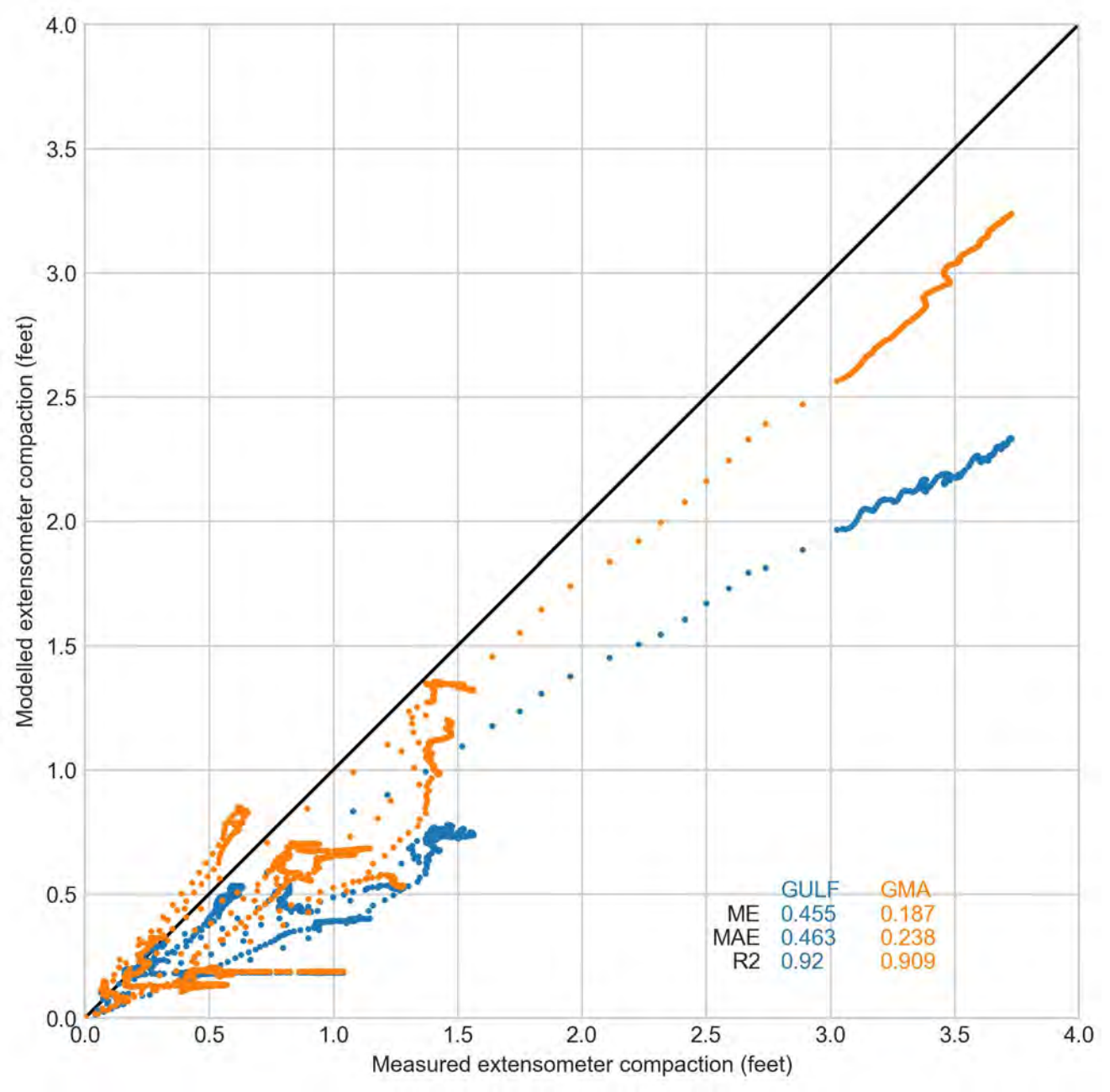

Layer 3
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)
GULF GMA
ME 14.6 -0.335
MAE 35.3 37.1
R2 0.919 0.916

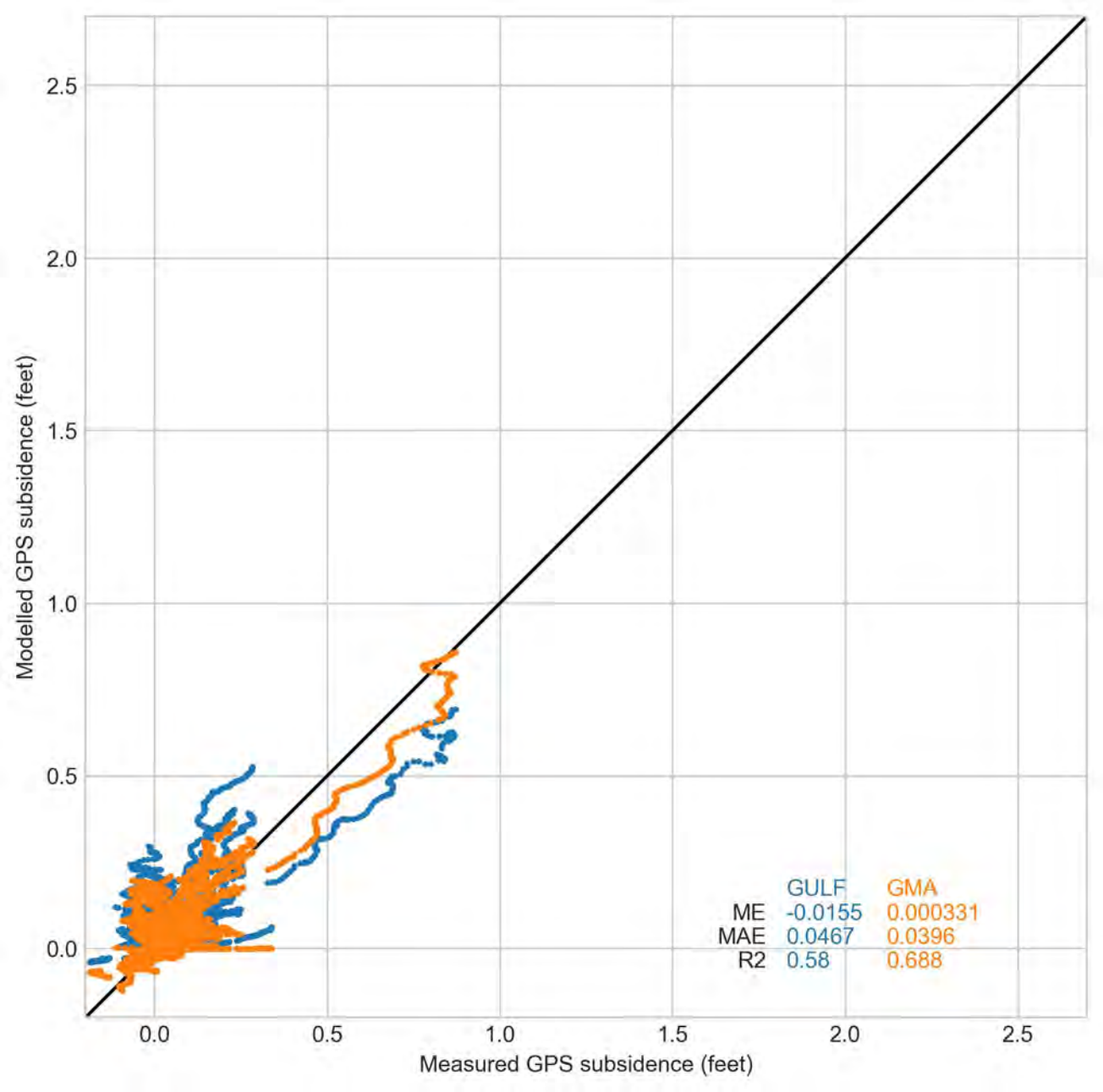

Layer 4
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)
GULF GMA
ME -82.7 -82.7
MAE 88.4 85.9
R2 0.687 0.625


Layer 5
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)
GULF GMA
ME -6.24 -7.08
MAE 44.1 35.8
R2 0.848 0.92


Layer 6
GULF
GMA
400
200
0
−200
−400
Modelled groundwater elevation (feet)
−400
−200
0
200
400
Measured groundwater elevation (feet)
GULF GMA
ME 39.5 40.2
MAE 68.1 76
R2 0.349 0.267

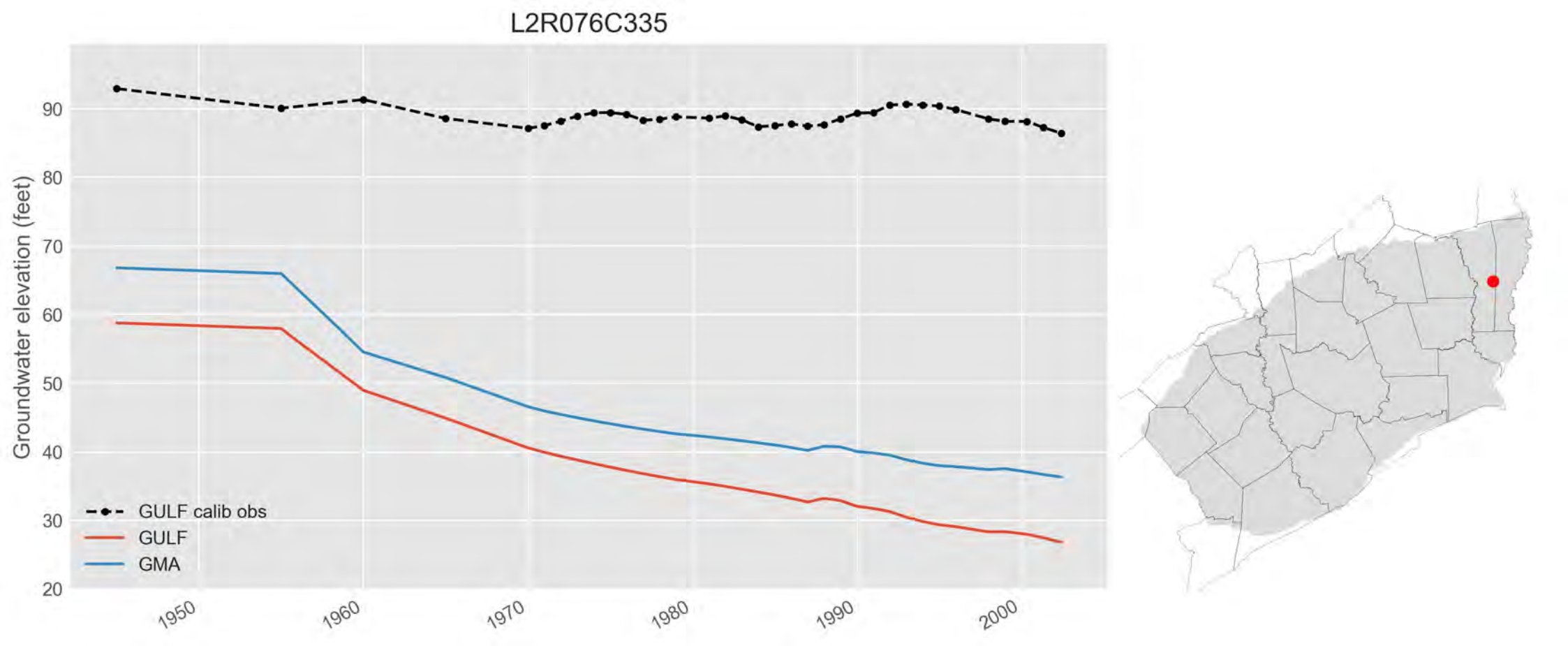

Modelled benchmark subsidence (feet)
Measured benchmark subsidence (feet)
0
1
2
3
4
5
6
7
8
9
GULF GMA
ME 0.2 0.165
MAE 0.43 0.367
R2 0.878 0.905

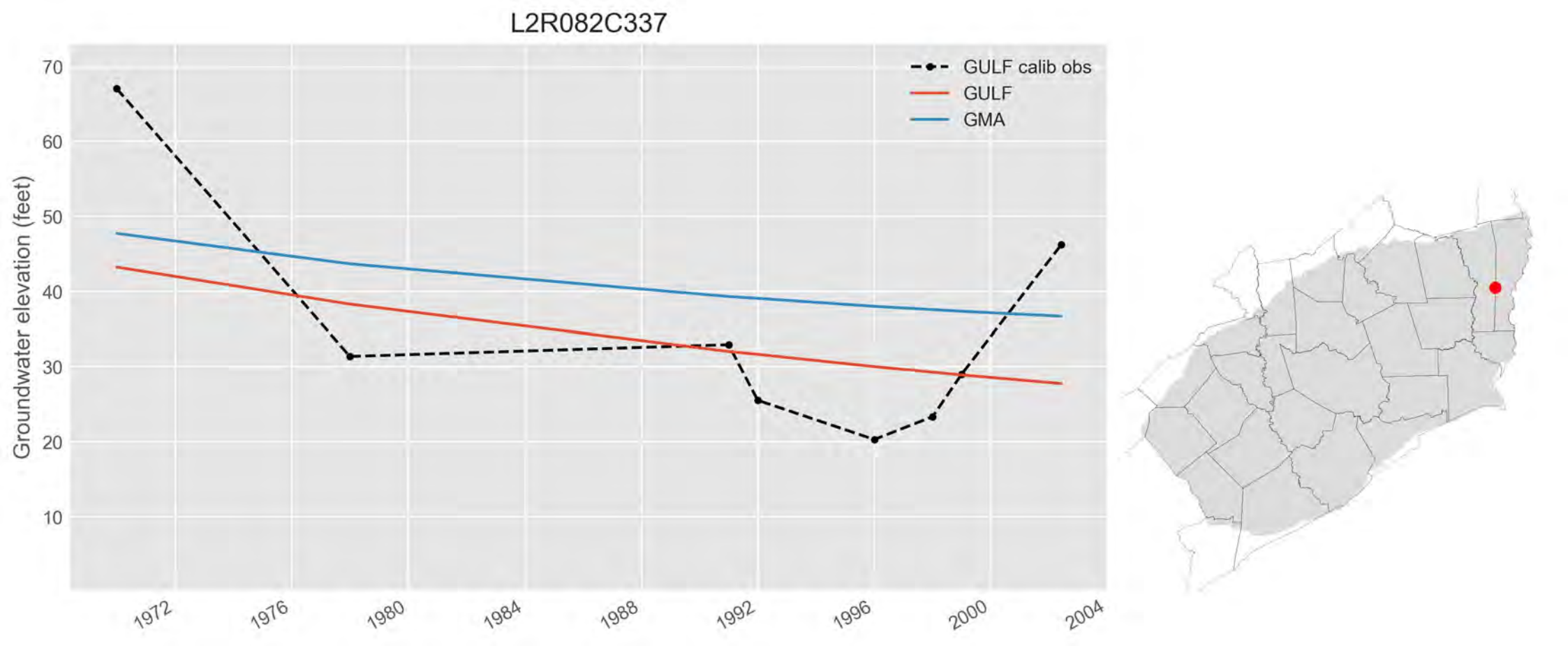

Modelled extensometer compaction (feet)
Measured extensometer compaction (feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
GULF GMA
ME 0.455 0.187
MAE 0.463 0.238
R2 0.92 0.909

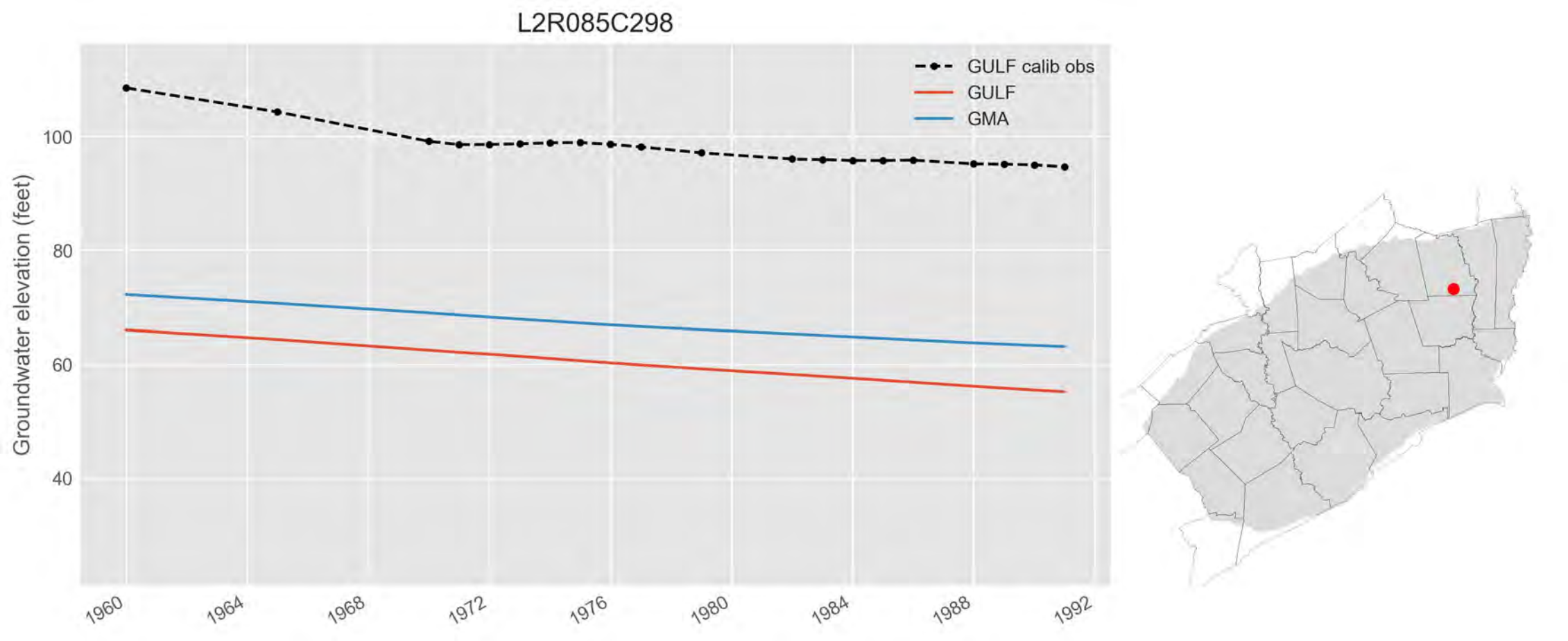

2.5
2.0
1.5
1.0
0.5
0.0
Modelled GPS subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
Measured GPS subsidence (feet)
GULF GMA
ME -0.0155 0.000331
MAE 0.0467 0.0396
R2 0.58 0.688

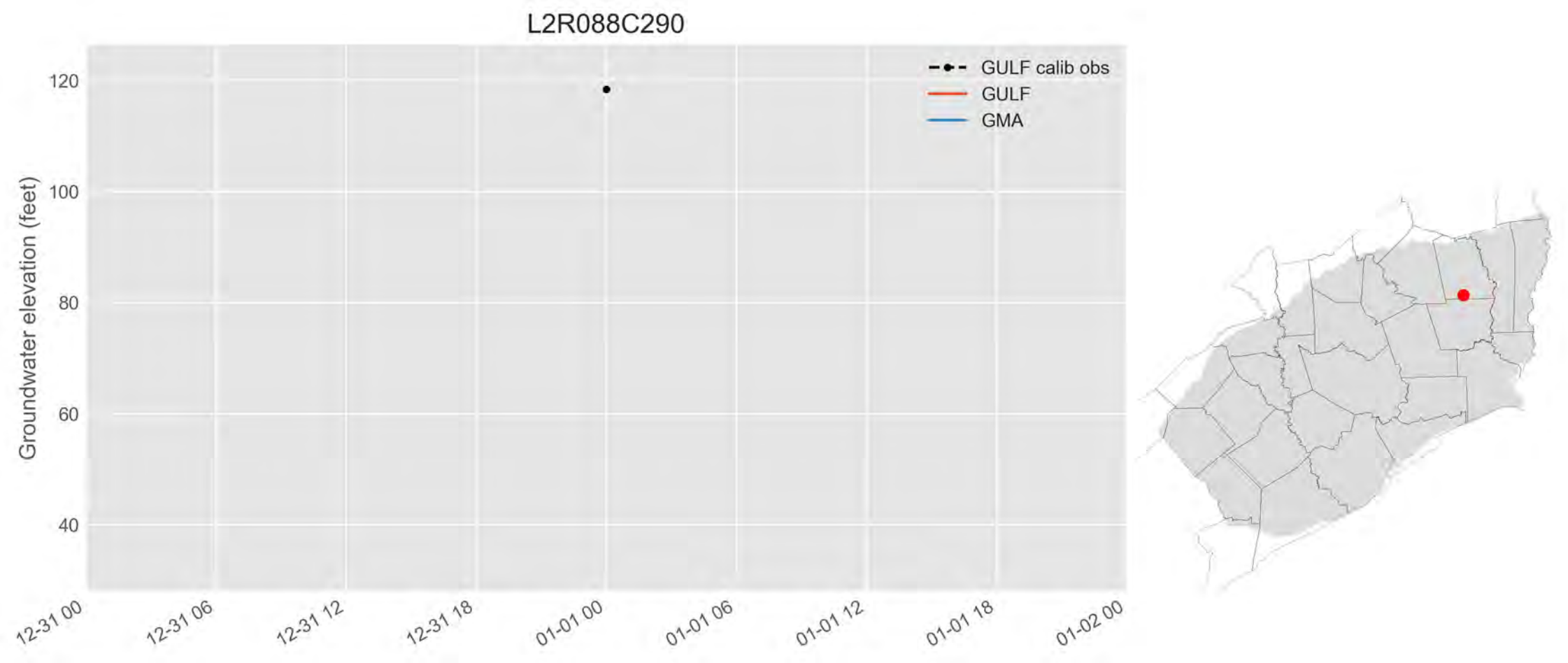
Appendix E

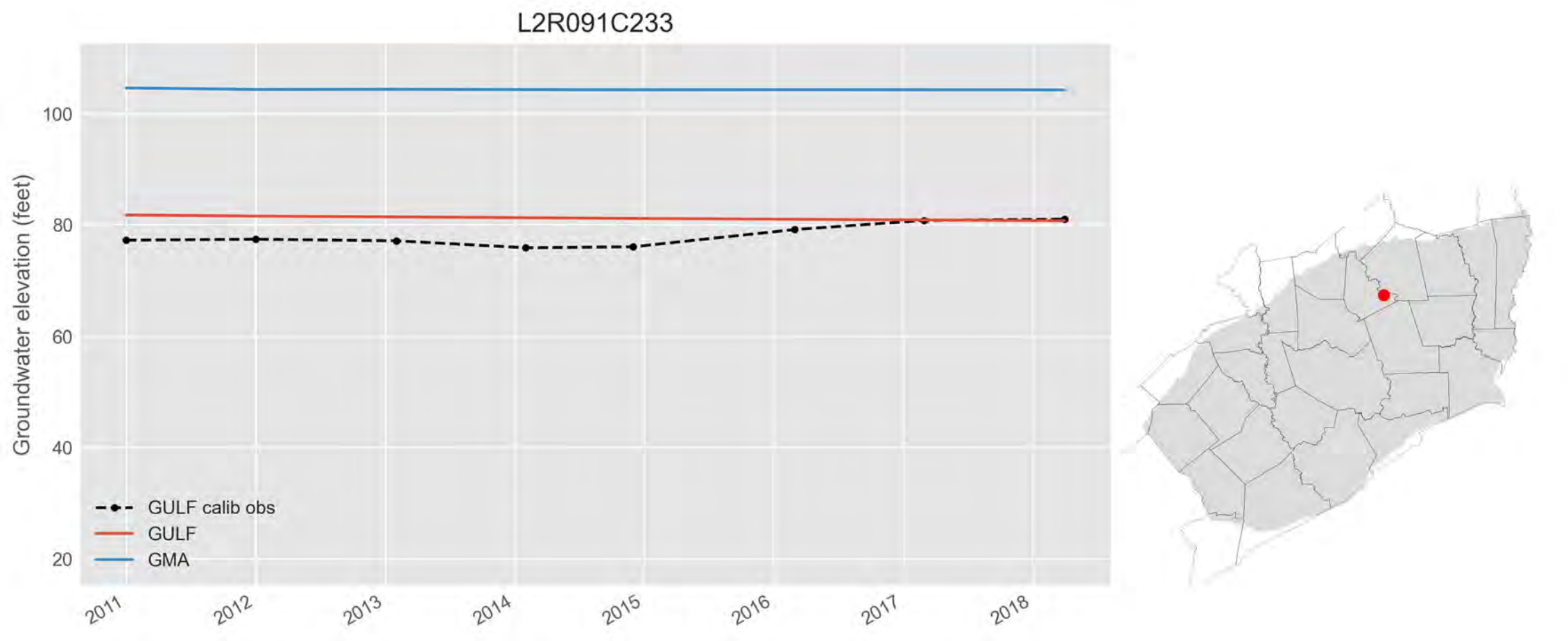
Time series plots comparing GULF model groundwater level observations with two models

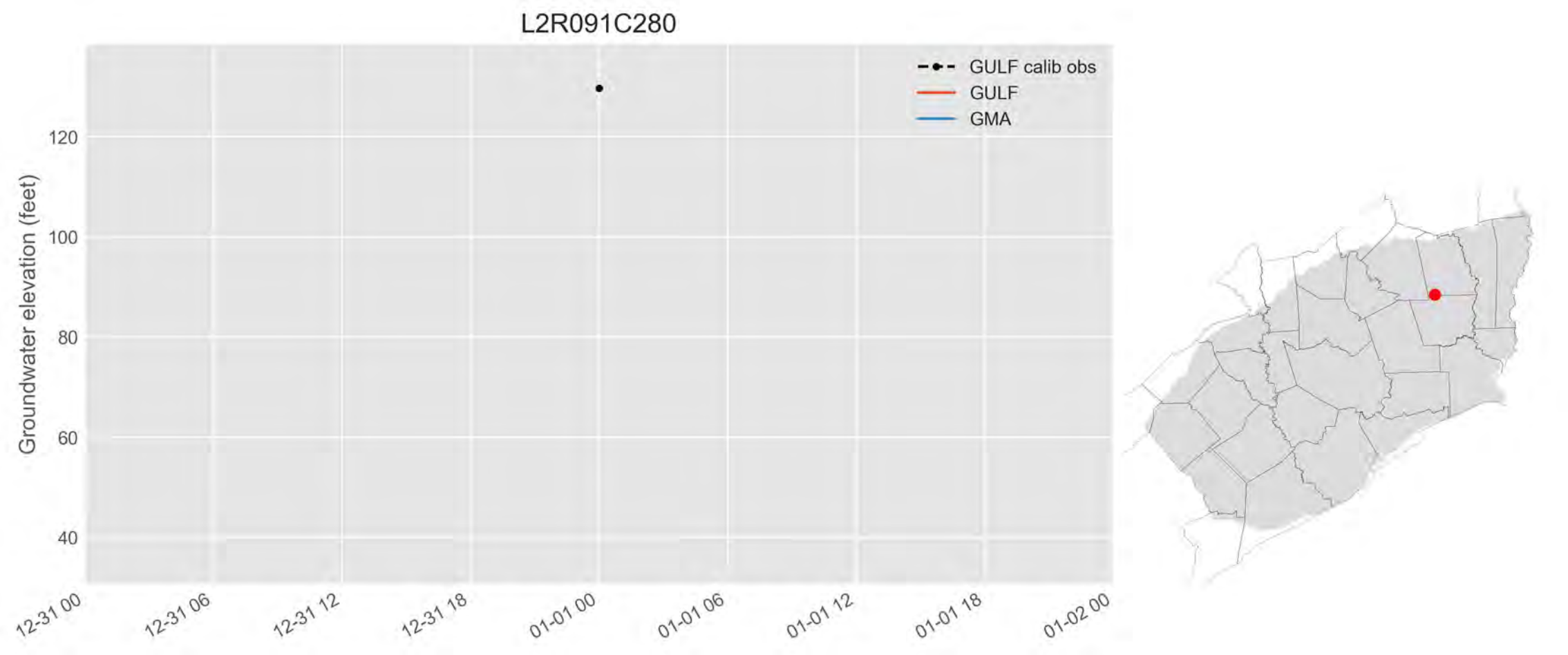

L2R076C335
Groundwater elevation (feet)
90
80
70
60
50
40
30
20
1950
1960
1970
1980
1990
2000
GULF calib obs
GULF
GMA

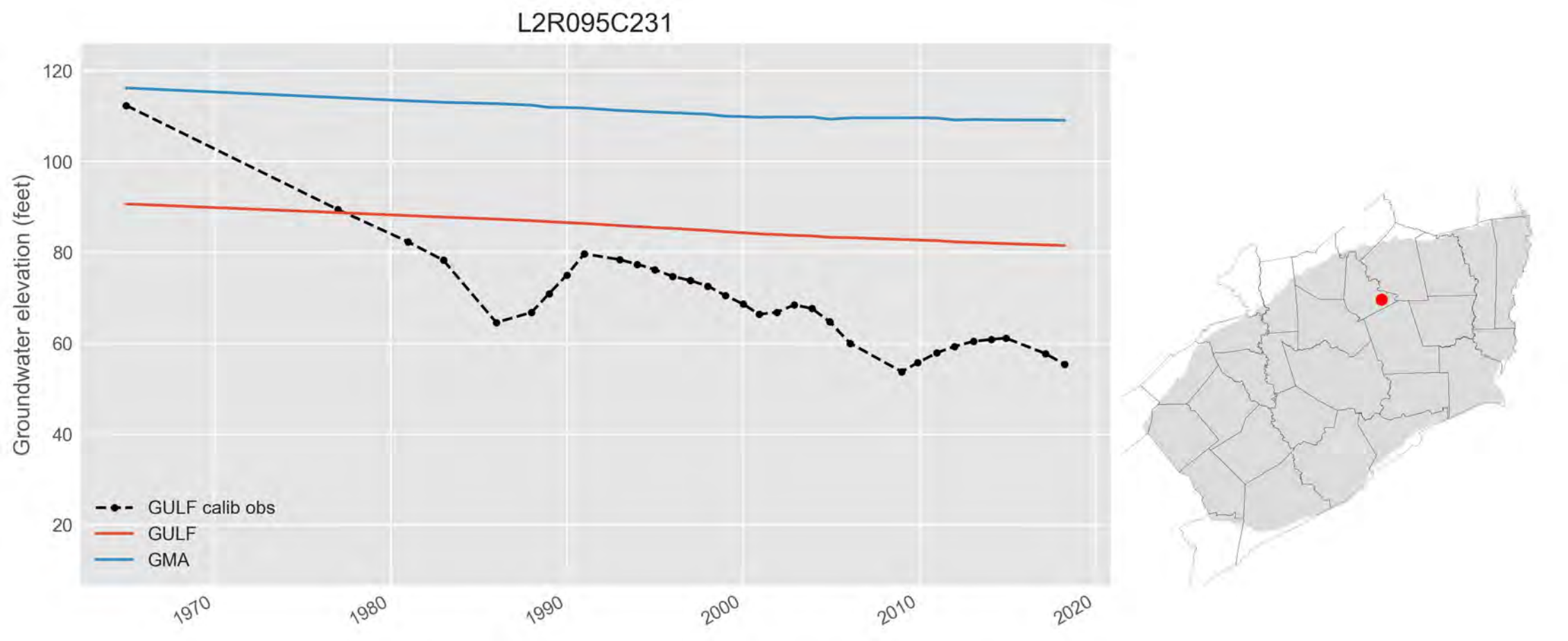

L2R082C337
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
70
60
50
40
30
20
10
1972
1976
1980
1984
1988
1992
1996
2000
2004

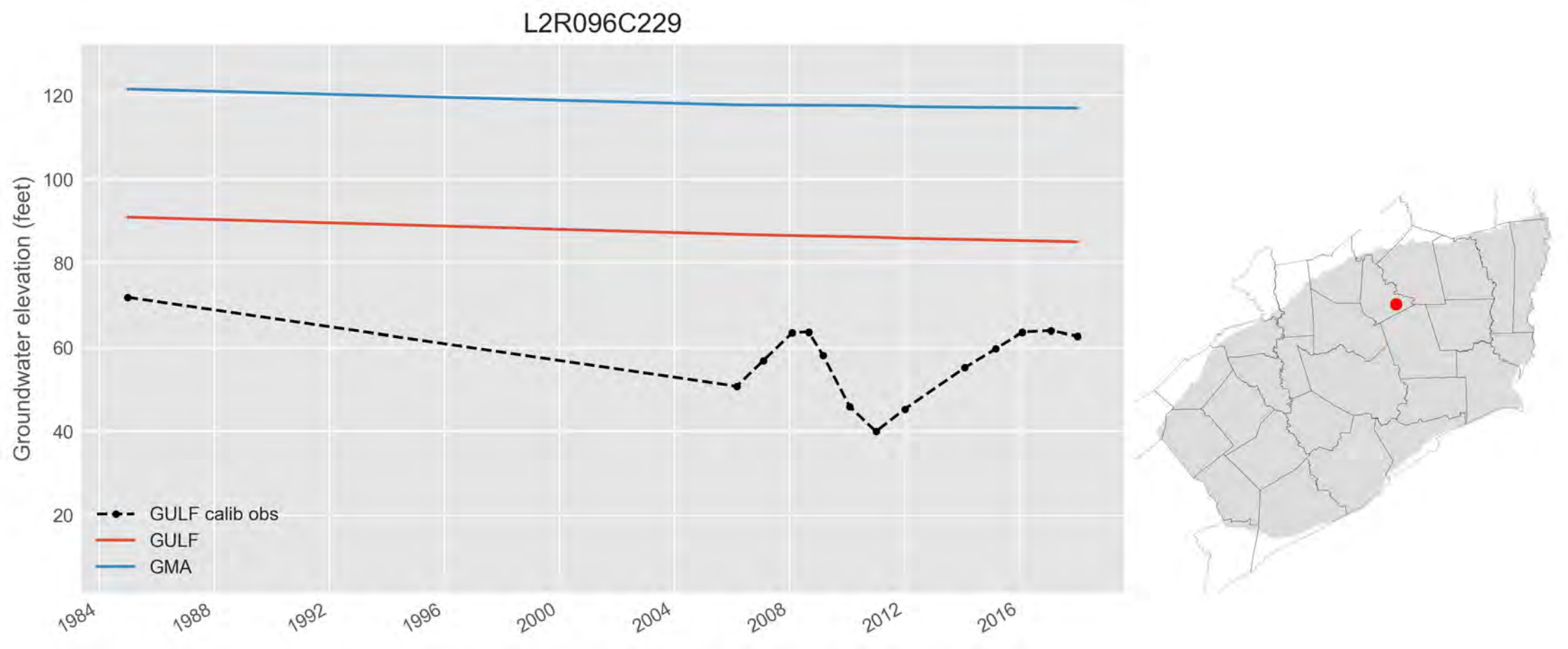

L2R085C298
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
1960
1964
1968
1972
1976
1980
1984
1988
1992

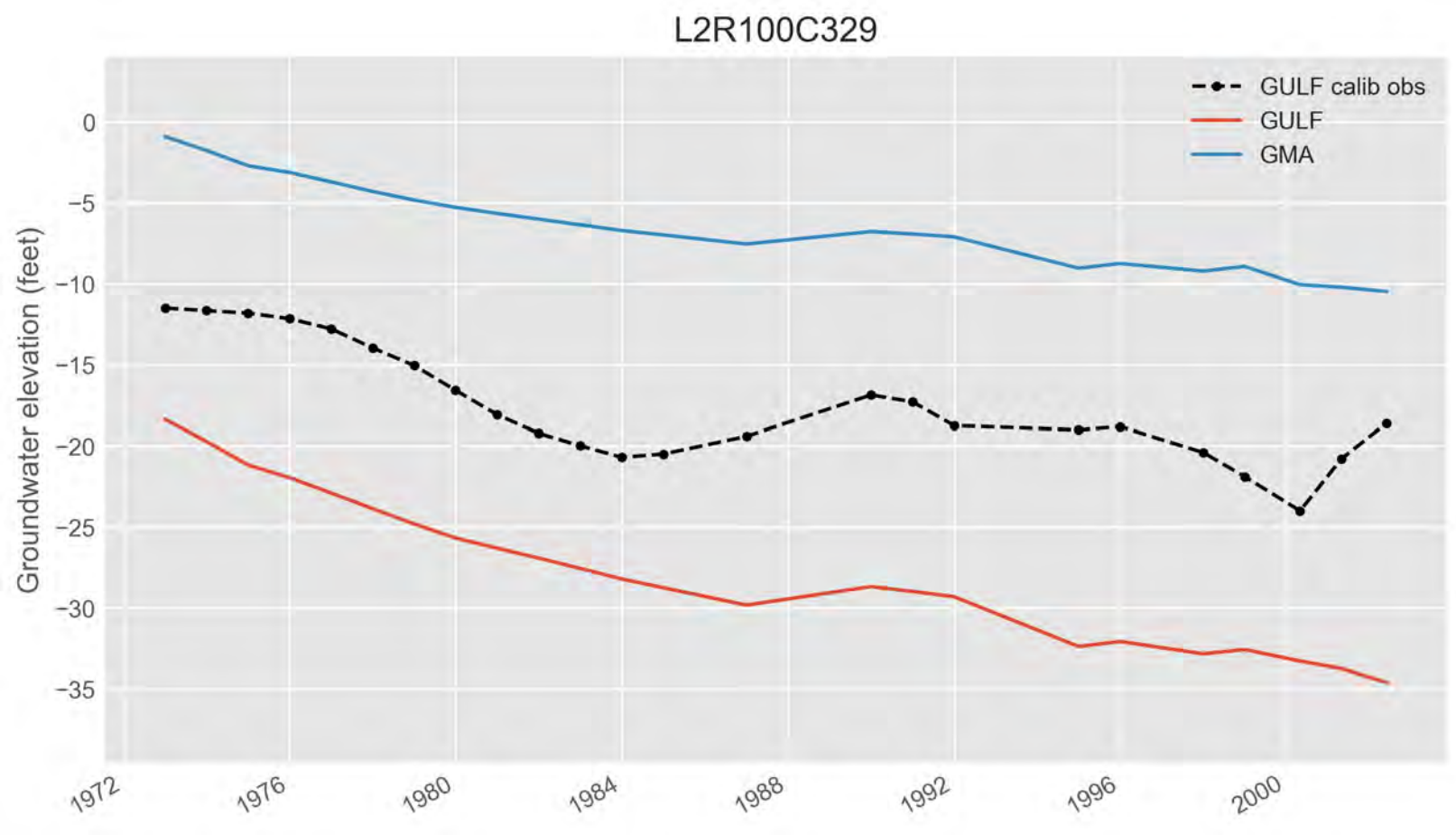

L2R088C290
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
12-31 00
12-31 06
12-31 12
12-31 18
01-01 00
01-01 06
01-01 12
01-01 18
01-02 00

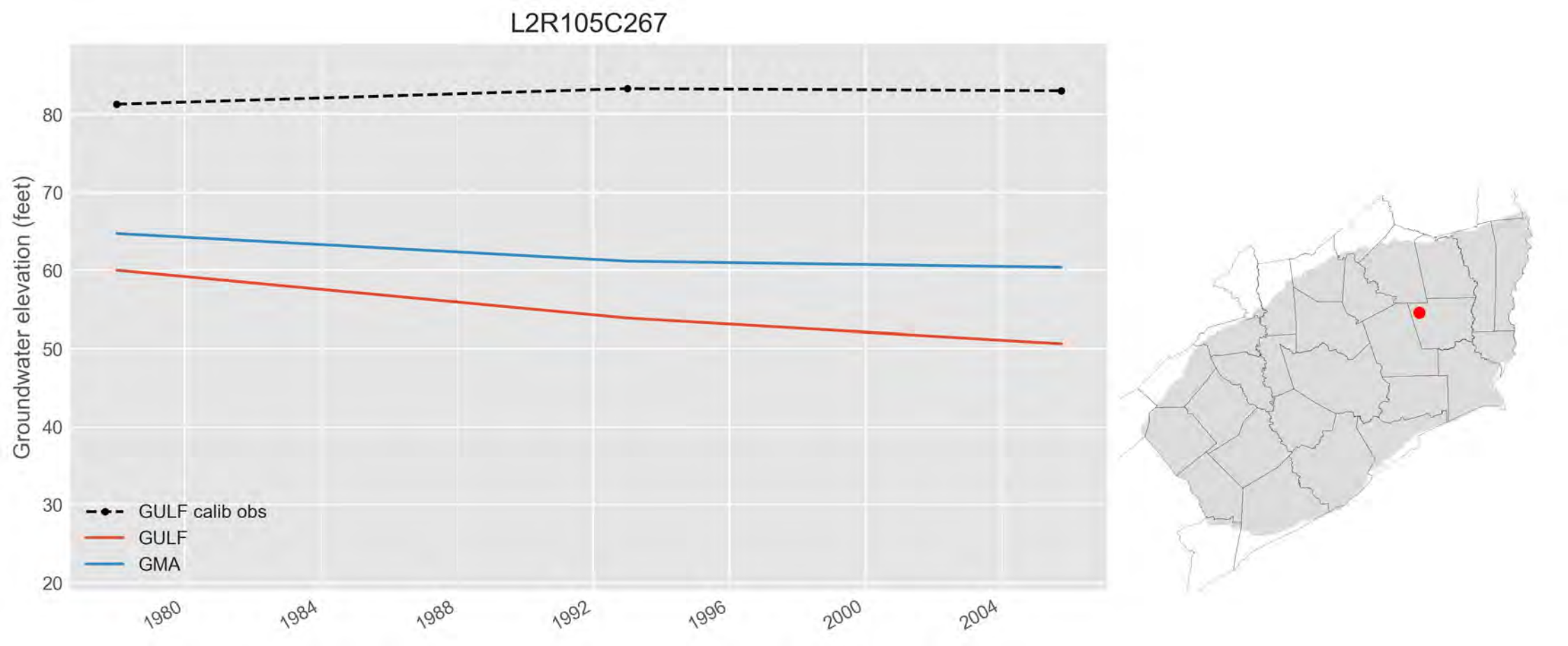

L2R091C233
Groundwater elevation (feet)
100
80
60
40
20
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

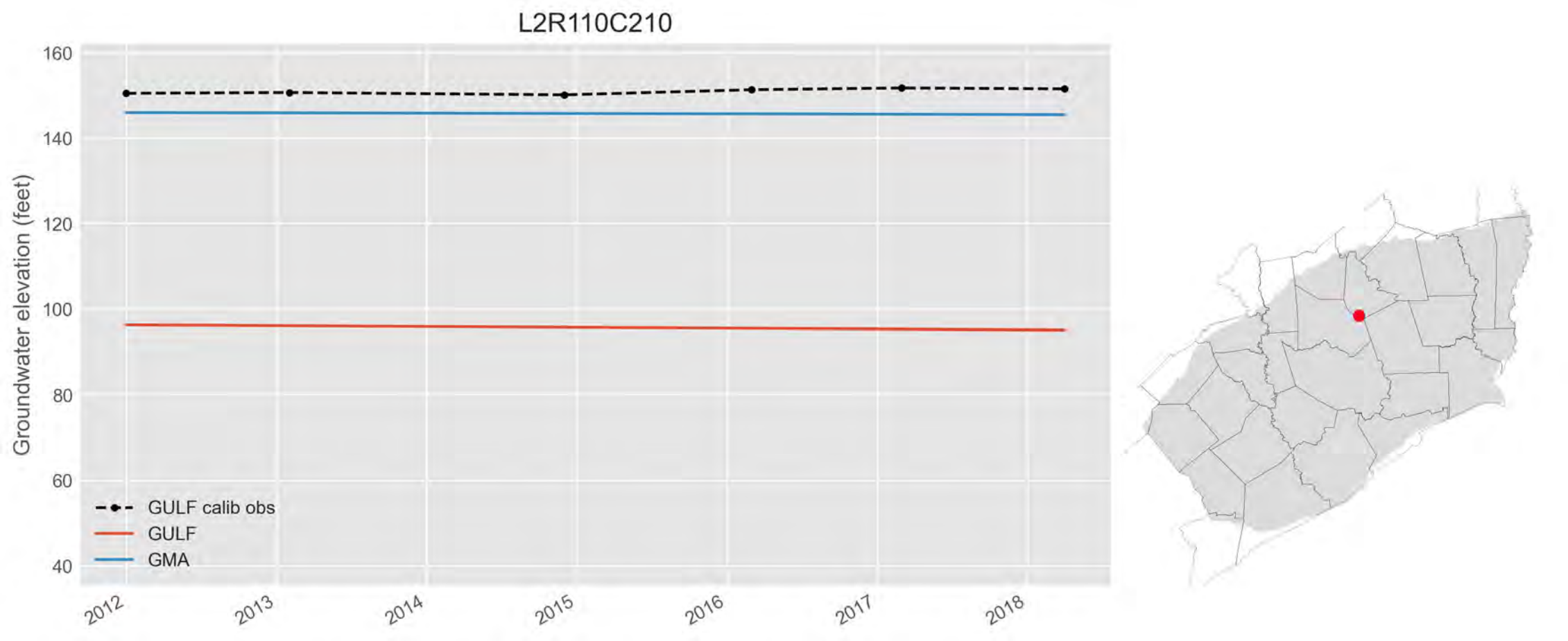

L2R091C280
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
12-31 00
12-31 06
12-31 12
12-31 18
01-01 00
01-01 06
01-01 12
01-01 18
01-02 00

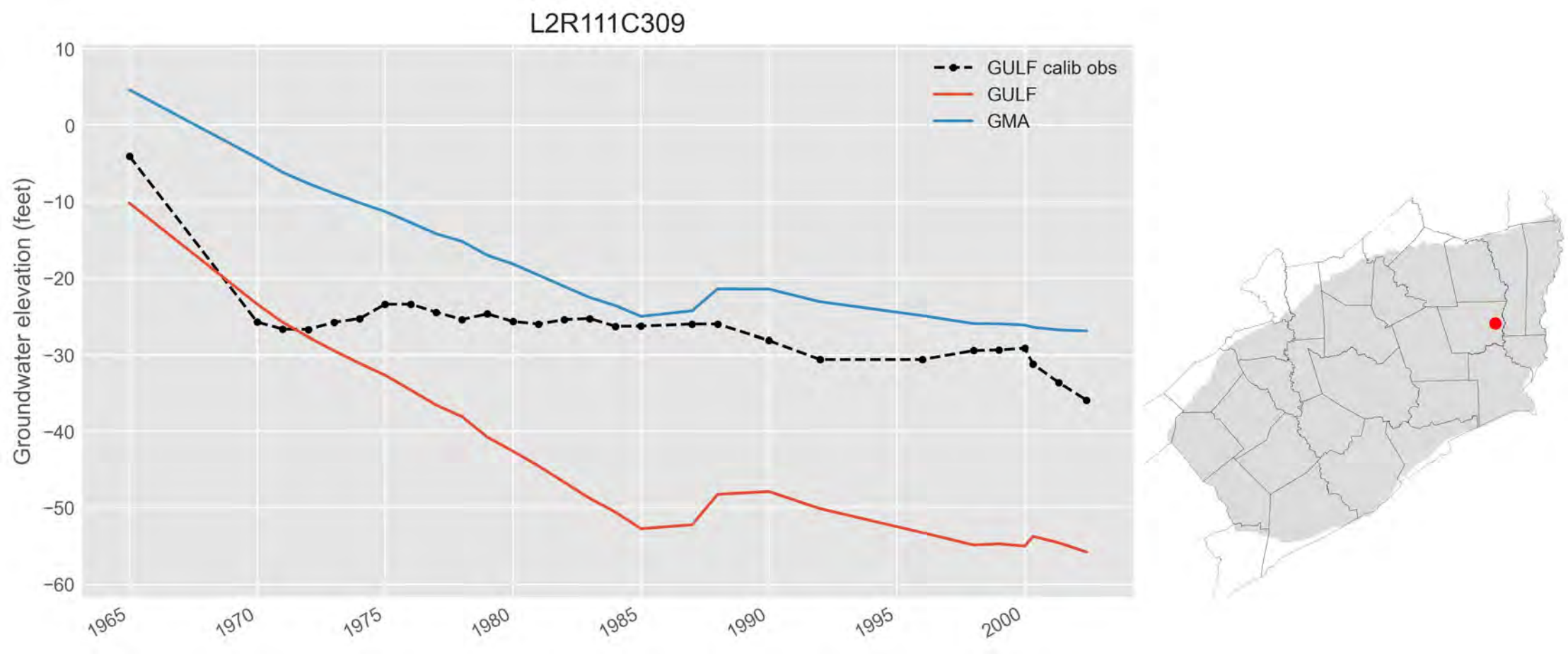

L2R095C231
Groundwater elevation (feet)
120
100
80
60
40
20
1970
1980
1990
2000
2010
2020
GULF calib obs
GULF
GMA

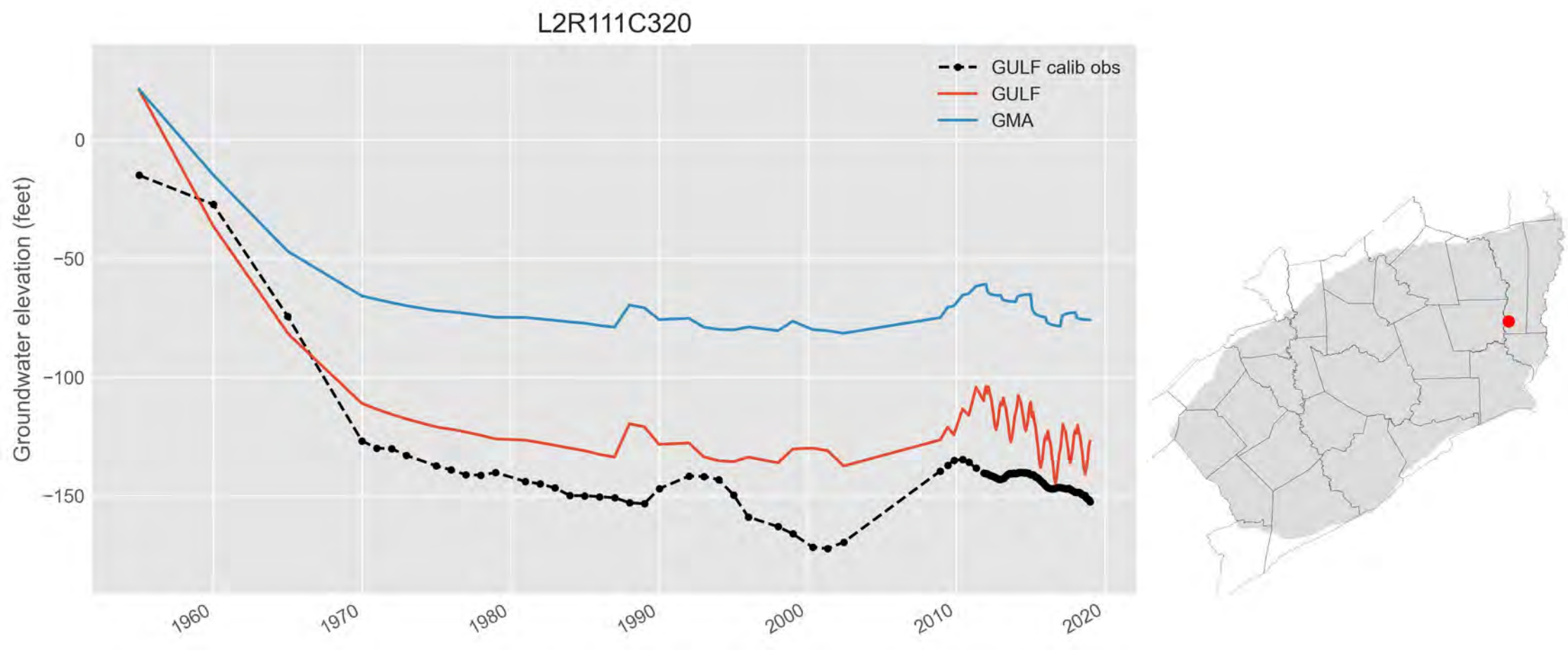

L2R096C229
Groundwater elevation (feet)
120
100
80
60
40
20
GULF calib obs
GULF
GMA
1984
1988
1992
1996
2000
2004
2008
2012
2016


L2R100C329
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
1972
1976
1980
1984
1988
1992
1996
2000

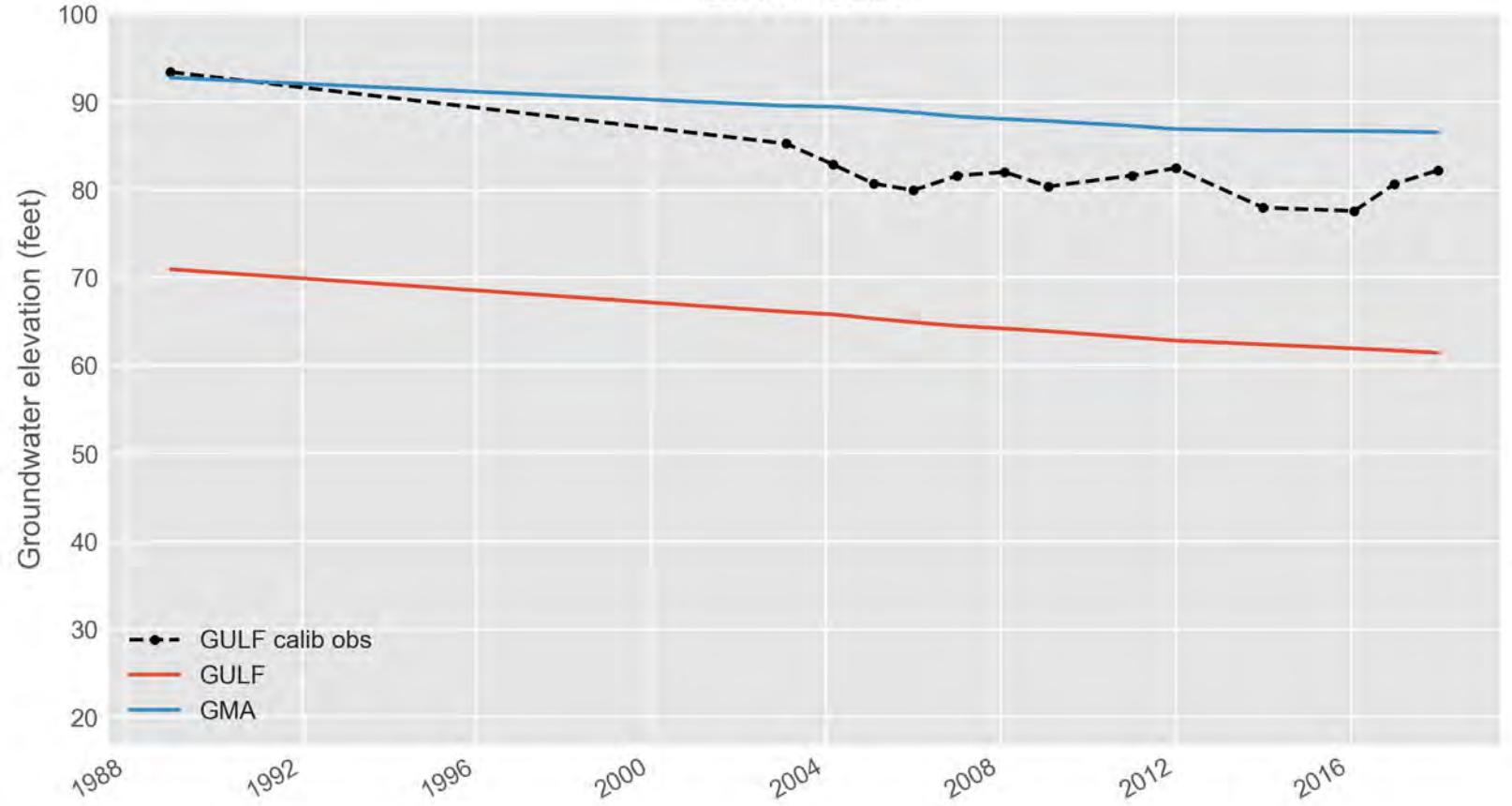

L2R105C267
Groundwater elevation (feet)
80
70
60
50
40
30
20
1980
1984
1988
1992
1996
2000
2004
GULF calib obs
GULF
GMA

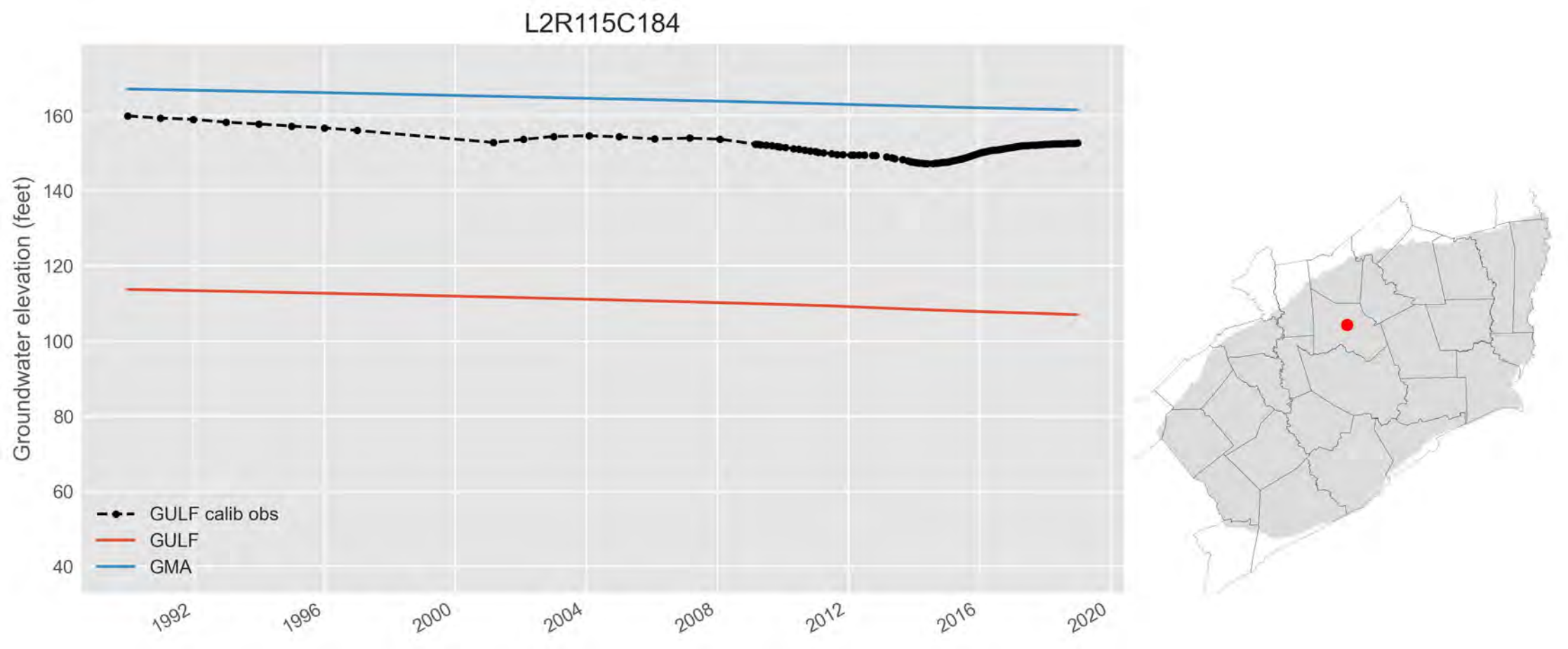

L2R110C210
Groundwater elevation (feet)
160
140
120
100
80
60
40
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

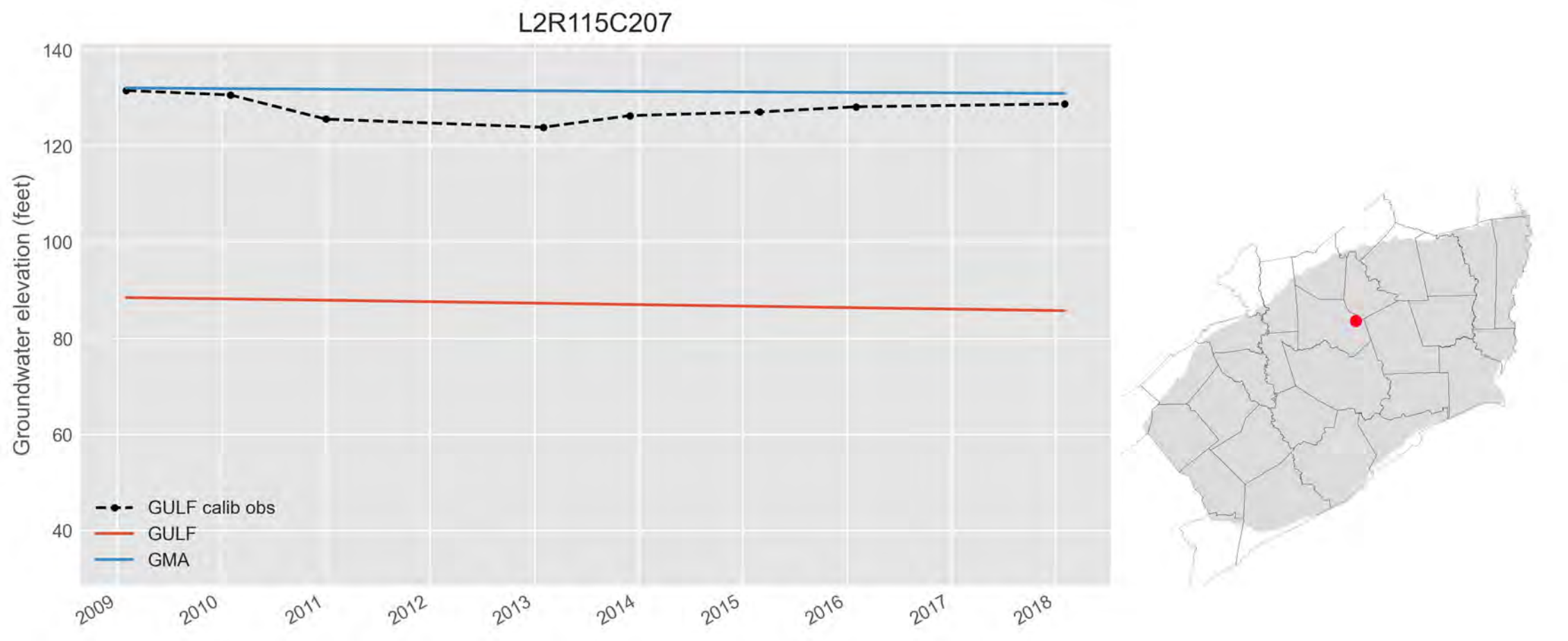

L2R111C309
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
10
0
−10
−20
−30
−40
−50
−60
1965
1970
1975
1980
1985
1990
1995
2000


L2R111C320
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
1960
1970
1980
1990
2000
2010
2020

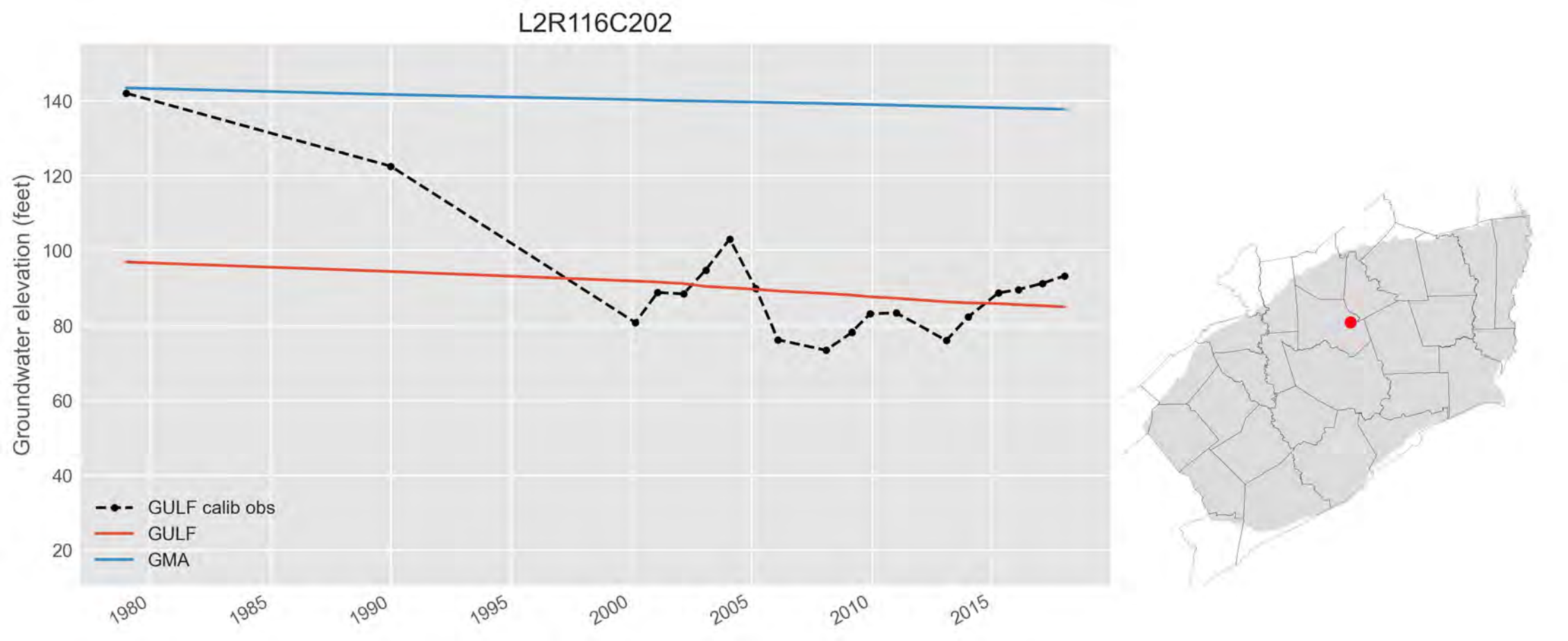
L2R114C226


Groundwater elevation (feet)
100
90
80
70
60
50
40
30
20
1988
1992
1996
2000
2004
2008
2012
2016
GULF calib obs
GULF
GMA

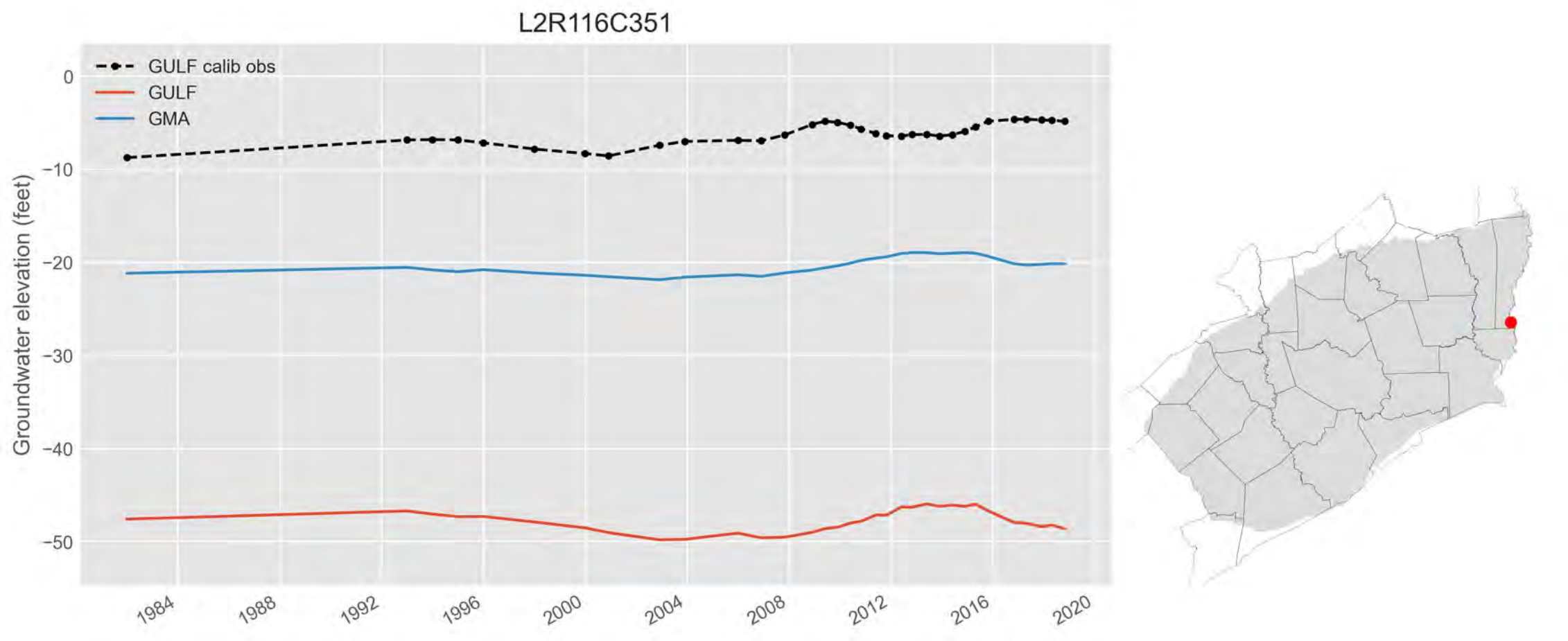

L2R115C184
Groundwater elevation (feet)
160
140
120
100
80
60
40
1992
1996
2000
2004
2008
2012
2016
2020
GULF calib obs
GULF
GMA

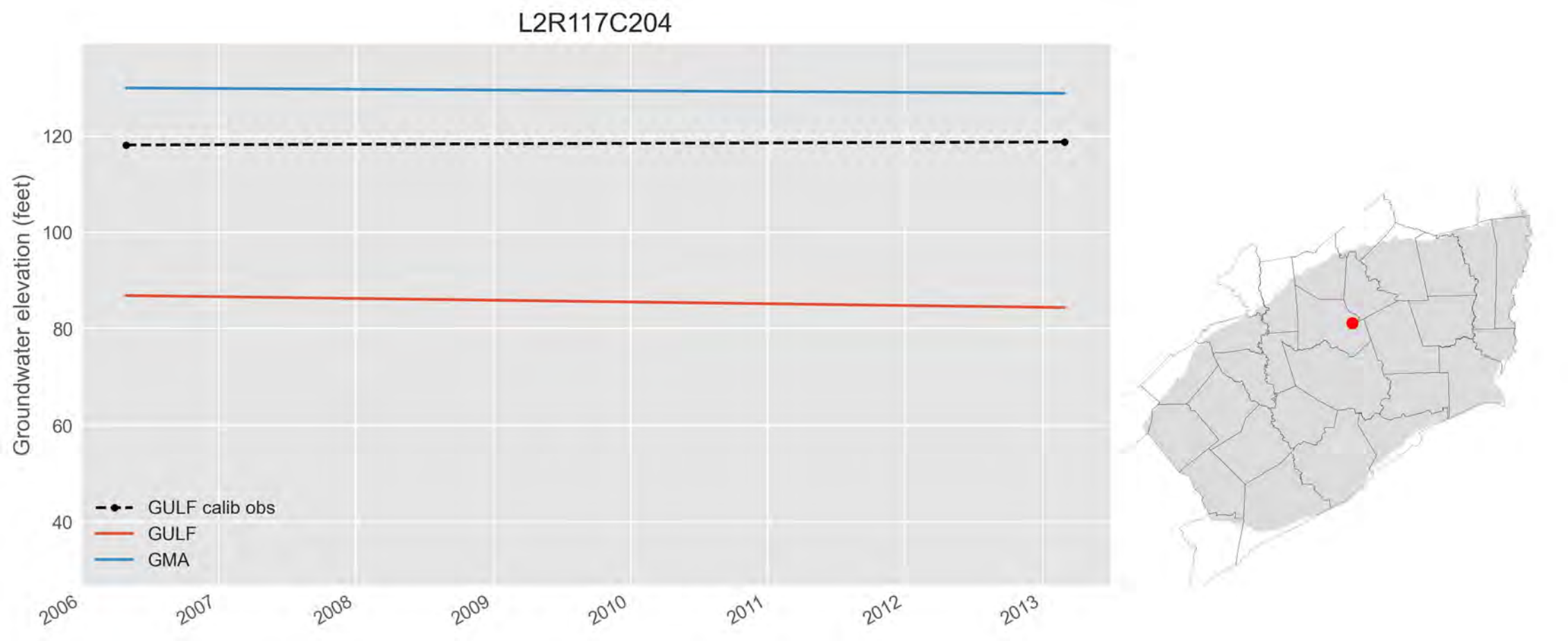

L2R115C207
Groundwater elevation (feet)
140
120
100
80
60
40
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

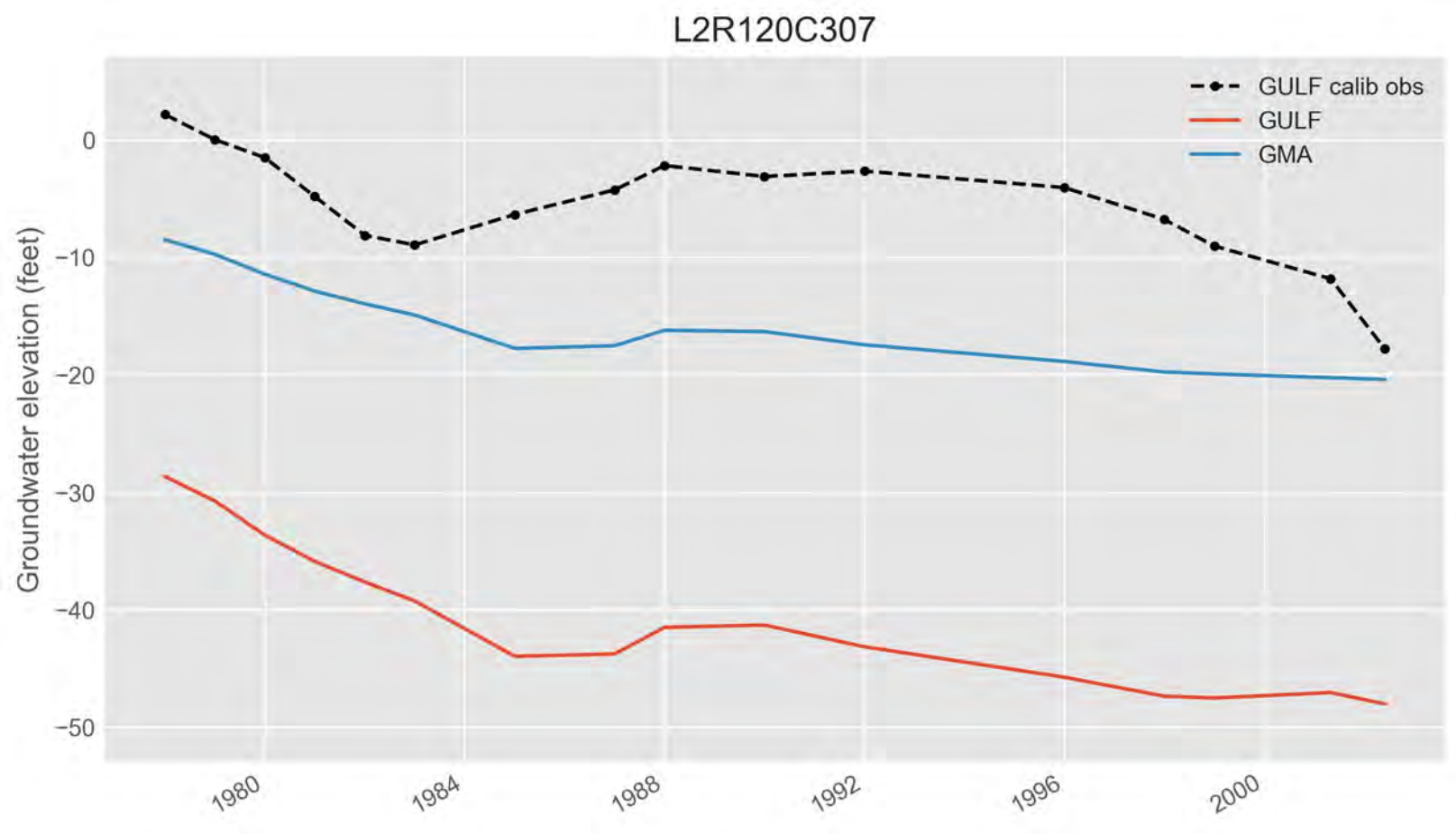
L2R115C232
Groundwater elevation (feet)
70
60
50
40
30
20
2004
2006
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA

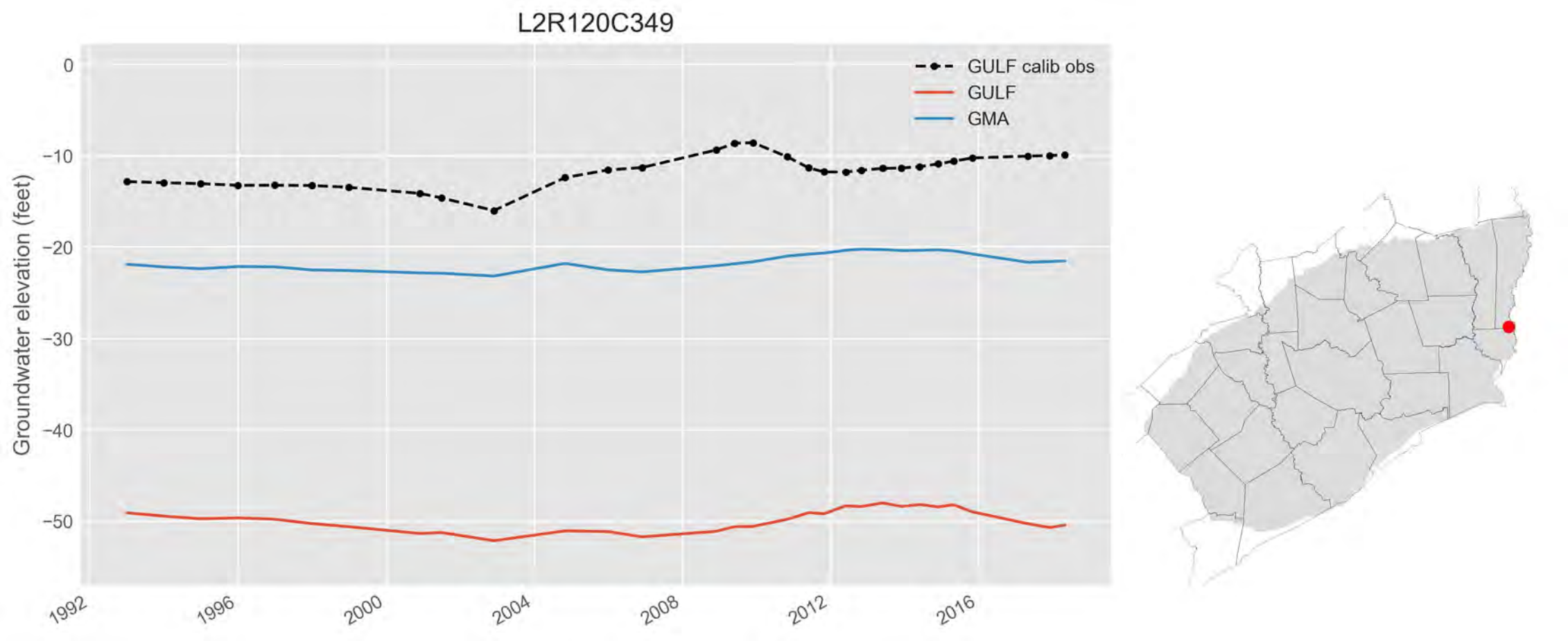

L2R116C202
Groundwater elevation (feet)
140
120
100
80
60
40
20
GULF calib obs
GULF
GMA
1980
1985
1990
1995
2000
2005
2010
2015

L2R116C234
Groundwater elevation (feet)
70
60
50
40
30
20
2002
2004
2006
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA

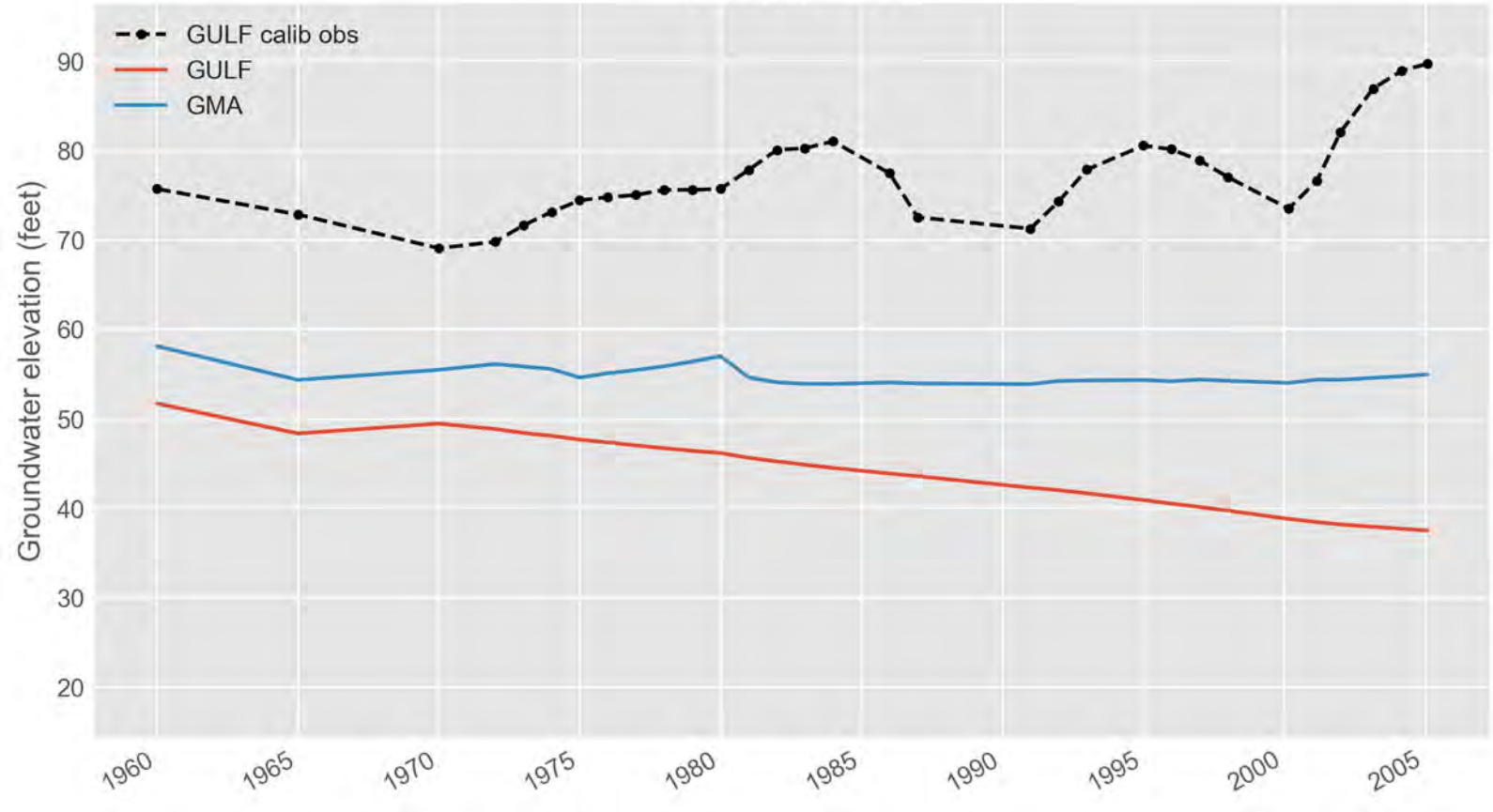

L2R116C351
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020

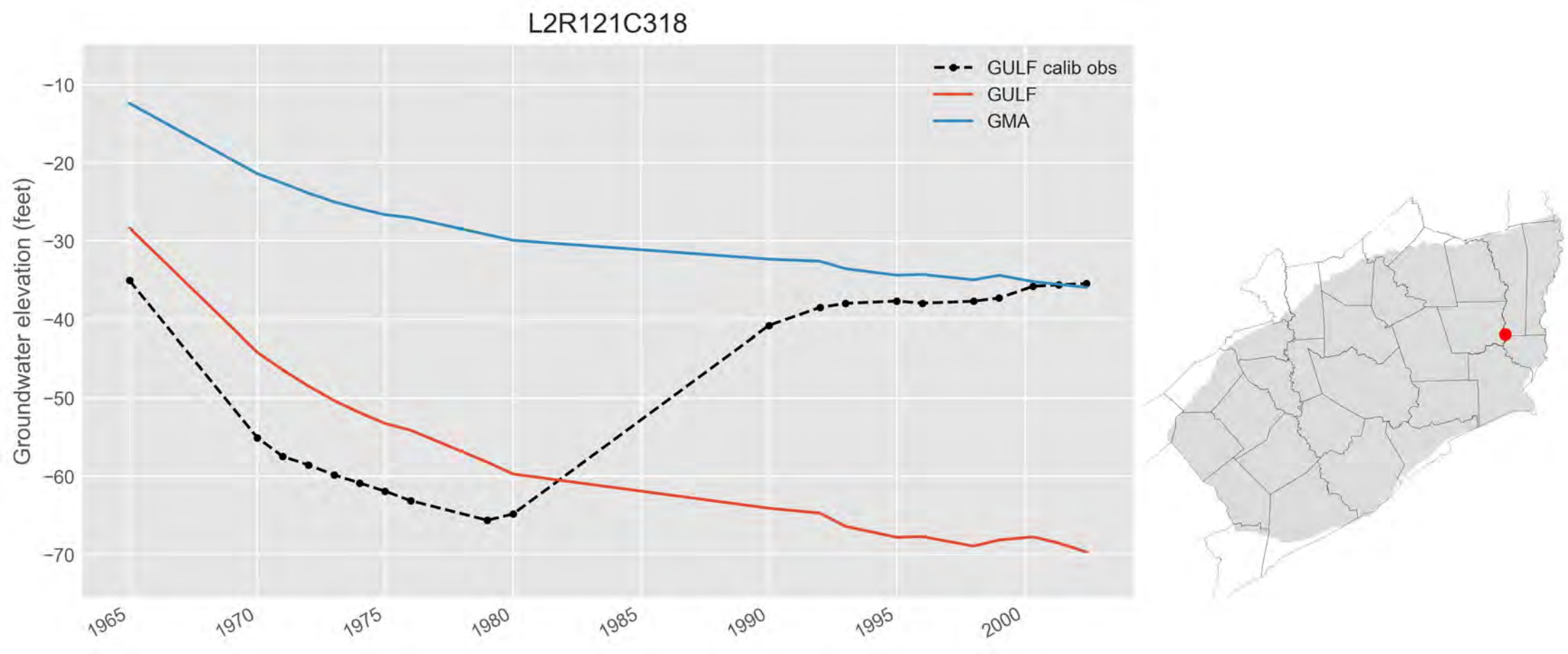

L2R117C204
Groundwater elevation (feet)
120
100
80
60
40
GULF calib obs
GULF
GMA
2006
2007
2008
2009
2010
2011
2012
2013

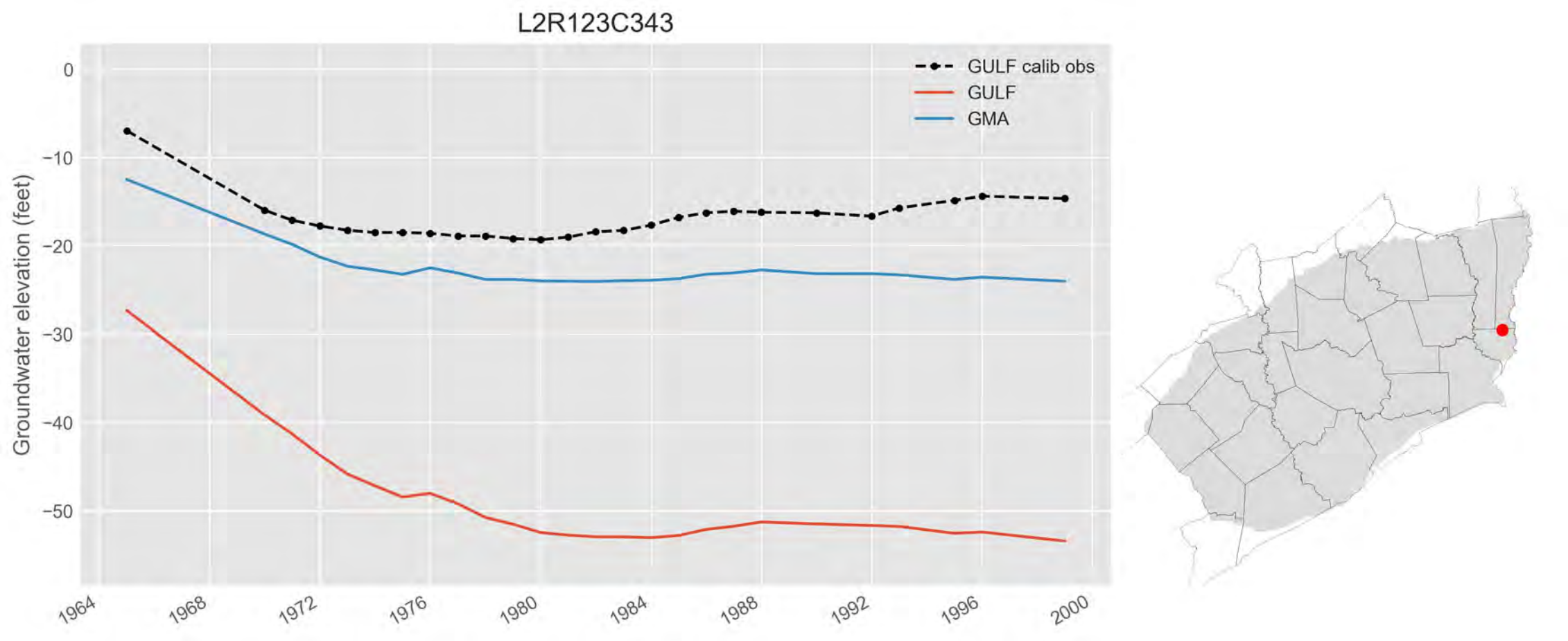

L2R120C307
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1980
1984
1988
1992
1996
2000

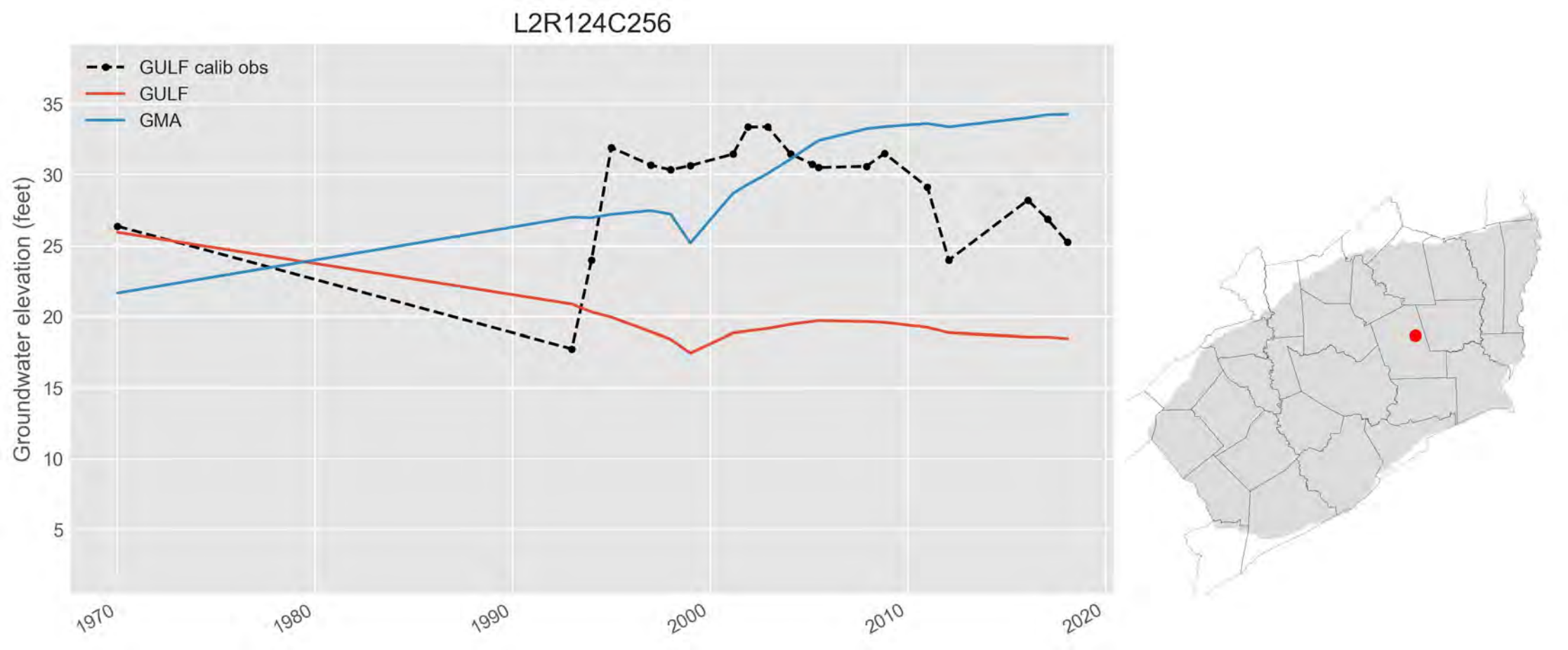

L2R120C349
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1992
1996
2000
2004
2008
2012
2016

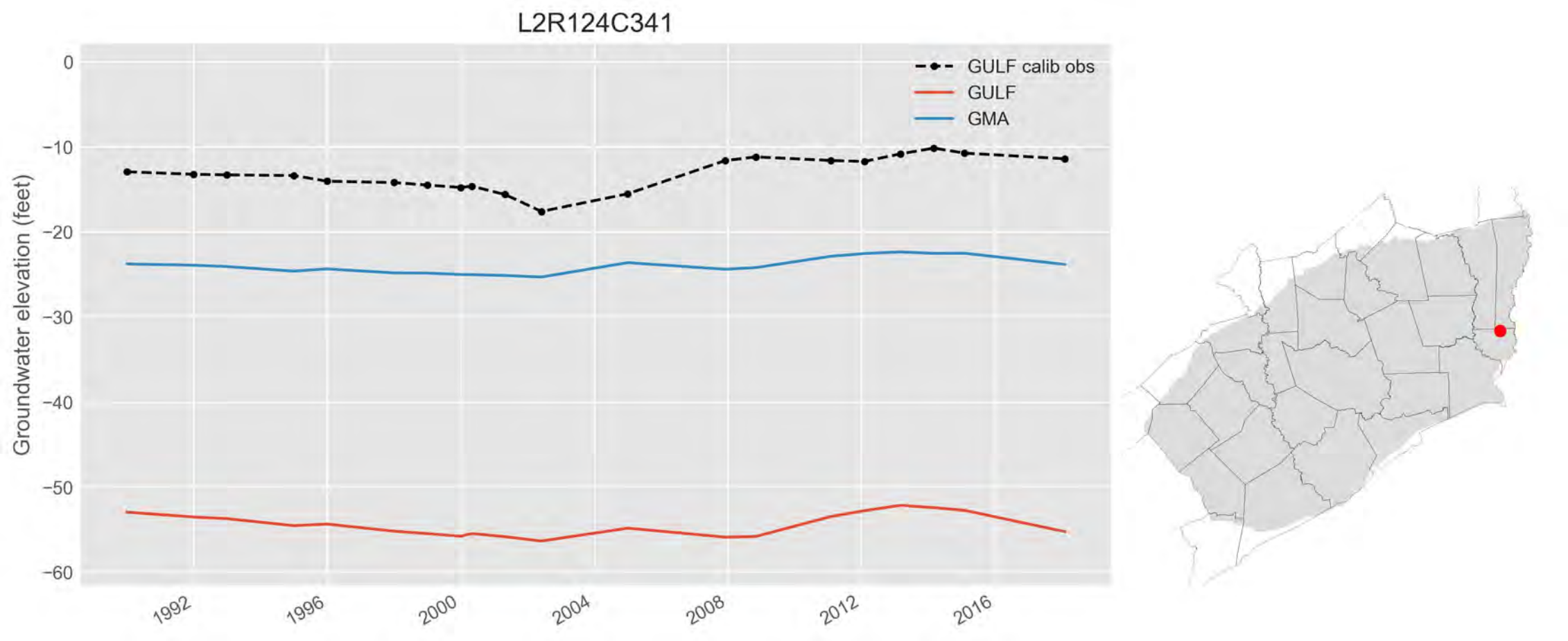
L2R121C233


GULF calib obs
GULF
GMA
Groundwater elevation (feet)
90
80
70
60
50
40
30
20
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

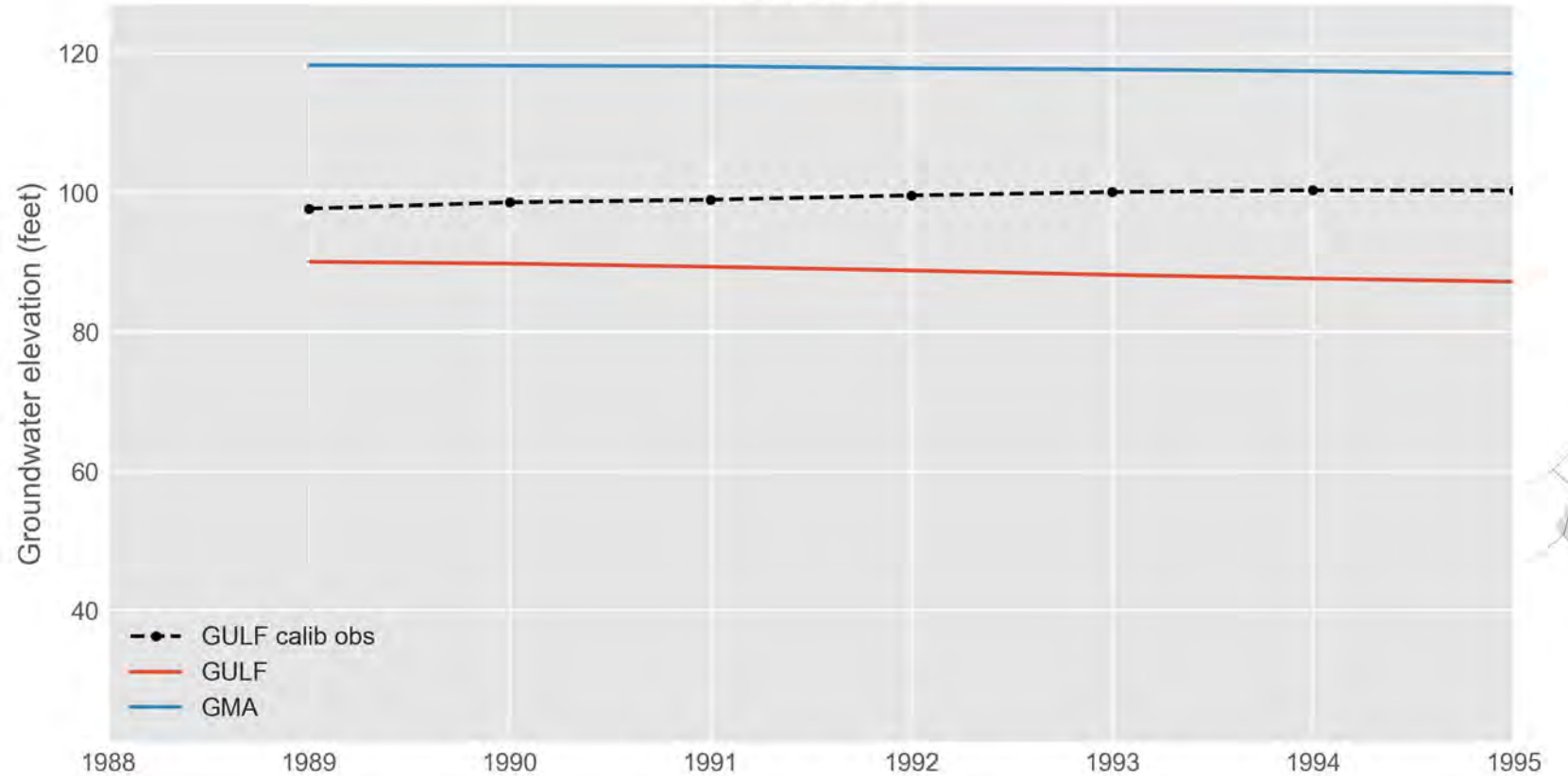

L2R121C318
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
1965
1970
1975
1980
1985
1990
1995
2000

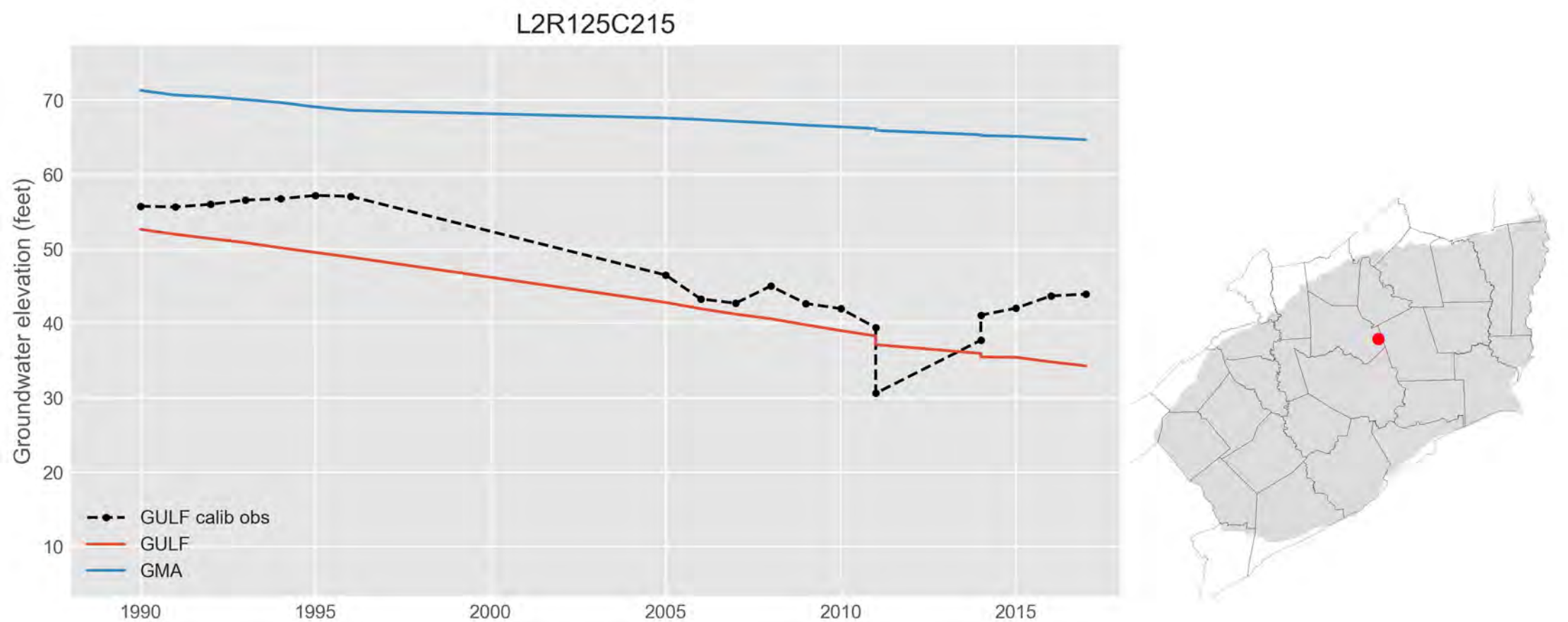

L2R123C343
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000

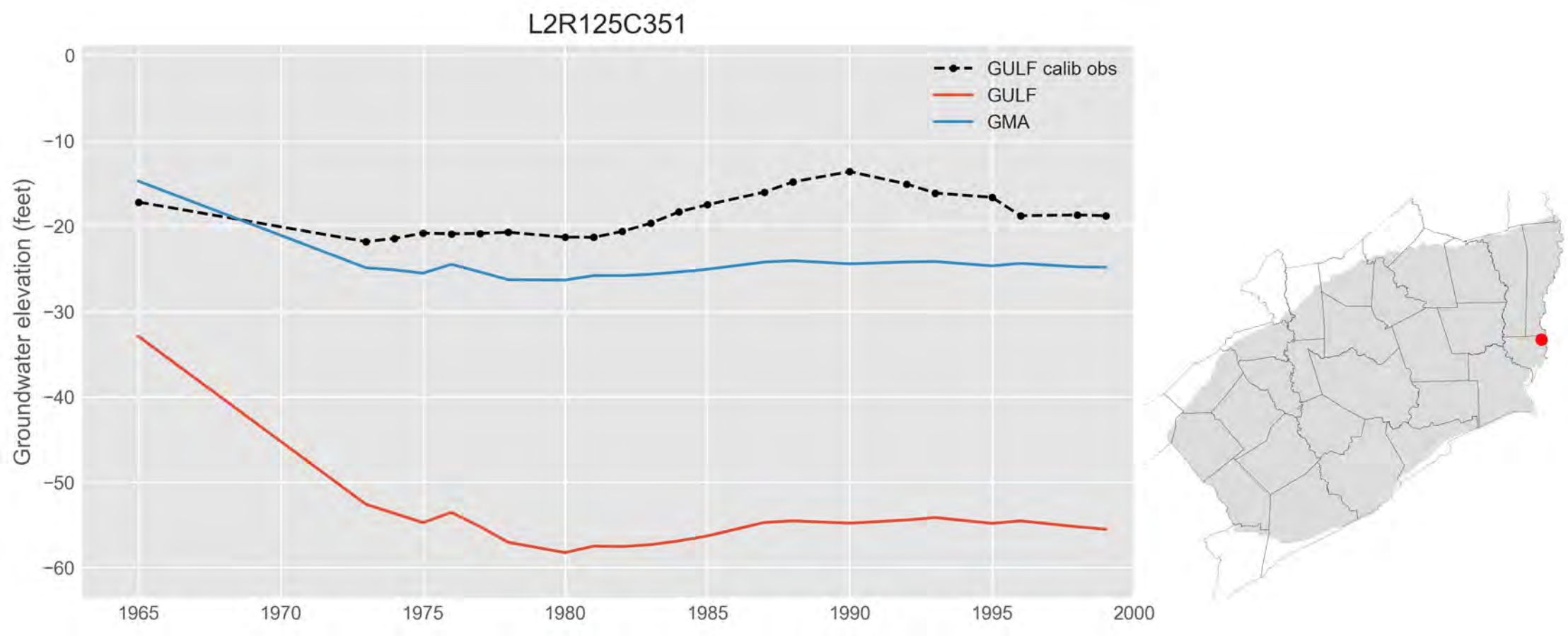

L2R124C256
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
35
30
25
20
15
10
5
1970
1980
1990
2000
2010
2020

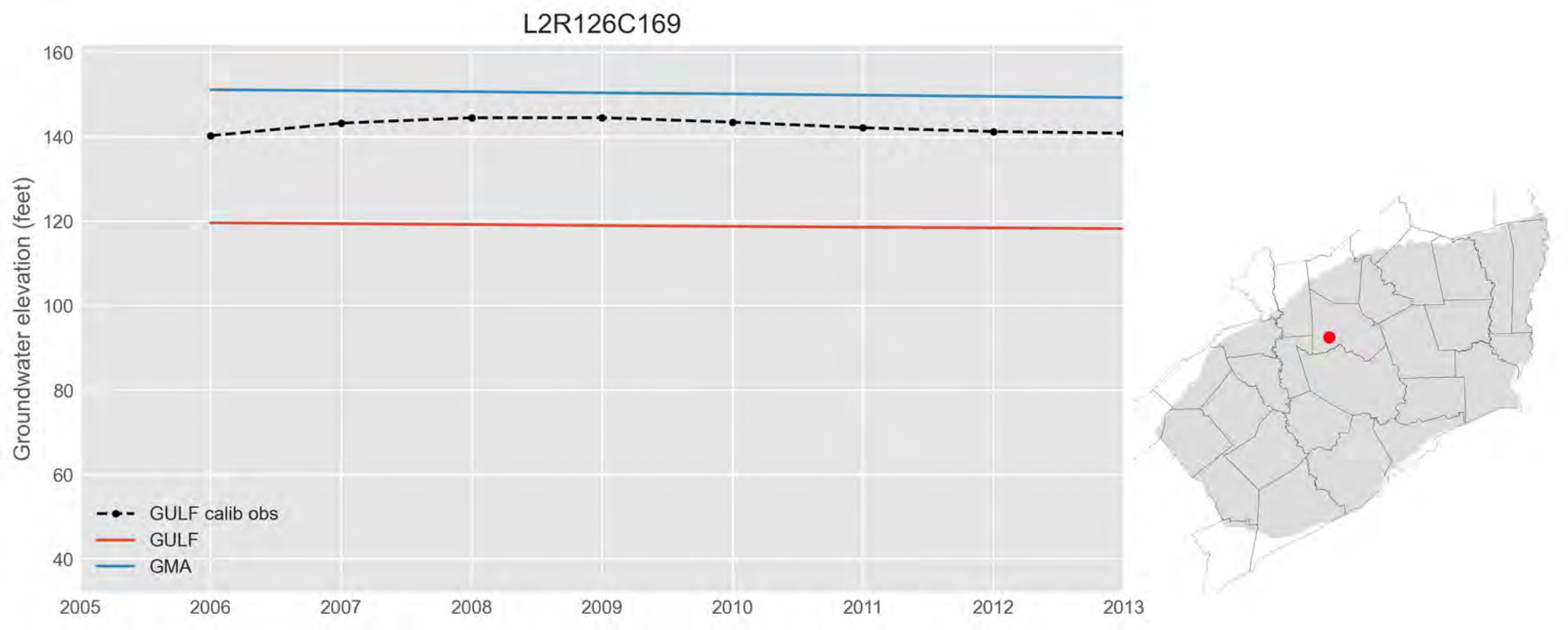

L2R124C341
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1992
1996
2000
2004
2008
2012
2016

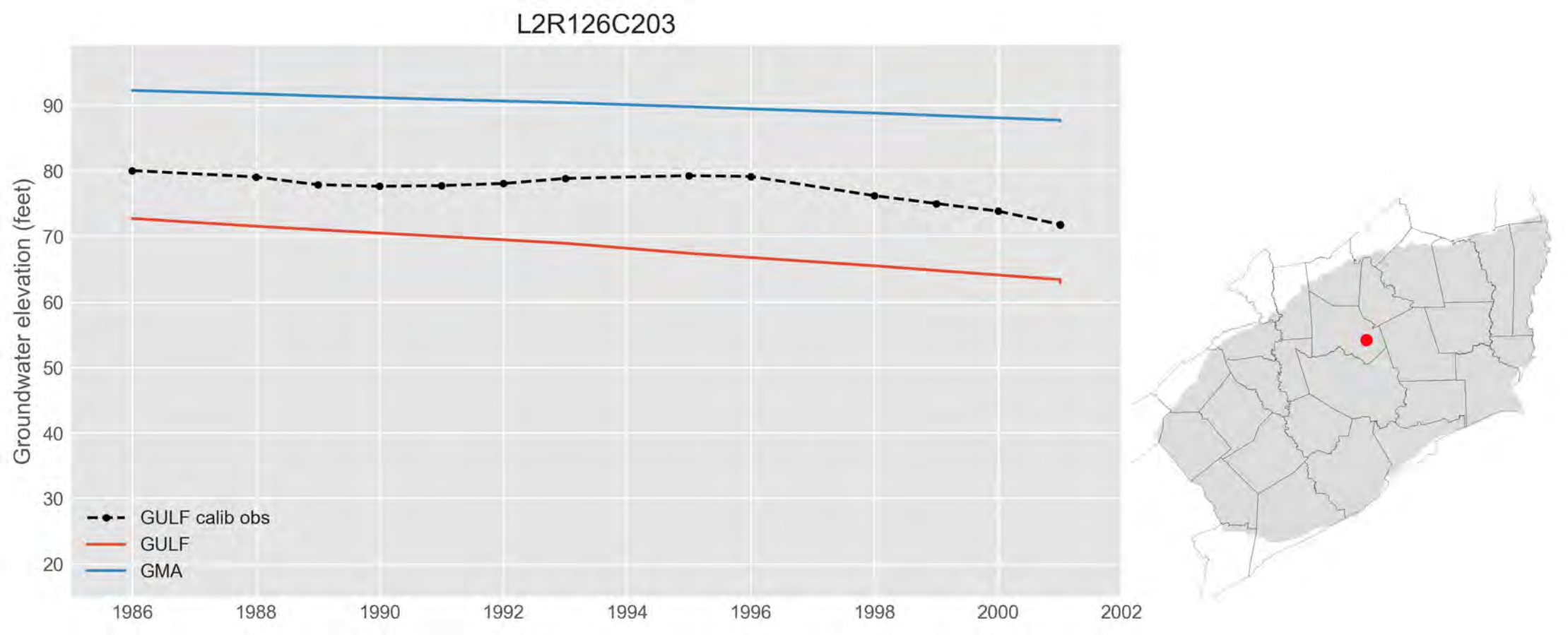
L2R125C186

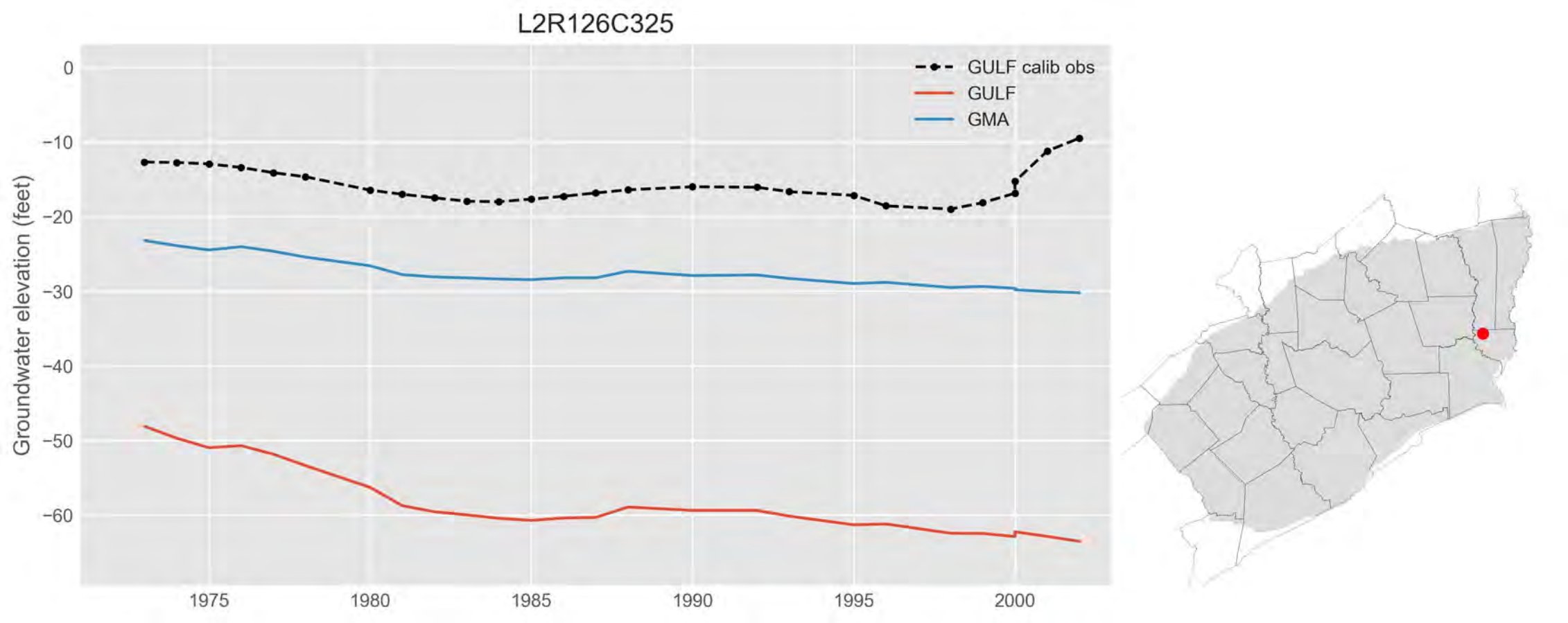

120
100
80
60
40
Groundwater elevation (feet)
GULF calib obs
GULF
GMA
1988
1989
1990
1991
1992
1993
1994
1995

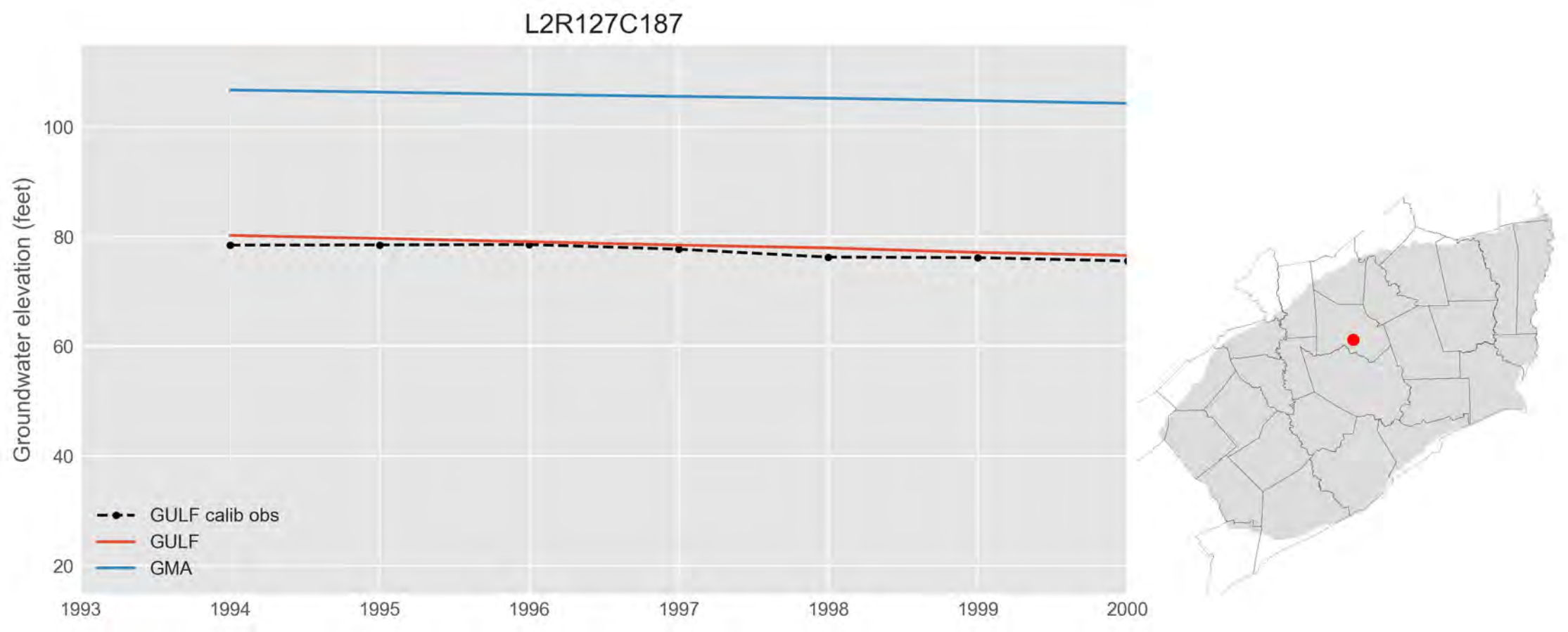

L2R125C215
Groundwater elevation (feet)
70
60
50
40
30
20
10
1990
1995
2000
2005
2010
2015
GULF calib obs
GULF
GMA

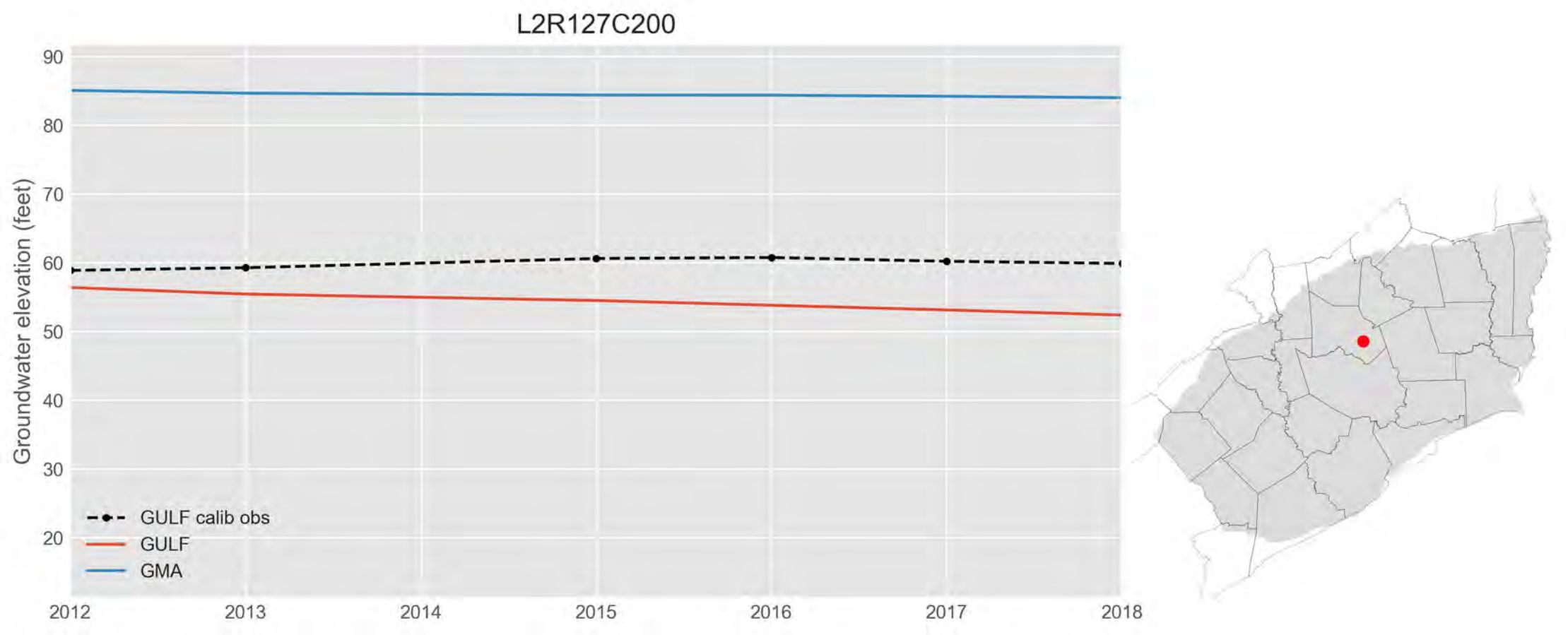

L2R125C351
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1965
1970
1975
1980
1985
1990
1995
2000

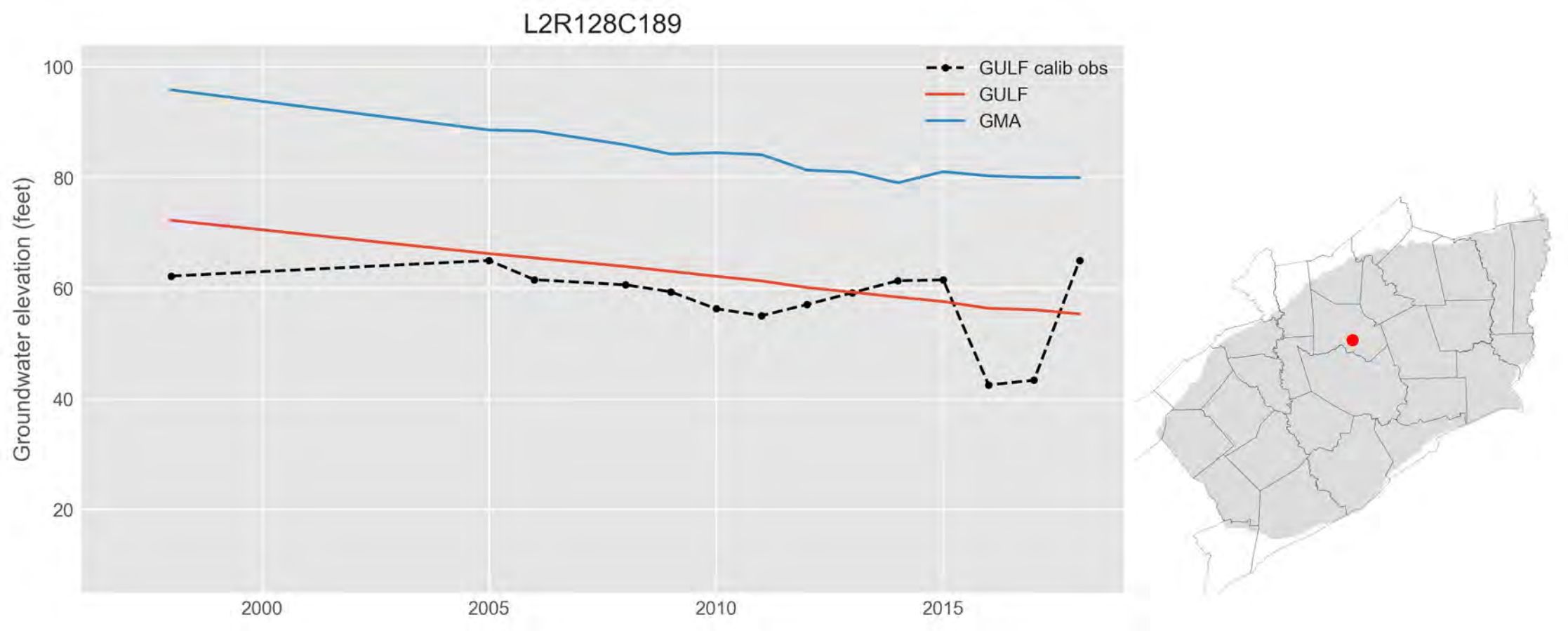

L2R126C169
Groundwater elevation (feet)
160
140
120
100
80
60
40
2005
2006
2007
2008
2009
2010
2011
2012
2013
GULF calib obs
GULF
GMA


L2R126C203
Groundwater elevation (feet)
90
80
70
60
50
40
30
20
1986
1988
1990
1992
1994
1996
1998
2000
2002
GULF calib obs
GULF
GMA

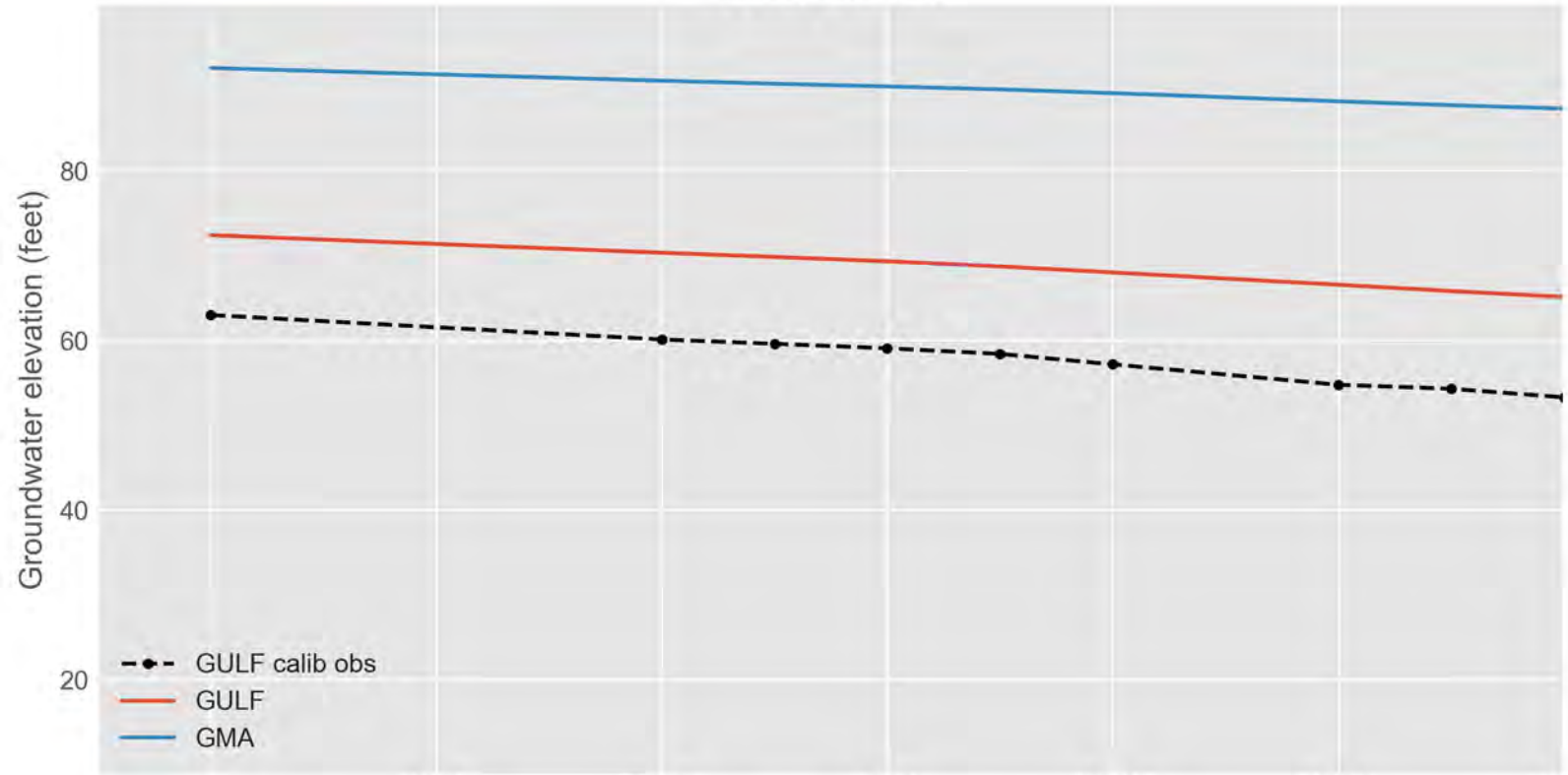

L2R126C325
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1975
1980
1985
1990
1995
2000

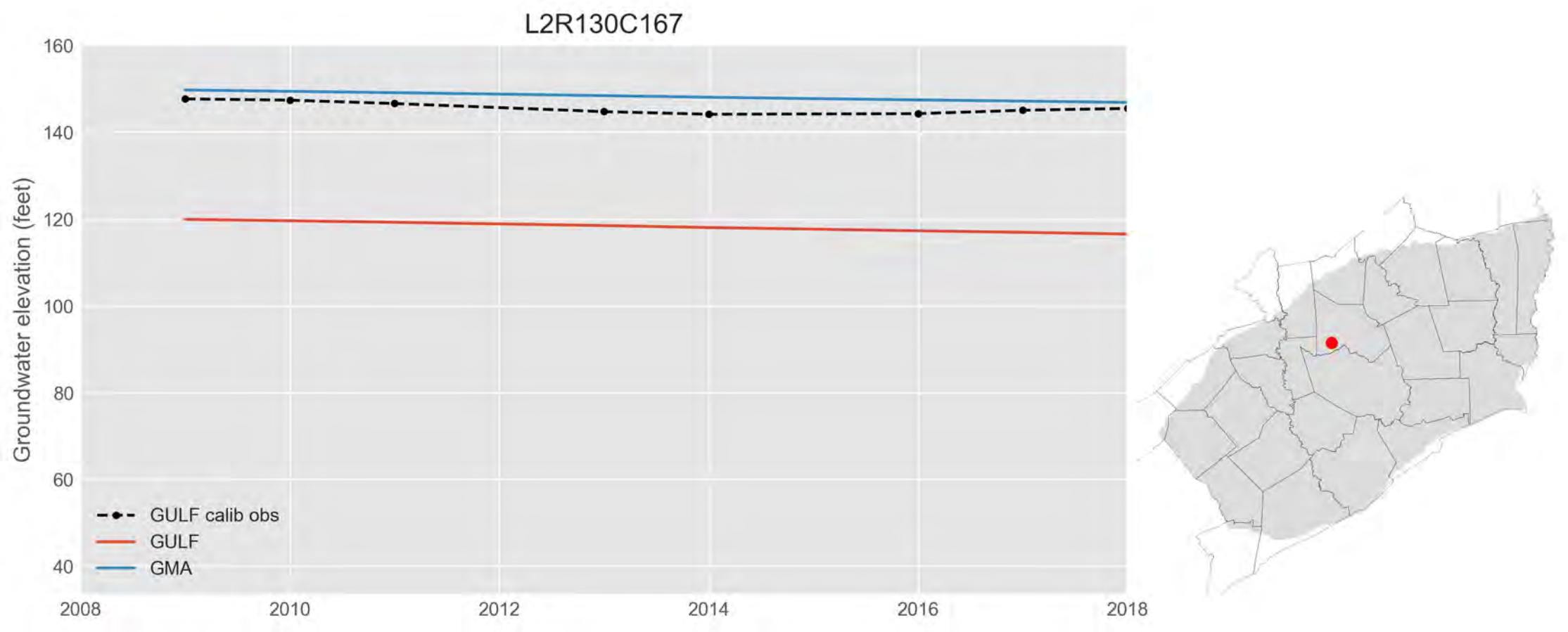

L2R127C187
Groundwater elevation (feet)
100
80
60
40
20
1993
1994
1995
1996
1997
1998
1999
2000
GULF calib obs
GULF
GMA

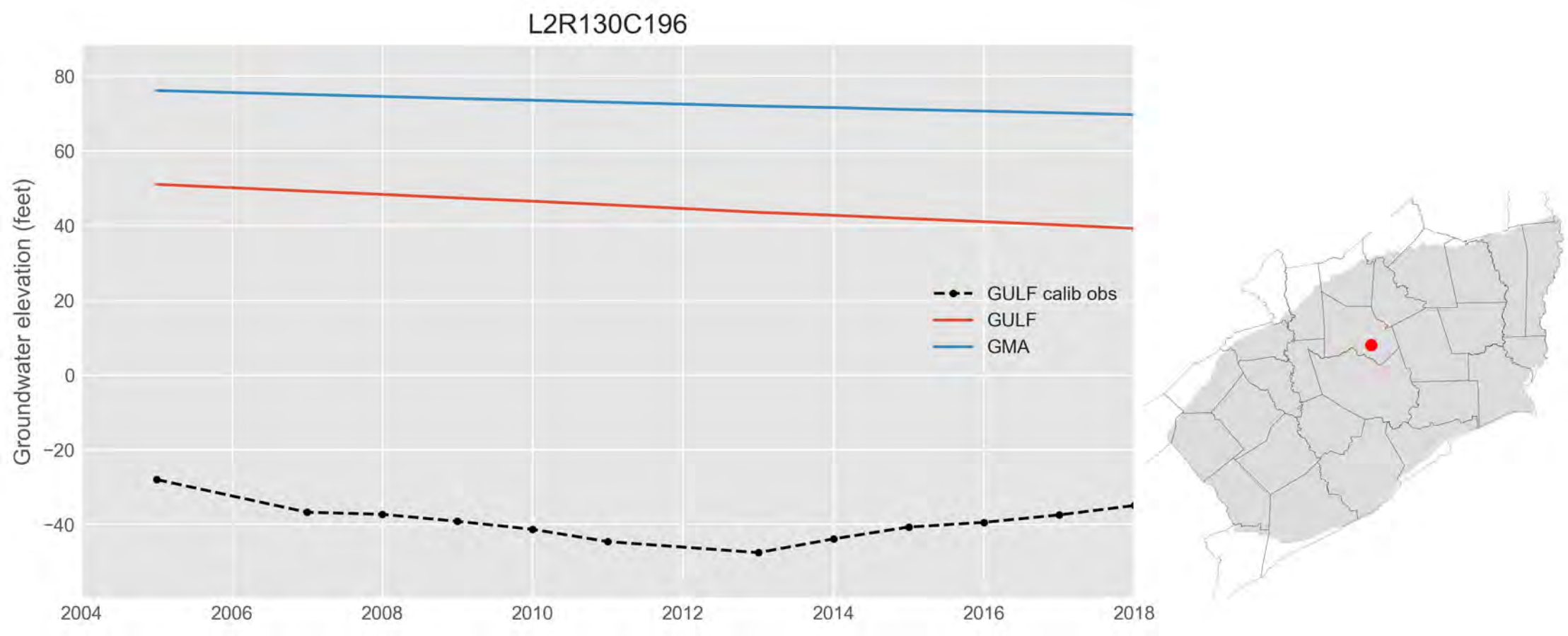

L2R127C200
Groundwater elevation (feet)
90
80
70
60
50
40
30
20
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

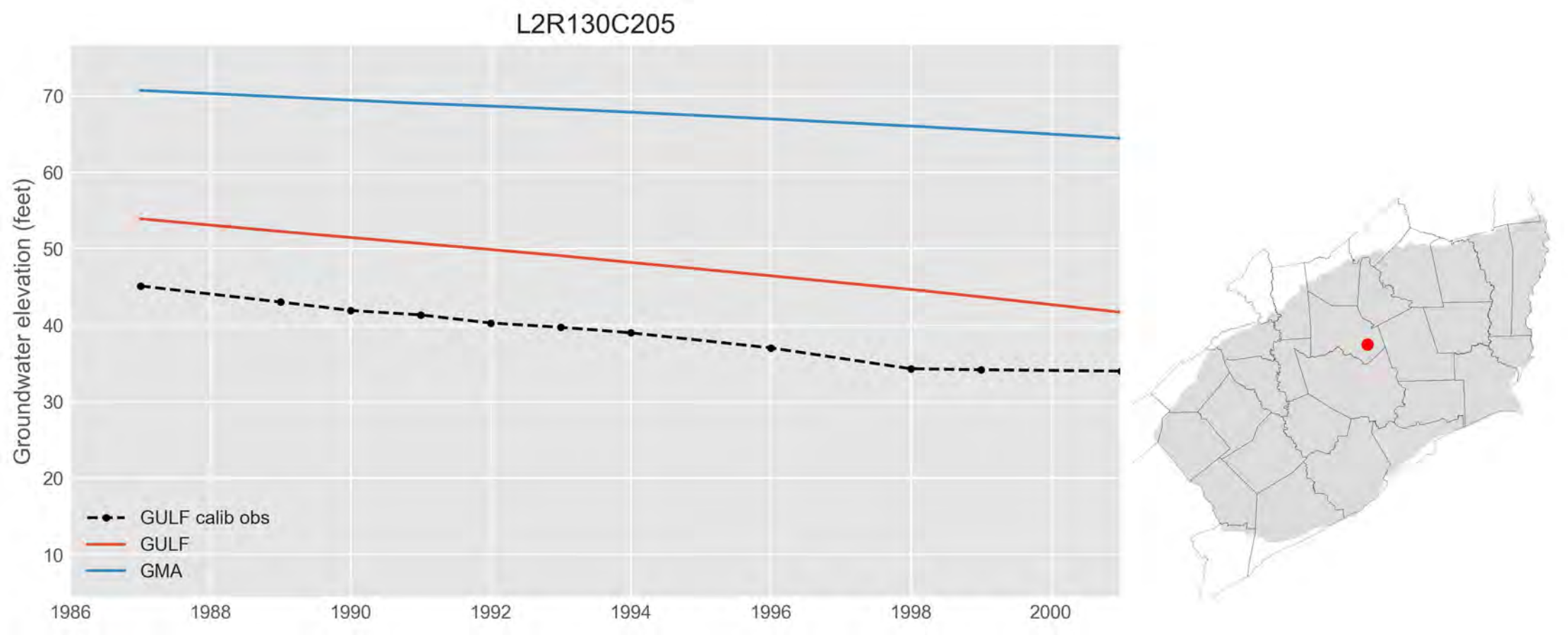

L2R128C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
2000
2005
2010
2015

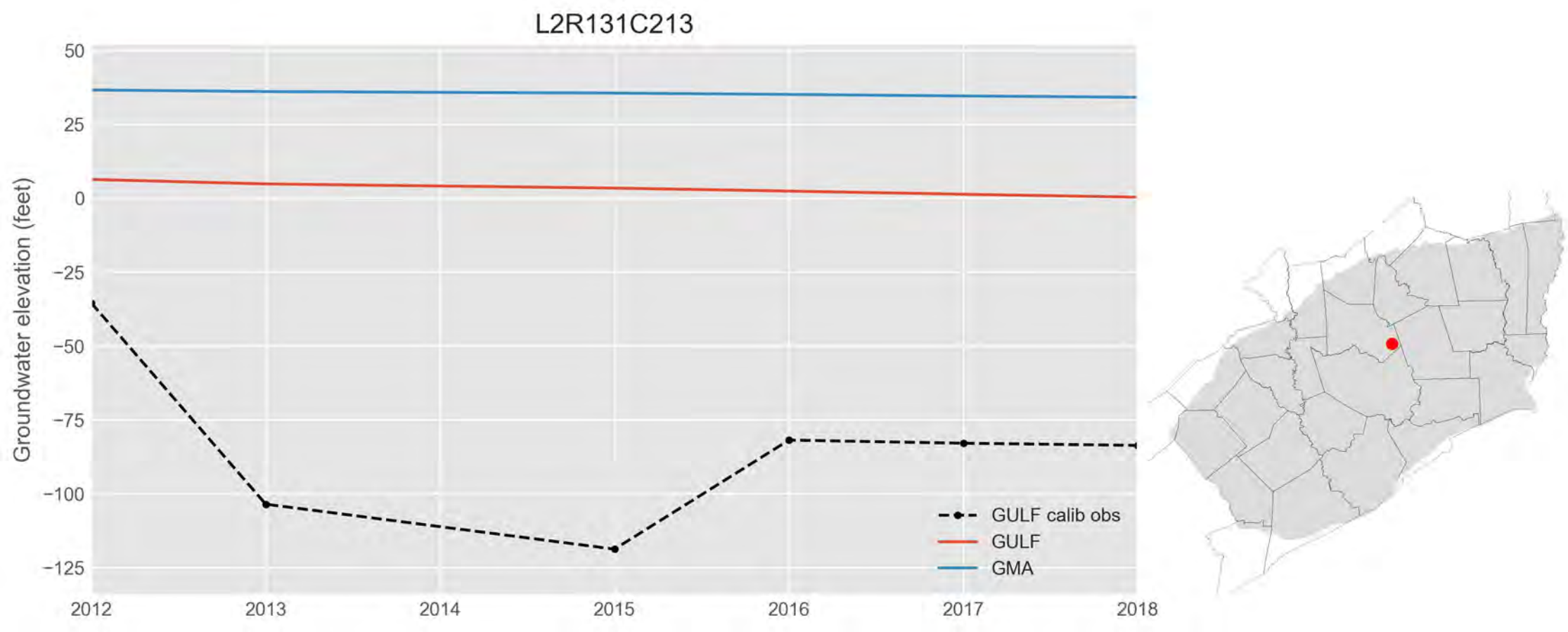
L2R129C191

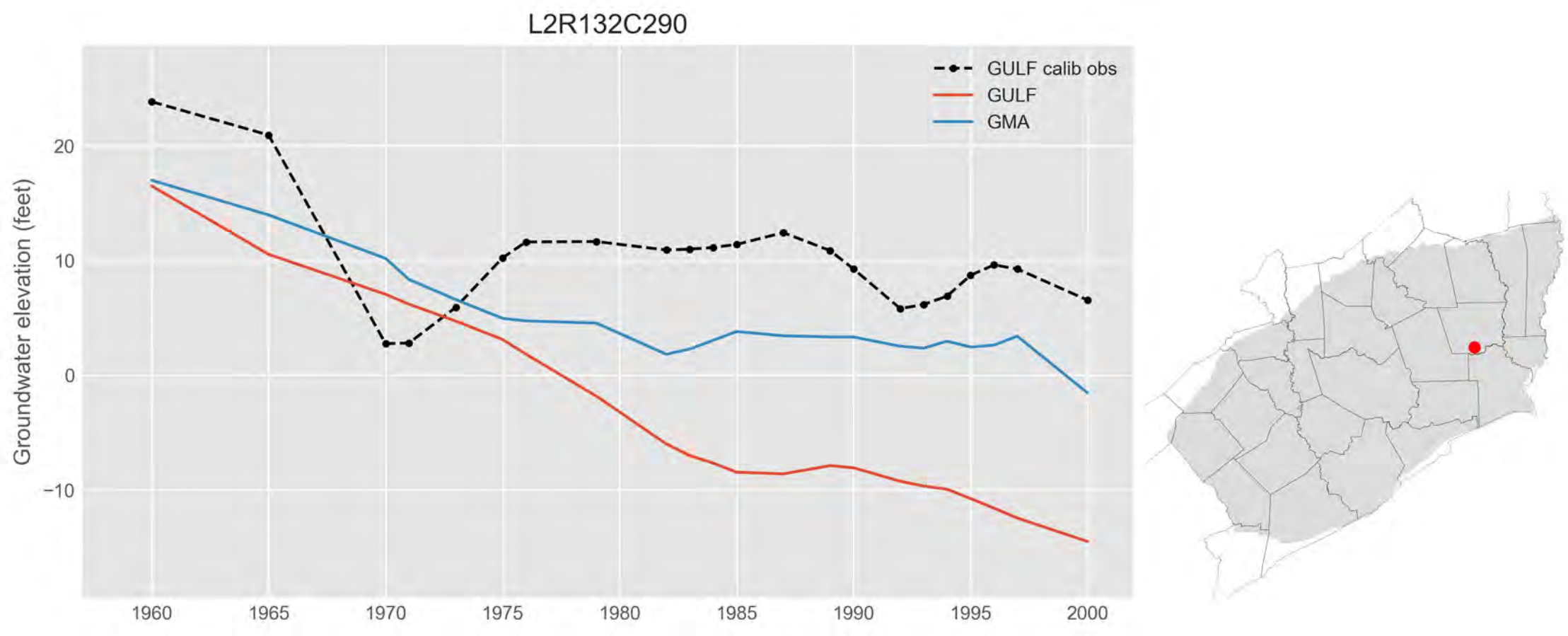

Groundwater elevation (feet)
80
60
40
20
1986
1988
1990
1992
1994
1996
1998
GULF calib obs
GULF
GMA

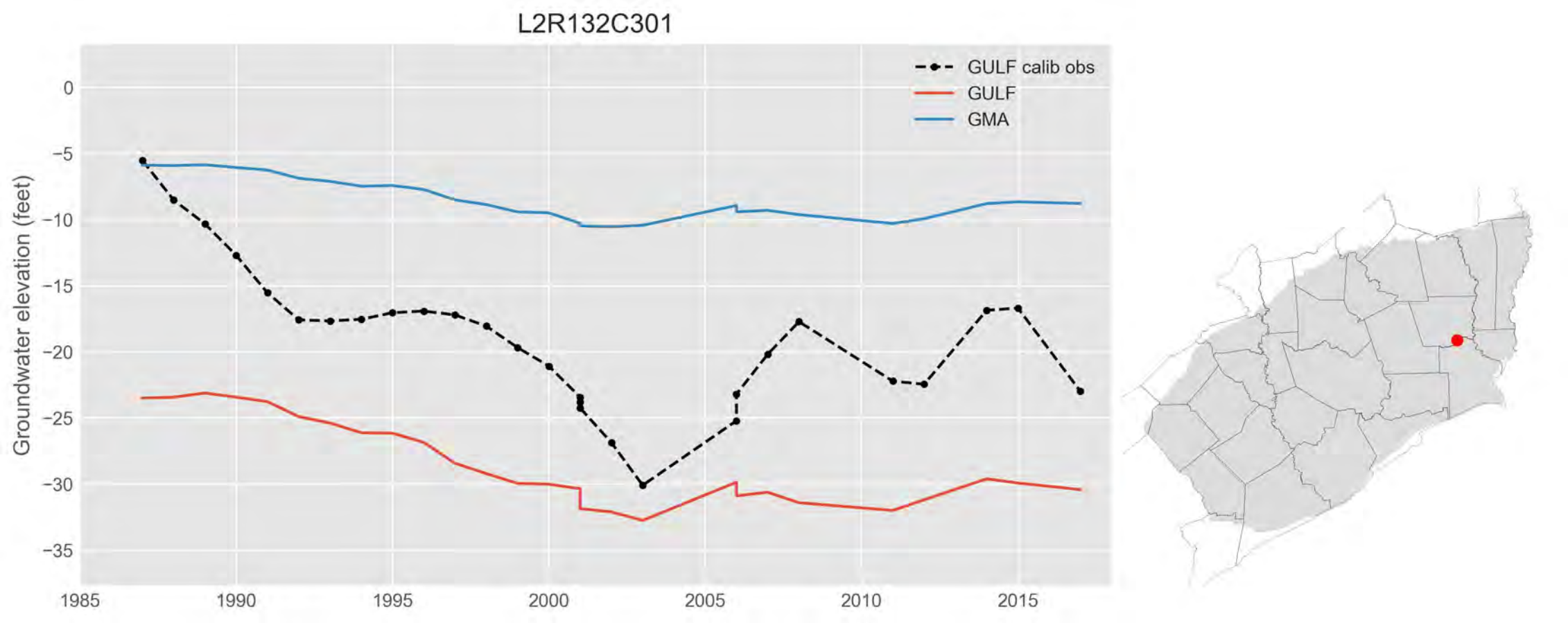

L2R130C167
Groundwater elevation (feet)
160
140
120
100
80
60
40
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA

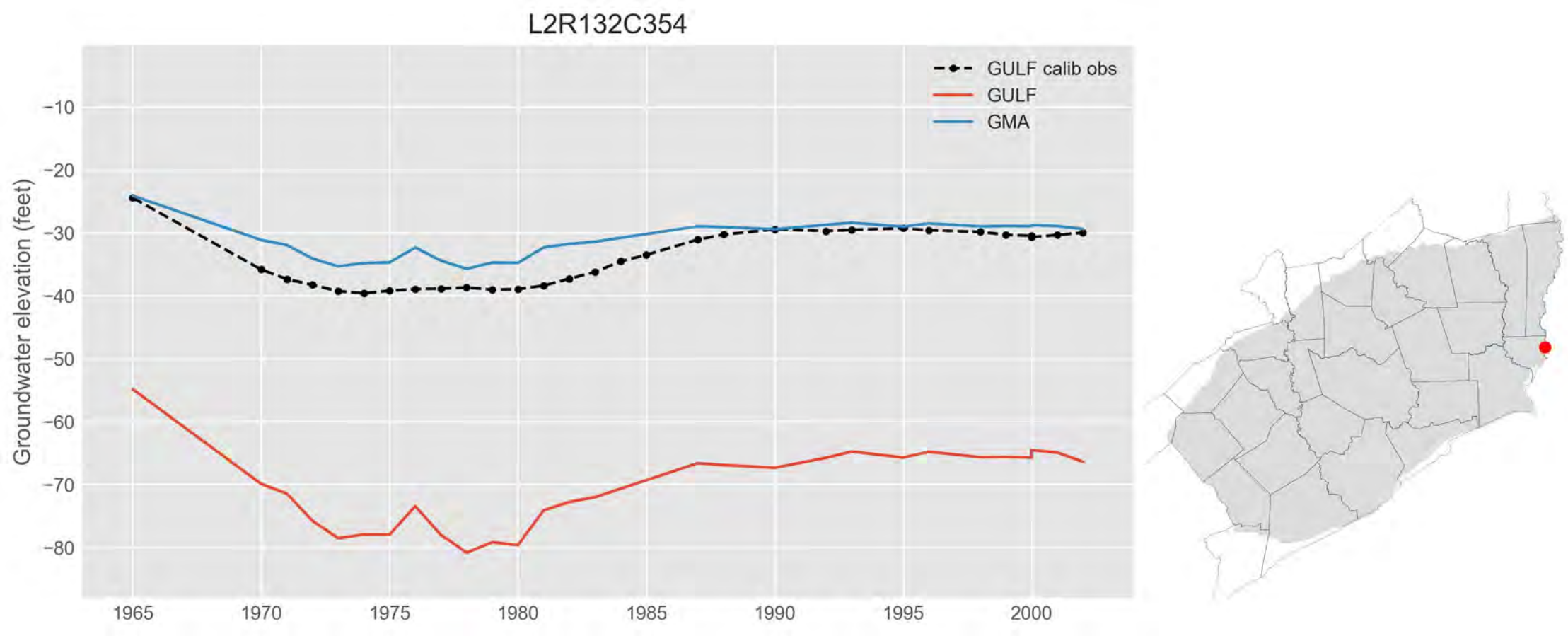

L2R130C196
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
2004
2006
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA


L2R130C205
Groundwater elevation (feet)
70
60
50
40
30
20
10
1986
1988
1990
1992
1994
1996
1998
2000
GULF calib obs
GULF
GMA

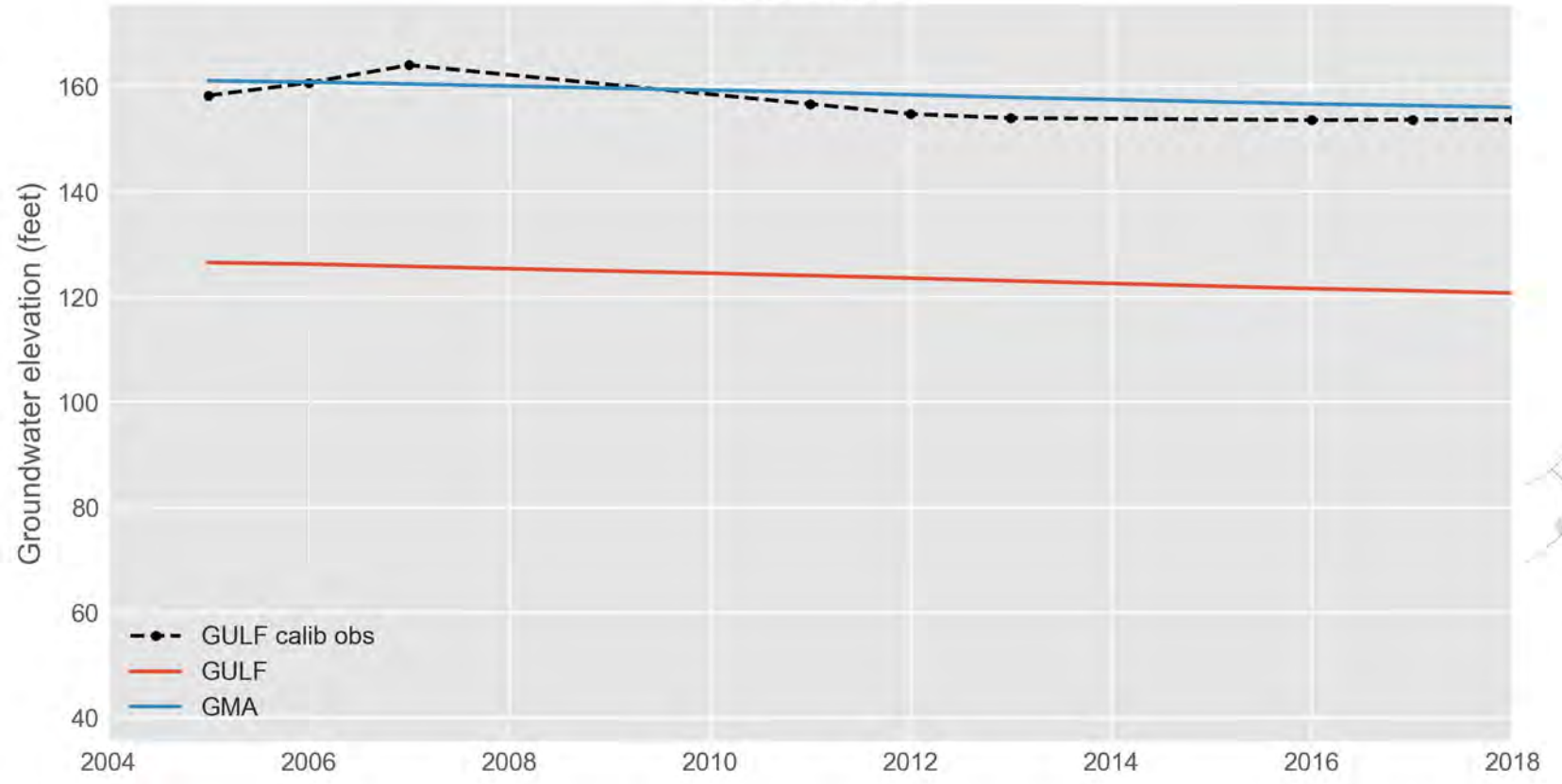

L2R131C213
Groundwater elevation (feet)
50
25
0
−25
−50
−75
−100
−125
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

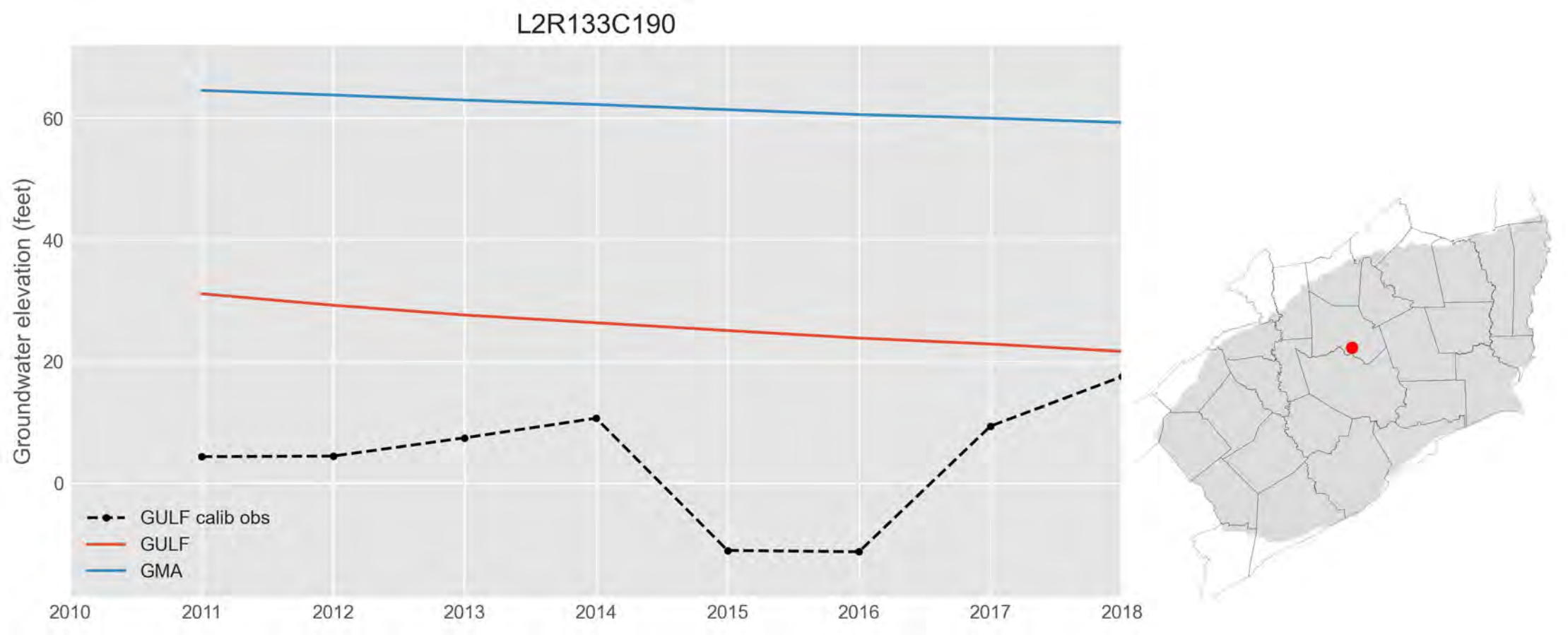

L2R132C290
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
1960
1965
1970
1975
1980
1985
1990
1995
2000

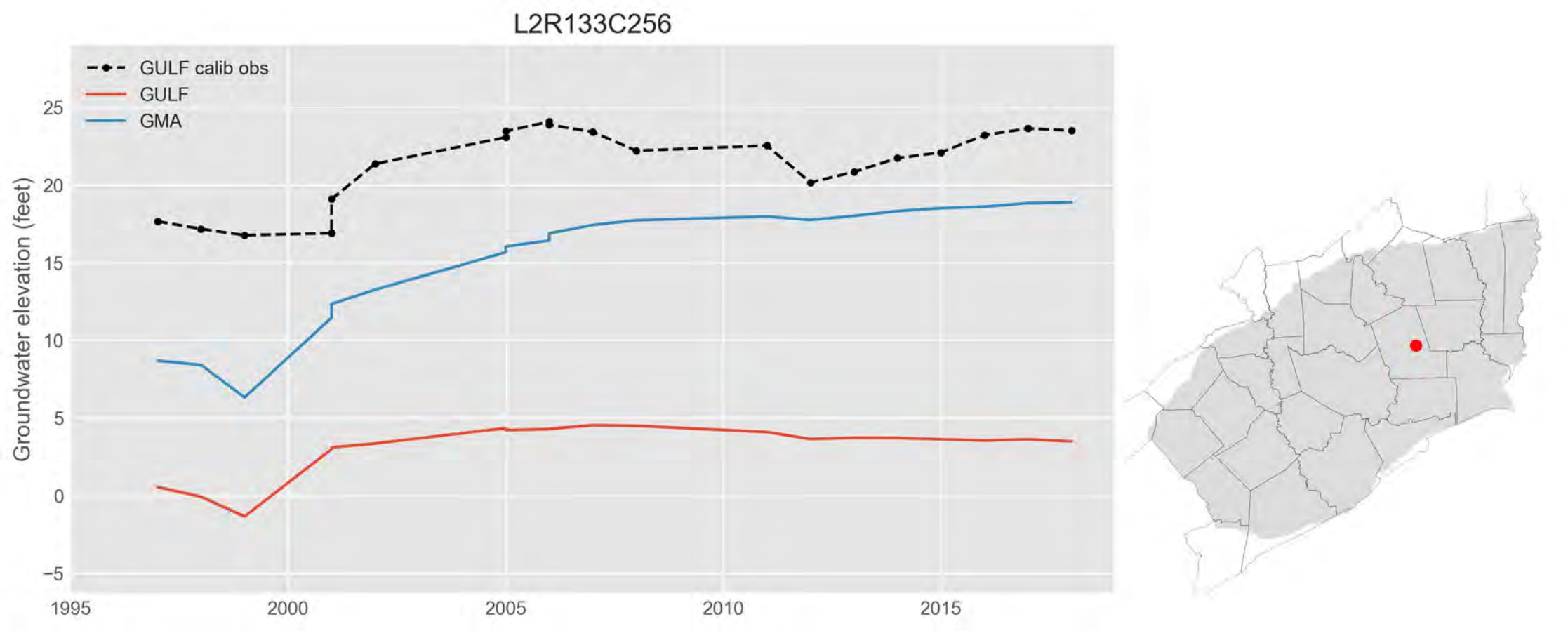

L2R132C301
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
1985
1990
1995
2000
2005
2010
2015

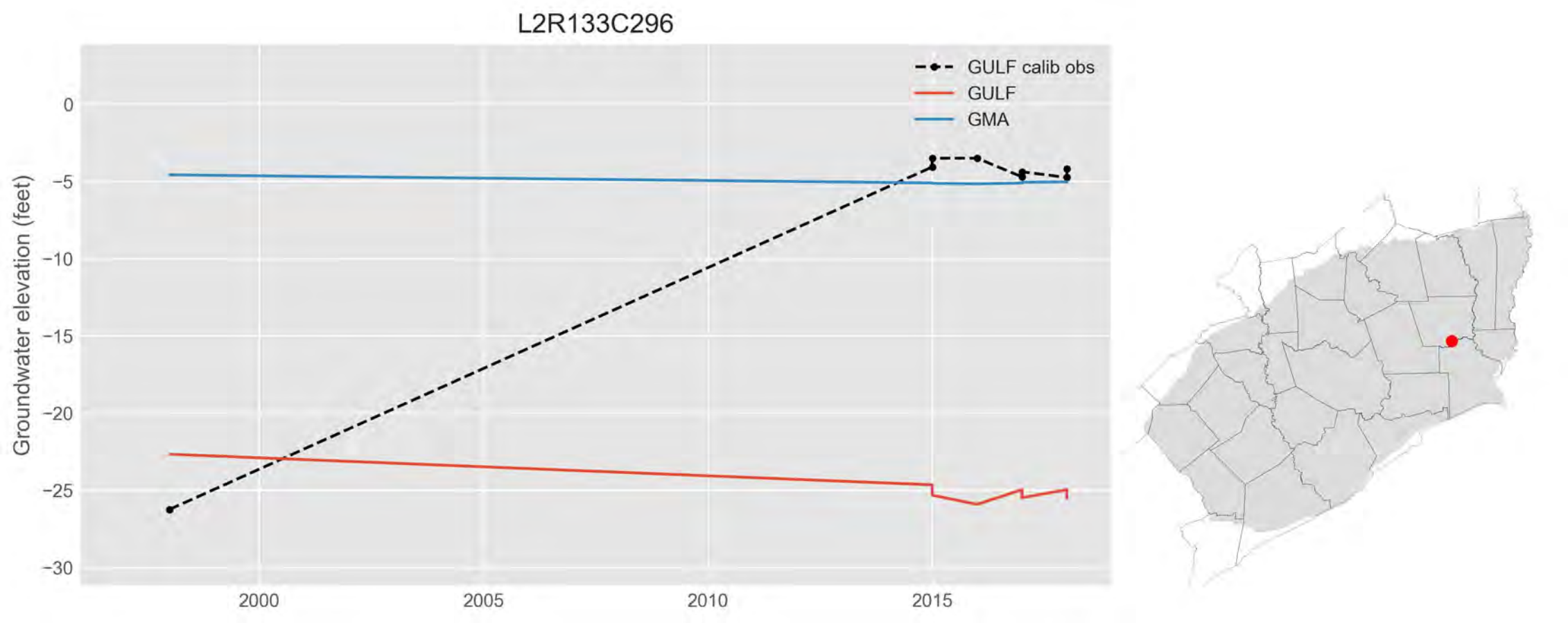

L2R132C354
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
1965
1970
1975
1980
1985
1990
1995
2000

L2R133C163

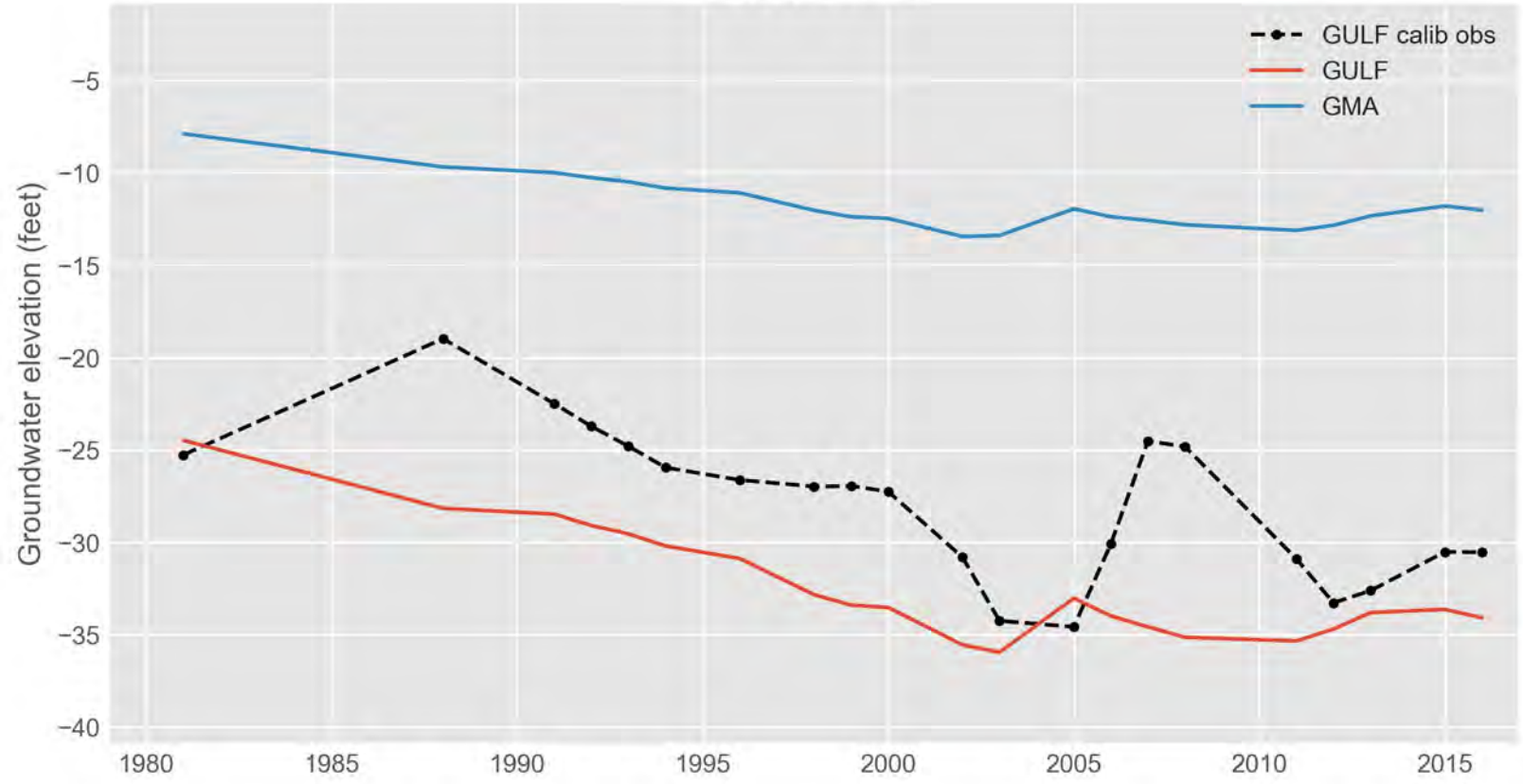

Groundwater elevation (feet)
160
140
120
100
80
60
40
2004
2006
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA

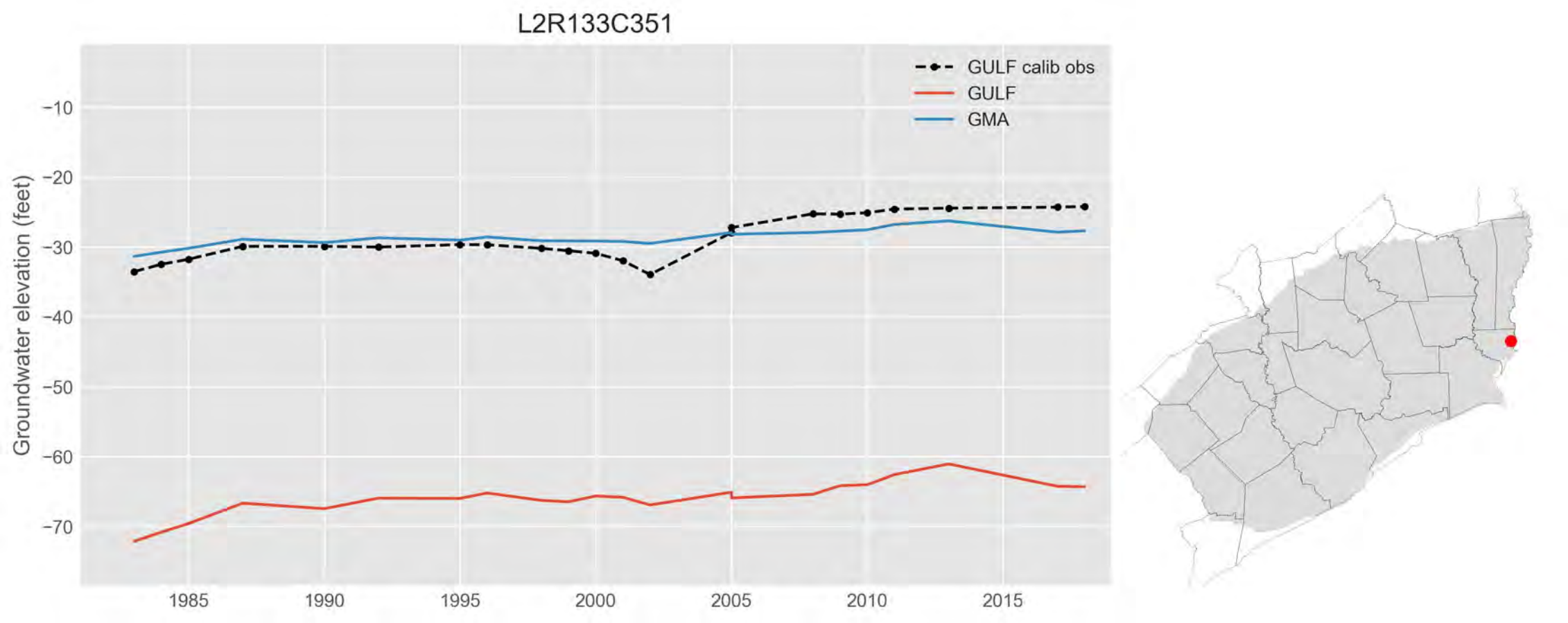

L2R133C190
Groundwater elevation (feet)
60
40
20
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA


L2R133C256
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
25
20
15
10
5
0
−5
1995
2000
2005
2010
2015

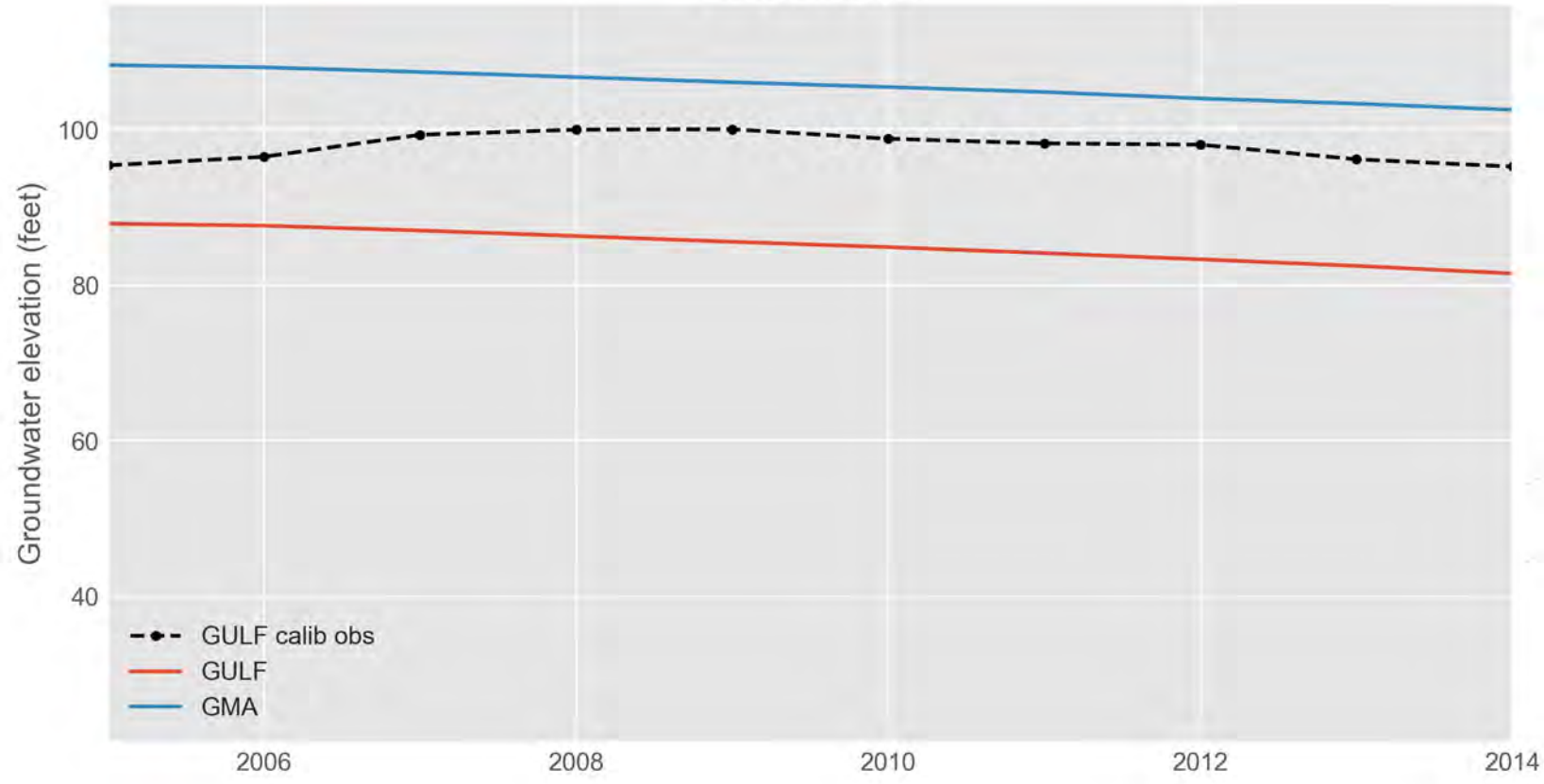

L2R133C296
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
2000
2005
2010
2015

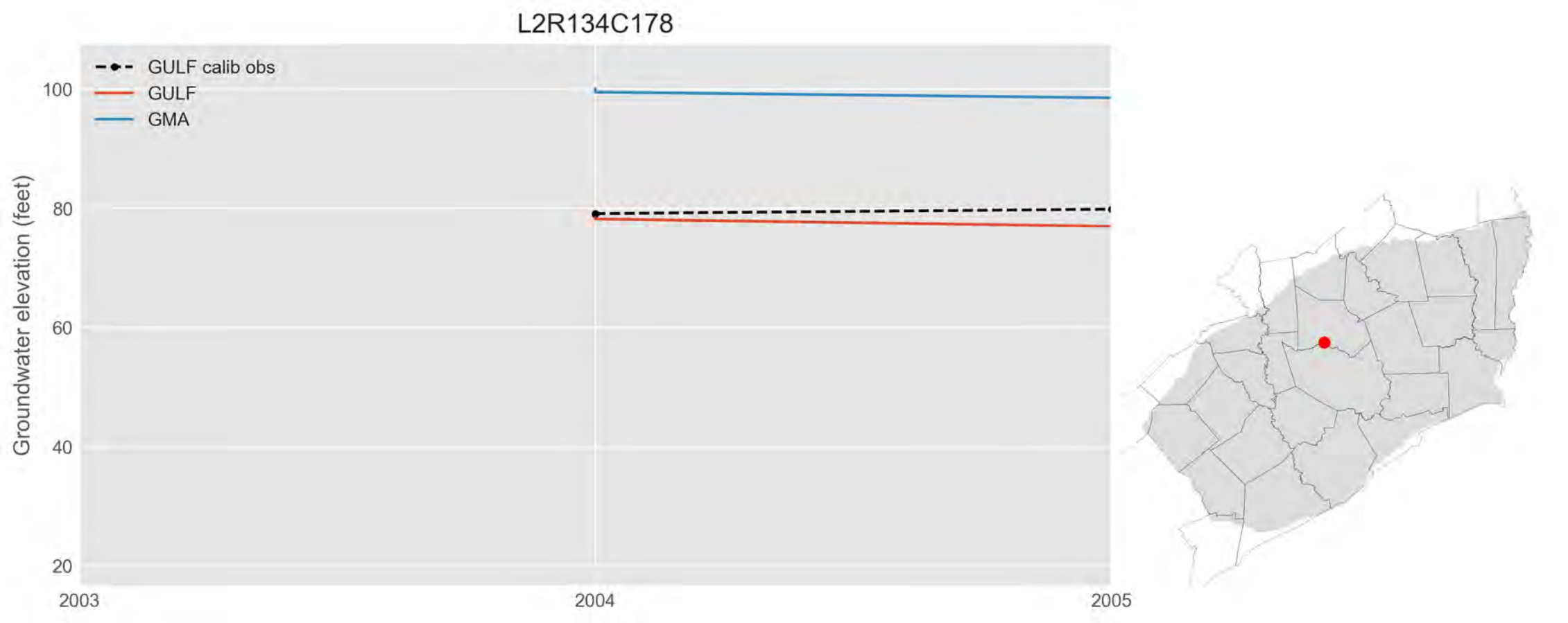
L2R133C305

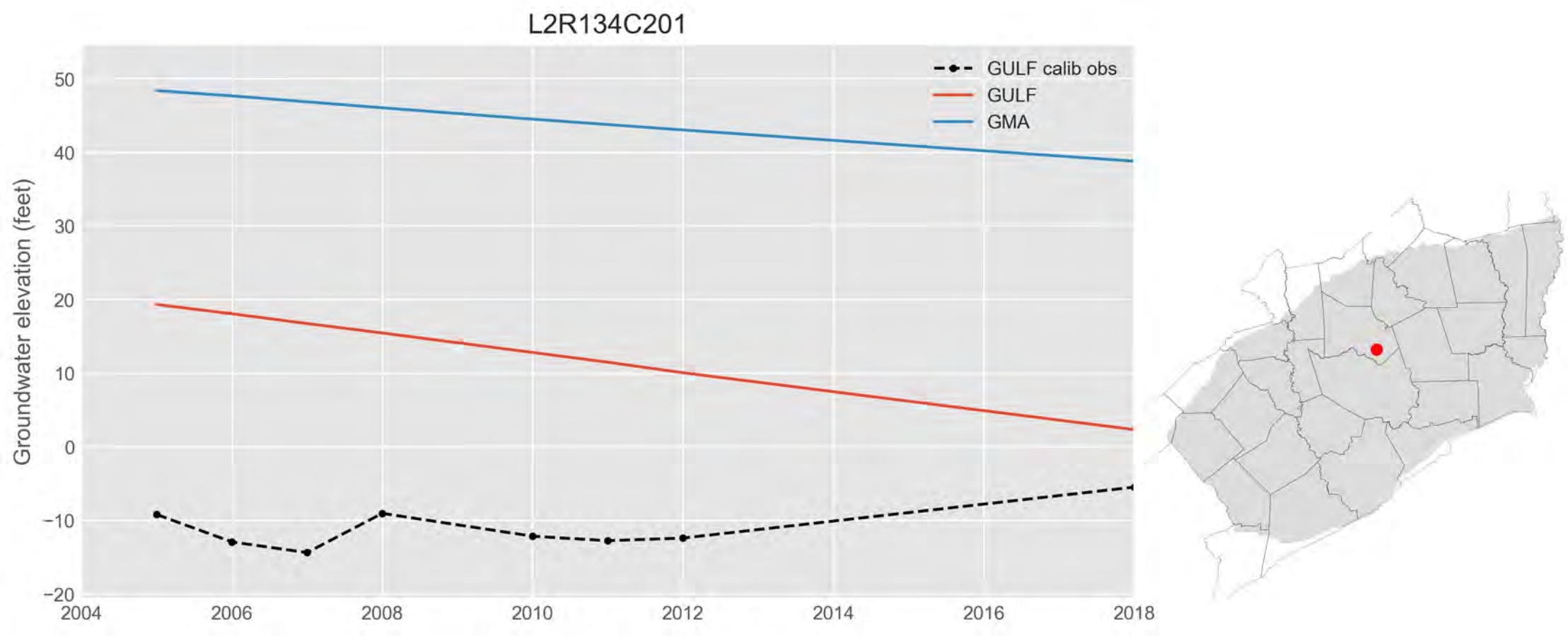

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
1980
1985
1990
1995
2000
2005
2010
2015

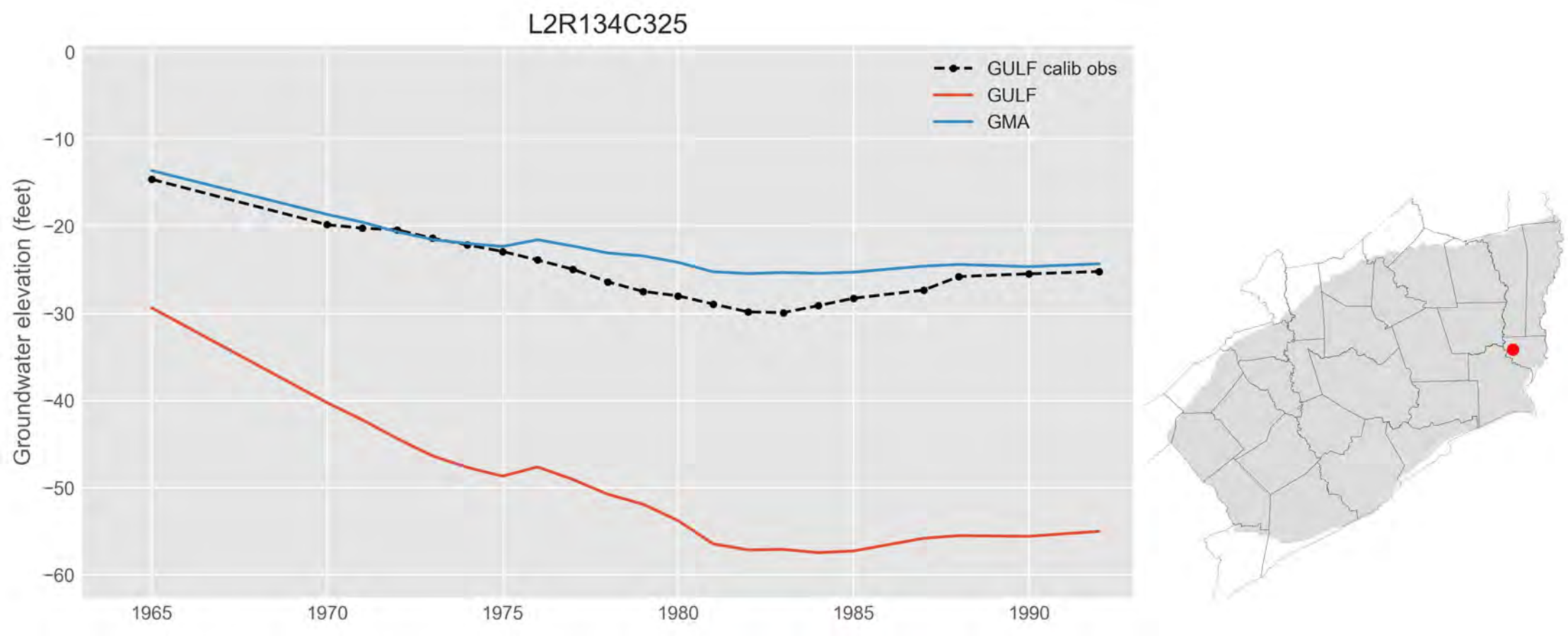

L2R133C351
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
1985
1990
1995
2000
2005
2010
2015

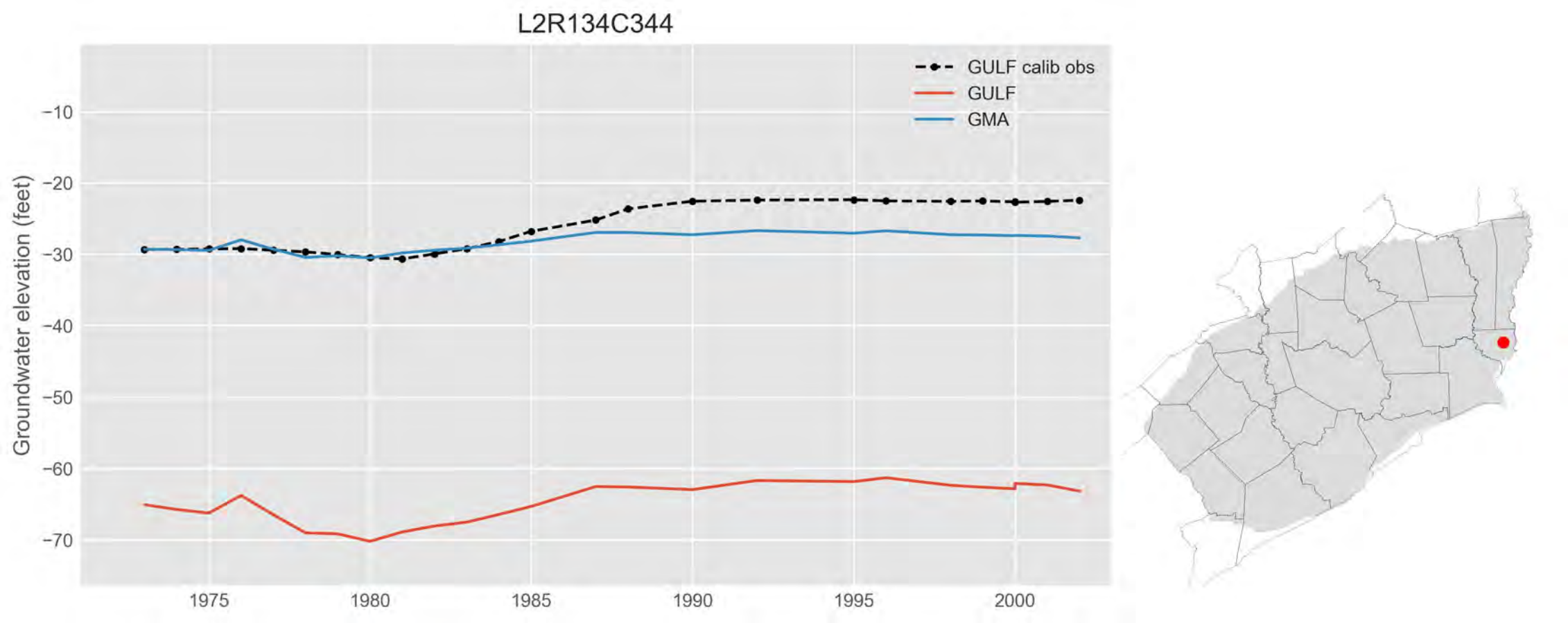
L2R134C175

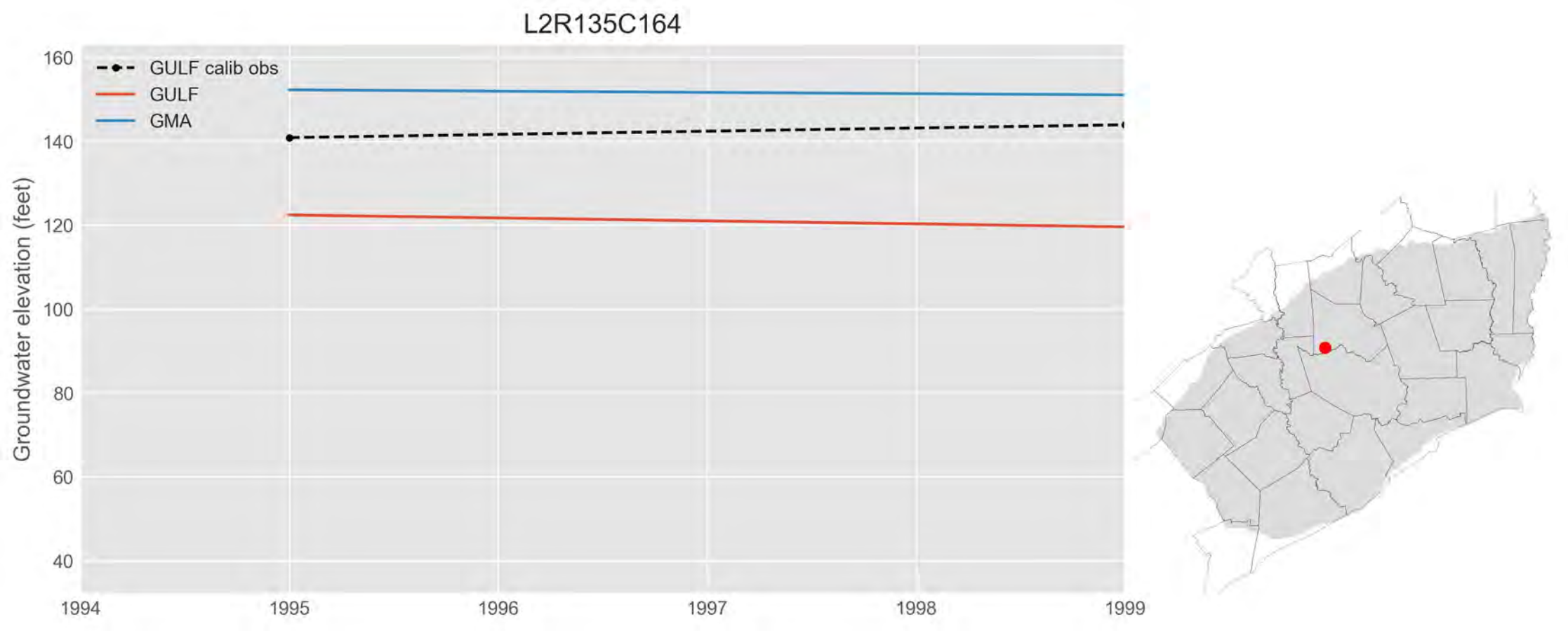

Groundwater elevation (feet)
100
80
60
40
2006
2008
2010
2012
2014
GULF calib obs
GULF
GMA


L2R134C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
2003
2004
2005

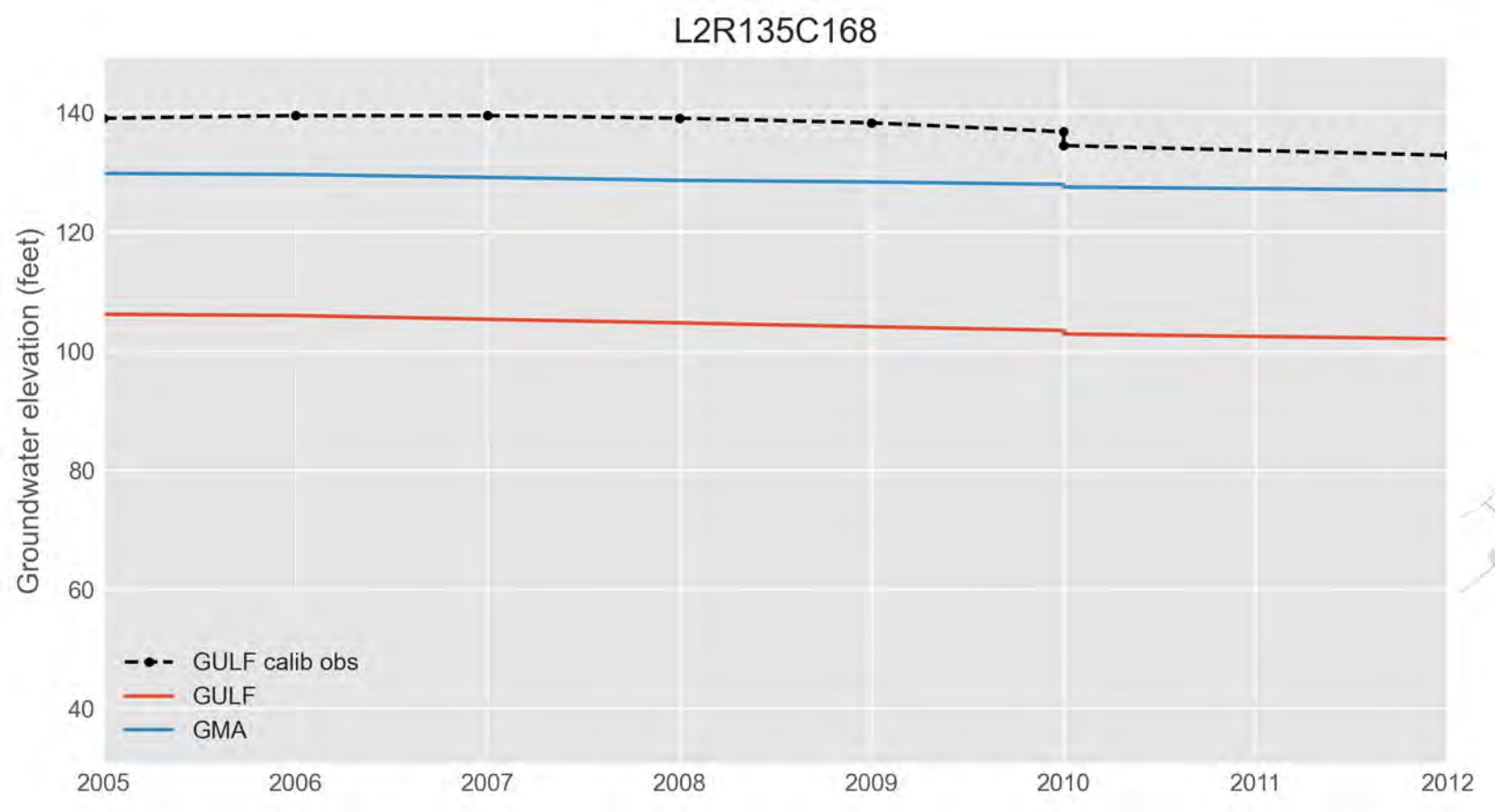

L2R134C201
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
−10
−20
2004
2006
2008
2010
2012
2014
2016
2018

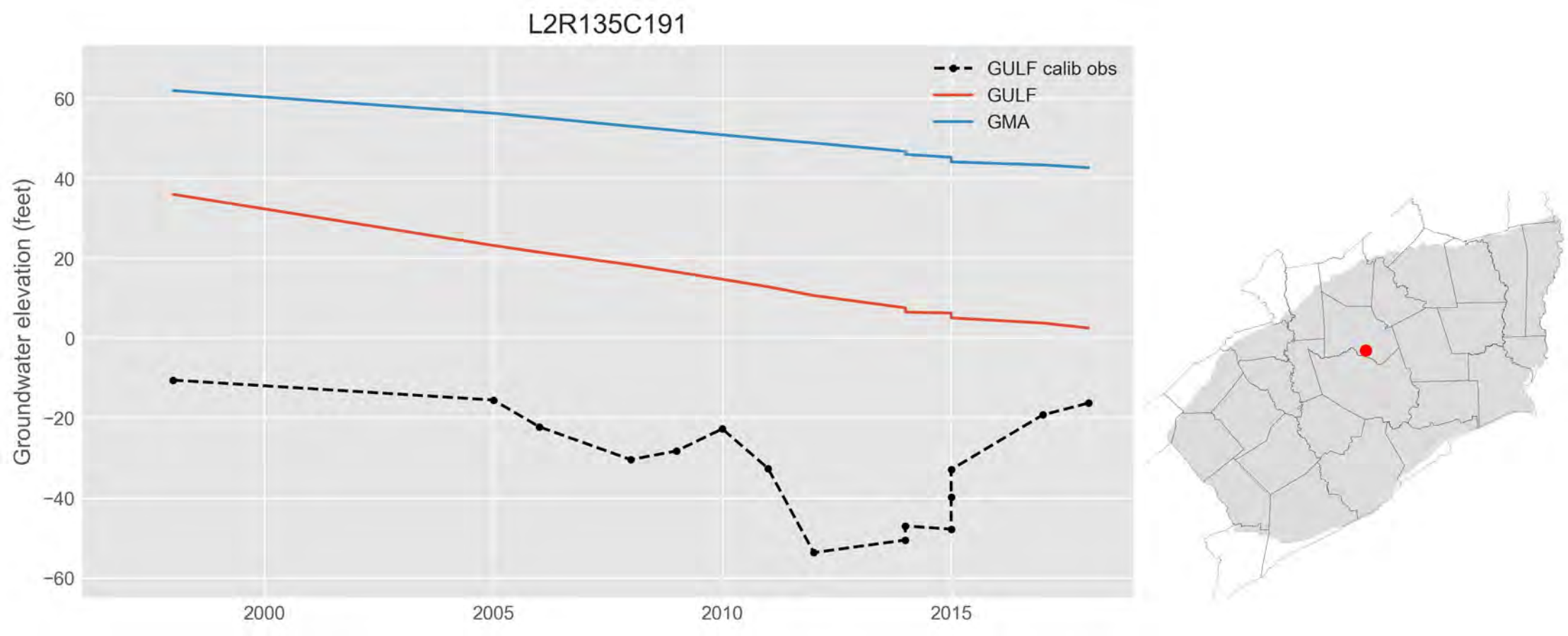

L2R134C325
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1965
1970
1975
1980
1985
1990

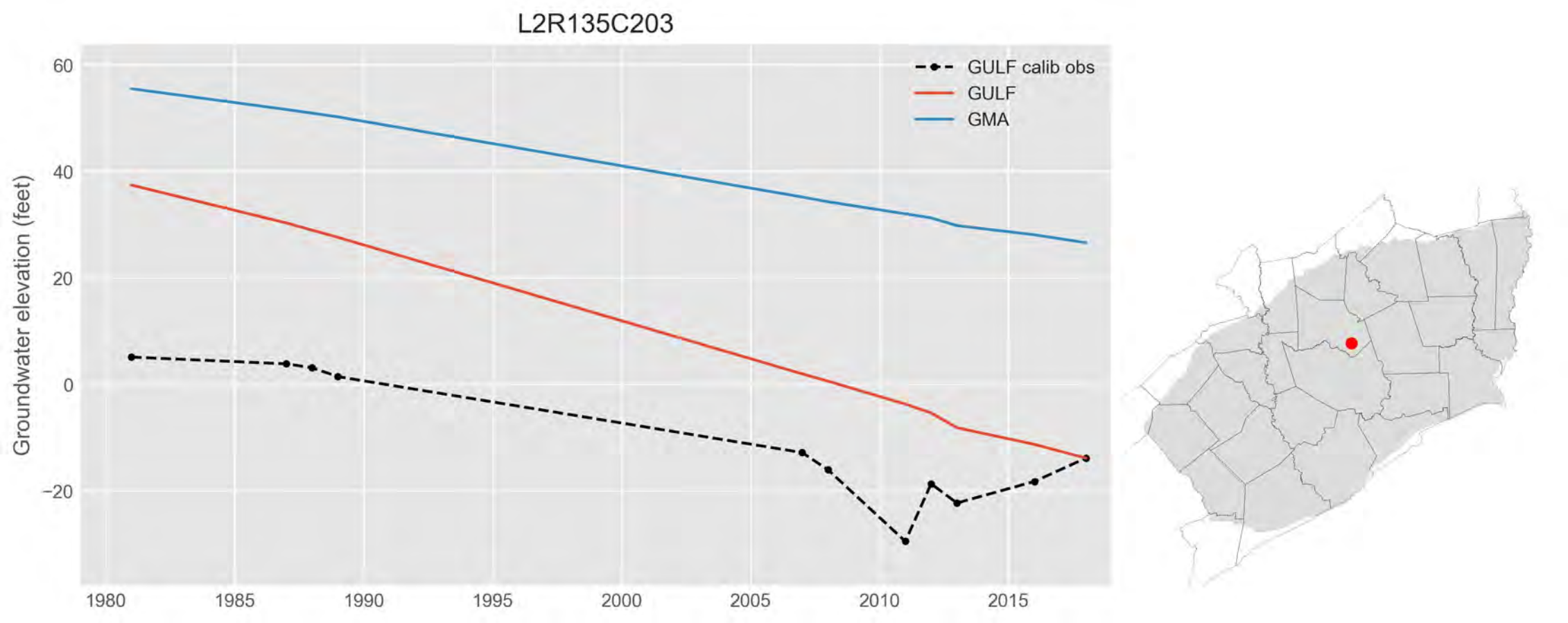

L2R134C344
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
1975
1980
1985
1990
1995
2000

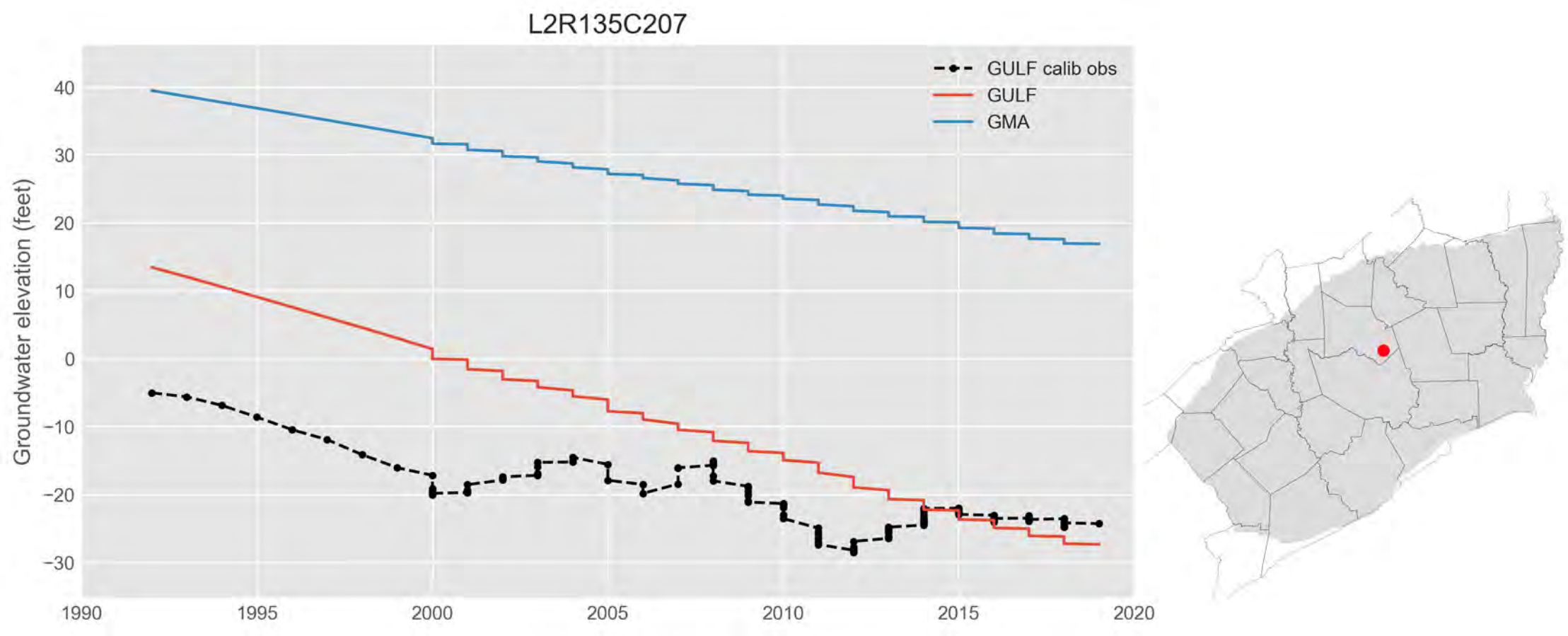

L2R135C164
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
1994
1995
1996
1997
1998
1999

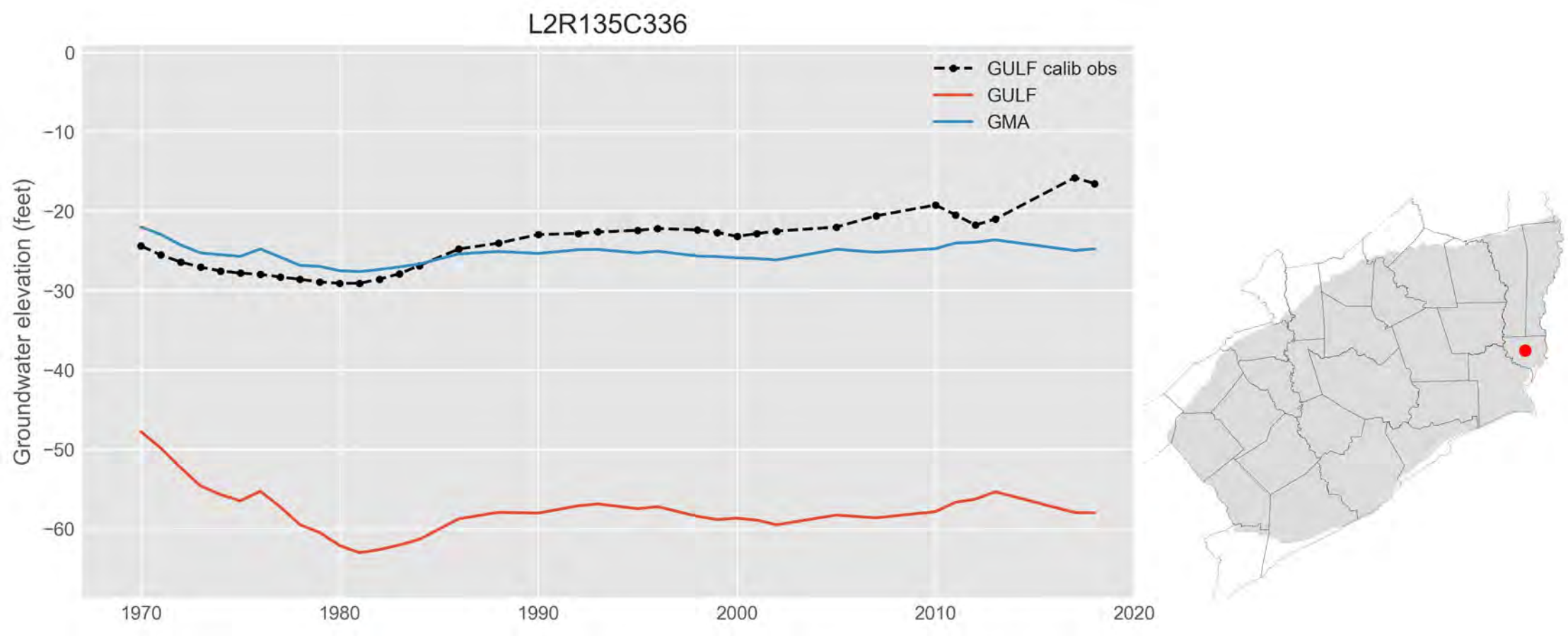
L2R135C168

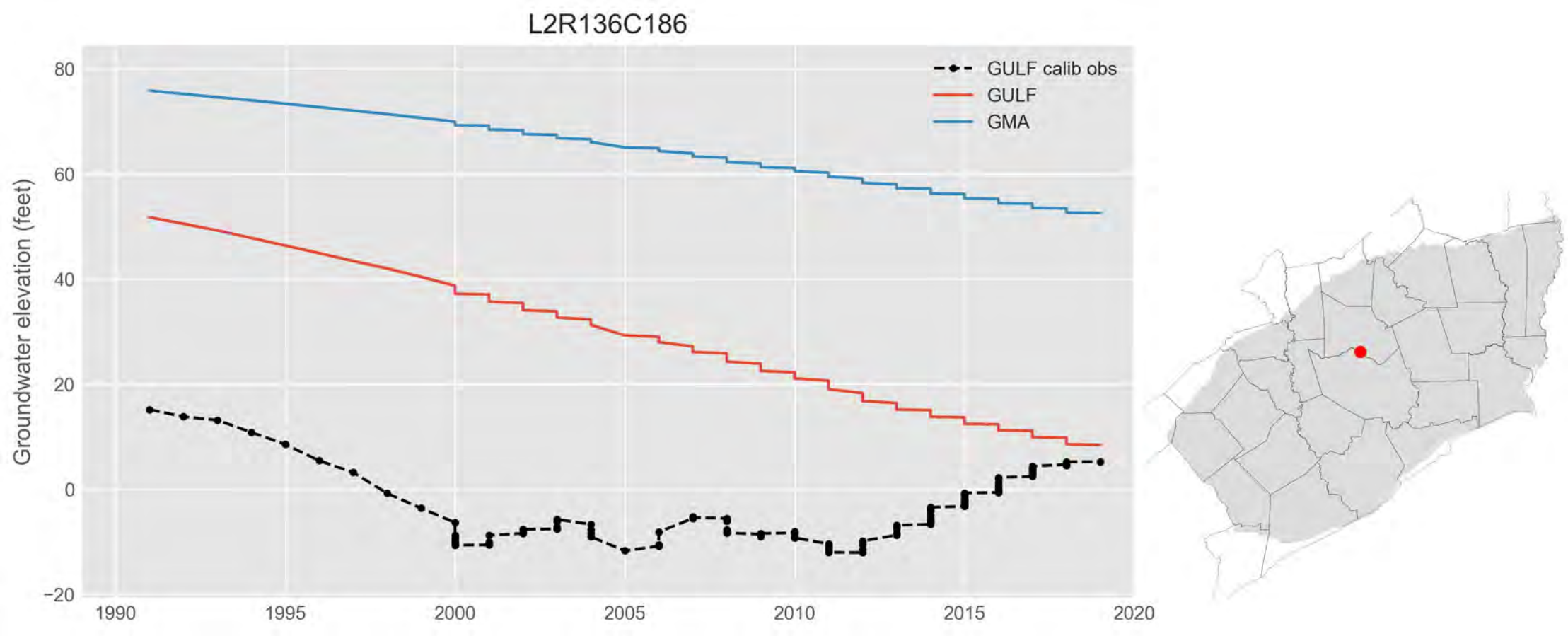

Groundwater elevation (feet)
140
120
100
80
60
40
2005
2006
2007
2008
2009
2010
2011
2012
GULF calib obs
GULF
GMA

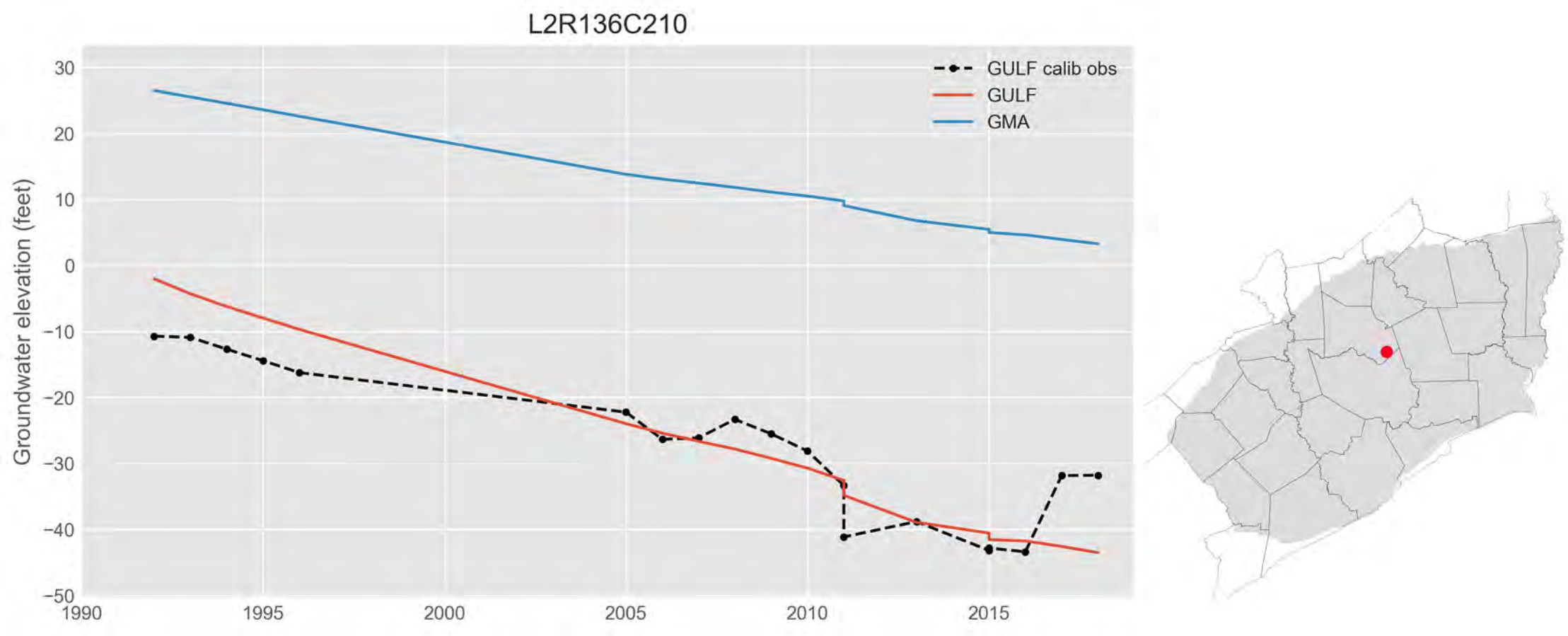

L2R135C191
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
40
20
0
−20
−40
−60
2000
2005
2010
2015

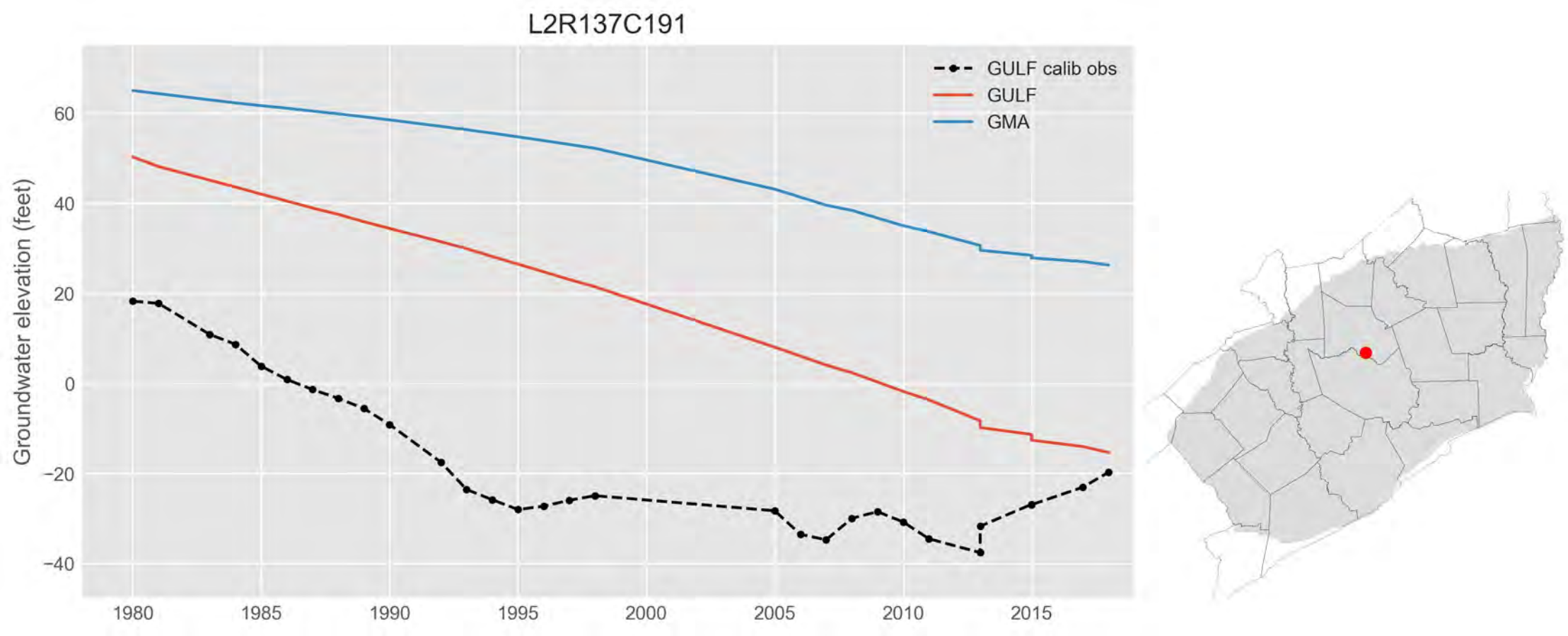

L2R135C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
40
20
0
−20
1980
1985
1990
1995
2000
2005
2010
2015

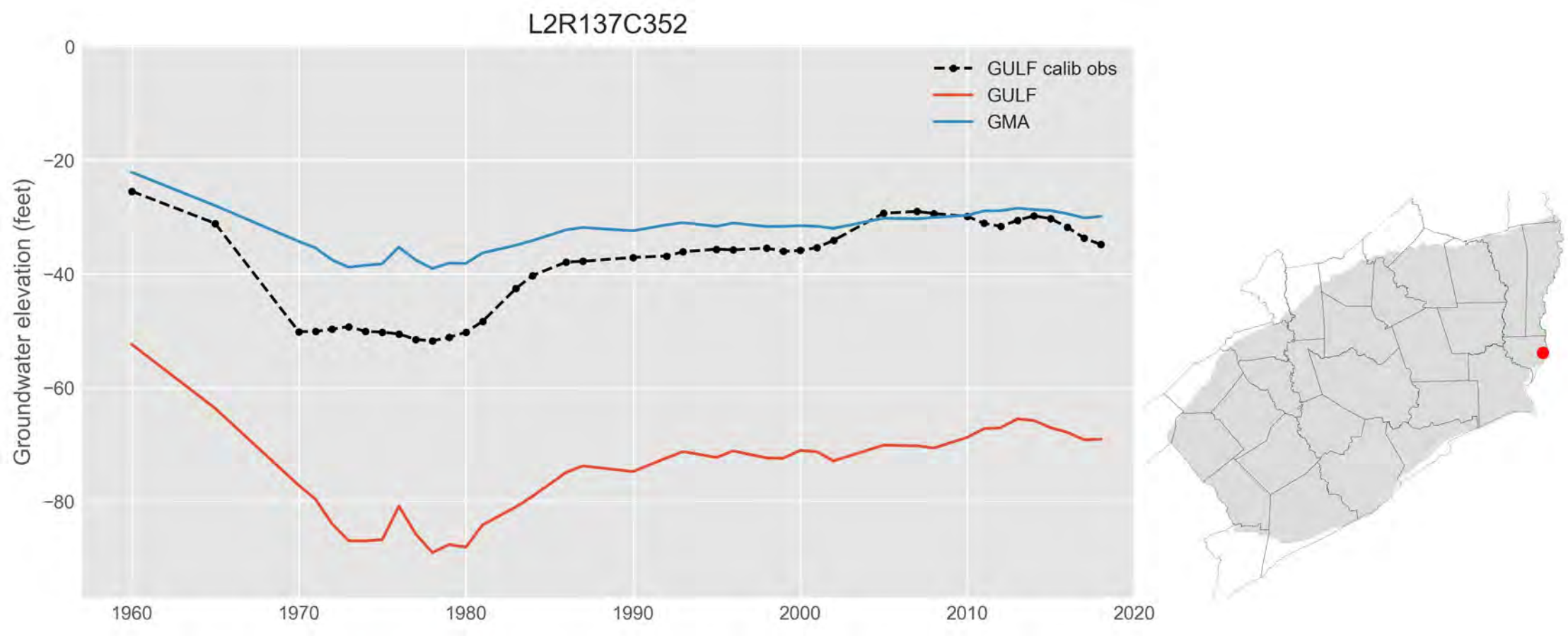

L2R135C207
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
30
20
10
0
−10
−20
−30
1990
1995
2000
2005
2010
2015
2020

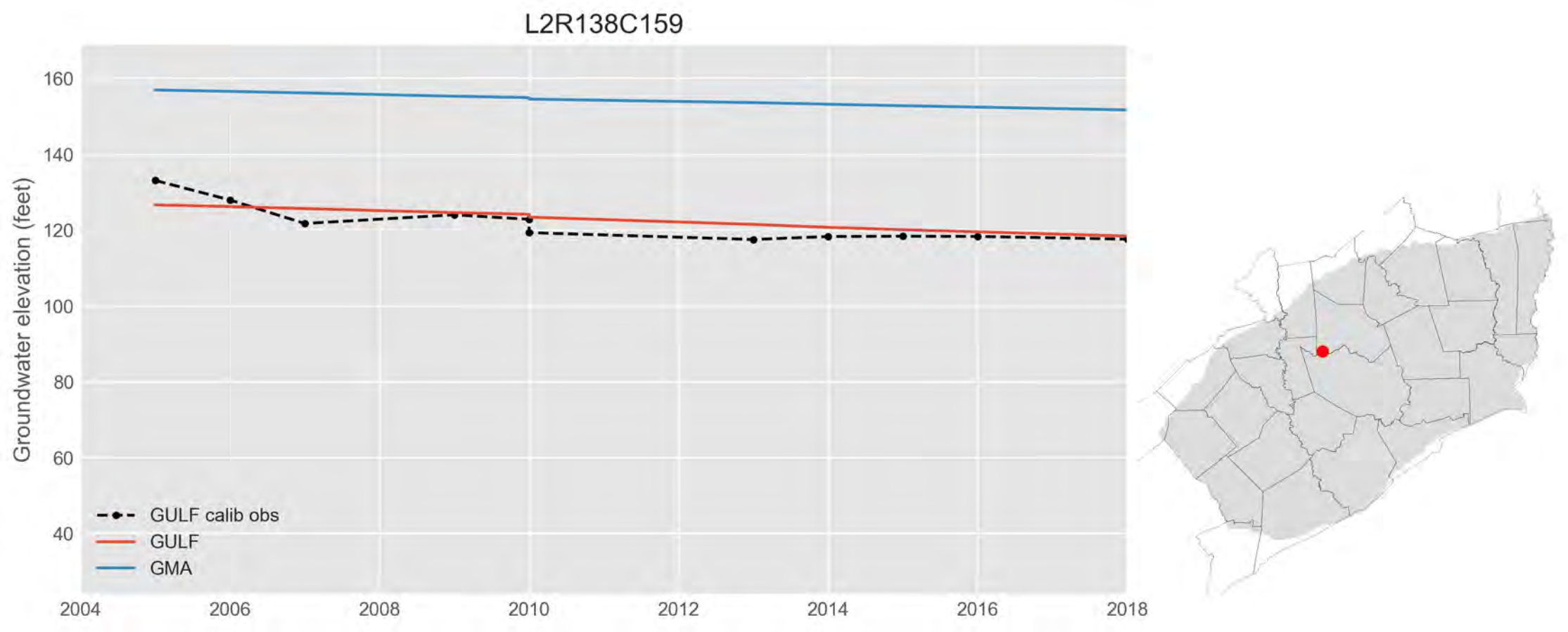

L2R135C336
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1970
1980
1990
2000
2010
2020

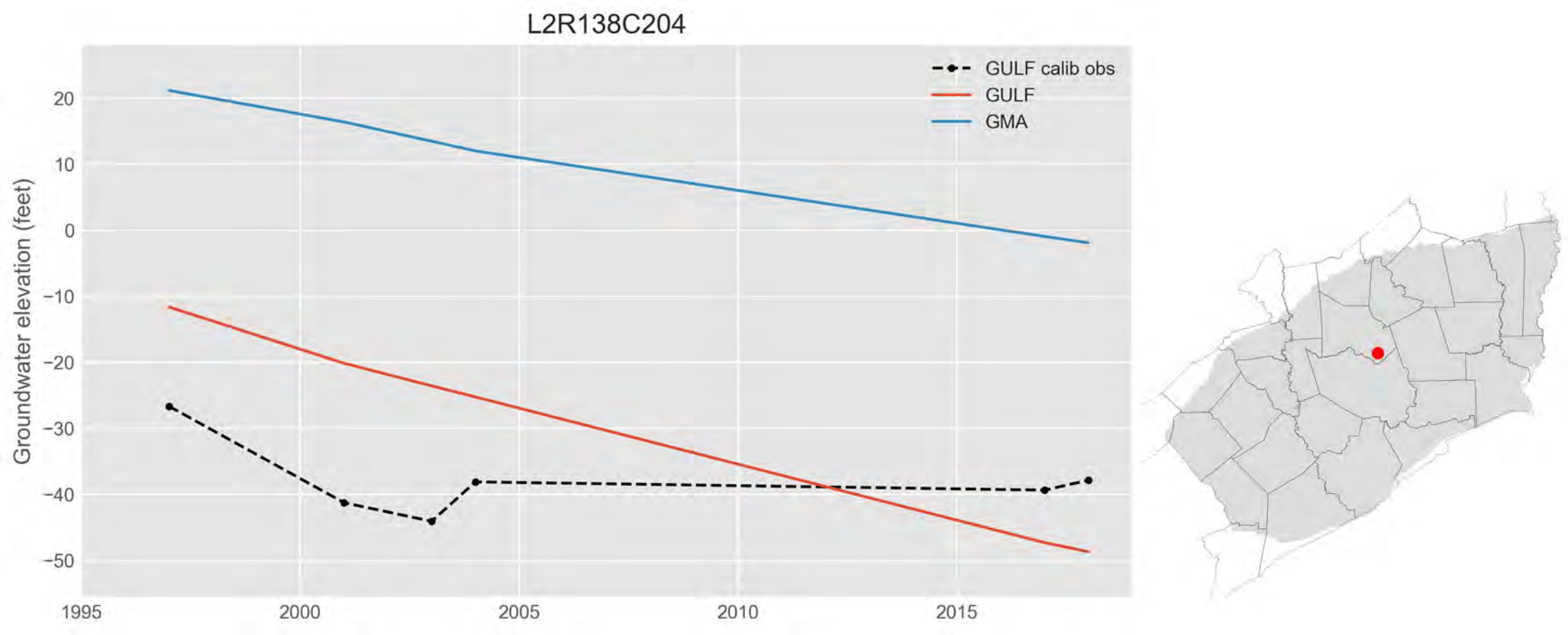

L2R136C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
1990
1995
2000
2005
2010
2015
2020

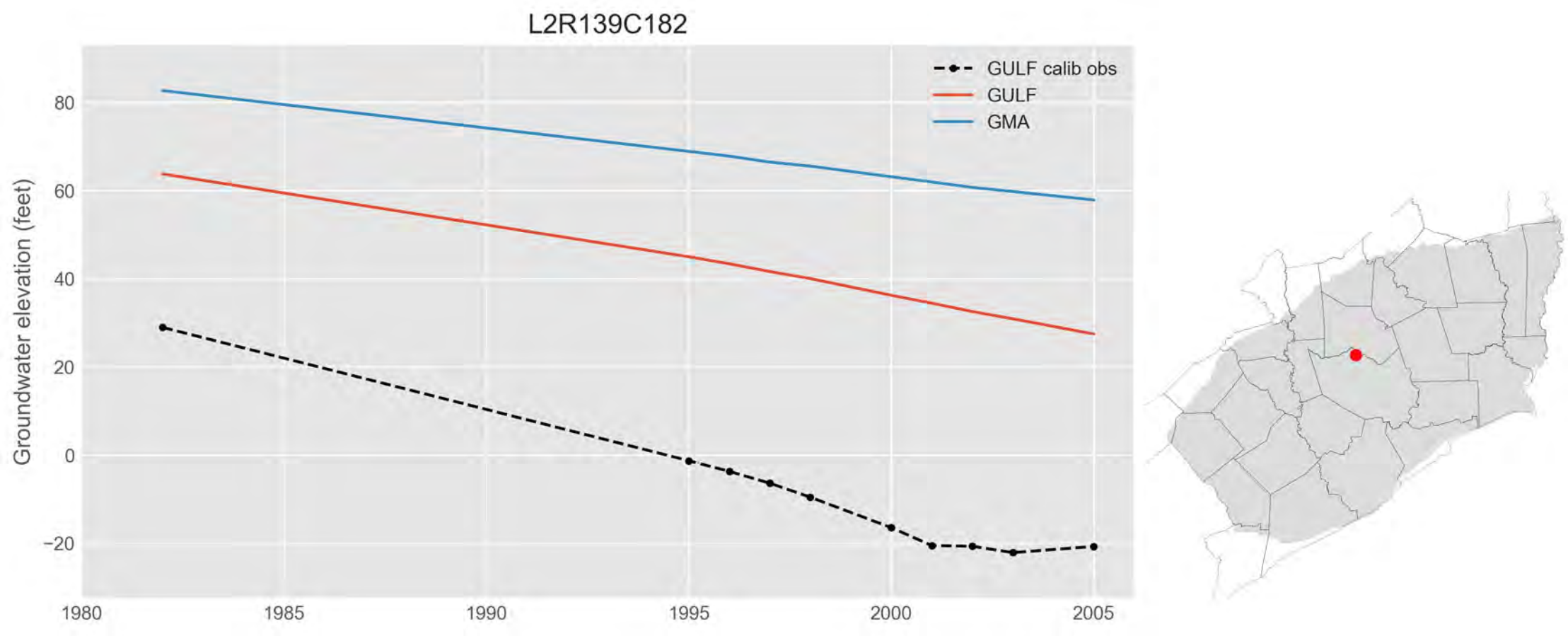

L2R136C210
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
−30
−40
−50
1990
1995
2000
2005
2010
2015

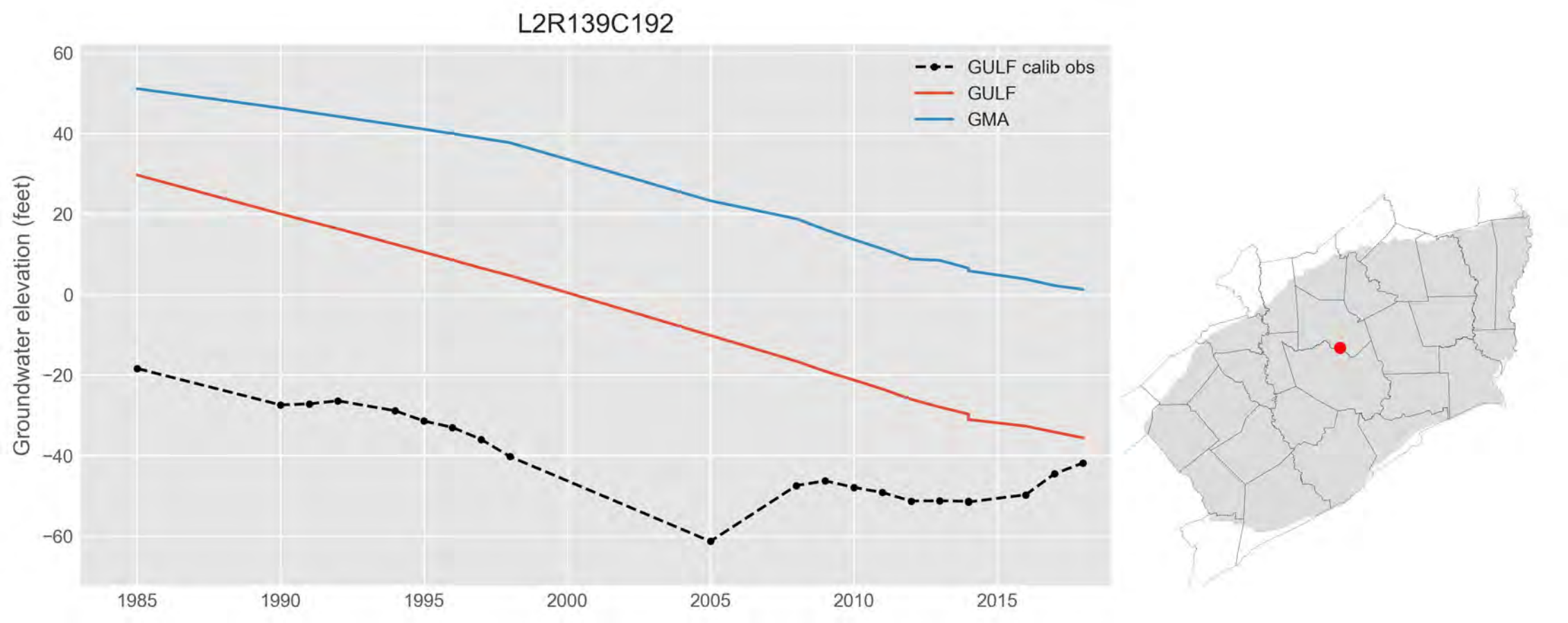

L2R137C191
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
40
20
0
−20
−40
1980
1985
1990
1995
2000
2005
2010
2015

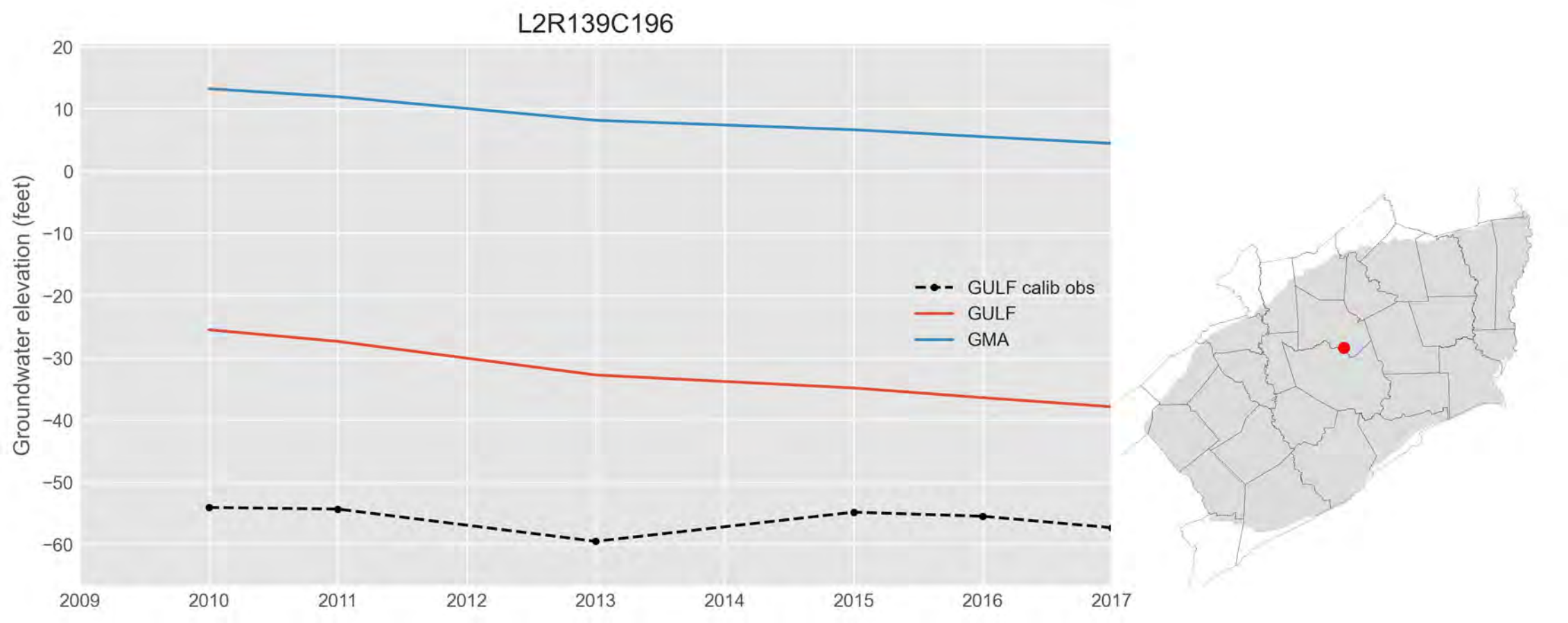

L2R137C352
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
1960
1970
1980
1990
2000
2010
2020

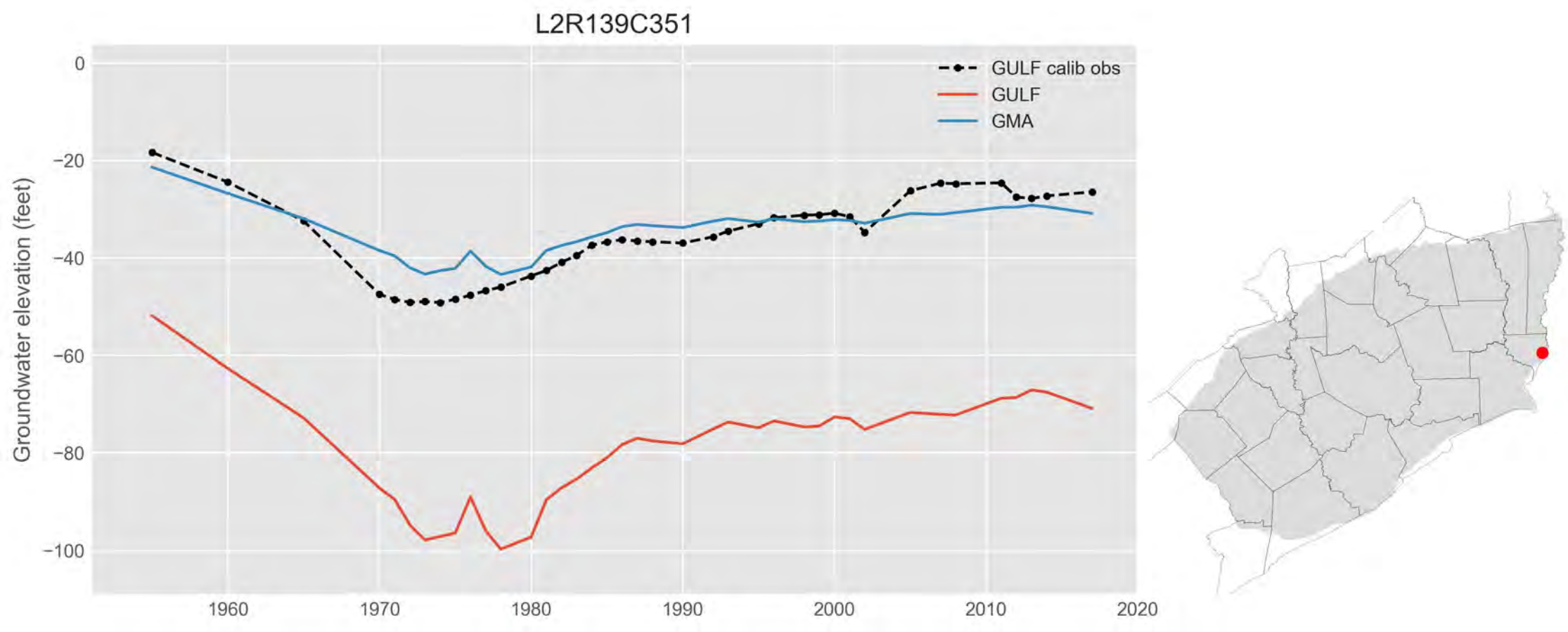

L2R138C159
Groundwater elevation (feet)
160
140
120
100
80
60
40
2004
2006
2008
2010
2012
2014
2016
2018
GULF calib obs
GULF
GMA

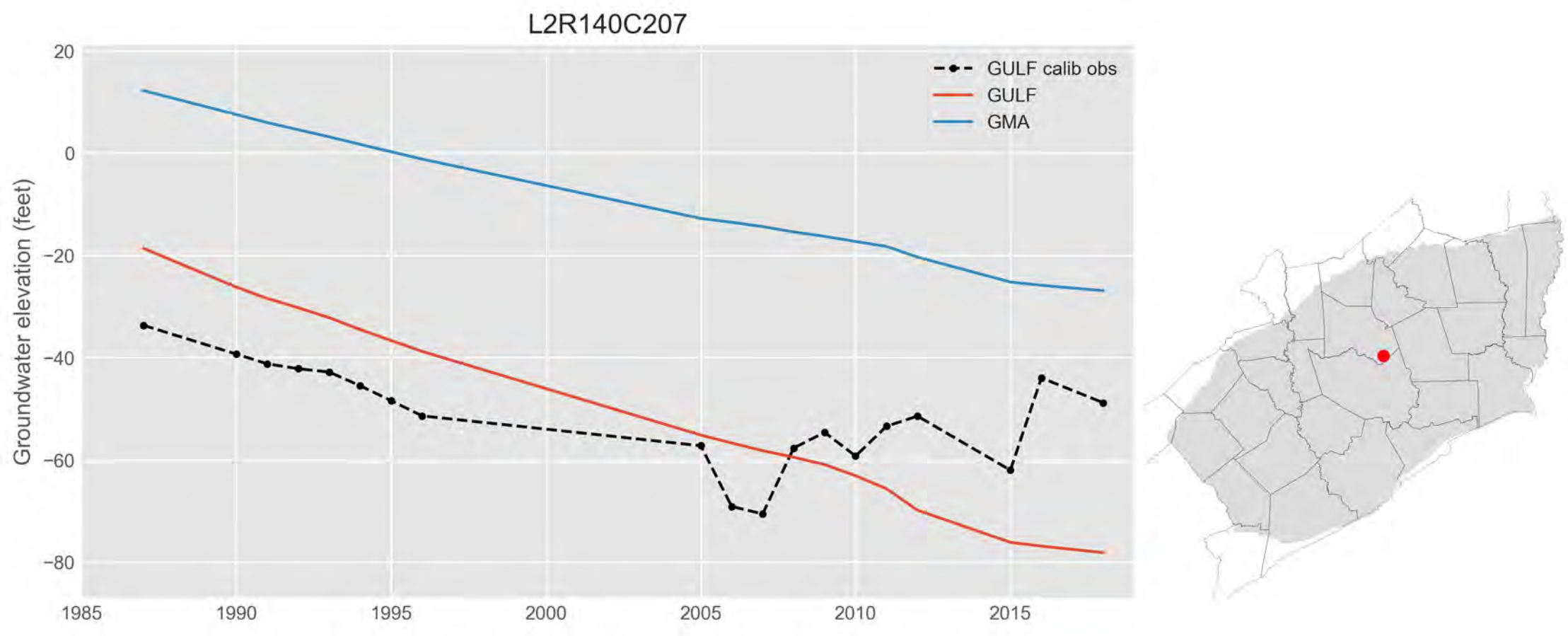

L2R138C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
−50
1995
2000
2005
2010
2015

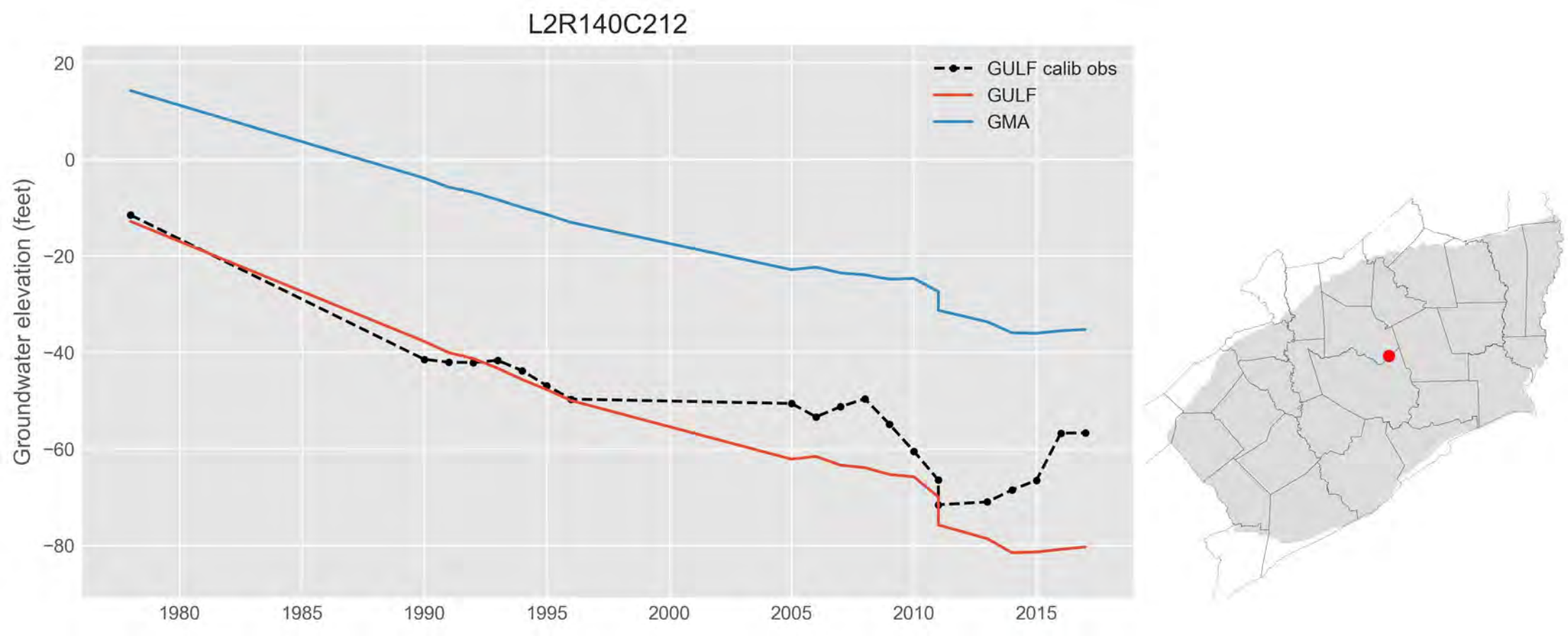

L2R139C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
1980
1985
1990
1995
2000
2005

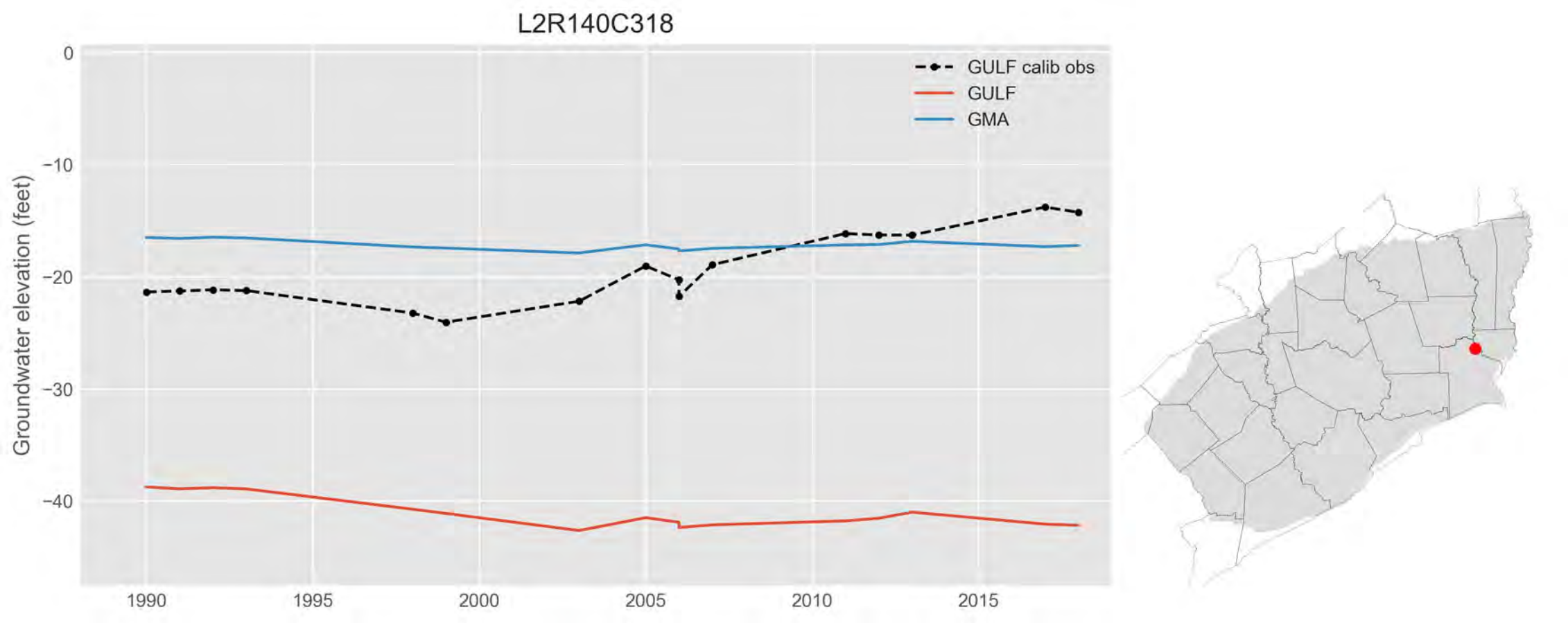

L2R139C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
40
20
0
−20
−40
−60
1985
1990
1995
2000
2005
2010
2015

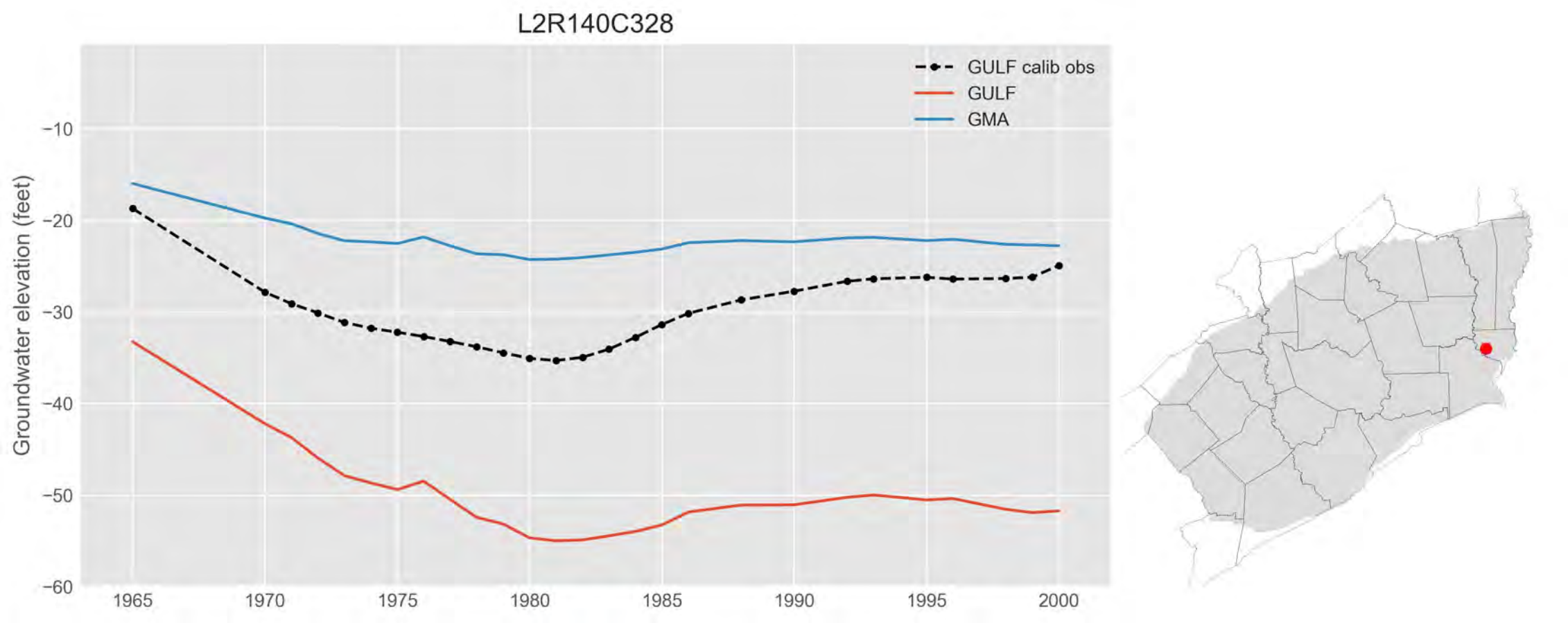

L2R139C196
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
−50
−60
2009
2010
2011
2012
2013
2014
2015
2016
2017
GULF calib obs
GULF
GMA

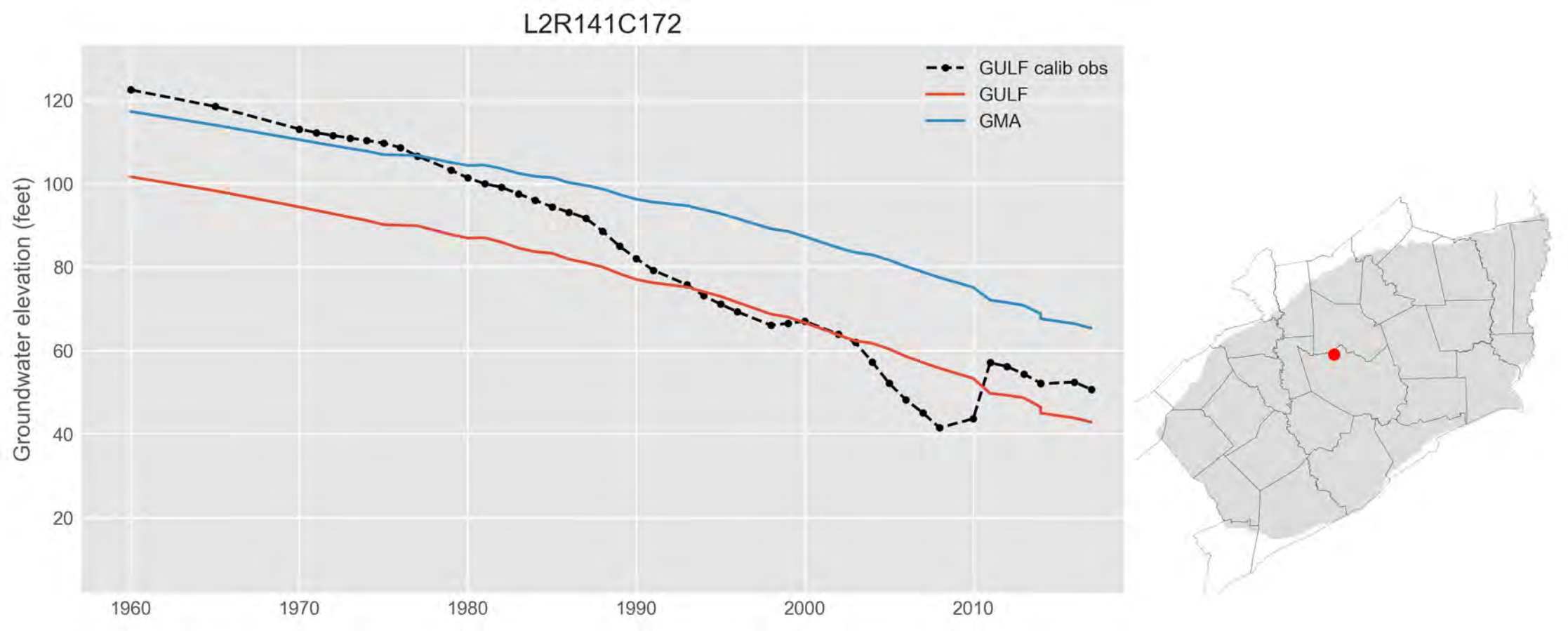

L2R139C351
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
1960
1970
1980
1990
2000
2010
2020

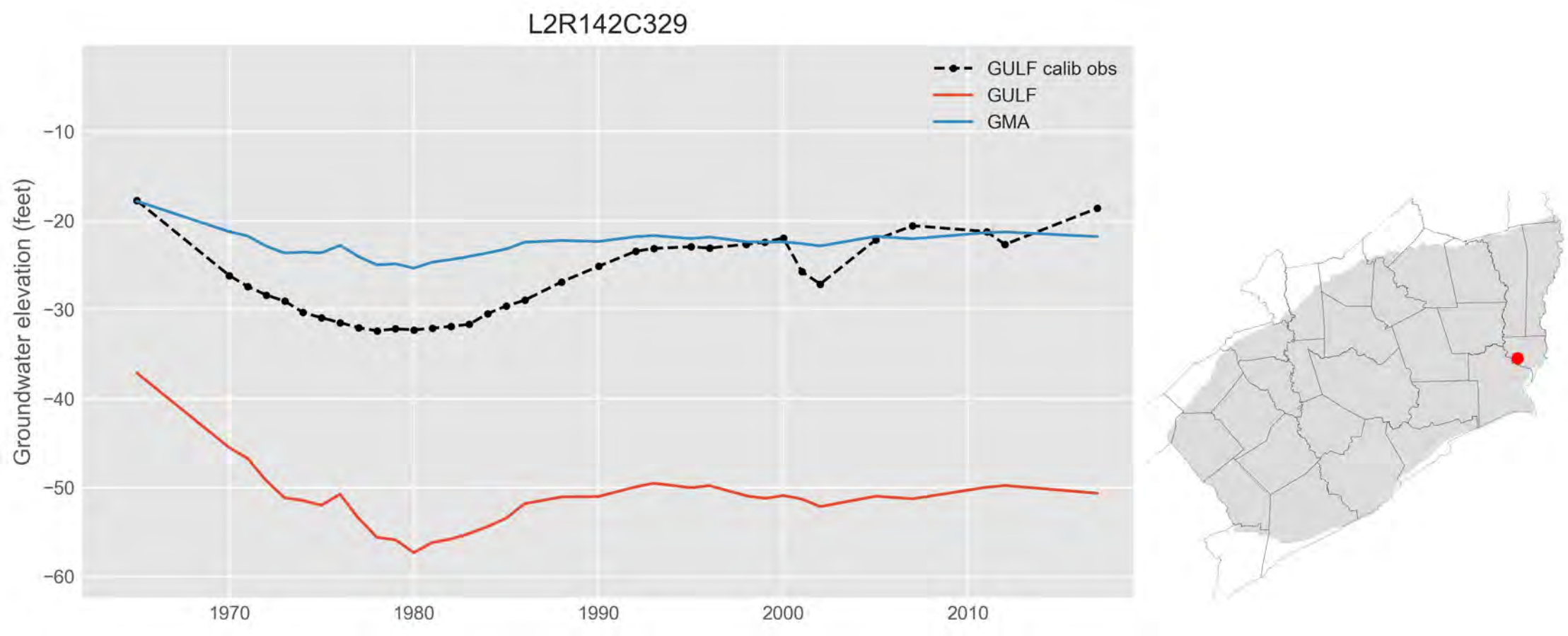

L2R140C207
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
1985
1990
1995
2000
2005
2010
2015

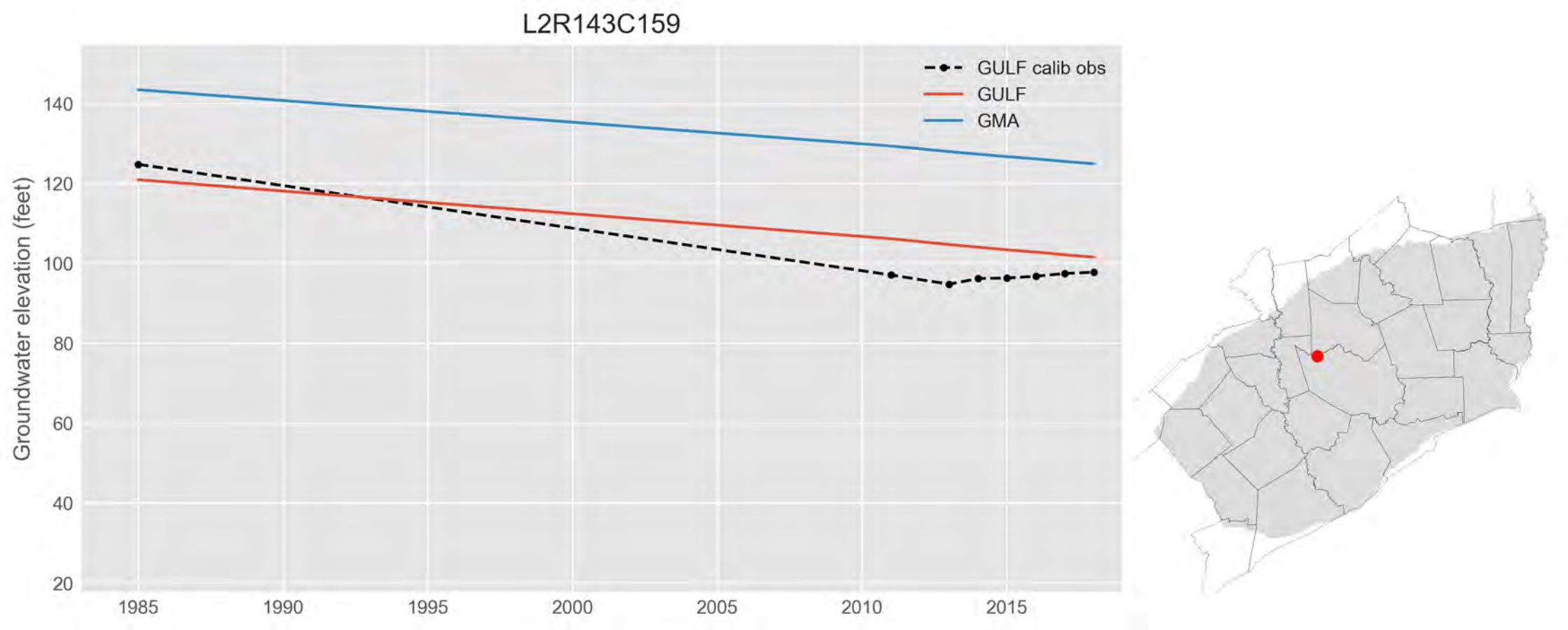

L2R140C212
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
1980
1985
1990
1995
2000
2005
2010
2015

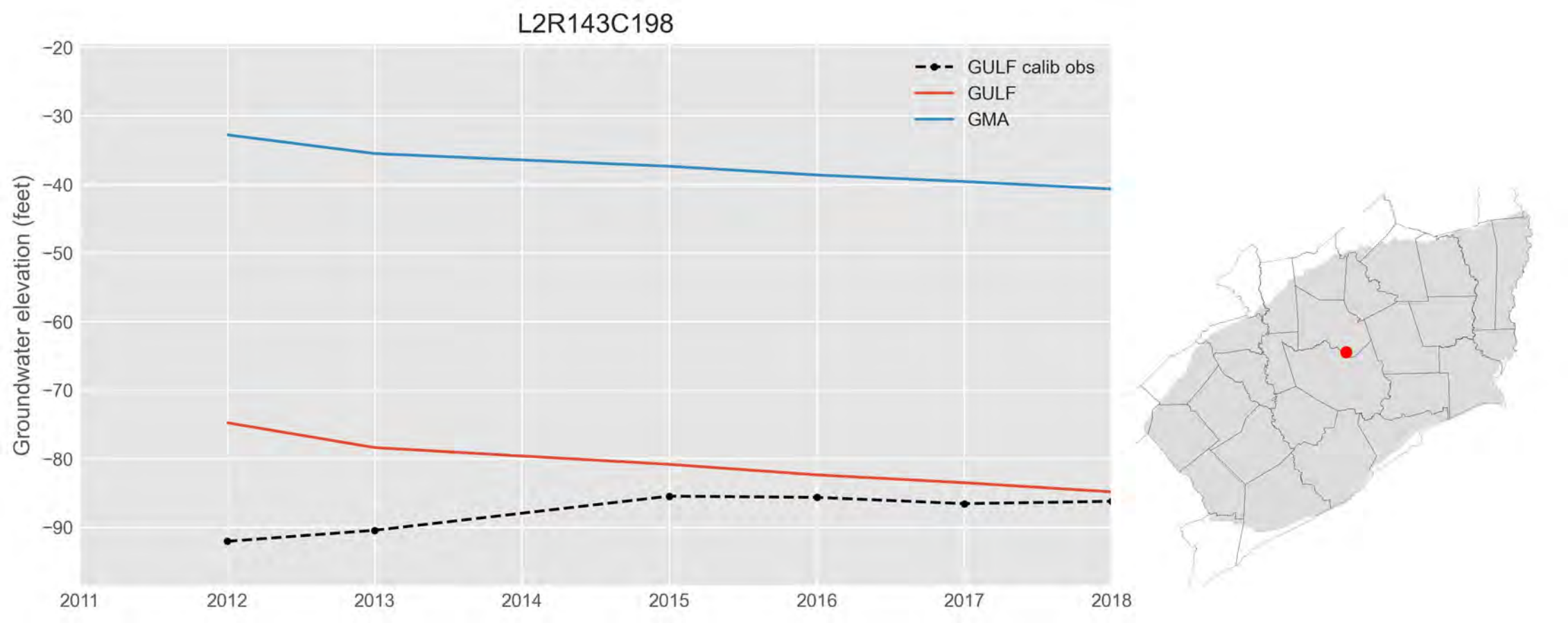

L2R140C318
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
1990
1995
2000
2005
2010
2015

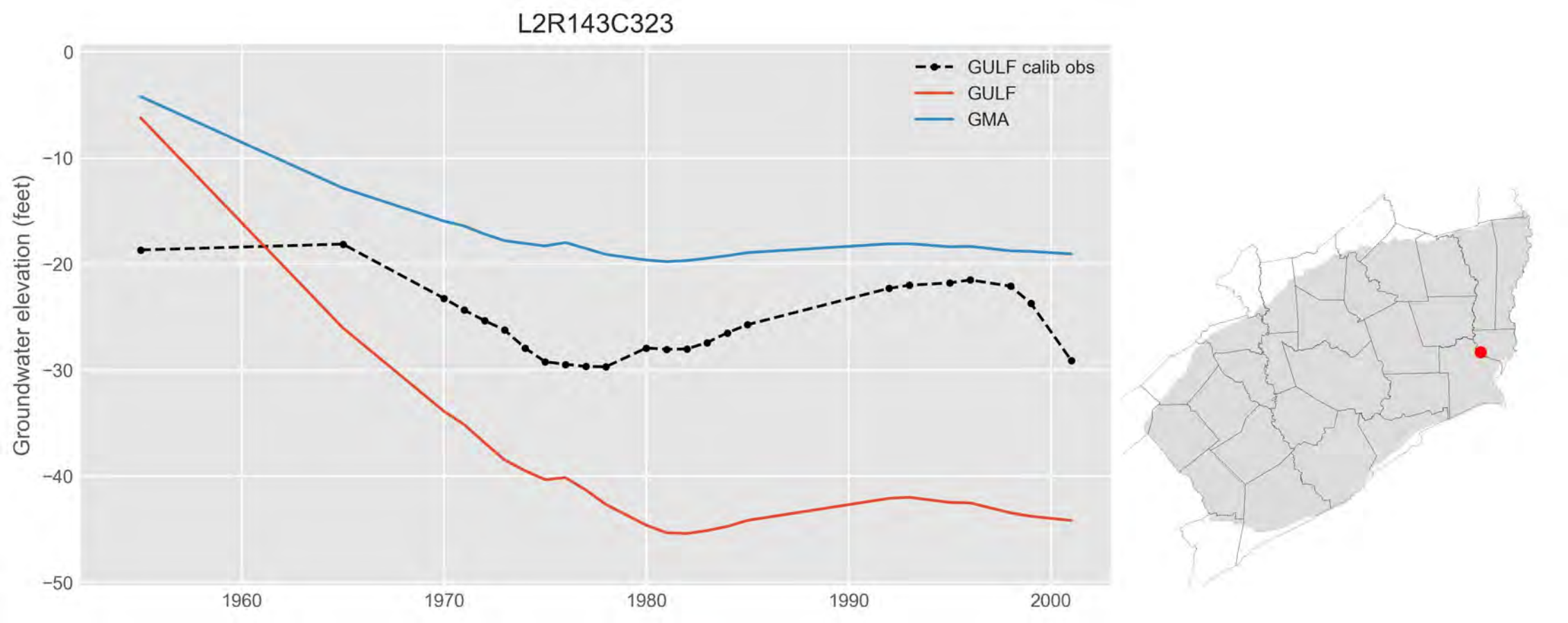

L2R140C328
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
1965
1970
1975
1980
1985
1990
1995
2000

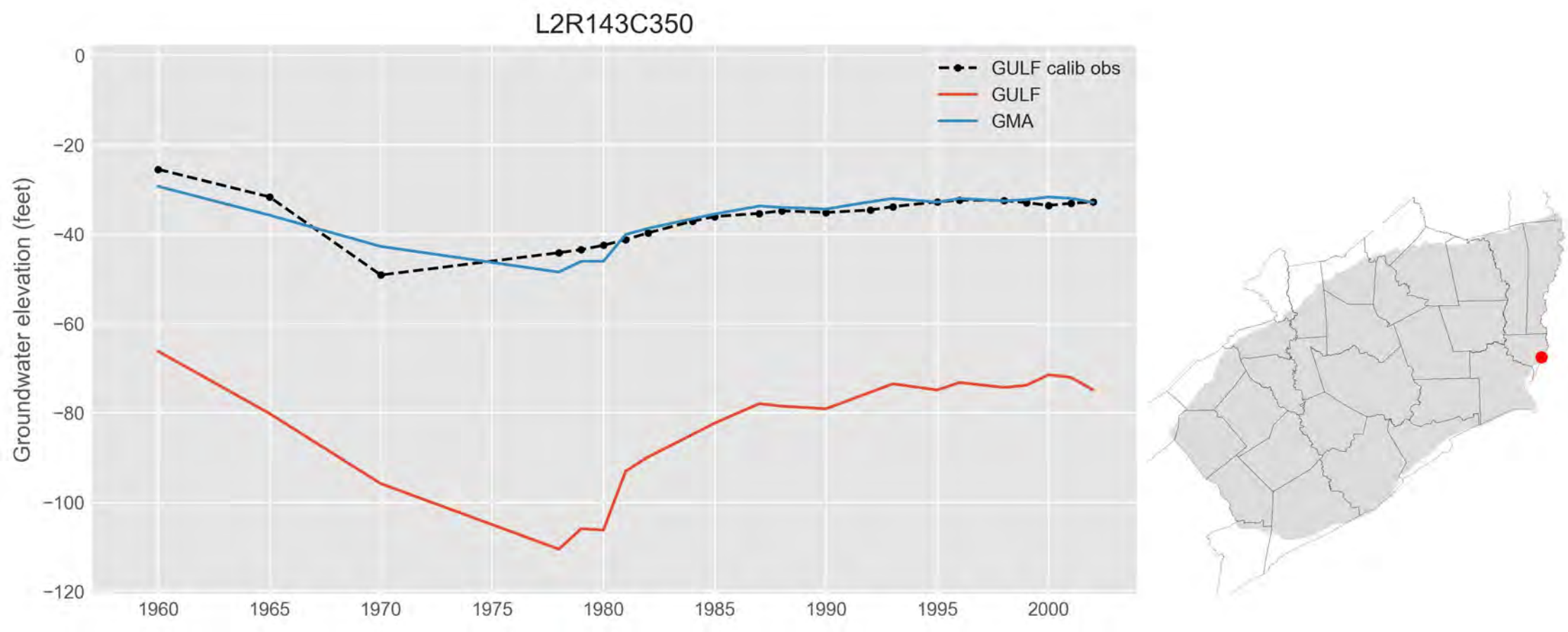

L2R141C172
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
1960
1970
1980
1990
2000
2010

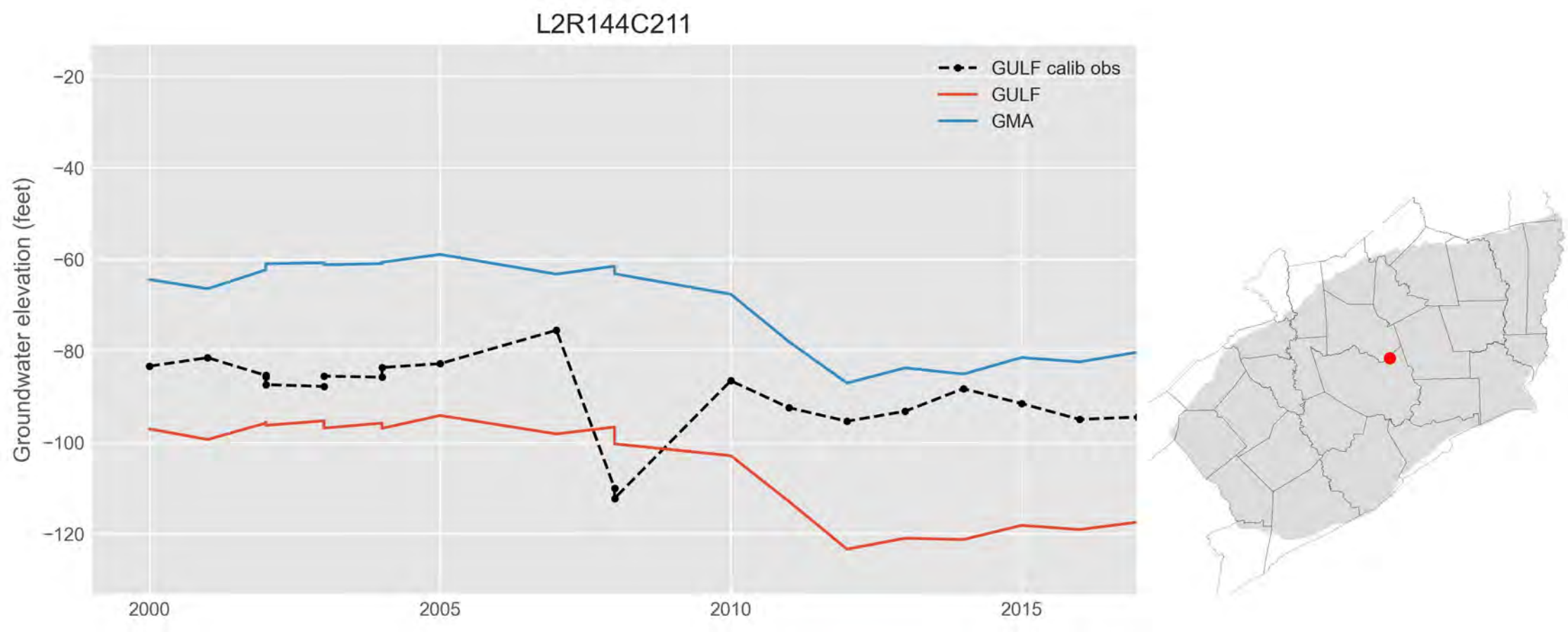

L2R142C329
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
1970
1980
1990
2000
2010

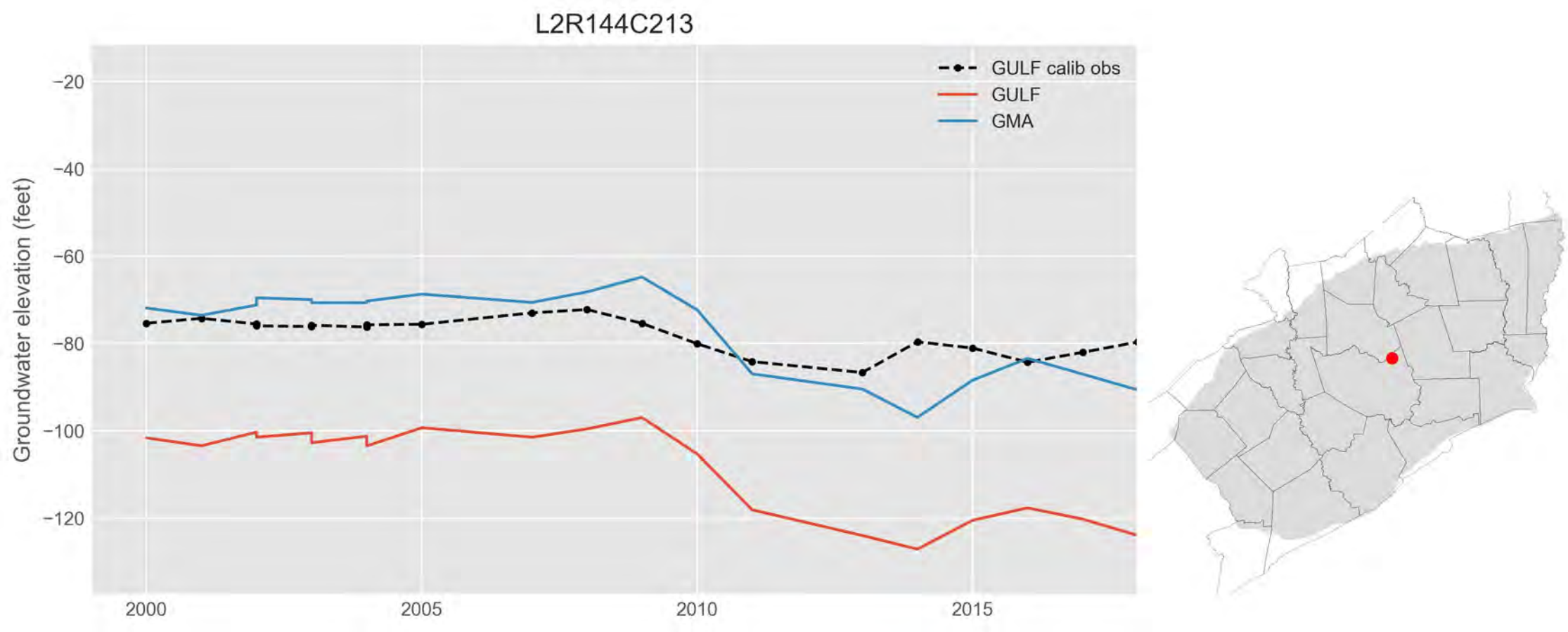

L2R143C159
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1985
1990
1995
2000
2005
2010
2015


L2R143C198
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
−90
2011
2012
2013
2014
2015
2016
2017
2018

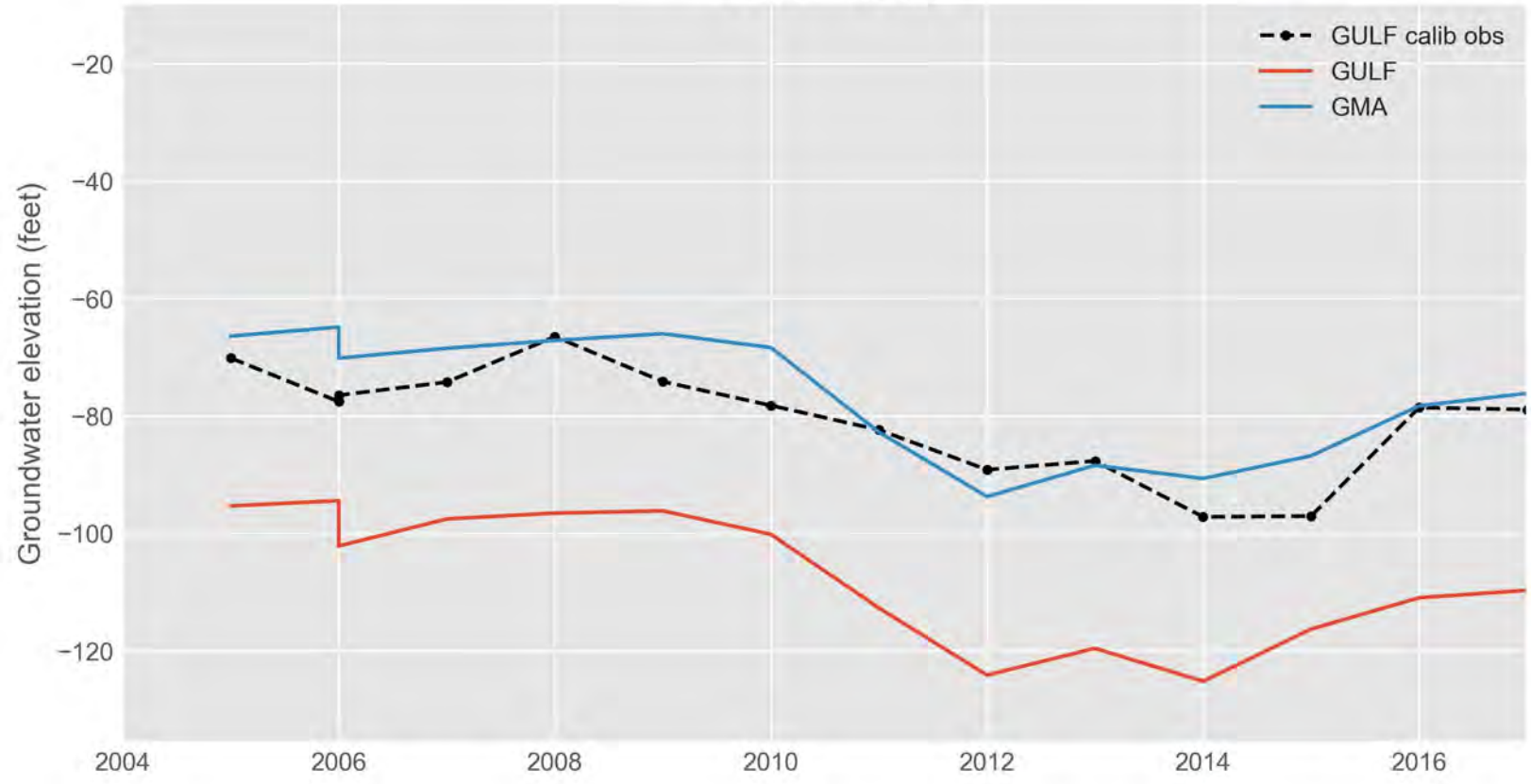

L2R143C323
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1960
1970
1980
1990
2000

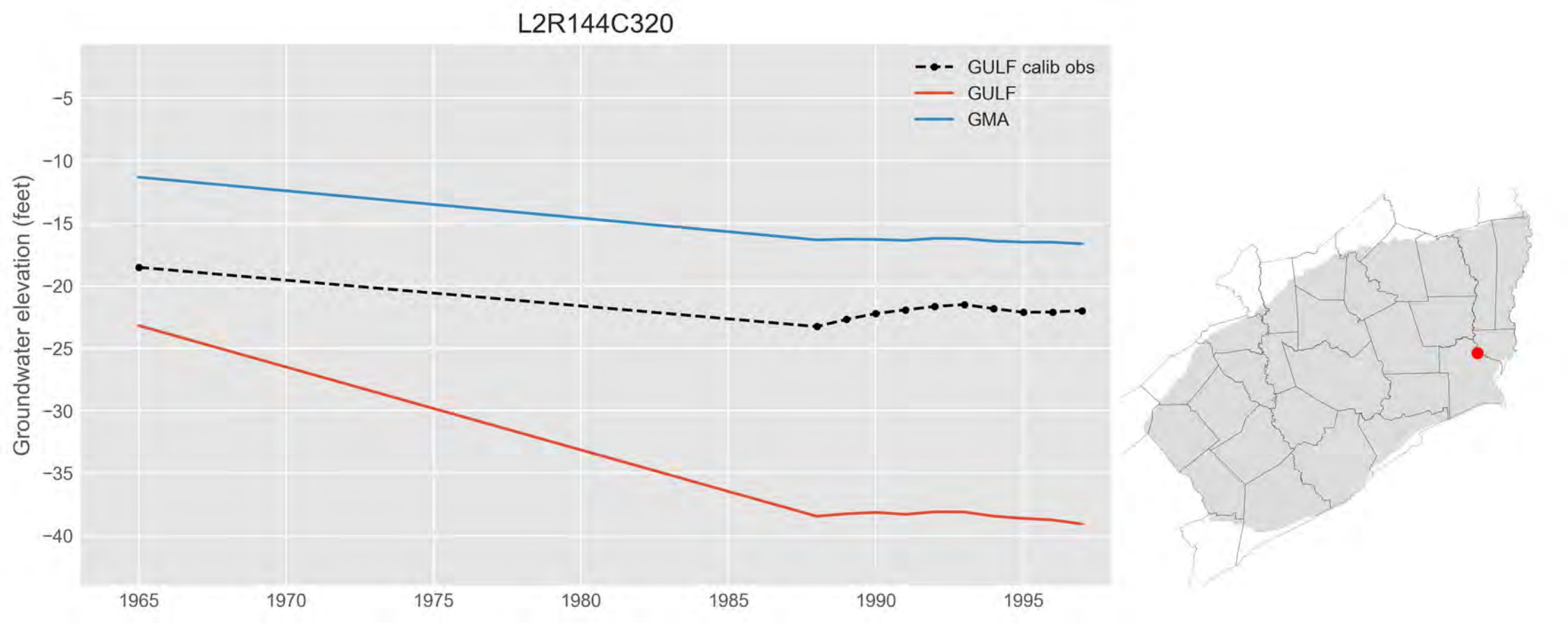

L2R143C350
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
1960
1965
1970
1975
1980
1985
1990
1995
2000

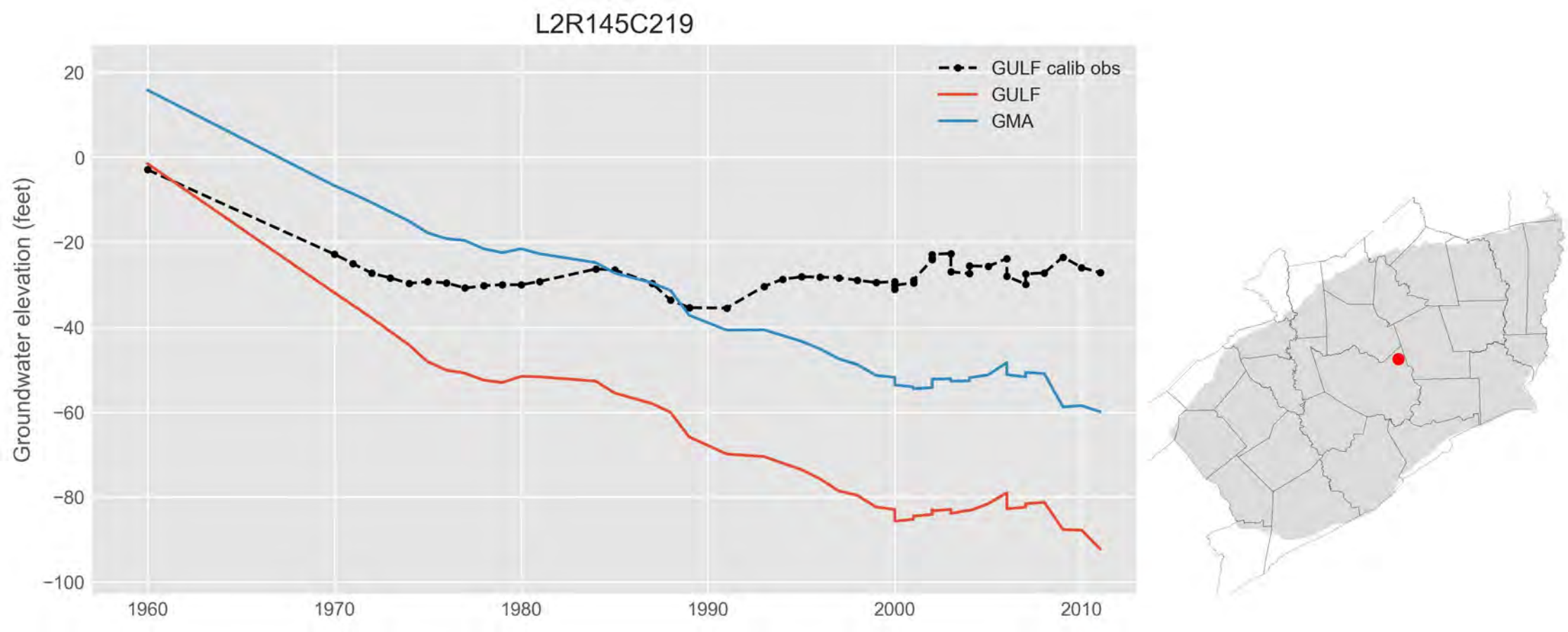

L2R144C211
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
2000
2005
2010
2015

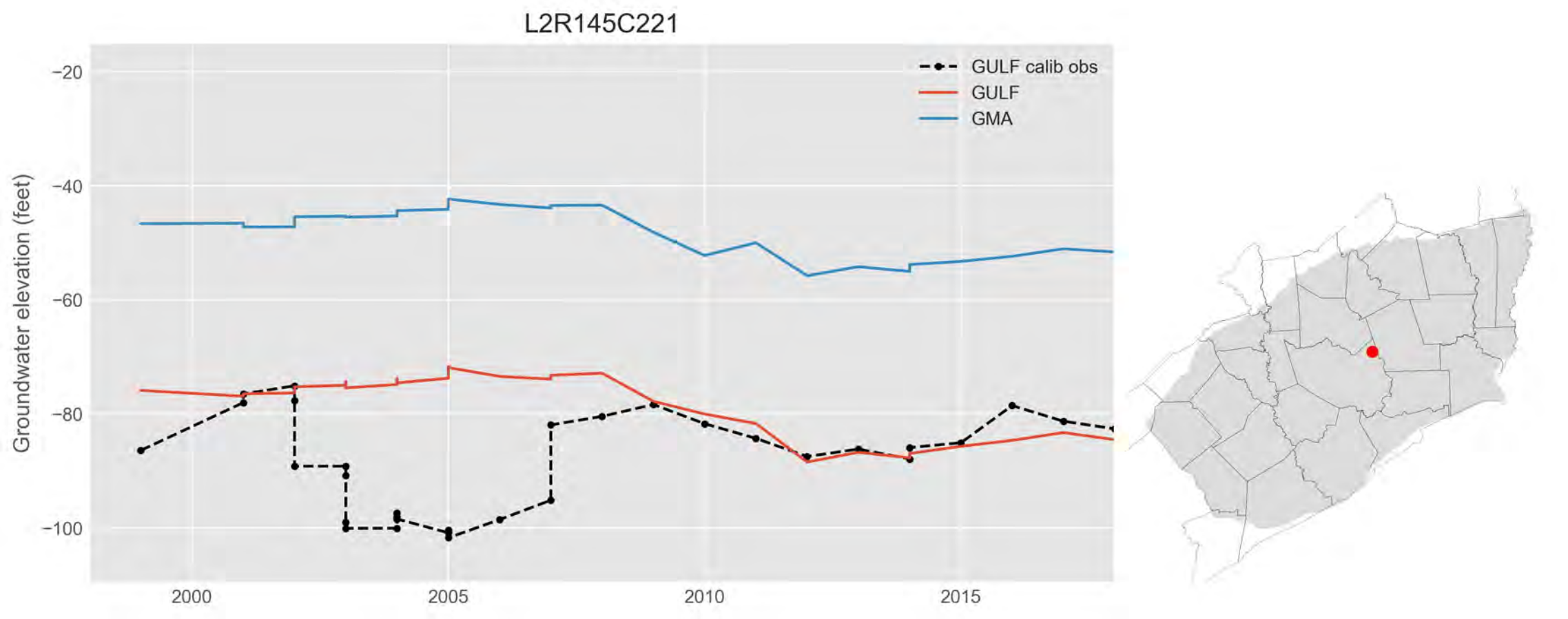

L2R144C213
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
2000
2005
2010
2015

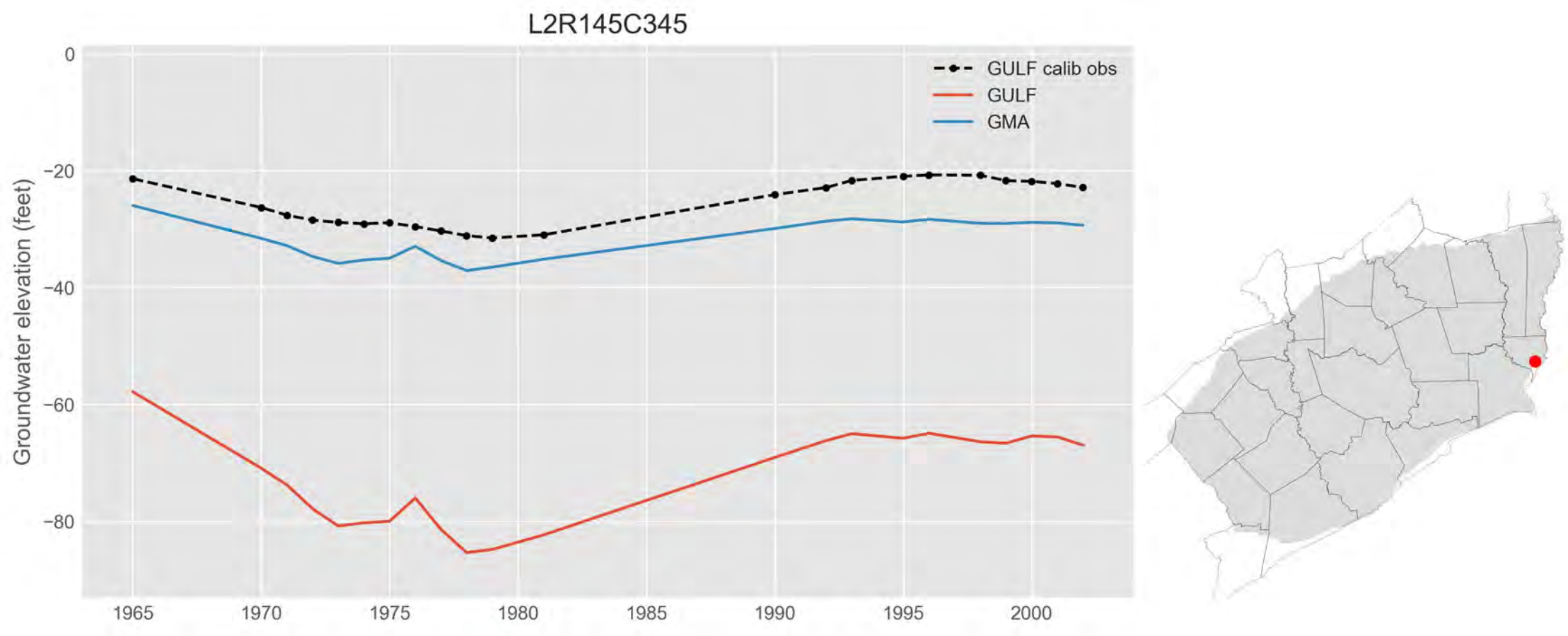
L2R144C215

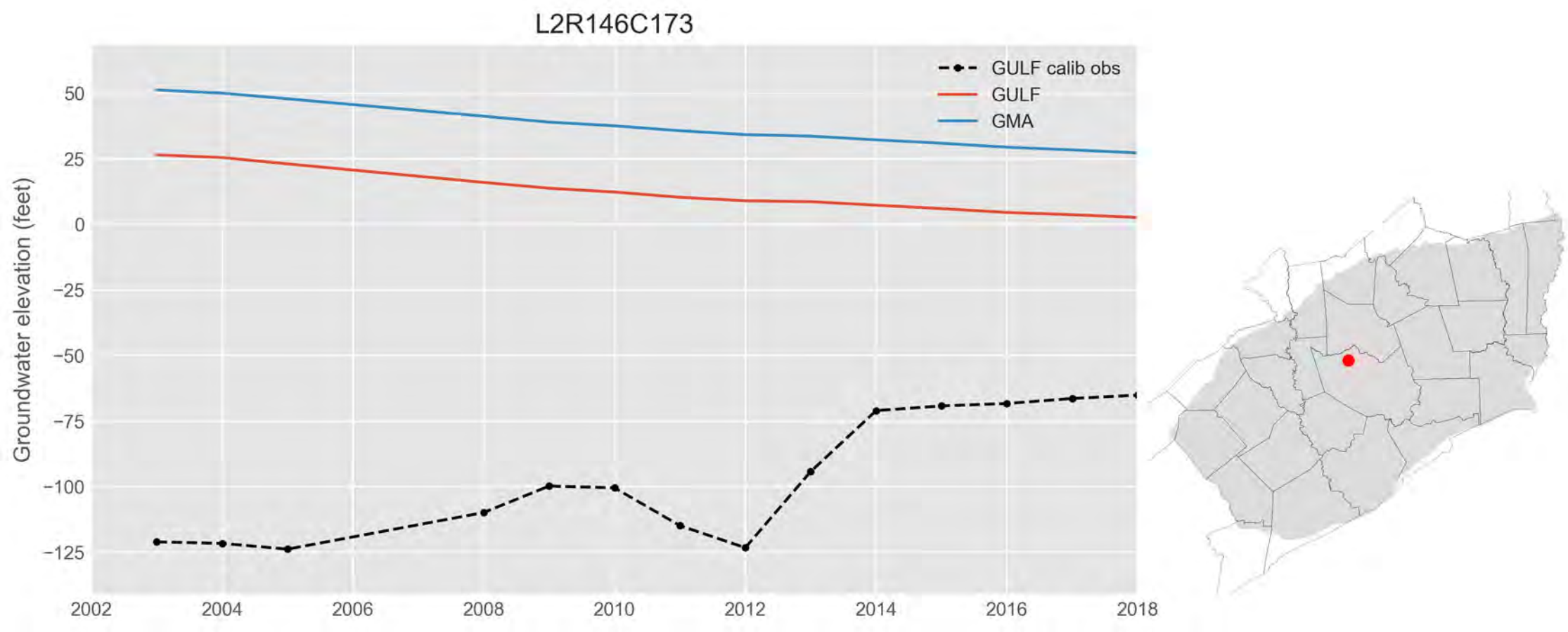

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
2004
2006
2008
2010
2012
2014
2016

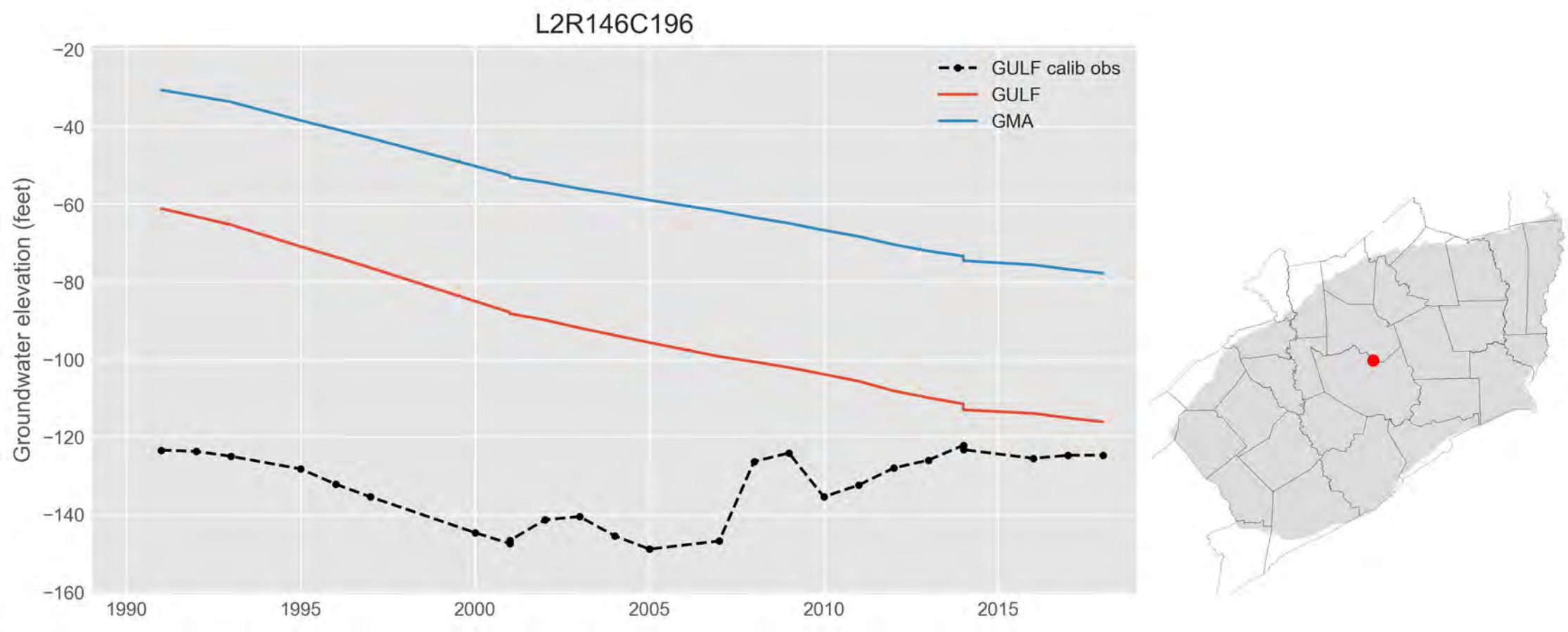

L2R144C320
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
1965
1970
1975
1980
1985
1990
1995

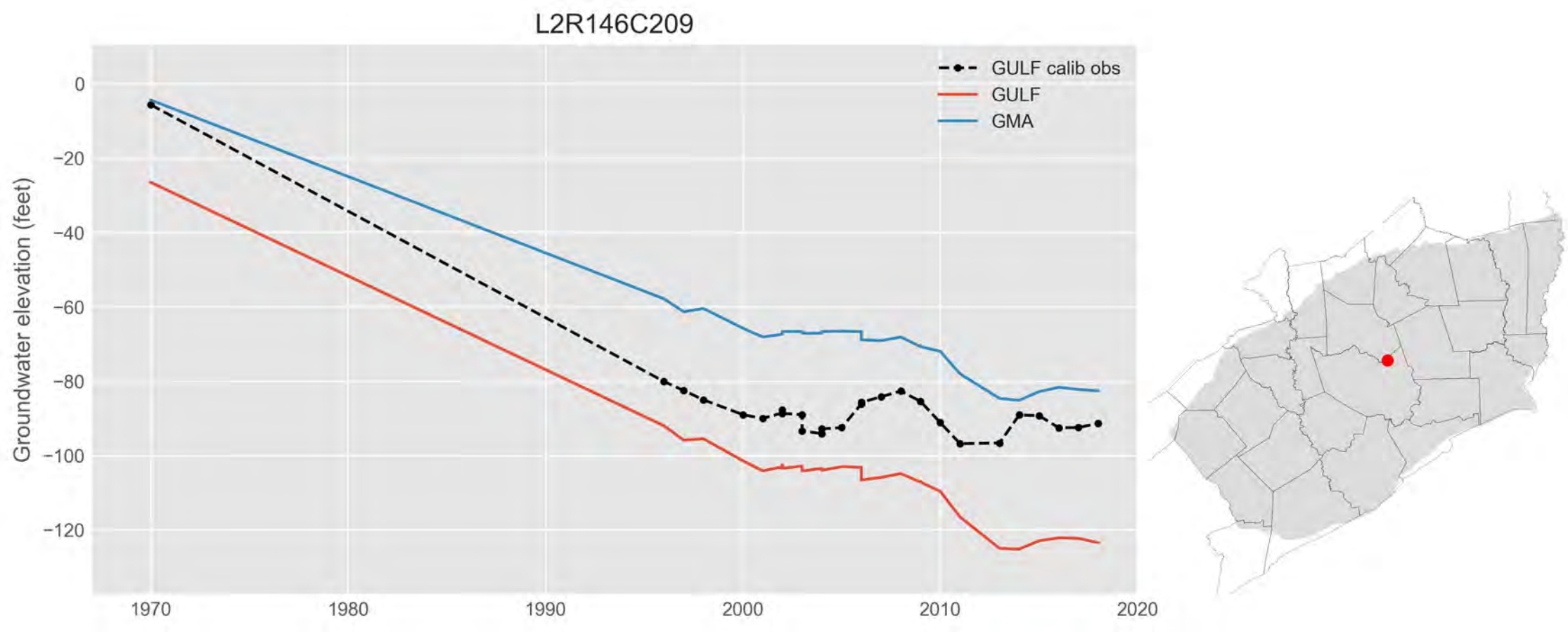

L2R145C219
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
−100
1960
1970
1980
1990
2000
2010

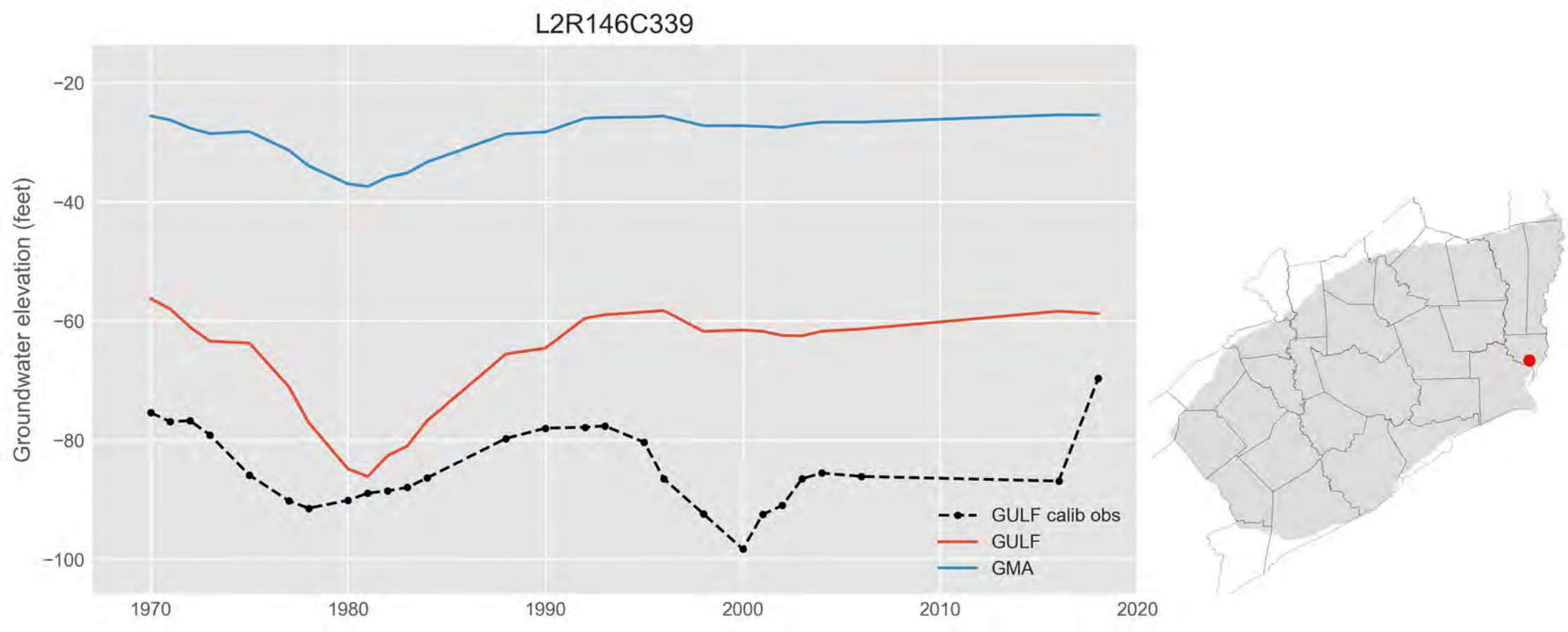

L2R145C221
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
2000
2005
2010
2015

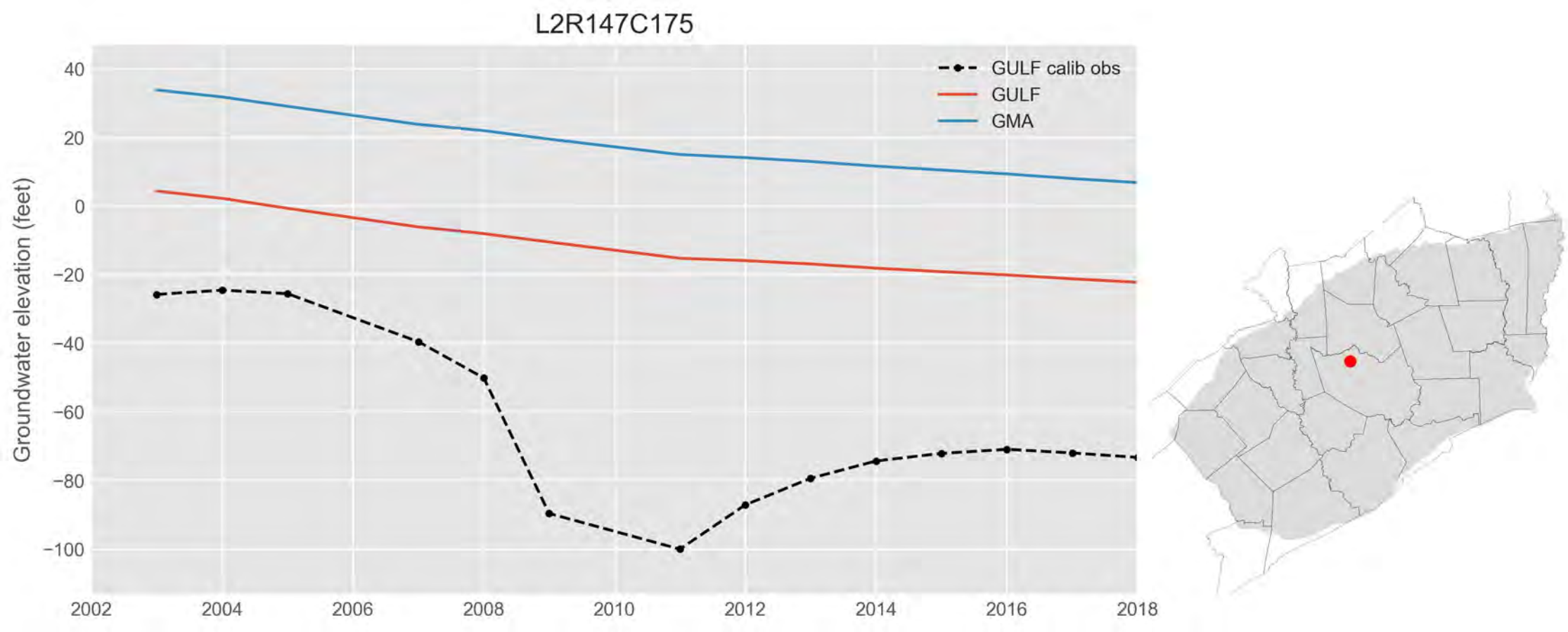

L2R145C345
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
1965
1970
1975
1980
1985
1990
1995
2000

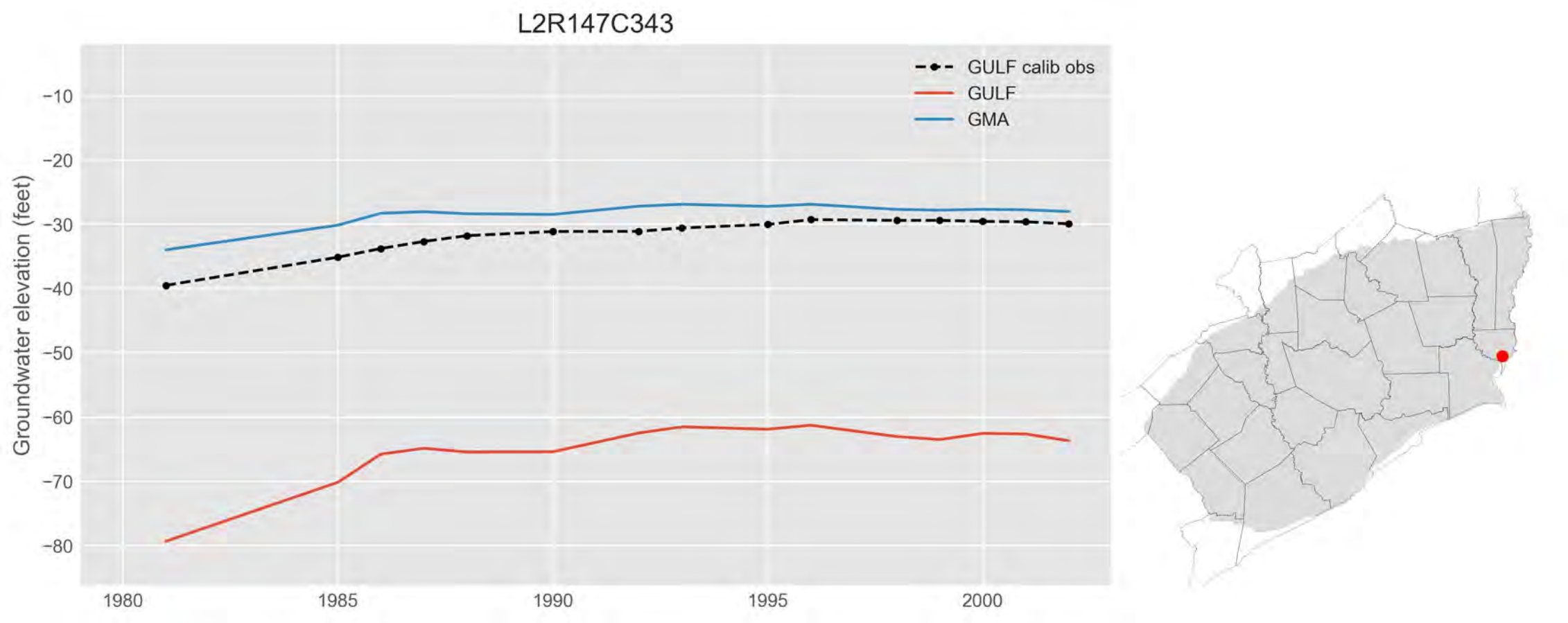

L2R146C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
25
0
−25
−50
−75
−100
−125
2002
2004
2006
2008
2010
2012
2014
2016
2018

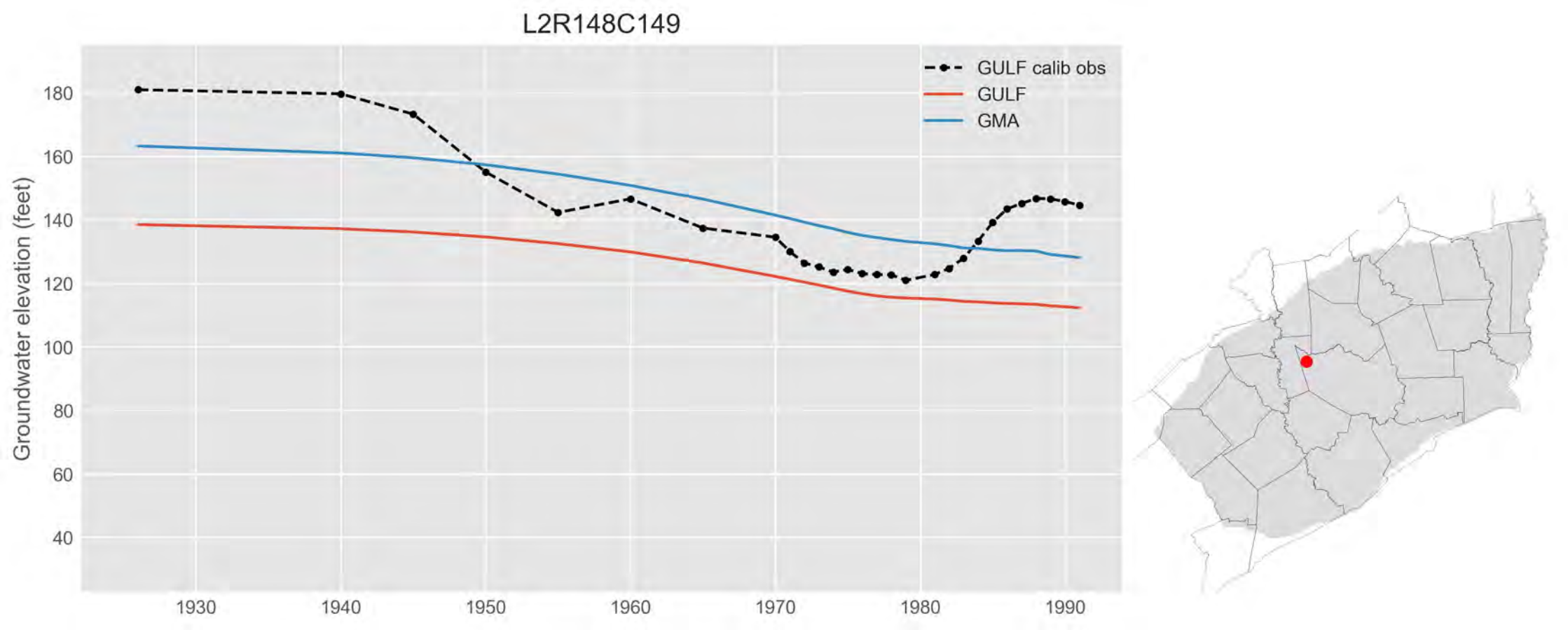

L2R146C196
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
1990
1995
2000
2005
2010
2015

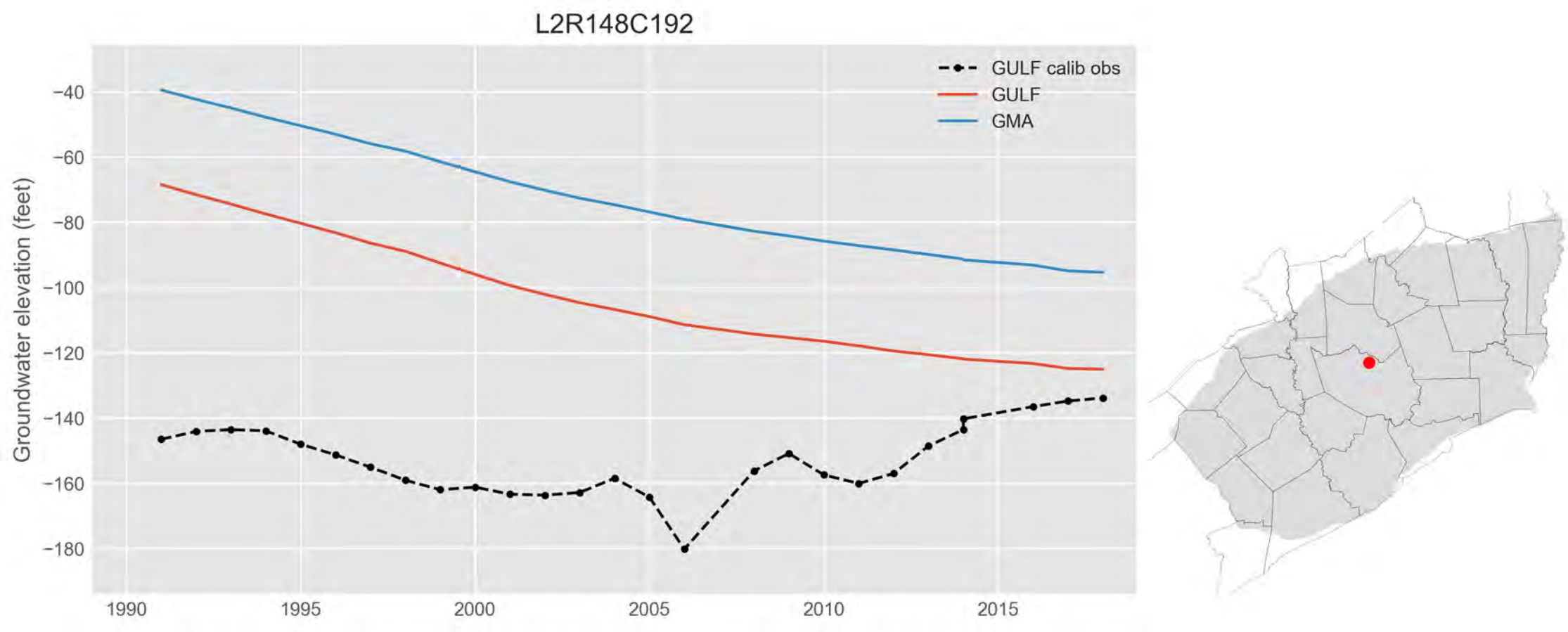

L2R146C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
1970
1980
1990
2000
2010
2020

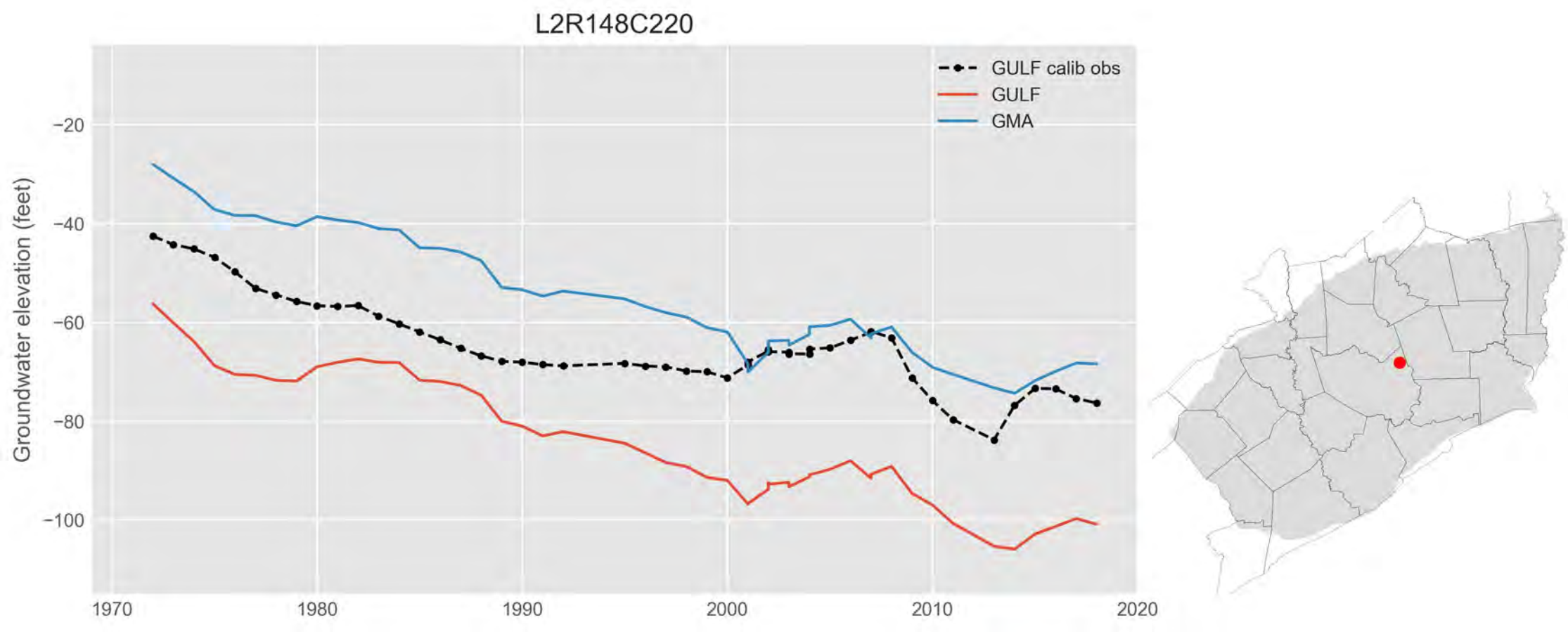

L2R146C339
Groundwater elevation (feet)
−20
−40
−60
−80
−100
1970
1980
1990
2000
2010
2020
GULF calib obs
GULF
GMA

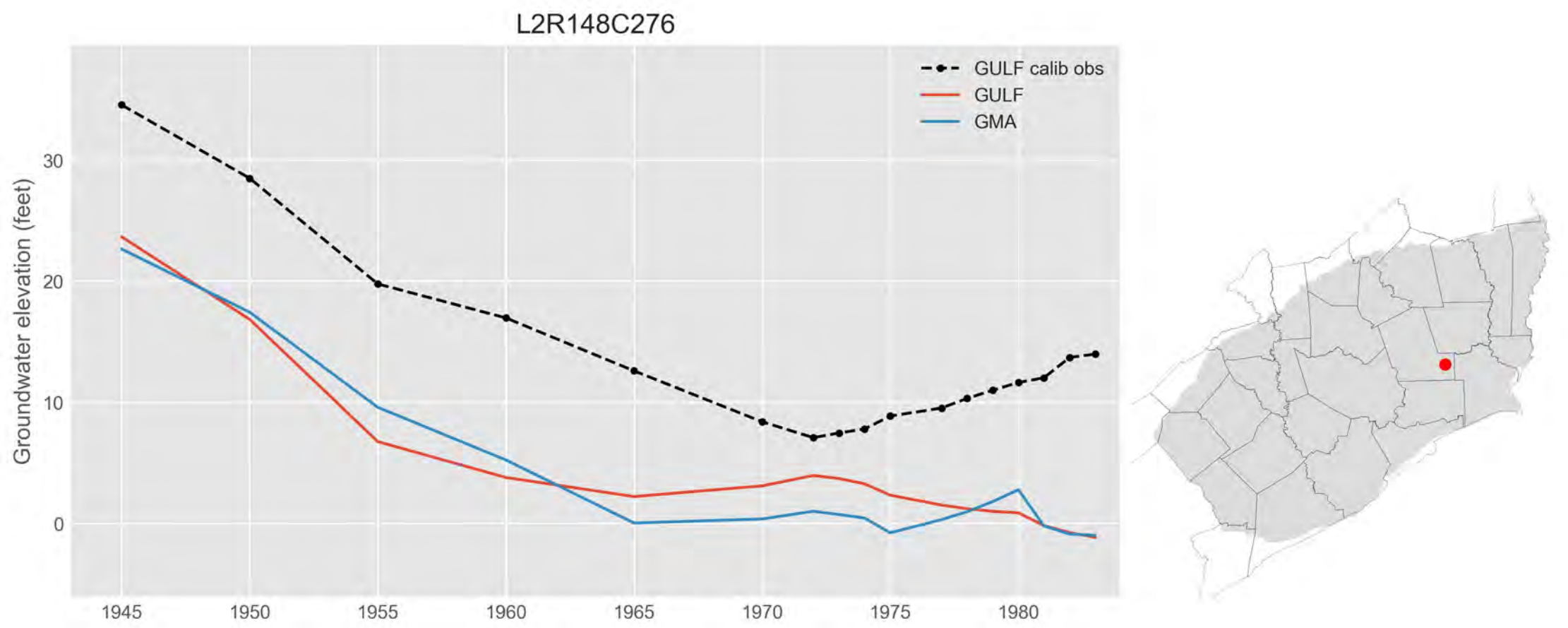

L2R147C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
−100
2002
2004
2006
2008
2010
2012
2014
2016
2018

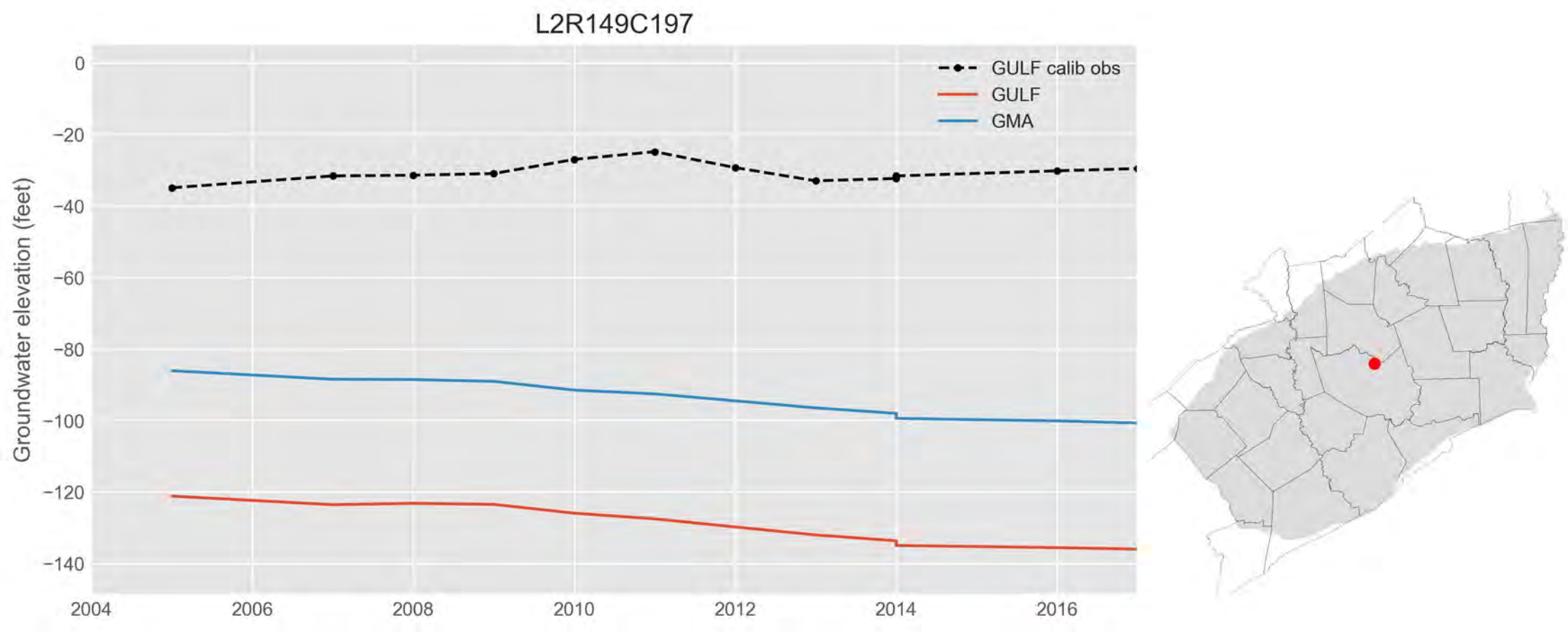

L2R147C343
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
1980
1985
1990
1995
2000

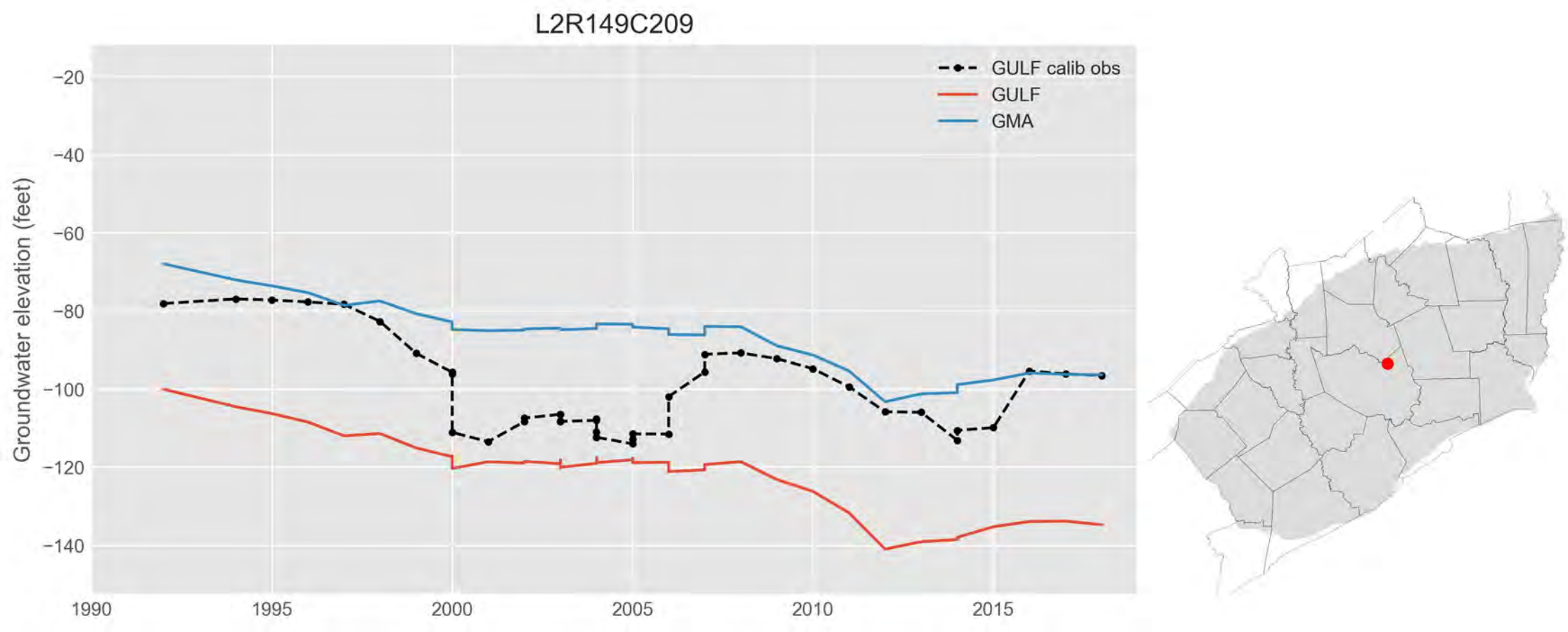

L2R148C149
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1930
1940
1950
1960
1970
1980
1990


L2R148C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
1990
1995
2000
2005
2010
2015

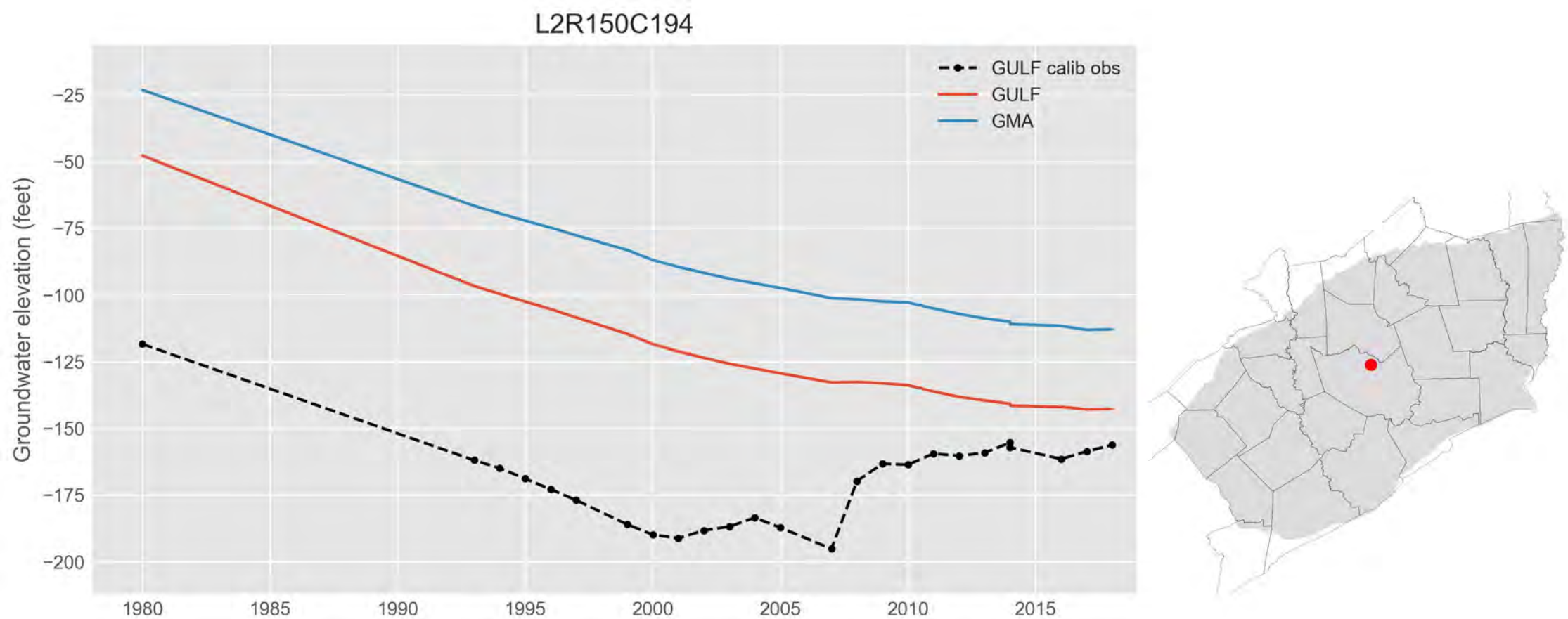

L2R148C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
1970
1980
1990
2000
2010
2020

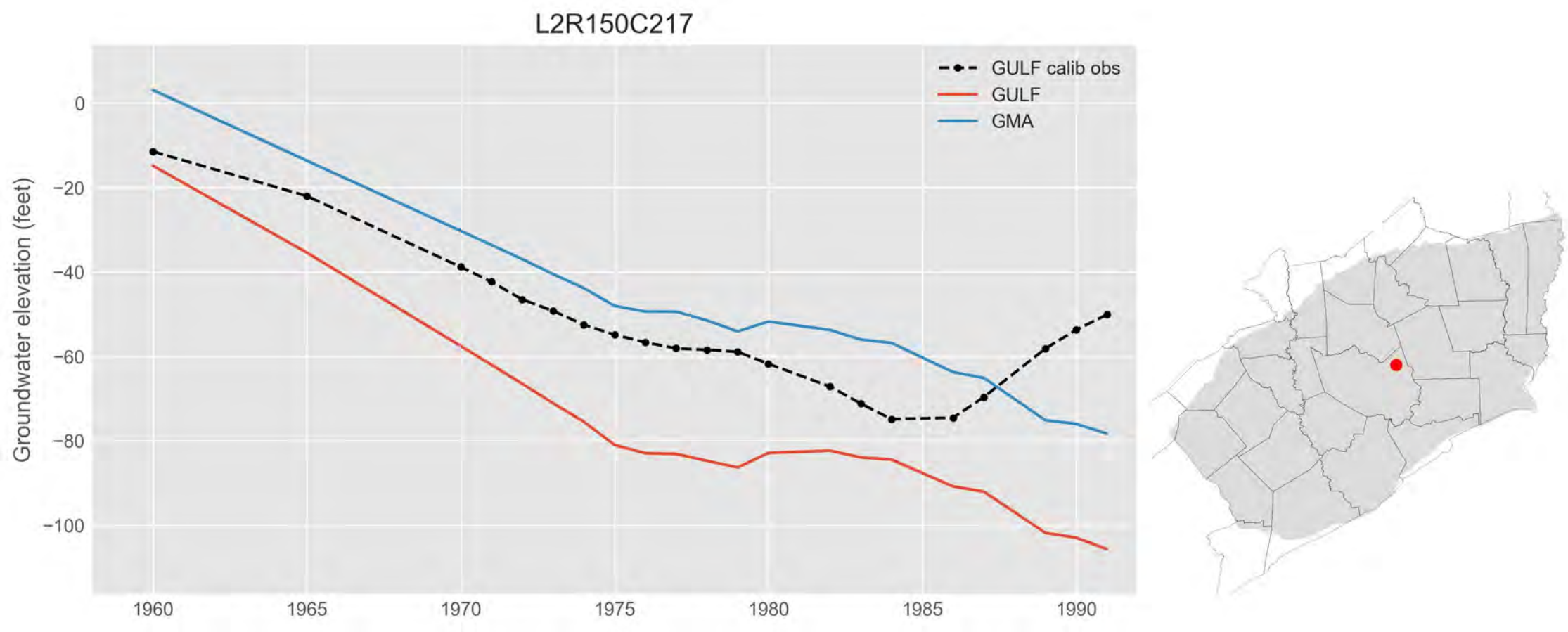

L2R148C276
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
1945
1950
1955
1960
1965
1970
1975
1980

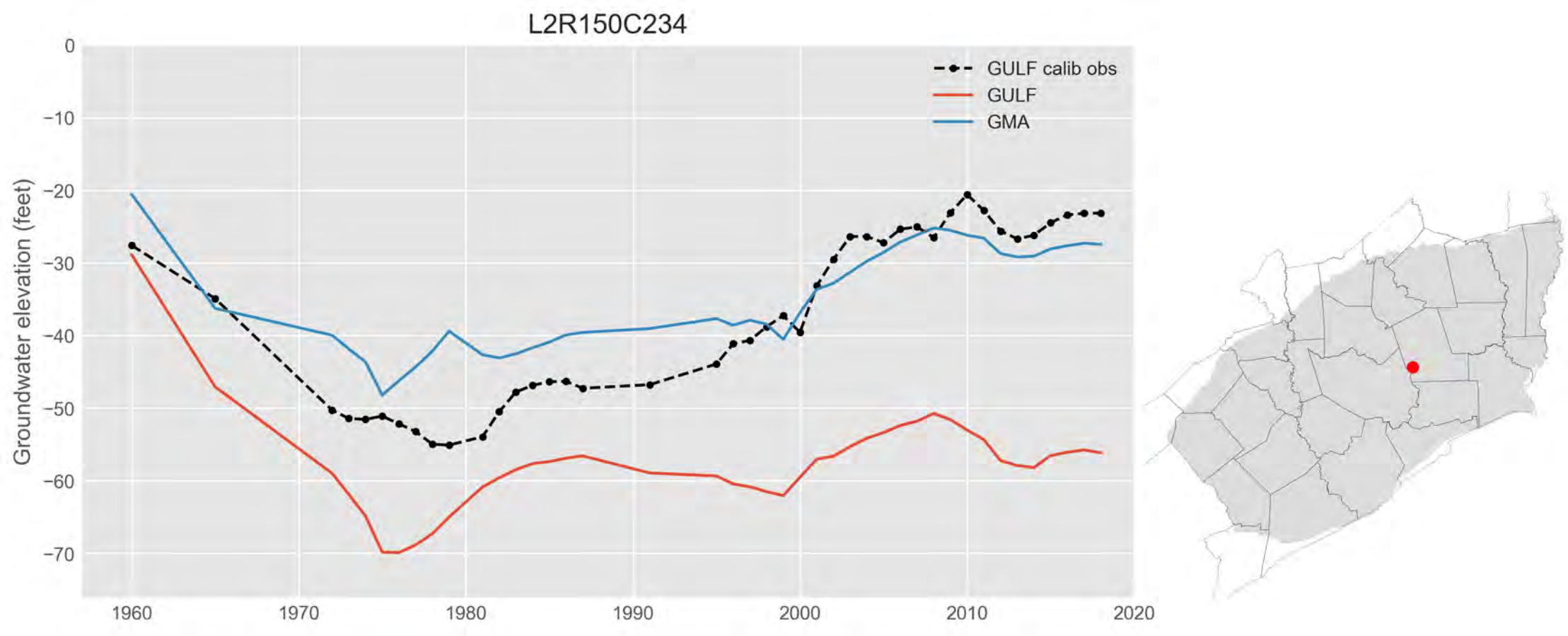

L2R149C197
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
2004
2006
2008
2010
2012
2014
2016

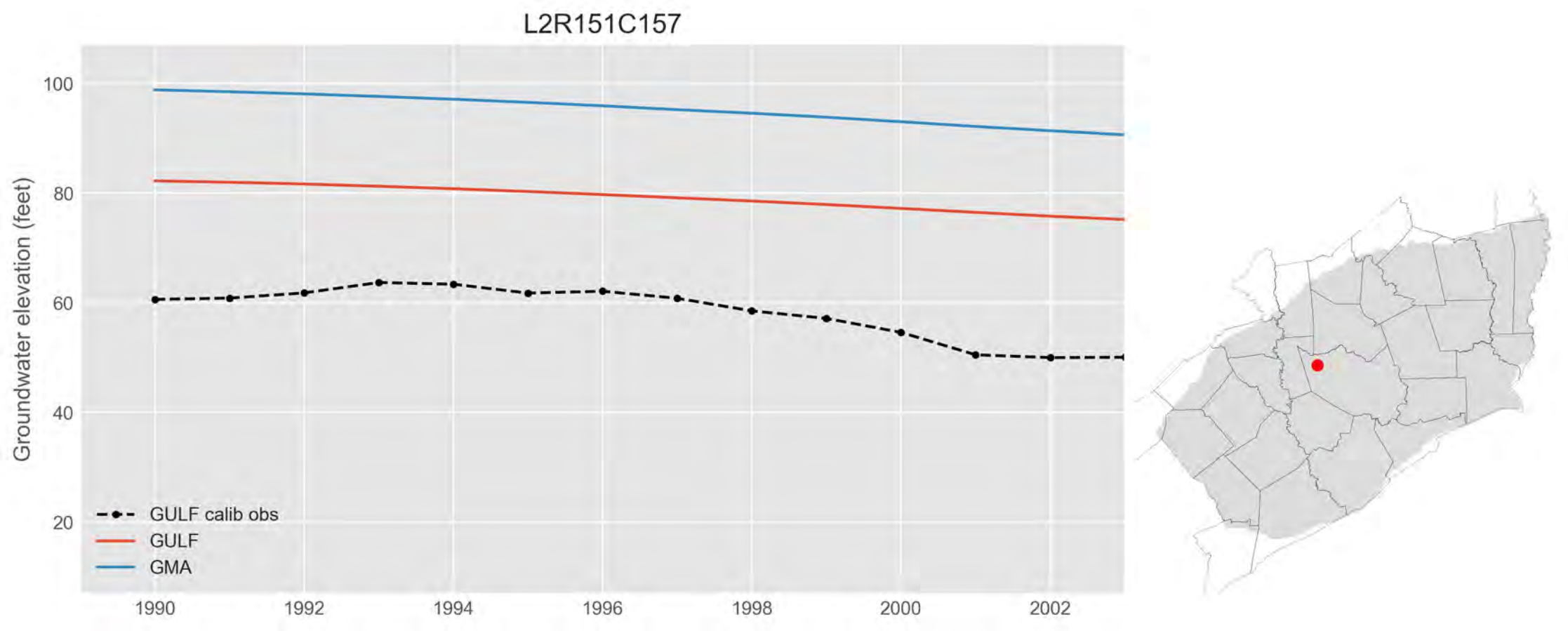

L2R149C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1990
1995
2000
2005
2010
2015

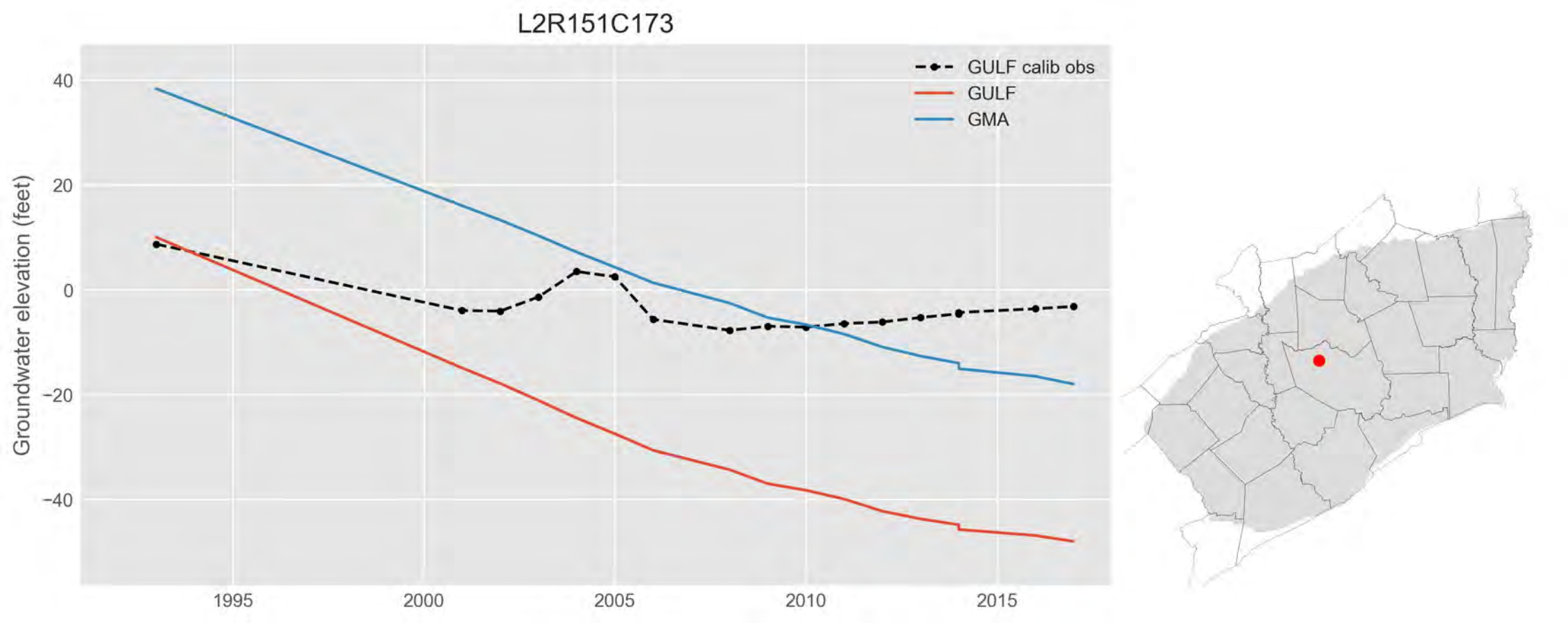
L2R150C194

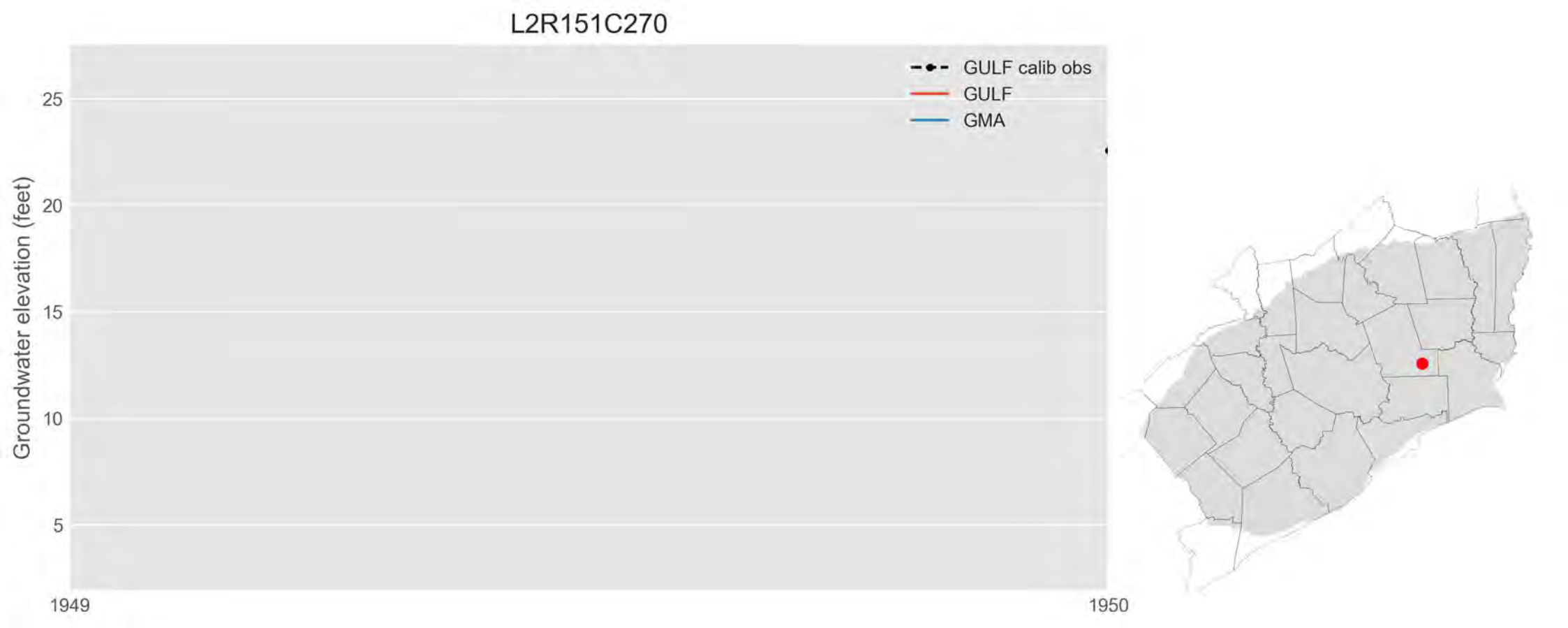

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1980
1985
1990
1995
2000
2005
2010
2015

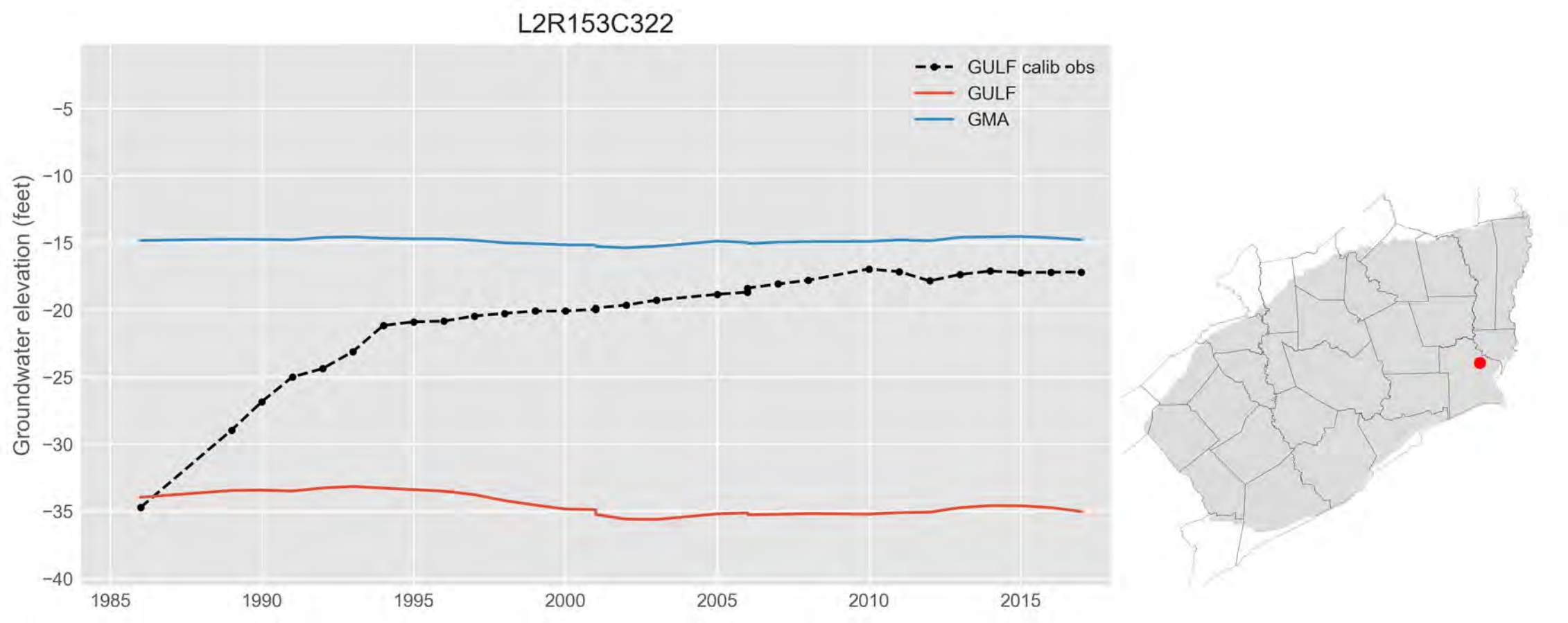

L2R150C217
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
1960
1965
1970
1975
1980
1985
1990

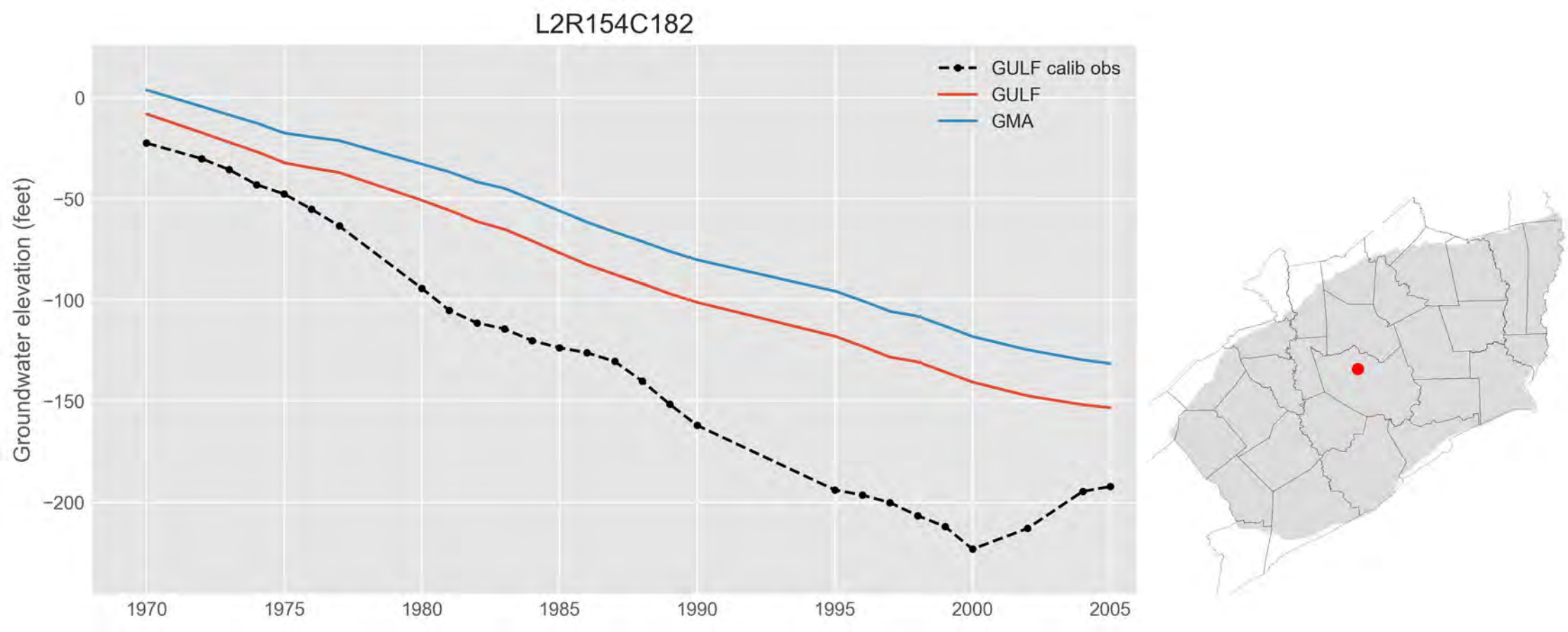

L2R150C234
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
−70
1960
1970
1980
1990
2000
2010
2020

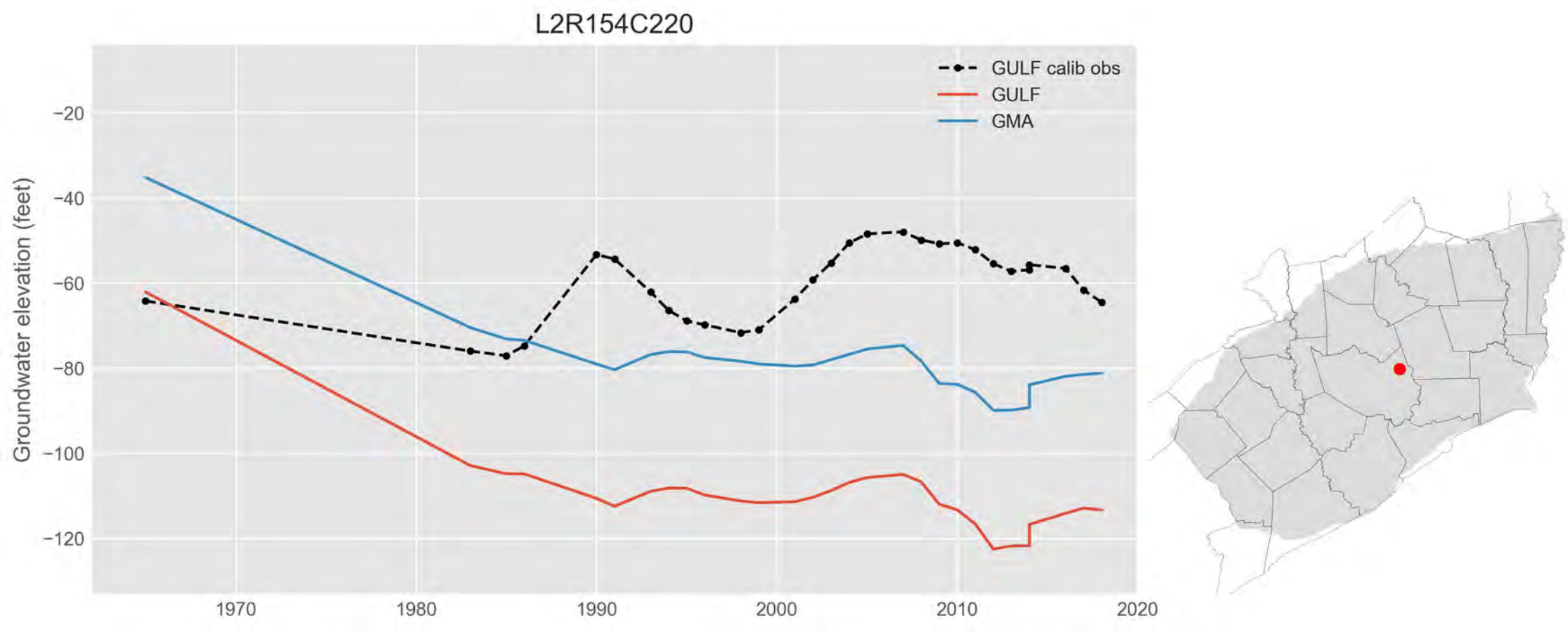

L2R151C157
Groundwater elevation (feet)
100
80
60
40
20
1990
1992
1994
1996
1998
2000
2002
GULF calib obs
GULF
GMA

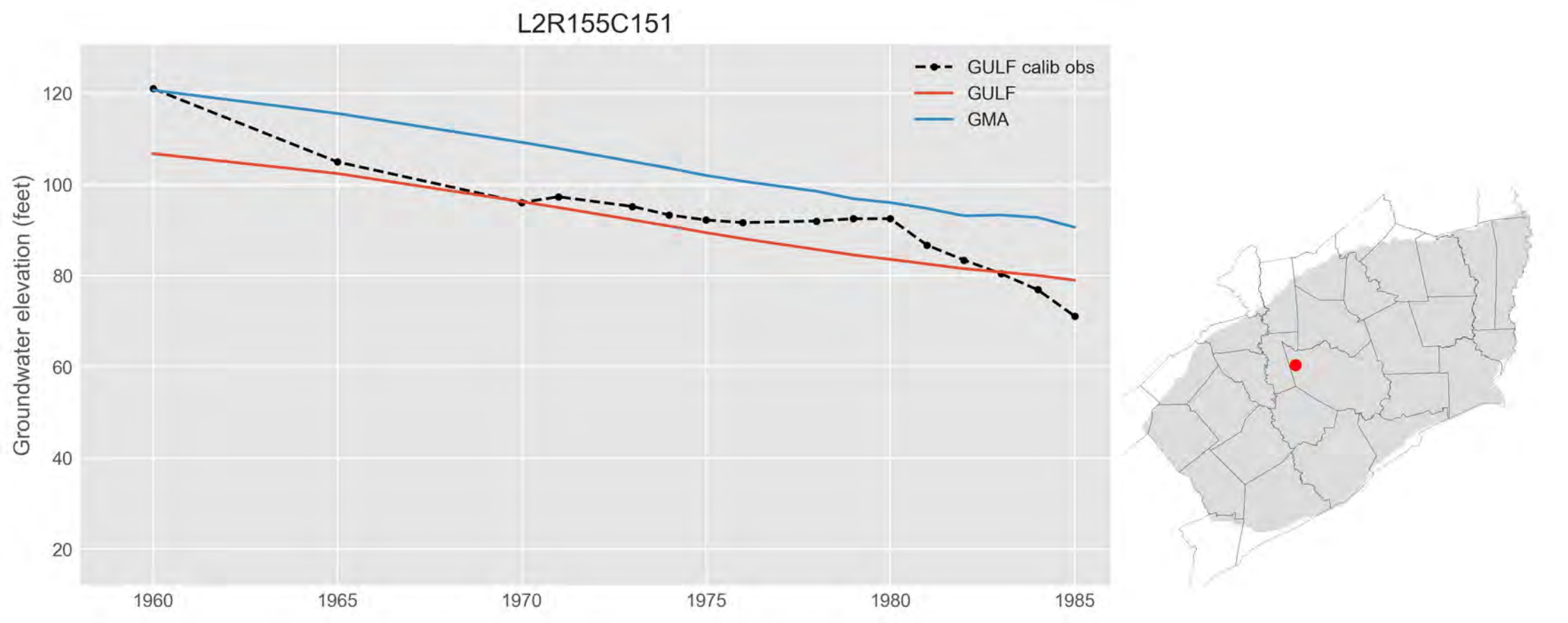

L2R151C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
1995
2000
2005
2010
2015

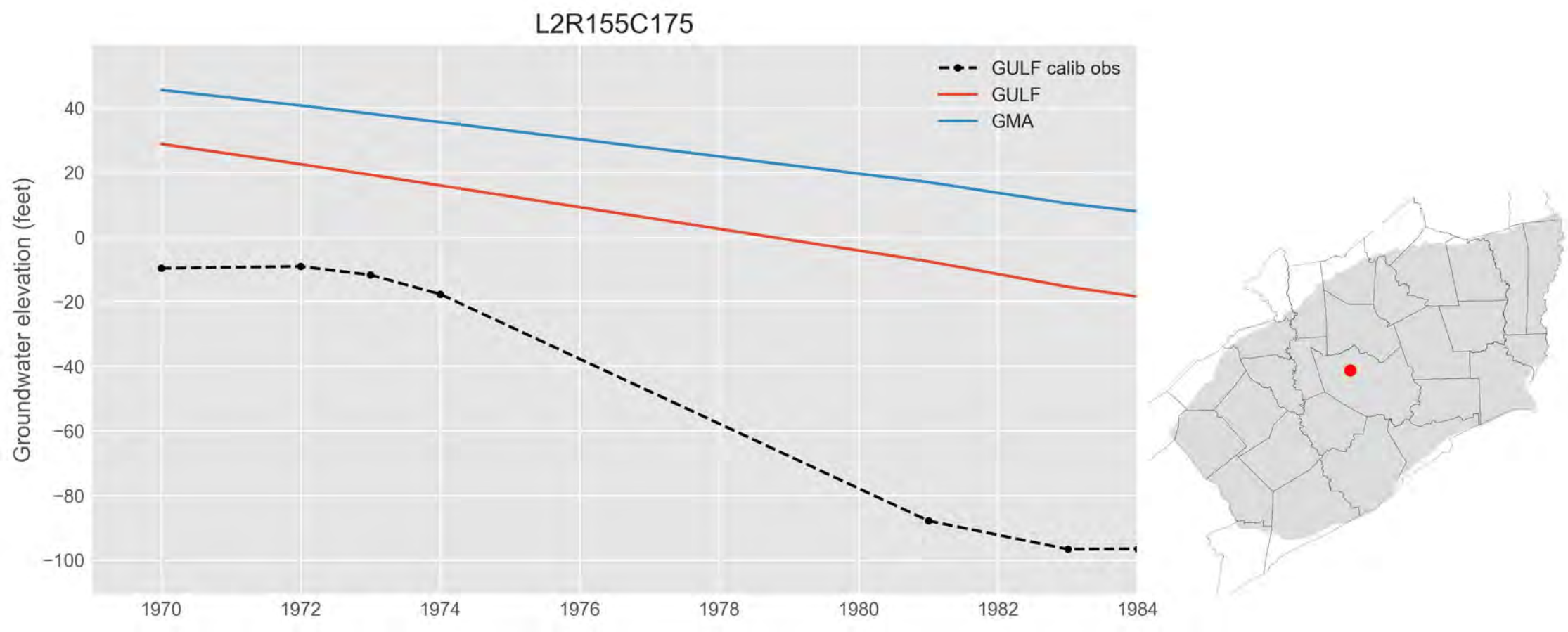

L2R151C270
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
25
20
15
10
5
1949
1950

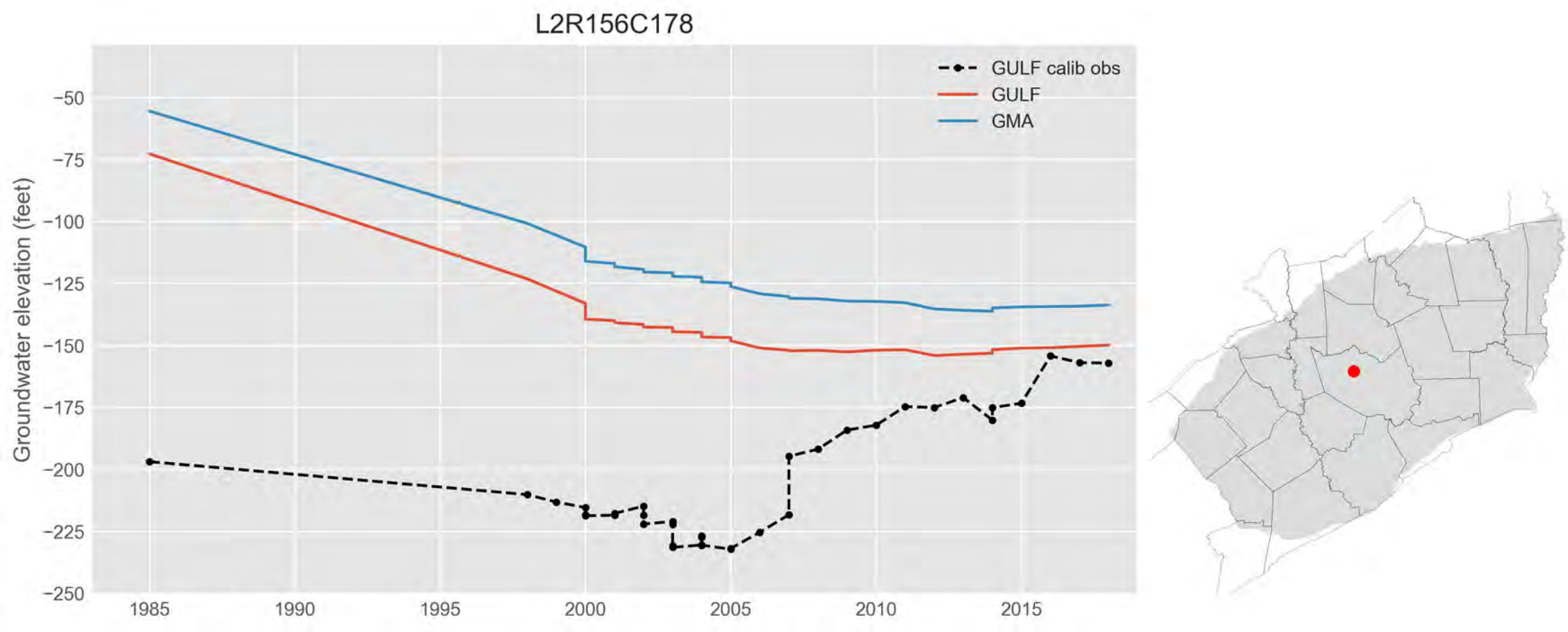

L2R153C322
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
1985
1990
1995
2000
2005
2010
2015

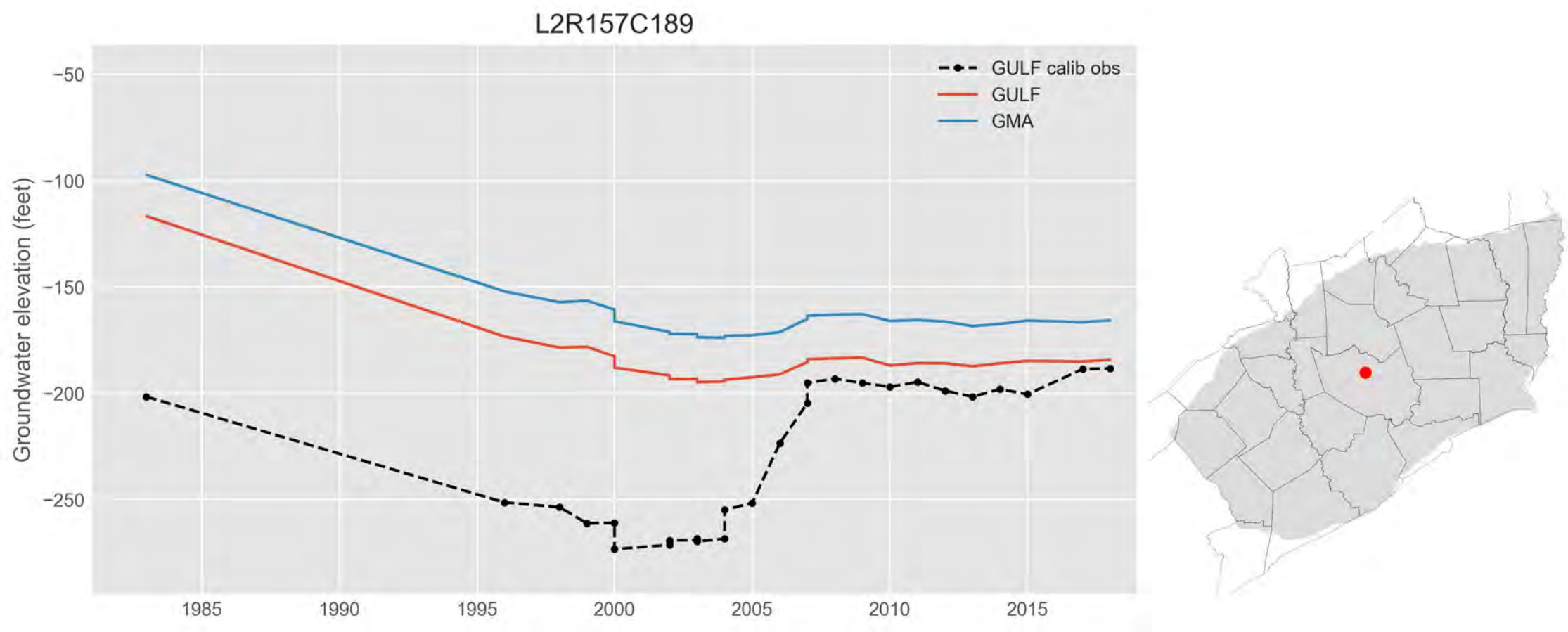

L2R154C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1970
1975
1980
1985
1990
1995
2000
2005

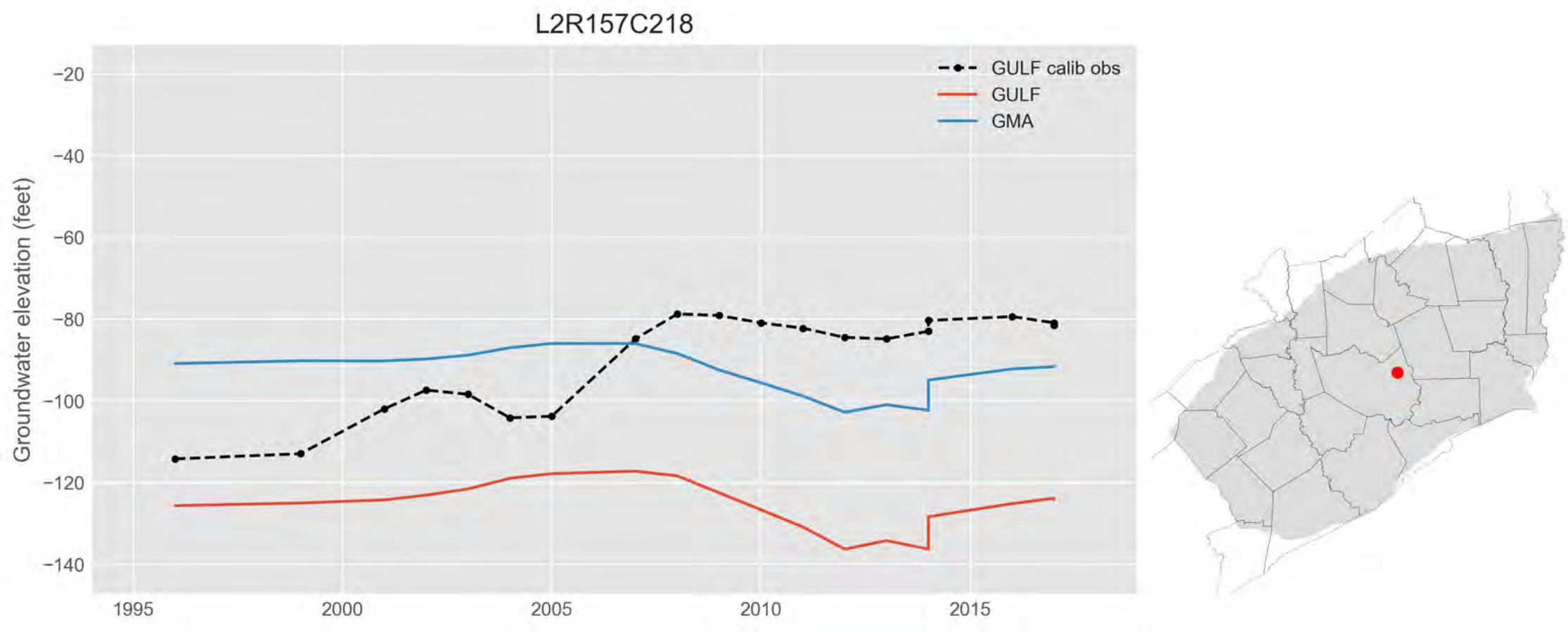

L2R154C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1970
1980
1990
2000
2010
2020

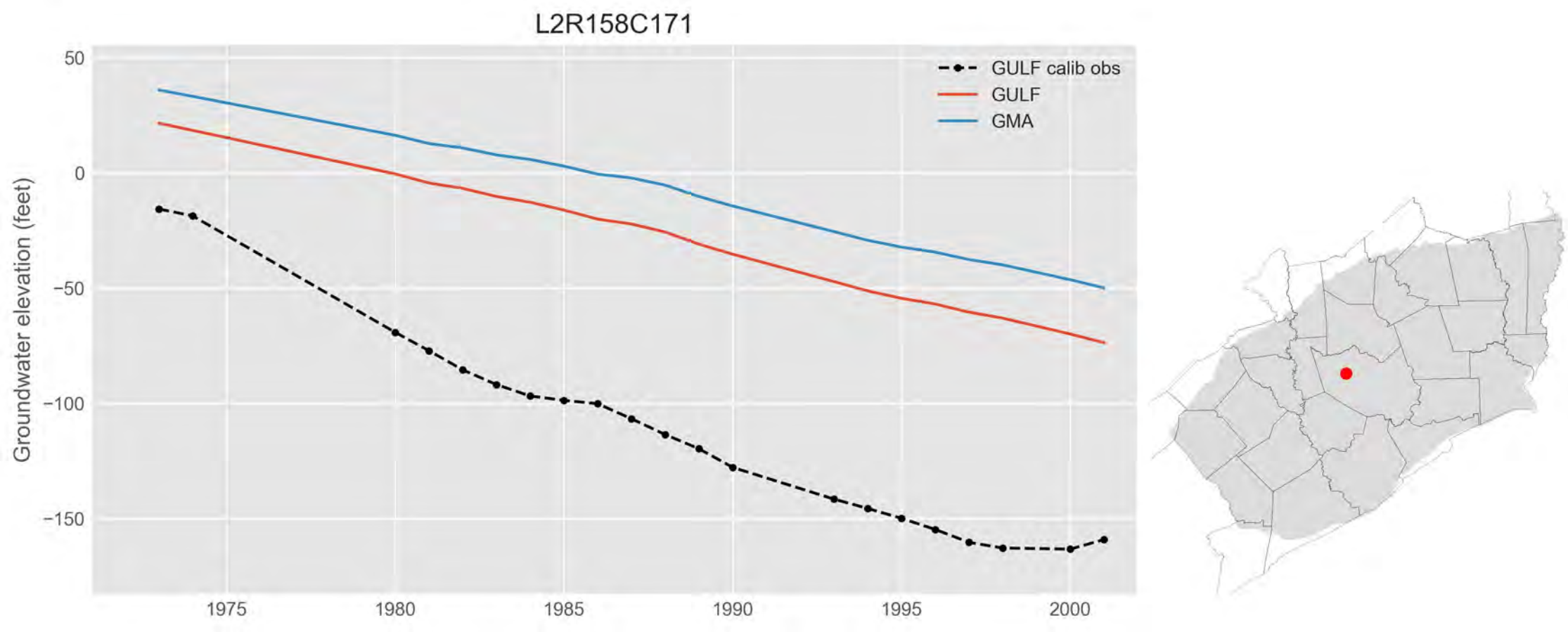

L2R155C151
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
1960
1965
1970
1975
1980
1985

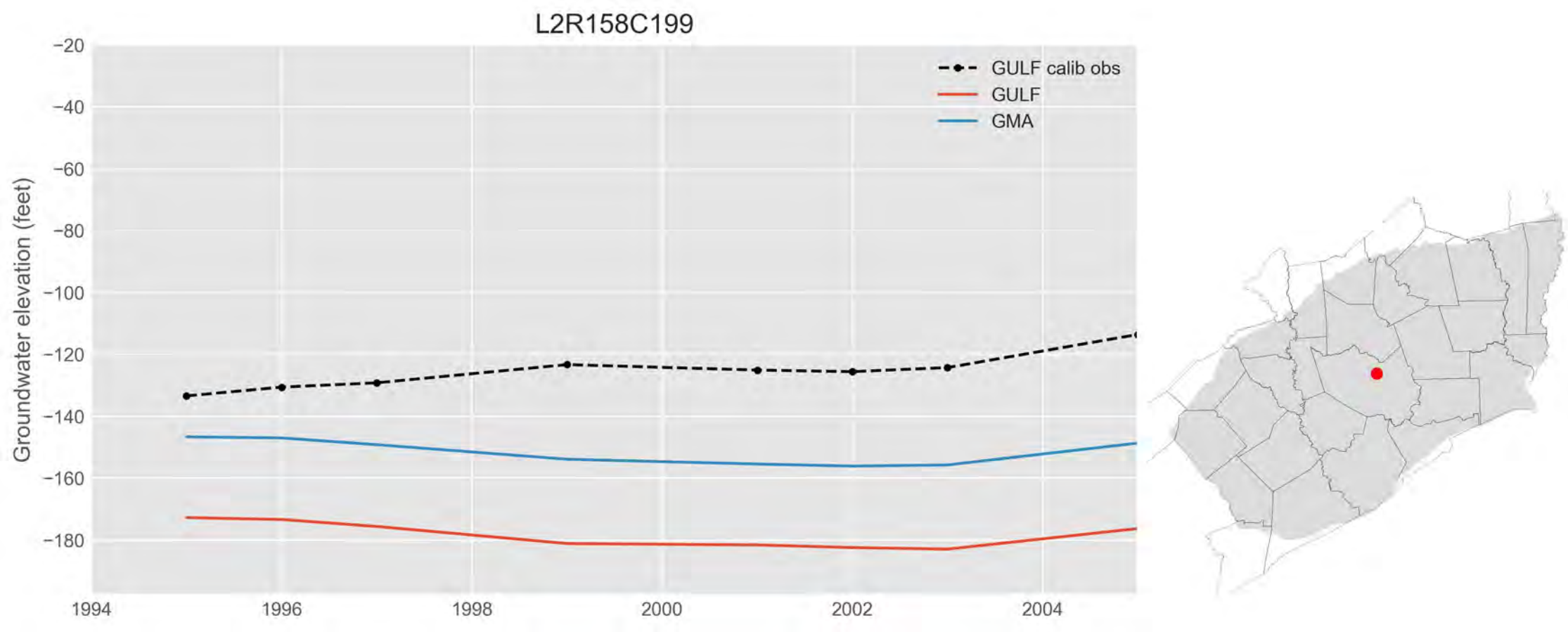

L2R155C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
−100
1970
1972
1974
1976
1978
1980
1982
1984

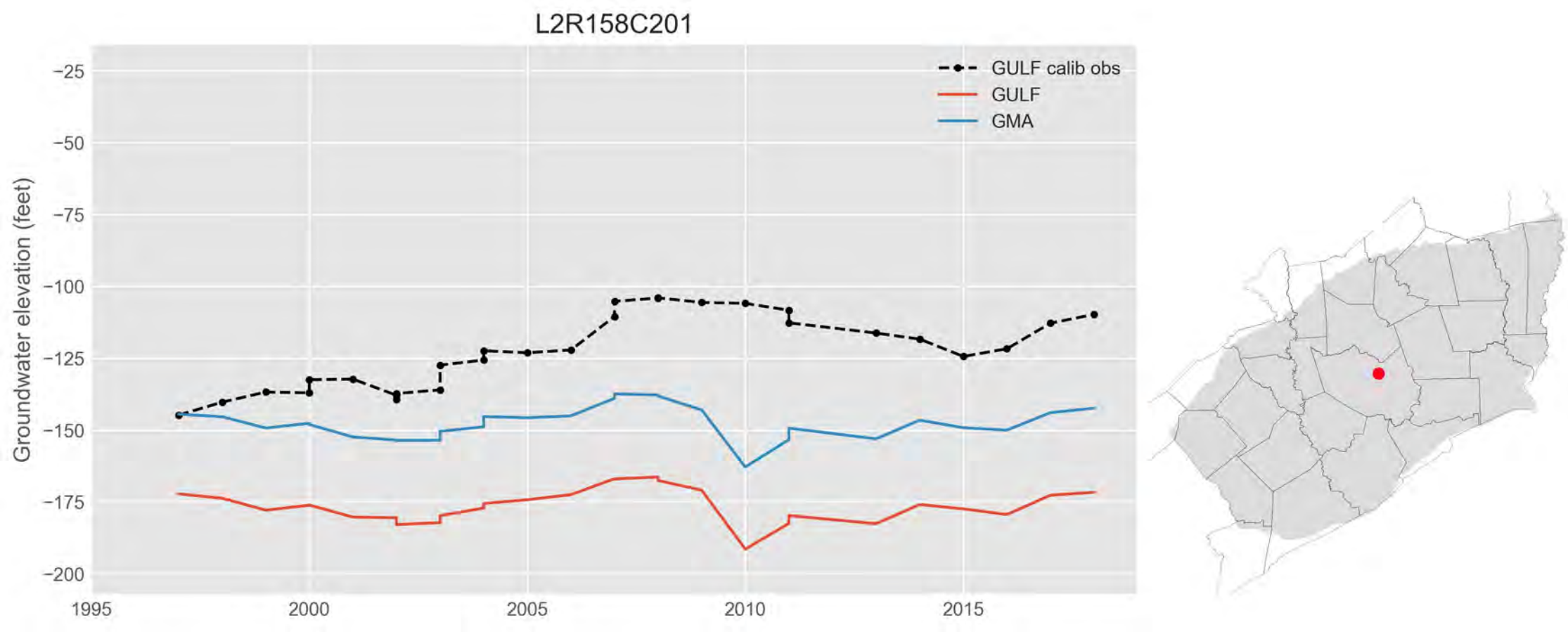

L2R156C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
−250
1985
1990
1995
2000
2005
2010
2015

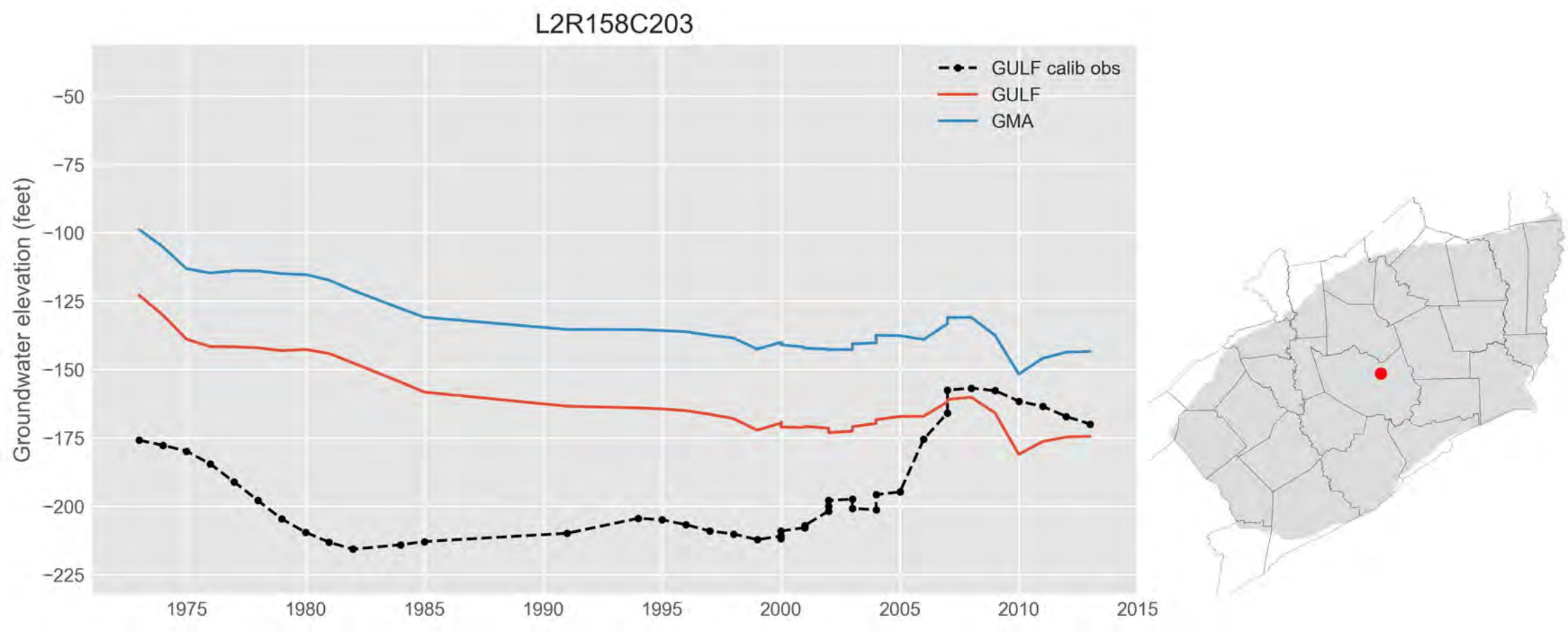

L2R157C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1985
1990
1995
2000
2005
2010
2015

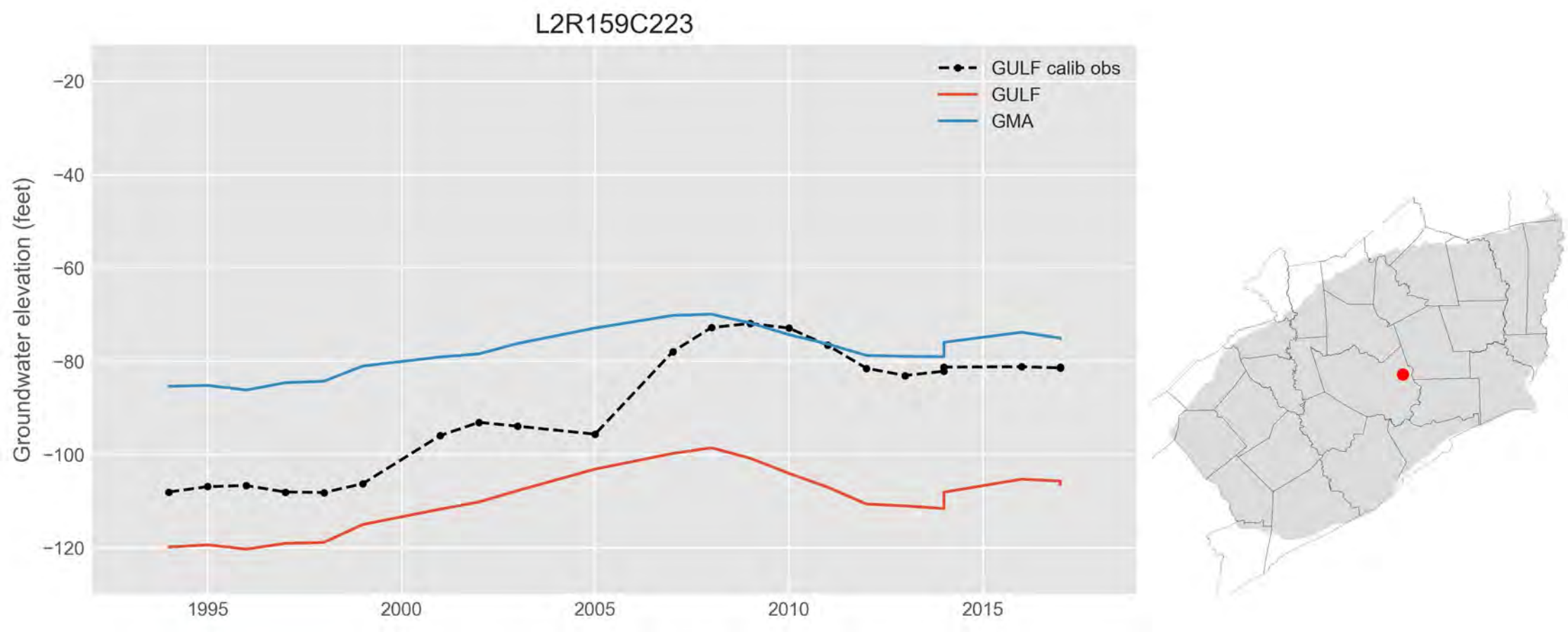

L2R157C218
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1995
2000
2005
2010
2015

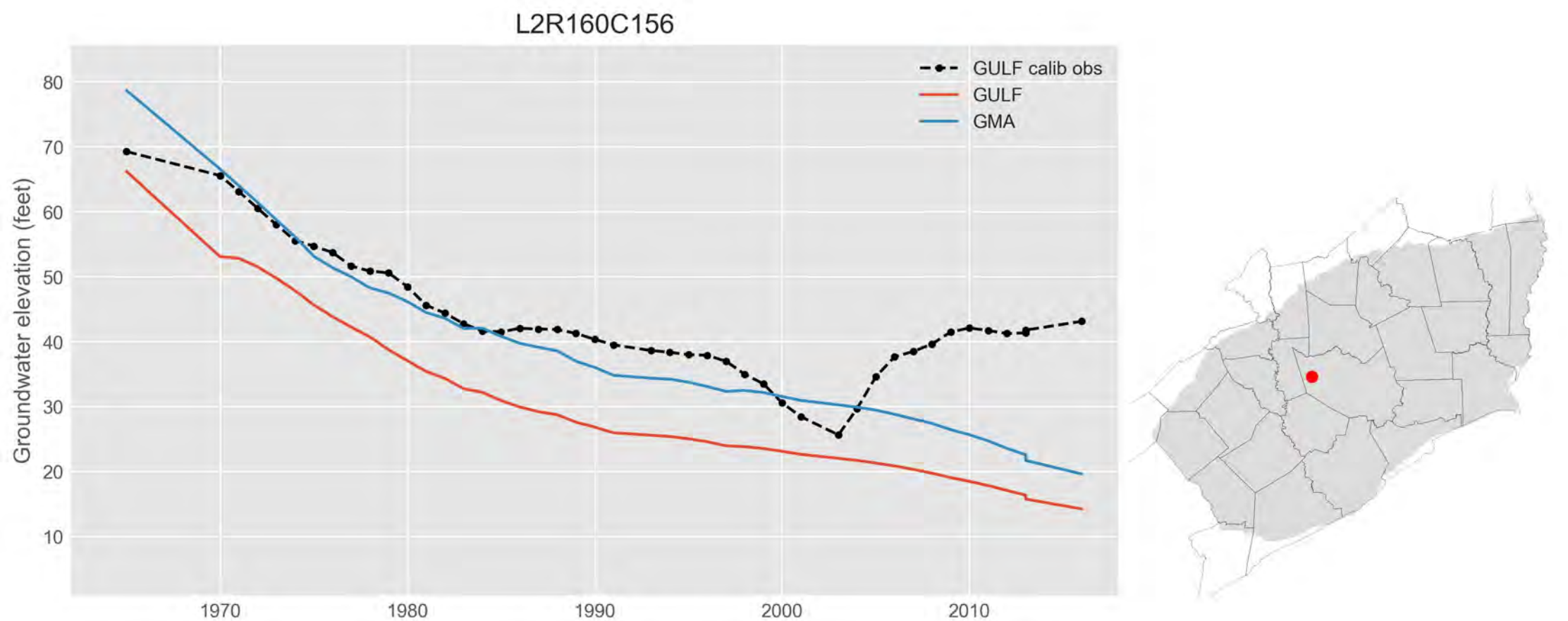

L2R158C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
1975
1980
1985
1990
1995
2000

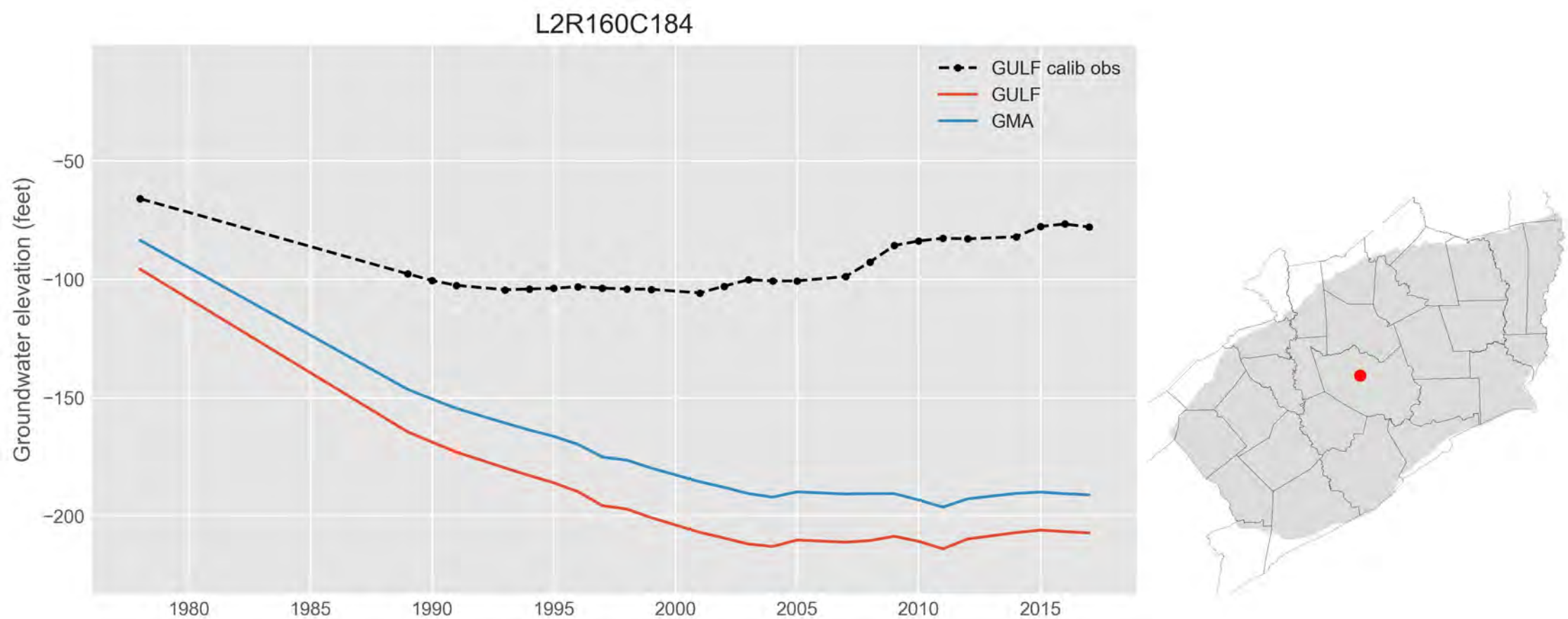

L2R158C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
−180
1994
1996
1998
2000
2002
2004

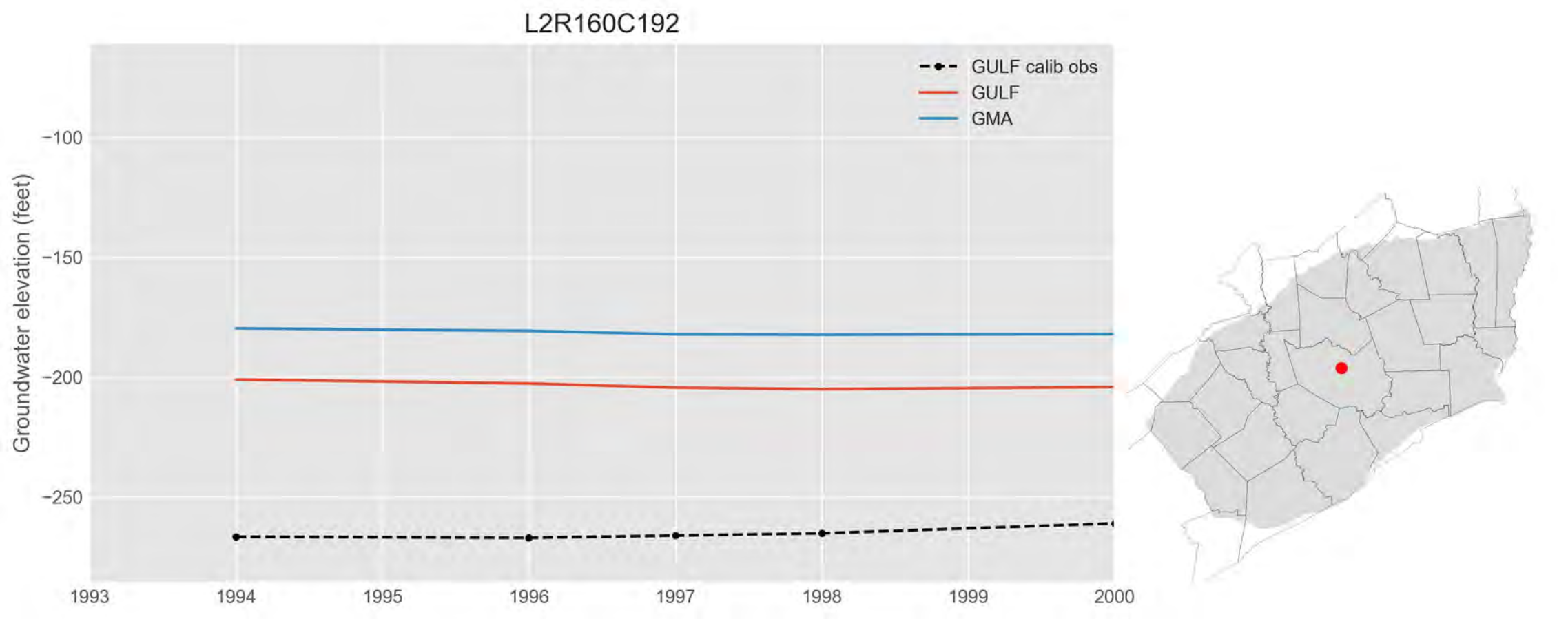

L2R158C201
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1995
2000
2005
2010
2015

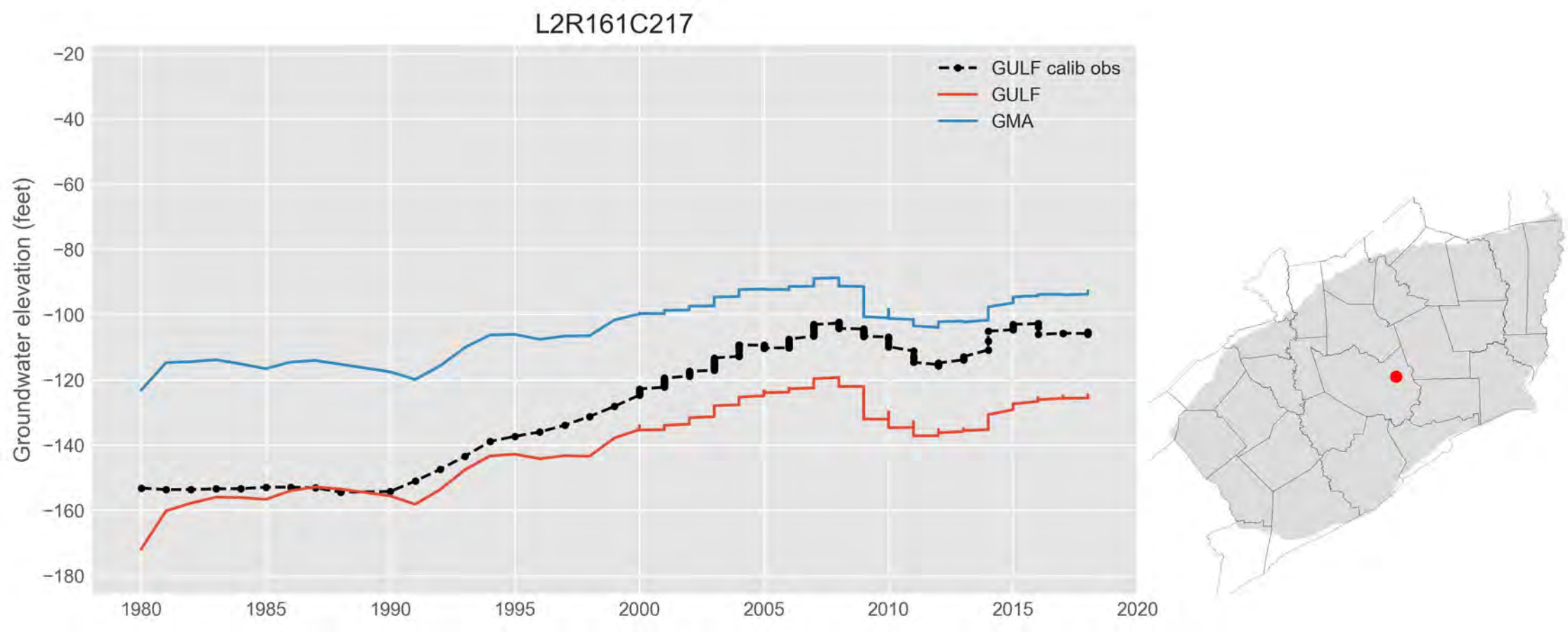

L2R158C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
1975
1980
1985
1990
1995
2000
2005
2010
2015

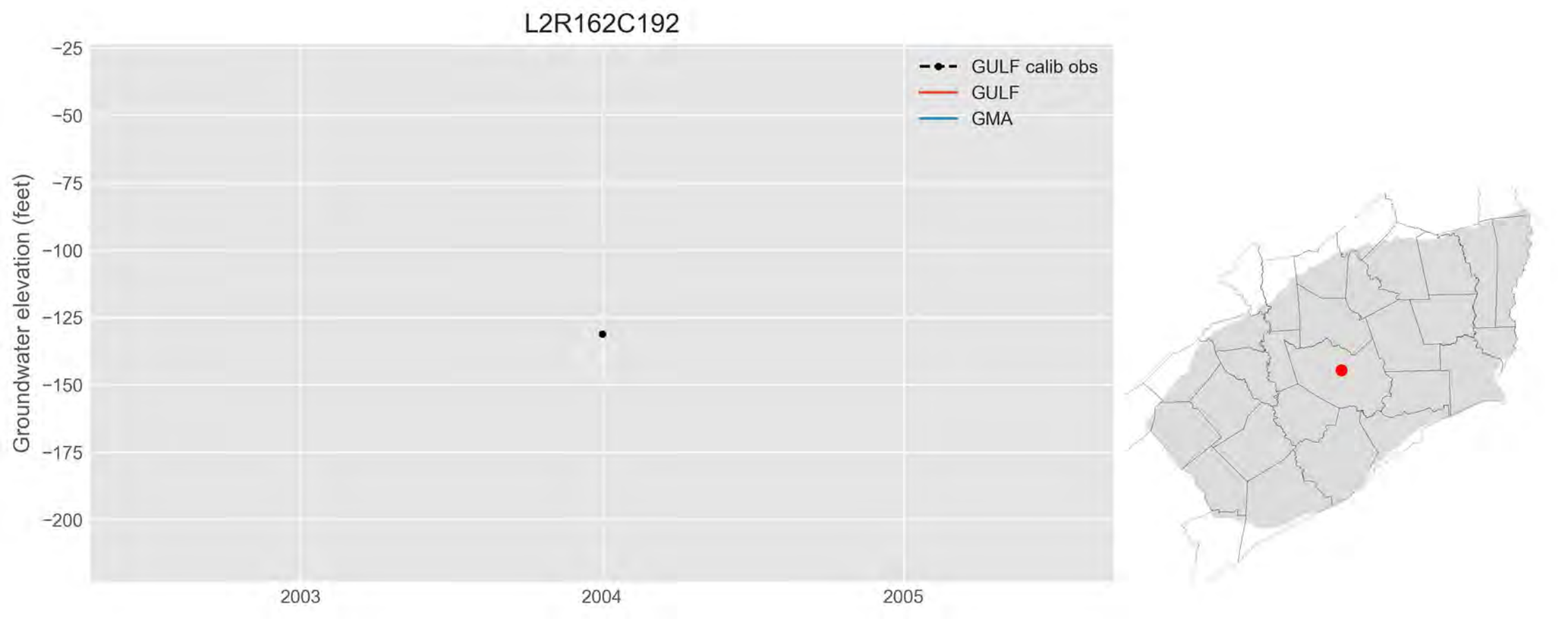

L2R159C223
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1995
2000
2005
2010
2015

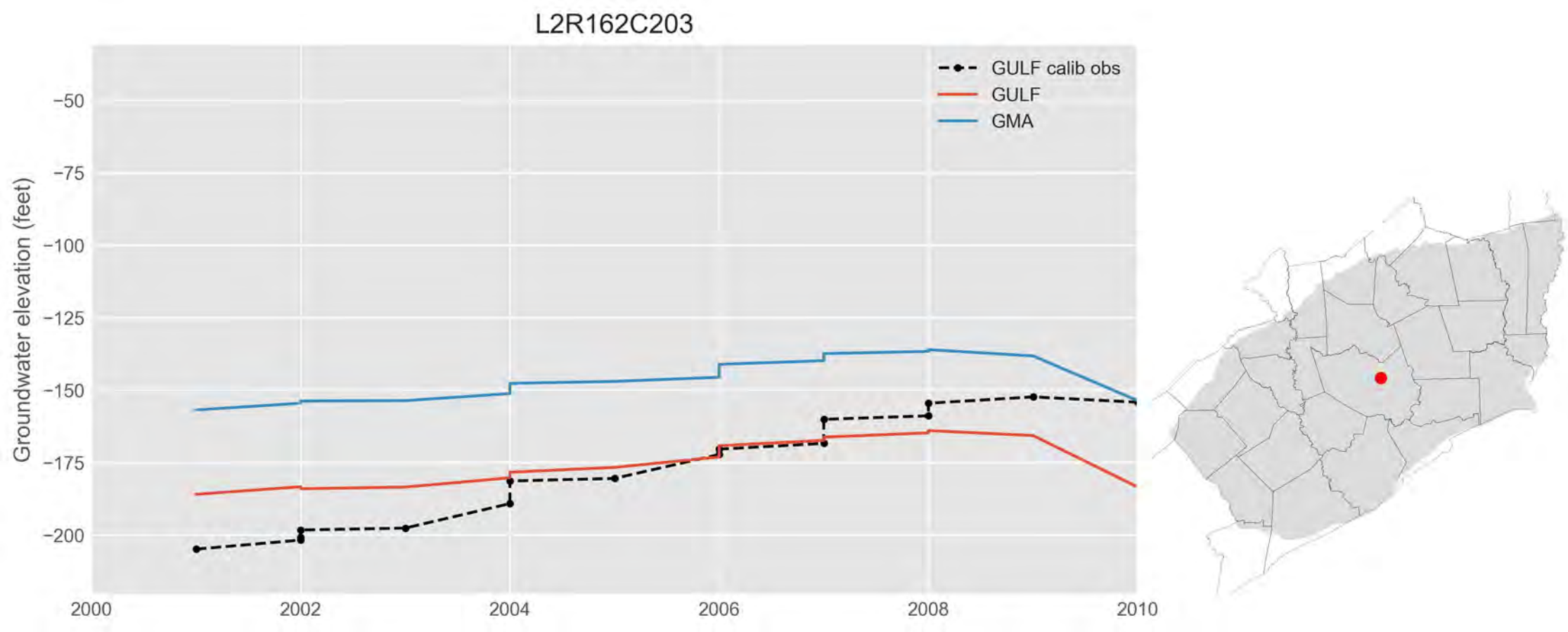

L2R160C156
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
70
60
50
40
30
20
10
1970
1980
1990
2000
2010

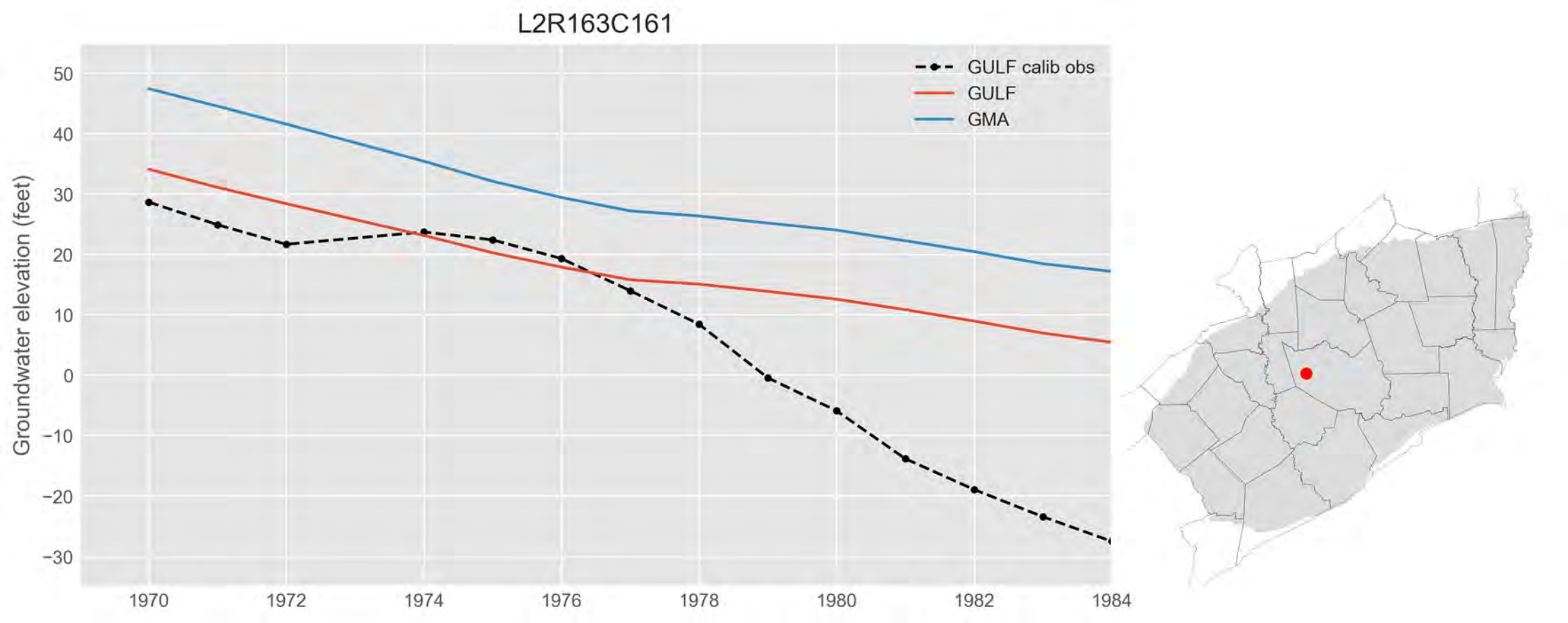

L2R160C184
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1980
1985
1990
1995
2000
2005
2010
2015

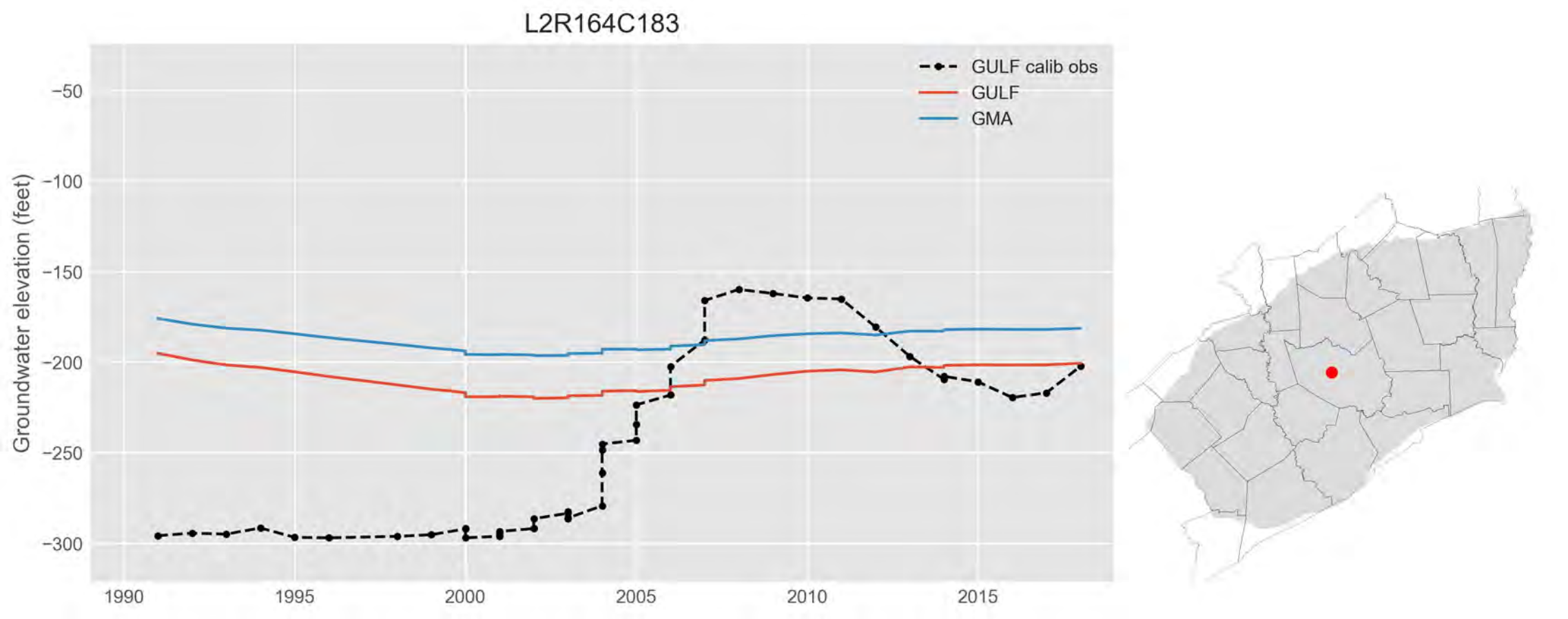

L2R160C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
1993
1994
1995
1996
1997
1998
1999
2000

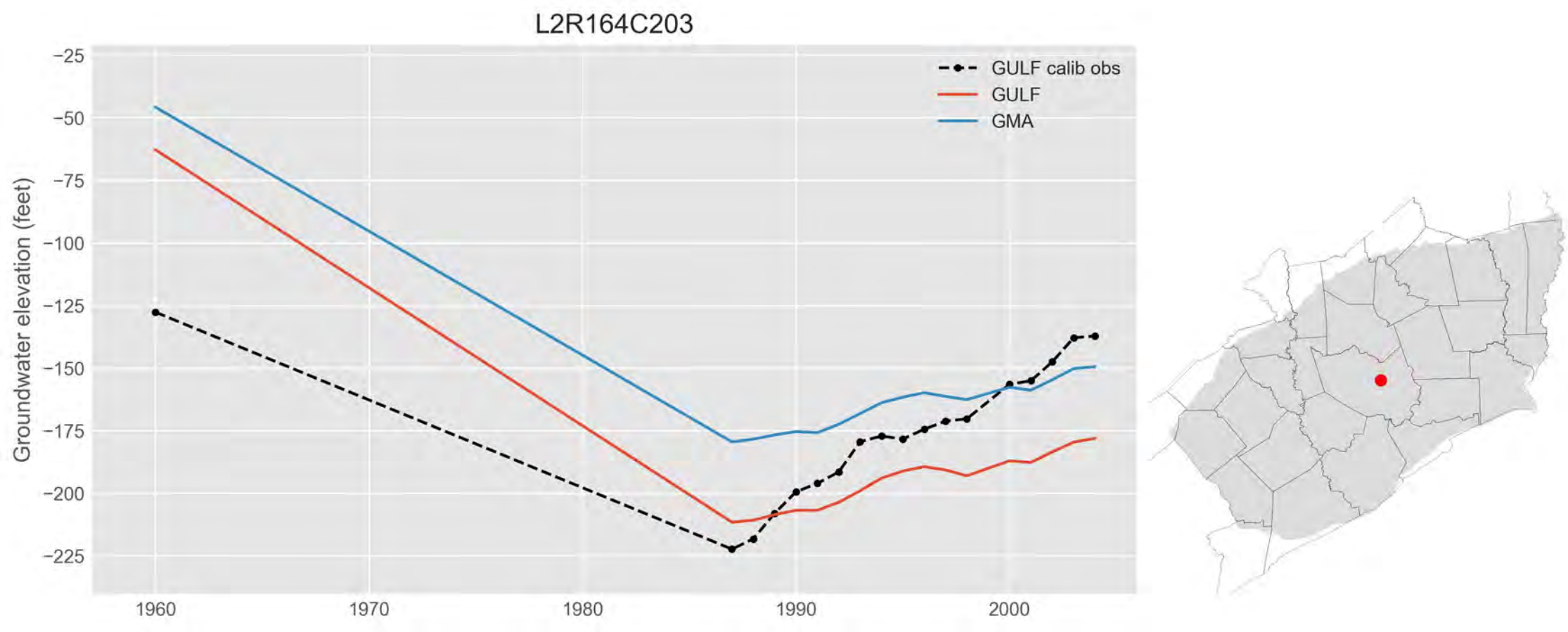

L2R161C217
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
−180
1980
1985
1990
1995
2000
2005
2010
2015
2020

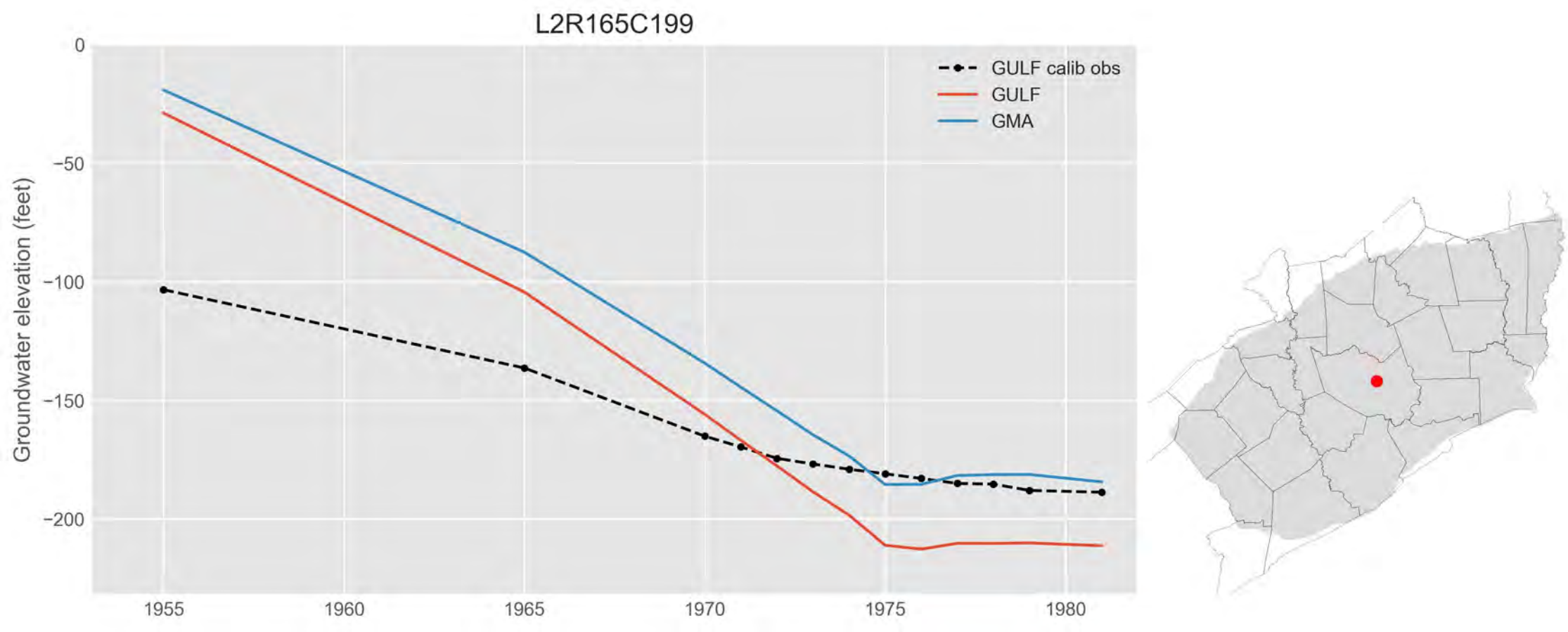

L2R162C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
2003
2004
2005


L2R162C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
2000
2002
2004
2006
2008
2010

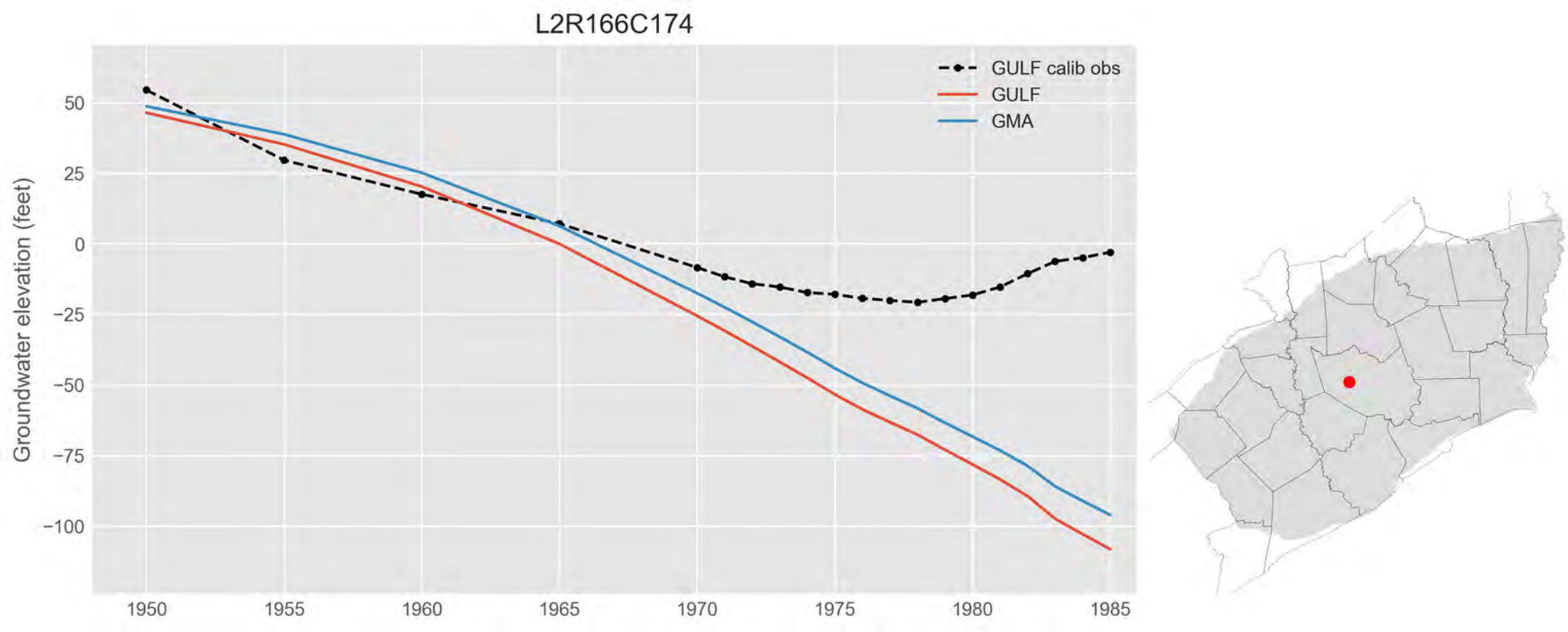

L2R163C161
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
−10
−20
−30
1970
1972
1974
1976
1978
1980
1982
1984

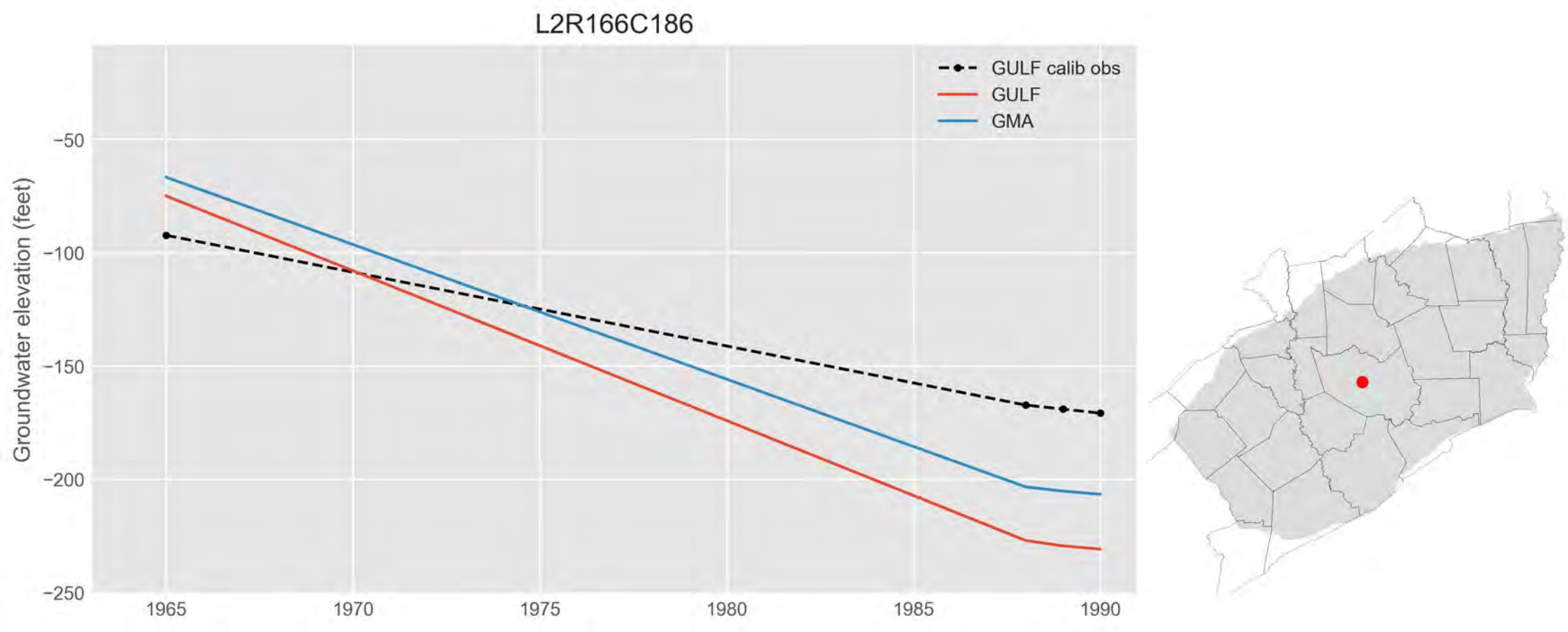

L2R164C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1990
1995
2000
2005
2010
2015

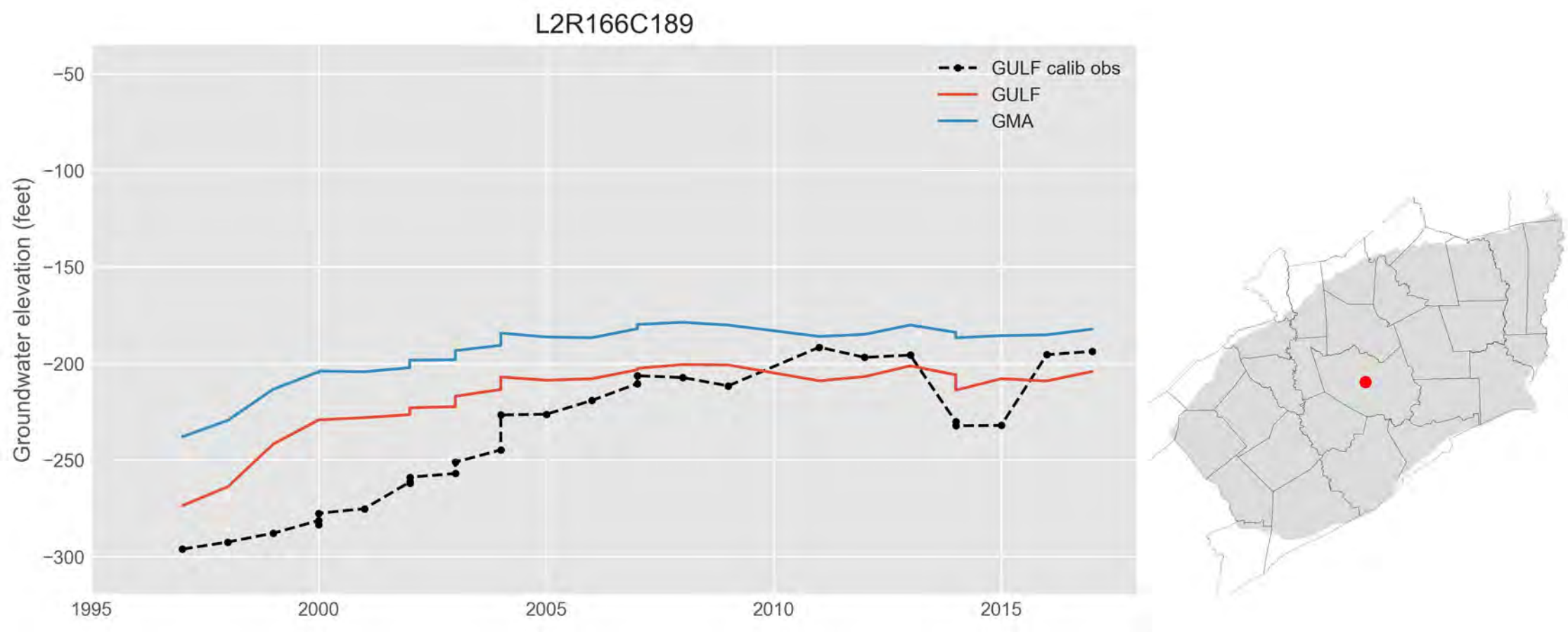

L2R164C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
−225
1960
1970
1980
1990
2000

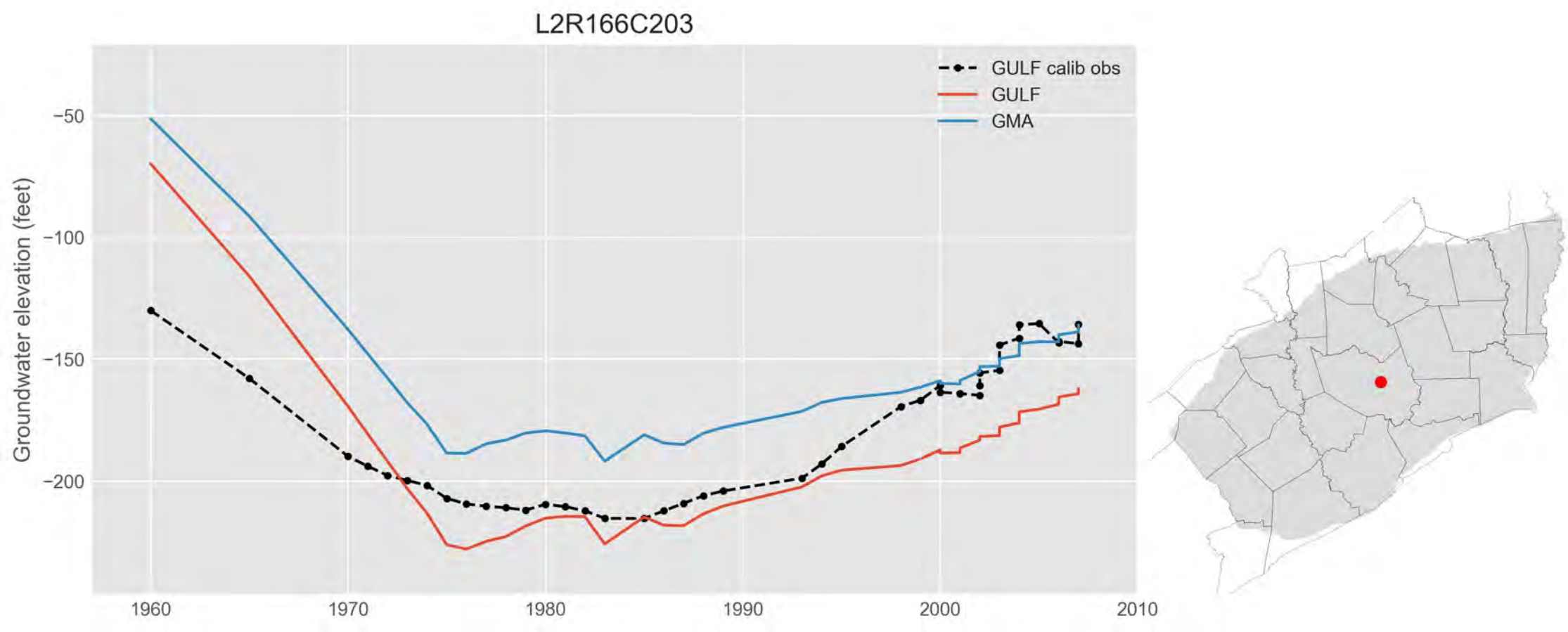

L2R165C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1955
1960
1965
1970
1975
1980

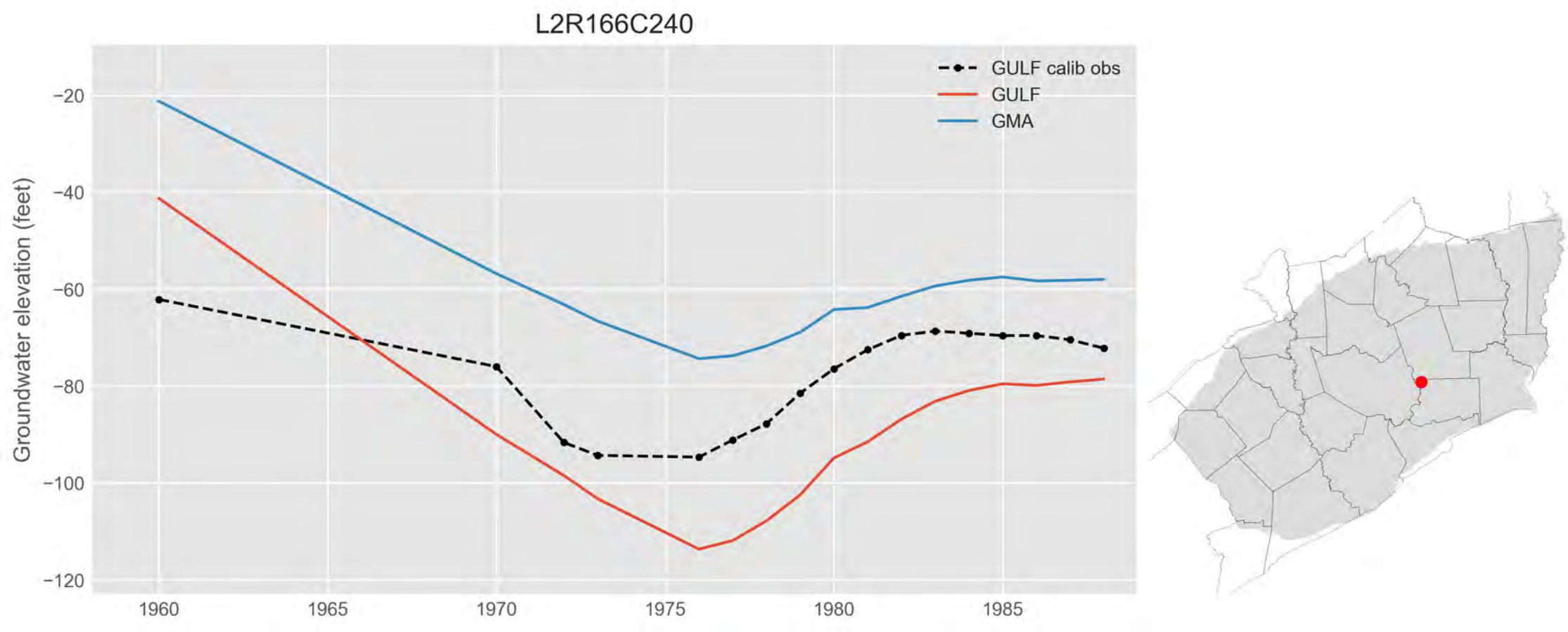
L2R165C243
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
1971
1972

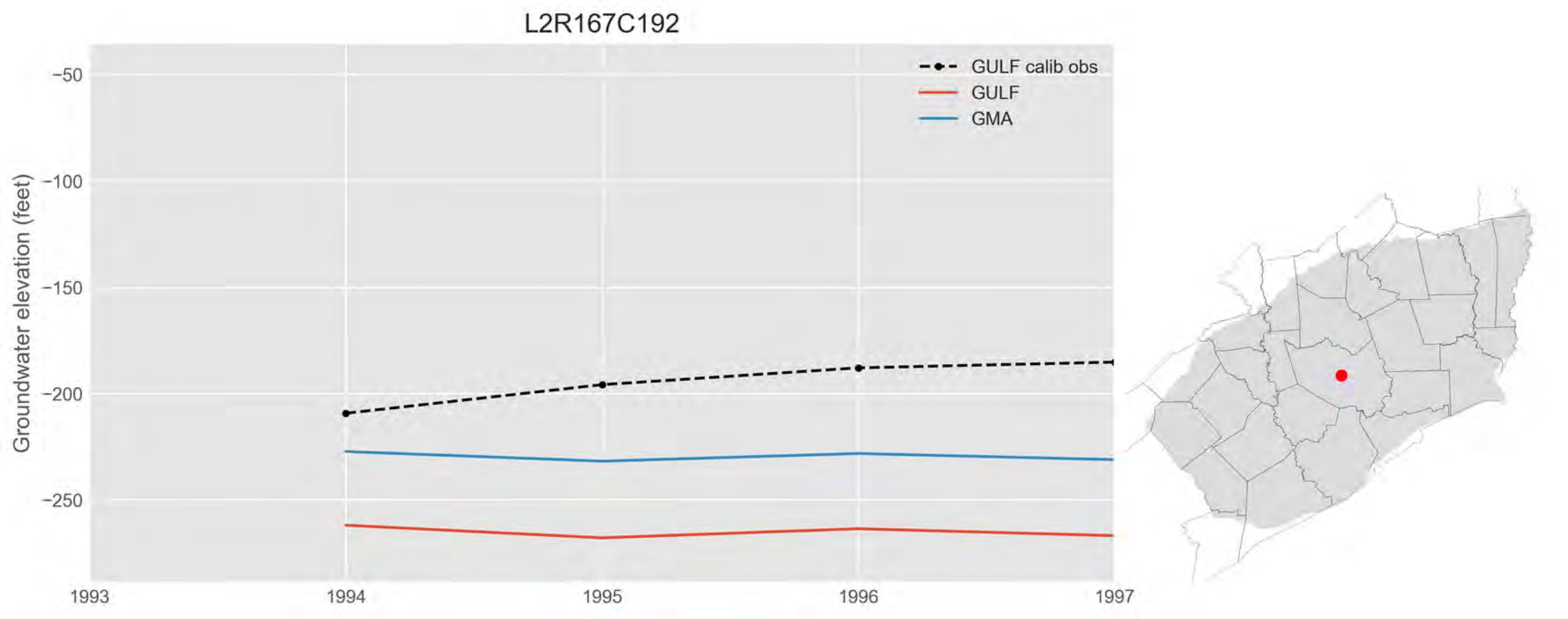

L2R166C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
25
0
−25
−50
−75
−100
1950
1955
1960
1965
1970
1975
1980
1985

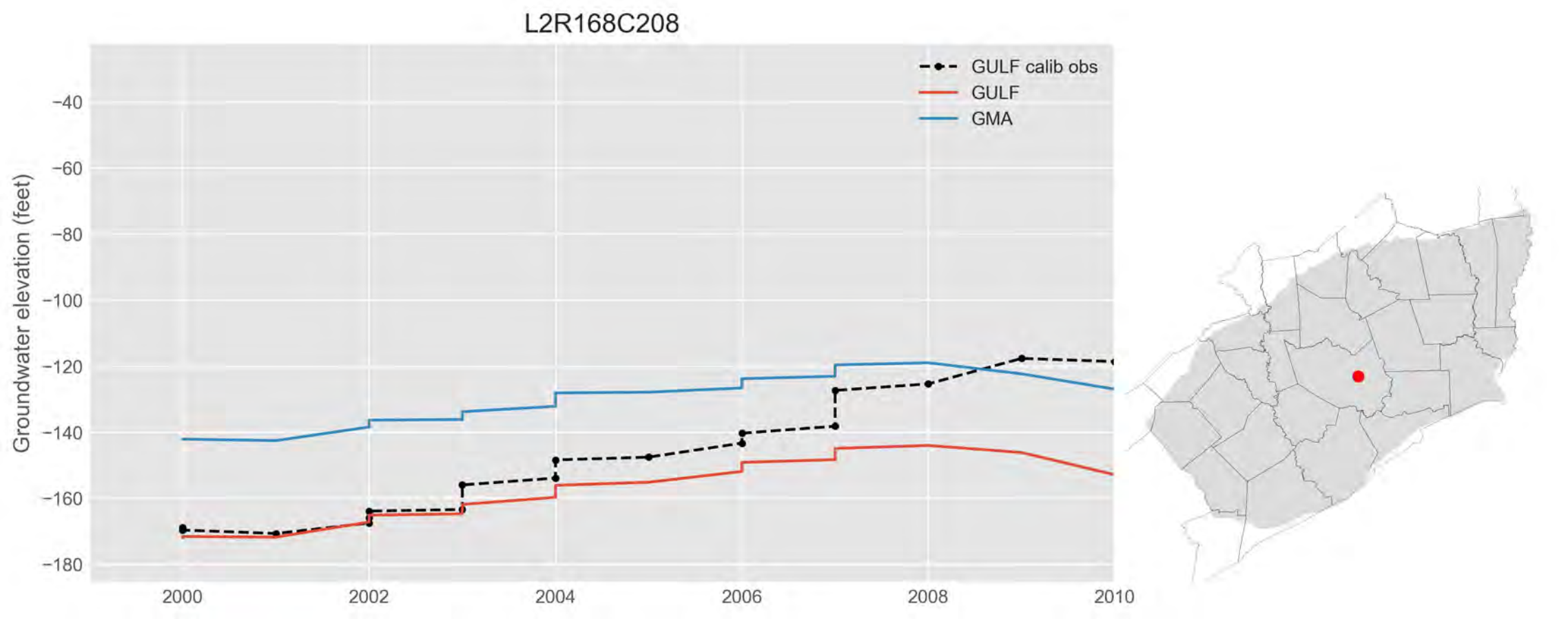

L2R166C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1965
1970
1975
1980
1985
1990

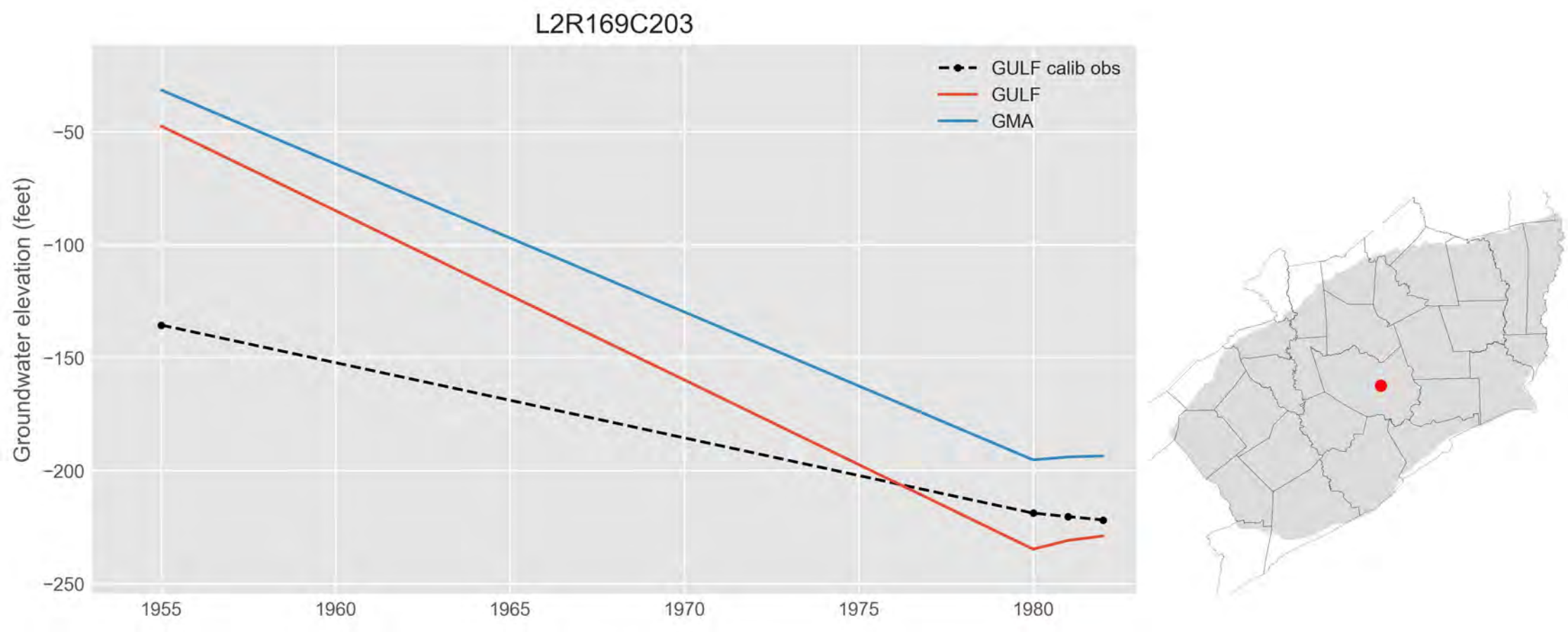

L2R166C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1995
2000
2005
2010
2015

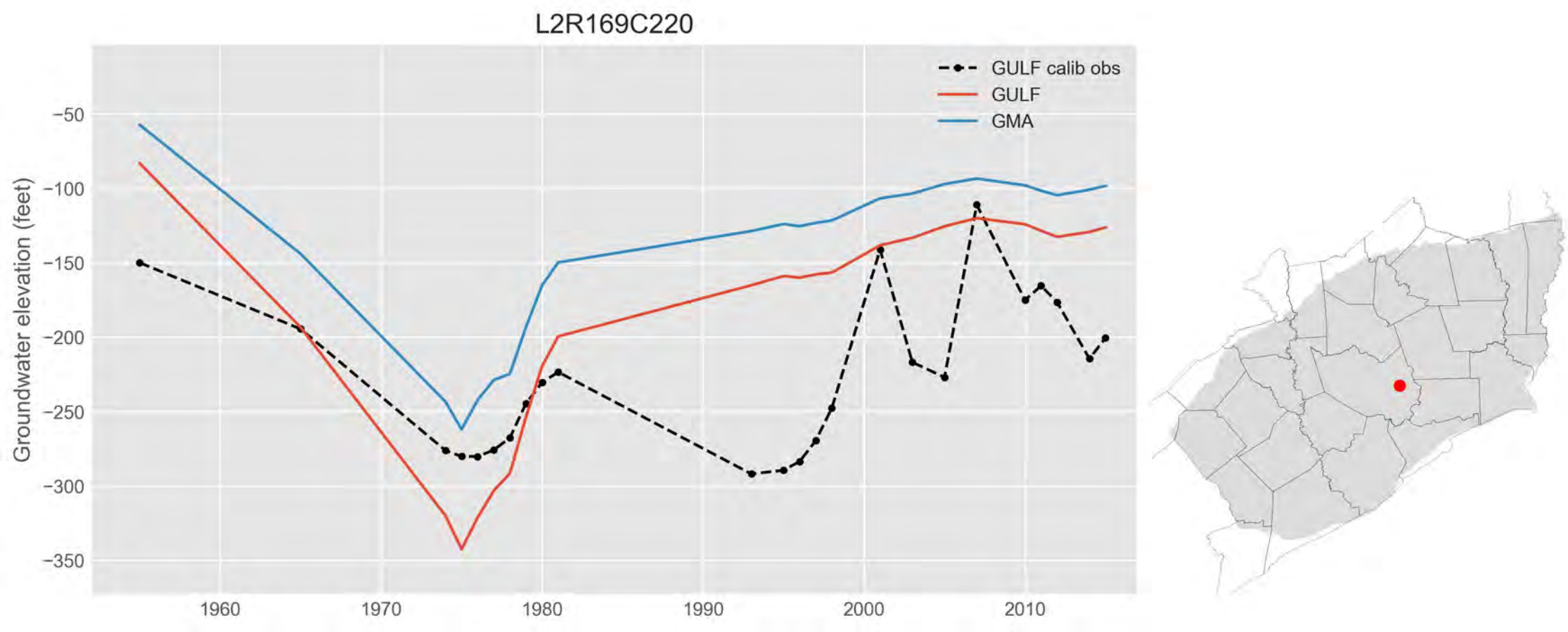

L2R166C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1960
1970
1980
1990
2000
2010

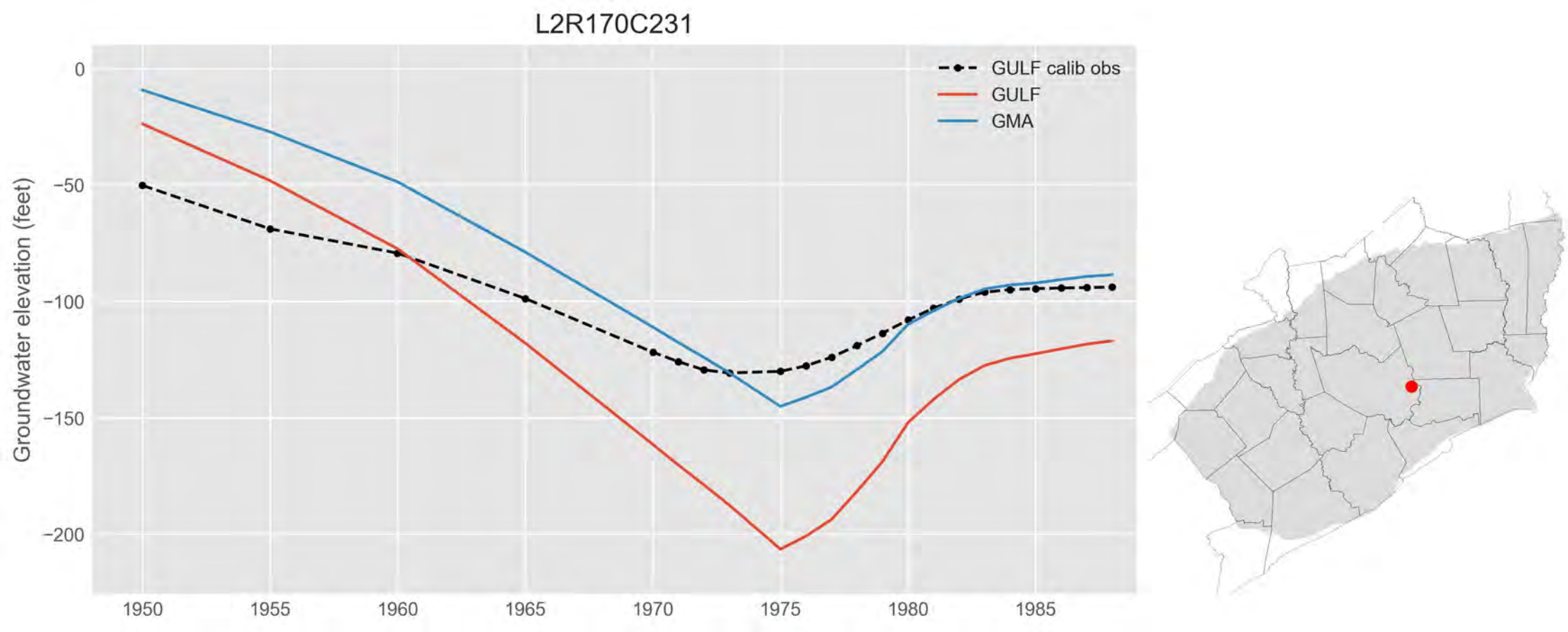

L2R166C240
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1960
1965
1970
1975
1980
1985

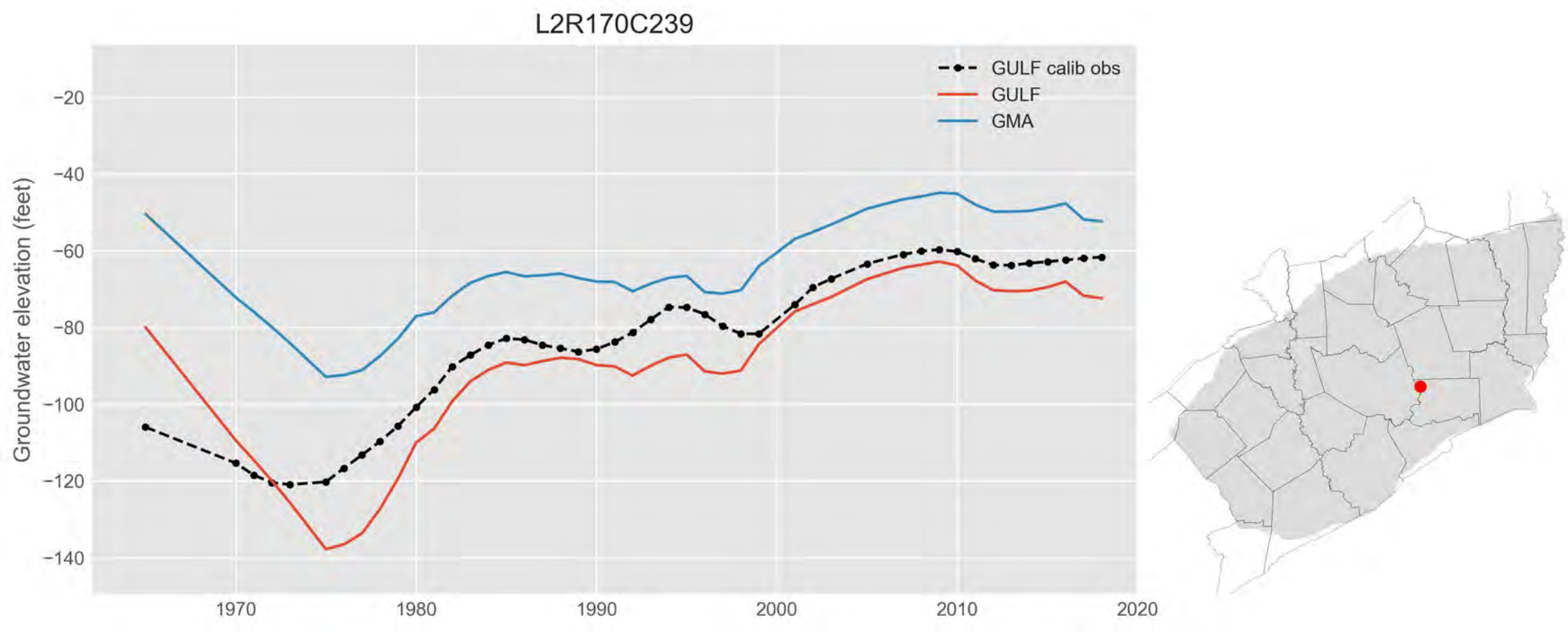

L2R167C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1993
1994
1995
1996
1997

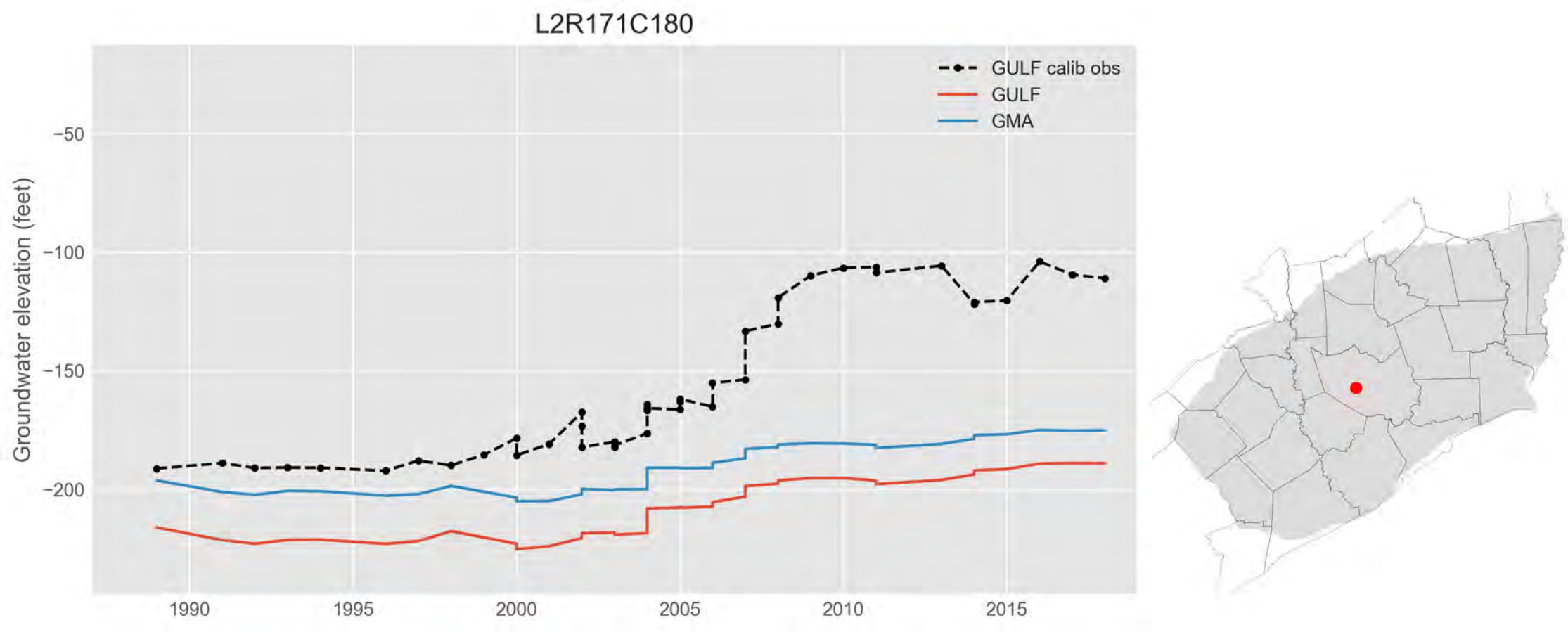

L2R168C208
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
2000
2002
2004
2006
2008
2010

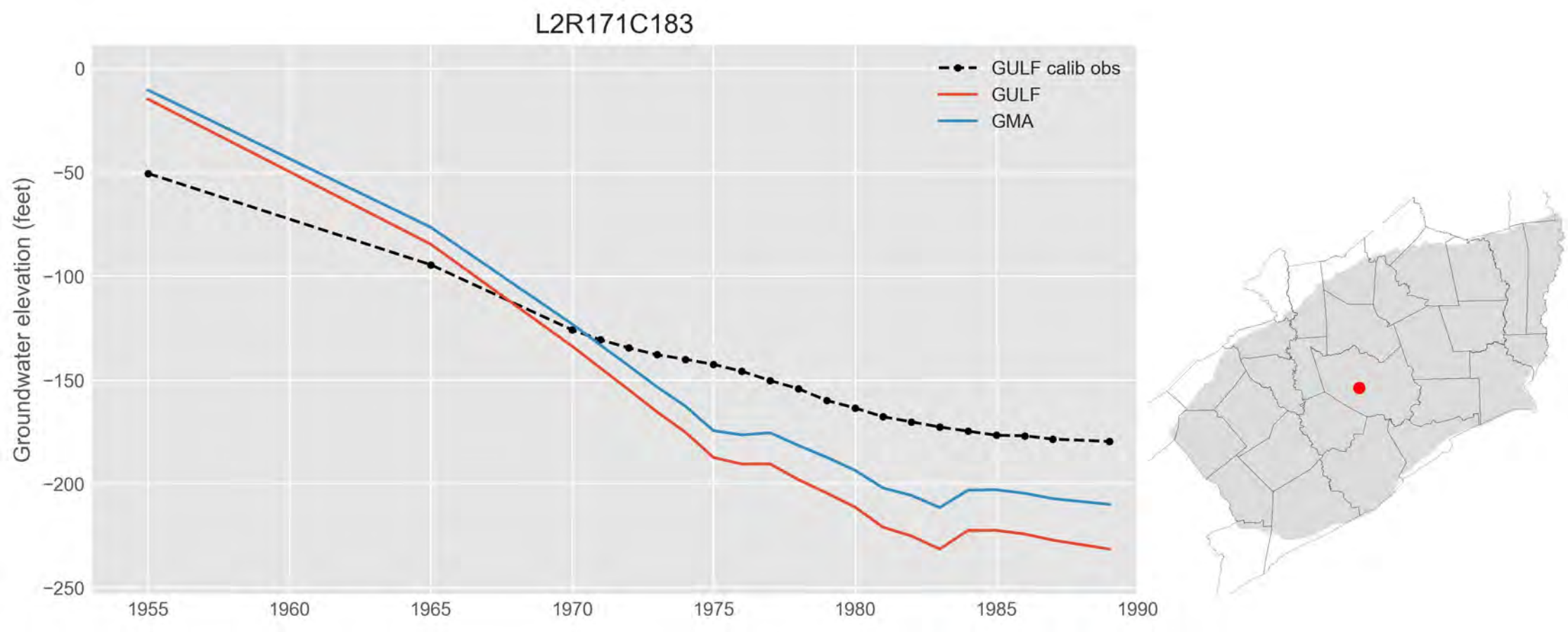

L2R169C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1955
1960
1965
1970
1975
1980

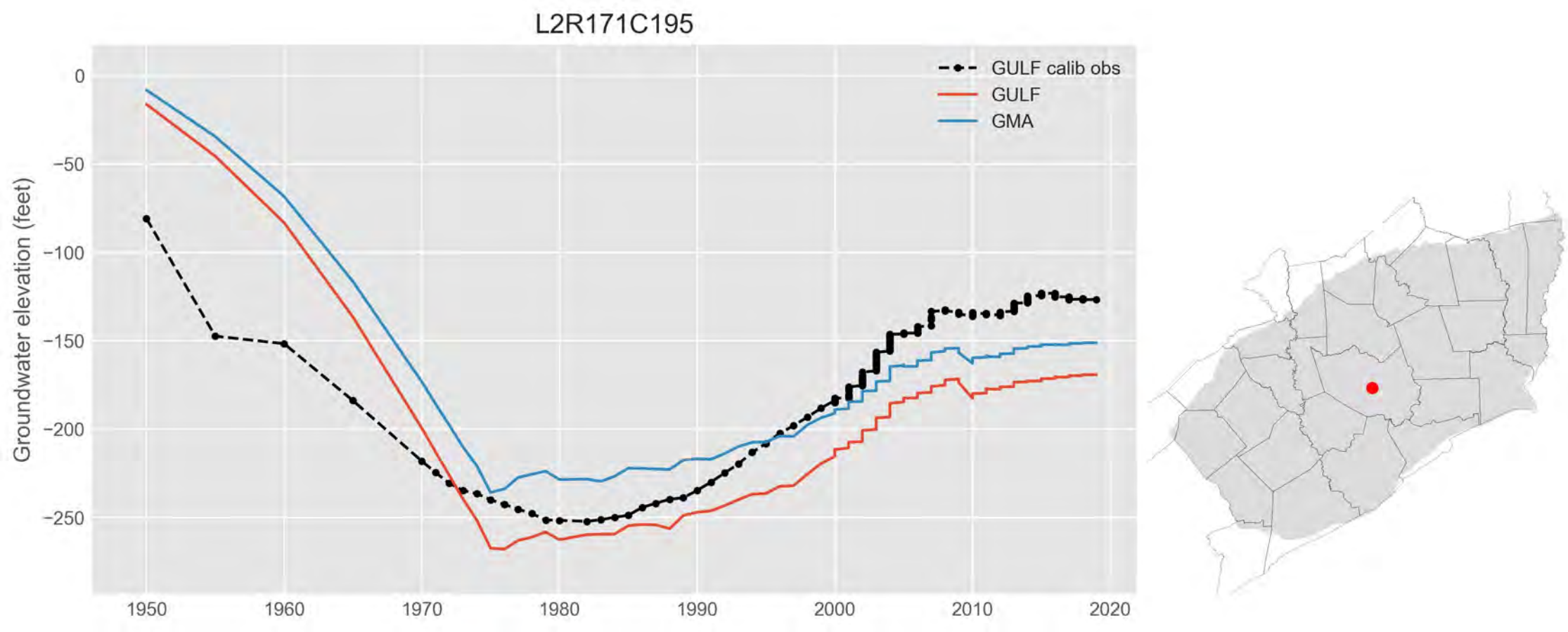

L2R169C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1960
1970
1980
1990
2000
2010

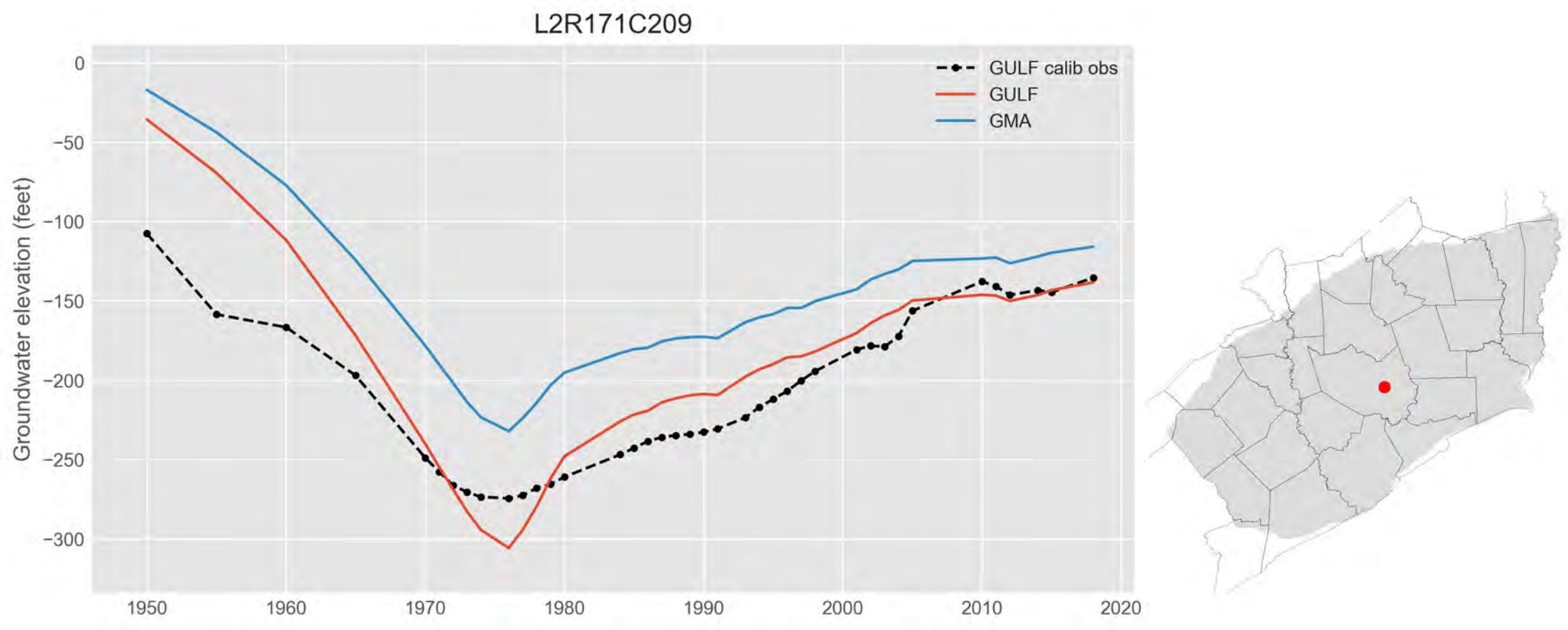

L2R170C231
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1950
1955
1960
1965
1970
1975
1980
1985

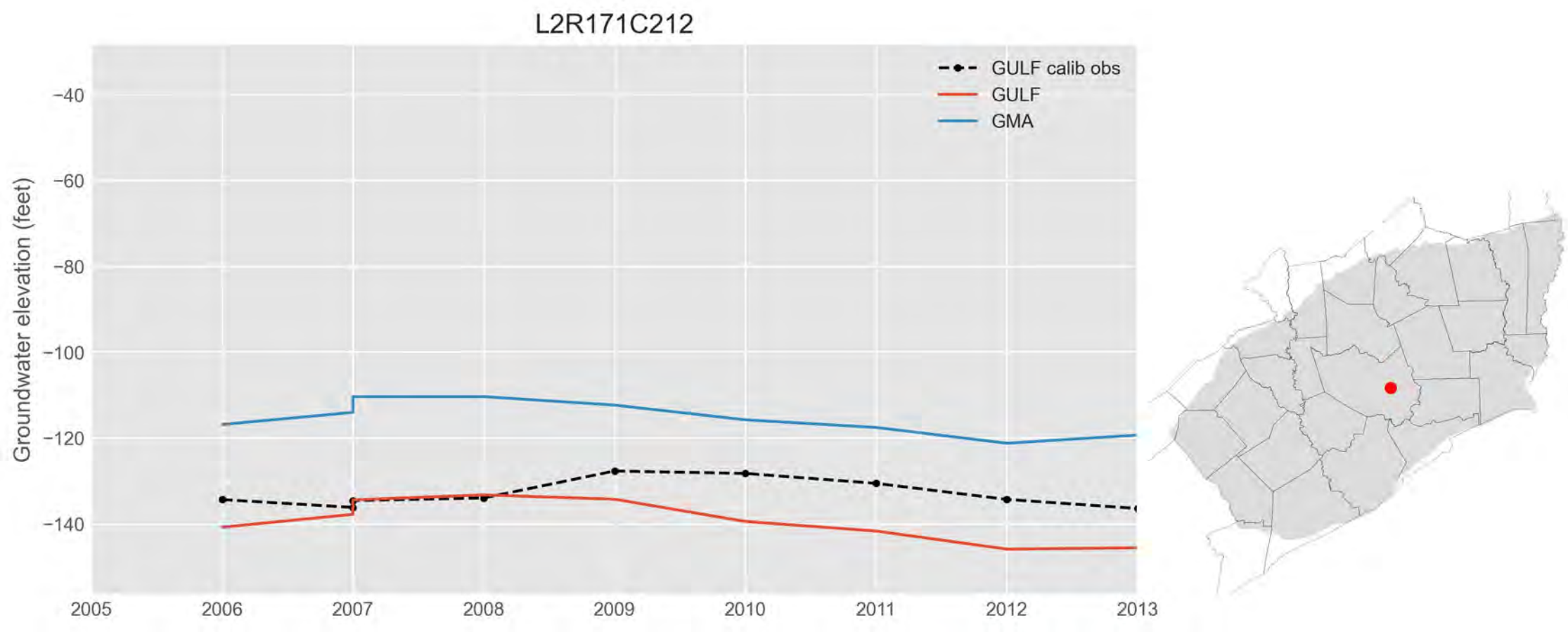

L2R170C239
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1970
1980
1990
2000
2010
2020

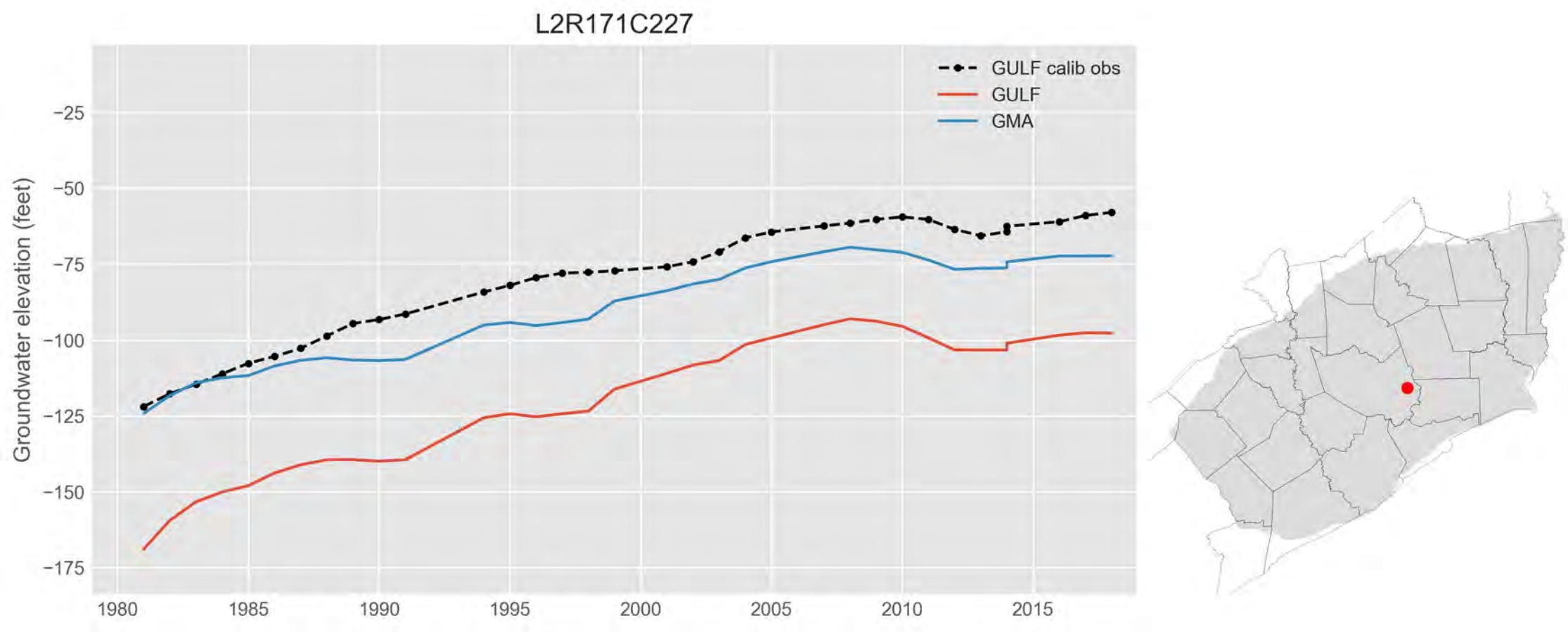

L2R171C180
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1990
1995
2000
2005
2010
2015

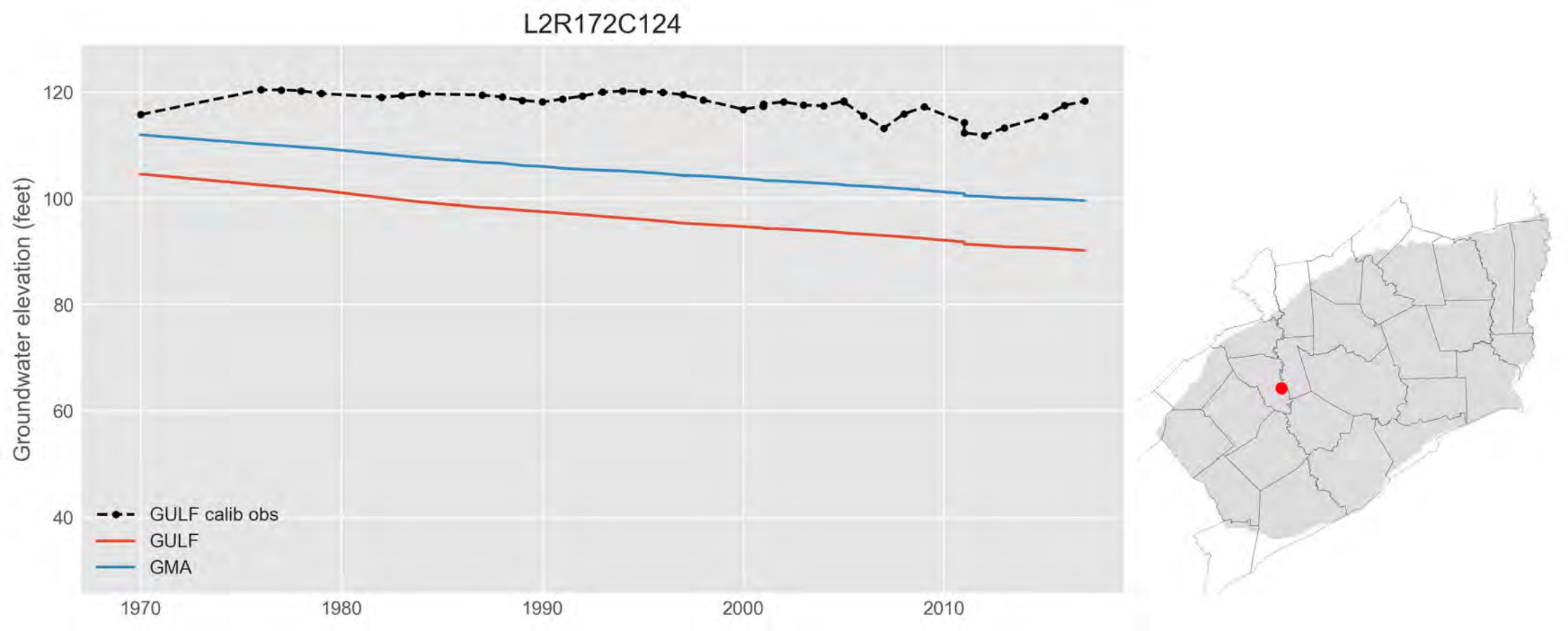

L2R171C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1955
1960
1965
1970
1975
1980
1985
1990

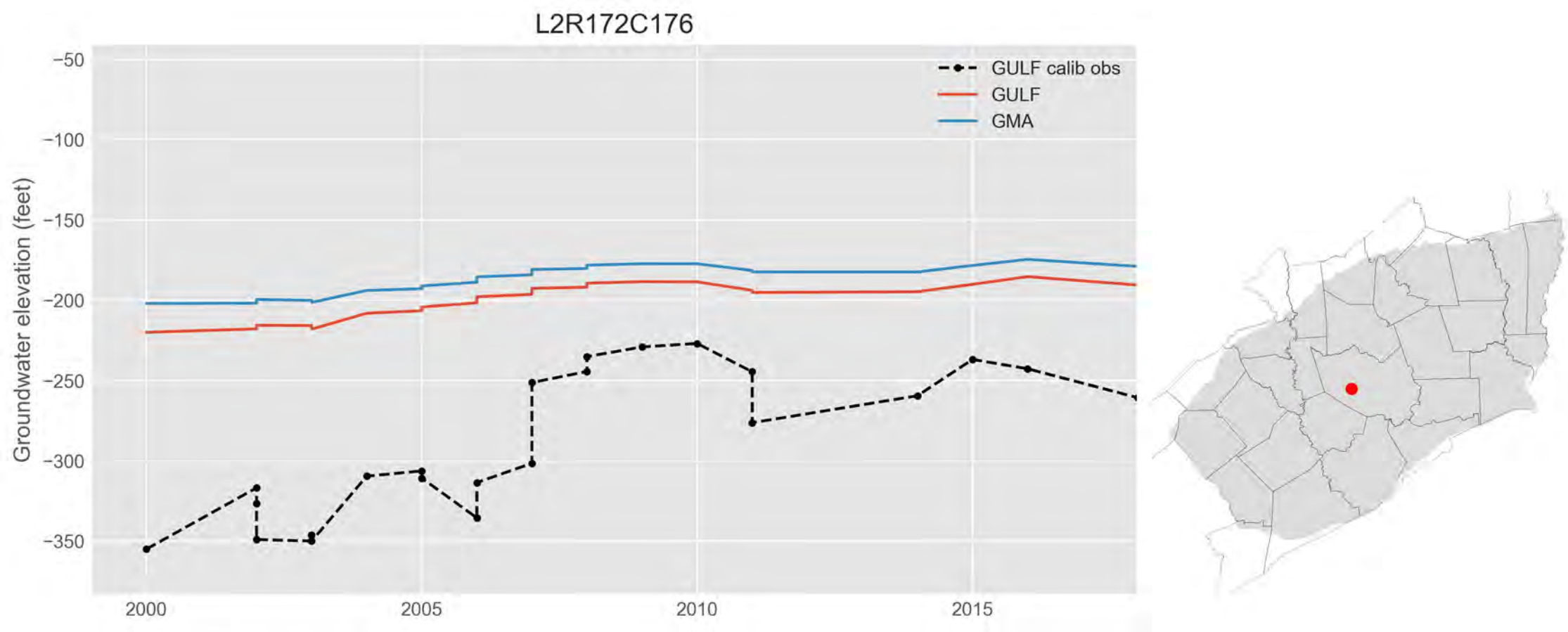

L2R171C195
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1950
1960
1970
1980
1990
2000
2010
2020

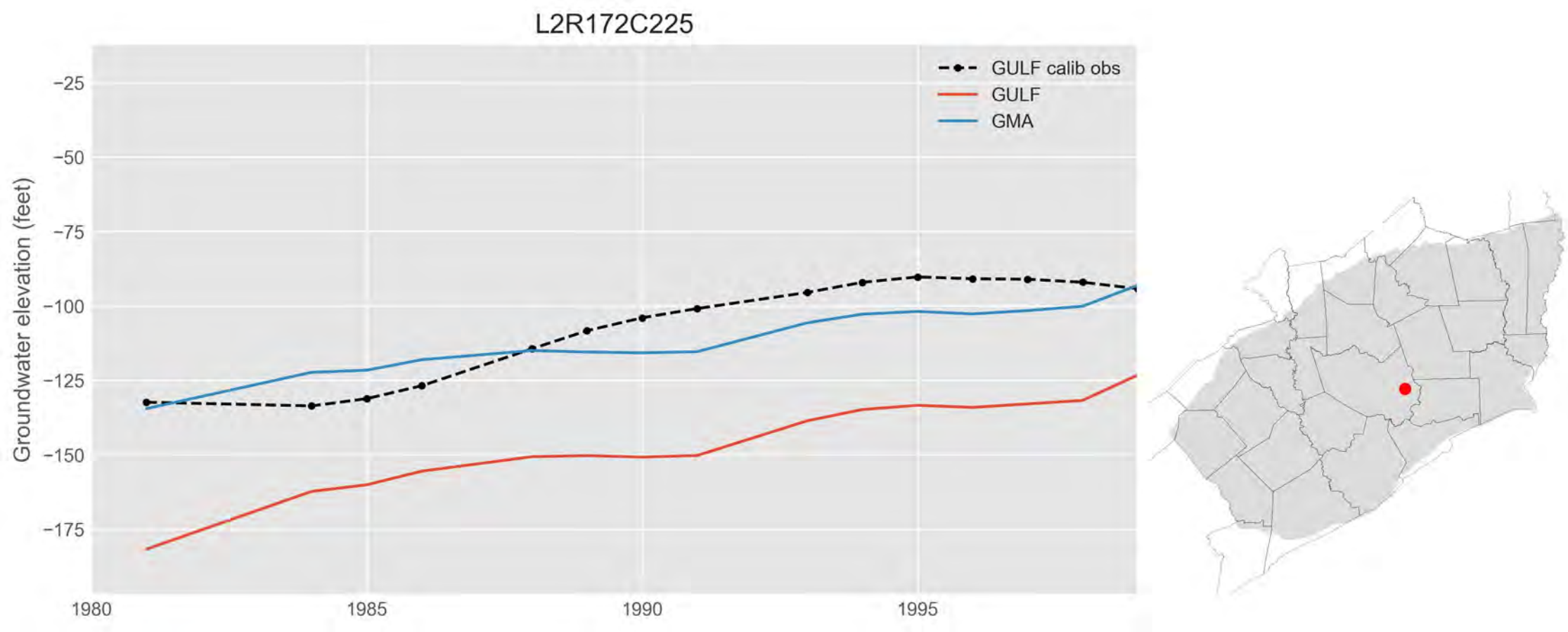

L2R171C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1950
1960
1970
1980
1990
2000
2010
2020

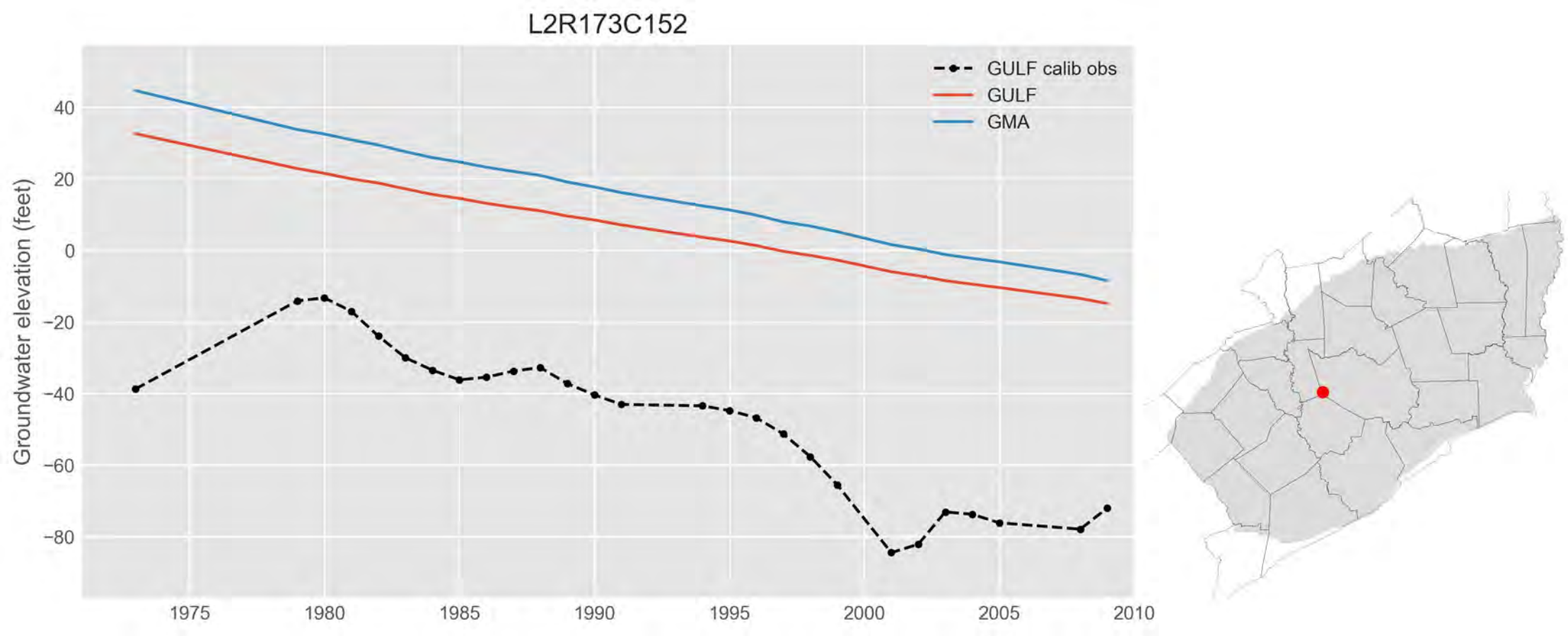

L2R171C212
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
2005
2006
2007
2008
2009
2010
2011
2012
2013

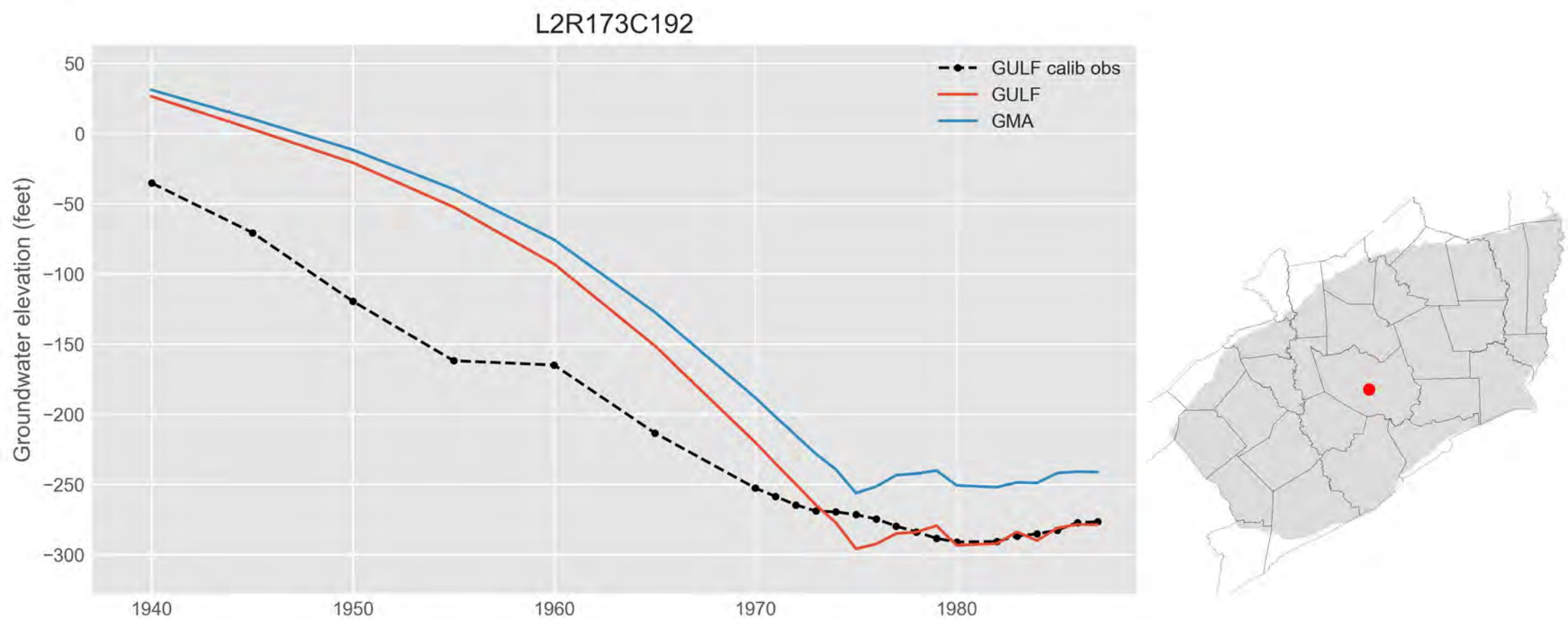

L2R171C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
1980
1985
1990
1995
2000
2005
2010
2015

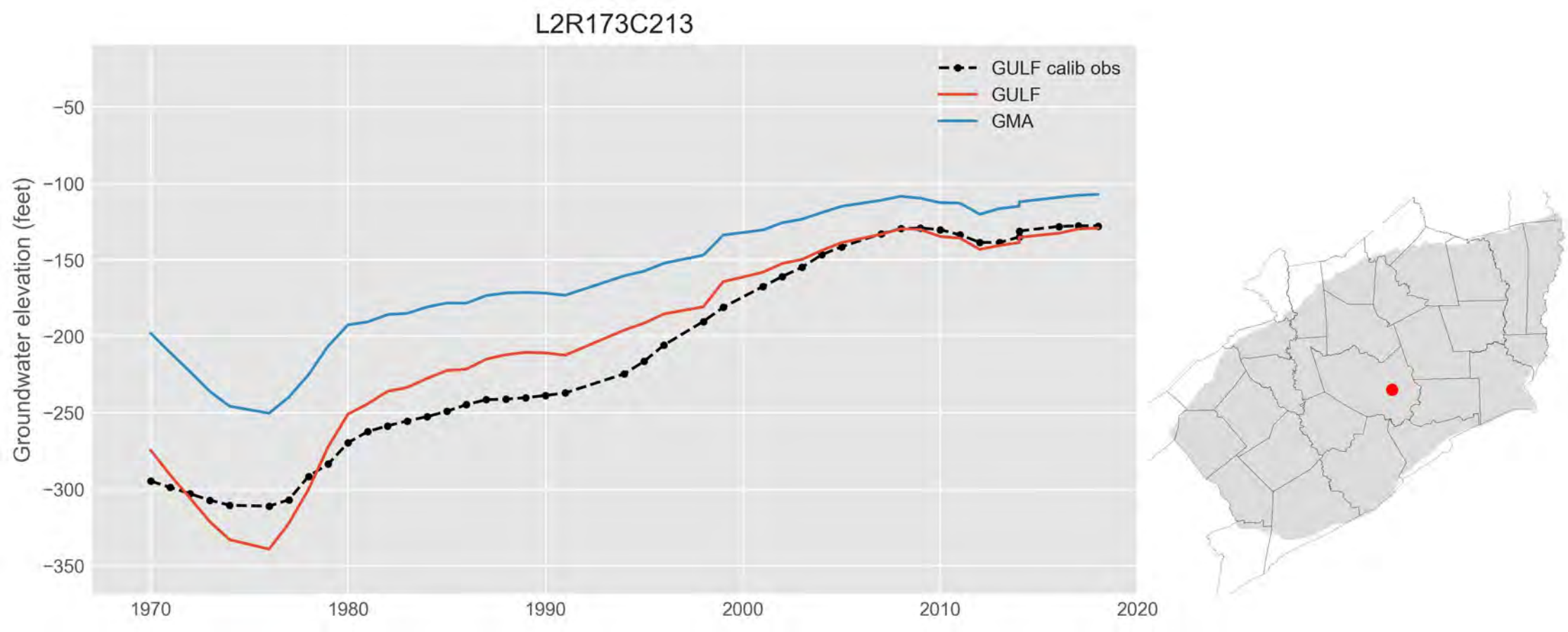

L2R172C124
Groundwater elevation (feet)
120
100
80
60
40
1970
1980
1990
2000
2010
GULF calib obs
GULF
GMA

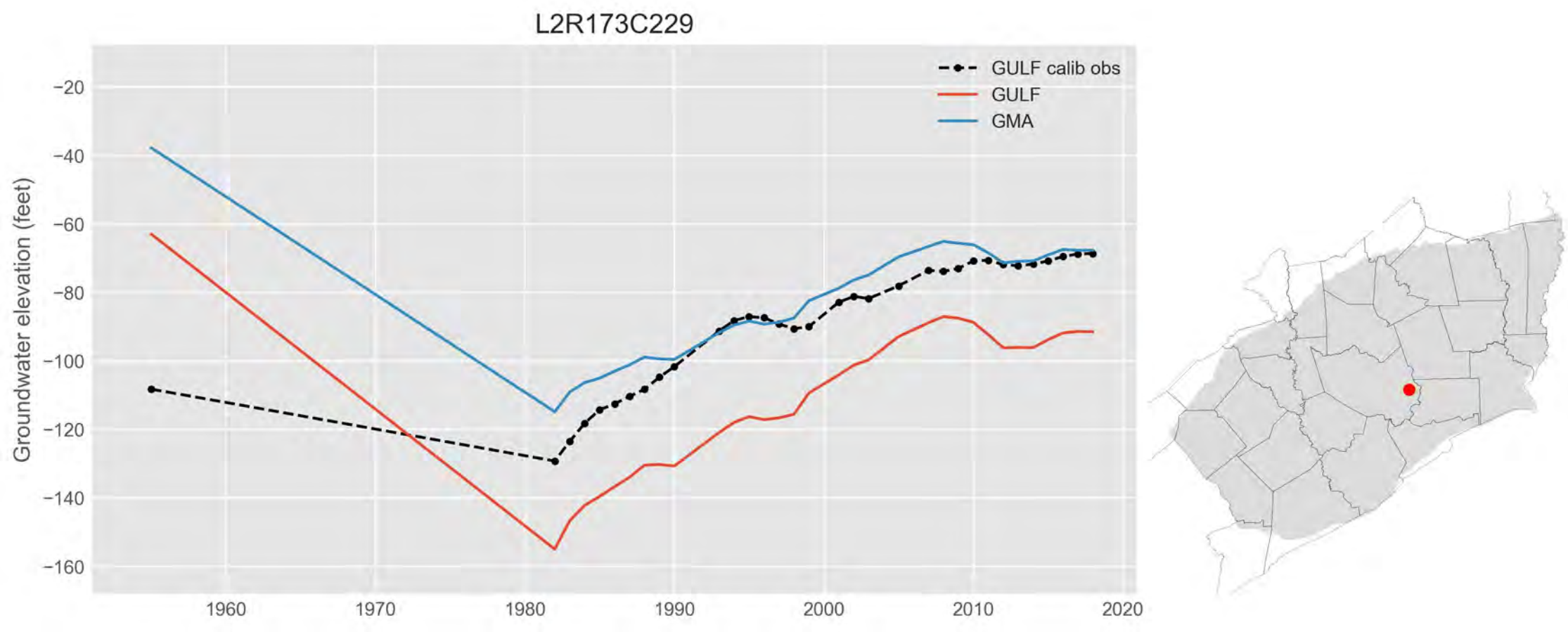

L2R172C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
2000
2005
2010
2015

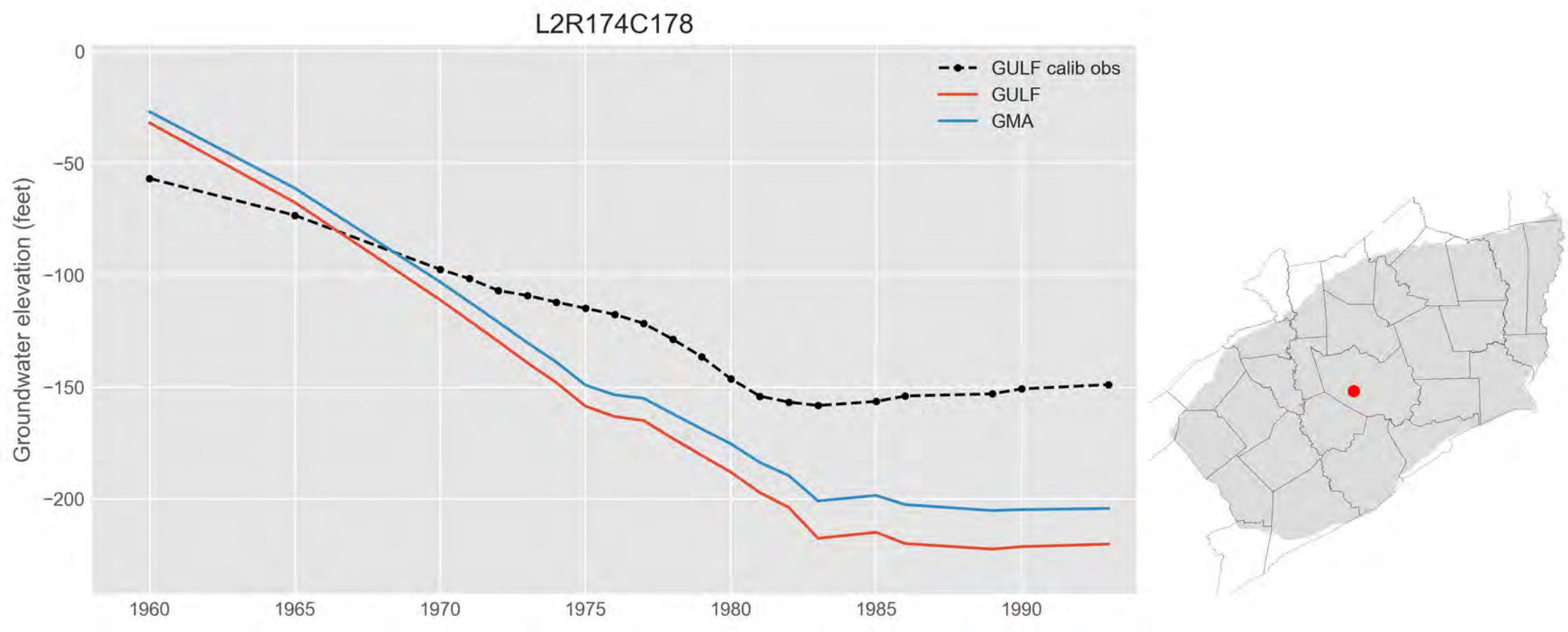

L2R172C225
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
1980
1985
1990
1995

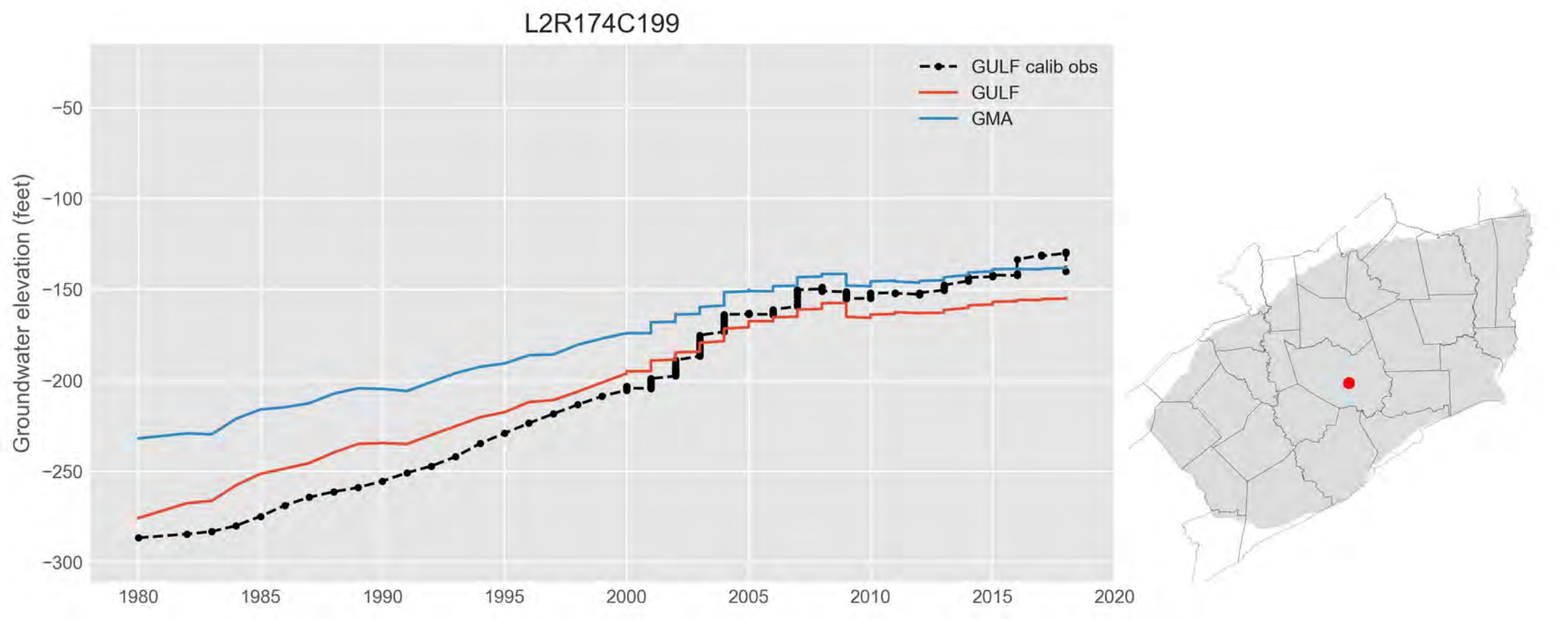

L2R173C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
1975
1980
1985
1990
1995
2000
2005
2010

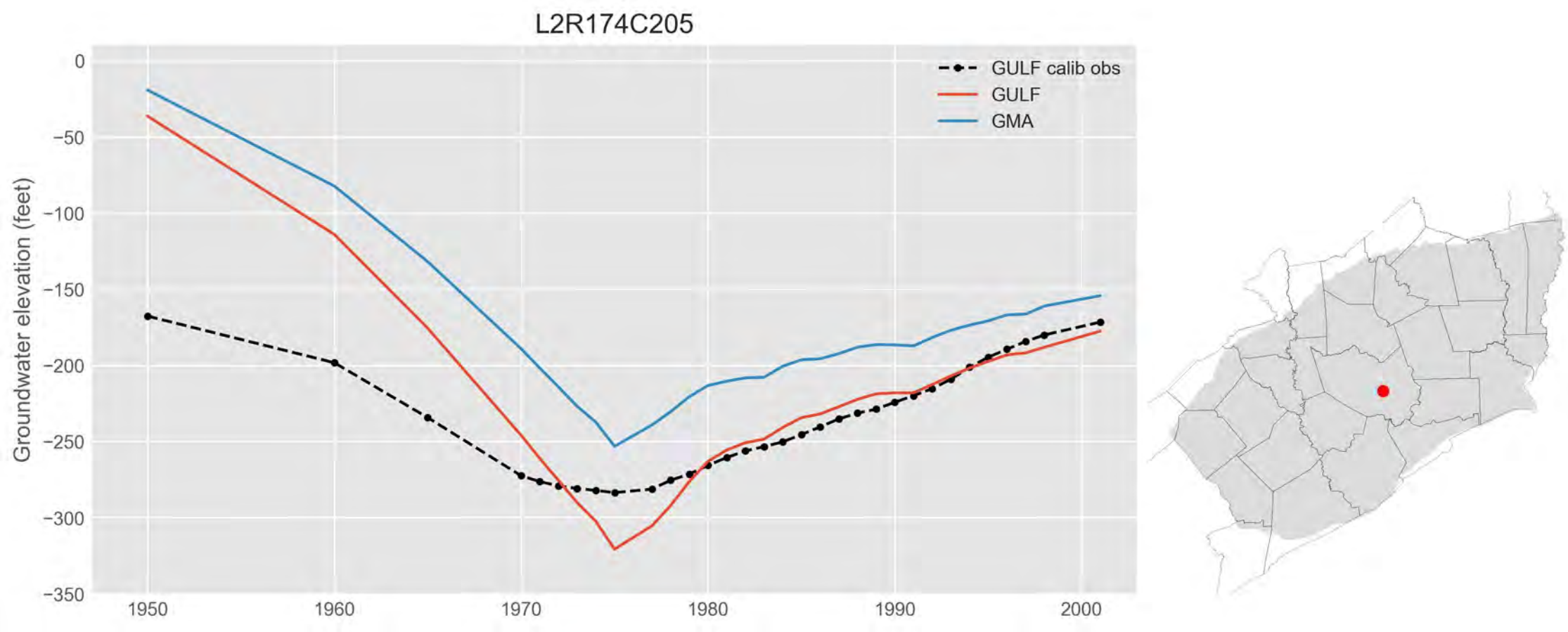

L2R173C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
−300
1940
1950
1960
1970
1980

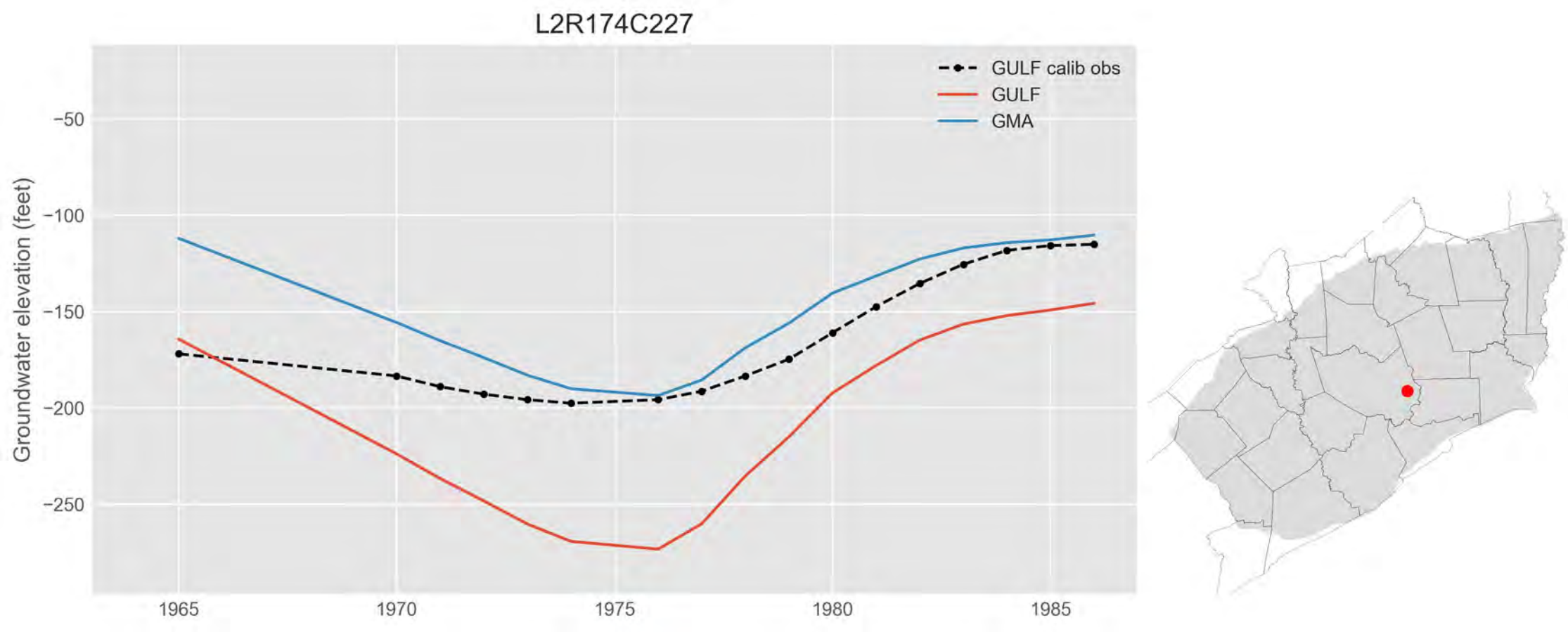

L2R173C213
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1970
1980
1990
2000
2010
2020

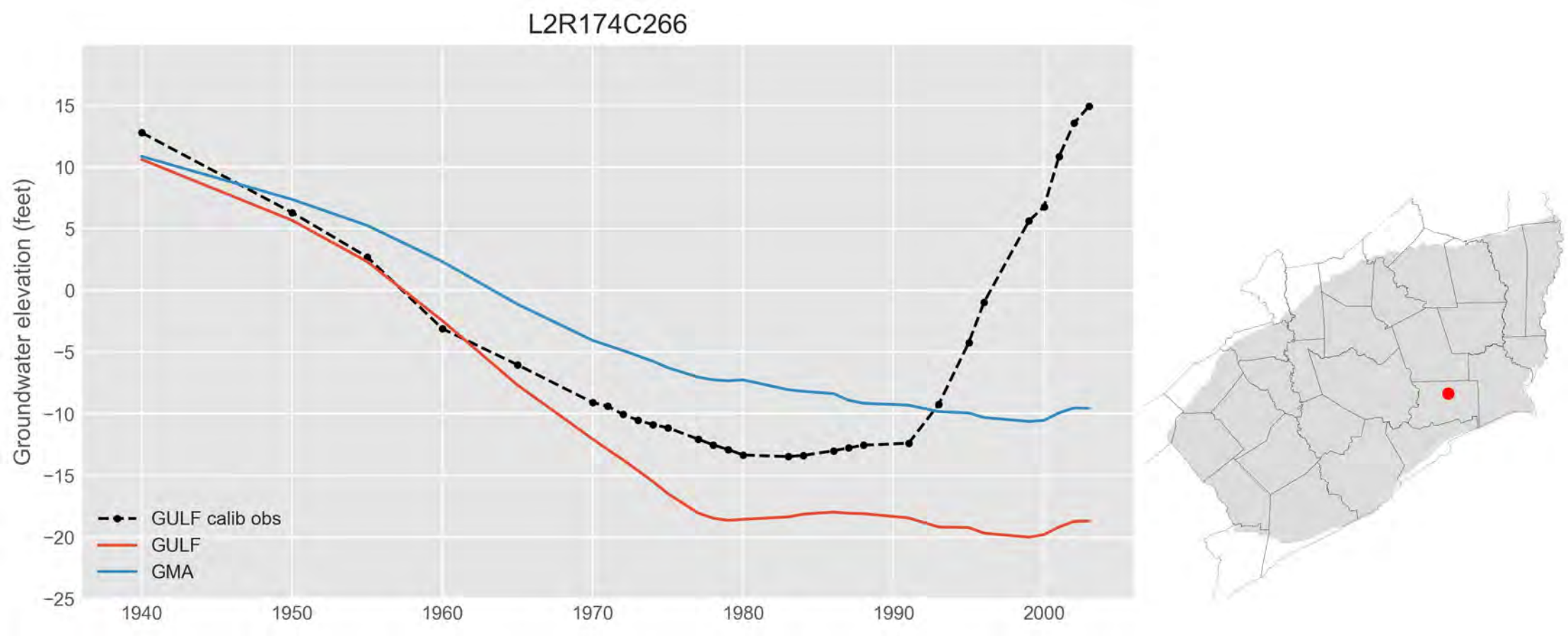

L2R173C229
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
1960
1970
1980
1990
2000
2010
2020

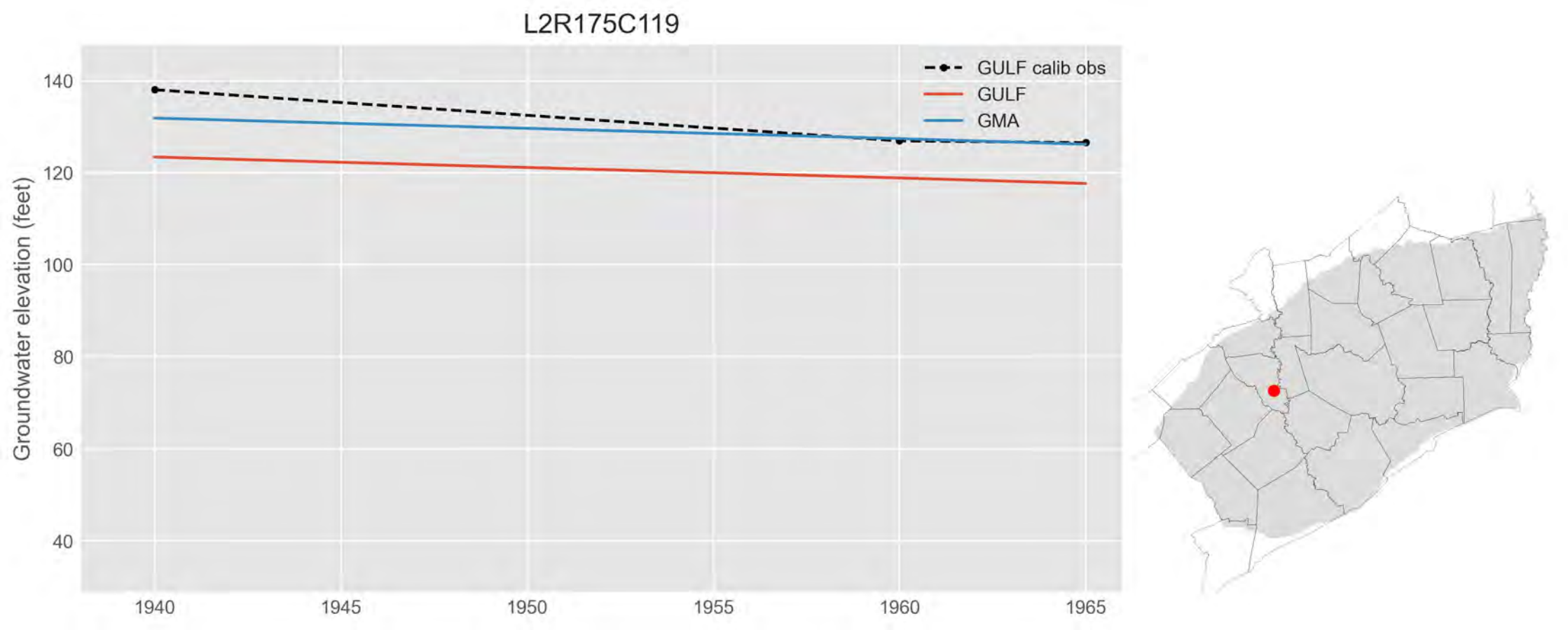

L2R174C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1960
1965
1970
1975
1980
1985
1990

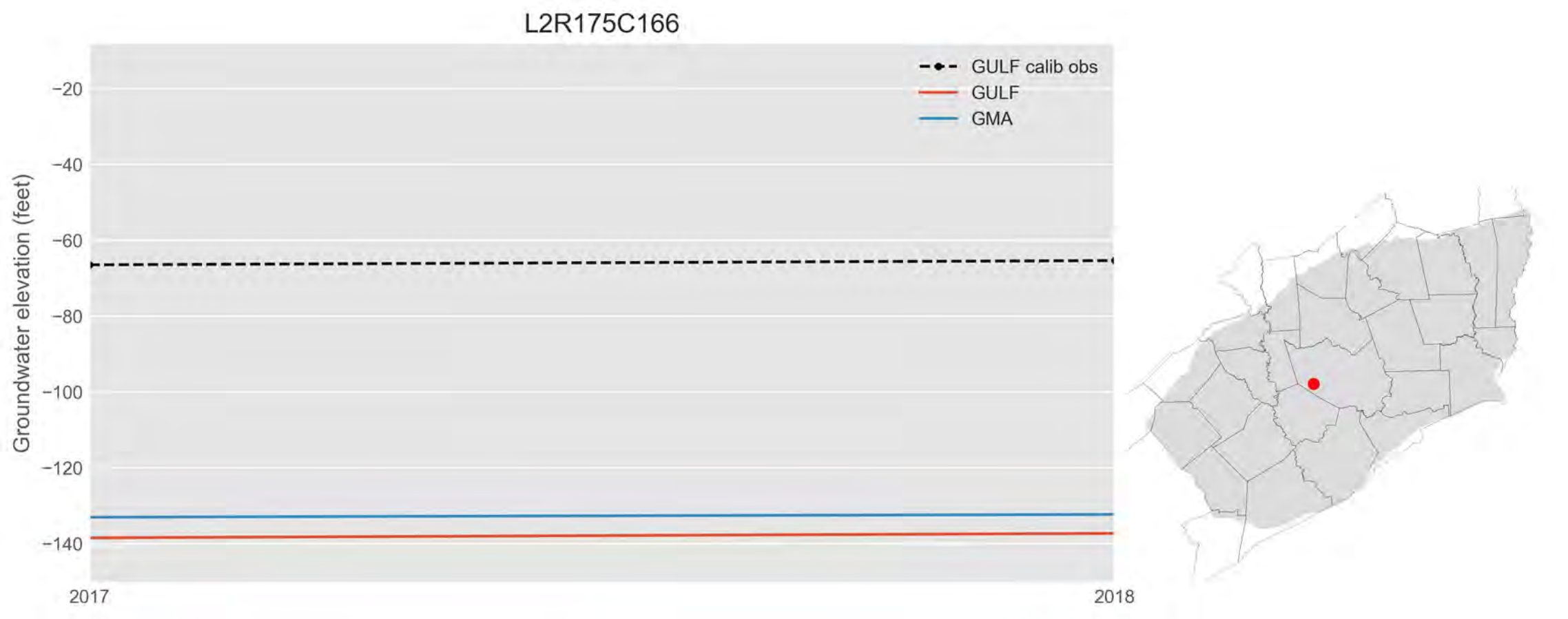

L2R174C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1980
1985
1990
1995
2000
2005
2010
2015
2020

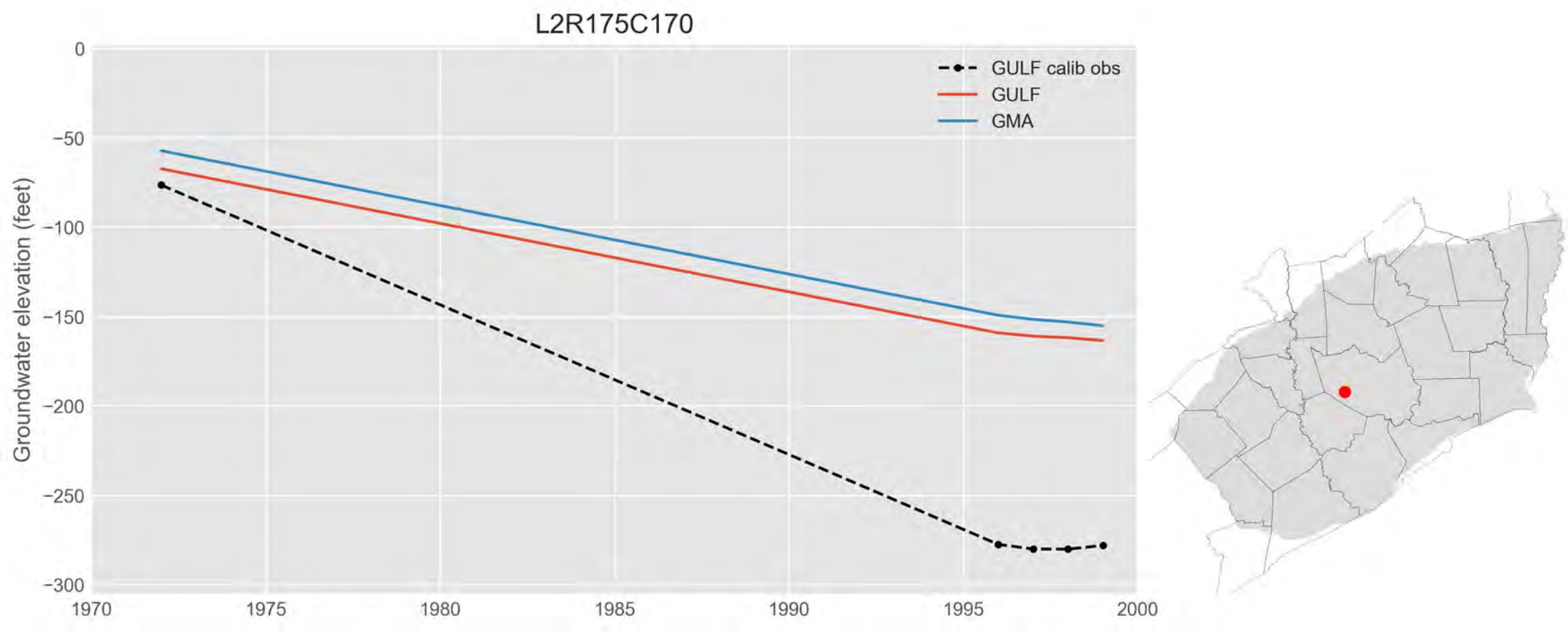

L2R174C205
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
1950
1960
1970
1980
1990
2000

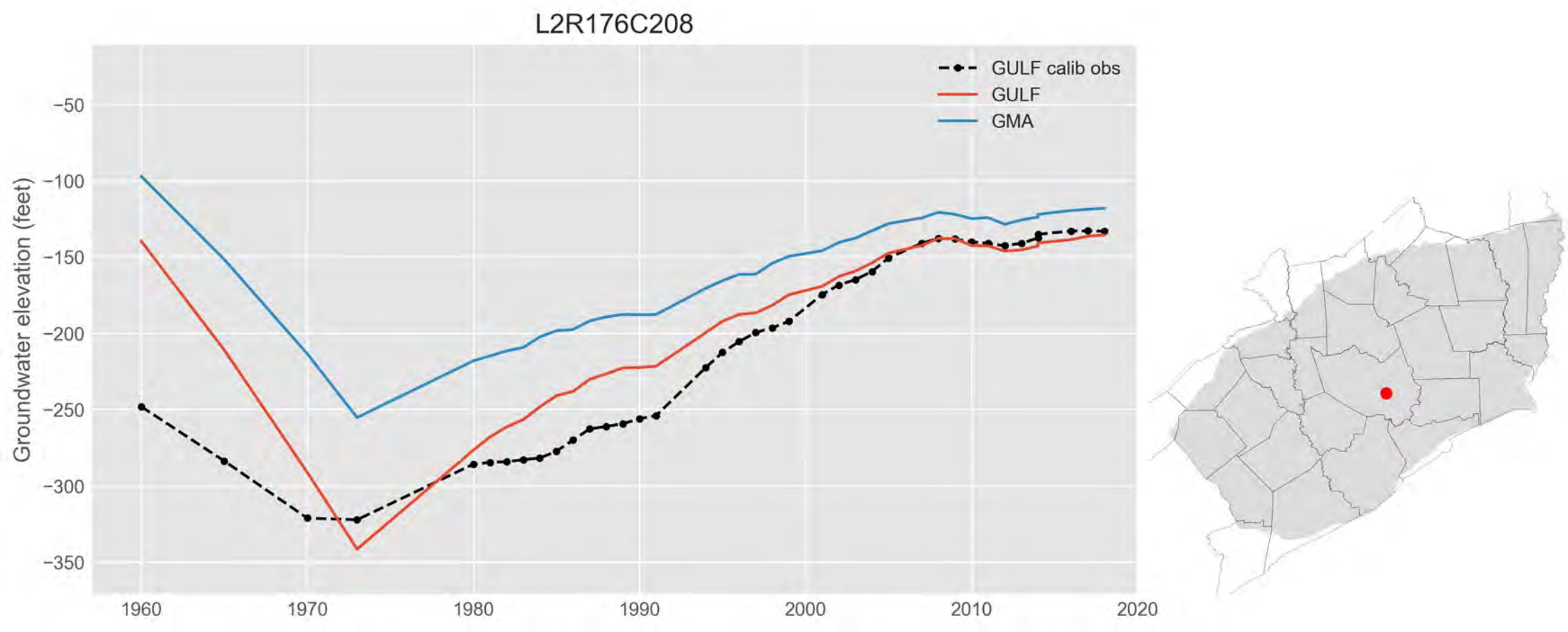

L2R174C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1965
1970
1975
1980
1985

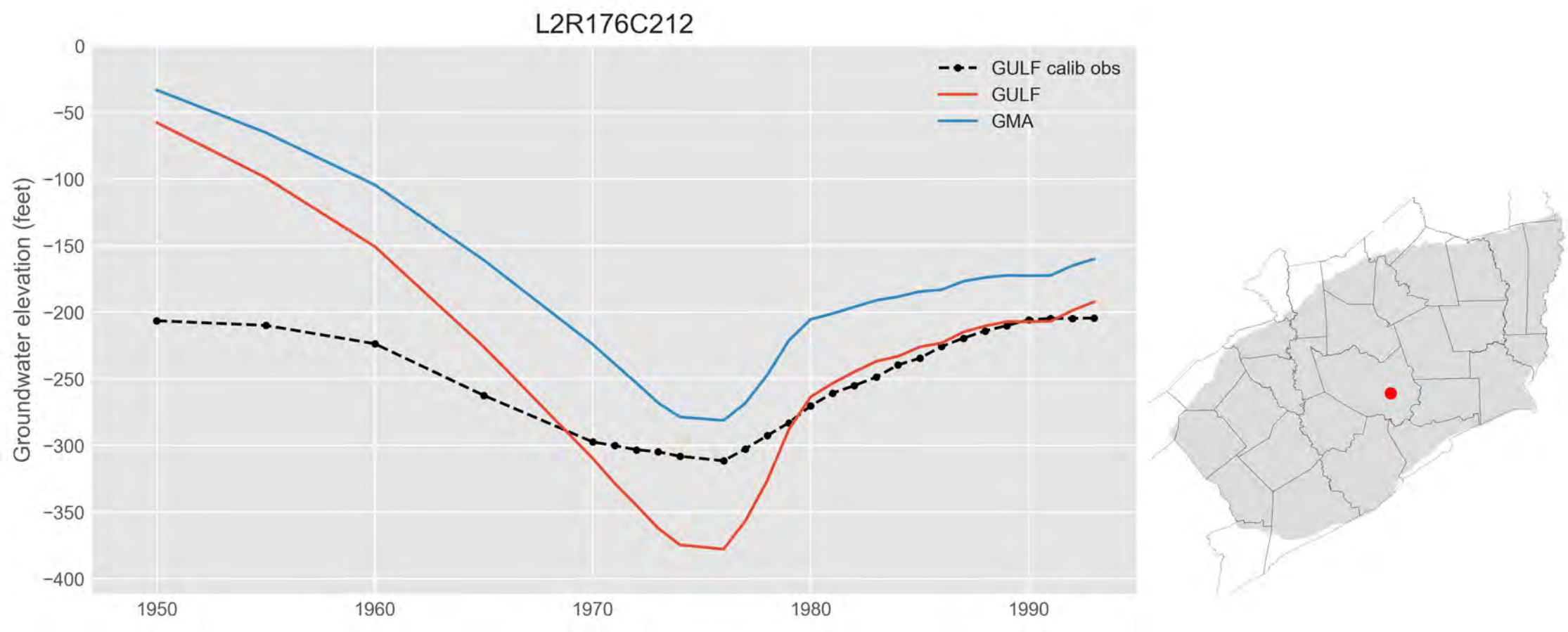

L2R174C266
Groundwater elevation (feet)
15
10
5
0
−5
−10
−15
−20
−25
1940
1950
1960
1970
1980
1990
2000
GULF calib obs
GULF
GMA

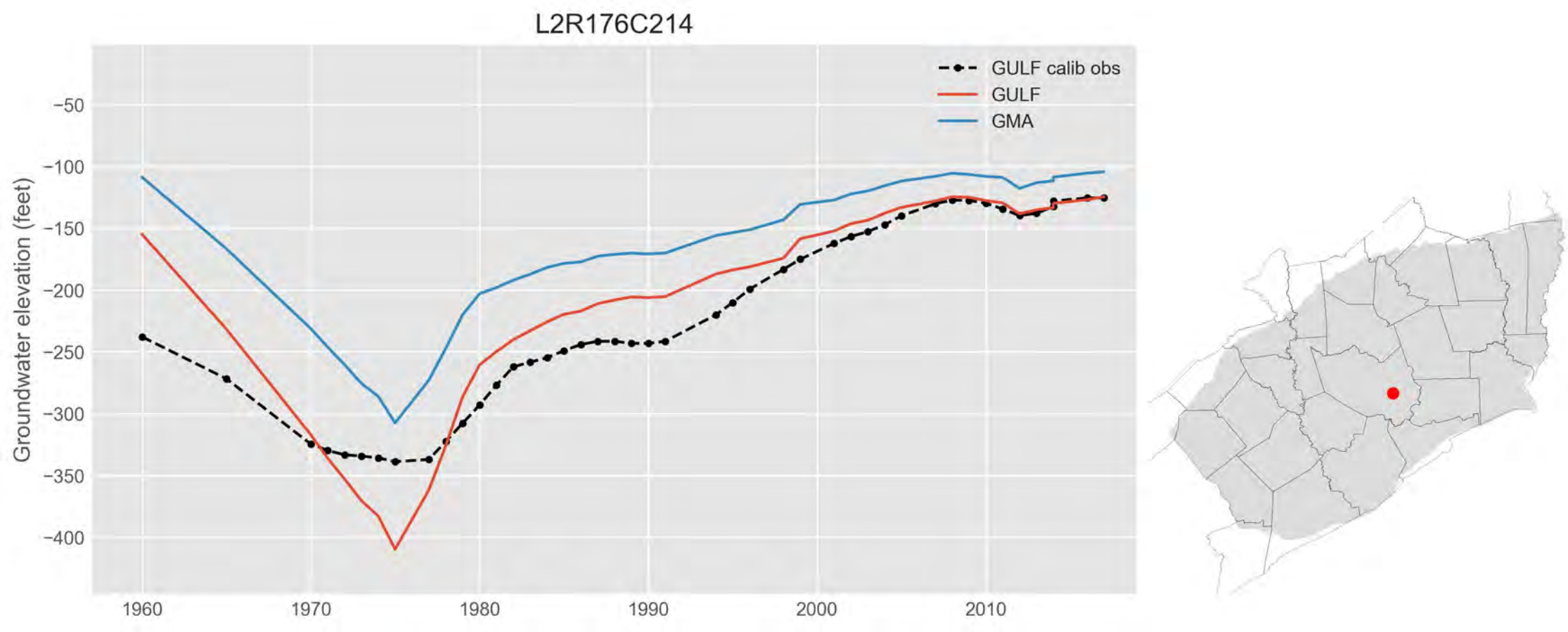

L2R175C119
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
1940
1945
1950
1955
1960
1965

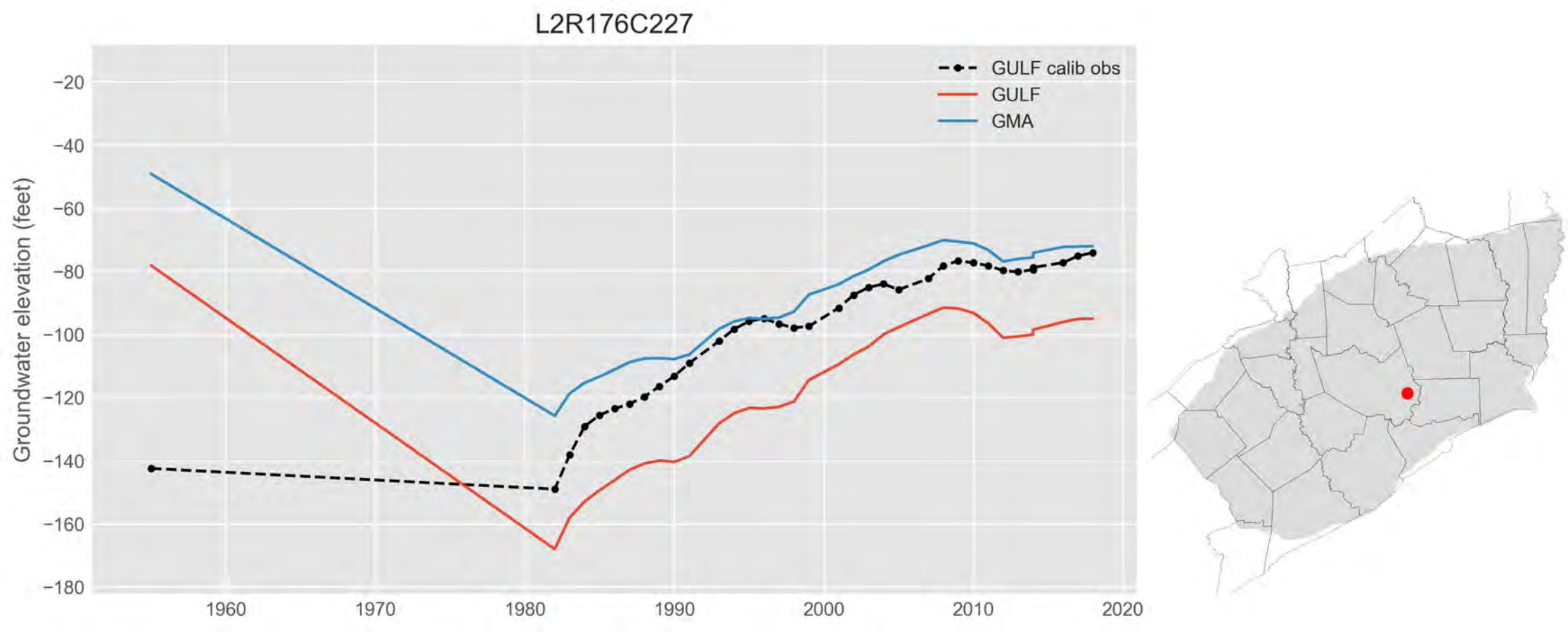

L2R175C166
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
2017
2018

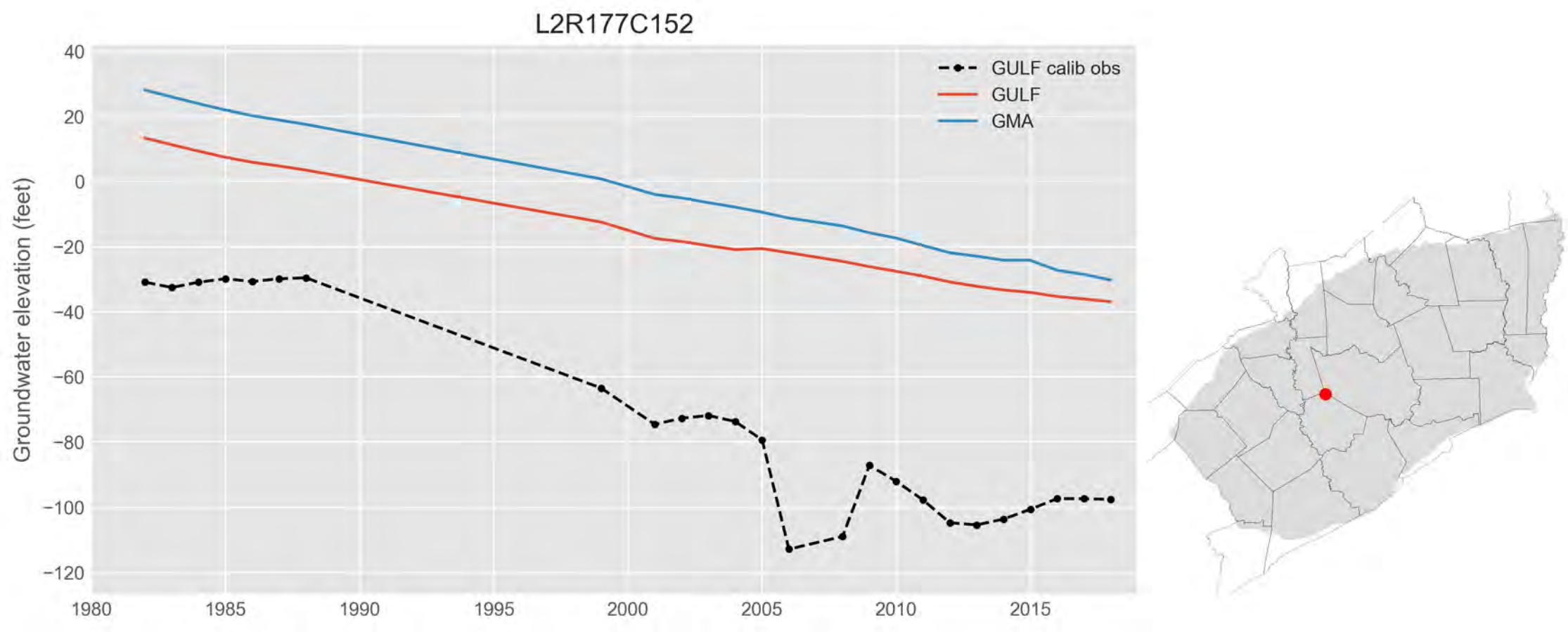

L2R175C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1970
1975
1980
1985
1990
1995
2000

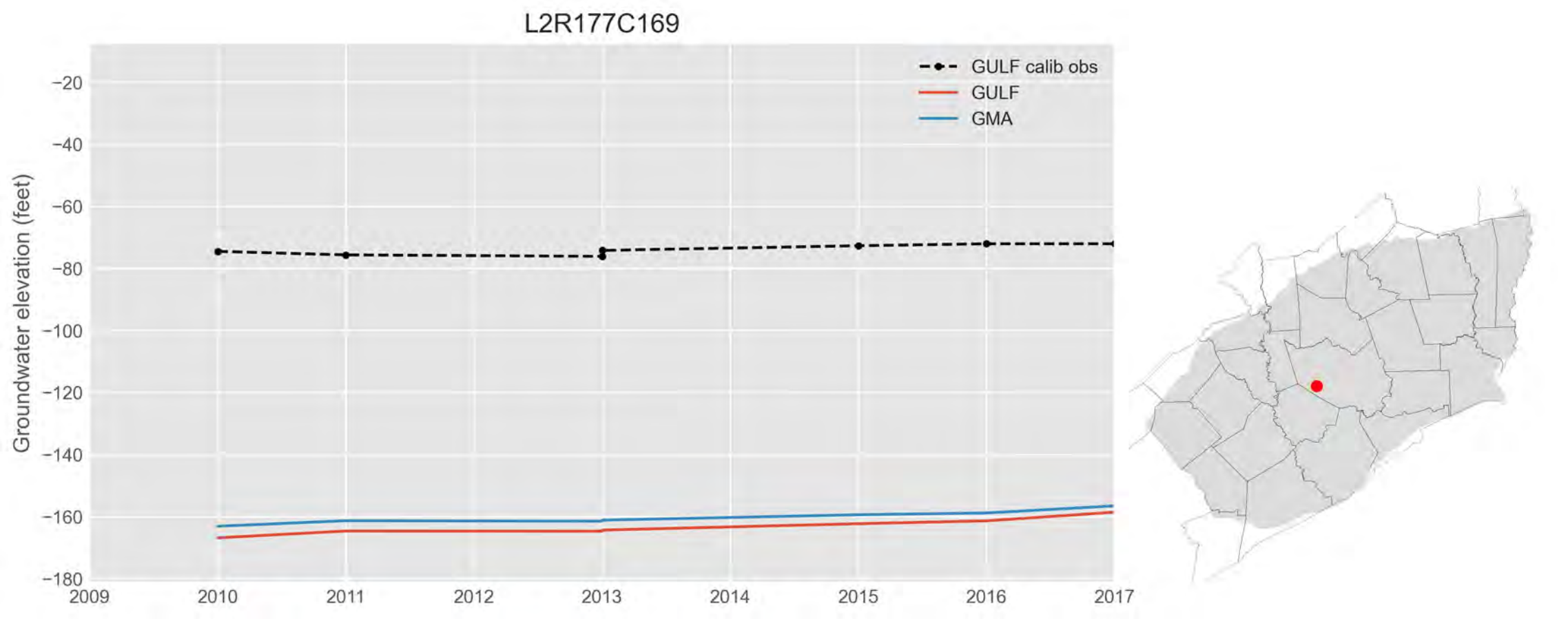

L2R176C208
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1960
1970
1980
1990
2000
2010
2020

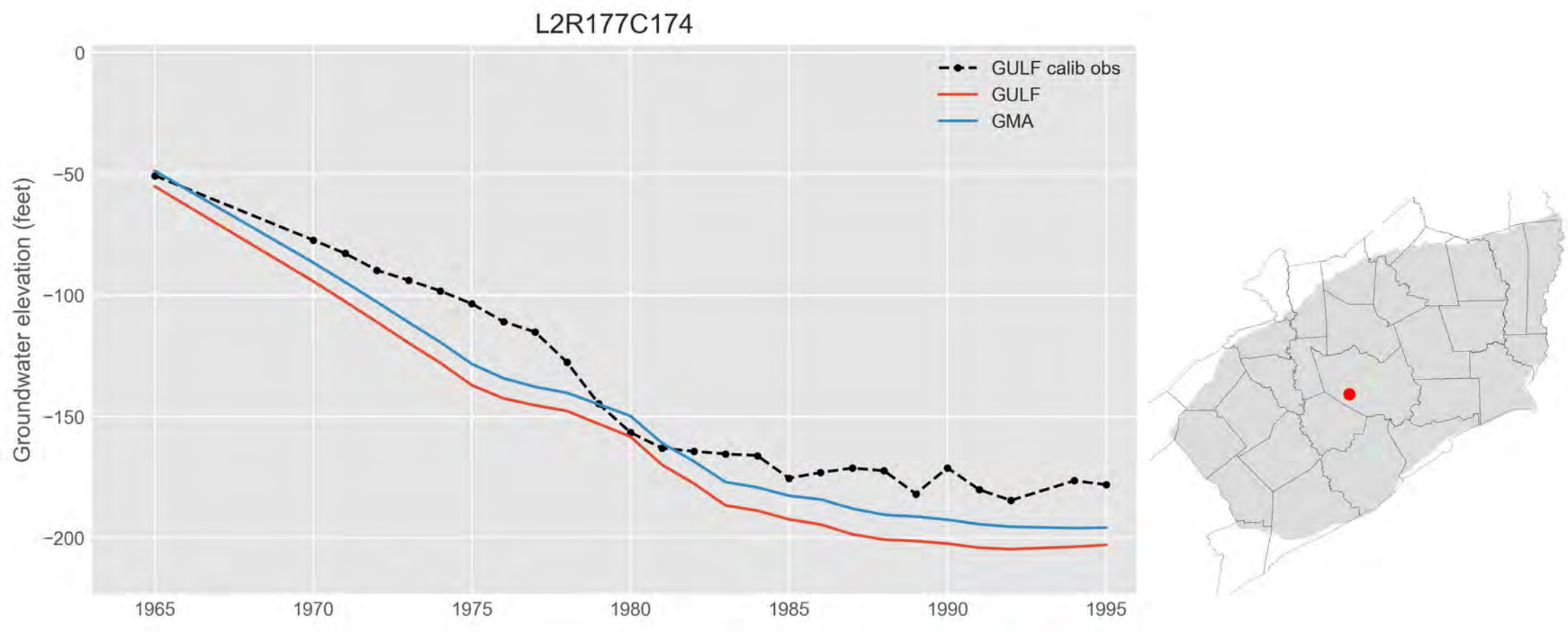

L2R176C212
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
−400
1950
1960
1970
1980
1990

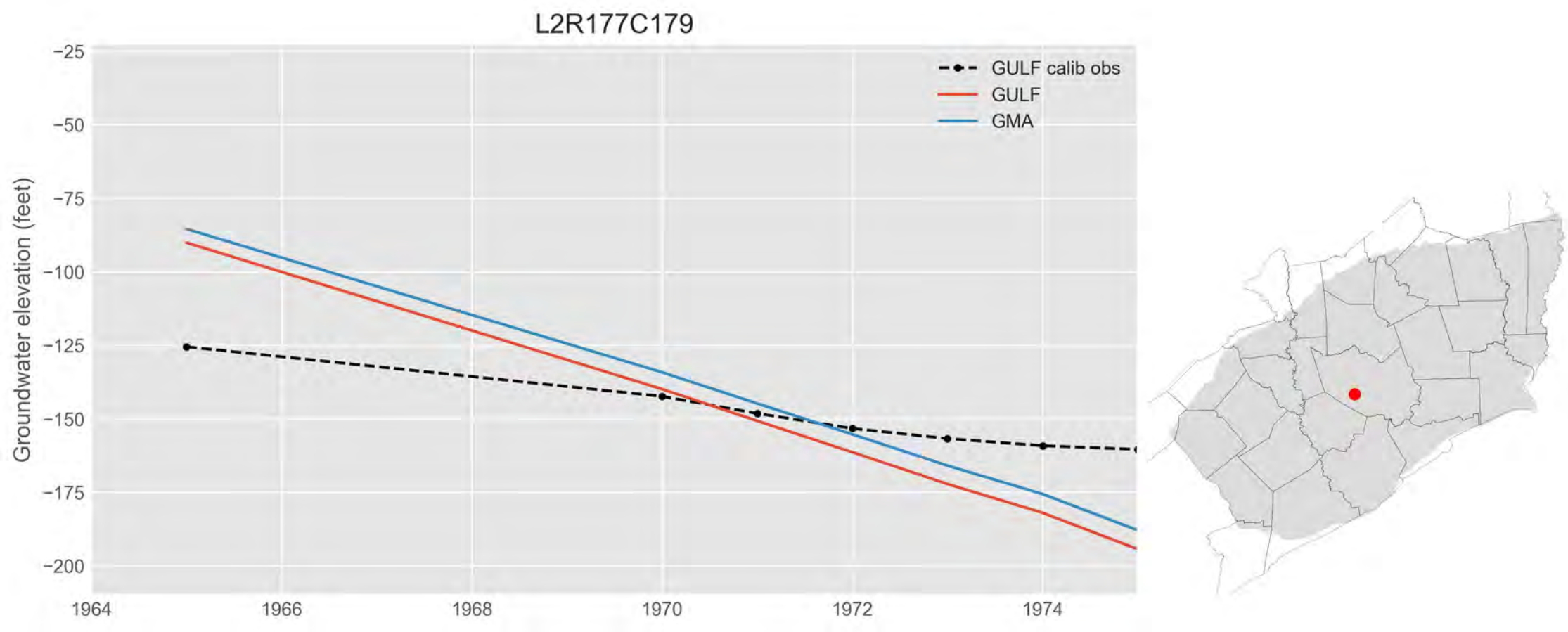

L2R176C214
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1960
1970
1980
1990
2000
2010

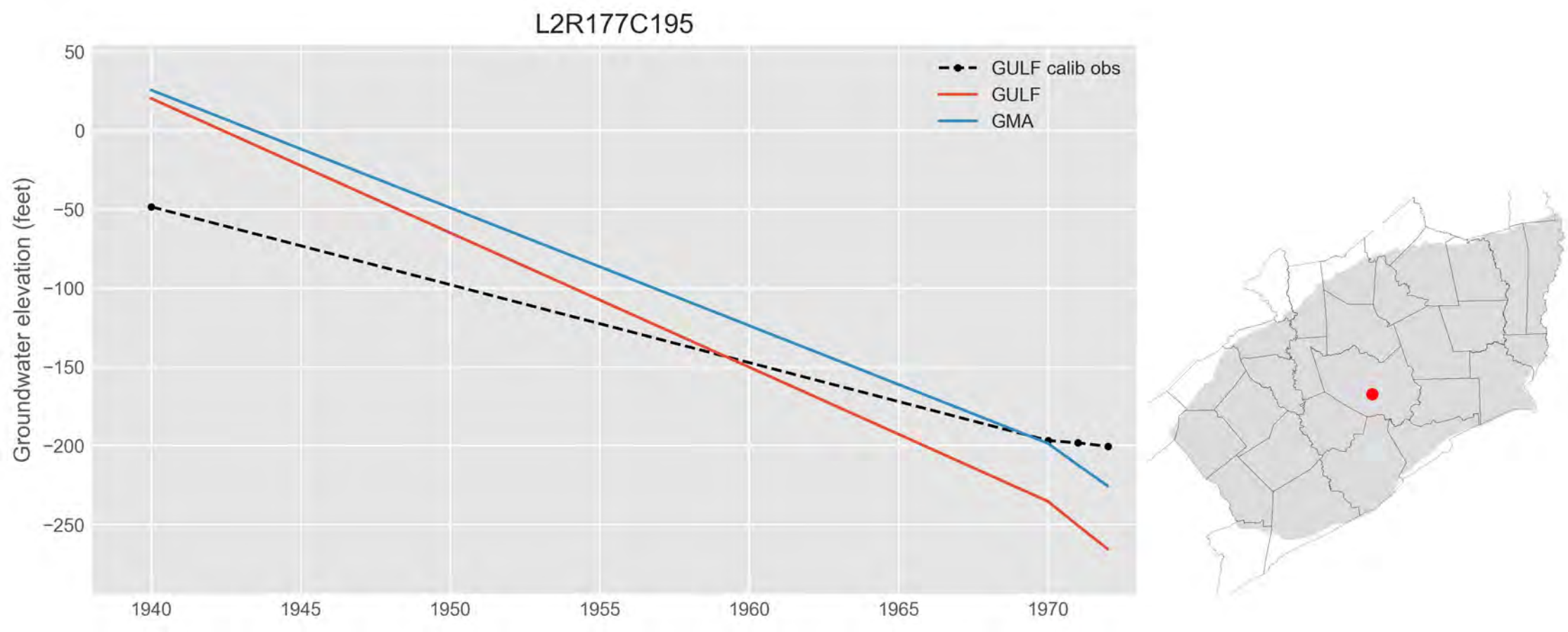

L2R176C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
−180
1960
1970
1980
1990
2000
2010
2020

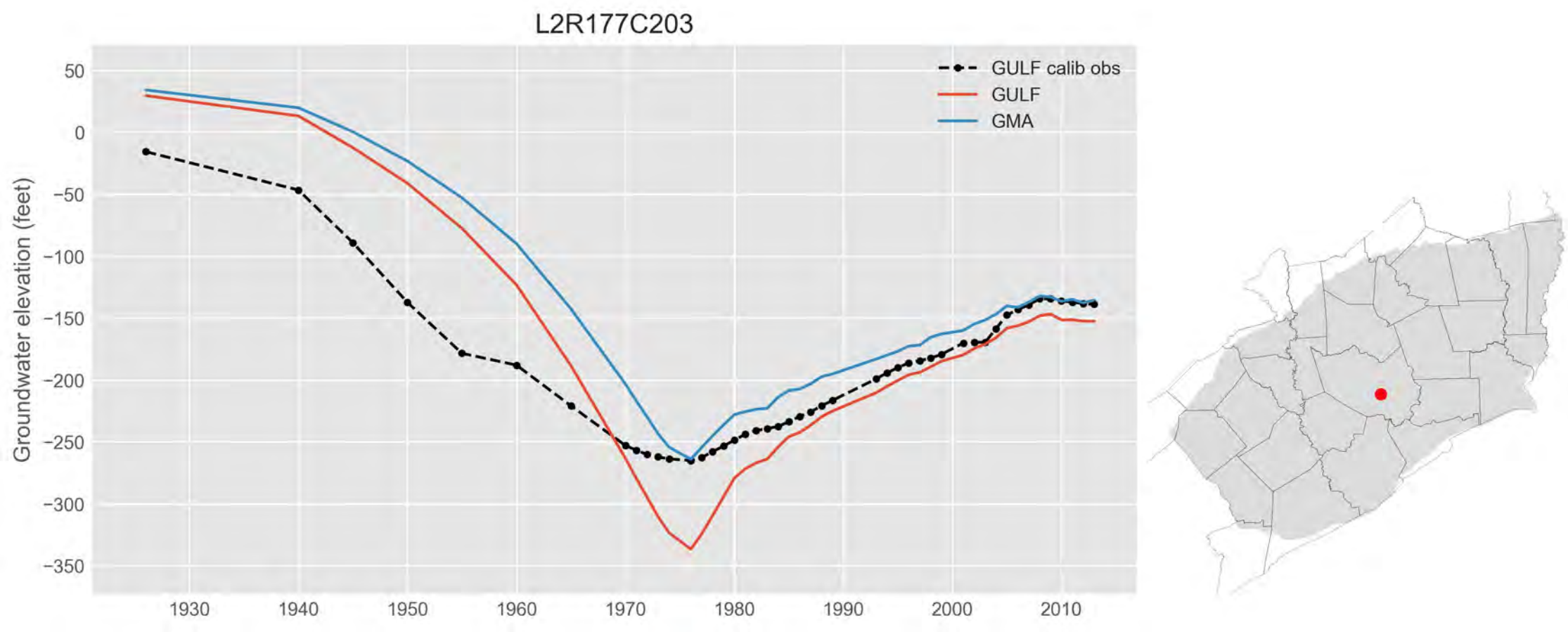

L2R177C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
−100
−120
1980
1985
1990
1995
2000
2005
2010
2015

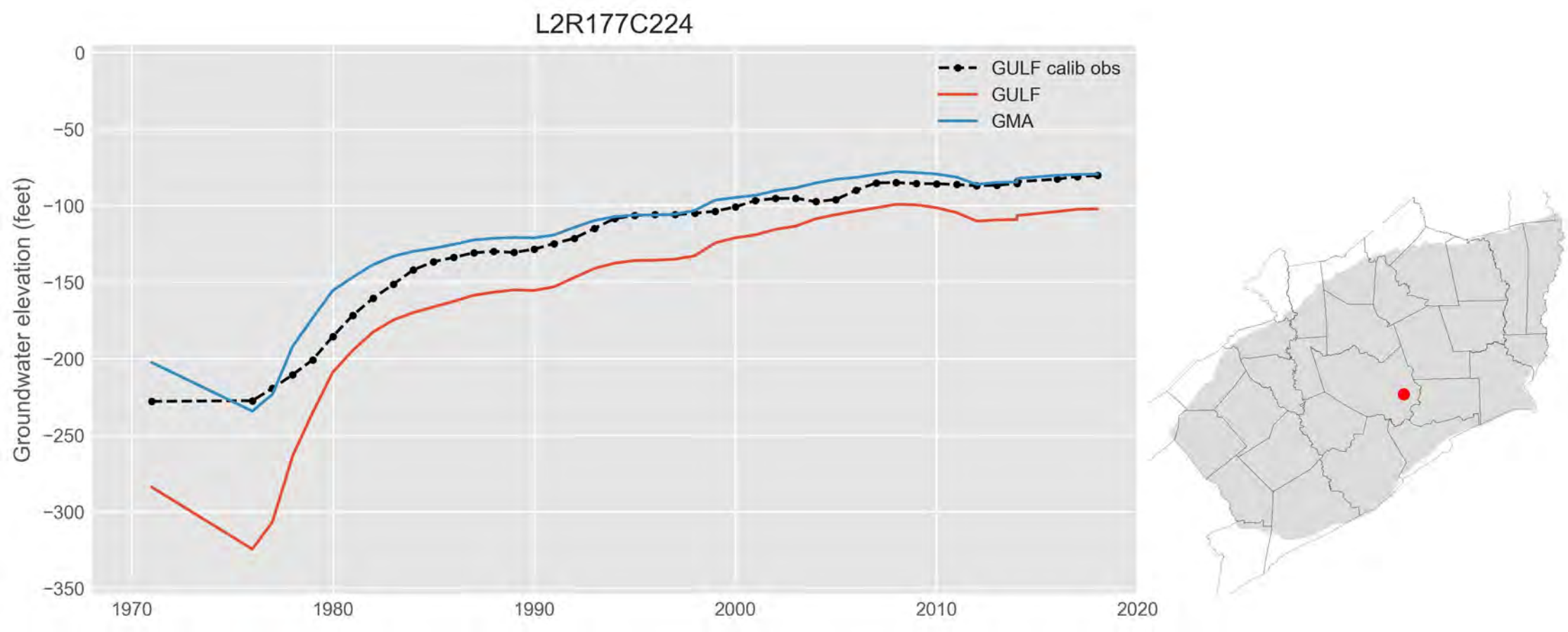

L2R177C169
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
−180
2009
2010
2011
2012
2013
2014
2015
2016
2017

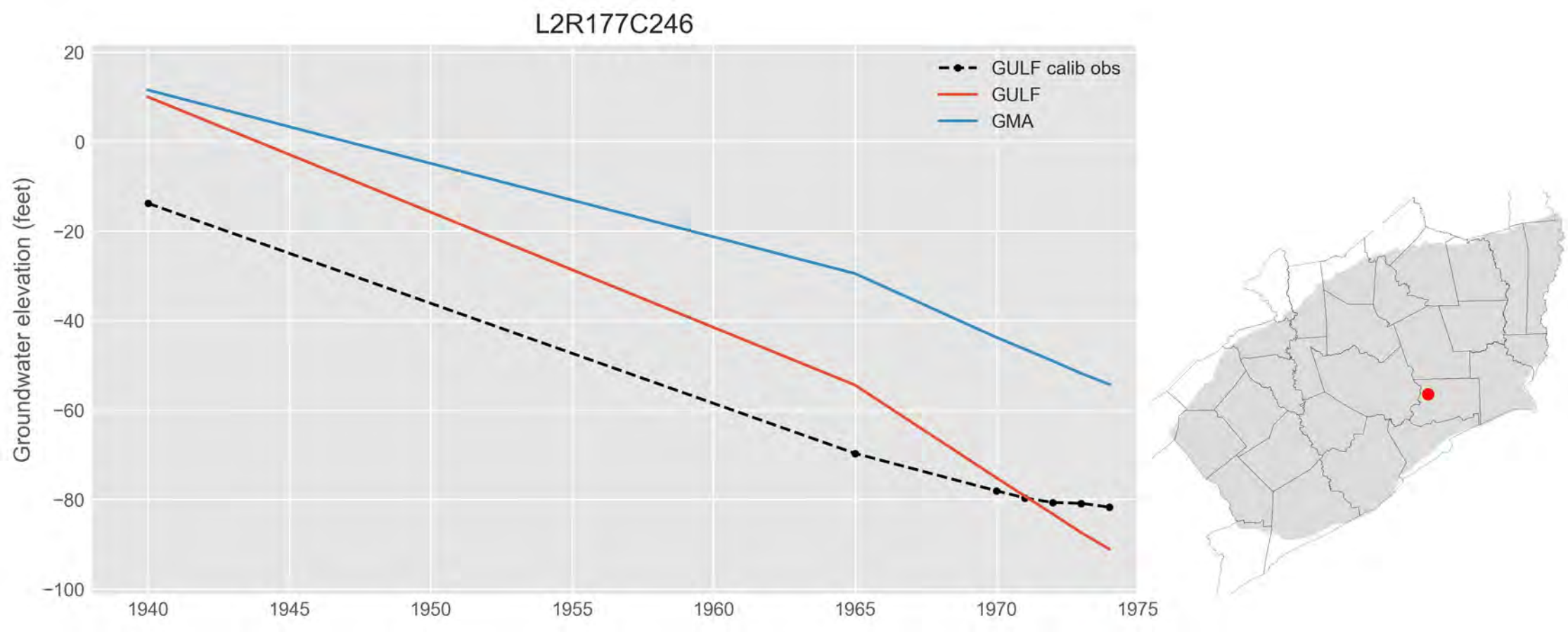

L2R177C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1965
1970
1975
1980
1985
1990
1995

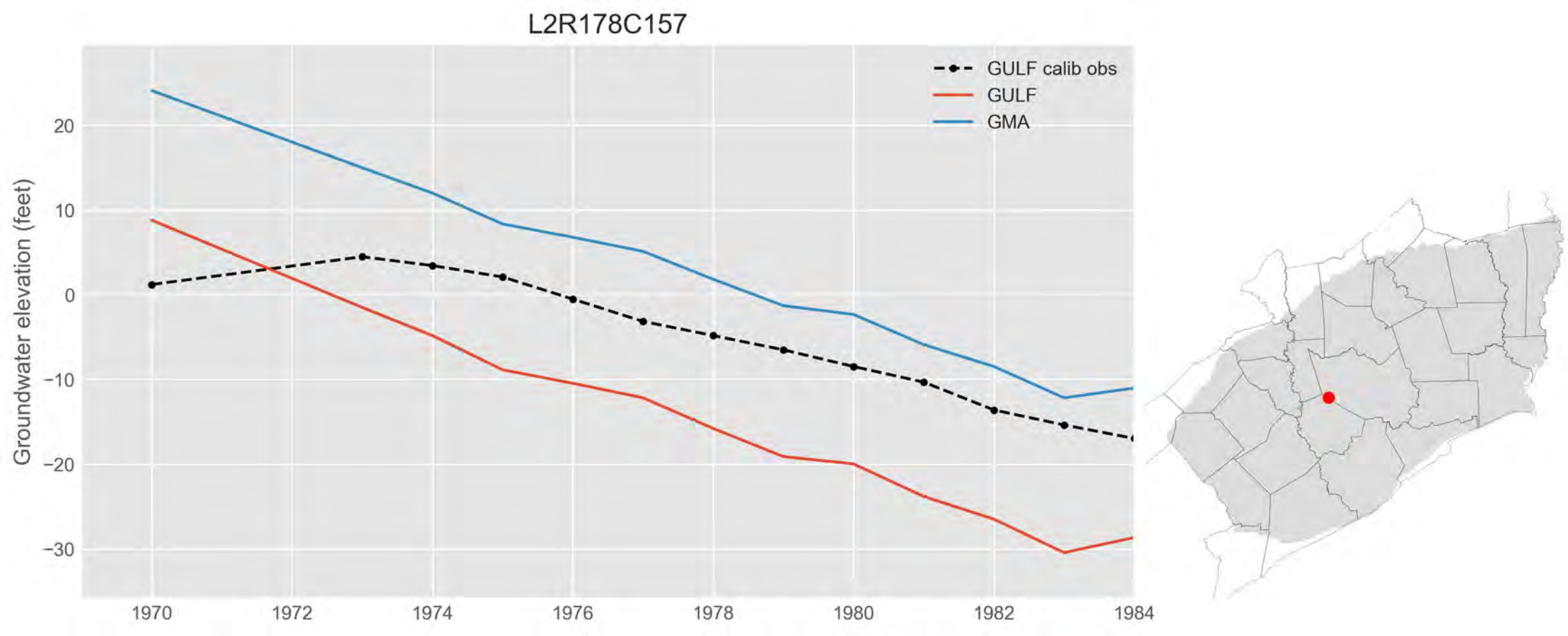

L2R177C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1964
1966
1968
1970
1972
1974

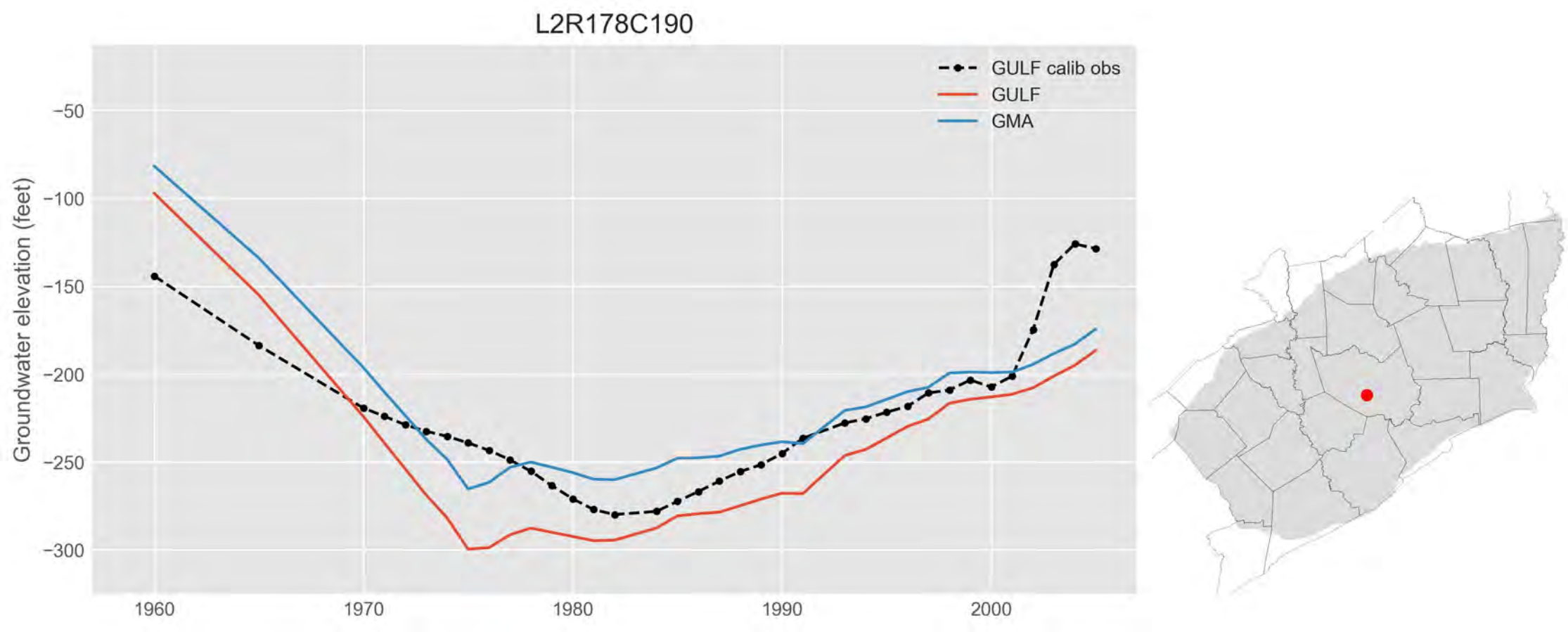

L2R177C195
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
1940
1945
1950
1955
1960
1965
1970

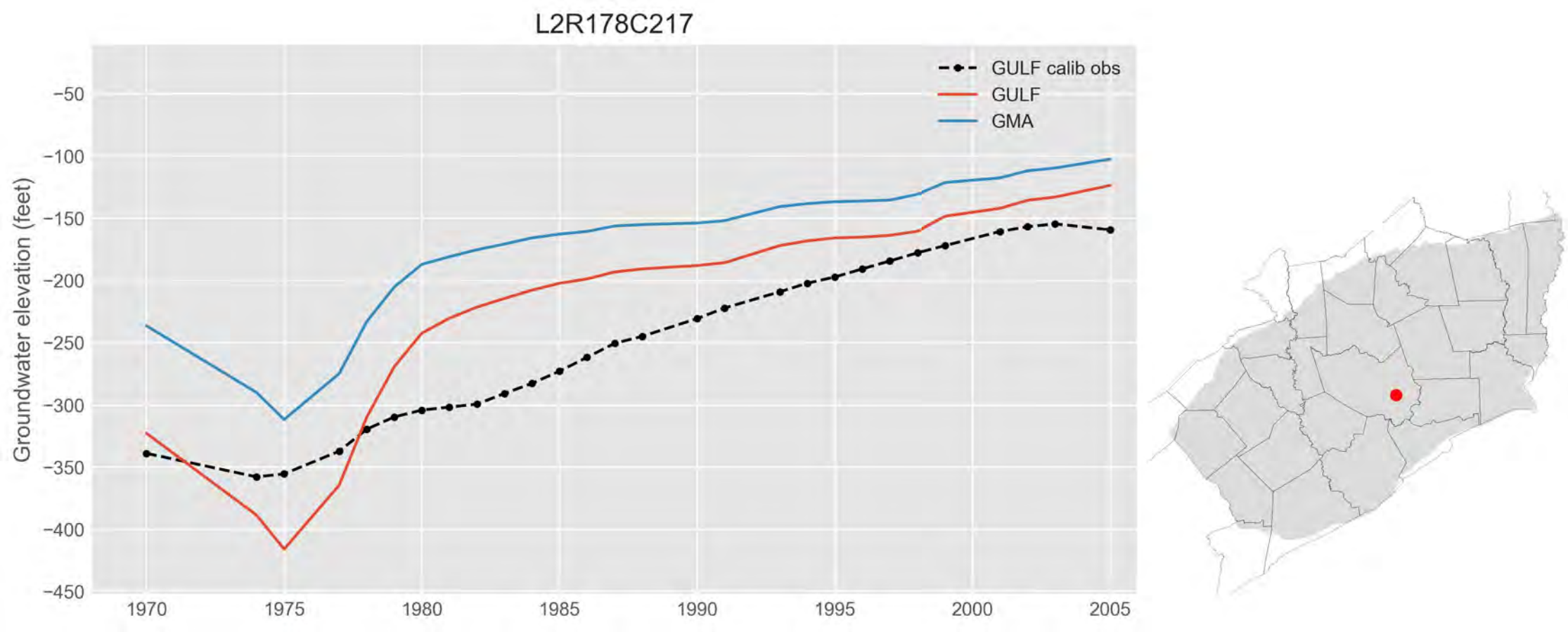

L2R177C203
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
−300
−350
1930
1940
1950
1960
1970
1980
1990
2000
2010

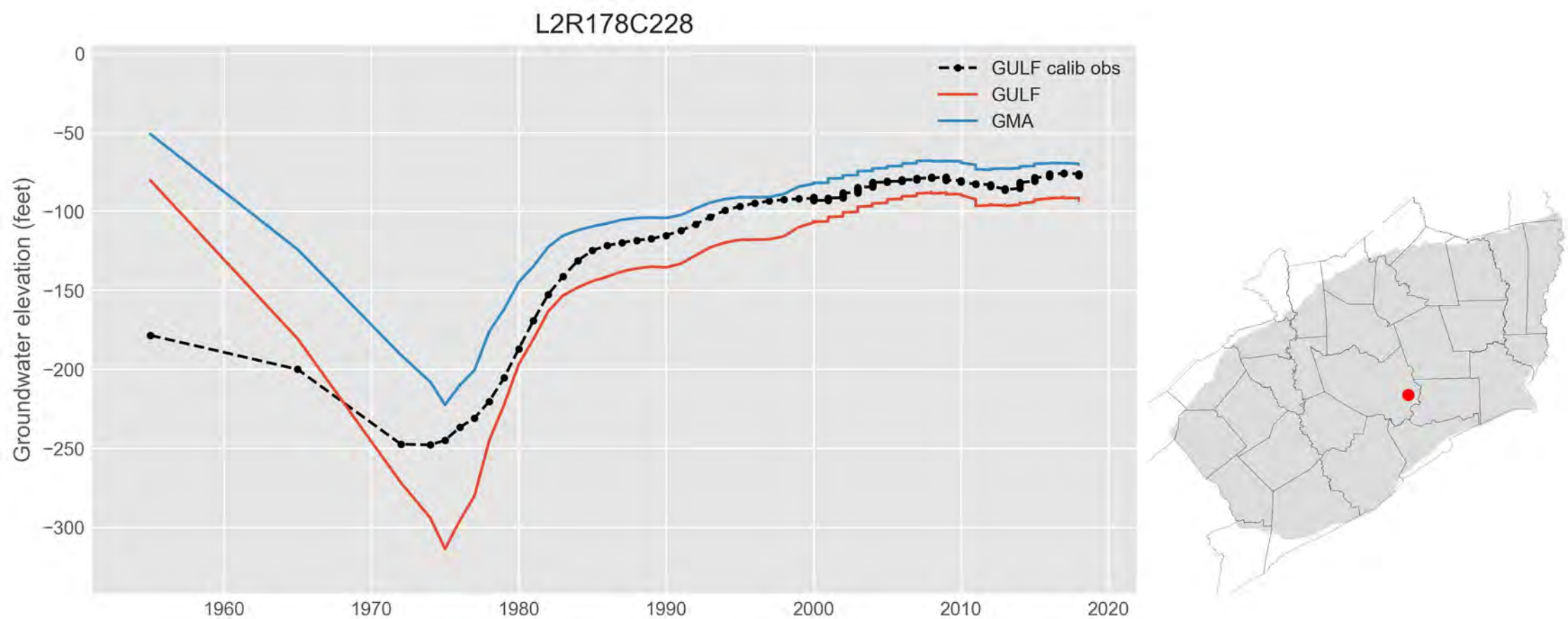

L2R177C224
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
1970
1980
1990
2000
2010
2020

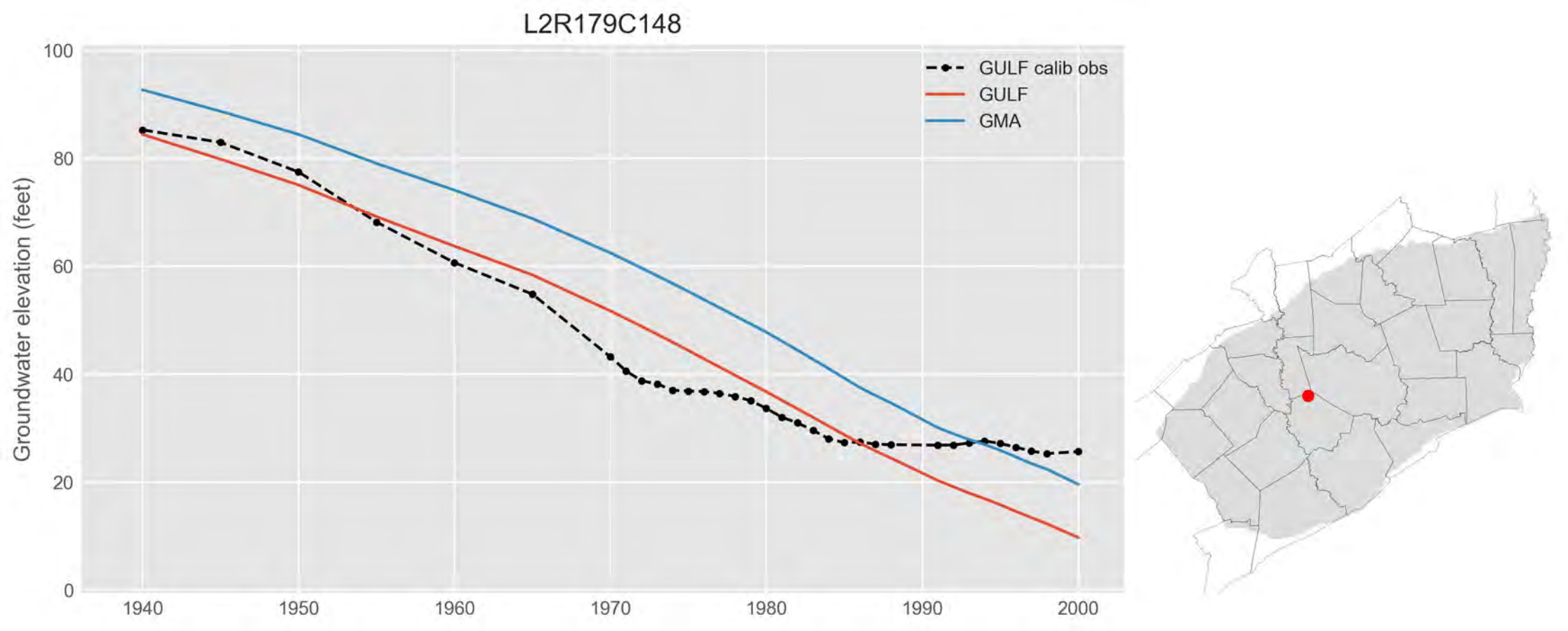

L2R177C246
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
−100
1940
1945
1950
1955
1960
1965
1970
1975

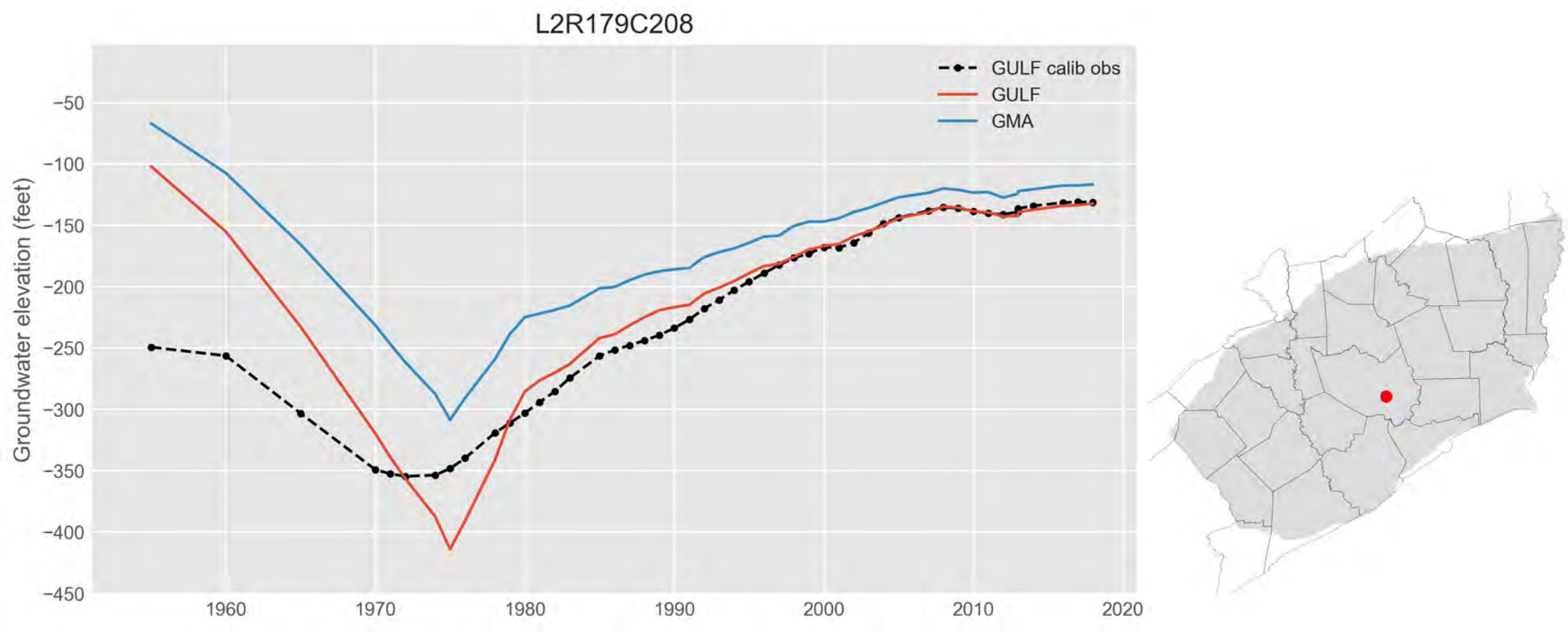

L2R178C157
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
1970
1972
1974
1976
1978
1980
1982
1984

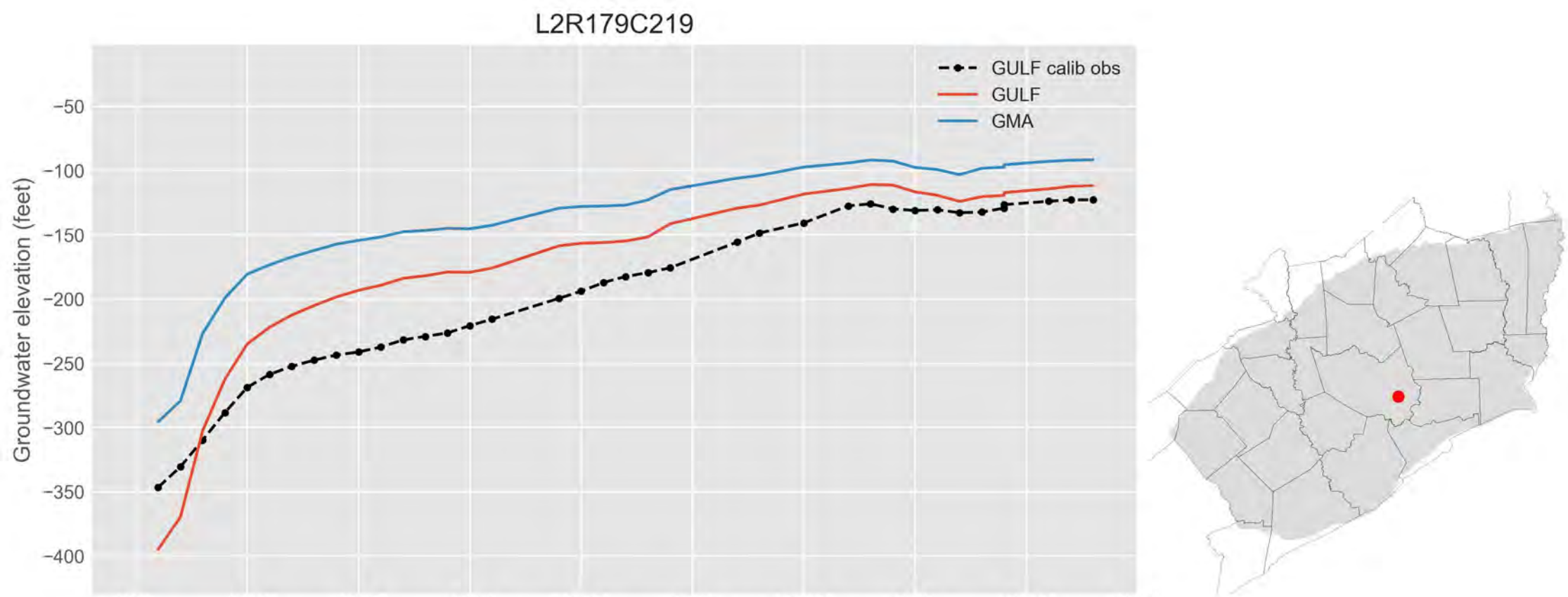

L2R178C190
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1960
1970
1980
1990
2000

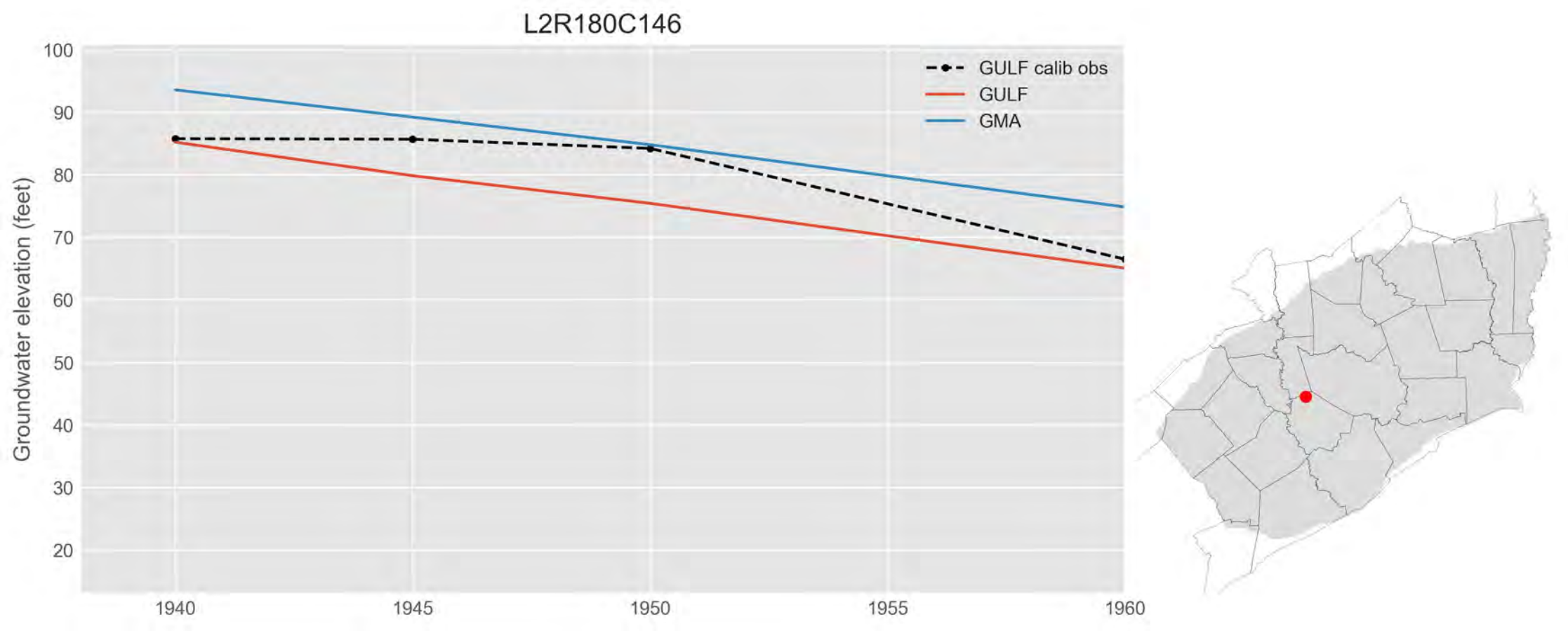

L2R178C217
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
−450
1970
1975
1980
1985
1990
1995
2000
2005

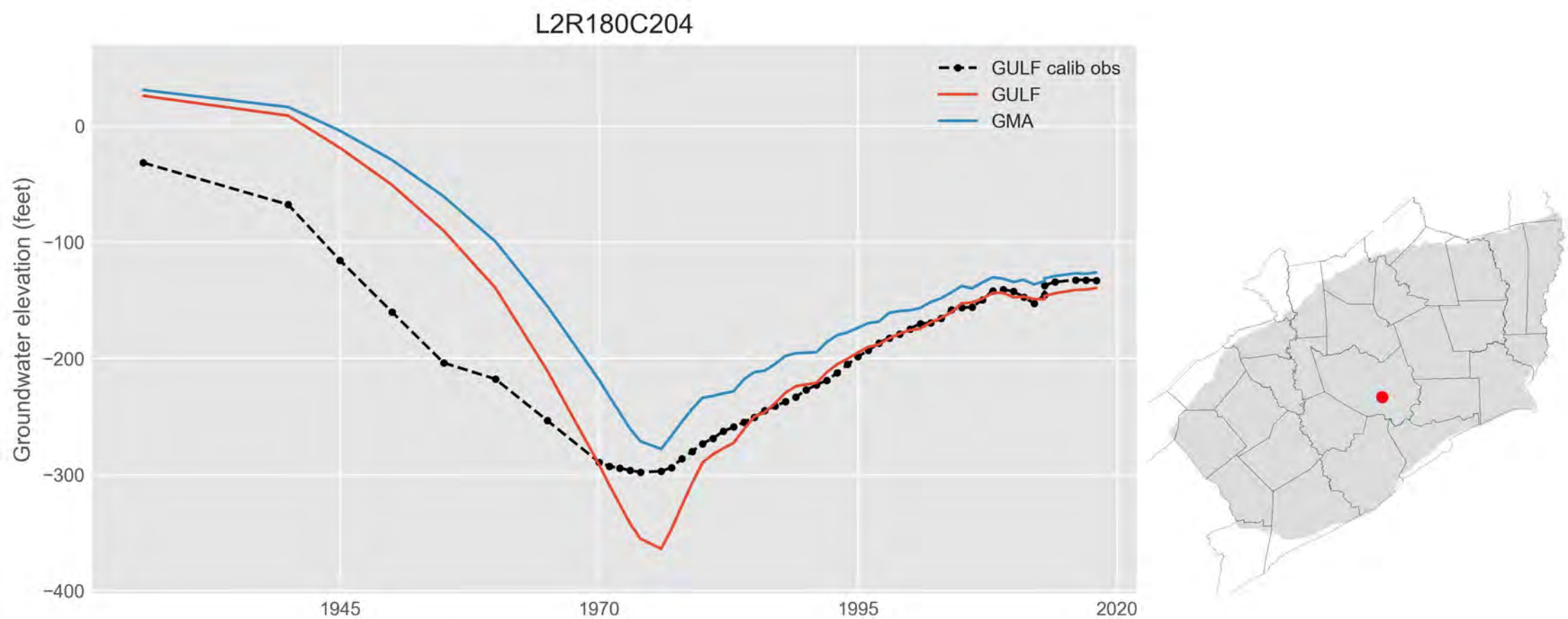

L2R178C228
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1960
1970
1980
1990
2000
2010
2020

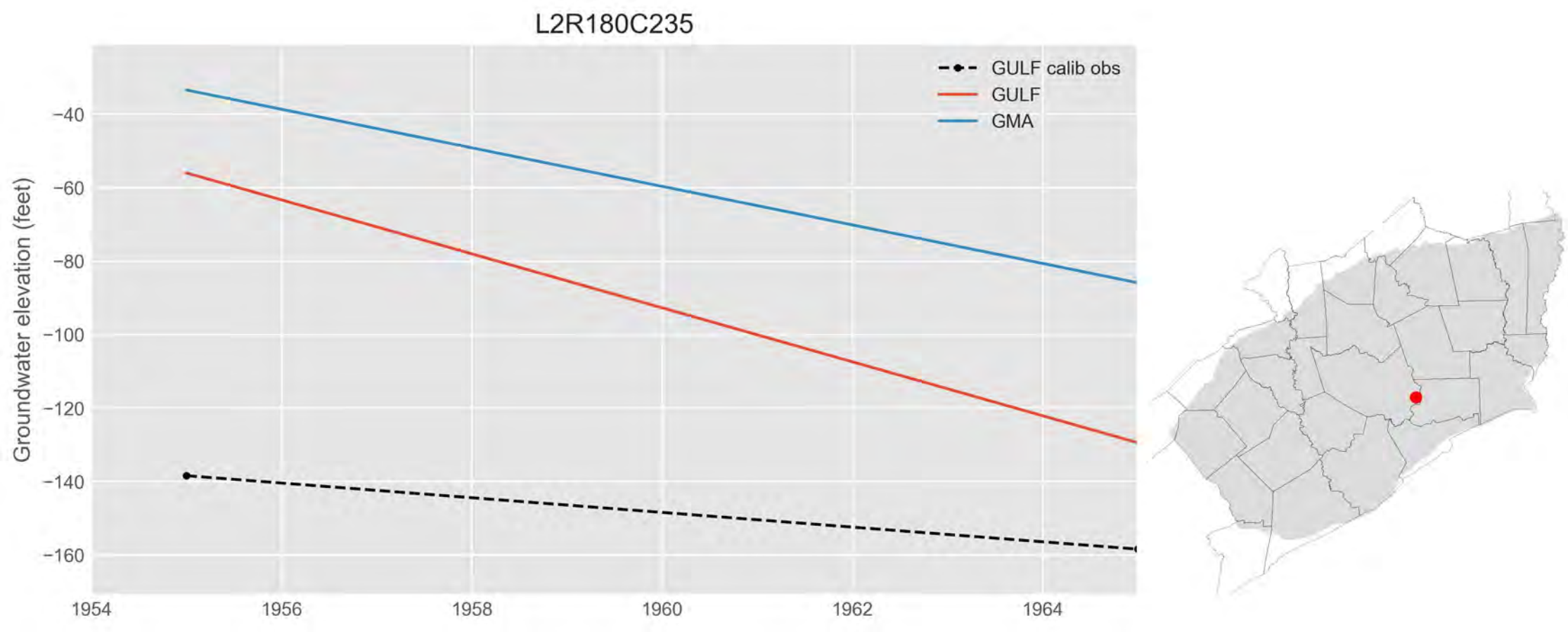

L2R179C148
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
0
1940
1950
1960
1970
1980
1990
2000


L2R179C208
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
−450
1960
1970
1980
1990
2000
2010
2020

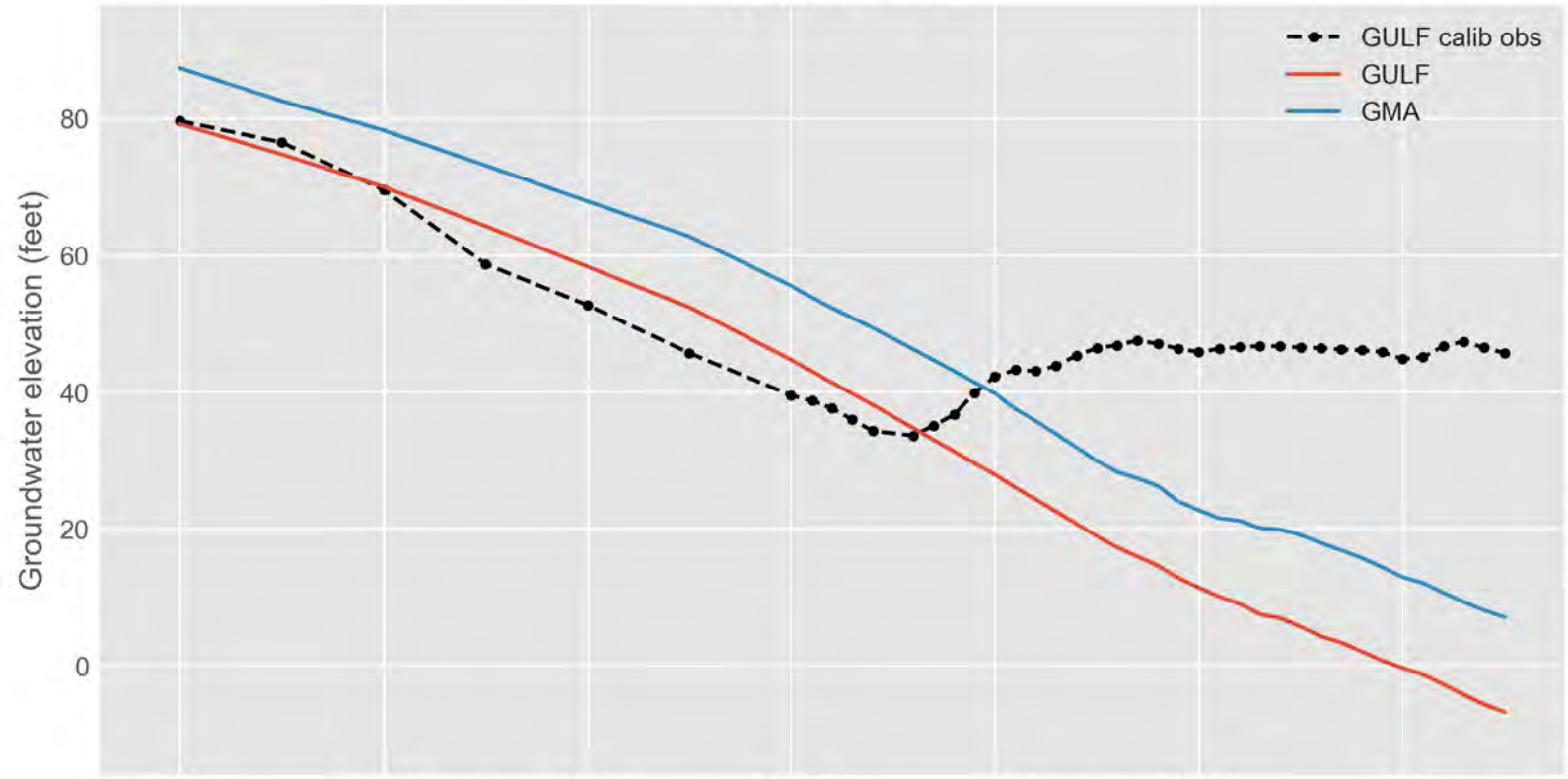

L2R179C219
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

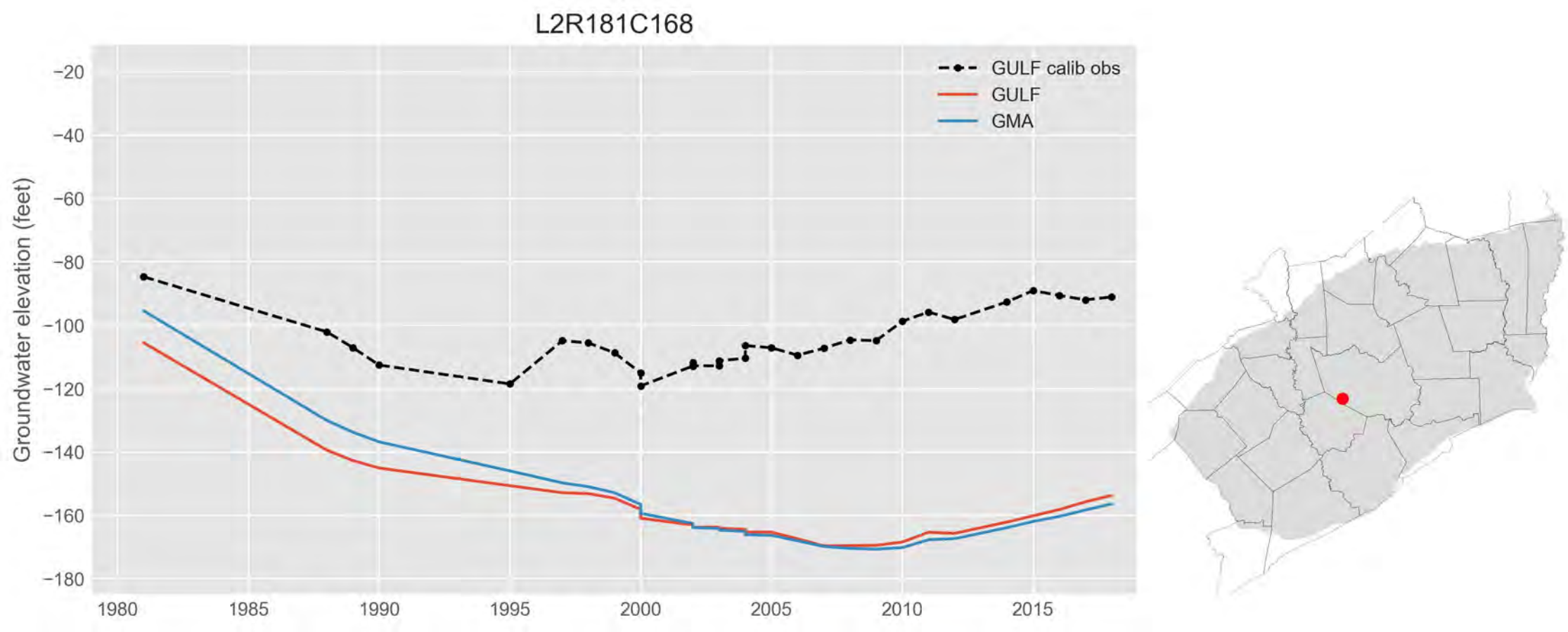

L2R180C146
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
90
80
70
60
50
40
30
20
1940
1945
1950
1955
1960

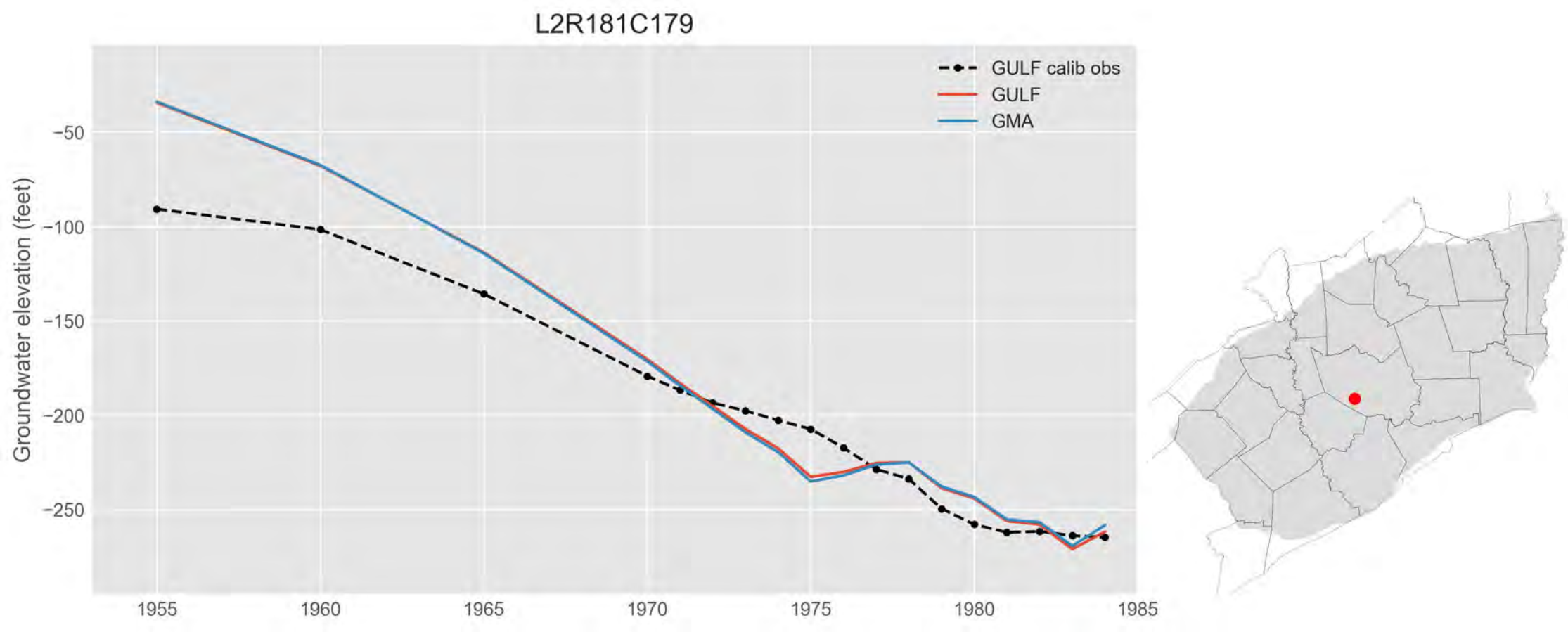

L2R180C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−100
−200
−300
−400
1945
1970
1995
2020

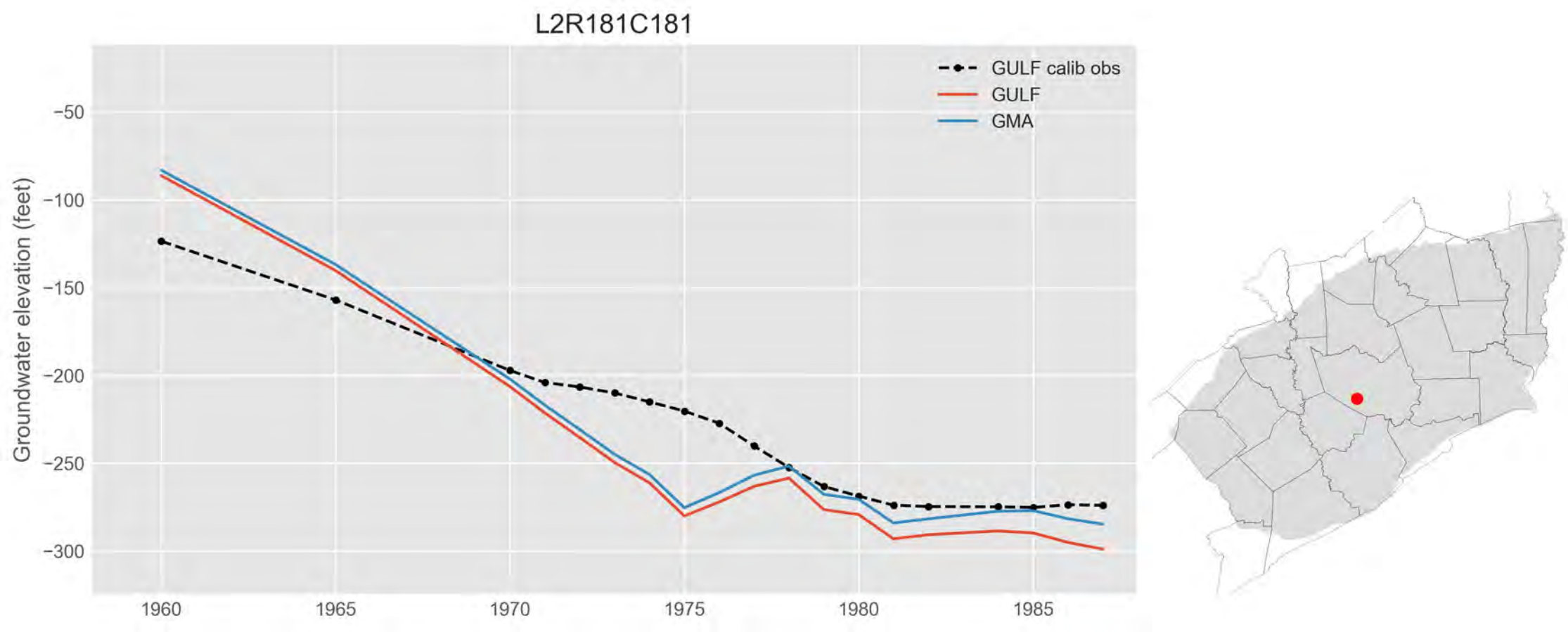

L2R180C235
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
1954
1956
1958
1960
1962
1964

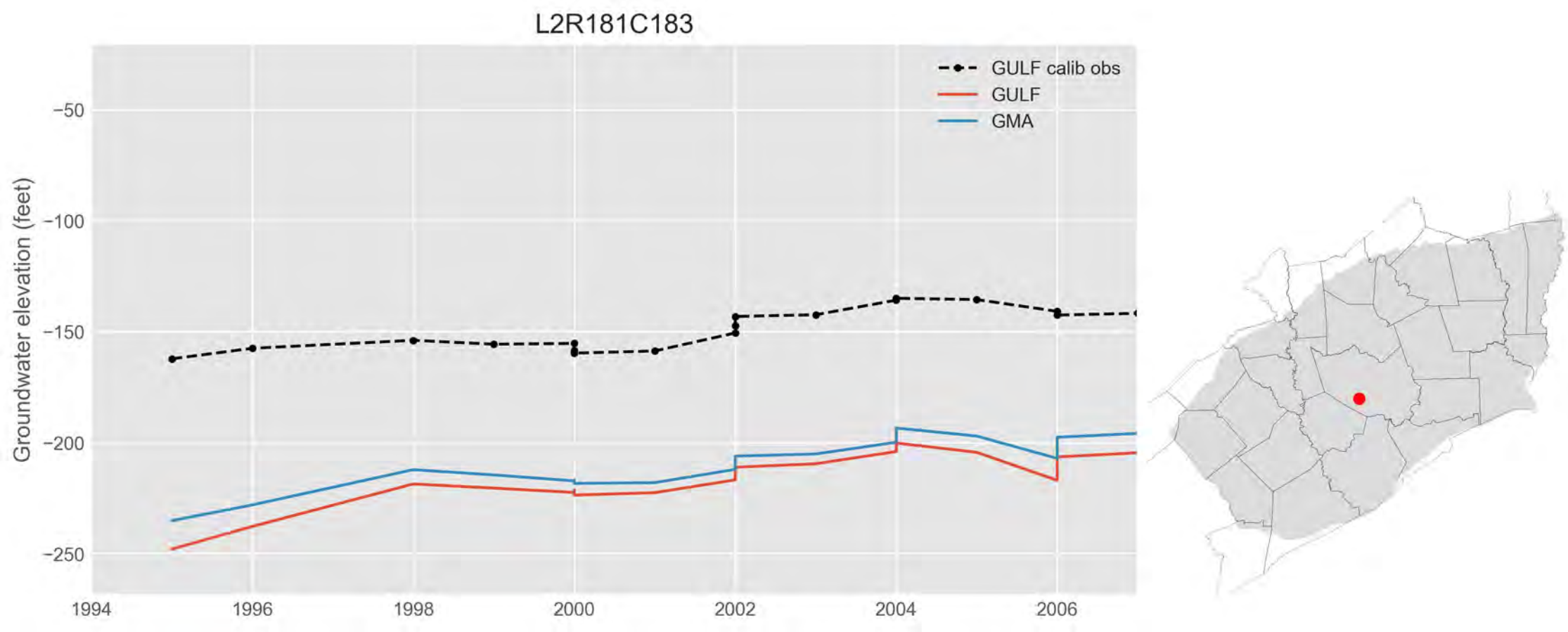
L2R181C149

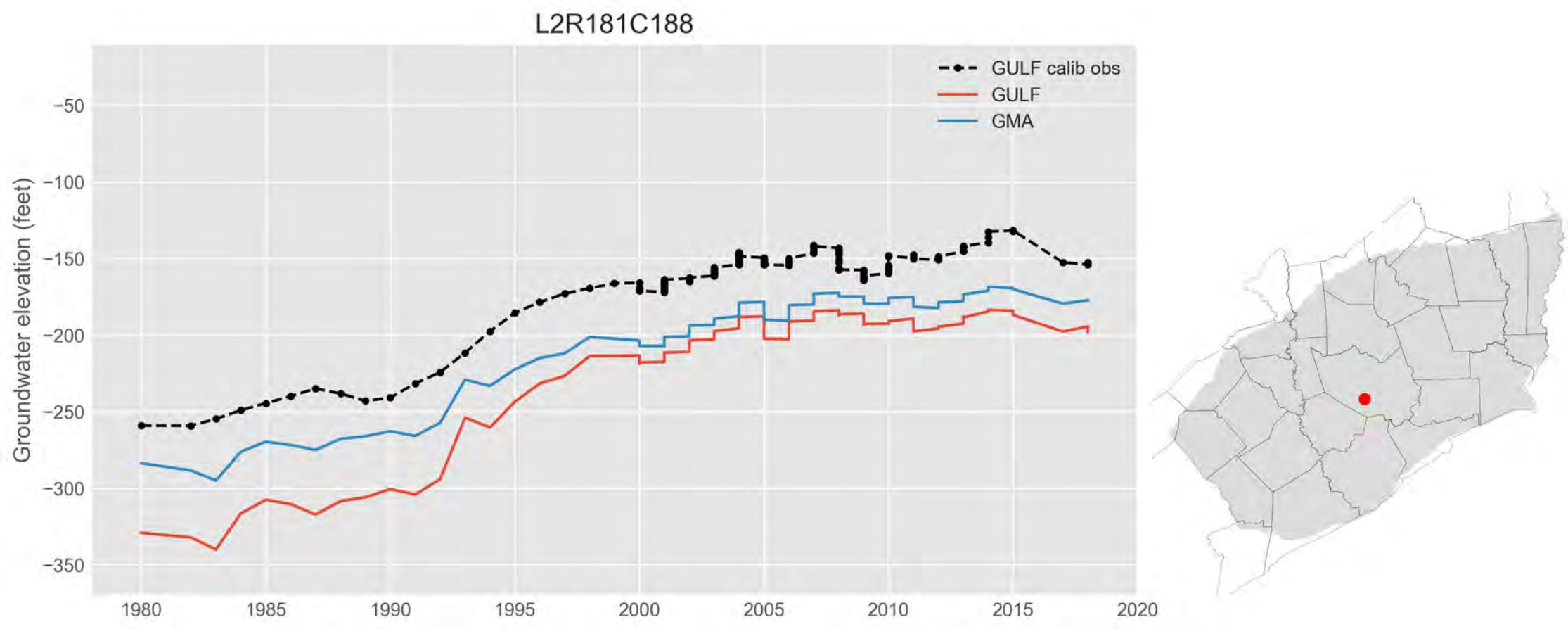

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
1940
1950
1960
1970
1980
1990
2000

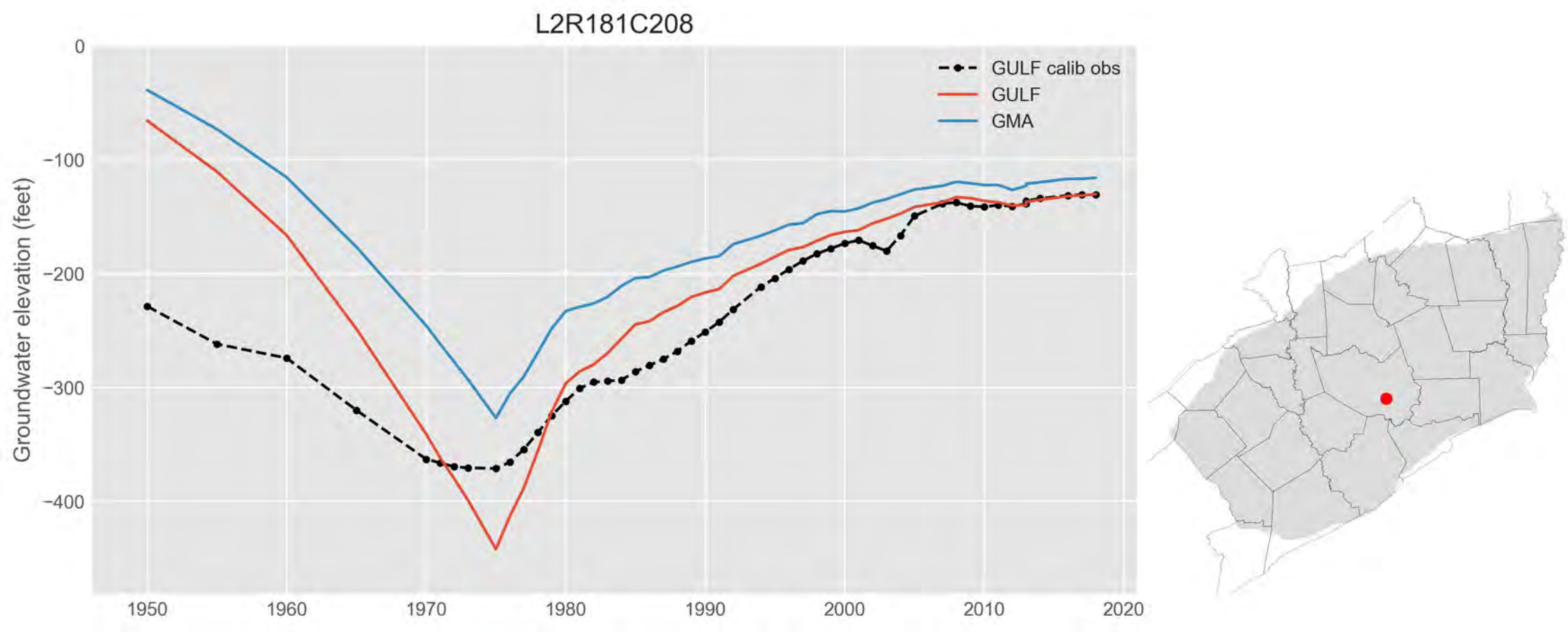

L2R181C168
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
−180
1980
1985
1990
1995
2000
2005
2010
2015

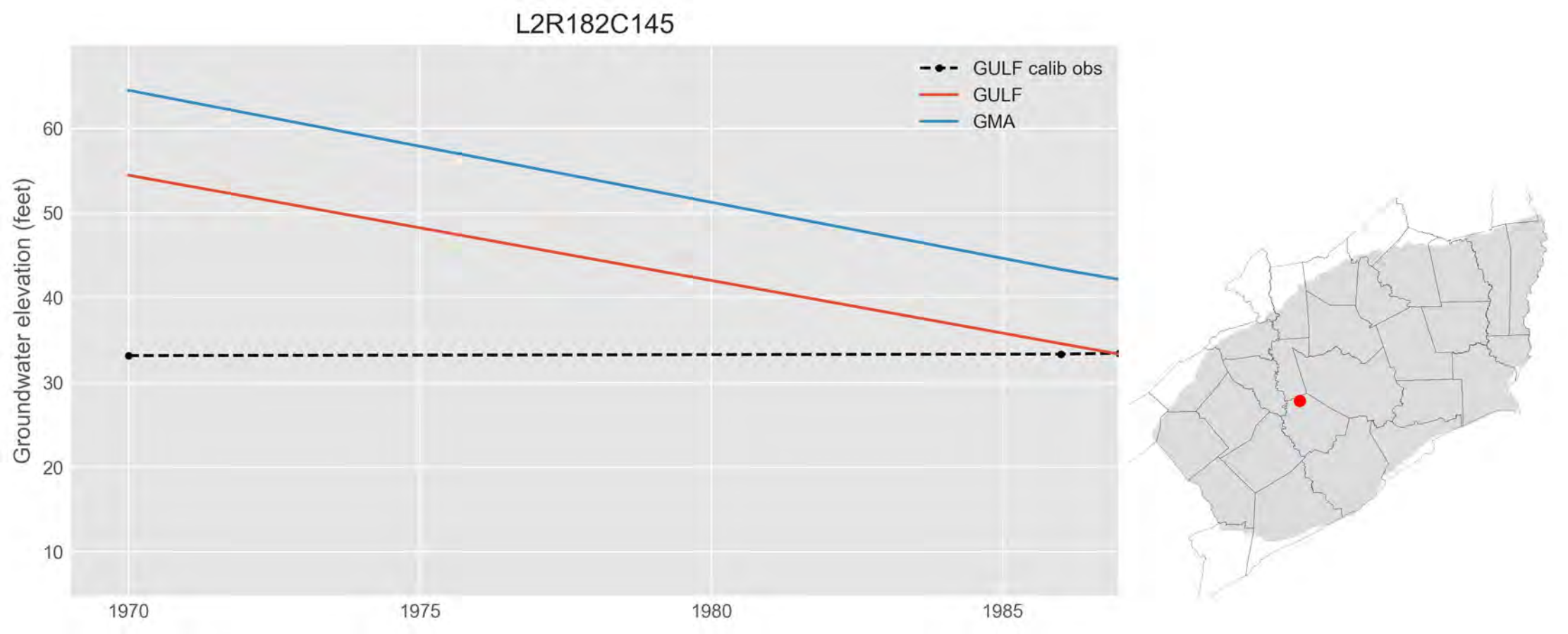

L2R181C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1955
1960
1965
1970
1975
1980
1985

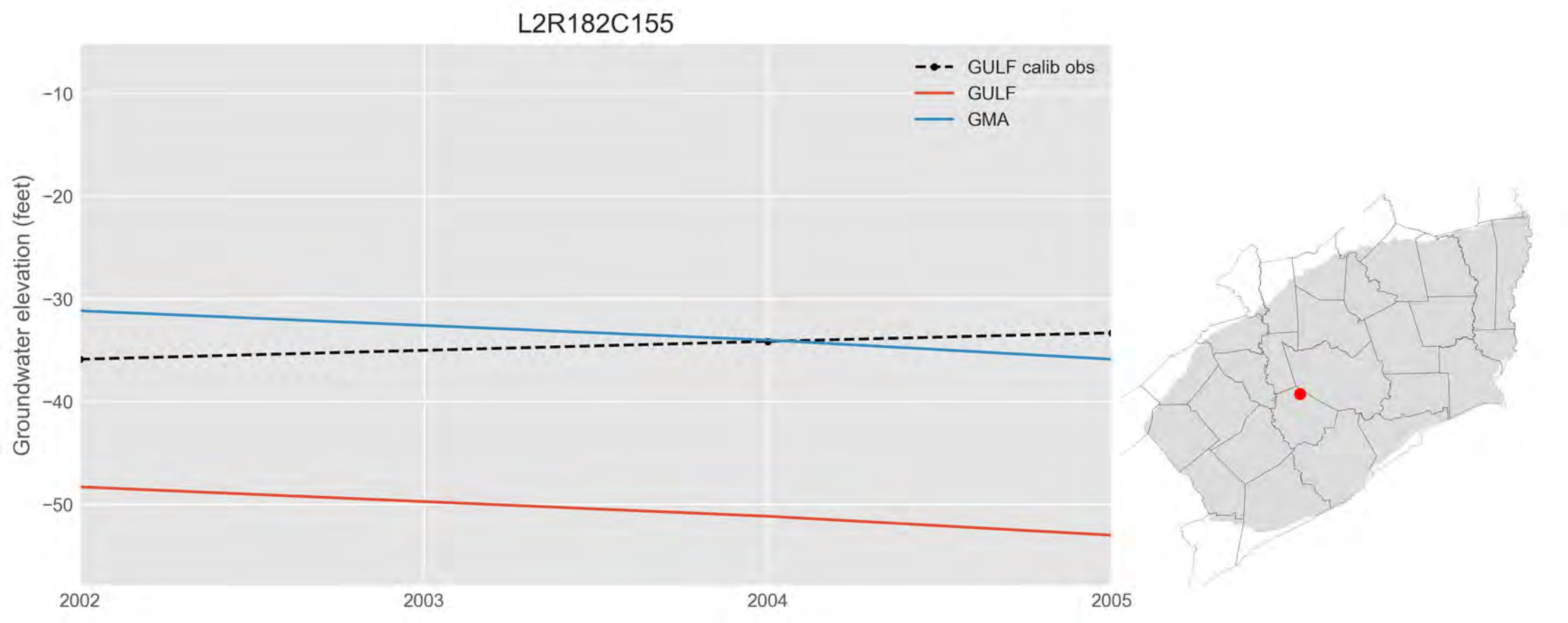

L2R181C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1960
1965
1970
1975
1980
1985

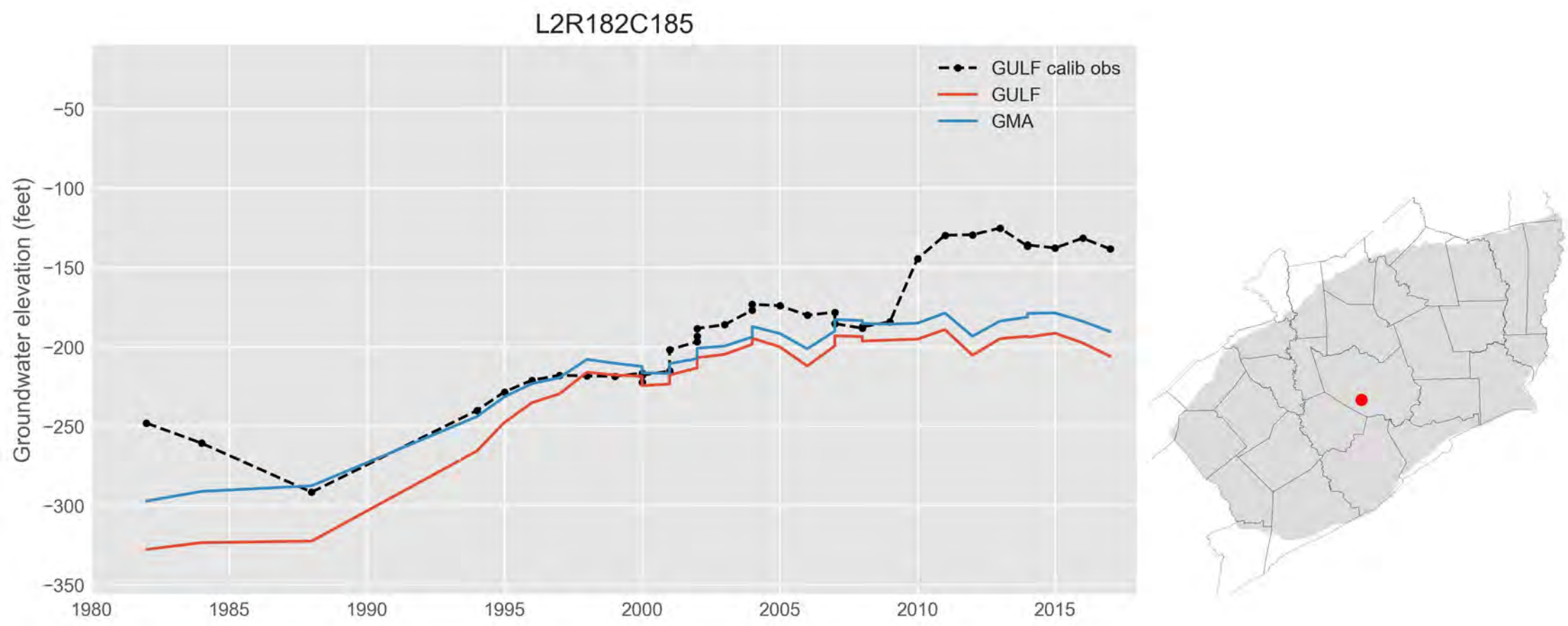

L2R181C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1994
1996
1998
2000
2002
2004
2006

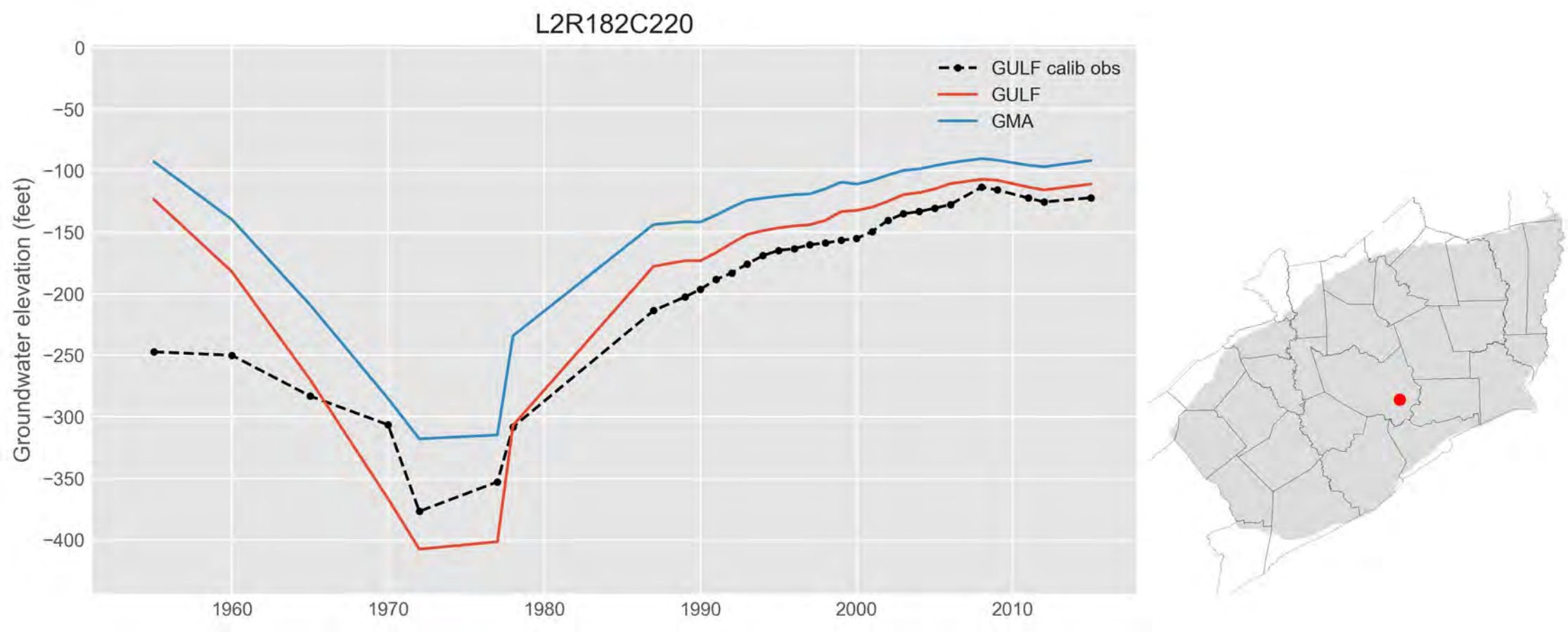

L2R181C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1980
1985
1990
1995
2000
2005
2010
2015
2020


L2R181C208
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−100
−200
−300
−400
1950
1960
1970
1980
1990
2000
2010
2020

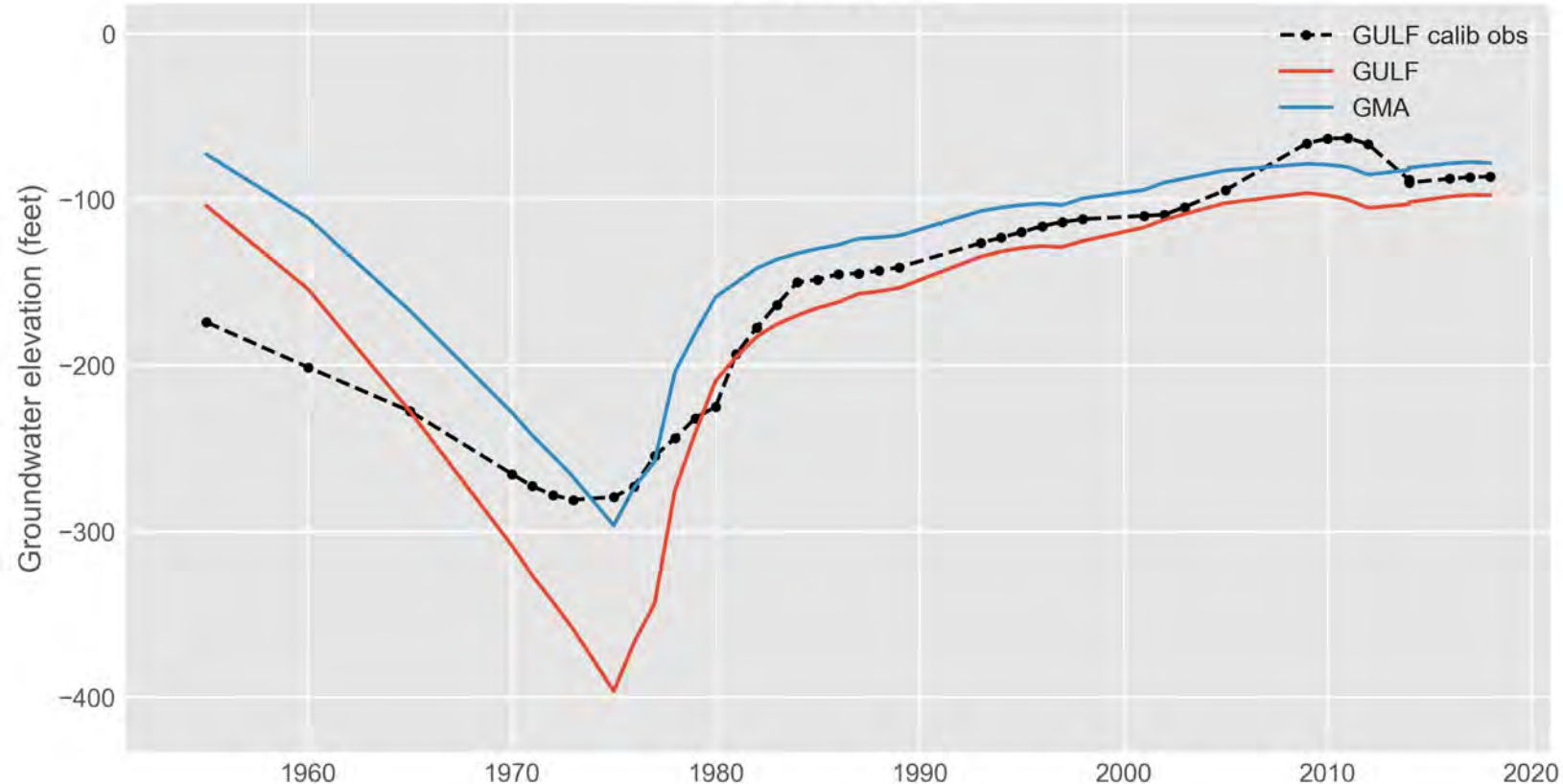

L2R182C145
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
50
40
30
20
10
1970
1975
1980
1985

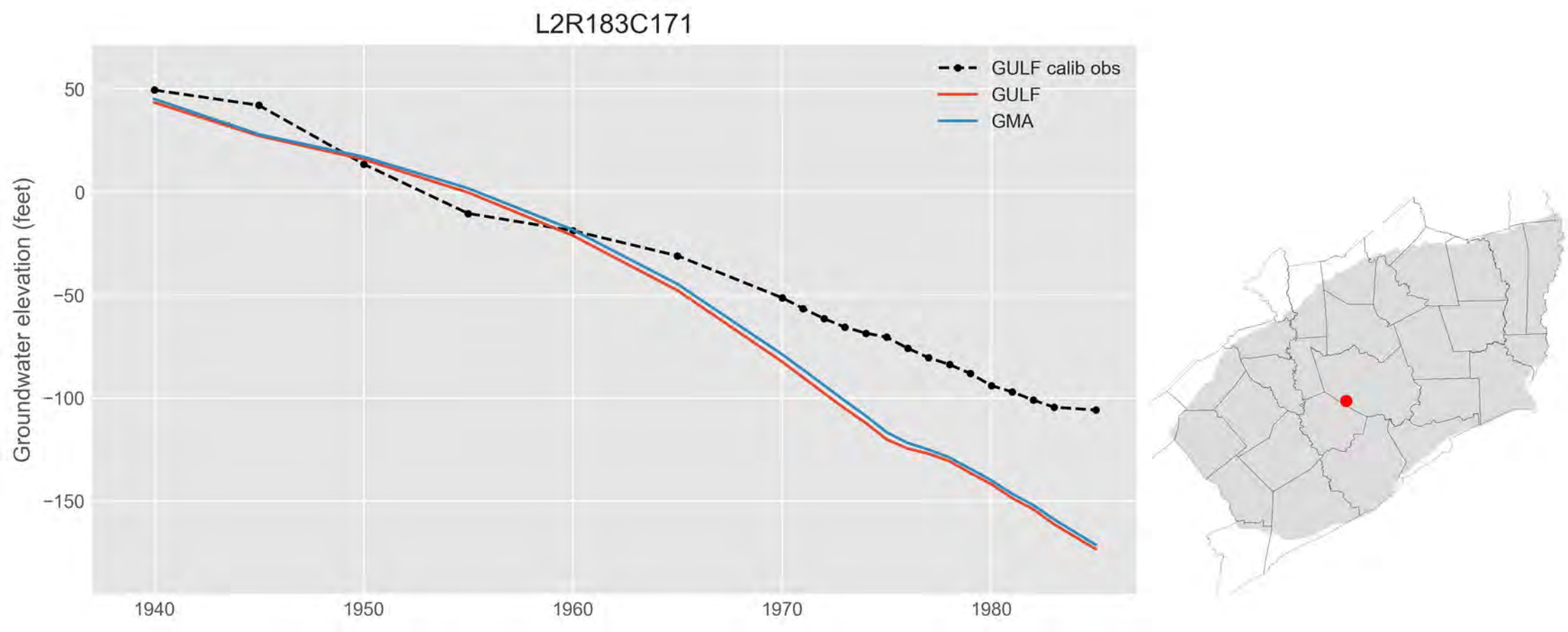

L2R182C155
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
2002
2003
2004
2005

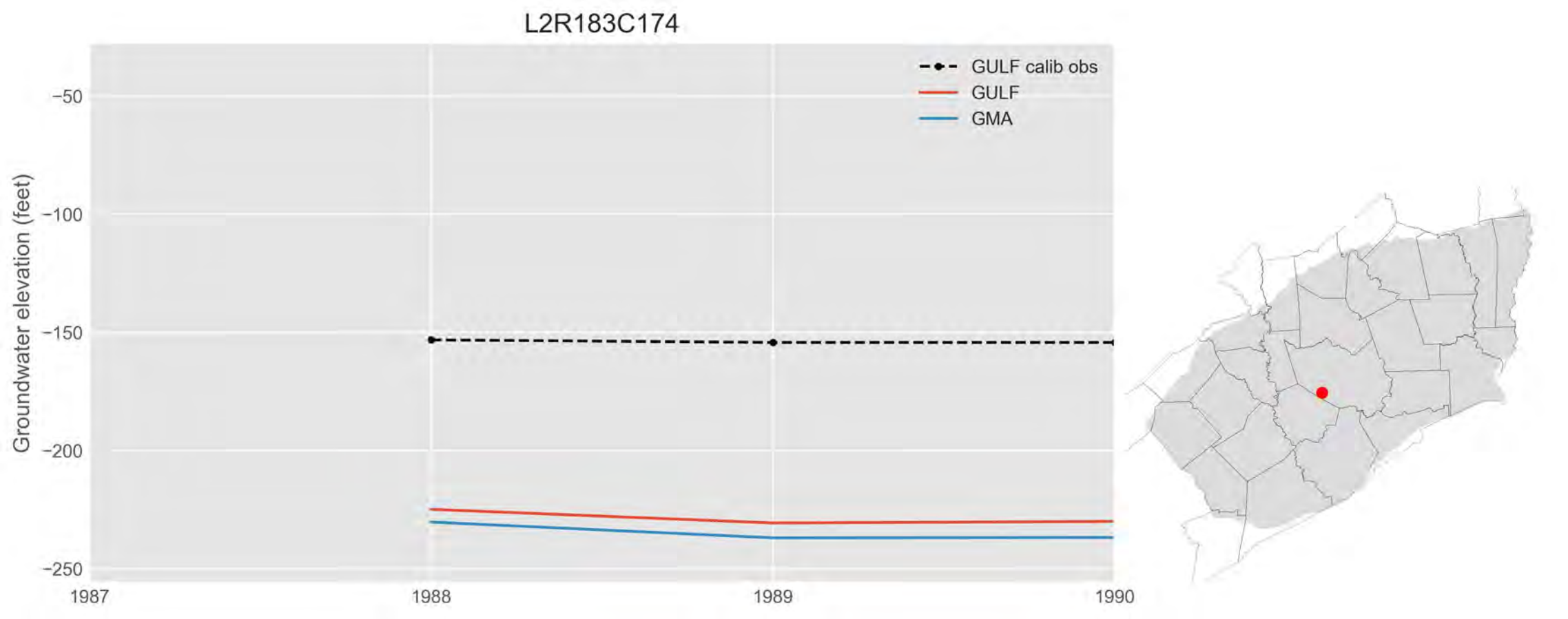

L2R182C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1980
1985
1990
1995
2000
2005
2010
2015

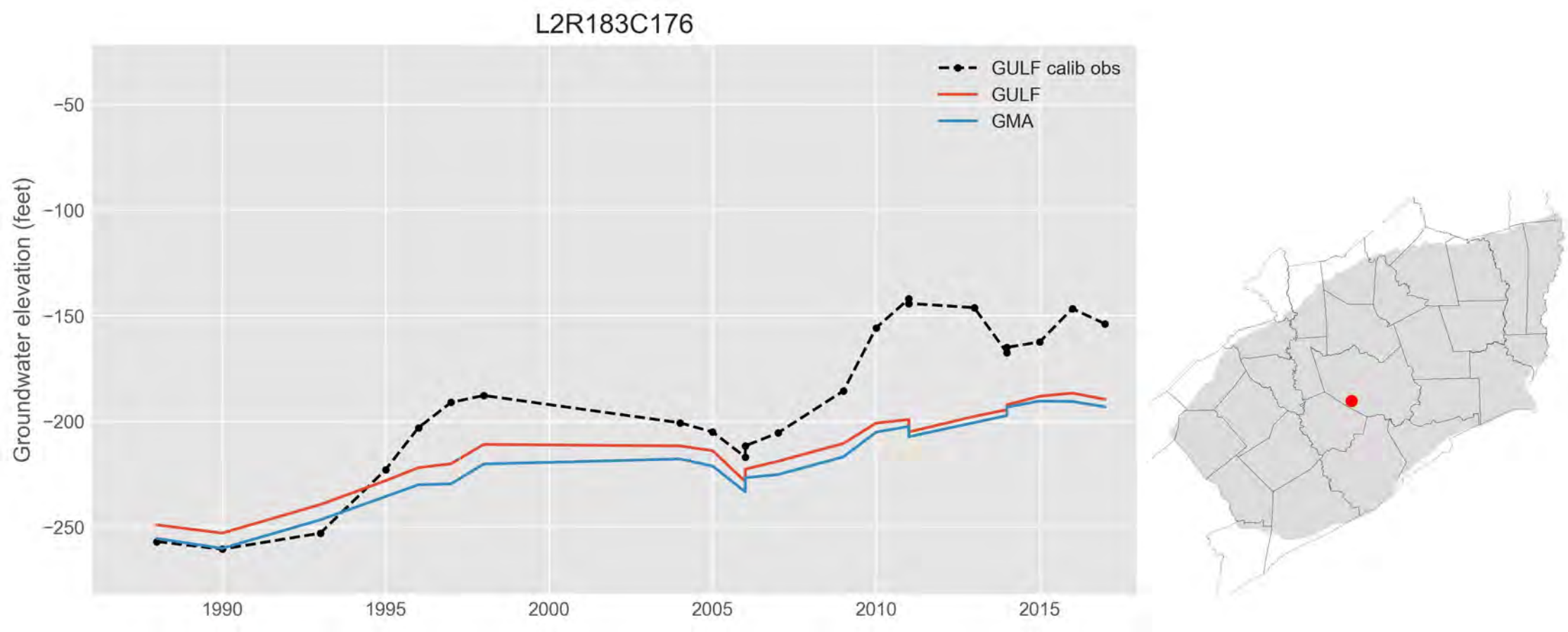

L2R182C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
−400
1960
1970
1980
1990
2000
2010

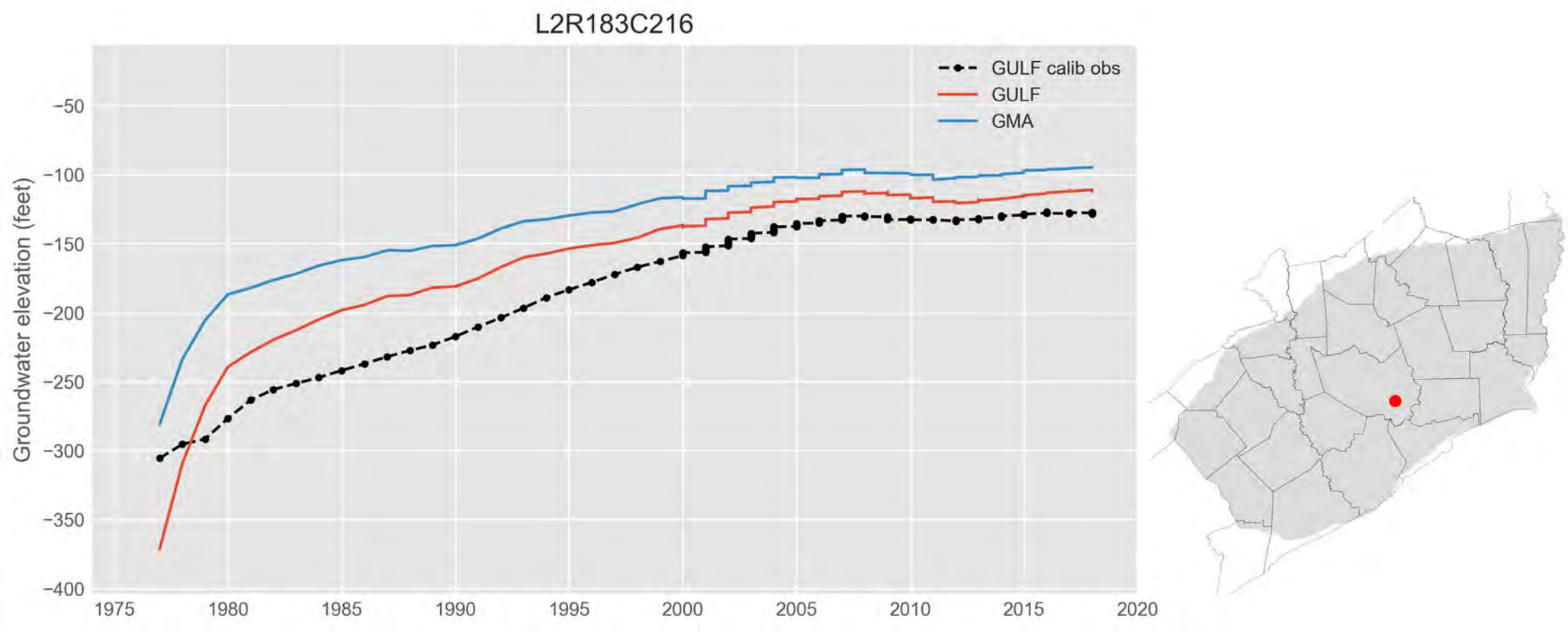
L2R182C224

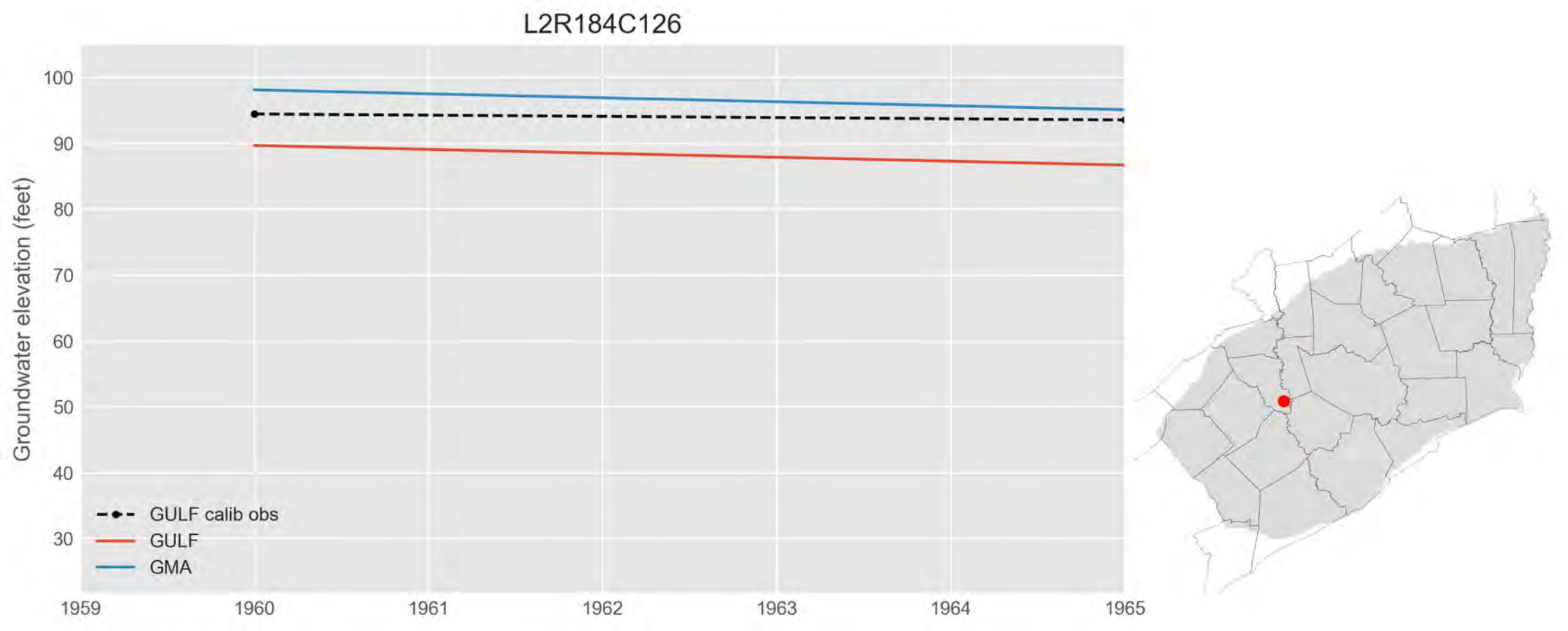

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−100
−200
−300
−400
1960
1970
1980
1990
2000
2010
2020

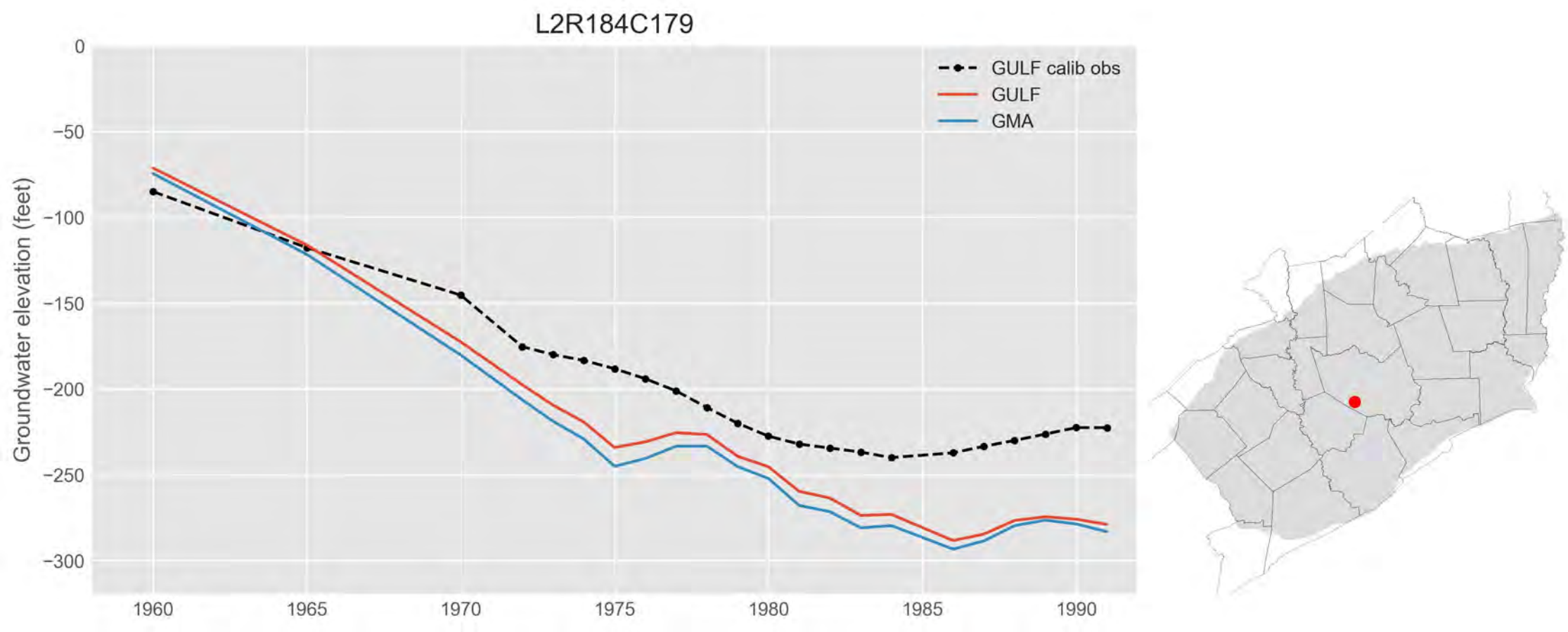

L2R183C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
1940
1950
1960
1970
1980

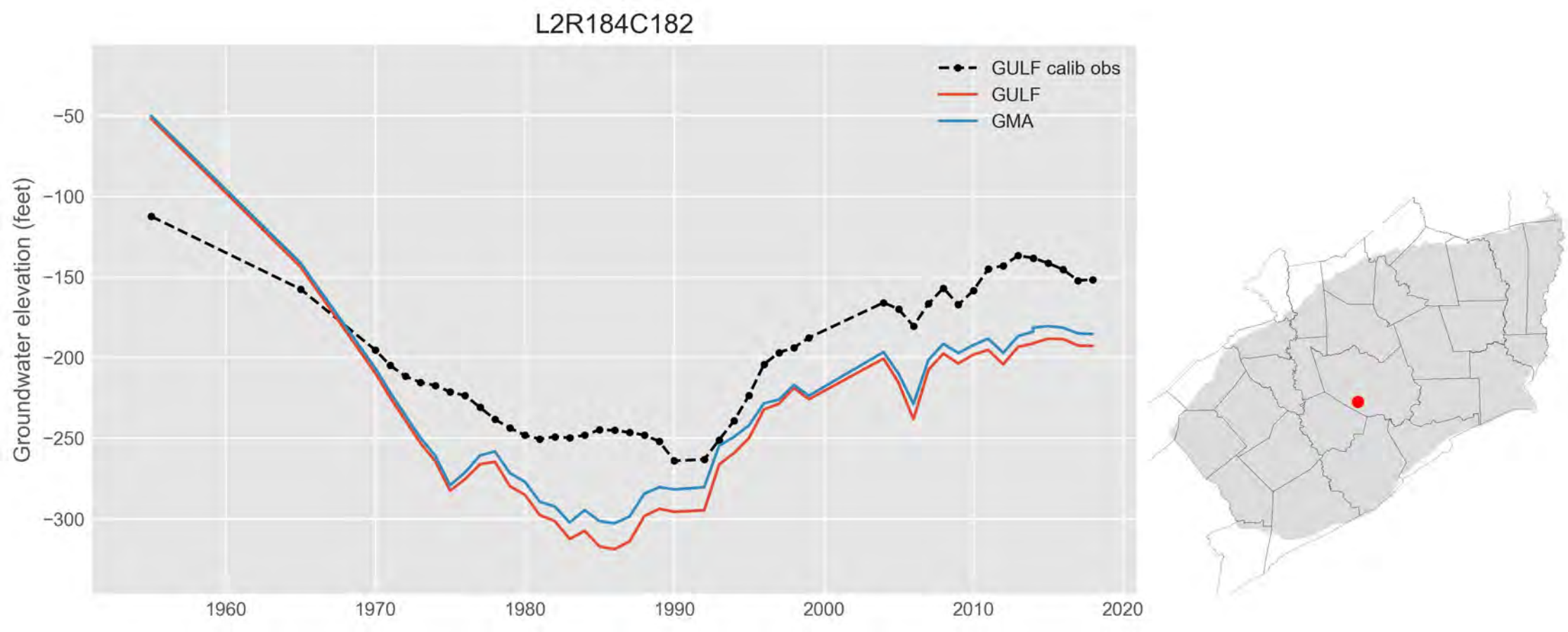

L2R183C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1987
1988
1989
1990

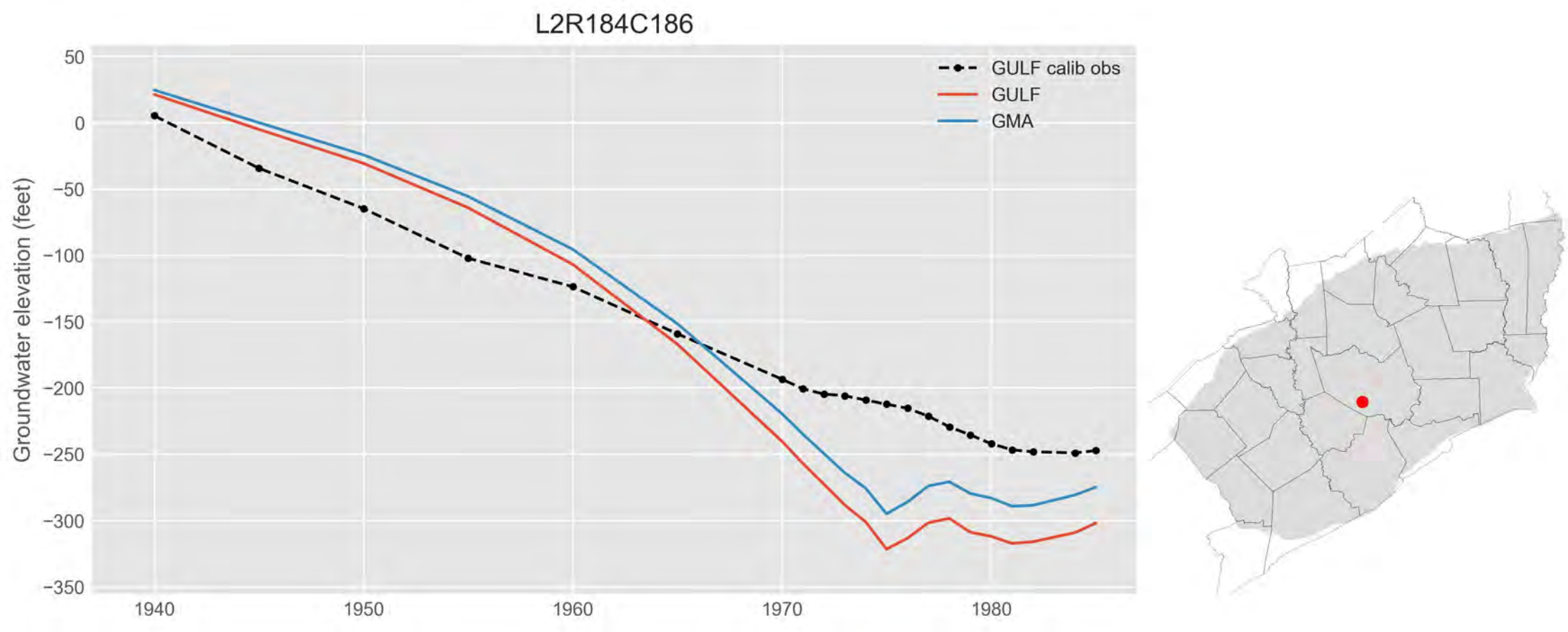

L2R183C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1990
1995
2000
2005
2010
2015

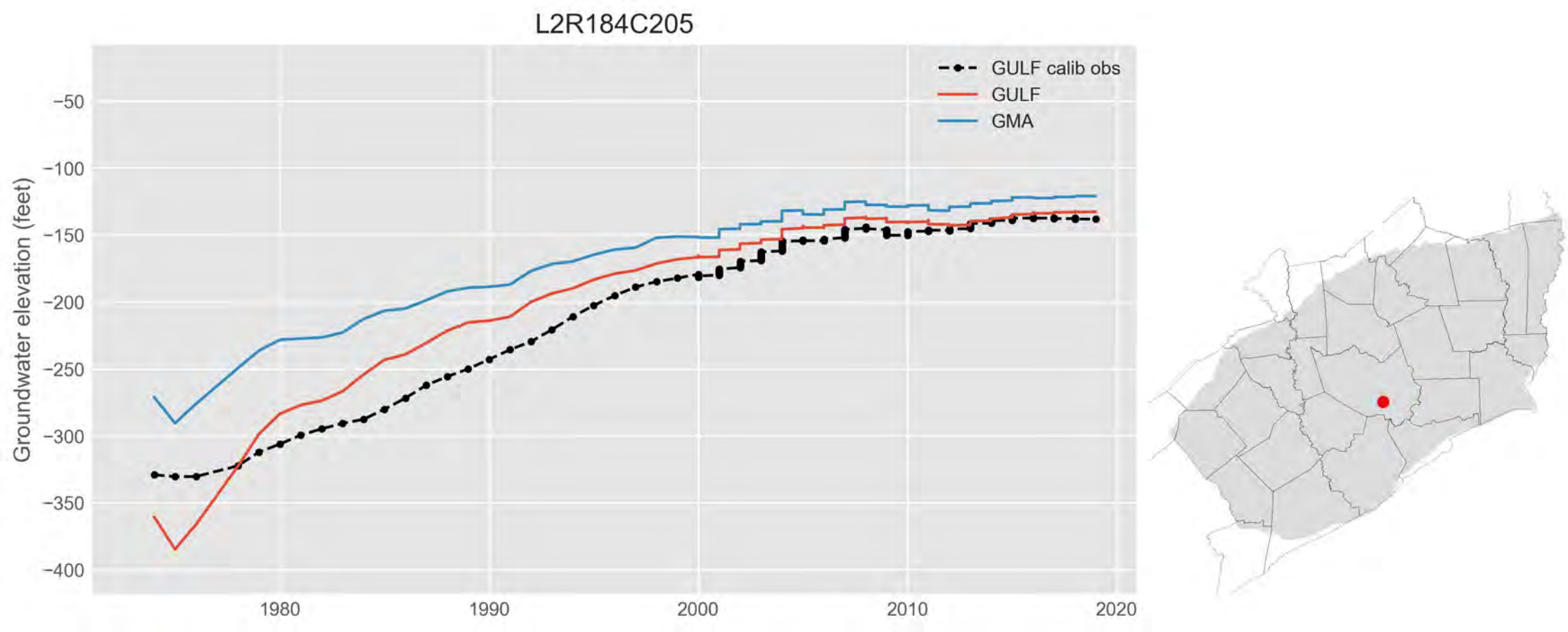

L2R183C216
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

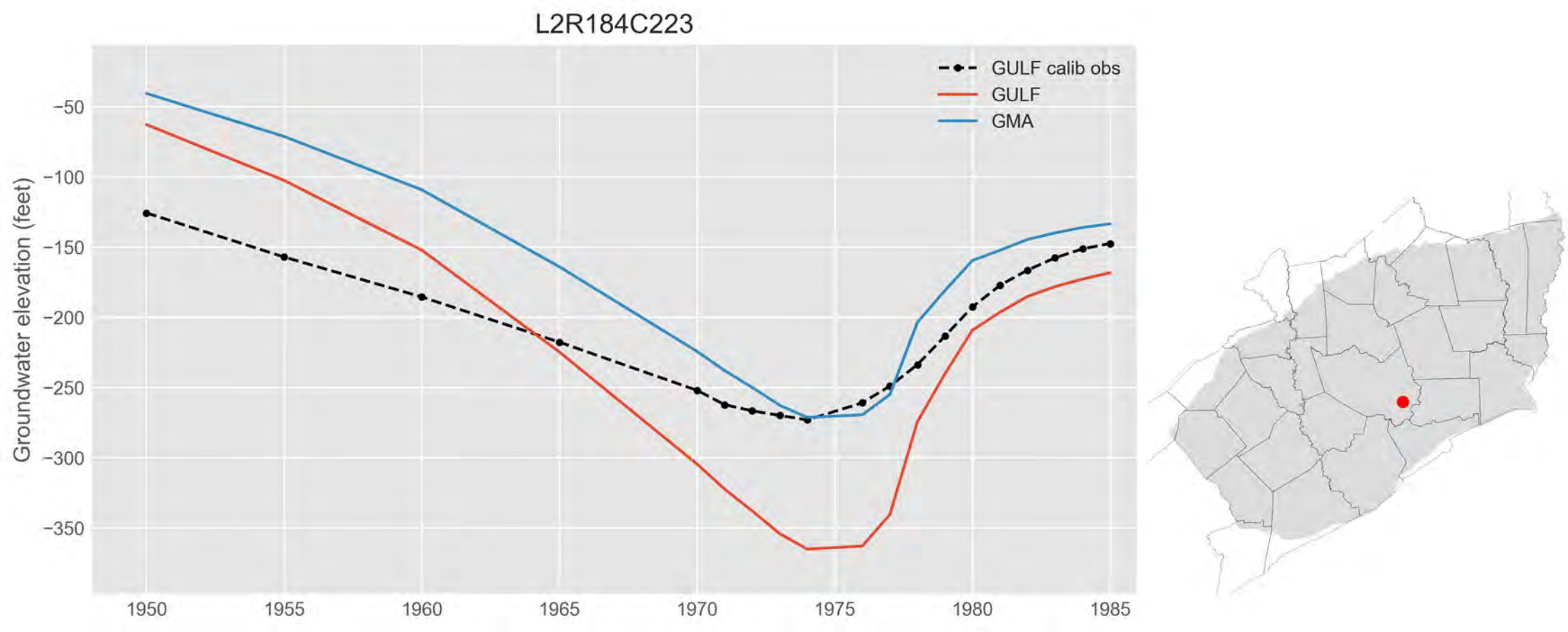

L2R184C126
Groundwater elevation (feet)
100
90
80
70
60
50
40
30
1959
1960
1961
1962
1963
1964
1965
GULF calib obs
GULF
GMA

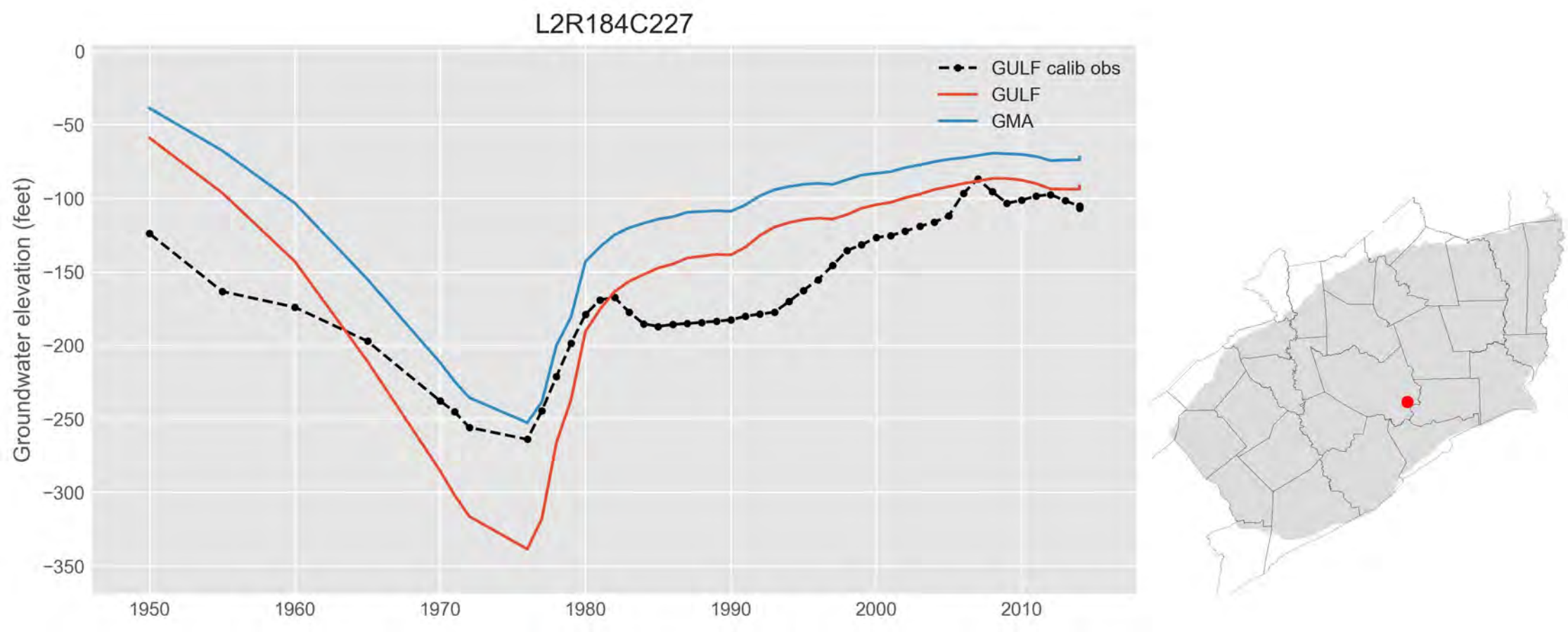

L2R184C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1960
1965
1970
1975
1980
1985
1990

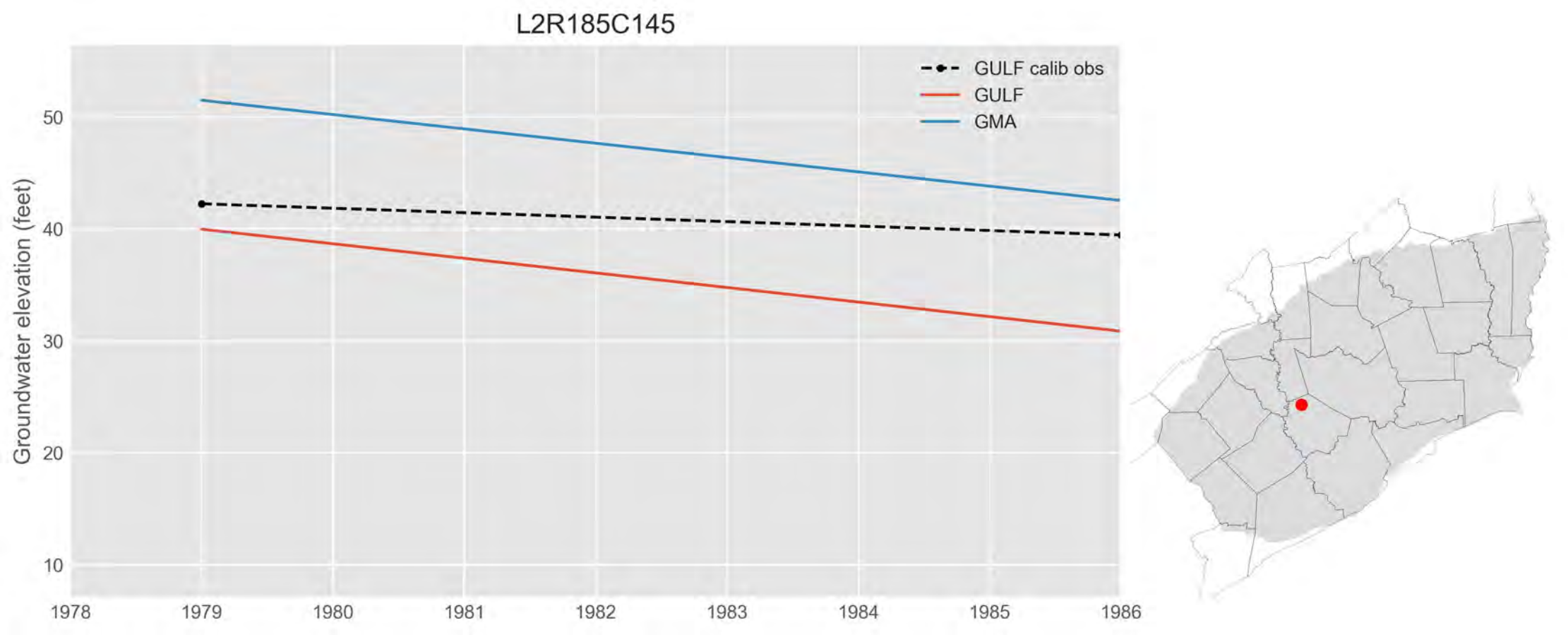

L2R184C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1960
1970
1980
1990
2000
2010
2020

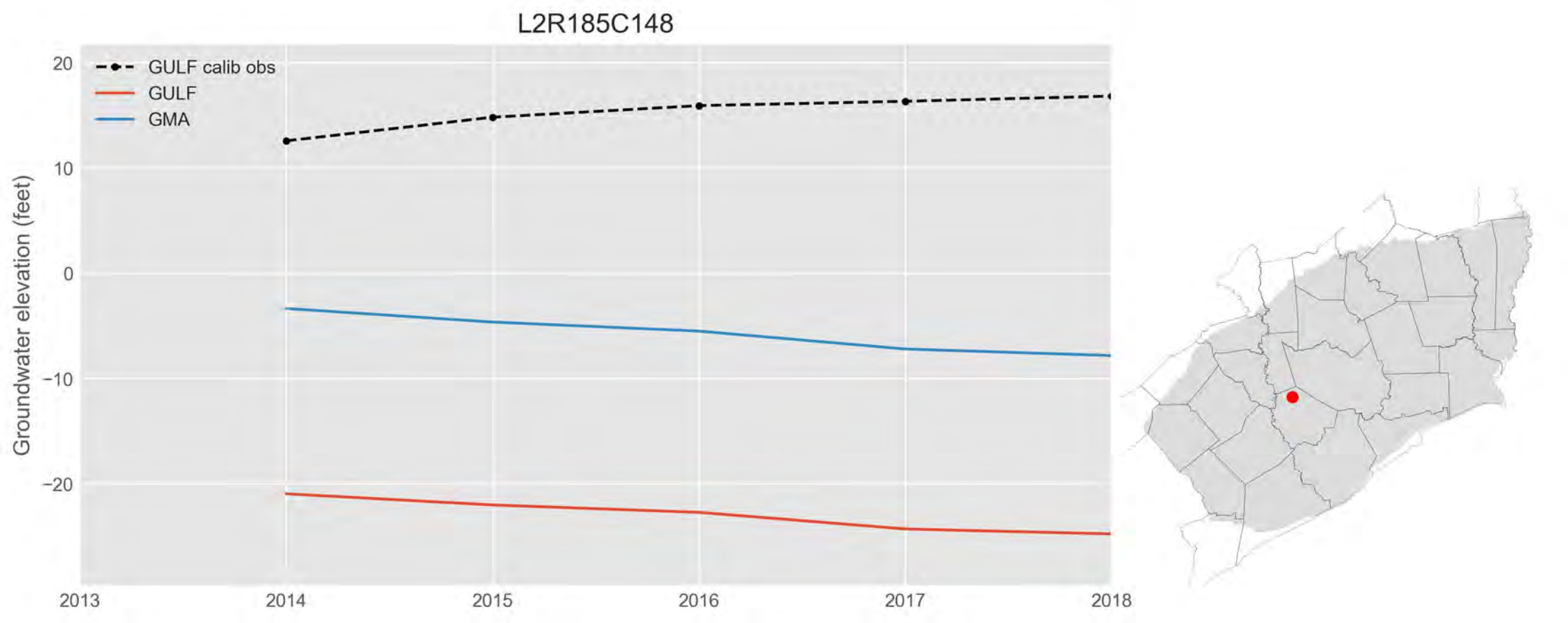

L2R184C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
−300
−350
1940
1950
1960
1970
1980

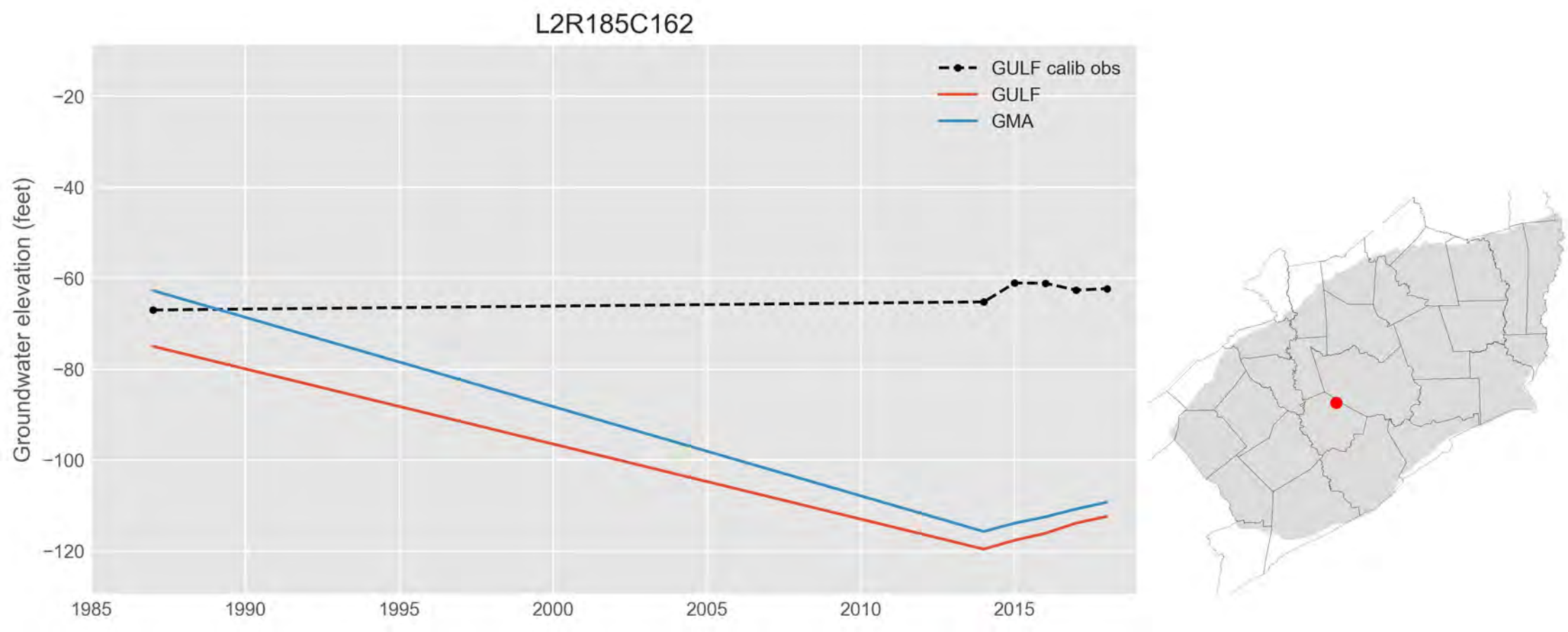

L2R184C205
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1980
1990
2000
2010
2020

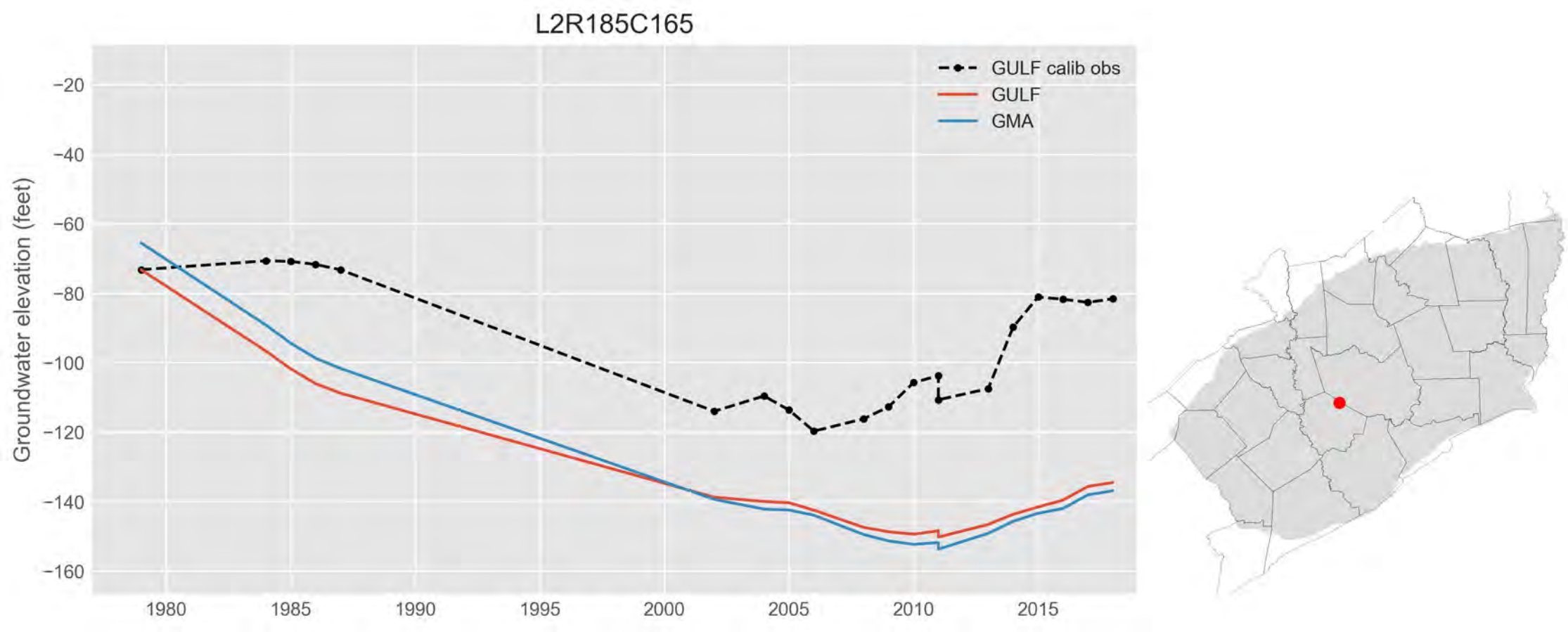

L2R184C223
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1950
1955
1960
1965
1970
1975
1980
1985

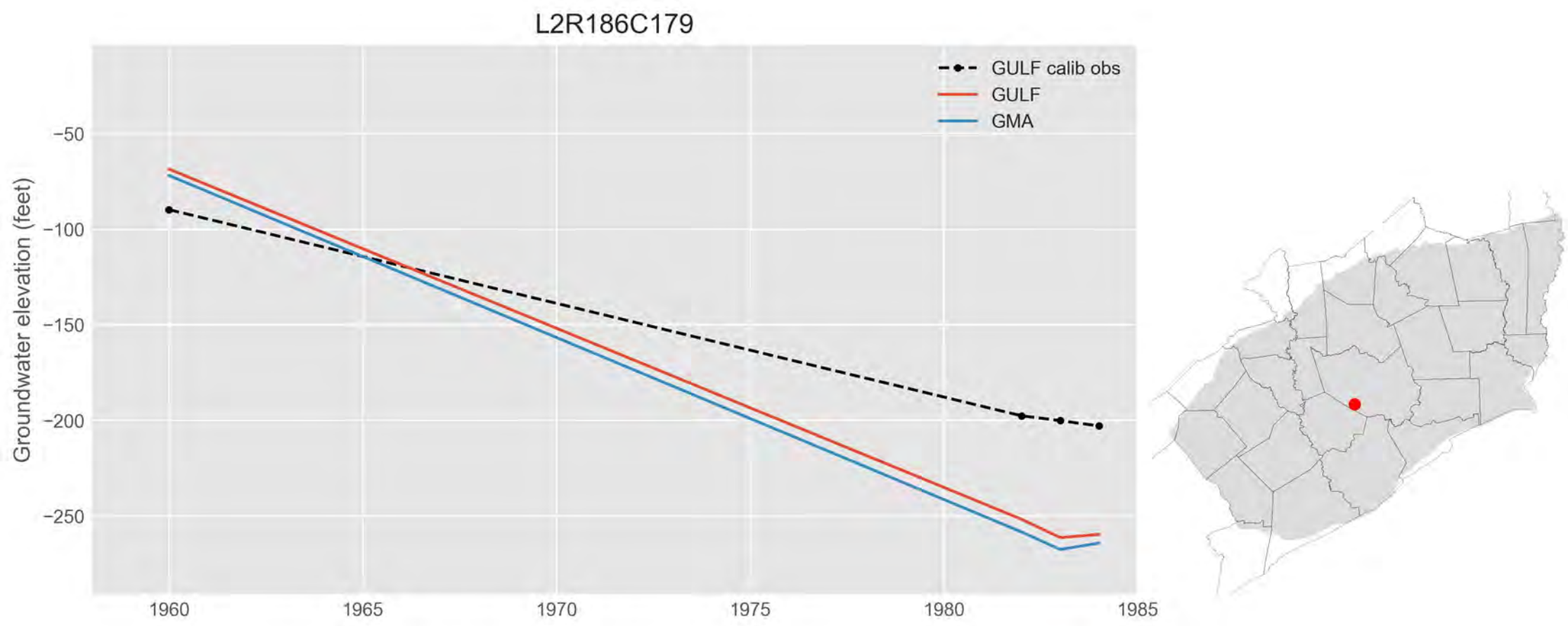

L2R184C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
1950
1960
1970
1980
1990
2000
2010

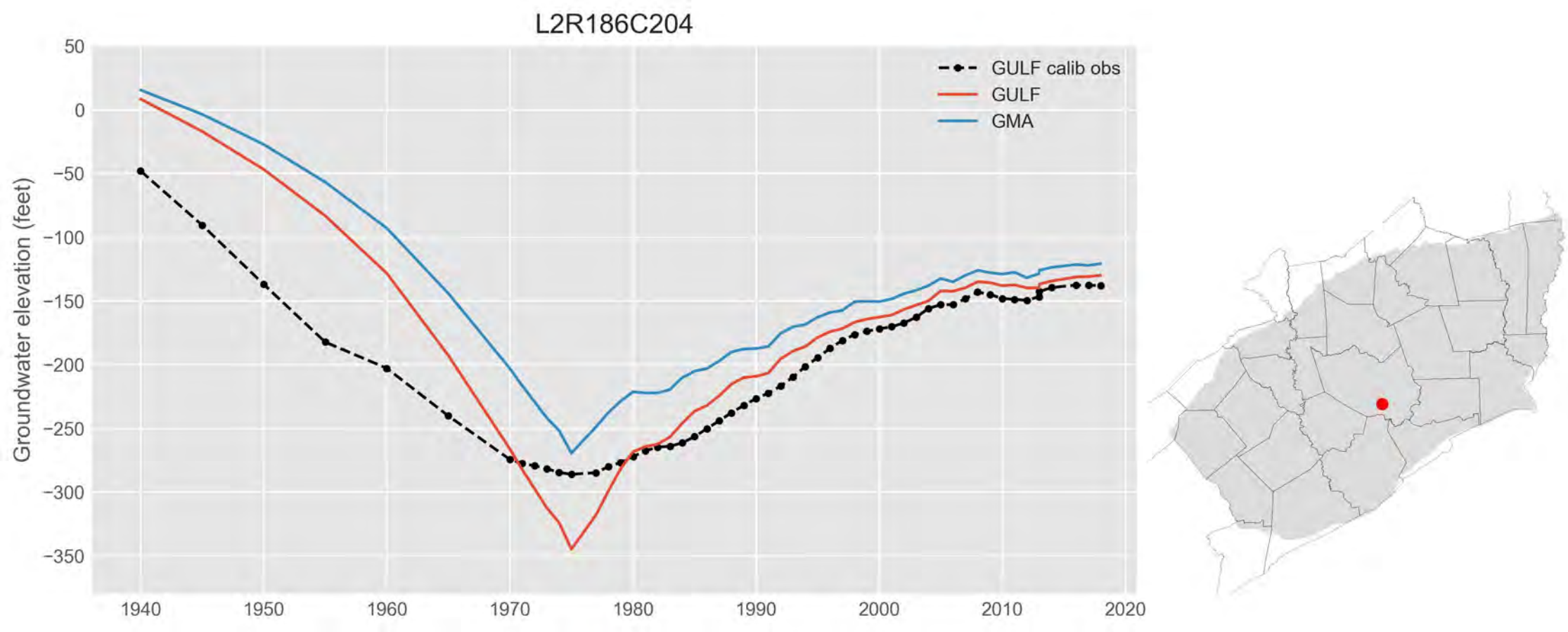

L2R185C145
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
1978
1979
1980
1981
1982
1983
1984
1985
1986

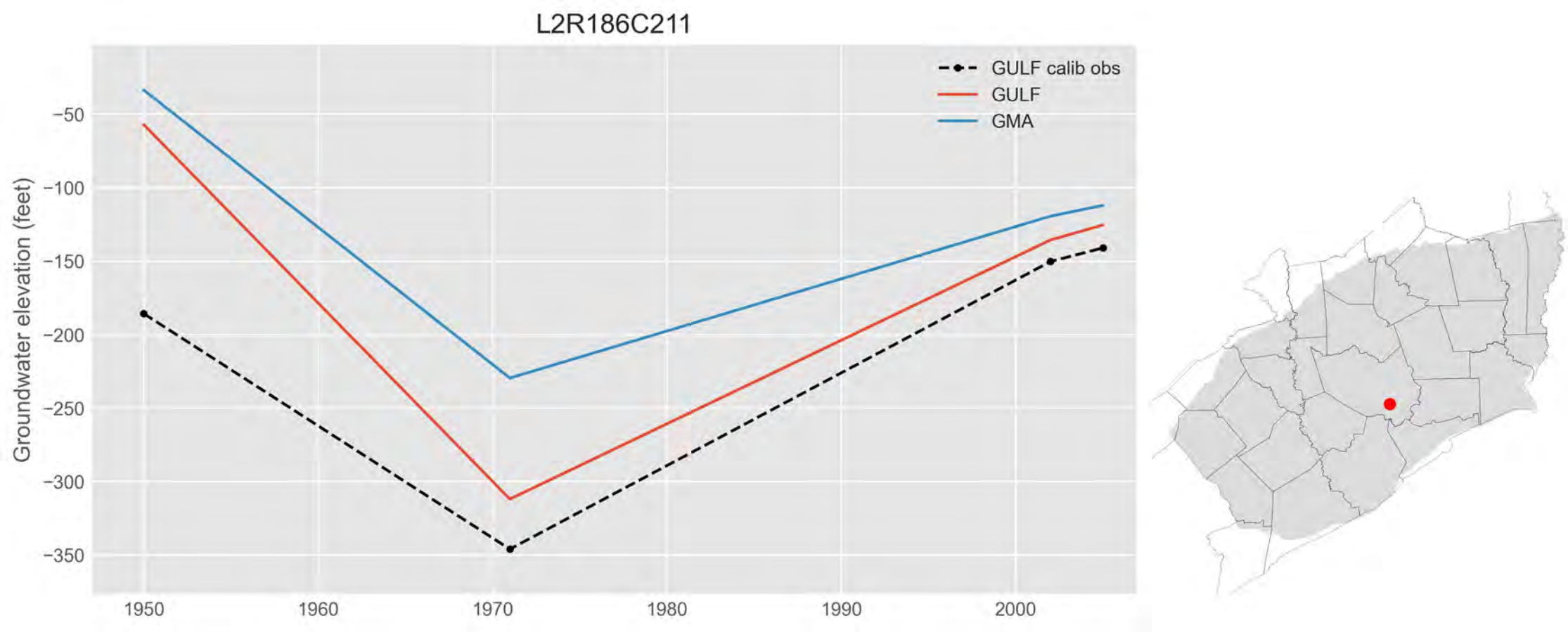

L2R185C148
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
2013
2014
2015
2016
2017
2018

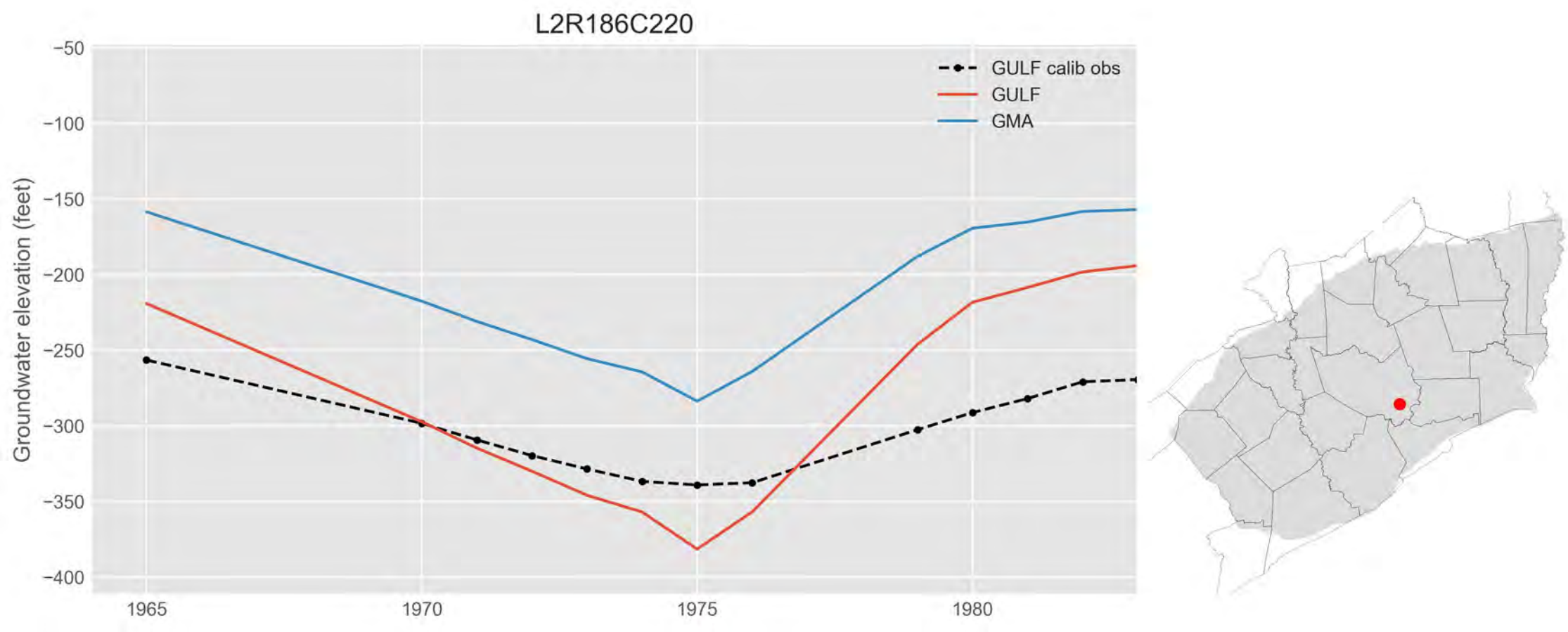

L2R185C162
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1985
1990
1995
2000
2005
2010
2015

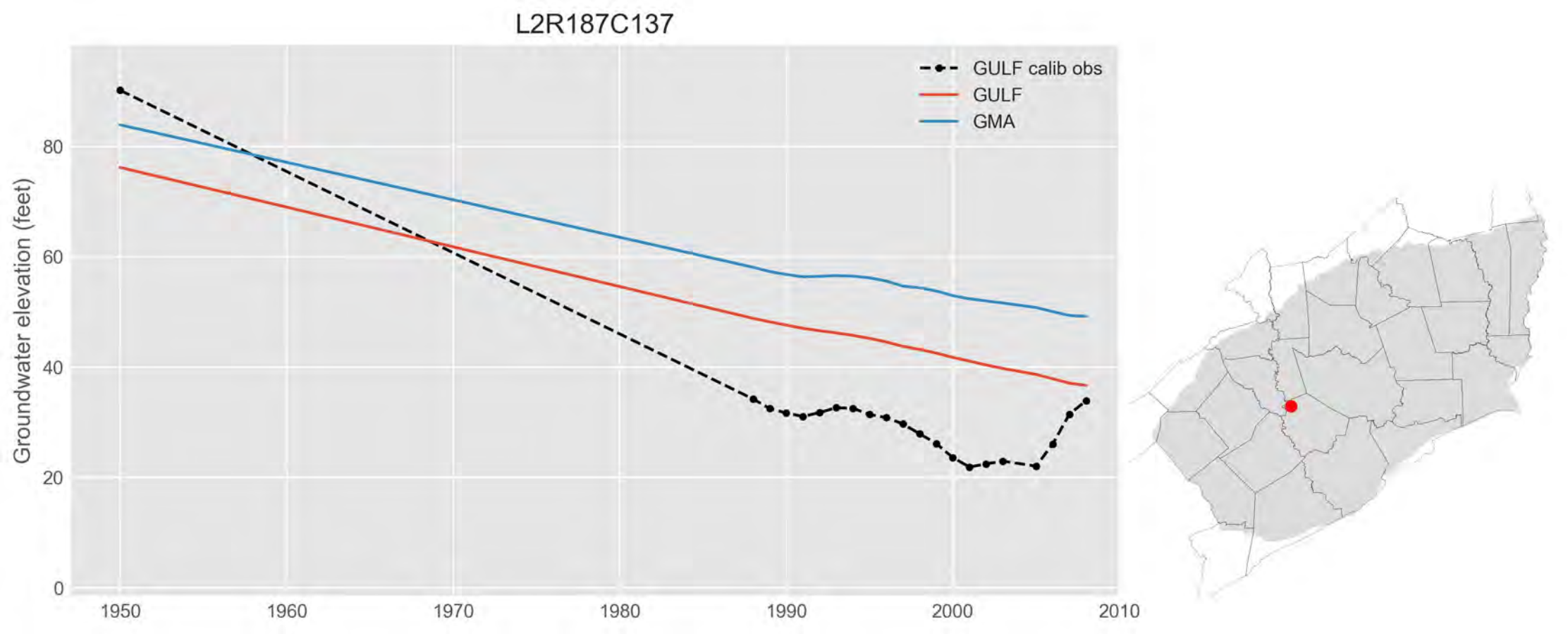

L2R185C165
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
1980
1985
1990
1995
2000
2005
2010
2015


L2R186C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1960
1965
1970
1975
1980
1985

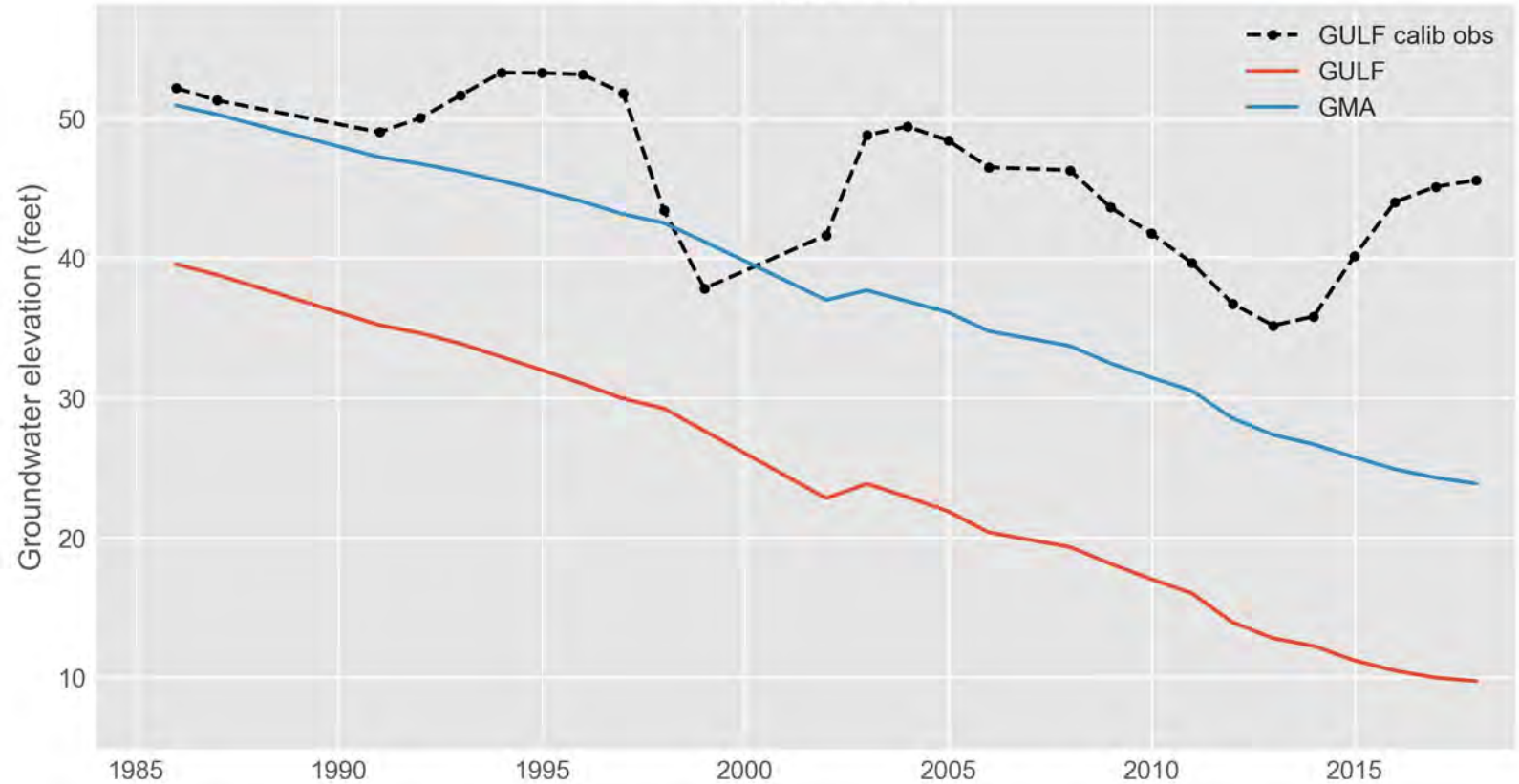

L2R186C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
−300
−350
1940
1950
1960
1970
1980
1990
2000
2010
2020

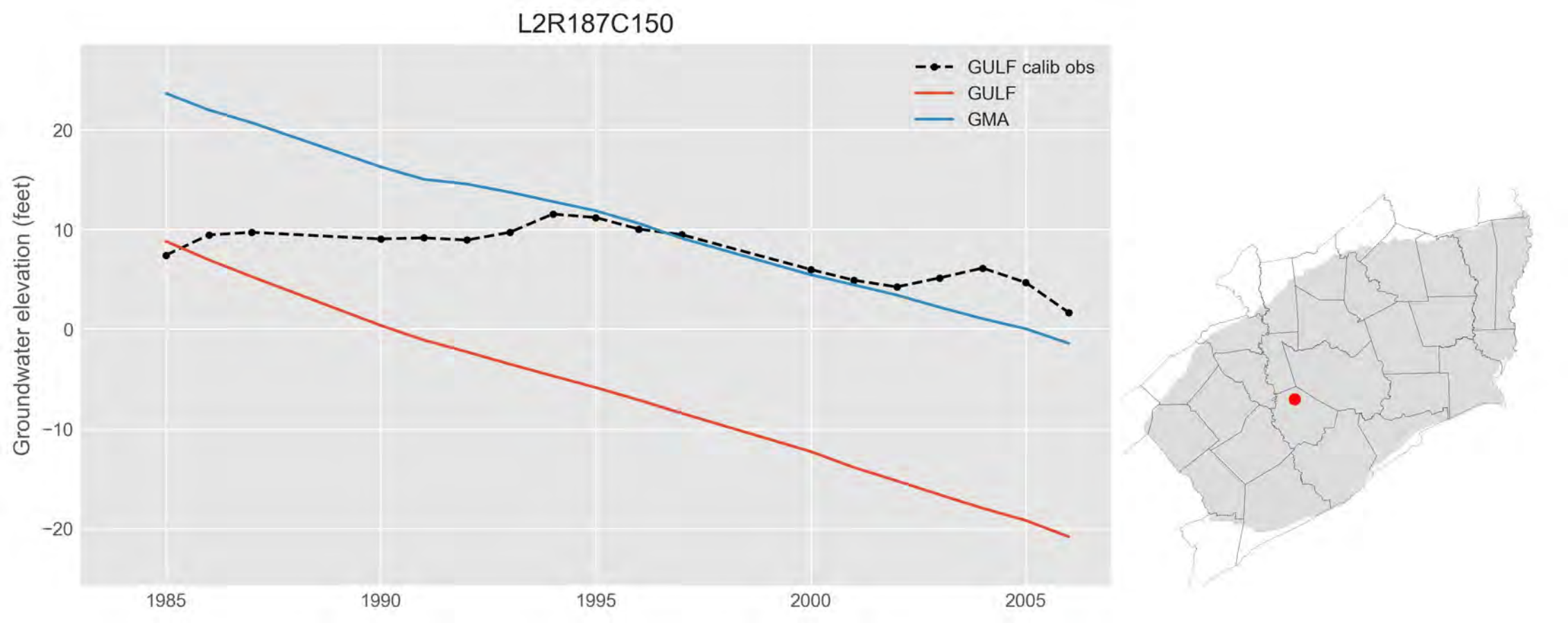

L2R186C211
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1950
1960
1970
1980
1990
2000

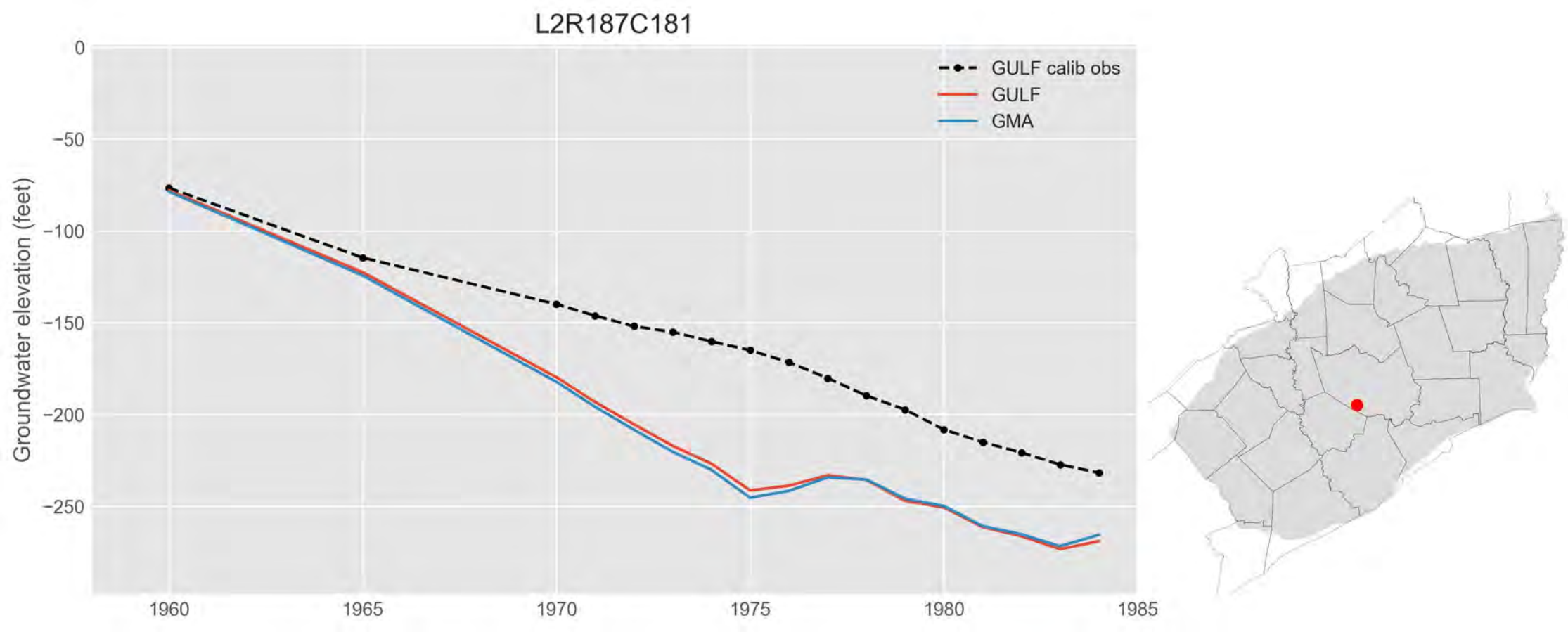

L2R186C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1965
1970
1975
1980

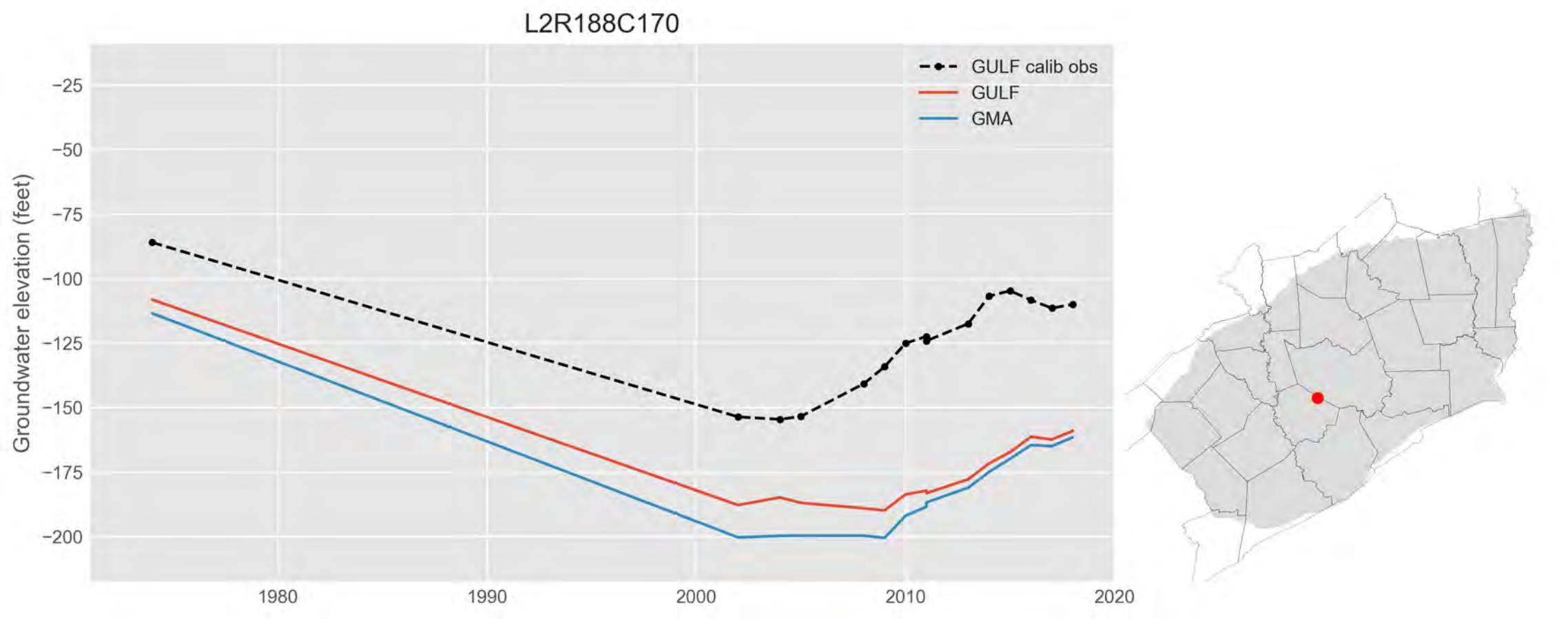

L2R187C137
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
20
40
60
80
1950
1960
1970
1980
1990
2000
2010

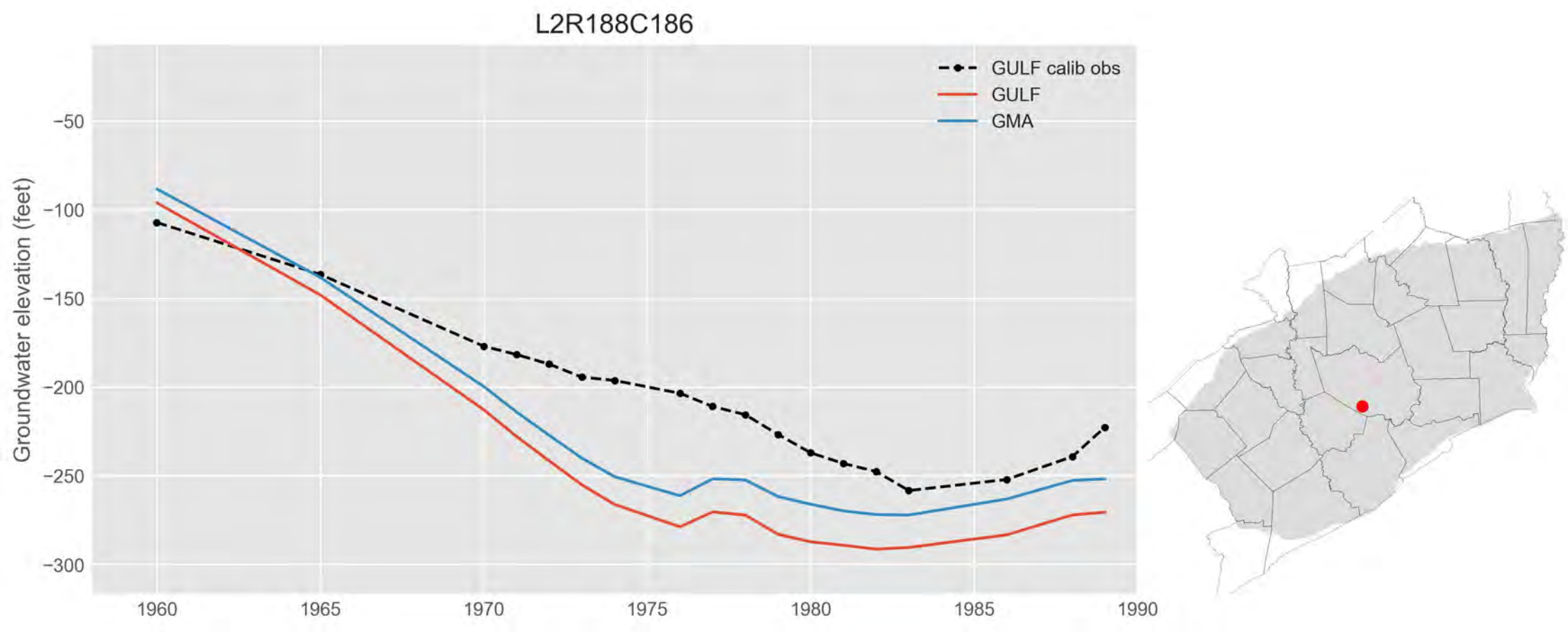
L2R187C141

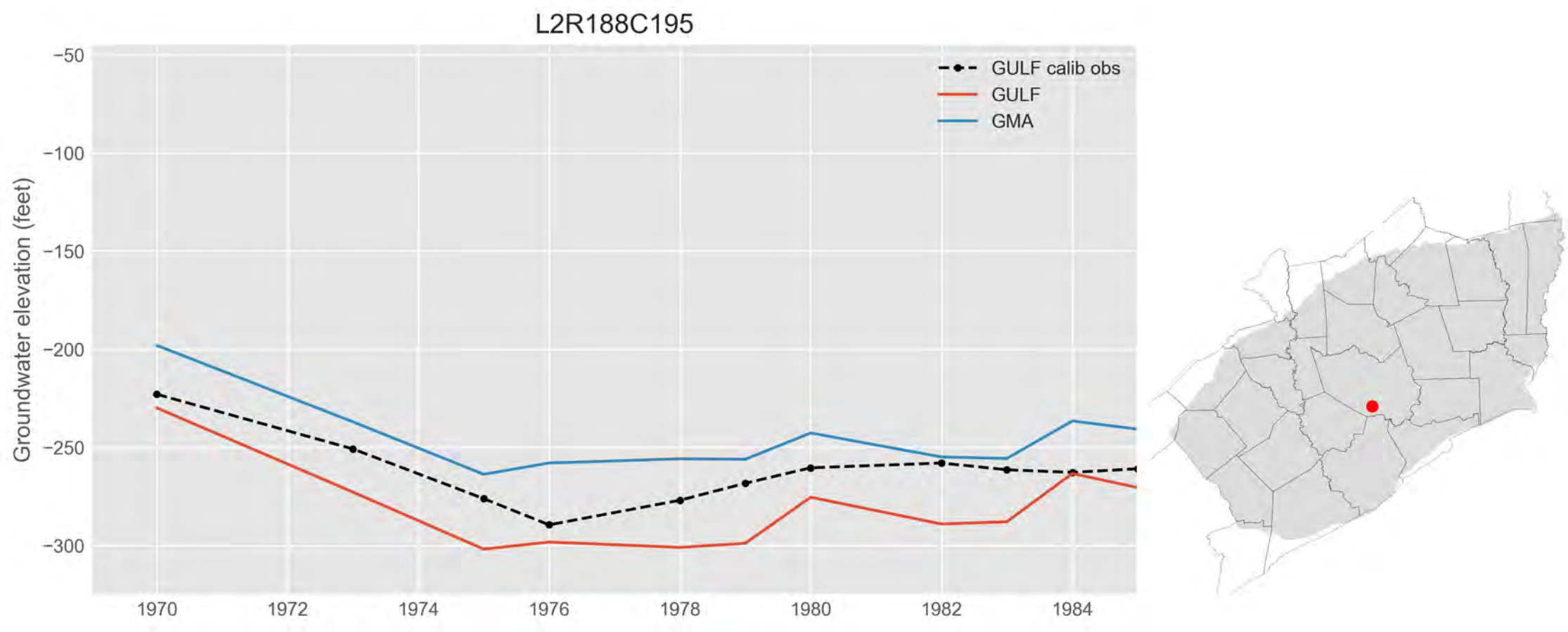

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
1985
1990
1995
2000
2005
2010
2015

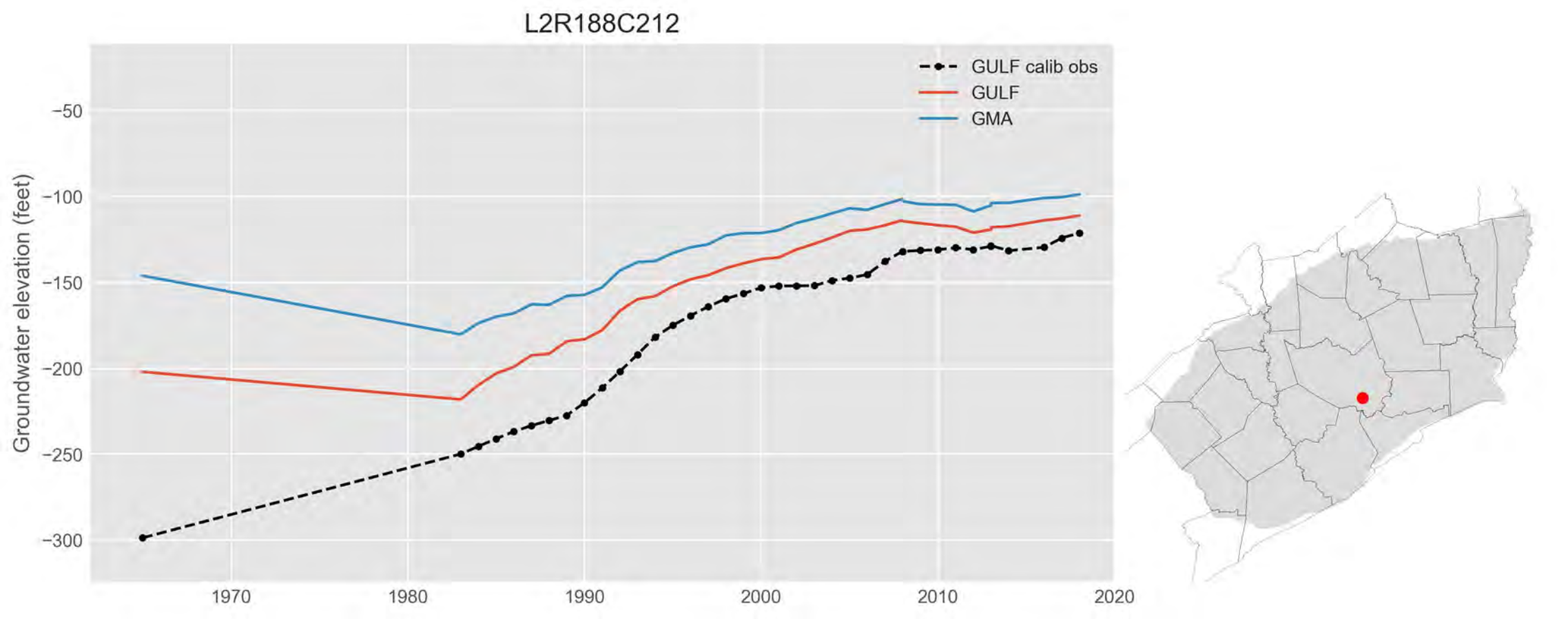

L2R187C150
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
1985
1990
1995
2000
2005

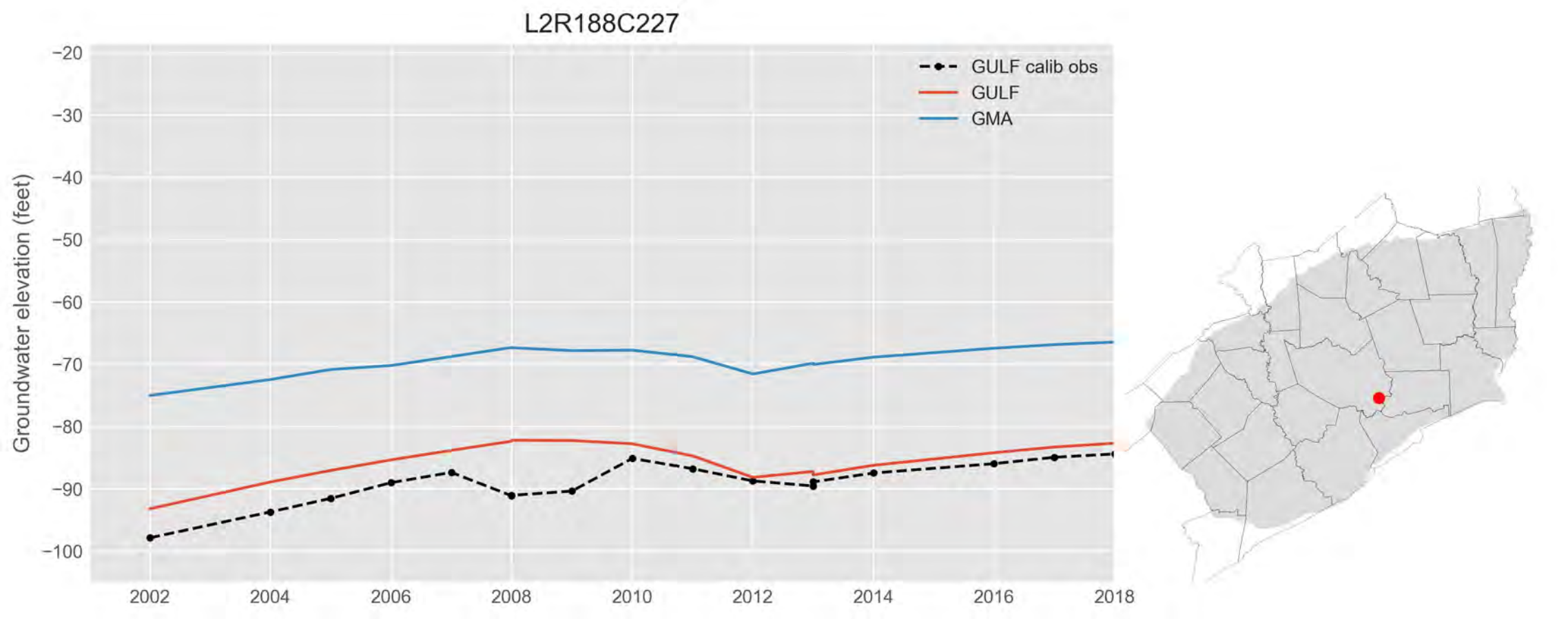

L2R187C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1960
1965
1970
1975
1980
1985

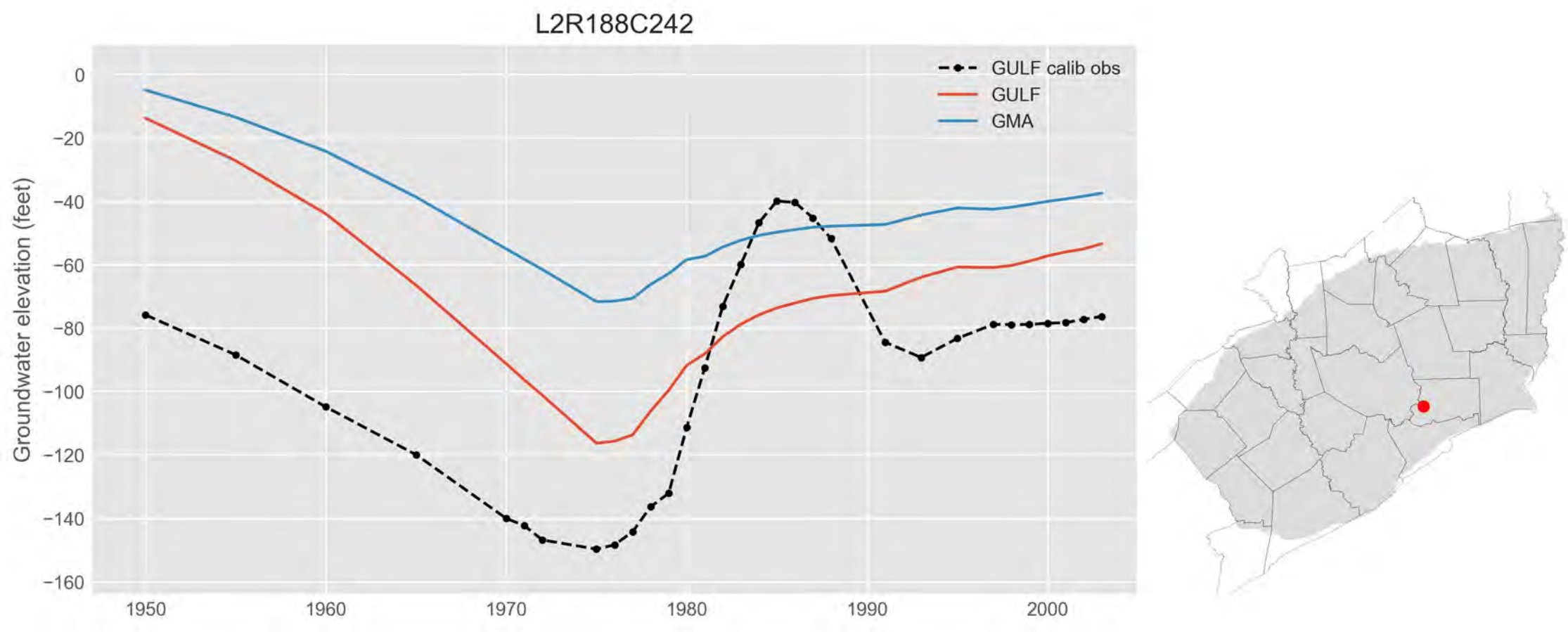

L2R188C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1980
1990
2000
2010
2020

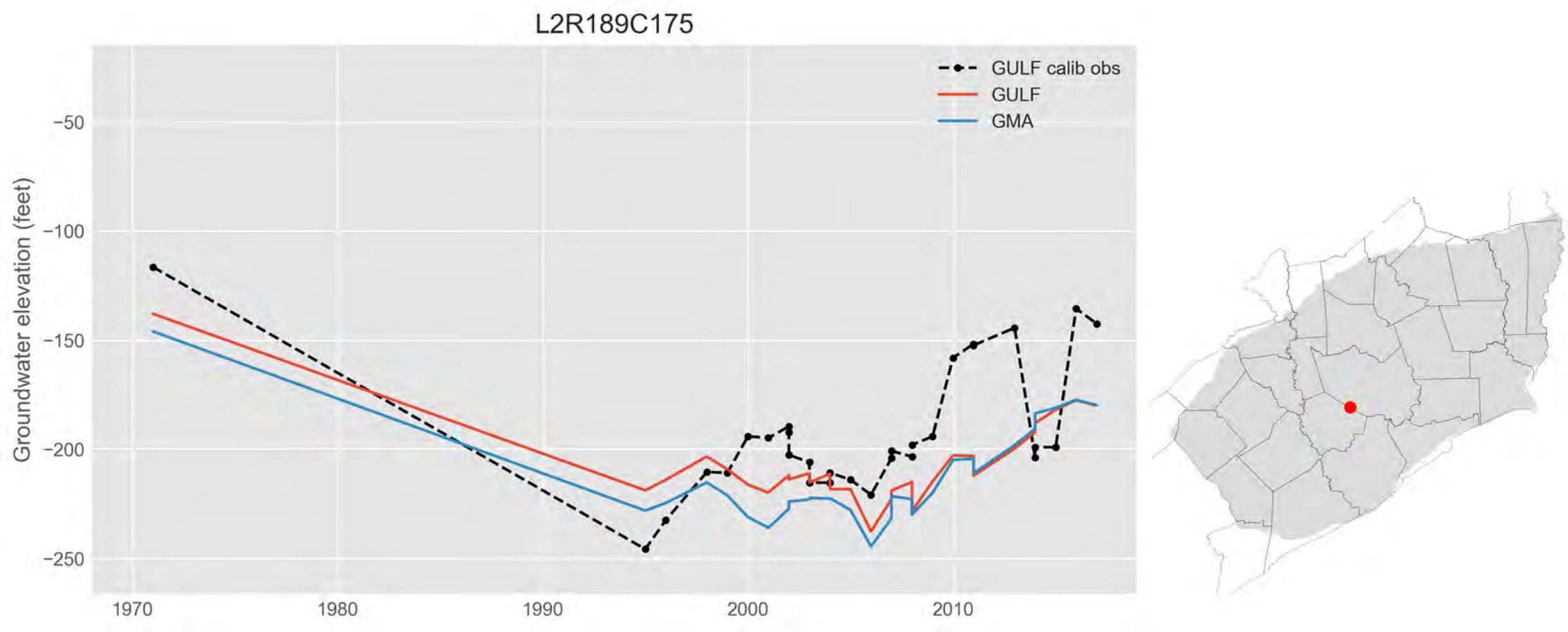

L2R188C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1960
1965
1970
1975
1980
1985
1990

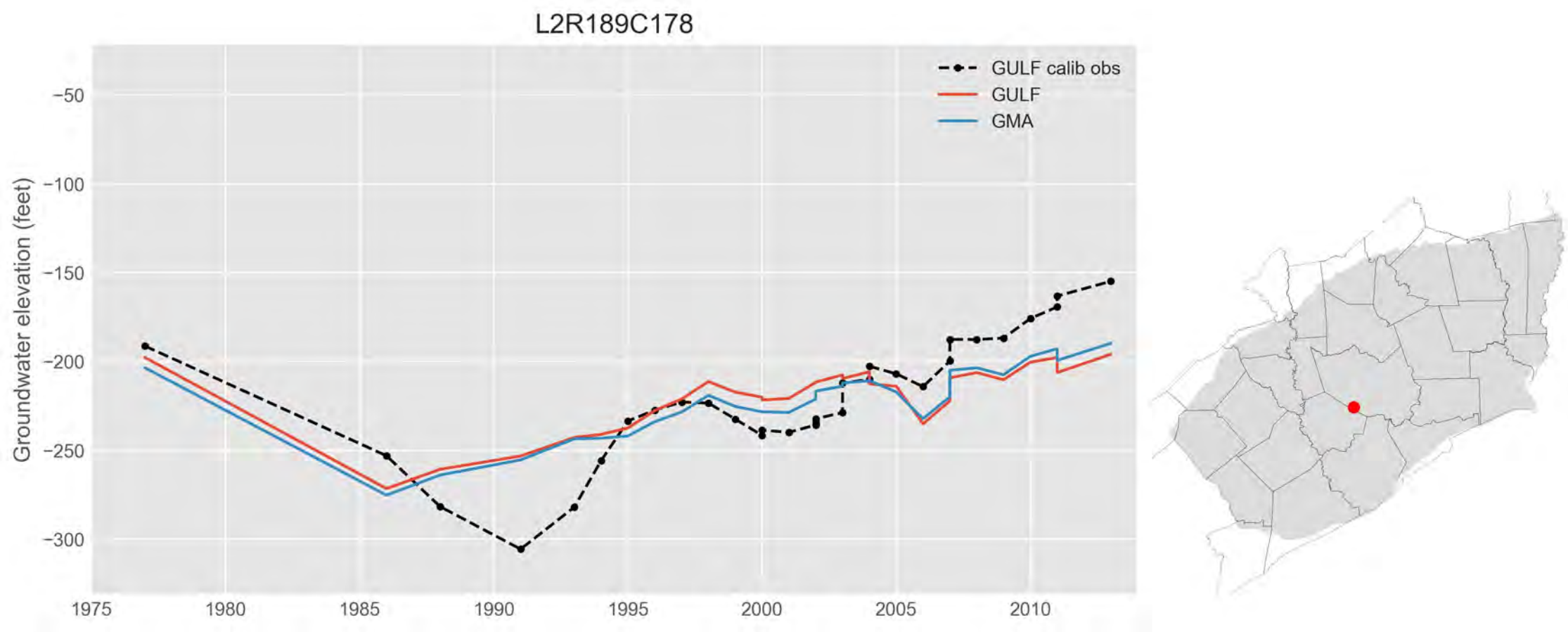

L2R188C195
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1970
1972
1974
1976
1978
1980
1982
1984

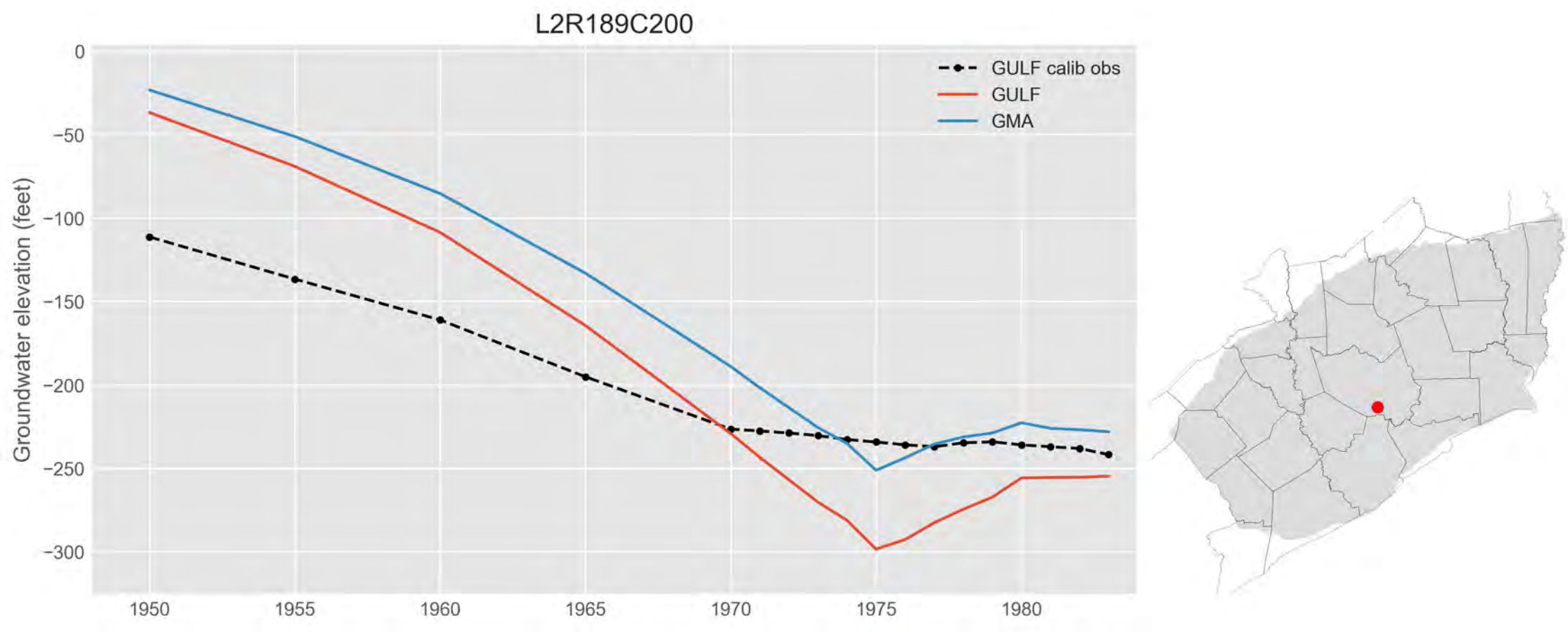

L2R188C212
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1970
1980
1990
2000
2010
2020

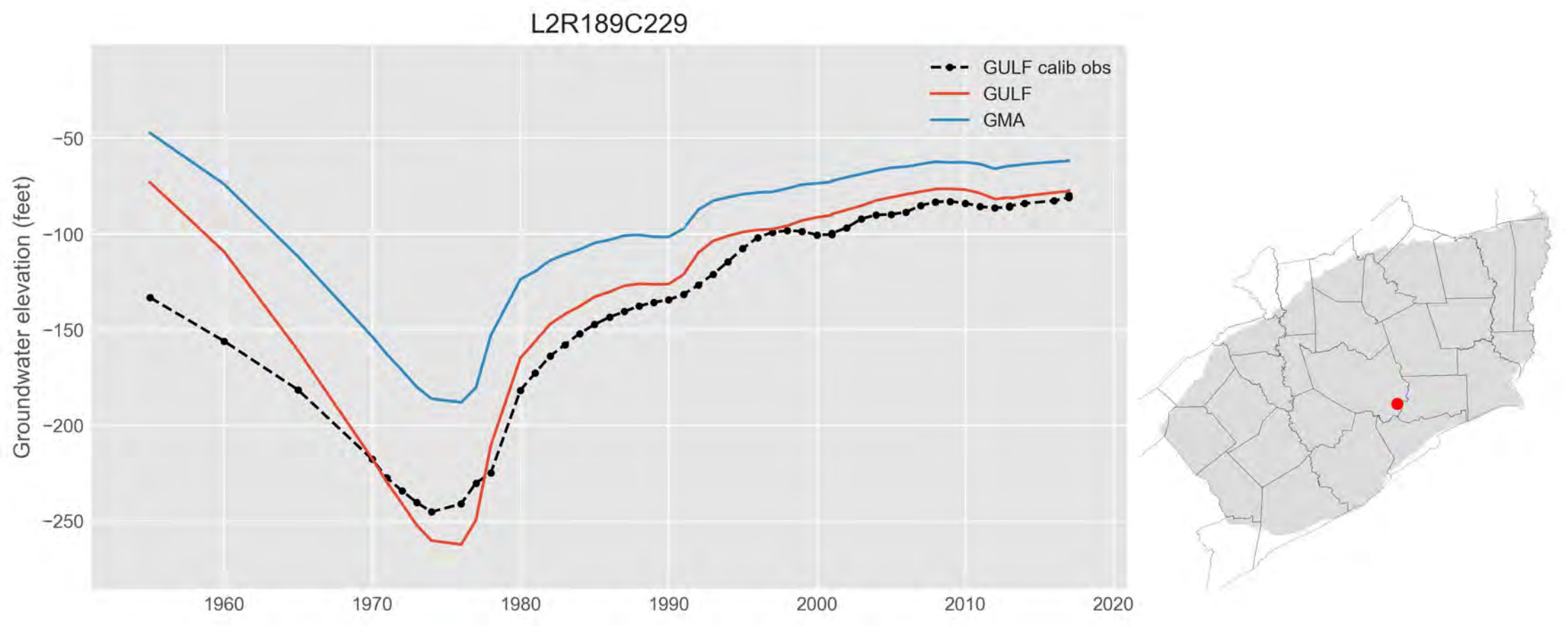

L2R188C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
−90
−100
2002
2004
2006
2008
2010
2012
2014
2016
2018

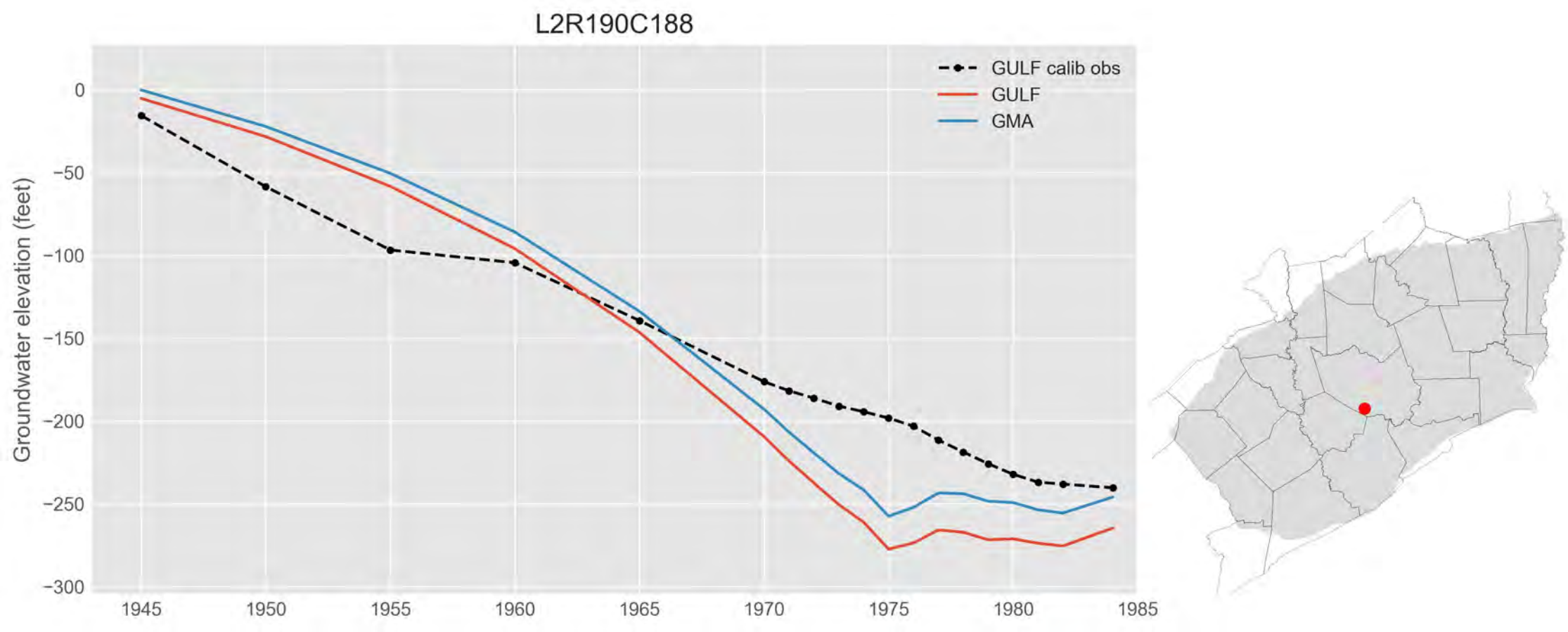

L2R188C242
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
−160
1950
1960
1970
1980
1990
2000

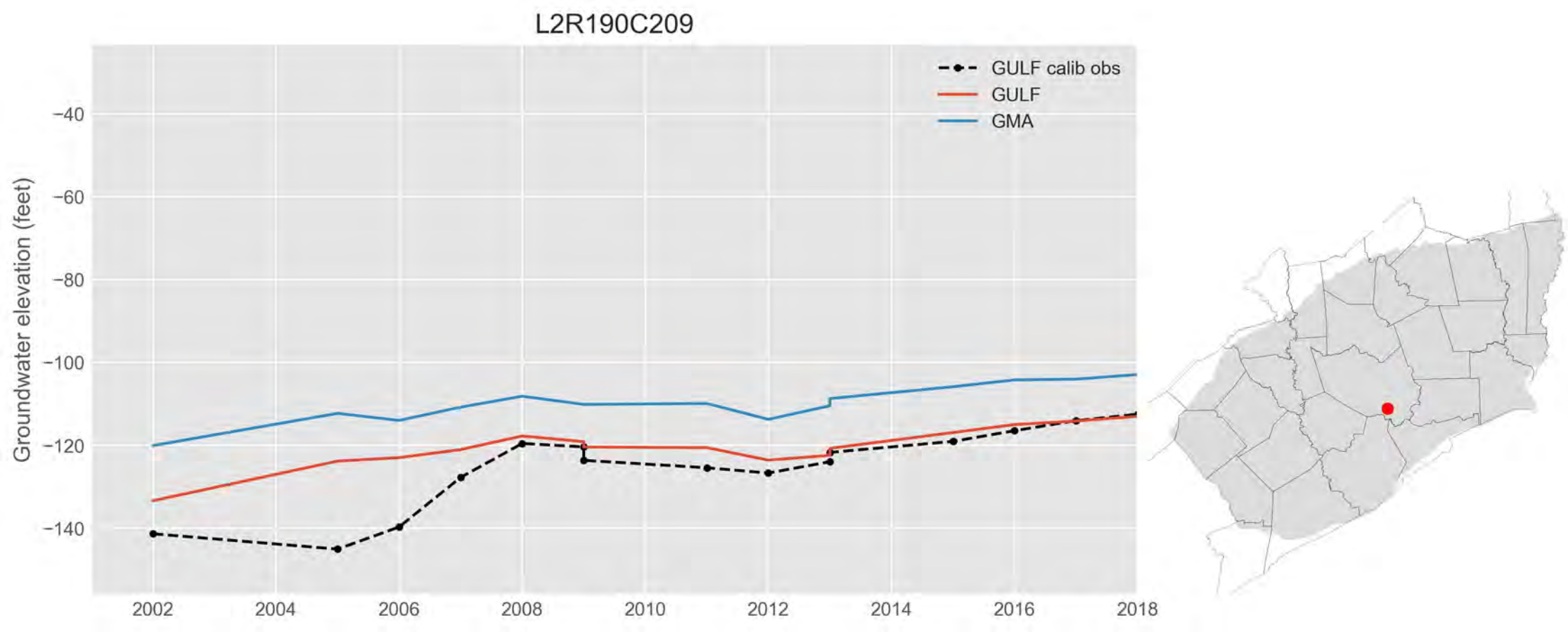

L2R189C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1970
1980
1990
2000
2010

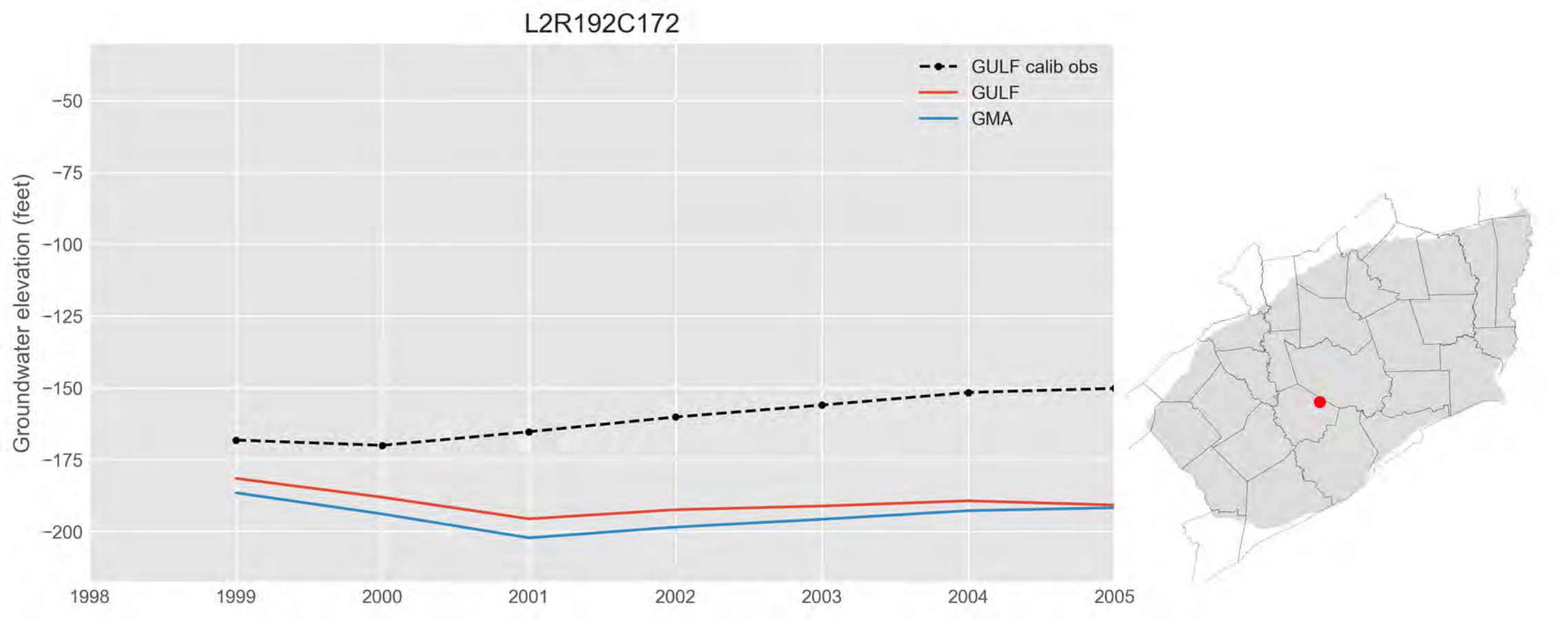

L2R189C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1975
1980
1985
1990
1995
2000
2005
2010


L2R189C200
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1950
1955
1960
1965
1970
1975
1980

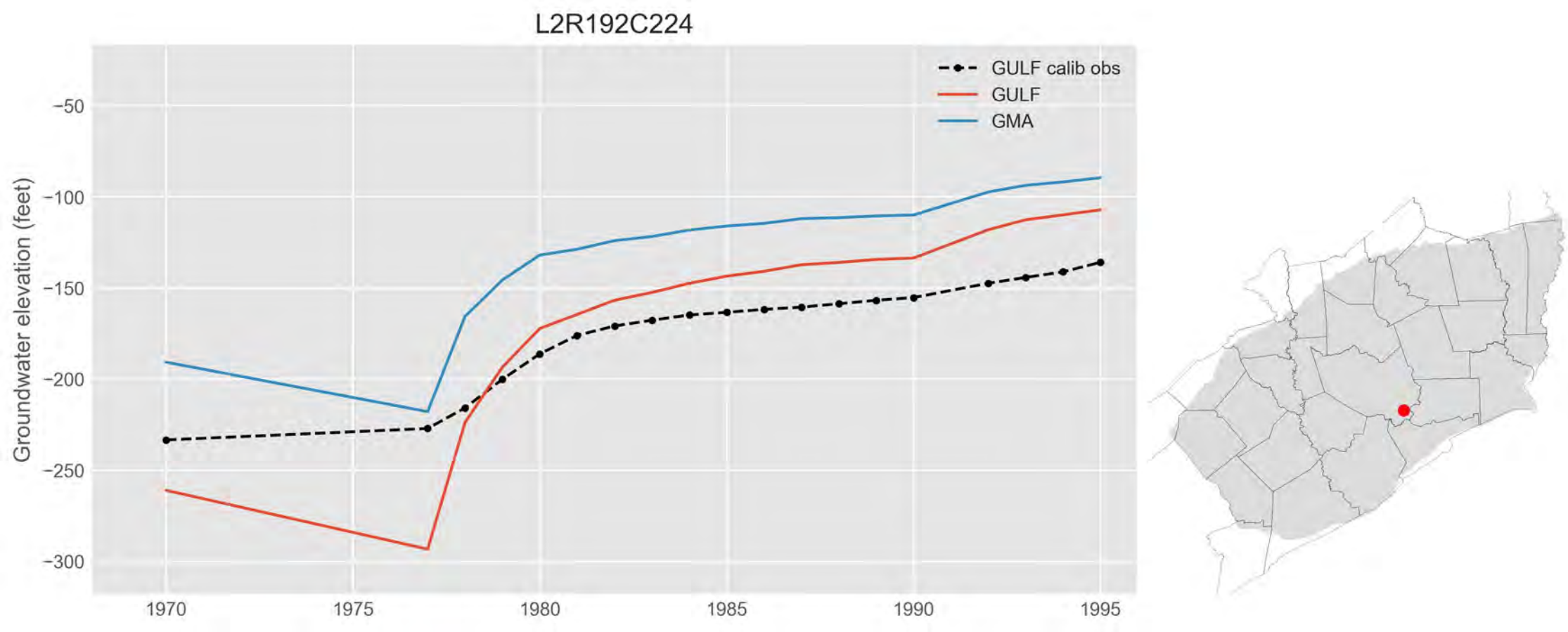

L2R189C229
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1960
1970
1980
1990
2000
2010
2020

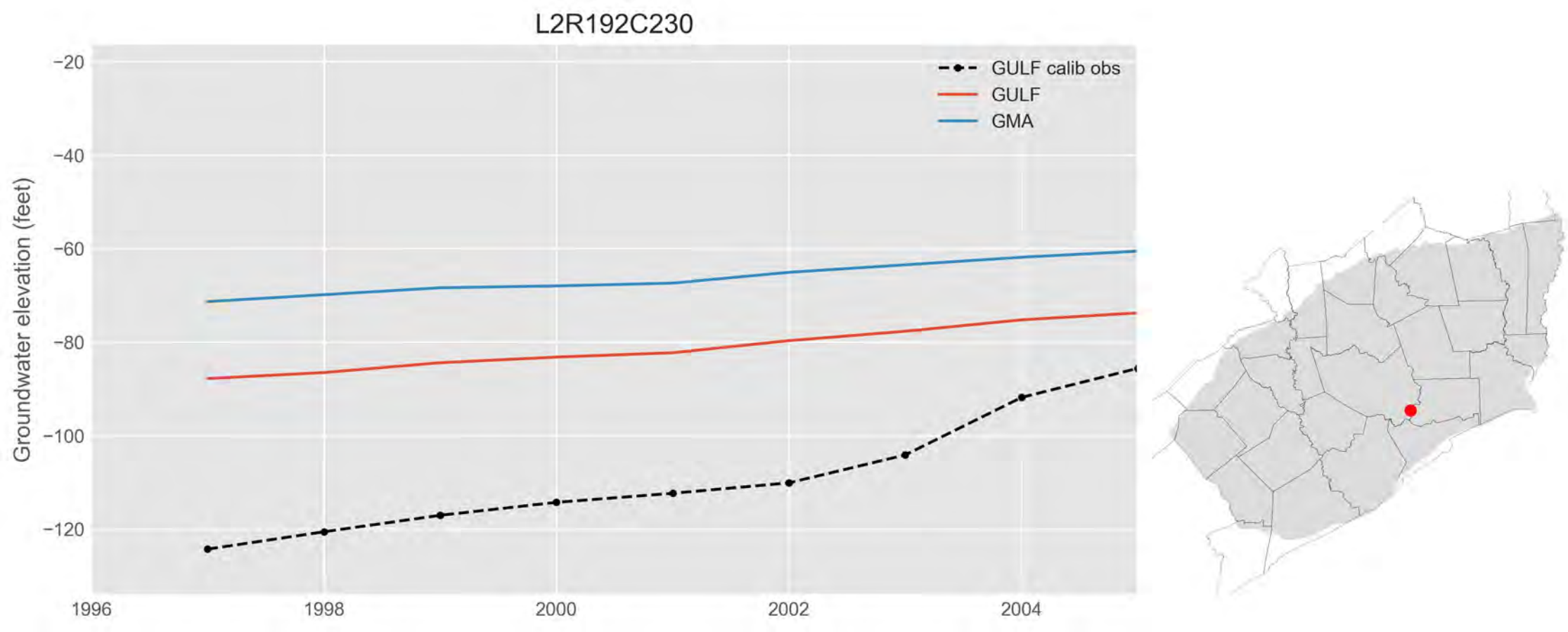

L2R190C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1945
1950
1955
1960
1965
1970
1975
1980
1985

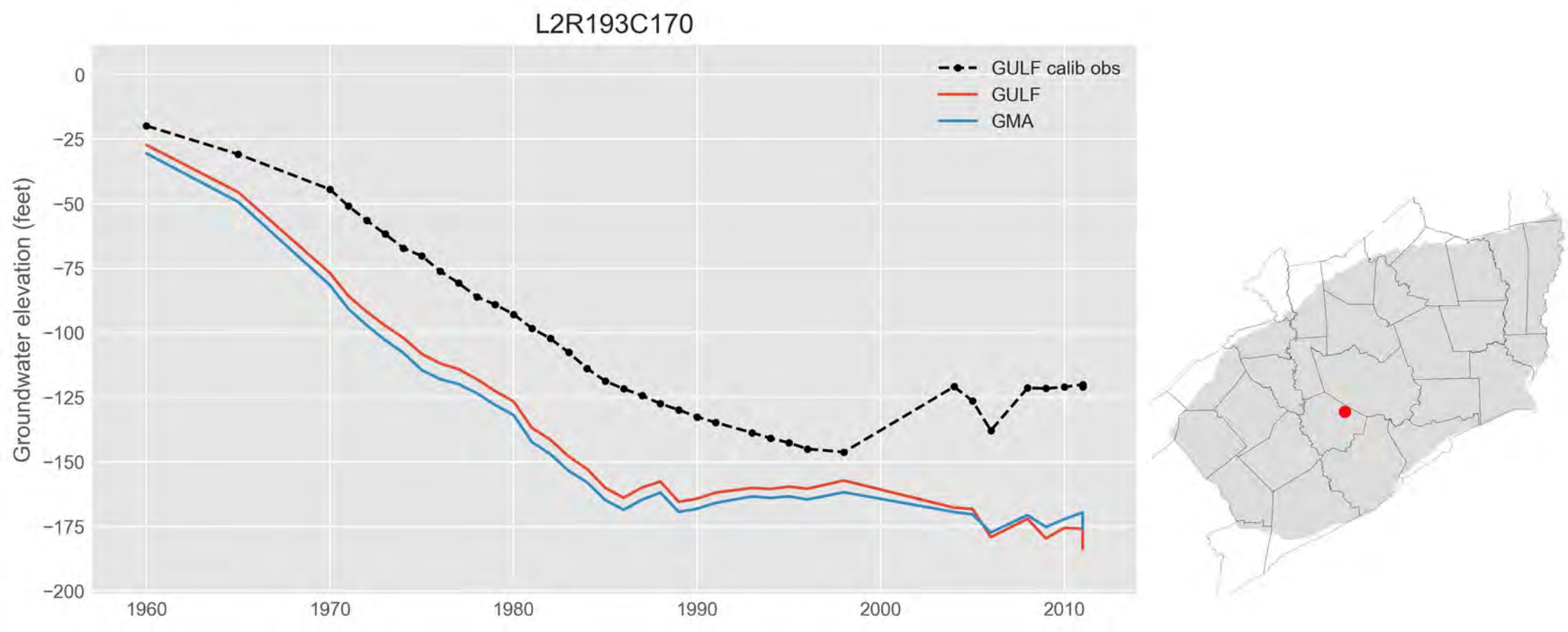

L2R190C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
2002
2004
2006
2008
2010
2012
2014
2016
2018

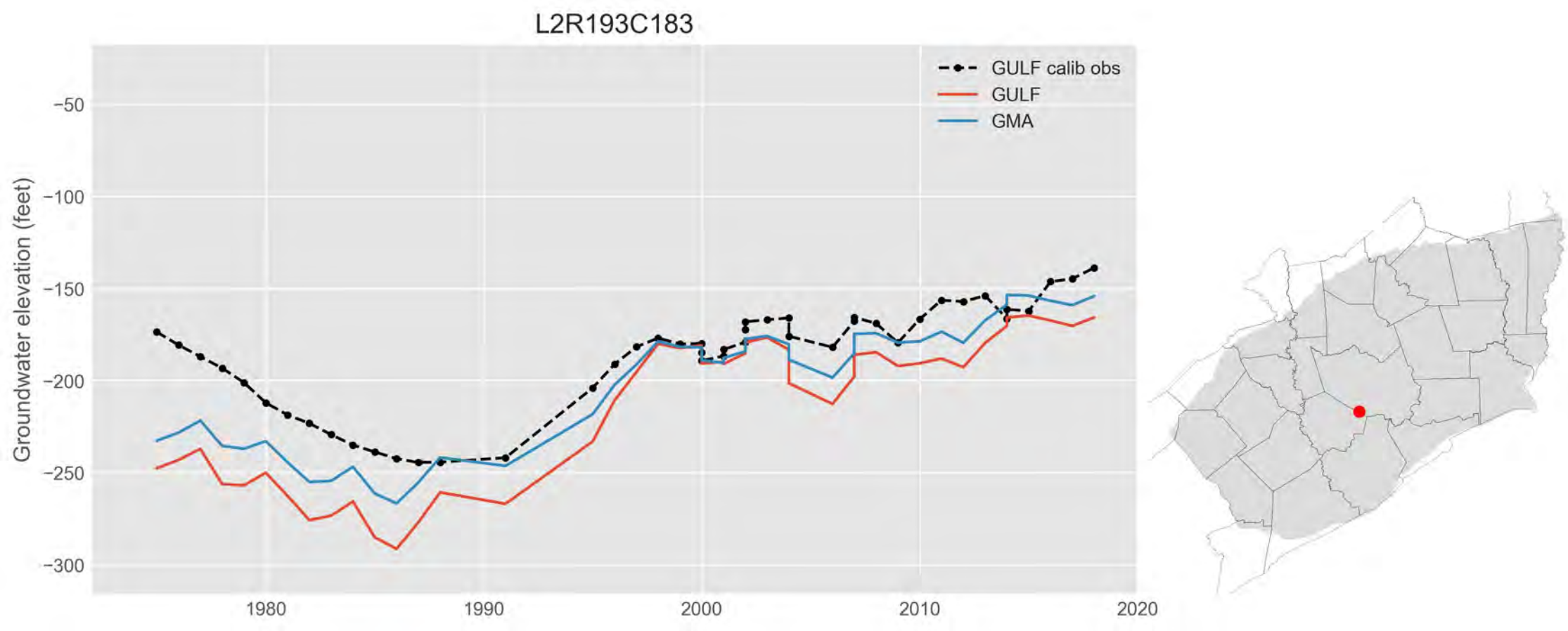

L2R192C172
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
1998
1999
2000
2001
2002
2003
2004
2005

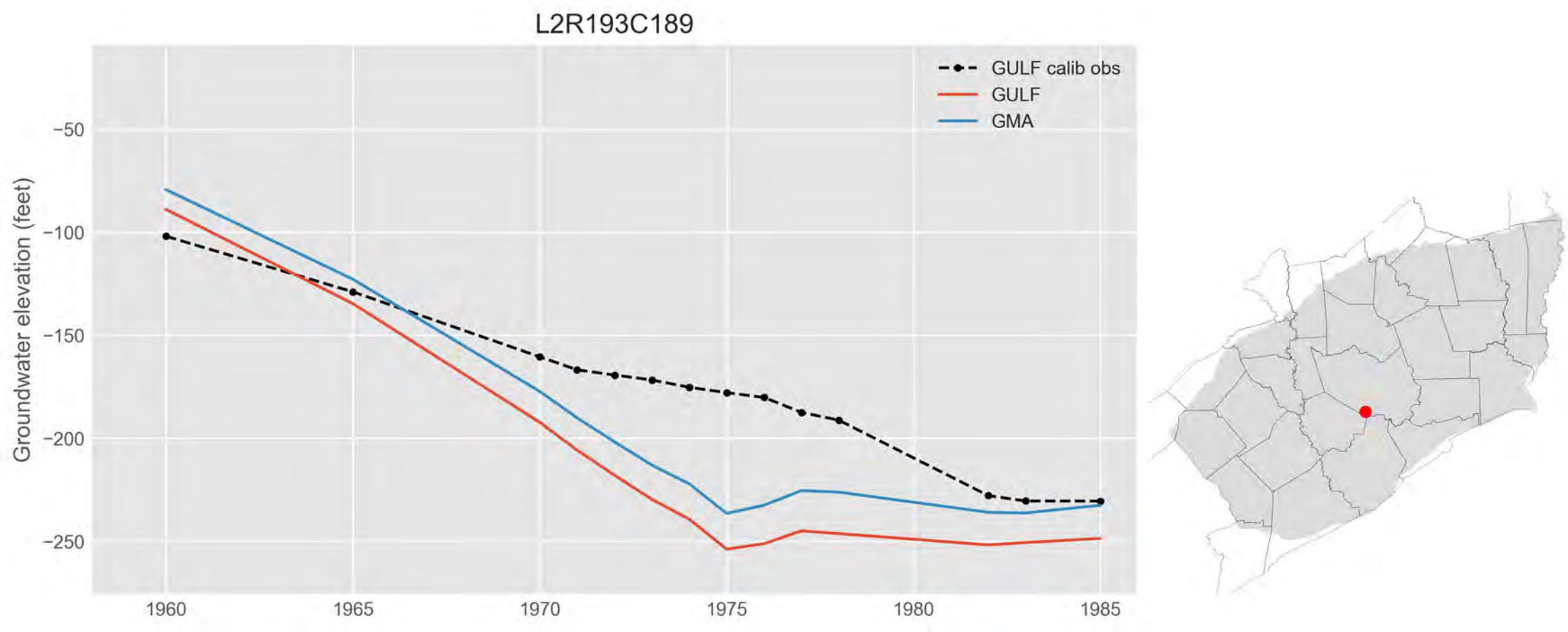
L2R192C224

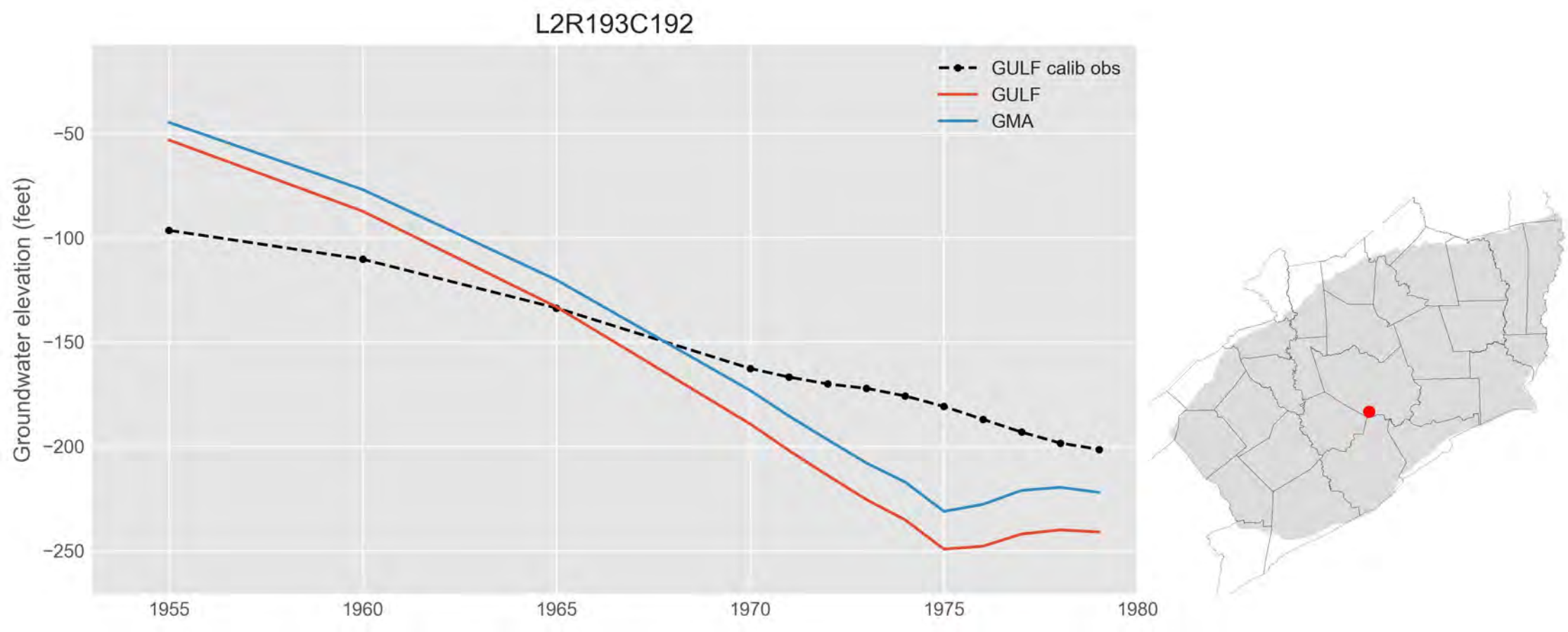

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1970
1975
1980
1985
1990
1995

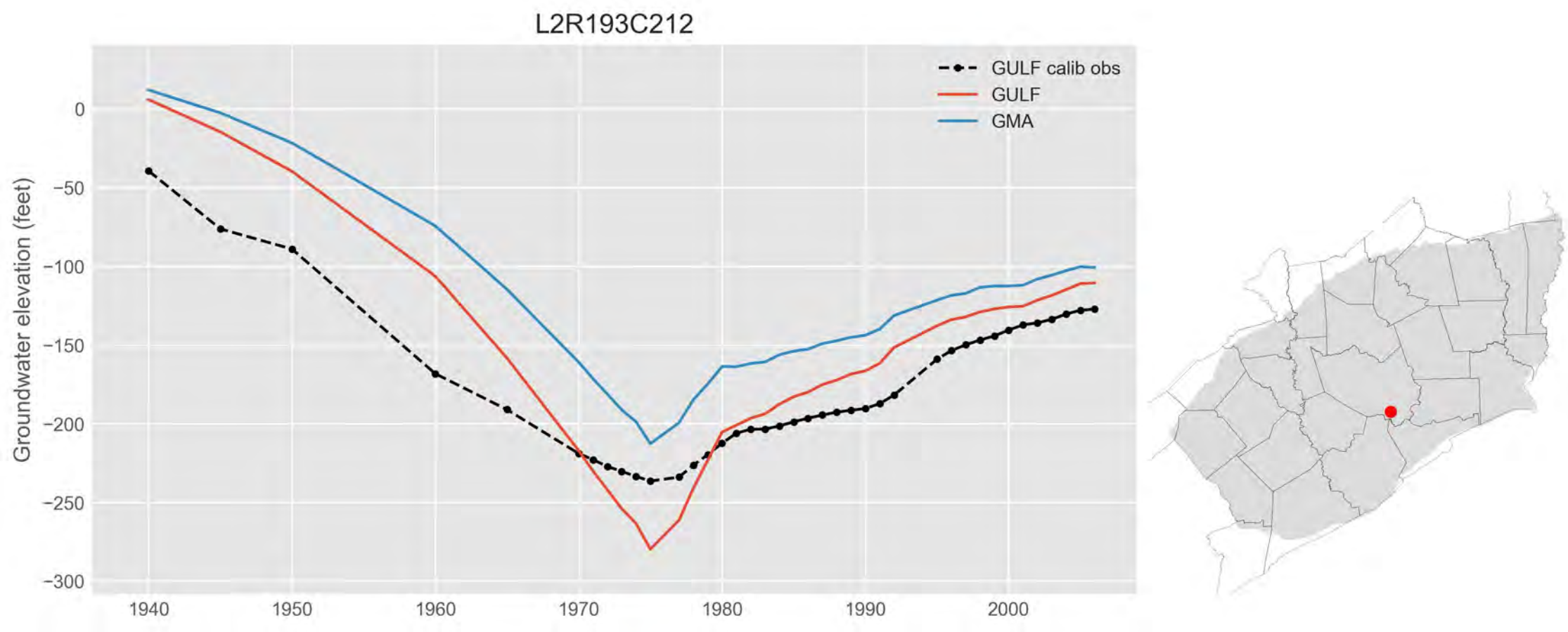

L2R192C230
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1996
1998
2000
2002
2004

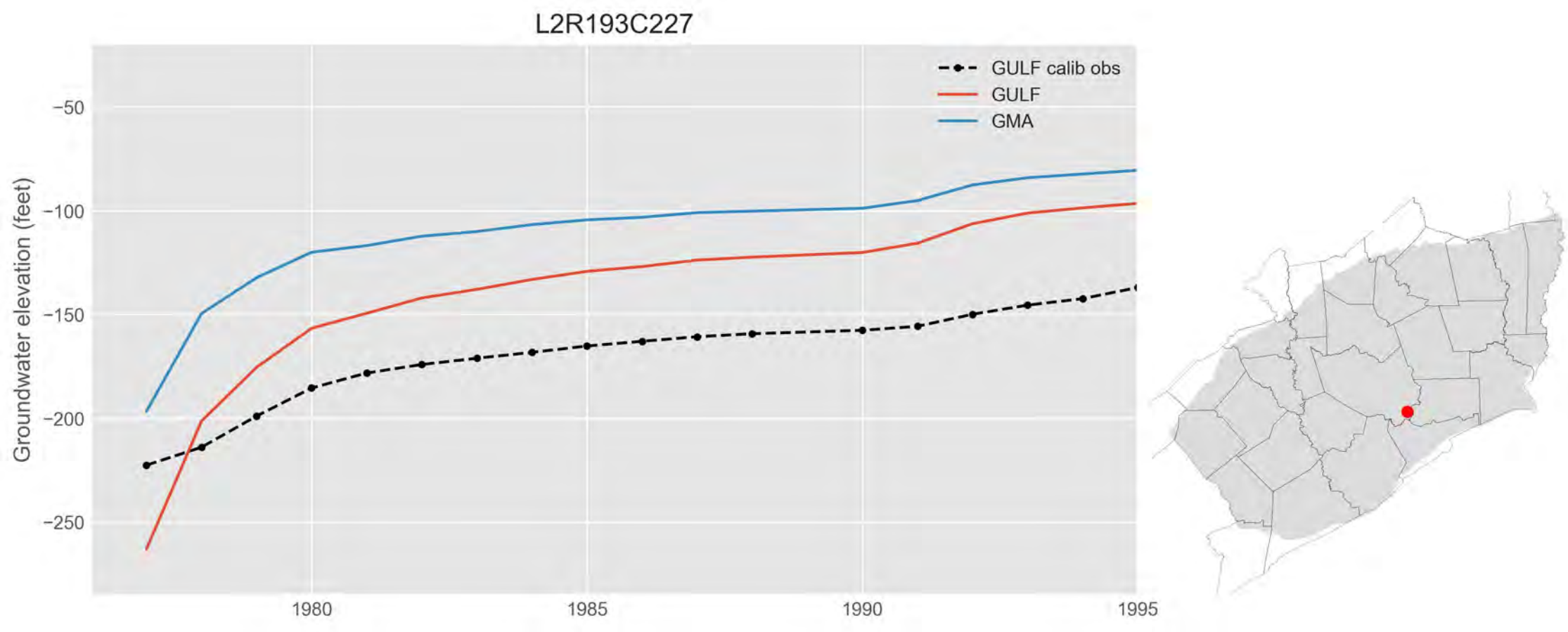

L2R193C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
−200
1960
1970
1980
1990
2000
2010

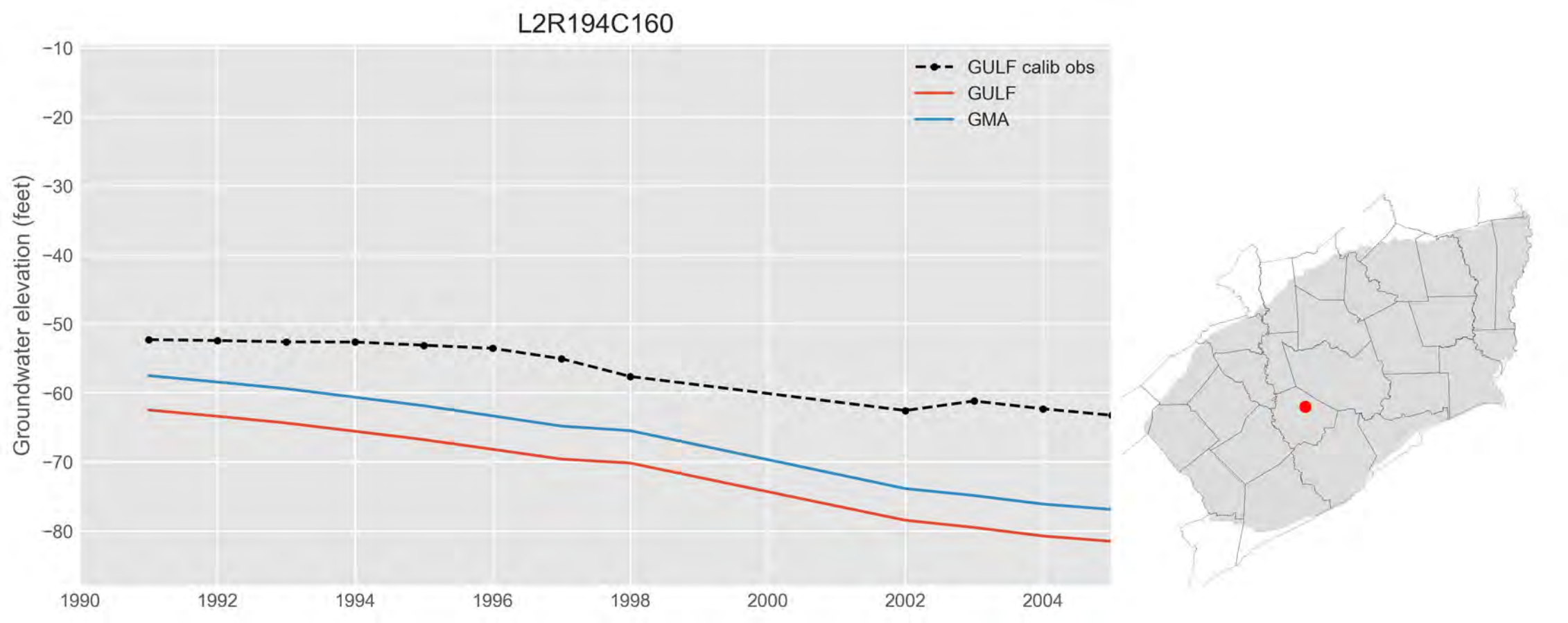

L2R193C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1980
1990
2000
2010
2020

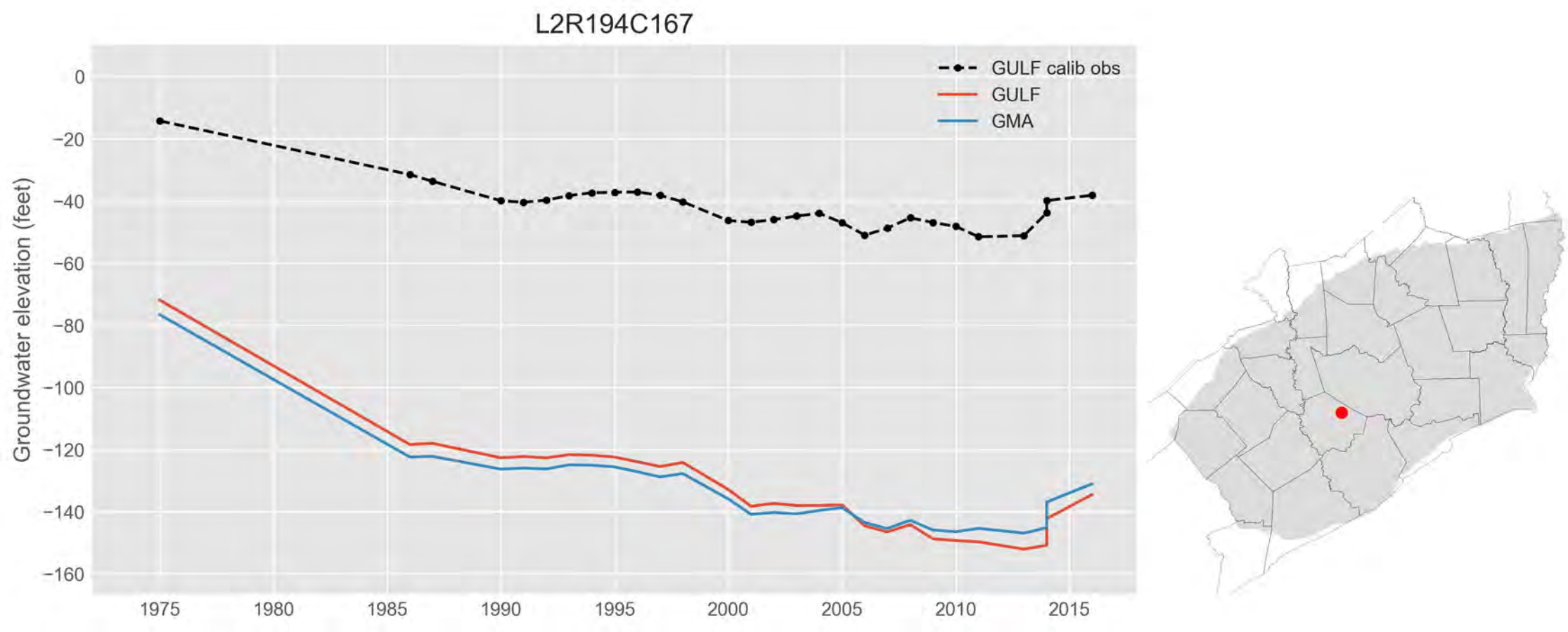

L2R193C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1960
1965
1970
1975
1980
1985

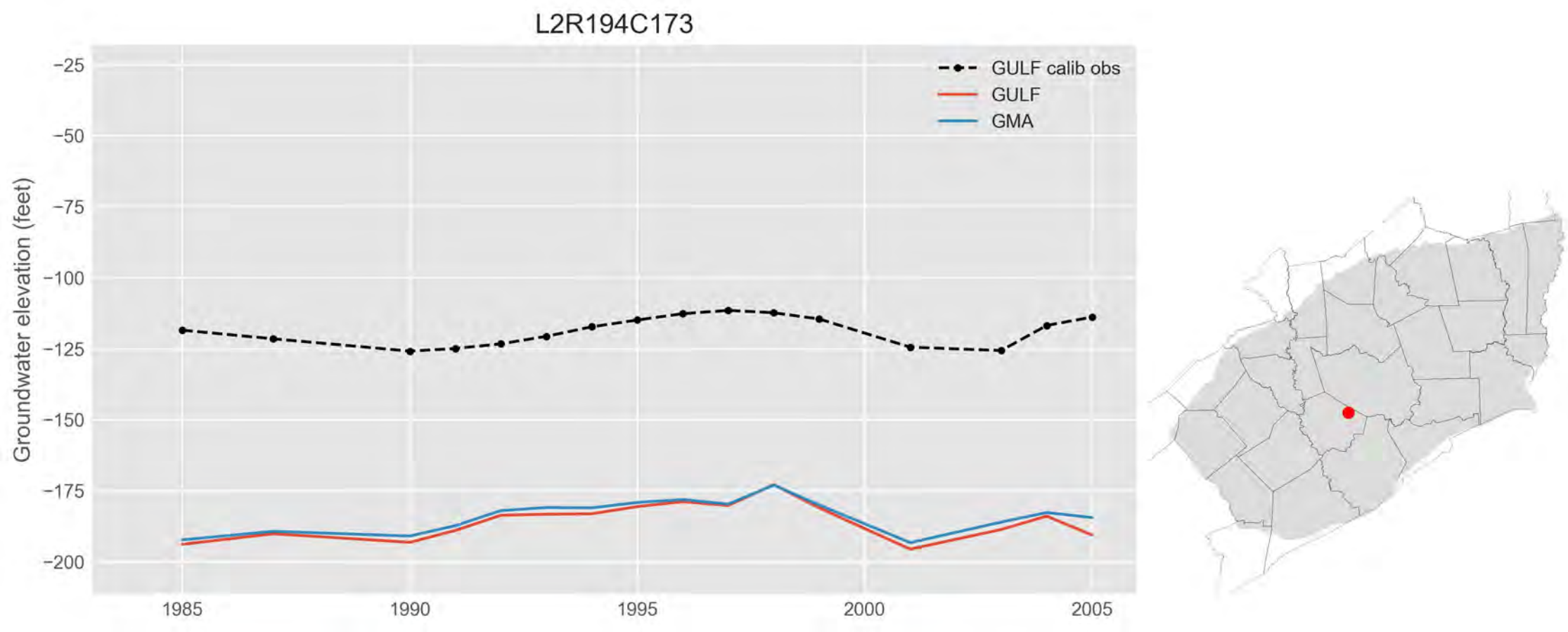

L2R193C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1955
1960
1965
1970
1975
1980

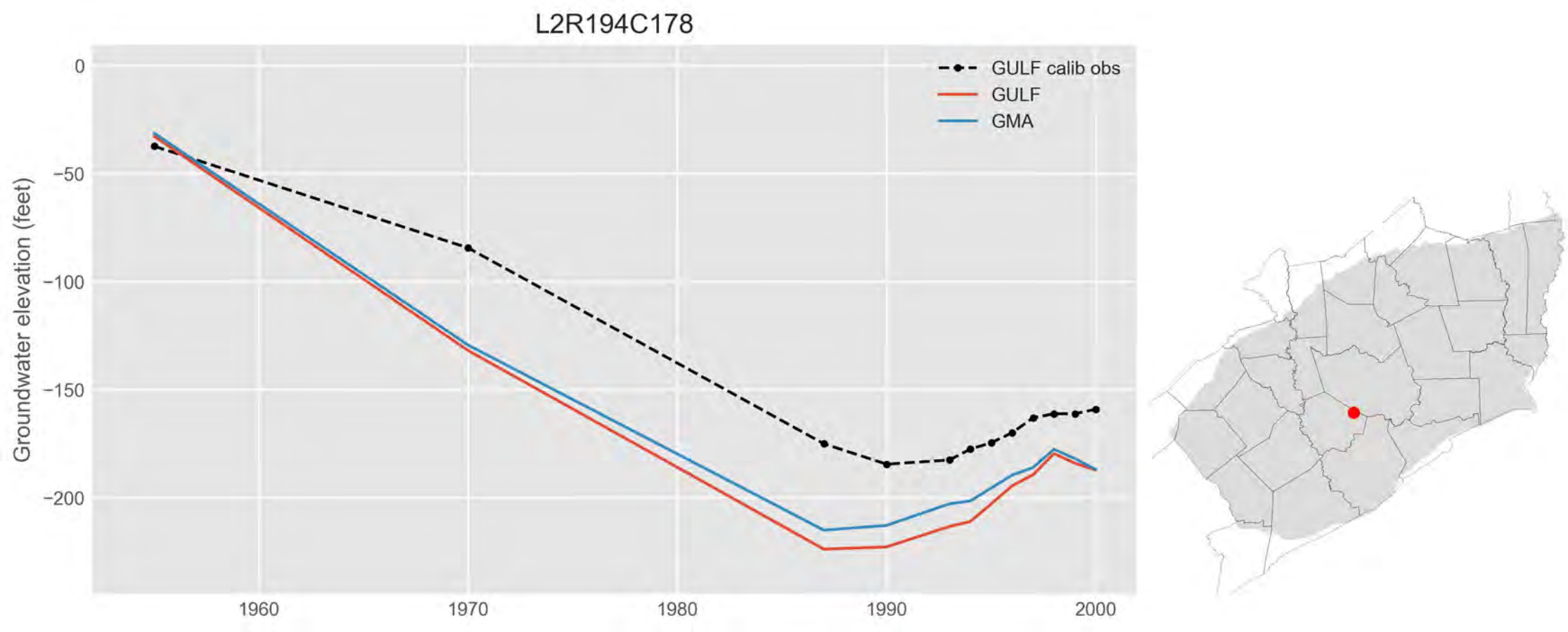

L2R193C212
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1940
1950
1960
1970
1980
1990
2000

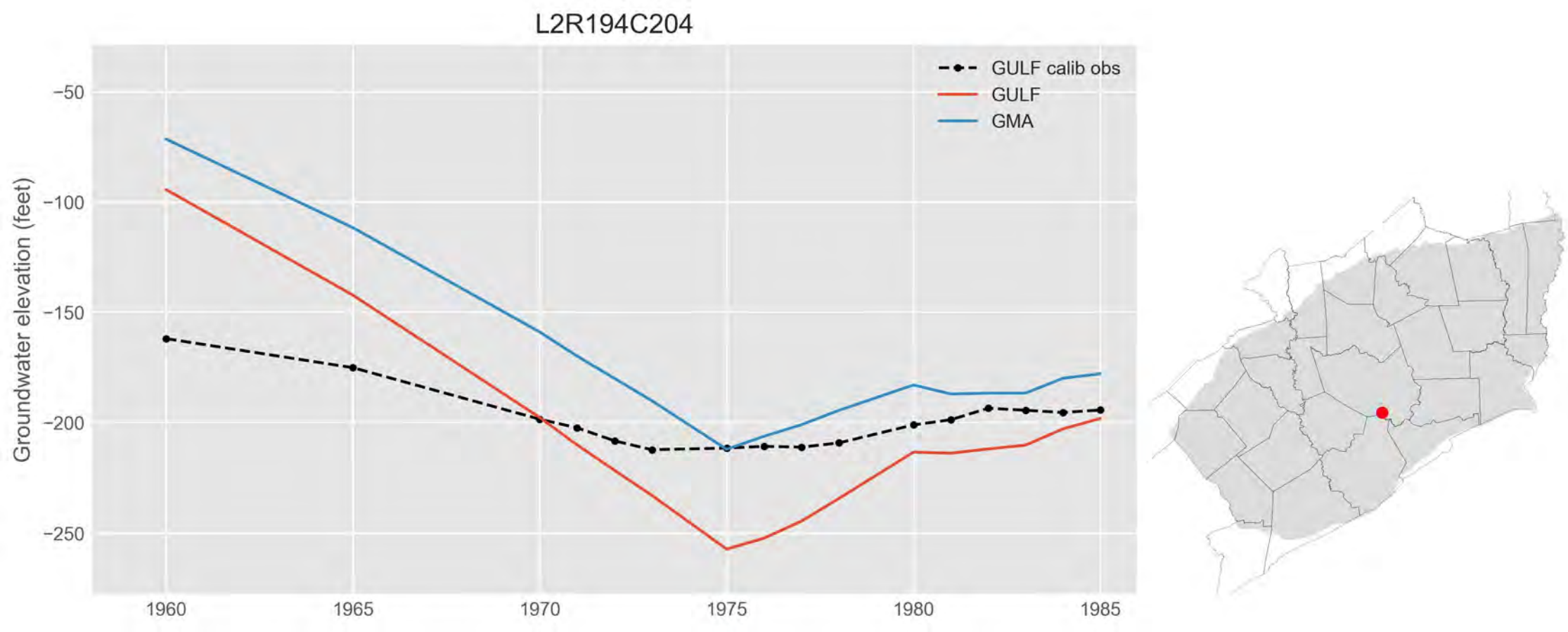

L2R193C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1980
1985
1990
1995

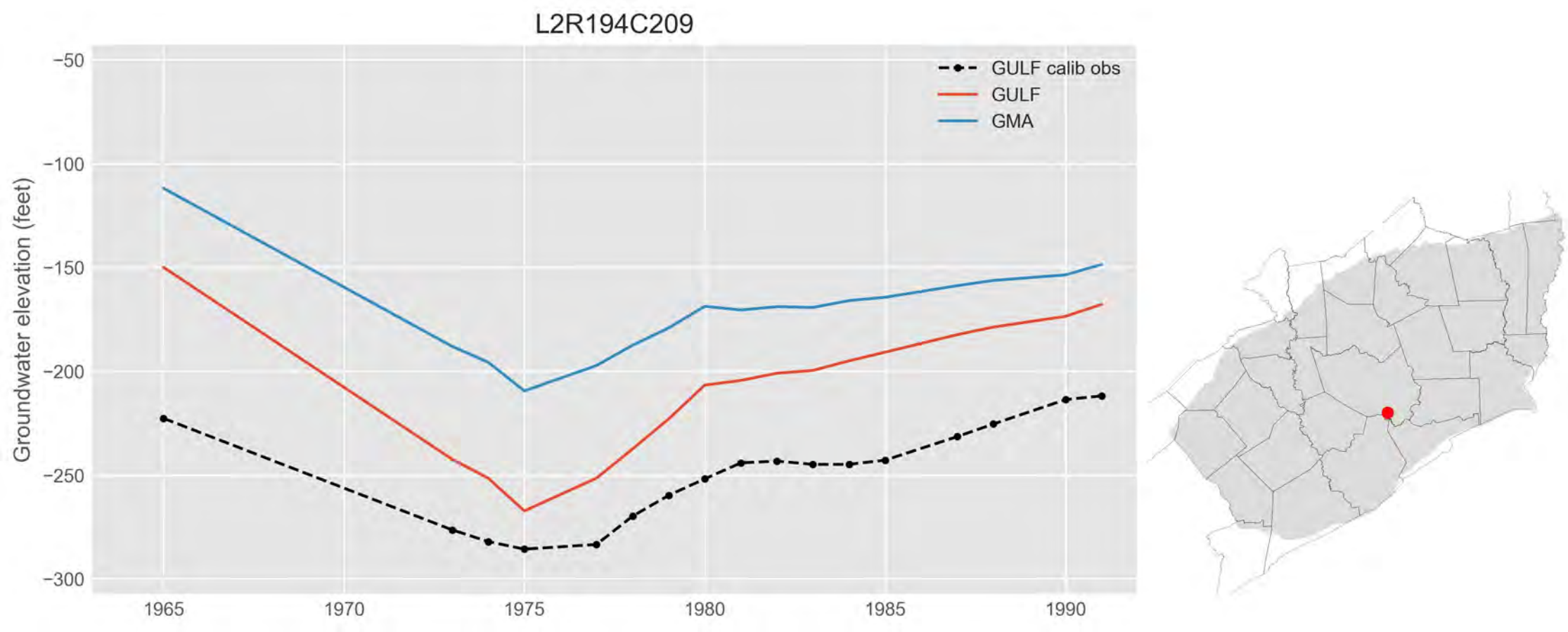

L2R194C160
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
1990
1992
1994
1996
1998
2000
2002
2004

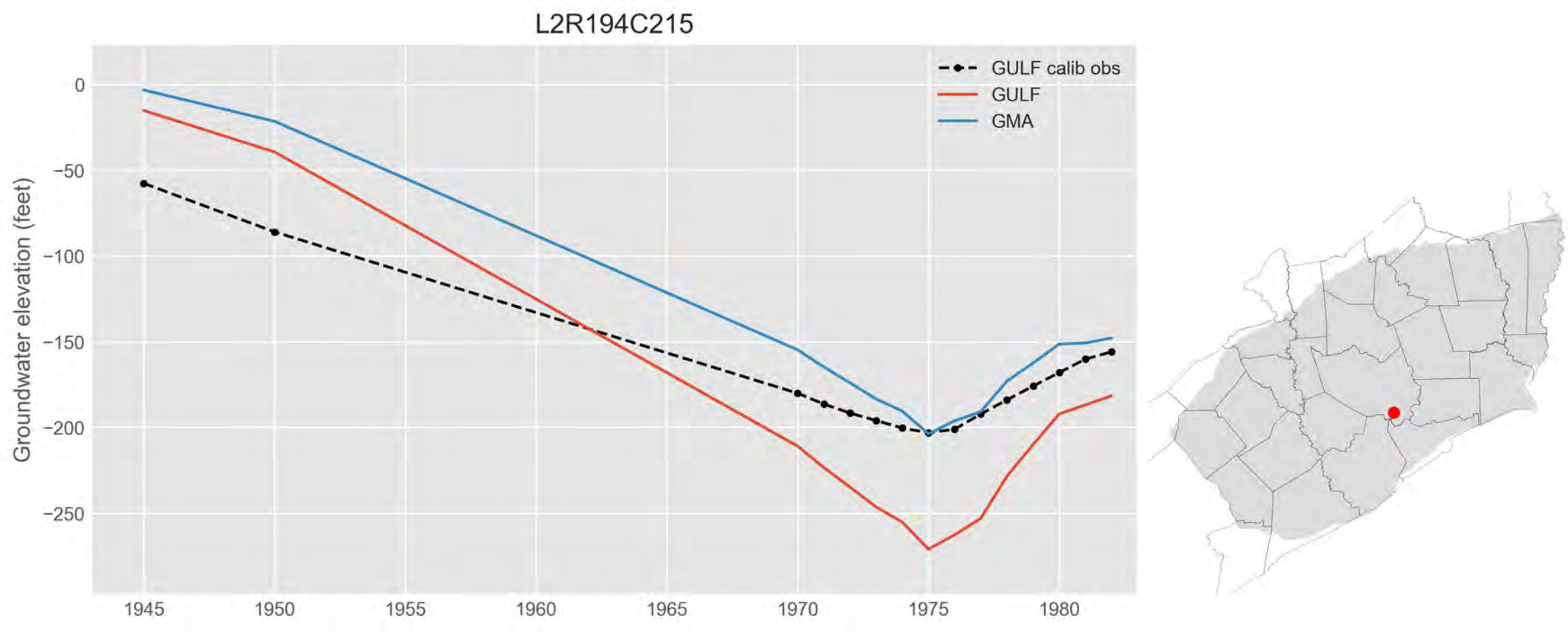

L2R194C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
−160
1975
1980
1985
1990
1995
2000
2005
2010
2015

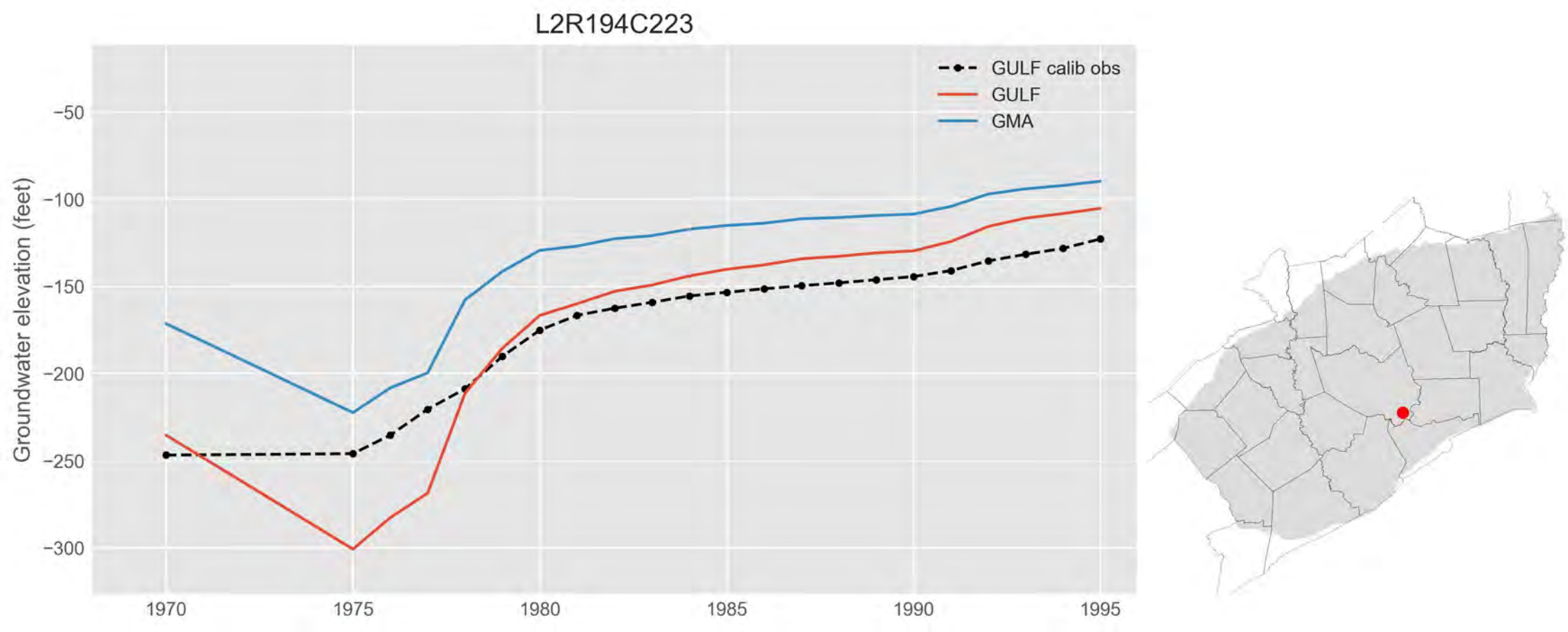

L2R194C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1985
1990
1995
2000
2005

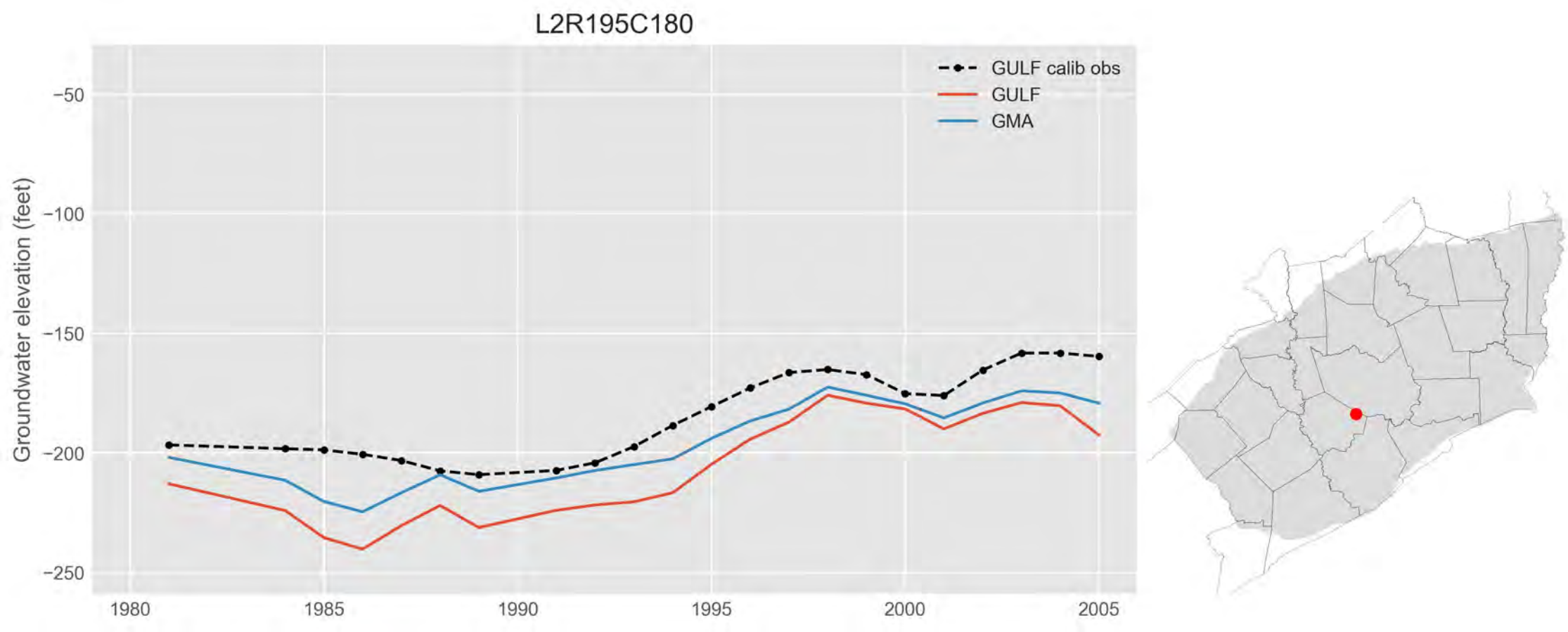

L2R194C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1960
1970
1980
1990
2000

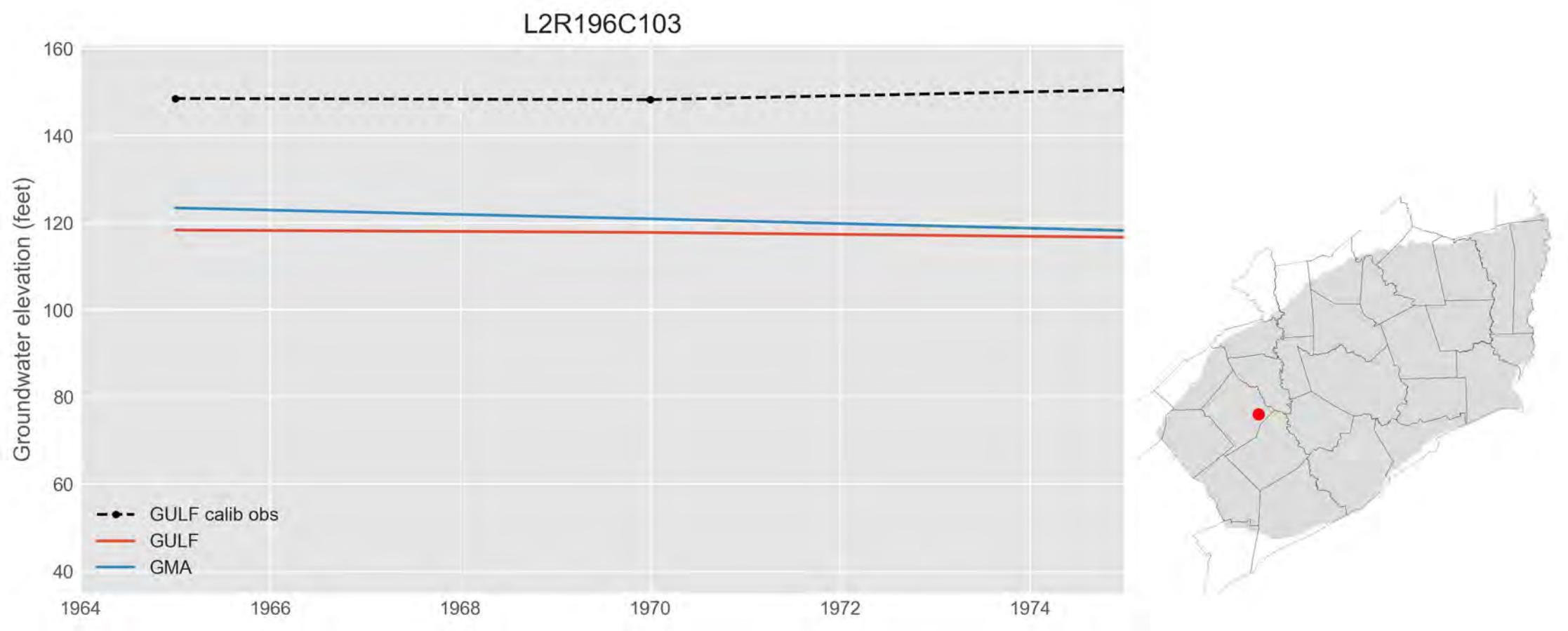

L2R194C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1960
1965
1970
1975
1980
1985

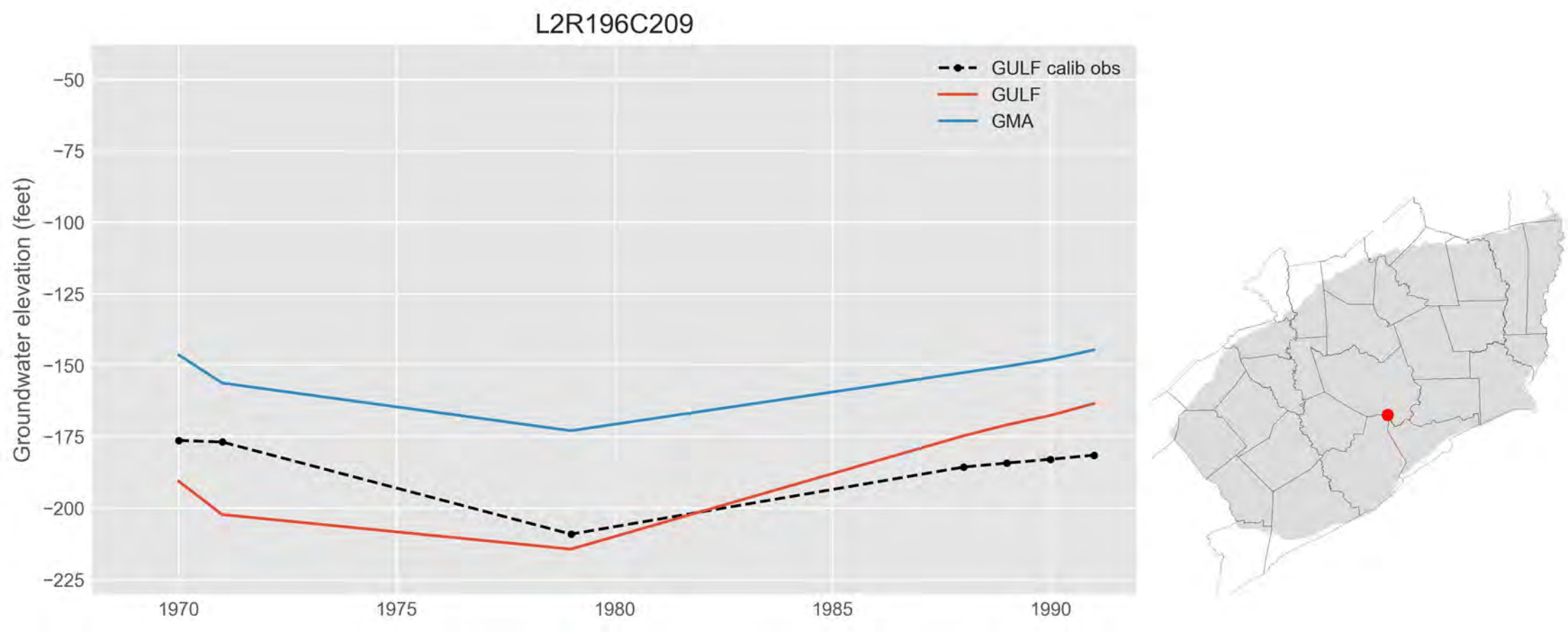

L2R194C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1965
1970
1975
1980
1985
1990

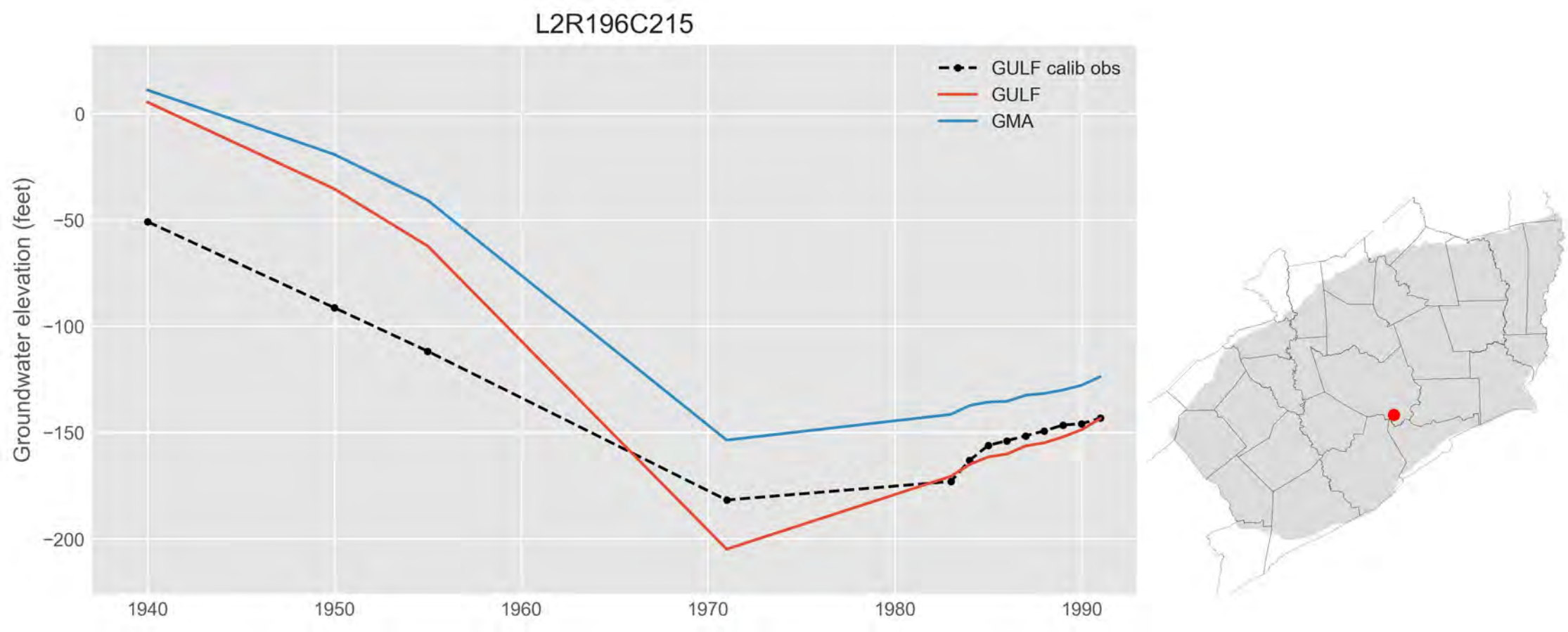

L2R194C215
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1945
1950
1955
1960
1965
1970
1975
1980

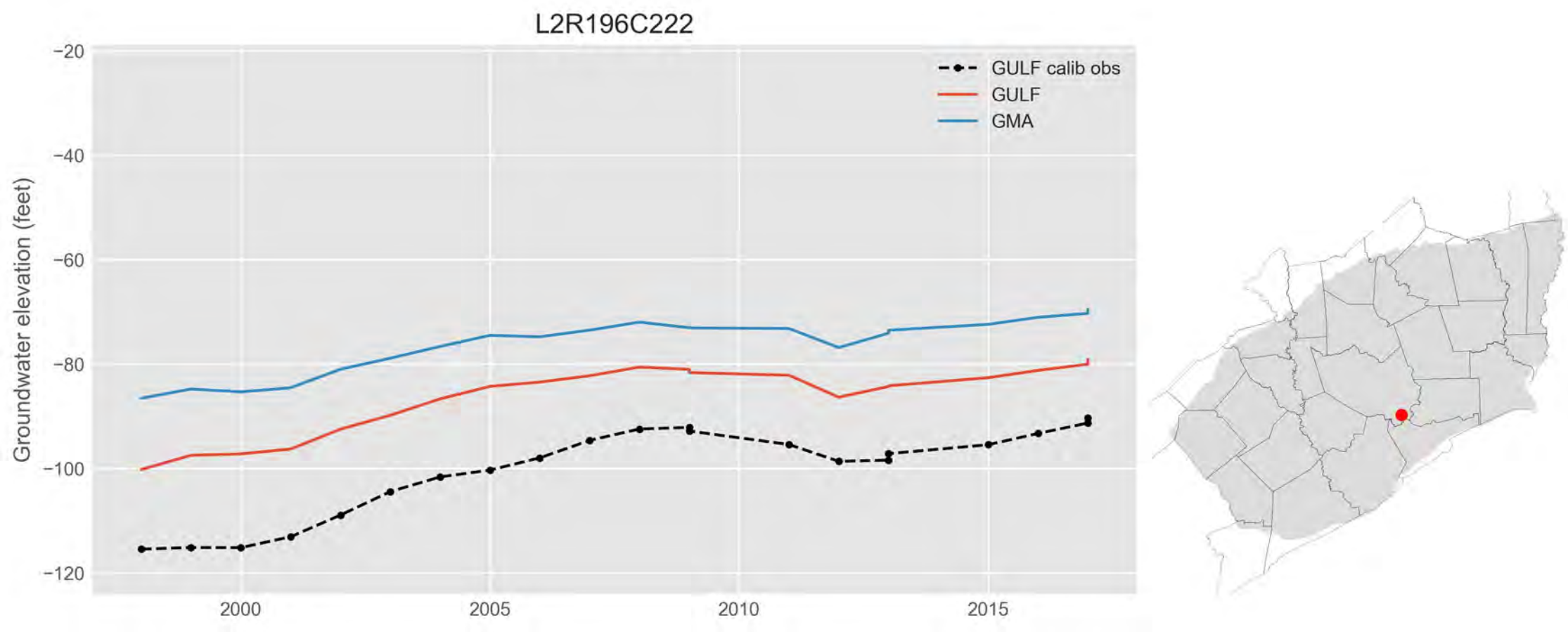

L2R194C223
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1970
1975
1980
1985
1990
1995

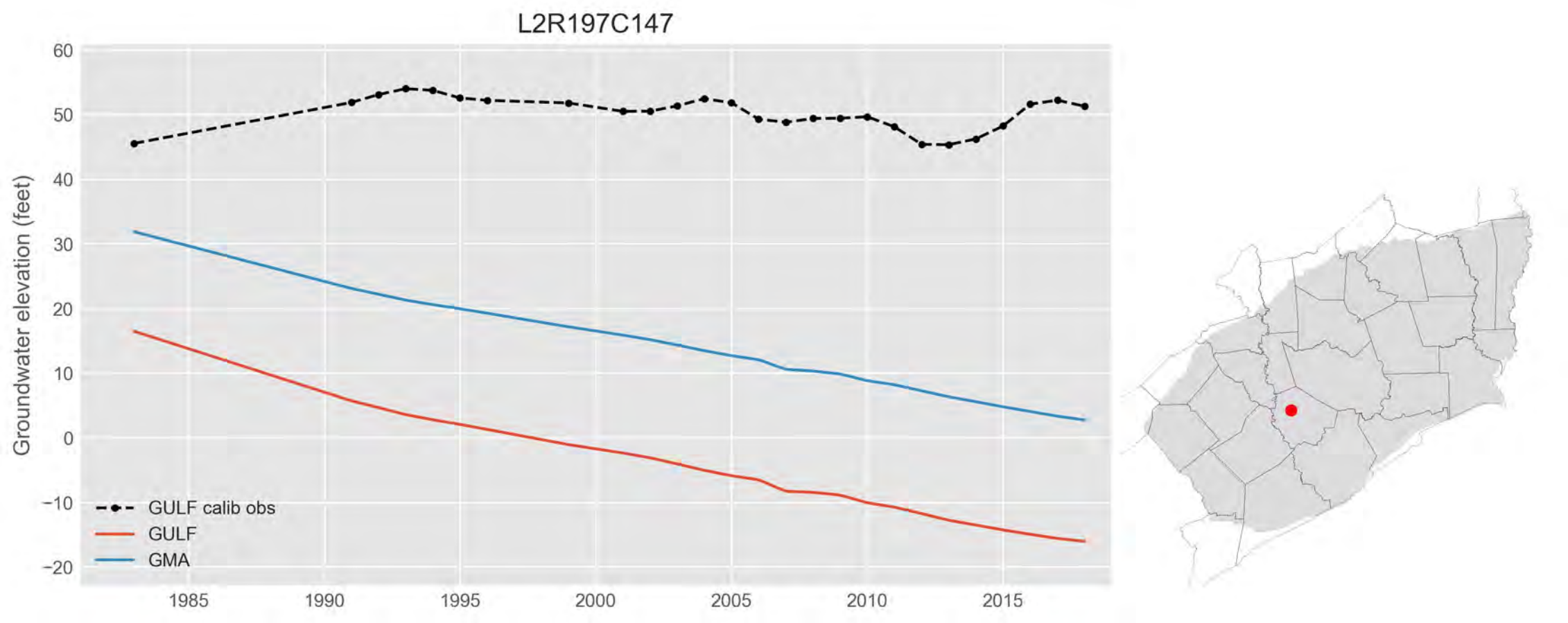

L2R195C180
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1980
1985
1990
1995
2000
2005

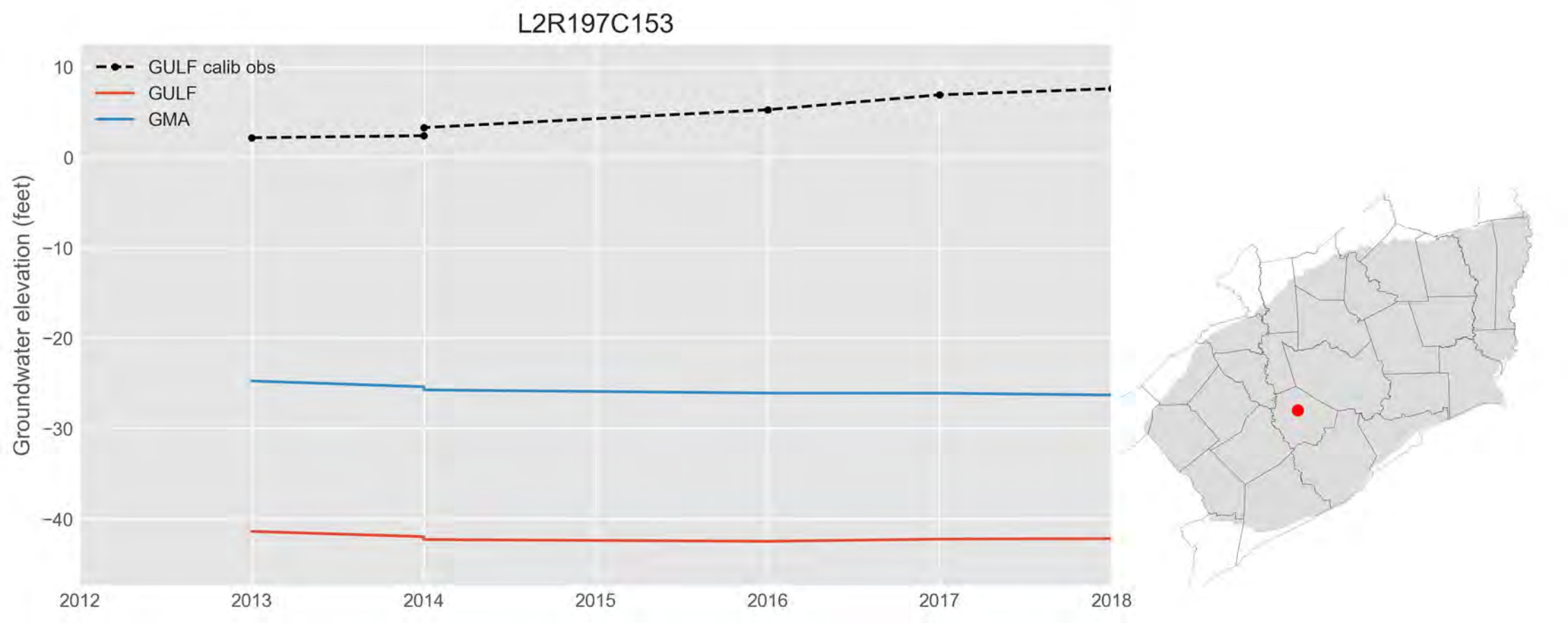

L2R196C103
Groundwater elevation (feet)
160
140
120
100
80
60
40
1964
1966
1968
1970
1972
1974
GULF calib obs
GULF
GMA

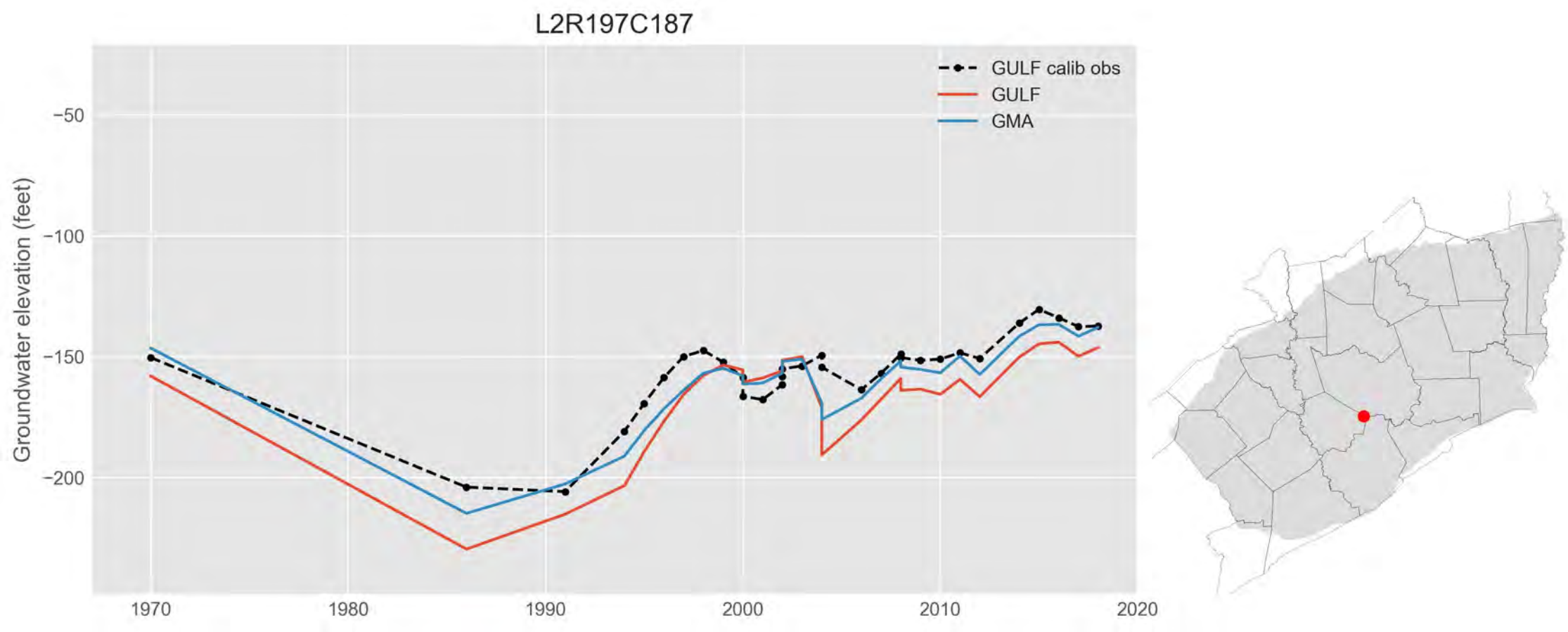

L2R196C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
1970
1975
1980
1985
1990

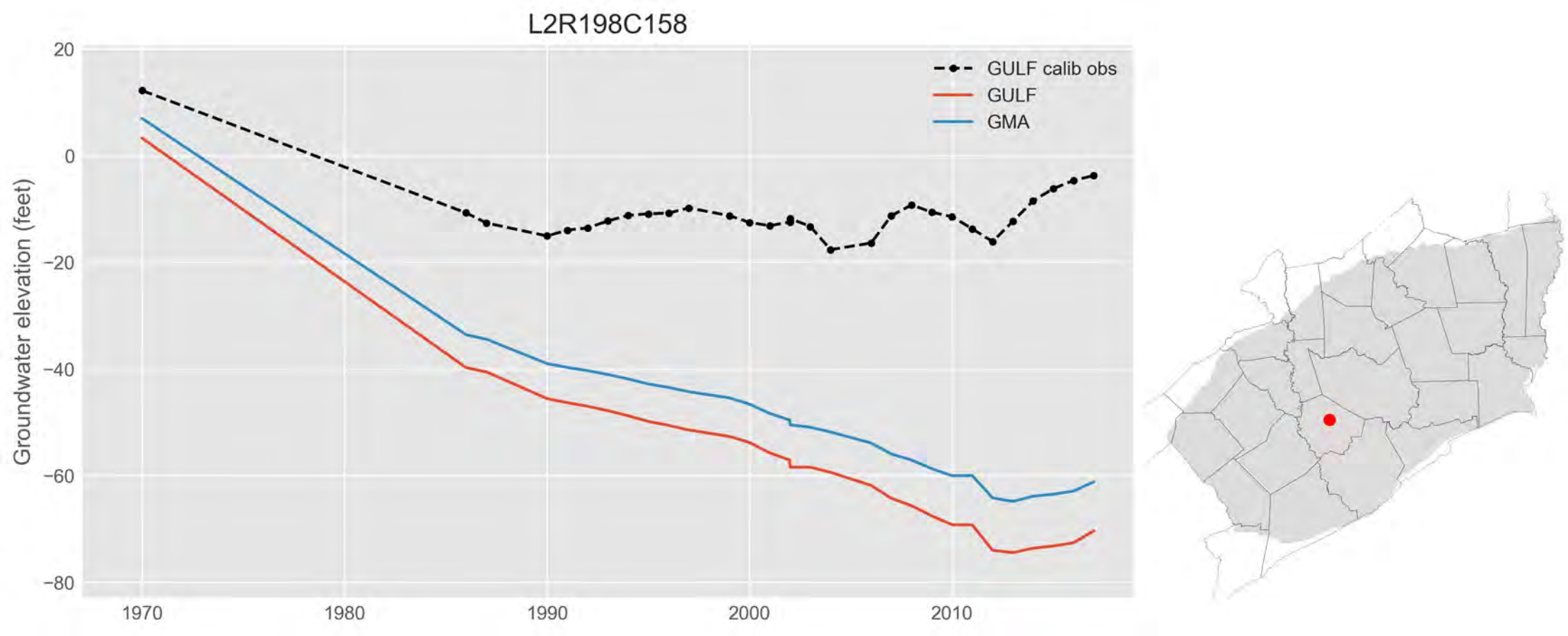

L2R196C215
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1940
1950
1960
1970
1980
1990

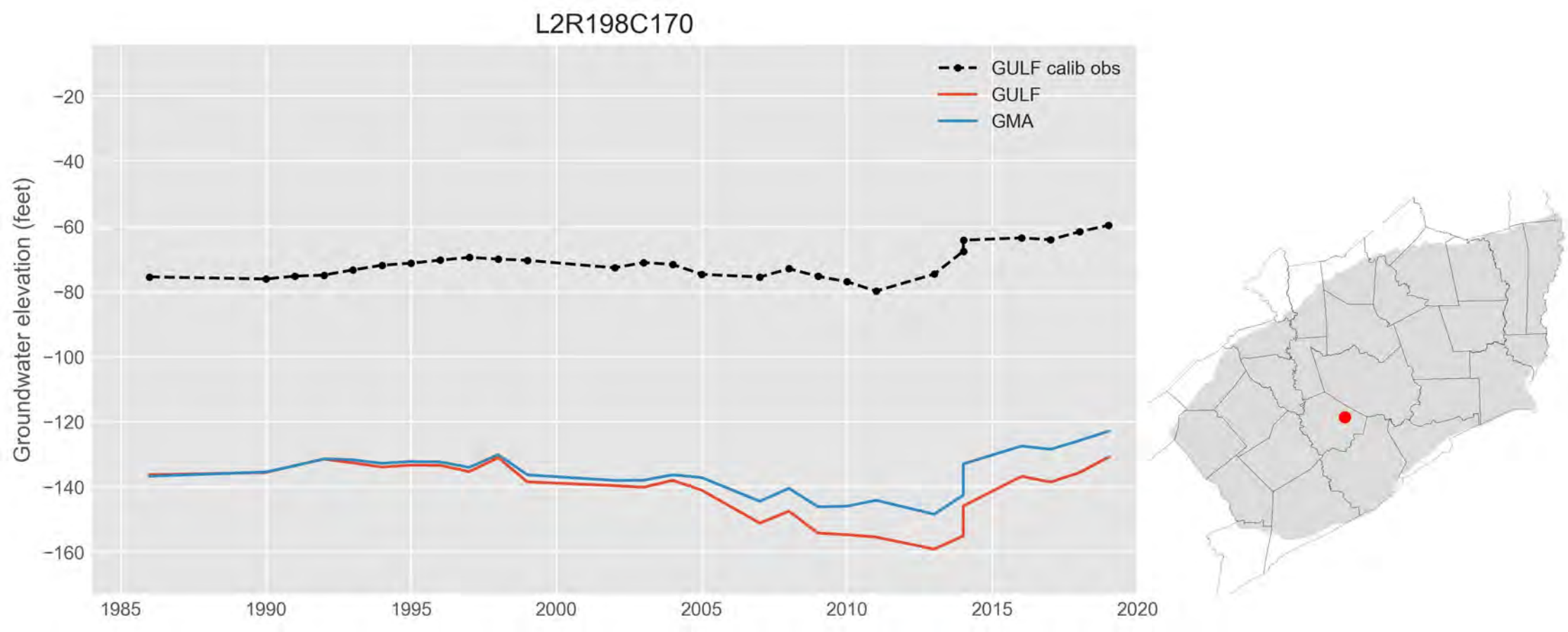

L2R196C222
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
2000
2005
2010
2015

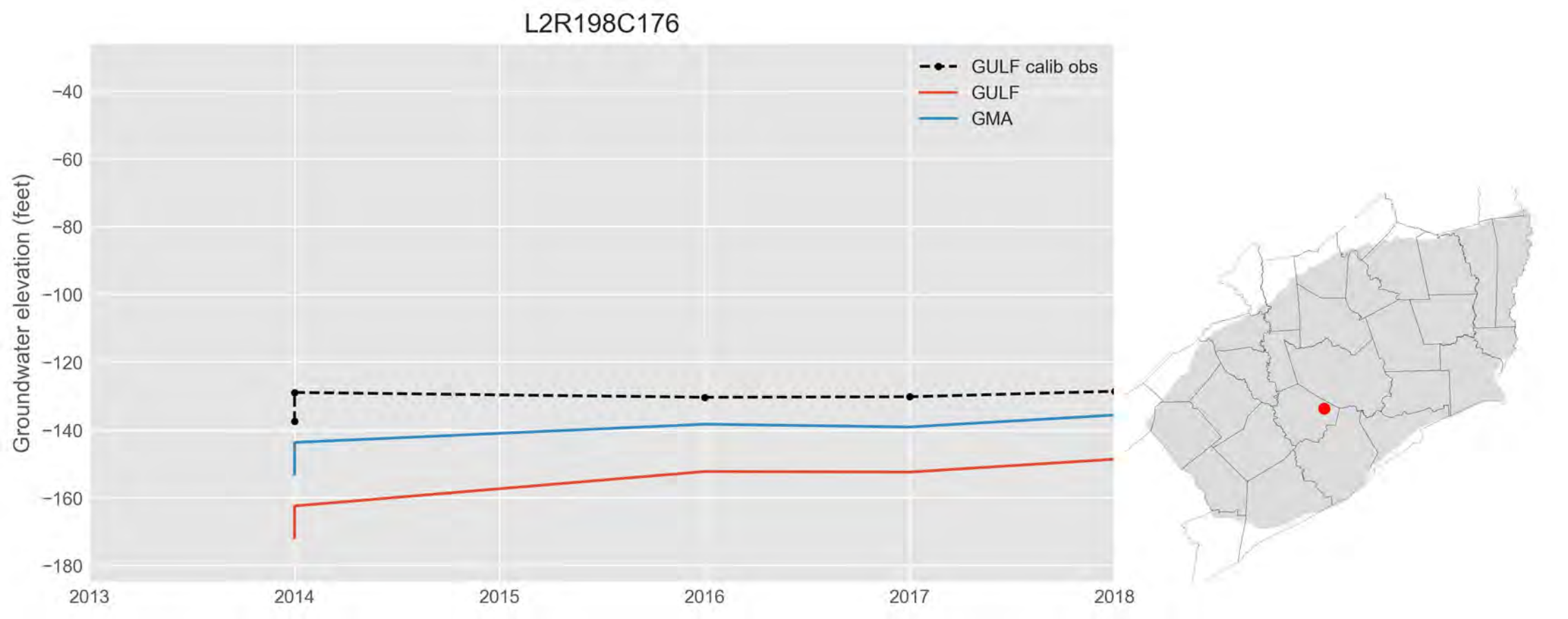

L2R197C147
Groundwater elevation (feet)
60
50
40
30
20
10
0
−10
−20
1985
1990
1995
2000
2005
2010
2015
GULF calib obs
GULF
GMA

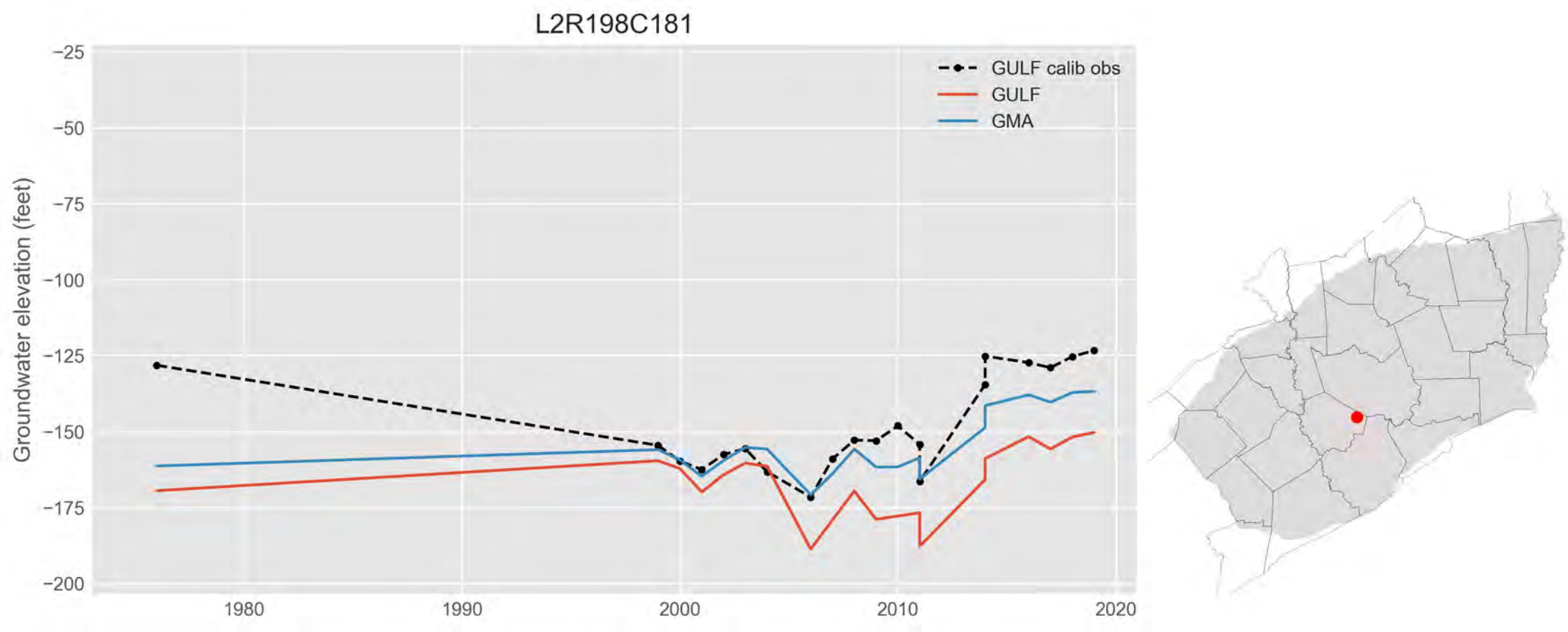

L2R197C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
10
0
−10
−20
−30
−40
2012
2013
2014
2015
2016
2017
2018

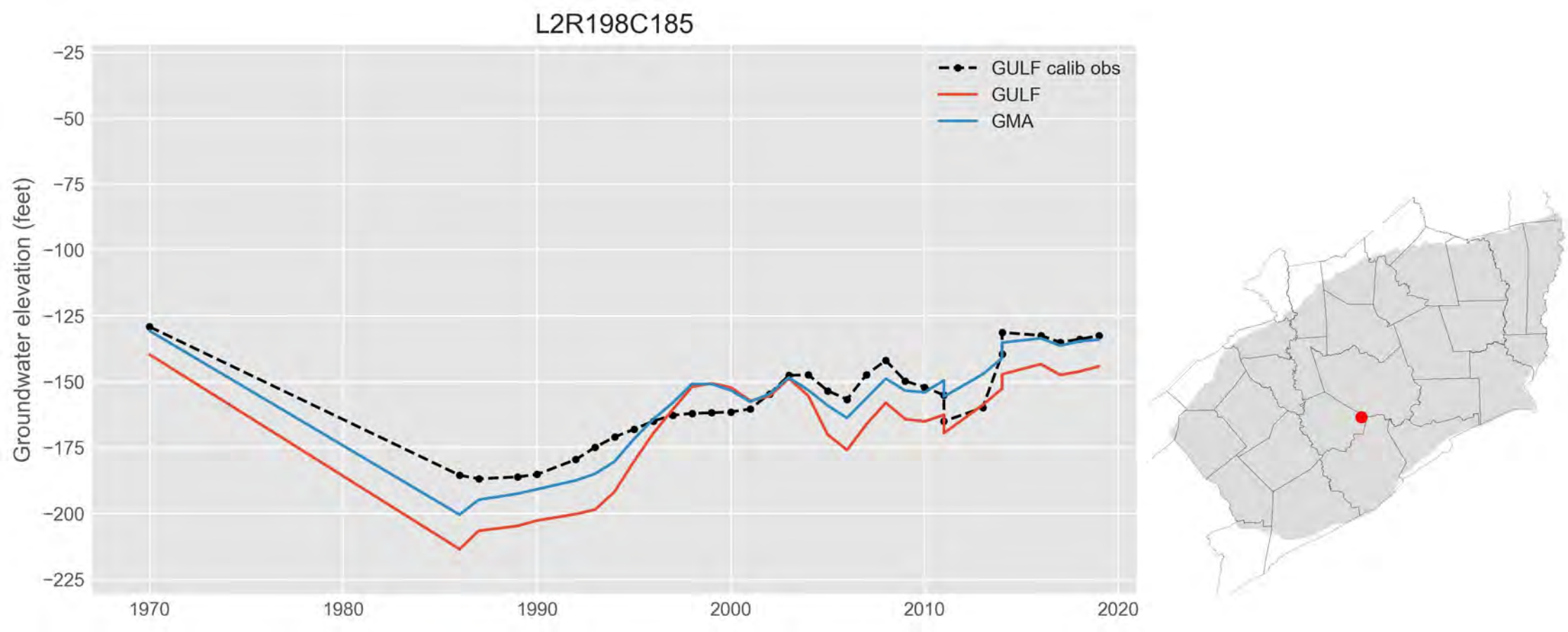

L2R197C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1970
1980
1990
2000
2010
2020

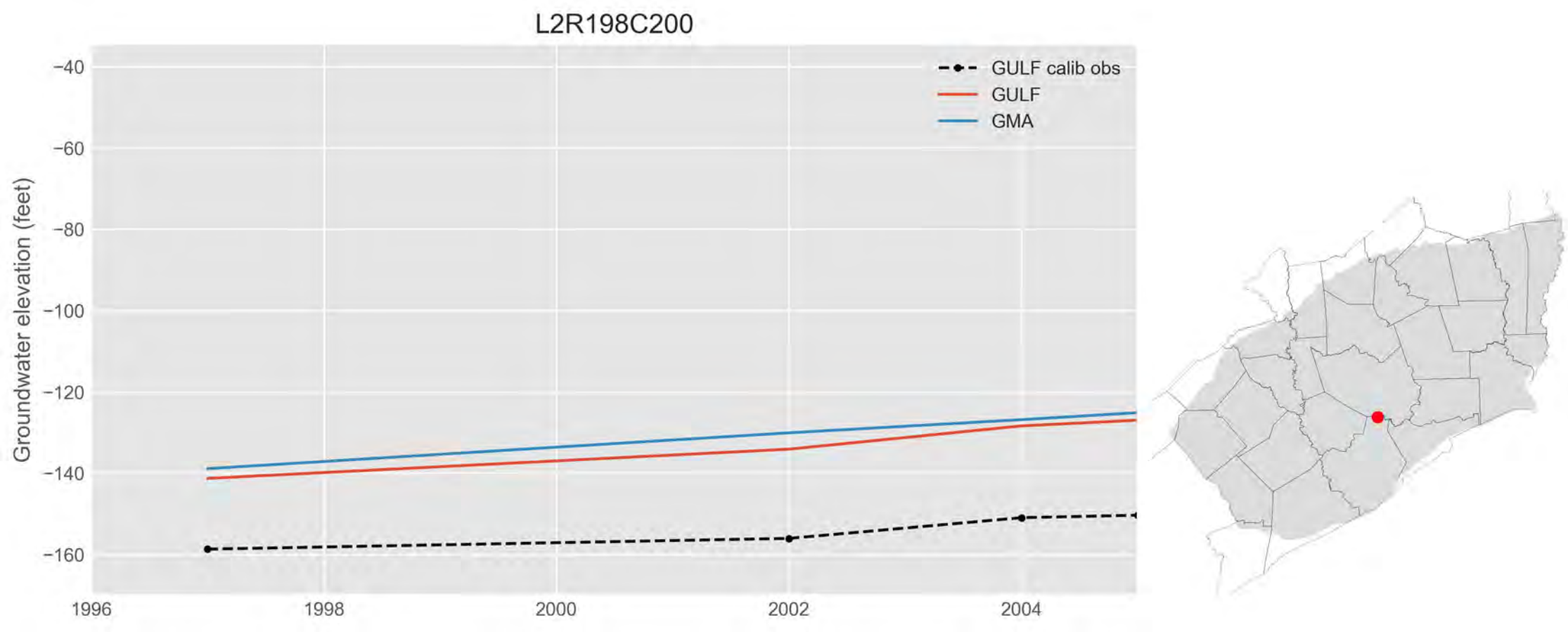

L2R198C158
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
1970
1980
1990
2000
2010

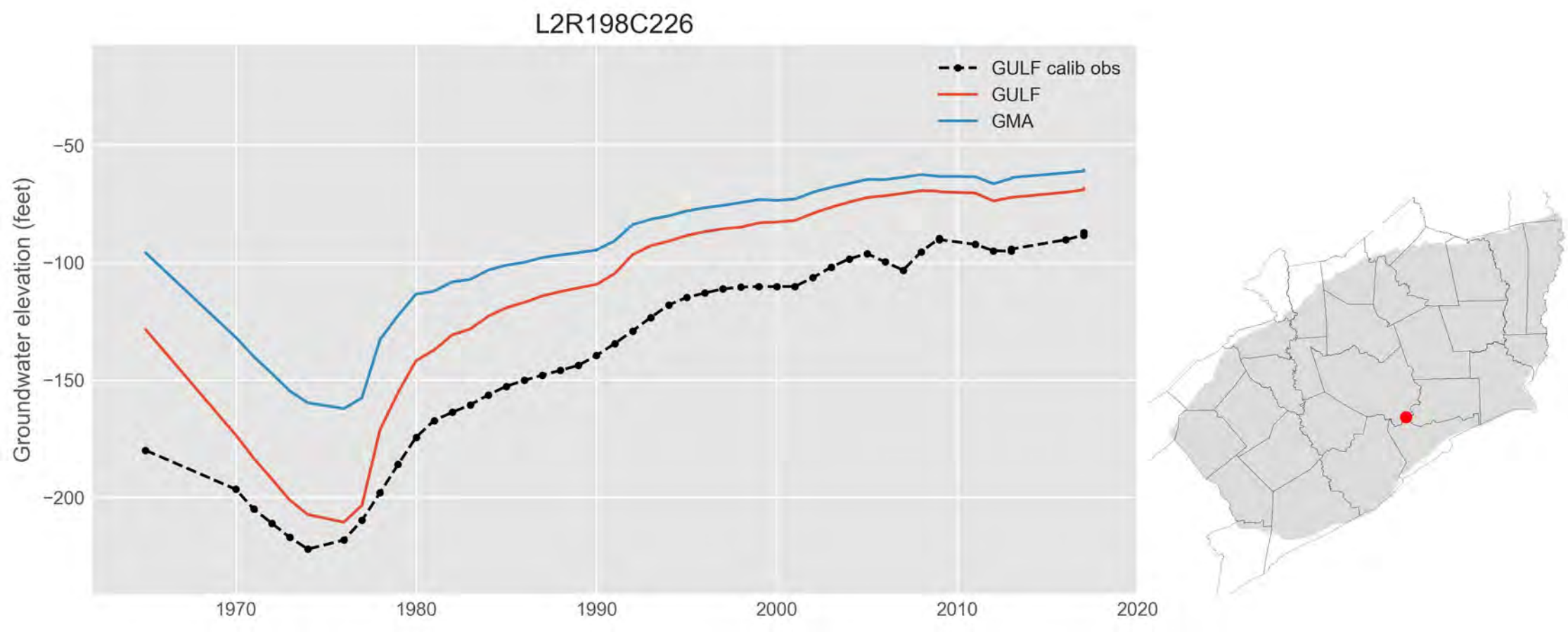

L2R198C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
1985
1990
1995
2000
2005
2010
2015
2020

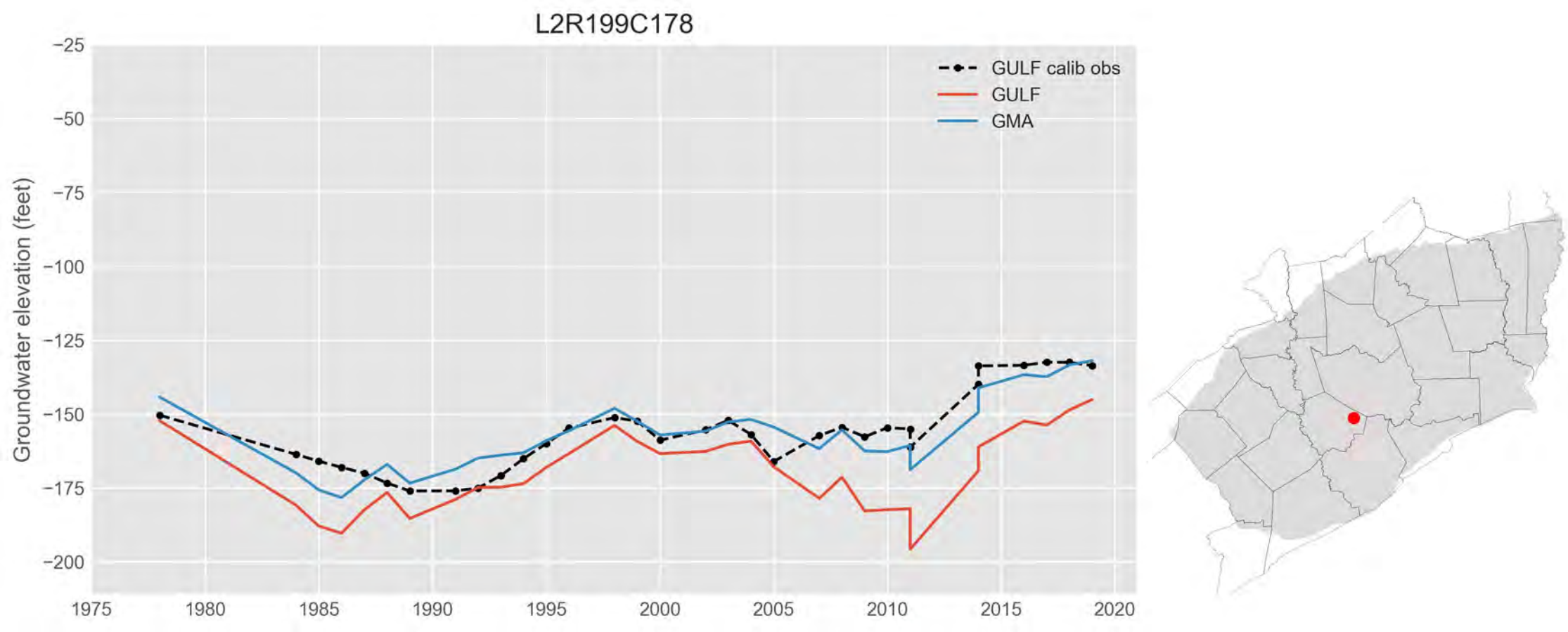

L2R198C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
2013
2014
2015
2016
2017
2018

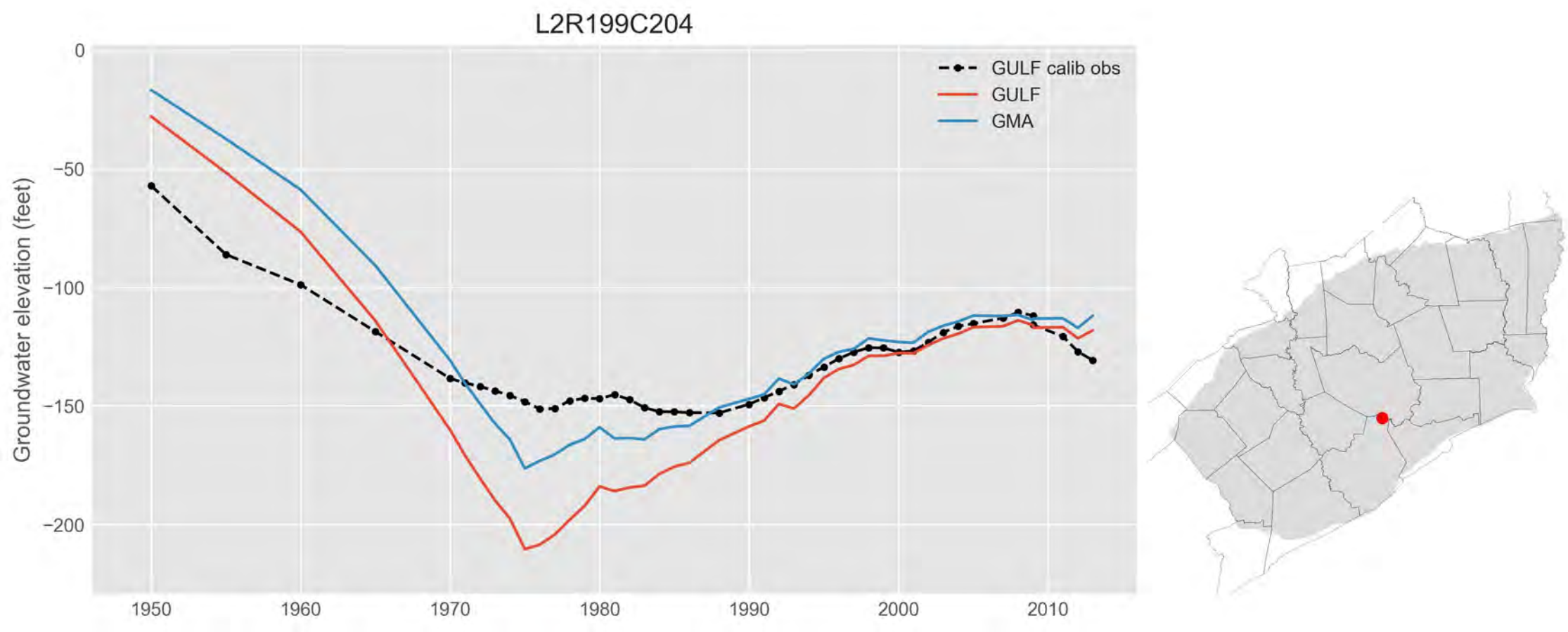

L2R198C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1980
1990
2000
2010
2020

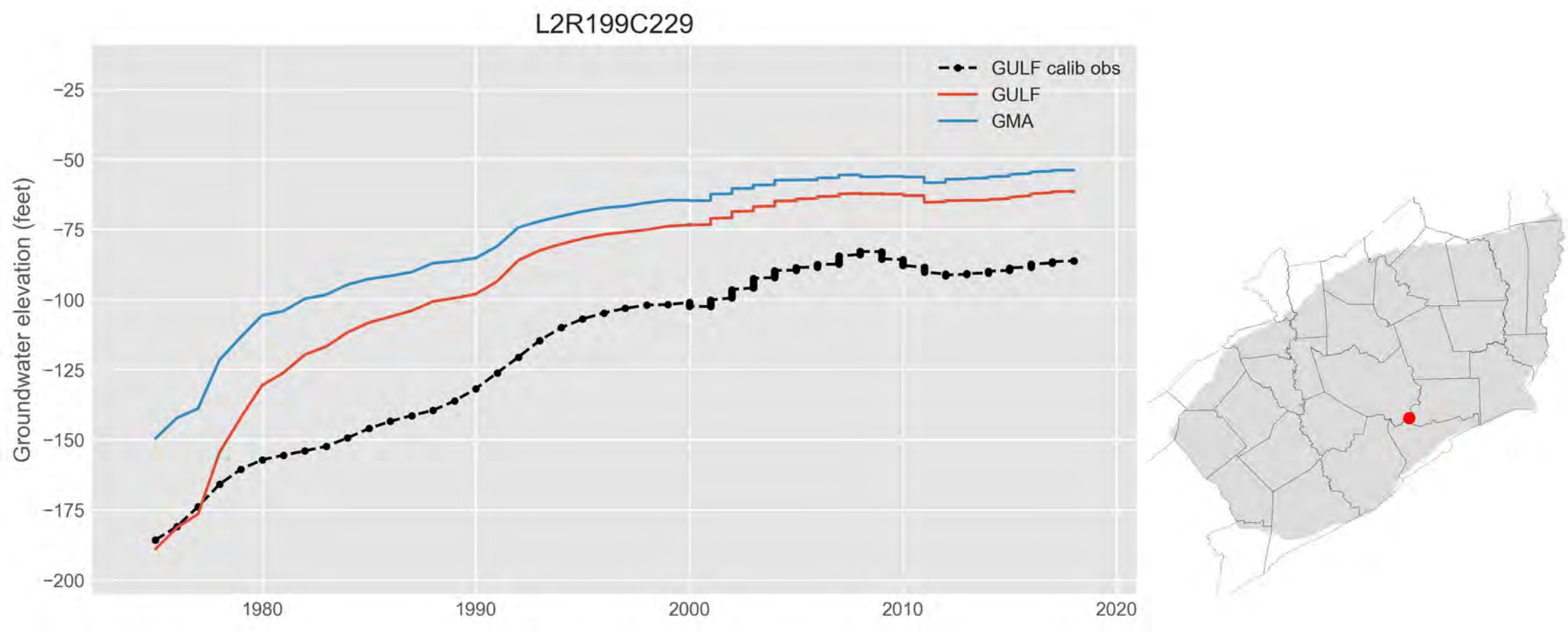

L2R198C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
−225
1970
1980
1990
2000
2010
2020

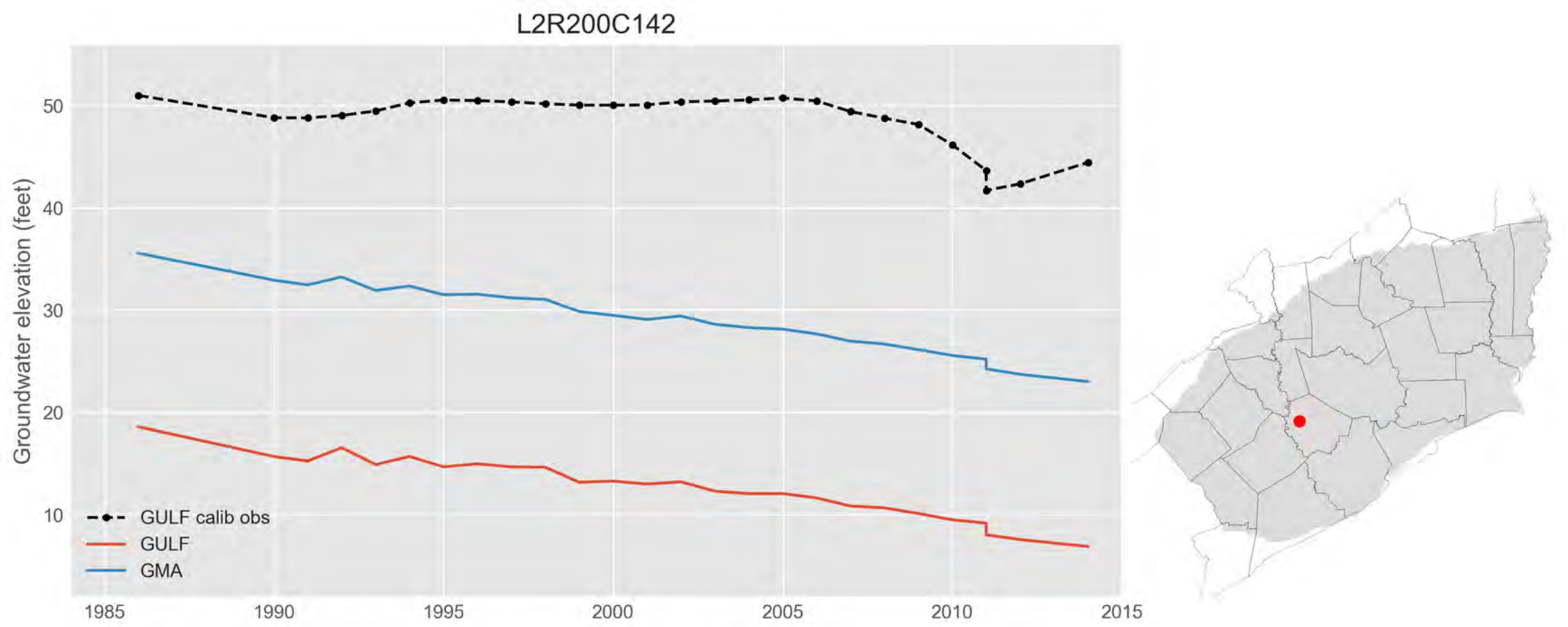

L2R198C200
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
1996
1998
2000
2002
2004

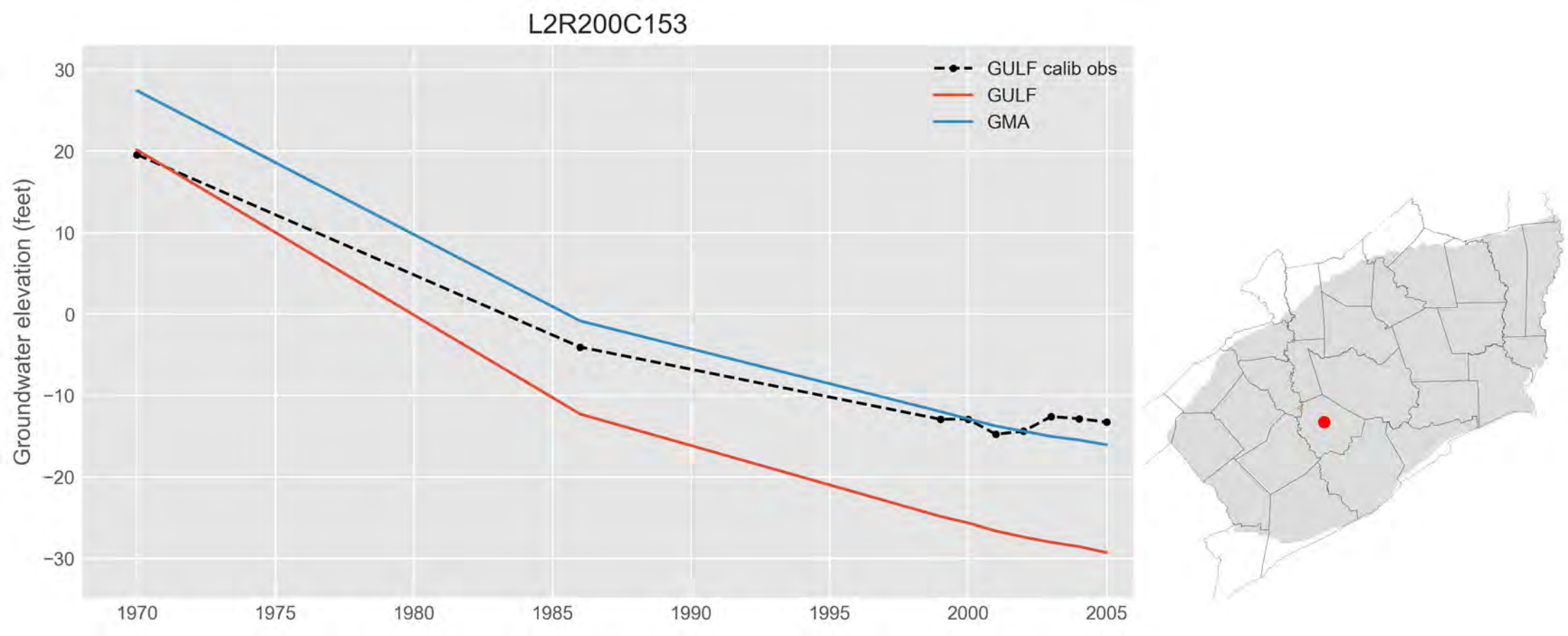

L2R198C226
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1970
1980
1990
2000
2010
2020

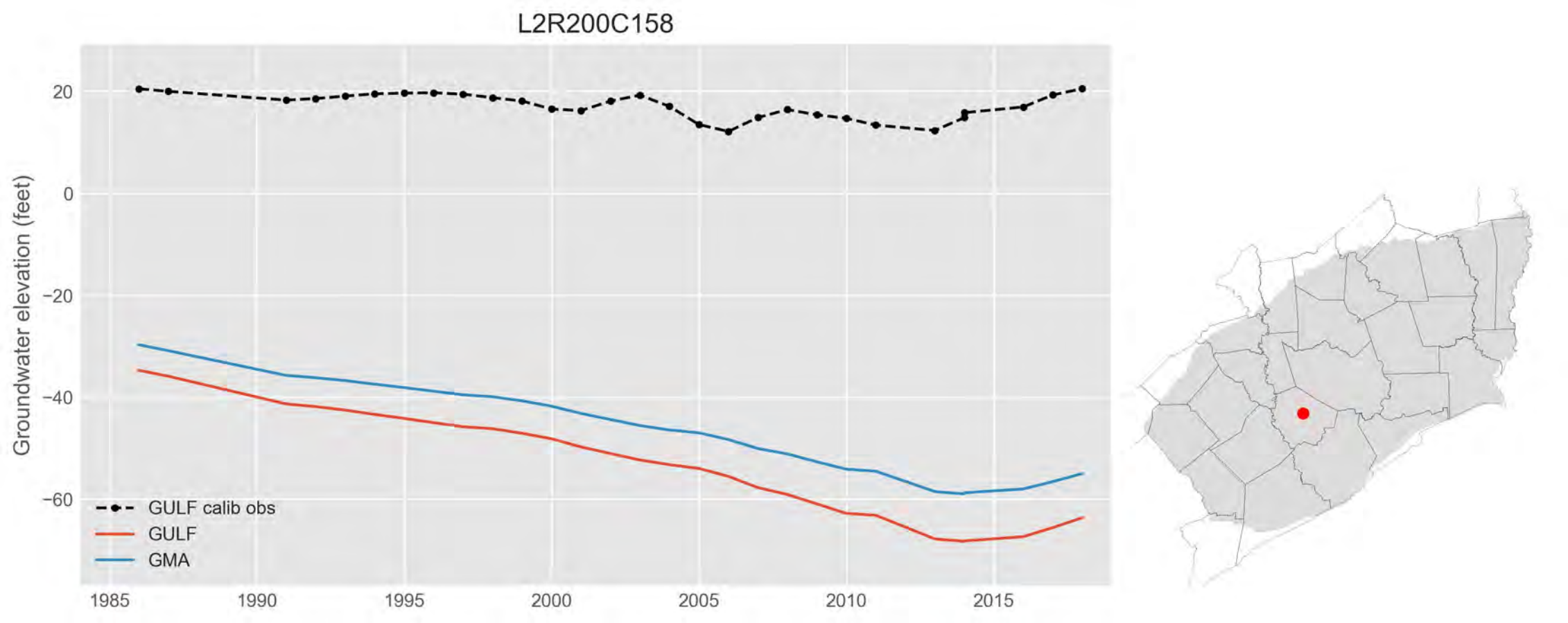

L2R199C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

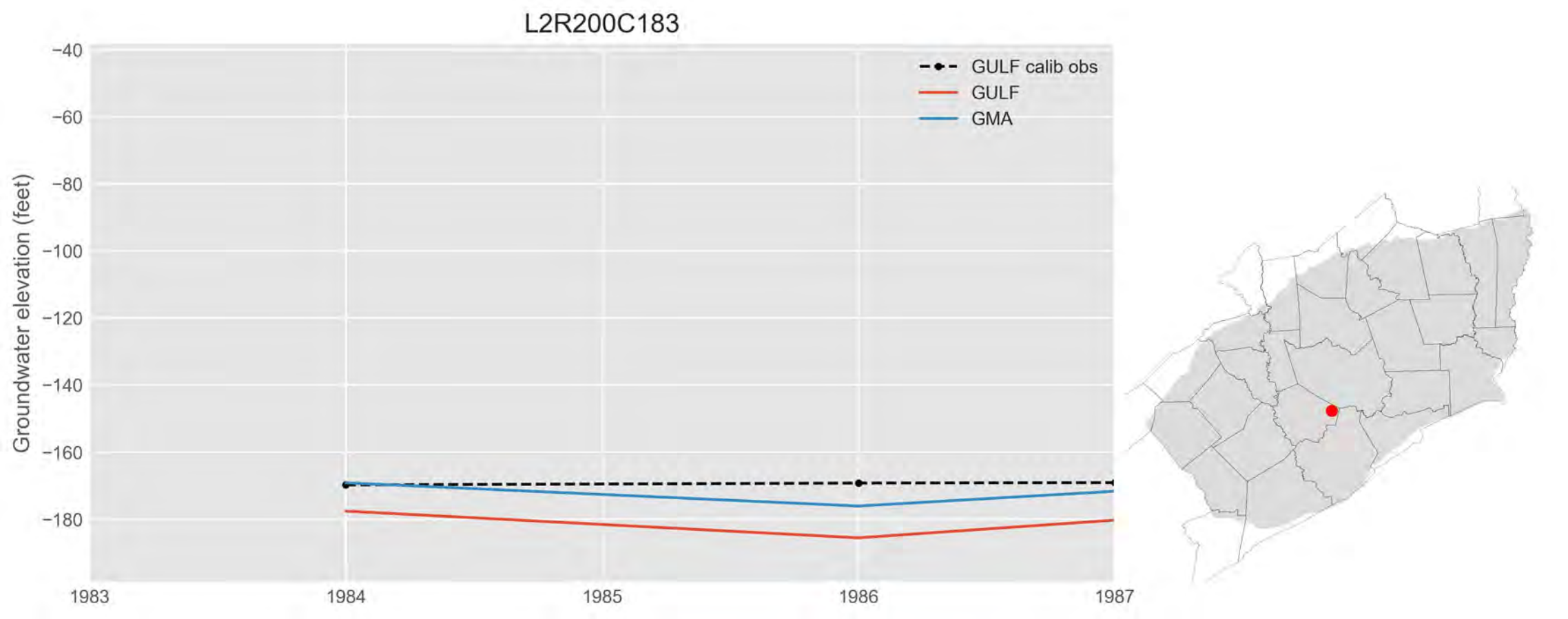

L2R199C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1950
1960
1970
1980
1990
2000
2010

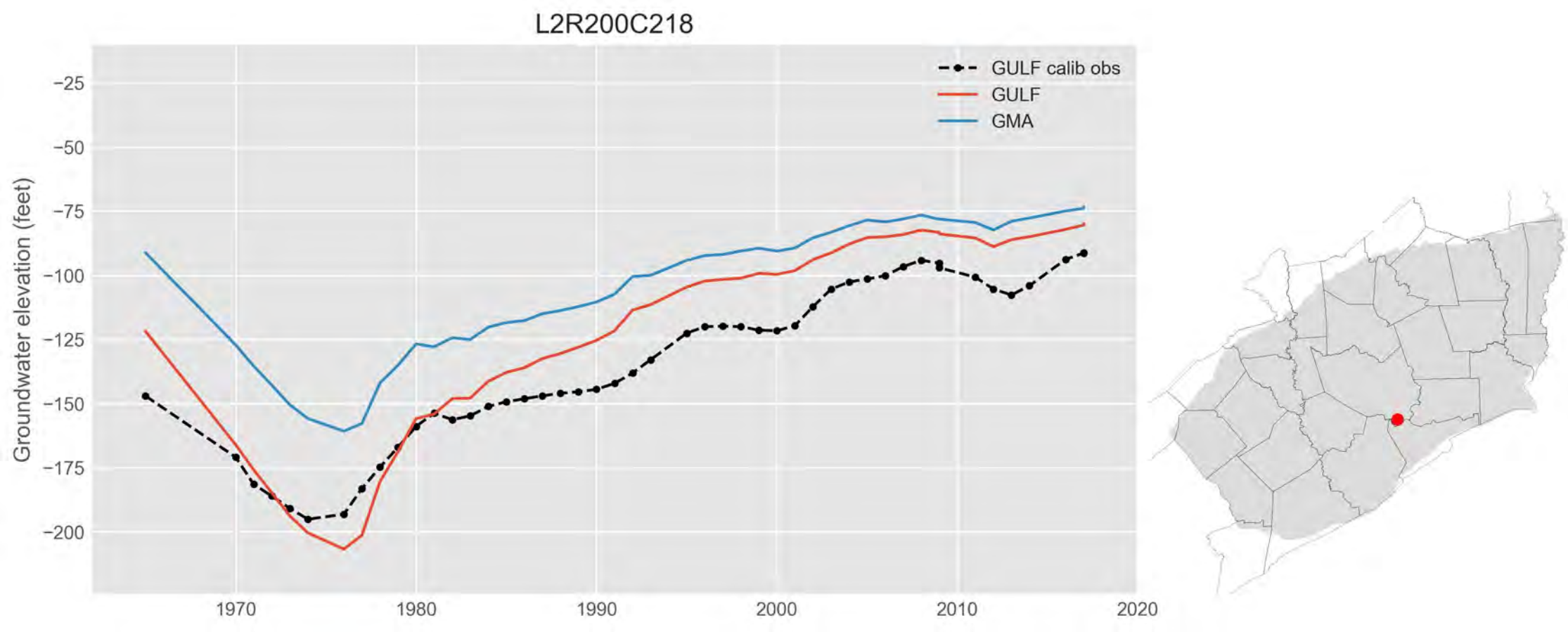

L2R199C229
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1980
1990
2000
2010
2020

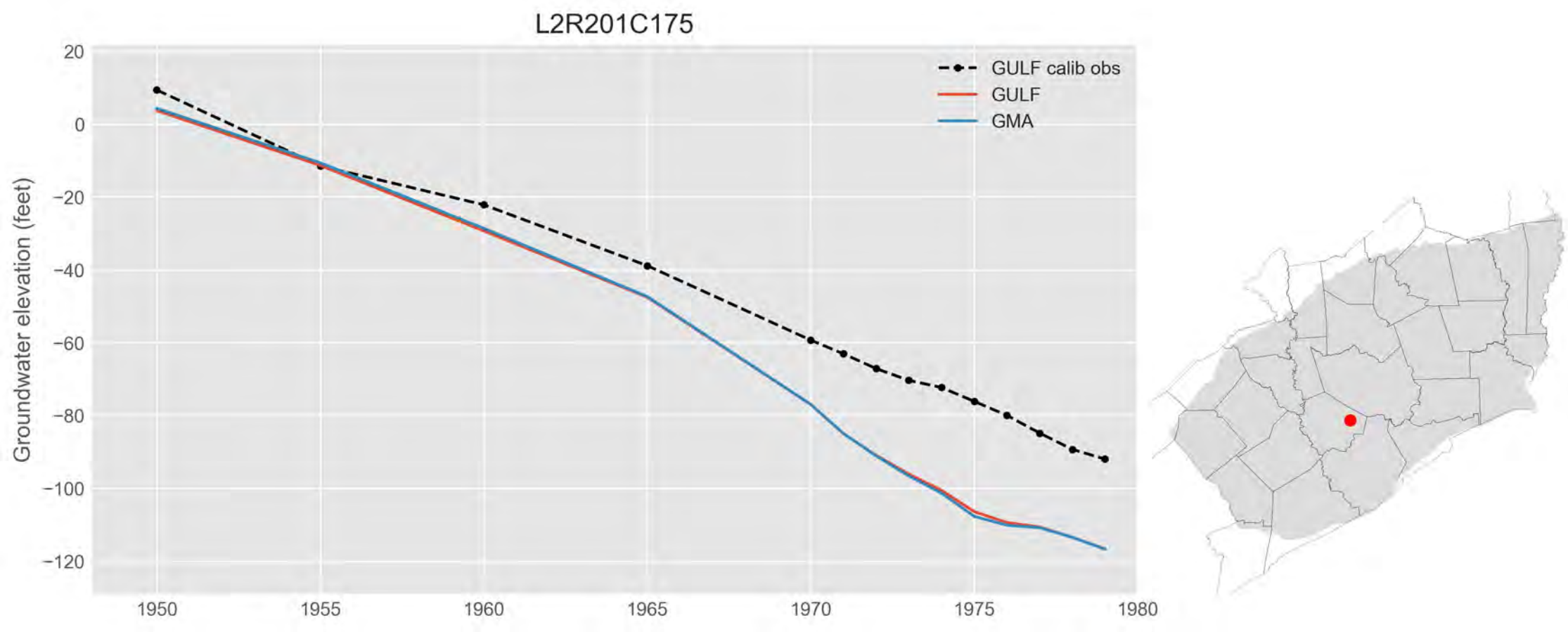

L2R200C142
Groundwater elevation (feet)
50
40
30
20
10
1985
1990
1995
2000
2005
2010
2015
GULF calib obs
GULF
GMA

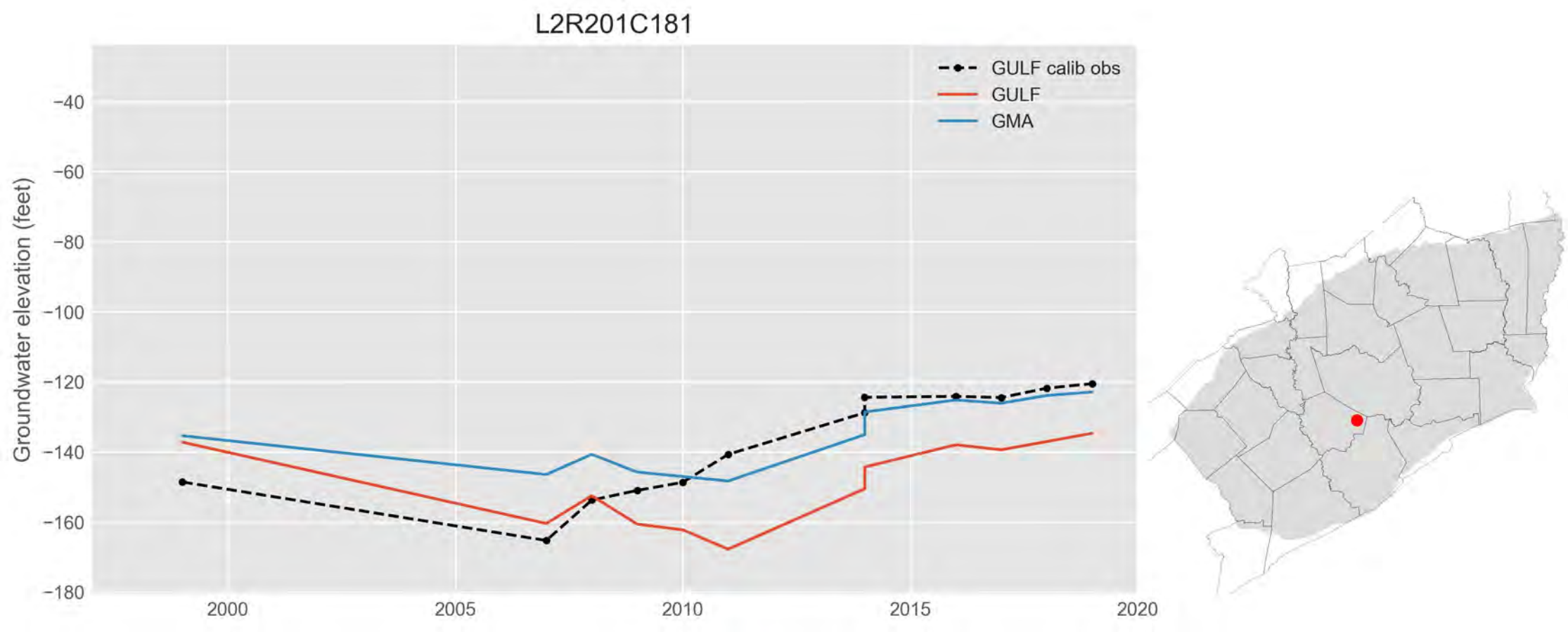

L2R200C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
−30
1970
1975
1980
1985
1990
1995
2000
2005

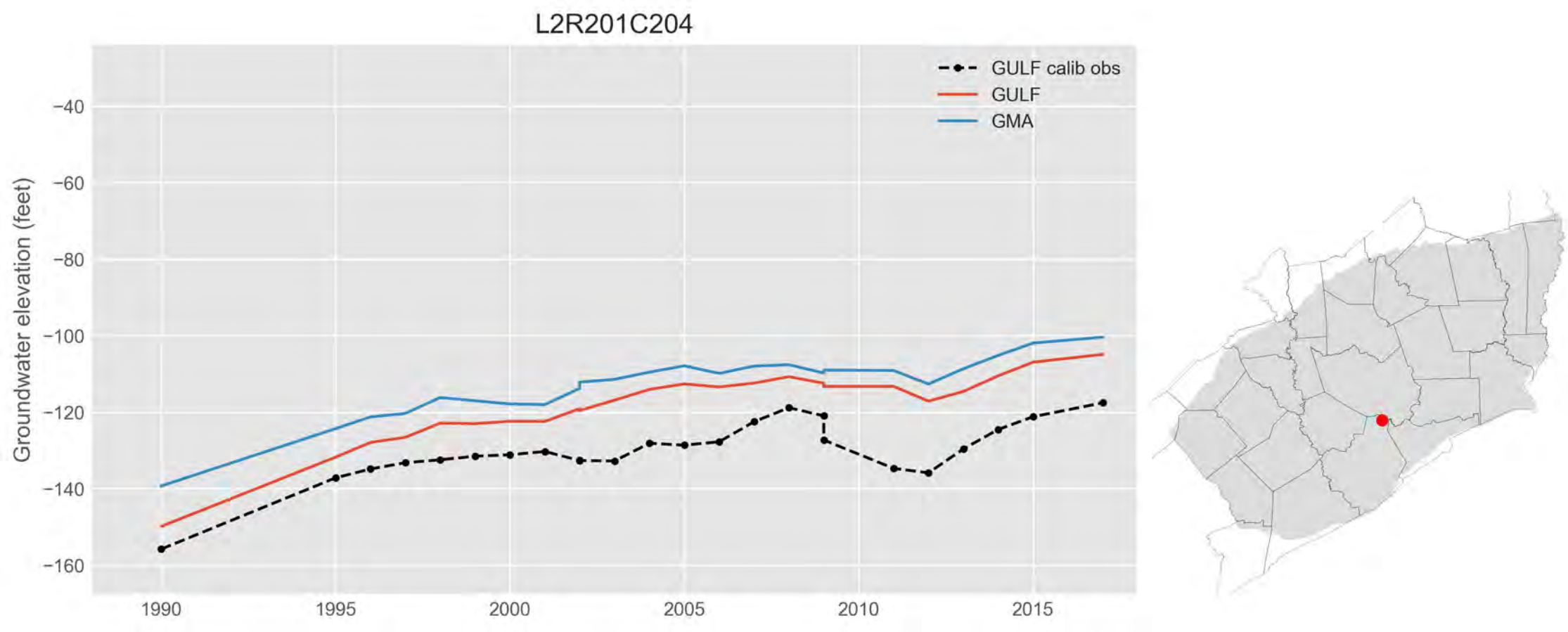

L2R200C158
Groundwater elevation (feet)
20
0
−20
−40
−60
1985
1990
1995
2000
2005
2010
2015
GULF calib obs
GULF
GMA

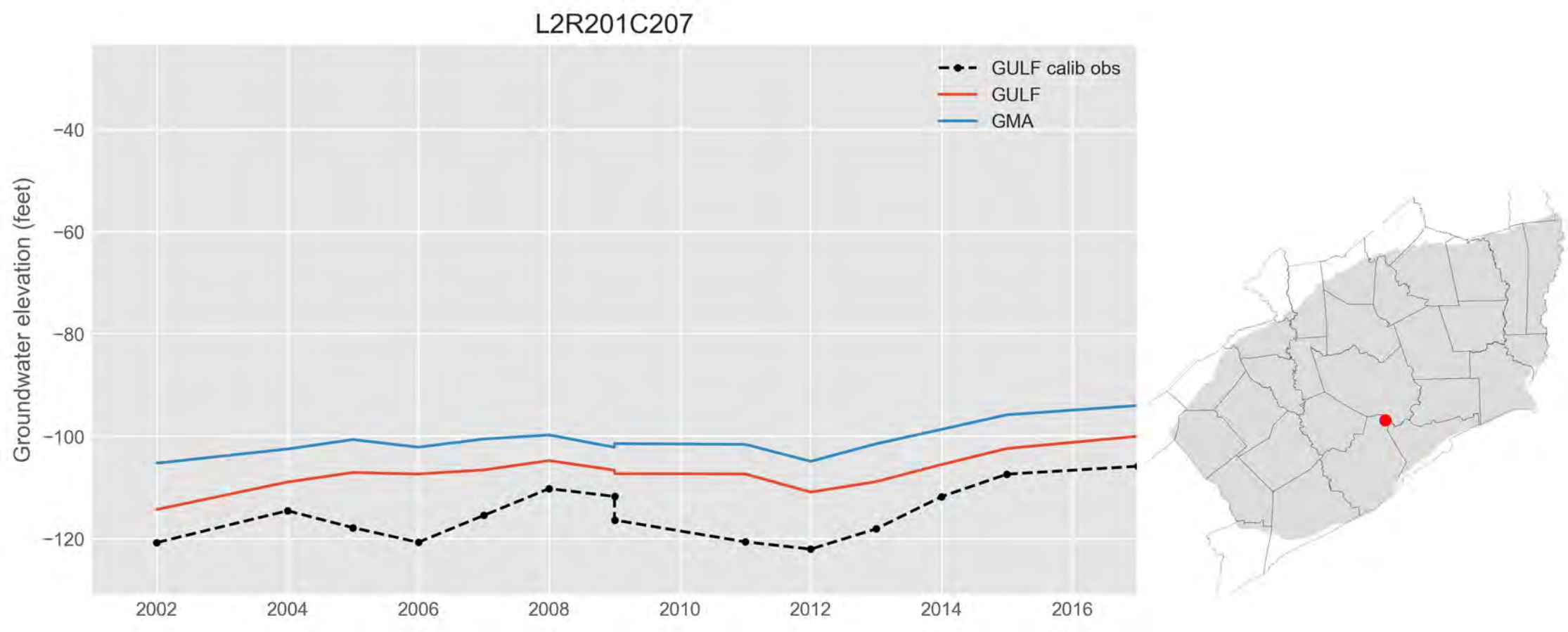

L2R200C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
1983
1984
1985
1986
1987

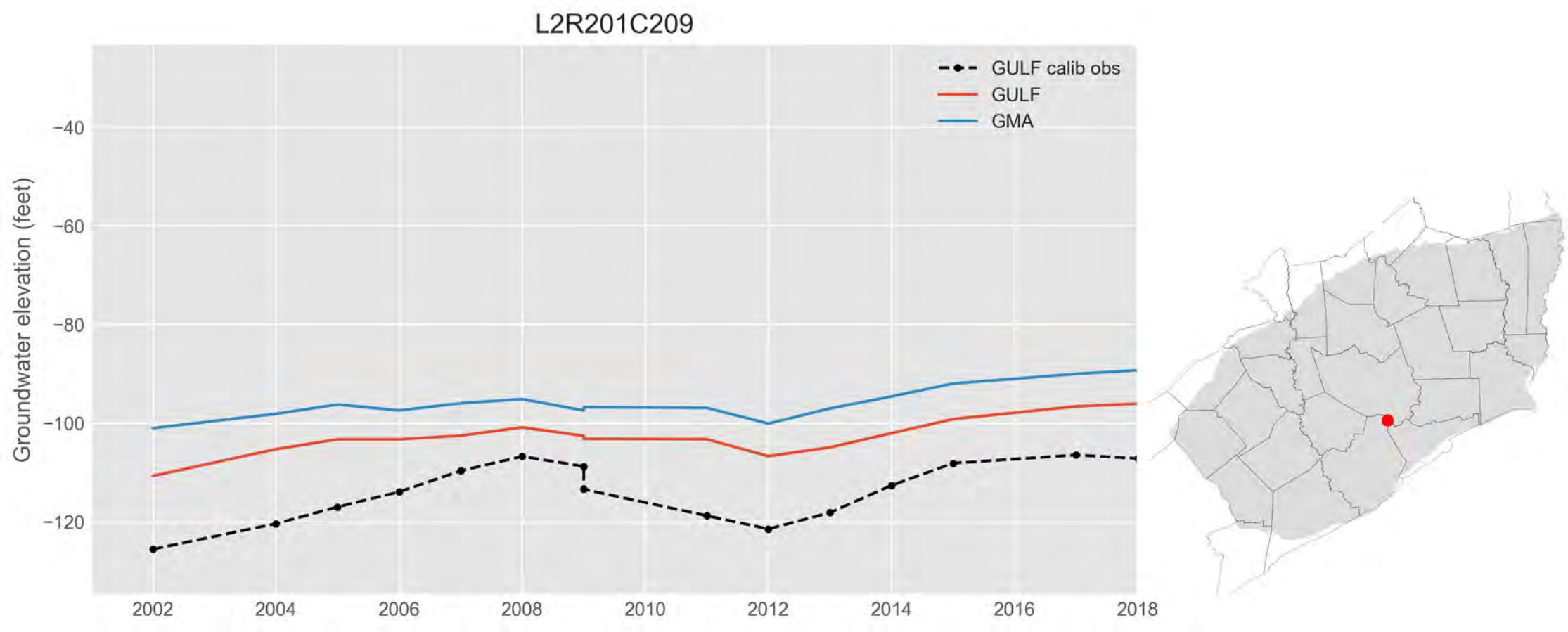

L2R200C218
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1970
1980
1990
2000
2010
2020

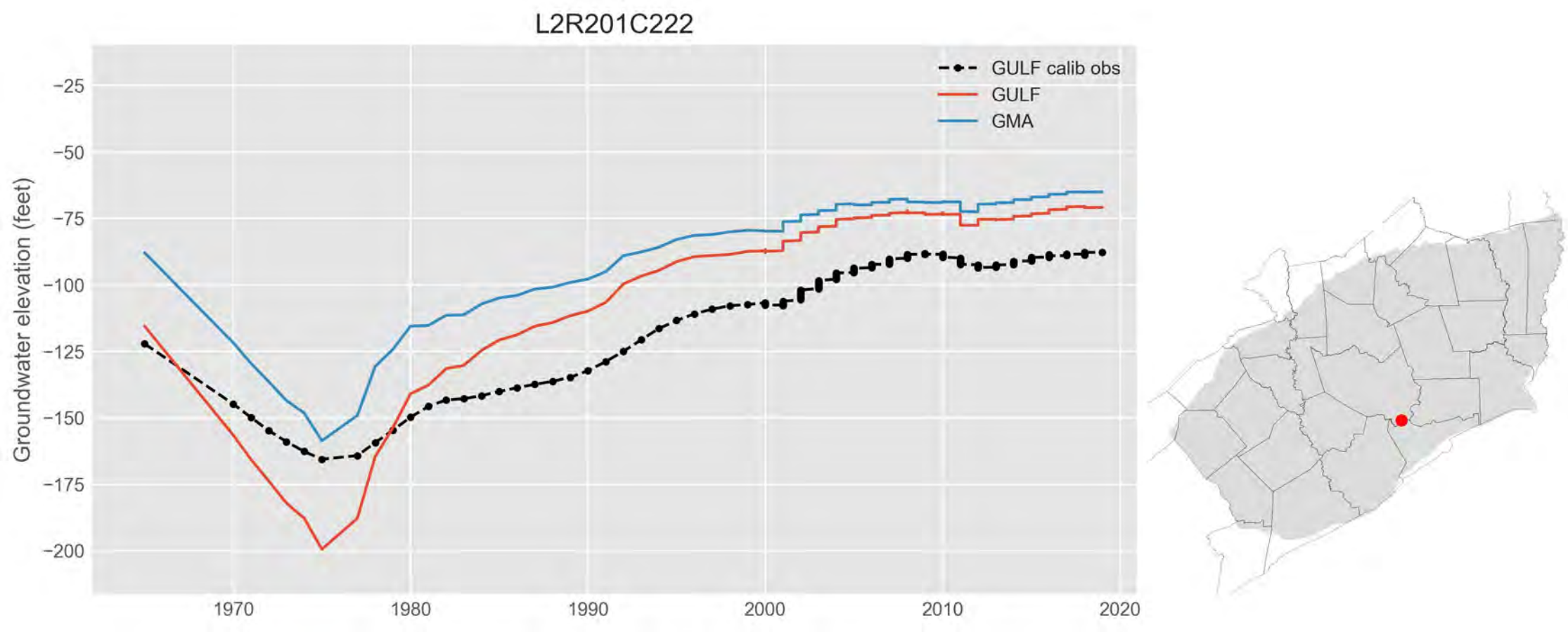

L2R201C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
−100
−120
1950
1955
1960
1965
1970
1975
1980

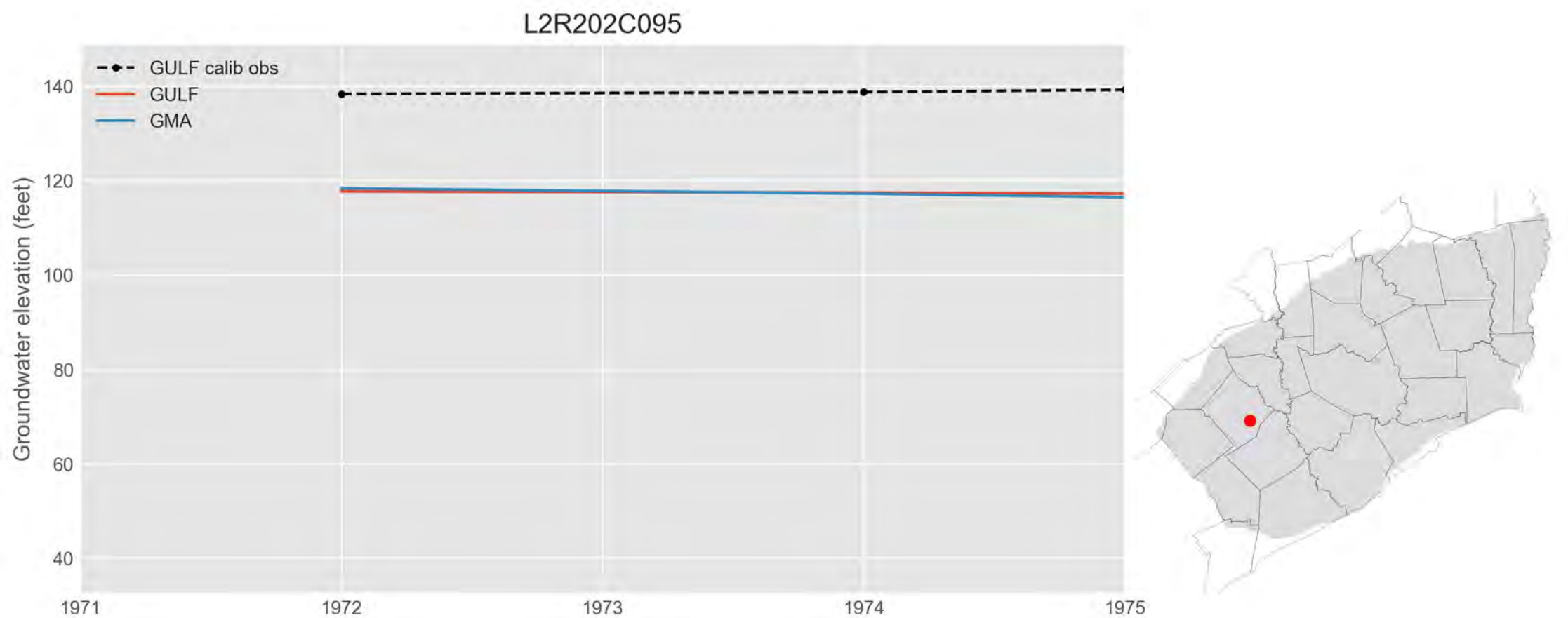

L2R201C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
2000
2005
2010
2015
2020

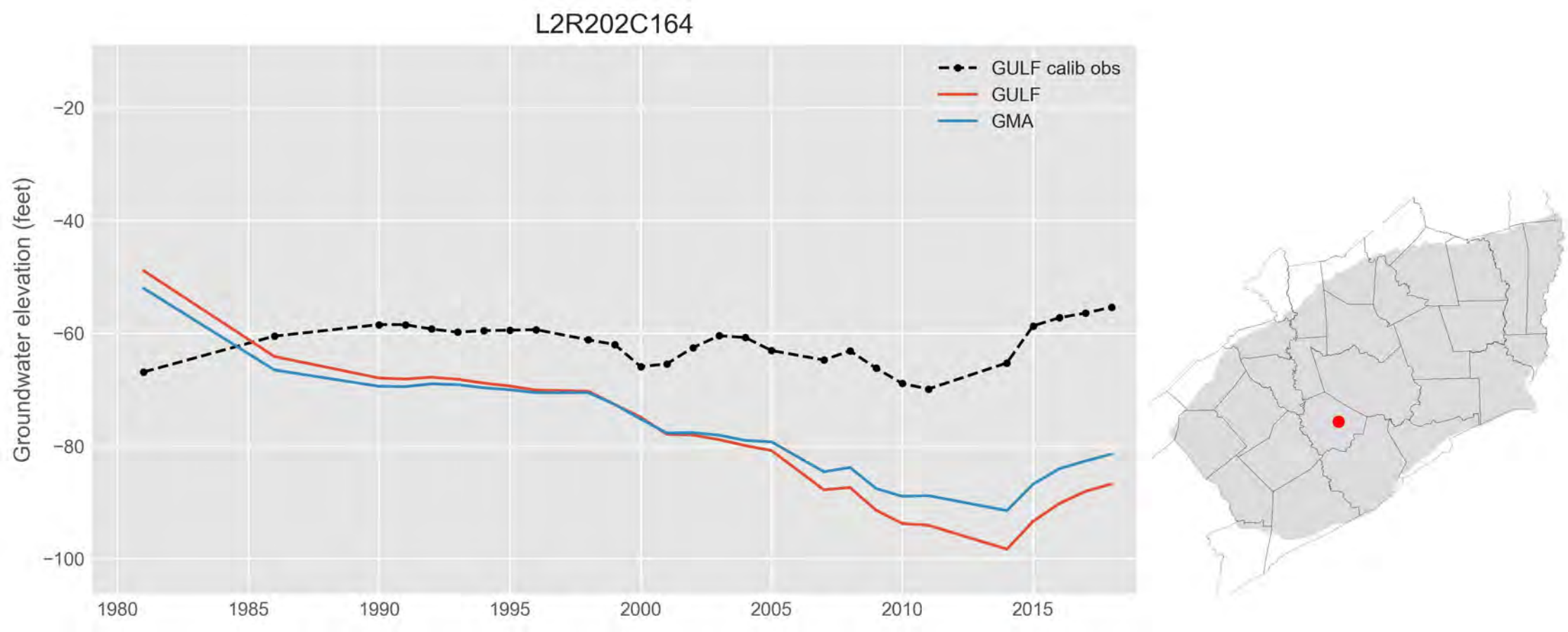

L2R201C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
1990
1995
2000
2005
2010
2015

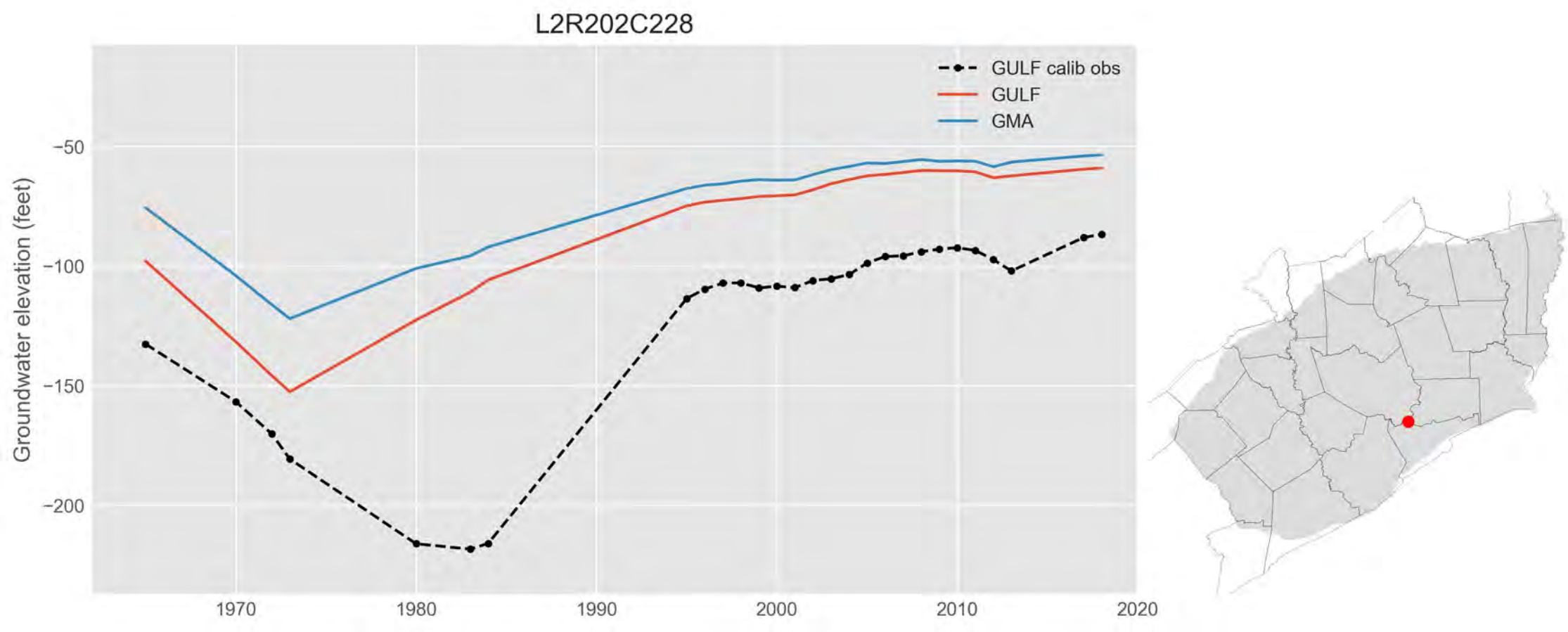

L2R201C207
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
2002
2004
2006
2008
2010
2012
2014
2016

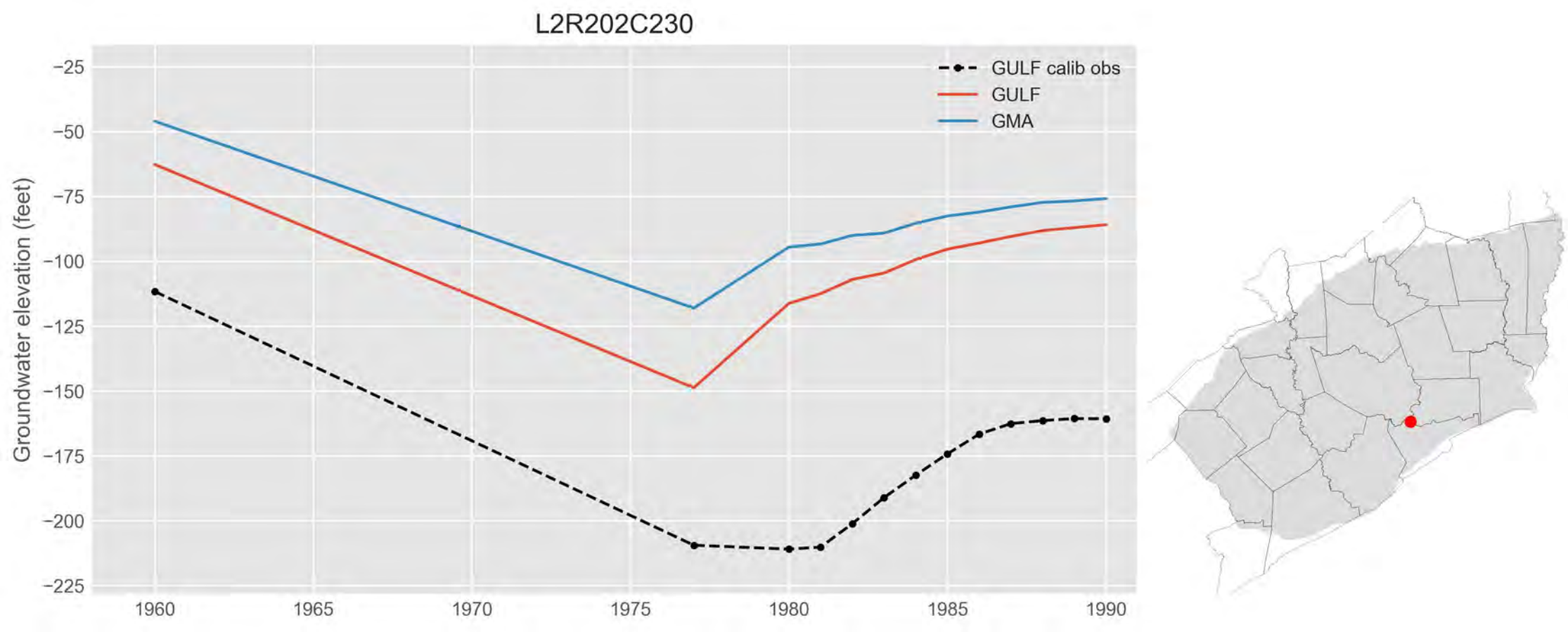

L2R201C209
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
2002
2004
2006
2008
2010
2012
2014
2016
2018

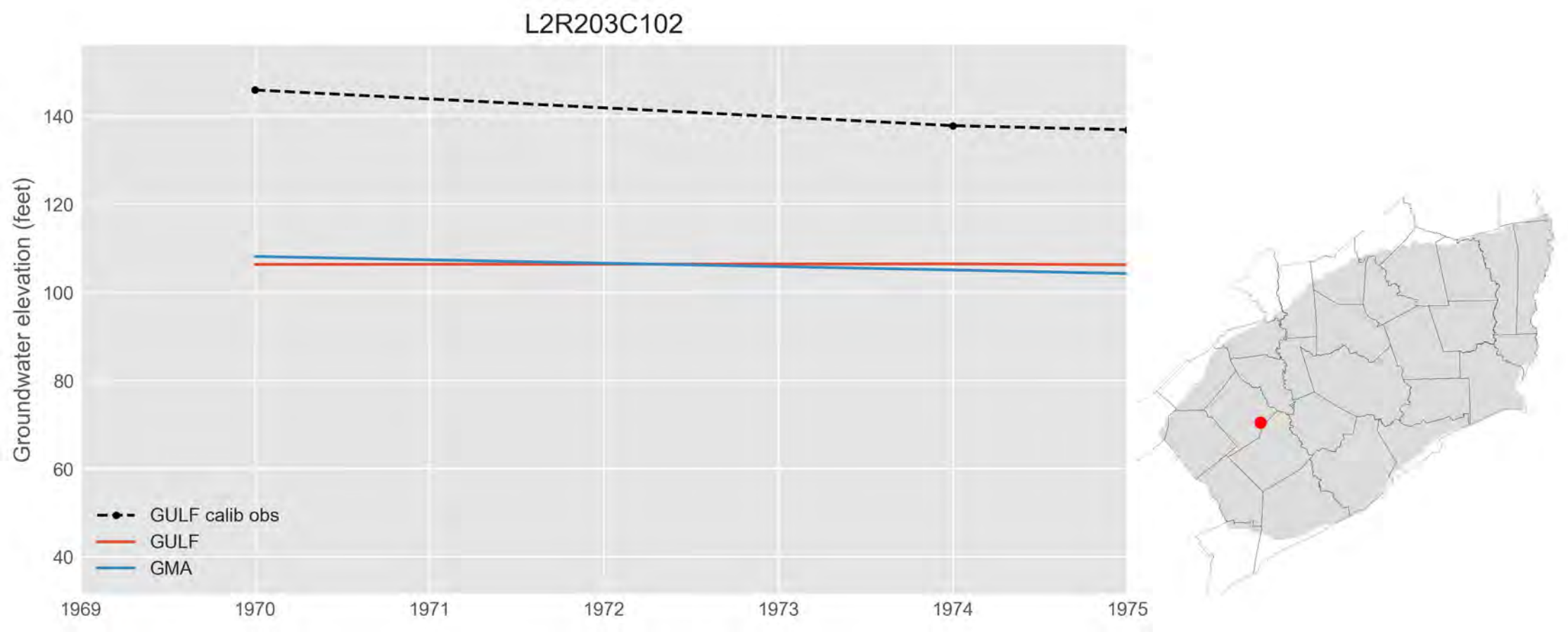

L2R201C222
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1970
1980
1990
2000
2010
2020

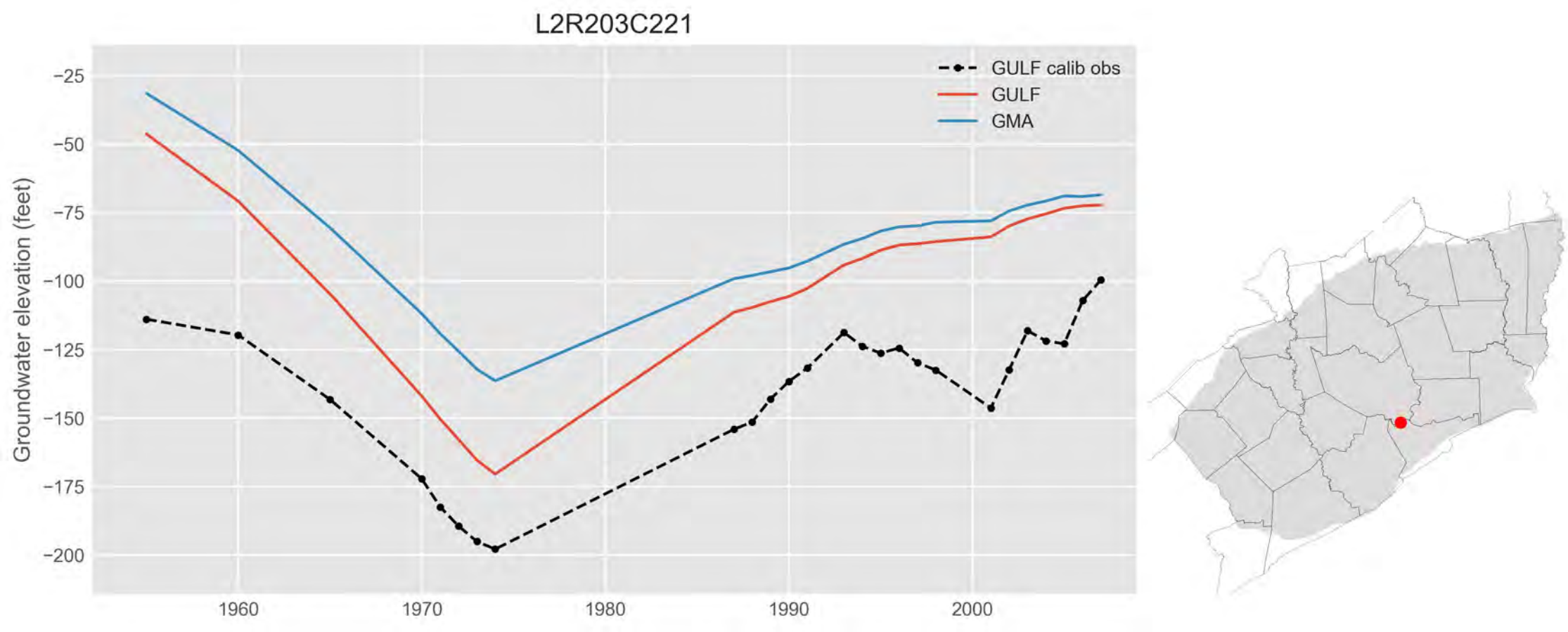

L2R202C095
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
1971
1972
1973
1974
1975

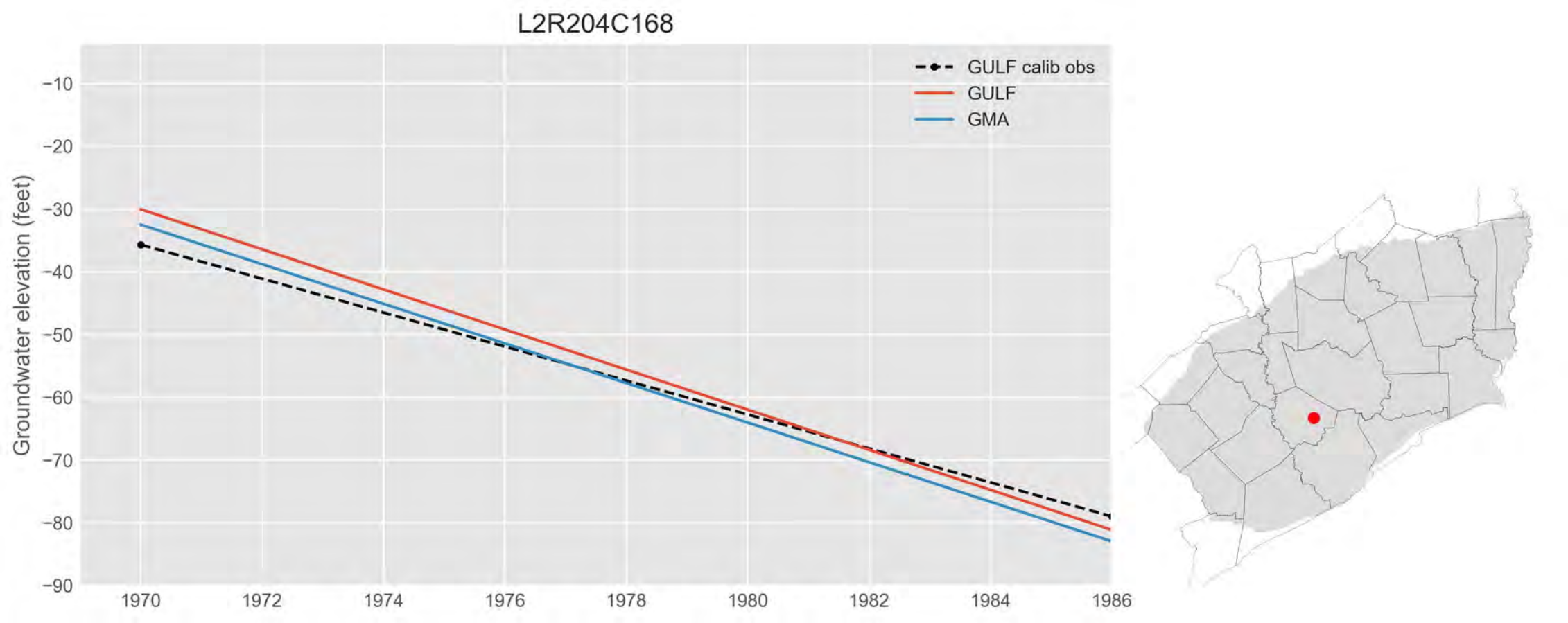

L2R202C164
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
1980
1985
1990
1995
2000
2005
2010
2015

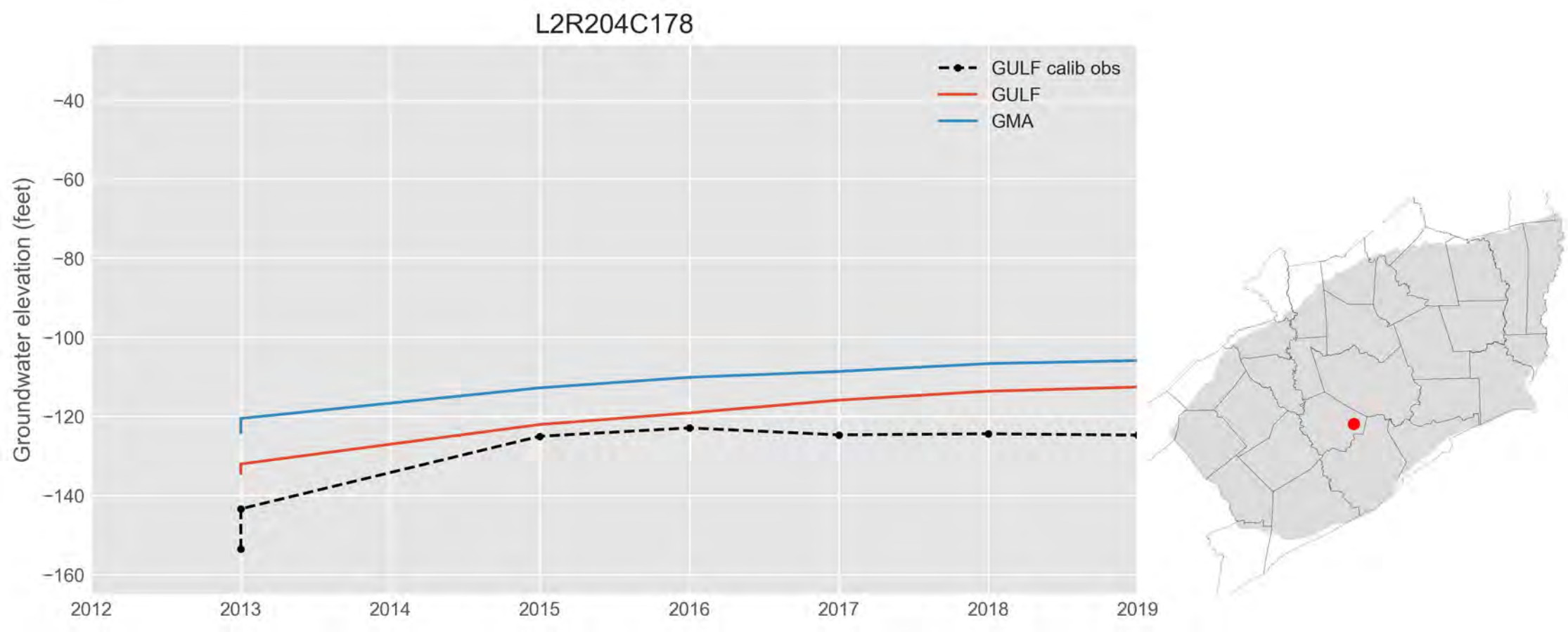

L2R202C228
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1970
1980
1990
2000
2010
2020

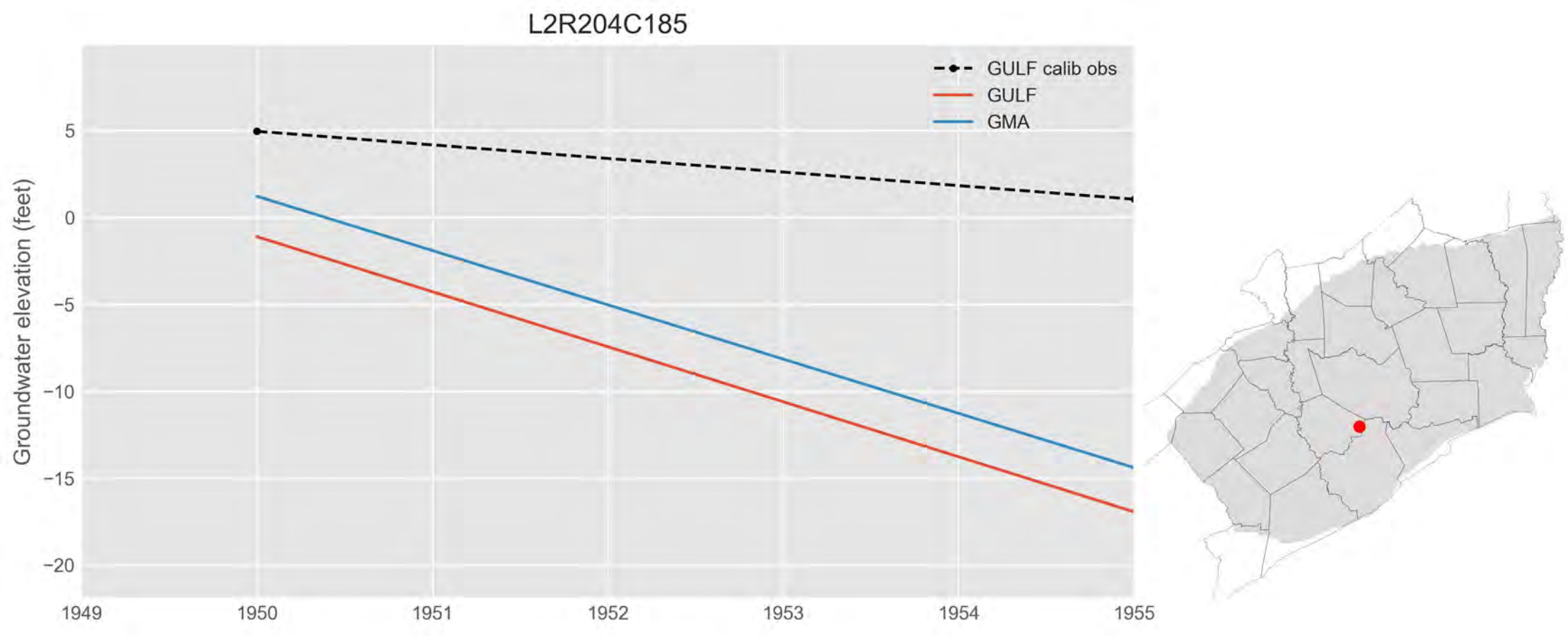

L2R202C230
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
−225
1960
1965
1970
1975
1980
1985
1990

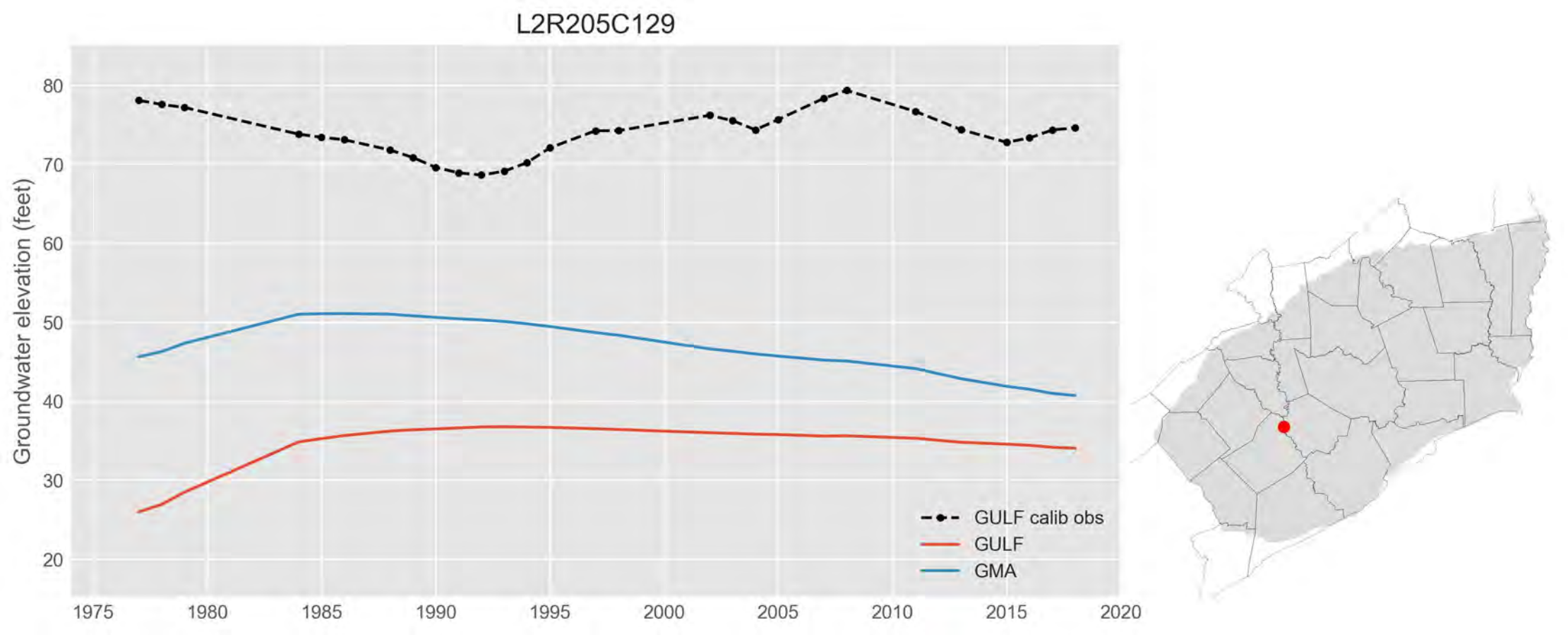

L2R203C102
Groundwater elevation (feet)
140
120
100
80
60
40
1969
1970
1971
1972
1973
1974
1975
GULF calib obs
GULF
GMA

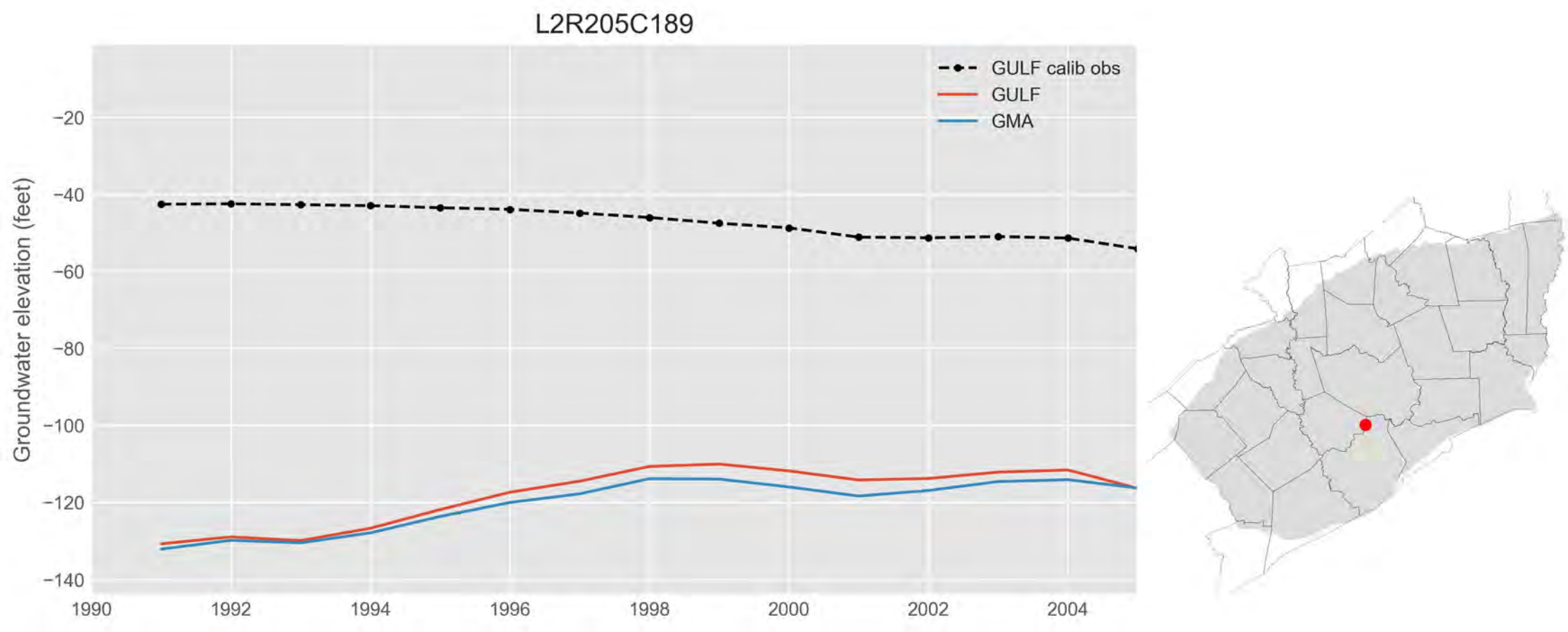

L2R203C221
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1960
1970
1980
1990
2000

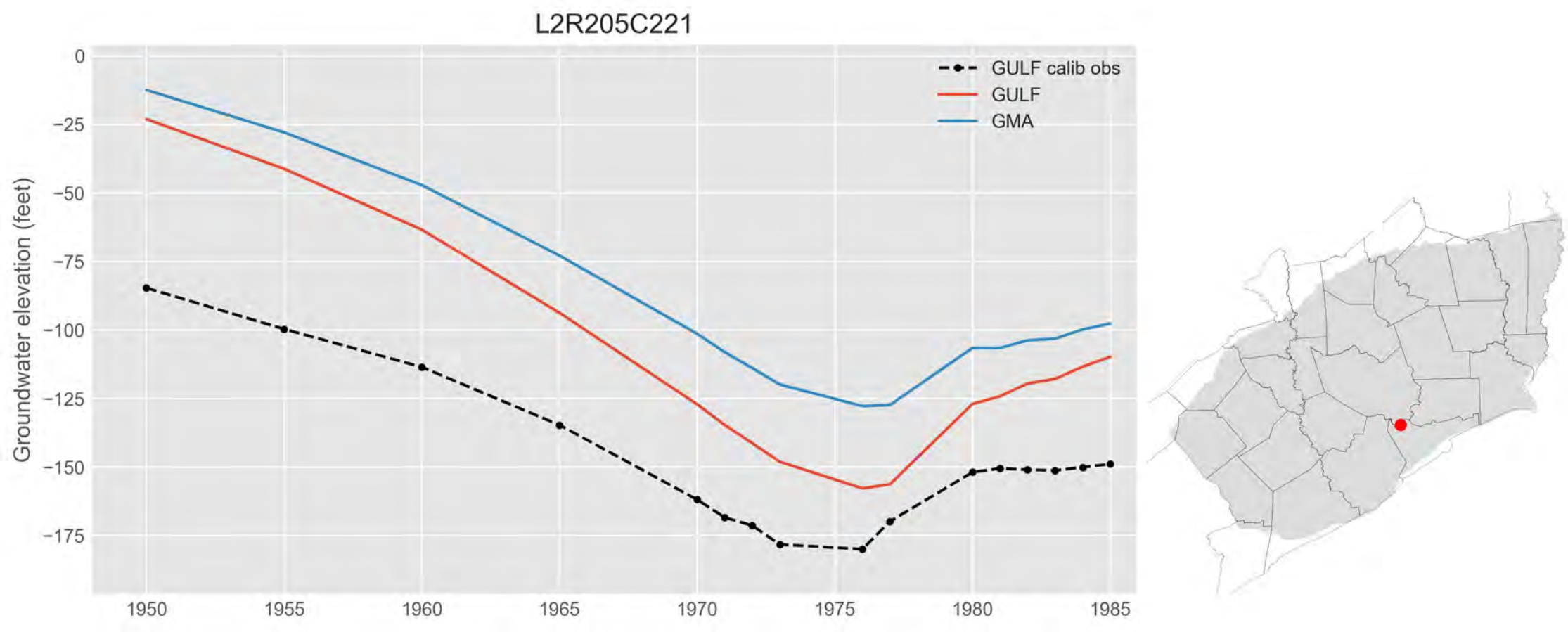

L2R204C168
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
−90
1970
1972
1974
1976
1978
1980
1982
1984
1986

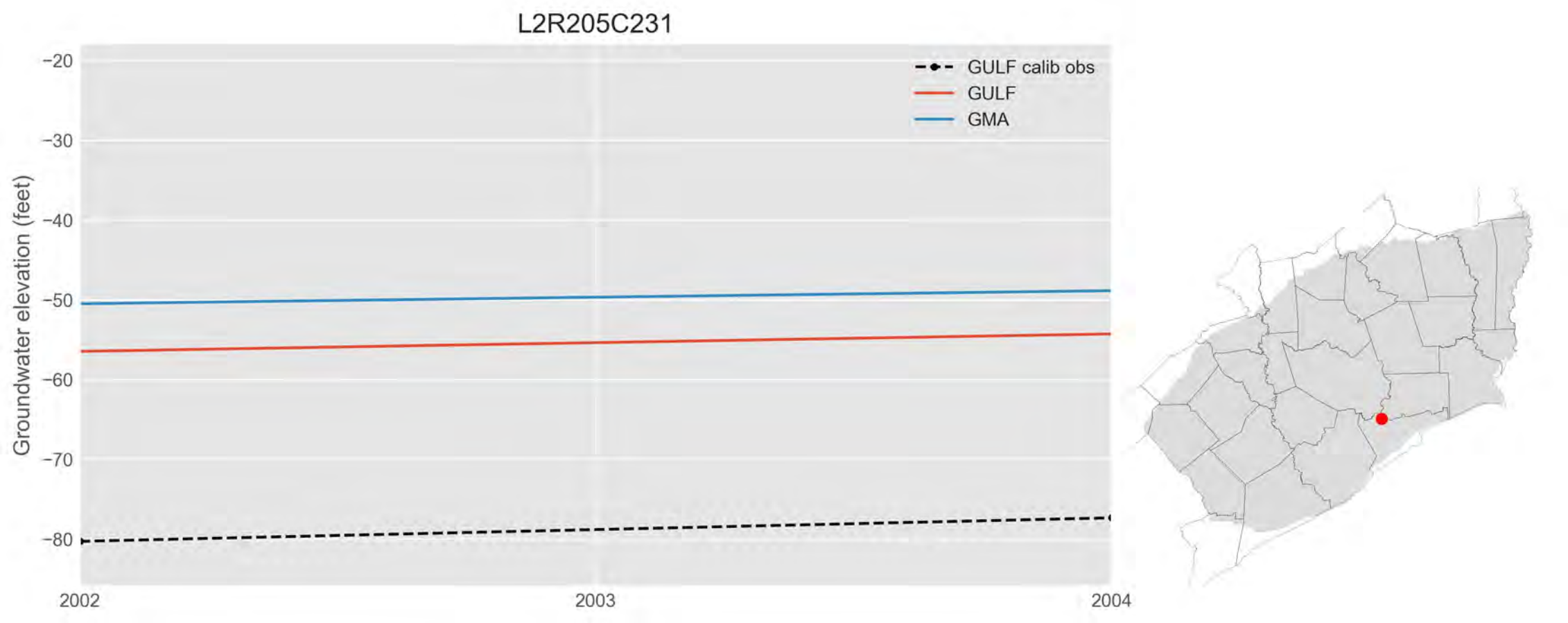

L2R204C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
2012
2013
2014
2015
2016
2017
2018
2019

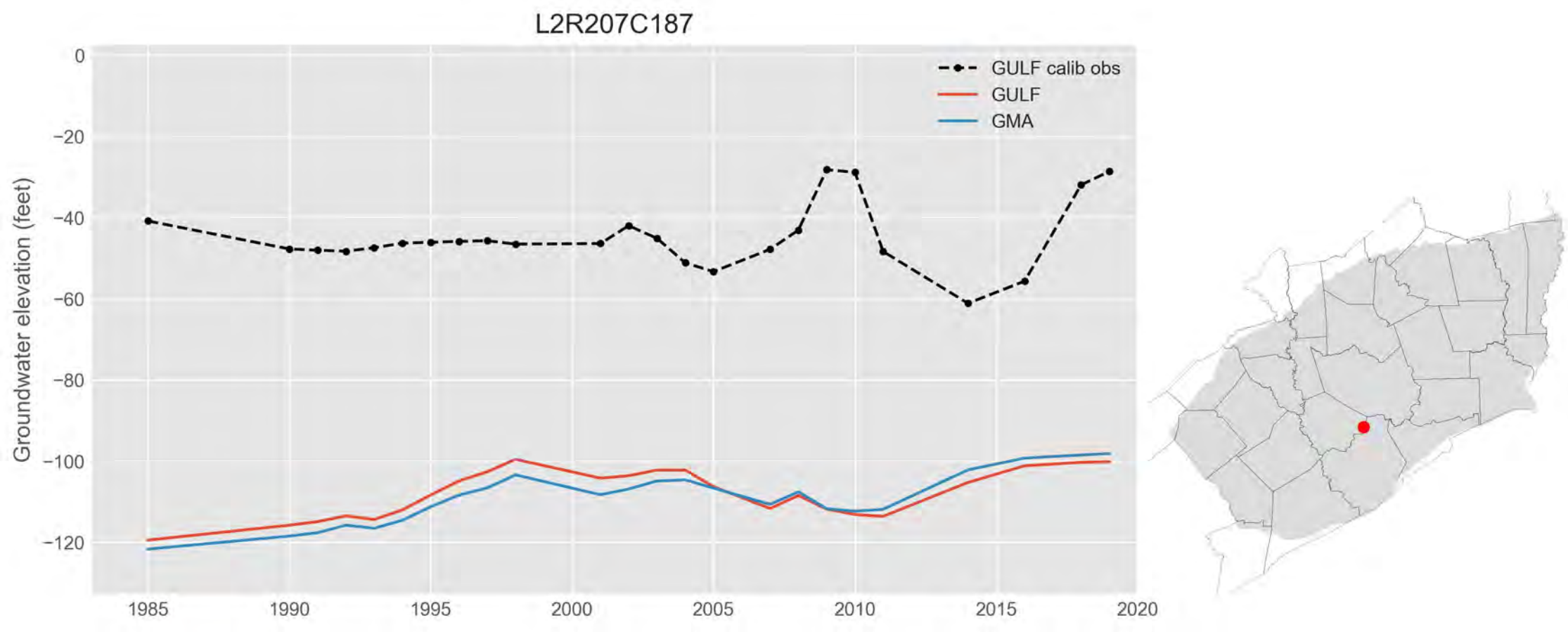

L2R204C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
5
0
−5
−10
−15
−20
1949
1950
1951
1952
1953
1954
1955

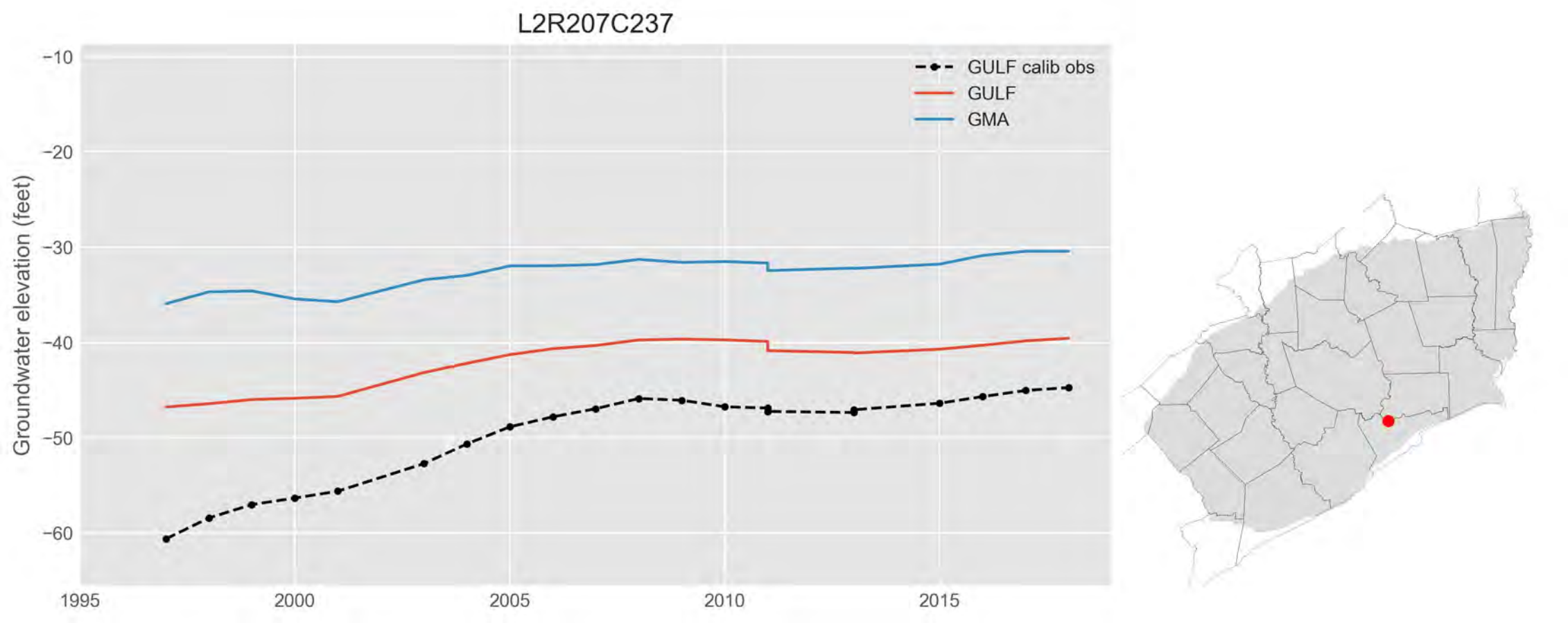

L2R205C129
Groundwater elevation (feet)
80
70
60
50
40
30
20
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
GULF calib obs
GULF
GMA

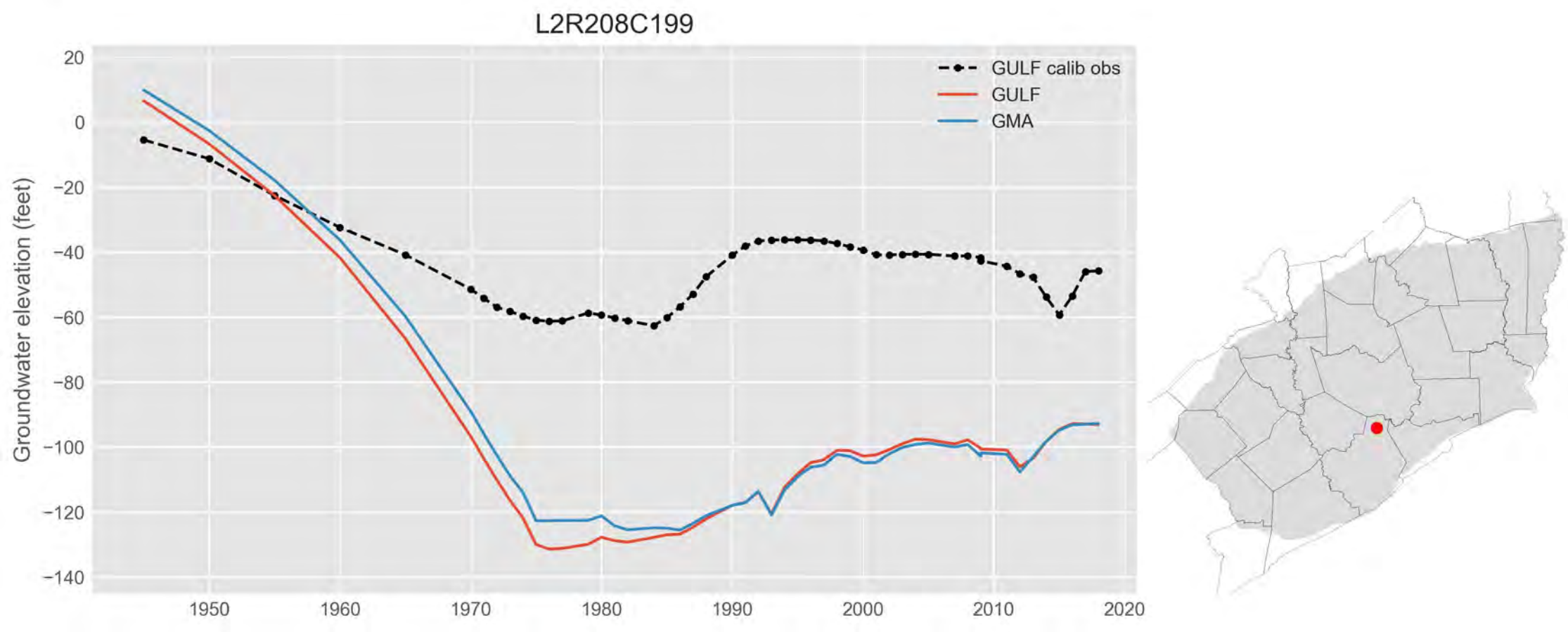

L2R205C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1990
1992
1994
1996
1998
2000
2002
2004

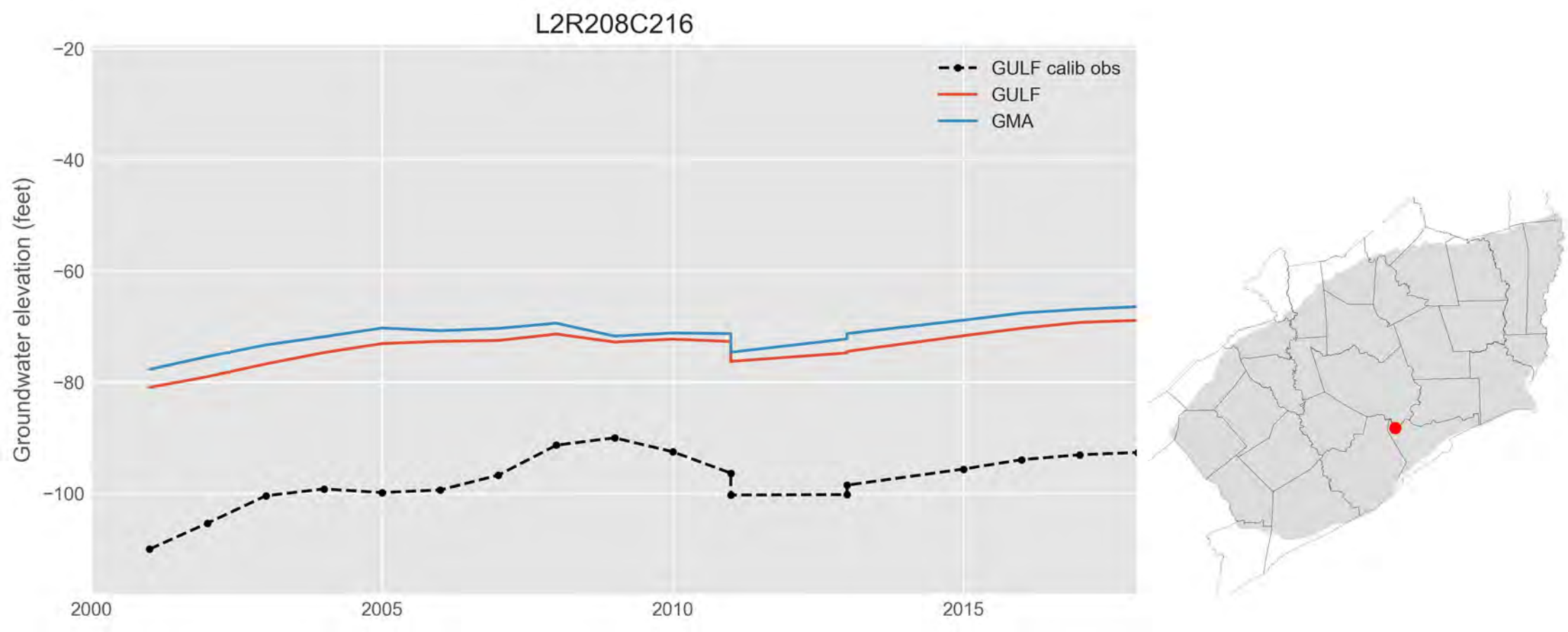

L2R205C221
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
1950
1955
1960
1965
1970
1975
1980
1985

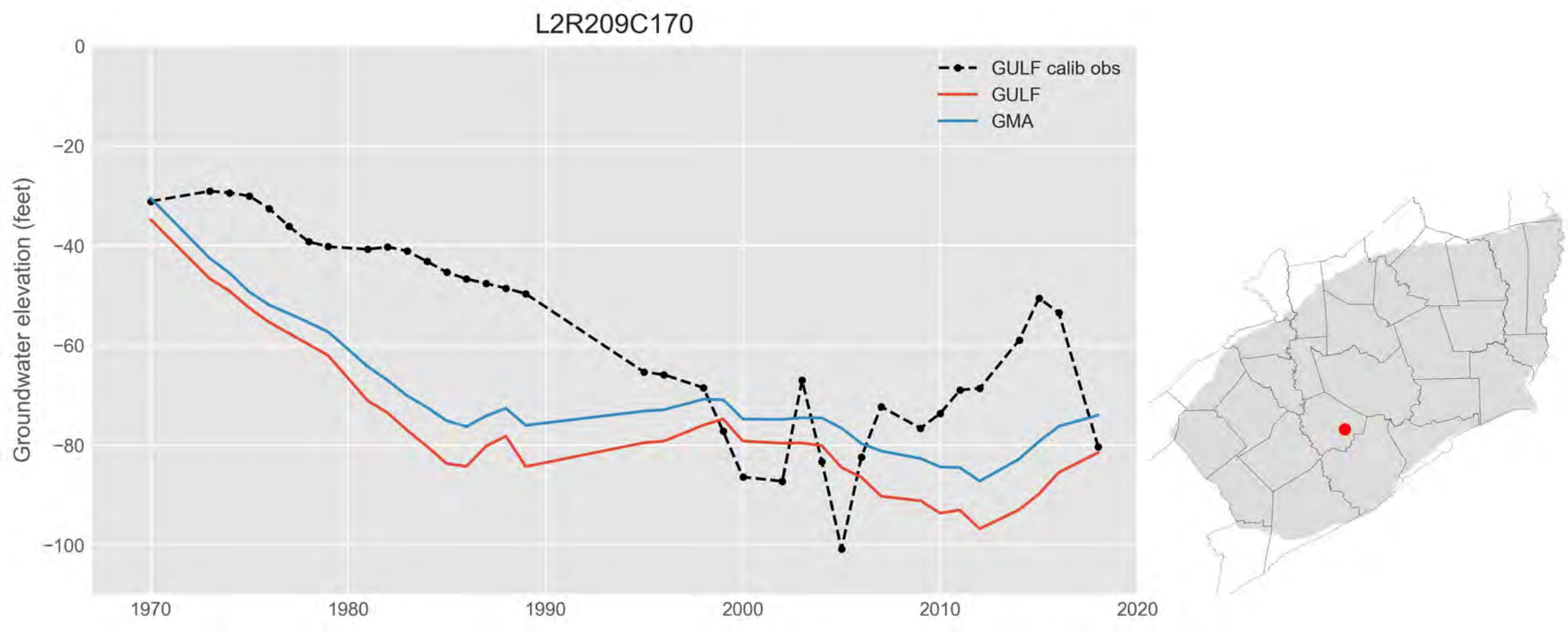

L2R205C231
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
2002
2003
2004

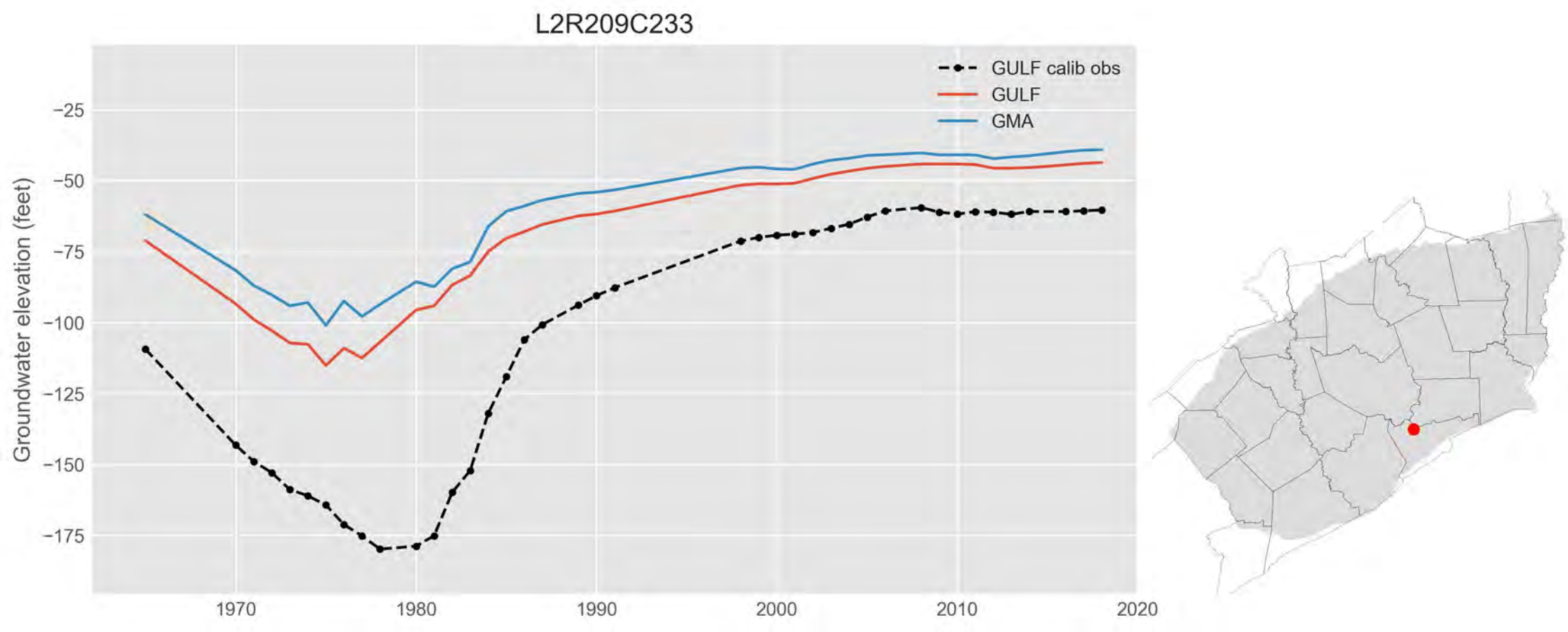

L2R207C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
1985
1990
1995
2000
2005
2010
2015
2020

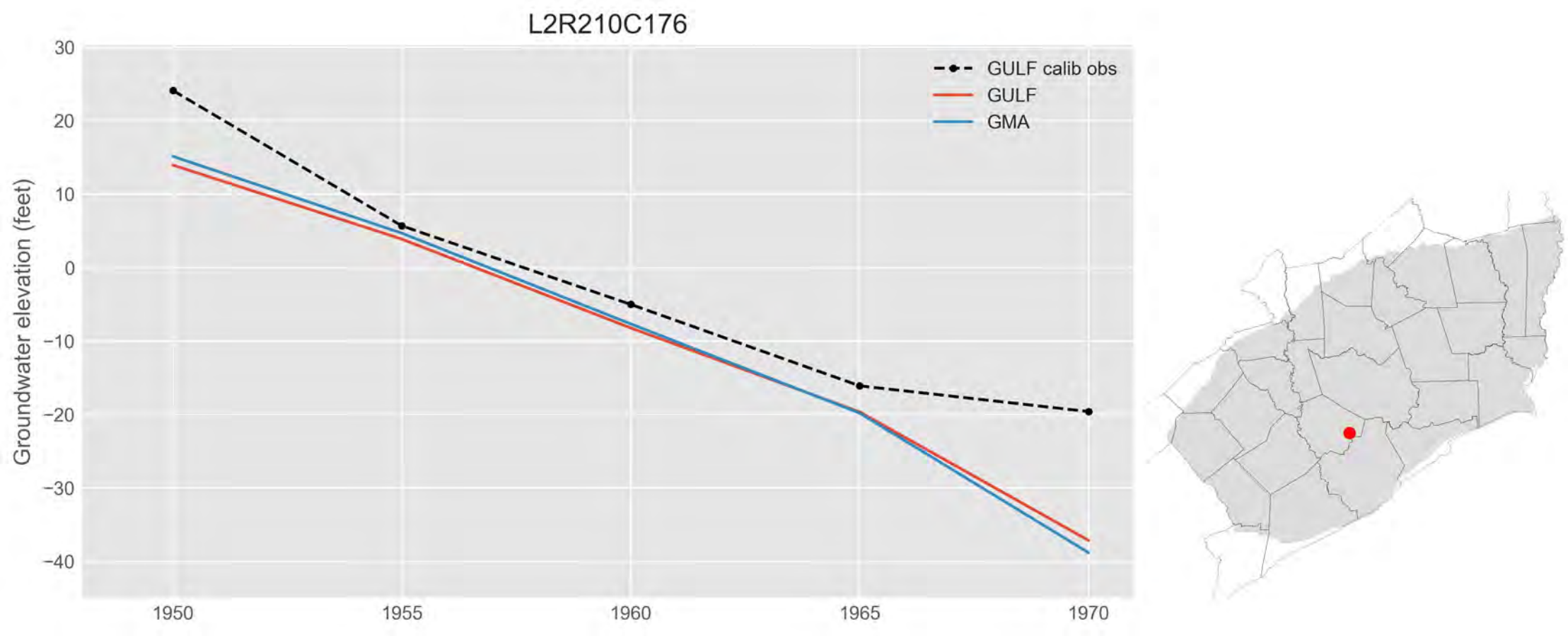

L2R207C237
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
1995
2000
2005
2010
2015

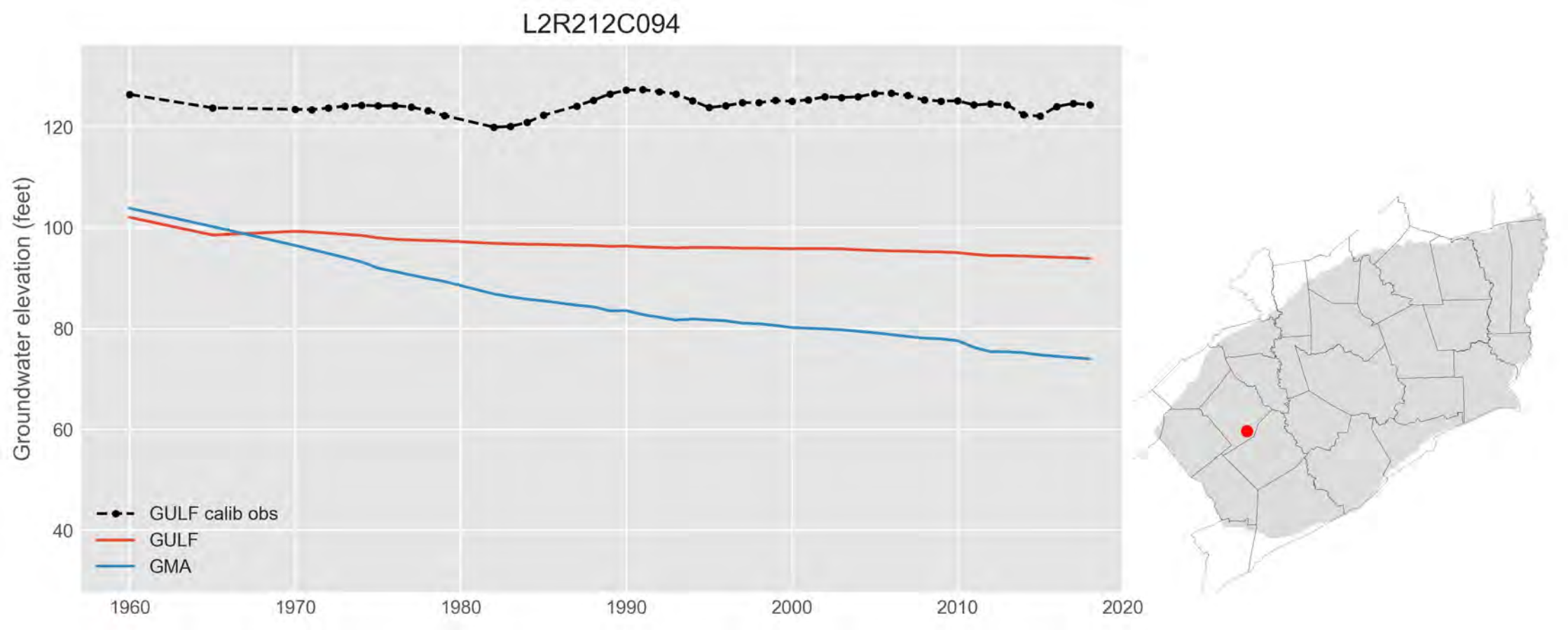

L2R208C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
−100
−120
−140
1950
1960
1970
1980
1990
2000
2010
2020

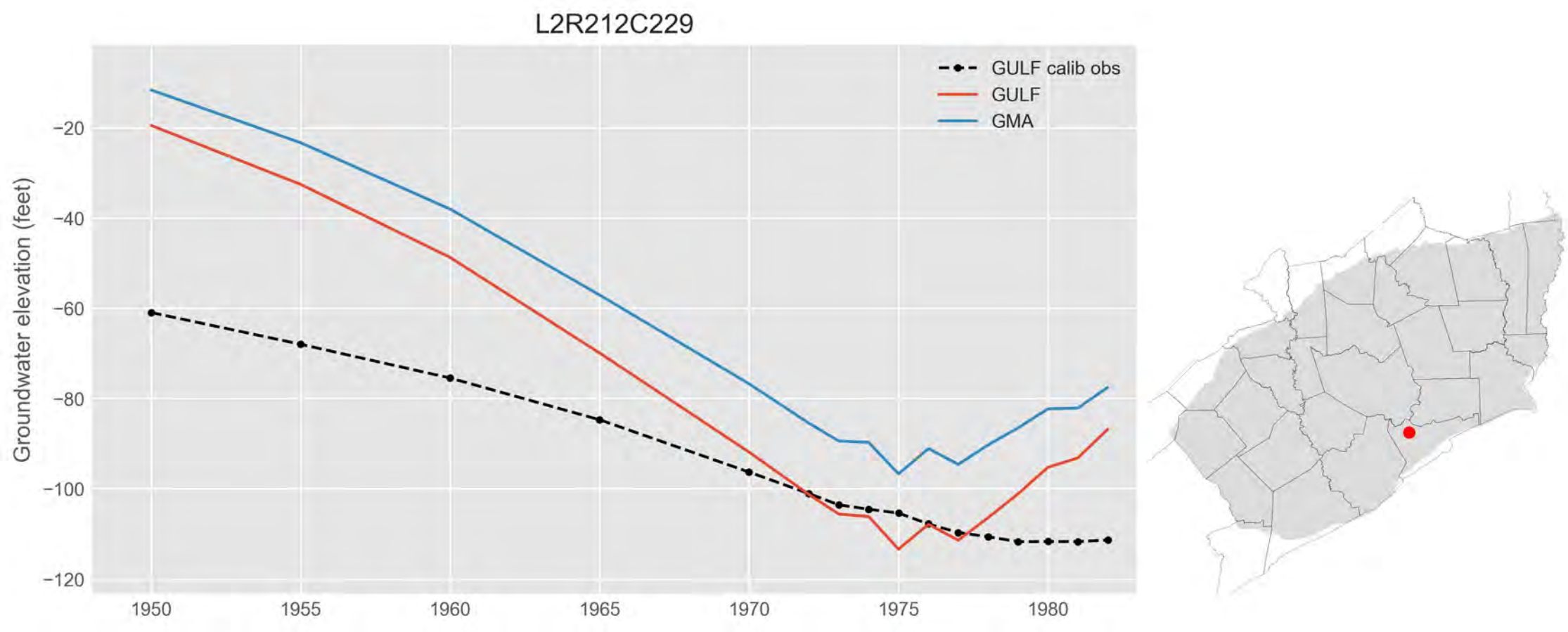

L2R208C216
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
2000
2005
2010
2015

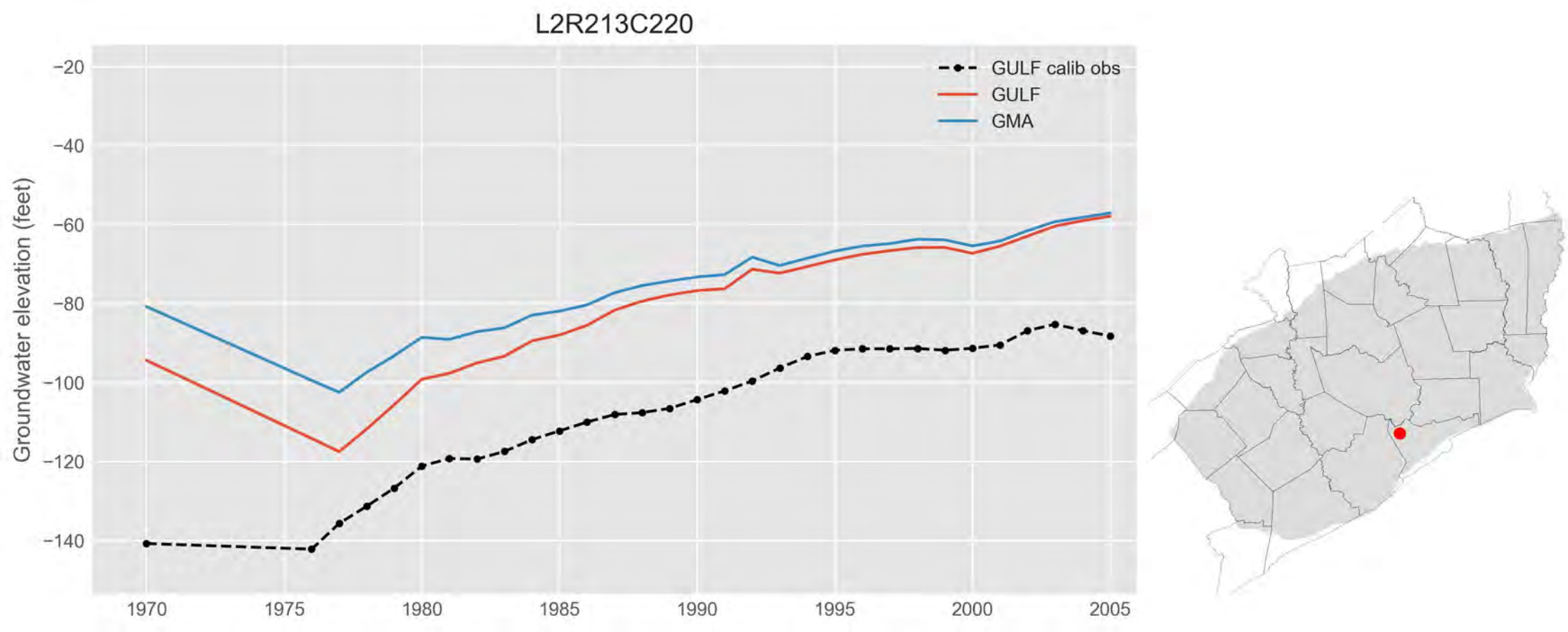

L2R209C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
1970
1980
1990
2000
2010
2020

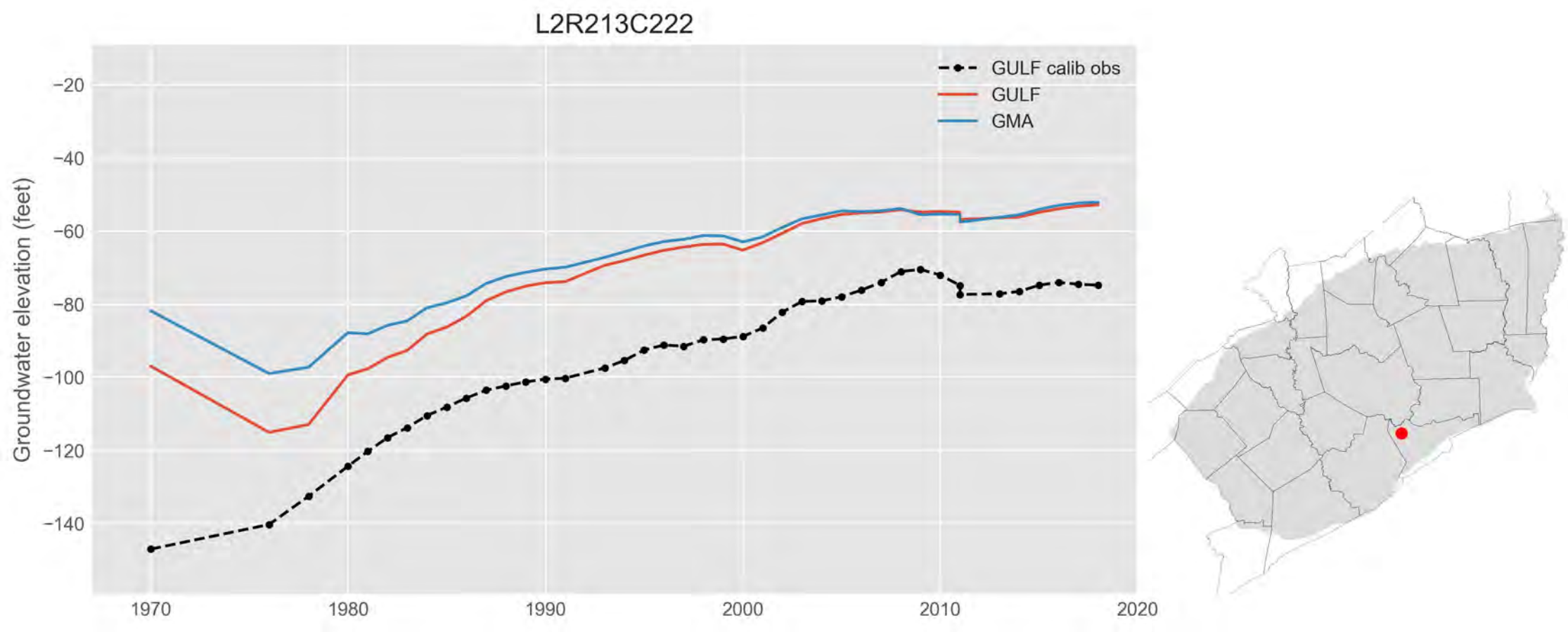

L2R209C233
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
1970
1980
1990
2000
2010
2020

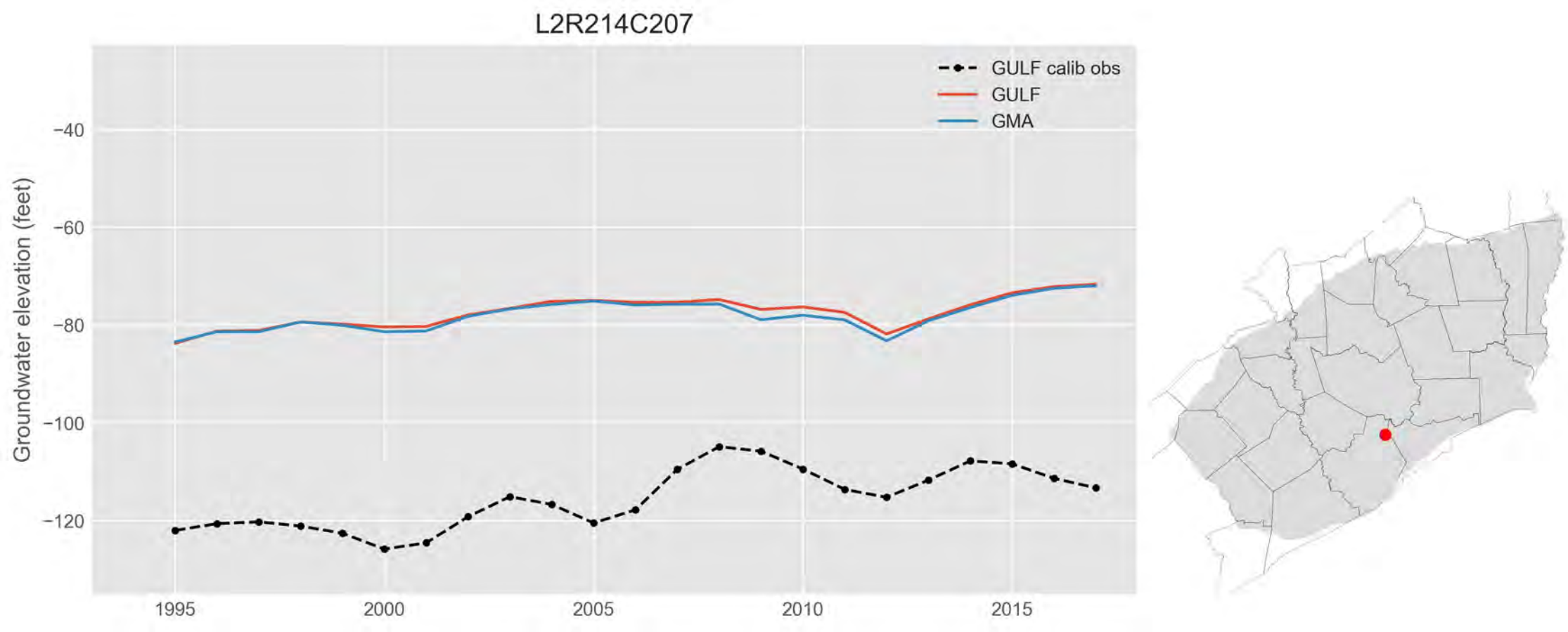

L2R210C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
−30
−40
1950
1955
1960
1965
1970

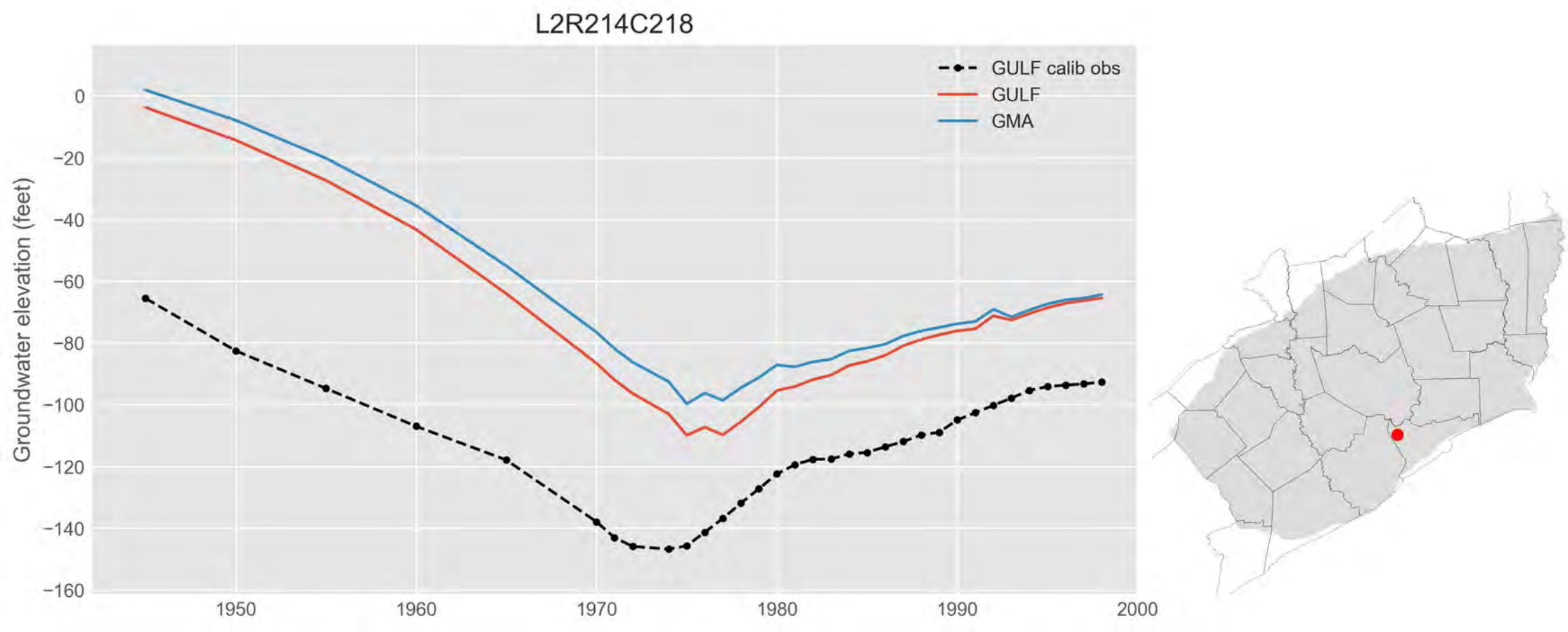

L2R212C094
Groundwater elevation (feet)
120
100
80
60
40
1960
1970
1980
1990
2000
2010
2020
GULF calib obs
GULF
GMA


L2R212C229
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1950
1955
1960
1965
1970
1975
1980

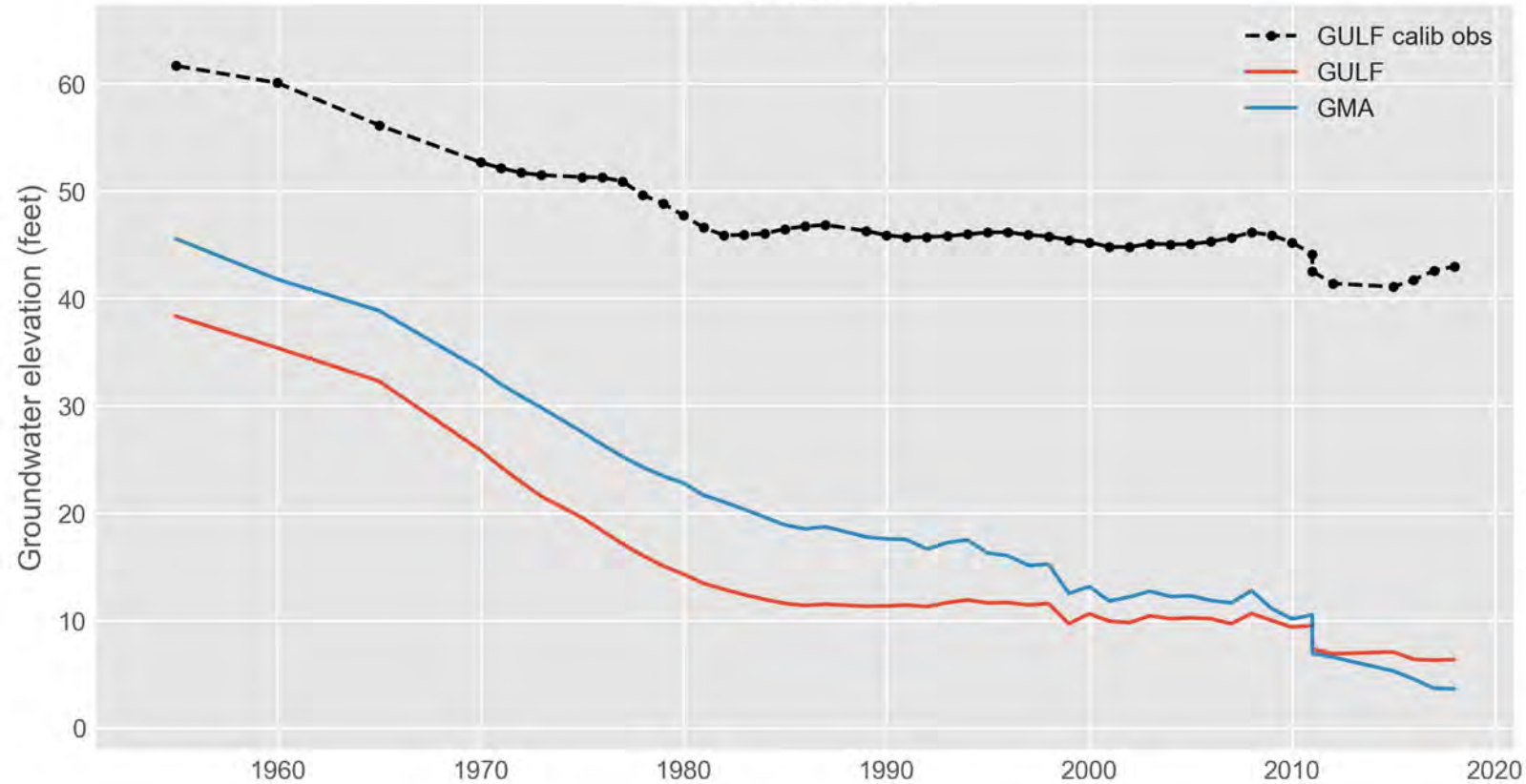

L2R213C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1970
1975
1980
1985
1990
1995
2000
2005

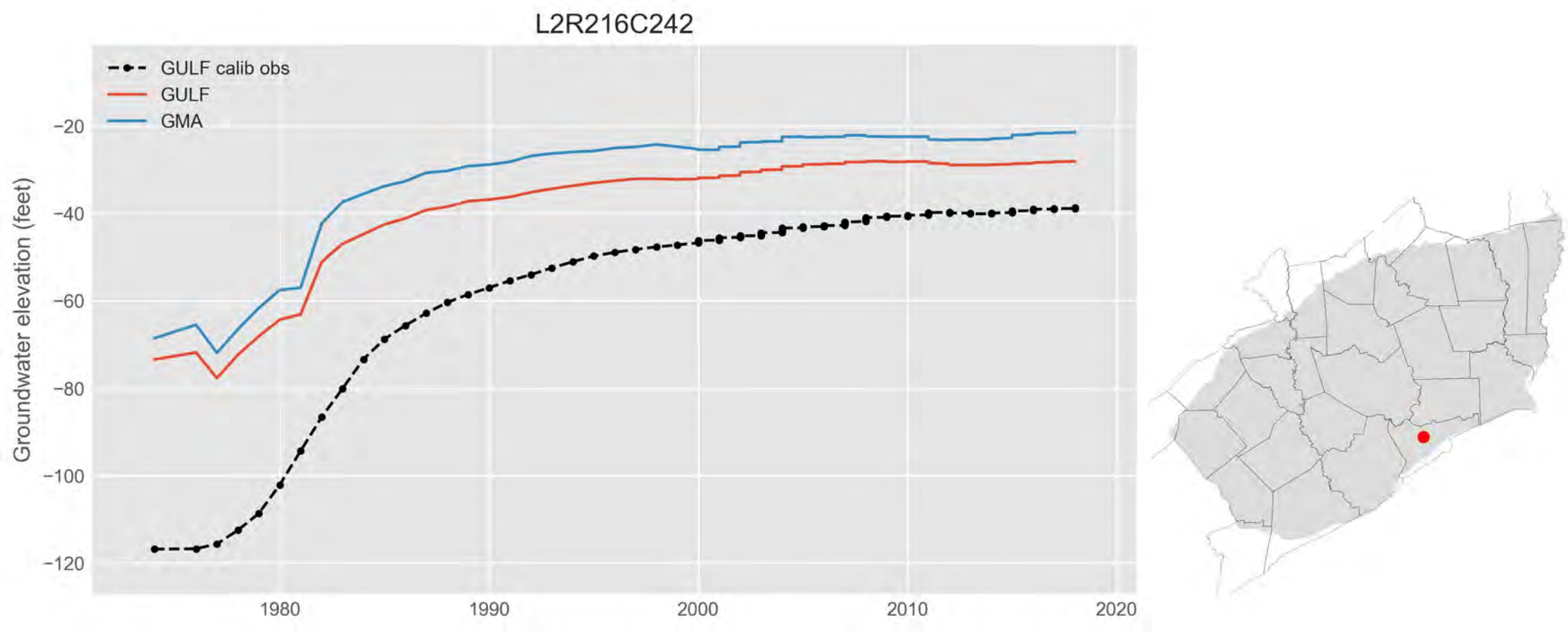

L2R213C222
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1970
1980
1990
2000
2010
2020

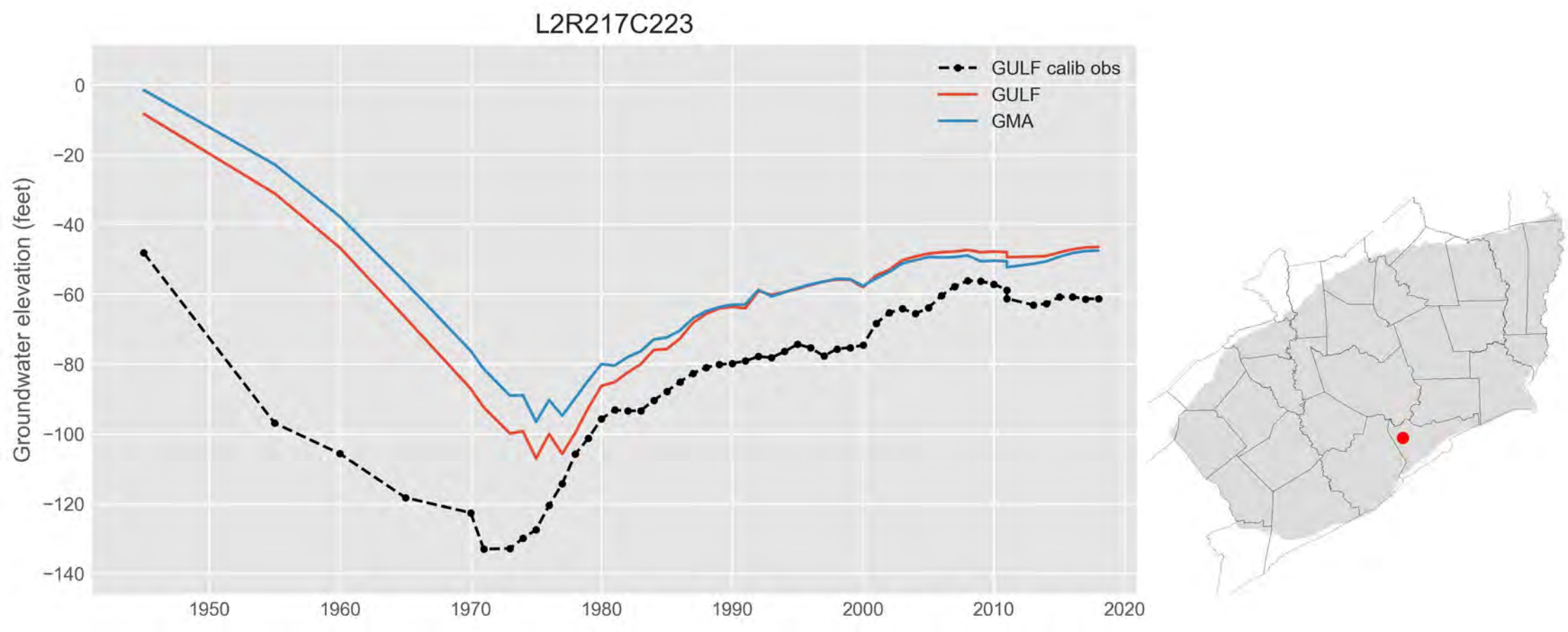

L2R214C207
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
1995
2000
2005
2010
2015

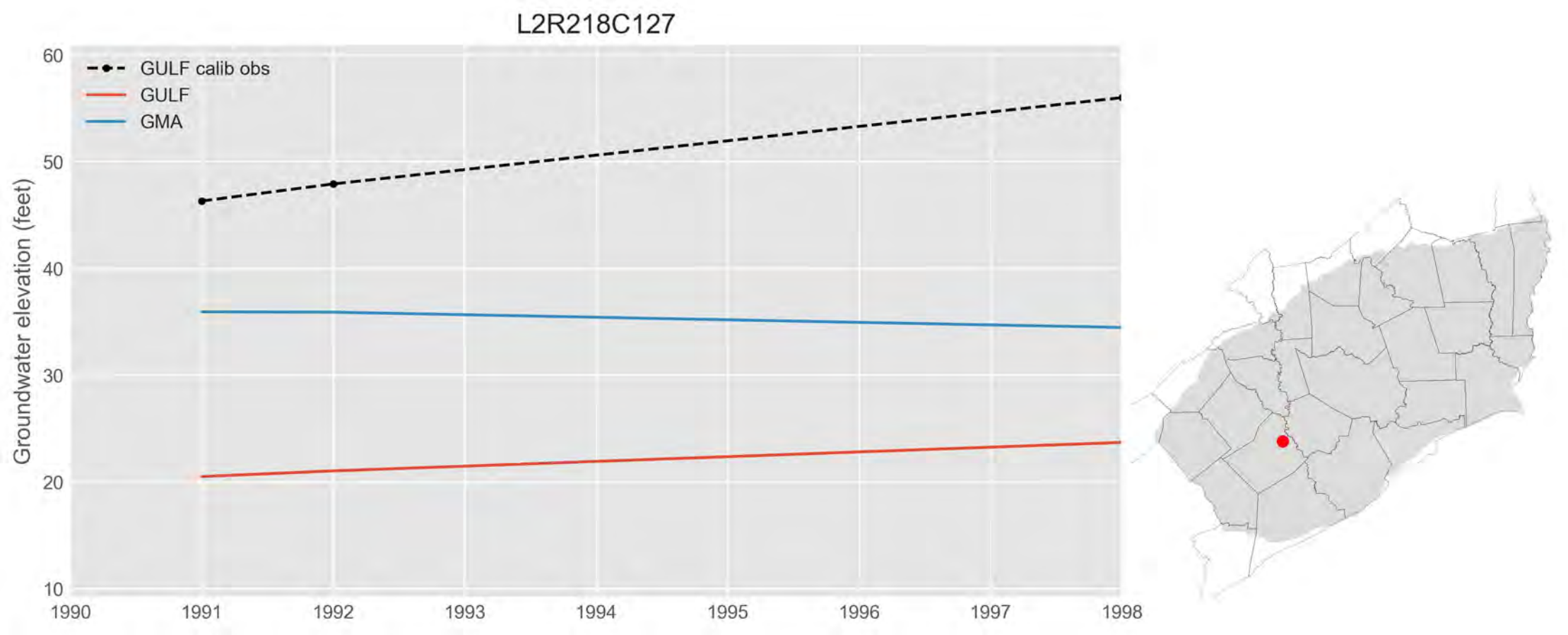

L2R214C218
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
−160
1950
1960
1970
1980
1990
2000

L2R216C141

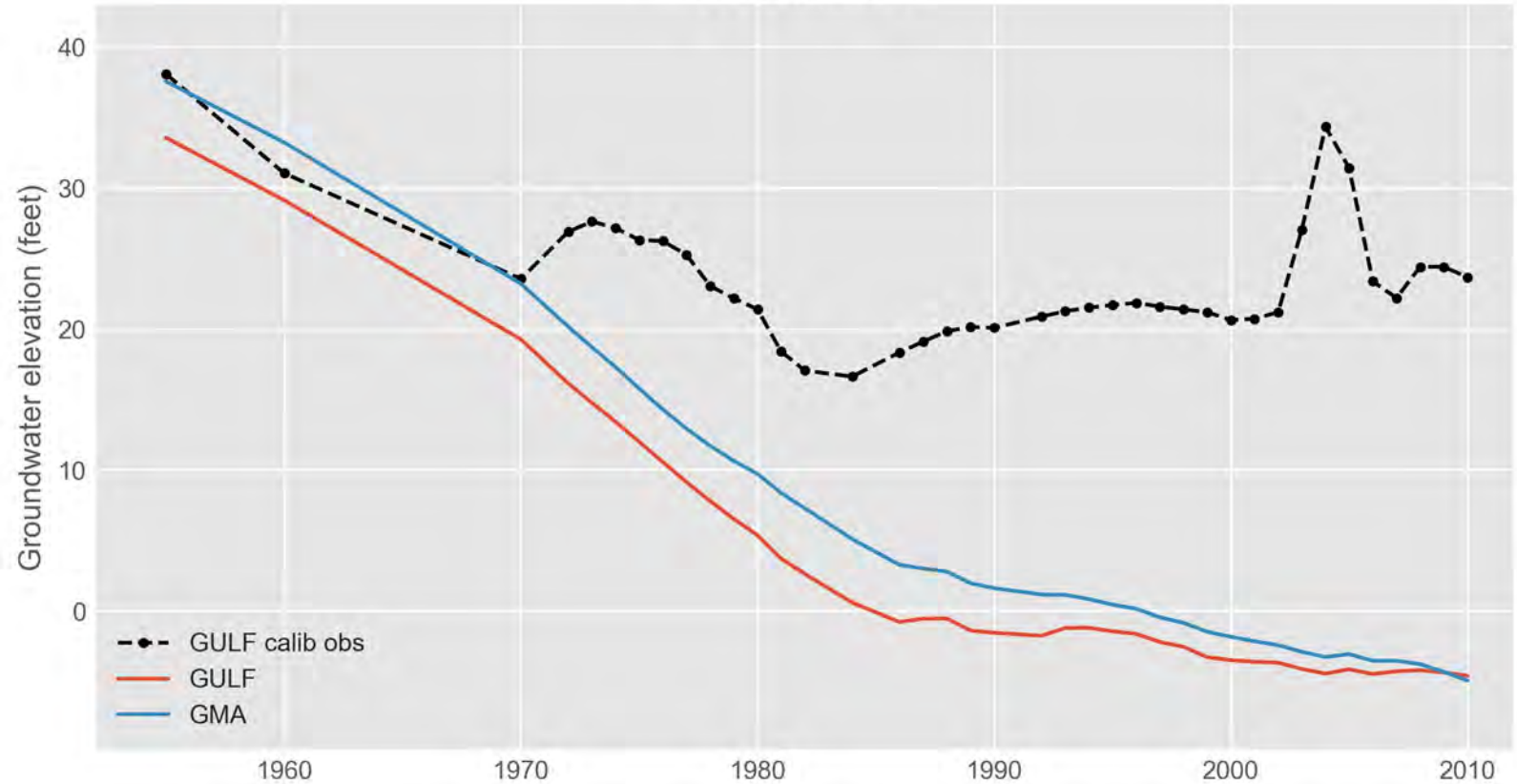

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
10
20
30
40
50
60
1960
1970
1980
1990
2000
2010
2020

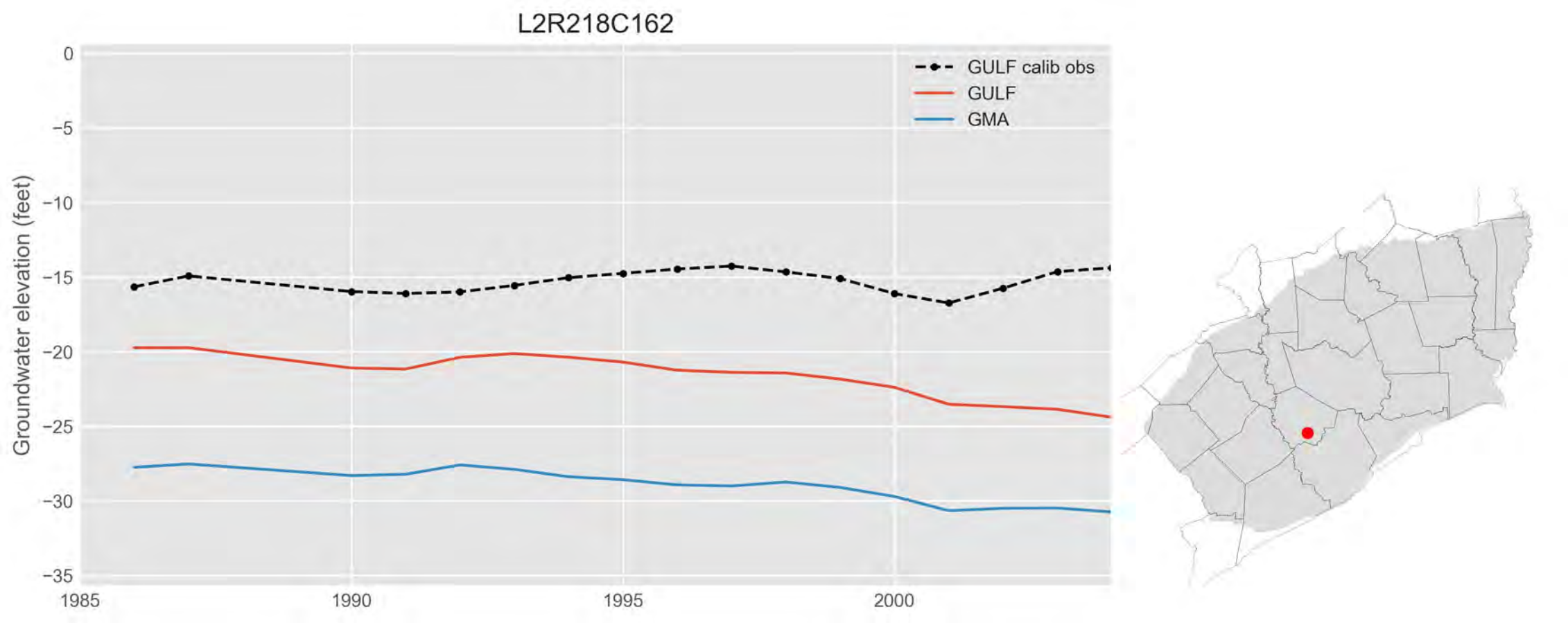

L2R216C242
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
1980
1990
2000
2010
2020

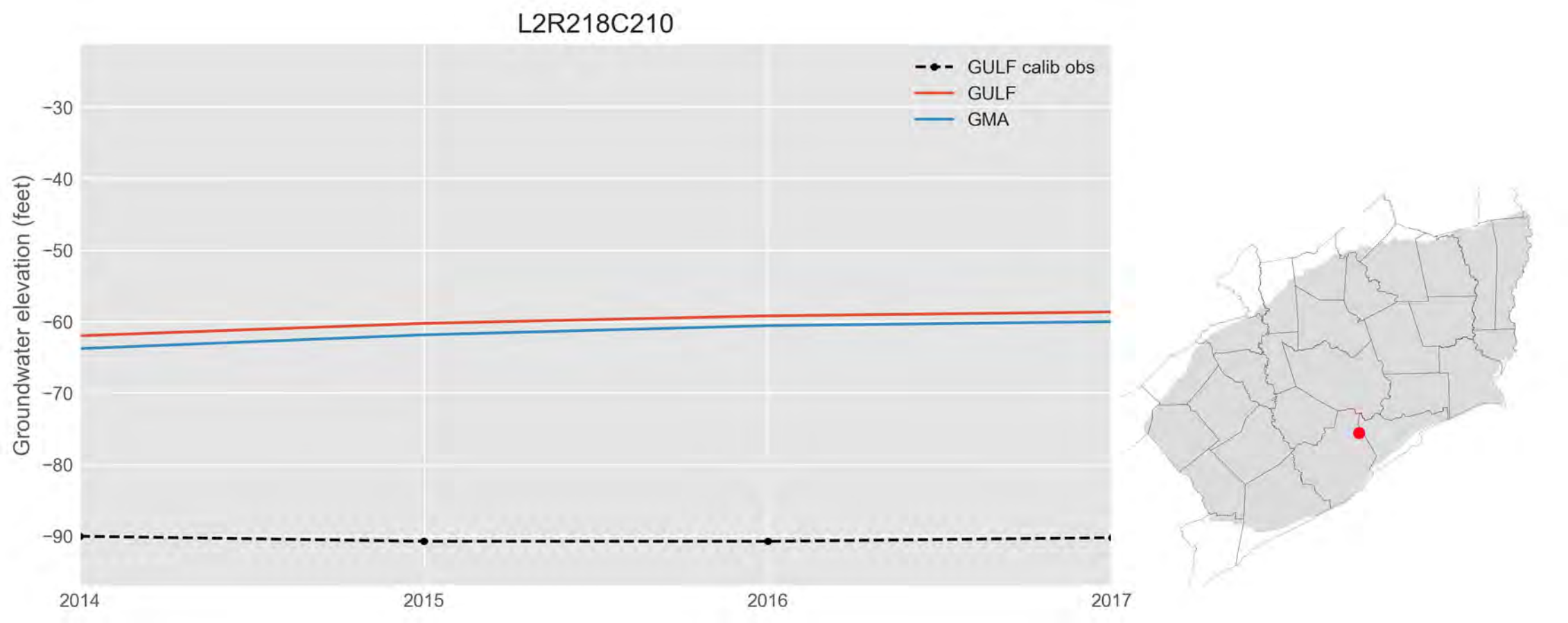

L2R217C223
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
1950
1960
1970
1980
1990
2000
2010
2020

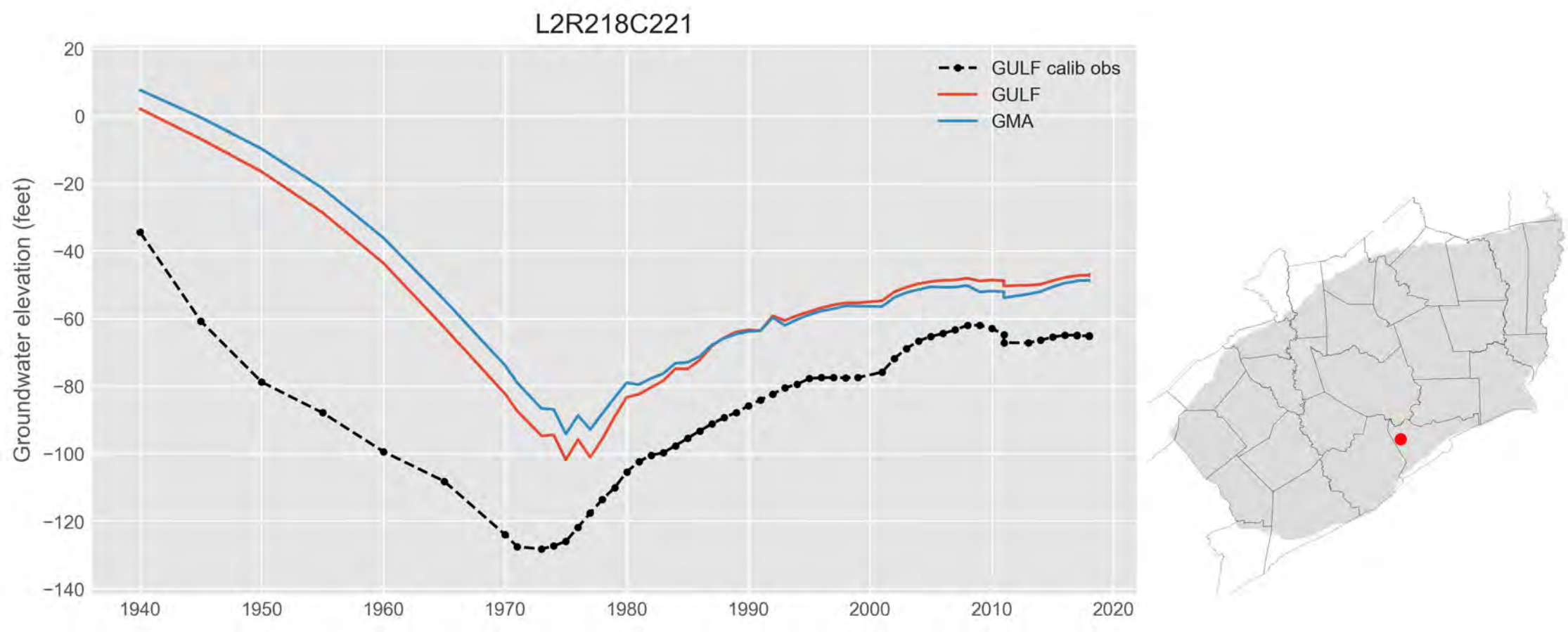

L2R218C127
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
50
40
30
20
10
1990
1991
1992
1993
1994
1995
1996
1997
1998

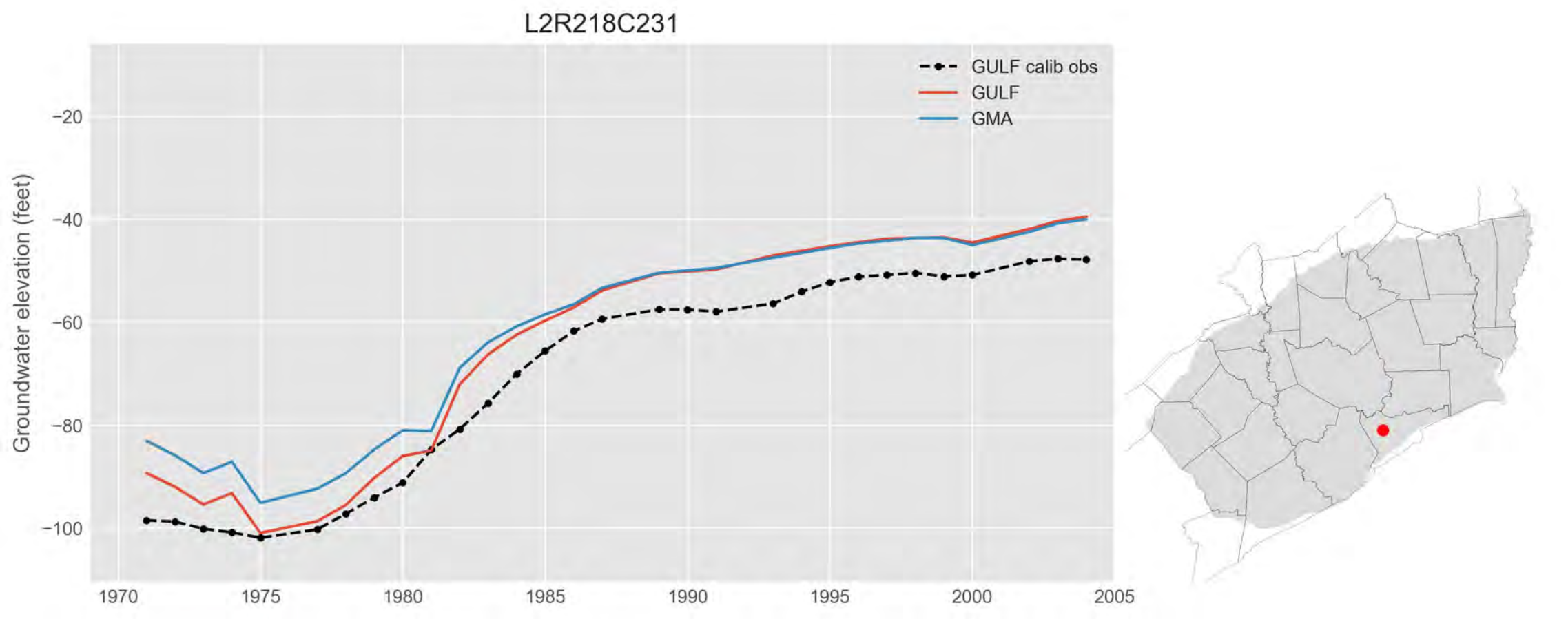
L2R218C150

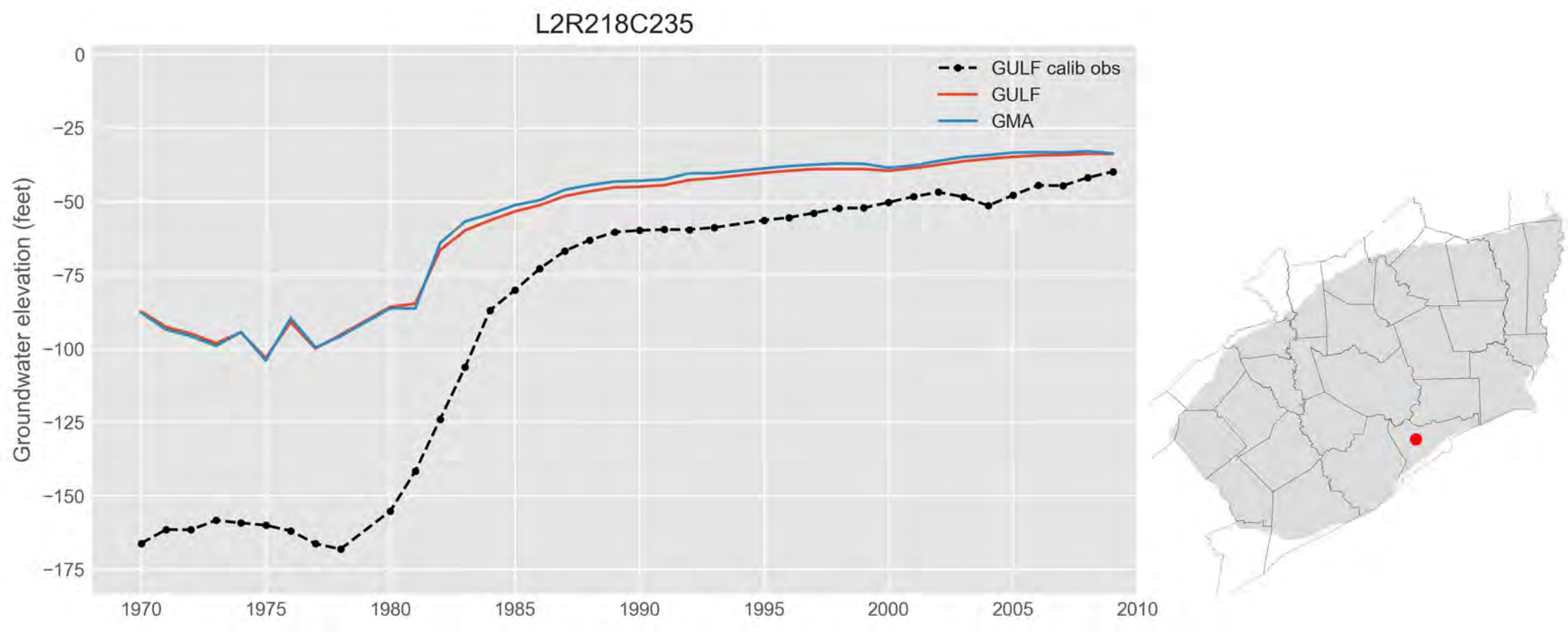

Groundwater elevation (feet)
40
30
20
10
0
1960
1970
1980
1990
2000
2010
GULF calib obs
GULF
GMA

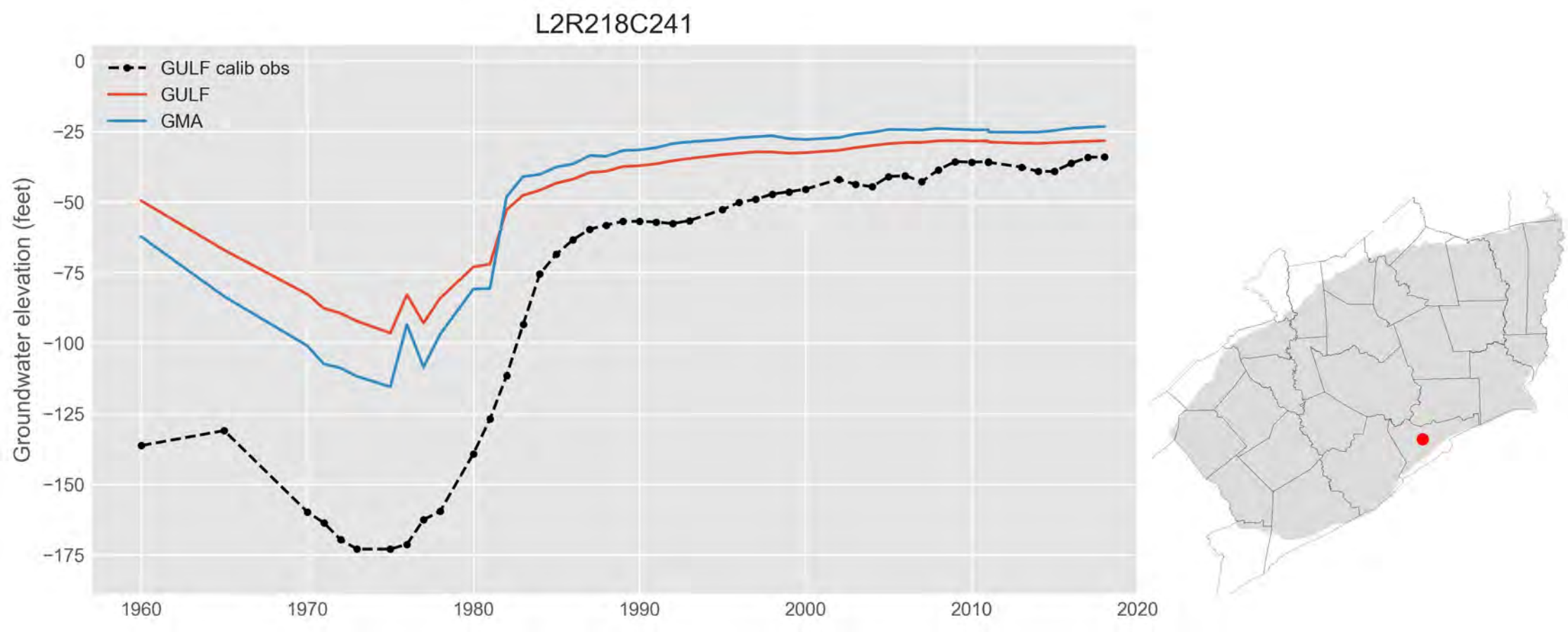

L2R218C162
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
1985
1990
1995
2000

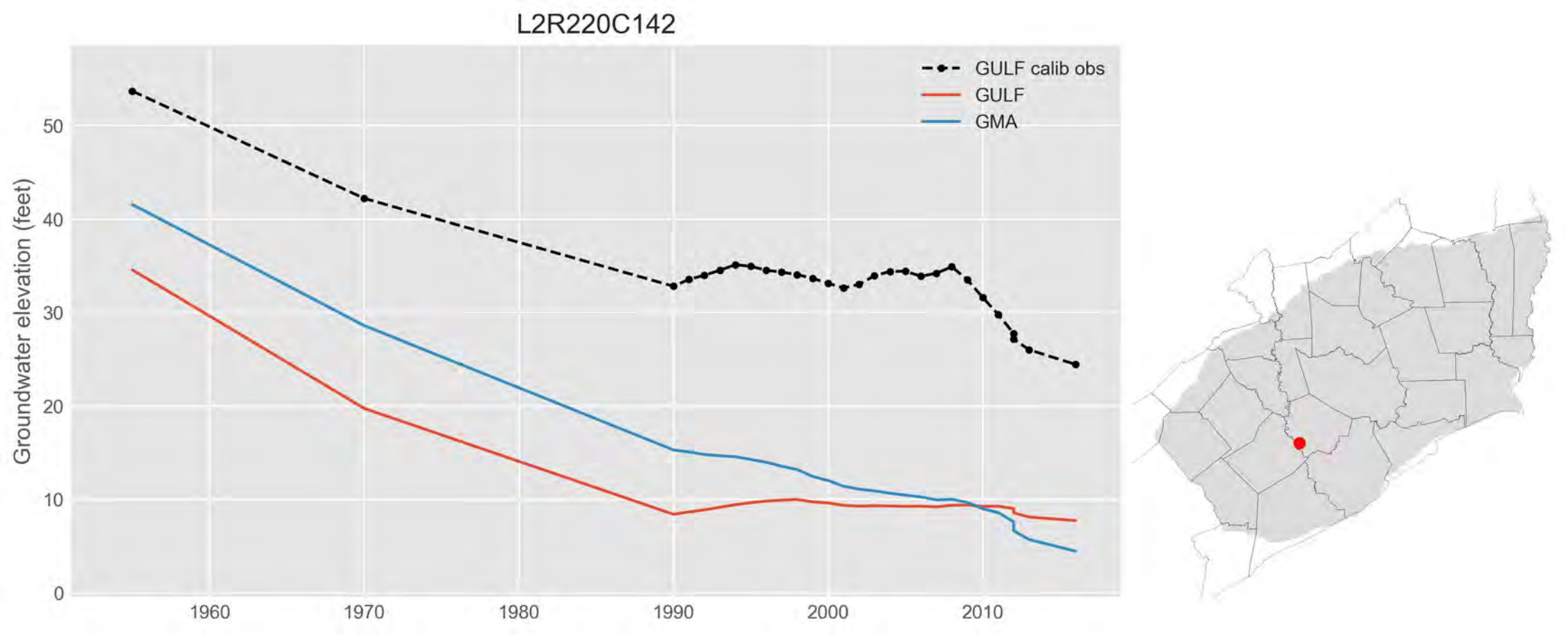

L2R218C210
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−30
−40
−50
−60
−70
−80
−90
2014
2015
2016
2017

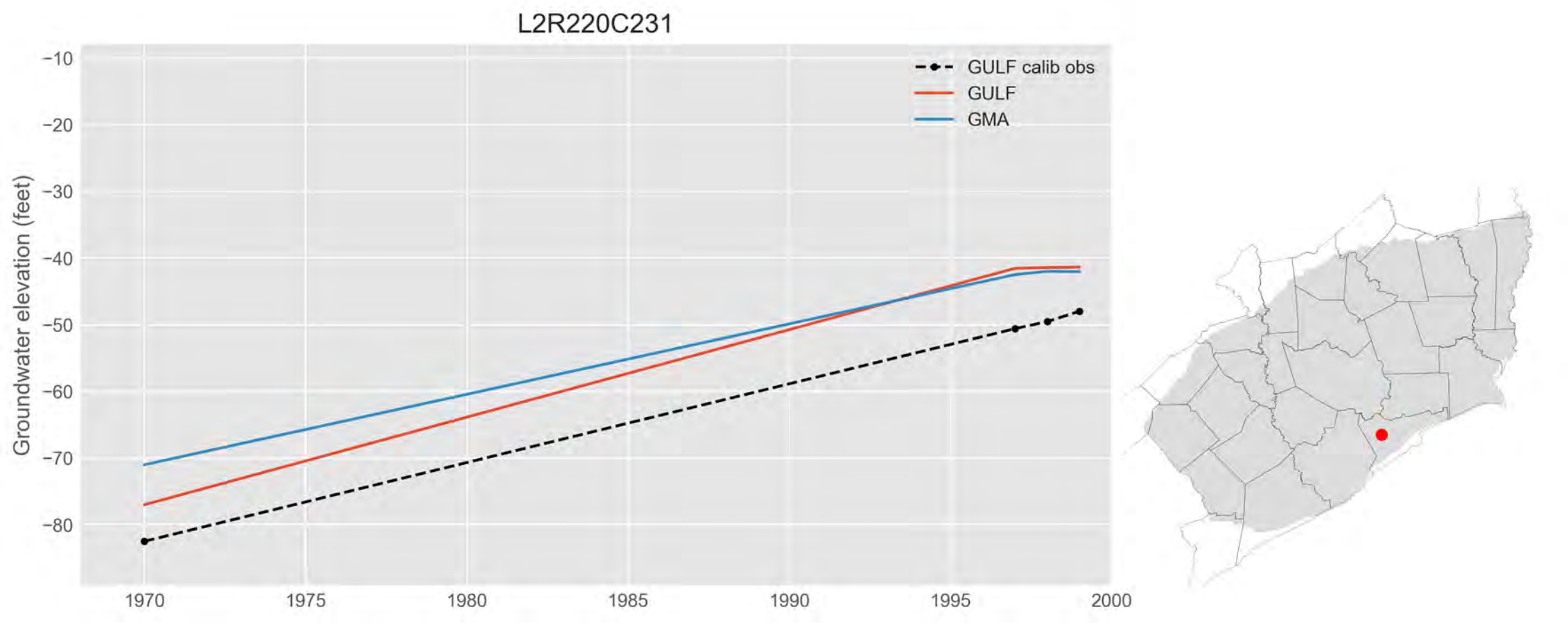

L2R218C221
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
−100
−120
−140
1940
1950
1960
1970
1980
1990
2000
2010
2020

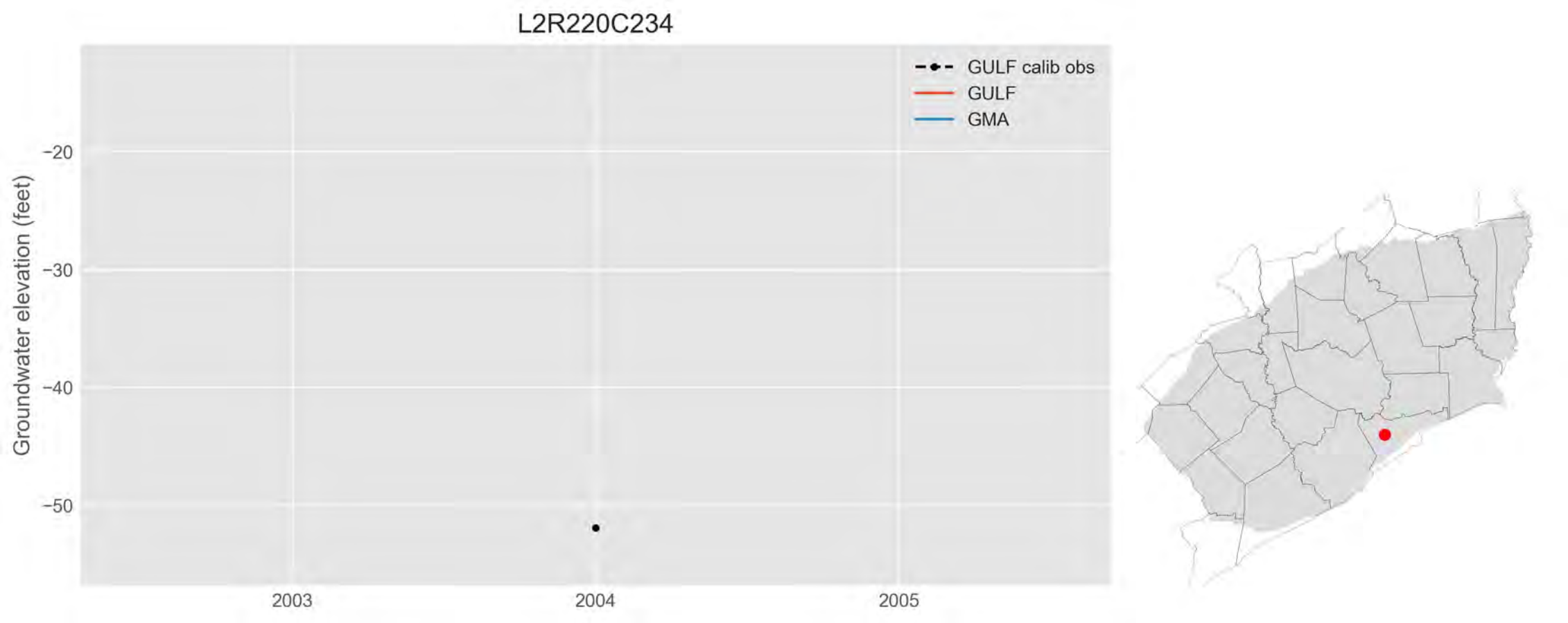

L2R218C231
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
1970
1975
1980
1985
1990
1995
2000
2005

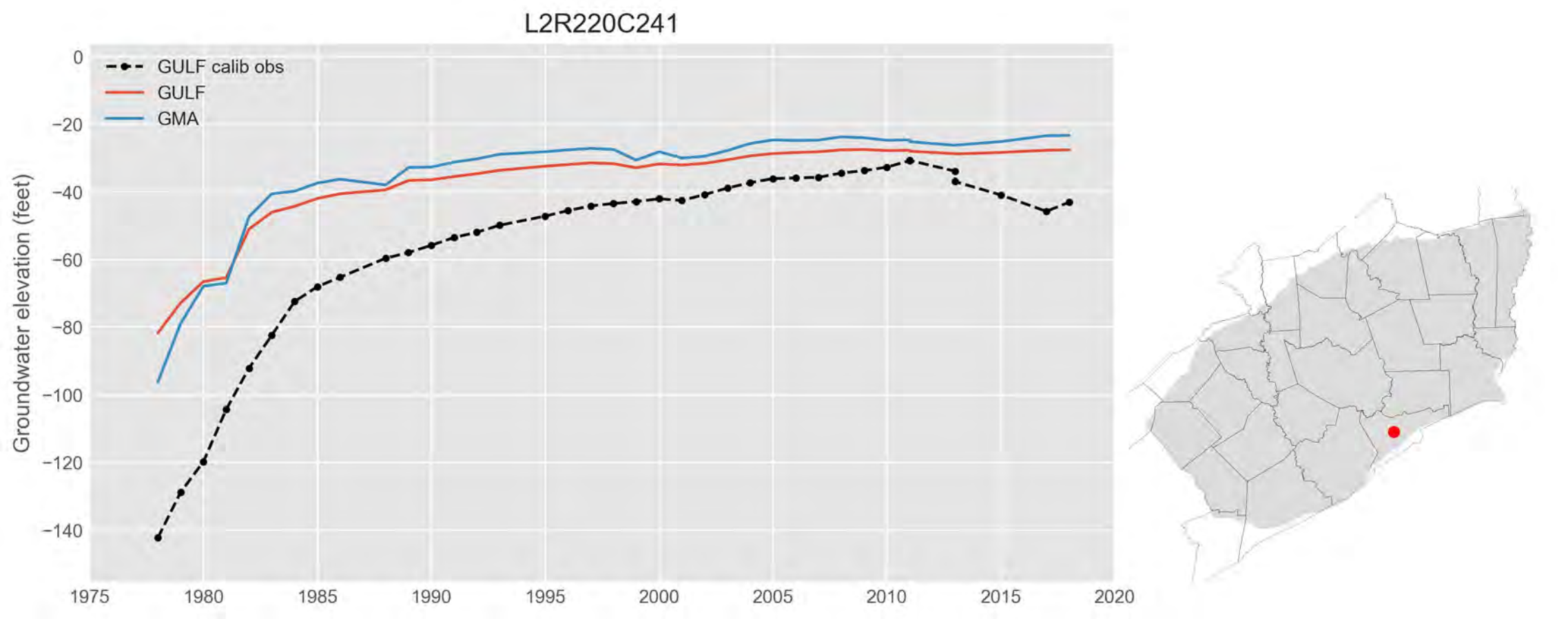

L2R218C235
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
1970
1975
1980
1985
1990
1995
2000
2005
2010


L2R218C241
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
1960
1970
1980
1990
2000
2010
2020

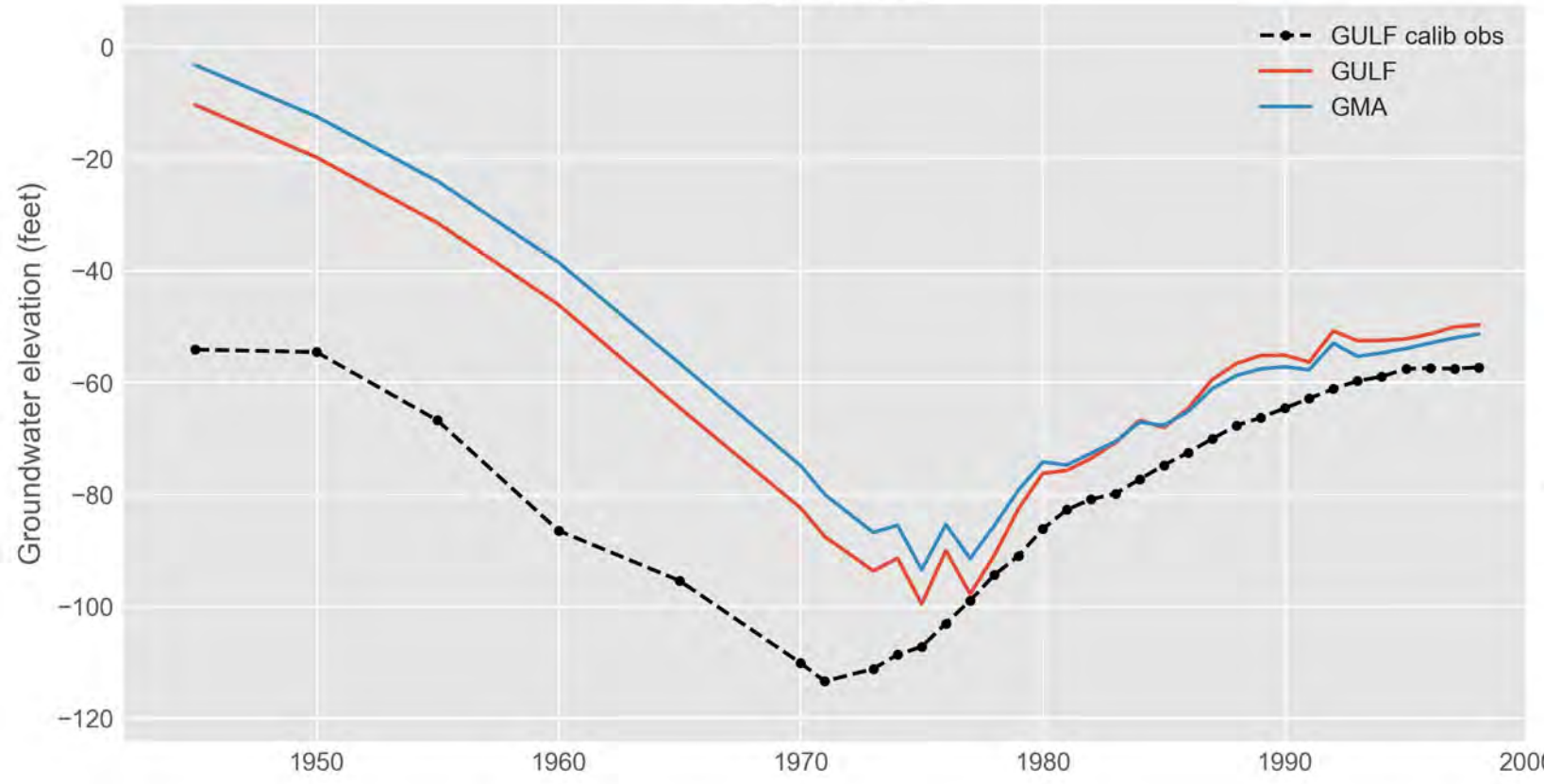

L2R220C142
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
10
20
30
40
50
1960
1970
1980
1990
2000
2010

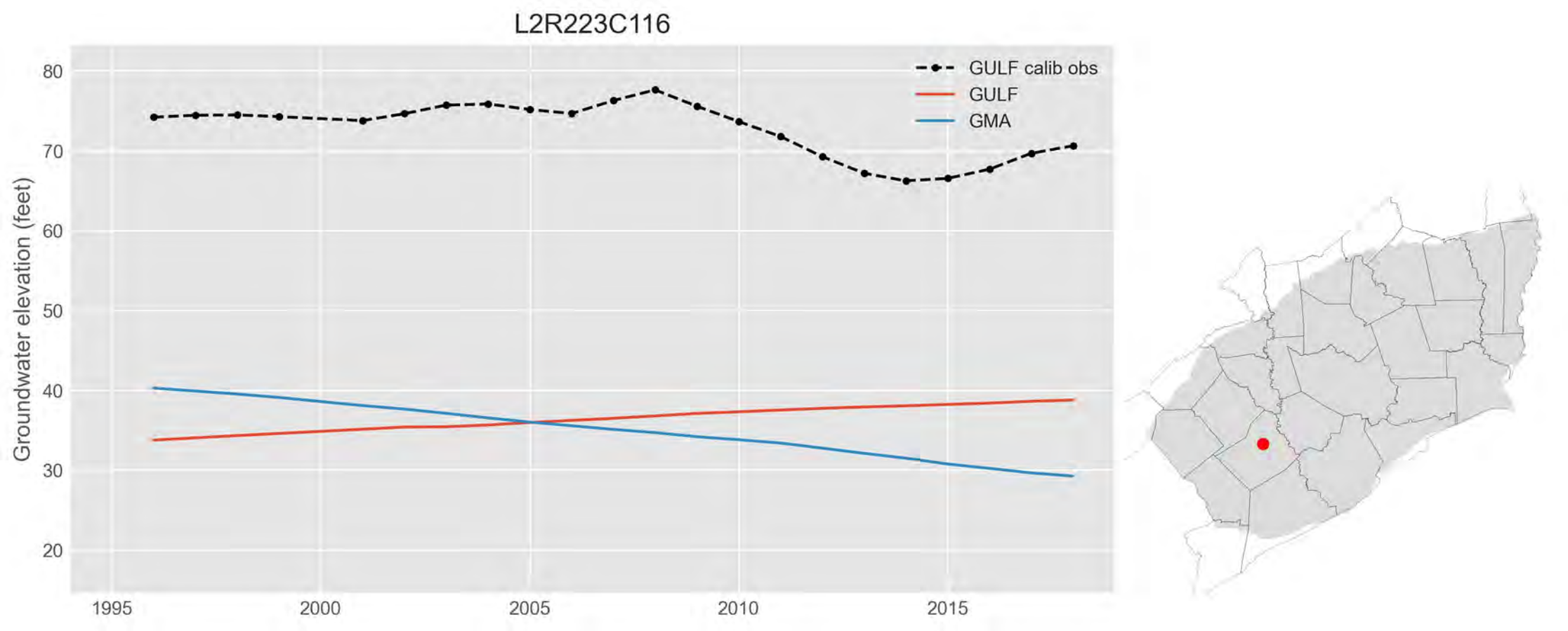

L2R220C231
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
1970
1975
1980
1985
1990
1995
2000

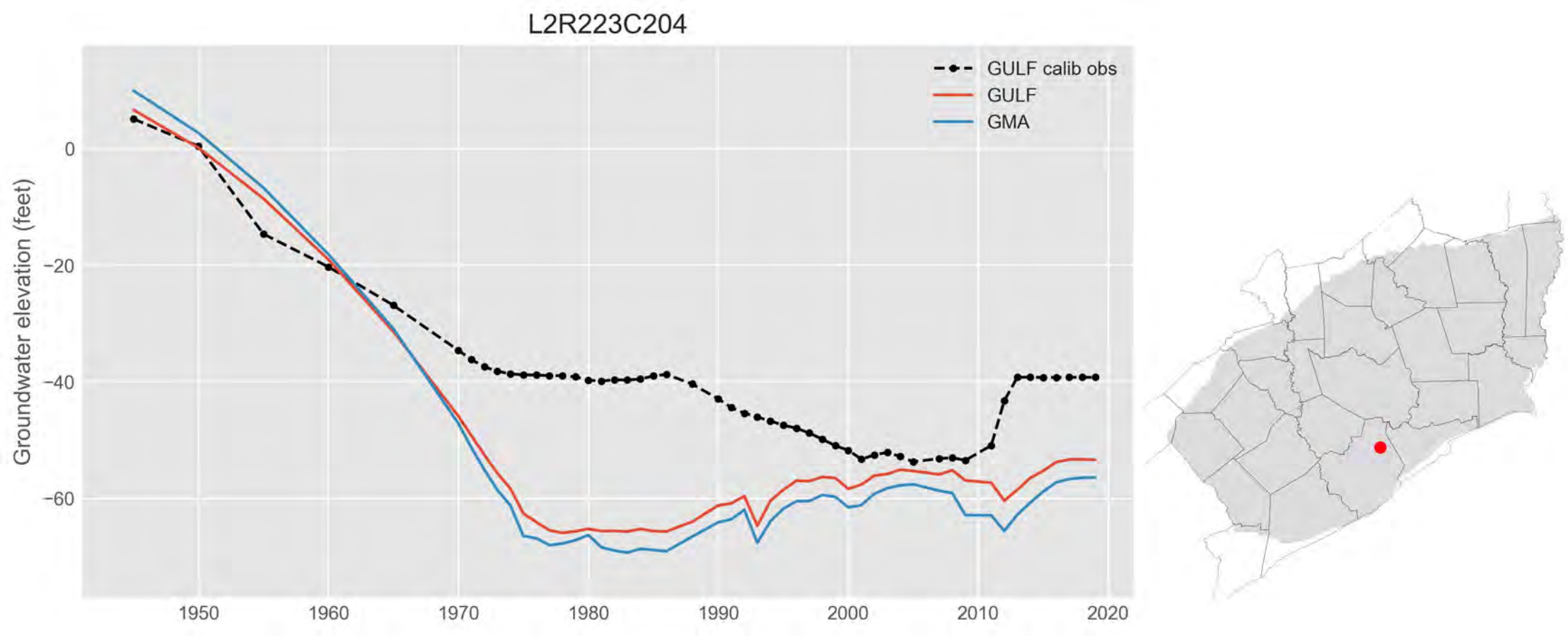

L2R220C234
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
2003
2004
2005

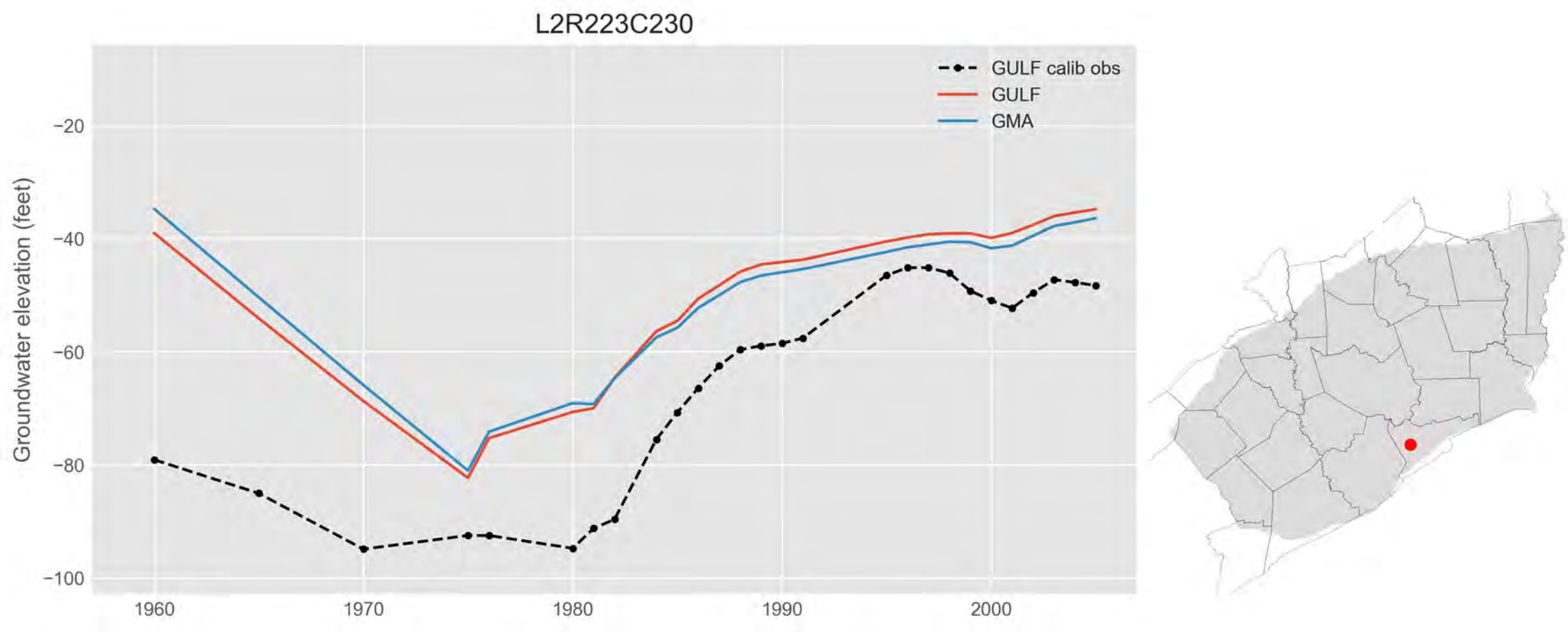

L2R220C241
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
−140
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

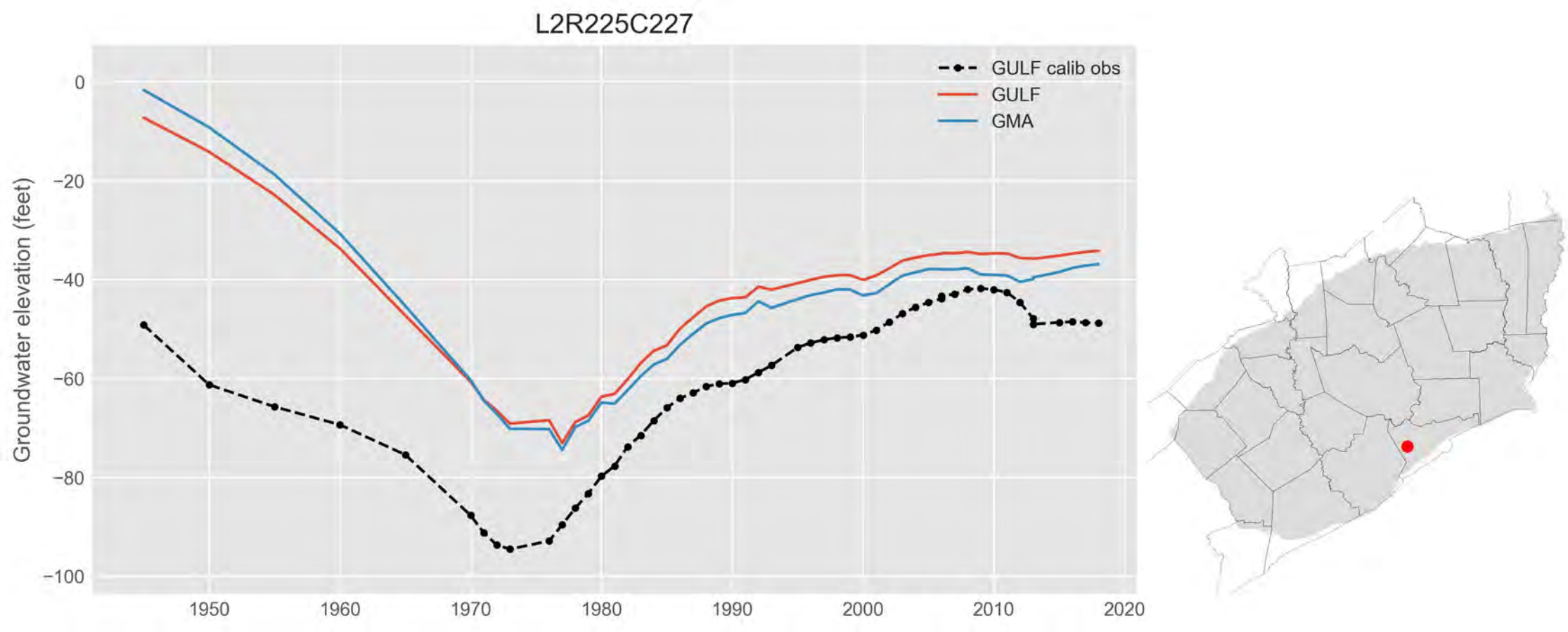
L2R221C224

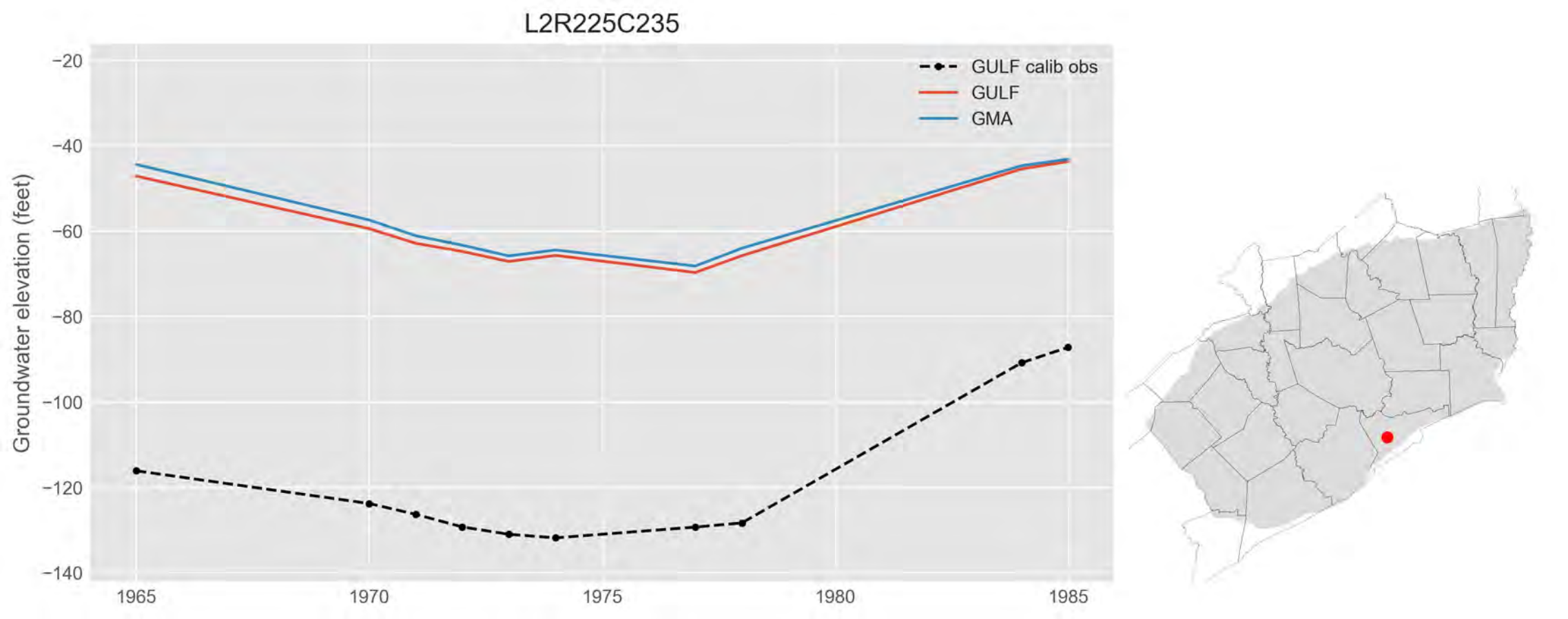

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
1950
1960
1970
1980
1990
2000

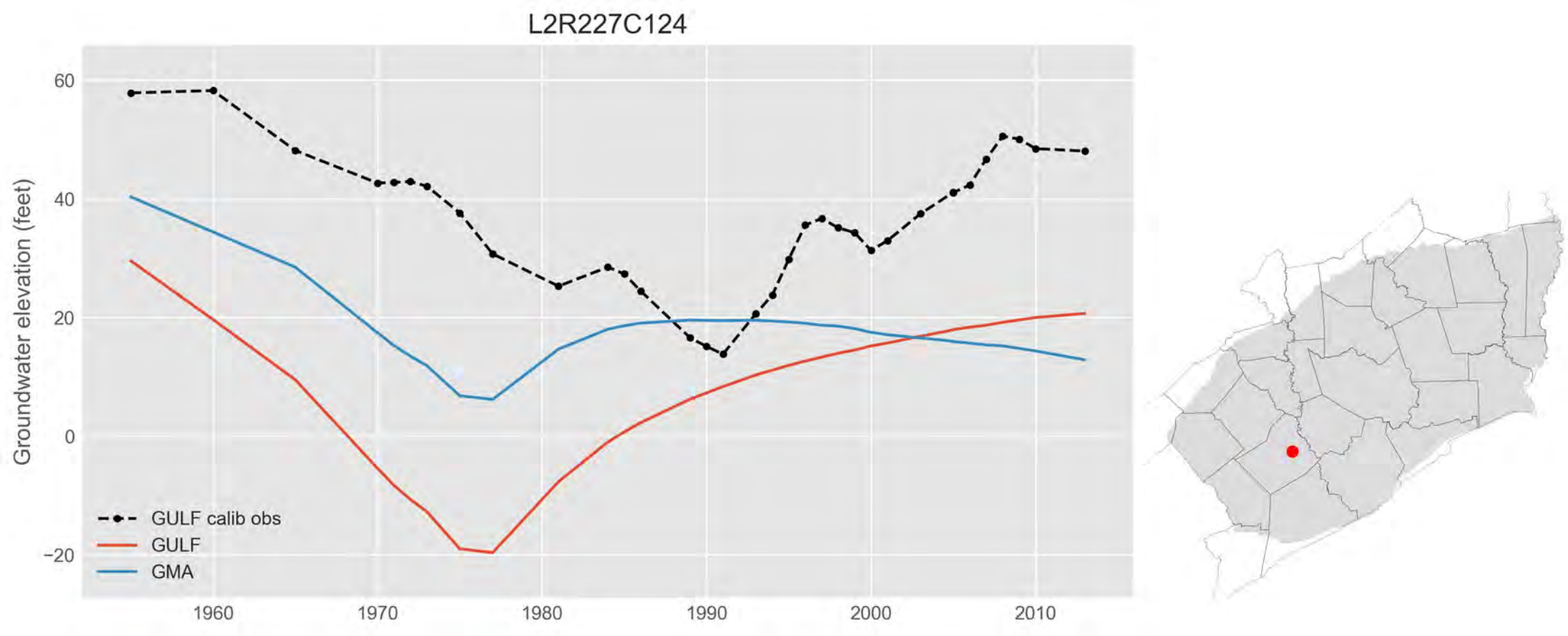

L2R223C116
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
70
60
50
40
30
20
1995
2000
2005
2010
2015

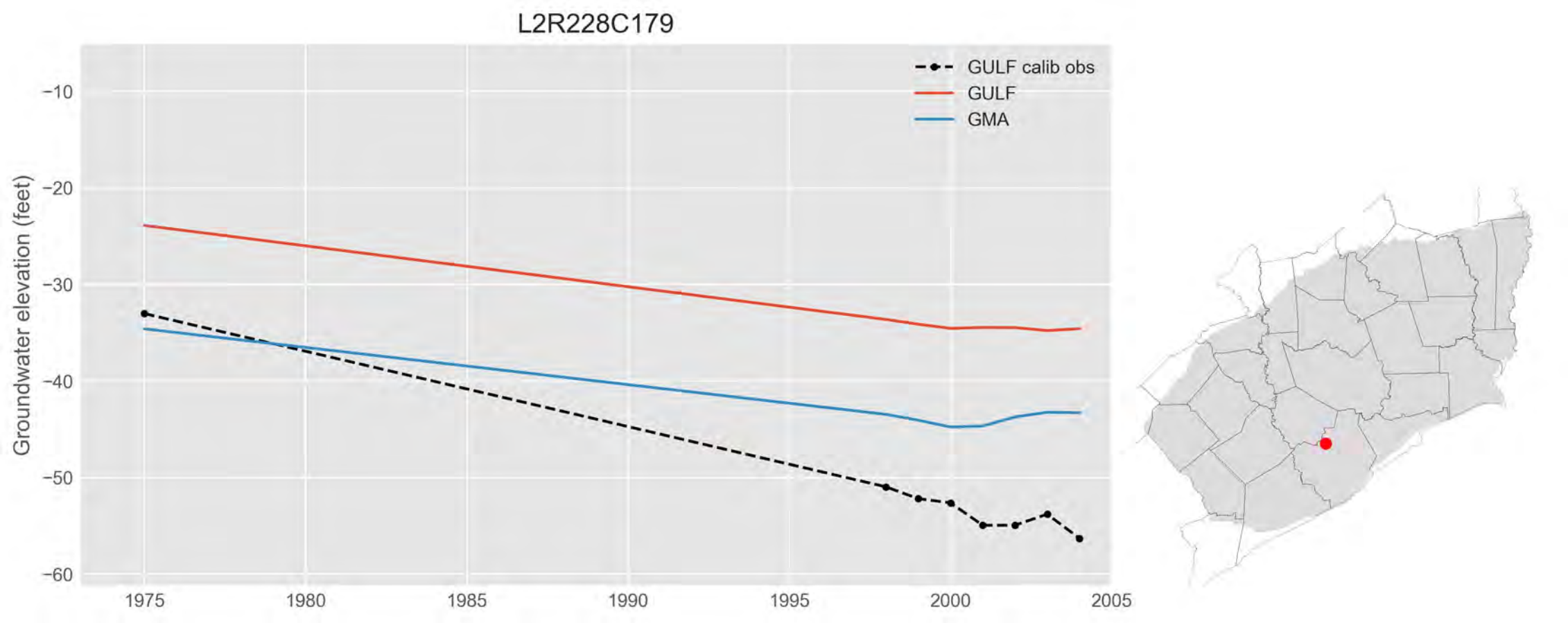

L2R223C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
1950
1960
1970
1980
1990
2000
2010
2020

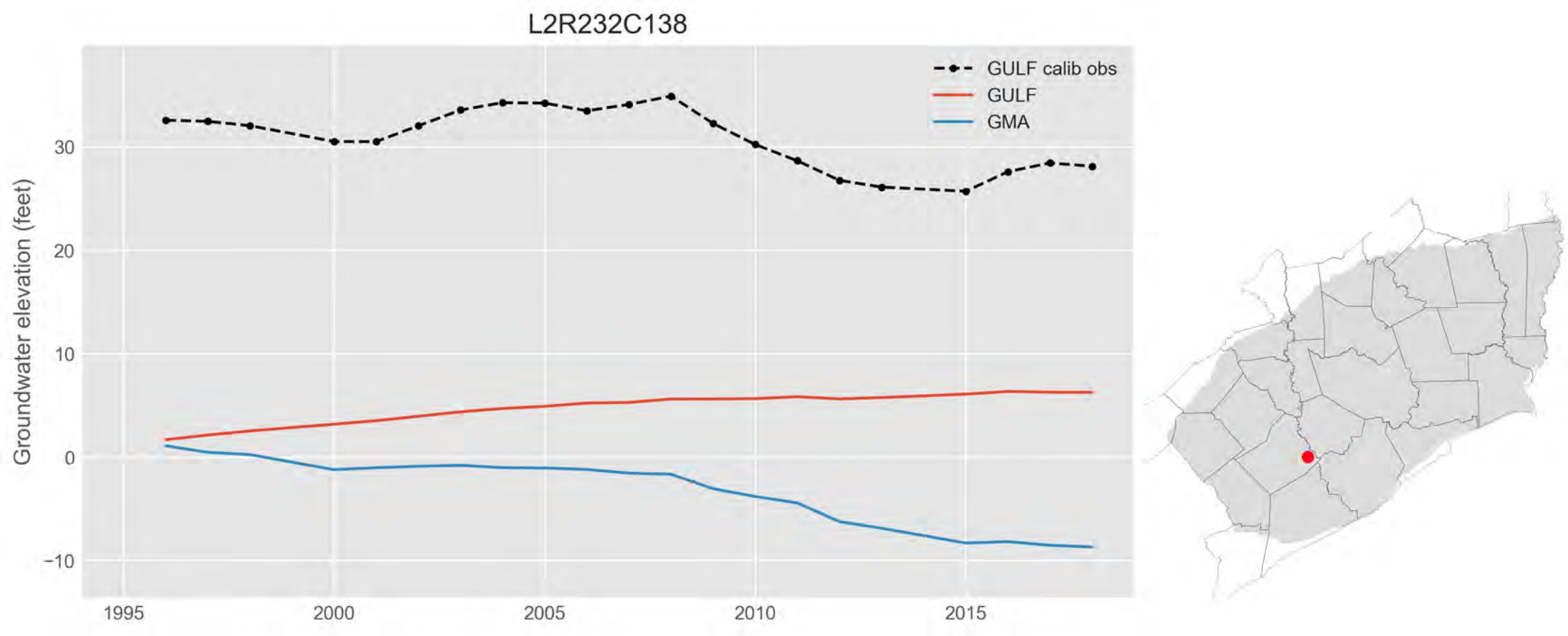

L2R223C230
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
1960
1970
1980
1990
2000

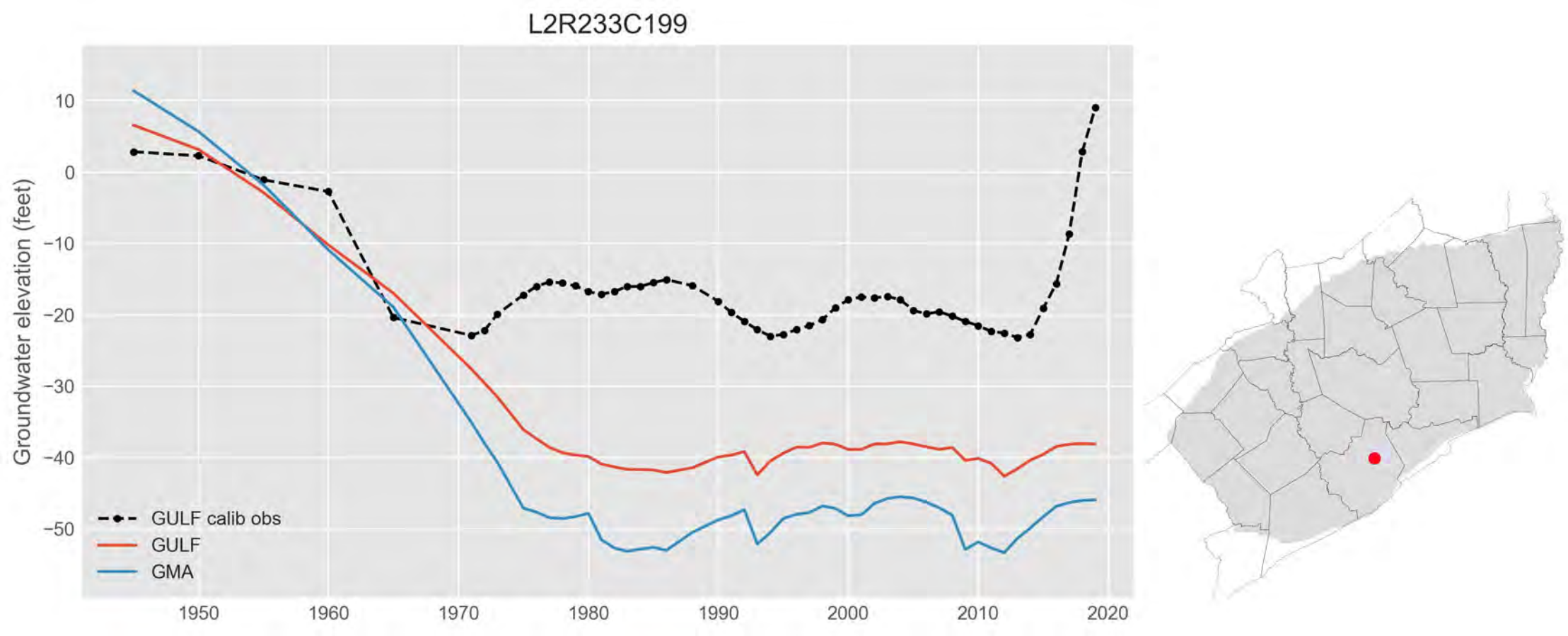

L2R225C227
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
1950
1960
1970
1980
1990
2000
2010
2020

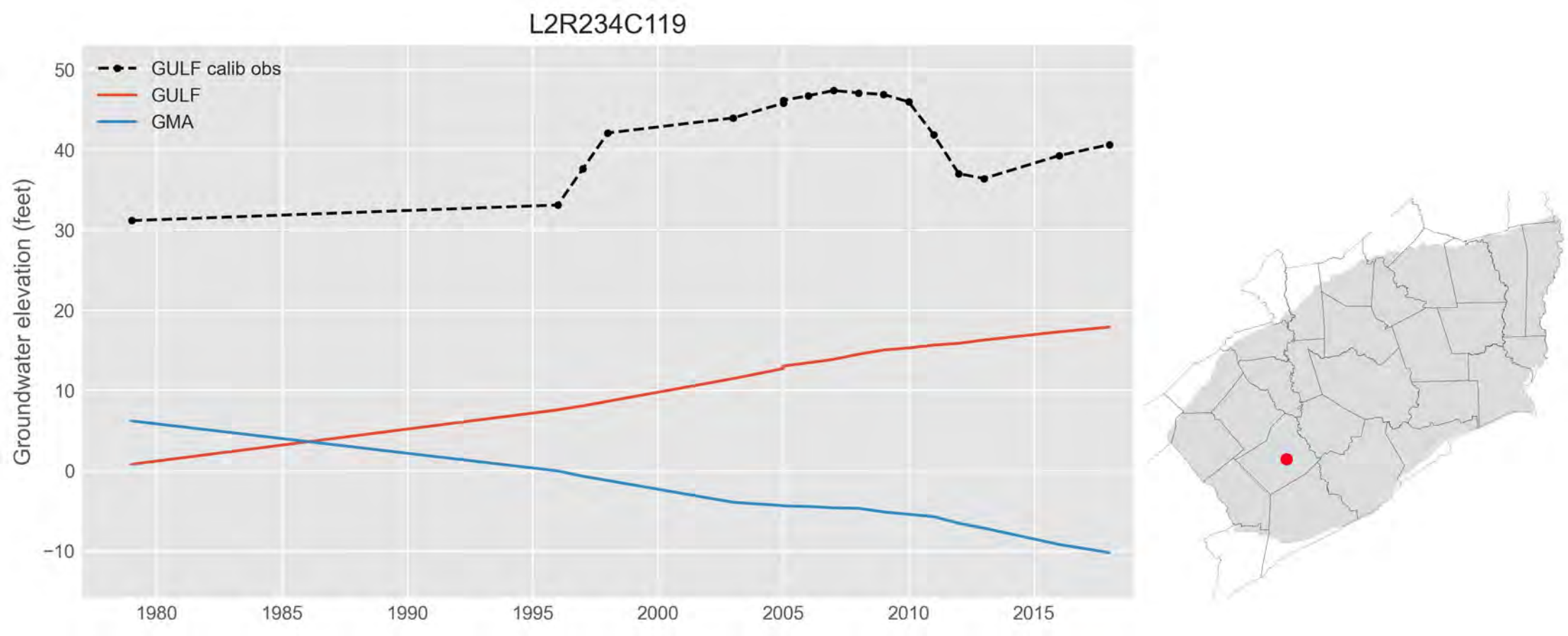

L2R225C235
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1965
1970
1975
1980
1985

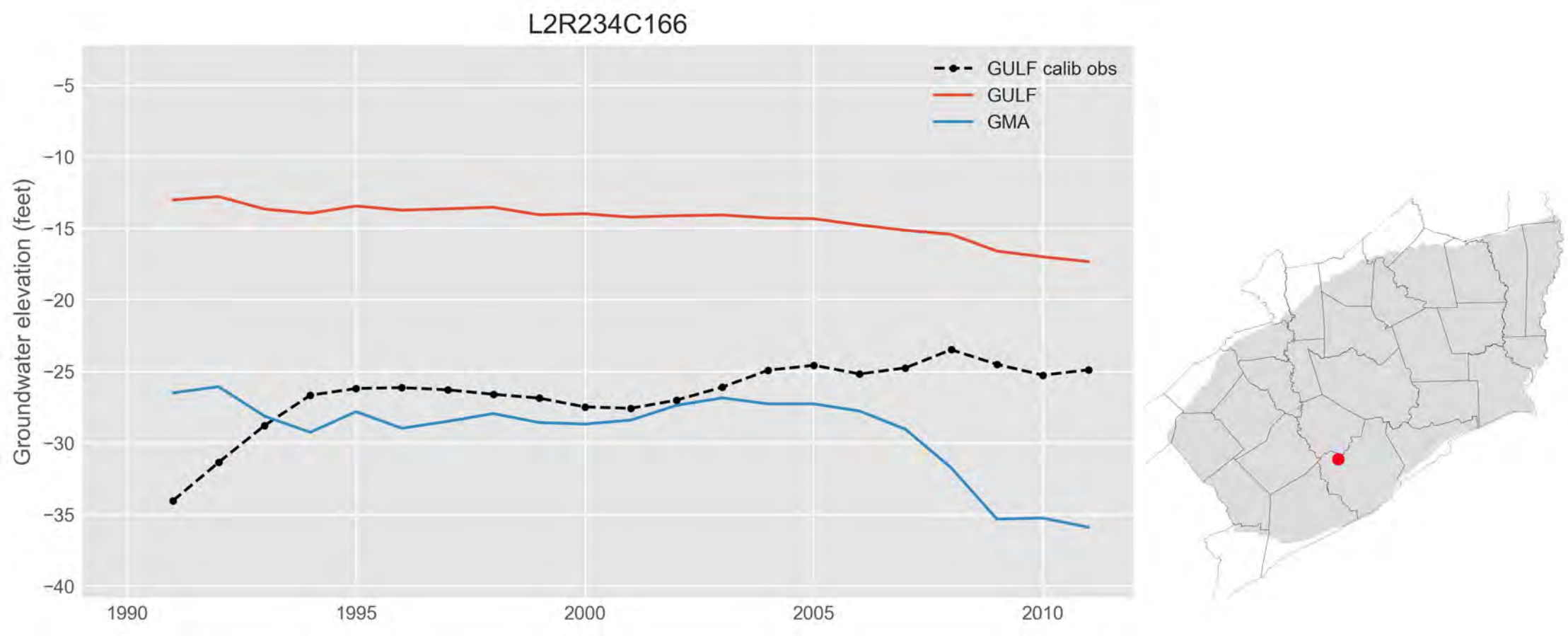

L2R227C124
Groundwater elevation (feet)
60
40
20
0
−20
1960
1970
1980
1990
2000
2010
GULF calib obs
GULF
GMA

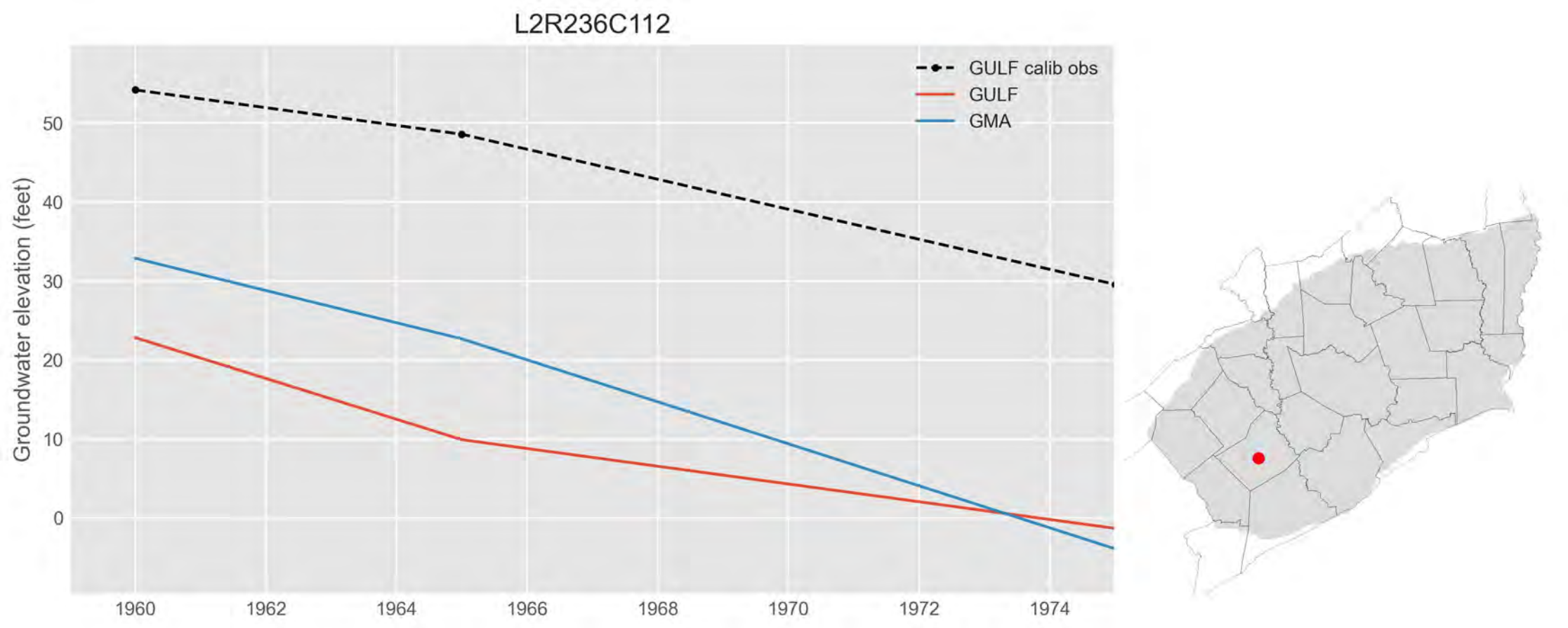

L2R228C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
1975
1980
1985
1990
1995
2000
2005

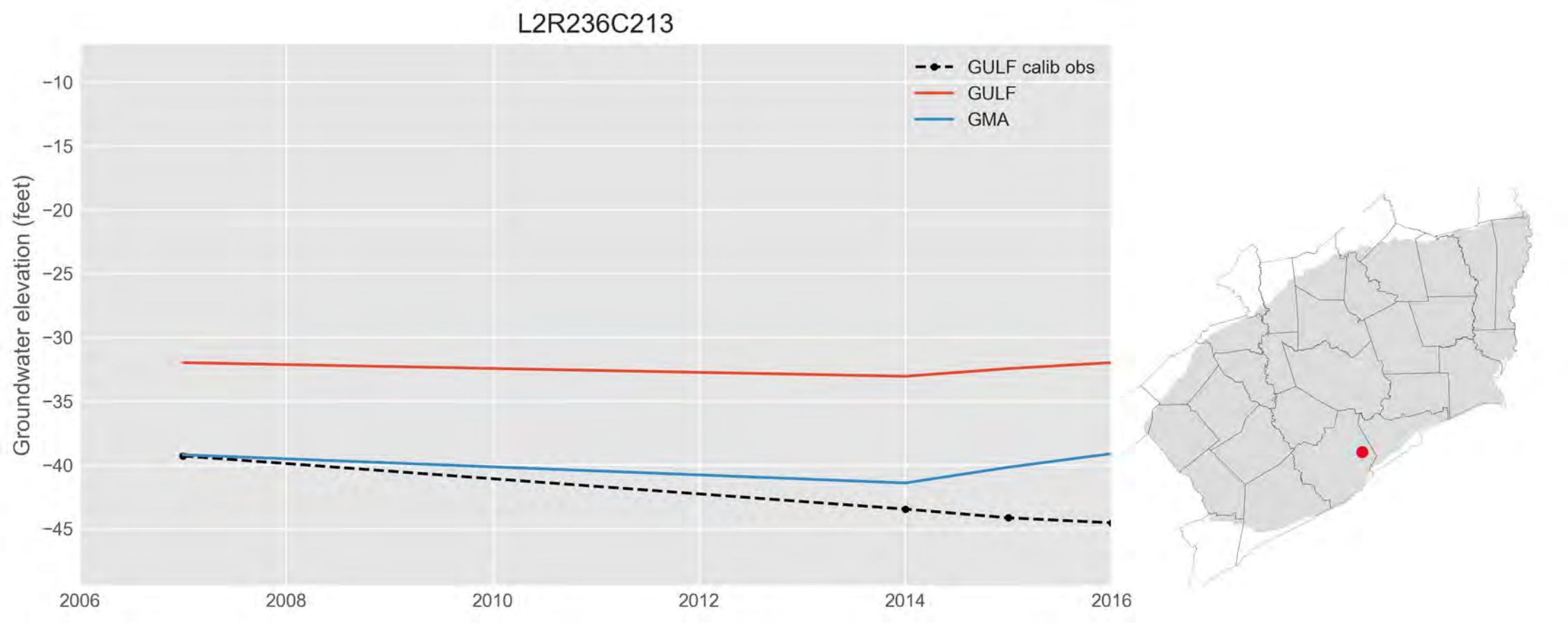

L2R232C138
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
1995
2000
2005
2010
2015

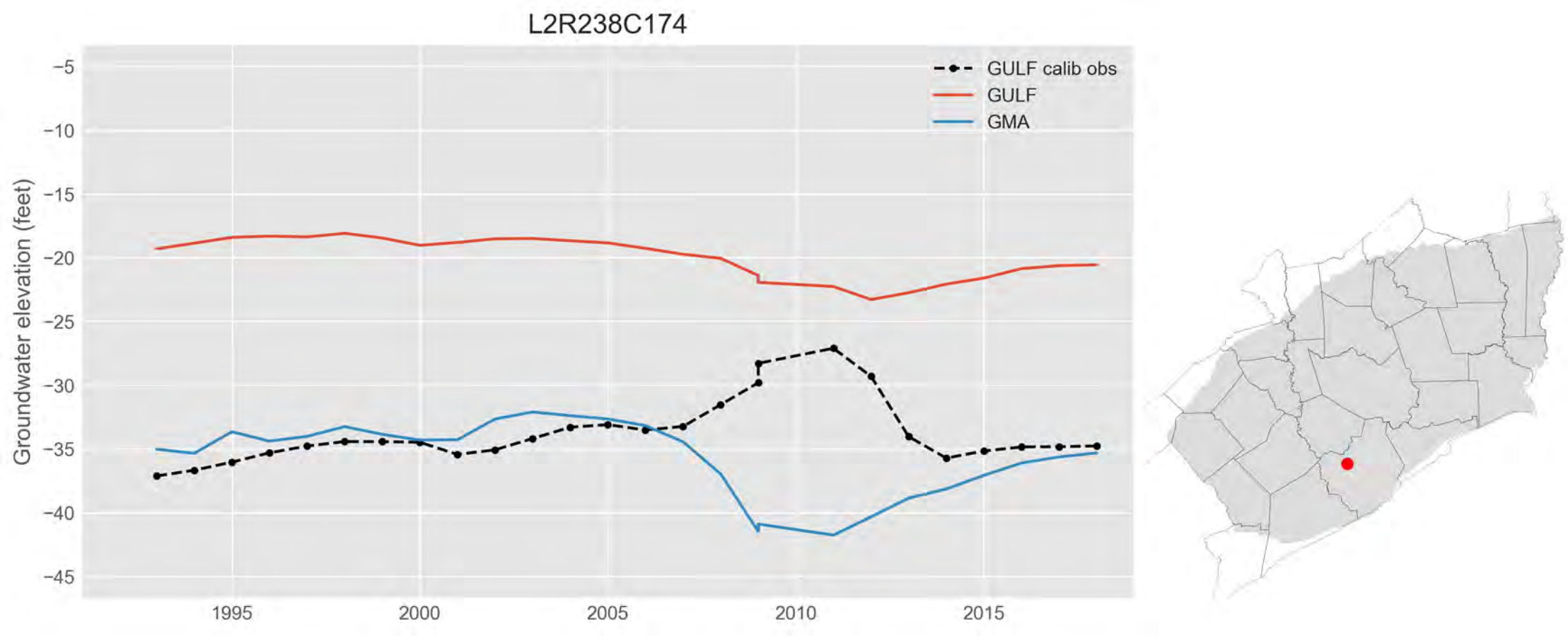

L2R233C199
Groundwater elevation (feet)
10
0
−10
−20
−30
−40
−50
1950
1960
1970
1980
1990
2000
2010
2020
GULF calib obs
GULF
GMA

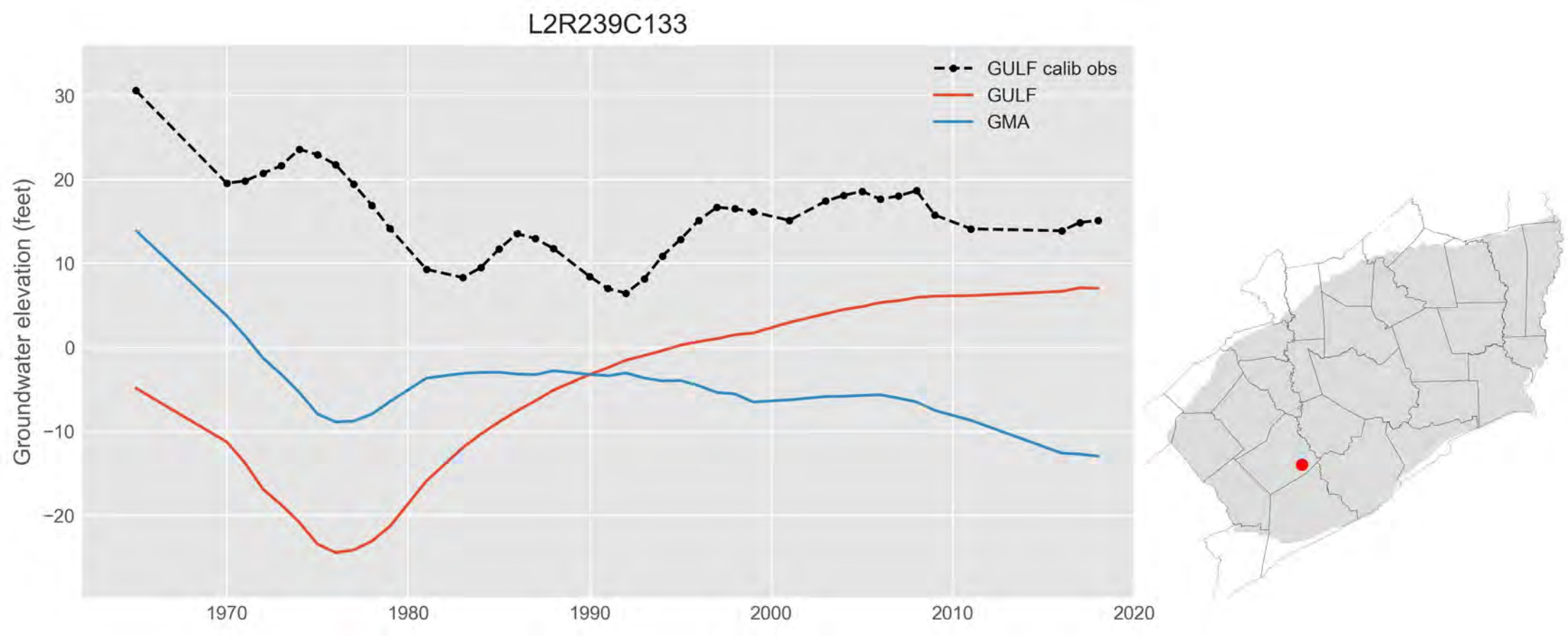

L2R234C119
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
−10
1980
1985
1990
1995
2000
2005
2010
2015

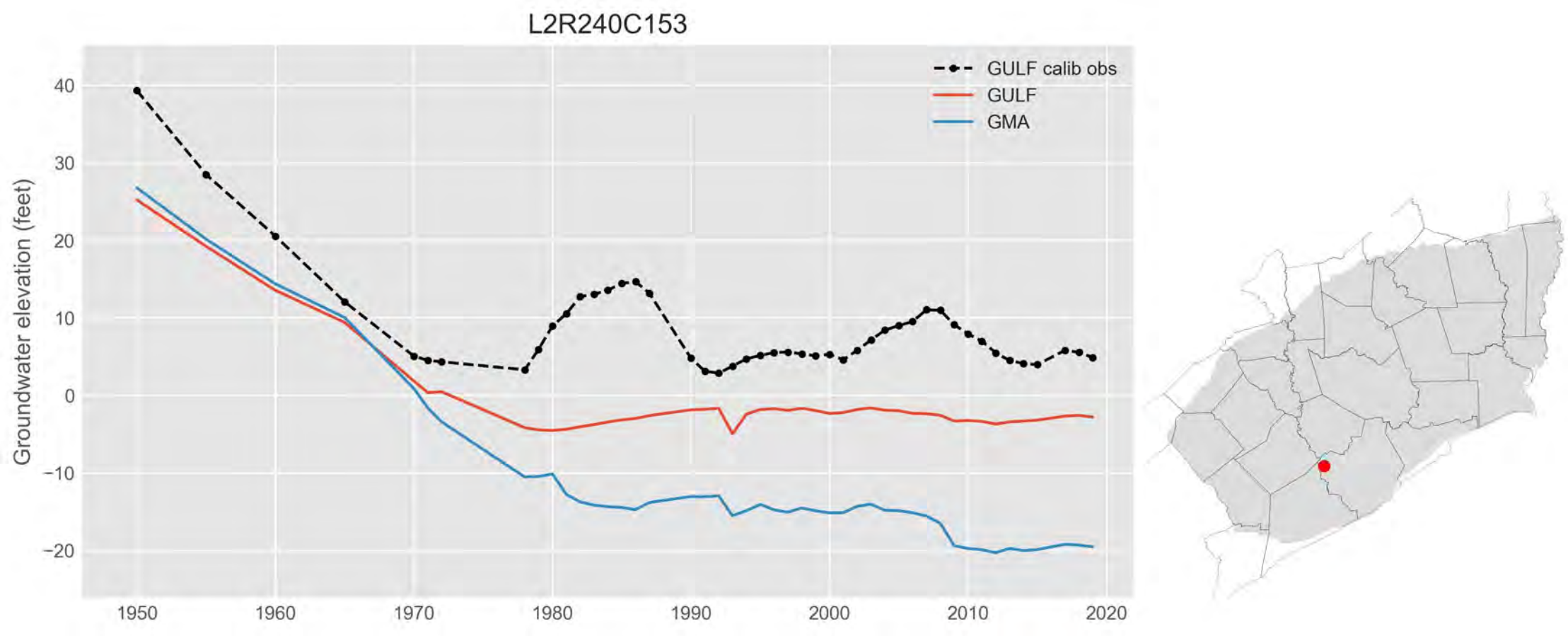

L2R234C166
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
1990
1995
2000
2005
2010

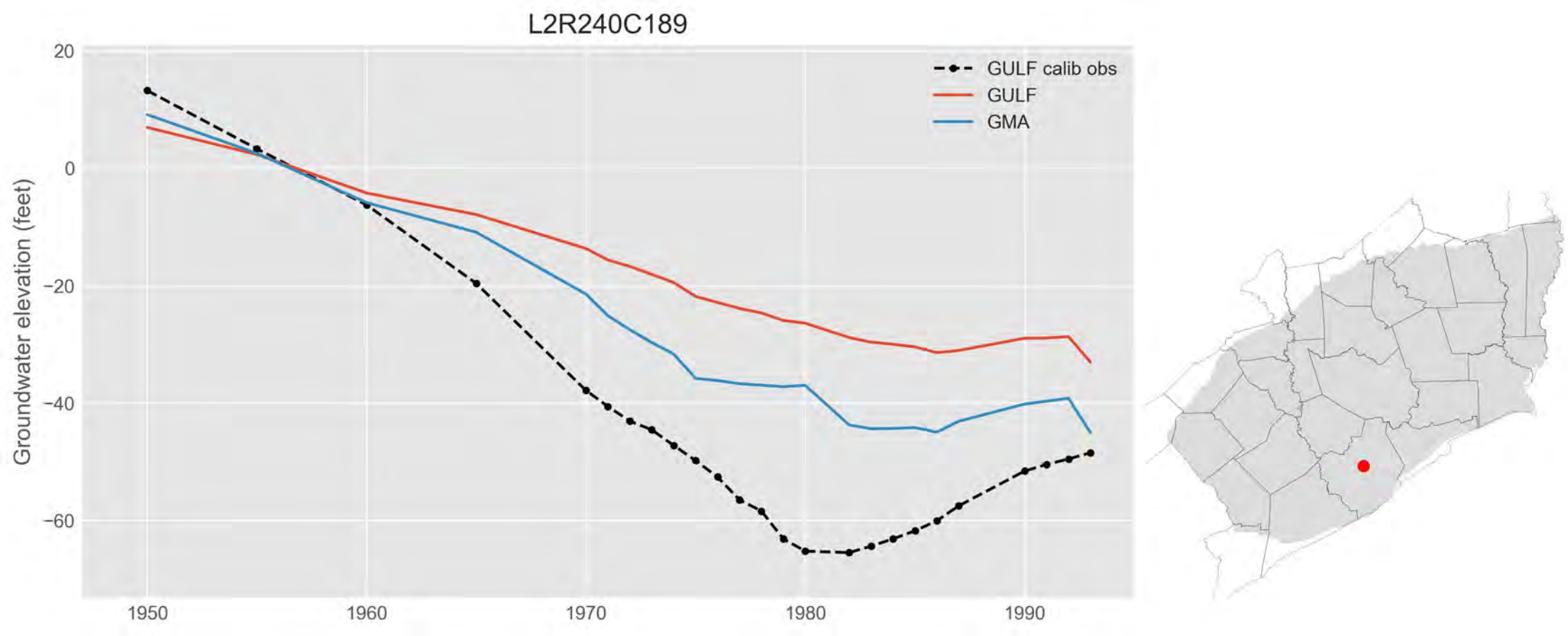

L2R236C112
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
1960
1962
1964
1966
1968
1970
1972
1974

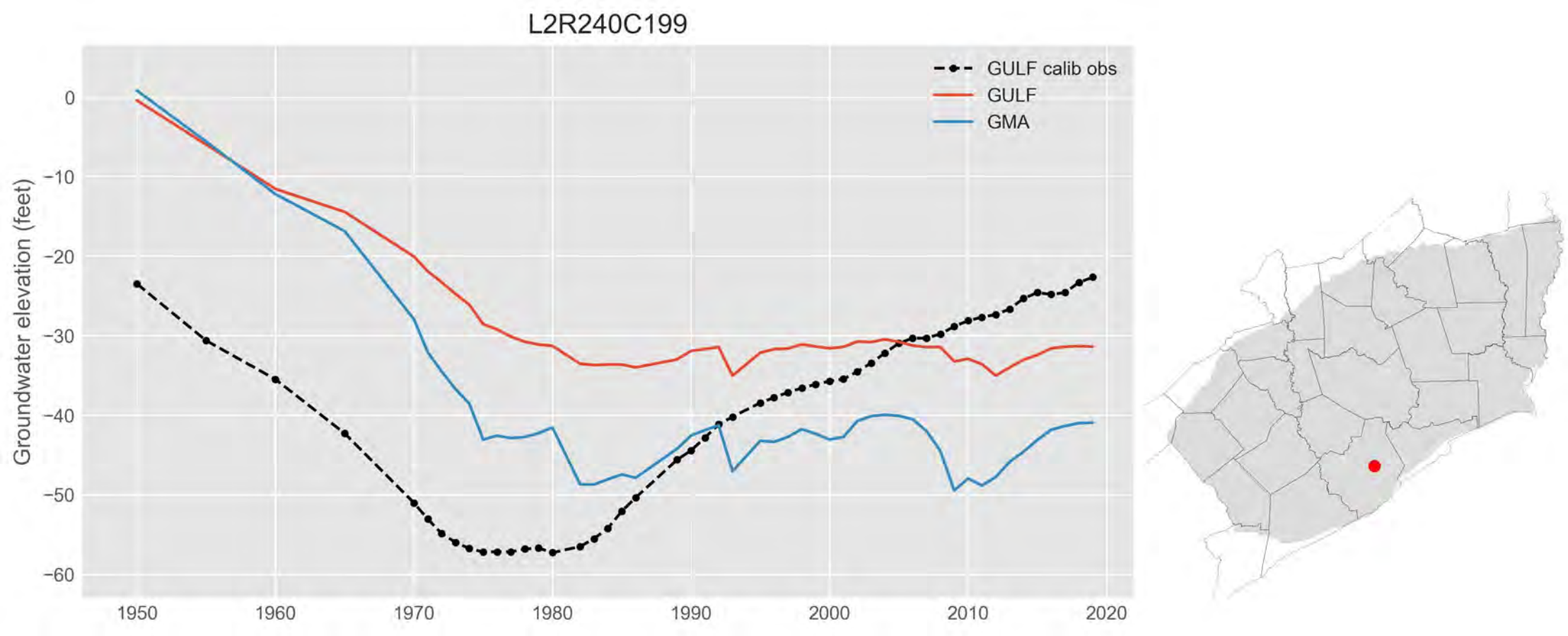

L2R236C213
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−15
−20
−25
−30
−35
−40
−45
2006
2008
2010
2012
2014
2016

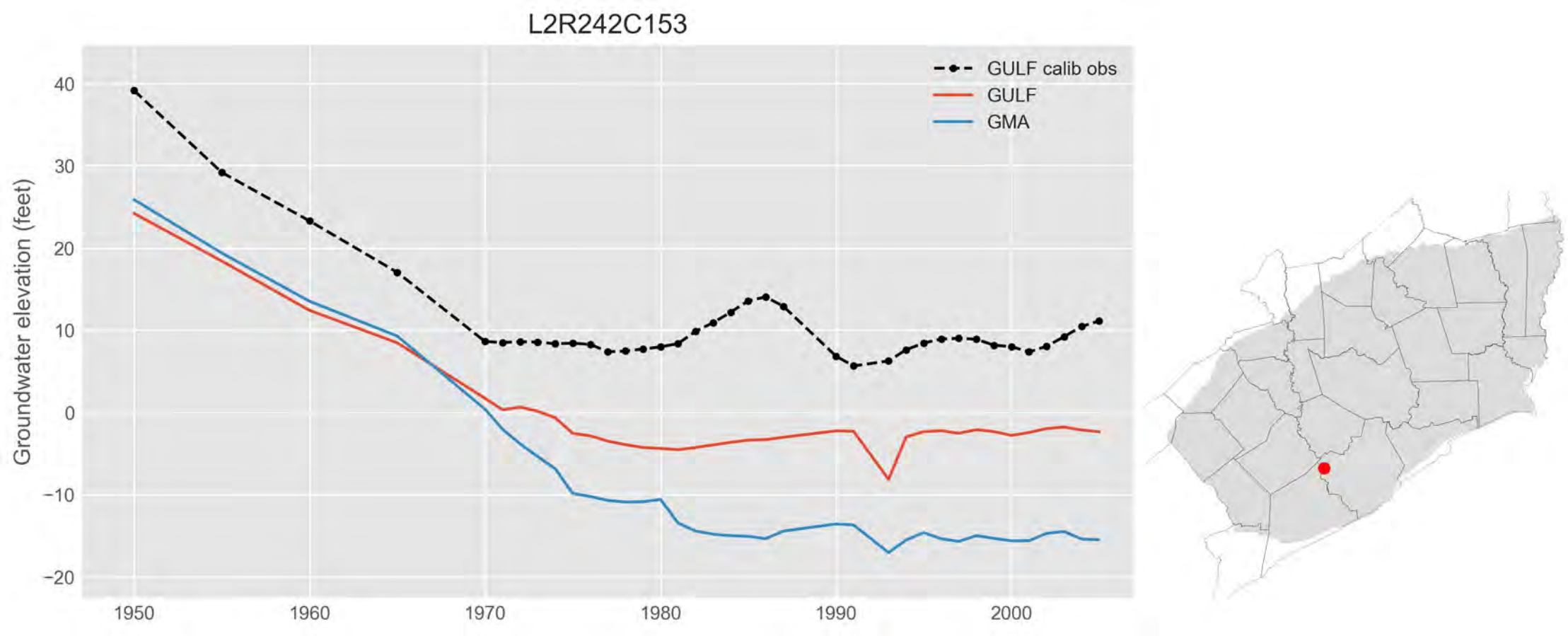

L2R238C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
−45
1995
2000
2005
2010
2015

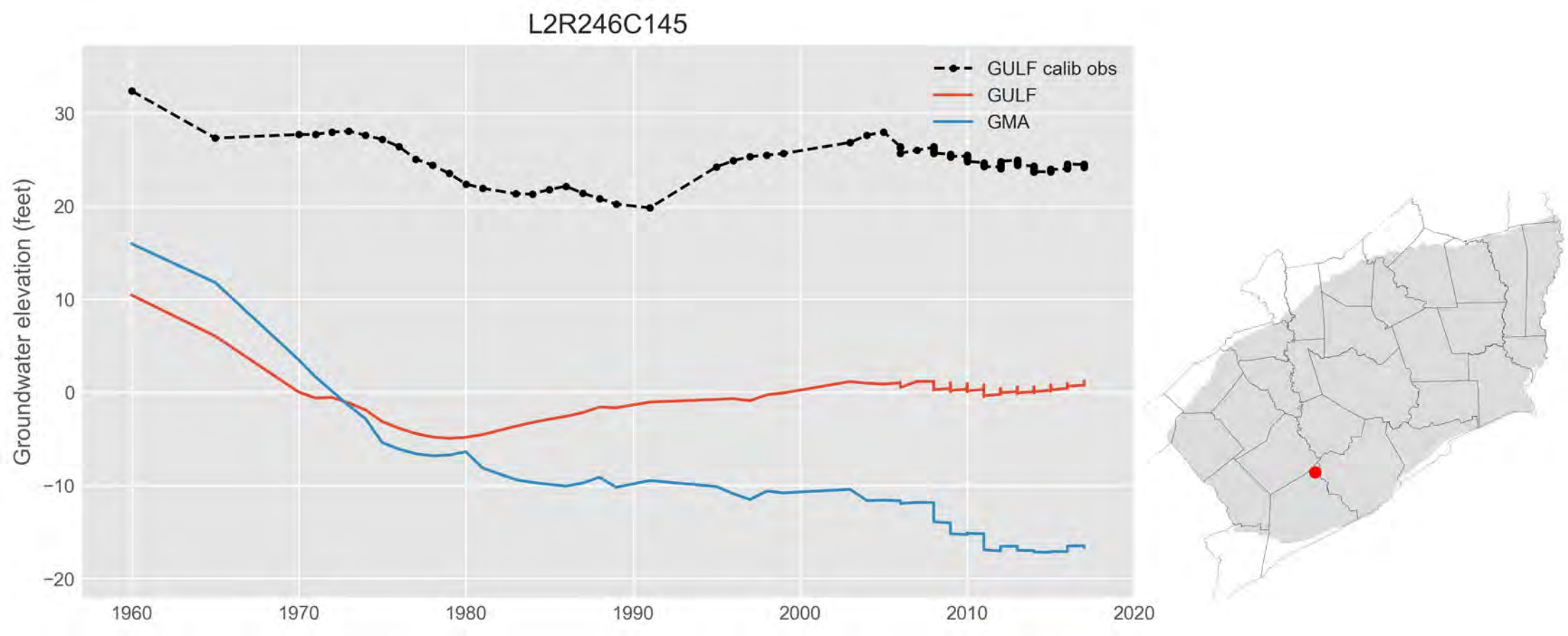

L2R239C133
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
1970
1980
1990
2000
2010
2020

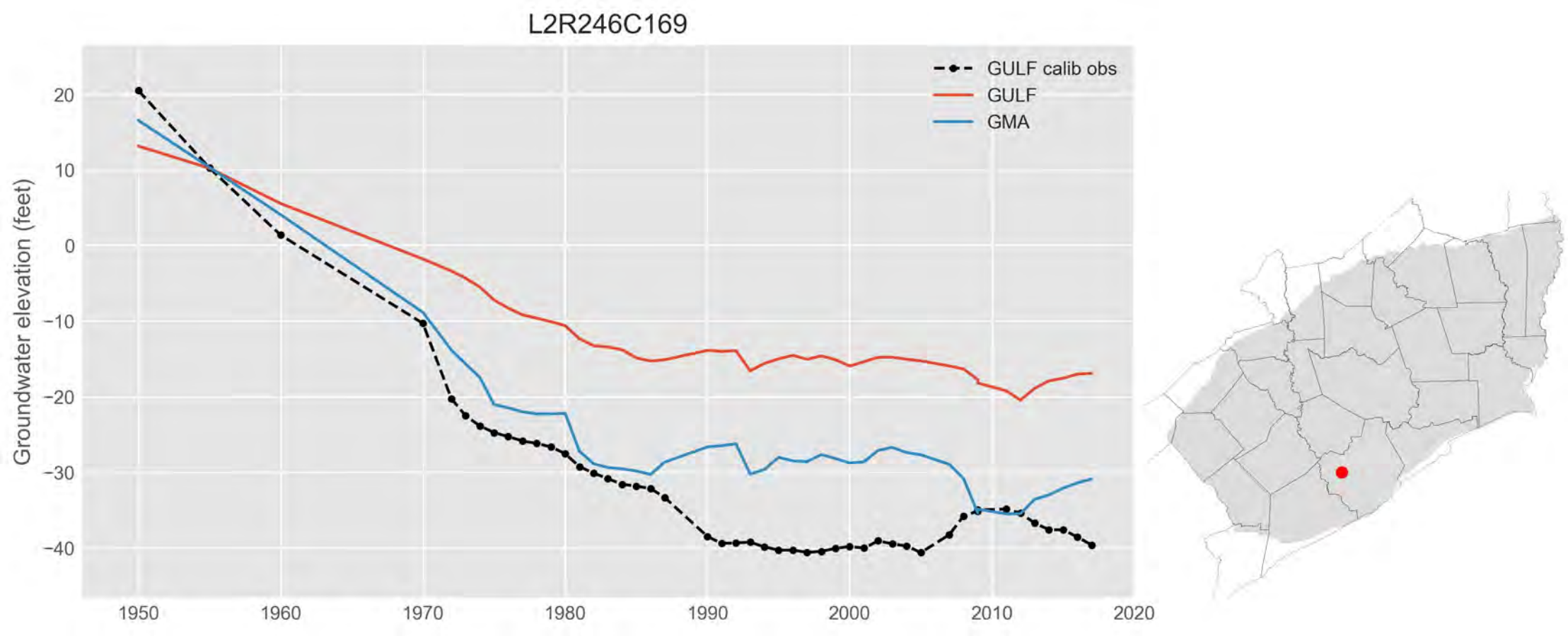

L2R240C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
30
20
10
0
−10
−20
1950
1960
1970
1980
1990
2000
2010
2020

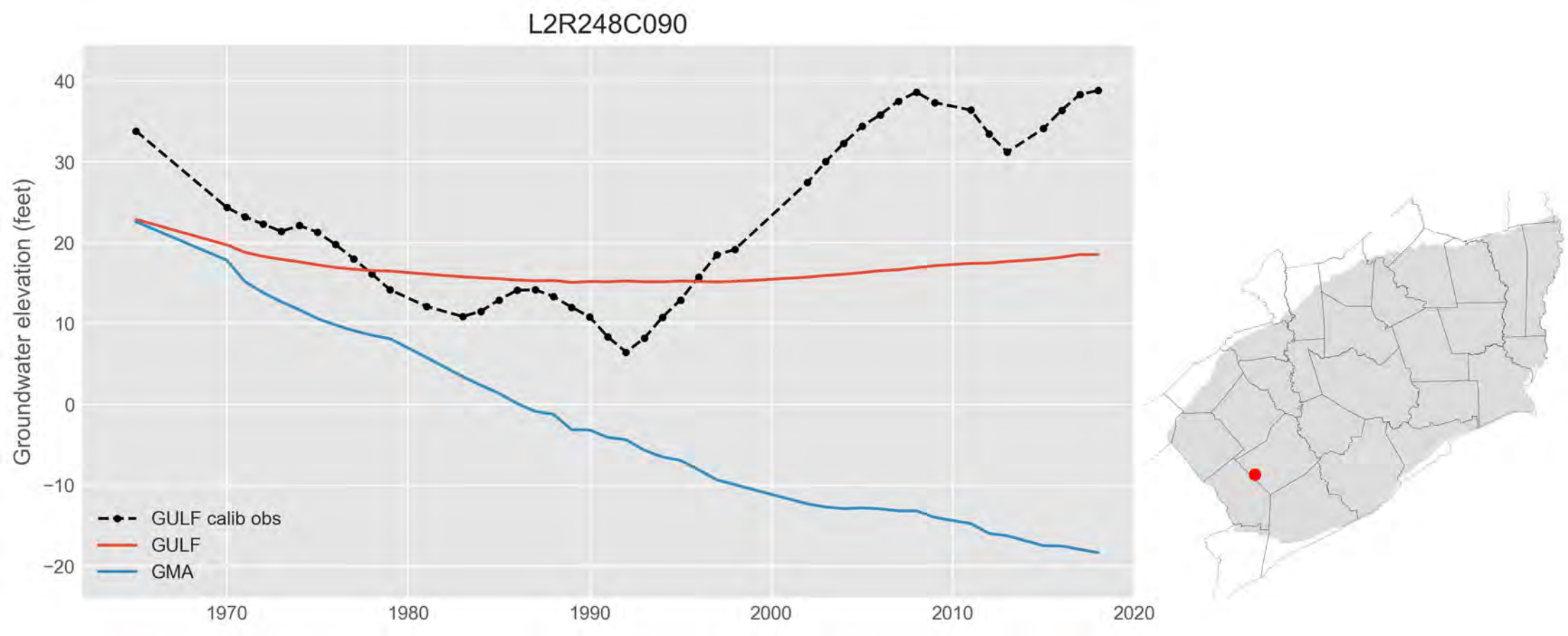

L2R240C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
1950
1960
1970
1980
1990

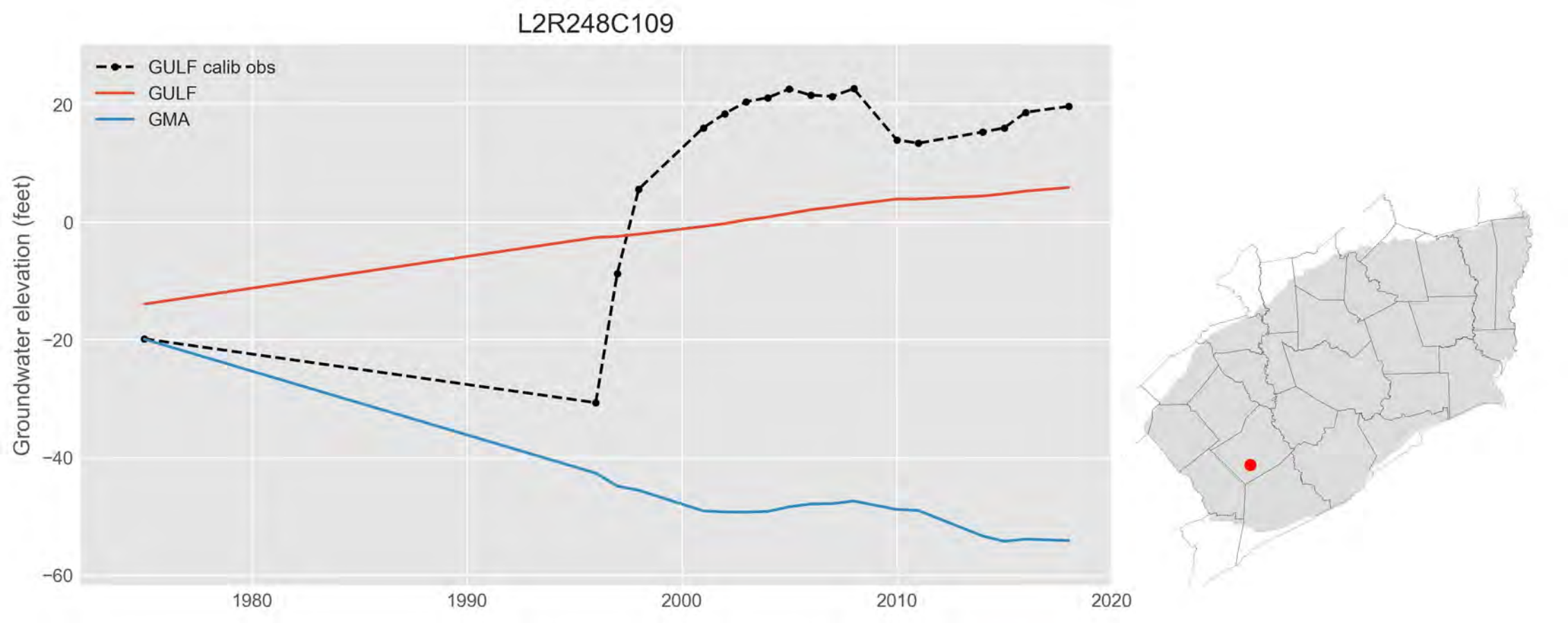

L2R240C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
1950
1960
1970
1980
1990
2000
2010
2020

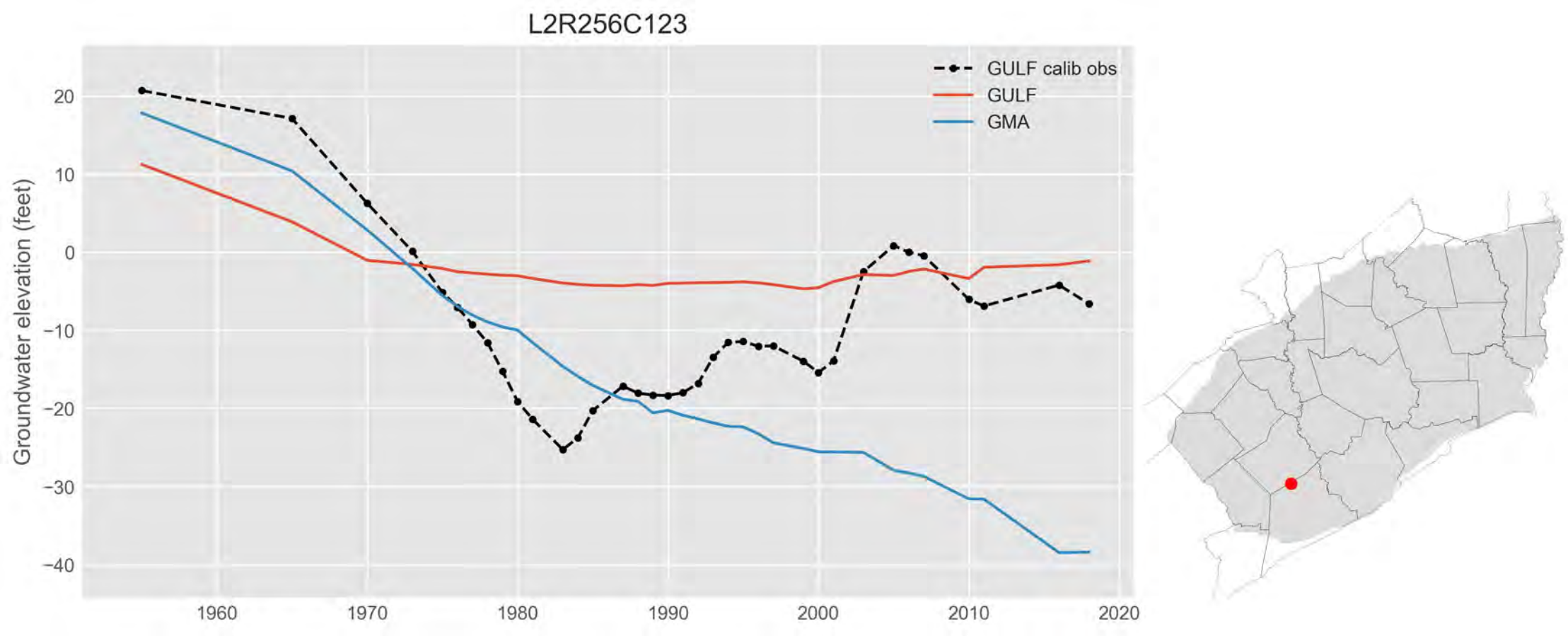

L2R242C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
30
20
10
0
−10
−20
1950
1960
1970
1980
1990
2000

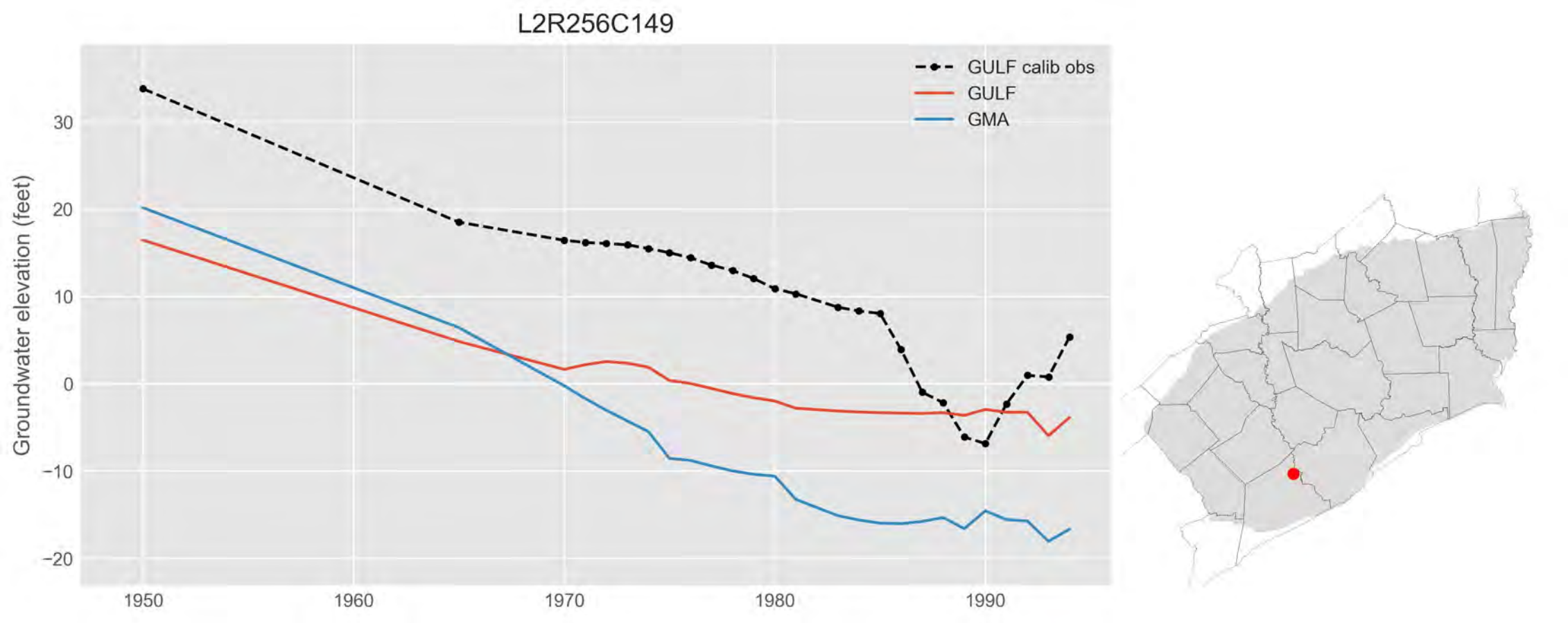

L2R246C145
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
1960
1970
1980
1990
2000
2010
2020

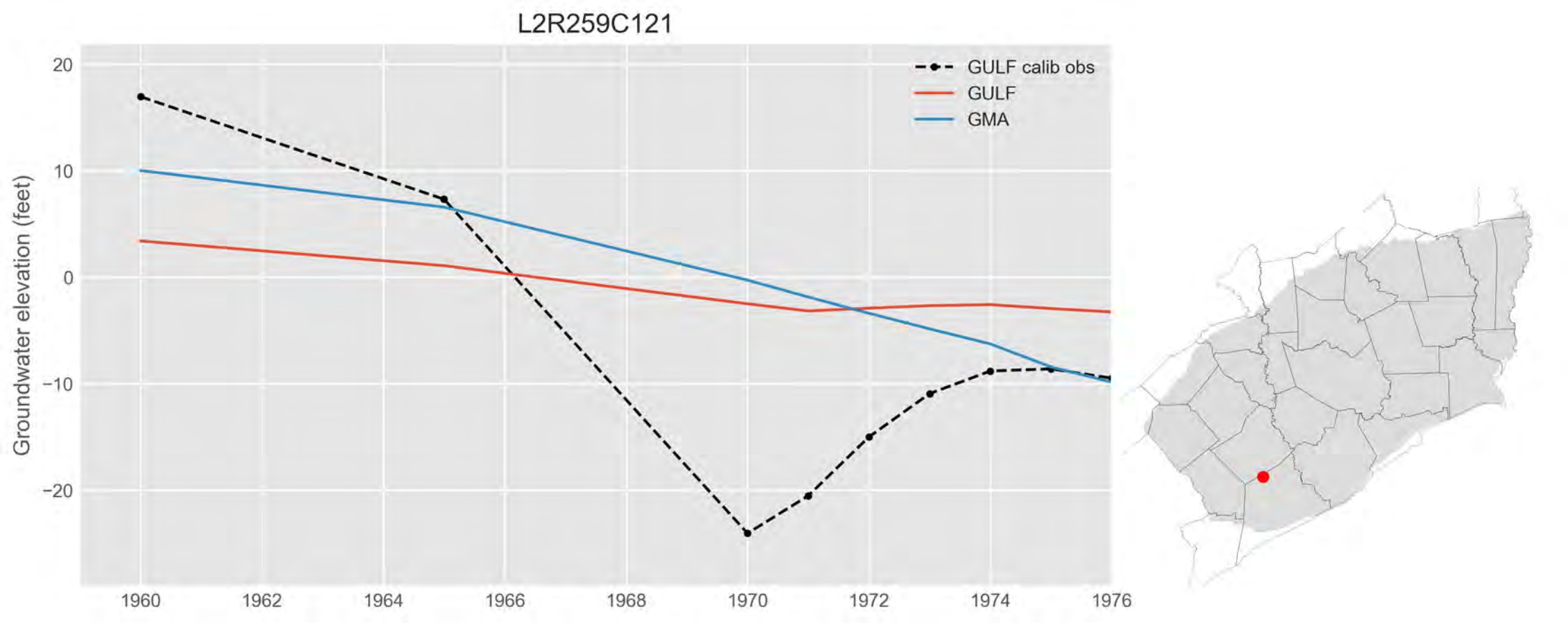

L2R246C169
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
1950
1960
1970
1980
1990
2000
2010
2020

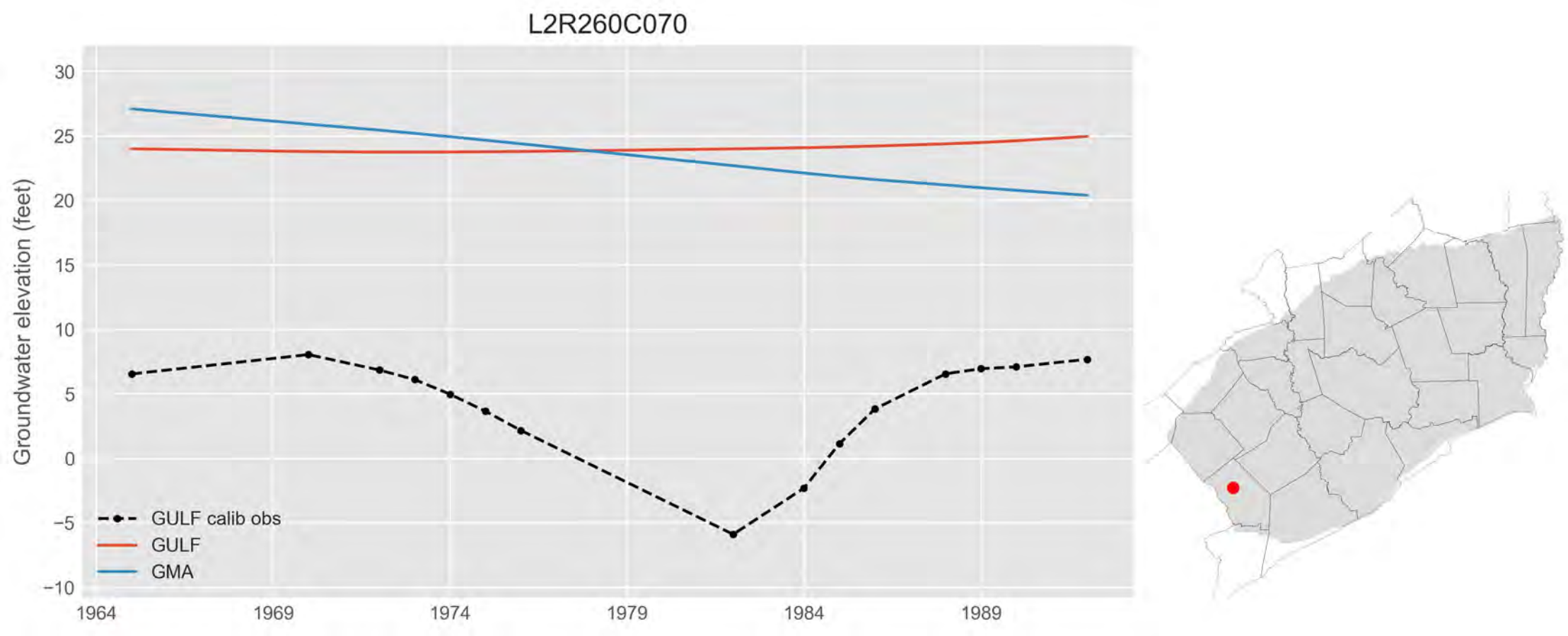

L2R248C090
Groundwater elevation (feet)
40
30
20
10
0
−10
−20
1970
1980
1990
2000
2010
2020
GULF calib obs
GULF
GMA

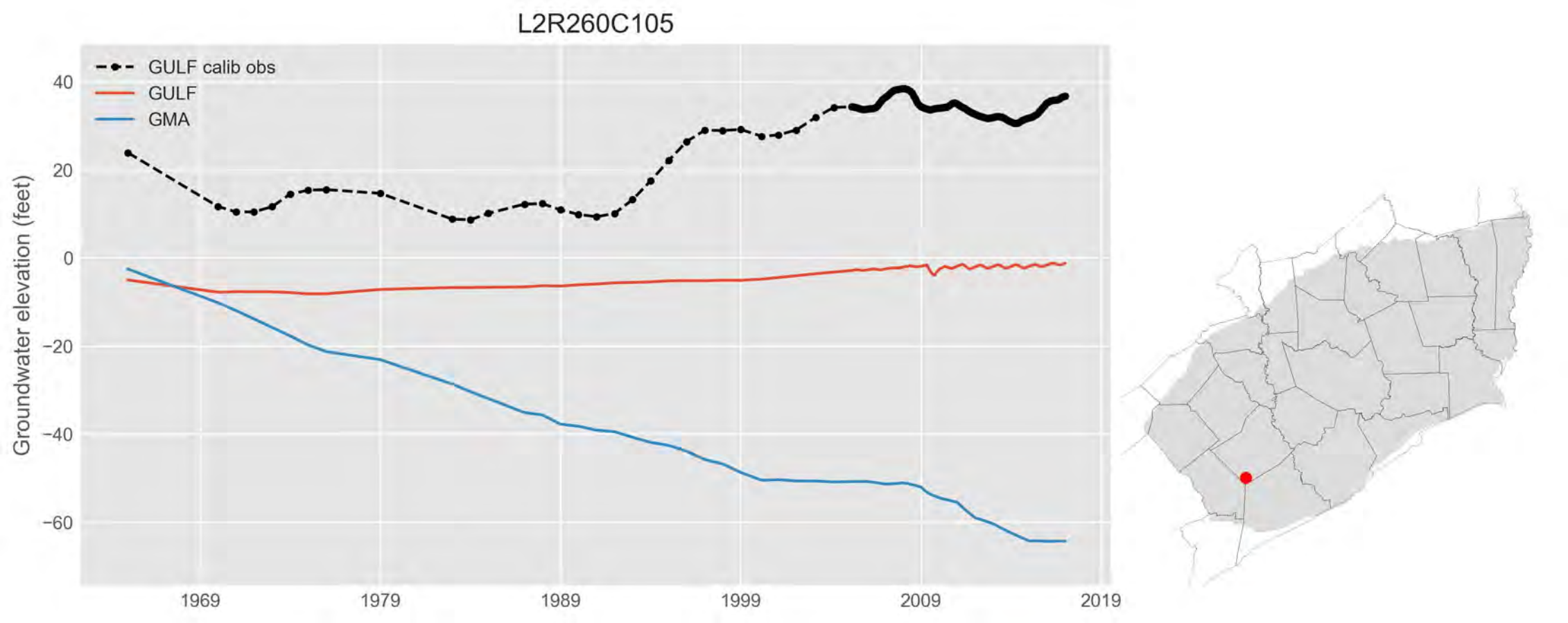

L2R248C109
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
1980
1990
2000
2010
2020

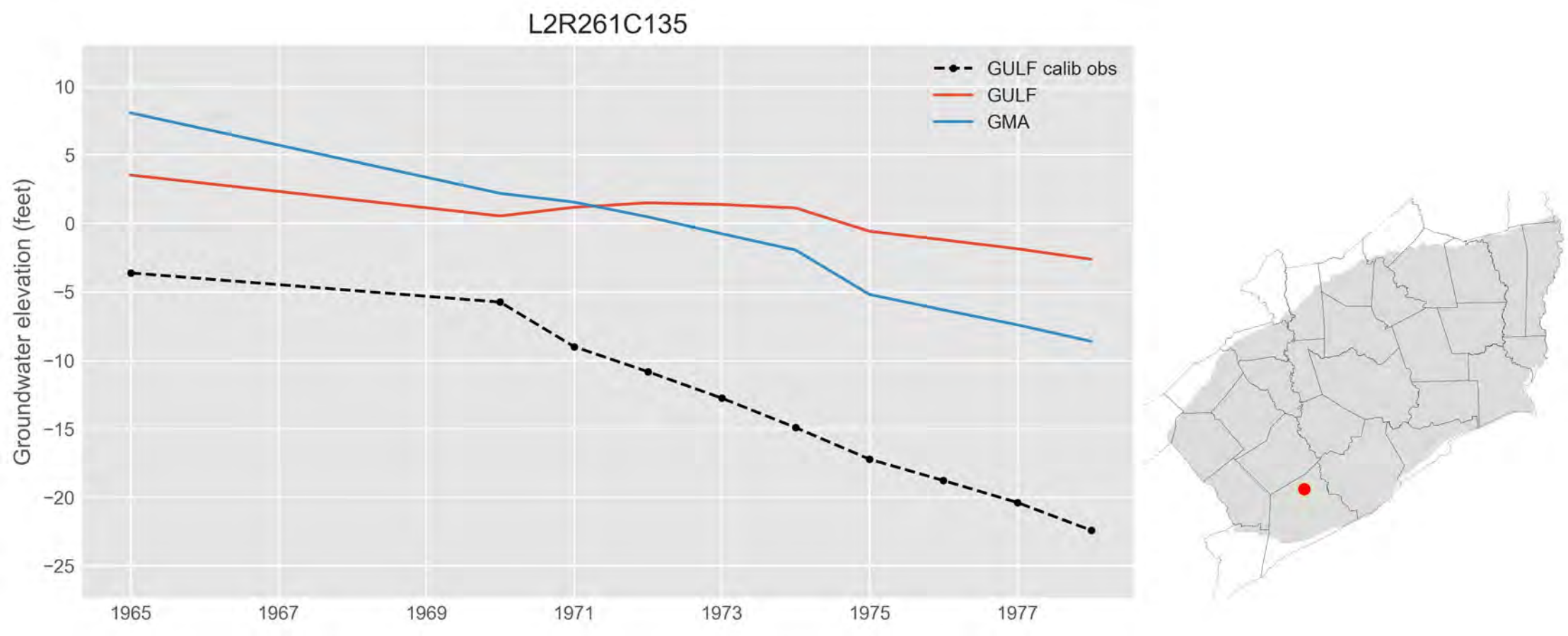

L2R256C123
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
1960
1970
1980
1990
2000
2010
2020

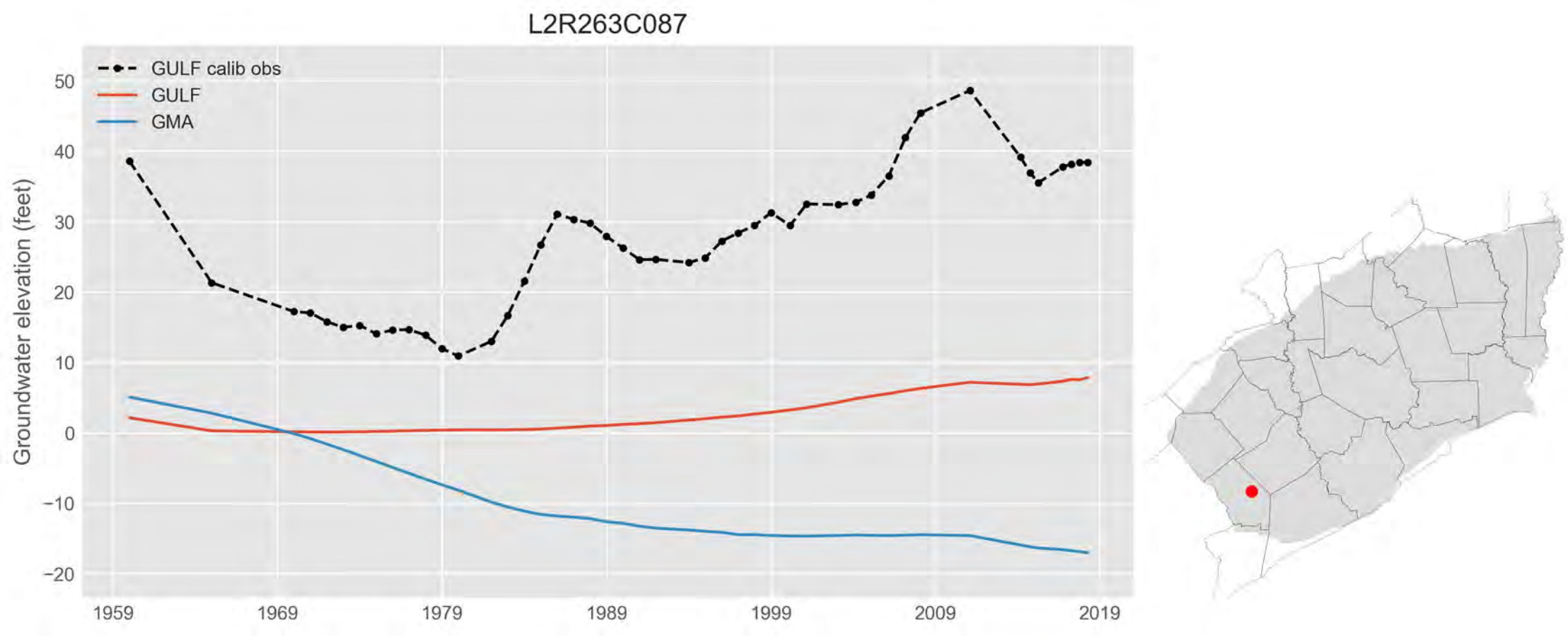

L2R256C149
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
1950
1960
1970
1980
1990

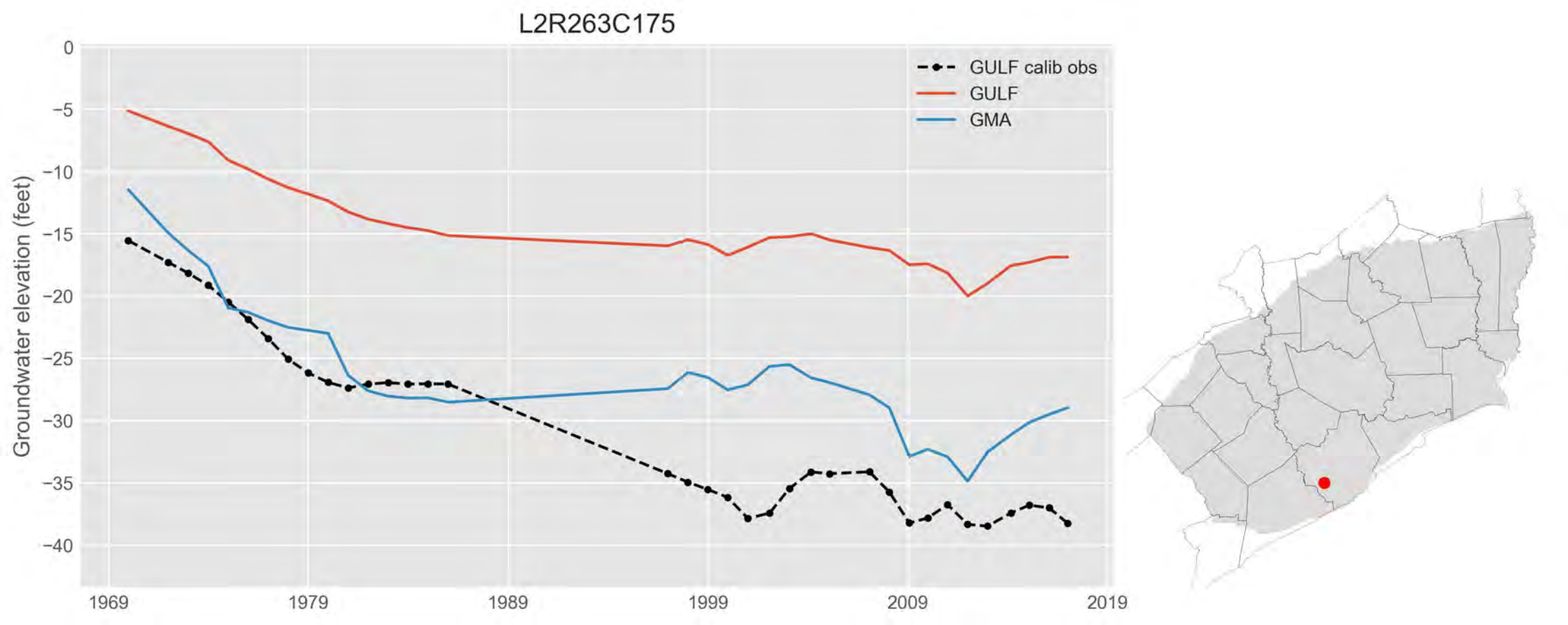

L2R259C121
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
1960
1962
1964
1966
1968
1970
1972
1974
1976

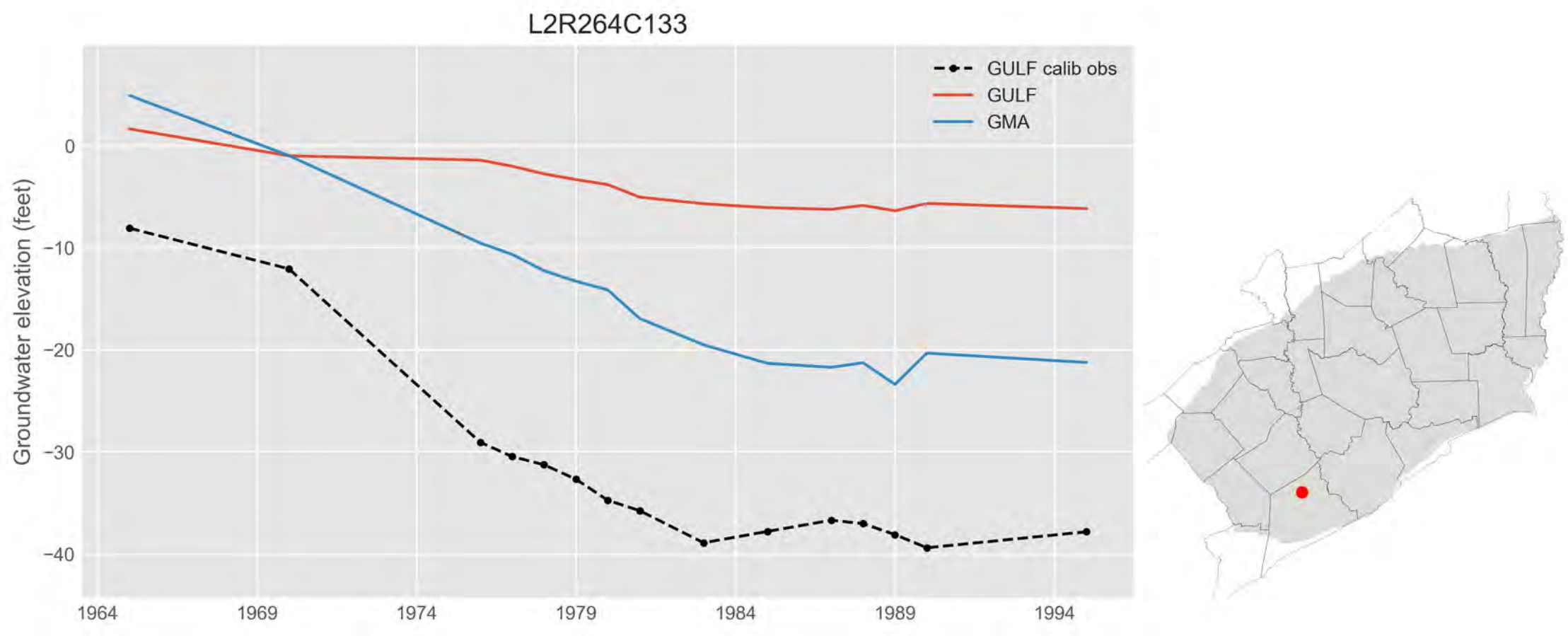

L2R260C070
Groundwater elevation (feet)
30
25
20
15
10
5
0
−5
−10
1964
1969
1974
1979
1984
1989
GULF calib obs
GULF
GMA

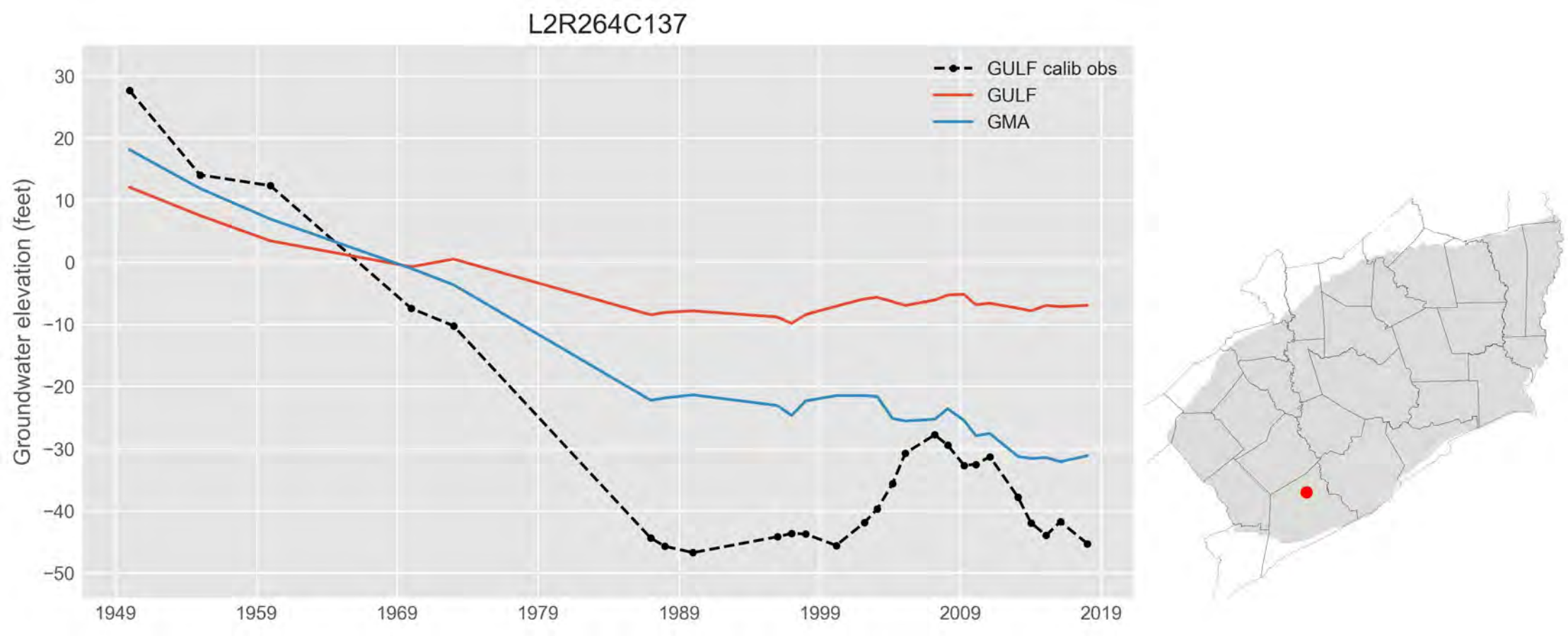

L2R260C105
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
1969
1979
1989
1999
2009
2019

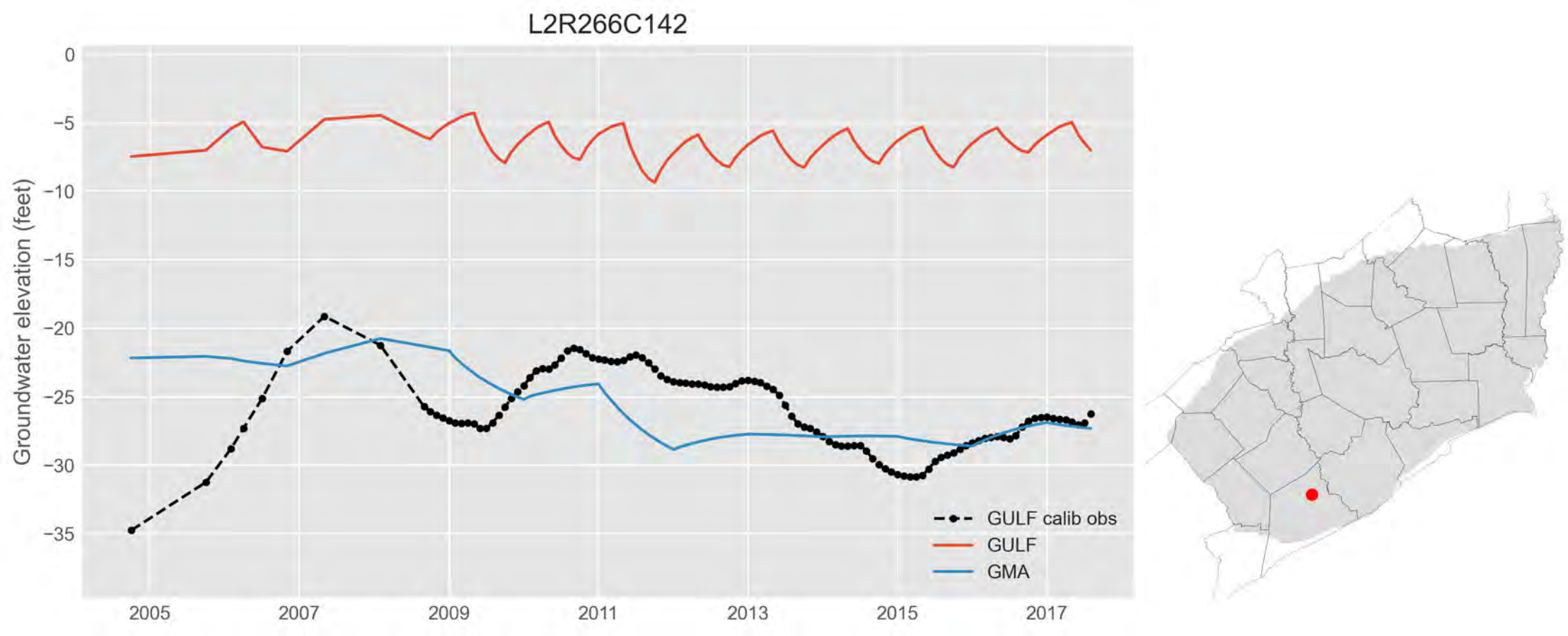

L2R261C135
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
10
5
0
−5
−10
−15
−20
−25
1965
1967
1969
1971
1973
1975
1977

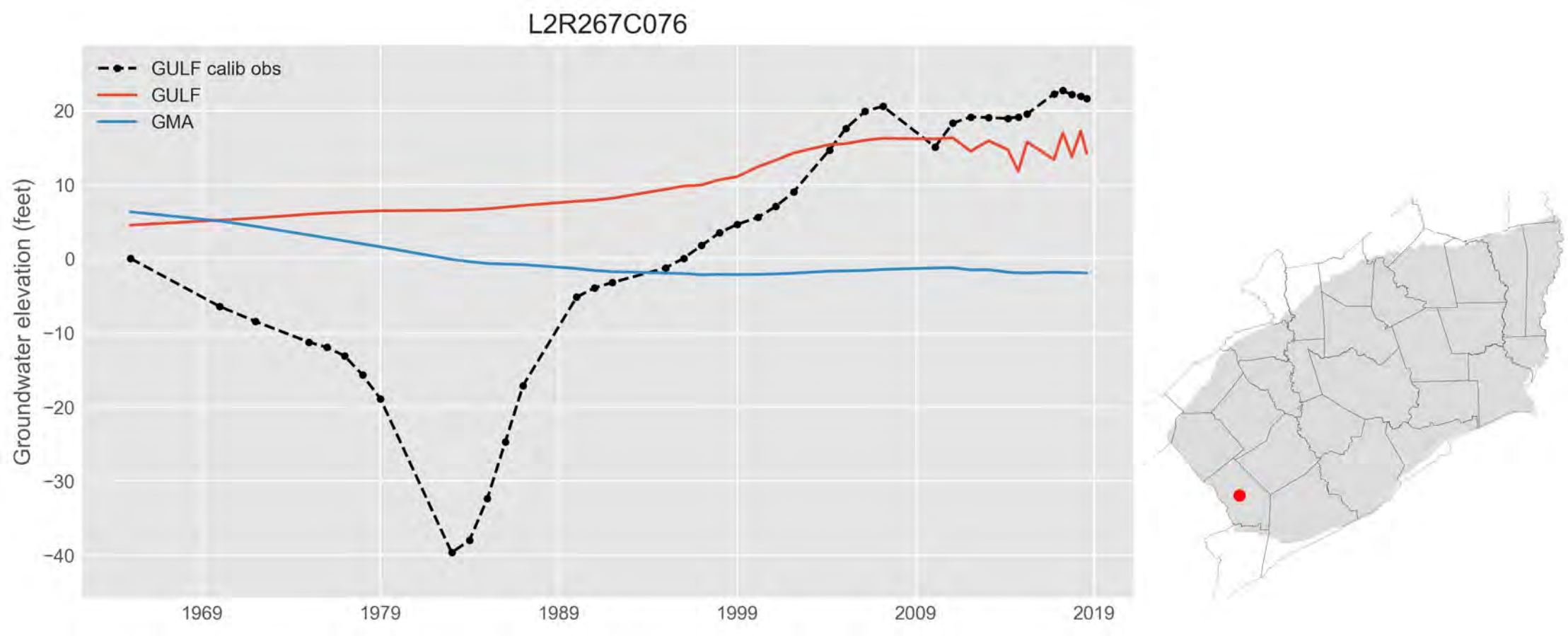

L2R263C087
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
−10
−20
1959
1969
1979
1989
1999
2009
2019

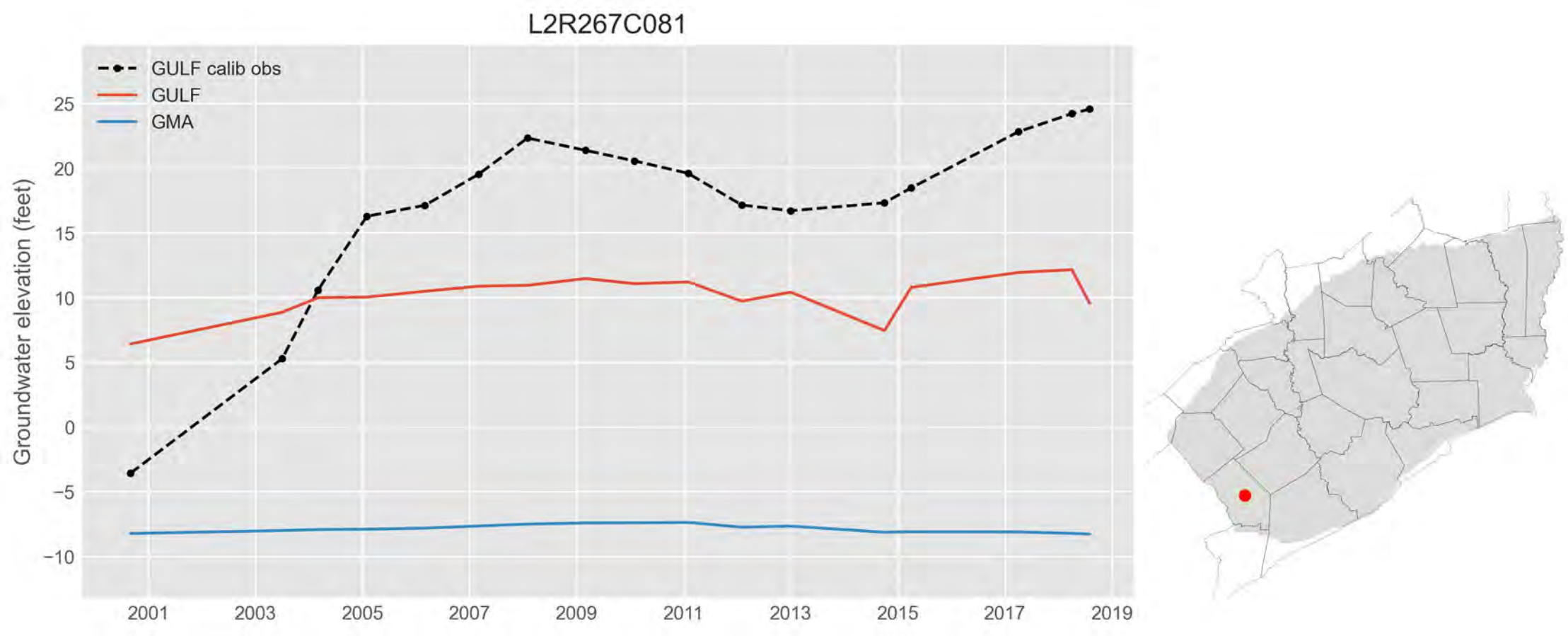

L2R263C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
−40
1969
1979
1989
1999
2009
2019

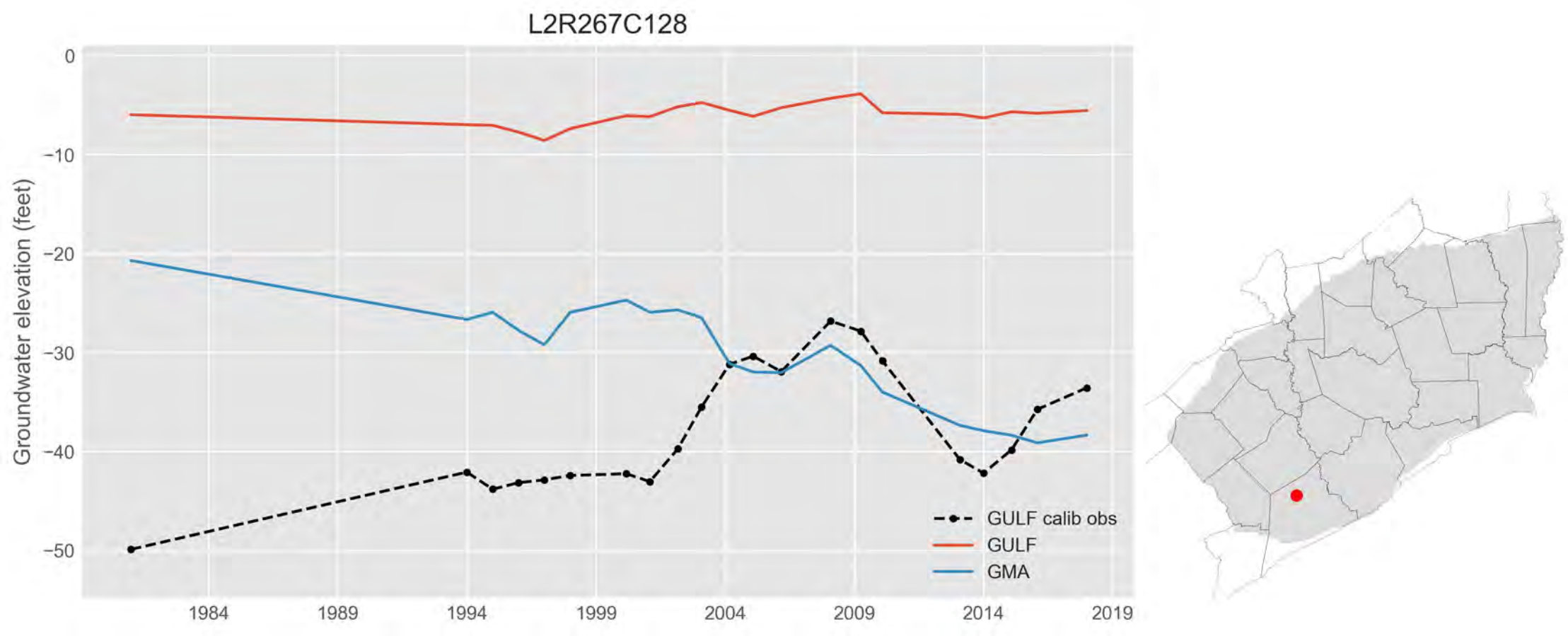

L2R264C133
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
1964
1969
1974
1979
1984
1989
1994

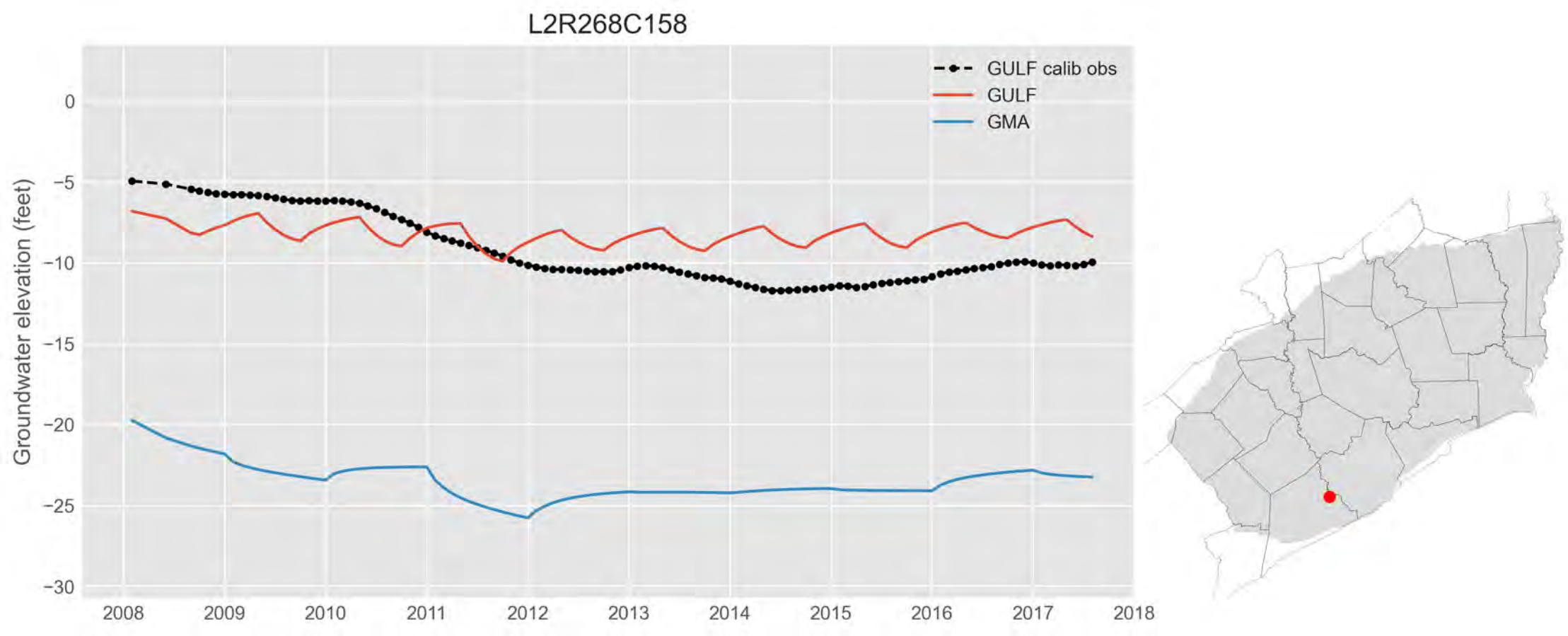

L2R264C137
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
30
20
10
0
−10
−20
−30
−40
−50
1949
1959
1969
1979
1989
1999
2009
2019

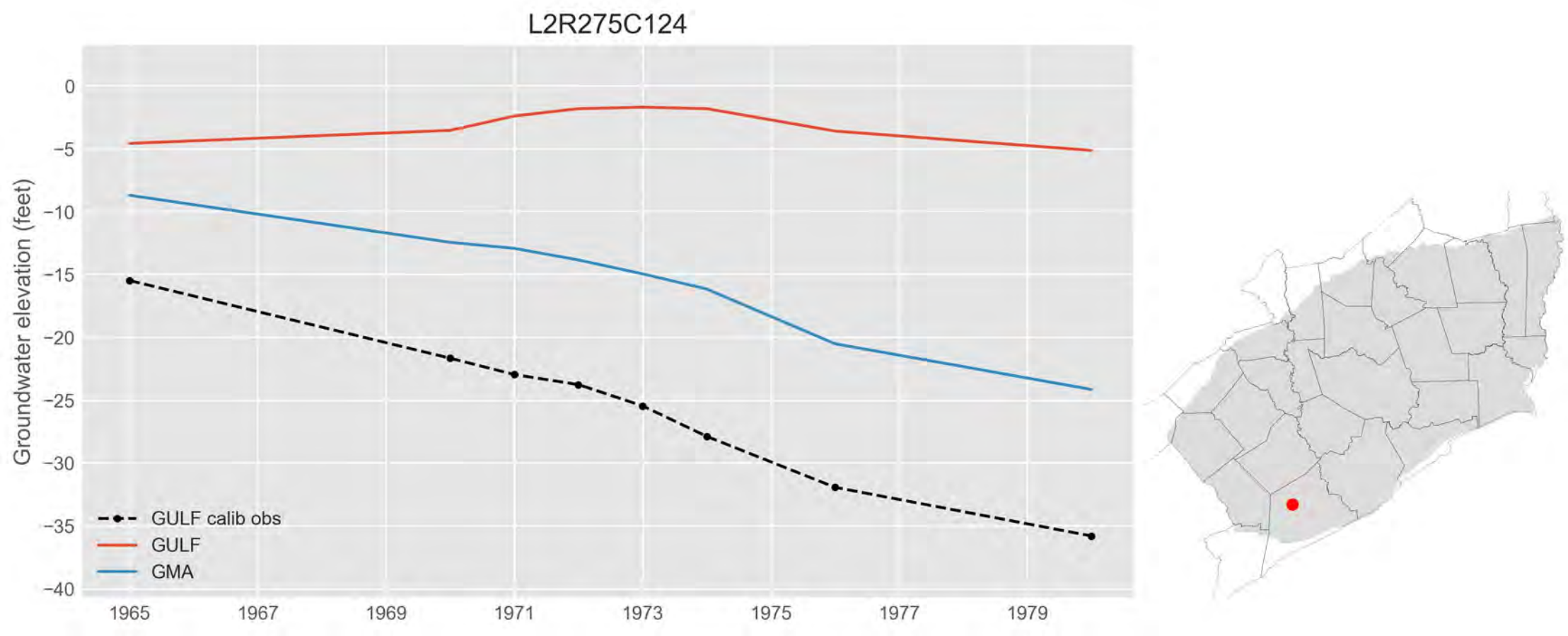

L2R266C142
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

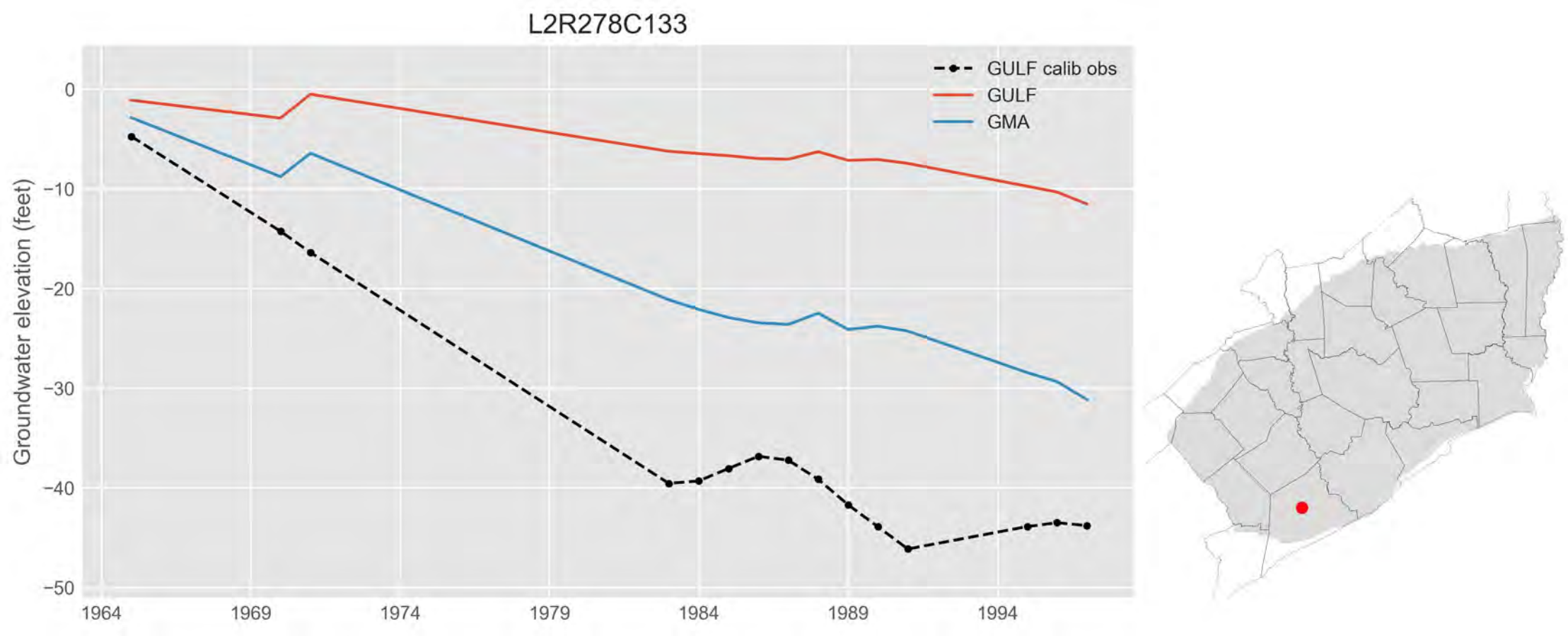

L2R267C076
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
1969
1979
1989
1999
2009
2019

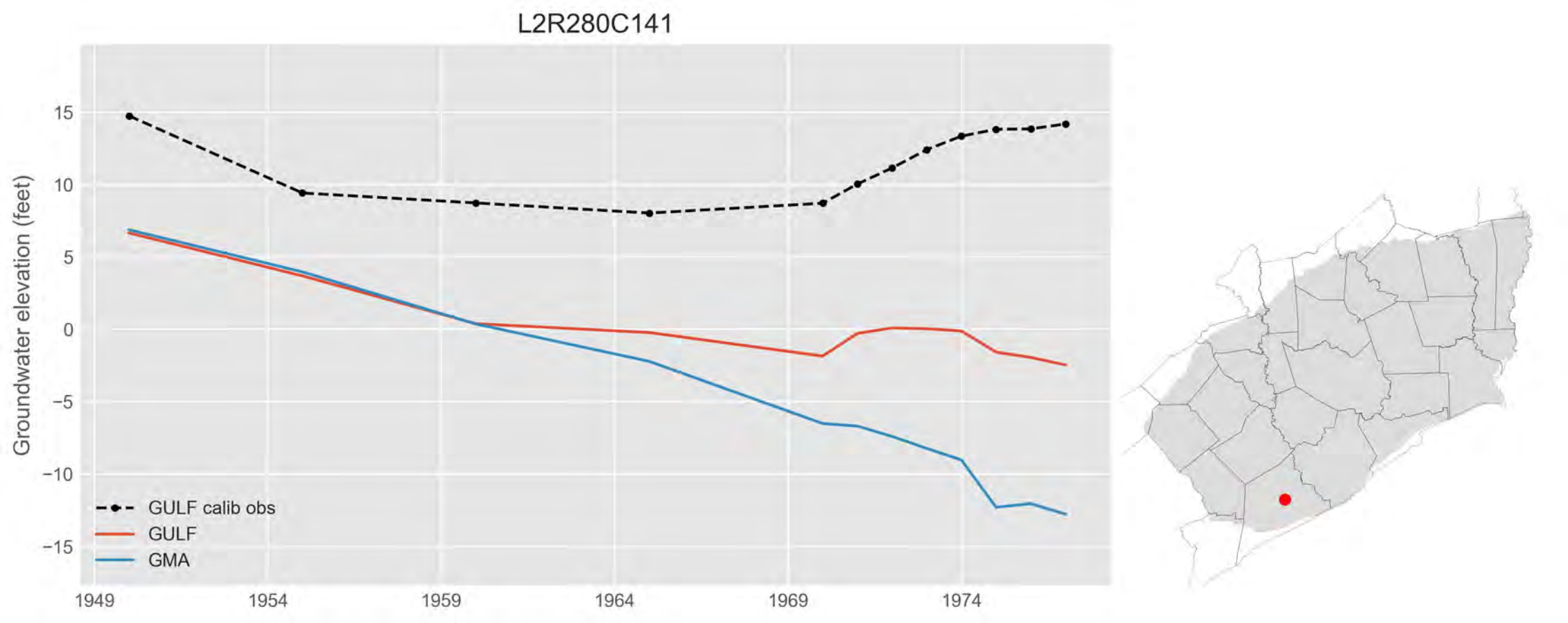

L2R267C081
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
25
20
15
10
5
0
−5
−10
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019

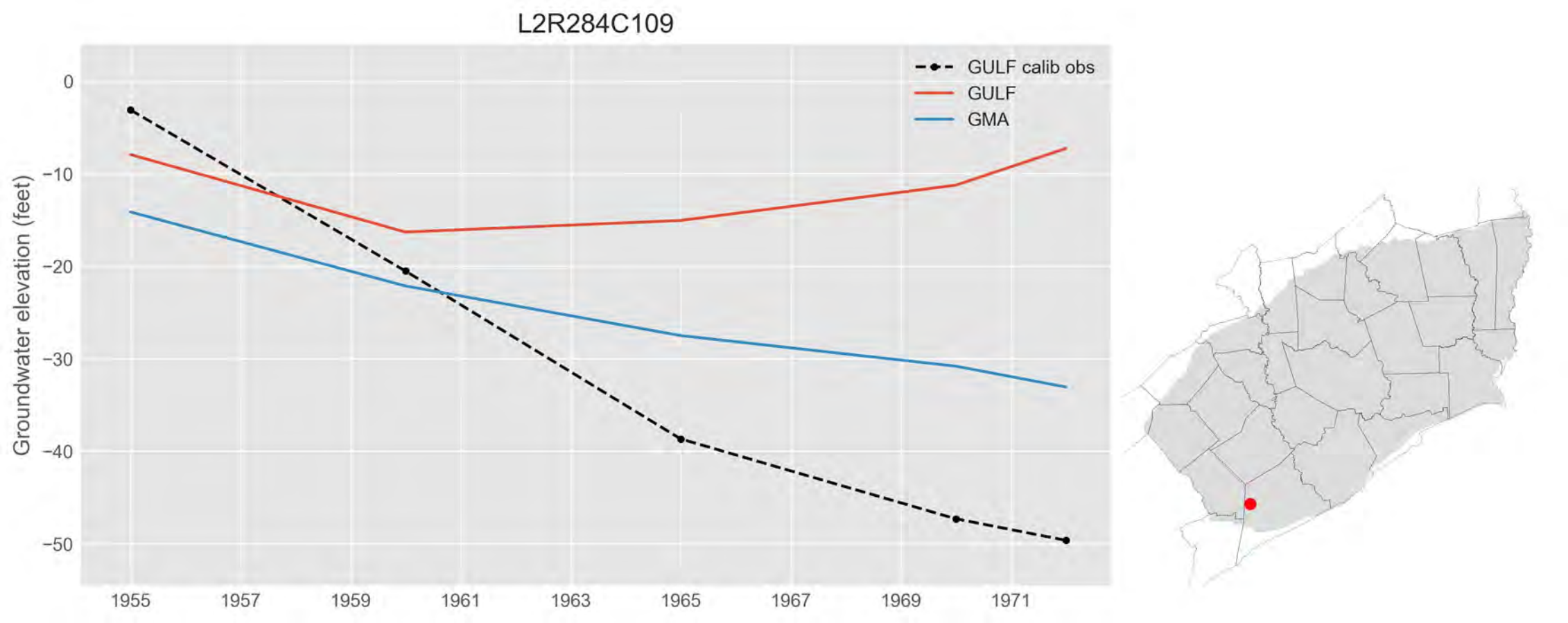

L2R267C128
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

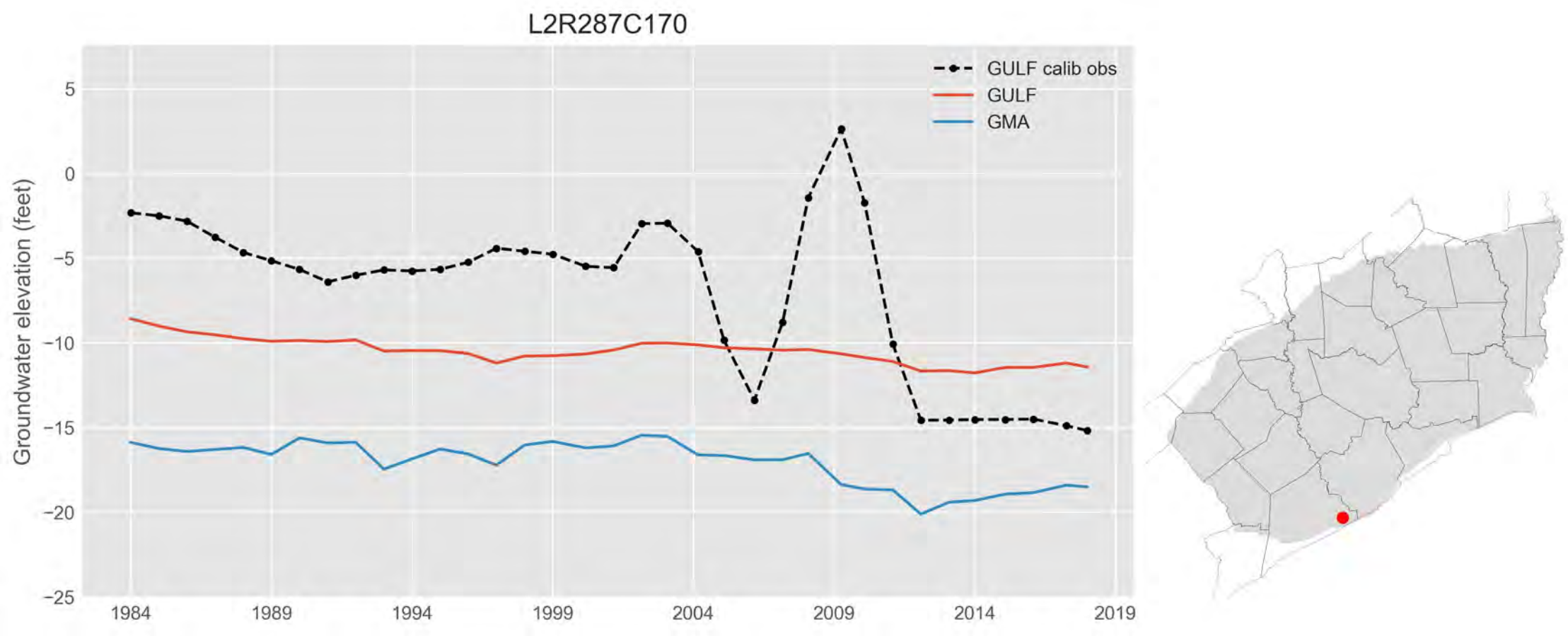

L2R268C158
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

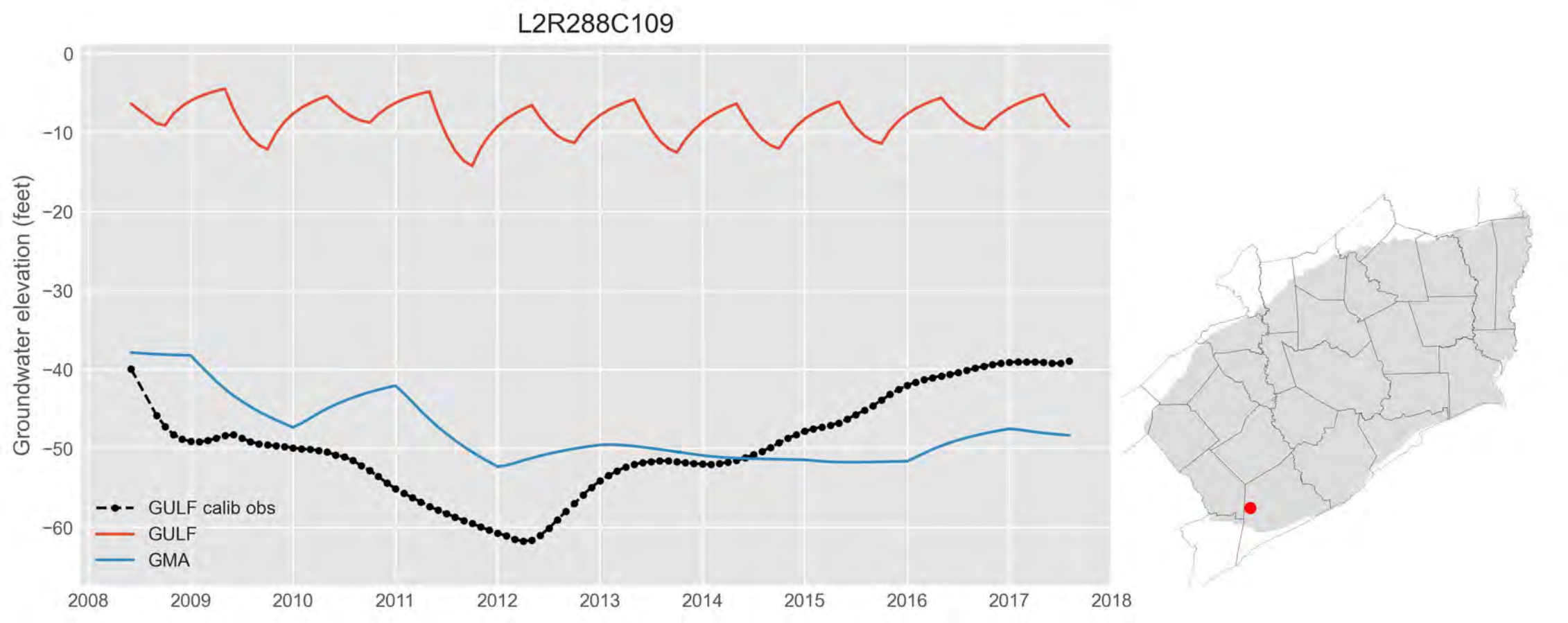

L2R275C124
Groundwater elevation (feet)
0
−5
−10
−15
−20
−25
−30
−35
−40
1965
1967
1969
1971
1973
1975
1977
1979
GULF calib obs
GULF
GMA


L2R278C133
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1964
1969
1974
1979
1984
1989
1994

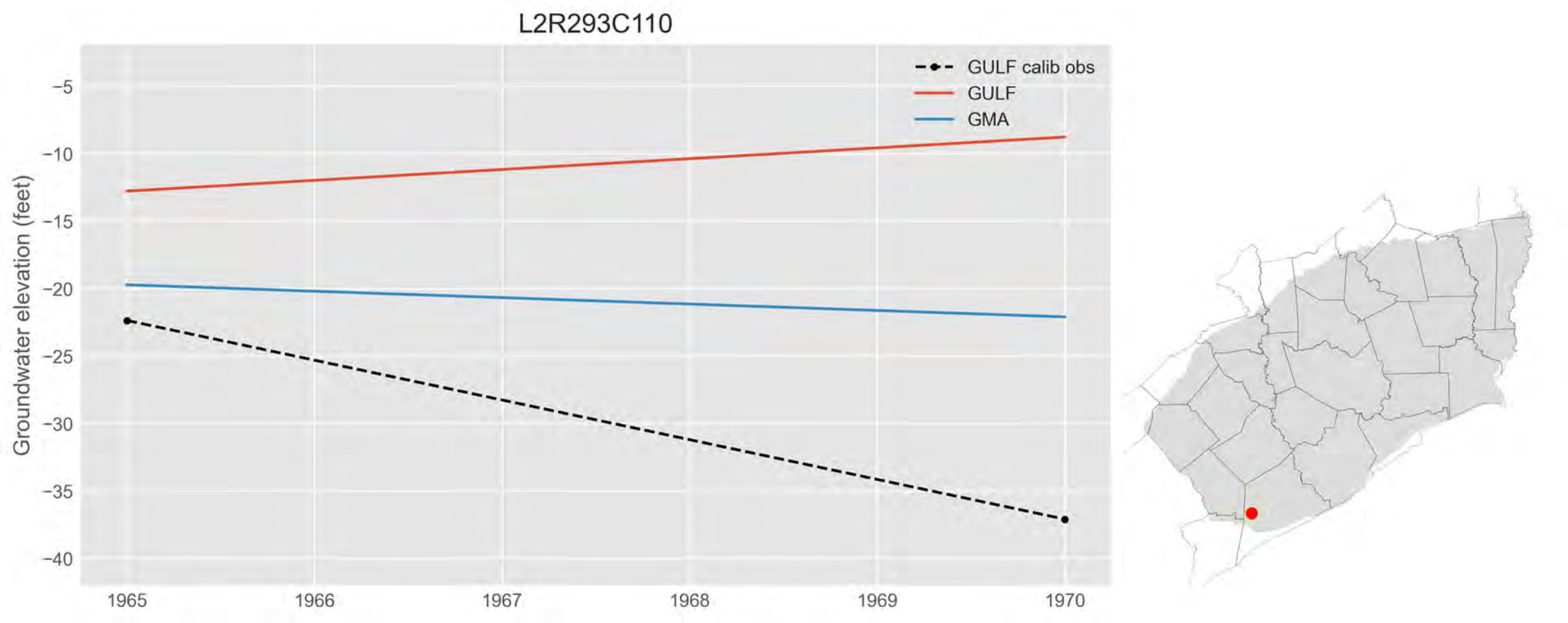

L2R280C141
Groundwater elevation (feet)
15
10
5
0
−5
−10
−15
1949
1954
1959
1964
1969
1974
GULF calib obs
GULF
GMA

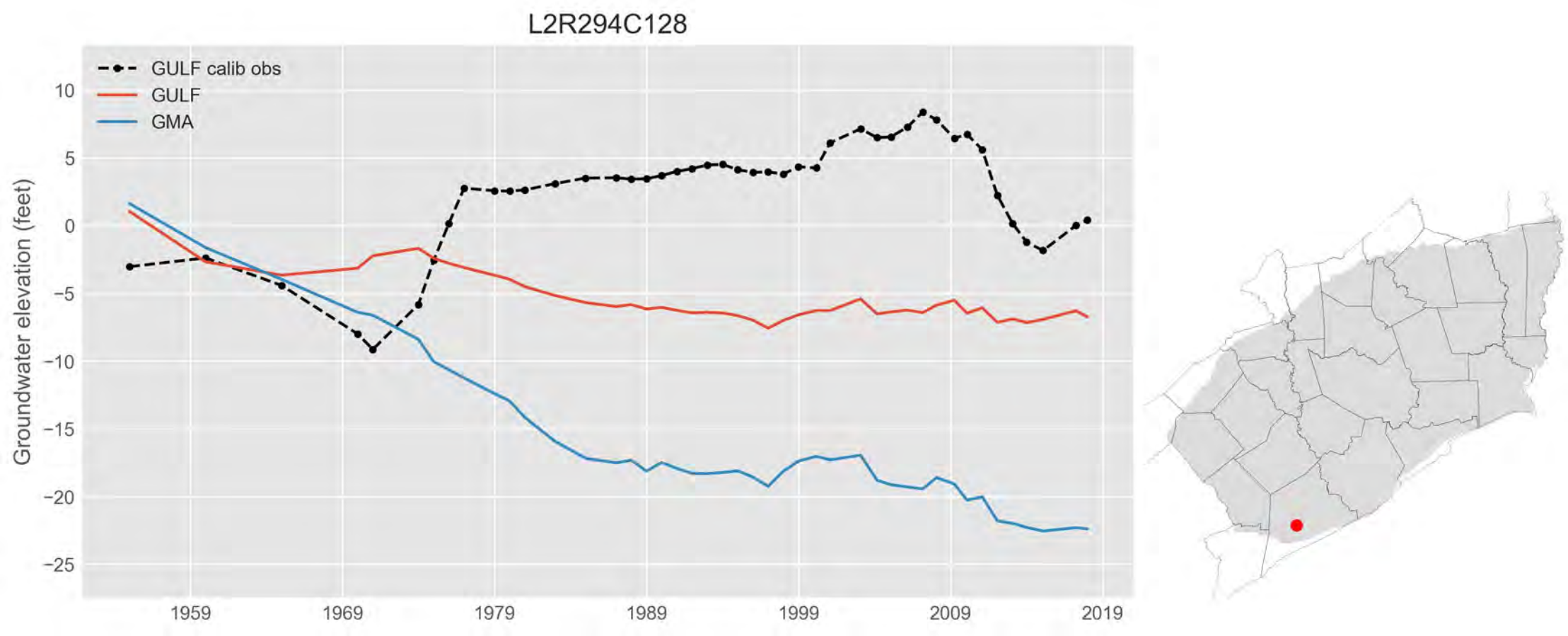

L2R284C109
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
1955
1957
1959
1961
1963
1965
1967
1969
1971

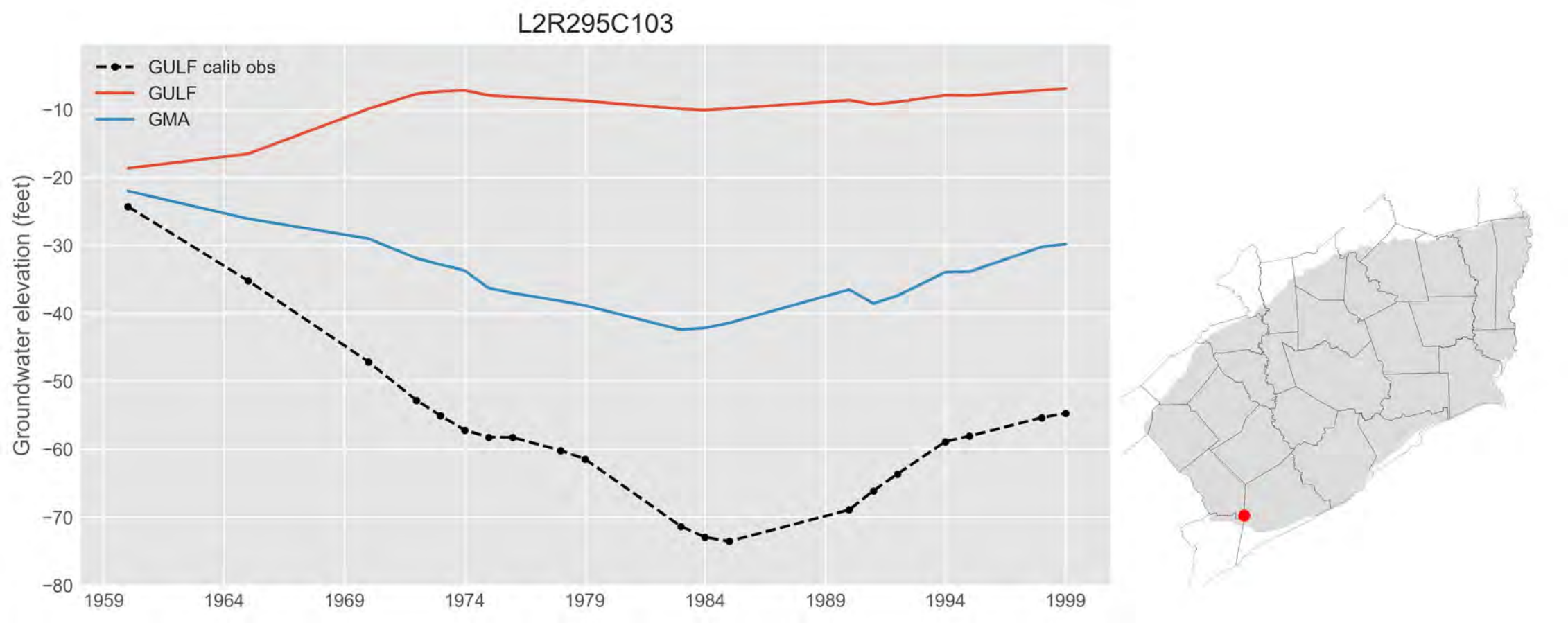

L2R287C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
5
0
−5
−10
−15
−20
−25
1984
1989
1994
1999
2004
2009
2014
2019

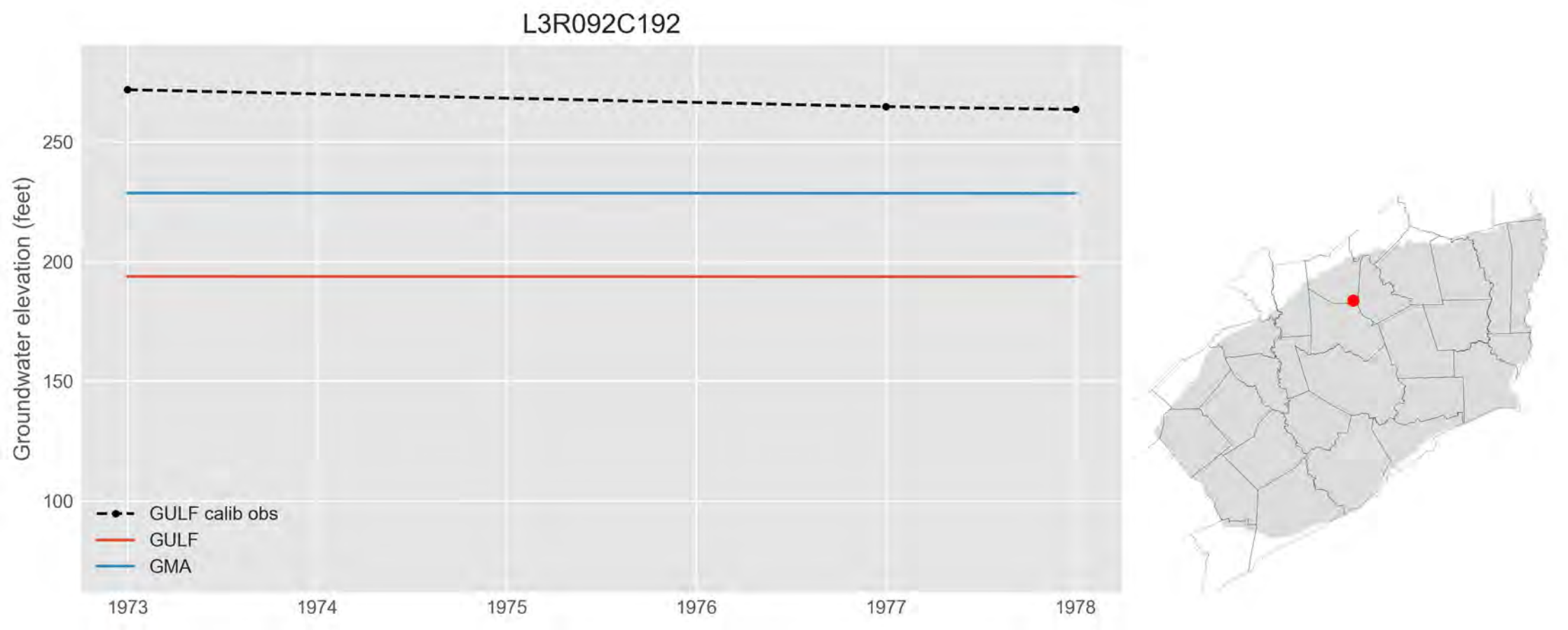

L2R288C109
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

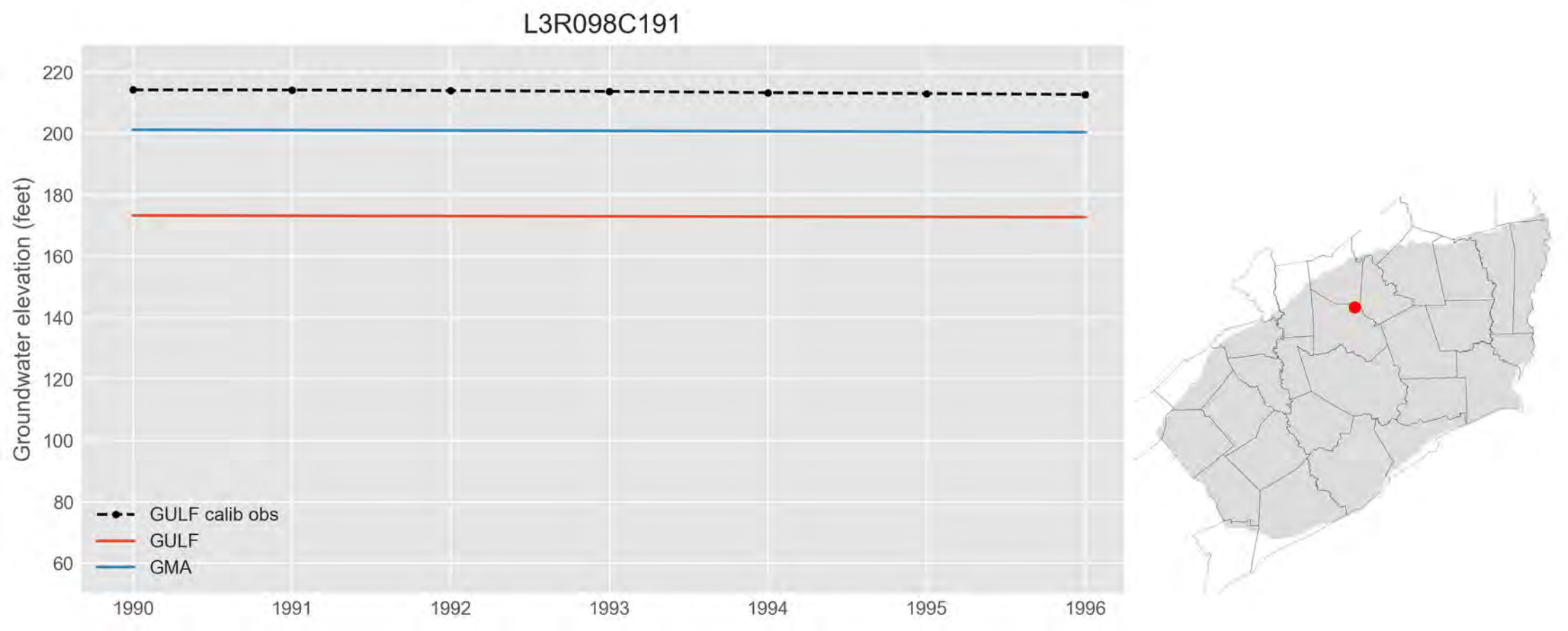
L2R293C090
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
Dec
Jan
1970


L2R293C110
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−5
−10
−15
−20
−25
−30
−35
−40
1965
1966
1967
1968
1969
1970

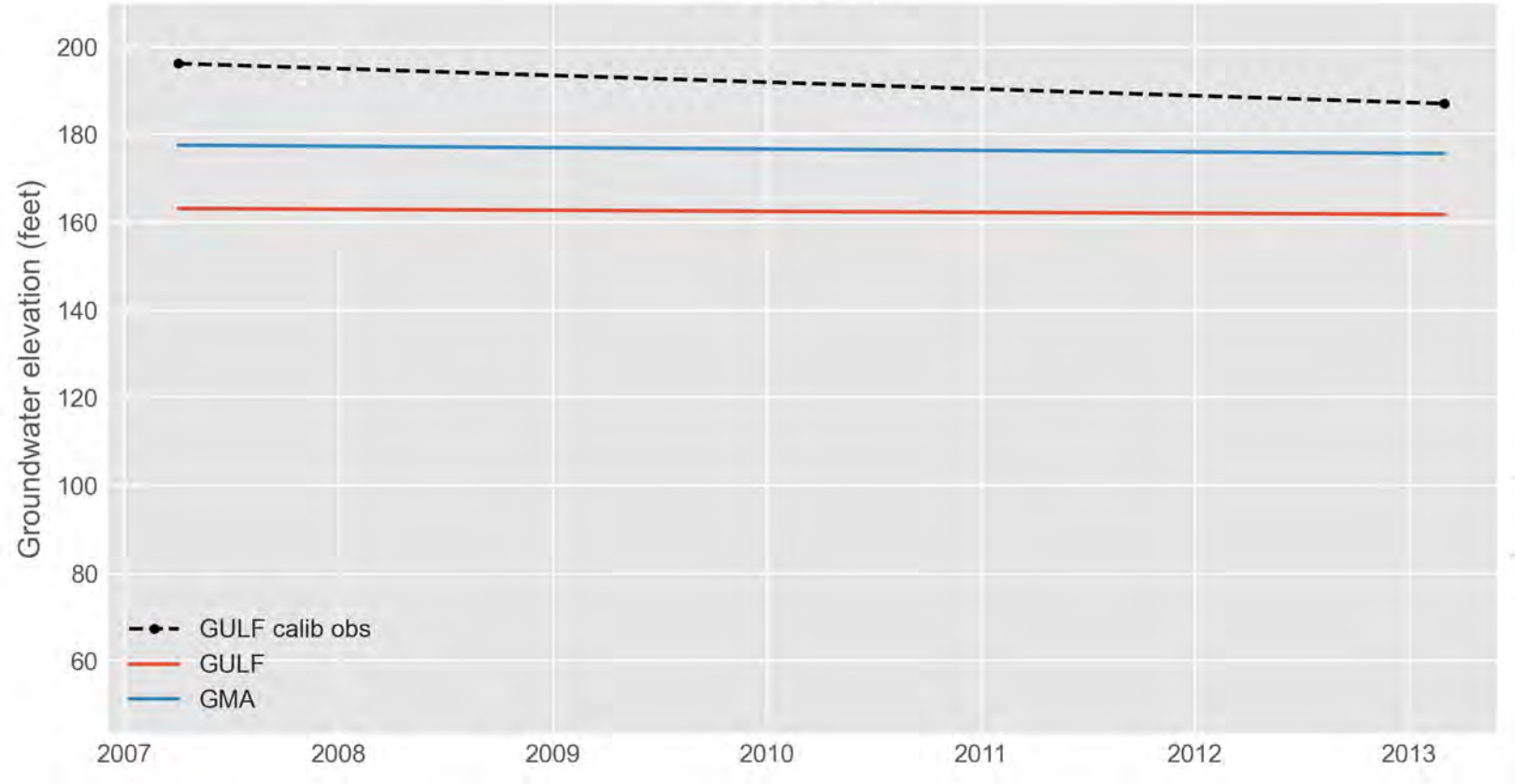

L2R294C128
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
10
5
0
−5
−10
−15
−20
−25
1959
1969
1979
1989
1999
2009
2019

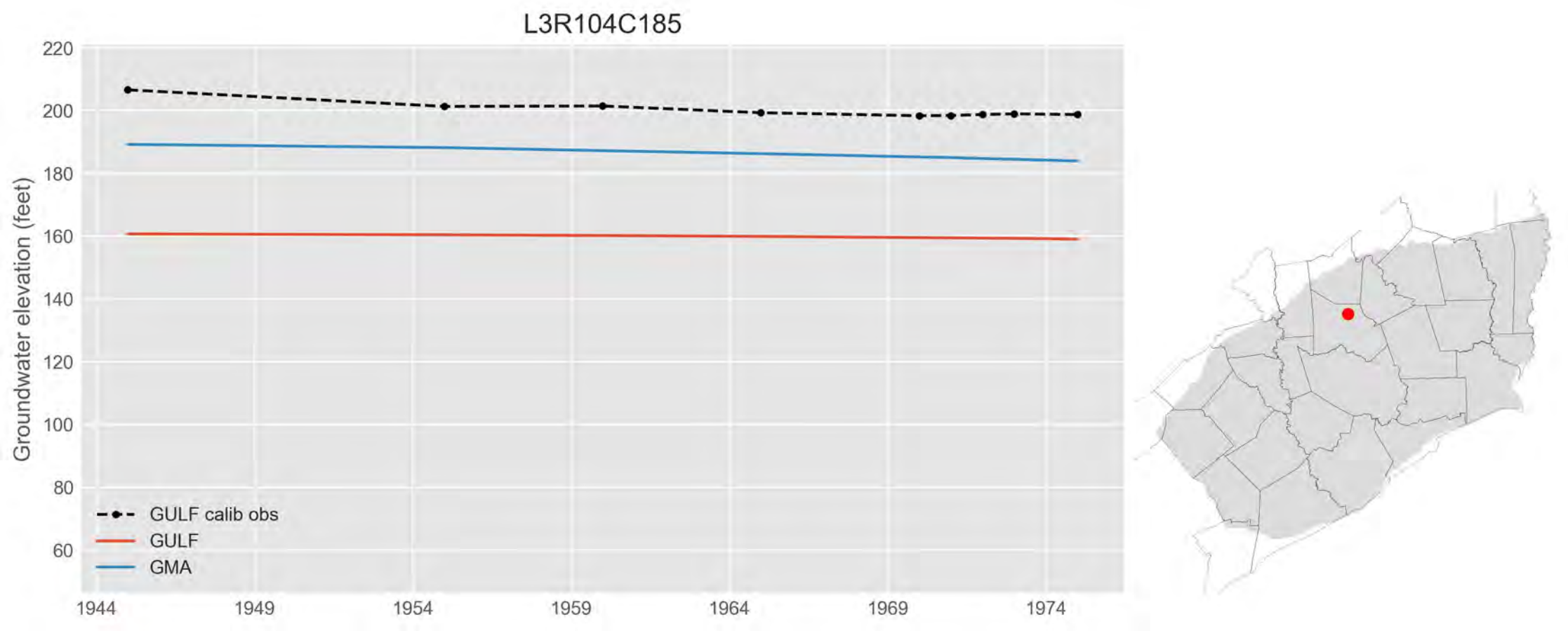

L2R295C103
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−10
−20
−30
−40
−50
−60
−70
−80
1959
1964
1969
1974
1979
1984
1989
1994
1999

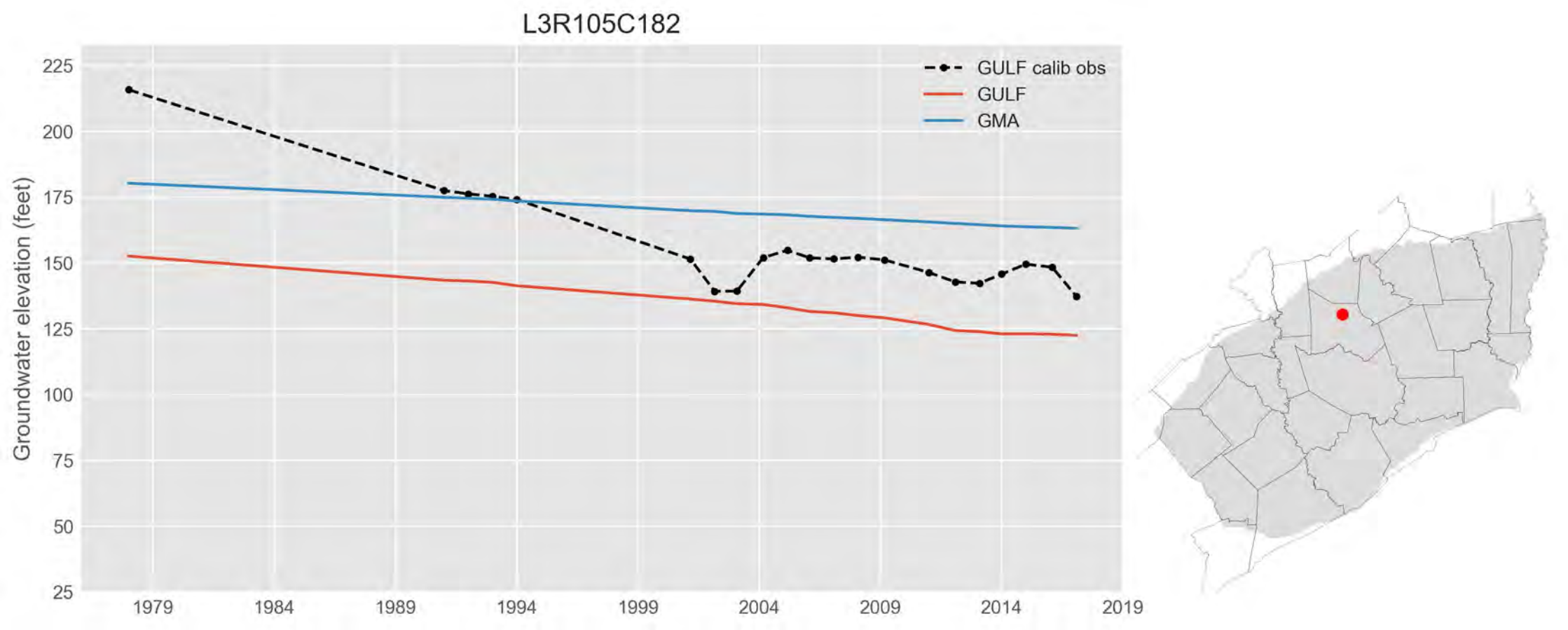

L3R092C192
Groundwater elevation (feet)
250
200
150
100
1973
1974
1975
1976
1977
1978
GULF calib obs
GULF
GMA

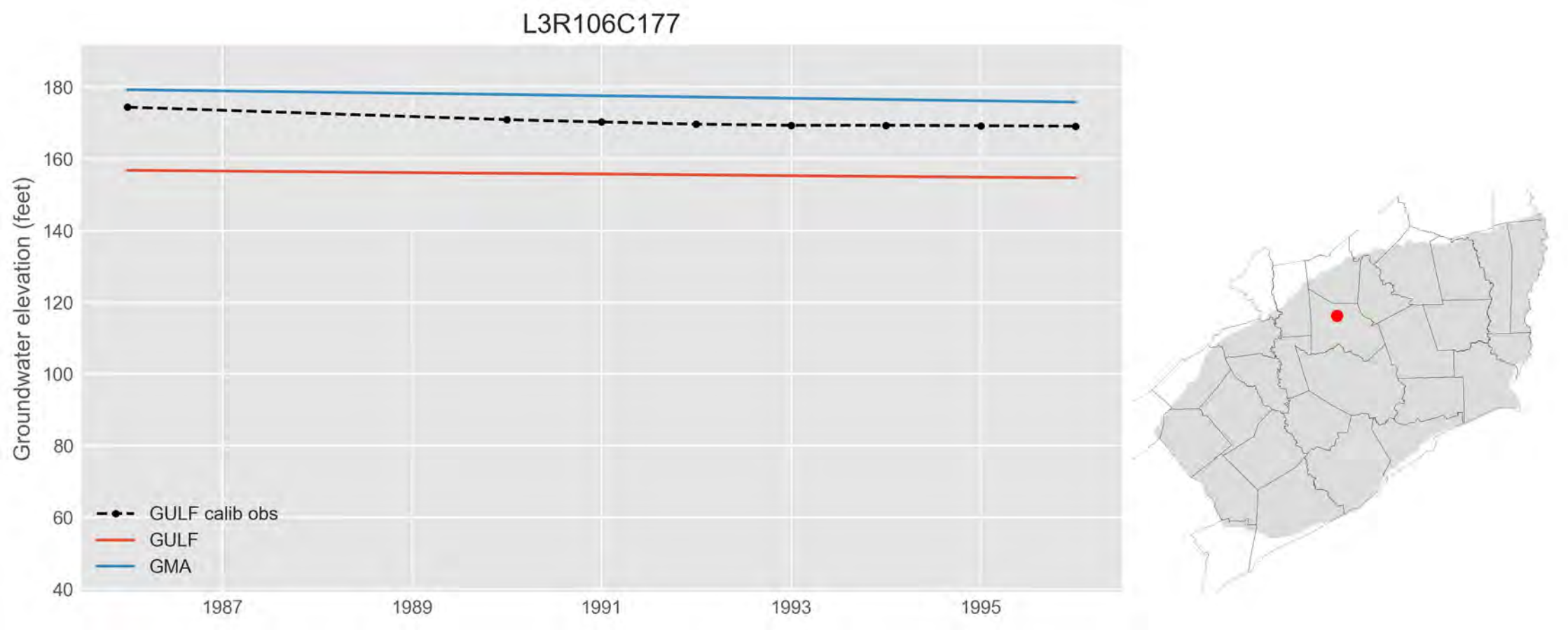

L3R098C191
Groundwater elevation (feet)
220
200
180
160
140
120
100
80
60
1990
1991
1992
1993
1994
1995
1996
GULF calib obs
GULF
GMA

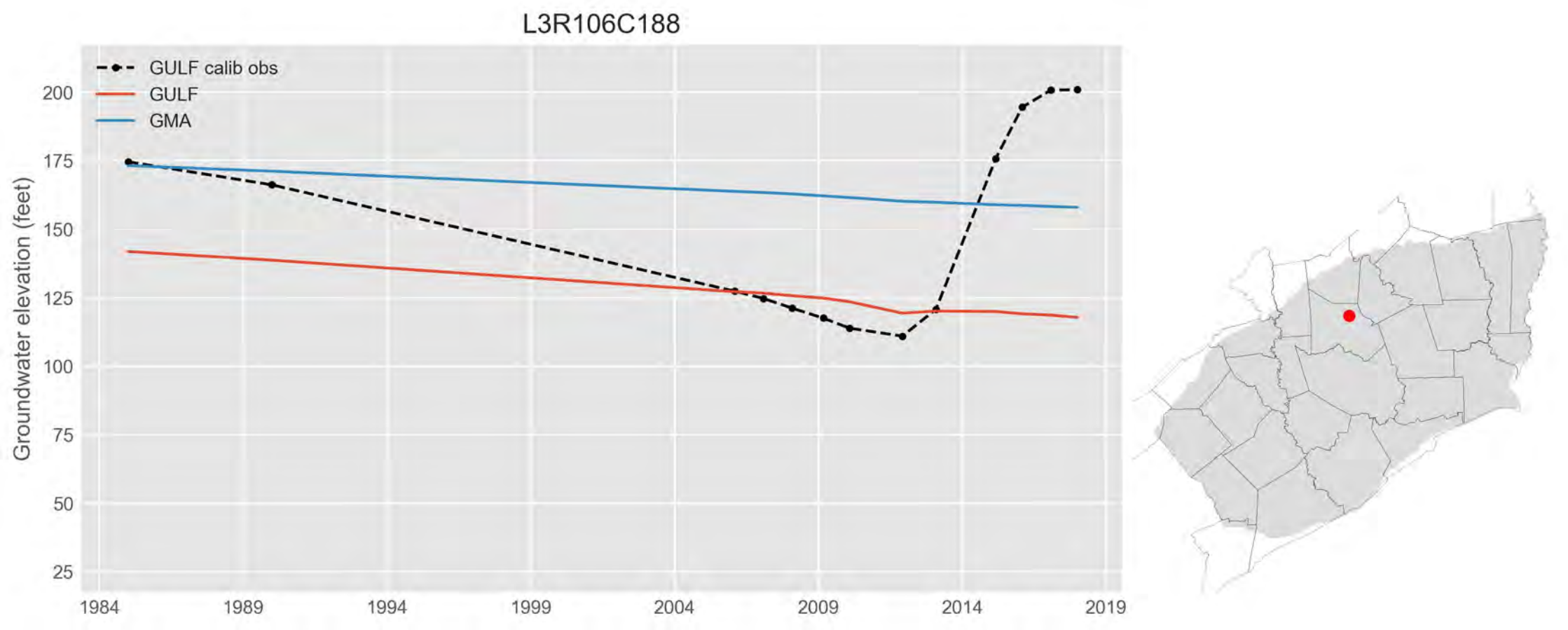
L3R102C179

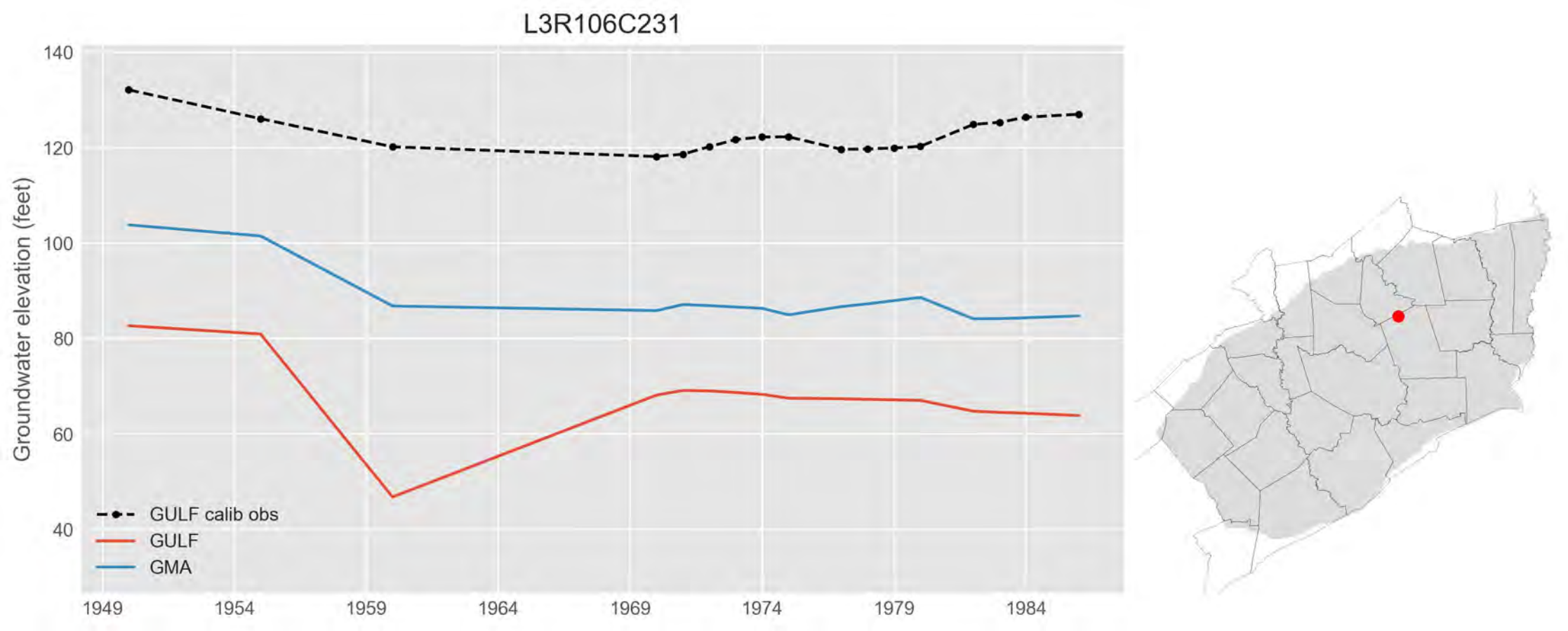

Groundwater elevation (feet)
200
180
160
140
120
100
80
60
2007
2008
2009
2010
2011
2012
2013
GULF calib obs
GULF
GMA

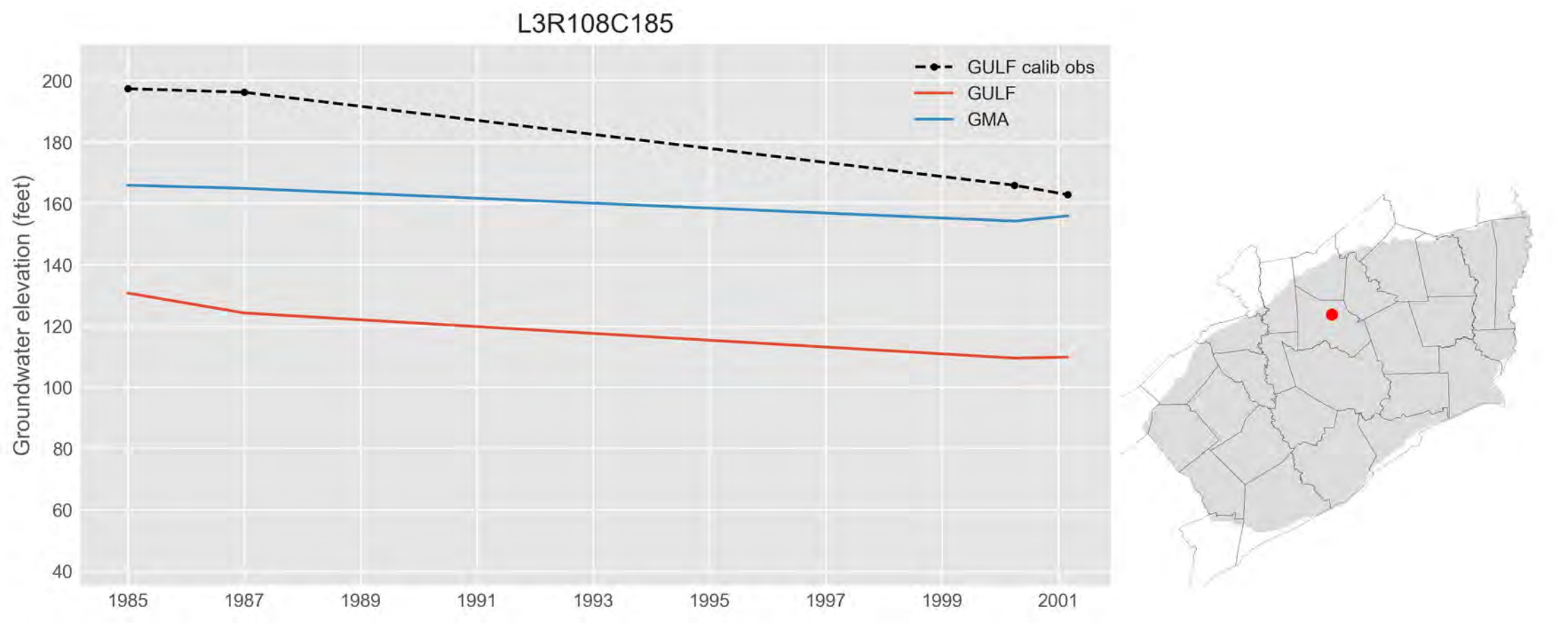

L3R104C185
Groundwater elevation (feet)
220
200
180
160
140
120
100
80
60
1944
1949
1954
1959
1964
1969
1974
GULF calib obs
GULF
GMA

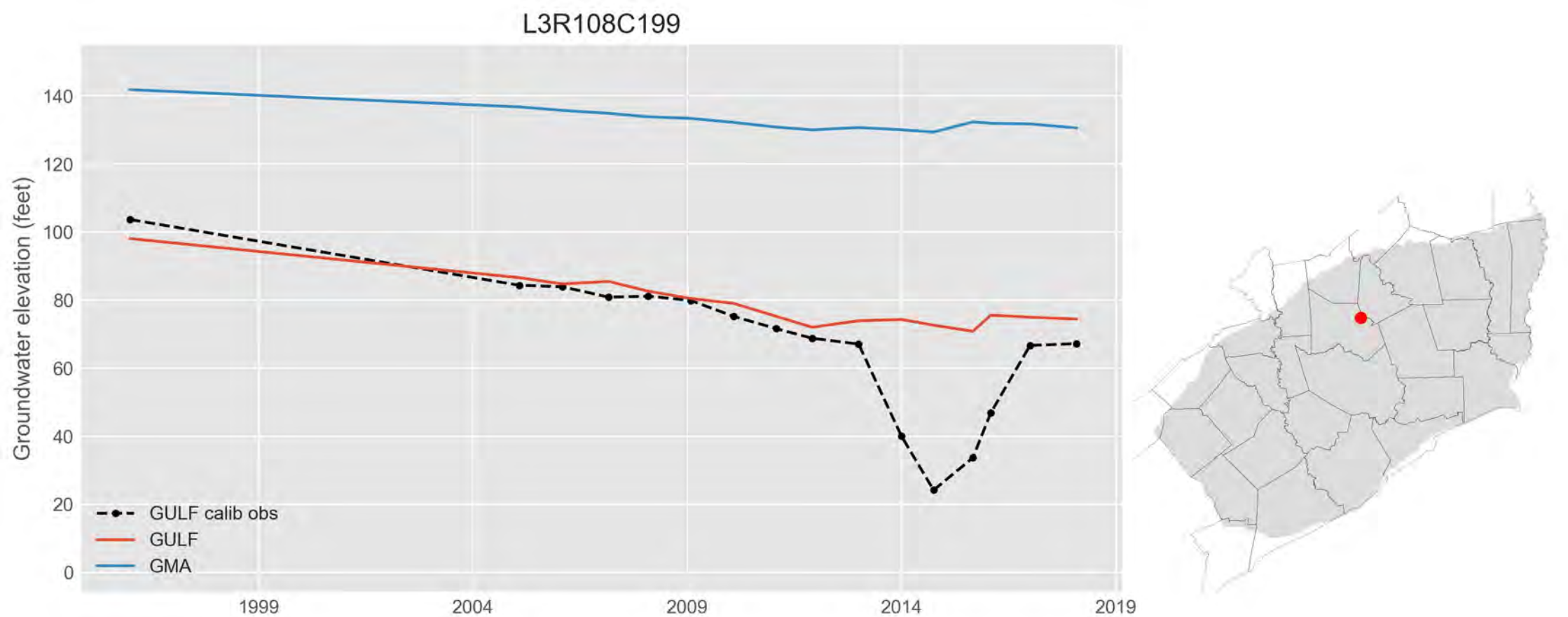

L3R105C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
25
1979
1984
1989
1994
1999
2004
2009
2014
2019

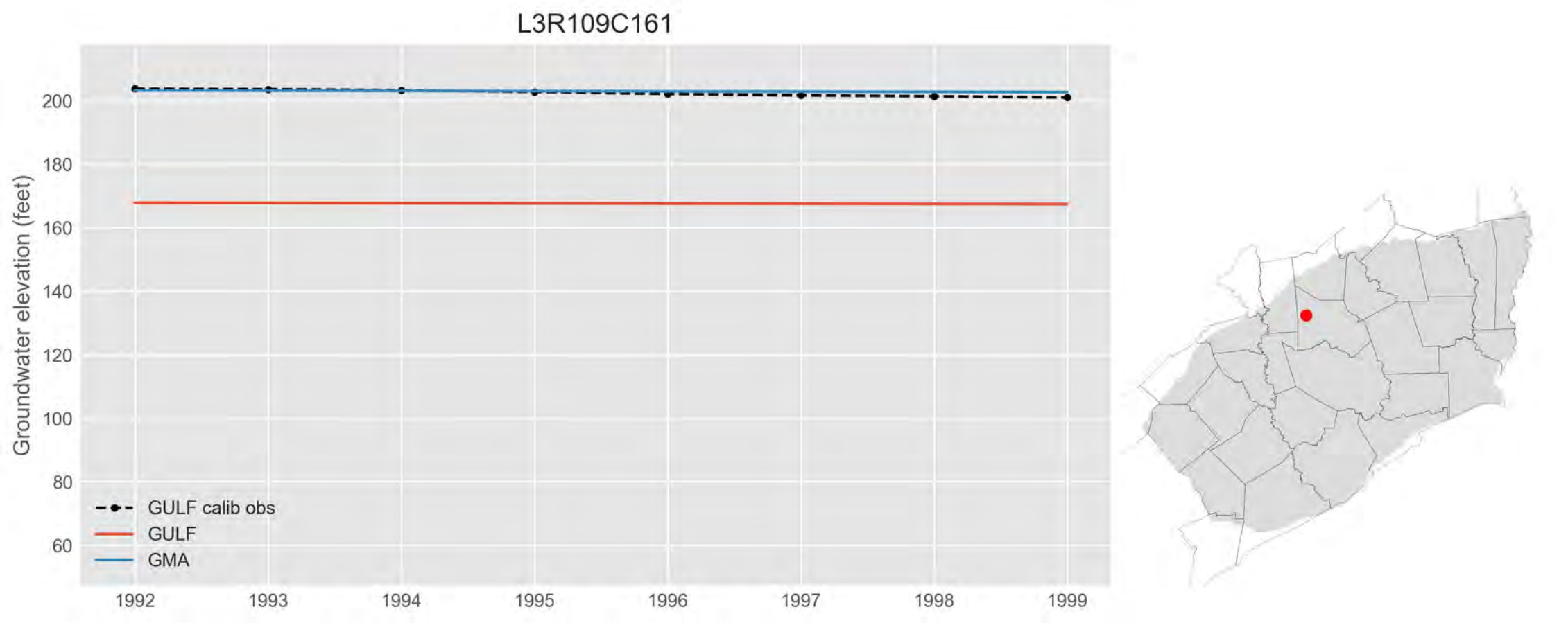

L3R106C177
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1987
1989
1991
1993
1995
GULF calib obs
GULF
GMA


L3R106C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1984
1989
1994
1999
2004
2009
2014
2019

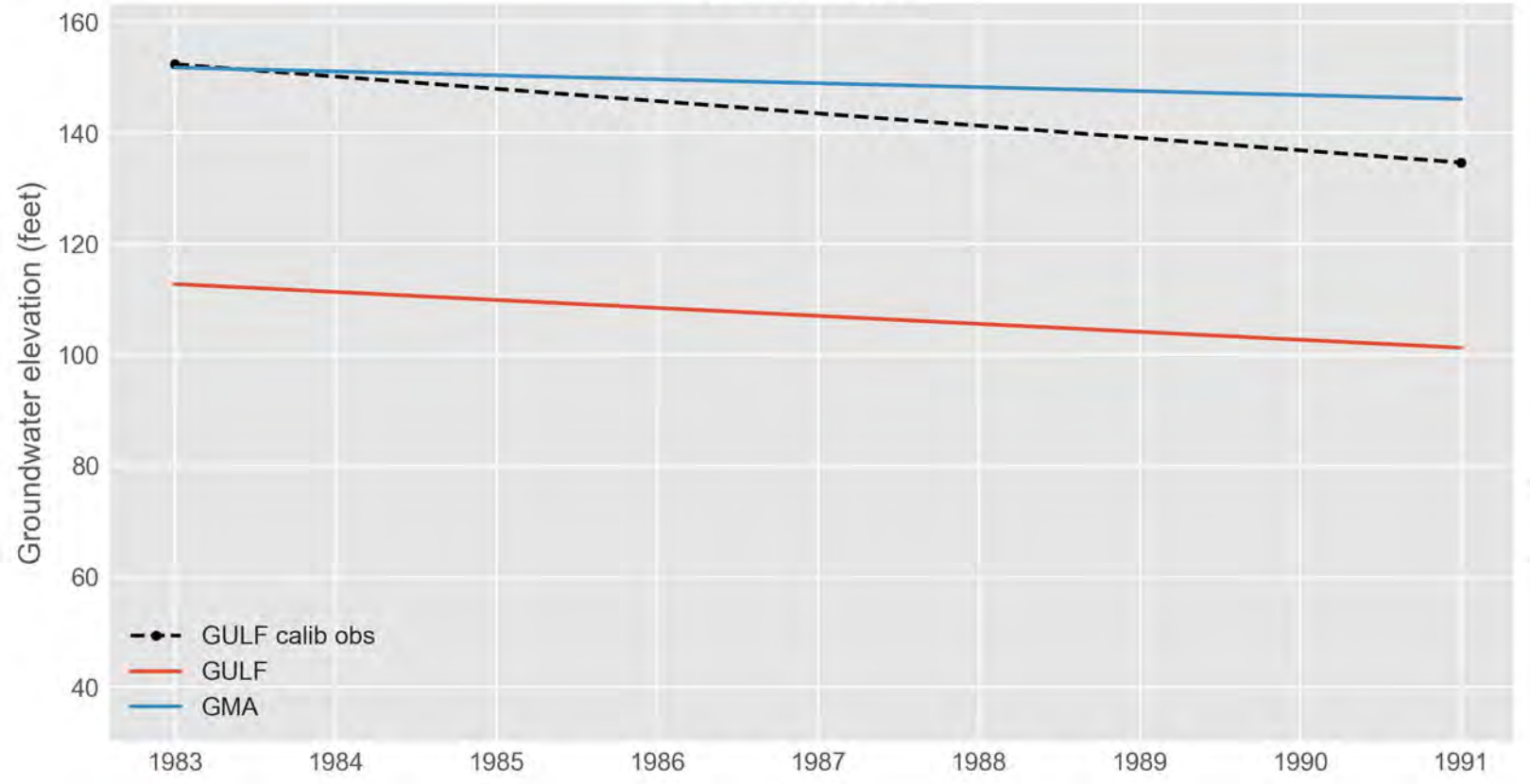

L3R106C231
Groundwater elevation (feet)
140
120
100
80
60
40
1949
1954
1959
1964
1969
1974
1979
1984
GULF calib obs
GULF
GMA

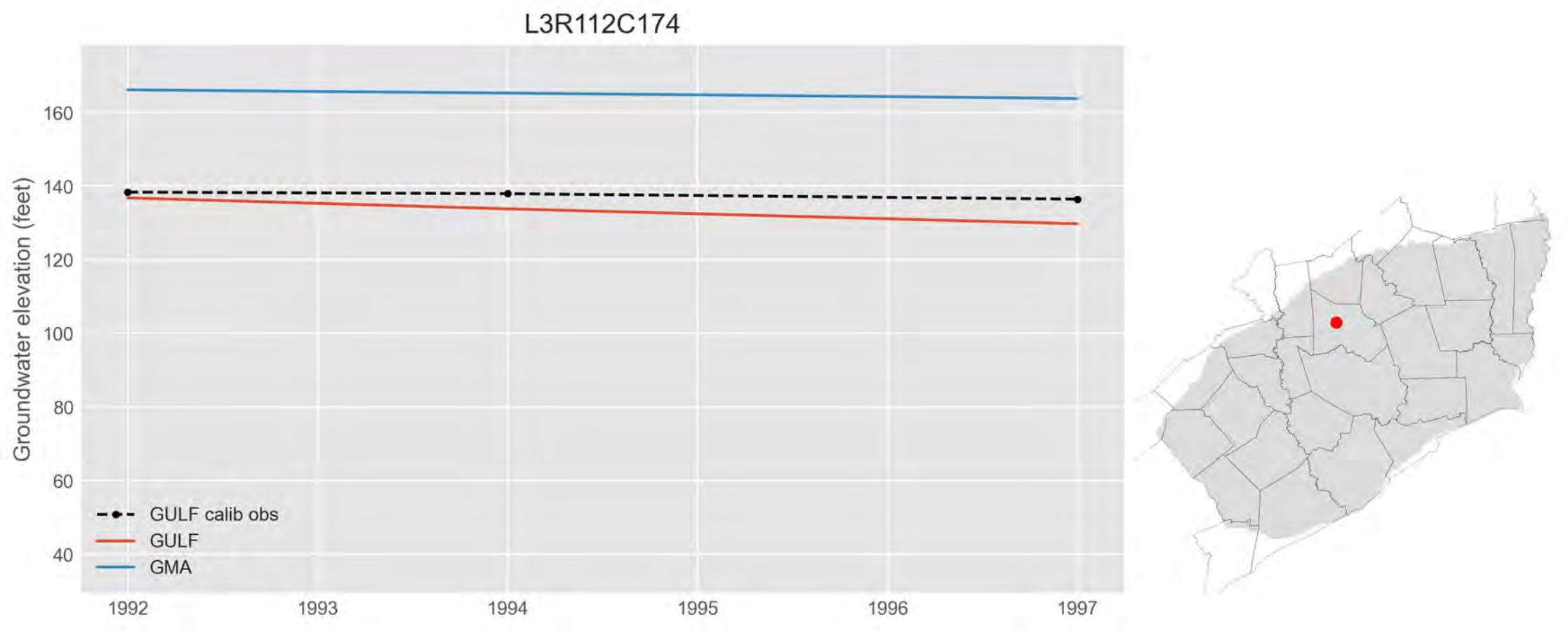

L3R108C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1985
1987
1989
1991
1993
1995
1997
1999
2001

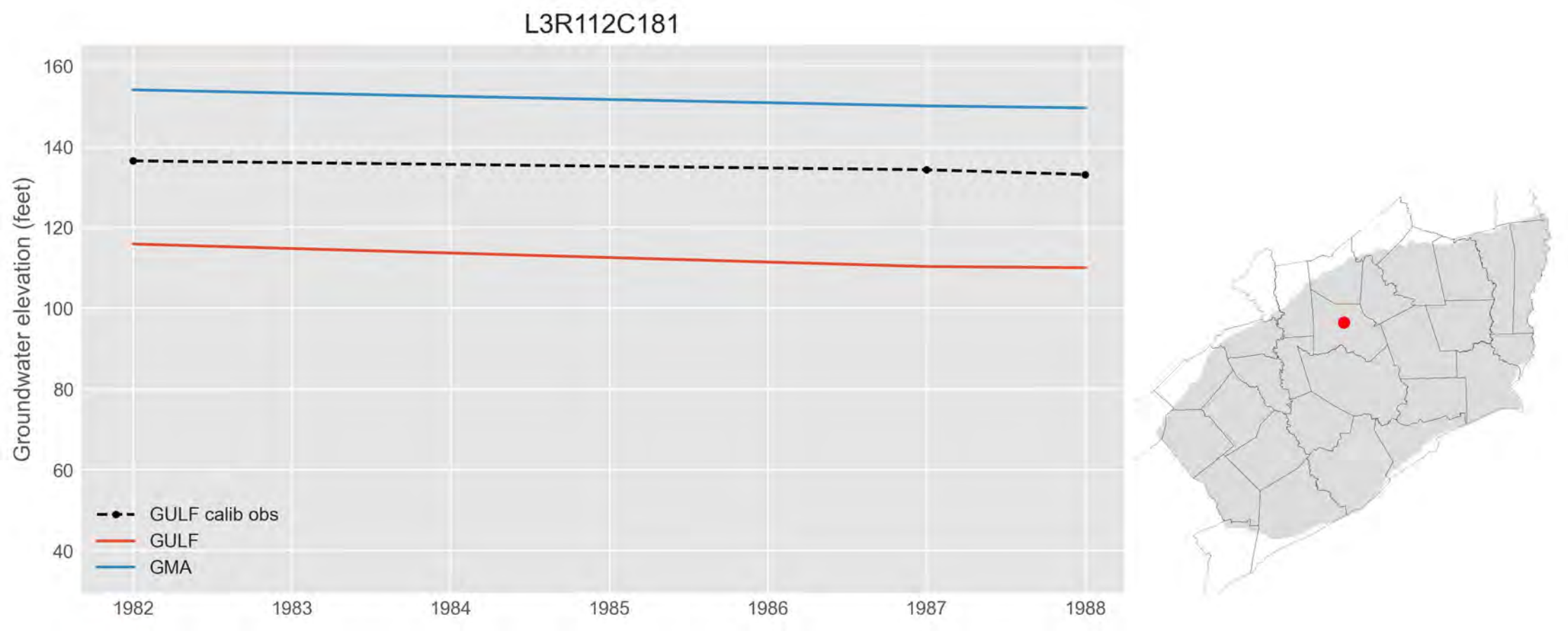

L3R108C199
Groundwater elevation (feet)
140
120
100
80
60
40
20
0
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

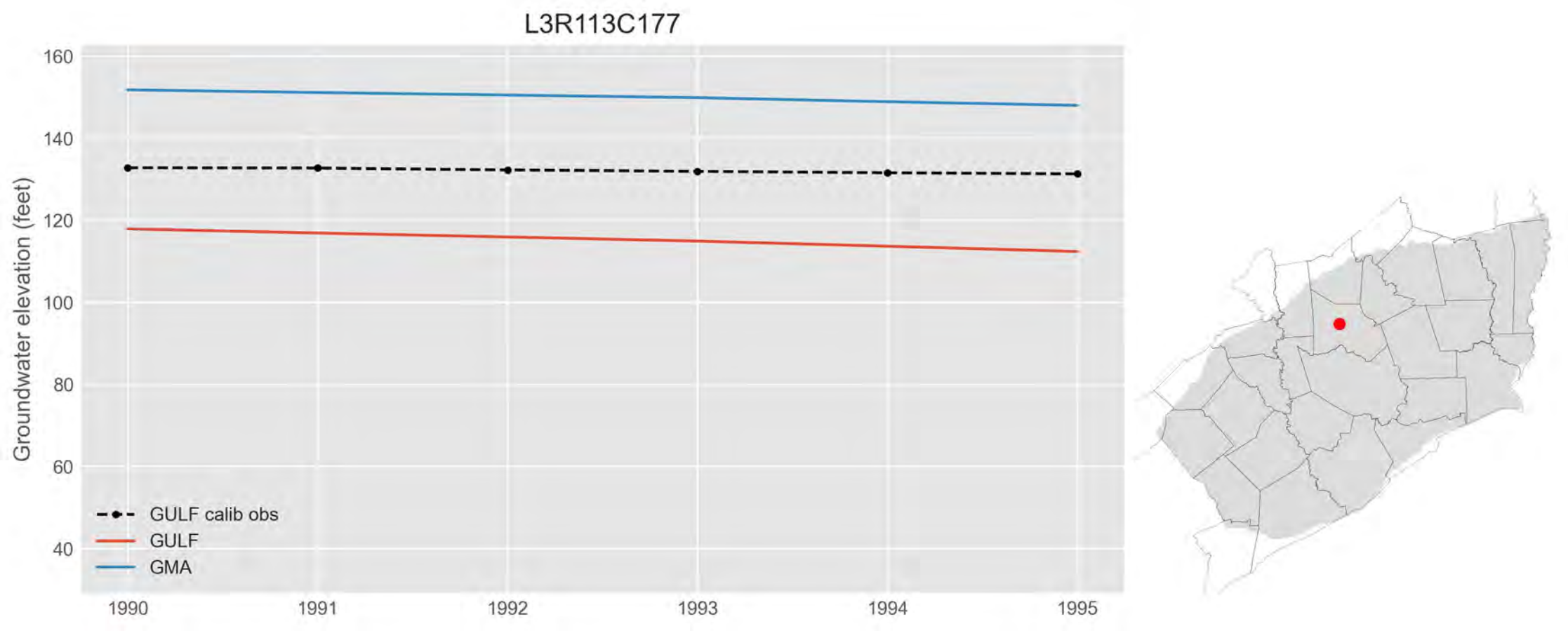

L3R109C161
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
1992
1993
1994
1995
1996
1997
1998
1999
GULF calib obs
GULF
GMA

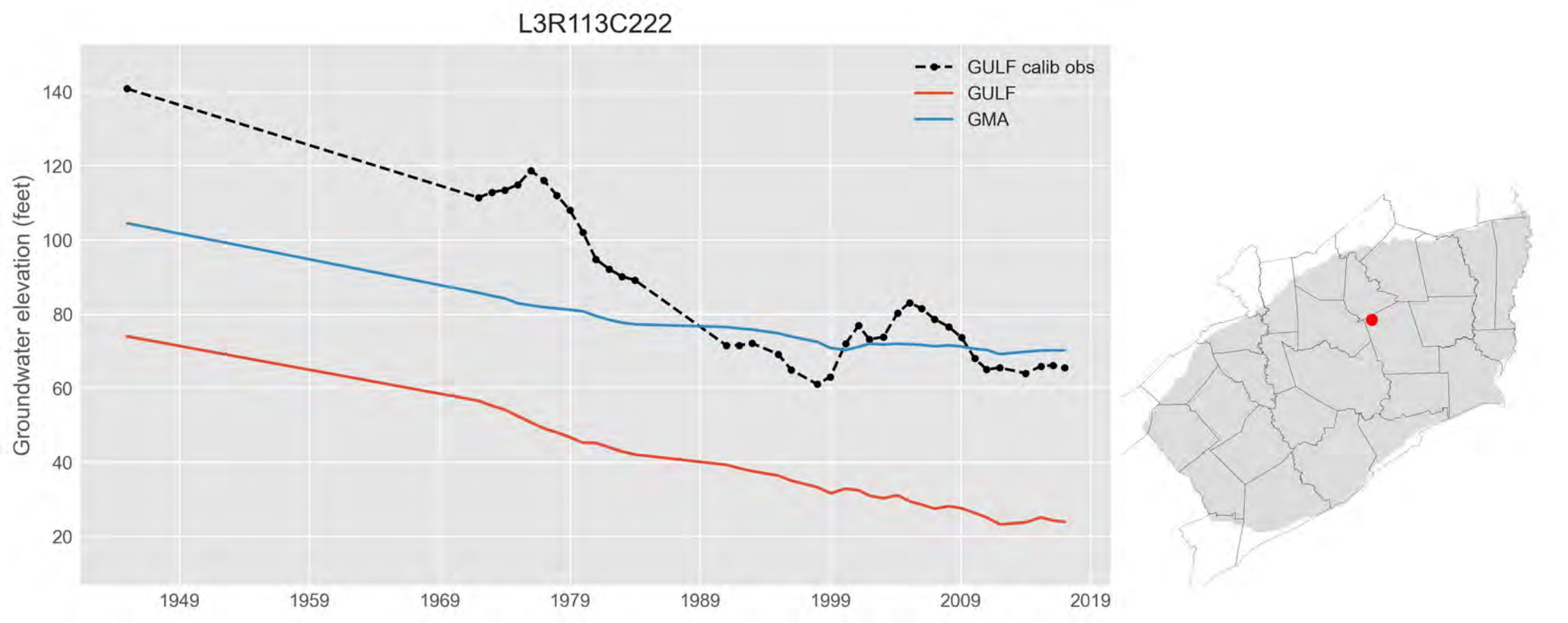
L3R111C186

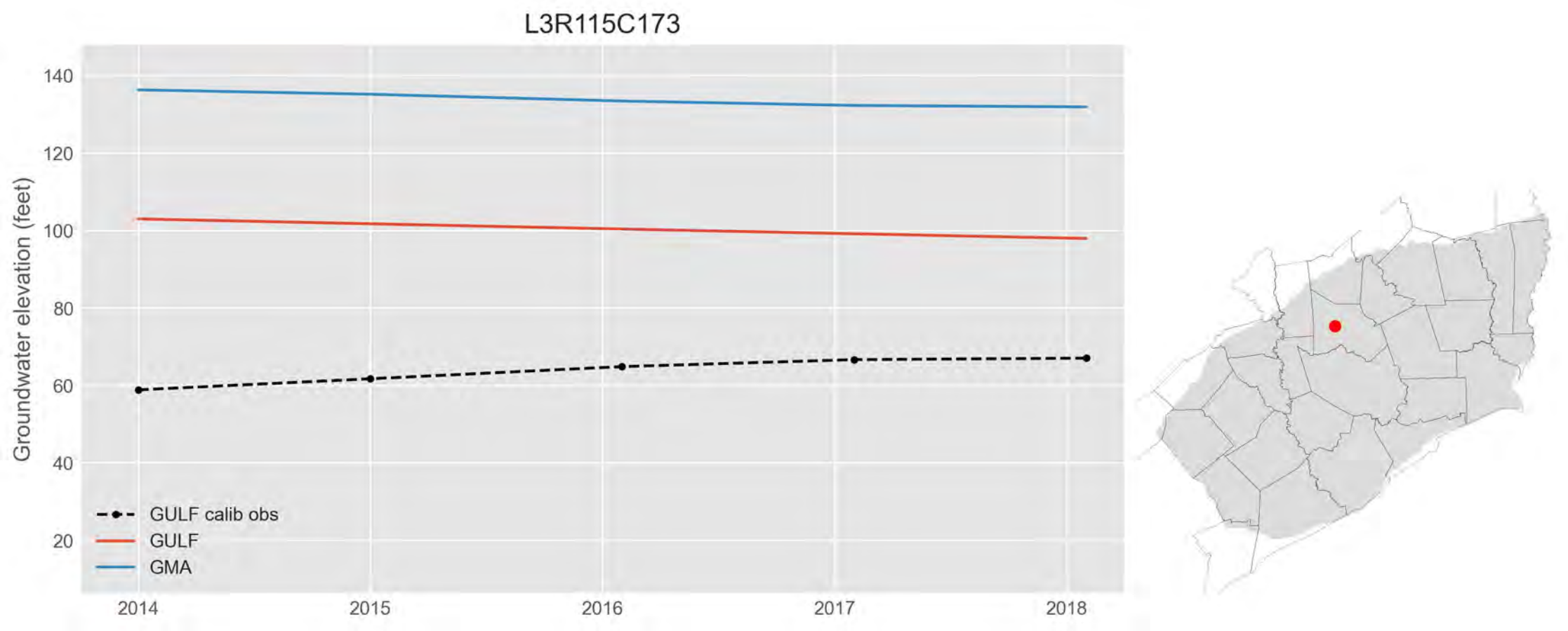

160
140
120
100
80
60
40
Groundwater elevation (feet)
GULF calib obs
GULF
GMA
1983
1984
1985
1986
1987
1988
1989
1990
1991

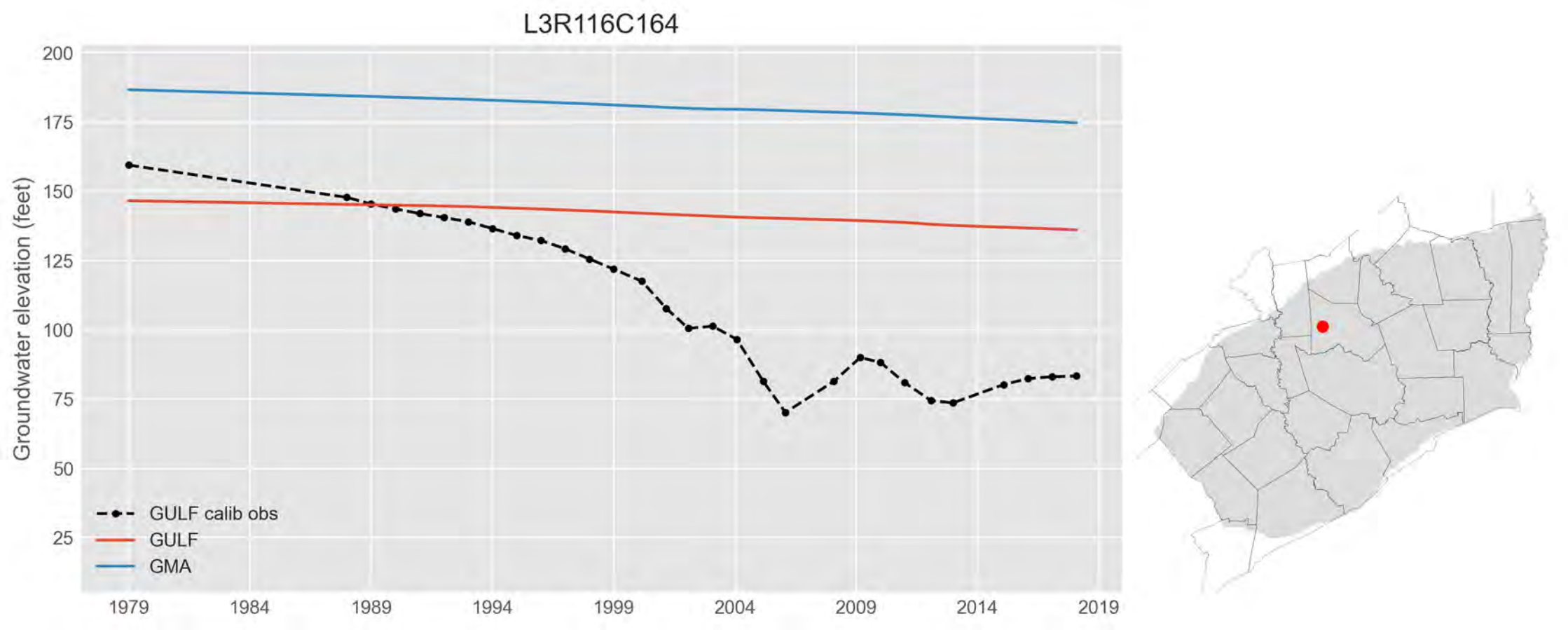

L3R112C174
Groundwater elevation (feet)
160
140
120
100
80
60
40
1992
1993
1994
1995
1996
1997
GULF calib obs
GULF
GMA

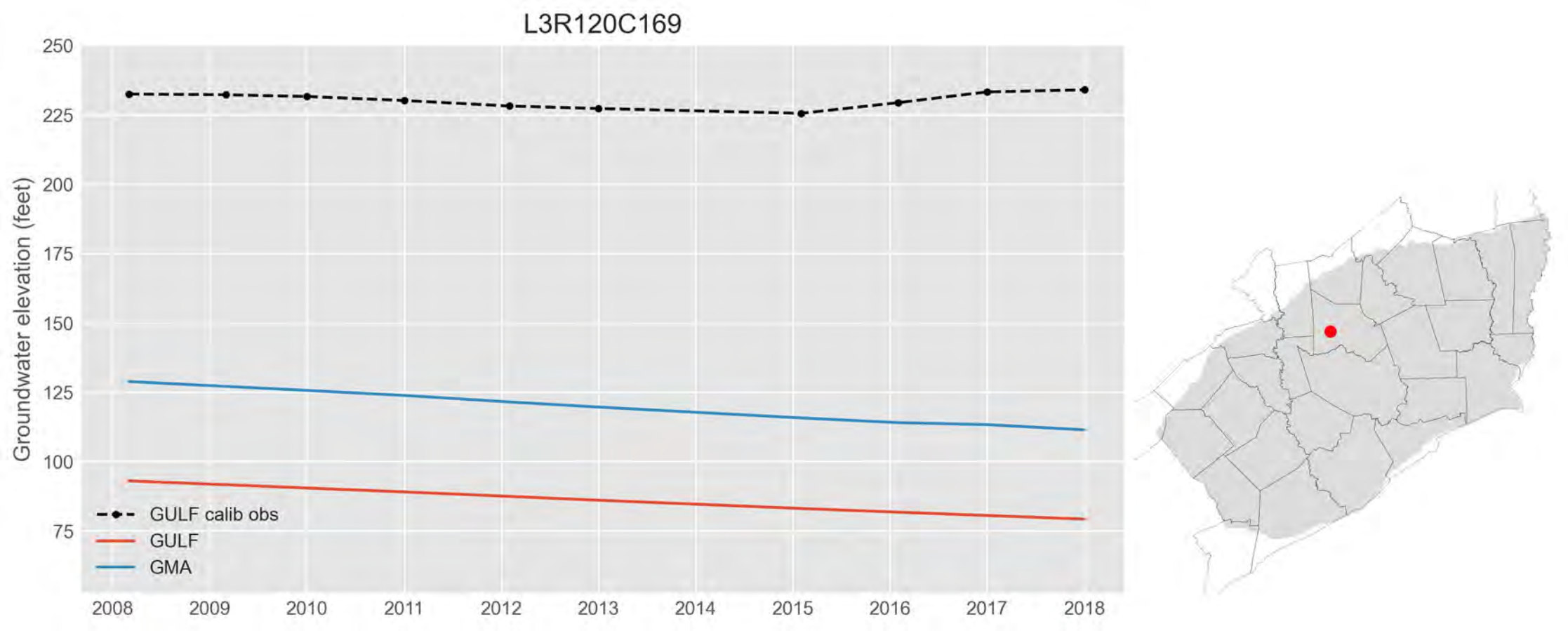

L3R112C181
Groundwater elevation (feet)
160
140
120
100
80
60
40
1982
1983
1984
1985
1986
1987
1988
GULF calib obs
GULF
GMA

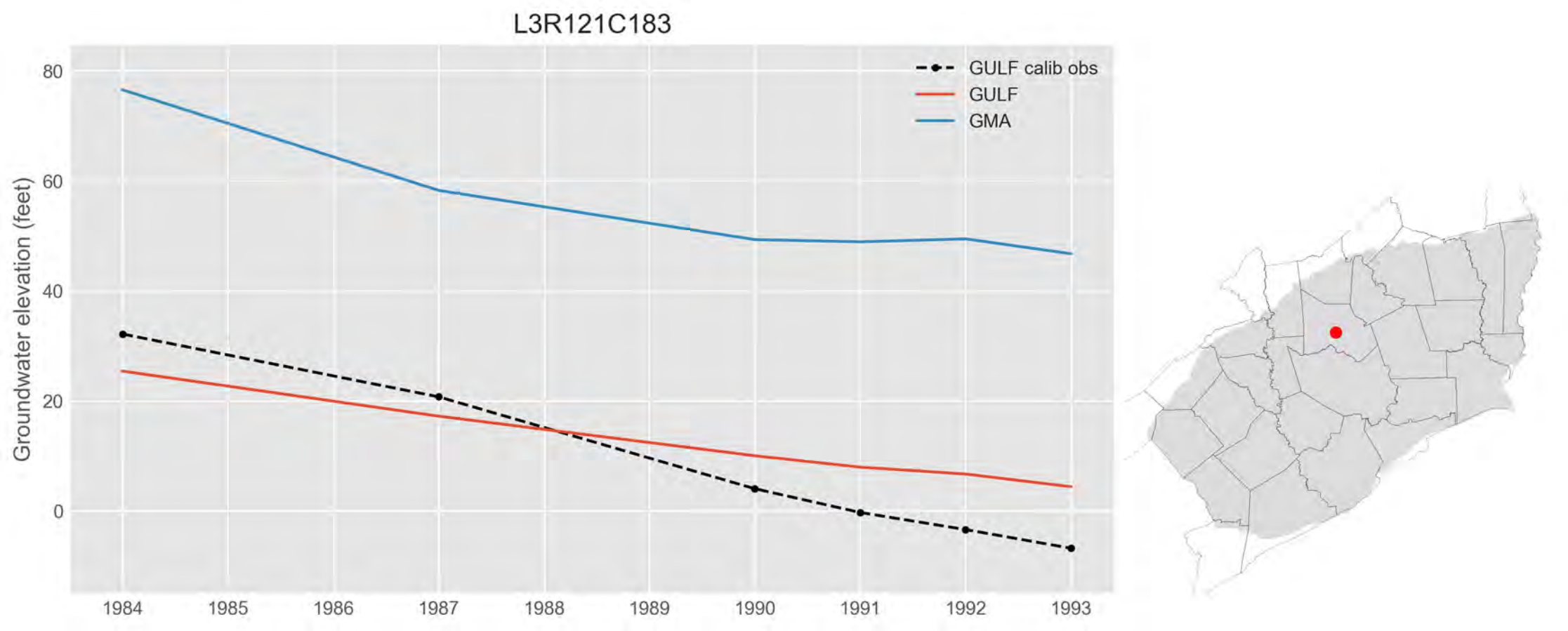

L3R113C177
Groundwater elevation (feet)
160
140
120
100
80
60
40
1990
1991
1992
1993
1994
1995
GULF calib obs
GULF
GMA

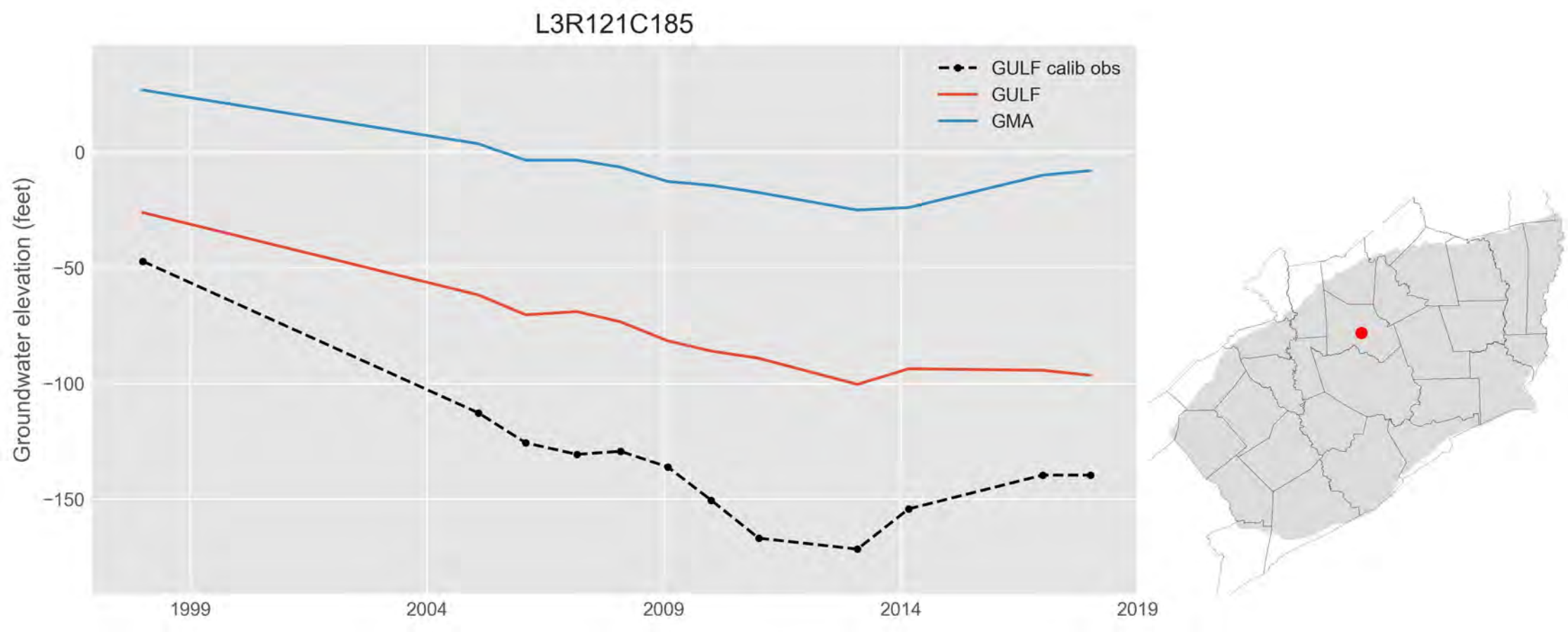

L3R113C222
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1949
1959
1969
1979
1989
1999
2009
2019

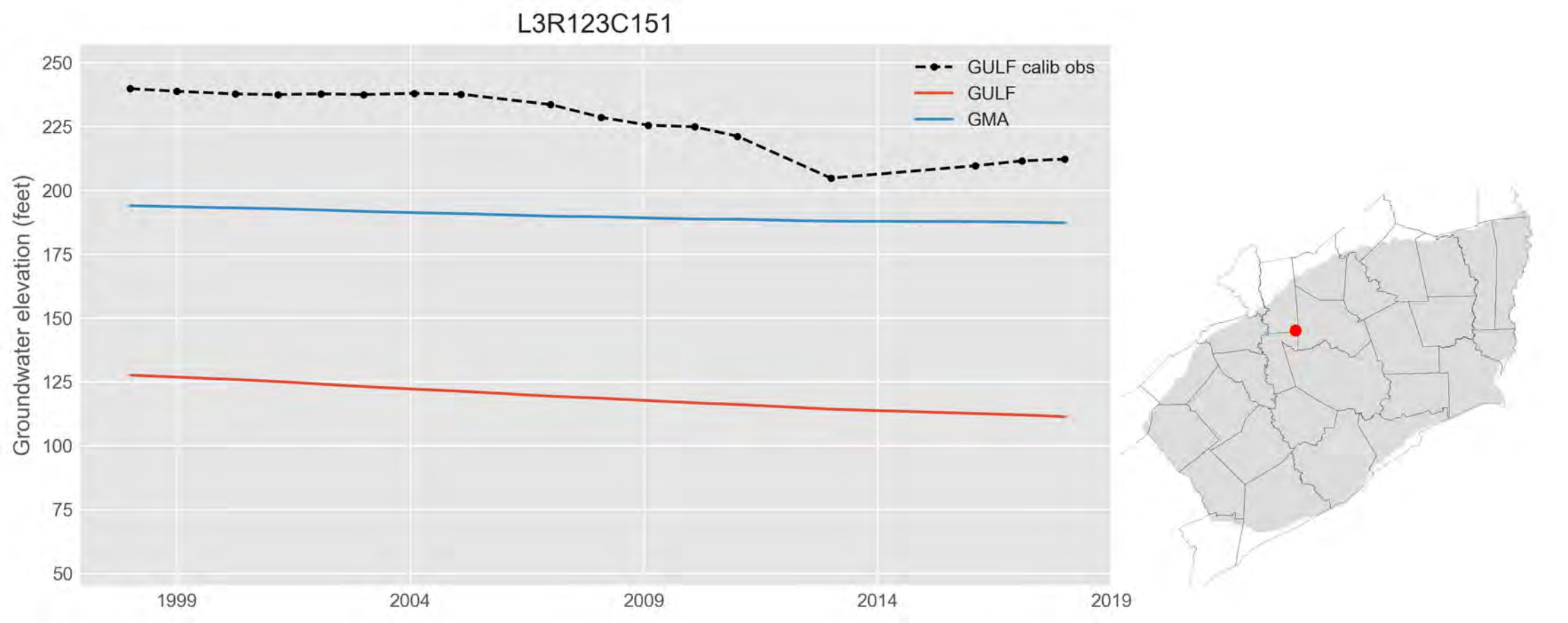

L3R115C173
Groundwater elevation (feet)
140
120
100
80
60
40
20
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

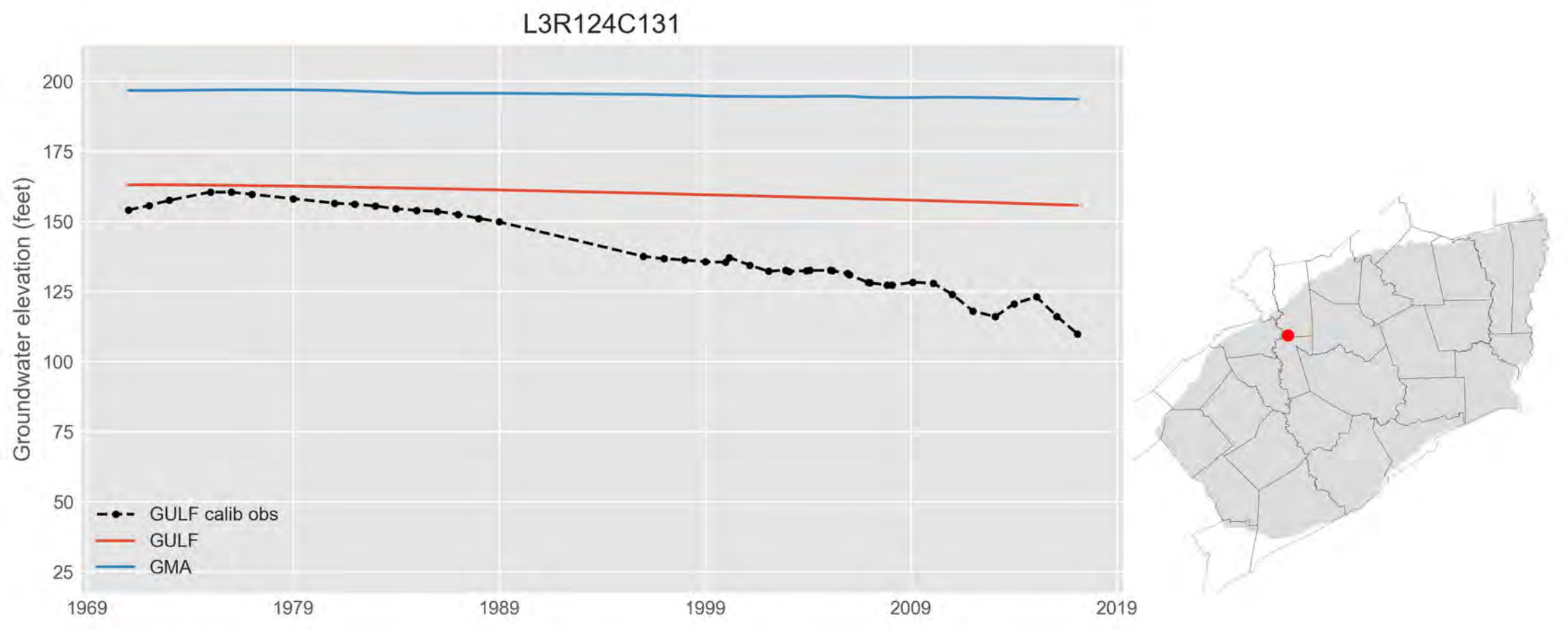

L3R116C164
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1979
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

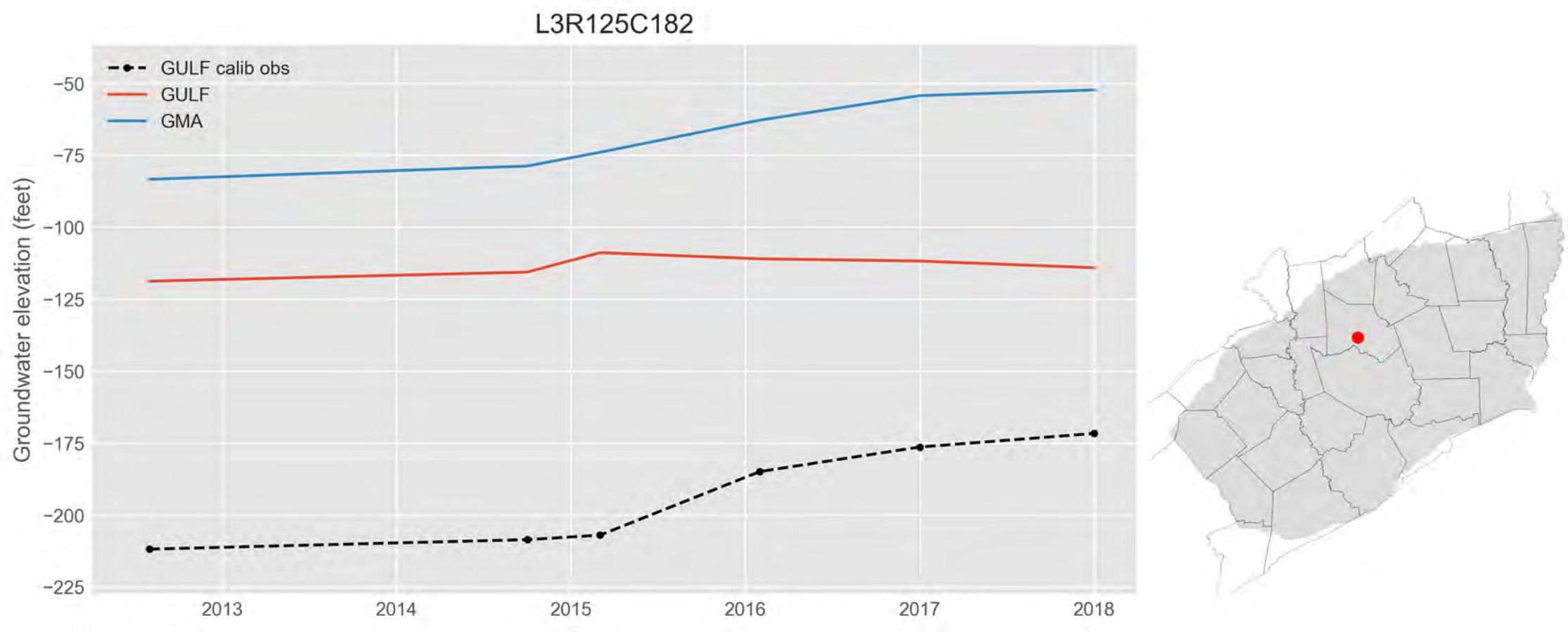

L3R120C169
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

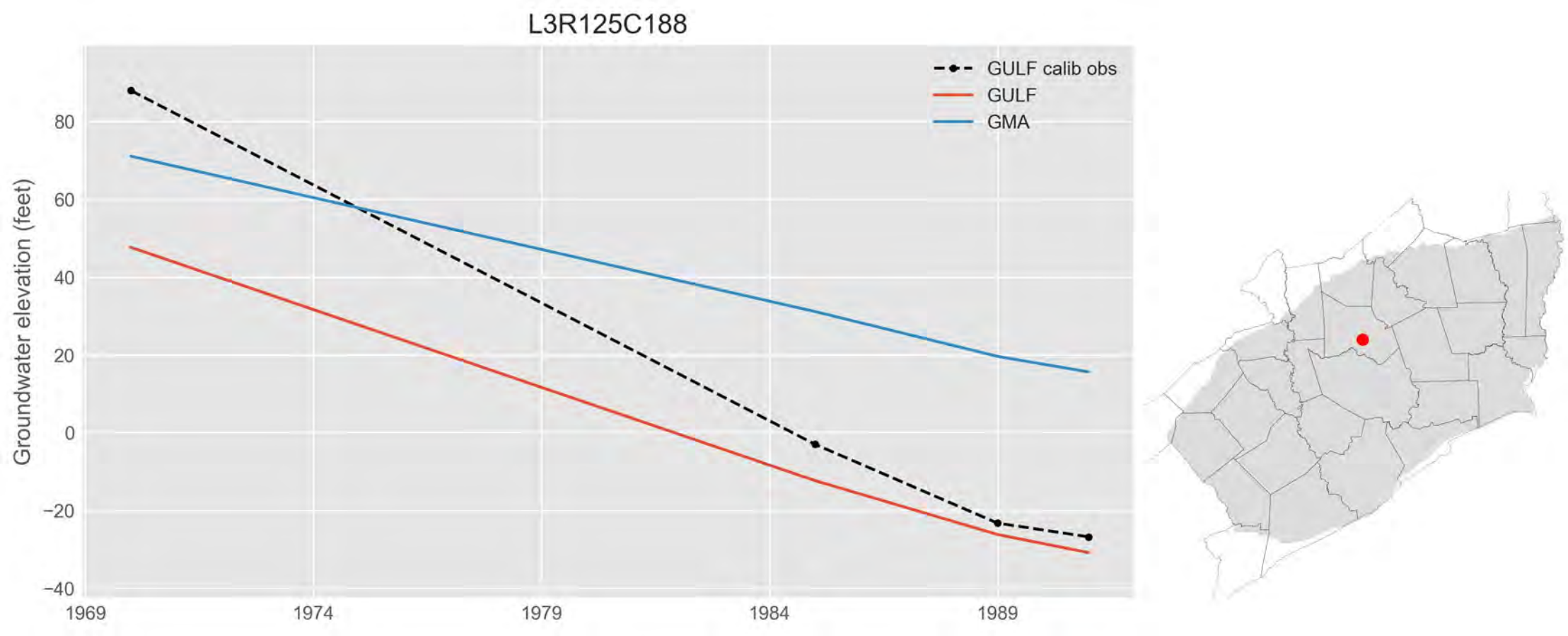

L3R121C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993

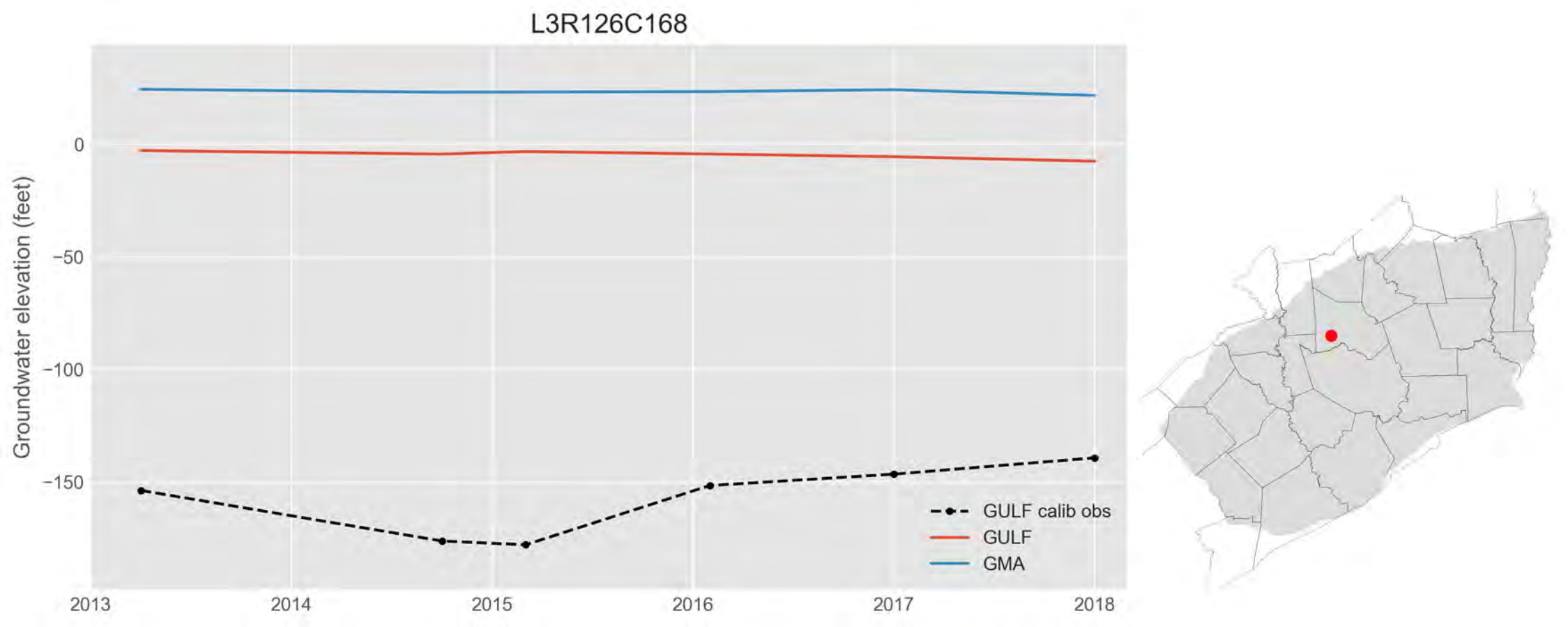

L3R121C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
1999
2004
2009
2014
2019

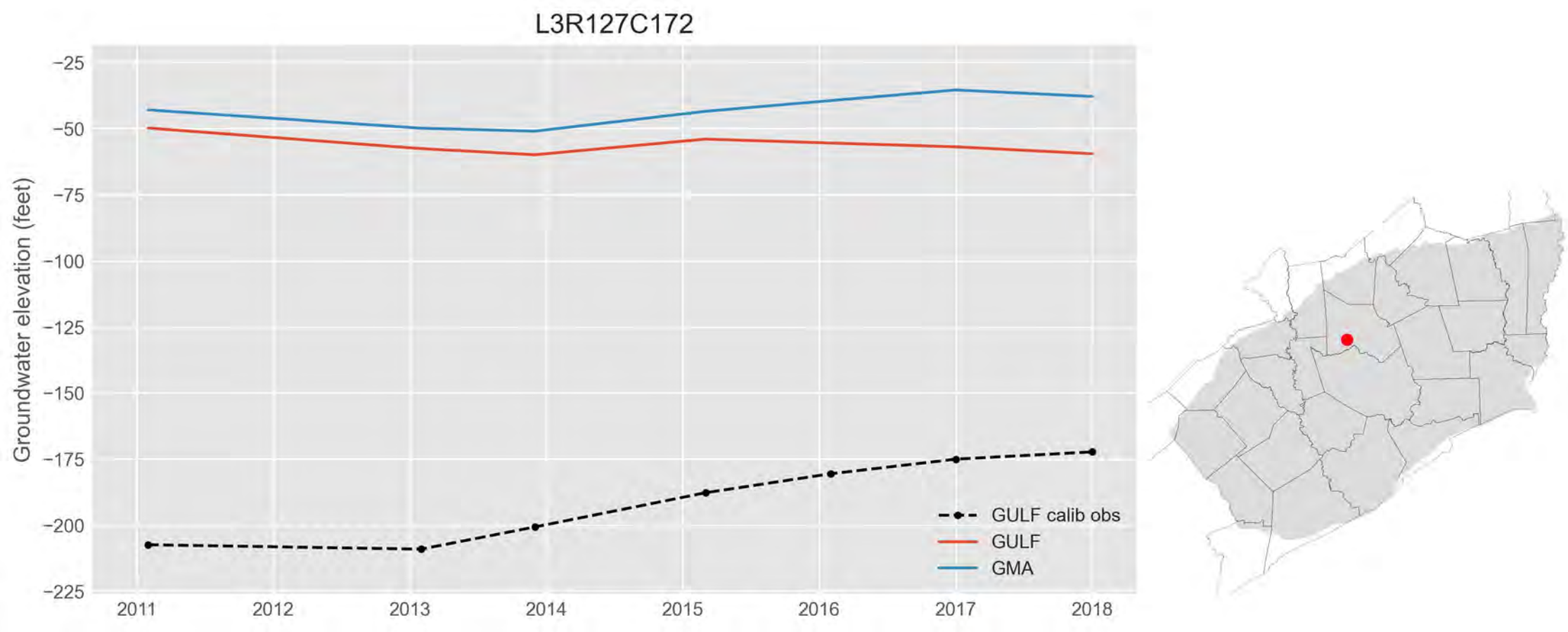

L3R123C151
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
50
1999
2004
2009
2014
2019

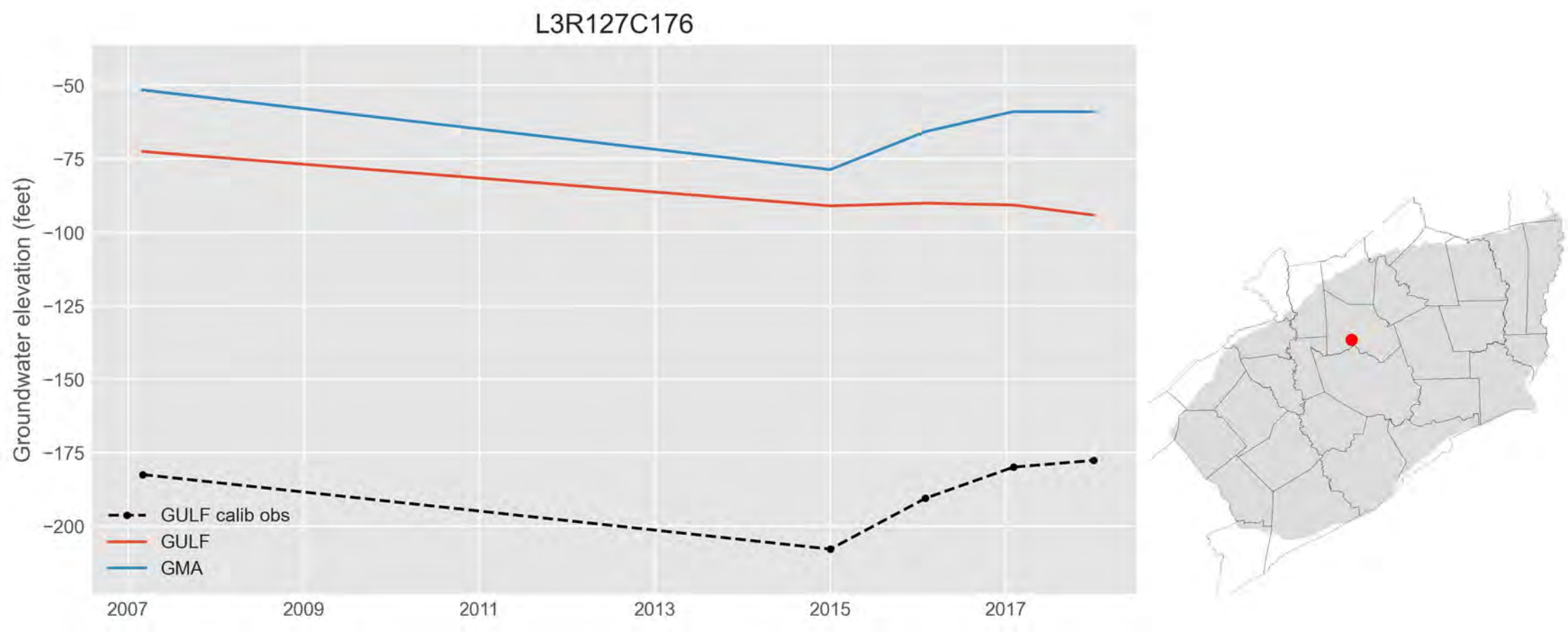

L3R124C131
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

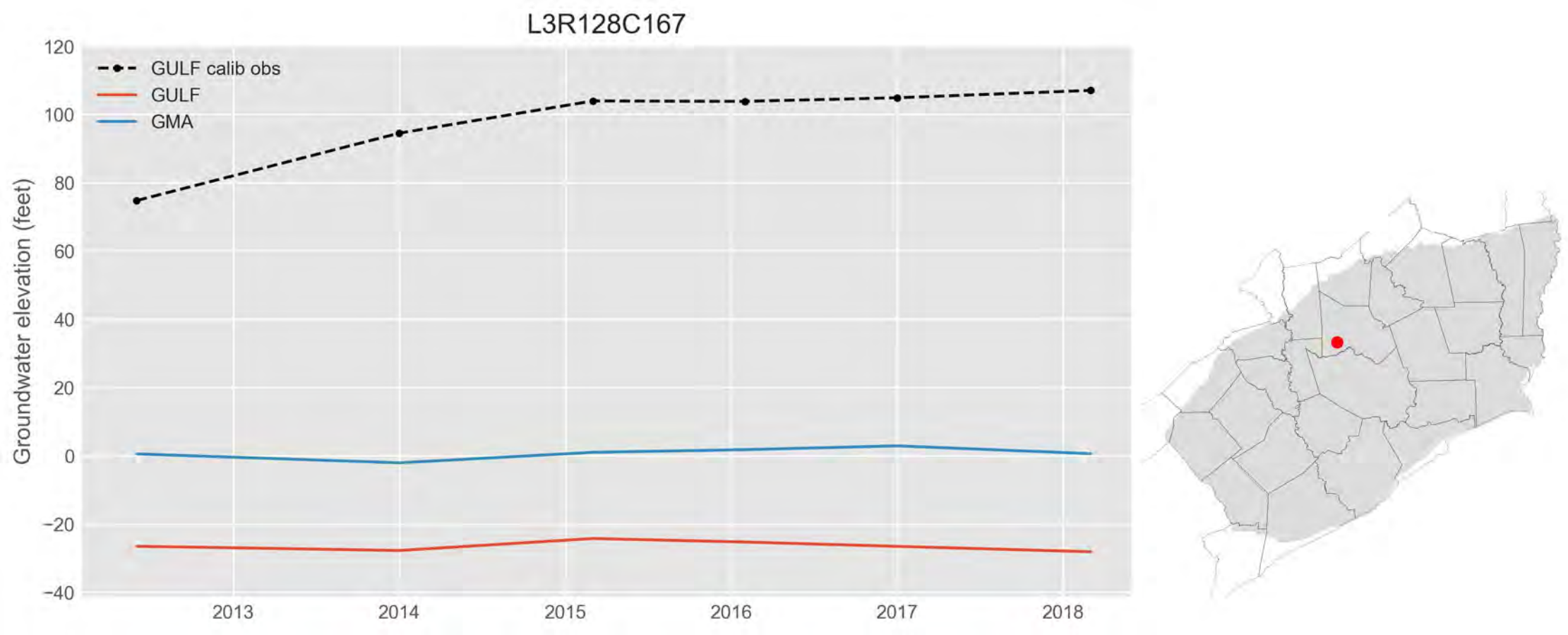

L3R125C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
2013
2014
2015
2016
2017
2018

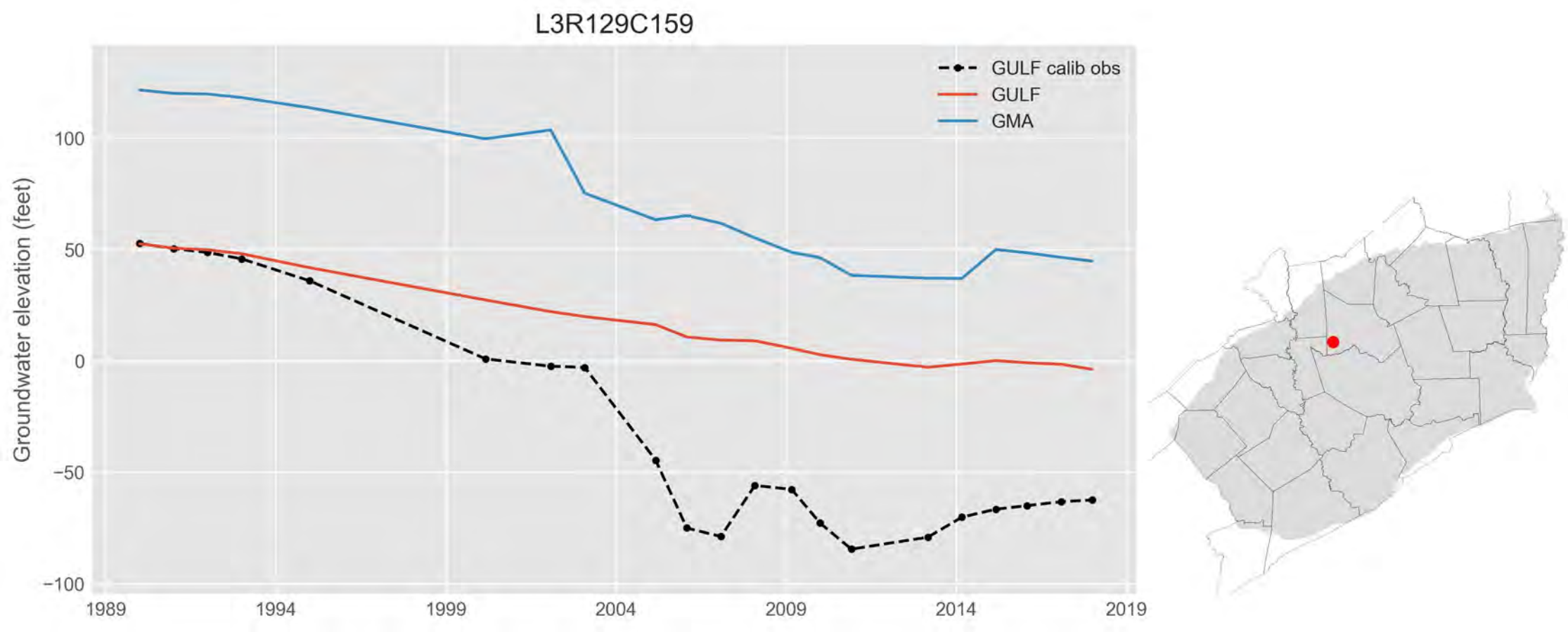

L3R125C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
1969
1974
1979
1984
1989

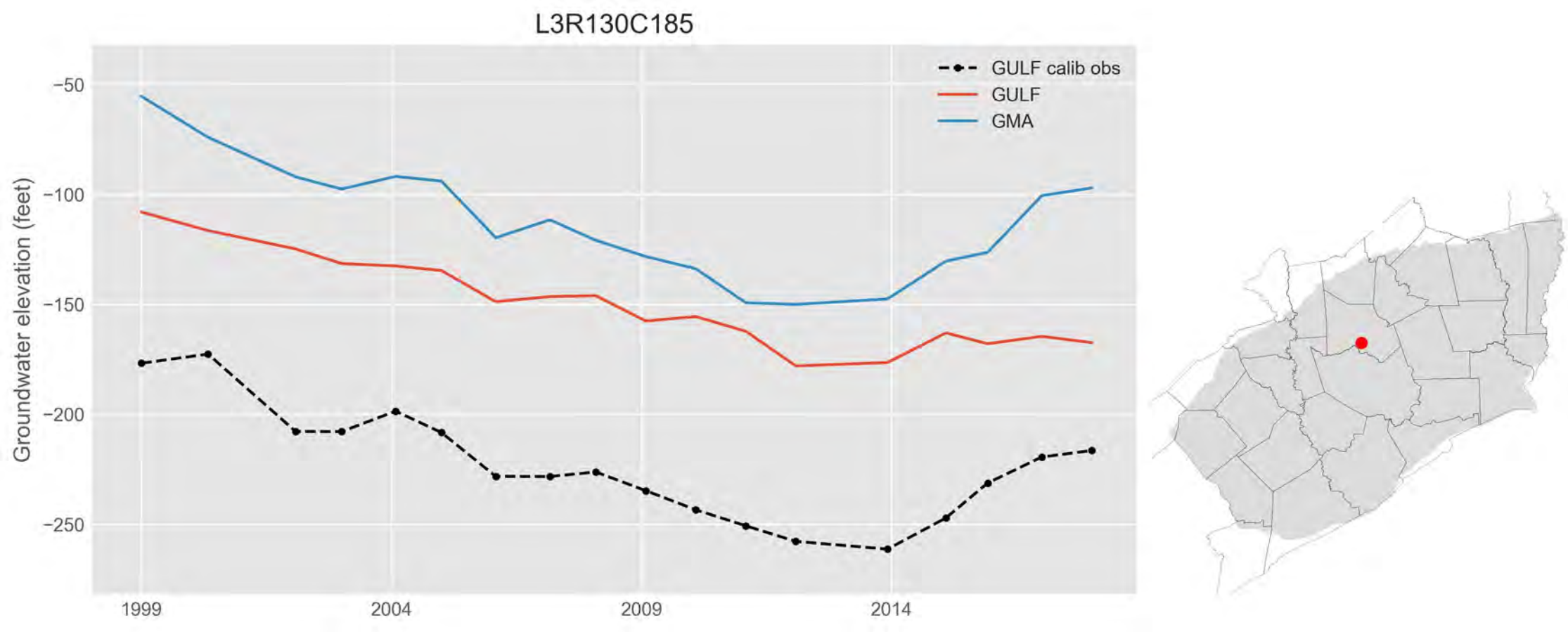

L3R126C168
Groundwater elevation (feet)
0
−50
−100
−150
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

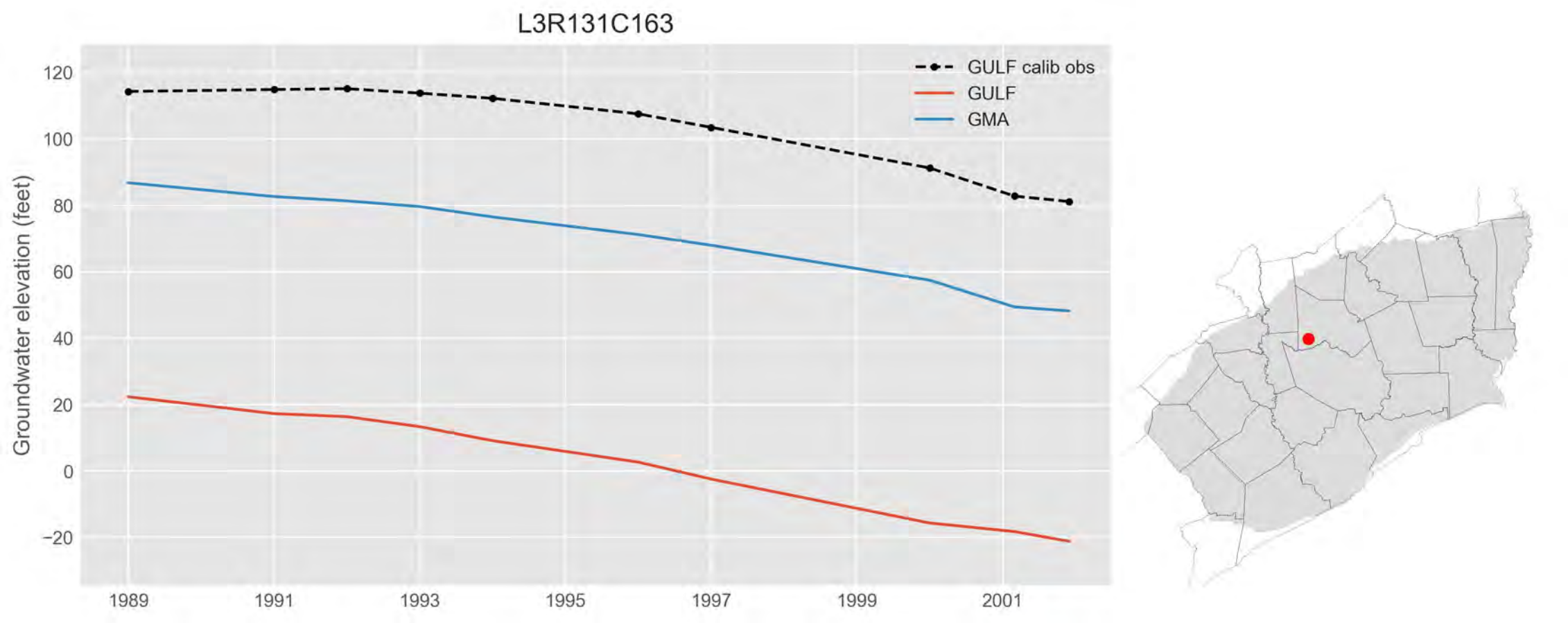

L3R127C172
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
−225
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

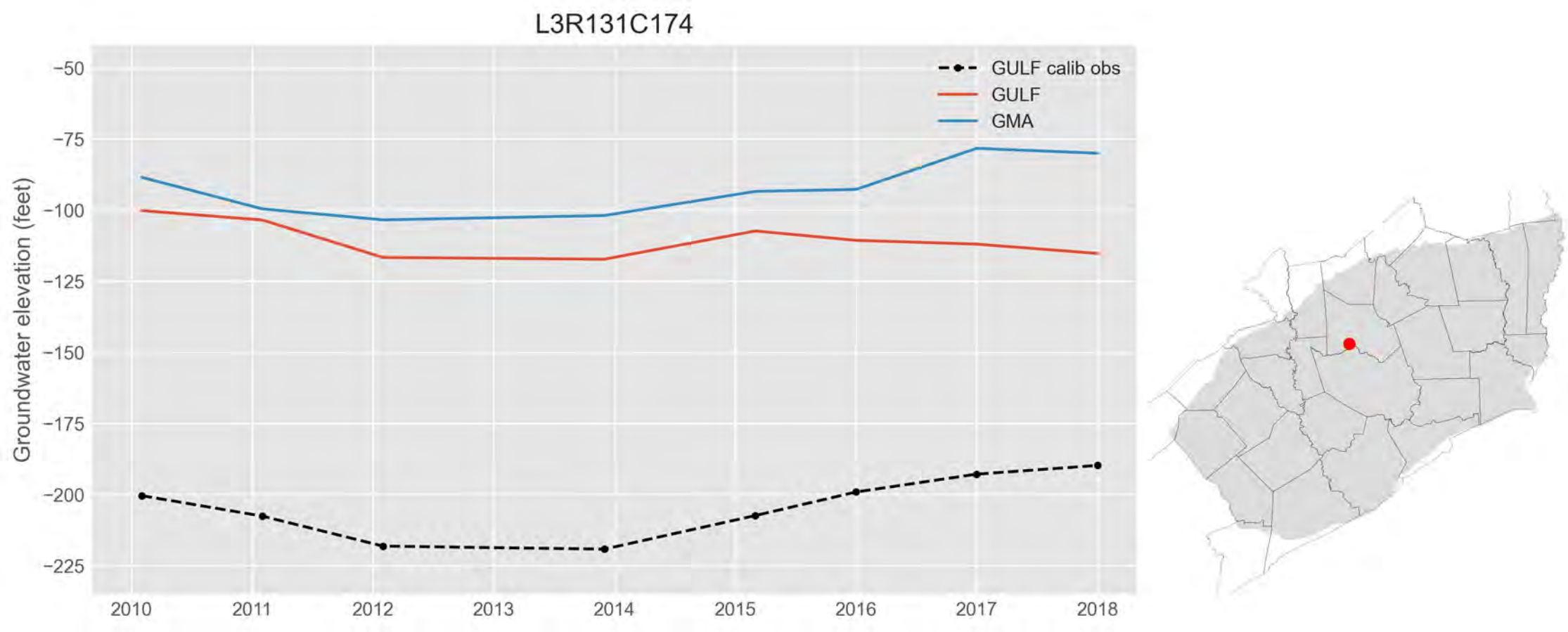

L3R127C176
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

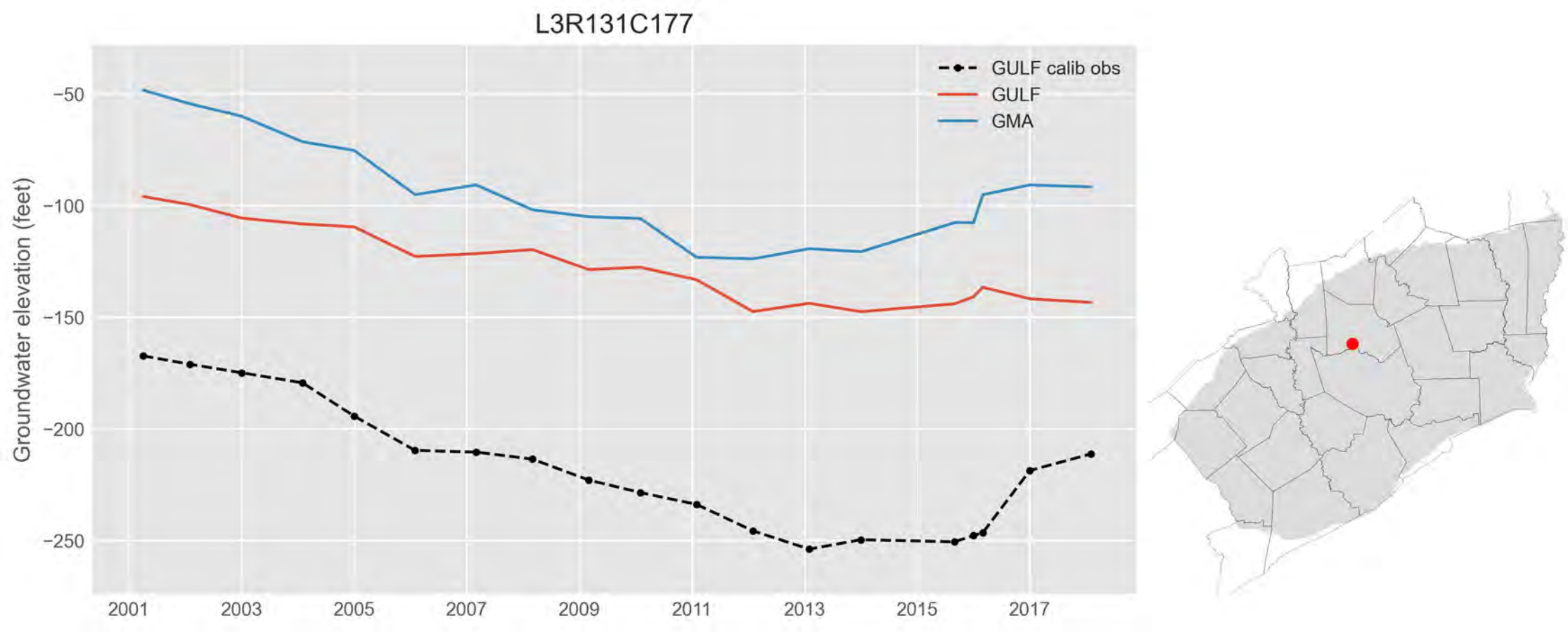

L3R128C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
0
−20
−40
2013
2014
2015
2016
2017
2018

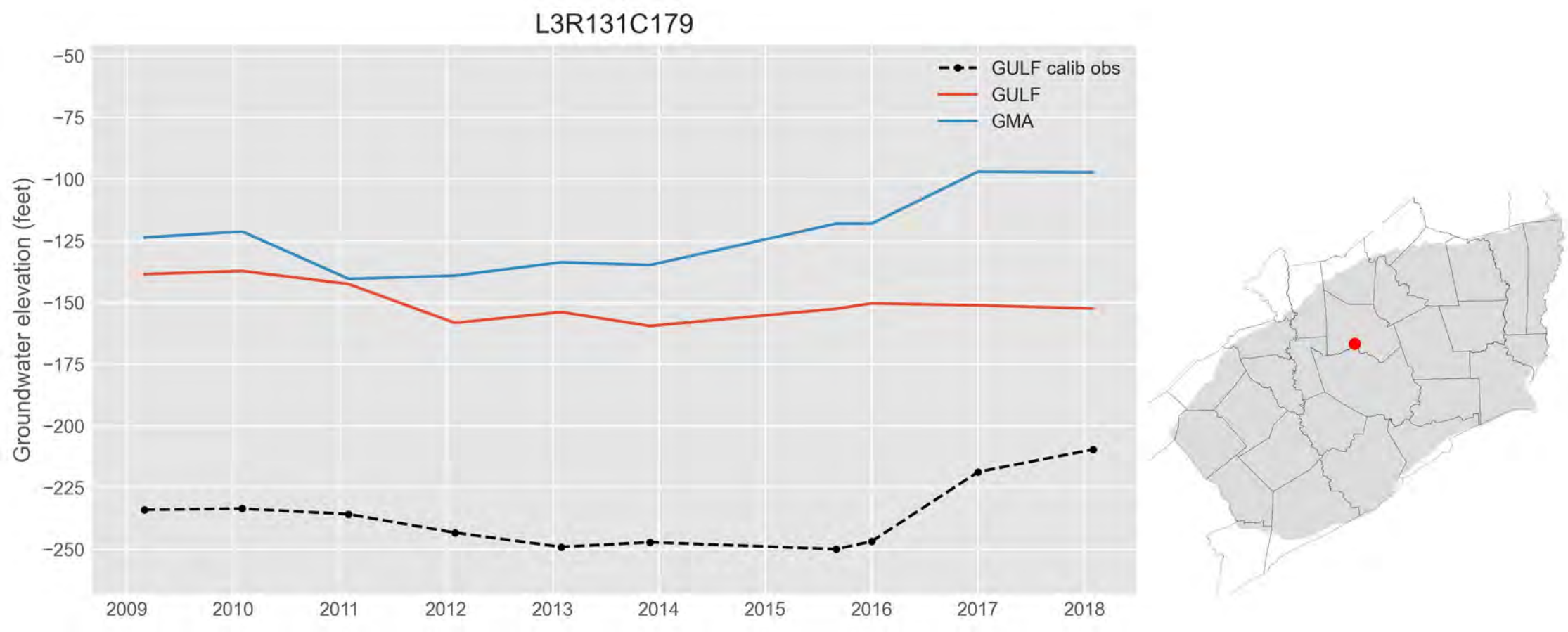

L3R129C159
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
1989
1994
1999
2004
2009
2014
2019

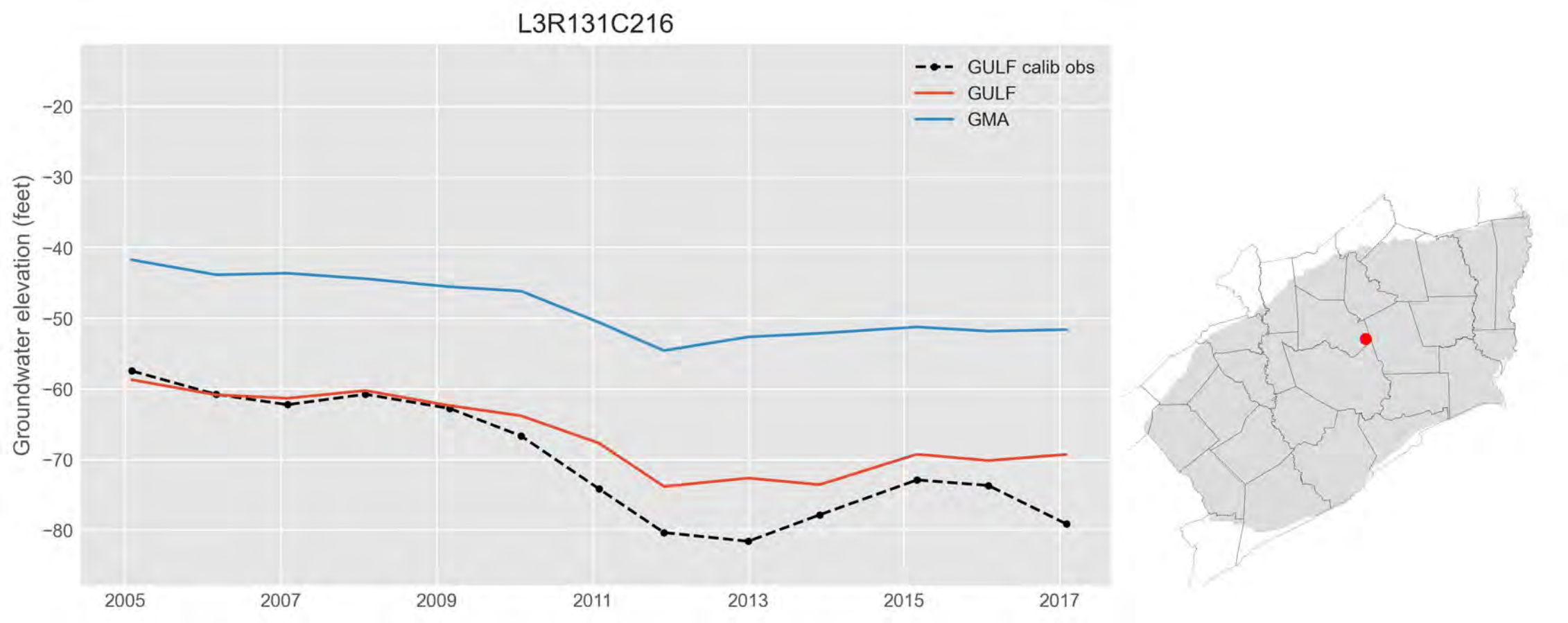

L3R130C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1999
2004
2009
2014

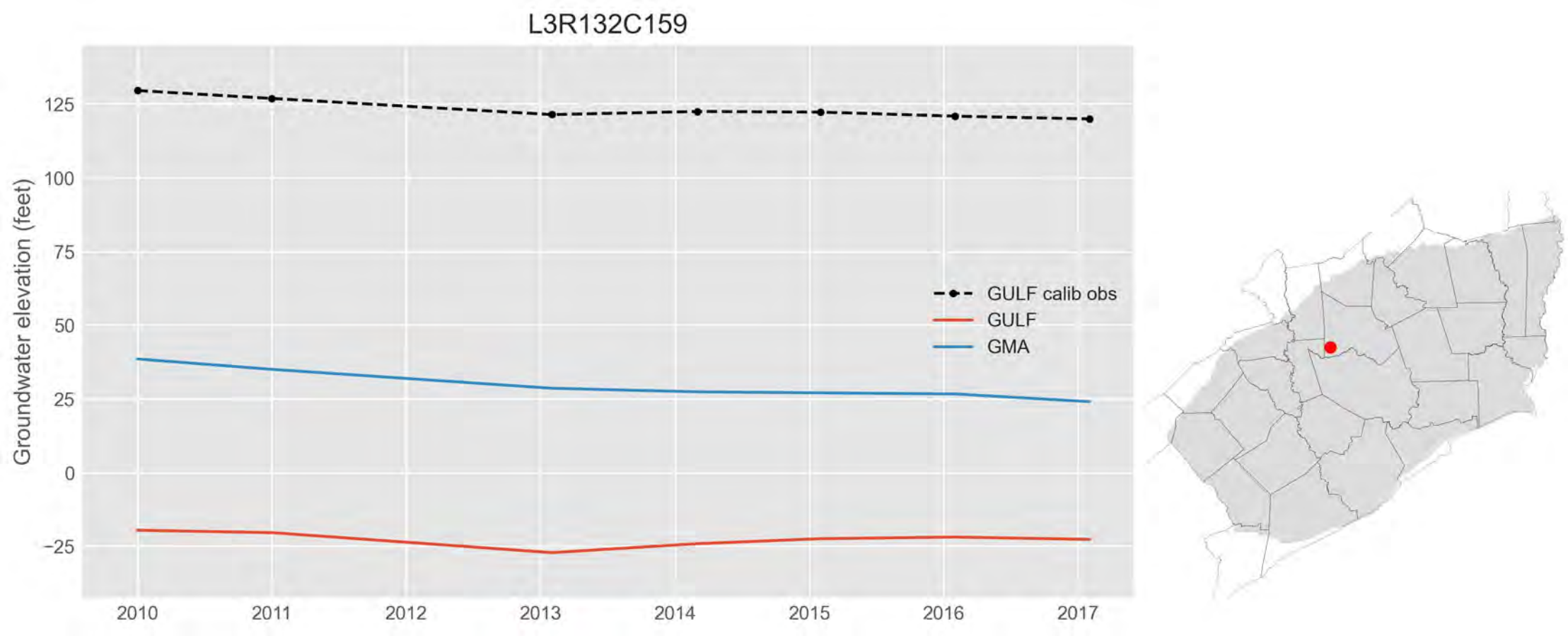

L3R131C163
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
0
−20
1989
1991
1993
1995
1997
1999
2001

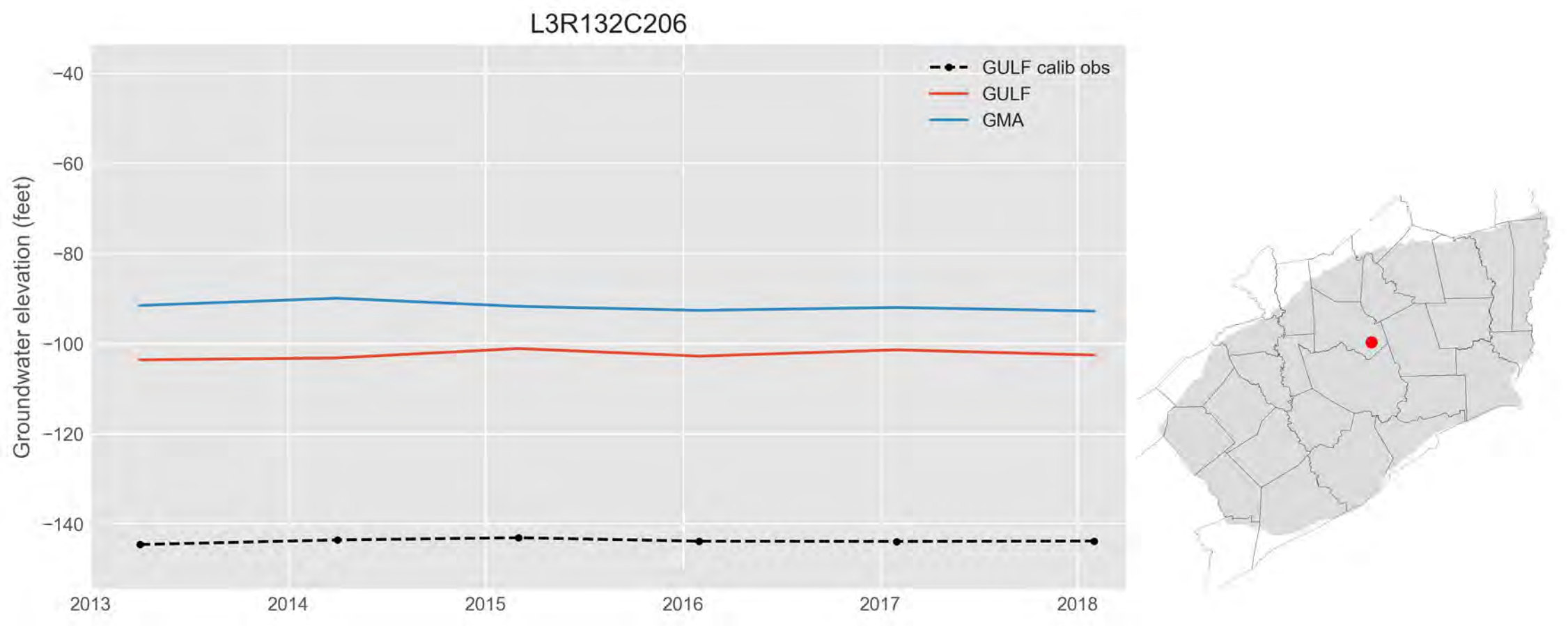

L3R131C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
2010
2011
2012
2013
2014
2015
2016
2017
2018

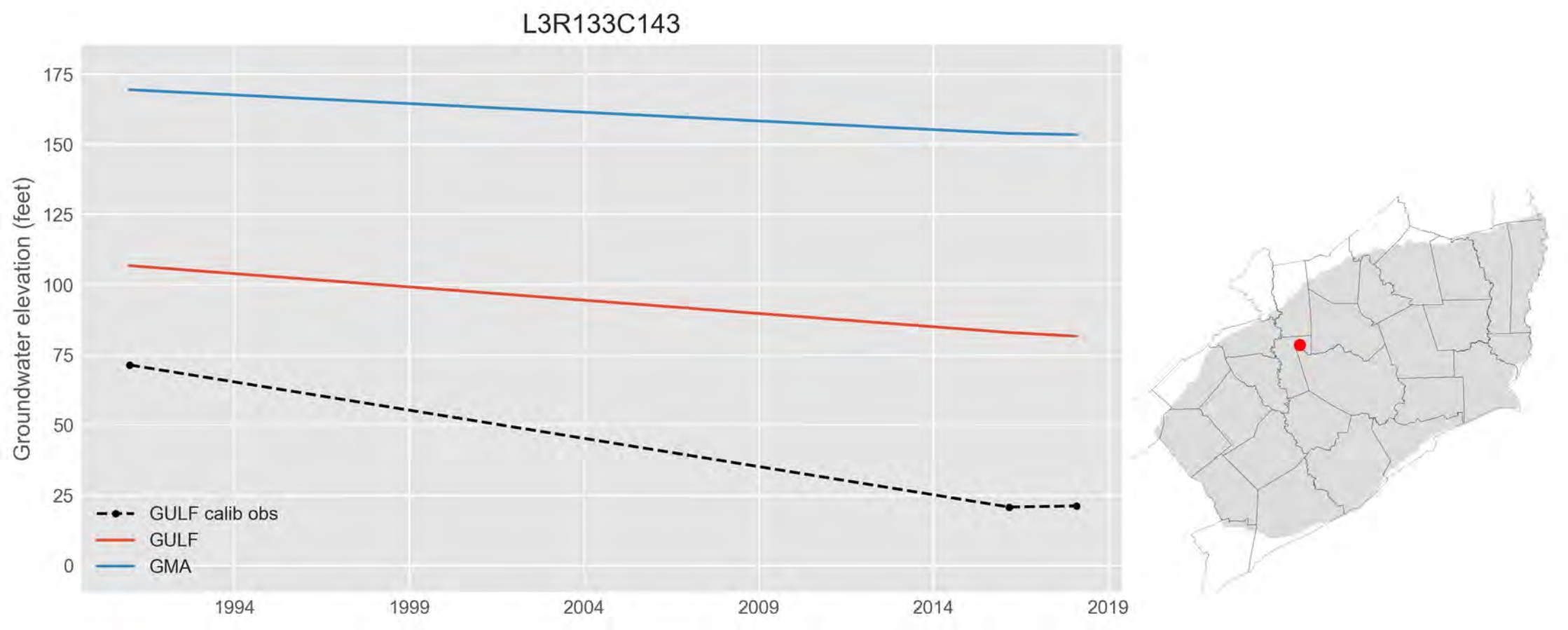

L3R131C177
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
2001
2003
2005
2007
2009
2011
2013
2015
2017

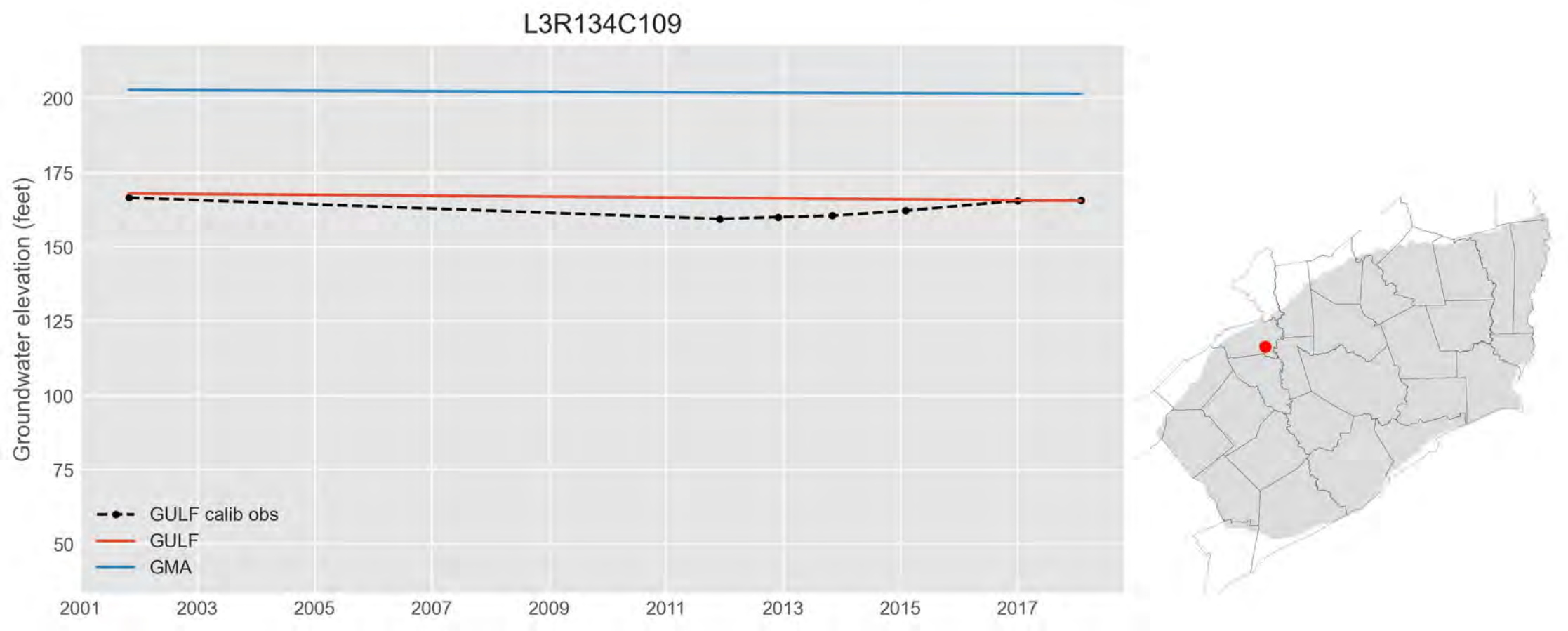

L3R131C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
−250
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

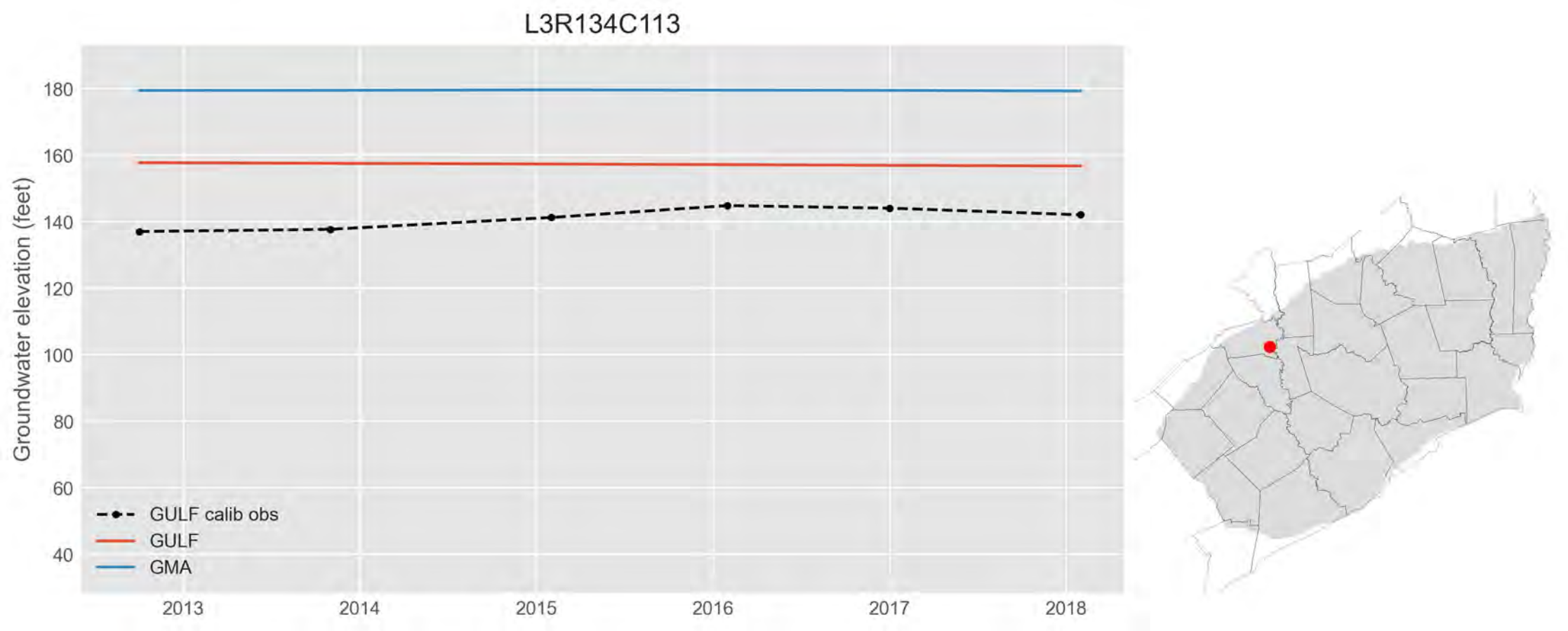

L3R131C216
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
2005
2007
2009
2011
2013
2015
2017

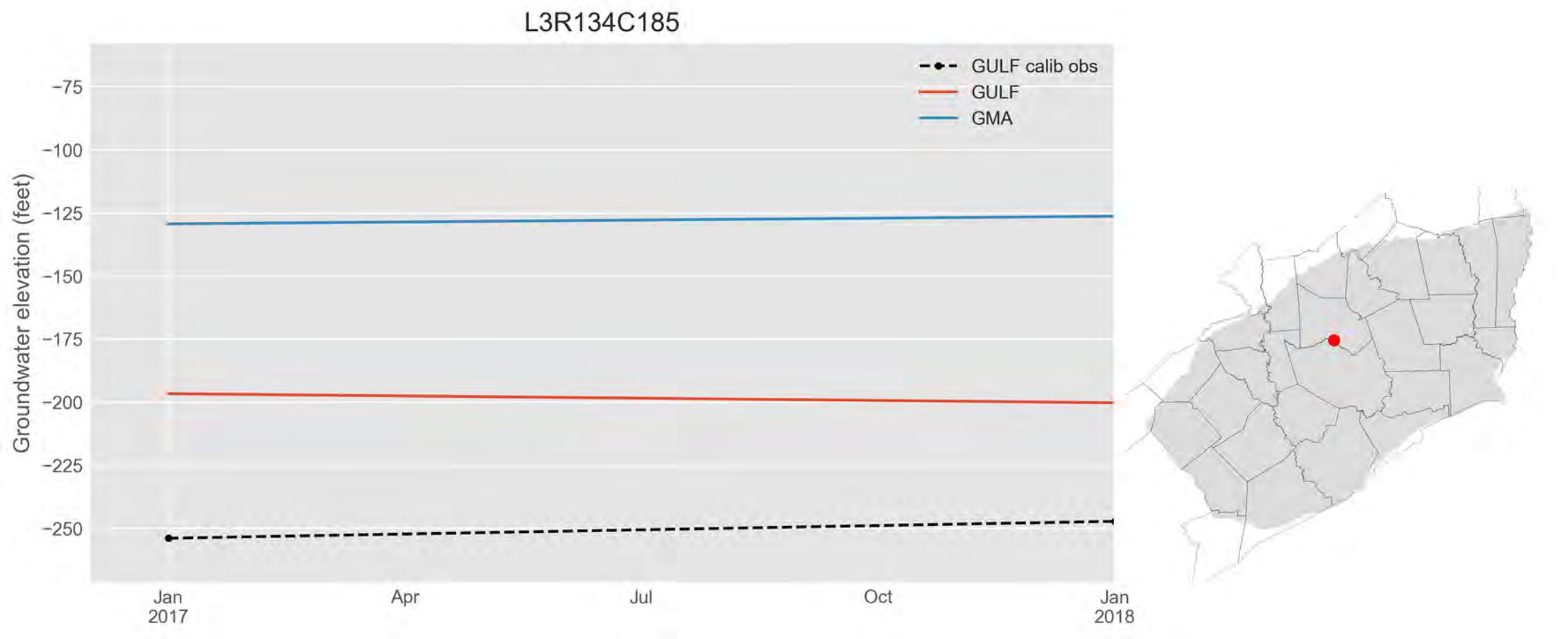

L3R132C159
Groundwater elevation (feet)
125
100
75
50
25
0
−25
2010
2011
2012
2013
2014
2015
2016
2017
GULF calib obs
GULF
GMA

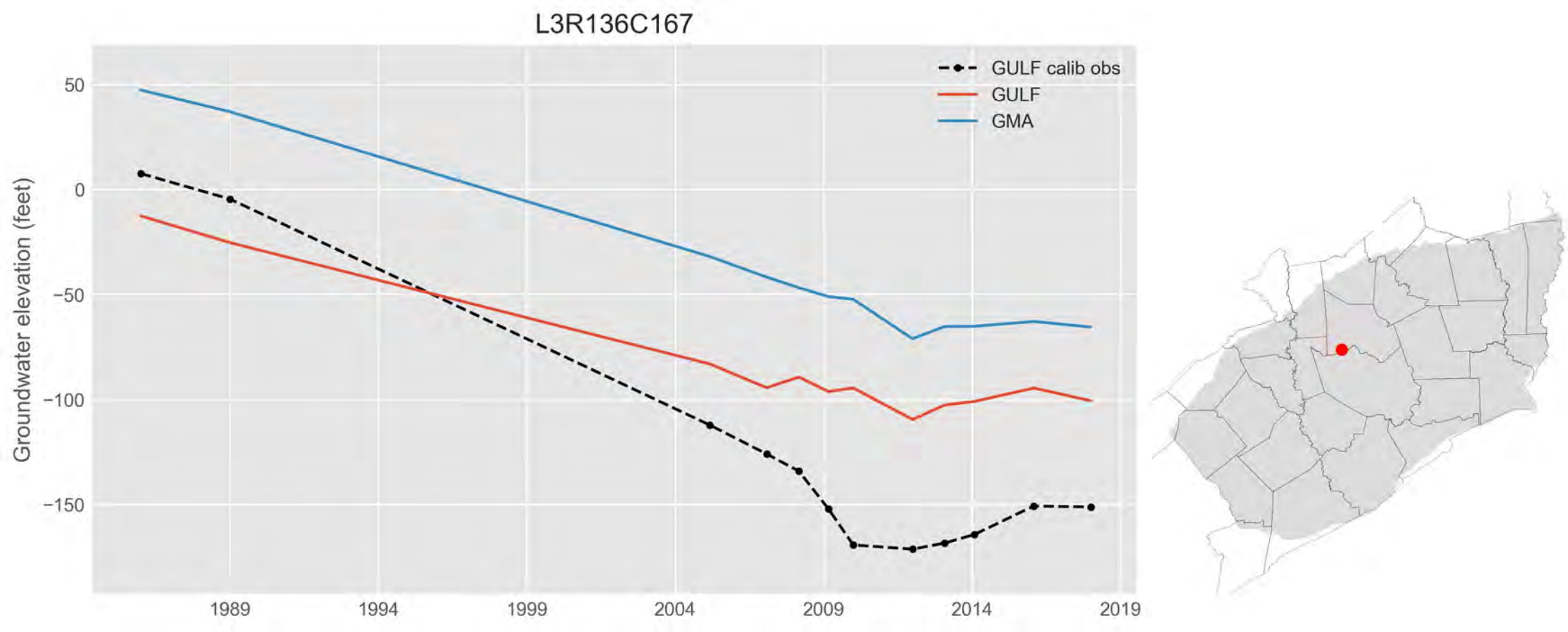

L3R132C206
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
2013
2014
2015
2016
2017
2018

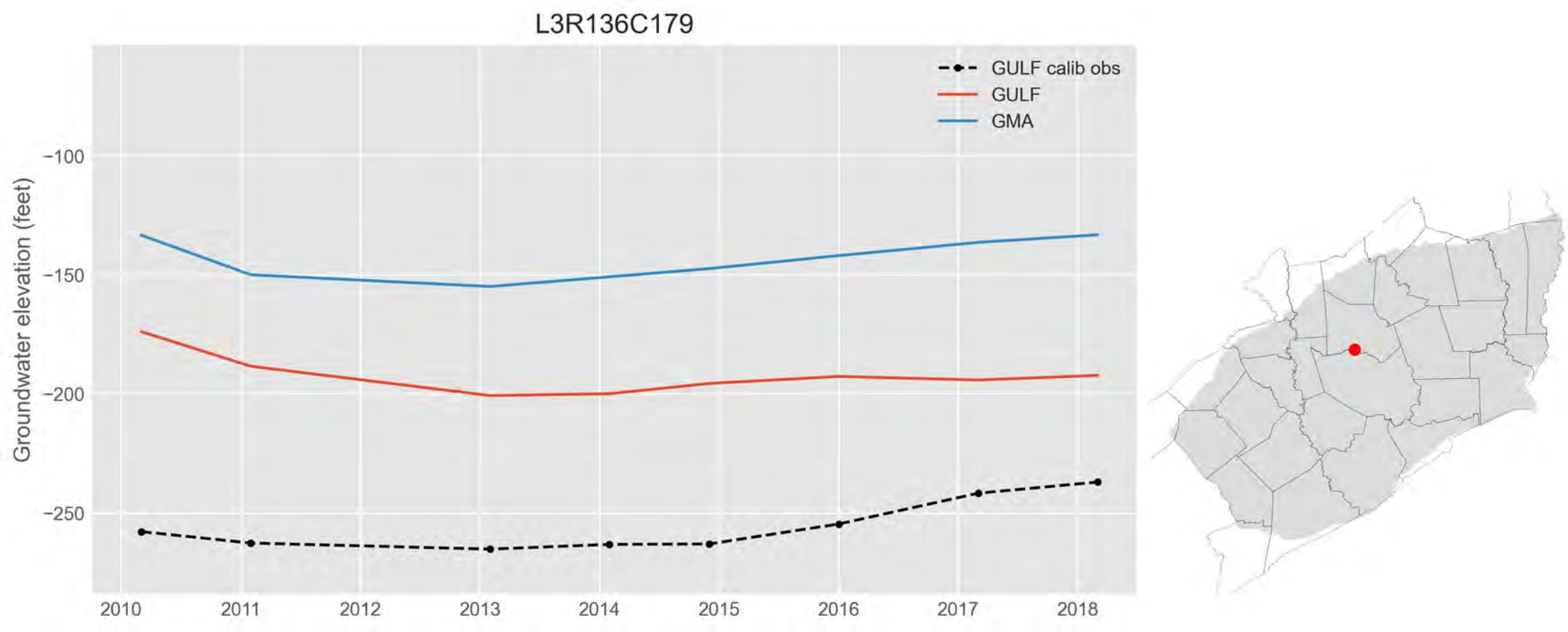

L3R133C143
Groundwater elevation (feet)
175
150
125
100
75
50
25
0
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

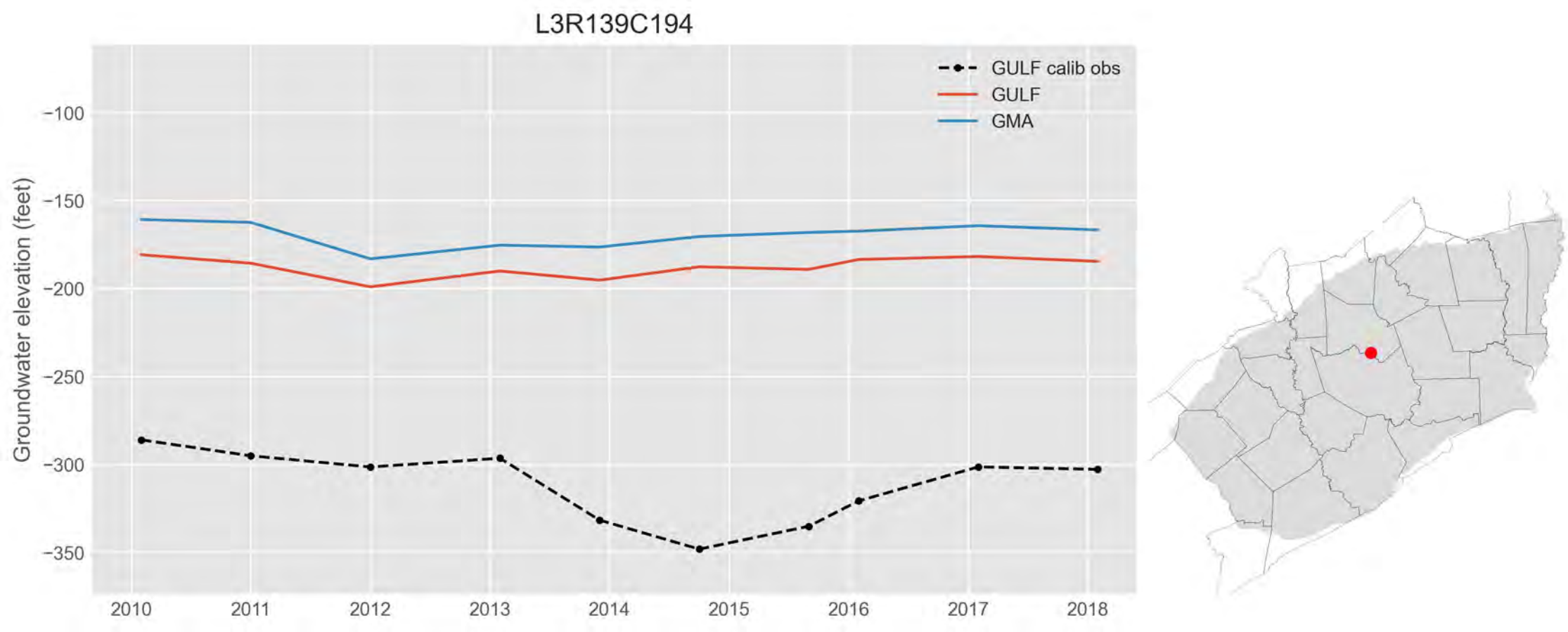

L3R134C109
Groundwater elevation (feet)
200
175
150
125
100
75
50
2001
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA


L3R134C113
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

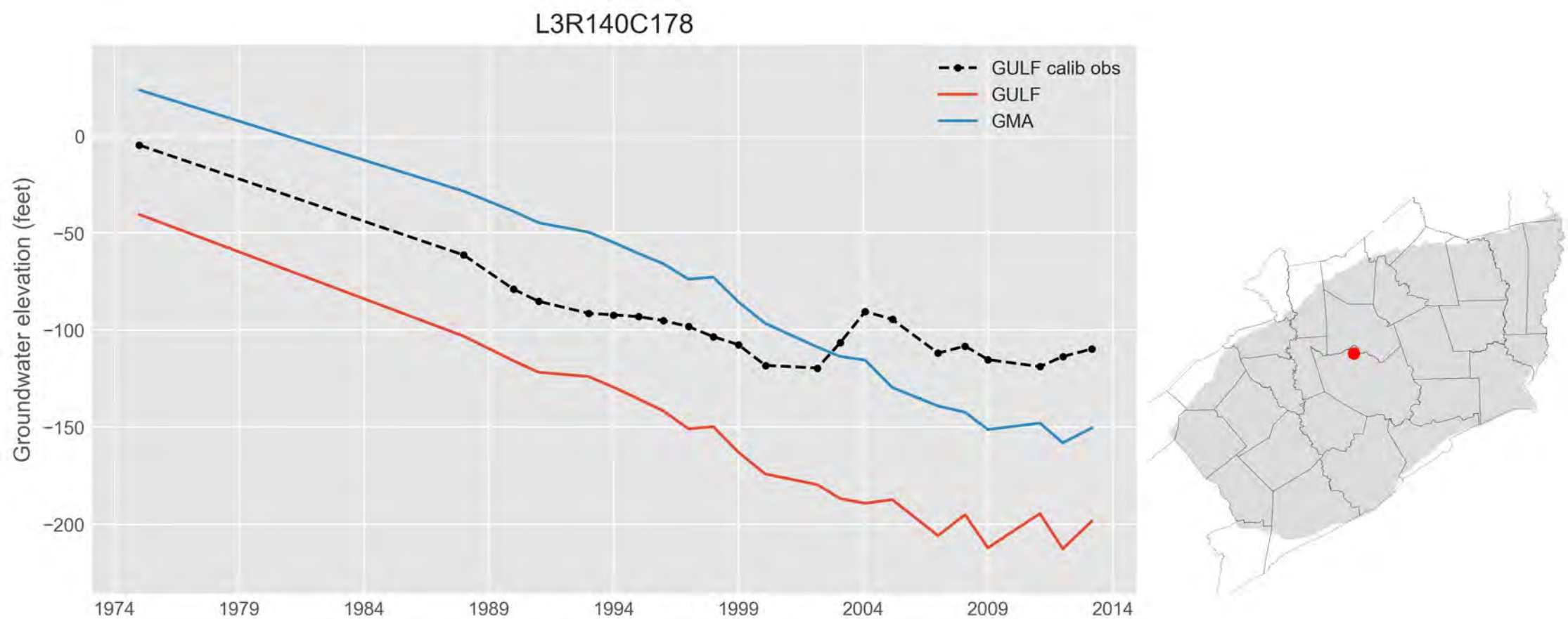

L3R134C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−75
−100
−125
−150
−175
−200
−225
−250
Jan
2017
Apr
Jul
Oct
Jan
2018

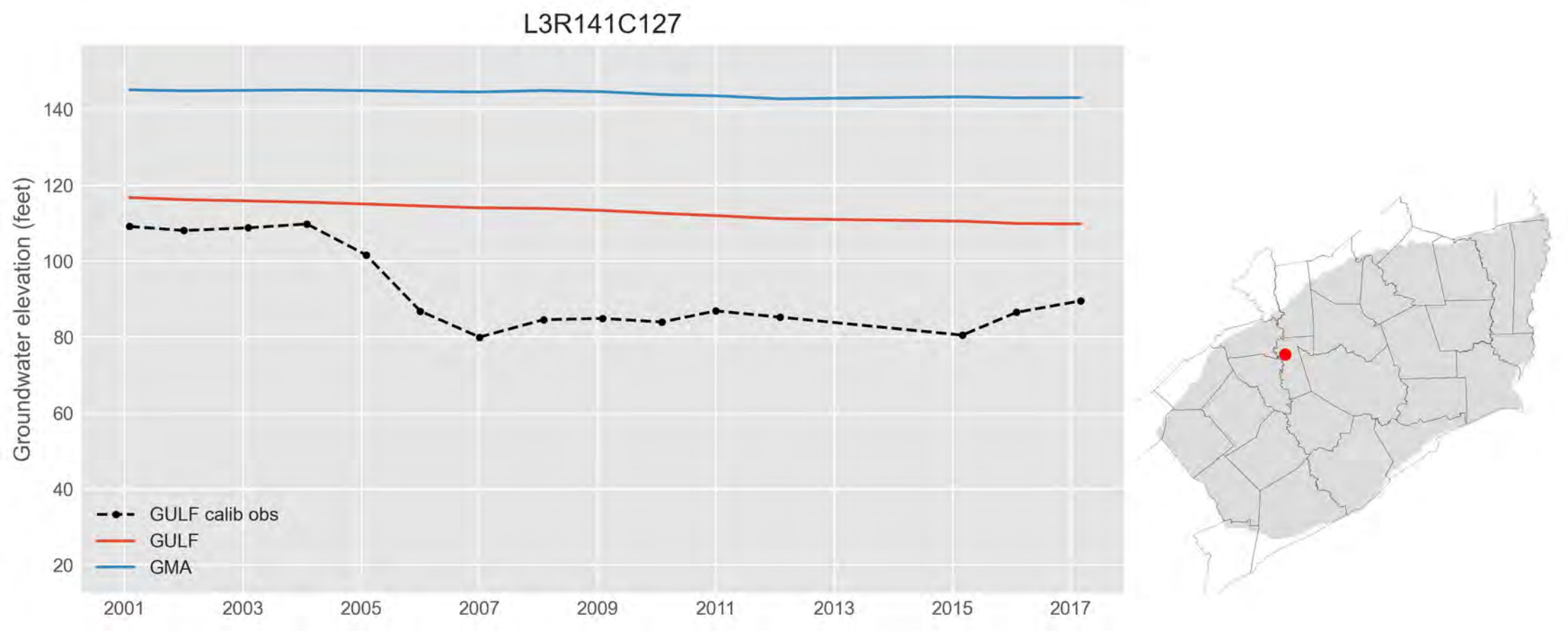

L3R136C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
1989
1994
1999
2004
2009
2014
2019

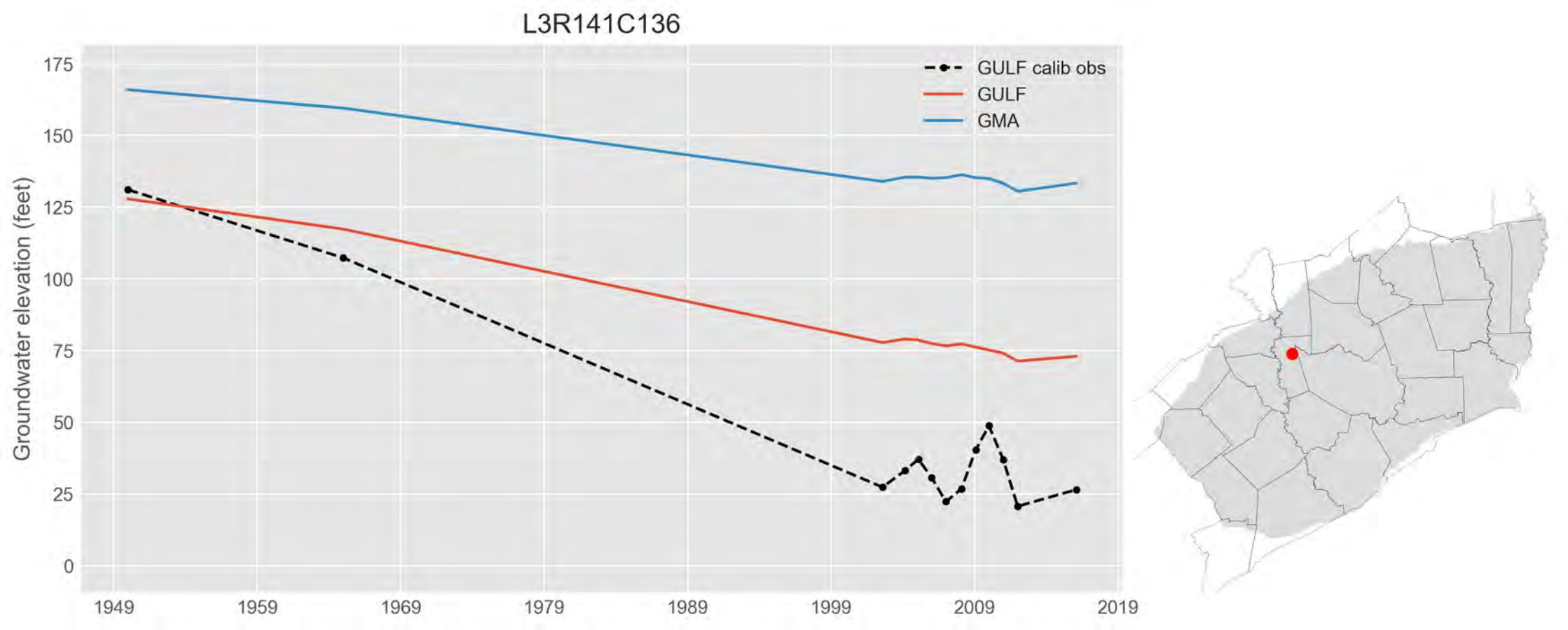

L3R136C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
2010
2011
2012
2013
2014
2015
2016
2017
2018


L3R139C194
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
−350
2010
2011
2012
2013
2014
2015
2016
2017
2018

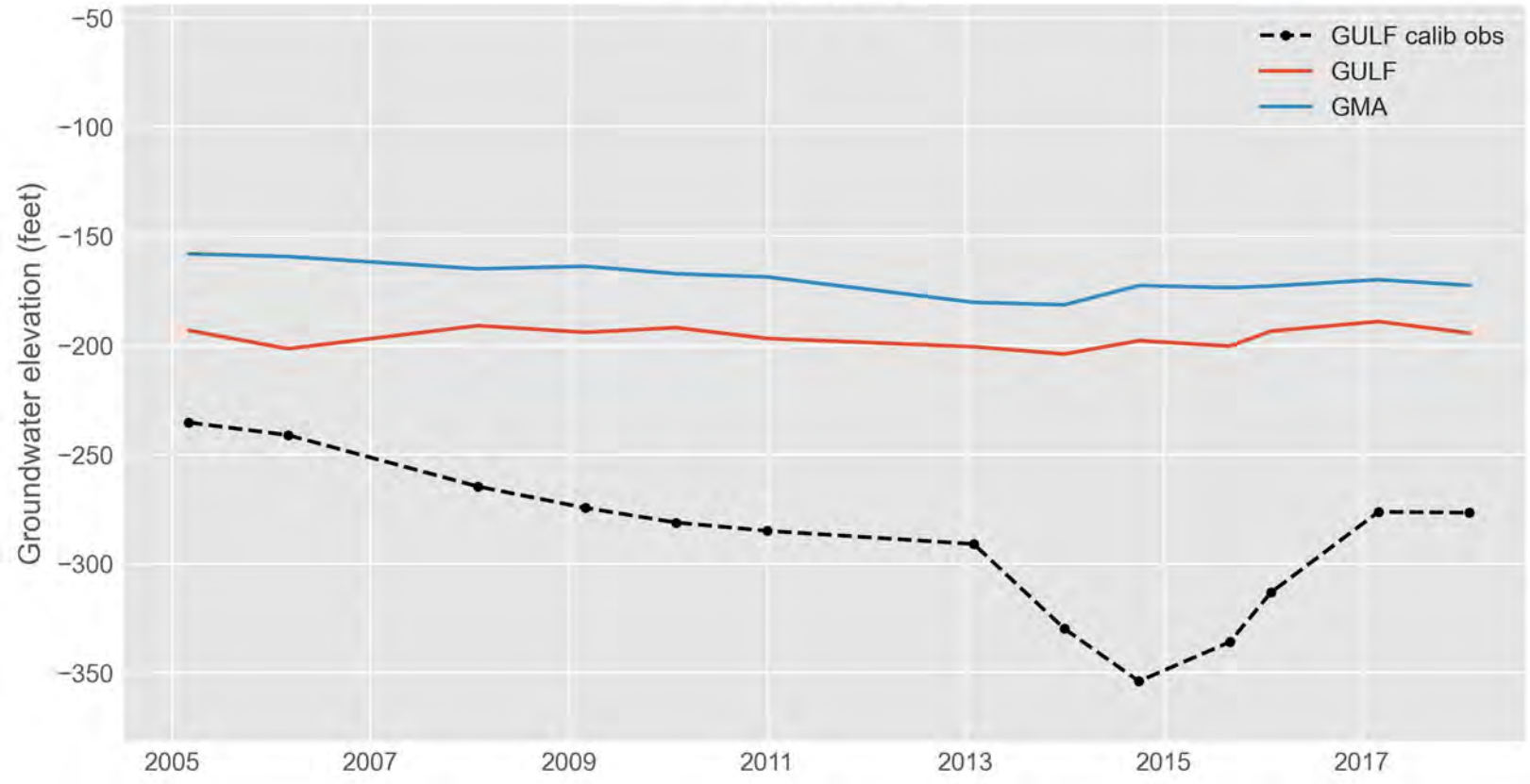
L3R139C255
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
2
0
−2
−4
−6
−8
−10
−12
−14
Dec
Jan
1981

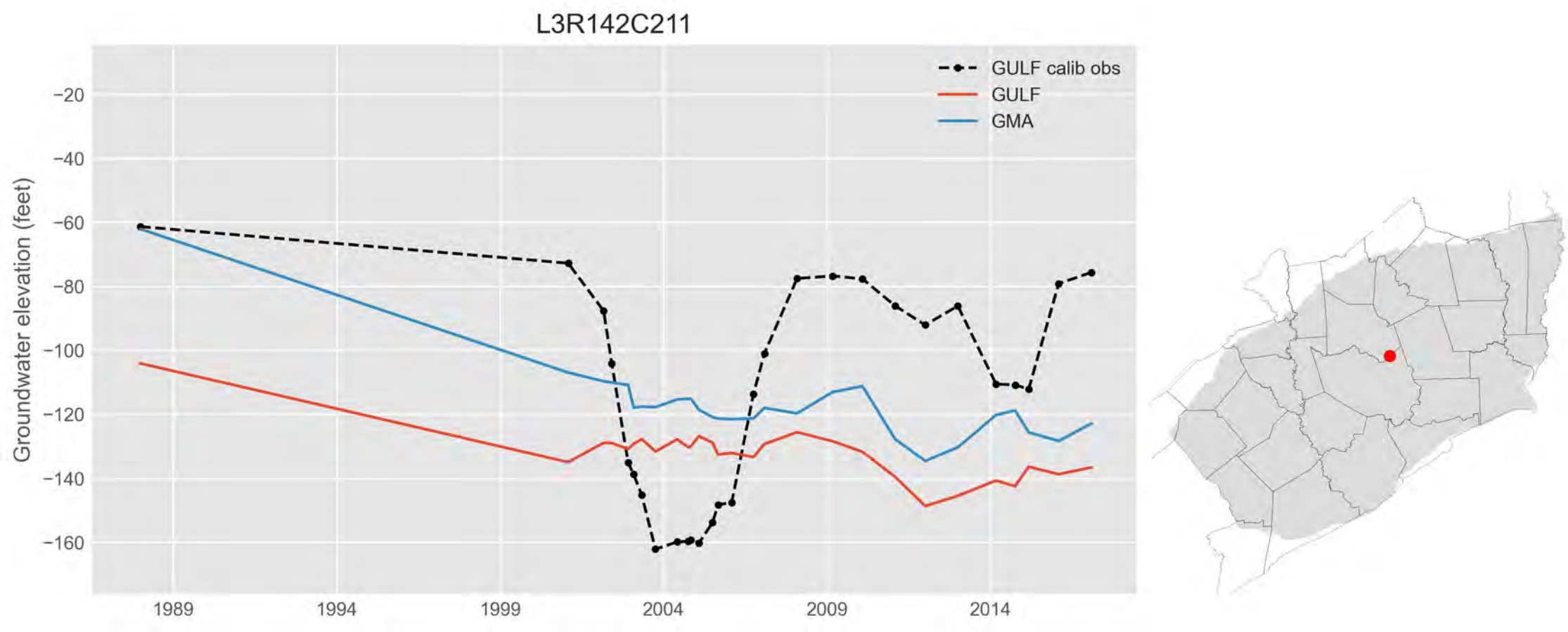

L3R140C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
1974
1979
1984
1989
1994
1999
2004
2009
2014

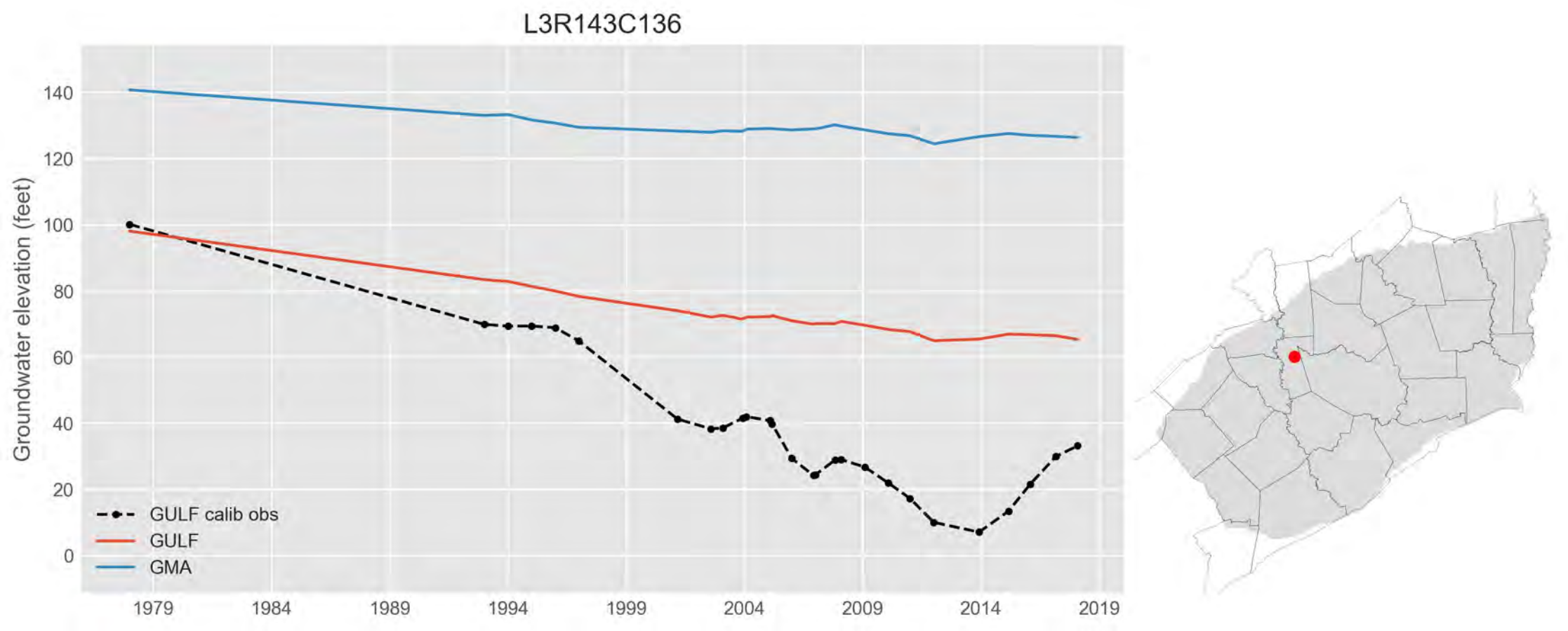

L3R141C127
Groundwater elevation (feet)
140
120
100
80
60
40
20
2001
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

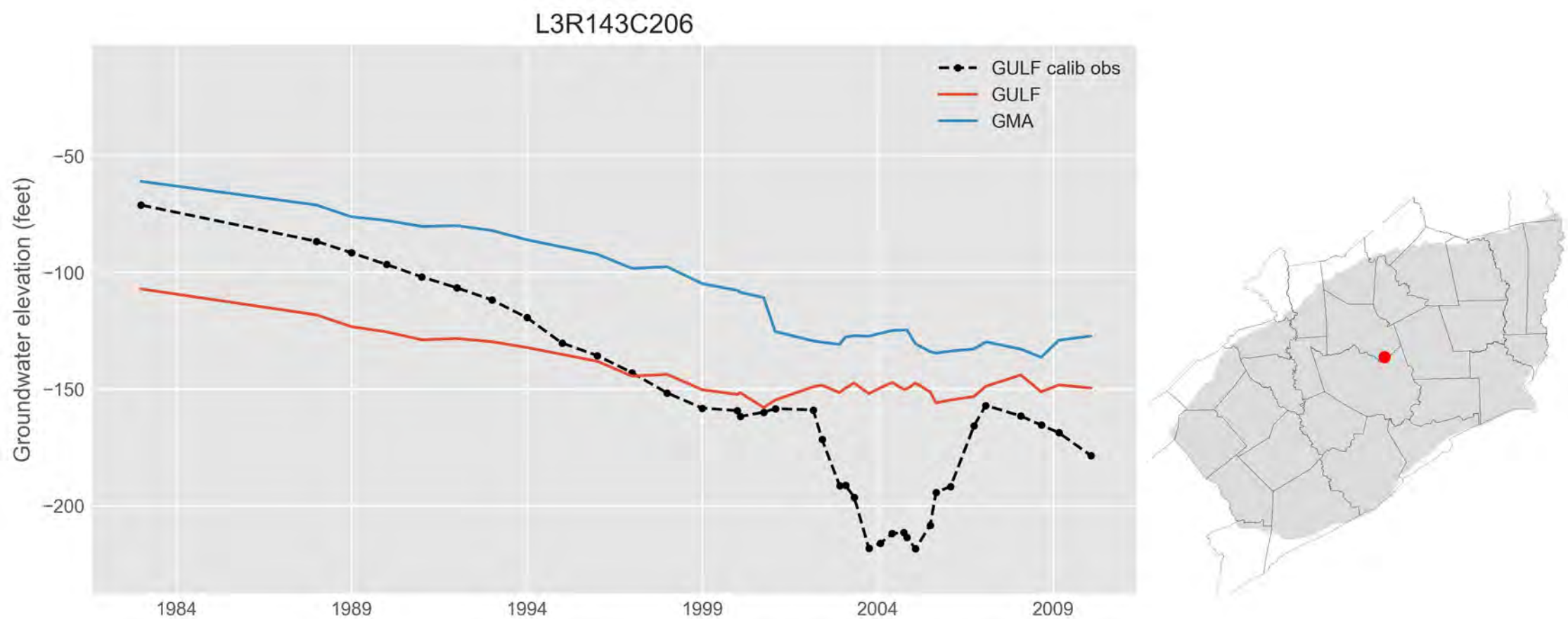

L3R141C136
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
0
1949
1959
1969
1979
1989
1999
2009
2019

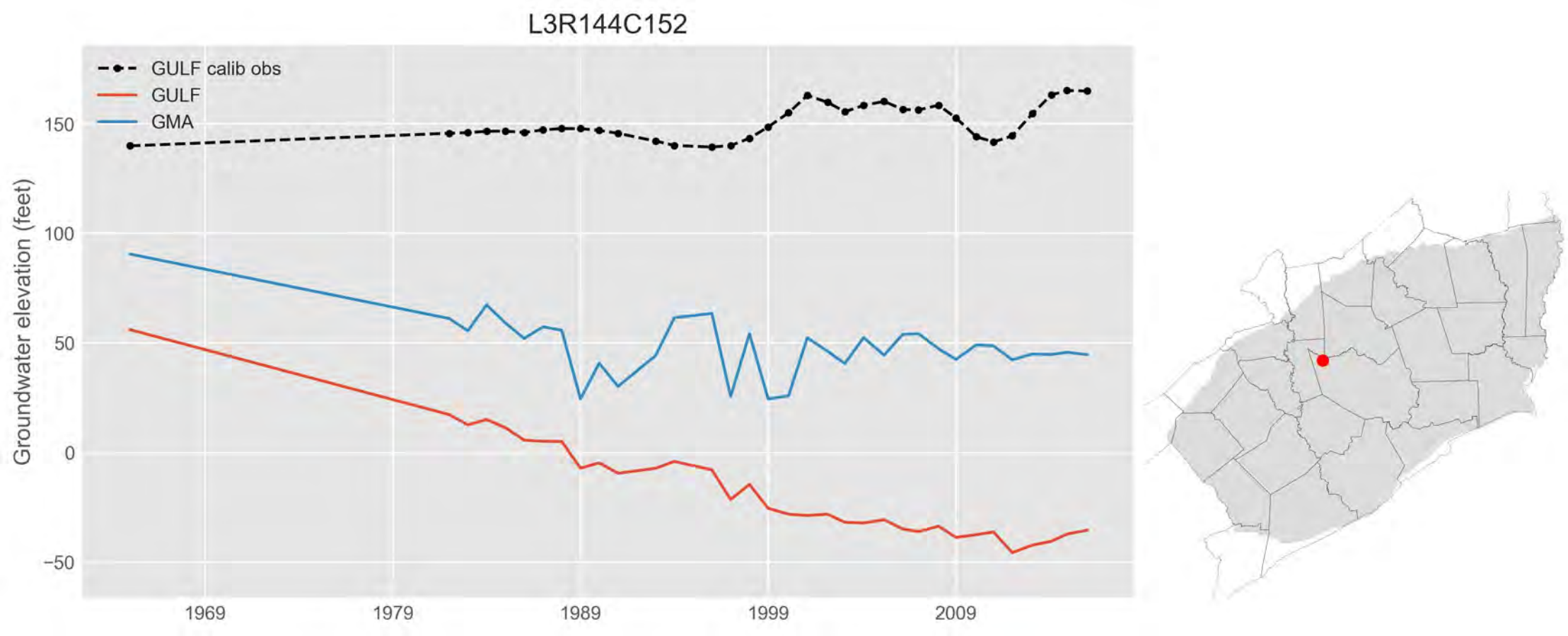
L3R141C194

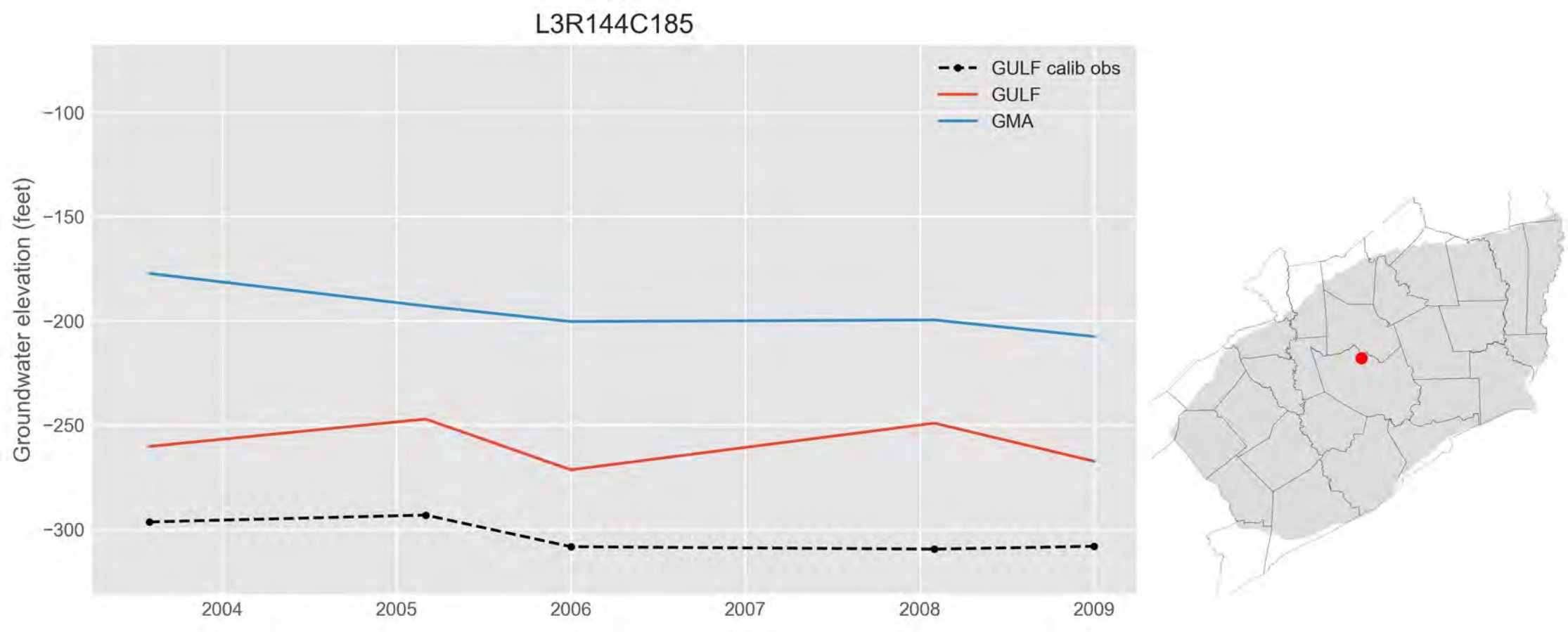

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
2005
2007
2009
2011
2013
2015
2017

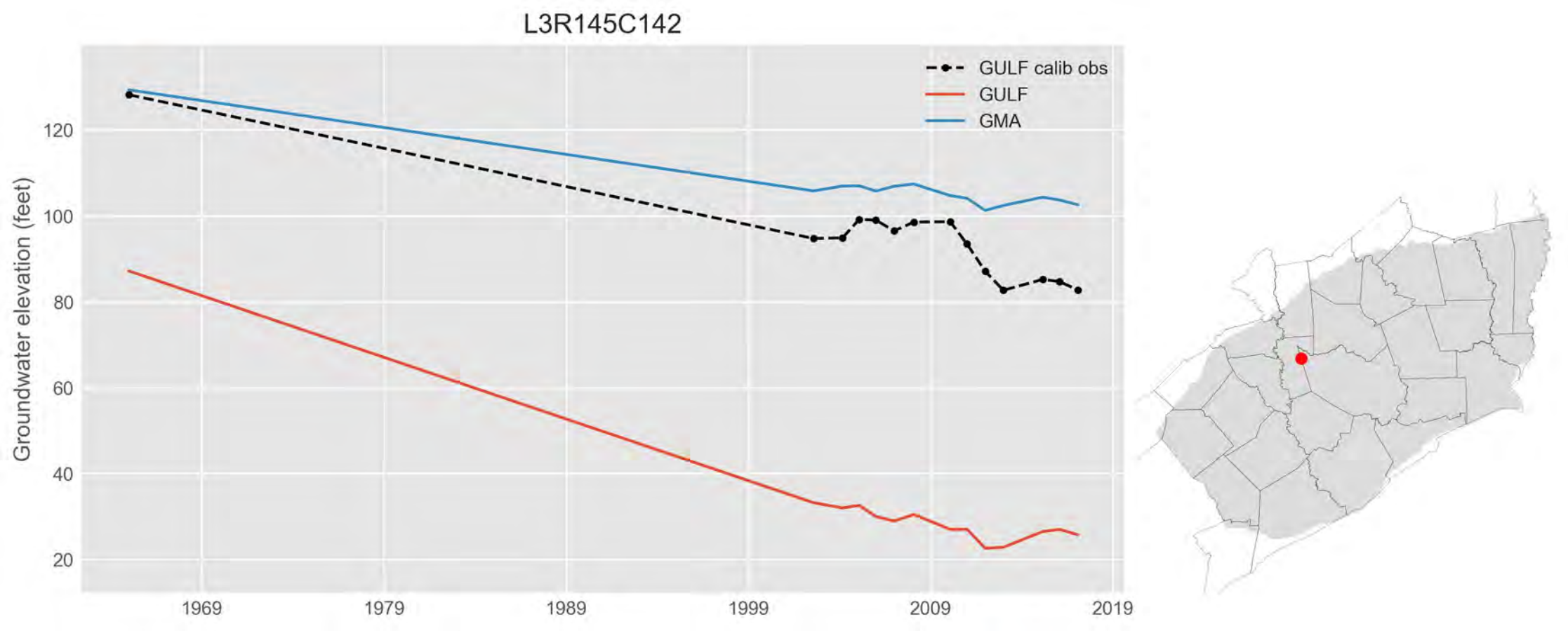

L3R142C211
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
−160
1989
1994
1999
2004
2009
2014


L3R143C136
Groundwater elevation (feet)
140
120
100
80
60
40
20
0
1979
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

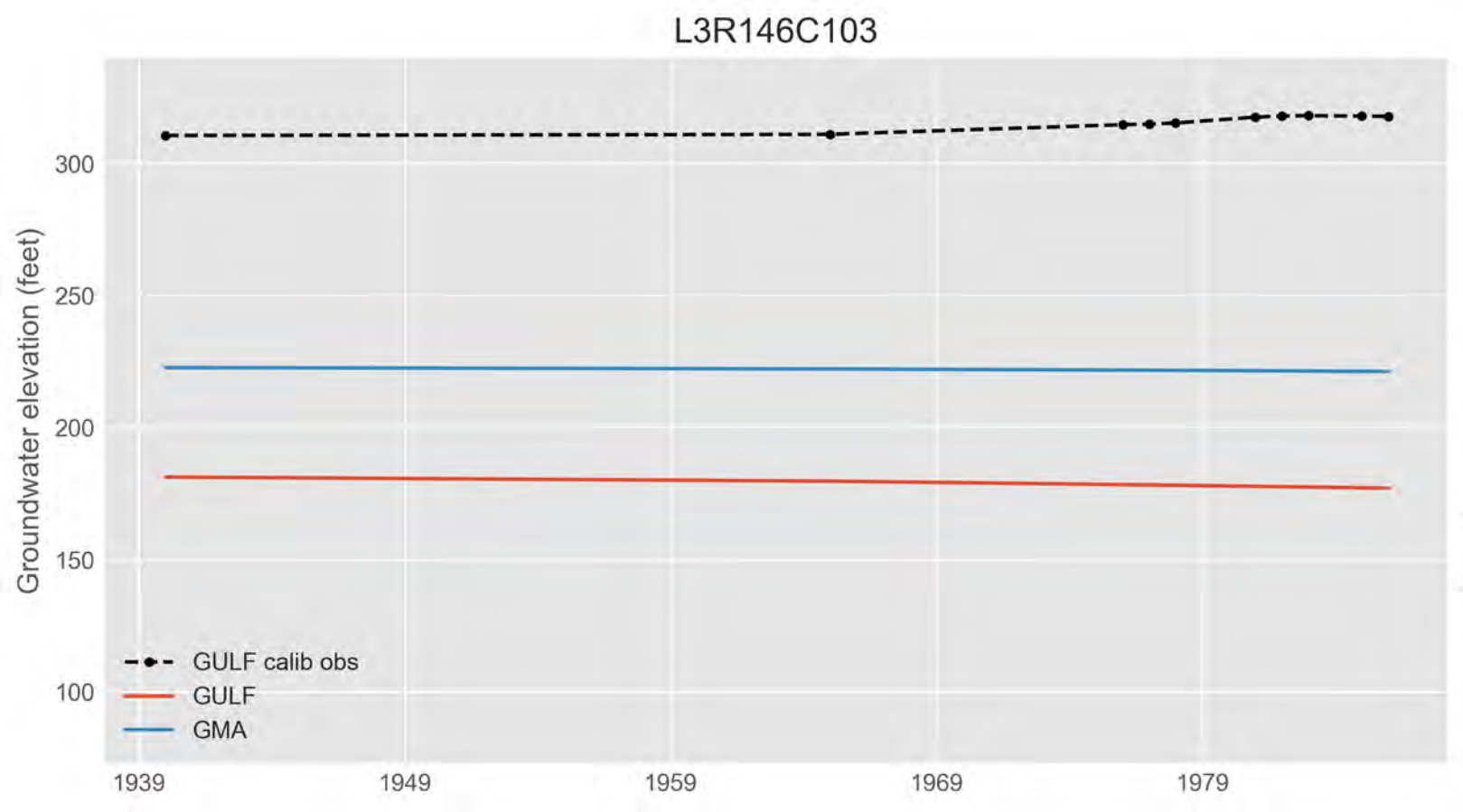

L3R143C206
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1984
1989
1994
1999
2004
2009

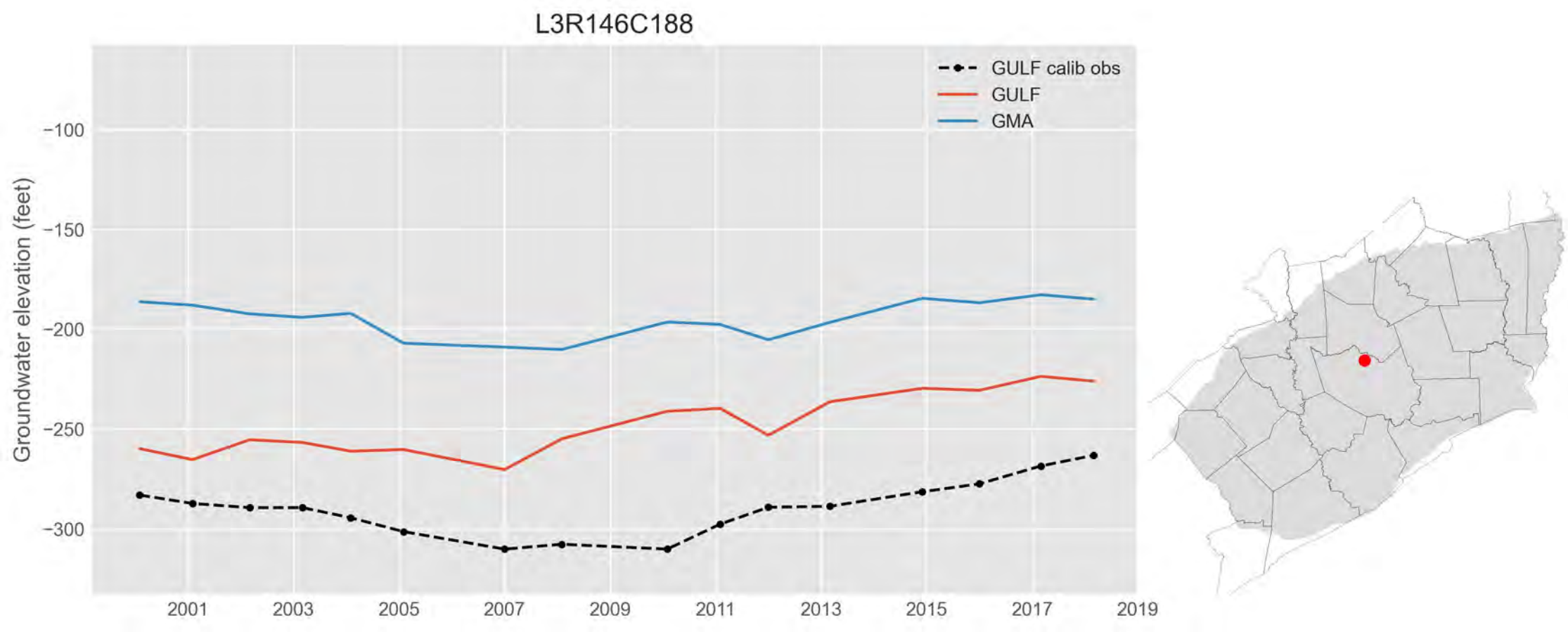

L3R144C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
100
50
0
−50
1969
1979
1989
1999
2009

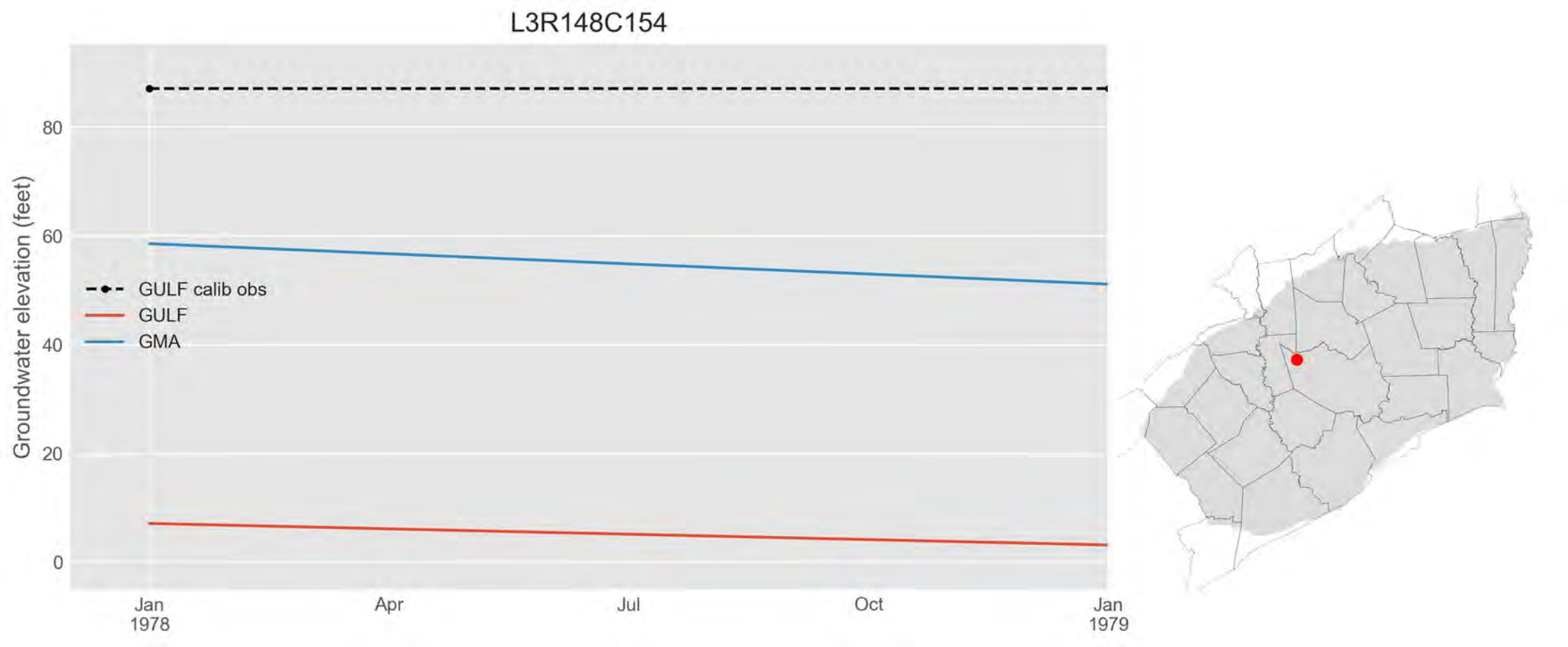

L3R144C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
2004
2005
2006
2007
2008
2009

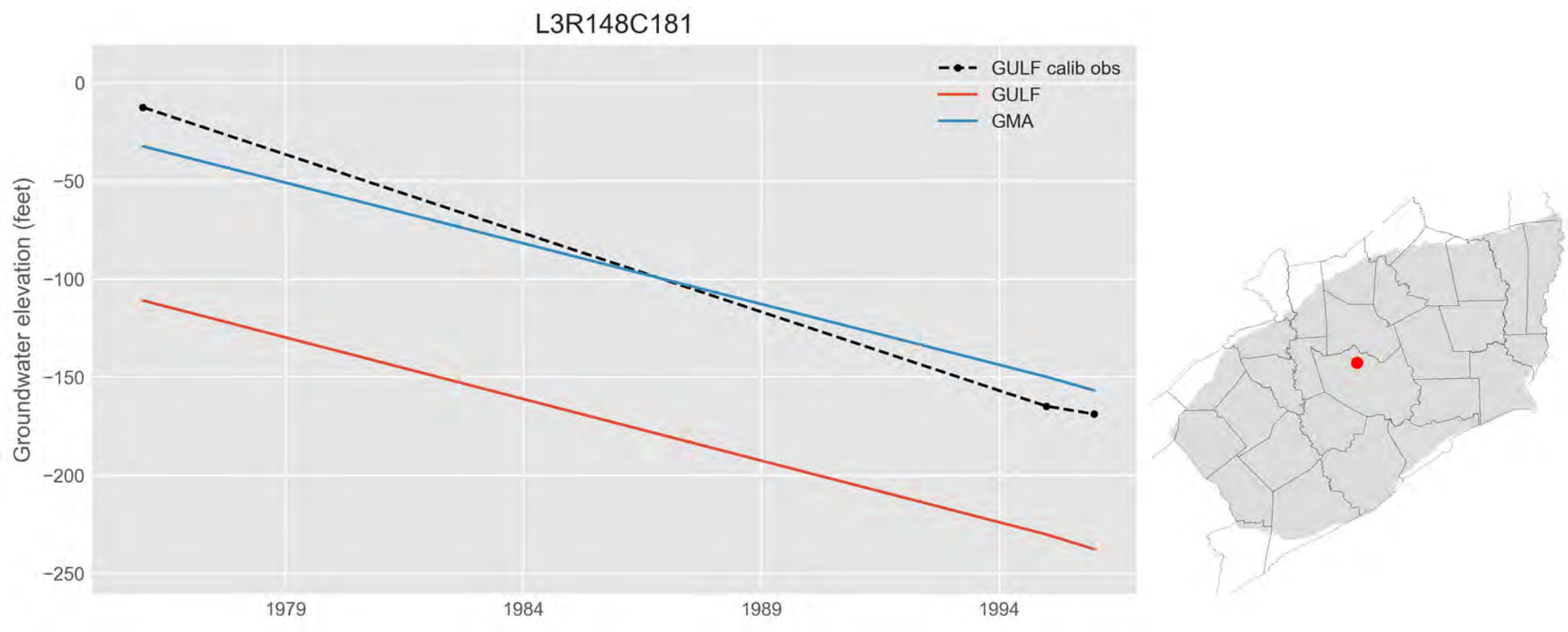

L3R145C142
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
1969
1979
1989
1999
2009
2019

L3R146C103

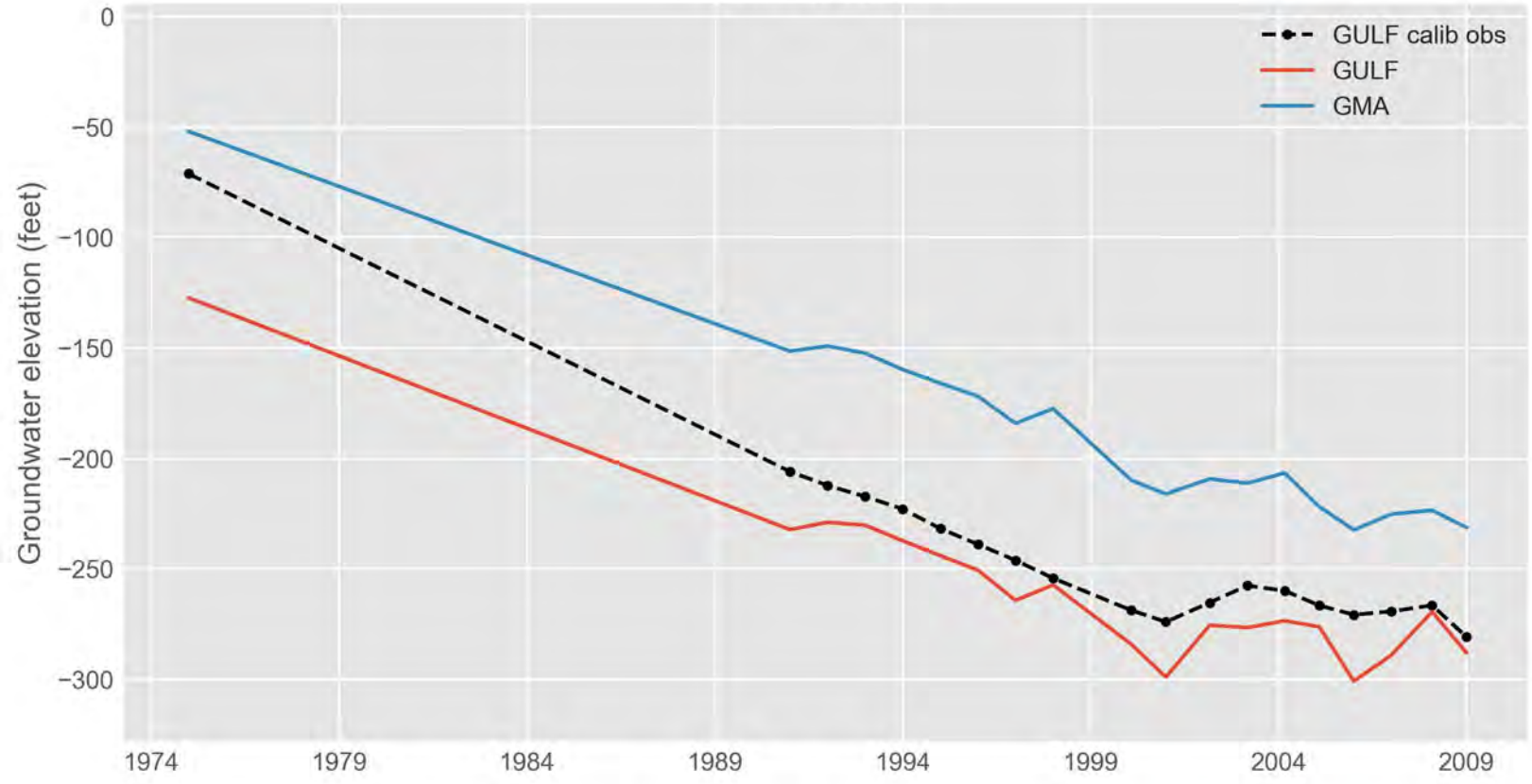

Groundwater elevation (feet)
300
250
200
150
100
1939
1949
1959
1969
1979
GULF calib obs
GULF
GMA

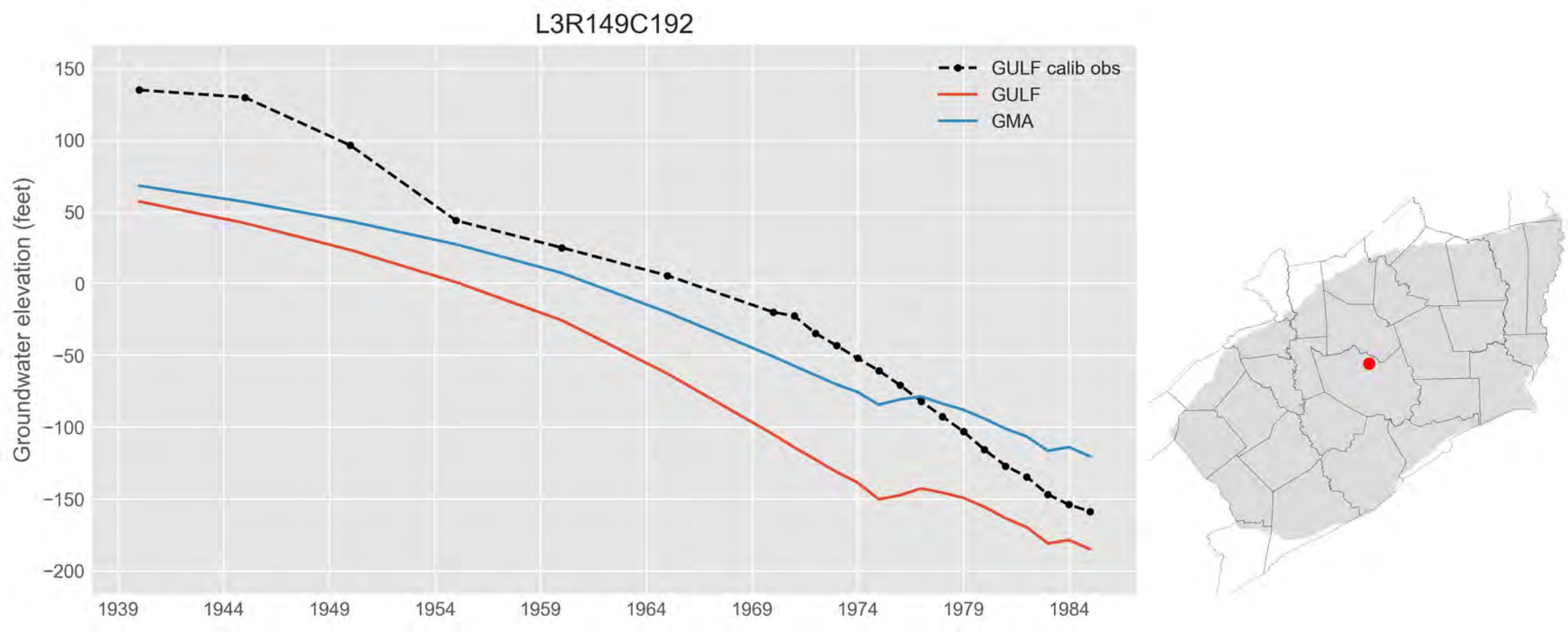

L3R146C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019

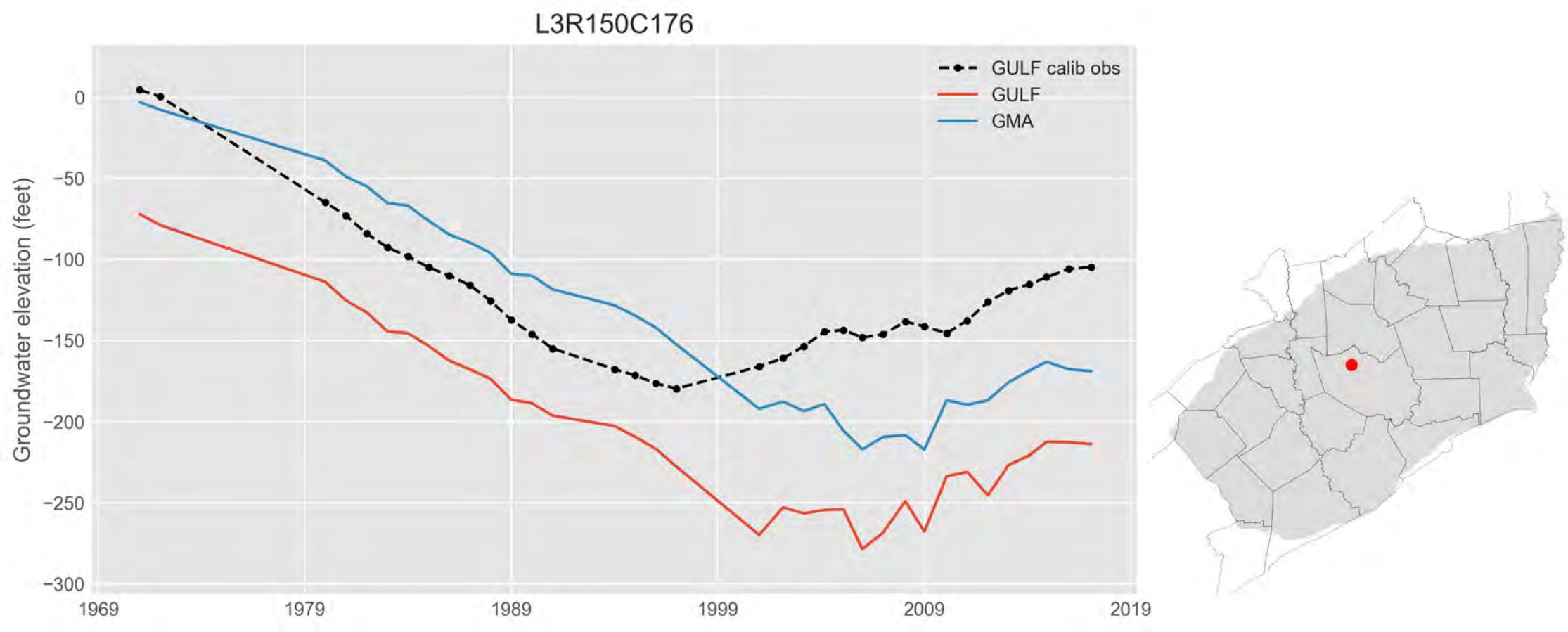

L3R148C154
Groundwater elevation (feet)
0
20
40
60
80
GULF calib obs
GULF
GMA
Jan
1978
Apr
Jul
Oct
Jan
1979

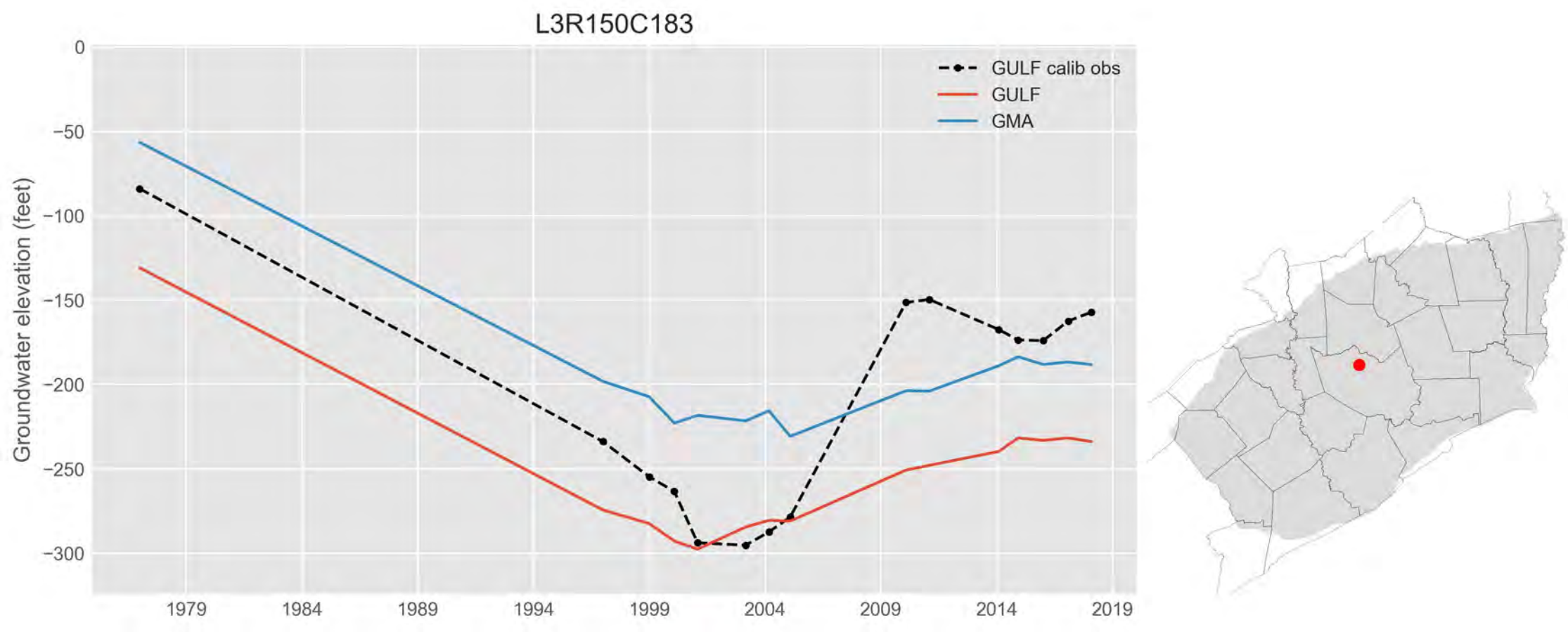

L3R148C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1979
1984
1989
1994

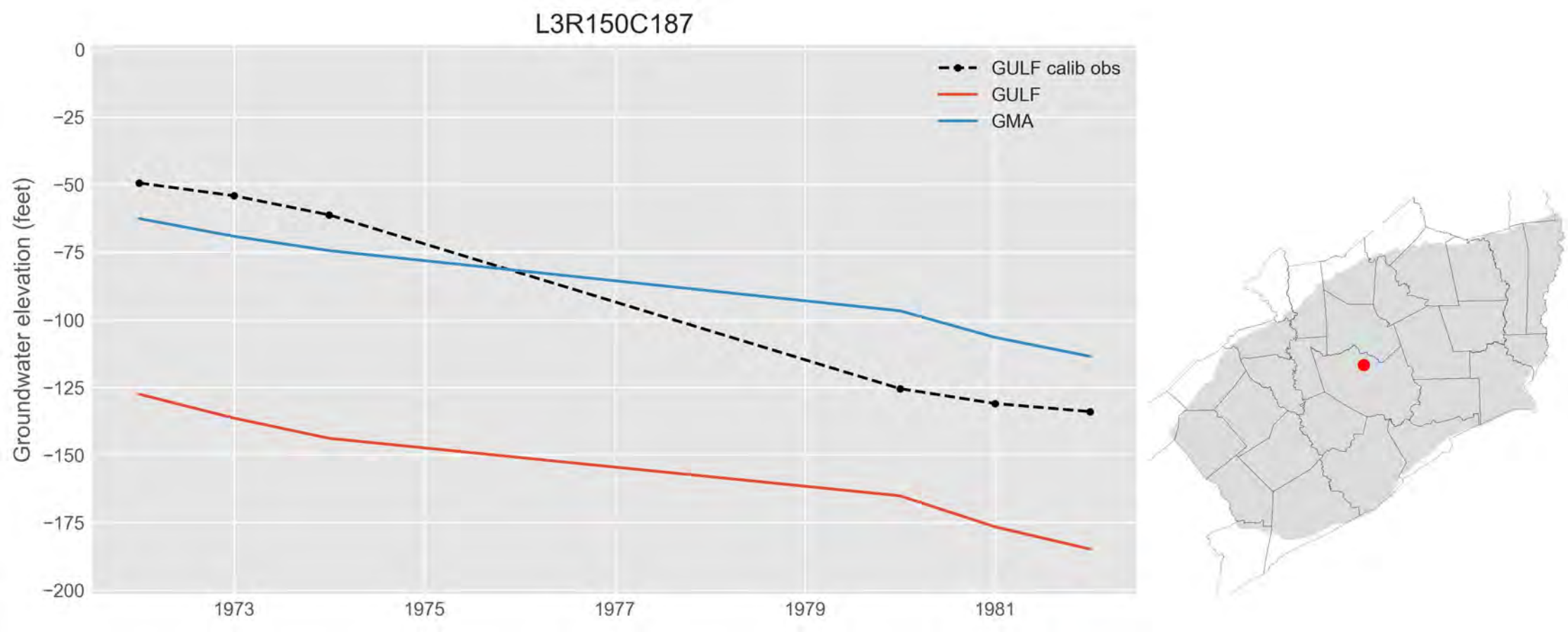
L3R148C184

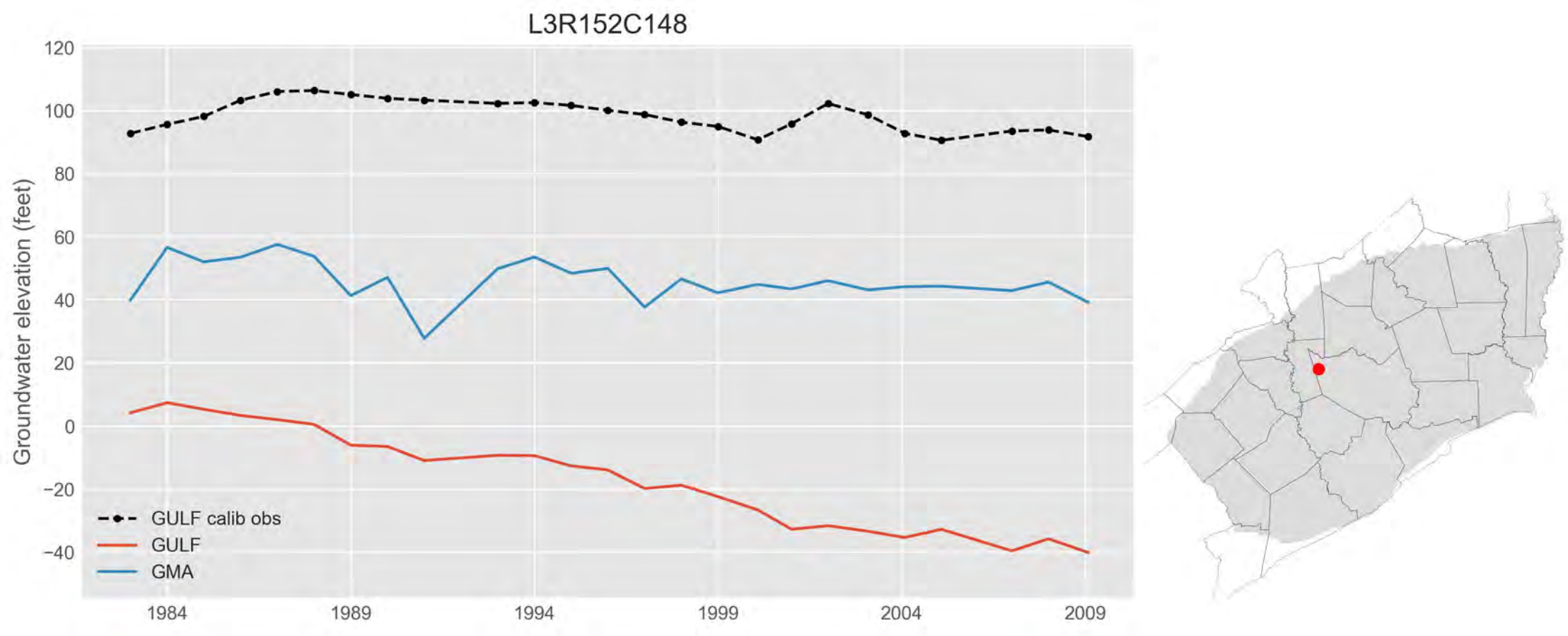

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1974
1979
1984
1989
1994
1999
2004
2009

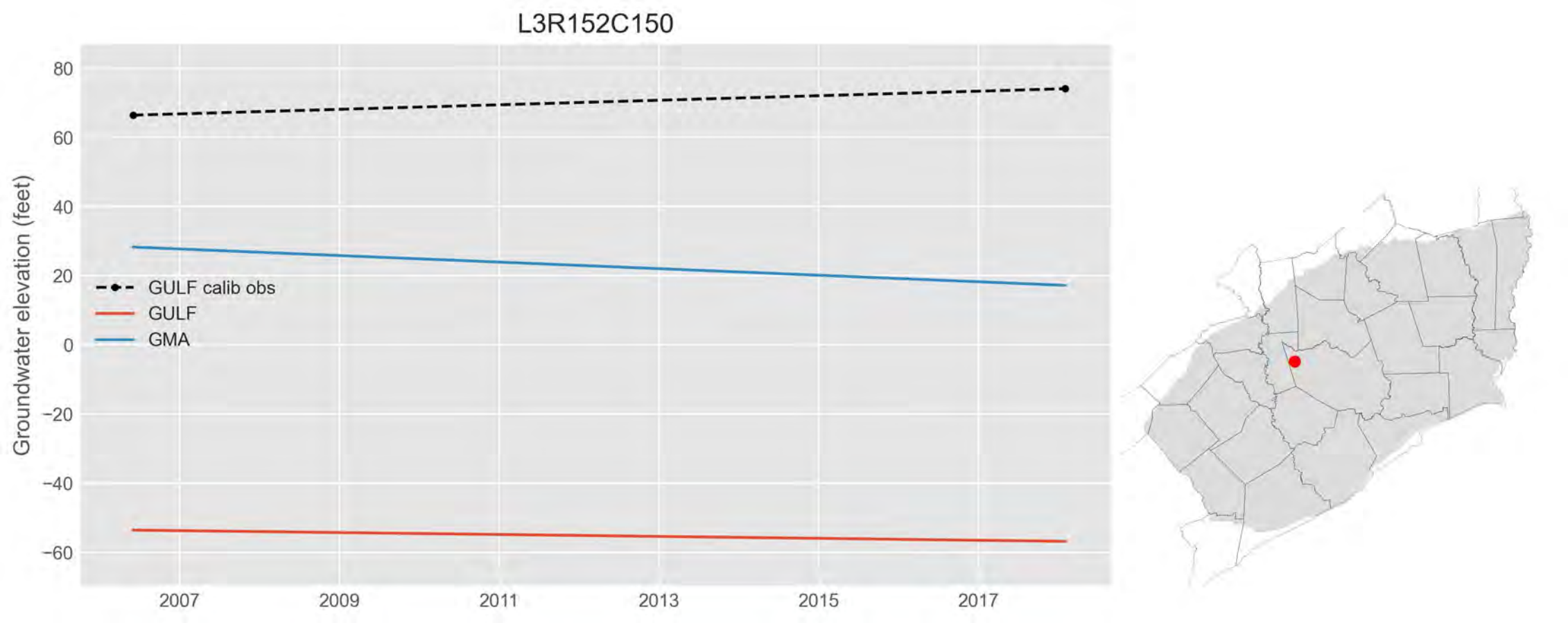

L3R149C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
100
50
0
−50
−100
−150
−200
1939
1944
1949
1954
1959
1964
1969
1974
1979
1984

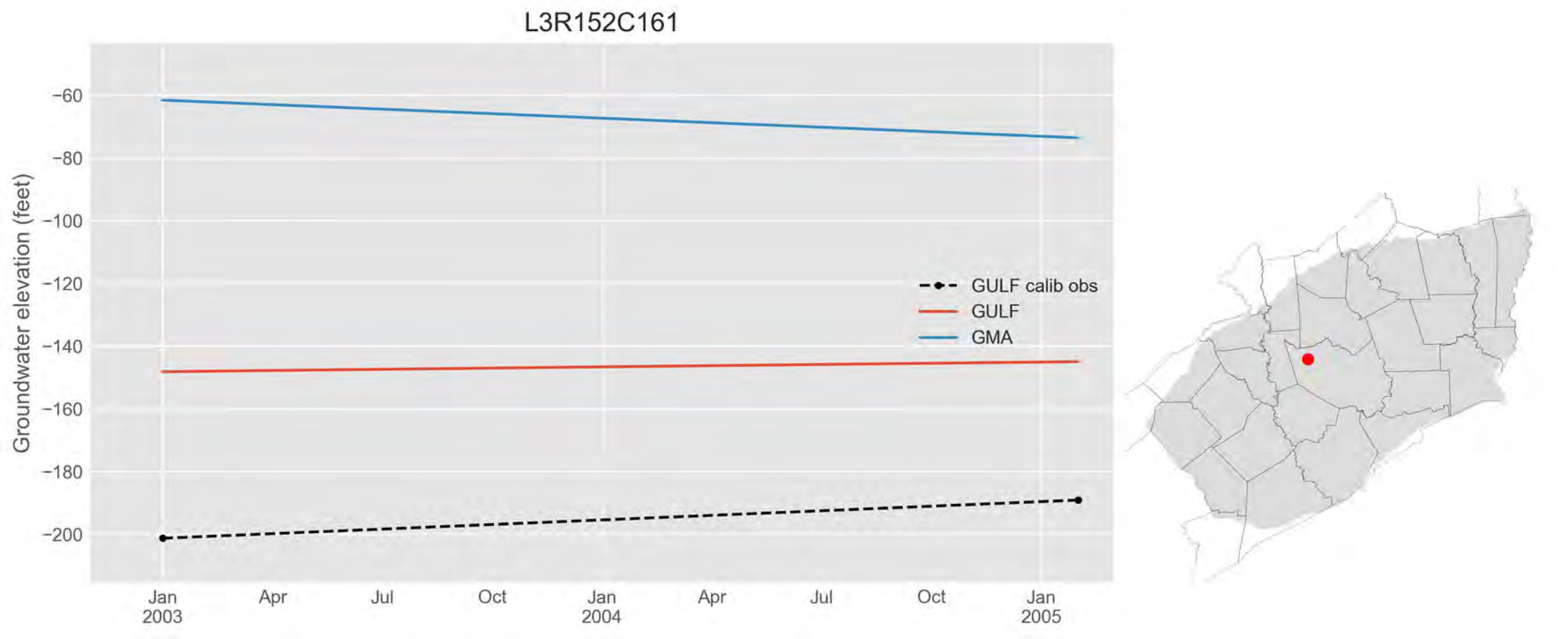

L3R150C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1969
1979
1989
1999
2009
2019

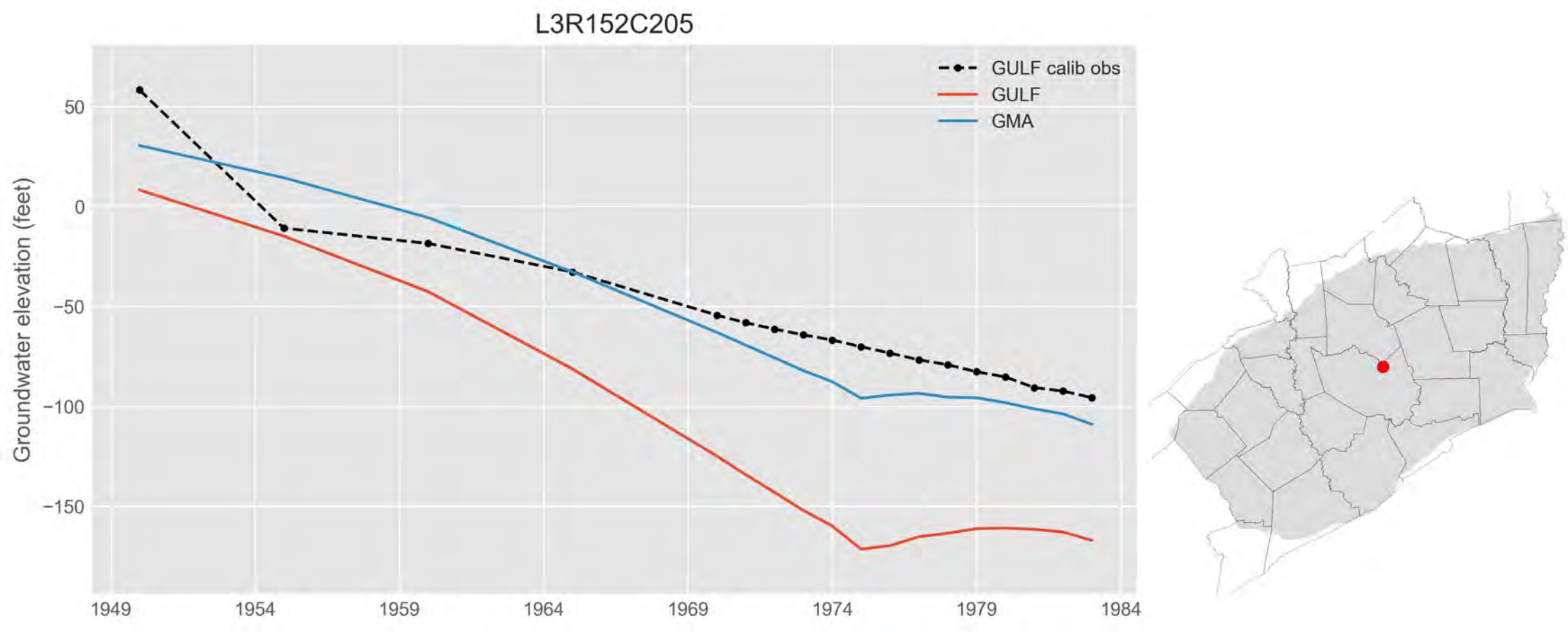

L3R150C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1979
1984
1989
1994
1999
2004
2009
2014
2019

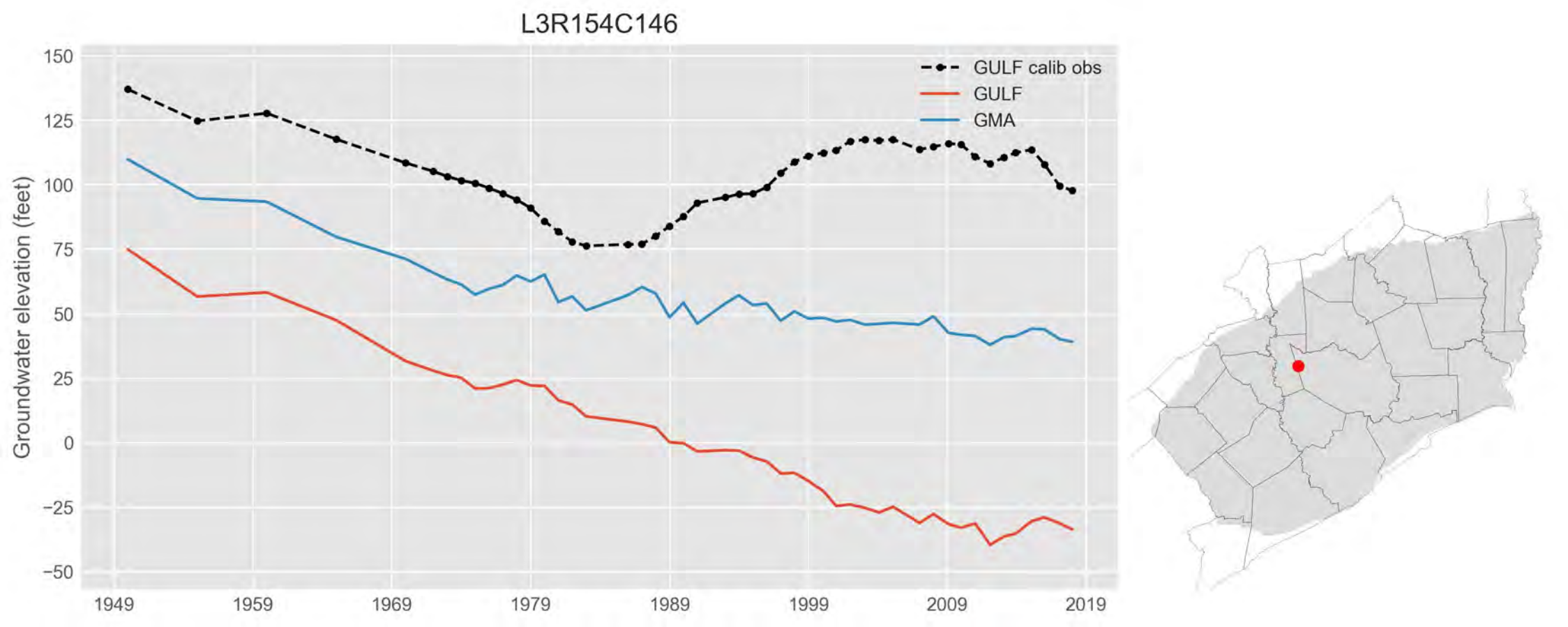

L3R150C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
−200
1973
1975
1977
1979
1981

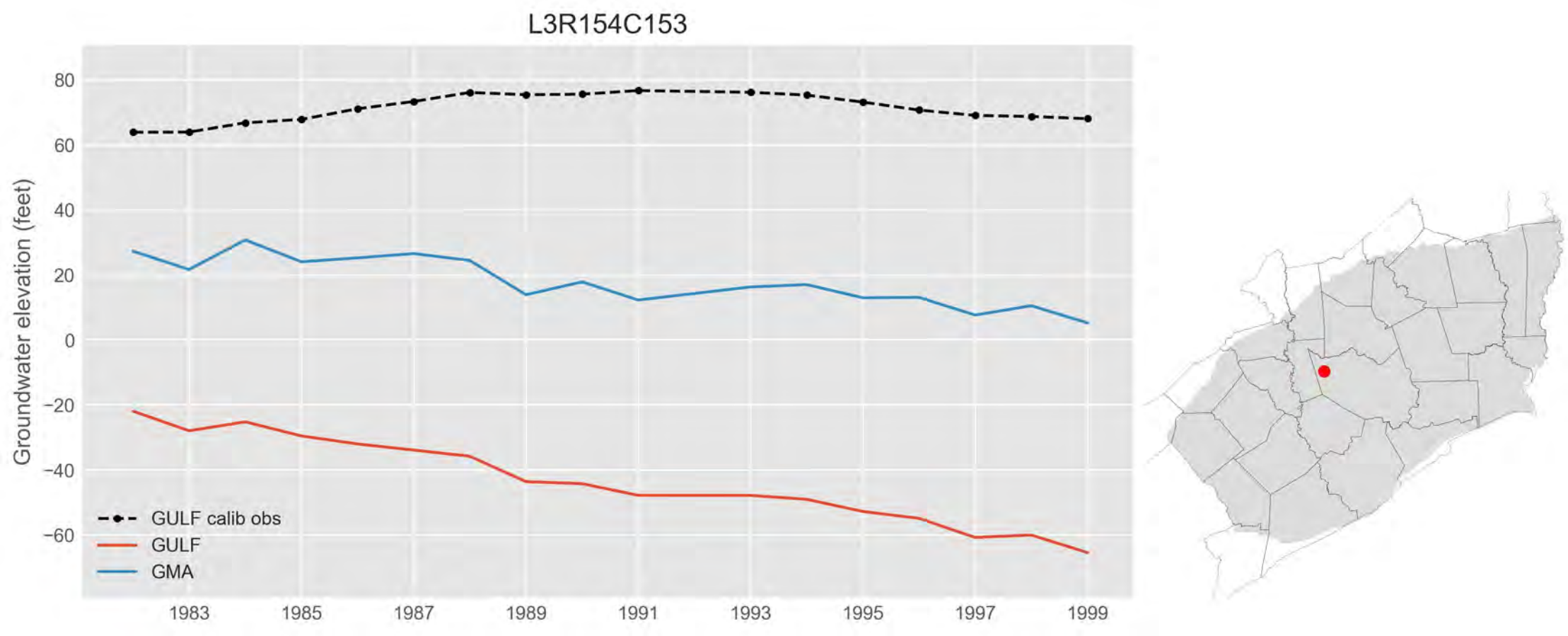

L3R152C148
Groundwater elevation (feet)
120
100
80
60
40
20
0
−20
−40
1984
1989
1994
1999
2004
2009
GULF calib obs
GULF
GMA

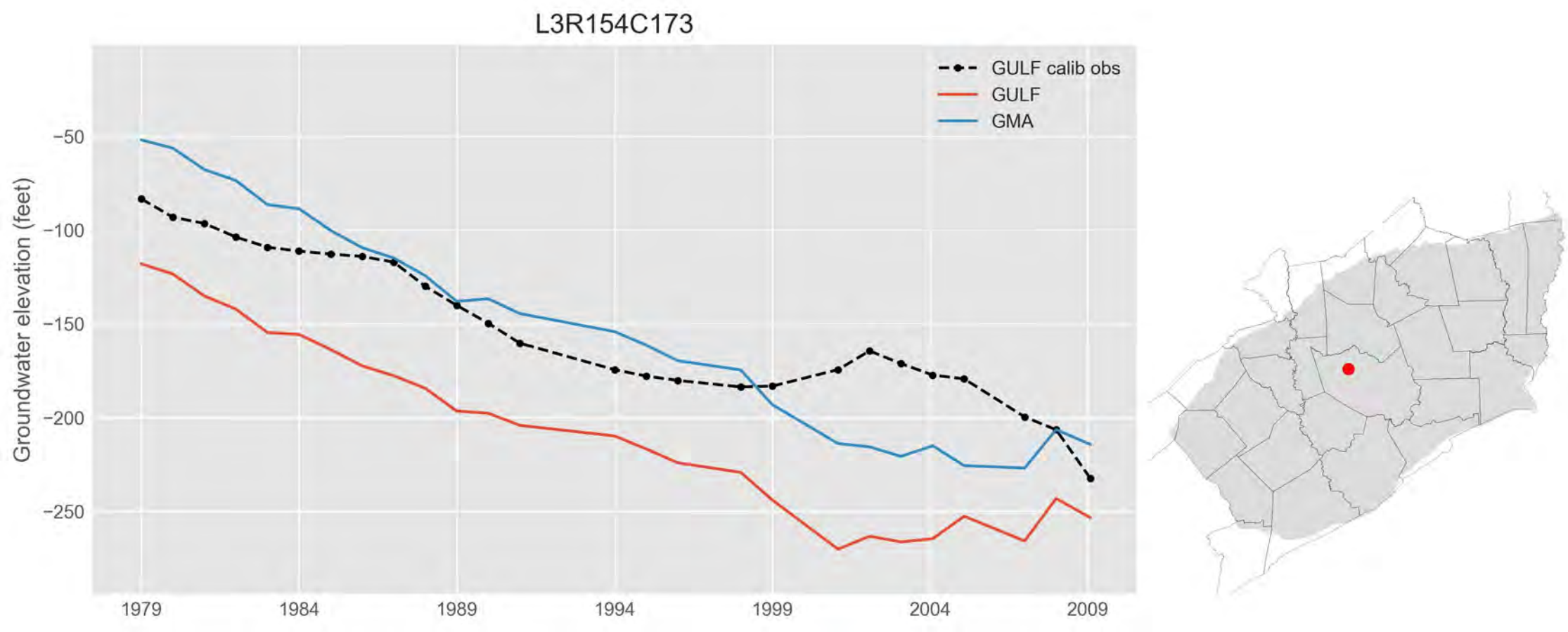

L3R152C150
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
−60
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

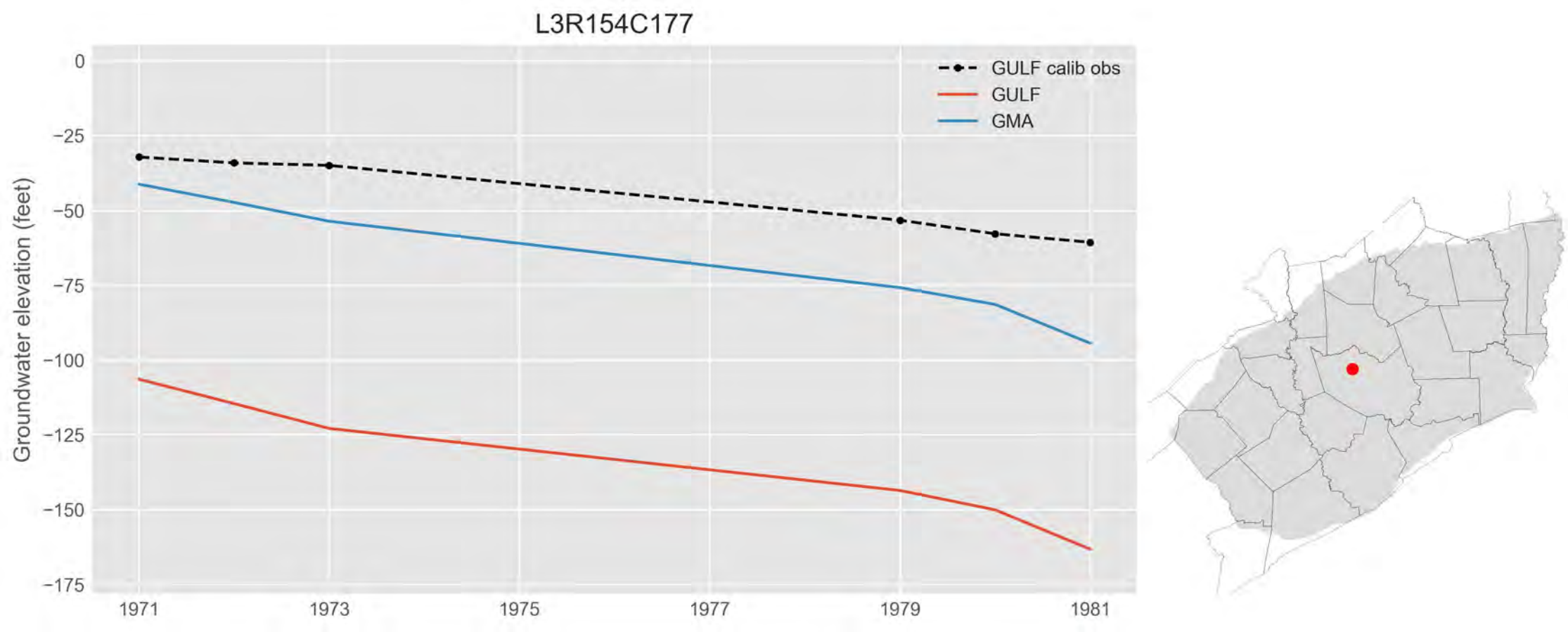

L3R152C161
Groundwater elevation (feet)
−60
−80
−100
−120
−140
−160
−180
−200
Jan
2003
Apr
Jul
Oct
Jan
2004
Apr
Jul
Oct
Jan
2005
GULF calib obs
GULF
GMA

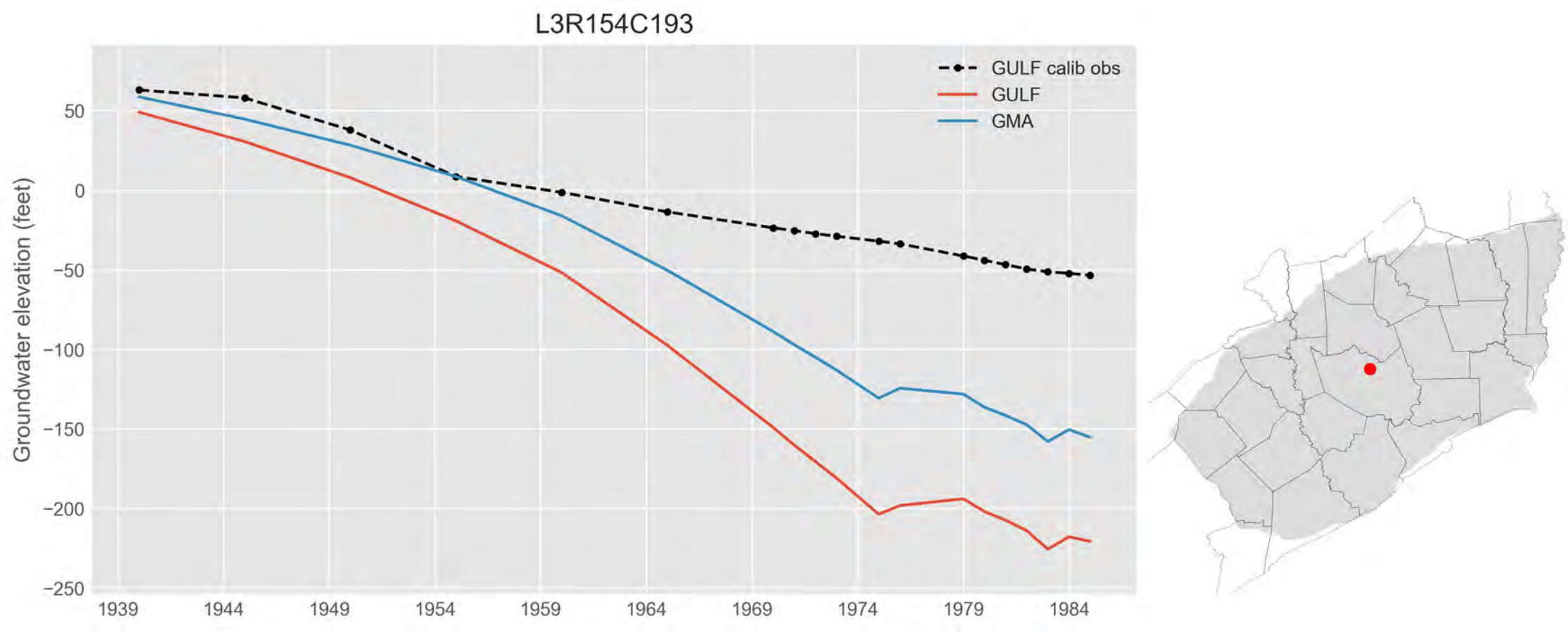

L3R152C205
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
1949
1954
1959
1964
1969
1974
1979
1984

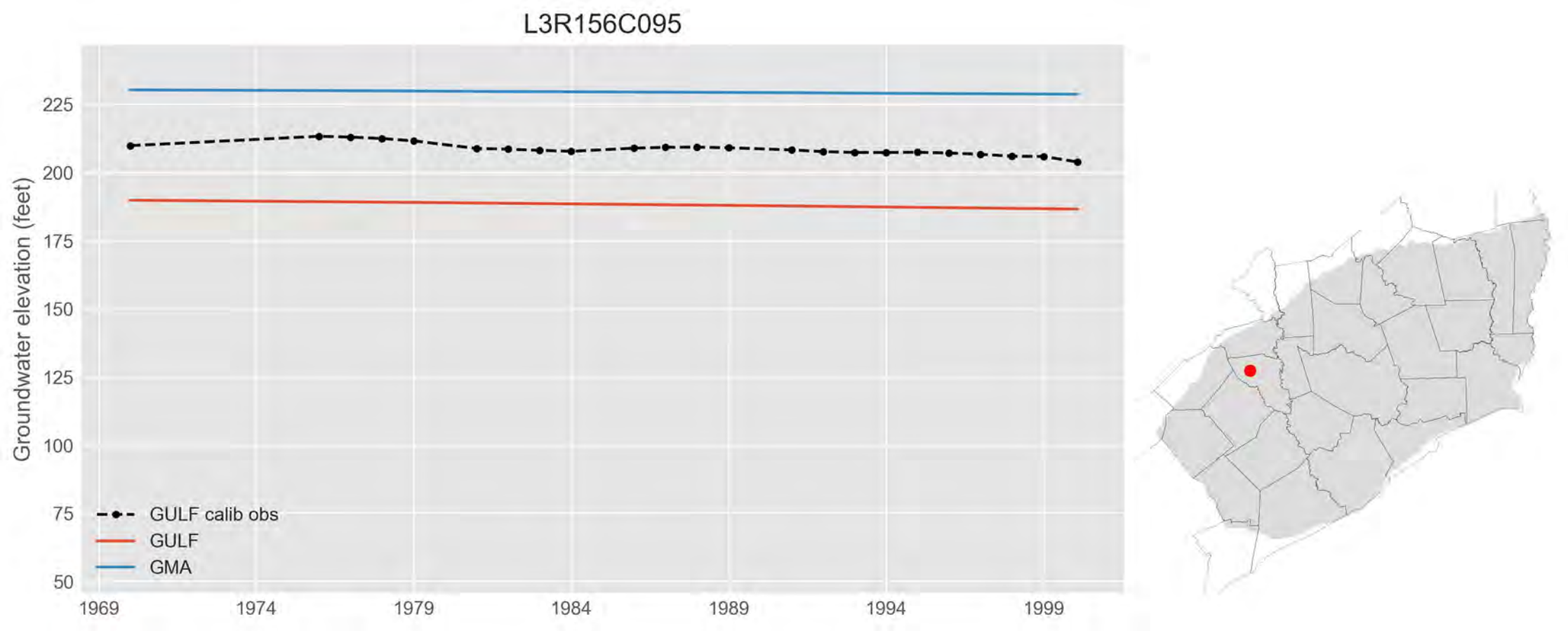

L3R154C146
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
125
100
75
50
25
0
−25
−50
1949
1959
1969
1979
1989
1999
2009
2019

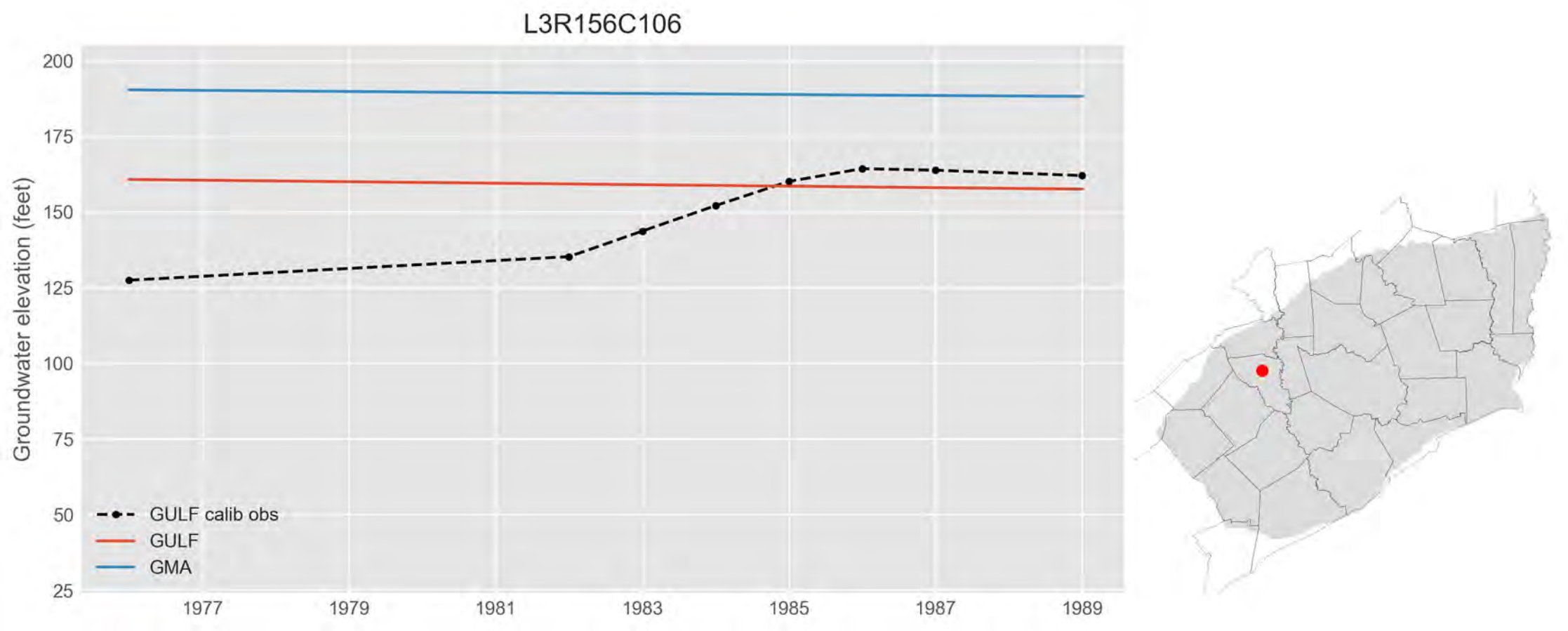

L3R154C153
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
−60
1983
1985
1987
1989
1991
1993
1995
1997
1999
GULF calib obs
GULF
GMA

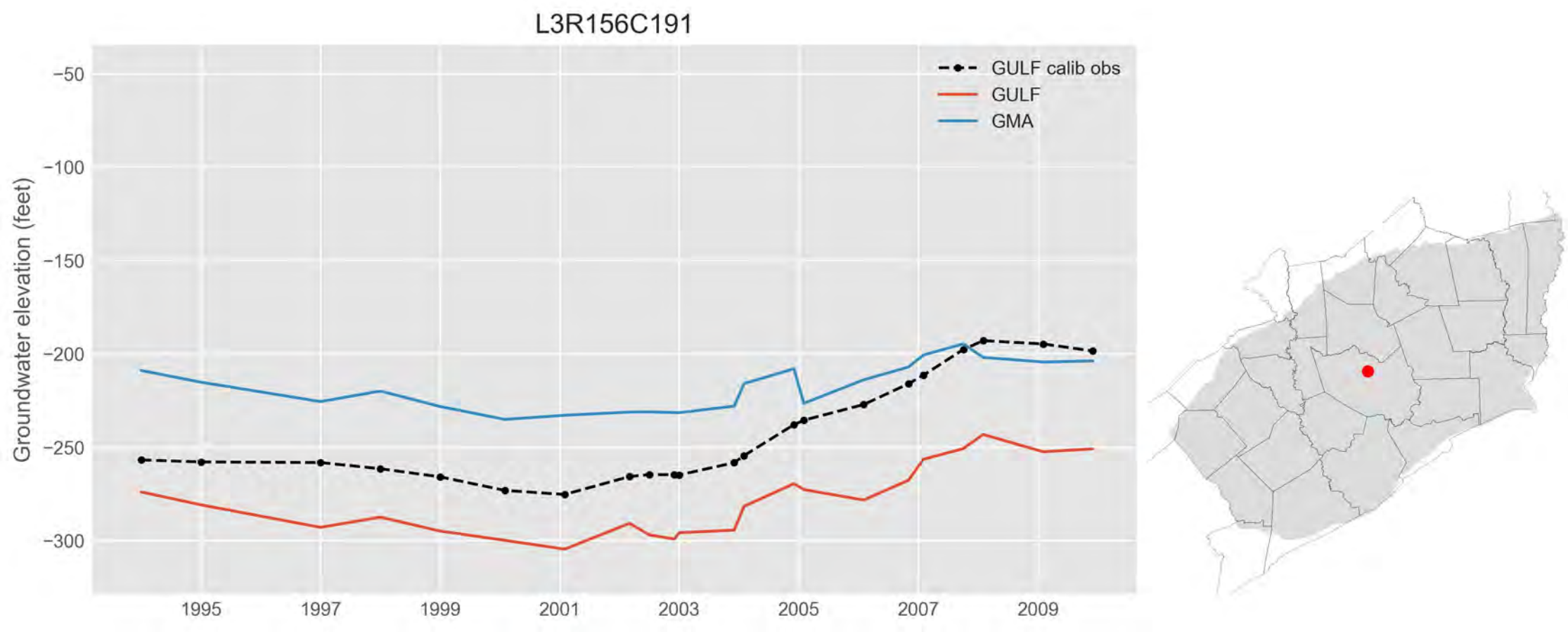

L3R154C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1979
1984
1989
1994
1999
2004
2009

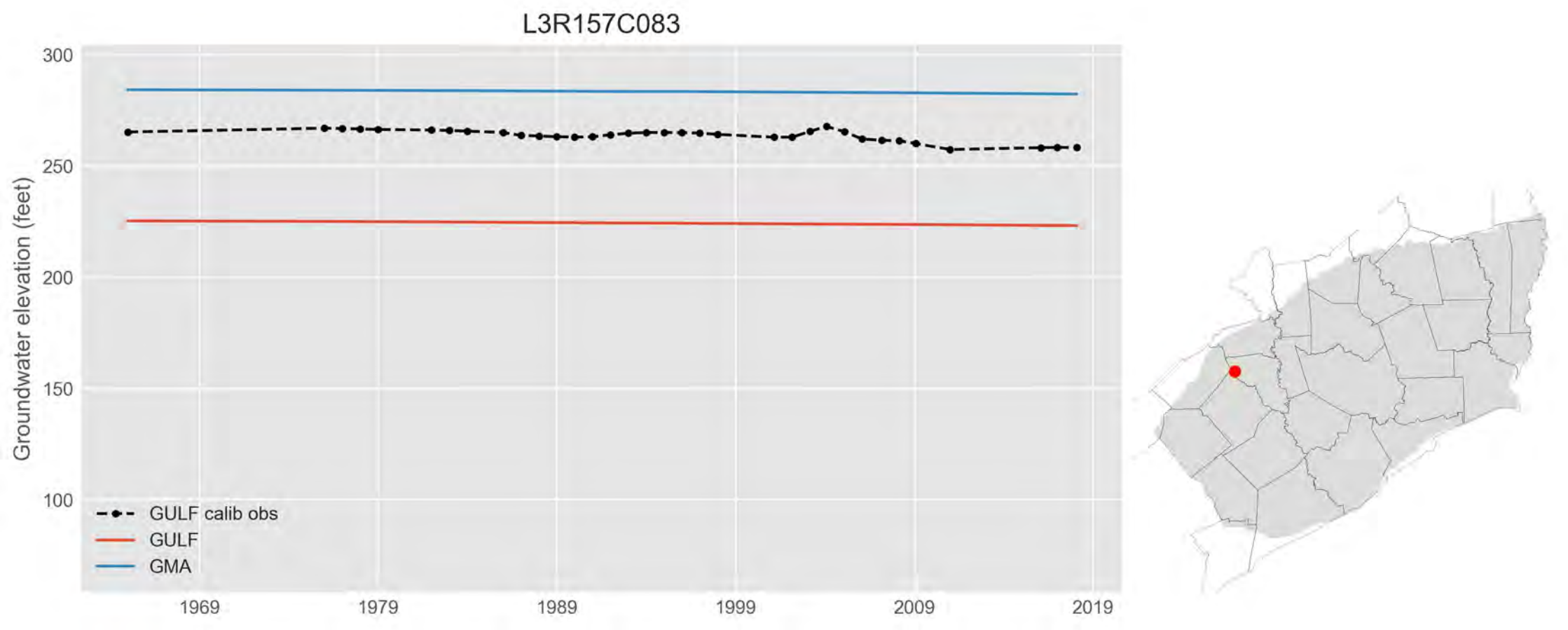

L3R154C177
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
1971
1973
1975
1977
1979
1981

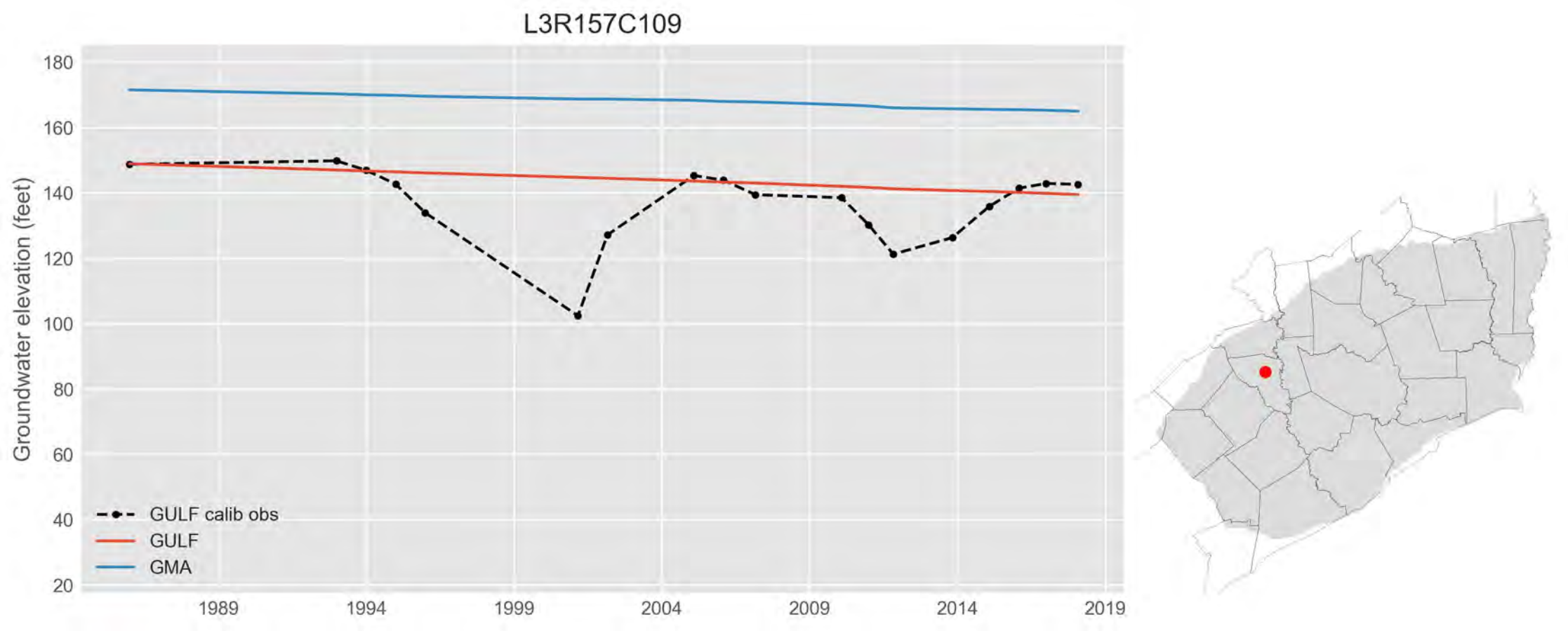

L3R154C193
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
1939
1944
1949
1954
1959
1964
1969
1974
1979
1984

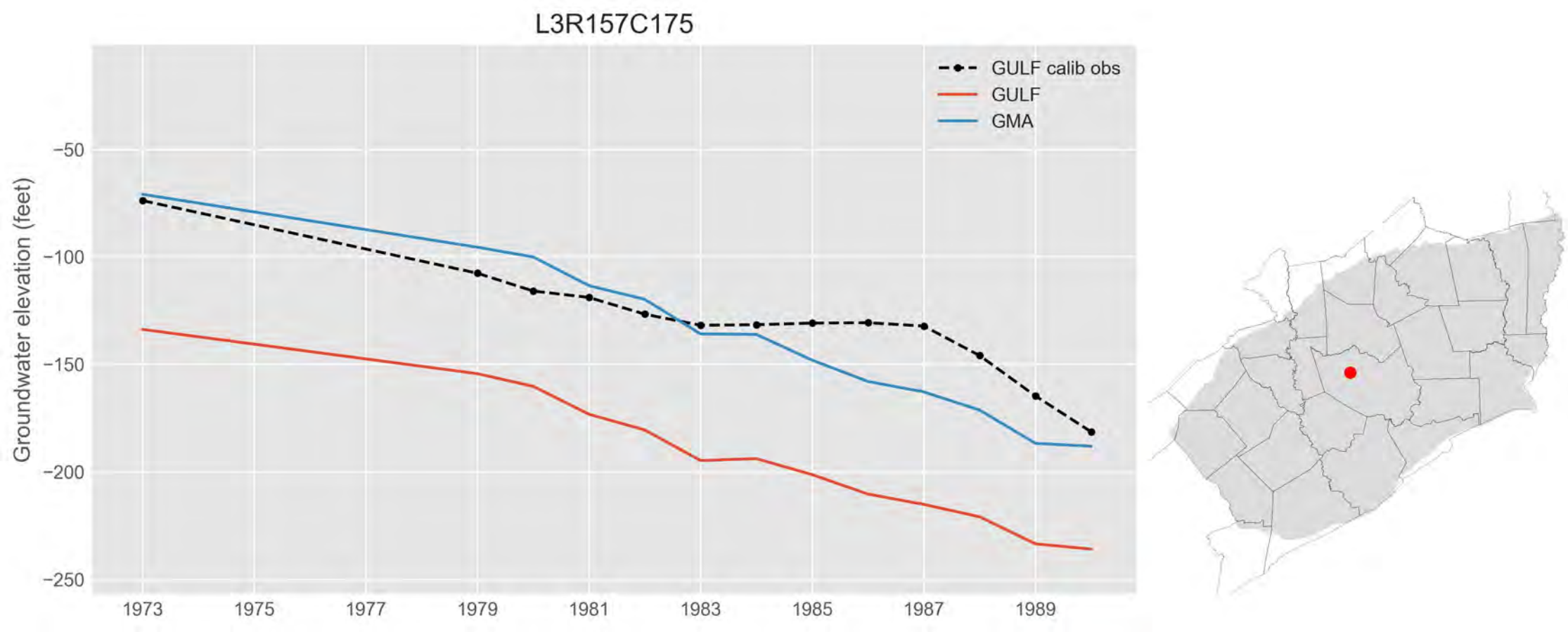

L3R156C095
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
1969
1974
1979
1984
1989
1994
1999
GULF calib obs
GULF
GMA

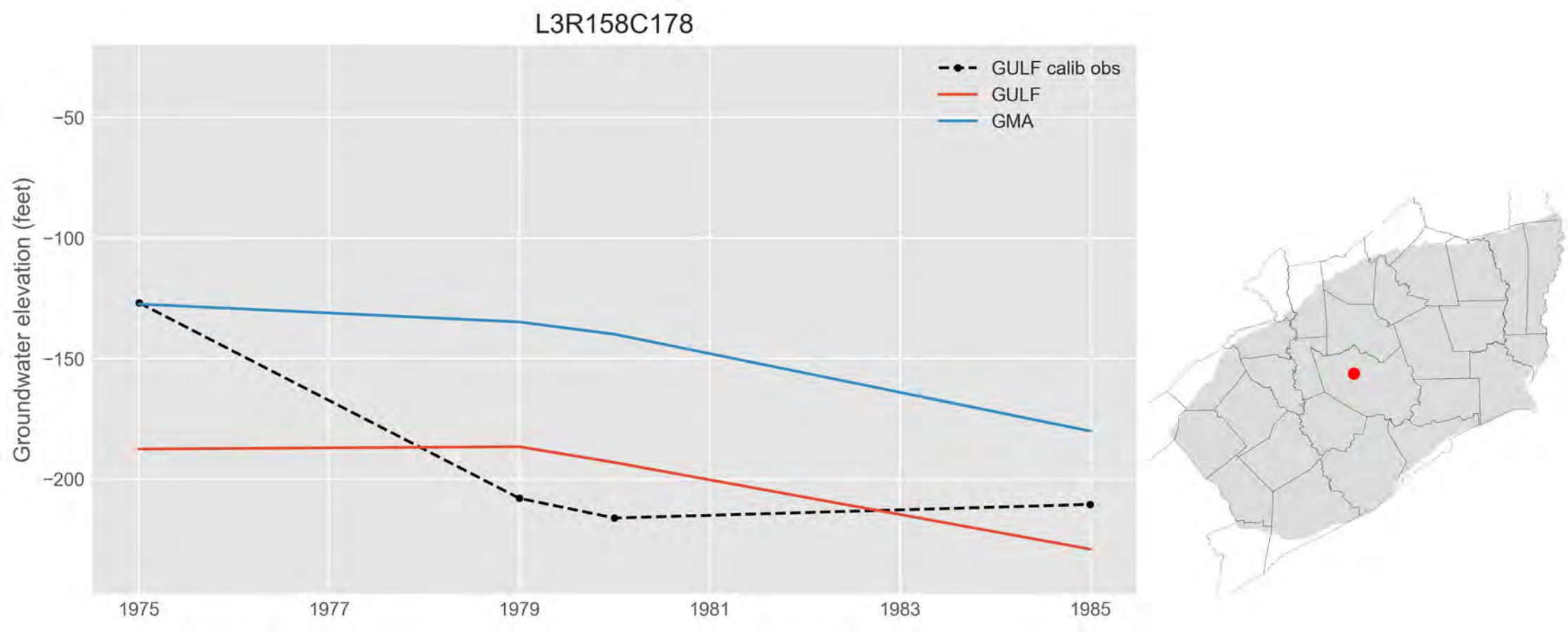

L3R156C106
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1977
1979
1981
1983
1985
1987
1989
GULF calib obs
GULF
GMA

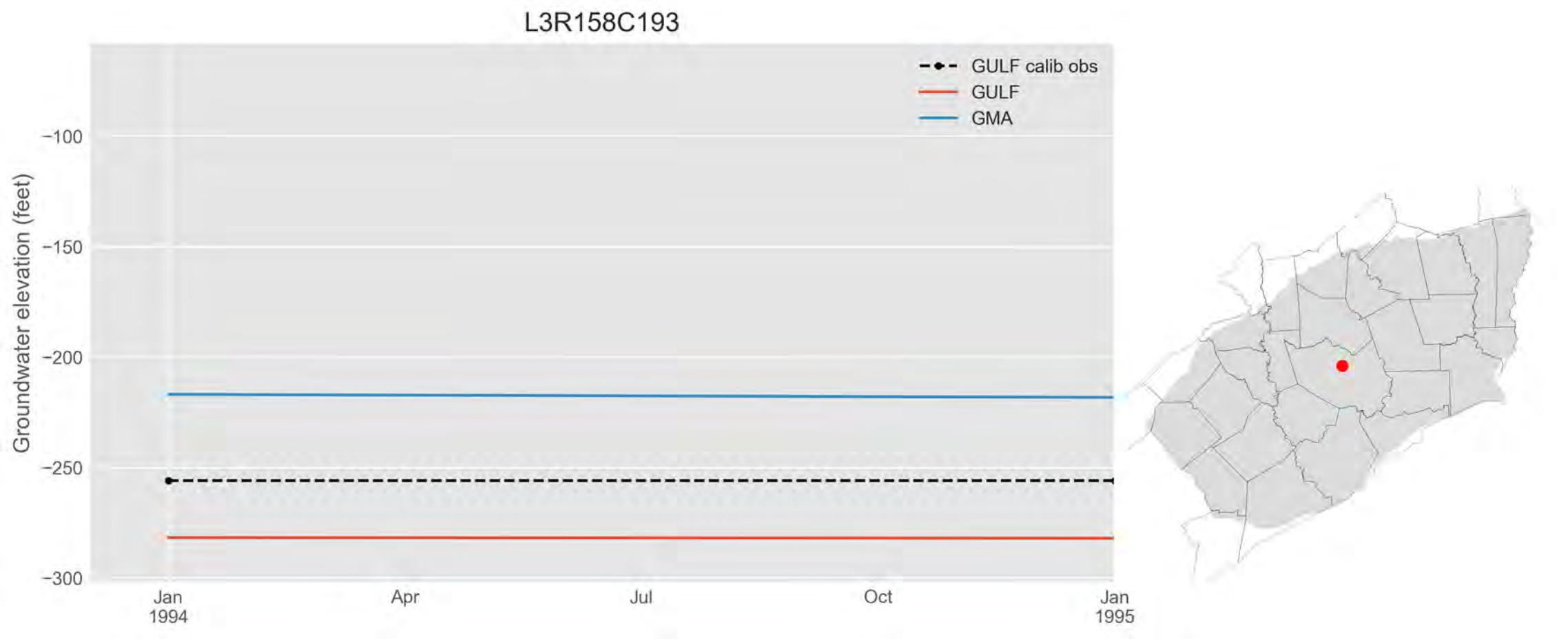

L3R156C191
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1995
1997
1999
2001
2003
2005
2007
2009


L3R157C083
Groundwater elevation (feet)
300
250
200
150
100
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

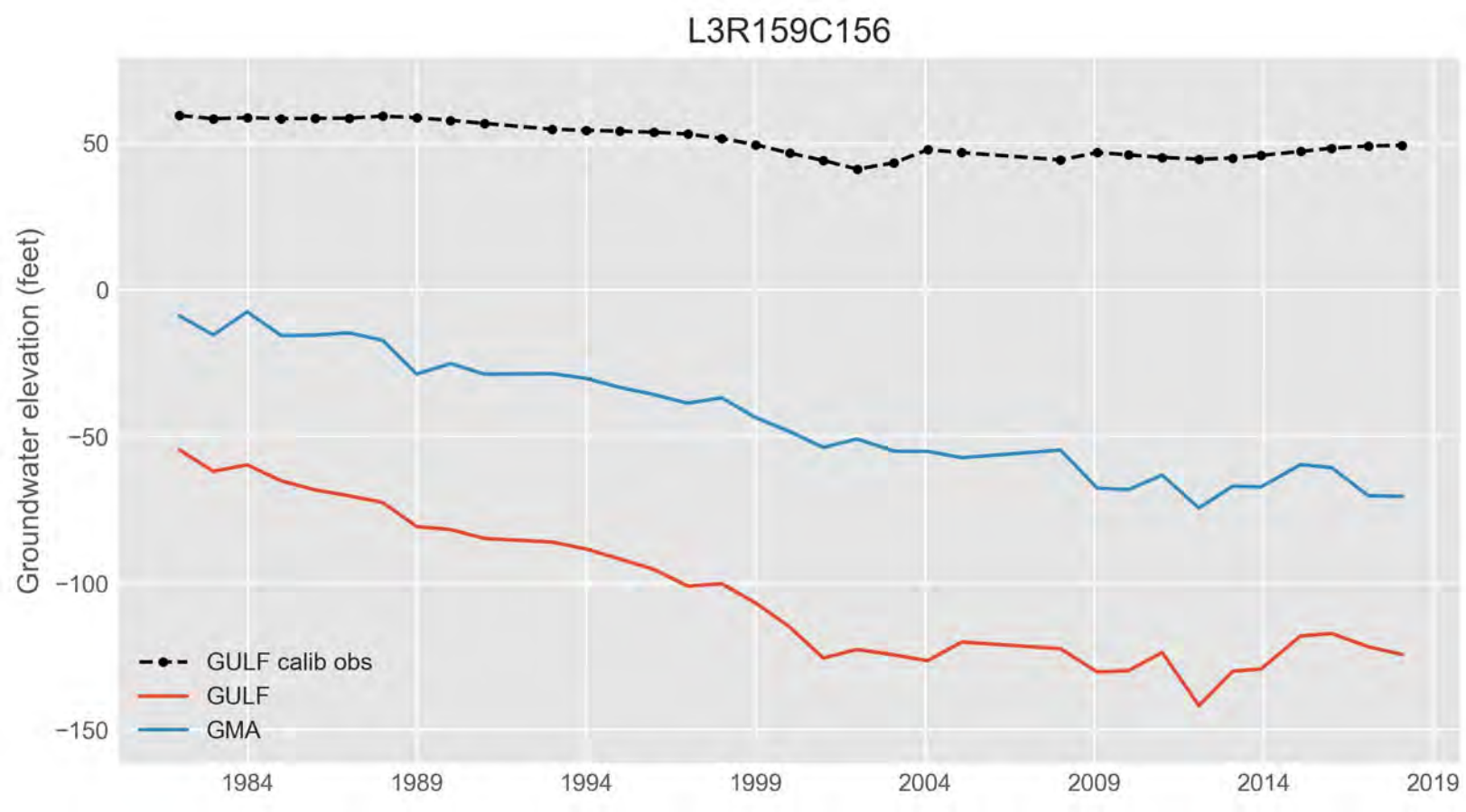

L3R157C109
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
20
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

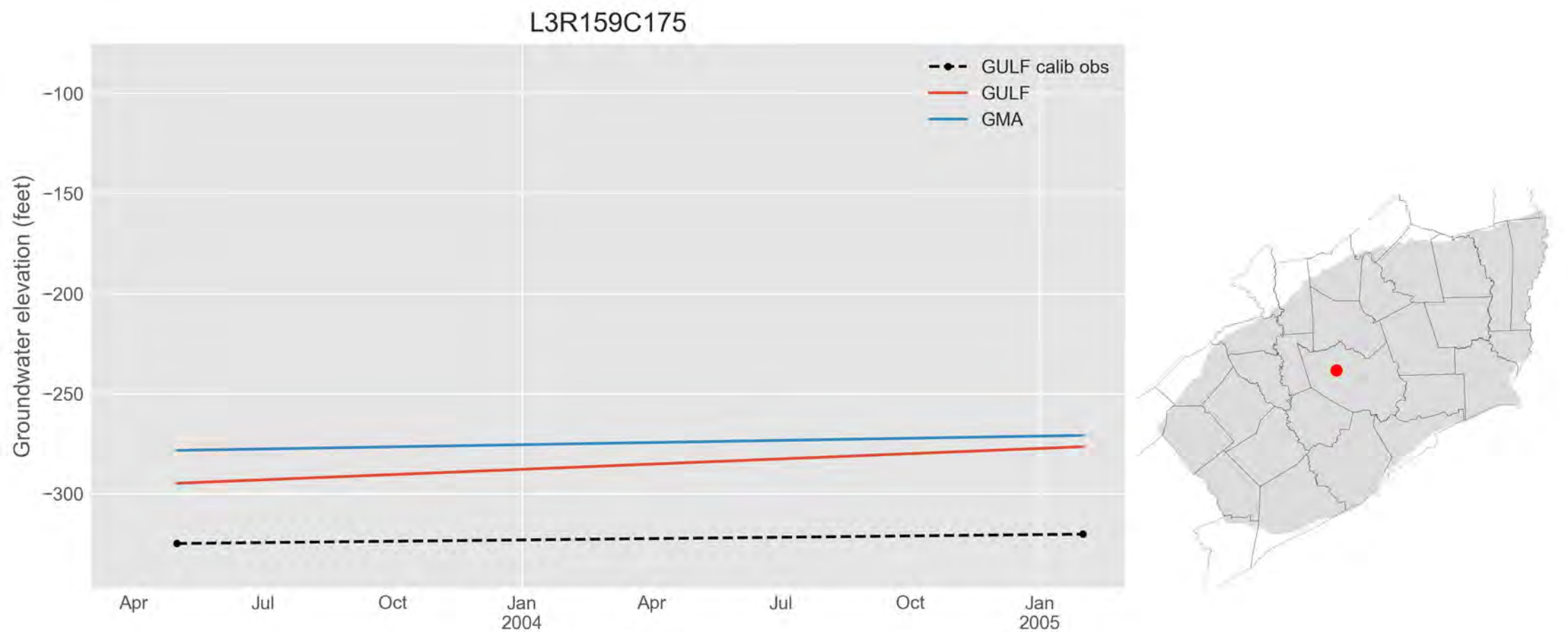

L3R157C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1973
1975
1977
1979
1981
1983
1985
1987
1989

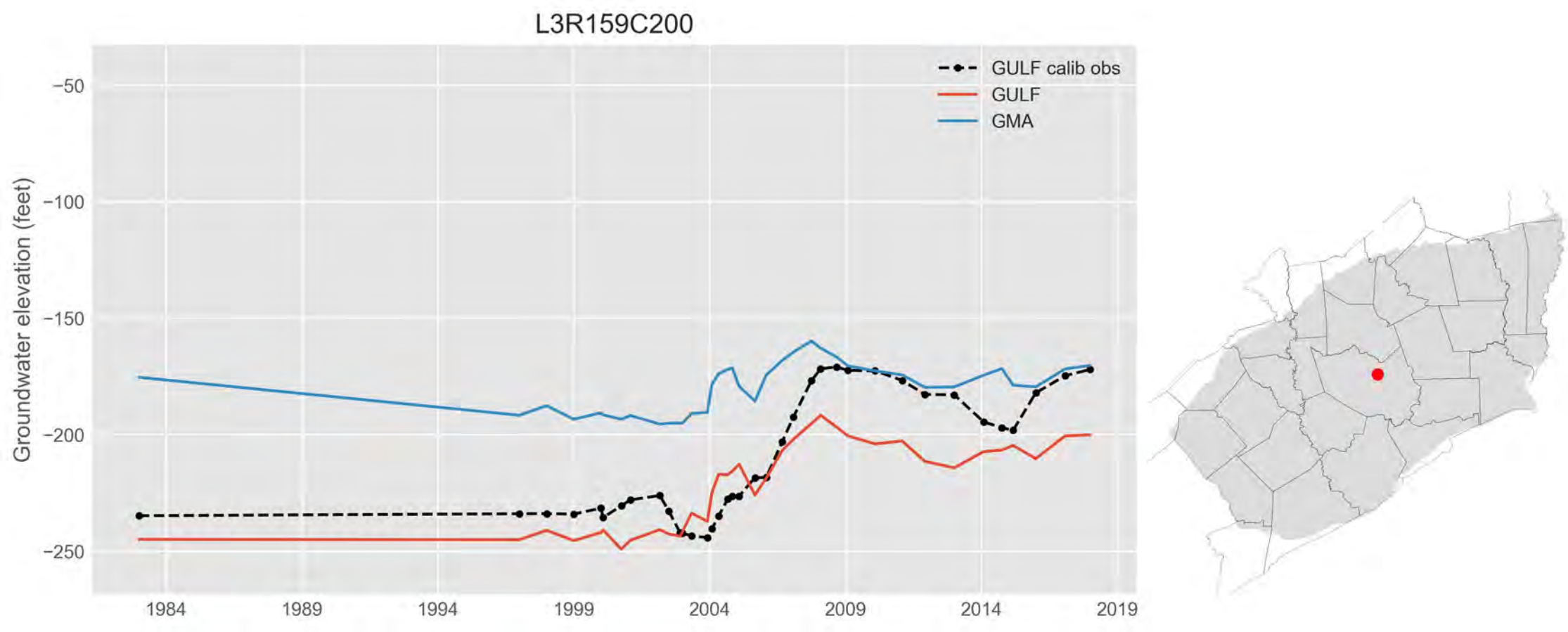

L3R158C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1975
1977
1979
1981
1983
1985

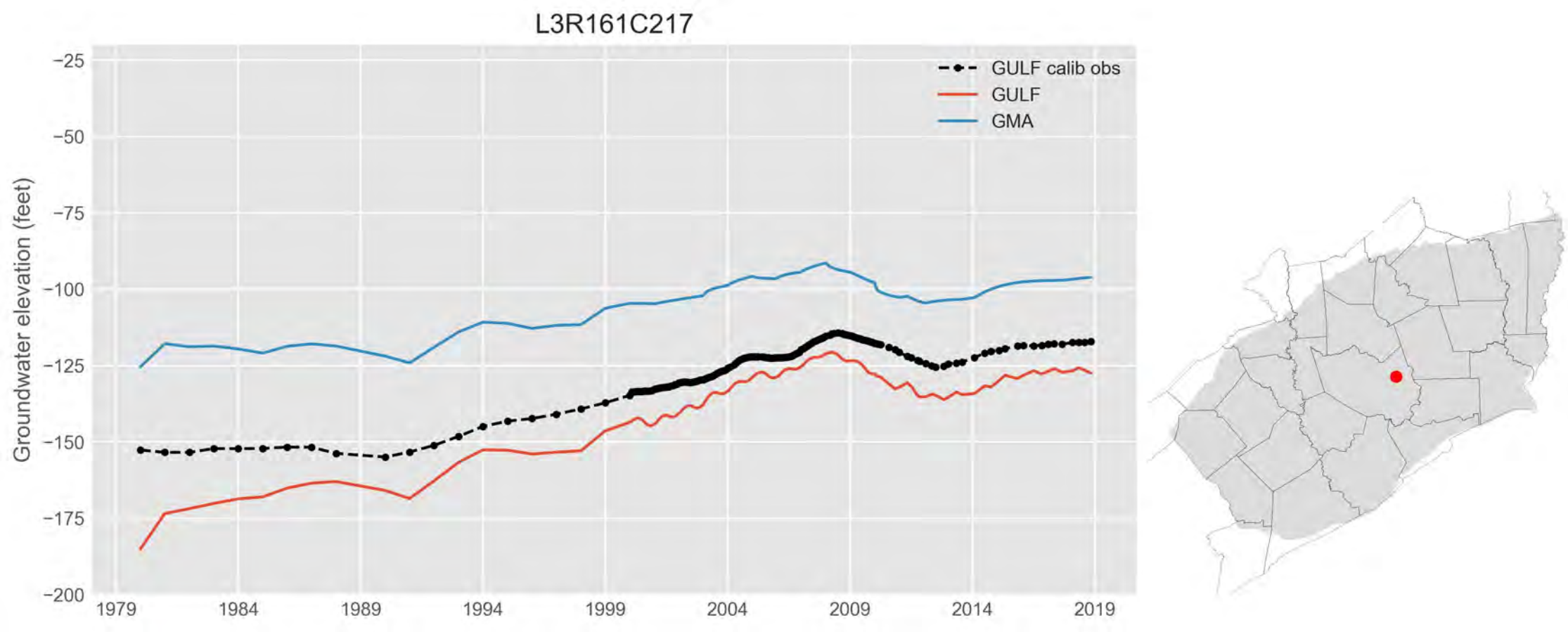

L3R158C193
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
Jan
1994
Apr
Jul
Oct
Jan
1995

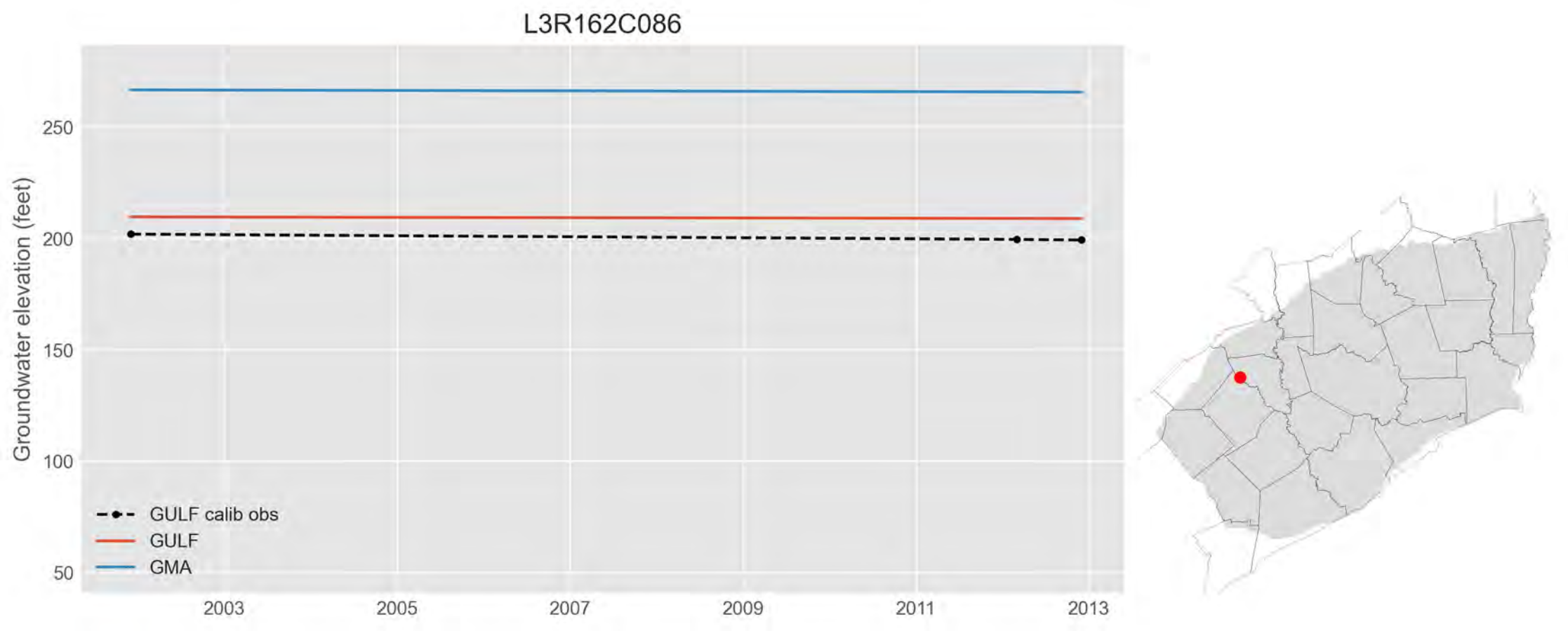
L3R159C156

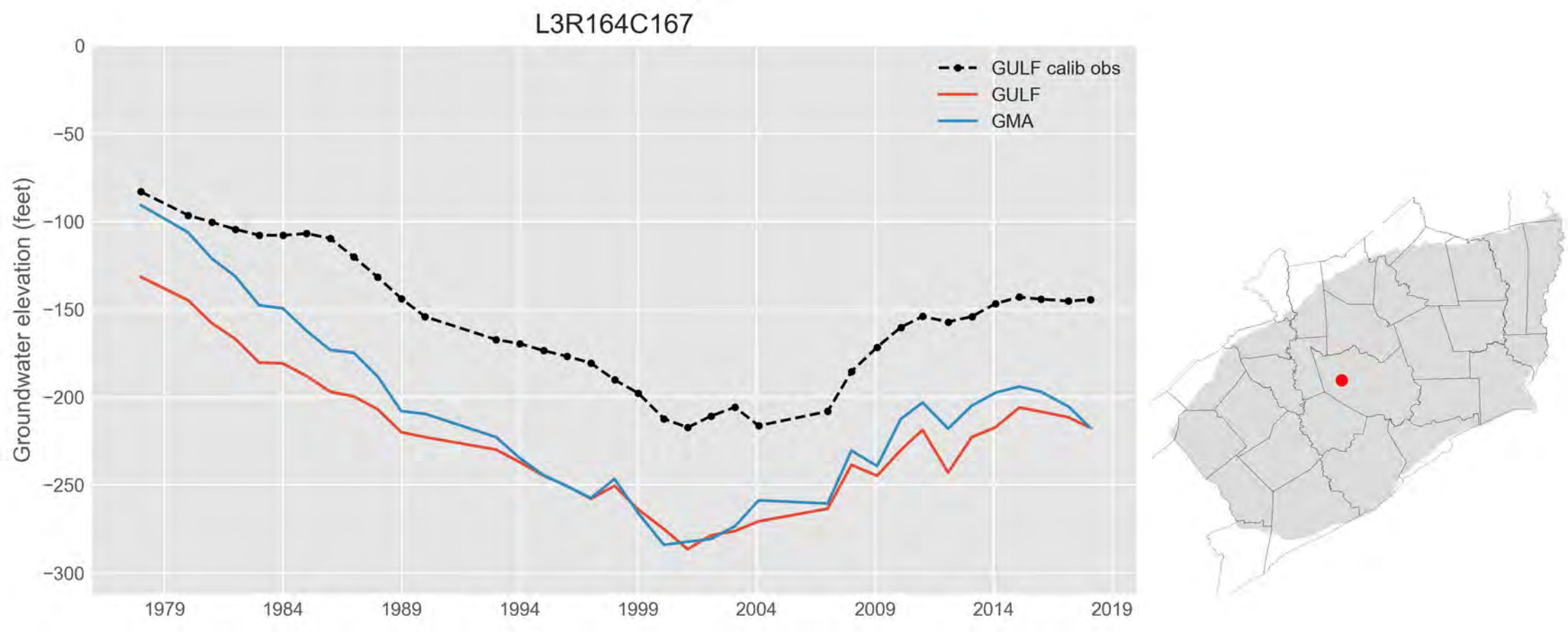

Groundwater elevation (feet)
50
0
−50
−100
−150
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

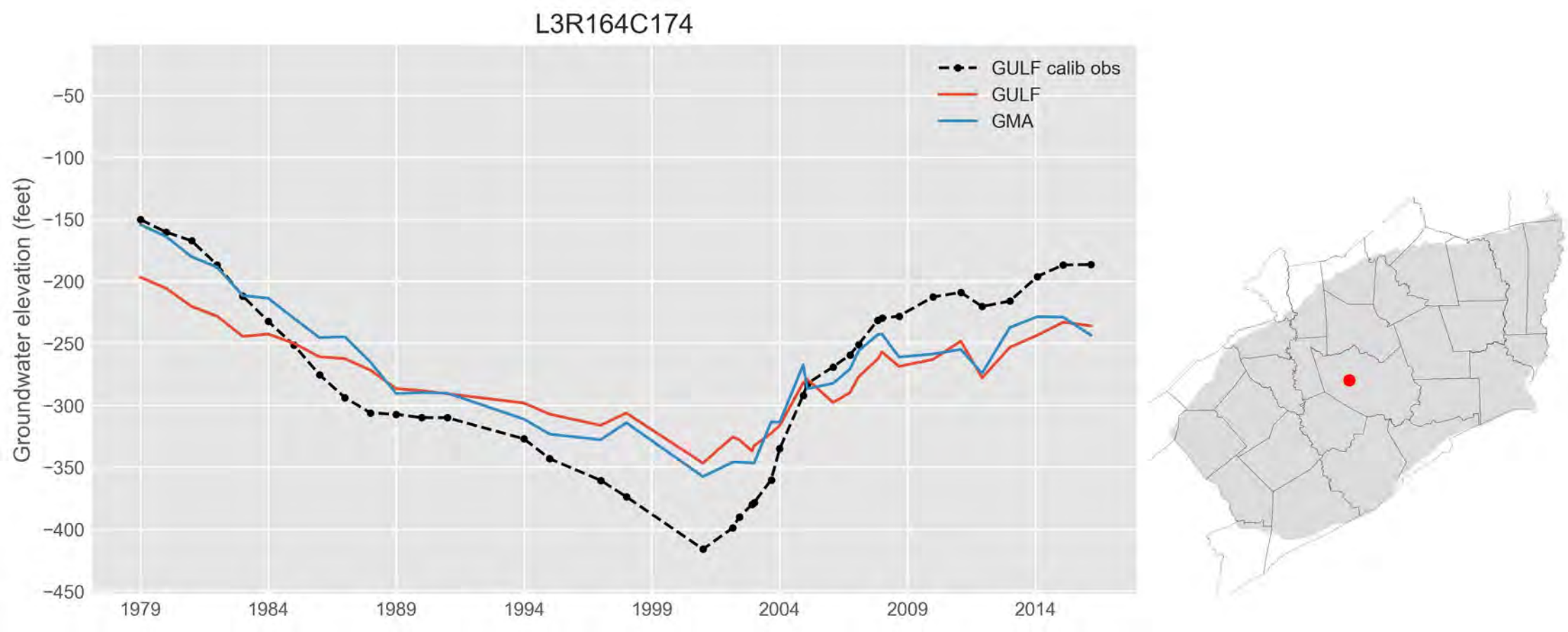

L3R159C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
Apr
Jul
Oct
Jan
2004
Apr
Jul
Oct
Jan
2005

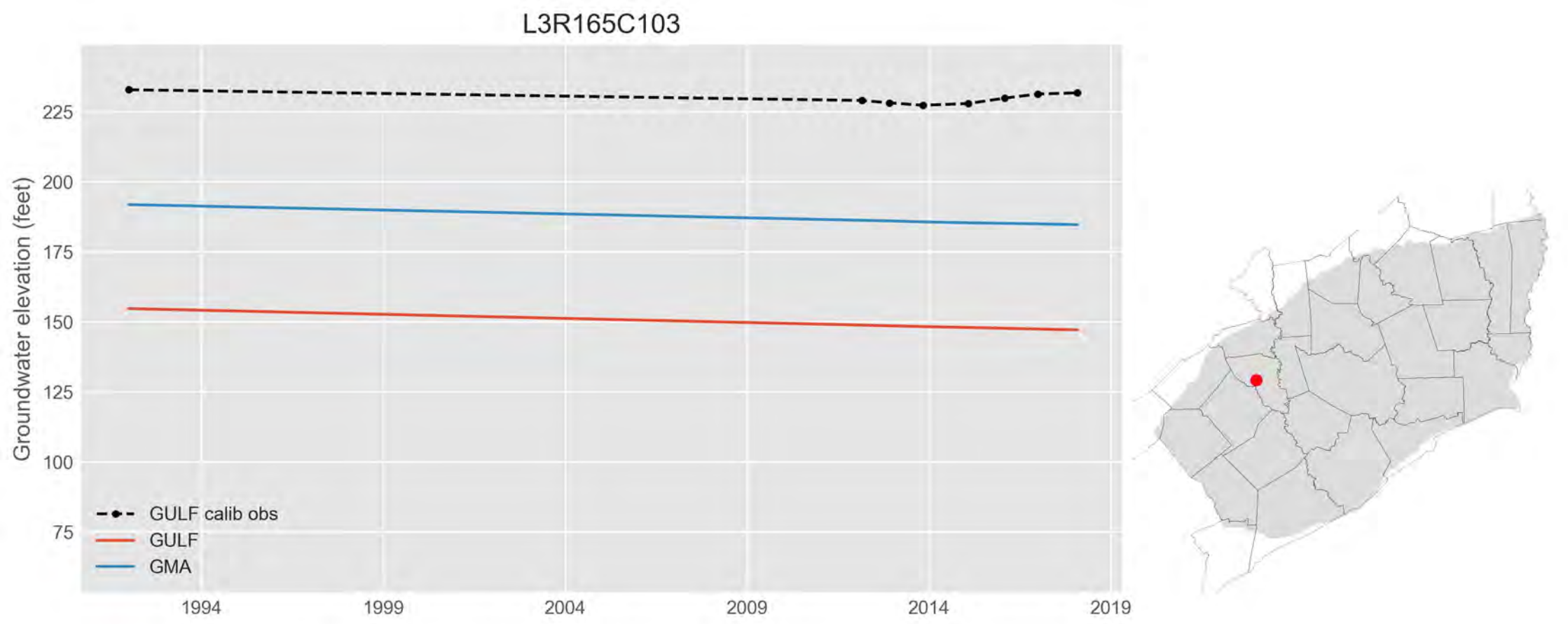

L3R159C200
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1984
1989
1994
1999
2004
2009
2014
2019

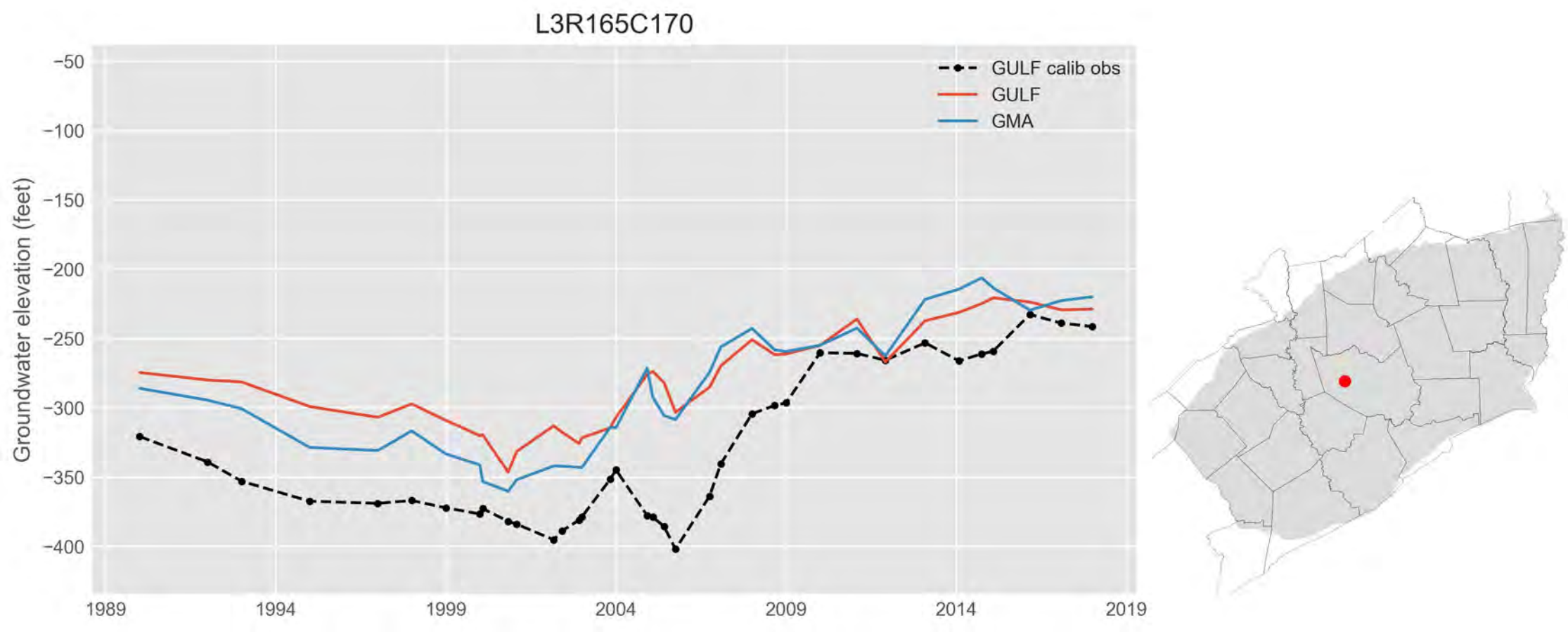

L3R161C217
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1979
1984
1989
1994
1999
2004
2009
2014
2019

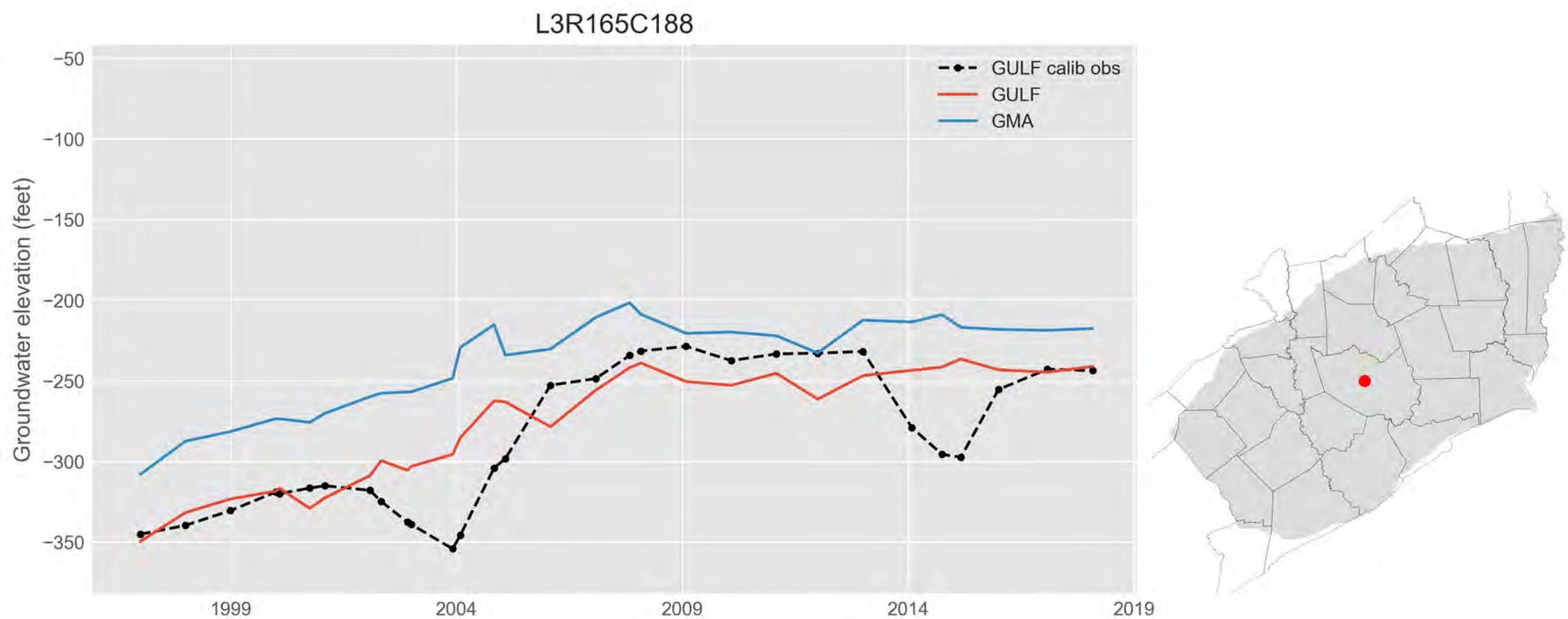

L3R162C086
Groundwater elevation (feet)
250
200
150
100
50
2003
2005
2007
2009
2011
2013
GULF calib obs
GULF
GMA

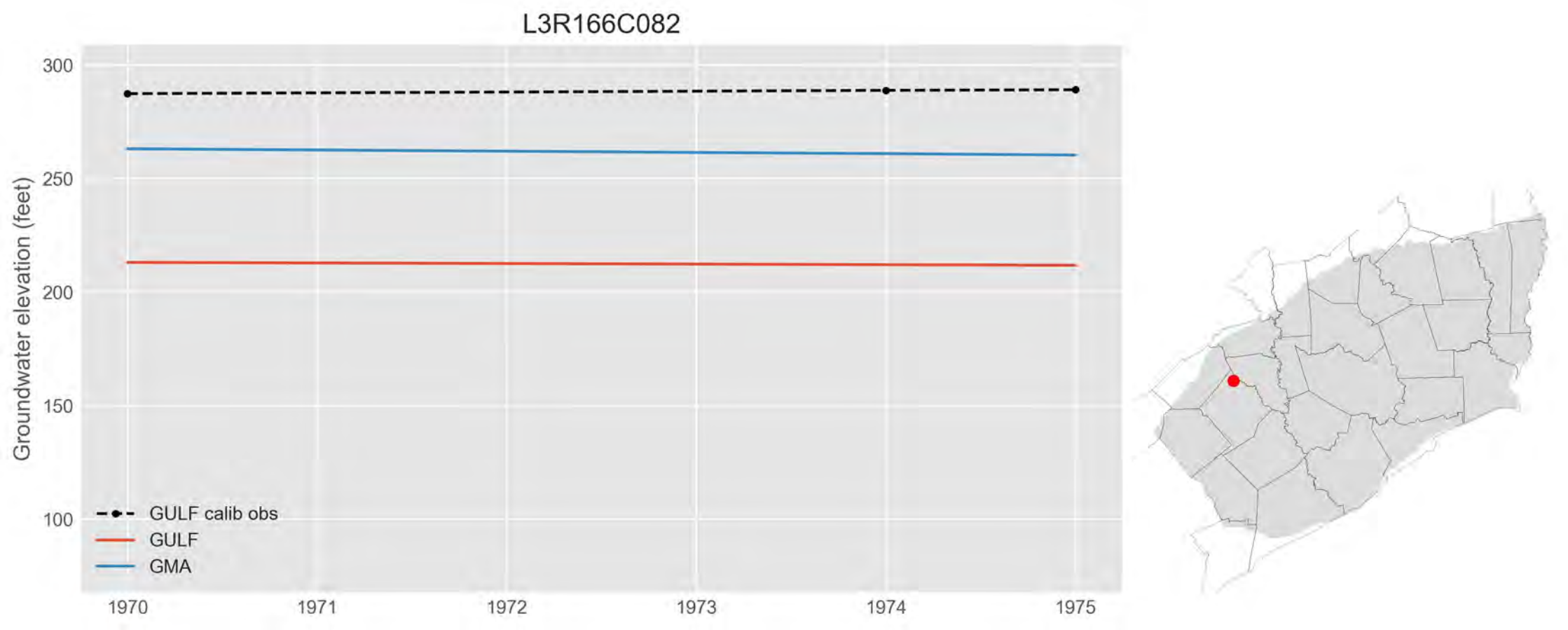

L3R164C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1979
1984
1989
1994
1999
2004
2009
2014
2019

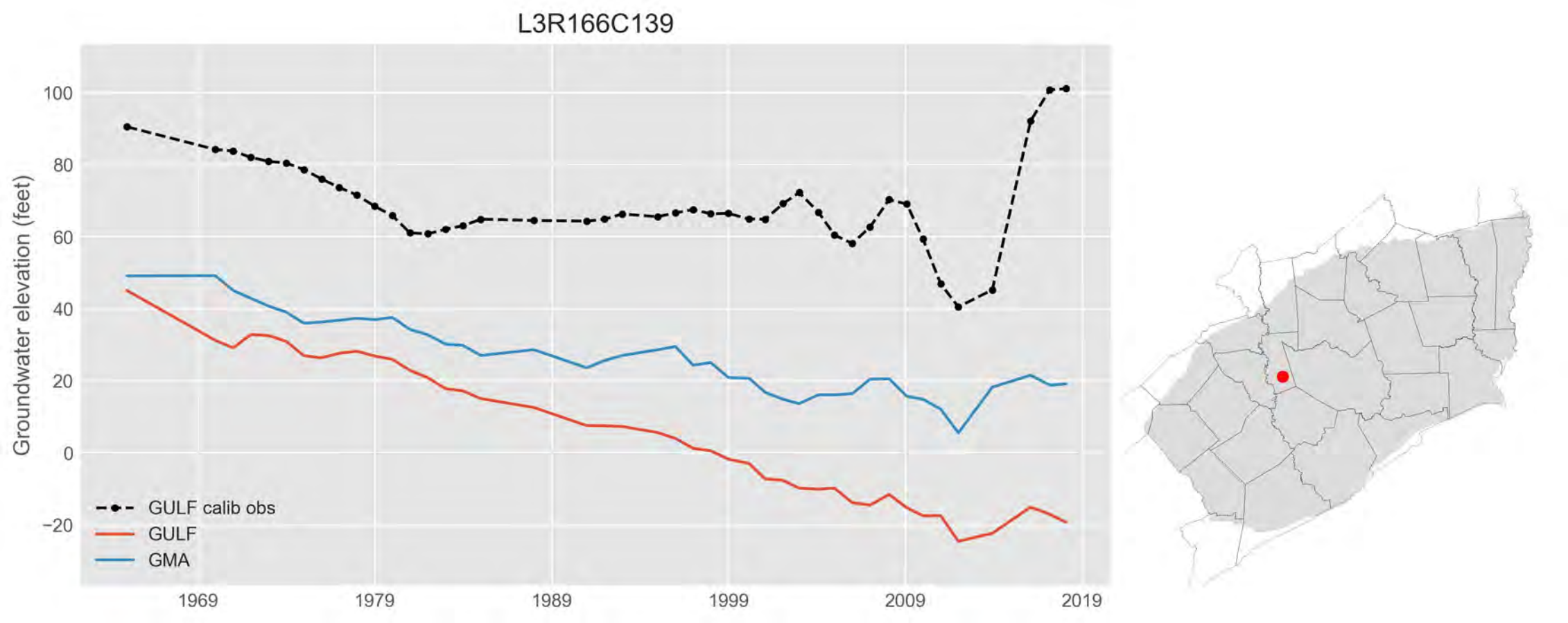

L3R164C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
−450
1979
1984
1989
1994
1999
2004
2009
2014

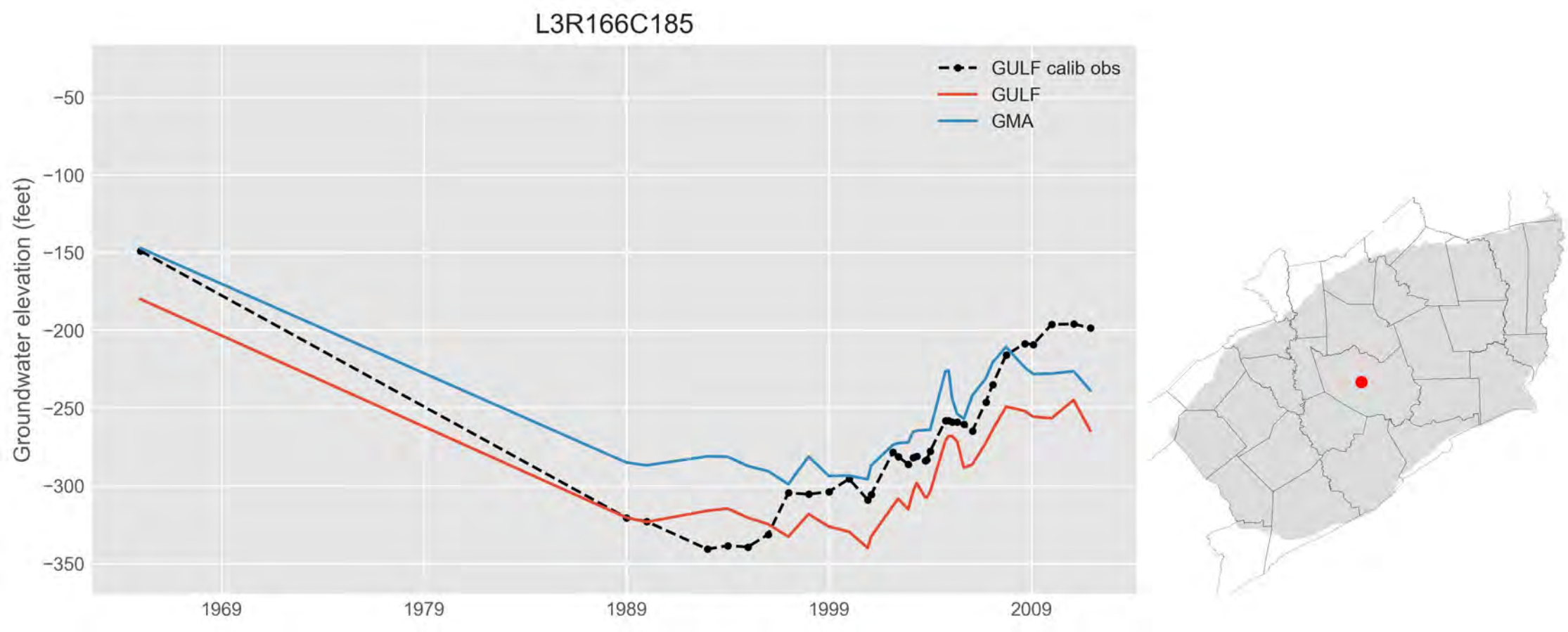

L3R165C103
Groundwater elevation (feet)
225
200
175
150
125
100
75
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

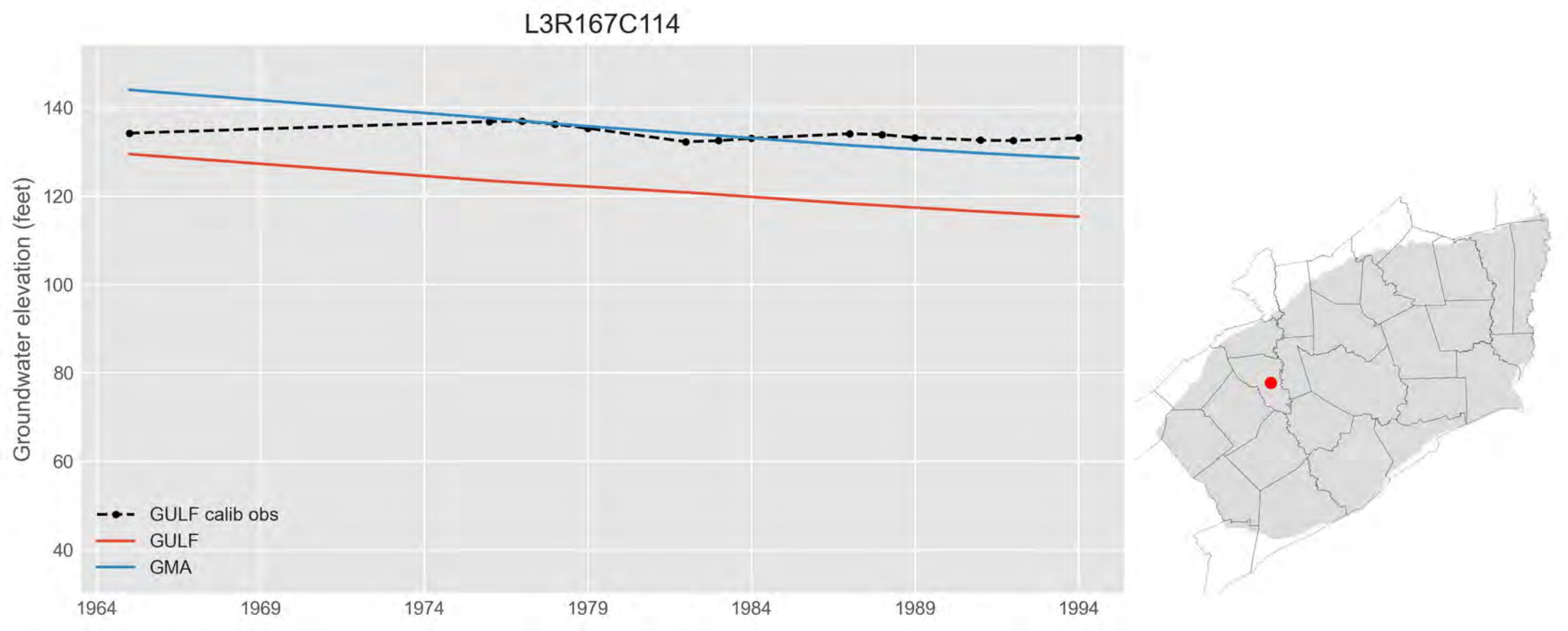

L3R165C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1989
1994
1999
2004
2009
2014
2019

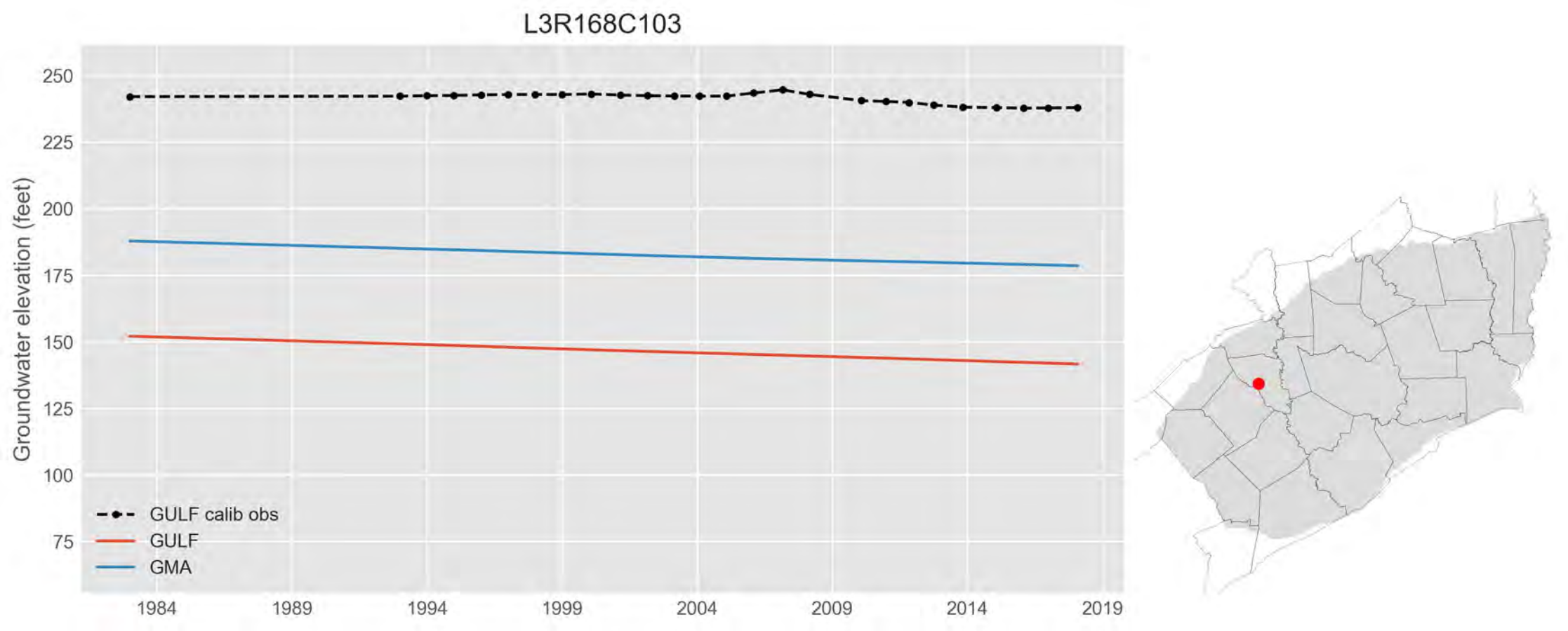

L3R165C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1999
2004
2009
2014
2019

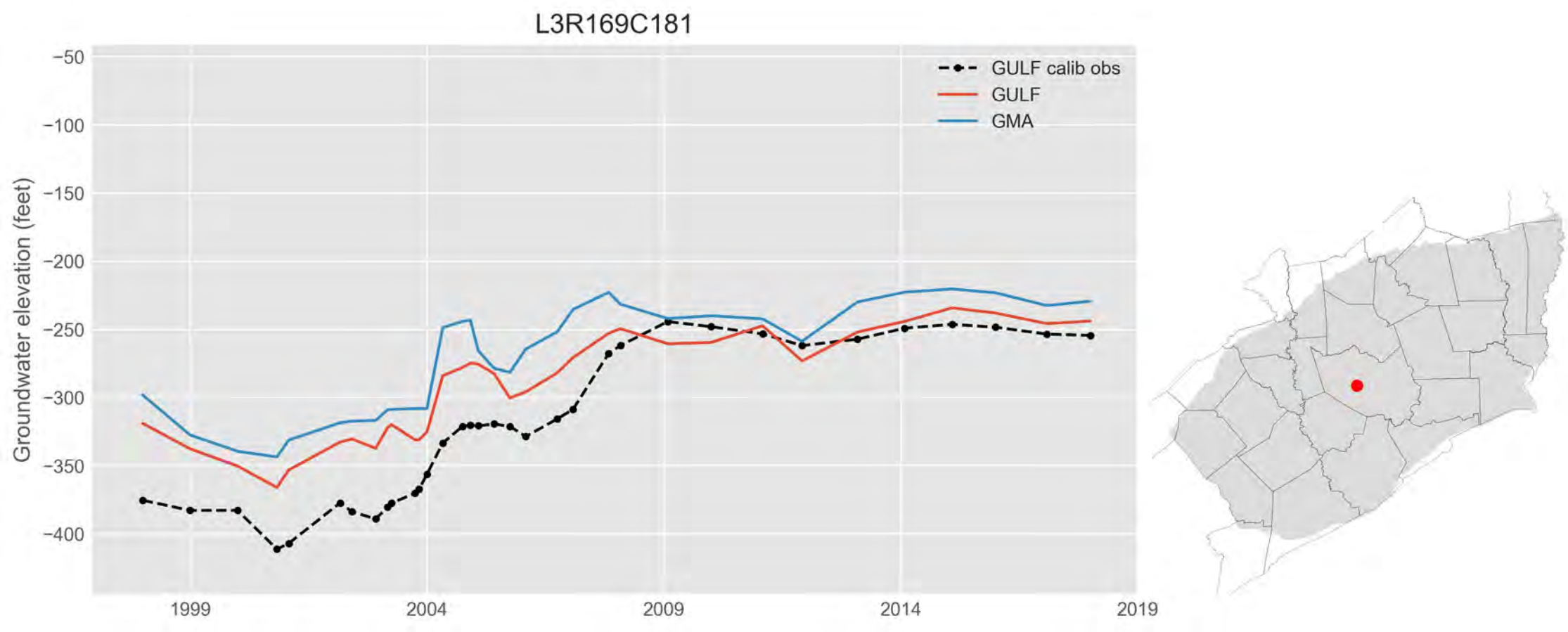

L3R166C082
Groundwater elevation (feet)
300
250
200
150
100
1970
1971
1972
1973
1974
1975
GULF calib obs
GULF
GMA

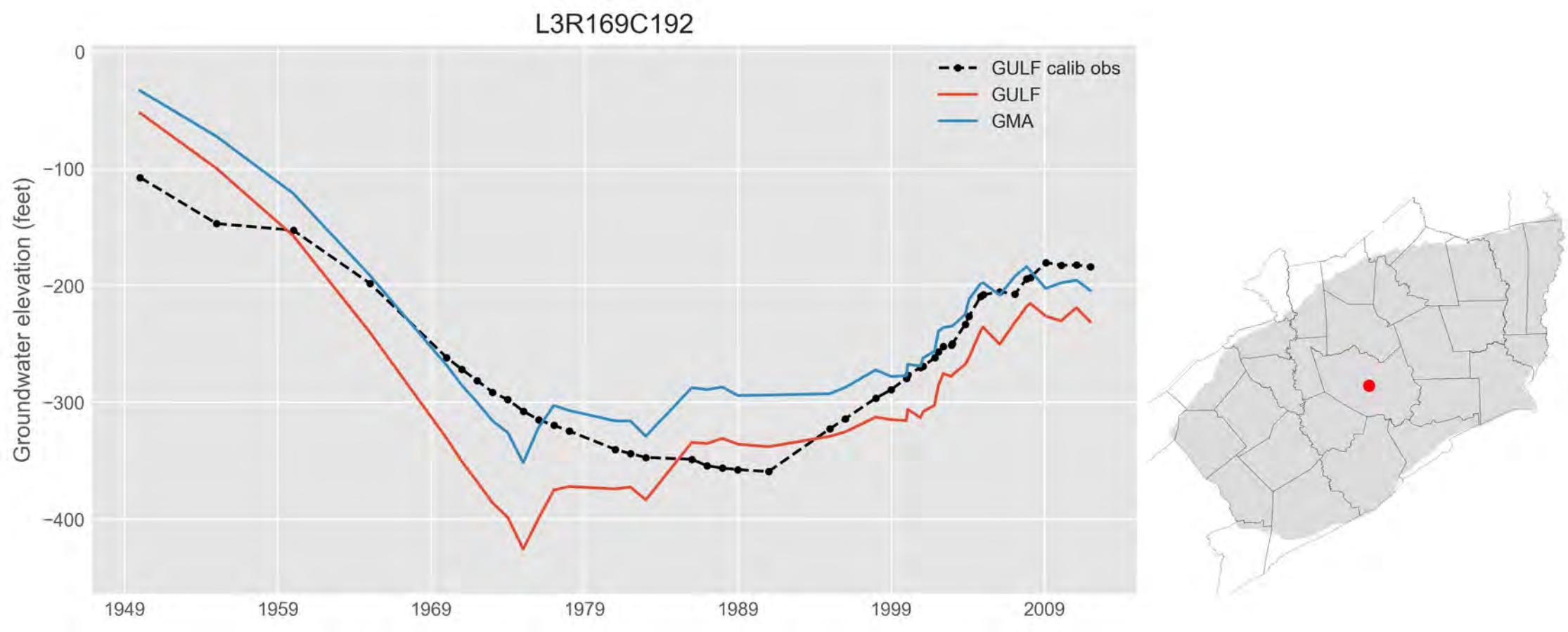

L3R166C139
Groundwater elevation (feet)
100
80
60
40
20
0
−20
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

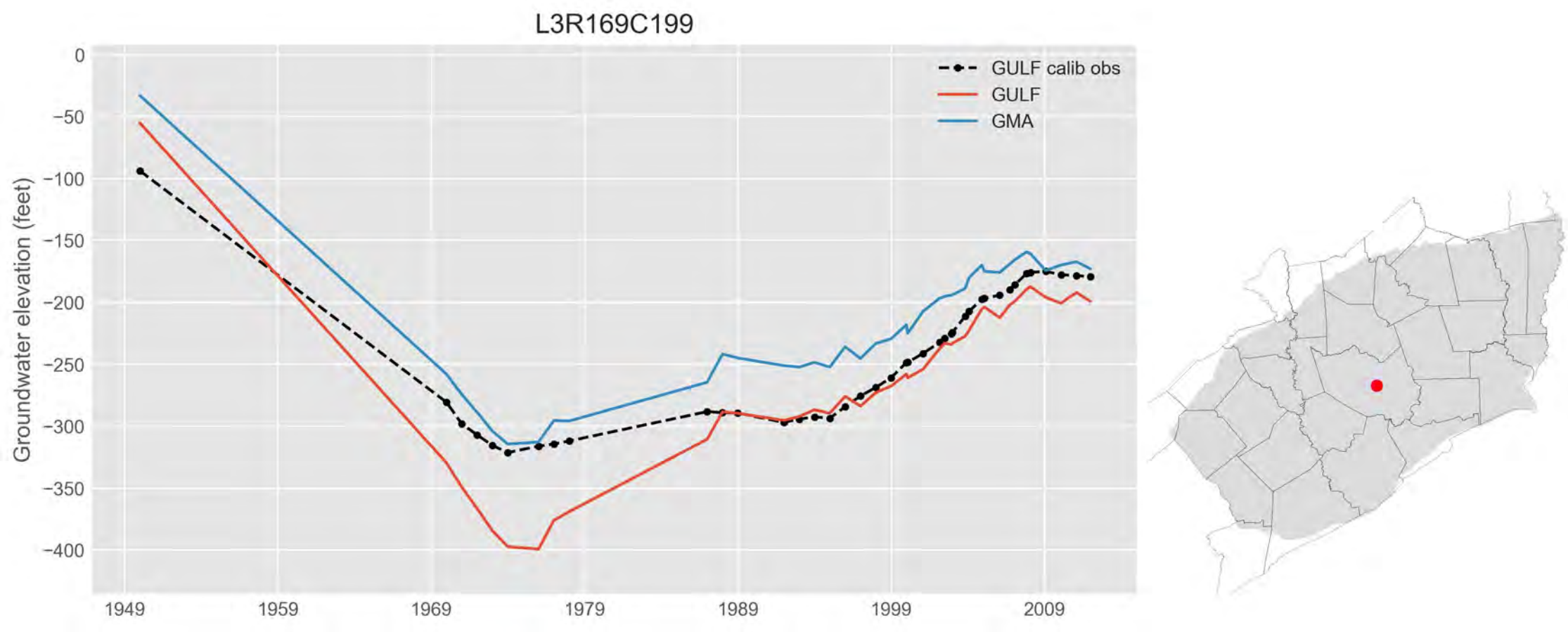

L3R166C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1969
1979
1989
1999
2009

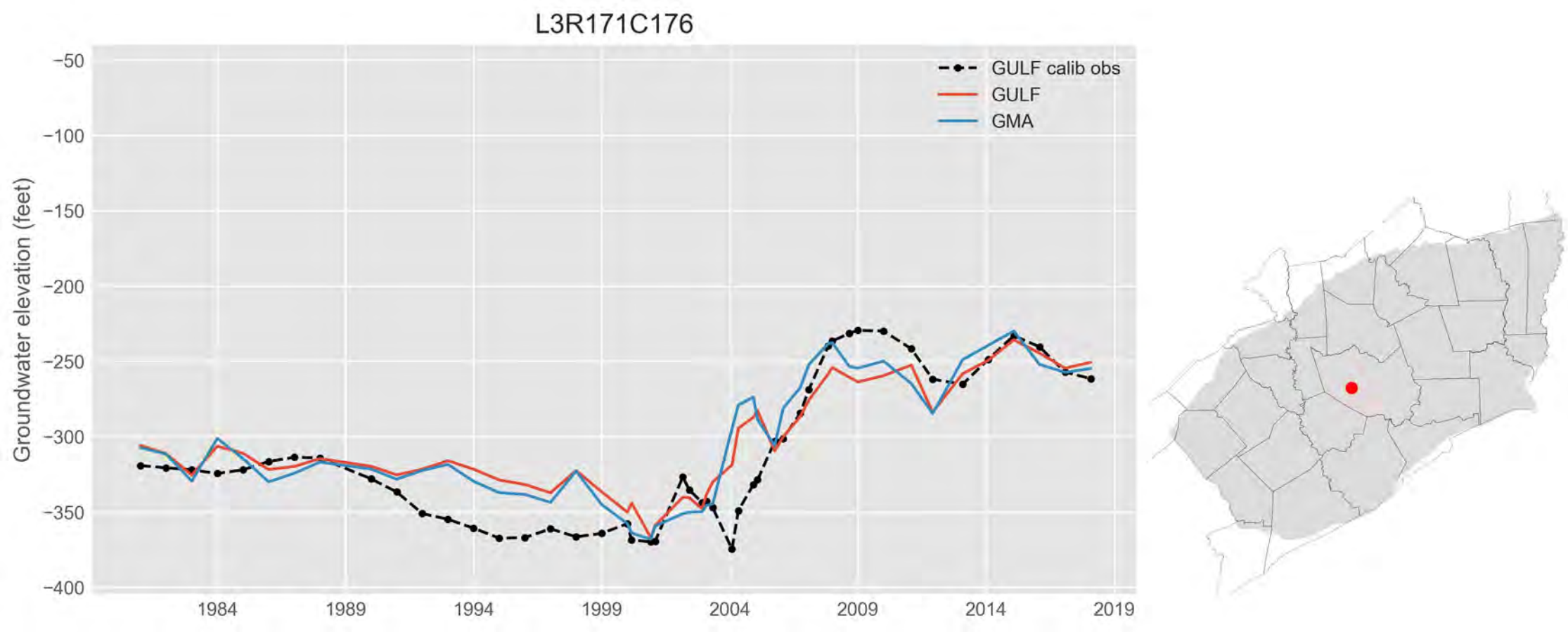

L3R167C114
Groundwater elevation (feet)
140
120
100
80
60
40
1964
1969
1974
1979
1984
1989
1994
GULF calib obs
GULF
GMA

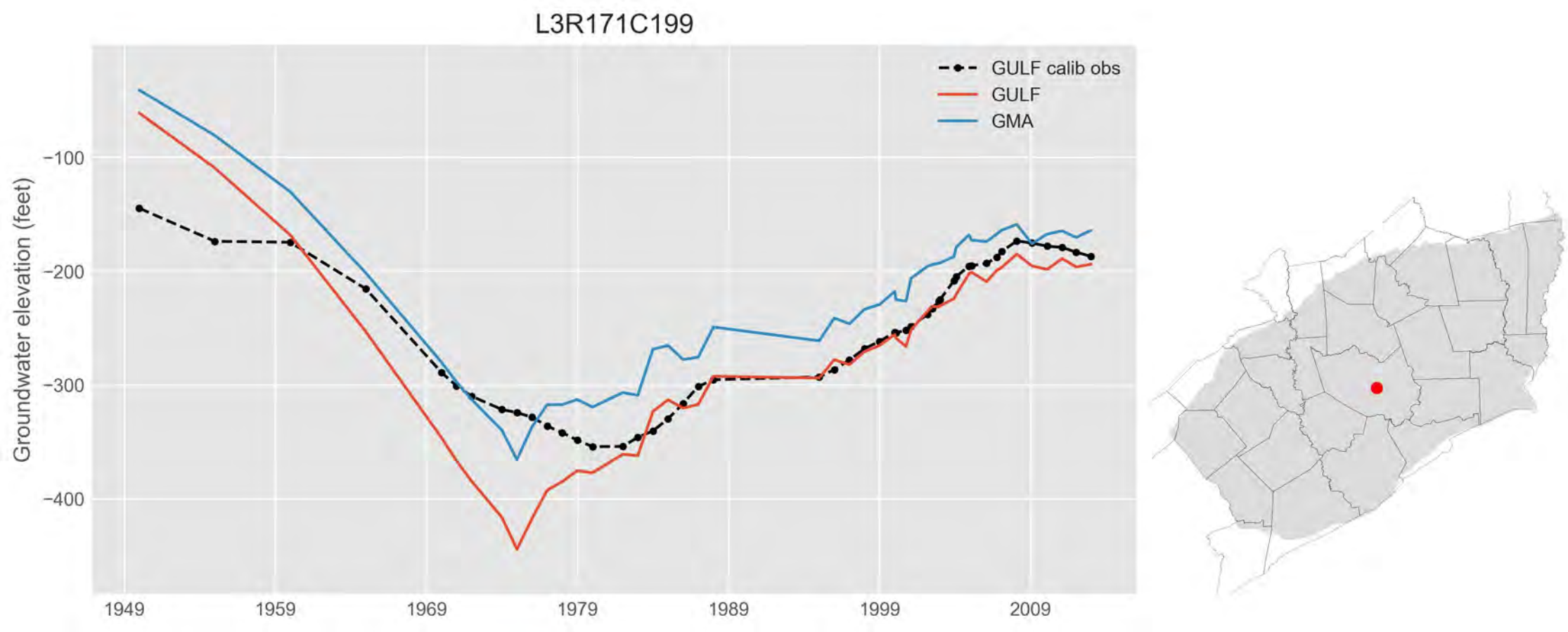

L3R168C103
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

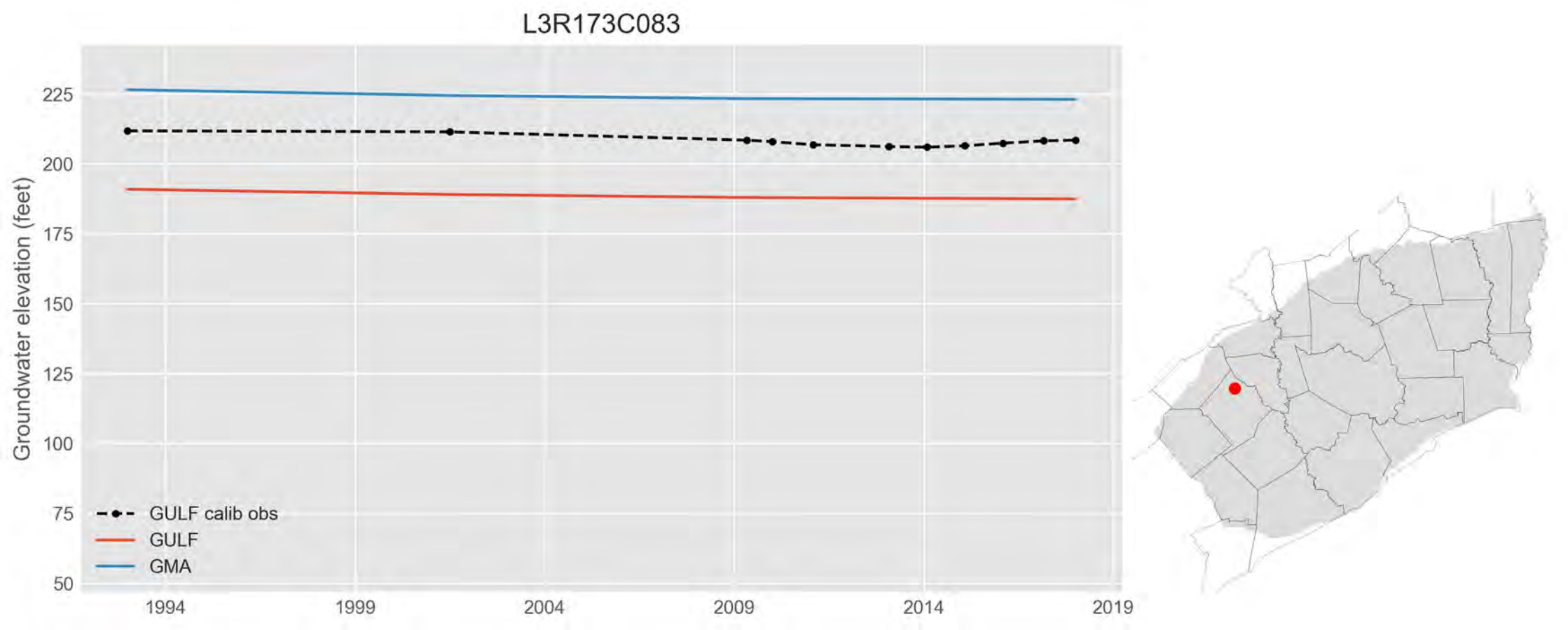

L3R169C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1999
2004
2009
2014
2019


L3R169C192
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−100
−200
−300
−400
1949
1959
1969
1979
1989
1999
2009

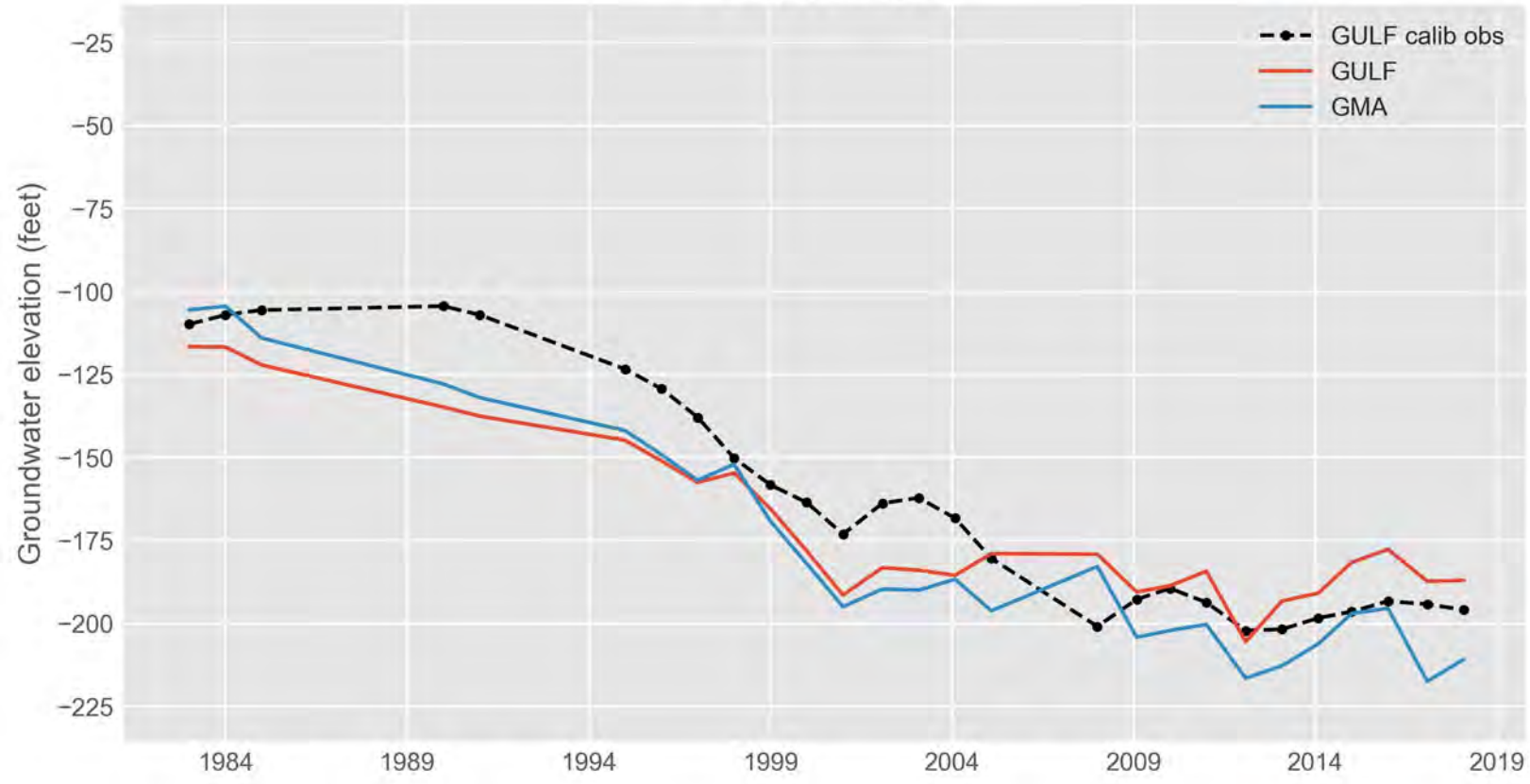

L3R169C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
−350
−400
1949
1959
1969
1979
1989
1999
2009

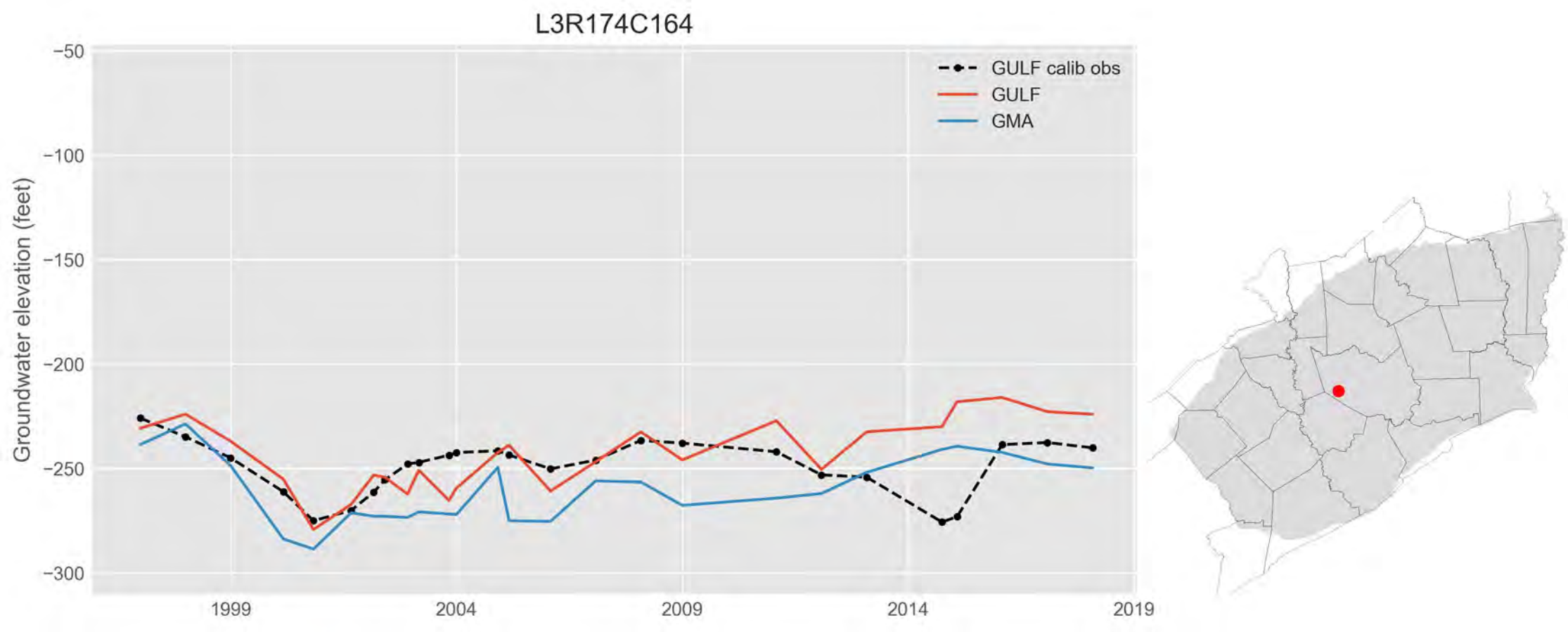

L3R171C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1984
1989
1994
1999
2004
2009
2014
2019

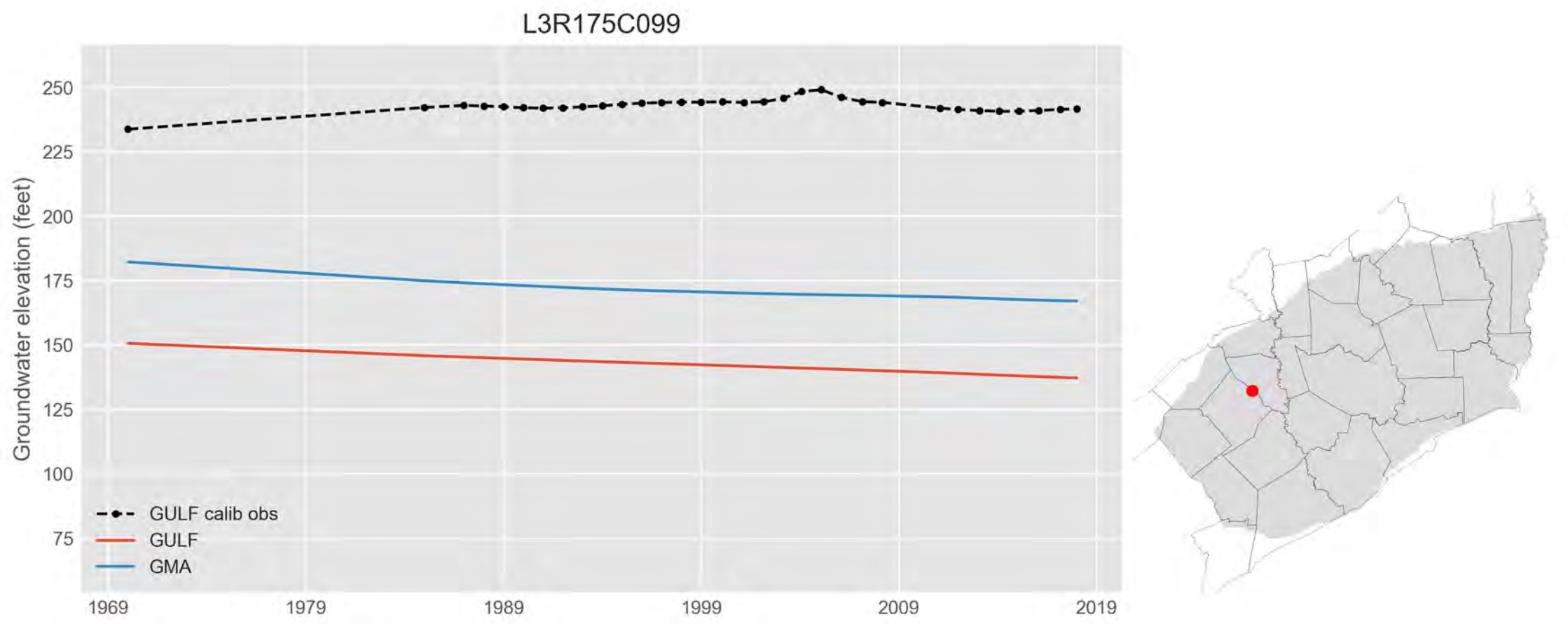

L3R171C199
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−200
−300
−400
1949
1959
1969
1979
1989
1999
2009

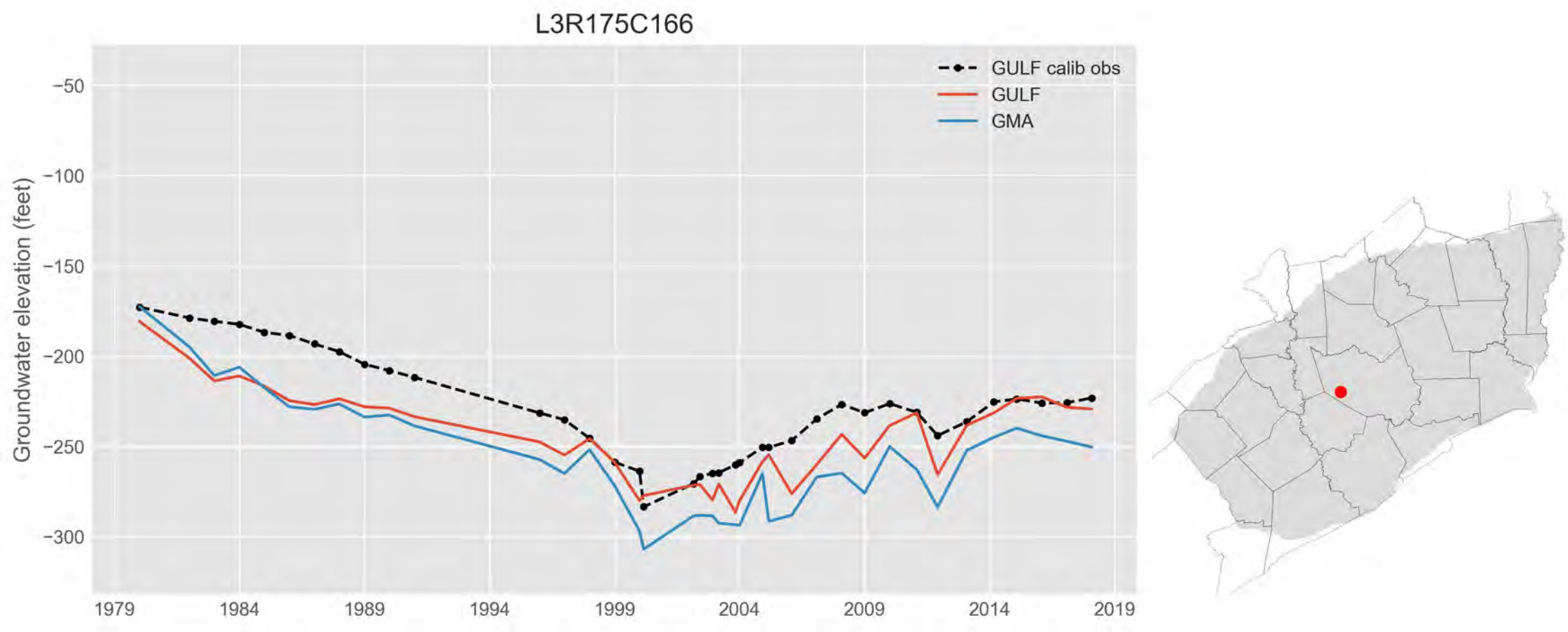

L3R173C083
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

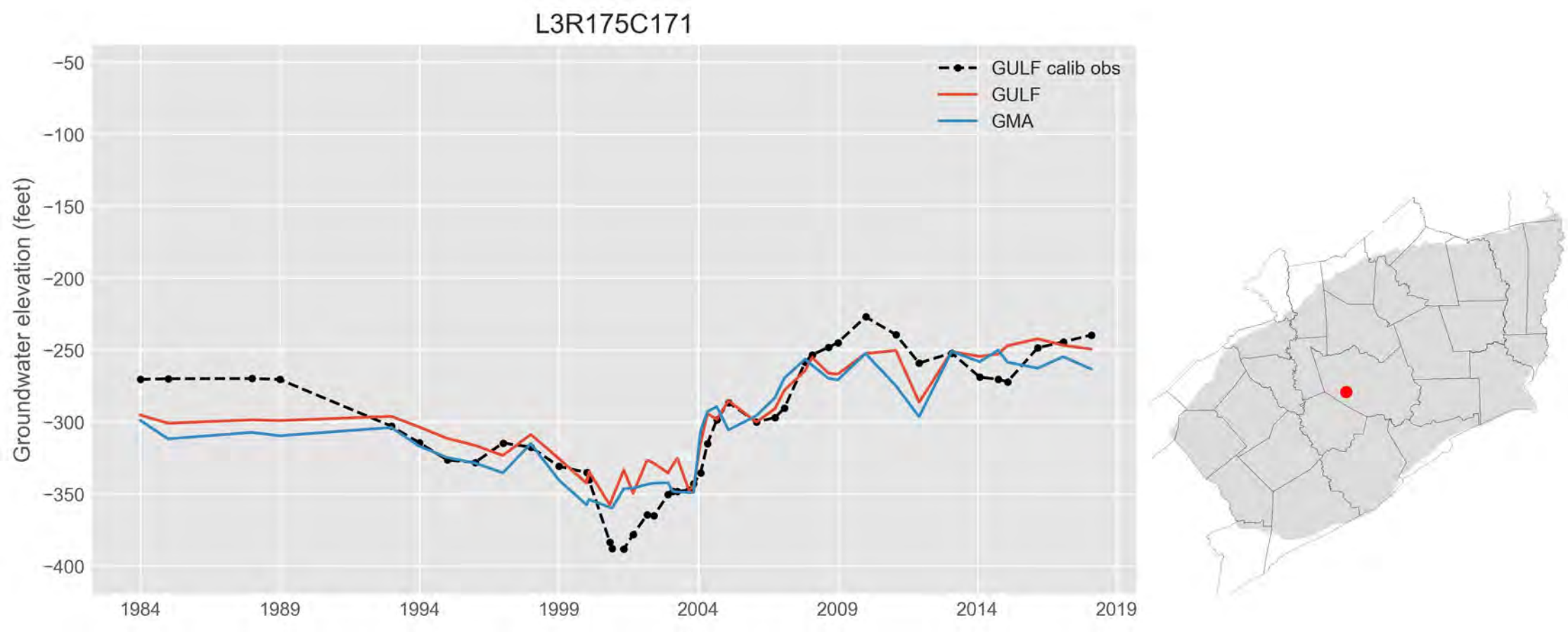
L3R174C158

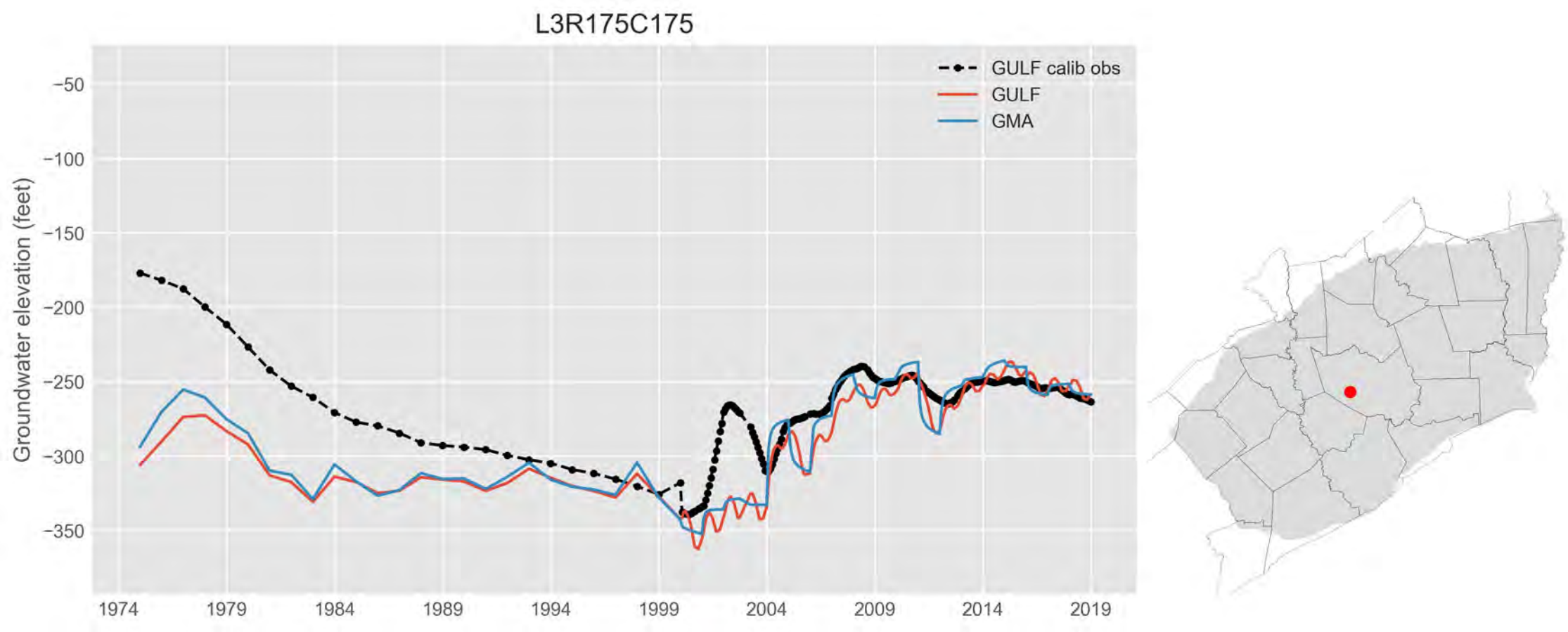

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
−225
1984
1989
1994
1999
2004
2009
2014
2019

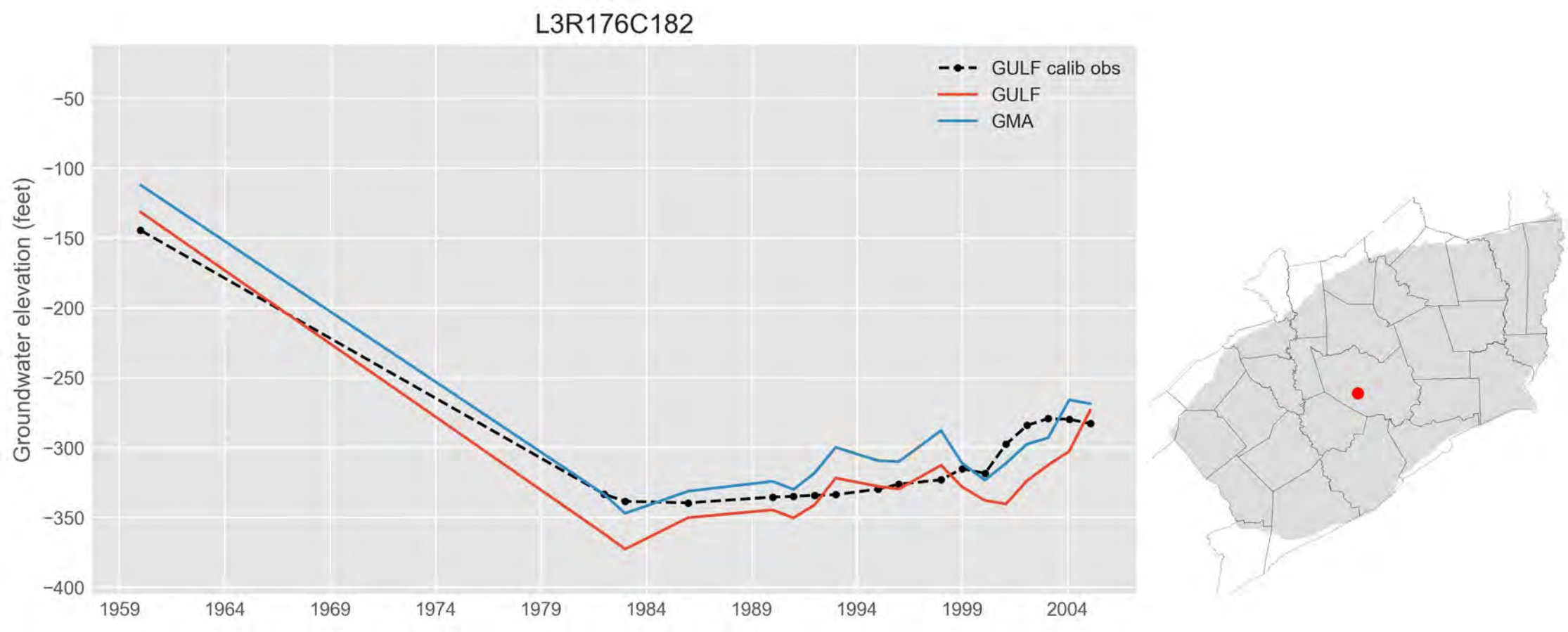

L3R174C164
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1999
2004
2009
2014
2019

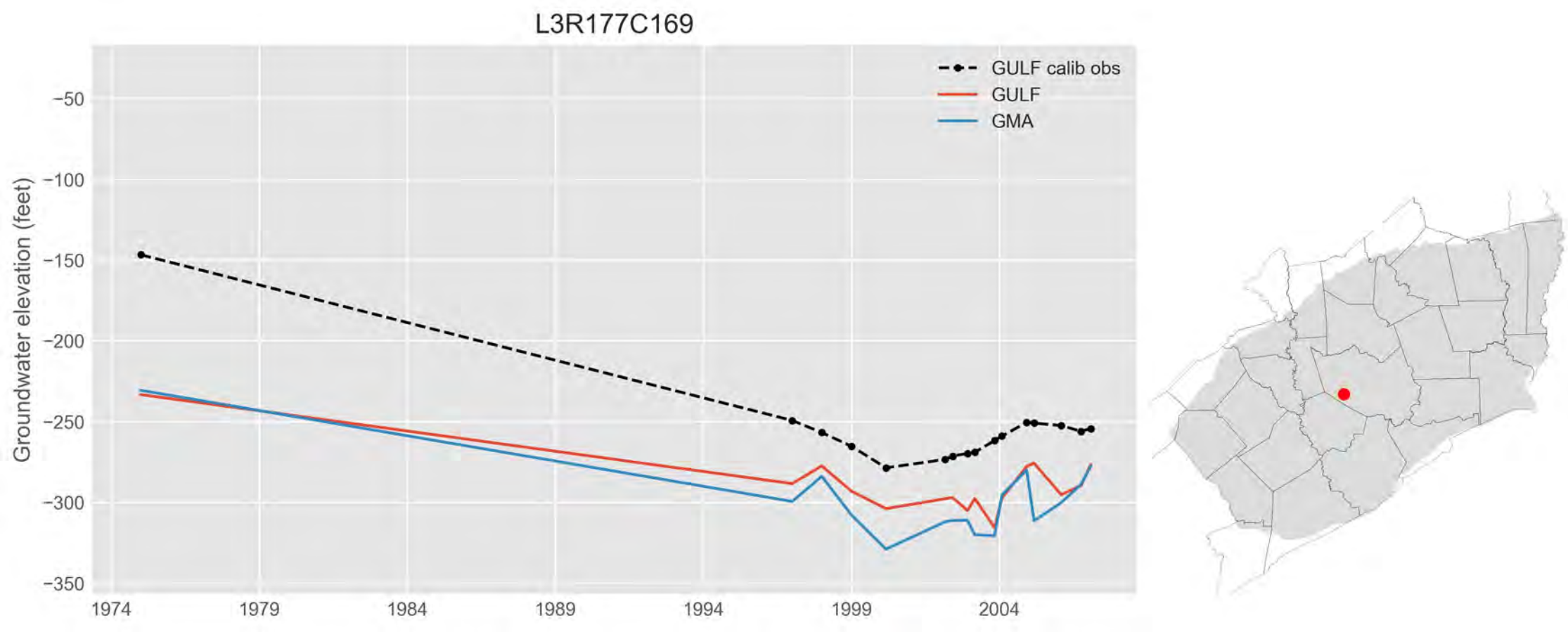

L3R175C099
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

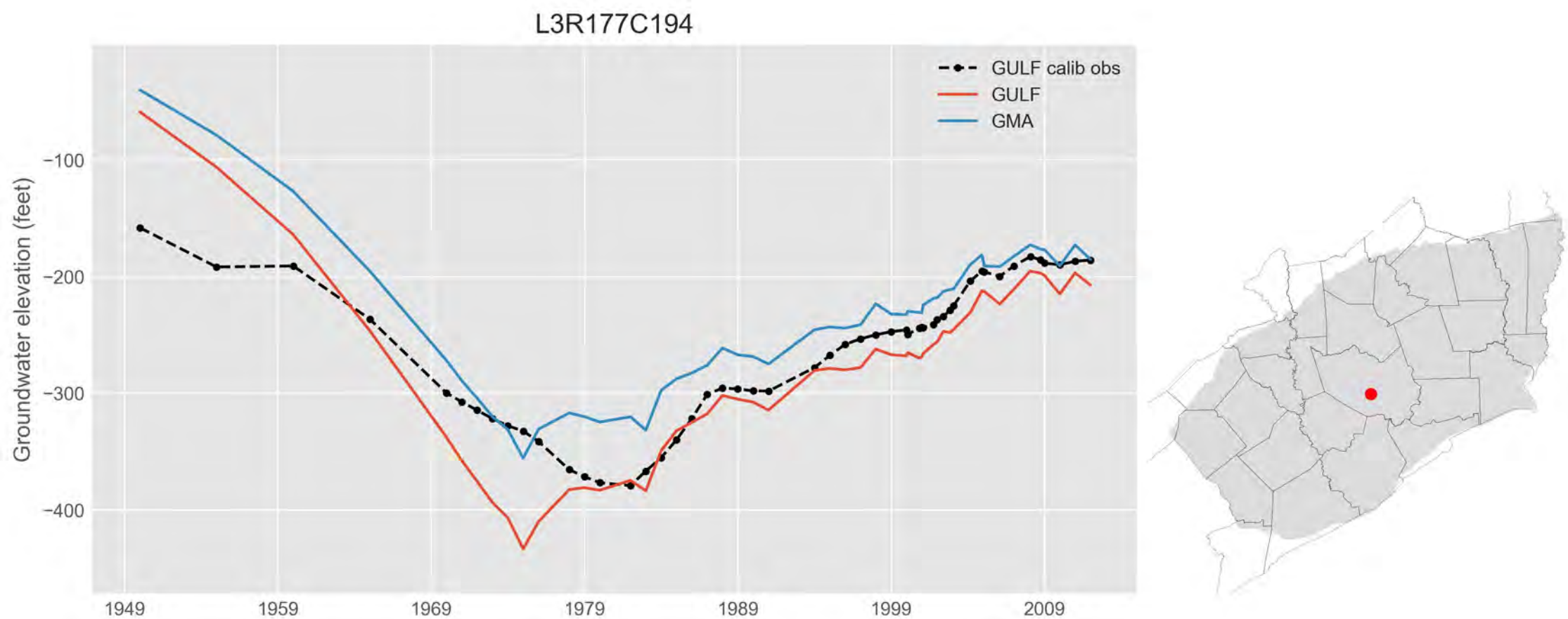

L3R175C166
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1979
1984
1989
1994
1999
2004
2009
2014
2019

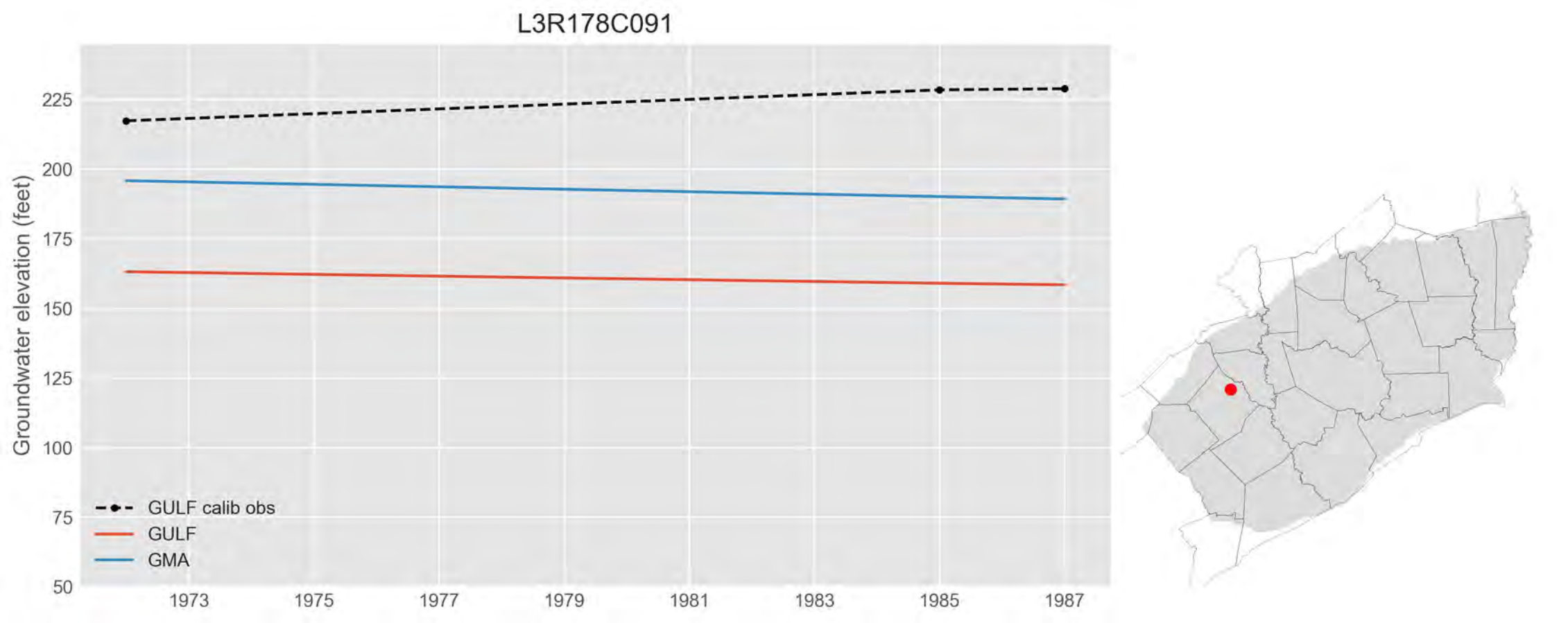

L3R175C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1984
1989
1994
1999
2004
2009
2014
2019

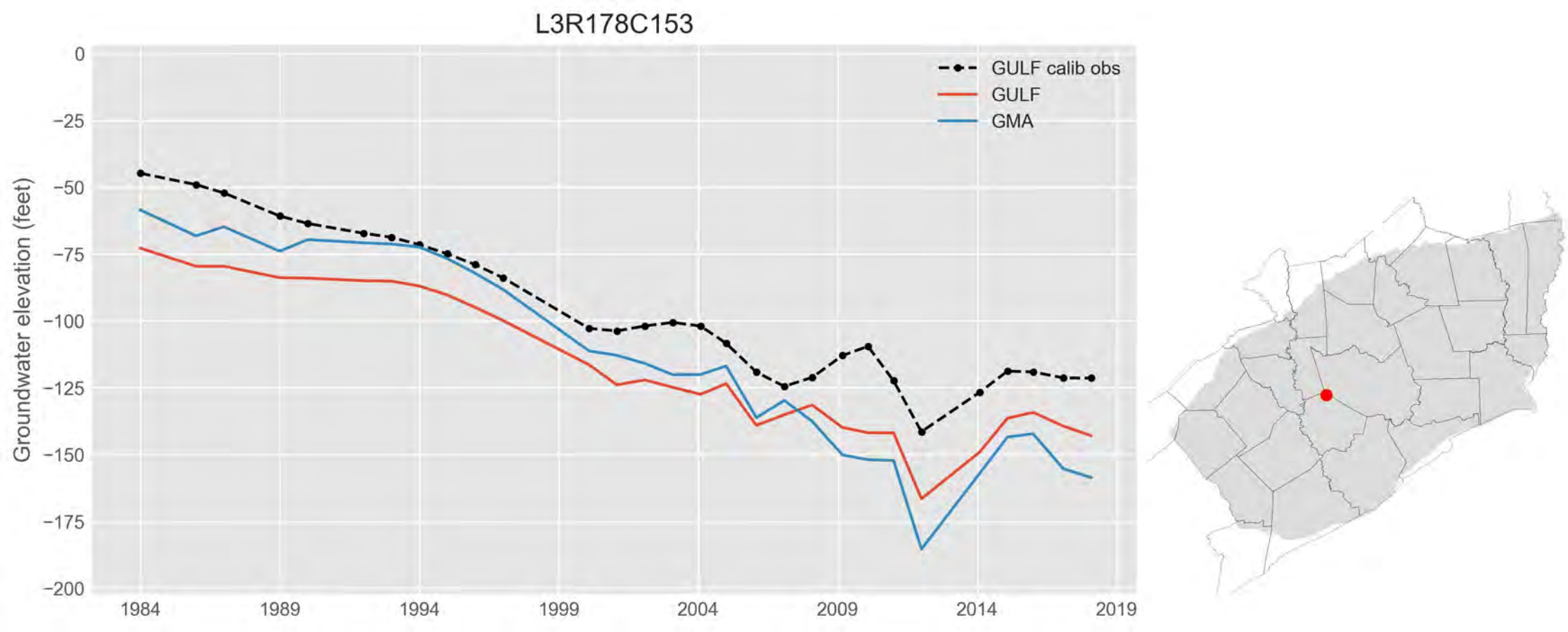

L3R175C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019


L3R176C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1959
1964
1969
1974
1979
1984
1989
1994
1999
2004

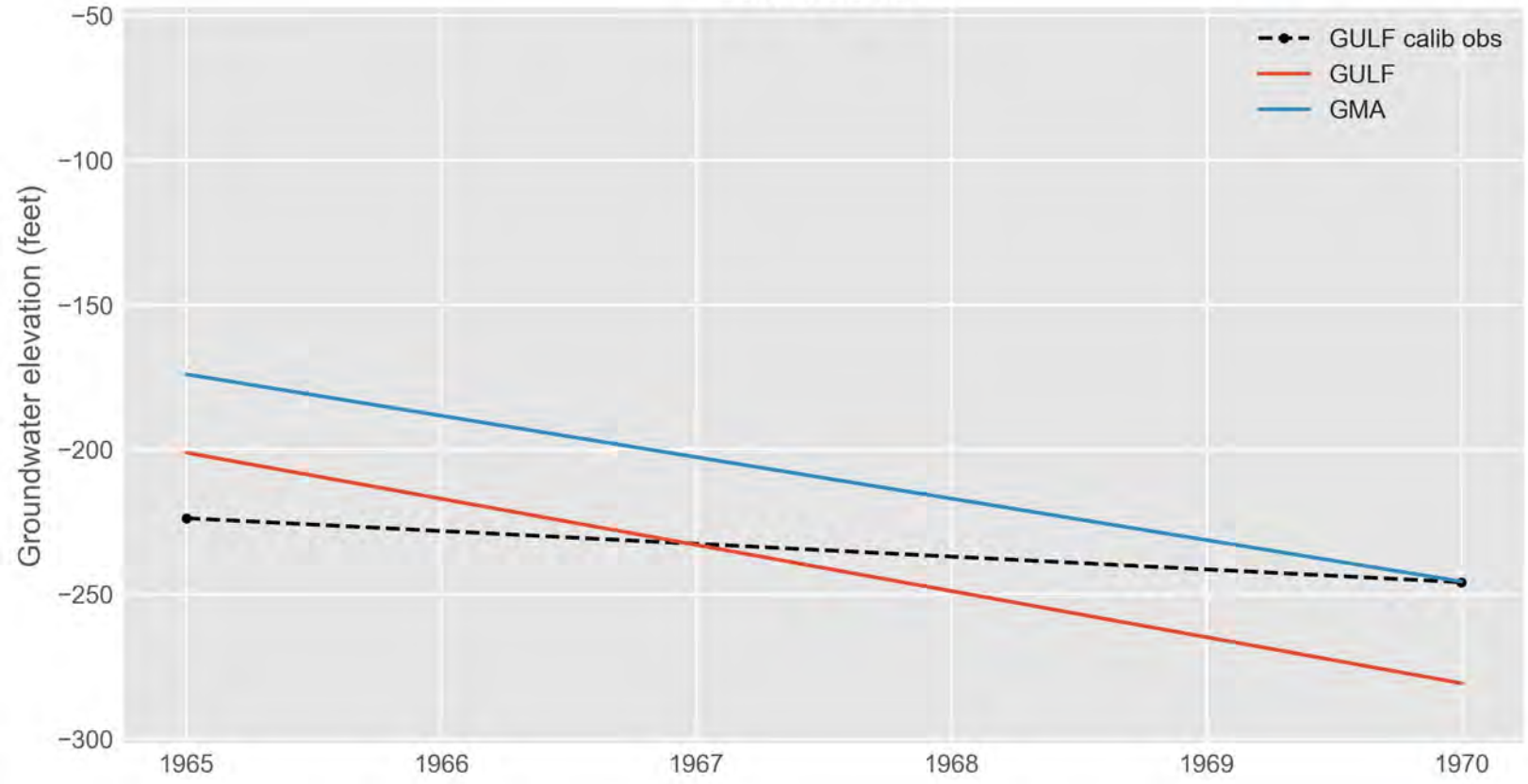

L3R177C169
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1974
1979
1984
1989
1994
1999
2004

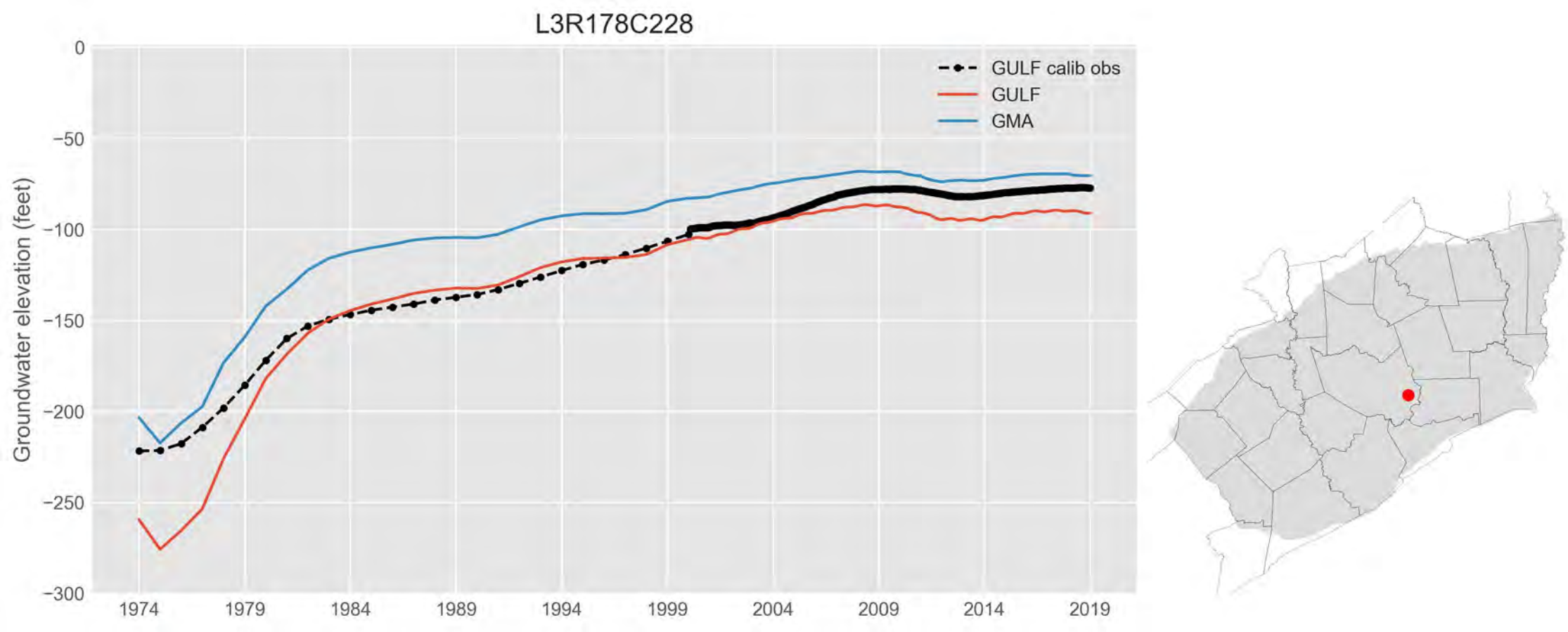

L3R177C194
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−200
−300
−400
1949
1959
1969
1979
1989
1999
2009

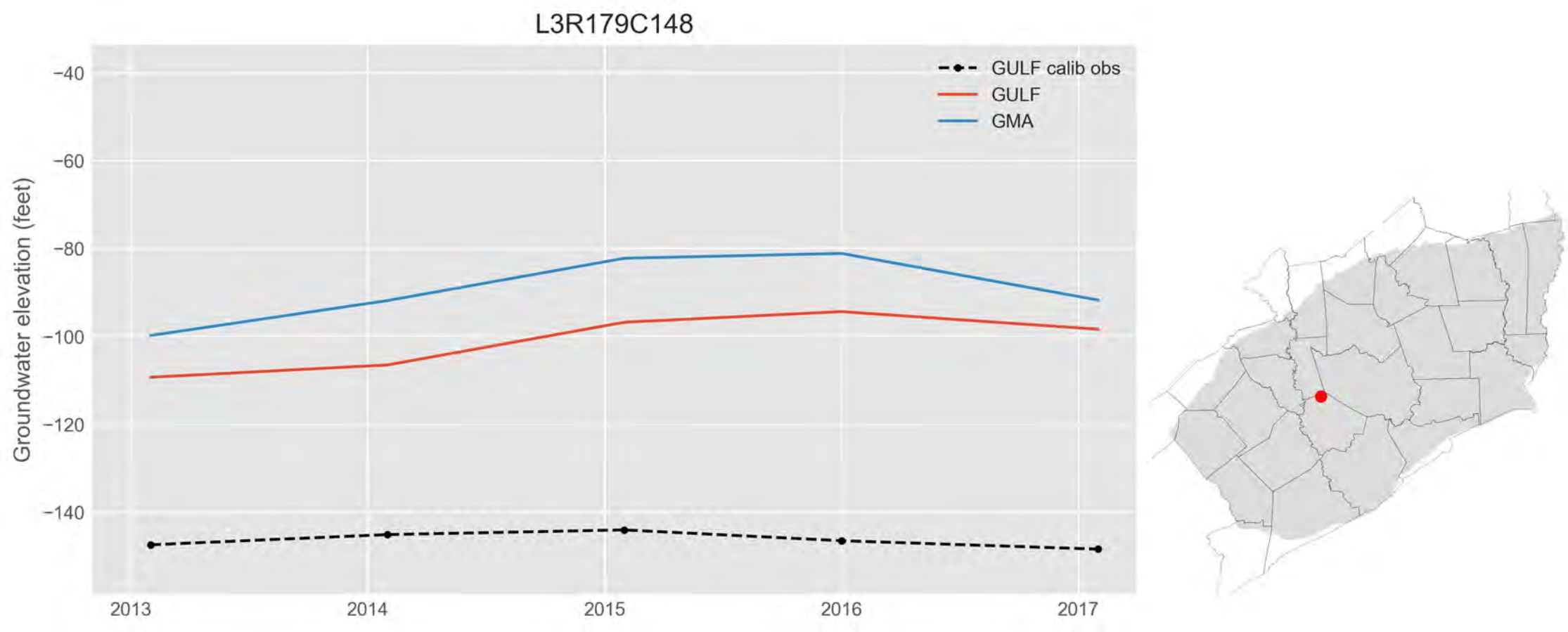

L3R178C091
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
1973
1975
1977
1979
1981
1983
1985
1987
GULF calib obs
GULF
GMA

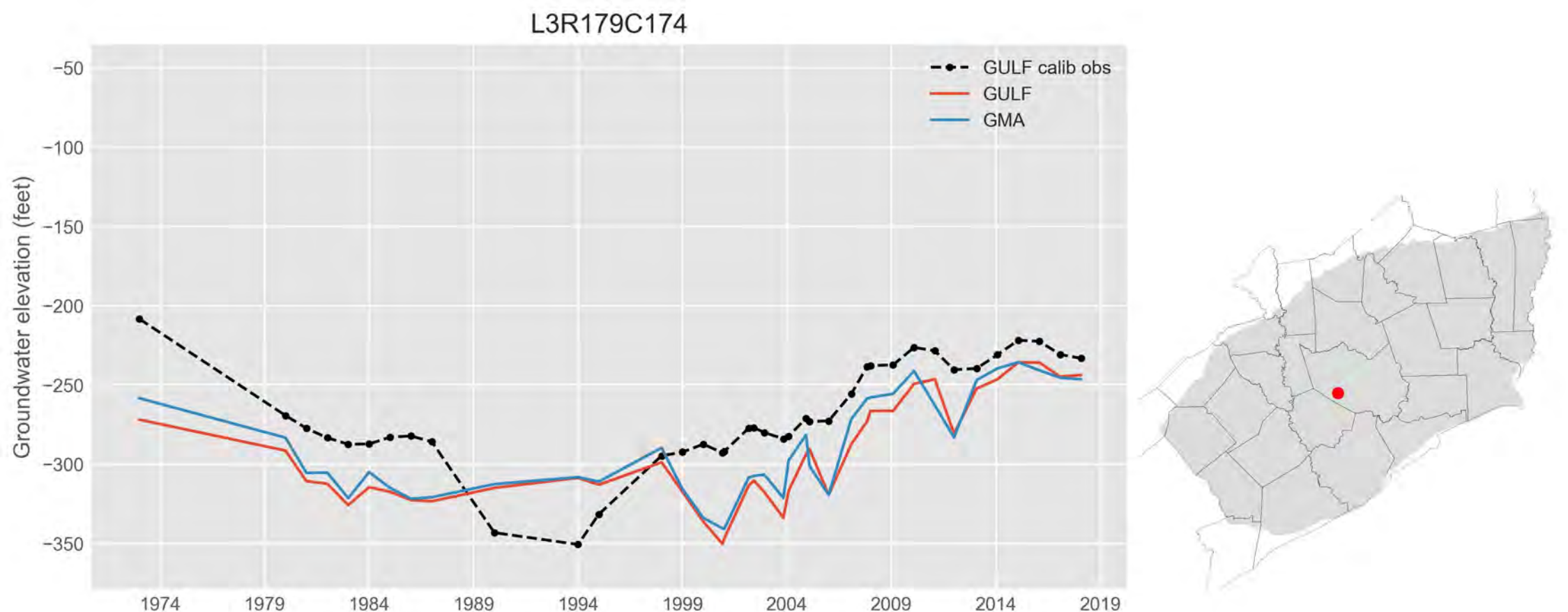

L3R178C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
−200
1984
1989
1994
1999
2004
2009
2014
2019

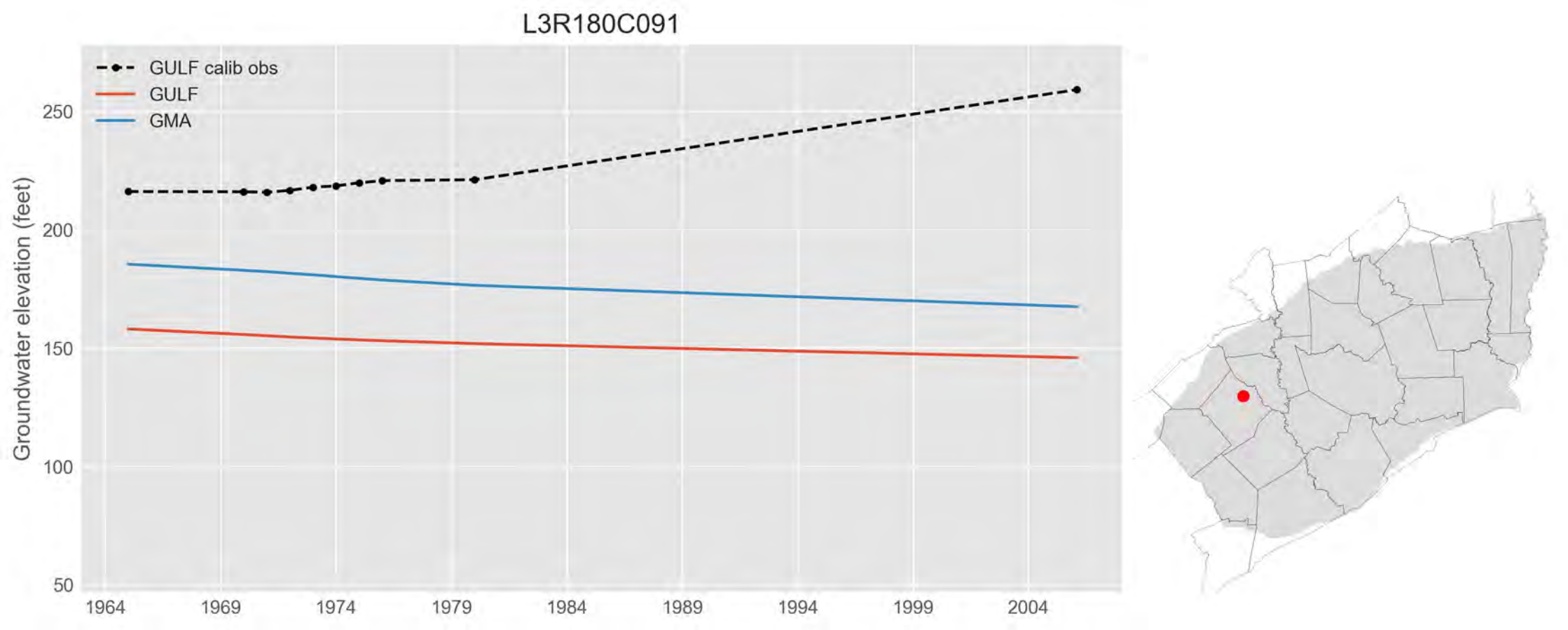
L3R178C181

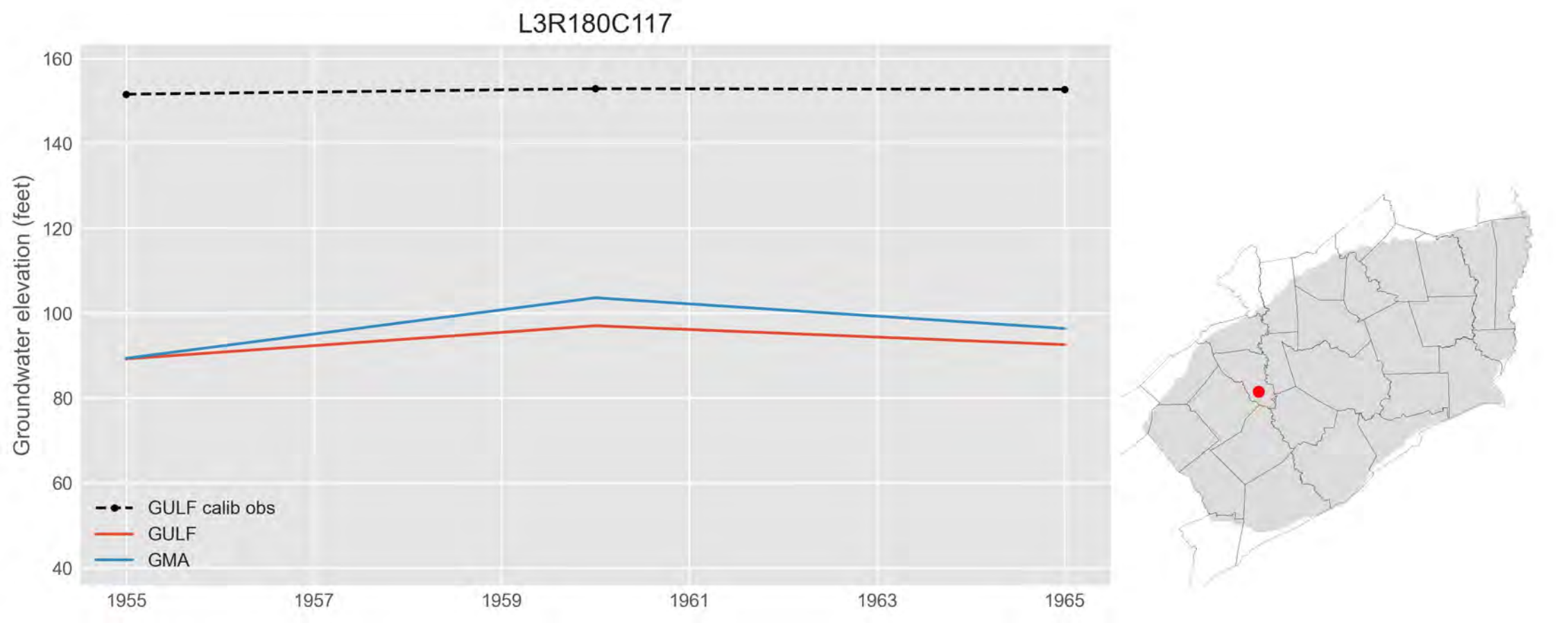

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1965
1966
1967
1968
1969
1970

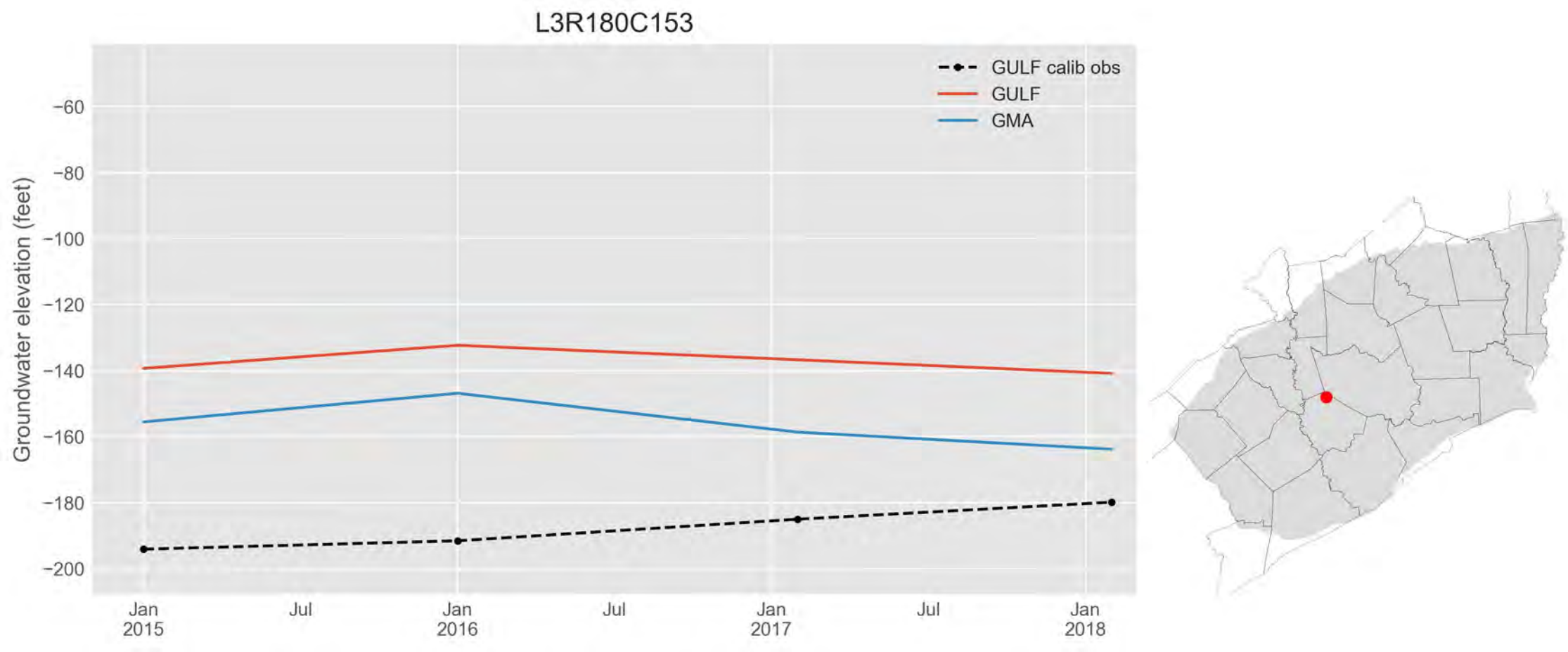

L3R178C228
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

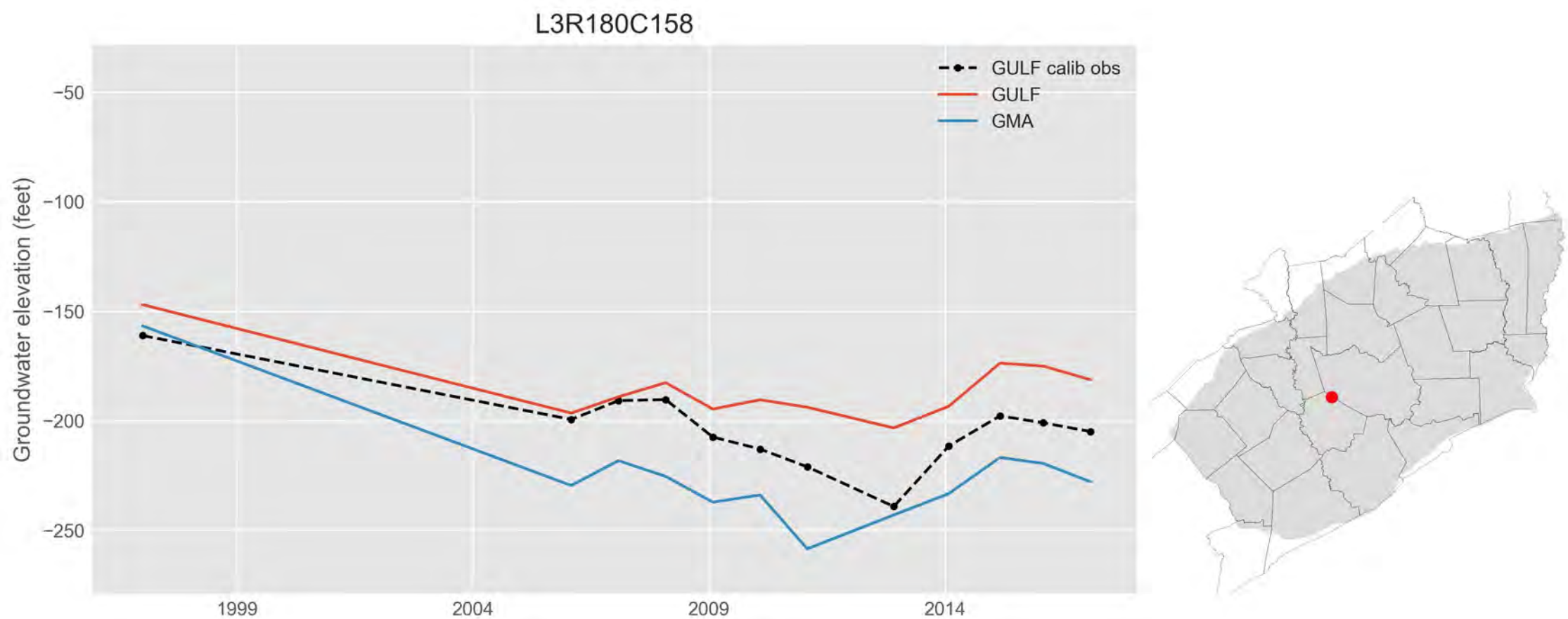

L3R179C148
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
2013
2014
2015
2016
2017

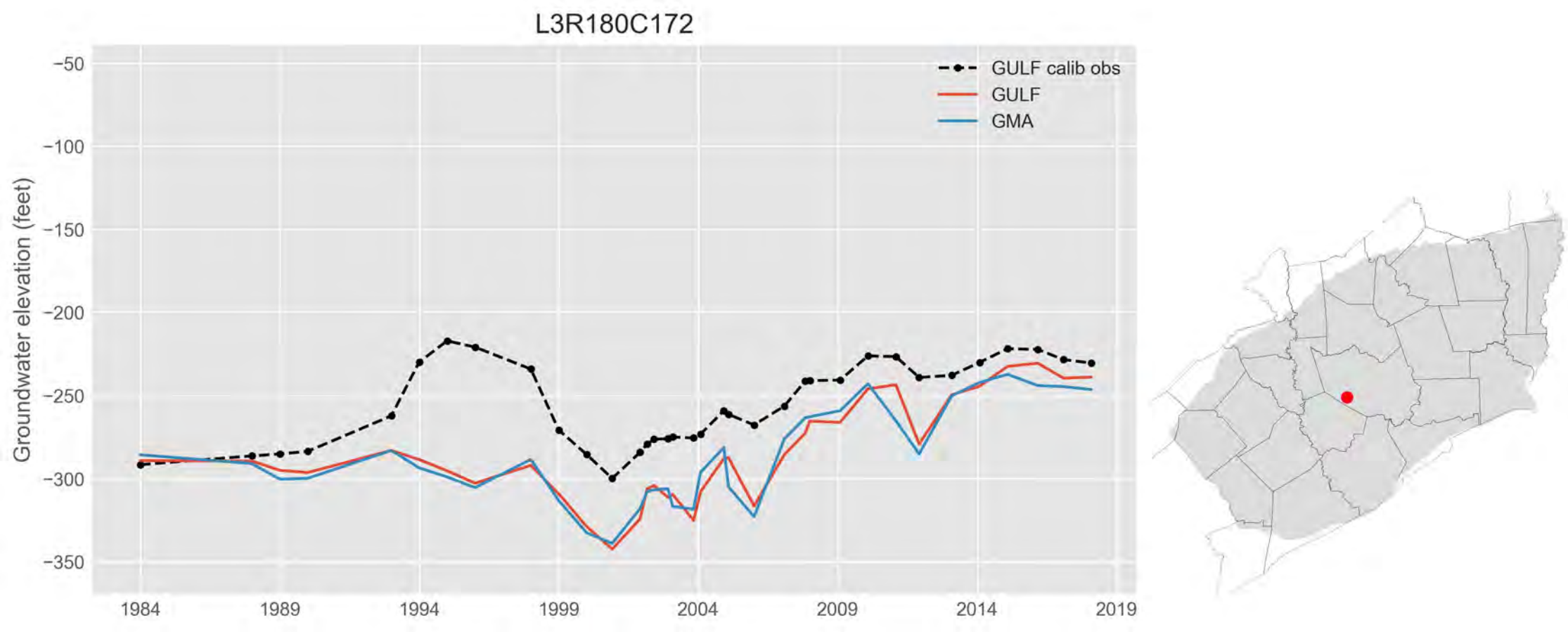

L3R179C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

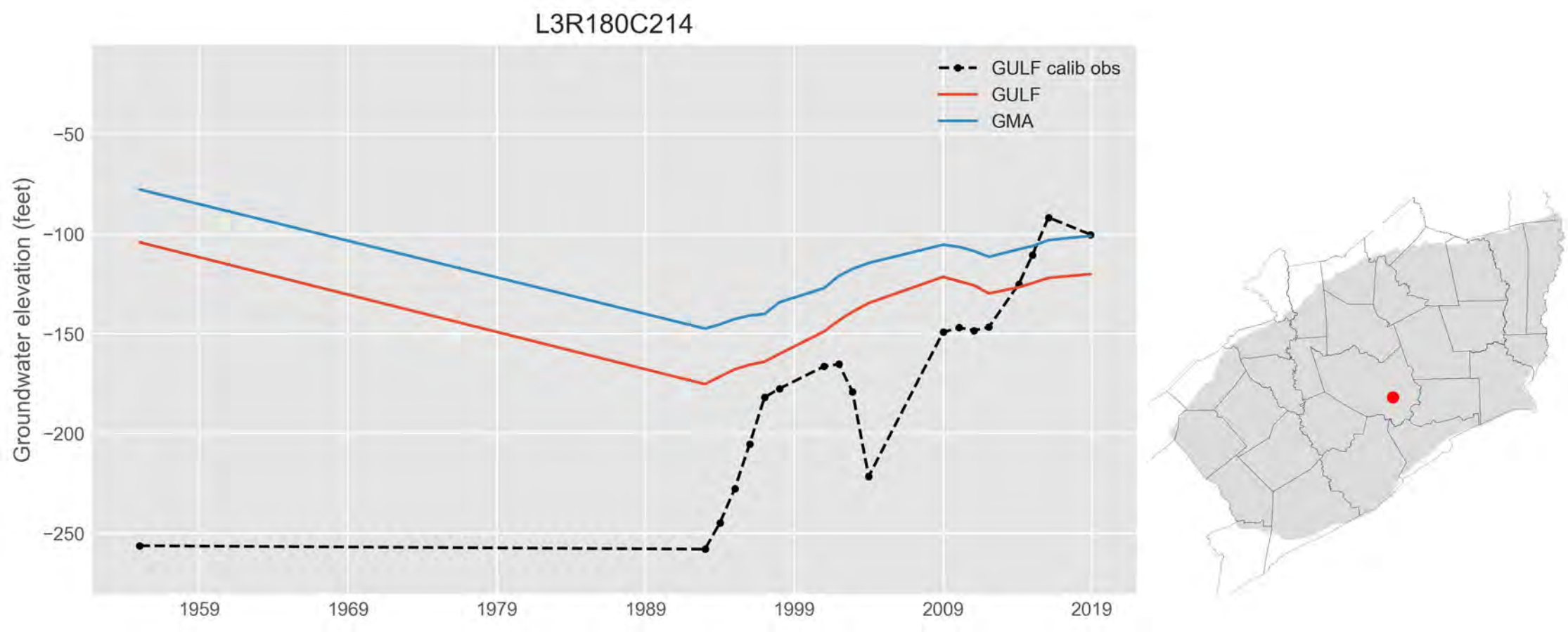

L3R180C091
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
250
200
150
100
50
1964
1969
1974
1979
1984
1989
1994
1999
2004

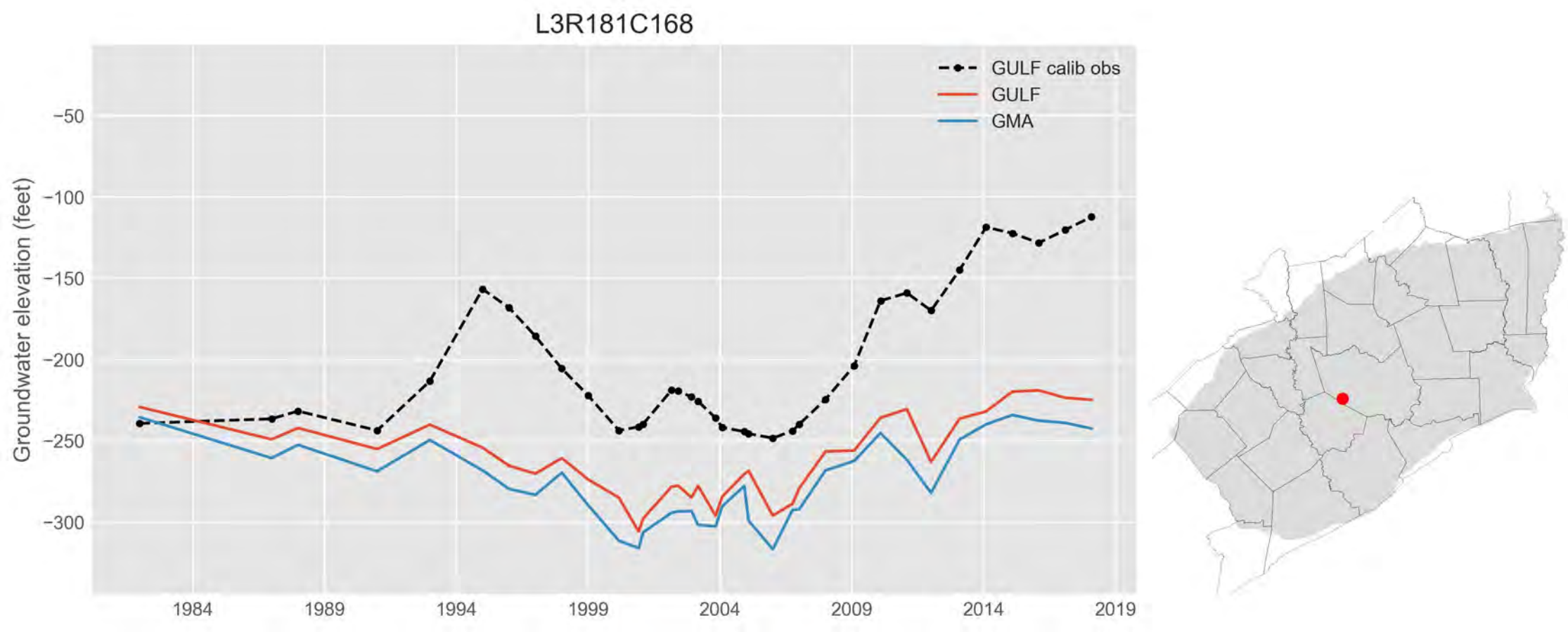

L3R180C117
Groundwater elevation (feet)
160
140
120
100
80
60
40
1955
1957
1959
1961
1963
1965
GULF calib obs
GULF
GMA

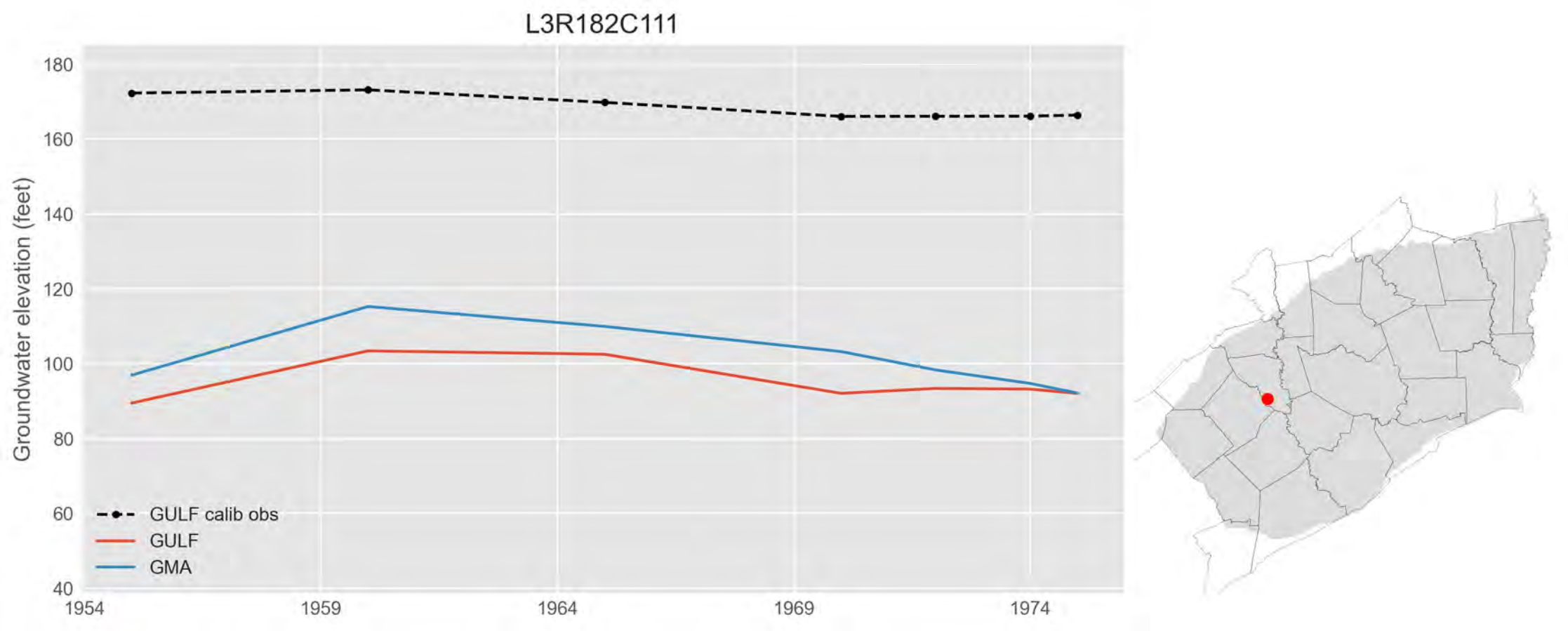

L3R180C153
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−60
−80
−100
−120
−140
−160
−180
−200
Jan
2015
Jul
Jan
2016
Jul
Jan
2017
Jul
Jan
2018

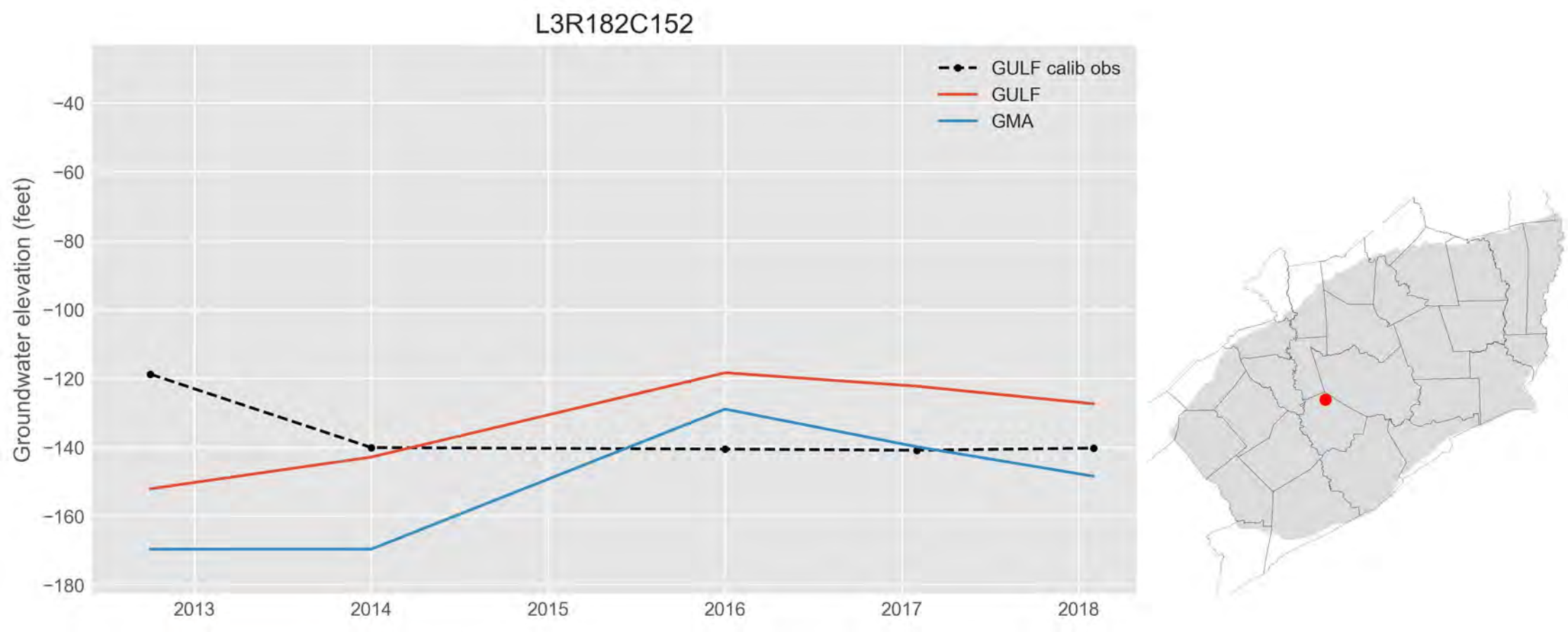

L3R180C158
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1999
2004
2009
2014

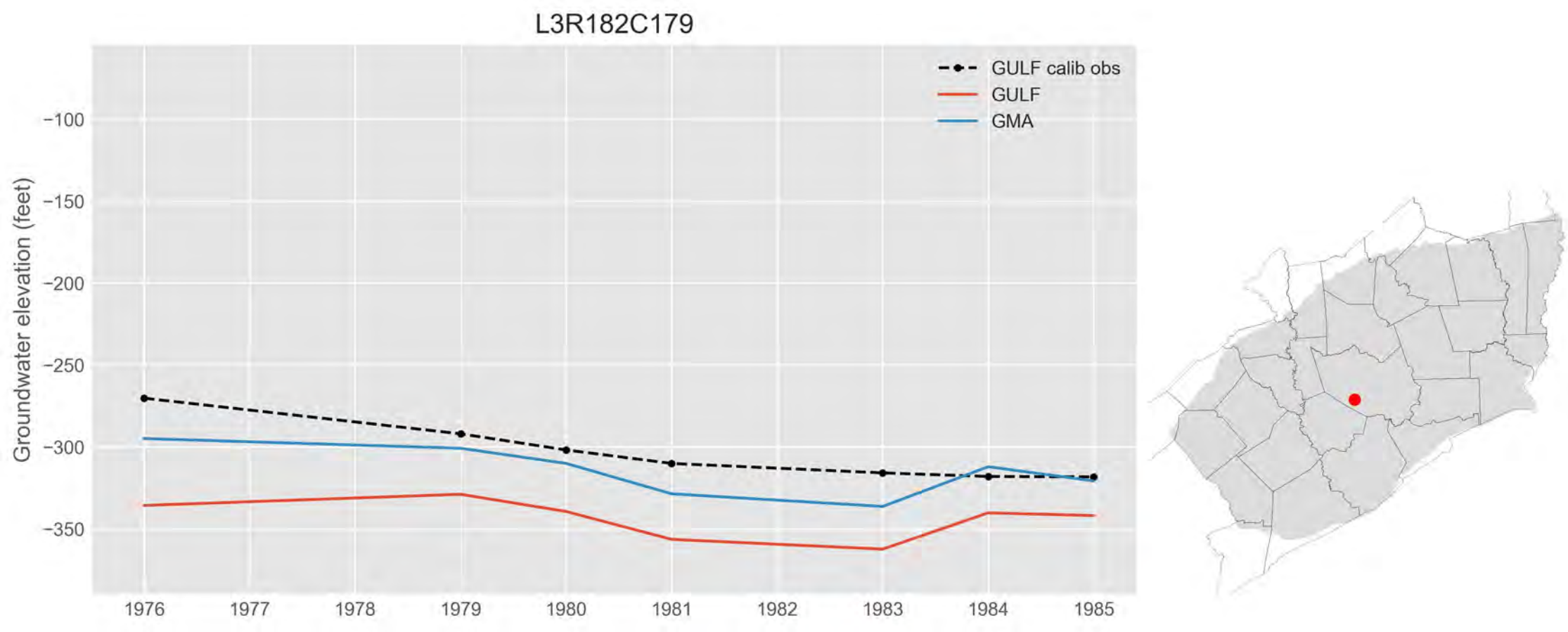

L3R180C172
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1984
1989
1994
1999
2004
2009
2014
2019

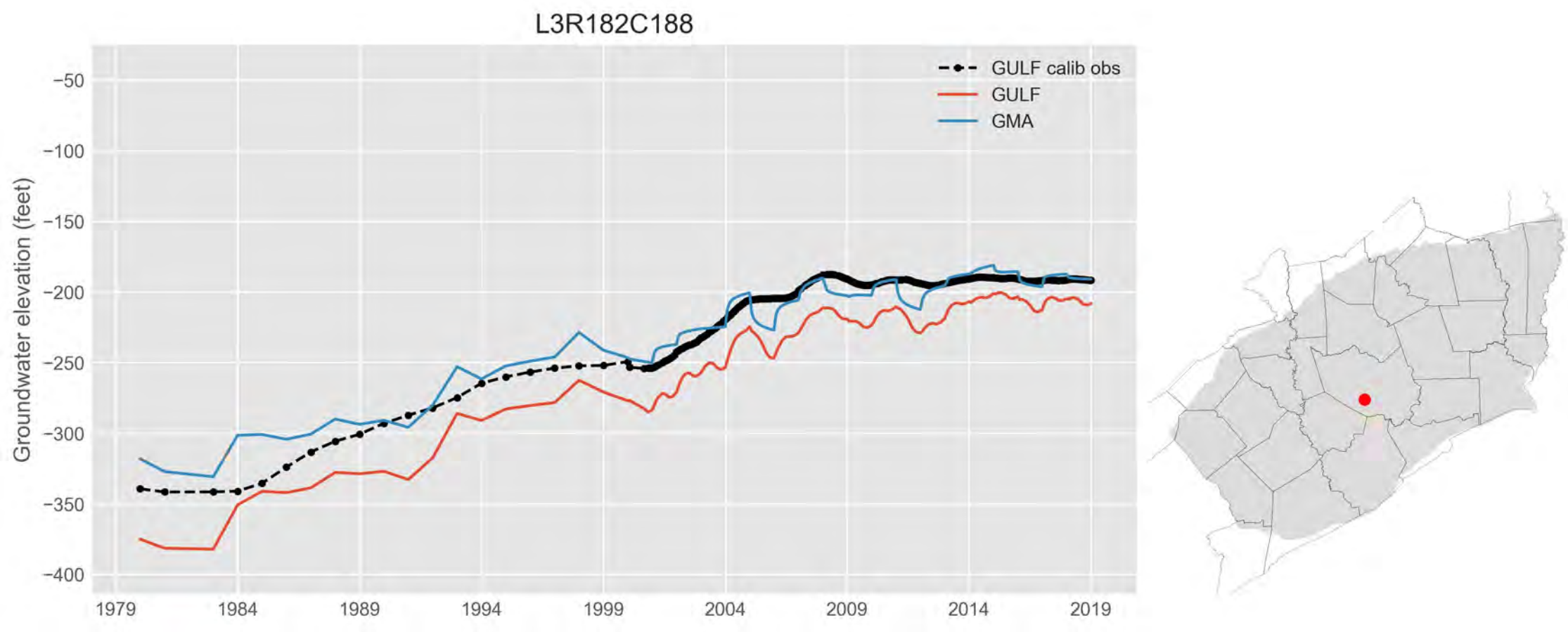

L3R180C214
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1959
1969
1979
1989
1999
2009
2019

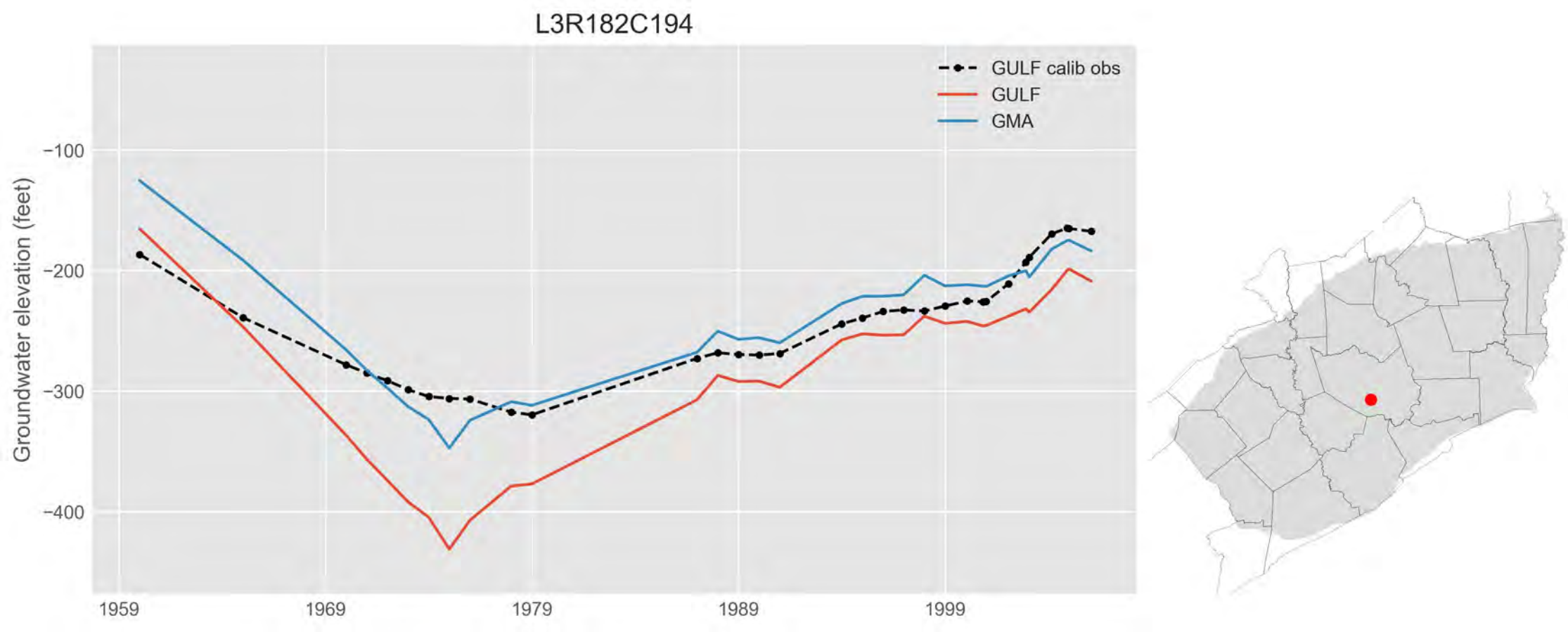

L3R181C168
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1984
1989
1994
1999
2004
2009
2014
2019

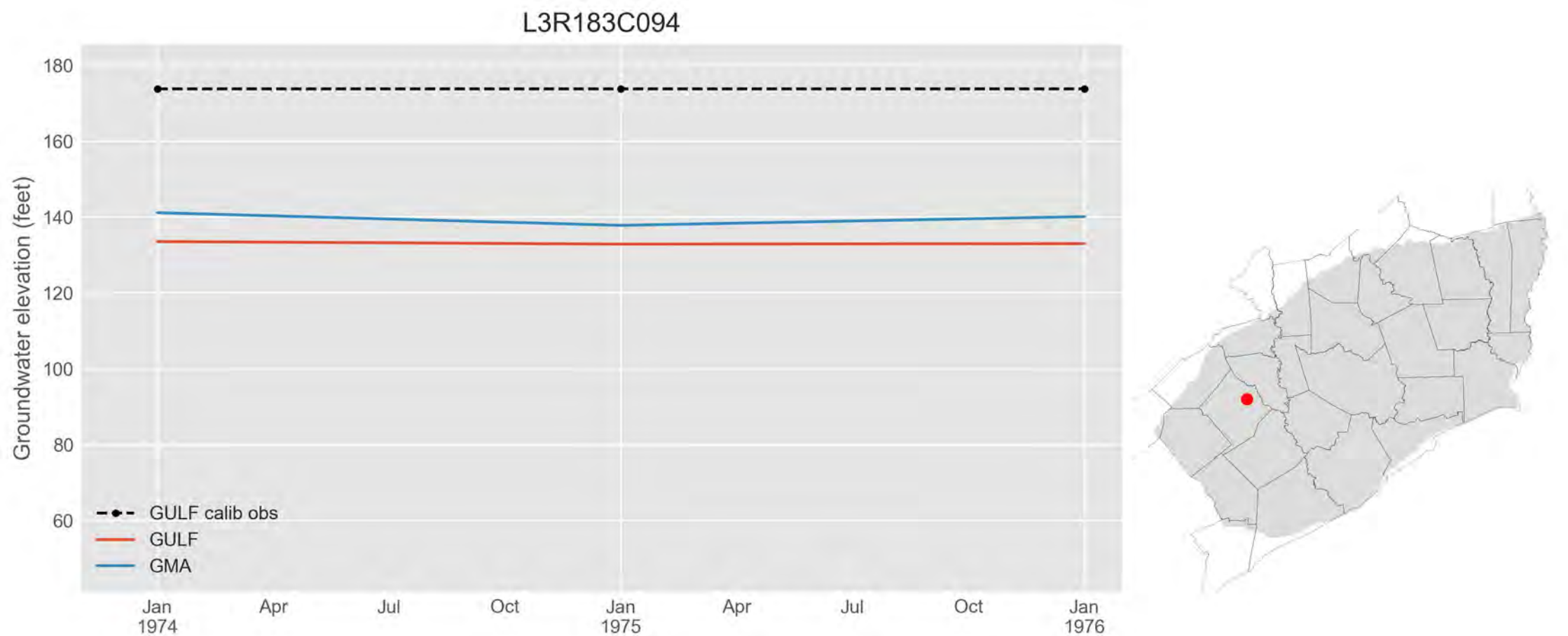

L3R182C111
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1954
1959
1964
1969
1974
GULF calib obs
GULF
GMA

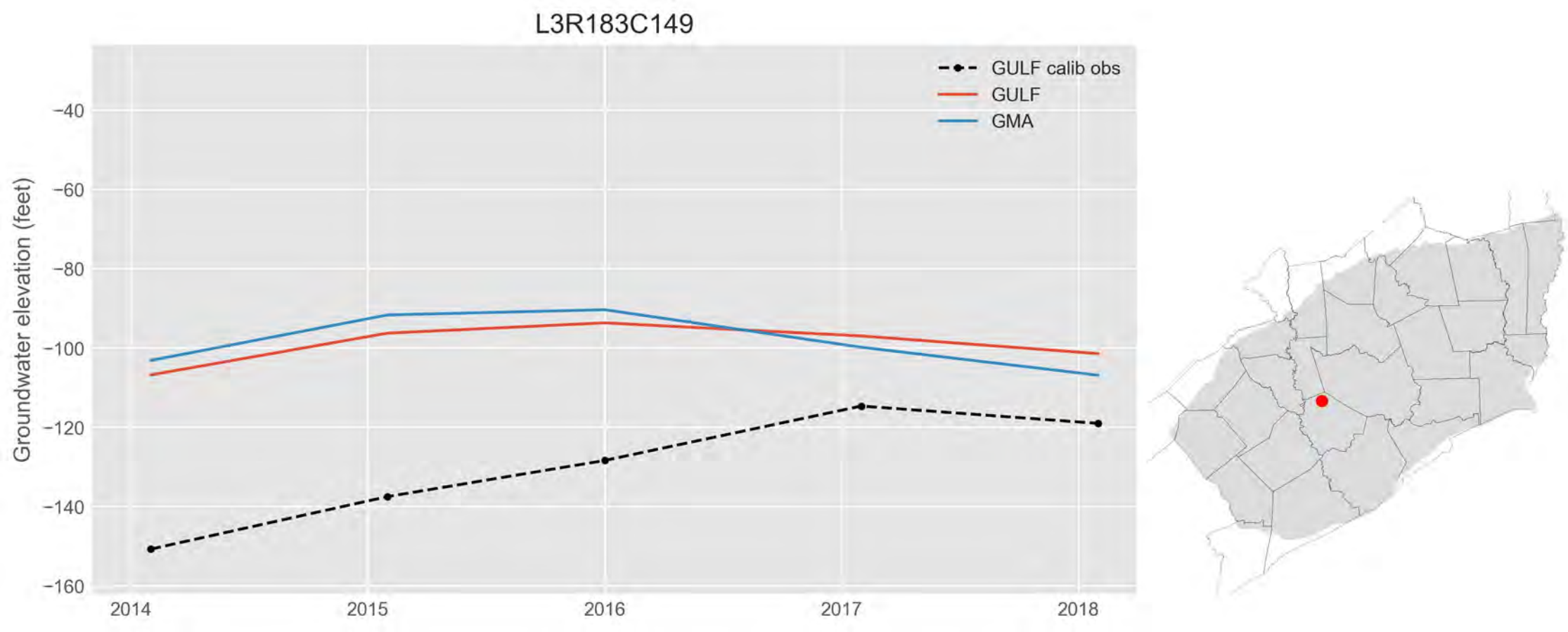

L3R182C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
2013
2014
2015
2016
2017
2018

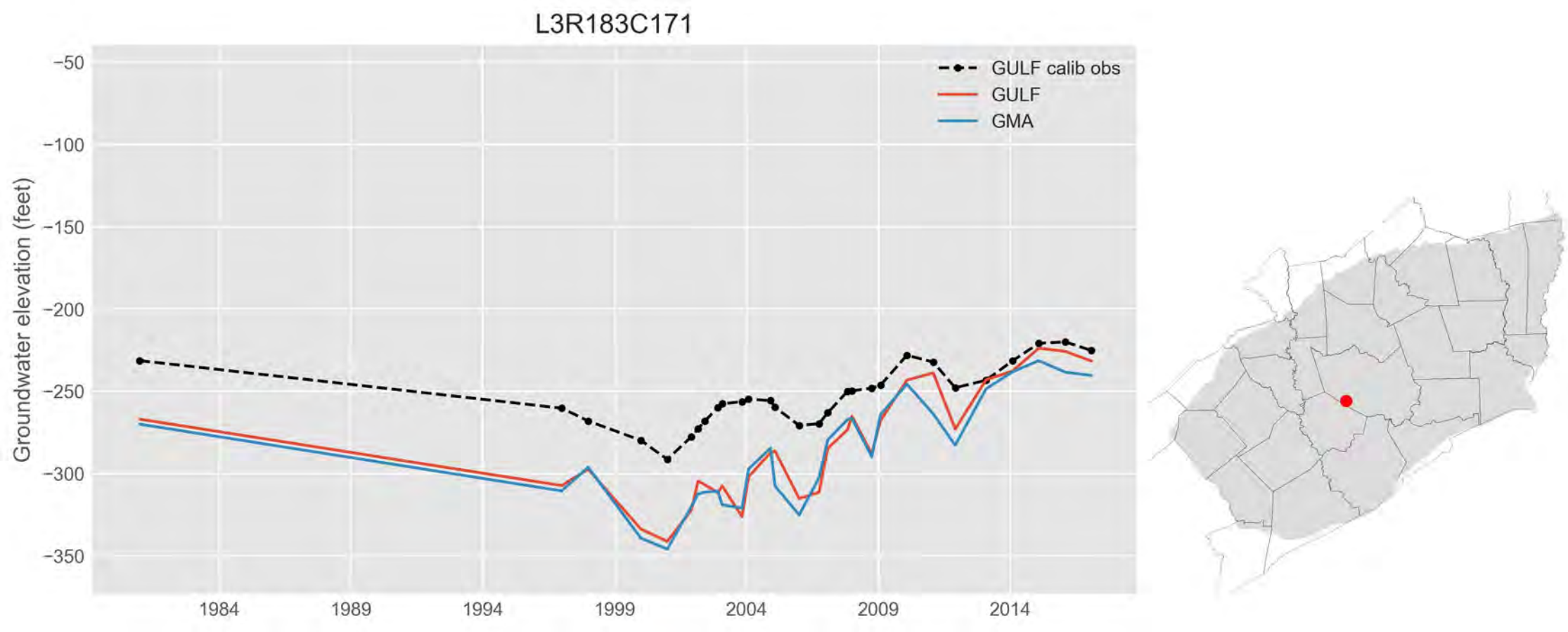

L3R182C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−150
−200
−250
−300
−350
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985

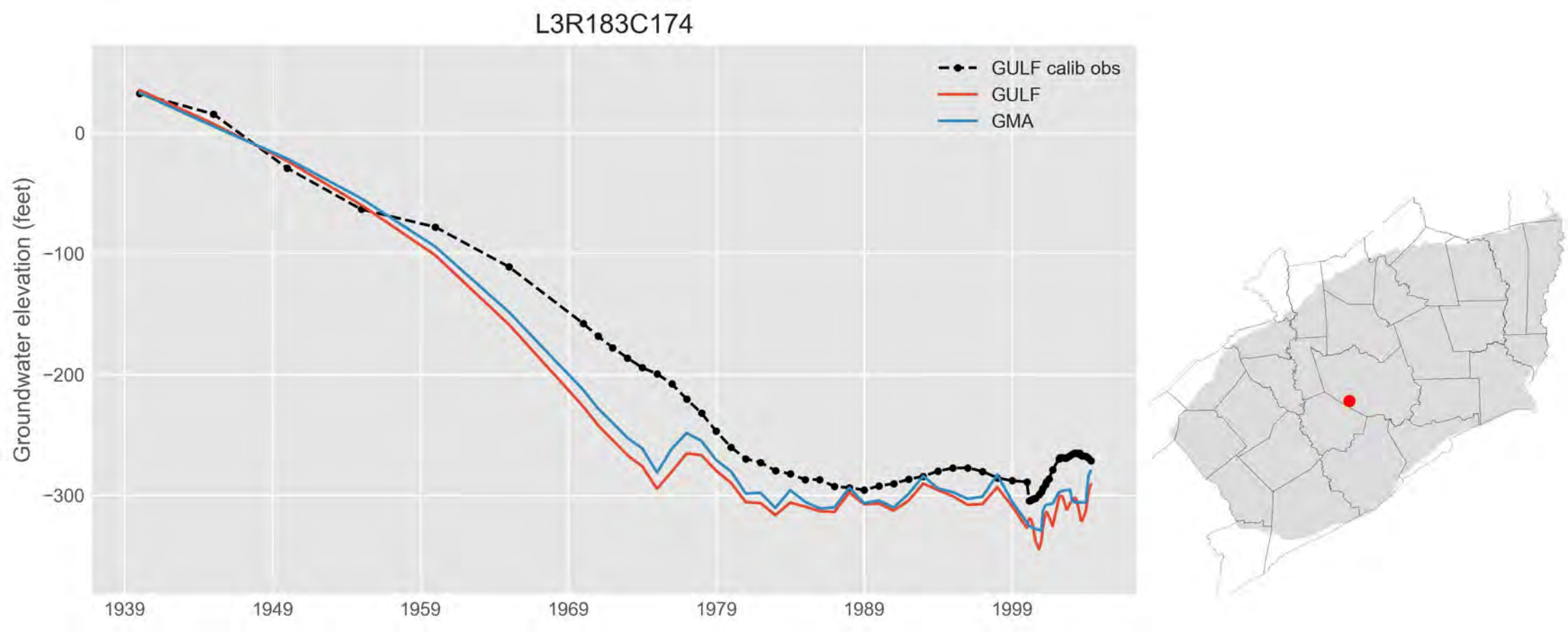

L3R182C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1979
1984
1989
1994
1999
2004
2009
2014
2019

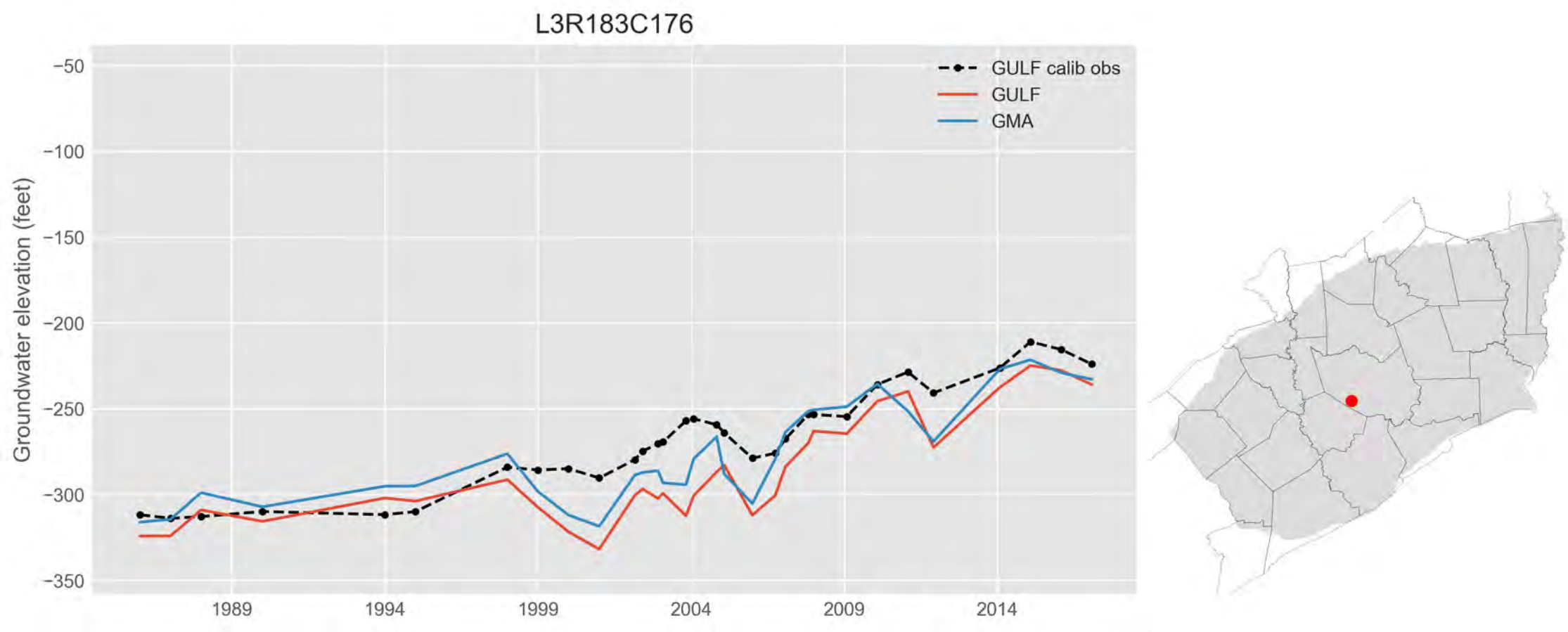

L3R182C194
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−100
−200
−300
−400
1959
1969
1979
1989
1999

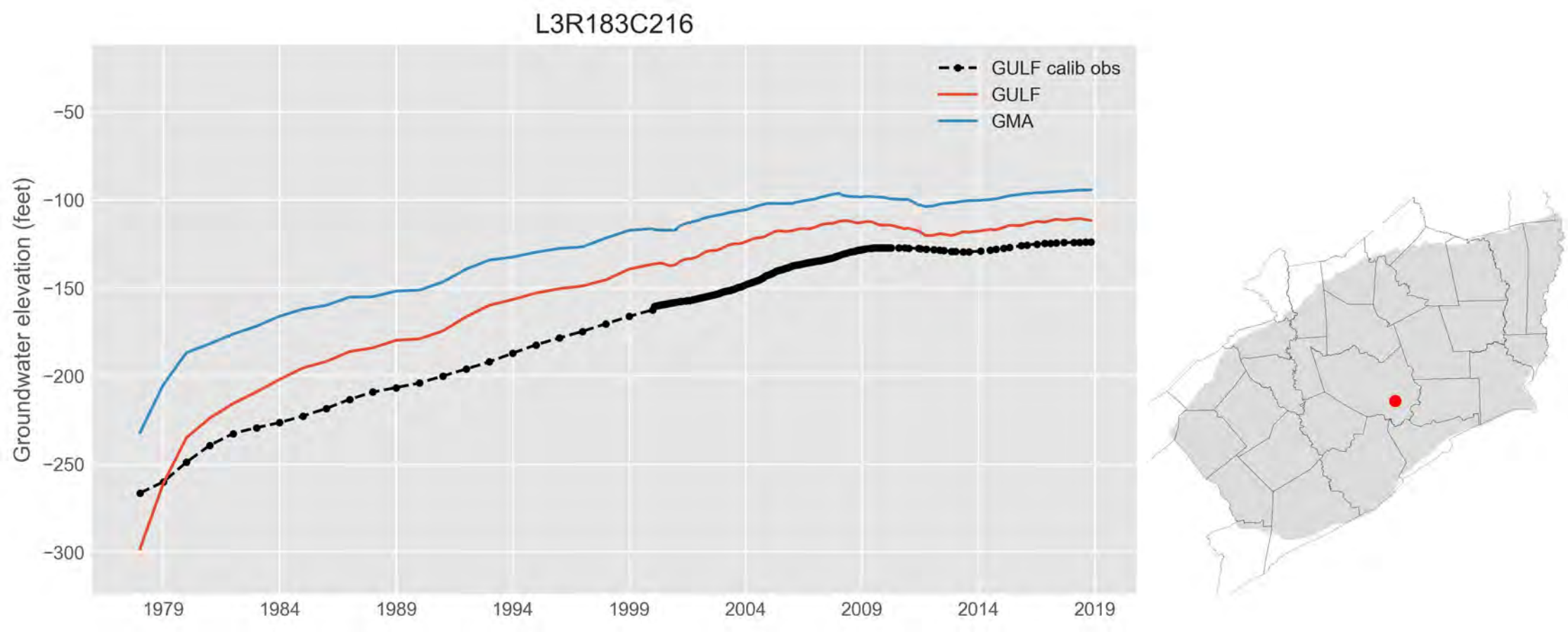

L3R183C094
Groundwater elevation (feet)
180
160
140
120
100
80
60
GULF calib obs
GULF
GMA
Jan
1974
Apr
Jul
Oct
Jan
1975
Apr
Jul
Oct
Jan
1976

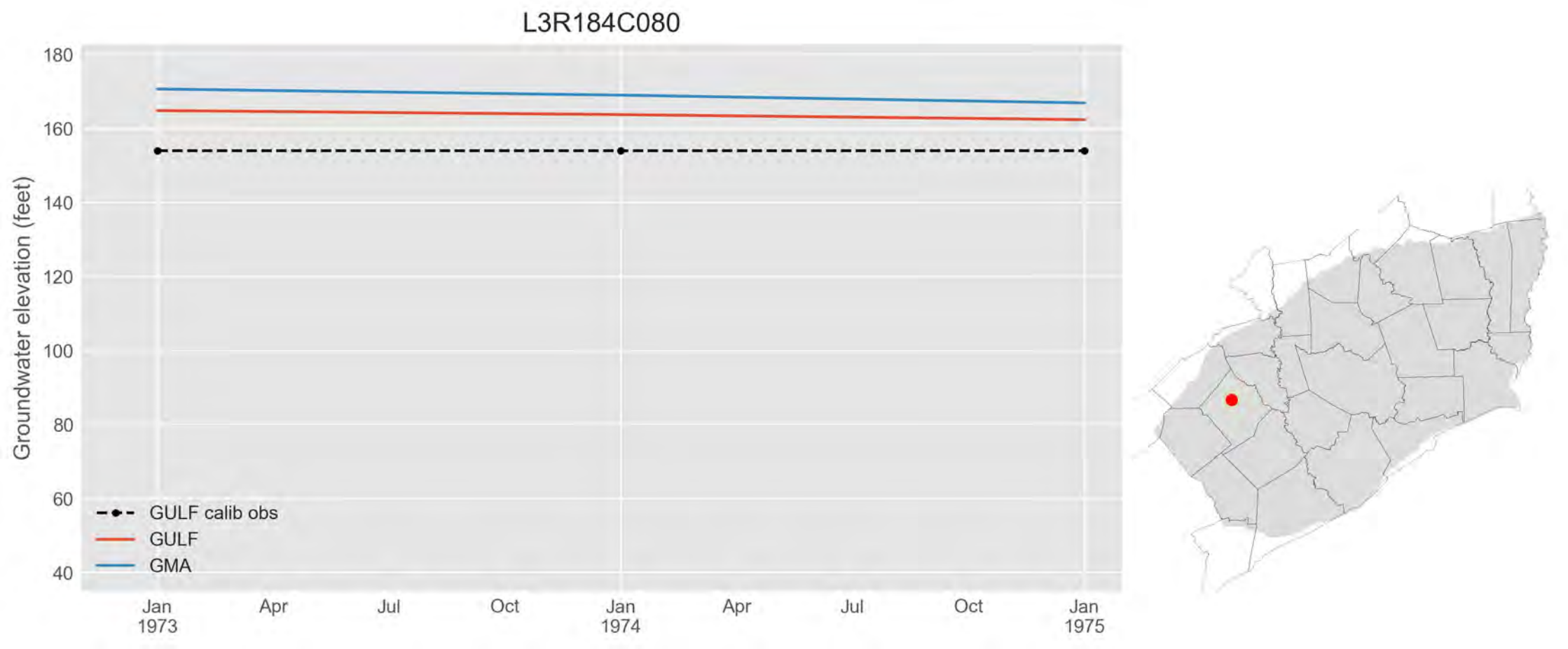

L3R183C149
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
2014
2015
2016
2017
2018

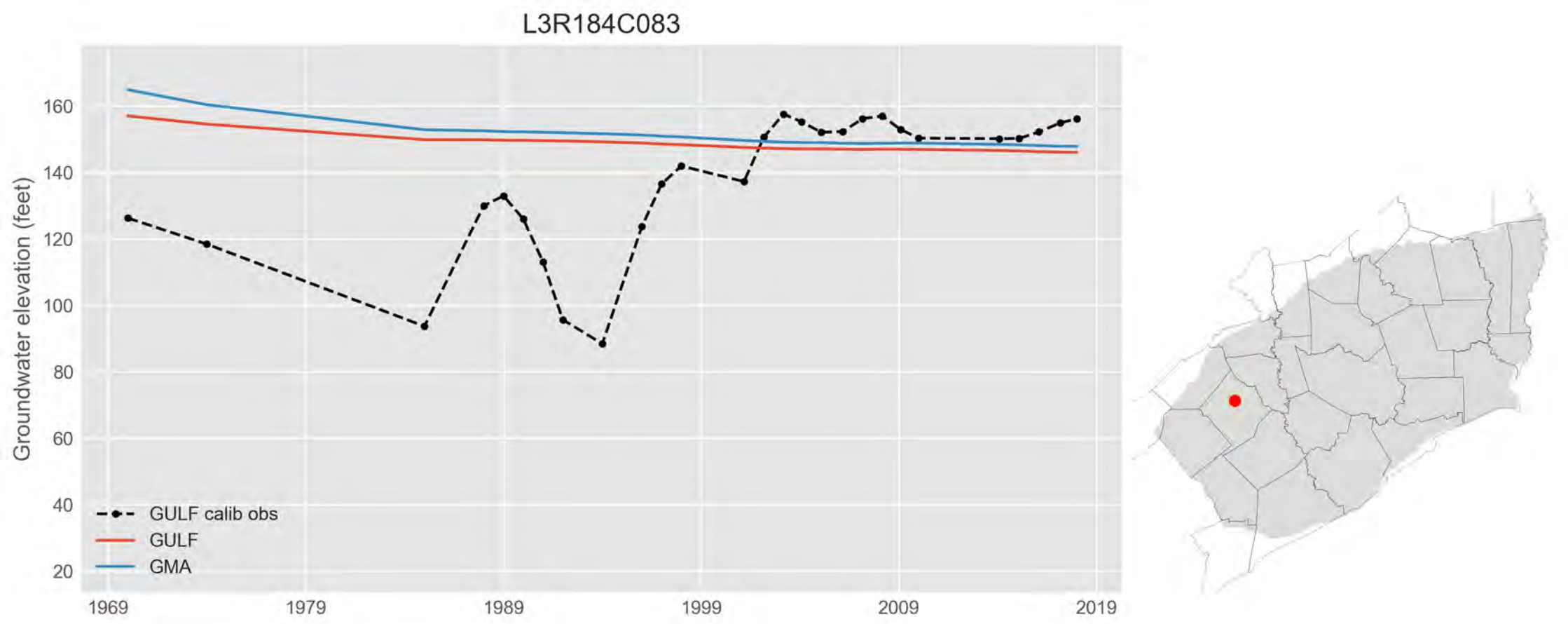

L3R183C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1984
1989
1994
1999
2004
2009
2014

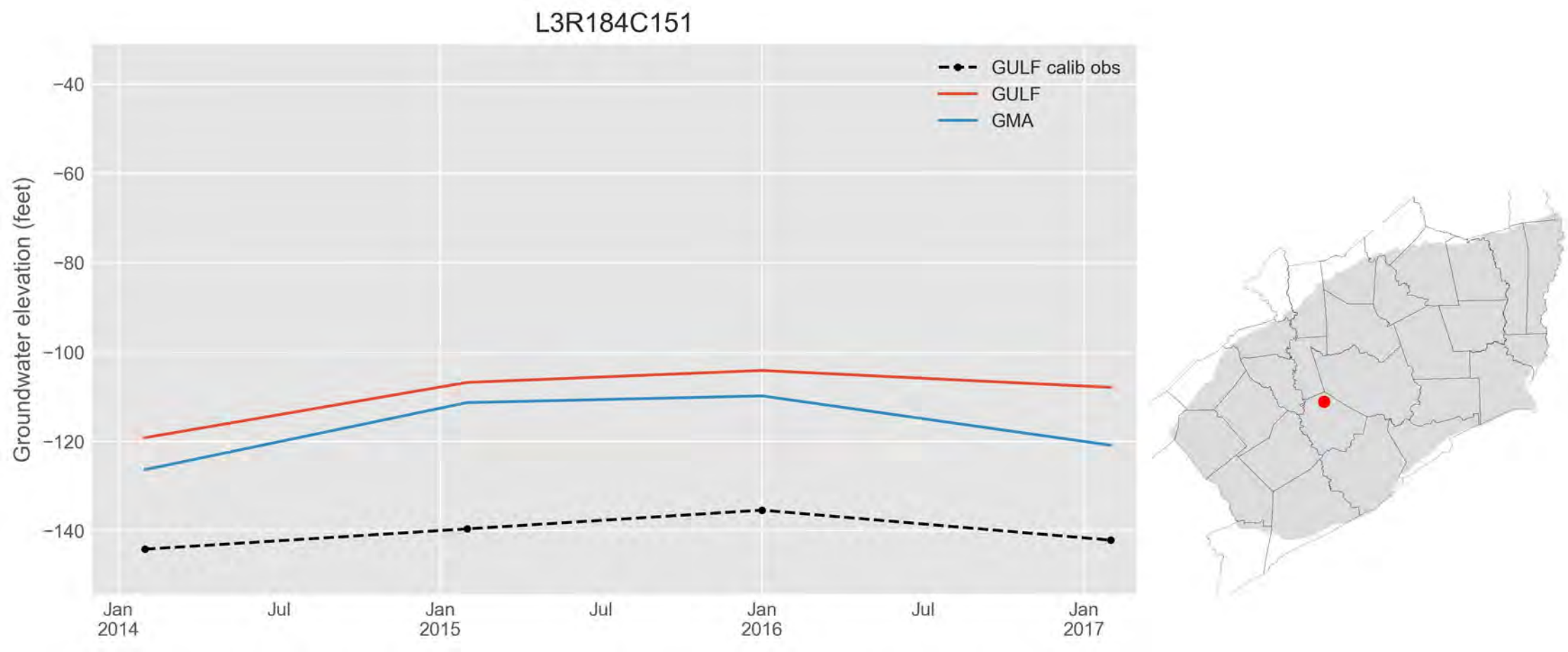

L3R183C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−100
−200
−300
1939
1949
1959
1969
1979
1989
1999

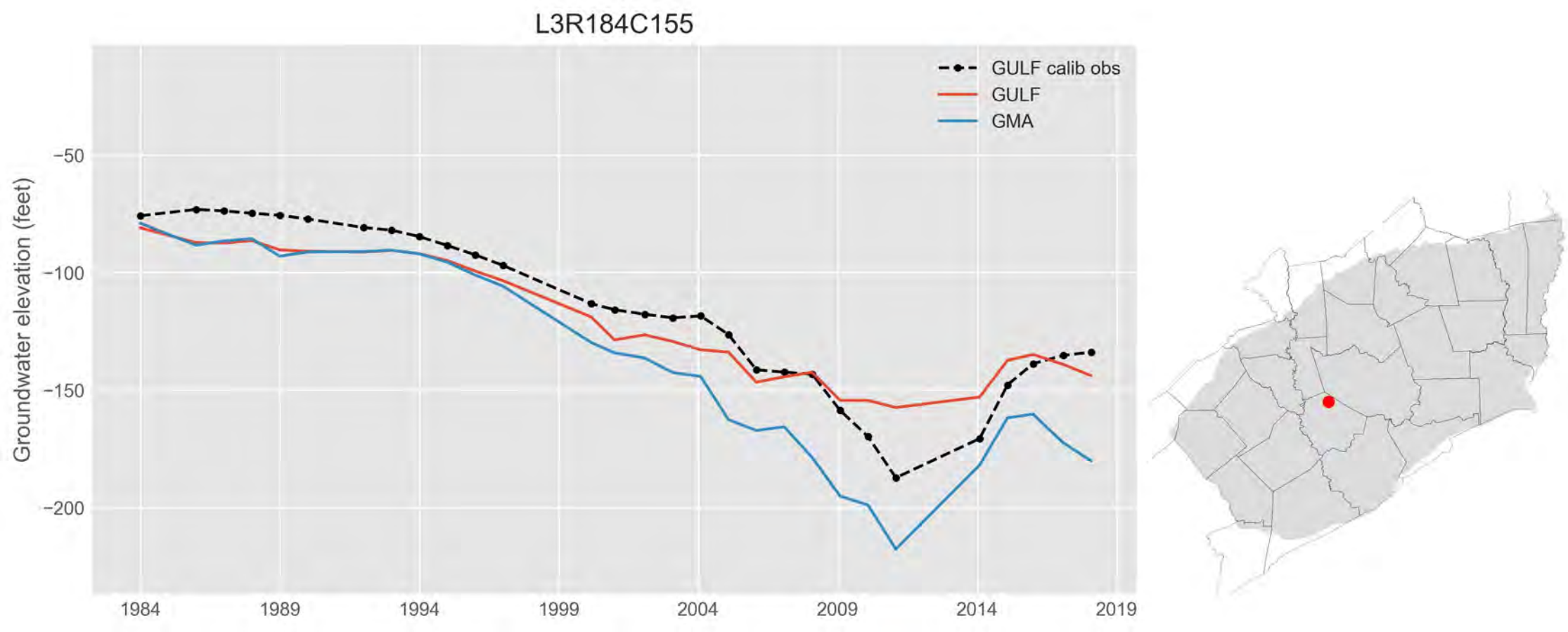

L3R183C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1989
1994
1999
2004
2009
2014

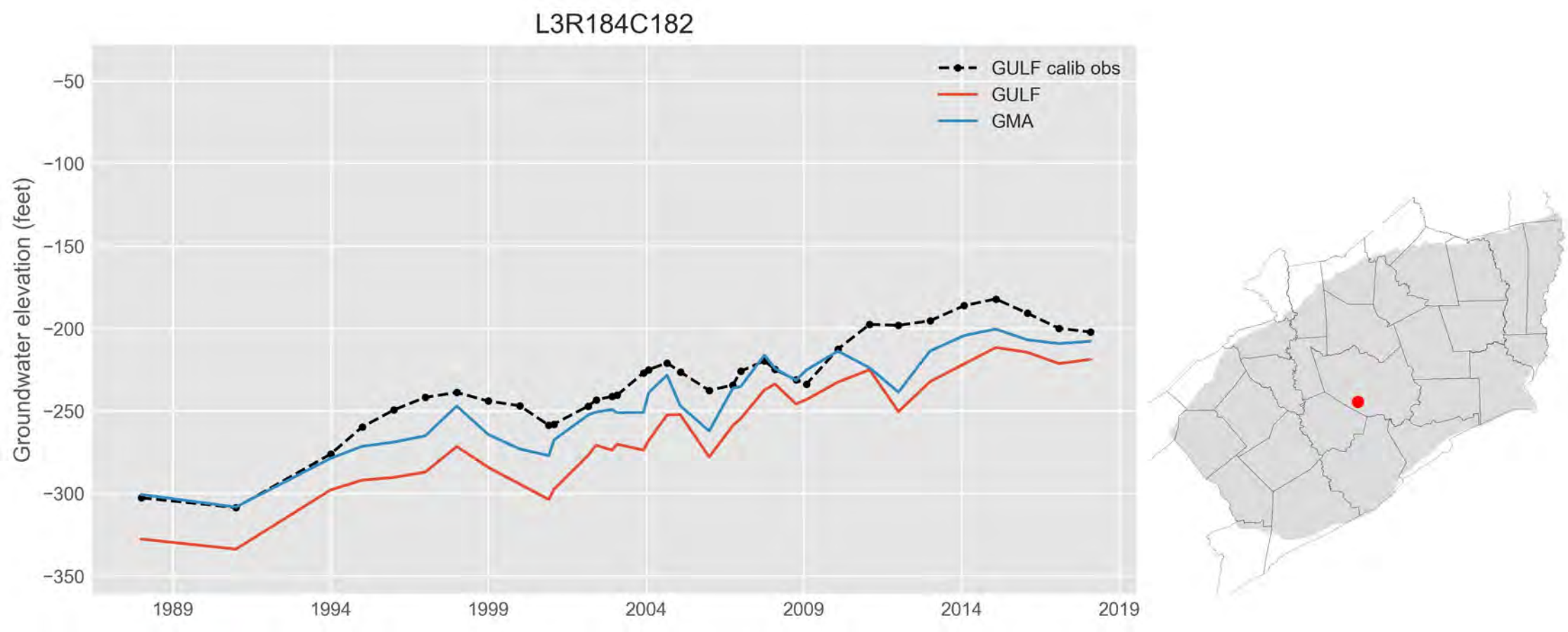

L3R183C216
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1979
1984
1989
1994
1999
2004
2009
2014
2019

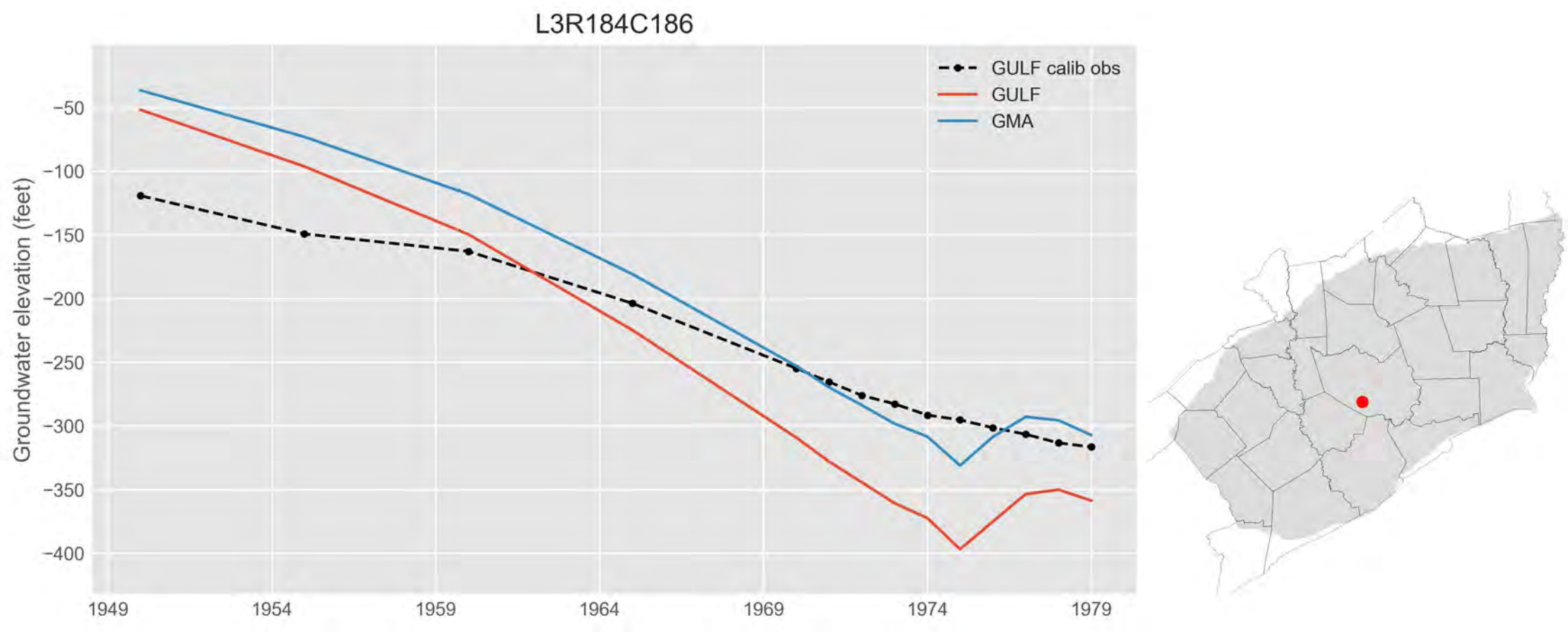

L3R184C080
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
GULF calib obs
GULF
GMA
Jan
1973
Apr
Jul
Oct
Jan
1974
Apr
Jul
Oct
Jan
1975

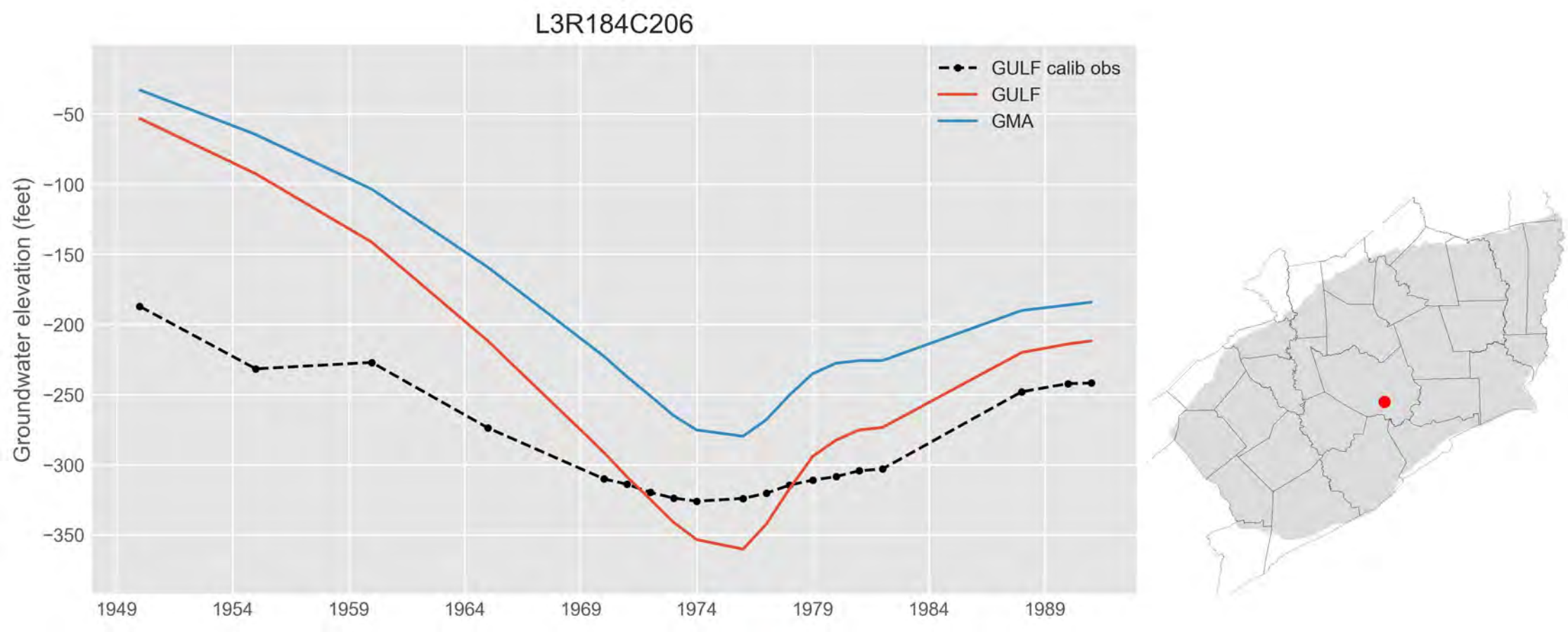

L3R184C083
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

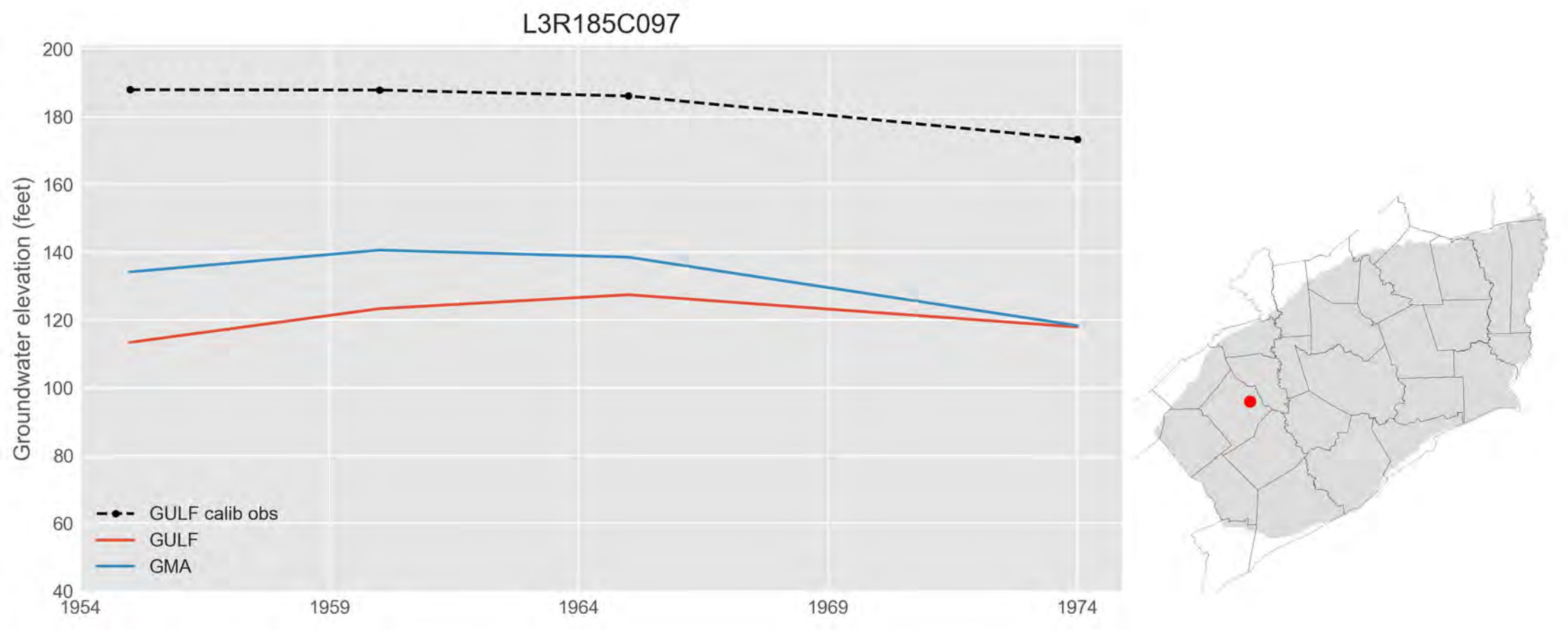

L3R184C151
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
Jan
2014
Jul
Jan
2015
Jul
Jan
2016
Jul
Jan
2017

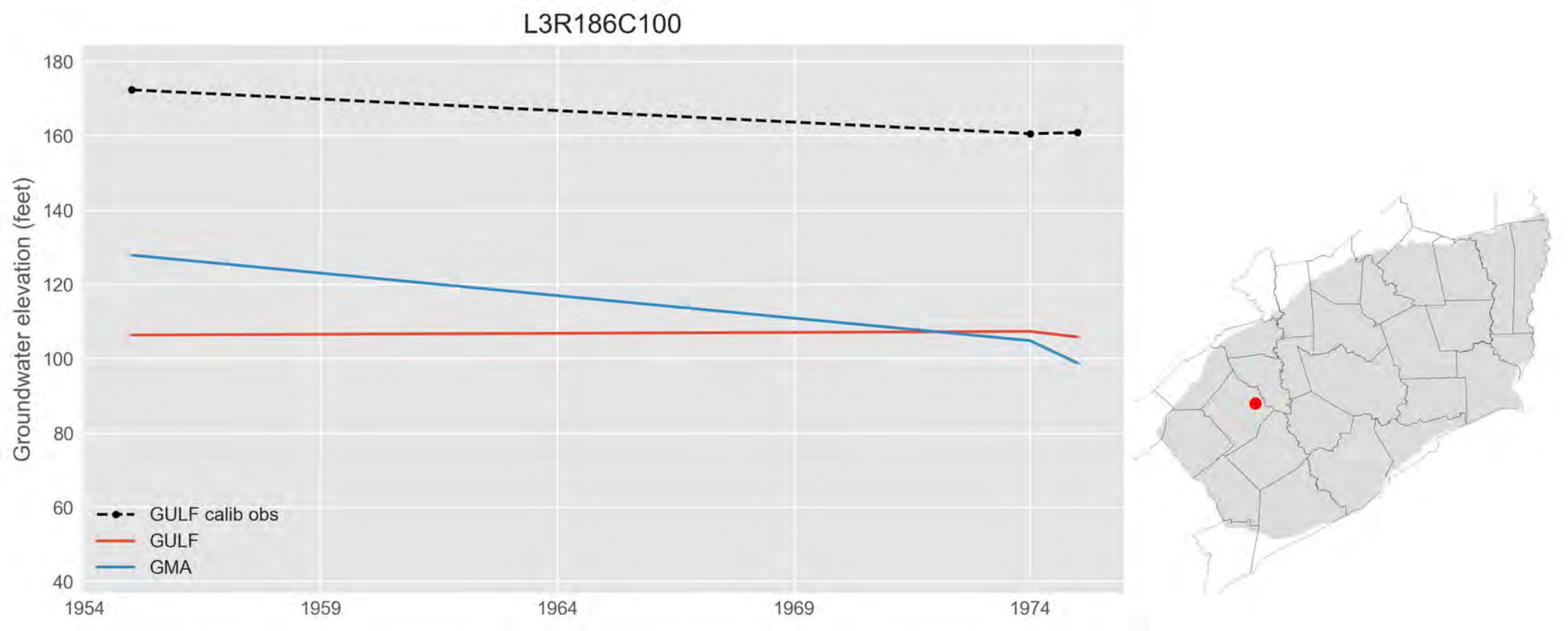

L3R184C155
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
1984
1989
1994
1999
2004
2009
2014
2019

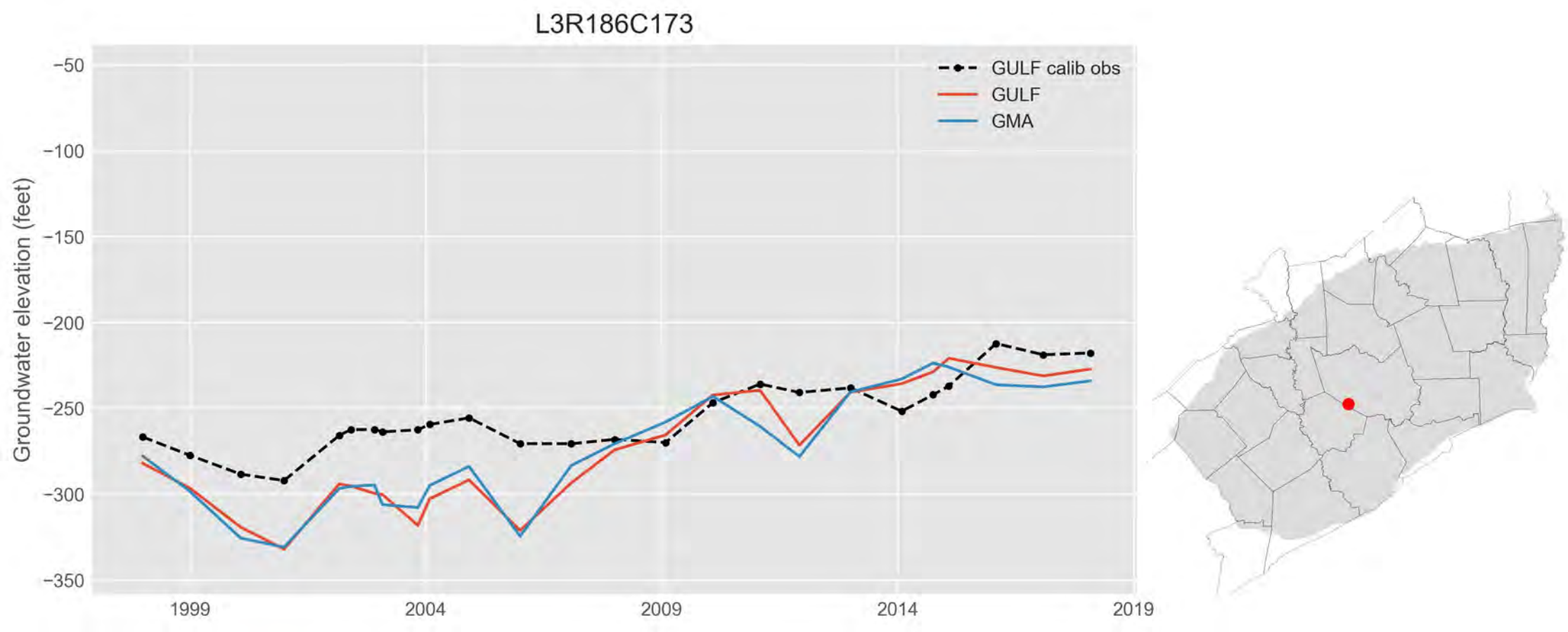

L3R184C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1989
1994
1999
2004
2009
2014
2019

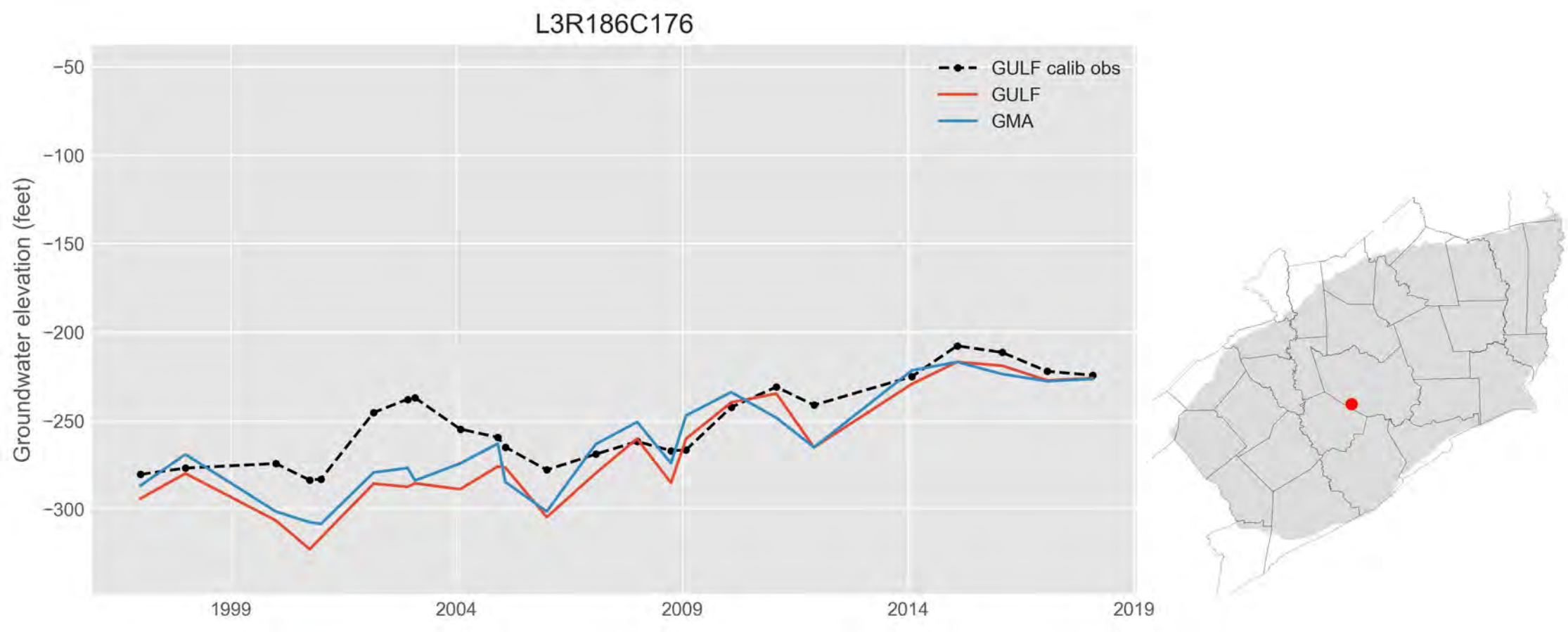

L3R184C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1949
1954
1959
1964
1969
1974
1979

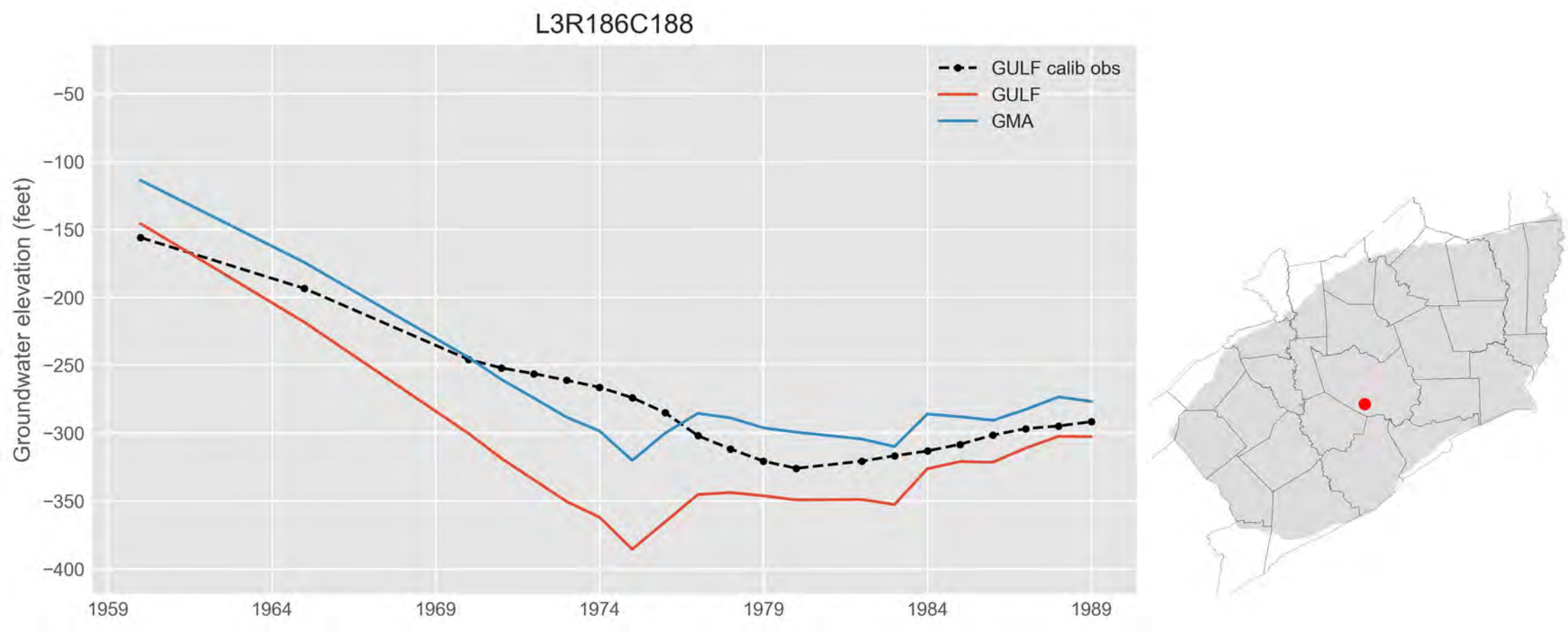

L3R184C206
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1949
1954
1959
1964
1969
1974
1979
1984
1989

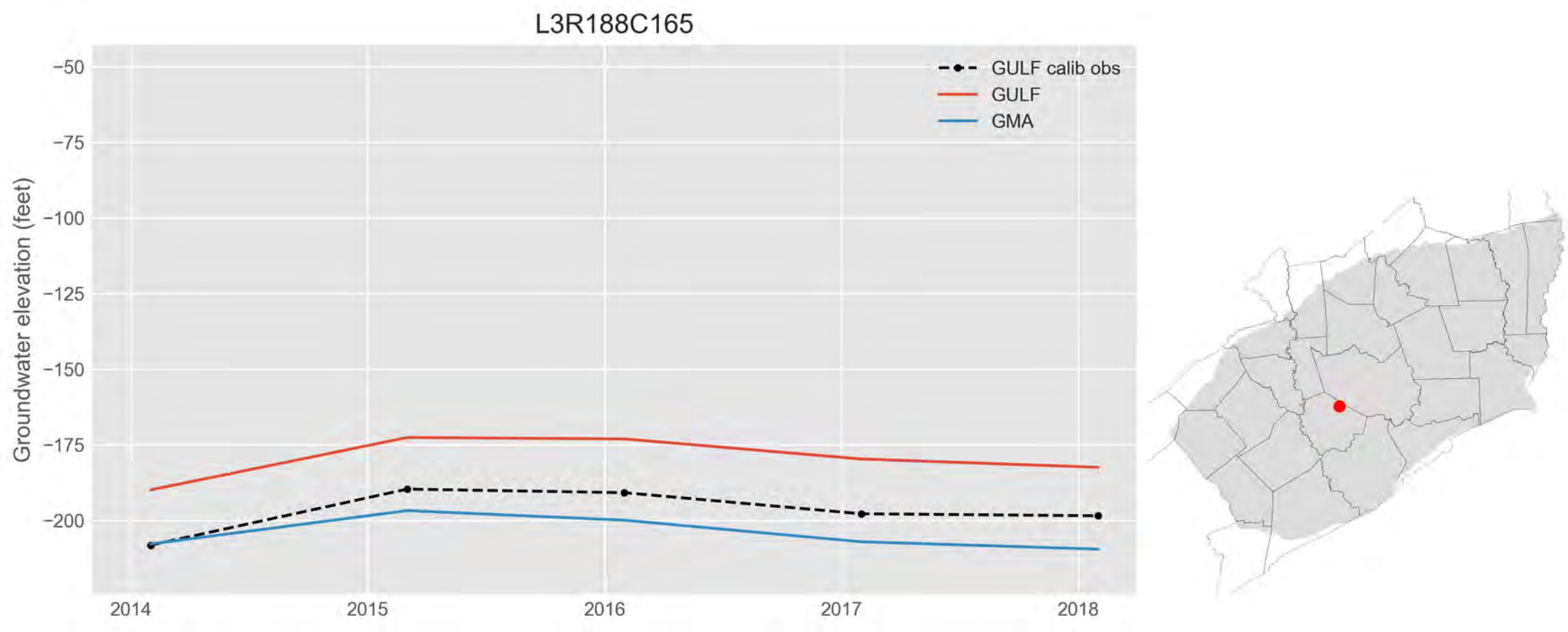

L3R185C097
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1954
1959
1964
1969
1974
GULF calib obs
GULF
GMA

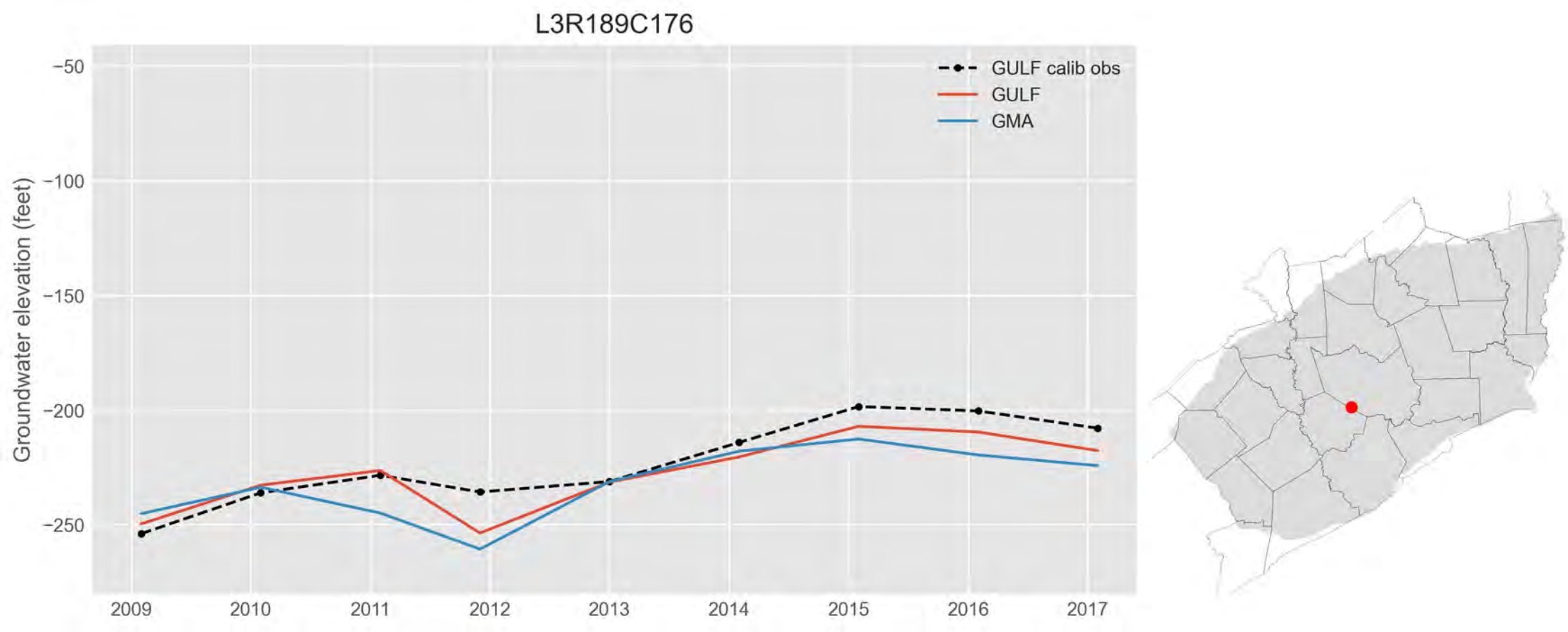

L3R186C100
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1954
1959
1964
1969
1974
GULF calib obs
GULF
GMA

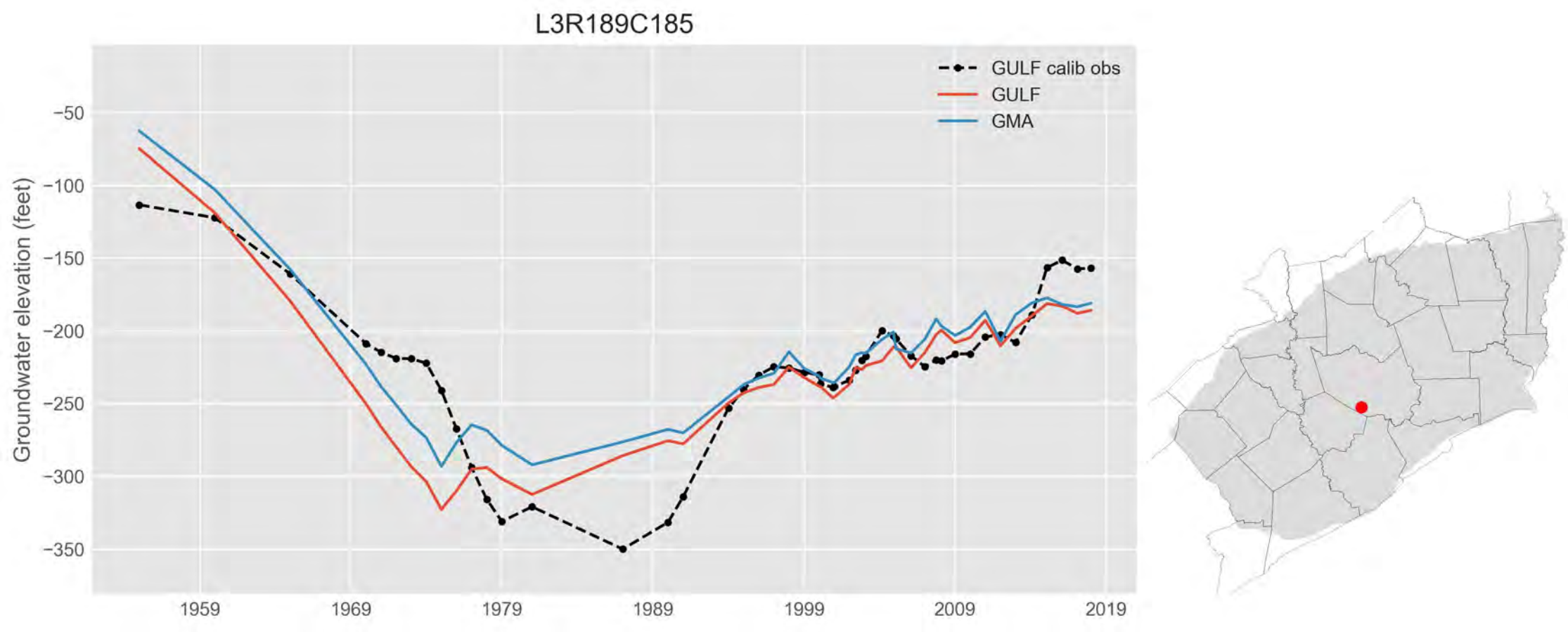

L3R186C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1999
2004
2009
2014
2019

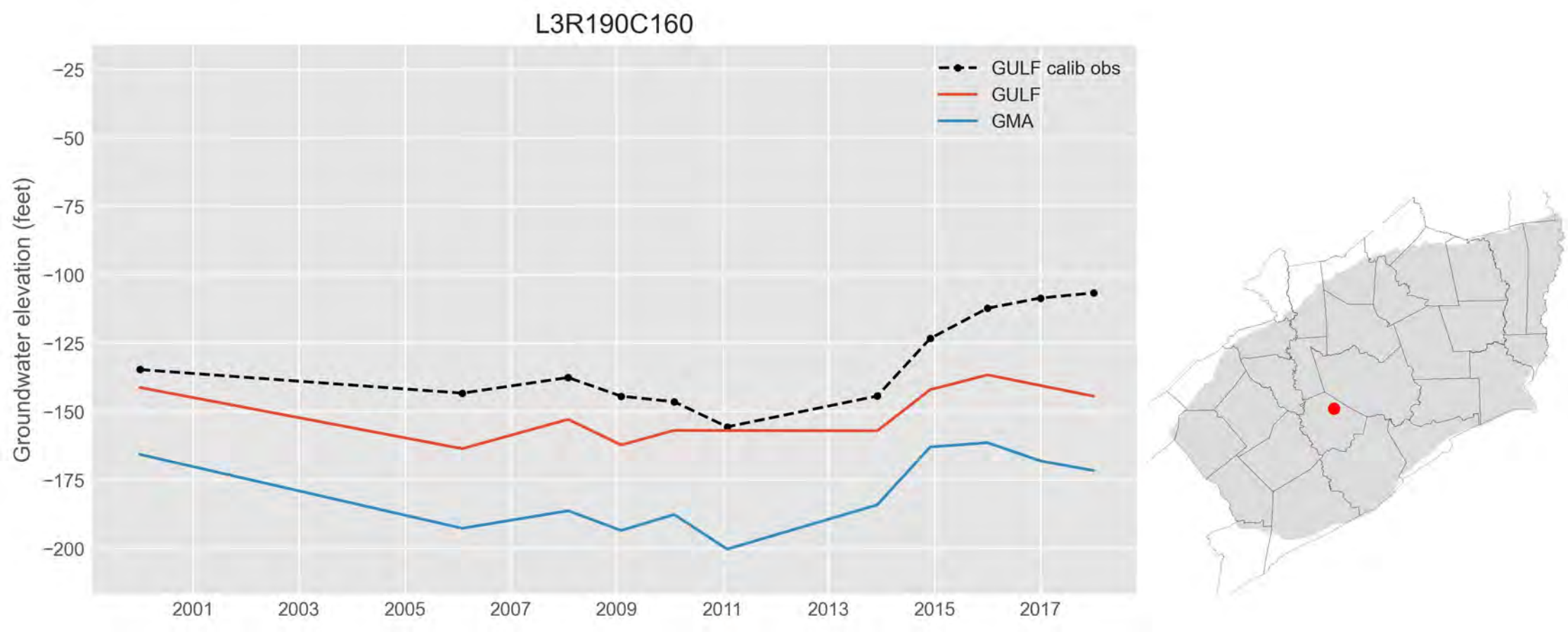

L3R186C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1999
2004
2009
2014
2019

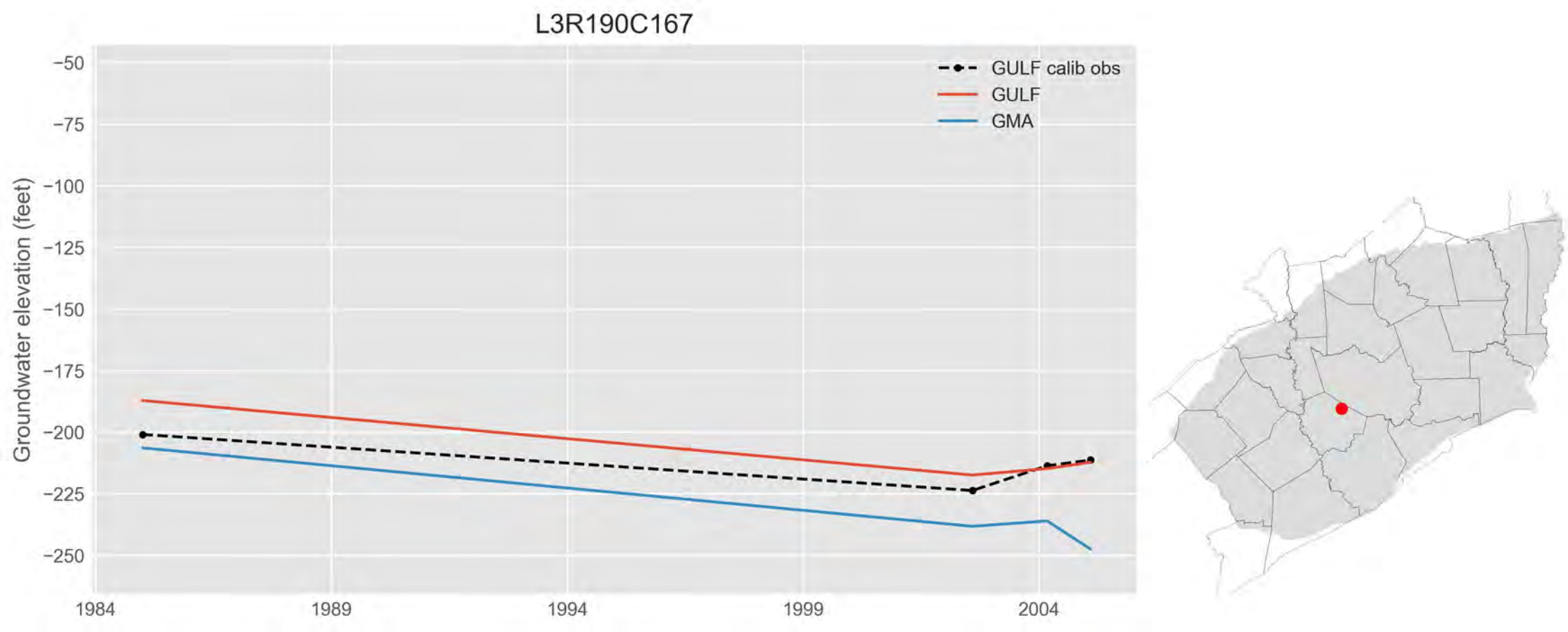

L3R186C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
−400
1959
1964
1969
1974
1979
1984
1989

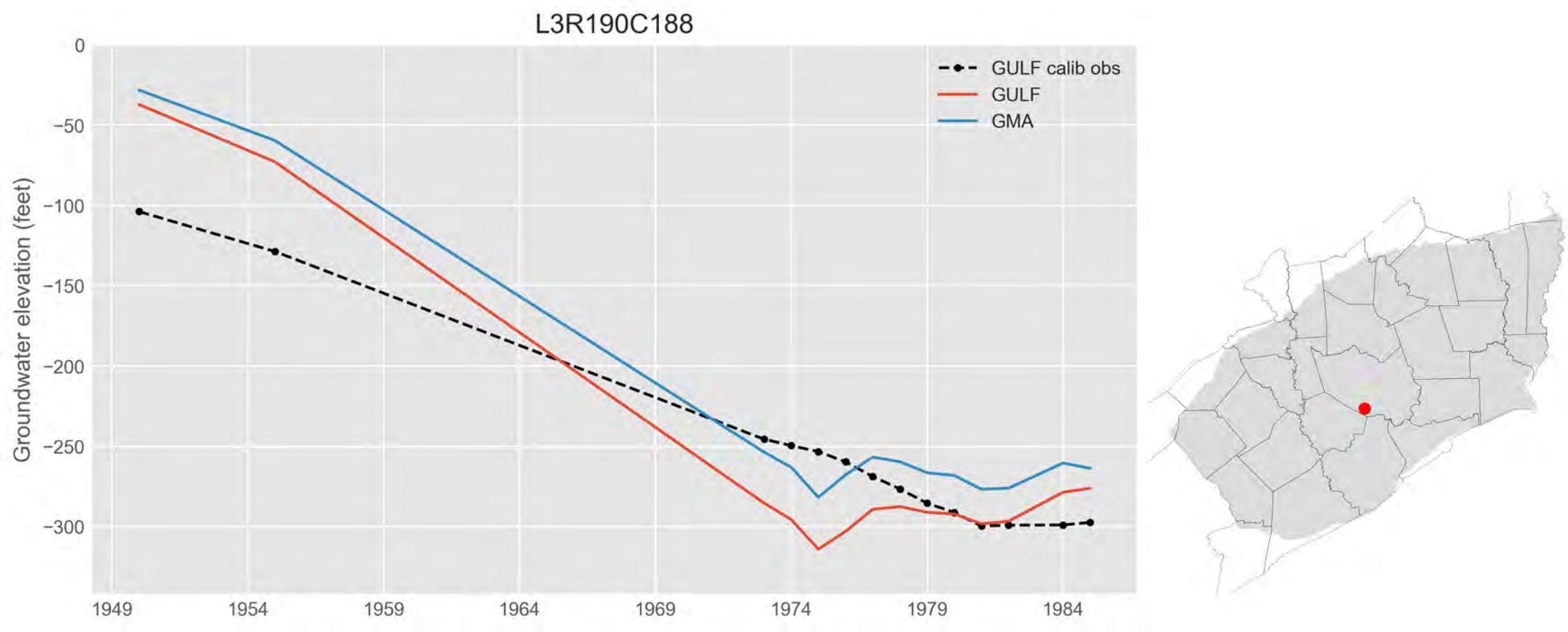

L3R188C165
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
2014
2015
2016
2017
2018

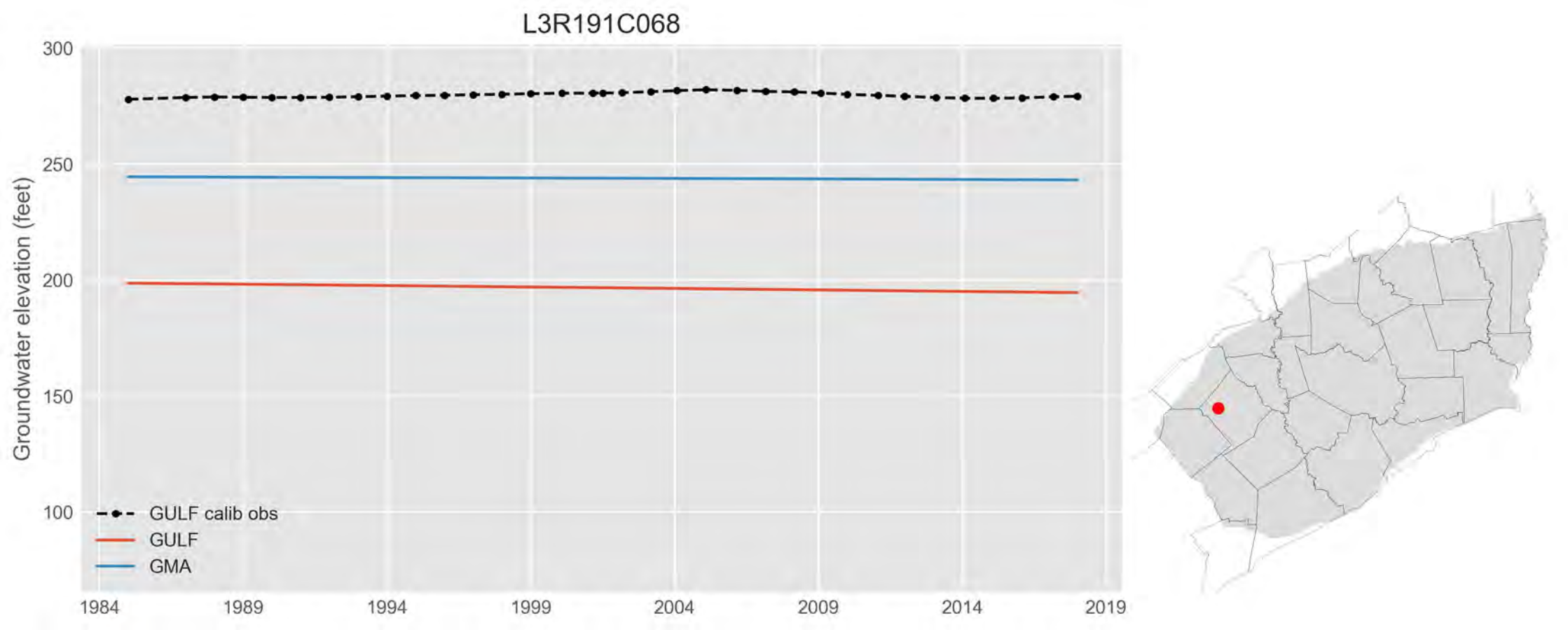

L3R189C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
2009
2010
2011
2012
2013
2014
2015
2016
2017

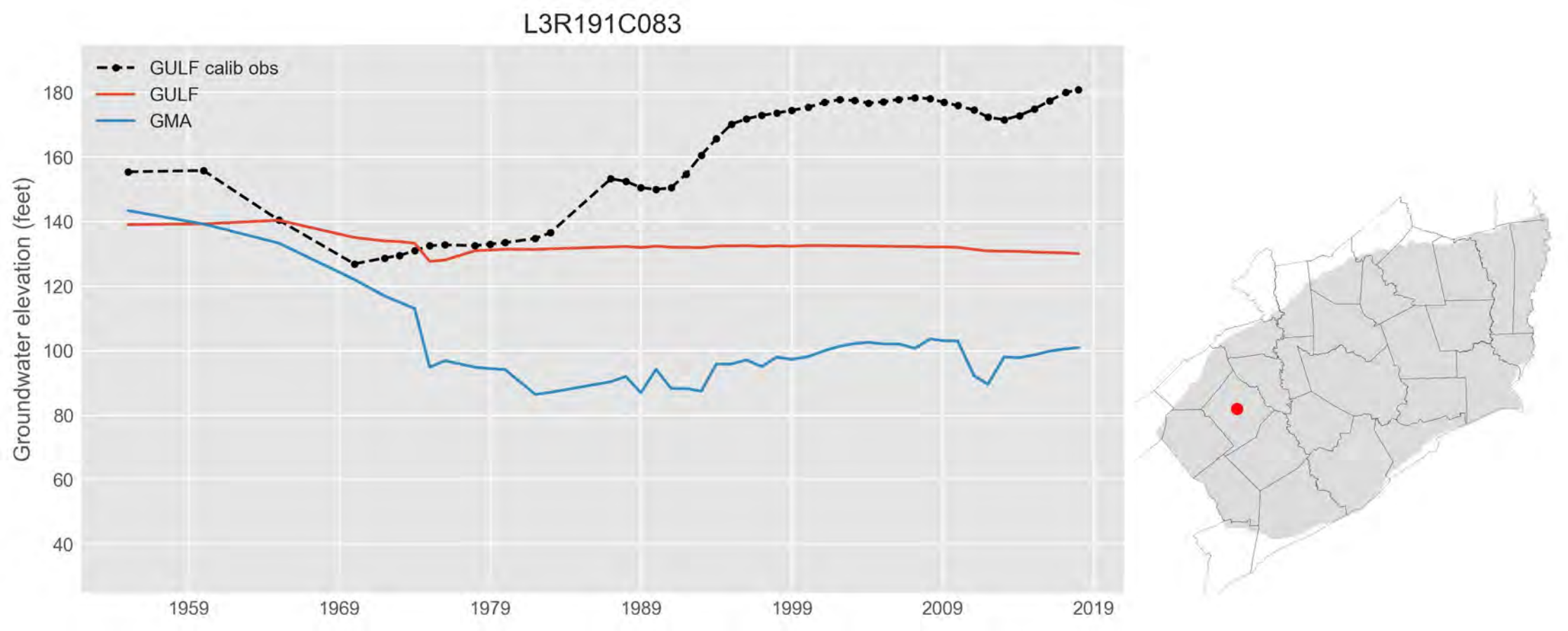

L3R189C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
−350
1959
1969
1979
1989
1999
2009
2019


L3R190C160
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
2001
2003
2005
2007
2009
2011
2013
2015
2017

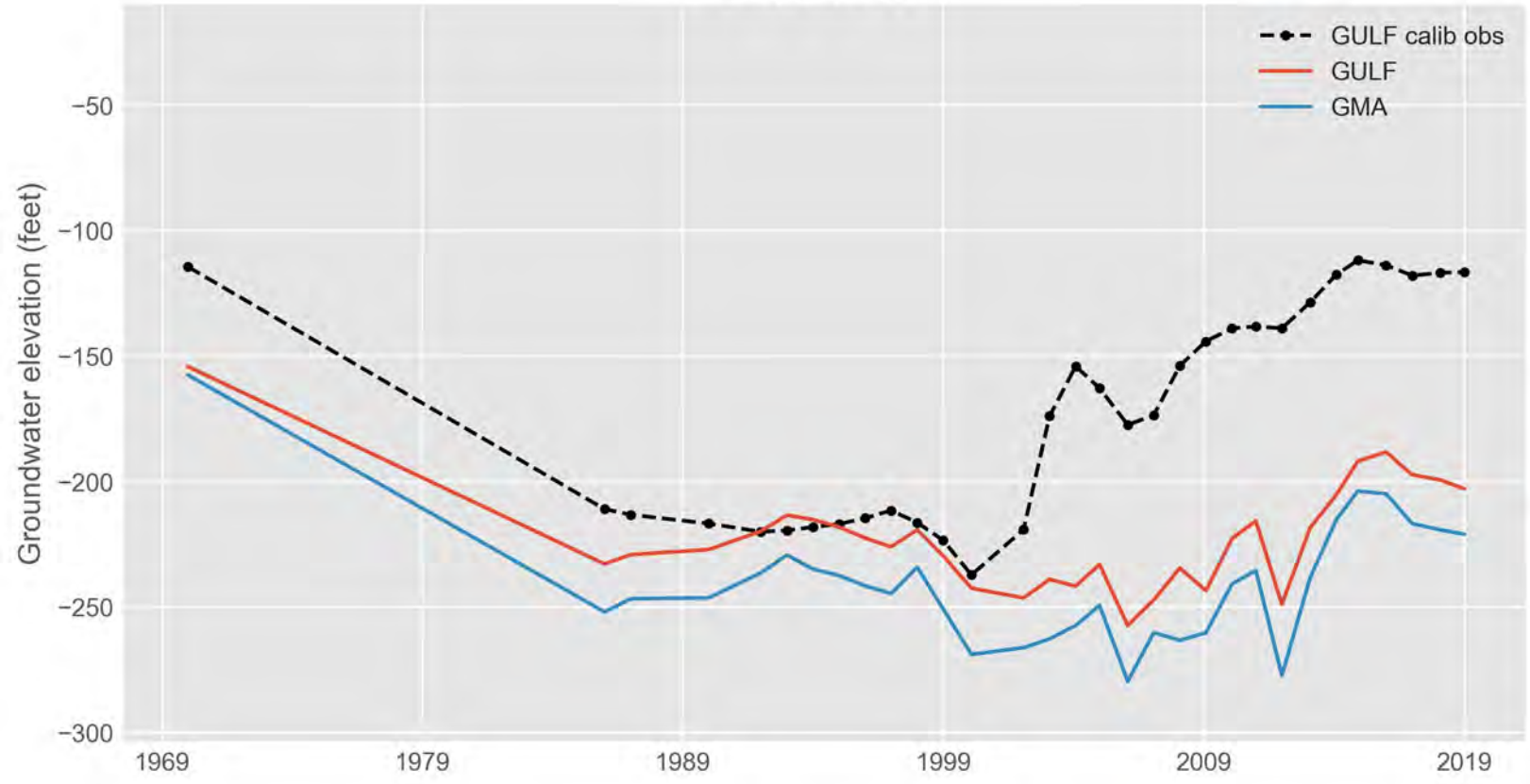

L3R190C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
−250
1984
1989
1994
1999
2004

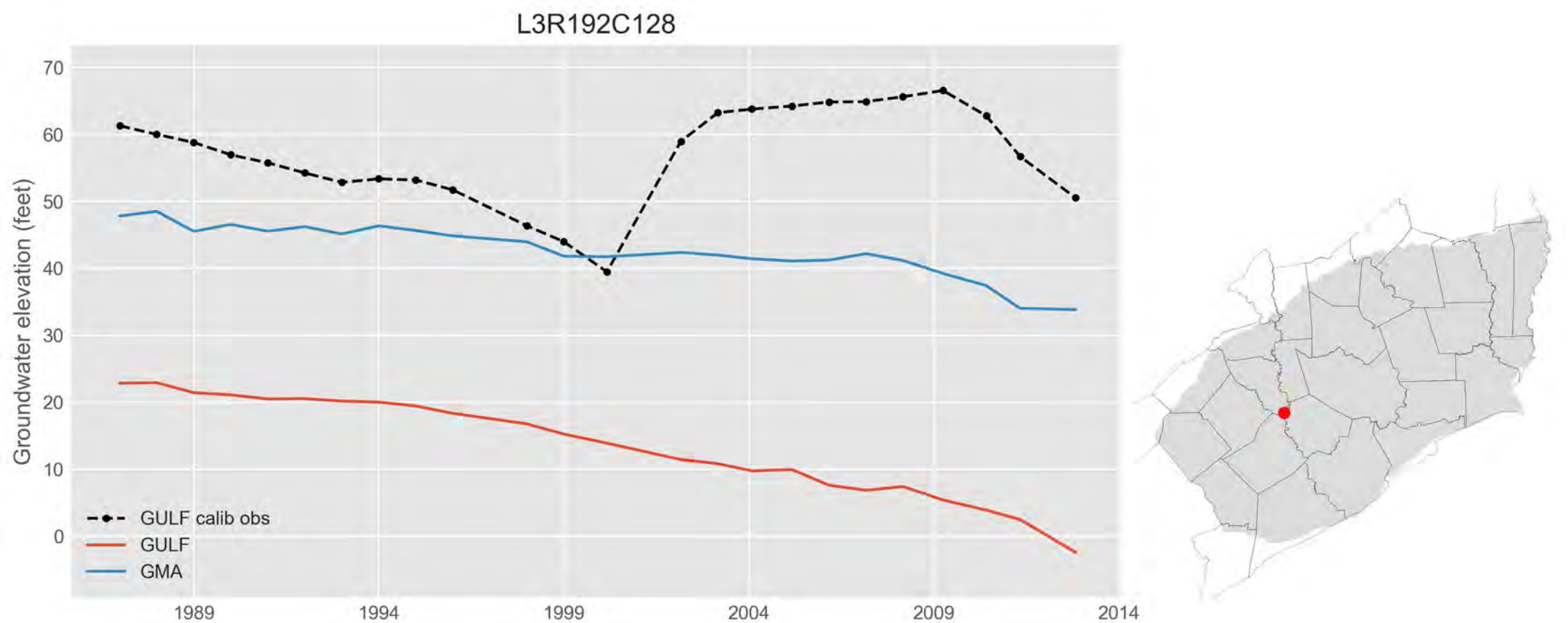

L3R190C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
−300
1949
1954
1959
1964
1969
1974
1979
1984

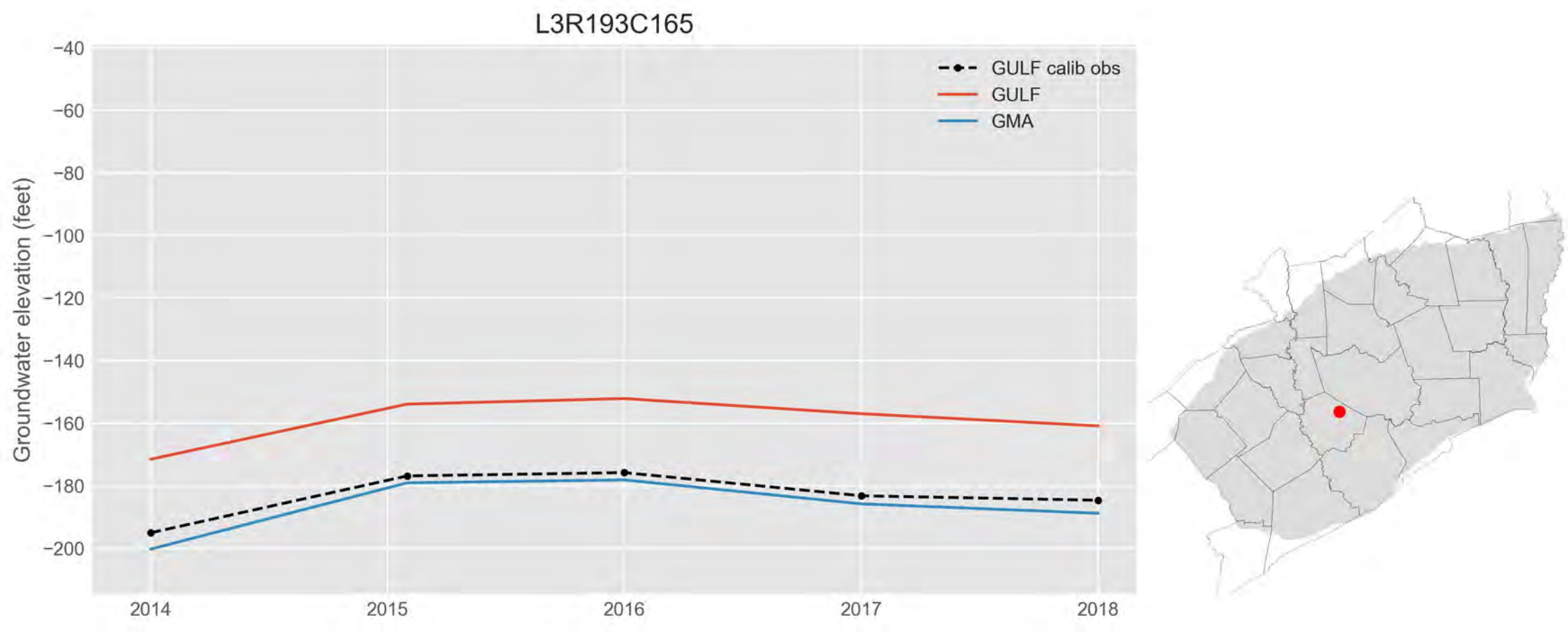

L3R191C068
Groundwater elevation (feet)
300
250
200
150
100
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

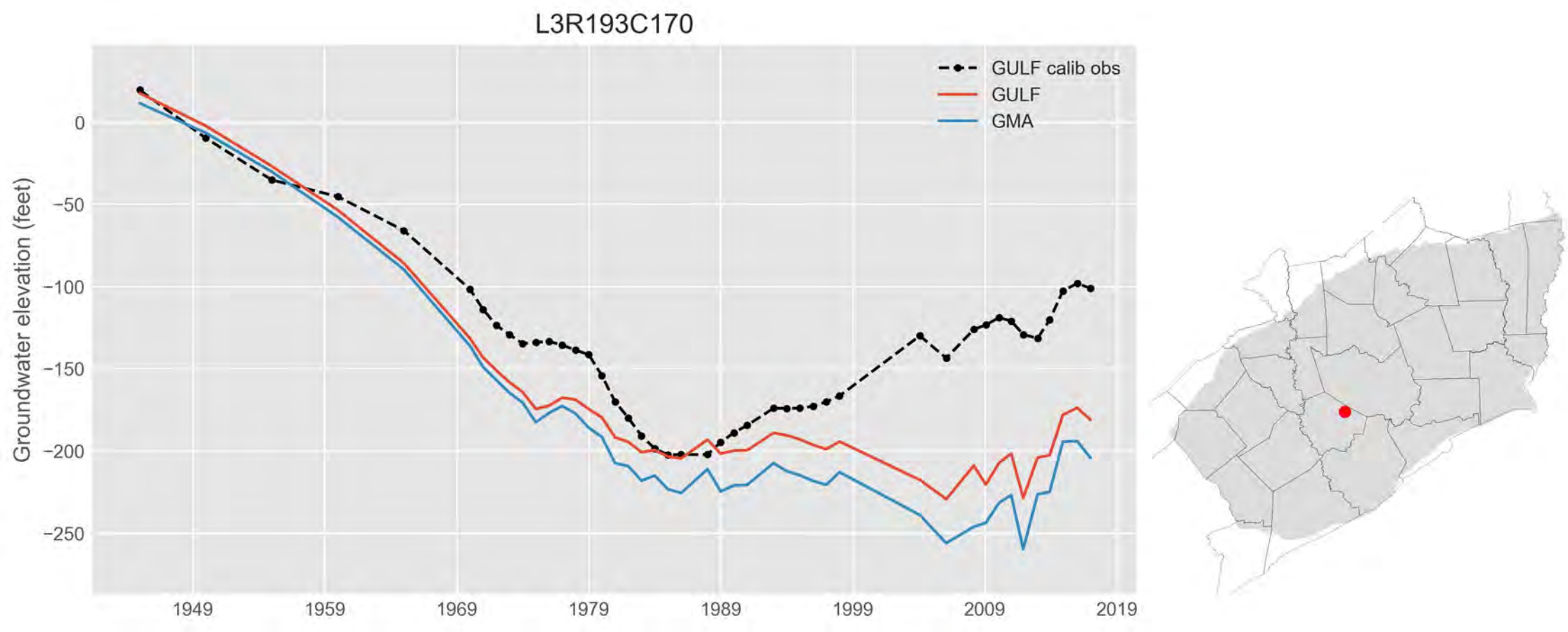

L3R191C083
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1959
1969
1979
1989
1999
2009
2019

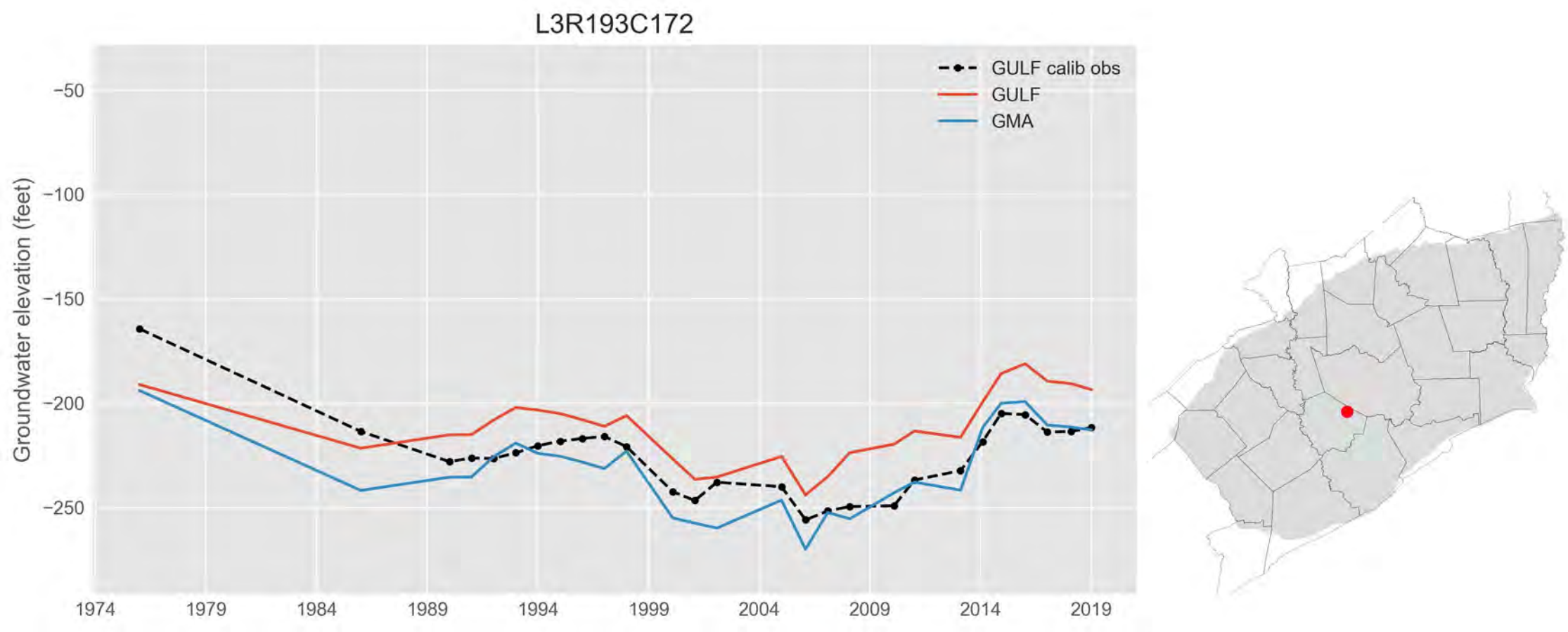
L3R191C171

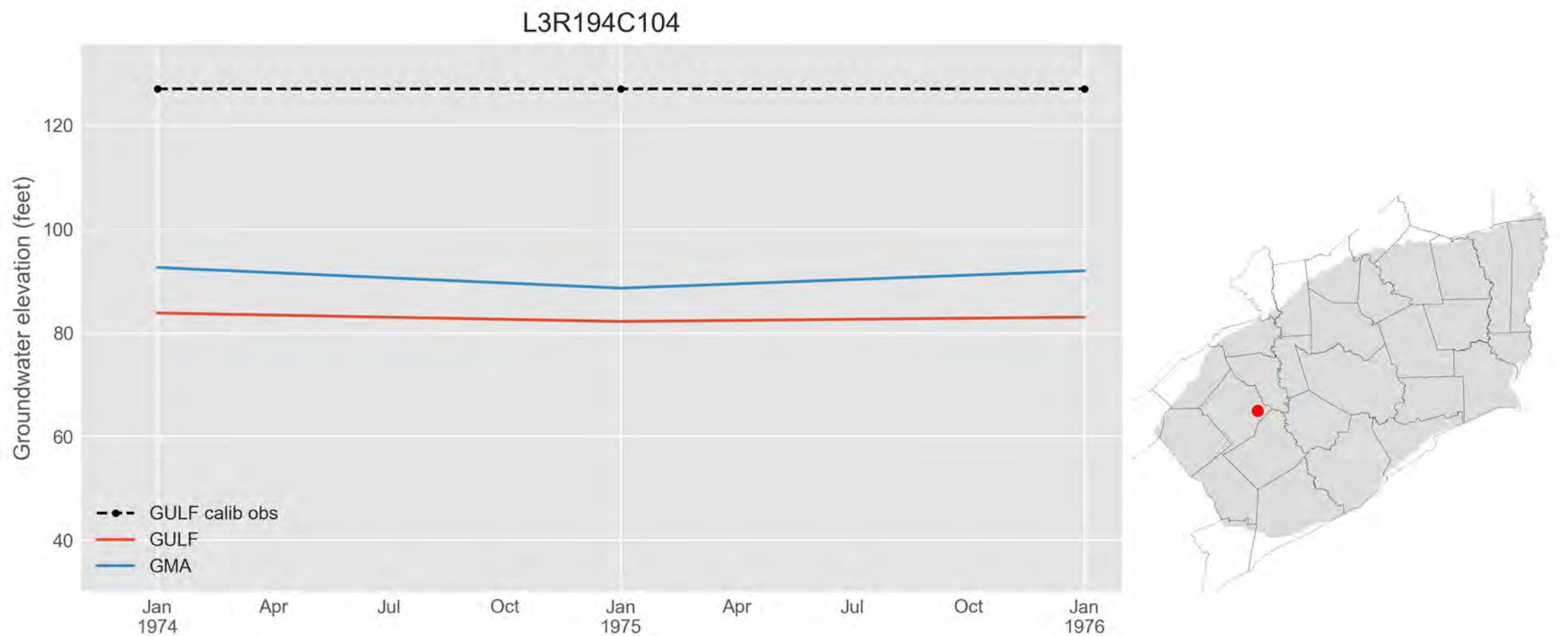

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
−300
1969
1979
1989
1999
2009
2019

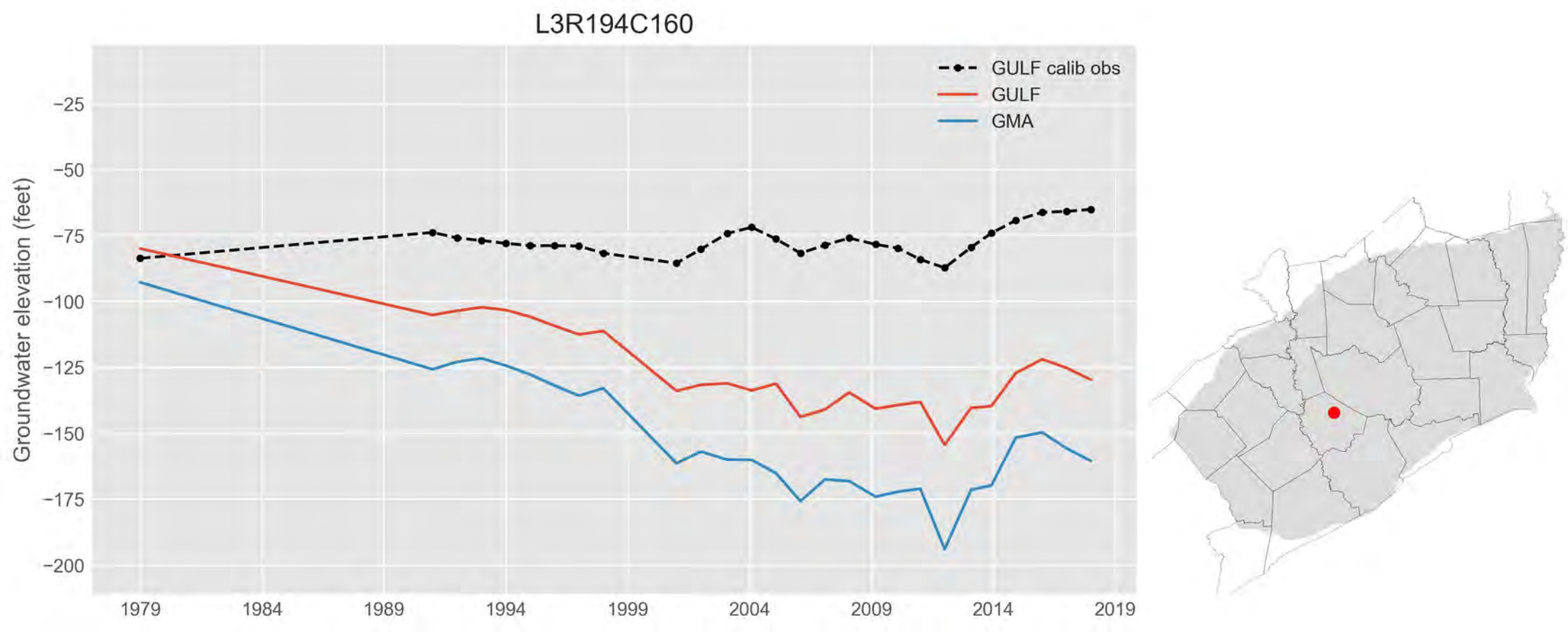

L3R192C128
Groundwater elevation (feet)
70
60
50
40
30
20
10
0
1989
1994
1999
2004
2009
2014
GULF calib obs
GULF
GMA

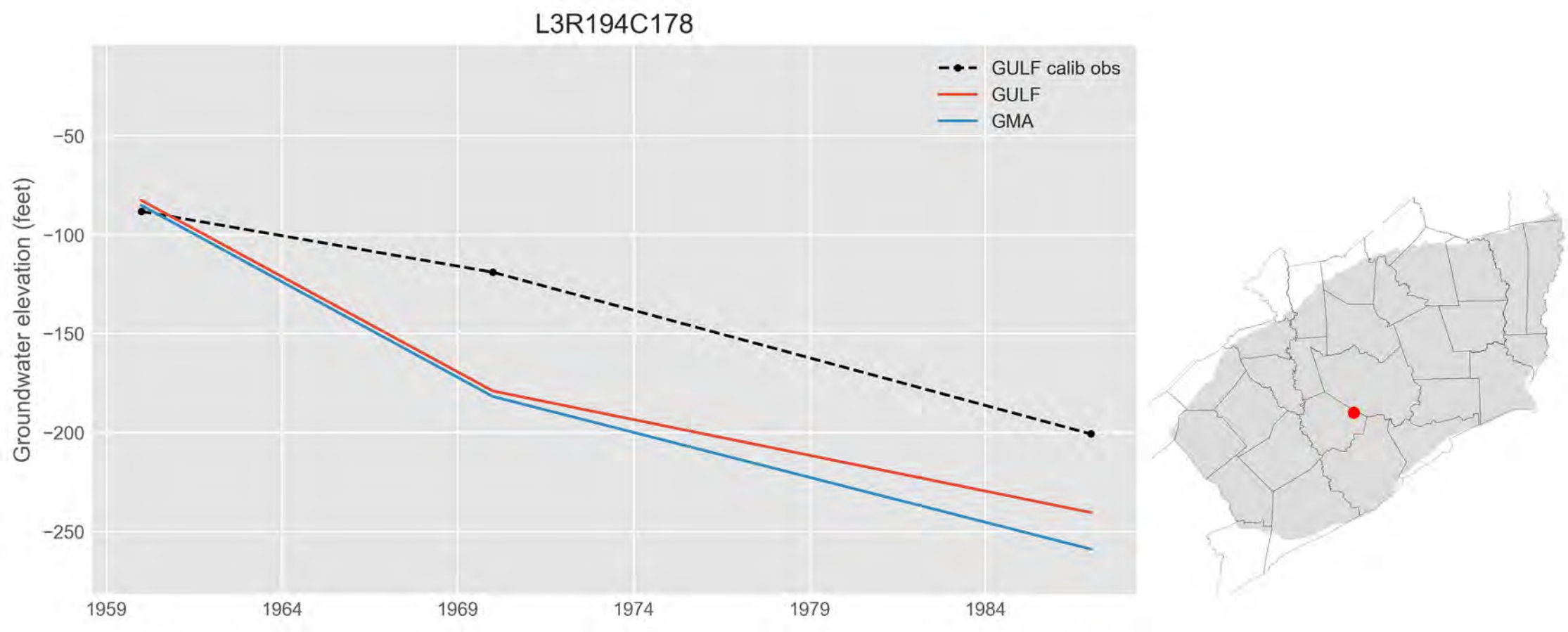

L3R193C165
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−40
−60
−80
−100
−120
−140
−160
−180
−200
2014
2015
2016
2017
2018

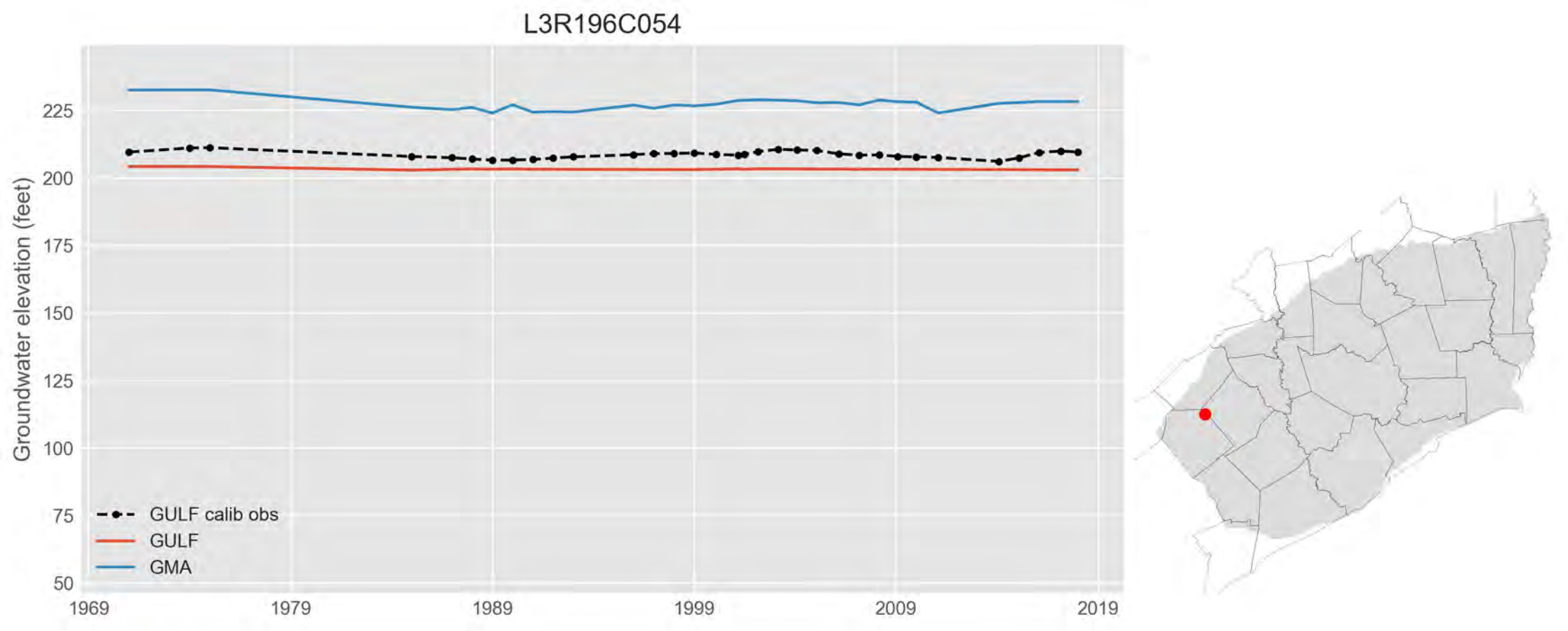

L3R193C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
1949
1959
1969
1979
1989
1999
2009
2019

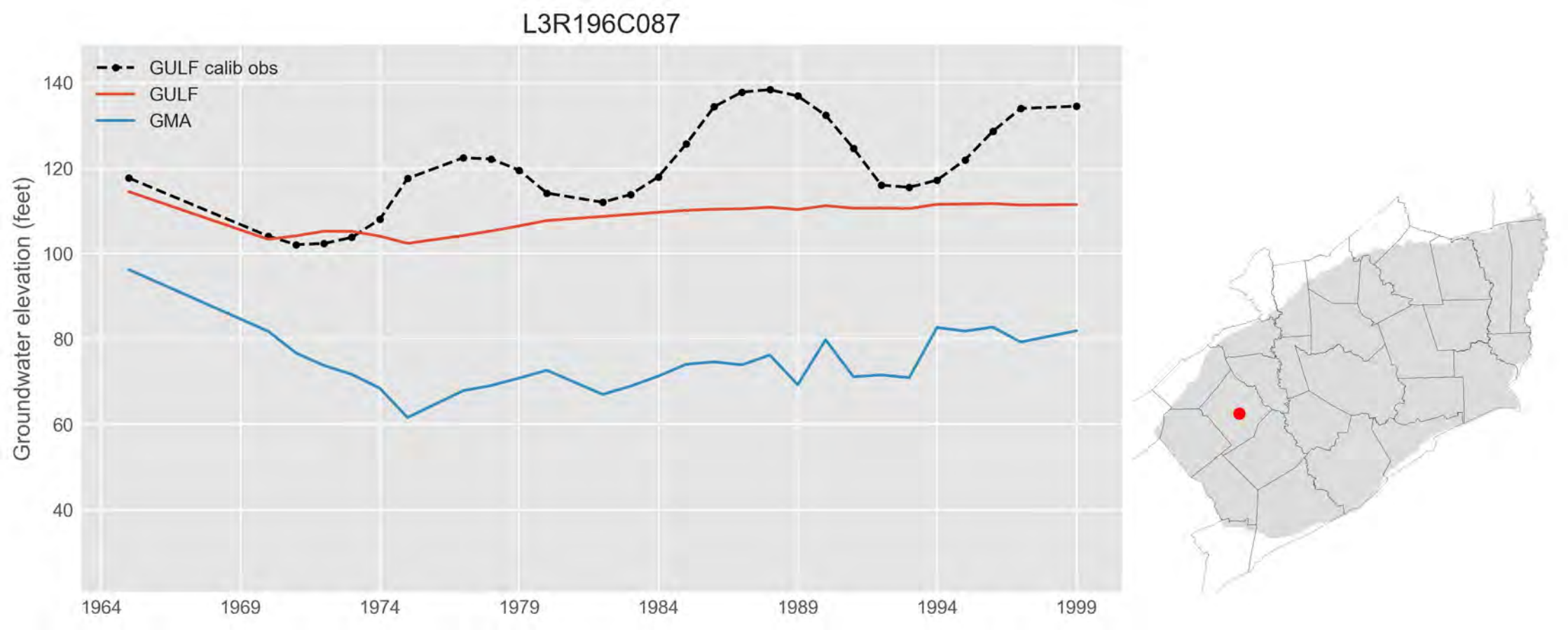

L3R193C172
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

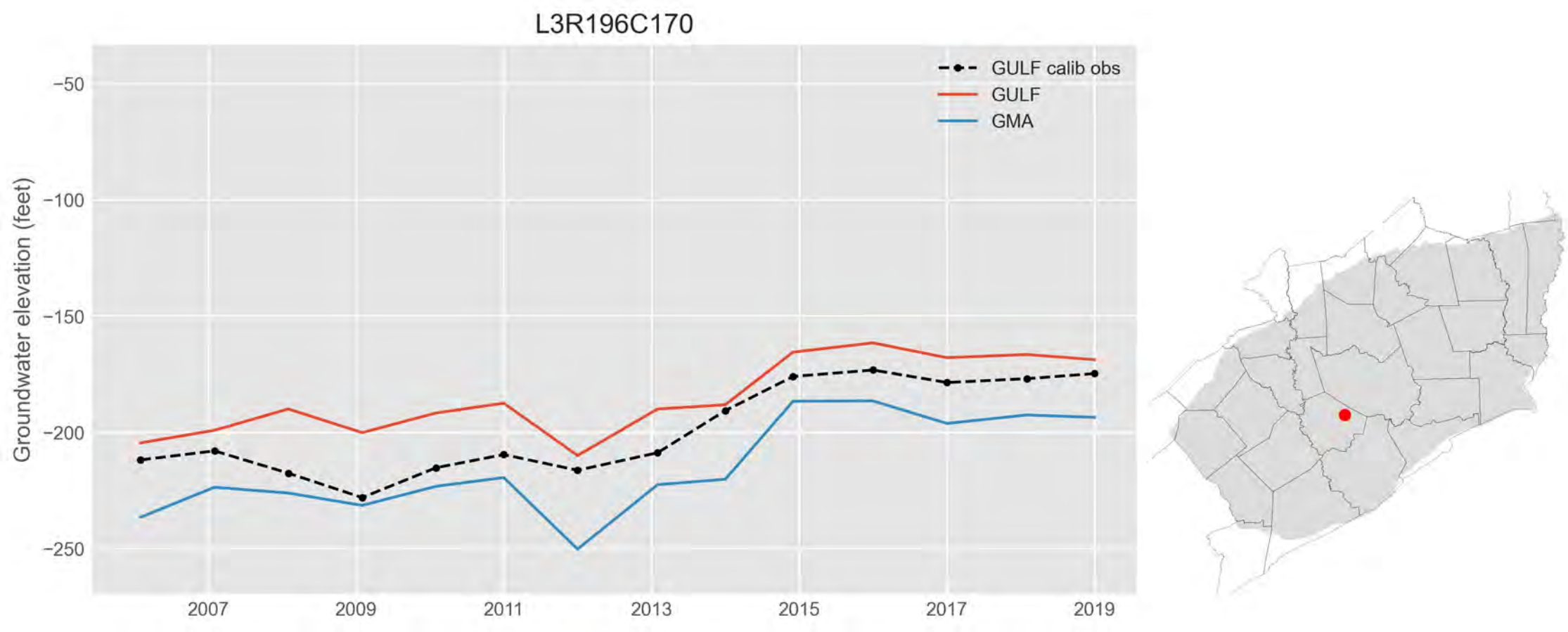

L3R194C104
Groundwater elevation (feet)
120
100
80
60
40
GULF calib obs
GULF
GMA
Jan
1974
Apr
Jul
Oct
Jan
1975
Apr
Jul
Oct
Jan
1976

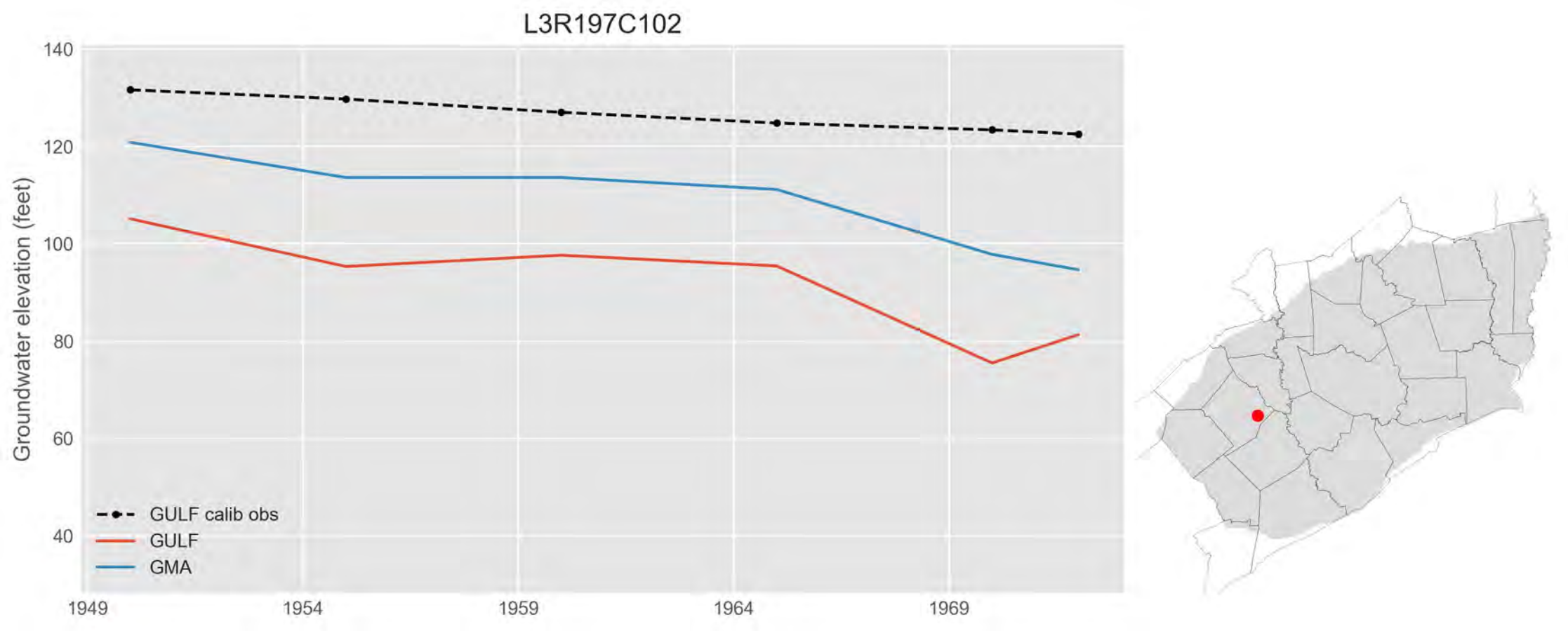

L3R194C160
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1979
1984
1989
1994
1999
2004
2009
2014
2019

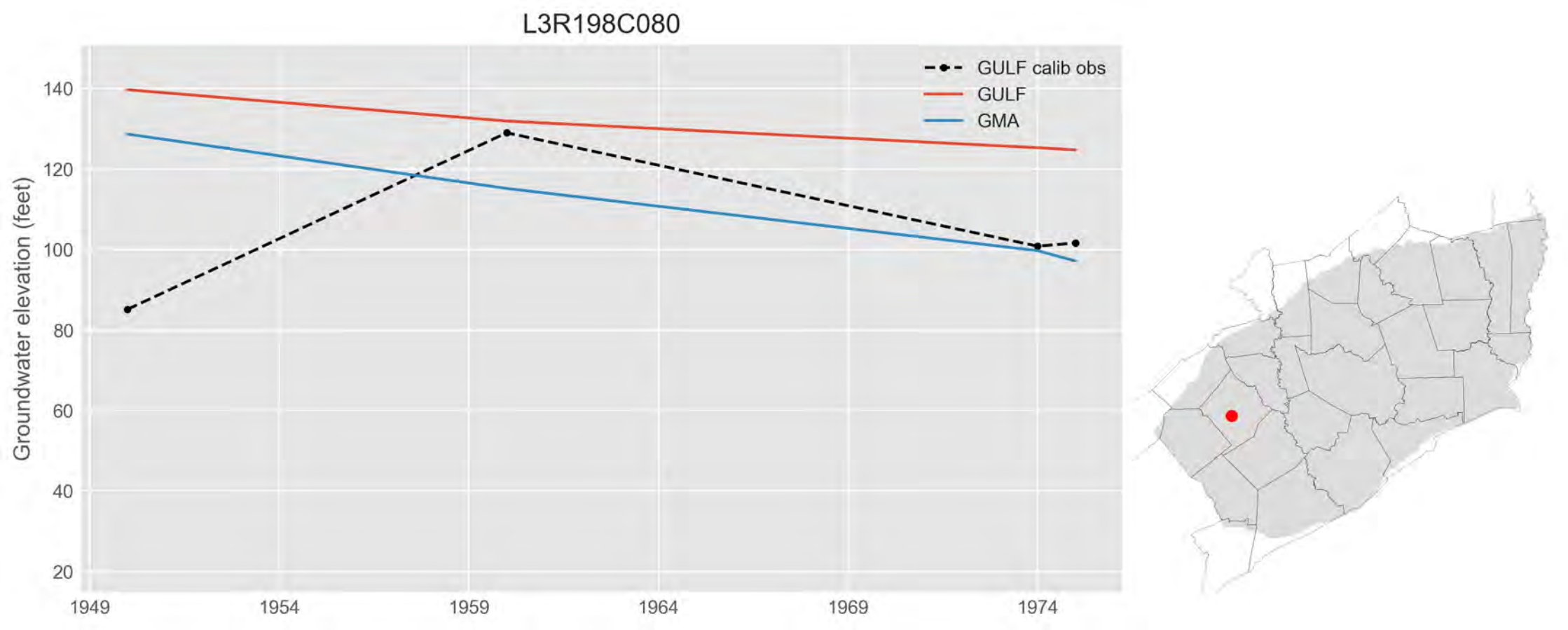

L3R194C178
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
1959
1964
1969
1974
1979
1984

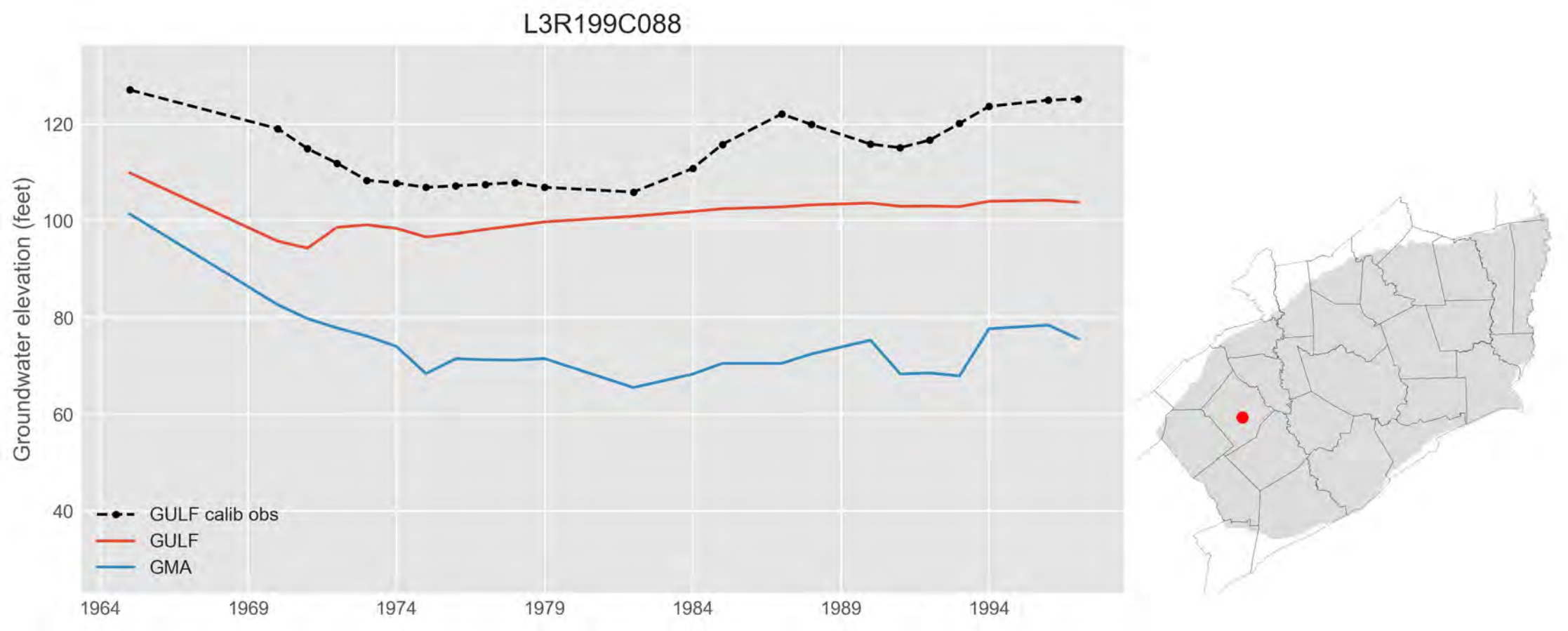

L3R196C054
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

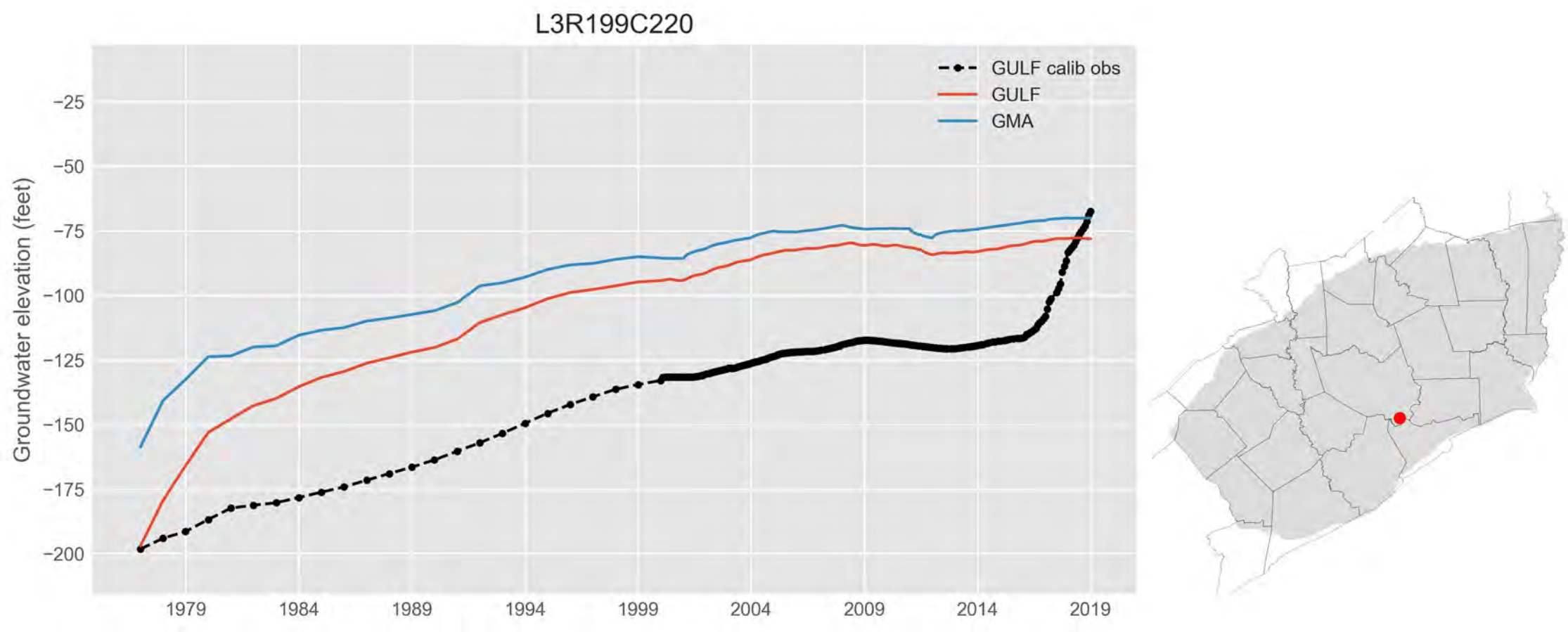

L3R196C087
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
1964
1969
1974
1979
1984
1989
1994
1999

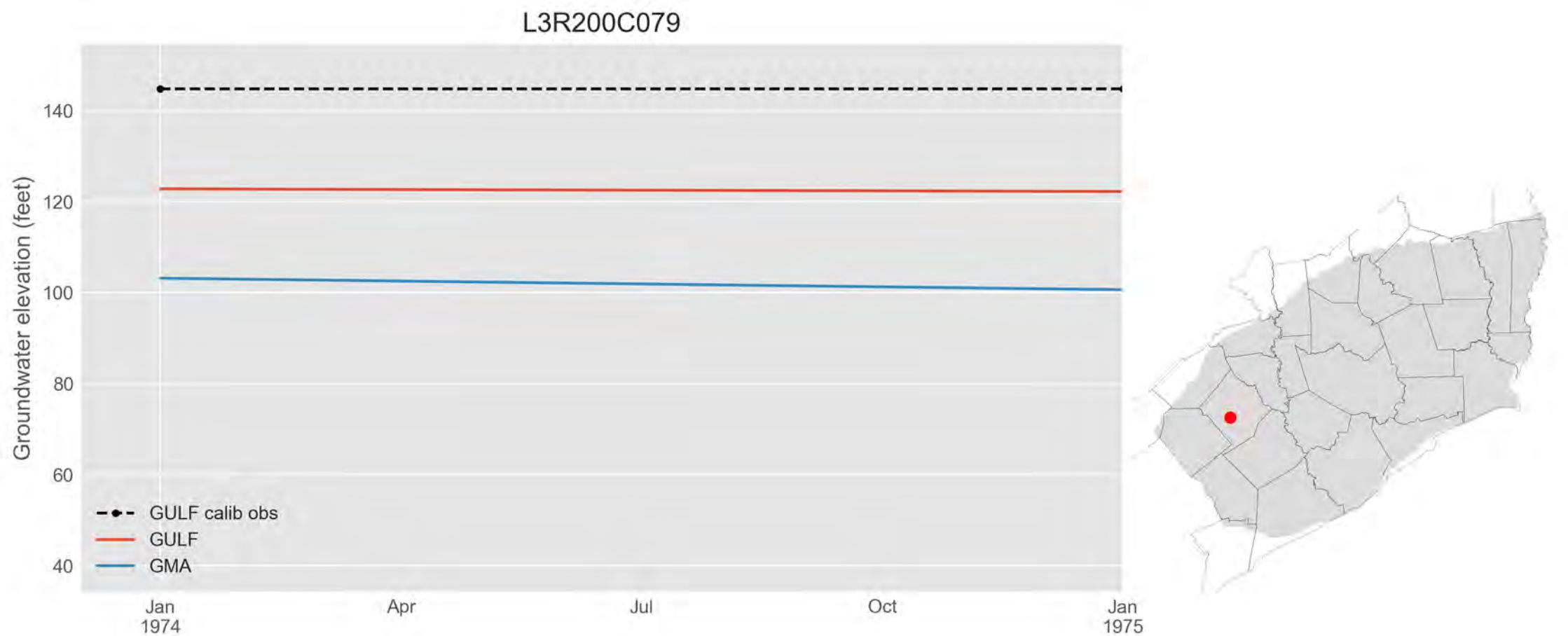

L3R196C170
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−100
−150
−200
−250
2007
2009
2011
2013
2015
2017
2019


L3R197C102
Groundwater elevation (feet)
140
120
100
80
60
40
1949
1954
1959
1964
1969
GULF calib obs
GULF
GMA

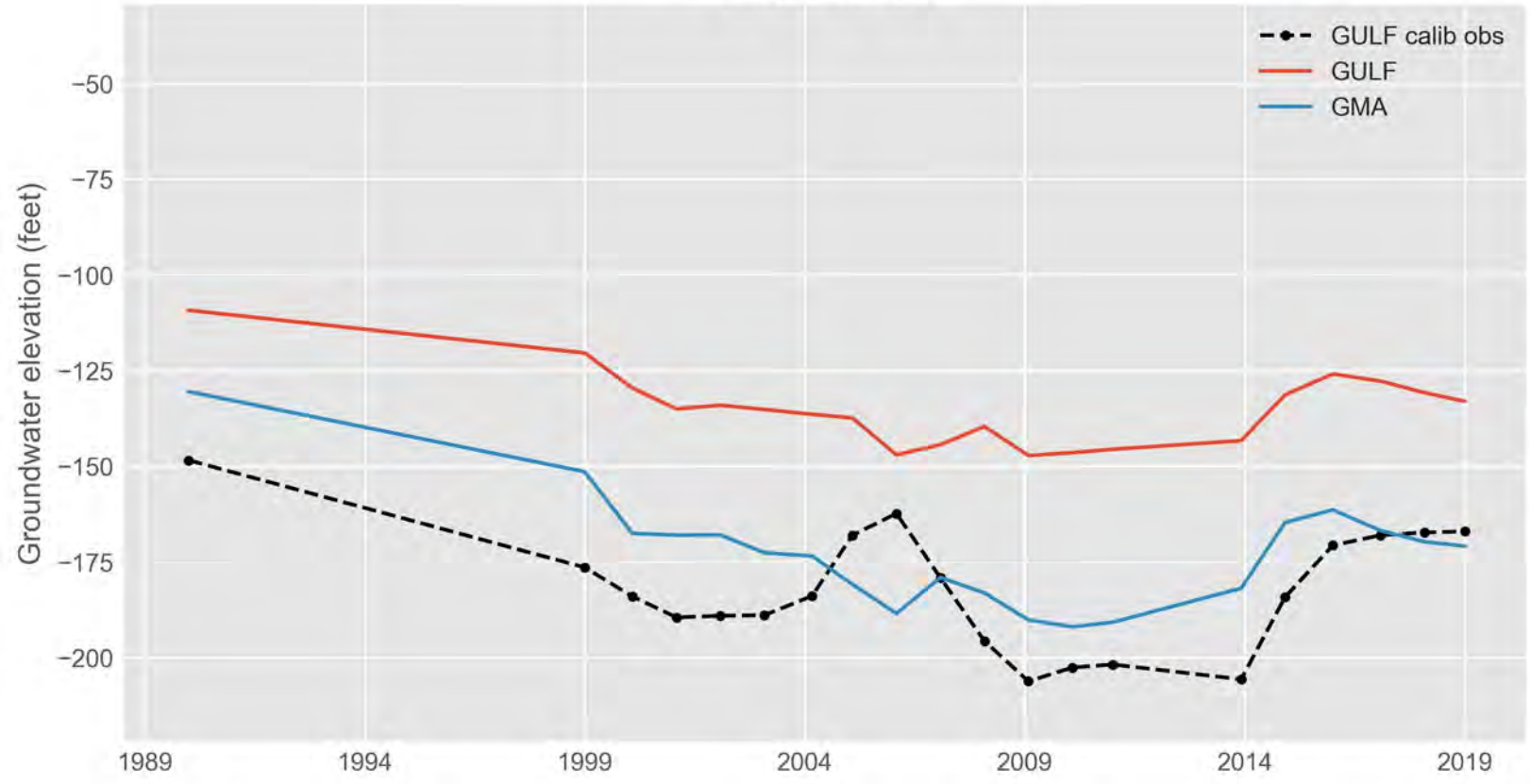

L3R198C080
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1949
1954
1959
1964
1969
1974

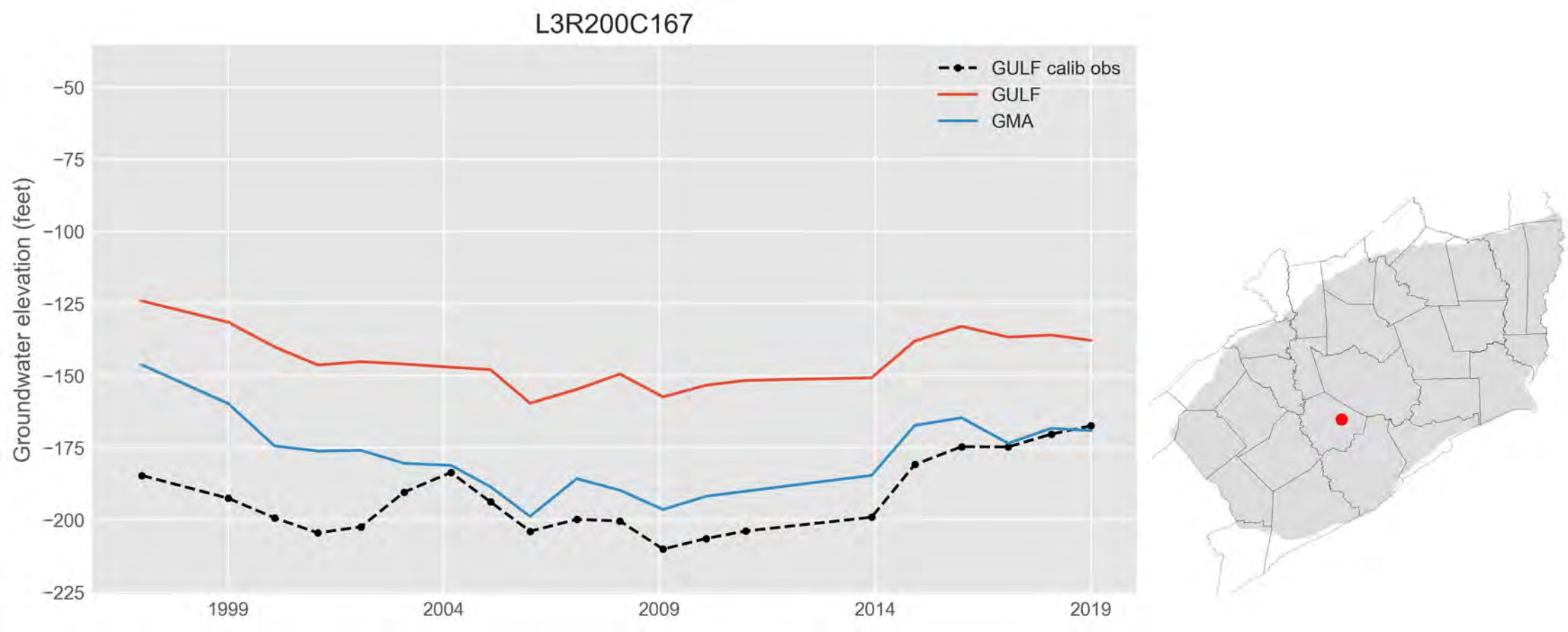

L3R199C088
Groundwater elevation (feet)
120
100
80
60
40
1964
1969
1974
1979
1984
1989
1994
GULF calib obs
GULF
GMA

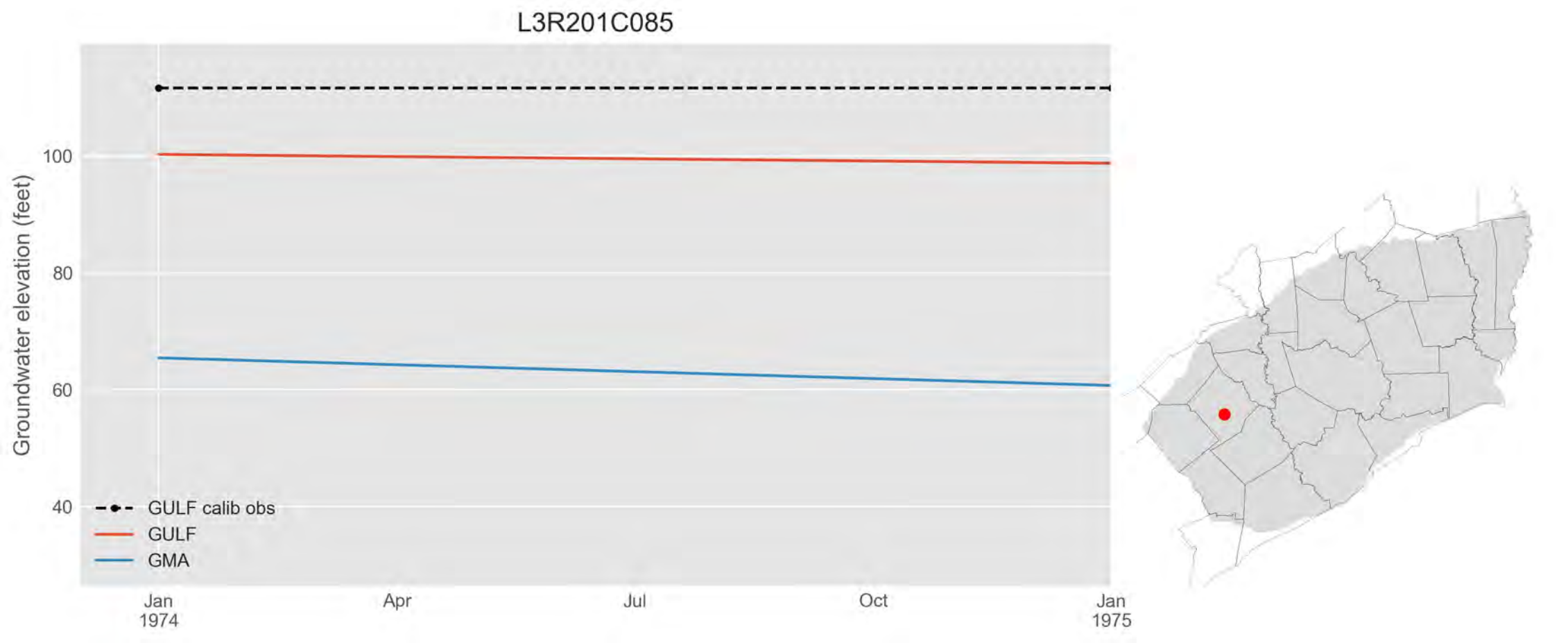

L3R199C220
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−25
−50
−75
−100
−125
−150
−175
−200
1979
1984
1989
1994
1999
2004
2009
2014
2019

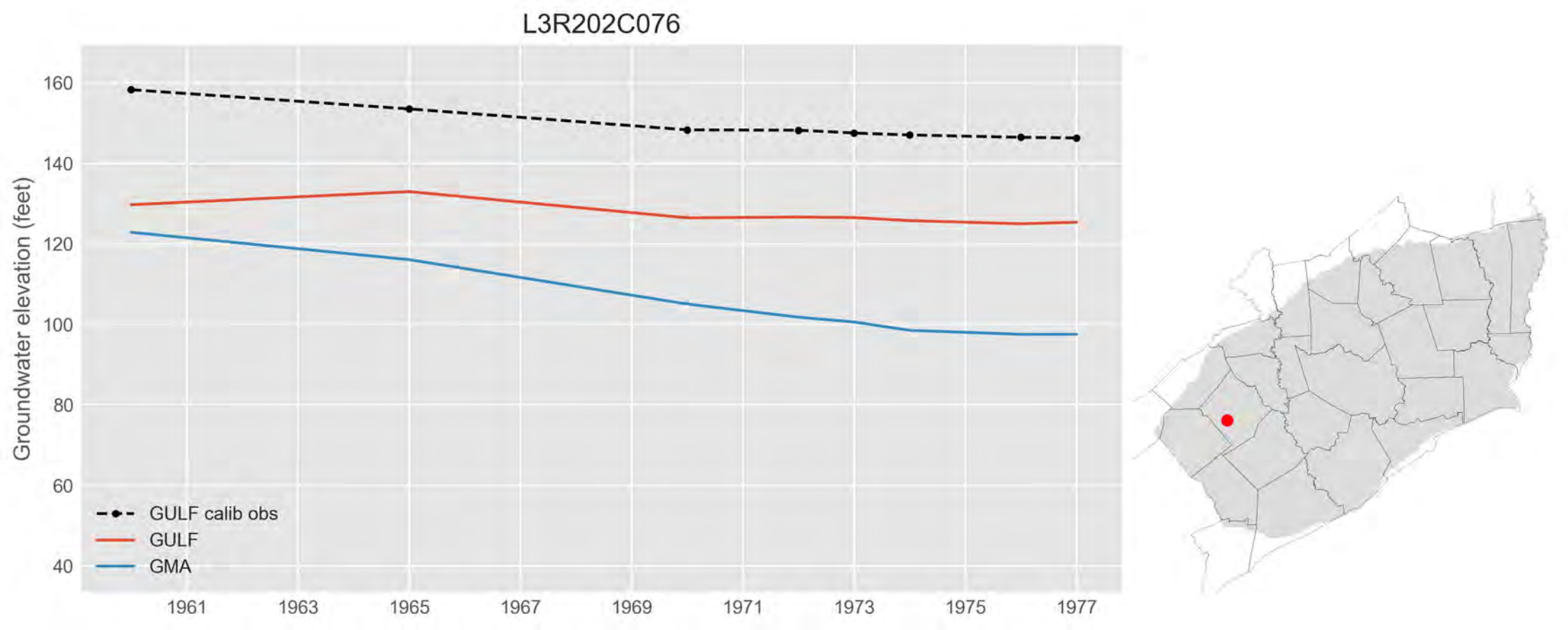

L3R200C079
Groundwater elevation (feet)
140
120
100
80
60
40
GULF calib obs
GULF
GMA
Jan
1974
Apr
Jul
Oct
Jan
1975

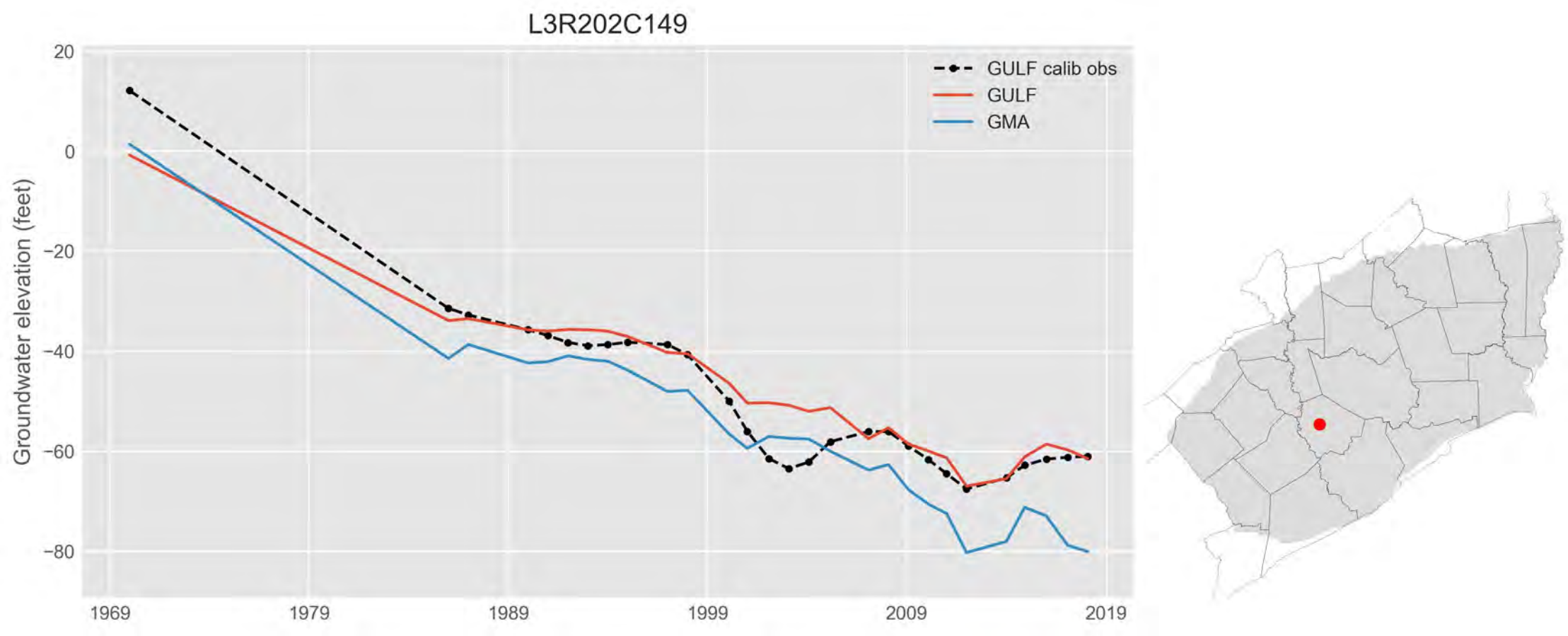
L3R200C165

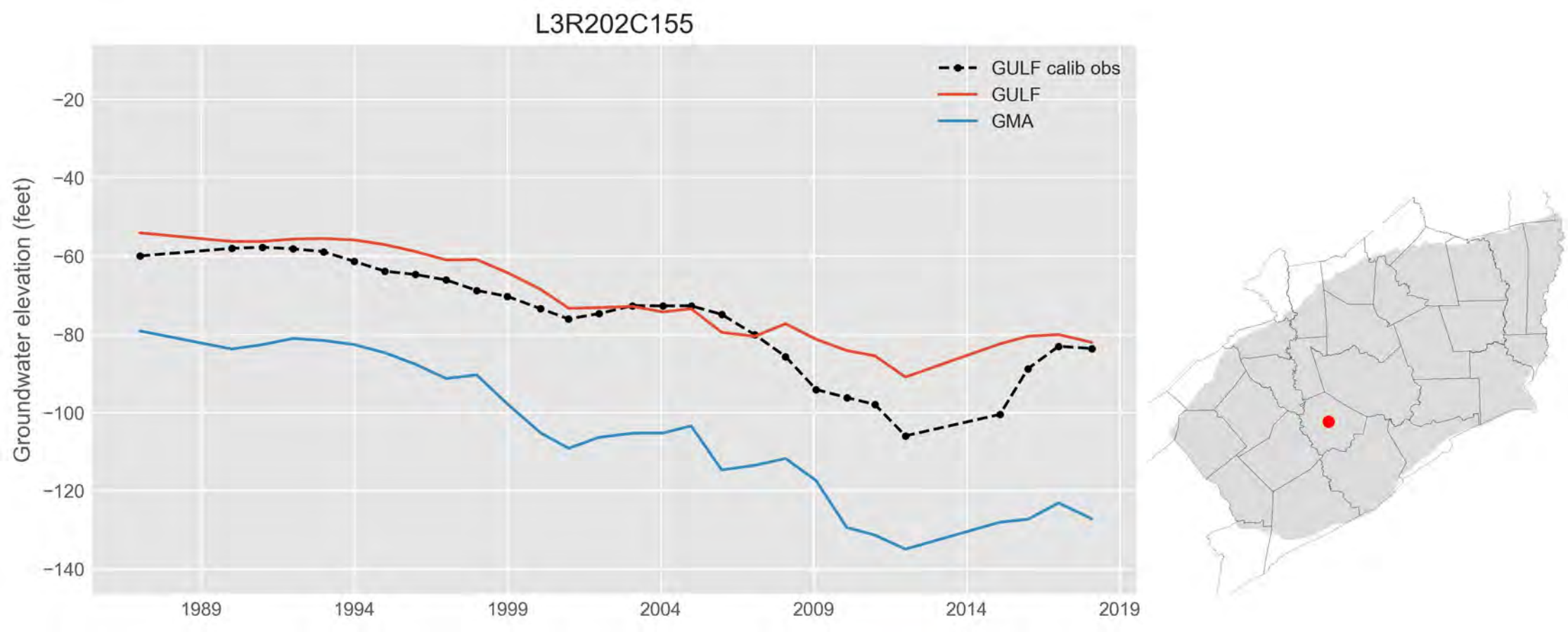

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
1989
1994
1999
2004
2009
2014
2019

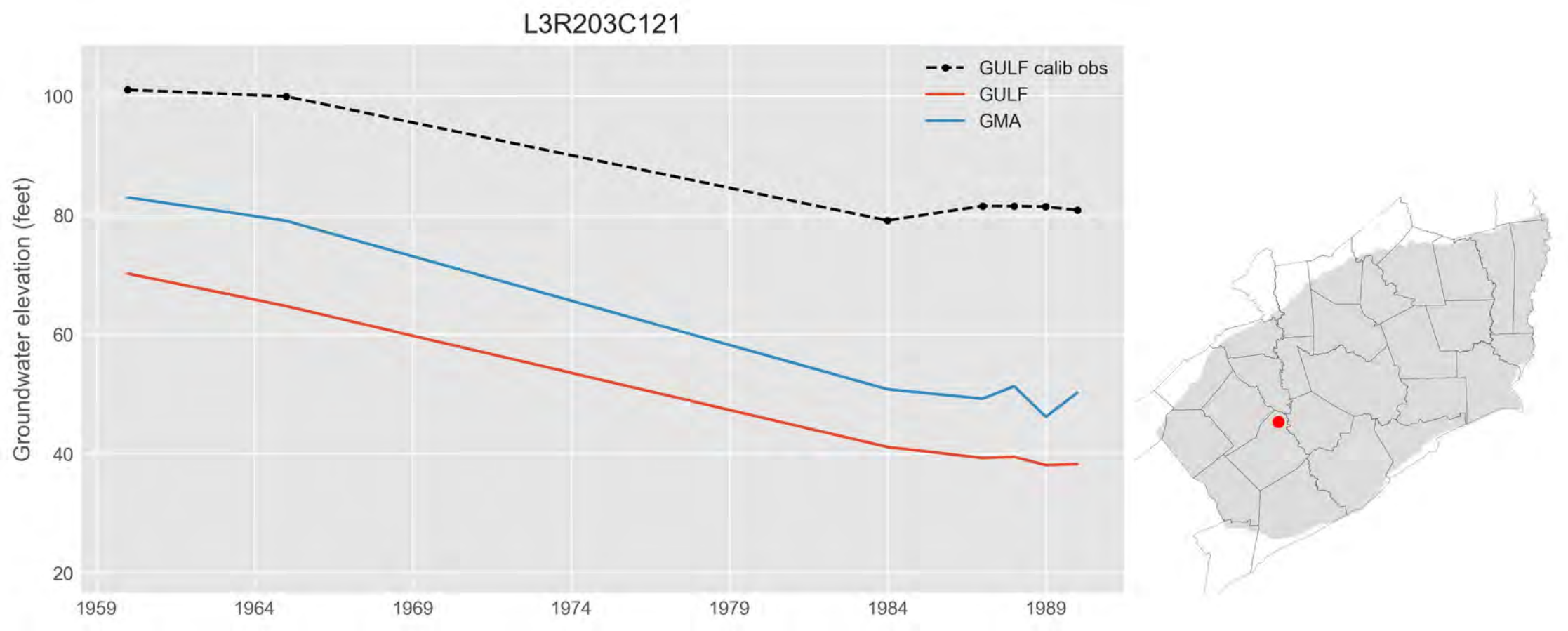

L3R200C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
1999
2004
2009
2014
2019

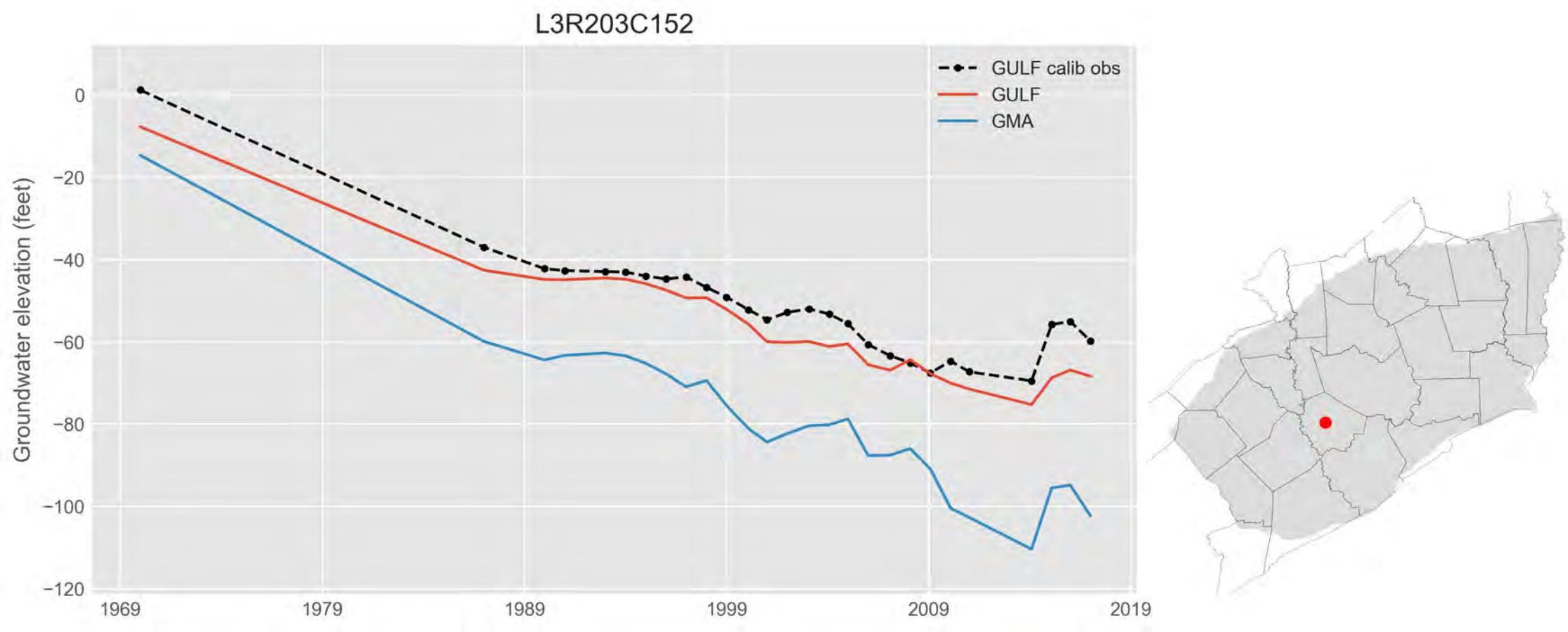

L3R201C085
Groundwater elevation (feet)
100
80
60
40
GULF calib obs
GULF
GMA
Jan
1974
Apr
Jul
Oct
Jan
1975

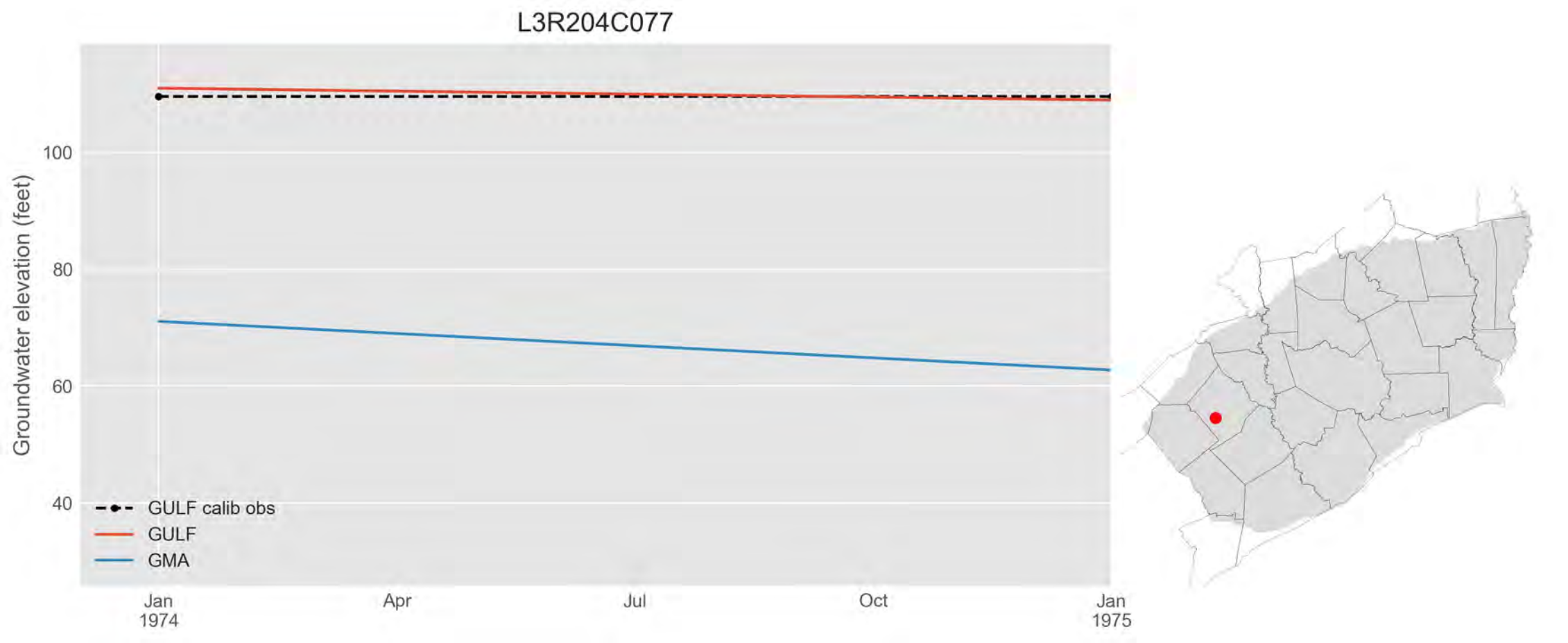

L3R202C076
Groundwater elevation (feet)
160
140
120
100
80
60
40
1961
1963
1965
1967
1969
1971
1973
1975
1977
GULF calib obs
GULF
GMA

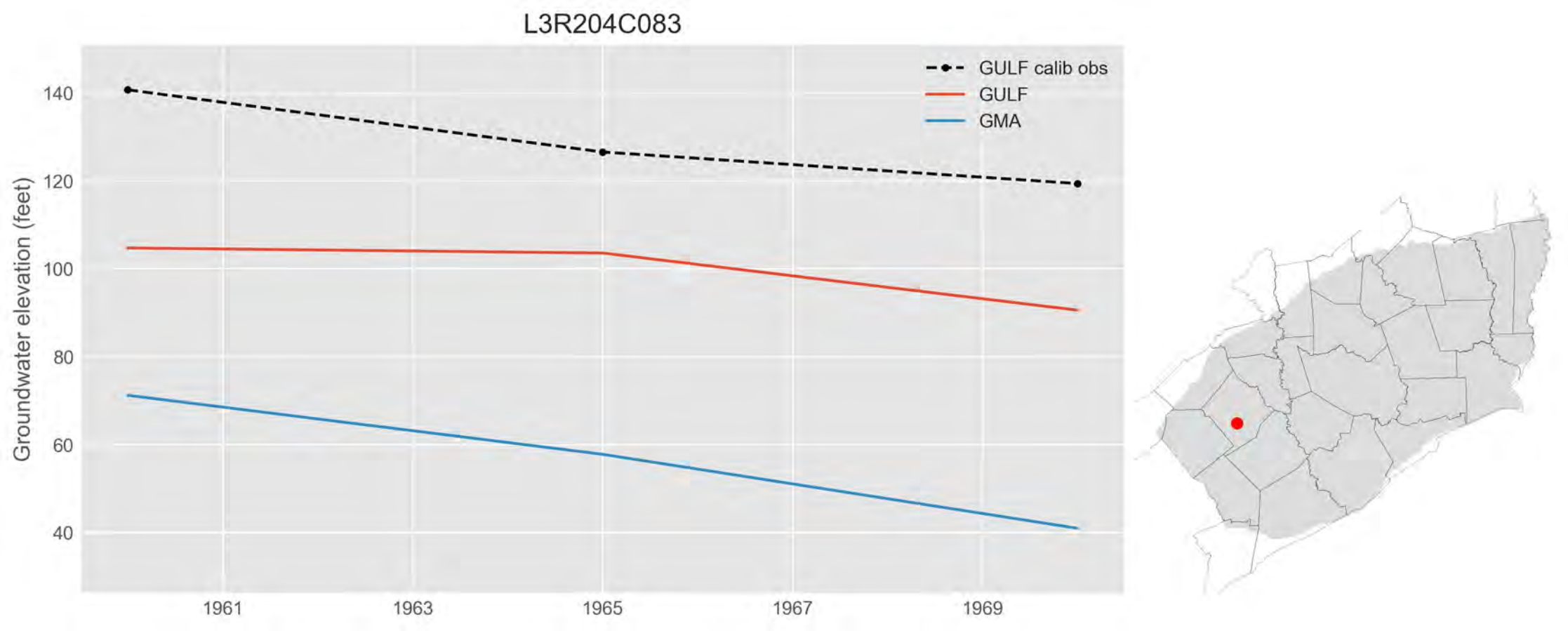

L3R202C149
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
0
−20
−40
−60
−80
1969
1979
1989
1999
2009
2019

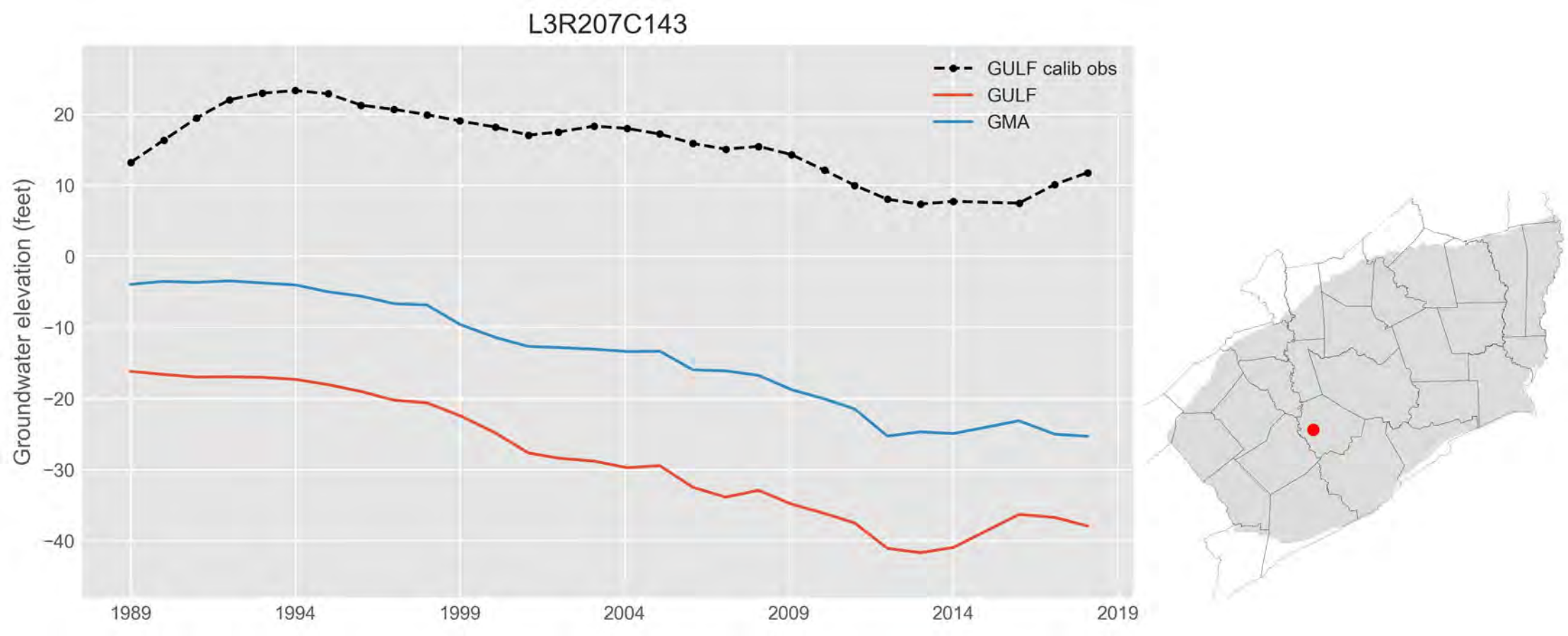

L3R202C155
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
−120
−140
1989
1994
1999
2004
2009
2014
2019

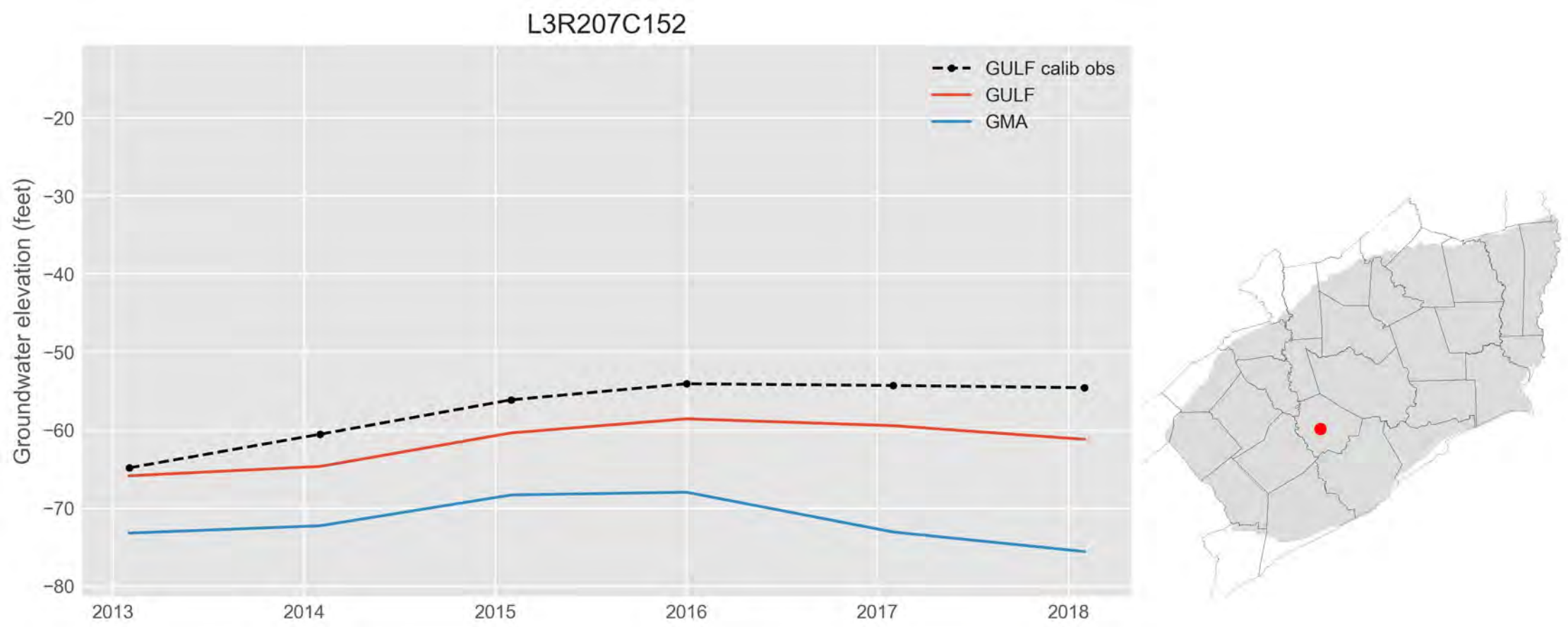

L3R203C121
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
1959
1964
1969
1974
1979
1984
1989

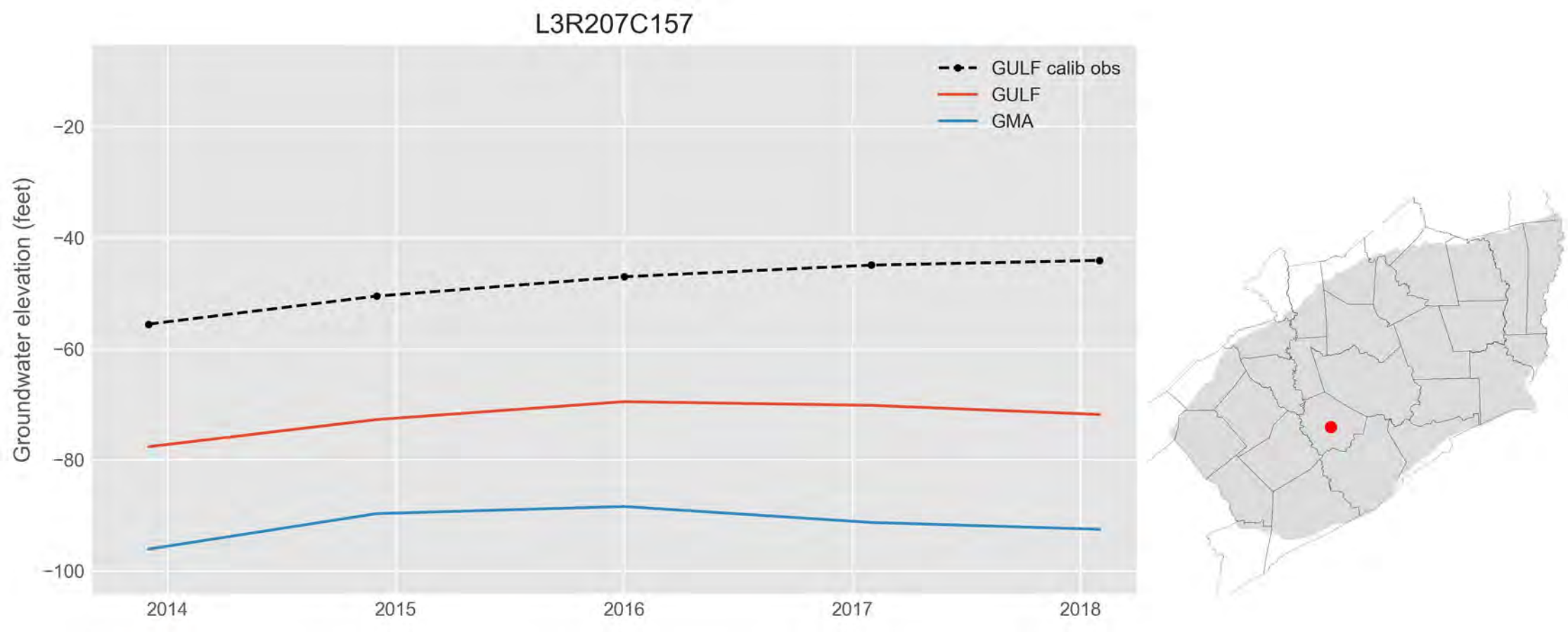

L3R203C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−20
−40
−60
−80
−100
−120
1969
1979
1989
1999
2009
2019

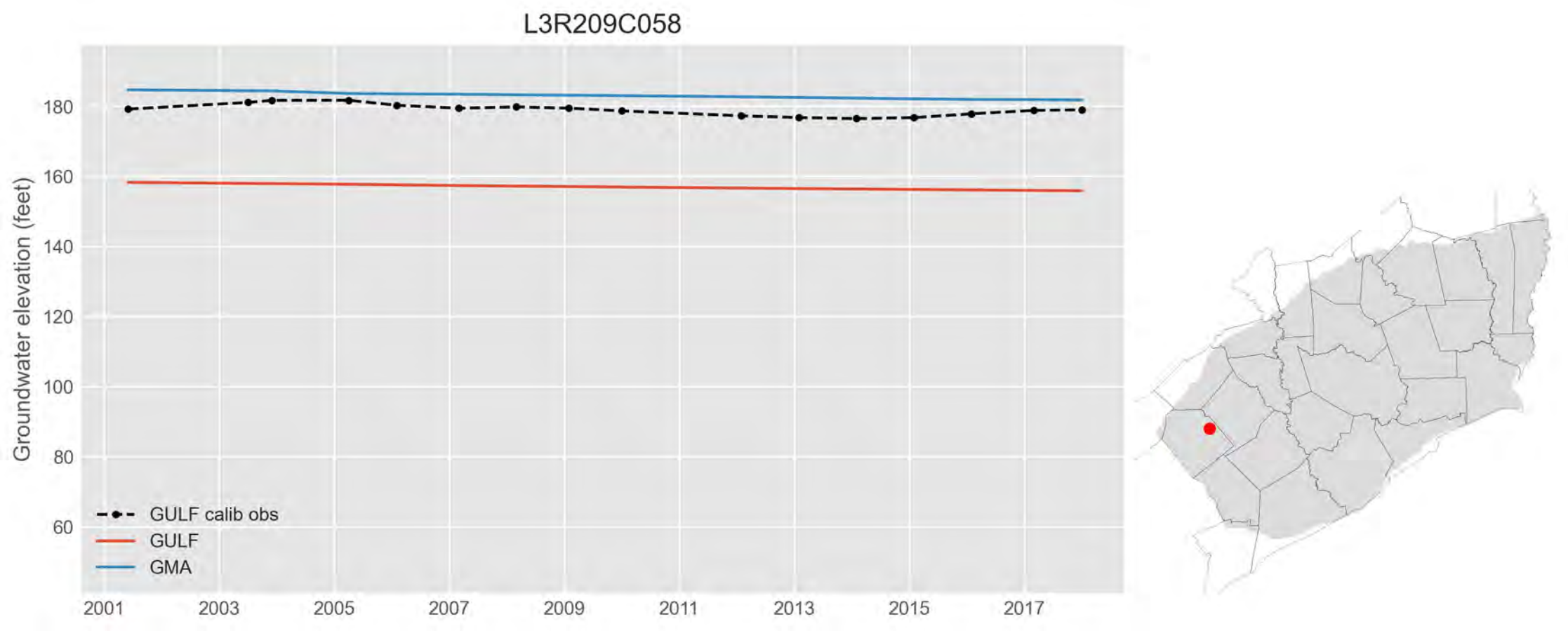

L3R204C077
Groundwater elevation (feet)
100
80
60
40
GULF calib obs
GULF
GMA
Jan
1974
Apr
Jul
Oct
Jan
1975

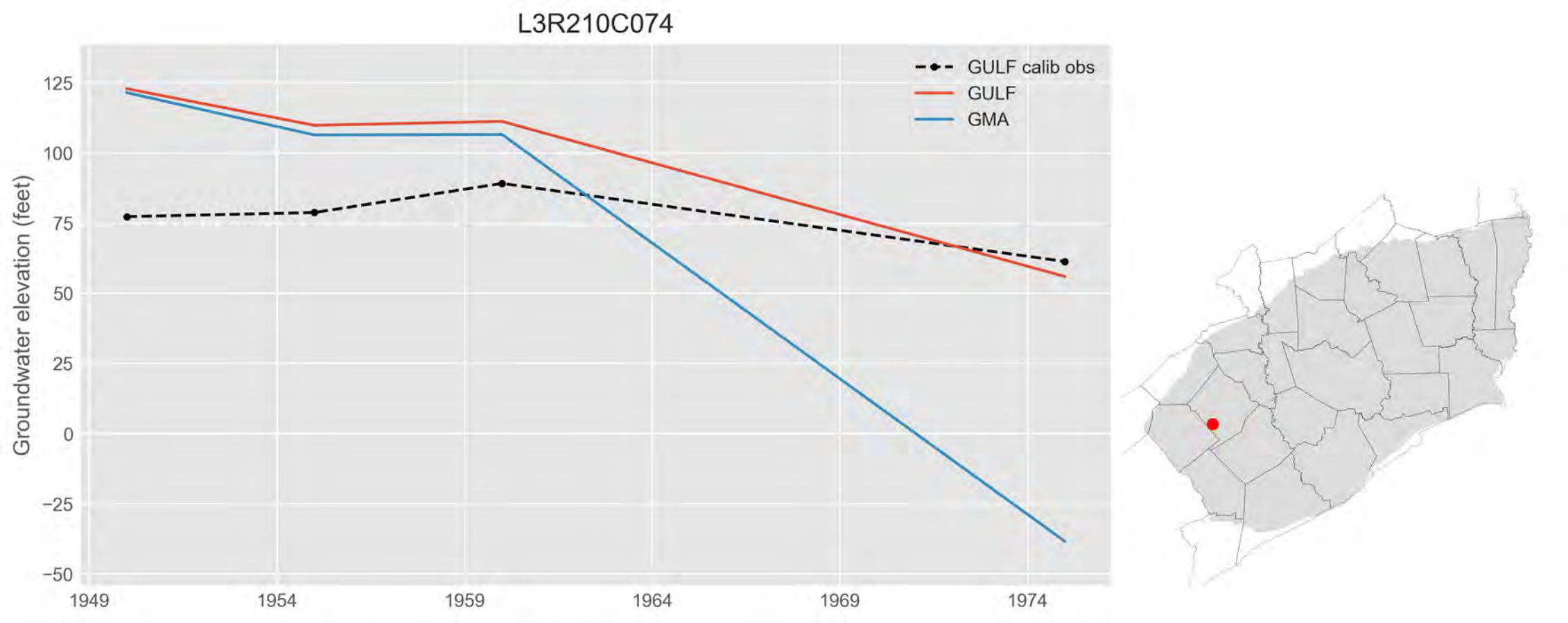

L3R204C083
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
1961
1963
1965
1967
1969

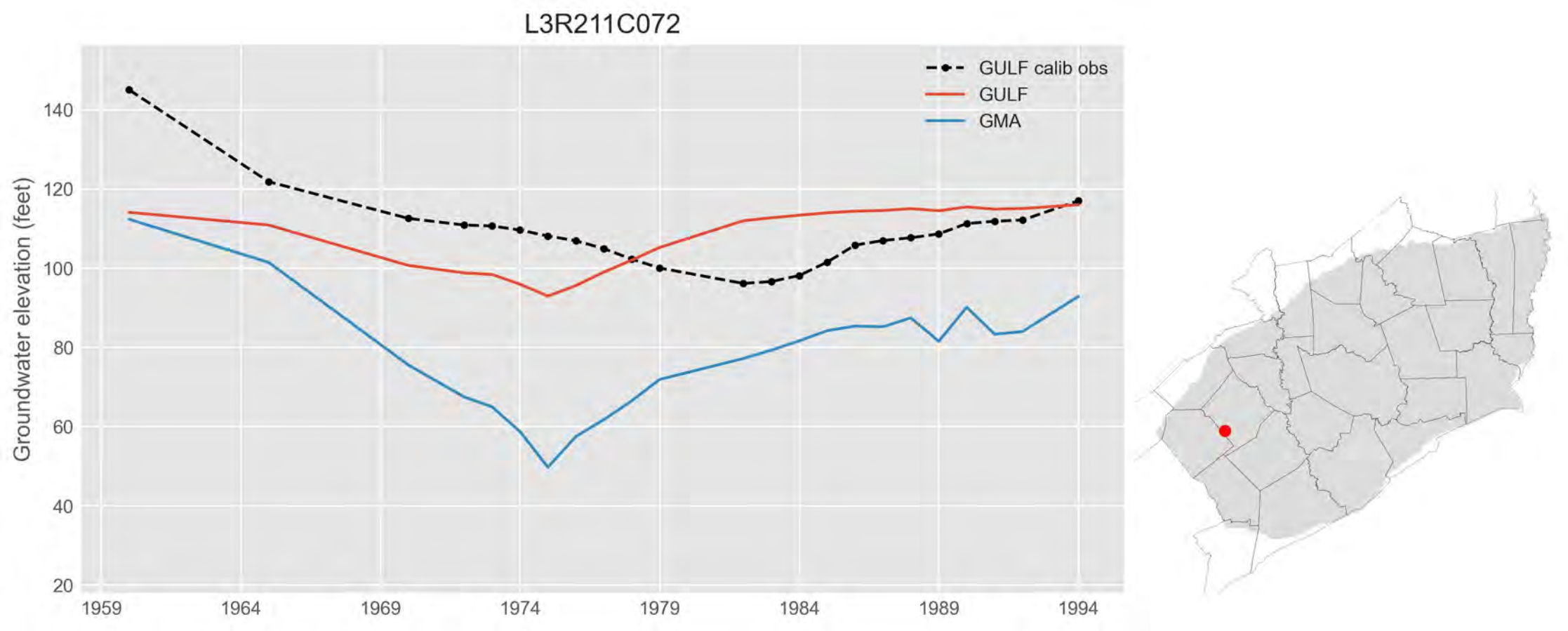

L3R207C143
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
20
10
0
−10
−20
−30
−40
1989
1994
1999
2004
2009
2014
2019

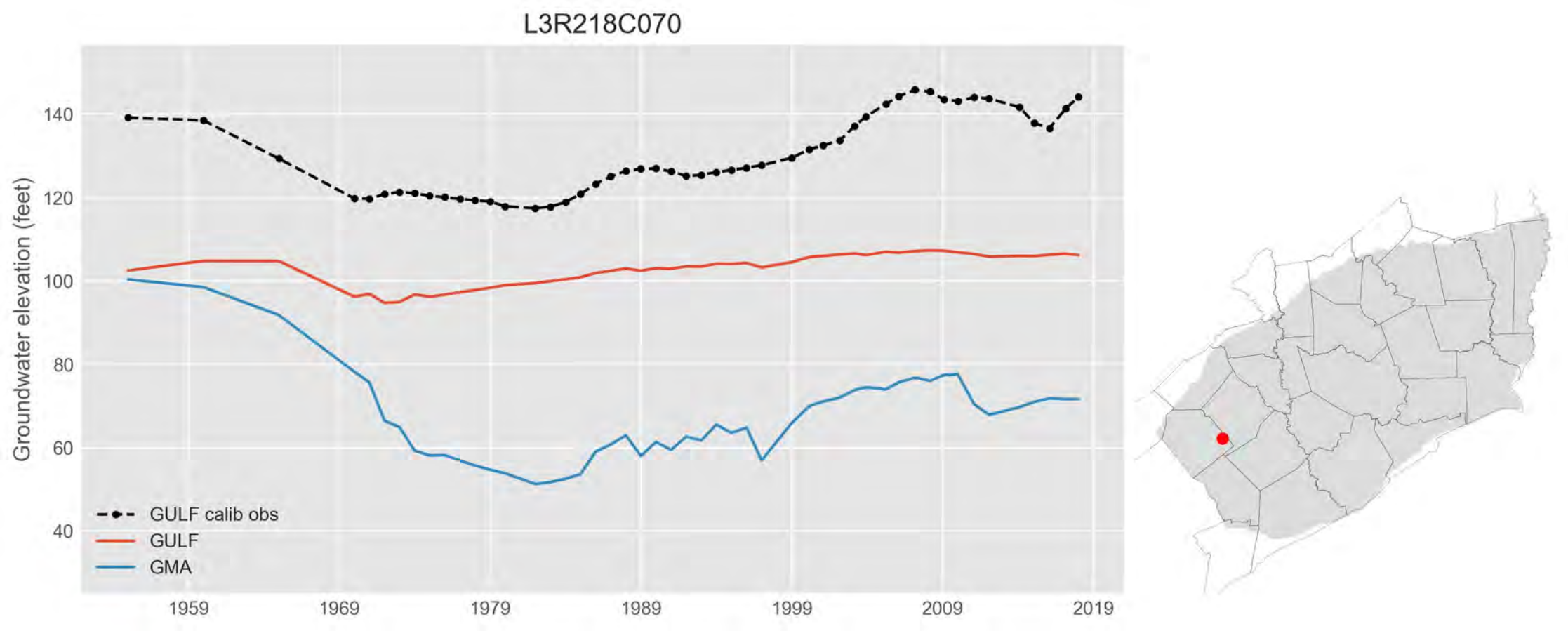

L3R207C152
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−30
−40
−50
−60
−70
−80
2013
2014
2015
2016
2017
2018

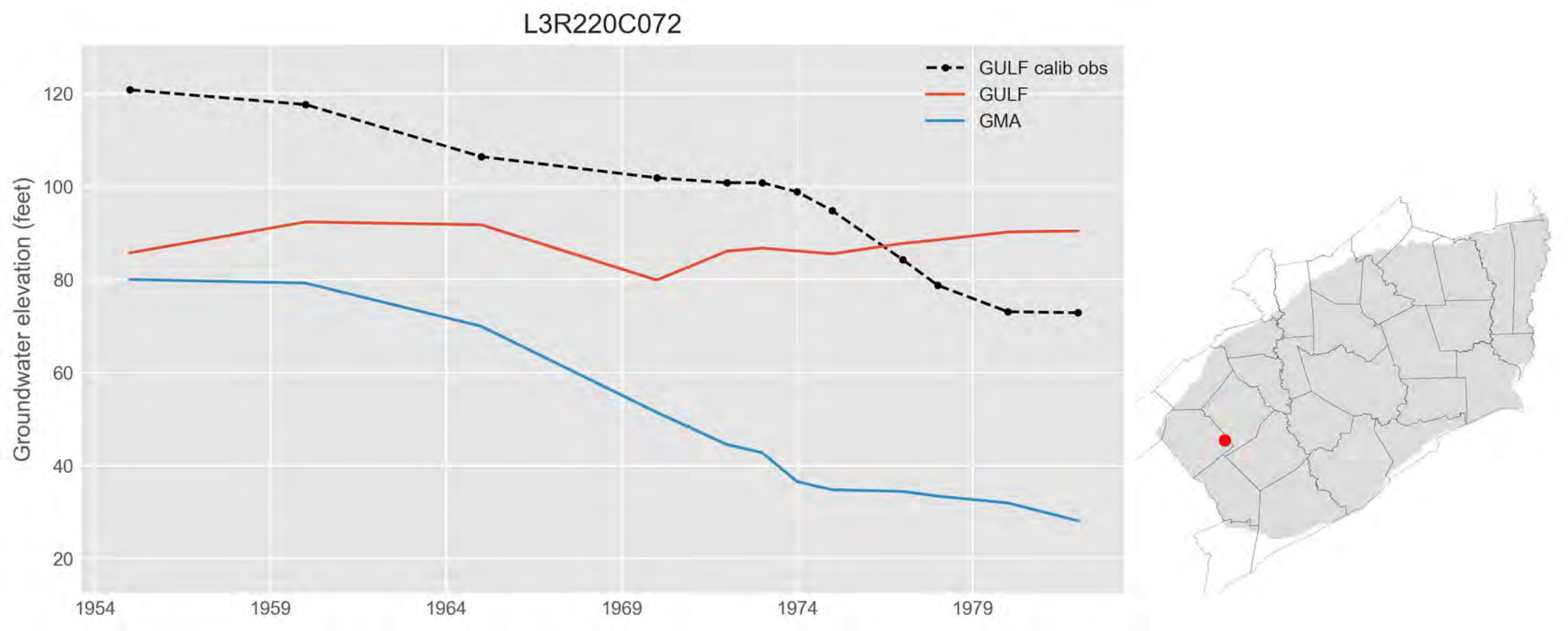

L3R207C157
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−20
−40
−60
−80
−100
2014
2015
2016
2017
2018

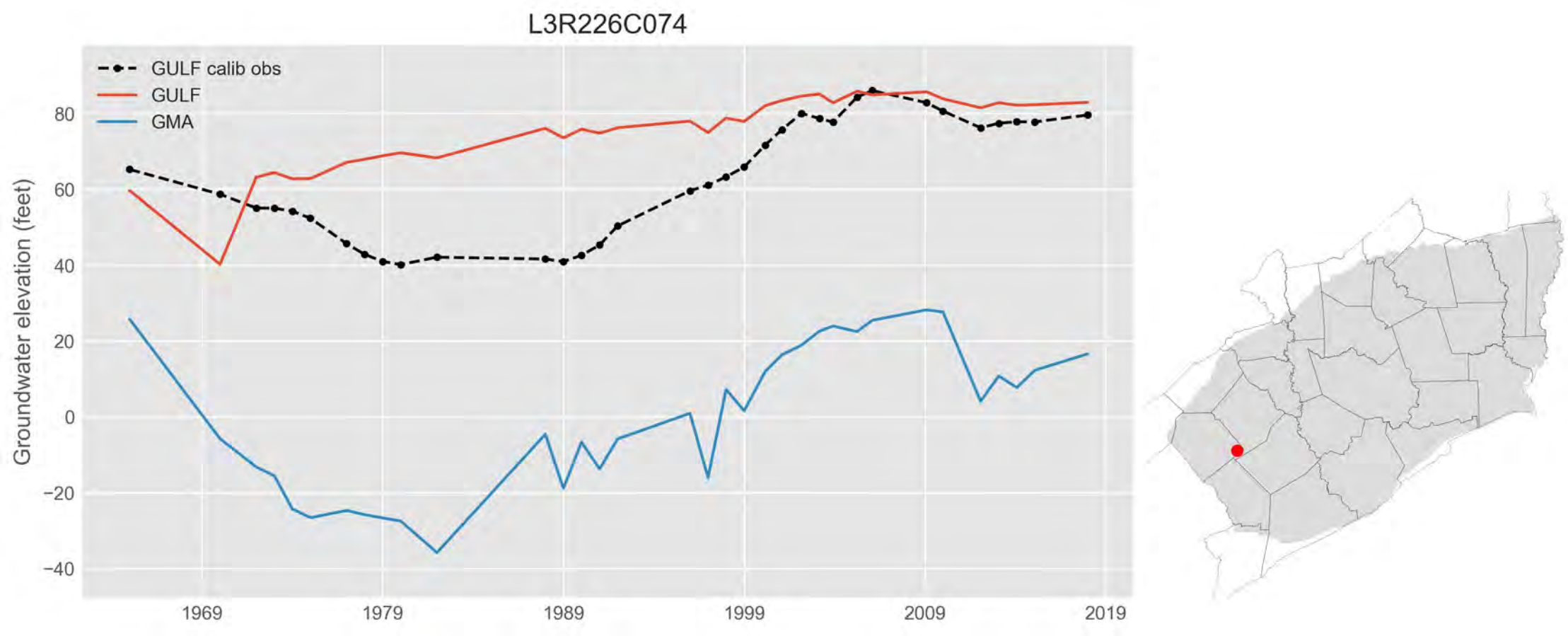

L3R209C058
Groundwater elevation (feet)
180
160
140
120
100
80
60
2001
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

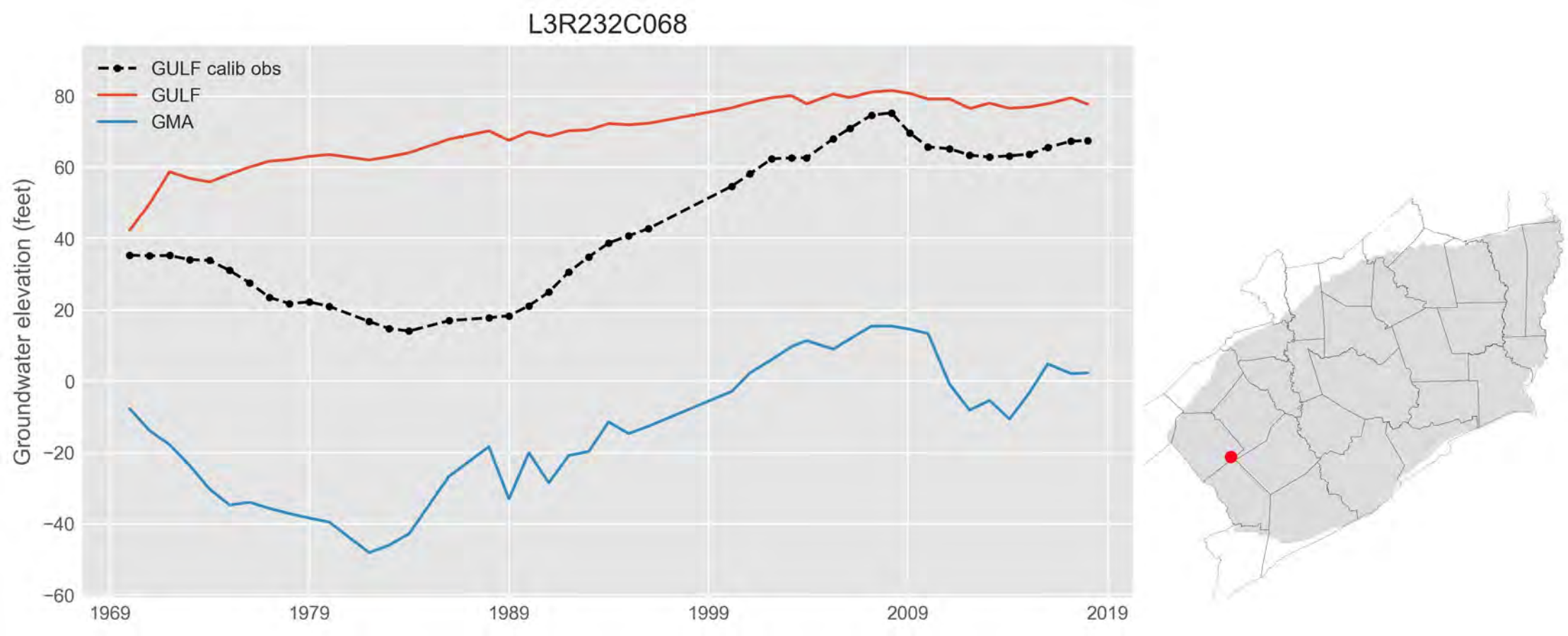

L3R210C074
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
125
100
75
50
25
0
−25
−50
1949
1954
1959
1964
1969
1974

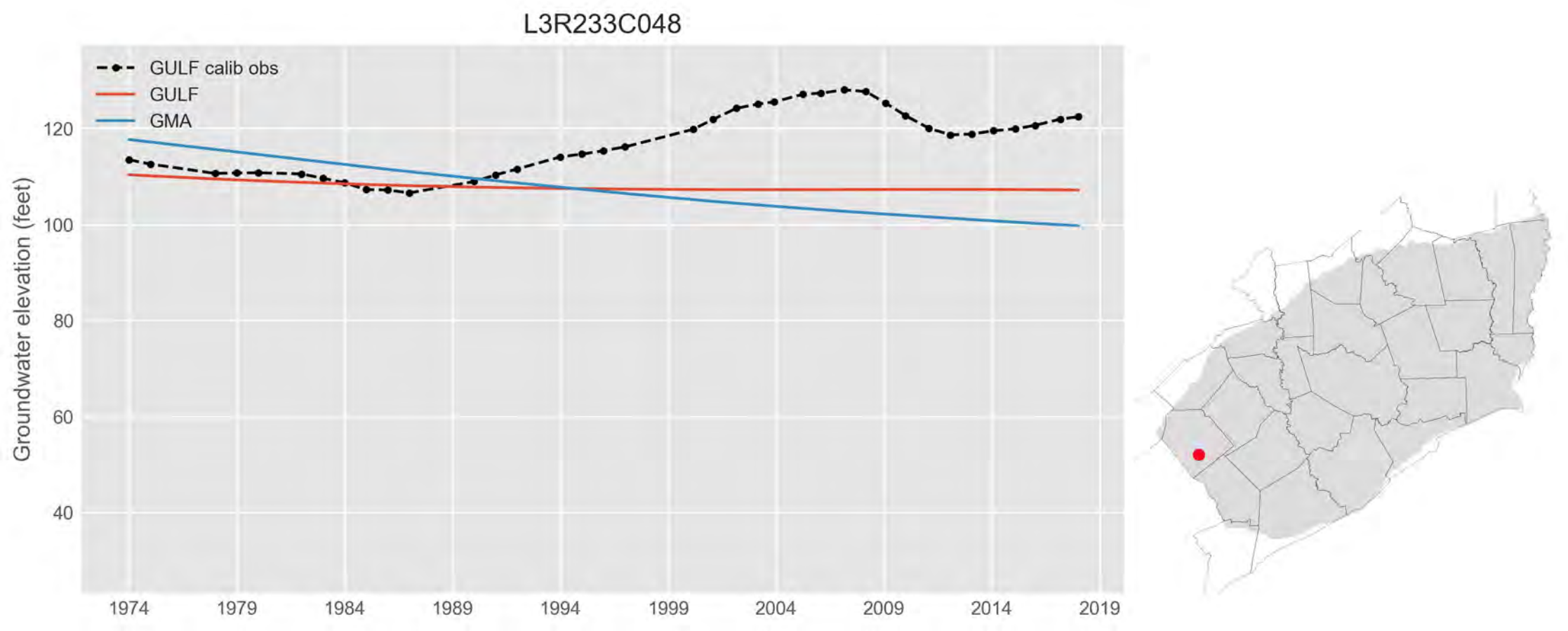

L3R211C072
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1959
1964
1969
1974
1979
1984
1989
1994

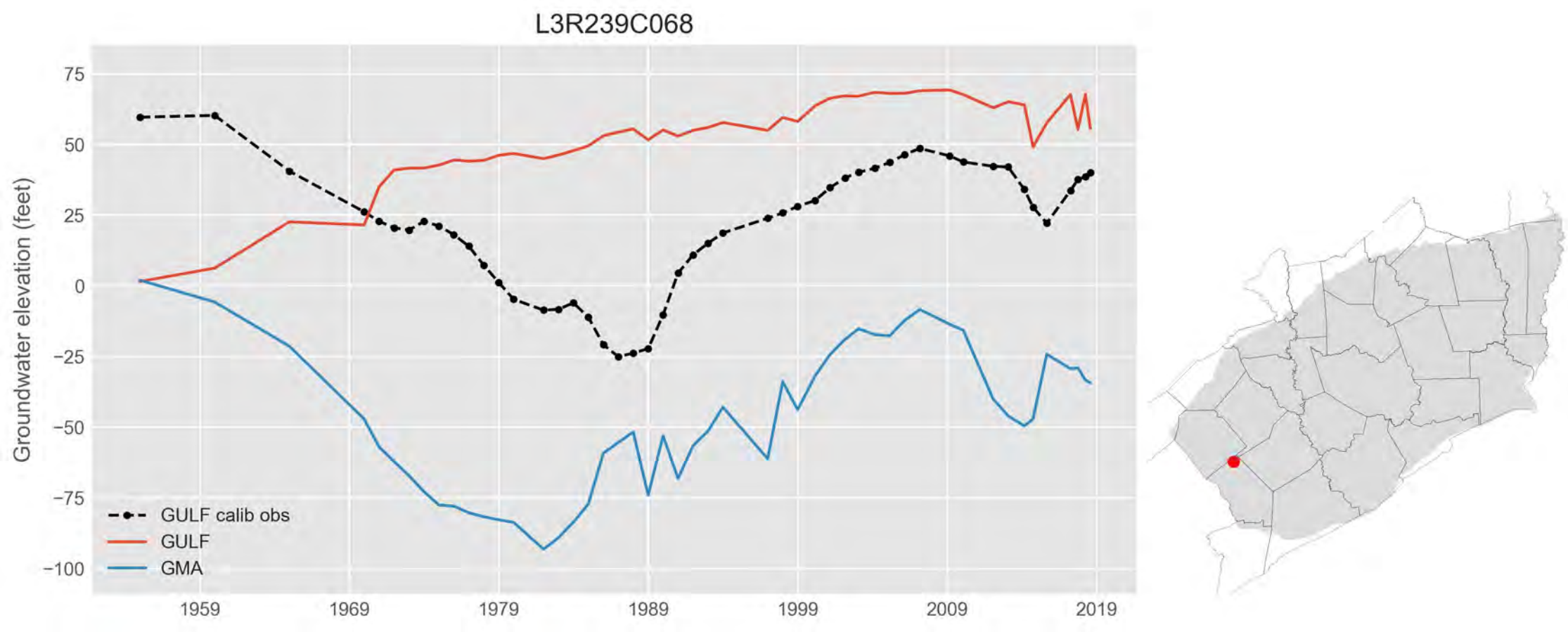

L3R218C070
Groundwater elevation (feet)
140
120
100
80
60
40
1959
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA


L3R220C072
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
1954
1959
1964
1969
1974
1979

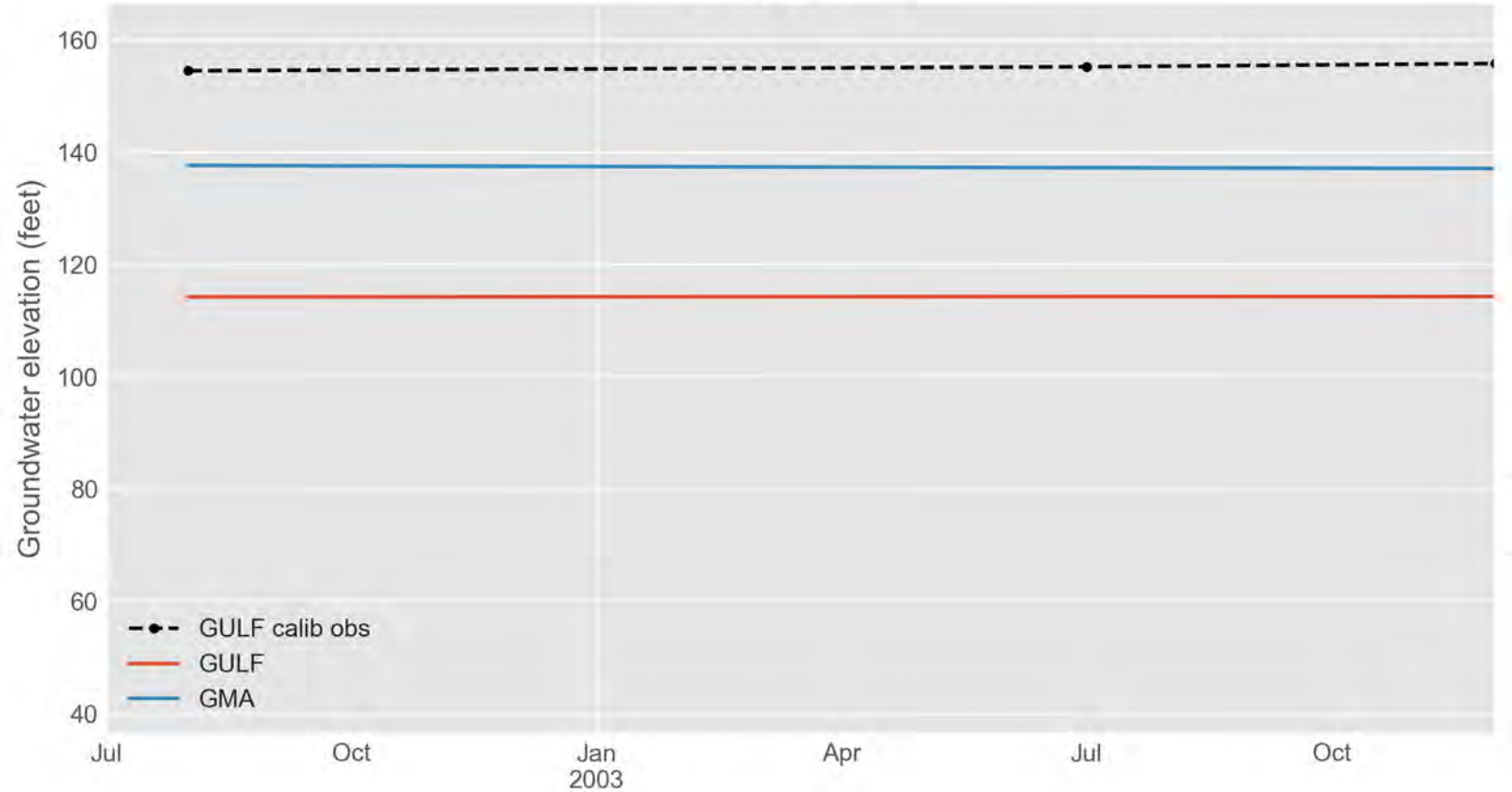

L3R226C074
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
1969
1979
1989
1999
2009
2019


L3R232C068
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
−60
1969
1979
1989
1999
2009
2019

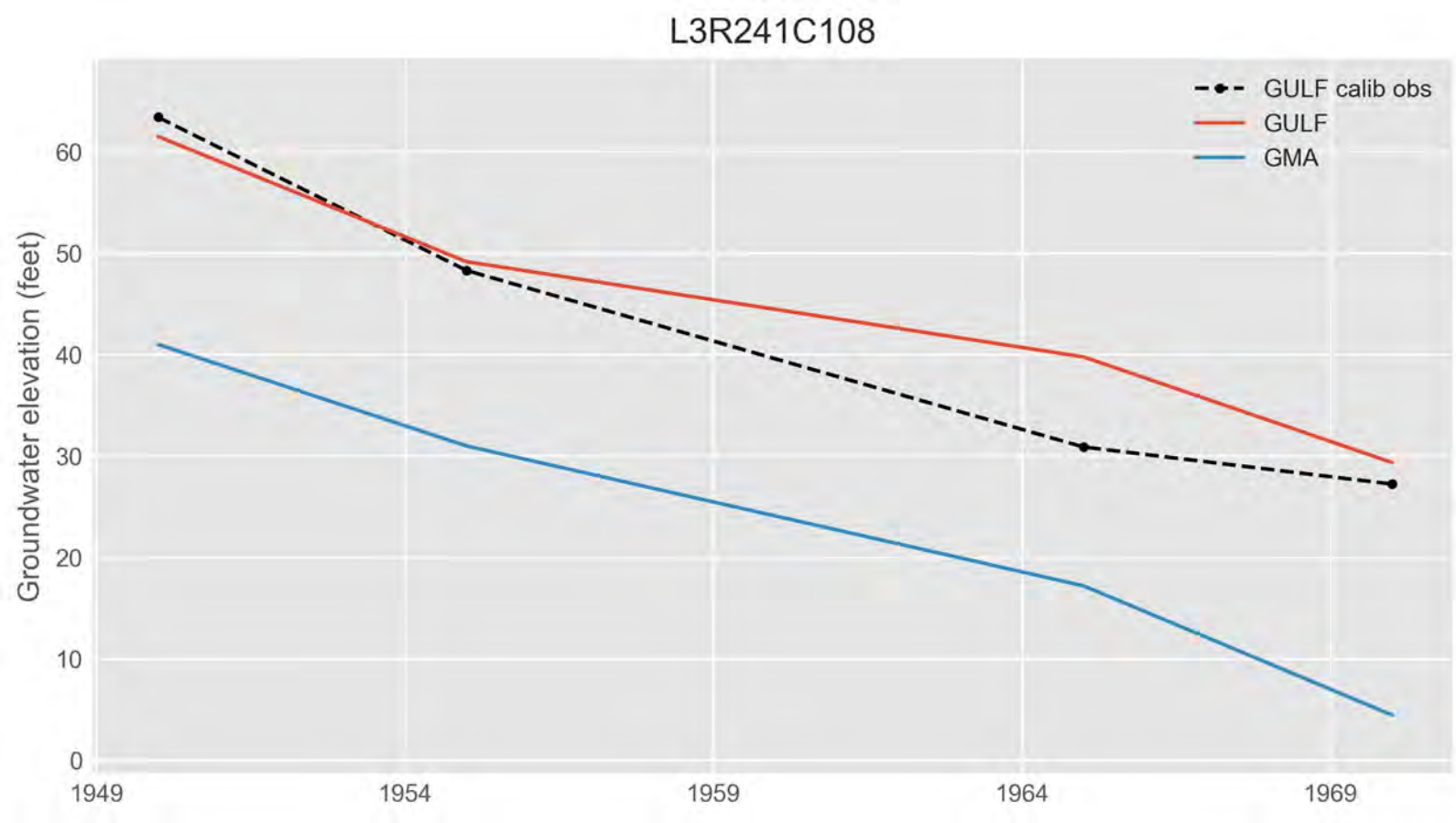

L3R233C048
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

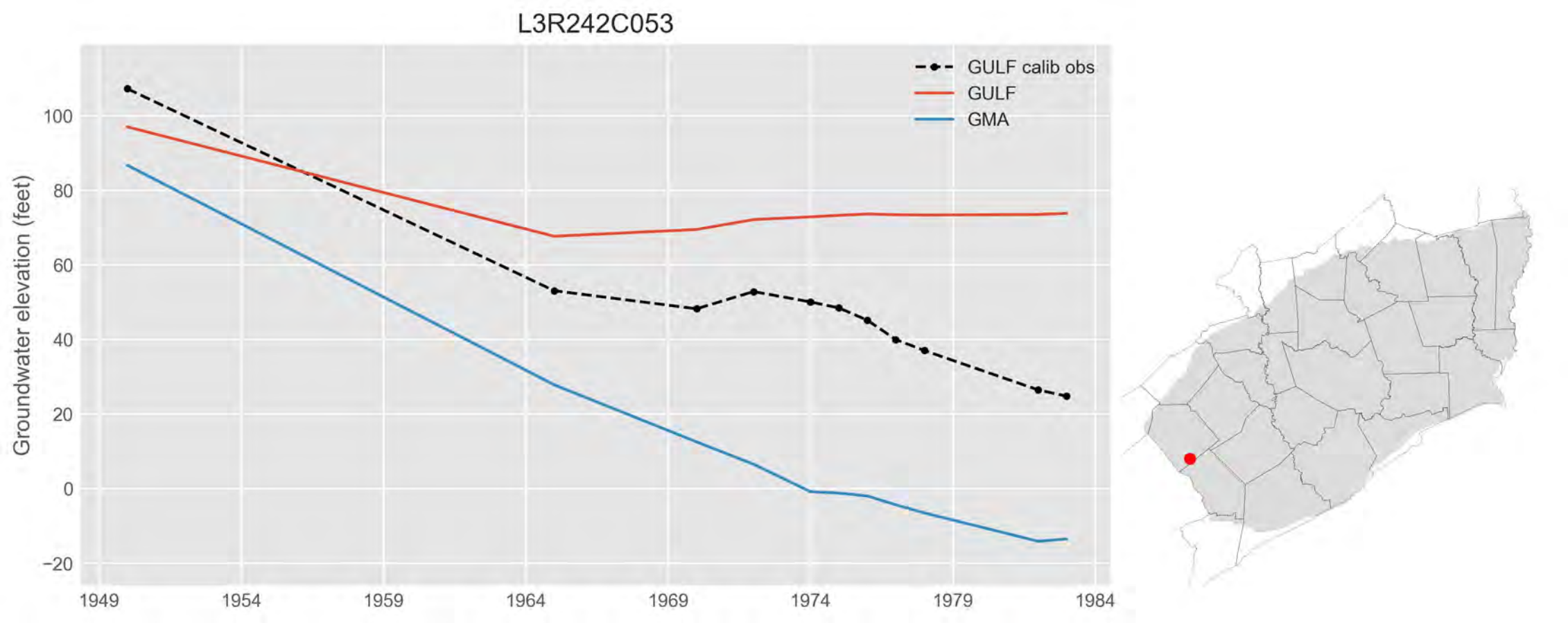

L3R239C068
Groundwater elevation (feet)
75
50
25
0
−25
−50
−75
−100
1959
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

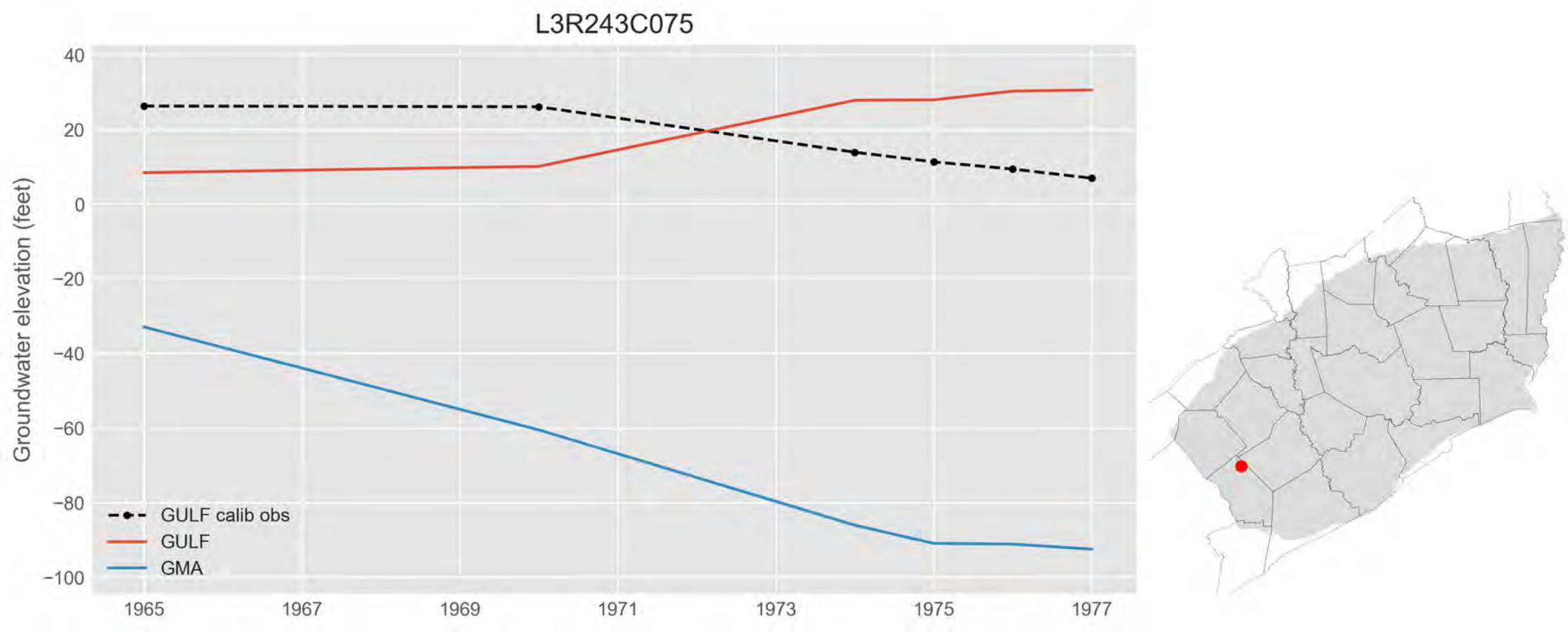
L3R241C035

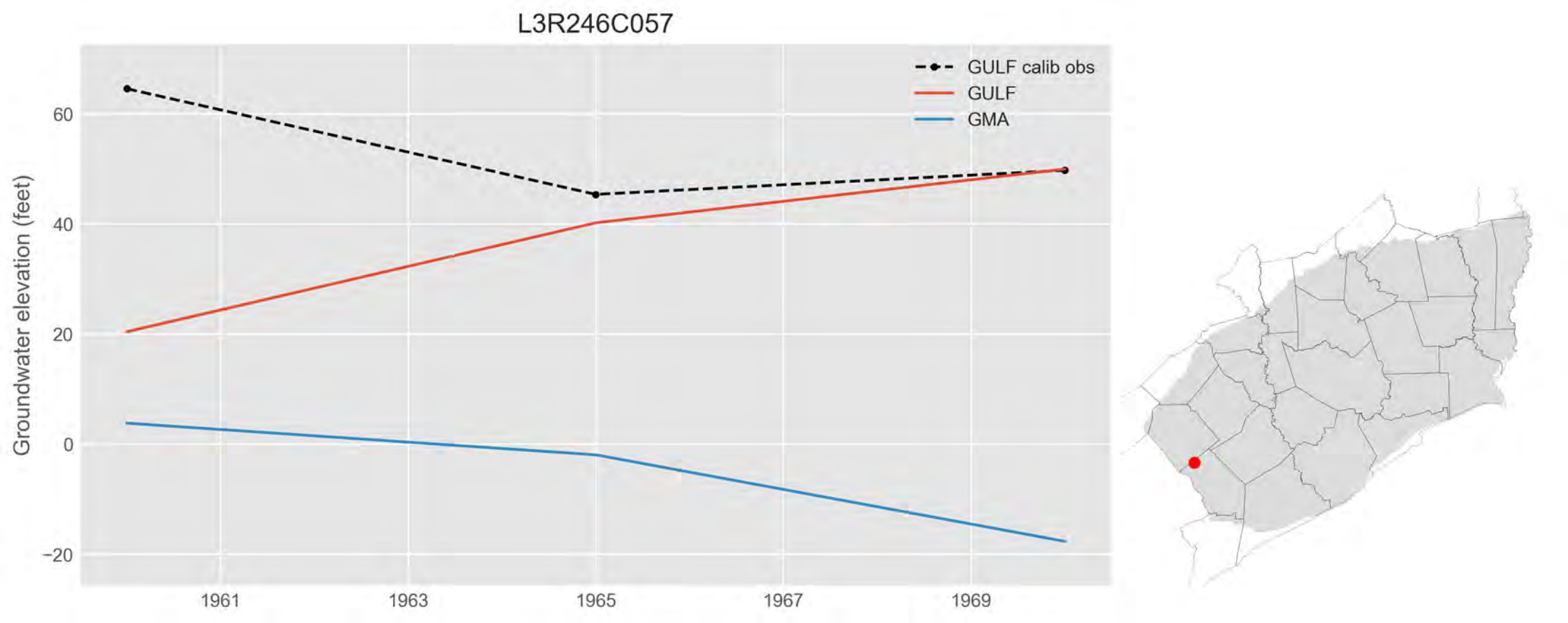

160
140
120
100
80
60
40
Groundwater elevation (feet)
GULF calib obs
GULF
GMA
Jul
Oct
Jan
2003
Apr
Jul
Oct

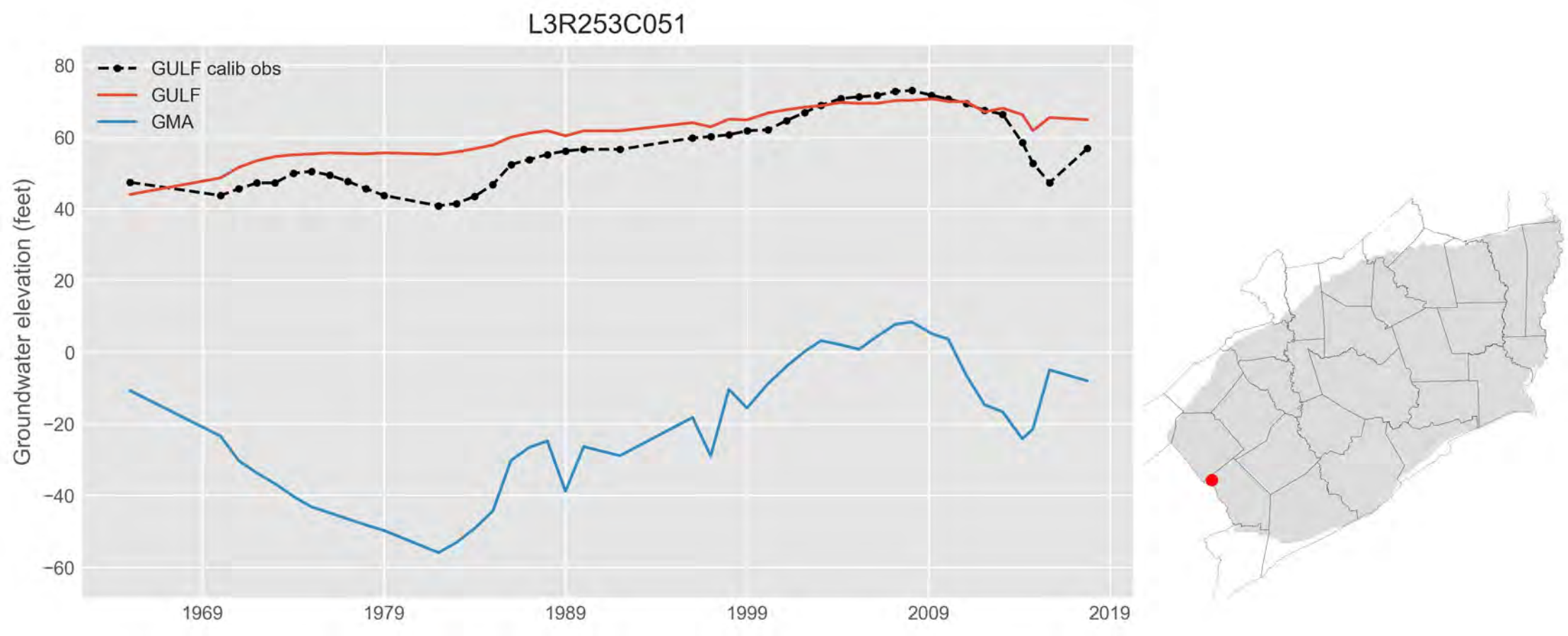
L3R241C108

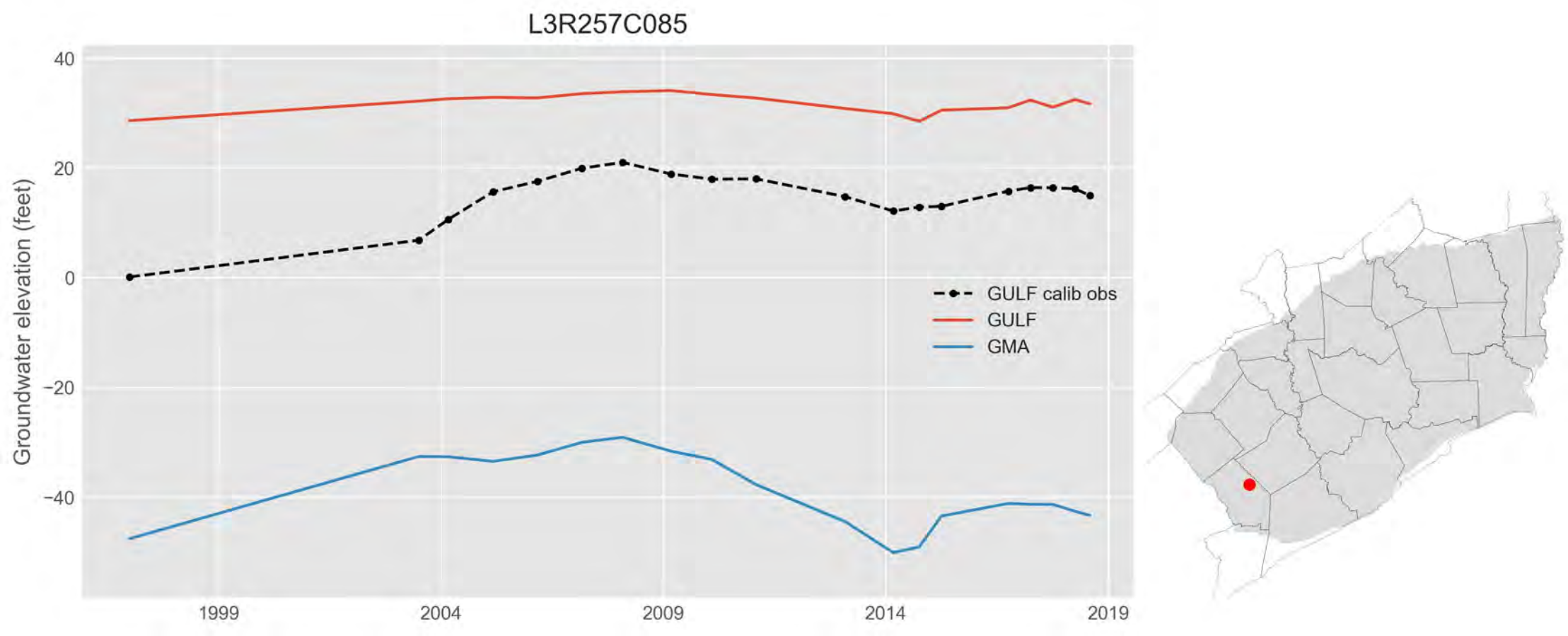

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
10
20
30
40
50
60
1949
1954
1959
1964
1969

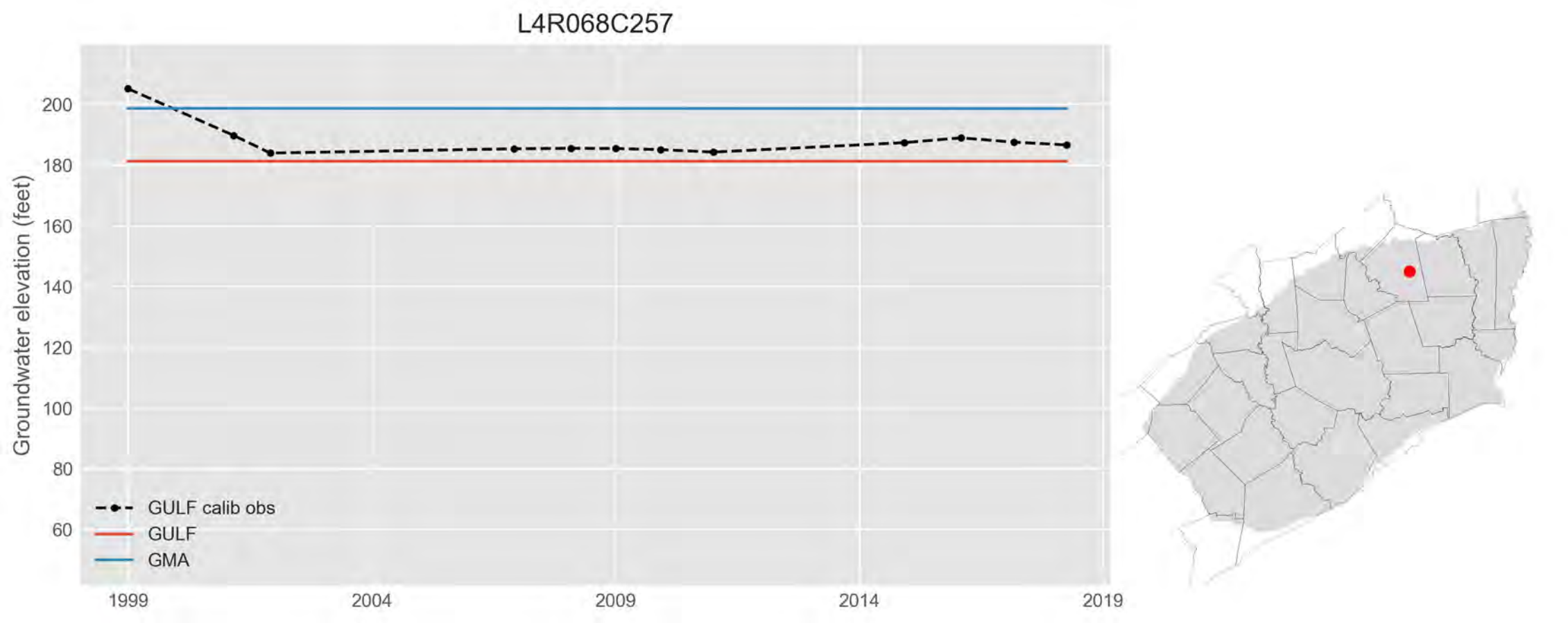

L3R242C053
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
0
−20
1949
1954
1959
1964
1969
1974
1979
1984

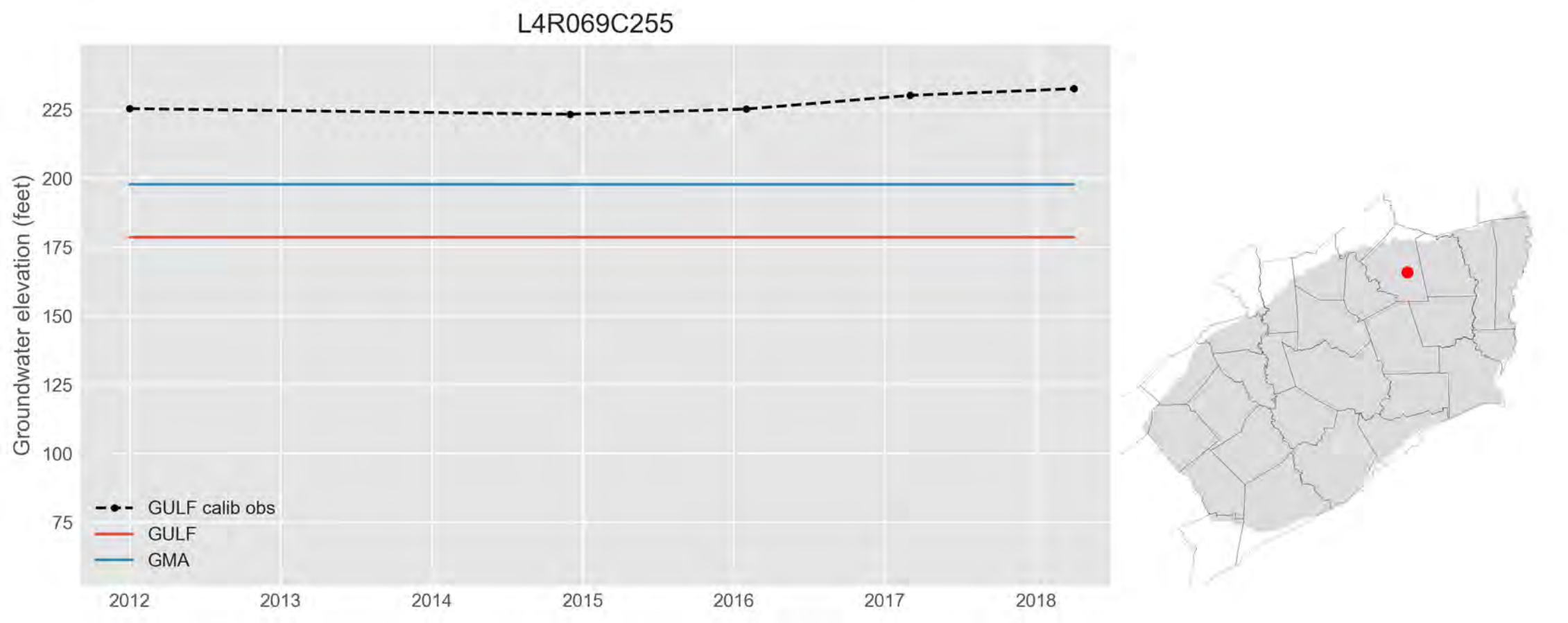

L3R243C075
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
−100
1965
1967
1969
1971
1973
1975
1977
GULF calib obs
GULF
GMA

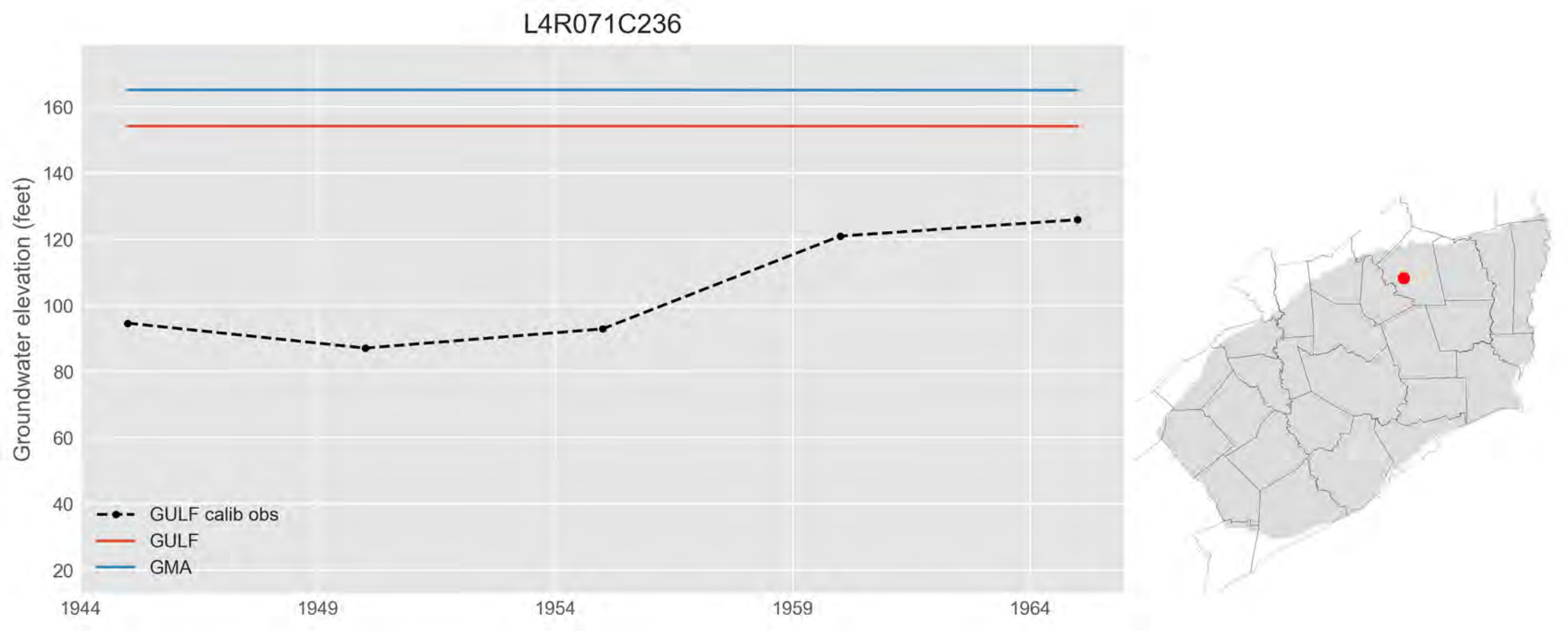

L3R246C057
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
60
40
20
0
−20
1961
1963
1965
1967
1969

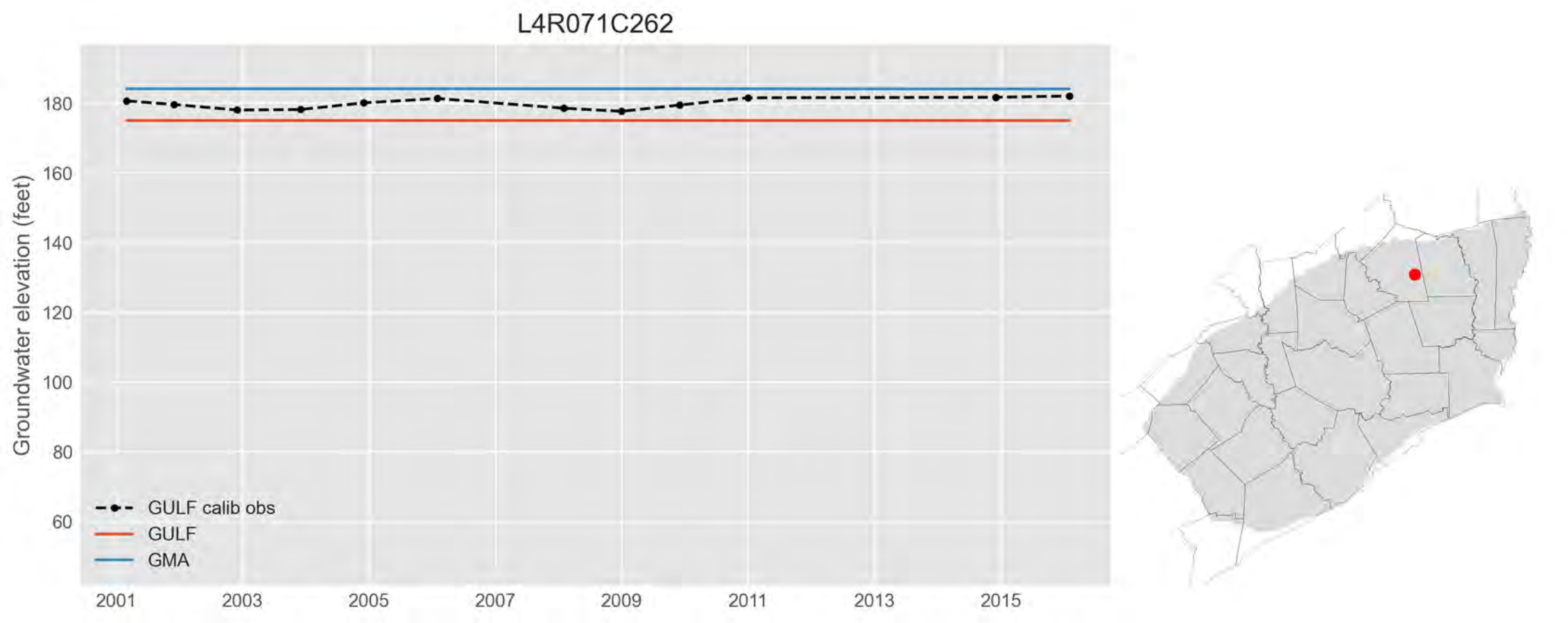

L3R253C051
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
−40
−60
1969
1979
1989
1999
2009
2019

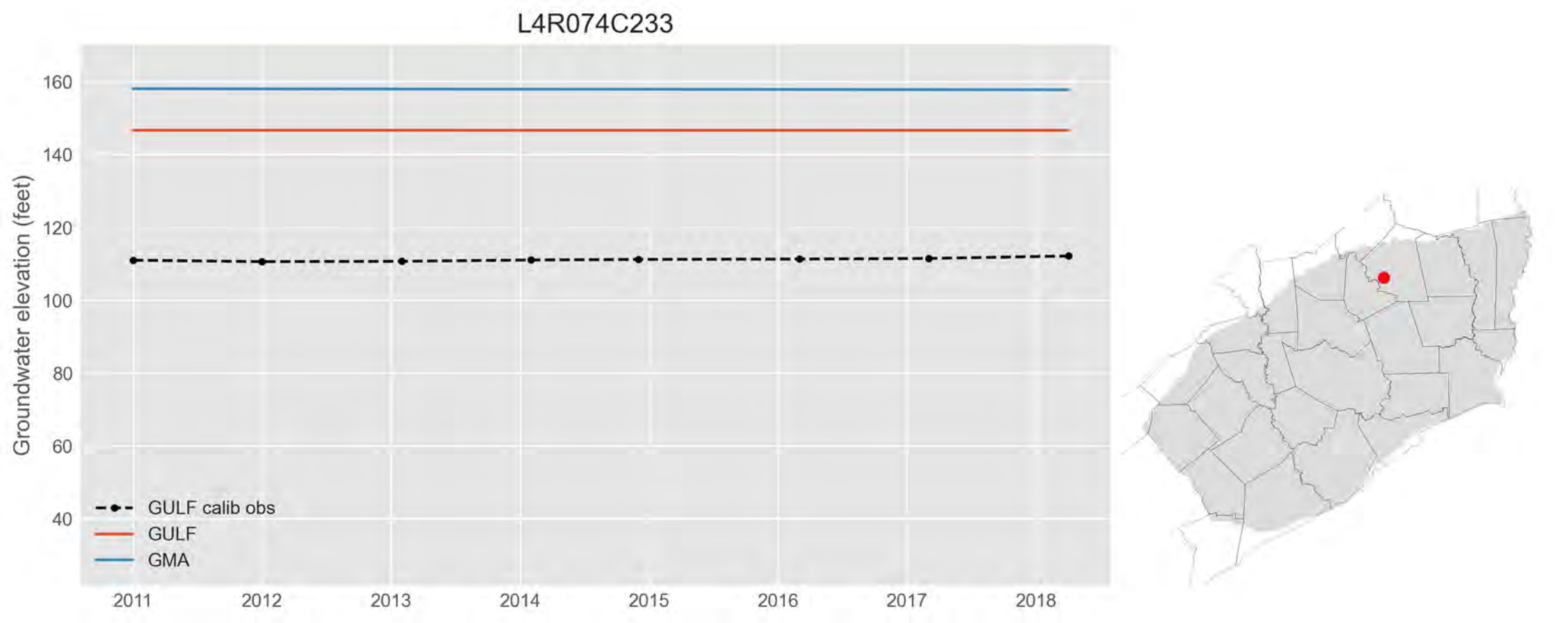

L3R257C085
Groundwater elevation (feet)
40
20
0
−20
−40
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

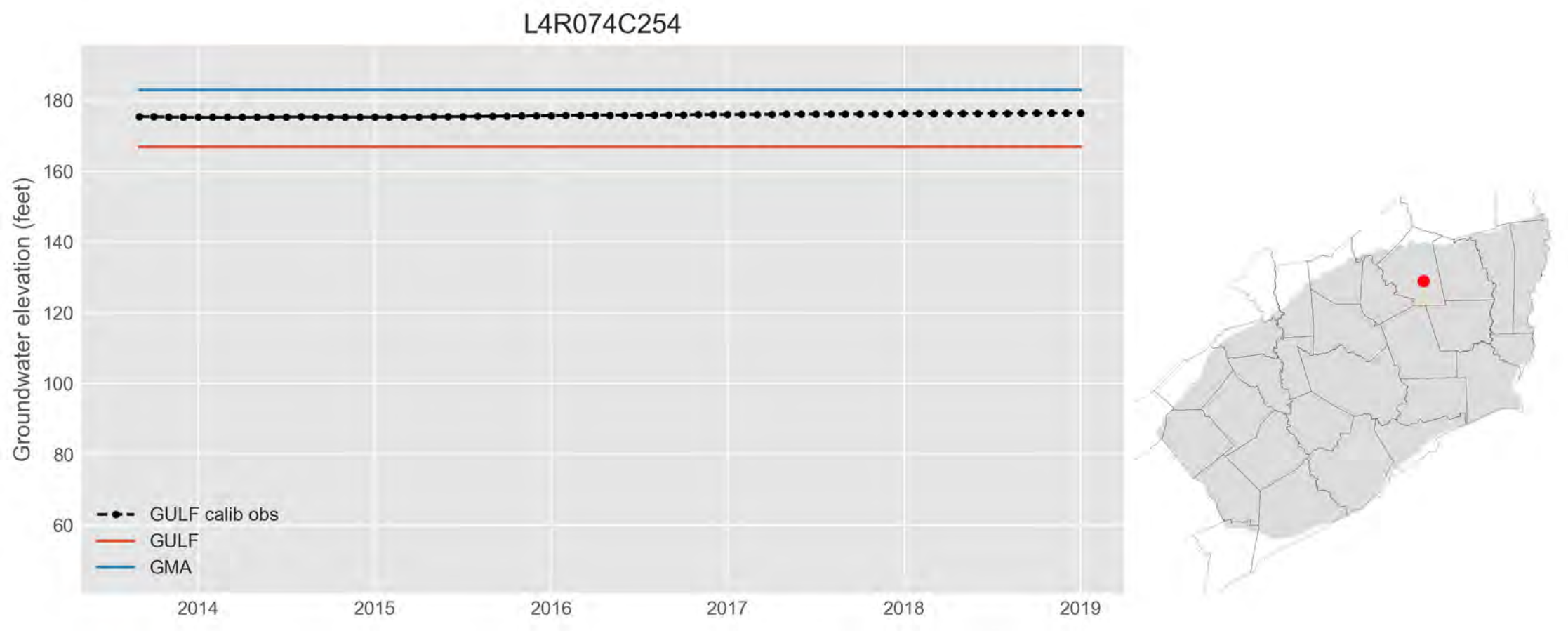

L4R068C257
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

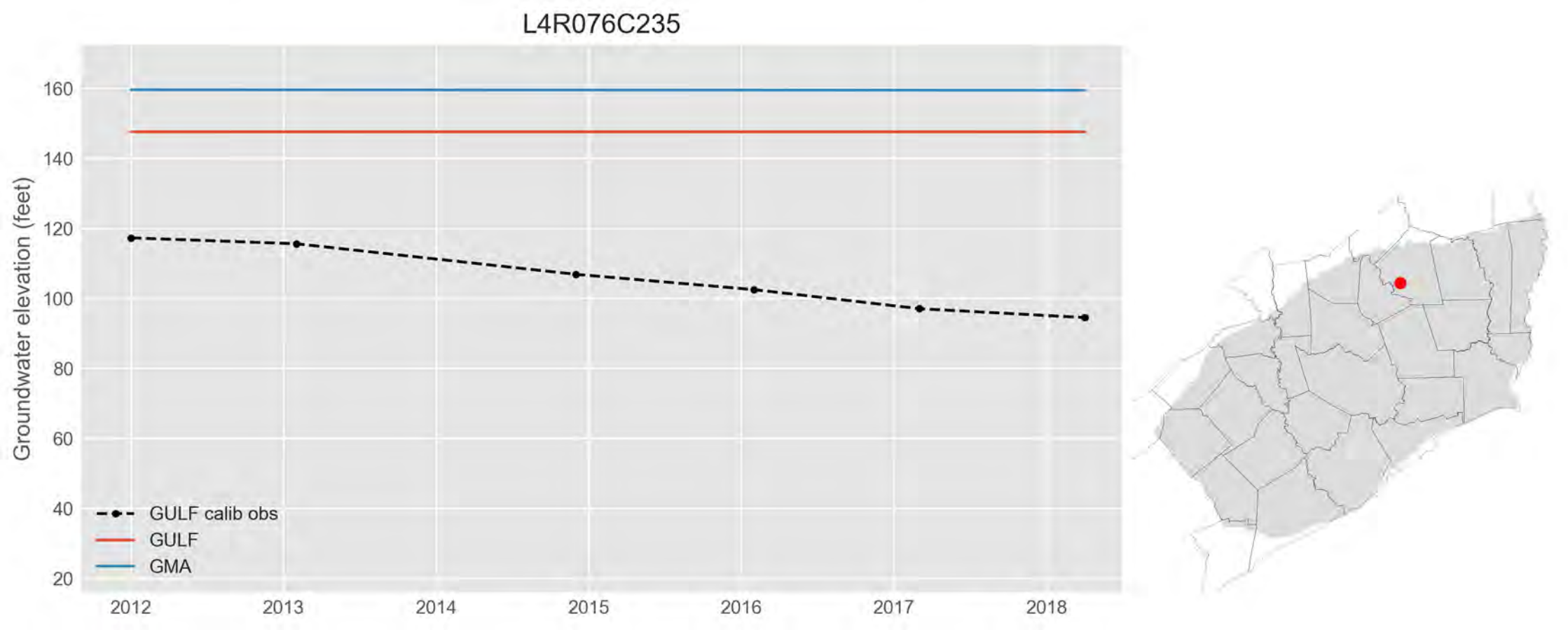

L4R069C255
Groundwater elevation (feet)
225
200
175
150
125
100
75
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

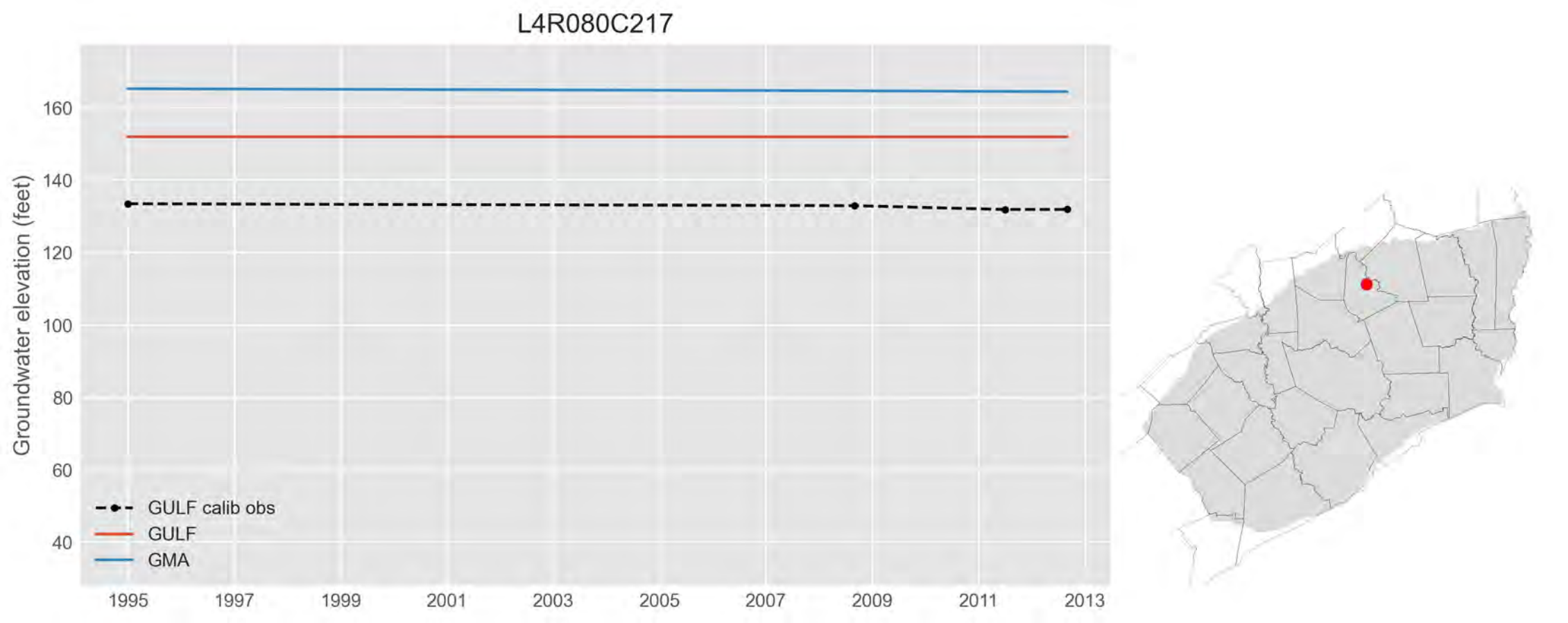

L4R071C236
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
1944
1949
1954
1959
1964
GULF calib obs
GULF
GMA


L4R071C262
Groundwater elevation (feet)
180
160
140
120
100
80
60
2001
2003
2005
2007
2009
2011
2013
2015
GULF calib obs
GULF
GMA

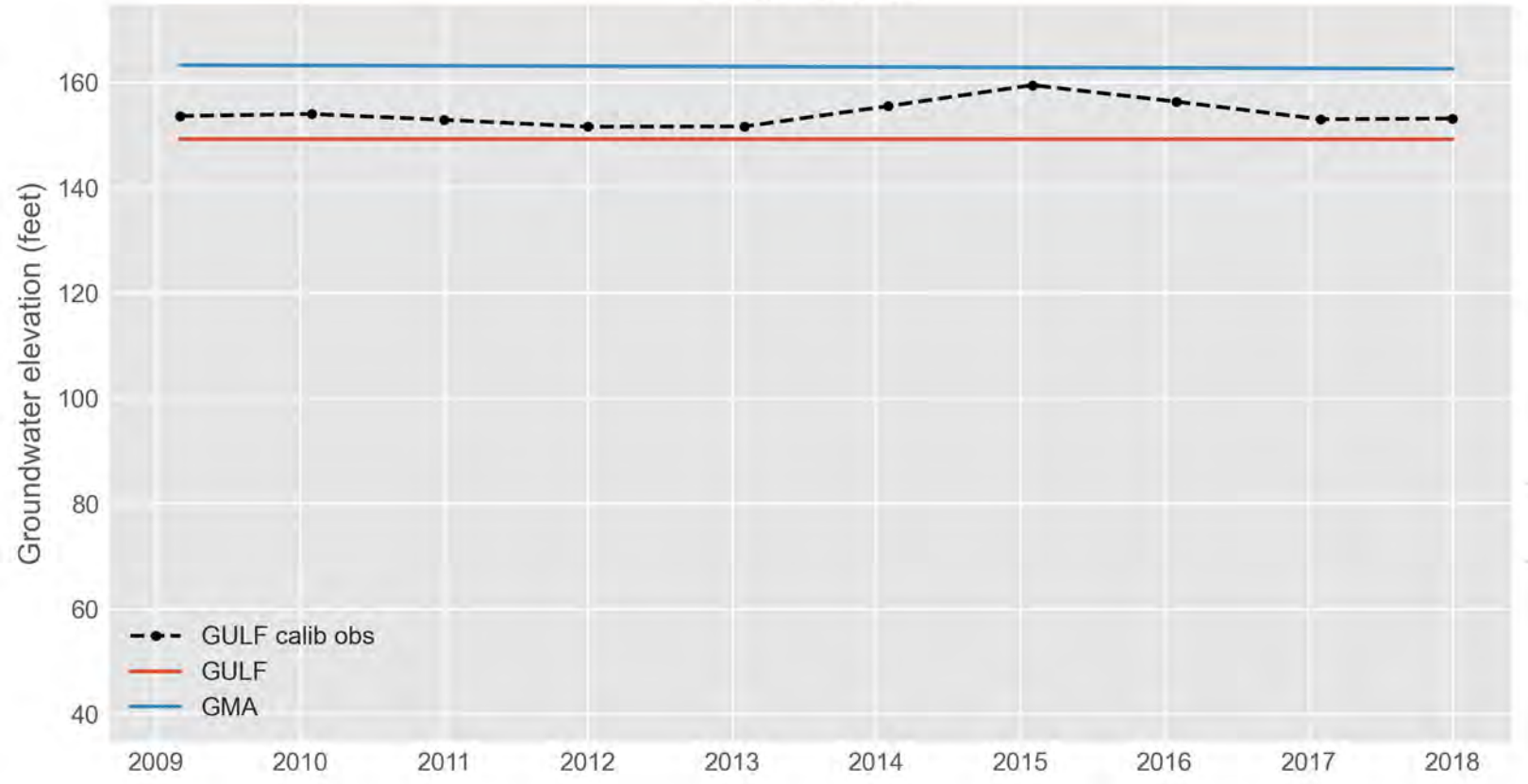

L4R074C233
Groundwater elevation (feet)
160
140
120
100
80
60
40
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

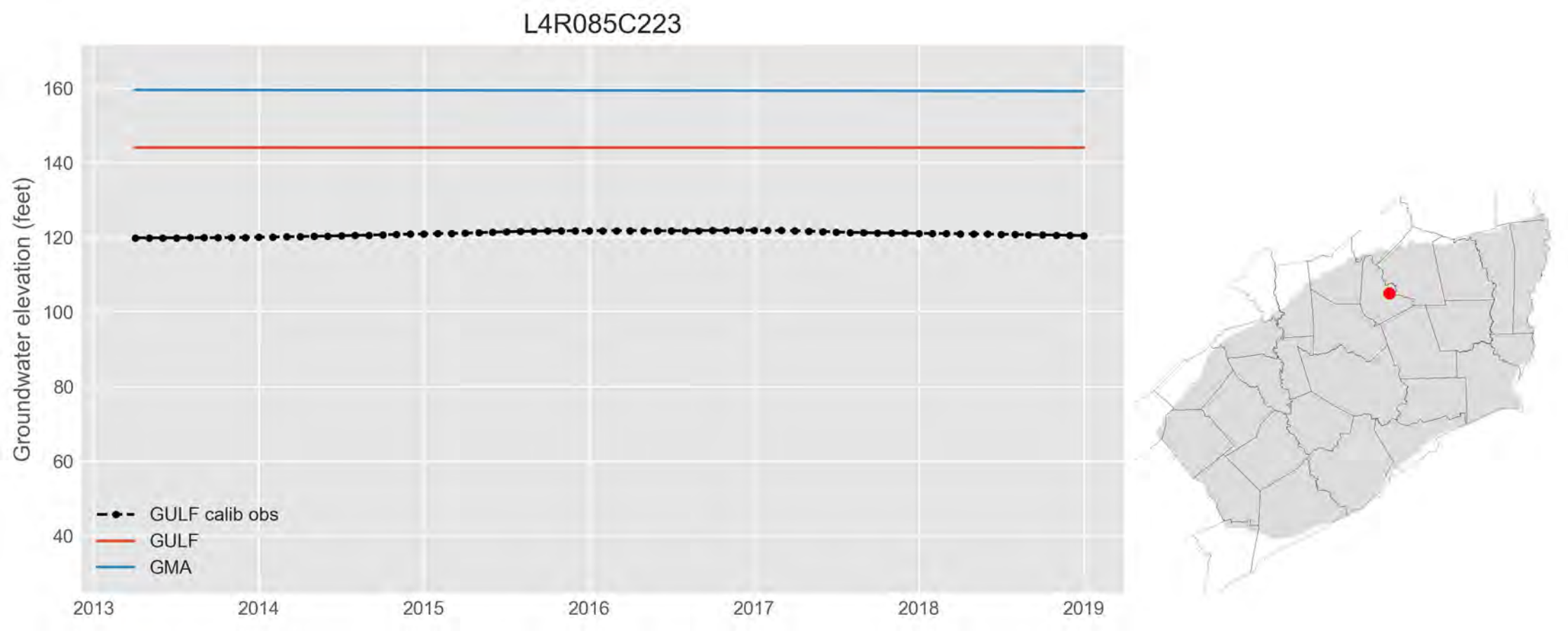

L4R074C254
Groundwater elevation (feet)
180
160
140
120
100
80
60
2014
2015
2016
2017
2018
2019
GULF calib obs
GULF
GMA

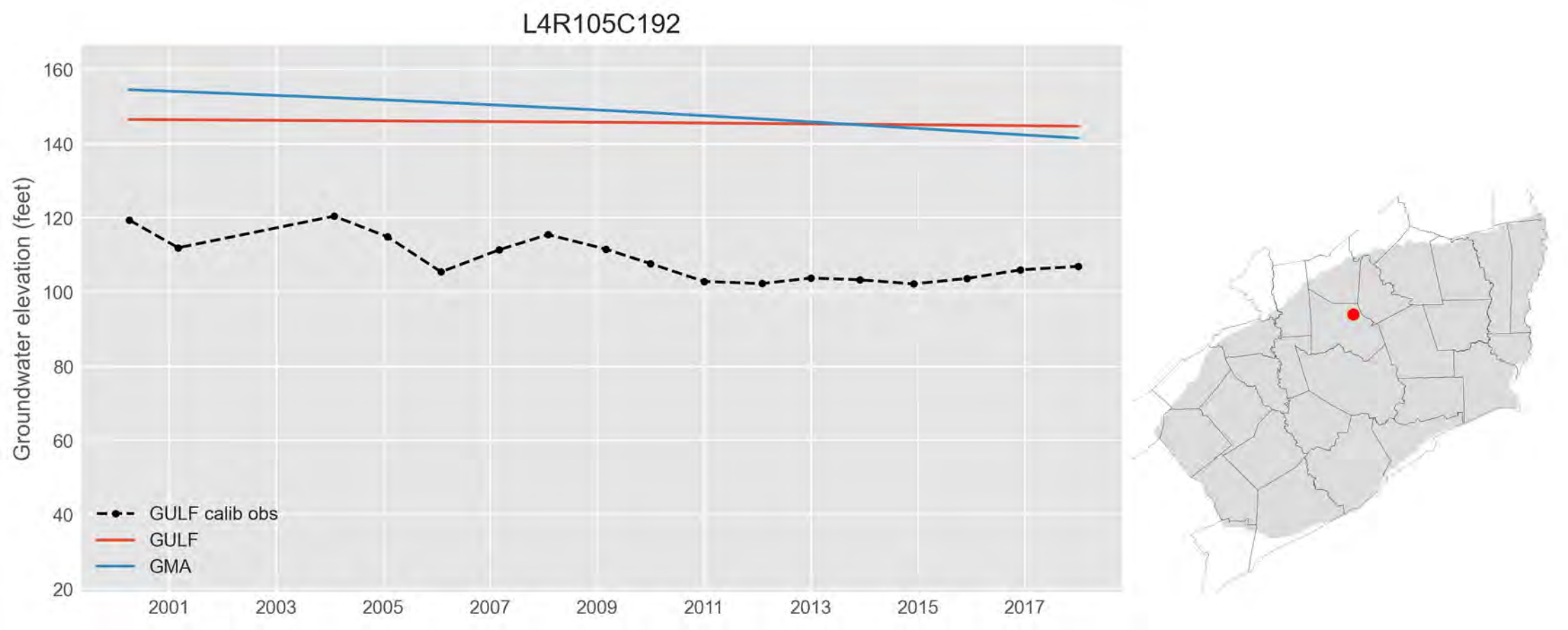

L4R076C235
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA


L4R080C217
Groundwater elevation (feet)
160
140
120
100
80
60
40
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
GULF calib obs
GULF
GMA

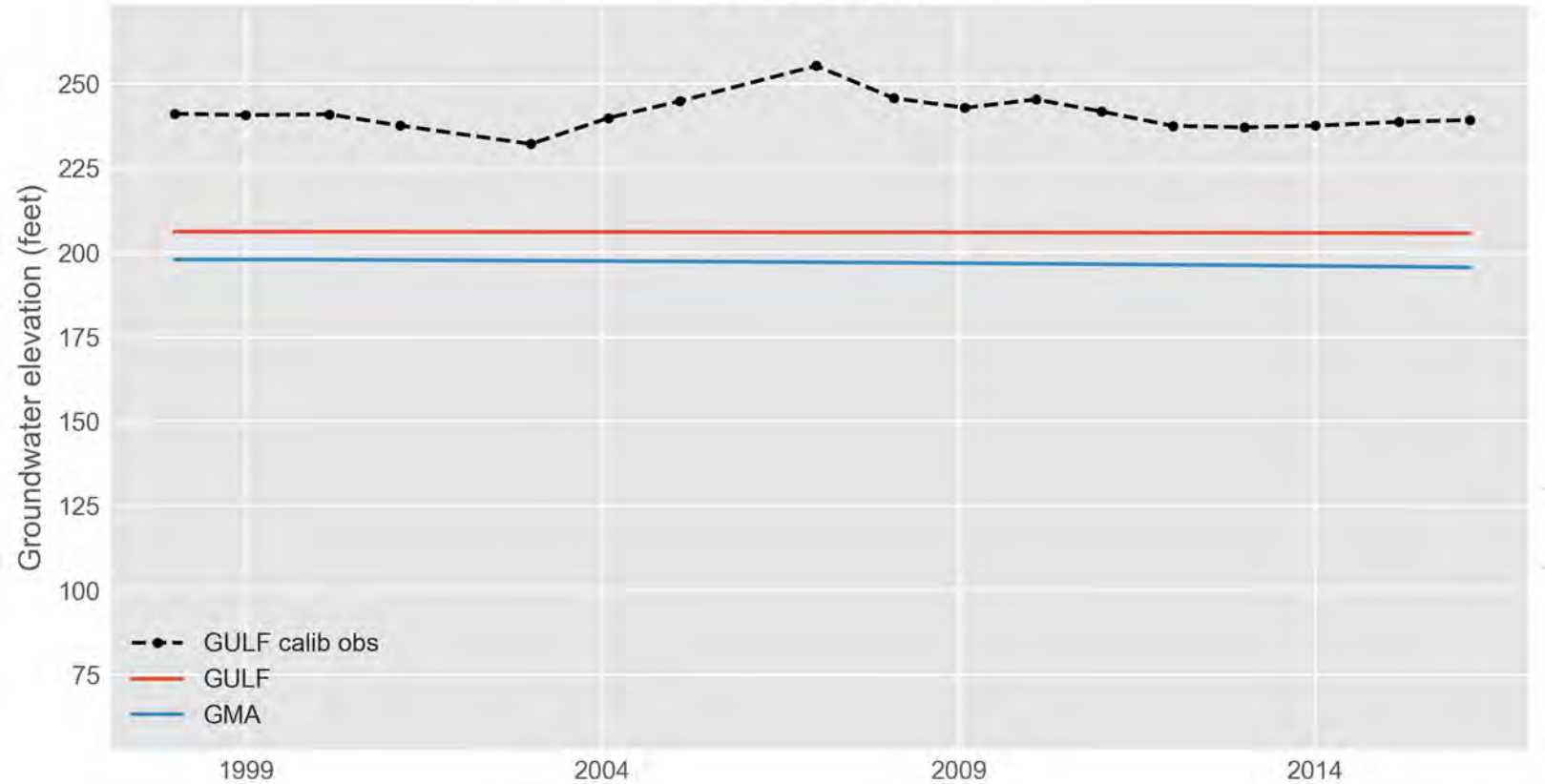
L4R085C218

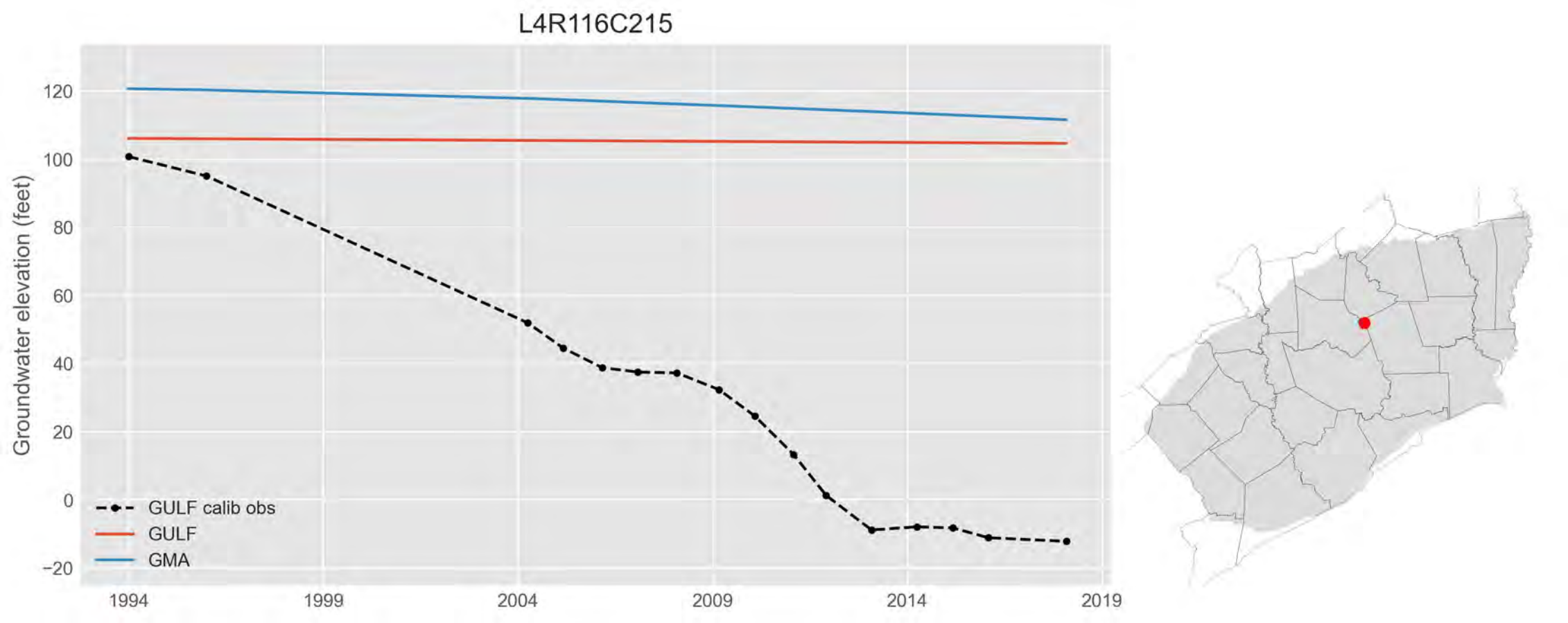

Groundwater elevation (feet)
160
140
120
100
80
60
40
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

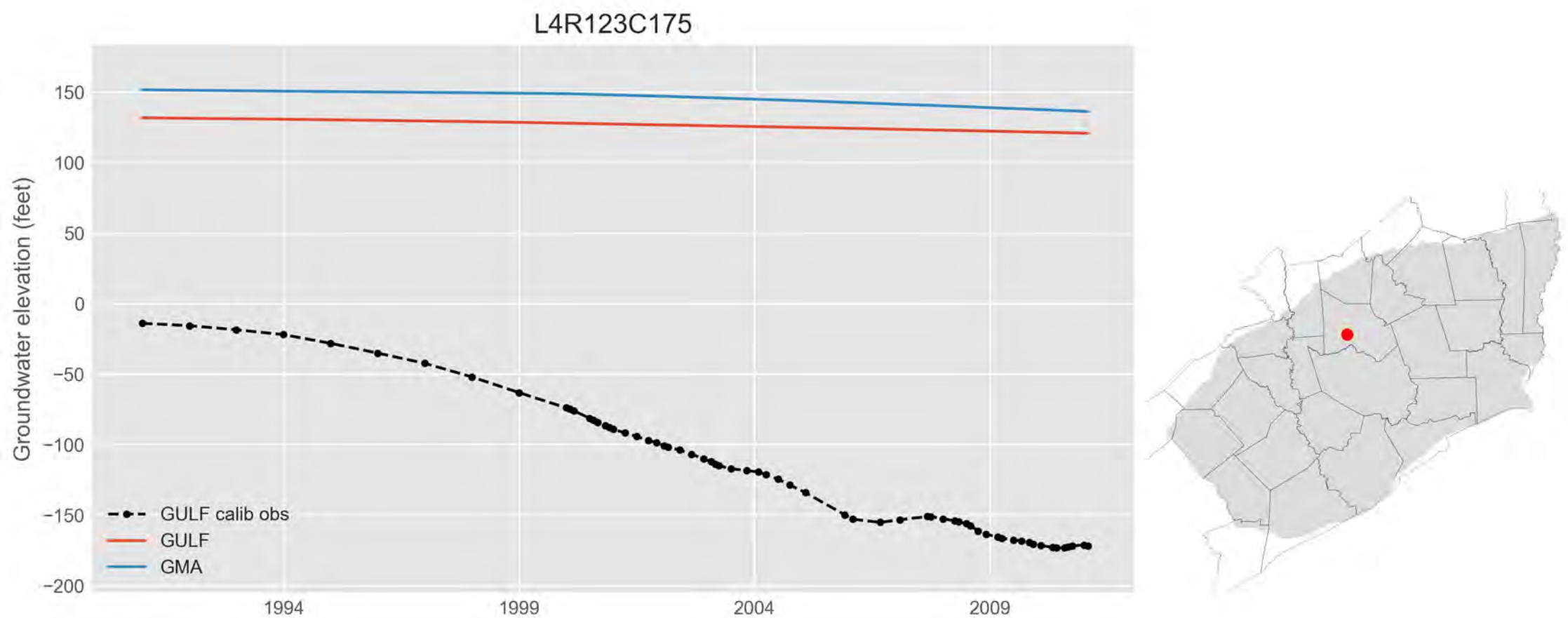

L4R085C223
Groundwater elevation (feet)
160
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
2019
GULF calib obs
GULF
GMA

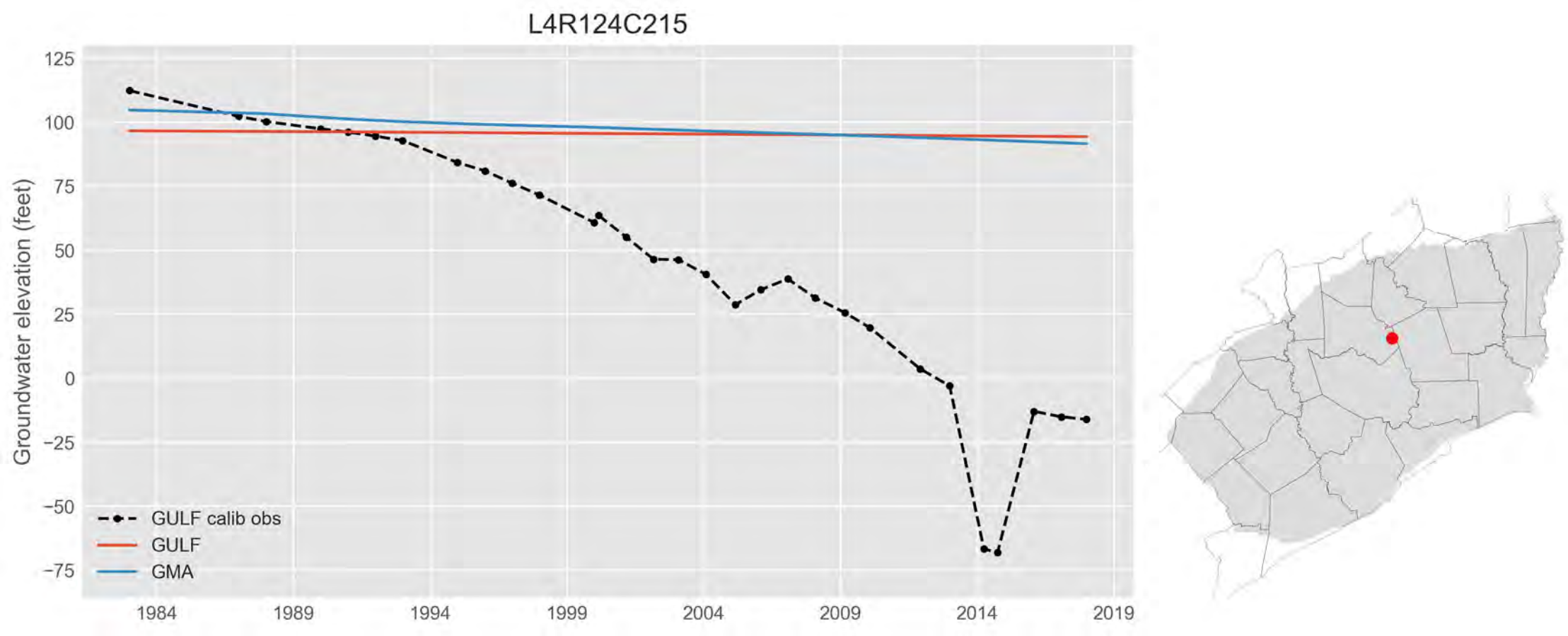

L4R105C192
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
2001
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

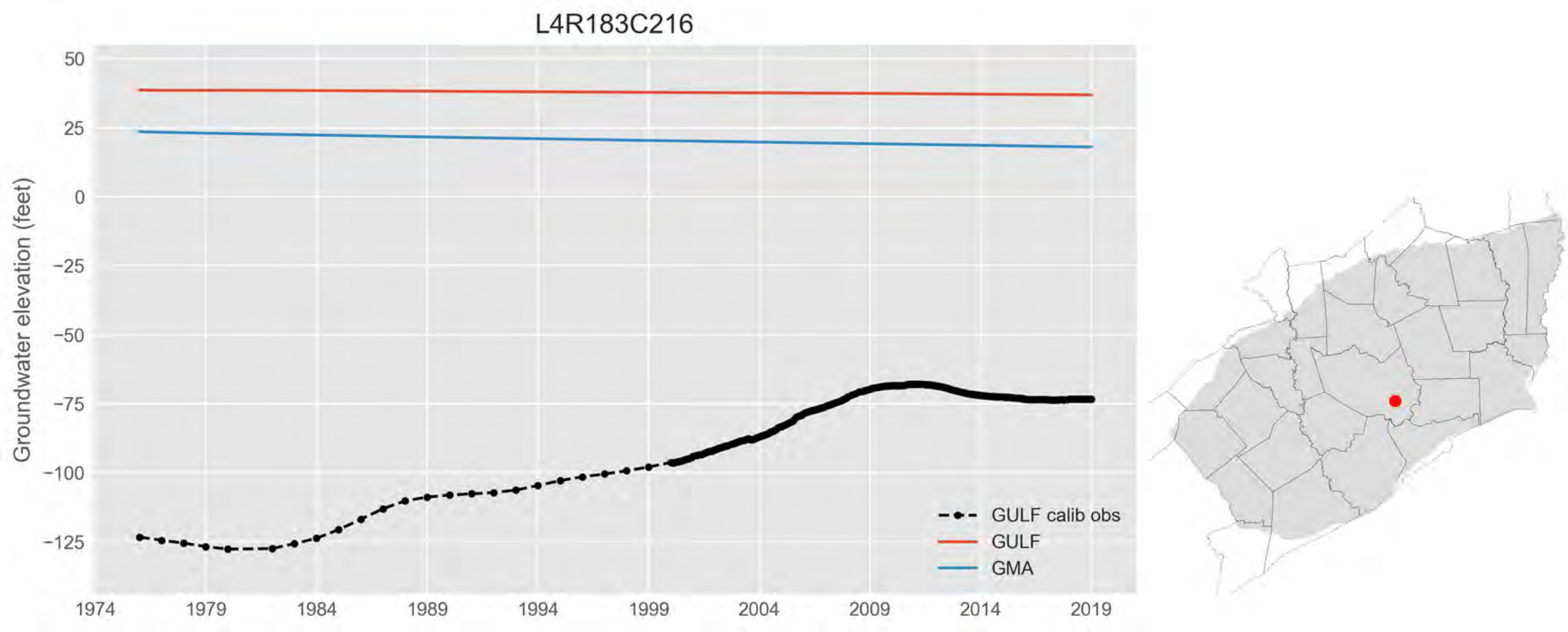
L4R108C147

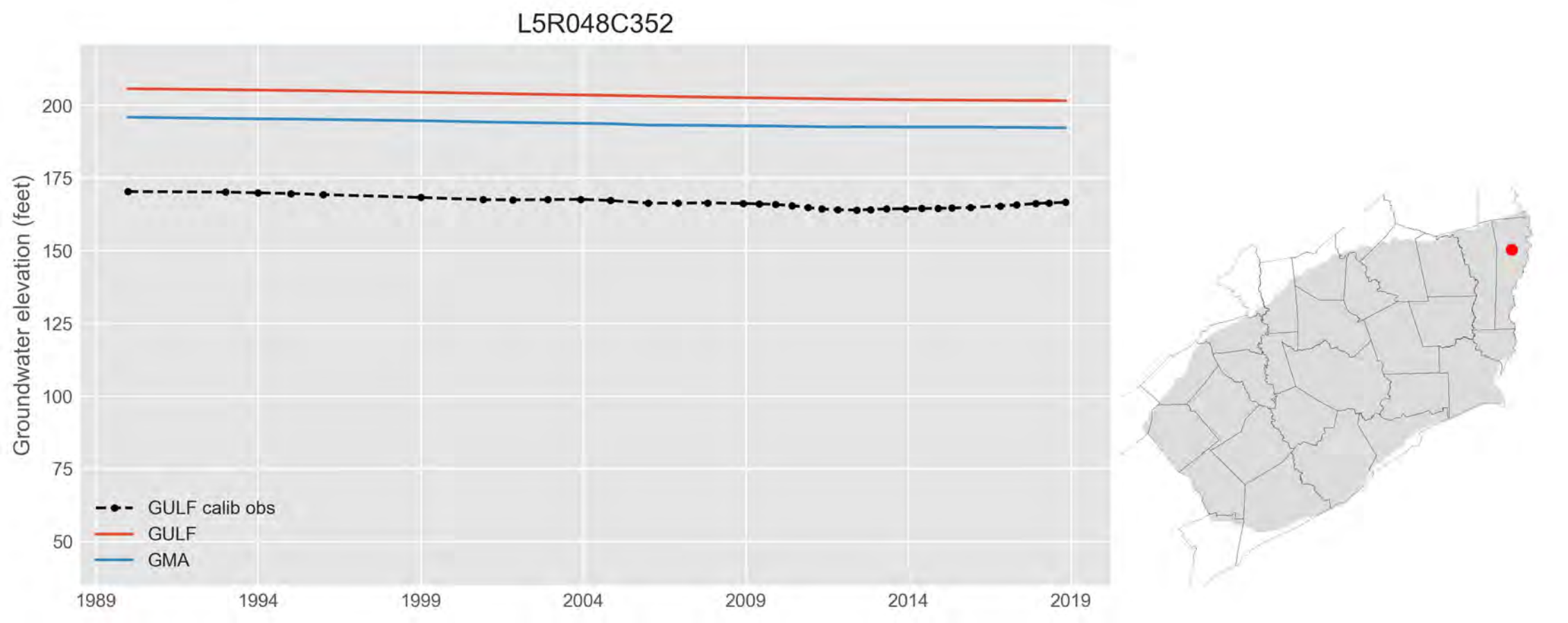

Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1999
2004
2009
2014
GULF calib obs
GULF
GMA

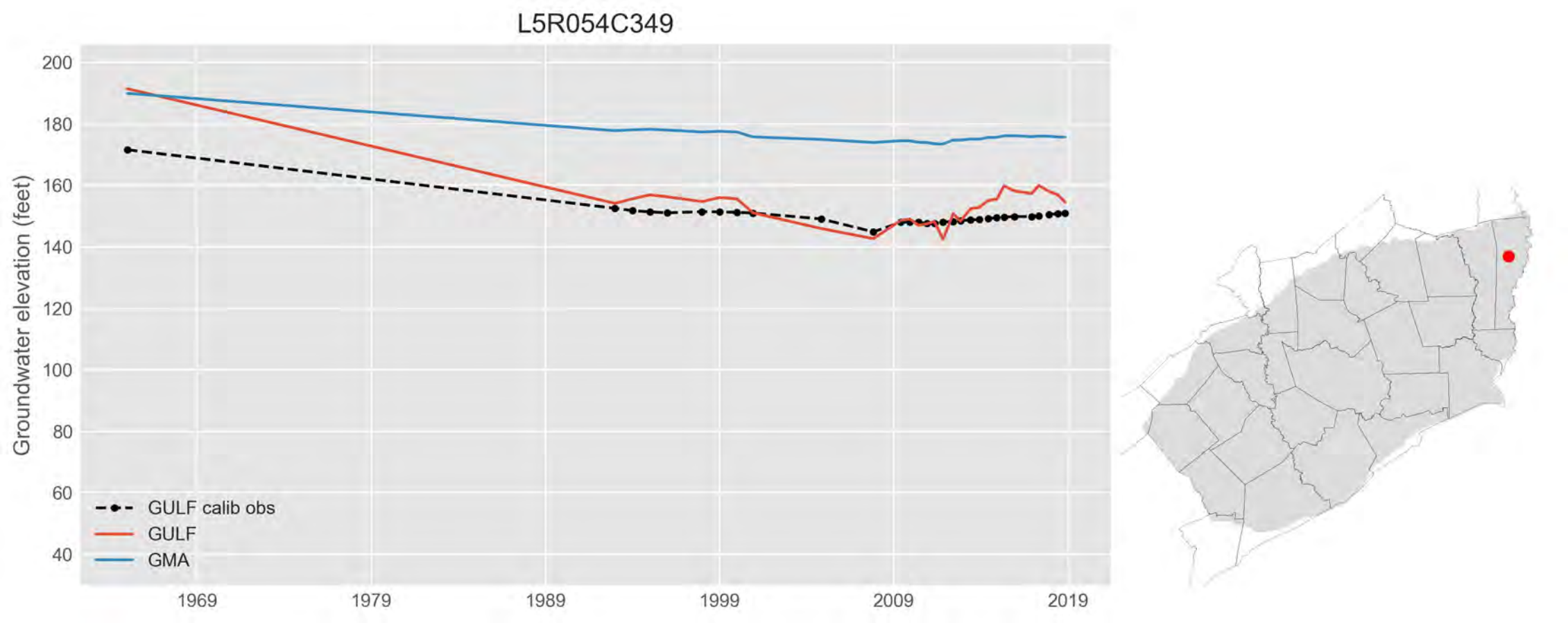

L4R116C215
Groundwater elevation (feet)
120
100
80
60
40
20
0
−20
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

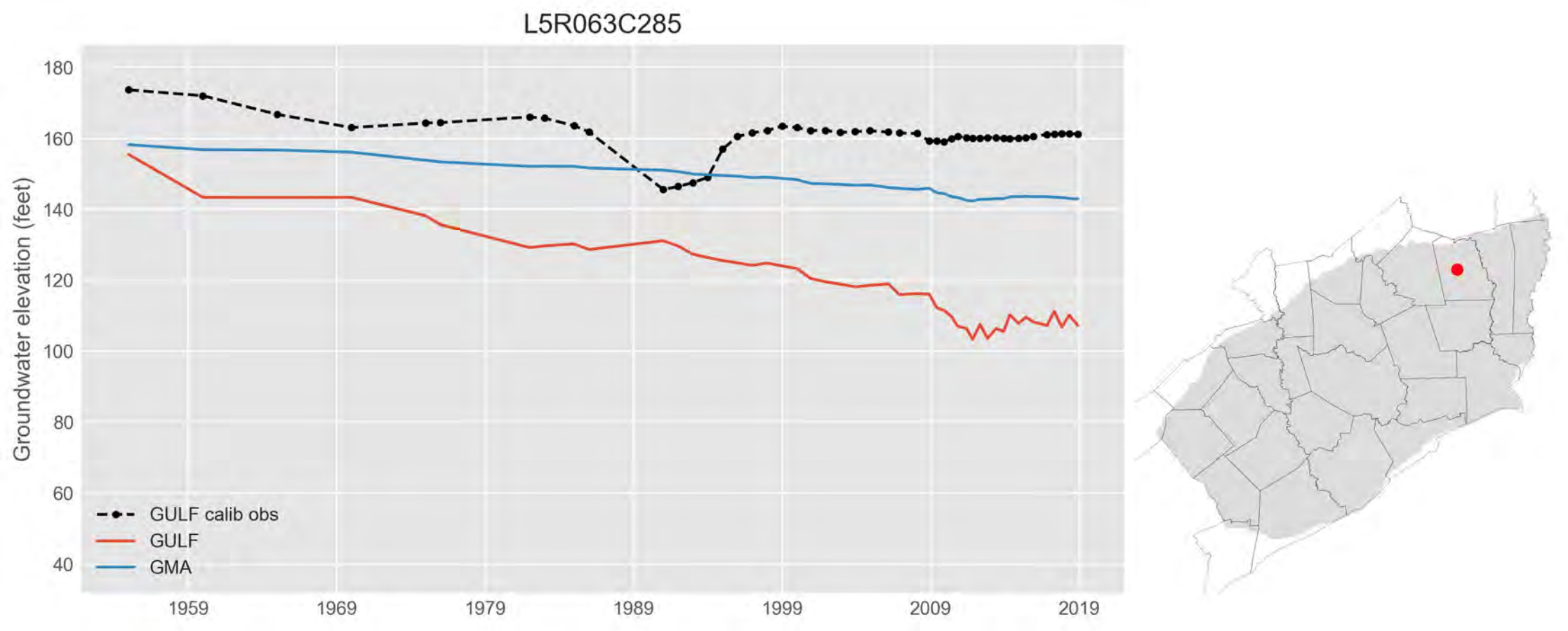

L4R123C175
Groundwater elevation (feet)
150
100
50
0
−50
−100
−150
−200
1994
1999
2004
2009
GULF calib obs
GULF
GMA

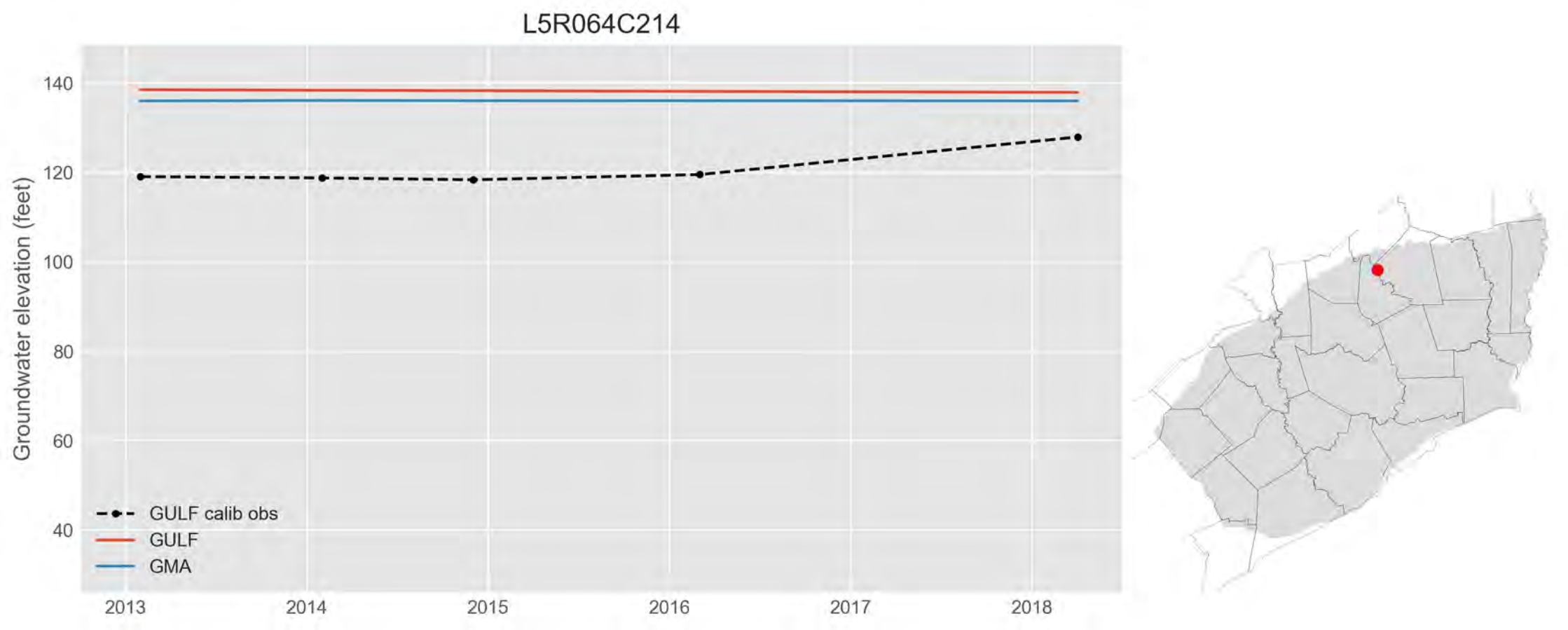

L4R124C215
Groundwater elevation (feet)
125
100
75
50
25
0
−25
−50
−75
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

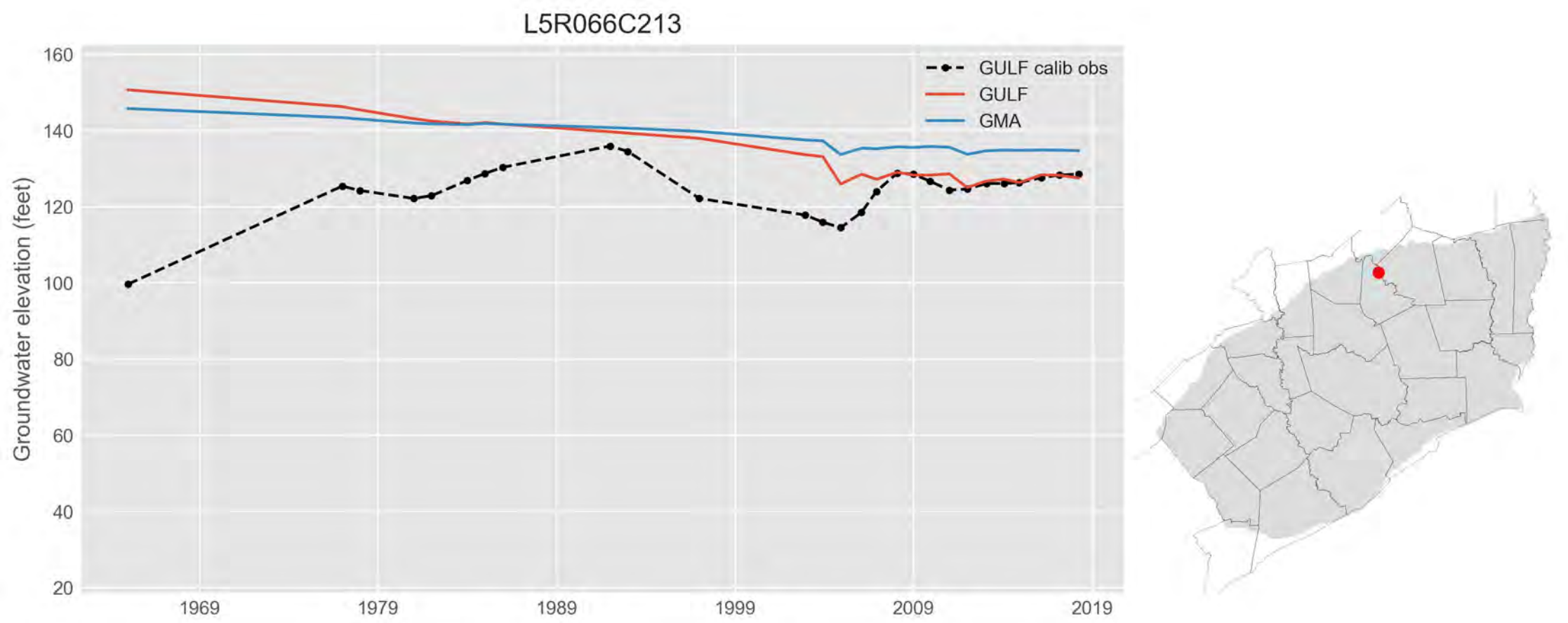

L4R183C216
Groundwater elevation (feet)
50
25
0
−25
−50
−75
−100
−125
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

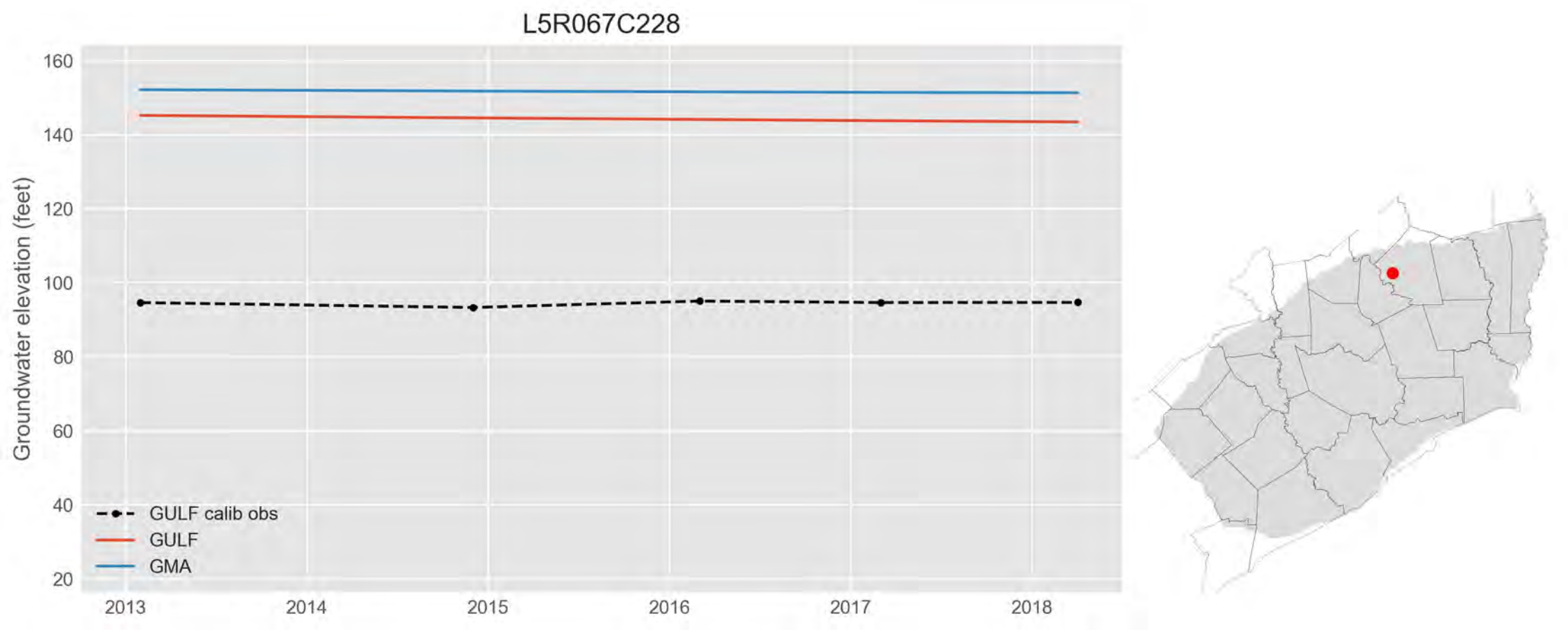

L5R048C352
Groundwater elevation (feet)
200
175
150
125
100
75
50
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

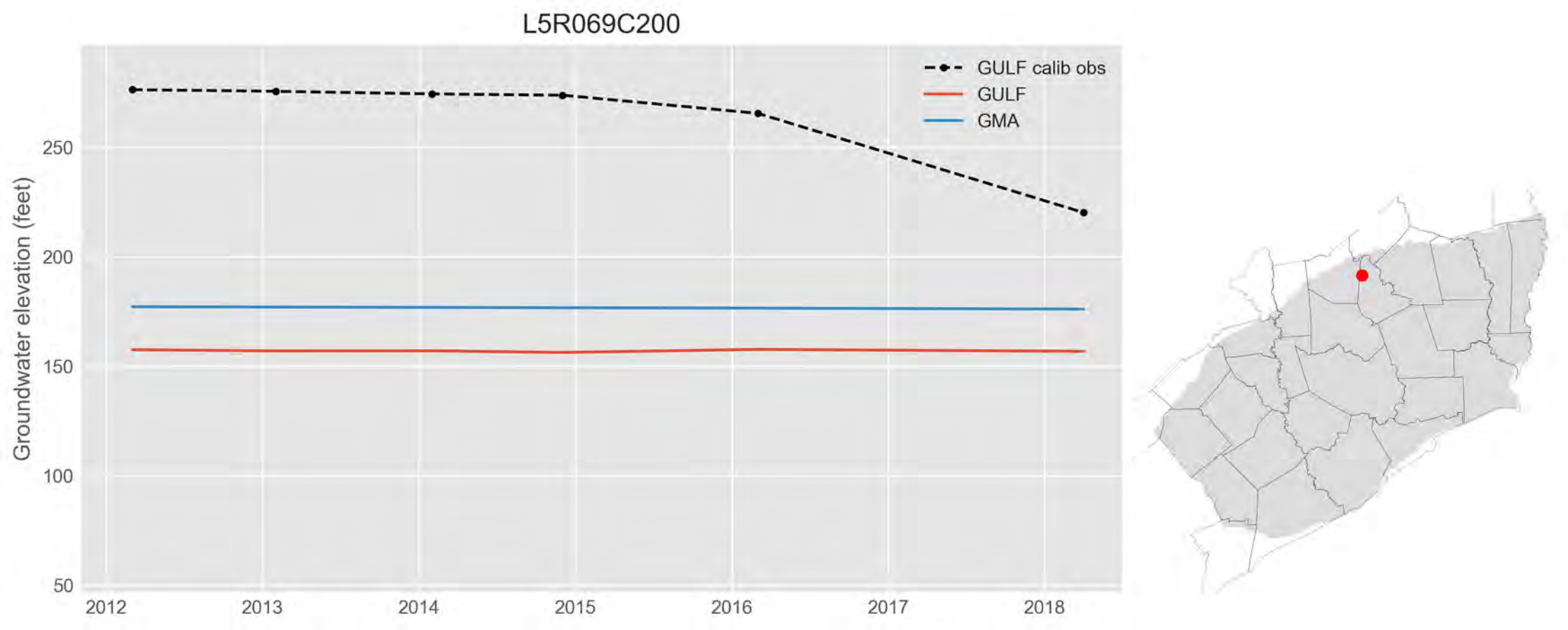

L5R054C349
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

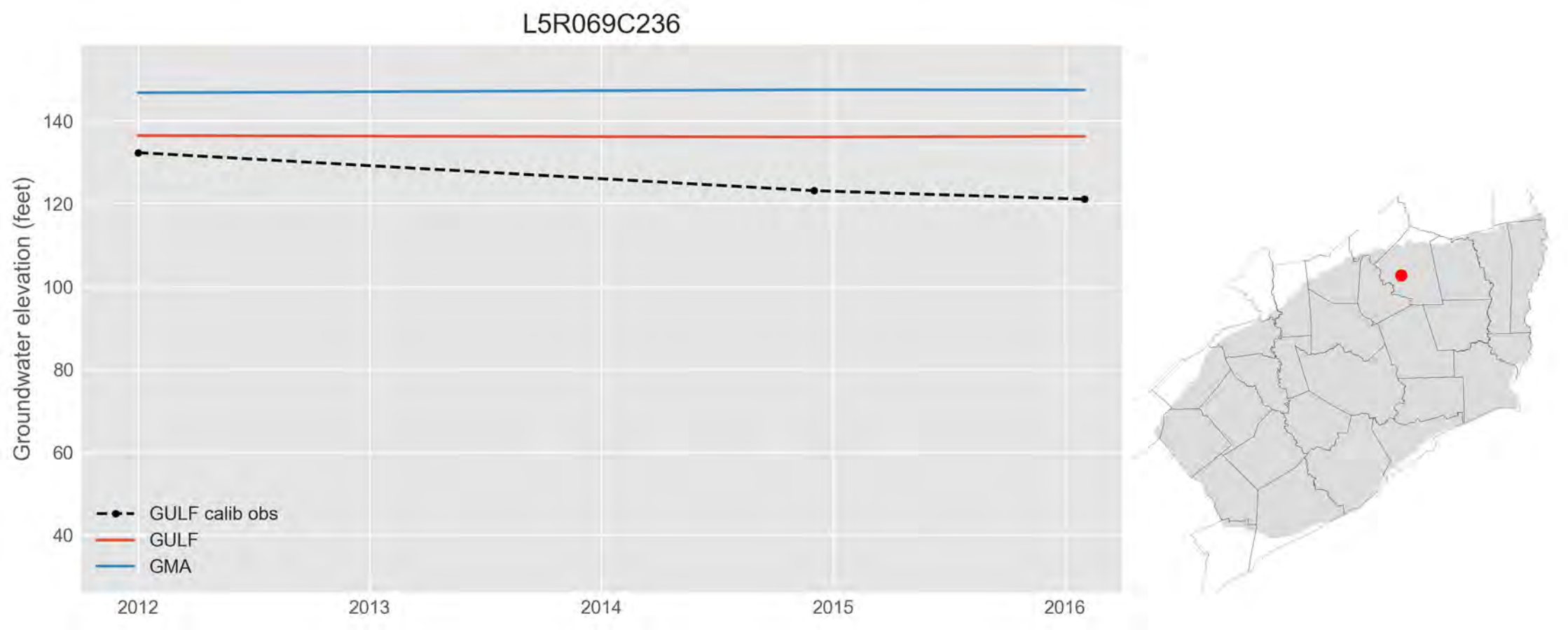

L5R063C285
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
1959
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

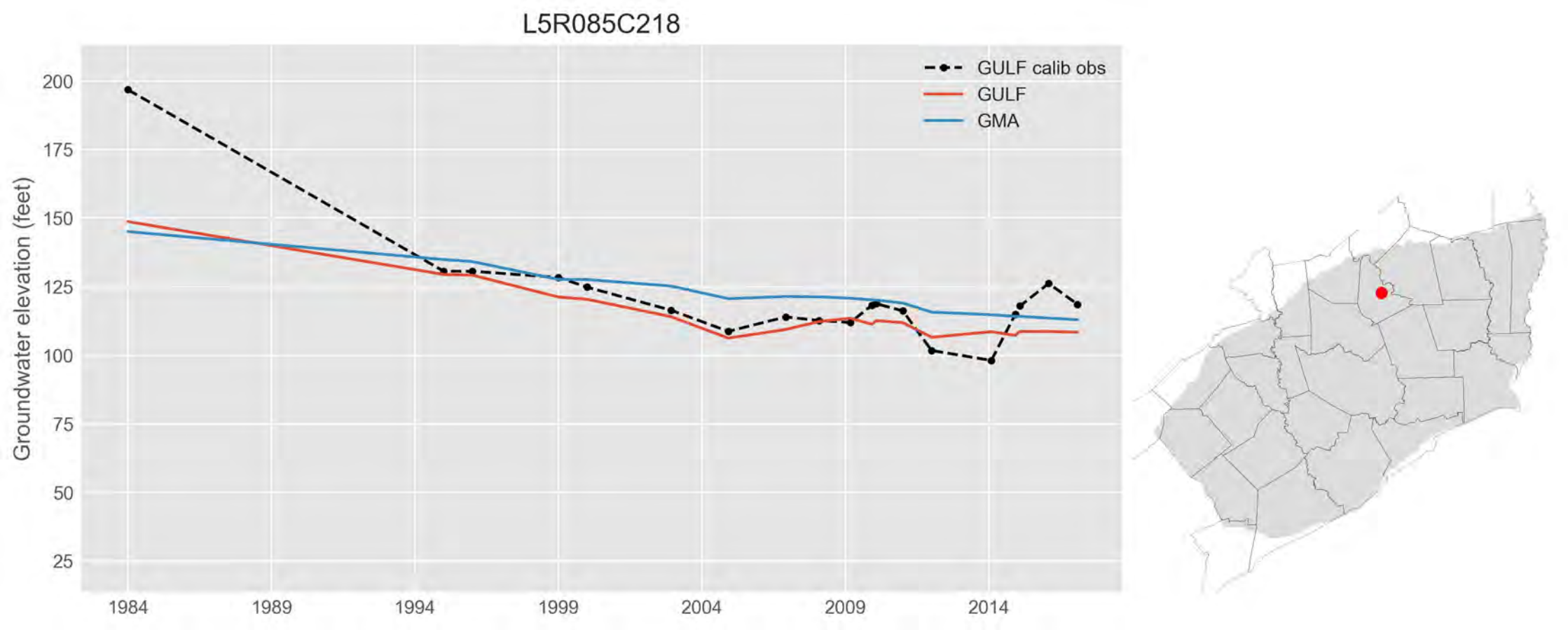

L5R064C214
Groundwater elevation (feet)
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

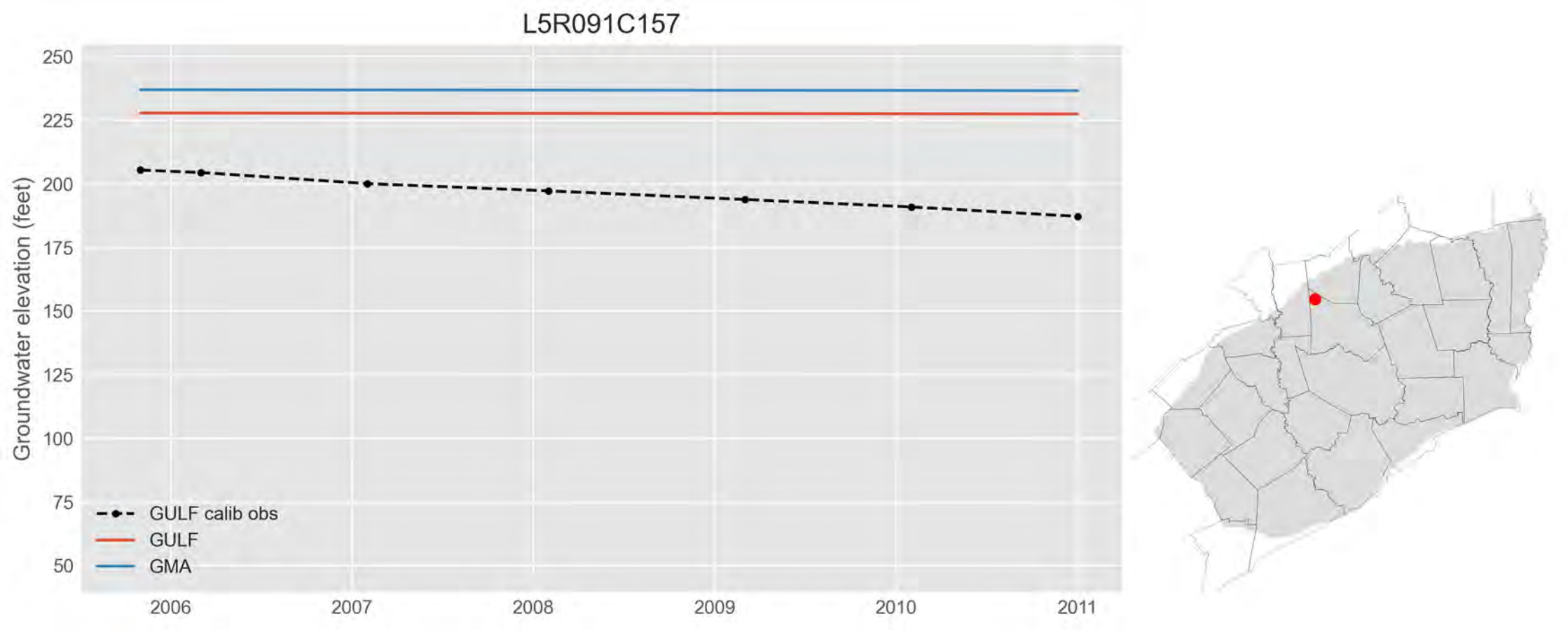

L5R066C213
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
1969
1979
1989
1999
2009
2019

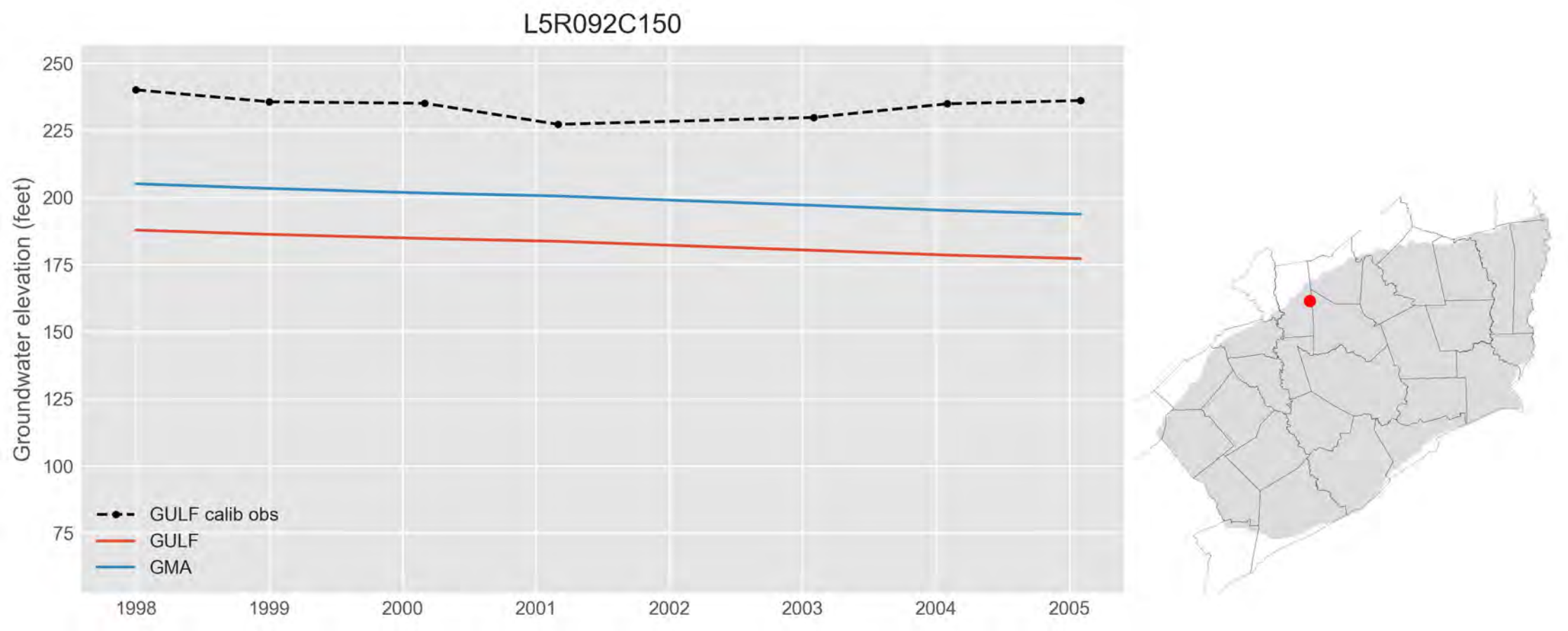

L5R067C228
Groundwater elevation (feet)
160
140
120
100
80
60
40
20
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

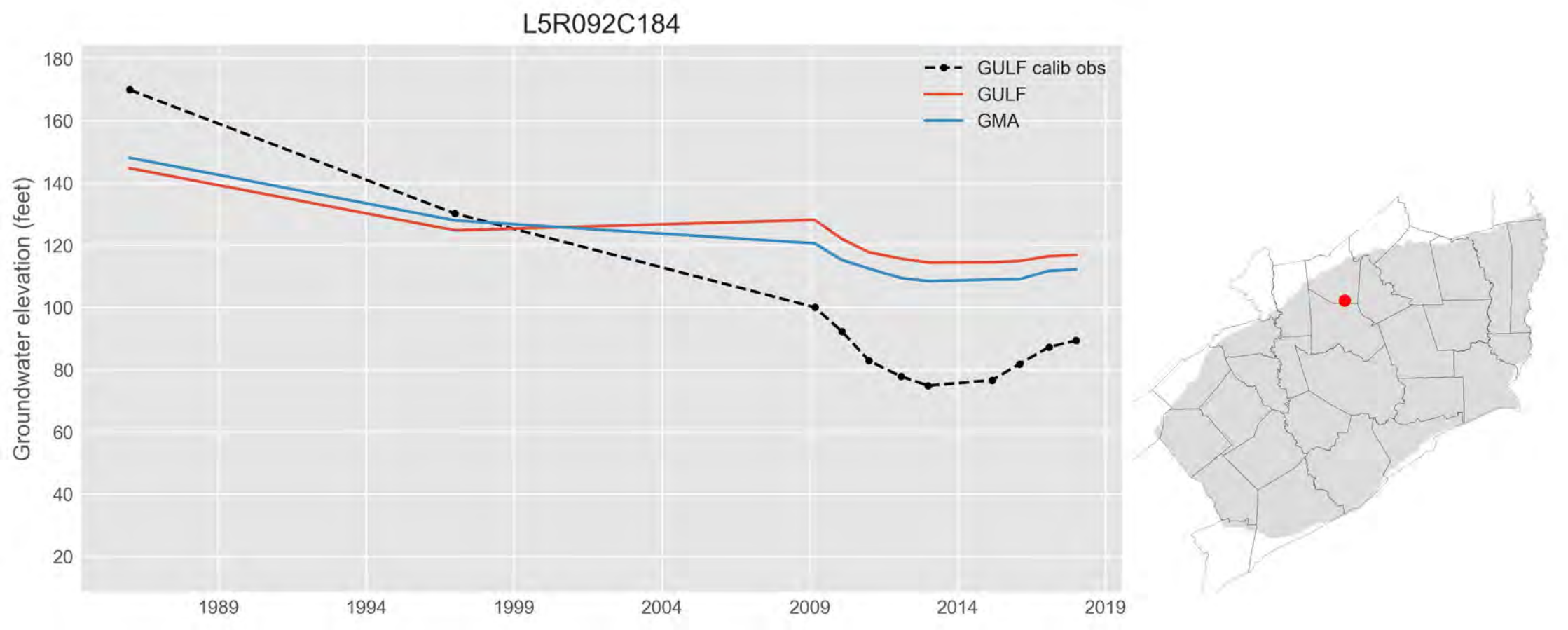

L5R069C200
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
250
200
150
100
50
2012
2013
2014
2015
2016
2017
2018

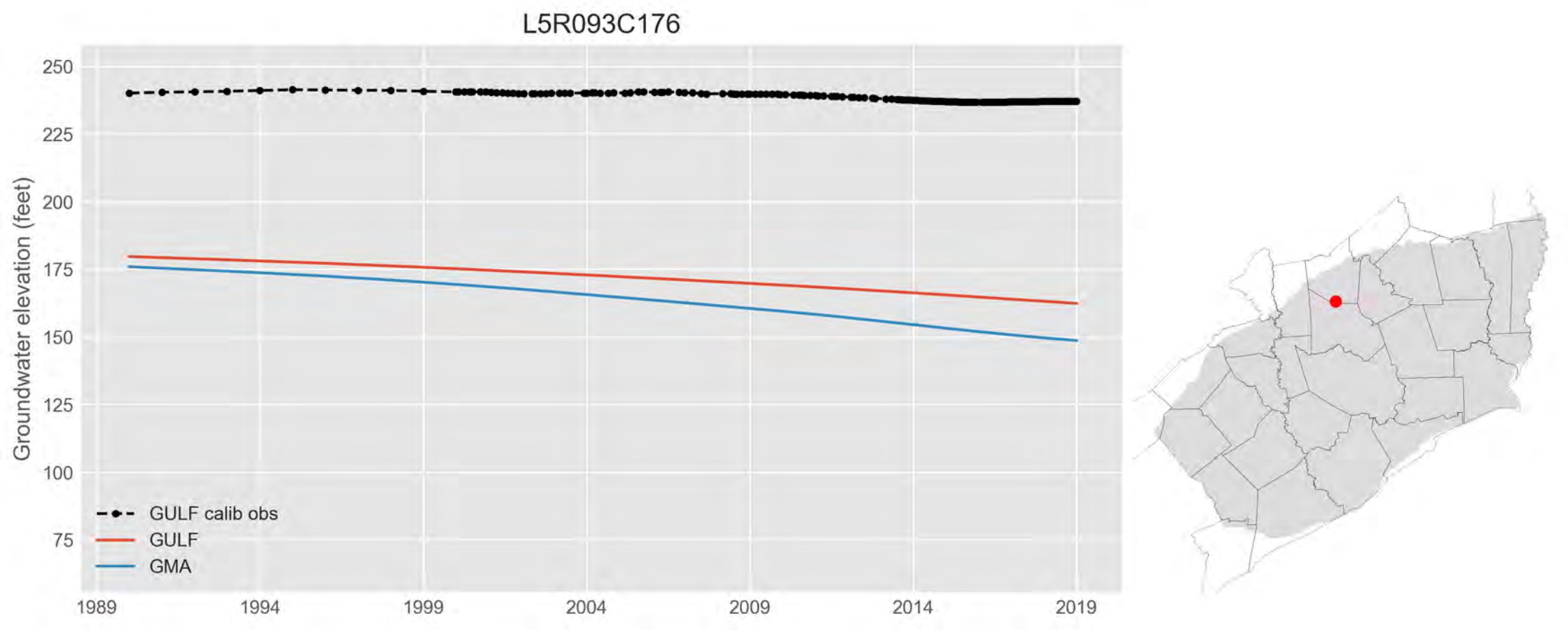

L5R069C236
Groundwater elevation (feet)
140
120
100
80
60
40
2012
2013
2014
2015
2016
GULF calib obs
GULF
GMA

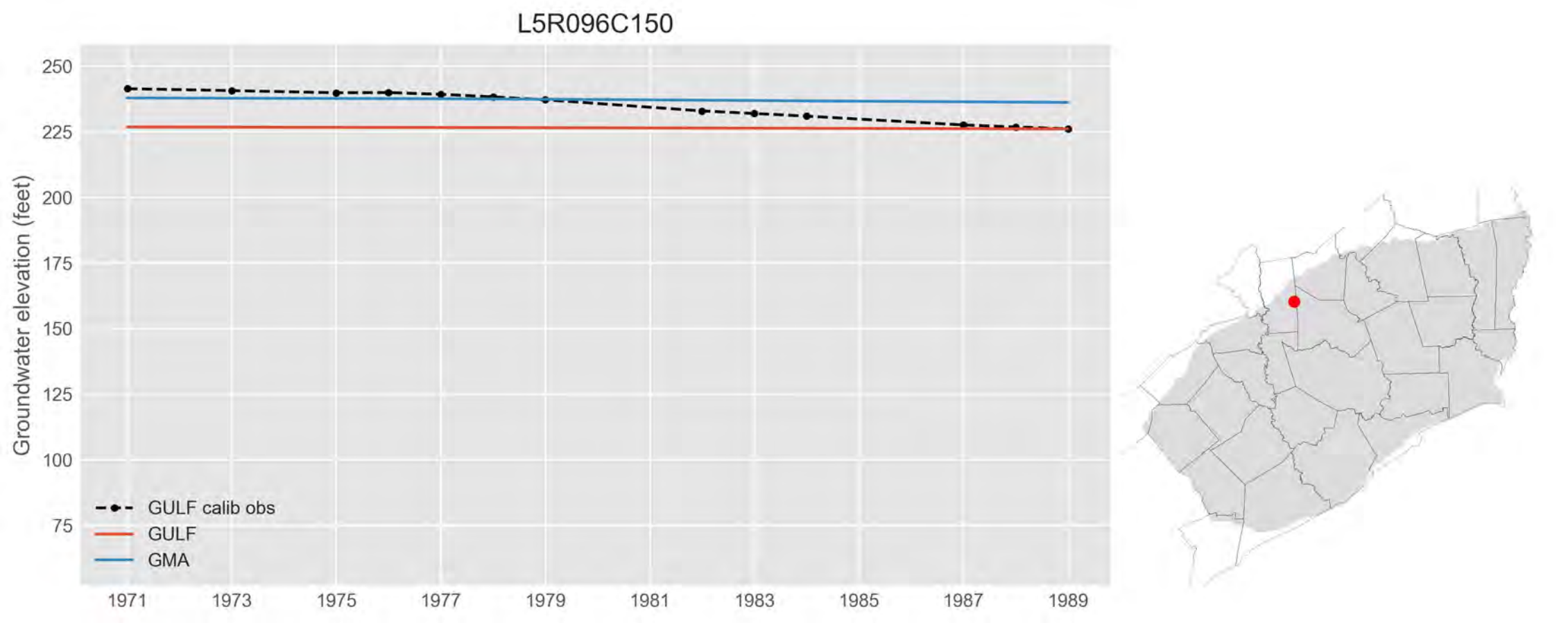

L5R085C218
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1984
1989
1994
1999
2004
2009
2014

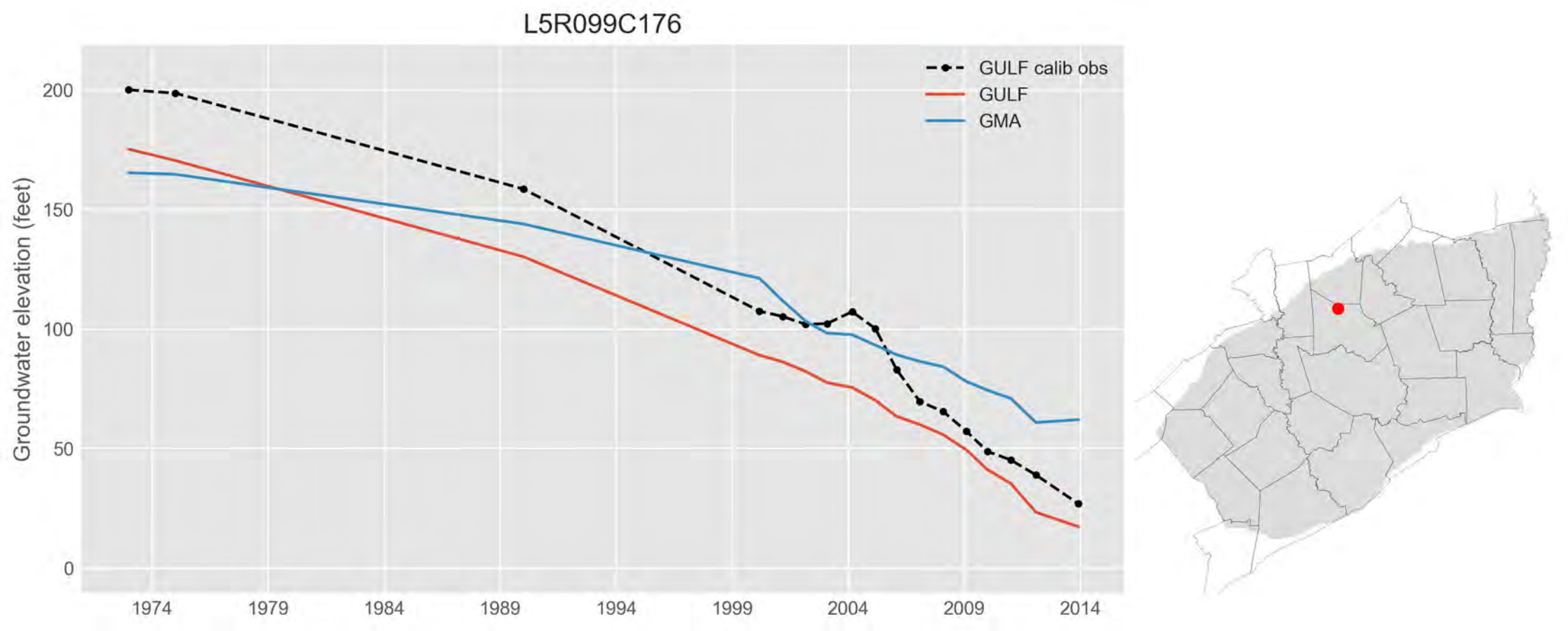

L5R091C157
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
50
2006
2007
2008
2009
2010
2011
GULF calib obs
GULF
GMA

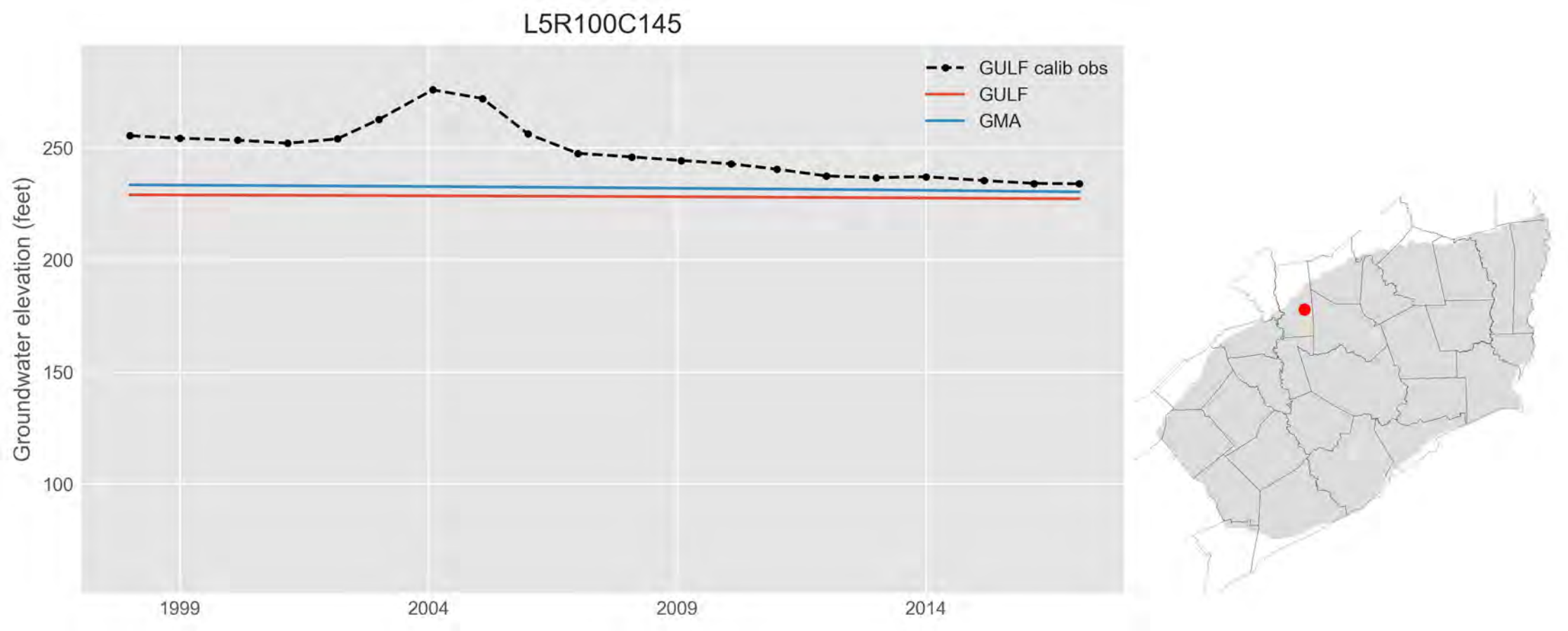

L5R092C150
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1998
1999
2000
2001
2002
2003
2004
2005
GULF calib obs
GULF
GMA

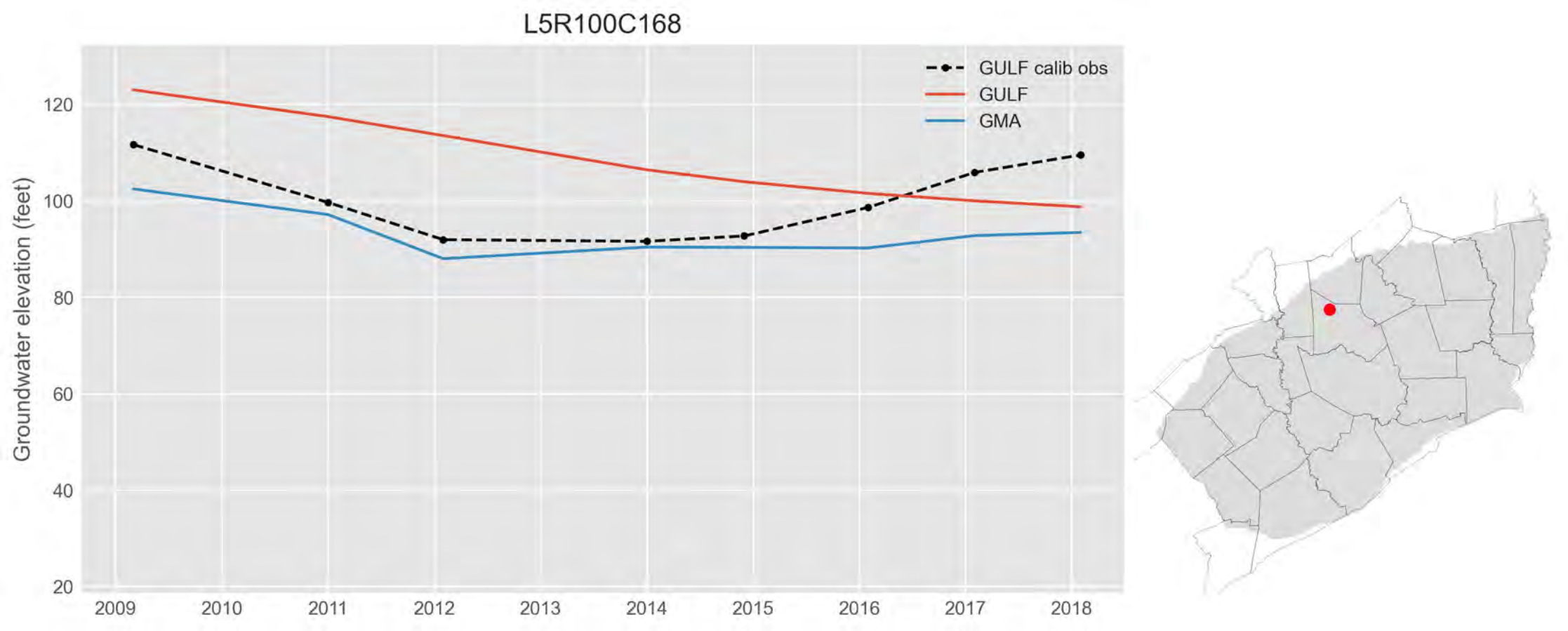

L5R092C184
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
20
1989
1994
1999
2004
2009
2014
2019

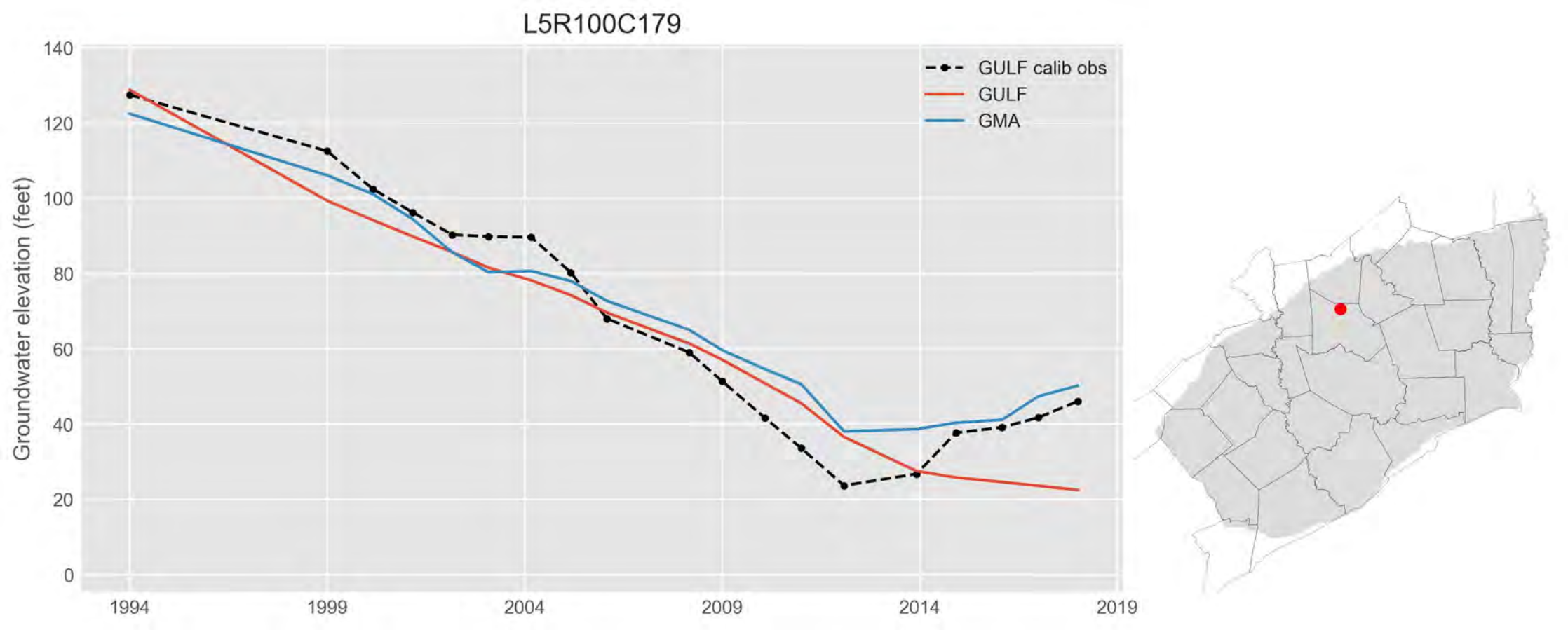

L5R093C176
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

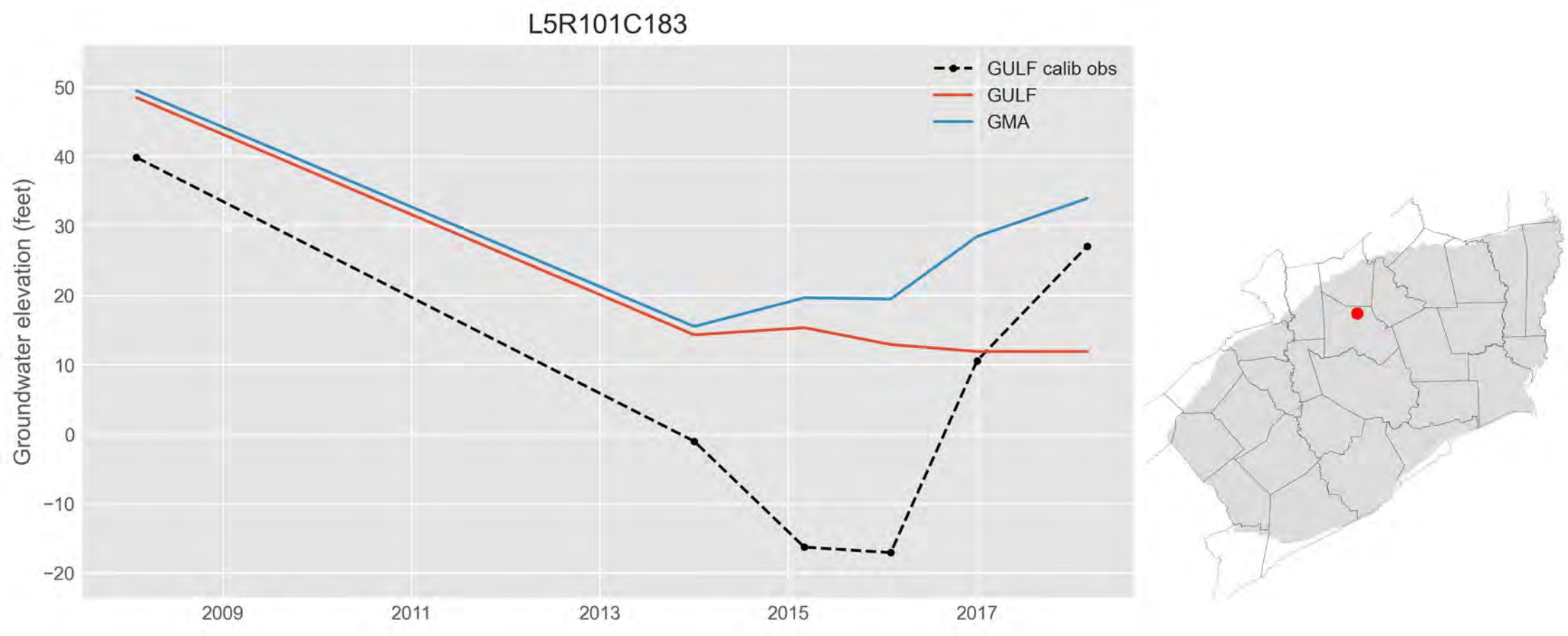

L5R096C150
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
GULF calib obs
GULF
GMA

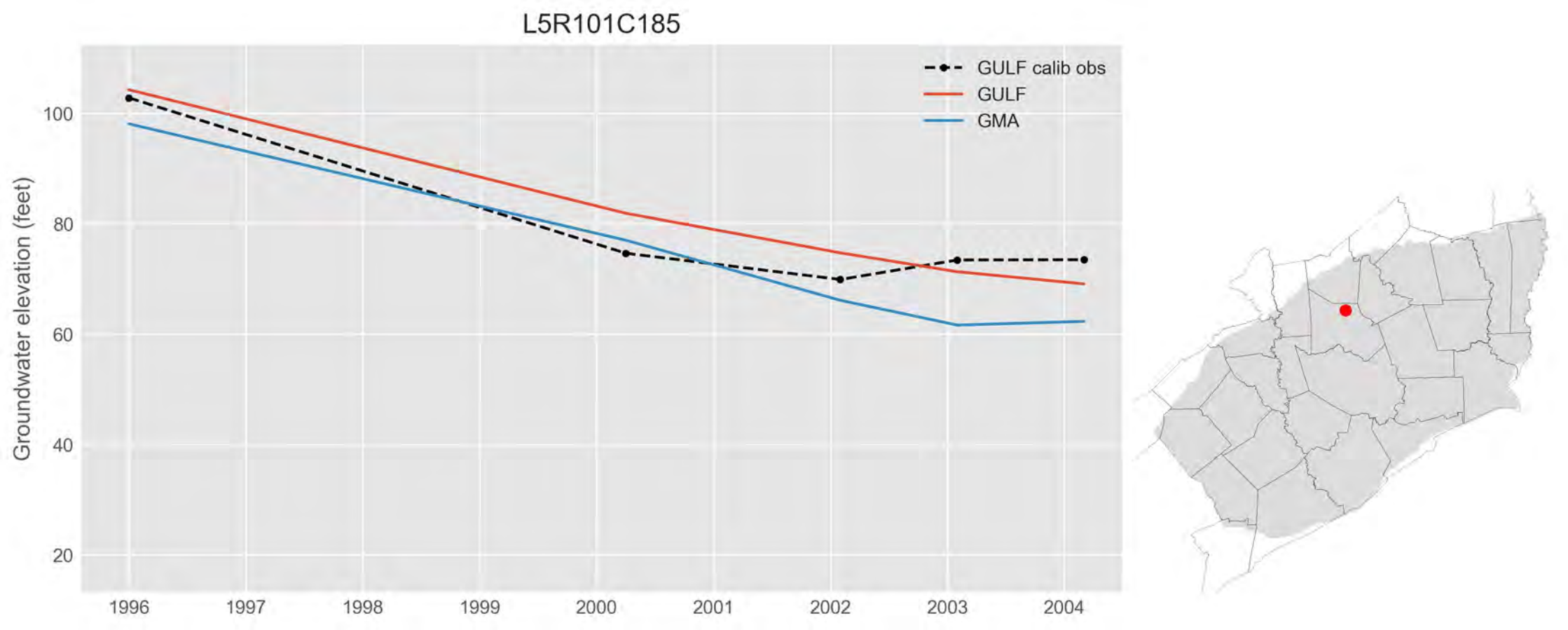

L5R099C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
1974
1979
1984
1989
1994
1999
2004
2009
2014

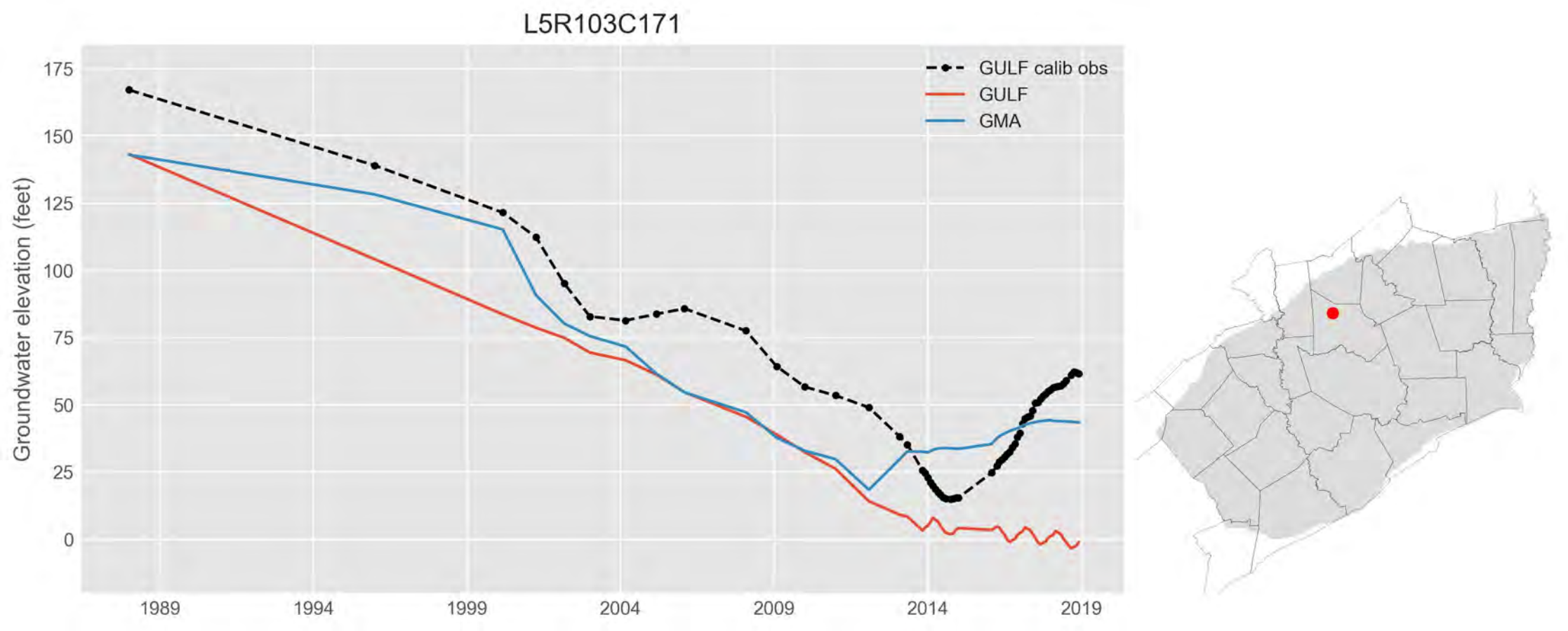

L5R100C145
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
250
200
150
100
1999
2004
2009
2014


L5R100C168
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

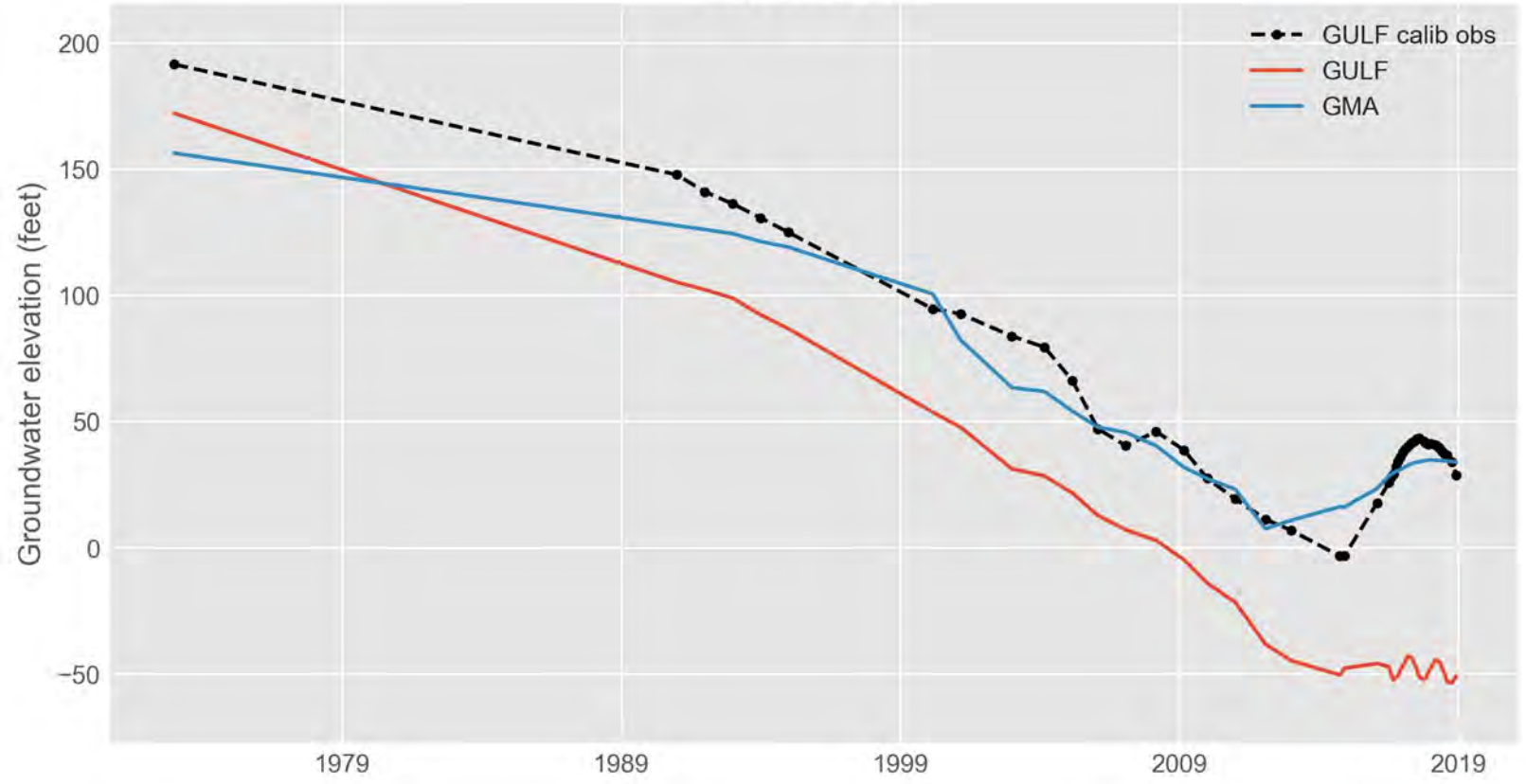

L5R100C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
0
1994
1999
2004
2009
2014
2019

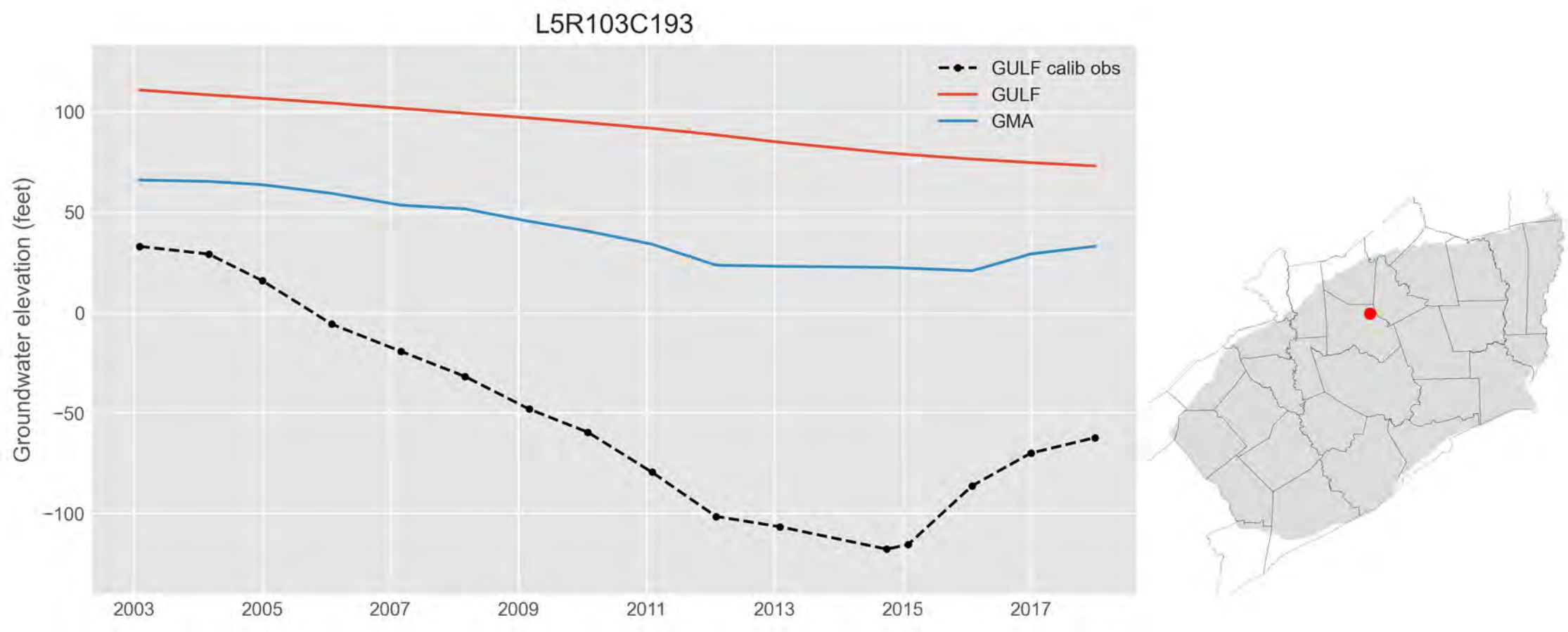

L5R101C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
40
30
20
10
0
−10
−20
2009
2011
2013
2015
2017

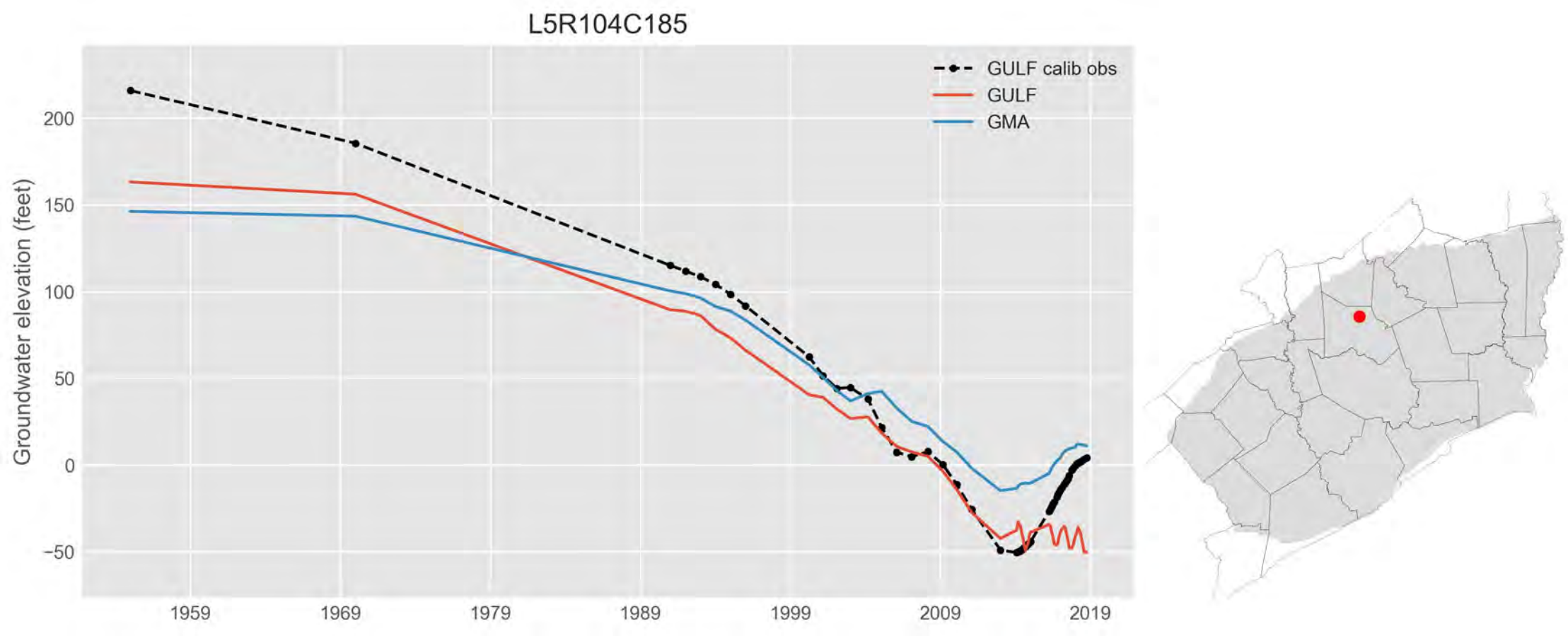

L5R101C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
1996
1997
1998
1999
2000
2001
2002
2003
2004

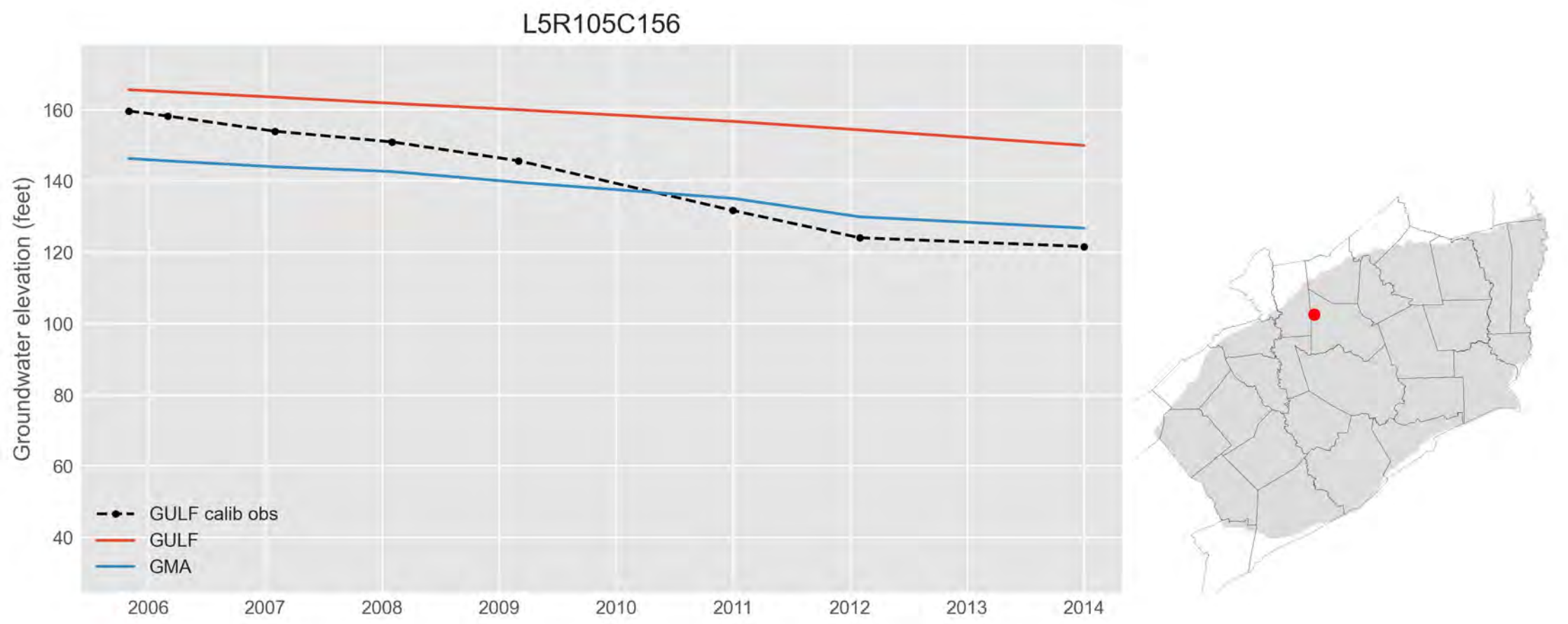

L5R103C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
0
1989
1994
1999
2004
2009
2014
2019

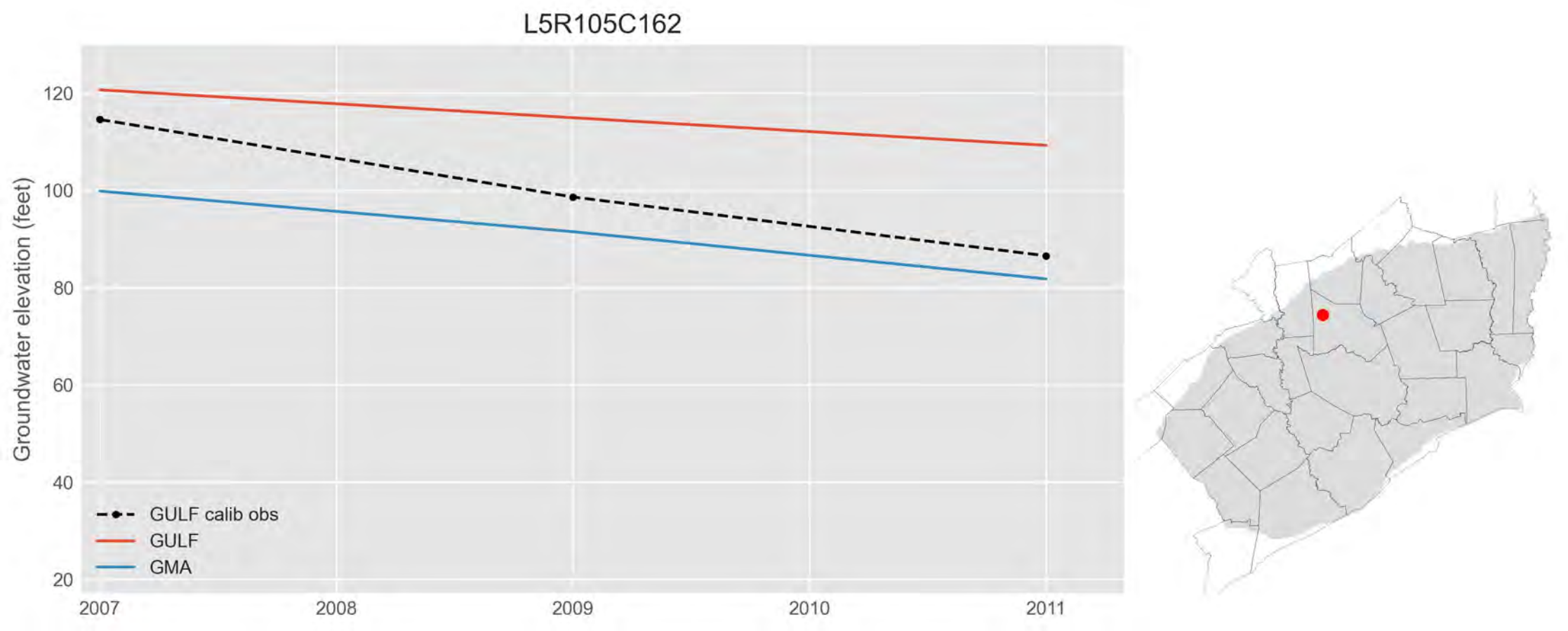
L5R103C175

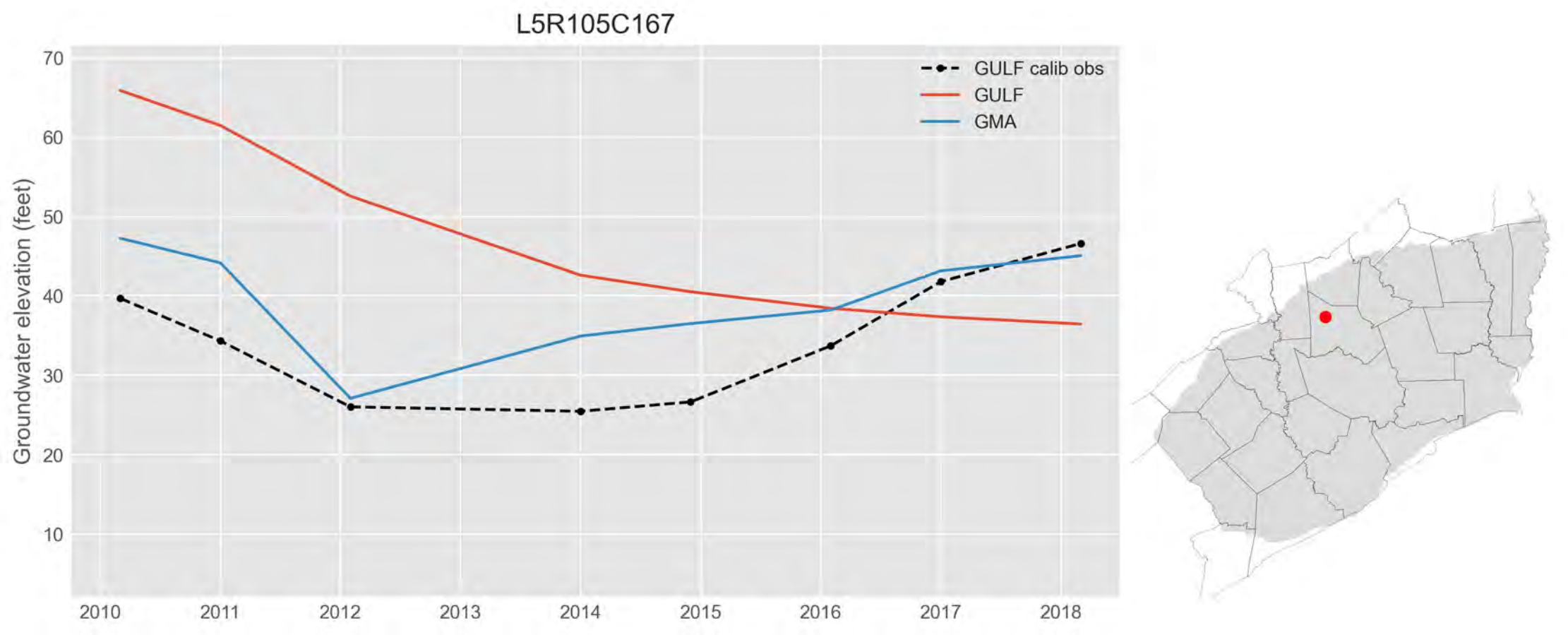

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
1979
1989
1999
2009
2019

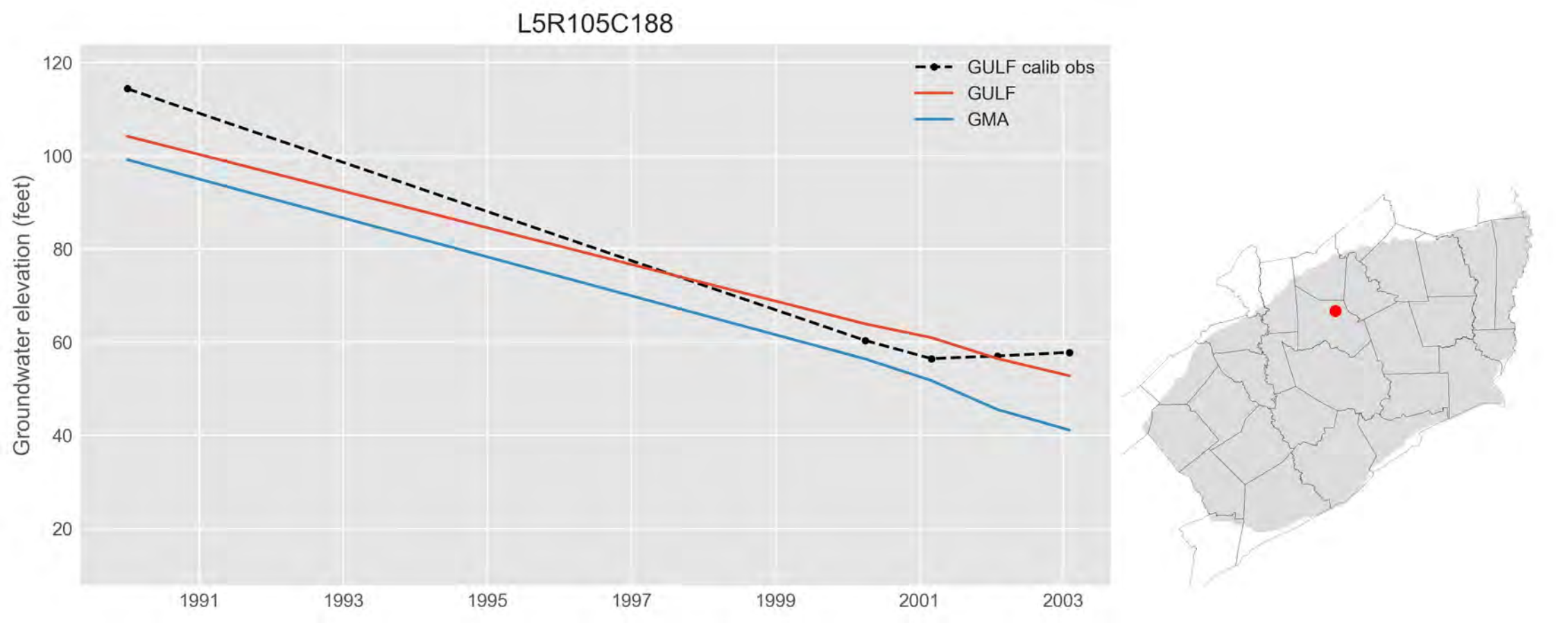

L5R103C193
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
2003
2005
2007
2009
2011
2013
2015
2017

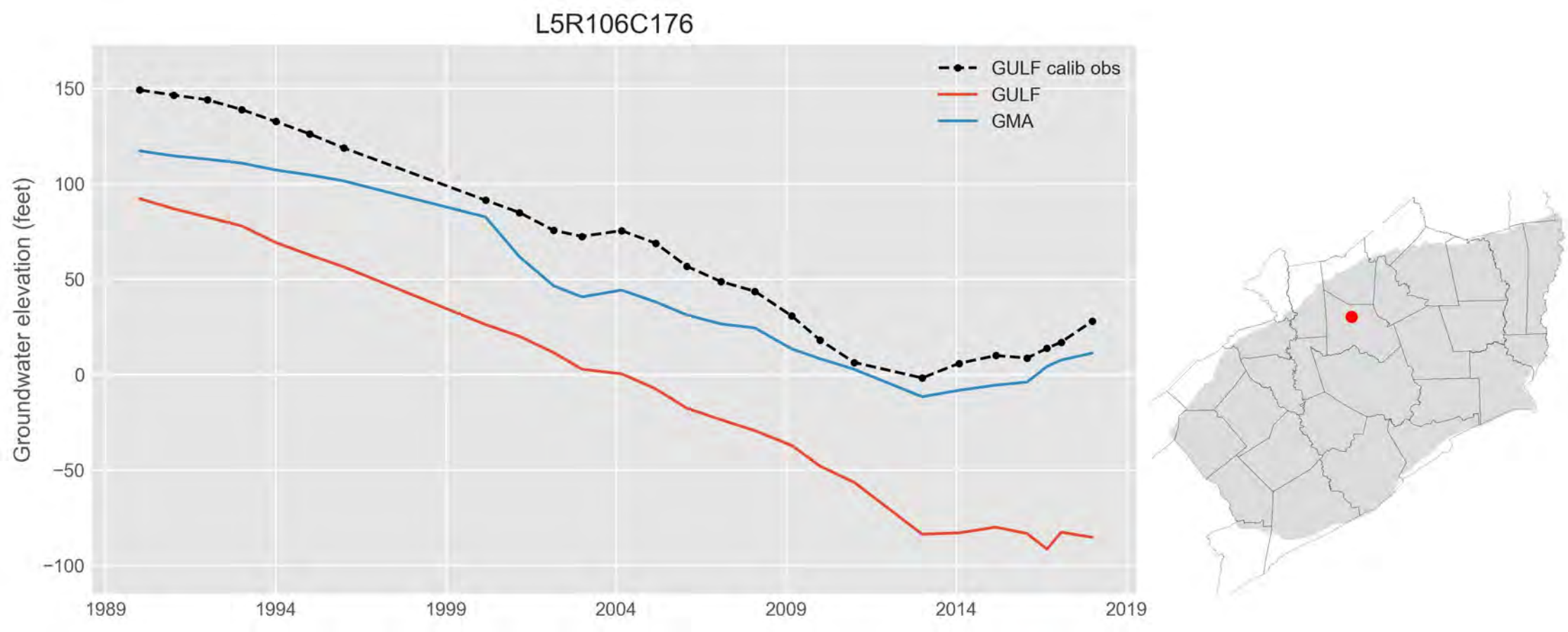

L5R104C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
1959
1969
1979
1989
1999
2009
2019

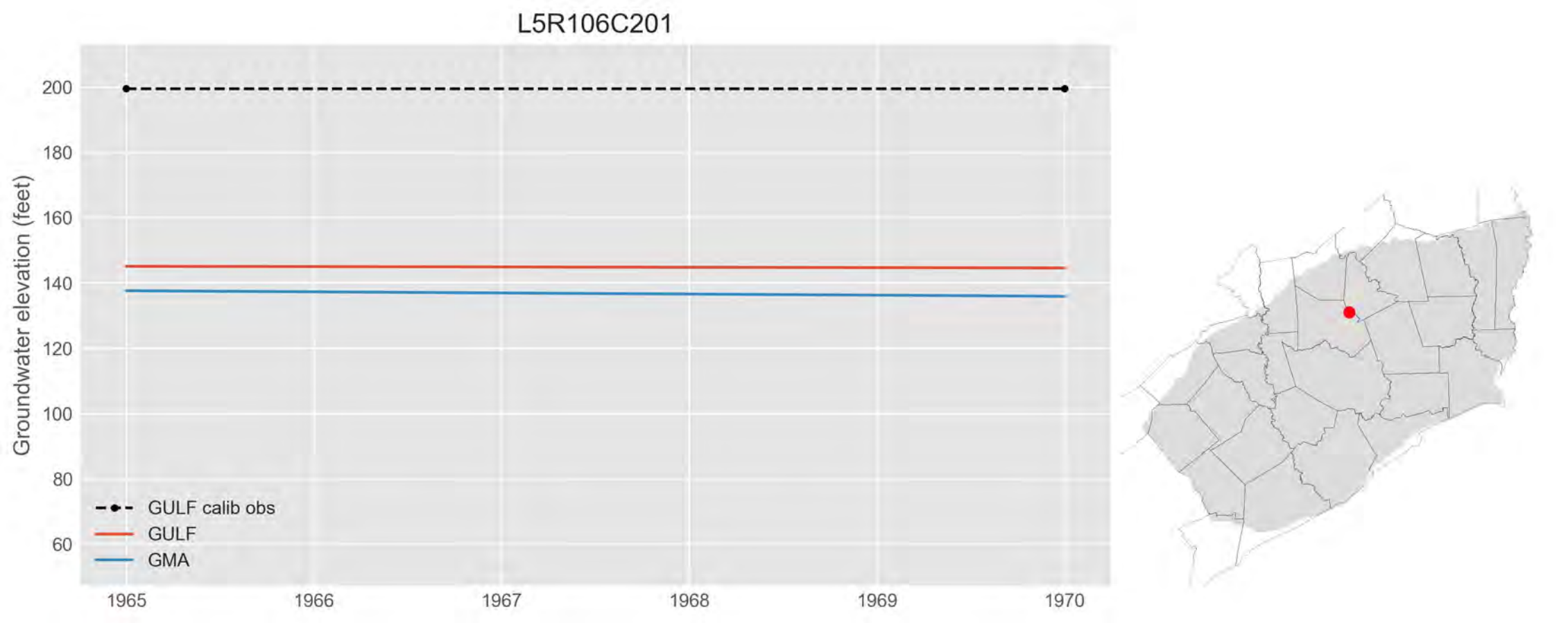

L5R105C156
Groundwater elevation (feet)
160
140
120
100
80
60
40
2006
2007
2008
2009
2010
2011
2012
2013
2014
GULF calib obs
GULF
GMA

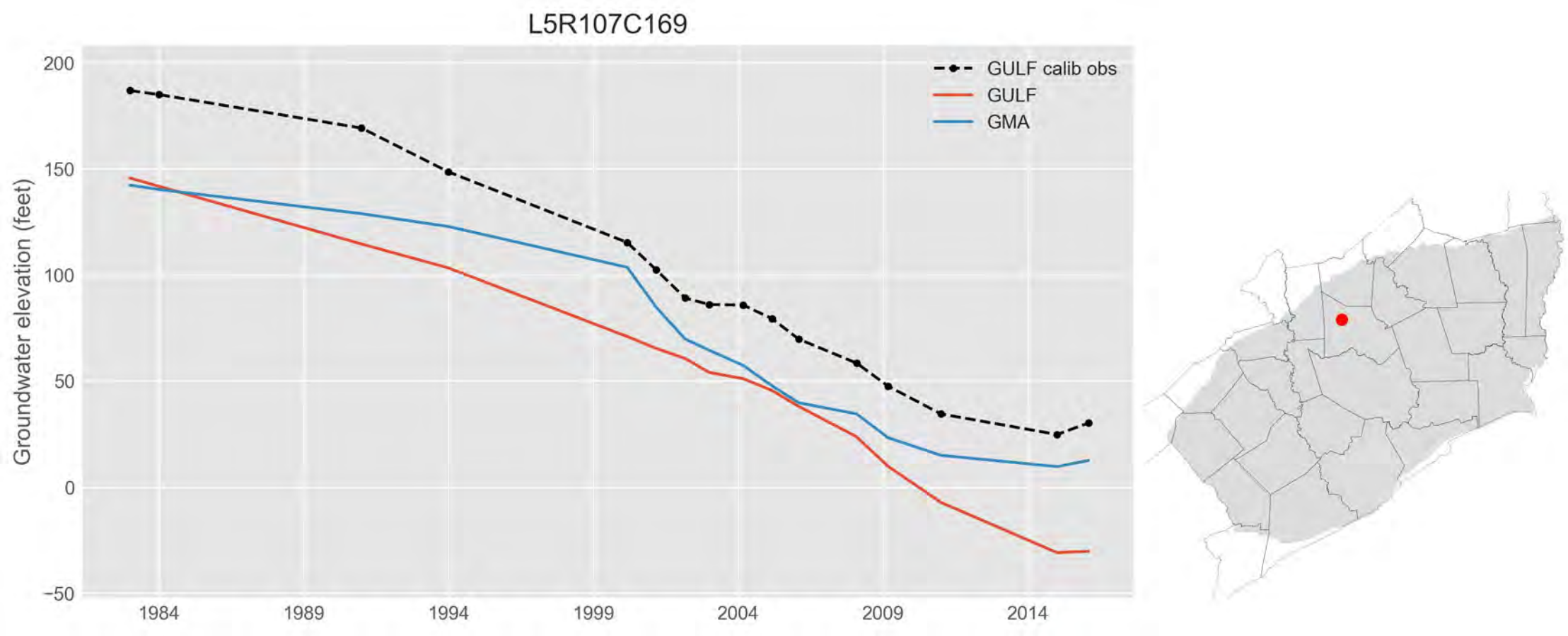

L5R105C162
Groundwater elevation (feet)
120
100
80
60
40
20
2007
2008
2009
2010
2011
GULF calib obs
GULF
GMA

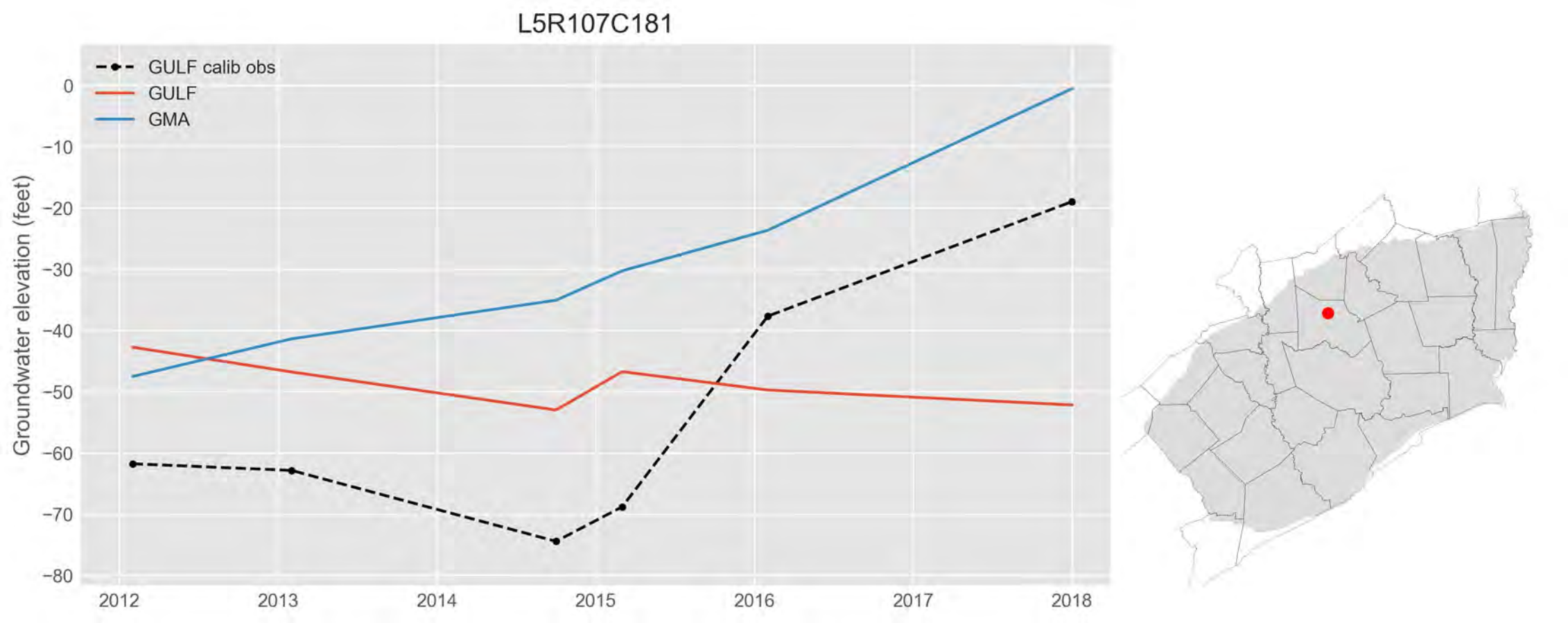

L5R105C167
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
70
60
50
40
30
20
10
2010
2011
2012
2013
2014
2015
2016
2017
2018

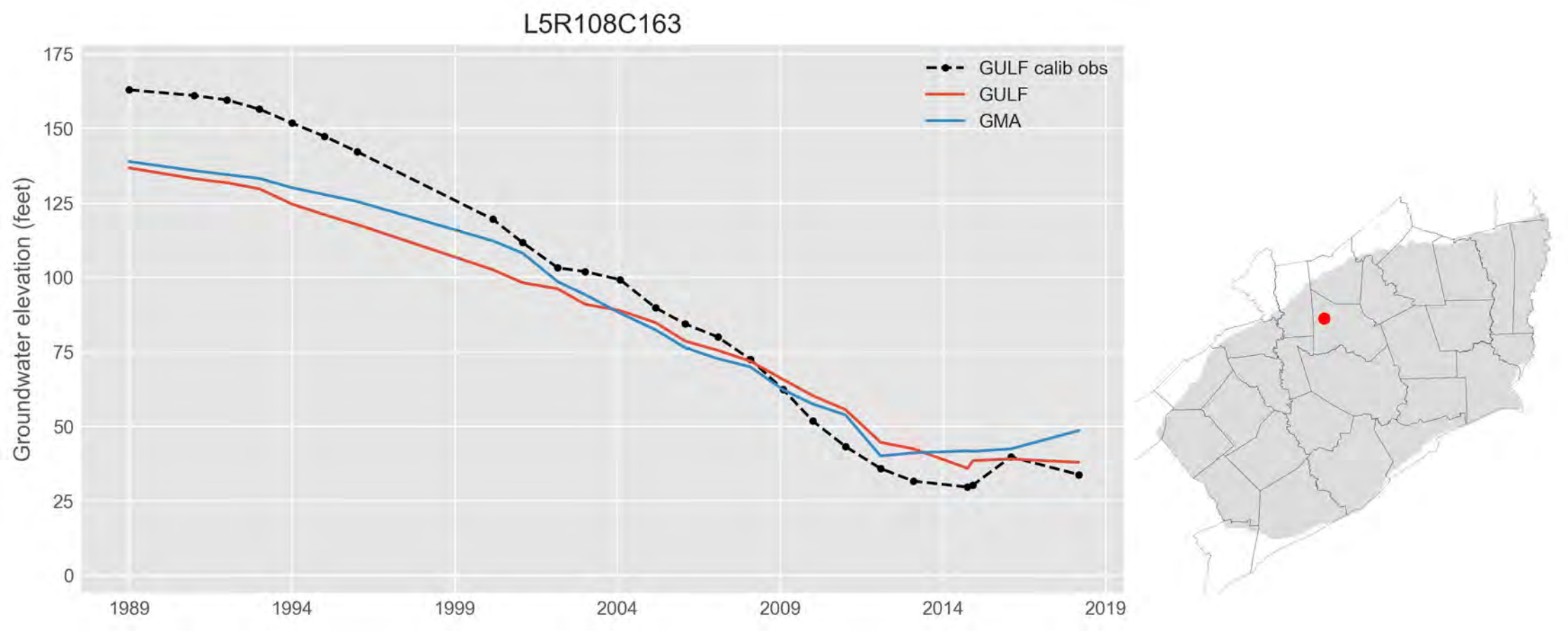

L5R105C188
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
1991
1993
1995
1997
1999
2001
2003

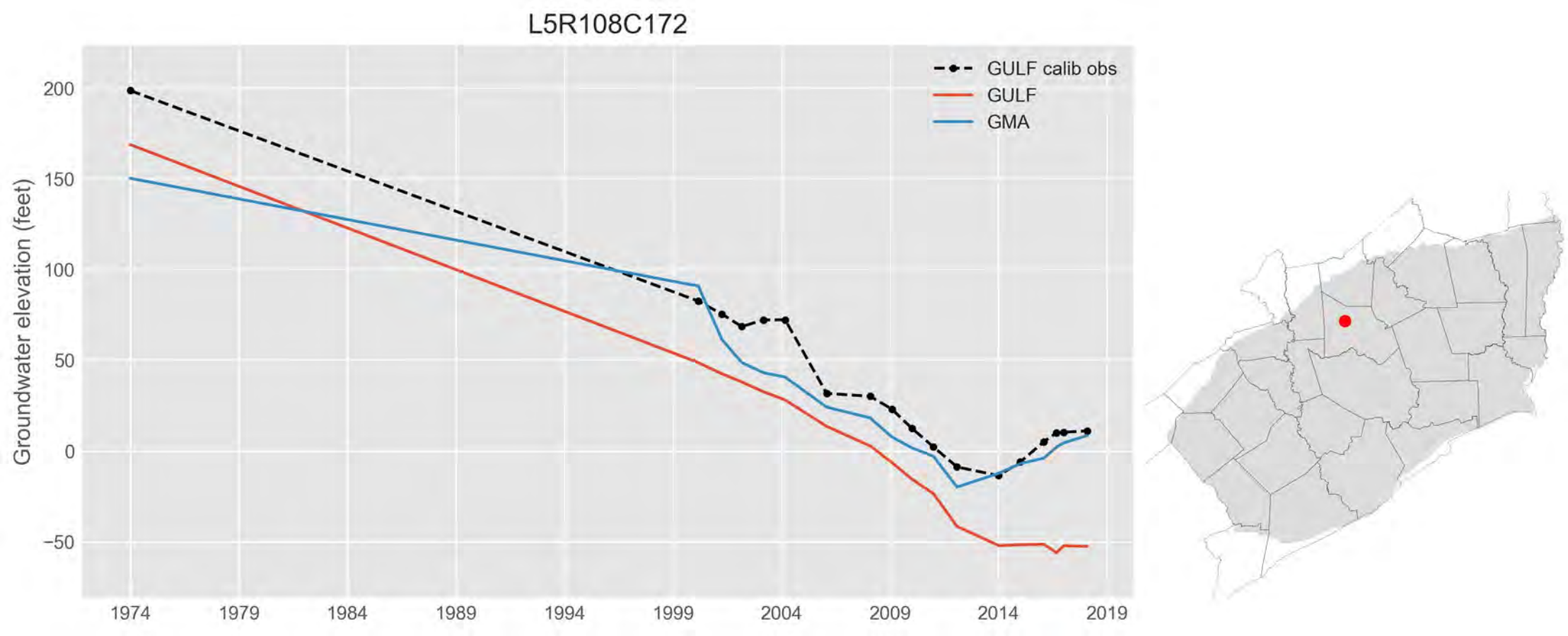

L5R106C176
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
100
50
0
−50
−100
1989
1994
1999
2004
2009
2014
2019

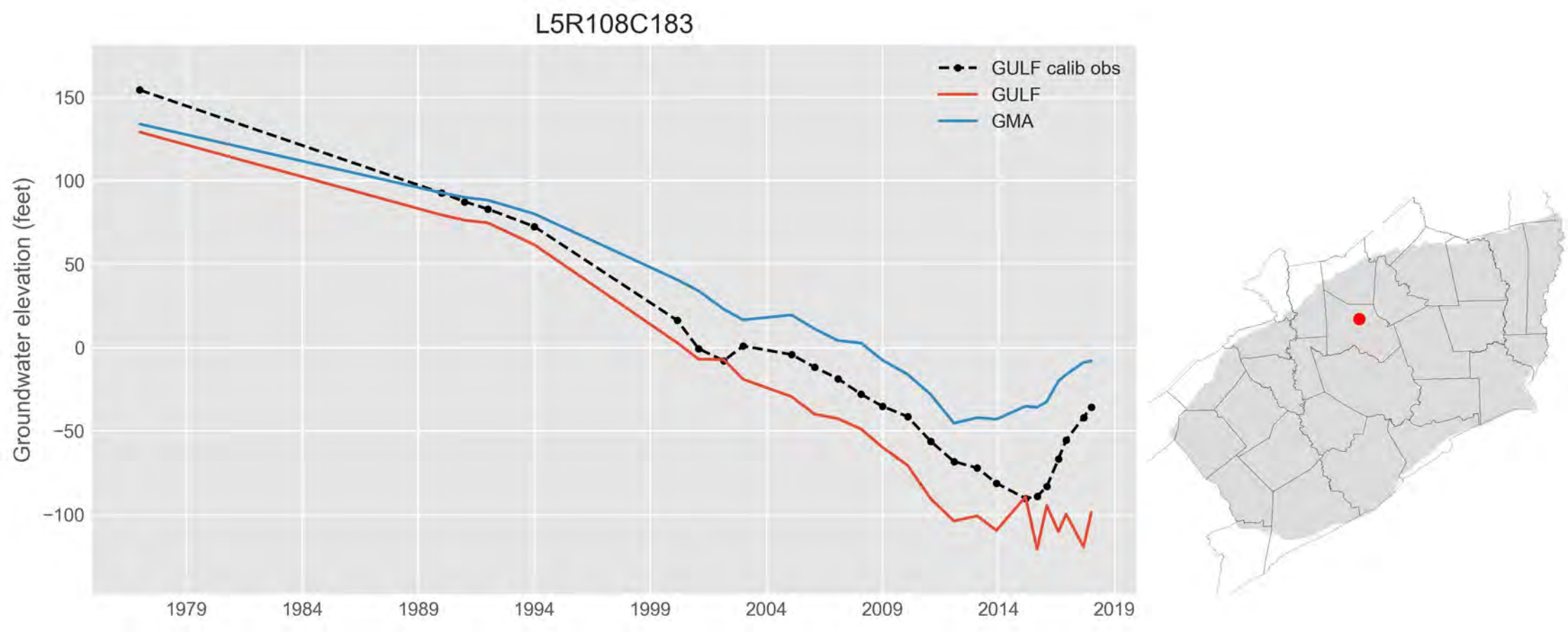

L5R106C201
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
1965
1966
1967
1968
1969
1970
GULF calib obs
GULF
GMA

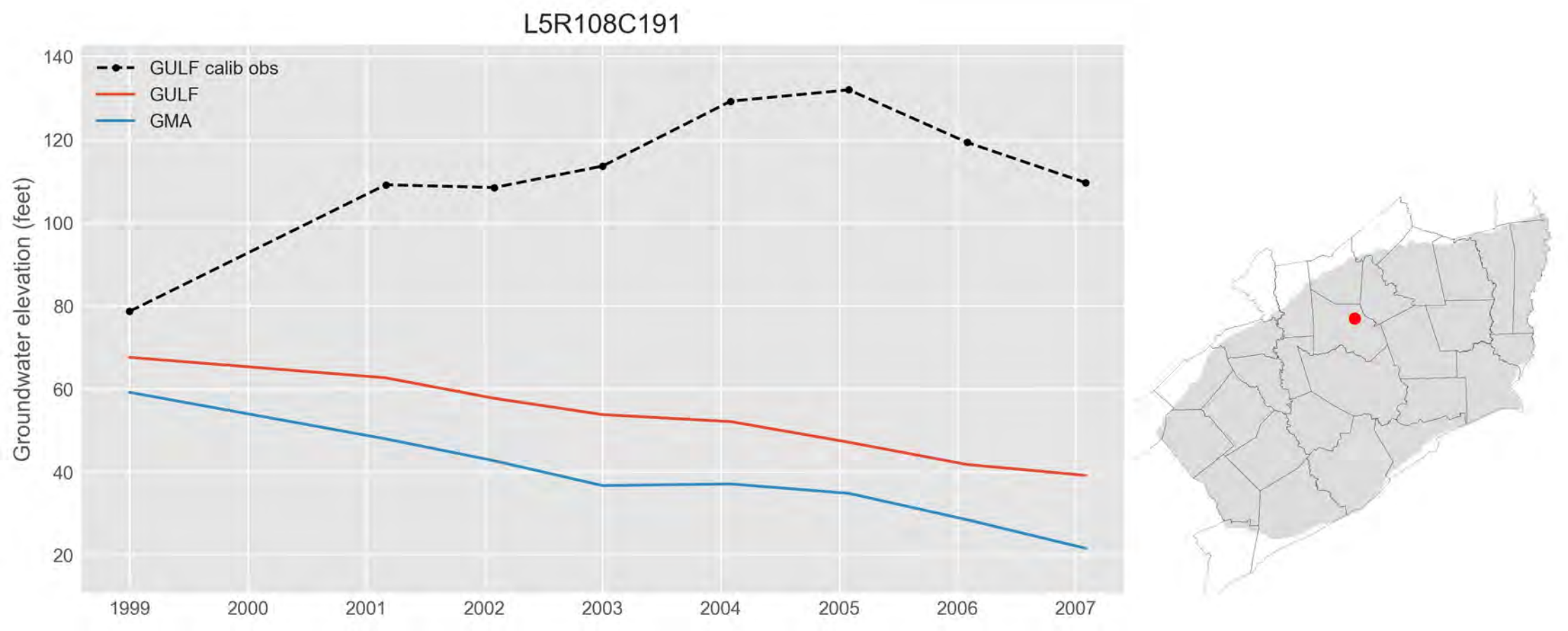

L5R107C169
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
1984
1989
1994
1999
2004
2009
2014

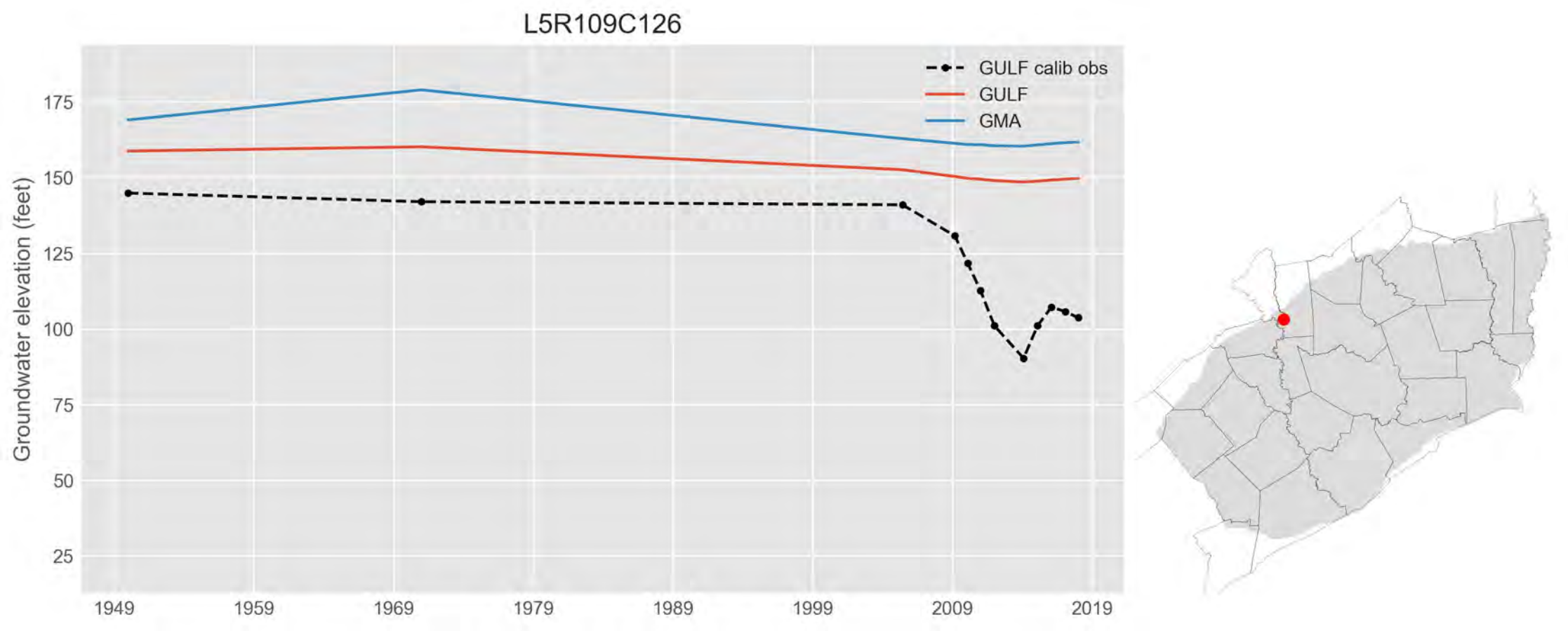

L5R107C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
−60
−70
−80
2012
2013
2014
2015
2016
2017
2018

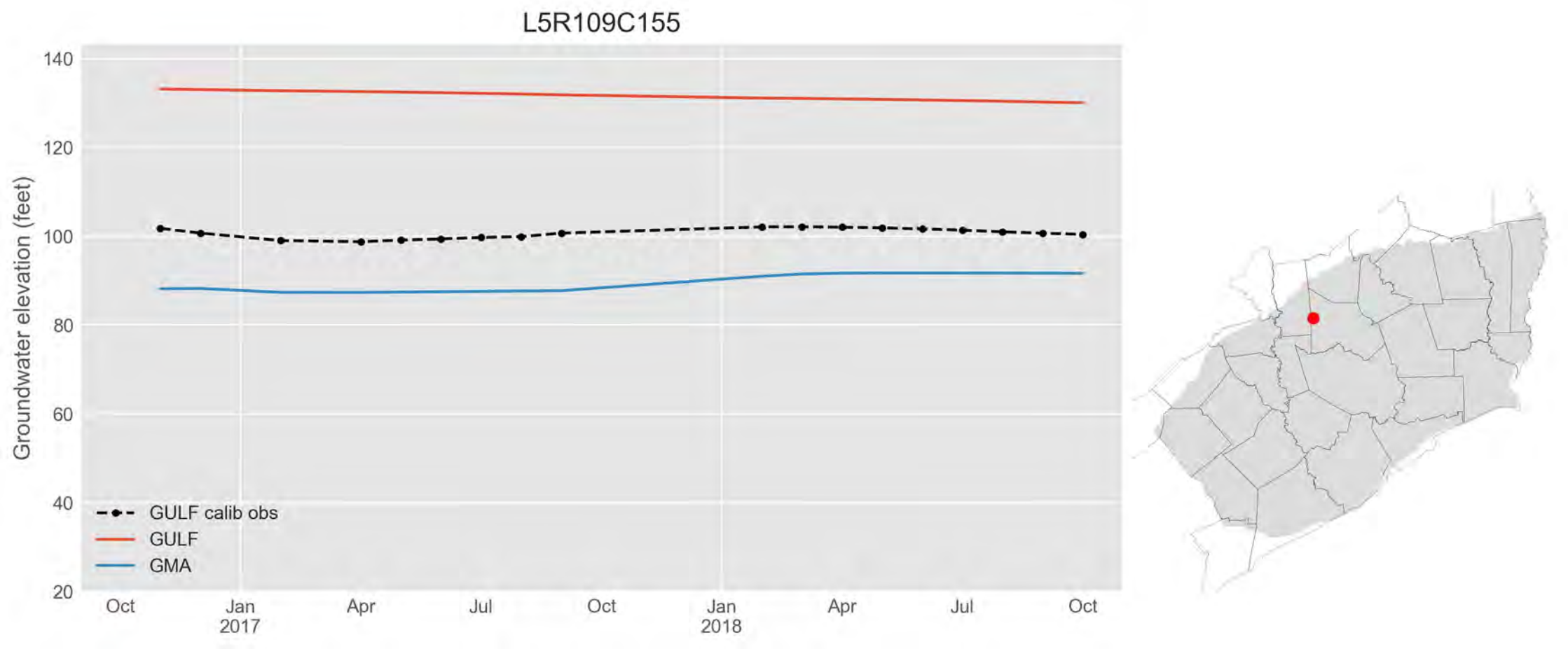

L5R108C163
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
0
1989
1994
1999
2004
2009
2014
2019

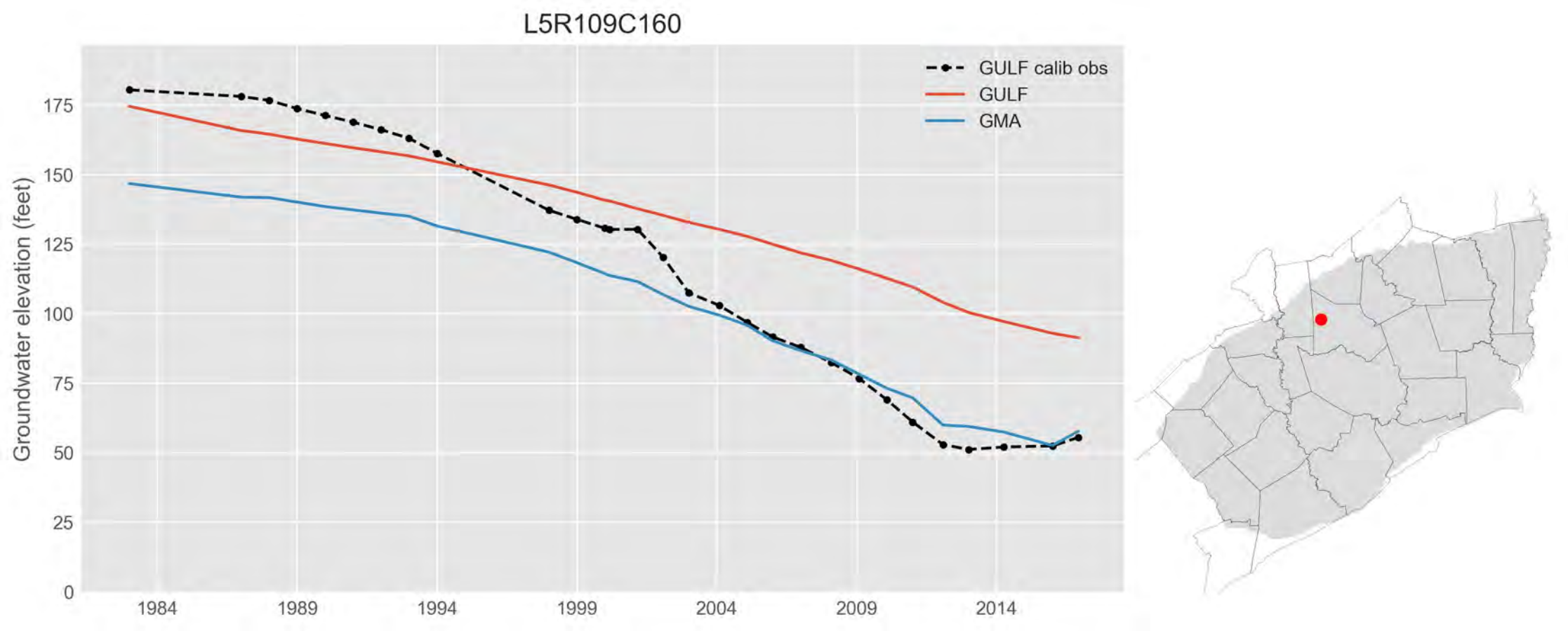

L5R108C172
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019


L5R108C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
100
50
0
−50
−100
1979
1984
1989
1994
1999
2004
2009
2014
2019

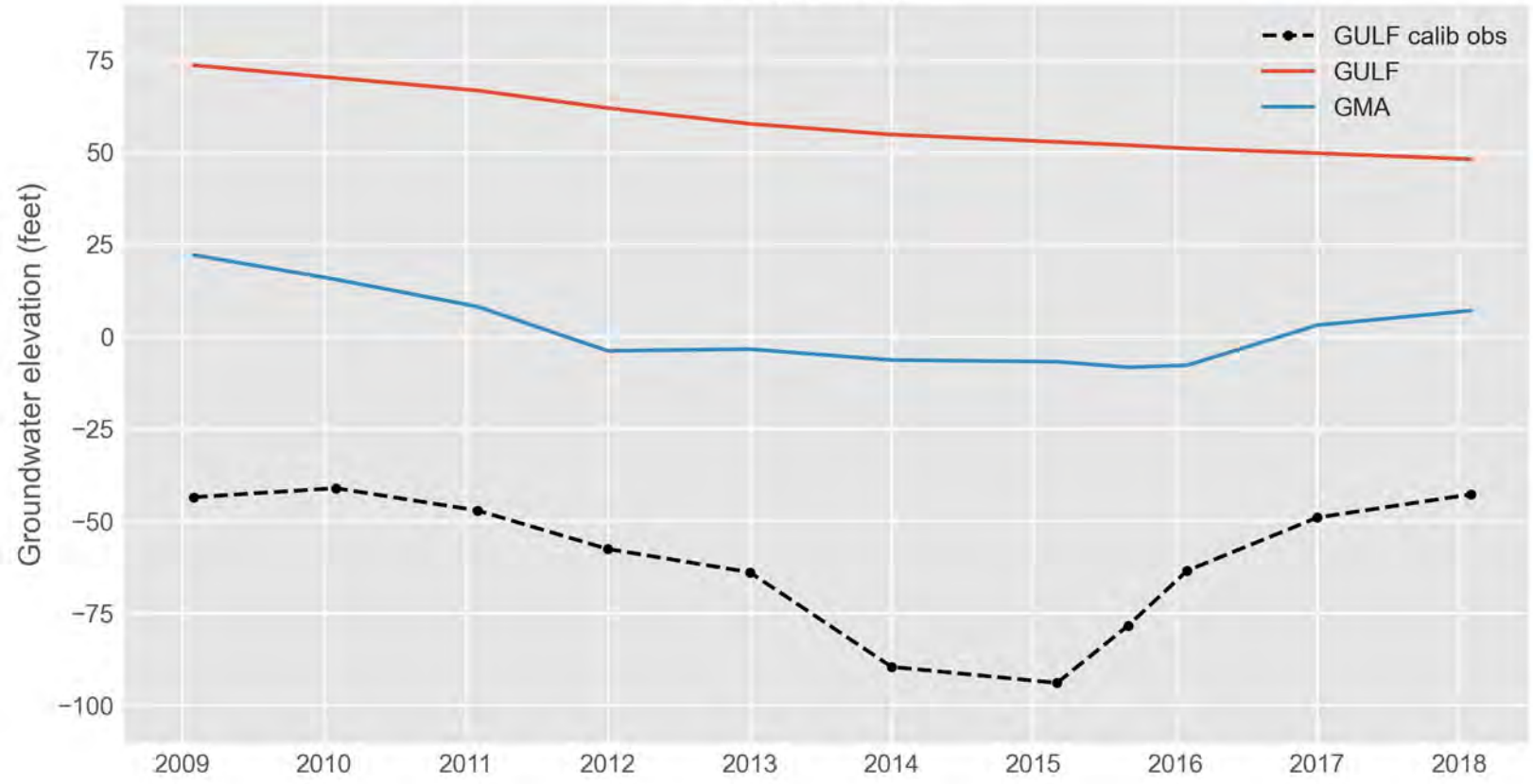

L5R108C191
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1999
2000
2001
2002
2003
2004
2005
2006
2007

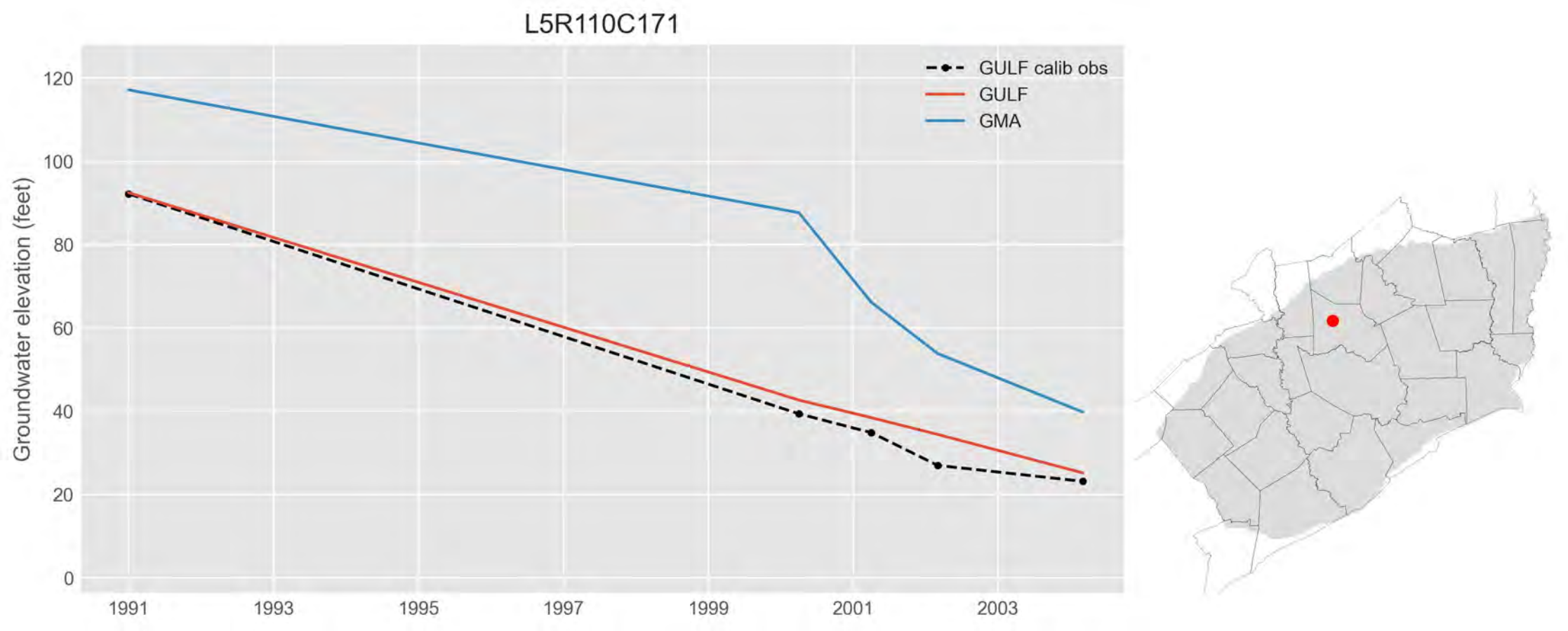

L5R109C126
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
1949
1959
1969
1979
1989
1999
2009
2019

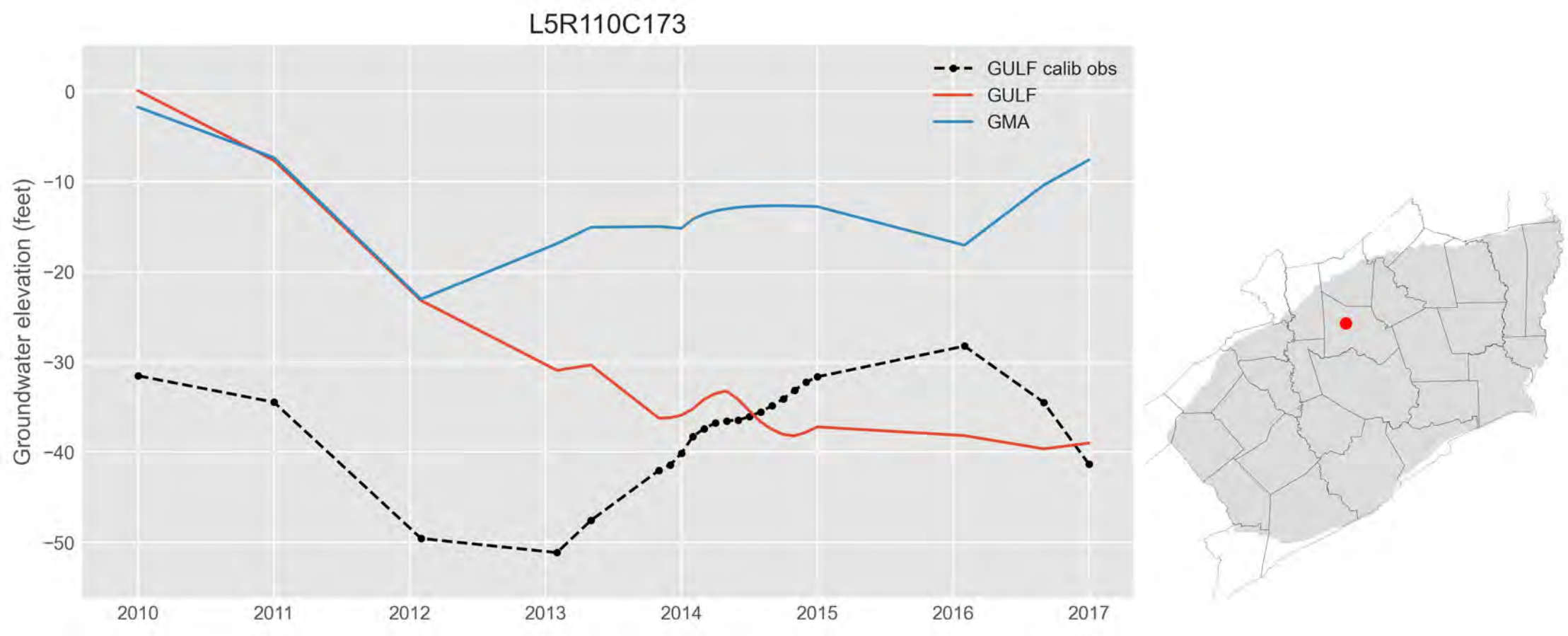

L5R109C155
Groundwater elevation (feet)
140
120
100
80
60
40
20
Oct
Jan
2017
Apr
Jul
Oct
Jan
2018
Apr
Jul
Oct
GULF calib obs
GULF
GMA

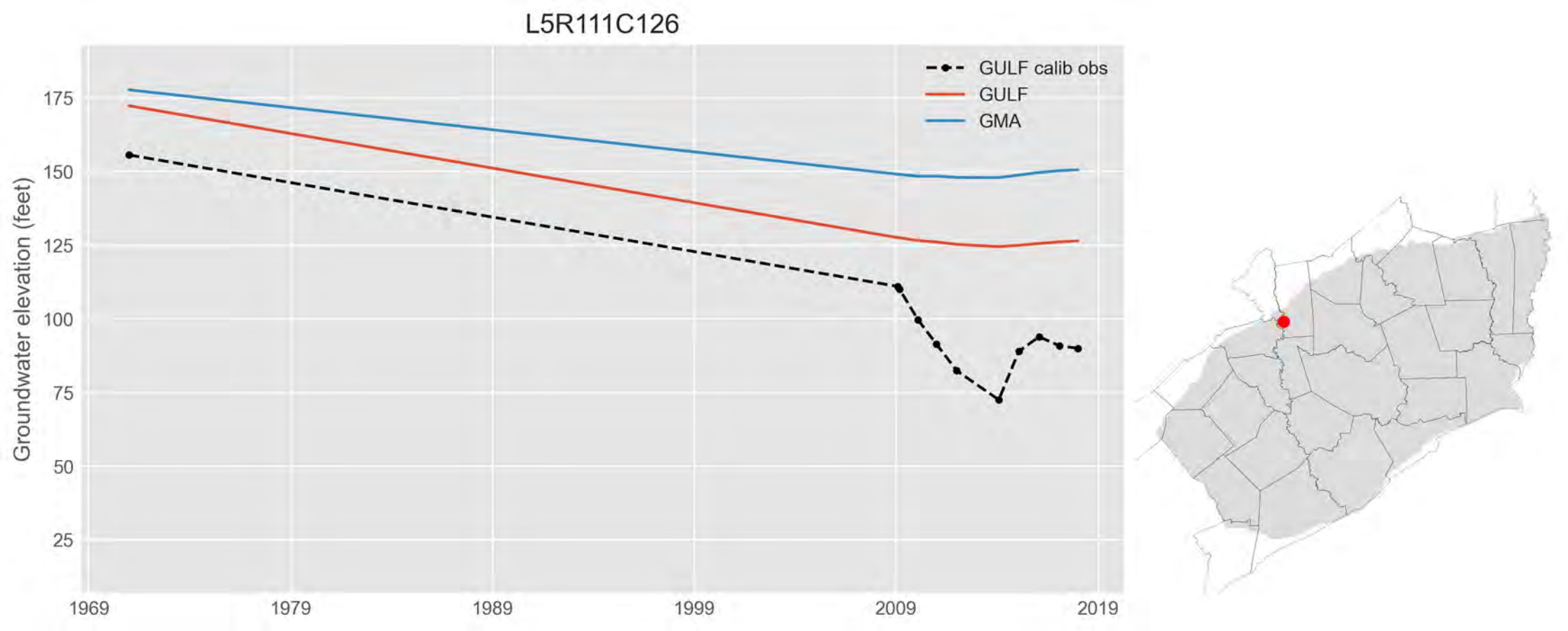

L5R109C160
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
0
1984
1989
1994
1999
2004
2009
2014

L5R109C194

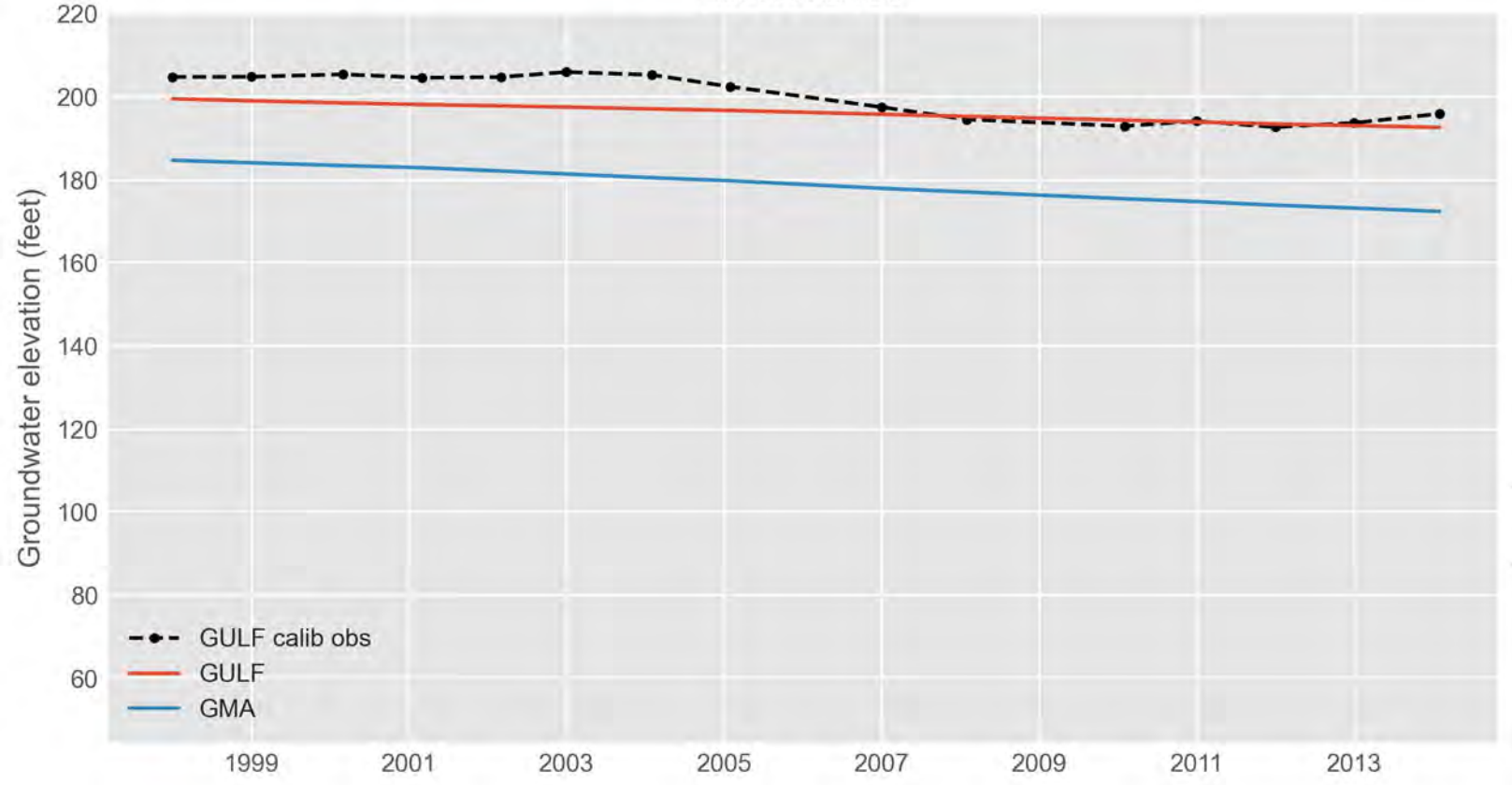

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
75
50
25
0
−25
−50
−75
−100
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


L5R110C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
0
1991
1993
1995
1997
1999
2001
2003

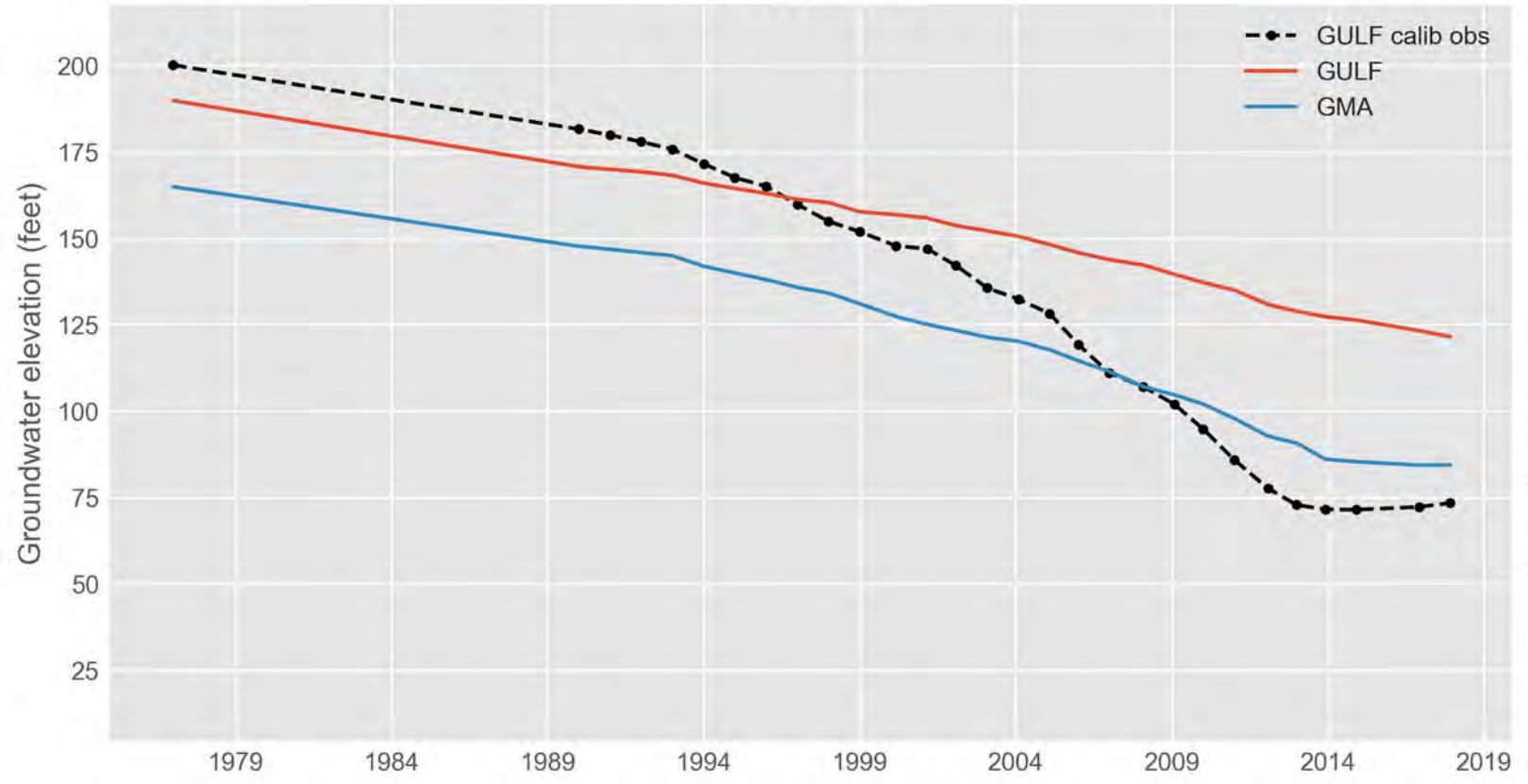

L5R110C173
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−10
−20
−30
−40
−50
2010
2011
2012
2013
2014
2015
2016
2017

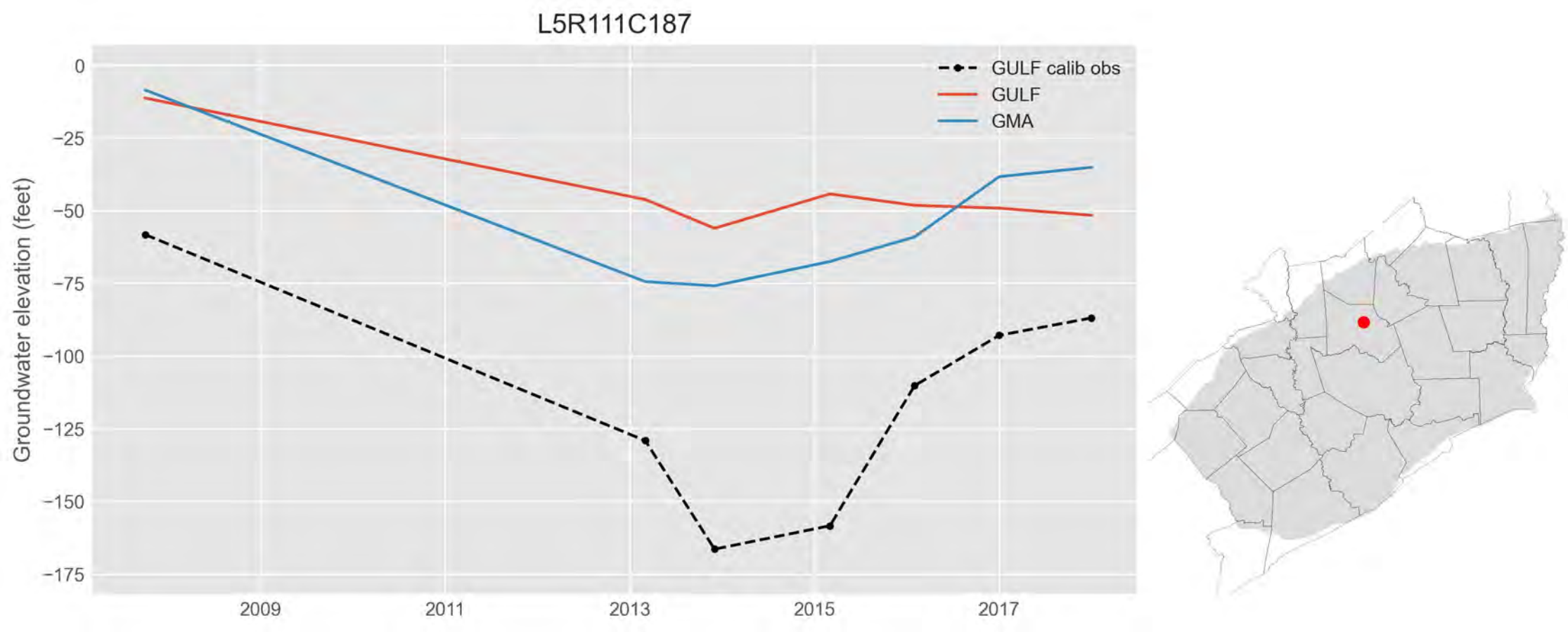

L5R111C126
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
175
150
125
100
75
50
25
1969
1979
1989
1999
2009
2019

L5R111C138

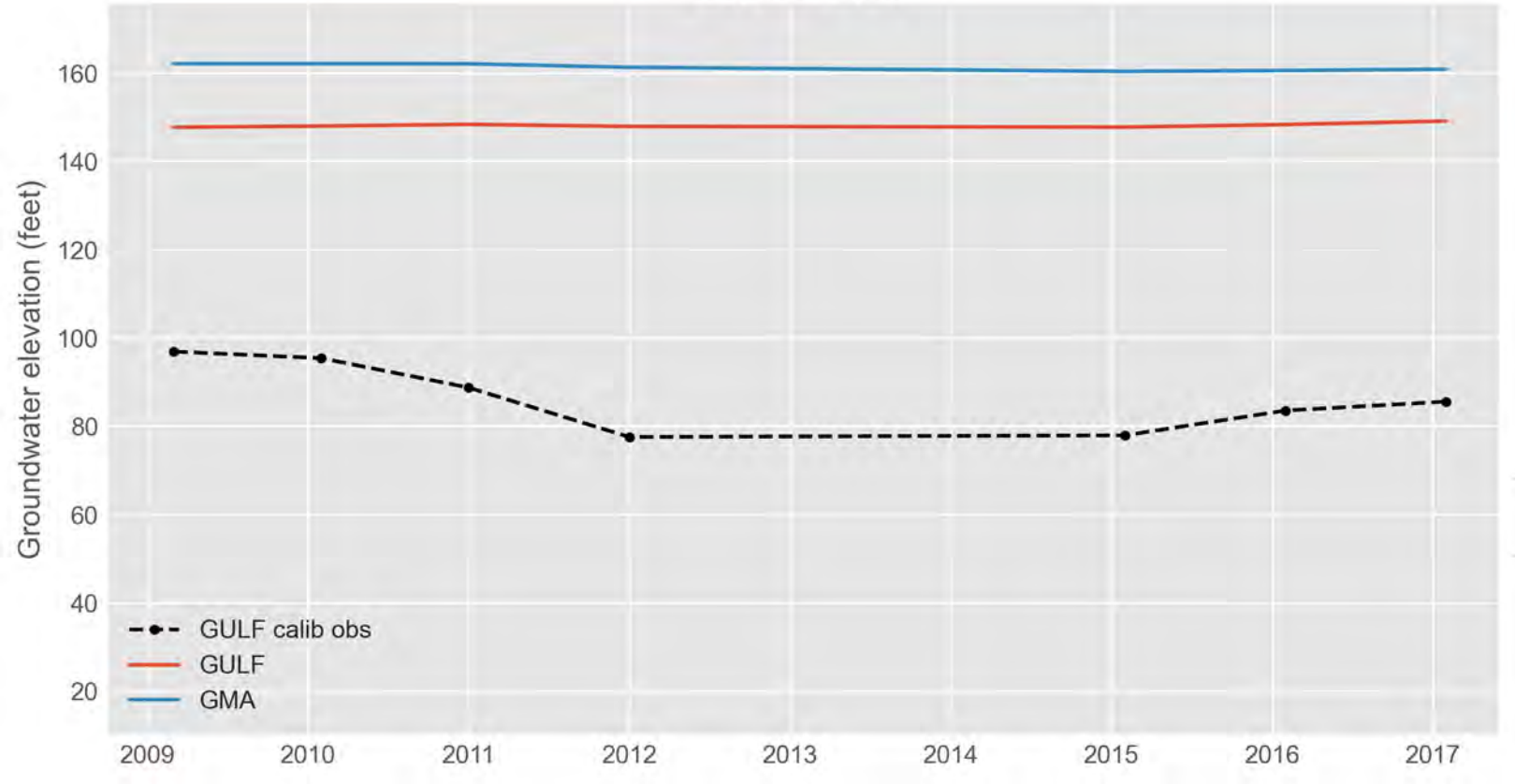

Groundwater elevation (feet)
220
200
180
160
140
120
100
80
60
1999
2001
2003
2005
2007
2009
2011
2013
GULF calib obs
GULF
GMA

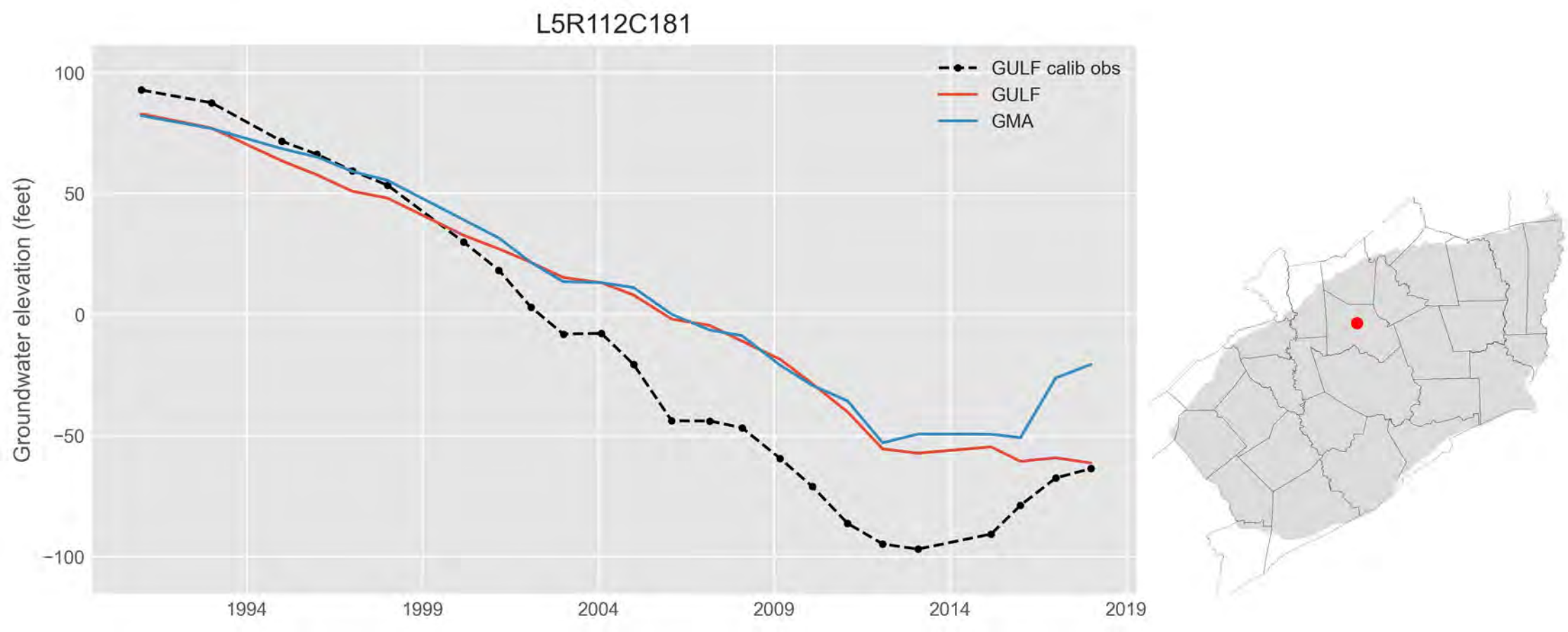
L5R111C154

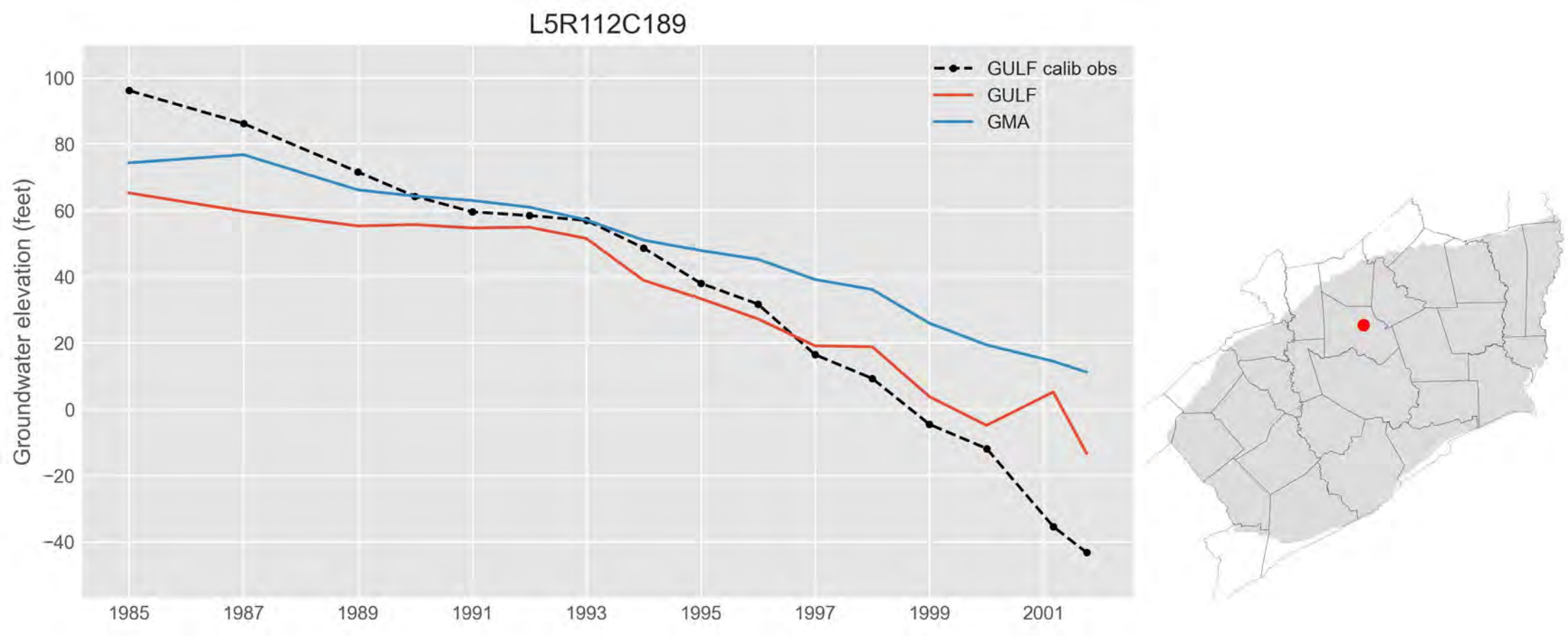

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
175
150
125
100
75
50
25
1979
1984
1989
1994
1999
2004
2009
2014
2019

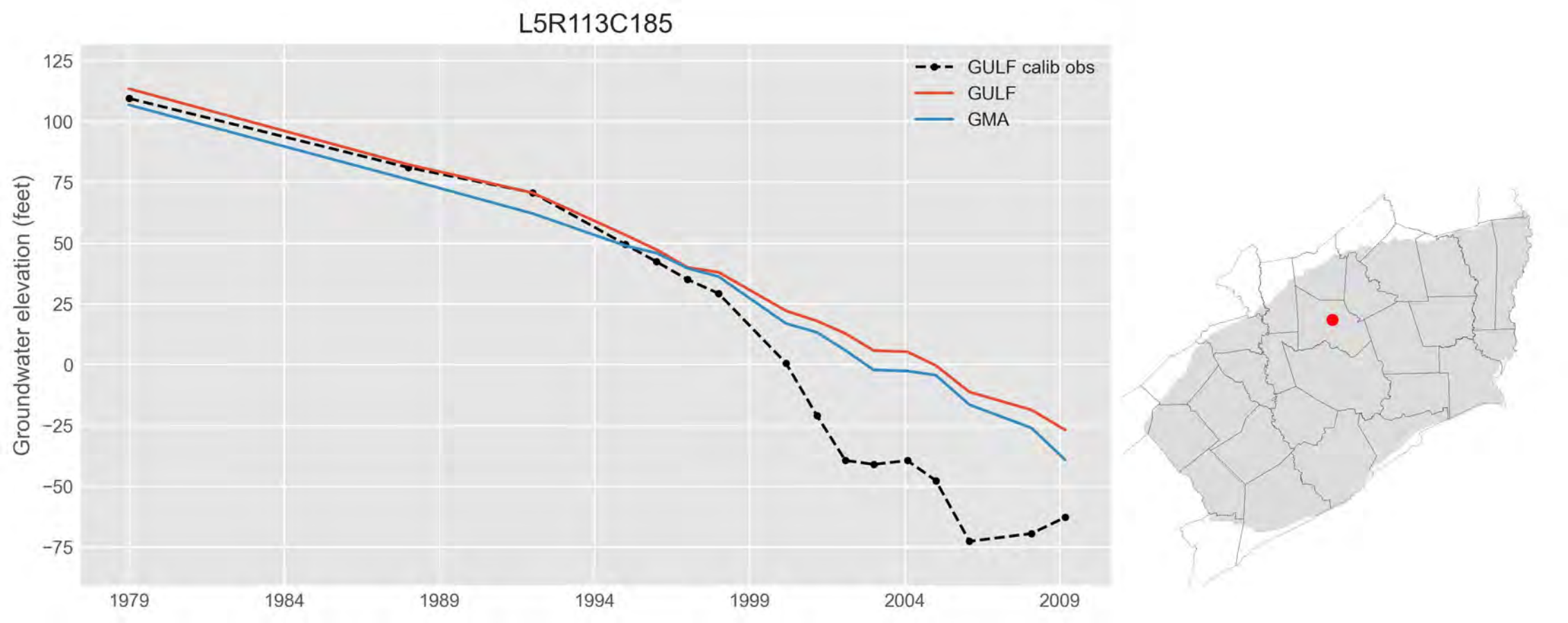

L5R111C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
−175
2009
2011
2013
2015
2017

L5R112C129

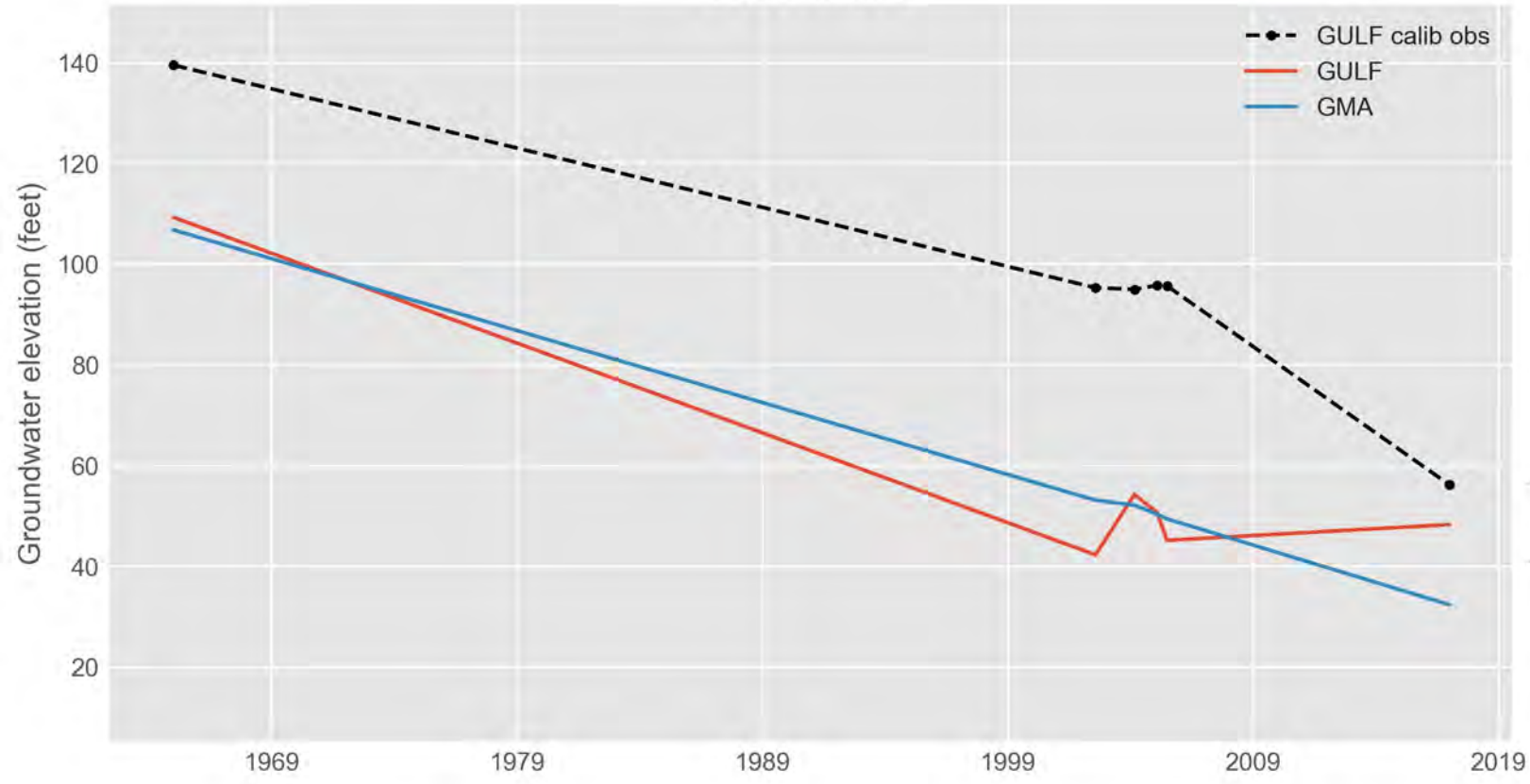

Groundwater elevation (feet)
160
140
120
100
80
60
40
20
2009
2010
2011
2012
2013
2014
2015
2016
2017
GULF calib obs
GULF
GMA

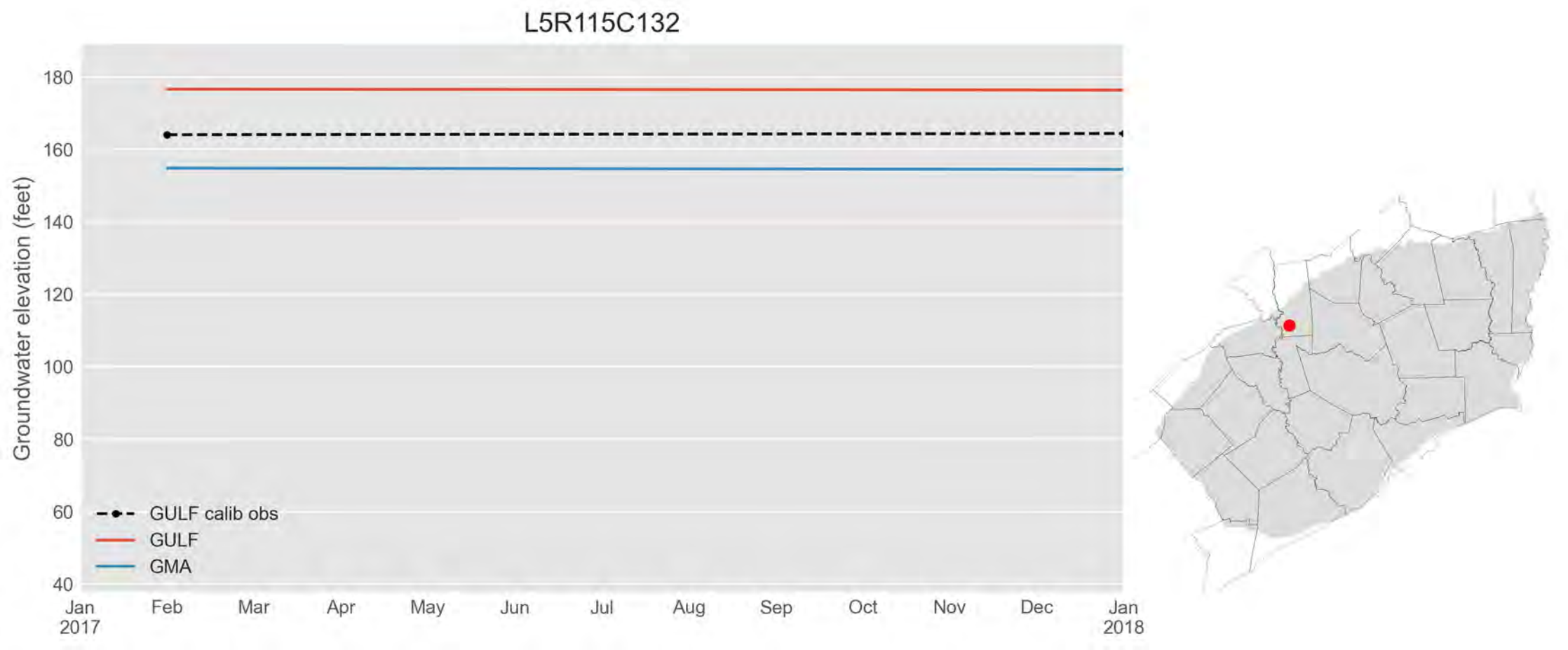

L5R112C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
1994
1999
2004
2009
2014
2019

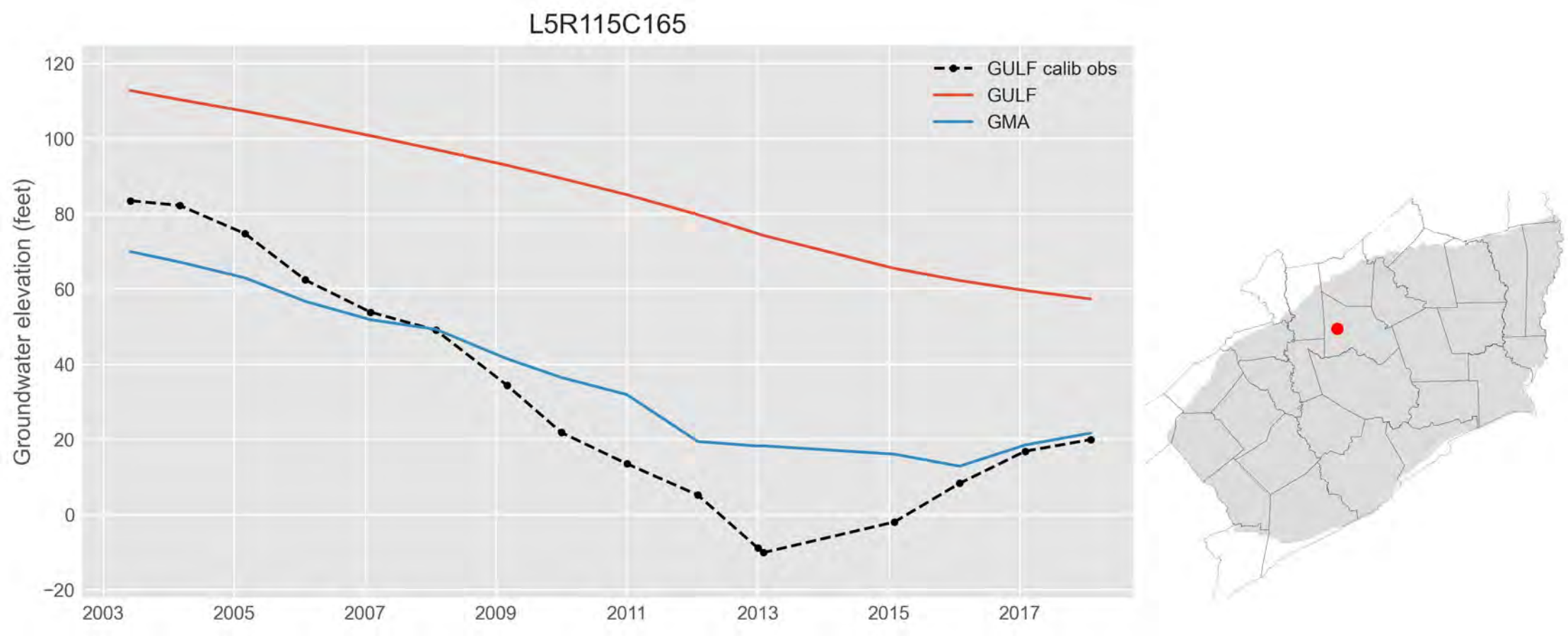

L5R112C189
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
80
60
40
20
0
−20
−40
1985
1987
1989
1991
1993
1995
1997
1999
2001

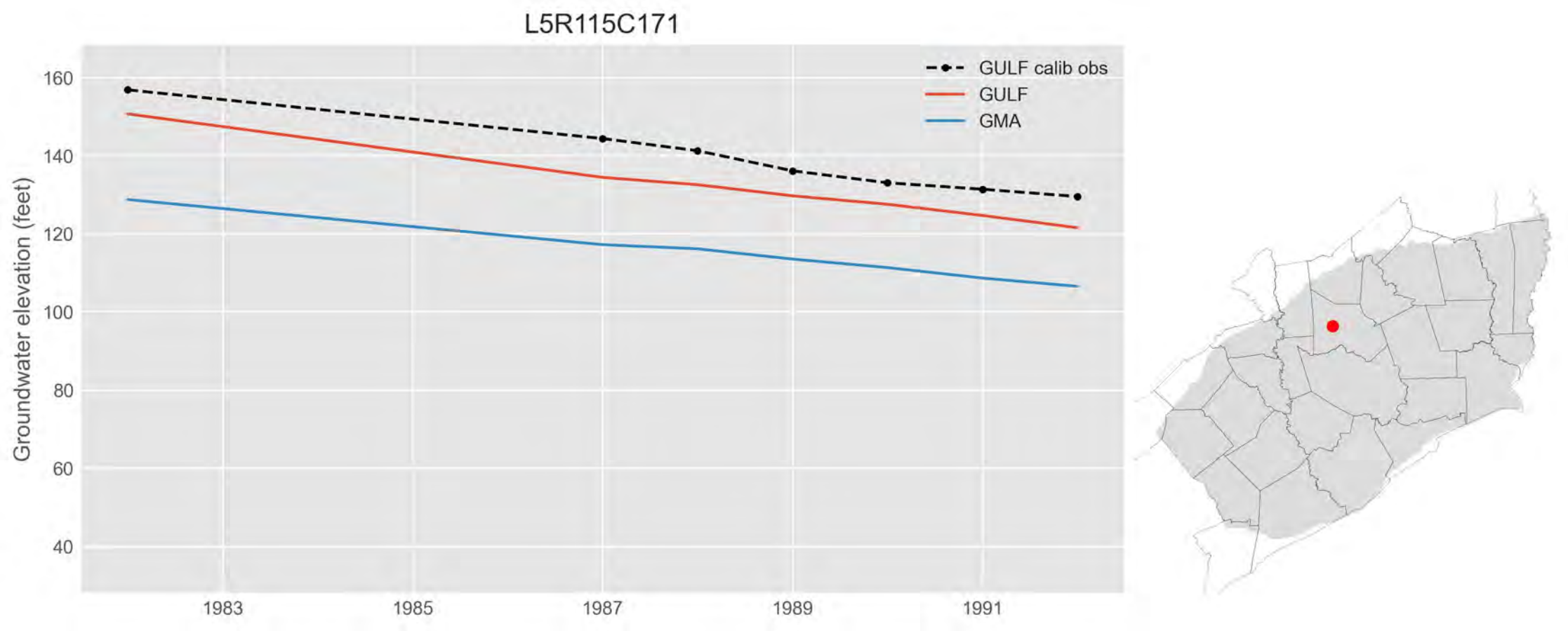

L5R113C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
125
100
75
50
25
0
−25
−50
−75
1979
1984
1989
1994
1999
2004
2009

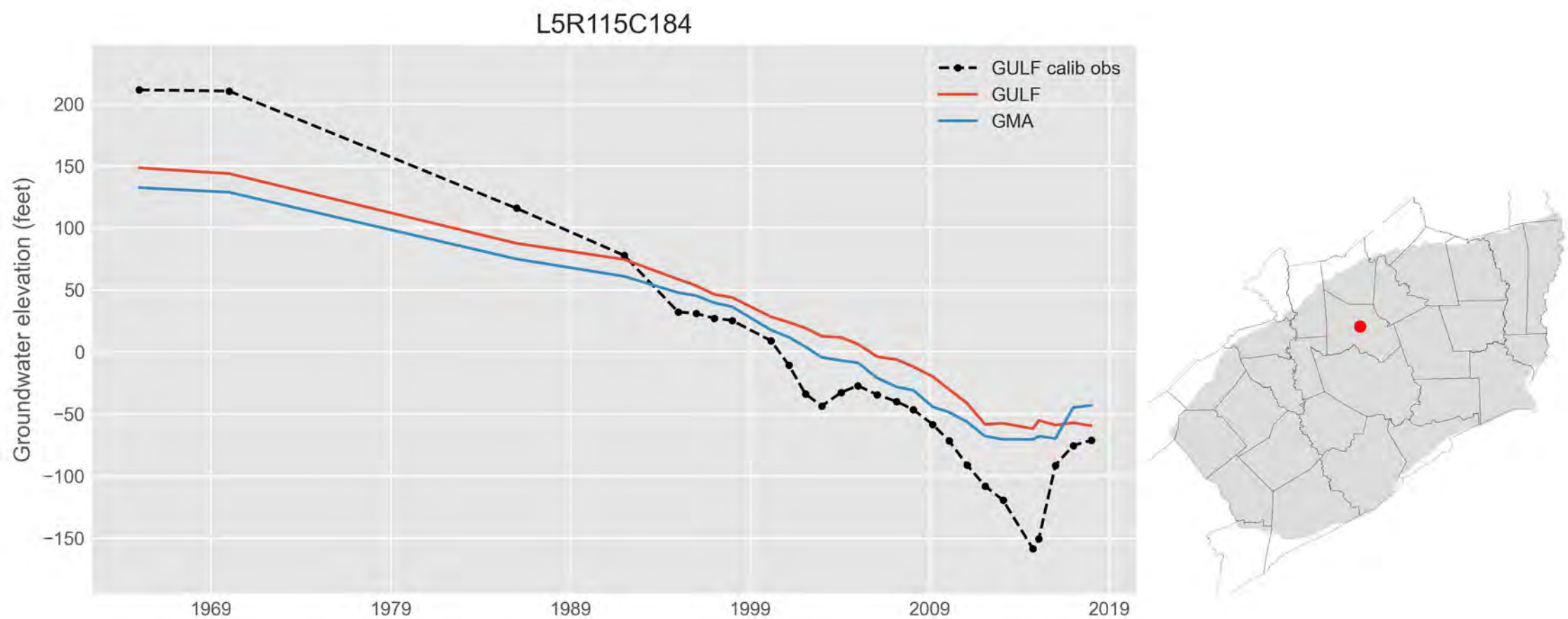
L5R114C223

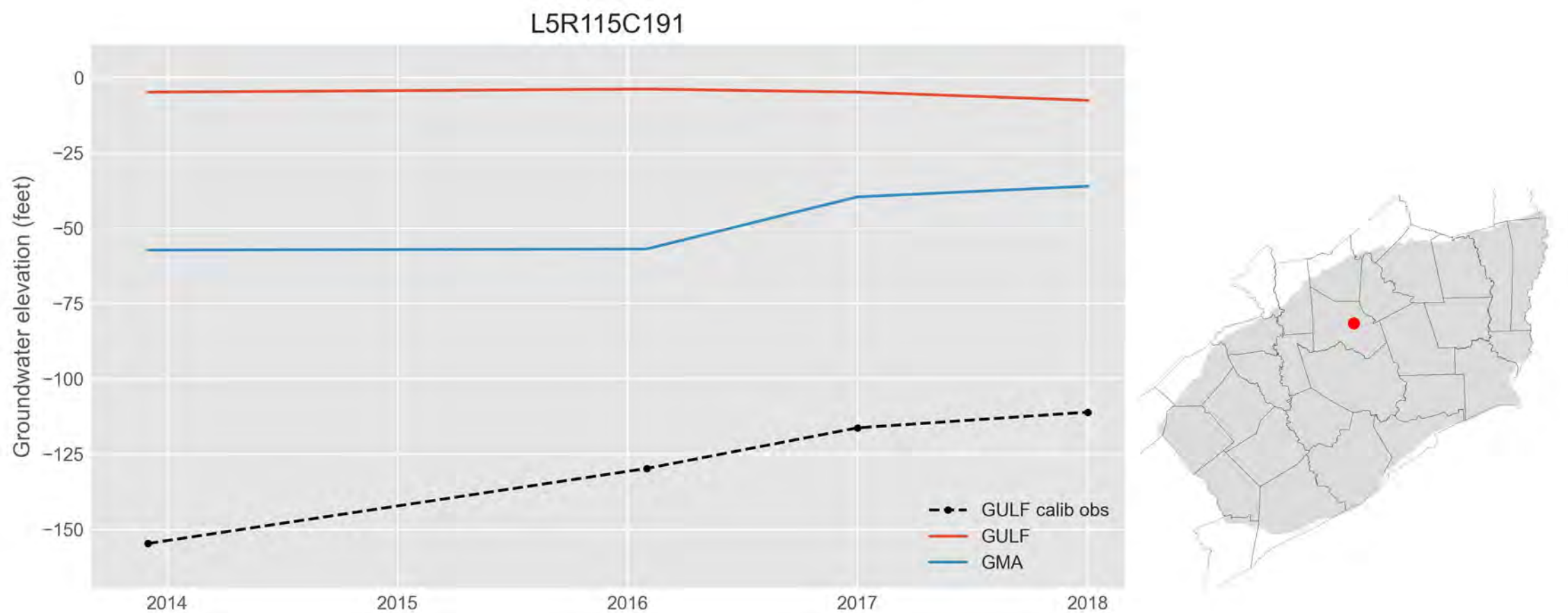

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
140
120
100
80
60
40
20
1969
1979
1989
1999
2009
2019

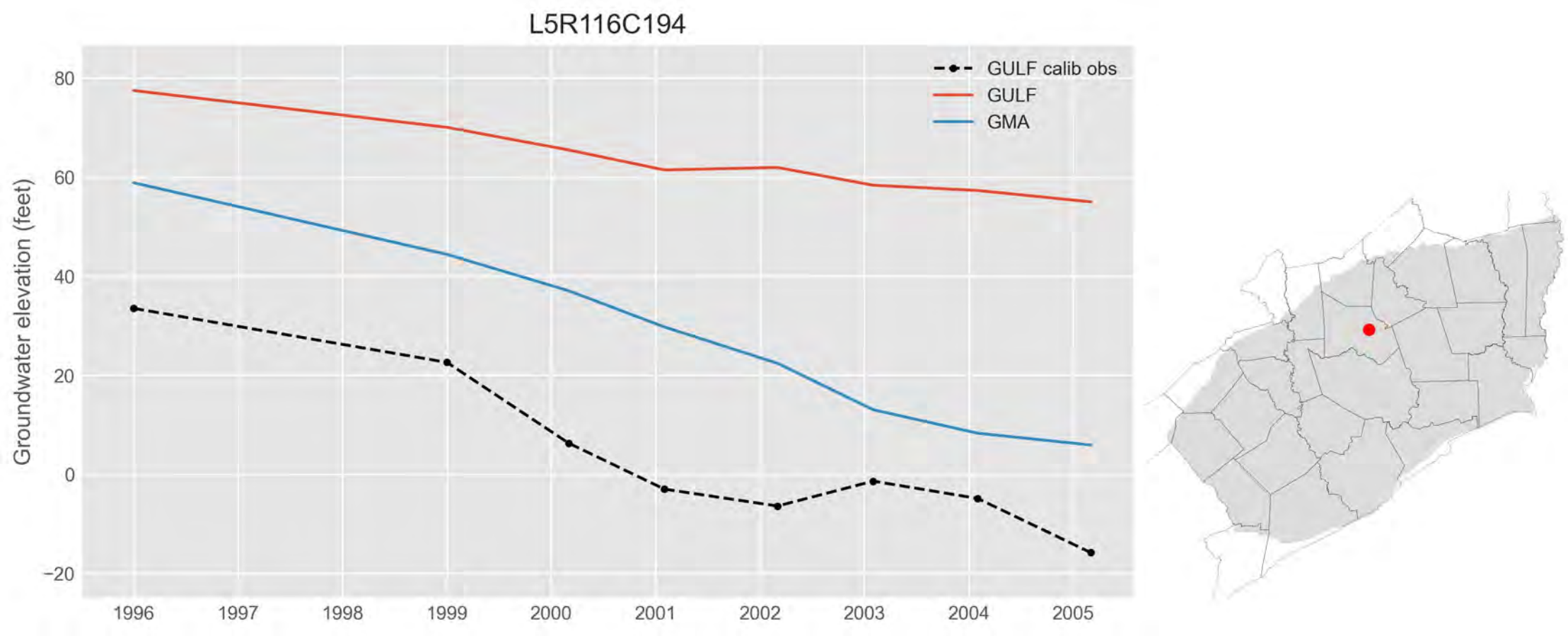

L5R115C132
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
Jan
2017
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
2018
GULF calib obs
GULF
GMA


L5R115C165
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
120
100
80
60
40
20
0
−20
2003
2005
2007
2009
2011
2013
2015
2017

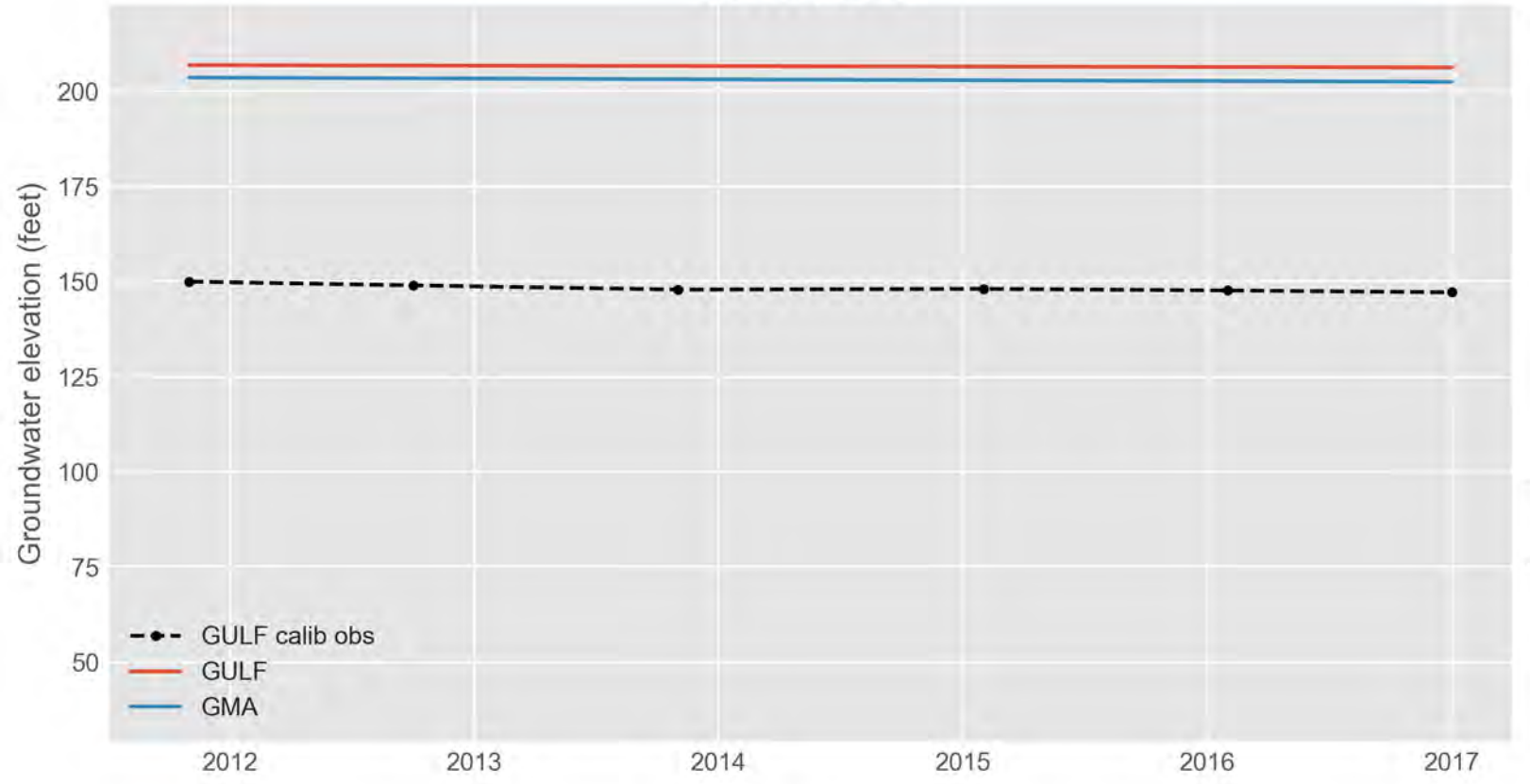

L5R115C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
1983
1985
1987
1989
1991

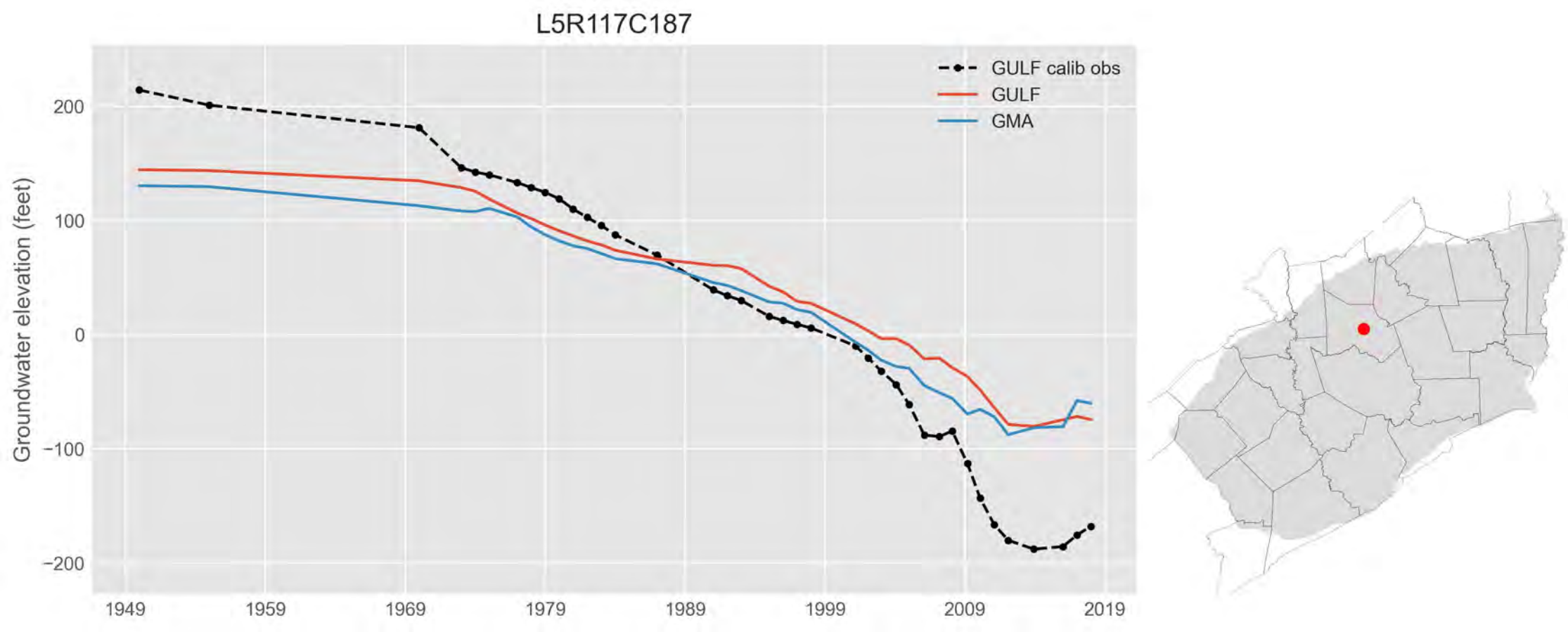

L5R115C184
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
−100
−150
1969
1979
1989
1999
2009
2019

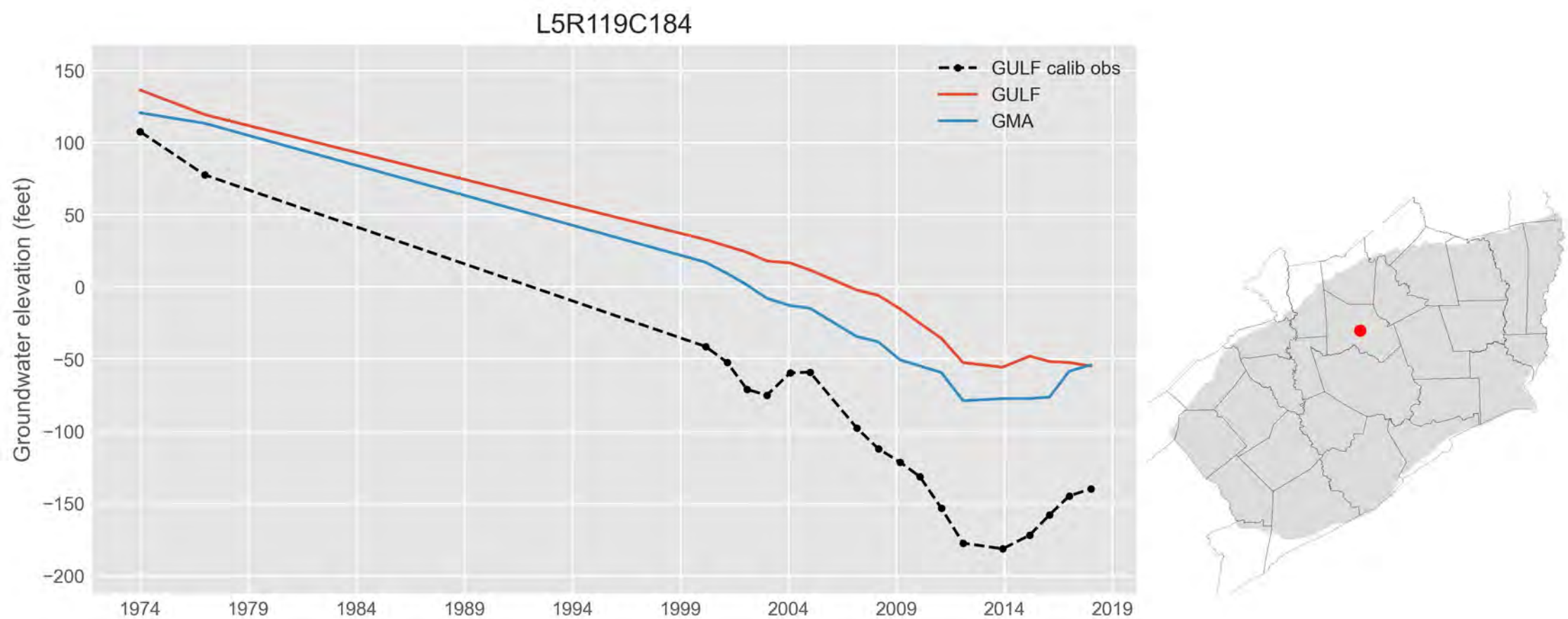

L5R115C191
Groundwater elevation (feet)
0
−25
−50
−75
−100
−125
−150
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

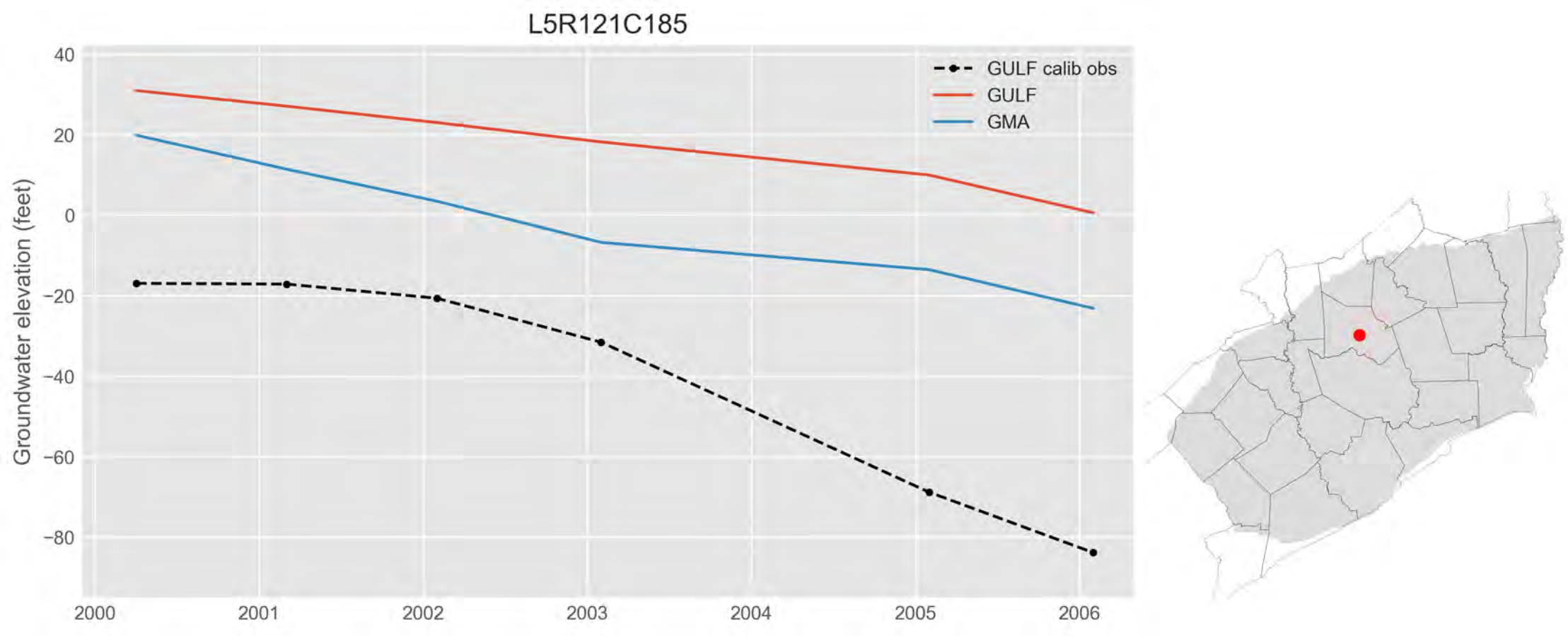

L5R116C194
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
−20
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005

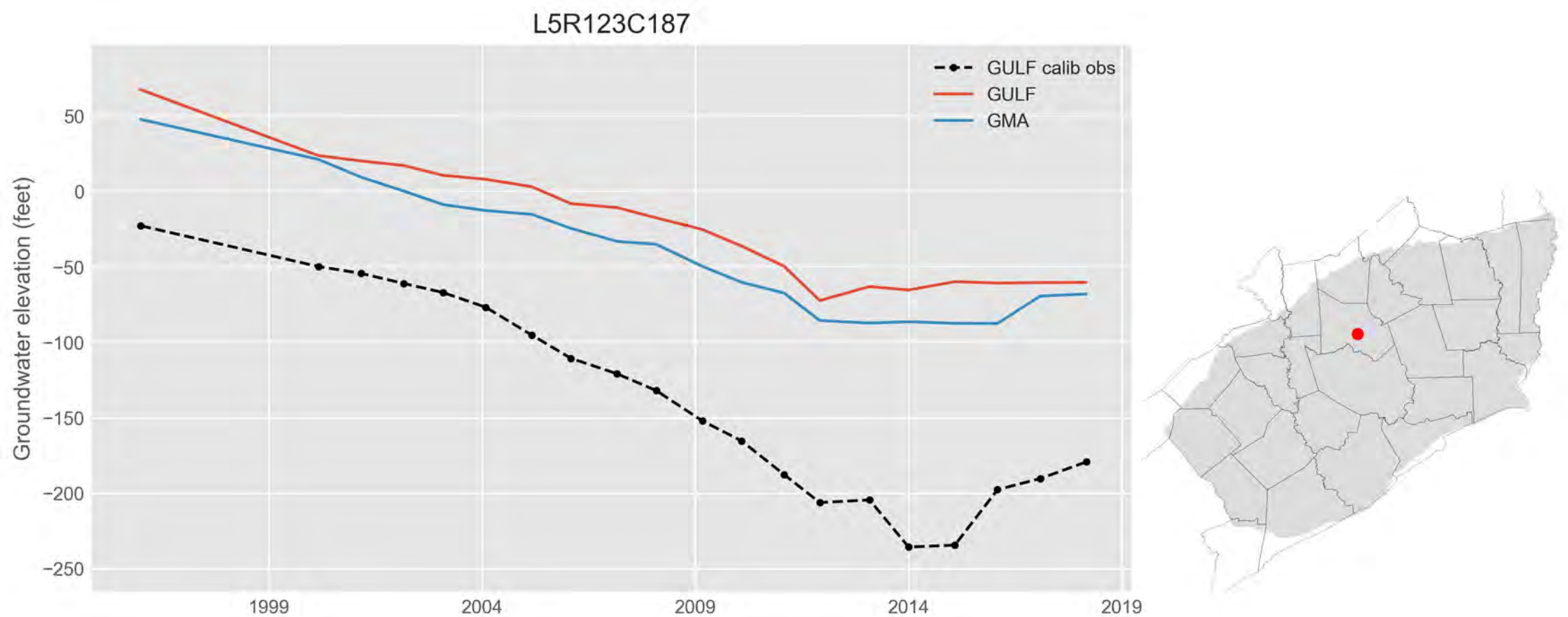
L5R117C117

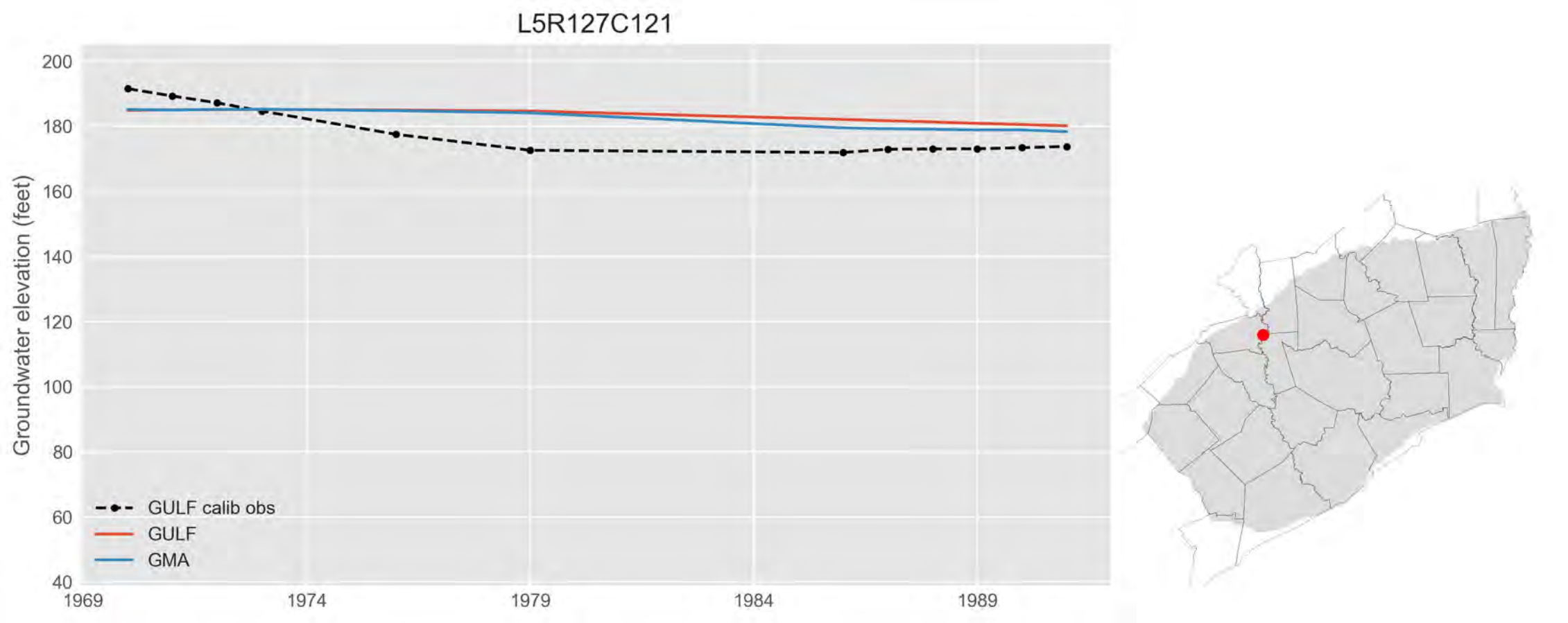

Groundwater elevation (feet)
200
175
150
125
100
75
50
2012
2013
2014
2015
2016
2017
GULF calib obs
GULF
GMA

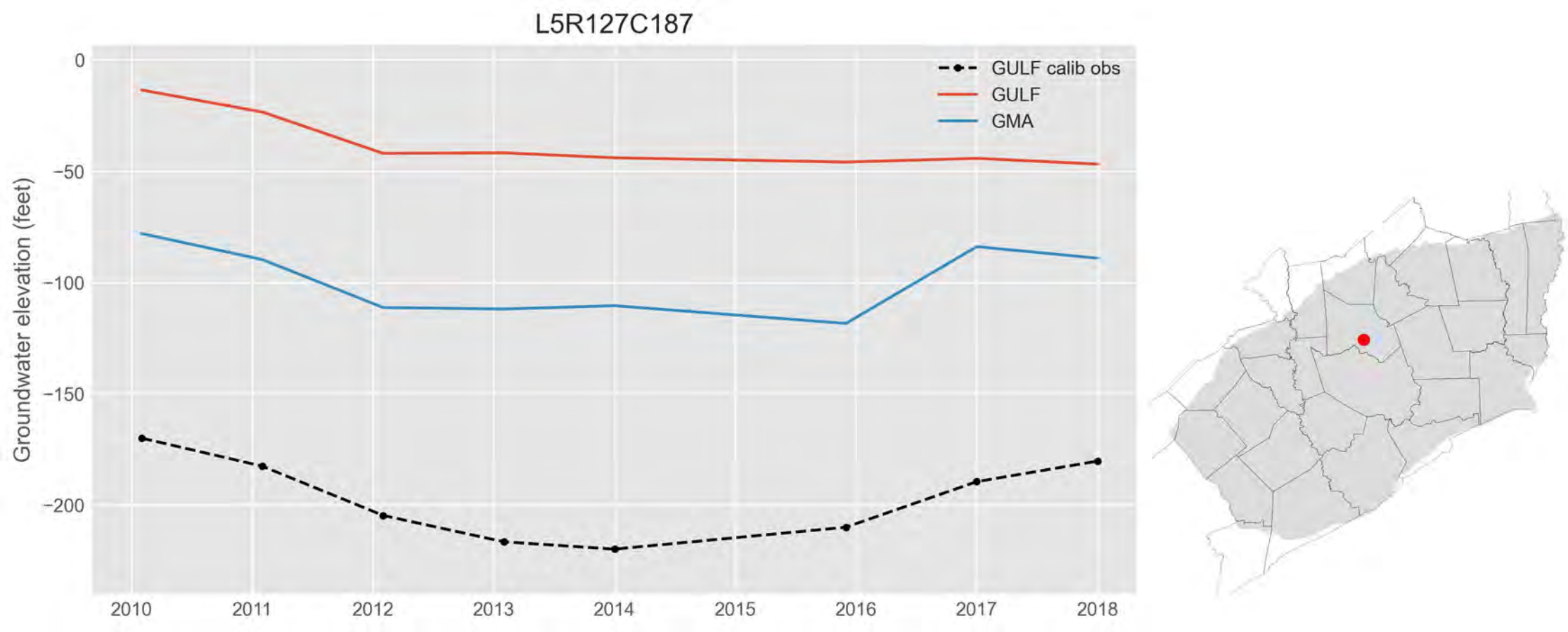

L5R117C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
100
0
−100
−200
1949
1959
1969
1979
1989
1999
2009
2019

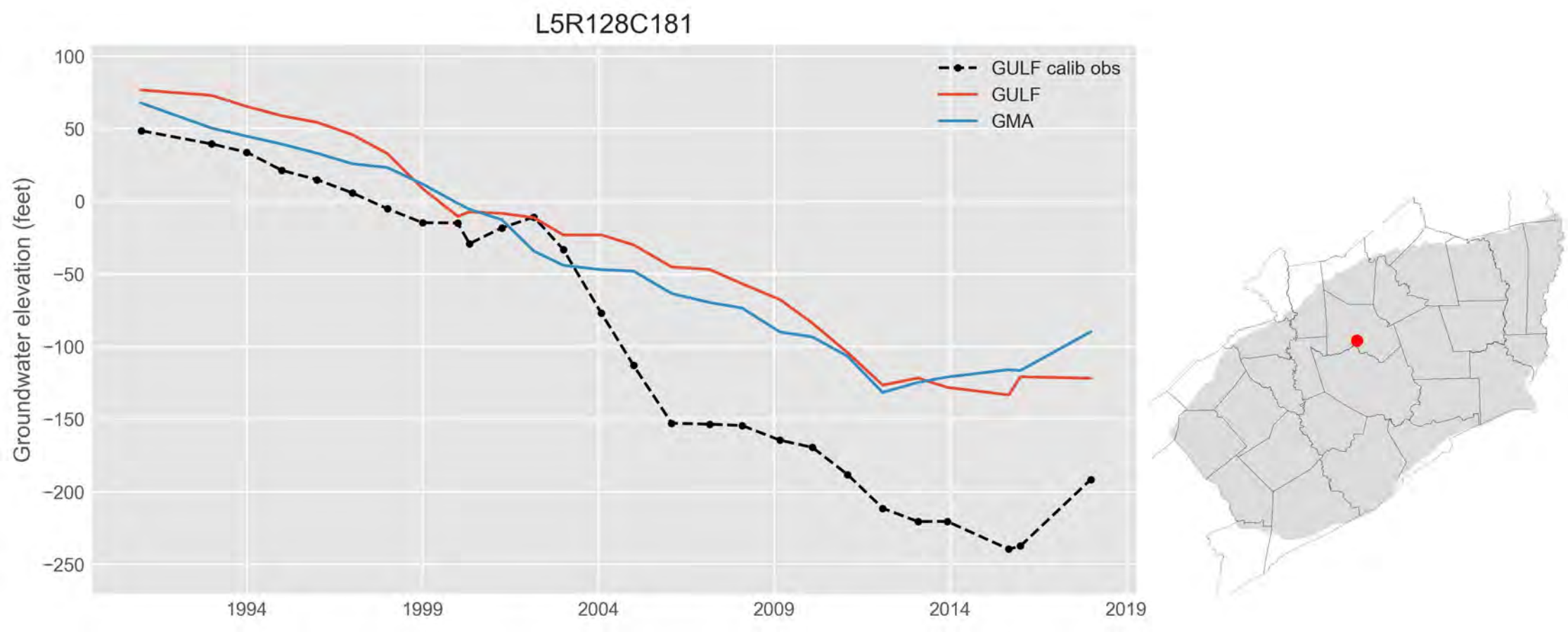

L5R119C184
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
150
100
50
0
−50
−100
−150
−200
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019


L5R121C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
40
20
0
−20
−40
−60
−80
2000
2001
2002
2003
2004
2005
2006

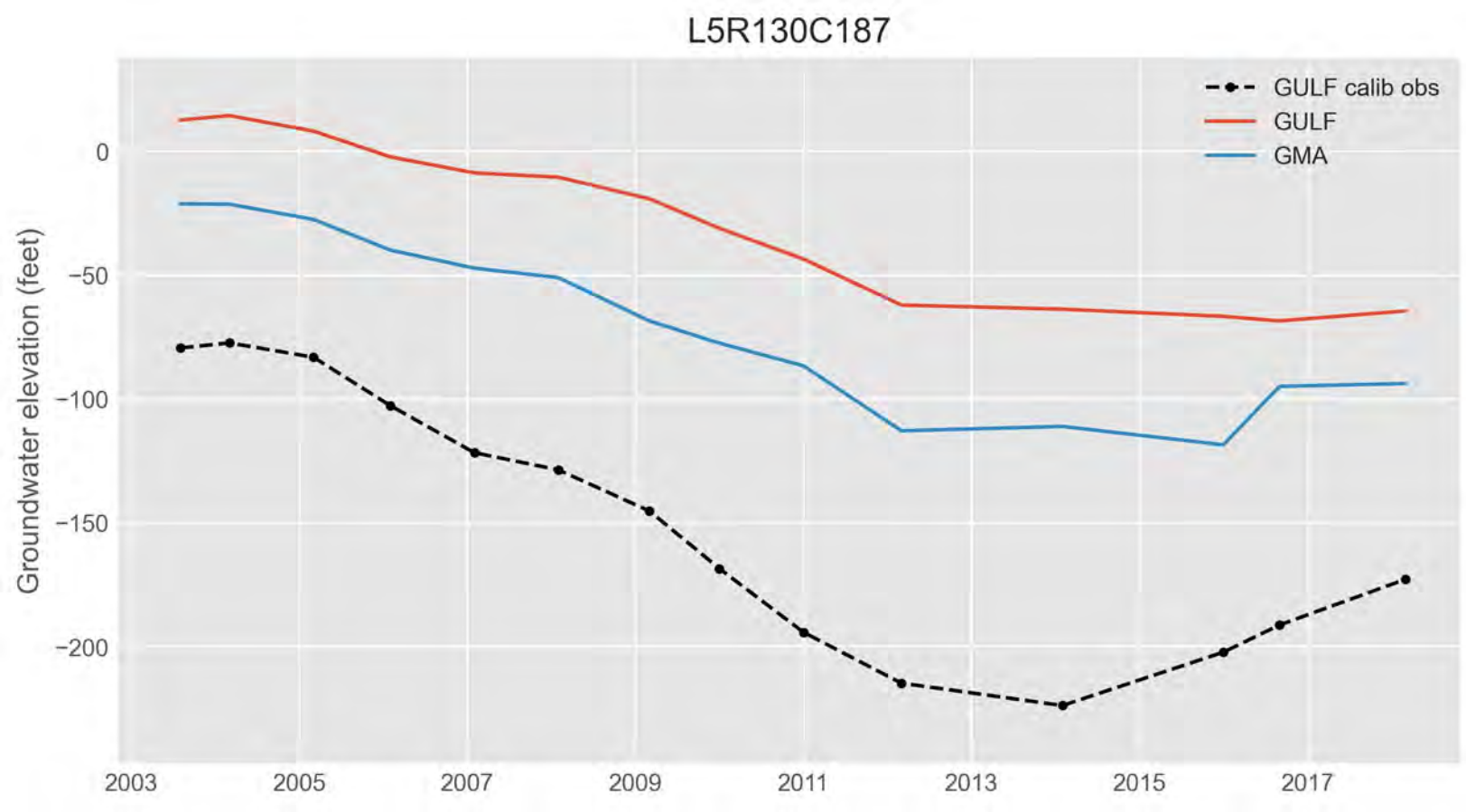

L5R123C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
1999
2004
2009
2014
2019

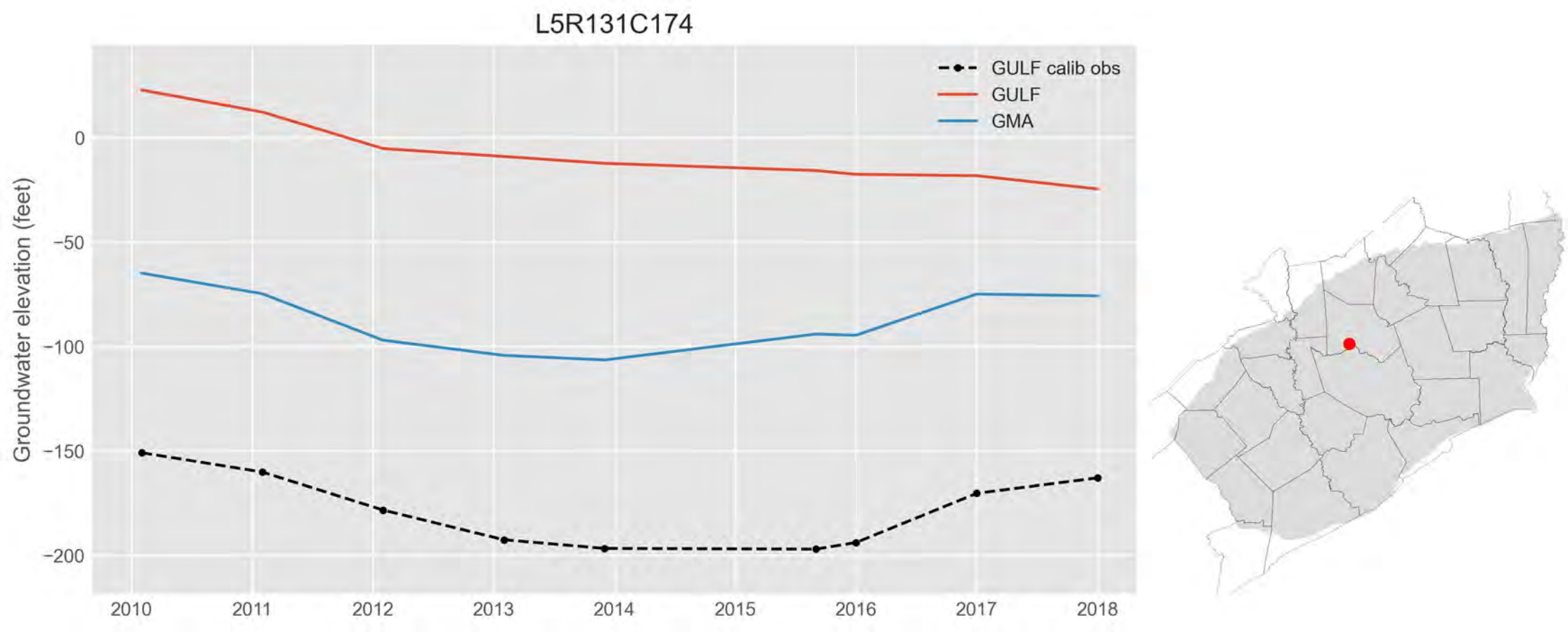

L5R127C121
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1969
1974
1979
1984
1989
GULF calib obs
GULF
GMA

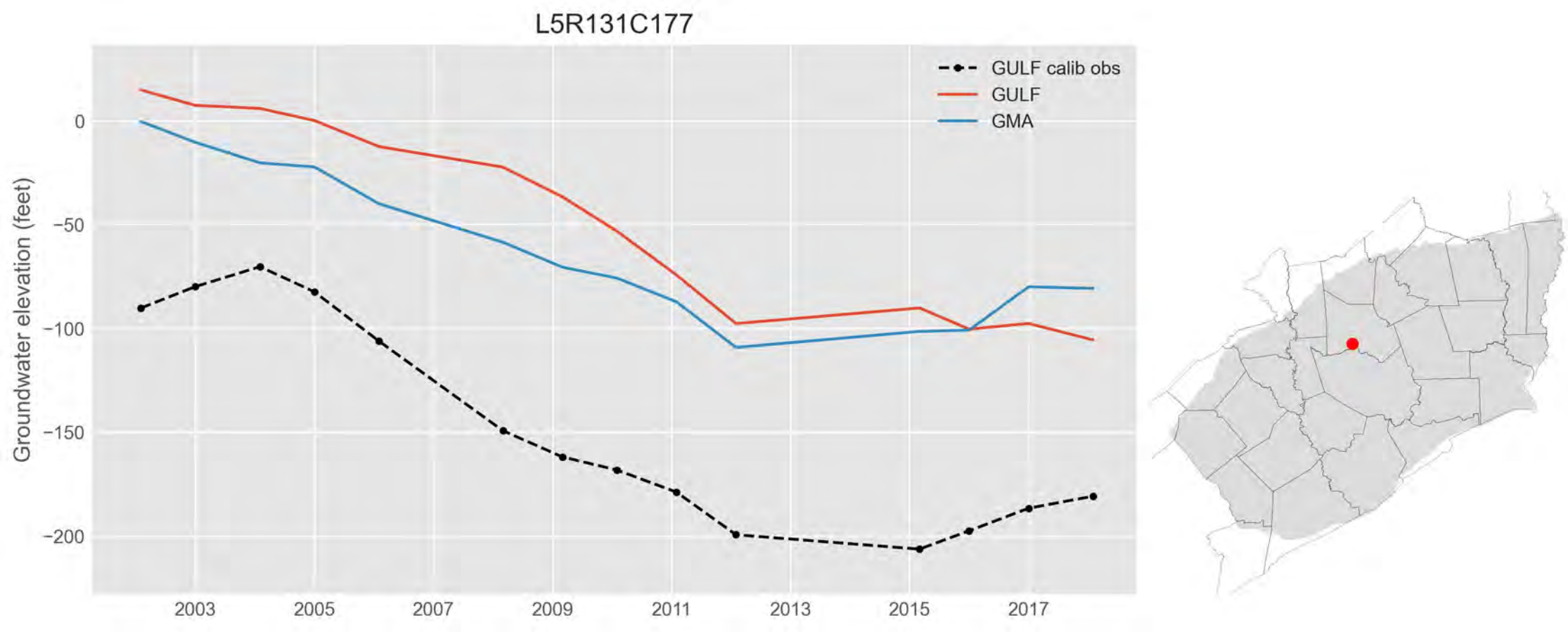

L5R127C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
2010
2011
2012
2013
2014
2015
2016
2017
2018

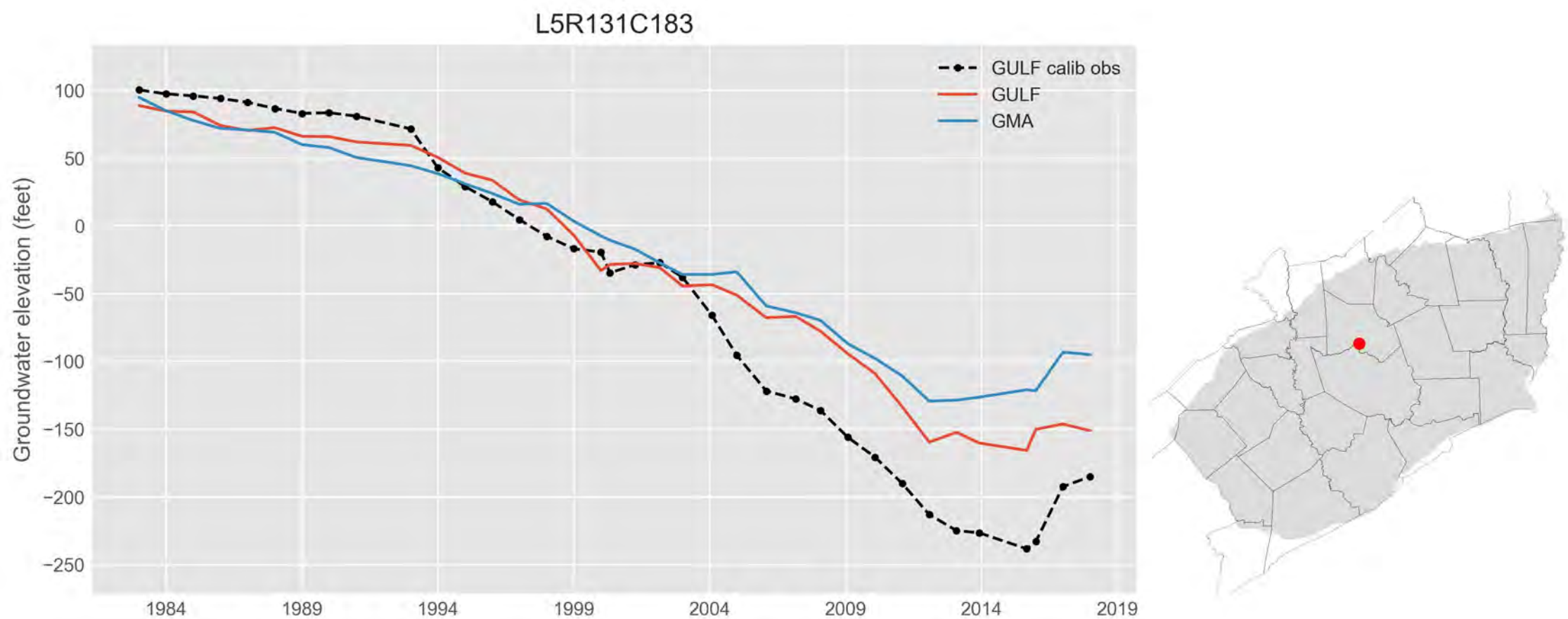

L5R128C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
−150
−200
−250
1994
1999
2004
2009
2014
2019

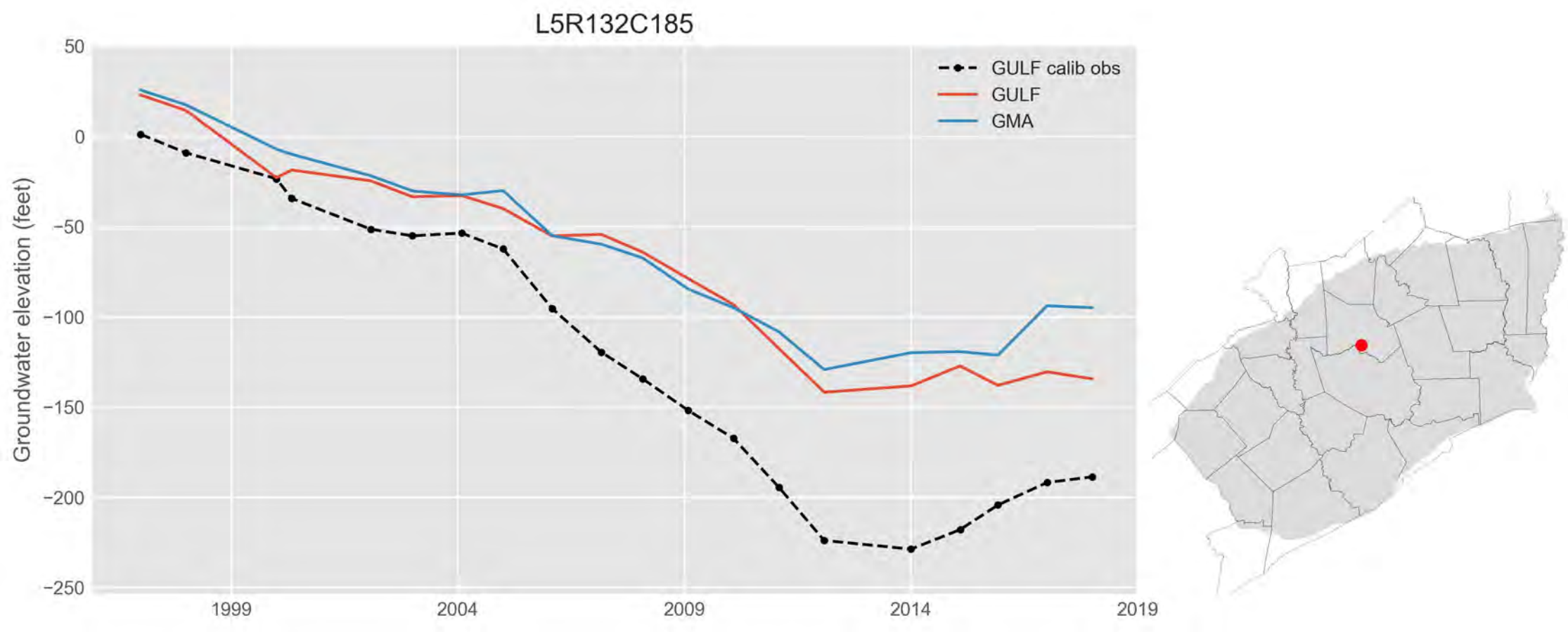
L5R130C187

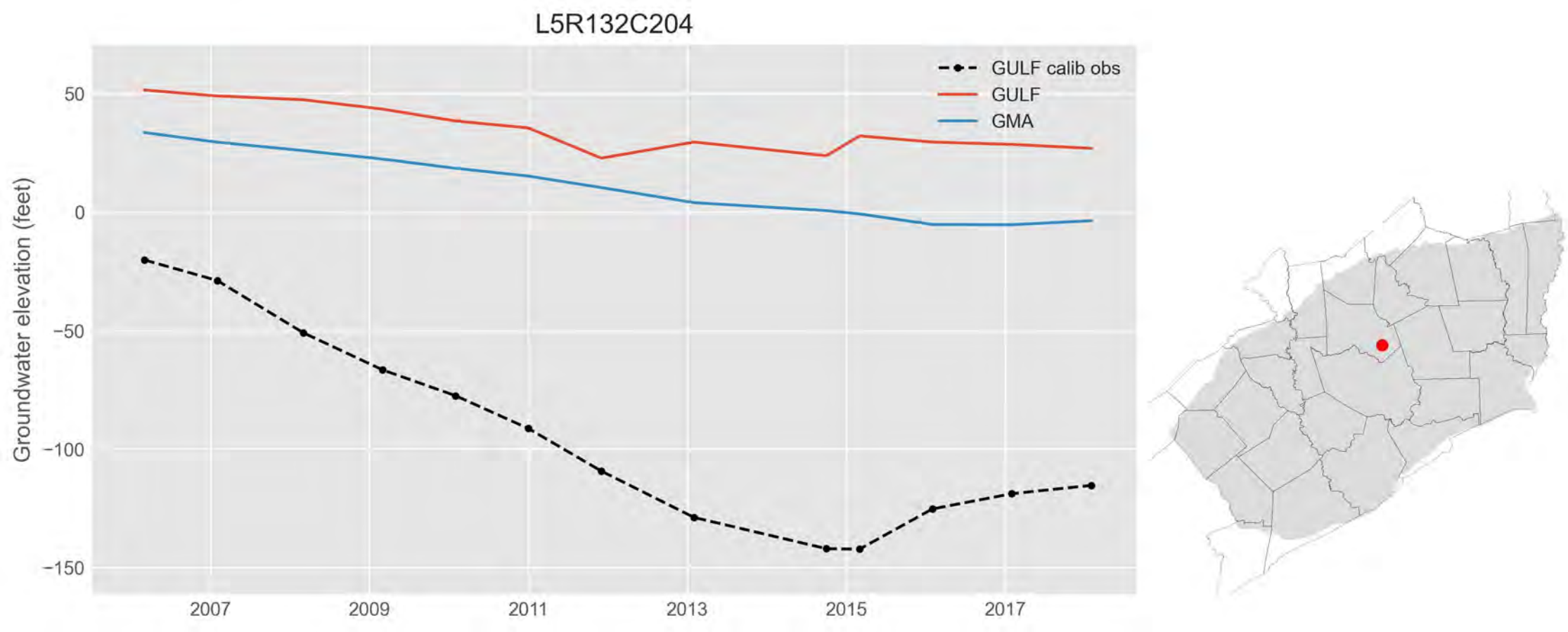

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
2003
2005
2007
2009
2011
2013
2015
2017

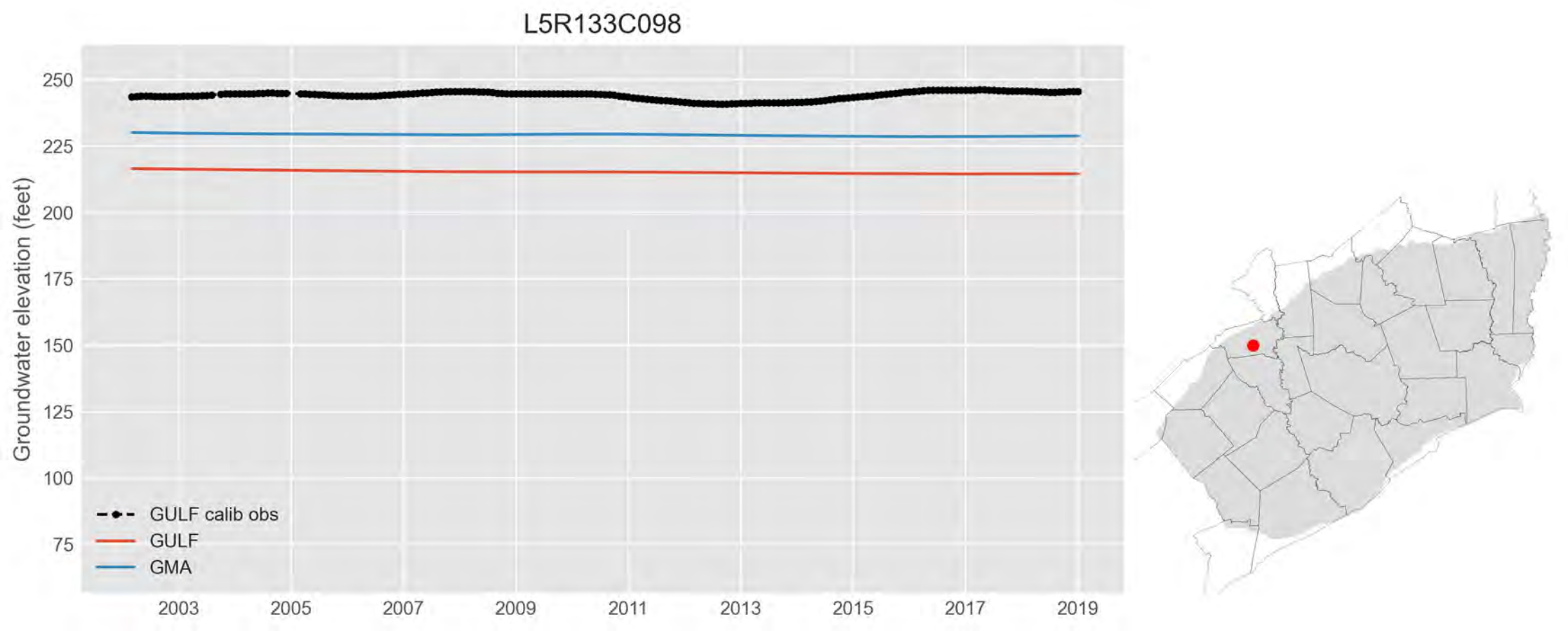

L5R131C174
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
2010
2011
2012
2013
2014
2015
2016
2017
2018

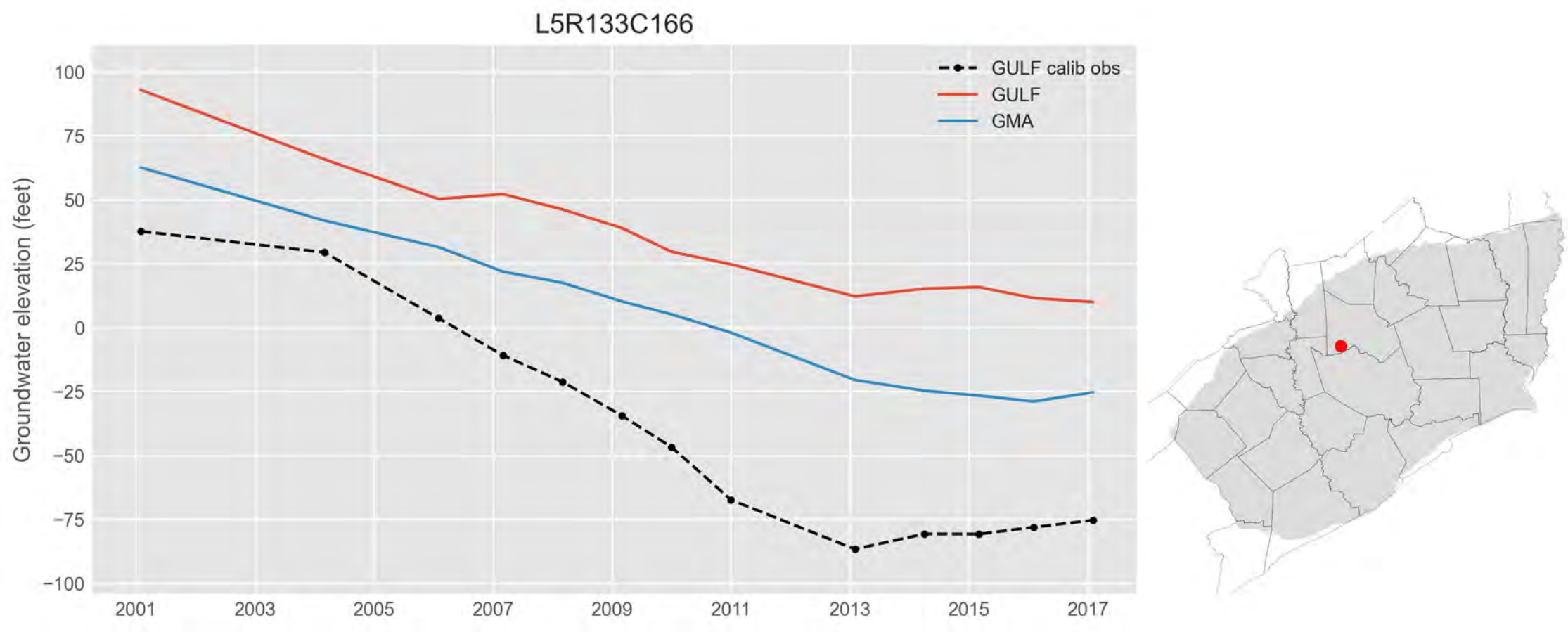

L5R131C177
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
2003
2005
2007
2009
2011
2013
2015
2017

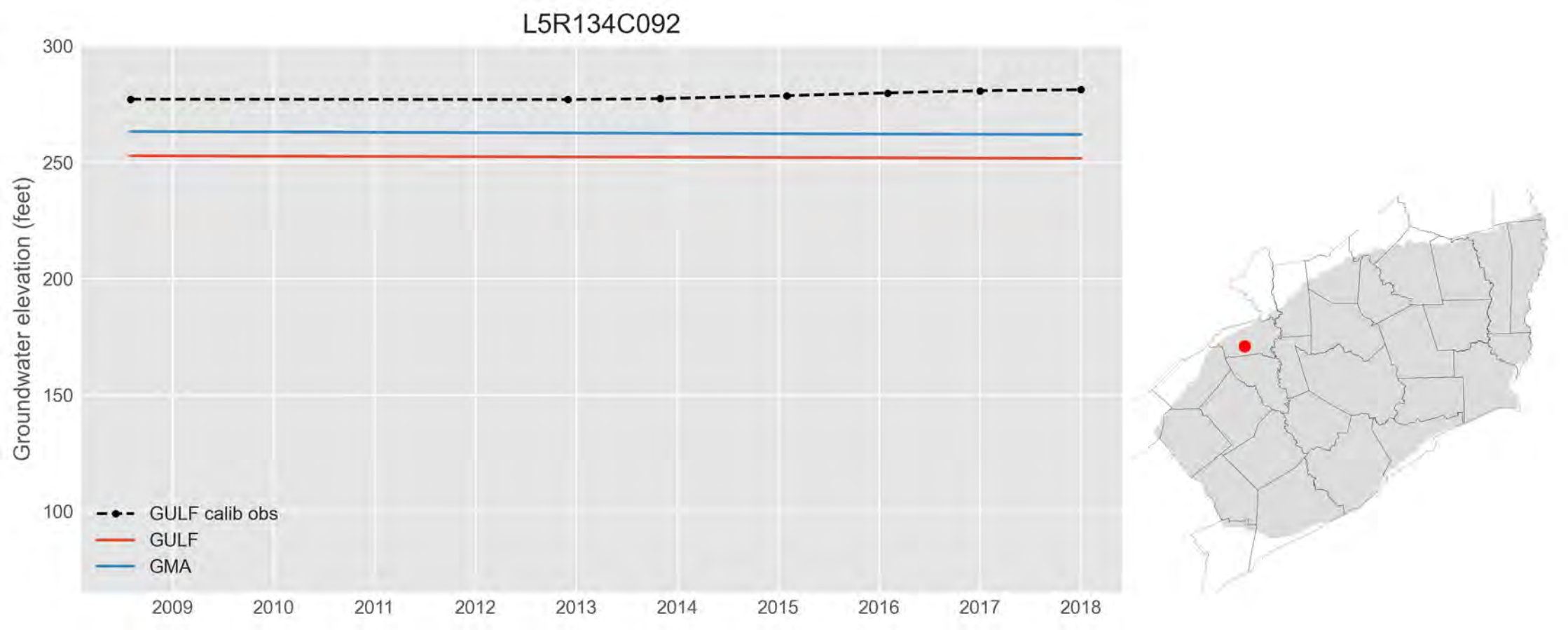

L5R131C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
−150
−200
−250
1984
1989
1994
1999
2004
2009
2014
2019

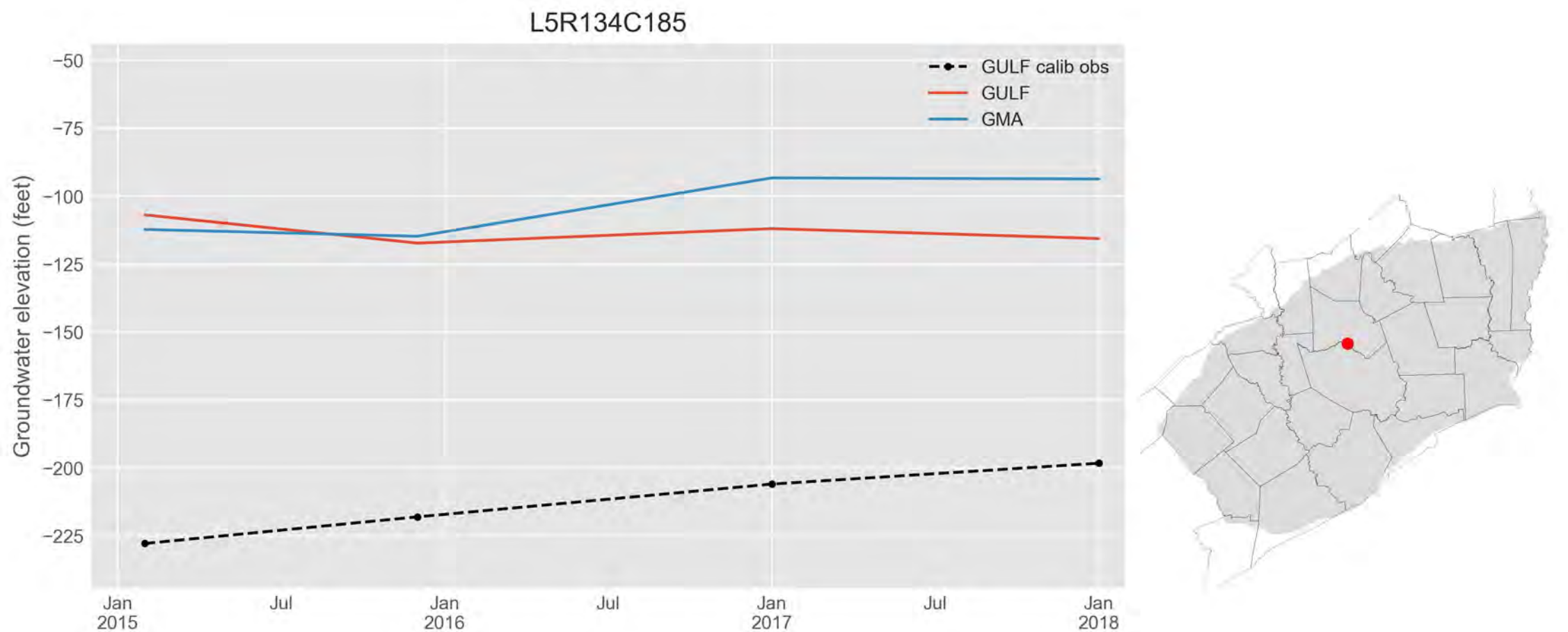

L5R132C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
−250
1999
2004
2009
2014
2019

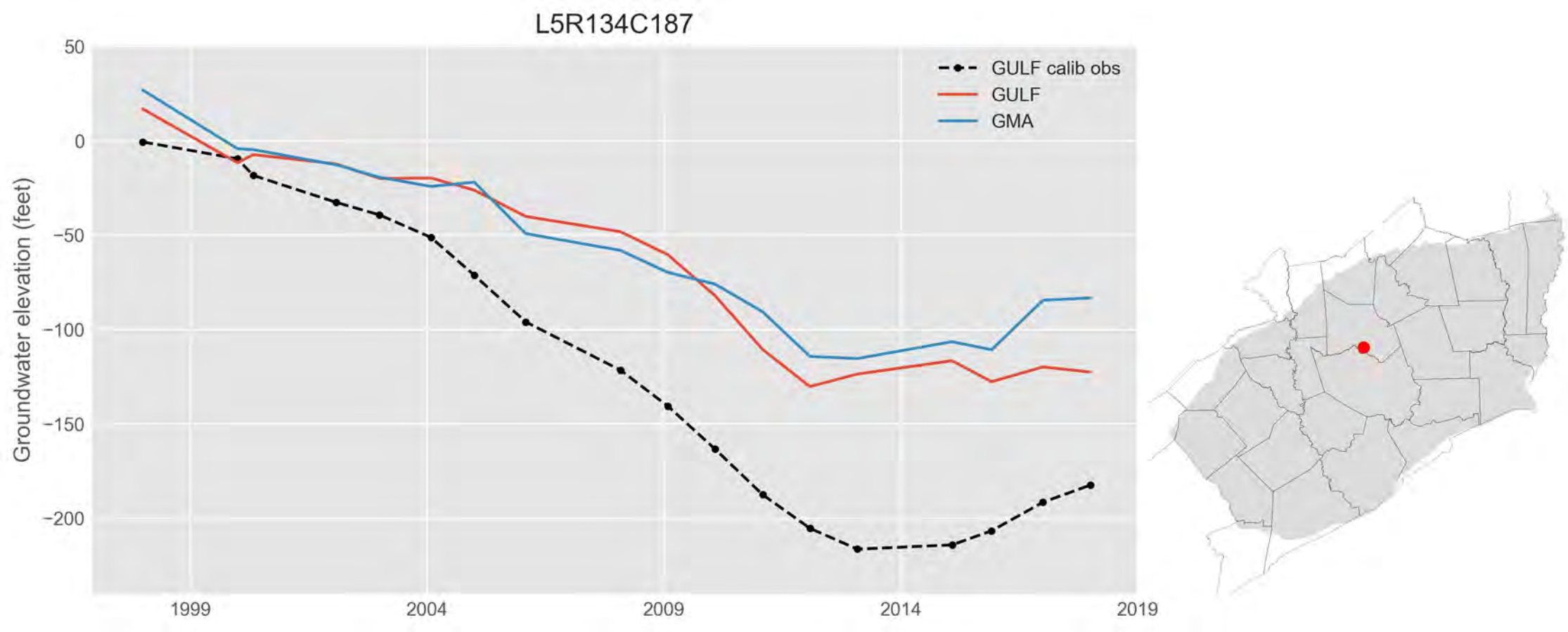

L5R132C204
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
2007
2009
2011
2013
2015
2017

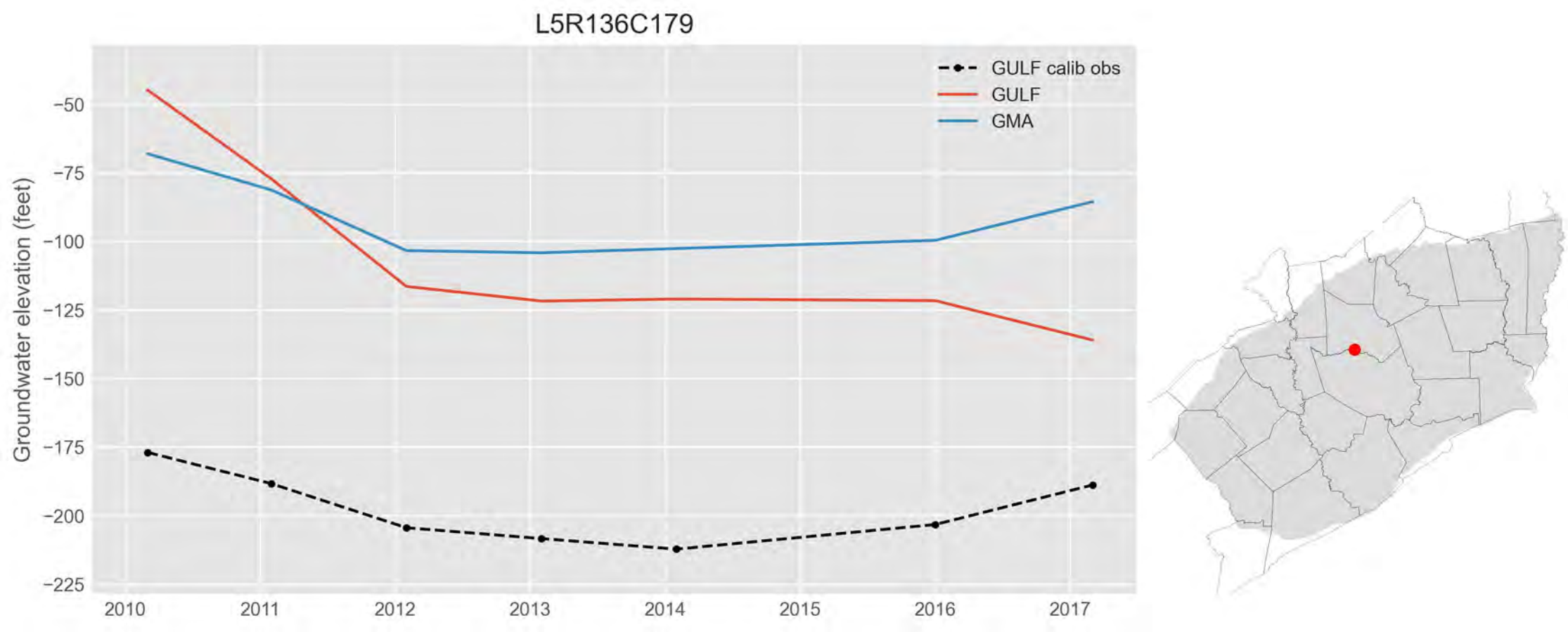

L5R133C098
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
2003
2005
2007
2009
2011
2013
2015
2017
2019
GULF calib obs
GULF
GMA

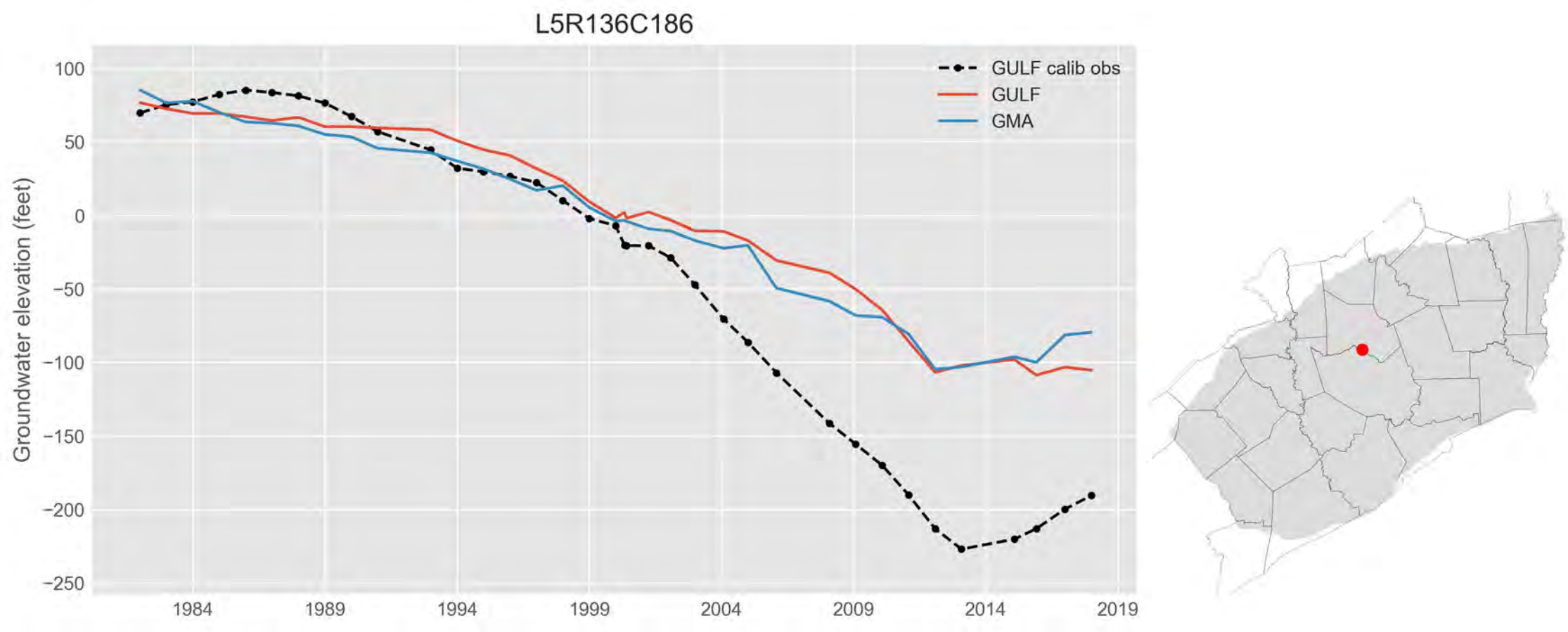

L5R133C166
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
75
50
25
0
−25
−50
−75
−100
2001
2003
2005
2007
2009
2011
2013
2015
2017

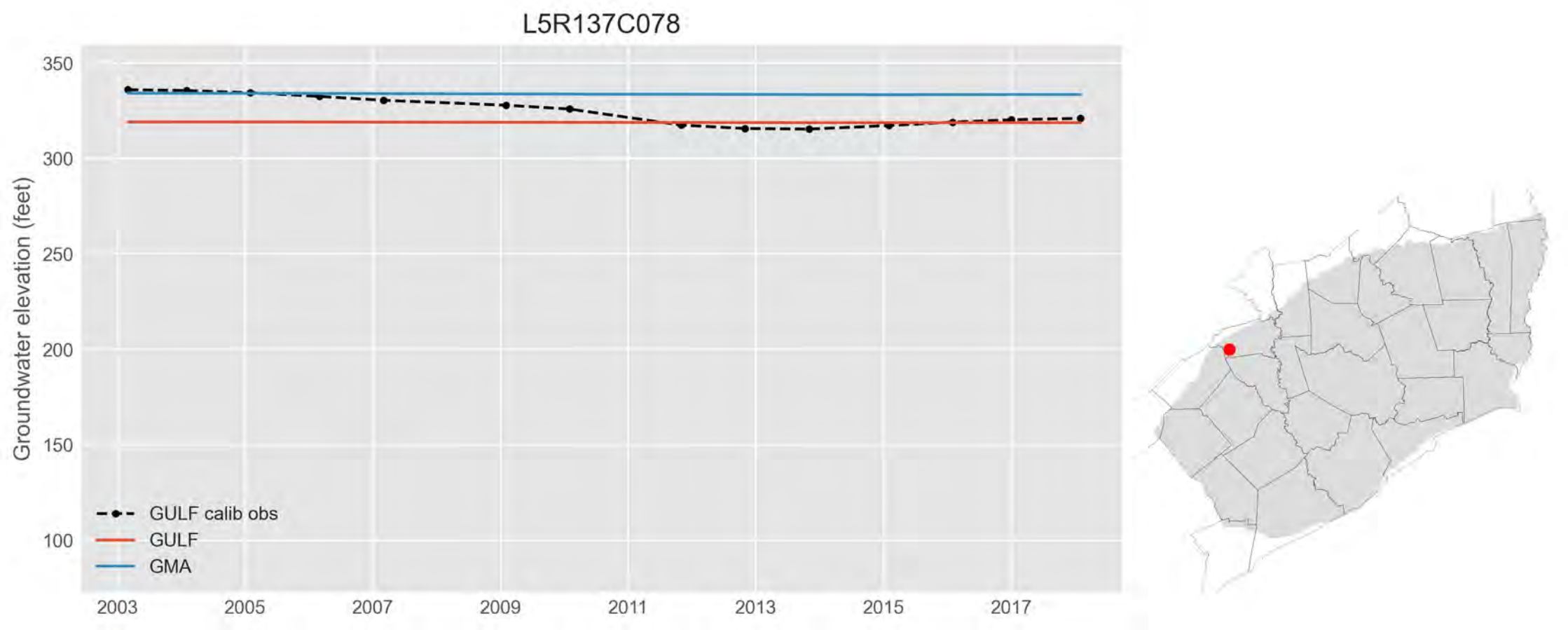

L5R134C092
300
250
200
150
100
Groundwater elevation (feet)
GULF calib obs
GULF
GMA
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

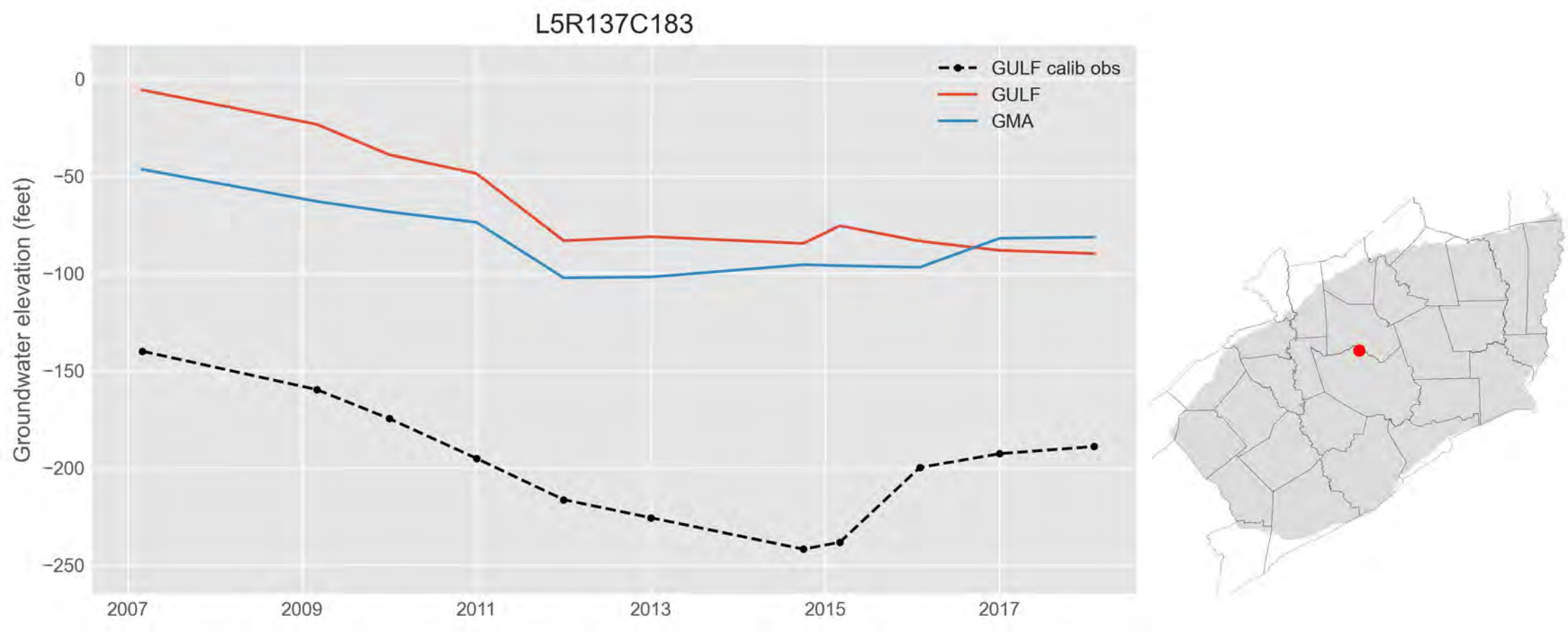

L5R134C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
Jan
2015
Jul
Jan
2016
Jul
Jan
2017
Jul
Jan
2018

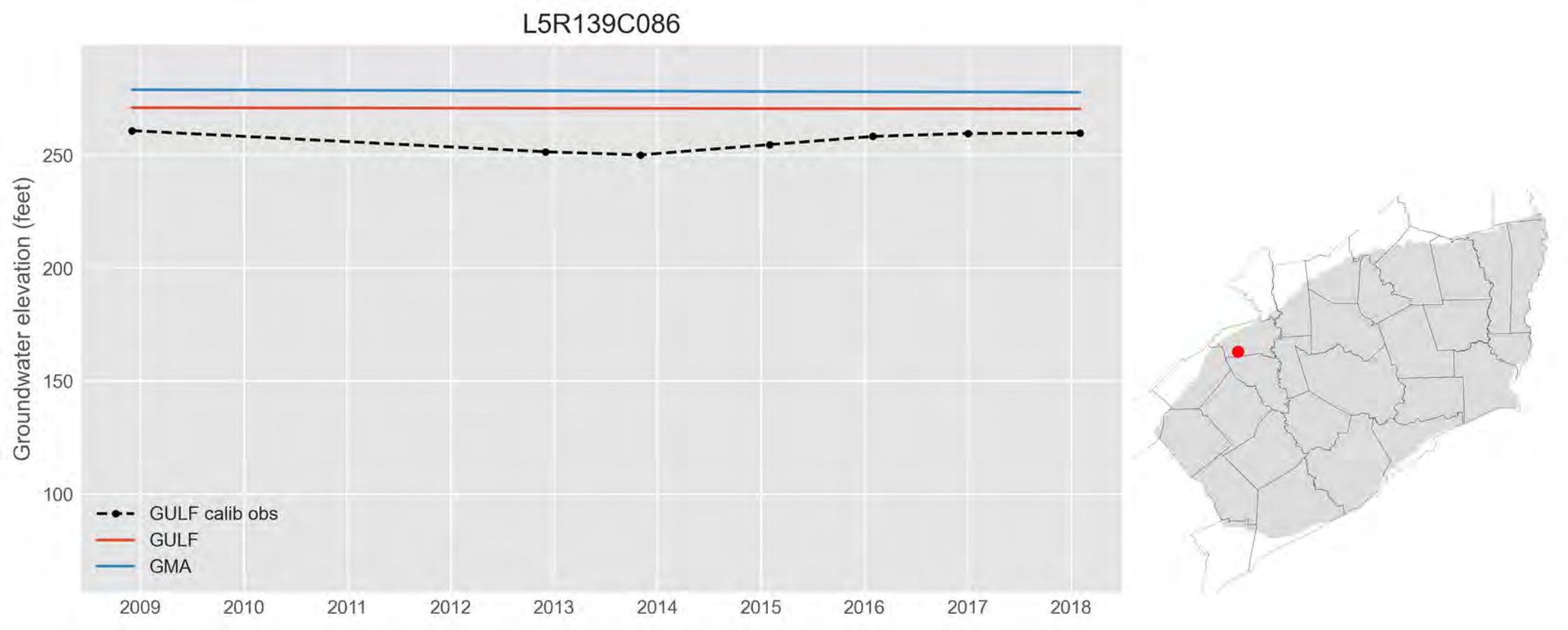

L5R134C187
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
−200
1999
2004
2009
2014
2019

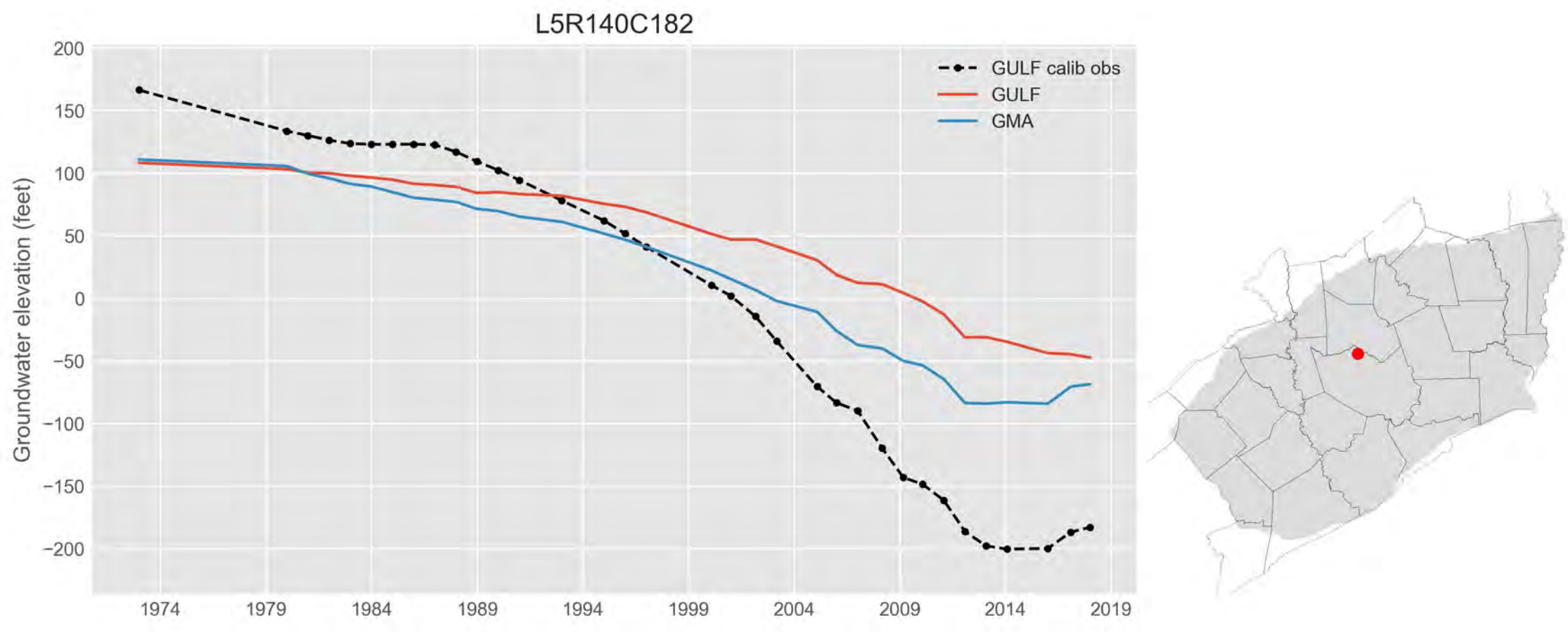

L5R136C179
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
−50
−75
−100
−125
−150
−175
−200
−225
2010
2011
2012
2013
2014
2015
2016
2017

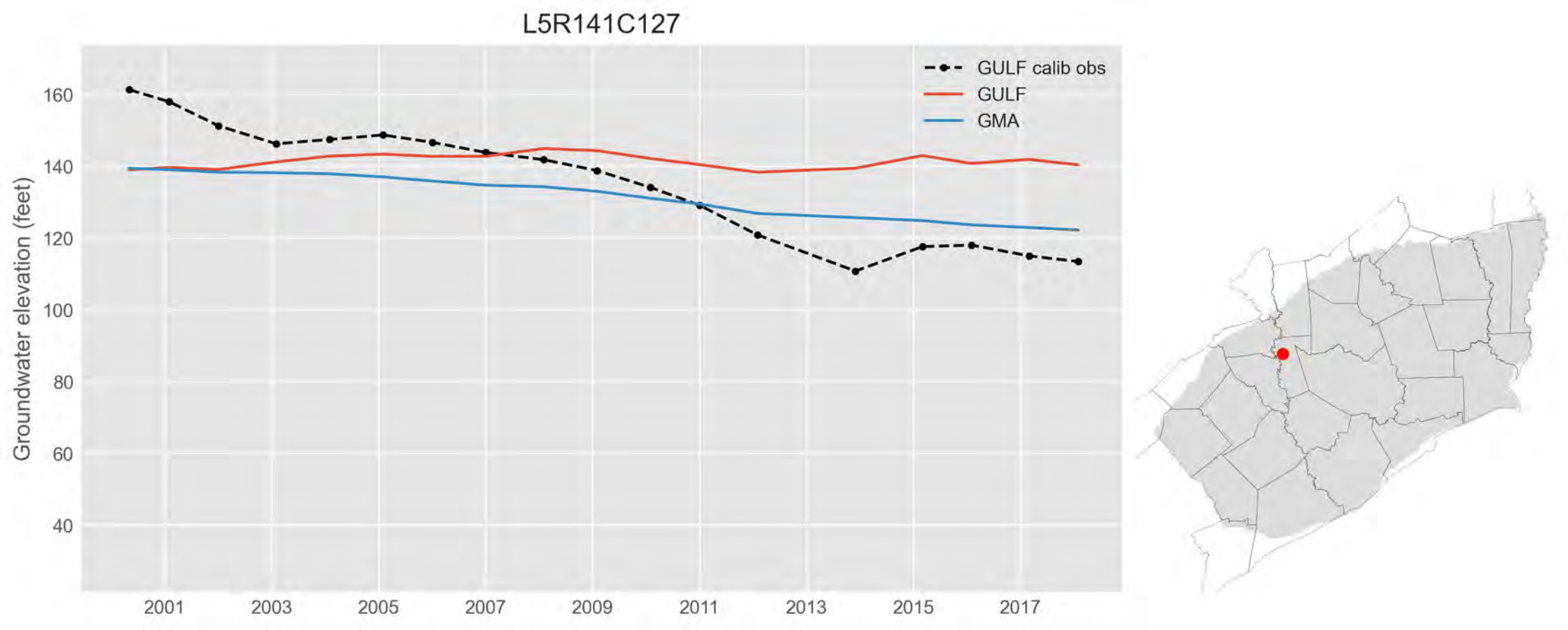

L5R136C186
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
100
50
0
−50
−100
−150
−200
−250
1984
1989
1994
1999
2004
2009
2014
2019

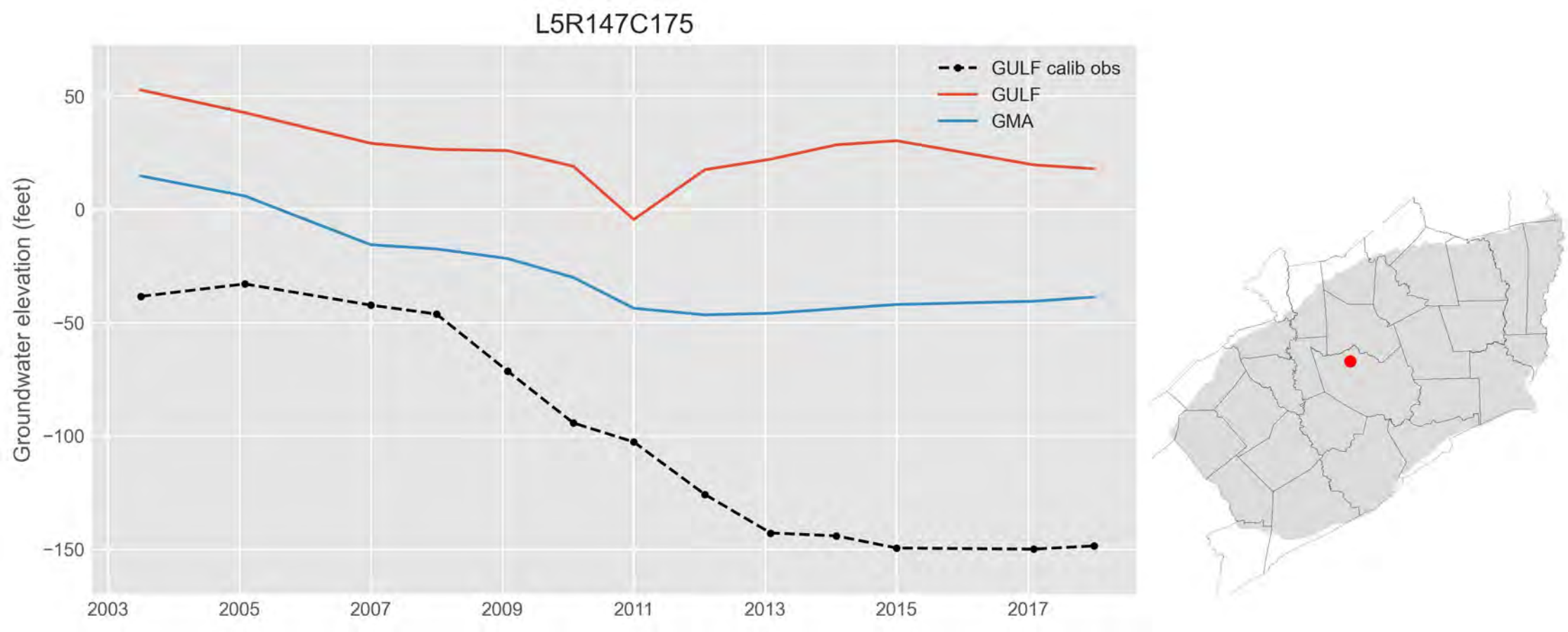

L5R137C078
Groundwater elevation (feet)
350
300
250
200
150
100
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

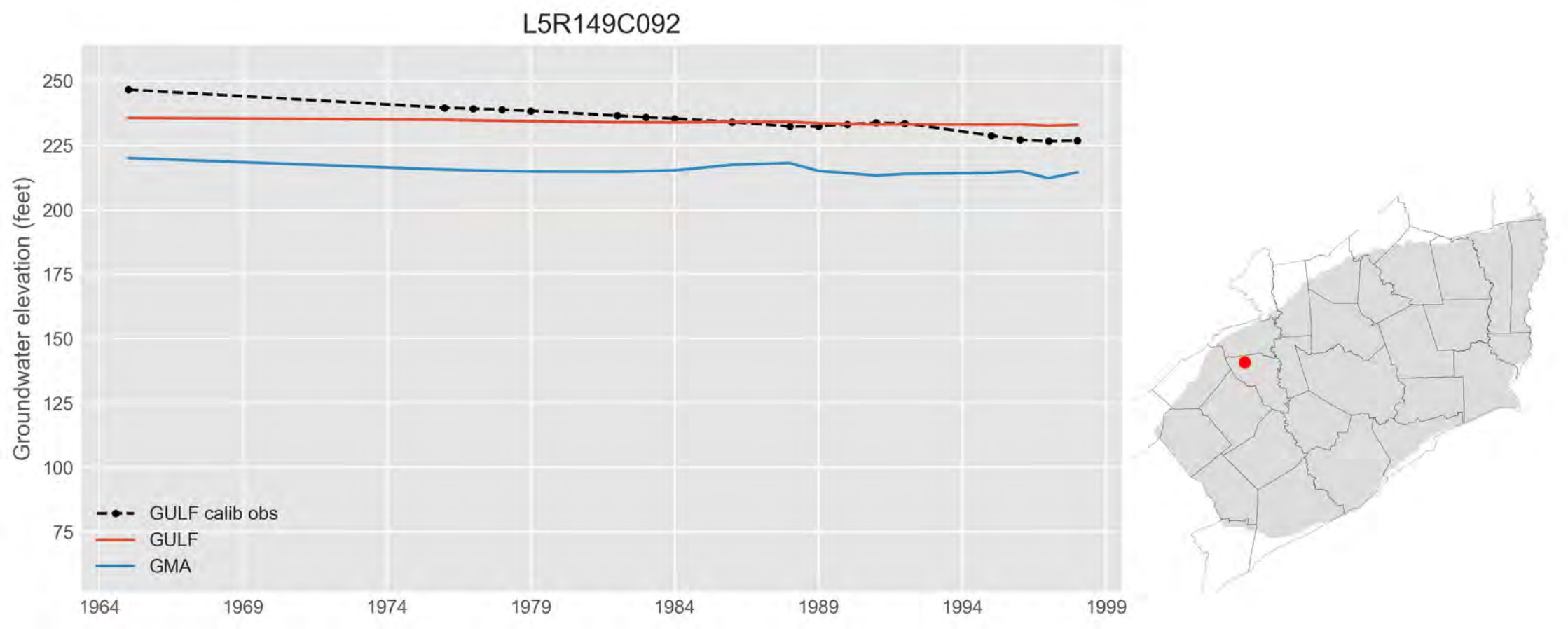

L5R137C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
0
−50
−100
−150
−200
−250
2007
2009
2011
2013
2015
2017

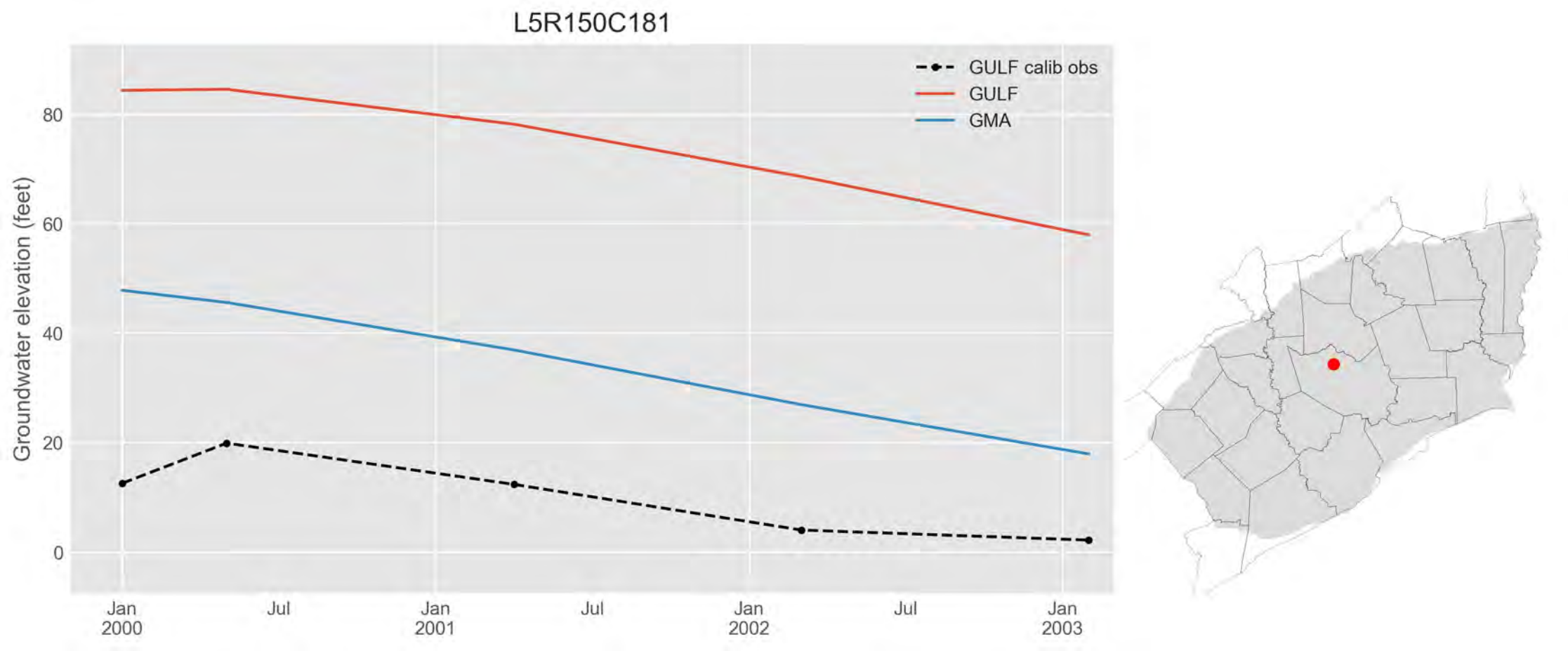

L5R139C086
Groundwater elevation (feet)
250
200
150
100
GULF calib obs
GULF
GMA
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

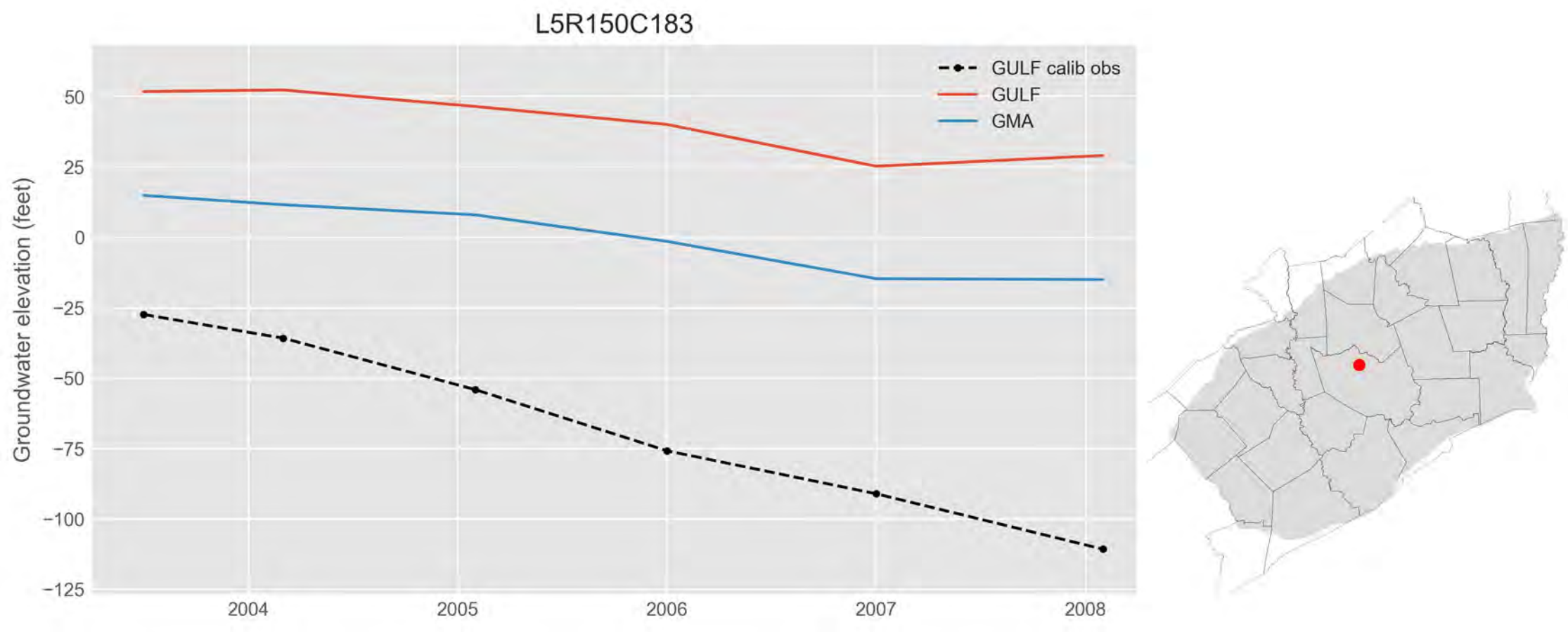

L5R140C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
150
100
50
0
−50
−100
−150
−200
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019

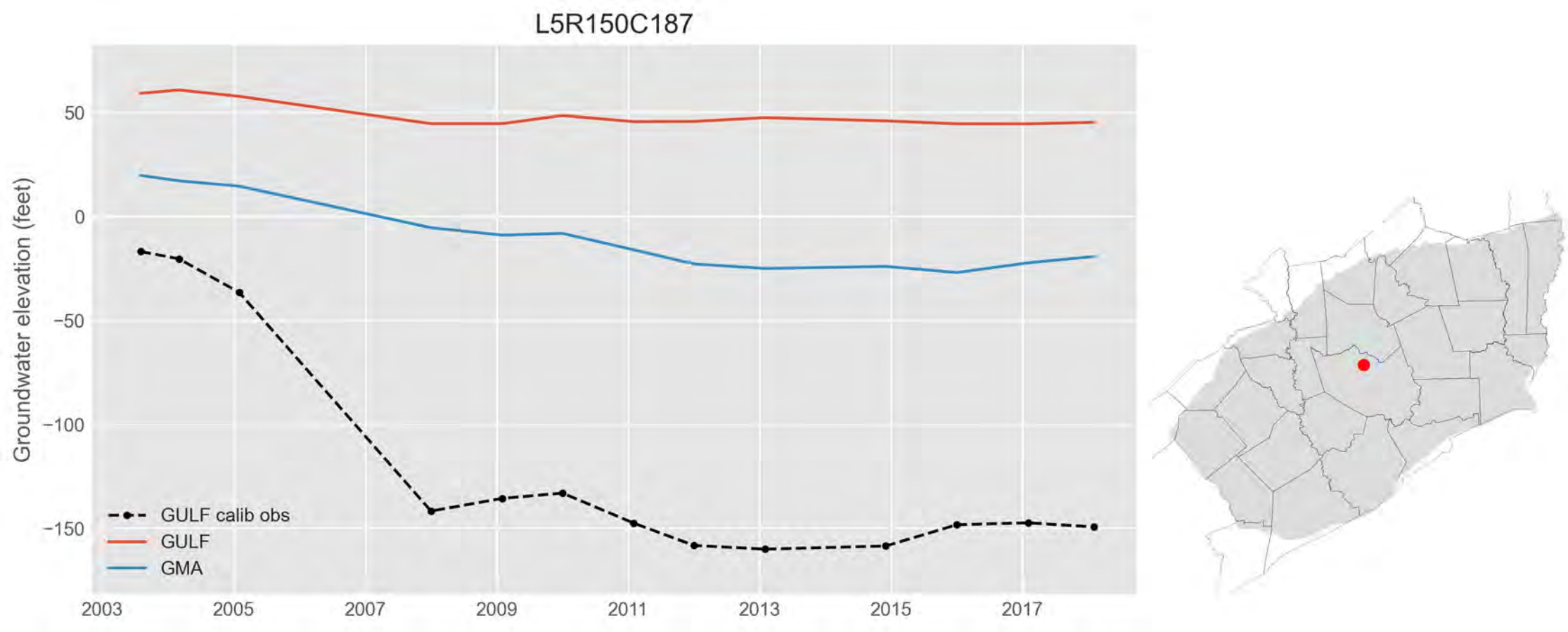

L5R141C127
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
2001
2003
2005
2007
2009
2011
2013
2015
2017

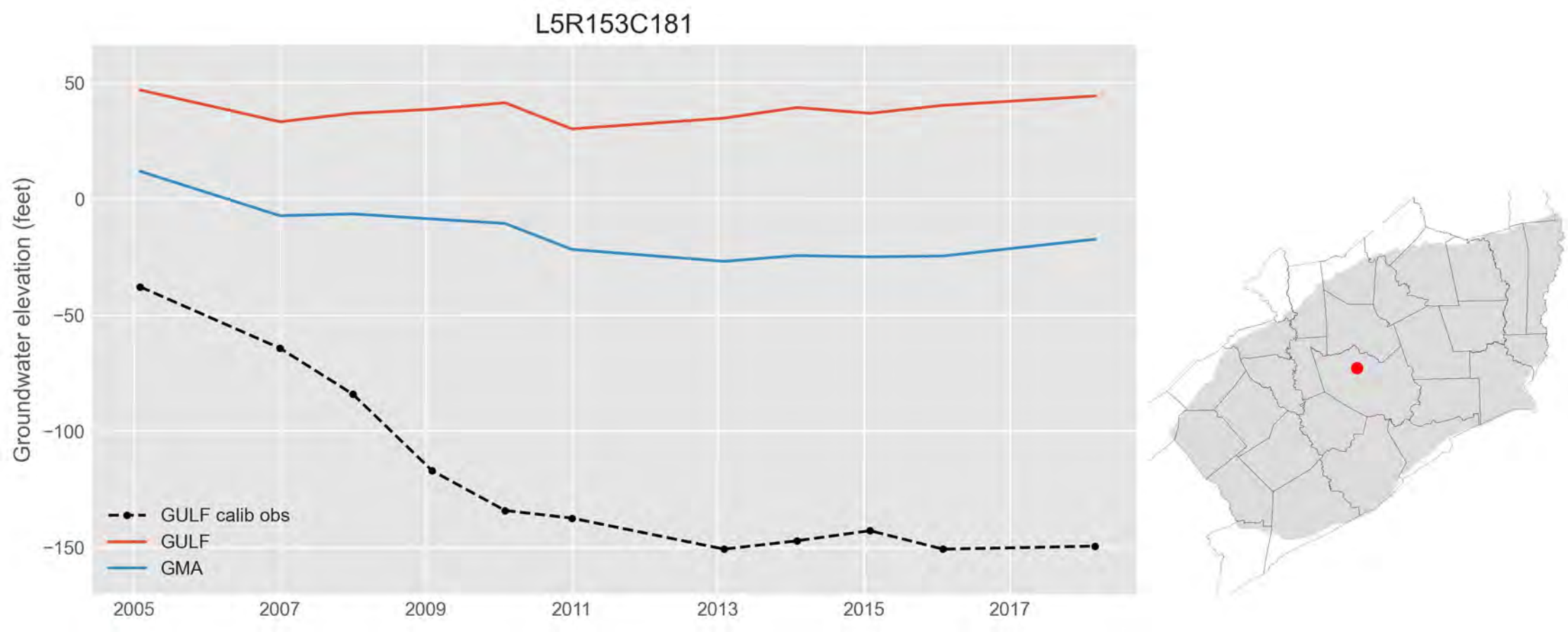

L5R147C175
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
0
−50
−100
−150
2003
2005
2007
2009
2011
2013
2015
2017

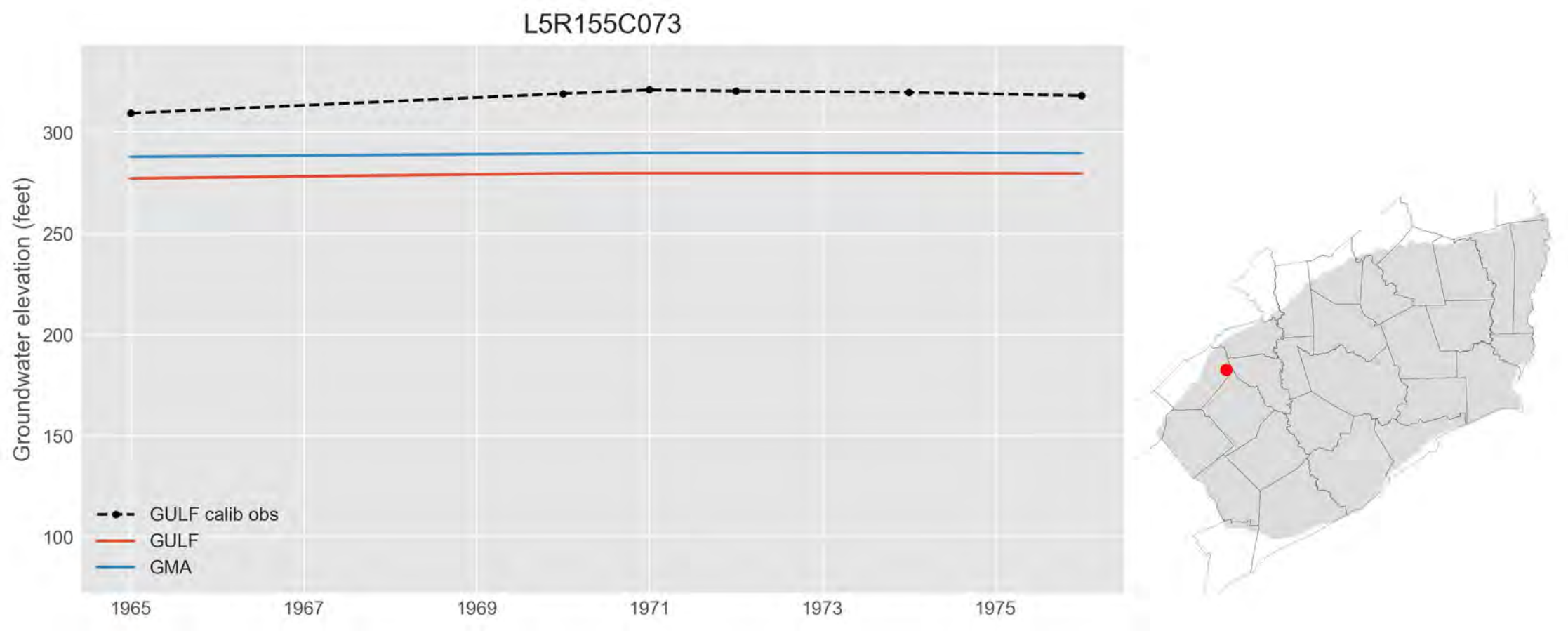

L5R149C092
Groundwater elevation (feet)
250
225
200
175
150
125
100
75
1964
1969
1974
1979
1984
1989
1994
1999
GULF calib obs
GULF
GMA

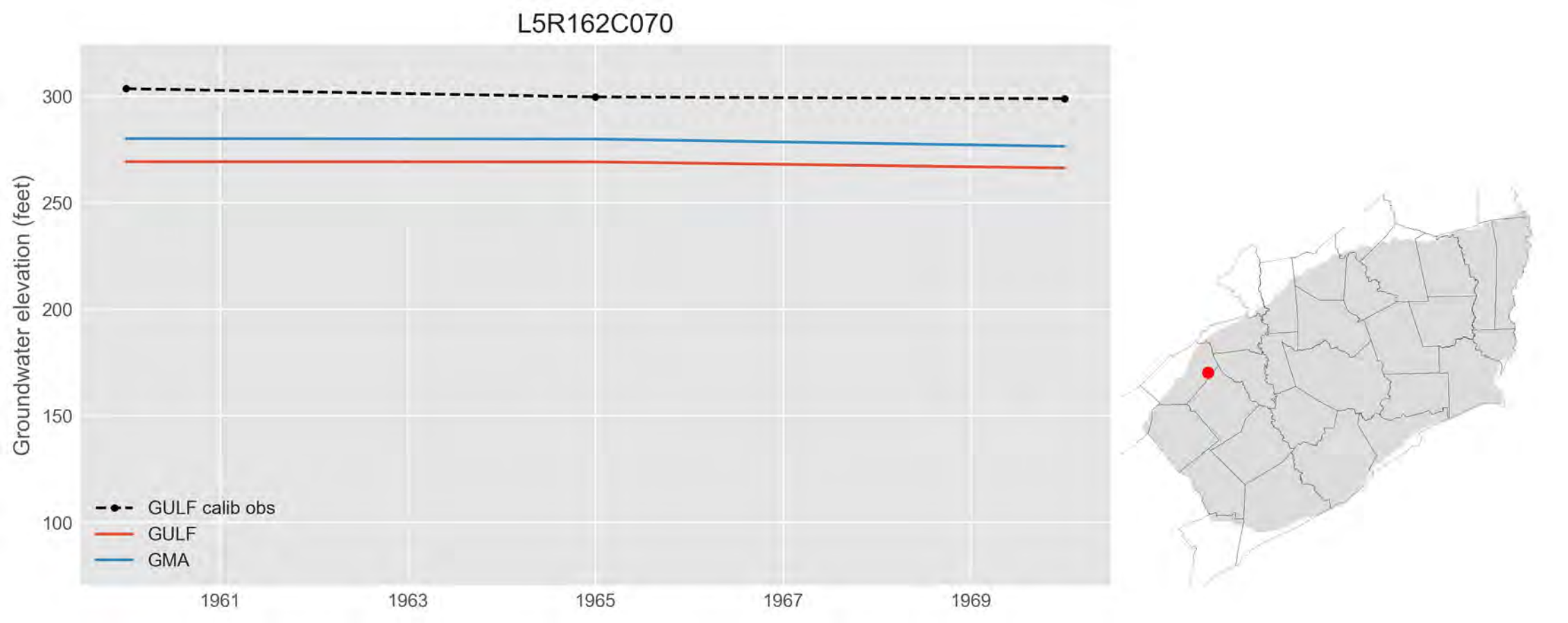

L5R150C181
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
80
60
40
20
0
Jan
2000
Jul
Jan
2001
Jul
Jan
2002
Jul
Jan
2003

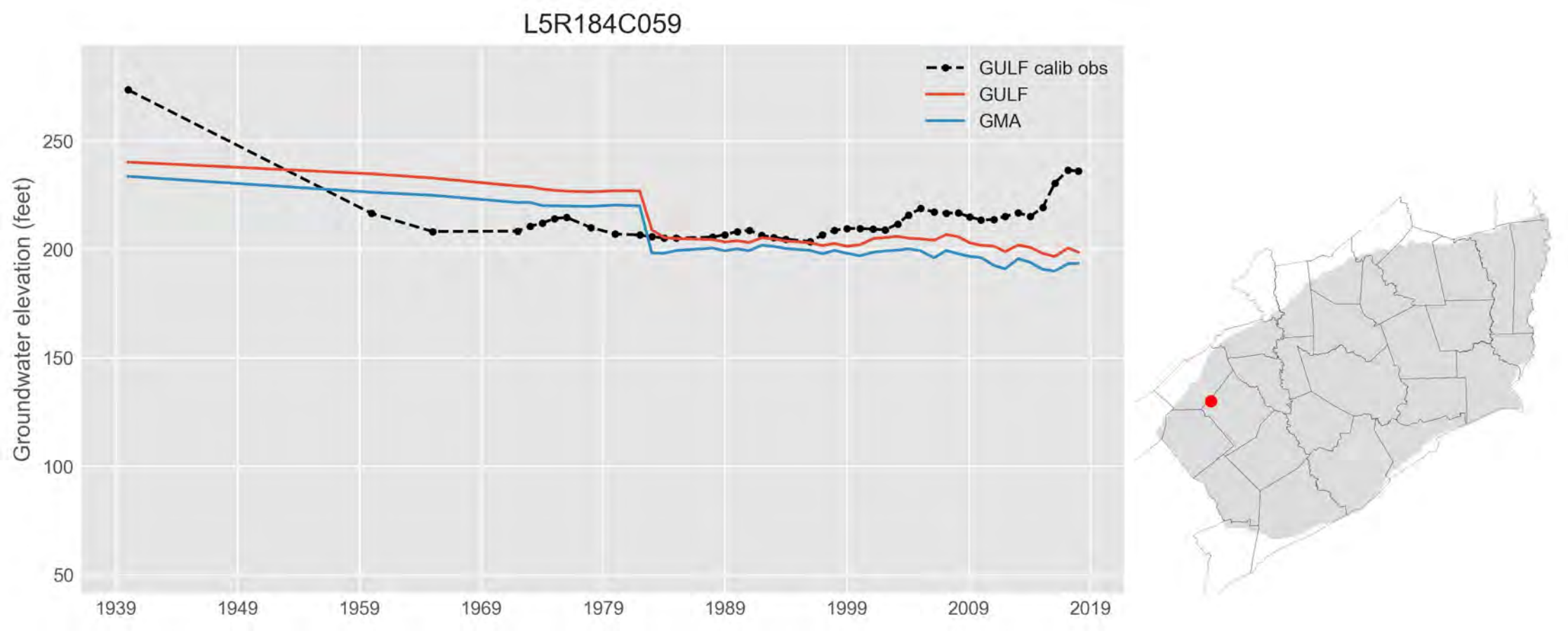

L5R150C183
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
50
25
0
−25
−50
−75
−100
−125
2004
2005
2006
2007
2008


L5R150C187
Groundwater elevation (feet)
50
0
−50
−100
−150
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

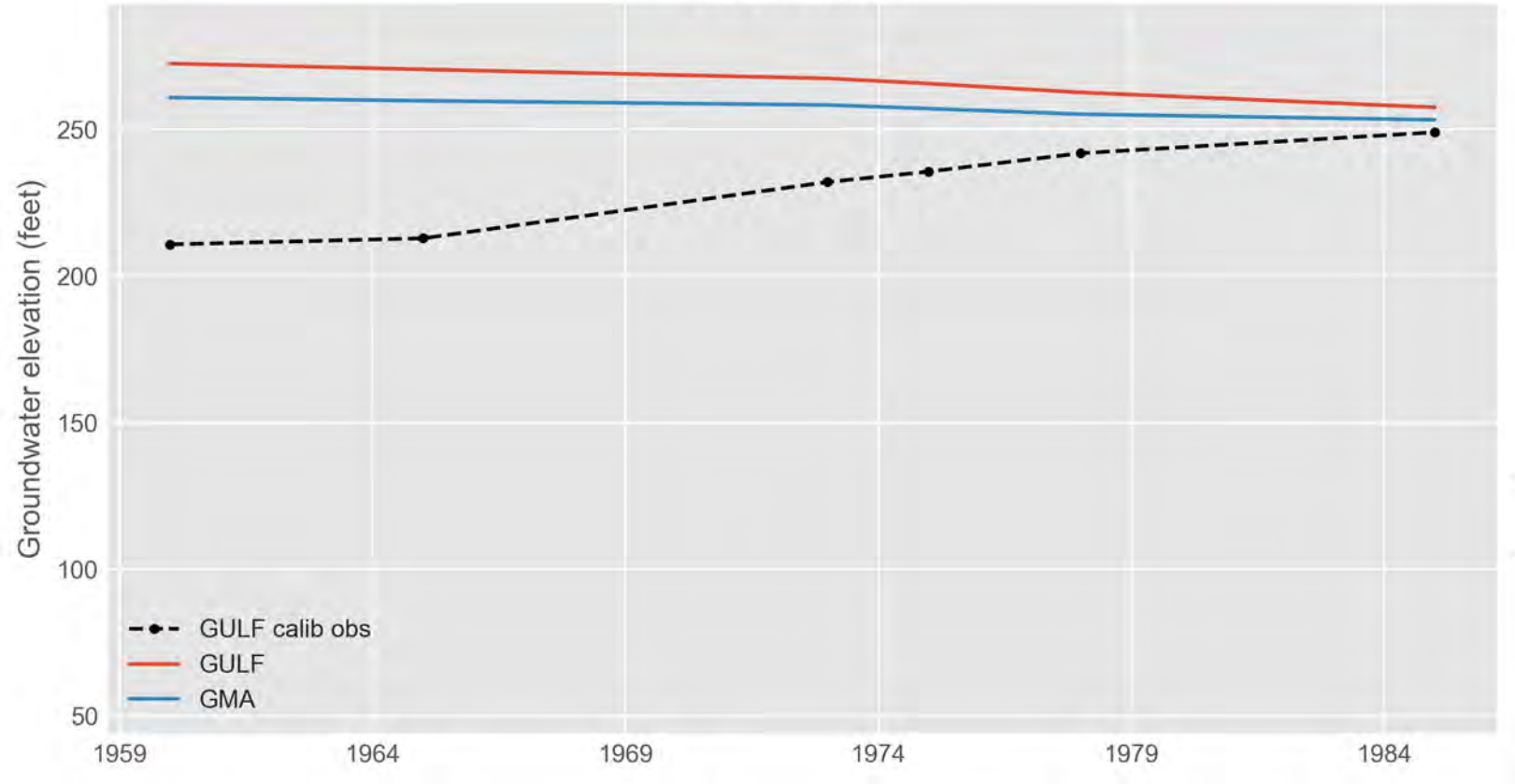

L5R153C181
Groundwater elevation (feet)
50
0
−50
−100
−150
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

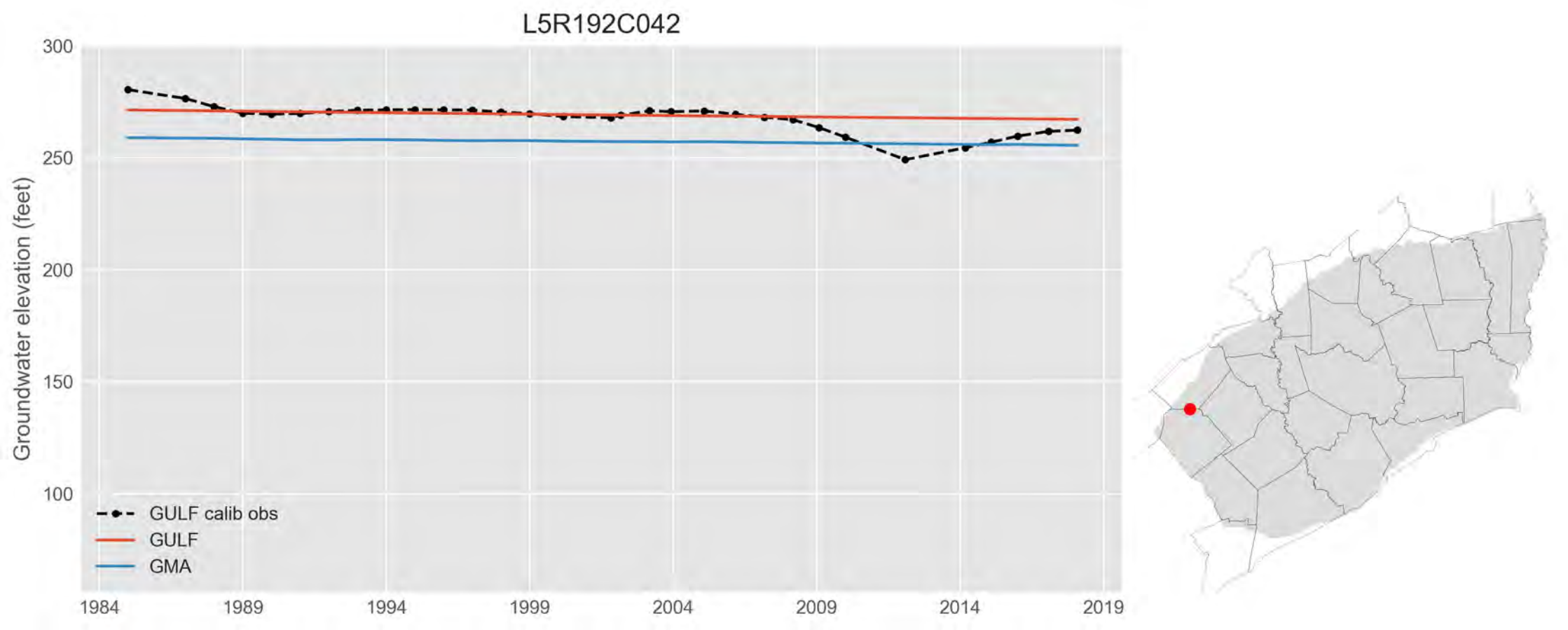

L5R155C073
Groundwater elevation (feet)
300
250
200
150
100
1965
1967
1969
1971
1973
1975
GULF calib obs
GULF
GMA

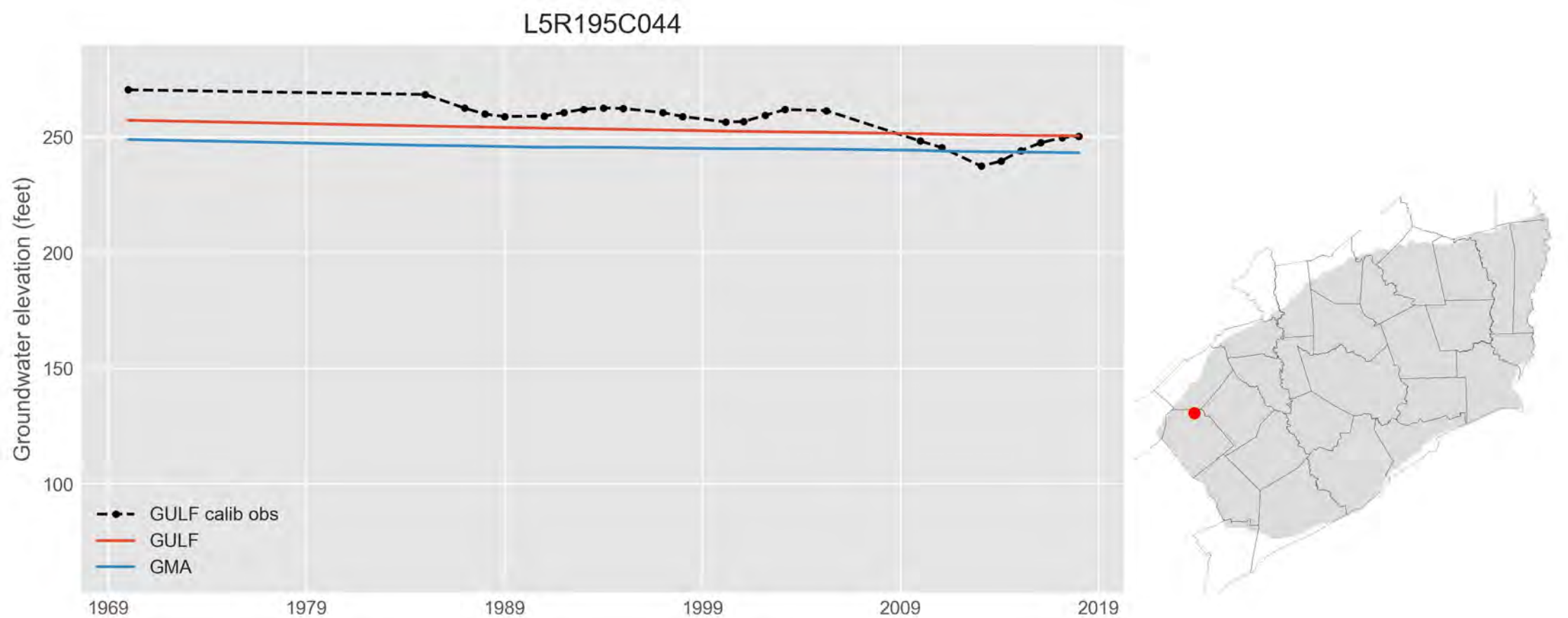

L5R162C070
Groundwater elevation (feet)
300
250
200
150
100
1961
1963
1965
1967
1969
GULF calib obs
GULF
GMA

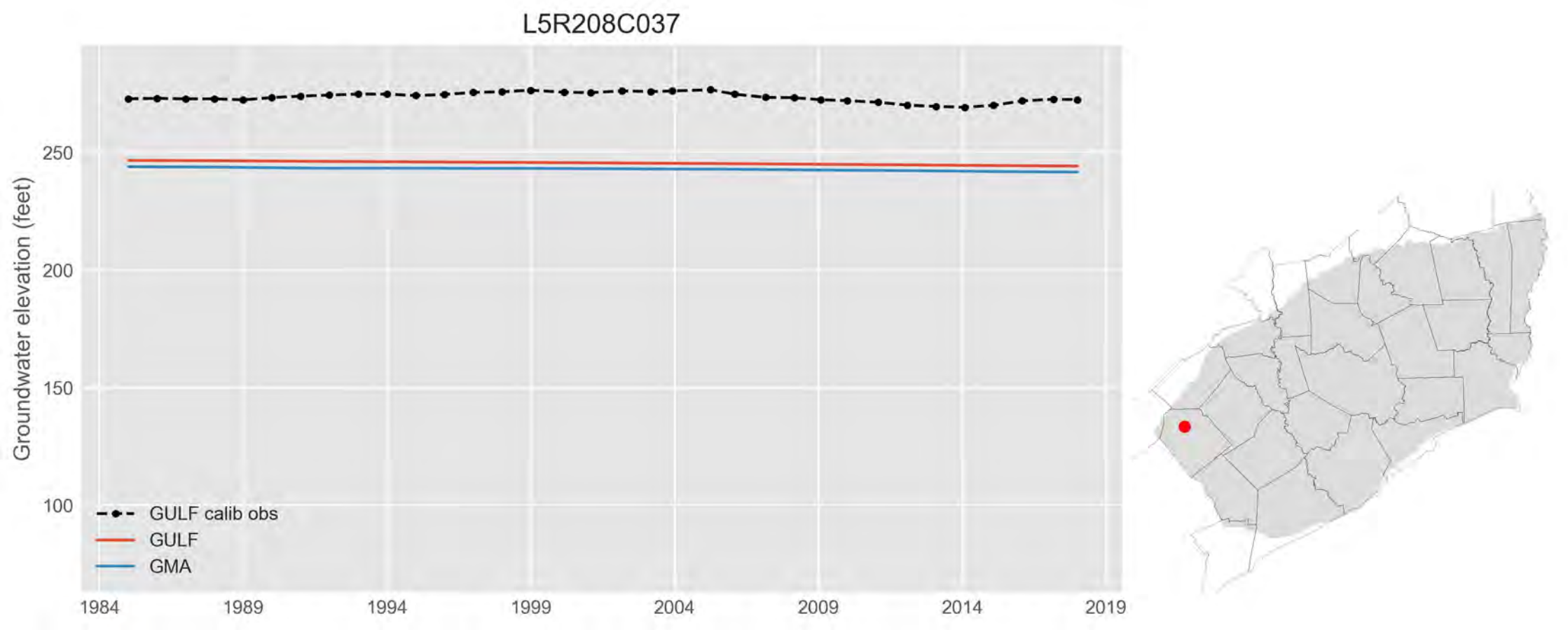

L5R184C059
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
250
200
150
100
50
1939
1949
1959
1969
1979
1989
1999
2009
2019

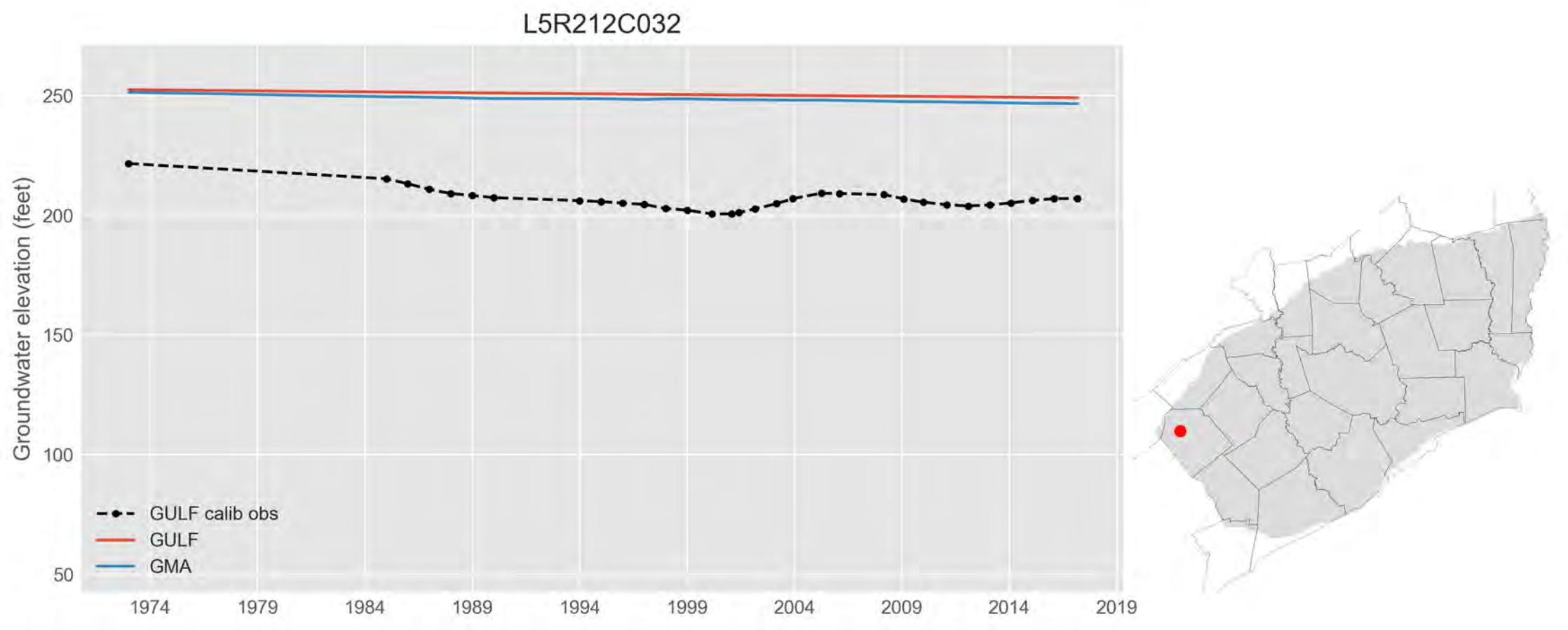
L5R186C046

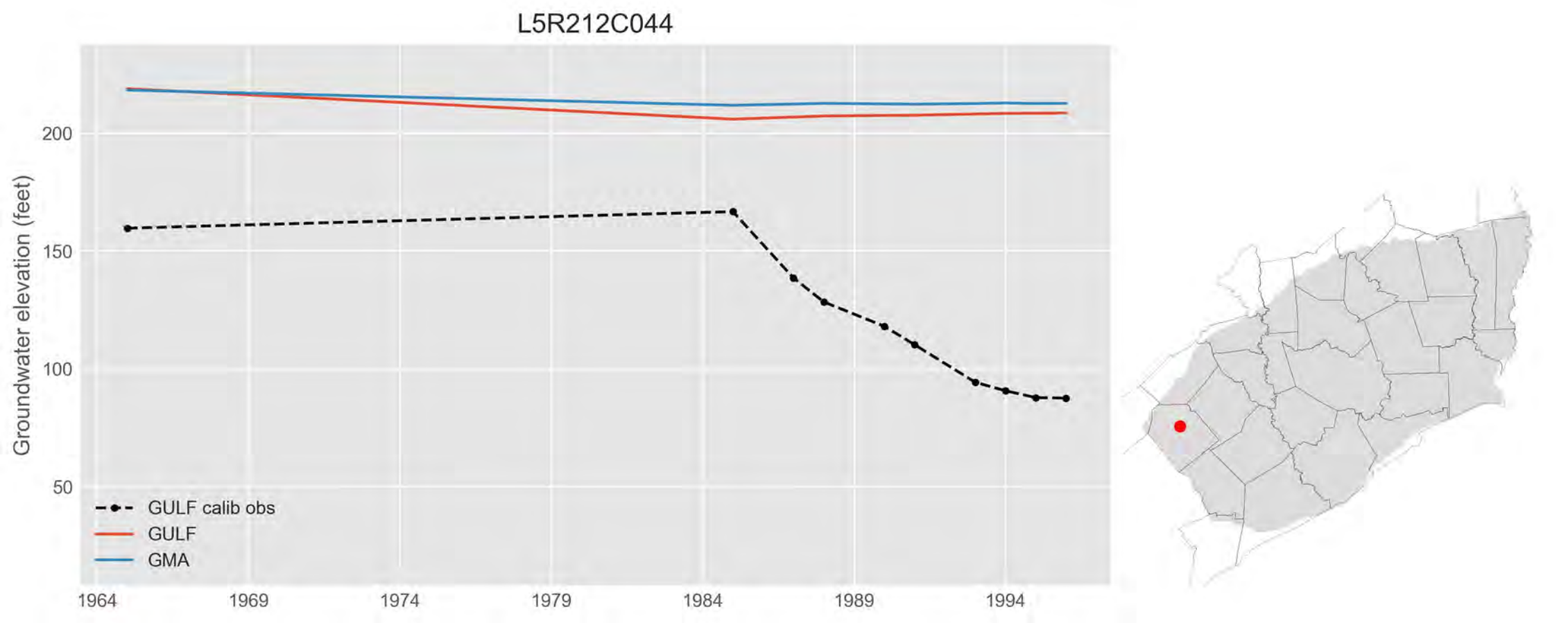

Groundwater elevation (feet)
250
200
150
100
50
1959
1964
1969
1974
1979
1984
GULF calib obs
GULF
GMA

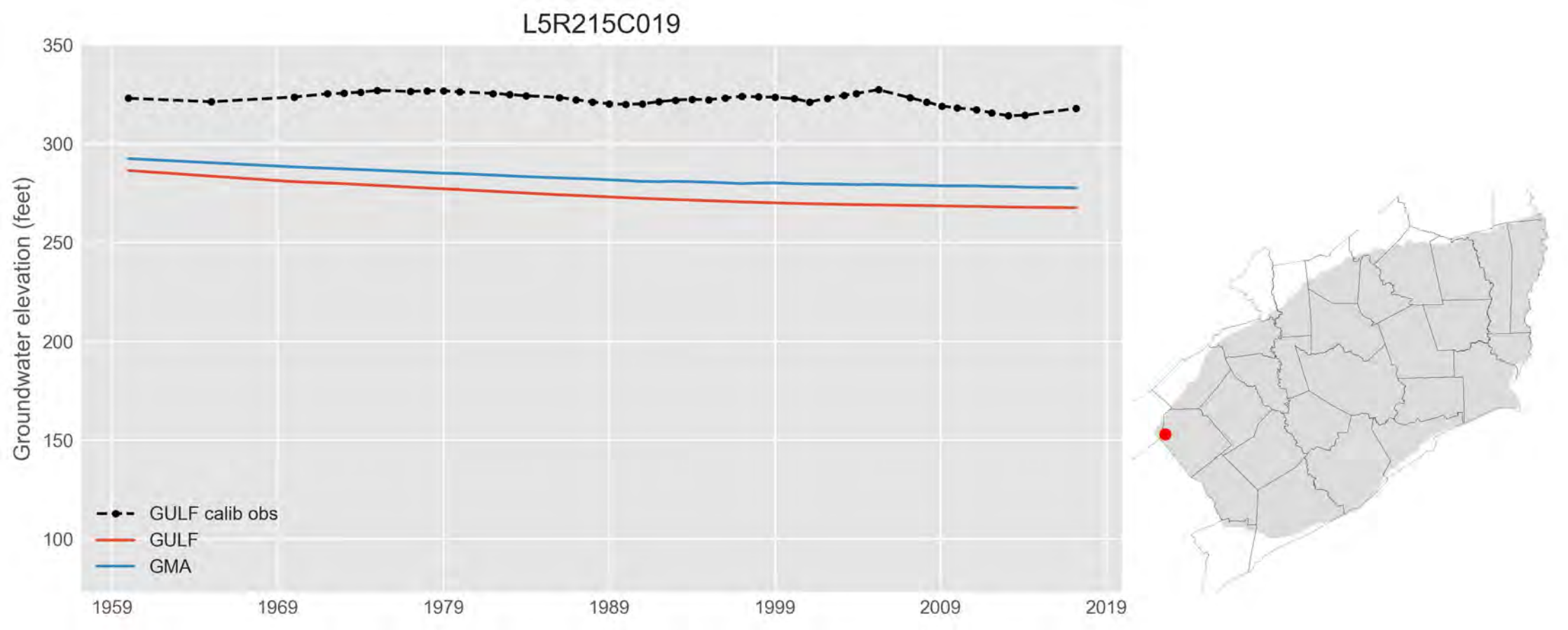

L5R192C042
Groundwater elevation (feet)
300
250
200
150
100
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

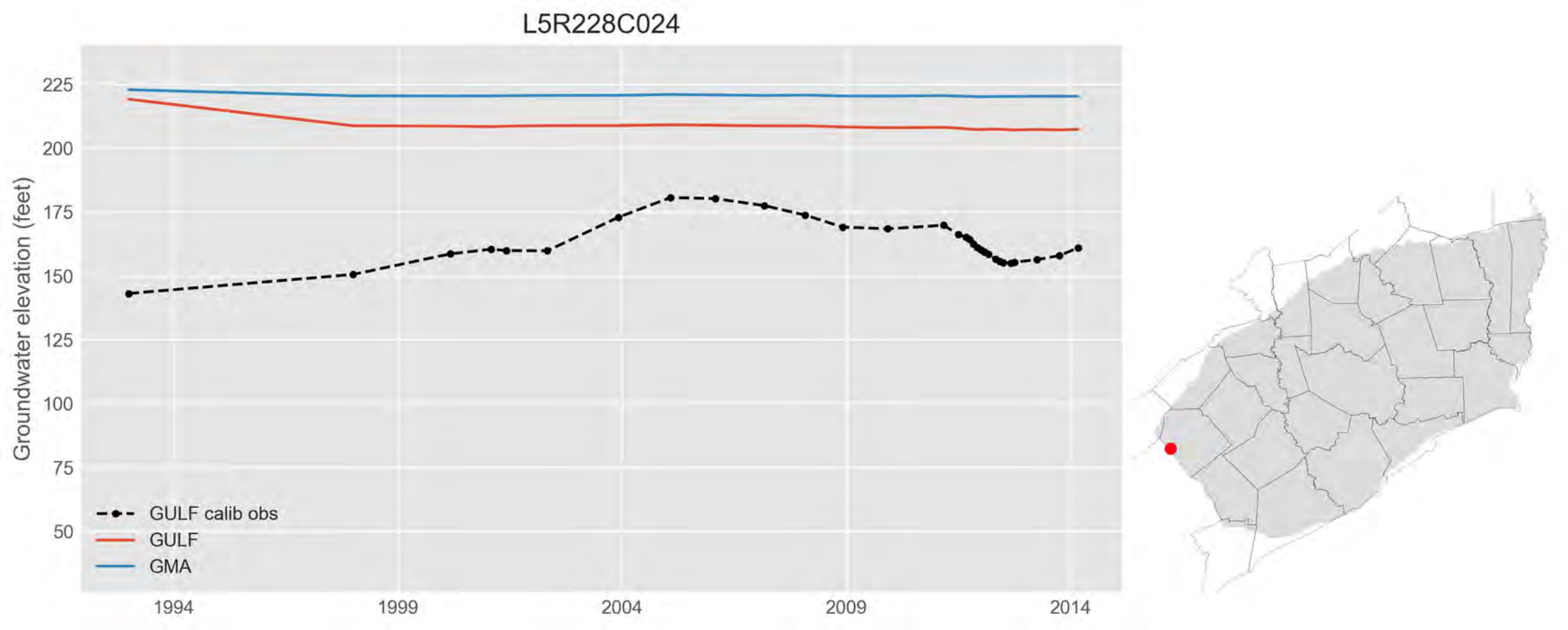

L5R195C044
Groundwater elevation (feet)
250
200
150
100
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

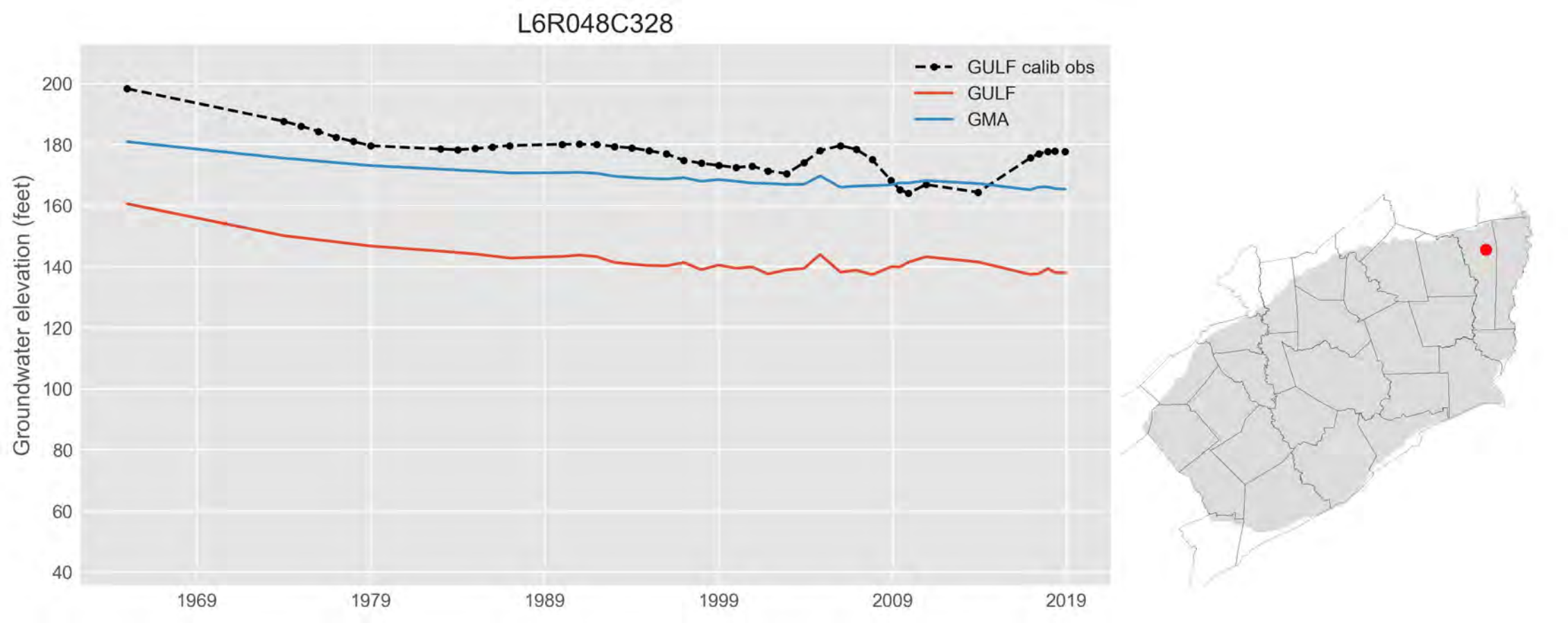

L5R208C037
Groundwater elevation (feet)
250
200
150
100
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

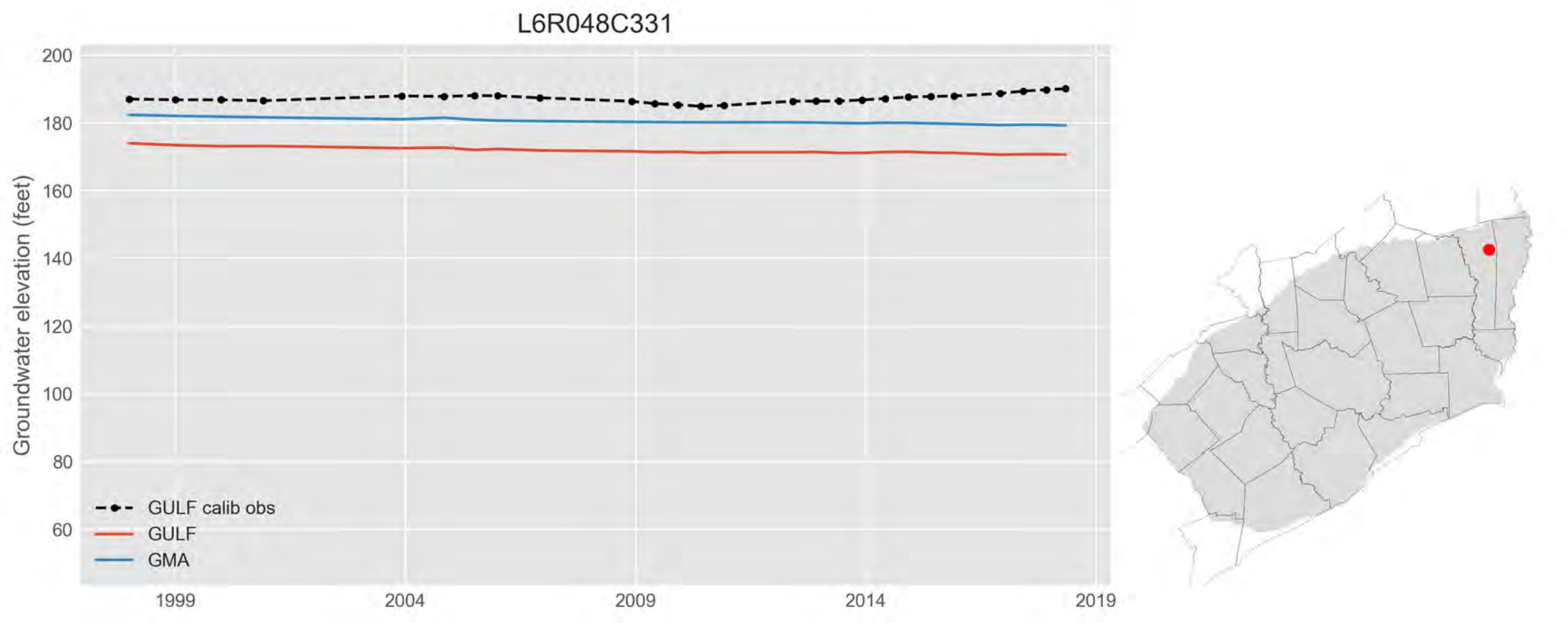

L5R212C032
Groundwater elevation (feet)
250
200
150
100
50
1974
1979
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

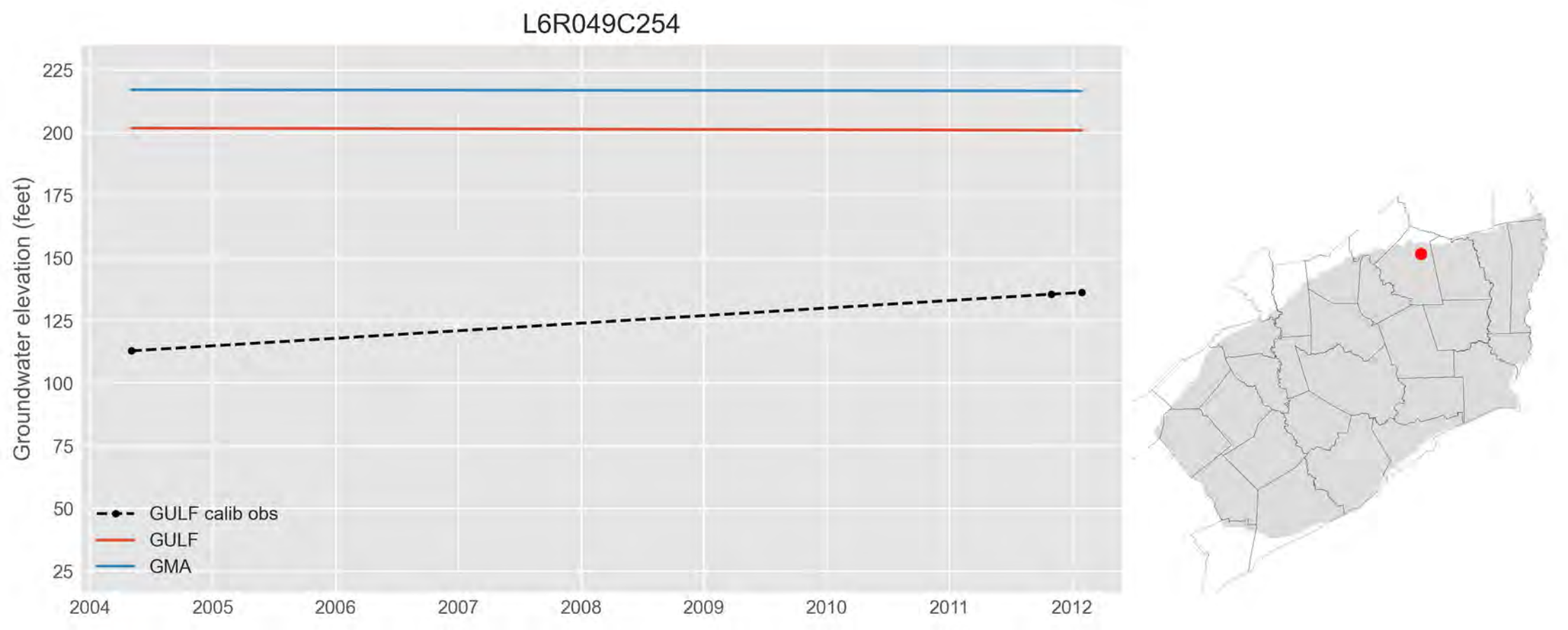

L5R212C044
Groundwater elevation (feet)
200
150
100
50
1964
1969
1974
1979
1984
1989
1994
GULF calib obs
GULF
GMA


L5R215C019
Groundwater elevation (feet)
350
300
250
200
150
100
1959
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

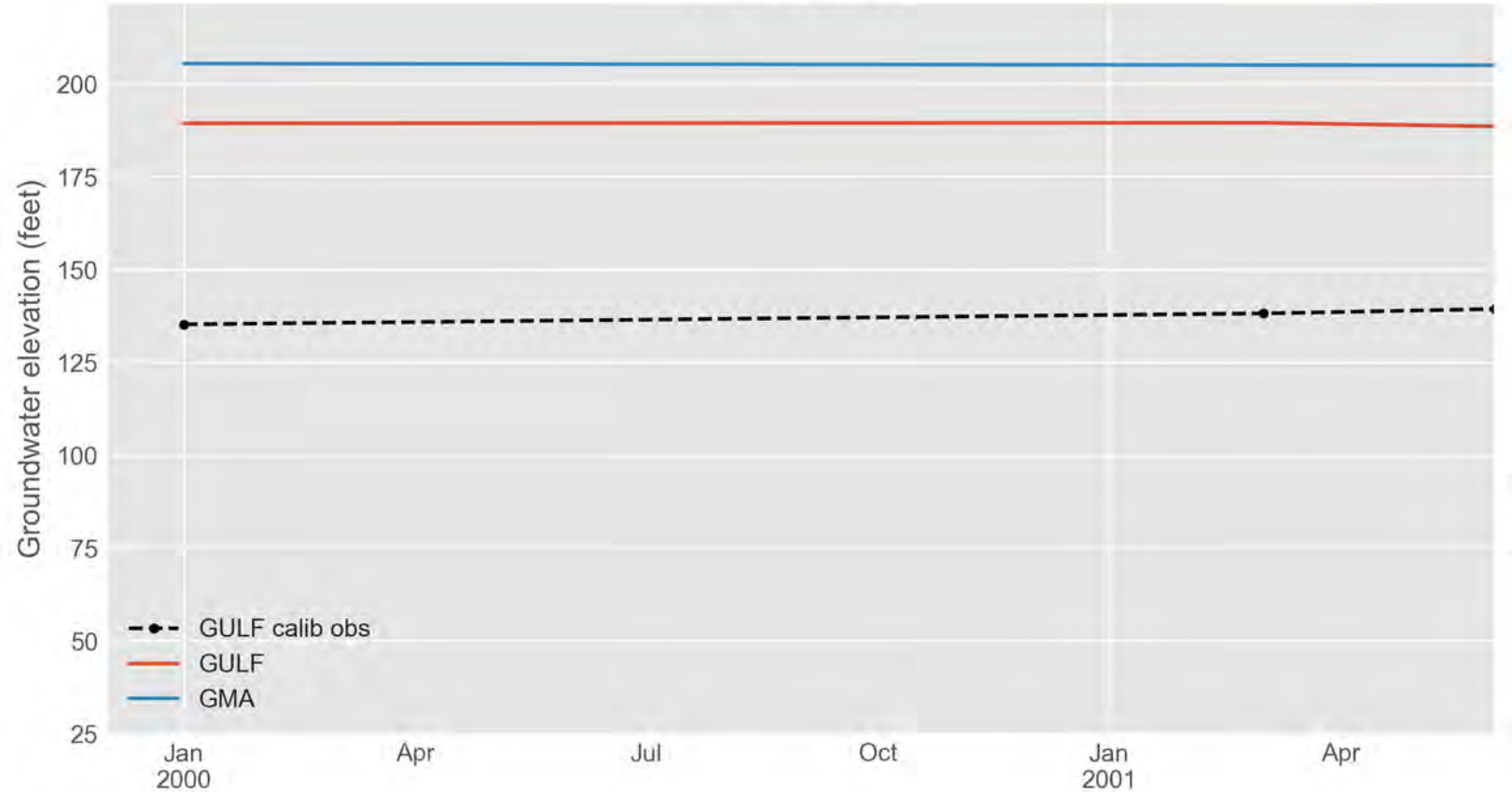

L5R228C024
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
1994
1999
2004
2009
2014
GULF calib obs
GULF
GMA

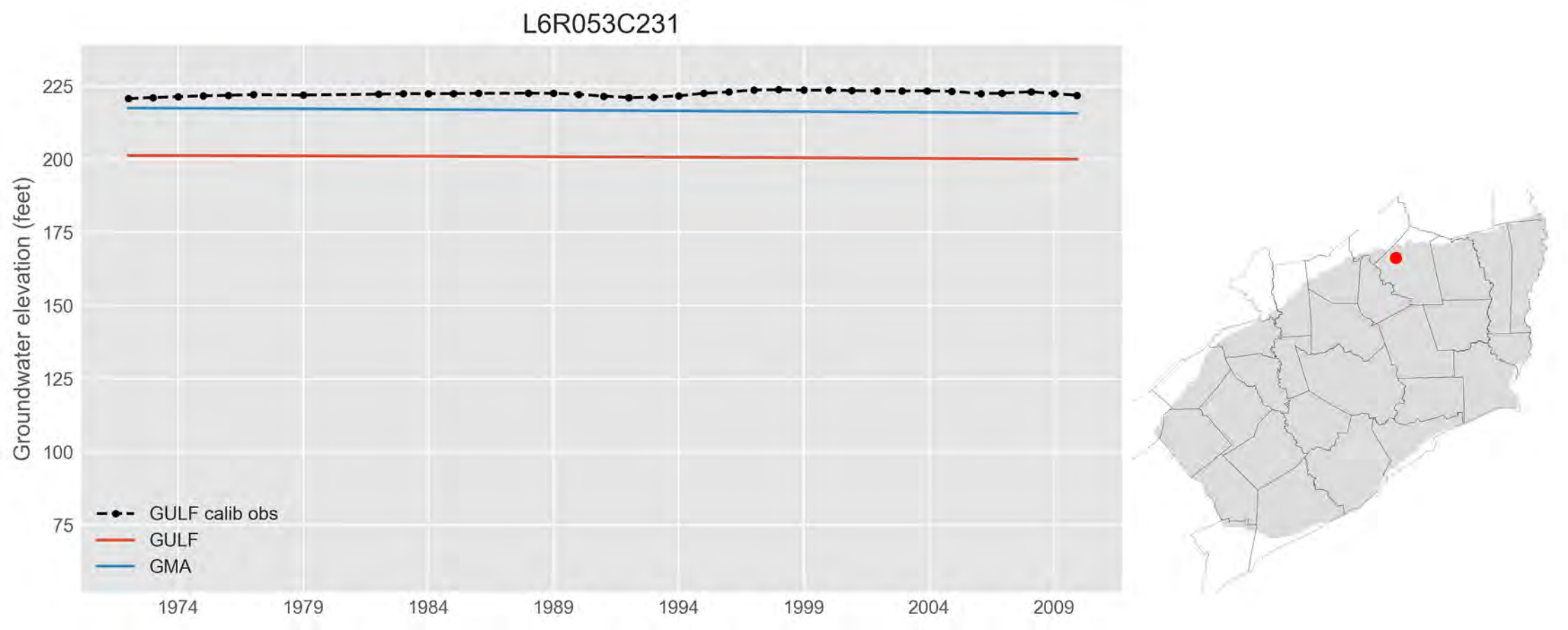

L6R048C328
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1969
1979
1989
1999
2009
2019

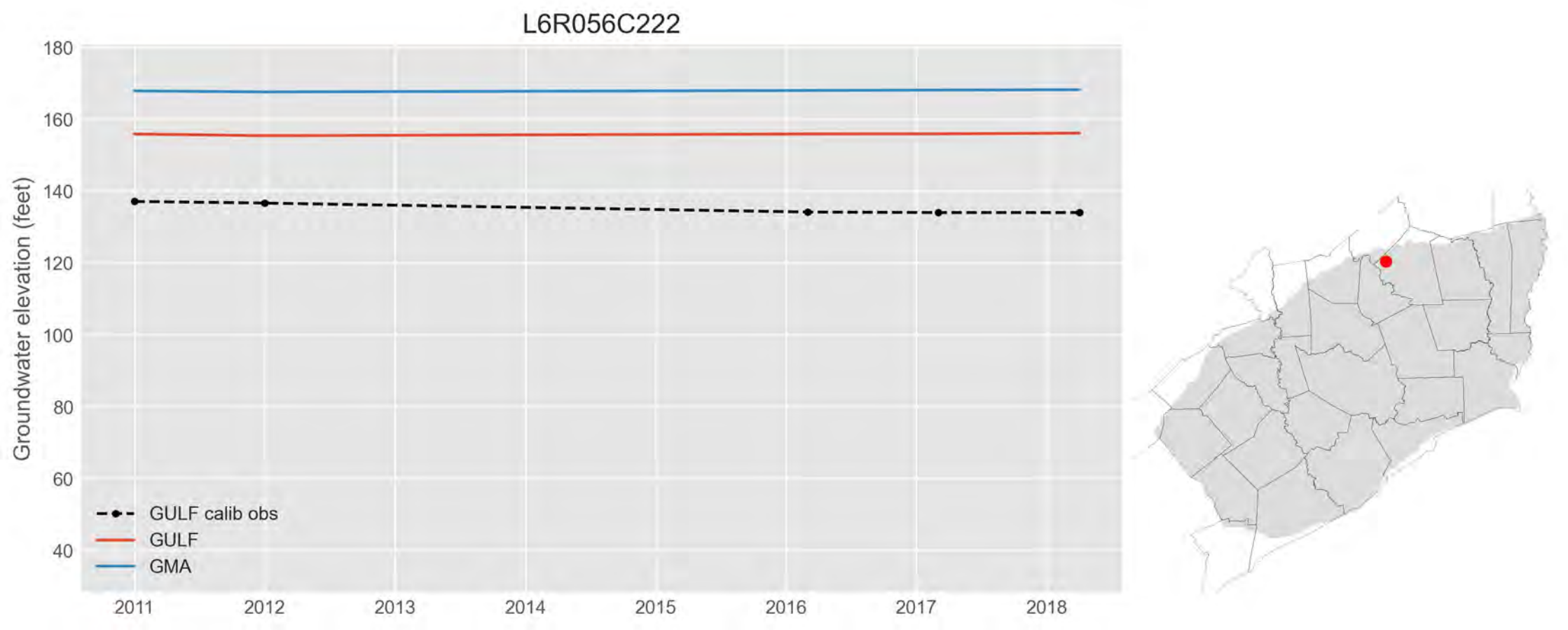

L6R048C331
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

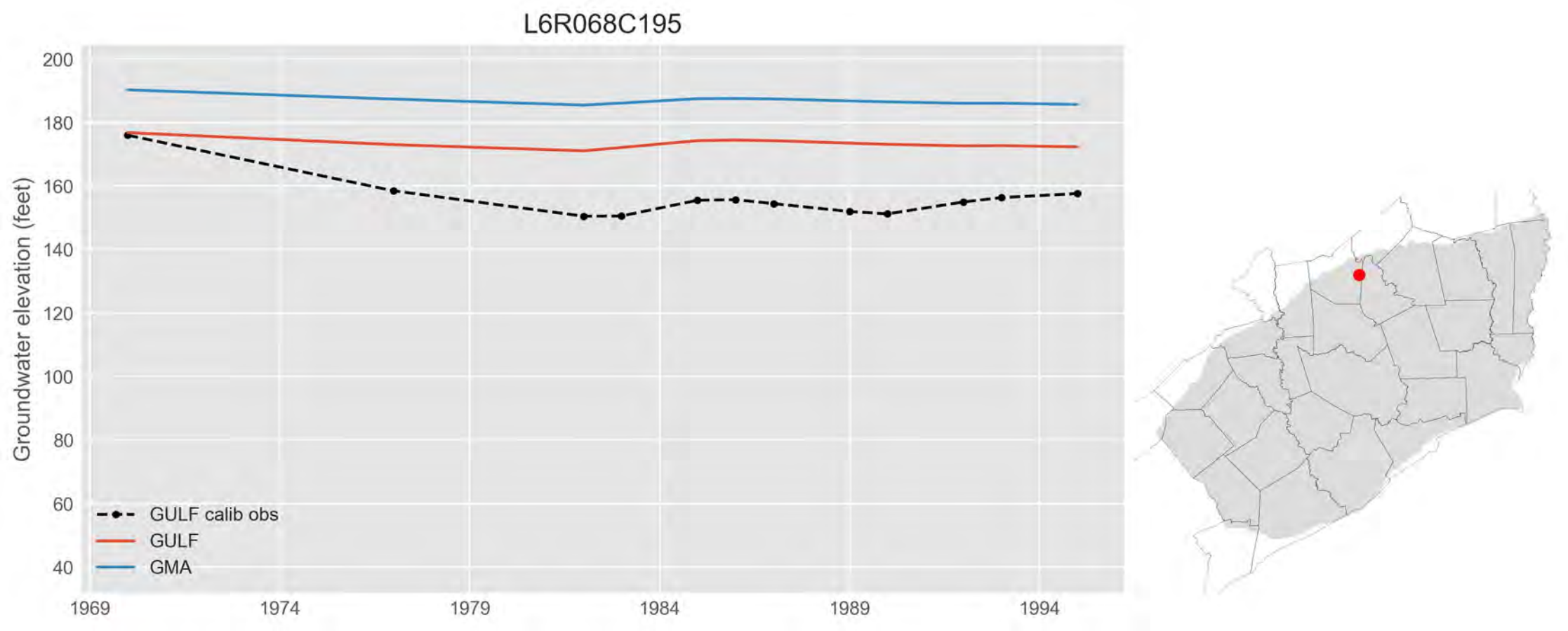

L6R049C254
Groundwater elevation (feet)
225
200
175
150
125
100
75
50
25
2004
2005
2006
2007
2008
2009
2010
2011
2012
GULF calib obs
GULF
GMA

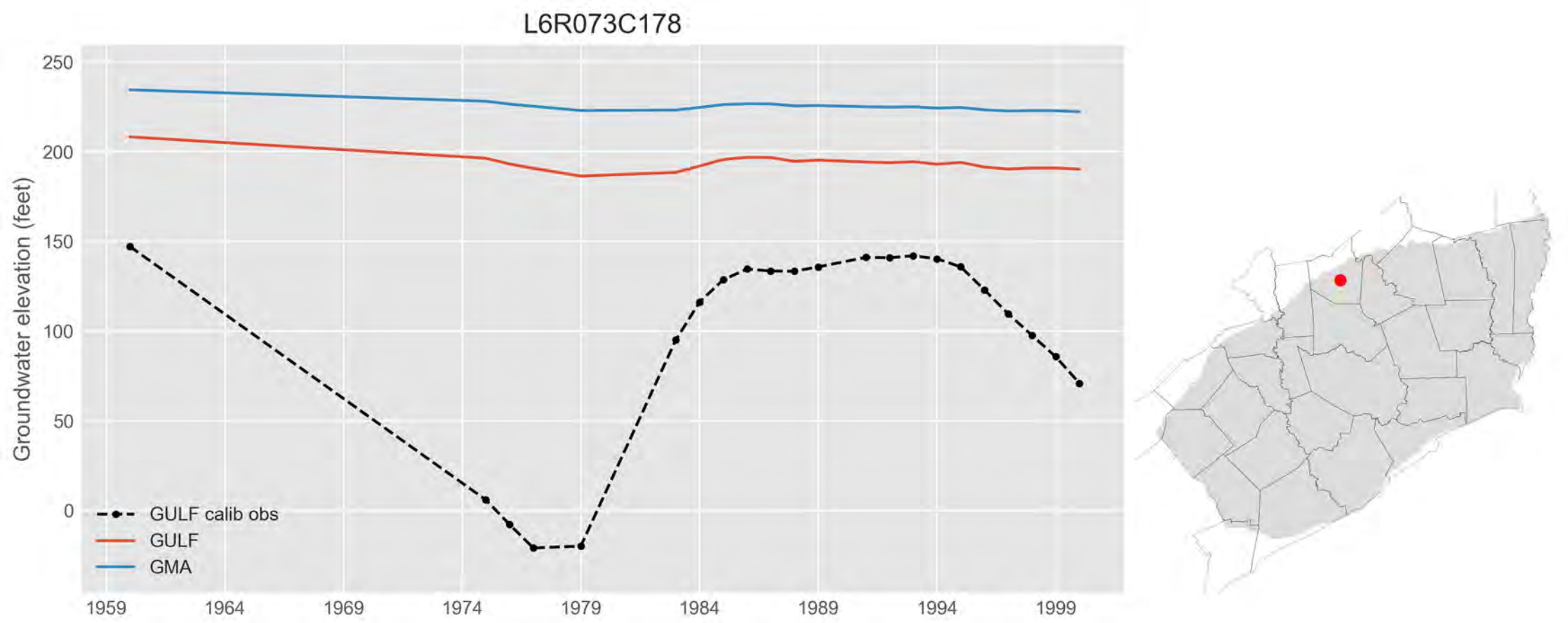
L6R051C259

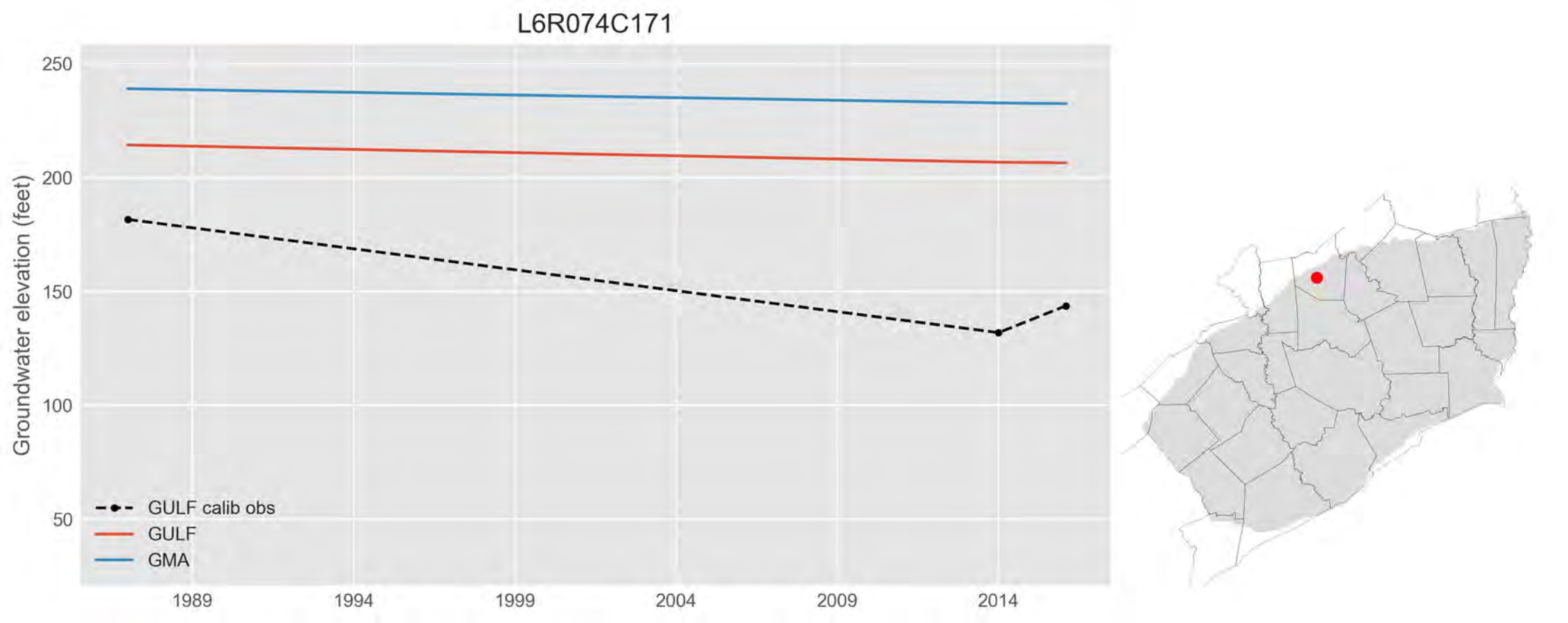

Groundwater elevation (feet)
200
175
150
125
100
75
50
25
Jan
2000
Apr
Jul
Oct
Jan
2001
Apr
GULF calib obs
GULF
GMA

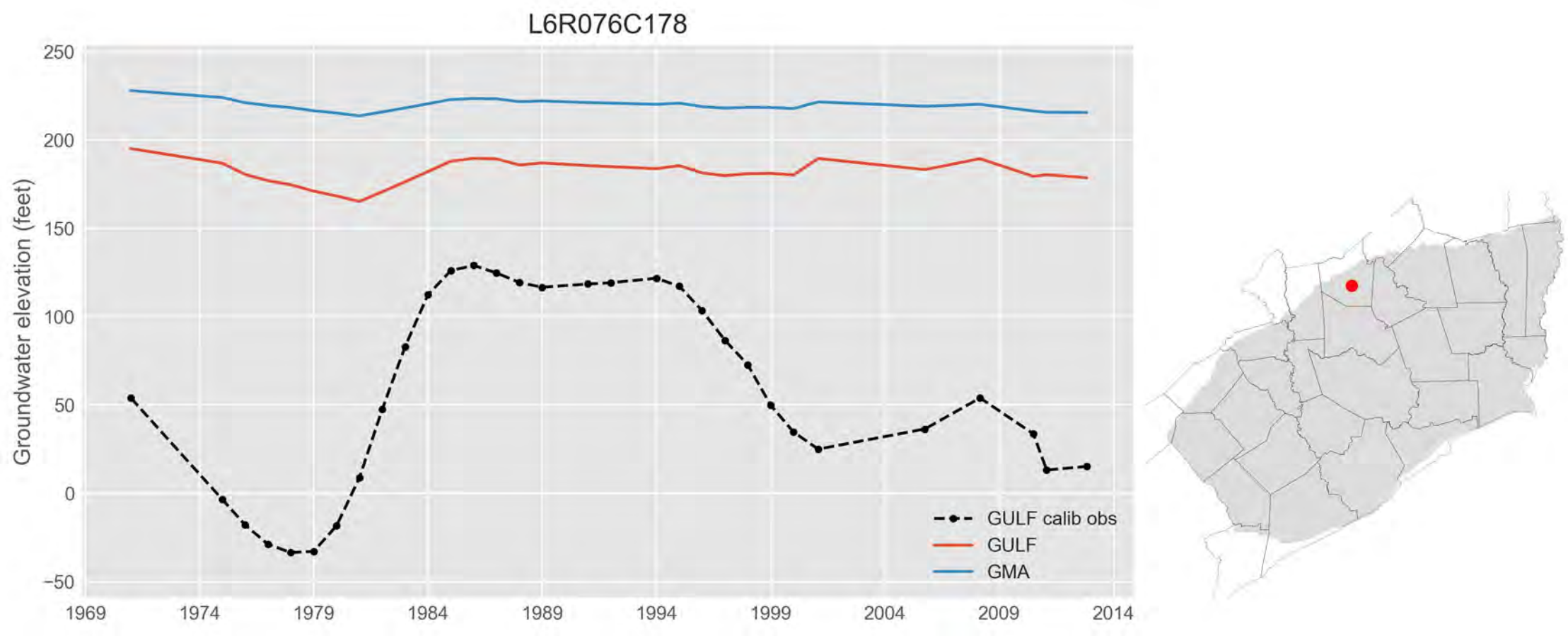

L6R053C231
Groundwater elevation (feet)
225
200
175
150
125
100
75
1974
1979
1984
1989
1994
1999
2004
2009
GULF calib obs
GULF
GMA

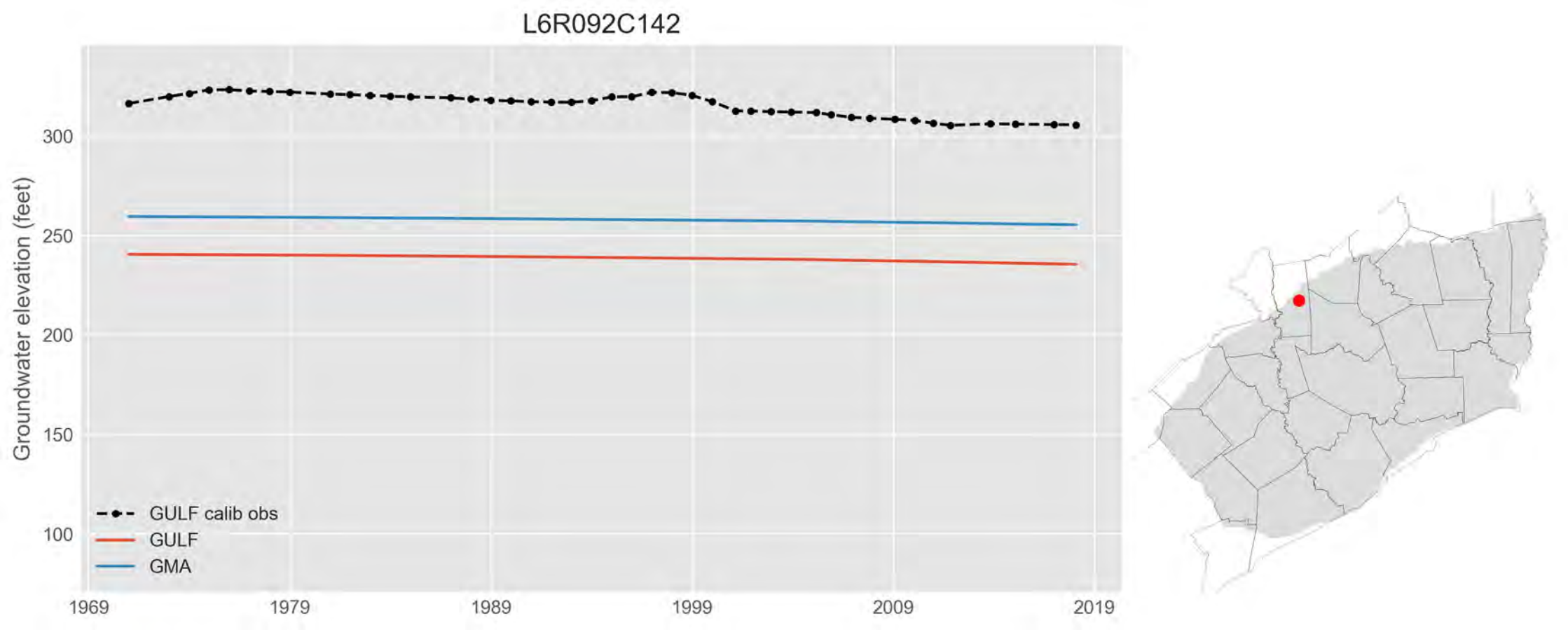

L6R056C222
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

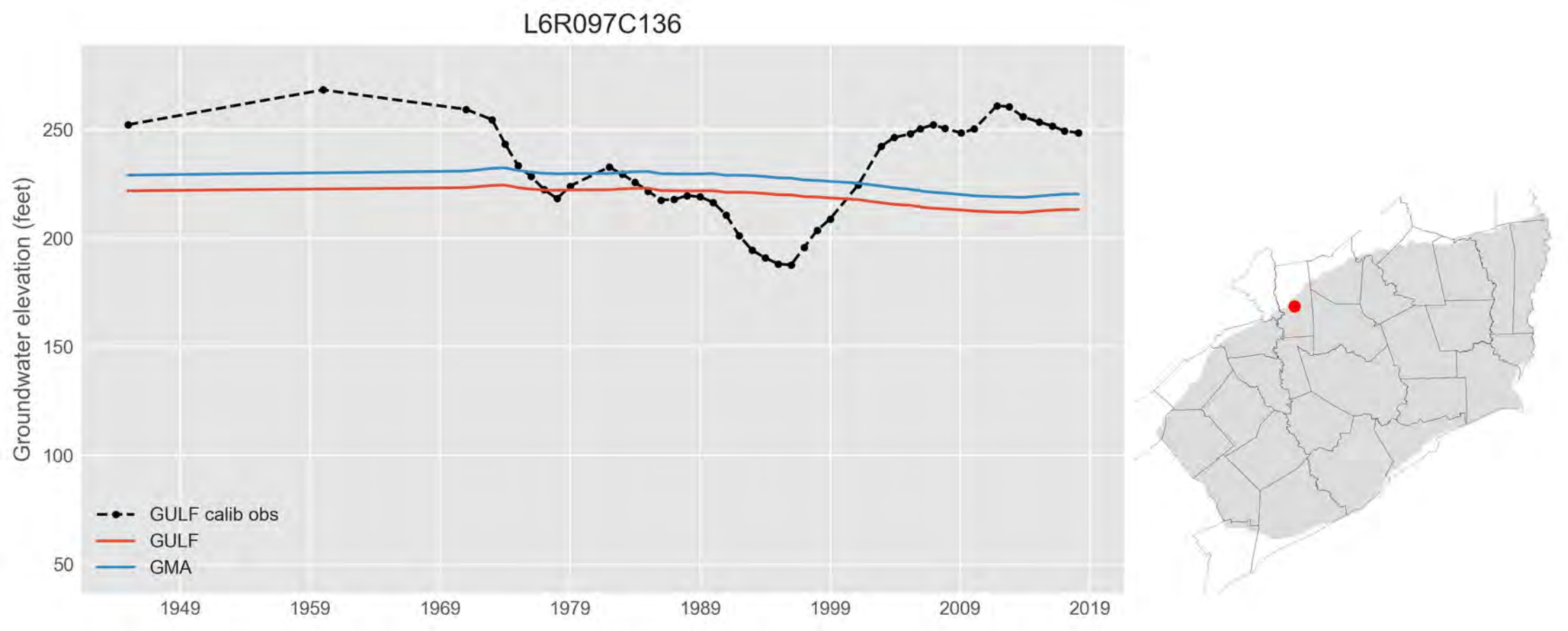

L6R068C195
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
1969
1974
1979
1984
1989
1994
GULF calib obs
GULF
GMA


L6R073C178
Groundwater elevation (feet)
250
200
150
100
50
0
1959
1964
1969
1974
1979
1984
1989
1994
1999
GULF calib obs
GULF
GMA

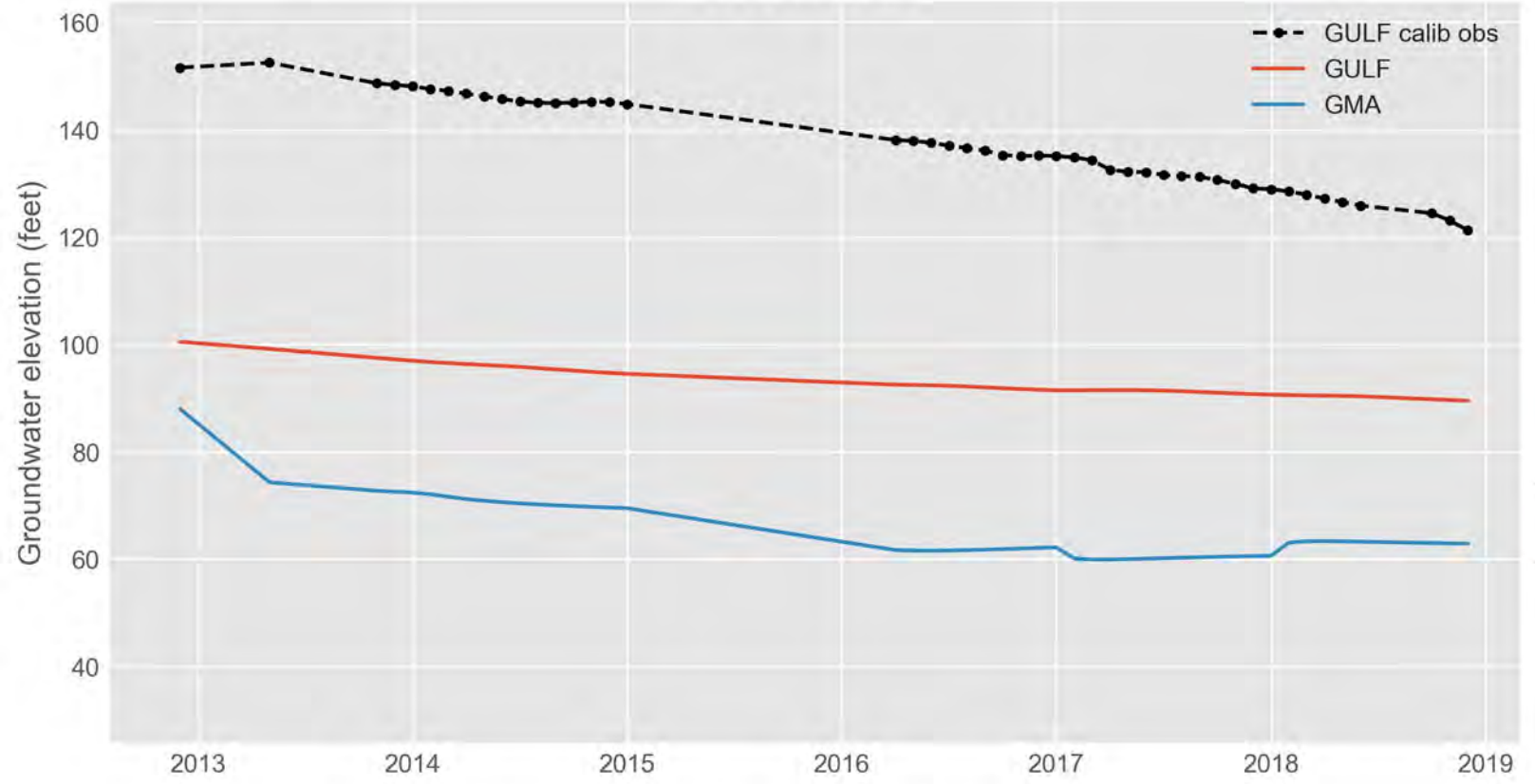

L6R074C171
Groundwater elevation (feet)
250
200
150
100
50
1989
1994
1999
2004
2009
2014
GULF calib obs
GULF
GMA

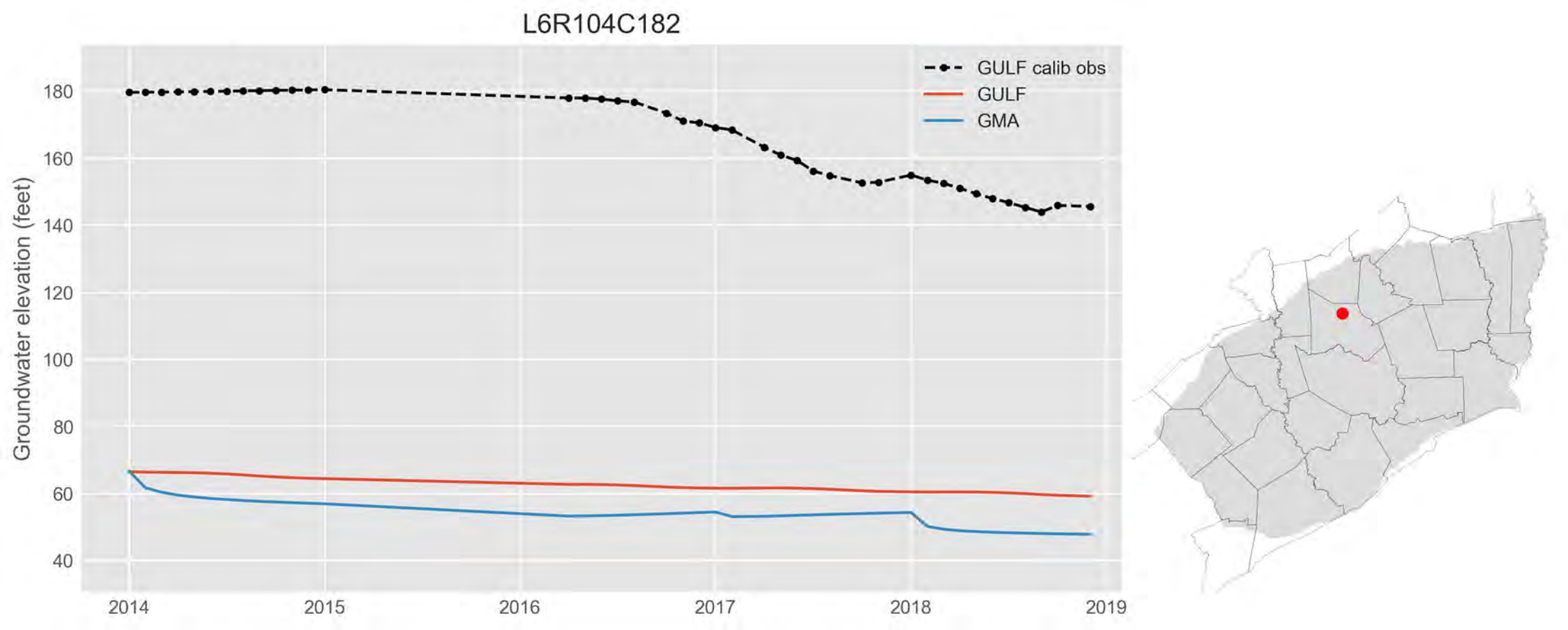

L6R076C178
Groundwater elevation (feet)
250
200
150
100
50
0
−50
1969
1974
1979
1984
1989
1994
1999
2004
2009
2014
GULF calib obs
GULF
GMA

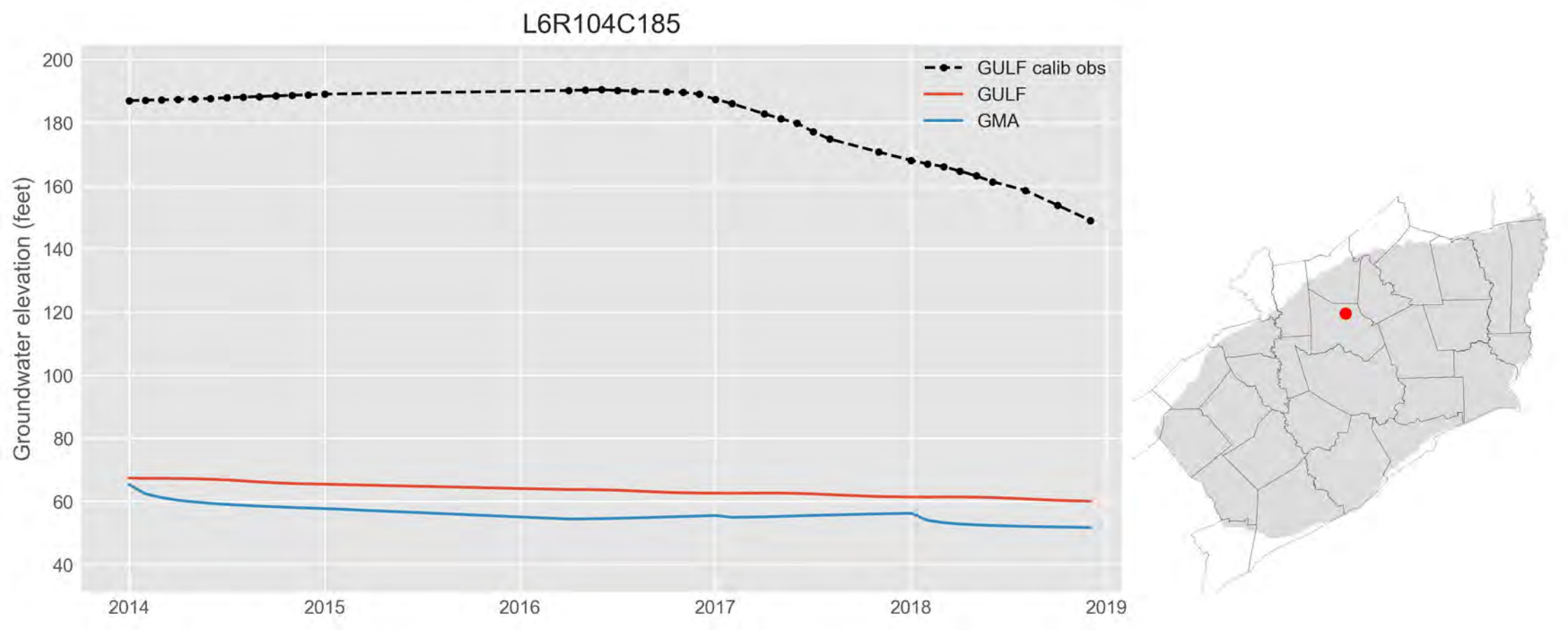

L6R092C142
Groundwater elevation (feet)
300
250
200
150
100
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

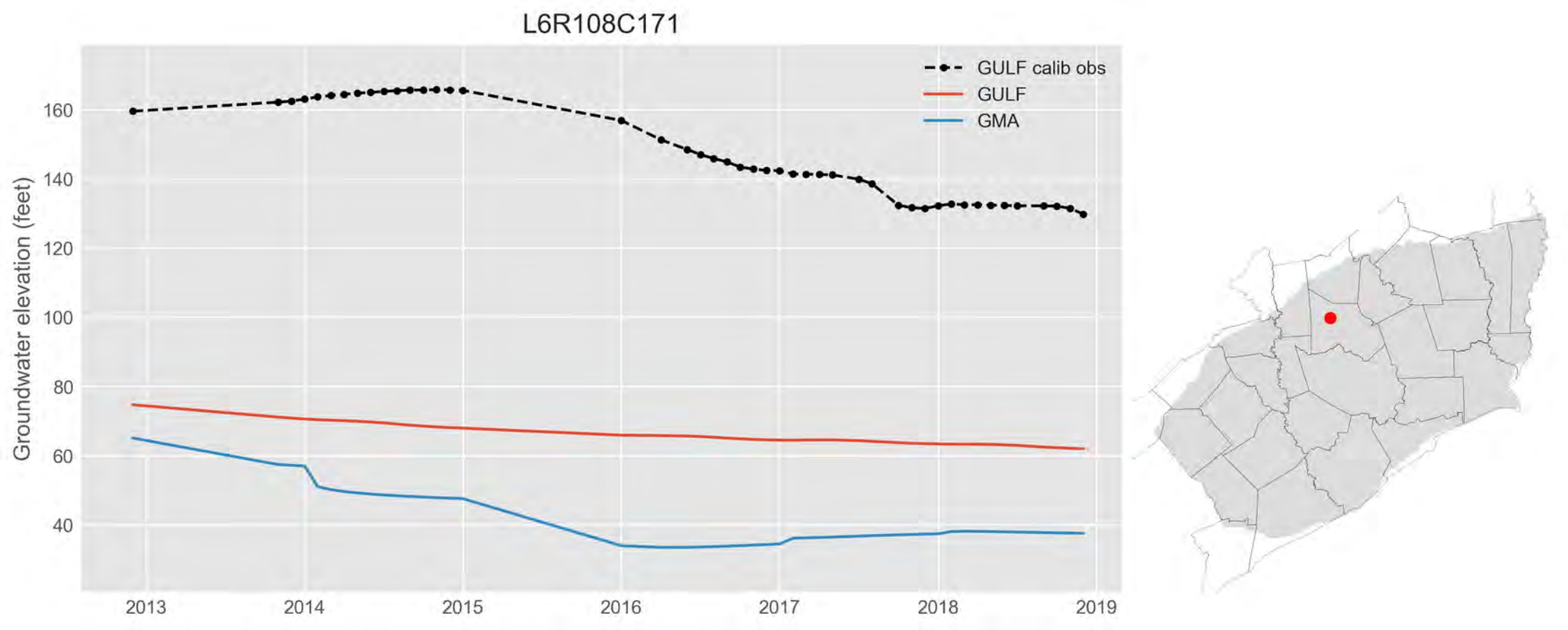

L6R097C136
Groundwater elevation (feet)
250
200
150
100
50
1949
1959
1969
1979
1989
1999
2009
2019
GULF calib obs
GULF
GMA

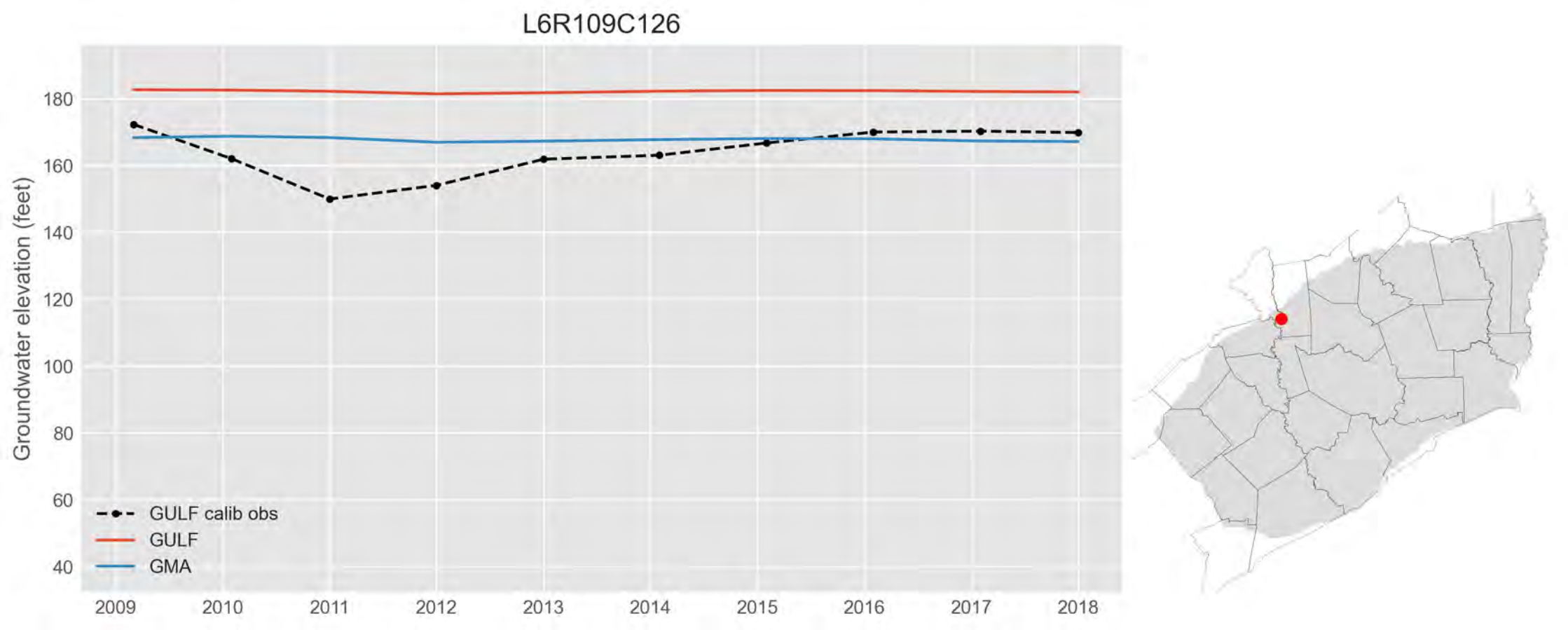
L6R103C169

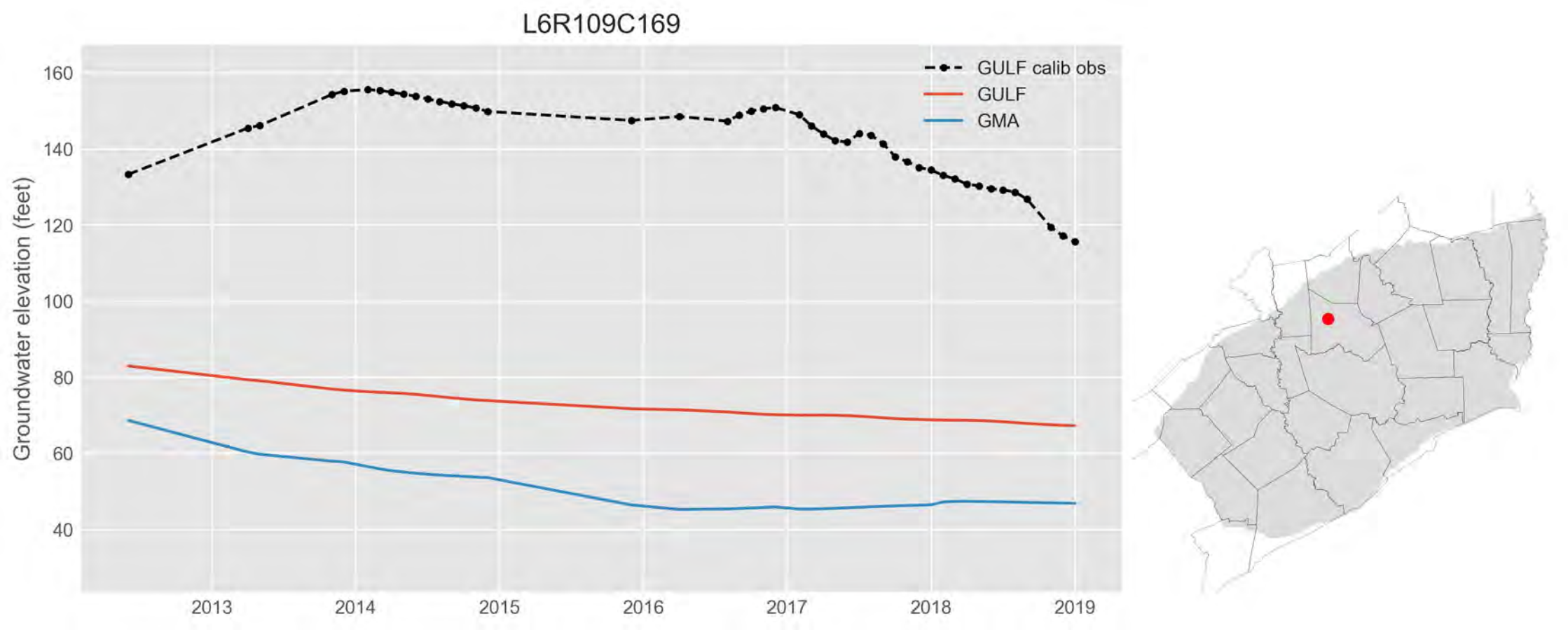

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
2019


L6R104C182
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2014
2015
2016
2017
2018
2019

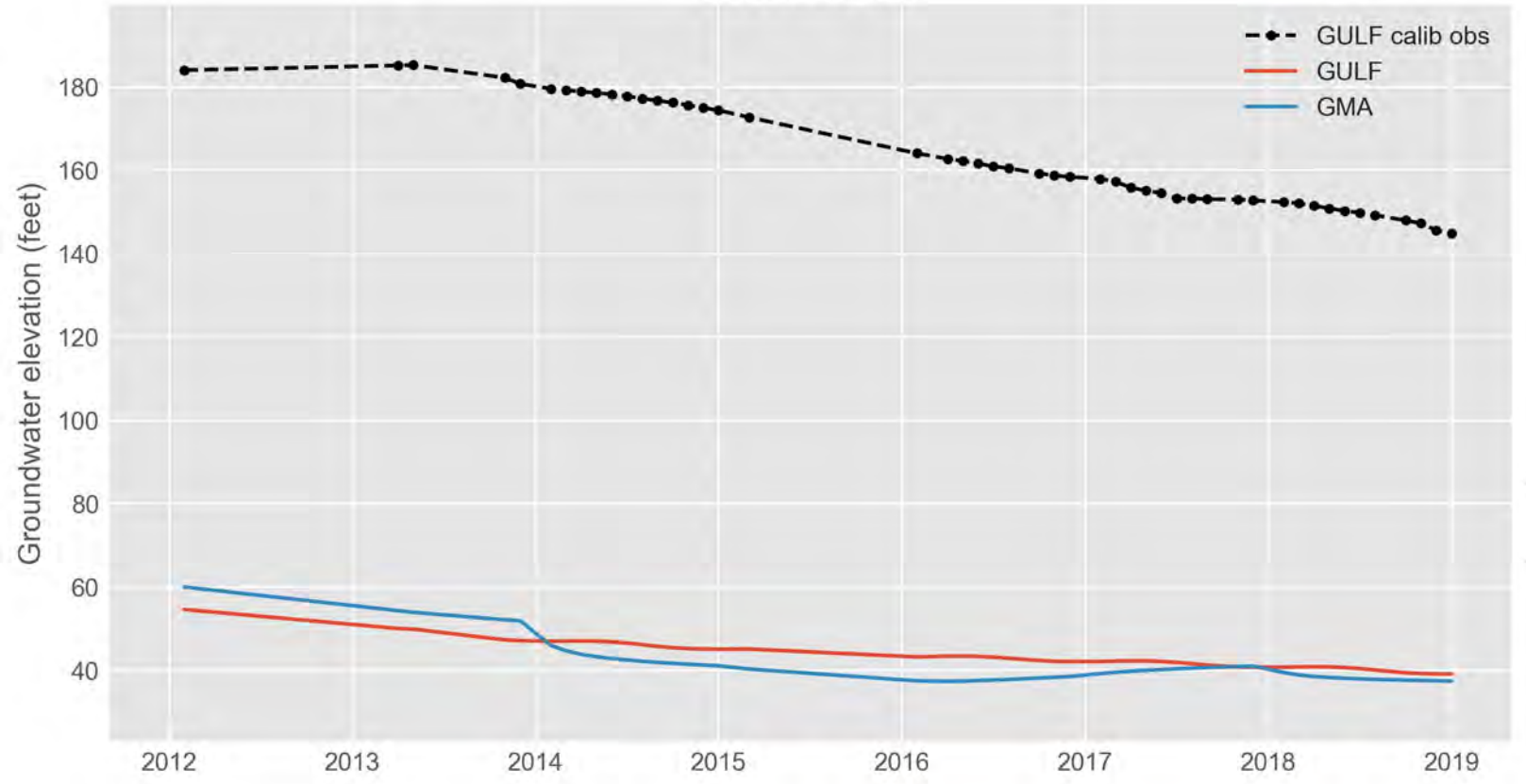

L6R104C185
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
200
180
160
140
120
100
80
60
40
2014
2015
2016
2017
2018
2019

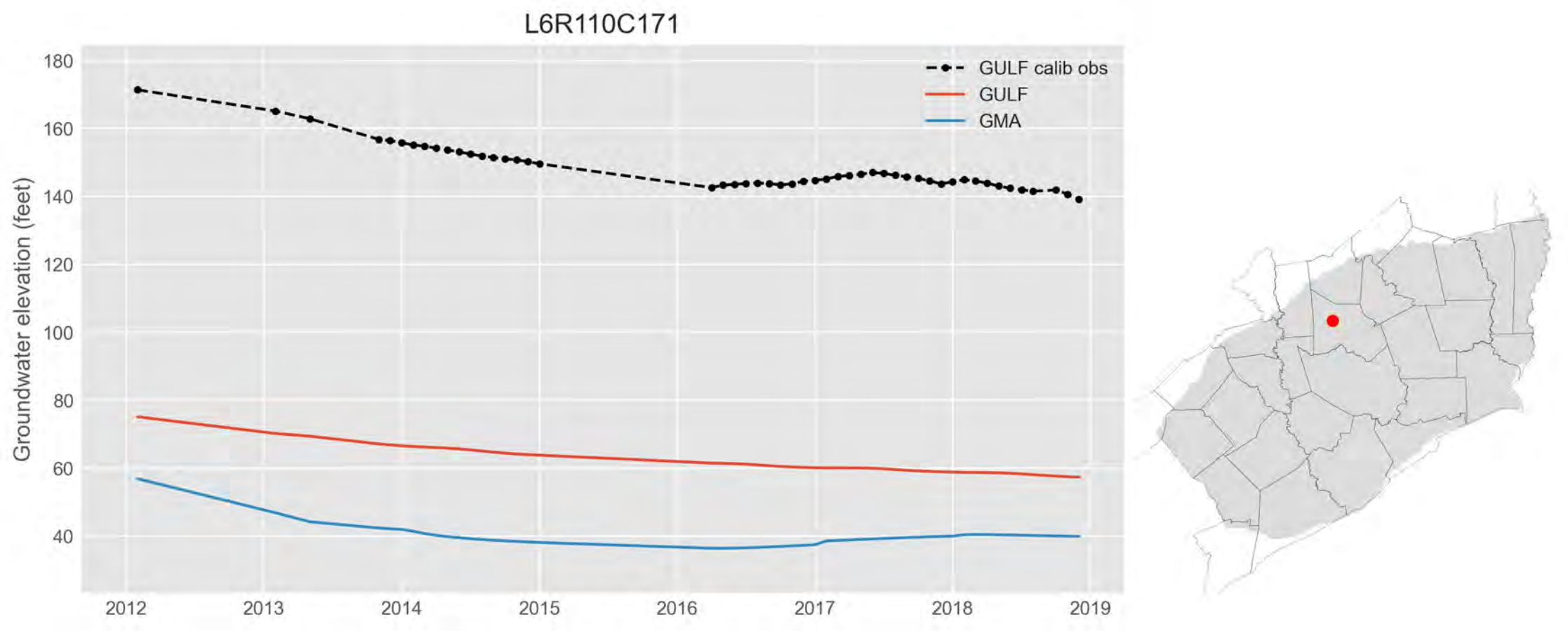

L6R108C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
2019

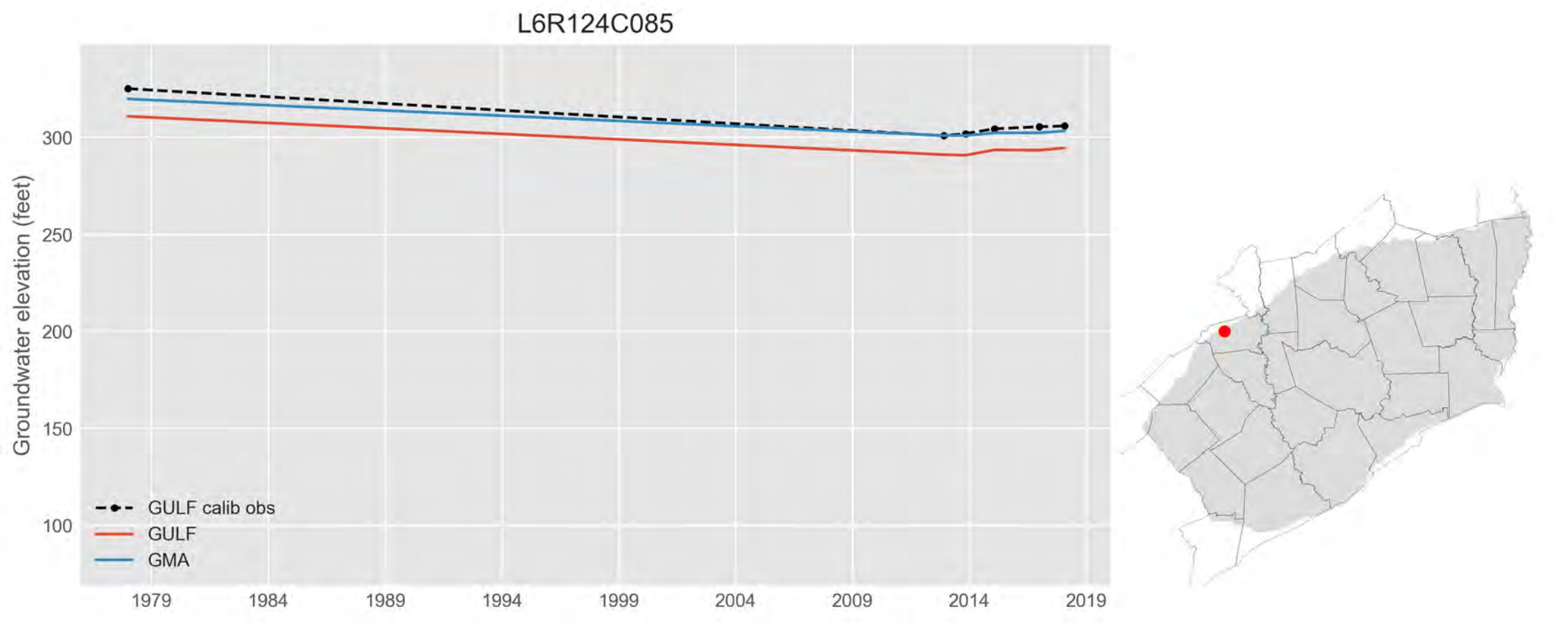

L6R109C126
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA

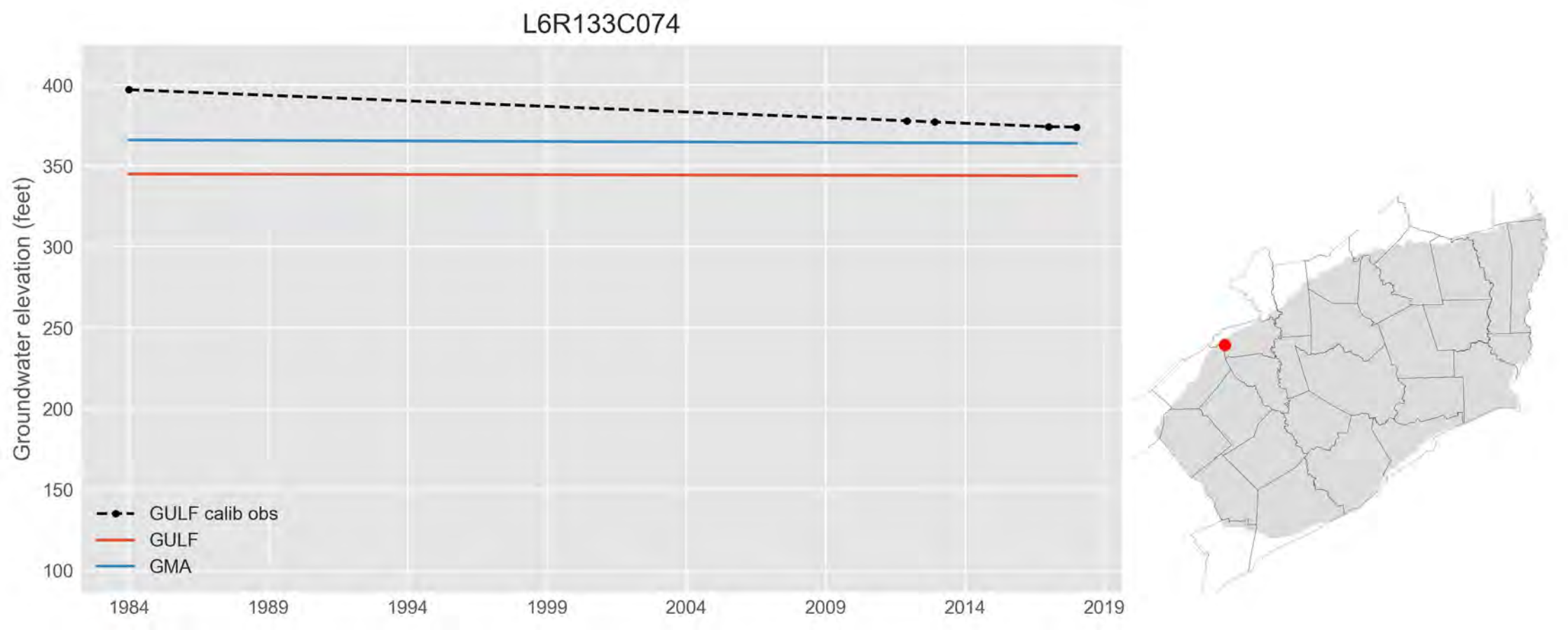

L6R109C169
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
160
140
120
100
80
60
40
2013
2014
2015
2016
2017
2018
2019

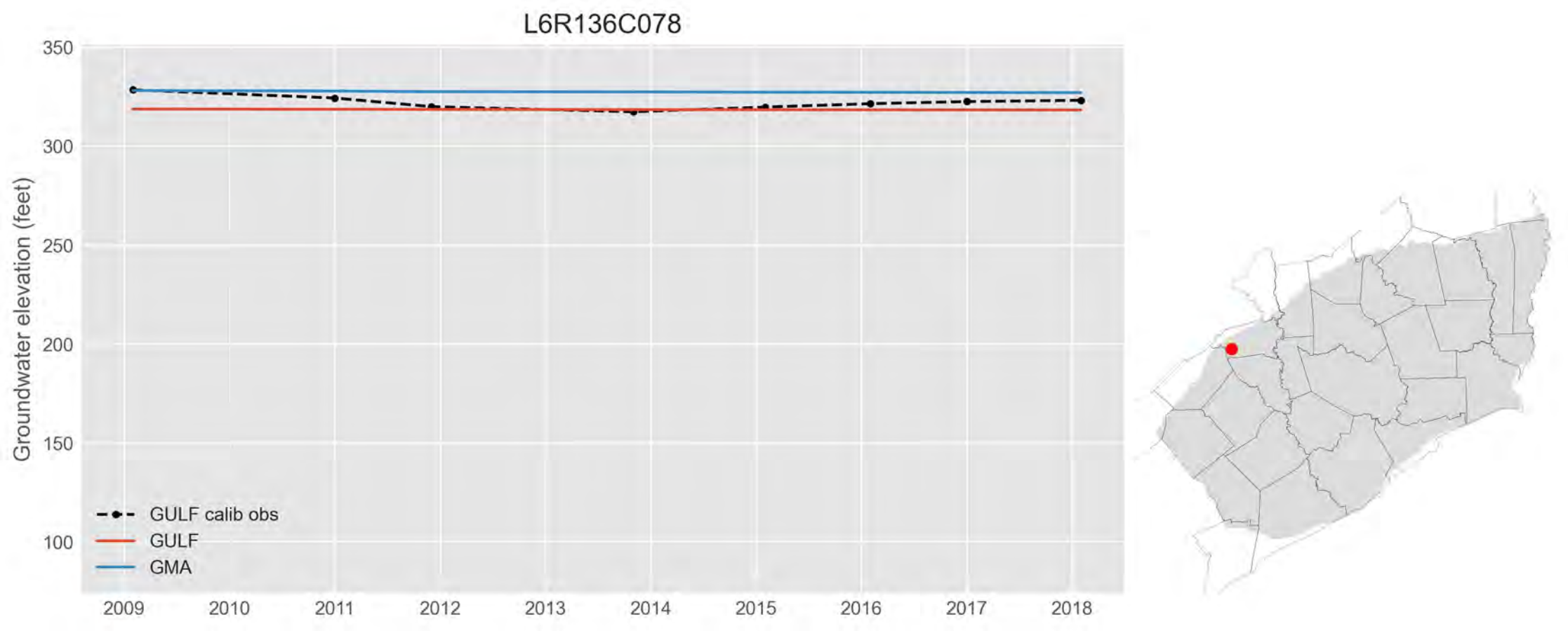
L6R109C183

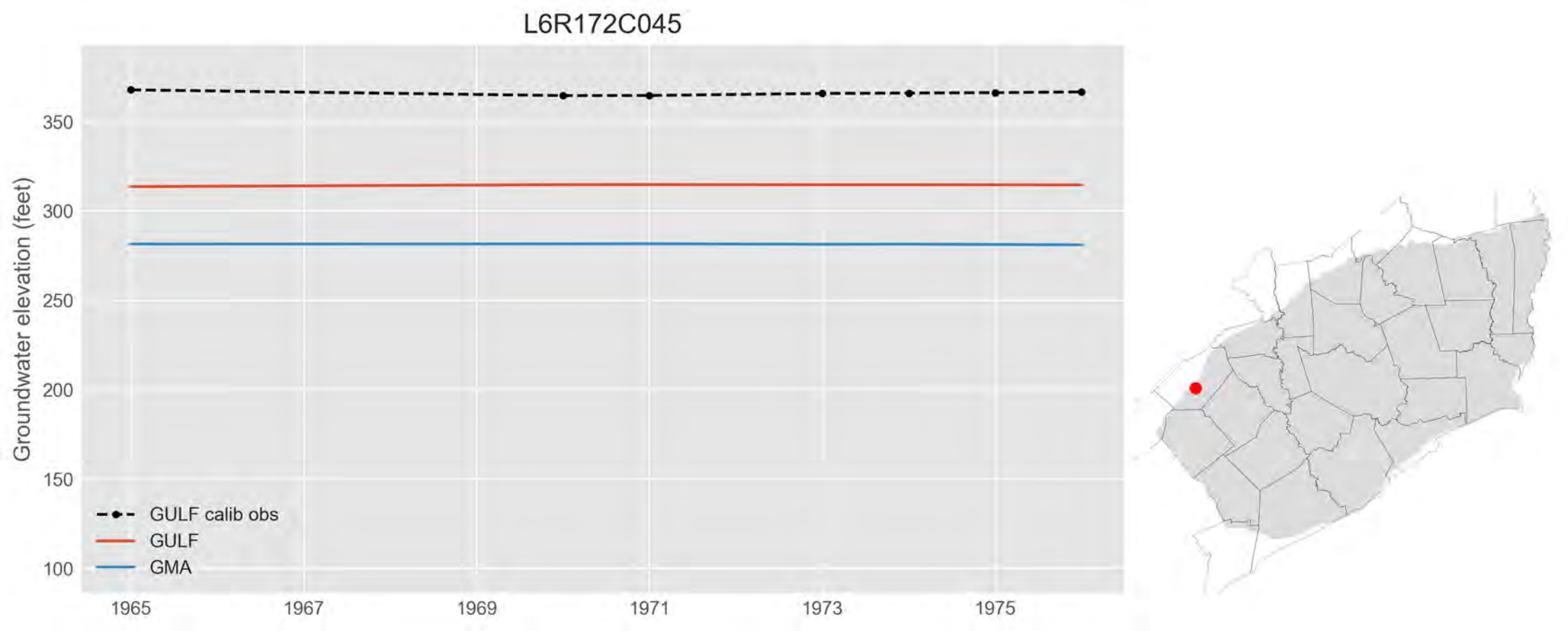

GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2012
2013
2014
2015
2016
2017
2018
2019

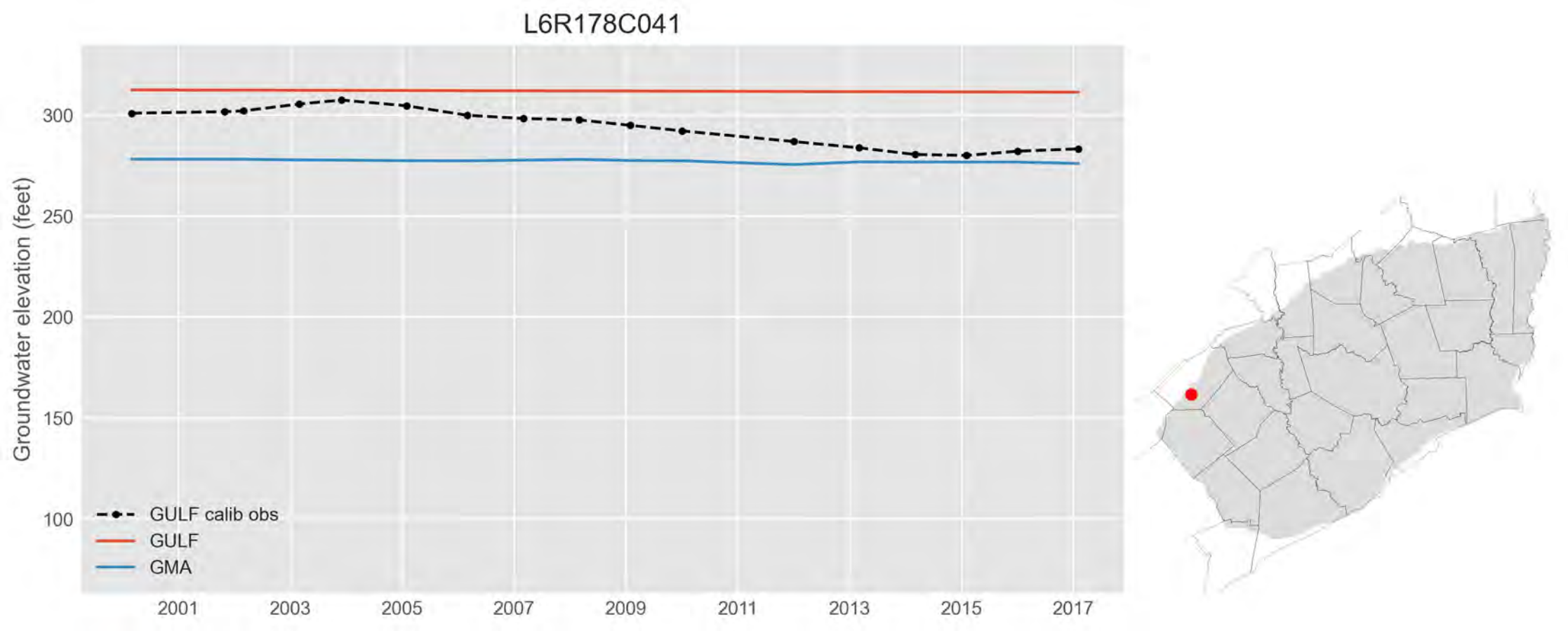

L6R110C171
GULF calib obs
GULF
GMA
Groundwater elevation (feet)
180
160
140
120
100
80
60
40
2012
2013
2014
2015
2016
2017
2018
2019

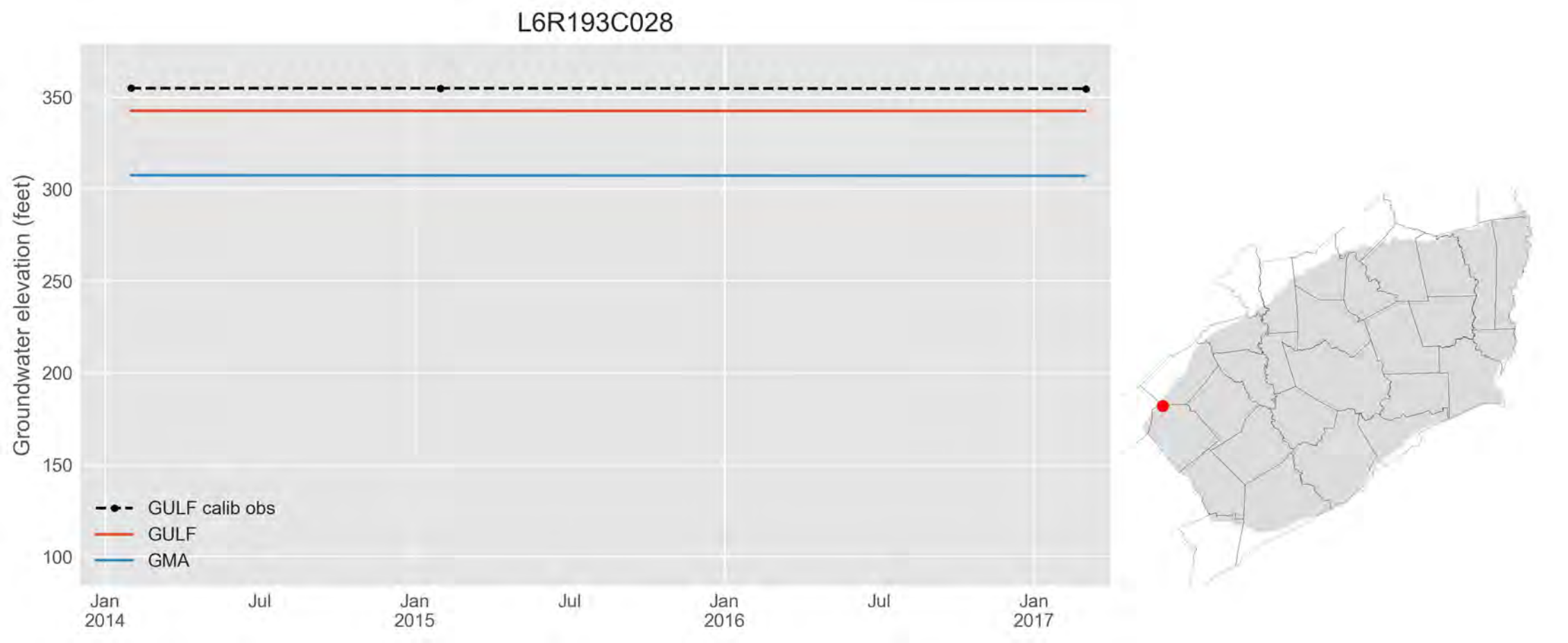

L6R124C085
Groundwater elevation (feet)
300
250
200
150
100
1979
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

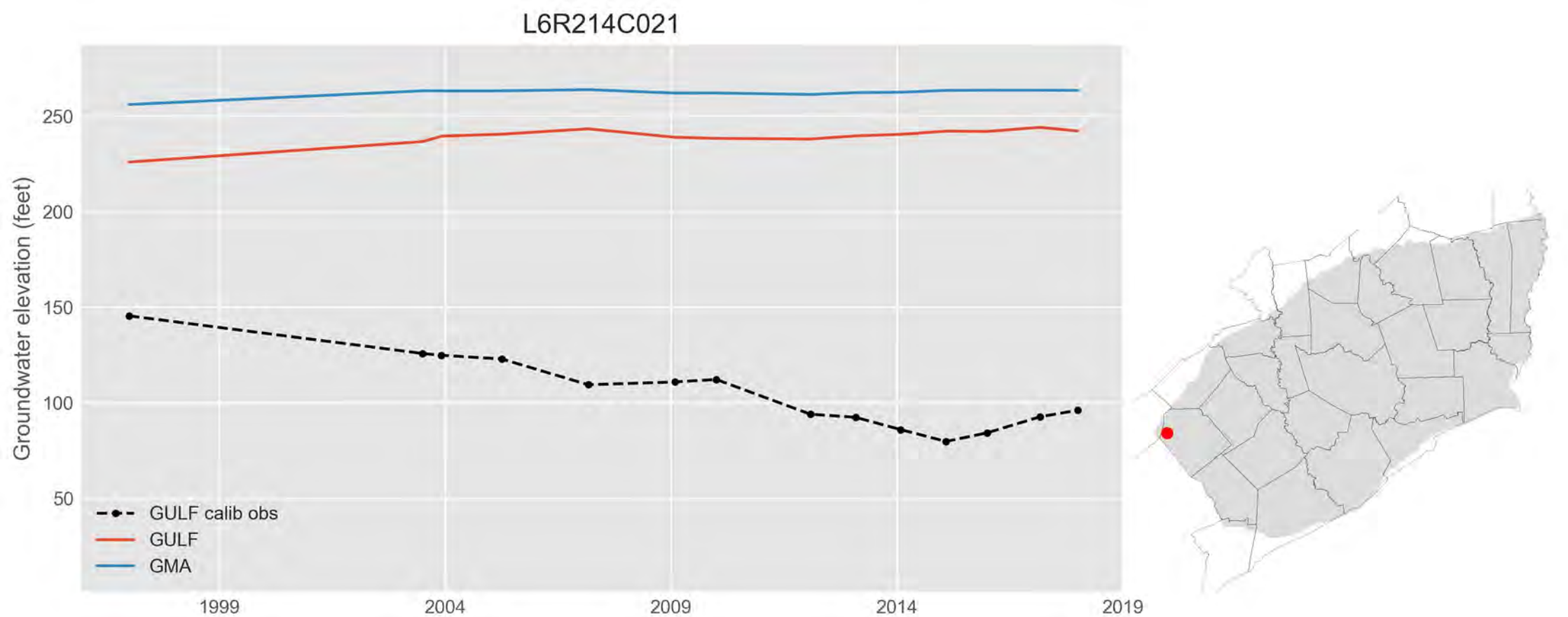

L6R133C074
Groundwater elevation (feet)
400
350
300
250
200
150
100
1984
1989
1994
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA


L6R136C078
Groundwater elevation (feet)
350
300
250
200
150
100
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
GULF calib obs
GULF
GMA


L6R172C045
Groundwater elevation (feet)
350
300
250
200
150
100
1965
1967
1969
1971
1973
1975
GULF calib obs
GULF
GMA

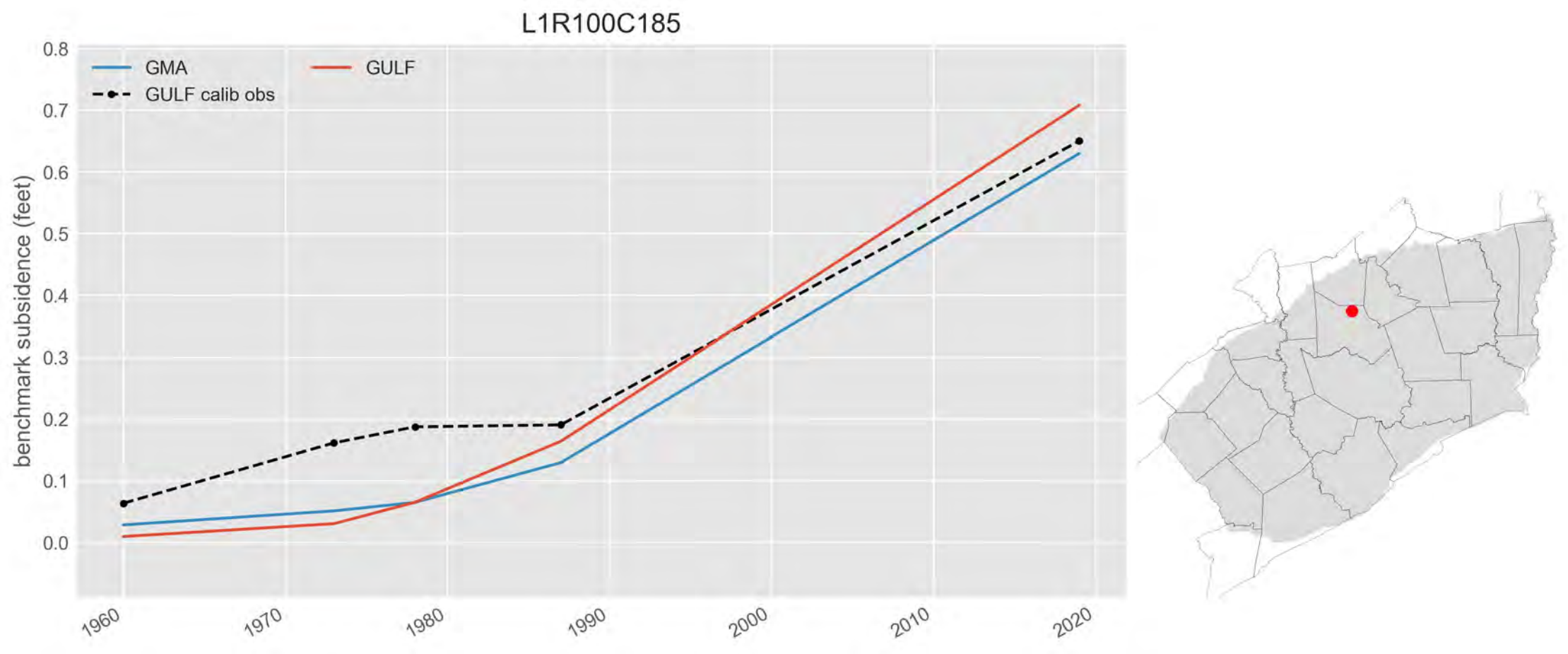

L6R178C041
Groundwater elevation (feet)
300
250
200
150
100
2001
2003
2005
2007
2009
2011
2013
2015
2017
GULF calib obs
GULF
GMA

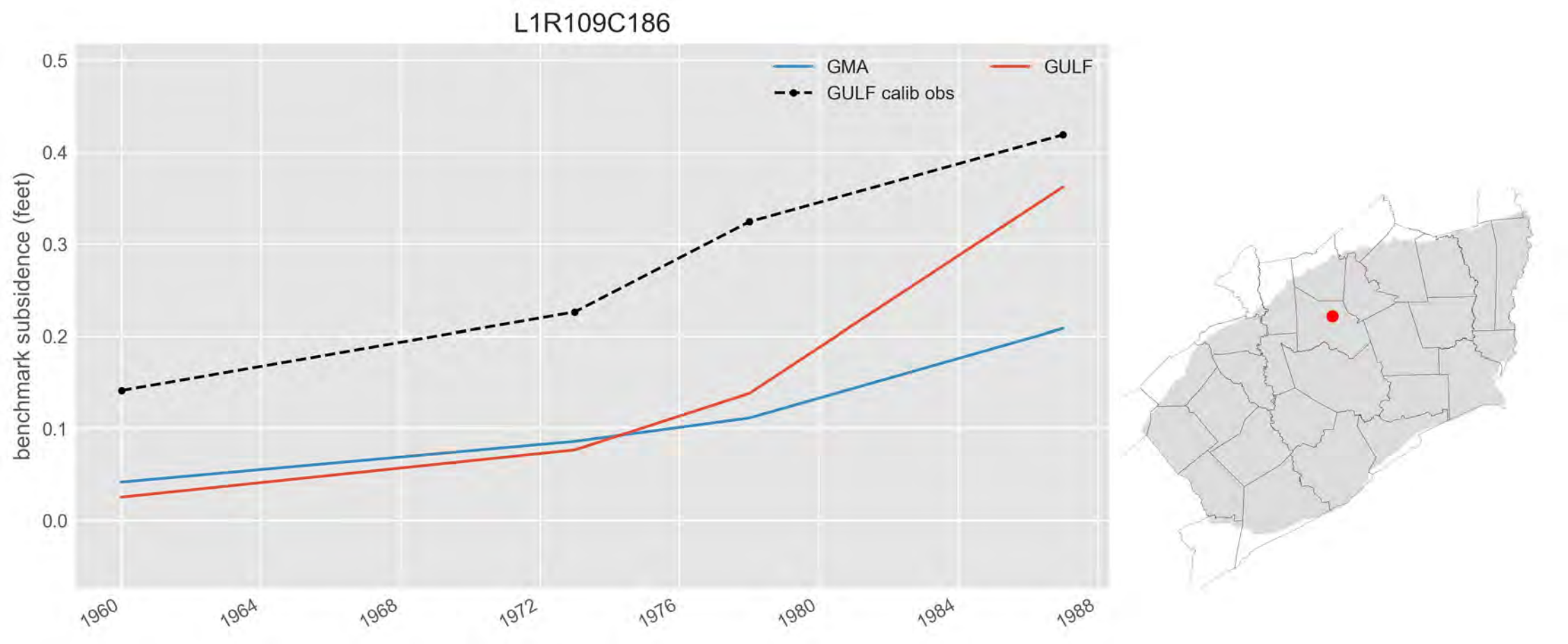

L6R193C028
Groundwater elevation (feet)
350
300
250
200
150
100
GULF calib obs
GULF
GMA
Jan
2014
Jul
Jan
2015
Jul
Jan
2016
Jul
Jan
2017

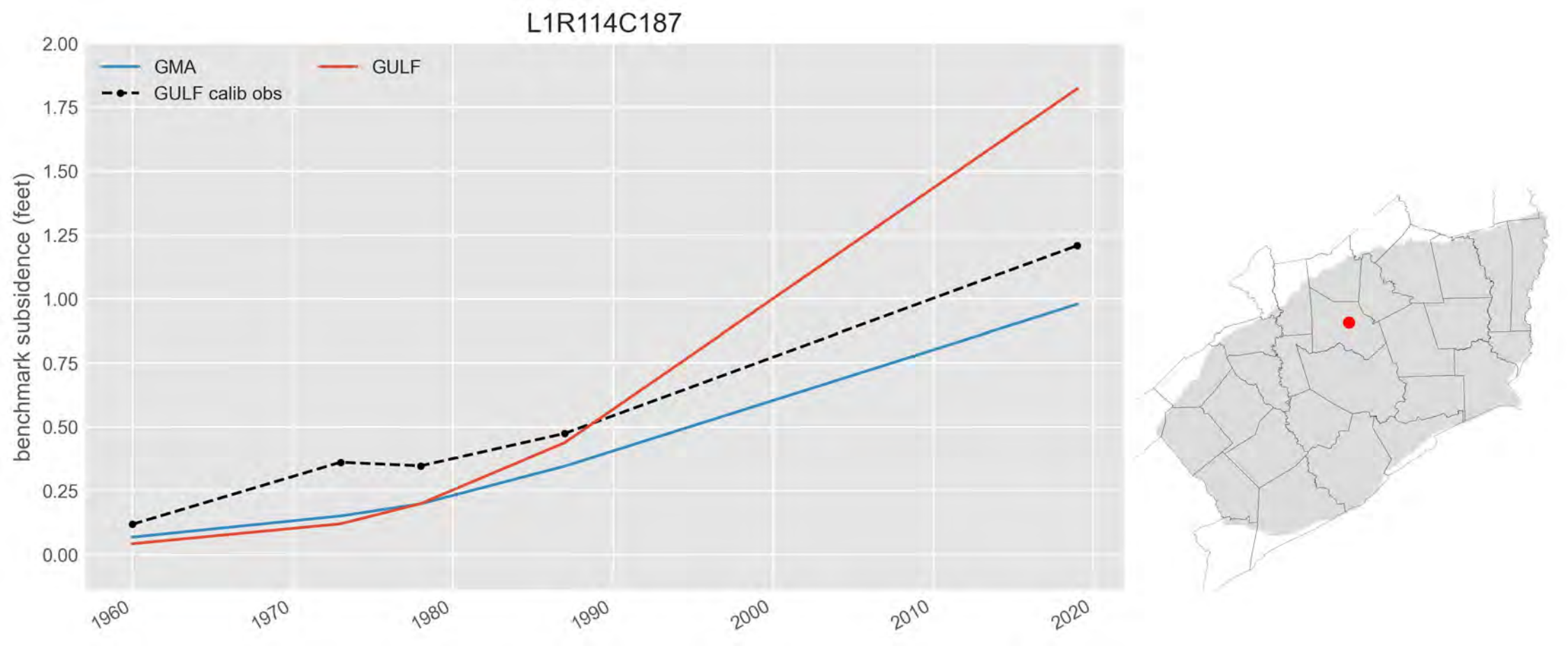

L6R214C021
Groundwater elevation (feet)
250
200
150
100
50
1999
2004
2009
2014
2019
GULF calib obs
GULF
GMA

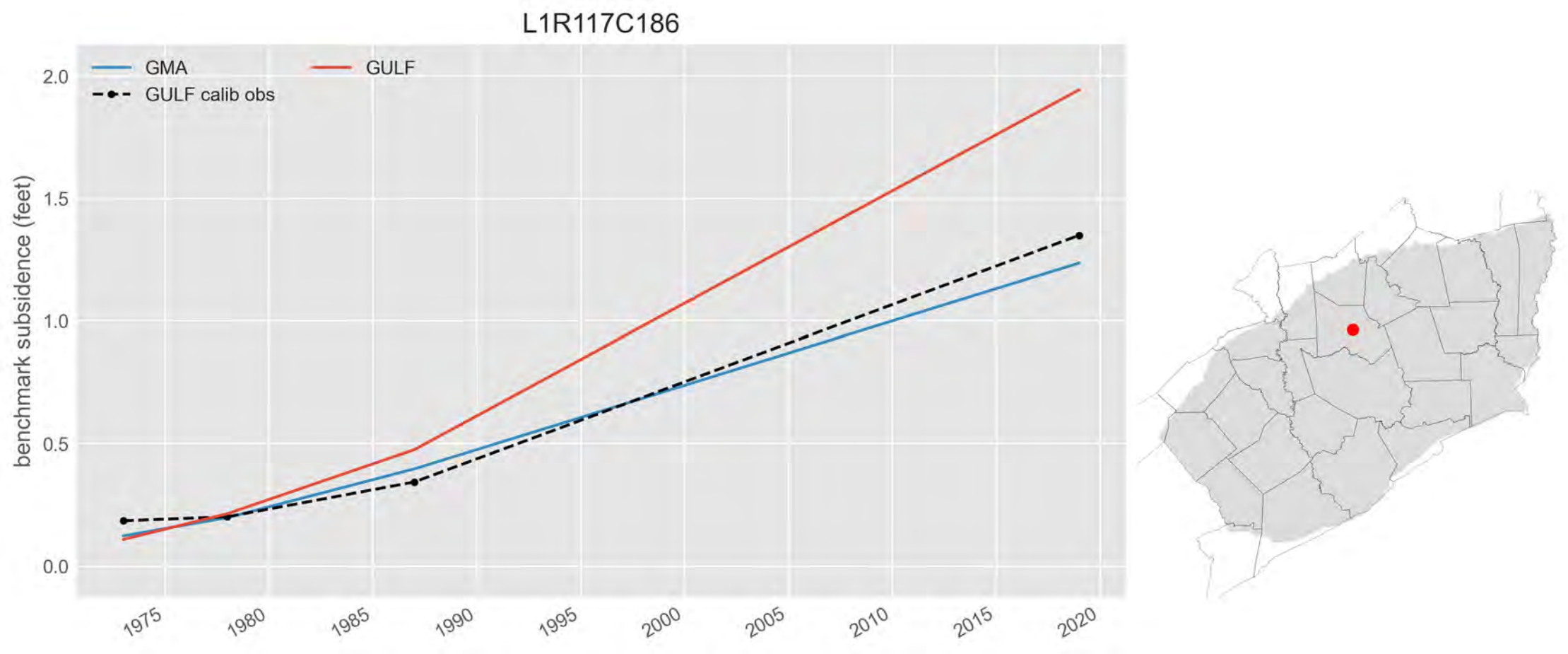
Appendix F

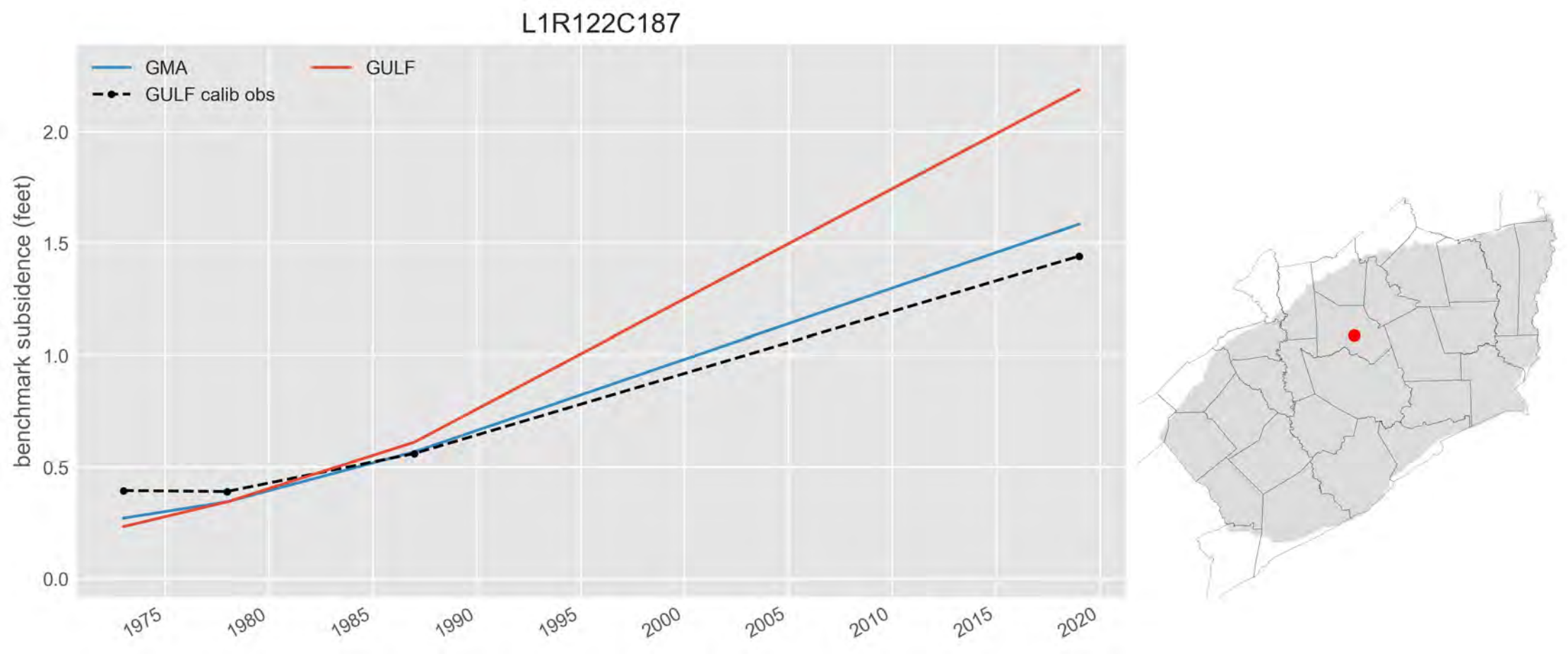
Time series plots comparing GULF model subsidence observations with two models

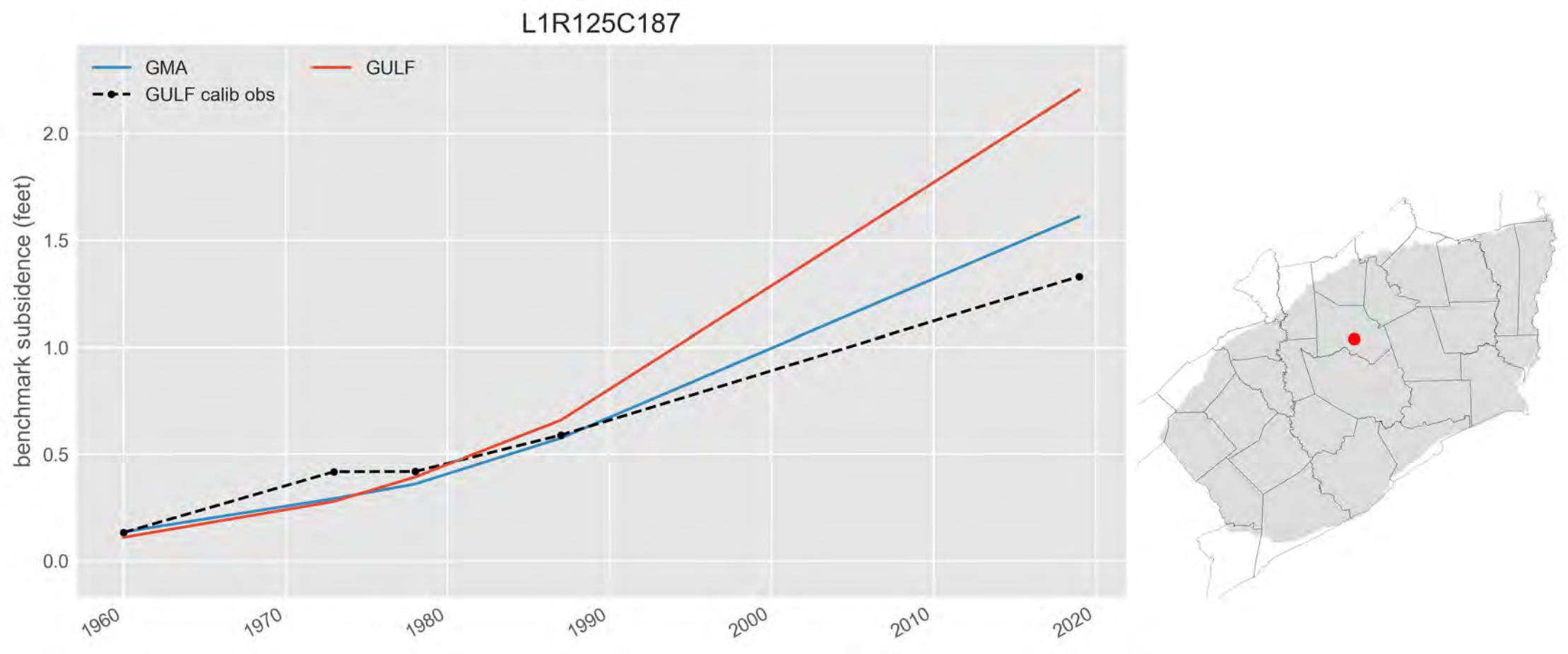

L1R100C185
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1960
1970
1980
1990
2000
2010
2020

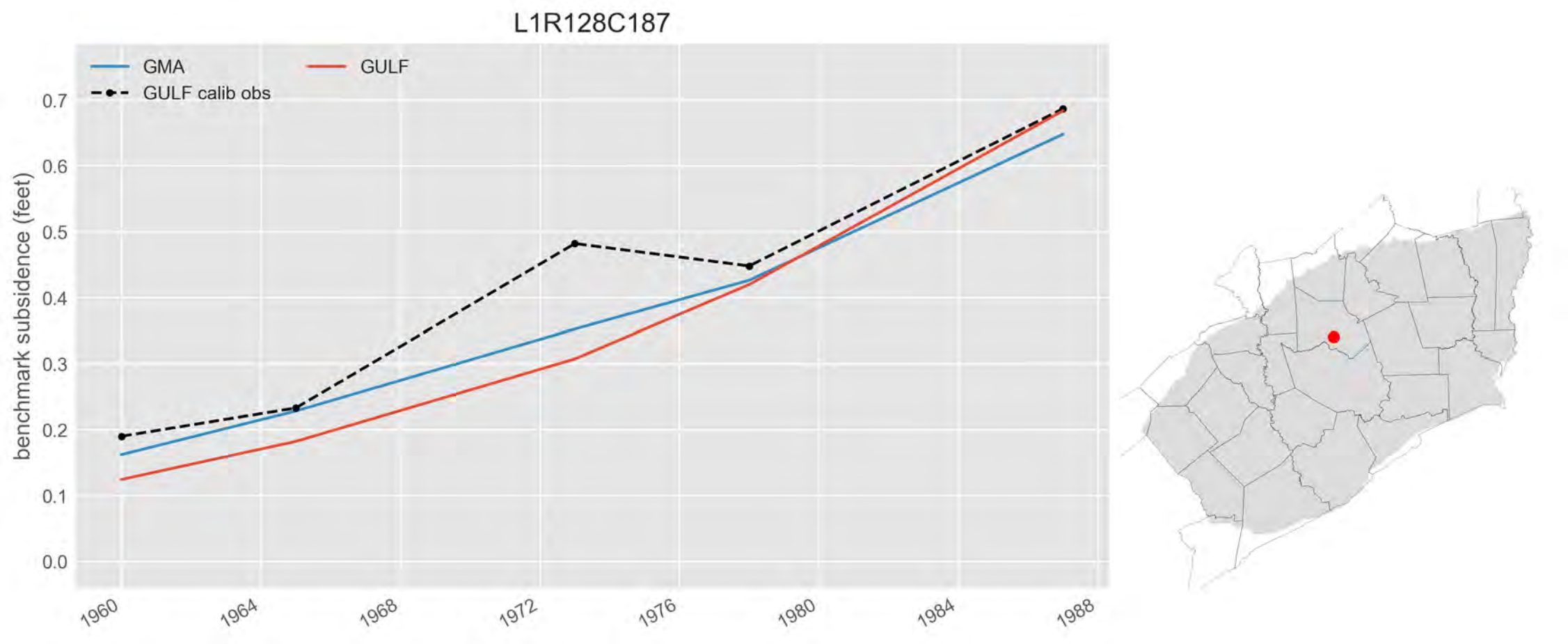

L1R109C186
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.5
0.4
0.3
0.2
0.1
0.0
1960
1964
1968
1972
1976
1980
1984
1988

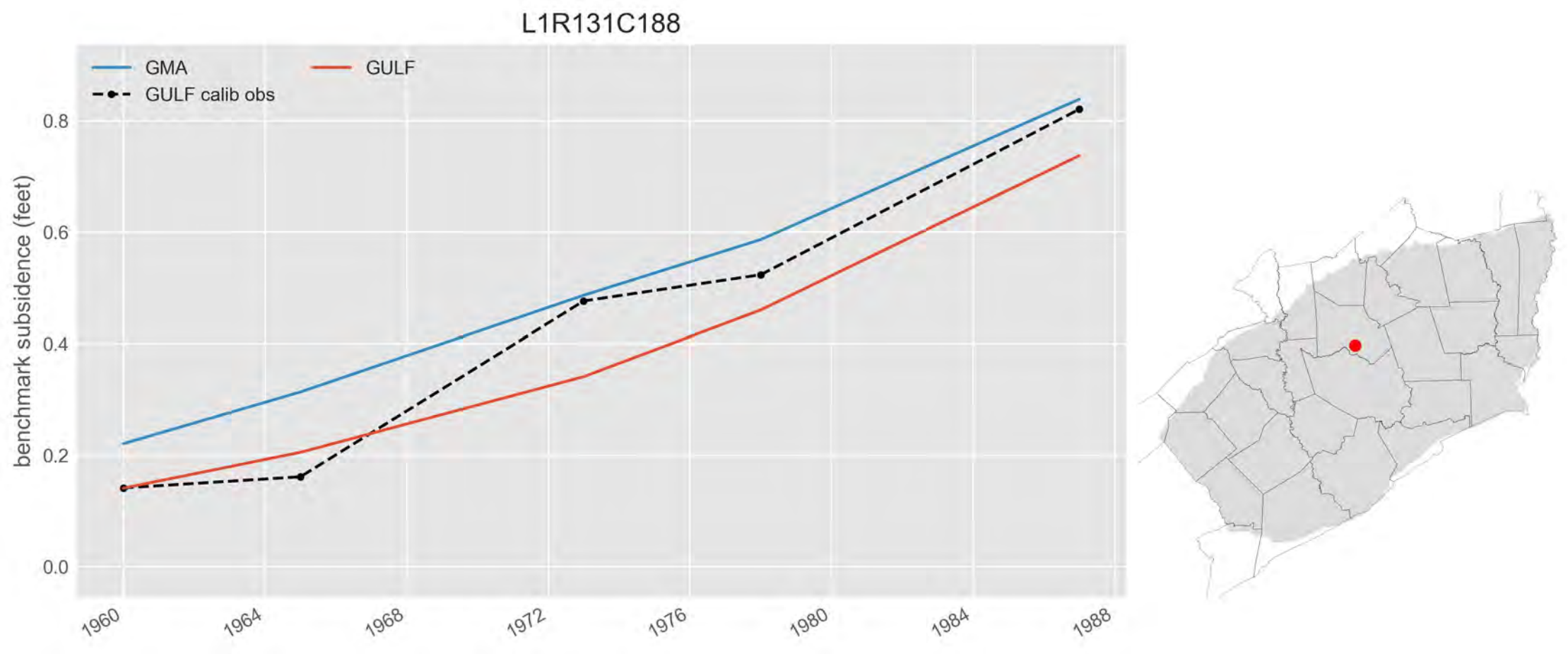

L1R114C187
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1960
1970
1980
1990
2000
2010
2020

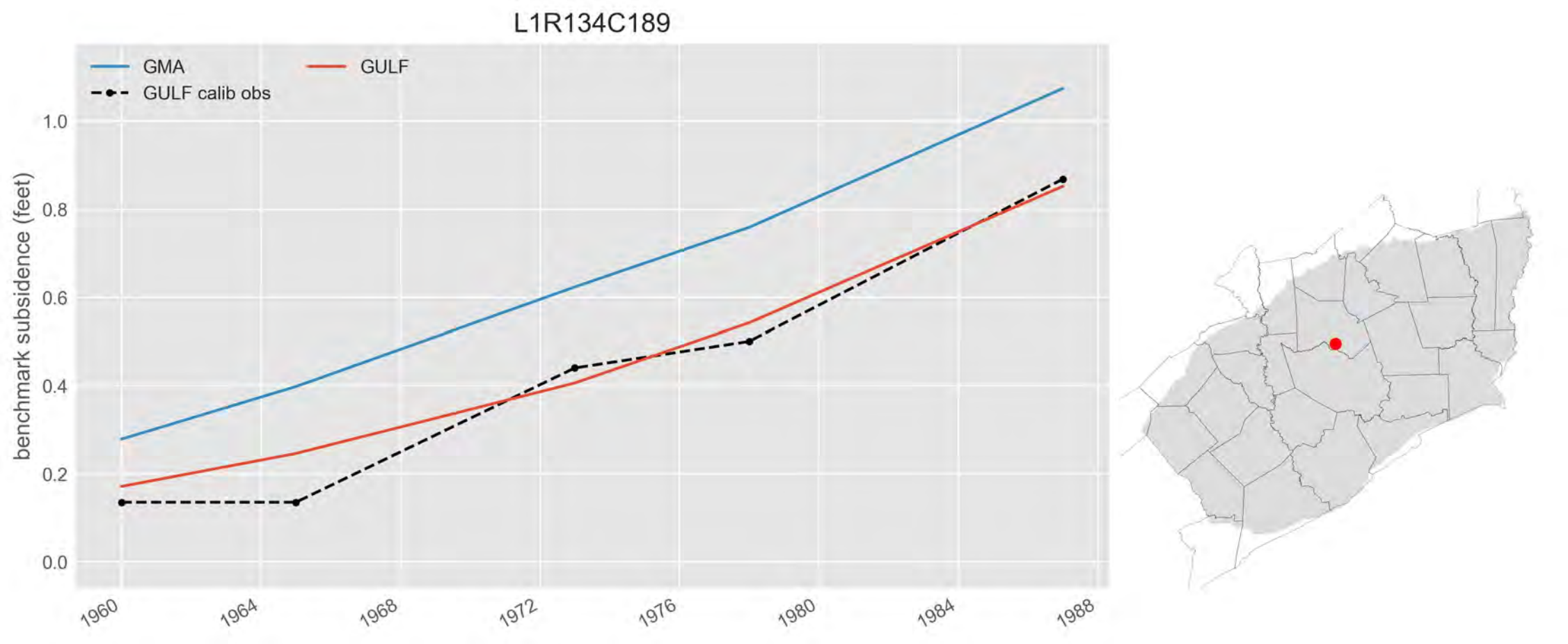

L1R117C186
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.0
1.5
1.0
0.5
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

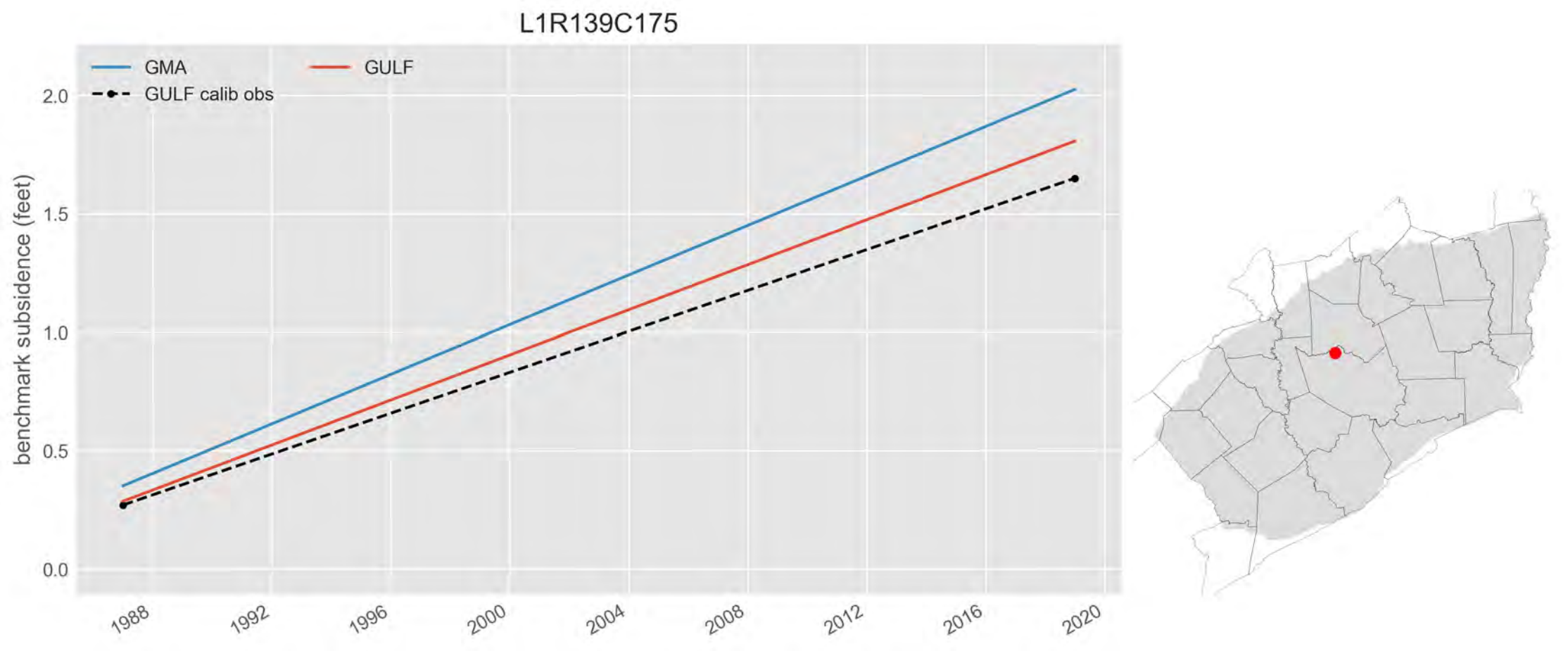

L1R122C187
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

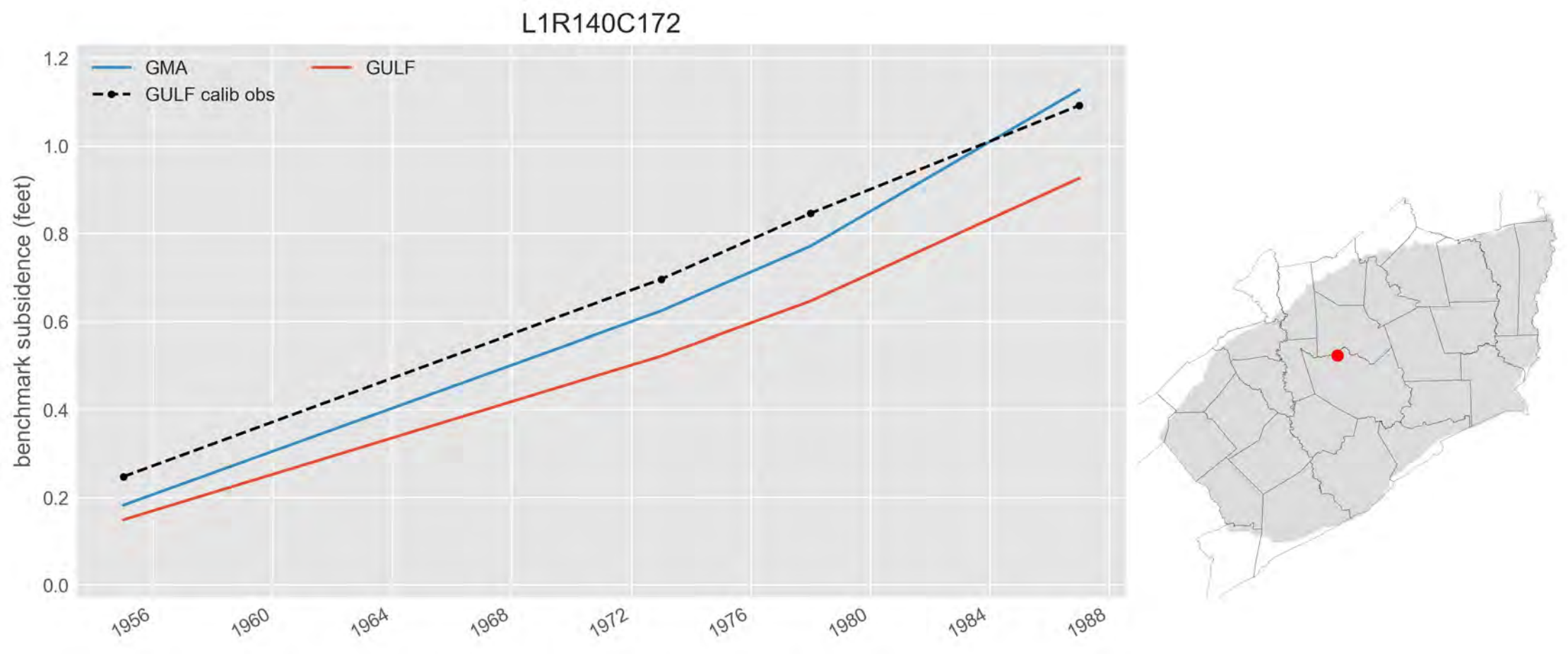

L1R125C187
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
1960
1970
1980
1990
2000
2010
2020

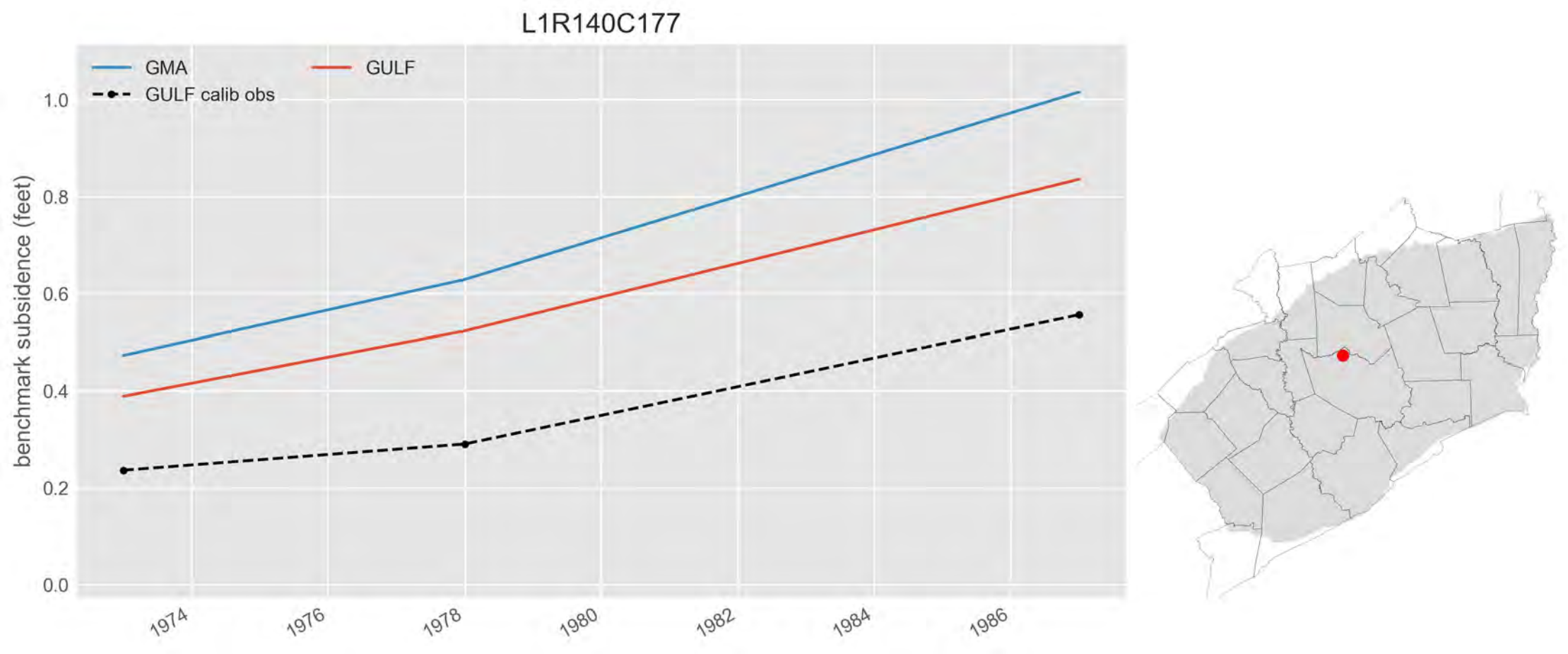

L1R128C187
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1960
1964
1968
1972
1976
1980
1984
1988


L1R131C188
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1960
1964
1968
1972
1976
1980
1984
1988

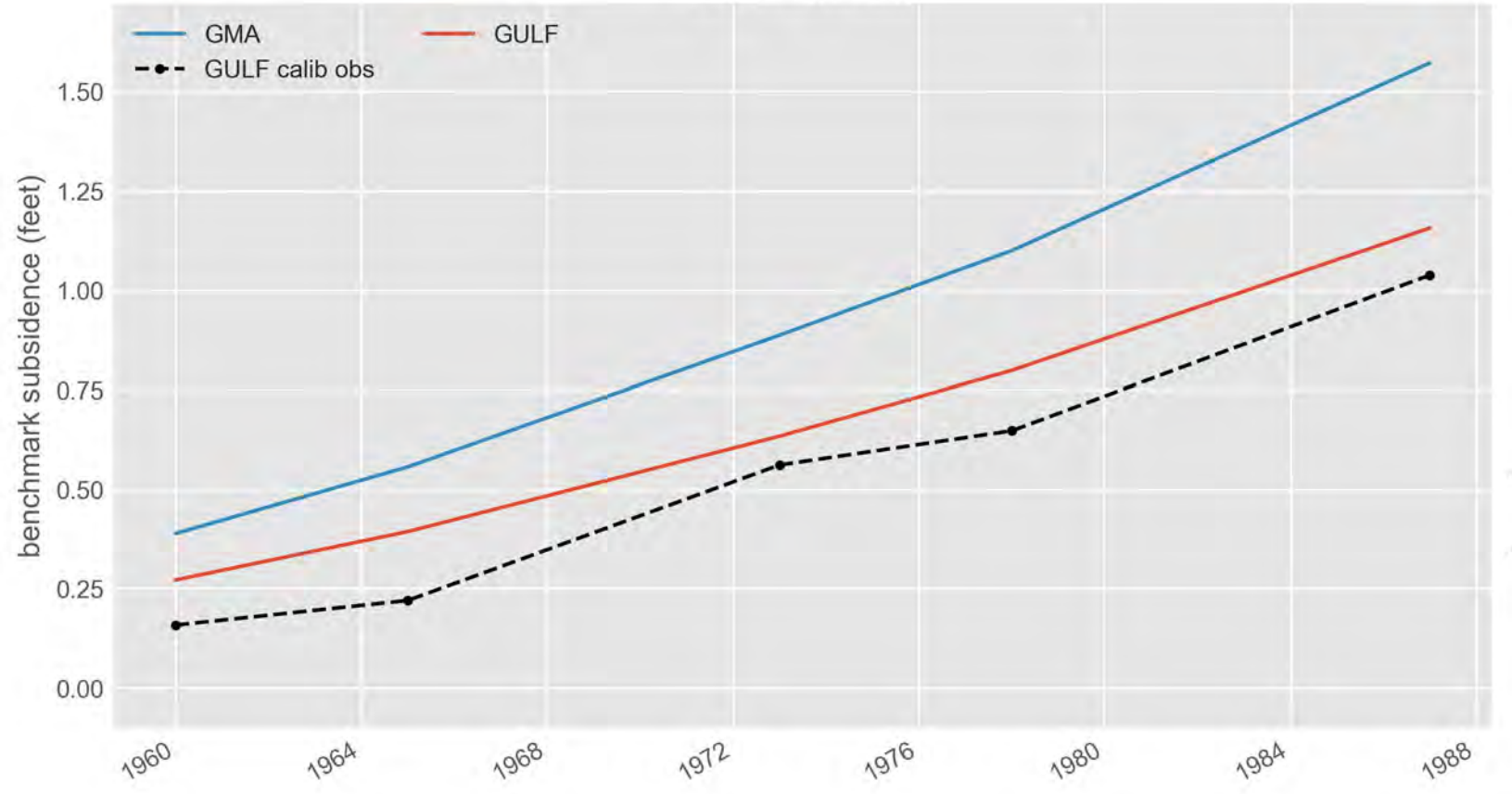

L1R134C189
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1960
1964
1968
1972
1976
1980
1984
1988

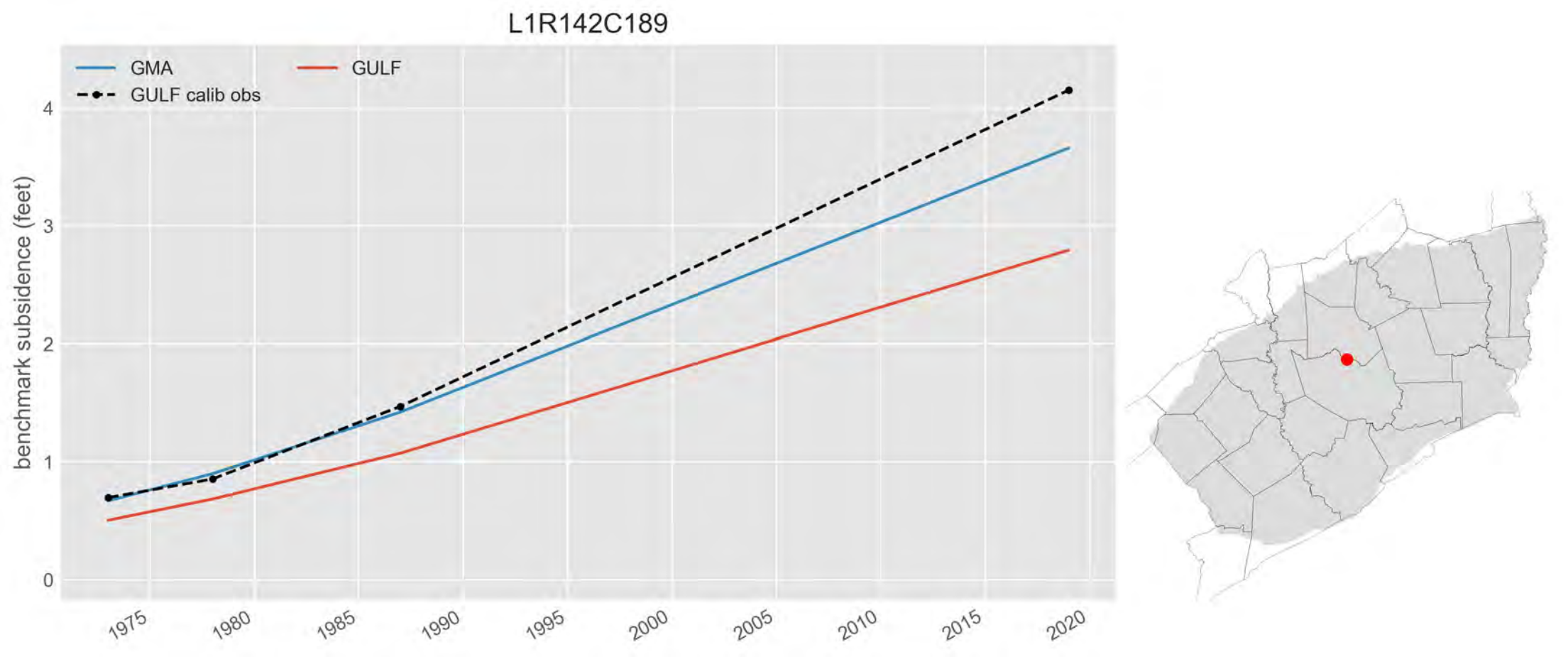

L1R139C175
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
1988
1992
1996
2000
2004
2008
2012
2016
2020


L1R140C172
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1956
1960
1964
1968
1972
1976
1980
1984
1988

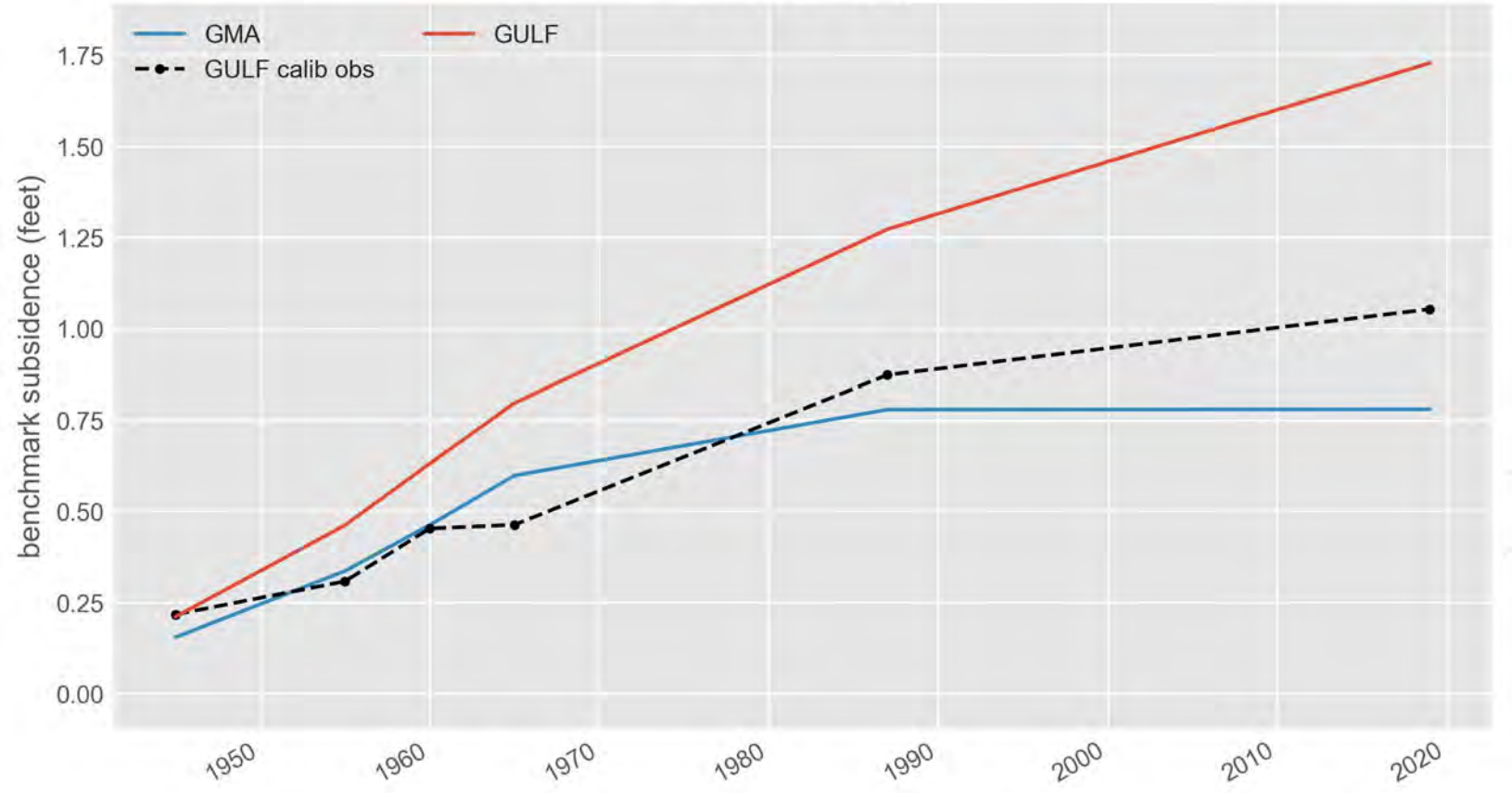

L1R140C177
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1974
1976
1978
1980
1982
1984
1986

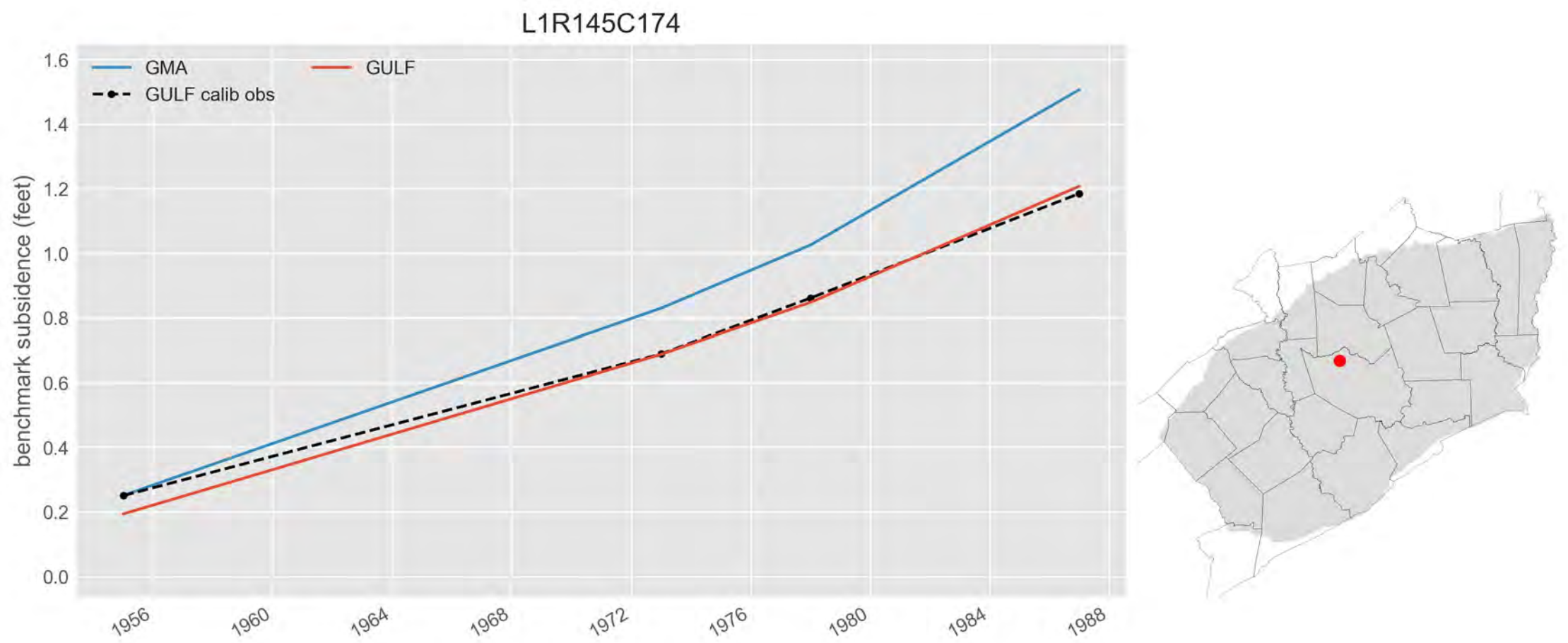
L1R140C190

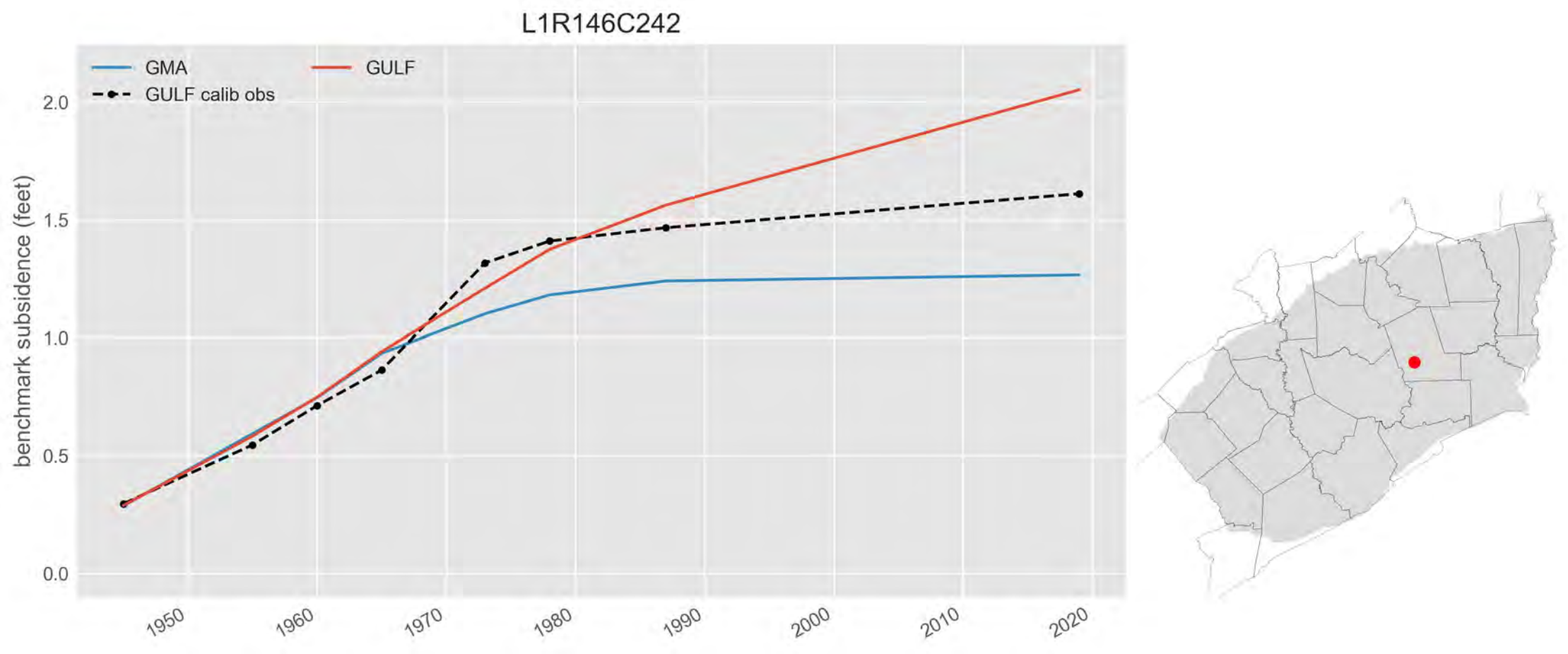

GMA
GULF
GULF calib obs
benchmark subsidence (feet)
1.50
1.25
1.00
0.75
0.50
0.25
0.00
1960
1964
1968
1972
1976
1980
1984
1988


L1R142C189
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

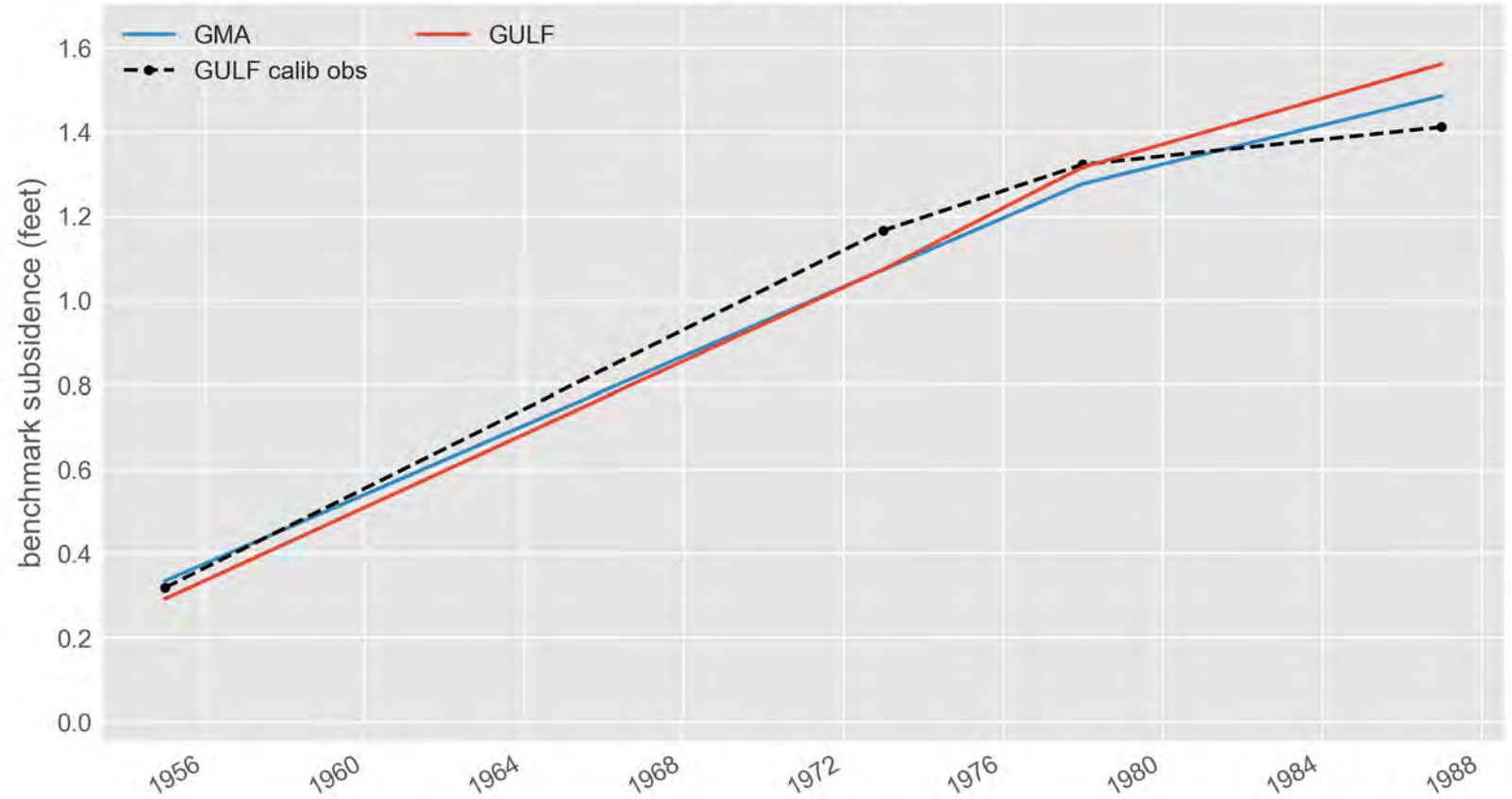
L1R144C250

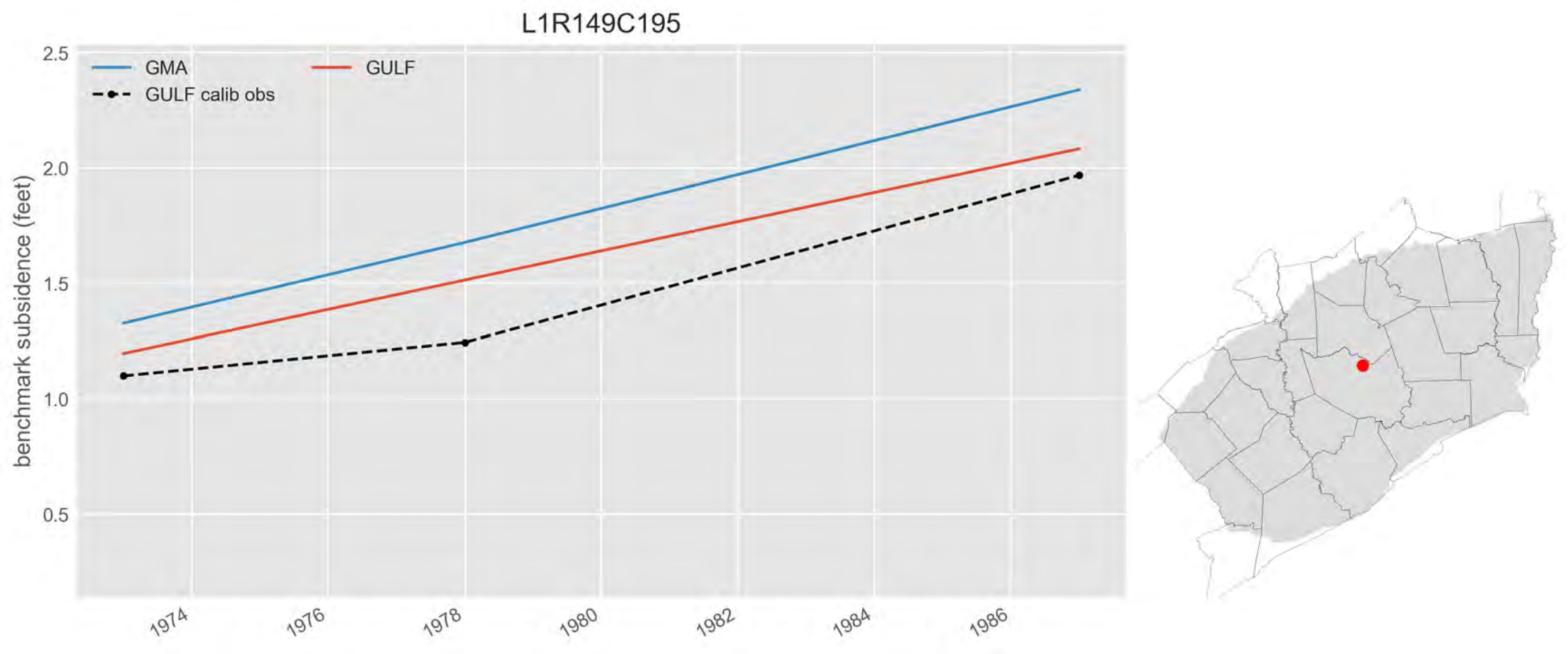

GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
1950
1960
1970
1980
1990
2000
2010
2020

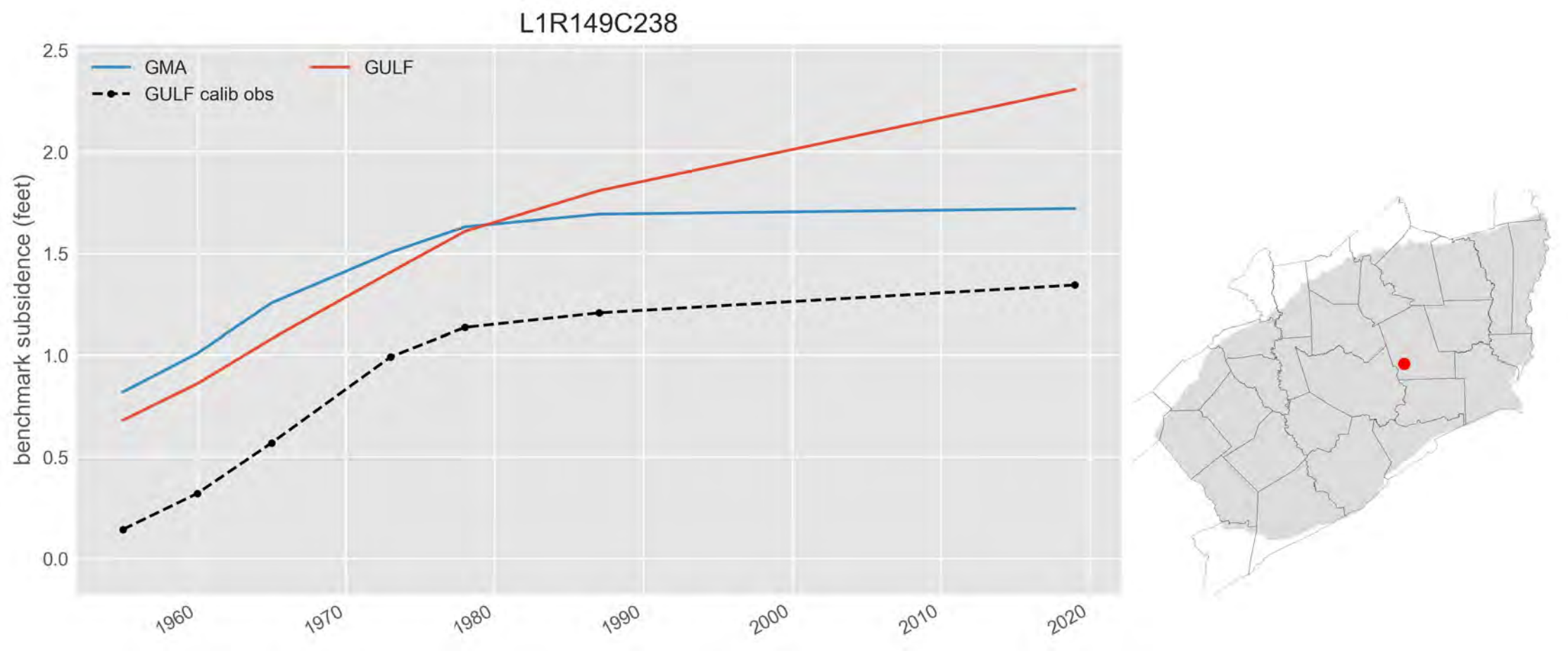

L1R145C174
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1956
1960
1964
1968
1972
1976
1980
1984
1988

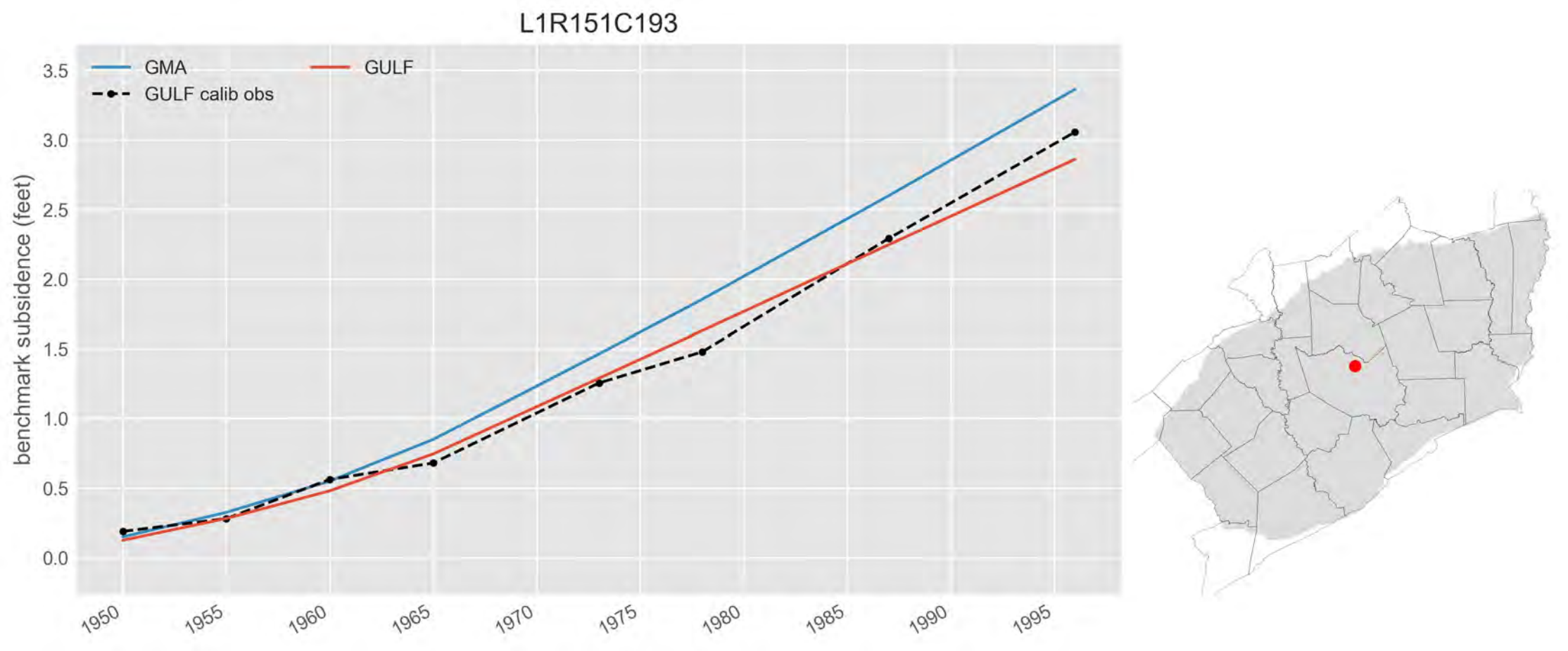

L1R146C242
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
1950
1960
1970
1980
1990
2000
2010
2020

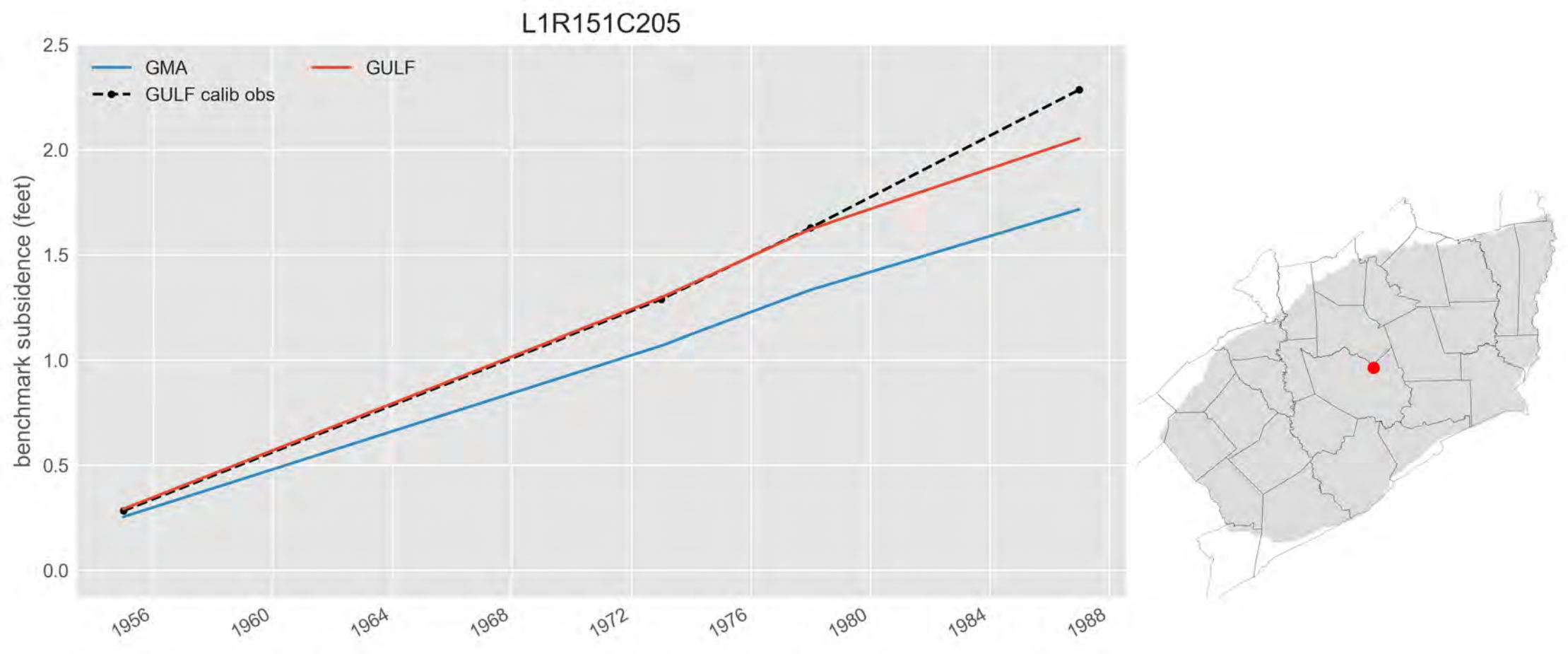
L1R148C222

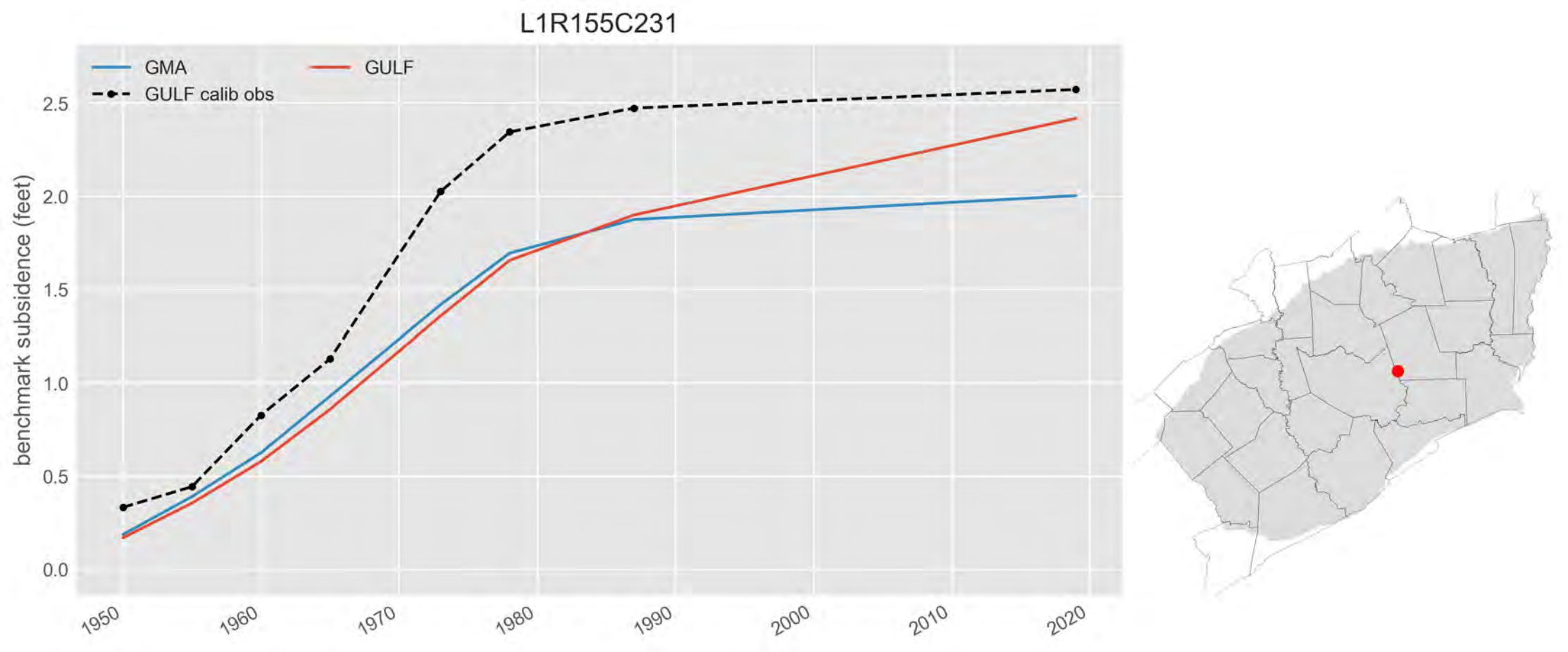

GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1956
1960
1964
1968
1972
1976
1980
1984
1988

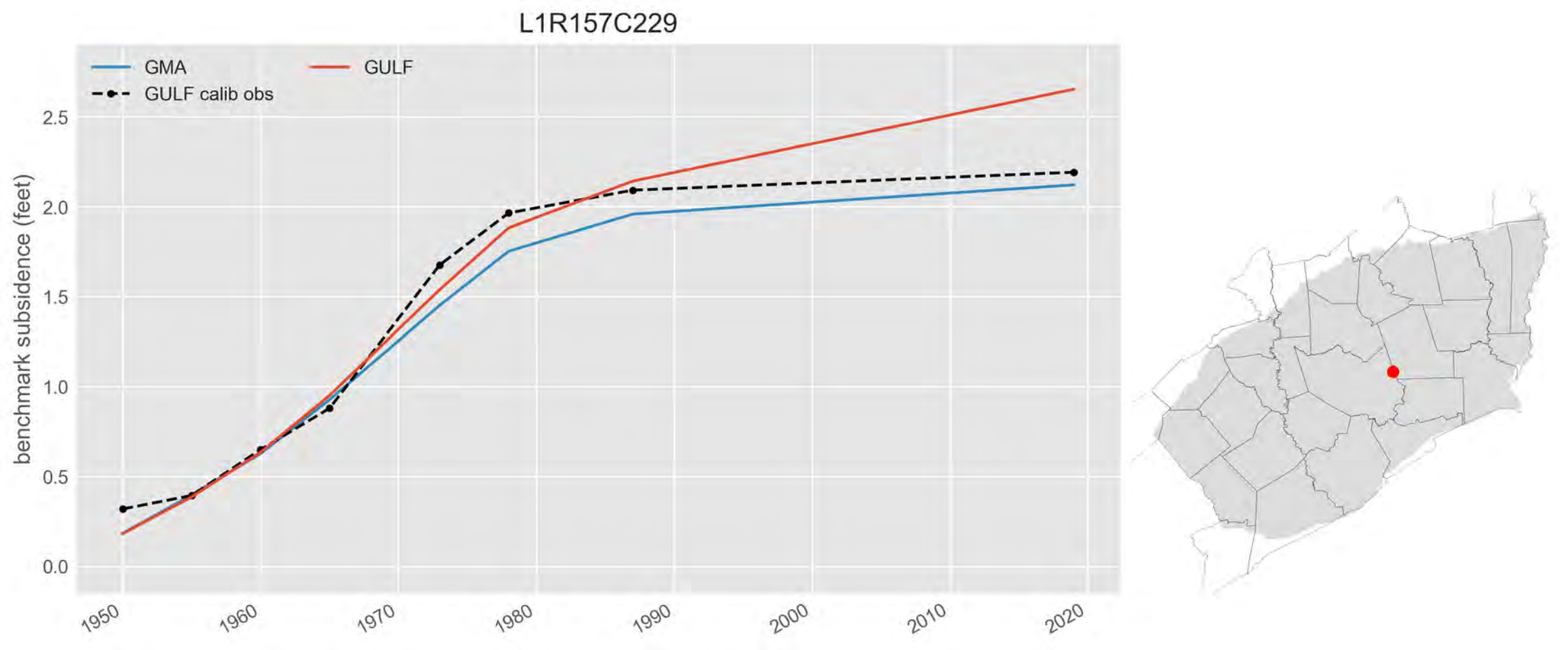

L1R149C195
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.5
2.0
1.5
1.0
0.5
1974
1976
1978
1980
1982
1984
1986

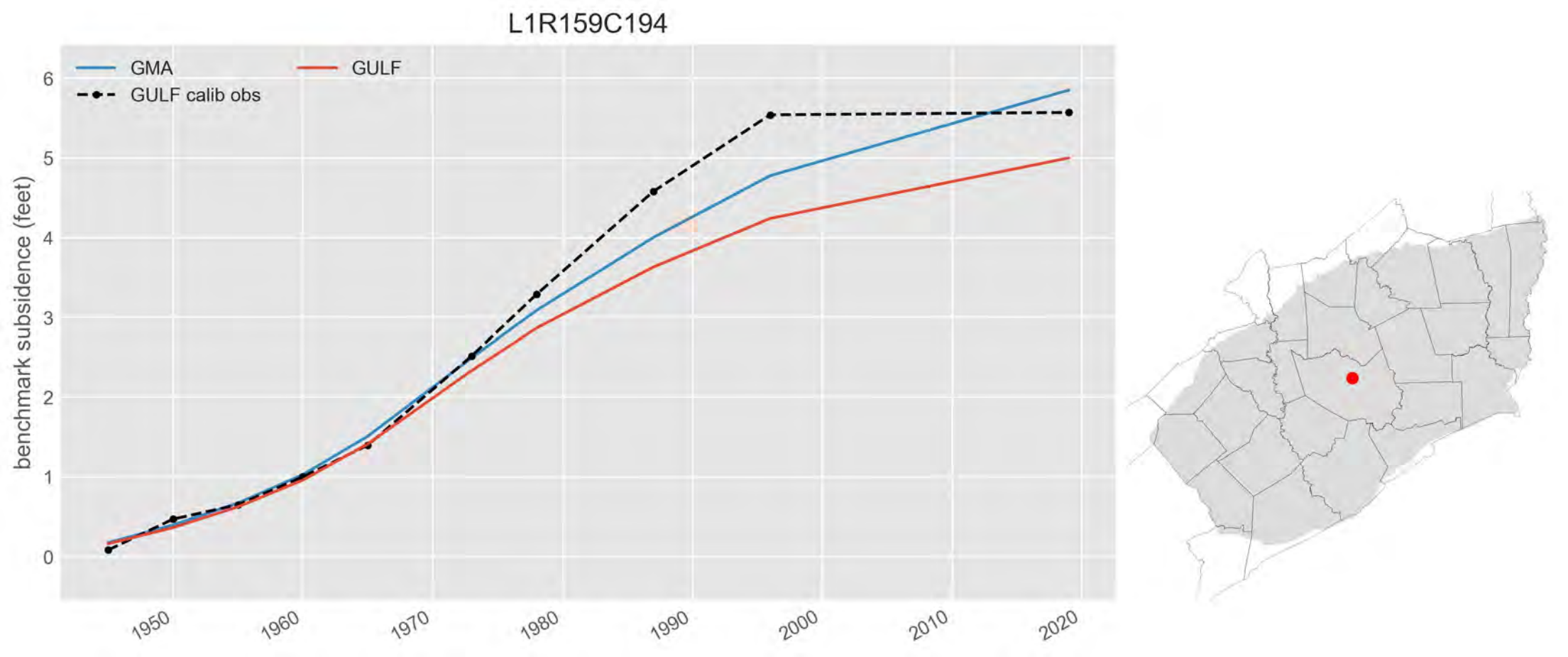

L1R149C238
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.5
2.0
1.5
1.0
0.5
0.0
1960
1970
1980
1990
2000
2010
2020

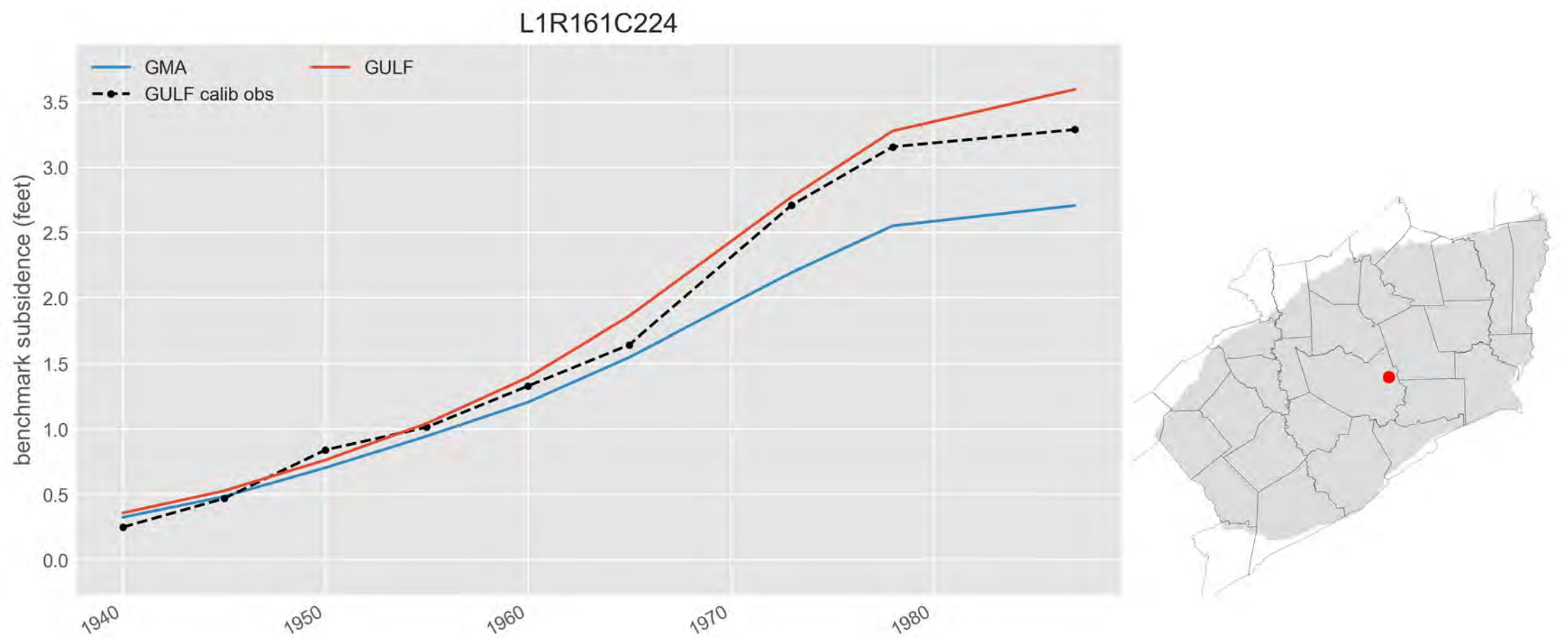

L1R151C193
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995

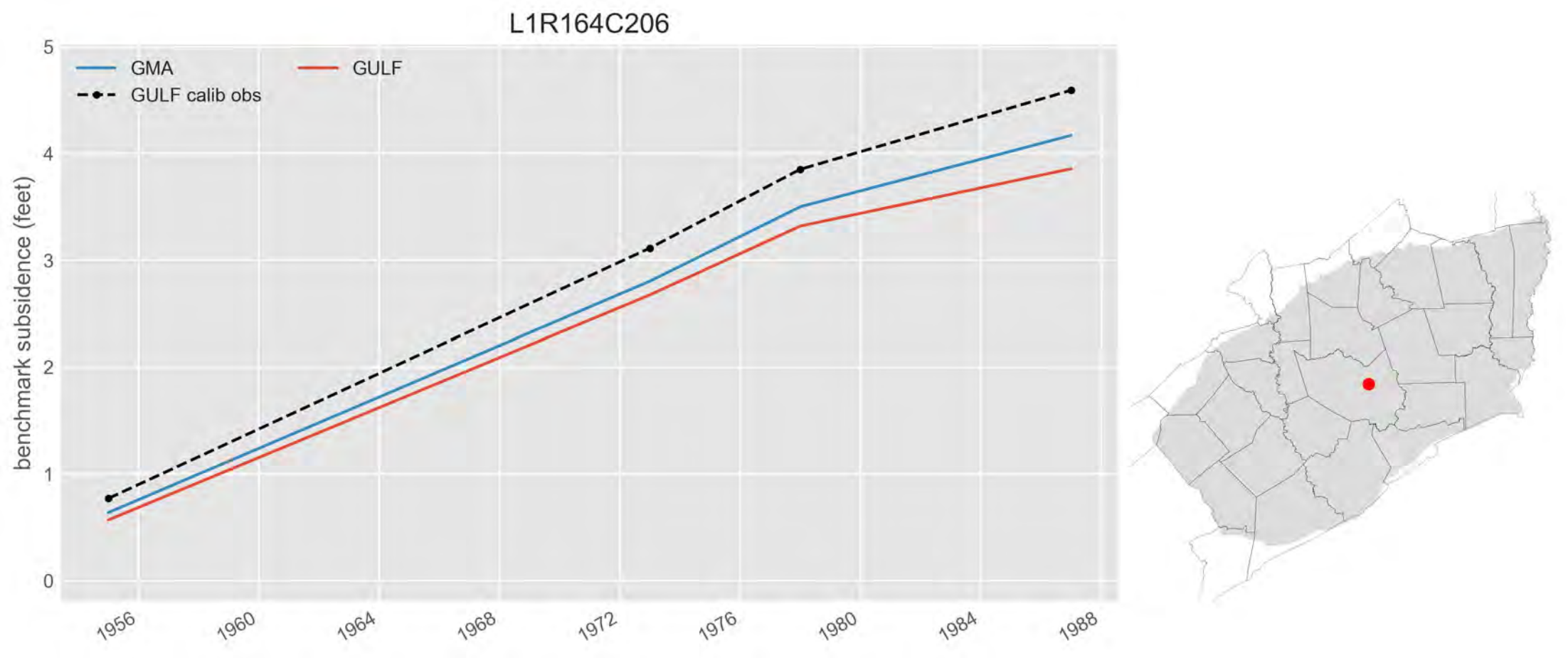

L1R151C205
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.5
2.0
1.5
1.0
0.5
0.0
1956
1960
1964
1968
1972
1976
1980
1984
1988

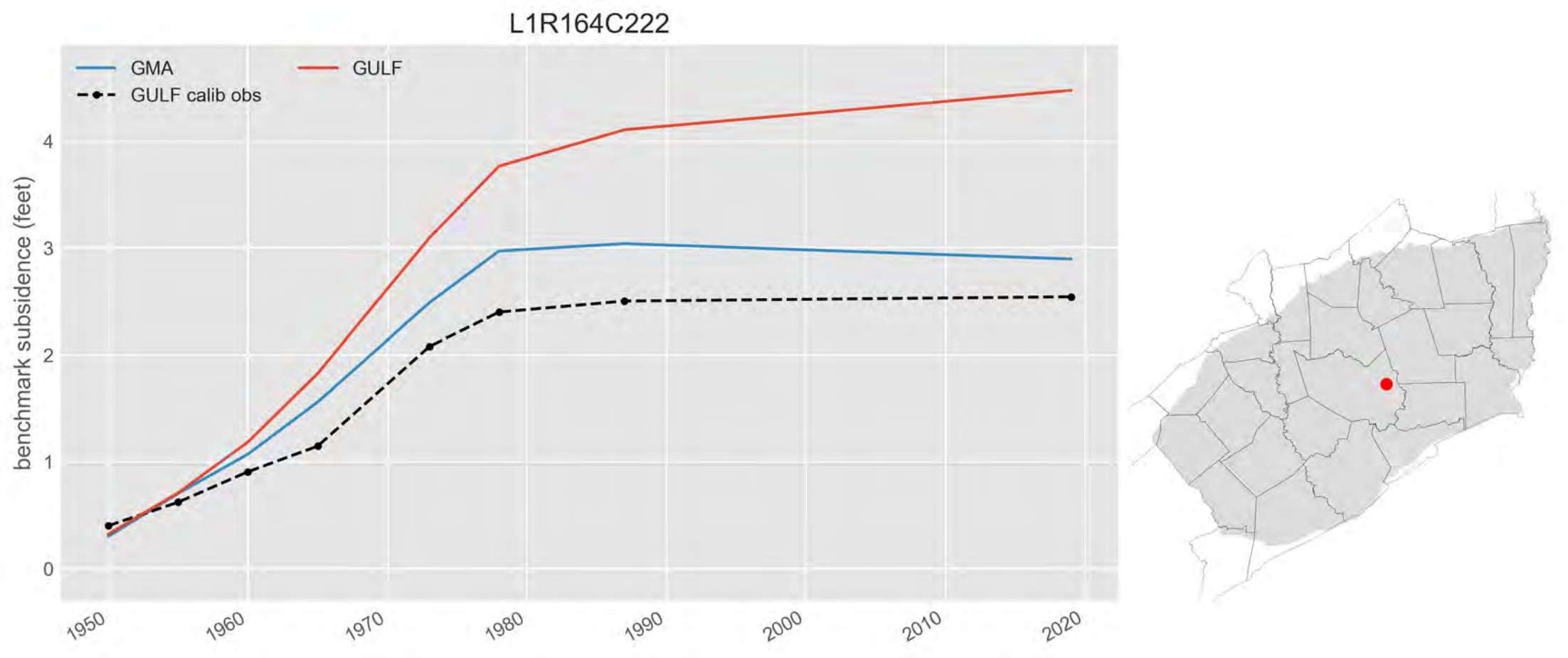

L1R155C231
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
1950
1960
1970
1980
1990
2000
2010
2020

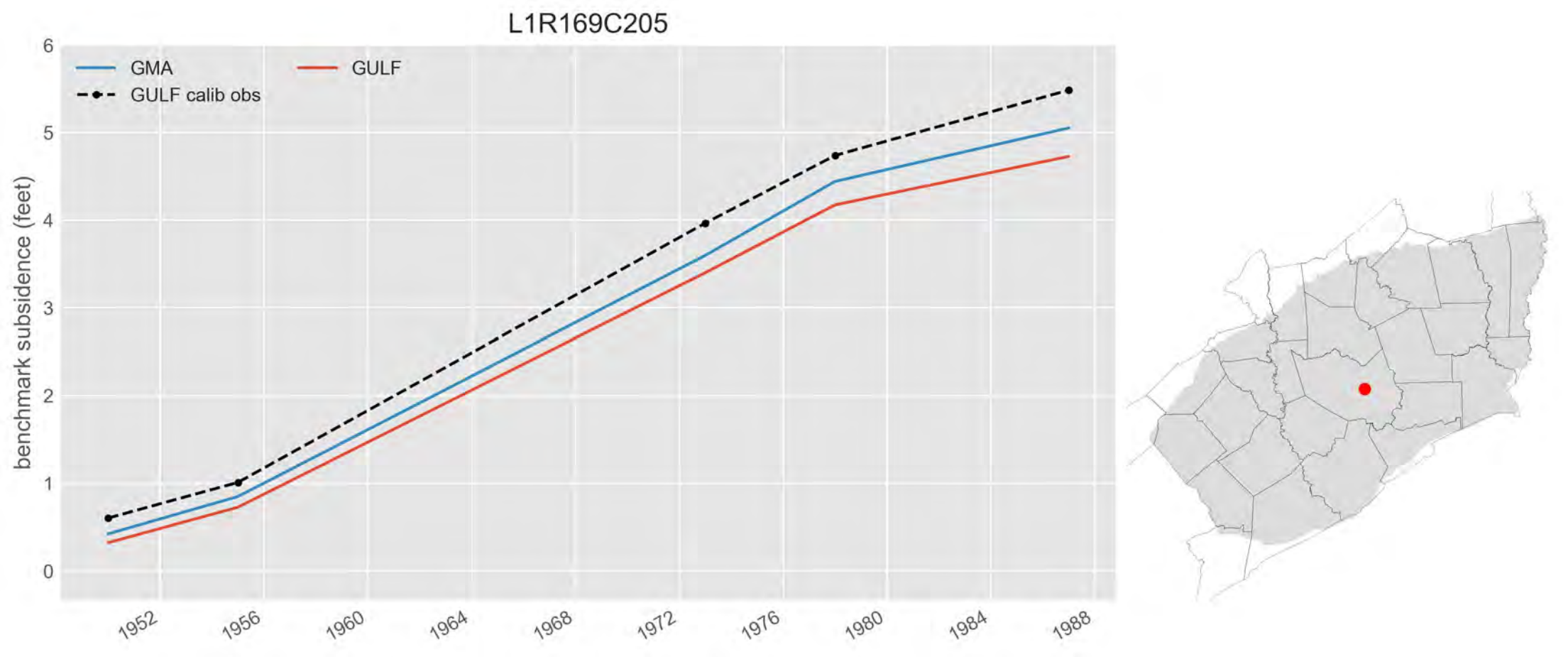

L1R157C229
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
1950
1960
1970
1980
1990
2000
2010
2020

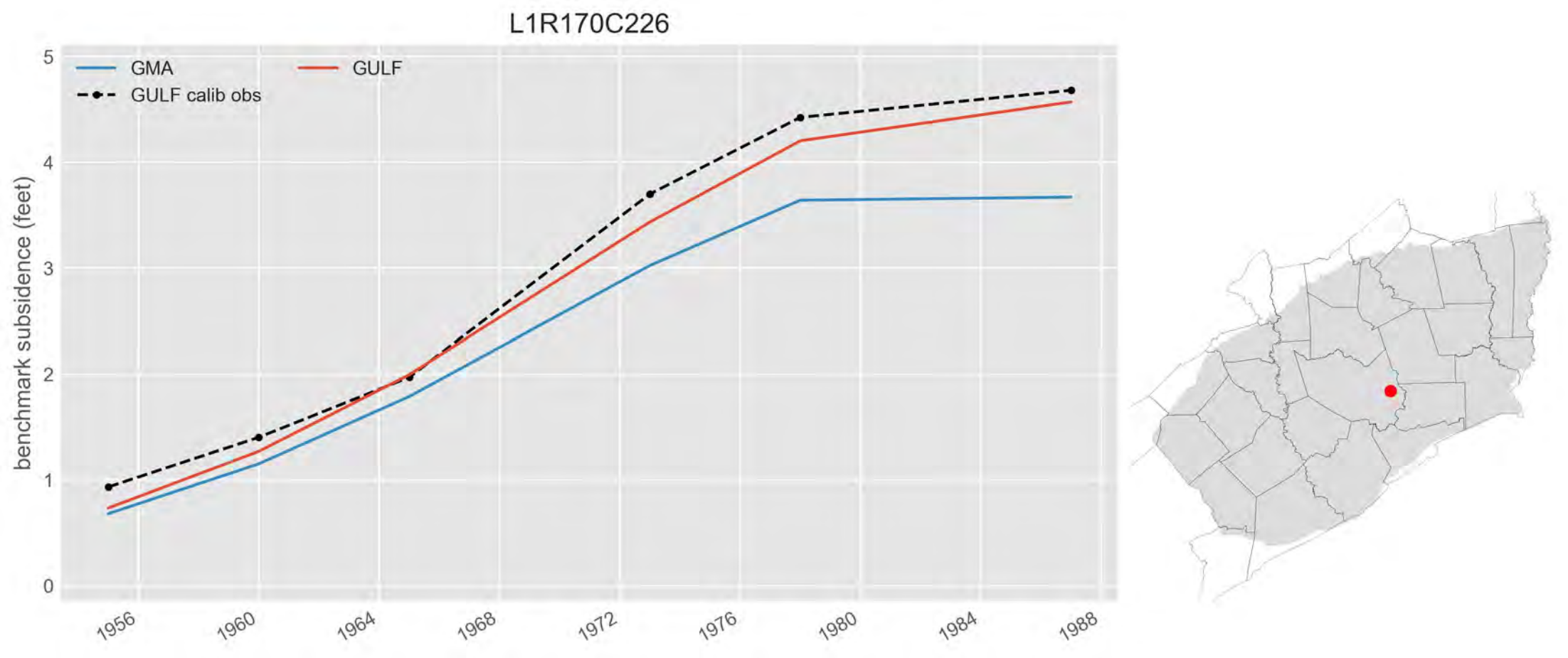

L1R159C194
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1950
1960
1970
1980
1990
2000
2010
2020

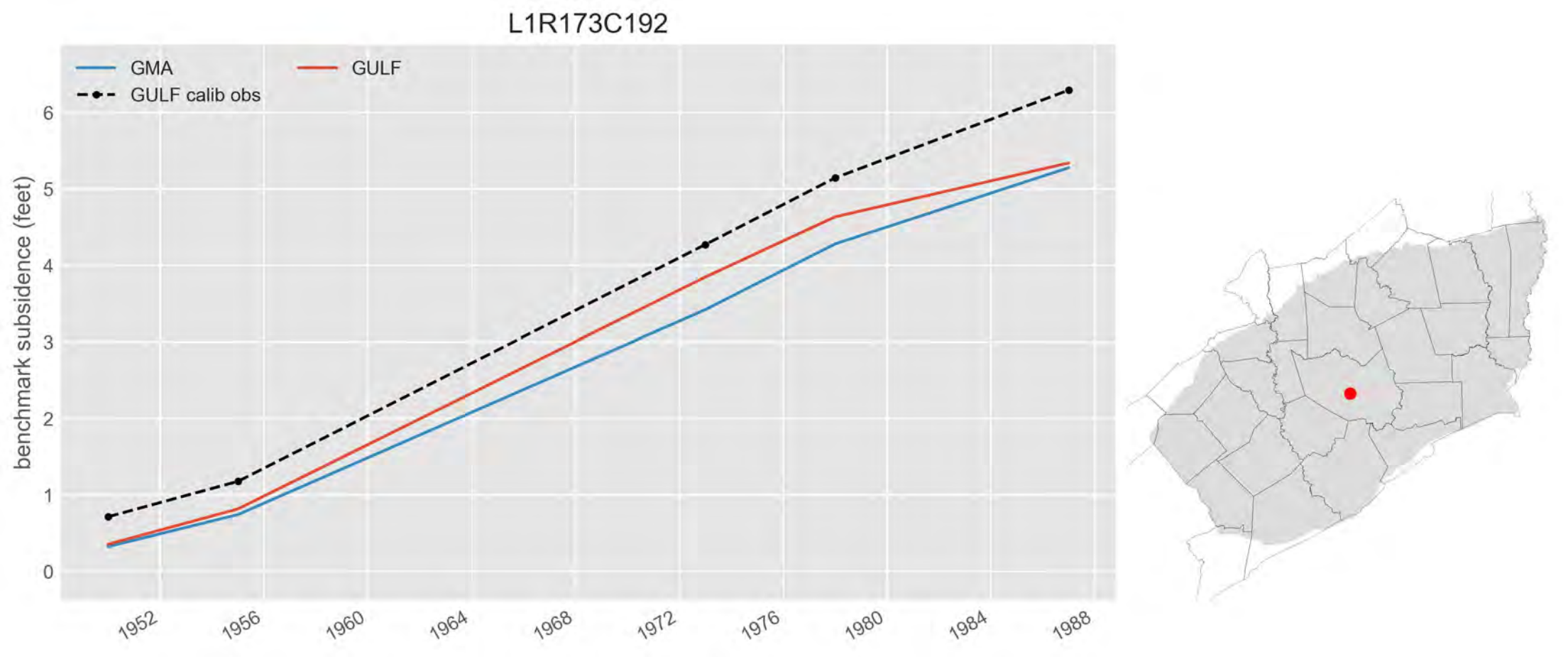

L1R161C224
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1940
1950
1960
1970
1980

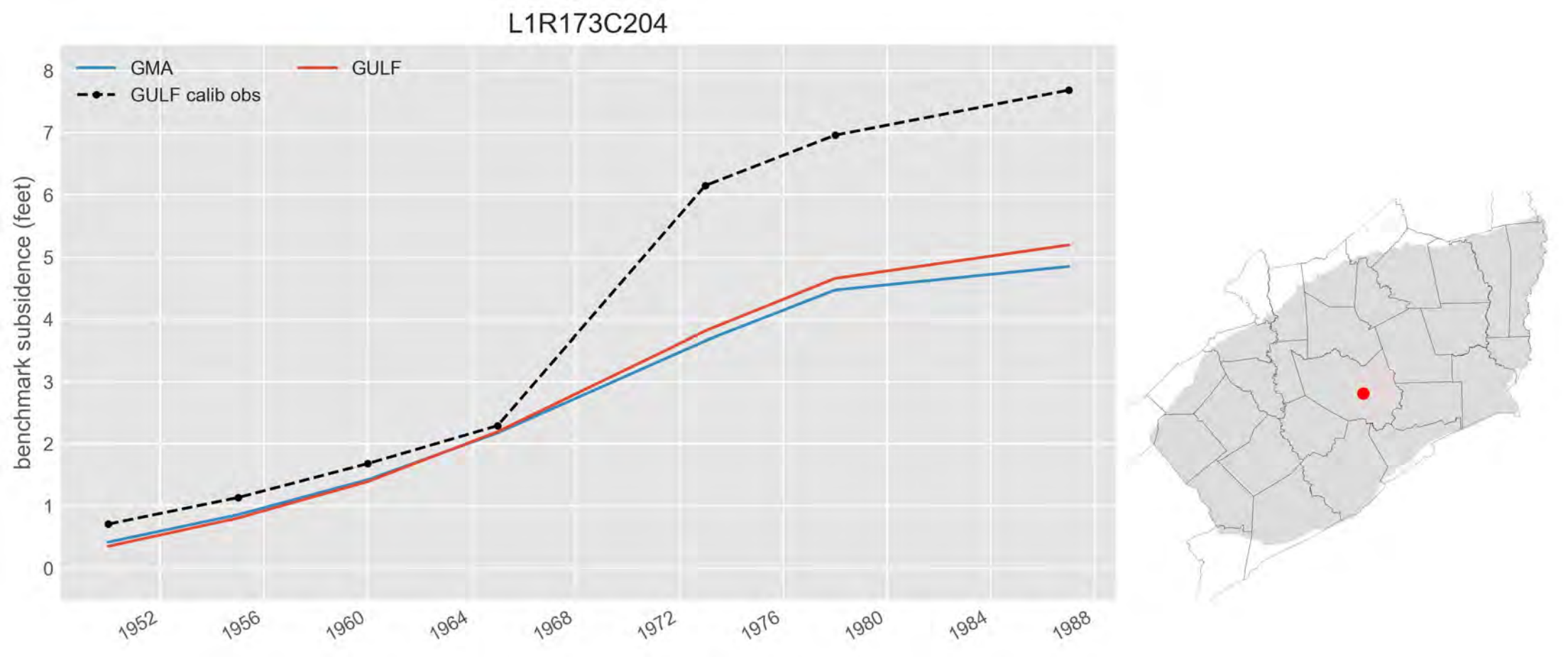

L1R164C206
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

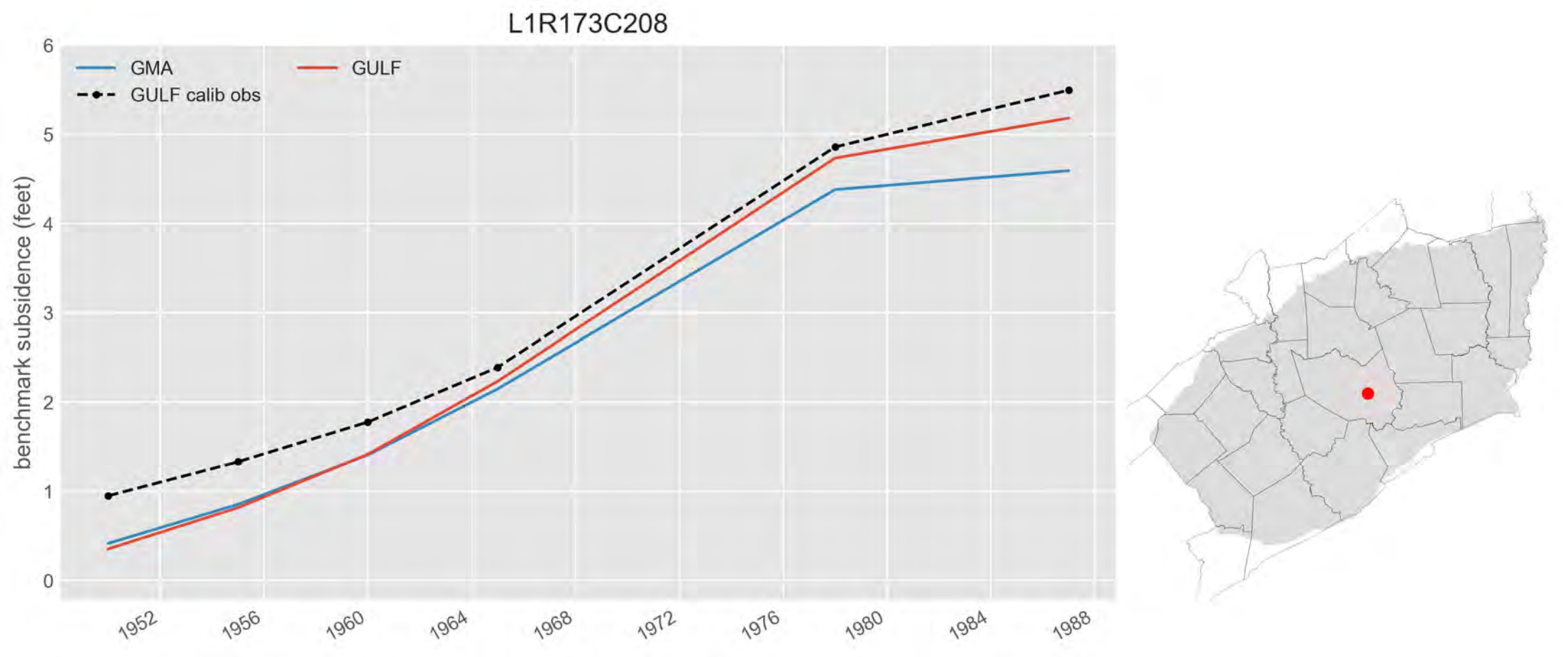

L1R164C222
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1950
1960
1970
1980
1990
2000
2010
2020

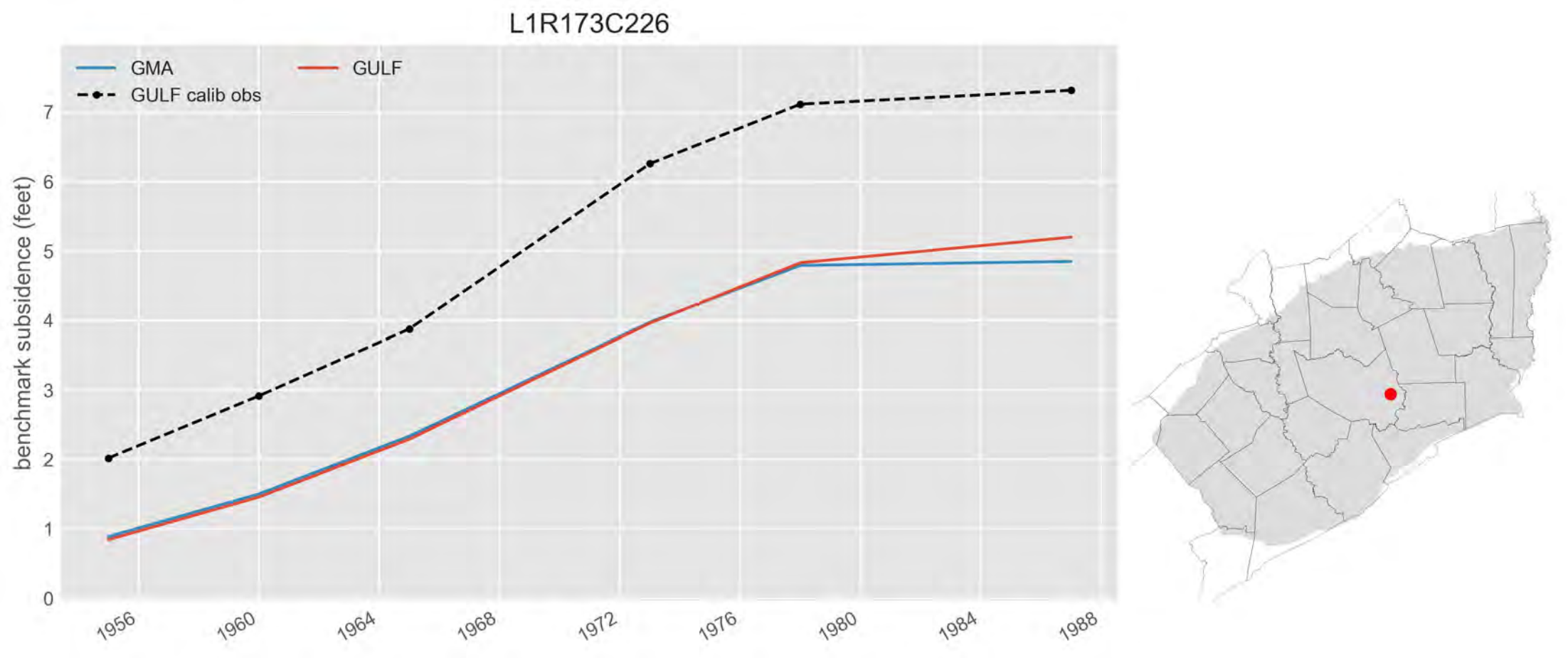

L1R169C205
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

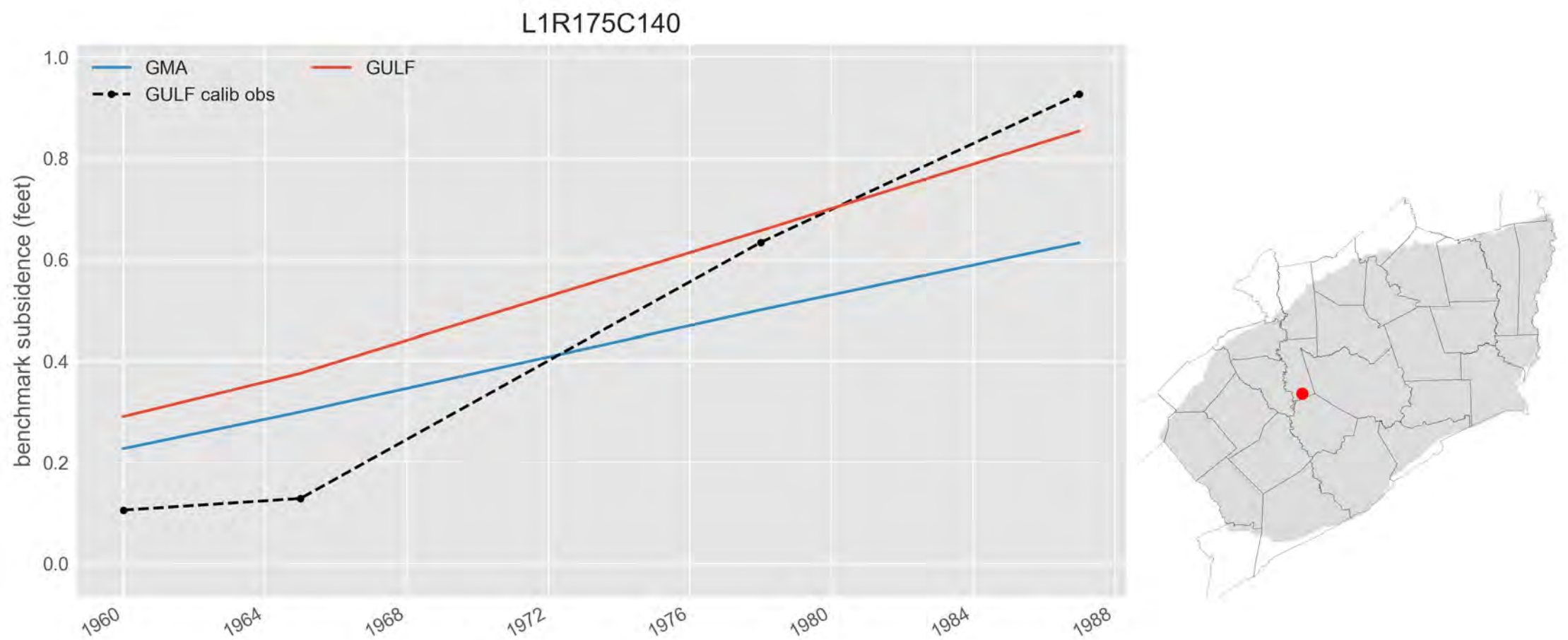

L1R170C226
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

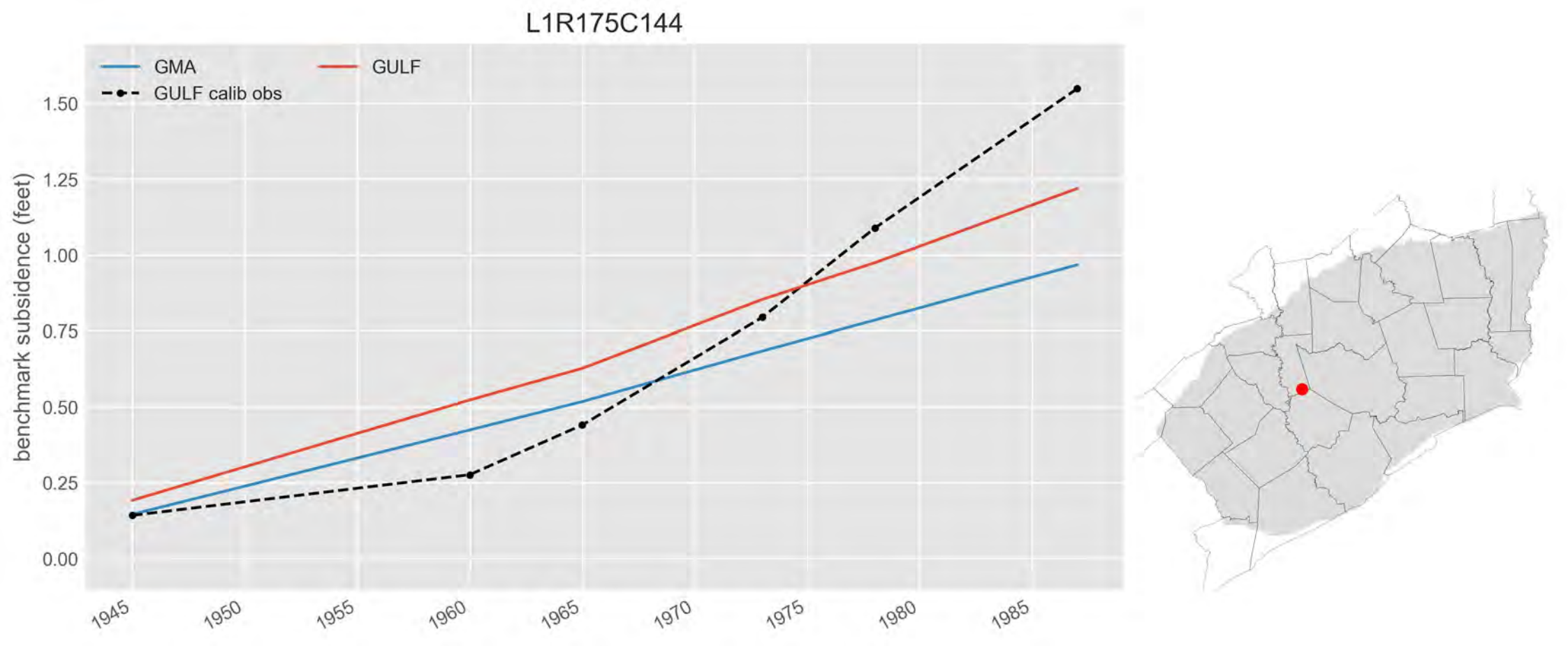

L1R173C192
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

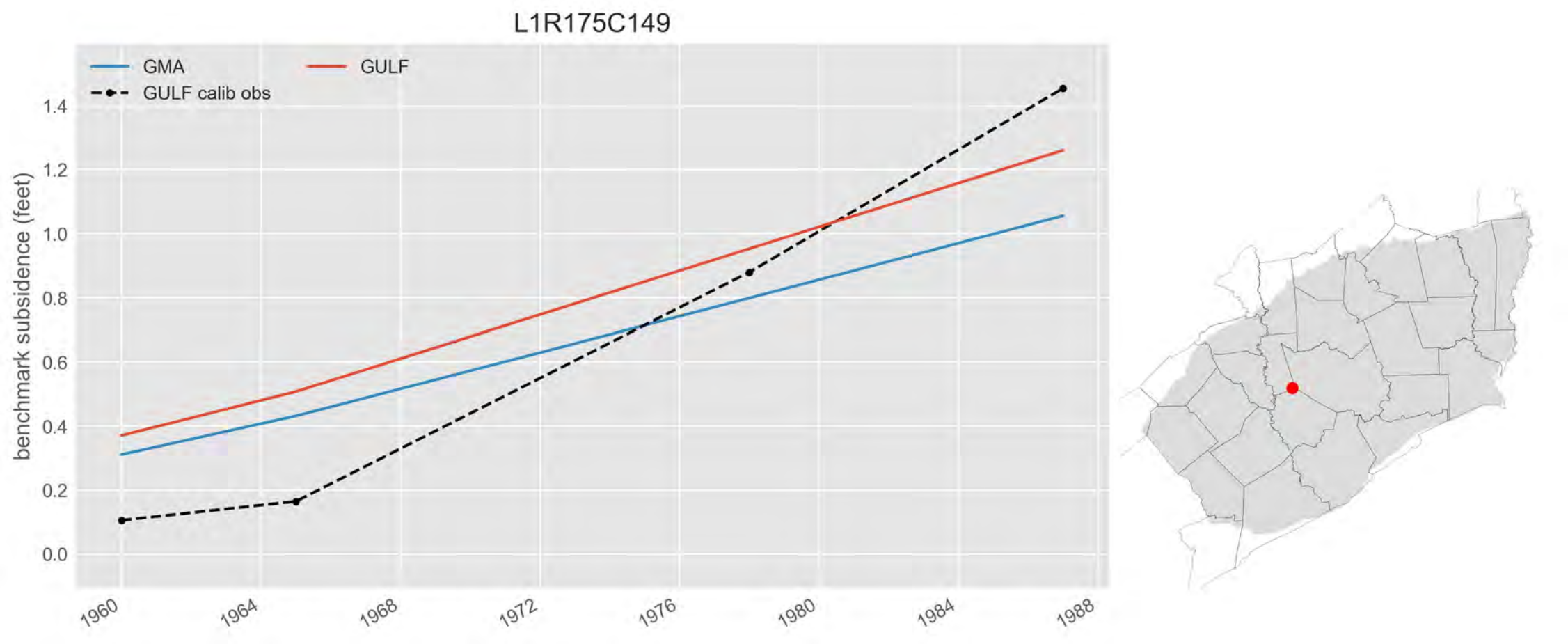

L1R173C204
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
8
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

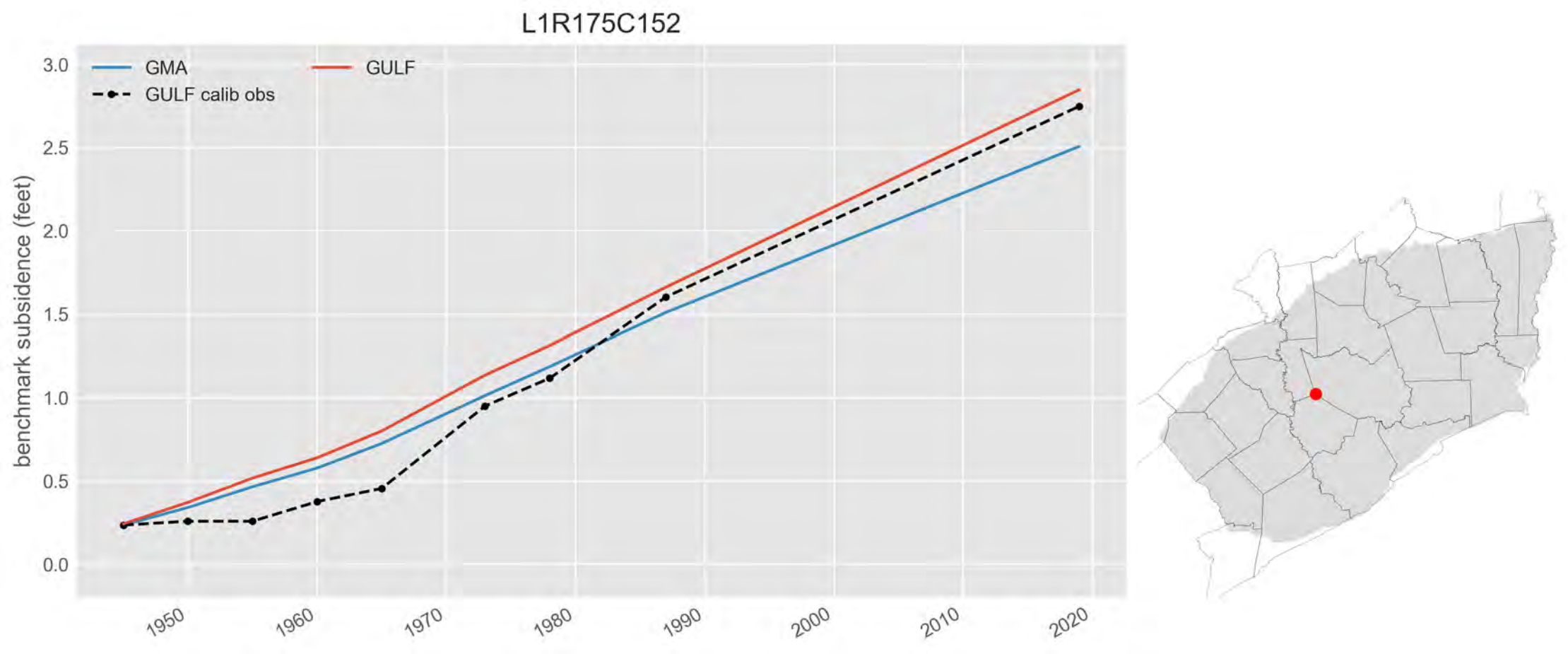

L1R173C208
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

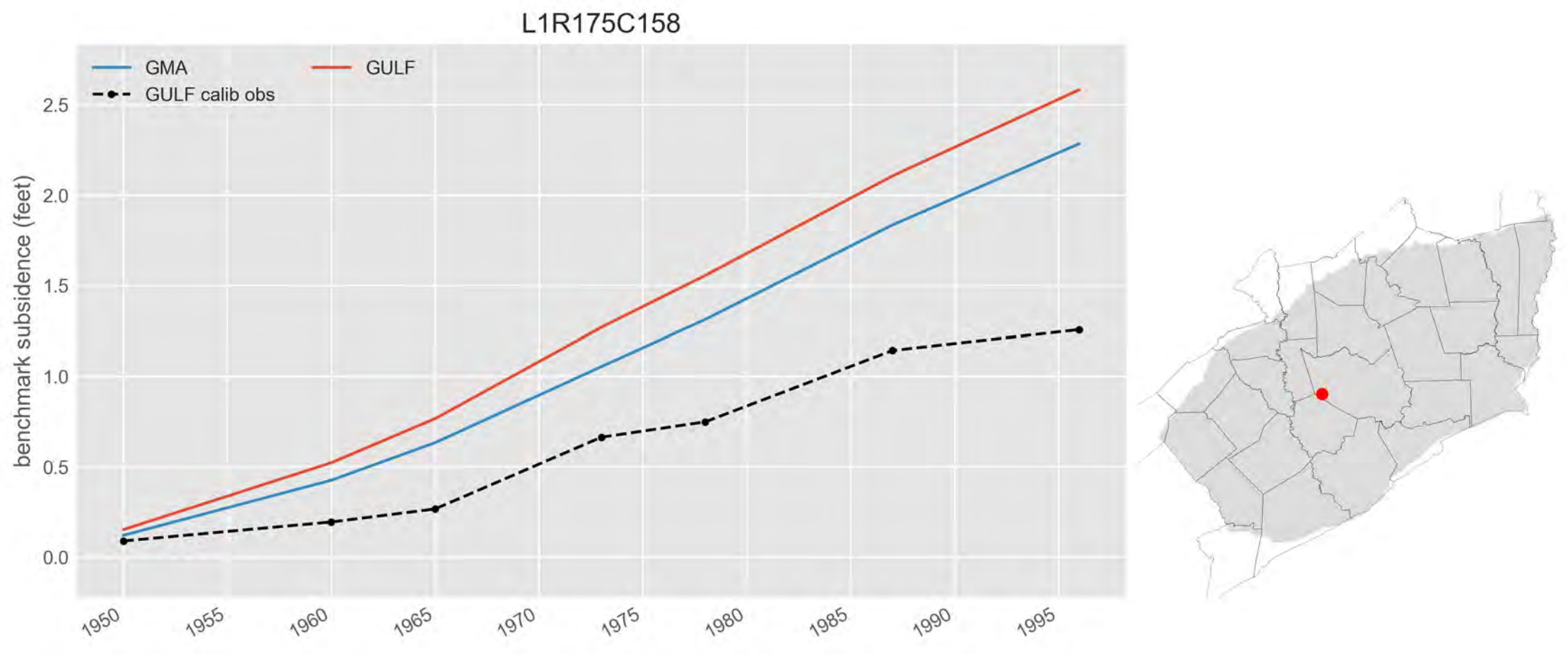

L1R173C226
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
1956
1960
1964
1968
1972
1976
1980
1984
1988

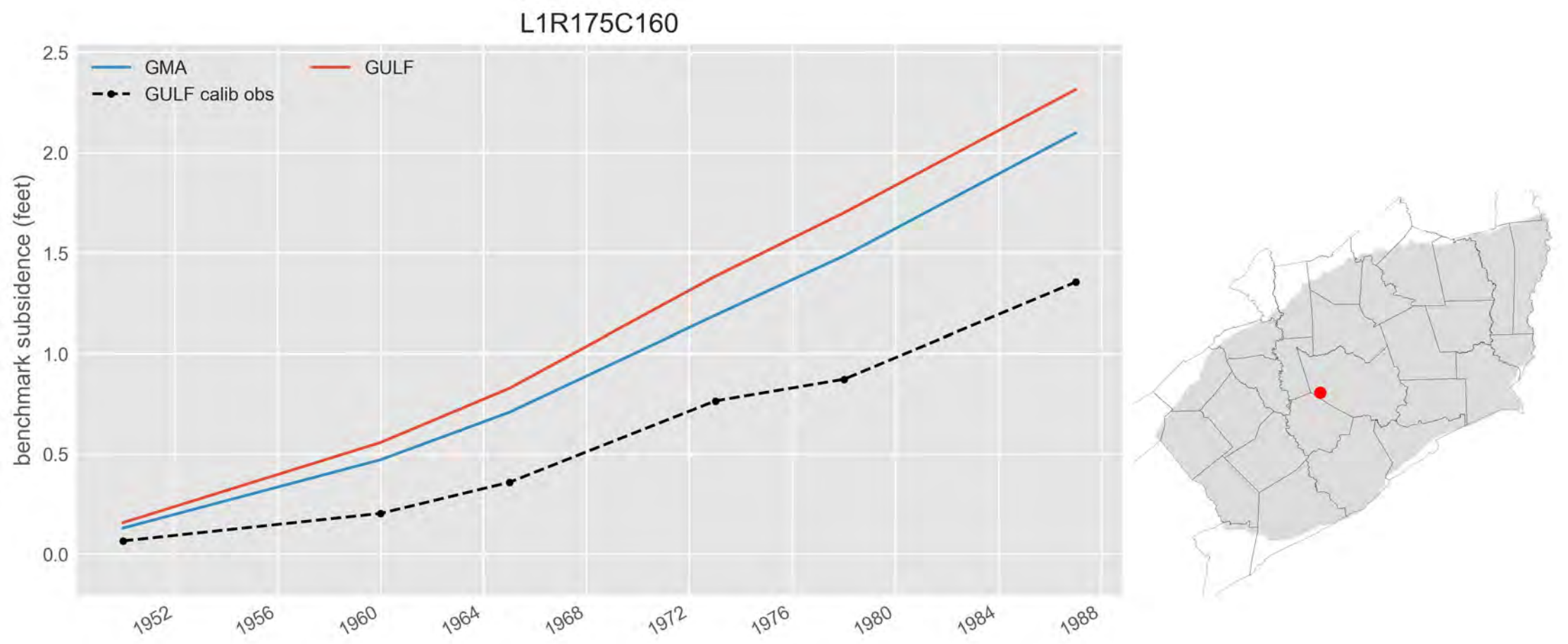

L1R175C140
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
1.0
0.8
0.6
0.4
0.2
0.0
1960
1964
1968
1972
1976
1980
1984
1988

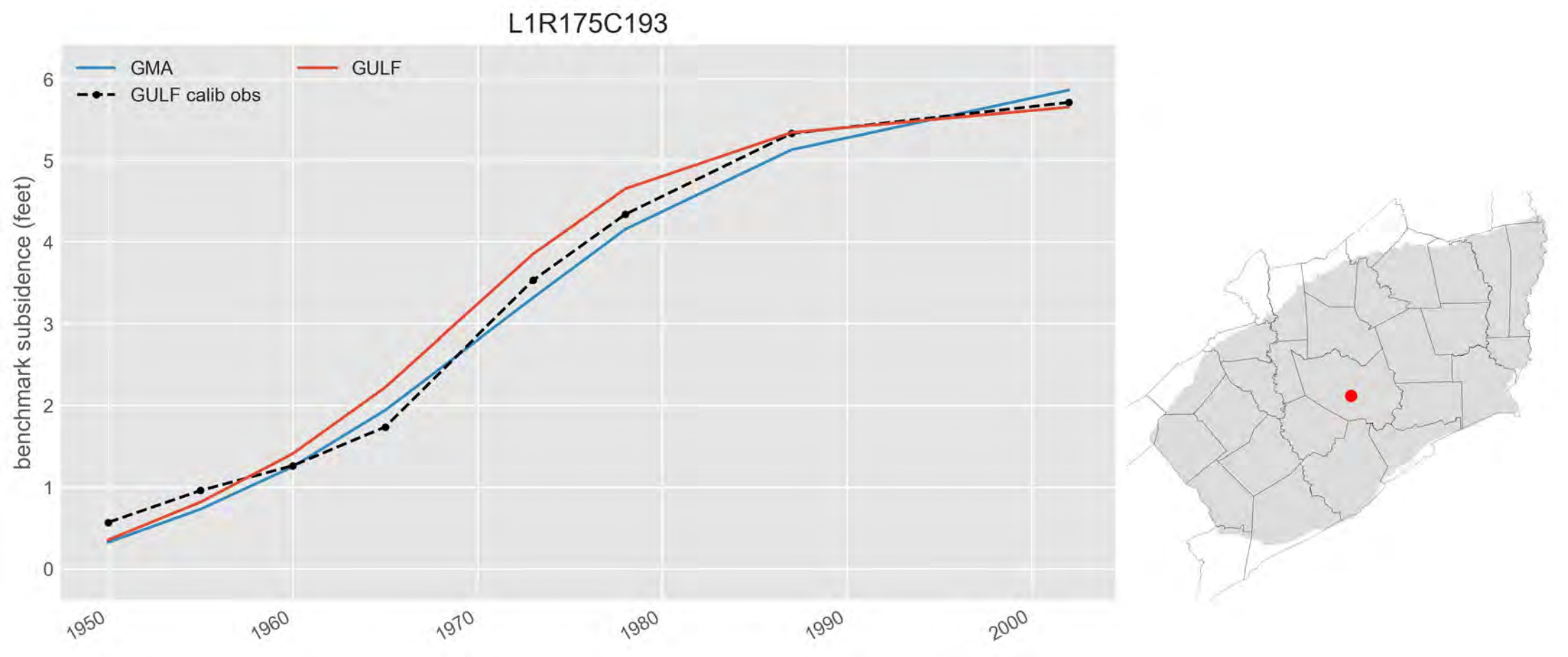

L1R175C144
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1945
1950
1955
1960
1965
1970
1975
1980
1985

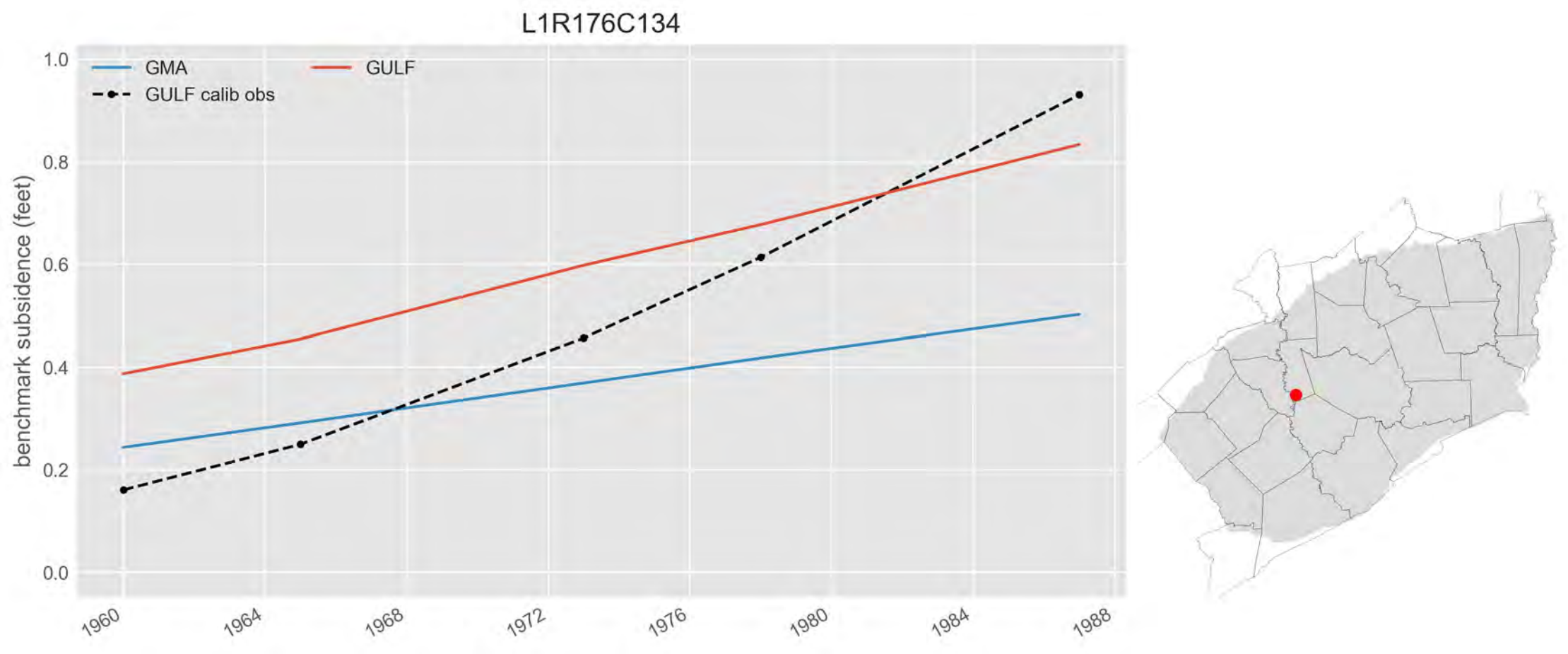

L1R175C149
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1960
1964
1968
1972
1976
1980
1984
1988

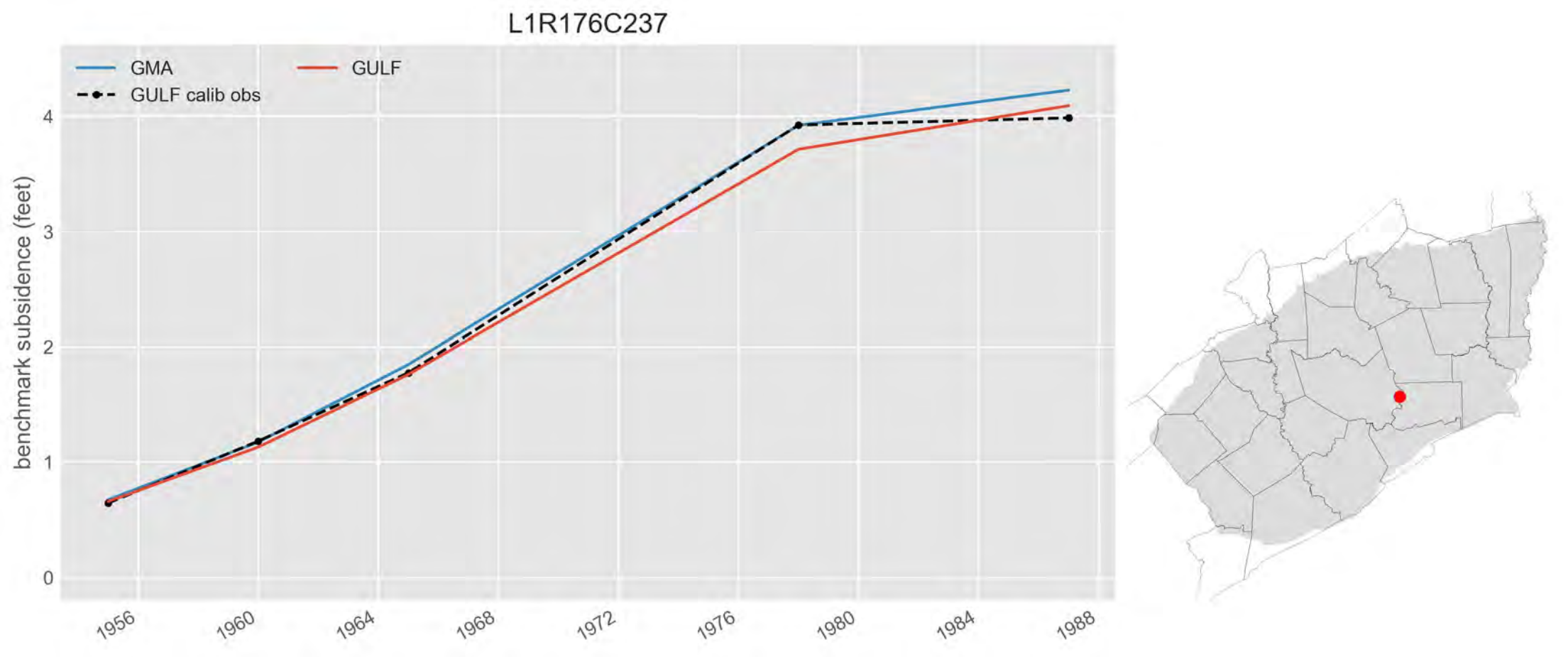

L1R175C152
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1950
1960
1970
1980
1990
2000
2010
2020

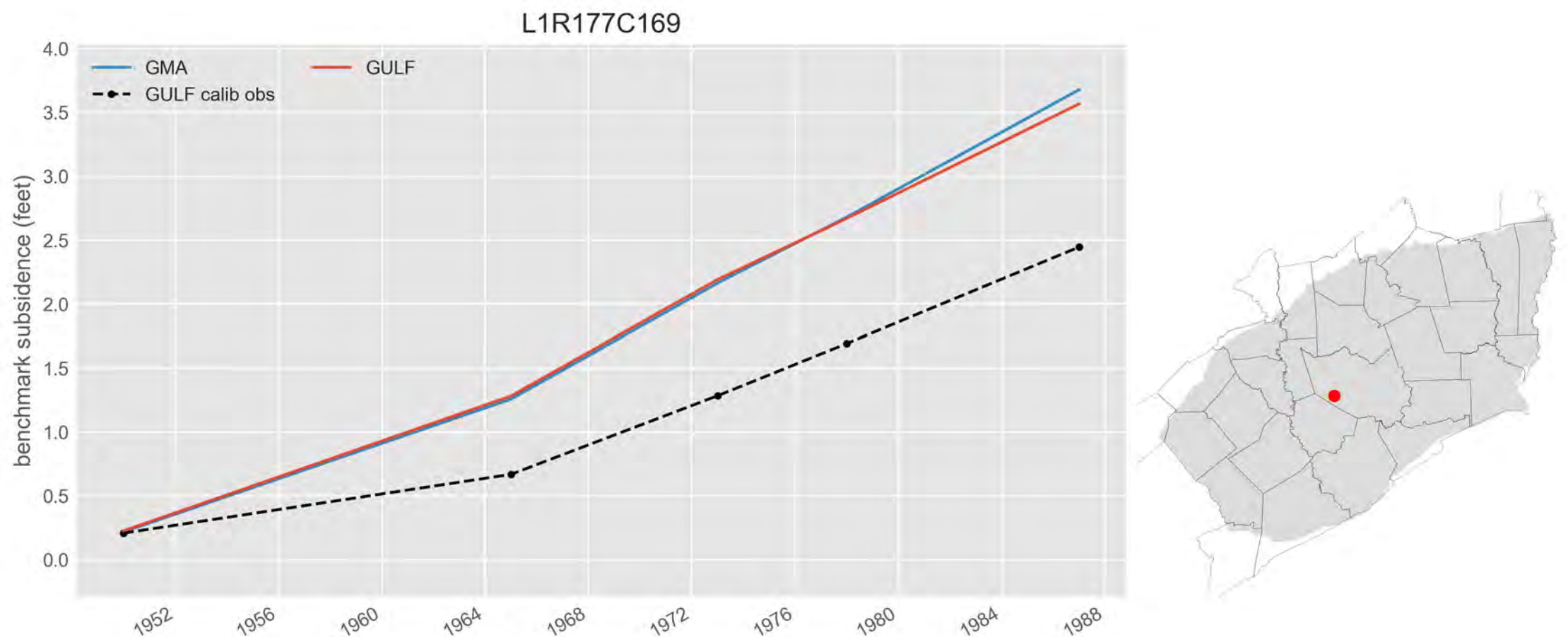

L1R175C158
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995

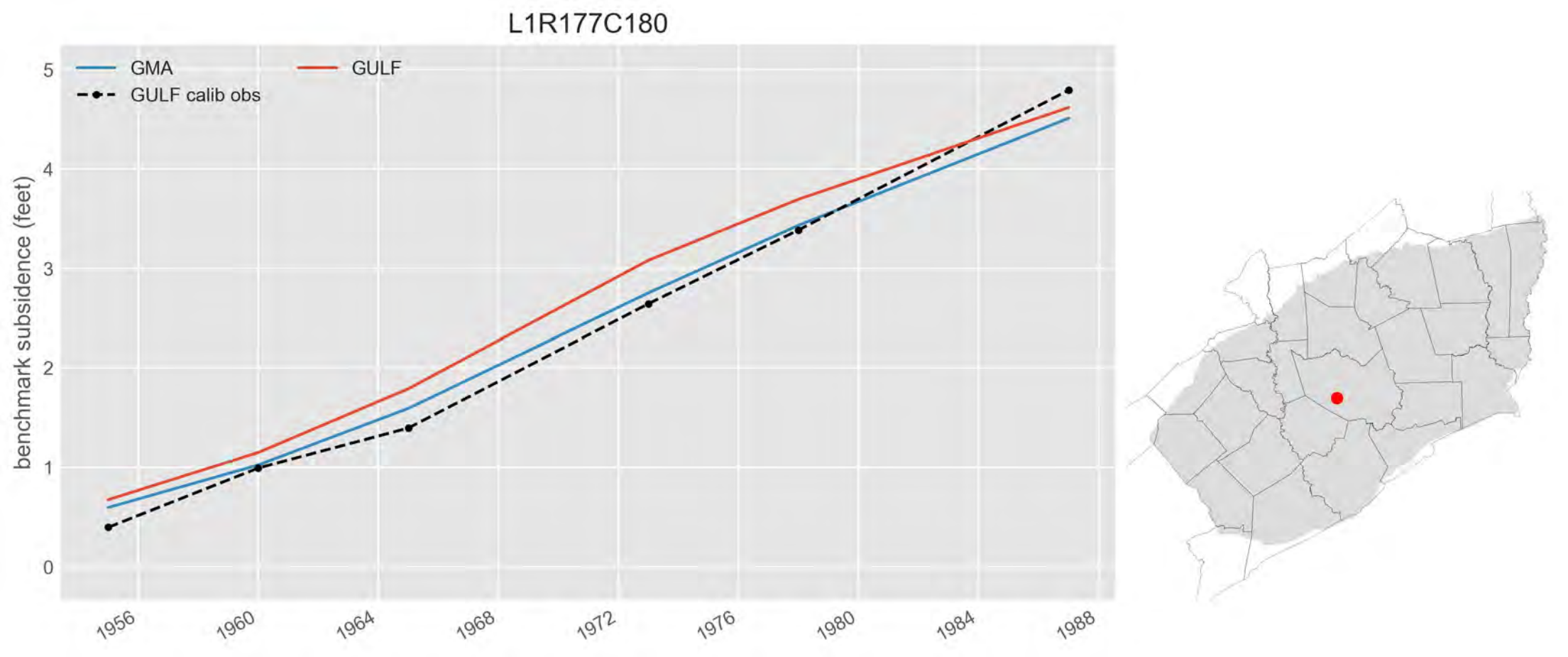

L1R175C160
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.5
2.0
1.5
1.0
0.5
0.0
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

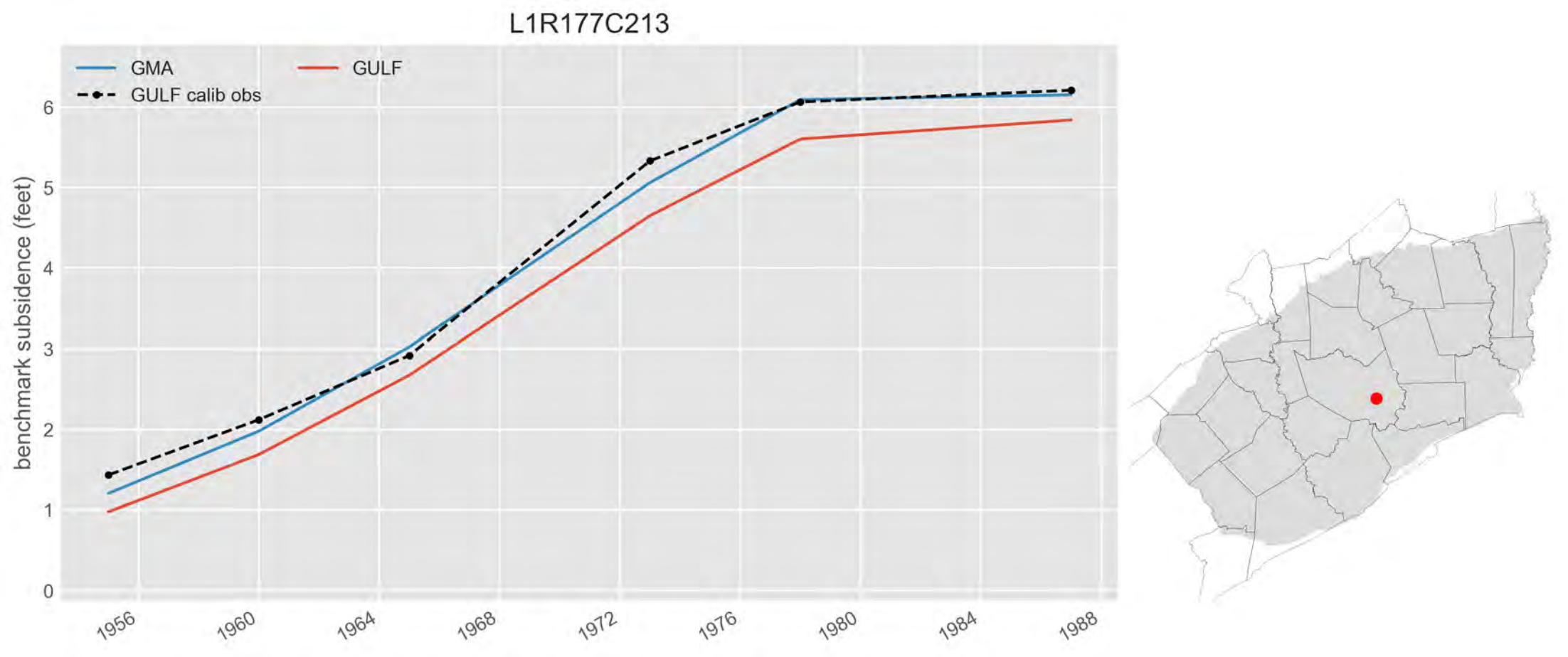

L1R175C193
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1950
1960
1970
1980
1990
2000

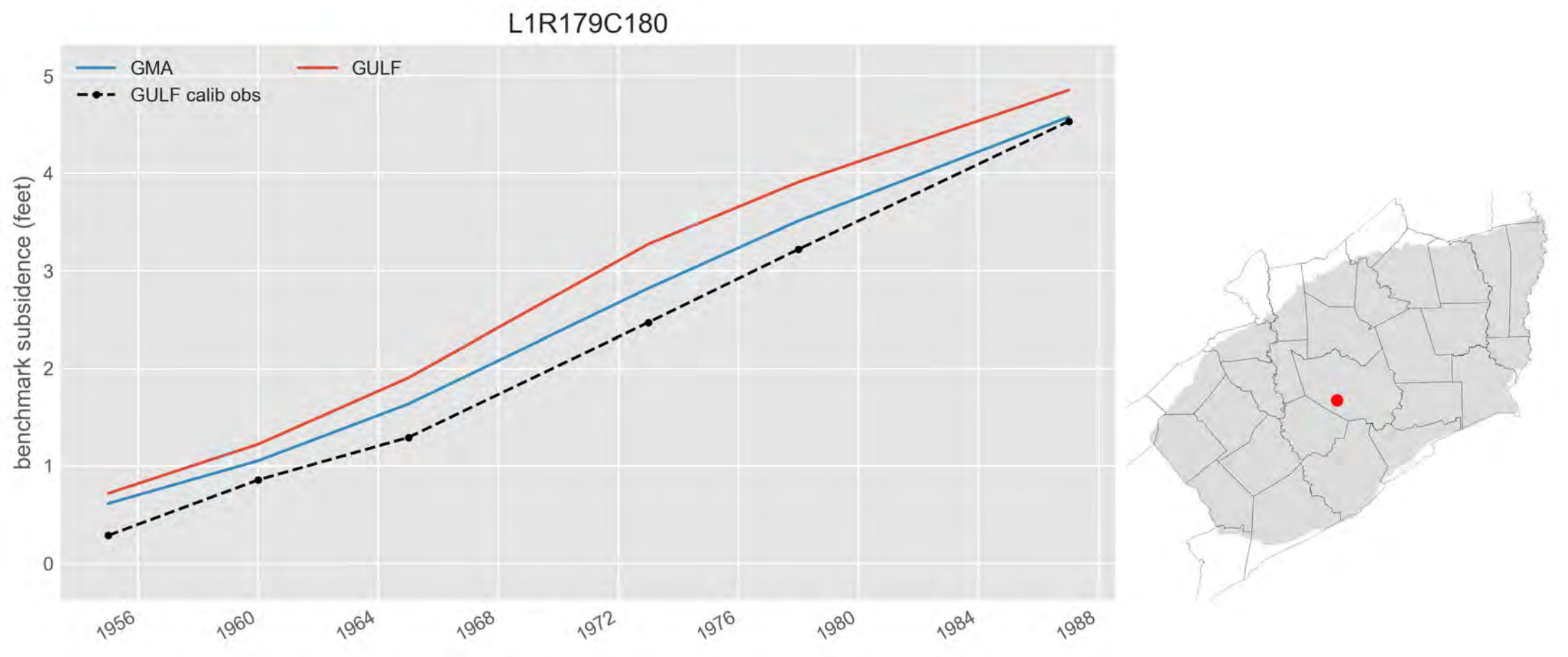

L1R176C134
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
1.0
0.8
0.6
0.4
0.2
0.0
1960
1964
1968
1972
1976
1980
1984
1988

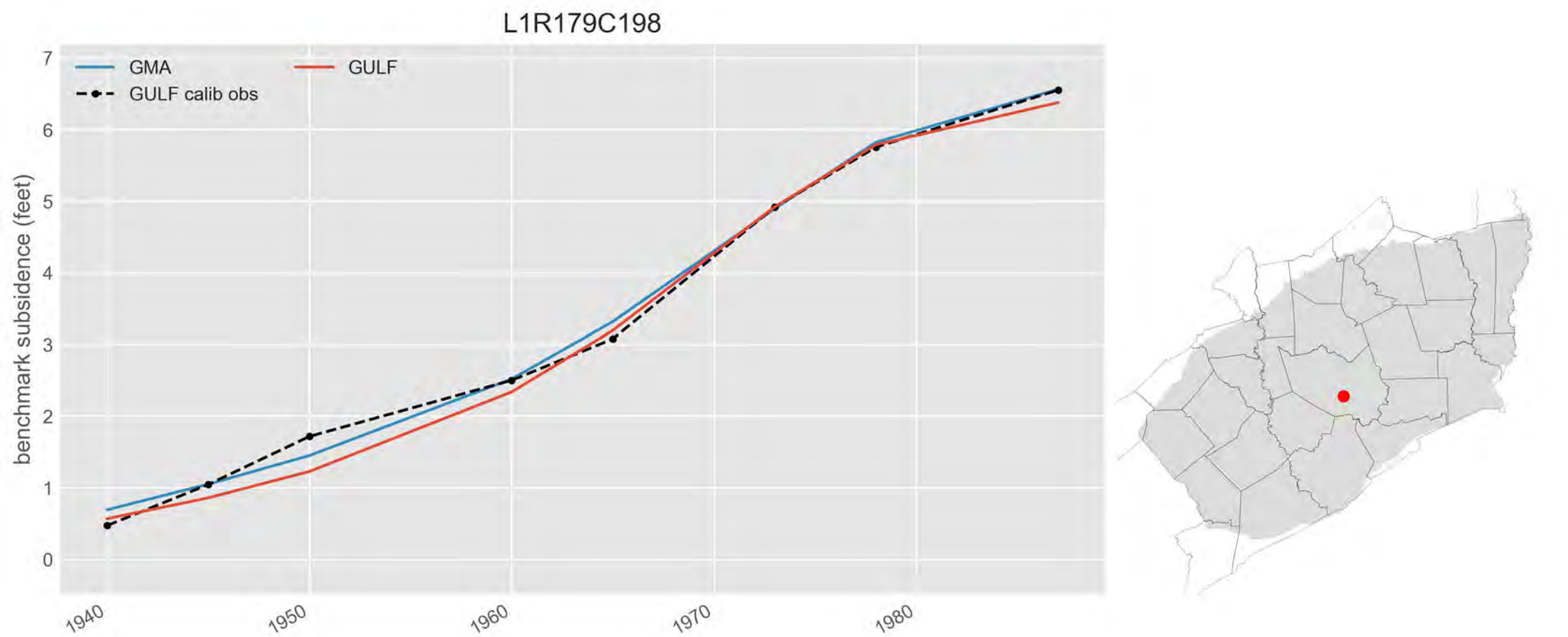

L1R176C237
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1956
1960
1964
1968
1972
1976
1980
1984
1988

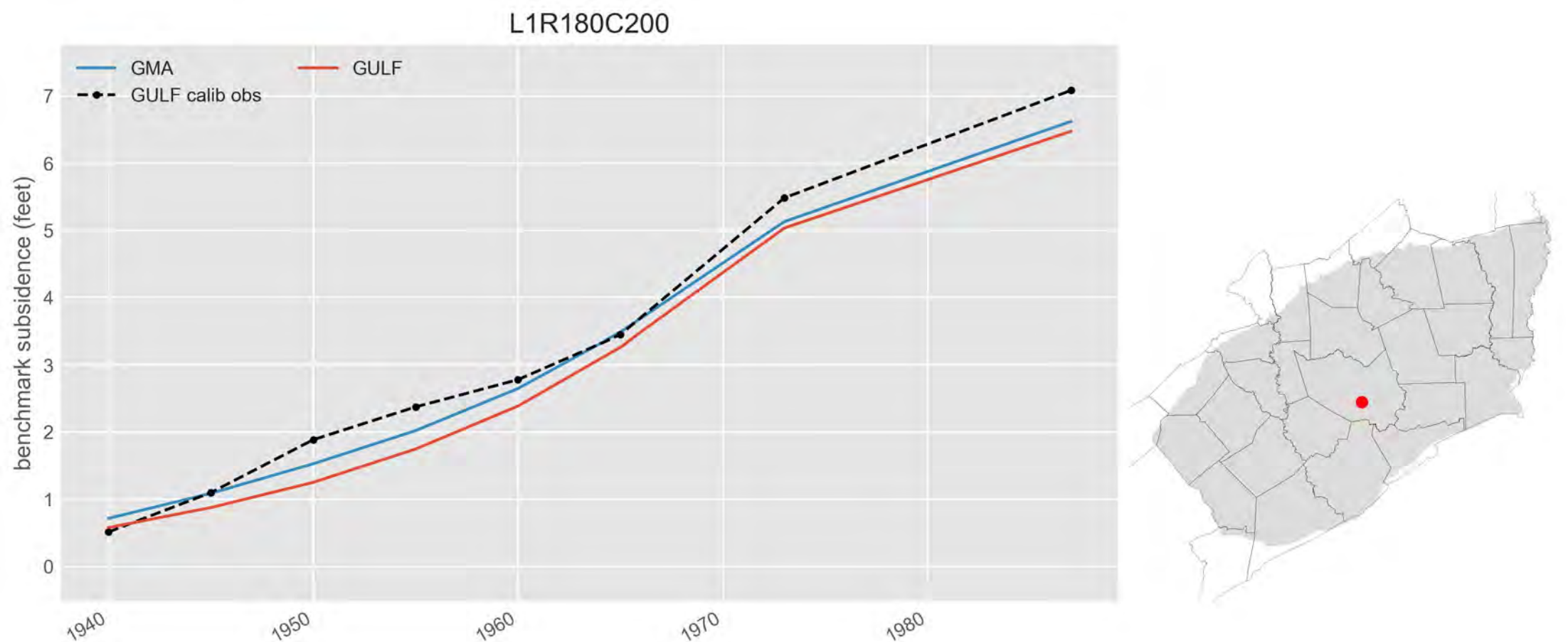

L1R177C169
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

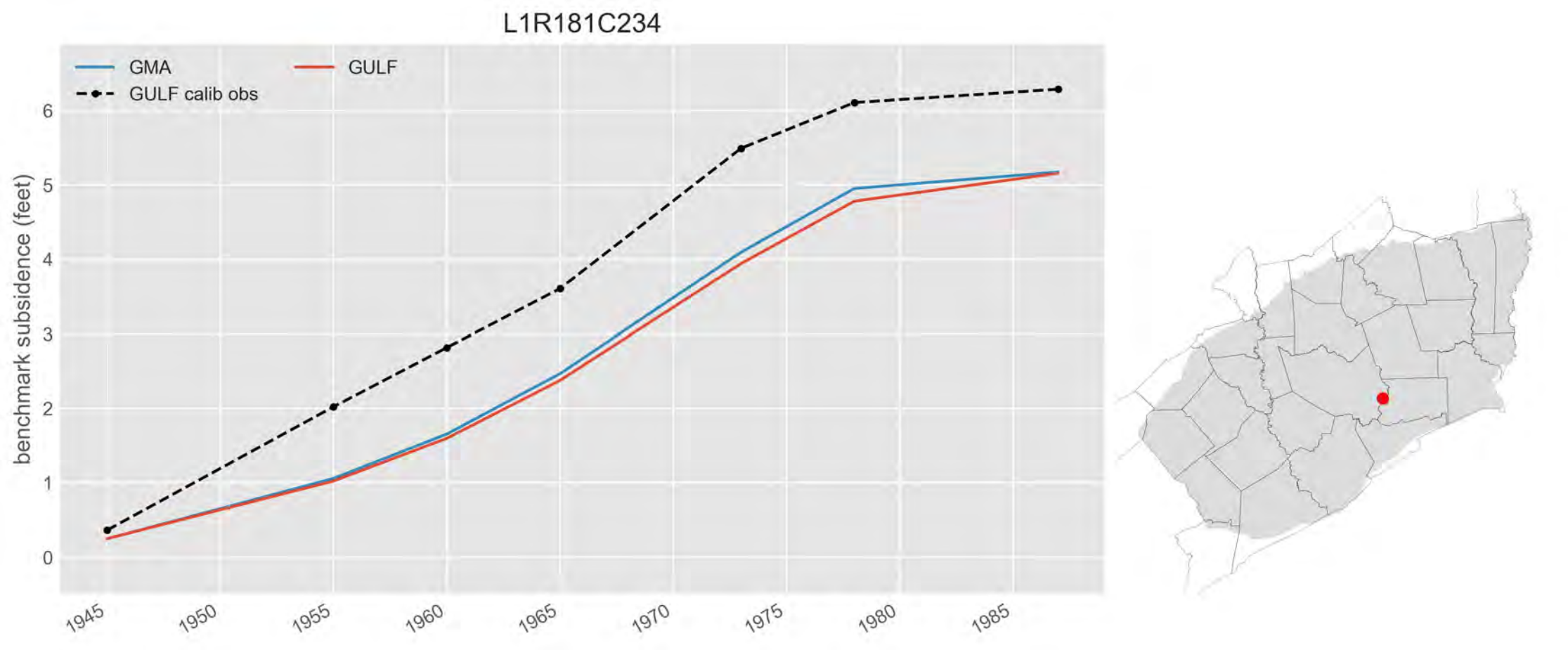

L1R177C180
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

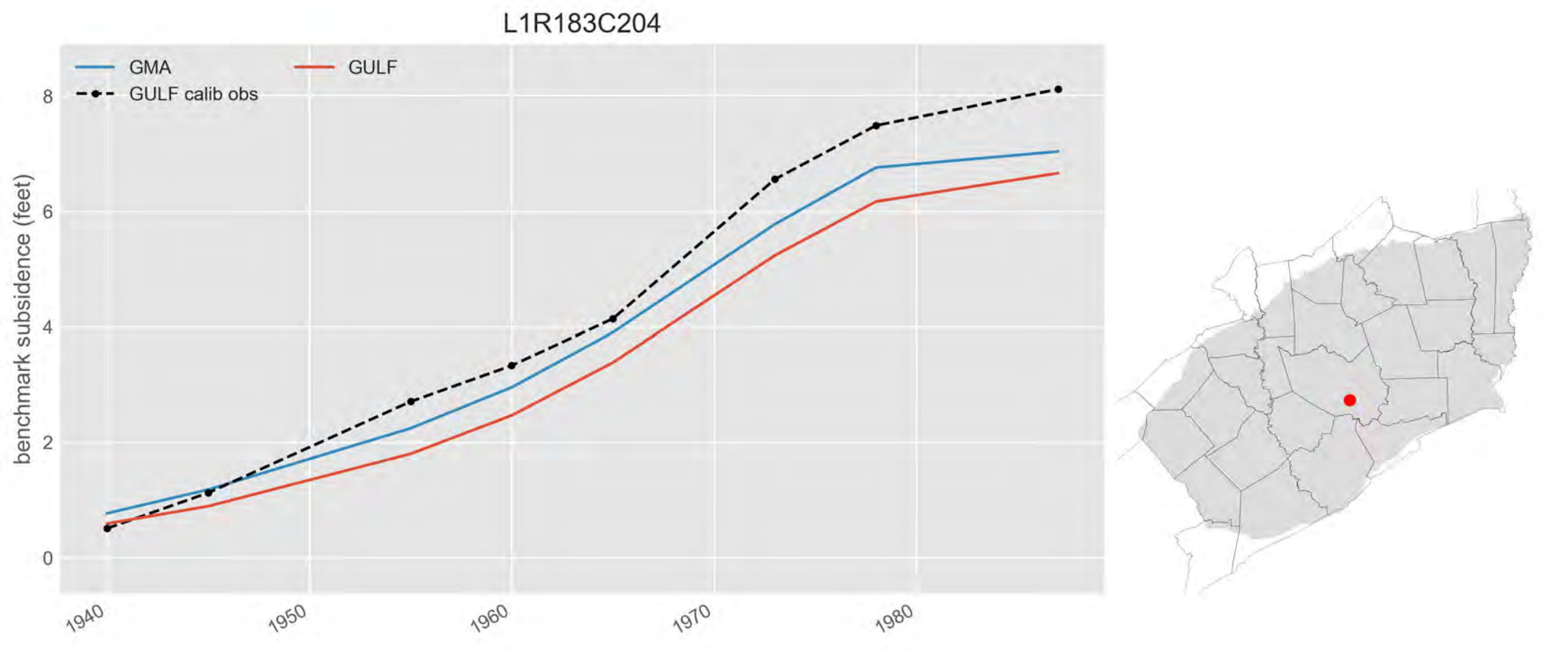

L1R177C213
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1956
1960
1964
1968
1972
1976
1980
1984
1988

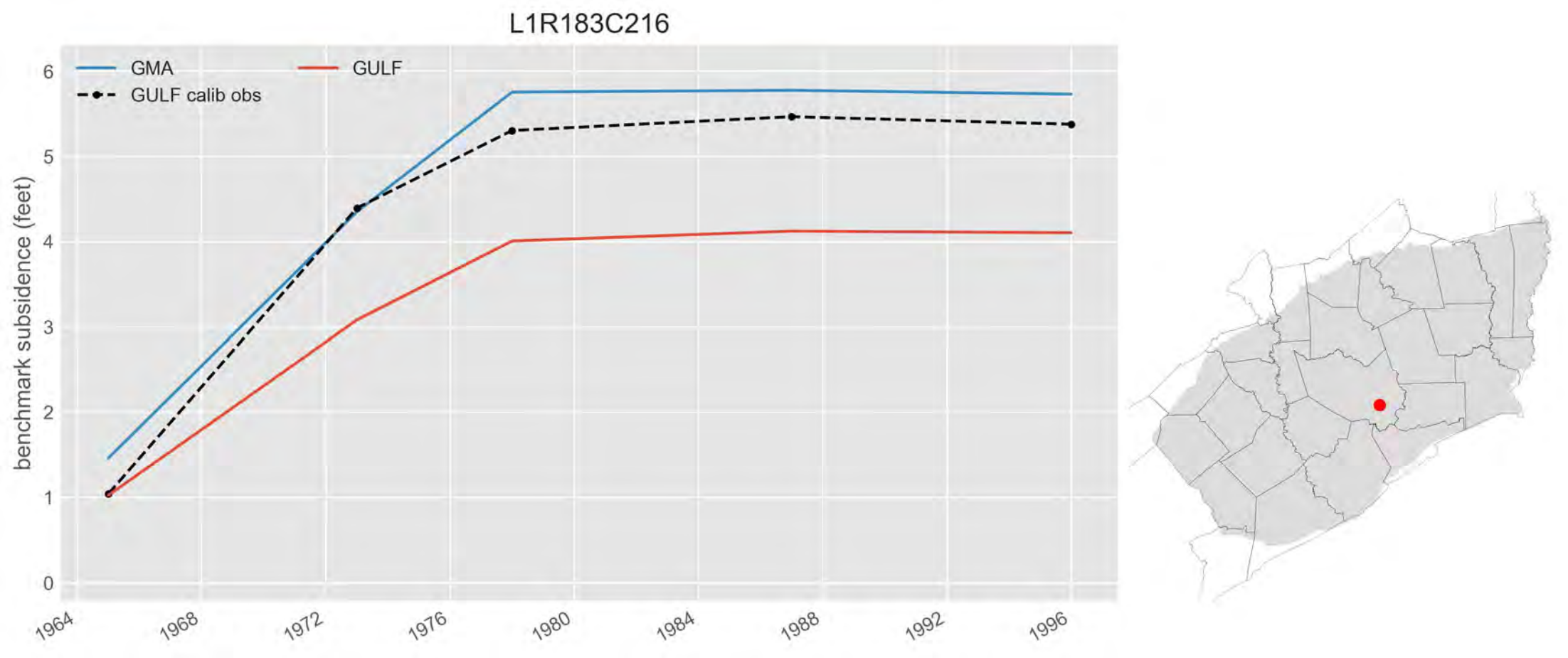

L1R179C180
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

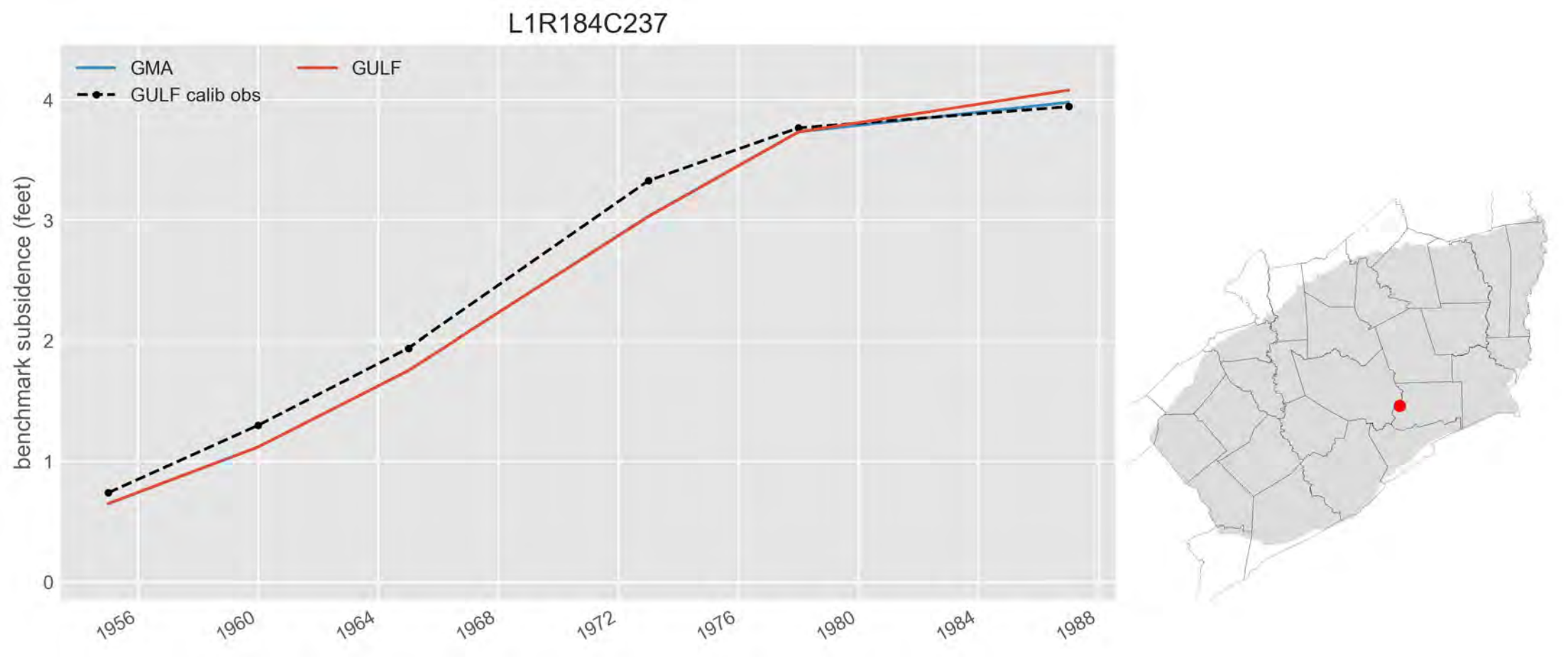

L1R179C198
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
1940
1950
1960
1970
1980

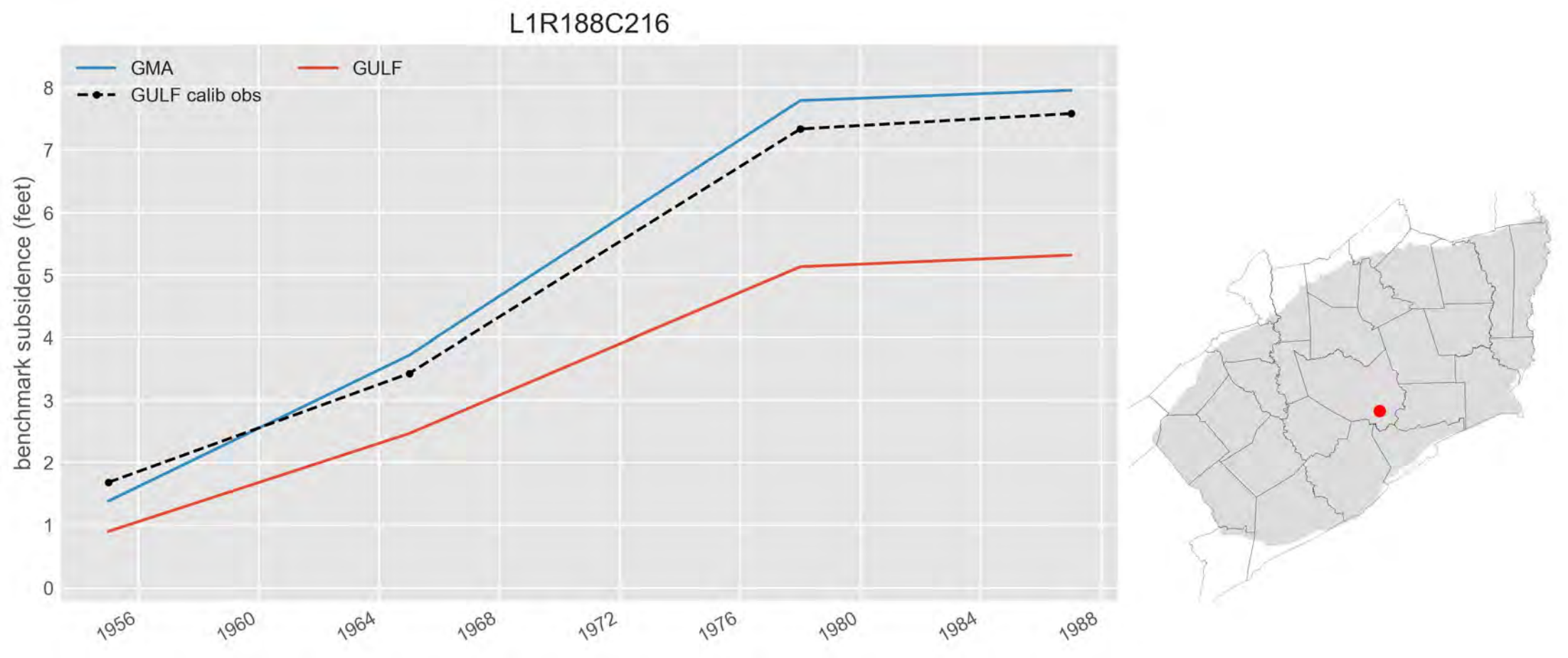

L1R180C200
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
1940
1950
1960
1970
1980

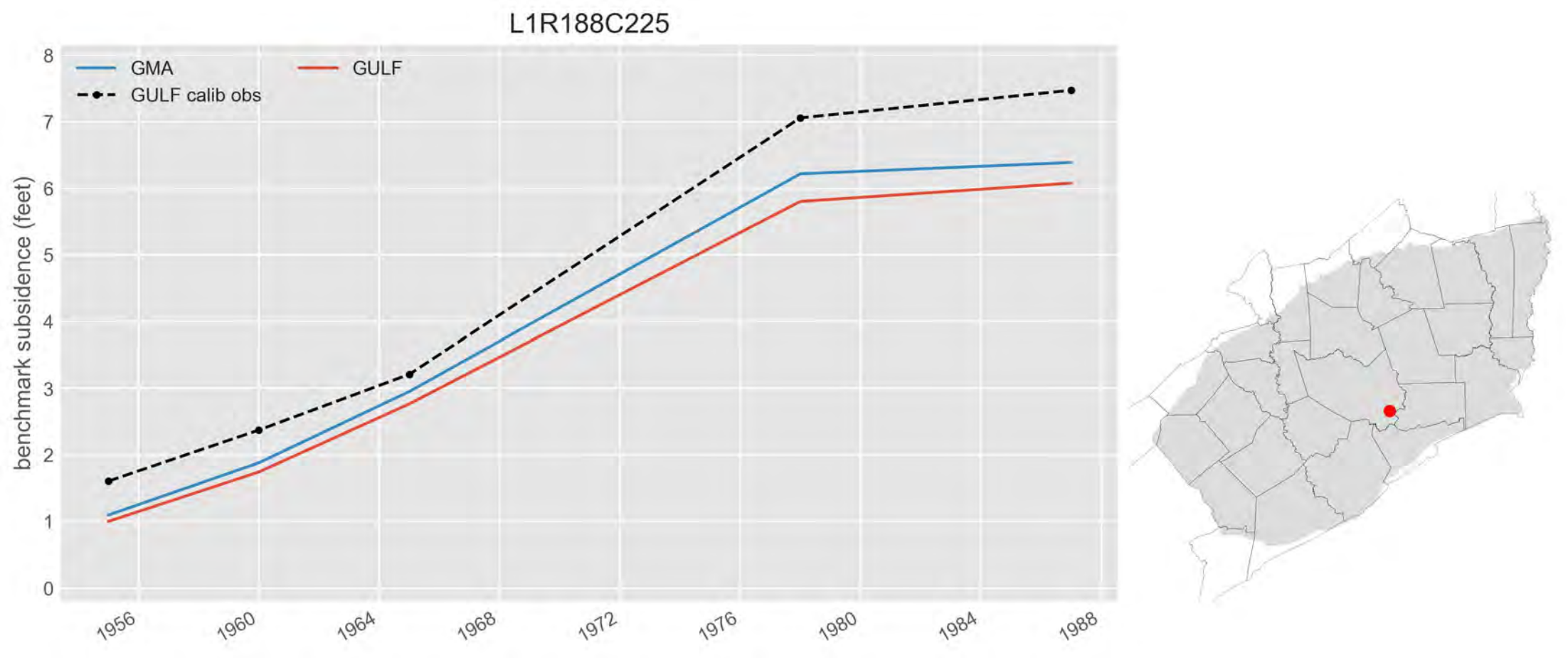

L1R181C234
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1945
1950
1955
1960
1965
1970
1975
1980
1985

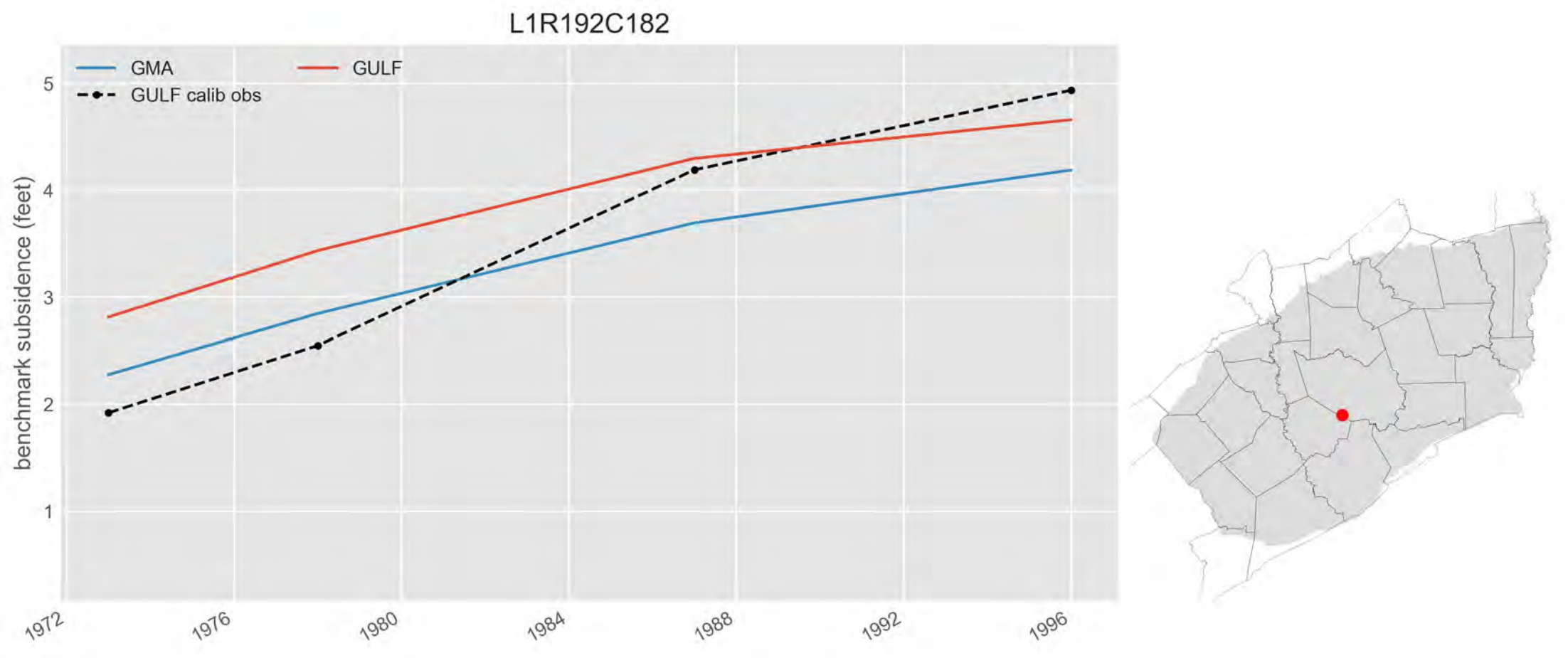

L1R183C204
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
2
4
6
8
1940
1950
1960
1970
1980

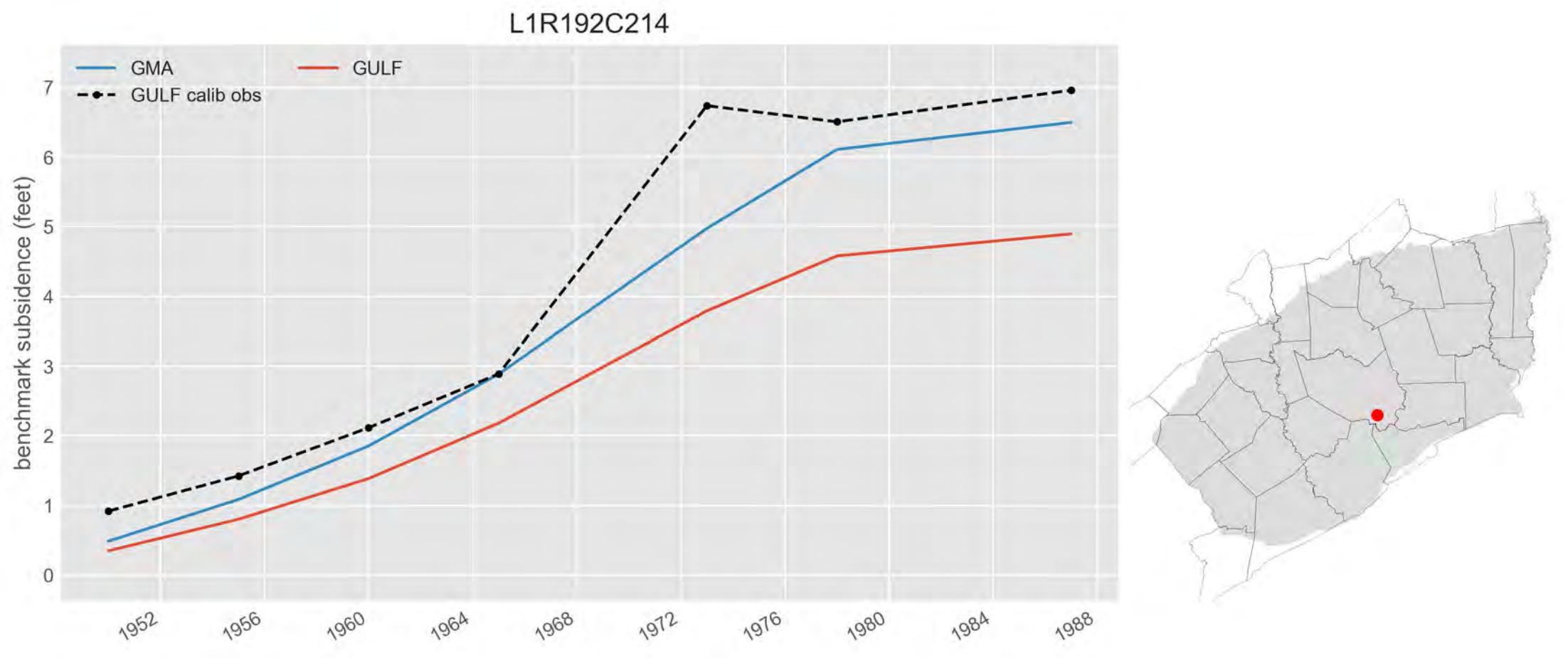

L1R183C216
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1964
1968
1972
1976
1980
1984
1988
1992
1996

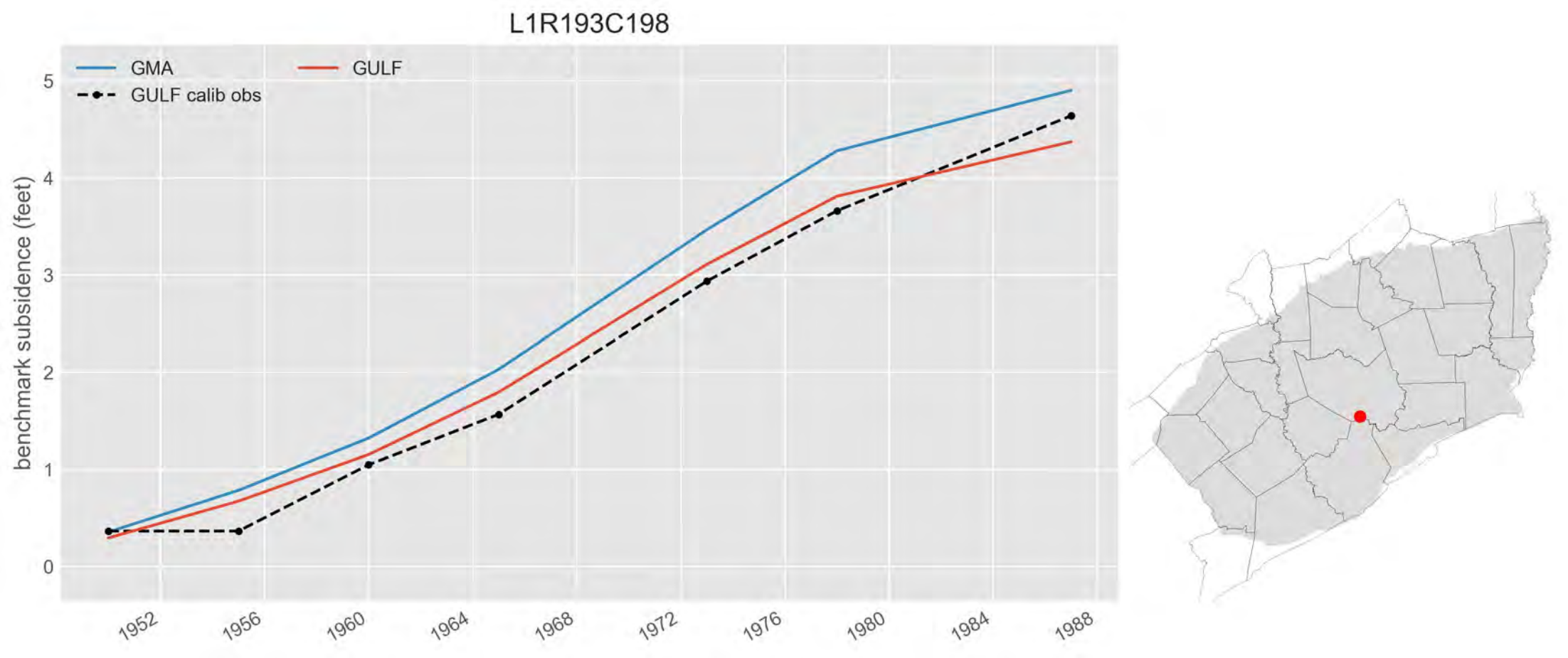

L1R184C237
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1956
1960
1964
1968
1972
1976
1980
1984
1988

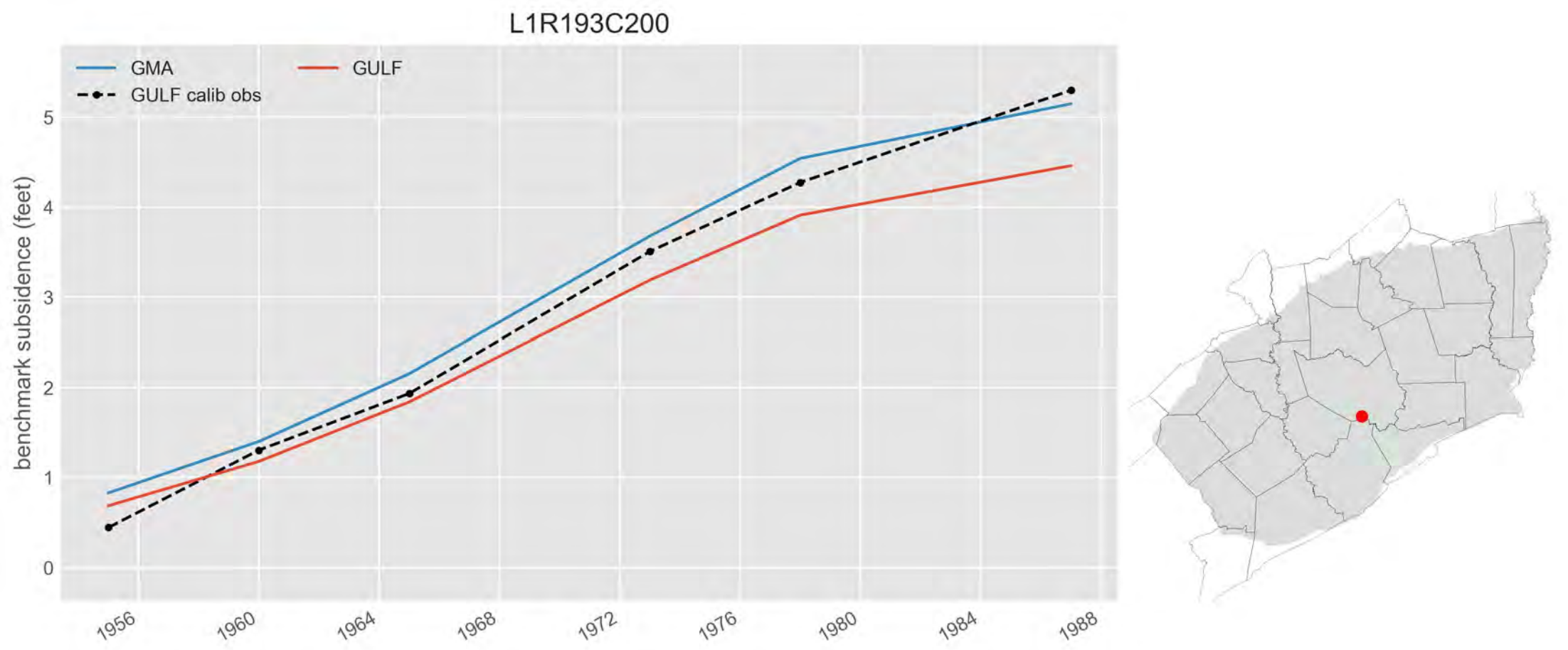

L1R188C216
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
8
1956
1960
1964
1968
1972
1976
1980
1984
1988

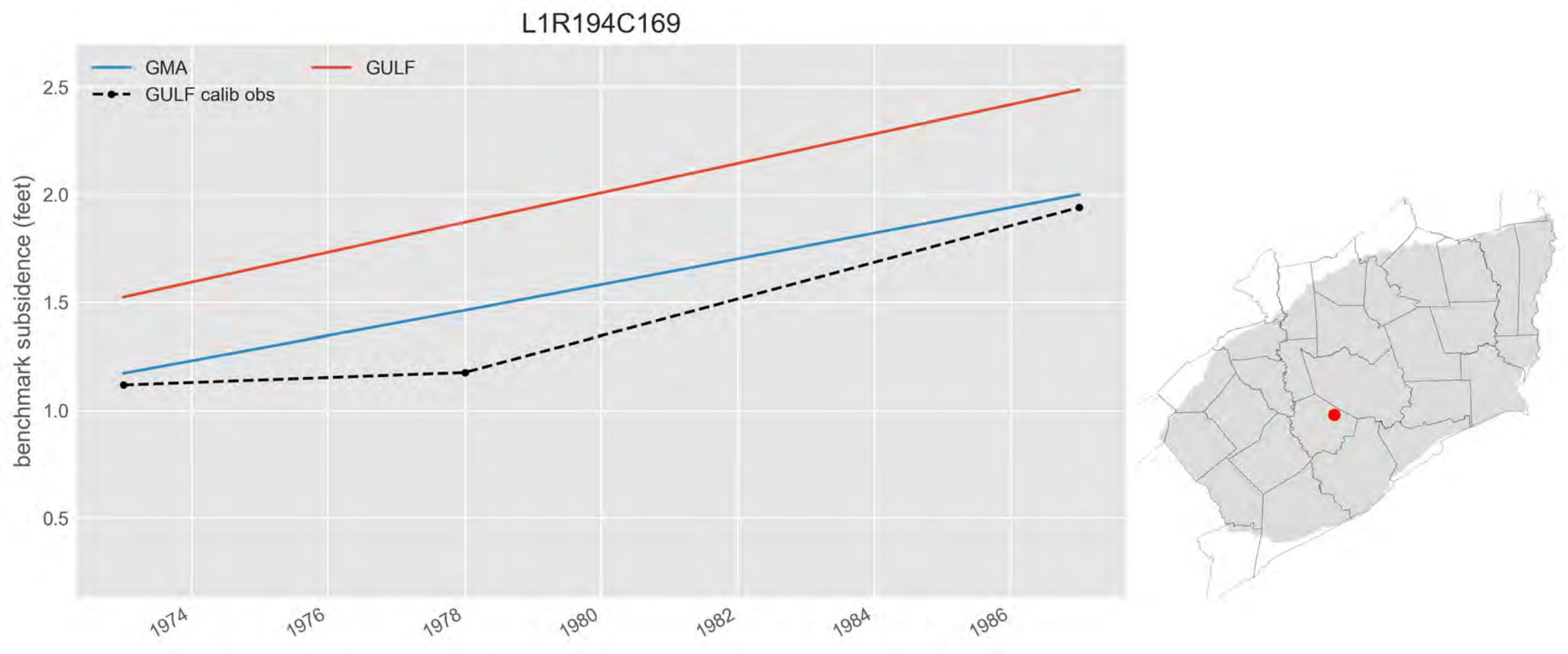

L1R188C225
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
8
1956
1960
1964
1968
1972
1976
1980
1984
1988

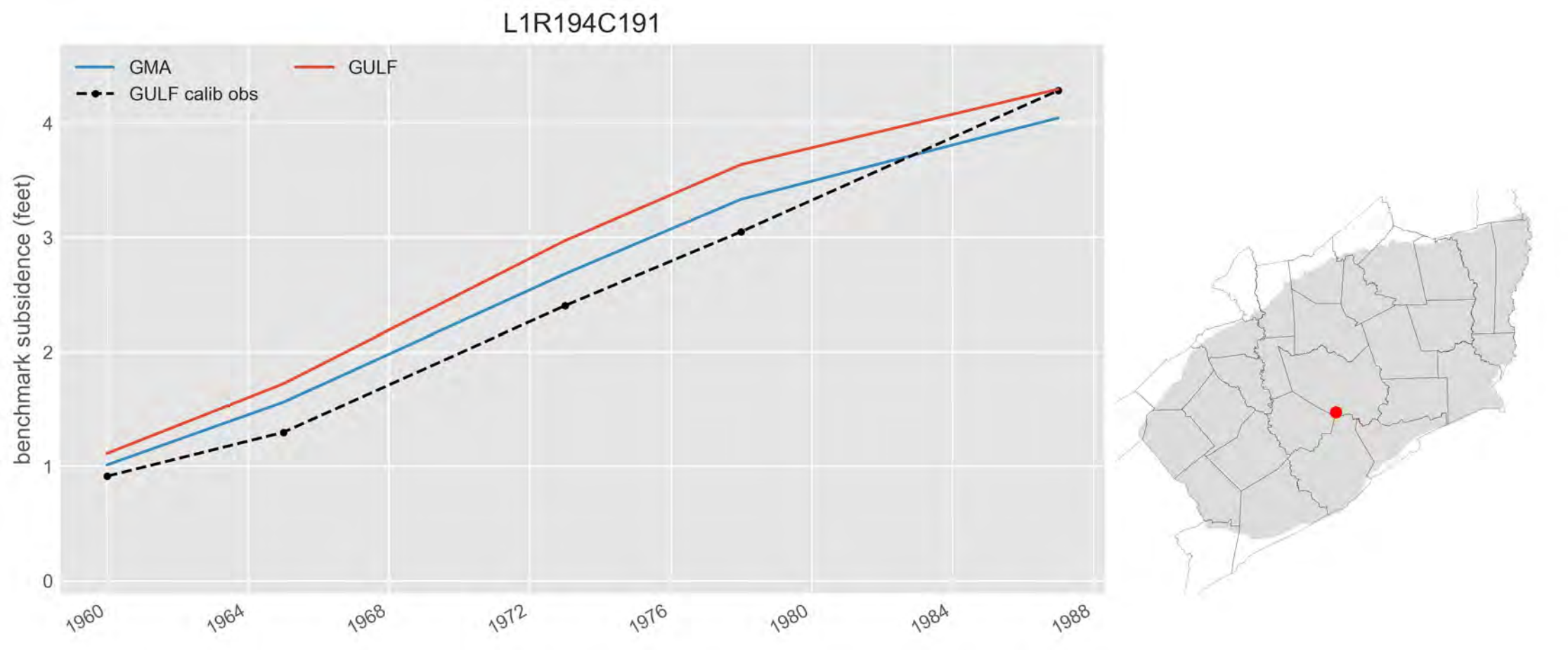

L1R192C182
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
5
4
3
2
1
1972
1976
1980
1984
1988
1992
1996

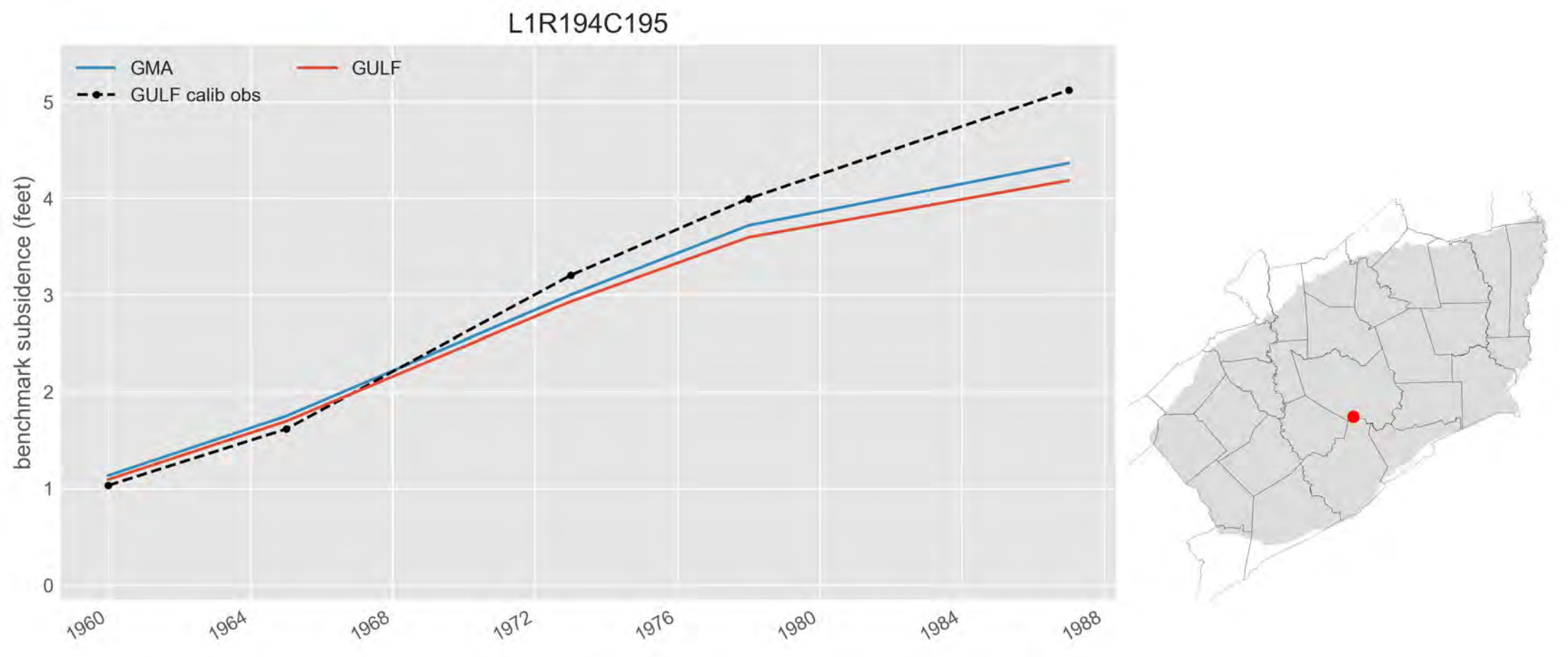

L1R192C214
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

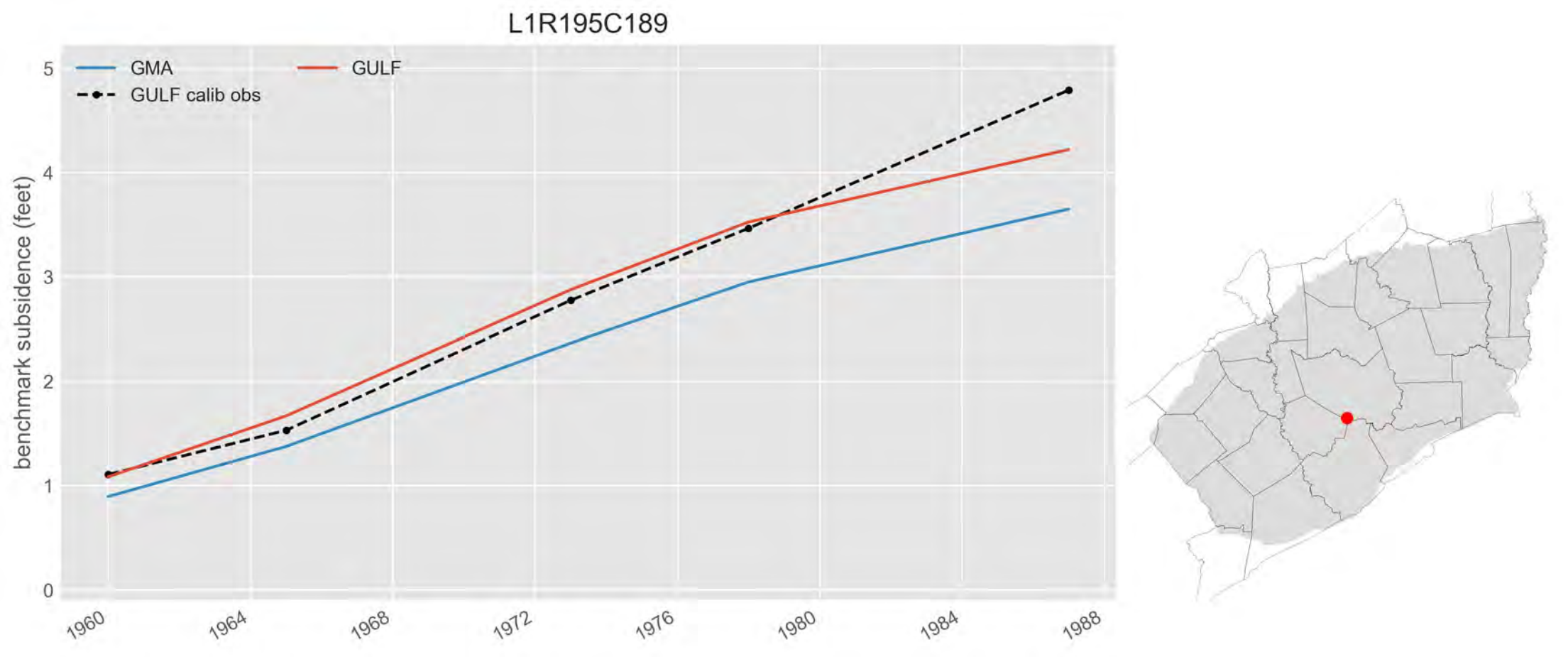

L1R193C198
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

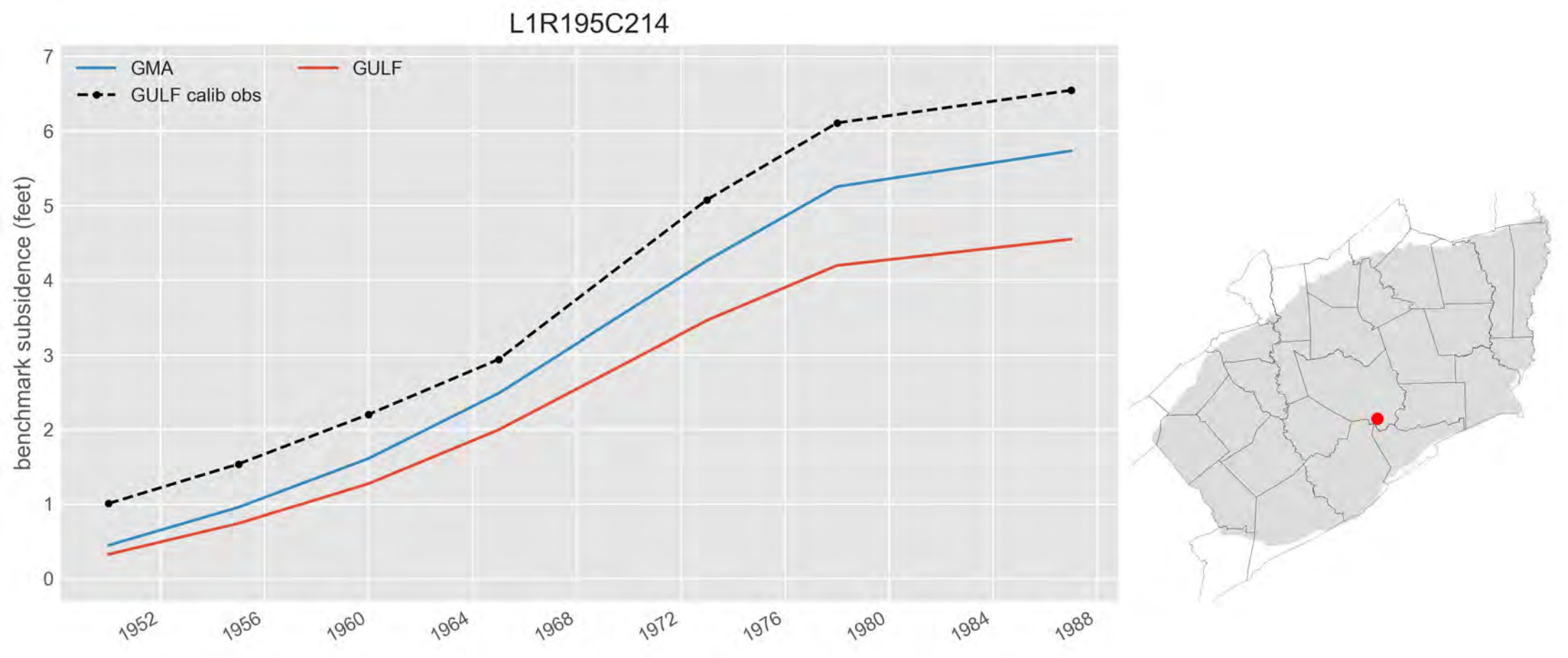

L1R193C200
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

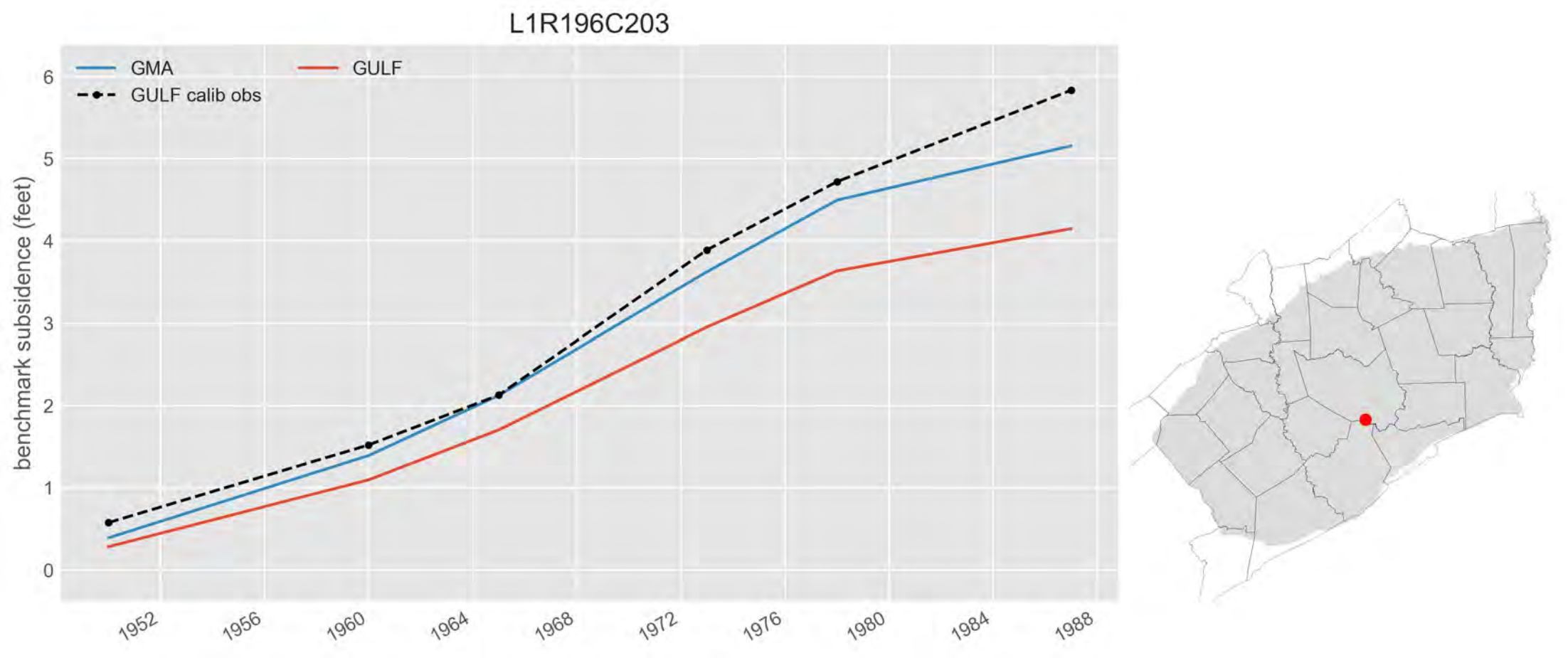

L1R194C169
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.5
2.0
1.5
1.0
0.5
1974
1976
1978
1980
1982
1984
1986

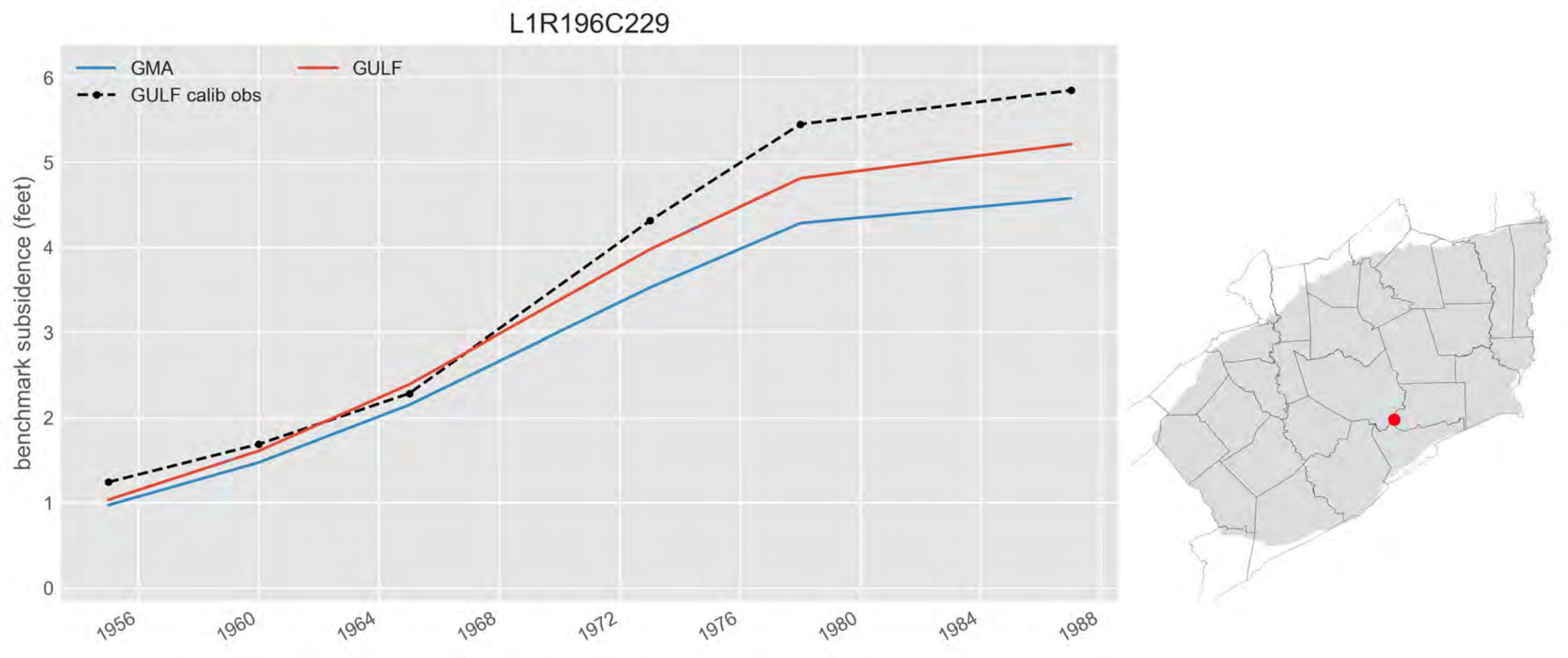

L1R194C191
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1960
1964
1968
1972
1976
1980
1984
1988

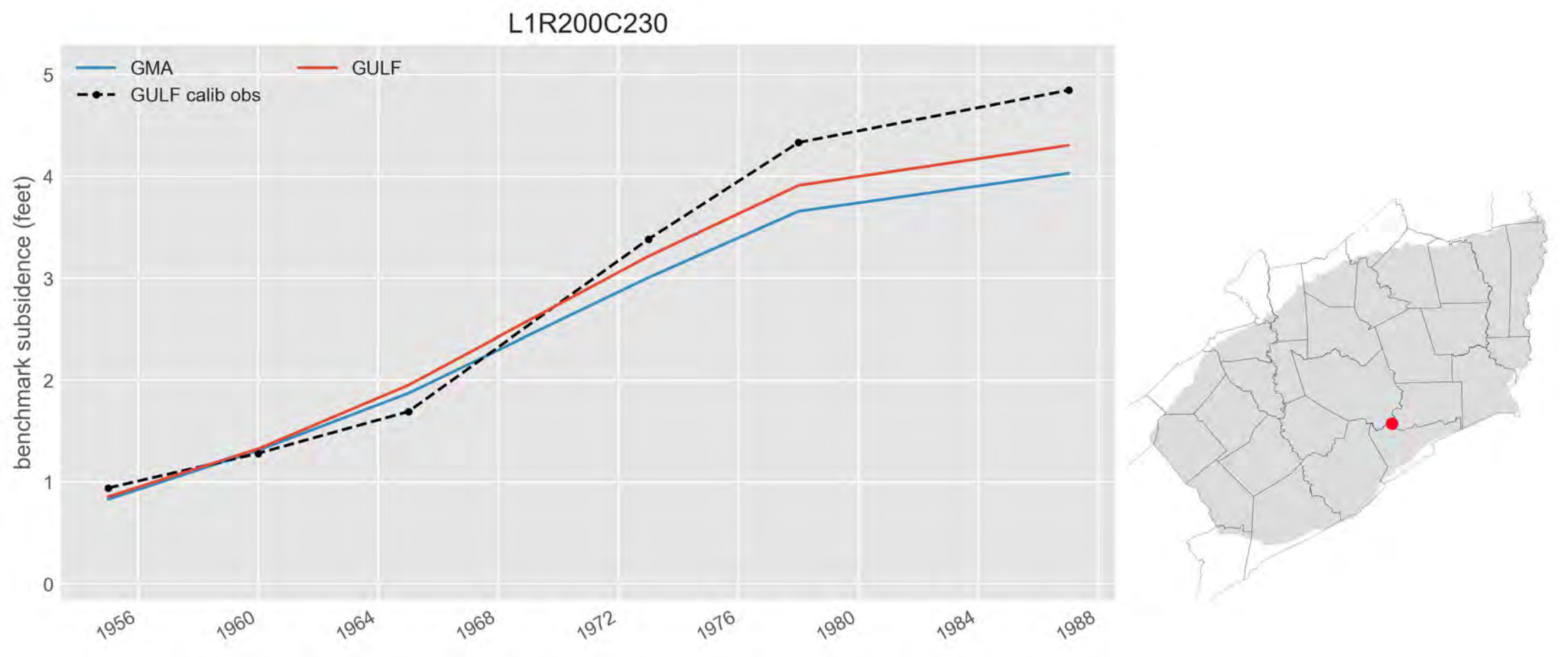

L1R194C195
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1960
1964
1968
1972
1976
1980
1984
1988

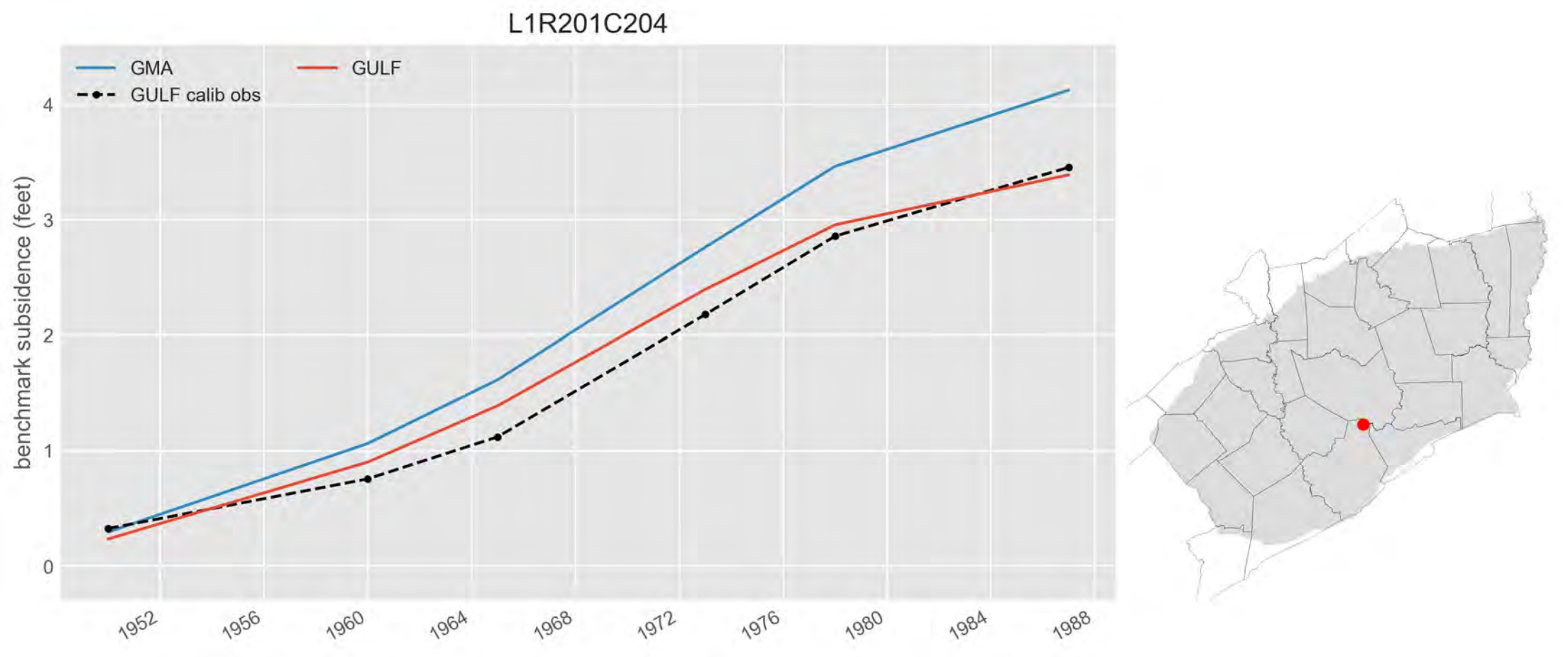

L1R195C189
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1960
1964
1968
1972
1976
1980
1984
1988

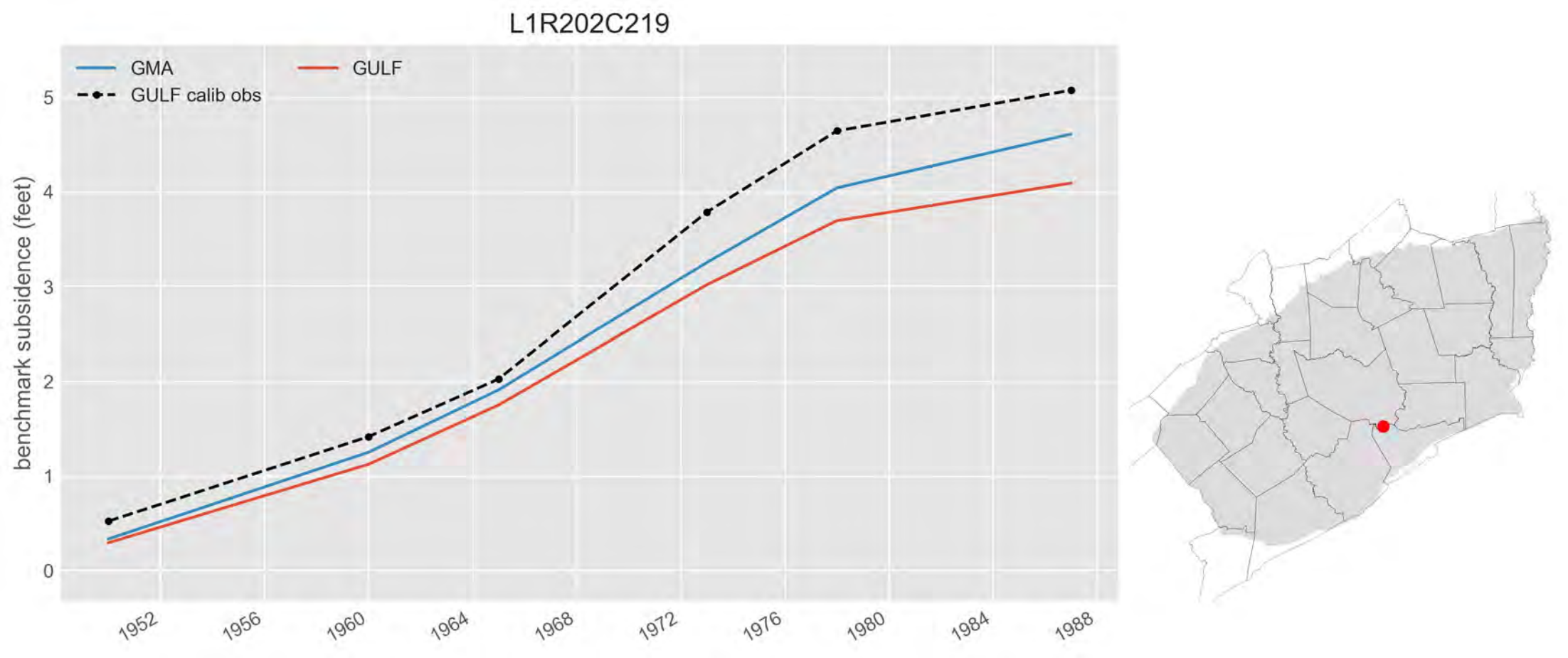

L1R195C214
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
7
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

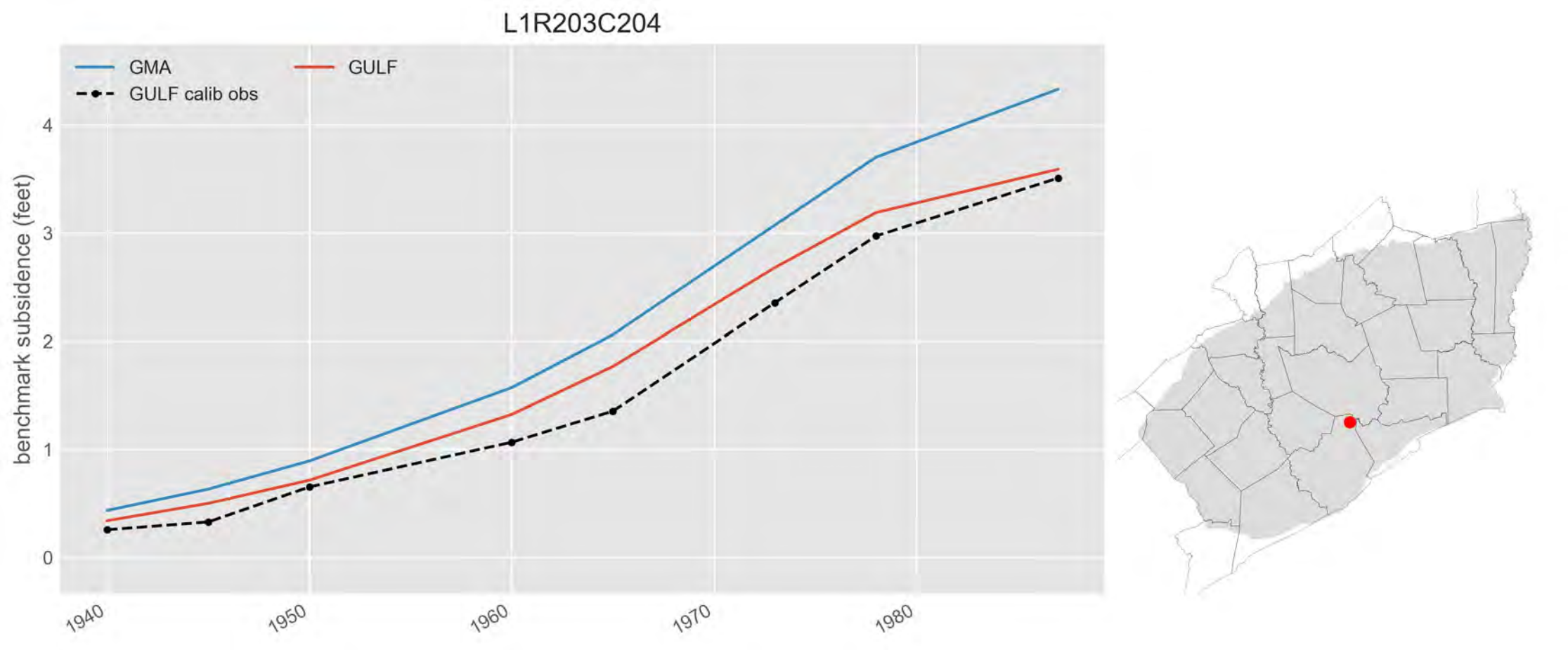

L1R196C203
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

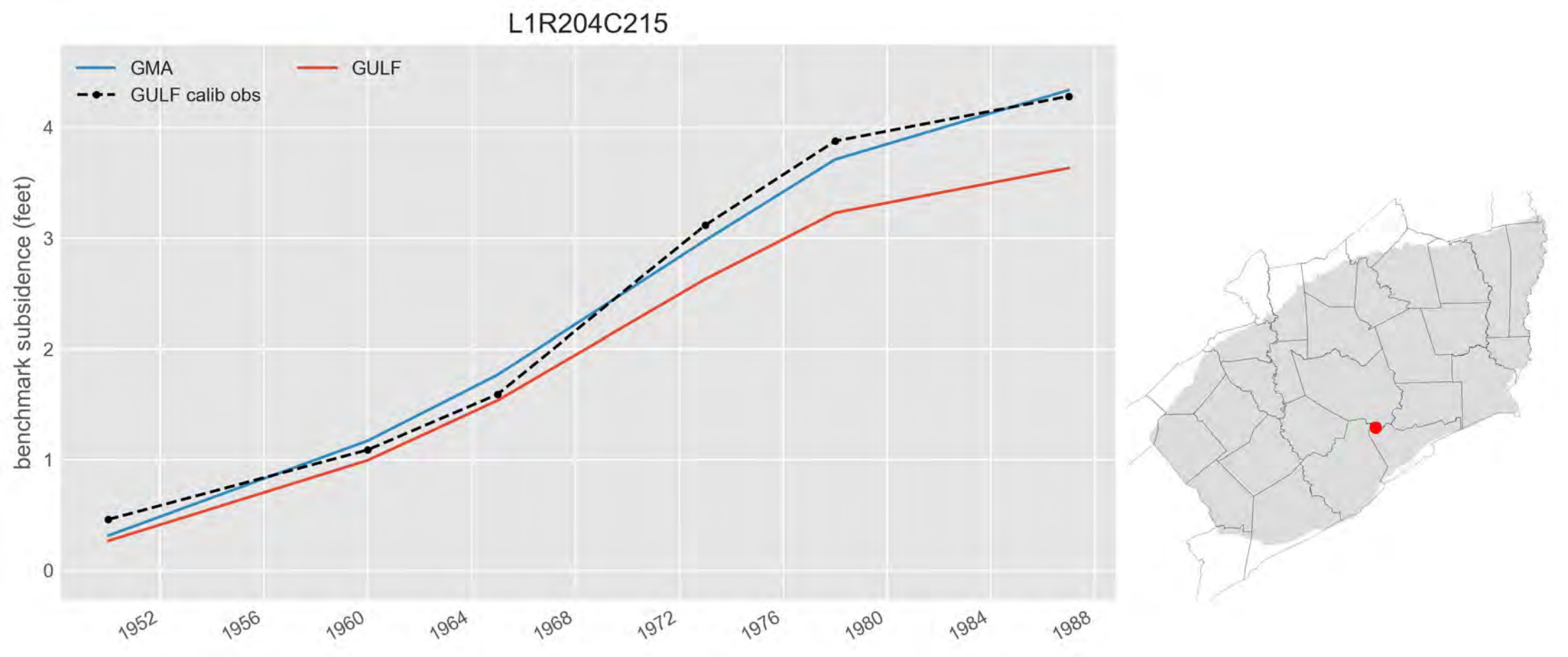

L1R196C229
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1956
1960
1964
1968
1972
1976
1980
1984
1988

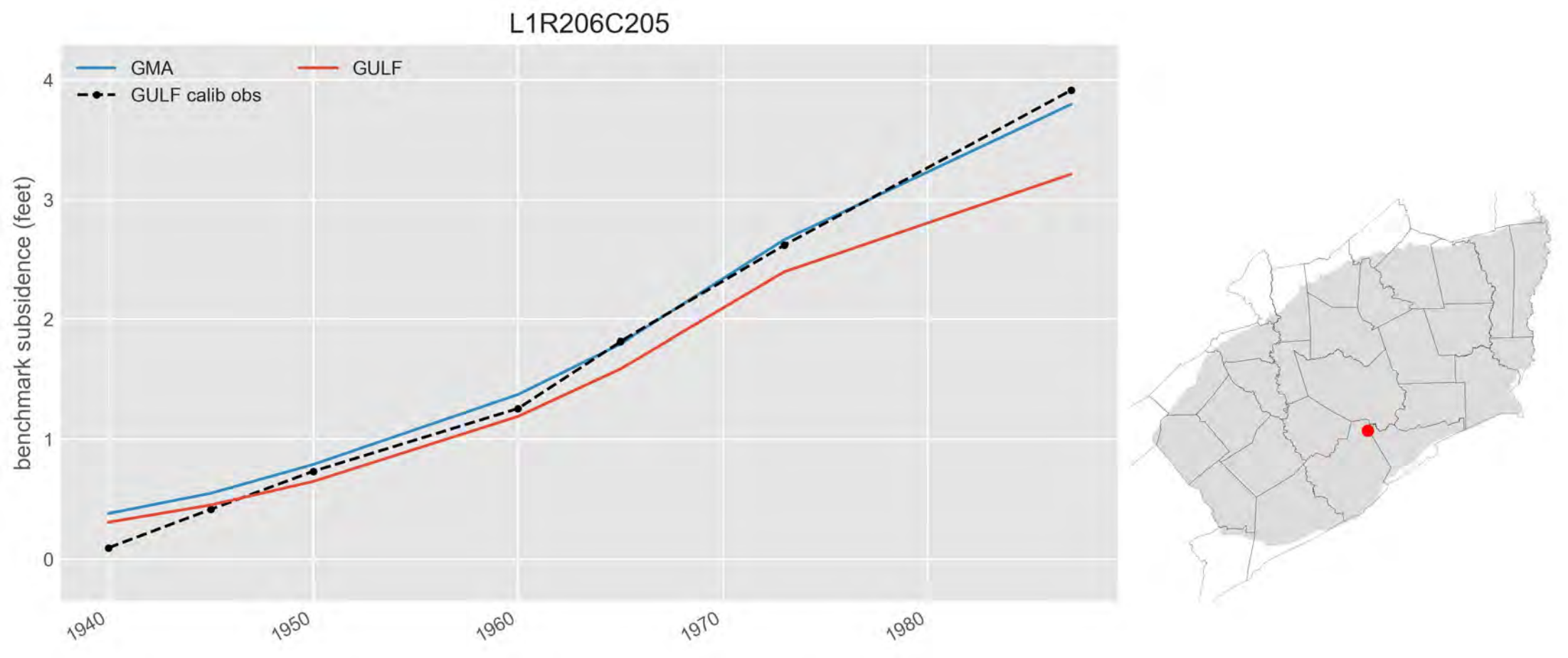

L1R200C230
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1956
1960
1964
1968
1972
1976
1980
1984
1988

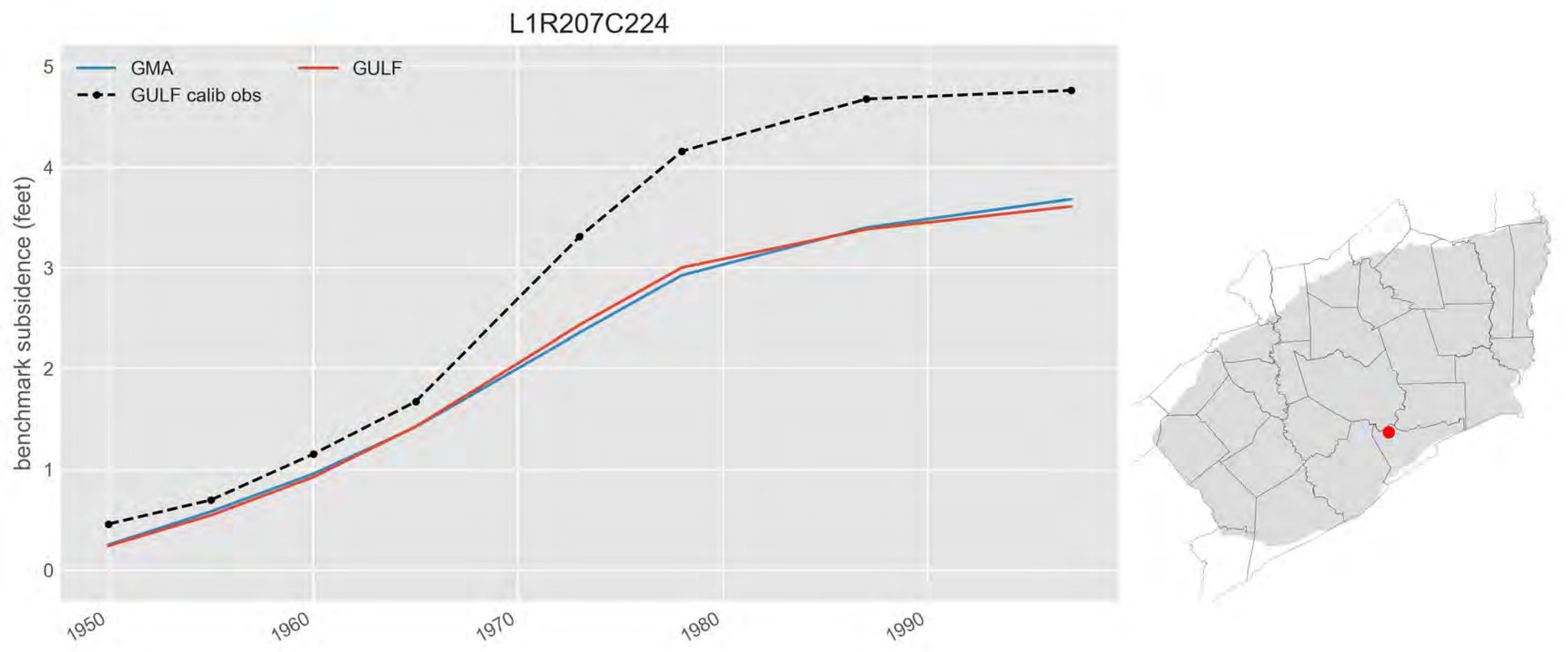

L1R201C204
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

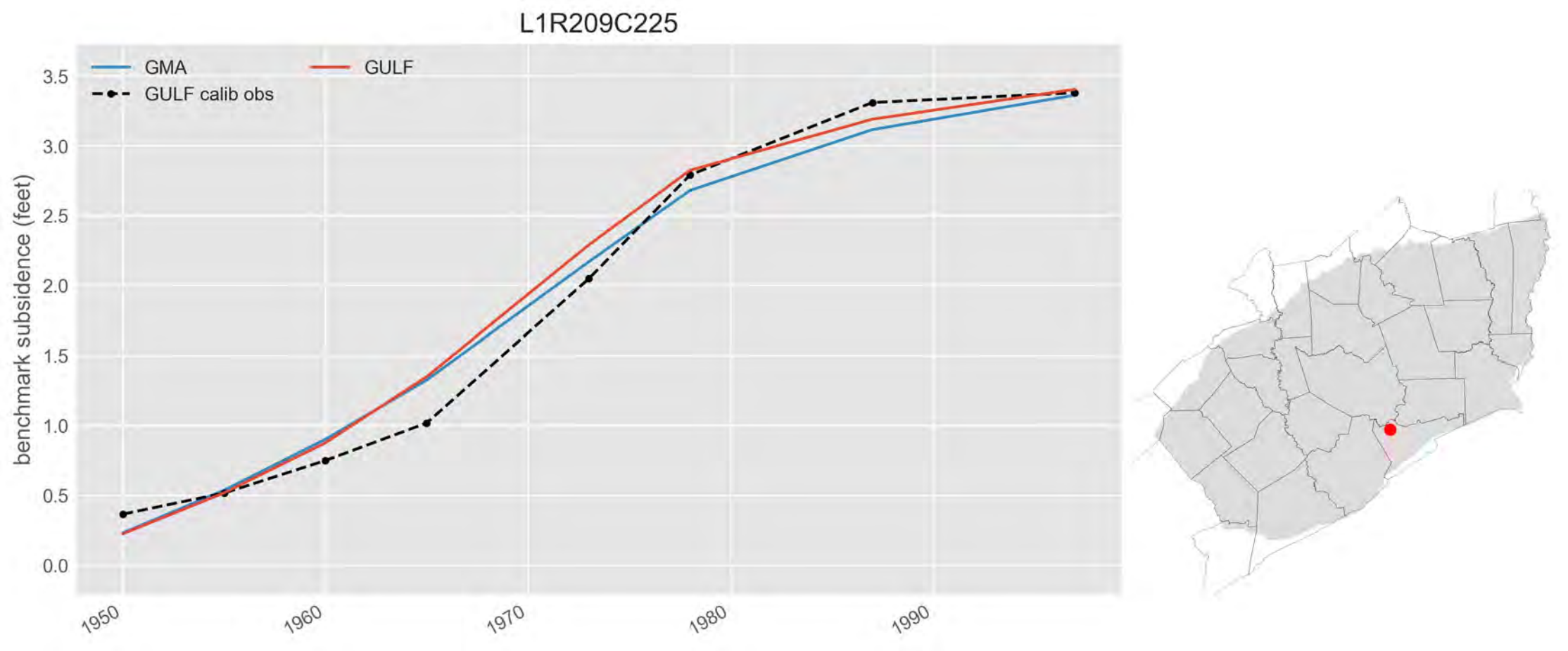

L1R202C219
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

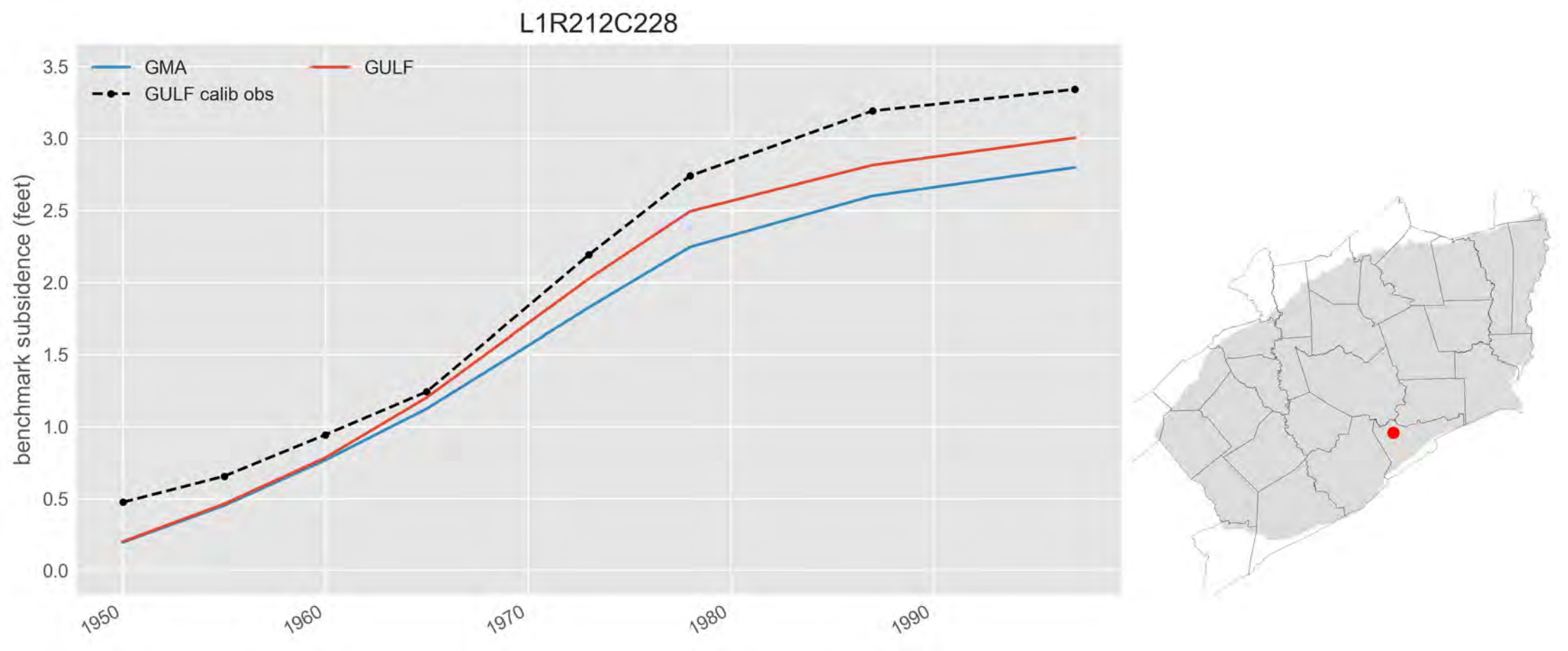

L1R203C204
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1940
1950
1960
1970
1980

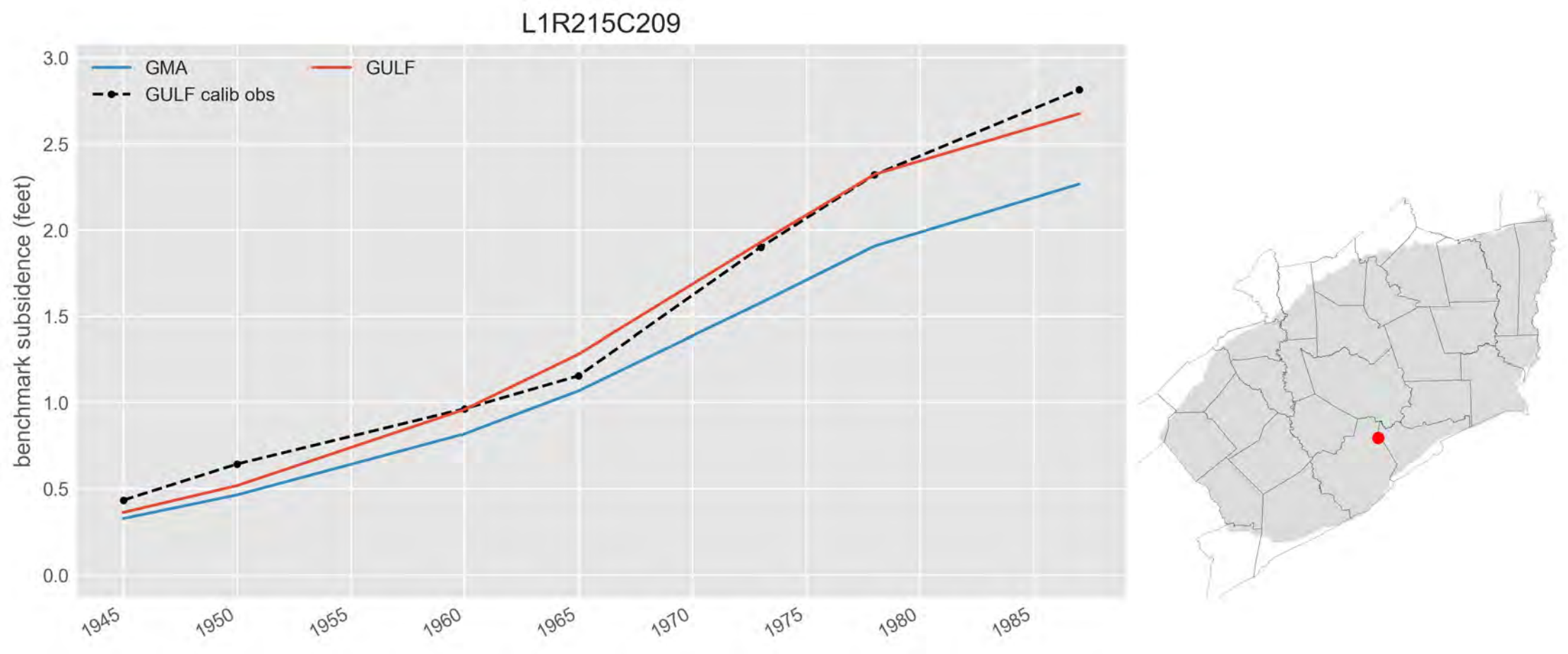

L1R204C215
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

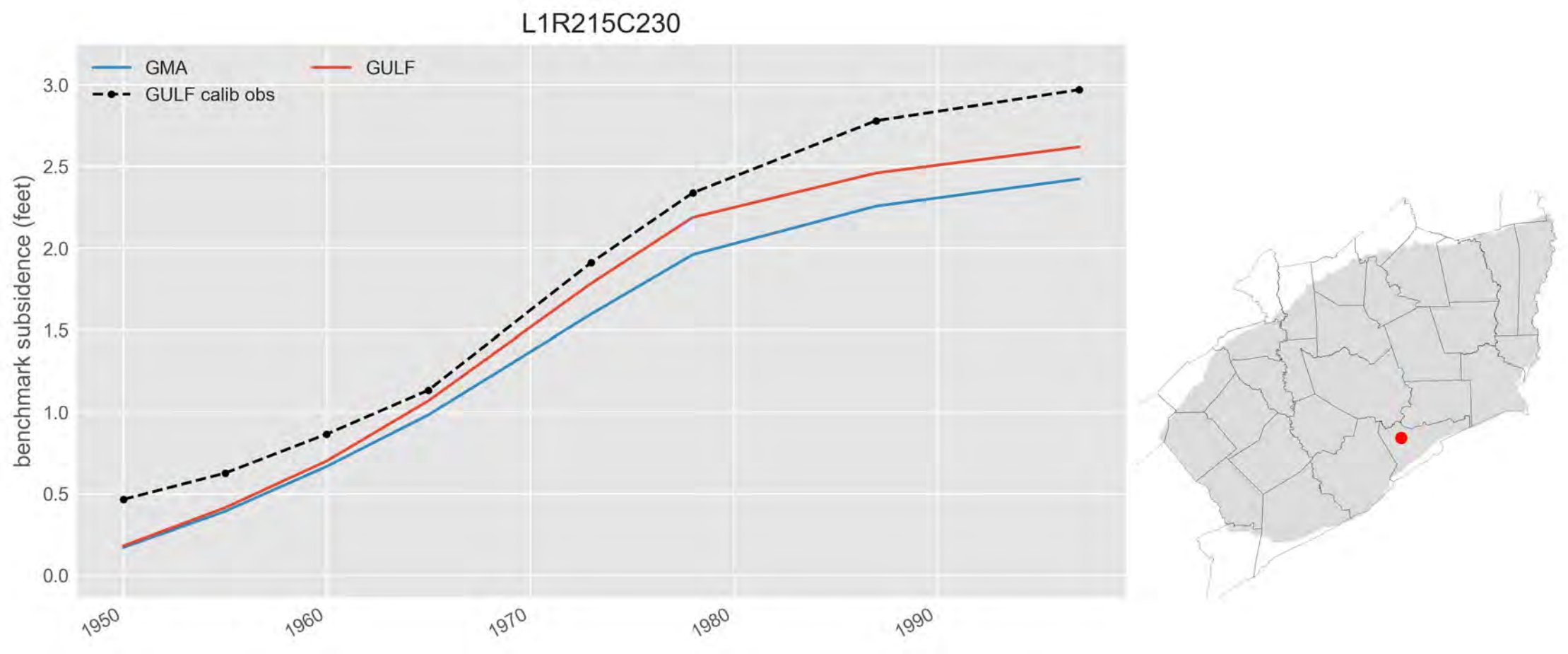

L1R206C205
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
1940
1950
1960
1970
1980

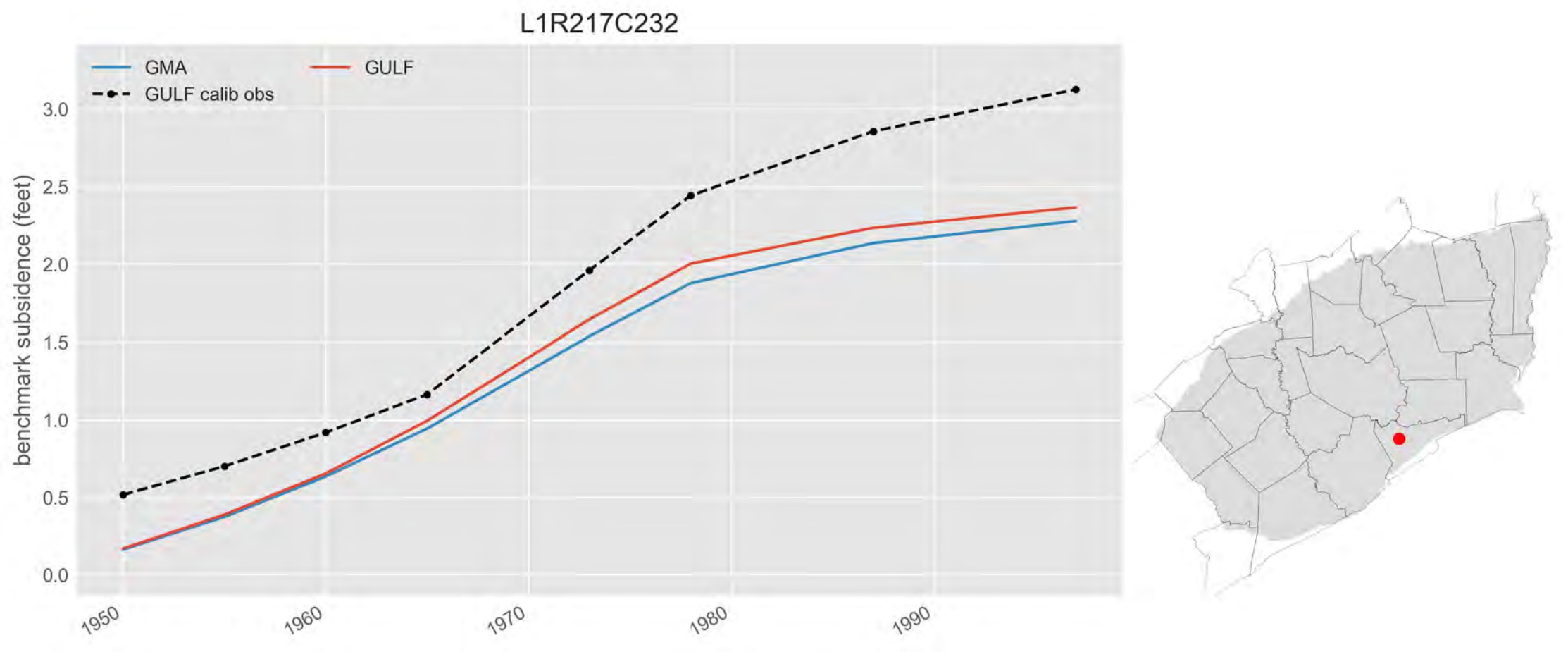

L1R207C224
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
1950
1960
1970
1980
1990

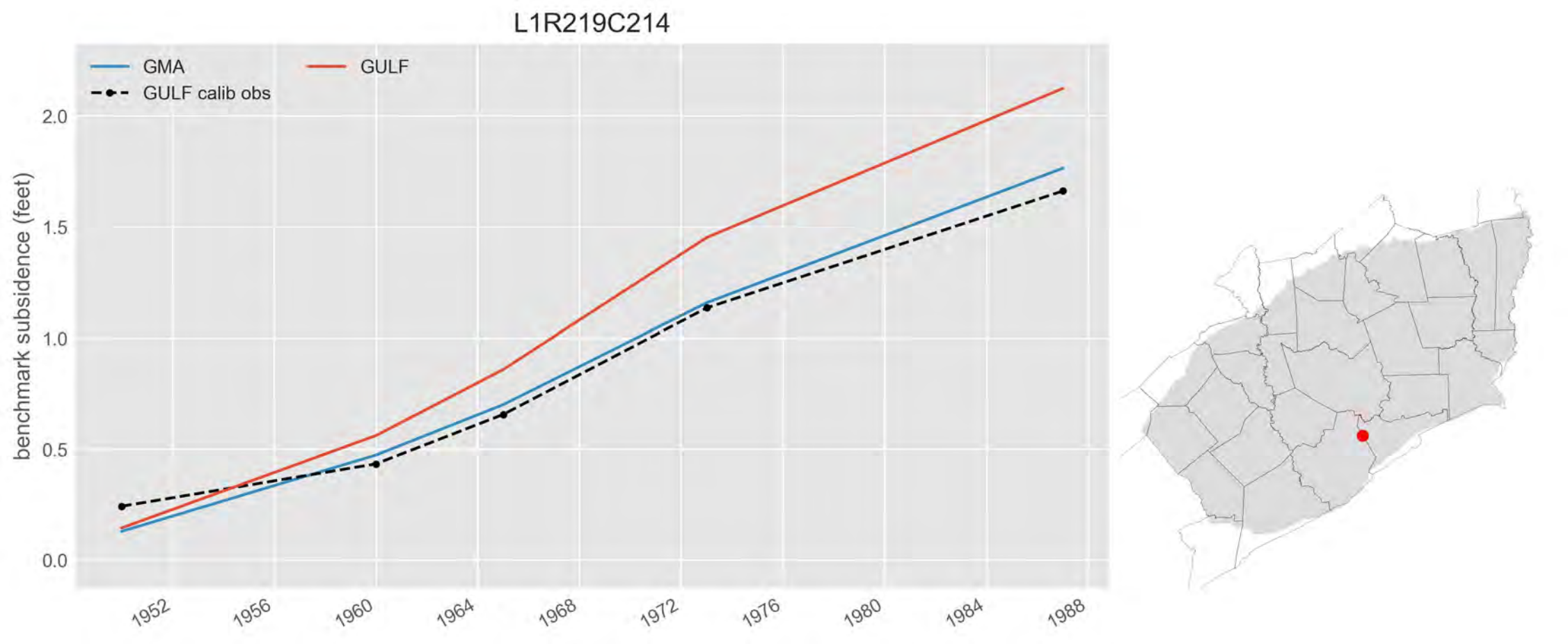

L1R209C225
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1950
1960
1970
1980
1990

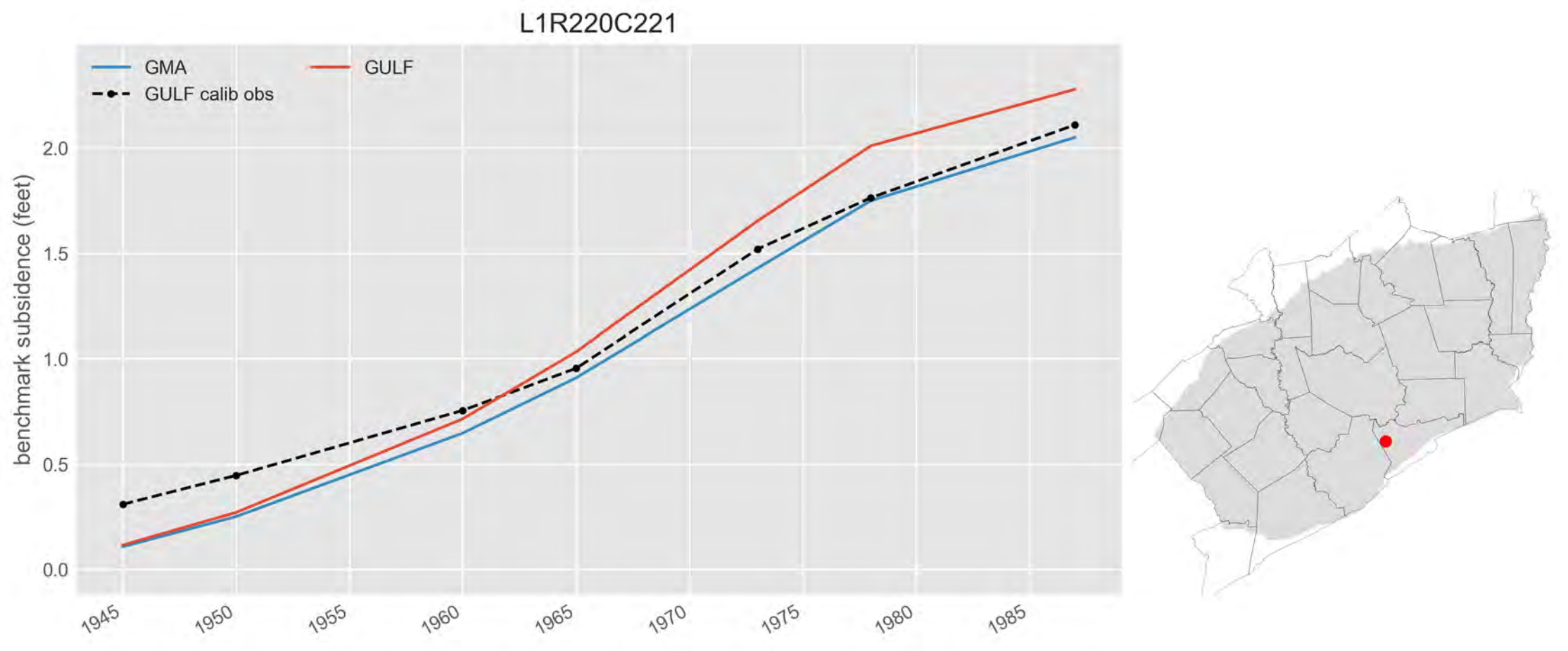

L1R212C228
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1950
1960
1970
1980
1990

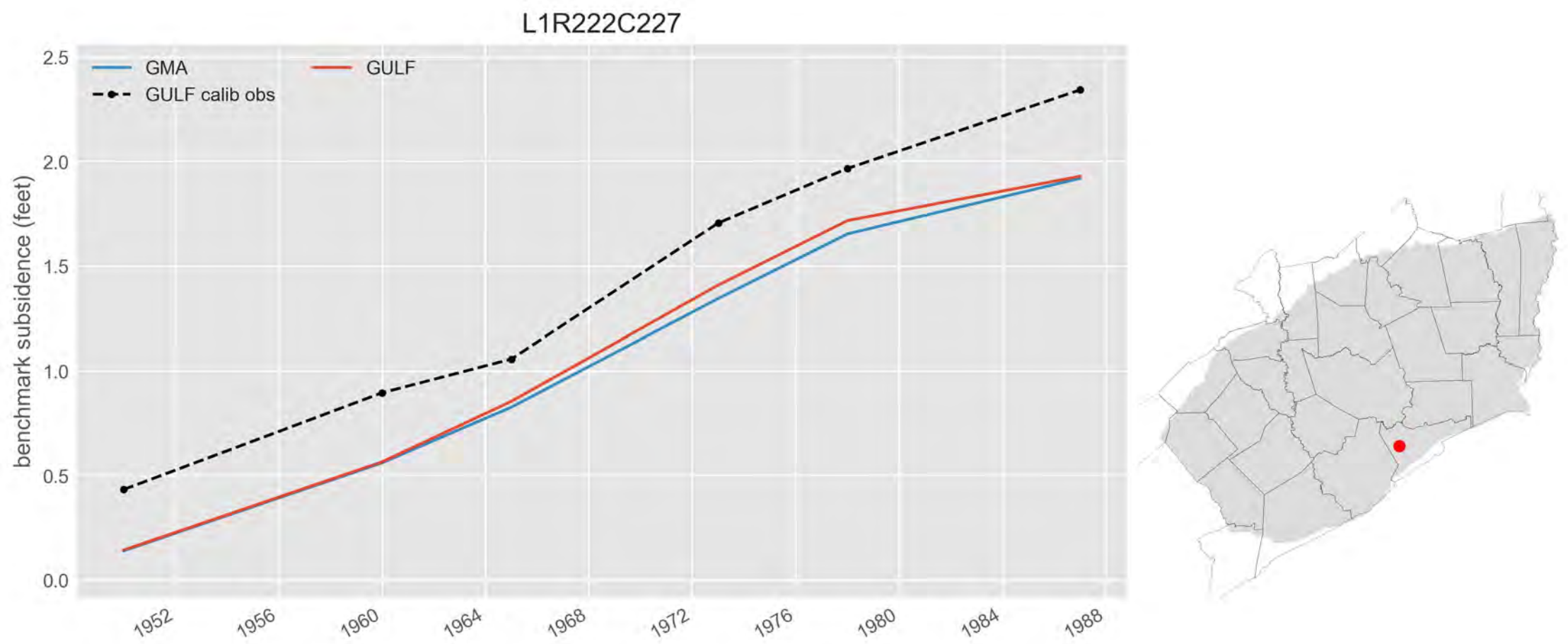

L1R215C209
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1945
1950
1955
1960
1965
1970
1975
1980
1985

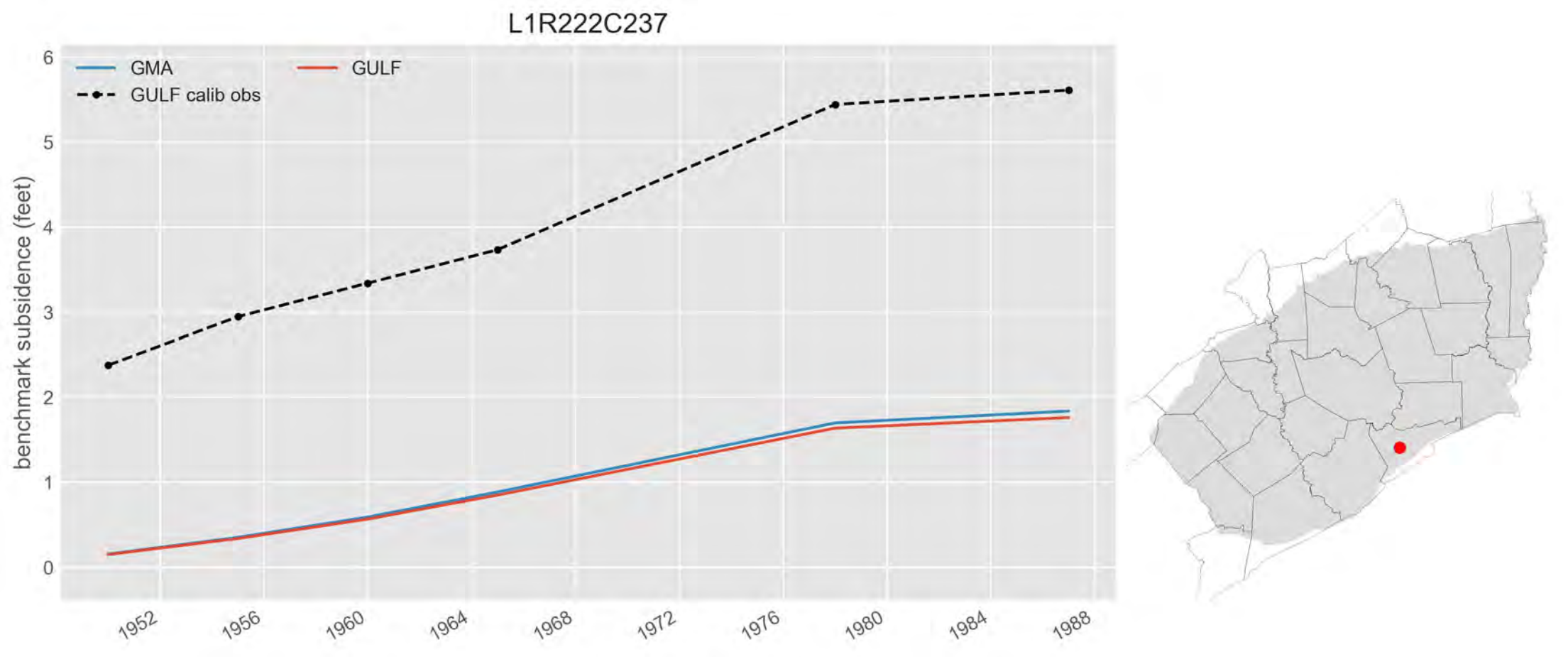

L1R215C230
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1950
1960
1970
1980
1990

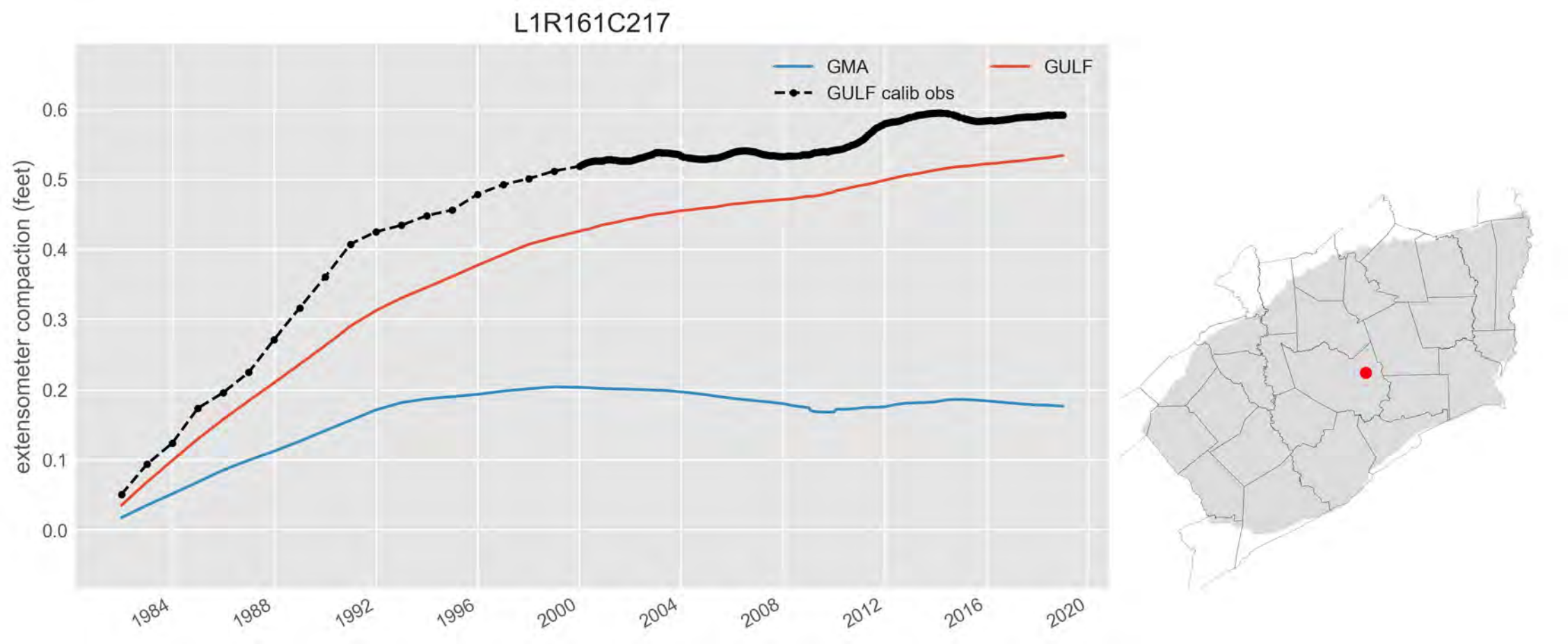

L1R217C232
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1950
1960
1970
1980
1990

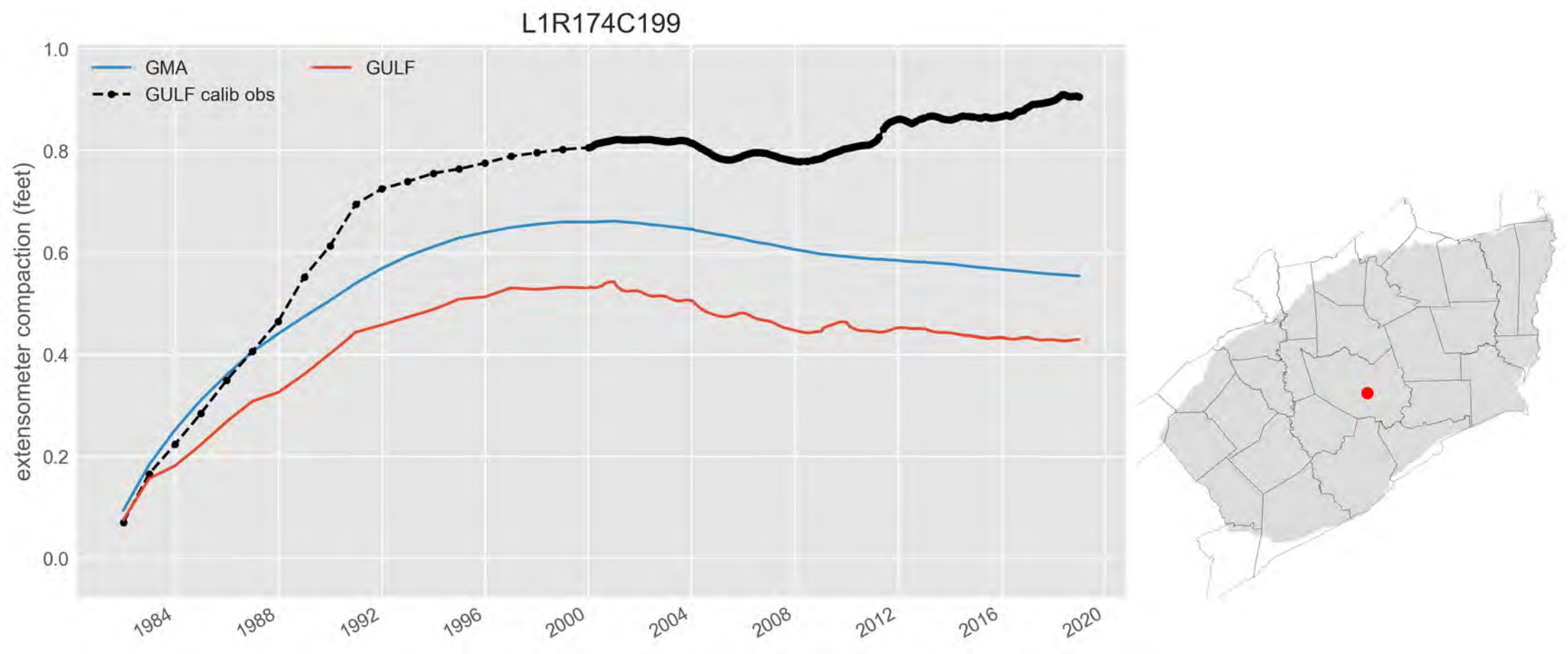

L1R219C214
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
2.0
1.5
1.0
0.5
0.0
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

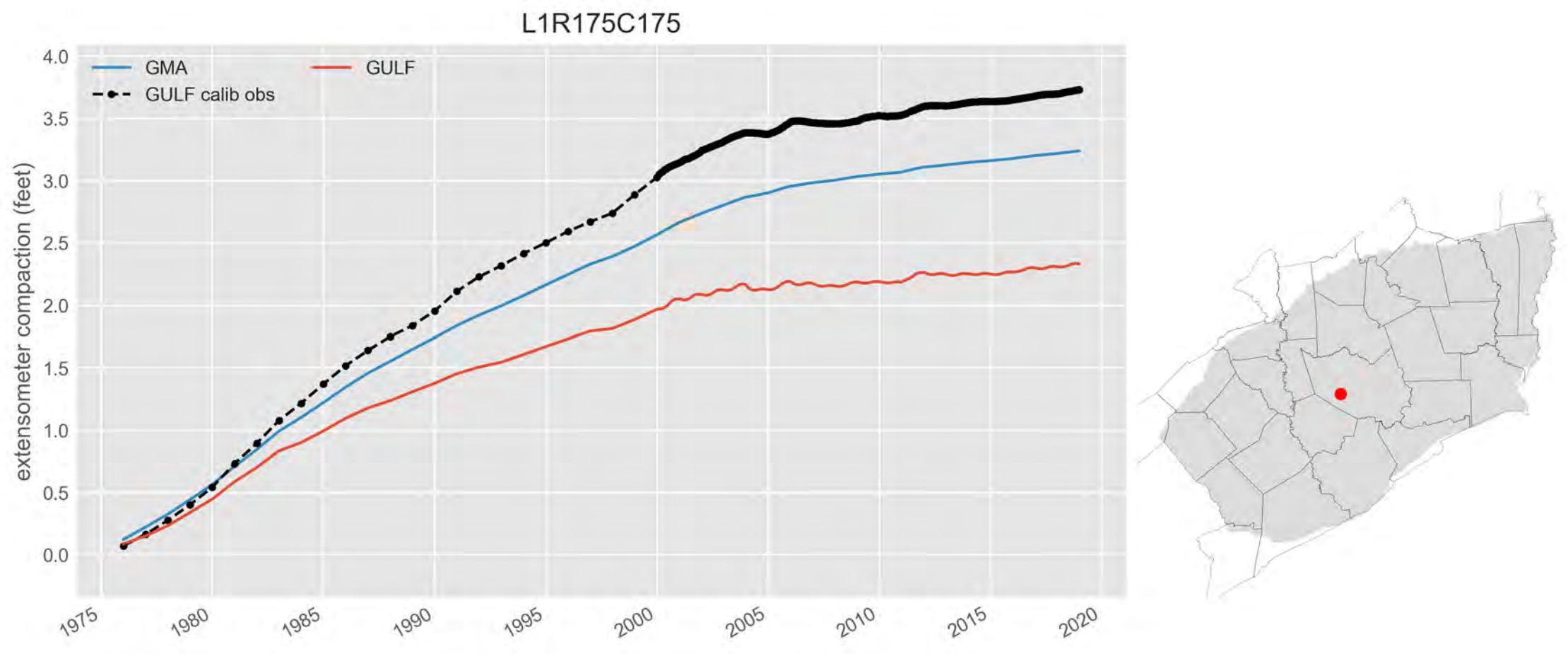

L1R220C221
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
1945
1950
1955
1960
1965
1970
1975
1980
1985

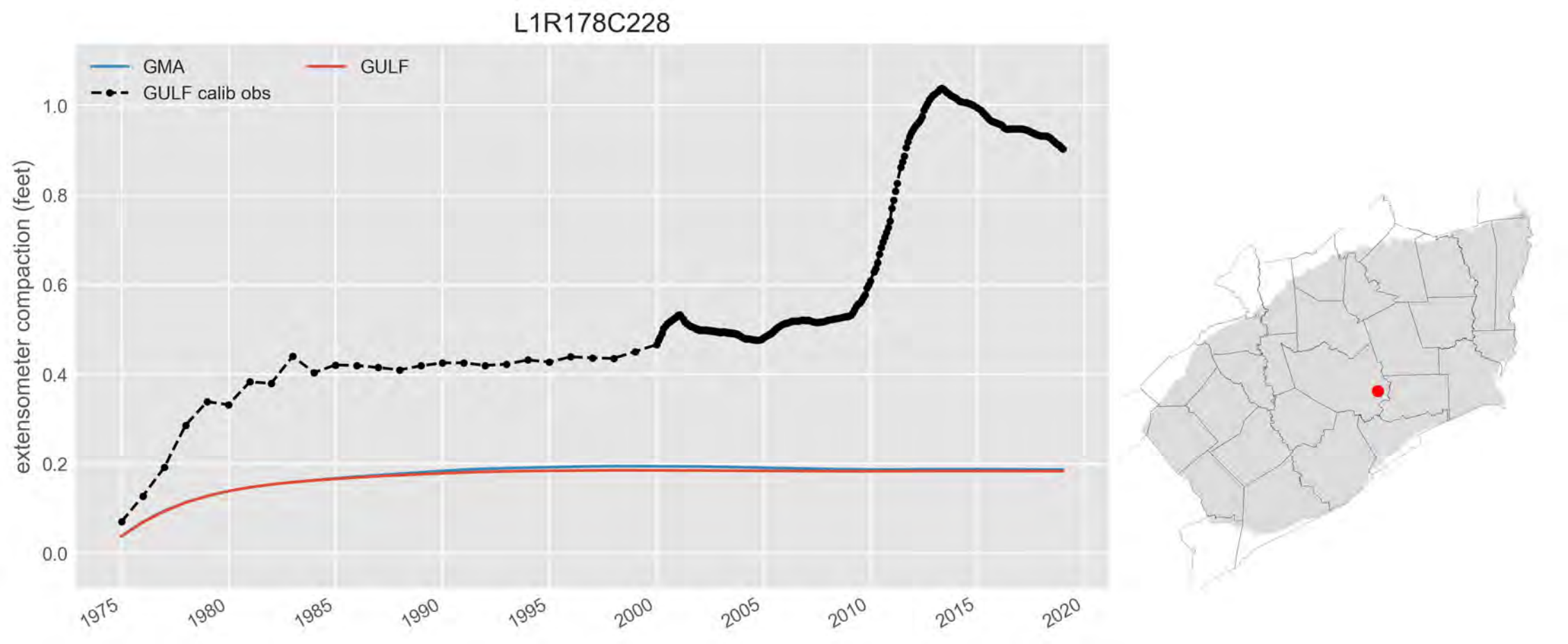

L1R222C227
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0.0
0.5
1.0
1.5
2.0
2.5
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

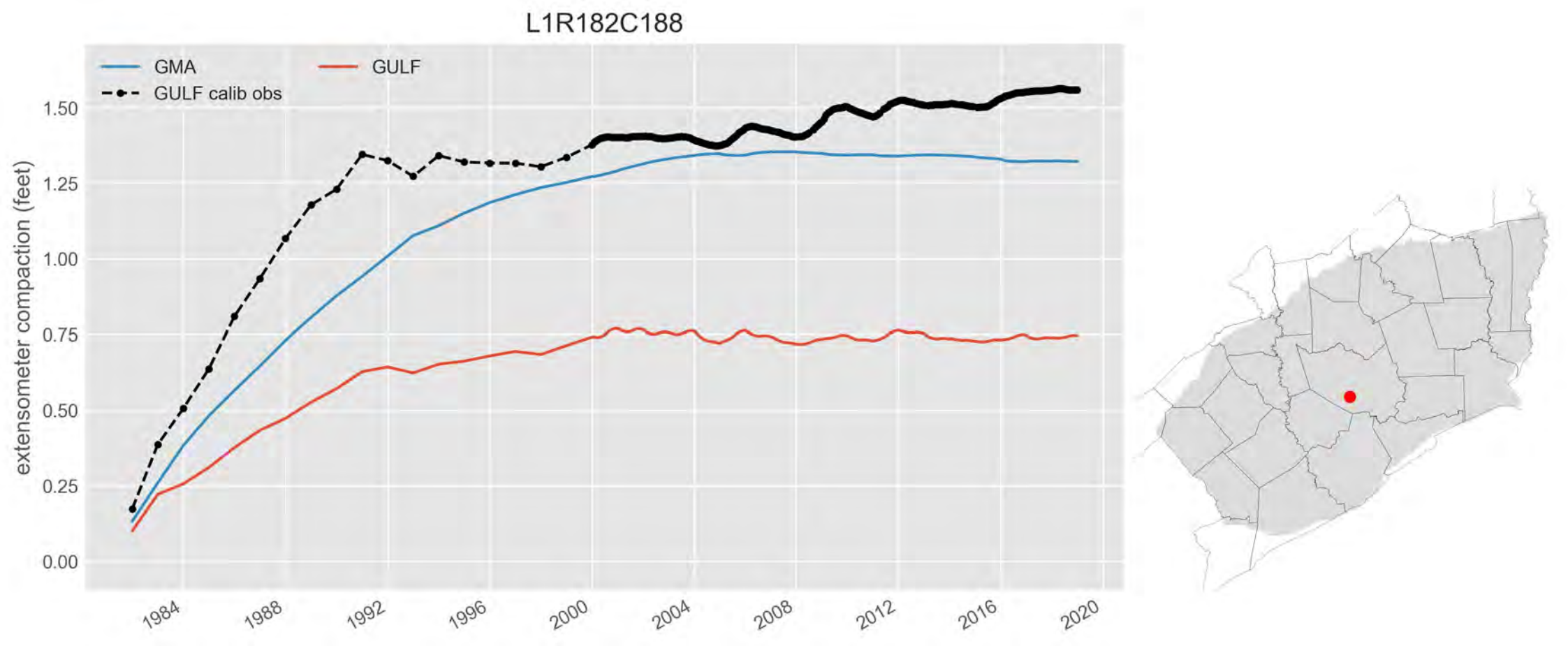

L1R222C237
GMA
GULF
GULF calib obs
benchmark subsidence (feet)
0
1
2
3
4
5
6
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988

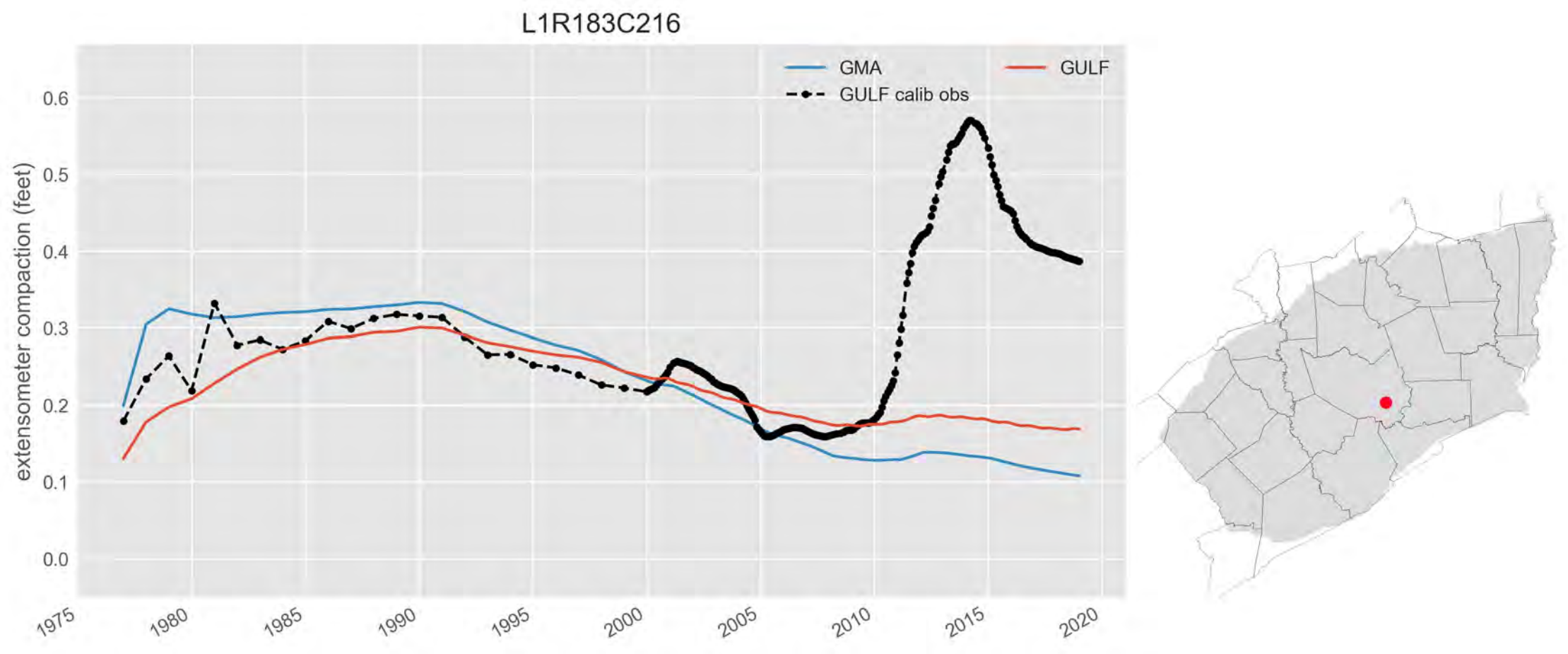

L1R161C217
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020


L1R174C199
GMA
GULF
GULF calib obs
extensometer compaction (feet)
1.0
0.8
0.6
0.4
0.2
0.0
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020

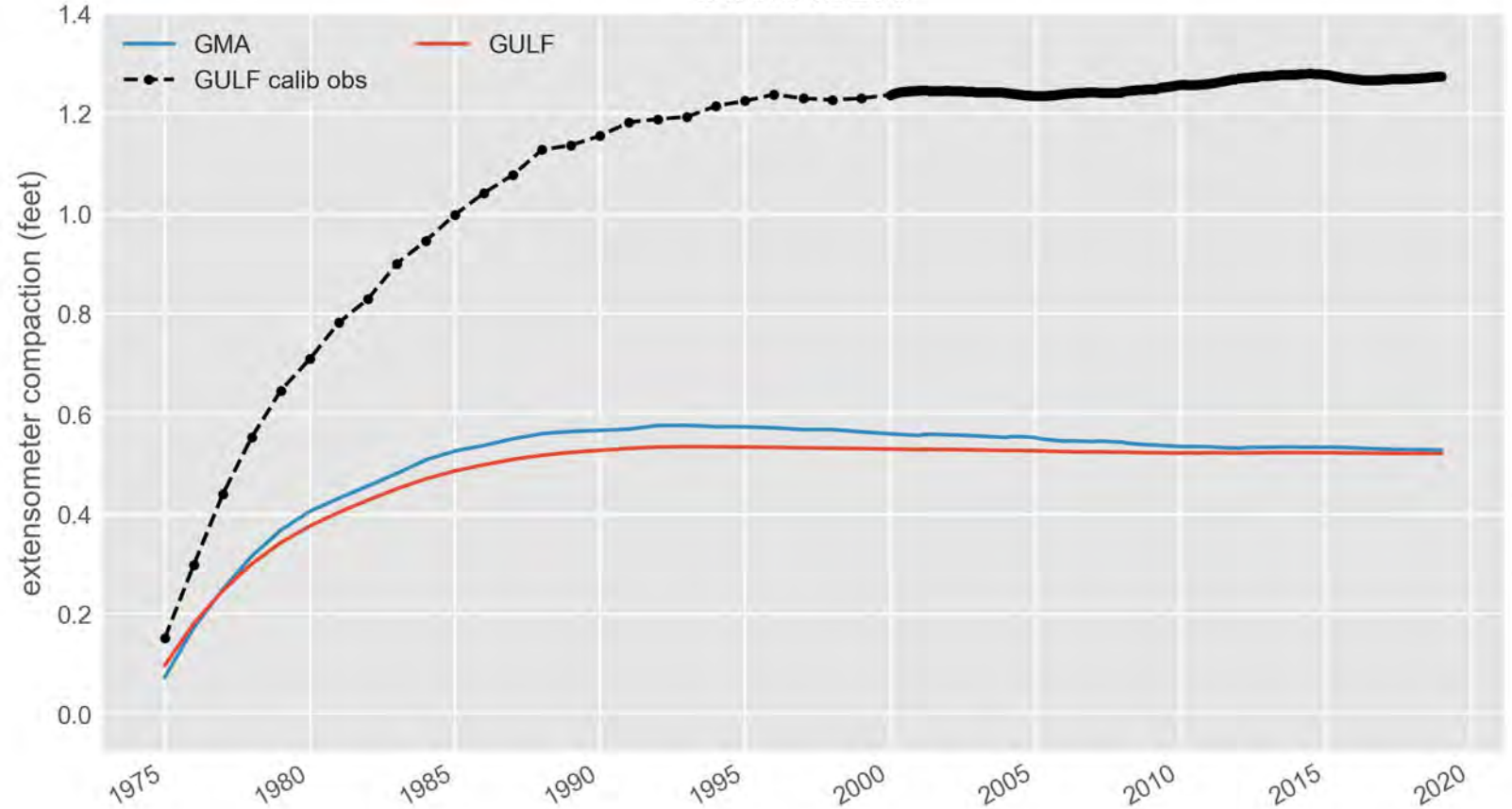

L1R175C175
GMA
GULF
GULF calib obs
extensometer compaction (feet)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

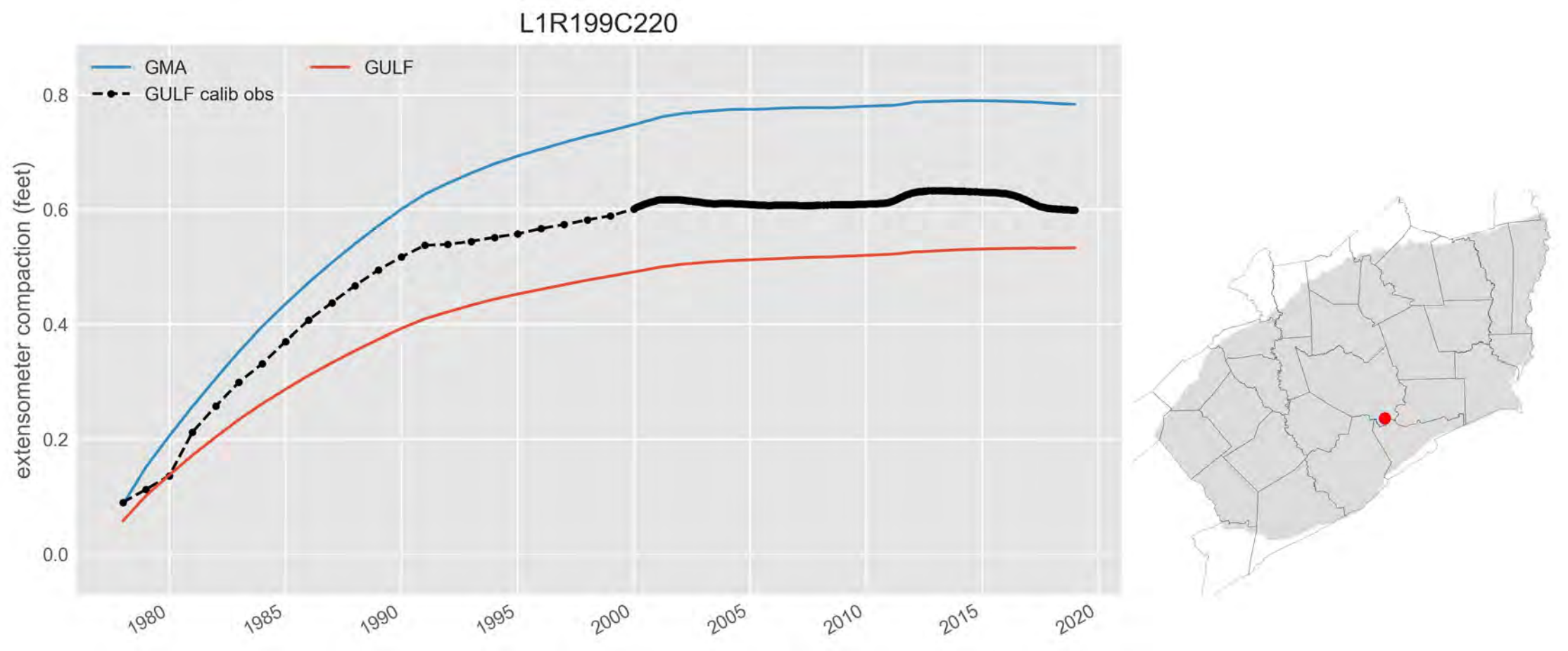

L1R178C228
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

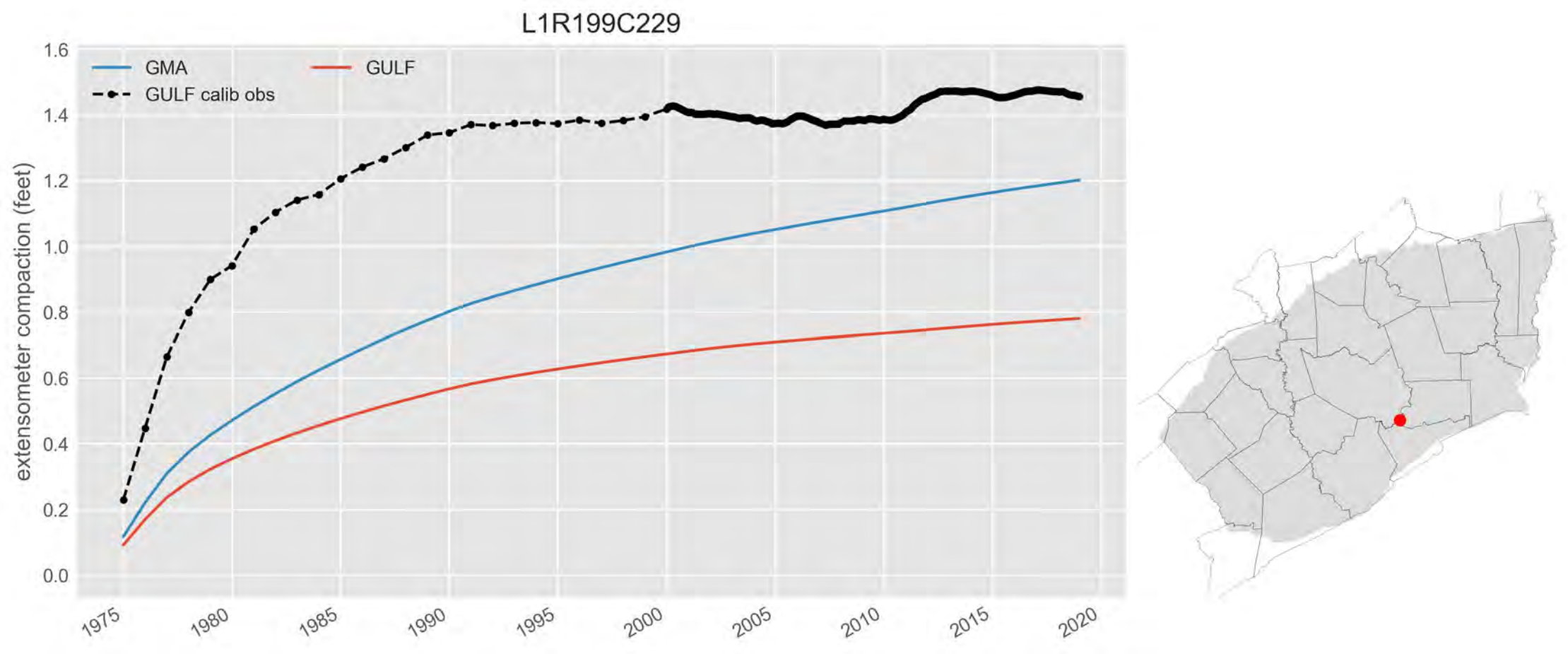

L1R182C188
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1984
1988
1992
1996
2000
2004
2008
2012
2016
2020

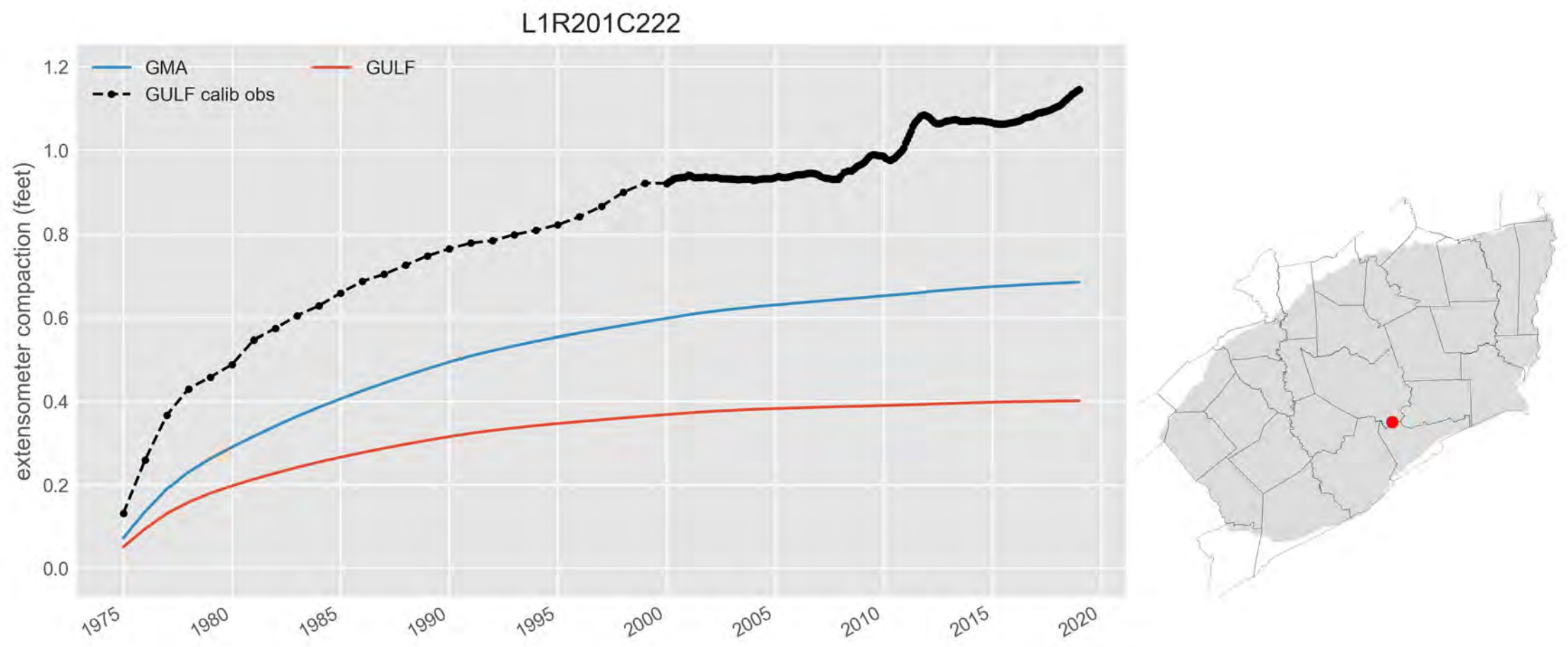

L1R183C216
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

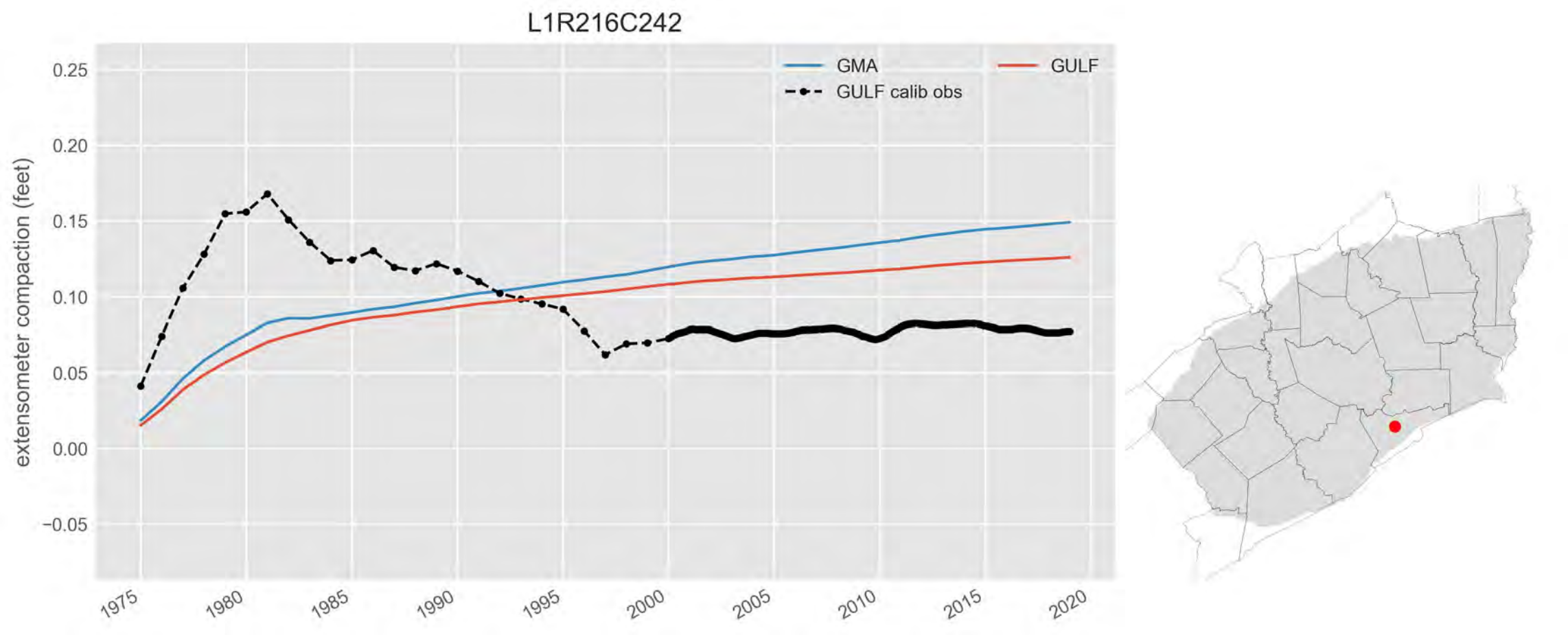
L1R184C205

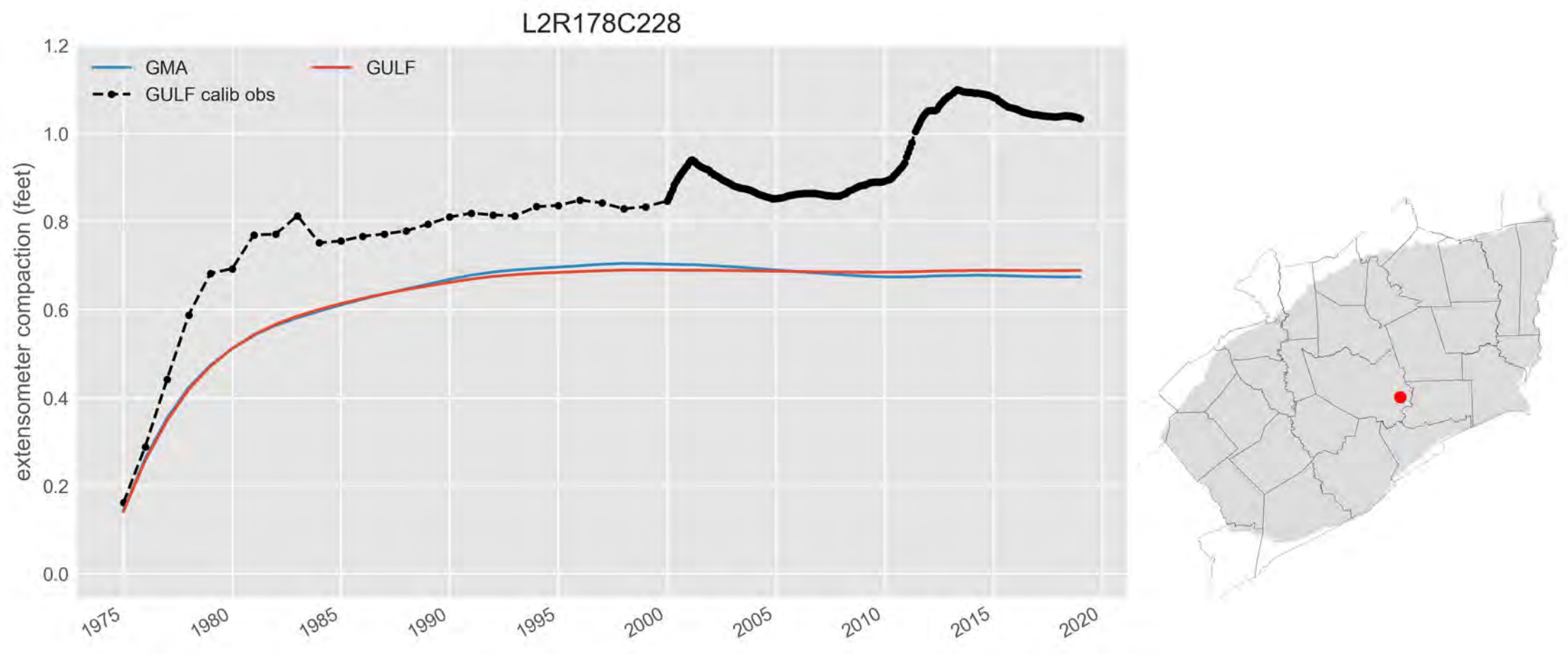

GMA
GULF
GULF calib obs
extensometer compaction (feet)
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

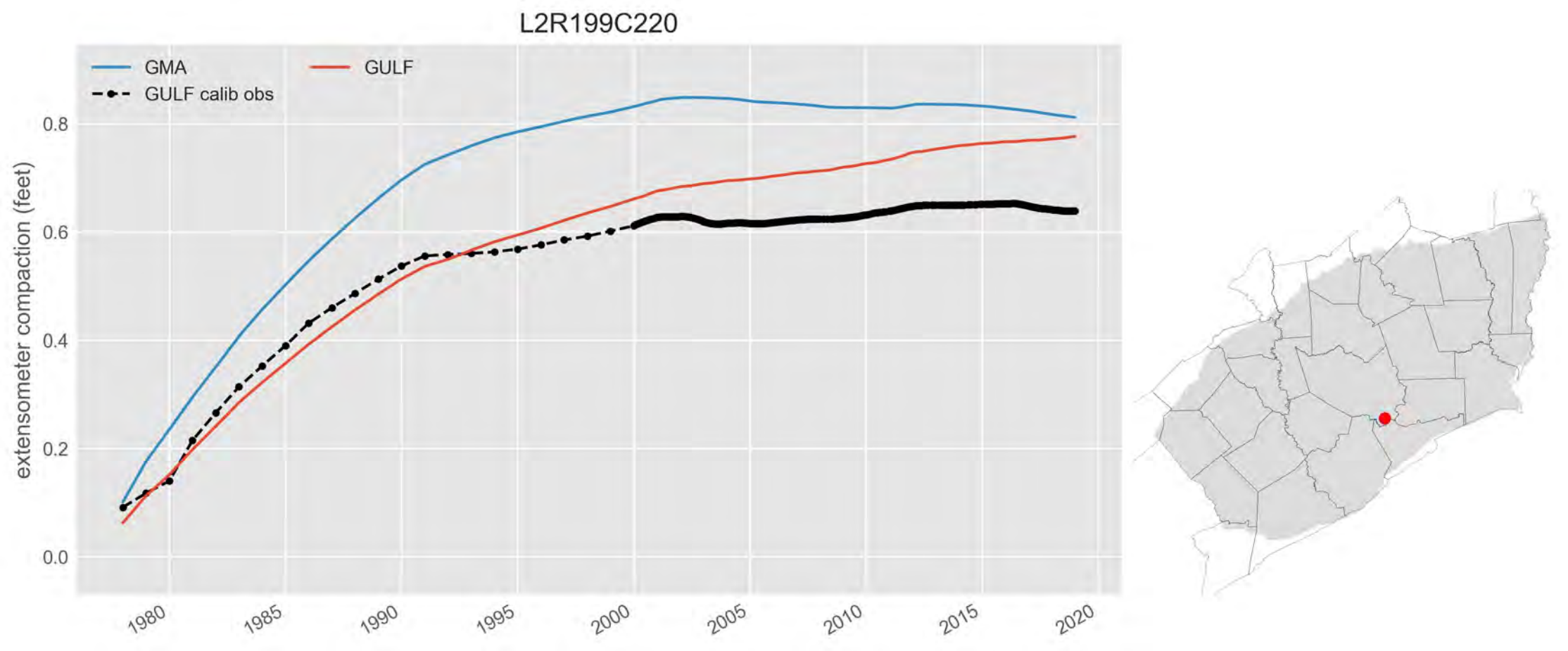

L1R199C220
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.2
0.4
0.6
0.8
1980
1985
1990
1995
2000
2005
2010
2015
2020

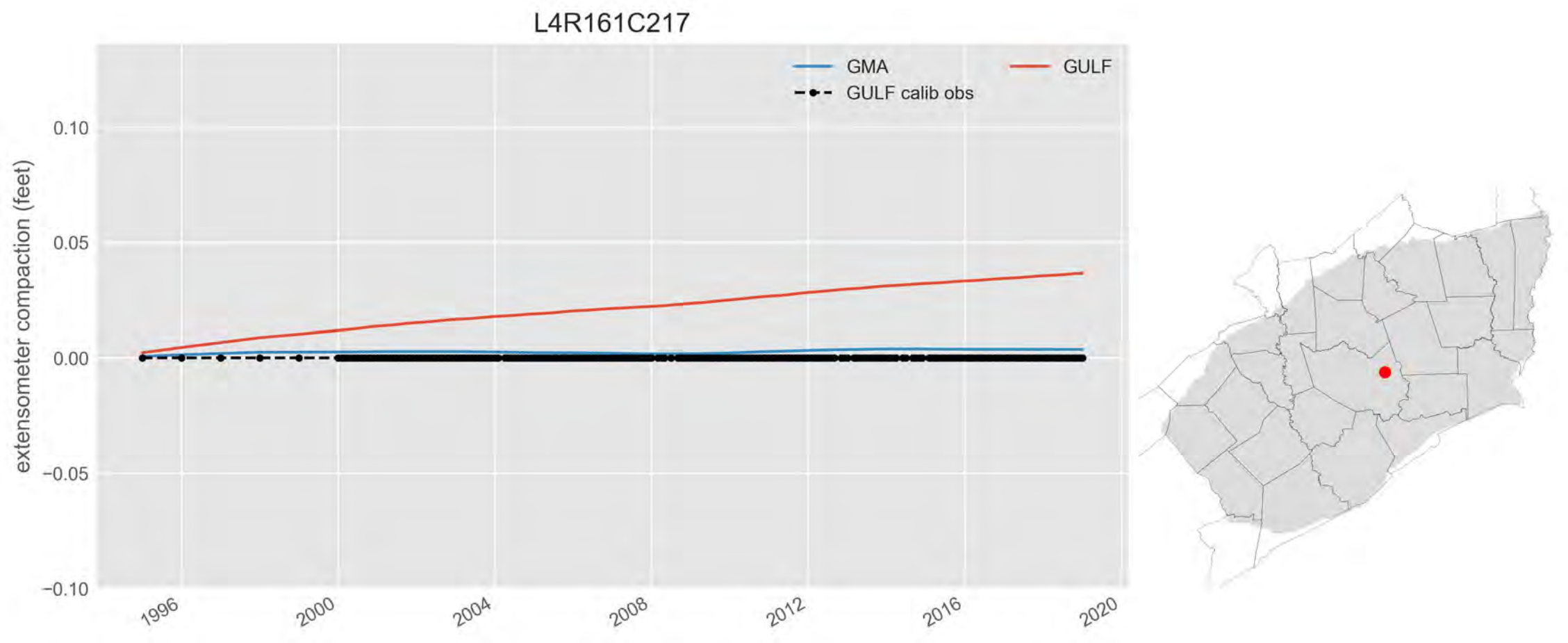

L1R199C229
GMA
GULF
GULF calib obs
extensometer compaction (feet)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

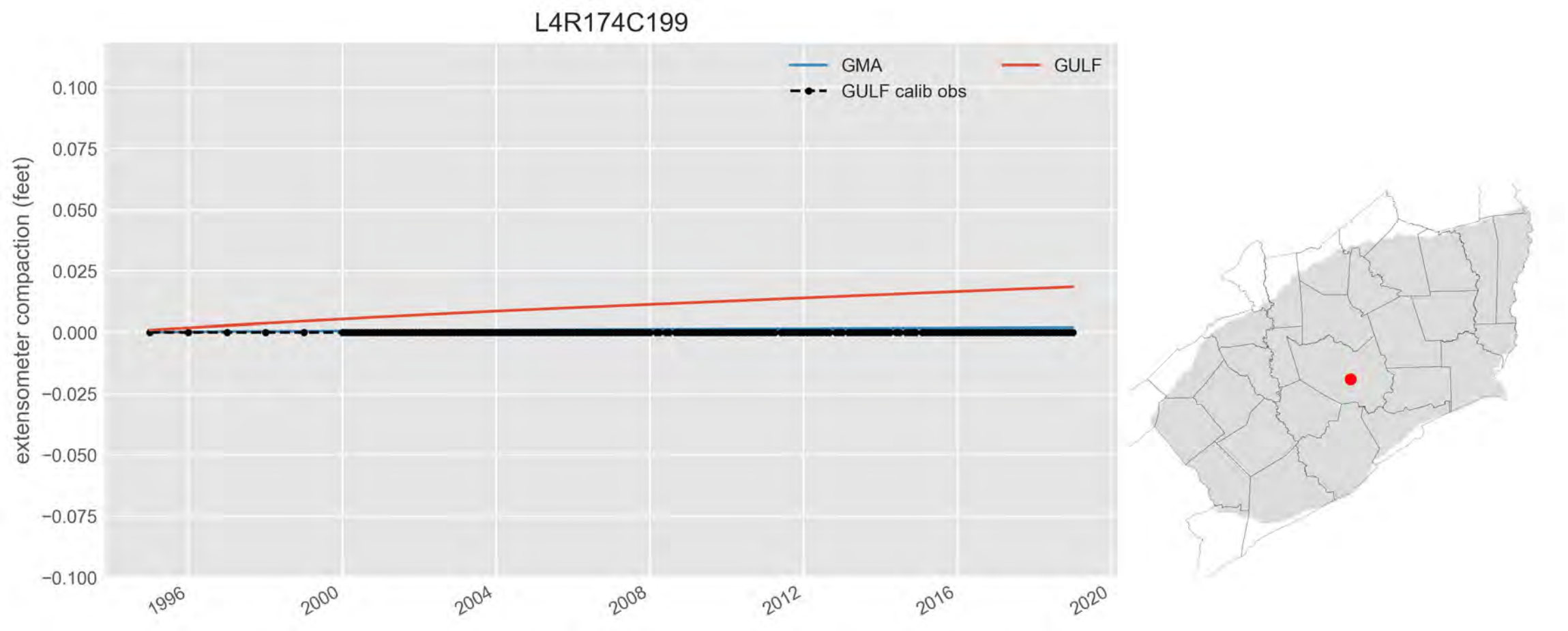

L1R201C222
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

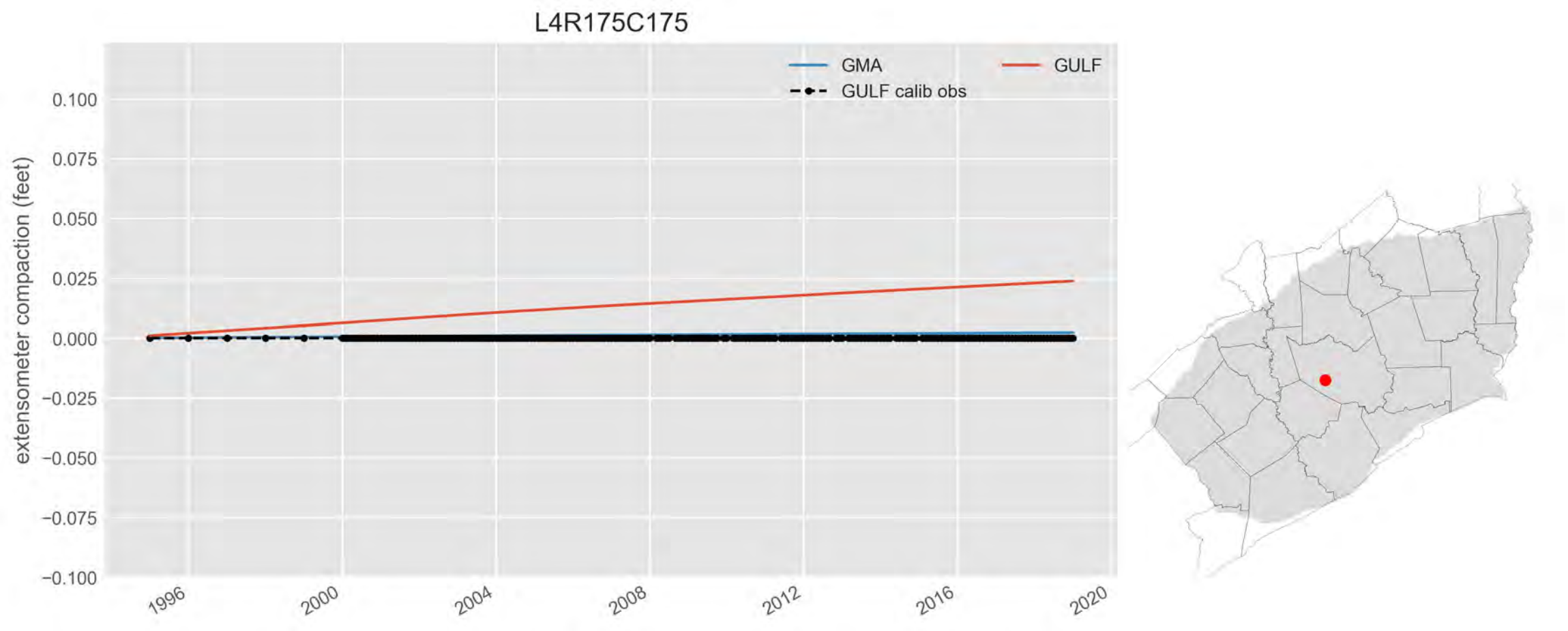

L1R216C242
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

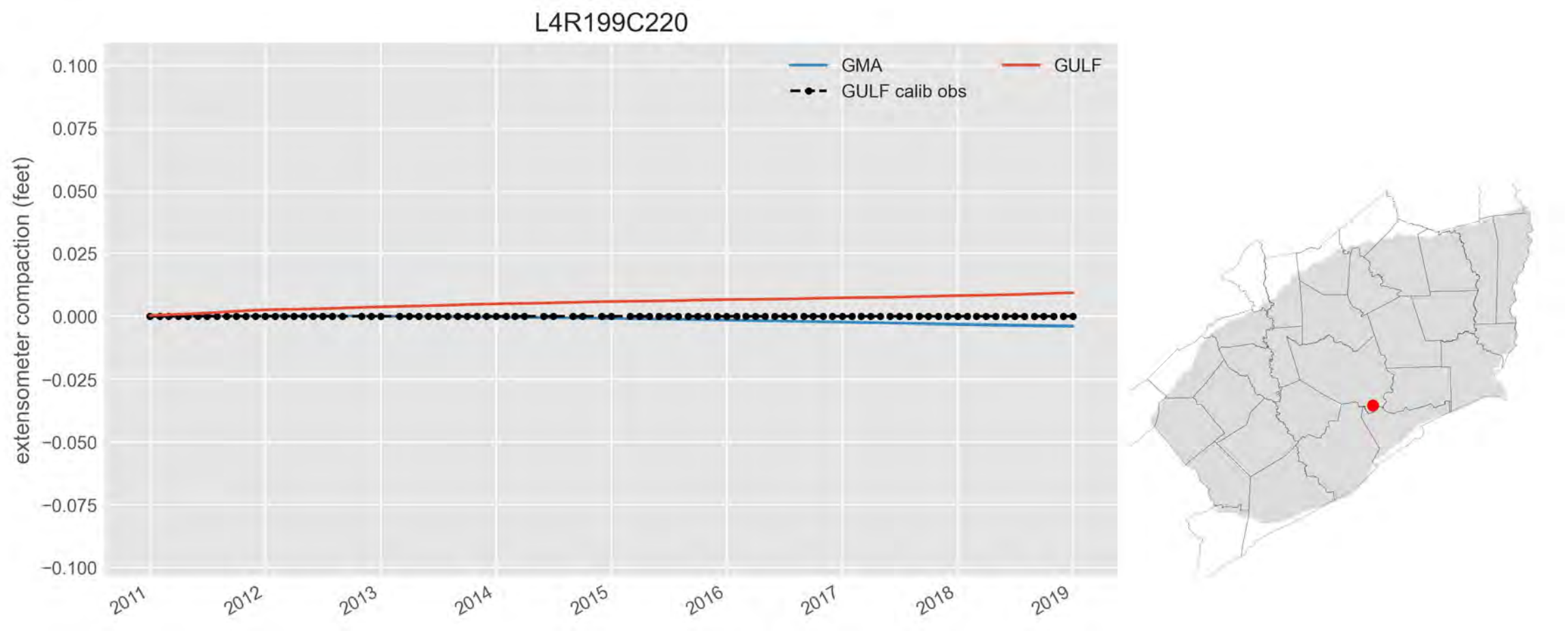

L2R178C228
GMA
GULF
GULF calib obs
extensometer compaction (feet)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020

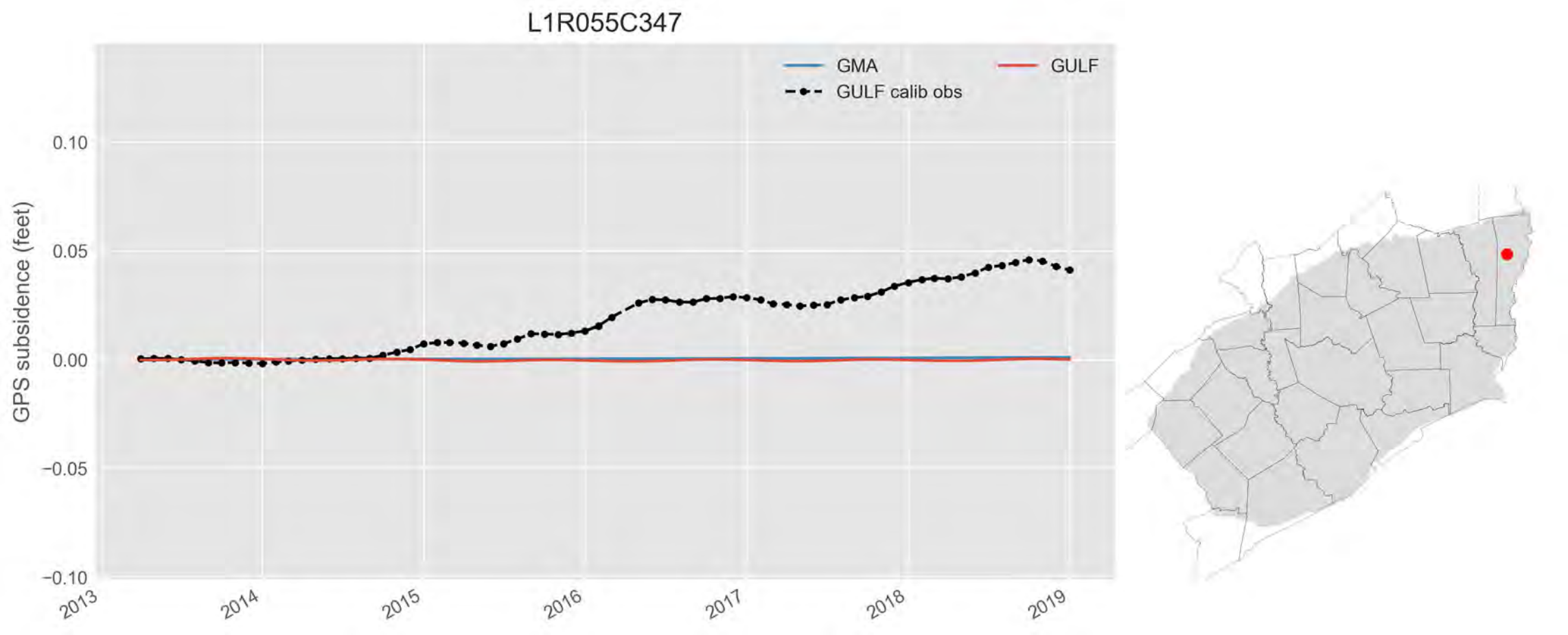

L2R199C220
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.0
0.2
0.4
0.6
0.8
1980
1985
1990
1995
2000
2005
2010
2015
2020

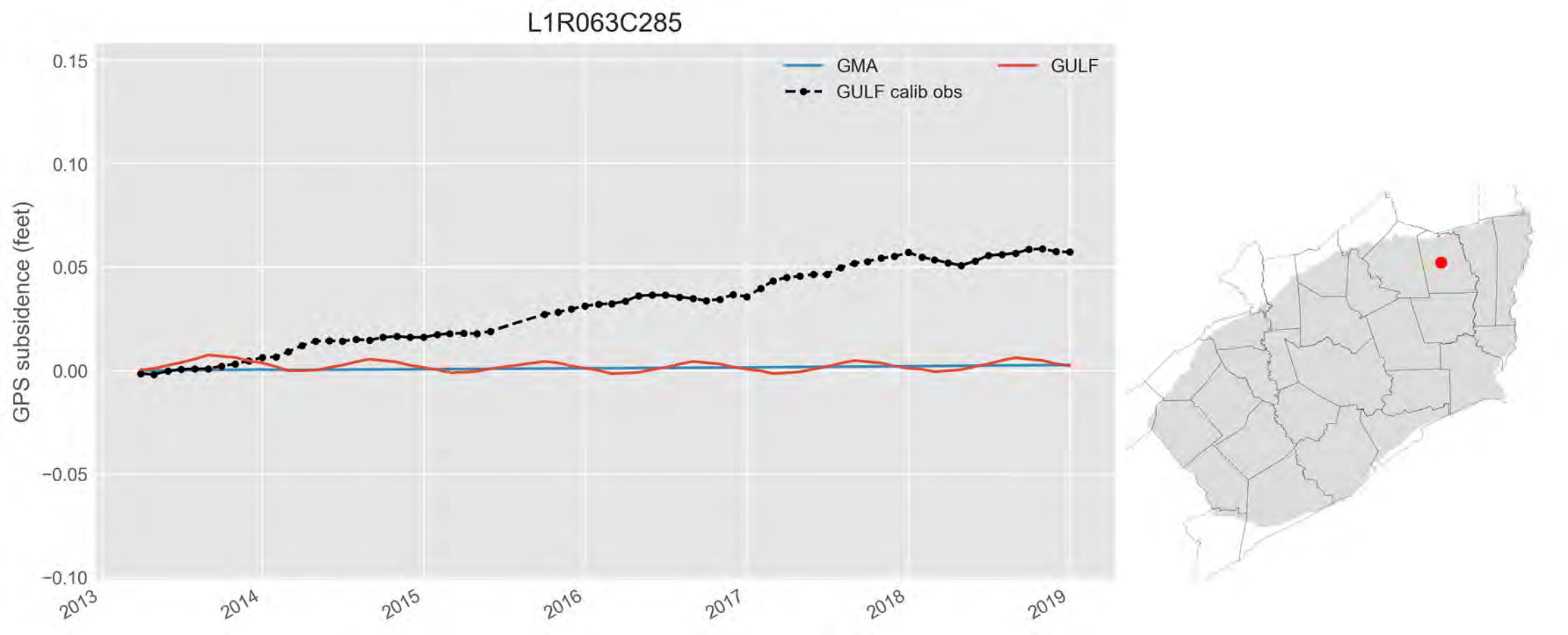

L4R161C217
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.10
0.05
0.00
−0.05
−0.10
1996
2000
2004
2008
2012
2016
2020

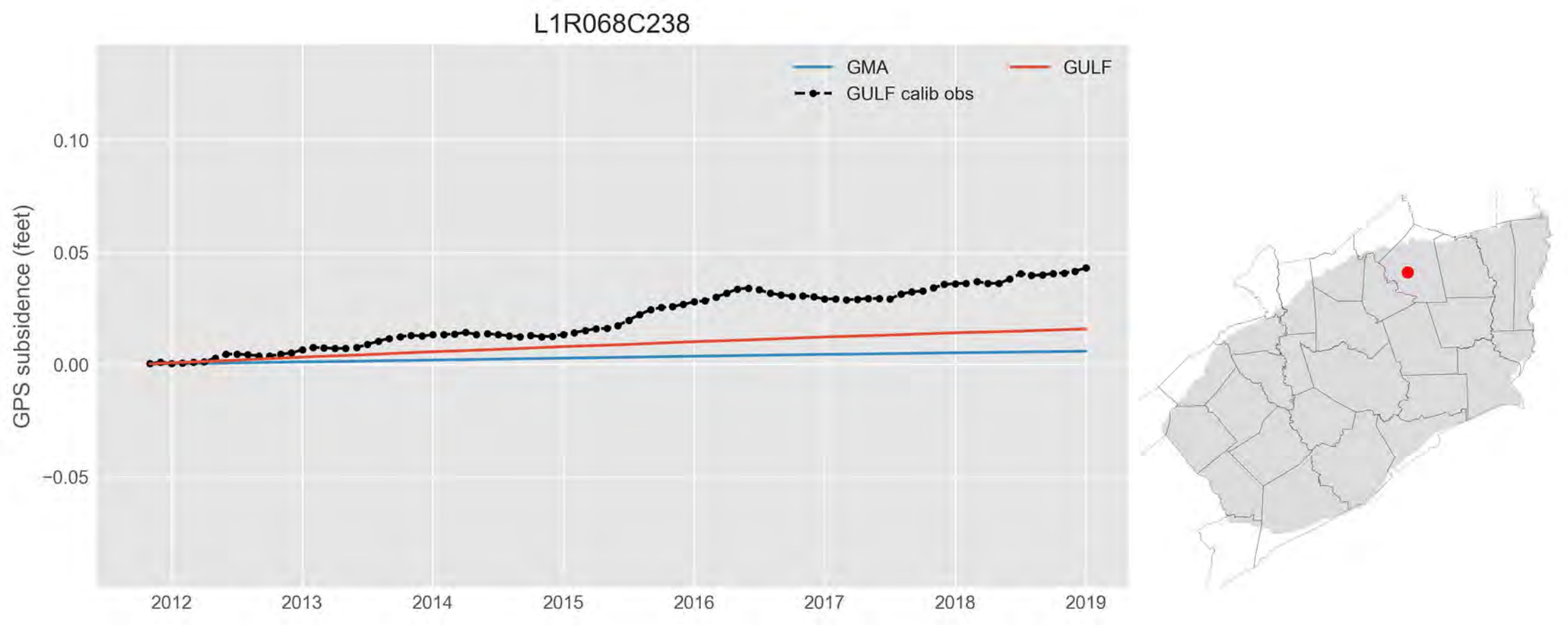

L4R174C199
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
1996
2000
2004
2008
2012
2016
2020

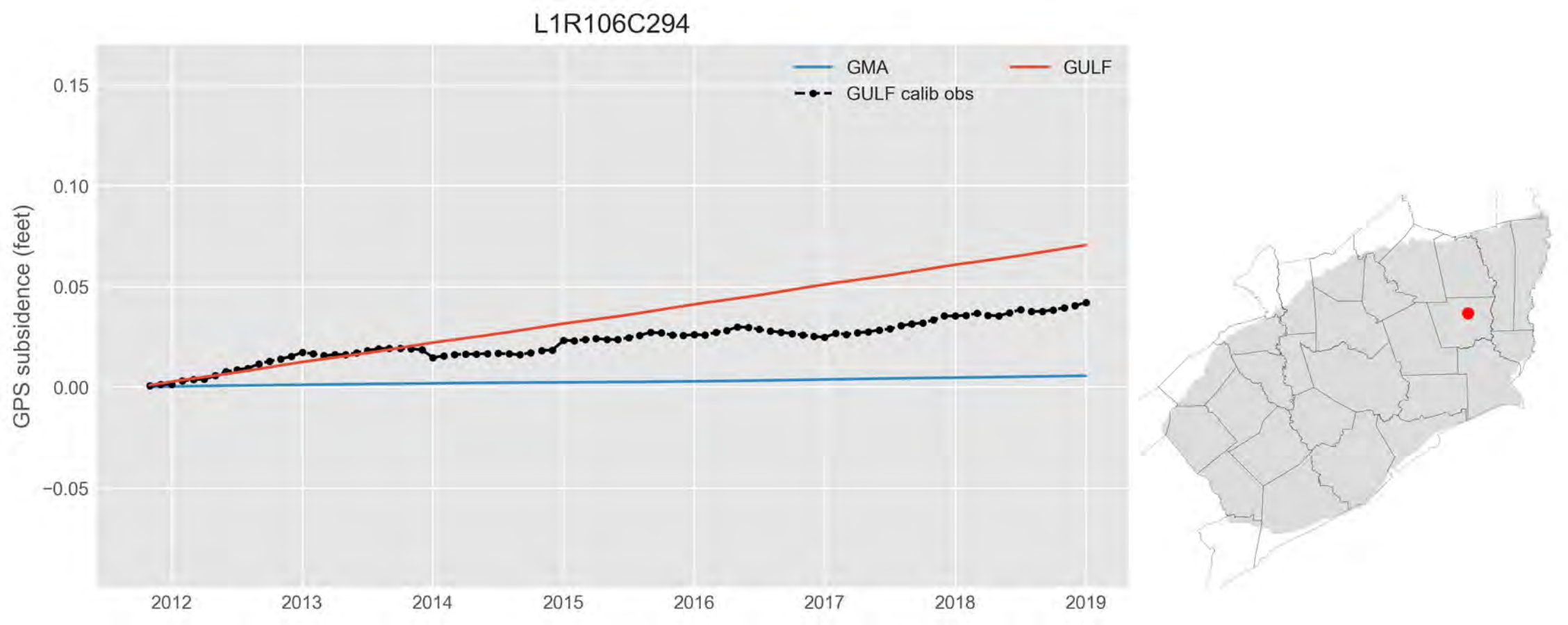

L4R175C175
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
1996
2000
2004
2008
2012
2016
2020

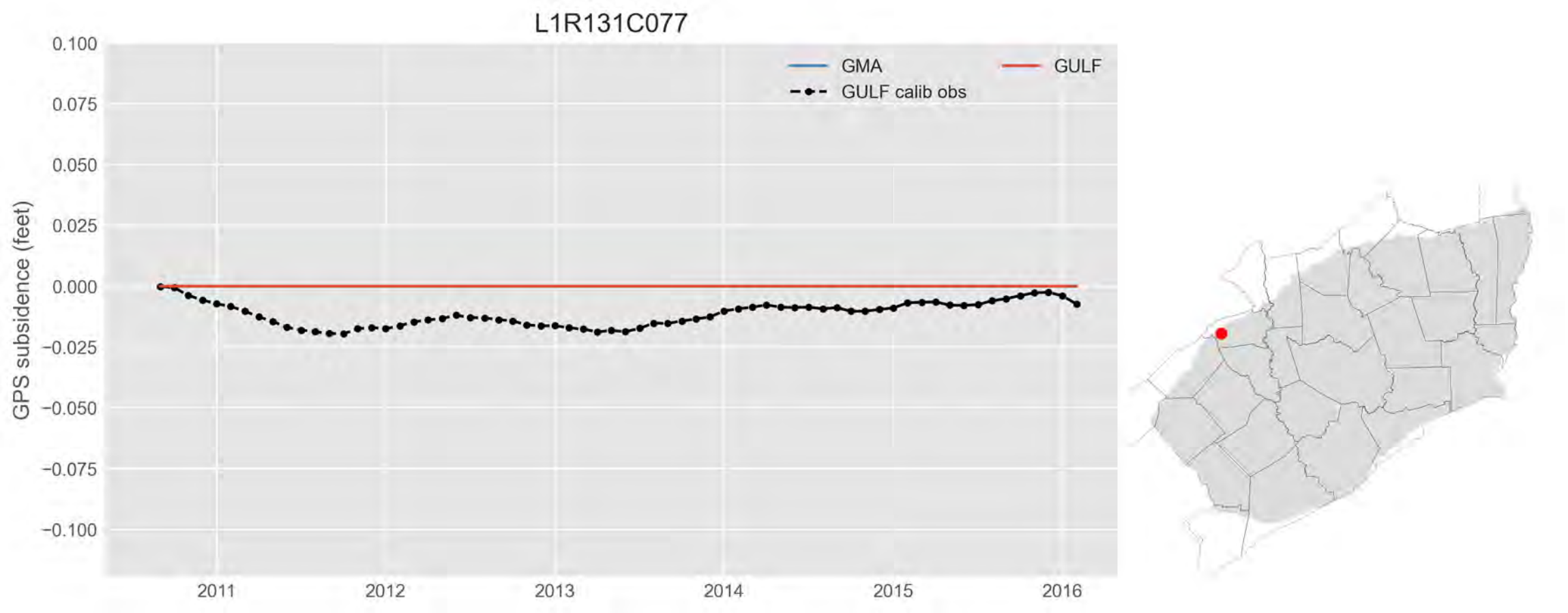

L4R199C220
GMA
GULF
GULF calib obs
extensometer compaction (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
2011
2012
2013
2014
2015
2016
2017
2018
2019


L1R055C347
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019

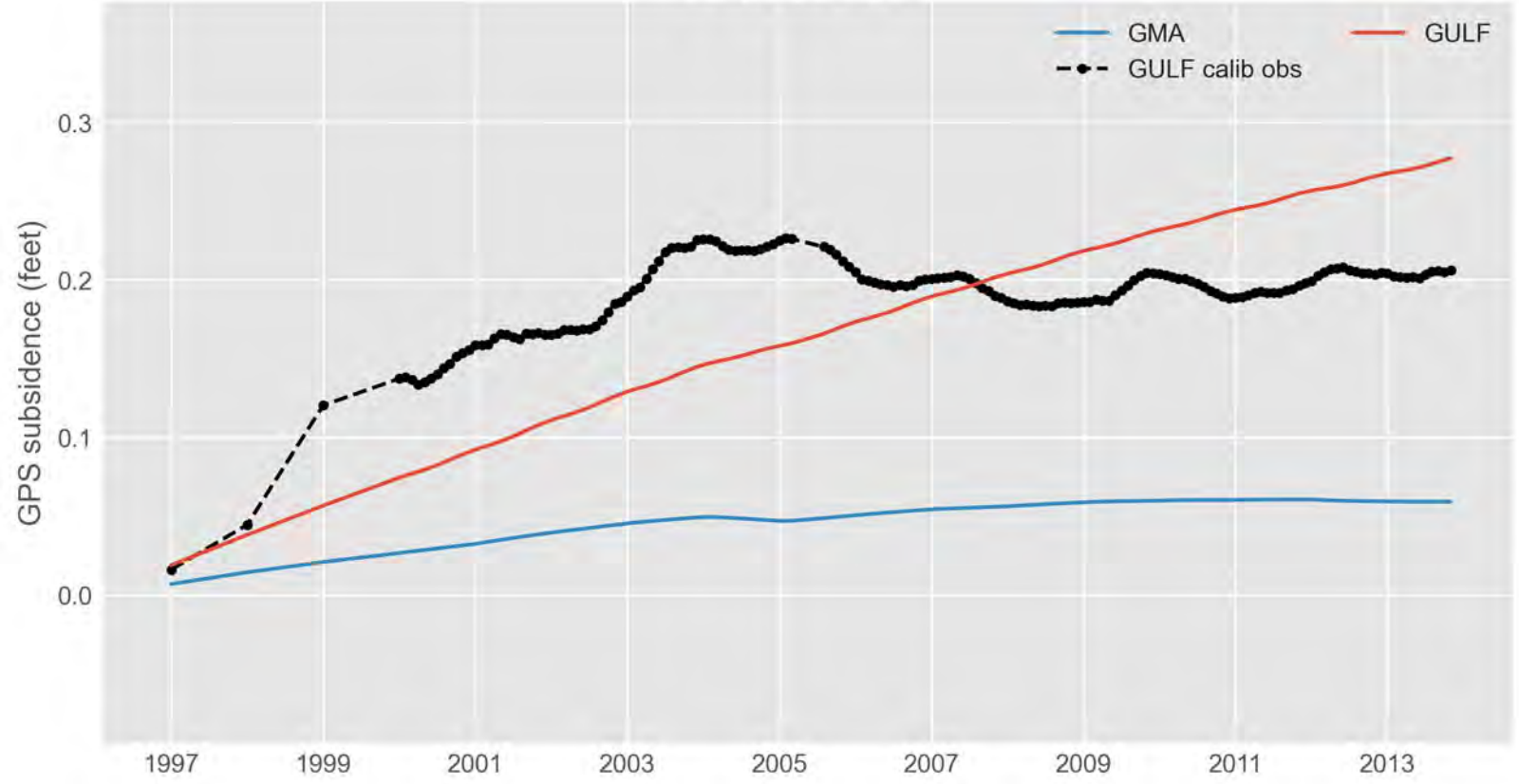

L1R063C285
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019

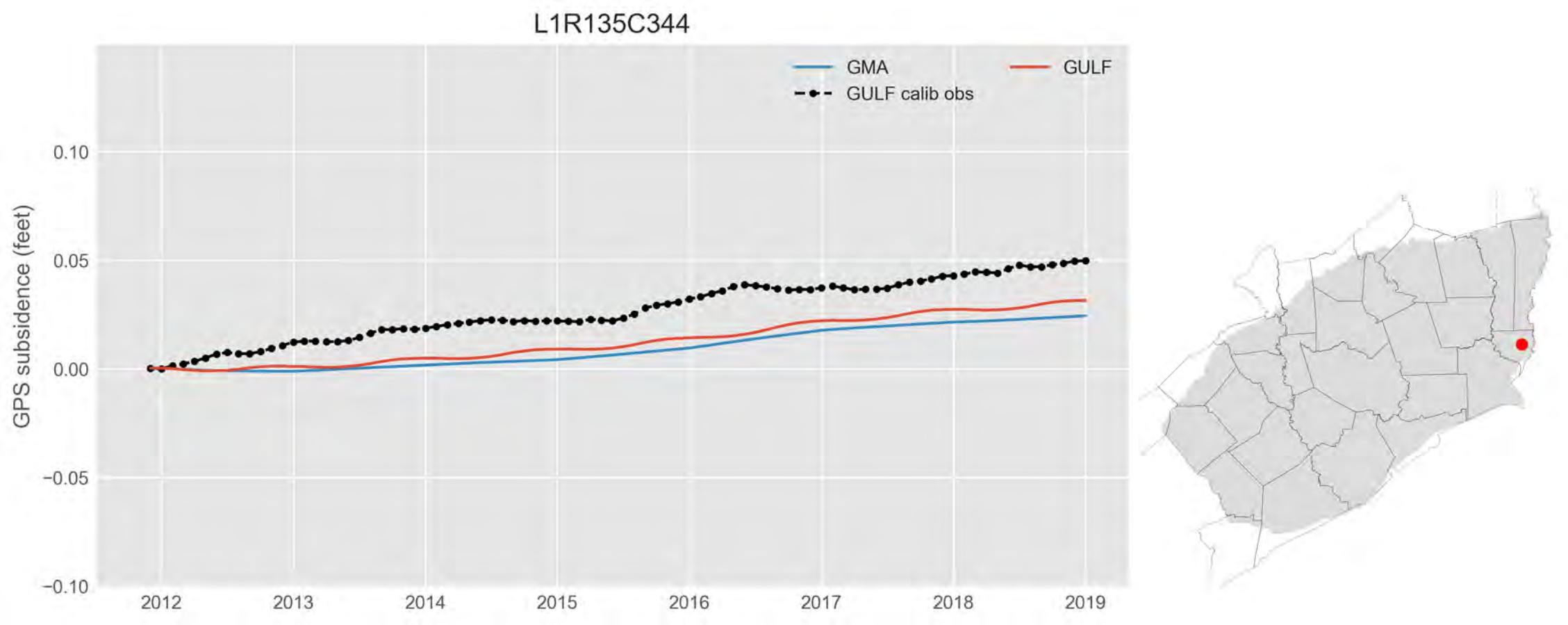

L1R068C238
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
2012
2013
2014
2015
2016
2017
2018
2019

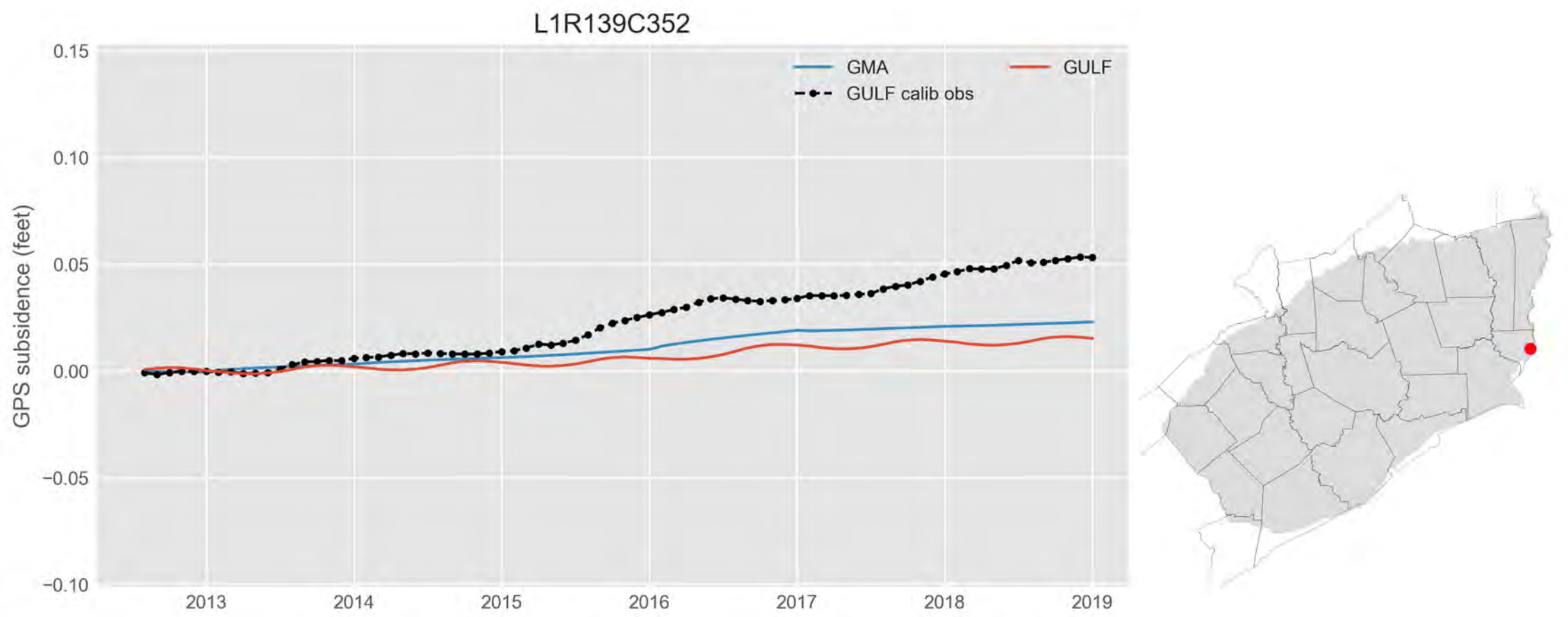

L1R106C294
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
2012
2013
2014
2015
2016
2017
2018
2019

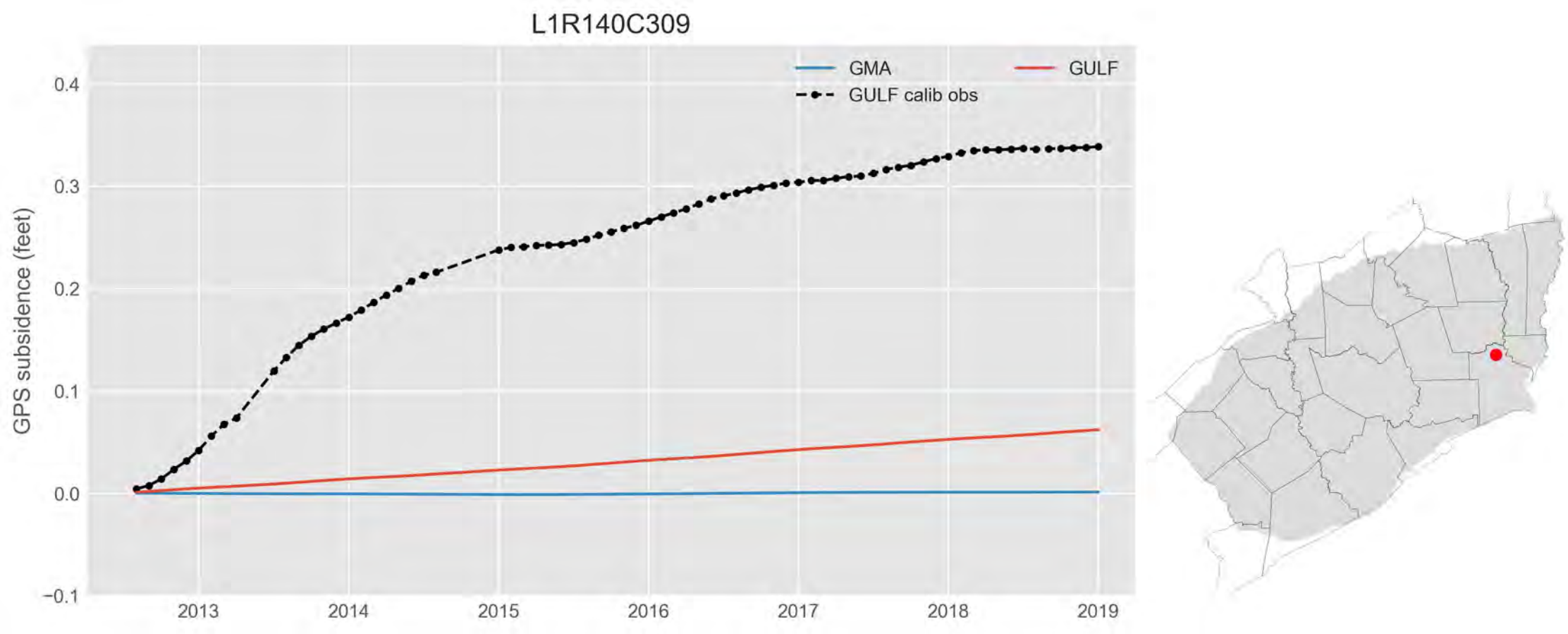

L1R131C077
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
2011
2012
2013
2014
2015
2016

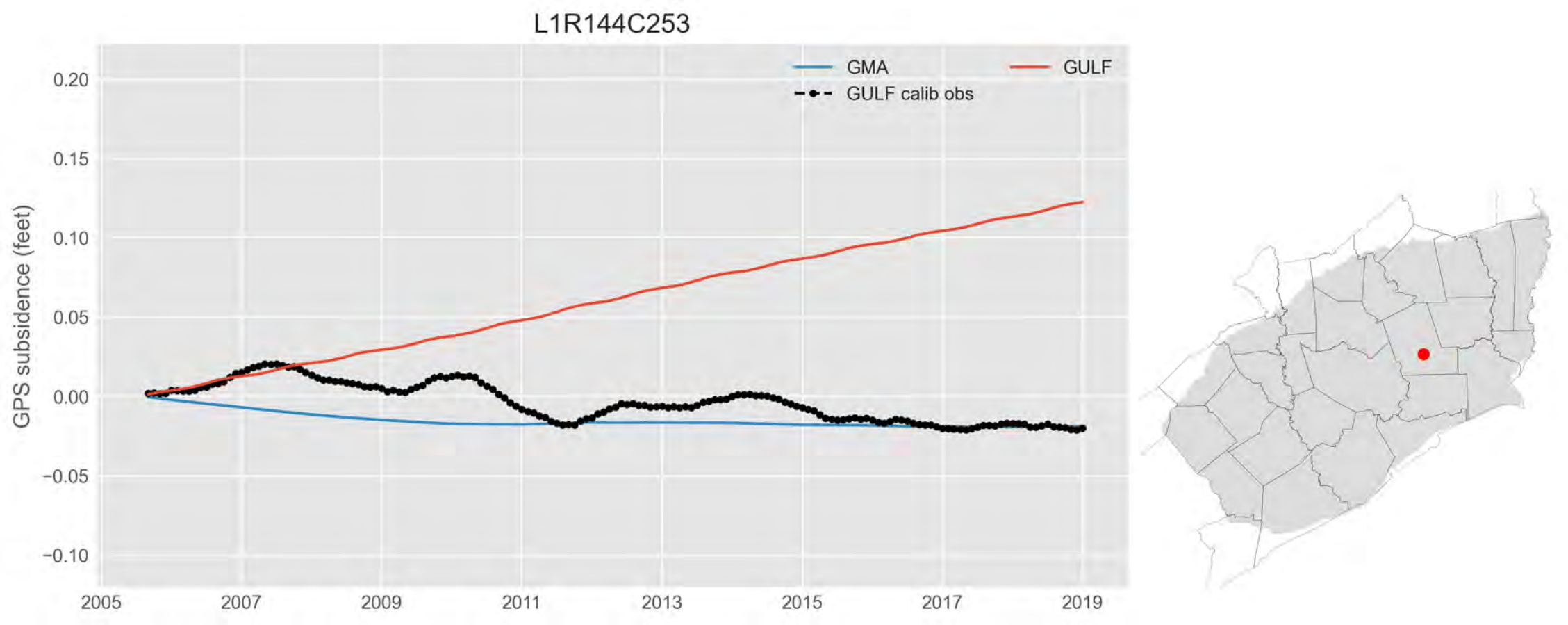
L1R132C310

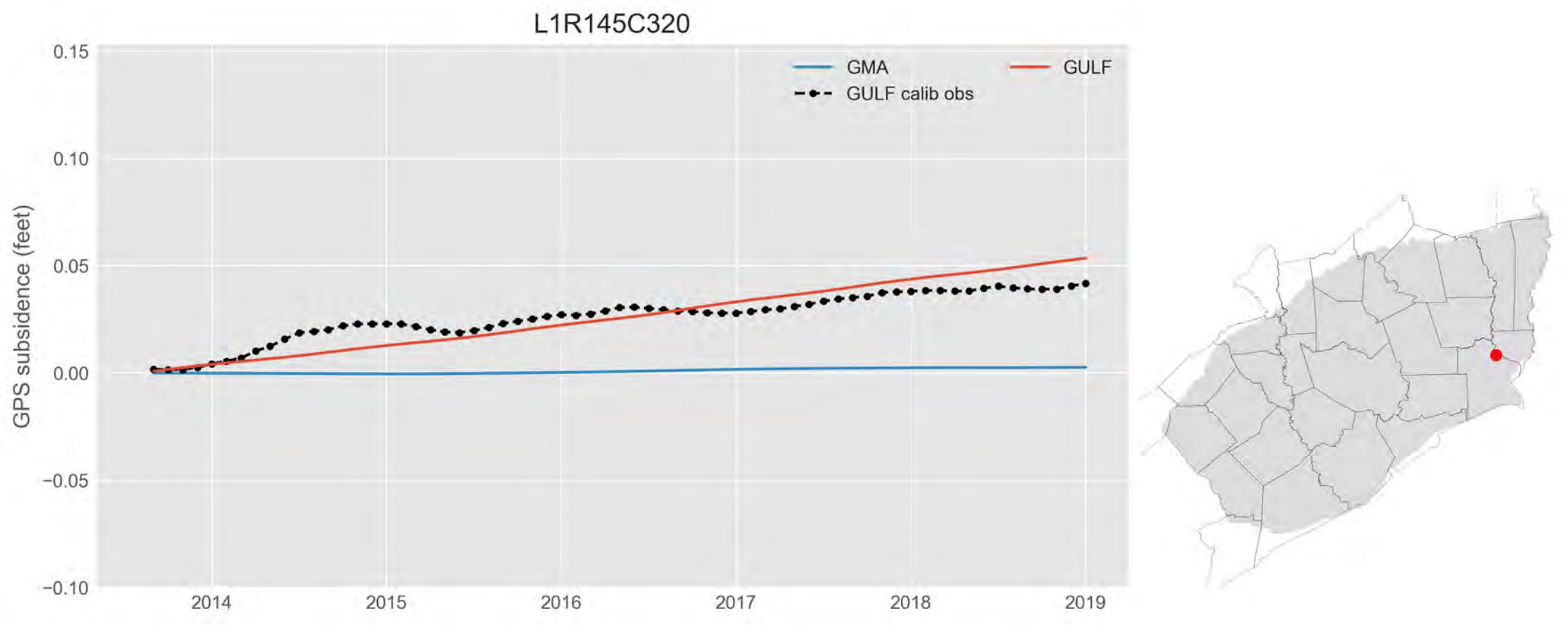

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
1997
1999
2001
2003
2005
2007
2009
2011
2013


L1R135C344
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2012
2013
2014
2015
2016
2017
2018
2019

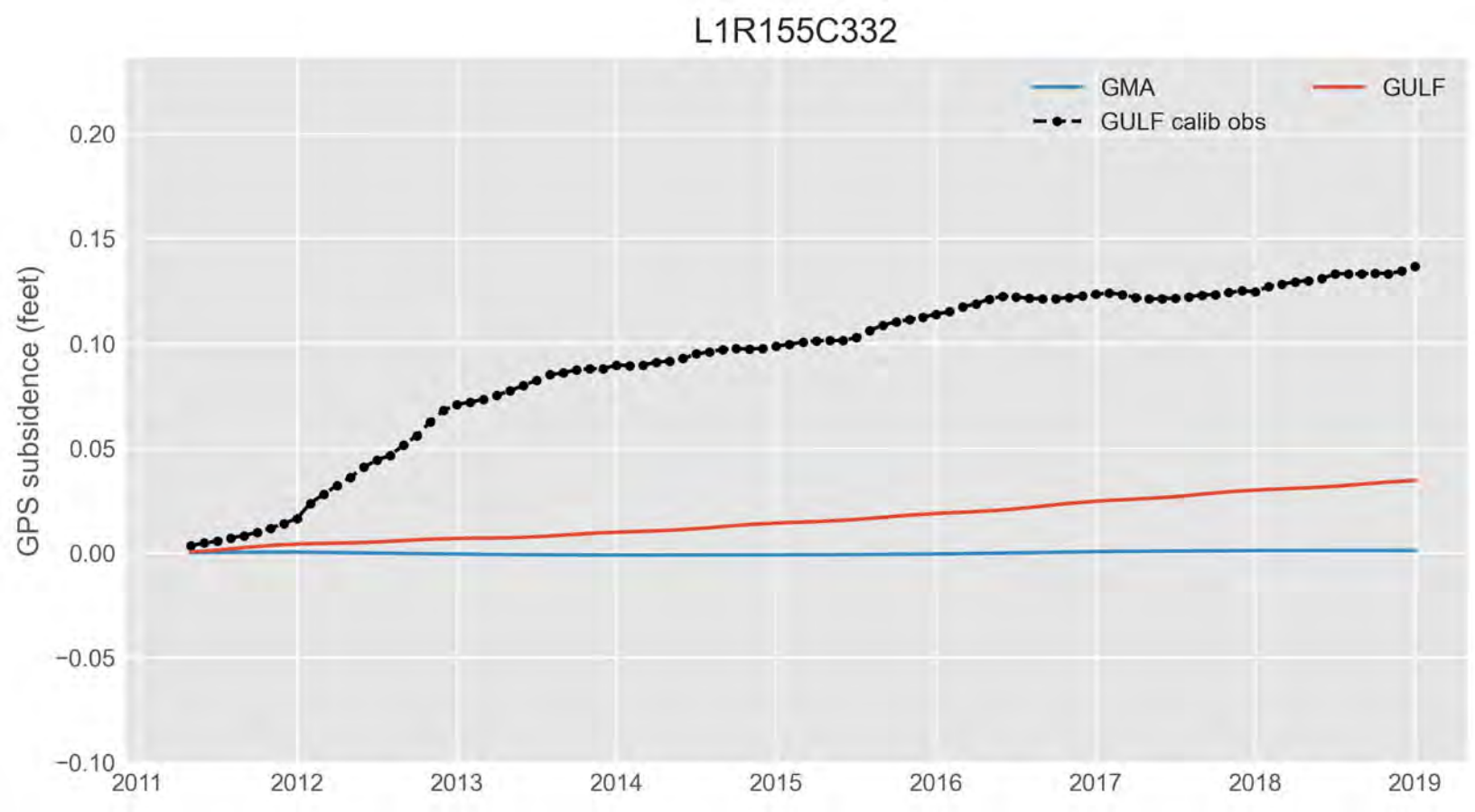

L1R139C352
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019


L1R140C309
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.4
0.3
0.2
0.1
0.0
−0.1
2013
2014
2015
2016
2017
2018
2019

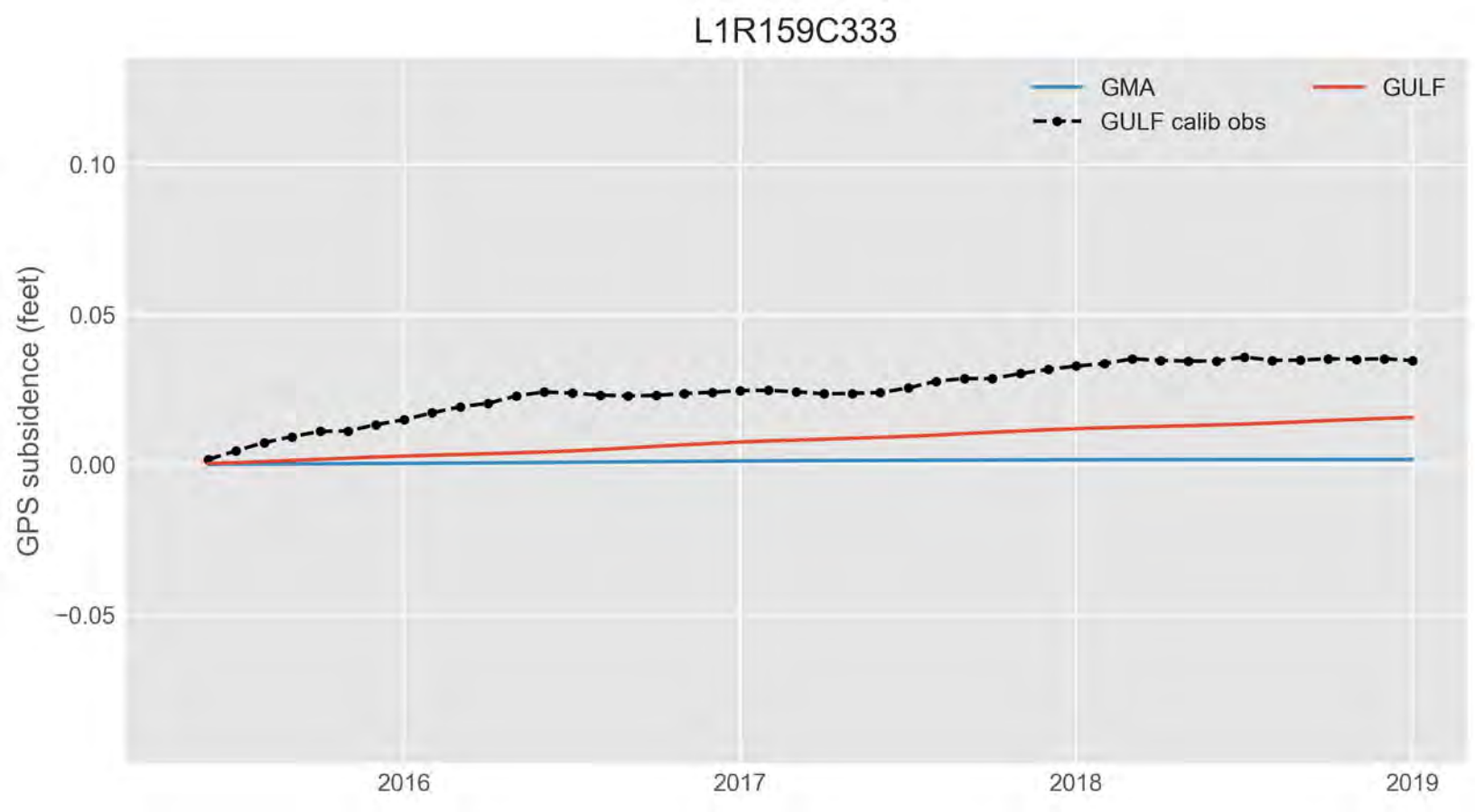

L1R144C253
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2005
2007
2009
2011
2013
2015
2017
2019

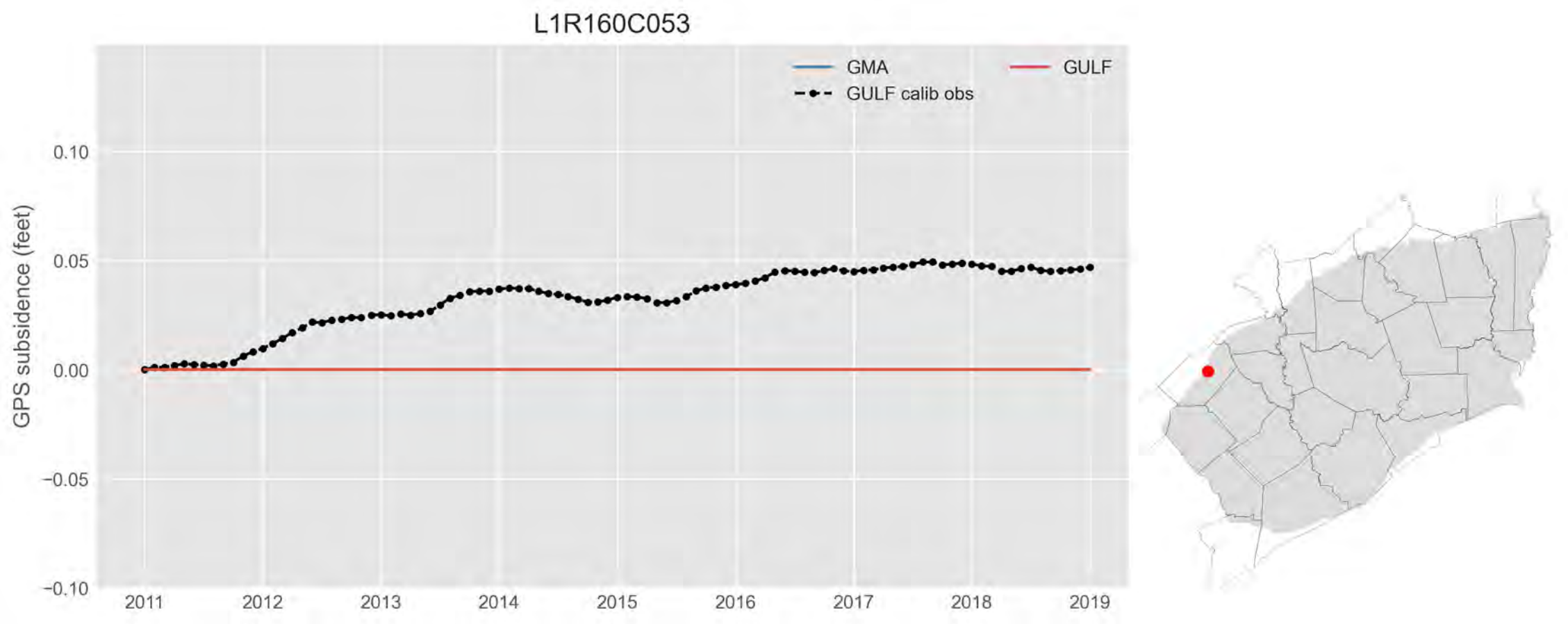

L1R145C320
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018
2019

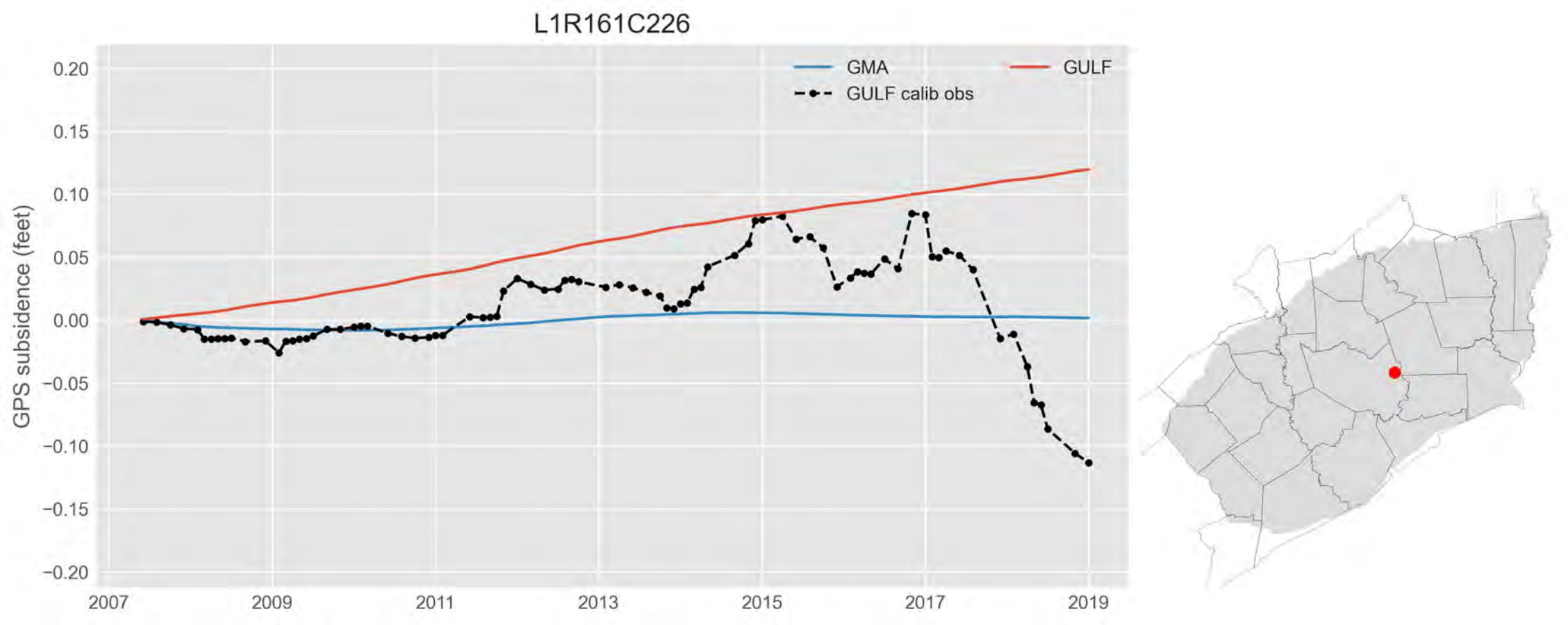
L1R155C332

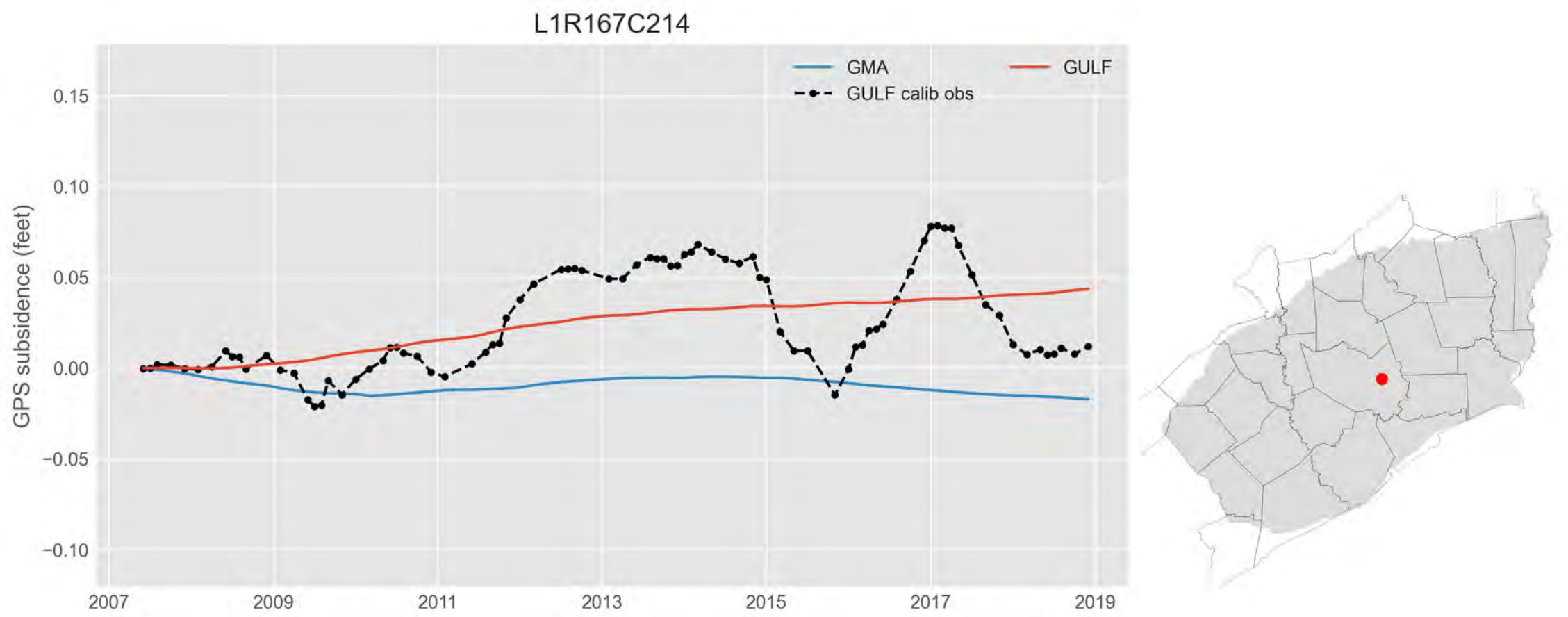

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2011
2012
2013
2014
2015
2016
2017
2018
2019

L1R159C333

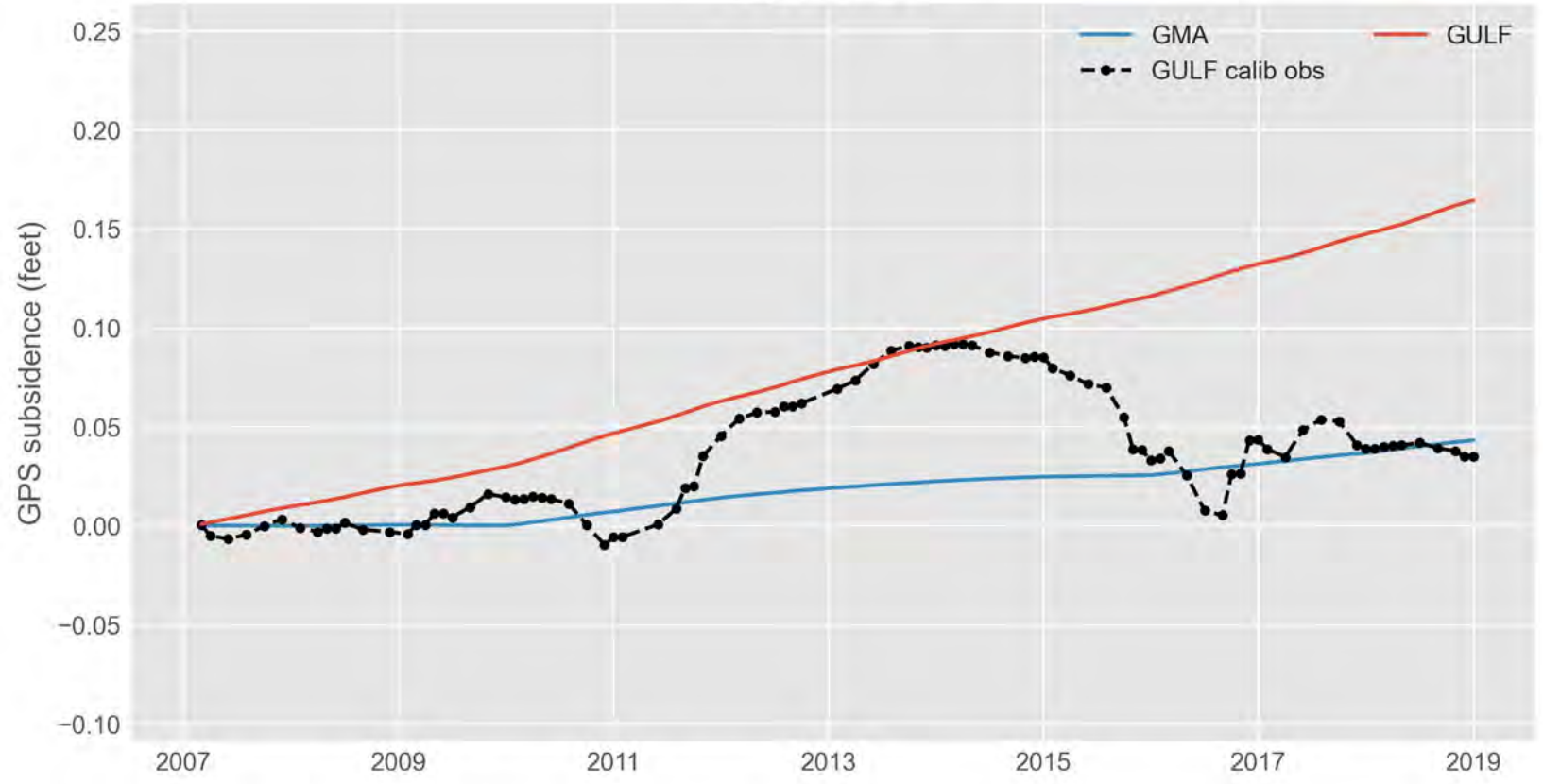

GMA
GULF
GULF calib obs
0.10
0.05
0.00
−0.05
GPS subsidence (feet)
2016
2017
2018
2019

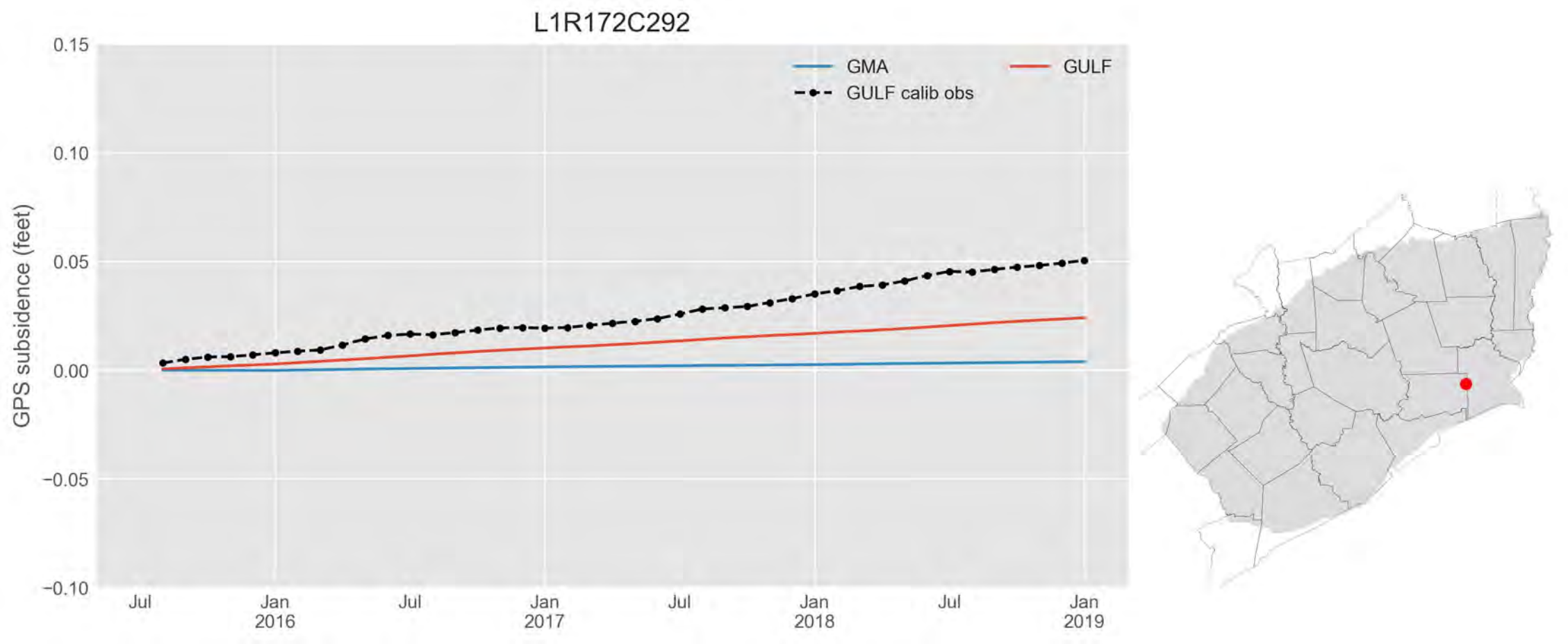

L1R160C053
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2011
2012
2013
2014
2015
2016
2017
2018
2019


L1R161C226
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
2007
2009
2011
2013
2015
2017
2019

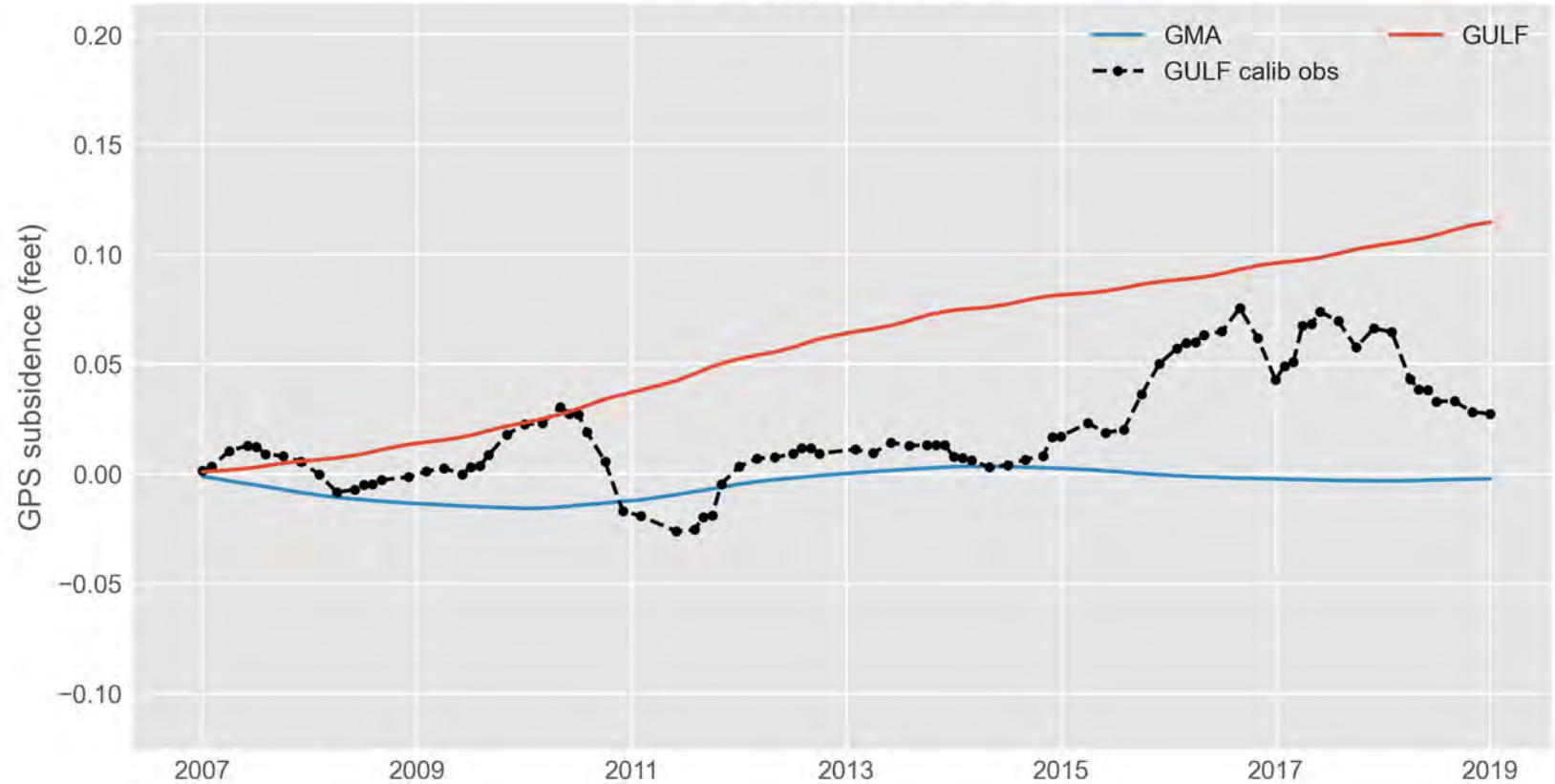

L1R167C214
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2007
2009
2011
2013
2015
2017
2019

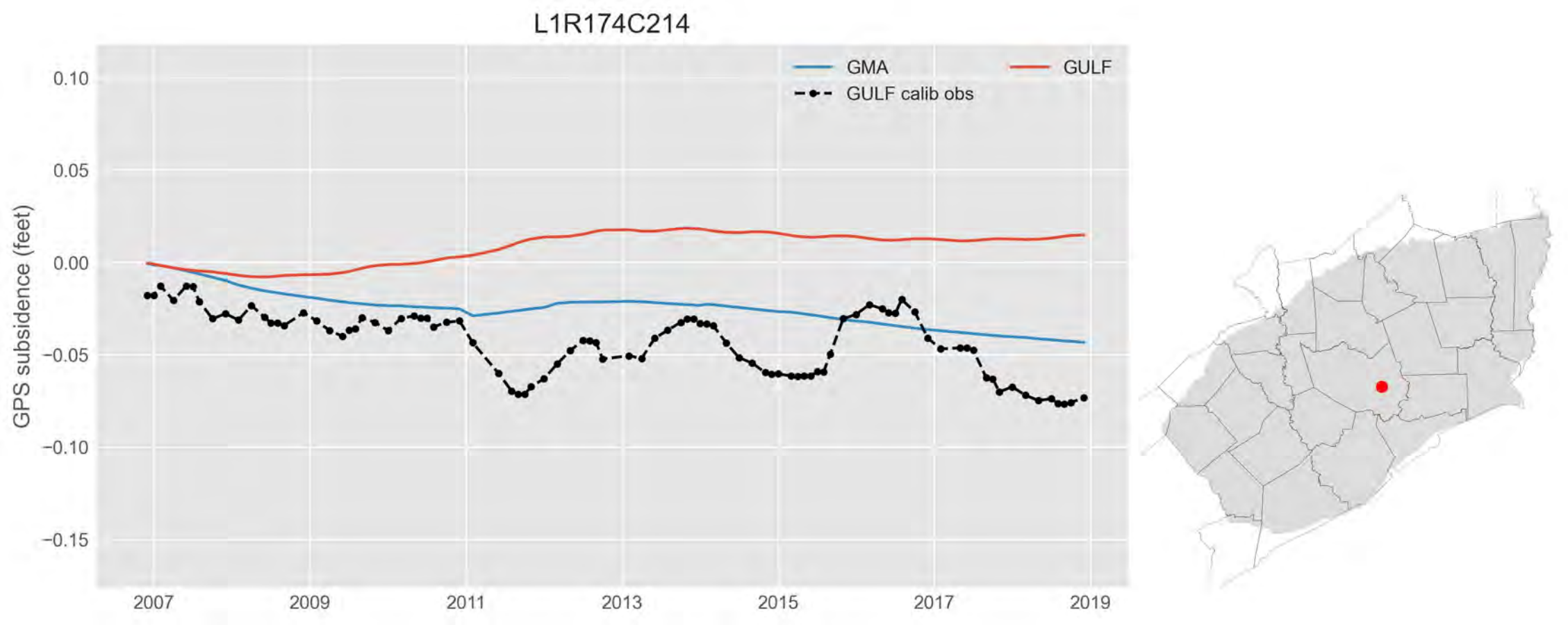
L1R168C245

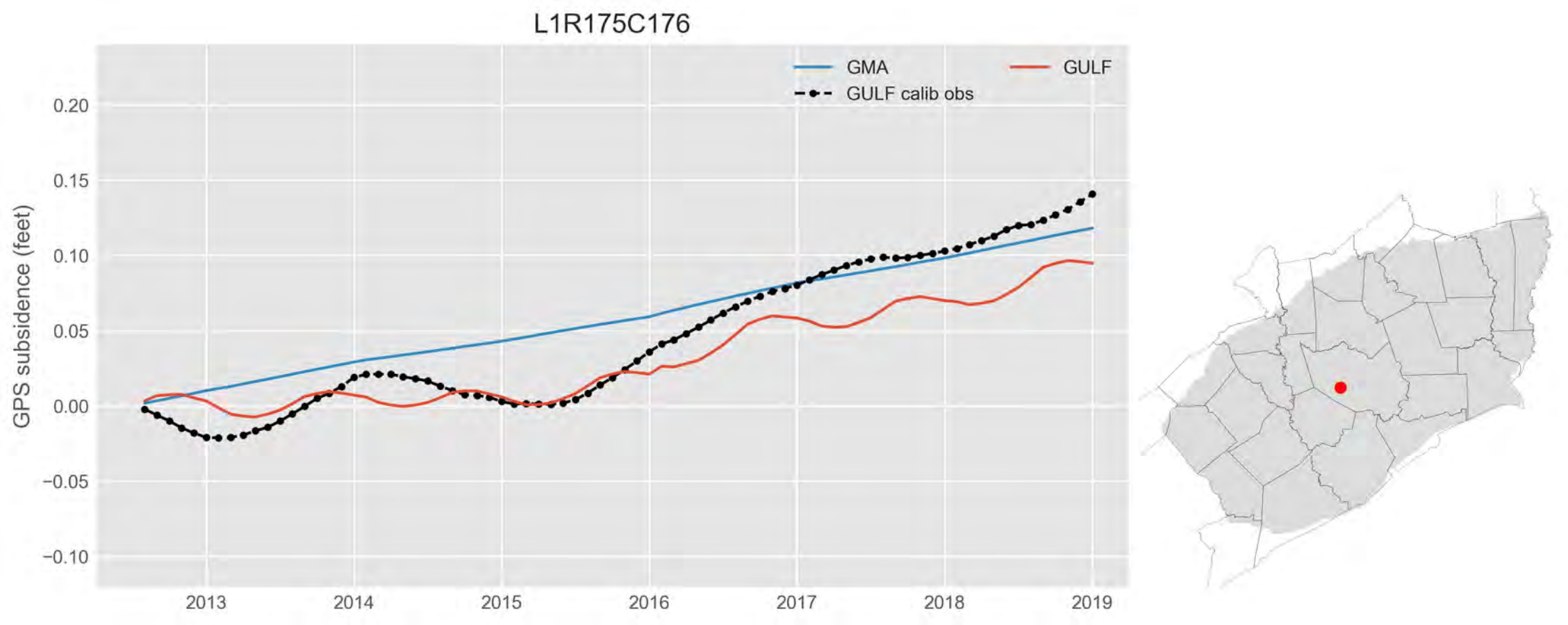

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2007
2009
2011
2013
2015
2017
2019

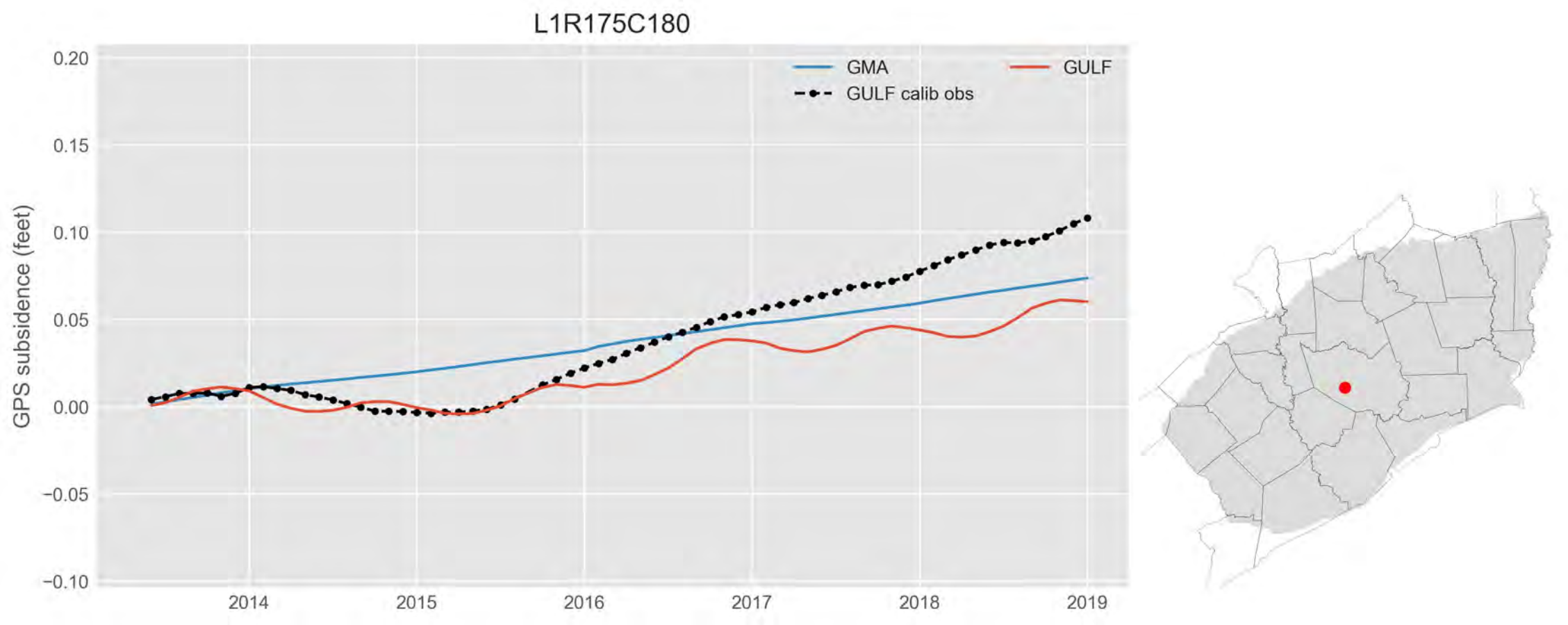

L1R172C292
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
Jul
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

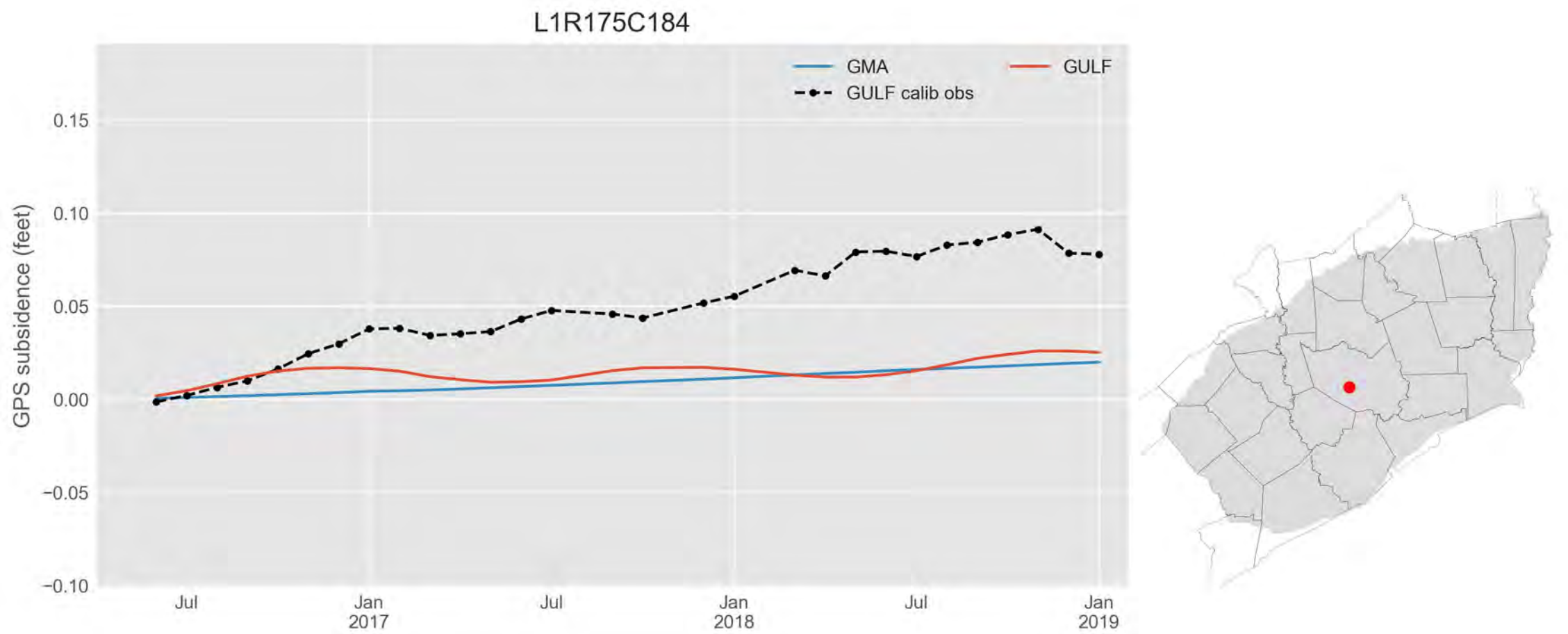
L1R173C228

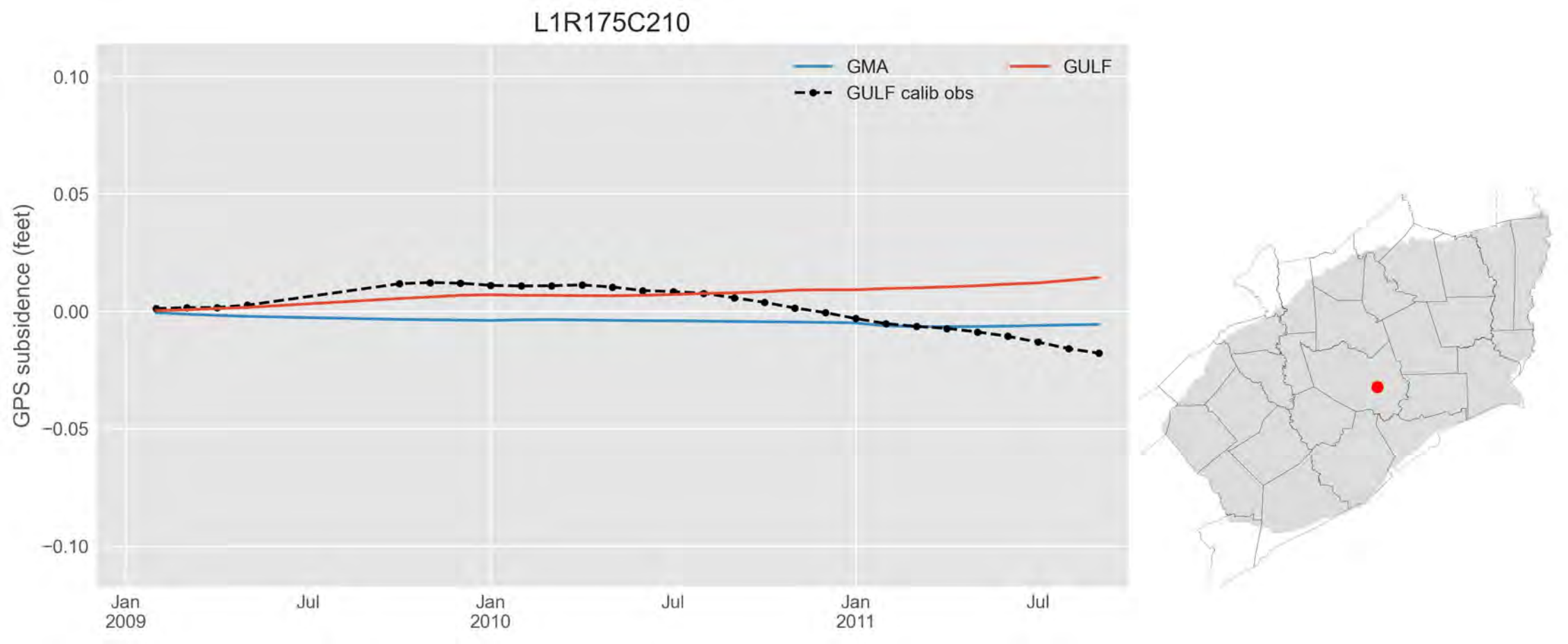

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2007
2009
2011
2013
2015
2017
2019

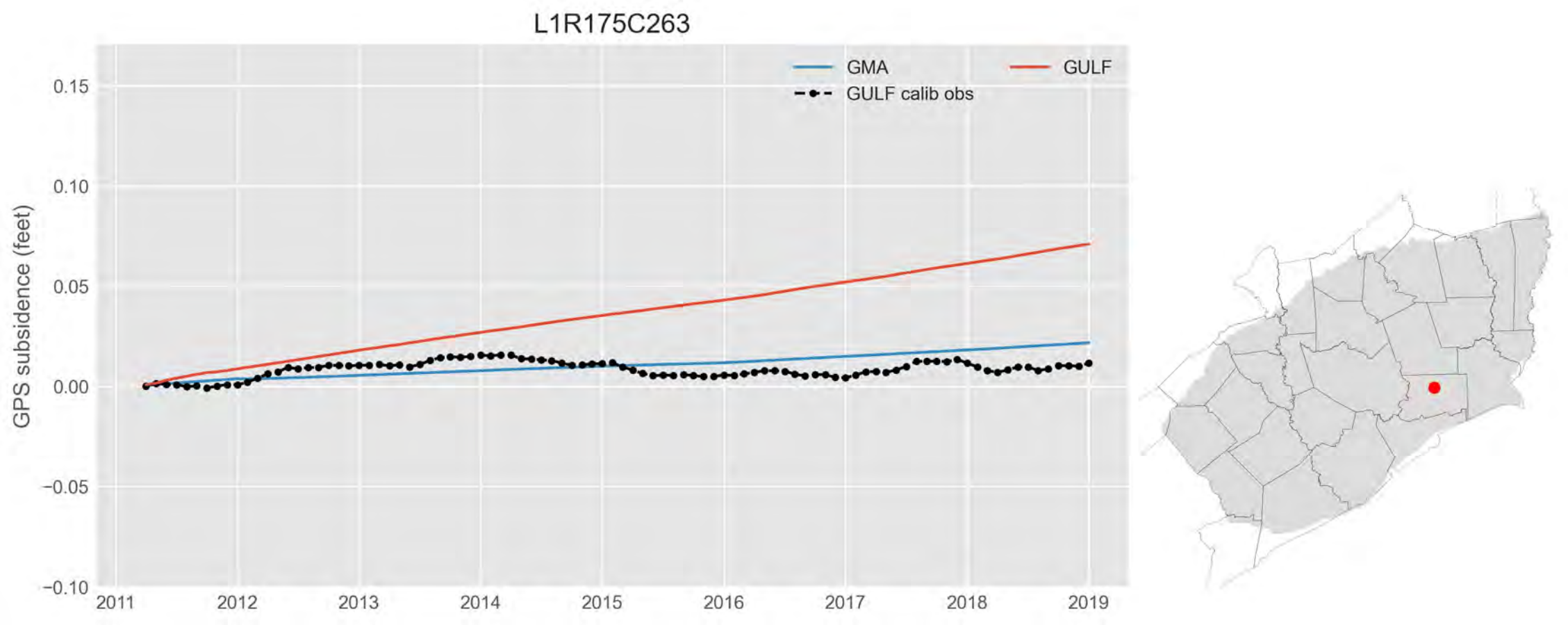

L1R174C214
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
−0.15
2007
2009
2011
2013
2015
2017
2019


L1R175C176
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019

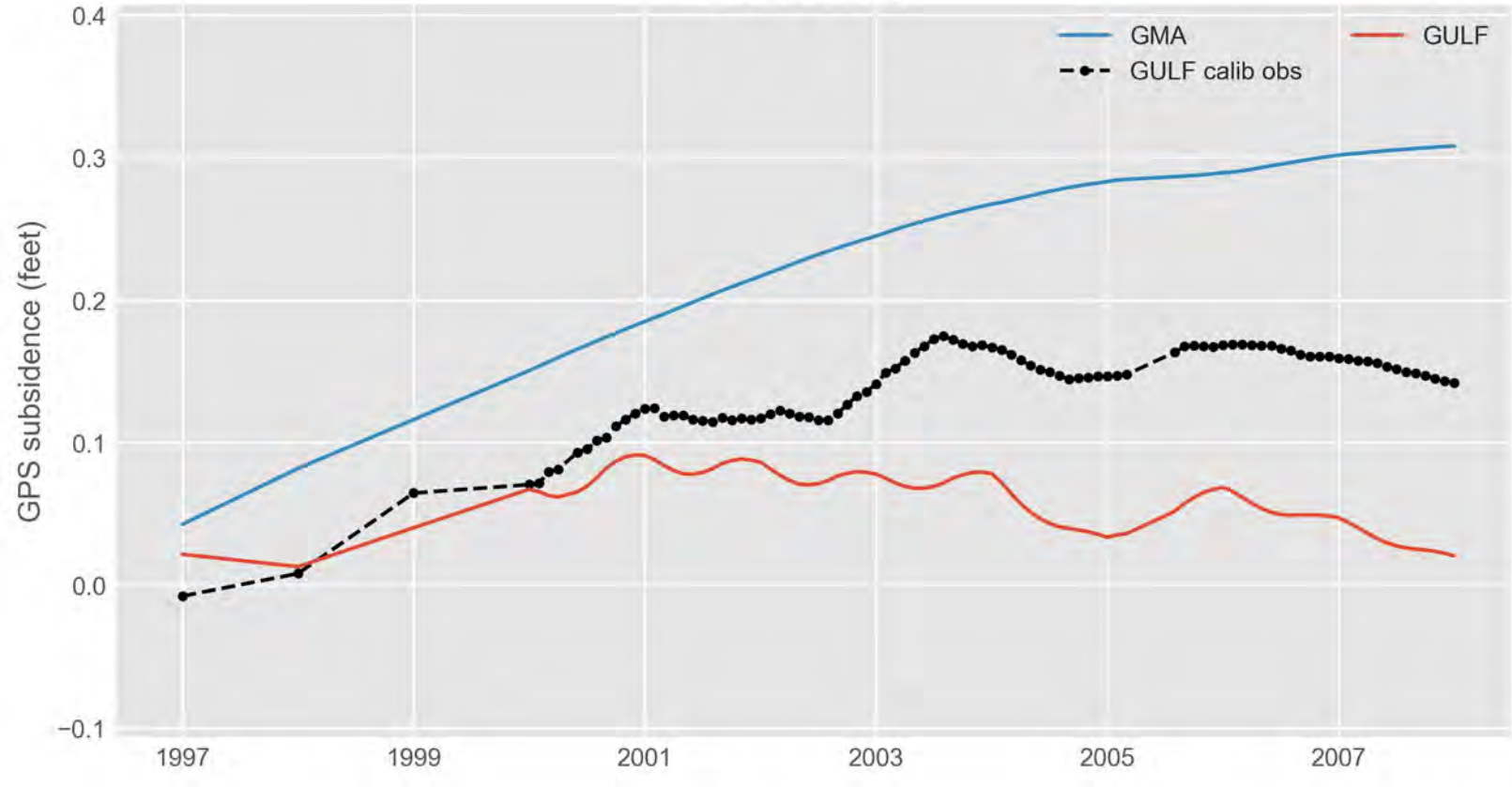

L1R175C180
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018
2019

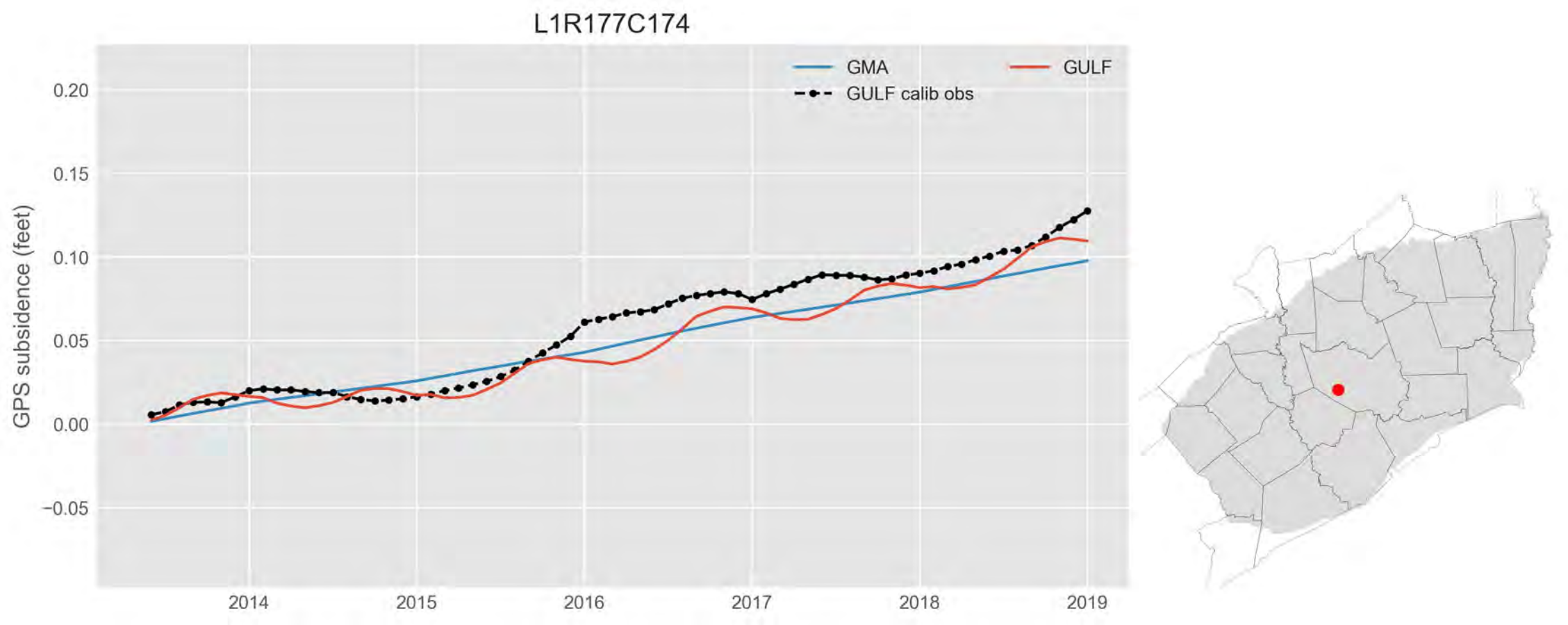

L1R175C184
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

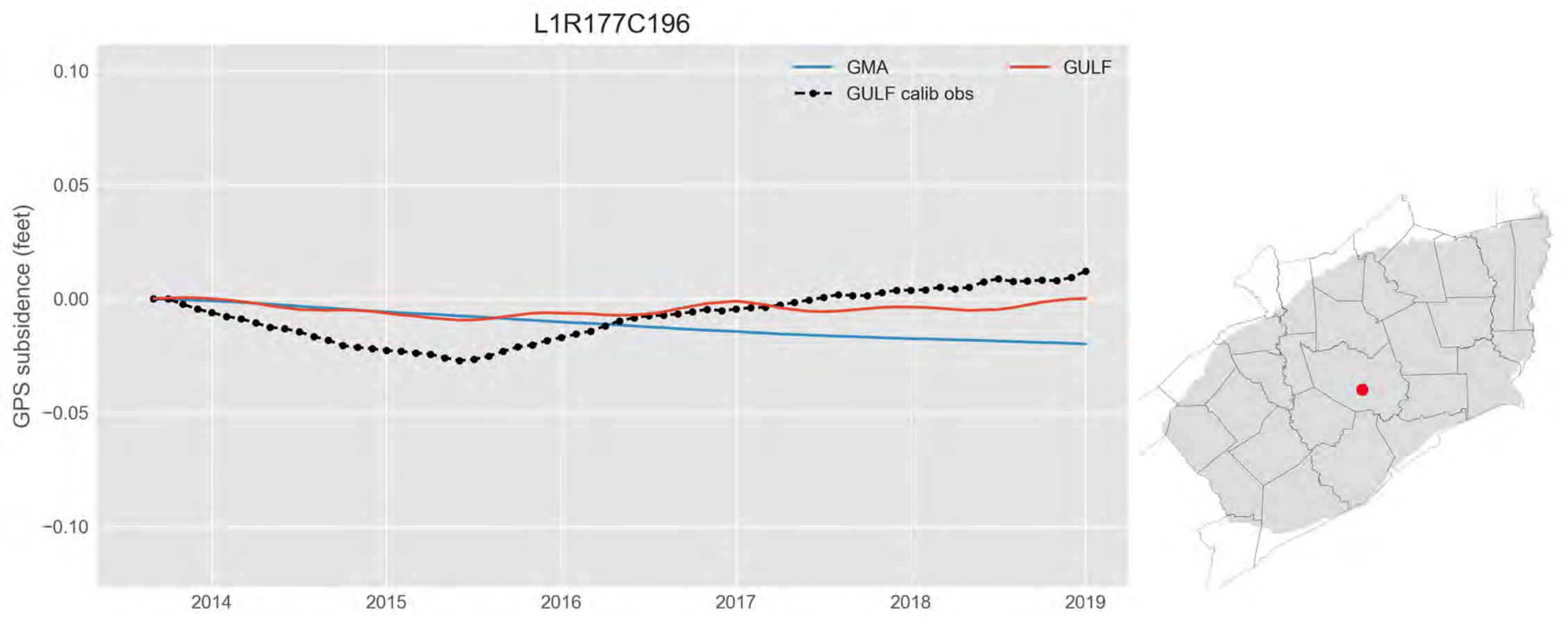

L1R175C210
GMA
GULF
GULF calib obs
0.10
0.05
0.00
−0.05
−0.10
GPS subsidence (feet)
Jan
2009
Jul
Jan
2010
Jul
Jan
2011
Jul

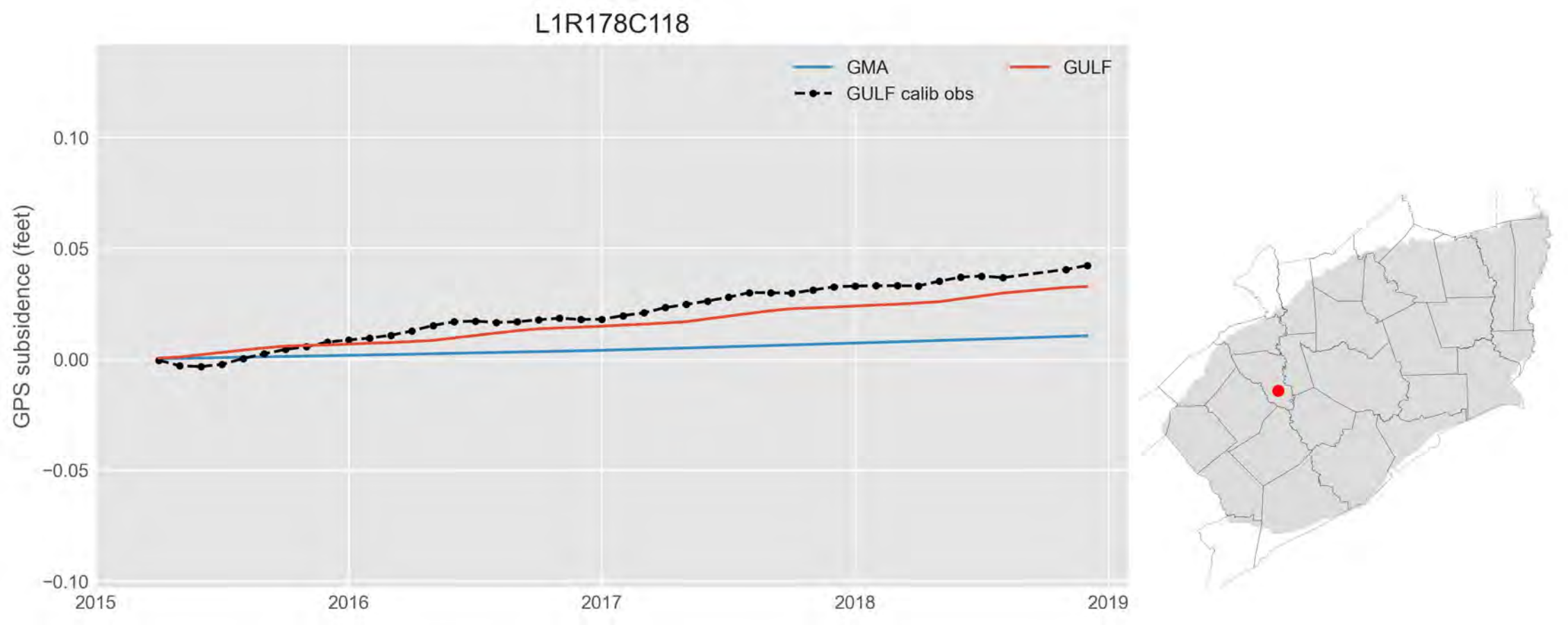

L1R175C263
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2011
2012
2013
2014
2015
2016
2017
2018
2019

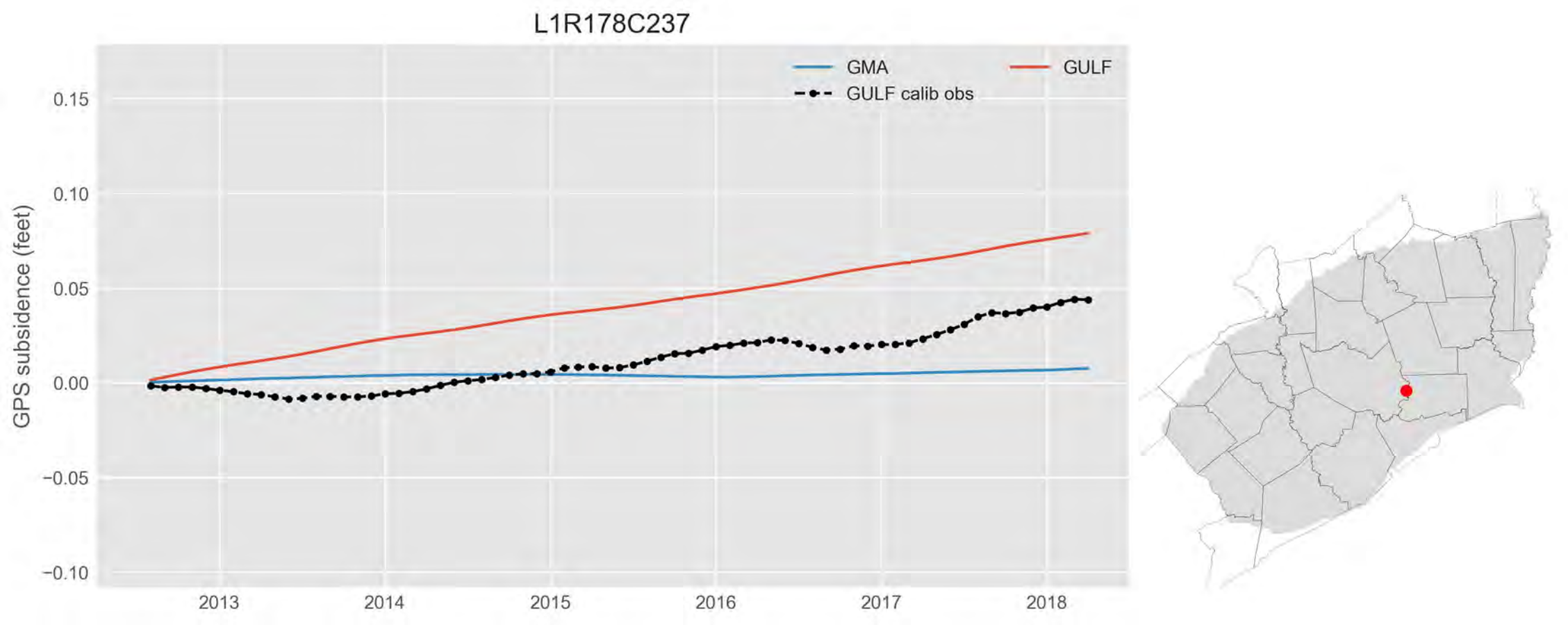
L1R176C189

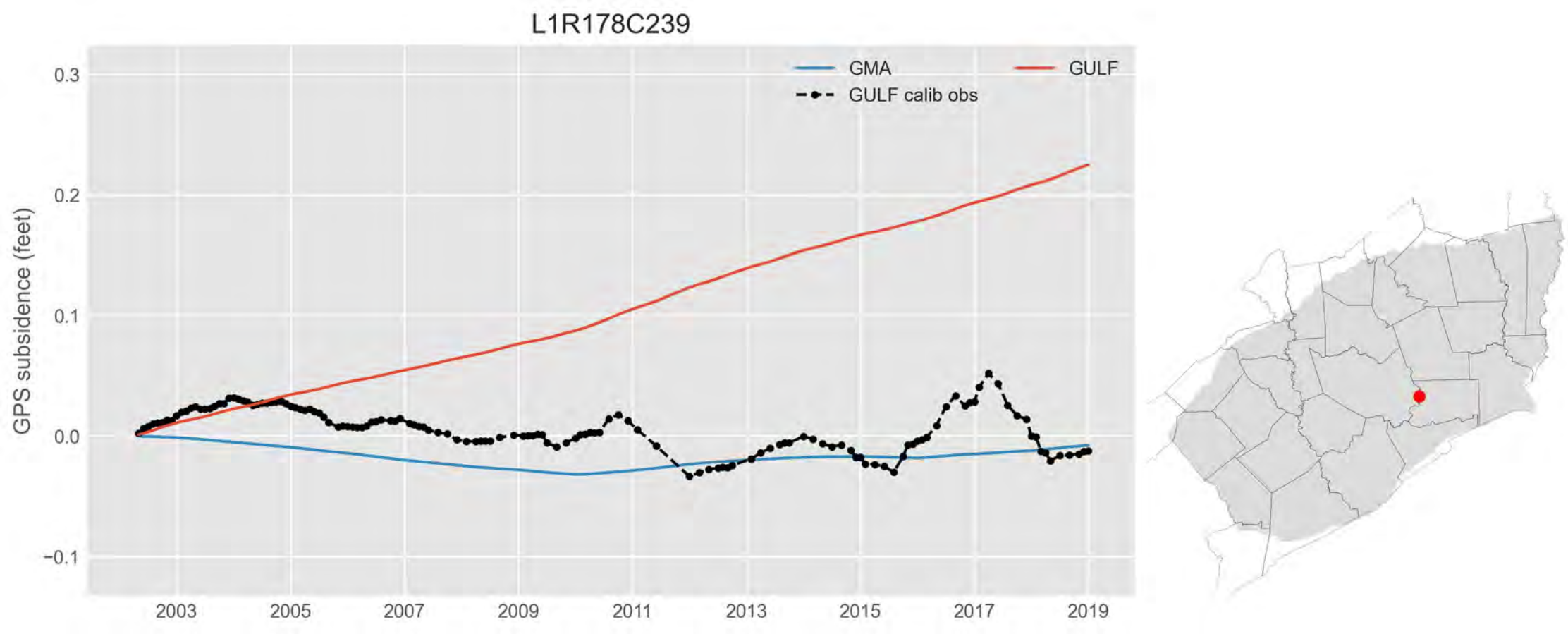

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.4
0.3
0.2
0.1
0.0
−0.1
1997
1999
2001
2003
2005
2007

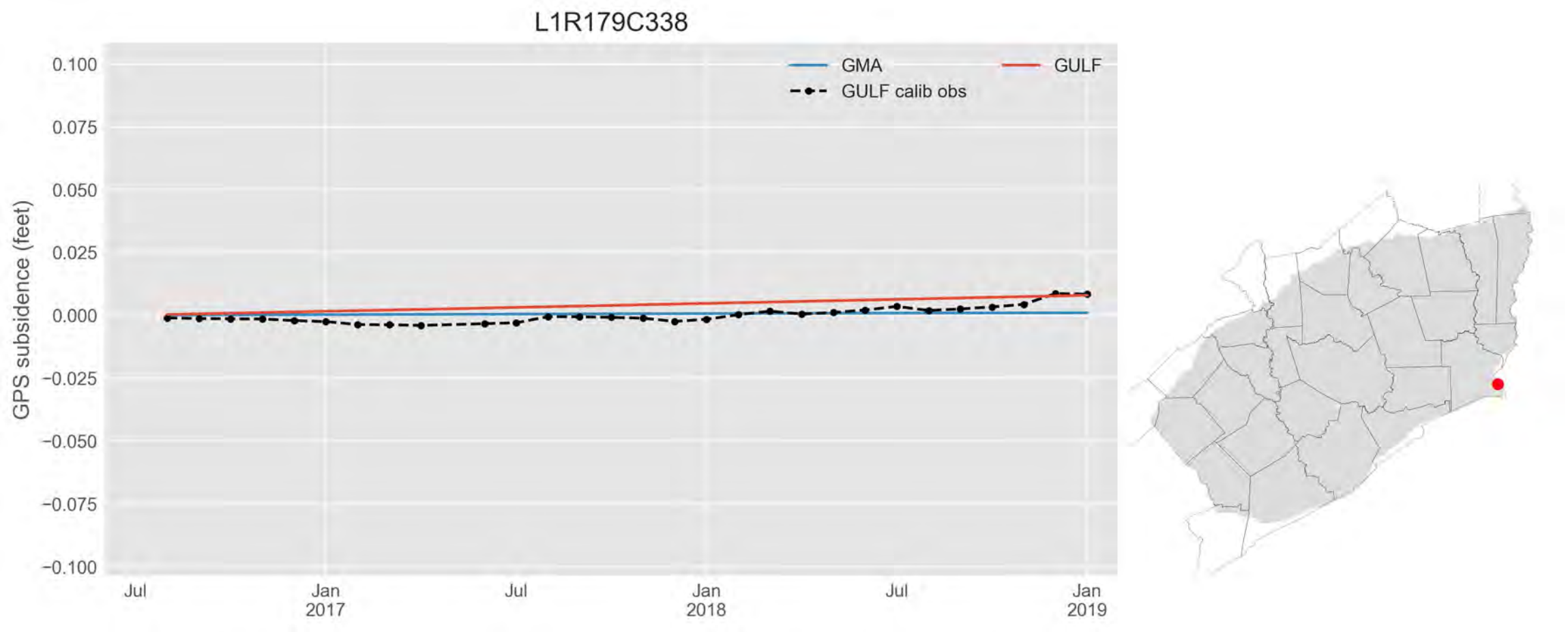

L1R177C174
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
2014
2015
2016
2017
2018
2019


L1R177C196
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018
2019

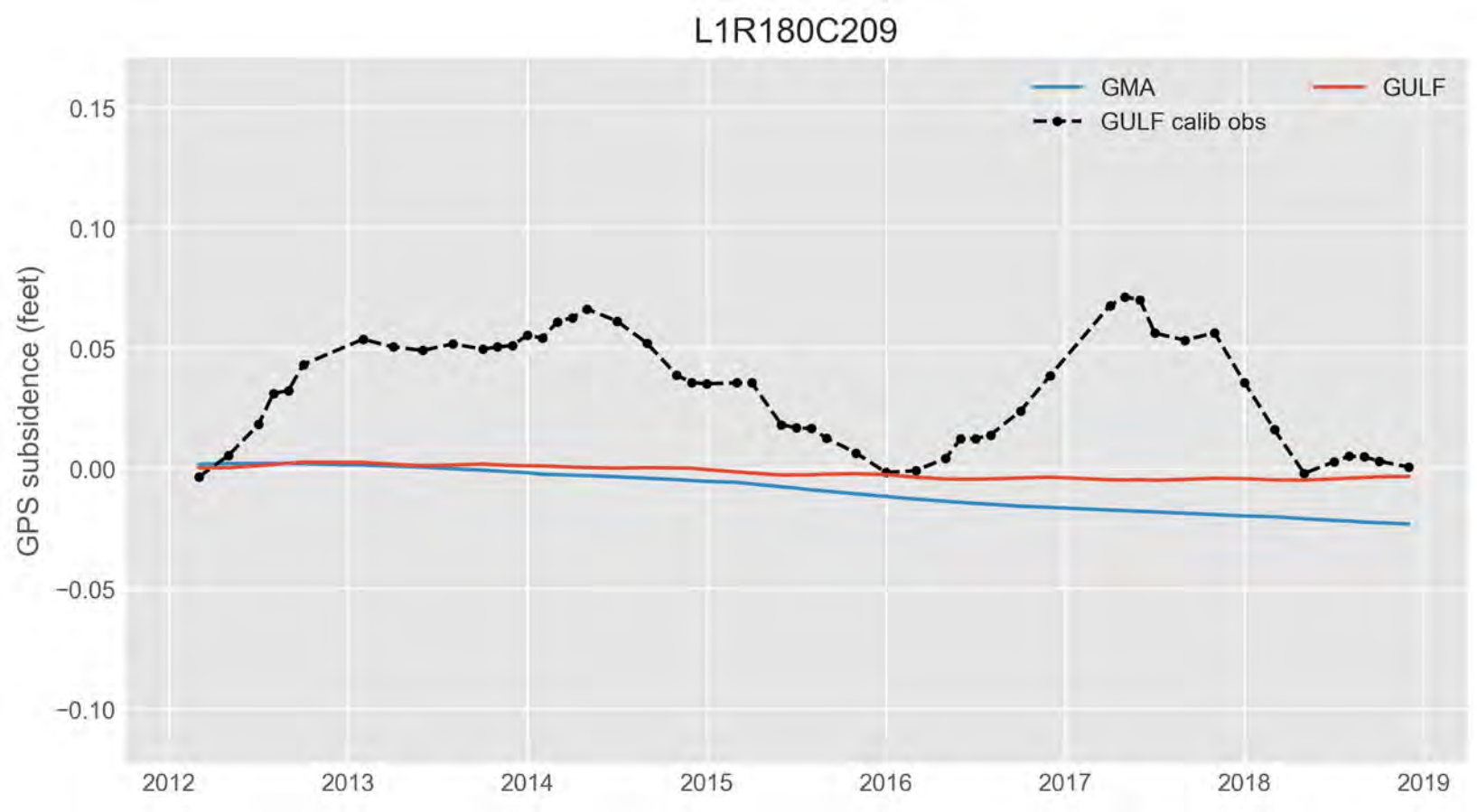

L1R178C118
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019


L1R178C237
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018

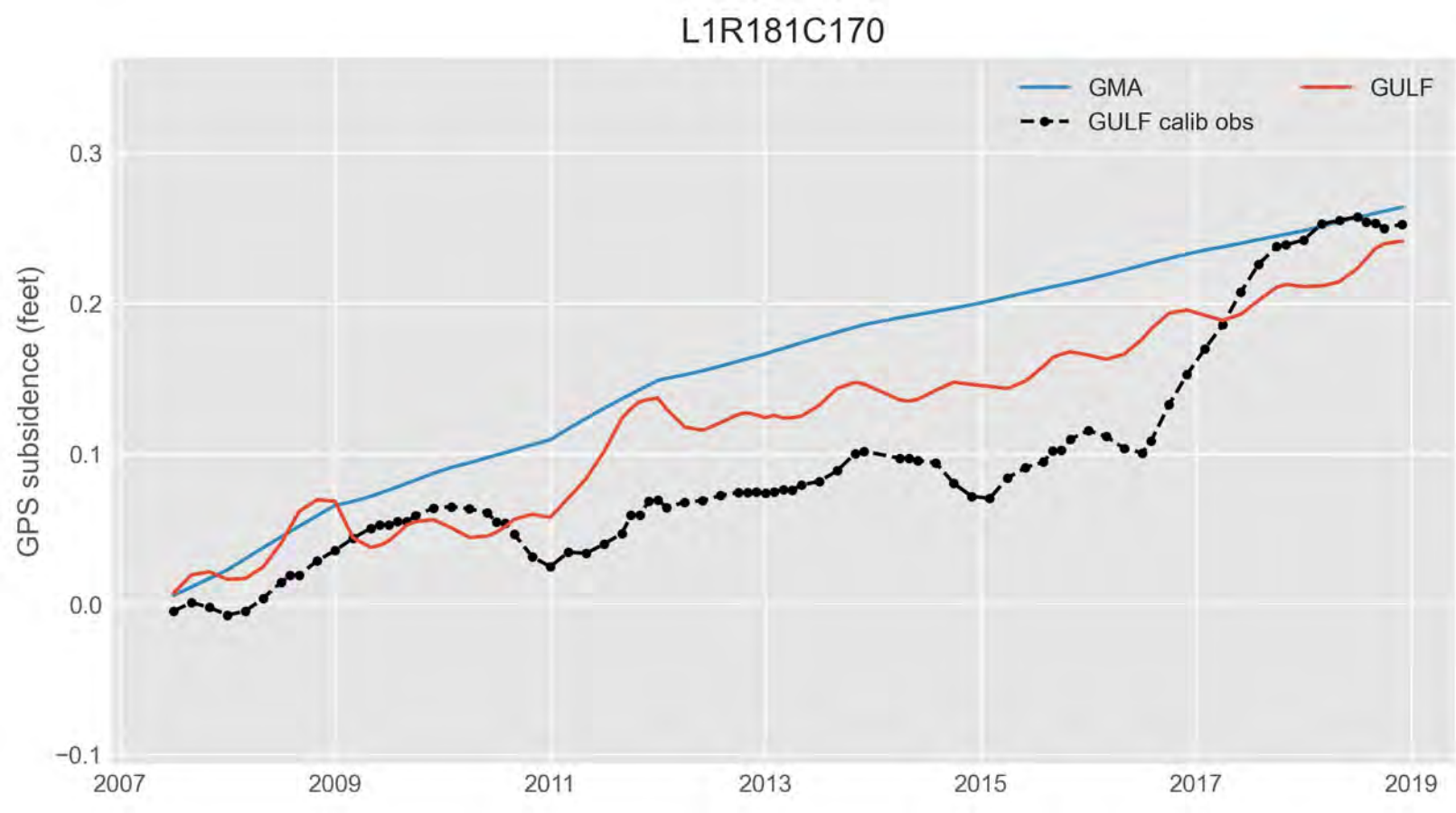

L1R178C239
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2003
2005
2007
2009
2011
2013
2015
2017
2019

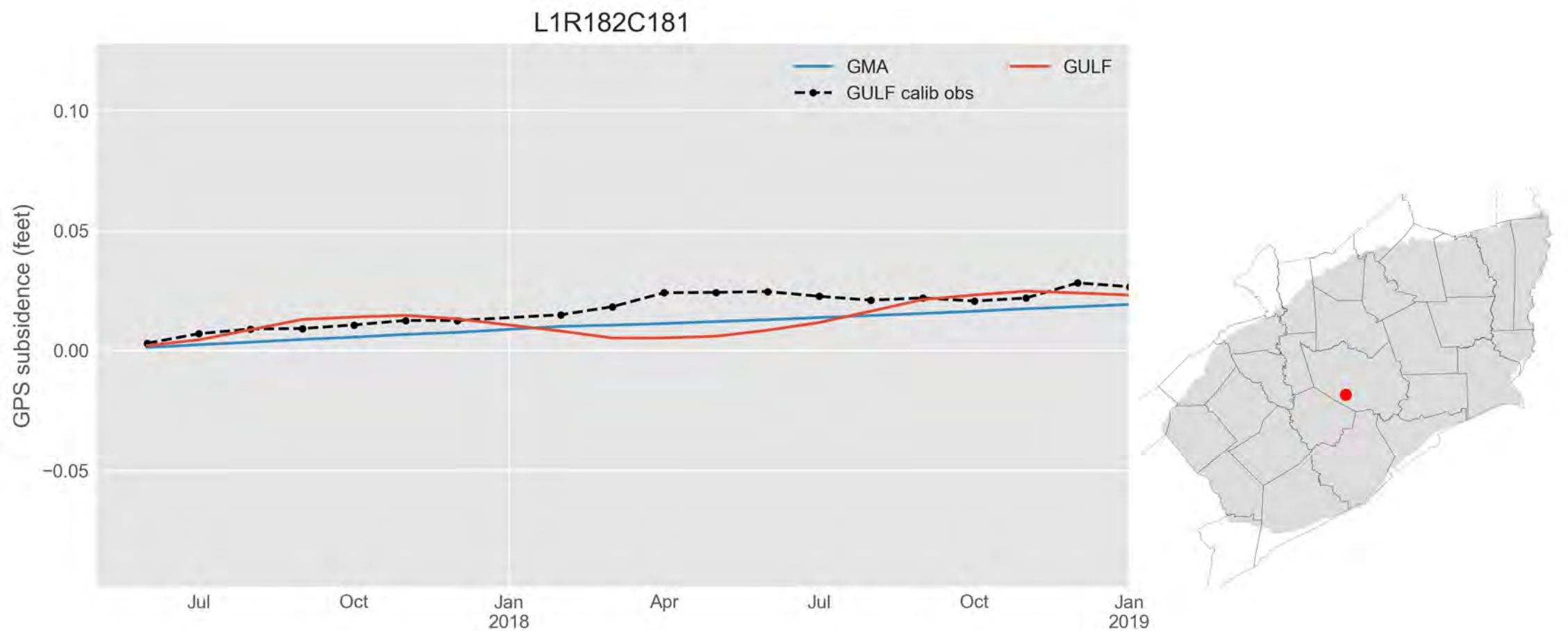

L1R179C338
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

L1R180C209

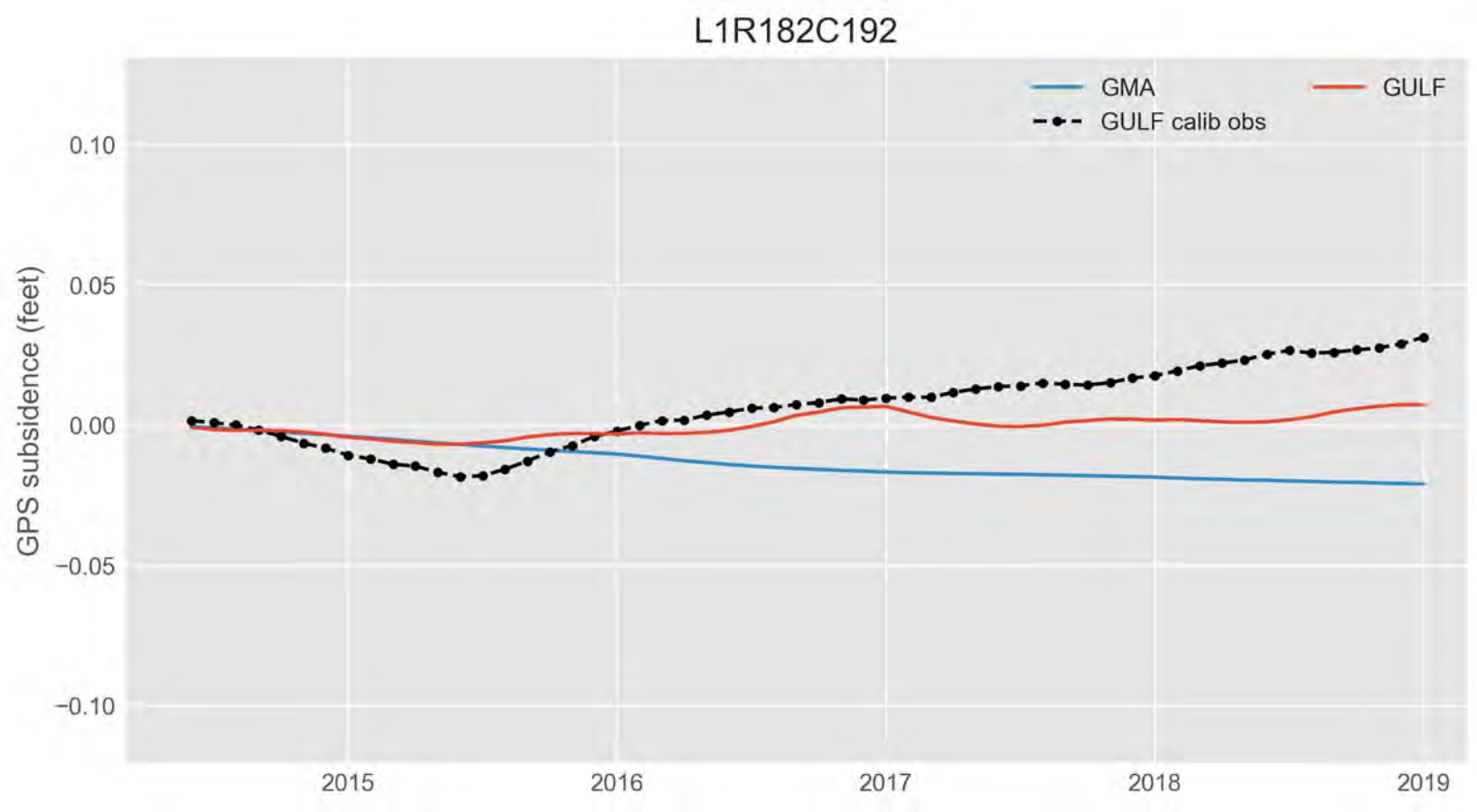

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2012
2013
2014
2015
2016
2017
2018
2019

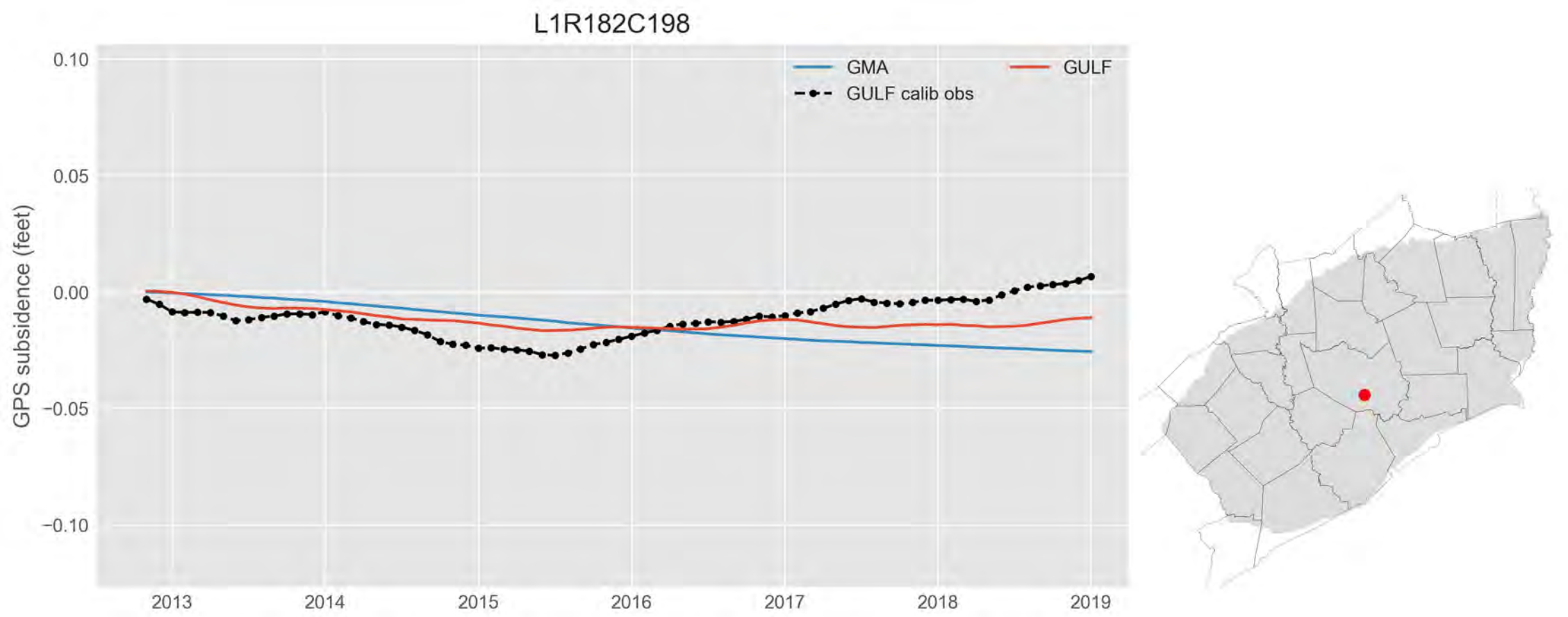
L1R181C170

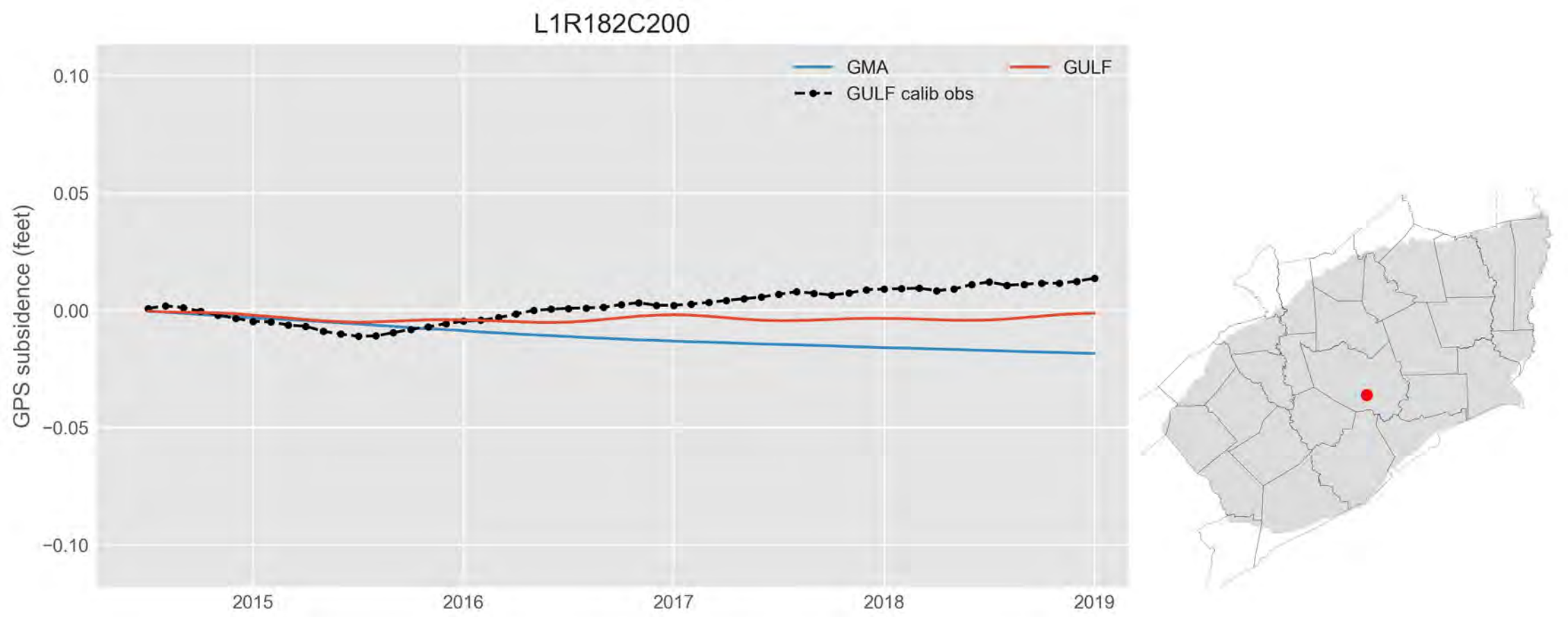

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019

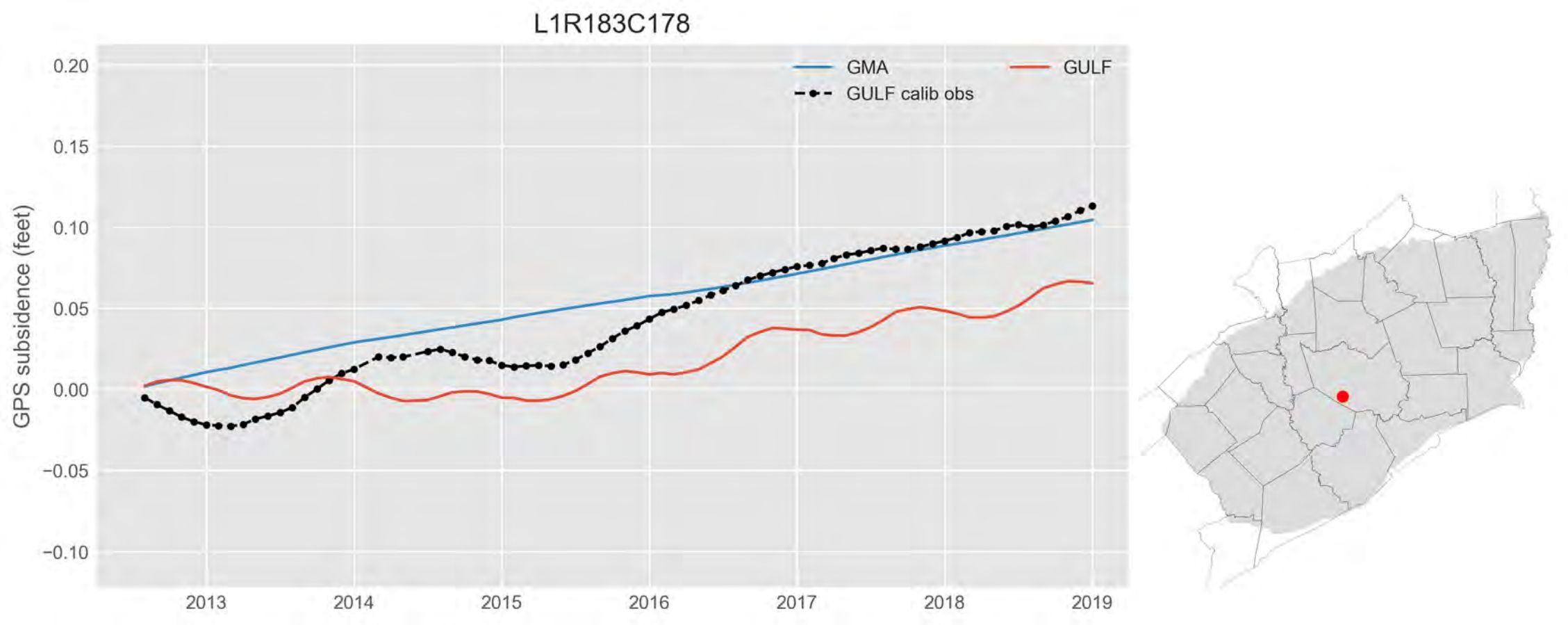

L1R182C181
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
Jul
Oct
Jan
2018
Apr
Jul
Oct
Jan
2019

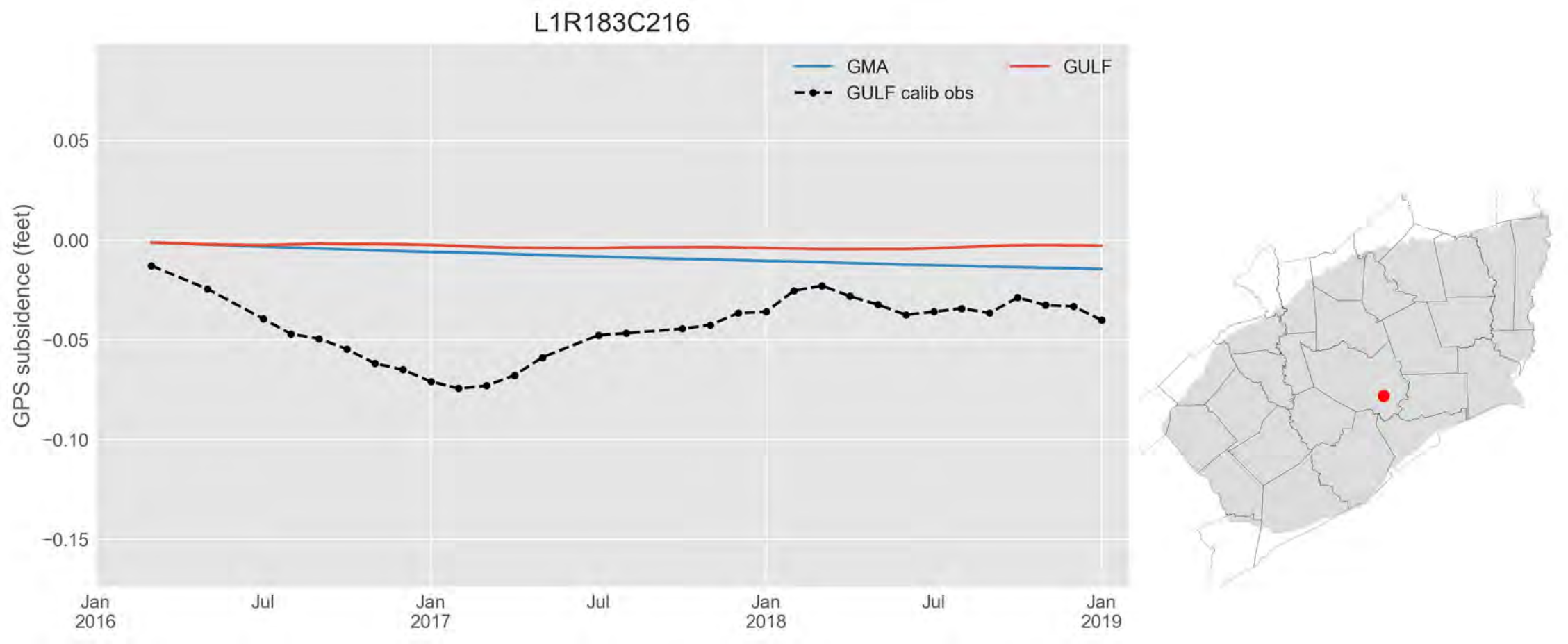
L1R182C192

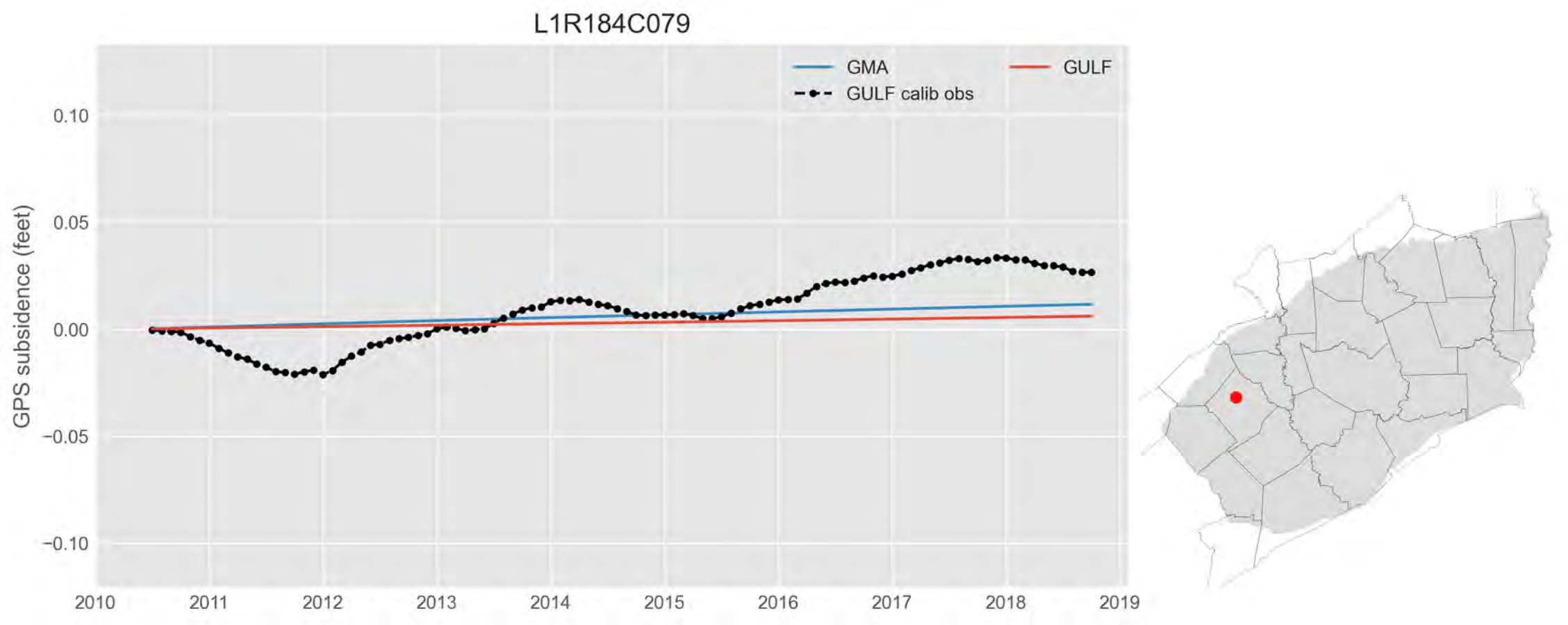

GMA
GULF
GULF calib obs
0.10
0.05
0.00
−0.05
−0.10
GPS subsidence (feet)
2015
2016
2017
2018
2019


L1R182C198
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019

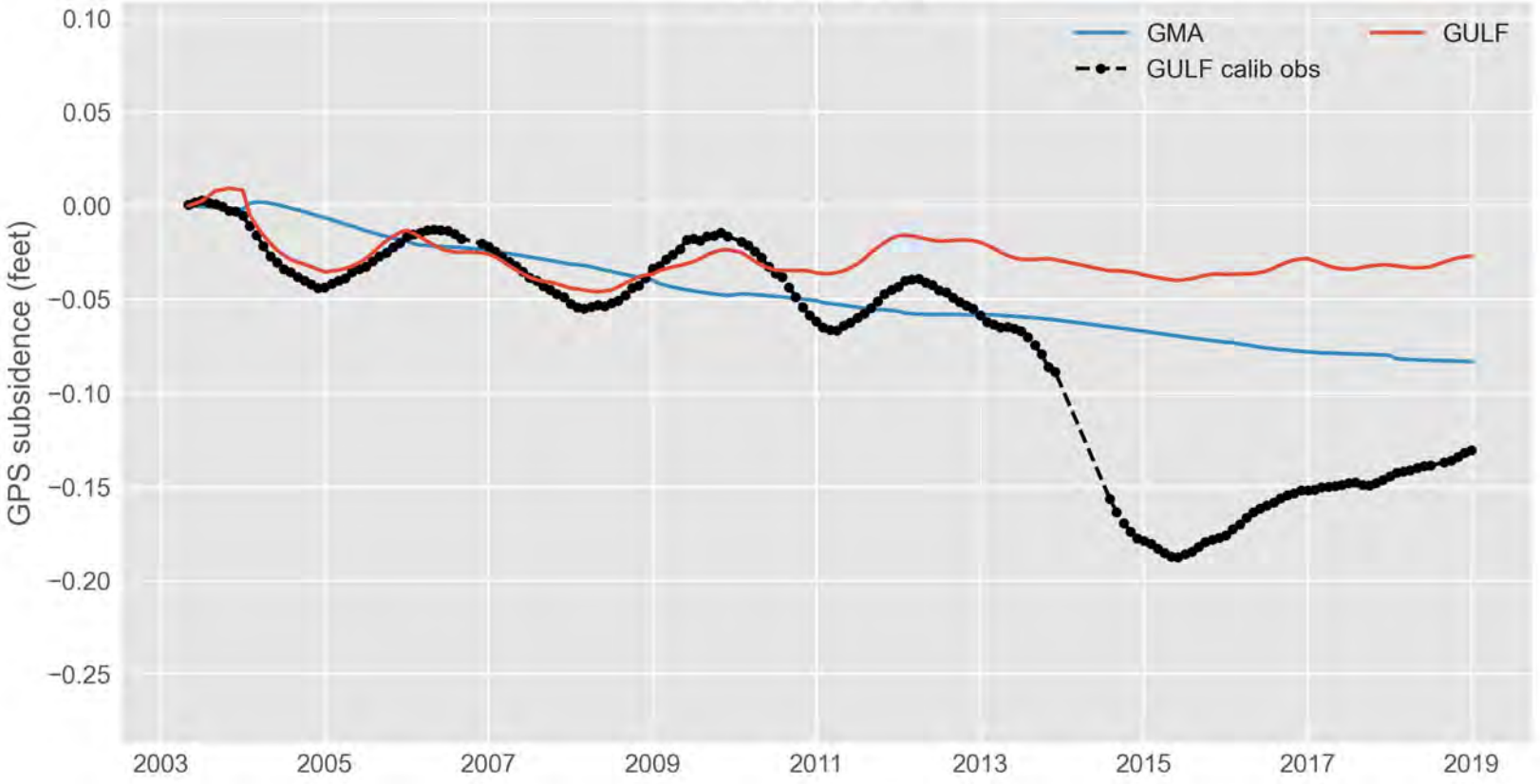

L1R182C200
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019


L1R183C178
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2013
2014
2015
2016
2017
2018
2019

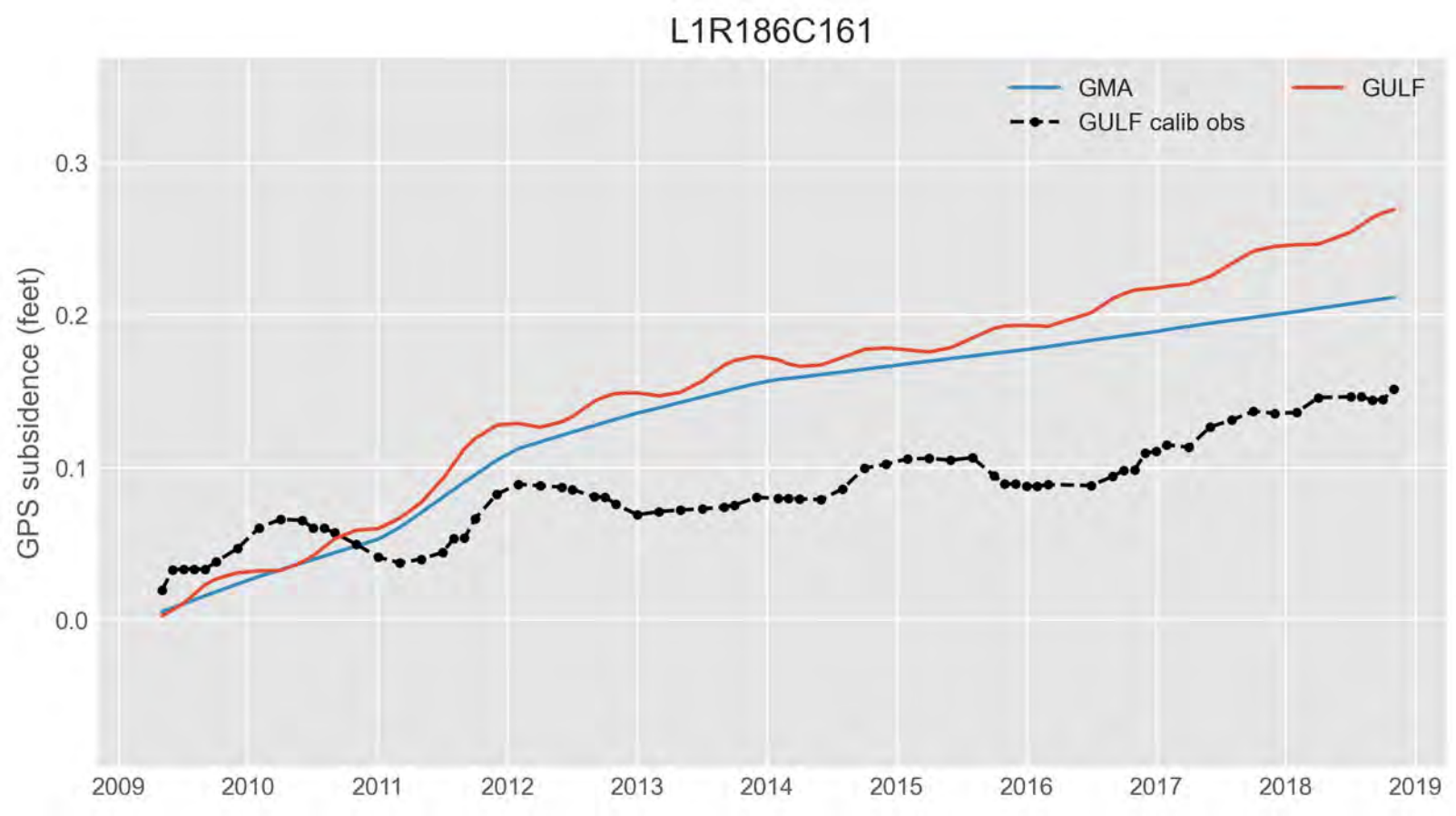

L1R183C216
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.05
0.00
−0.05
−0.10
−0.15
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

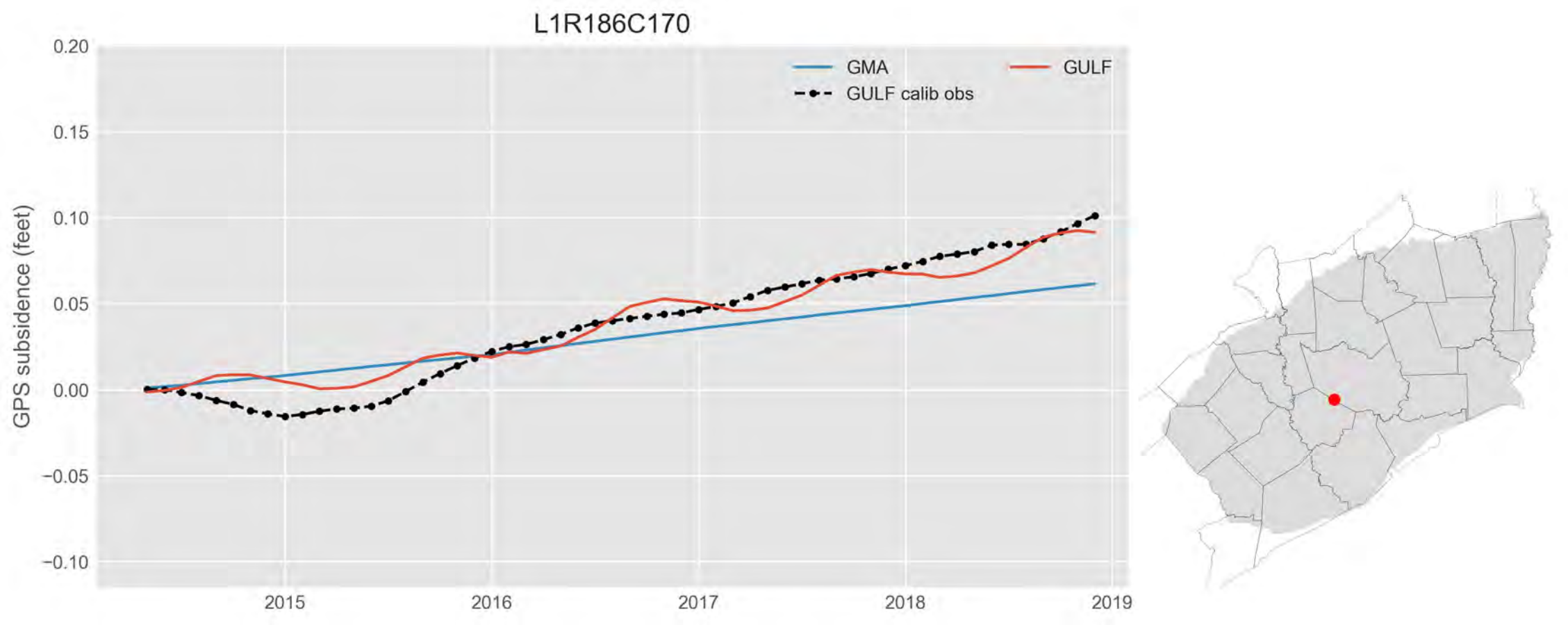

L1R184C079
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

L1R184C193

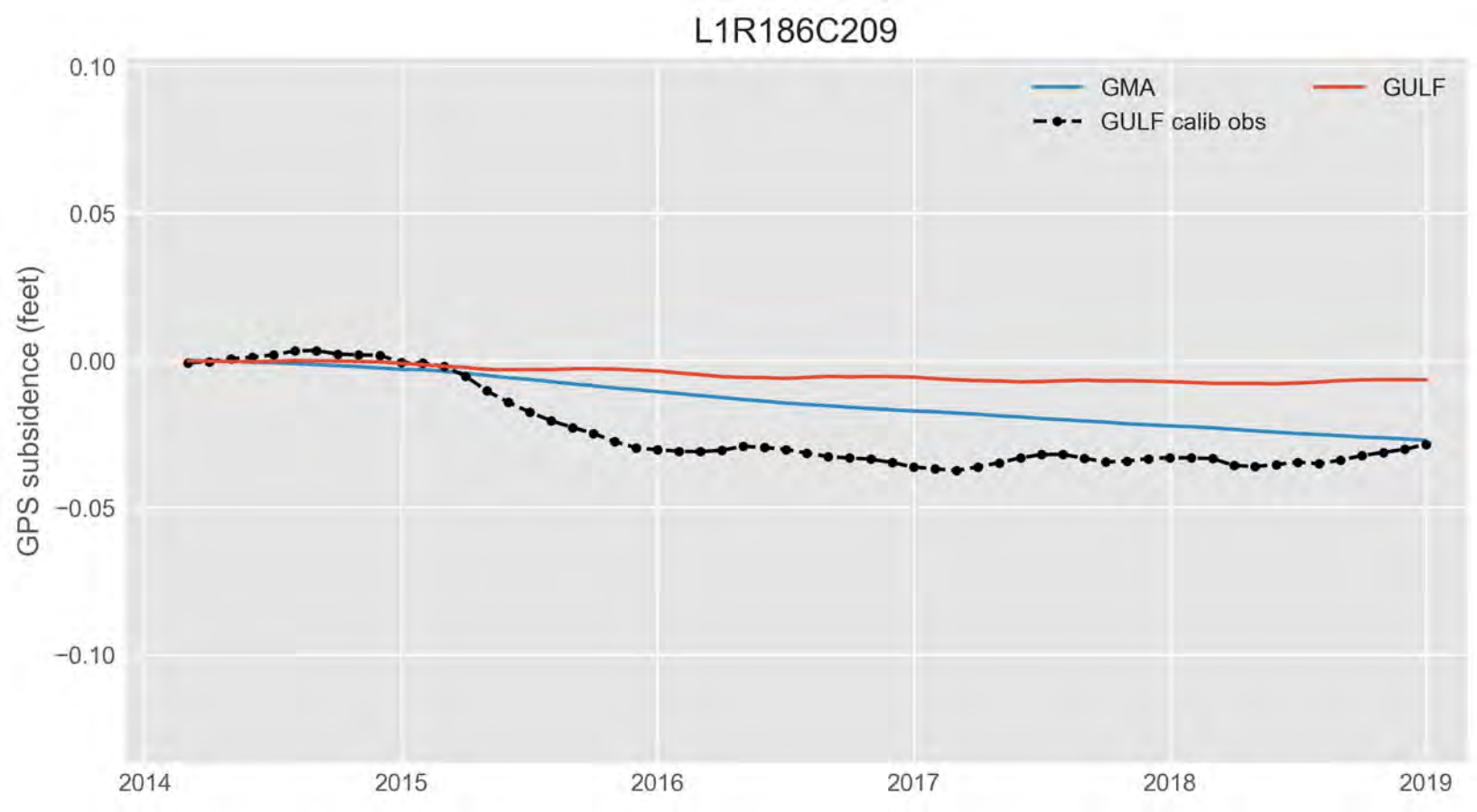

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
−0.25
2003
2005
2007
2009
2011
2013
2015
2017
2019

L1R186C161

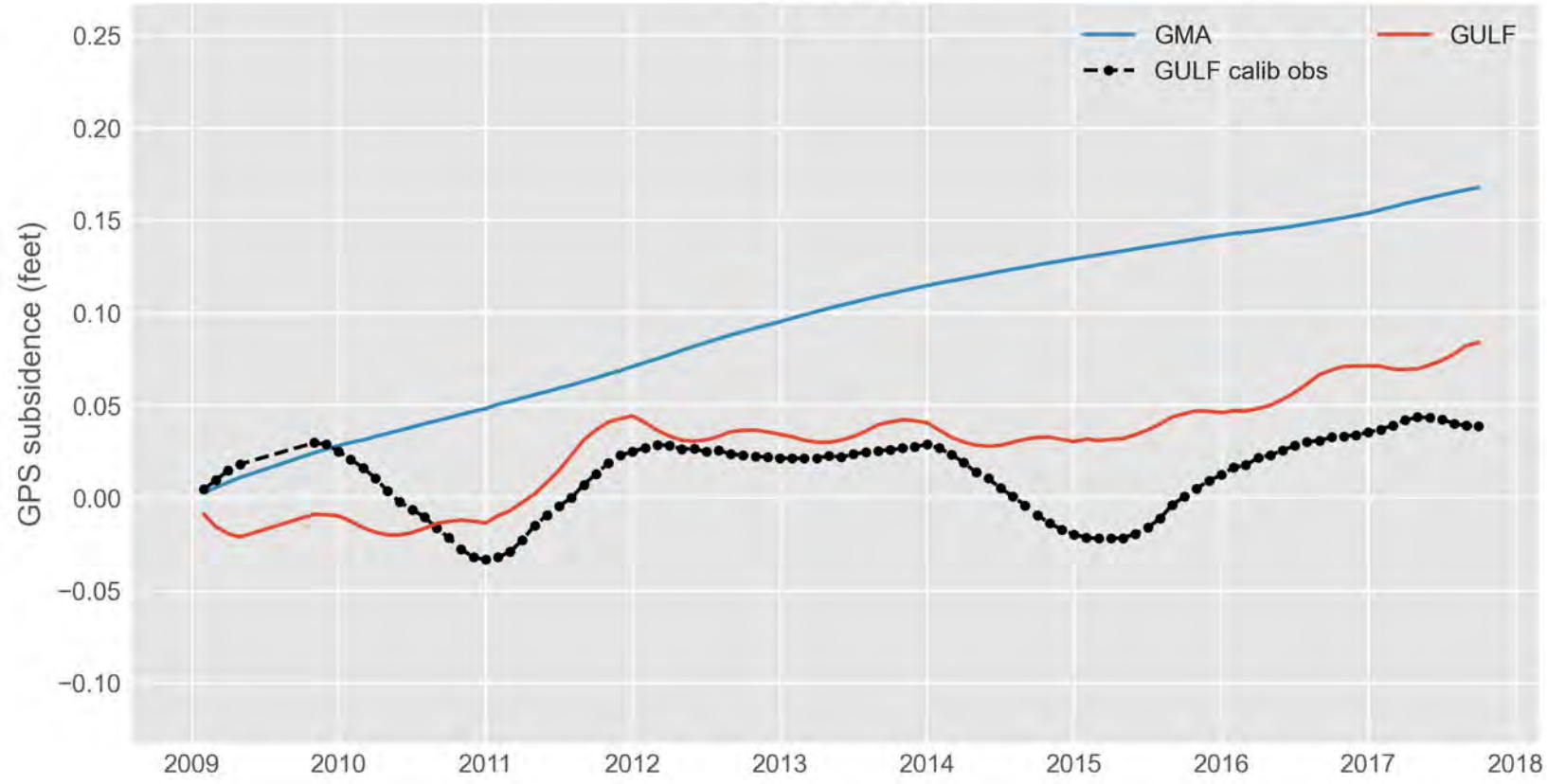

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

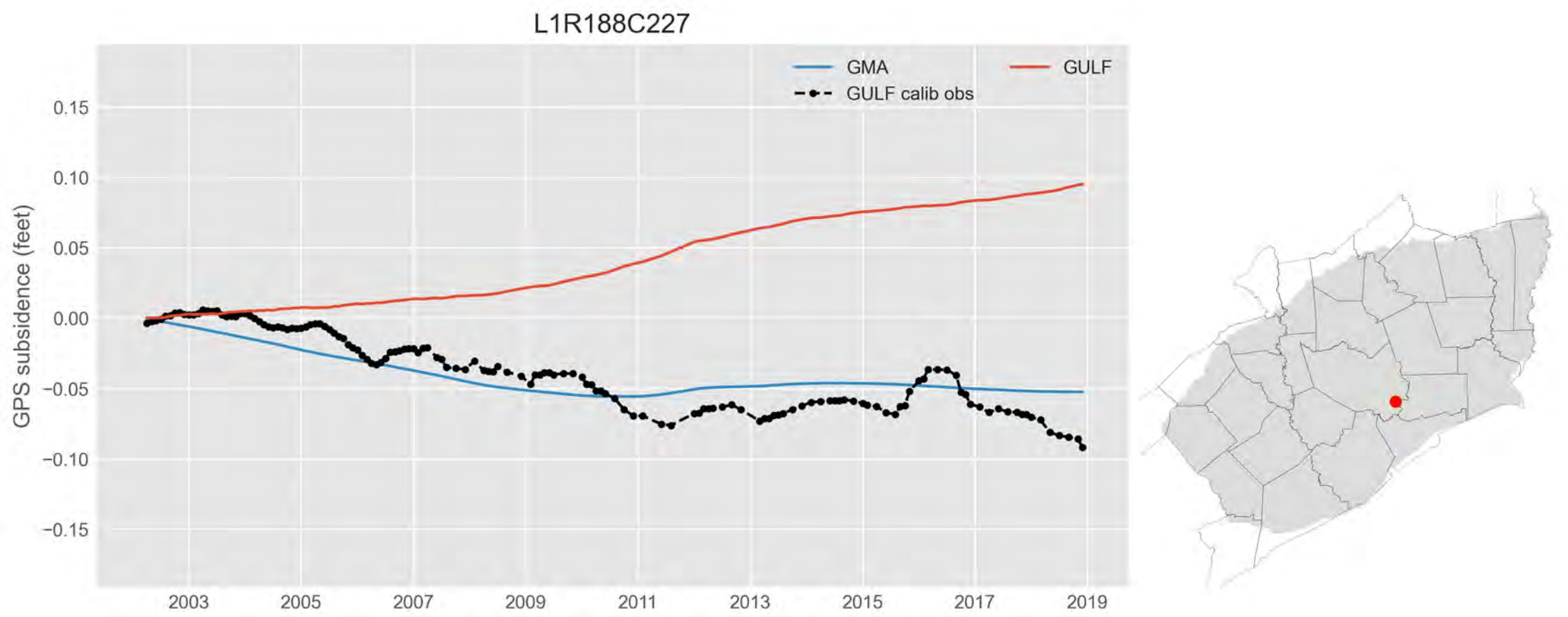

L1R186C170
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019

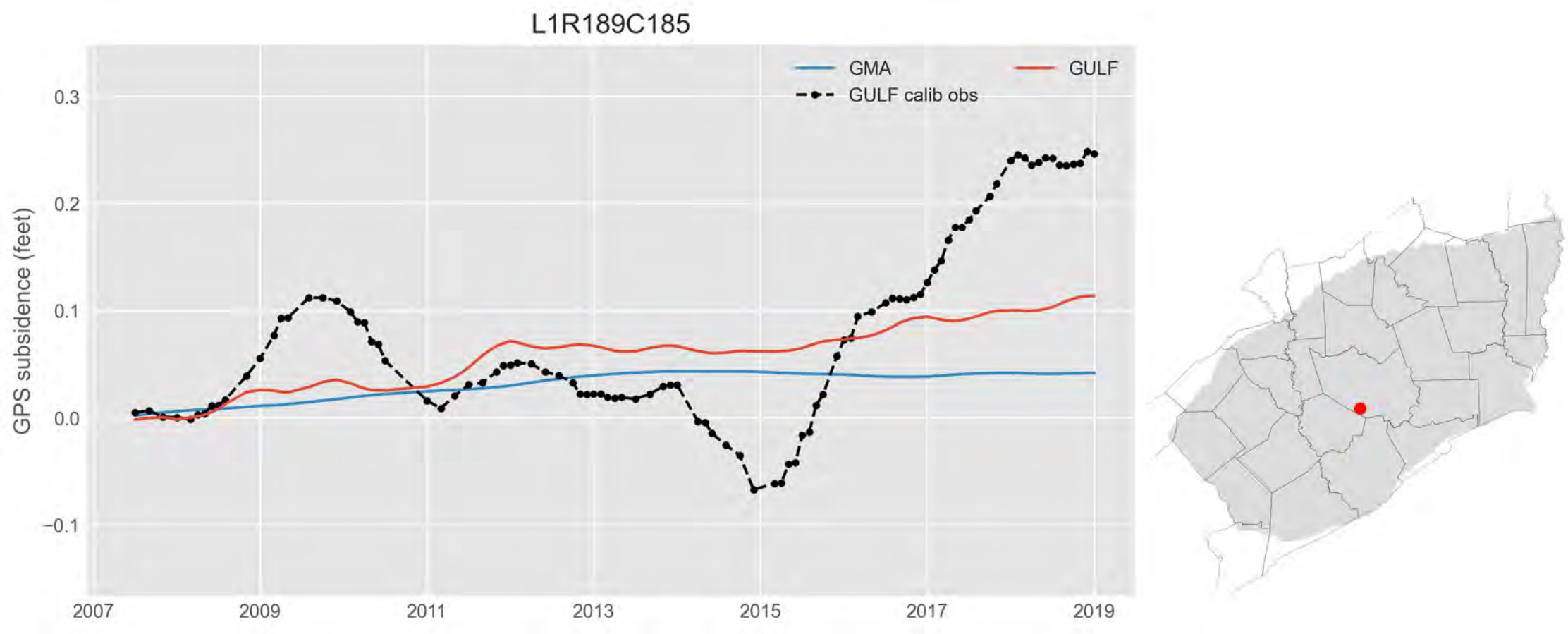
L1R186C209

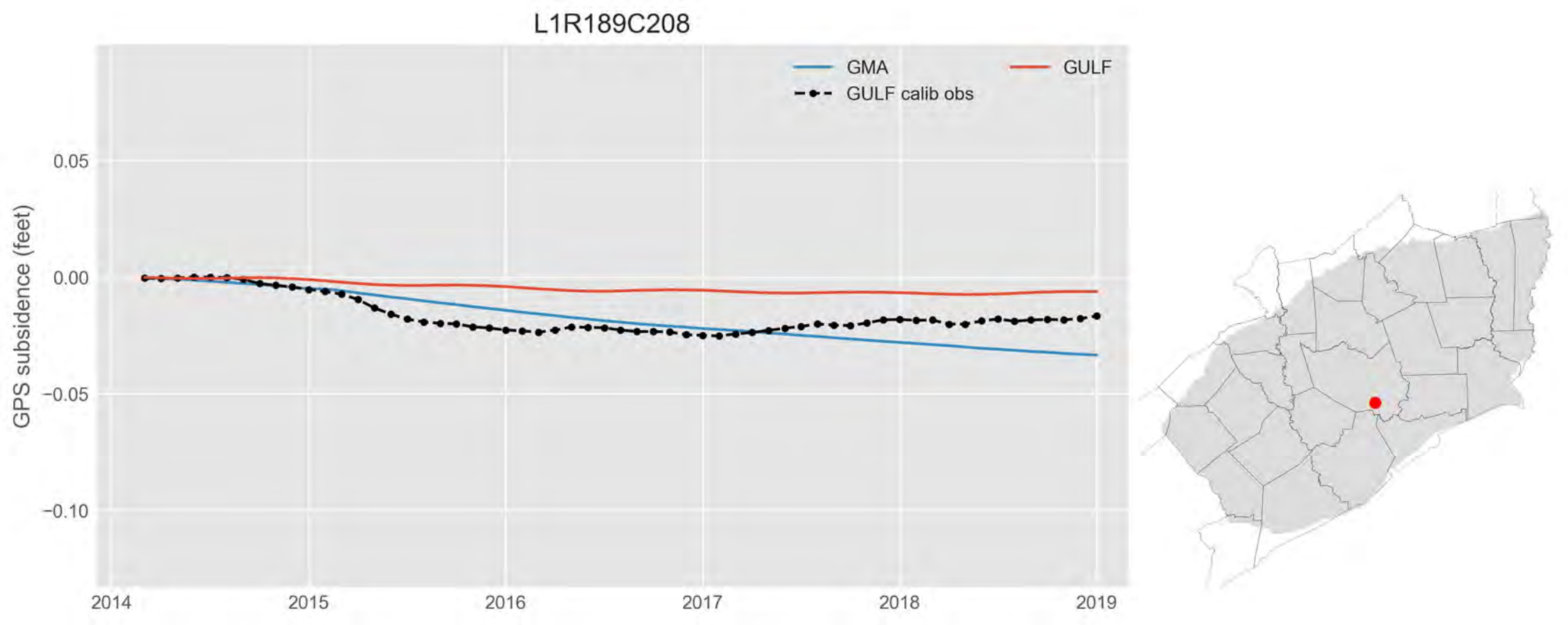

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018
2019

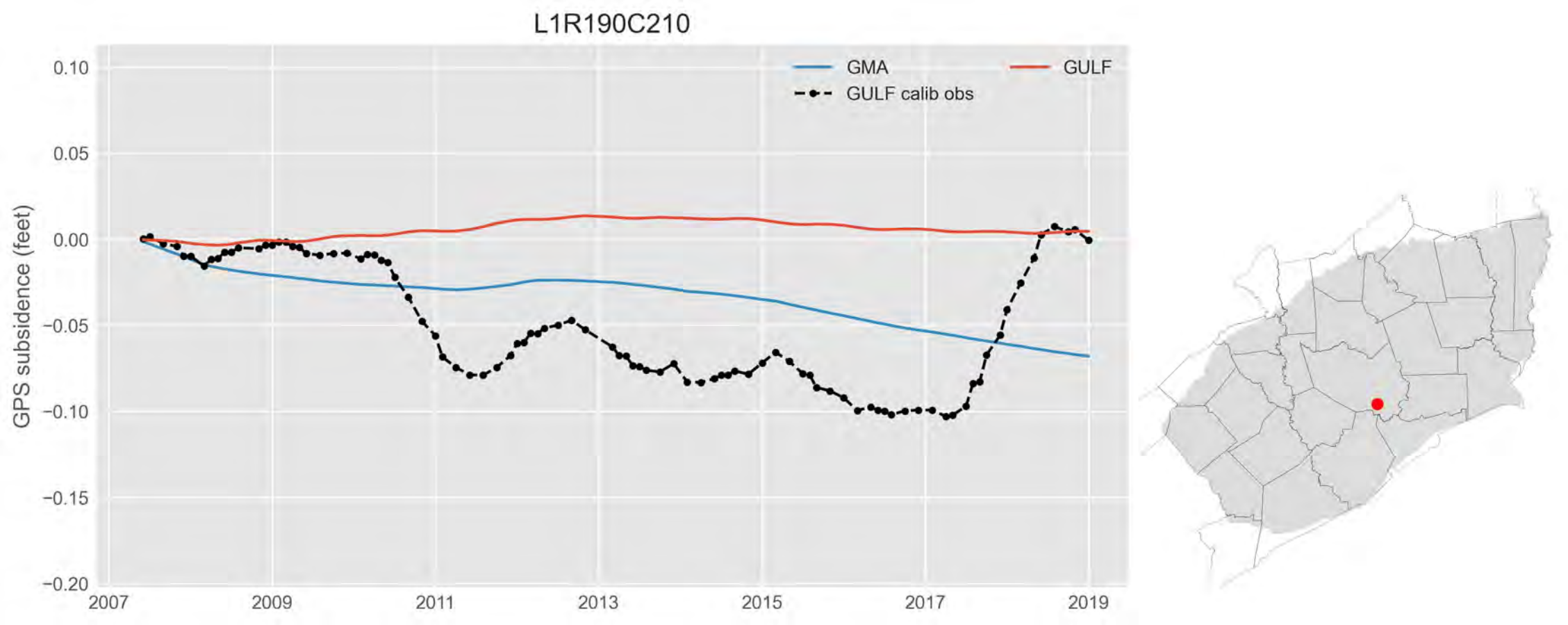
L1R188C179


GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

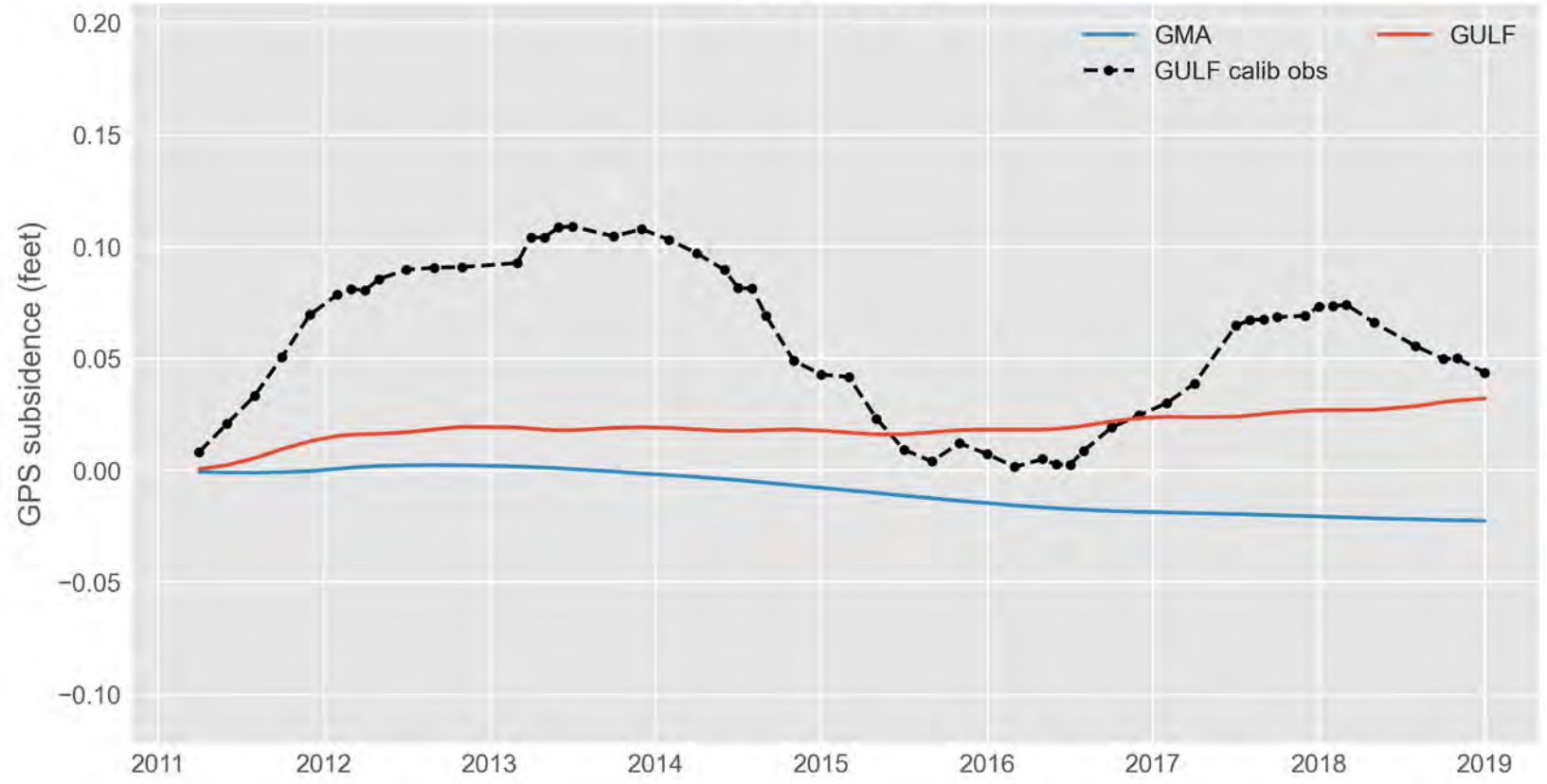

L1R188C227
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
2003
2005
2007
2009
2011
2013
2015
2017
2019

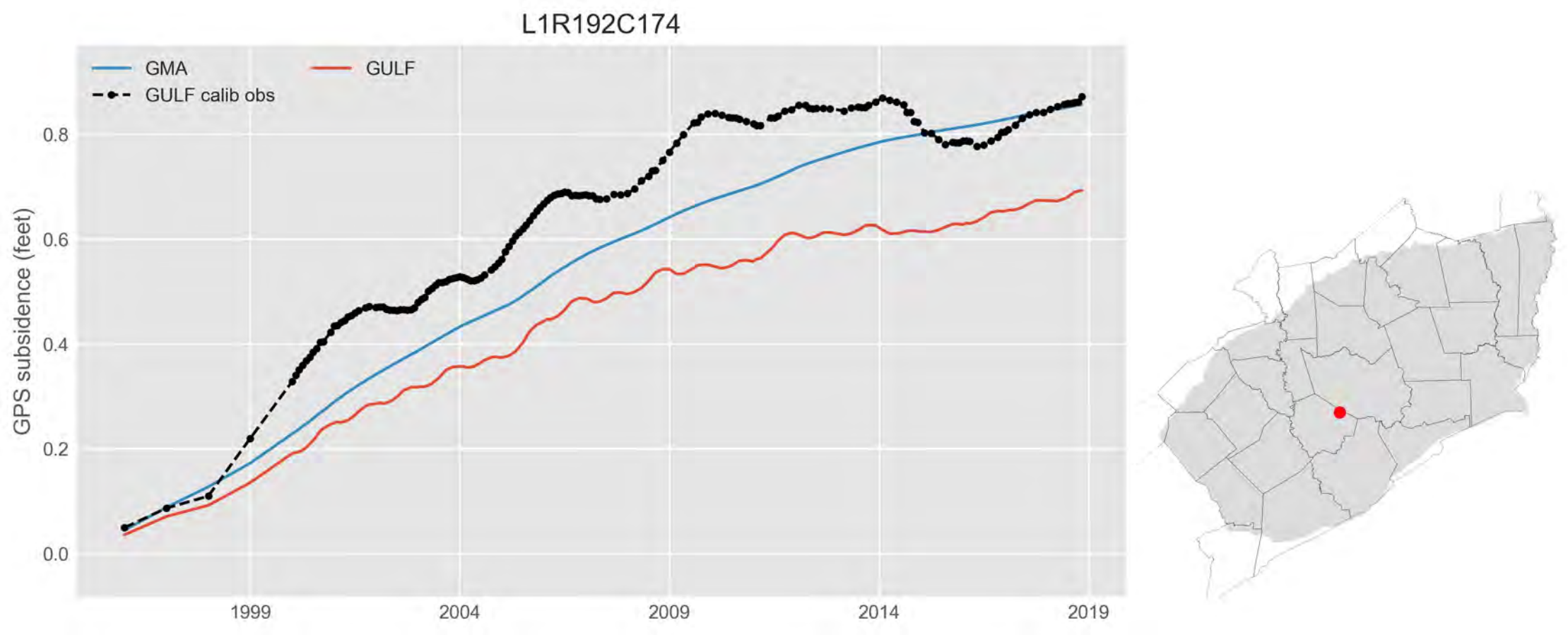

L1R189C185
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019


L1R189C208
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018
2019

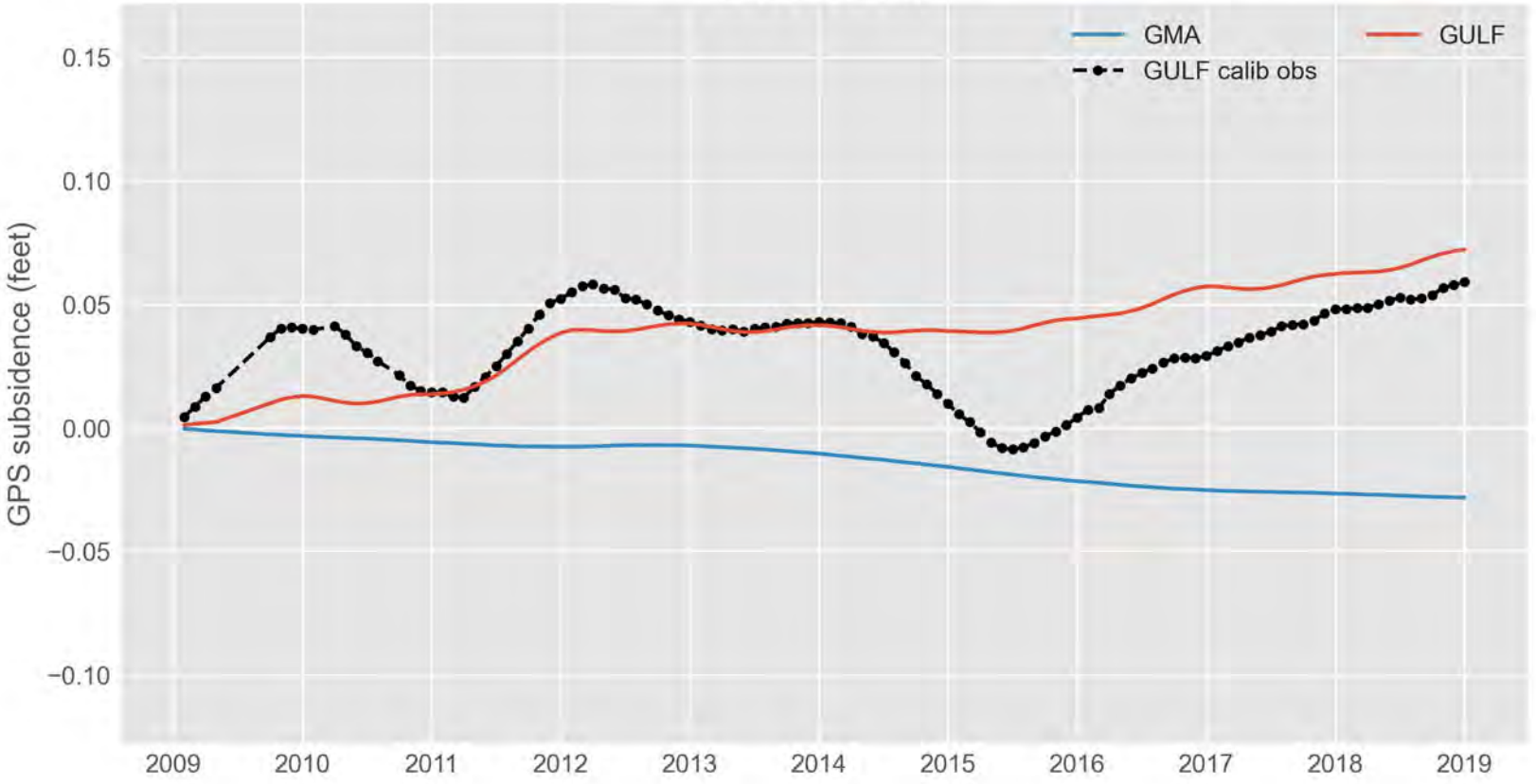

L1R190C210
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
2007
2009
2011
2013
2015
2017
2019

L1R191C199

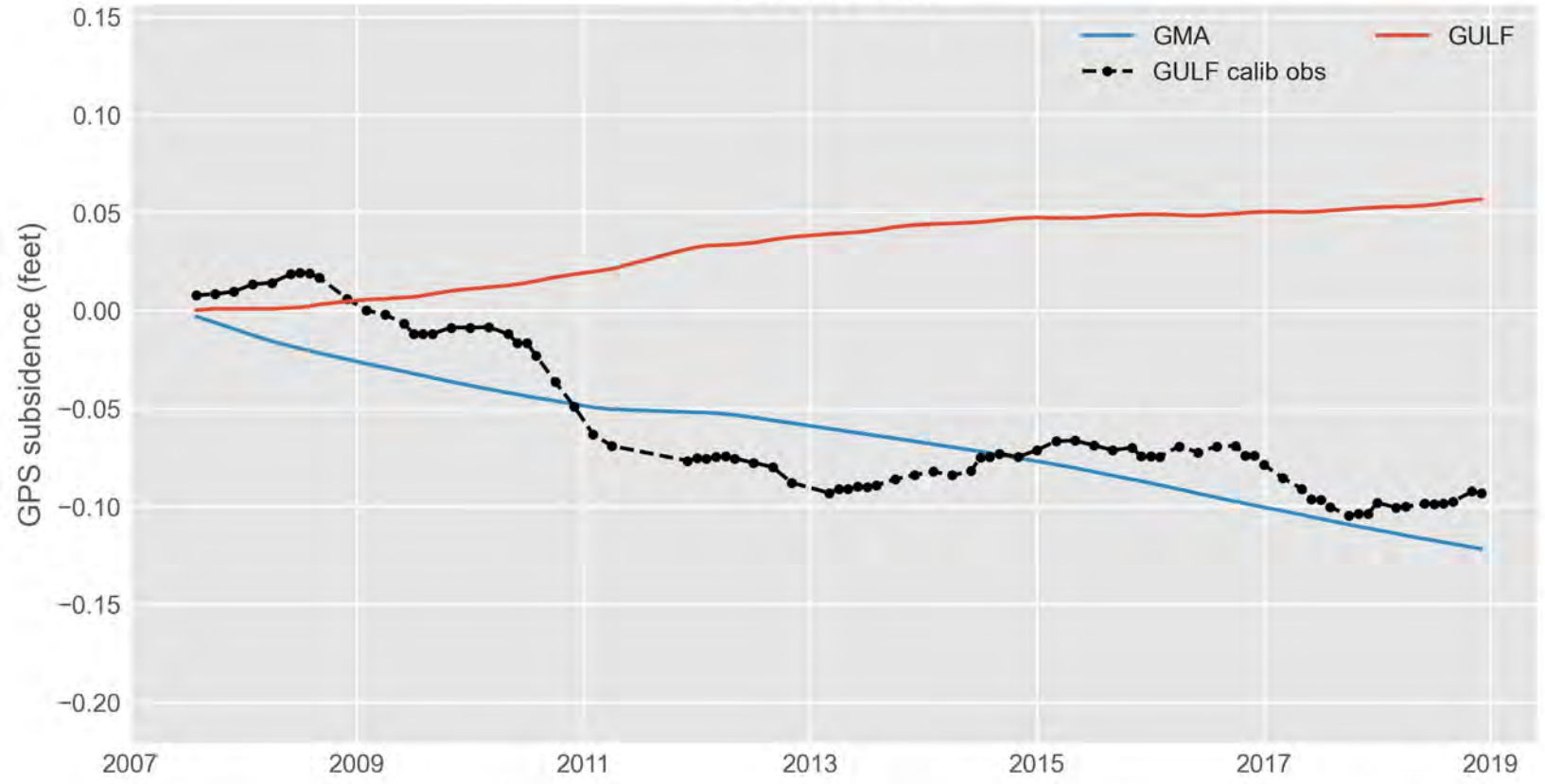

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2011
2012
2013
2014
2015
2016
2017
2018
2019

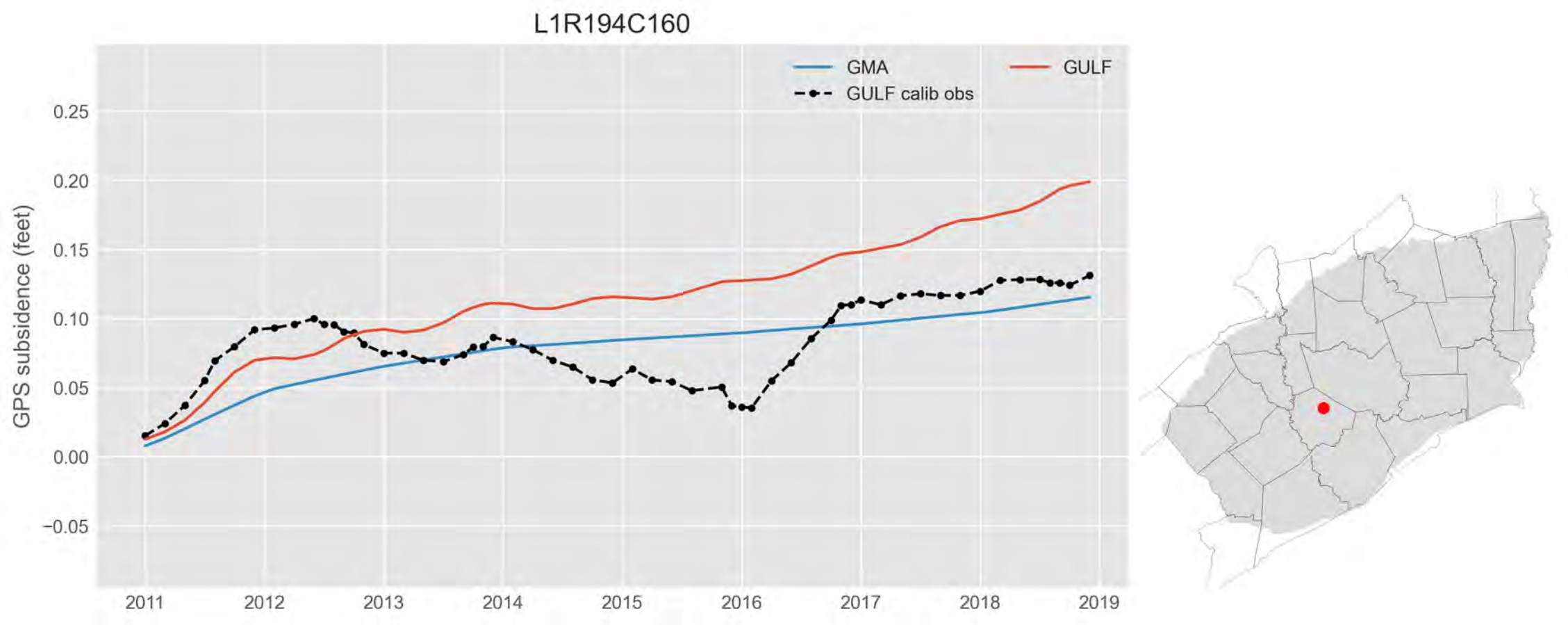

L1R192C174
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.0
0.2
0.4
0.6
0.8
1999
2004
2009
2014
2019

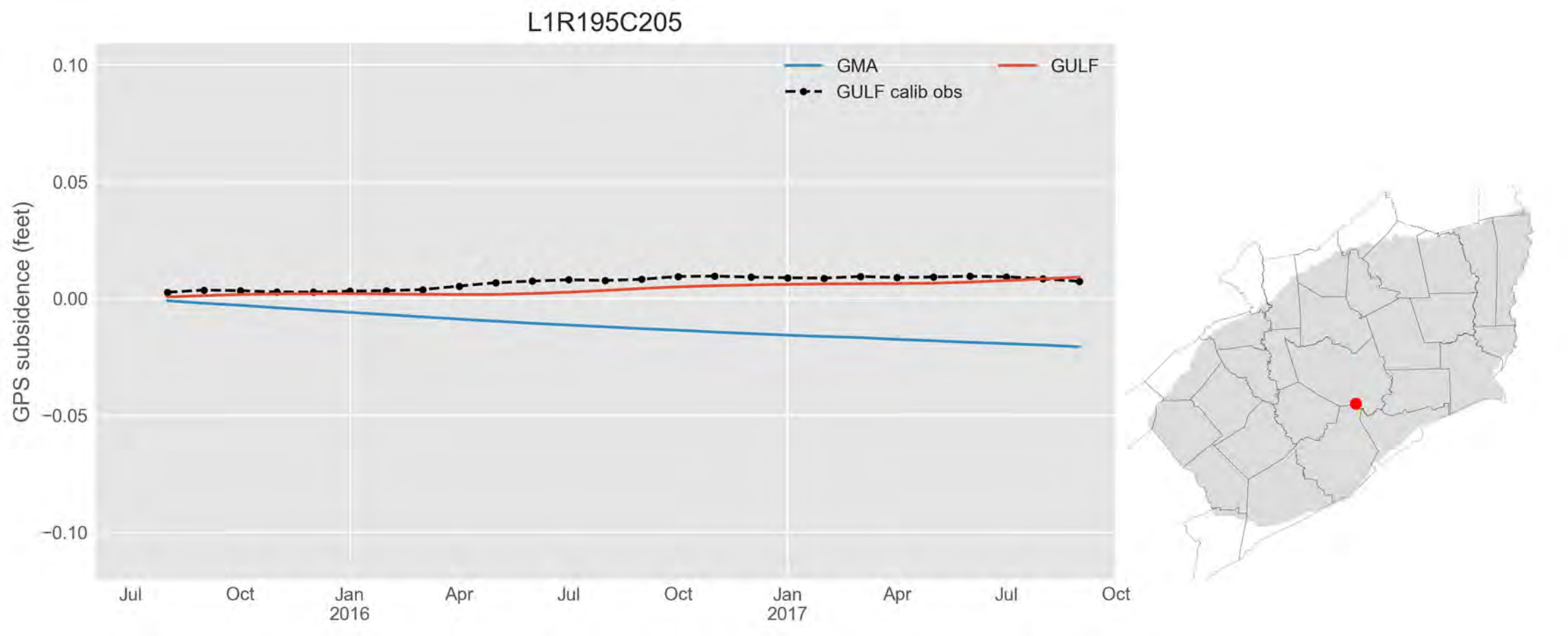
L1R192C192

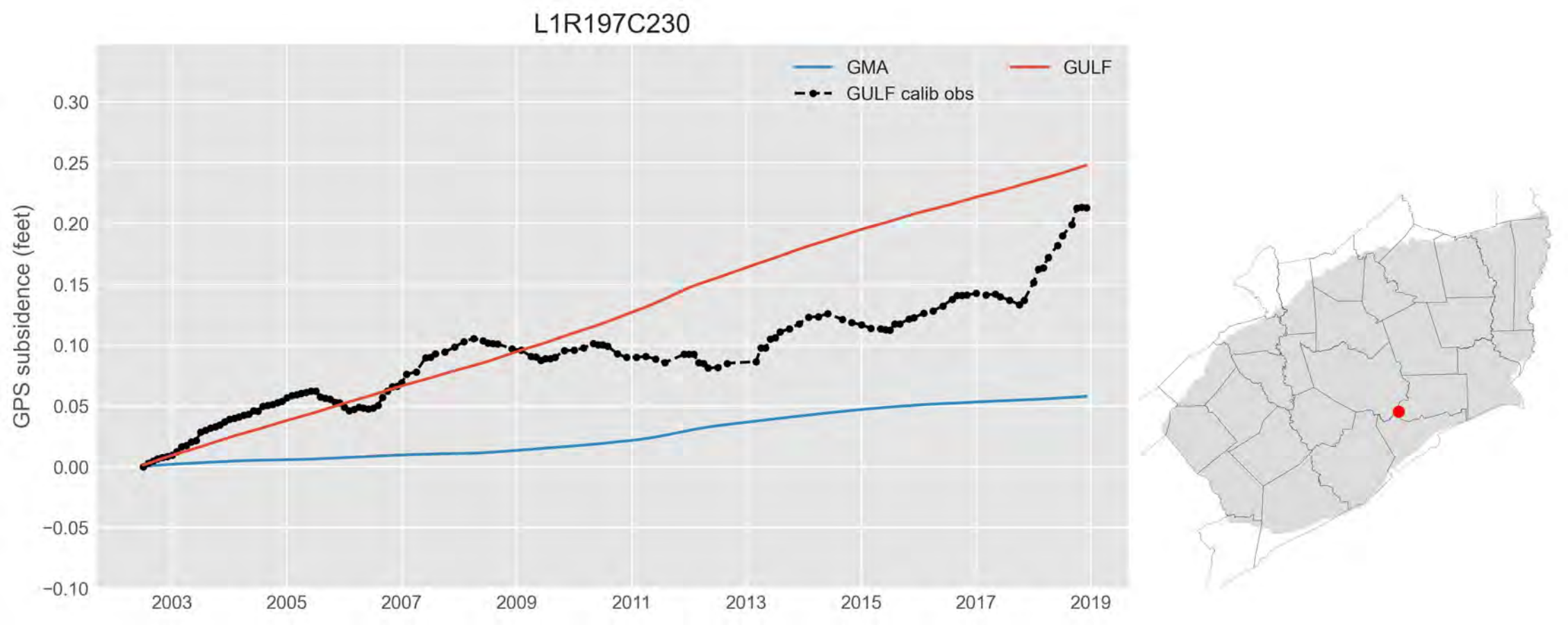

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

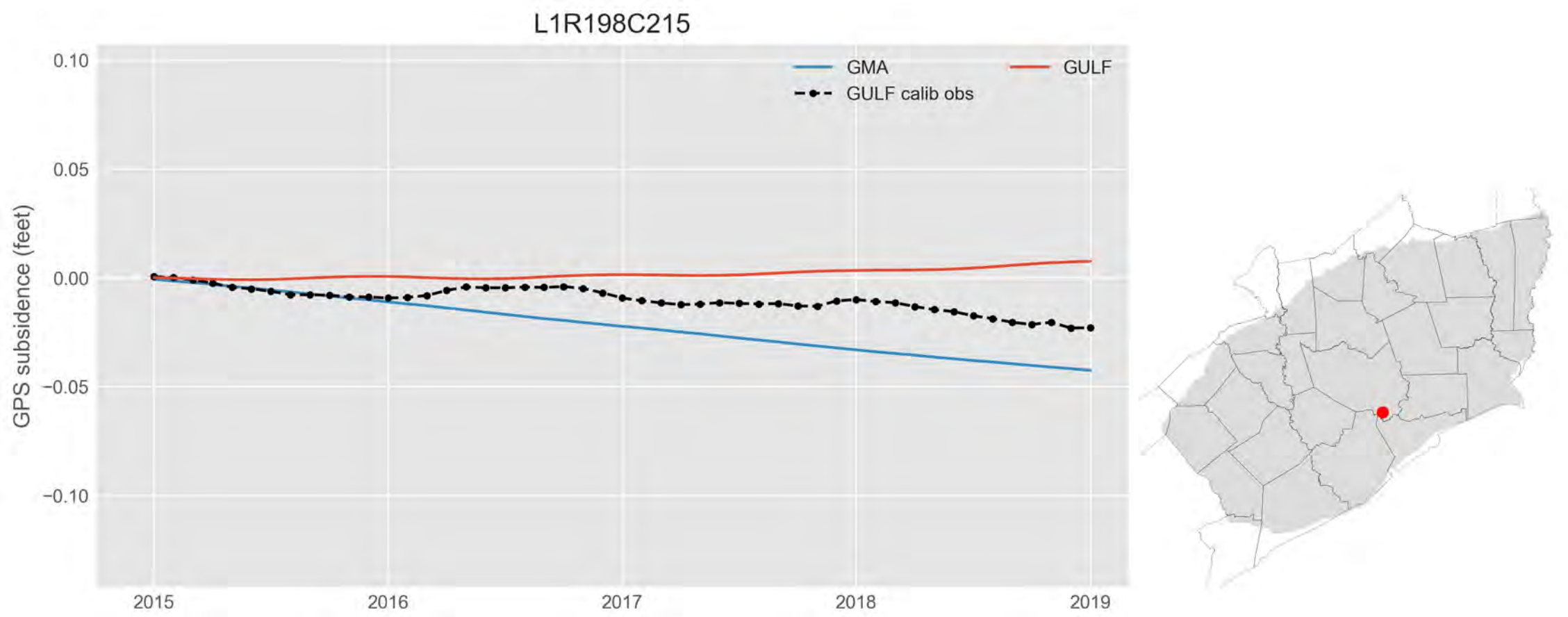
L1R192C222

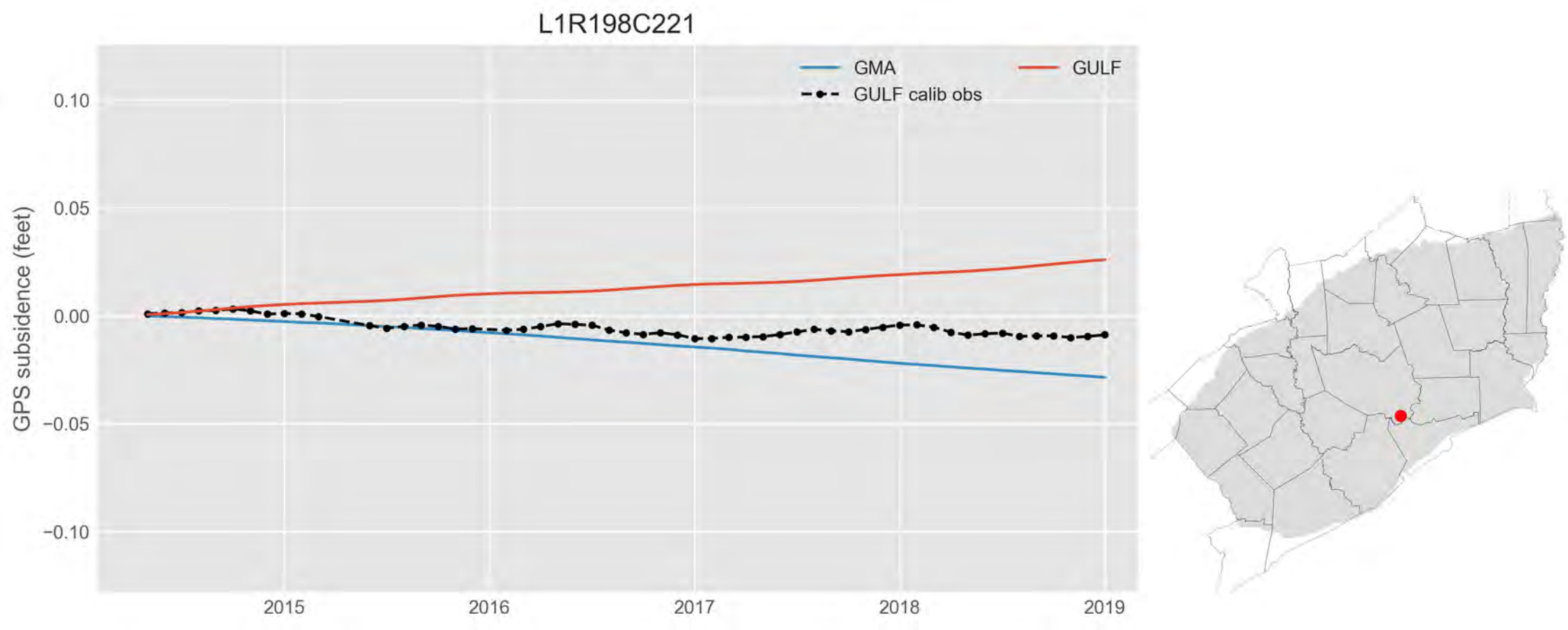

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
−0.20
2007
2009
2011
2013
2015
2017
2019

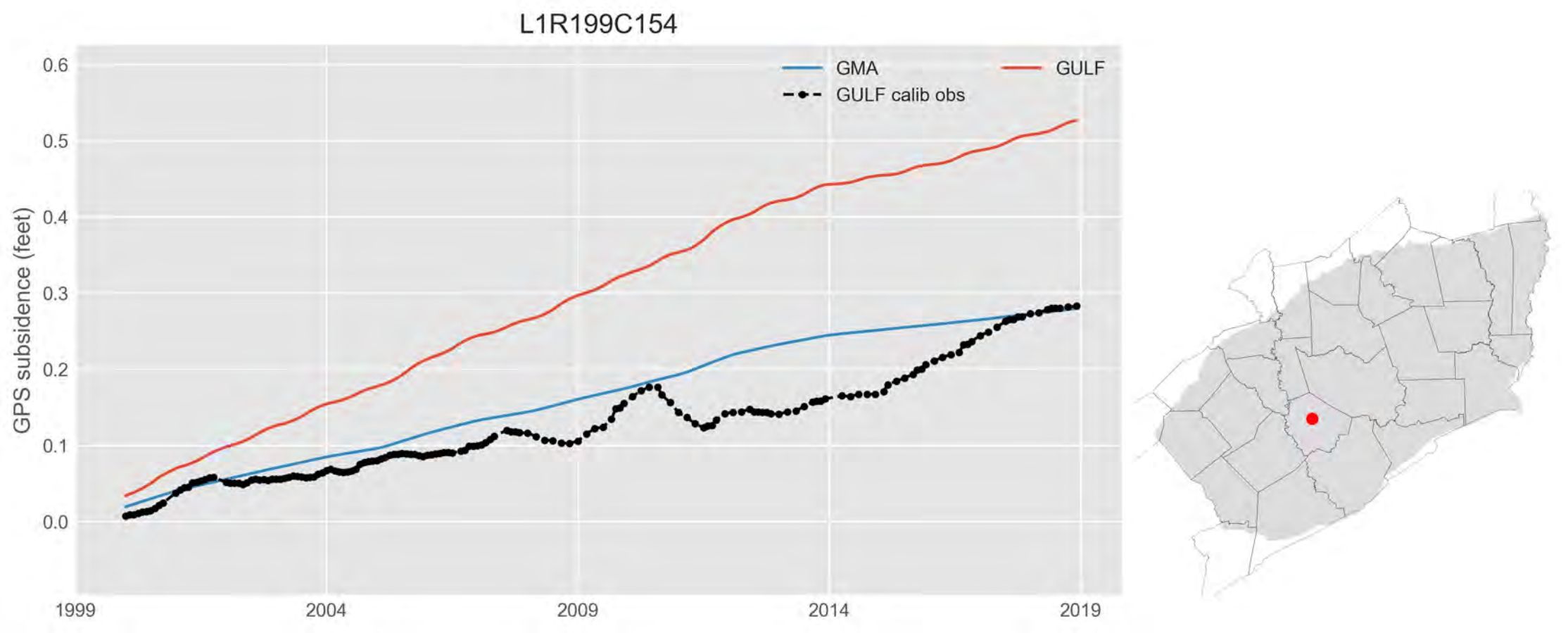

L1R194C160
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
2011
2012
2013
2014
2015
2016
2017
2018
2019

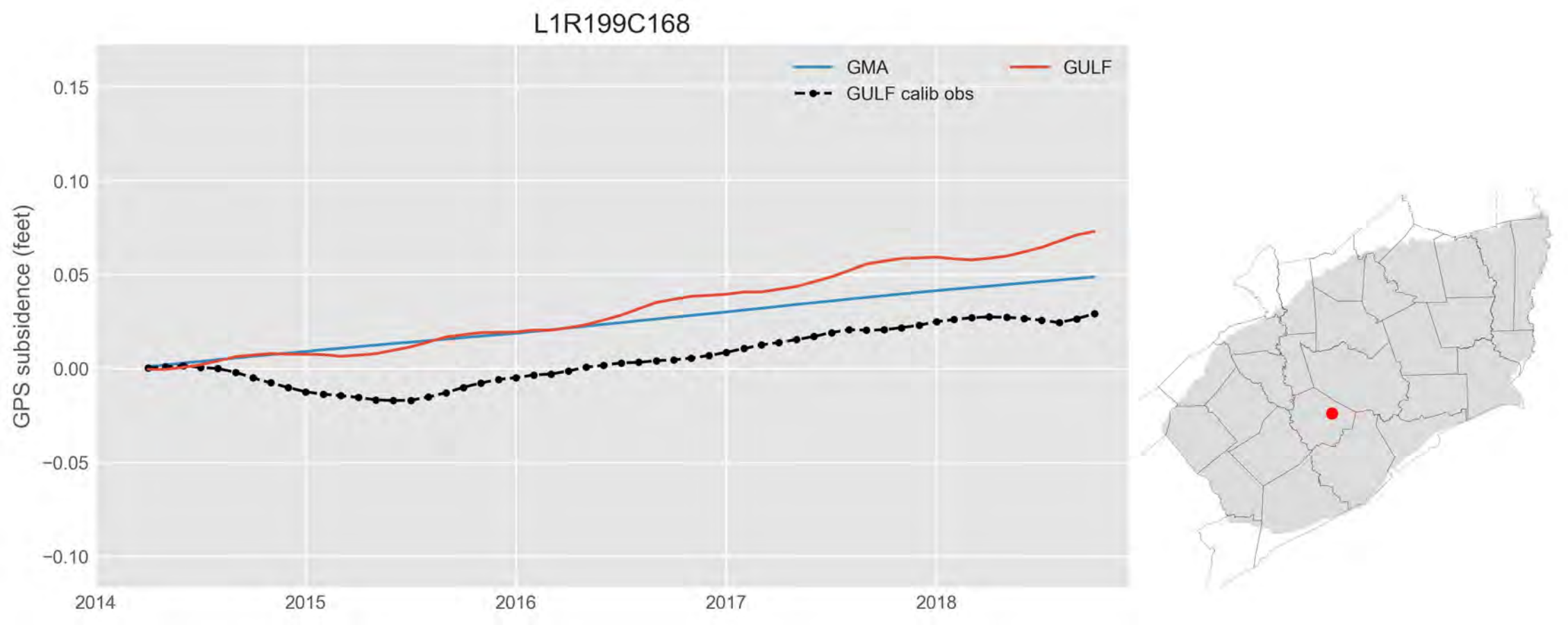

L1R195C205
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
Jul
Oct
Jan
2016
Apr
Jul
Oct
Jan
2017
Apr
Jul
Oct

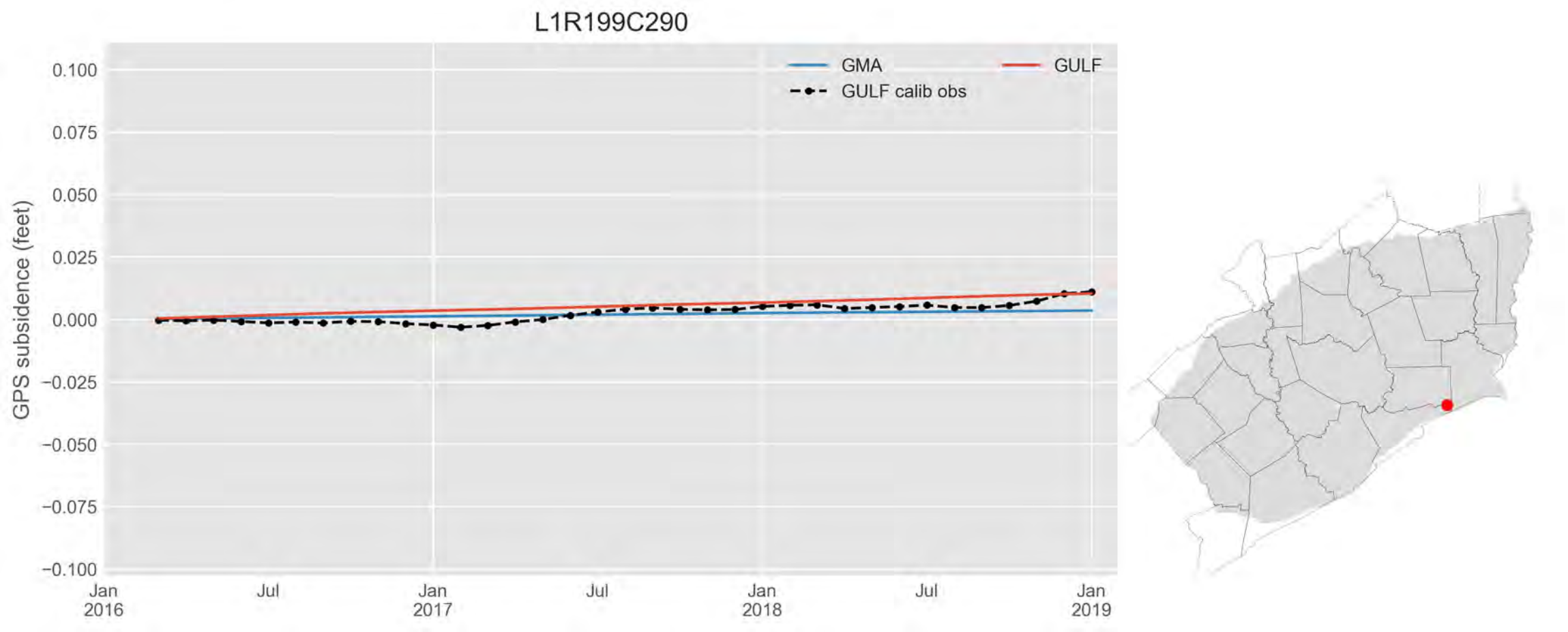

L1R197C230
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2003
2005
2007
2009
2011
2013
2015
2017
2019

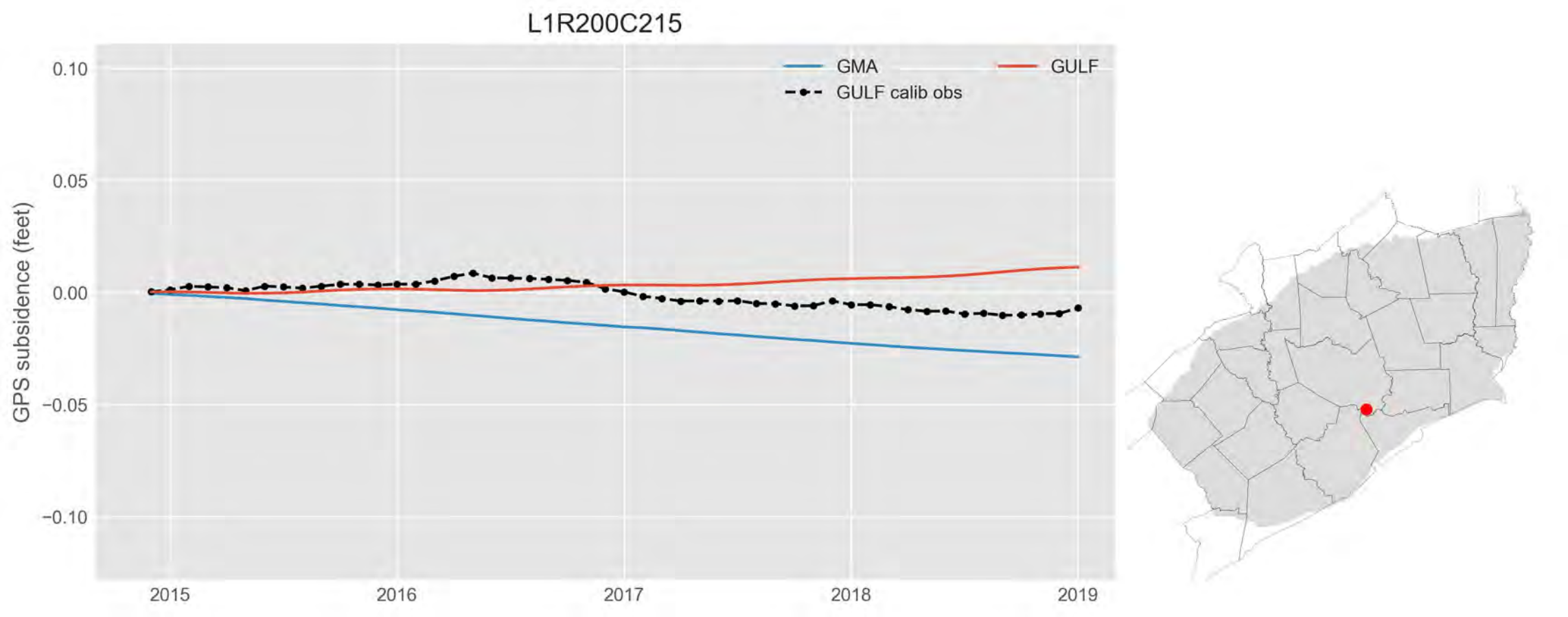

L1R198C215
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019


L1R198C221
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019

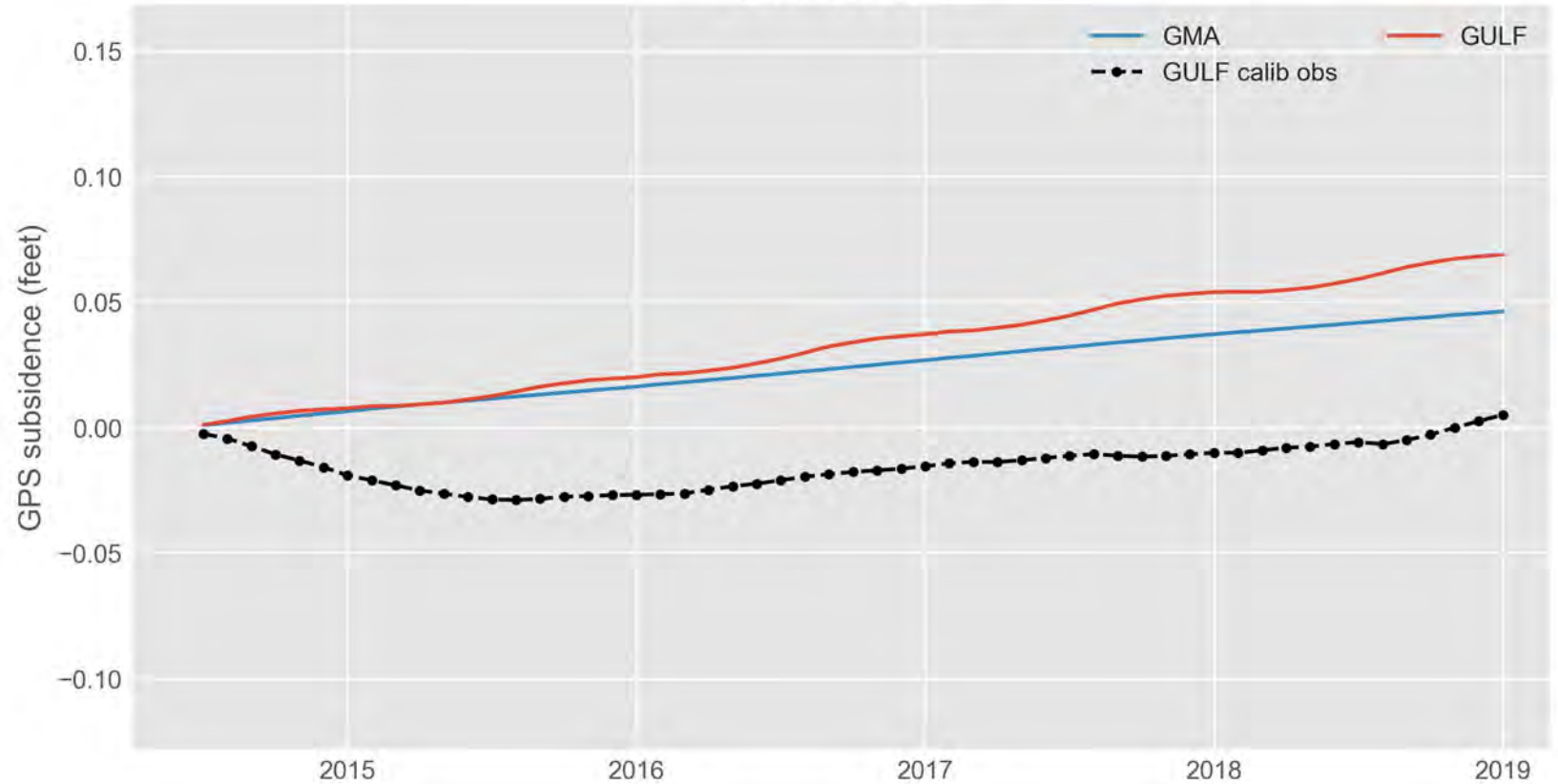

L1R199C154
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1999
2004
2009
2014
2019

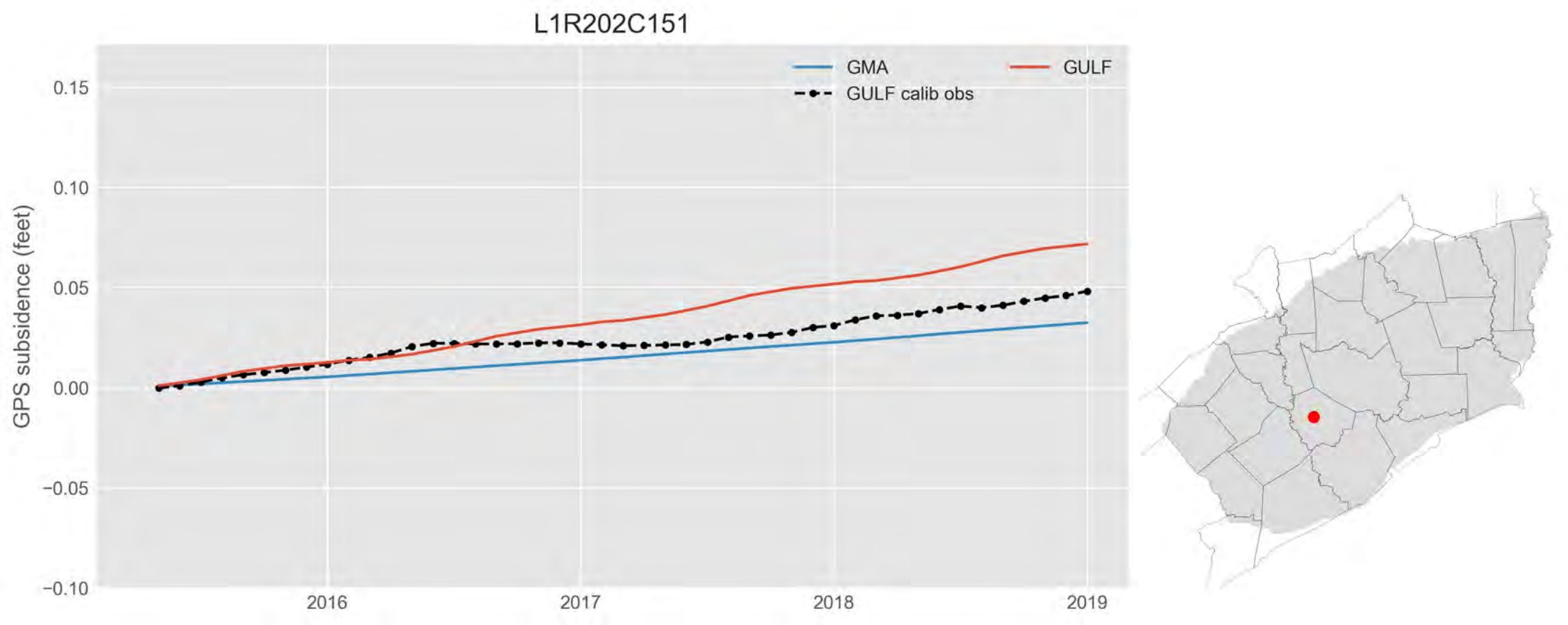

L1R199C168
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2014
2015
2016
2017
2018

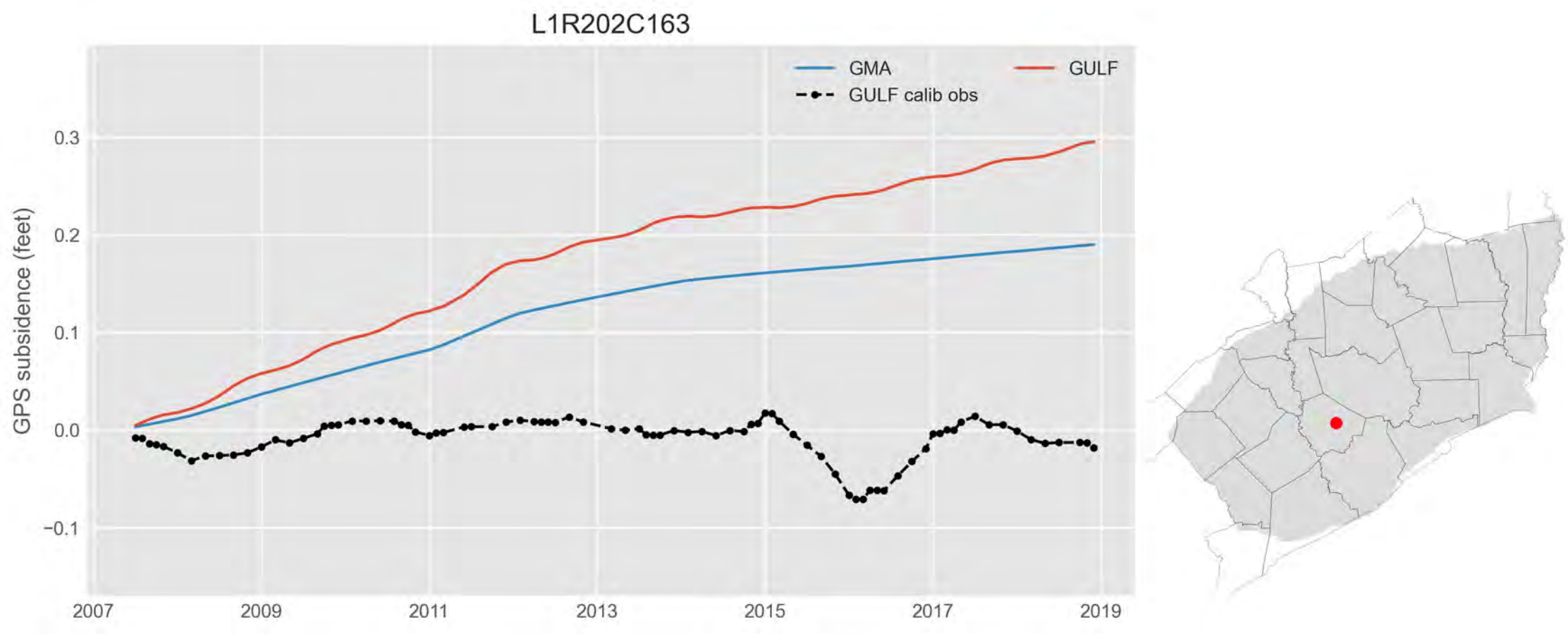

L1R199C290
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
−0.100
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

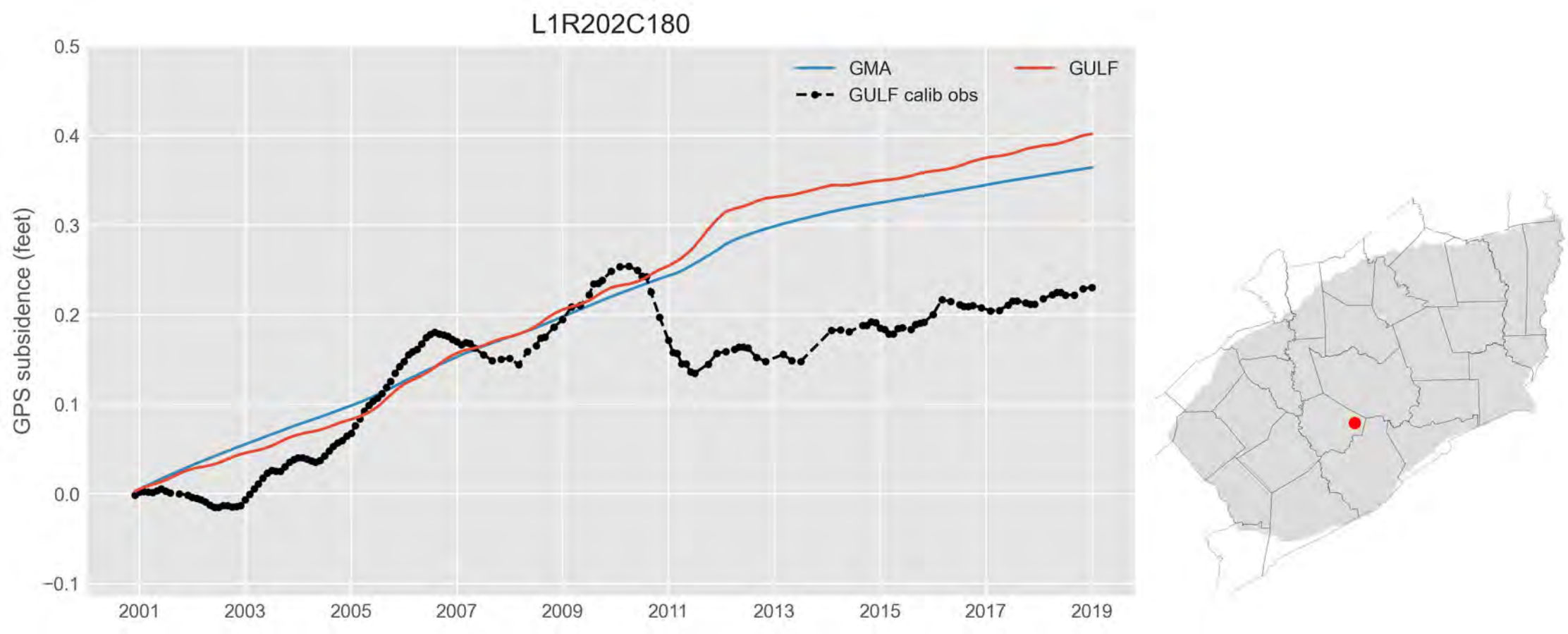

L1R200C215
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019

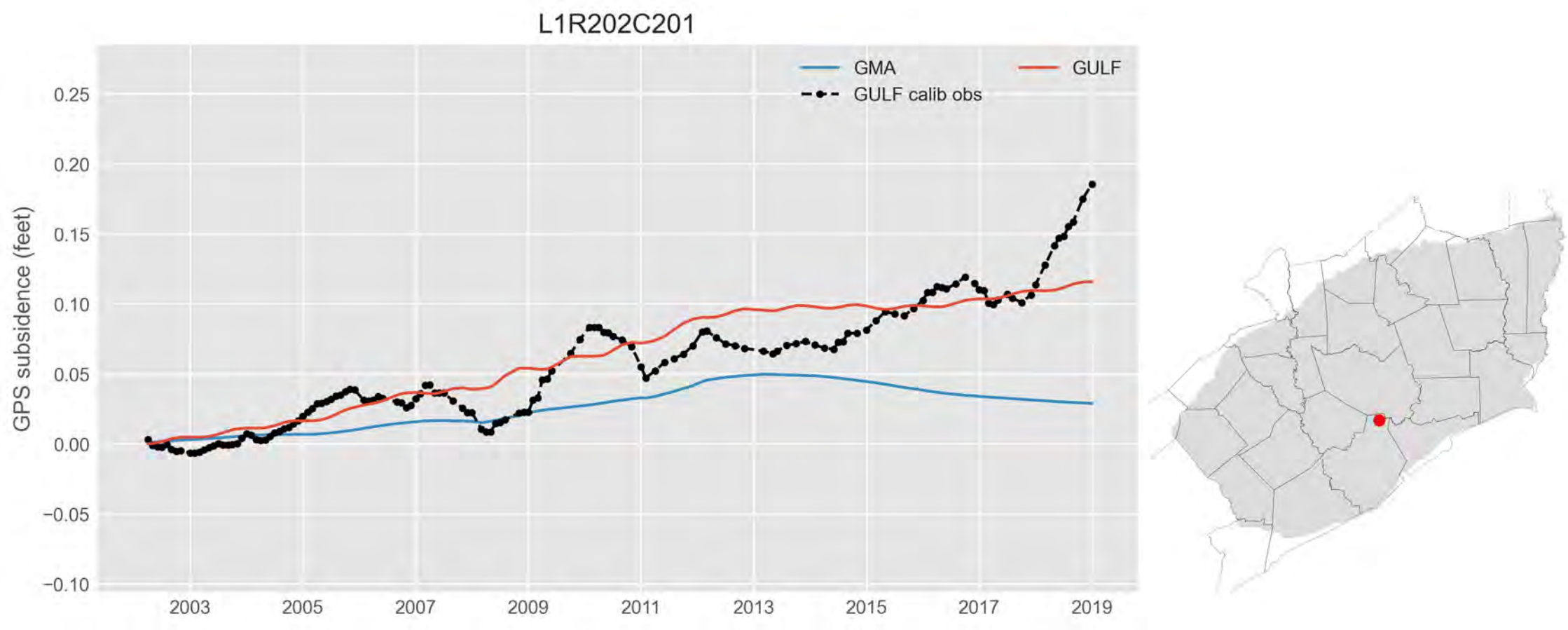
L1R201C170

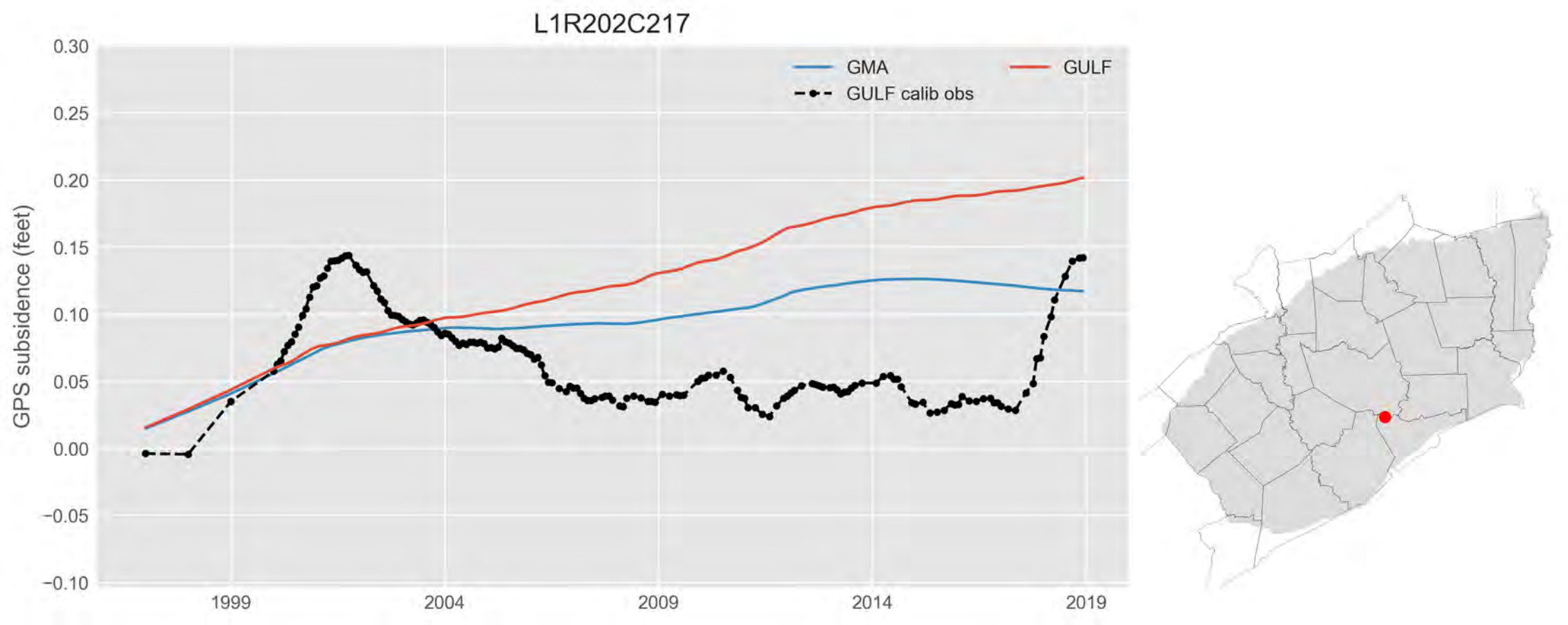

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019


L1R202C151
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.15
0.10
0.05
0.00
−0.05
−0.10
2016
2017
2018
2019

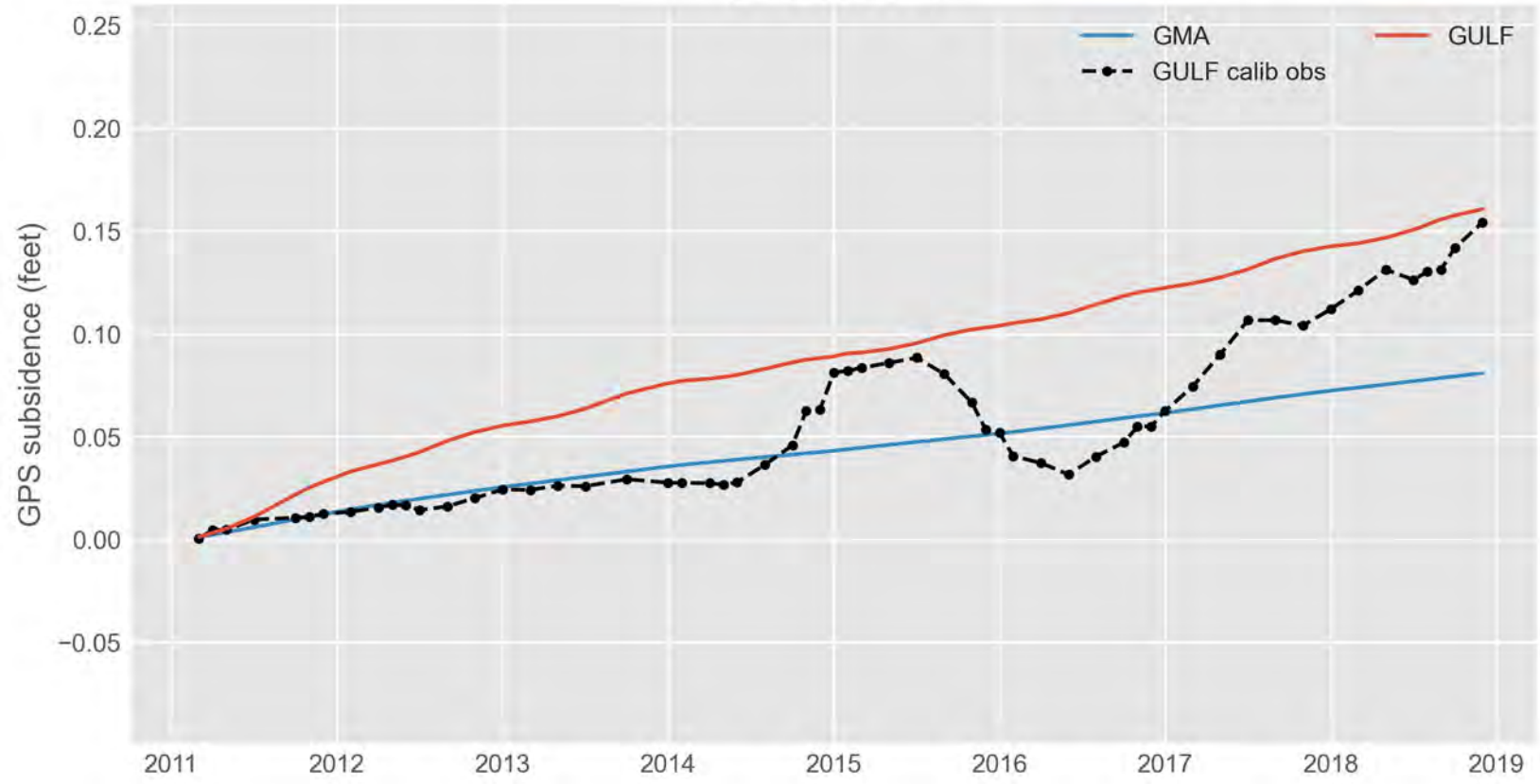

L1R202C163
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019

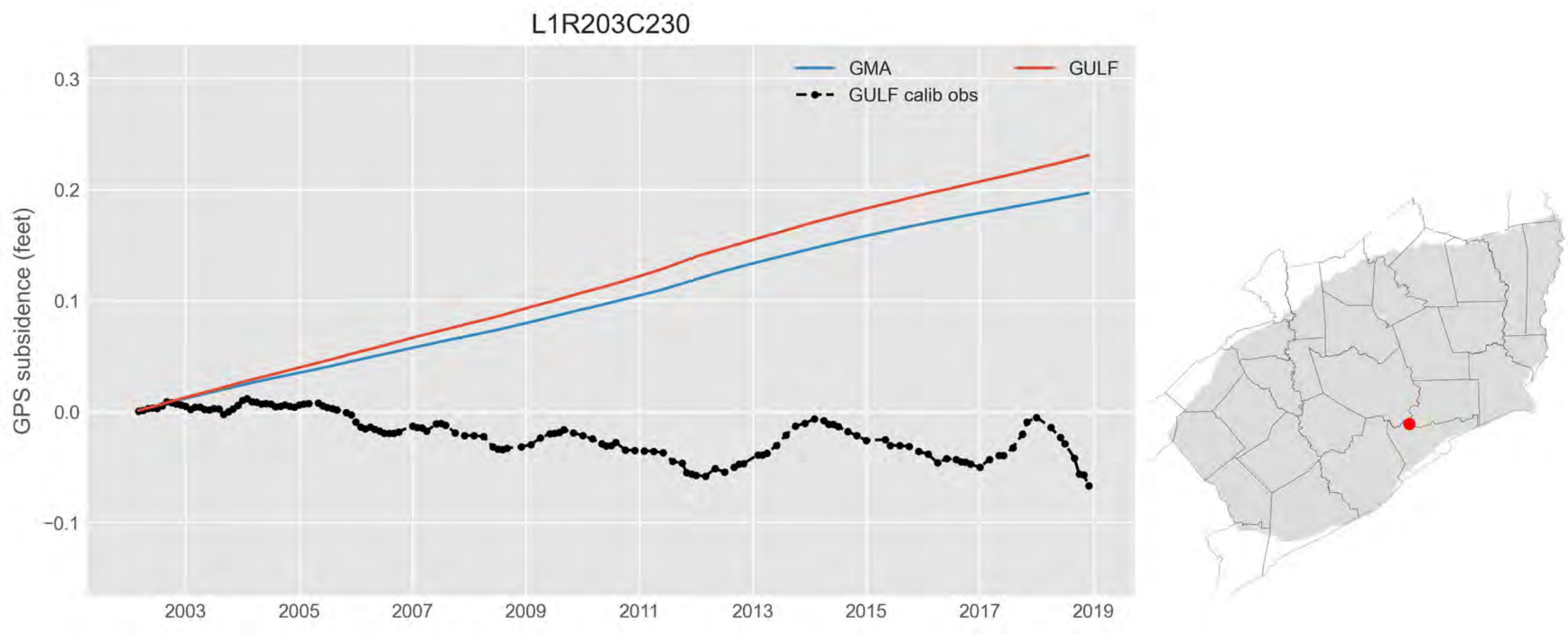

L1R202C180
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019

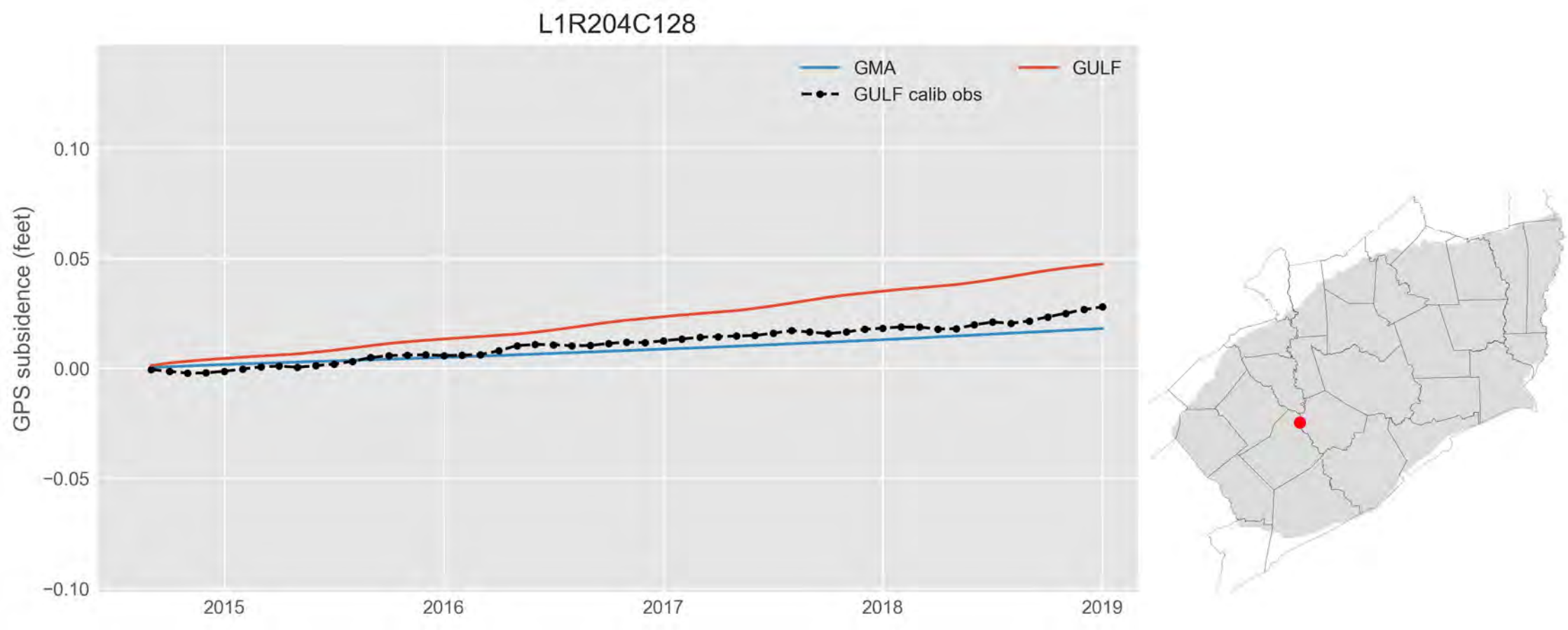

L1R202C201
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2003
2005
2007
2009
2011
2013
2015
2017
2019

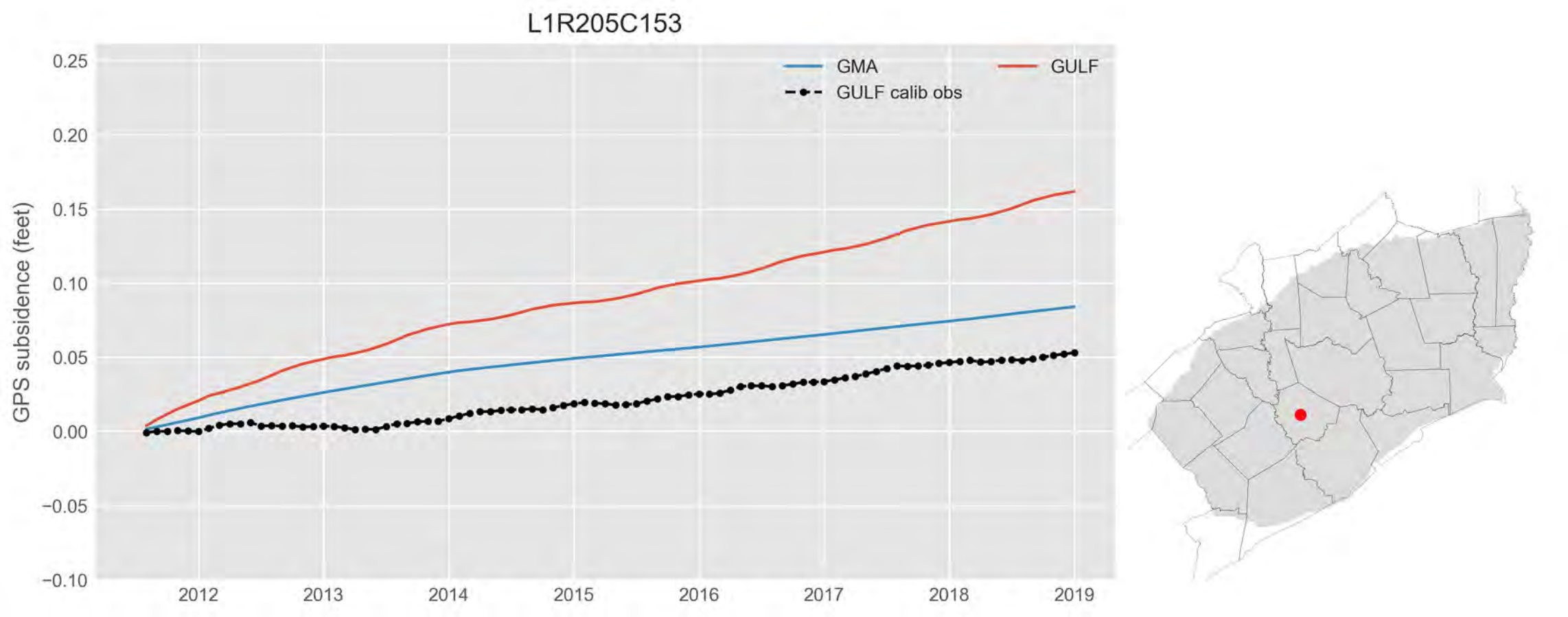

L1R202C217
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
1999
2004
2009
2014
2019

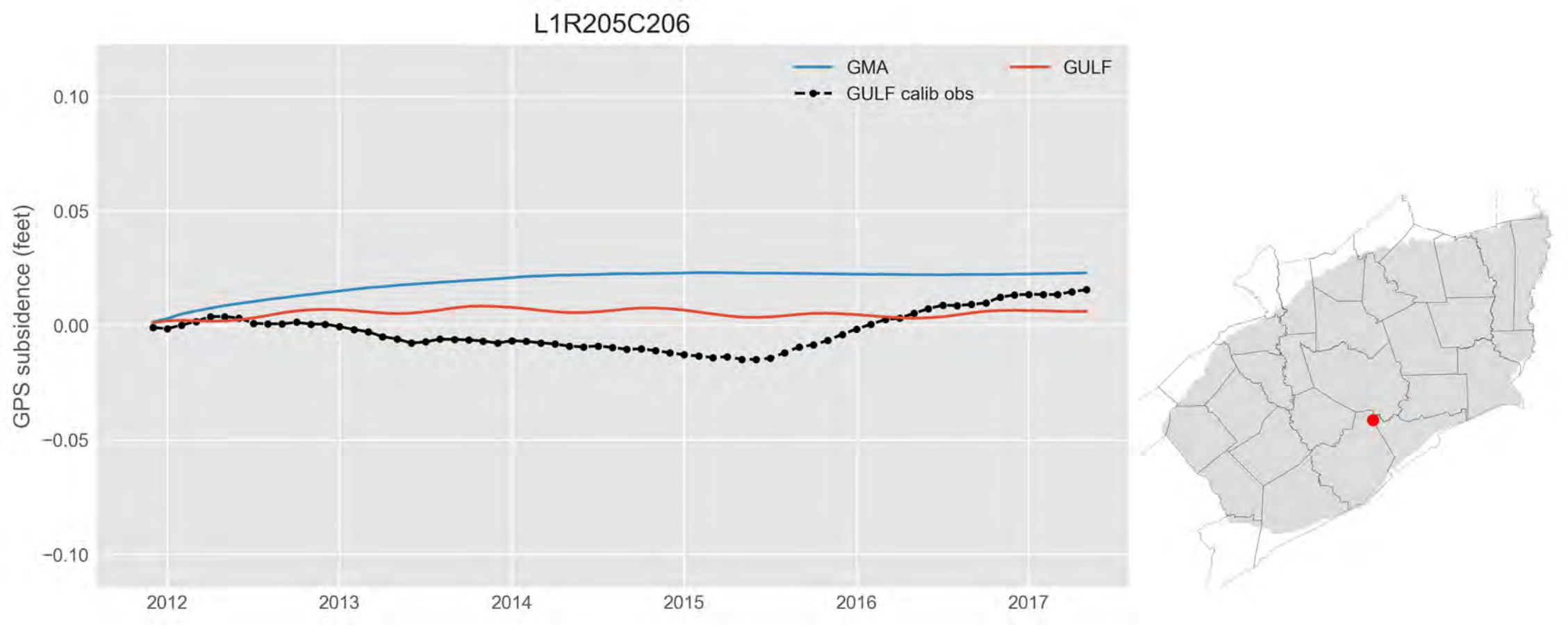
L1R203C149


GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
2011
2012
2013
2014
2015
2016
2017
2018
2019

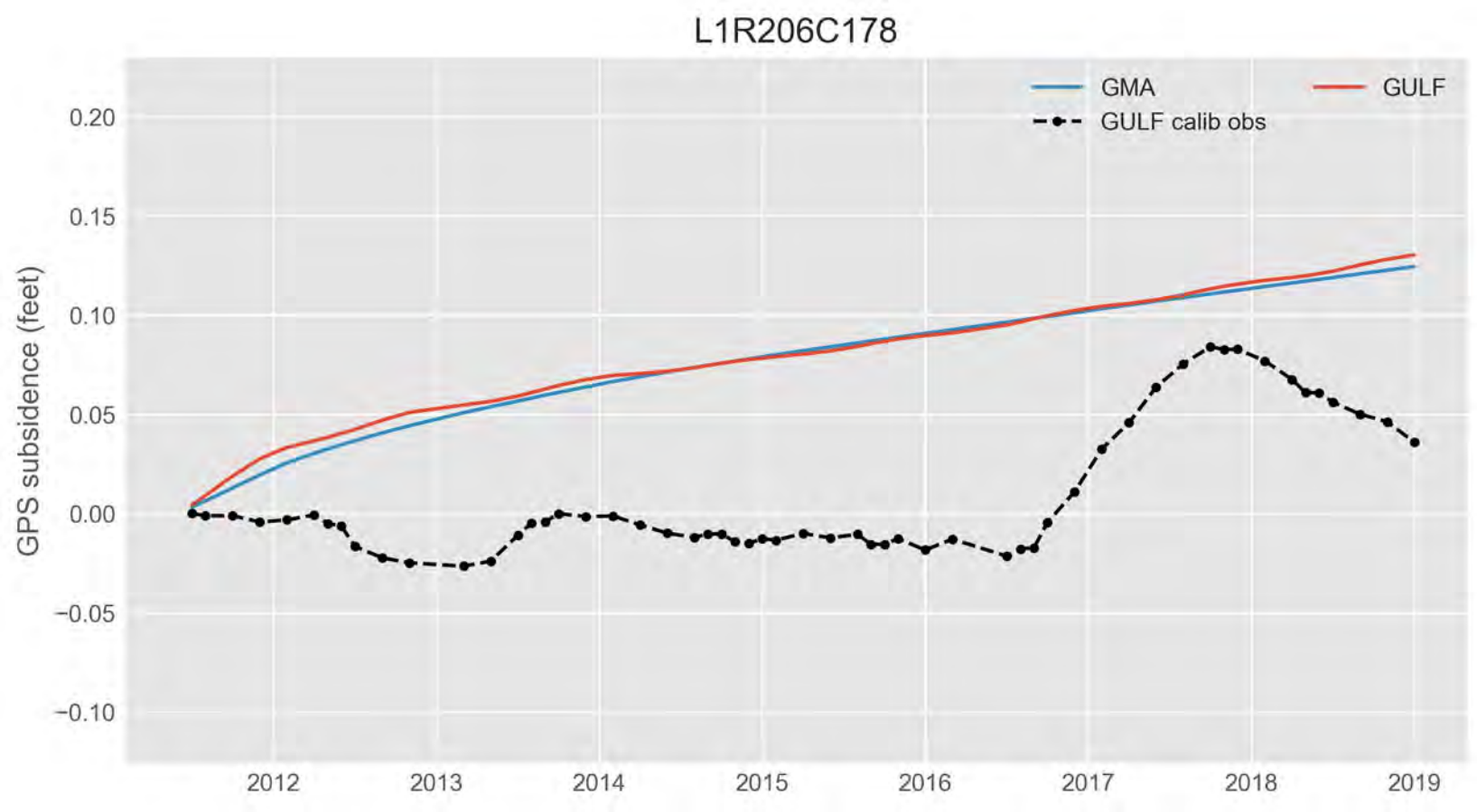

L1R203C230
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2003
2005
2007
2009
2011
2013
2015
2017
2019

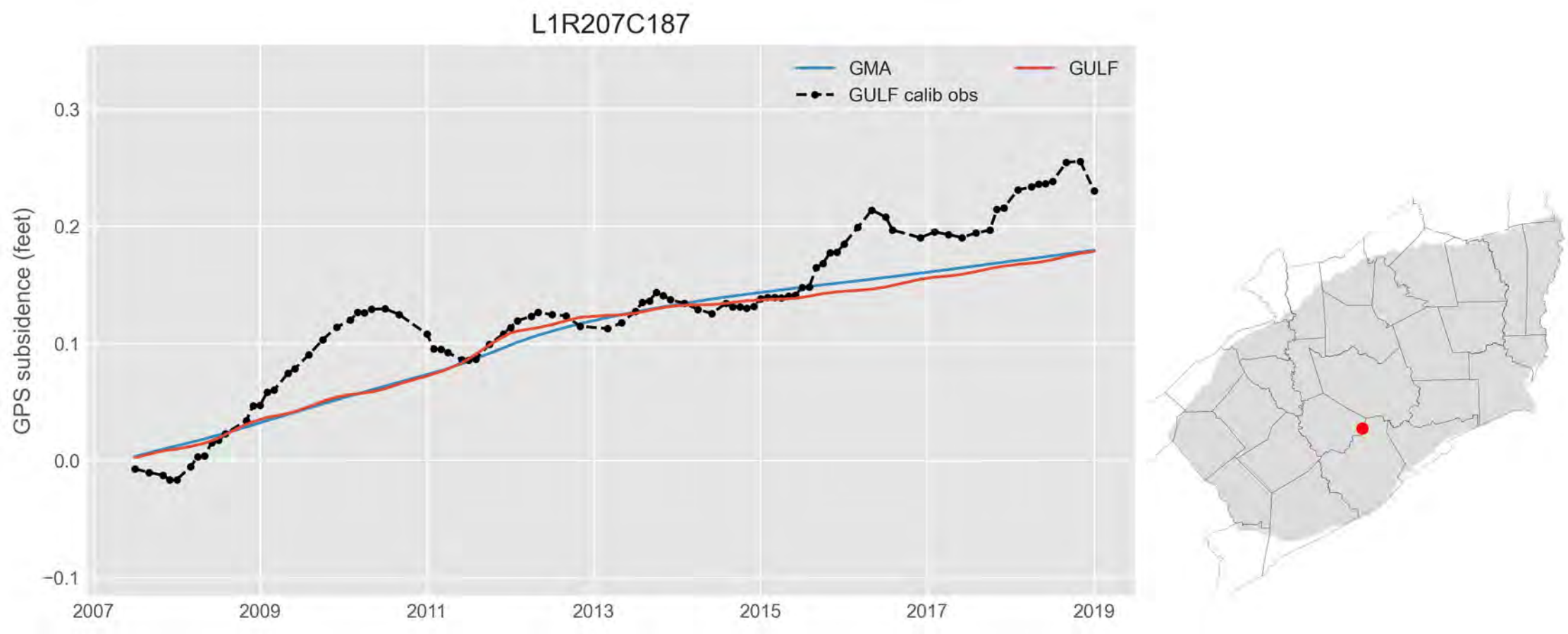

L1R204C128
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019

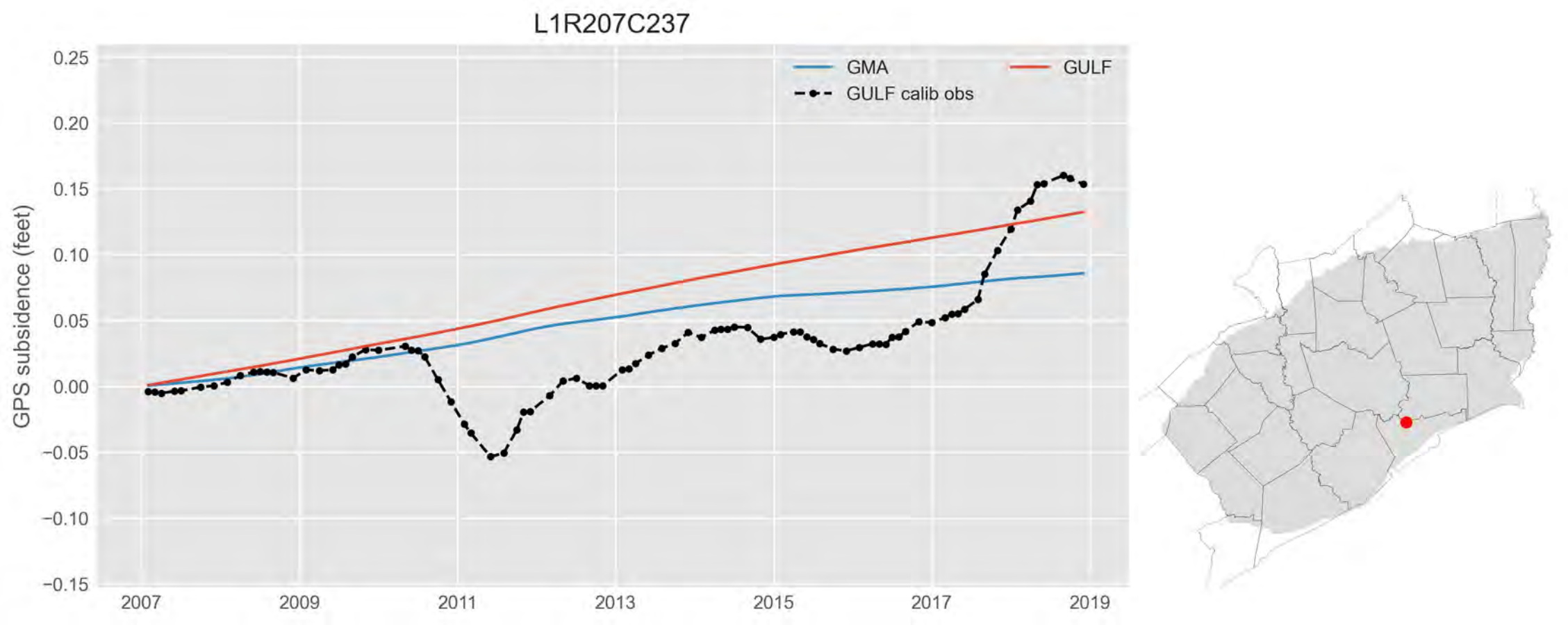

L1R205C153
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2012
2013
2014
2015
2016
2017
2018
2019

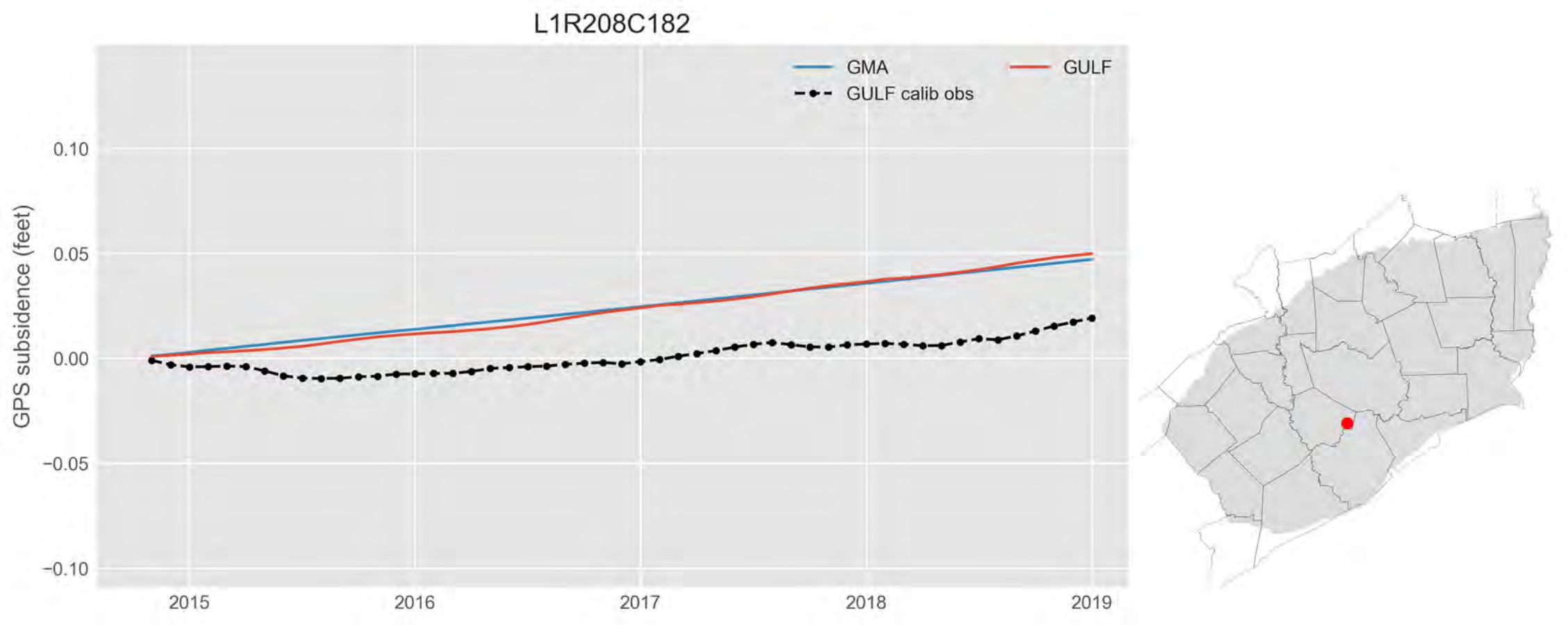

L1R205C206
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2012
2013
2014
2015
2016
2017

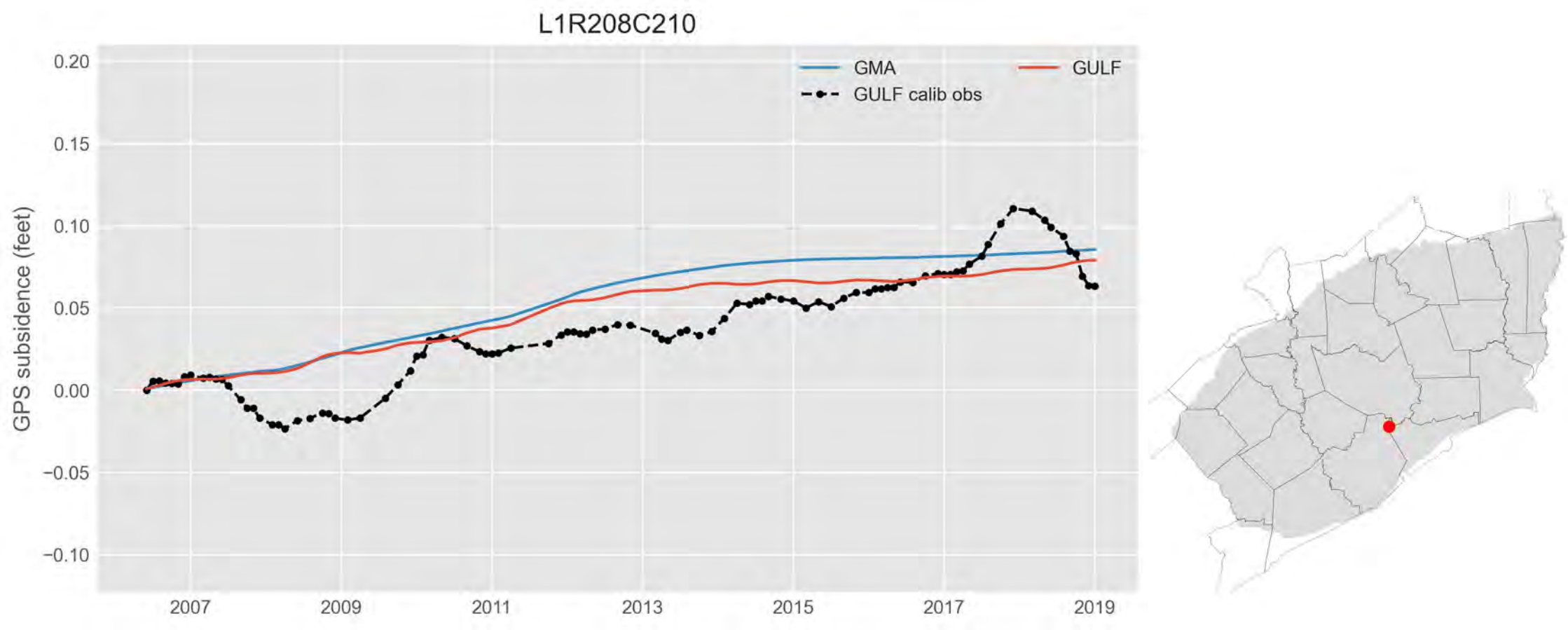
L1R206C178


GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2012
2013
2014
2015
2016
2017
2018
2019

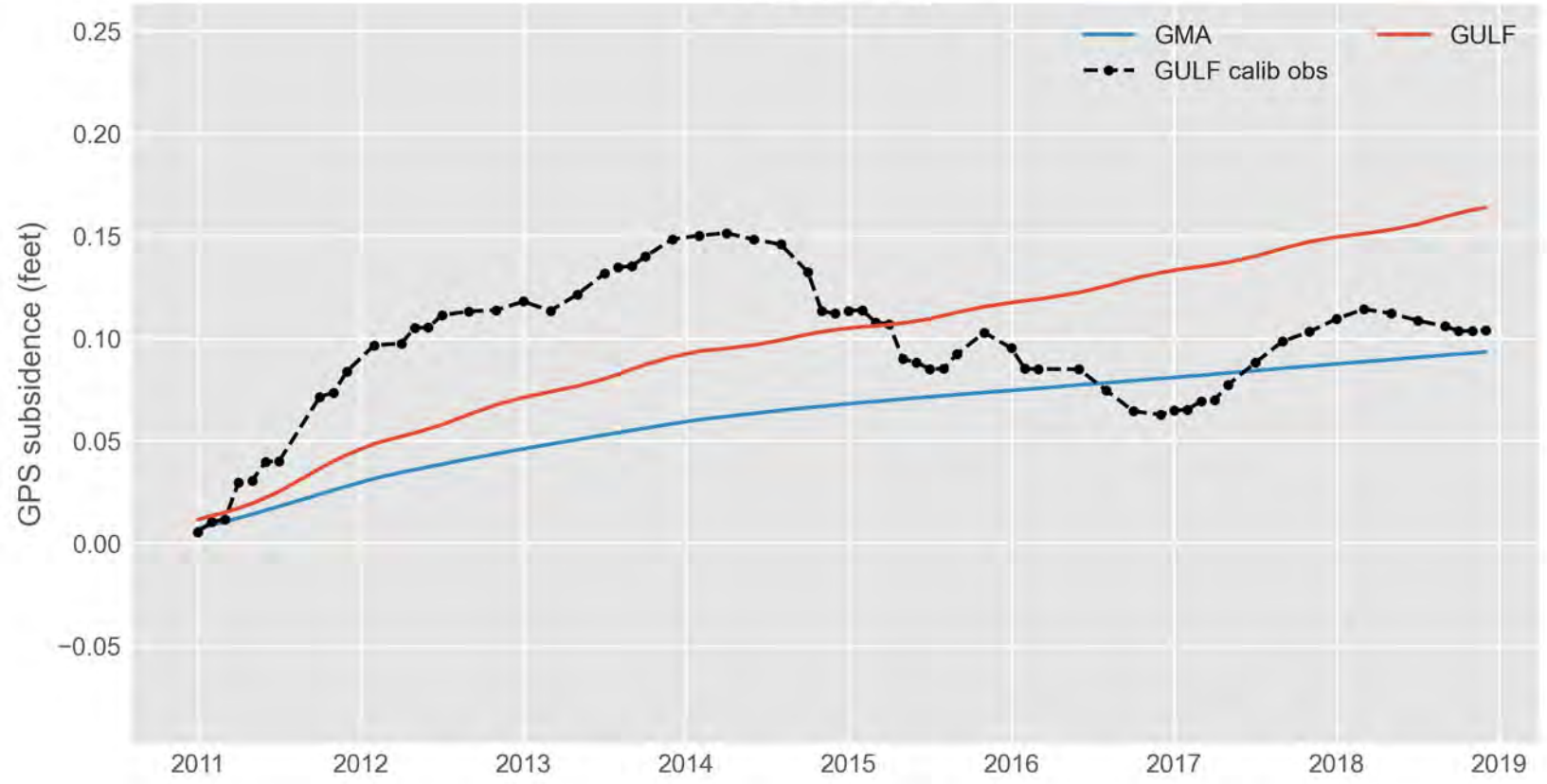

L1R207C187
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.3
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019

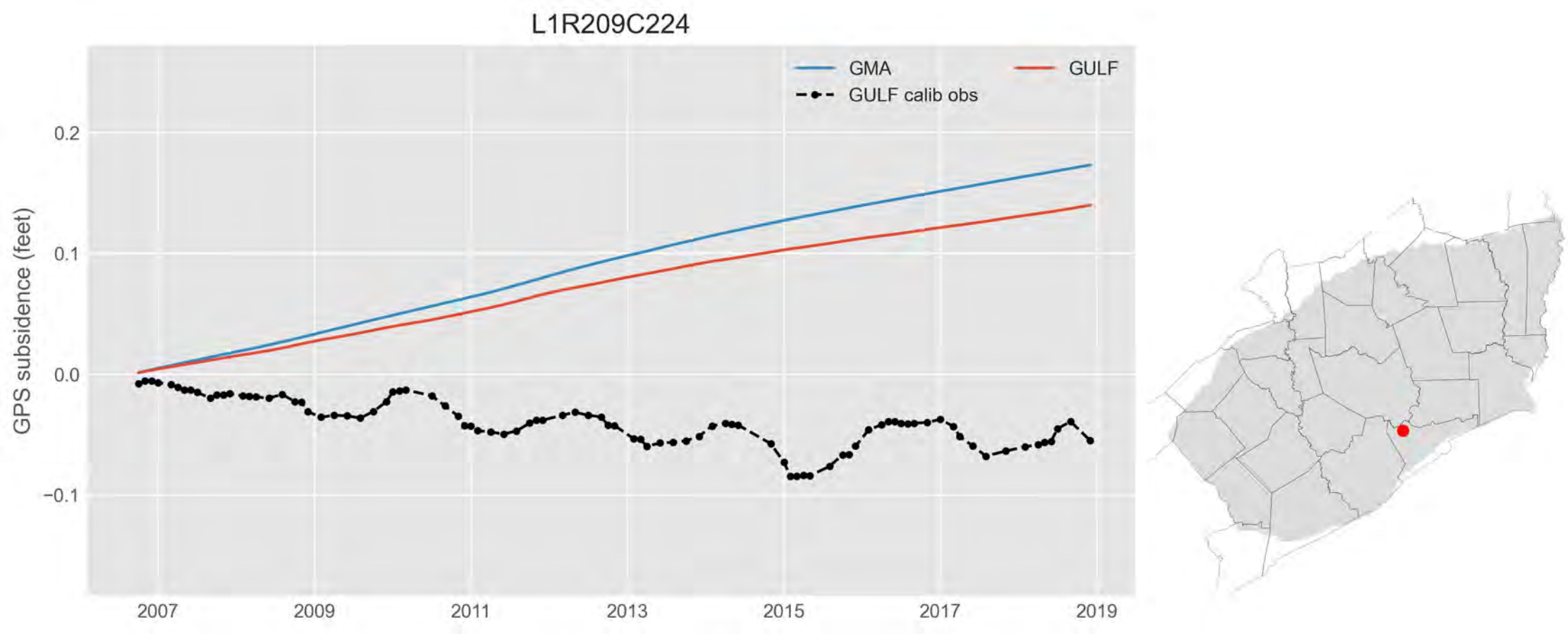

L1R207C237
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
−0.15
2007
2009
2011
2013
2015
2017
2019

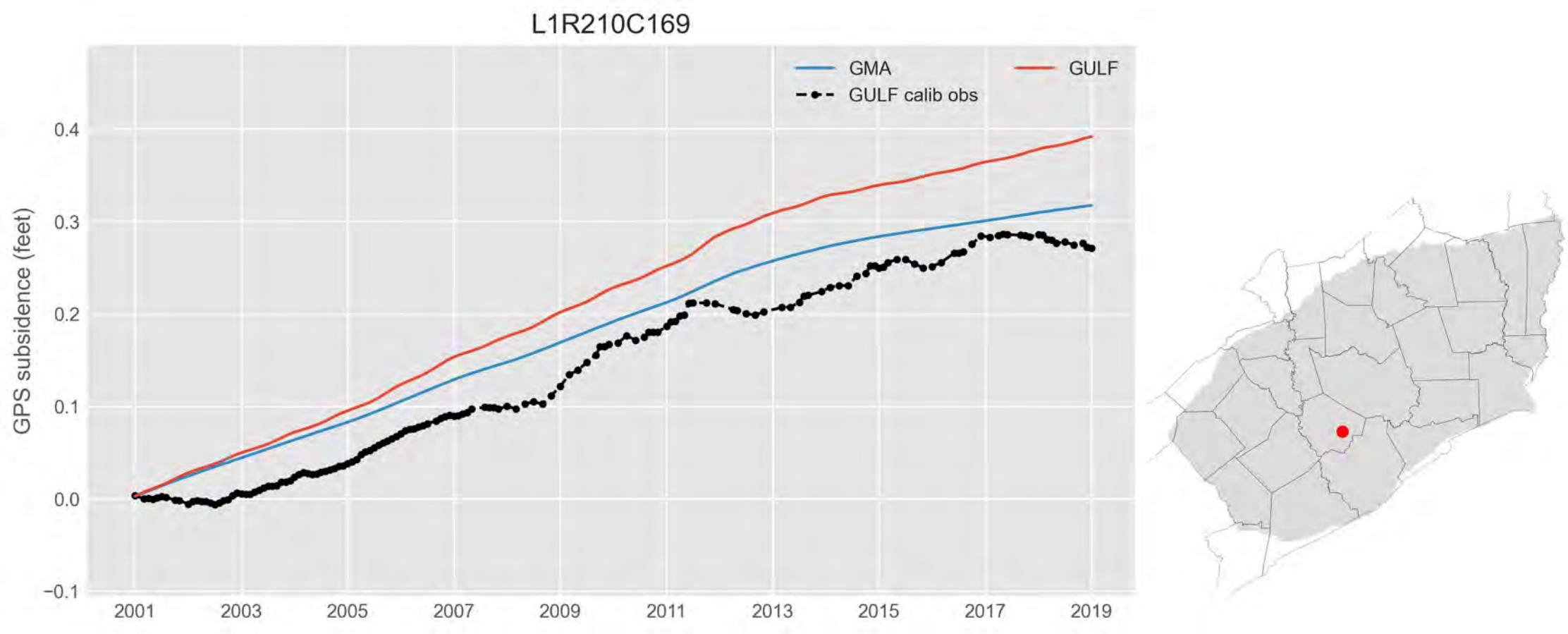

L1R208C182
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019

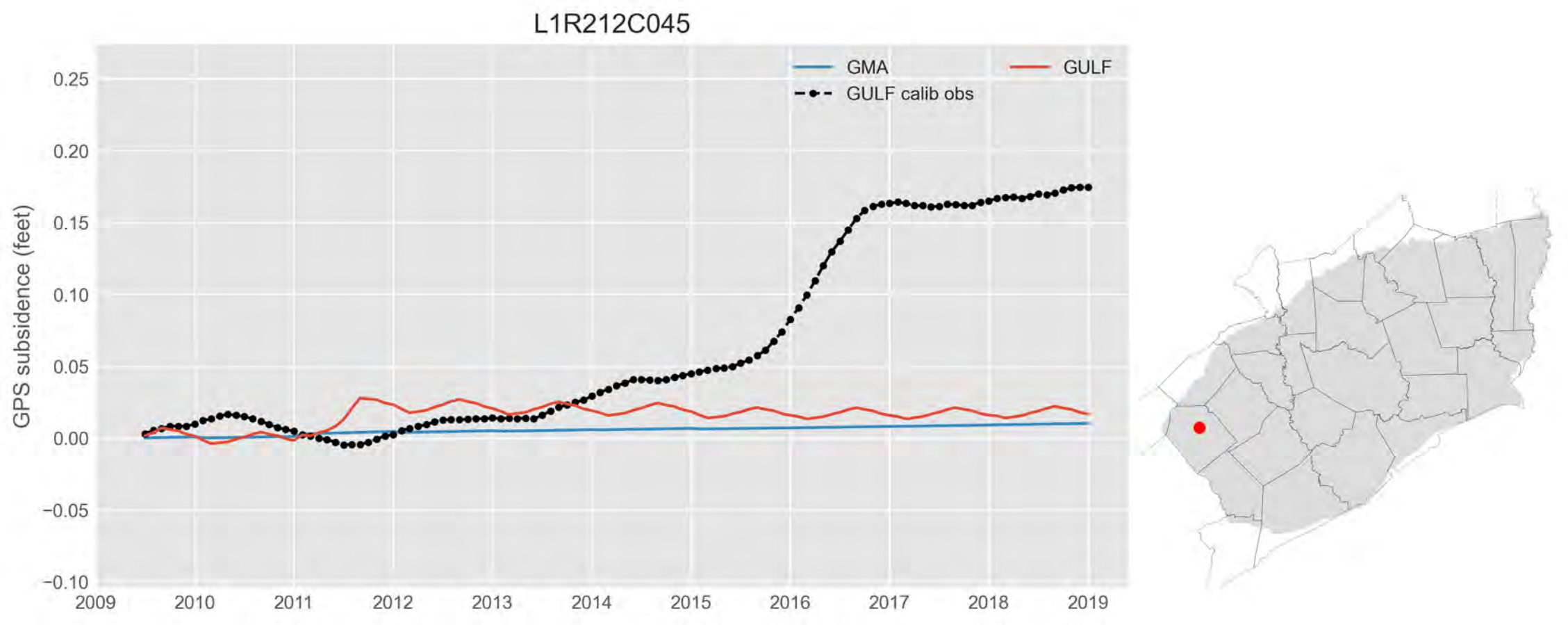

L1R208C210
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2007
2009
2011
2013
2015
2017
2019

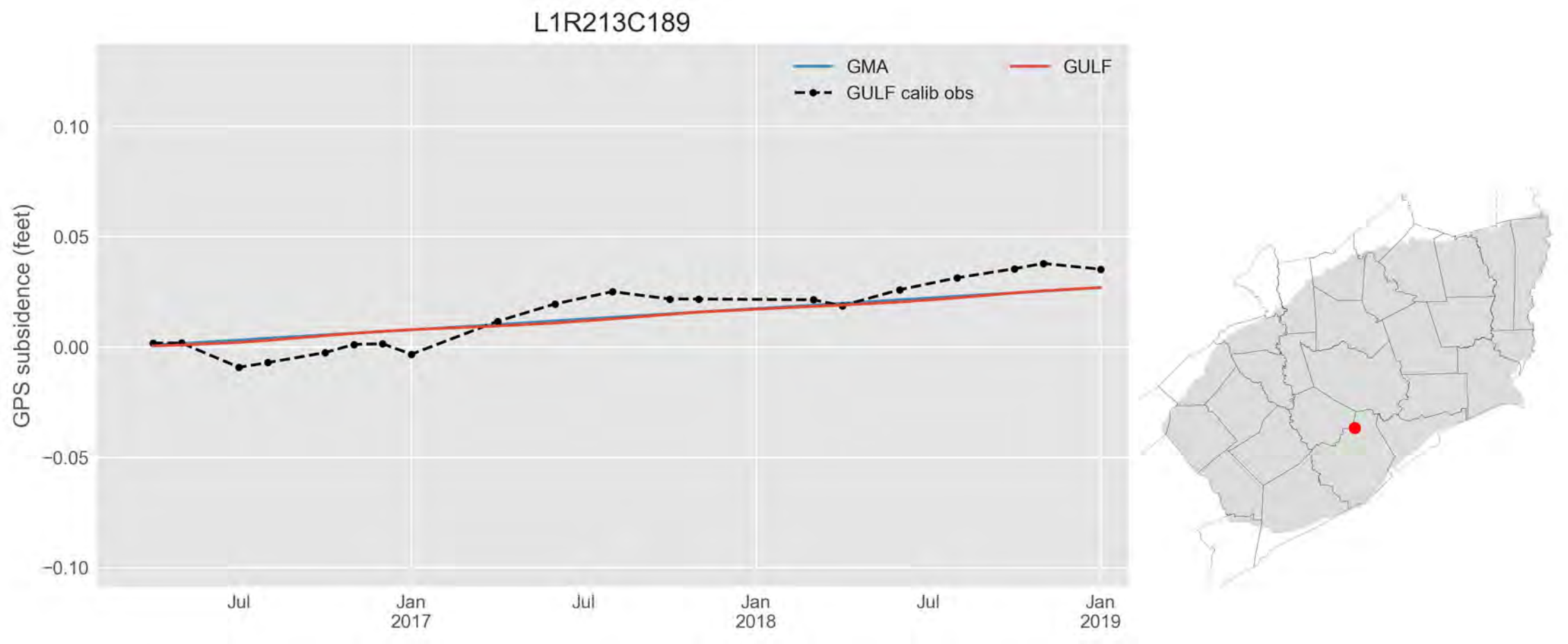
L1R209C162


GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
2011
2012
2013
2014
2015
2016
2017
2018
2019

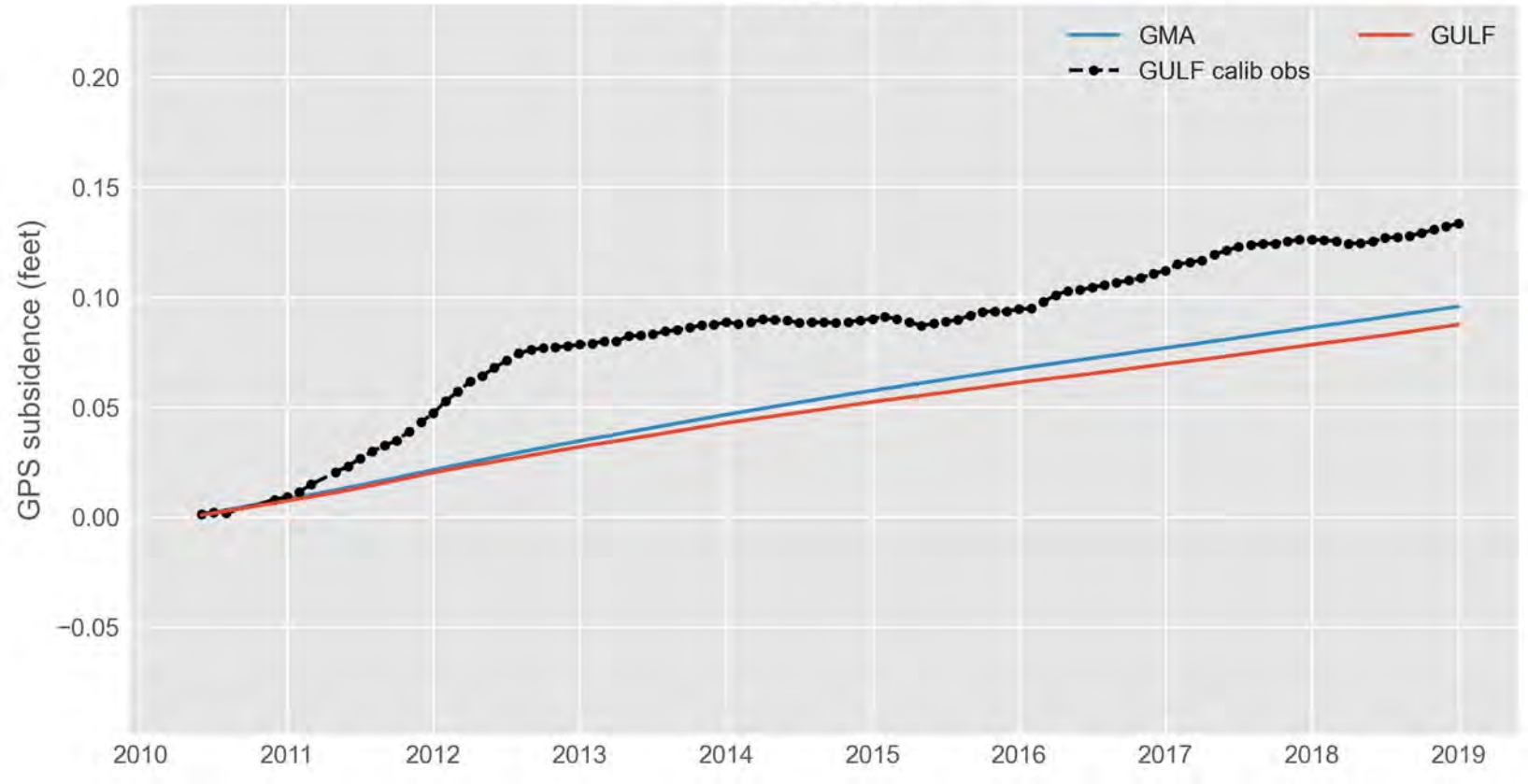

L1R209C224
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019

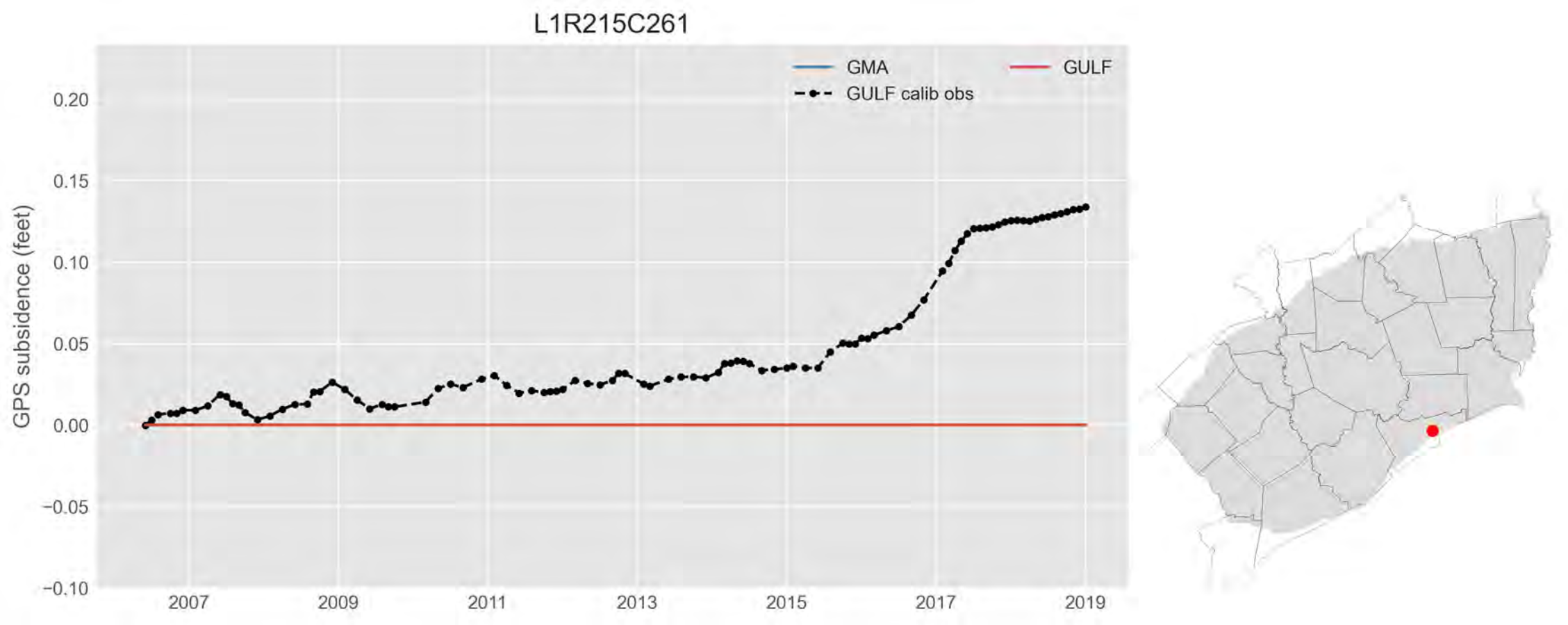

L1R210C169
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.4
0.3
0.2
0.1
0.0
−0.1
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019

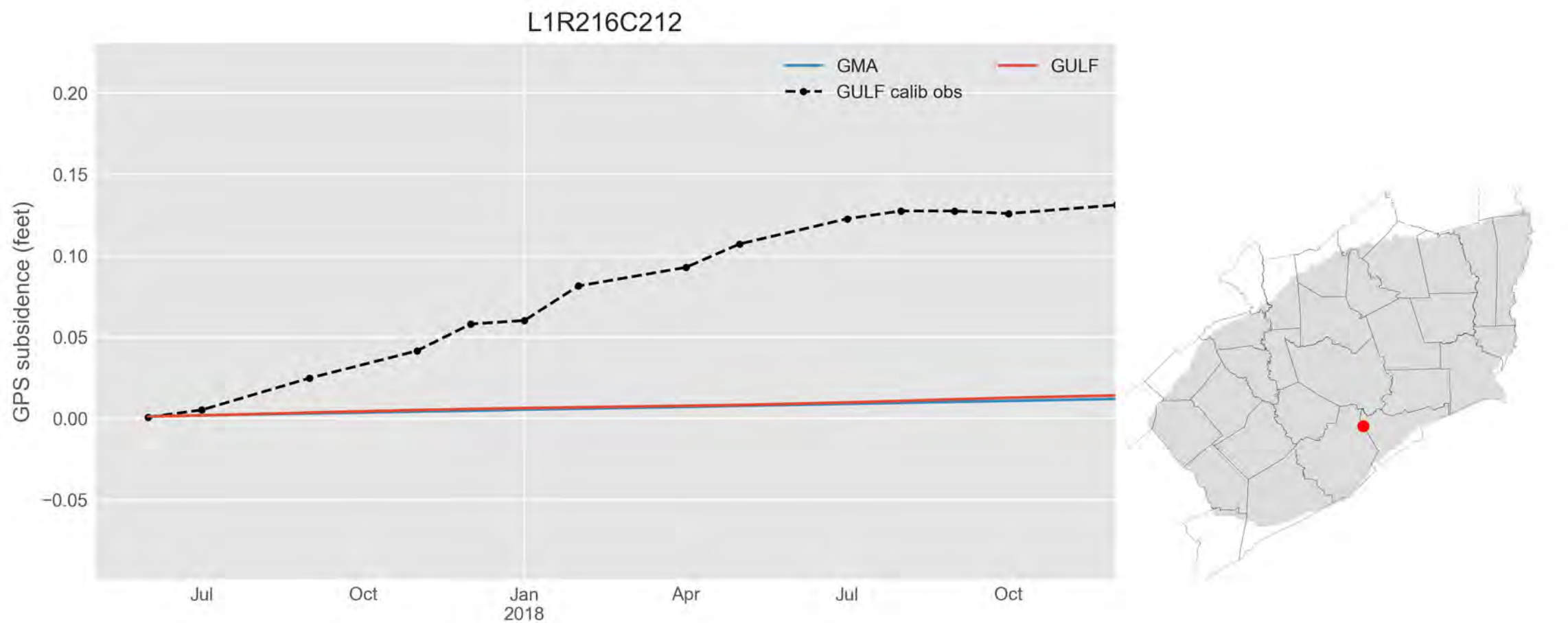

L1R212C045
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.25
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

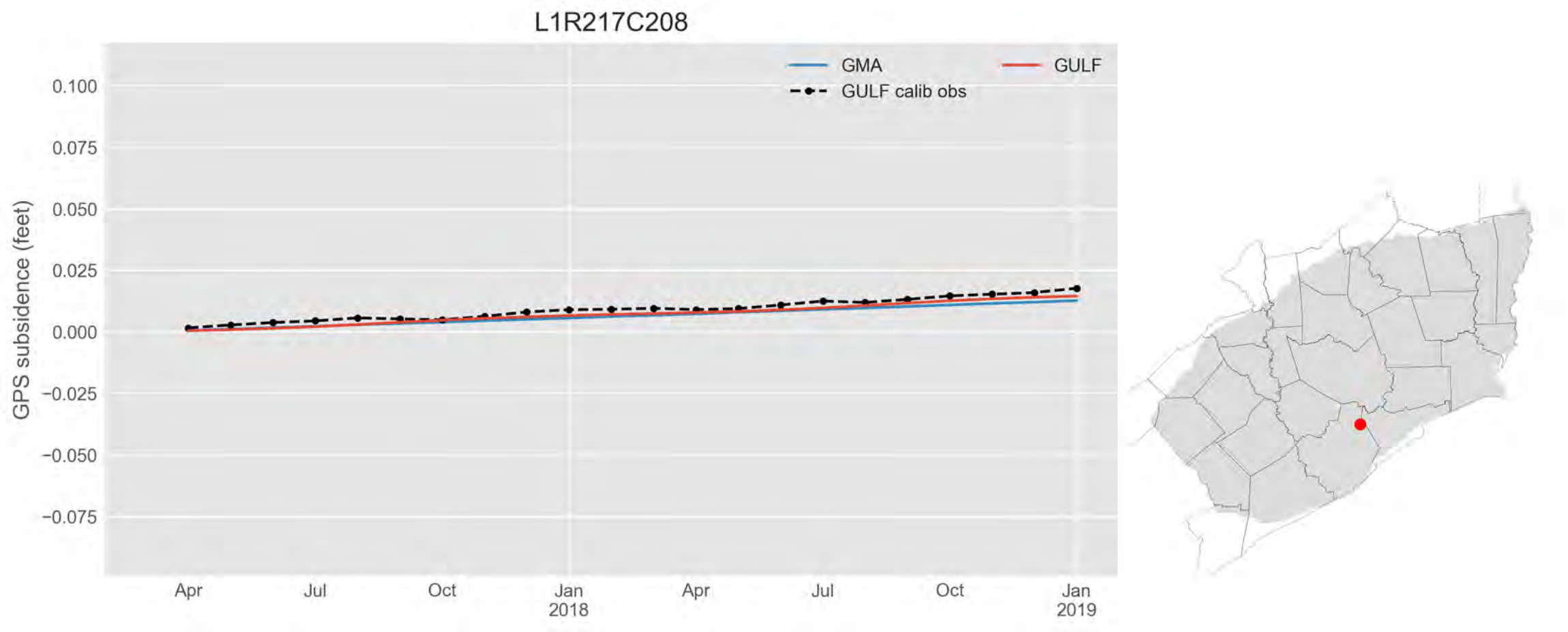

L1R213C189
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.10
0.05
0.00
−0.05
−0.10
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019

L1R215C228

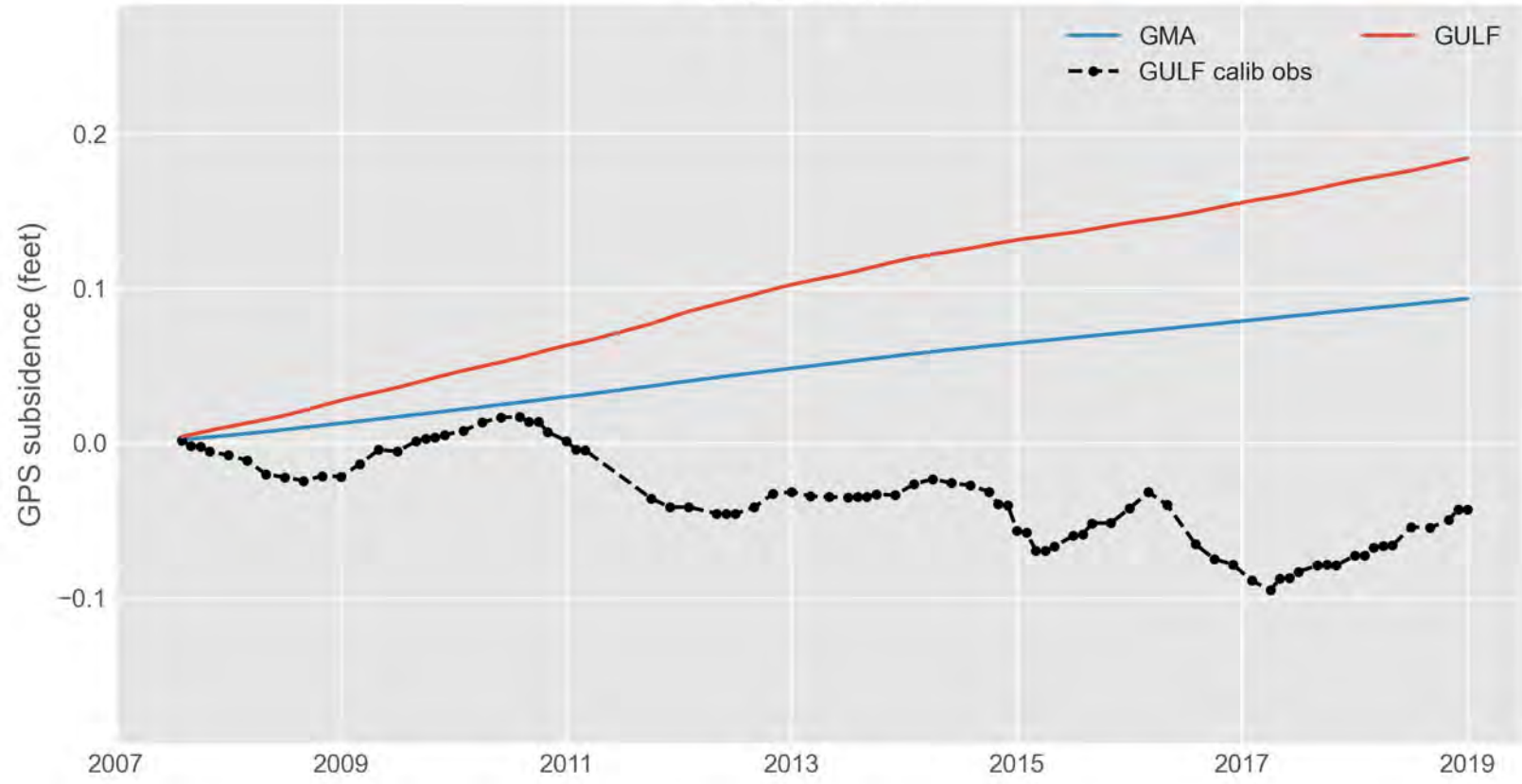

GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

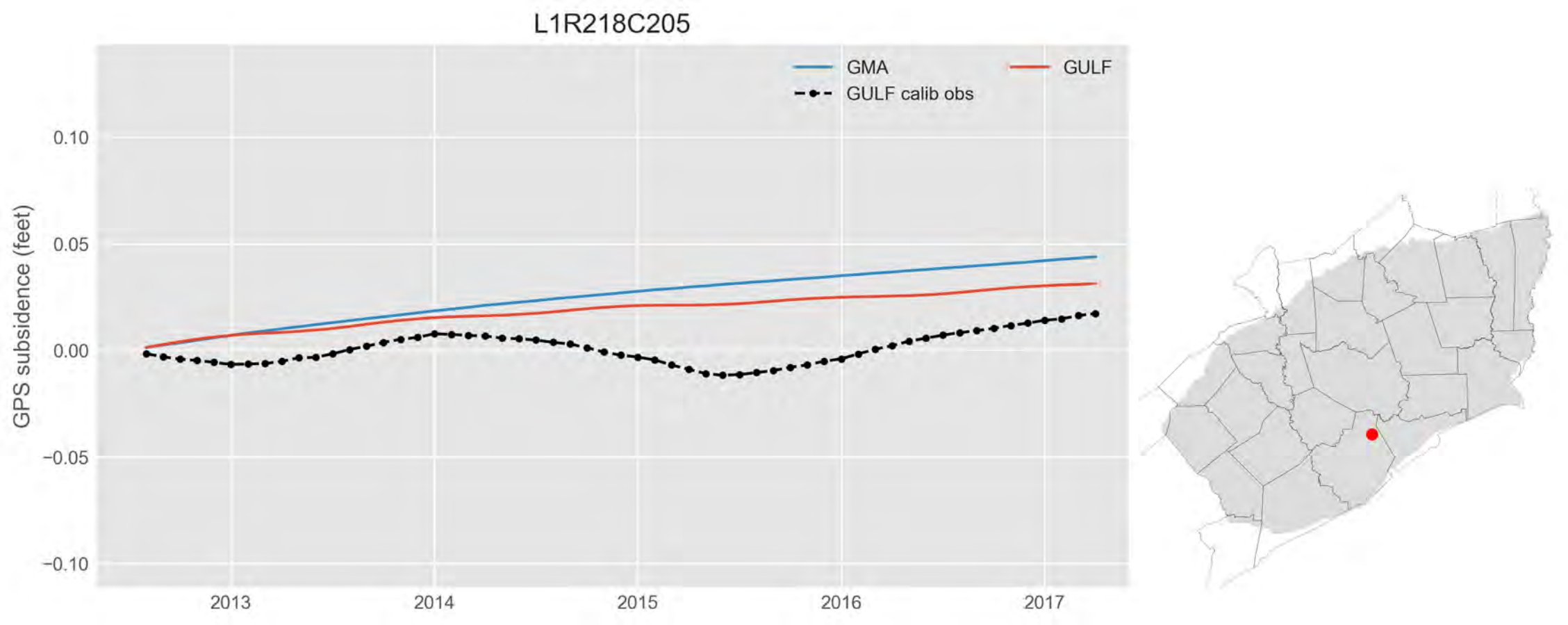

L1R215C261
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
−0.10
2007
2009
2011
2013
2015
2017
2019


L1R216C212
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.20
0.15
0.10
0.05
0.00
−0.05
Jul
Oct
Jan
2018
Apr
Jul
Oct


L1R217C208
GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.100
0.075
0.050
0.025
0.000
−0.025
−0.050
−0.075
Apr
Jul
Oct
Jan
2018
Apr
Jul
Oct
Jan
2019

L1R218C149


GMA
GULF
GULF calib obs
GPS subsidence (feet)
0.2
0.1
0.0
−0.1
2007
2009
2011
2013
2015
2017
2019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GULF
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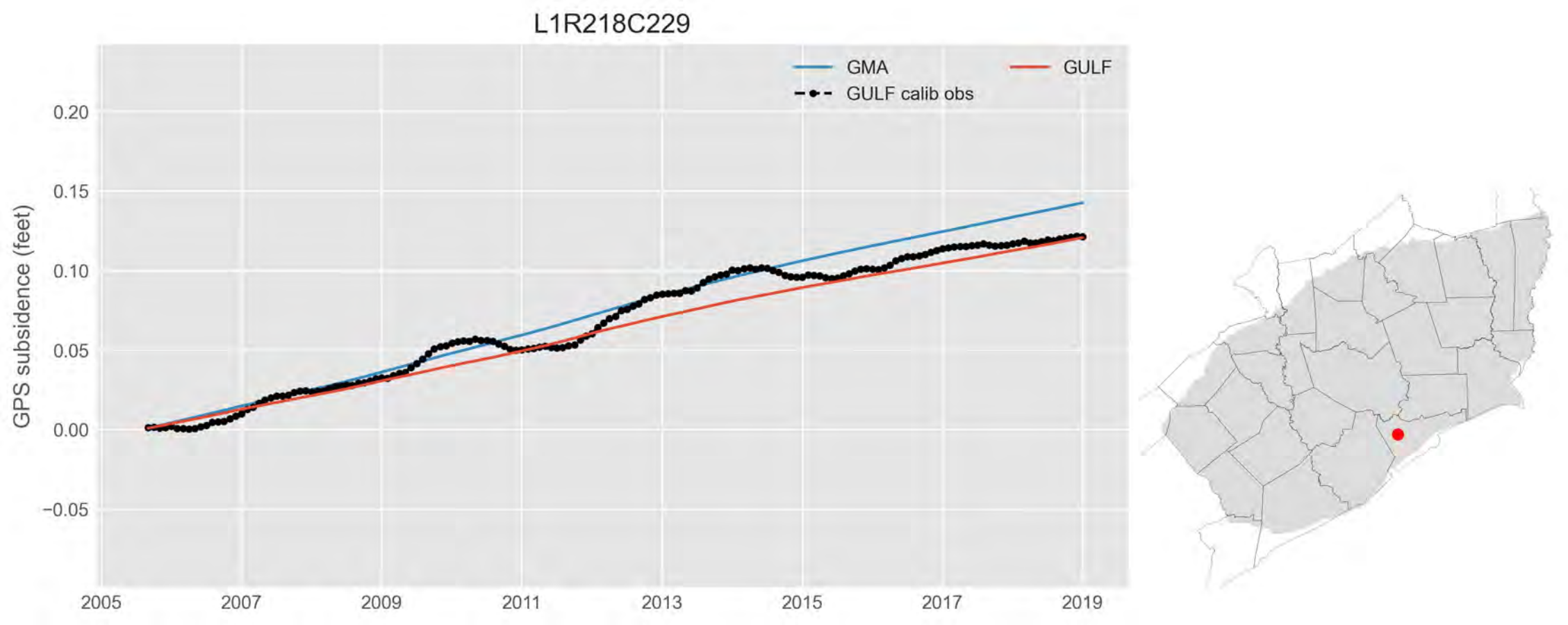
2013
2014
2015
2016
2017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GULF
GULF calib obs
GPS subsidence (feet)
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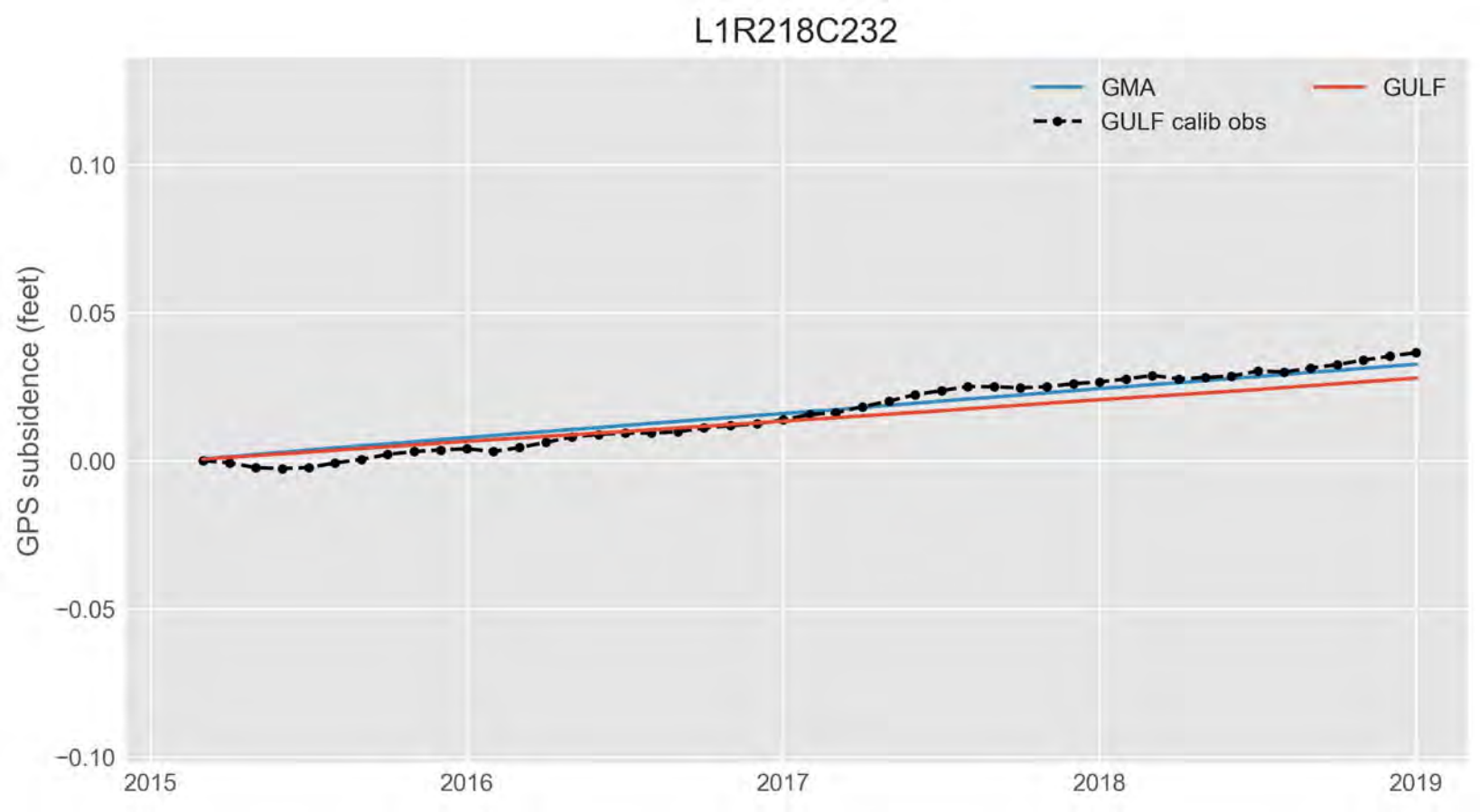
−0.05
2005
2007
2009
2011
2013
2015
2017
2019

L1R218C232


GMA
GULF
GULF calib obs
GPS subsidence (feet)
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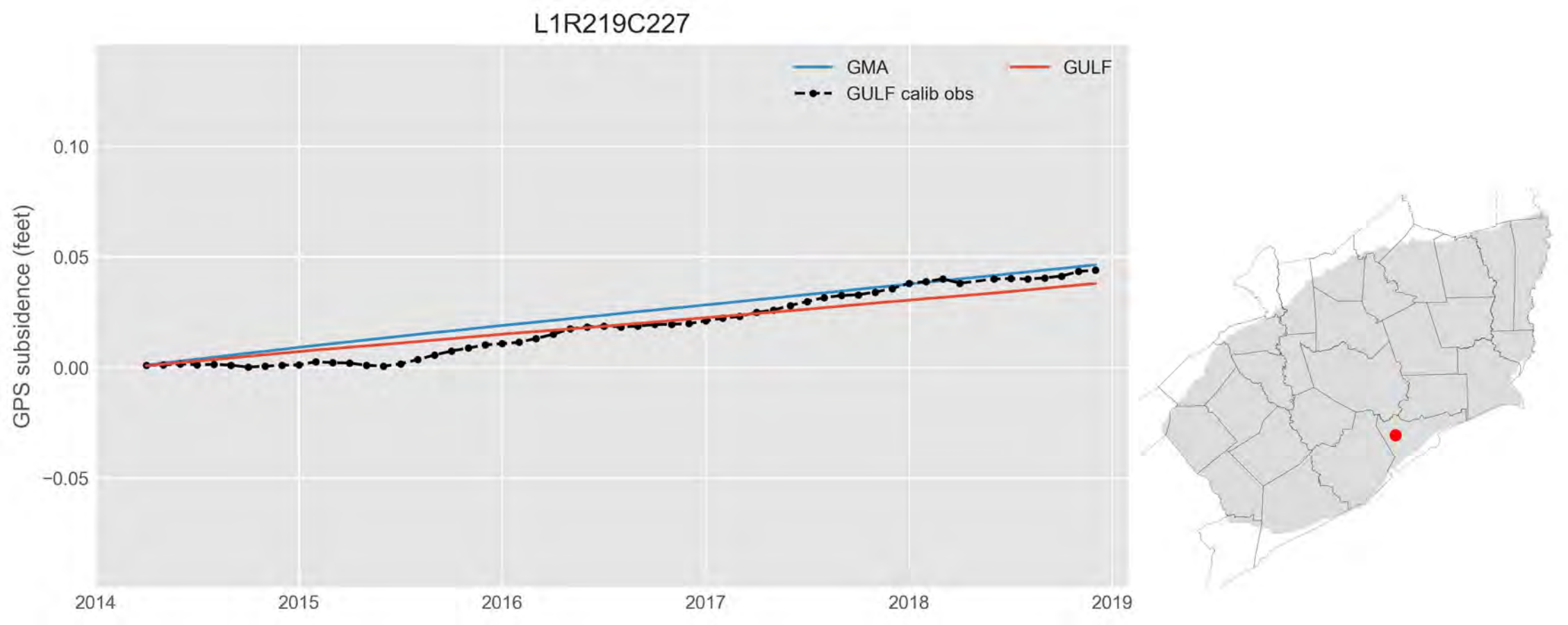
0.05
0.00
−0.05
−0.10
2015
2016
2017
2018
2019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GULF
GULF calib obs
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0.00
−0.05
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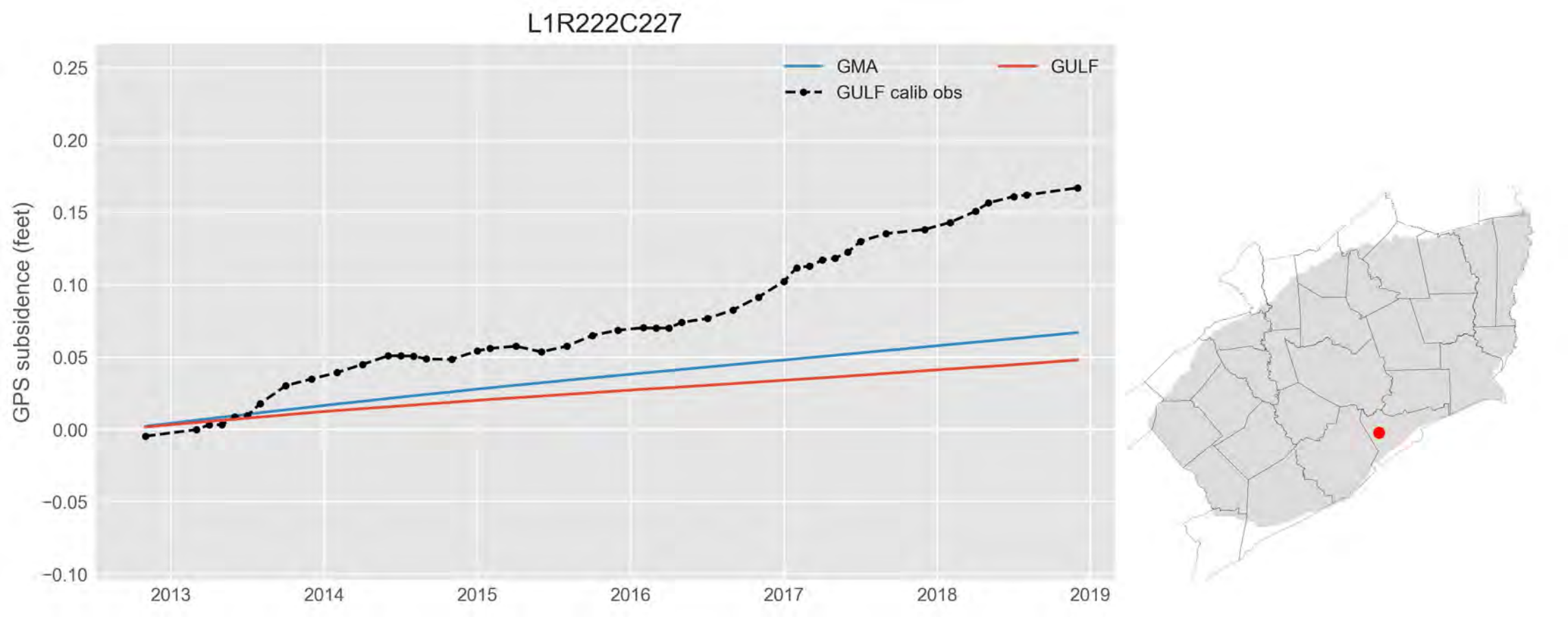
2015
2016
2017
2018
2019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GMA
GULF
GULF calib obs
GPS subsidence (feet)
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0.10
0.05
0.00
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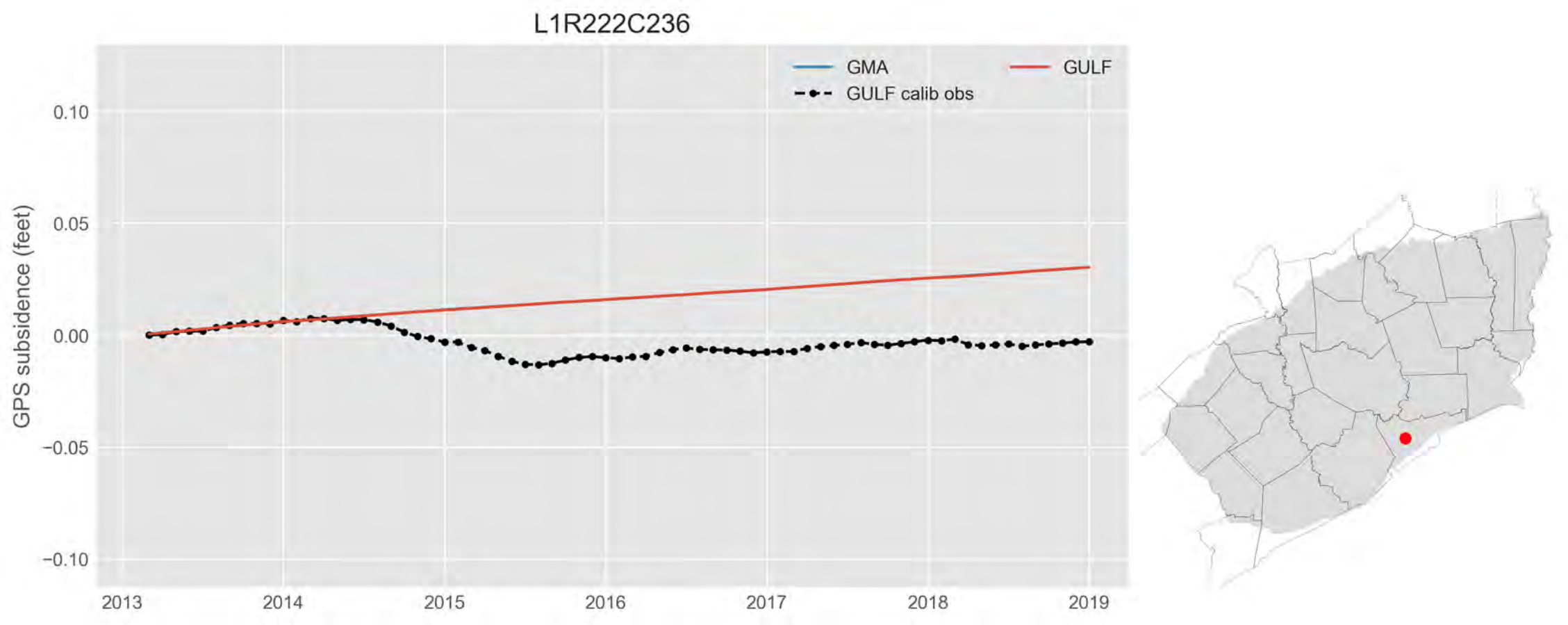
2014
2015
2016
2017
2018
2019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GMA
GULF
GULF calib obs
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0.05
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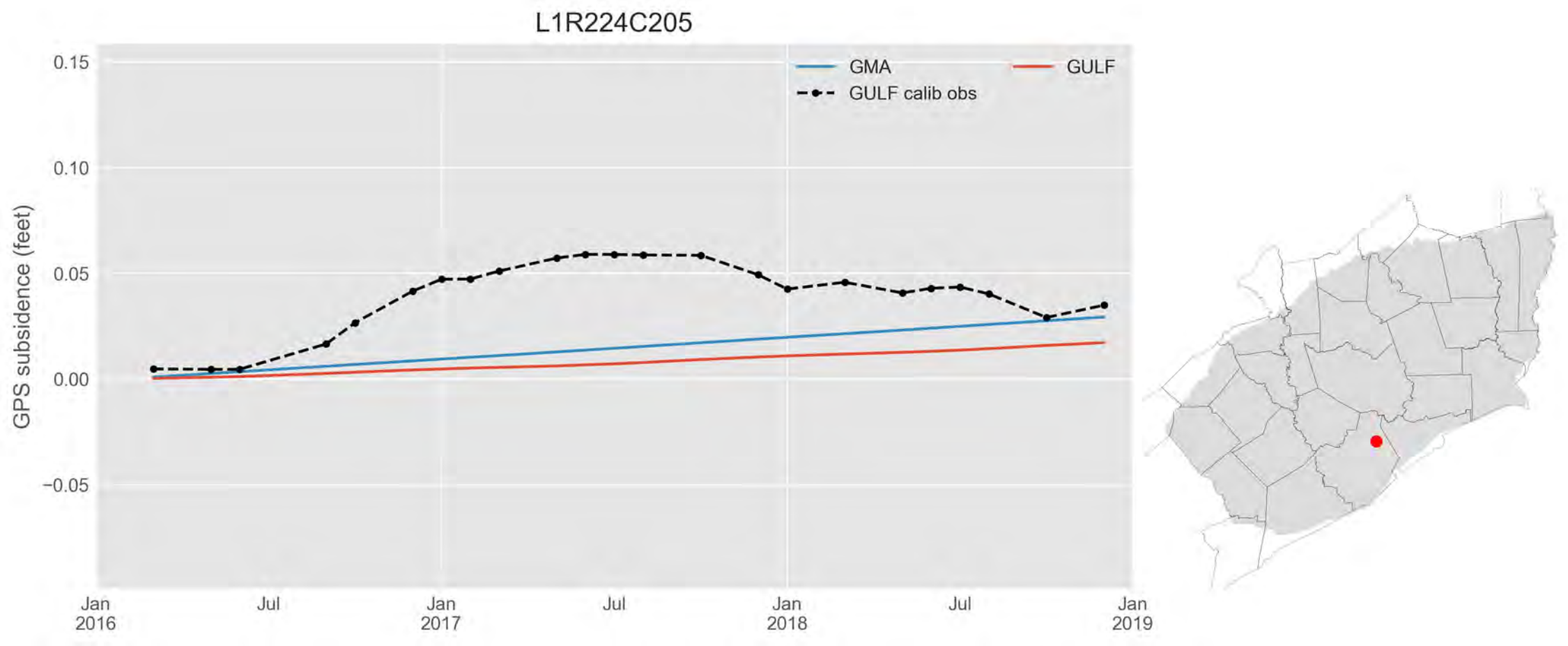
2013
2014
2015
2016
2017
2018
2019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GULF
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0.05
0.00
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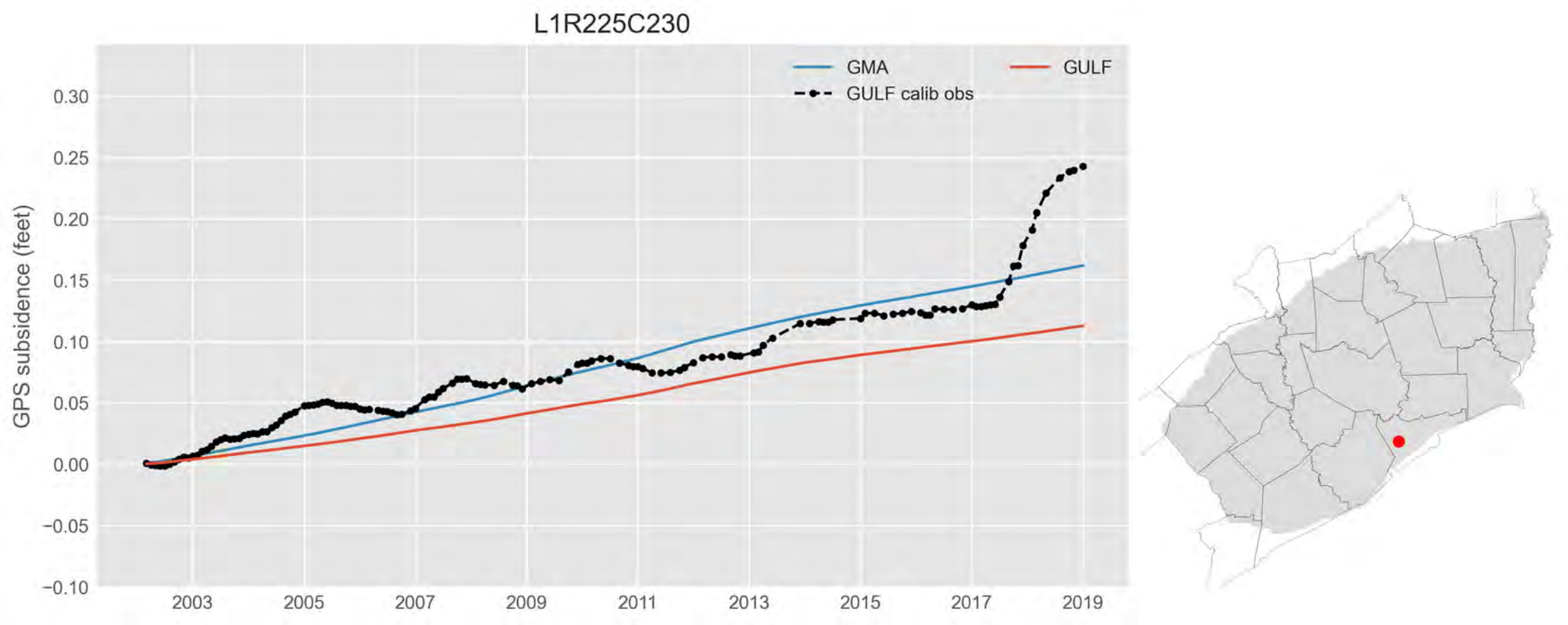
Jan 2016
Jul
Jan 2017
Jul
Jan 2018
Jul
Jan 2019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0.00
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−0.10
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2005
2007
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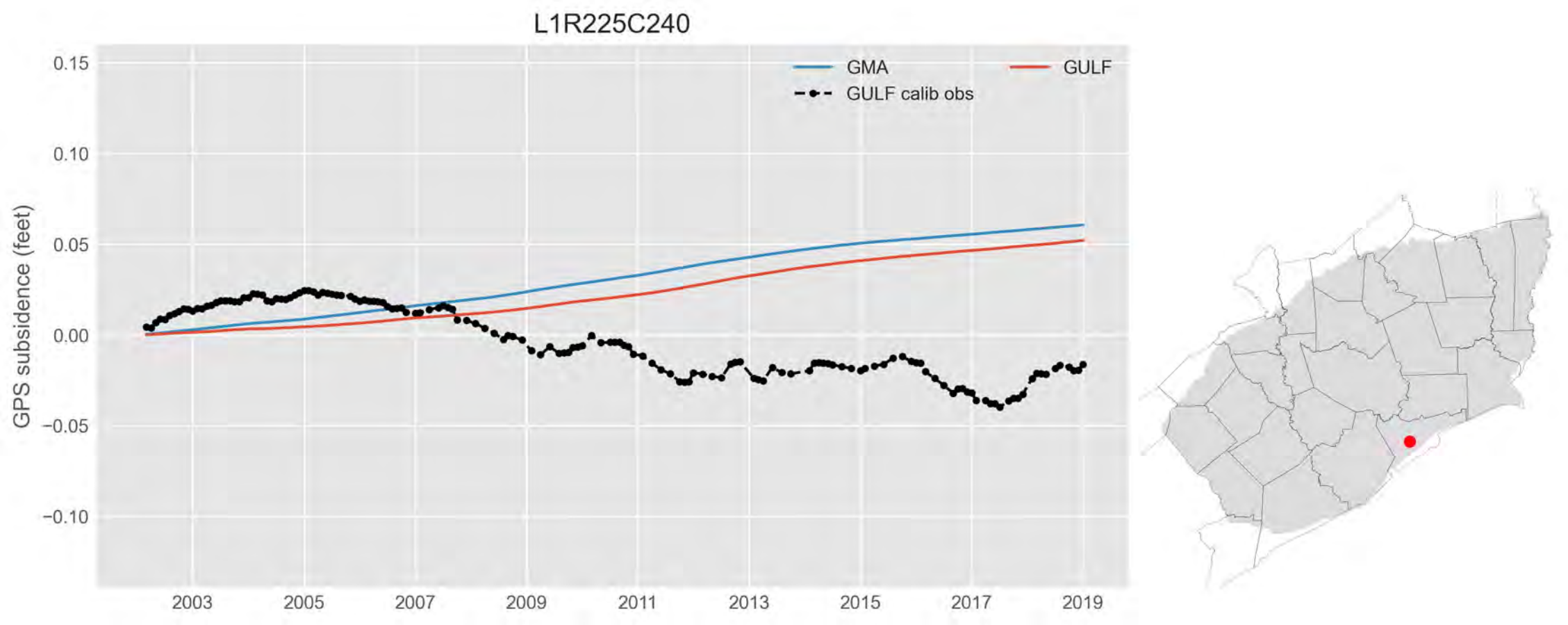
2015
2017
2019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2005
2007
2009
2011
2013
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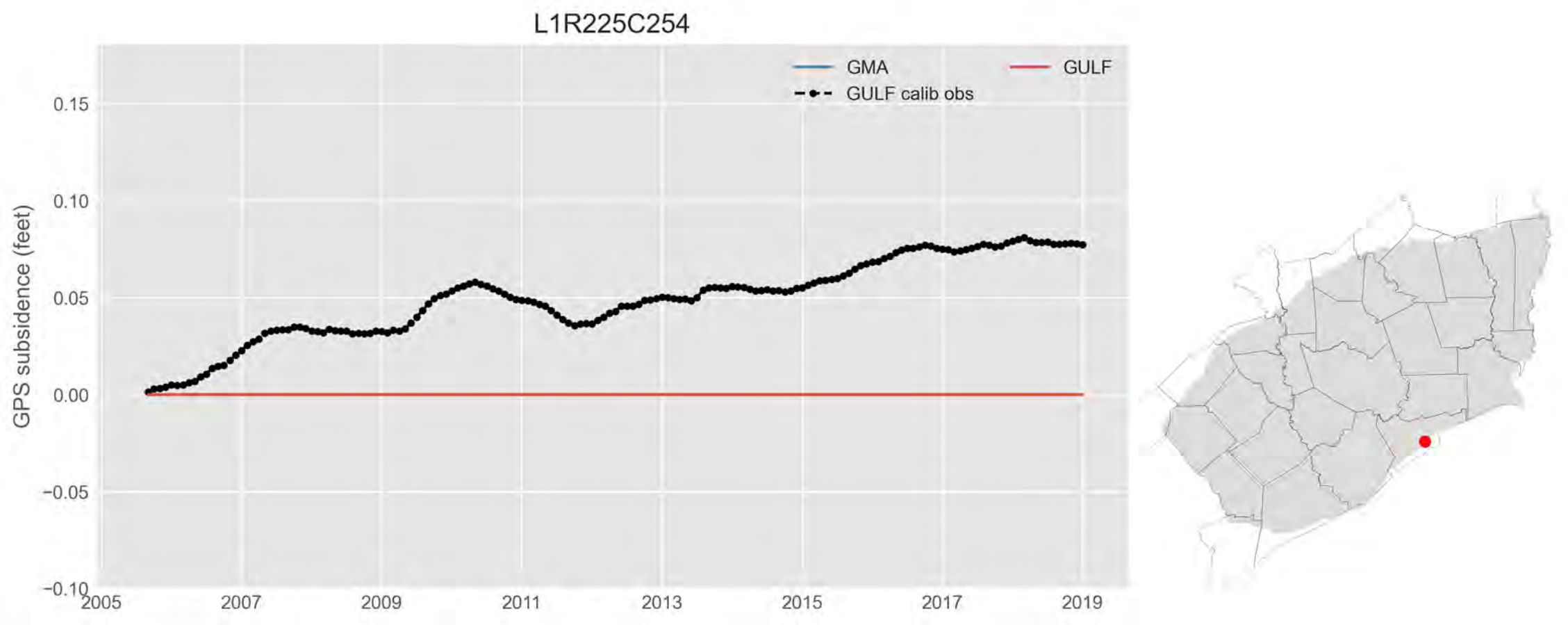
2017
2019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−0.10
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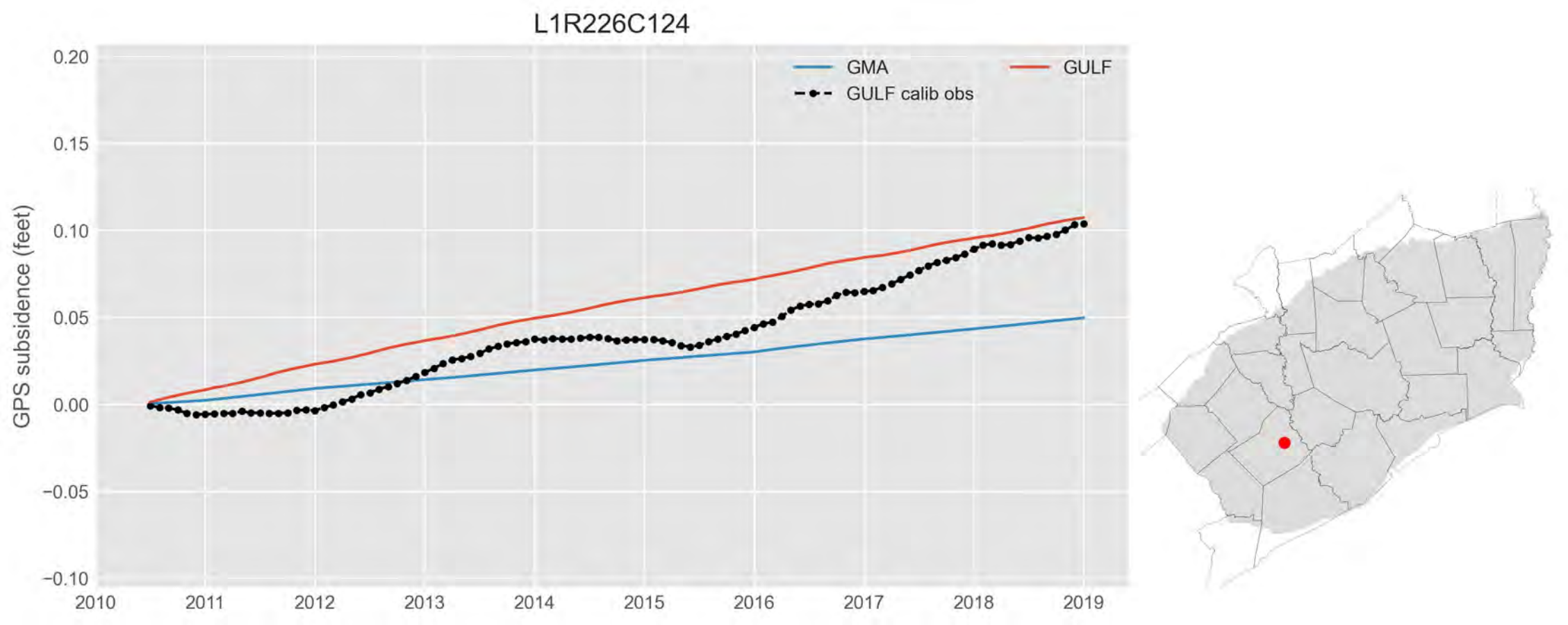
2007
2009
2011
2013
2015
2017
2019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GULF
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GPS subsidence (feet)
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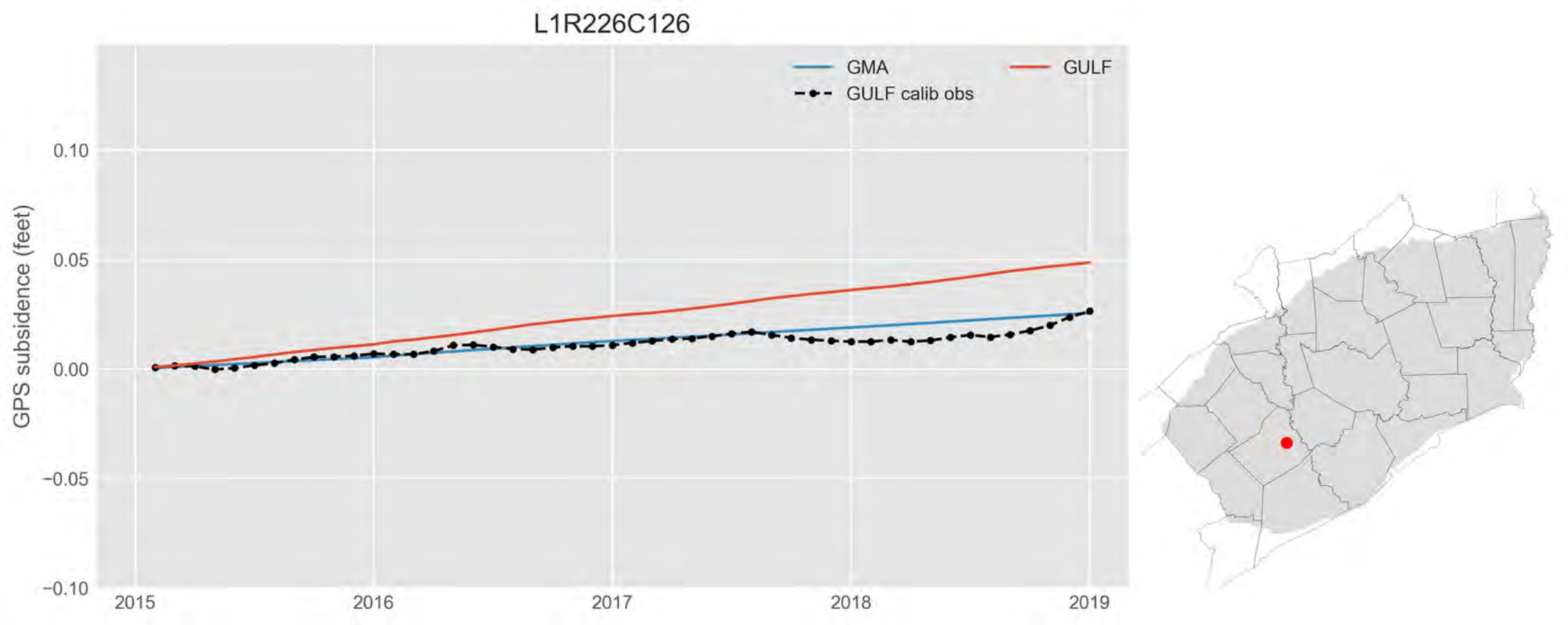
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019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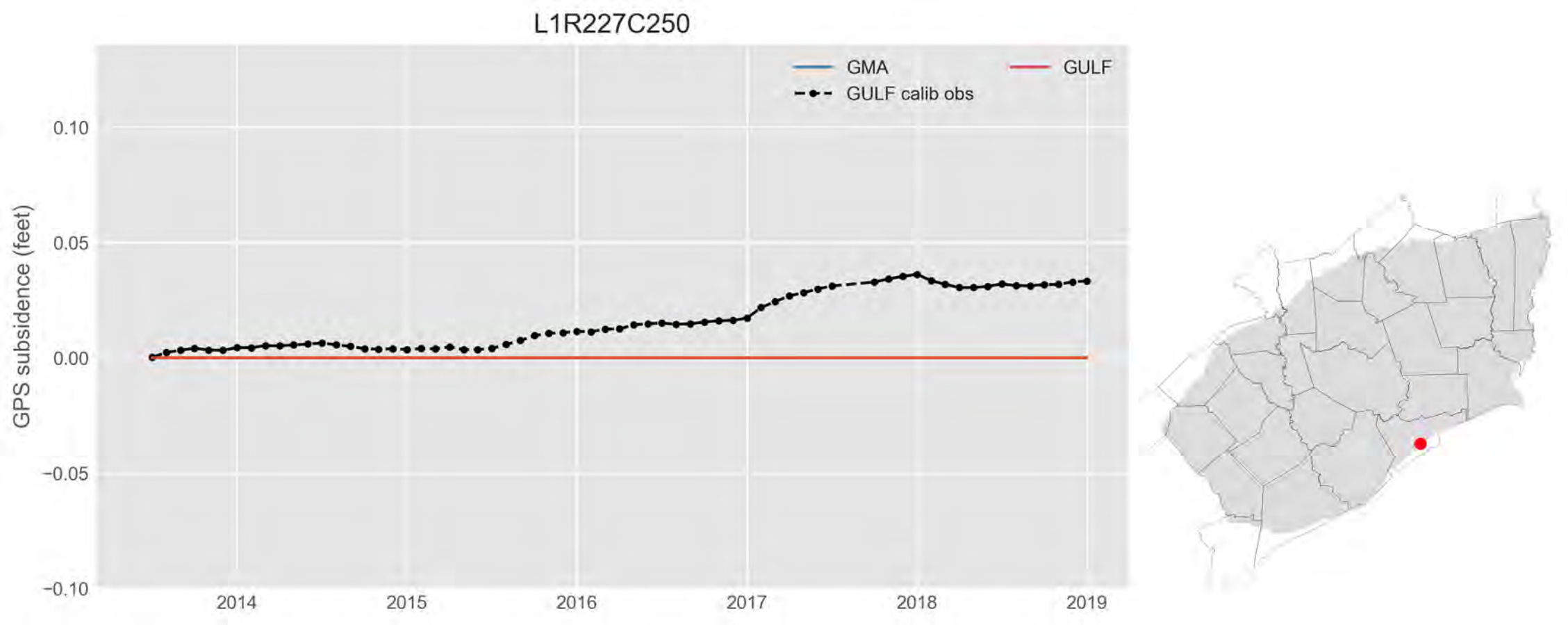
2015
2016
2017
2018
2019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GULF
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−0.10
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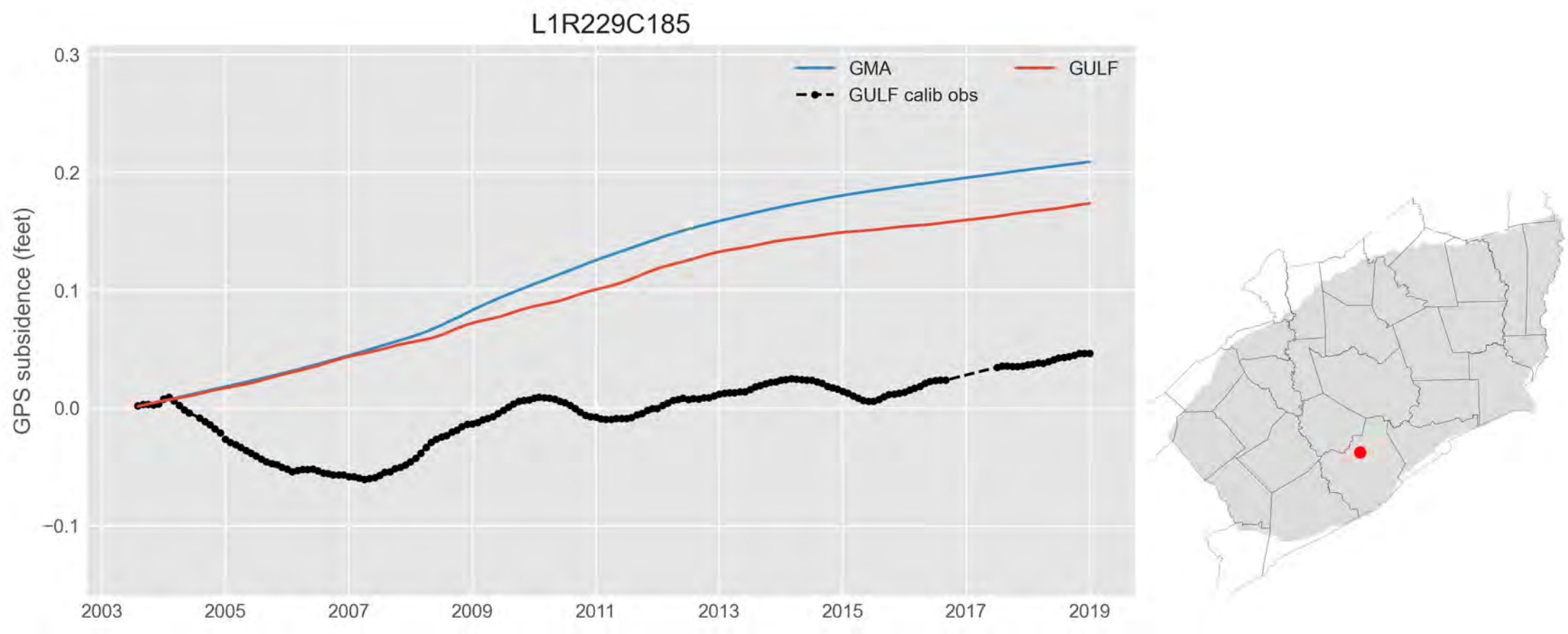
2015
2016
2017
2018
2019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GULF
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GPS subsidence (feet)
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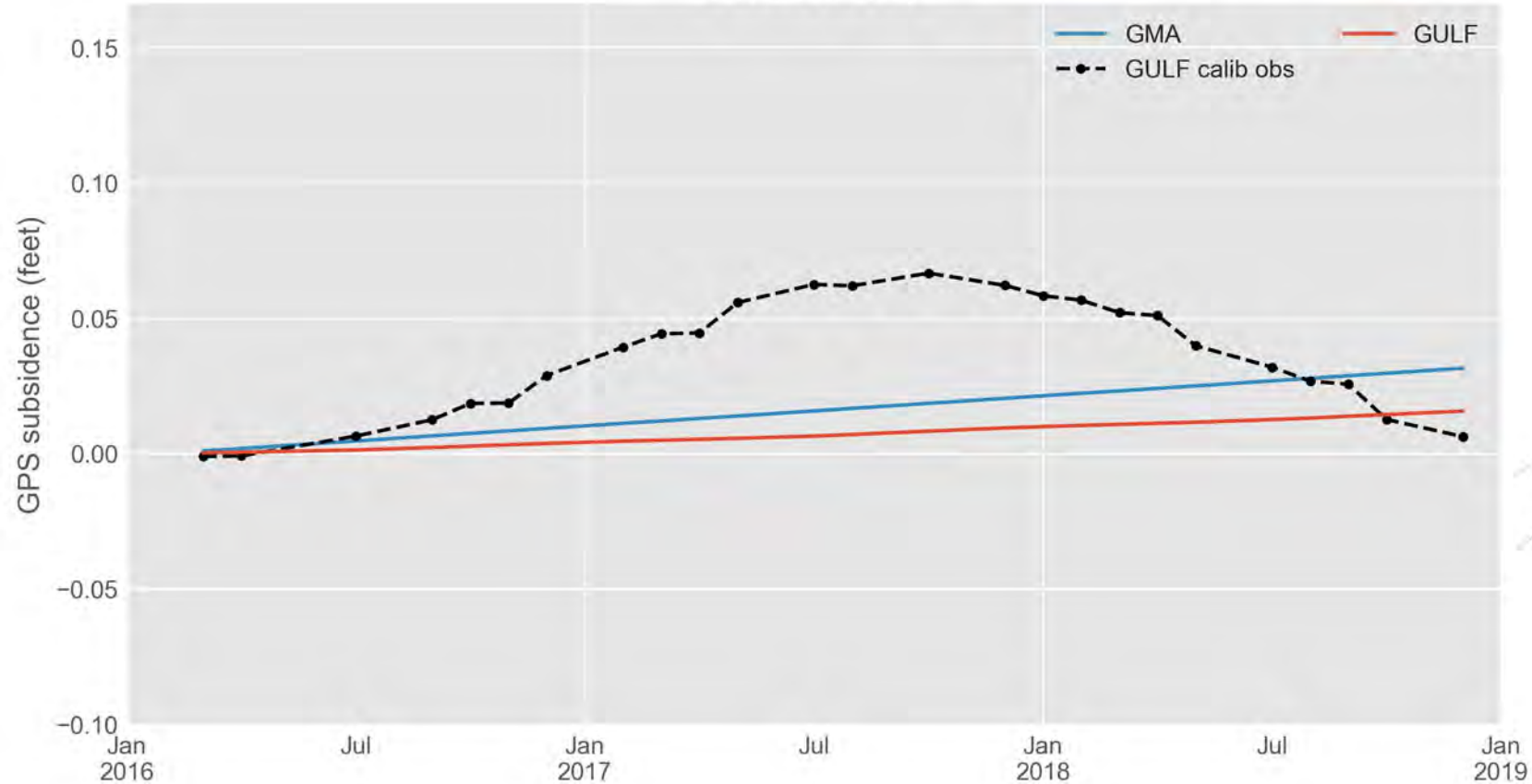
2005
2007
2009
2011
2013
2015
2017
2019

L1R229C196


GMA
GULF
GULF calib obs
GPS subsidence (feet)
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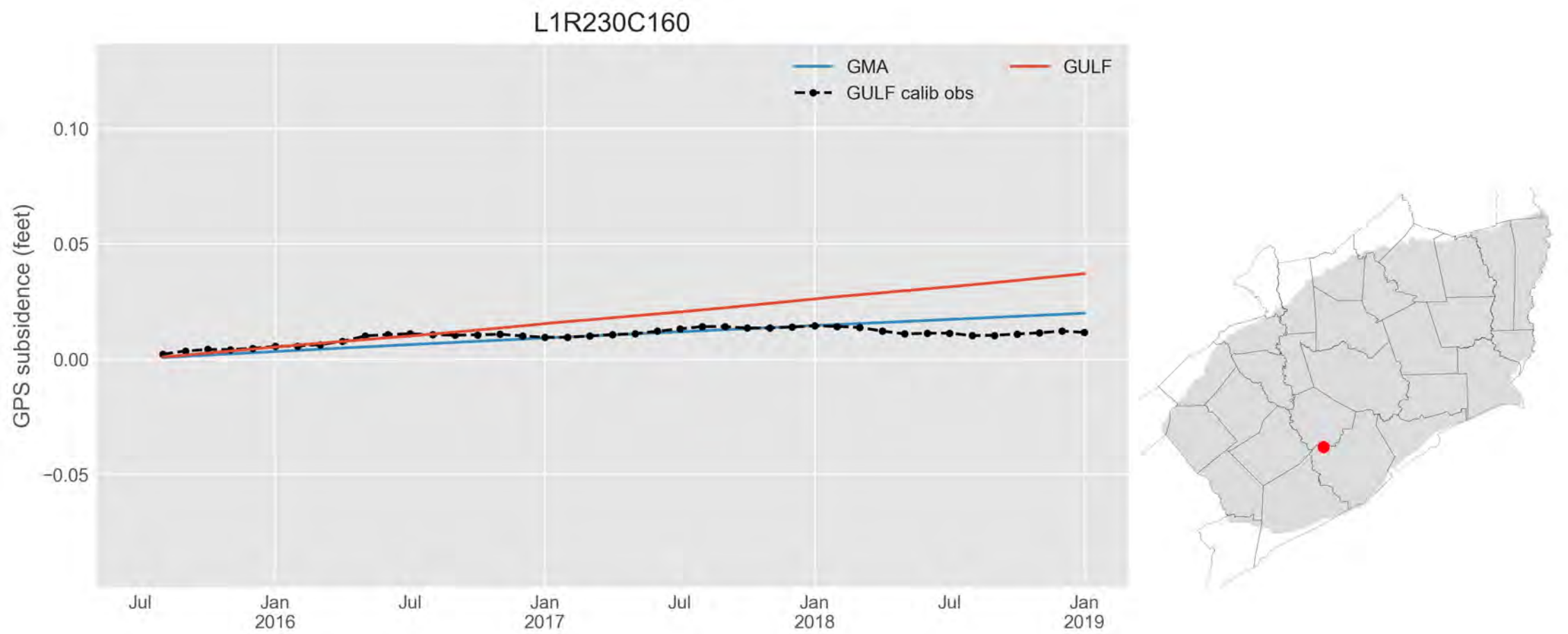
0.10
0.05
0.00
−0.05
−0.10
Jan 2016
Jul
Jan 2017
Jul
Jan 2018
Jul
Jan 2019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GULF
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0.05
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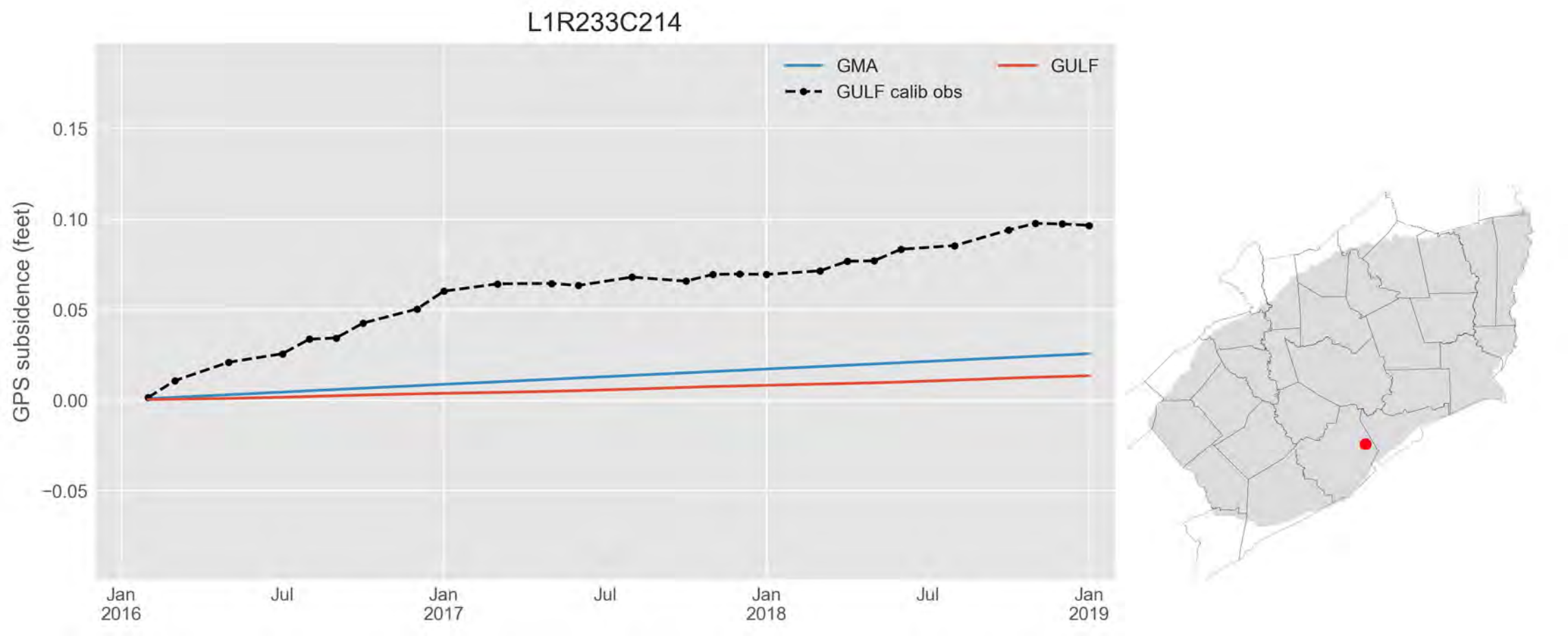
GPS subsidence (feet)
Jul
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019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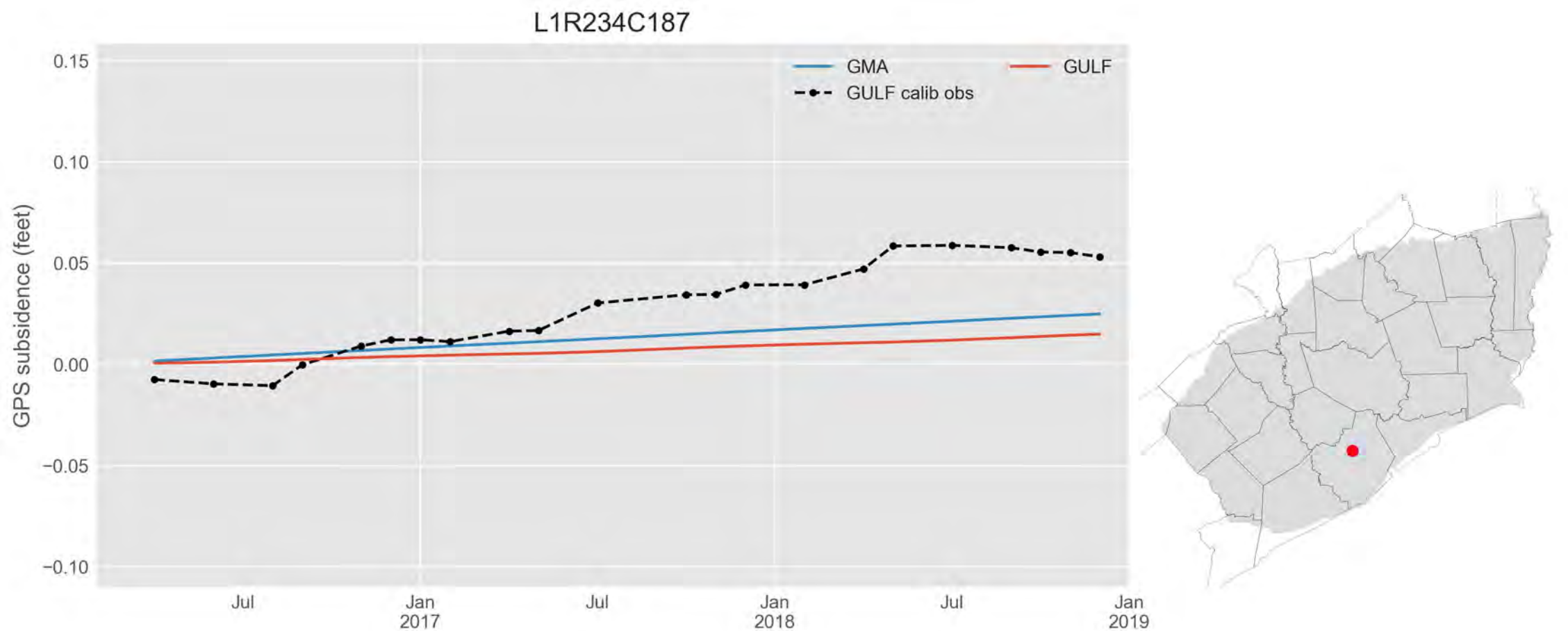
0.05
0.00
−0.05
Jan
2016
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019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GULF
GULF calib obs
GPS subsidence (feet)
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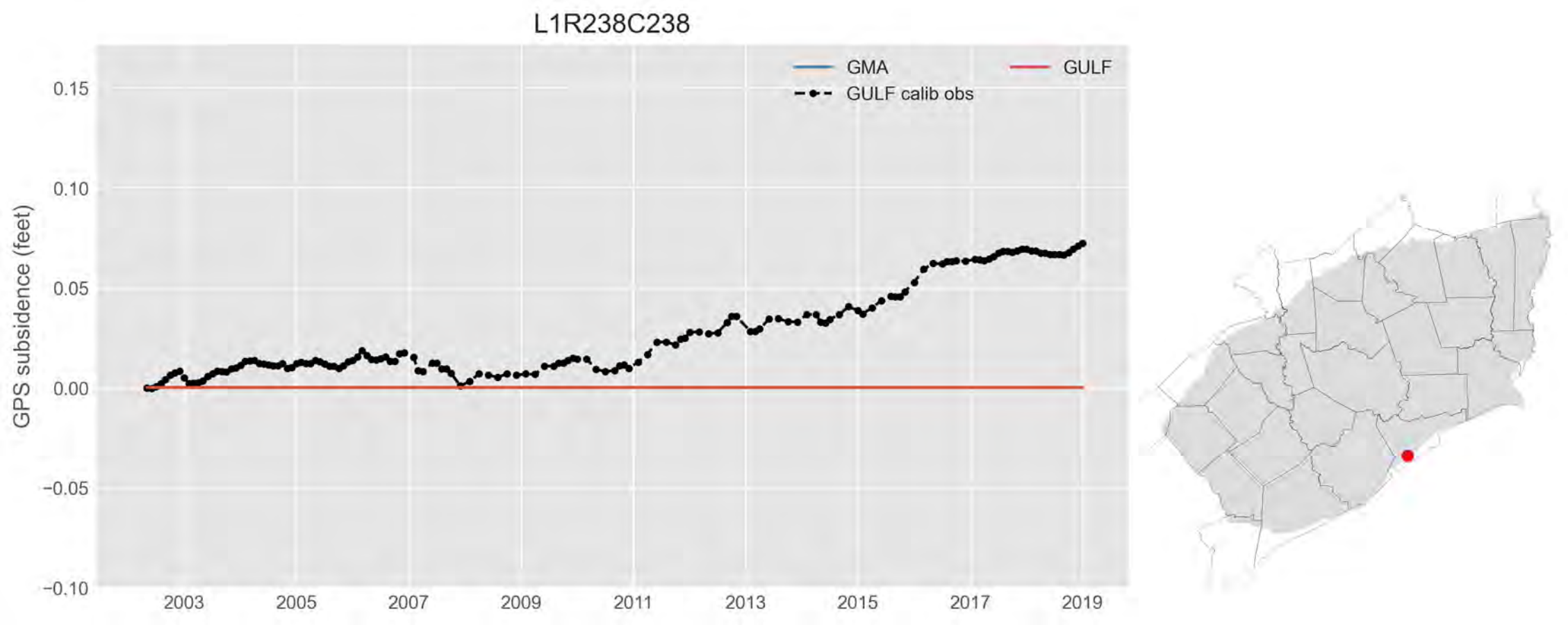
0.05
0.00
−0.05
−0.10
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019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GULF
GULF calib obs
GPS subsidence (feet)
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0.05
0.00
−0.05
−0.10
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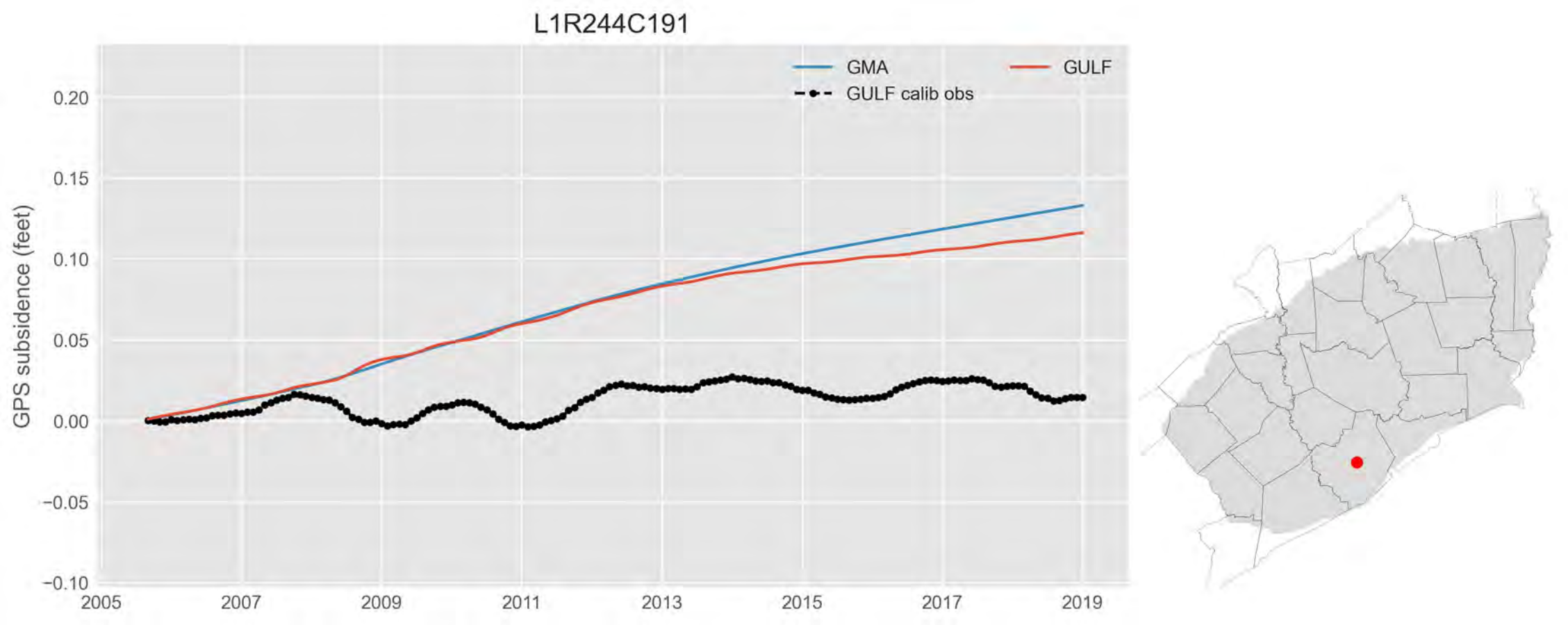
2005
2007
2009
2011
2013
2015
2017
2019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GULF
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GPS subsidence (feet)
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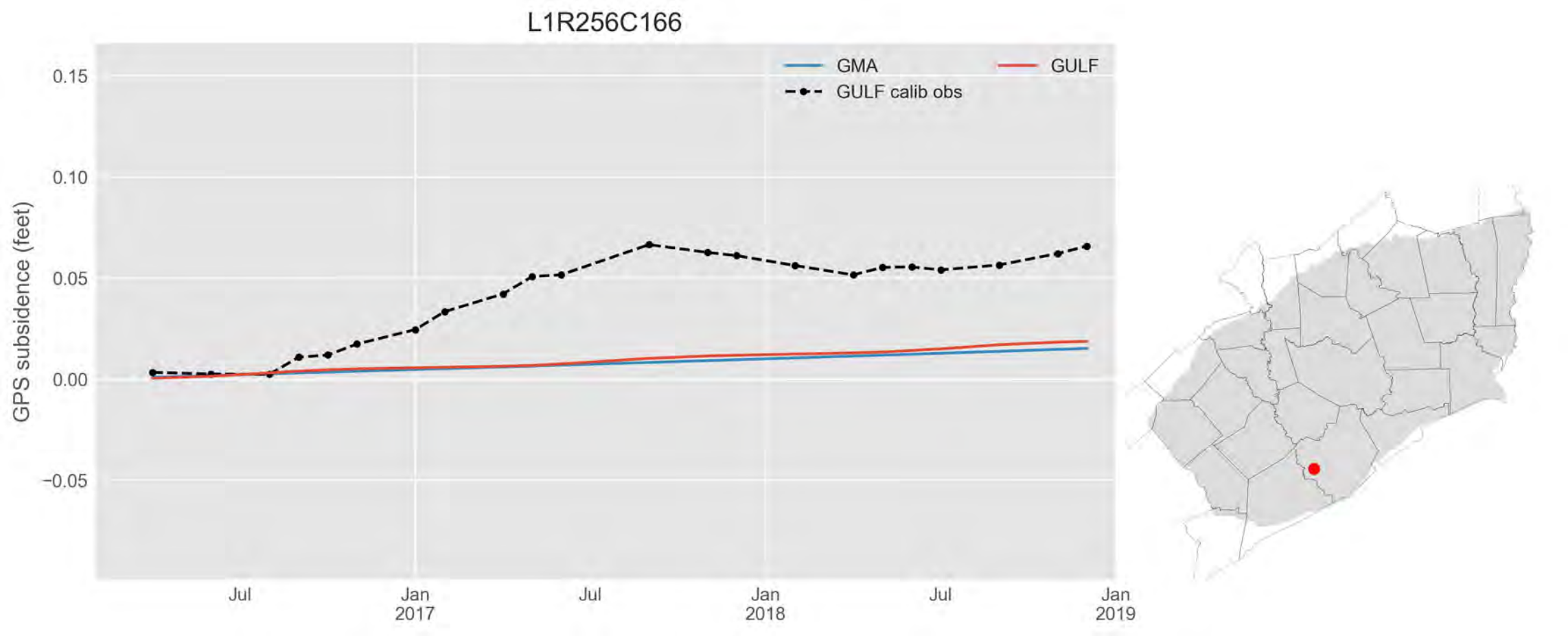
2005
2007
2009
2011
2013
2015
2017
2019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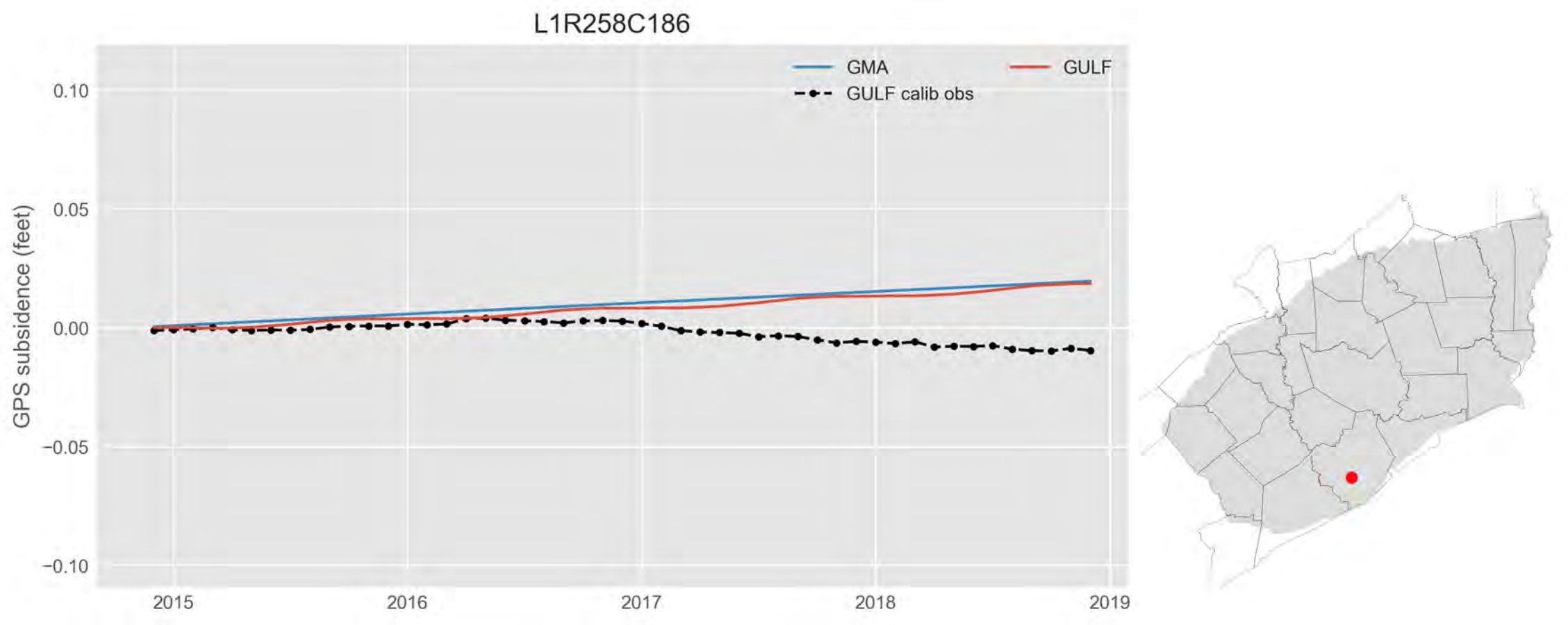
−0.05
Jul
Jan
2017
Jul
Jan
2018
Jul
Jan
2019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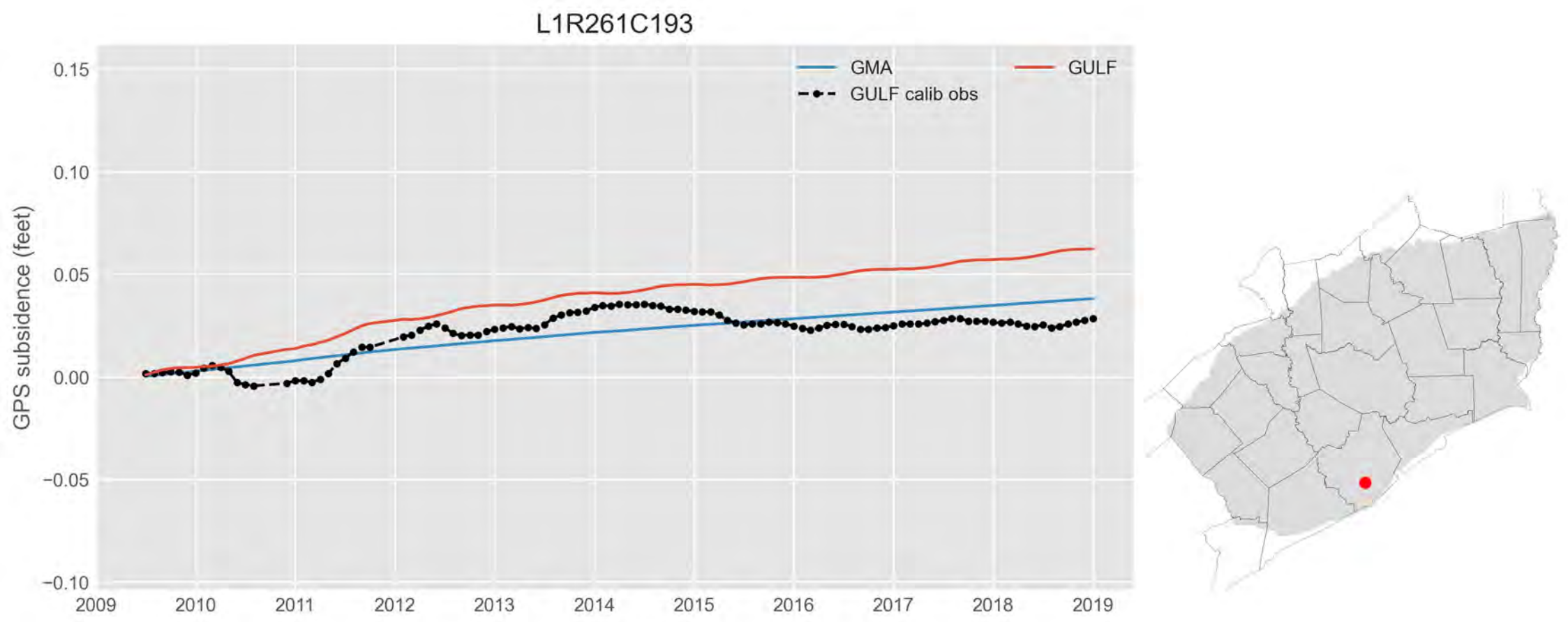
2016
2017
2018
2019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2012
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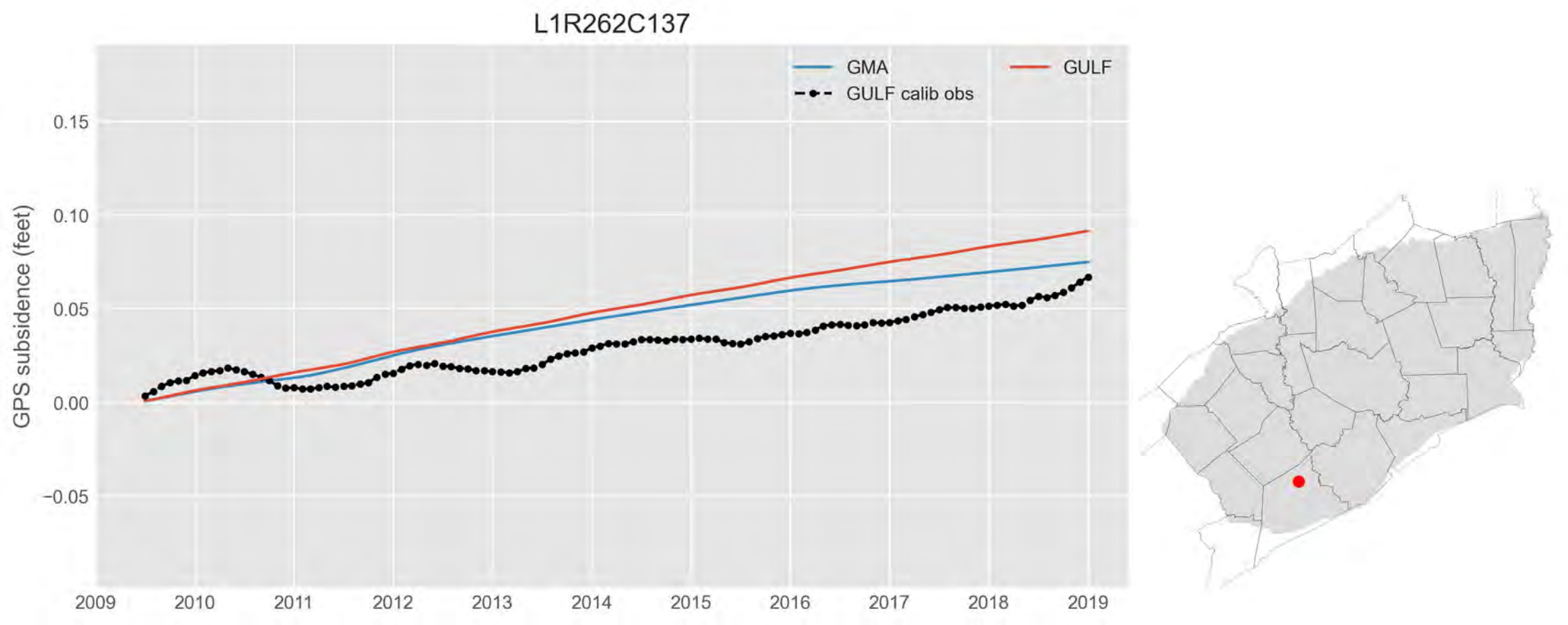
2016
2017
2018
2019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2012
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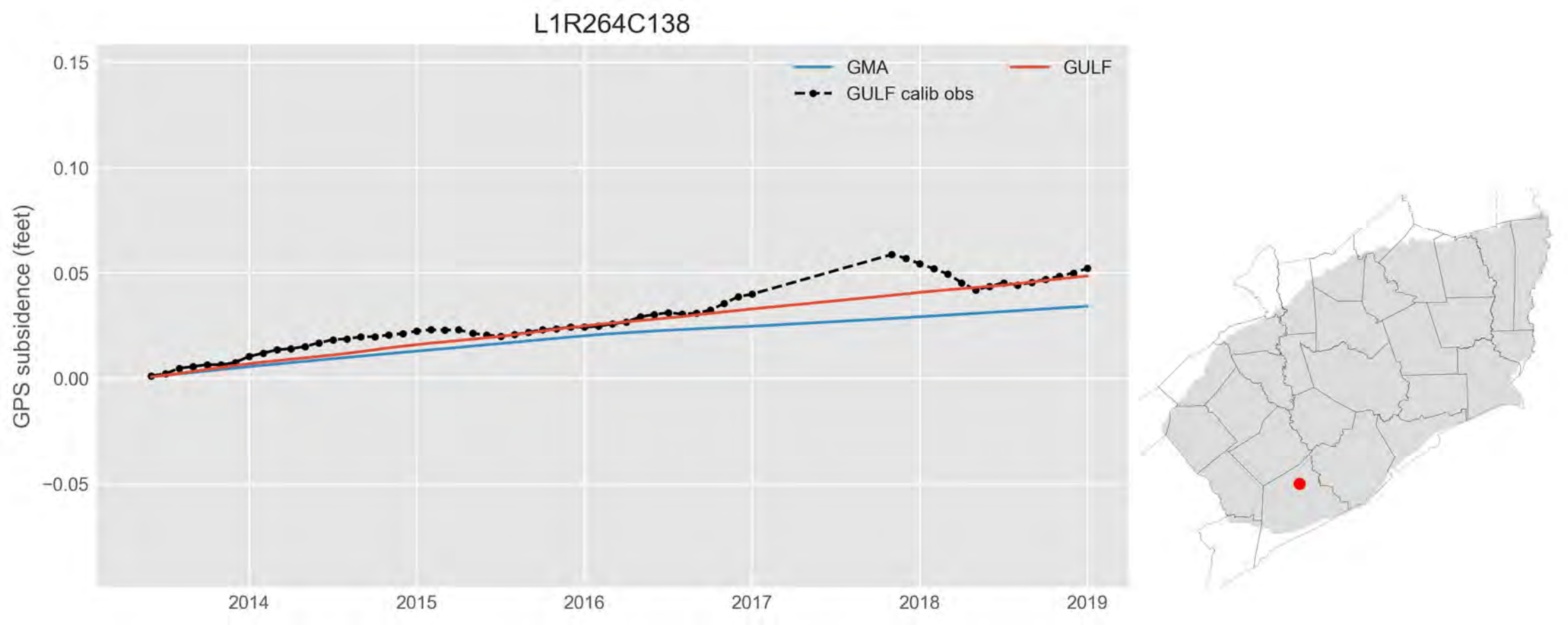
2018
2019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GULF
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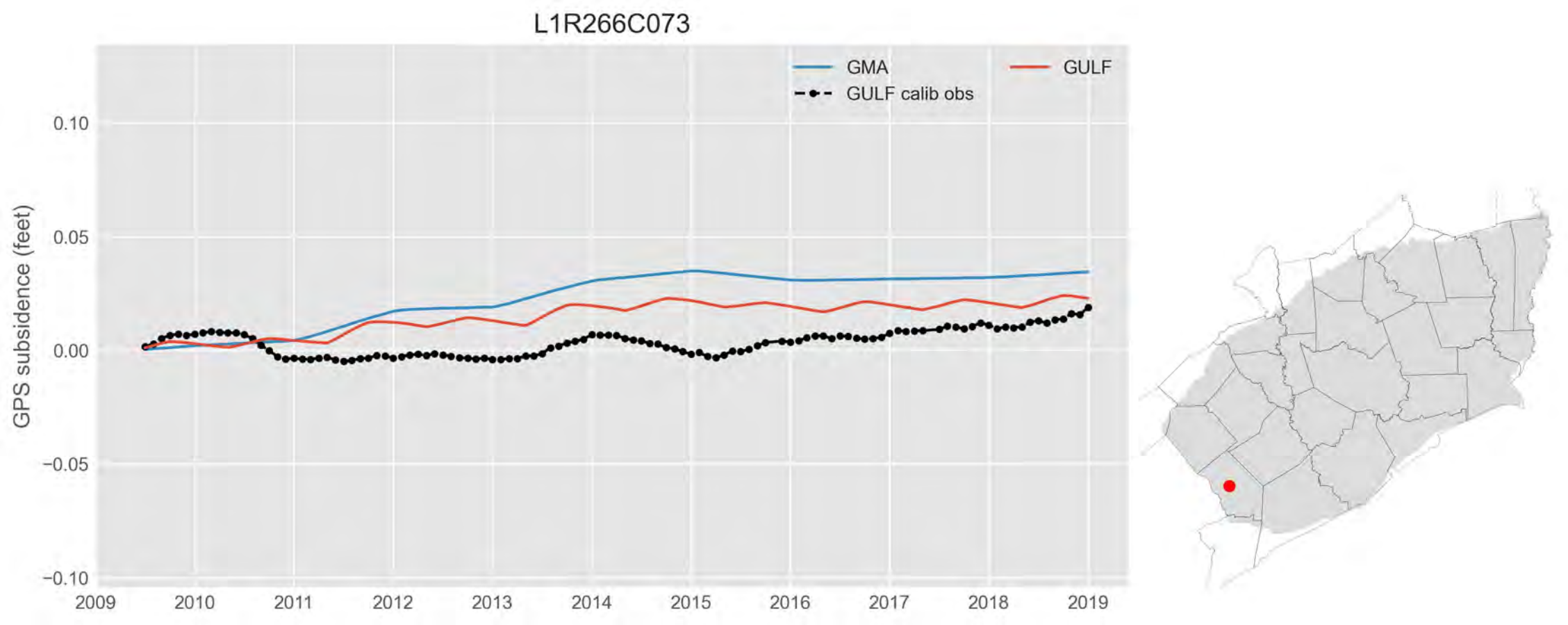
2016
2017
2018
2019


L1R266C073
GMA
GULF
GULF calib obs
GPS subsidence (feet)
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0.05
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−0.05
−0.10
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

Appendix 12 —
Review of Public Comments Received by the TWDB

Dr. Daryn Hardwick stated his email dated April 25, 2025 with the subject “Release of draft recalibration GAM for the northern portion of the Gulf Coast Aquifer System”:

> In 2024, the TWDB released a new groundwater availability model for the northern portion of the Gulf Coast Aquifer System (Ellis and others, 2023). This model had several model limitations. To address those limitations, the member districts in Groundwater Management Area 14 have submitted a request for the TWDB to release a recalibrated model (Keester and others, 2025) in a letter dated March 31, 2025. This recalibrated model aims to correct those limitations by:
>
> 1. Updating aquifer transmissivity using previously unpublished data
> 2. Updating groundwater pumping by disallowing pumping reduction during model calibration
> 3. Updating aquifer compaction using newly acquired compaction data from Lone Star Groundwater Conservation District
>
> As part of this model development process, the TWDB requires that the model and model report be sent to all interested stakeholders and that those stakeholders be provided the opportunity to review and provide comments to the TWDB.

Appendix 12 contains those public comments on the recalibrated model that were submitted to the TWDB along with responses to those comments.

Comments submitted by the Harris-Galveston Subsidence District

Comment 1. Data Documentation and Transparency. We support the incorporation of unpublished transmissivity data, which improves spatial coverage of key hydraulic properties. However, including these values without explaining the estimation methodology reduces transparency. Although it is understood from discussions with the report’s author that an analytical approach was applied, referencing LBG-Guyton’s March 2011 Technical Memorandum titled “Groundwater Update and Improvements,” this information has yet to be included in the report. Incorporating this background information will enhance transparency and credibility. Furthermore, a general review of the spatial distribution of transmissivity shows that most values are reasonable and align with expectations, although a discussion on interpolation methodologies was not provided. Nonetheless, several outliers and conflicting values exist. For example, transmissivity estimates for Keenan WSC Well #3 (TWDB SWN 60-43-514) differ substantially between GULF2023 (T = 20,945 gpd/ft) and the unpublished dataset (T = 35,242 gpd/ft). Clarifying how such discrepancies were resolved would improve the technical approach. Providing access to the original pumping test data would further support validation efforts.

Response 1: We have updated Section 2.1 to discuss the source of the unpublished data. As described in the section, while we refer to the data as unpublished, the technical memorandum with the data was included as an attachment to the June 2013 Regional Groundwater Update Project Report prepared for the Harris-Galveston Subsidence District, Fort Bend Subsidence District, and Lone Star Groundwater Conservation District (FNI and others, 2013). The original pumping test data evaluated and transmissivity results reported by LBG-Guyton Associates (2011) were not available for re-analysis for the GMA 14 Model.

Regarding the differences between transmissivity values in the GULF-2023 dataset relative to the GMA 14 Model dataset, the variations are due to analysis methods. Specifically, we observed differences in transmissivity estimates from evaluation of the pumping period data versus recovery period data. In addition, we also observed differences between evaluation of the pumping test data and estimates of transmissivity using specific capacity (that is, pumping rate divided by drawdown) data.

Using the example of Keenan WSC Well #3 (TWDB State Well Number 60-43-514), as noted in the comment, the GULF-2023 dataset reported an estimated transmissivity of 20,945 gallons per day per foot ("gpd/ft") whereas we reported an unpublished value of 35,242 gpd/ft. The TWDB Well Schedule reports that this well had a measured yield or pumping rate of 554 gallons per minute with 52.9 feet of drawdown after pumping 36-hours in 2003. The well contractor's August 2003 36-hour pumping test data in the TWDB Well Schedule also indicate the well had an initial static water level of 267.6 feet with a 36-hour pumping water level of 320.5 feet which equals a 36-hour specific capacity value of 10.4725 gallons per minute per foot of drawdown ("gpm/ft"). According to Driscoll (1986), one can use the specific capacity to estimate the transmissivity of a confined aquifer as follows:

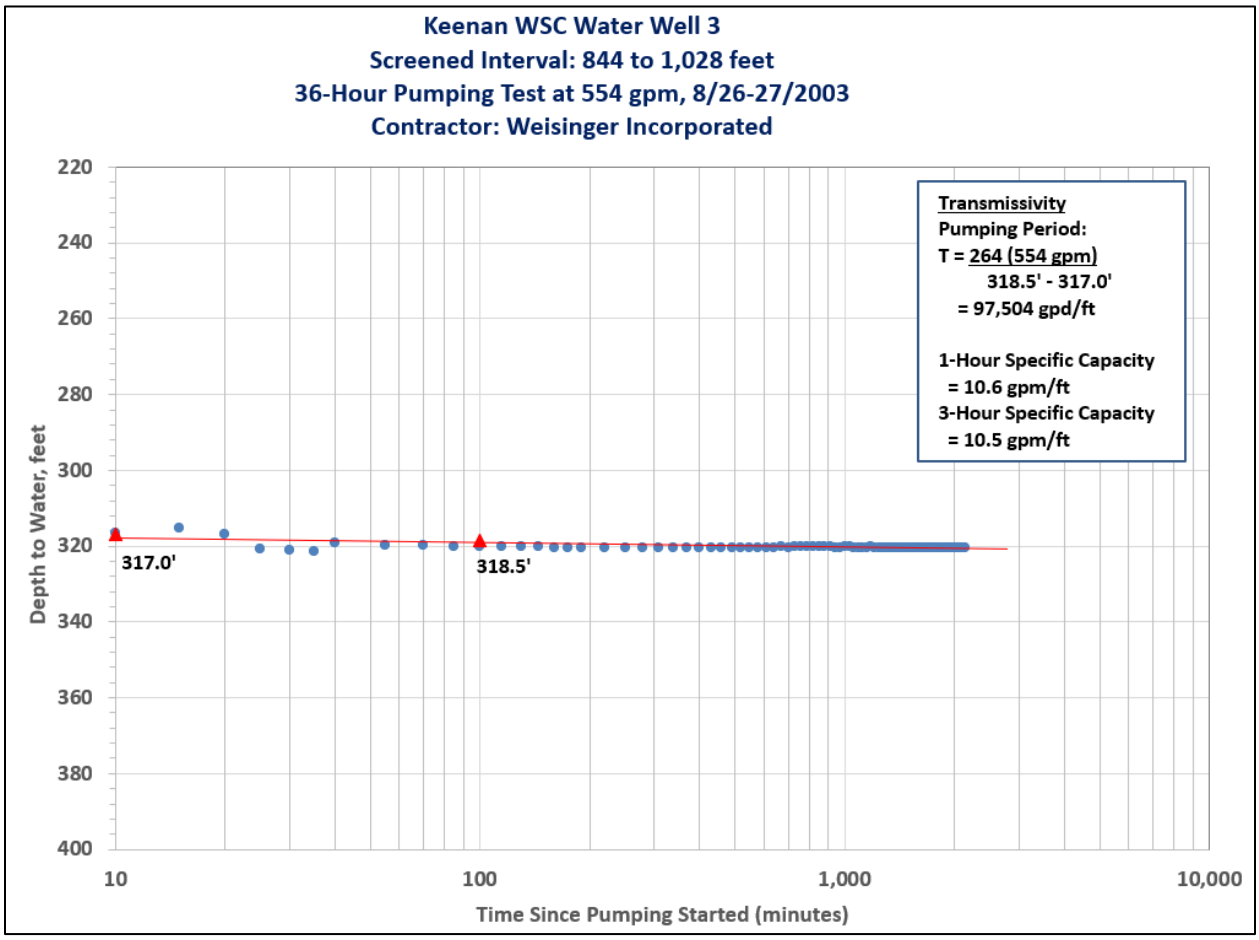
$$T = 2{,}000\frac{Q}{s} = 2{,}000 \times 10.4725 = 20{,}945\frac{gpd}{ft}$$

Where:

$T = Transmissivity\ in\ gpd/ft$

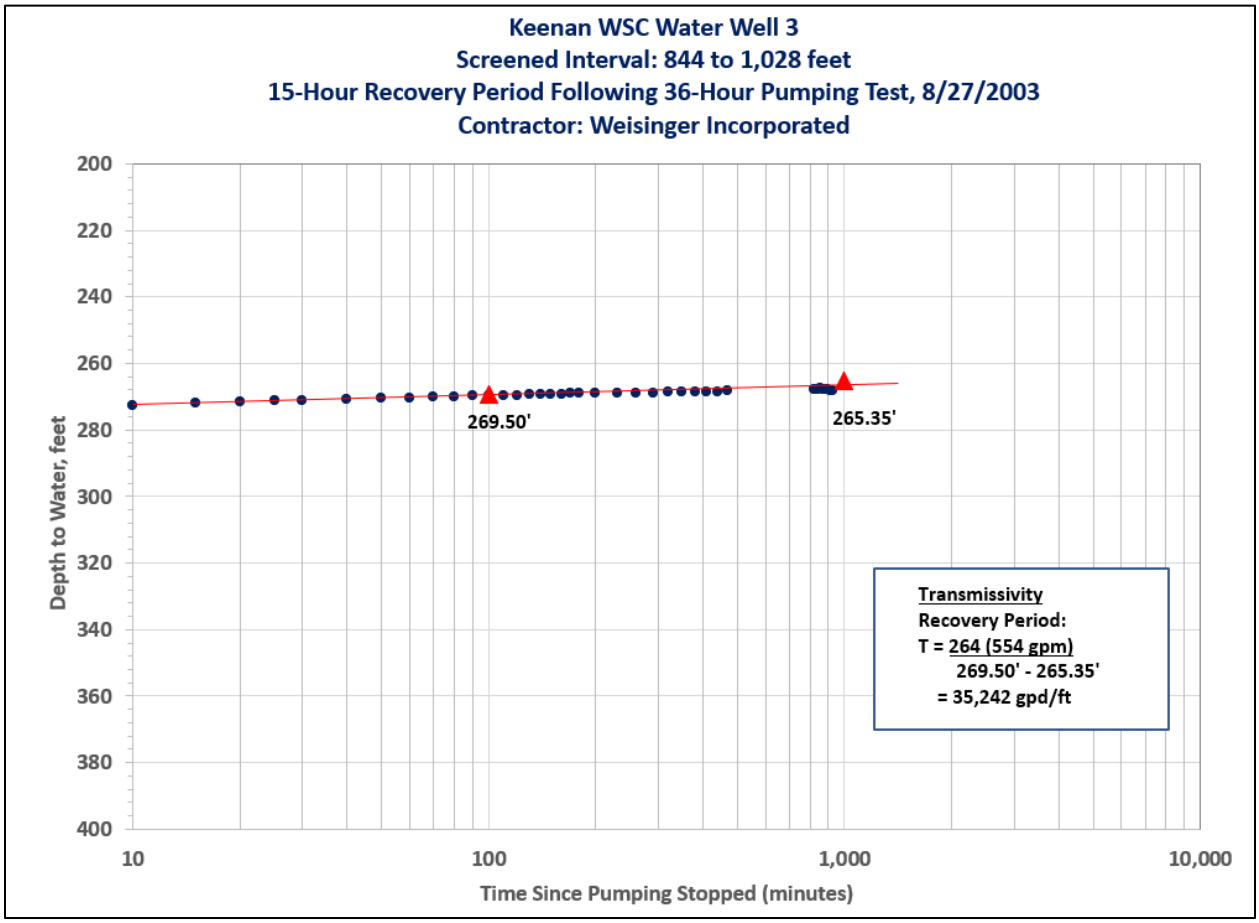
$\frac{Q}{s} = Specifice\ Capacity\ in\ gpm/ft$

Using the estimation approach of Driscoll (1986) is a valid approach when limited to specific capacity data. However, analysis of well pumping test data provides a more reliable estimate of transmissivity while also allowing for analysis of potential changes in aquifer hydraulic properties during the test. To verify the LBG-Guyton Associates (2011) analyses, we requested the pumping test data from the time of construction Keenan WSC Well #3. Pumping water level data collected by the water well contractor during the Keenan Well #3 36-hour continuous pumping test and the 15-hour recovery period that followed the 36-hour continuous pumping test were reviewed and plotted. Graphs of the semi-log plots of the pumping and recovery data are shown below.



The semi-log data plot above shows the pumping water level data from the Keenan WSC Well #3 36-hour continuous pumping test and the pumping levels are nearly flat. The estimated transmissivity value is 97,504 gpd/ft for the 36-hour continuous pumping period which is not a reasonable value based on the specific capacity value for Keenan WSC

Well #3 or pumping test data for other moderate capacity wells in west Montgomery County.



The semi-log data plot above shows the recovery water level data from the Keenan WSC Well #3 15-hour recovery period that followed the 36-hour continuous pumping test and the estimated transmissivity value is 35,242 gpd/ft. The transmissivity value of 35,242 gpd/ft estimated using the static water level data for the 15-hour recovery period is more reasonable for the Jasper Aquifer than what was estimated during the pumping period. The decision to include the recovery period transmissivity estimate in the dataset instead of the transmissivity from the pumping period or specific capacity was based on the result being from analysis of data collected during the pumping test itself rather than an estimate and professional experience from many other water wells completed in the Gulf Coast Aquifer System in Texas.

The difference in the transmissivity values of 20,945 gpd/ft and 35,242 gpd/ft are reasonable due to different methods applied. Different data

from the same well testing were used to calculate both estimates. It is not uncommon for differences in estimated transmissivity between specific capacity, pumping, and recovery test data to occur. For future conceptual model updates, it may be possible to work with the TCEQ staff to obtain pumping test records for public water supply wells for evaluation and verification of transmissivity values.

Comment 2. Non-Exempt Pumping in Montgomery County. A substantial portion of non-exempt pumping in Montgomery County was moved from the Chicot Aquifer to the Evangeline and Jasper Aquifers. The basis for this change was reported pumping from the Lone Star Groundwater Conservation District. Since this change has significant implications for transmissivity and prediction of drawdown and subsidence, it would be helpful for transparency if the underlying Lone Star Conservation District records could be provided as part of the GMA 14 model submittal.

Response 2: The GULF-2023 pumping for Montgomery County does not accurately reflect the Lone Star Groundwater Conservation District permitted groundwater production in Montgomery County.

Lone Star Groundwater Conservation District began permitting non-exempt groundwater production by aquifer with the 2020 Rule change. Work documented in a 2016 memorandum by LBG-Guyton Associates (Drabek and Seifert, 2016) as part of Task 2 of the Lone Star Groundwater Conservation District Strategic Planning Study provided the foundation for the aquifer designation of permitted wells and production by aquifer in Montgomery County. Lone Star Groundwater Conservation District continued to work to update the aquifer designation of the permitted and registered wells as aquifer assignment of permitted production began in 2021.

The Lone Star Groundwater Conservation District Phase 2 Subsidence Study (Keester and others, 2022) documents the differences in geologic structure of the GULF-2023 model (Young and Draper, 2020) compared to a common approach taken by groundwater professionals towards the delineation of water bearing units of the Gulf Coast Aquifer System in Montgomery and surrounding counties (Popkin, 1971; Gabrysch and Bonnet, 1974; 1976a; 1976b; Espey, Huston, and Associates, Inc., 1982; Carr and others, 1983; Kasmarek and Robinson, 2004; Kasmarek, 2013). The Gulf Coast Aquifer system is a complex system and practical hydrogeology concepts, including noticeable differences in lithology, permeability, static water levels, and water quality must all be considered

in delineating aquifer surfaces in combination with geophysical log interpretations. It should be noted that the aquifer surfaces within the GULF-2023 model are based on picks from geophysical logs and represent approximations of the extent of the aquifer surfaces and would benefit from improvement.

While Lone Star Groundwater Conservation District cannot speak for other groundwater conservation districts in the greater Houston area, Harris-Galveston Subsidence District did not contact Lone Star Groundwater Conservation District to discuss how these structural changes to the aquifer system ultimately used in GULF- 2023 would affect groundwater permitting. It is known that aquifer designations for some non-exempt wells permitted by Lone Star Groundwater Conservation District do not correlate accurately with the updated aquifer structure of the GULF-2023 model. It would be a very large undertaking to update Lone Star Groundwater Conservation District permitted and registered well aquifer designations related to non-exempt production based on the aquifer structure in the GULF-2023 model which differs from previous hydrogeologic interpretations of the Gulf Coast Aquifer System.

As discussed in Section 2.2.3.3, updates to the pumping were primarily to correct the distribution of pumping. The GMA 14 Model documentation discusses the pumping updates along with visual comparisons of the updates in the appendices. Pumping for the model is also included in the geodatabase provided with this report as discussed in response to comment 5. Updates and data provided are consistent with TWDB standards and similar to the documentation of the development of the MODFLOW well package for the northern Gulf Coast Aquifer (Oliver and Harmon, 2022).

No additional updates to the GMA 14 Model or documentation were necessary in response to this comment.

Comment 3. Fort Bend County Subsidence Predictions. Under a predictive scenario envisioning continued or increasing pumping in Fort Bend County, less compaction is predicted by the GMA14 model in Fort Bend County in all aquifers compared to the GULF2023 model, with the difference most significant in the Evangeline Aquifer. Less compaction appears to be driven by the lower relative compaction ratio (ratio of compaction to drawdown), primarily due to the lower interbed inelastic specific storage. In the GMA14 model, the inelastic specific storage in Fort Bend County is about three

times less than the inelastic specific storage in Harris County (note in the GULF2023 model, the difference in inelastic specific storage between the two counties is only about 17%). This decrease may be based on calibration to the only benchmark calibration target in Fort Bend County, which the GMA14 model simulates quite well. Despite this single calibration fit, and the overall value remaining in a plausible range for the parameter, this difference has a large effect on model predictions of subsidence in Fort Bend County. A more conceptually based justification for the change from Harris County (where calibration to subsidence is well-constrained) to Fort Bend County (where calibration to subsidence is far less constrained) would improve confidence in GMA14 model predictions for Fort Bend County.

Response 3: Our initial assignment of compaction parameters followed the depth-dependent conceptual model described in Section 2.3. Specifically, we assigned the initial values using the following equations:

- Initial porosity: Eq. 6
- Initial inelastic specific storage: Eq. 11
- Initial elastic specific storage: Eq. 12
- Initial vertical hydraulic conductivity: Eq. 14

Our depth-dependent approach to initializing the parameters is consistent with the stated approach of the GULF-2023 authors. For the GMA 14 Model, we did not deviate from the depth-dependent functions listed above for initialization of the parameters. However, to calibrate the model we used pilot points (see Figures 51 through 54) which were initialized using the depth-dependent parameters and then allowed to change during history matching per the values in Table 9. During the history matching process, land surface change data within Fort Bend County from GPS stations and benchmarks were used as calibration targets. The figures included in Appendix 8 illustrate the model's fit to the available GPS station and benchmark data.

One factor which accounts for the difference in the compaction parameters between the GMA 14 Model and GULF-2023 is how the numerical model is parameterized. In the "build_model.py" script published with GULF-2023, the authors included upper and lower bounds as part of the initialization along with a subsequent multiplier on the values where as our approach was as stated above. For example, here is GULF-2023 function for the inelastic specific storage:

```
def sskv(depth, lb, ub):
    return np.max((np.min((0.0125 * depth ** -0.699, ub)), lb))
```

```
pkg_data['ssv_cc'] = pkg_data.mdepth.apply(lambda x: sskv(x, 1e-4, 6e-3))
pkg_data.loc[:, "ssv_cc"] *= 0.91
```

The above code uses the midpoint depth of a cell to calculate a possible inelastic specific storage for the cell. If the calculated value is between 0.0001 and 0.006, the value is applied to the cell otherwise the lower or upper bound is applied. Once the value is applied to the cell, each cell is multiplied by 0.91 for the final value. Essentially, the bounds set as part of the GULF-2023 package initialization placed a lower limit that is not necessarily supported by the referenced conceptual model.

Another factor affecting the difference in compaction parameters is the geographical location of Fort Bend County relative to Harris County and the dip of the aquifer units. Portions of Harris County are more updip than the northern boundary of Fort Bend County. We would anticipate the aquifer units in those more updip areas to be shallower and have higher parameter values based on the depth-dependent parameter equations.

Finally, since we have a limited amount of data regarding the geotechnical properties of the fine-grained sediments, we must apply our interpretation of the data consistently and then allow other data to inform our understanding. For the GMA 14 Model, we applied a consistent depth-dependent calculation derived from the available data. We then used available data on land surface changes from GPS stations and benchmarks to guide how those parameters may need to change spatially during model calibration. We then applied the ensemble approach to calibration to aid our understanding of the uncertainty associated with the parameters based on the available data.

Our approach is consistent with the available data and conceptual model. The data through the application of PEST++ guided the calibration of the parameters across the model domain which resulted in the differences noted between Fort Bend and Harris counties.

No additional updates to the GMA 14 Model or documentation were necessary in response to this comment.

Comment 4. Text-to-Figure Inconsistencies and Figure Data Omission. Text in Section 2.1 refers to unpublished pumping data for the Evangeline, Jasper, and Catahoula aquifers. However, the figures provided pertain to the Chicot, Evangeline, and Jasper aquifers. The inclusion of the Chicot and omission of the Catahoula are not explained

and contradict the narrative, introducing confusion regarding which datasets informed the new interpolation results. Additionally, Figure 2 of Keester and others (2025), which depicts the spatial distribution of transmissivity data, omits numerous published data points previously included in the GULF2023 model (e.g., TWDB SWNs 6050615, 6050204, 6030908, etc.). These data points reappear in Figures 3-5, raising questions about what data were used during interpolation. Clarifying this inconsistency is important for understanding the data integration and interpolation workflow.

Response 4: The unpublished data only included pumping tests from the Evangeline, Jasper, and Catahoula aquifers. Figures 3 through 6 represent the initial interpolated transmissivity surface from the unpublished and published data shown in Figure 2.

Figure 2 has been updated to include all aquifer test data utilized in the development of the transmissivity surfaces. The initial interpolated transmissivity surface for the Catahoula has been added as Figure 6.

Comment 5. Documentation and Deliverables per TWDB GAM Standards. GAM standards require that all conceptual model components be thoroughly documented and made available to the public upon completion of the project, including source and derived information from the development of the conceptual model in an ESRI ArcGIS Pro File geodatabase. Based on discussions with the report's author, we understand that this geodatabase is still under development. Once finalized, we request that this information be made available for additional review.

Response 5: We have compiled the data into the TWDB GAM geodatabase format and submitted it with this report.

Comments submitted by Benjamin Slotnick, PhD

Comment 6. Comment submitted via email with the subject “Concern Regarding Use of Outdated Groundwater Data in GMA 14 Modeling by Lone Star Groundwater Conservation District.” Reproduced text of the email follows:

> Dear Members of the Texas Water Development Board,
>
> I am writing to express serious concern regarding the data inputs being used by the Lone Star Groundwater Conservation District (LSGCD) in its contributions to the Groundwater Management Area 14 (GMA 14) planning process. Specifically, it has come to my attention that the well water level data provided by LSGCD only extends through the year 2019, with no updates from the subsequent years included in the current modeling efforts here in 2025.

This omission, whether intentional or unintentional, is deeply problematic. The exclusion of data from 2020 onward—years that have seen significant changes in groundwater use and aquifer conditions—means that the resulting model will reflect conditions as they were in 2019, not as they are today. Notably, 2019 represented one of the shallowest aquifer levels since 2012, which could unintentionally or otherwise present an overly optimistic picture of aquifer health. This misrepresentation risks undermining the accuracy and credibility of the model and, by extension, the effectiveness of groundwater management strategies derived from it.

Accurate and up-to-date data is essential for responsible water planning. Modeling based on outdated information fails to capture the current stress on aquifers and may lead to decisions that jeopardize long-term water availability and regional sustainability. It is imperative that the most recent well monitoring data be incorporated into the GMA 14 model to ensure it reflects present-day realities.

I respectfully urge the Board to:

- Require LSGCD and other contributing entities to include the most current well water level data available, ideally through 2023 or later, in all groundwater availability models used in GMA 14 planning.
- Reevaluate any draft Desired Future Conditions (DFCs) or Managed Available Groundwater (MAG) estimates that rely on incomplete or outdated datasets.
- Ensure transparency and scientific rigor in the regional planning process by mandating regular updates and public disclosure of groundwater monitoring data.

Thank you for your attention to this matter and for your continued commitment to safeguarding Texas’s groundwater resources through sound science and policy.

Sincerely,
Benjamin Slotnick, PhD
San Jacinto River Authority GRP Committee Member
Montgomery County MUD89 Director

Response 6: The USGS submitted a proposal on September 25, 2019 to the HGSD to update the model of the Gulf Coast Aquifer System. On February 28, 2020 the TWDB executed an agreement with the HGSD that the updated model would meet the GAM standards. This updated model became known as GULF-2023 which was released by the TWDB as the

GAM for the northern portion of the Gulf Coast Aquifer System in February 2024. The TWDB considers the GMA 14 Model as a recalibration of the GULF-2023 model.

As a recalibration, the GMA 14 Model relies heavily on GULF-2023. We made no changes to the GULF-2023 structure or calibration period. The GMA 14 Model was intentionally updated to focus changes on only the items identified in comments on the draft GULF-2023 that were most relevant to the model's applicability to GMA 14 joint planning. The base model for the GMA 14 Model (namely, GULF-2023) was completed approximately 4 years after HGSD entered the agreement with the TWDB and about 5 years after 2018.

The LSGCD Board approved work to update the model on May 14, 2024, the updated model was presented to GMA 14 on February 3, 2025, with submission of the model and documentation to the TWDB on March 31, 2025. That is, LSGCD completed the draft GMA 14 Model in less than 9 months with submission less than 2 months after presentation to GMA 14. The update was completed during this period in part because many features of GULF-2023, including the end of the calibration period, were not changed.

We understand that there are many more updates to the groundwater flow model that can occur. However, the GMA 14 Model does provide a reasonable representation of the groundwater flow system based on the history matching of the model. The end of the calibration being 2018 captures many stresses on the aquifer system. The calibration period covers more than 120 years beginning in 1896 and is sufficient for the planning period extending through 2080. Future model updates will extend the calibration period. For the GMA 14 joint planning process, having a model that is more applicable to the GMA's considerations was the primary concern and the GMA 14 Model meets the GMA's needs.

No additional updates to the GMA 14 Model or documentation were necessary in response to this comment.

Comment 7. Comment submitted via email with the subject "Concern Regarding Temporal Limitations in GMA 14 Model and Implications for Groundwater Planning." Reproduced text of the email follows:

Dear Members of the Texas Water Development Board,

I am writing to express concern regarding the temporal limitations of the groundwater data used in the recently released 2025 GMA 14 Groundwater Availability Model. While the model represents a significant technical effort and includes valuable updates to aquifer properties and compaction parameters, it is important to highlight that the model's calibration and simulation period ends in 2018, with no incorporation of groundwater level or pumping data beyond that year.

This limitation is clearly stated throughout the model documentation. For example, the time discretization summary (Section 3.1.1, Table 7) confirms that the model simulates conditions only through December 31, 2018. Similarly, the hydrographs, calibration targets, and water budget analyses all reflect data ending in 2018. While the model was finalized in 2025, it does not include any well monitoring data or pumping records from the past six years.

This poses a significant issue for stakeholders and planners. The year 2018 represents a period of relatively shallow aquifer levels—among the highest since 2012—meaning the model may unintentionally present an overly optimistic picture of aquifer health. As a result, the model's outputs, including simulated drawdowns, compaction, and water budgets, are not representative of current conditions in 2025. This is particularly concerning given the substantial changes in groundwater use, regulatory policy, and drought conditions that have occurred since 2019.

The absence of recent data undermines the model's utility for setting Desired Future Conditions (DFCs) and estimating Managed Available Groundwater (MAG). Without incorporating the most recent monitoring data, the model risks producing conclusions that are outdated and potentially misleading, especially in areas like Montgomery County where groundwater stress has intensified.

I respectfully urge the Board to:

- Require the inclusion of groundwater level and pumping data through at least 2023 in any model used for GMA 14 joint planning.
- Clearly disclose the model's temporal limitations in all public-facing documentation and planning materials.
- Encourage GMA 14 and its member districts to update the model with current data before finalizing DFCs or MAG estimates.

Thank you for your attention to this matter and for your continued commitment to ensuring that Texas's groundwater planning is based on the most current and accurate data available.

Sincerely,
Benjamin Slotnick, PhD
San Jacinto River Authority GRP Committee Member
Montgomery County MUD89 Director

Response 7: See Response 6. In addition, while LSGCD can update water level and pumping data within Montgomery County, for a robust regional model development of pumping estimates and locations outside of Montgomery County is far beyond what LSGCD can reasonably accomplish within the relatively short period that was available to update and recalibrate GULF-2023.

No additional updates to the GMA 14 Model or documentation were necessary in response to this comment.

Comment submitted by Paul Cote

Comment 8. Comment submitted via email with the subject “Clean Water Must Come Before Old Models and Empty Promises.” Reproduced text of the email follows:

Here are comments for the 2025 GMA 14 Model and the 2026 Region H Water Plan.

Clean Water Must Come Before Old Models and Empty Promises

In Texas, nothing is more foundational than water. It flows beneath our feet and through every vein of our community's growth. Yet in Montgomery County, where cities like Conroe face real-time water shortages and moratoriums on new development, the public is told that water policy is being guided by the “best available science,” even as our water management authorities rely on models and data from before 2018.

The Lone Star Groundwater Conservation District (LSGCD) promotes “Managing Nature's Precious Resource While Protecting Property Rights, Balancing Conservation and Development, and Using the Best Available Science.” That sounds good, noble, even. However, when the rubber meets the road, that statement raises a simple yet pointed question: How can this be the “best available science” when the LSGCD data in the 2025 GMA 14 Model Documentation is dated 2018 or before?

Since 2018, Montgomery County’s water picture has undergone significant changes. Cities are issuing building moratoriums, and water utilities currently utilizing surface water are seeking more; moreover, an increasing number of

groundwater-only utilities are prioritizing the need for surface water in addition to groundwater. Groundwater levels are in observable significant decline according to the 2023 USGS SIR. And yet, the regional planning process's official documentation, as used in the 2026 Region H Water Plan Initial Planning Proposal (IPP) under GMA 14, is still based on outdated hydrological models and assumptions that predate the explosive growth and aquifer stress of the last seven years.

This isn't just a bureaucratic oversight. It's a fundamental threat to clean, dependable, potable water in one of the fastest-growing regions in Texas. When science is outdated, decisions become misaligned with reality. And in a drought-prone state like ours, misalignment means real consequences for families, businesses, farms, and entire communities.

Property rights are sacred in Texas. But so is the right to drinkable, available water. When these rights are in tension, such as when over-pumping threatens shared aquifers or outdated models justify unsustainable permits, conservation cannot take a back seat. The water plan must be rooted in facts, not aspirations. And the science must reflect today, not yesterday.

It's time for the LSGCD and the regional planners of GMA 14 to stop defending old data and embrace new realities. The people of Montgomery County deserve a water plan grounded in current science, not political slogans about the importance of property rights. We deserve real conservation. We deserve transparency. And most of all, we deserve water, not just today, but tomorrow.

Until that happens, one question must echo across every Montgomery County city council, township, commissioners court, special district, state legislator, and Regional Water Planner:

"How is this the best available science?"

If the answer isn't straightforward and current, then the policy isn't defensible, and the future isn't safe.

Additionally, please also note that the 2021 Region H Water Plan, which incorporates the GAM Run 17-030 MAG model, includes data up to approximately 2016 or 2017. Today, the 2026 Region H Water Plan only includes data up to 2018. Where is the 2019-2024 GAM data for the 2026 Region H Water Plan?

Additional Questions for LSGCD

1. How many acre-feet of groundwater have been withdrawn each calendar year, per aquifer, within the boundaries of LSGCD, beginning in 2017 and continuing through 2024?
2. Please provide a list of new property developments or subdivisions for which the District has been collecting a fee since 2017.
3. When will a more recent and realistic data set (2019 to present), which is available, be used, as the population of Montgomery County has grown by over 40% in some areas since 2018? Using data from 2018 and earlier is inadequate and misleading to county decision-makers and taxpayers.
4. Please post all the data collected or produced for the New Caney coring study online.

I'm looking forward to these responses and ask that the answers to questions 1 and 2 be included in the LSGCD District Annual Report in the future.

Paul Cote

Response 8: See Responses 6 and 7. In addition, for clarification, the reference GAM Run 17-030 MAG uses the Houston Area Groundwater Model which was calibrated through 2009 not 2016 or 2017 as stated.

No additional updates to the GMA 14 Model or documentation were necessary in response to this comment.