

Report on the Quality of Land Surface Observations in Region II (Asia)

January – June 2025

No. 69

December 2025

RSMC Tokyo

Lead Center for Monitoring Quality of Land Surface Observations

Japan Meteorological Agency

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Japan

**Report on the Quality of Land Surface Observations in Region II
(No. 69)
January – June 2025**

Summary

In its role as a Lead Center, RSMC Tokyo has issued the 69th report on the land surface observation quality monitoring for the period from January to June 2025. The report includes a consolidated list of stations suspected of producing low-quality observation data.

(1) SLP

As a result of monitoring, eight stations (35284, 38313, 38318, 41265, 41396, 41437, 48018, 48986) were excluded from the consolidated lists of the previous report (July – December 2024), and three stations (41171, 41175, 41177) were newly added to the lists.

(2) MSLP

As a result of monitoring, two stations (31445, 48986) were excluded from the consolidated lists of the previous report (July – December 2024), and five stations (41171, 41175, 41177, 41710, 42849) were newly added to the lists.

(3) GZ

As a result of monitoring, one station (48043) was newly added to the lists.

1. Introduction

Pursuant to Paragraph 22 of Attachment II.7 of the Manual on the Global Data Processing and Forecasting System (WMO No. 485), the Regional Specialized Meteorological Center (RSMC) Tokyo was designated by the President of the Commission for Basic Systems (CBS) as a Lead Center for monitoring the quality of land surface observations (i.e., SYNOP) in Region II in March 1991. The Center is responsible for monitoring the quality of land surface observations and maintaining consolidated lists of stations suspected of reporting low-quality observation data together with adequate evidence. The lists are to be passed on to the WMO Secretariat and monitoring centers participating in this activity as well as to Members of Regional Association (RA) II for their reference.

2. Monitored Data

Monitored surface observation data are obtained at 00, 06, 12 and 18 UTC and collected at RSMC Tokyo before the data cut-off time, defined as the end of the period in which observation data are gathered for operational analysis. The cut-off times for Japan Meteorological Agency (JMA) global analysis are shown in Table 1.

Table 1 Data cut-off times for JMA global analysis.

Analysis time	Data cut-off time
00 UTC	11:50 UTC
06 UTC	13:50 UTC
12 UTC	23:50 UTC
18 UTC	01:50 UTC

The observation elements monitored are (1) station level pressure, (2) mean sea level pressure and (3) geopotential height, hereafter referred to as SLP, MSLP and GZ, respectively. In accordance with the Manual on Codes (WMO No. 306) Volume II, GZ data on an agreed standard pressure level are reported at the stations whose elevation is higher than 800 m. Standard pressure levels defined in line with station elevation are shown in Table 2.

Table 2 Elevation of stations reporting GZ data and corresponding standard pressure levels.

Station elevation (m)	Pressure level (hPa)
800 - 2,300	850
2,300 - 3,700	700
Higher than 3,700	500

The numbers of stations reporting SLP, MSLP and/or GZ data in Region II are shown in Table 3, and the locations of these land surface stations are shown in Figure 1.

Table 3 Numbers of stations reporting SLP, MSLP and/or GZ data in Region II

Element	Number of stations
SLP	1931
MSLP	2012
GZ	100

3. Monitoring Methods

The three items described below are examined for each element.

- (i) Monthly statistics on observation deviations from the most recent forecast of JMA 's global model (referred to as first-guess values) (observation minus guess, hereafter referred to as O-G) and on related trends over the monitoring period
- (ii) Monthly statistics on deviations from values observed at surrounding stations
- (iii) Reference information from other monitoring centers

Information on the latitude, longitude and altitude of each station is necessary for calculation of first-guess values. Such data for land surface station locations is retrieved from the surface-based observing

system component of the Observing Systems Capability Analysis and Review Tool (OSCAR/Surface)* , replacing WMO No. 9, Volume A.

The monitoring procedure has two steps as outlined below.

(1) Exclusion of data with gross errors from the statistical calculation sample

The following thresholds are applied for the gross error check in the first step:

$$\begin{aligned} |O-G| &\geq 15 \text{ hPa for SLP and MSLP} \\ |O-G| &\geq 100 \text{ gpm for GZ} \end{aligned}$$

Gross error data are excluded from the calculation of BIAS (the mean of O-G) and SD (the standard deviation of O-G).

(2) Identification of suspect stations

When the total number of observations (NOBS) is 181 or more, the next criteria are applied:

- BIAS	$ BIAS \geq 3 \text{ hPa for SLP and MSLP}$ $ BIAS \geq 30 \text{ gpm for GZ}$
- SD	$SD \geq 5 \text{ hPa for SLP and MSLP}$ $SD \geq 40 \text{ gpm for GZ}$
- Percentage of gross errors (PGE)	$PGE \geq 25\%$

Stations with even one statistic exceeding the threshold are considered suspect.

Note:

- (i) The quality of observation data from stations is not checked when the NOBS value is less than 181 or the difference between the station elevation and the model elevation is greater than 1,000 m. MSLP reports are also not checked for stations located at altitudes higher than 1,000 m above sea level.
- (ii) In case of low quality of the first-guess field, those statistics can exceed the threshold and the stations are listed in the consolidated list. To avoid such situations, statistics of surrounding stations and information from other monitoring centers are also used to judge whether the quality of the station's first-guess field value is appropriate.

*<https://oscar.wmo.int/surface/index.html#/>

4. Monitoring Results

4.1 Consolidated list of suspect stations throughout the period

Table 4 List of suspect land surface stations during the period from January to June 2025

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
30673	53.8	119.7	625	747	SLP	724	0	0.9	-8.6	8.6
					MSLP	724	0	1.4	0.2	1.4
35615	47.6	53.3	-21	-16	SLP	680	0	0.5	0.3	0.6
					MSLP	680	0	0.6	5.3	5.3
35701	47.2	51.0	-27	-24	SLP	710	0	0.5	0.1	0.5
					MSLP	710	0	0.6	6.6	6.6
38262	43.0	59.8	93	64	SLP	724	0	0.7	3.5	3.6
					MSLP	724	0	0.8	0.4	0.9
38567	40.1	65.4	340	407	SLP	720	1	1.3	-6.9	7.0
					MSLP	720	0	1.4	-6.9	7.0
38836	38.6	68.7	800	1034	SLP	719	1	1.2	-2.7	3.0
					MSLP	715	0	1.9	-3.7	4.2
38875	39.0	73.6	3930	4259	SLP	344	100	*****	*****	*****
					-	-	-	-	-	-
38880	38.0	58.4	312	199	SLP	723	0	1.3	11.9	12.0
					MSLP	722	0	0.9	0.1	0.9
38944	37.5	69.4	447	622	SLP	720	0	1.1	-5.5	5.6
					MSLP	721	0	1.4	-5.5	5.7
41249	23.9	56.2	633	784	SLP	720	0	0.4	-0.6	0.7
					GZ850	421	97	56.2	-13.9	57.9
41315	17.3	54.1	881	641	SLP	724	97	0.4	14.6	14.6
					GZ850	711	90	58.6	1.6	58.6
41573	33.9	73.4	2127	1411	SLP	715	0	1.3	8.9	9.0
					GZ850	717	0	12.9	-0.5	12.9
41757	25.1	62.3	96	-6	SLP	715	0	1.0	10.1	10.1
					MSLP	715	0	0.7	0.4	0.8
42045	33.5	75.2	1630	2356	SLP	543	0	1.5	-6.4	6.6
					GZ850	543	1	15.4	-67.0	68.7
42056	32.7	74.8	323	295	SLP	722	0	1.0	-6.6	6.7
					-	-	-	-	-	-
42083	31.1	77.2	2202	1552	SLP	353	76	0.3	14.7	14.7
					GZ850	18	100	*****	*****	*****
42111	30.3	78.1	683	851	SLP	720	0	0.9	5.9	6.0
					MSLP	721	0	1.6	-1.4	2.1
42114	30.4	78.4	770	1482	SLP	362	100	*****	*****	*****
					-	-	-	-	-	-
42147	29.5	79.7	2311	1687	SLP	362	0	0.6	4.6	4.6

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
					-	-	-	-	-	-
42299	27.3	88.6	1756	1964	SLP	362	0	0.8	0.3	0.9
					GZ850	362	0	9.5	56.2	57.0
44406	29.3	80.9	617	1459	SLP	482	0	1.9	4.2	4.6
					MSLP	482	0	3.5	-3.0	4.6
47020	41.0	126.6	306	677	SLP	723	0	1.0	-0.4	1.1
					MSLP	723	0	2.5	8.5	8.9
47037	40.0	125.3	99	217	SLP	723	0	1.4	-4.0	4.2
					MSLP	723	0	1.5	-4.0	4.3
48001	27.3	97.4	434	555	SLP	513	41	1.6	0.3	1.6
					MSLP	513	1	2.0	-1.2	2.3
48921	21.6	101.9	1360	1049	SLP	517	0	1.0	-4.6	4.7
					GZ850	514	100	5.0	-87.6	87.7
48925	20.7	102.0	636	960	SLP	488	0	1.2	-4.2	4.4
					MSLP	487	0	1.6	-2.7	3.1
48935	19.5	103.1	1094	1204	SLP	510	0	0.9	0.1	0.9
					GZ850	510	9	8.8	-87.4	87.8
48944	18.3	102.6	185	226	SLP	290	100	*****	*****	*****
					MSLP	290	1	3.0	-7.0	7.6
48952	15.7	106.4	180	288	SLP	527	0	1.2	3.3	3.5
					MSLP	527	0	1.2	2.1	2.4
48961	14.2	103.5	23	42	SLP	444	2	2.0	1.3	2.4
					MSLP	444	2	2.3	4.0	4.6
48963	12.8	102.6	170	353	SLP	346	36	2.1	10.1	10.3
					MSLP	346	54	1.0	12.3	12.3
48973	13.7	107.0	330	230	SLP	525	100	*****	*****	*****
					MSLP	525	100	*****	*****	*****

WMO IDENT: WMO station identification number
 LAT: station latitude
 LON: station longitude
 H: barometer elevation
 HM: model elevation
 ELEM: observed element
 NOBS: total number of observations during the period
 PGE: percentage of gross errors
 SD: standard deviation of (observation - guess)
 BIAS: bias of (observation - guess)
 RMS: root mean square of (observation - guess)

RUSSIAN FEDERATION IN ASIA

30673 - Negative bias of O-G at the station level (Figures 2 and 3)

KAZAKHSTAN

35615 - Positive bias of O-G at the mean sea level (Figures 4 and 5)

35701 - Positive bias of O-G at the mean sea level (Figures 4 and 6)

UZBEKISTAN

38262 - Positive bias of O-G at the station level (Figures 7 and 8)

38567 - Negative bias of O-G at the station level and at the mean sea level (Figures 9, 10 and 11)

TAJIKISTAN

38836 - Negative bias of O-G at the mean sea level (Figures 10 and 12)

38875 - Positive bias of O-G at the station level (Figure 13)

38944 - Negative bias of O-G at the station level and at the mean sea level (Figures 9, 10 and 15)

TURKMENISTAN

38880 - Positive bias of O-G at the station level (Figures 7 and 14)

OMAN

41249 - Negative bias of O-G at 850 hPa or 700 hPa (Figure 16)

41315 - Positive bias of O-G at the station level and negative bias of O-G at 850 hPa or 700 hPa (Figures 17 and 18)

PAKISTAN

41573 - Positive bias of O-G at the station level (Figures 19 and 20)

41757 - Positive bias of O-G at the station level (Figures 21 and 22)

INDIA

42045 - Negative bias of O-G at the station level and at 850 hPa (Figures 19, 23 and 24)

42056 - Negative bias of O-G at the station level (Figures 19 and 25)

42083 - Positive bias of O-G at the station level (Figures 19 and 26)

42111 - Positive bias of O-G at the station level (Figures 19 and 27)

42114 - Negative bias of O-G at the station level (Figure 28)

42147 - Positive bias of O-G at the station level (Figures 19 and 29)

42299 - Positive bias of O-G at 850 hPa (Figures 30 and 31)

NEPAL

44406 - Positive bias of O-G at the station level (Figures 19 and 32)

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF

47020 - Positive bias of O-G at the mean sea level (Figures 33 and 34)

47037 - Negative bias of O-G at the station level and at the mean sea level (Figures 33, 35 and 36)

MYANMAR

48001 - Intermittent Positive bias of O-G at the station level (Figure 37)

LAO PEOPLE'S DEMOCRATIC REPUBLIC

48921 - Negative bias of O-G at the station level and at 850 hPa (Figures 38 and 39)

48925 - Negative bias of O-G at the station level (Figures 38 and 40)

48935 - Negative bias of O-G at 850 hPa (Figures 41 and 42)

48944 - Negative bias of O-G at the station level and at the mean sea level (Figures 43 and 44)

48952 - Positive bias of O-G at the station level (Figures 38 and 45)

CAMBODIA

48961 - Positive bias of O-G at the mean sea level (Figures 43 and 46)

48963 - Positive bias of O-G at the station level and at the mean sea level (Figures 43, 47 and 48)

48973 - Positive bias of O-G at the station level and at the mean sea level (Figure 49)

4.2 Stations where quality deteriorated during the period

Table 5 List of suspect land surface stations where quality deteriorated during the period

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
41171	25.4	51.5	24	13	SLP	326	0	0.5	3.2	3.2
					MSLP	326	0	0.5	3.2	3.2
41175	25.0	51.0	48	56	SLP	326	0	0.4	6.0	6.0
					MSLP	326	0	0.4	6.3	6.3
41177	24.7	51.2	46	34	SLP	326	0	0.4	5.5	5.5
					MSLP	326	0	0.4	5.8	5.8
41710	28.8	62.8	683	685	SLP	714	0	1.2	-2.2	2.5
					MSLP	714	0	1.5	-3.4	3.7
42849	21.8	75.6	252	256	MSLP	181	0	3.0	3.7	4.8
					-	-	-	-	-	-
48043	22.0	96.5	1078	946	GZ850	261	100	*****	*****	*****
					-	-	-	-	-	-

QATAR

41171 - Positive bias of O-G at the station level and at the mean sea level (Figures 50, 51 and 52)

41175 - Positive bias of O-G at the station level and at the mean sea level (Figures 50, 51 and 53)

41177 - Positive bias of O-G at the station level and at the mean sea level (Figures 50, 51 and 54)

PAKISTAN

41710 - Negative bias of O-G at the mean sea level (Figures 55 and 56)

INDIA

42849 - Positive bias of O-G at the mean sea level (Figures 57 and 58)

MYANMAR

48043 - Negative bias of O-G at 850 hPa (Figure 59)

4.3 Stations improved and excluded from the previous consolidated list

KAZAKHSTAN

35284 - Quality has improved with use of site elevation data (rather than instrument elevation data) in OSCAR/Surface. (Figure omitted)

38313 - Quality has improved with a metadata update in OSCAR/Surface. (Figure omitted)

38318 - Quality has improved with use of site elevation data (rather than instrument elevation data) in OSCAR/Surface. (Figure omitted)

OMAN

41265 - Quality has improved with use of site elevation data (rather than instrument elevation data) in OSCAR/Surface. (Figure omitted)

4.4 Stations removed from the previous consolidated list

RUSSIAN FEDERATION IN ASIA

31445 - No reports during the period

YEMEN

41396 - Although station 41396 still displays positive biases of O-G at the station level, it was removed from the consolidated list because the number of reports (135) was insufficient for quality checking. (Figure 60)

41437 - Although station 41437 still displays negative biases of O-G at the station level, it was removed from the consolidated list because the number of reports (79) was insufficient for quality checking. (Figure 61)

MYANMAR

48018 - Although station 48018 still displays positive biases of O-G at the station level, it was removed from the consolidated list because the number of reports (136) was insufficient for quality check-

ing. (Figure 62)

CAMBODIA

48986 - No reports during the period

5. Possible Causes of Remarkable and Sustained Biases

The following are possible causes of remarkable and sustained biases

- (i) The barometer used for observation is not correctly calibrated.
- (ii) The latitude, longitude or altitude of the station in OSCAR/Surface has not been updated in a timely and appropriate manner. This could result in remarkable biases because it may cause incorrect calculated first-guess field values.
- (iii) Biases are specific to the NWP model used in quality monitoring.

Note: Model biases are likely to appear in relatively large areas.

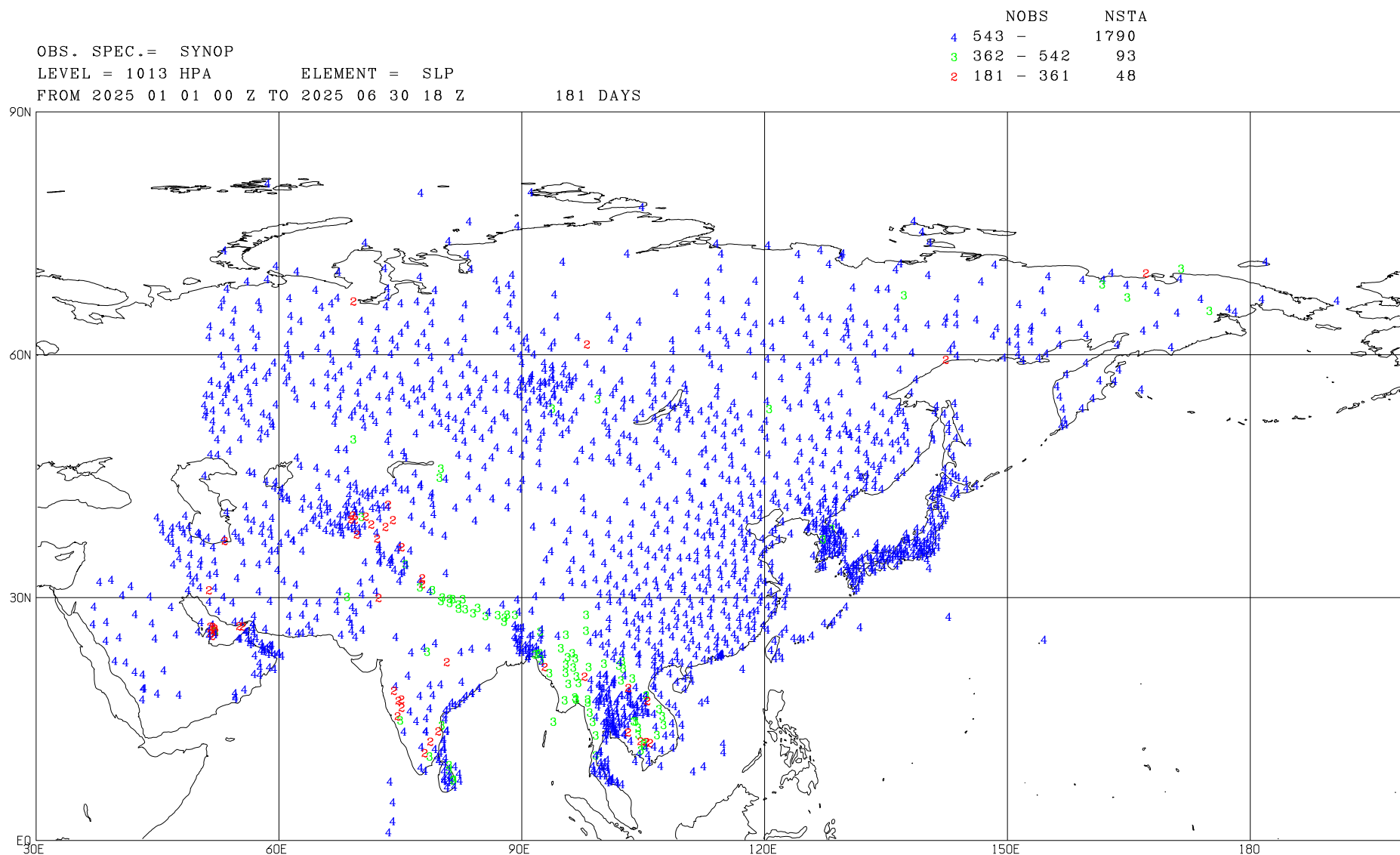


Figure 1(a) Location of all land surface stations reporting station level pressure (SLP) observations in Region II over the six-month period from January to June 2025. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting SLP are shown at the top of the figure.

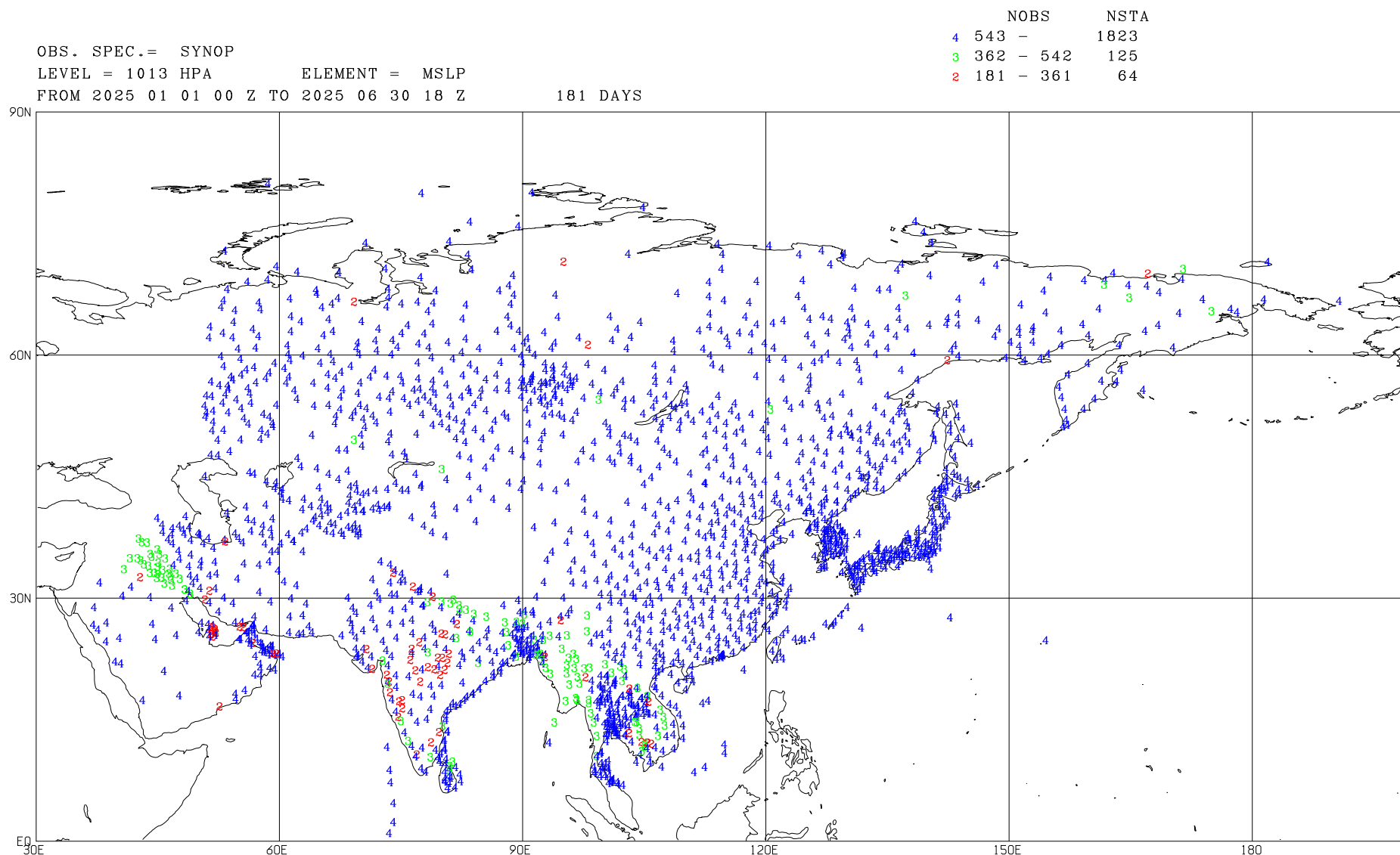


Figure 1(b) Location of all land surface stations reporting mean sea level pressure (MSLP) observations in Region II over the six-month period from January to June 2025. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting MSLP are shown at the top of the figure.

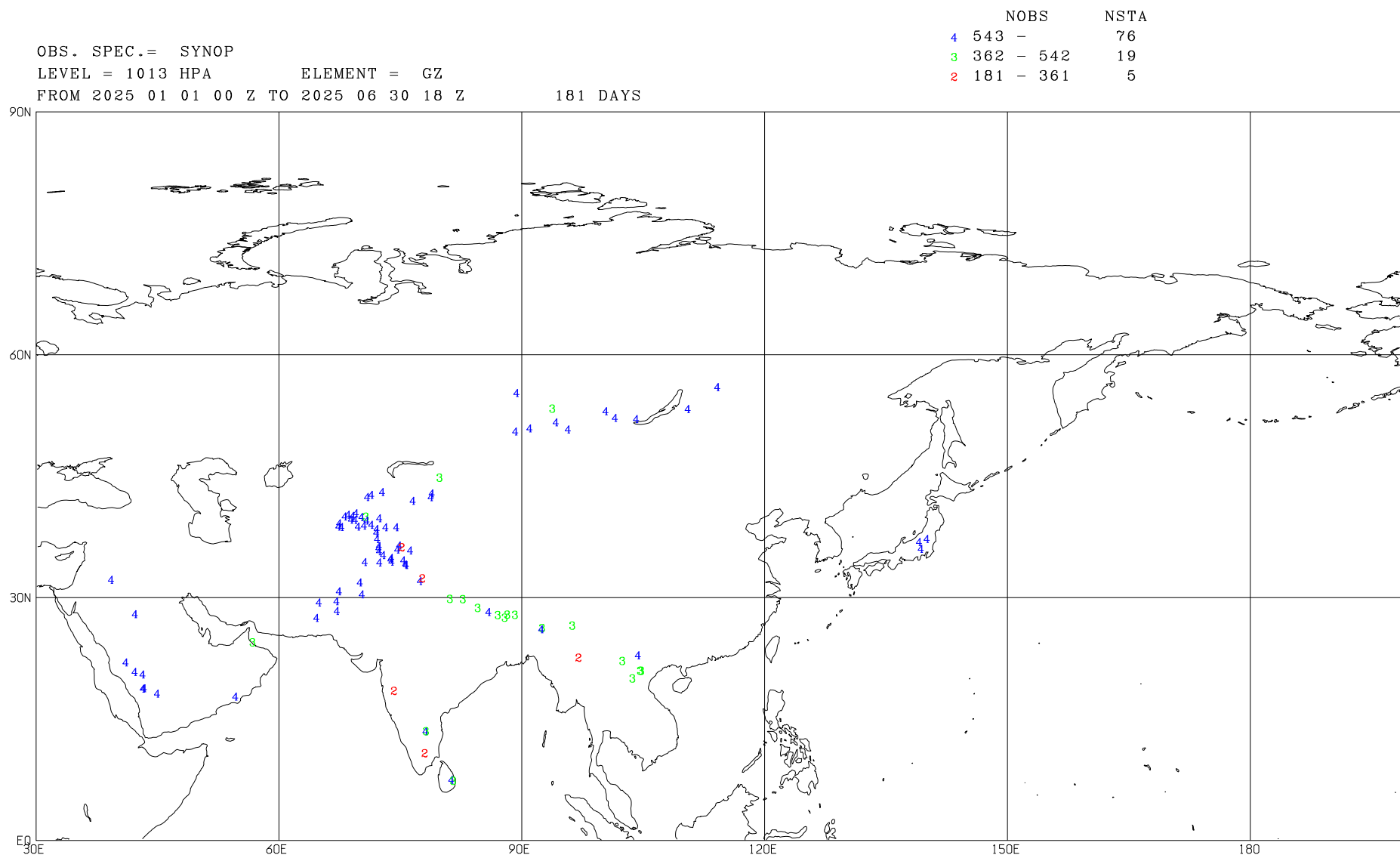


Figure 1(c) Location of all land surface stations reporting geopotential height (GZ) observations in Region II over the six-month period from January to June 2025. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting GZ are shown at the top of the figure.

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

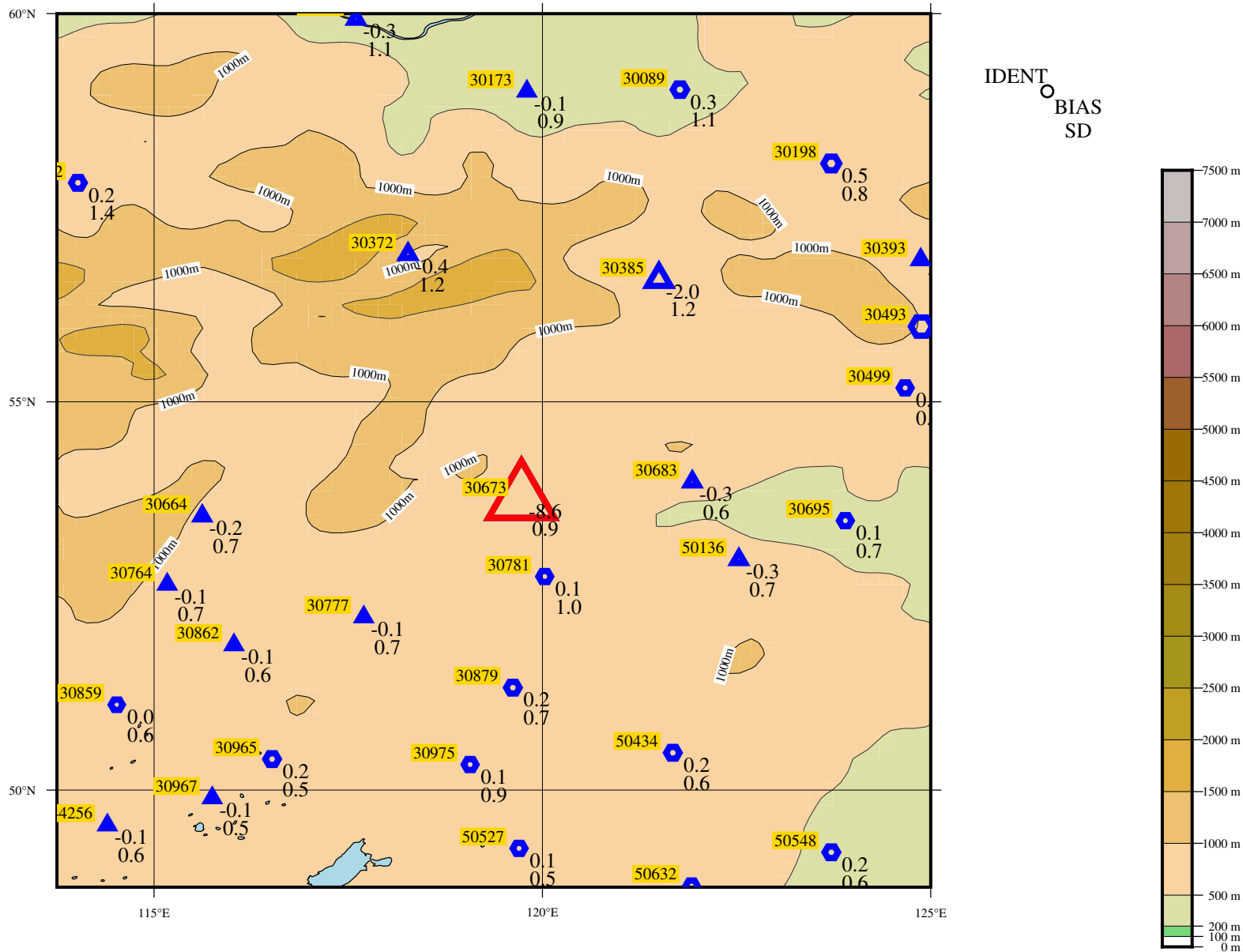
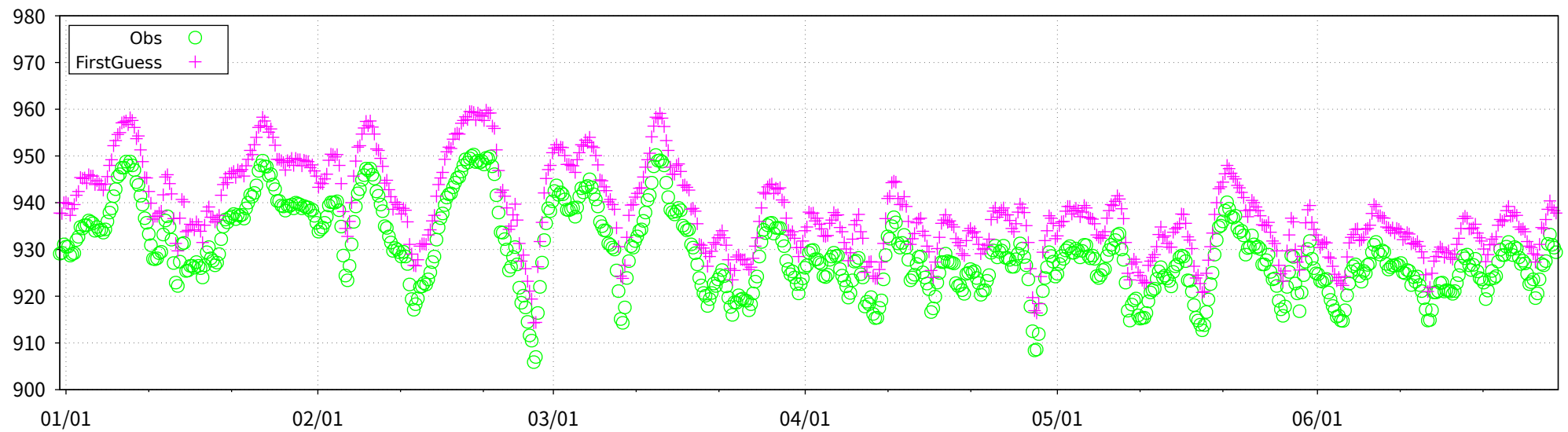


Figure 2 BIAS and SD of SLP for station 30673 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 30673 (lat: 53.8N, lon: 119.7E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

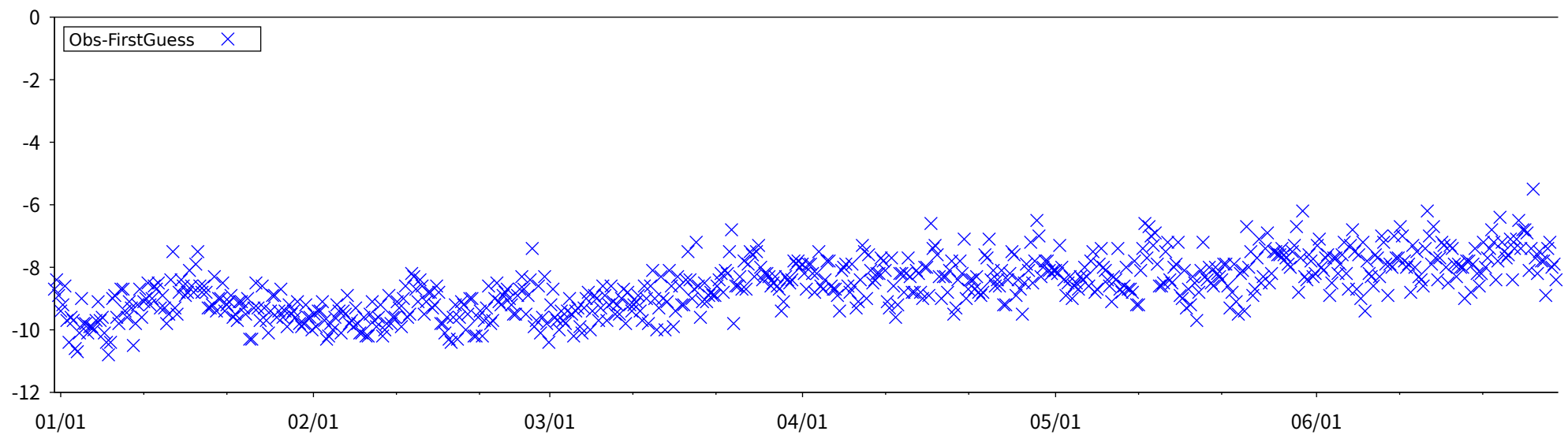


Figure 3 Time-series representation of SLP Obs minus FirstGuess for station 30673

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

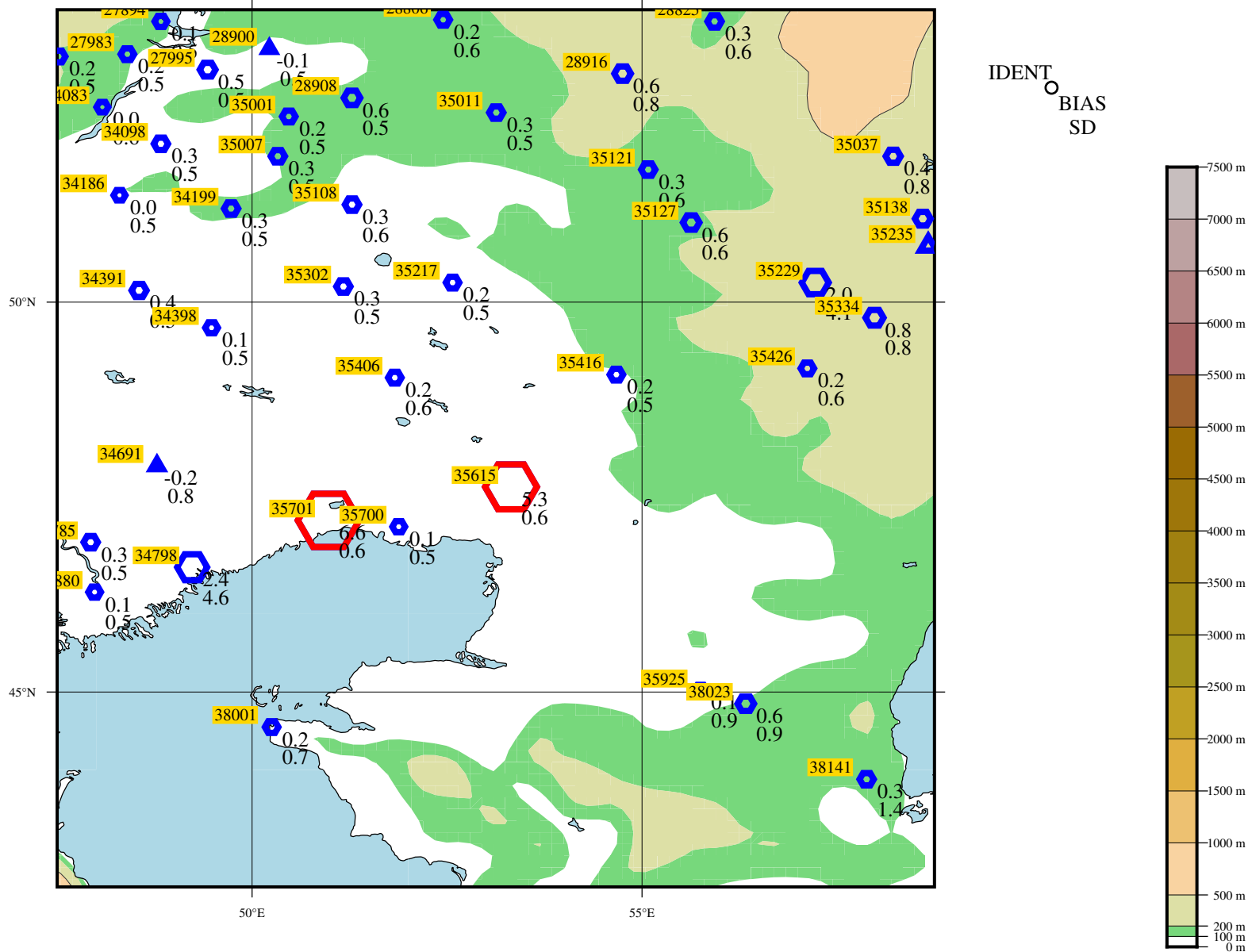


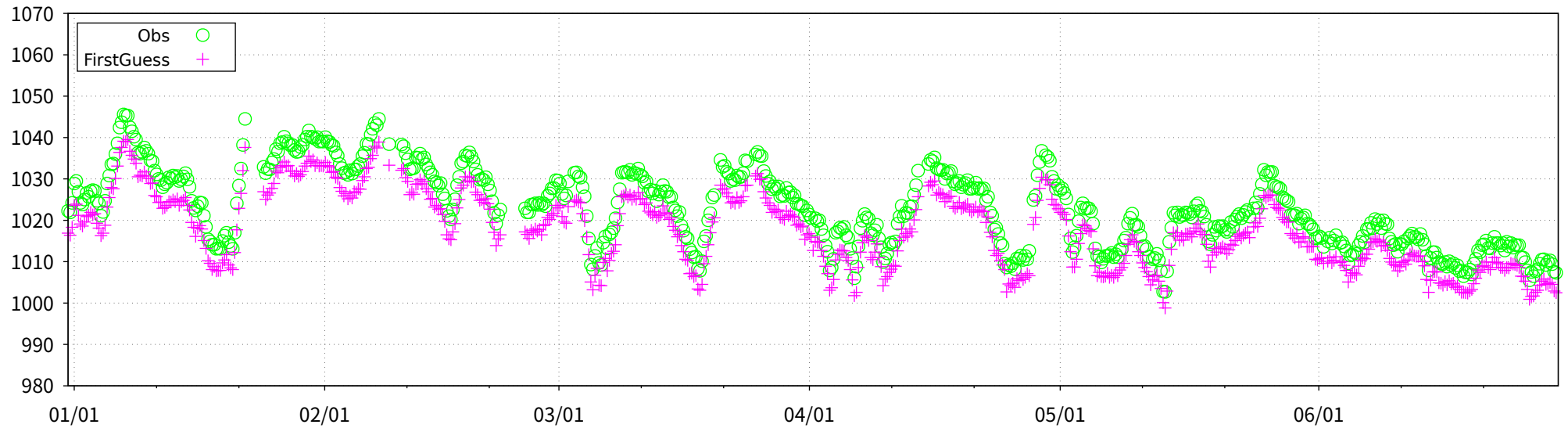
Figure 4 BIAS and SD of MSLP for station 35615, 35701 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 35615 (lat: 47.6N, lon: 53.3E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

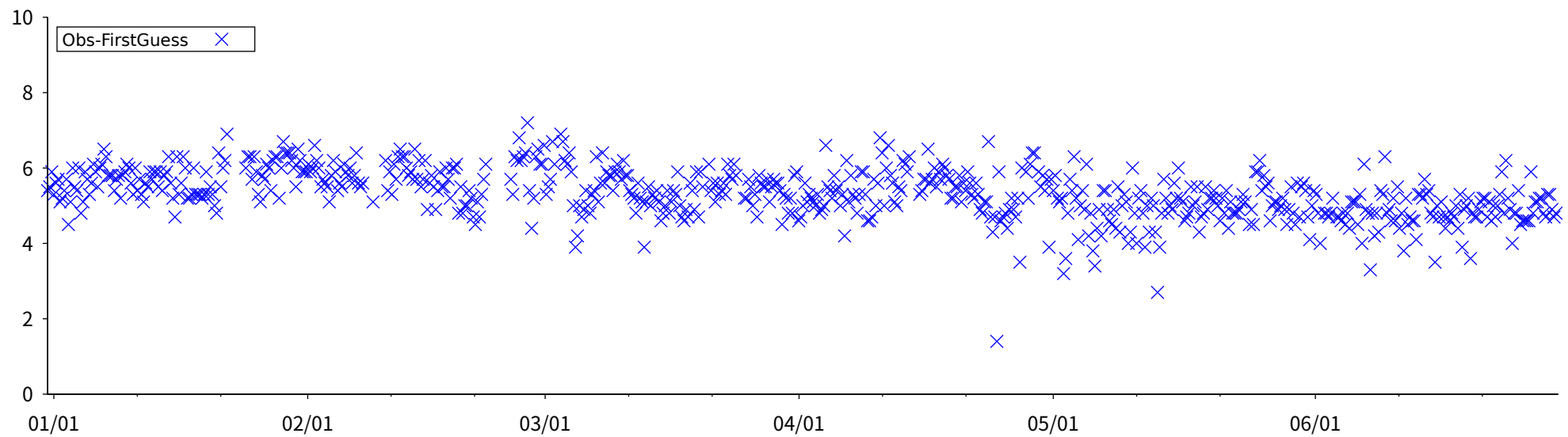
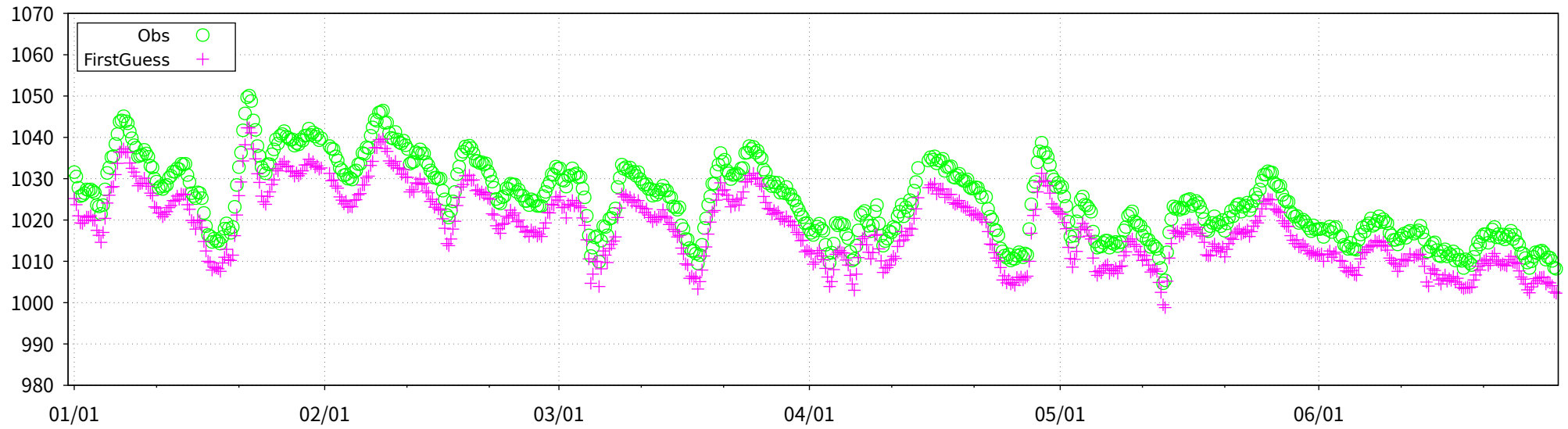


Figure 5 Time-series representation of MSLP Obs minus FirstGuess for station 35615

ID: 35701 (lat: 47.2N, lon: 51.0E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

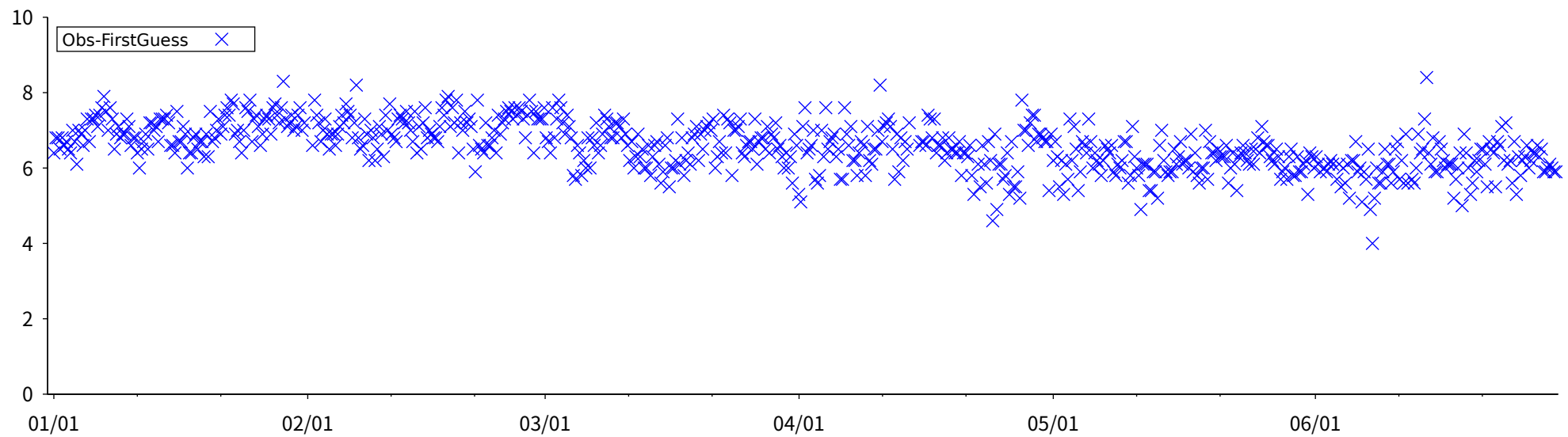


Figure 6 Time-series representation of MSLP Obs minus FirstGuess for station 35701

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

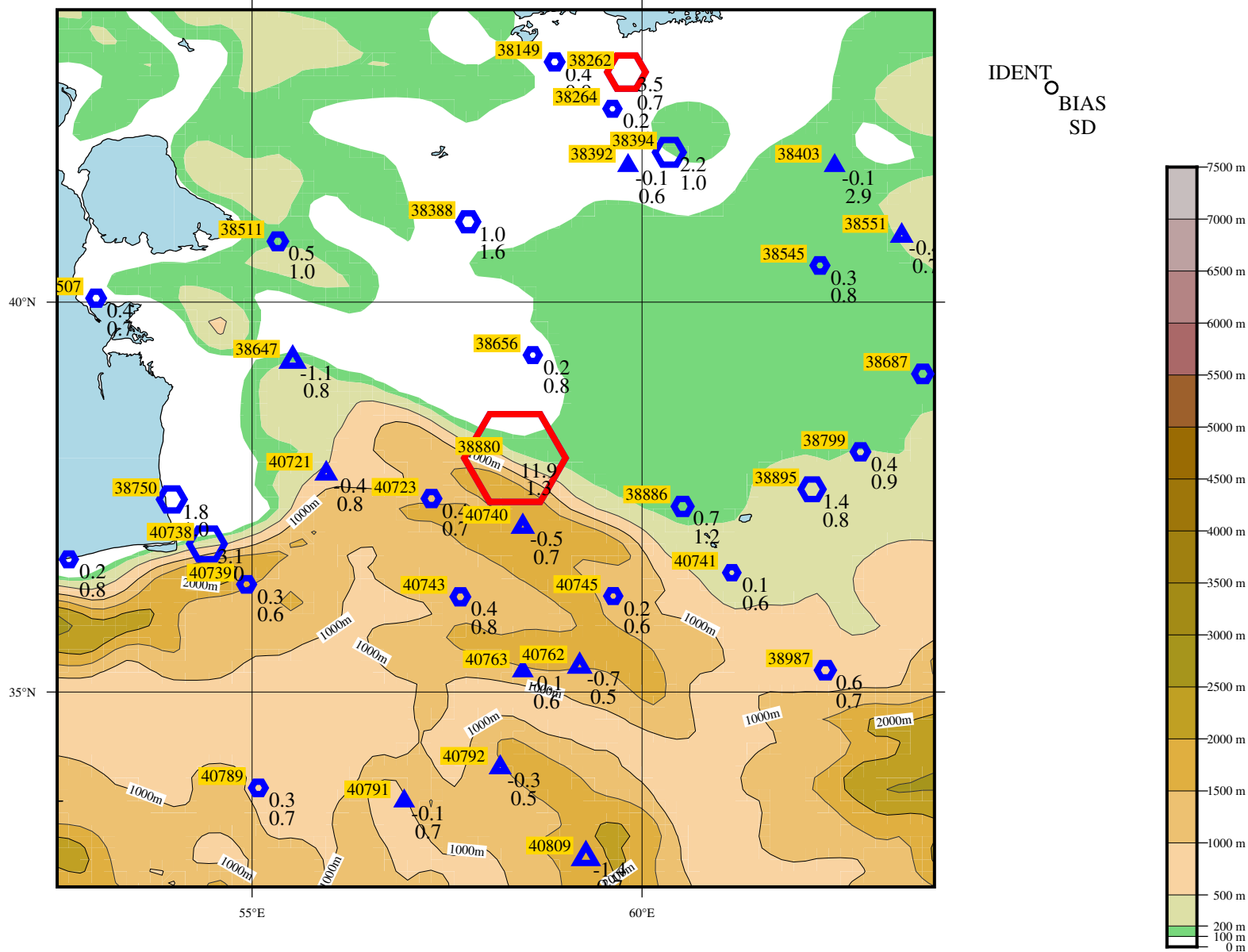


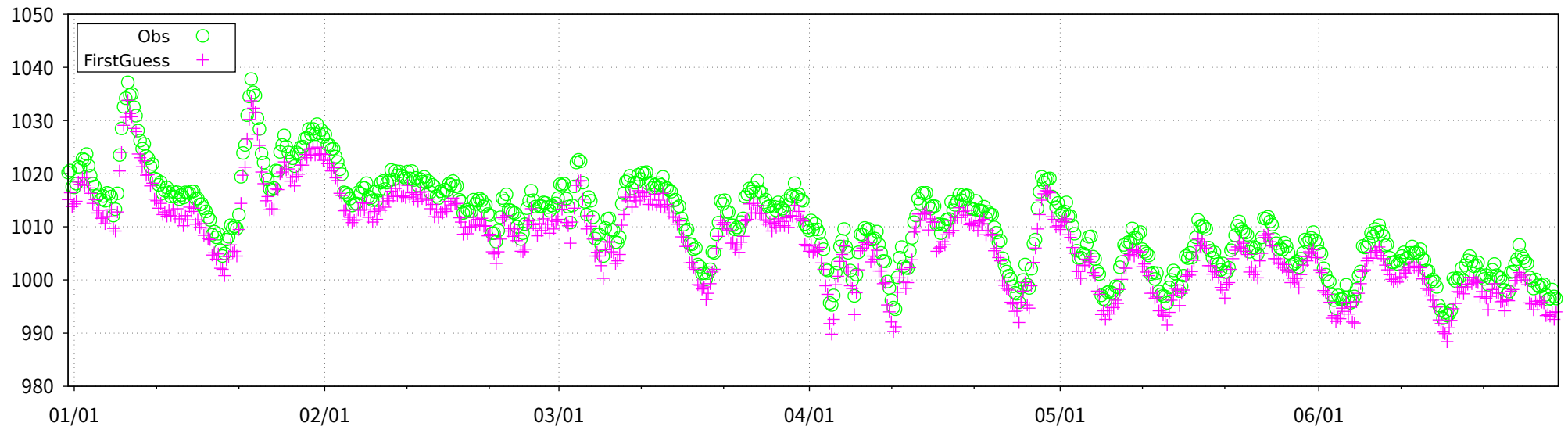
Figure 7 BIAS and SD of SLP for station 38262, 38880 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 38262 (lat: 43.0N, lon: 59.8E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

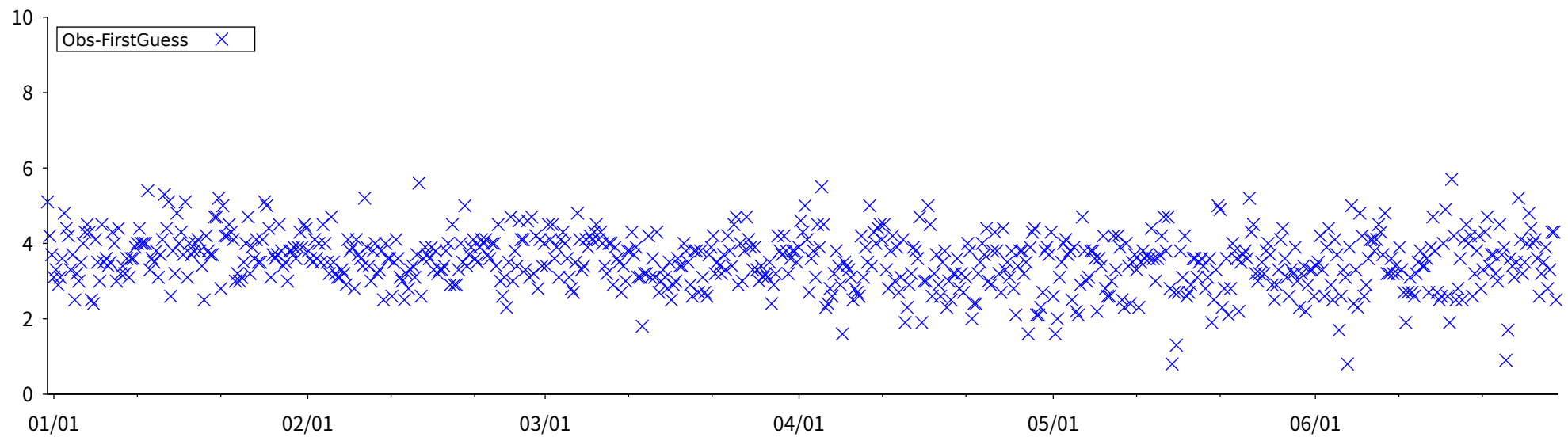


Figure 8 Time-series representation of SLP Obs minus FirstGuess for station 38262

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

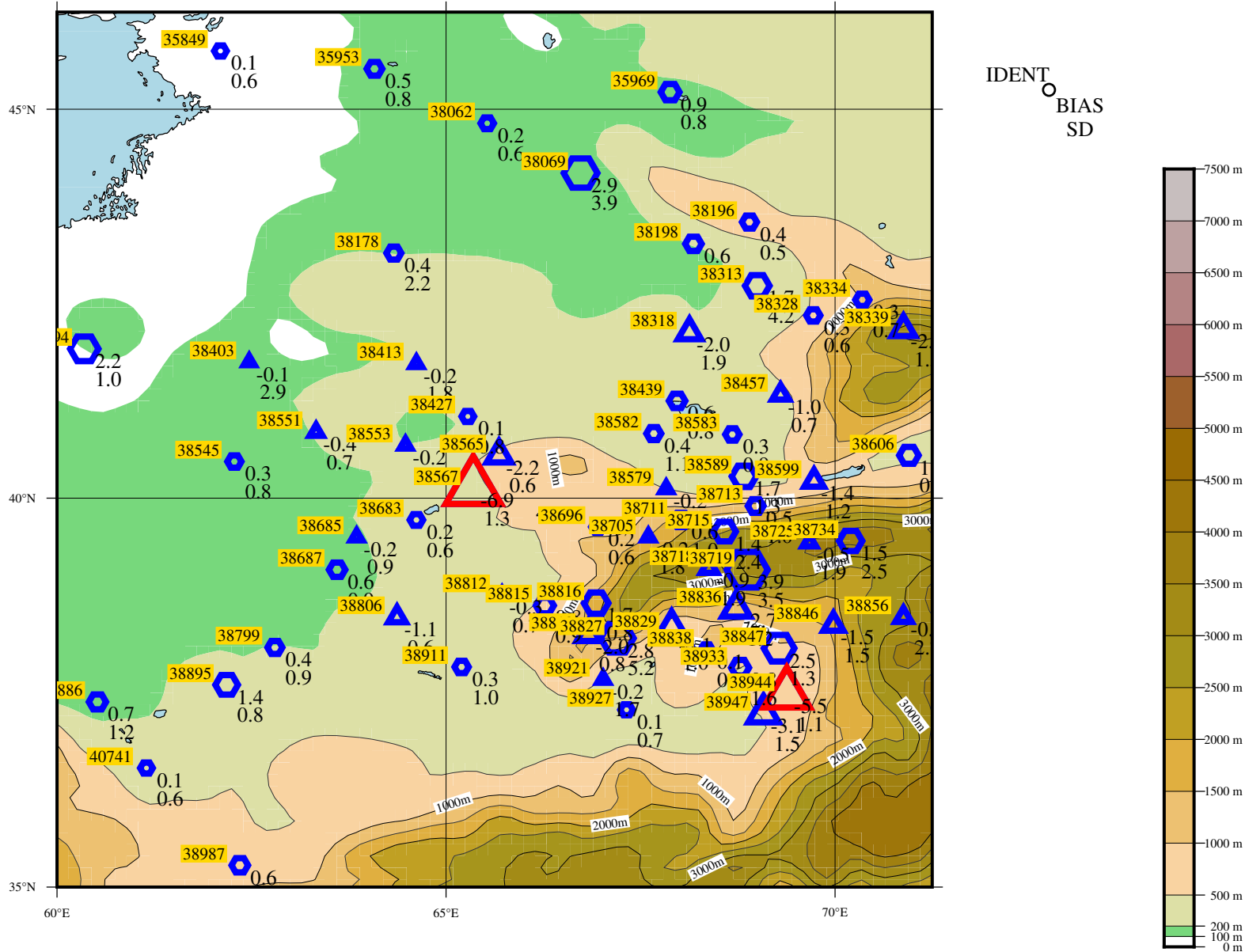


Figure 9 BIAS and SD of SLP for station 38567, 38944 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

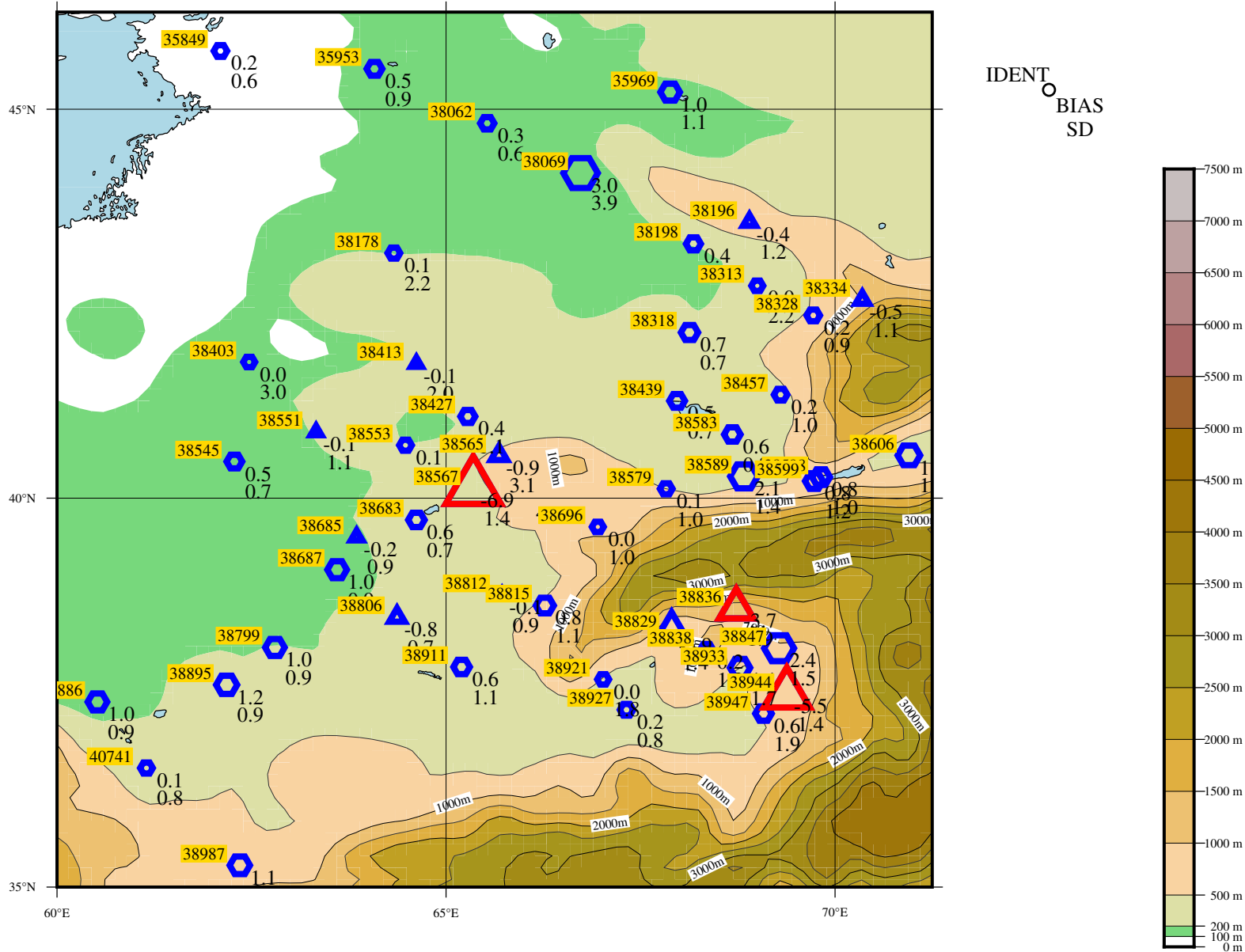
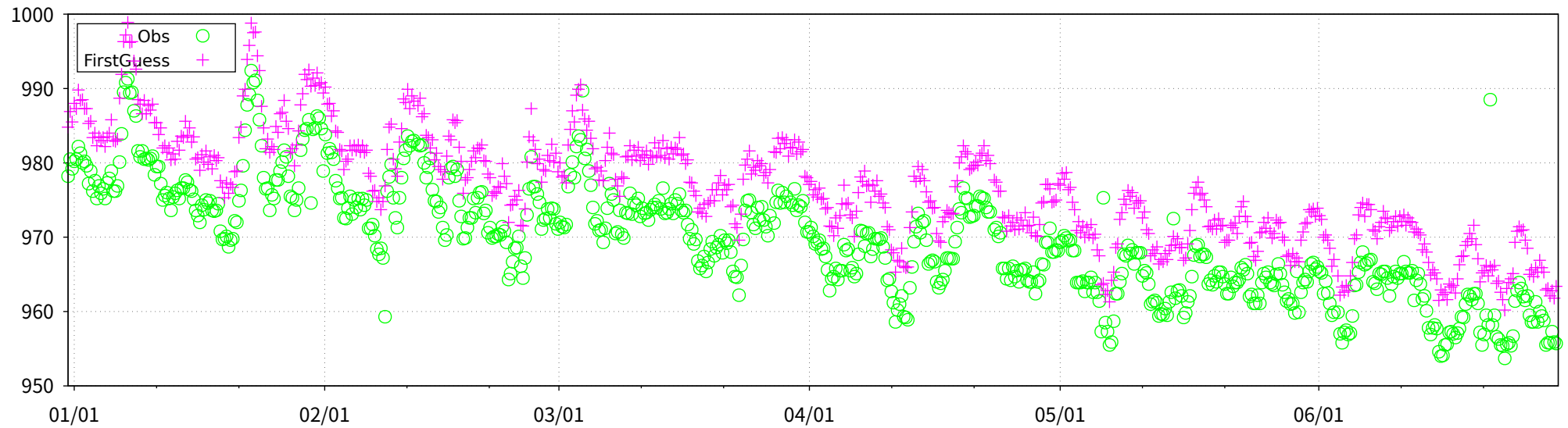


Figure 10 BIAS and SD of MSLP for station 38567, 38836, 38944 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 38567 (lat: 40.1N, lon: 65.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

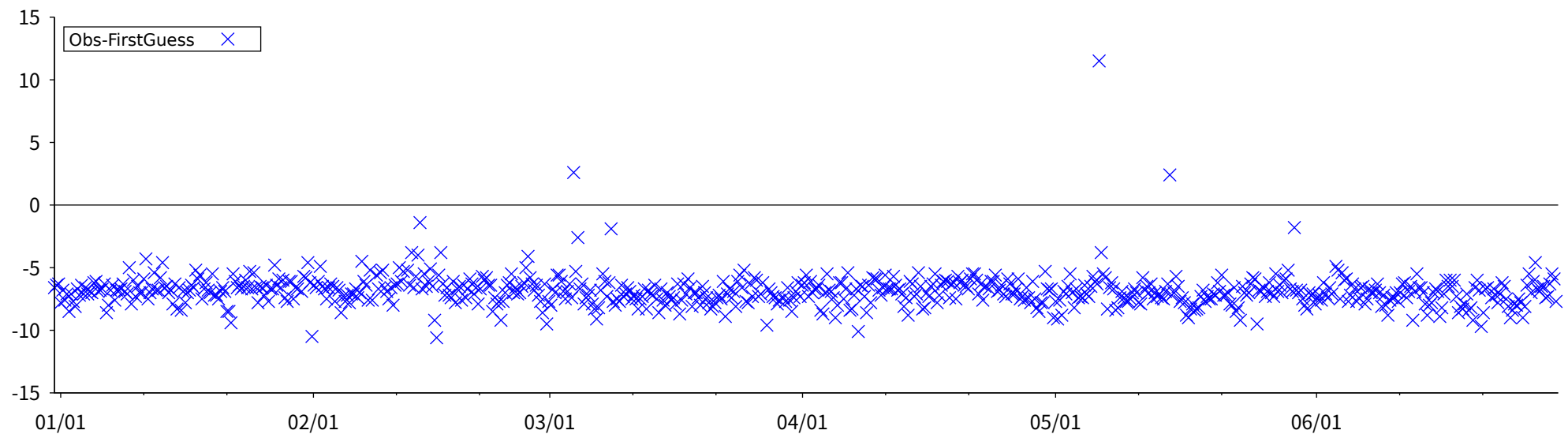
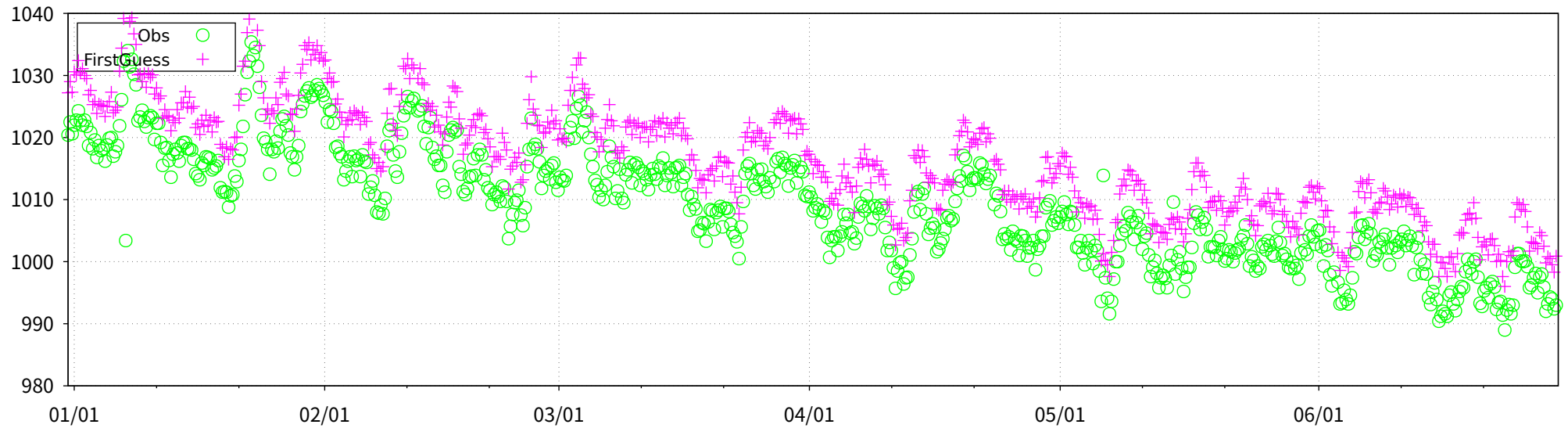


Figure 11(a) Time-series representation of SLP Obs minus FirstGuess for station 38567

ID: 38567 (lat: 40.1N, lon: 65.4E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

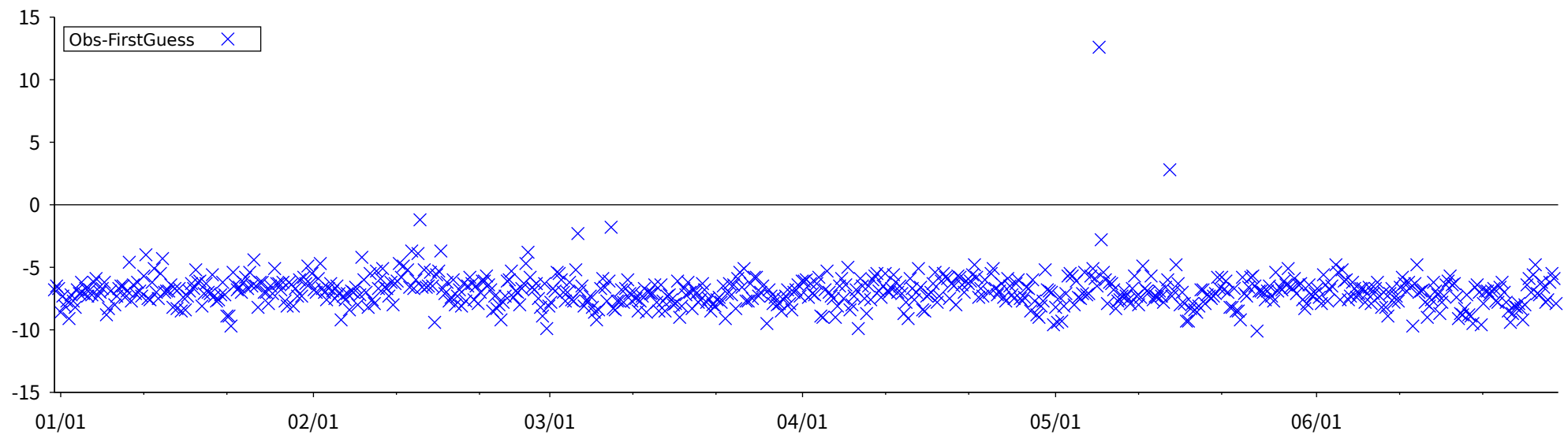
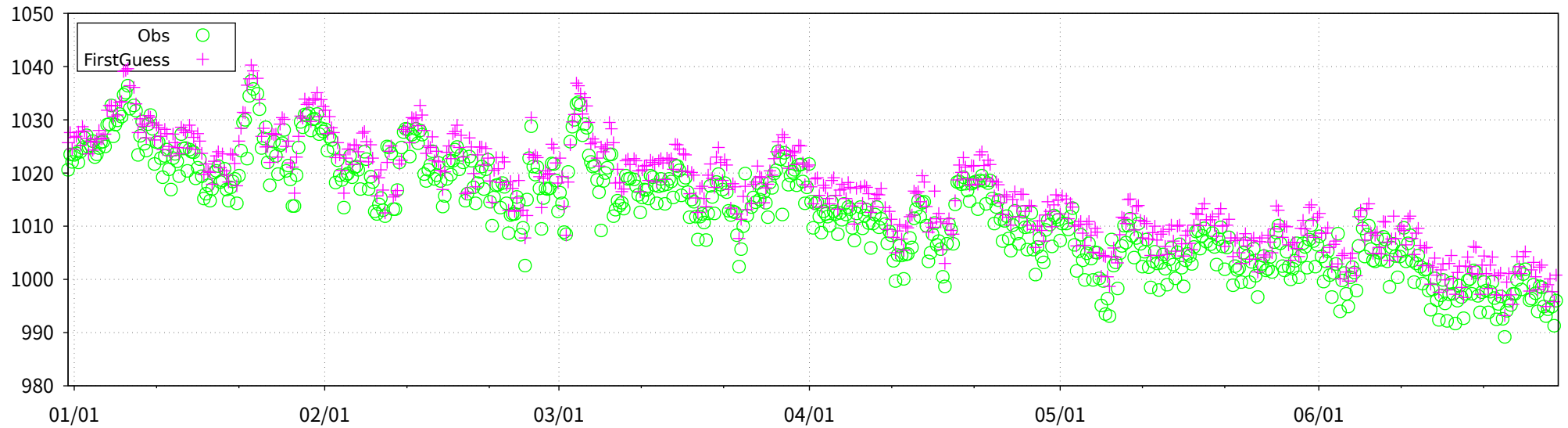


Figure 11(b) Time-series representation of MSLP Obs minus FirstGuess for station 38567

ID: 38836 (lat: 38.6N, lon: 68.7E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

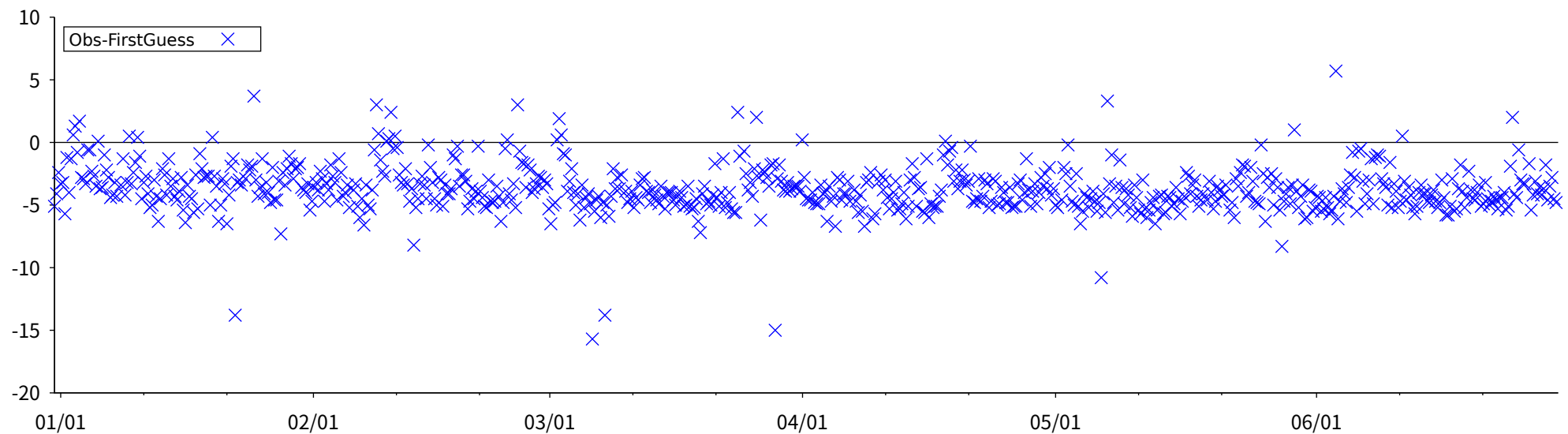
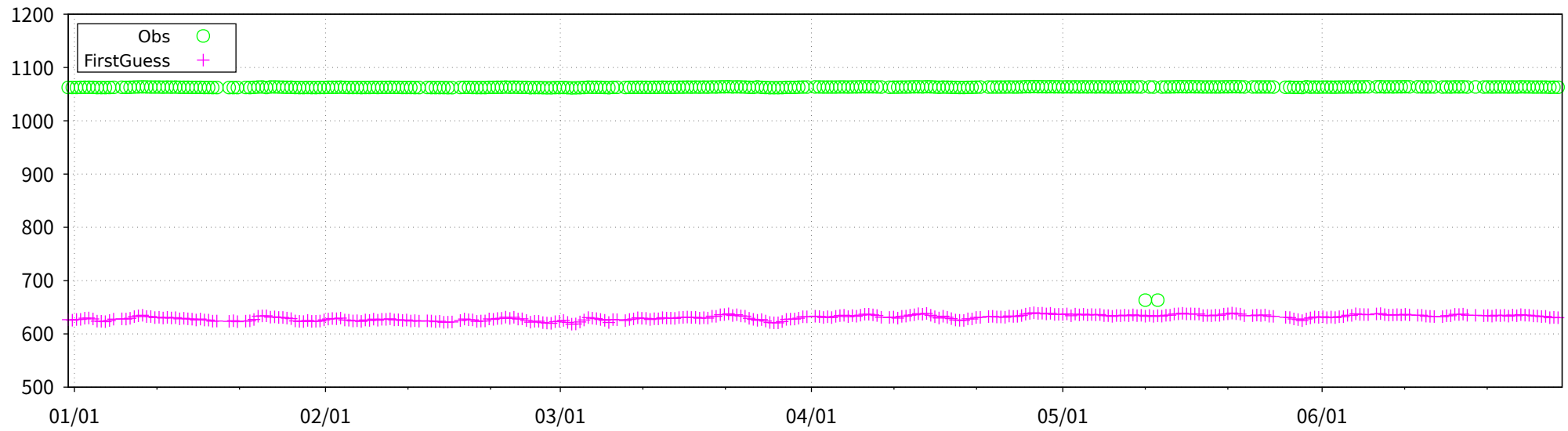


Figure 12 Time-series representation of MSLP Obs minus FirstGuess for station 38836

ID: 38875 (lat: 39.0N, lon: 73.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

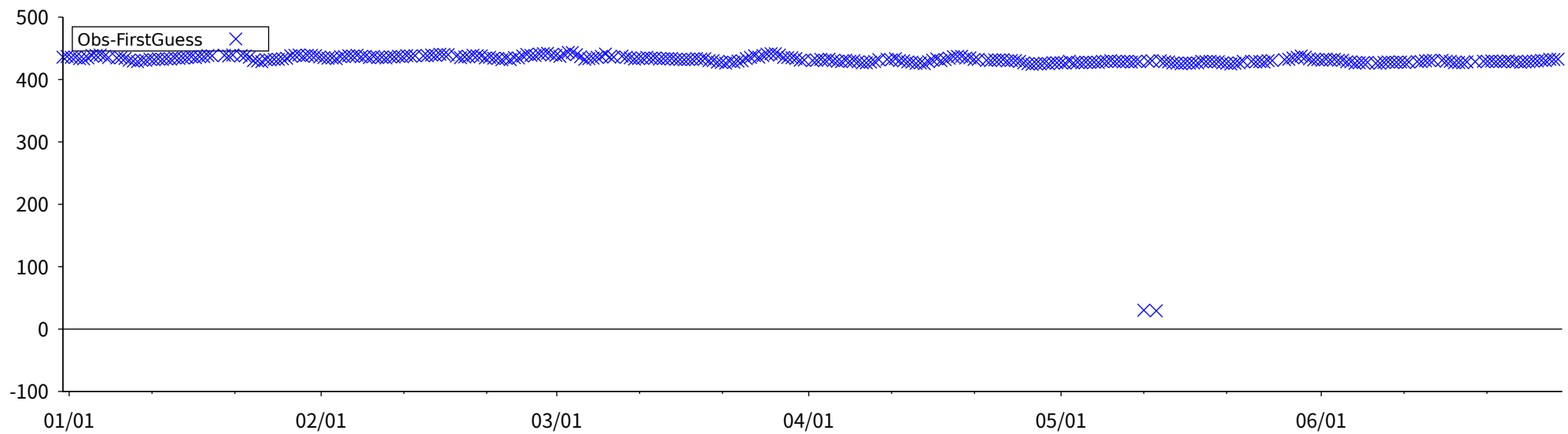
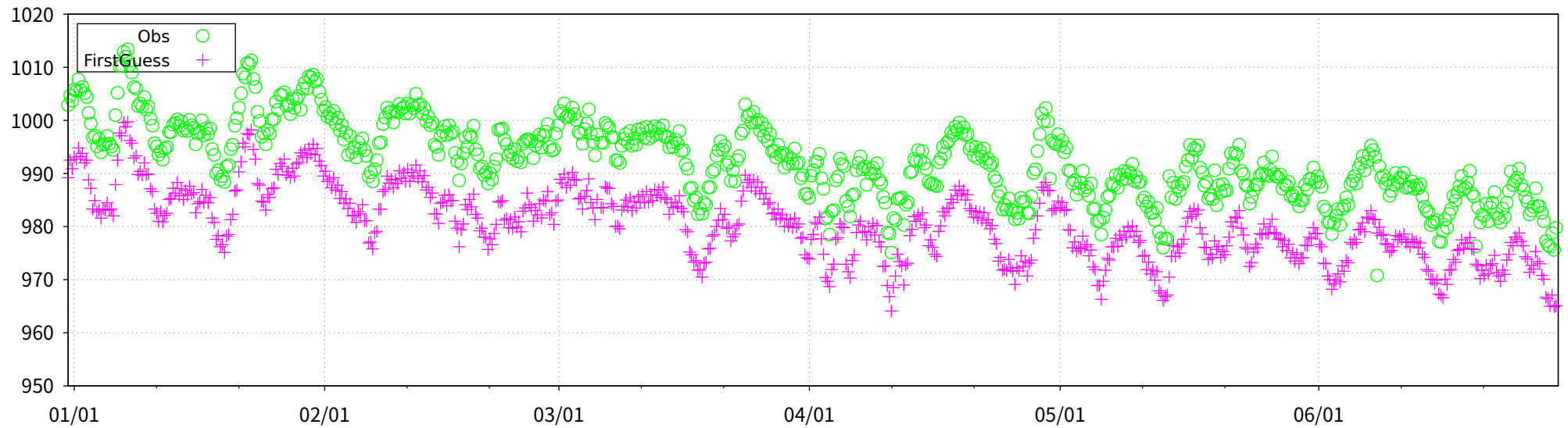


Figure 13 Time-series representation of SLP Obs minus FirstGuess for station 38875

ID: 38880 (lat: 38.0N, lon: 58.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

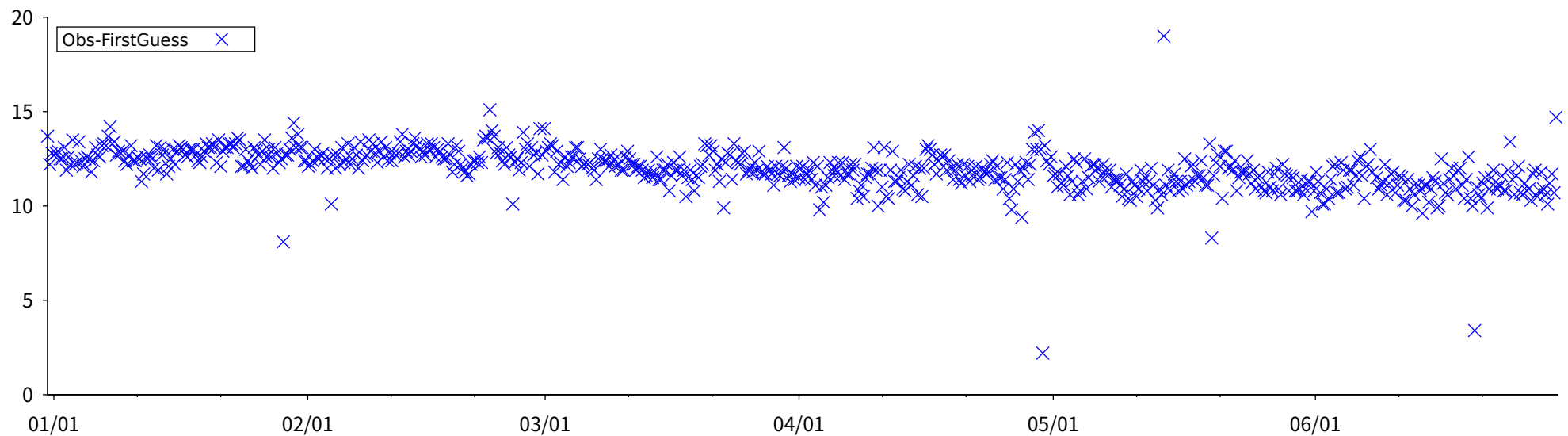
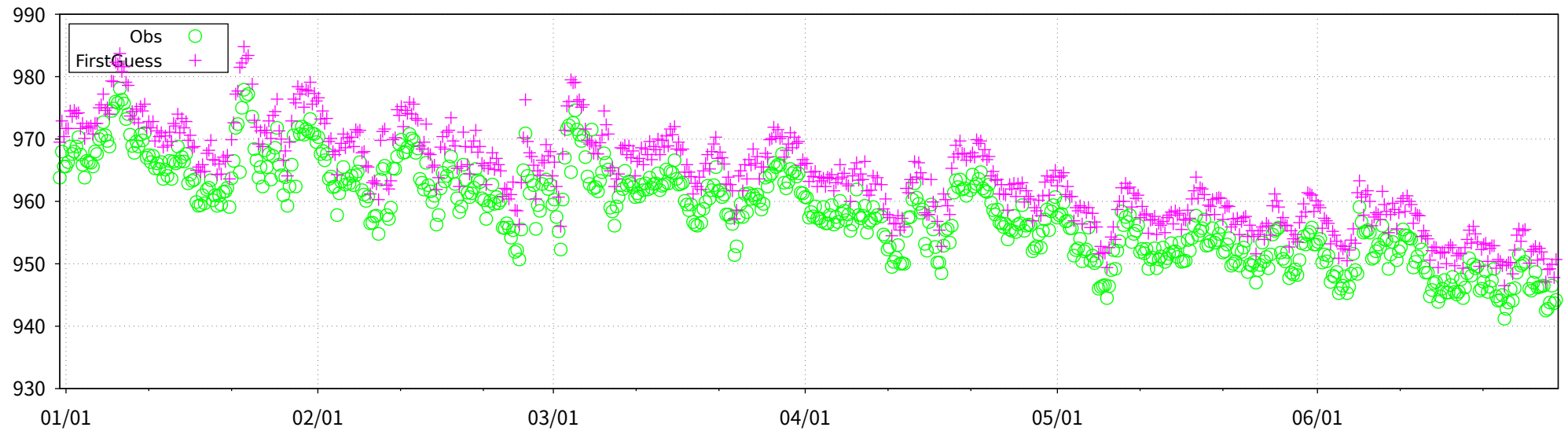


Figure 14 Time-series representation of SLP Obs minus FirstGuess for station 38880

ID: 38944 (lat: 37.5N, lon: 69.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

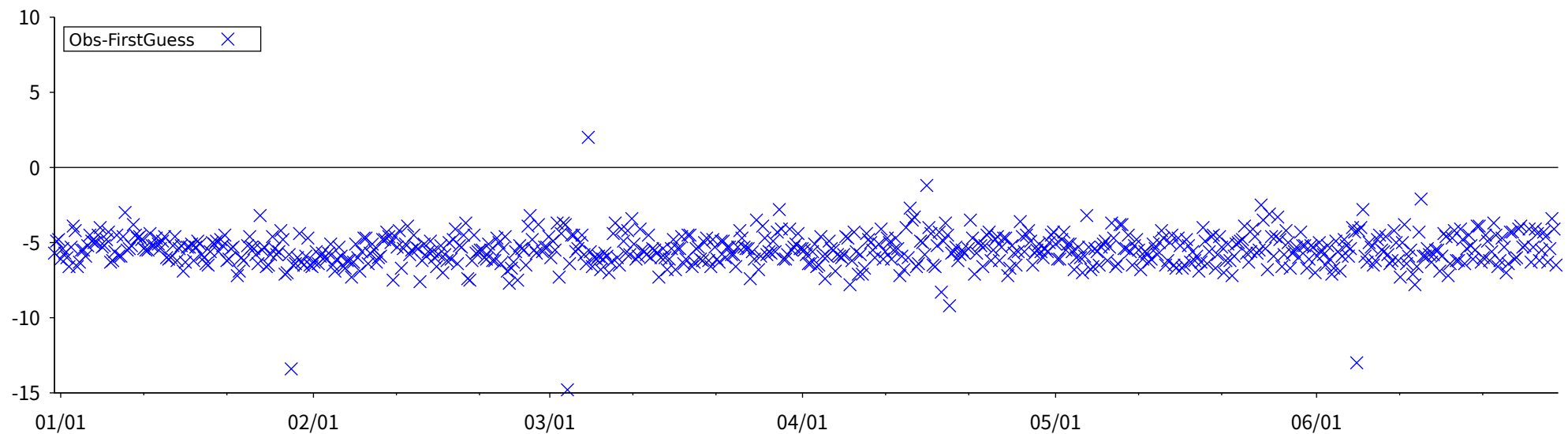
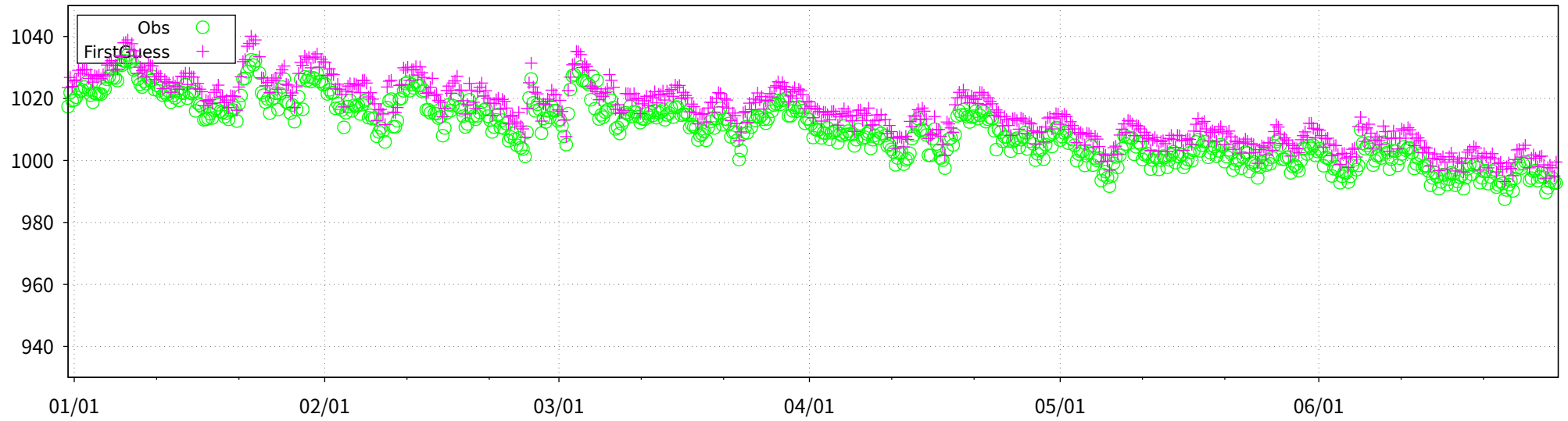


Figure 15(a) Time-series representation of SLP Obs minus FirstGuess for station 38944

ID: 38944 (lat: 37.5N, lon: 69.4E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

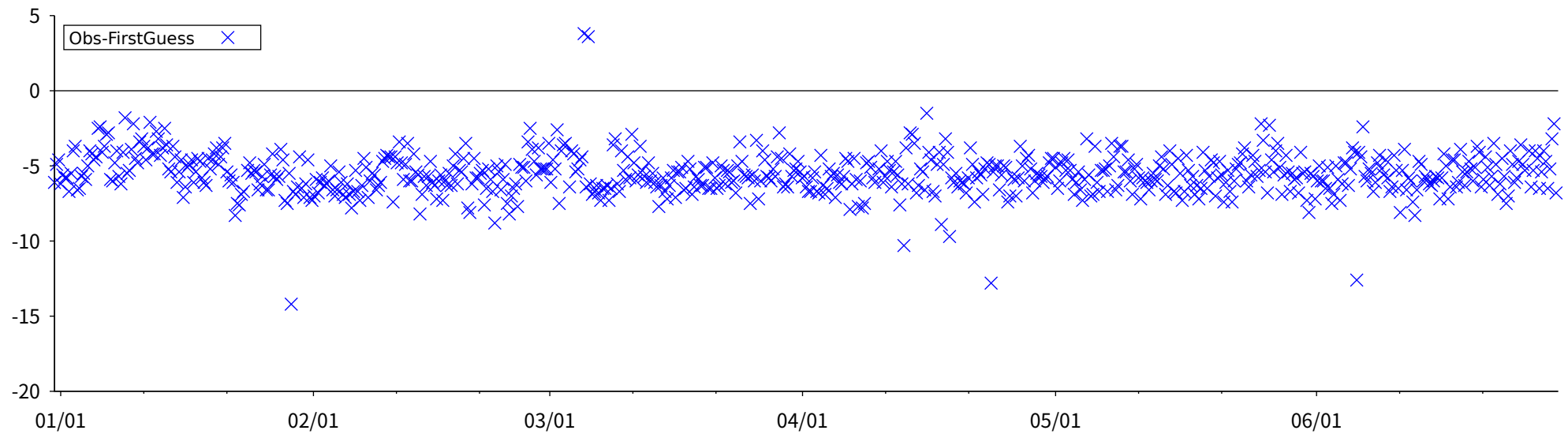
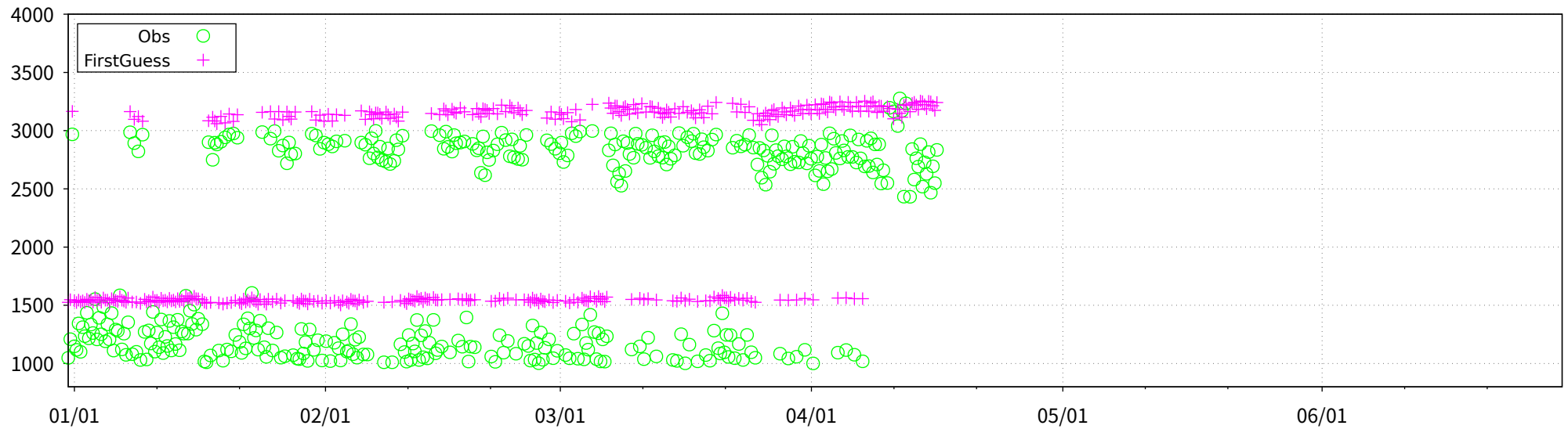


Figure 15(b) Time-series representation of MSLP Obs minus FirstGuess for station 38944

ID: 41249 (lat: 23.9N, lon: 56.2E)

GZ850 or GZ700 [m]



GZ850 or GZ700 [m] (Obs-FirstGuess)

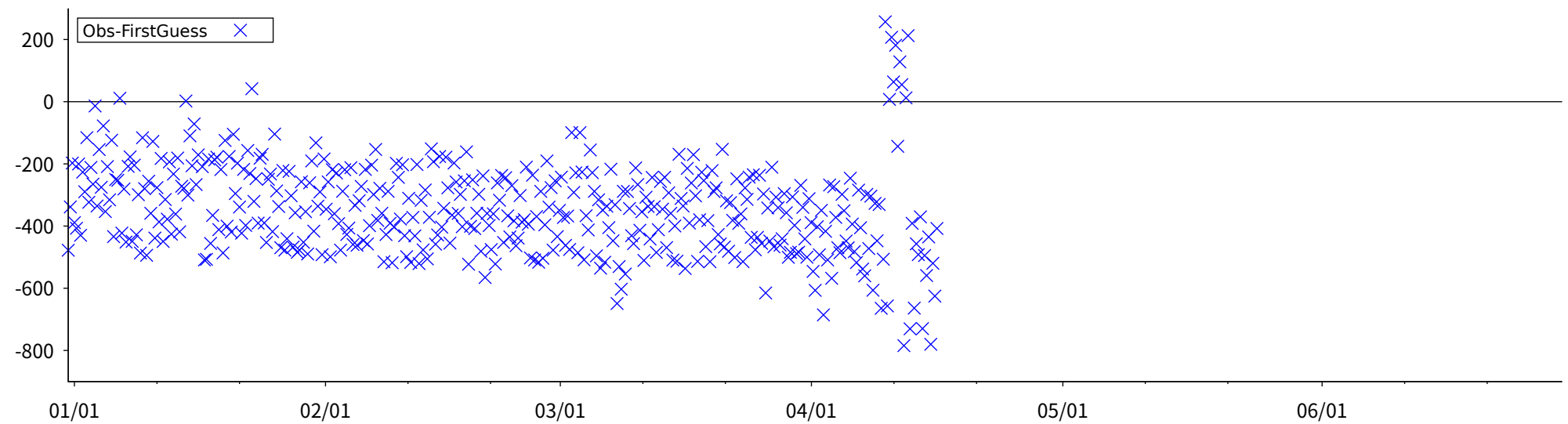


Figure 16 Time-series representation of GZ850 or GZ700 Obs minus FirstGuess for station 41249

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

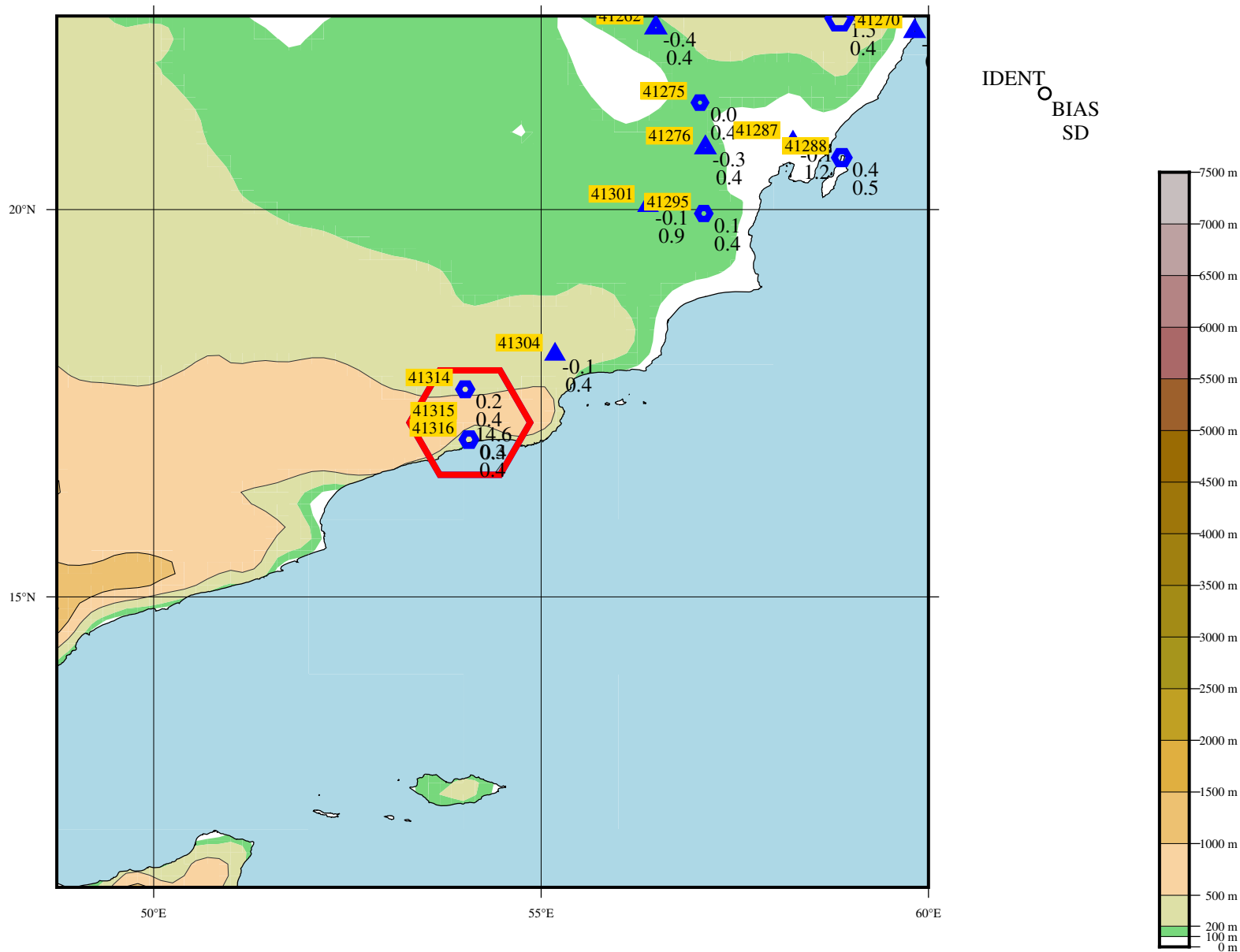
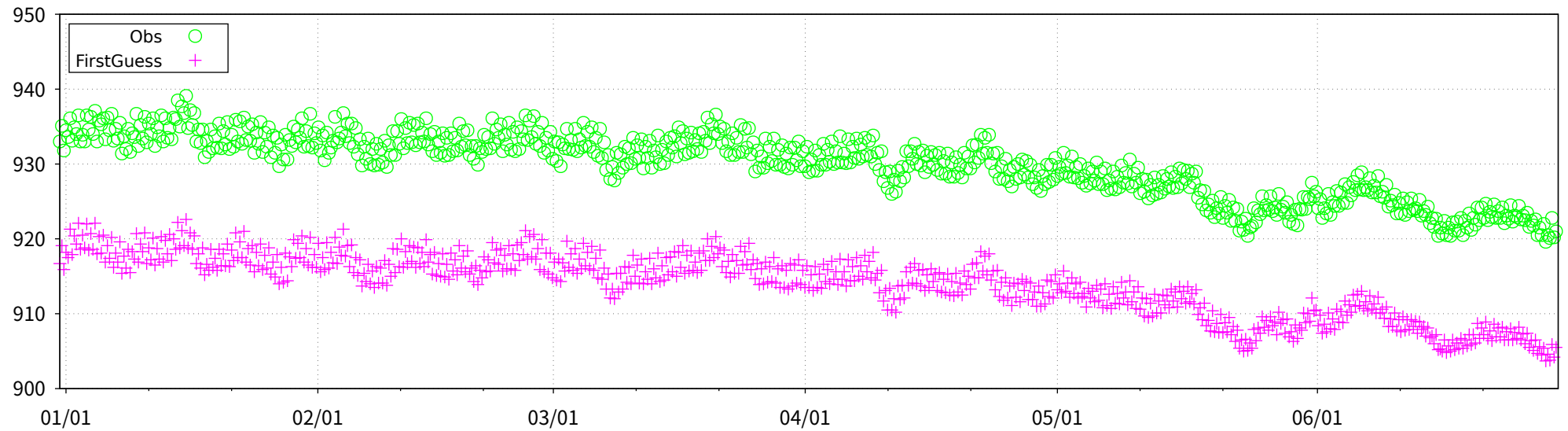


Figure 17 BIAS and SD of SLP for station 41315 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 41315 (lat: 17.3N, lon: 54.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

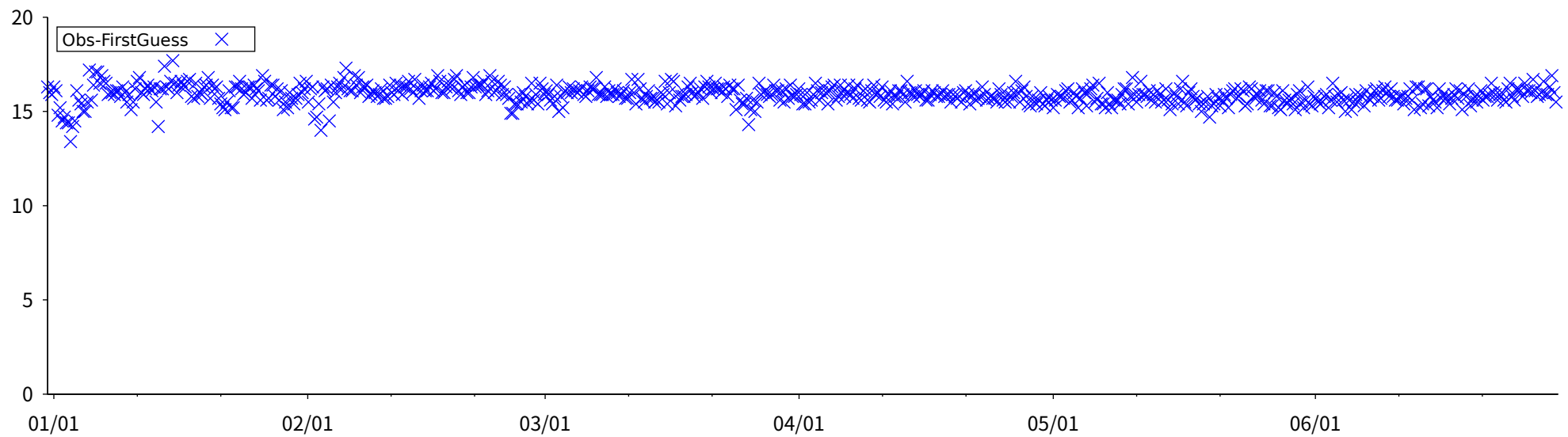
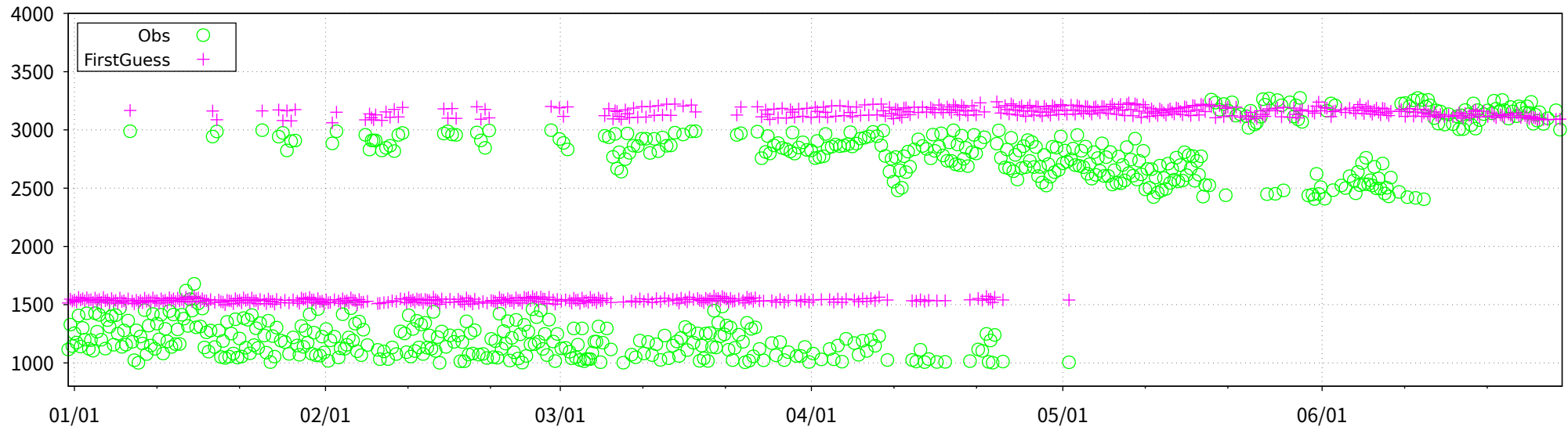


Figure 18(a) Time-series representation of SLP Obs minus FirstGuess for station 41315

ID: 41315 (lat: 17.3N, lon: 54.1E)

GZ850 or GZ700 [m]



GZ850 or GZ700 [m] (Obs-FirstGuess)

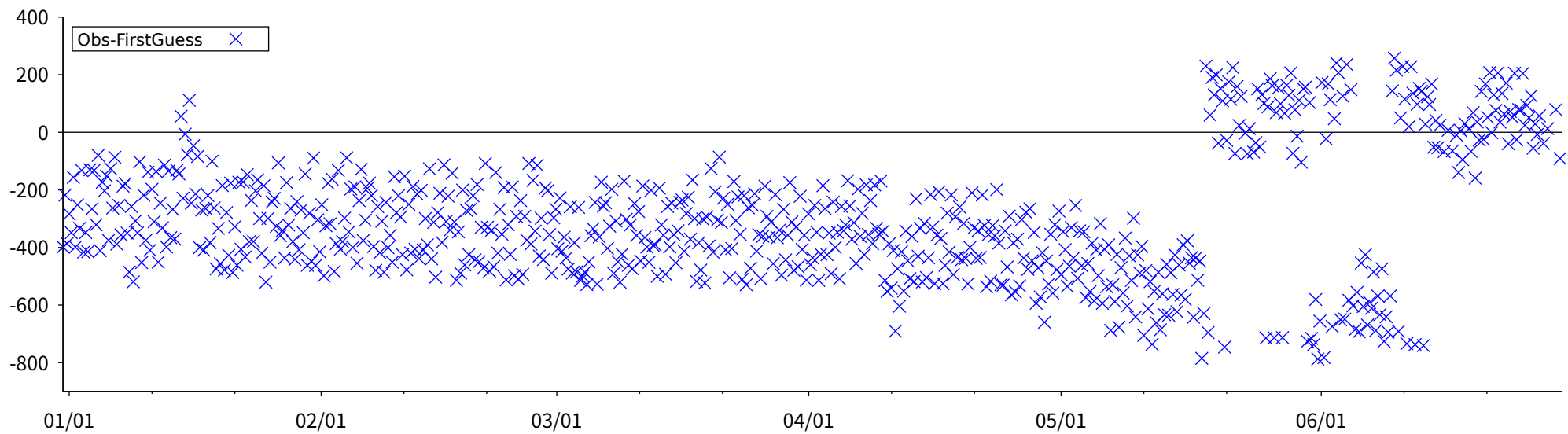


Figure 18(b) Time-series representation of GZ850 or GZ700 Obs minus FirstGuess for station 41315

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

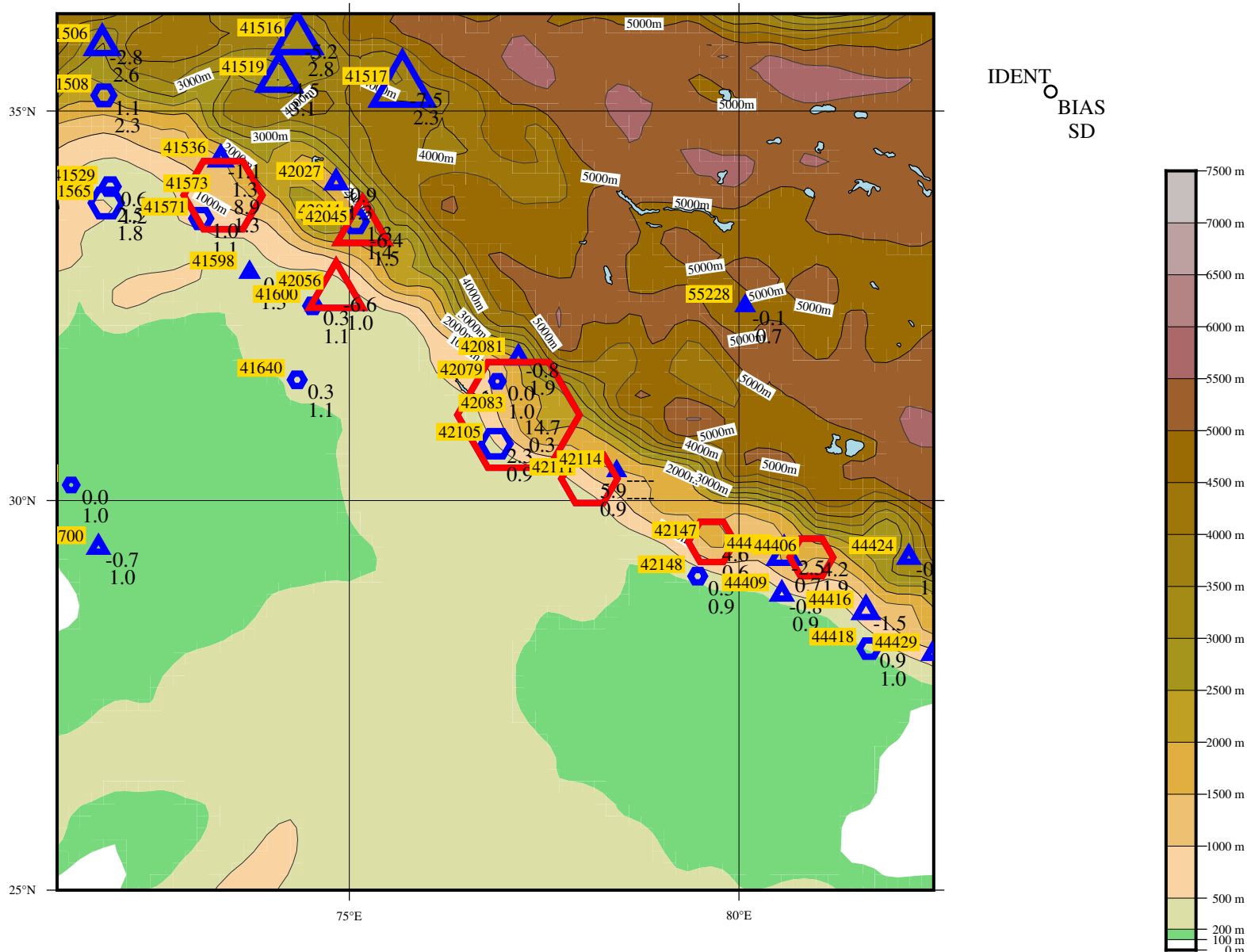
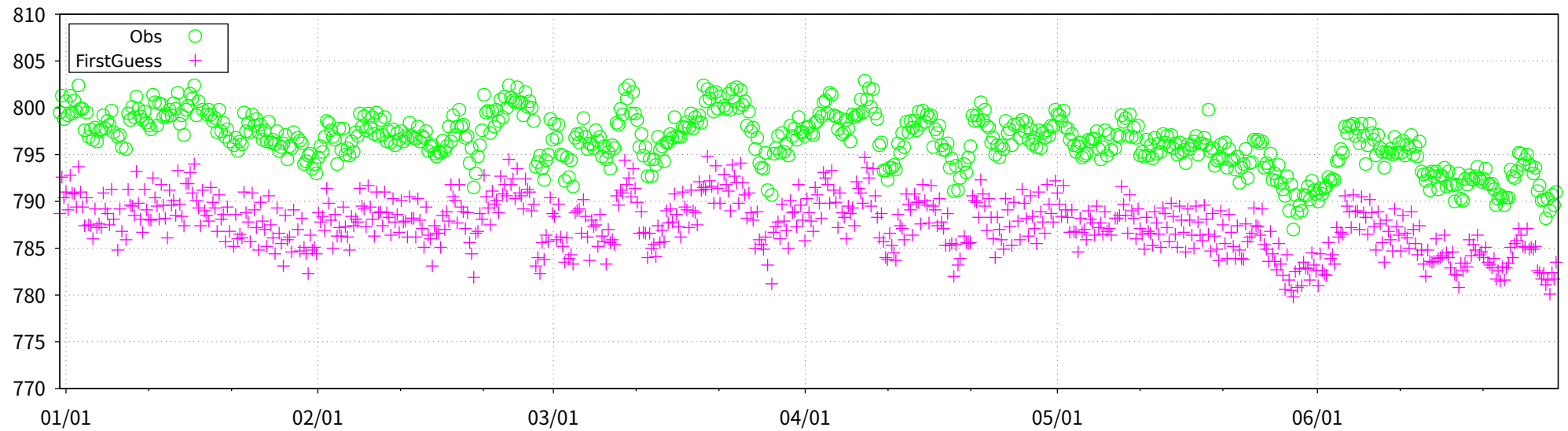


Figure 19 BIAS and SD of SLP for station 41573, 42045, 42056, 42083, 42111, 42147, 44406 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 41573 (lat: 33.9N, lon: 73.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

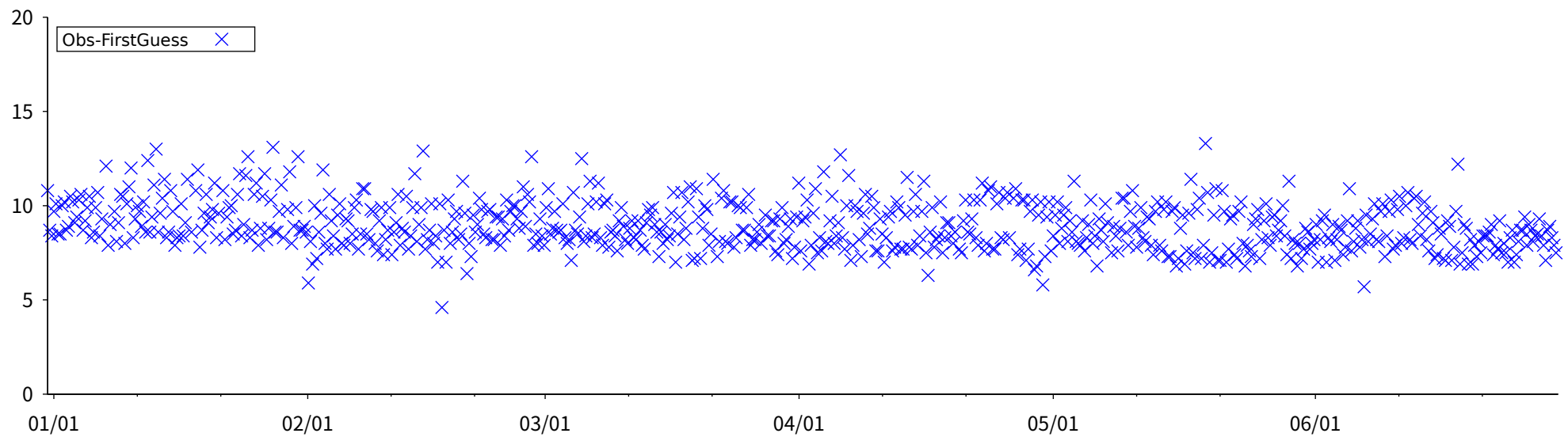


Figure 20 Time-series representation of SLP Obs minus FirstGuess for station 41573

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

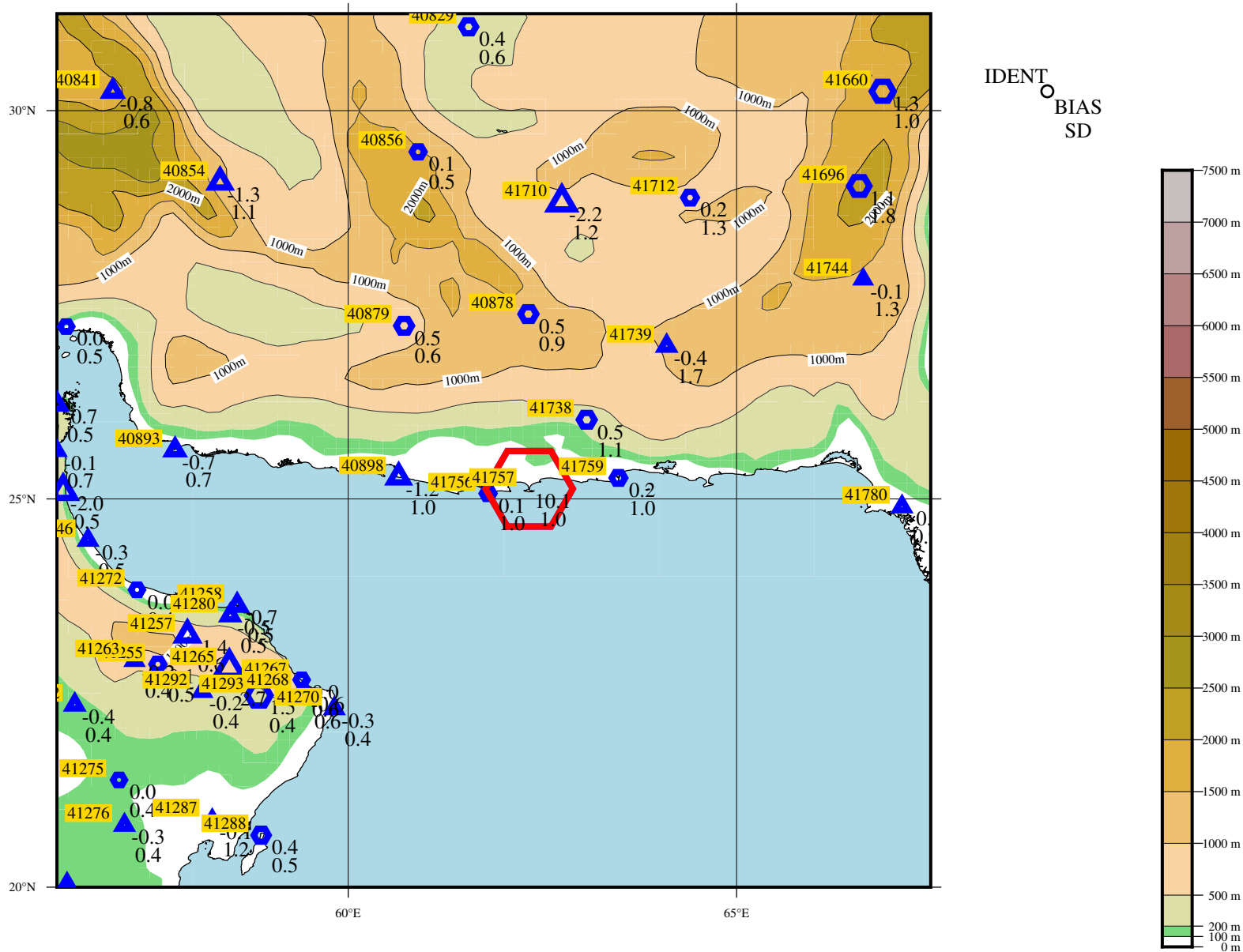


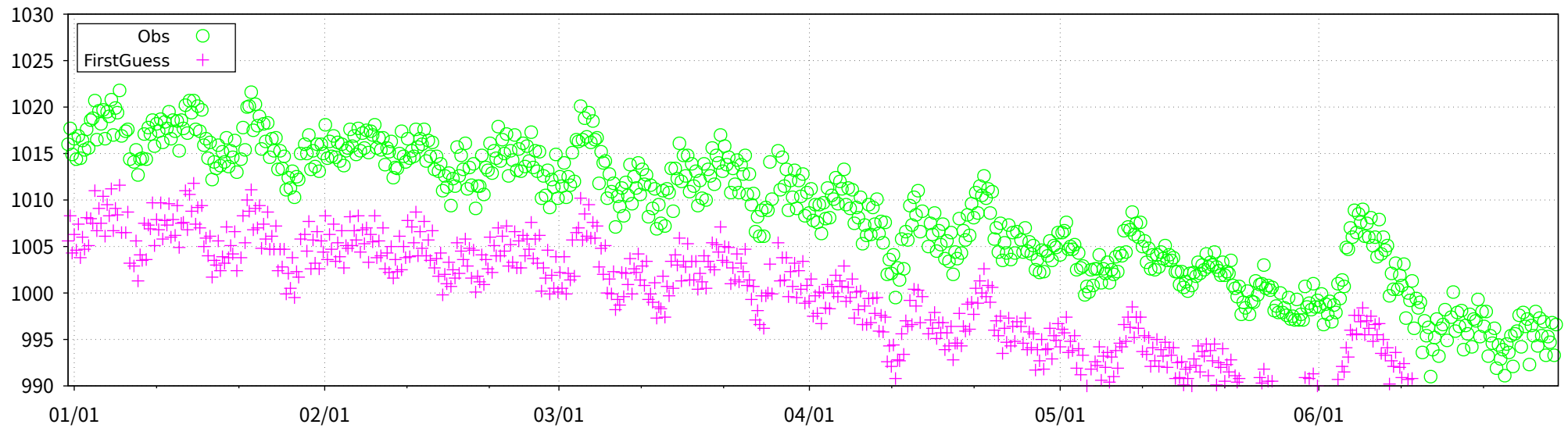
Figure 21 BIAS and SD of SLP for station 41757 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 41757 (lat: 25.1N, lon: 62.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

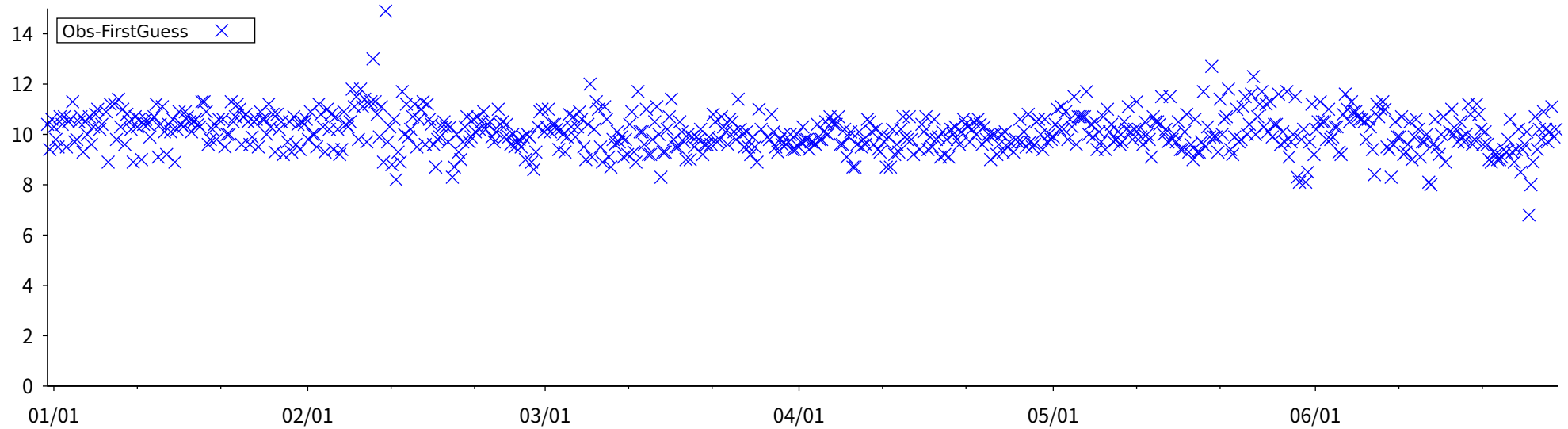


Figure 22 Time-series representation of SLP Obs minus FirstGuess for station 41757

LEVEL = SUR ELEMENT = GZ
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

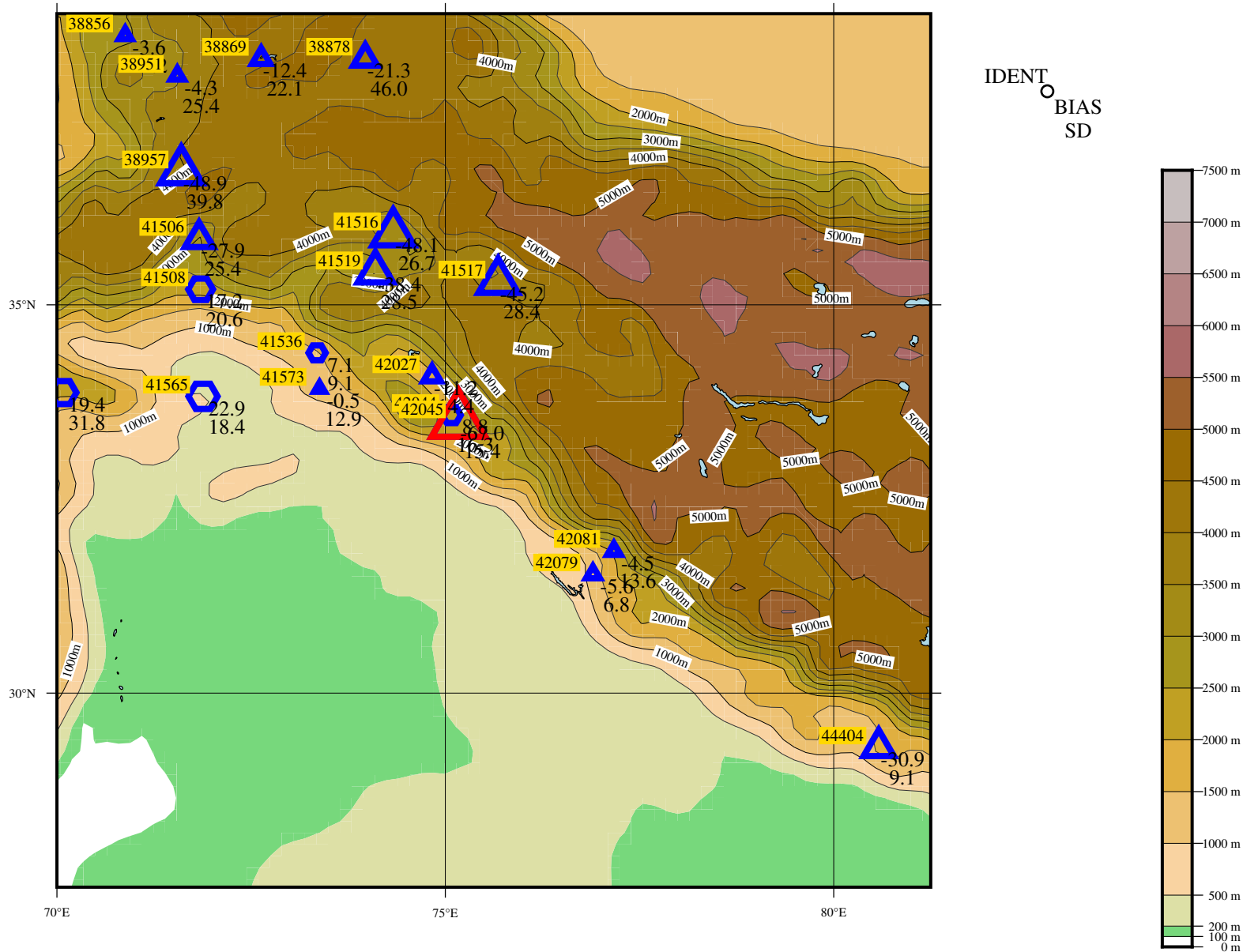
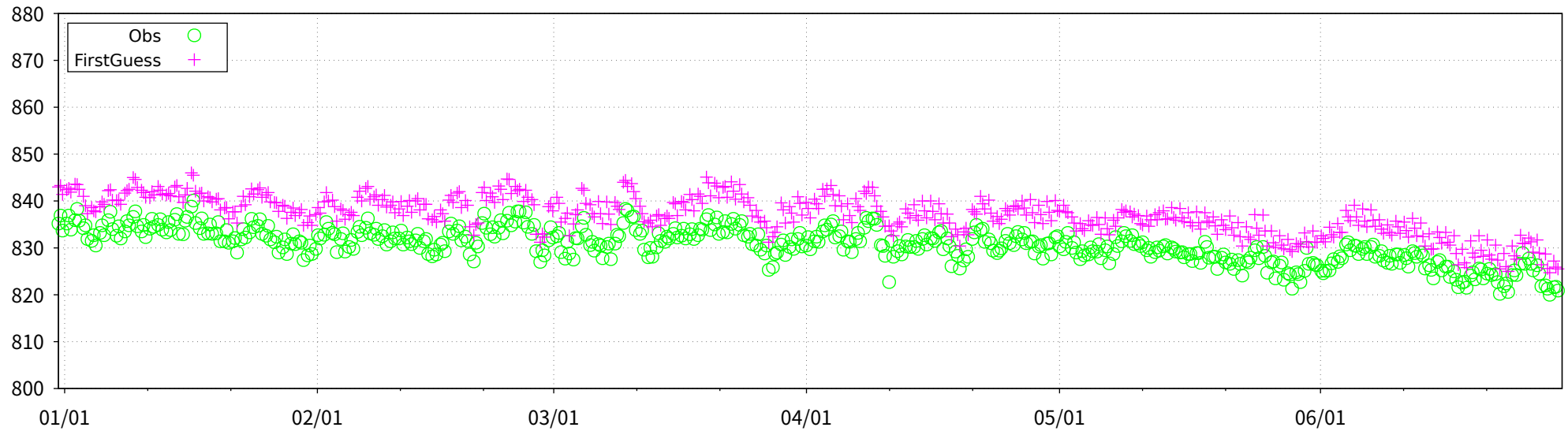


Figure 23 BIAS and SD of GZ for station 42045 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 42045 (lat: 33.5N, lon: 75.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

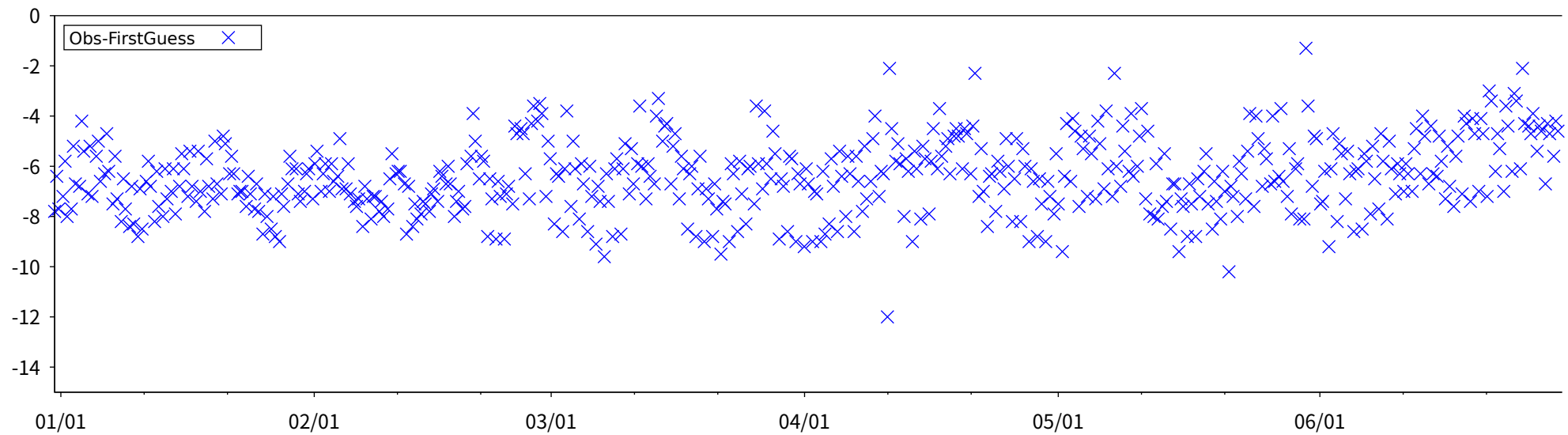
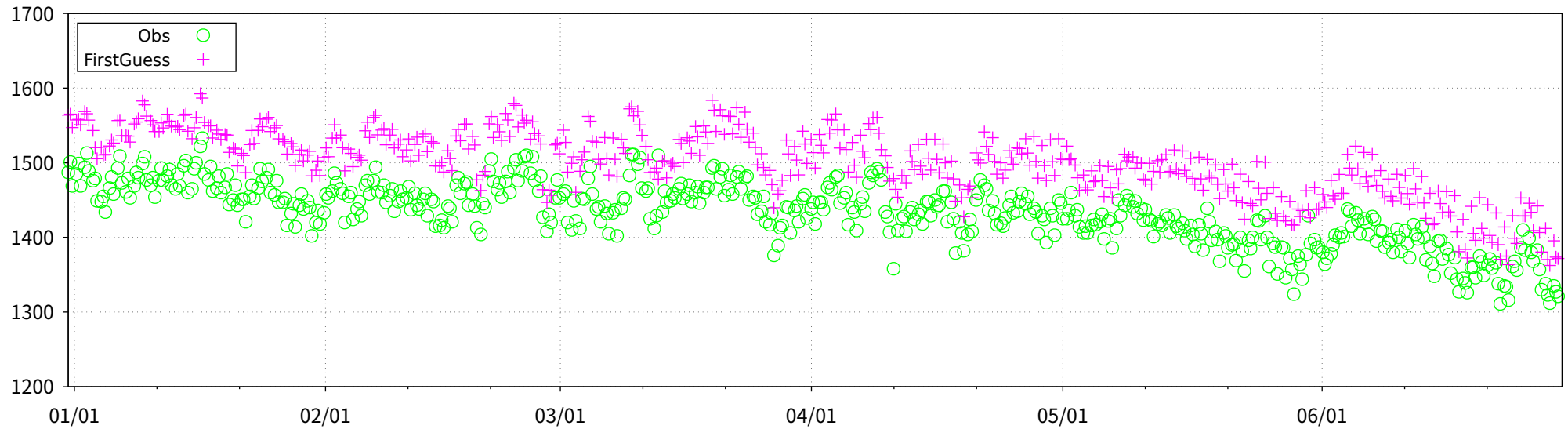


Figure 24(a) Time-series representation of SLP Obs minus FirstGuess for station 42045

ID: 42045 (lat: 33.5N, lon: 75.2E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

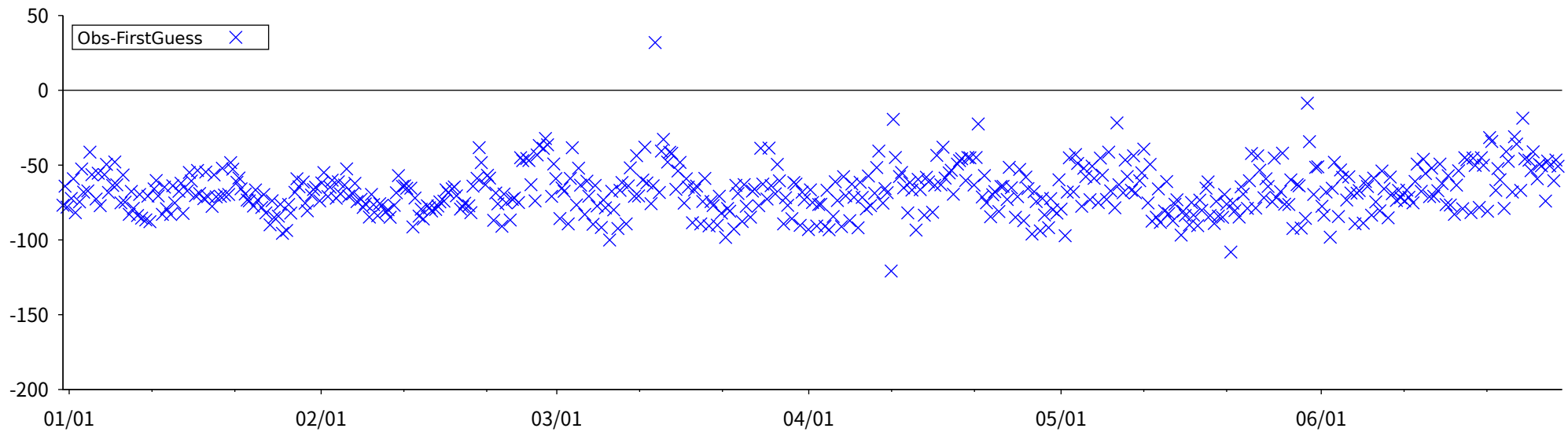
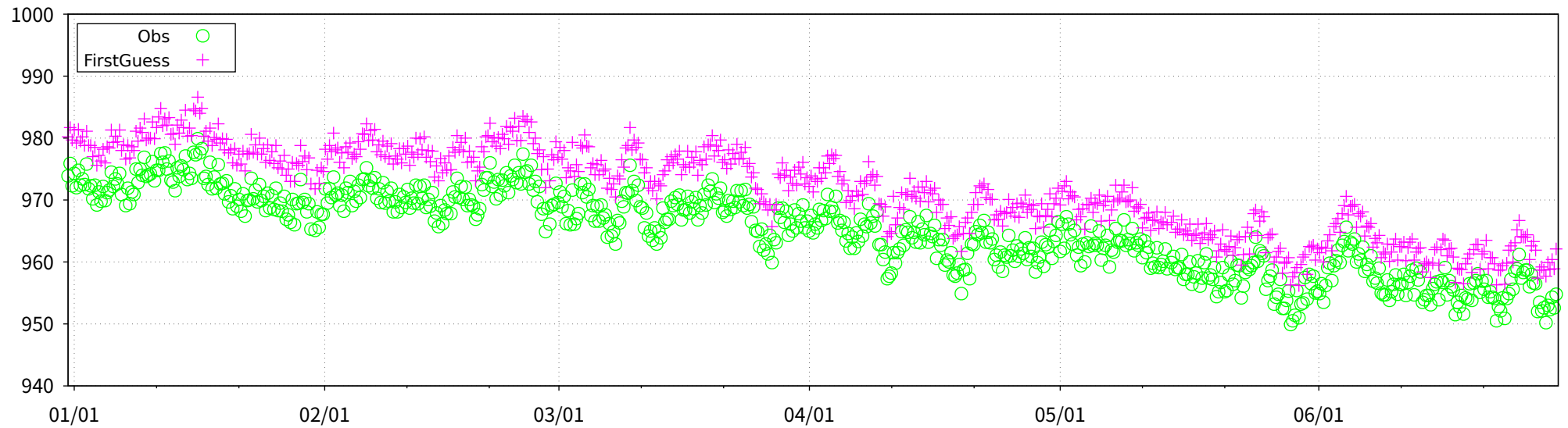


Figure 24(b) Time-series representation of GZ850 Obs minus FirstGuess for station 42045

ID: 42056 (lat: 32.7N, lon: 74.8E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

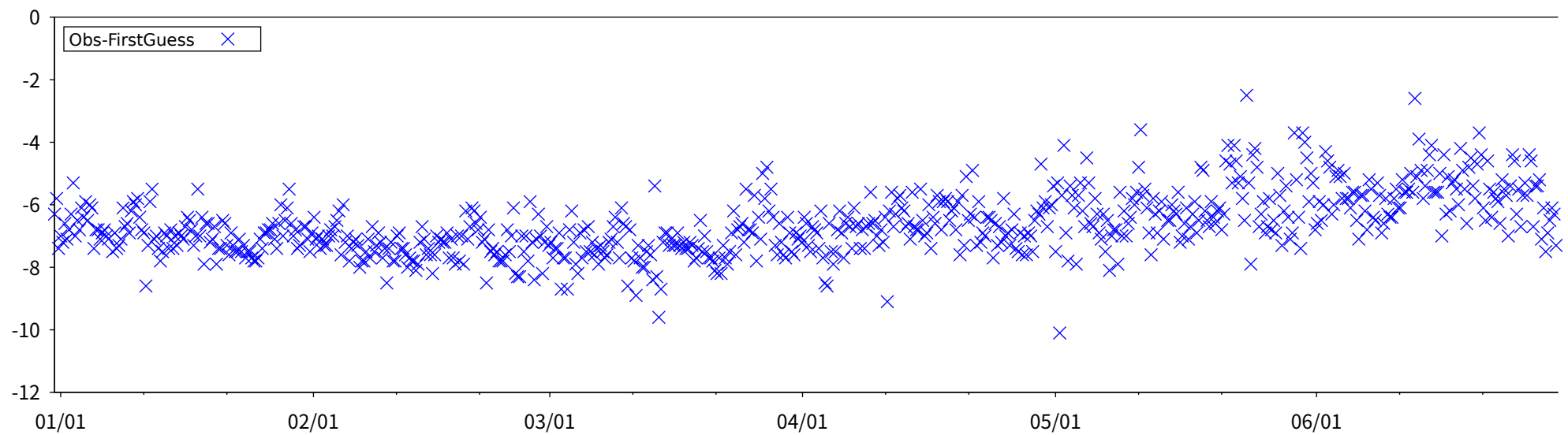
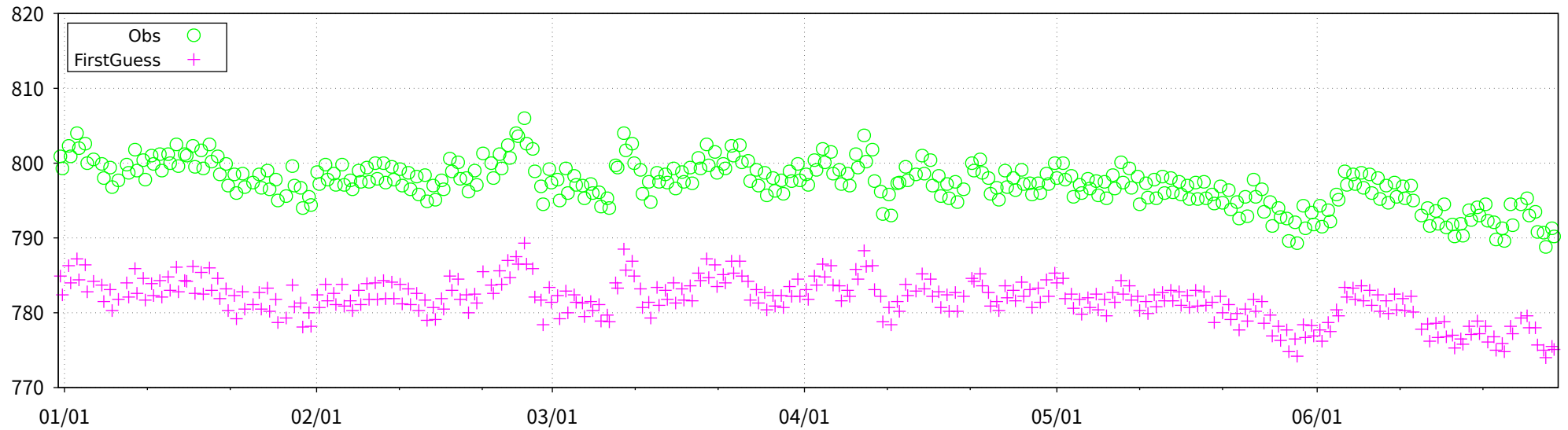


Figure 25 Time-series representation of SLP Obs minus FirstGuess for station 42056

ID: 42083 (lat: 31.1N, lon: 77.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

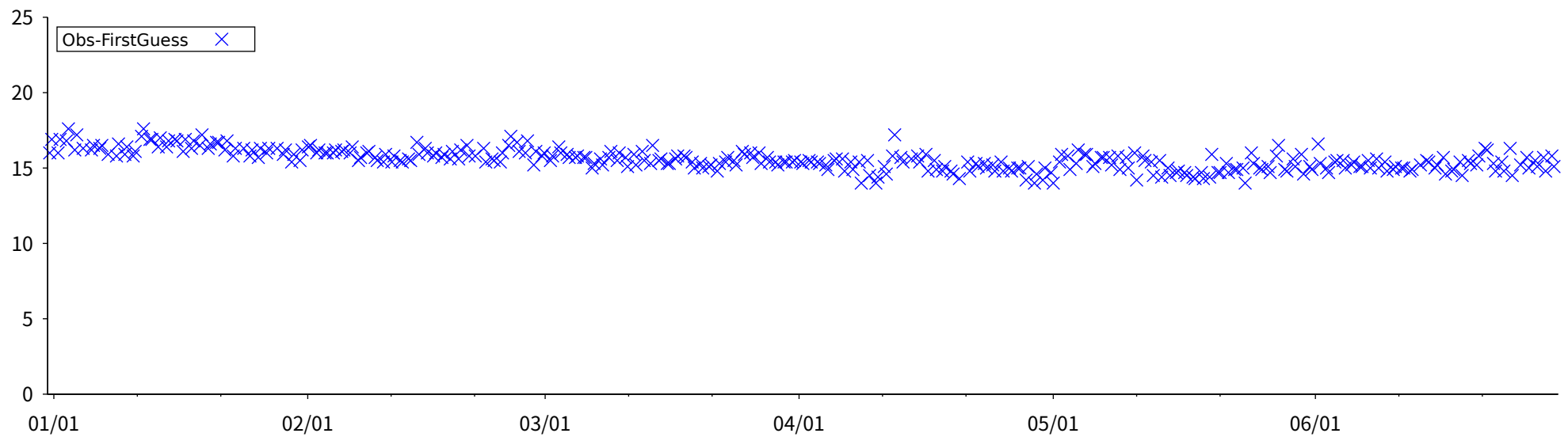
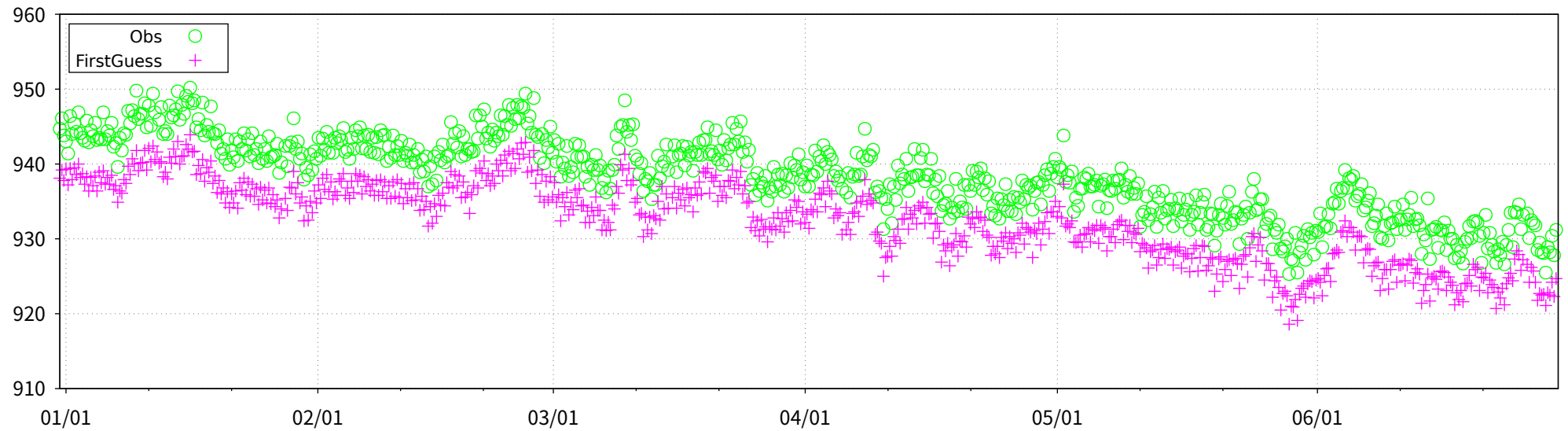


Figure 26 Time-series representation of SLP Obs minus FirstGuess for station 42083

ID: 42111 (lat: 30.3N, lon: 78.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

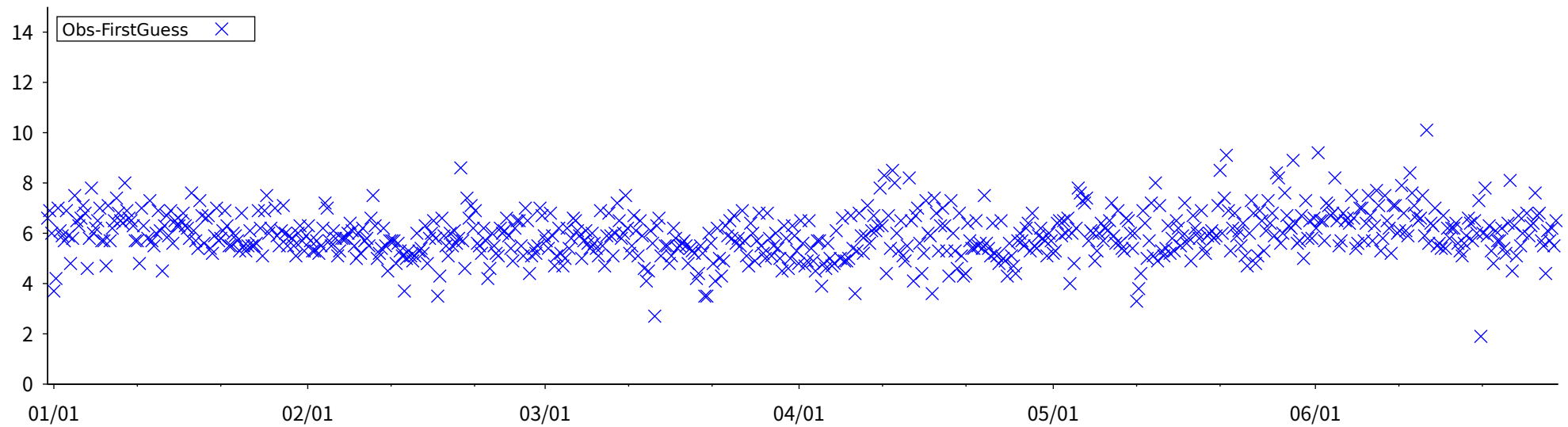
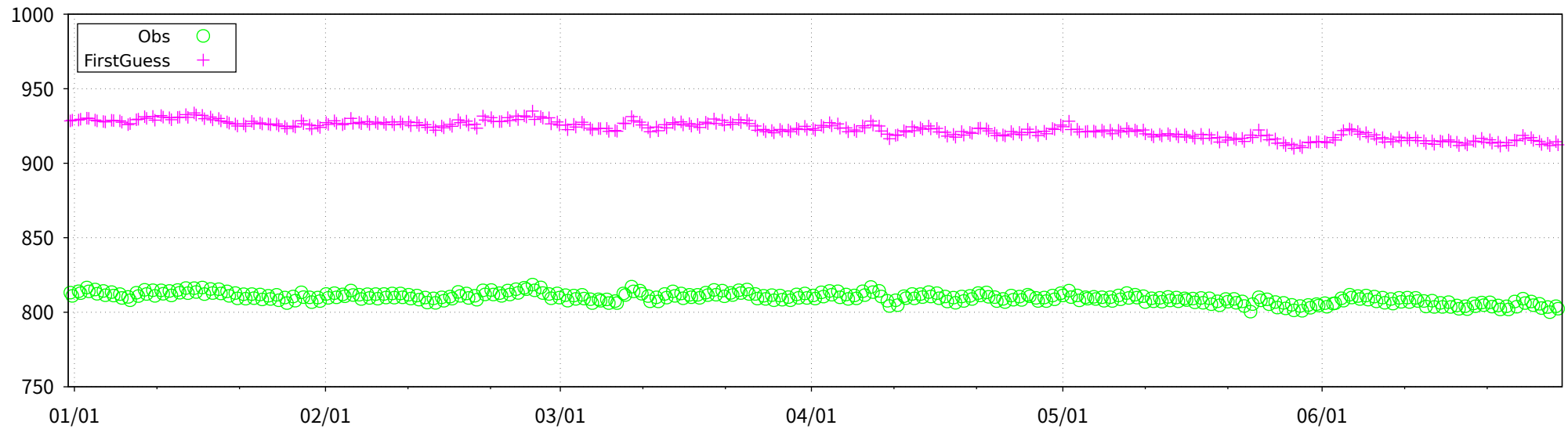


Figure 27 Time-series representation of SLP Obs minus FirstGuess for station 42111

ID: 42114 (lat: 30.4N, lon: 78.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

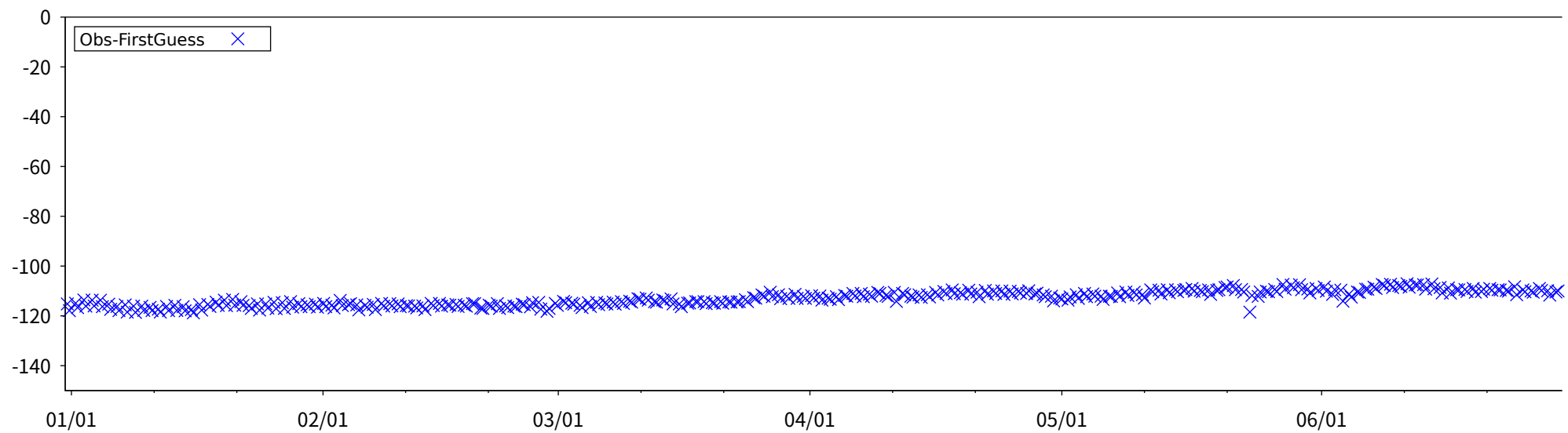
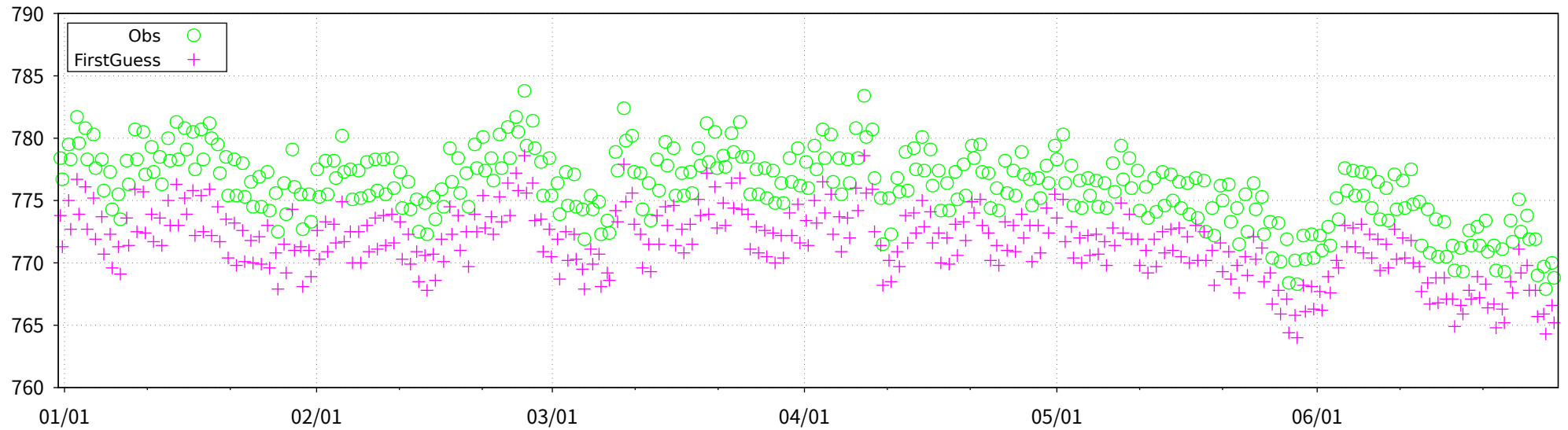


Figure 28 Time-series representation of SLP Obs minus FirstGuess for station 42114

ID: 42147 (lat: 29.5N, lon: 79.7E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

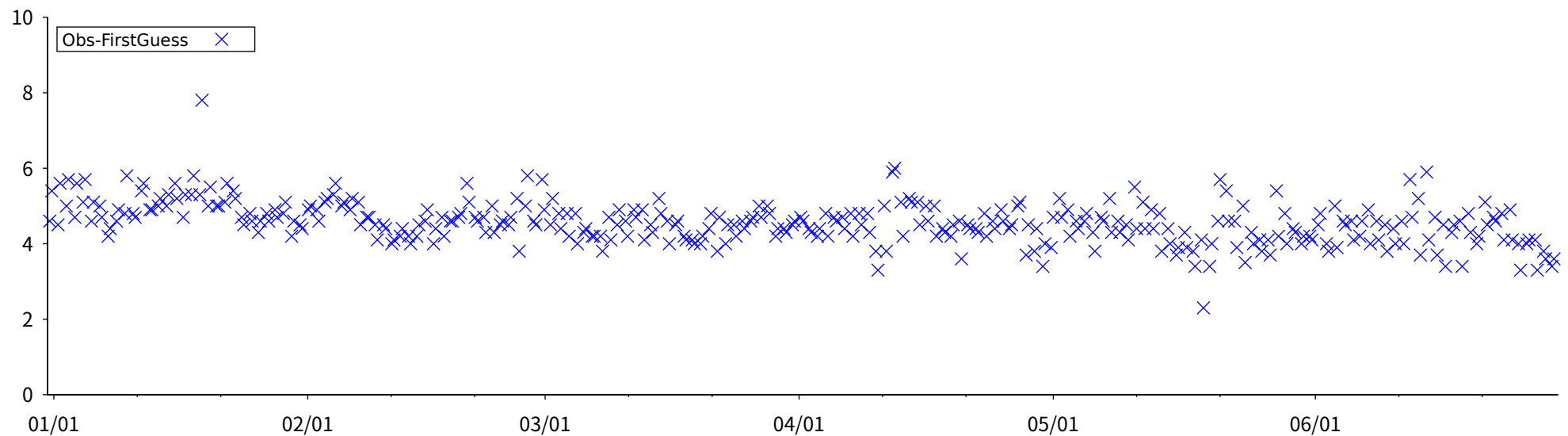


Figure 29 Time-series representation of SLP Obs minus FirstGuess for station 42147

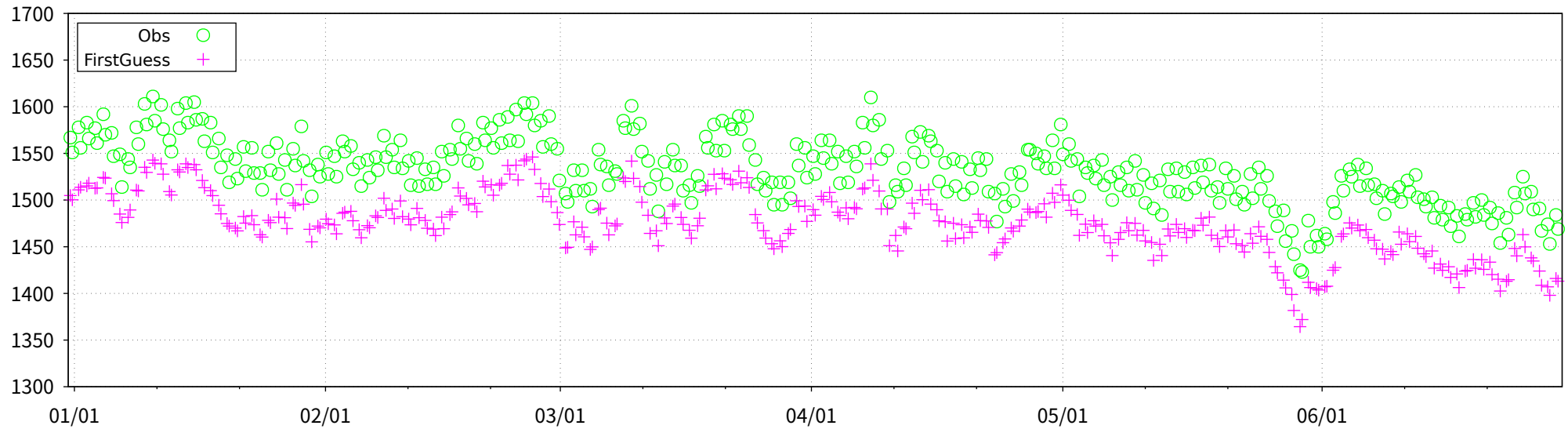
2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)



The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 42299 (lat: 27.3N, lon: 88.6E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

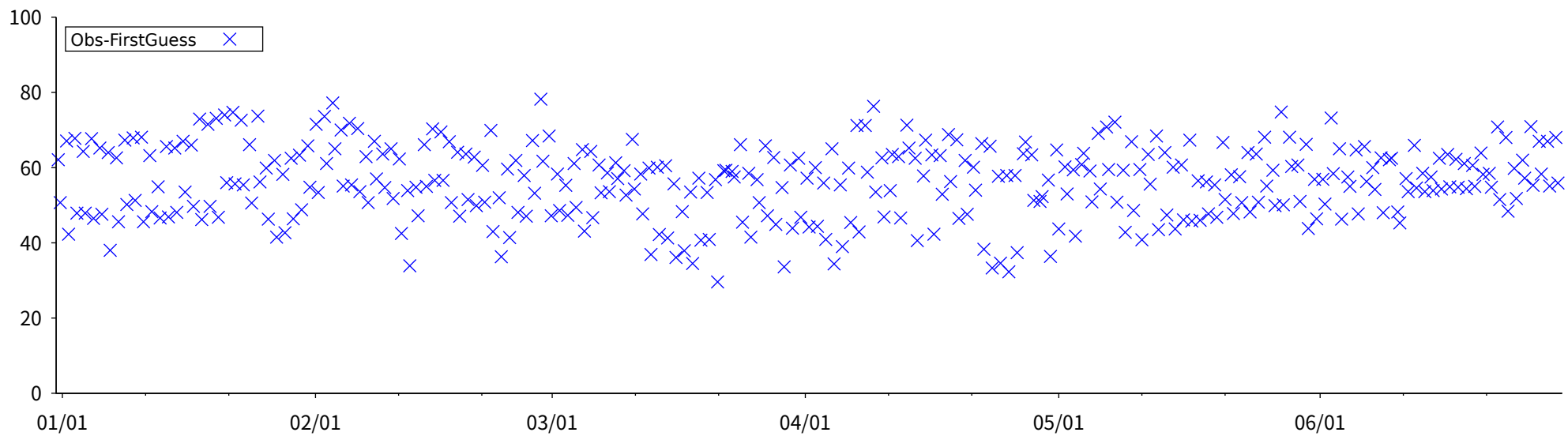
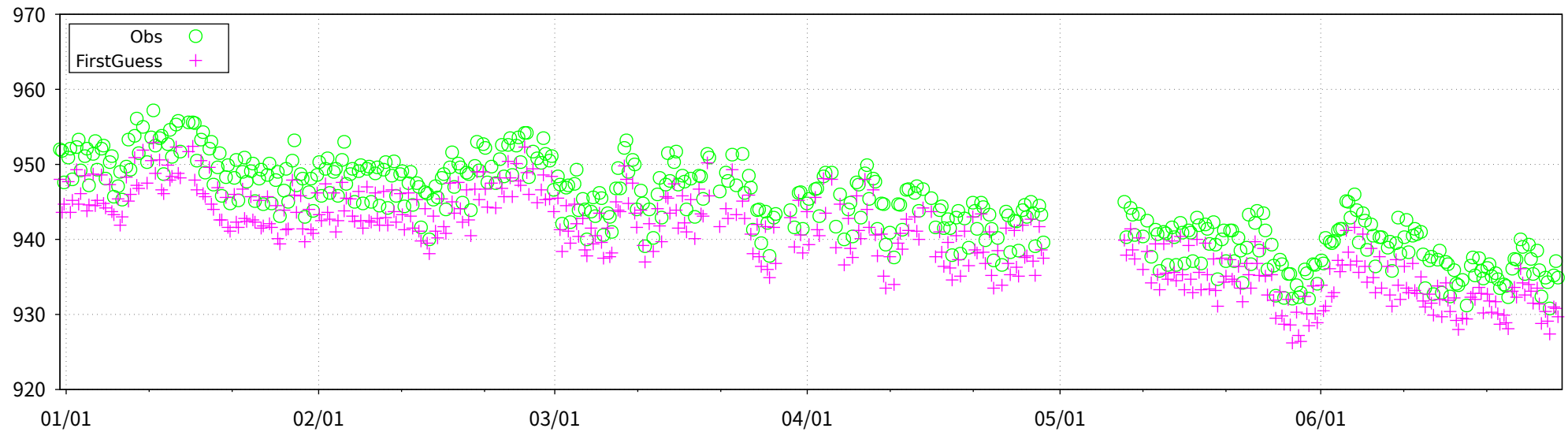


Figure 31 Time-series representation of GZ850 Obs minus FirstGuess for station 42299

ID: 44406 (lat: 29.3N, lon: 80.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

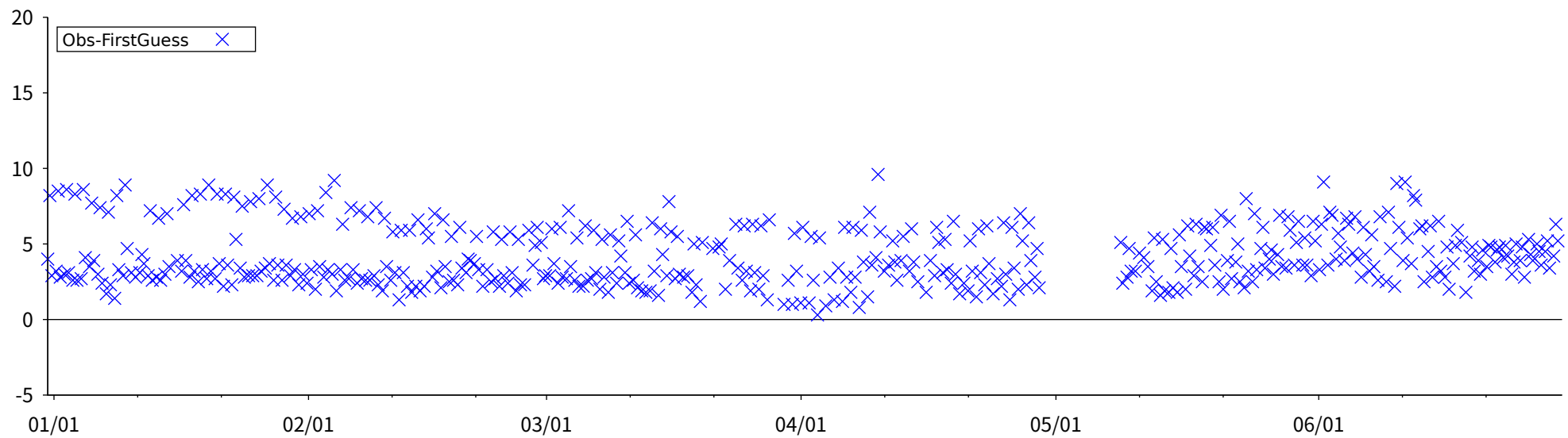


Figure 32 Time-series representation of SLP Obs minus FirstGuess for station 44406

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

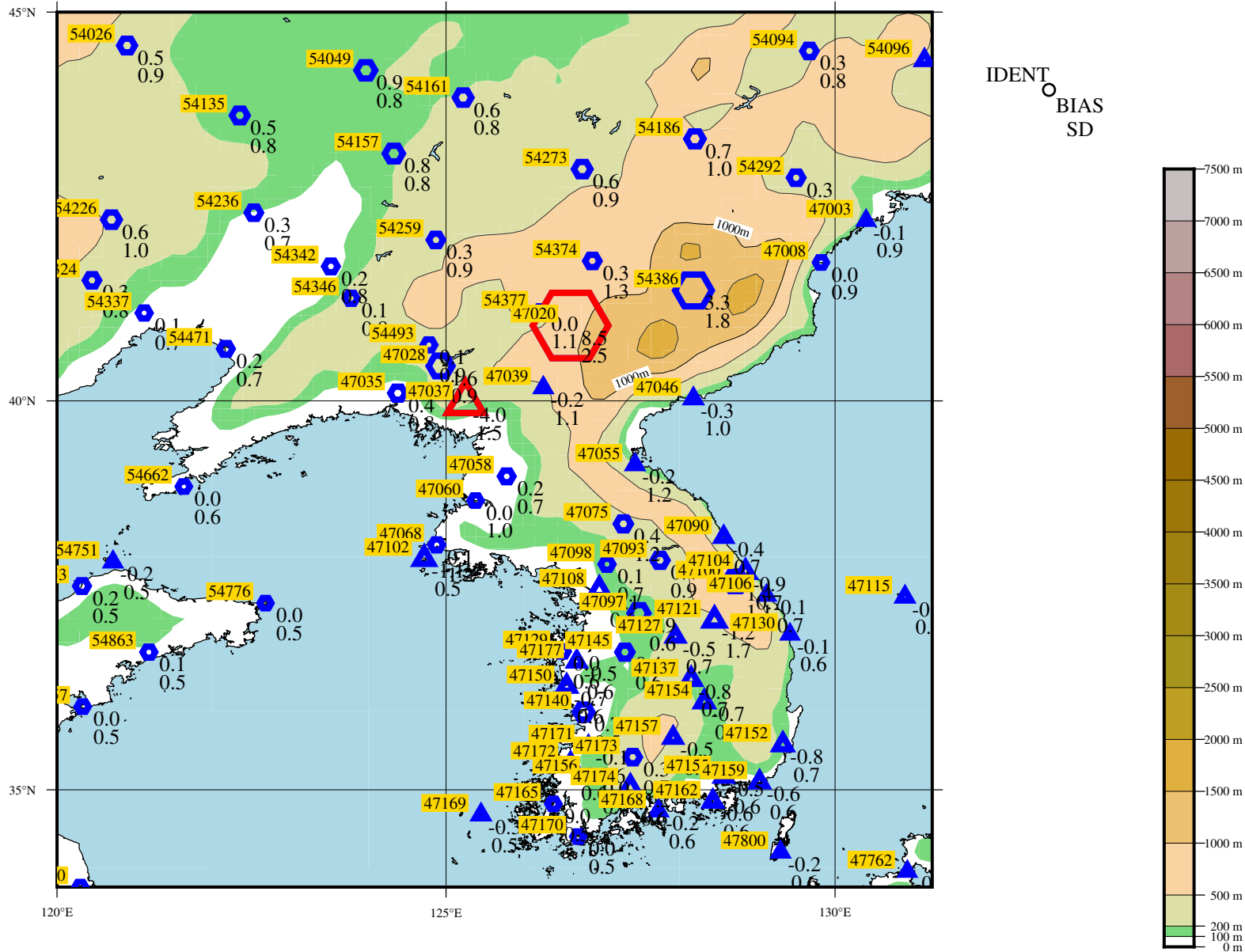


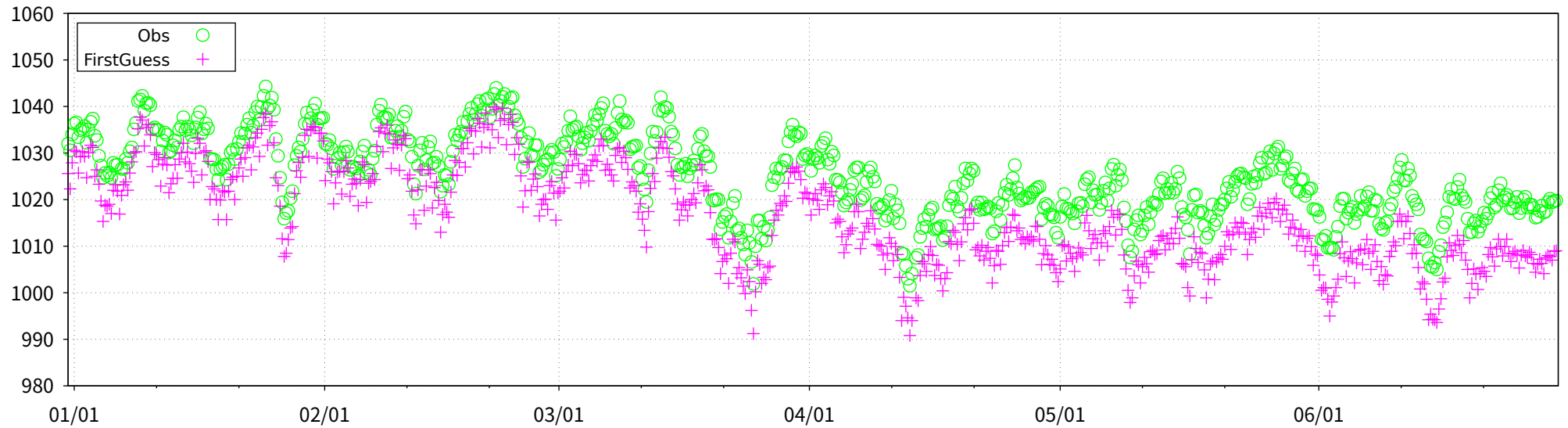
Figure 33 BIAS and SD of MSLP for station 47020, 47037 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 47020 (lat: 41.0N, lon: 126.6E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

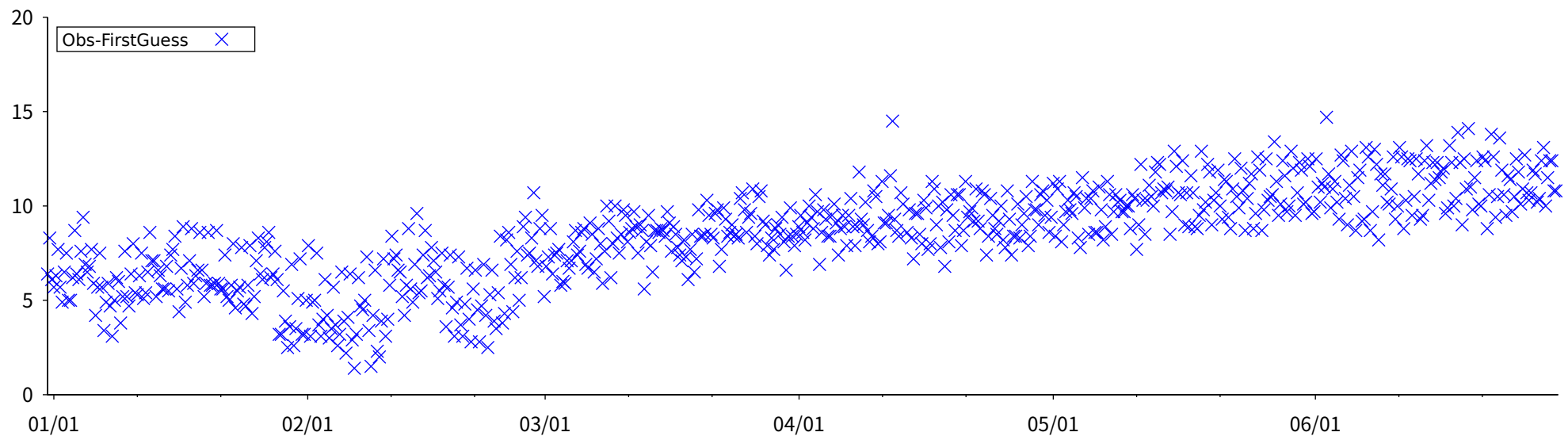


Figure 34 Time-series representation of MSLP Obs minus FirstGuess for station 47020

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

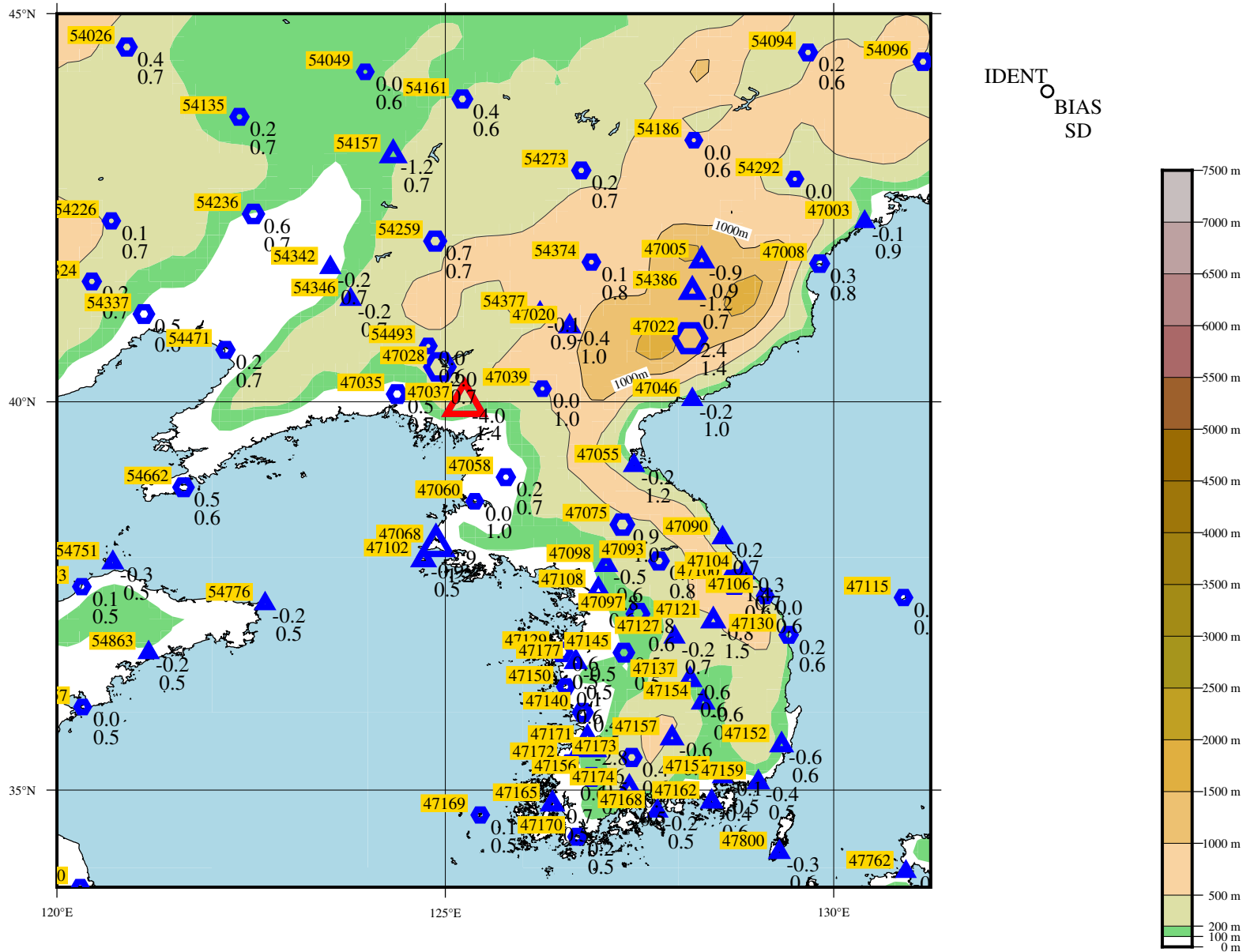


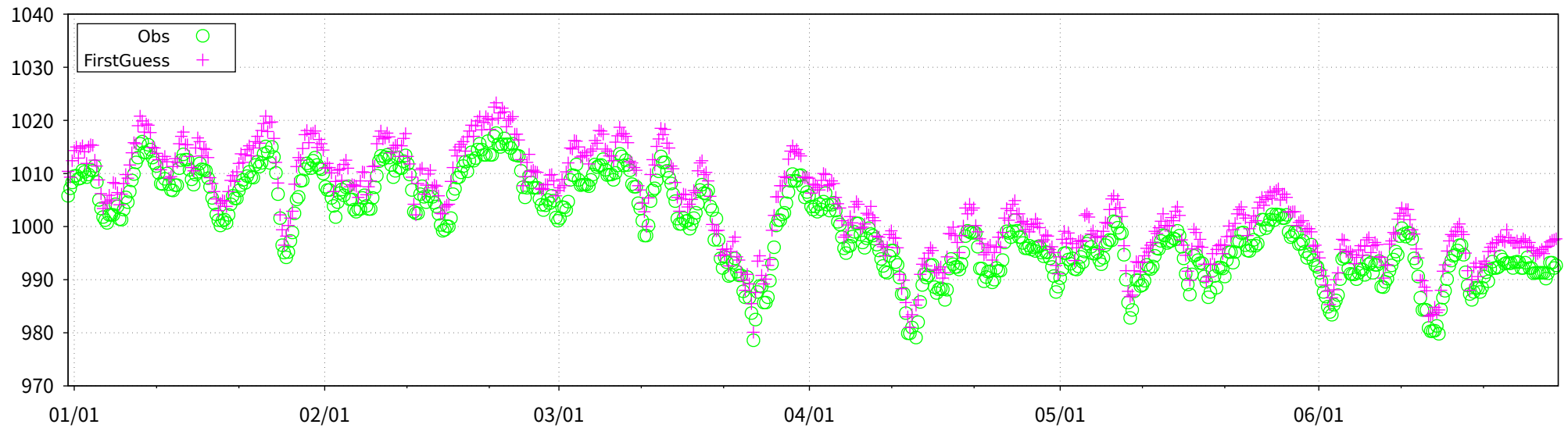
Figure 35 BIAS and SD of SLP for station 47037 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 47037 (lat: 40.0N, lon: 125.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

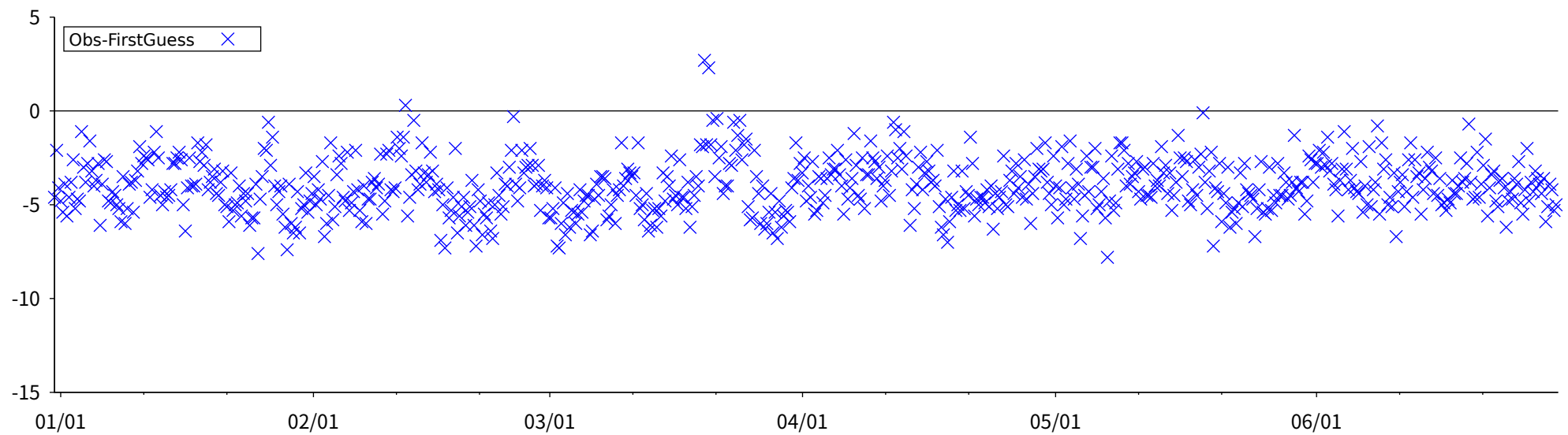
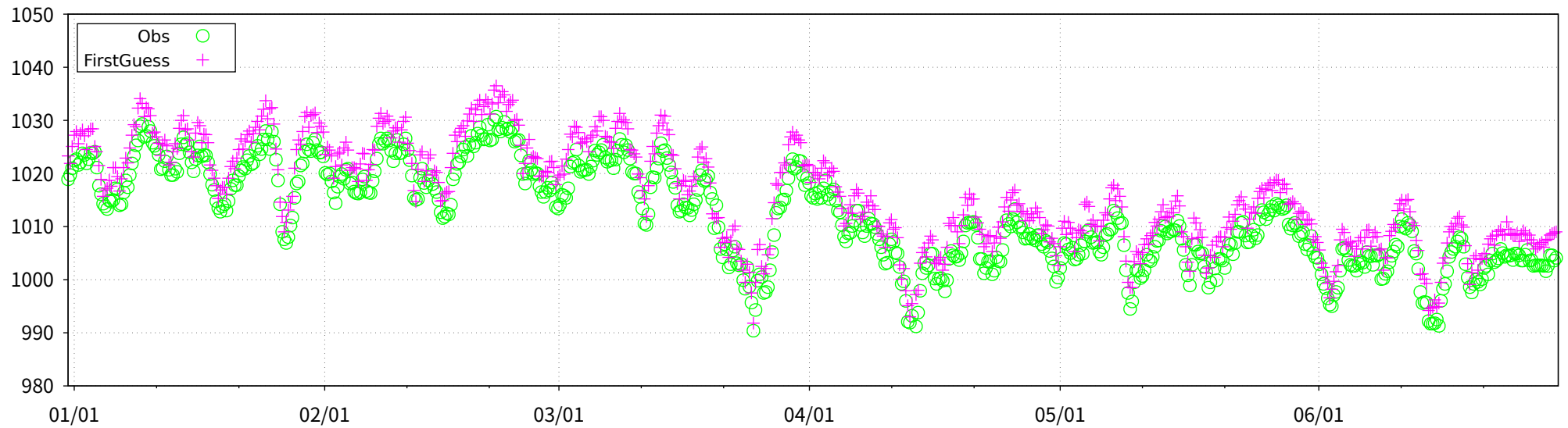


Figure 36(a) Time-series representation of SLP Obs minus FirstGuess for station 47037

ID: 47037 (lat: 40.0N, lon: 125.3E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

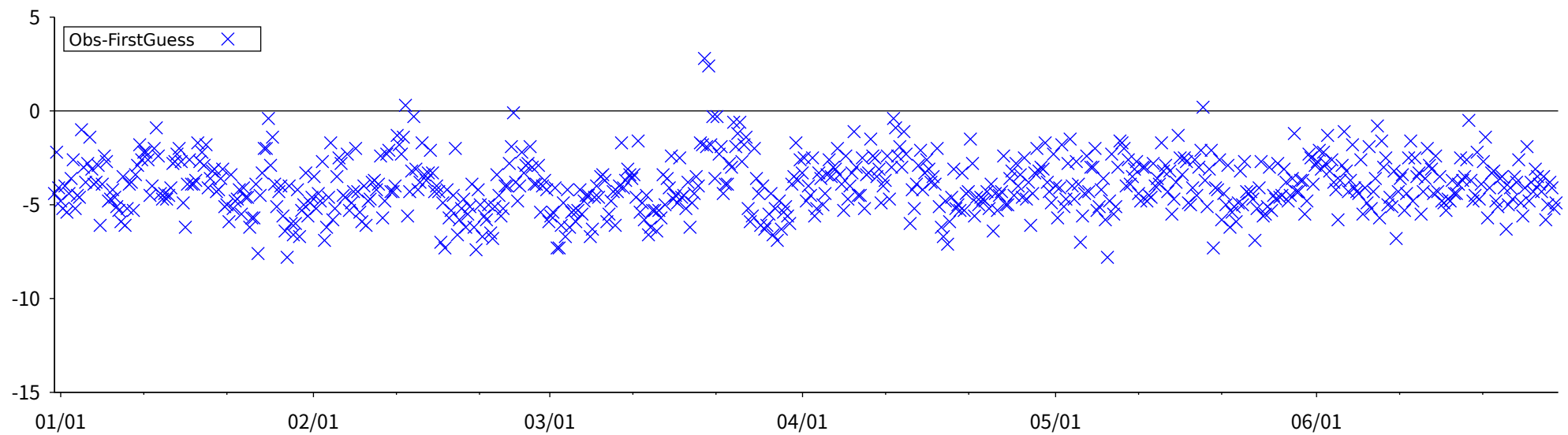
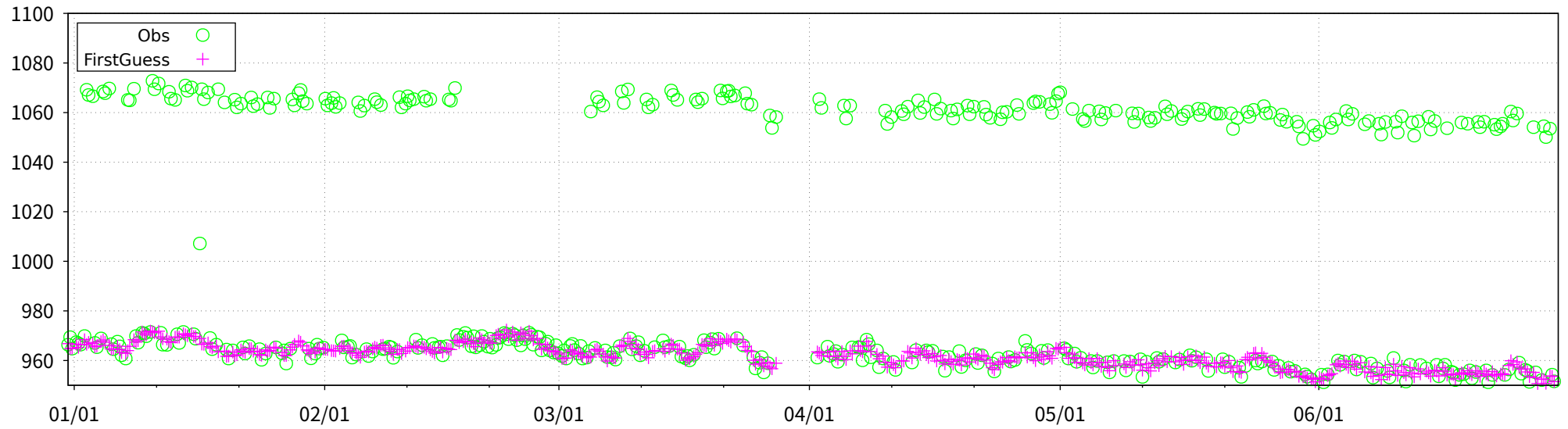


Figure 36(b) Time-series representation of MSLP Obs minus FirstGuess for station 47037

ID: 48001 (lat: 27.3N, lon: 97.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

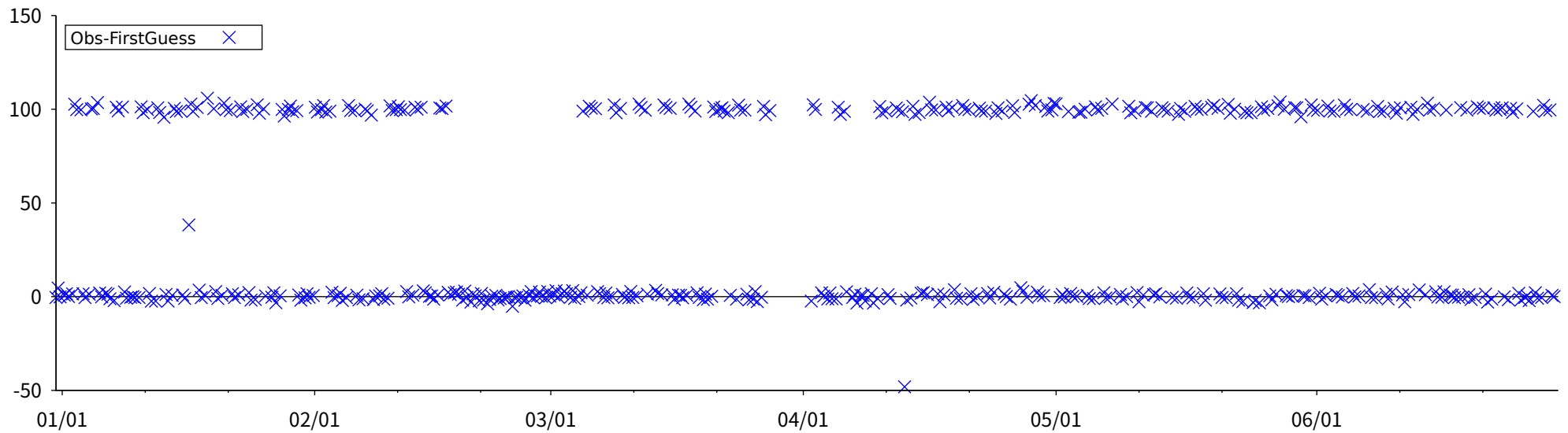


Figure 37 Time-series representation of SLP Obs minus FirstGuess for station 48001

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

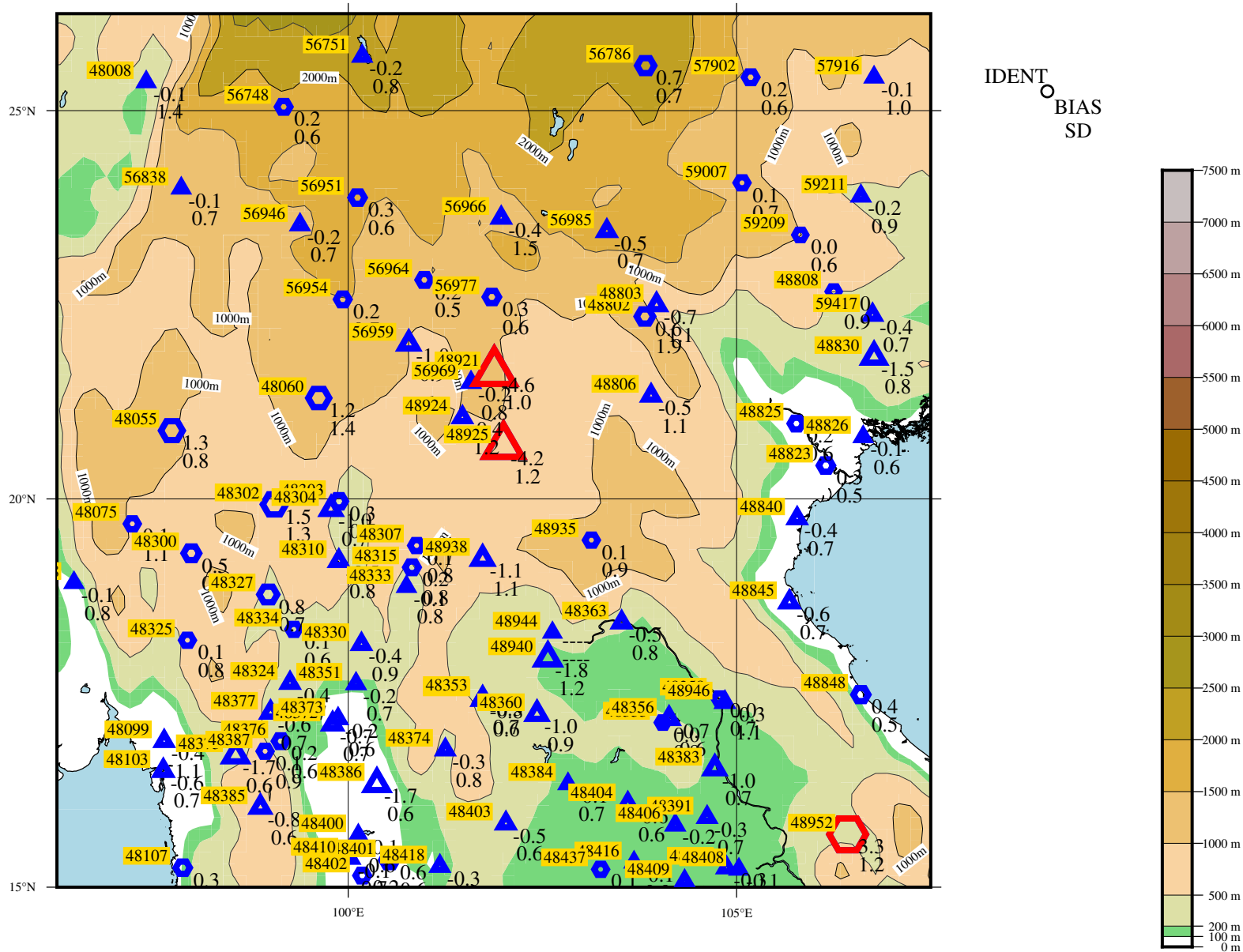
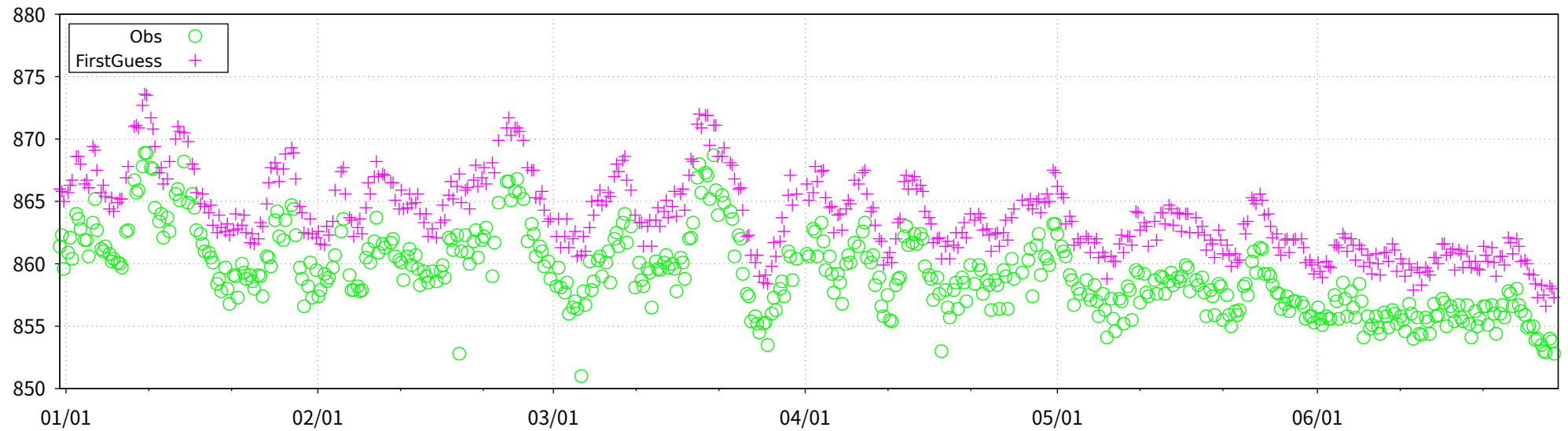


Figure 38 BIAS and SD of SLP for station 48921, 48925, 48952 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 48921 (lat: 21.6N, lon: 101.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

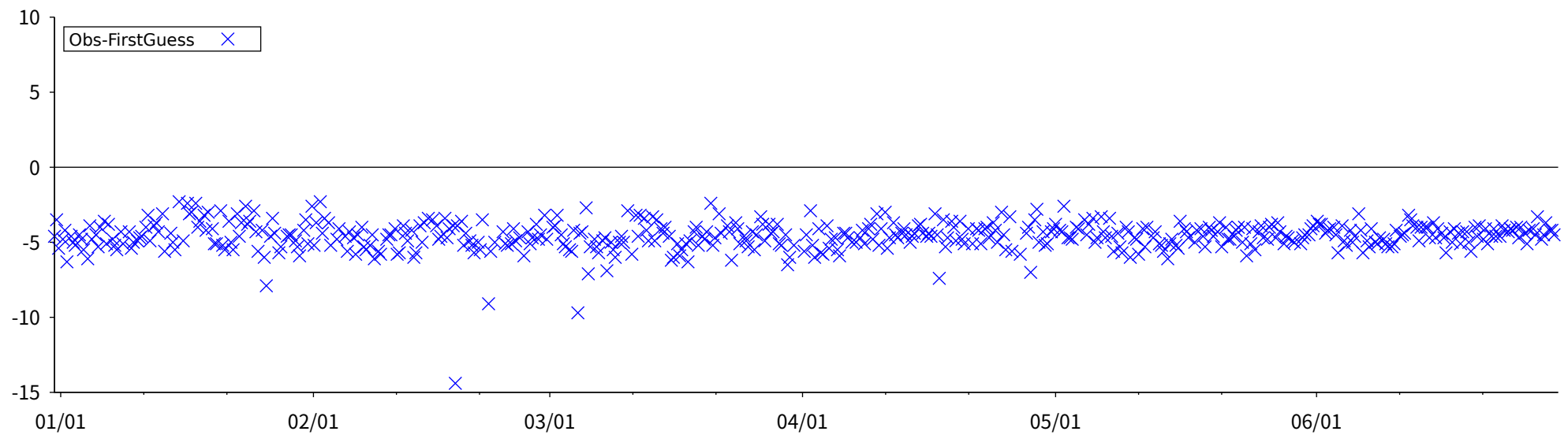
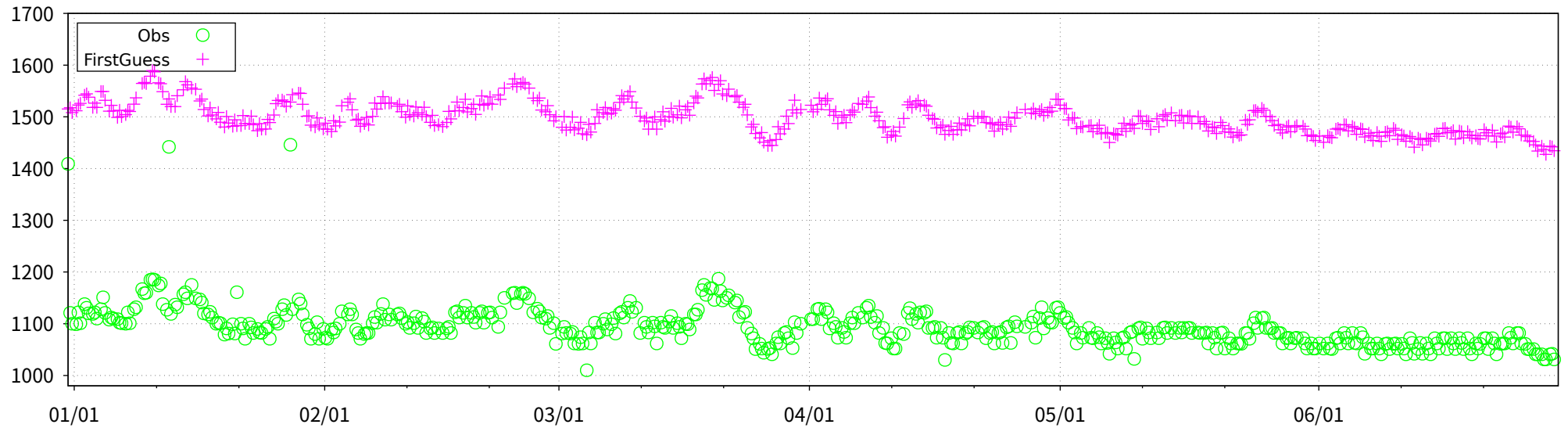


Figure 39(a) Time-series representation of SLP Obs minus FirstGuess for station 48921

ID: 48921 (lat: 21.6N, lon: 101.9E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

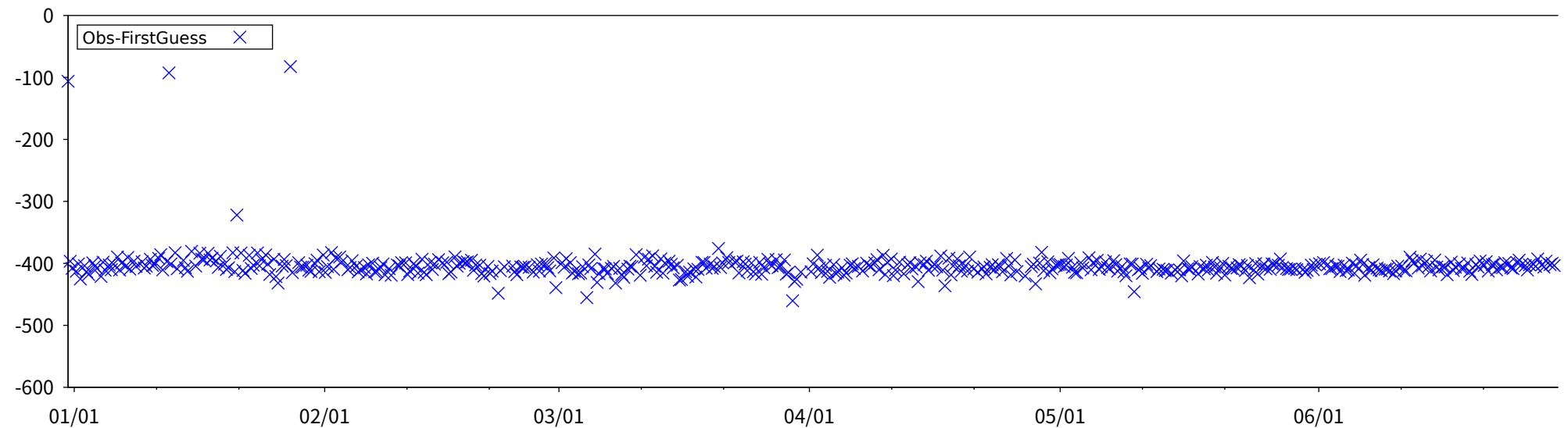
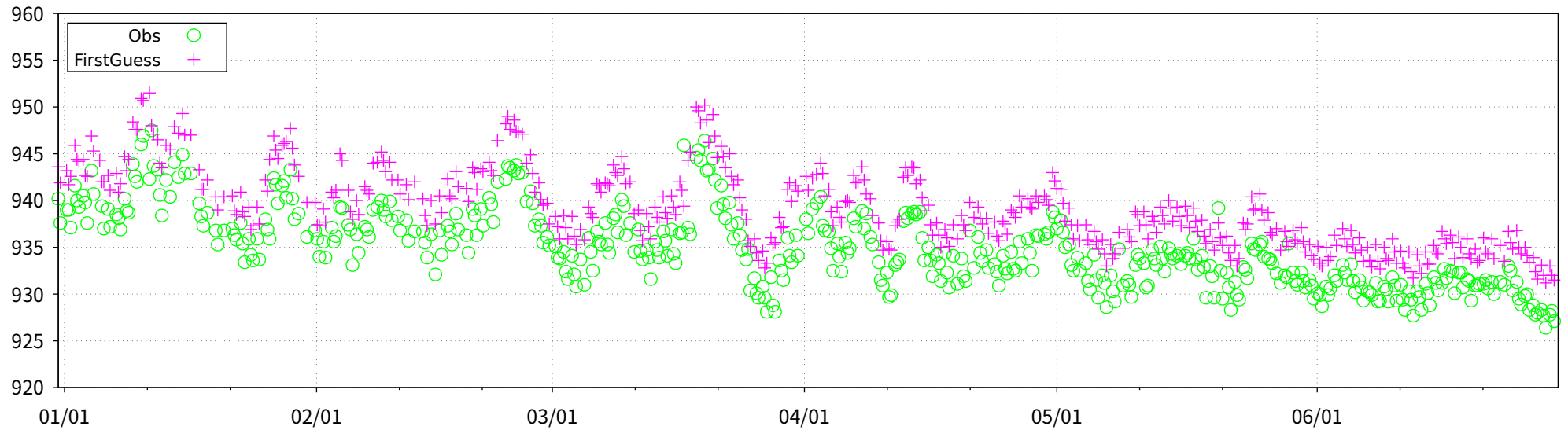


Figure 39(b) Time-series representation of GZ850 Obs minus FirstGuess for station 48921

ID: 48925 (lat: 20.7N, lon: 102.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

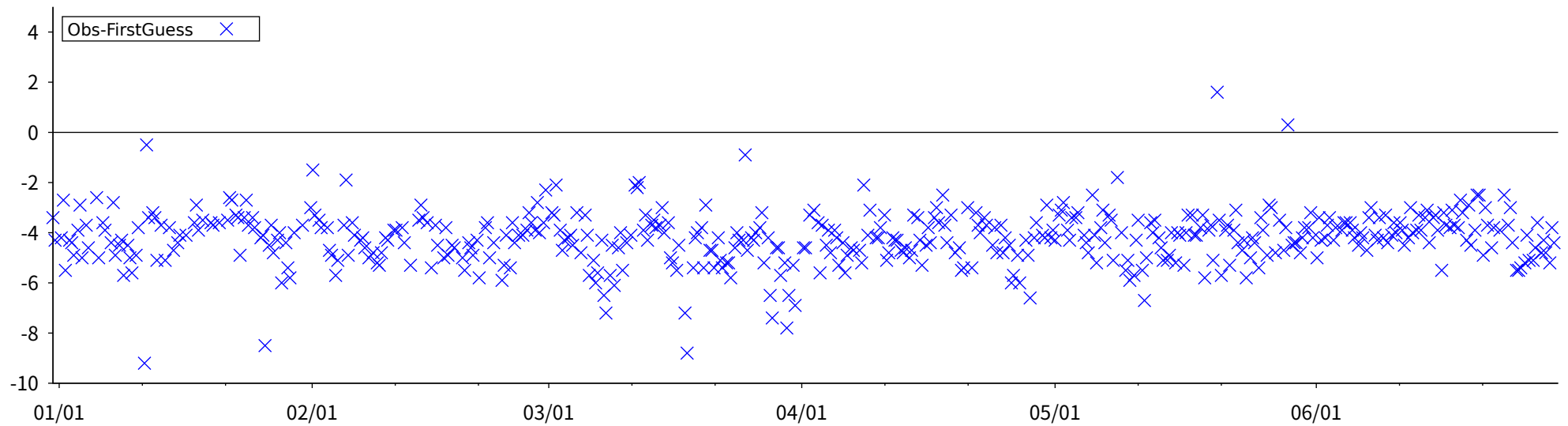


Figure 40 Time-series representation of SLP Obs minus FirstGuess for station 48925

LEVEL = SUR ELEMENT = GZ
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

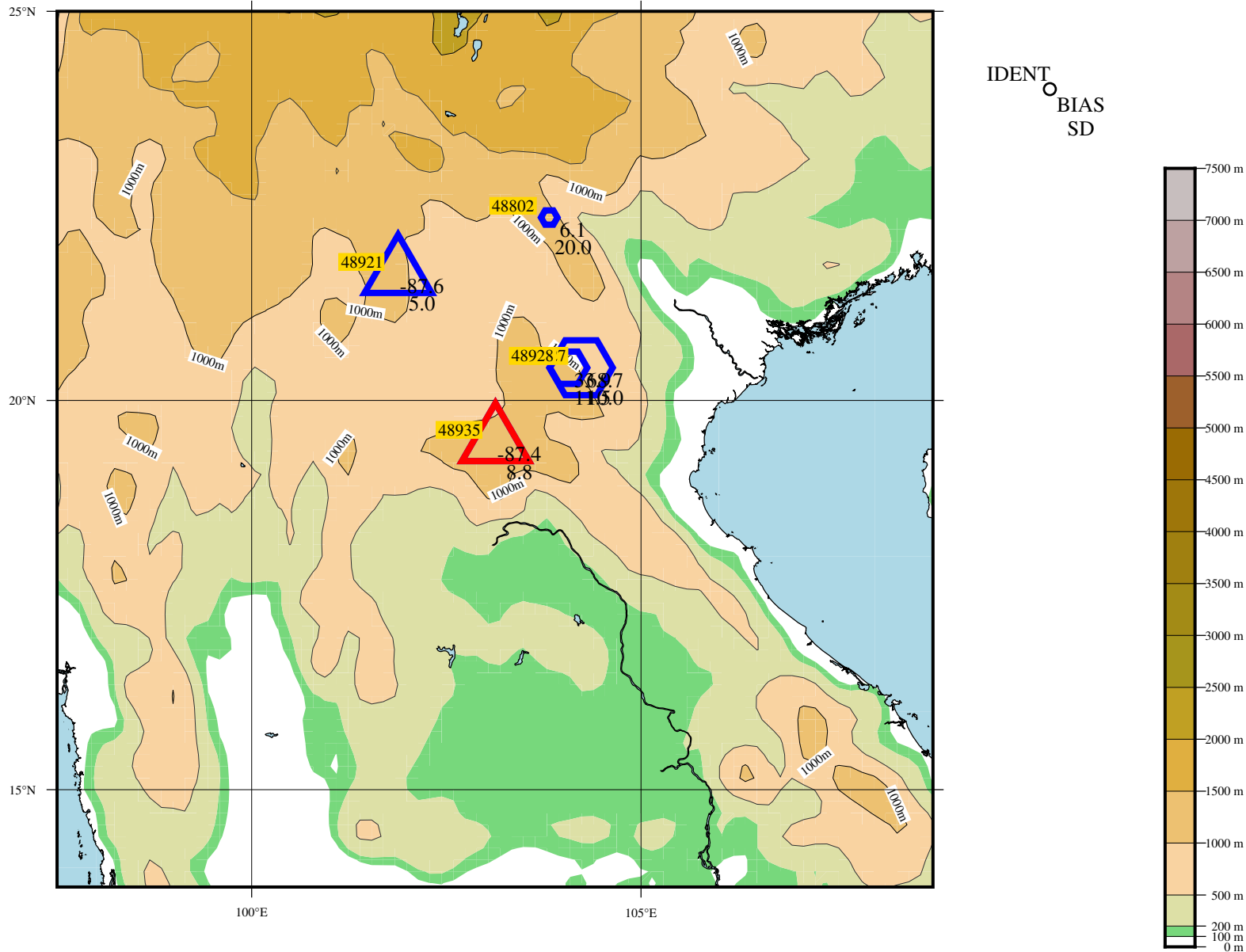
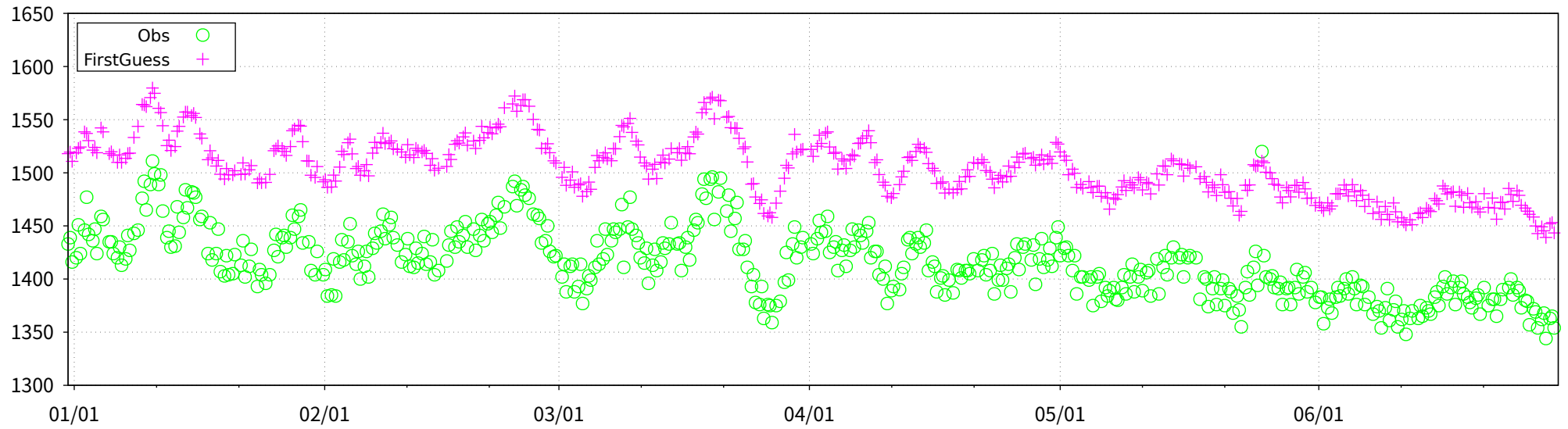


Figure 41 BIAS and SD of GZ for station 48935 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 48935 (lat: 19.5N, lon: 103.1E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

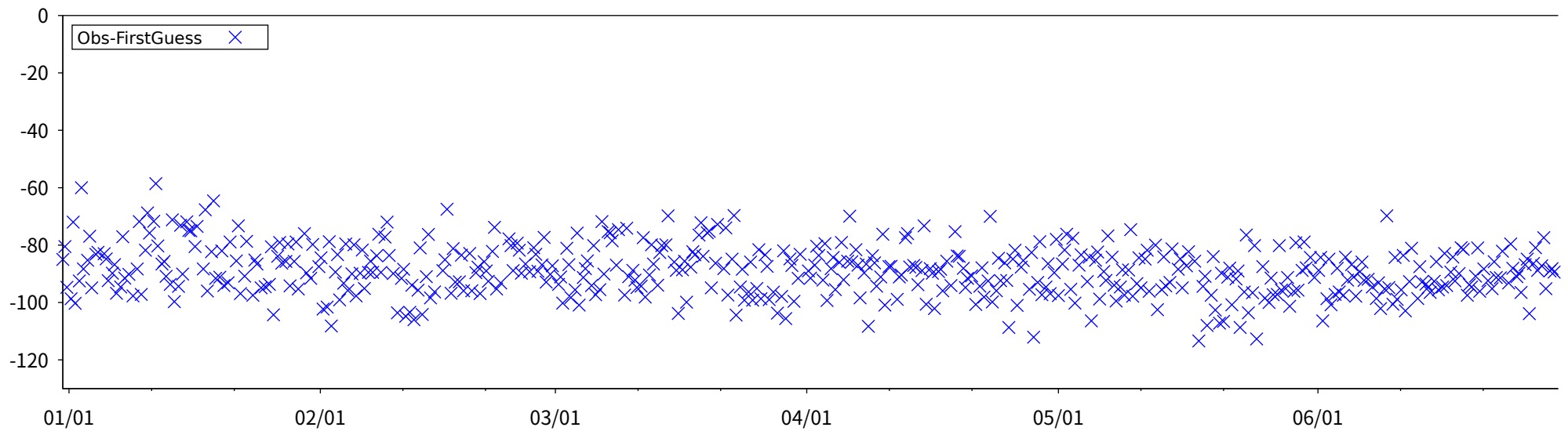


Figure 42 Time-series representation of GZ850 Obs minus FirstGuess for station 48935

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

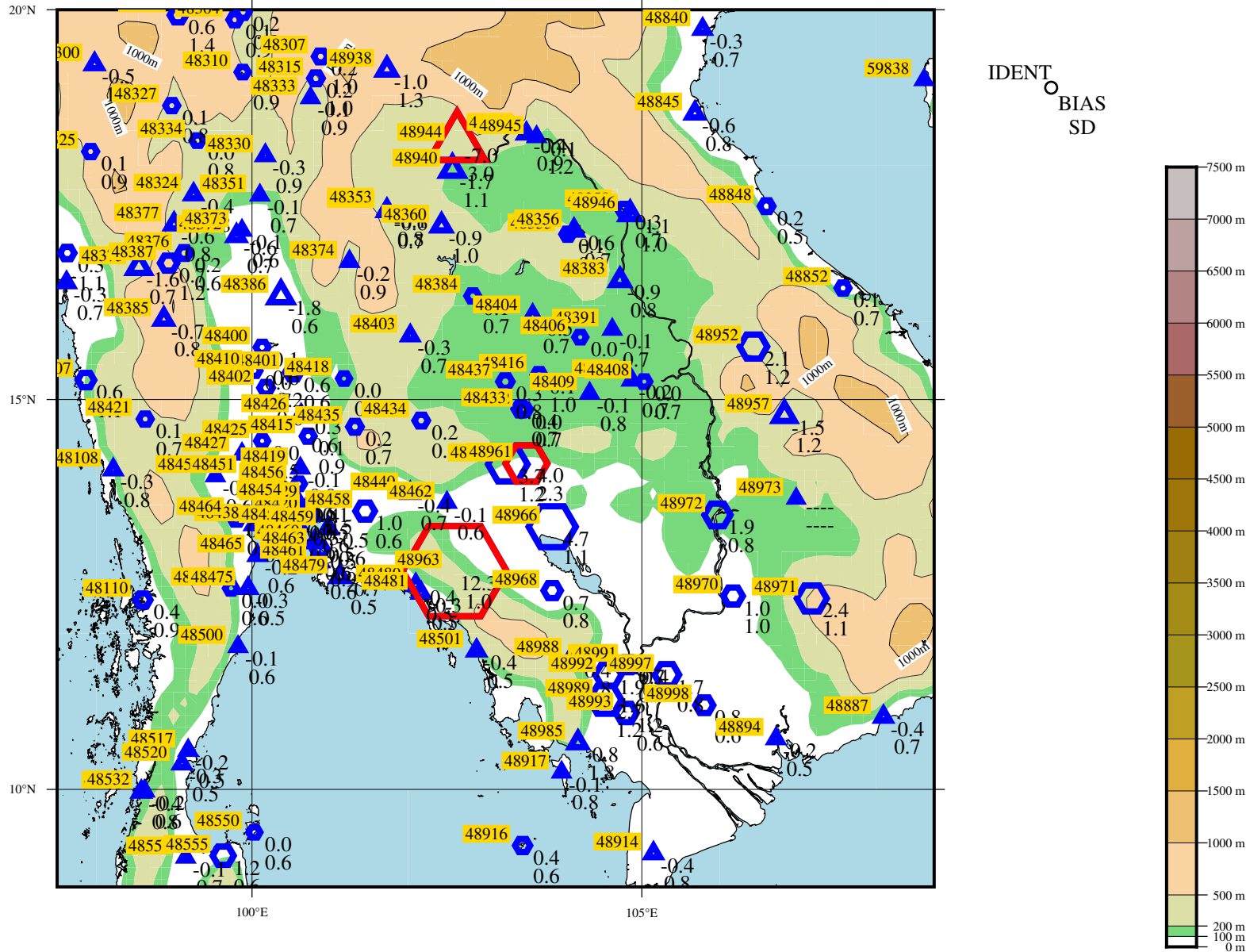
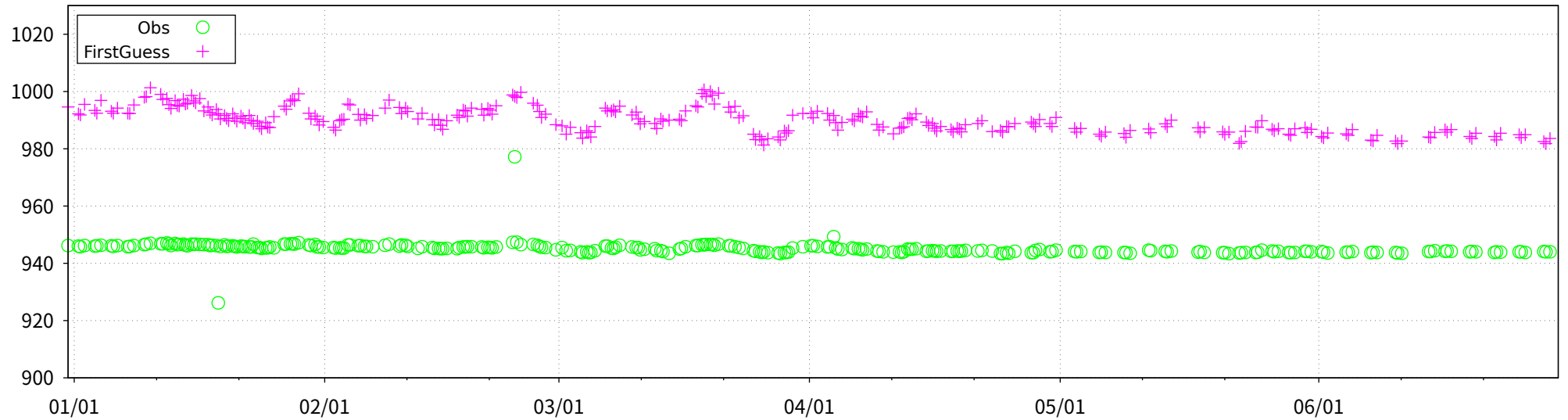


Figure 43 BIAS and SD of MSLP for station 48944, 48961, 48963 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 48944 (lat: 18.3N, lon: 102.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

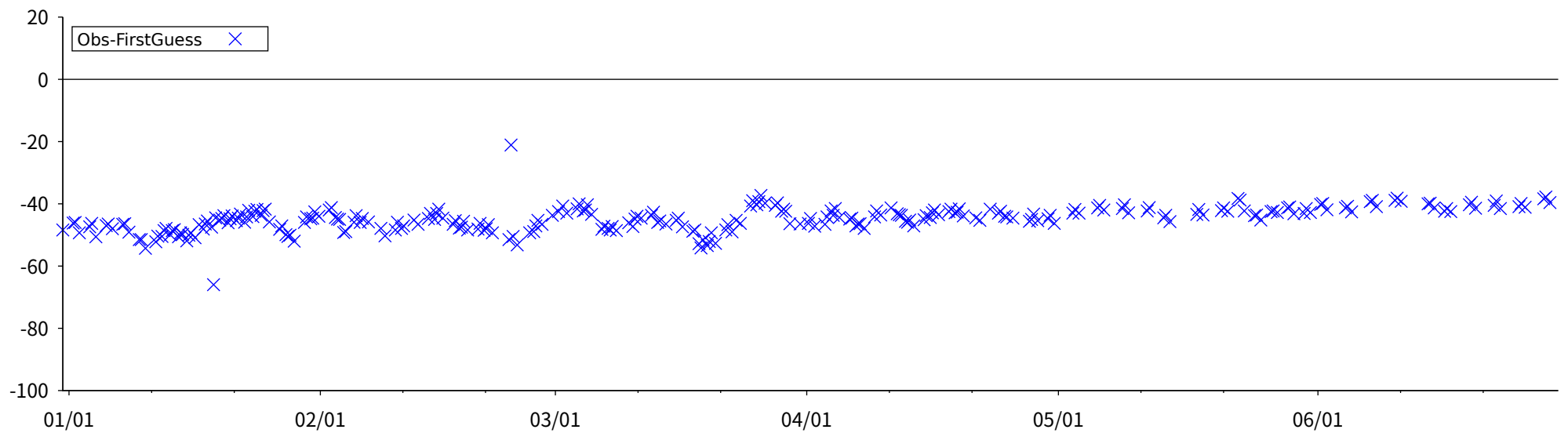
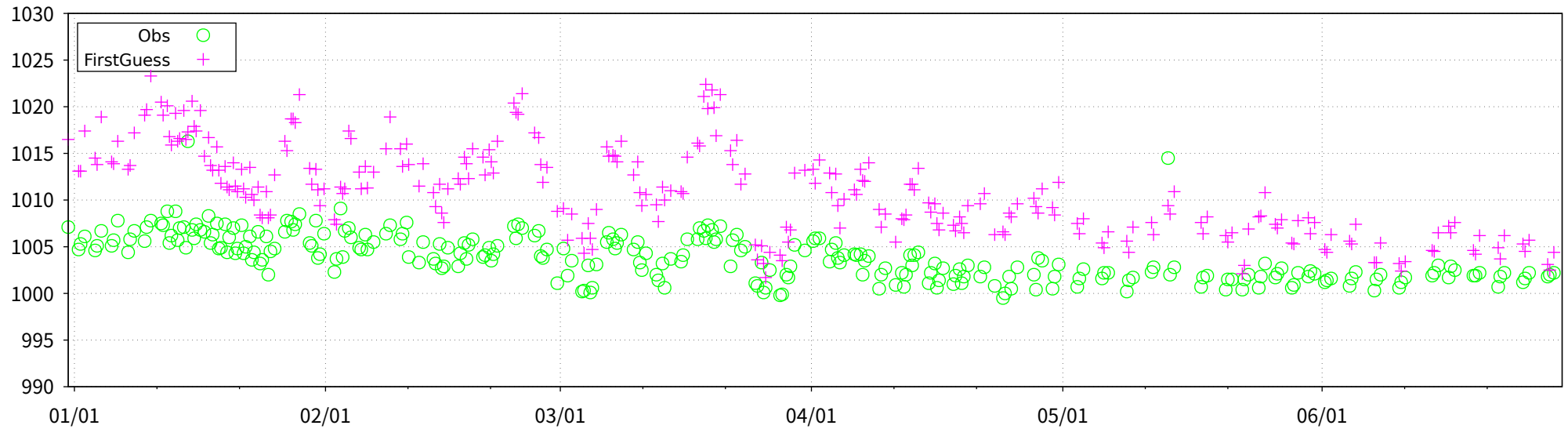


Figure 44(a) Time-series representation of SLP Obs minus FirstGuess for station 48944

ID: 48944 (lat: 18.3N, lon: 102.6E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

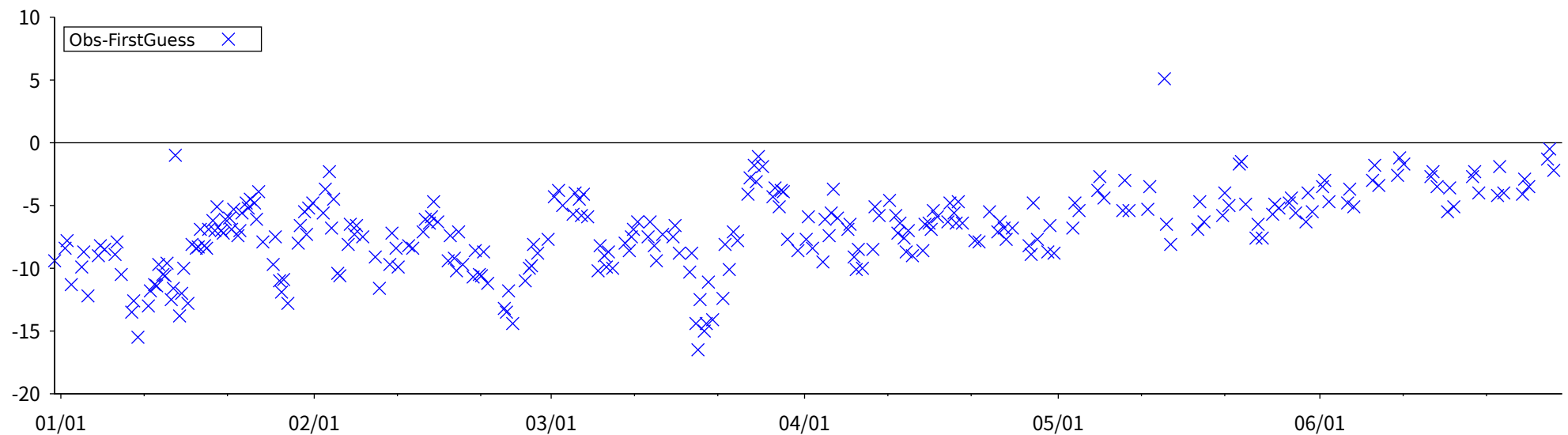
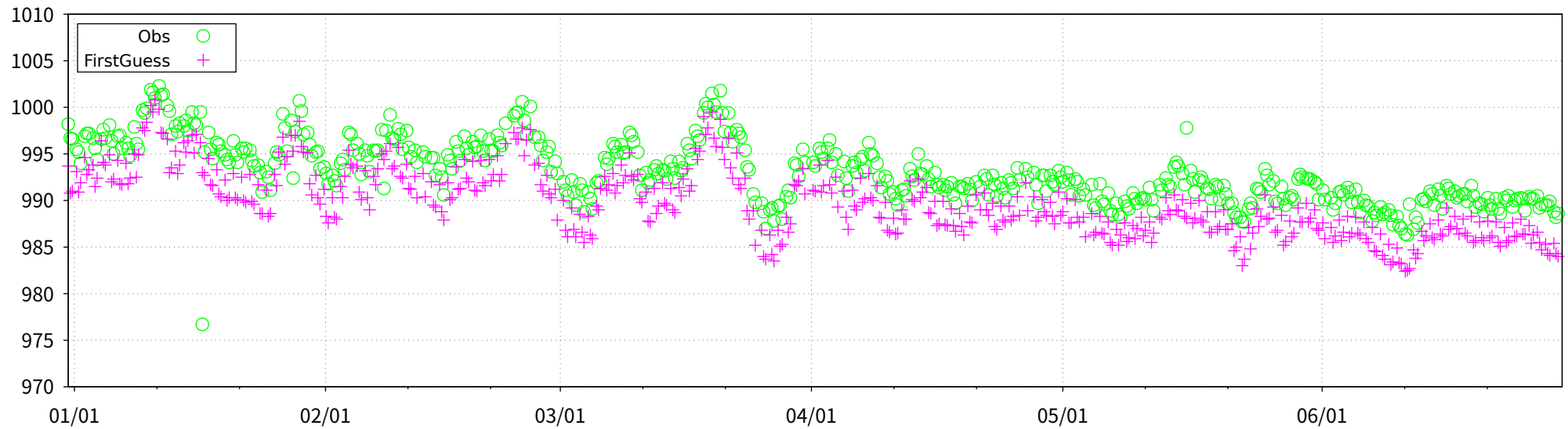


Figure 44(b) Time-series representation of MSLP Obs minus FirstGuess for station 48944

ID: 48952 (lat: 15.7N, lon: 106.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

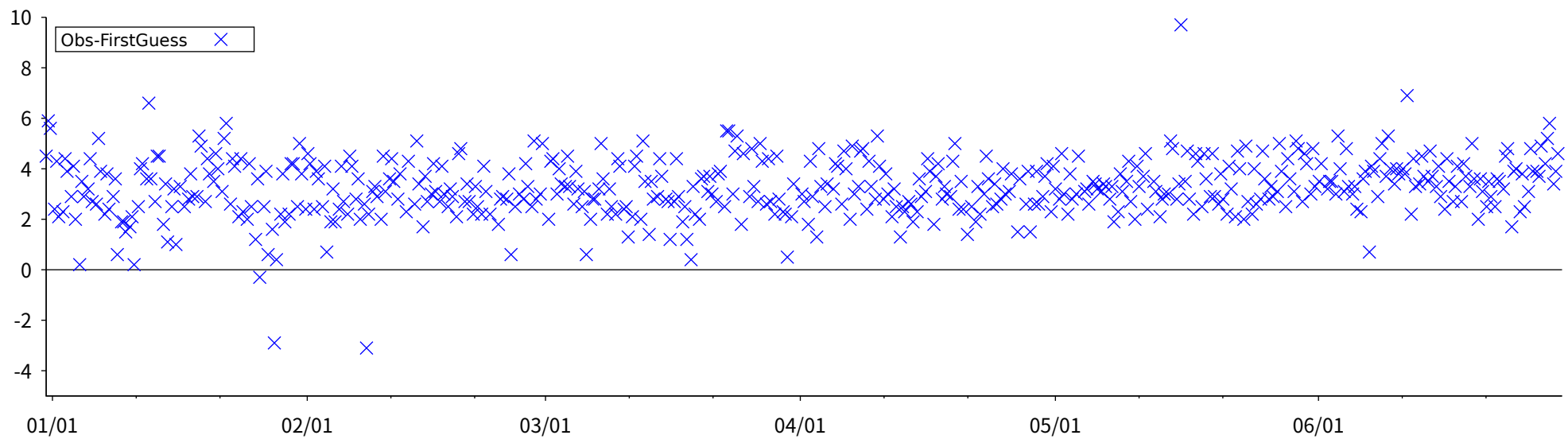
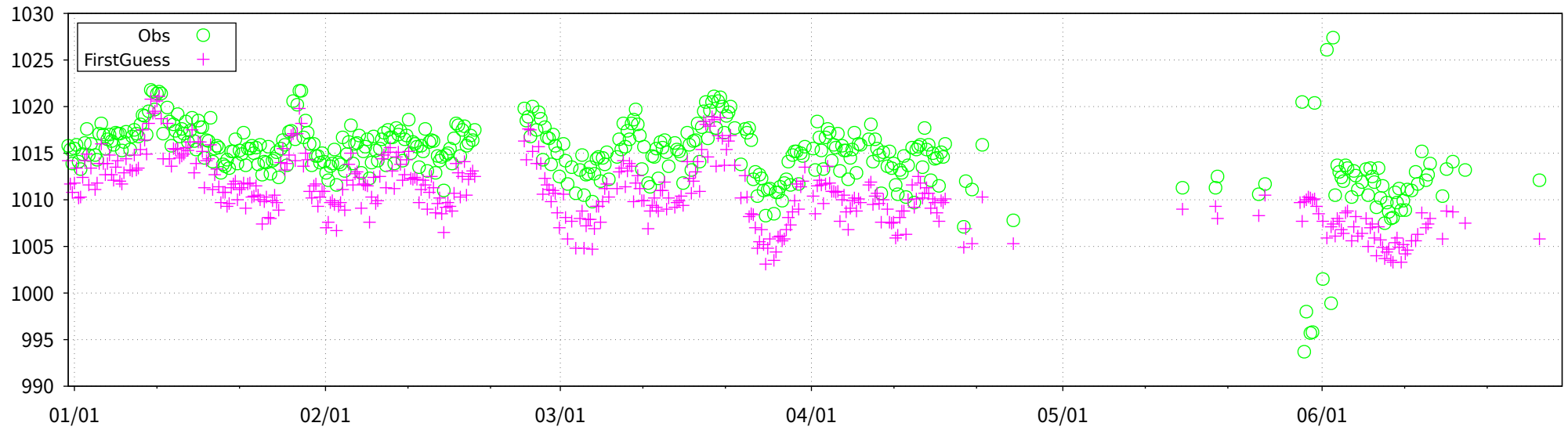


Figure 45 Time-series representation of SLP Obs minus FirstGuess for station 48952

ID: 48961 (lat: 14.2N, lon: 103.5E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

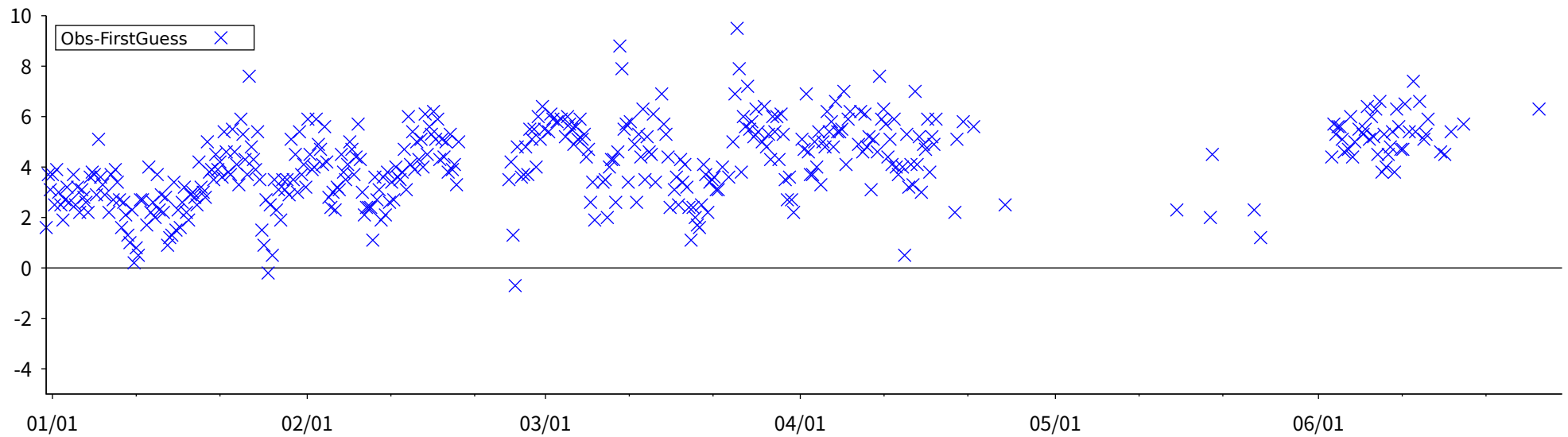


Figure 46 Time-series representation of MSLP Obs minus FirstGuess for station 48961

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

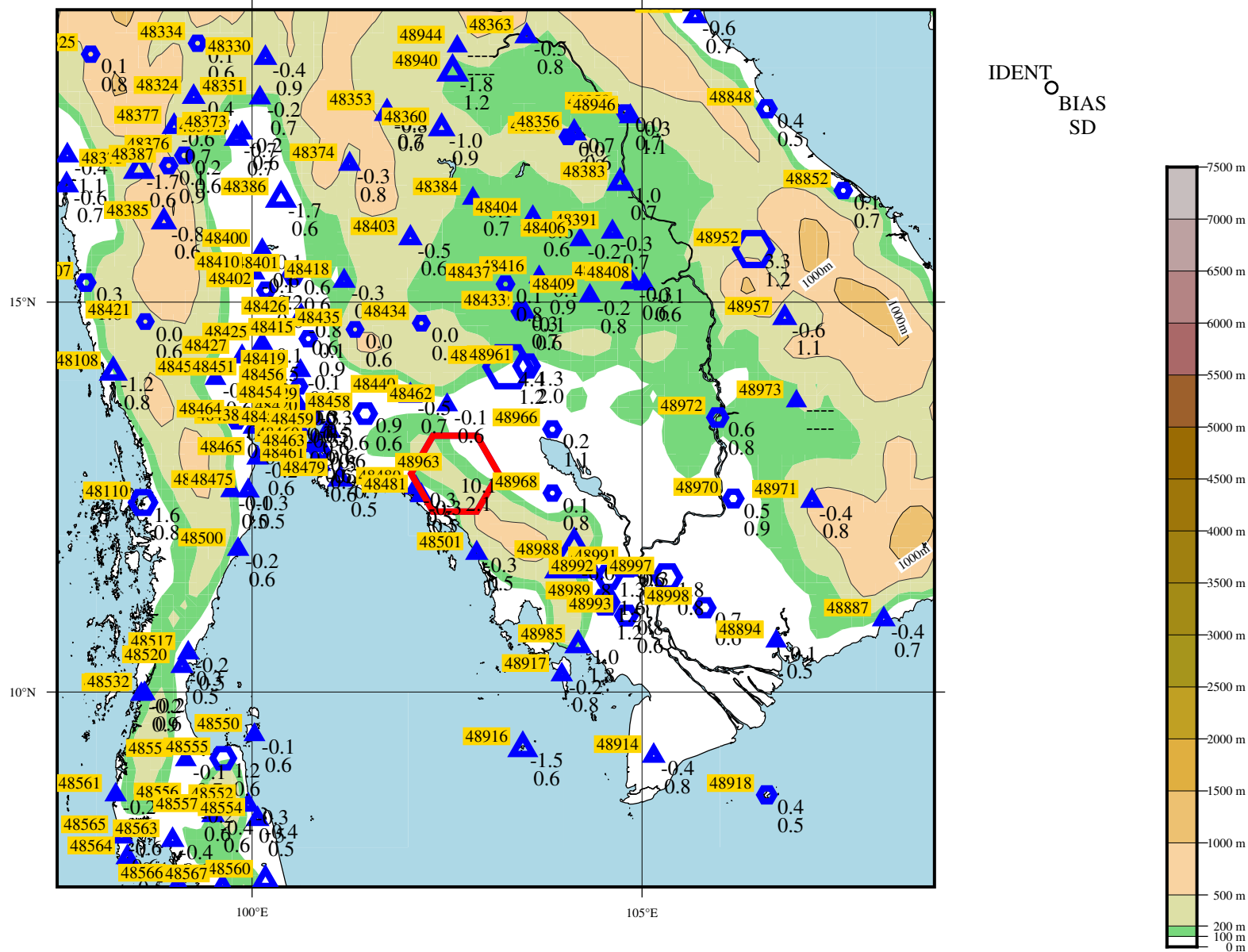


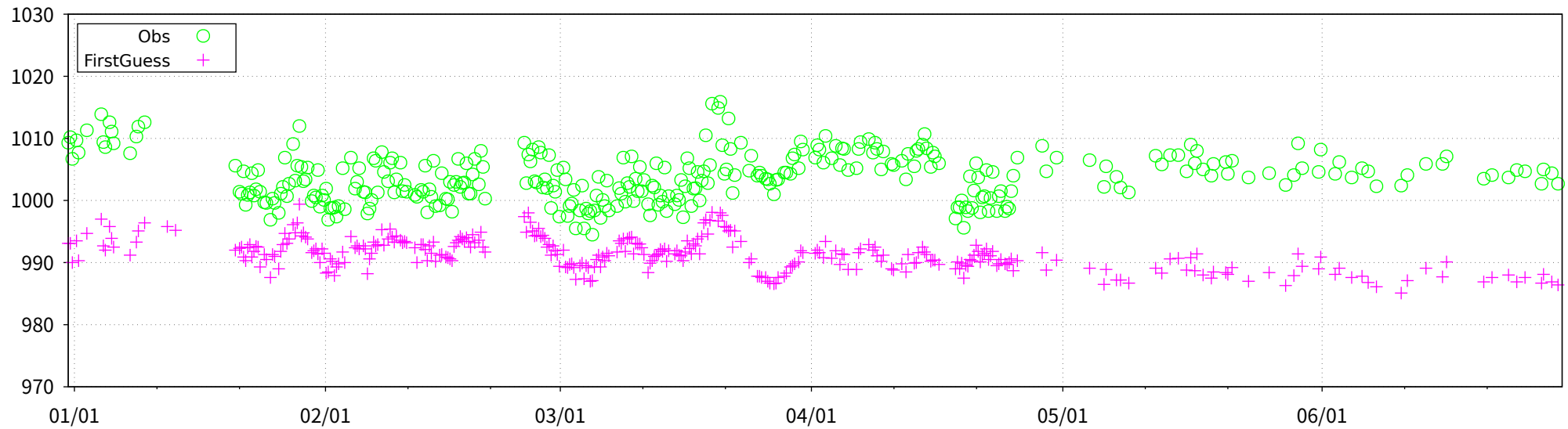
Figure 47 BIAS and SD of SLP for station 48963 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 48963 (lat: 12.8N, lon: 102.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

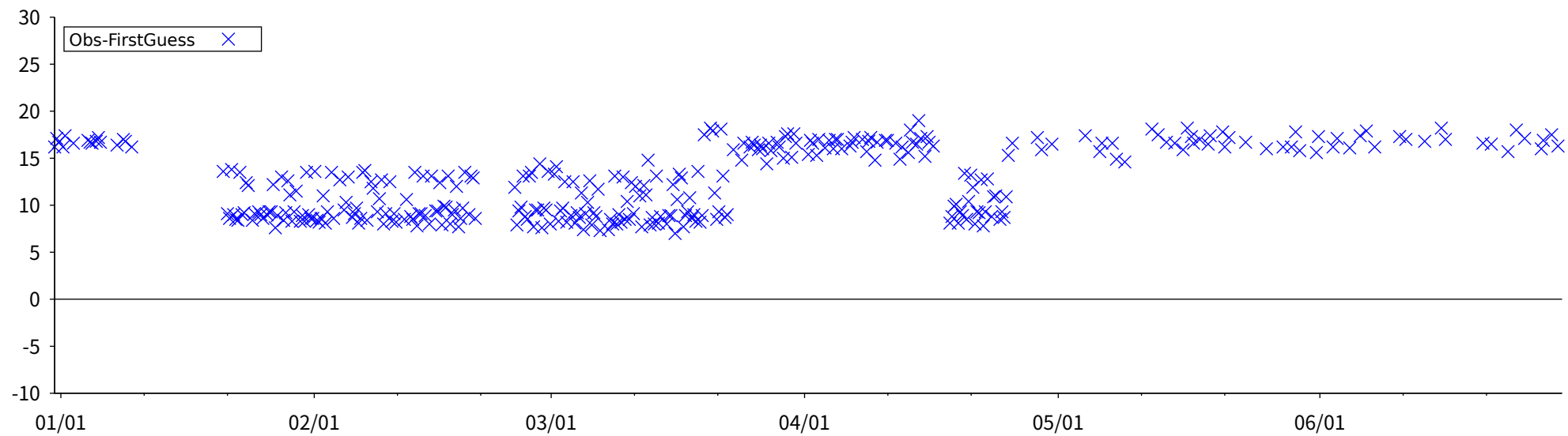
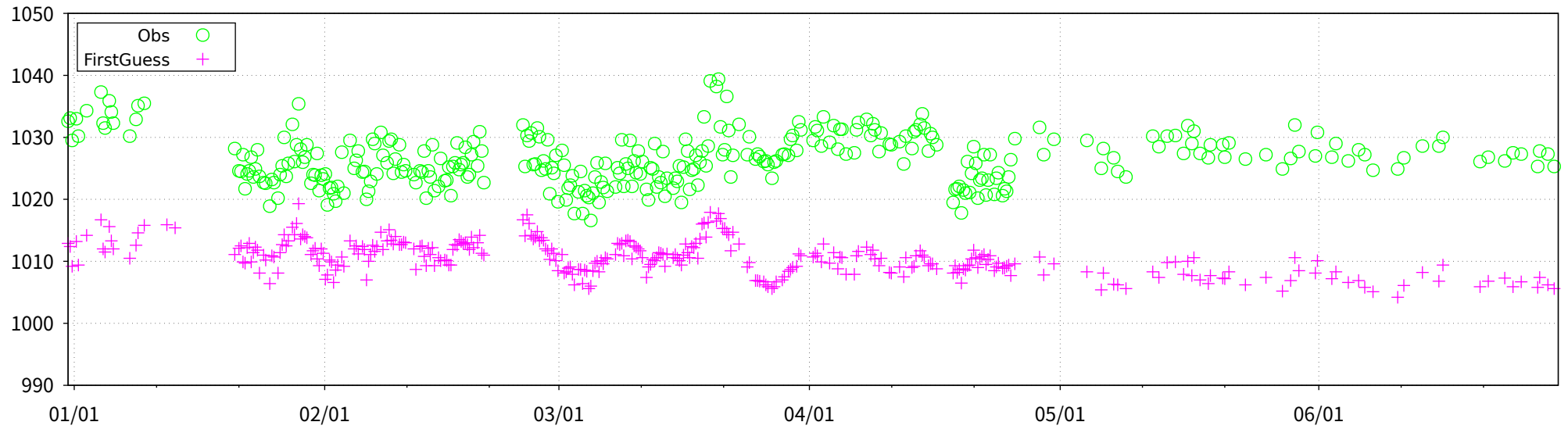


Figure 48(a) Time-series representation of SLP Obs minus FirstGuess for station 48963

ID: 48963 (lat: 12.8N, lon: 102.6E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

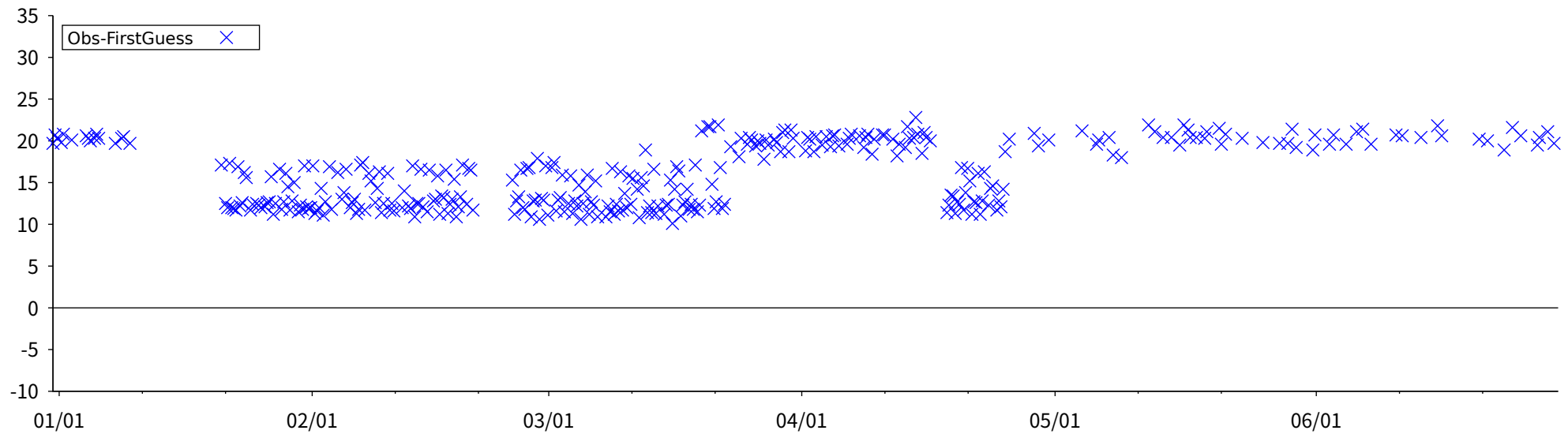
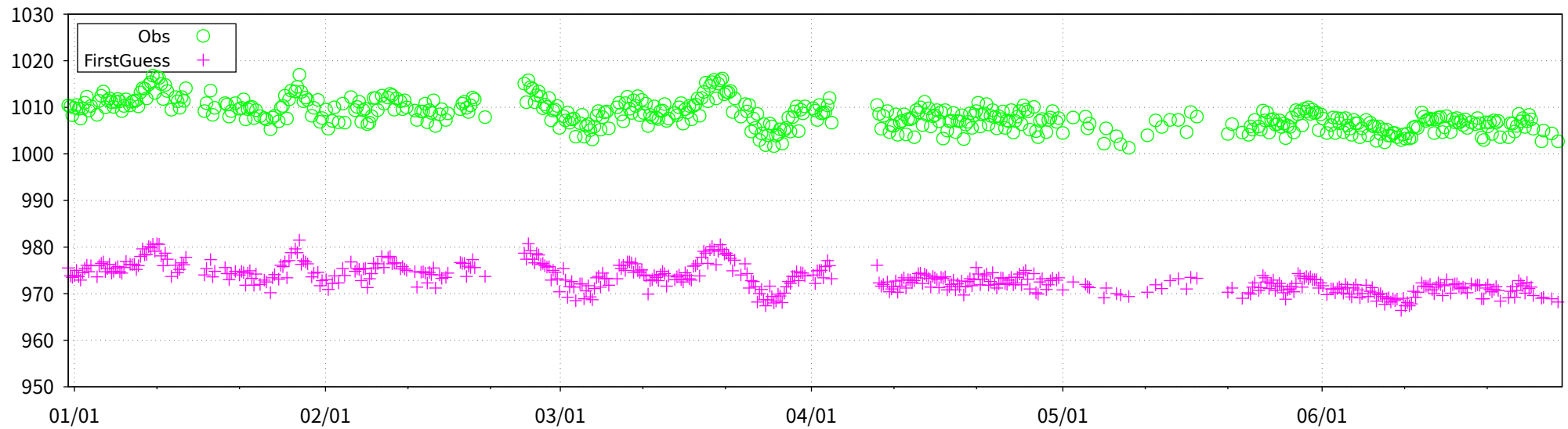


Figure 48(b) Time-series representation of MSLP Obs minus FirstGuess for station 48963

ID: 48973 (lat: 13.7N, lon: 107.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

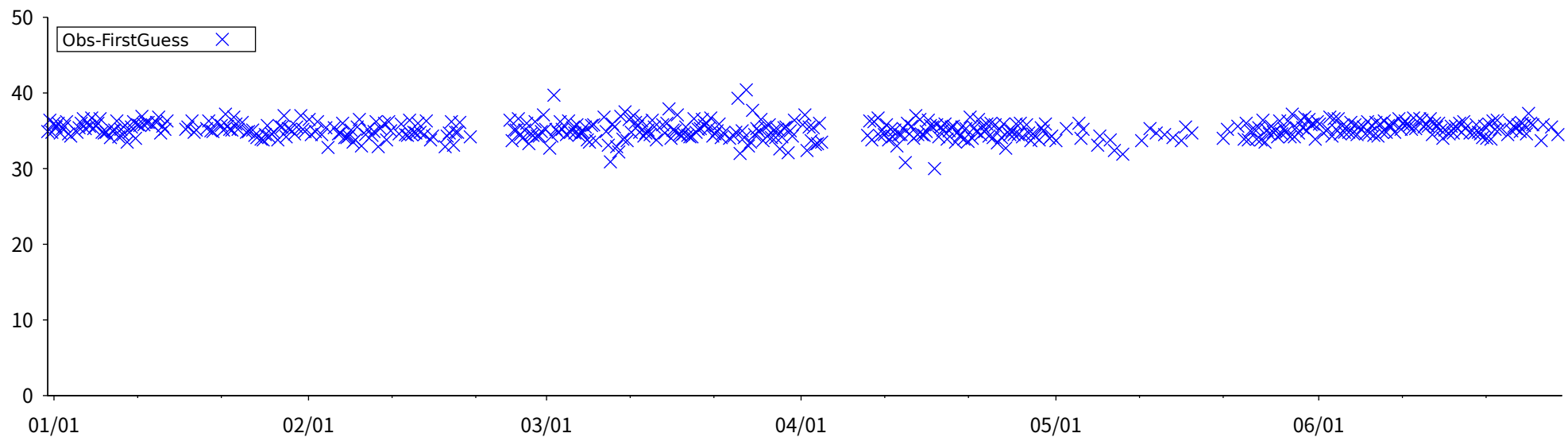
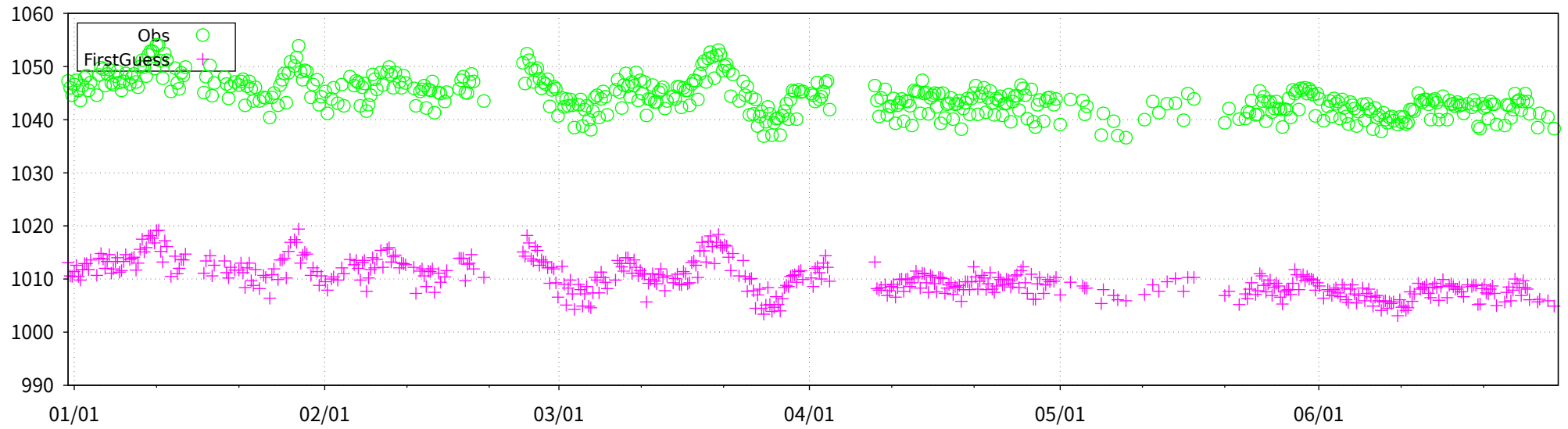


Figure 49(a) Time-series representation of SLP Obs minus FirstGuess for station 48973

ID: 48973 (lat: 13.7N, lon: 107.0E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

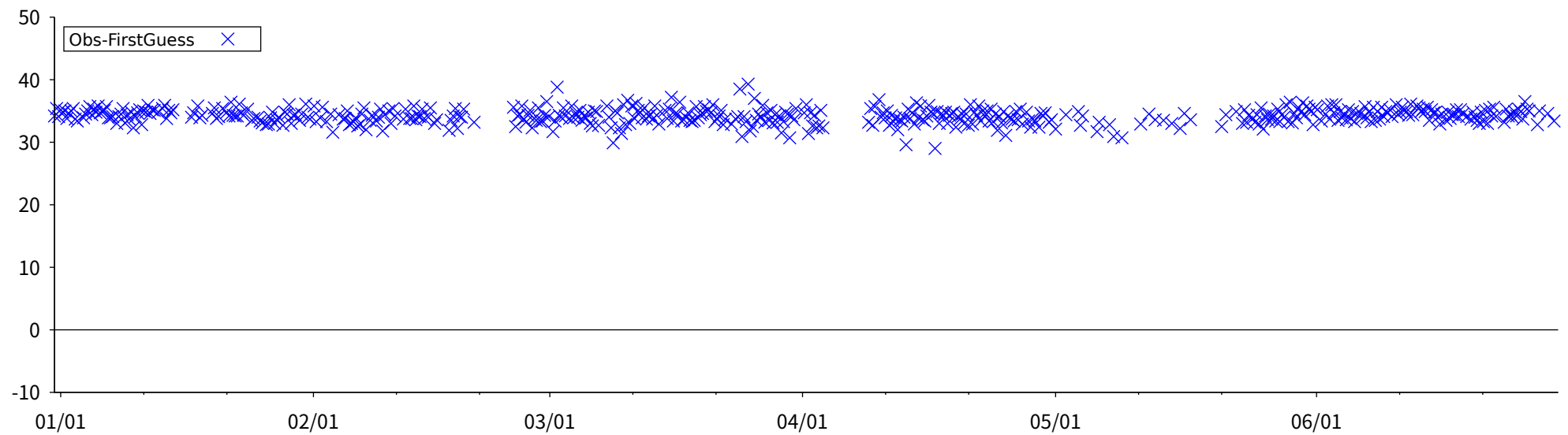


Figure 49(b) Time-series representation of MSLP Obs minus FirstGuess for station 48973

LEVEL = SUR ELEMENT = SLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

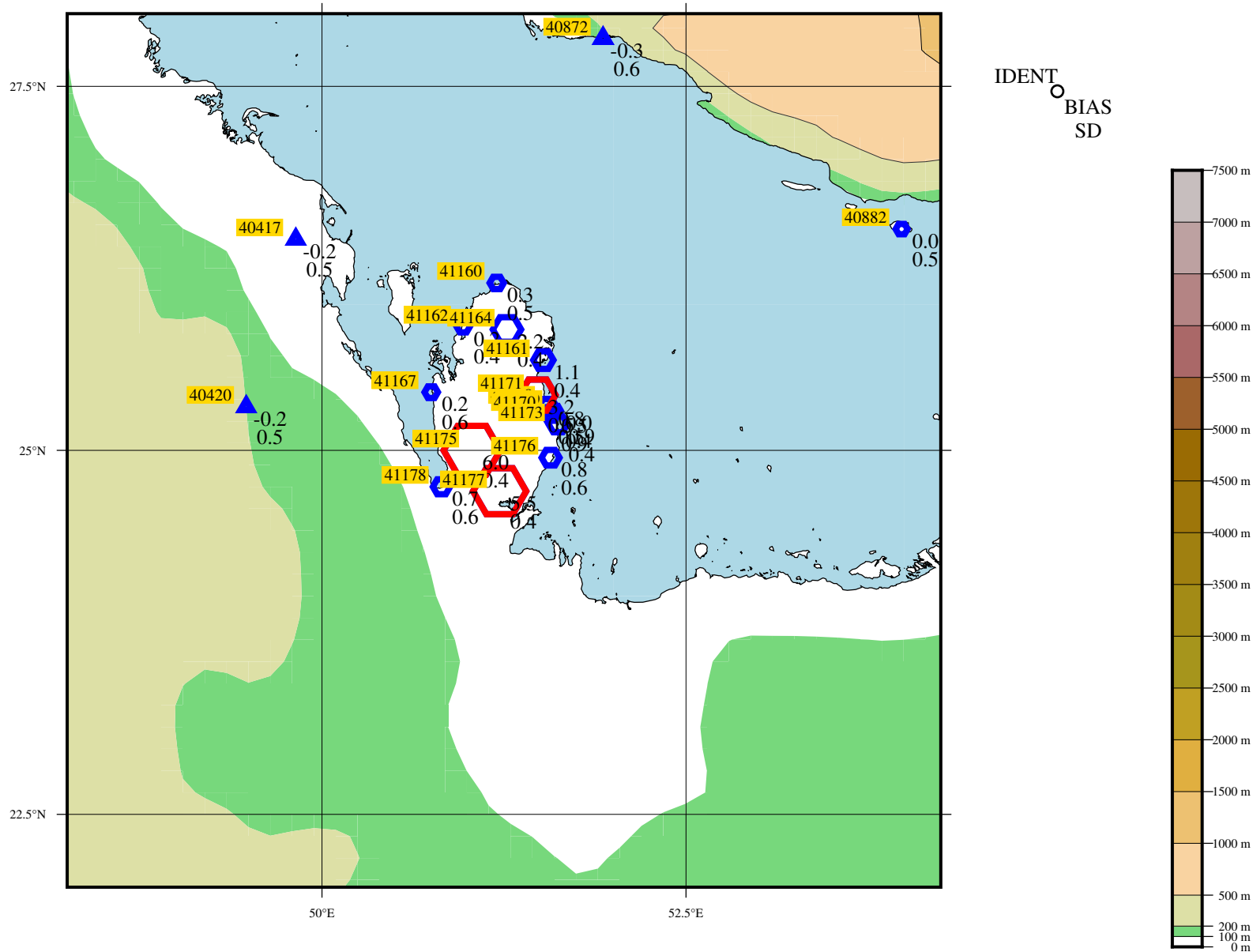


Figure 50 BIAS and SD of SLP for station 41171, 41175, 41177 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

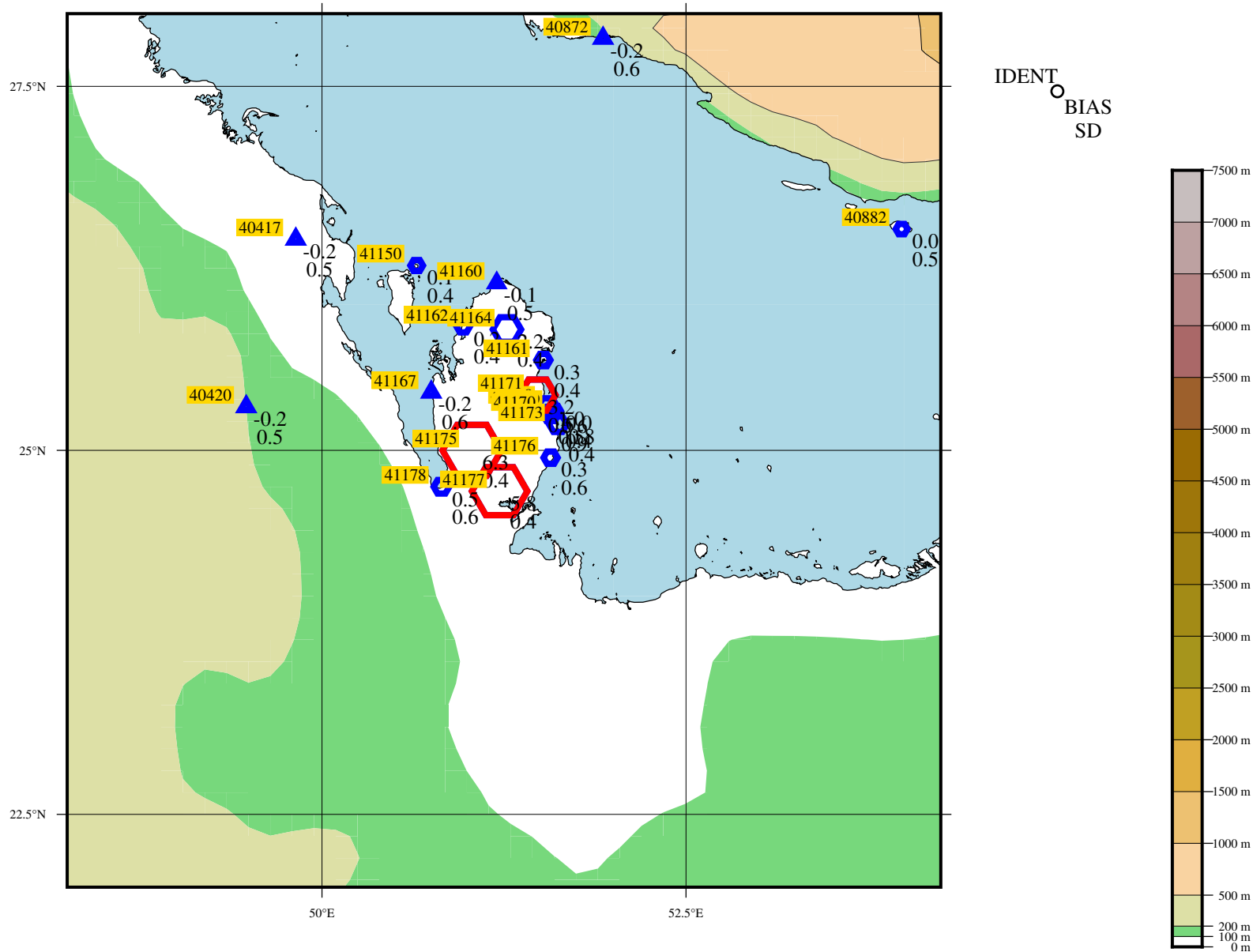
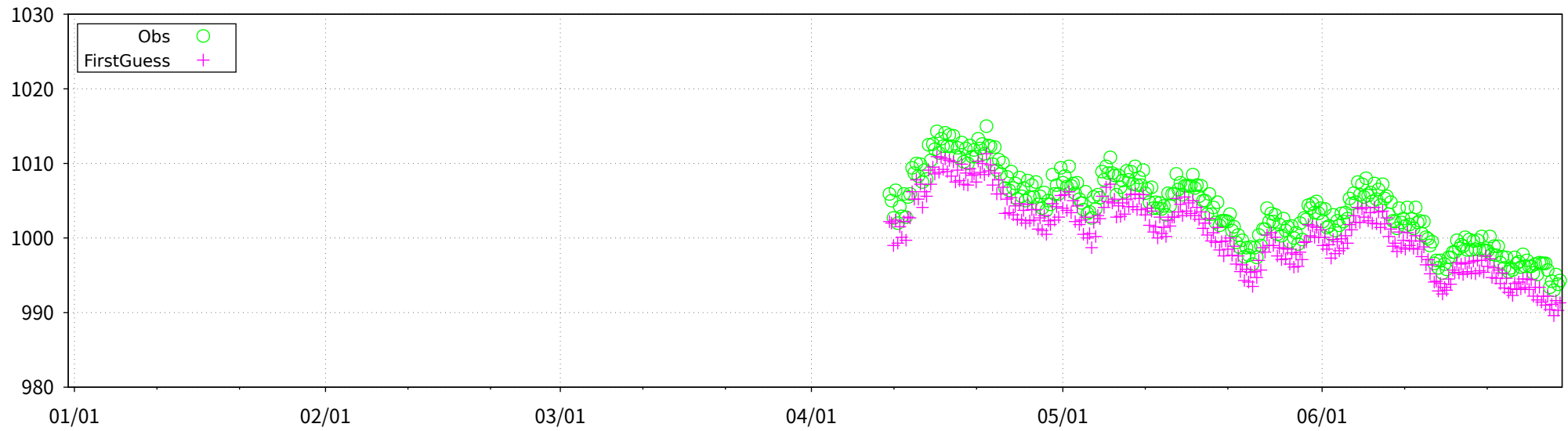


Figure 51 BIAS and SD of MSLP for station 41171, 41175, 41177 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 41171 (lat: 25.4N, lon: 51.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

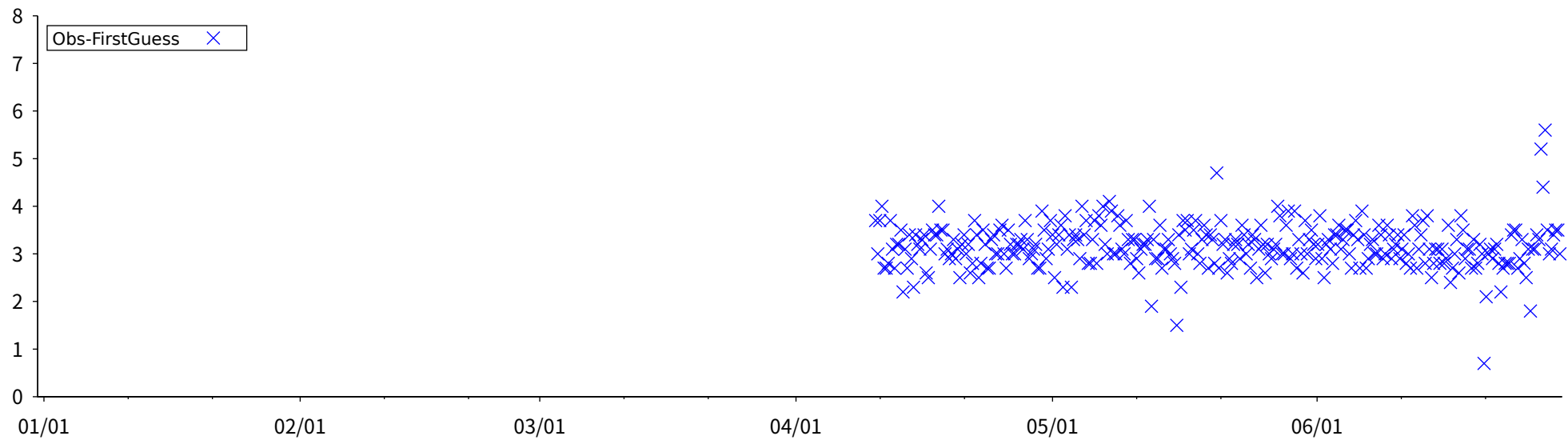
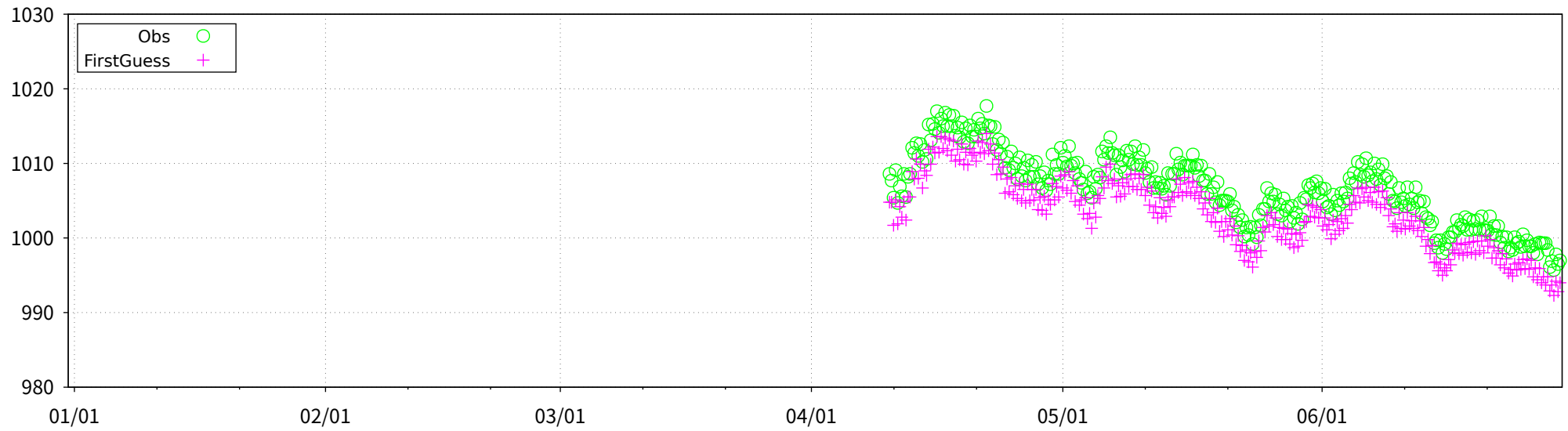


Figure 52(a) Time-series representation of SLP Obs minus FirstGuess for station 41171

ID: 41171 (lat: 25.4N, lon: 51.5E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

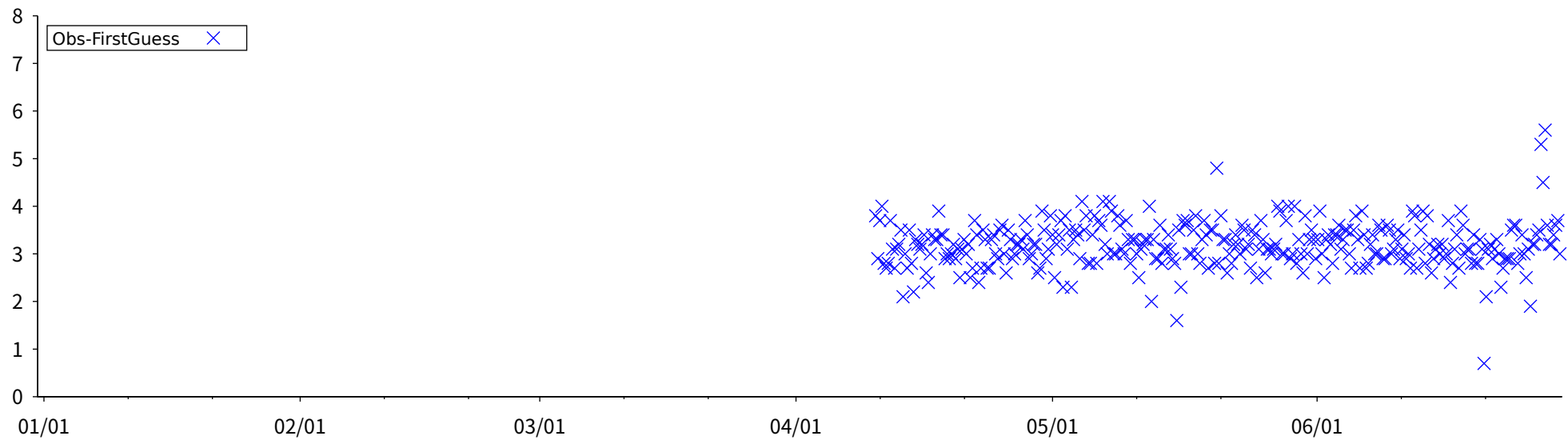
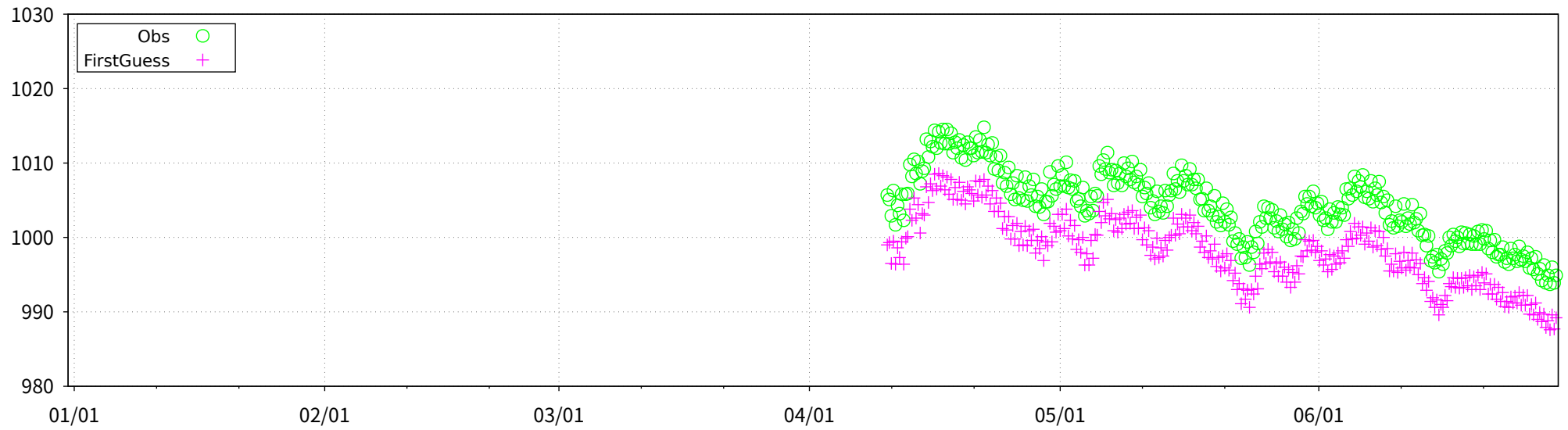


Figure 52(b) Time-series representation of MSLP Obs minus FirstGuess for station 41171

ID: 41175 (lat: 25.0N, lon: 51.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

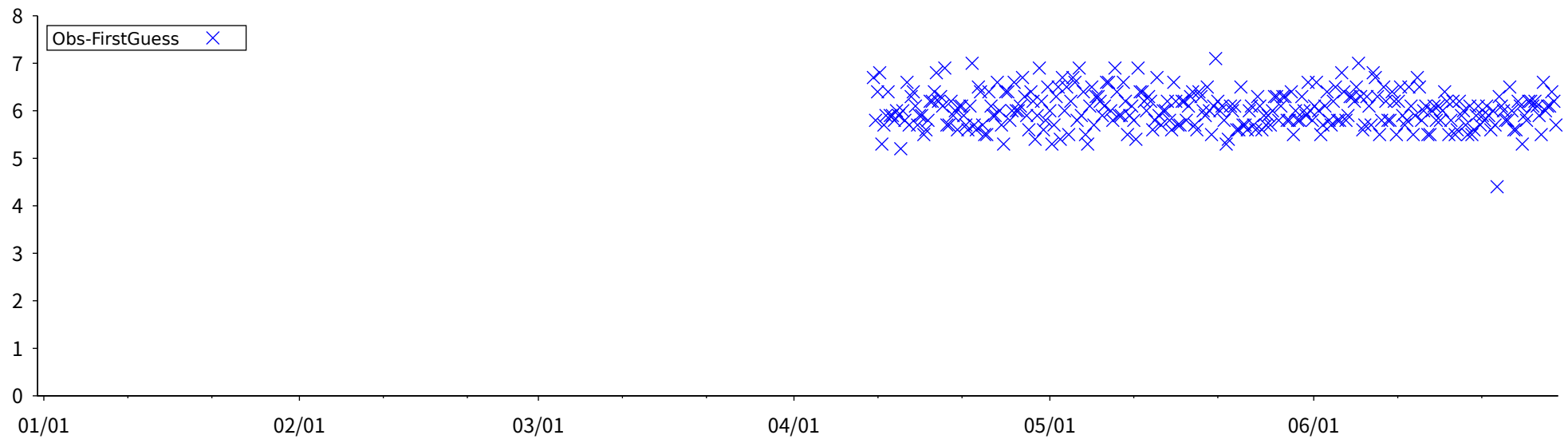
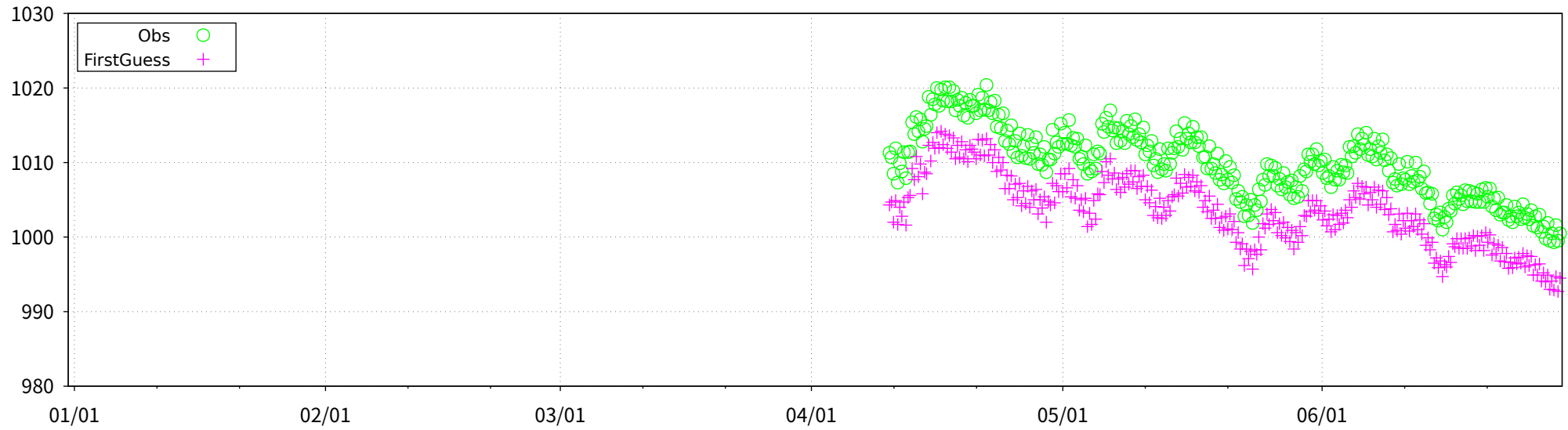


Figure 53(a) Time-series representation of SLP Obs minus FirstGuess for station 41175

ID: 41175 (lat: 25.0N, lon: 51.0E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

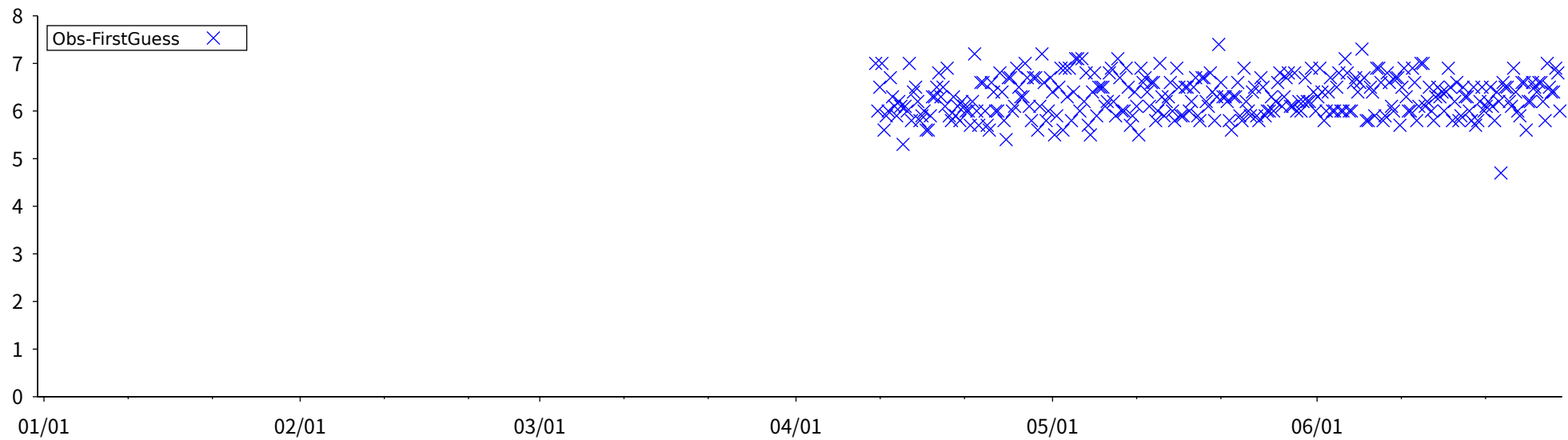
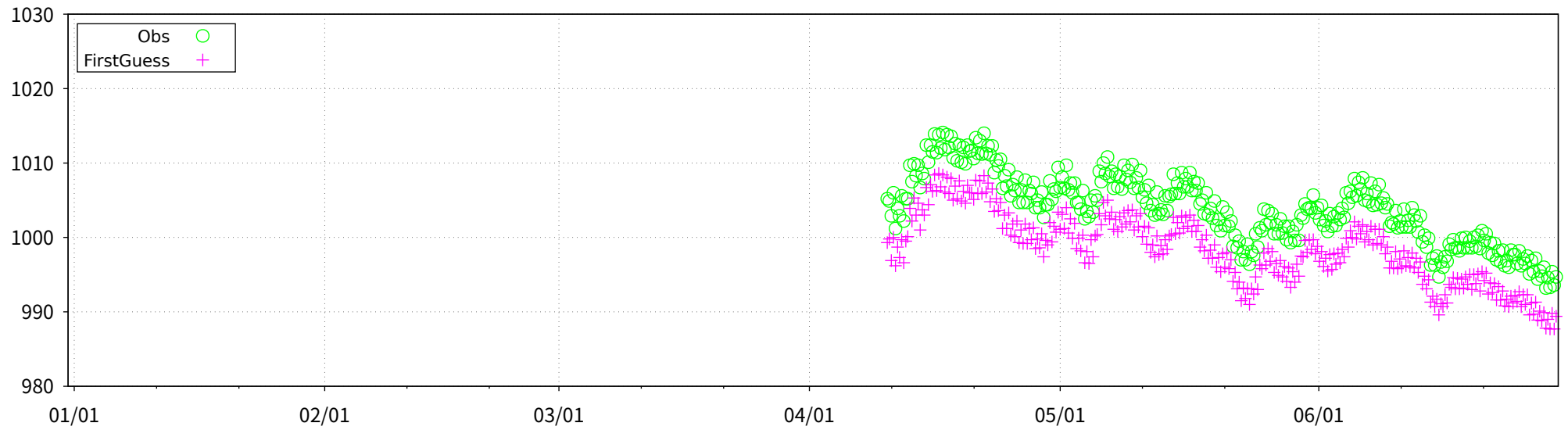


Figure 53(b) Time-series representation of MSLP Obs minus FirstGuess for station 41175

ID: 41177 (lat: 24.7N, lon: 51.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

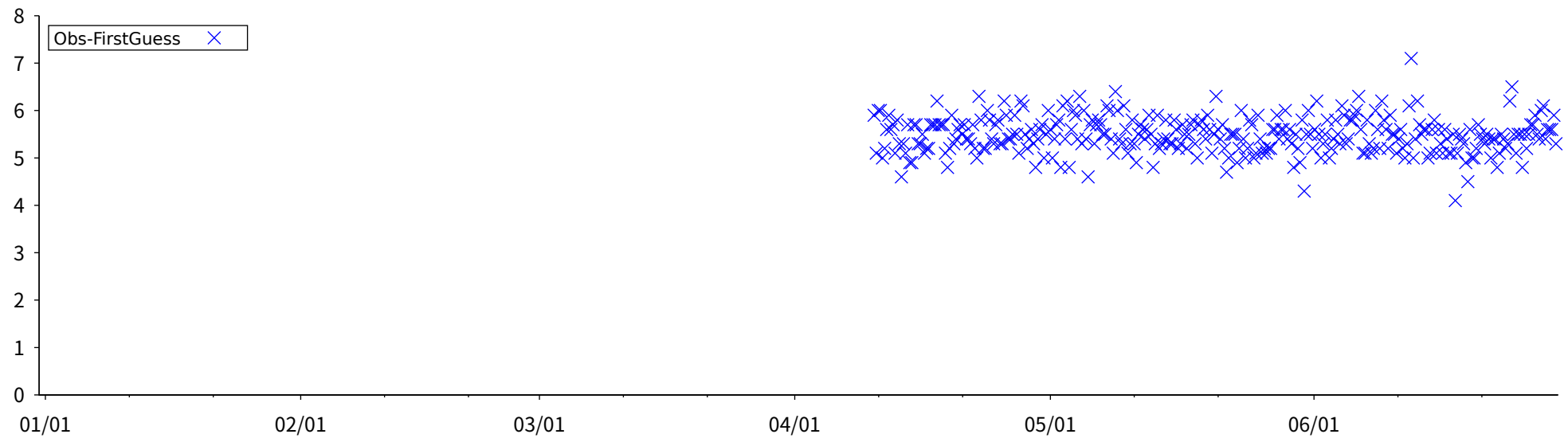
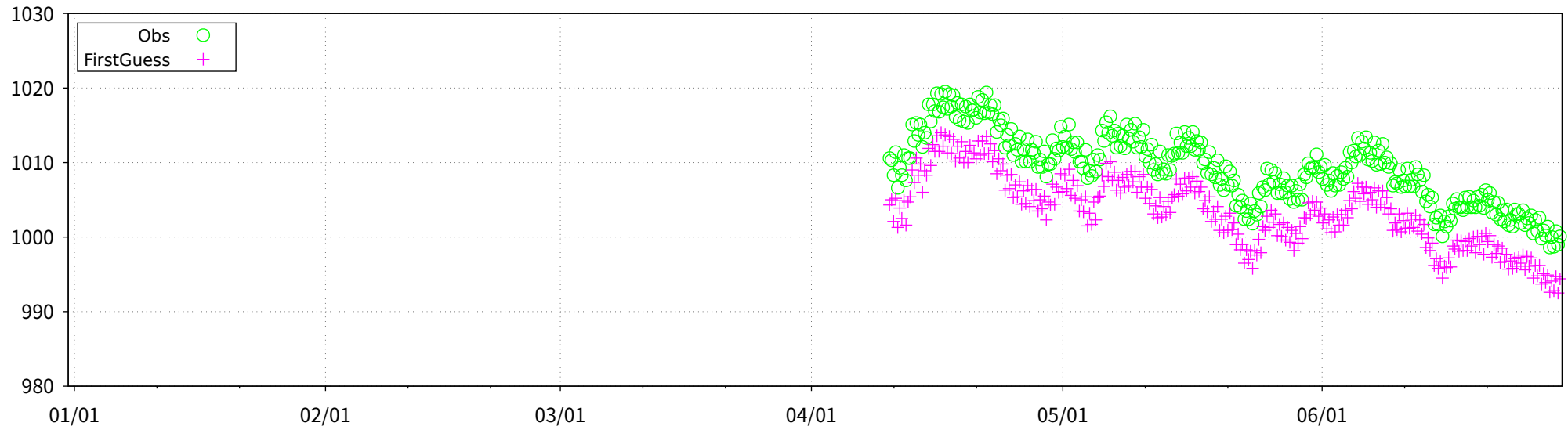


Figure 54(a) Time-series representation of SLP Obs minus FirstGuess for station 41177

ID: 41177 (lat: 24.7N, lon: 51.2E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

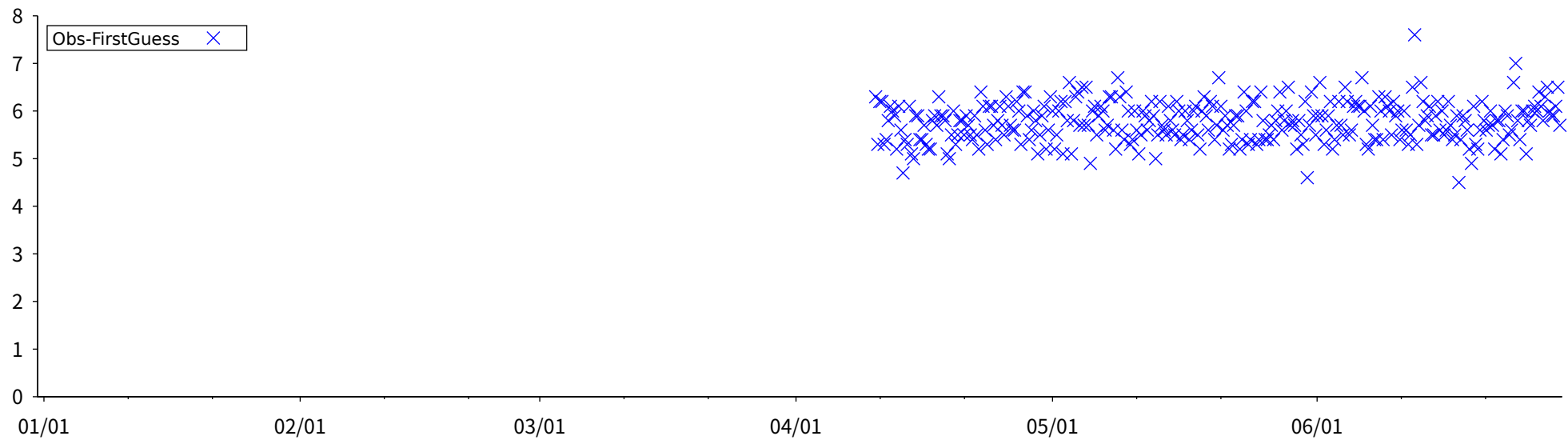


Figure 54(b) Time-series representation of MSLP Obs minus FirstGuess for station 41177

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

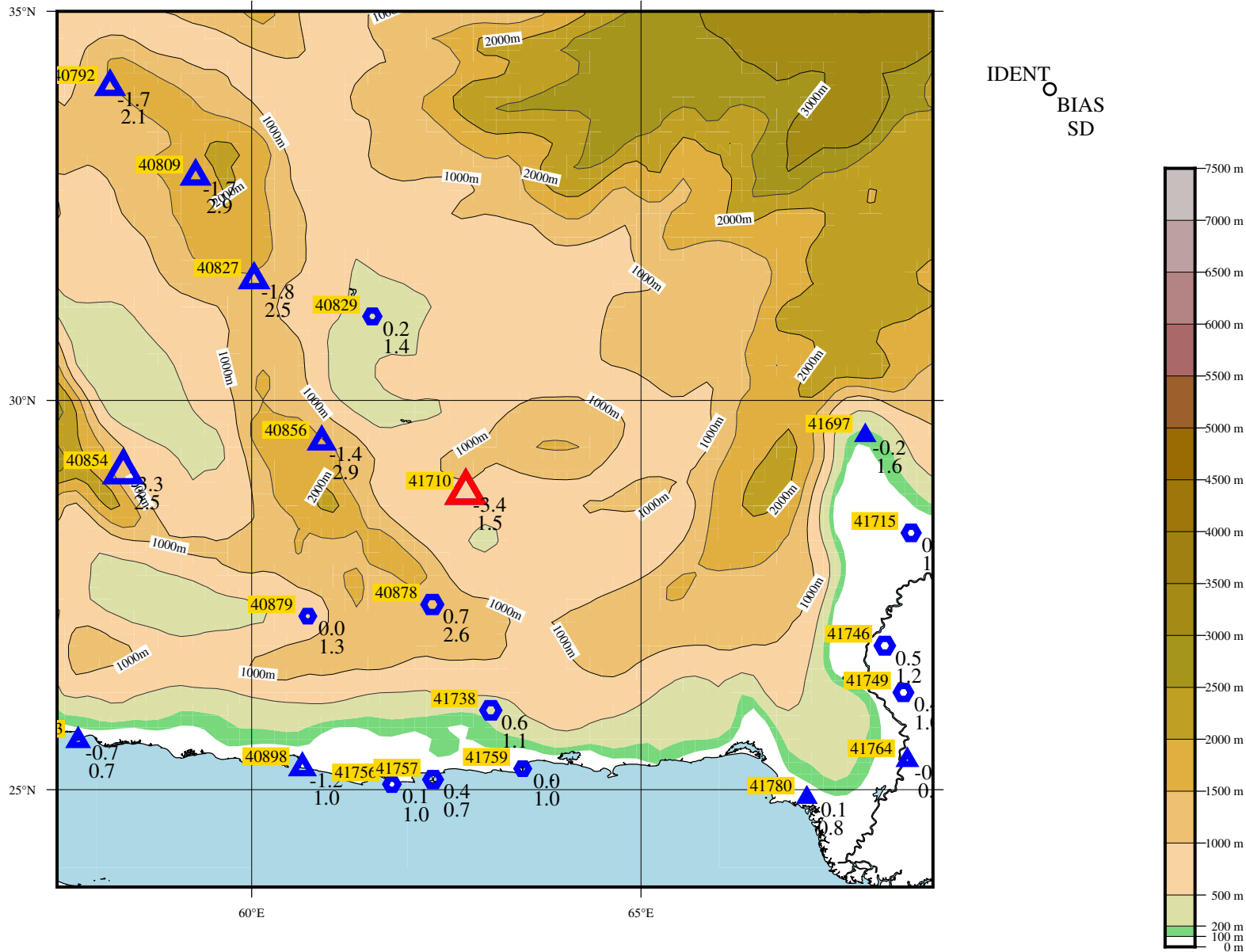
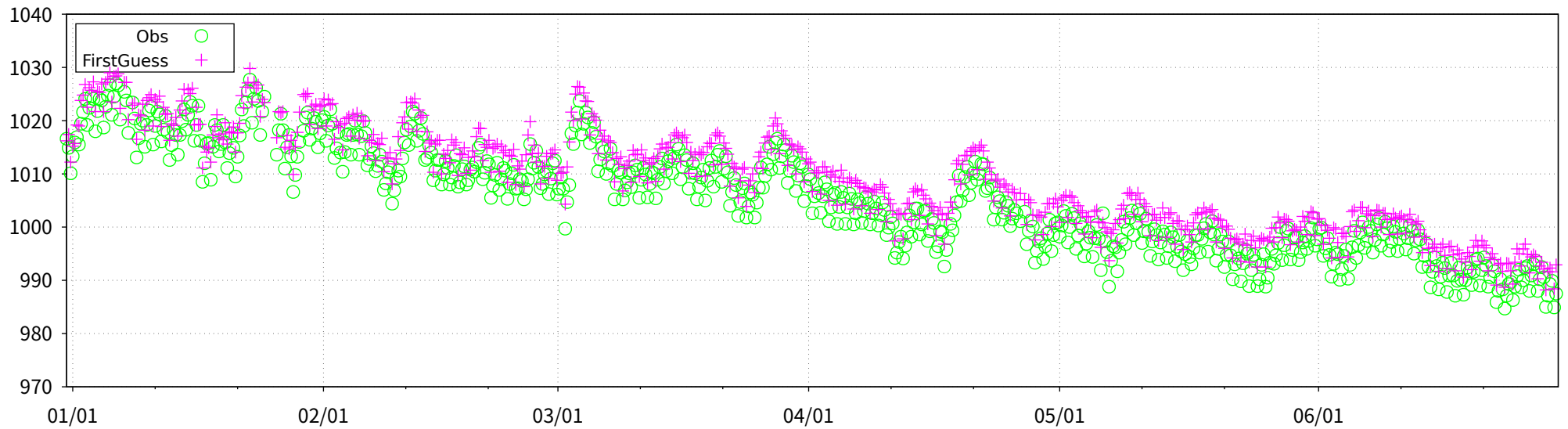


Figure 55 BIAS and SD of MSLP for station 41710 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 41710 (lat: 28.8N, lon: 62.8E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

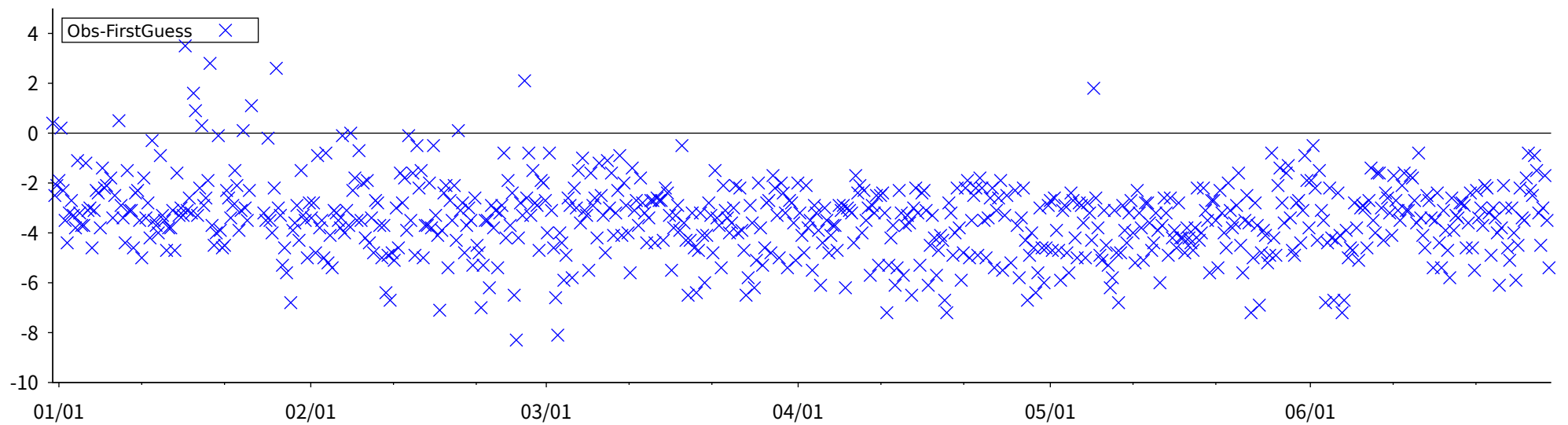


Figure 56 Time-series representation of MSLP Obs minus FirstGuess for station 41710

LEVEL = SUR ELEMENT = MSLP
 2025 01 01 00 UTC -> 2025 06 30 18 UTC (181 DAYS)

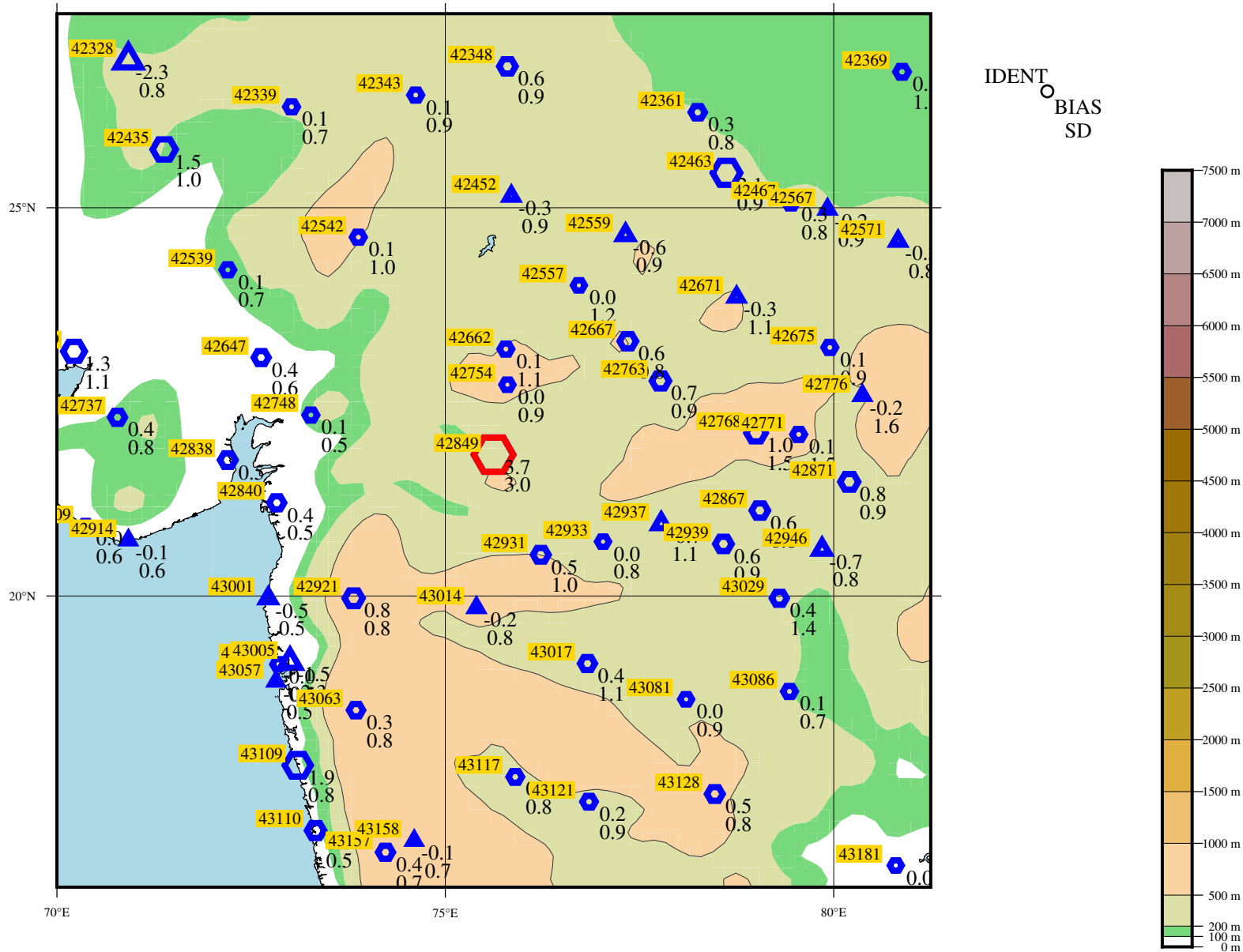


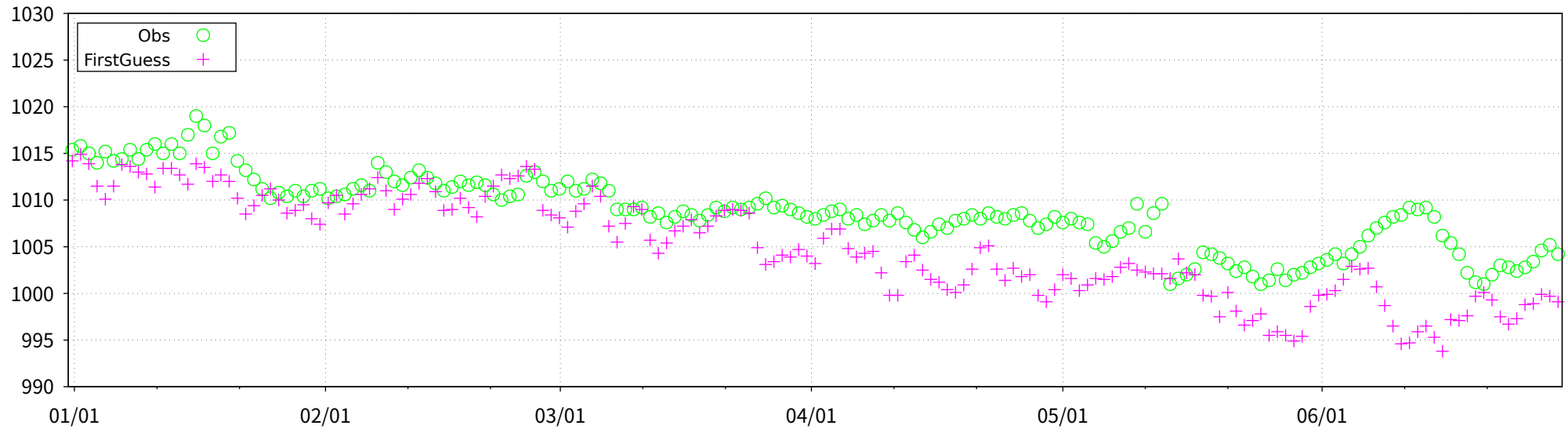
Figure 57 BIAS and SD of MSLP for station 42849 (red) and surrounding stations (blue).

The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

ID: 42849 (lat: 21.8N, lon: 75.6E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

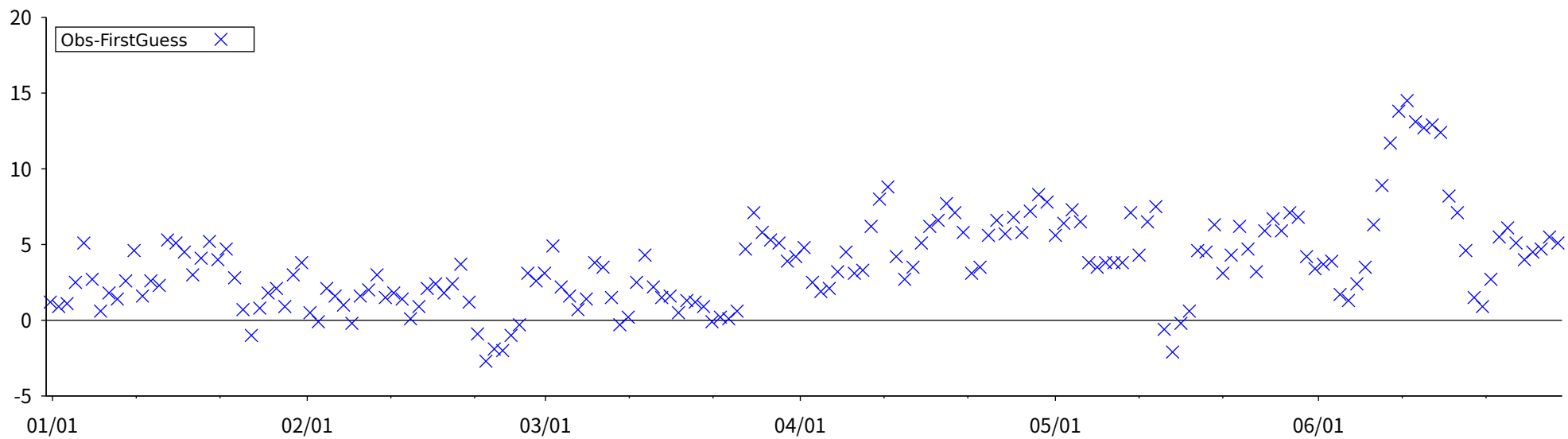
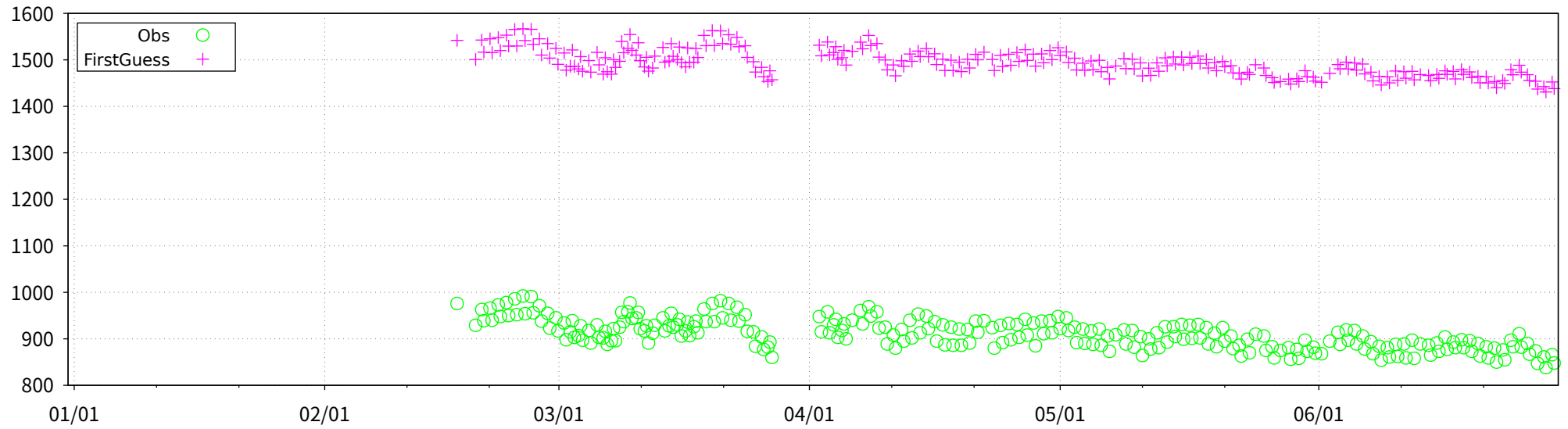


Figure 58 Time-series representation of MSLP Obs minus FirstGuess for station 42849

ID: 48043 (lat: 22.0N, lon: 96.5E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

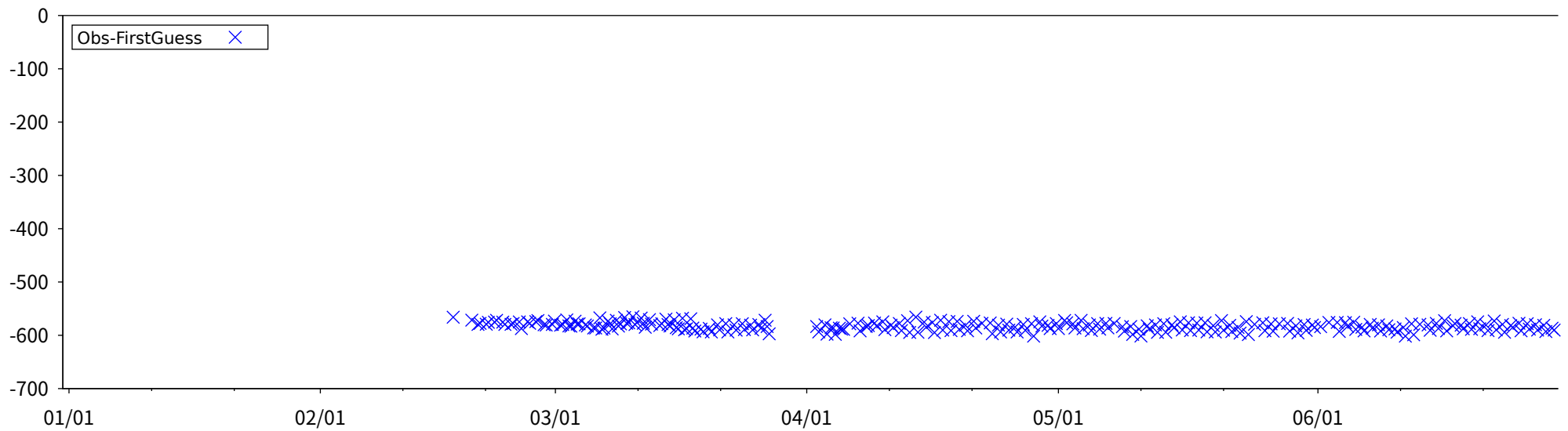
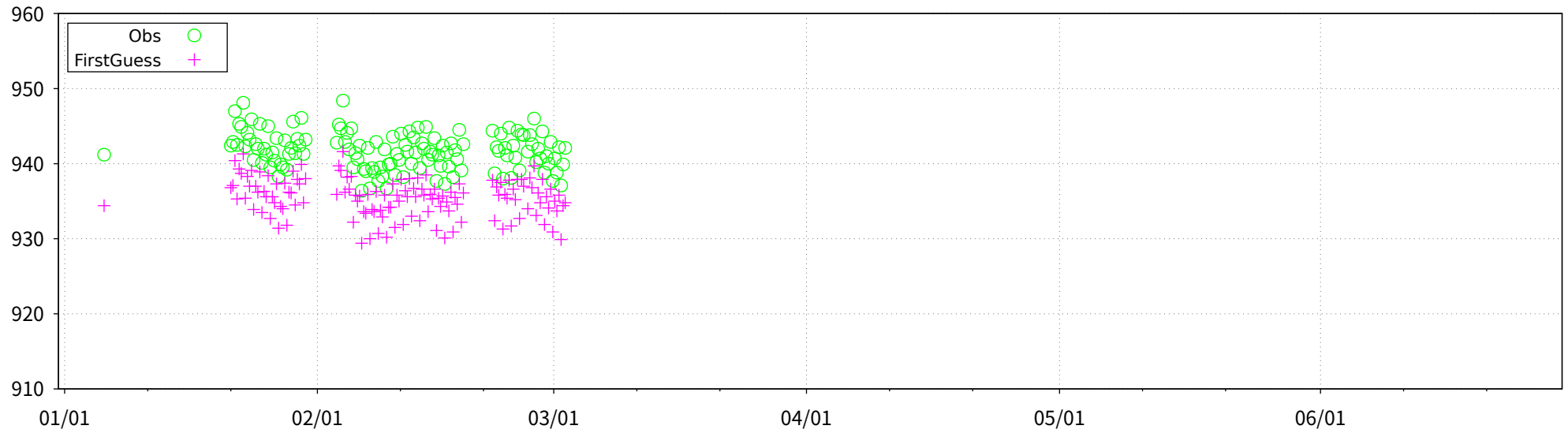


Figure 59 Time-series representation of GZ850 Obs minus FirstGuess for station 48043

ID: 41396 (lat: 16.0N, lon: 49.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

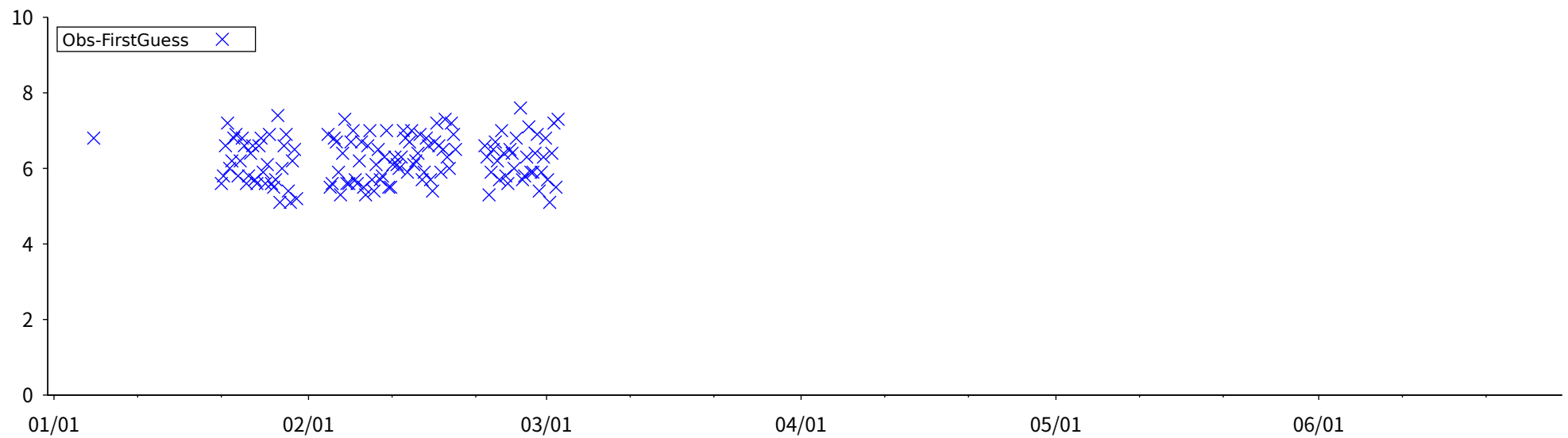
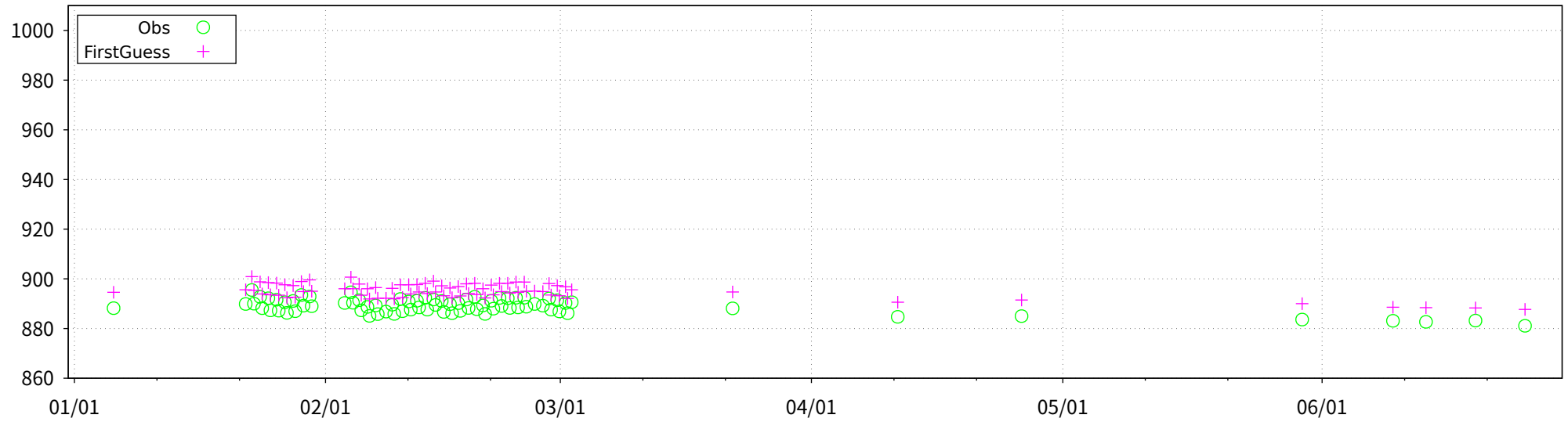


Figure 60 Time-series representation of SLP Obs minus FirstGuess for station 41396

ID: 41437 (lat: 14.5N, lon: 46.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

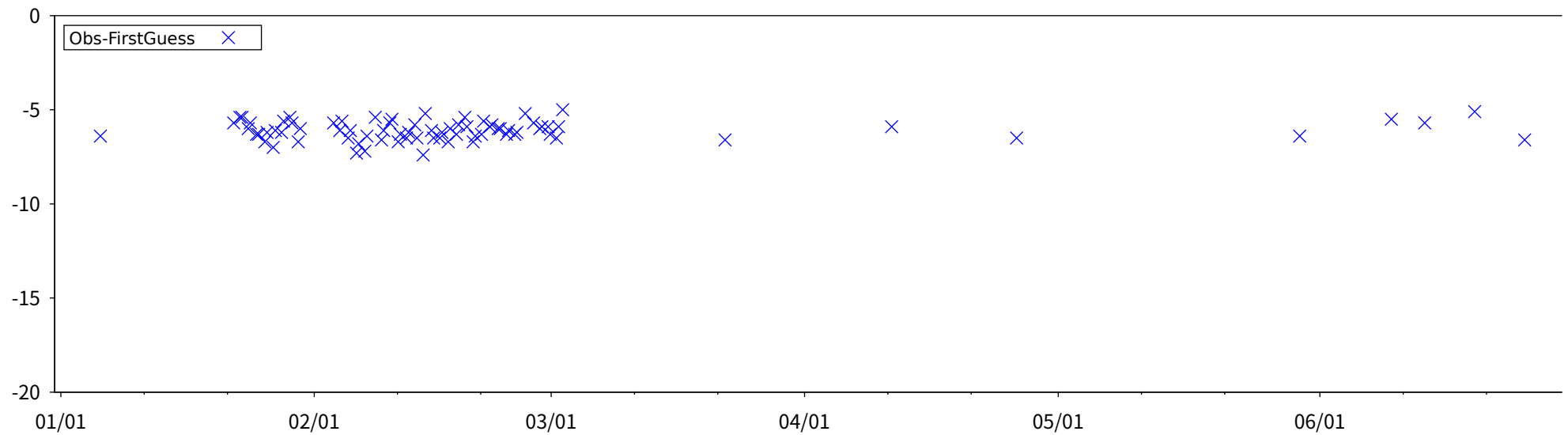
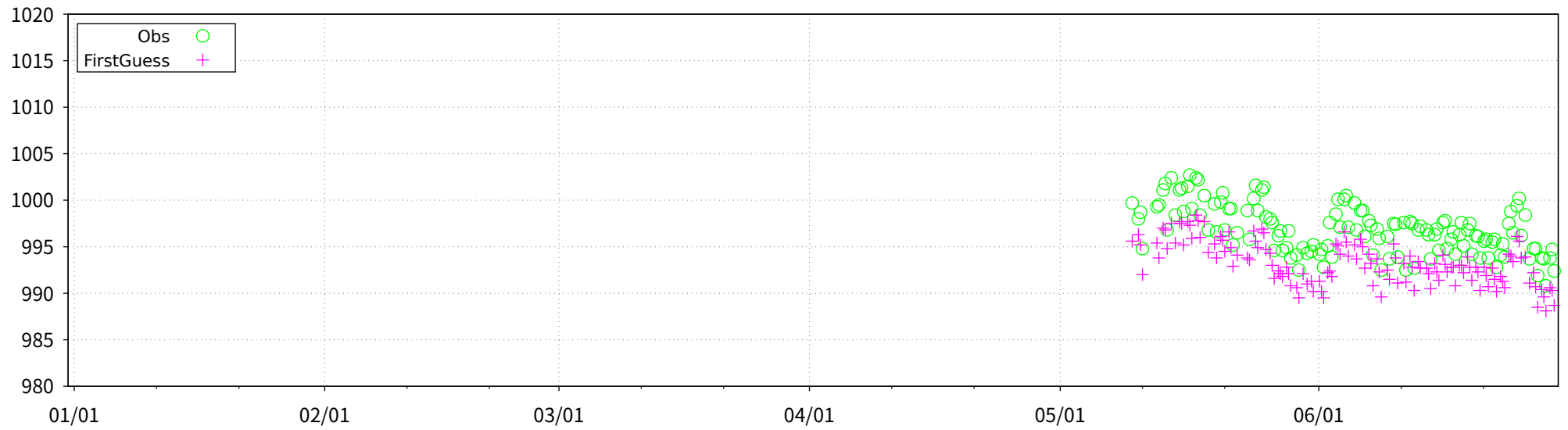


Figure 61 Time-series representation of SLP Obs minus FirstGuess for station 41437

ID: 48018 (lat: 24.2N, lon: 96.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

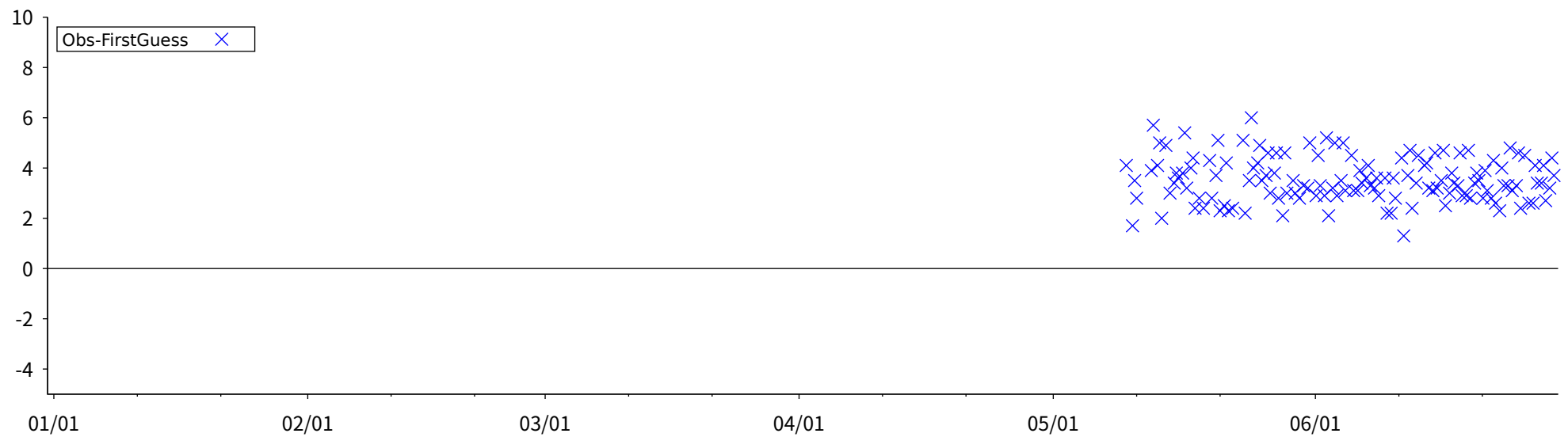


Figure 62 Time-series representation of SLP Obs minus FirstGuess for station 48018