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Water-Level Data for the Albuquerque Basin and Adjacent Areas, Central New Mexico, Period of Record Through September 30, 2015

Data Series 1025

U.S. Department of the Interior
U.S. Geological Survey

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SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Director

U.S. Geological Survey, Reston, Virginia: 2016

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	4,047	square meter (m^2)

Datum

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Supplemental Information

Water year is defined as beginning October 1 and continuing through September 30 of the following year.

Water-Level Data for the Albuquerque Basin and Adjacent Areas, Central New Mexico, Period of Record Through September 30, 2015

By Joseph E. Beman and Christina F. Bryant

Abstract

The Albuquerque Basin, located in central New Mexico, is about 100 miles long and 25–40 miles wide. The basin is hydrologically defined as the extent of consolidated and unconsolidated deposits of Tertiary and Quaternary age that encompasses the structural Rio Grande Rift between San Acacia to the south and Cochiti Lake to the north. Drinking-water supplies throughout the basin were obtained solely from groundwater resources until December 2008, when the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) began treatment and distribution of surface water from the Rio Grande through the San Juan-Chama Drinking Water Project. A 20-percent population increase in the basin from 1990 to 2000 and a 22-percent population increase from 2000 to 2010 may have resulted in an increased demand for water in areas within the basin.

An initial network of wells was established by the U.S. Geological Survey (USGS) in cooperation with the City of Albuquerque from April 1982 through September 1983 to monitor changes in groundwater levels throughout the Albuquerque Basin. In 1983, this network consisted of 6 wells with analog-to-digital recorders and 27 wells where water levels were measured monthly. The network currently (2015) consists of 124 wells and piezometers. (A piezometer is a specialized well open to a specific depth in the aquifer, often of small diameter and nested with other piezometers open to different depths.) The USGS, in cooperation with the ABCWUA, currently (2015) measures and reports water levels from the 124 wells and piezometers in the network; this report presents water-level data collected by USGS personnel at those 124 sites through water year 2015 (October 1, 2014, through September 30, 2015).

Introduction

The Albuquerque Basin, located in central New Mexico, is about 100 miles long and 25–40 miles wide (fig. 1). The basin is defined as the extent of consolidated and unconsolidated deposits of Tertiary and Quaternary age that encompasses the structural Rio Grande Rift within the basin (Thorn and others, 1993). The basin is approximately bisected by the southward-flowing Rio Grande, the only perennial stream extending through the length of it. The study area, which includes the Albuquerque Basin and adjacent areas, extends from just upstream of Cochiti Lake south to San Acacia and from Tijeras Canyon west to near the intersection of Interstate 40 and the Bernalillo-Cibola County line.

In 2000, the population of the Albuquerque Basin was about 690,000 (Bartolino and Cole, 2002). According to 2010 U.S. Census Bureau data, the 2010 population was about 840,000 (U.S. Census Bureau, 2011a; calculated as sum of population for census tract centers within the basin). The majority of the population is concentrated within the city limits of Albuquerque, which had a population of 448,600 in 2000 (U.S. Census Bureau, 2001) and 545,852 in 2010 (U.S. Census Bureau, 2011b). The basin population increased about 20 percent from 1990 to 2000 (Thorn and others, 1993; Bartolino and Cole, 2002) and about 22 percent from 2000 to 2010 (U.S. Census Bureau, 2011a). Prior to 2008, demand for groundwater may have increased as population increased because drinking-water supplies throughout the Albuquerque Basin were obtained solely from groundwater sources. In December 2008, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) began treatment and distribution of surface water from the Rio Grande to their customers through the San Juan-Chama Drinking Water Project.

An initial network of wells was established by the U.S. Geological Survey (USGS) in cooperation with the City of Albuquerque from April 1982 through September 1983 to monitor changes in groundwater levels throughout the Albuquerque Basin. In 1983, this network consisted of 6 wells with analog-to-digital recorders and 27 wells where water levels were measured monthly. Since the initial installation, additional wells and piezometers have been added to the network, and currently (2015), the network consists of 124 wells and piezometers (table 1). (A piezometer is a specialized well open to a specific depth in the aquifer, often of small diameter and nested with other piezometers open to different depths.) Of these wells and piezometers, 69 are equipped with continuously recording data loggers, and 55 are measured with a steel or electric tape semiannually, quarterly, or irregularly.

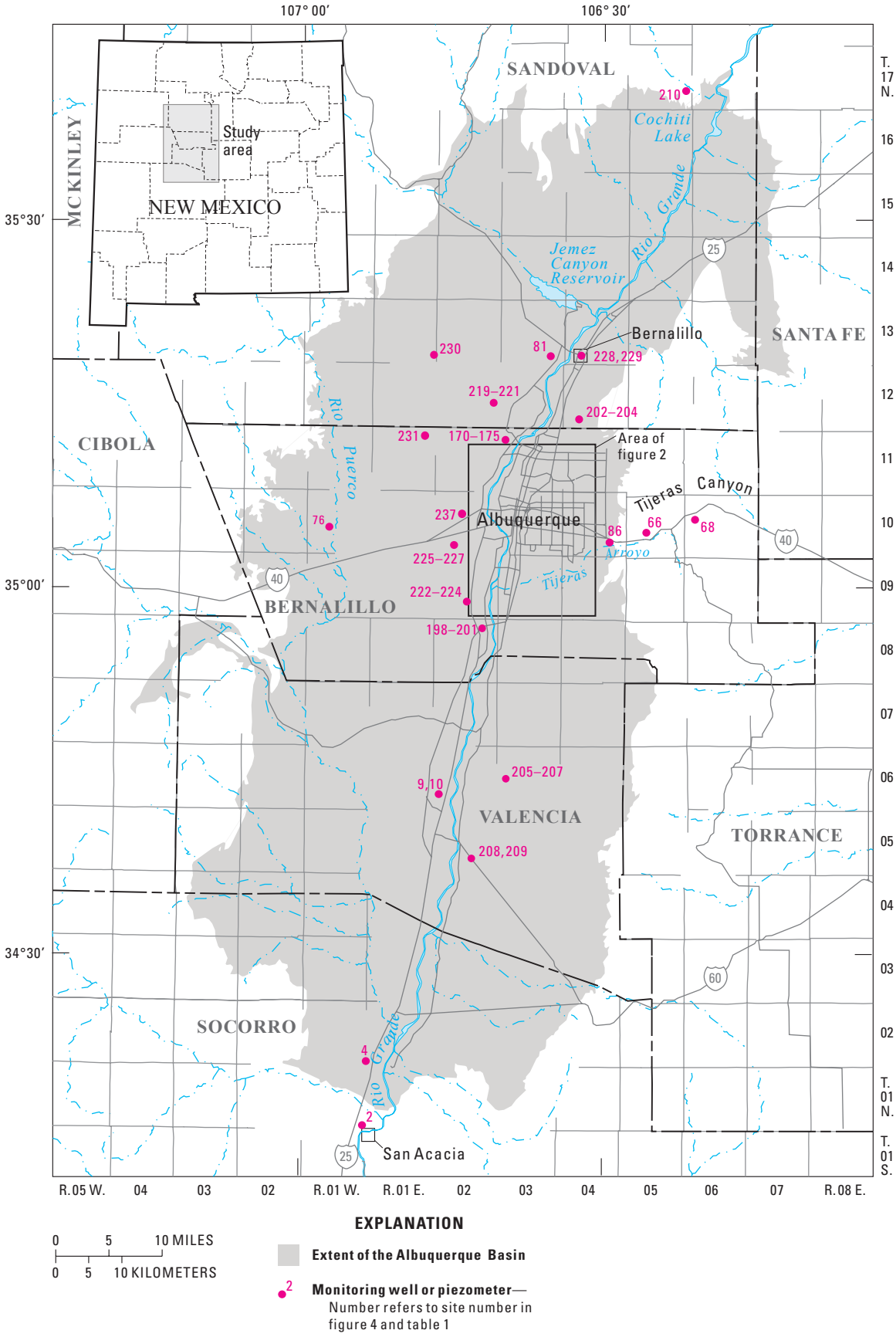


Figure 1. Location of the study area and selected monitoring wells and piezometers in and adjacent to the Albuquerque Basin, central New Mexico.

Table 1. Data from selected wells and piezometers in and adjacent to the Albuquerque Basin, central New Mexico, period of record through September 30, 2015.

[USGS, U.S. Geological Survey; --, no data or not applicable. Discontinuity in numbering sequence is due to wells omitted from this report because of lack of recent data collection. Data from discontinued wells can be seen in previous USGS open-file reports and data series (Kues, 1987; Rankin, 1994, 1996, 1998, 1999, 2000; DeWees, 2001, 2002, 2003, 2006; Beman, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015; Beman and Torres, 2010)]

Site number	Figure number	USGS site number	Local identifier	Other identifier	Well depth (feet below land surface)	Screened interval (feet below land surface)
2	1	341528106533301	01S.01W.01.213	--	38	--
4	1	342107106530401	02N.01E.31.313	Sevilleta Refuge Headquarters	223	210–220
9	1	344258106460901	06N.02E.30.412A	Estes 1	135	125–130
10	1	344258106460902	06N.02E.30.412B	Estes 5	300	265–270
12	2	350137106410501	09N.02E.12.214A	Rio Bravo Nest 1	148.5	138.5–143.5
13	2	350137106410502	09N.02E.12.214B	Rio Bravo Nest 1	103.8	94–99
14	2	350137106410503	09N.02E.12.214C	Rio Bravo Nest 1	38.4	28–33
15	2	350138106395501	09N.03E.07.131A	Rio Bravo Nest 2	153.5	143.5–148.5
16	2	350138106395502	09N.03E.07.131B	Rio Bravo Nest 2	91.2	81–86
17	2	350138106395503	09N.03E.07.131C	Rio Bravo Nest 2	48.6	38.6–43.6
18	2	350138106393201	09N.03E.07.241A	Rio Bravo Nest 3	148	138–143
19	2	350138106393202	09N.03E.07.241B	Rio Bravo Nest 3	101	91–96
20	2	350138106393203	09N.03E.07.241C	Rio Bravo Nest 3	49.3	39.3–44.3
24	2	350138106401103	09N.03E.07.114B	Rio Bravo Nest 5	515	500–510
25	2	350138106401101	09N.03E.07.114	Rio Bravo Nest 5	150	135–145
26	2	350138106401102	09N.03E.07.114A	Rio Bravo Nest 5	22	7–17
27	2	350854106403701	11N.02E.25.341A	Montaño Nest 1	152	140–145
28	2	350854106403702	11N.02E.25.341B	Montaño Nest 1	93.4	83.4–88.4
29	2	350854106403703	11N.02E.25.341C	Montaño Nest 1	48.4	40–45
30	2	350836106395601	--	Montaño Nest 2	147.4	138–143
32	2	350836106395603	--	Montaño Nest 2	39.7	30–35
33	2	350827106391301	--	Montaño Nest 3	150	140–145
34	2	350827106391302	--	Montaño Nest 3	99	90–95
35	2	350827106391303	--	Montaño Nest 3	50	40–45
36	2	350821106383701	--	Montaño Nest 4	132	123–128
37	2	350821106383702	--	Montaño Nest 4	94	85–90
38	2	350821106383703	--	Montaño Nest 4	50	40–45
39	2	350859106401601	11N.03E.30.313	Montaño Nest 5	25	10–20
40	2	350859106401602	11N.03E.30.313A	Montaño Nest 5	75	60–70
41	2	350859106401603	11N.03E.30.313B	Montaño Nest 5	150	135–145
42	2	350836106395401	11N.03E.31.21311A	Montaño Nest 6	983	972–978
43	2	350836106395402	11N.03E.31.21311B	Montaño Nest 6	836	826–831
44	2	350836106395403	11N.03E.31.21311C	Montaño Nest 6	568	558–563
45	2	350836106395404	11N.03E.31.21311D	Montaño Nest 6	182	172–177
46	2	351059106385903	11N.03E.17.141B	Paseo del Norte Nest 1	600	545–555
47	2	351059106385901	11N.03E.17.141	Paseo del Norte Nest 1	150	135–145
48	2	351059106385902	11N.03E.17.141A	Paseo del Norte Nest 1	25	10–20
49	2	351057106384201	11N.03E.17.233	Paseo del Norte Nest 2	150	135–145
50	2	351057106384202	11N.03E.17.233A	Paseo del Norte Nest 2	95	80–90
51	2	351057106384203	11N.03E.17.233B	Paseo del Norte Nest 2	45	30–40
53	2	351035106364703	11N.03E.15.344C	Paseo del Norte Nest 3	544	539–544
54	2	351035106364702	11N.03E.15.344B	Paseo del Norte Nest 3	144	139–144

Table 1. Data from selected wells and piezometers in and adjacent to the Albuquerque Basin, central New Mexico, period of record through September 30, 2015.—Continued

[USGS, U.S. Geological Survey; --, no data or not applicable. Discontinuity in numbering sequence is due to wells omitted from this report because of lack of recent data collection. Data from discontinued wells can be seen in previous USGS open-file reports and data series (Kues, 1987; Rankin, 1994, 1996, 1998, 1999, 2000; DeWees, 2001, 2002, 2003, 2006; Beman, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015; Beman and Torres, 2010)]

Site number	Figure number	USGS site number	Local identifier	Other identifier	Well depth (feet below land surface)	Screened interval (feet below land surface)
55	2	351035106364701	11N.03E.15.344A	Paseo del Norte Nest 3	69	64–69
64	2	350256106390801	10N.03E.32.314	San Jose 9	765	188–764
66	1	350359106254701	10N.05E.29.114	Dead Man's Curve	--	--
68	1	350602106210401	10N.05E.12.434	Home Oil	54	--
70	2	350548106383901	10N.03E.17.232	City 1	149	139–149
71	2	350824106375301	11N.03E.33.143	City 2	150	140–150
72	2	350837106393801	11N.03E.31.214	City 3	152	142–152
73	2	350646106403601	10N.02E.12.241	City 4	150	140–150
76	1	350454106570401	10N.01W.21.134	Cañoncito	117	--
81	1	351852106344901	13N.03E.36.132A	San Miguel	206	--
83	2	350829106420401	11N.02E.35.142	La Luz del Sol	250	230–245
86	1	350339106294001	10N.04E.26.331	Four Hills	--	--
87	2	351009106344701	11N.03E.24.142	Pino Yards	360	--
165	2	350908106344401	11N.03E.25.322	Sister Cities	1,308	1,298–1,303
166	2	350908106344402	11N.03E.25.322A	Sister Cities	799	789–794
167	2	350534106354701	10N.03E.14.324	Del Sol Divider	1,567	1,557–1,562
168	2	350534106354702	10N.03E.14.324A	Del Sol Divider	842	832–837
169	2	350534106354703	10N.03E.14.324B	Del Sol Divider	425	315–415
170	1	351201106400501	11N.03E.07.141	Hunters Ridge Nest 1	1,518	1,508–1,513
171	1	351201106400502	11N.03E.07.141A	Hunters Ridge Nest 1	855	845–850
172	1	351201106400503	11N.03E.07.141B	Hunters Ridge Nest 1	238	148–228
173	1	351201106400504	11N.03E.07.141C	Hunters Ridge Nest 2	359	349–354
174	1	351201106400505	11N.03E.07.141D	Hunters Ridge Nest 2	305	295–300
175	1	351201106400506	11N.03E.07.141E	Hunters Ridge Nest 2	263	238–258
176	2	350638106413701	10N.02E.11.244	West Bluff Nest 1	1,095	1,085–1,090
177	2	350638106413702	10N.02E.11.244A	West Bluff Nest 1	689	679–684
178	2	350638106413703	10N.02E.11.244B	West Bluff Nest 1	433	422–427
179	2	350638106413704	10N.02E.11.244C	West Bluff Nest 2	328	318–323
180	2	350638106413705	10N.02E.11.244D	West Bluff Nest 2	254	244–249
181	2	350638106413706	10N.02E.11.244E	West Bluff Nest 2	173	143–163
182	2	350706106390301	10N.03E.05.341	Garfield Park	1,020	995–1,010
183	2	350706106390302	10N.03E.05.341A	Garfield Park	582	552–572
184	2	350706106390303	10N.03E.05.341B	Garfield Park	93	43–83
189	2	351114106330601	11N.04E.18.222	Nor Este	1,525	1,515–1,520
190	2	351114106330602	11N.04E.18.222A	Nor Este	1,193	1,183–1,188
191	2	351114106330603	11N.04E.18.222B	Nor Este	608	538–598
192	2	350910106414801	11N.03E.26.243	Sierra Vista	1,644	1,634–1,639
193	2	350910106414802	11N.03E.26.243A	Sierra Vista	928	918–923
194	2	350910106414803	11N.03E.26.243B	Sierra Vista	205	140–200
195	2	350056106370101	09N.03E.10.334	Montessa Park	1,628	1,618–1,623
196	2	350056106370102	09N.03E.10.334A	Montessa Park	708	698–703
197	2	350056106370103	09N.03E.10.334B	Montessa Park	330	260–320

Table 1. Data from selected wells and piezometers in and adjacent to the Albuquerque Basin, central New Mexico, period of record through September 30, 2015.—Continued

[USGS, U.S. Geological Survey; --, no data or not applicable. Discontinuity in numbering sequence is due to wells omitted from this report because of lack of recent data collection. Data from discontinued wells can be seen in previous USGS open-file reports and data series (Kues, 1987; Rankin, 1994, 1996, 1998, 1999, 2000; DeWees, 2001, 2002, 2003, 2006; Beman, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015; Beman and Torres, 2010)]

Site number	Figure number	USGS site number	Local identifier	Other identifier	Well depth (feet below land surface)	Screened interval (feet below land surface)
198	1	345650106415901	08N.02E.02.413	Isleta	1,340	1,330–1,335
199	1	345650106415902	08N.02E.02.413A	Isleta	815	805–810
200	1	345650106415903	08N.02E.02.413B	Isleta	185	175–180
201	1	345650106415904	08N.02E.02.413C	Isleta	50	10–40
202	1	351357106323001	12N.04E.29.433	Sandia Pueblo	1,305	1,295–1,300
203	1	351357106323002	12N.04E.29.433A	Sandia Pueblo	1,025	1,015–1,020
204	1	351357106323003	12N.04E.29.433B	Sandia Pueblo	535	485–525
205	1	344431106393401	06N.03E.18.442	Tomé	1,200	1,185–1,195
206	1	344431106393402	06N.03E.18.442A	Tomé	710	695–705
207	1	344431106393403	06N.03E.18.442B	Tomé	275	225–265
208	1	343753106430601	05N.03E.28.411	Nancy Lopez	1,186	1,166–1,176
209	1	343753106430602	05N.03E.28.411A	Nancy Lopez	695	675–685
210	1	354056106215801	17N.05E.24.344	Dome Road	1,295	1,280–1,290
211	2	350100106405701	09N.02E.12.433	Rio Bravo Park	595	585–590
212	2	350100106405702	09N.02E.12.433A	Rio Bravo Park	210	200–205
213	2	345758106364001	09N.03E.34.231	Mesa del Sol	1,630	1,580–1,620
214	2	345758106364002	09N.03E.34.231A	Mesa del Sol	1,015	990–1,010
215	2	345758106364003	09N.03E.34.231B	Mesa del Sol	525	420–520
216	2	350653106311601	10N.04E.09.214	Matheson Park	1,520	1,460–1,500
217	2	350653106311602	10N.04E.09.214A	Matheson Park	1,045	1,020–1,040
218	2	350653106311603	10N.04E.09.214B	Matheson Park	705	600–700
219	1	351515106410401	12N.02E.24.144	Lincoln Middle School	1,260	1,200–1,240
220	1	351515106410402	12N.02E.24.144A	Lincoln Middle School	835	810–830
221	1	351515106410403	12N.02E.24.144B	Lincoln Middle School	595	490–590
222	1	345842106443101	09N.02E.28.312	Niese Road	1,455	1,445–1,450
223	1	345842106443102	09N.02E.28.312A	Niese Road	960	950–955
224	1	345842106443103	09N.02E.28.312B	Niese Road	297	242–292
225	1	350244106450201	10N.02E.32.433	Westgate Heights Park	1,290	1,280–1,285
226	1	350244106450202	10N.02E.32.433A	Westgate Heights Park	868	858–863
227	1	350244106450203	10N.02E.32.433B	Westgate Heights Park	370	320–360
228	1	351821106333901	13N.04E.31.343	Bernalillo	1,190	1,175–1,185
229	1	351821106333902	13N.04E.31.343A	Bernalillo	805	290–300
230	1	352019106474801	13N.01E.24.313	Phoenix Road	1,625	1,600–1,620
231	1	351040106482801	11N.01E.14.342	Paradise Road	1,740	1,720–1,730
232	2	350545106335901	10N.04E.18.133A	Jerry Cline Park	1,462	1,435–1,445
233	2	350545106335902	10N.04E.18.133B	Jerry Cline Park	1,040	1,030–1,040
234	2	350545106335903	10N.04E.18.133C	Jerry Cline Park	510	400–500
235	2	350307106410601	10N.02E.36.321A	Armijo	1,623	1,593–1,613
236	2	350307106410602	10N.02E.36.321B	Armijo	1,025	995–1,015
237	1	350552106444601	--	Arroyo Vista	1,424	520–1,424

The USGS, in cooperation with the ABCWUA, currently (2015) measures and reports water levels from the 124 wells and piezometers in the network (table 1). Monitoring-well locations within the basin and adjacent areas are shown in figure 1, and those within the Albuquerque metropolitan area are shown in figure 2.

Purpose and Scope

The purpose of this report is to present an annual update of water-level data collected from the Albuquerque Basin well network during the 2015 water year (October 1, 2014, through September 30, 2015). Water-level data collected from the Albuquerque Basin and adjacent areas for the period of record through September 30, 2015, are presented. Water-level data that were collected from wells in previous water years, but not during the 2015 water year, can be found in previous versions of this report (Kues, 1987; Rankin, 1994, 1996, 1998, 1999, 2000; DeWees, 2001, 2002, 2003, 2006; Beman, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015; Beman and Torres, 2010).

Well-Numbering System

The system of numbering wells and piezometers in New Mexico is based on the common subdivision of public lands into sections (fig. 3). Each well number, in addition to designating the well, locates the position to the nearest 10-acre tract in the land network. This number (referred to as "local identifier" in table 1) is divided into four segments. The first segment denotes the township ("T.") north or south of the New Mexico base line, the second denotes the range ("R.") east or west of the New Mexico principal meridian, and the third denotes the section. The fourth segment of the well number, which consists of three digits, denotes the 160-, 40-, and 10-acre tracts in which the well is located. Each section is divided into quarters—numbered 1, 2, 3, and 4—for the northwest, northeast, southwest, and southeast quarters, respectively. The first digit of the fourth segment gives the quarter section, which is a tract of 160 acres. Each quarter section is then subdivided into four 40-acre tracts numbered in the same manner, and the second digit denotes the 40-acre tract. Finally, each 40-acre tract is further subdivided into four 10-acre tracts, and the third digit denotes the 10-acre tract. The fourth segment of the well number can further denote subdivisions of the 10-acre tract by including more than three digits; each additional digit further subdivides the tract by quarters in the same manner as shown in figure 3. Letters A, B, C, and so on are added to the end of the last segment of the well number to designate the second, third, fourth, and succeeding wells in the same tract. For example, well 09N.03E.07.131A is the first subsequent well in the northwest quarter (NW 1/4) of the southwest quarter (SW 1/4) of the northwest quarter (NW 1/4) of section 7, T. 09 N., R. 03 E. (fig. 3).

Methods

Water-level measurements at all wells and piezometers were collected by following standard USGS Office of Groundwater protocols for discrete and continuous groundwater measurements using electric and steel tapes (Cunningham and Schalk, 2011). Fifty of the sites (2, 4, 9, 10, 12–20, 24–30, 32–41, 46–51, 53–55, 68, 70–73, 76, 81, 83, 86, 87, and 237) are measured semiannually, and two of the sites (230 and 231) are measured quarterly or irregularly. At 69 of the sites (42–45, 64, 66, 165–184, 189–221, 225–229, and 232–236), pressure transducers and data loggers are used to collect hourly water-level data. The transducers and data loggers were removed from sites 222–224, but periodic measurements continue; the equipment may be redeployed to these piezometers after repairs are made to equipment housing.

Water-Level Data

Data for the 124 wells and piezometers in the network include site number, number of the figure on which the well location is shown, USGS site number, local identifier (if applicable), other identifier (if applicable), well depth, and screened interval (table 1). Hydrographs presenting water-level data collected by the USGS include water level in feet below land surface and water level in feet above the National Geodetic Vertical Datum of 1929 (NGVD 29) (fig. 4). Data in hydrographs from wells that have continuous recorders are shown by solid lines that represent continuous data (fig. 4). In hydrographs that present data from periodically measured wells, dashed lines connect symbols ("+") that represent the periodic measurements (fig. 4). In hydrographs showing periodically measured piezometers that are nested (more than one trace per graph), the symbols were removed to make the hydrographs easier to read (fig. 4). There are two hydrographs presenting data for sites 42–45: one showing periodic water-level measurements and one showing continuous data (fig. 4). Data gaps are present in some of the hydrographs; these gaps may be caused by, but are not limited to, equipment malfunction or removal of spurious data.

Starting in early 2009, the water levels in the deep piezometer at the Montessa Park site (site 195; fig. 4) appear to have been affected by sediment in the well. The water levels in this piezometer probably reflect seasonal water-level changes in the aquifer but are not a reliable indicator of daily or weekly water-level changes.

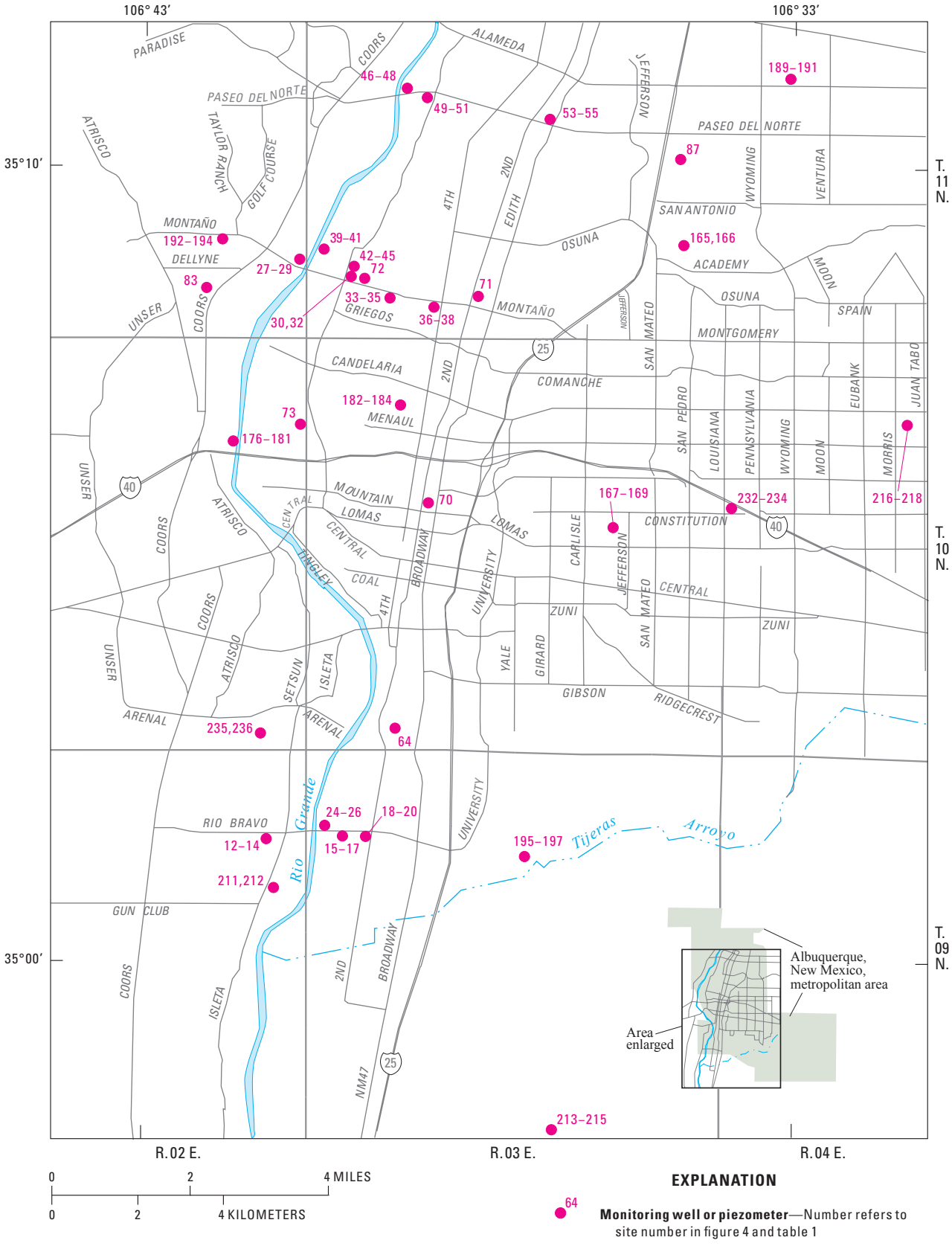


Figure 2. Location of selected monitoring wells and piezometers within the Albuquerque, New Mexico, metropolitan area.

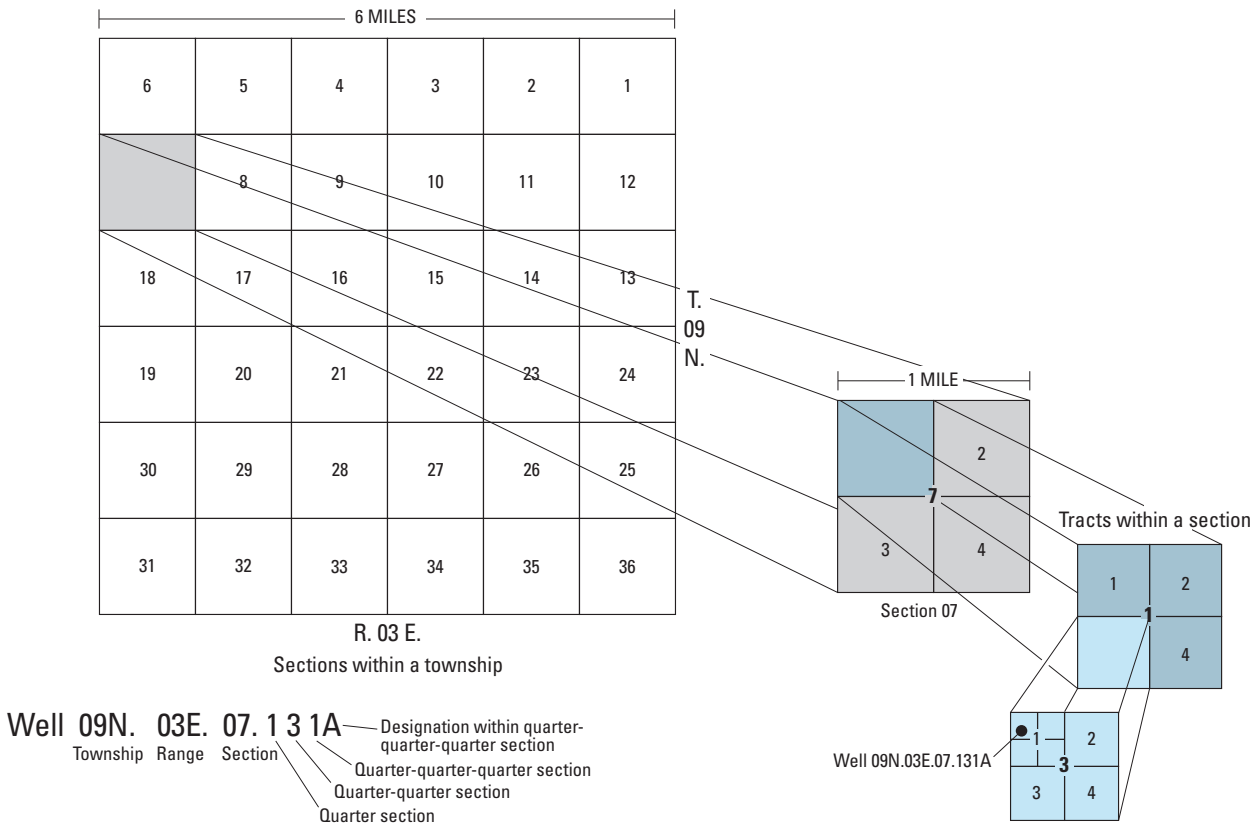


Figure 3. System for numbering wells and piezometers in New Mexico.

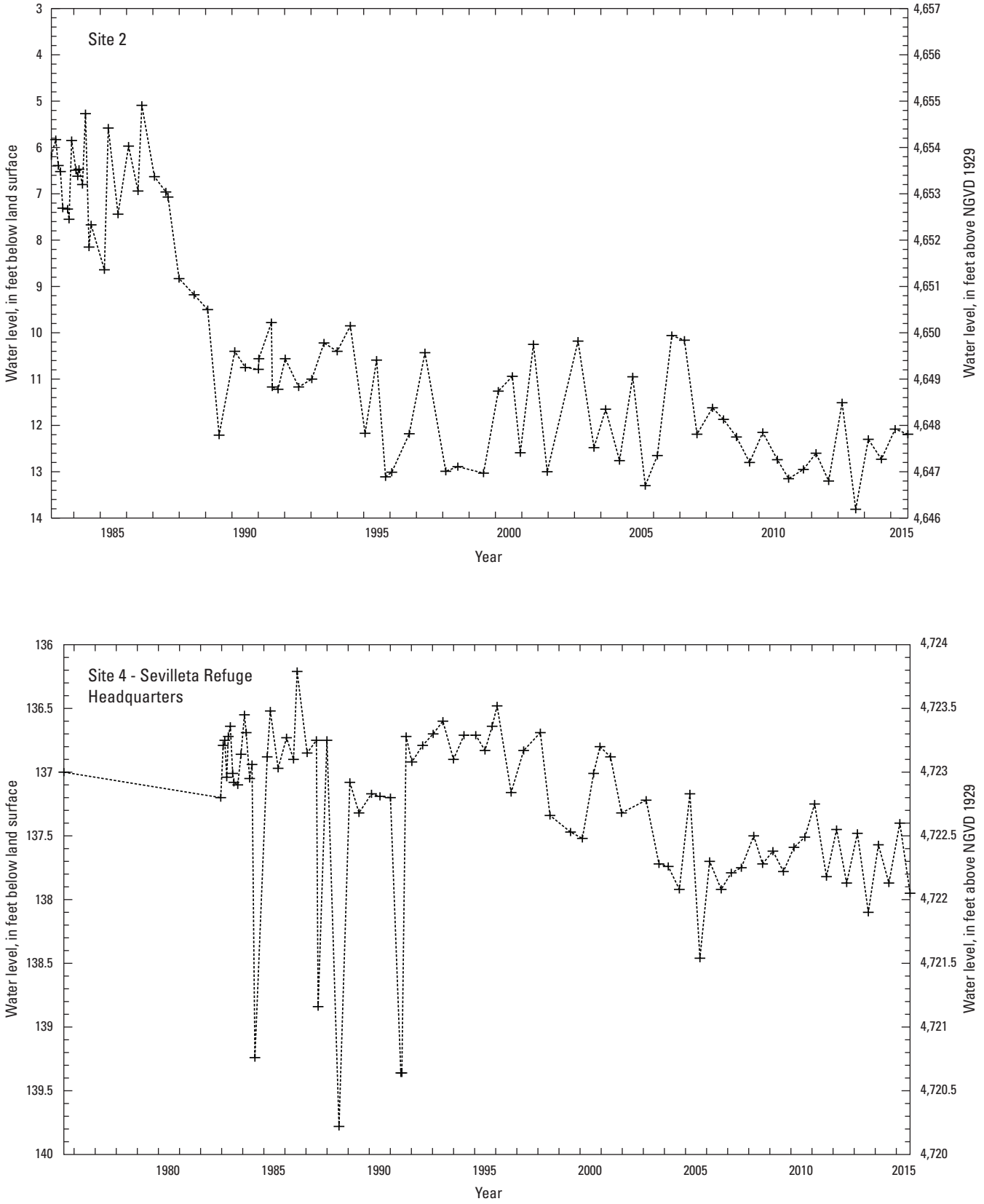
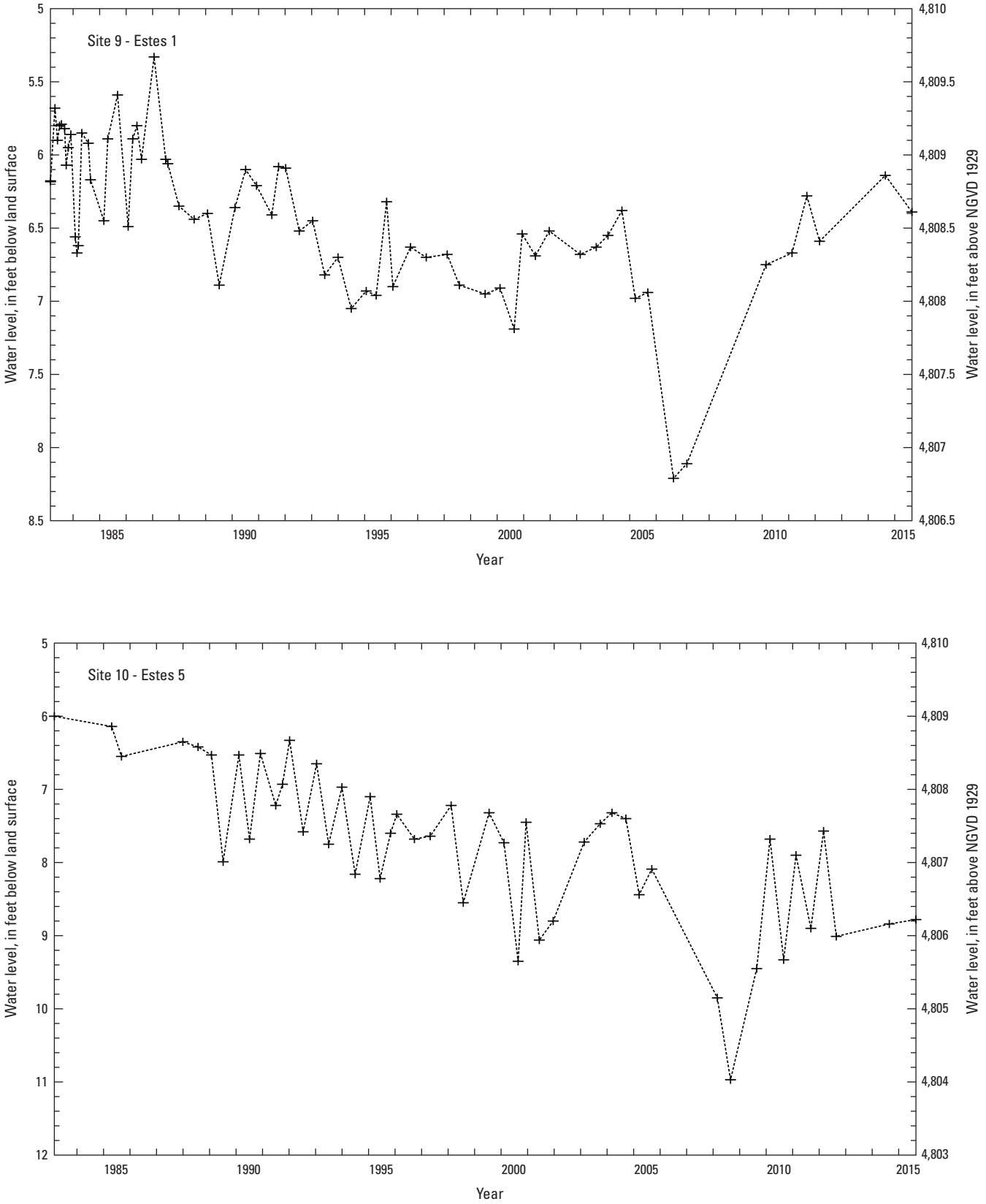


Figure 4. Water-level data for selected wells and piezometers in the Albuquerque Basin, central New Mexico, period of record through September 30, 2015 (NGVD 29, National Geodetic Vertical Datum of 1929).



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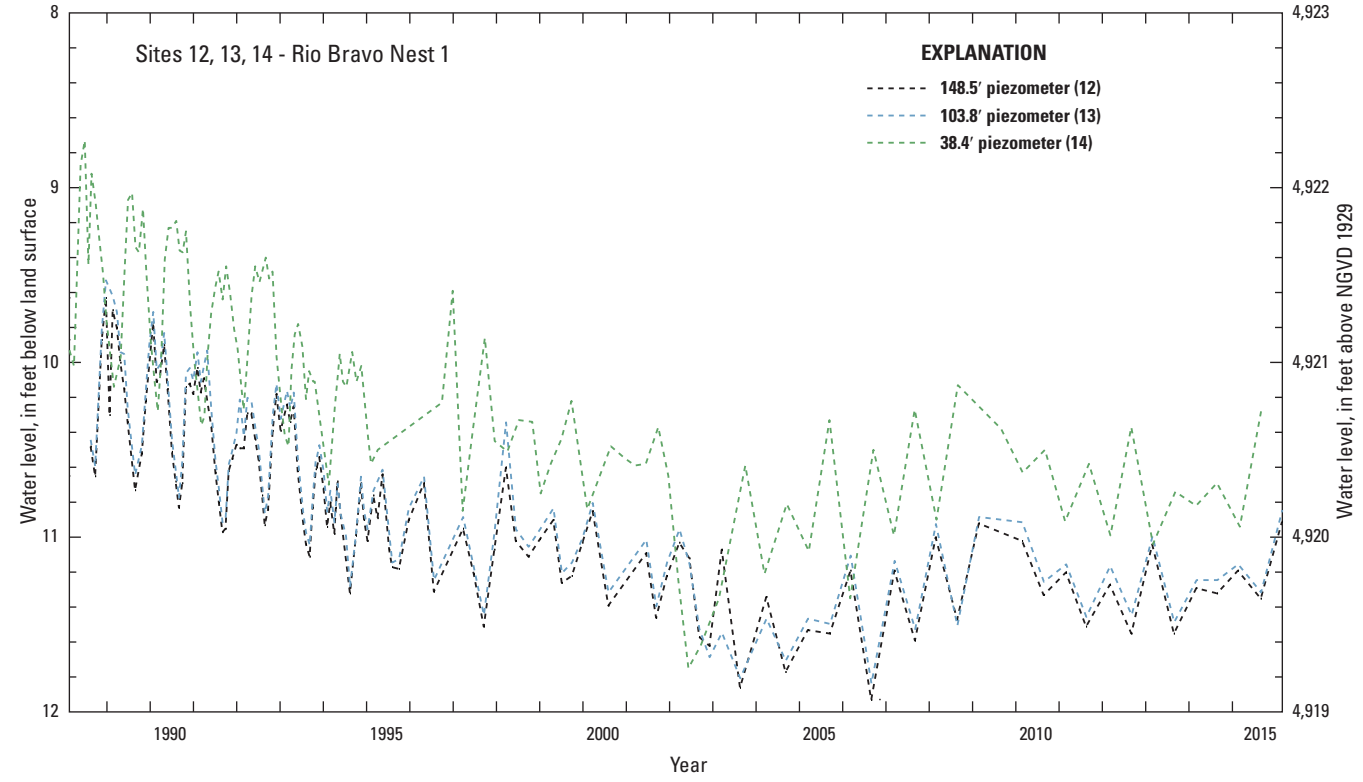

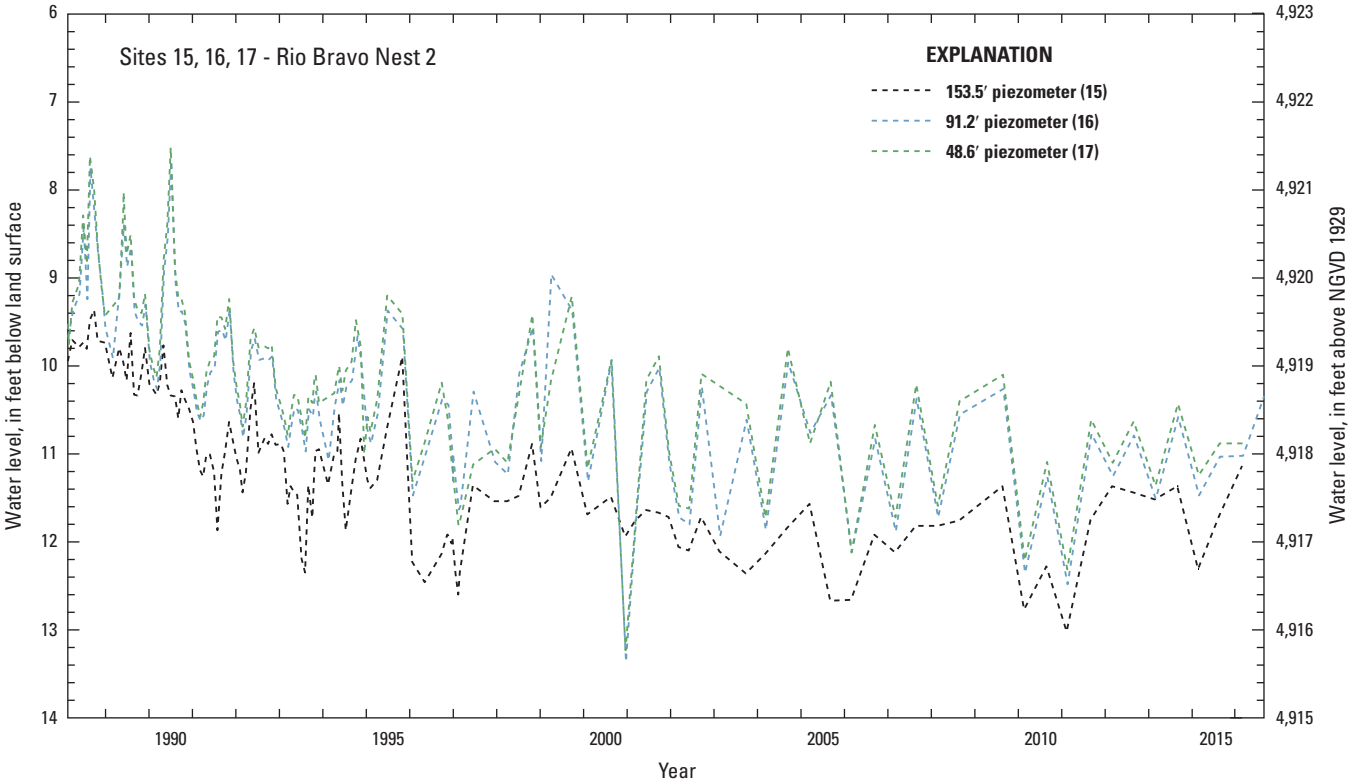

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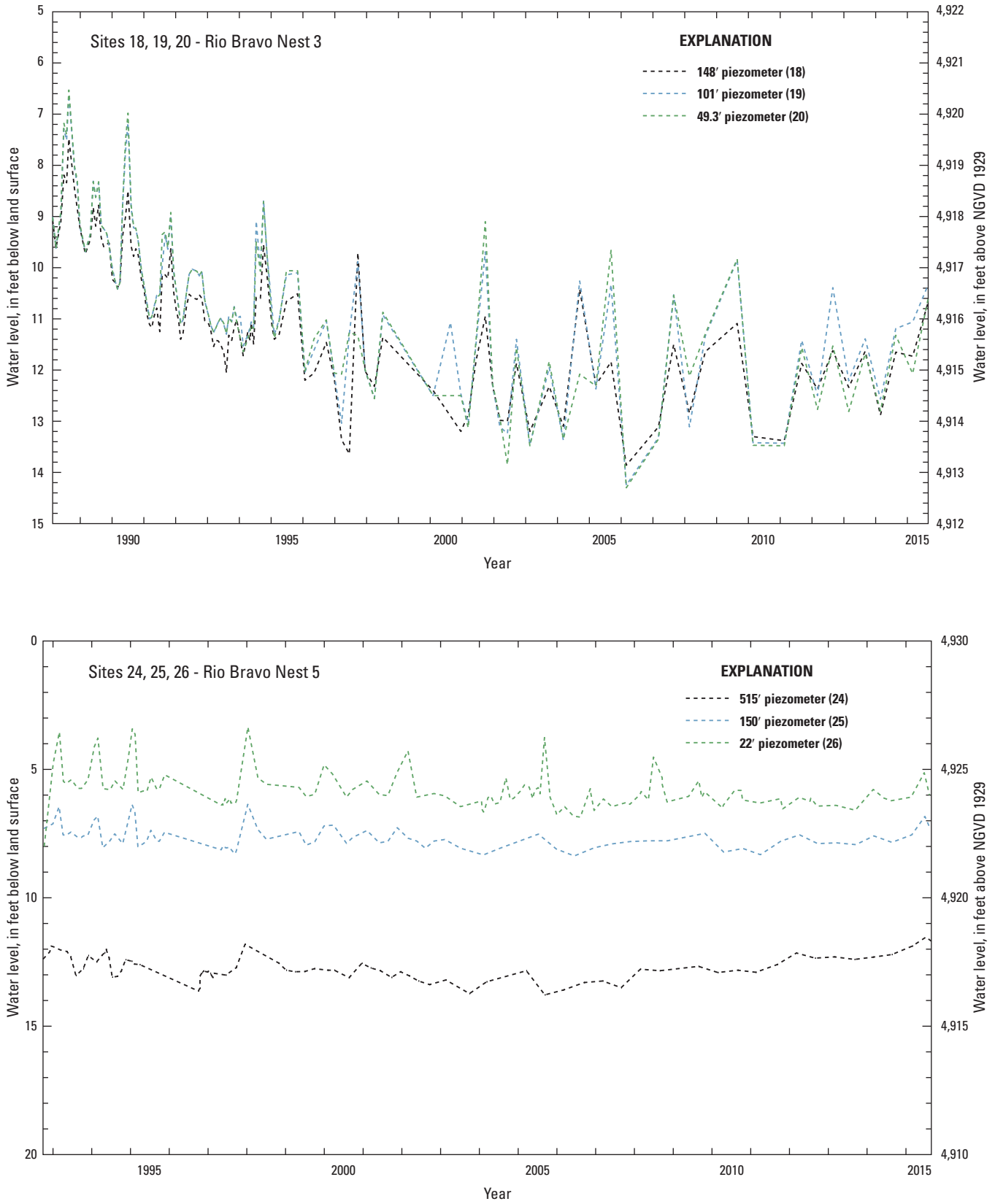

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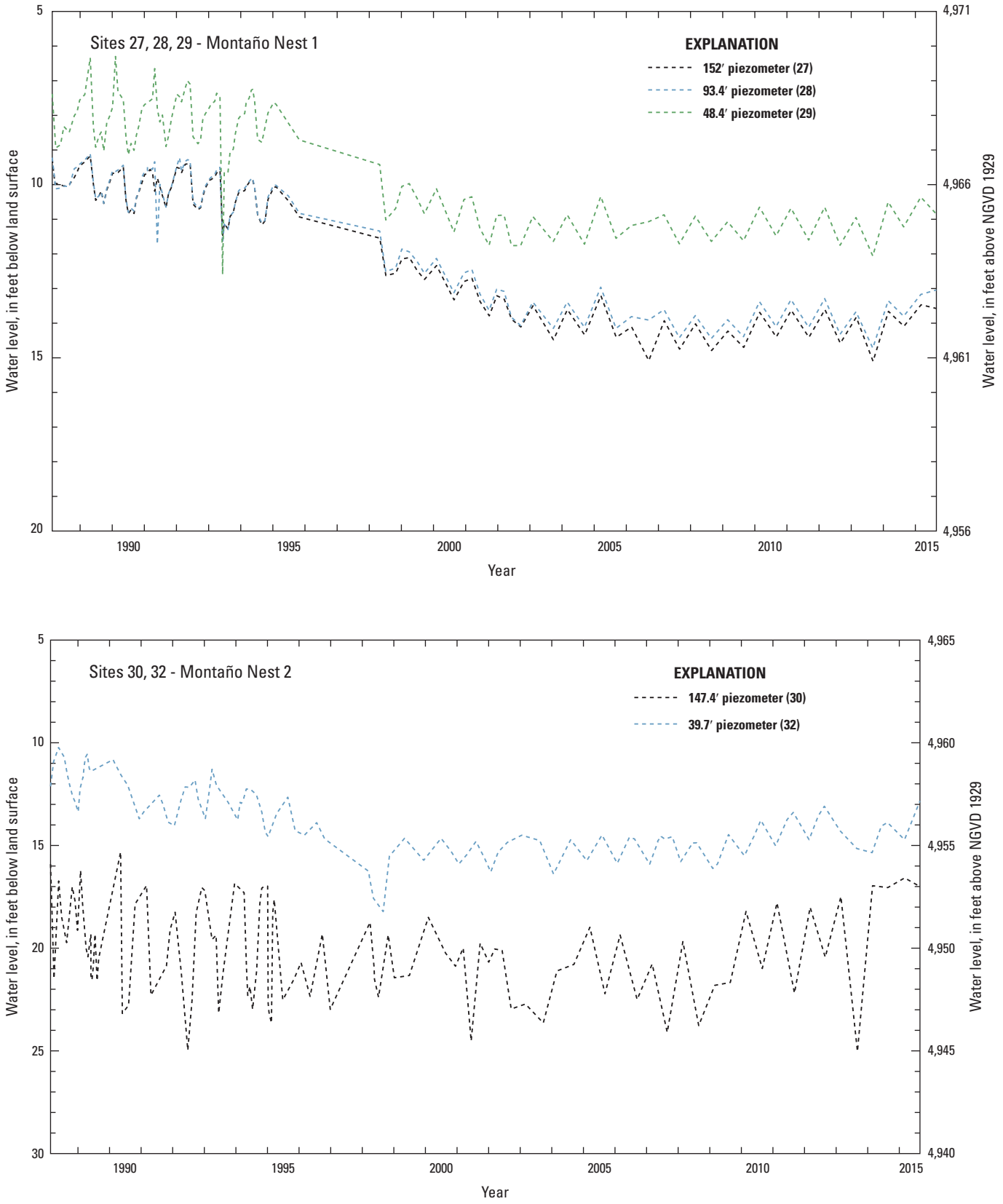

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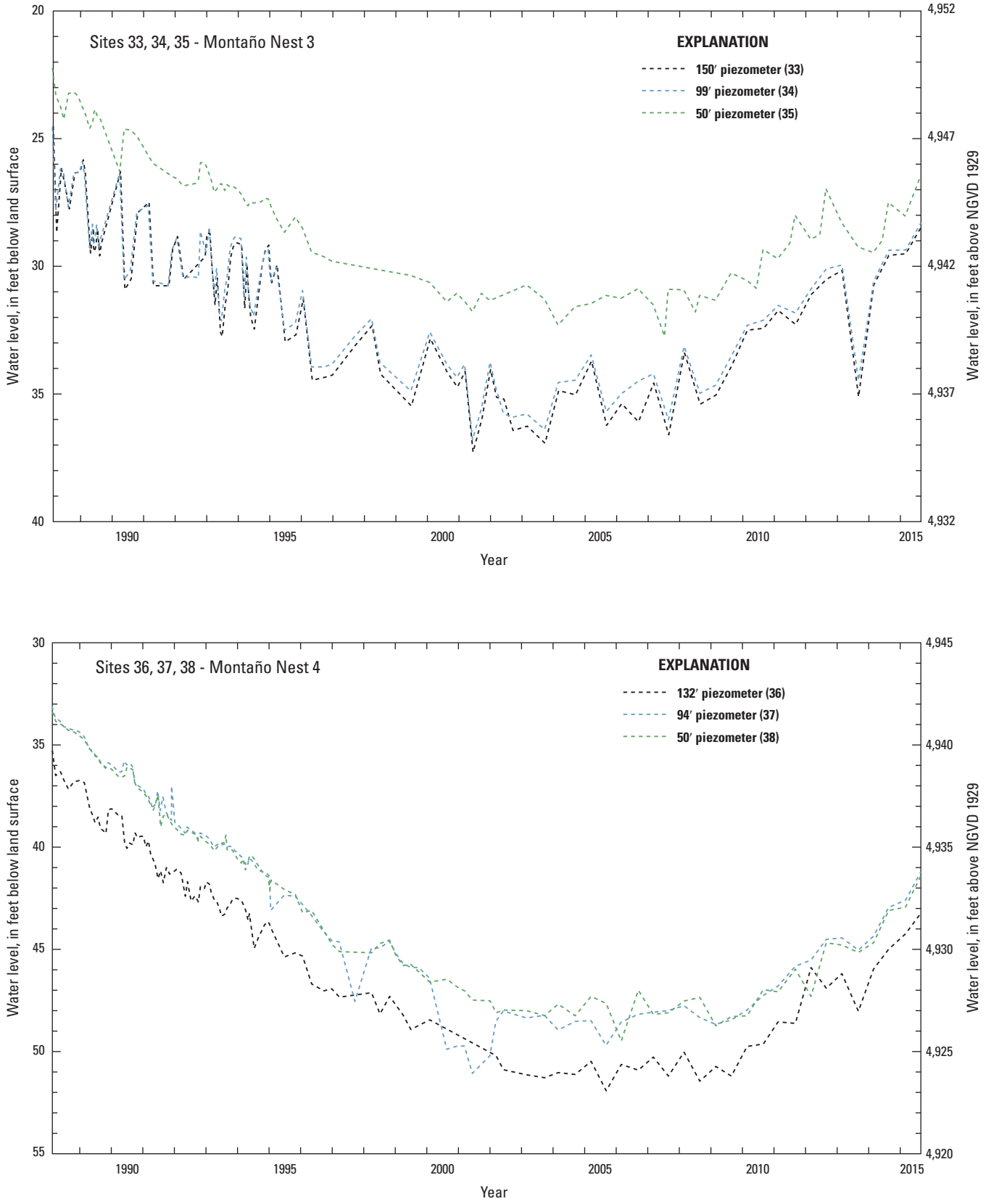

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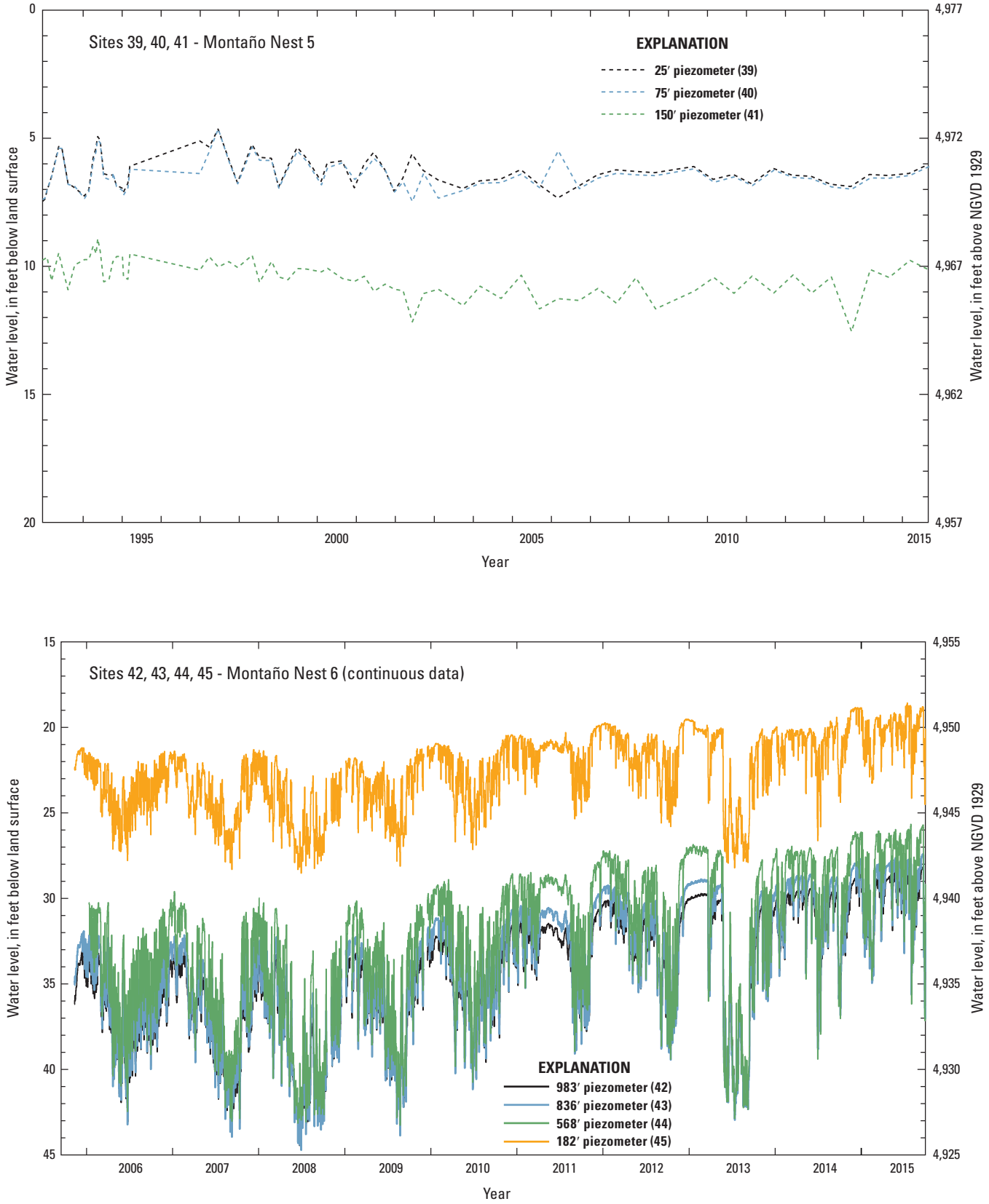

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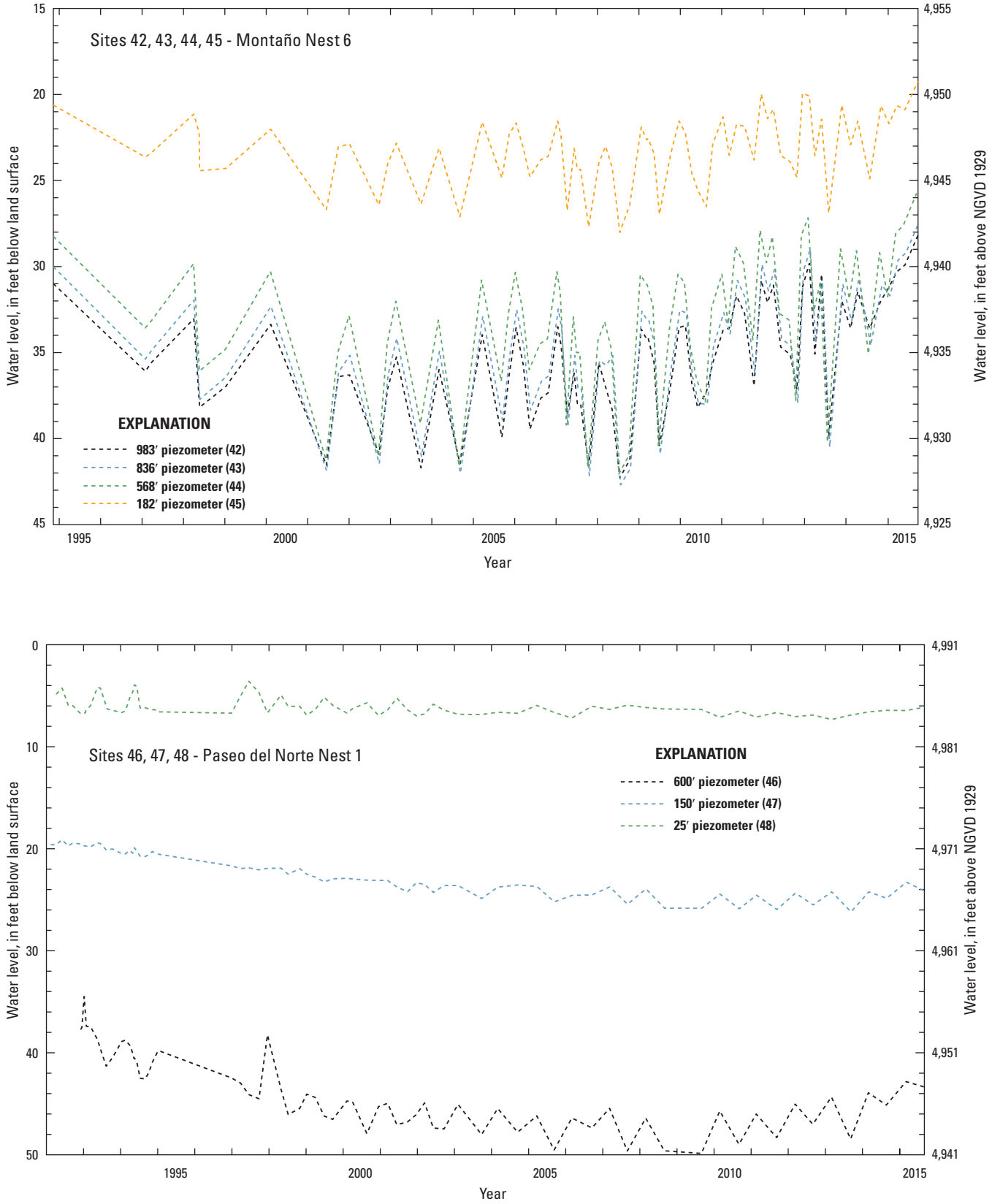

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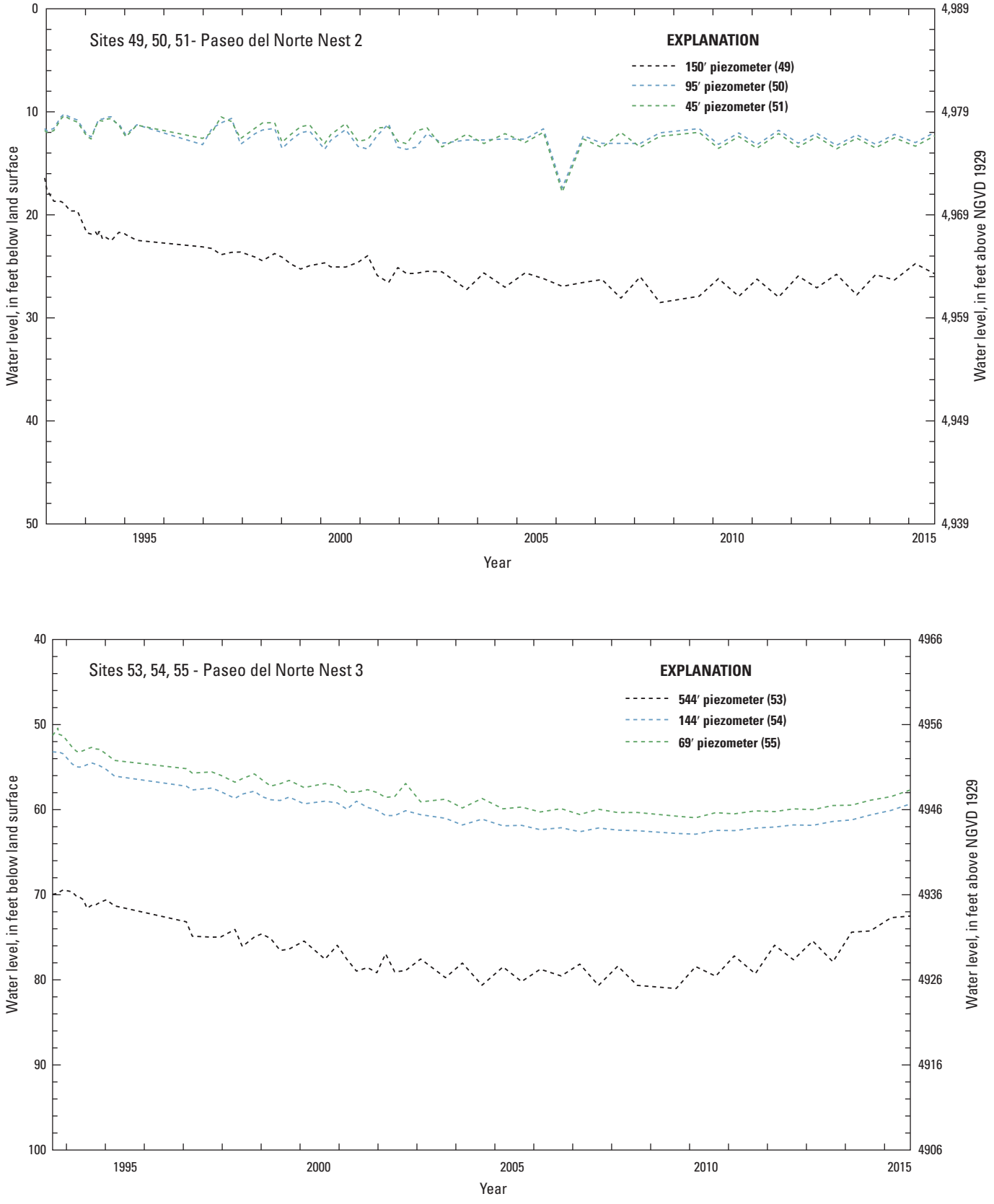

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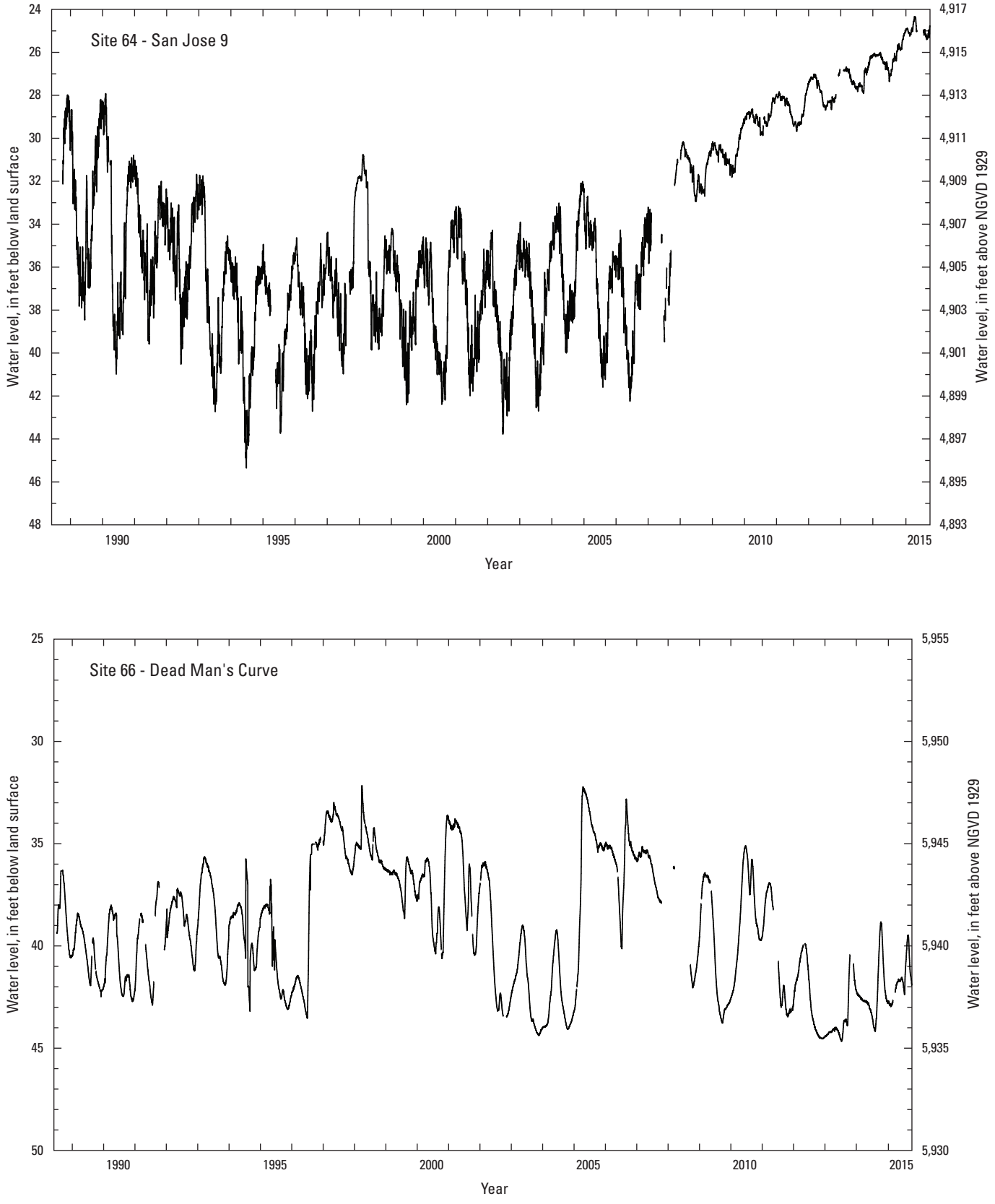

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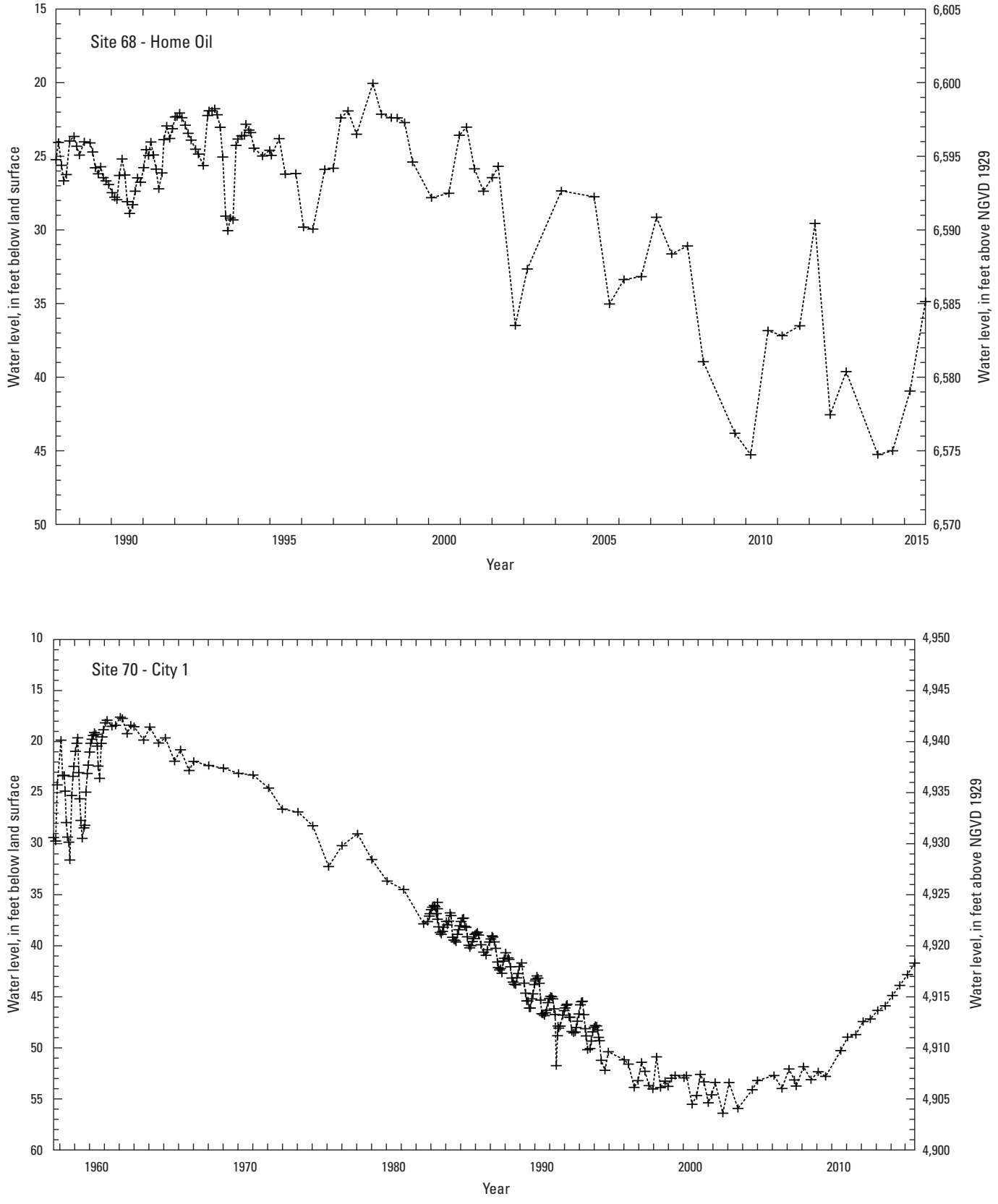

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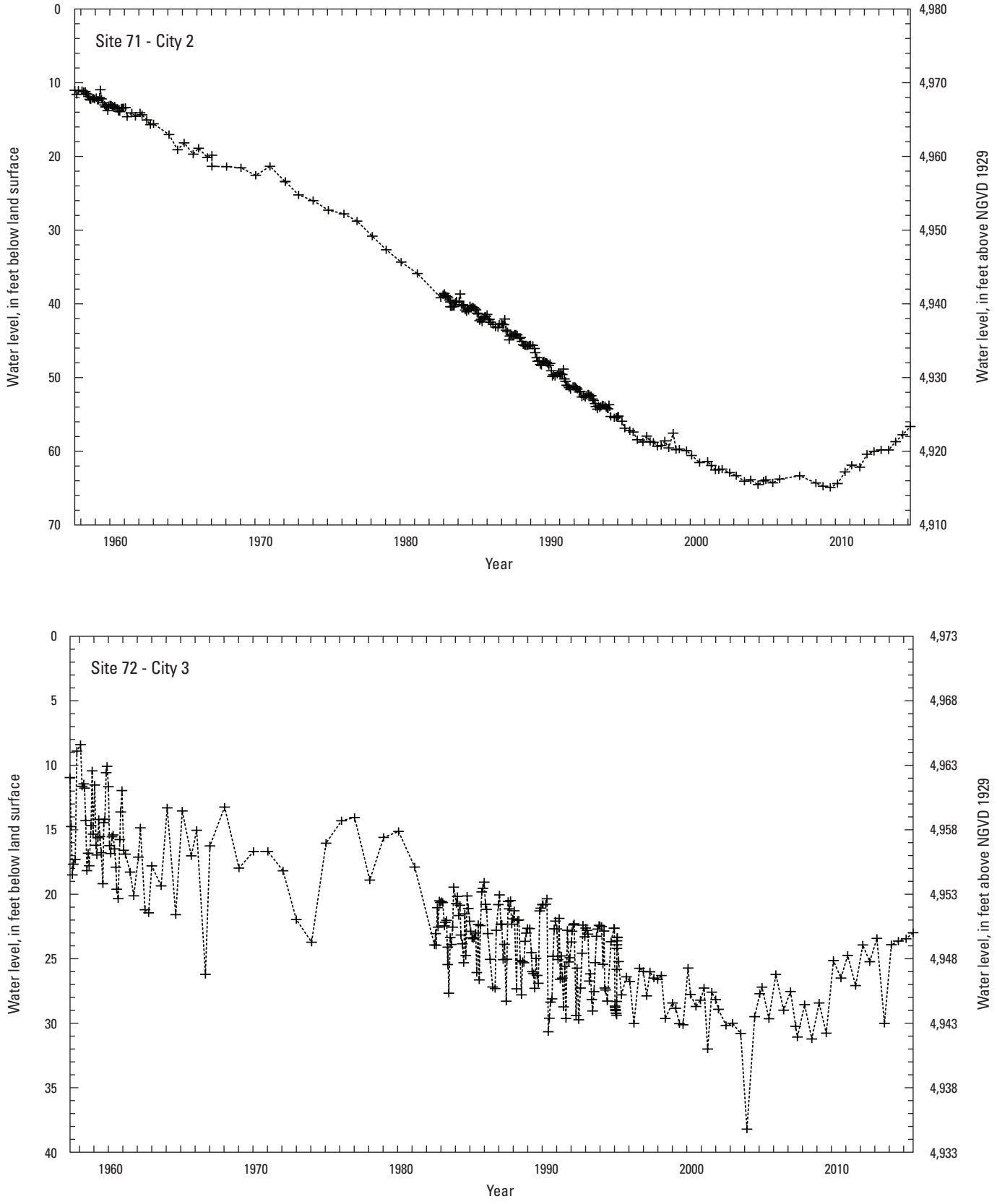

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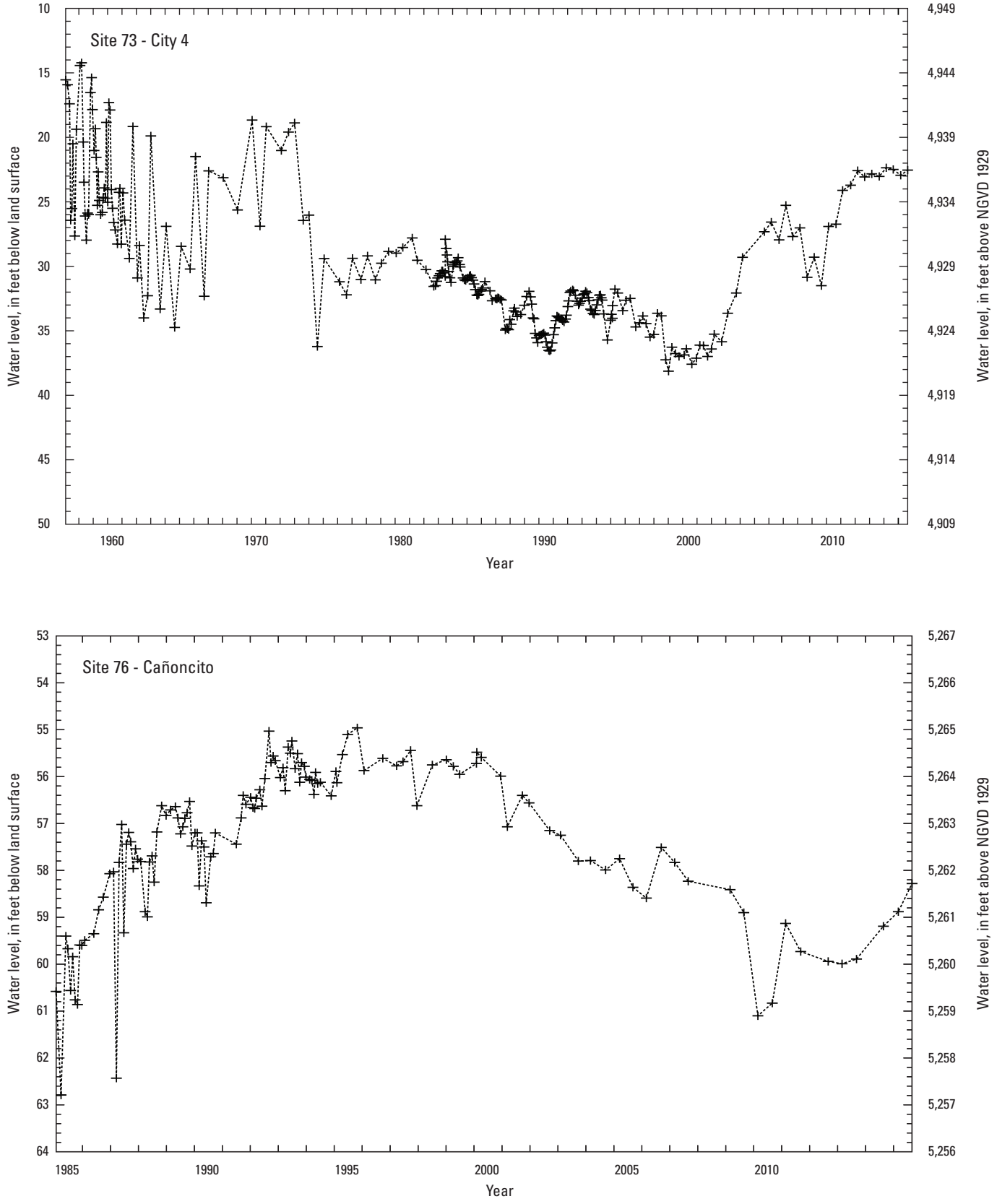

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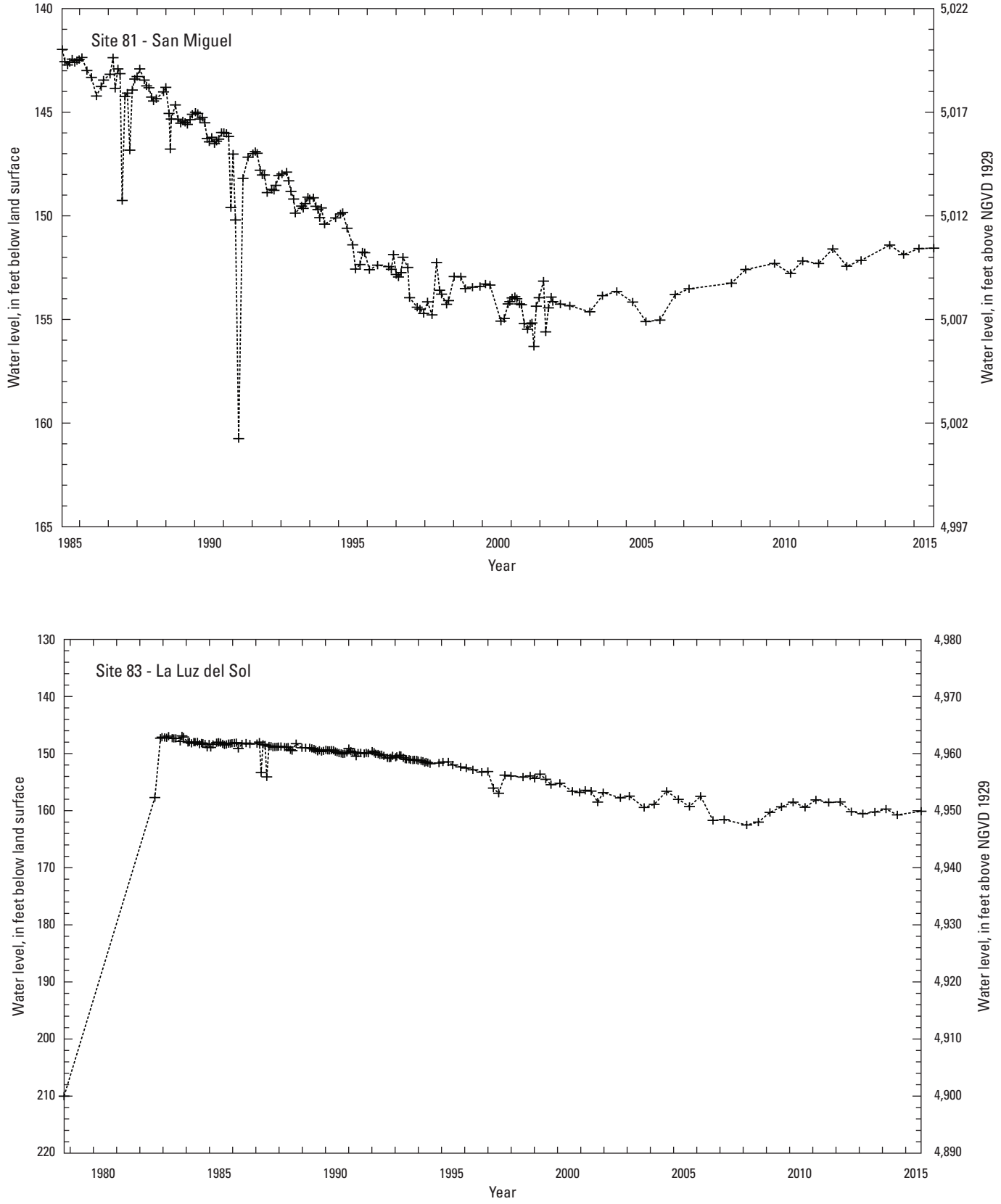

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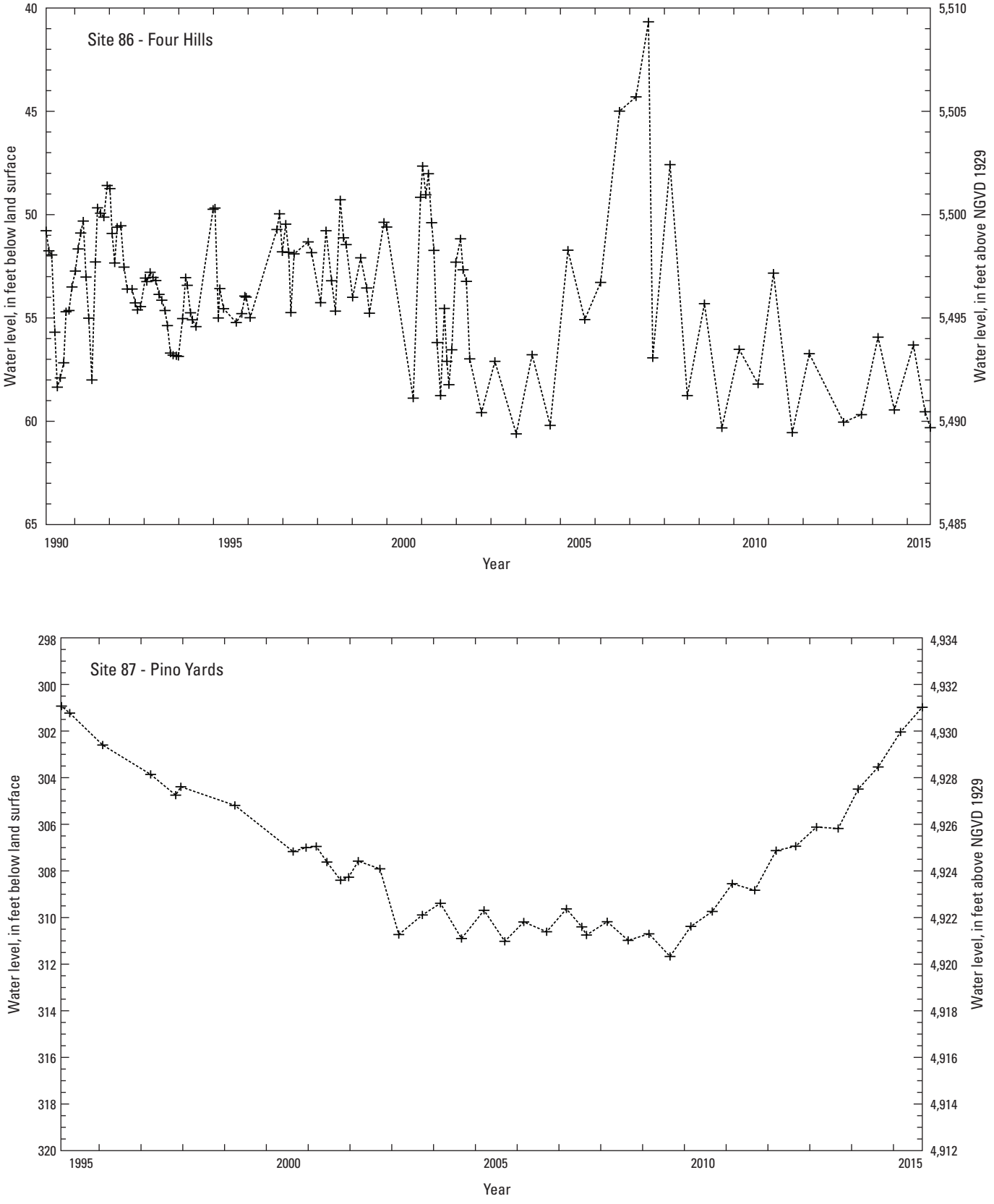

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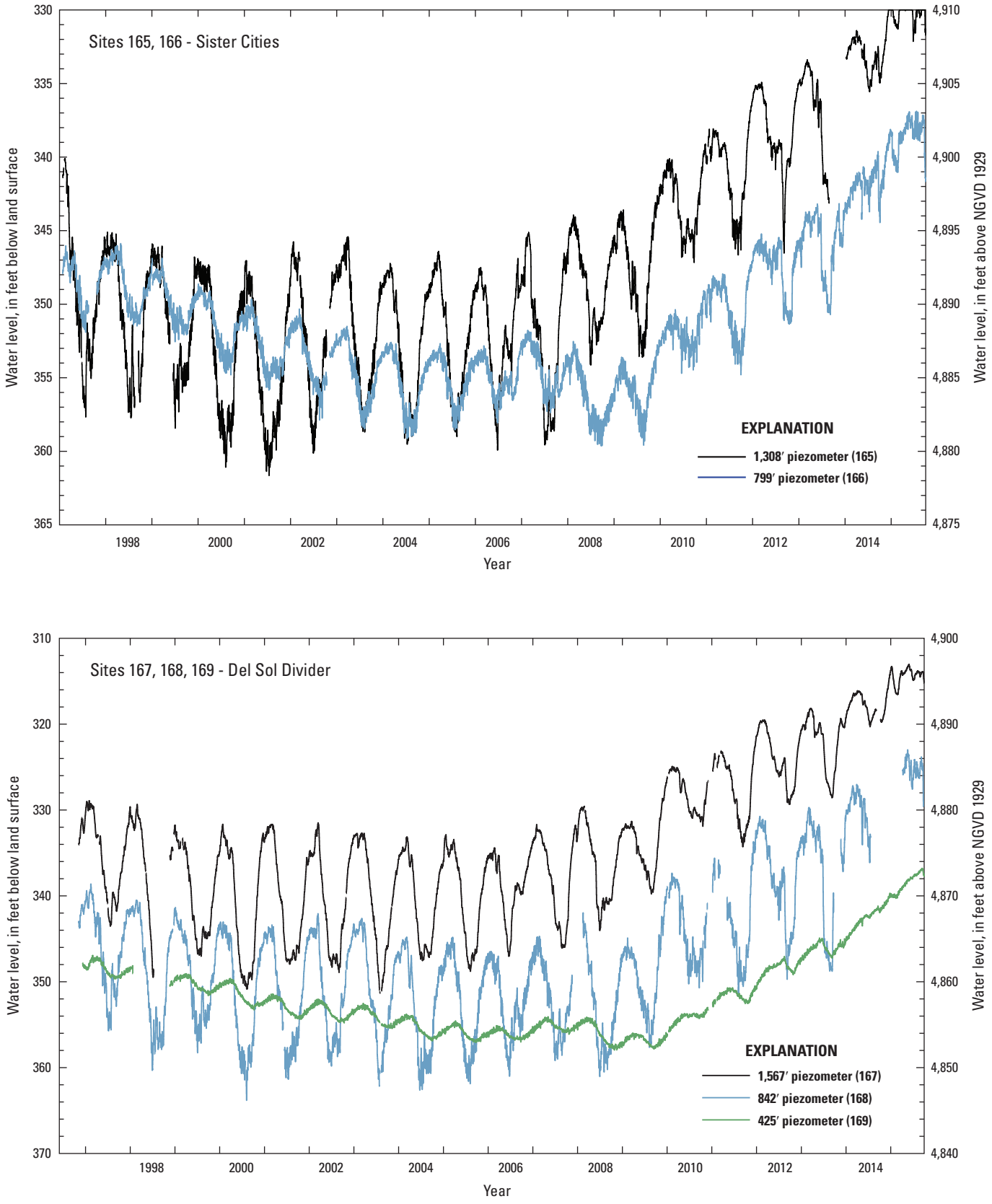

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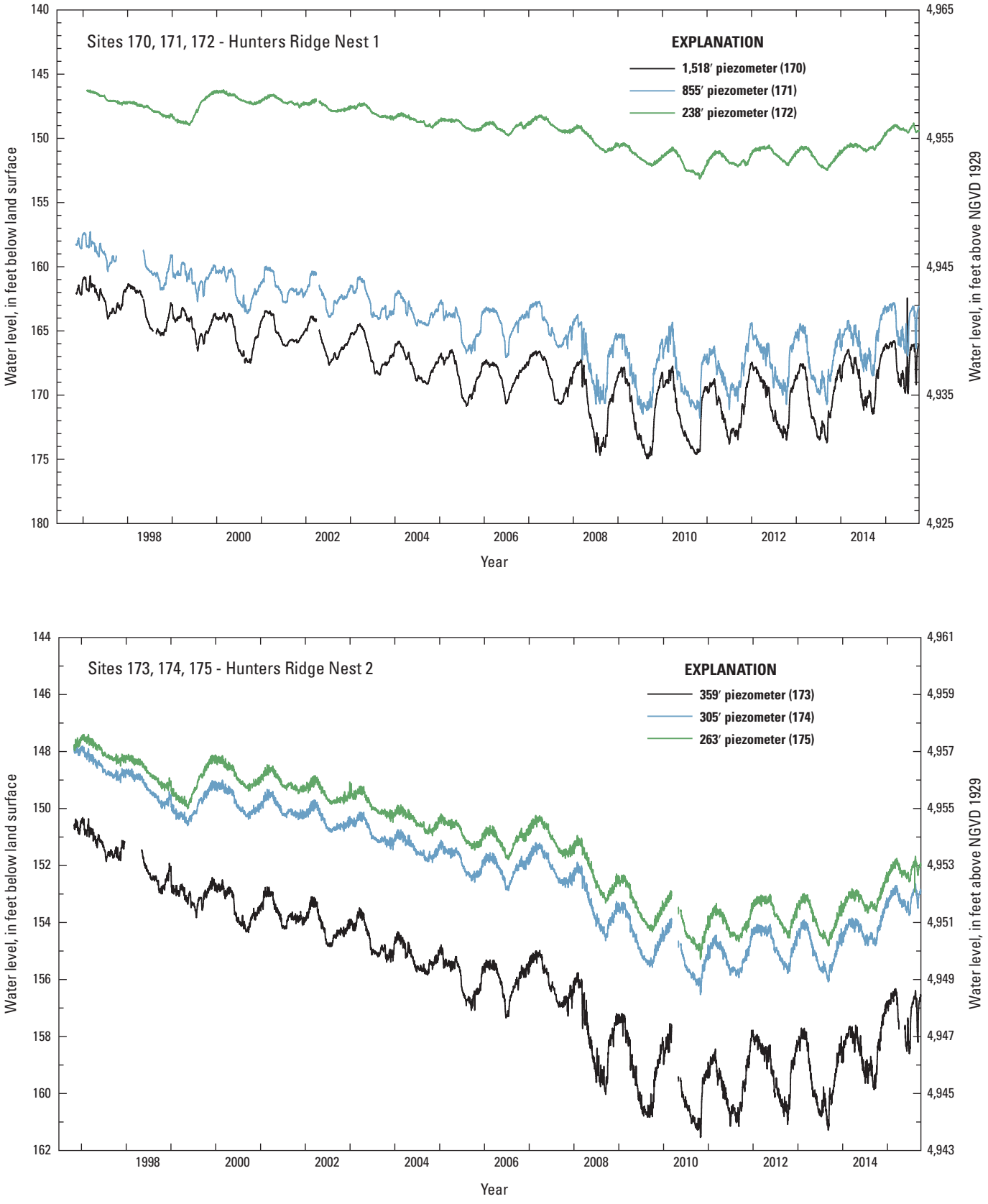

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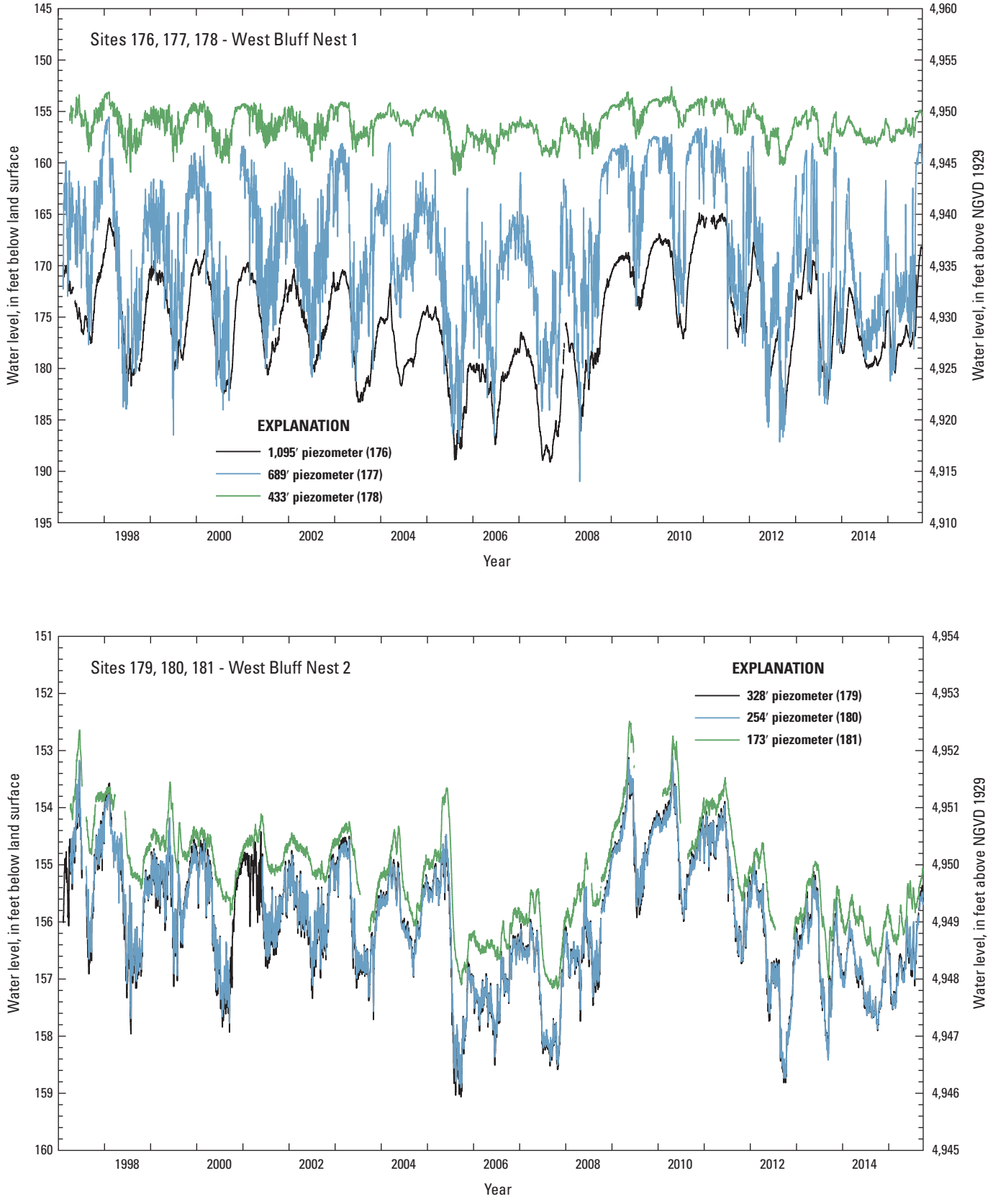

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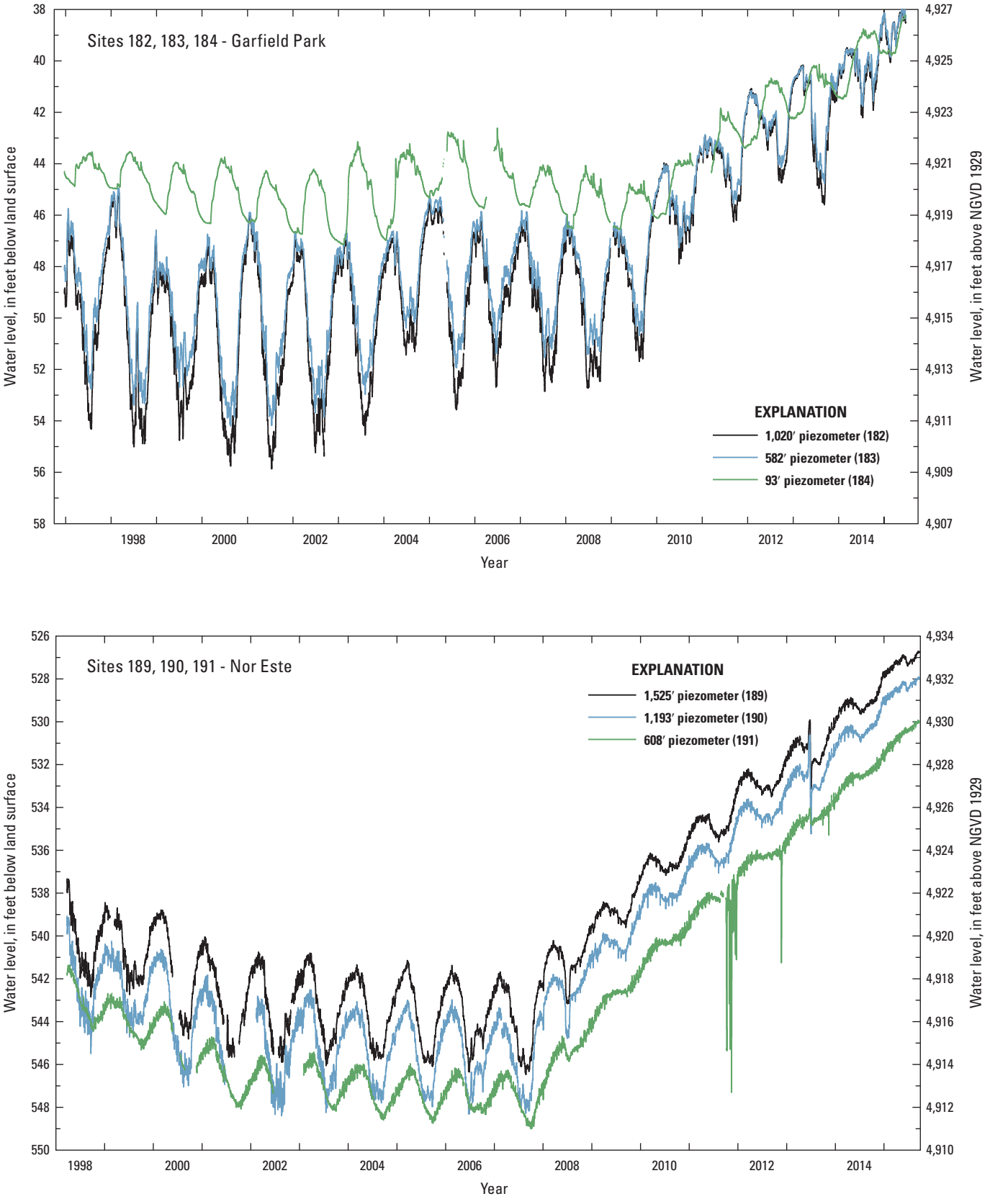

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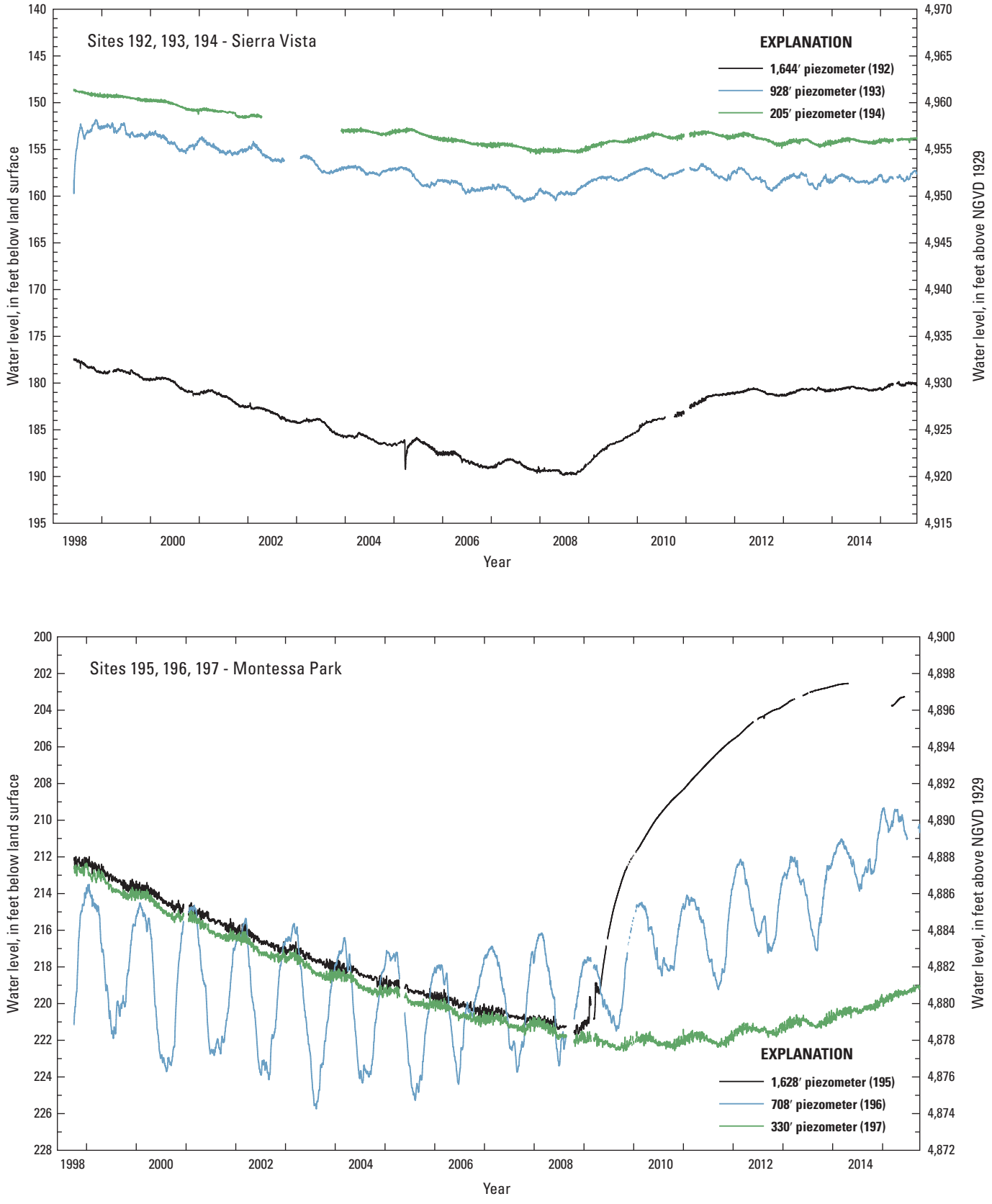

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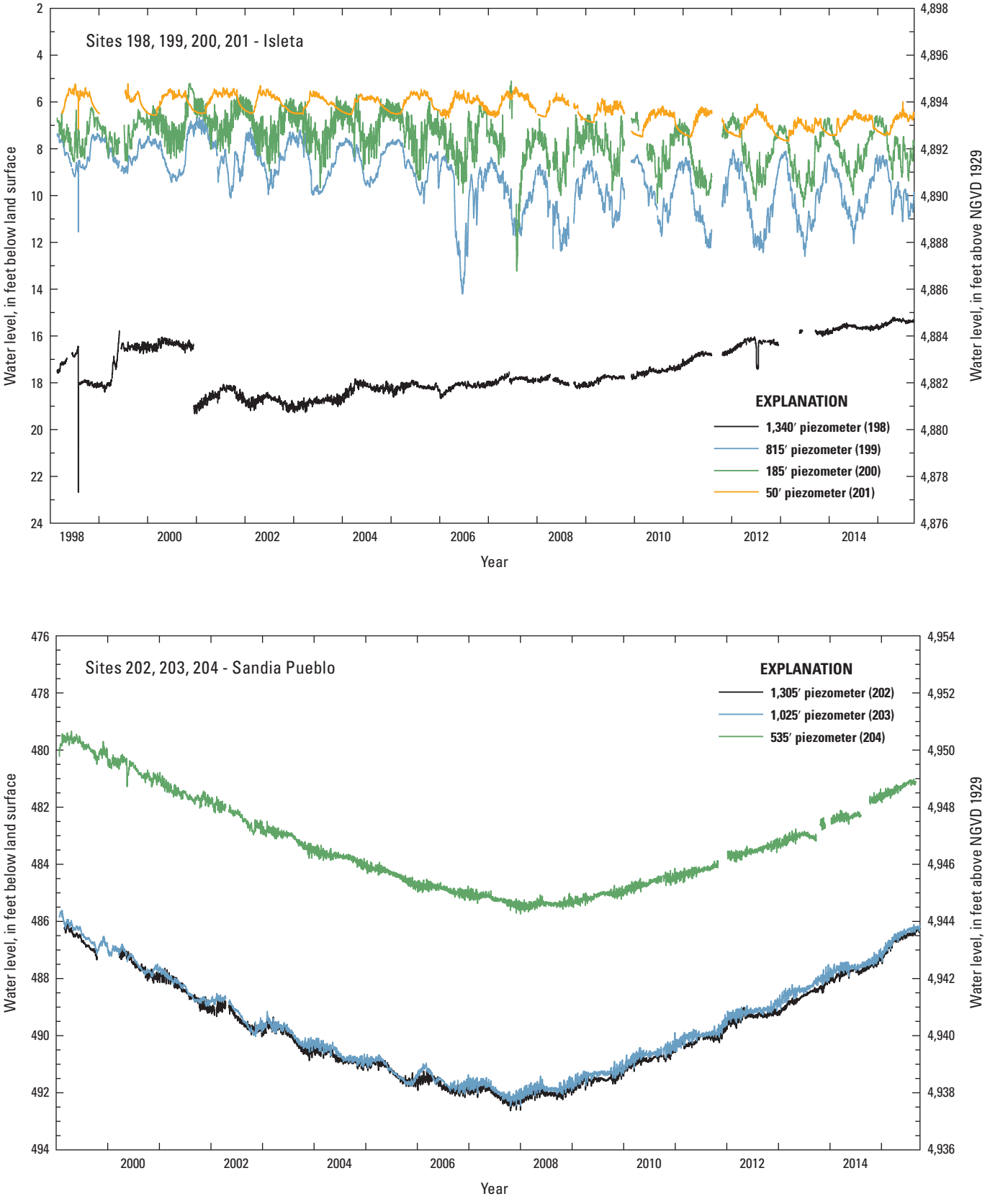

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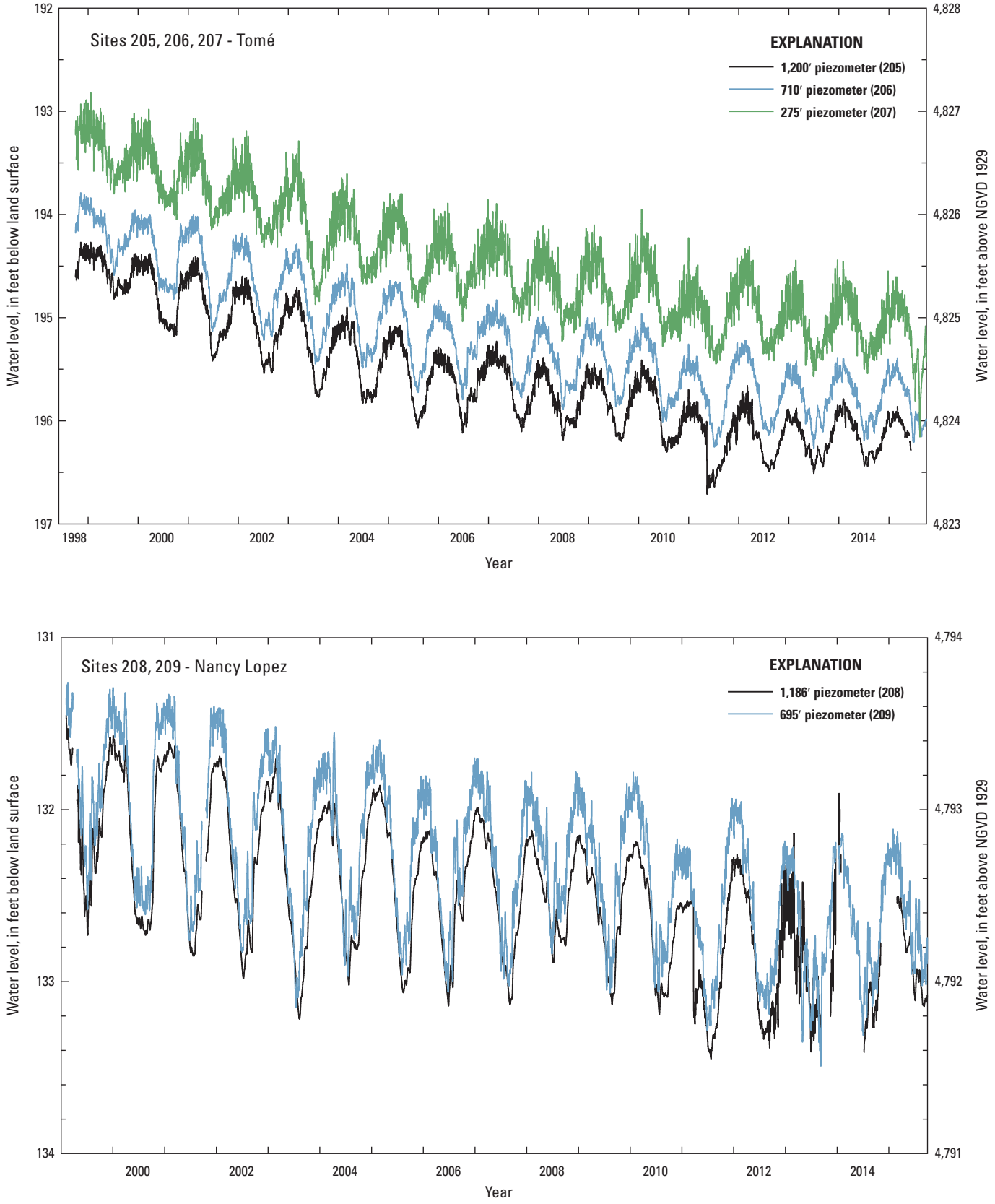

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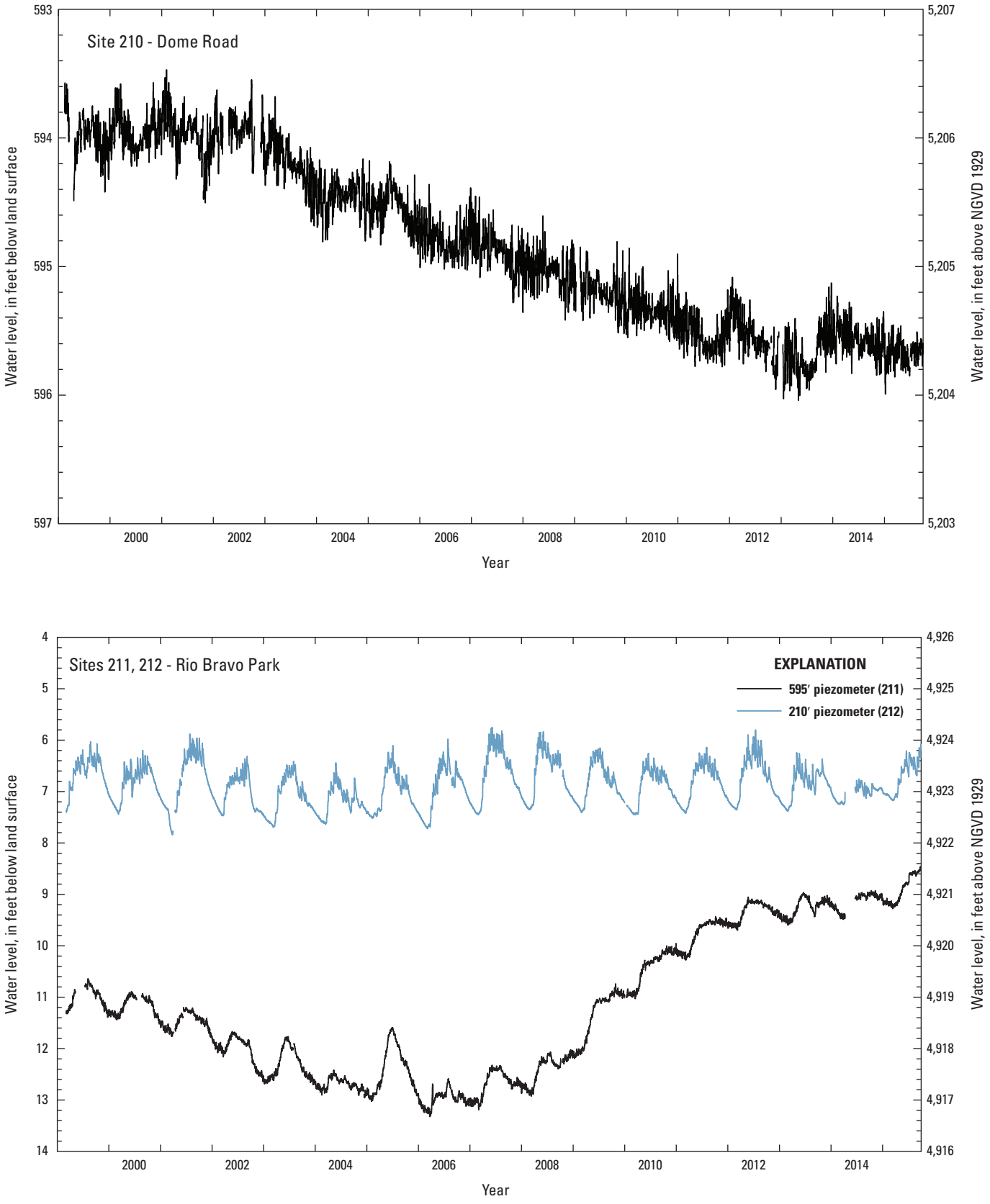

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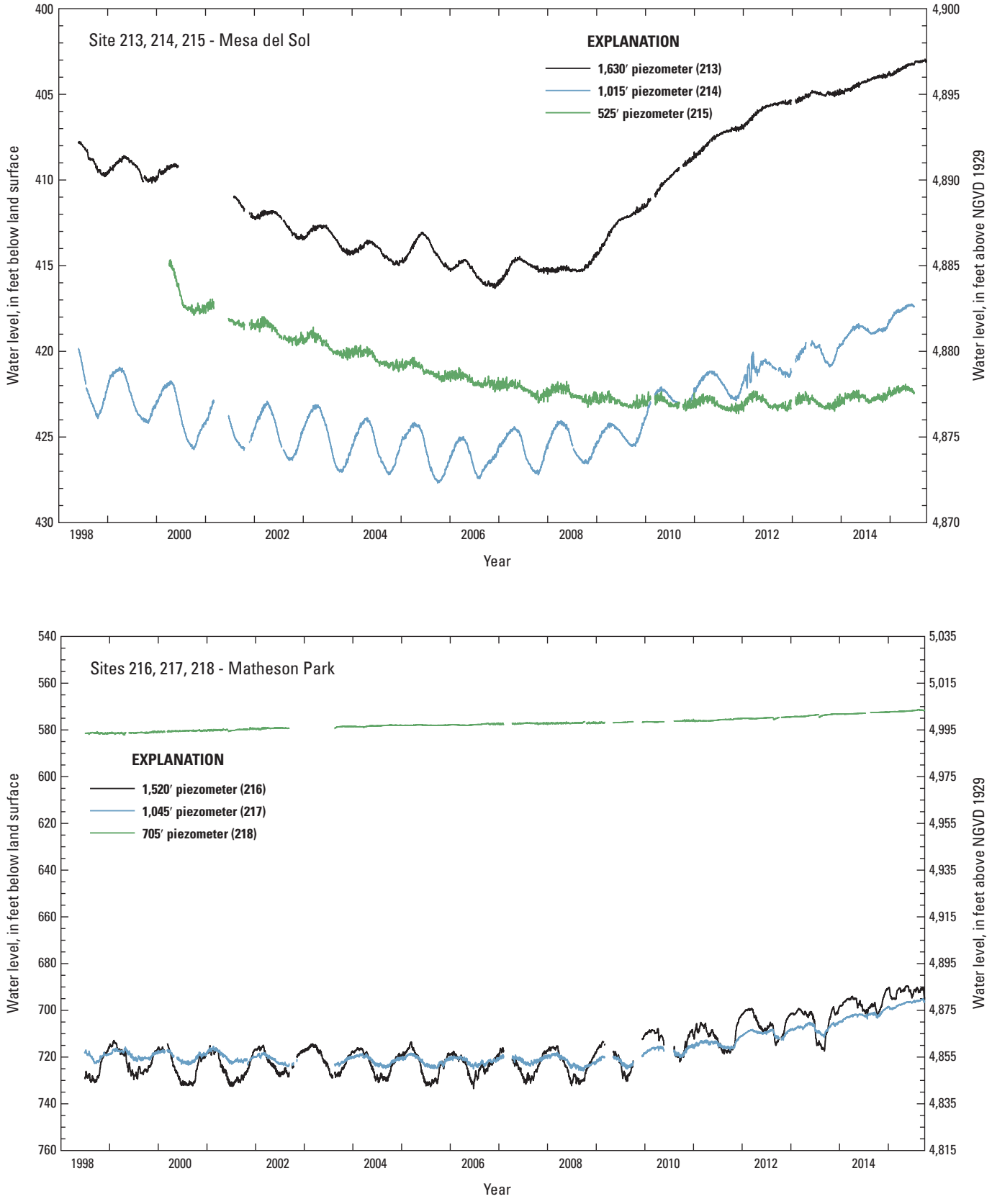

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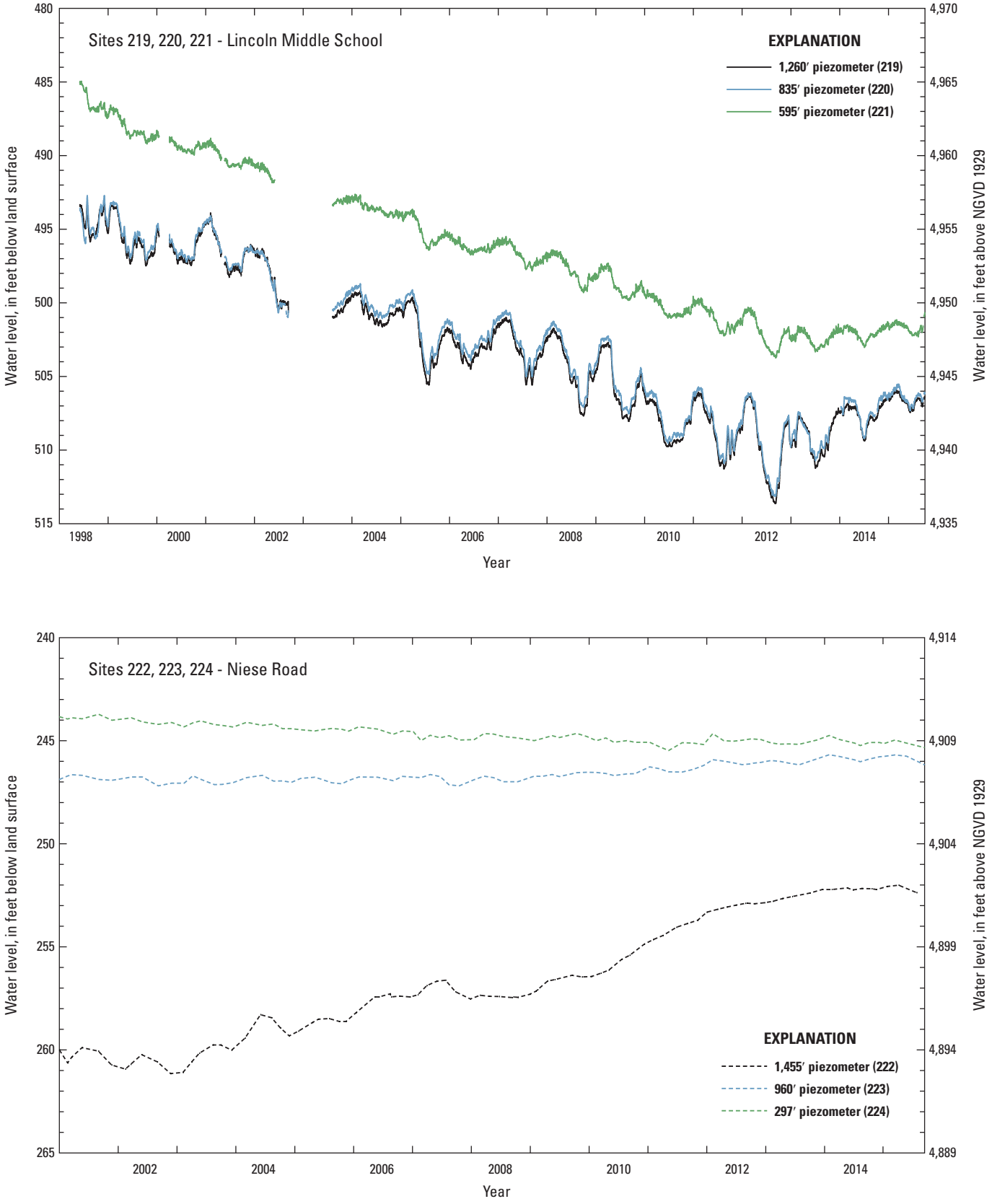

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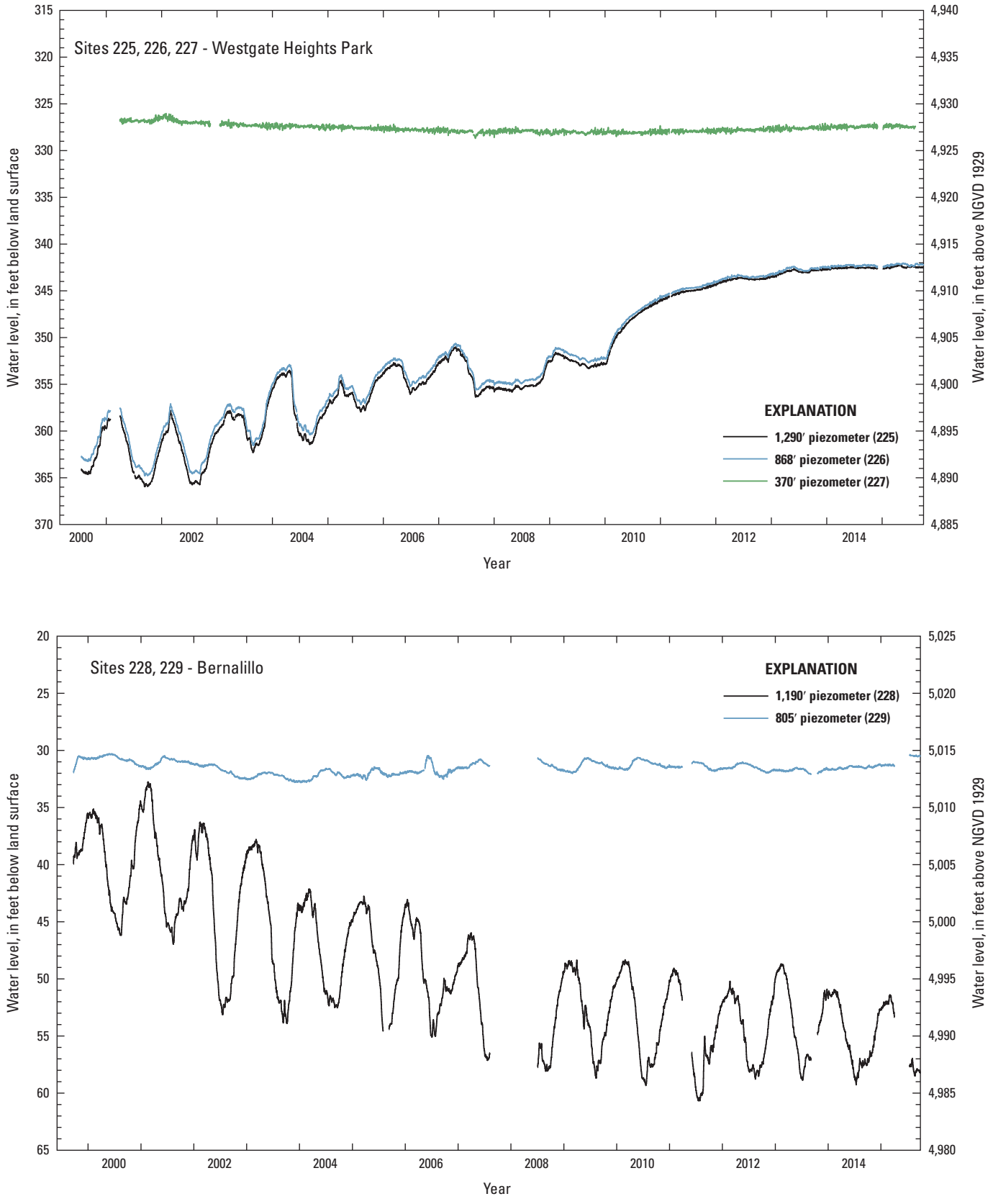

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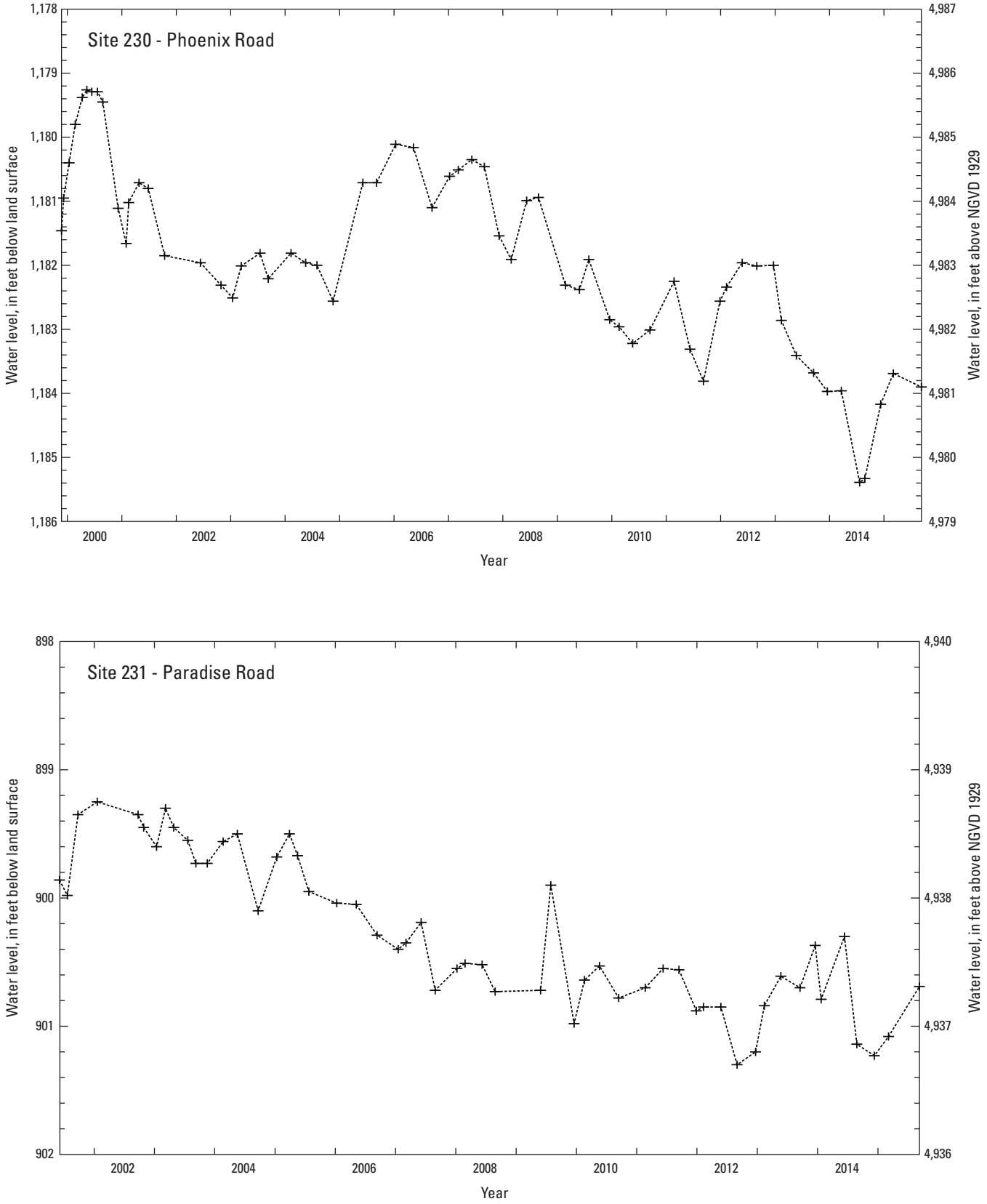

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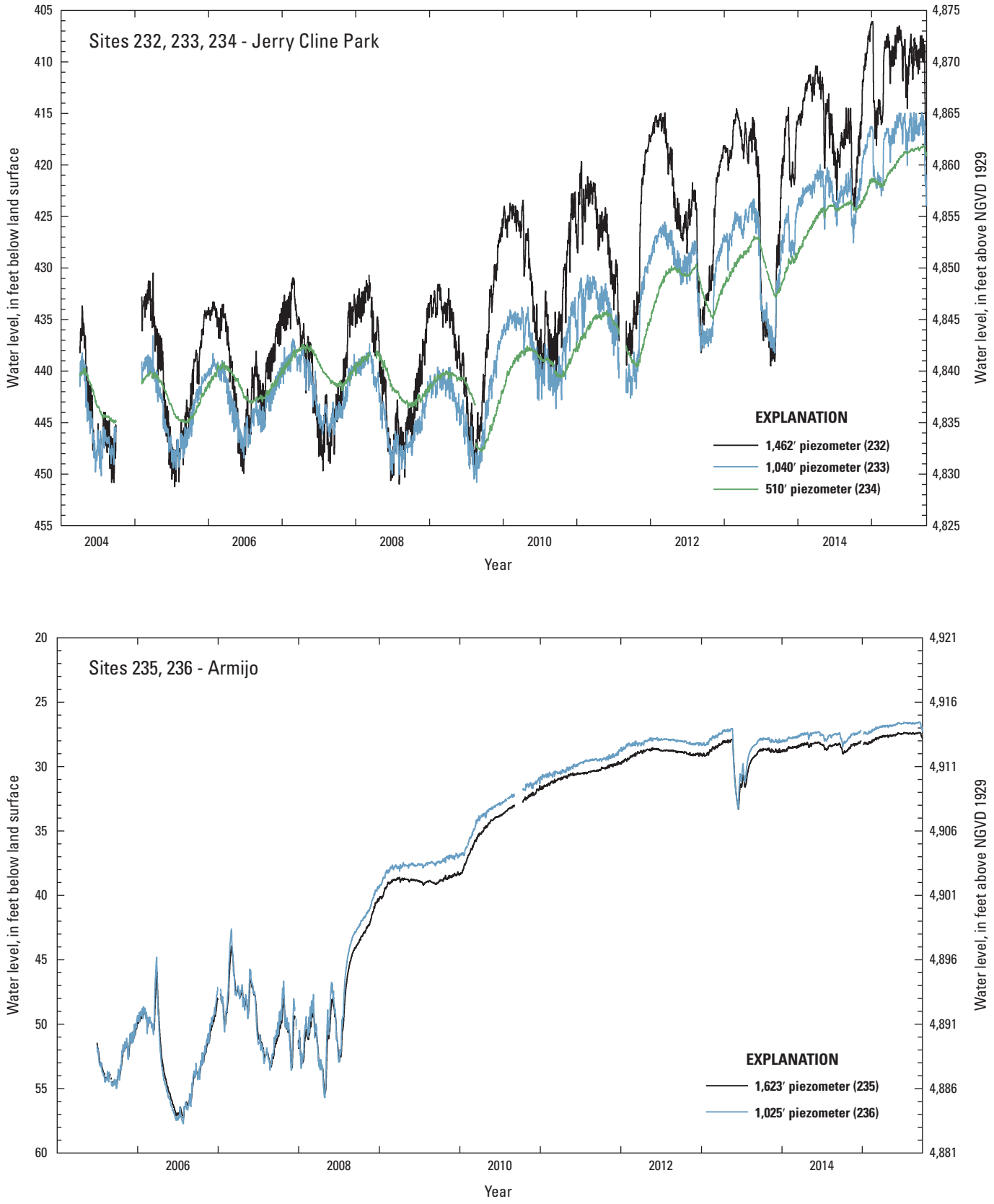

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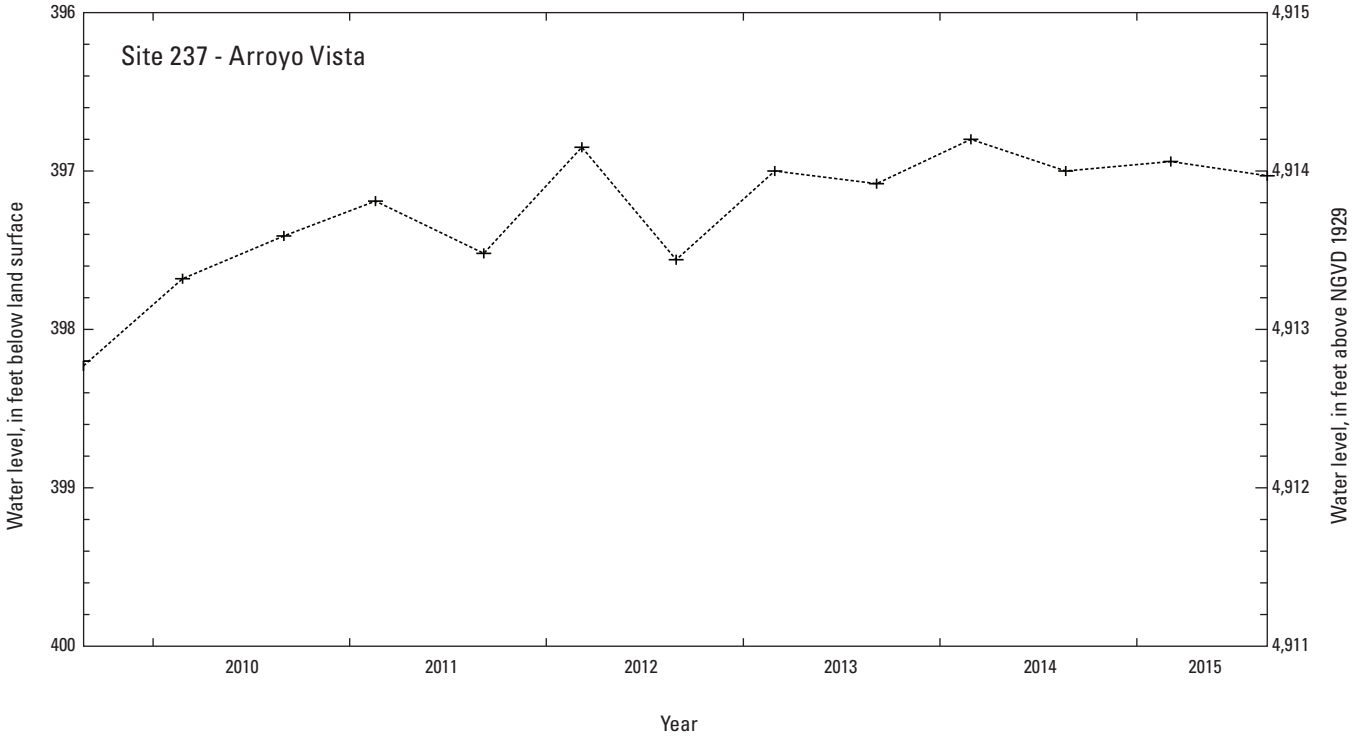

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