

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

July – December 2023

No. 66

March 2024

**RSMC Tokyo
Lead Center for Monitoring Quality of Land Surface Observations**

**Japan Meteorological Agency
3-6-9 Toranomon, Minato City, Tokyo 105-8431
Japan**

Report on the Quality of Land Surface Observations in Region II
(No. 66)
July – December 2023

Summary

In its role as a Lead Center, RSMC Tokyo has issued the 66th report on the land surface observation quality monitoring for the period from July to December 2023. The report includes a consolidated list of stations suspected of producing low-quality observation data.

(1) SLP

As a result of monitoring, four stations (41252, 43113, 48062, 48085) were excluded from the consolidated lists of the previous report (January – June 2023), and two stations (41437, 48944) were newly added to the lists.

(2) MSLP

As a result of monitoring, one station (48065) was excluded from the consolidated lists of the previous report (January – June 2023), and two stations (42056, 48944) were newly added to the lists.

(3) GZ

As a result of monitoring, one station (41437) 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	1939
MSLP	2010
GZ	96

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 184 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 184 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 July to December 2023

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
30673	53.8	119.7	625	747	SLP	732	0	0.8	-8.5	8.5
					MSLP	732	0	1.4	0.2	1.4
31445	51.5	128.1	200	195	SLP	407	0	0.4	0.5	0.6
					MSLP	407	0	1.1	10.9	11.0
35284	50.6	70.0	384	330	SLP	735	0	0.7	6.5	6.5
					MSLP	735	0	0.7	0.7	1.0
35615	47.6	53.3	-21	-16	SLP	724	0	0.5	0.2	0.5
					MSLP	724	0	0.6	5.2	5.2
35701	47.2	51.0	-27	-24	SLP	211	0	0.5	0.1	0.5
					MSLP	211	0	0.6	6.7	6.7
38262	43.0	59.8	93	64	SLP	736	0	0.8	3.5	3.6
					MSLP	736	0	0.9	0.4	1.0
38313	43.7	69.0	405	737	SLP	358	77	1.7	13.8	13.9
					MSLP	358	1	2.6	-0.8	2.7
38318	42.1	68.1	183	214	SLP	682	0	0.6	-8.4	8.4
					MSLP	682	0	0.7	-4.1	4.2
38836	38.6	68.7	800	1034	SLP	731	0	1.0	-3.1	3.3
					MSLP	725	1	1.4	-4.0	4.2
38875	39.0	73.6	3930	4259	SLP	349	100	*****	*****	*****
					-	-	-	-	-	-
38880	38.0	58.4	312	199	SLP	736	0	1.0	11.7	11.7
					MSLP	736	0	0.8	0.1	0.8
38944	37.5	69.4	447	622	SLP	733	0	1.1	-5.5	5.6
					MSLP	730	0	1.4	-5.6	5.8
41249	23.9	56.2	633	784	SLP	719	0	0.3	-0.7	0.8
					GZ850	546	83	58.7	-10.7	59.7
41265	22.8	58.5	469	585	SLP	726	0	0.4	-5.0	5.0
					MSLP	674	0	0.6	-1.8	1.9
41315	17.3	54.1	881	641	SLP	614	99	0.3	14.8	14.8
					GZ850	658	87	56.4	12.6	57.8
41396	16.0	49.0	700	801	SLP	635	0	0.5	6.4	6.4
					MSLP	639	0	0.9	0.2	0.9
41573	33.9	73.4	2127	1411	SLP	716	0	1.4	8.8	8.9
					GZ850	716	0	9.8	-2.4	10.1
42056	32.7	74.8	323	295	SLP	721	0	0.6	-6.7	6.7
					MSLP	284	97	3.8	-5.5	6.7
42083	31.1	77.2	2202	1552	SLP	331	88	0.2	14.8	14.8

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
					GZ850	4	100	*****	*****	*****
42111	30.3	78.1	683	851	SLP	720	0	0.8	5.5	5.6
					MSLP	721	0	1.2	-1.8	2.2
42114	30.4	78.4	770	1482	SLP	361	100	*****	*****	*****
					-	-	-	-	-	-
42147	29.5	79.7	2311	1687	SLP	360	0	0.5	4.4	4.4
					-	-	-	-	-	-
42299	27.3	88.6	1756	1964	SLP	364	0	0.6	0.4	0.7
					GZ850	364	0	7.5	57.8	58.3
43418	8.6	81.2	79	12	SLP	724	0	0.4	4.7	4.7
					MSLP	724	0	0.4	-0.1	0.4
43479	7.0	81.1	670	911	SLP	491	0	0.5	-9.8	9.8
					-	-	-	-	-	-
44406	29.3	80.9	617	1459	SLP	429	0	1.3	4.0	4.2
					MSLP	429	0	2.4	-3.0	3.8
44424	29.3	82.2	2300	3290	SLP	420	0	1.2	-6.2	6.3
					GZ700	418	0	13.9	-52.2	54.0
44429	28.0	82.5	634	809	SLP	427	0	0.5	-3.6	3.6
					MSLP	428	0	1.2	0.6	1.3
47020	41.0	126.6	306	677	SLP	735	0	0.9	0.2	0.9
					MSLP	735	0	2.4	10.1	10.4
47037	40.0	125.3	99	217	SLP	735	0	1.6	-4.4	4.7
					MSLP	735	0	1.7	-4.4	4.7
47102	38.0	124.7	146	4	SLP	736	0	0.7	11.8	11.8
					MSLP	736	0	0.5	-1.2	1.3
47145	36.8	127.3	26	126	SLP	736	0	0.6	-6.7	6.7
					MSLP	736	0	0.5	0.2	0.5
47152	35.6	129.3	36	115	SLP	736	0	0.6	-5.8	5.8
					MSLP	736	0	0.5	-0.5	0.7
48018	24.2	96.3	95	204	SLP	548	0	1.1	3.7	3.9
					MSLP	548	0	1.2	-0.5	1.3
48107	15.3	97.9	7	60	SLP	547	0	1.0	-3.5	3.6
					MSLP	548	0	1.1	0.1	1.1
48921	21.6	101.9	1360	1049	SLP	532	0	1.3	-4.4	4.6
					GZ850	530	100	0.0	-94.8	94.8
48925	20.7	102.0	636	960	SLP	493	1	1.0	-3.7	3.8
					MSLP	493	0	1.3	-1.8	2.2
48935	19.5	103.1	1094	1204	SLP	539	0	1.0	0.8	1.3
					GZ850	539	1	10.1	-83.5	84.1
48952	15.7	106.4	180	288	SLP	539	0	1.3	3.5	3.7
					MSLP	539	0	1.3	2.4	2.7
48961	14.2	103.5	23	42	SLP	678	1	2.1	1.5	2.6
					MSLP	678	1	2.2	4.3	4.8
48963	12.8	102.6	170	353	SLP	519	100	*****	*****	*****
					MSLP	519	100	*****	*****	*****

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
54945	35.5	119.6	37	14	SLP	736	0	0.5	-3.4	3.4
					MSLP	736	0	0.5	0.0	0.5
56946	23.6	99.4	1104	1355	SLP	736	0	0.6	-4.0	4.0
					MSLP	732	0	1.8	0.9	2.0
56951	24.0	100.2	1503	1981	SLP	736	0	0.7	-12.9	12.9
					MSLP	736	0	1.9	1.5	2.4
57731	28.0	108.3	418	697	SLP	736	100	0.0	-15.0	15.0
					MSLP	736	0	1.0	0.7	1.2
58921	26.0	117.4	204	516	SLP	736	0	0.7	-6.2	6.2
					MSLP	736	0	0.8	0.2	0.8
59632	22.0	108.6	6	23	SLP	736	0	0.4	-5.1	5.1
					MSLP	736	0	0.4	0.0	0.4

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)

31445 - Positive bias of O-G at the mean sea level (Figures 4 and 5)

KAZAKHSTAN

35284 - Positive bias of O-G at the station level (Figures 6 and 7)

35615 - Positive bias of O-G at the mean sea level (Figures 8 and 9)

35701 - Positive bias of O-G at the mean sea level (Figures 8 and 10)

38313 - Positive bias of O-G at the station level (Figures 13 and 14)

38318 - Negative bias of O-G at the station level and at the mean sea level (Figures 13, 15 and 16)

UZBEKISTAN

38262 - Positive bias of O-G at the station level (Figures 11 and 12)

TAJIKISTAN

38836 - Negative bias of O-G at the mean sea level (Figures 17 and 18)

38875 - Mostly positive bias of O-G at the station level (Figures 19 and 20)

38944 - Negative bias of O-G at the station level and at the mean sea level (Figures 13, 17 and 22)

TURKMENISTAN

38880 - Positive bias of O-G at the station level (Figures 11 and 21)

OMAN

41249 - Mostly negative bias of O-G at 850 hPa or 700 hPa (Figures 23 and 24)

41265 - Negative bias of O-G at the station level (Figures 25 and 26)

41315 - Mostly positive bias of O-G at the station level and negative bias of O-G at 850 hPa or 700 hPa (Figures 27, 28 and 29)

YEMEN

41396 - Positive bias of O-G at the station level (Figures 30 and 31)

PAKISTAN

41573 - Positive bias of O-G at the station level (Figures 32 and 33)

INDIA

42056 - Negative bias of O-G at the station level (Figures 32 and 34)

42083 - Positive bias of O-G at the station level (Figures 32 and 35)

42111 - Positive bias of O-G at the station level (Figures 32 and 36)

42114 - Negative bias of O-G at the station level (Figures 32 and 37)

42147 - Positive bias of O-G at the station level (Figures 32 and 38)

42299 - Positive bias of O-G at 850 hPa (Figures 39 and 40)

SRI LANKA

43418 - Positive bias of O-G at the station level (Figures 41 and 42)

43479 - Negative bias of O-G at the station level (Figures 41 and 43)

NEPAL

44406 - Positive bias of O-G at the station level (Figures 32 and 44)

44424 - Negative bias of O-G at the station level (Figures 32 and 45)

44429 - Negative bias of O-G at the station level (Figures 32 and 46)

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF

47020 - Positive bias of O-G at the mean sea level (Figures 47 and 48)

47037 - Negative bias of O-G at the station level and at the mean sea level (Figures 47, 49 and 50)

KOREA, REPUBLIC OF

47102 - Positive bias of O-G at the station level (Figures 49 and 51)

47145 - Negative bias of O-G at the station level (Figures 49 and 52)

47152 - Negative bias of O-G at the station level (Figures 49 and 53)

MYANMAR

48018 - Positive bias of O-G at the station level (Figures 54 and 55)

48107 - Negative bias of O-G at the station level (Figures 56 and 57)

LAO PEOPLE'S DEMOCRATIC REPUBLIC

48921 - Negative bias of O-G at the station level and at 850 hPa (Figures 58, 59 and 60)

48925 - Negative bias of O-G at the station level (Figures 58 and 61)

48935 - Negative bias of O-G at 850 hPa (Figures 62 and 63)

48952 - Positive bias of O-G at the station level (Figures 58 and 64)

CAMBODIA

48961 - Positive bias of O-G at the mean sea level (Figures 65 and 66)

48963 - Positive bias of O-G at the station level and at the mean sea level (Figure 67)

CHINA

54945 - Negative bias of O-G at the station level (Figures 49 and 68)

56946 - Negative bias of O-G at the station level (Figures 58 and 69)

56951 - Negative bias of O-G at the station level (Figures 58 and 70)

57731 - Negative bias of O-G at the station level (Figures 71 and 72)

58921 - Negative bias of O-G at the station level (Figures 73 and 74)

59632 - Negative bias of O-G at the station level (Figures 75 and 76)

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
41437	14.5	46.9	1067	1292	SLP GZ850	230 229	1 1	0.8 9.3	-11.4 -34.5	11.4 35.7
42056	32.7	74.8	323	295	SLP MSLP	721 284	0 97	0.6 3.8	-6.7 -5.5	6.7 6.7
48944	18.3	102.6	185	226	SLP MSLP	236 235	99 1	0.6 3.8	2.9 -7.4	3.0 8.3

YEMEN

41437 - The negative bias of O-G at the station level and at 850 hPa appears to have been observed since August 2023. (Figures 30, 77 and 78)

INDIA

42056 - Positive bias of O-G at the mean sea level (Figures 79 and 80)

LAO PEOPLE'S DEMOCRATIC REPUBLIC

48944 - Negative bias of O-G at the station level and at the mean sea level (Figures 58, 65, 81)

4.3 Stations improved and excluded from the previous consolidated list

MYANMAR

48062 - The positive bias of O-G at the station level has improved since September 2023. (Figure 82)

48085 - The positive bias of O-G at the station level has improved since September 2023. (Figure 83)

4.4 Stations removed from the previous consolidated list

OMAN

41252 - No reports during the period

INDIA

43113 - Although station 43113 still displays negative biases of O-G at the station level, it was removed from the consolidated list because the number of reports (181) was insufficient for quality checking. (Figure 84)

MYANMAR

48065 - Few 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.

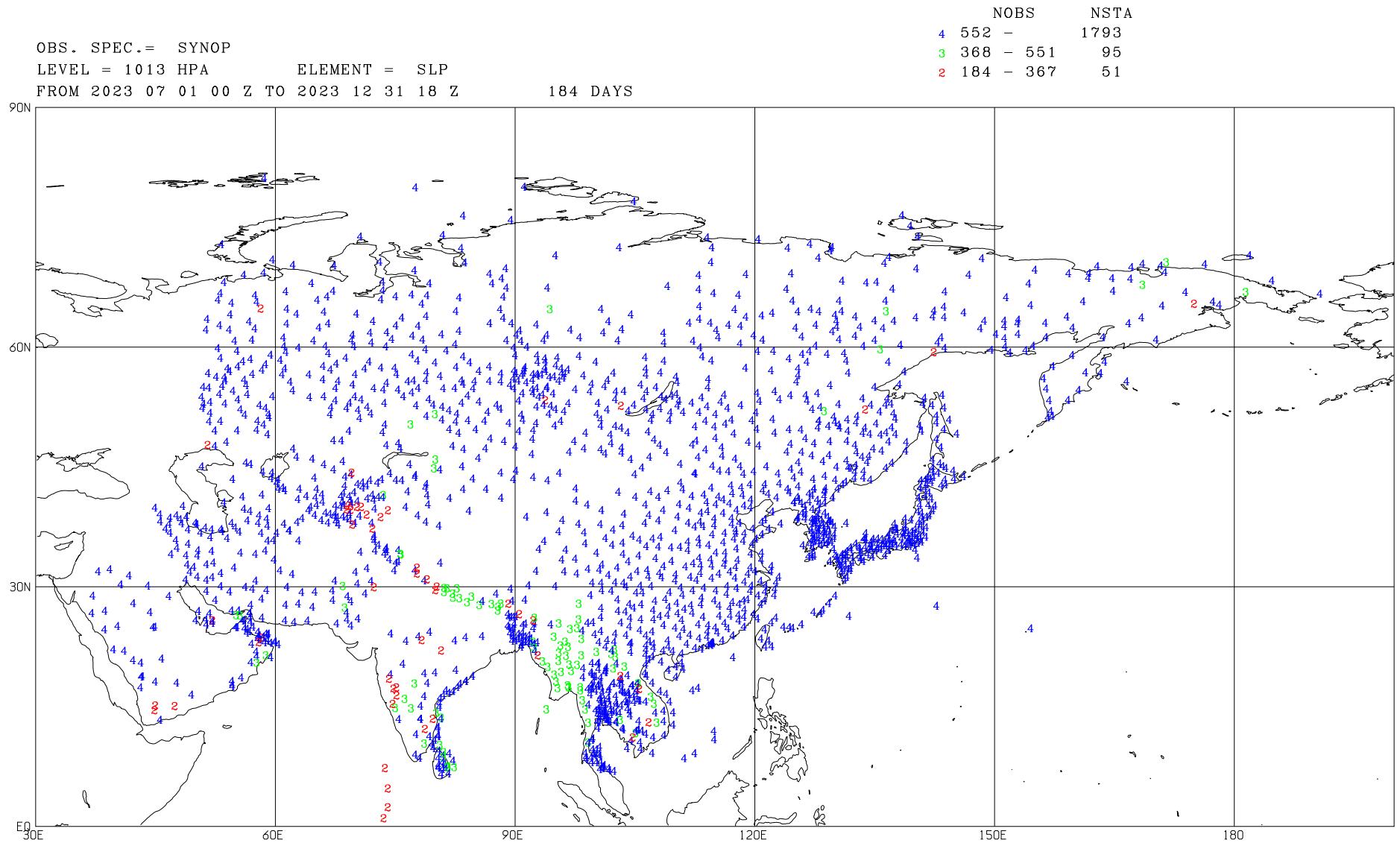


Figure 1(a) Location of all land surface stations reporting station level pressure (SLP) observations in Region II over the six-month period from July to December 2023. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting SLP are shown at the top of the figure.

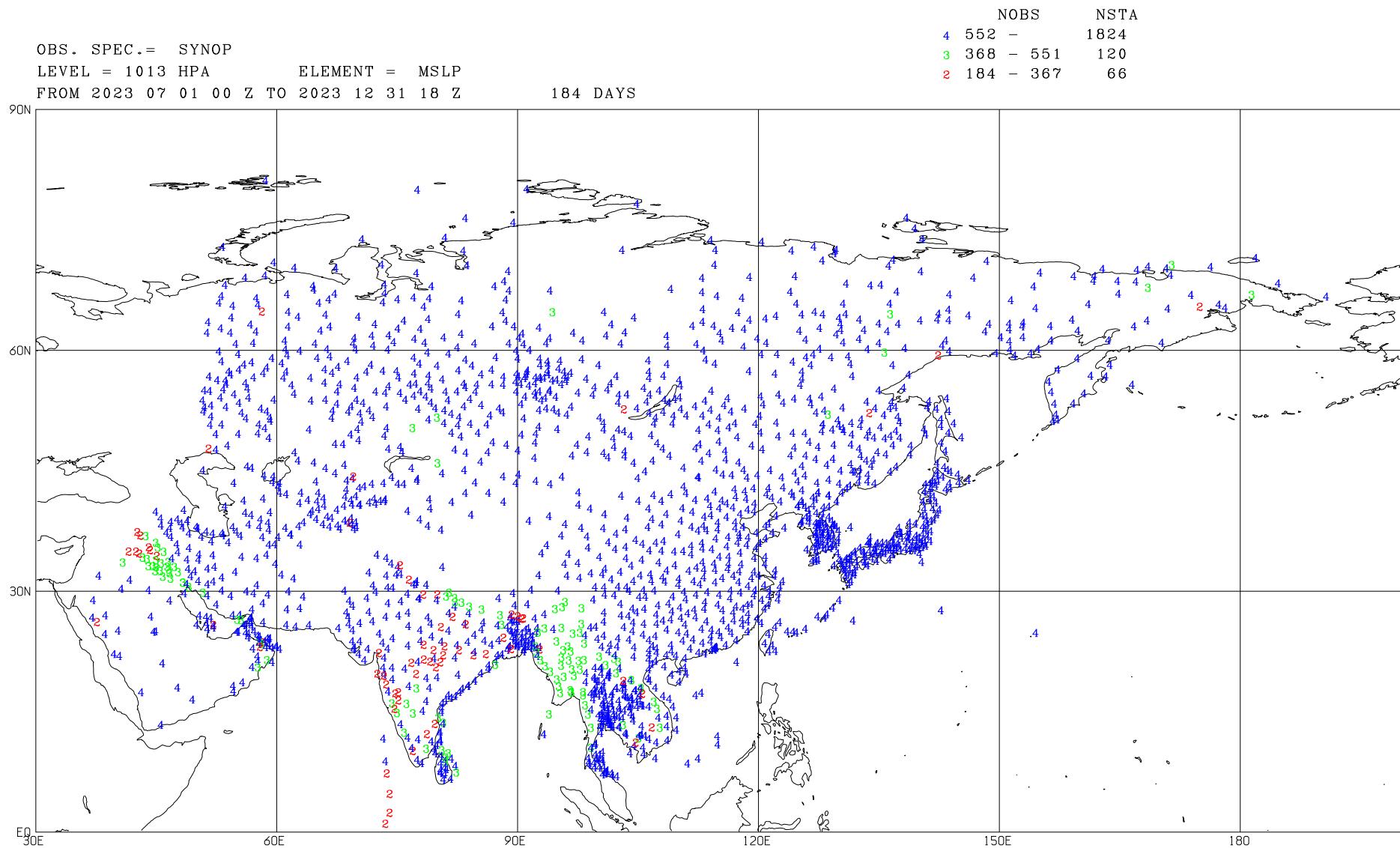


Figure 1(b) Location of all land surface stations reporting mean sea level pressure (MSLP) observations in Region II over the six-month period from July to December 2023. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting MSLP are shown at the top of the figure.

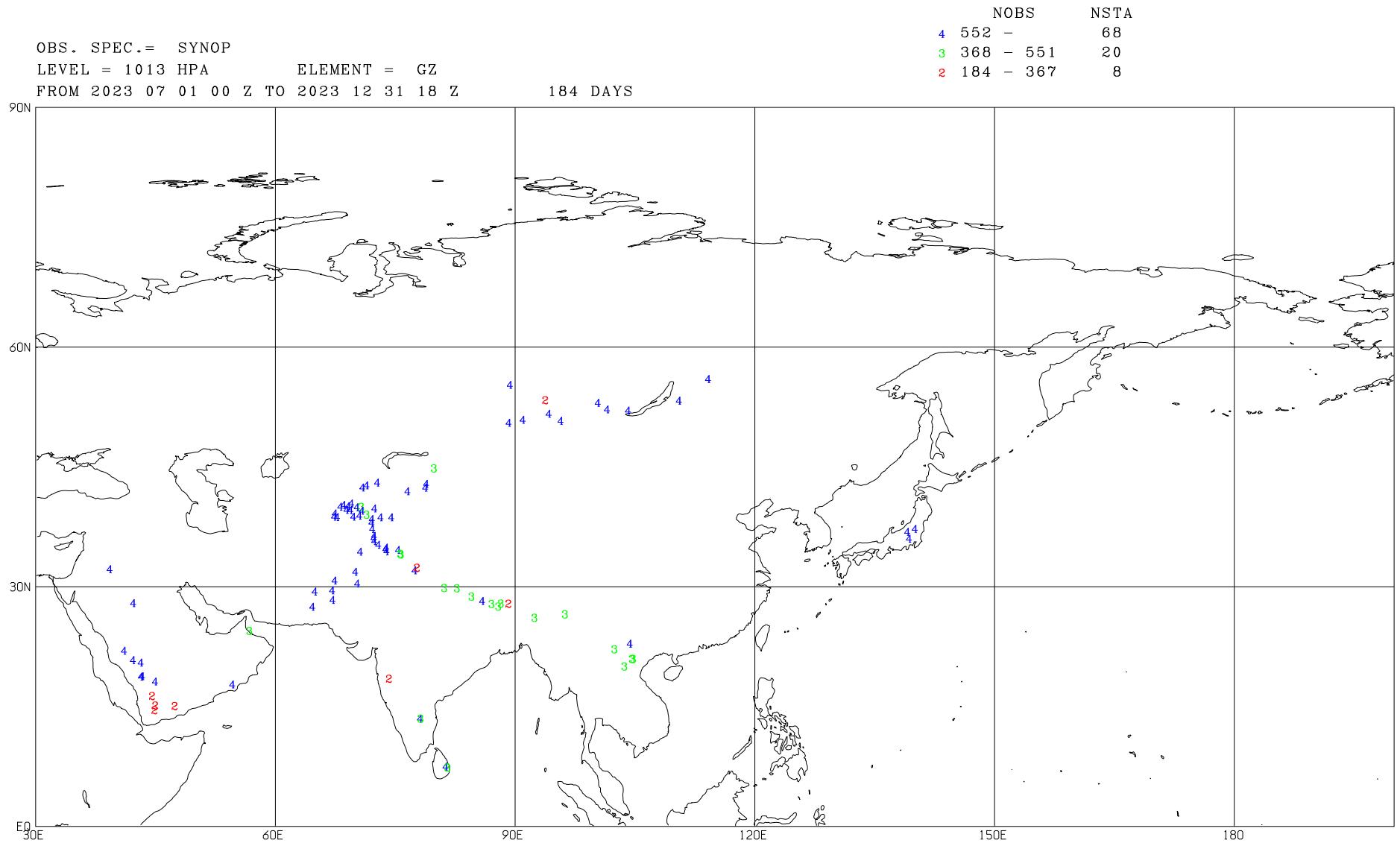
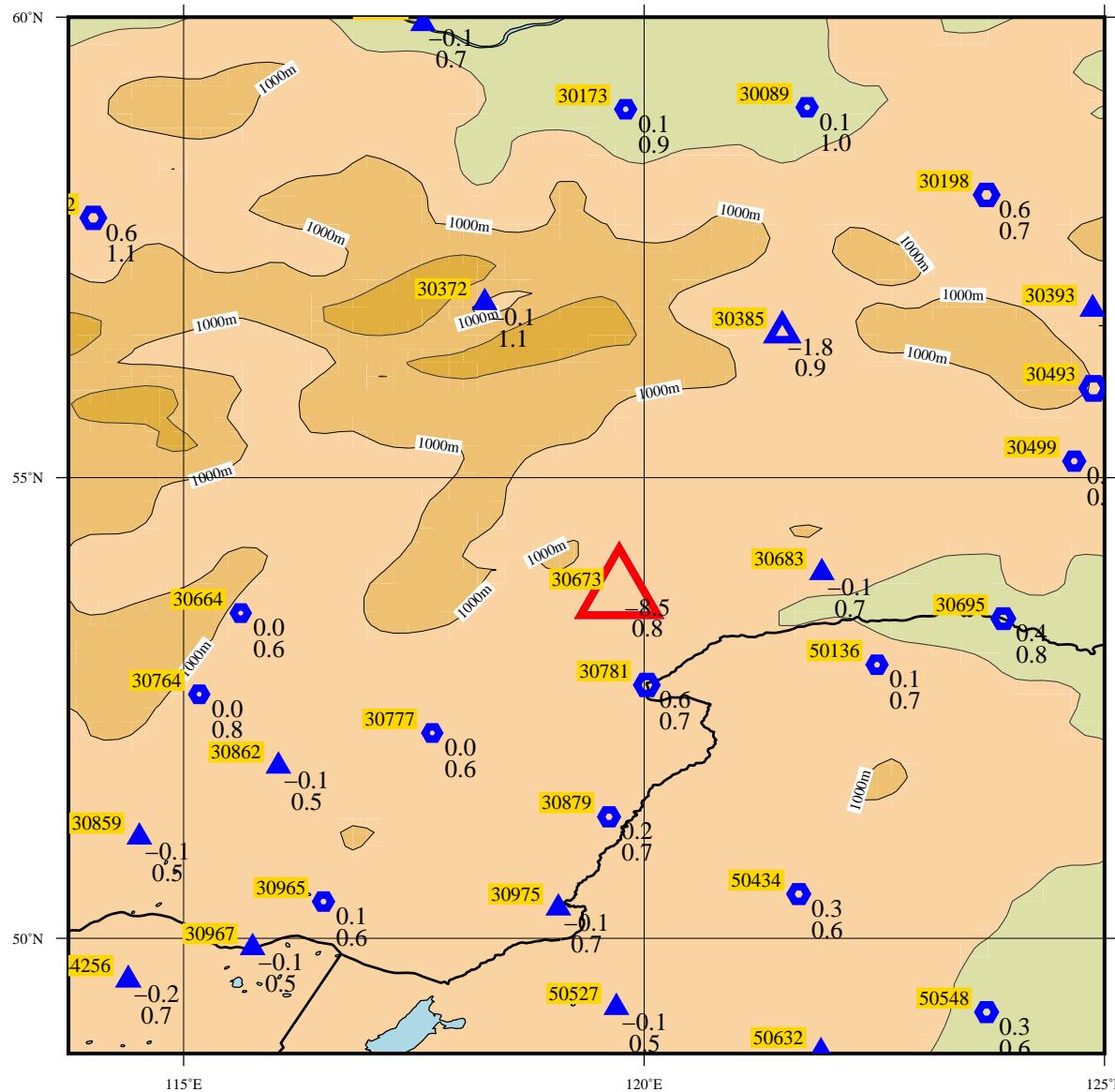


Figure 1(c) Location of all land surface stations reporting geopotential height (GZ) observations in Region II over the six-month period from July to December 2023. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting GZ are shown at the top of the figure.

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

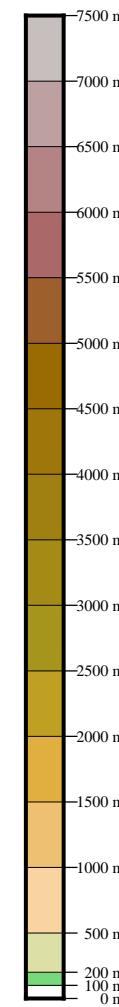


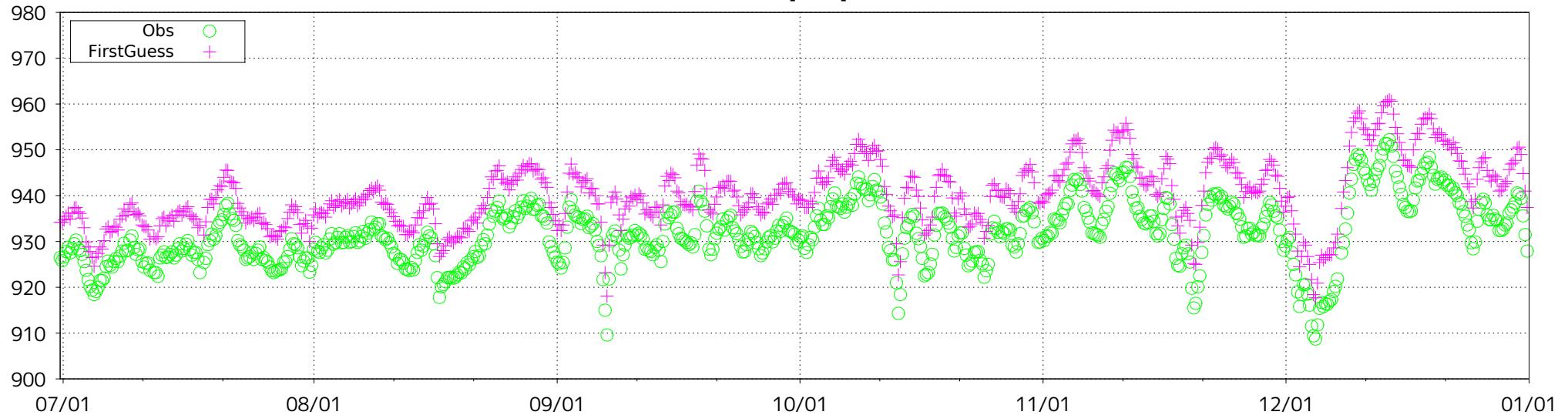
Figure 2 BIAS and SD of SLP for station 30673 (red) and surrounding stations (blue).

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)

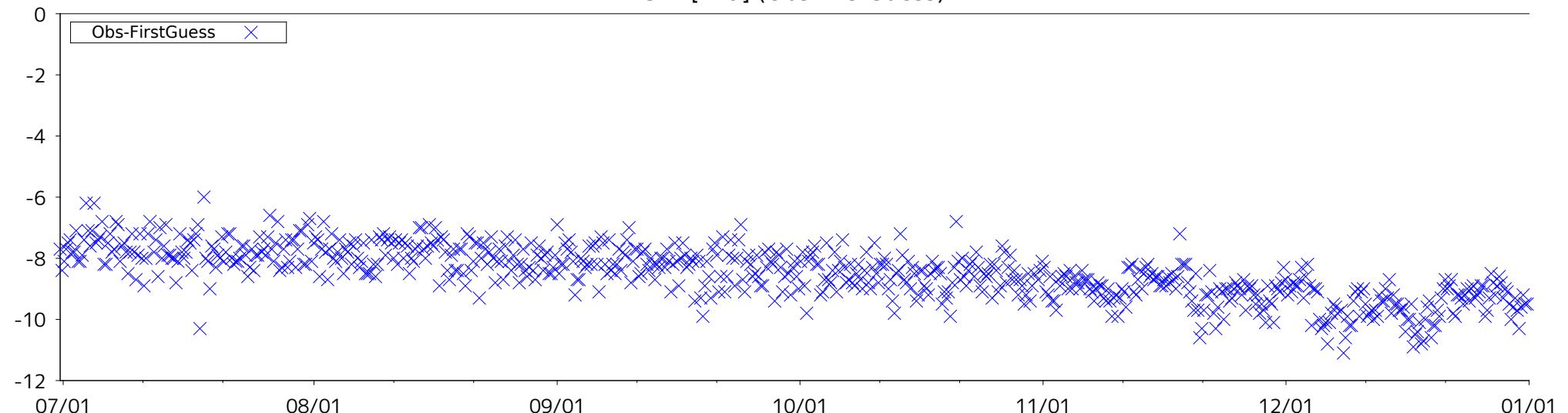
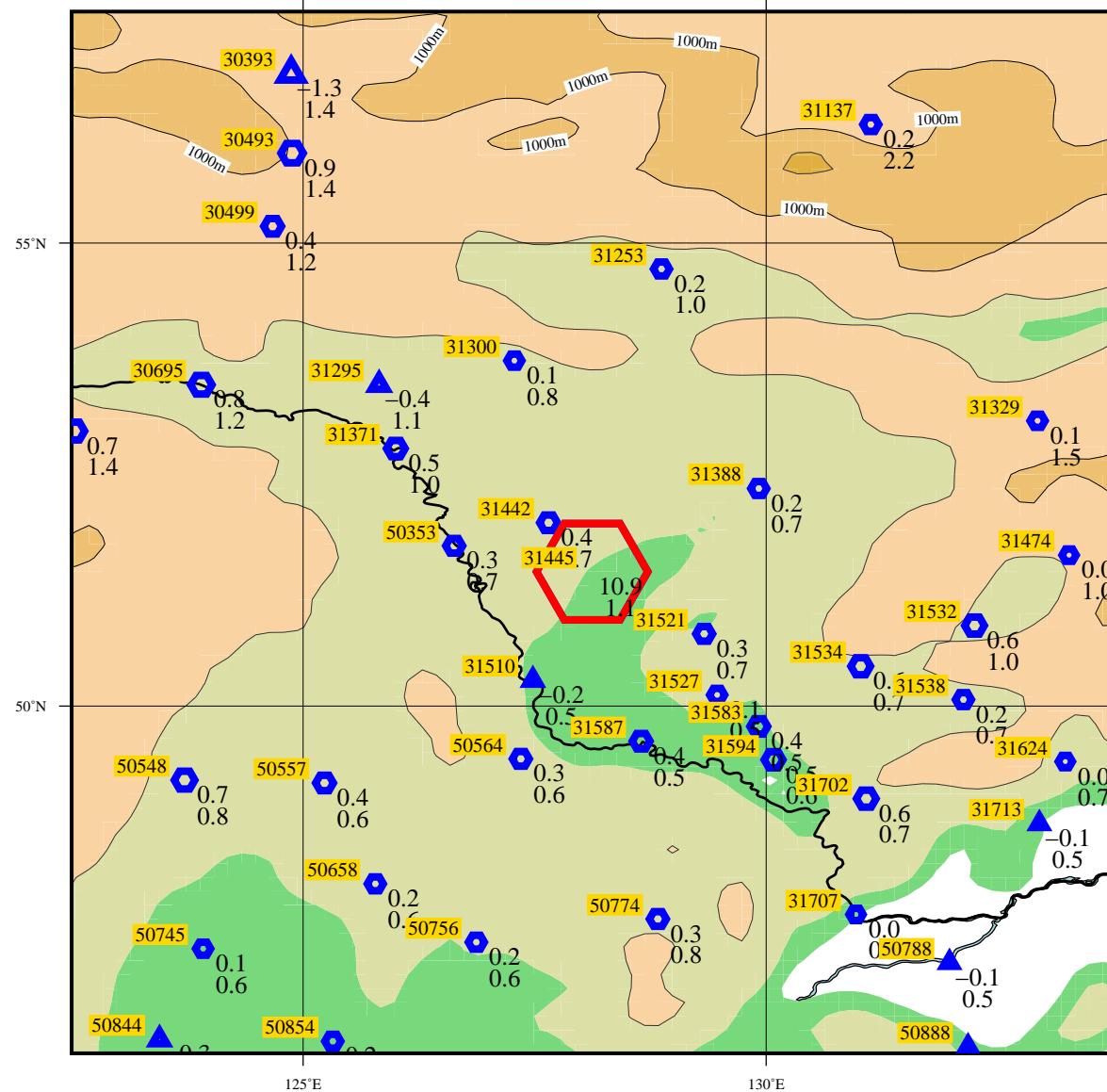


Figure 3 Time-series representation of SLP Obs minus FirstGuess for station 30673

LEVEL = SUR

ELEMENT = MSLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

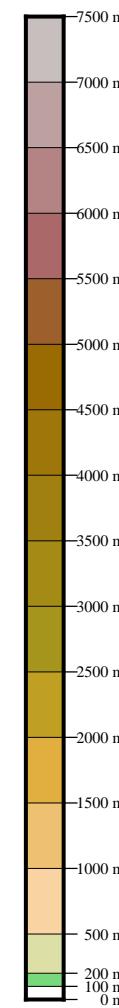


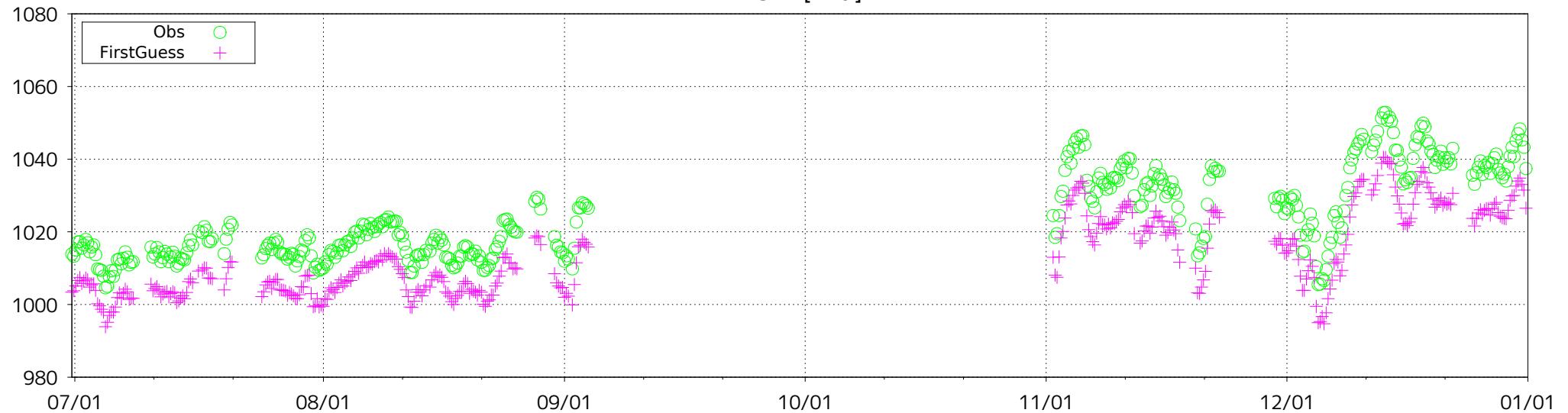
Figure 4 BIAS and SD of MSLP for station 31445 (red) and surrounding stations (blue).

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: 31445 (lat: 51.5N, lon: 128.1E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

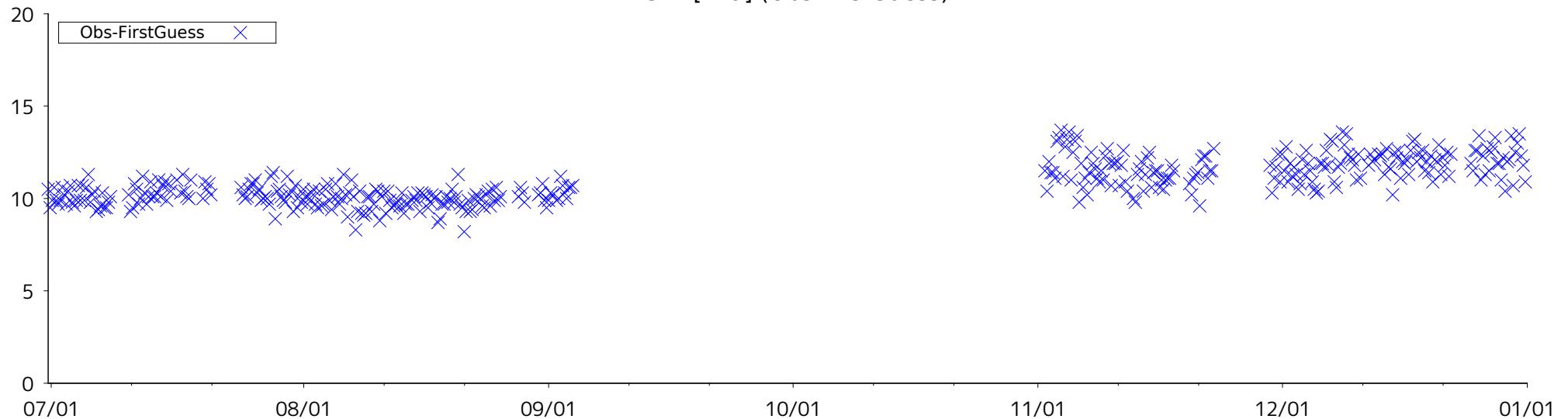
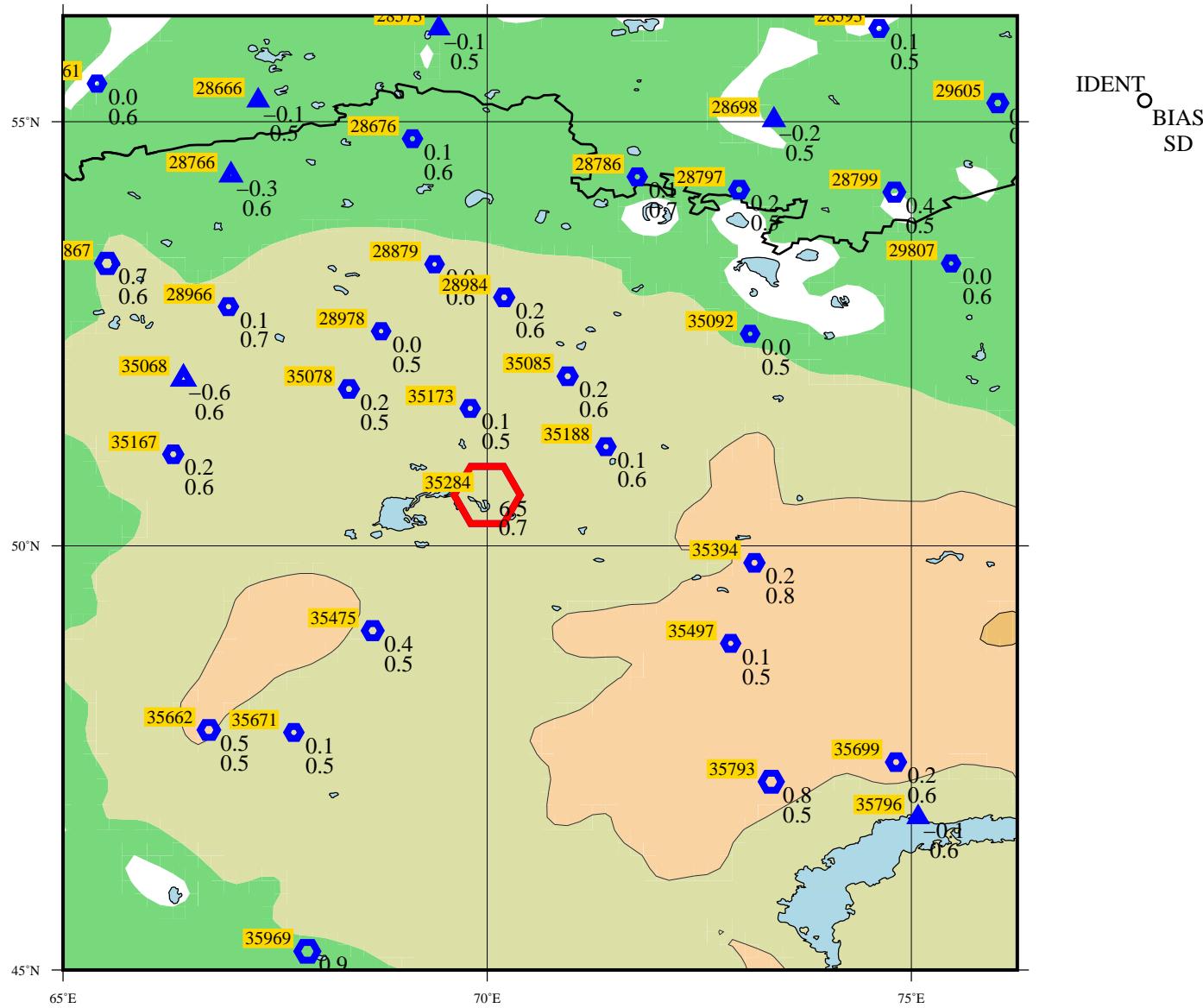


Figure 5 Time-series representation of MSLP Obs minus FirstGuess for station 31445

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

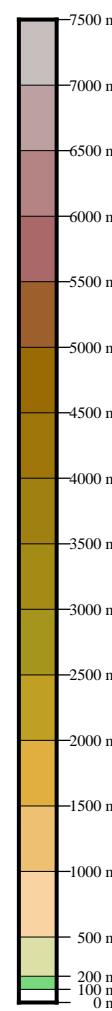


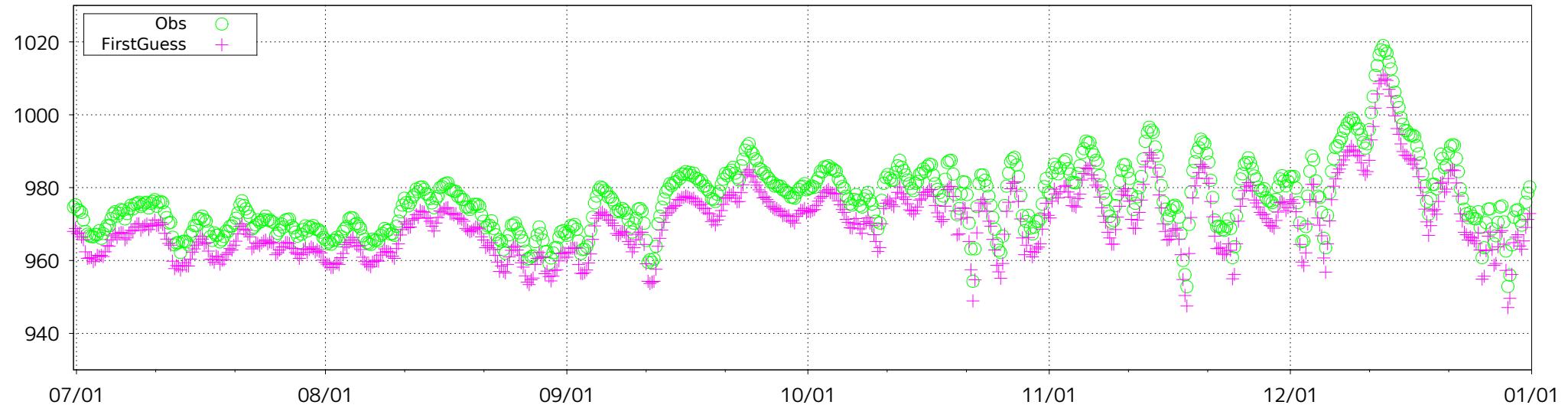
Figure 6 BIAS and SD of SLP for station 35284 (red) and surrounding stations (blue).

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: 35284 (lat: 50.6N, lon: 70.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

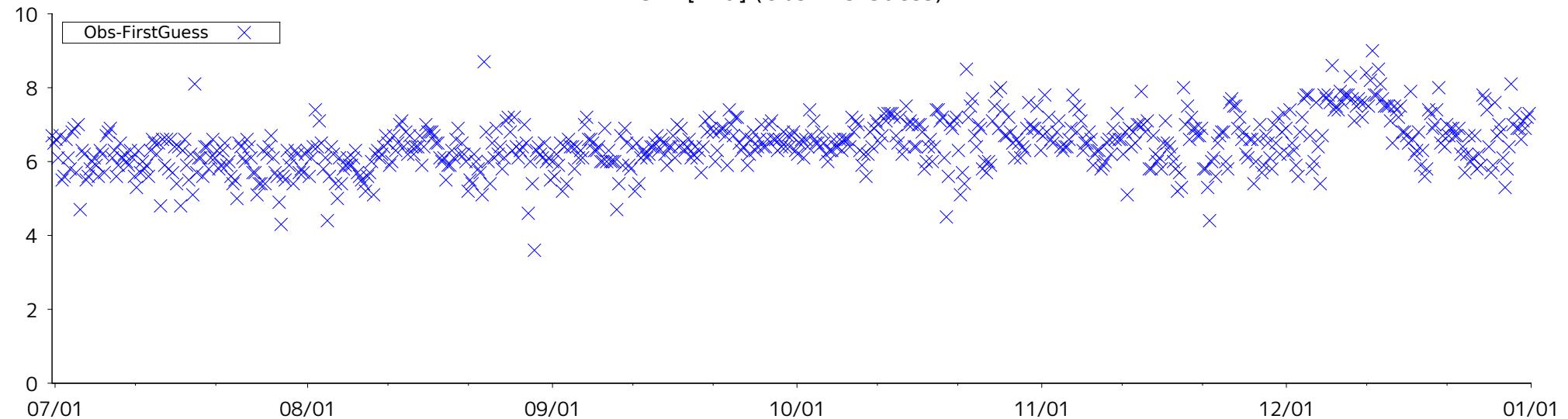
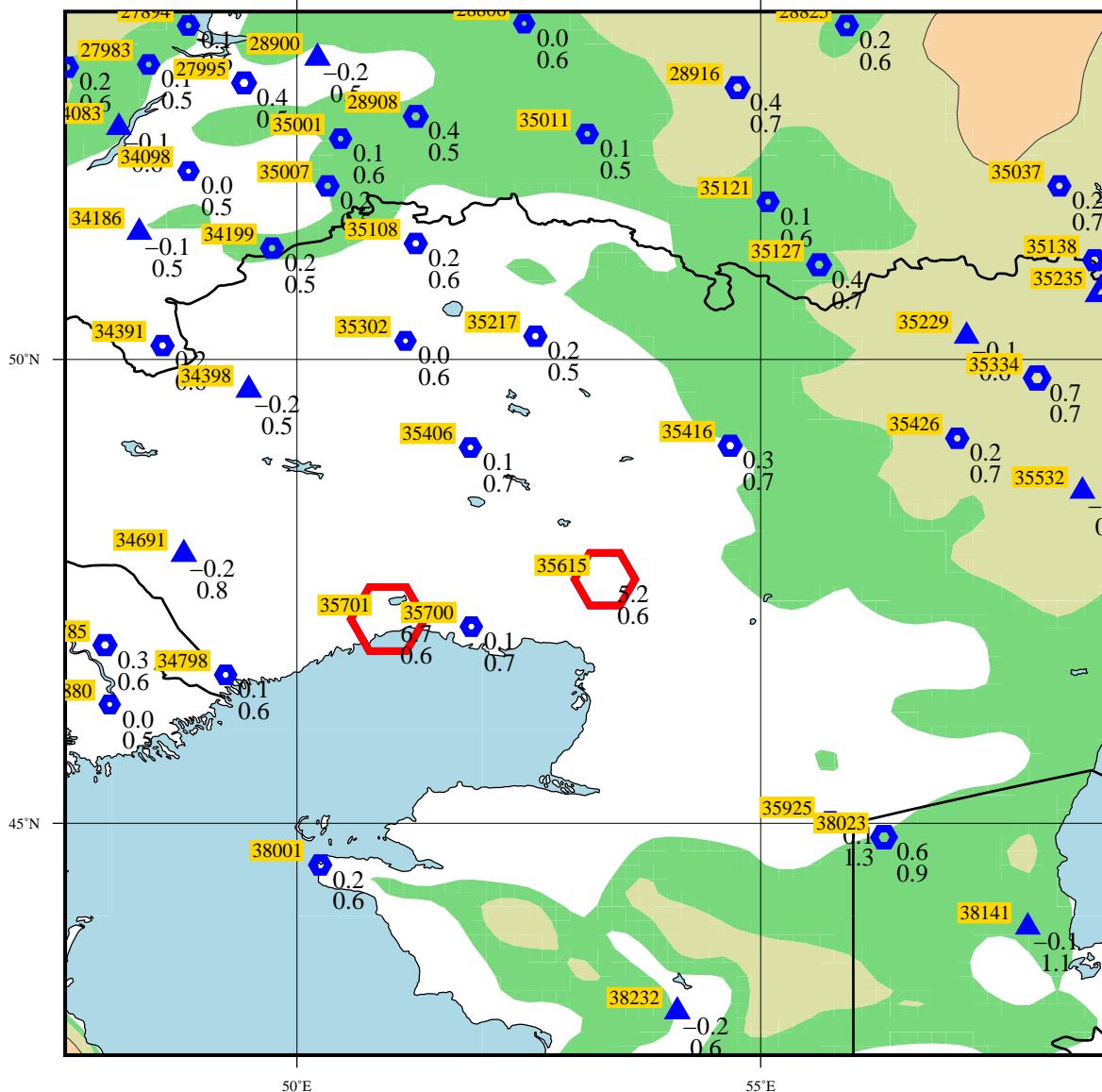


Figure 7 Time-series representation of SLP Obs minus FirstGuess for station 35284

LEVEL = SUR ELEMENT = MSLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

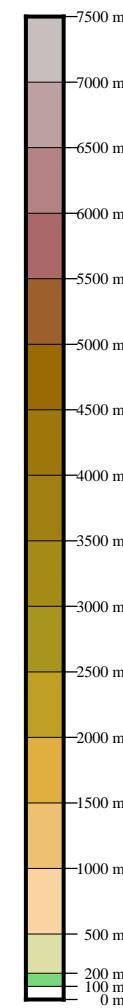


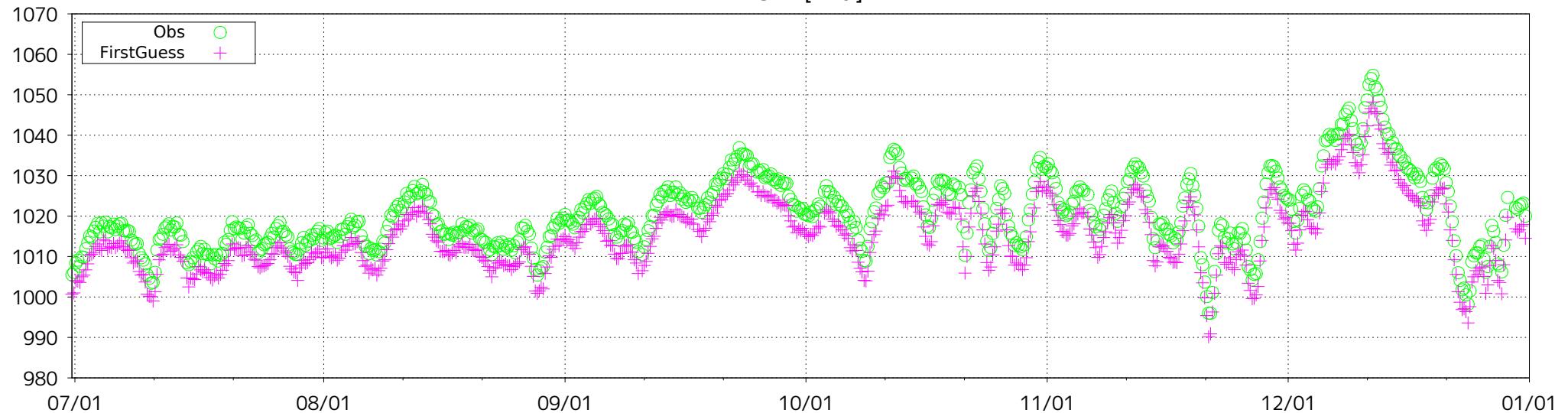
Figure 8 BIAS and SD of MSLP for station 35615, 35701 (red) and surrounding stations (blue).

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)

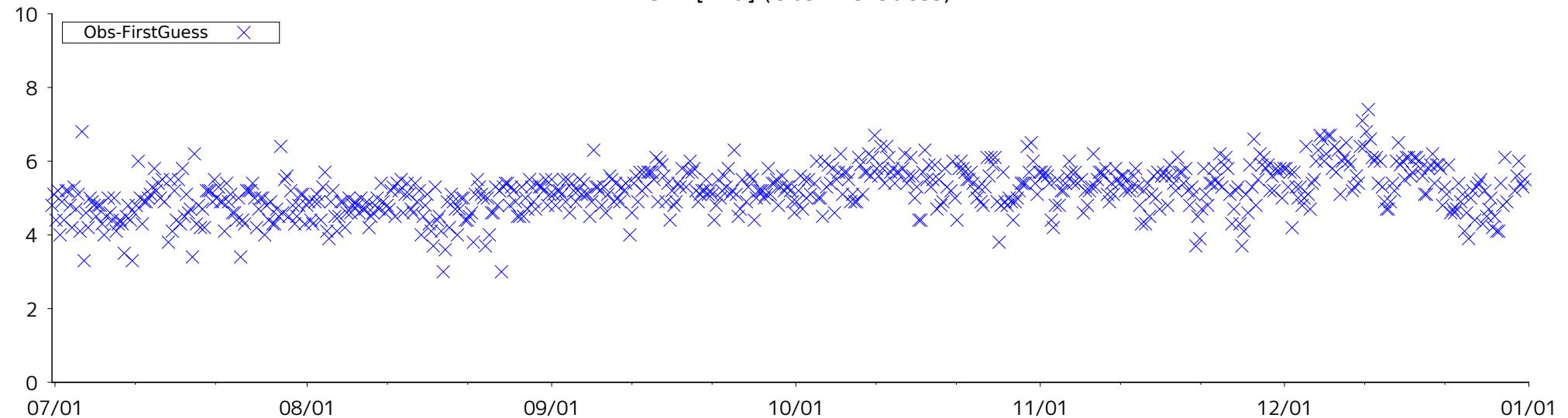
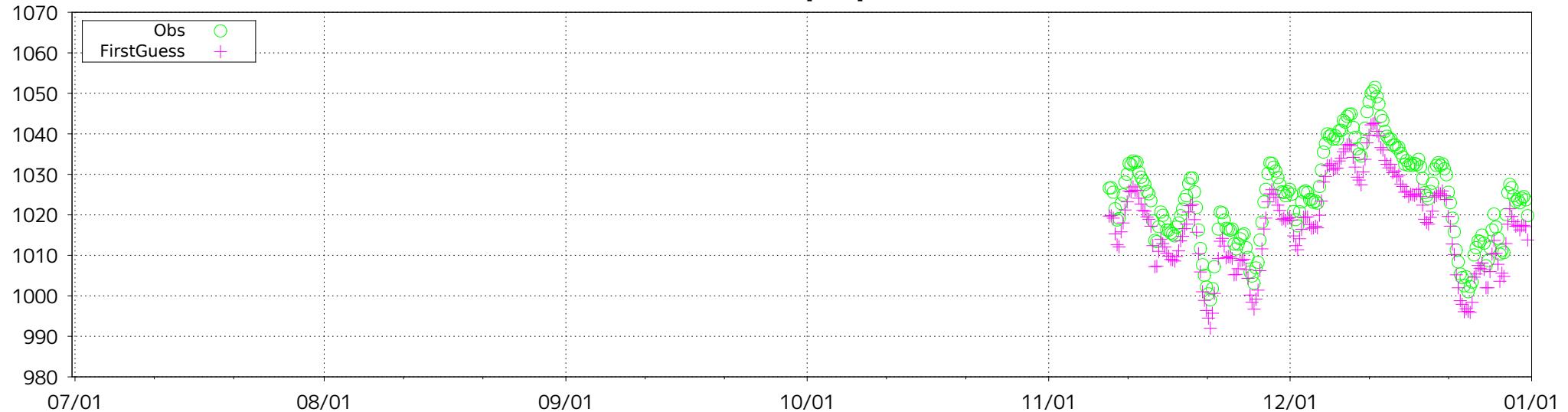


Figure 9 Time-series representation of MSLP Obs minus FirstGuess for station 35615

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

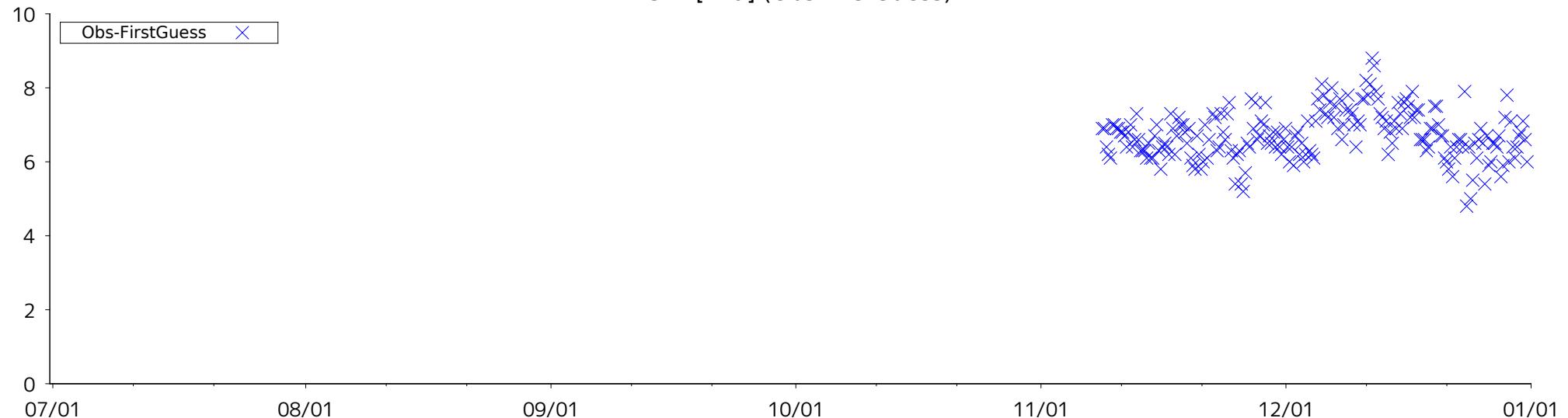
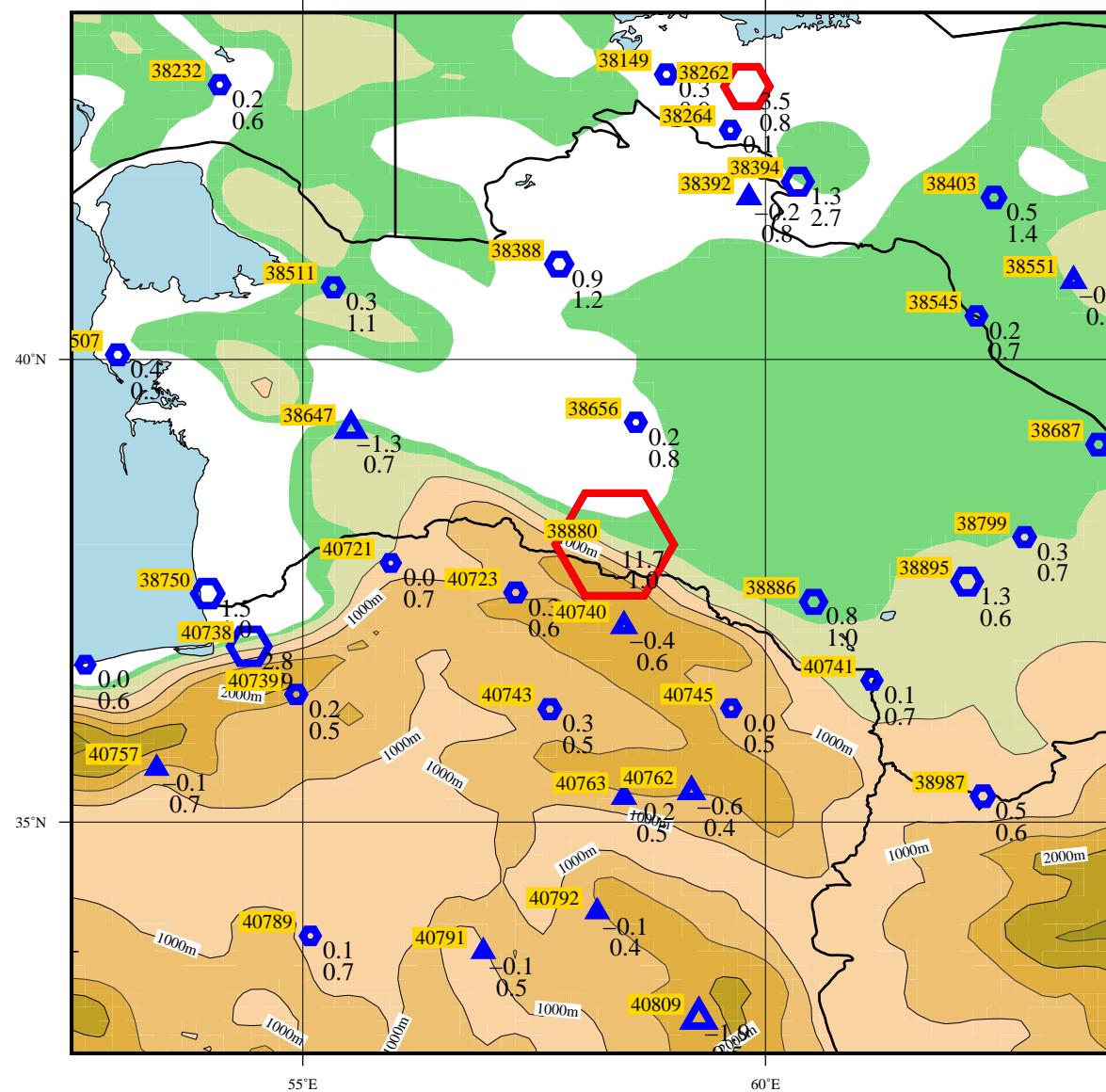


Figure 10 Time-series representation of MSLP Obs minus FirstGuess for station 35701

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

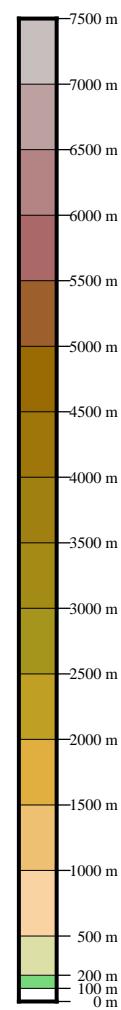


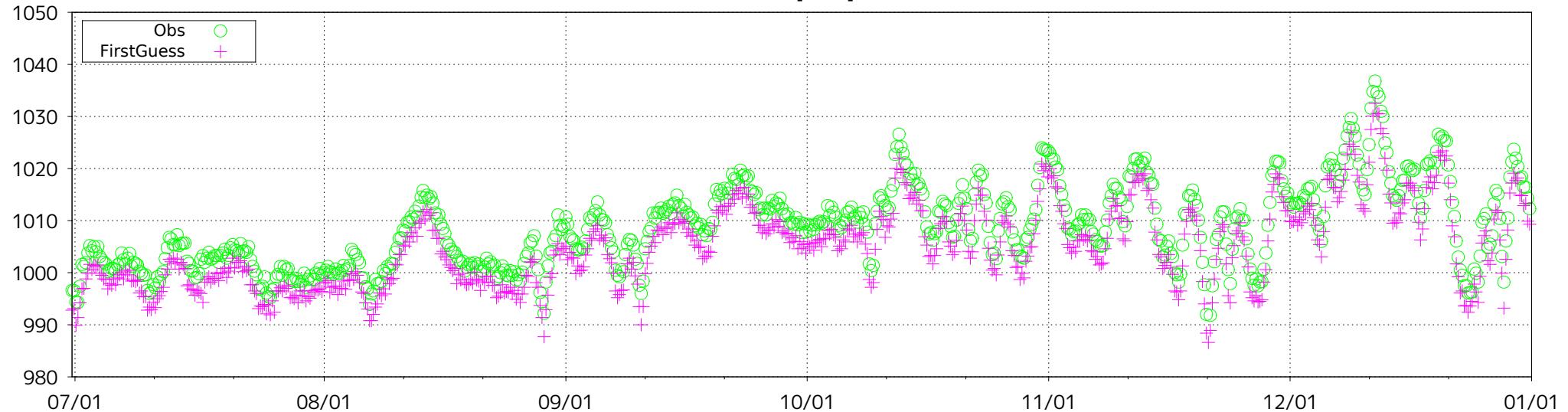
Figure 11 BIAS and SD of SLP for station 38262, 38880 (red) and surrounding stations (blue).

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)

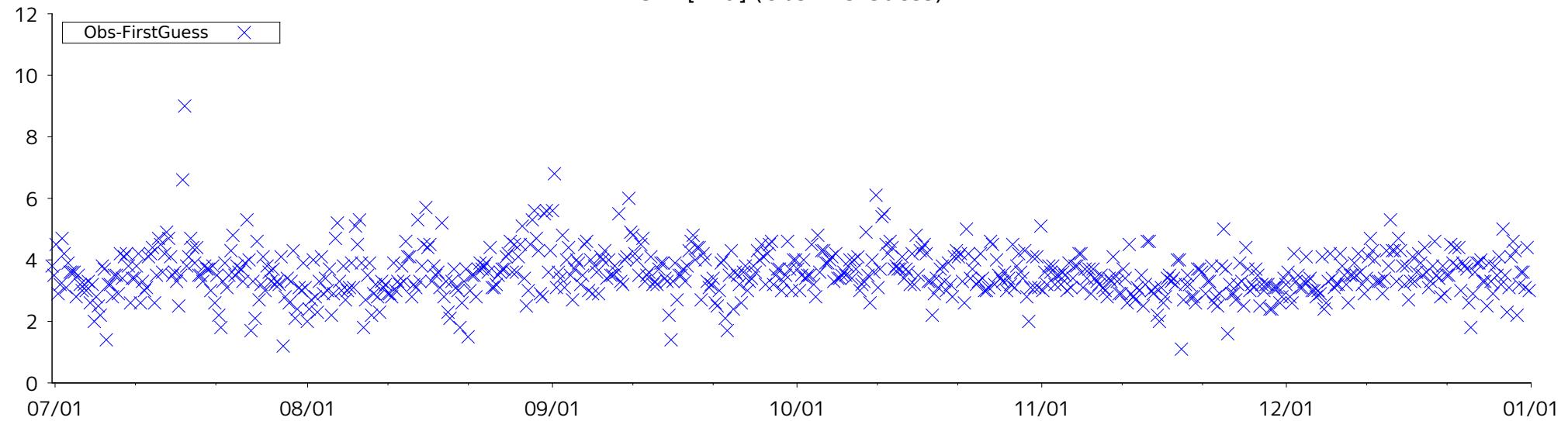
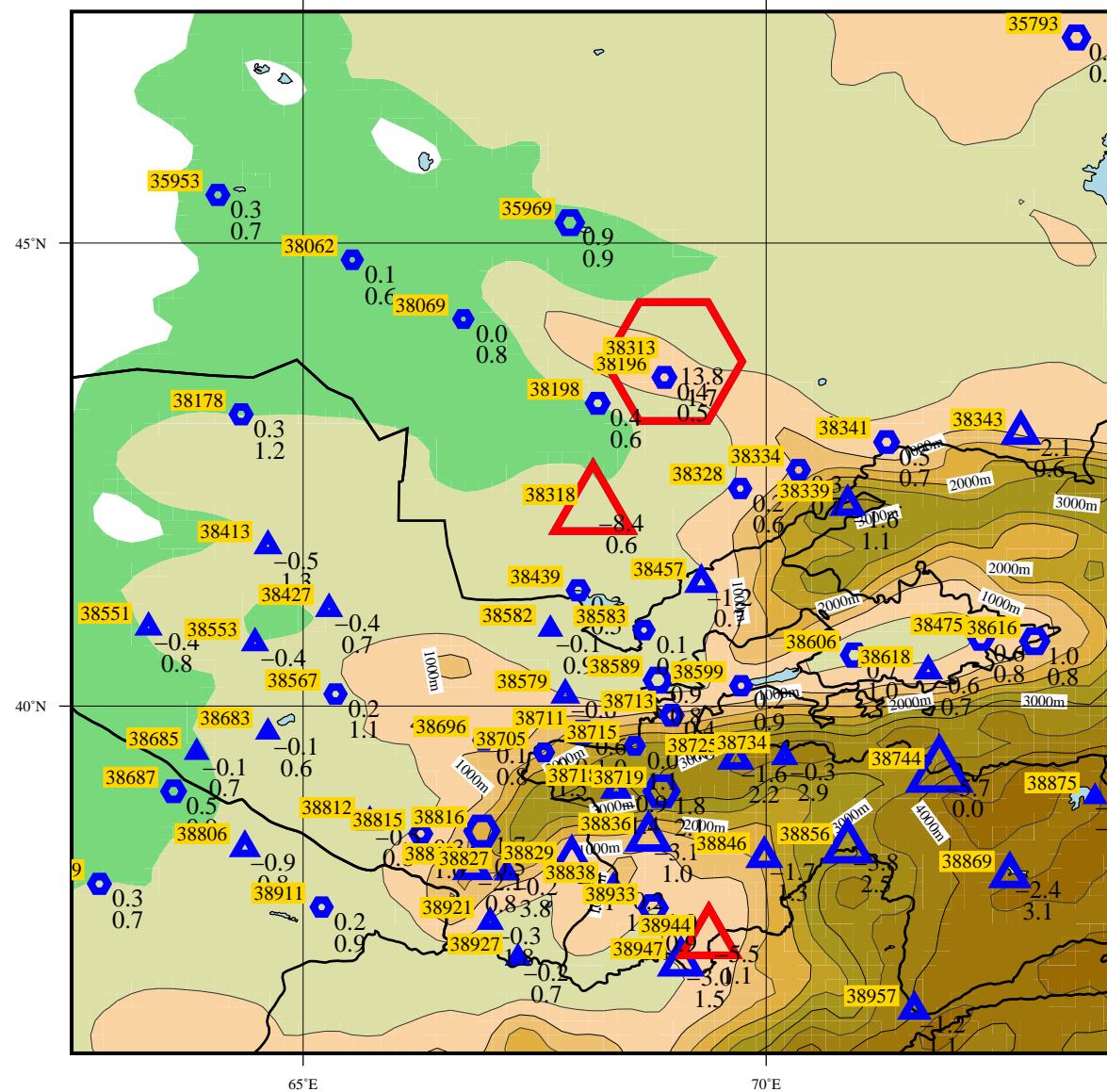


Figure 12 Time-series representation of SLP Obs minus FirstGuess for station 38262

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

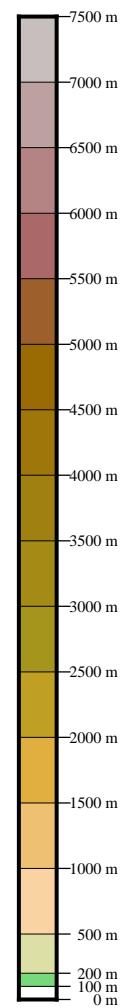


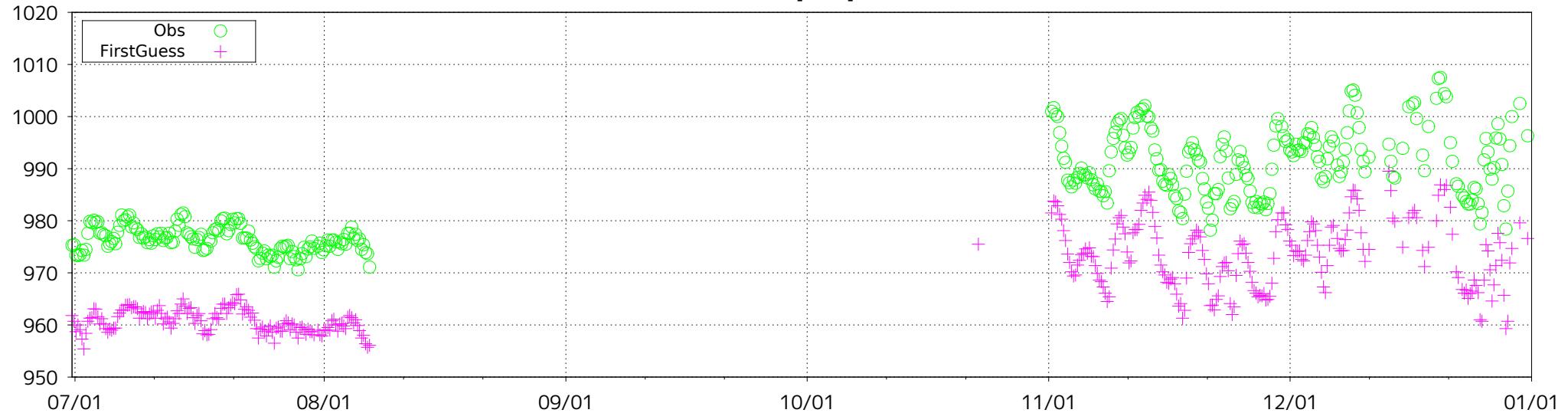
Figure 13 BIAS and SD of SLP for station 38313, 38318, 38944 (red) and surrounding stations (blue).

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: 38313 (lat: 43.7N, lon: 69.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

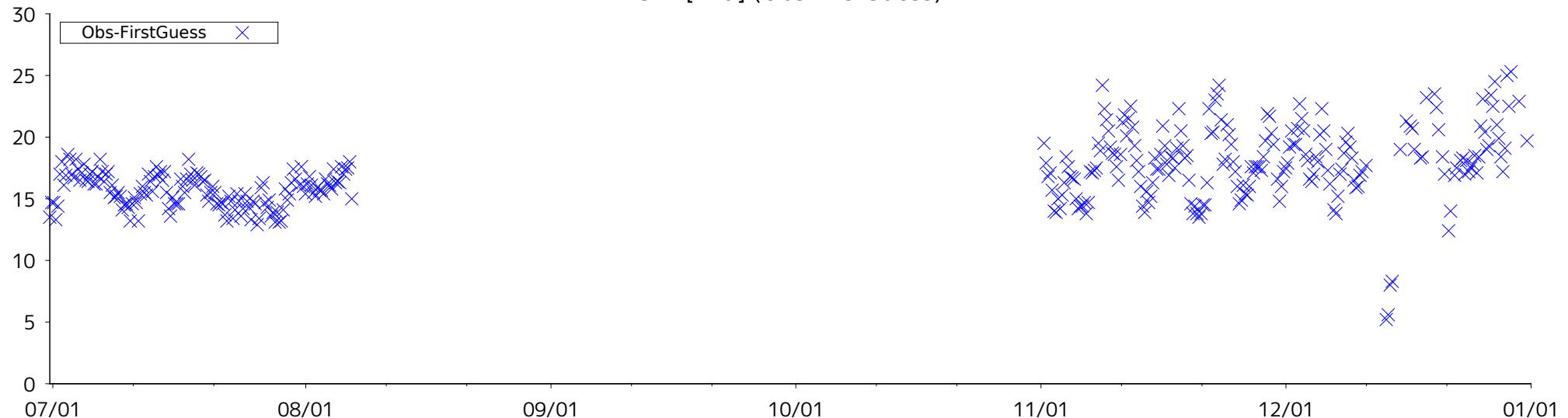
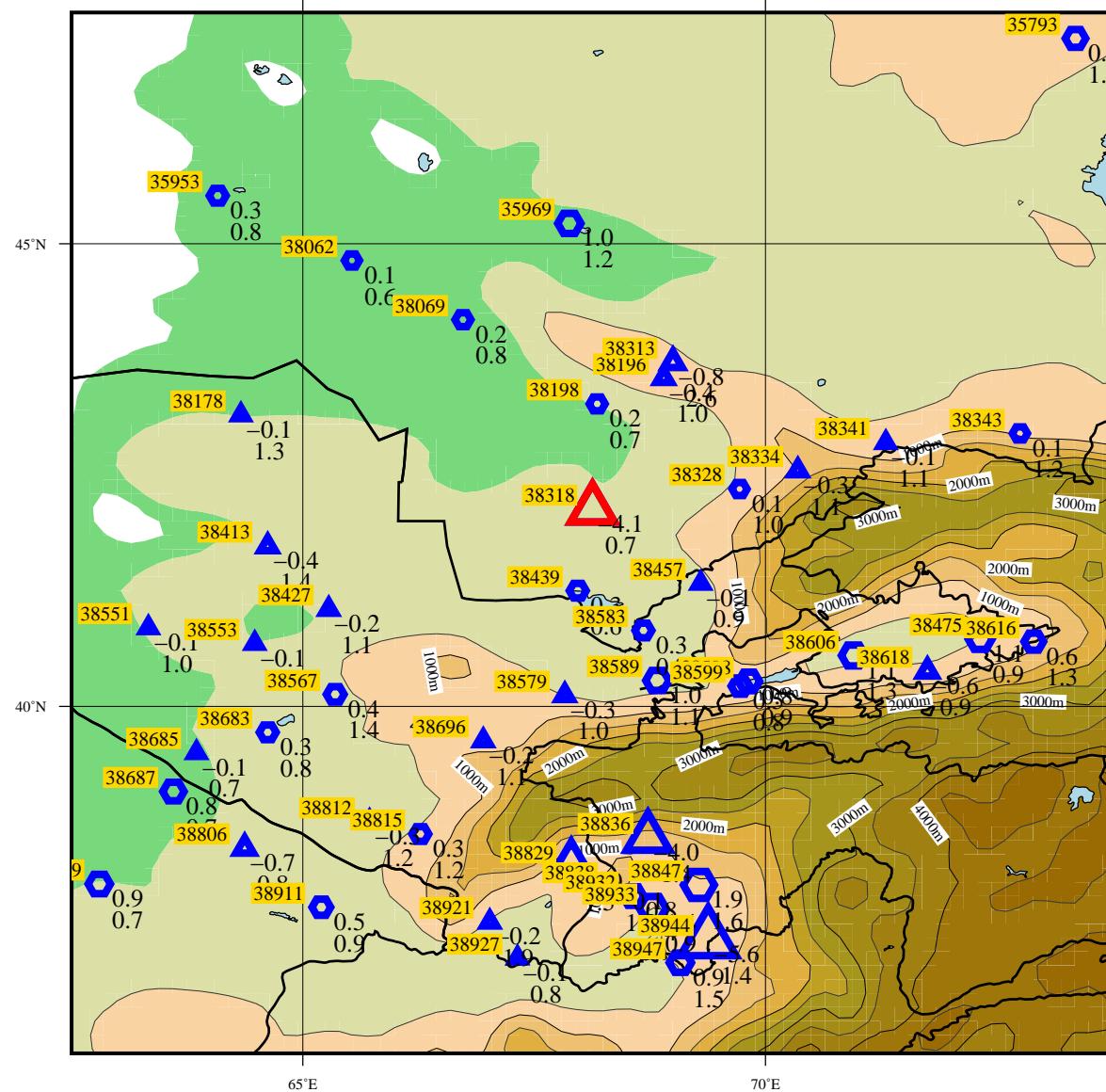


Figure 14 Time-series representation of SLP Obs minus FirstGuess for station 38313

LEVEL = SUR

ELEMENT = MSLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

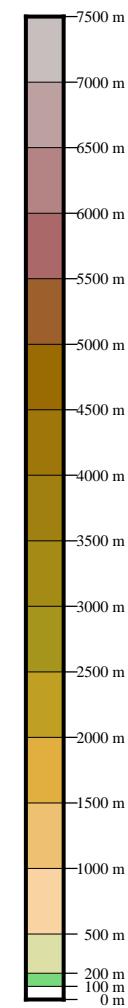


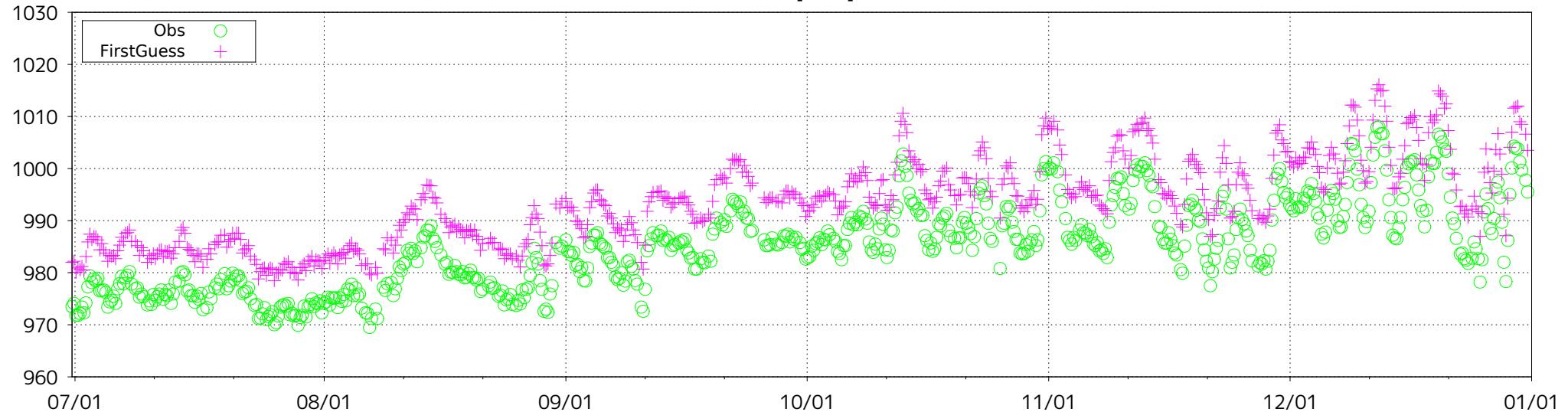
Figure 15 BIAS and SD of MSLP for station 38318 (red) and surrounding stations (blue).

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: 38318 (lat: 42.1N, lon: 68.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

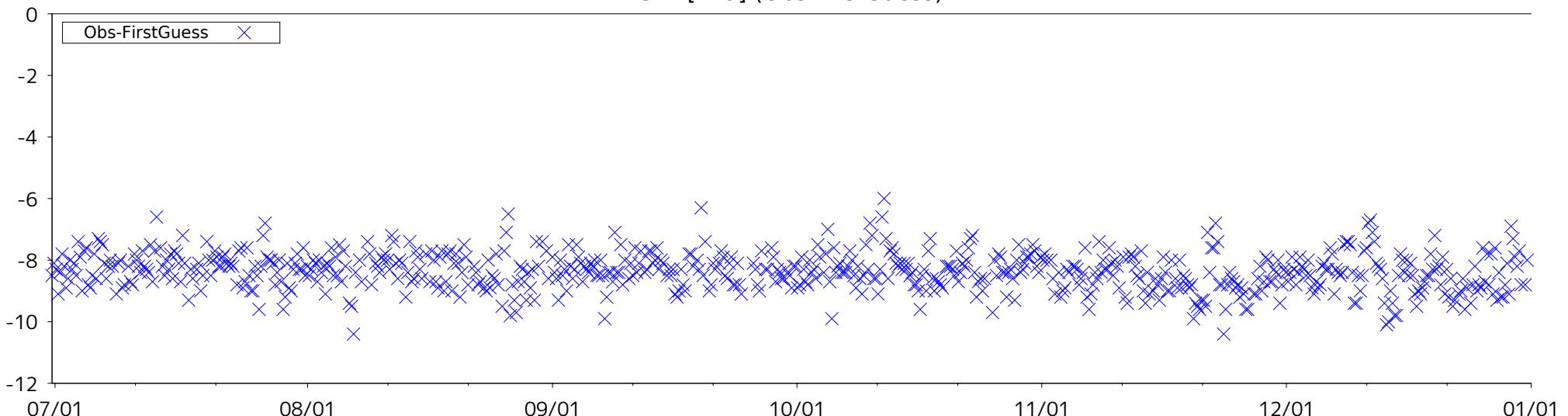
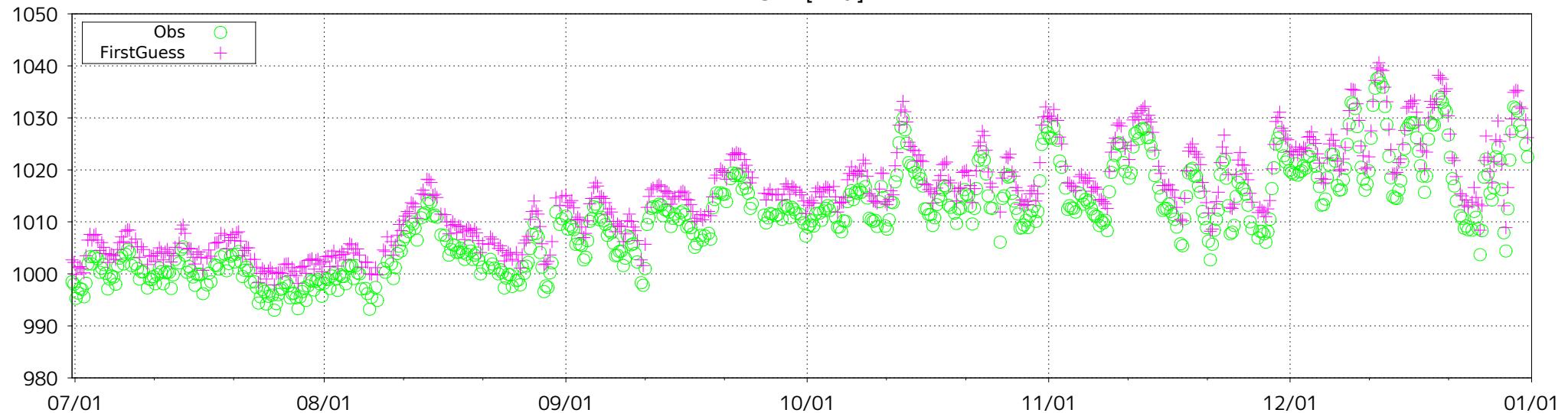


Figure 16(a) Time-series representation of SLP Obs minus FirstGuess for station 38318

ID: 38318 (lat: 42.1N, lon: 68.1E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

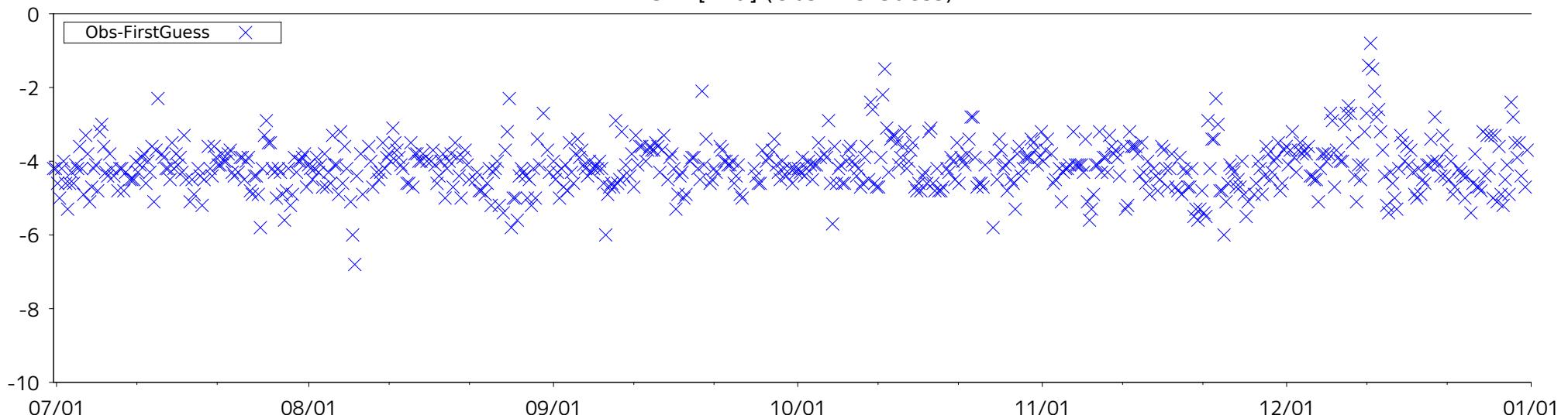
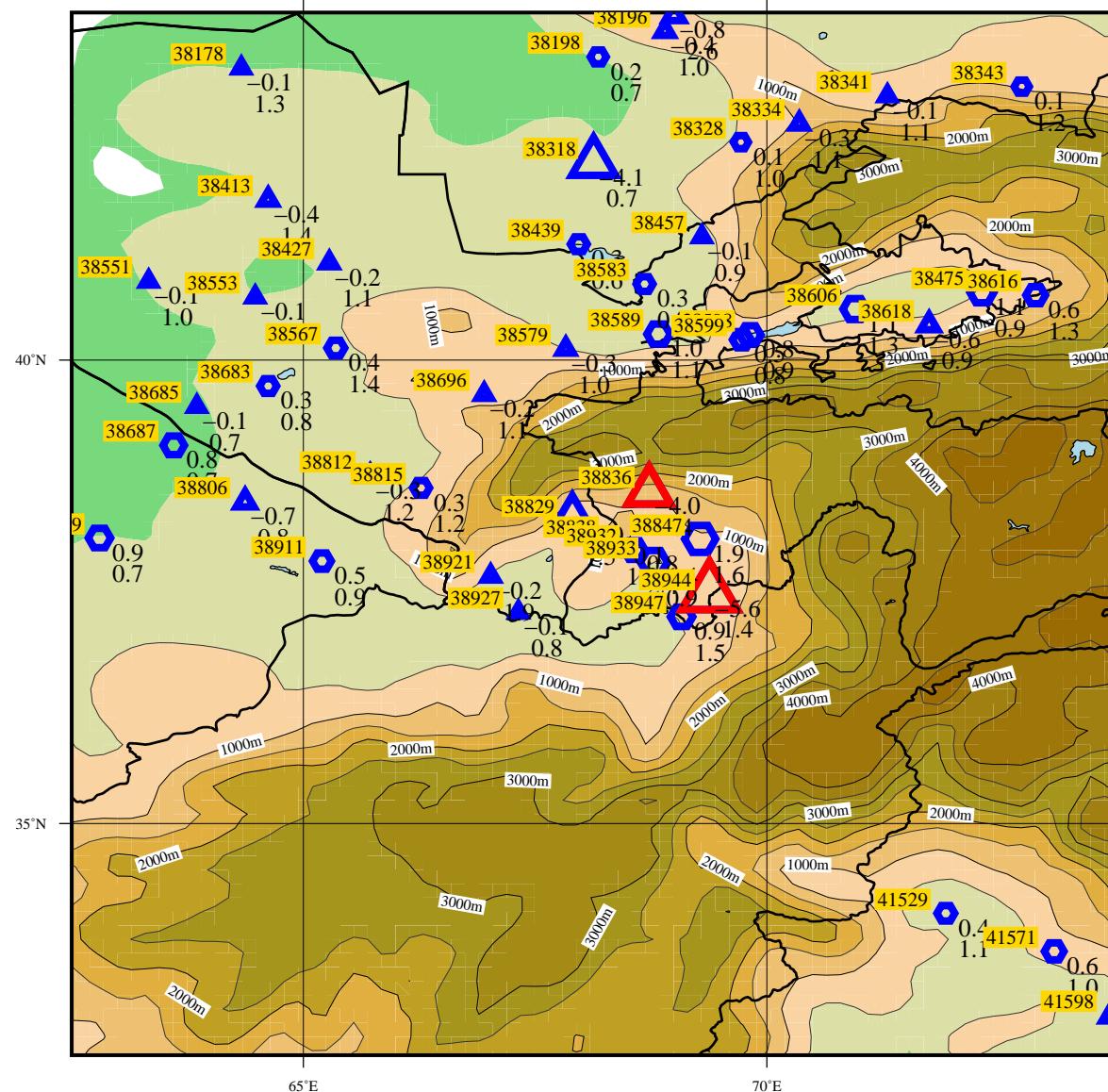


Figure 16(b) Time-series representation of MSLP Obs minus FirstGuess for station 38318

LEVEL = SUR

ELEMENT = MSLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

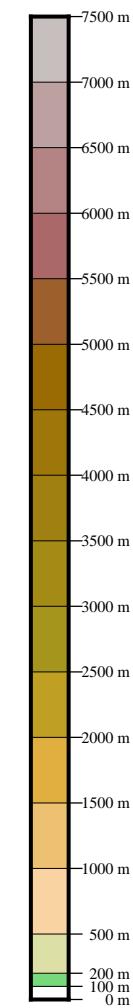


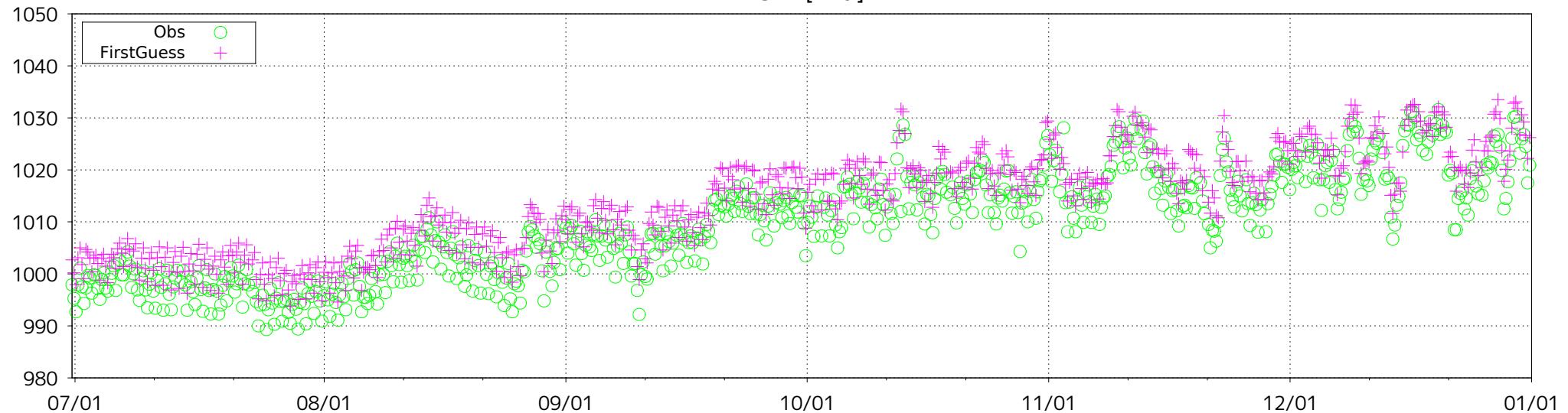
Figure 17 BIAS and SD of MSLP for station 38836, 38944 (red) and surrounding stations (blue).

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

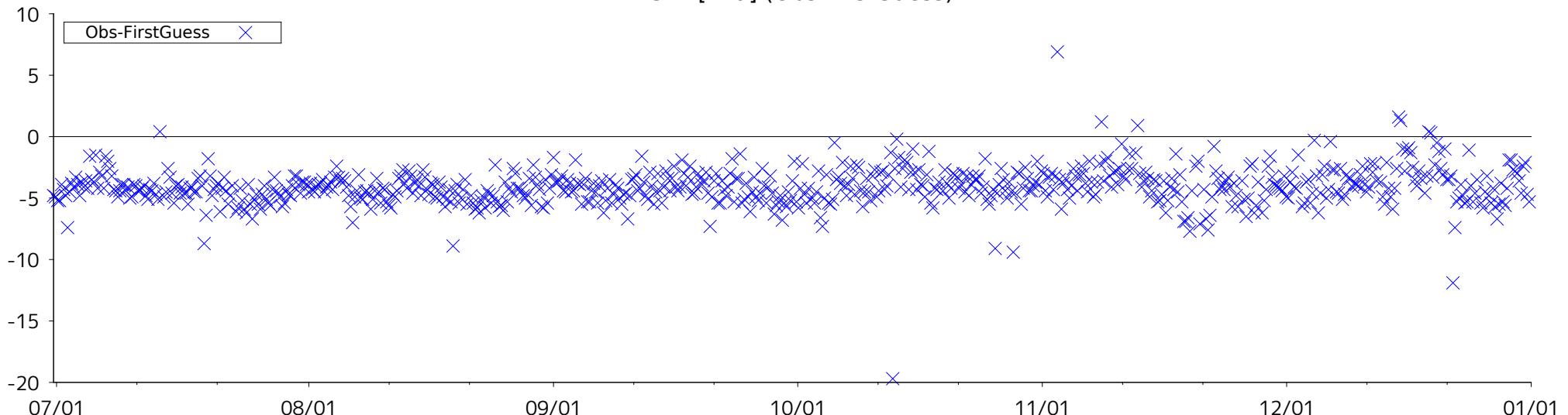
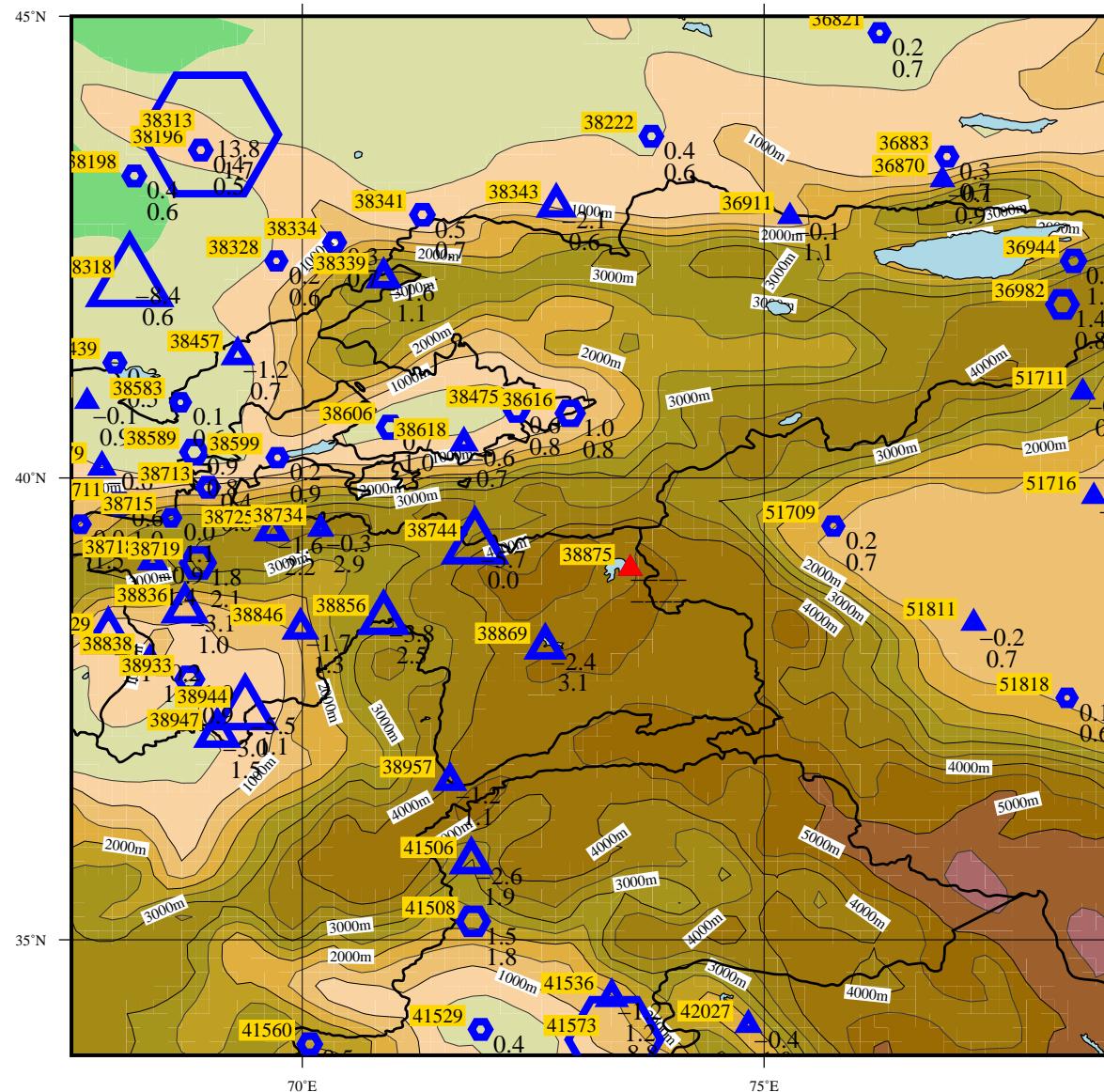


Figure 18 Time-series representation of MSLP Obs minus FirstGuess for station 38836

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

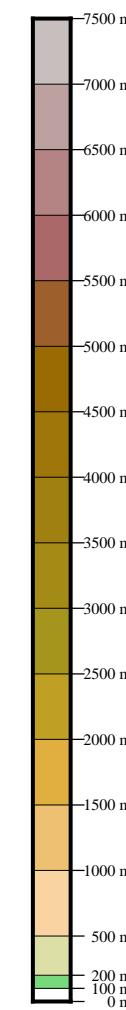


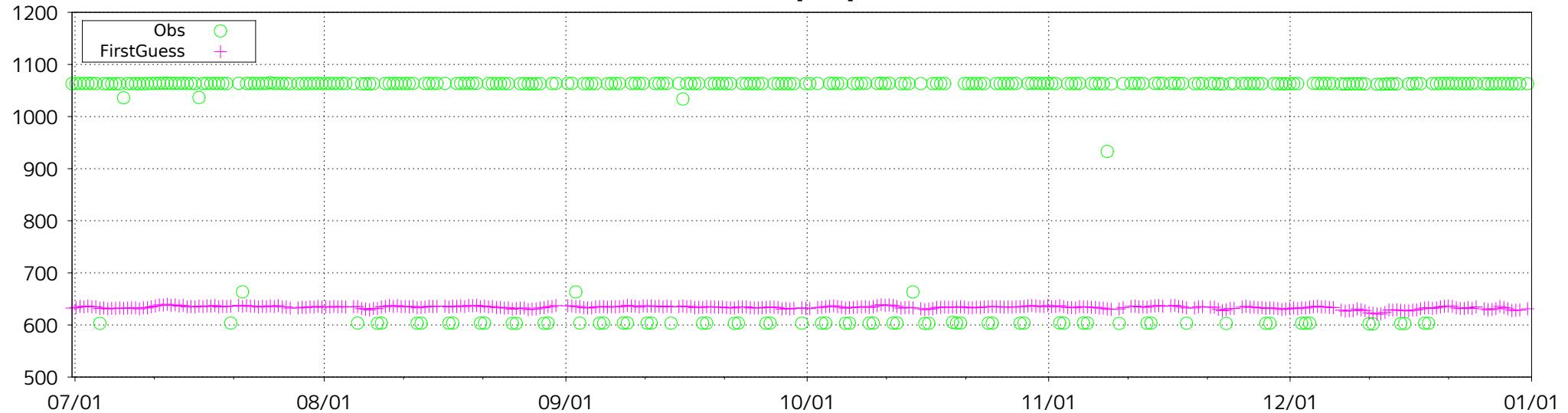
Figure 19 BIAS and SD of SLP for station 38875 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

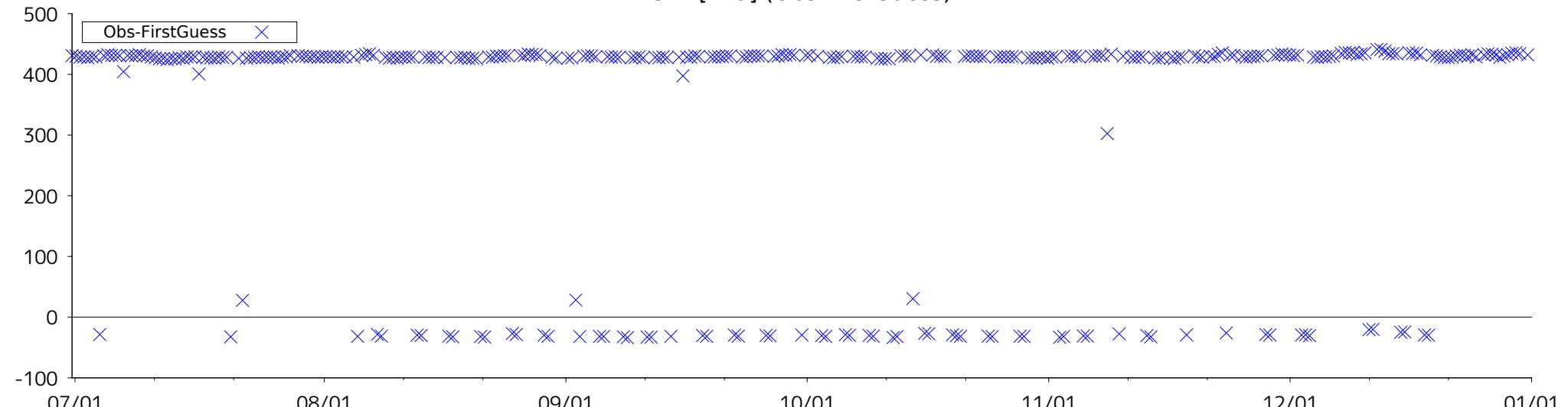
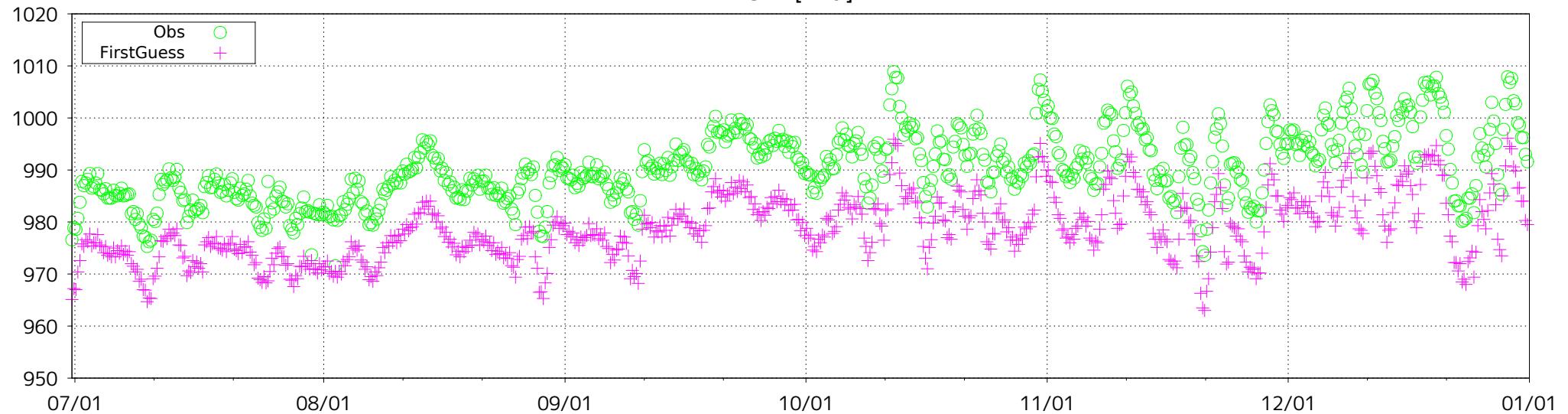


Figure 20 Time-series representation of SLP Obs minus FirstGuess for station 38875

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

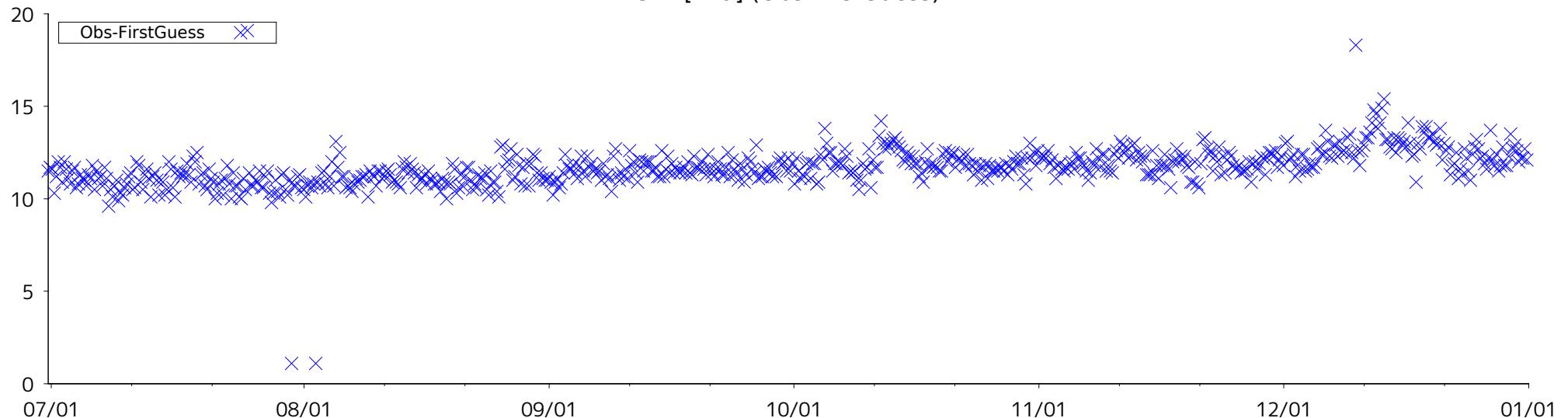
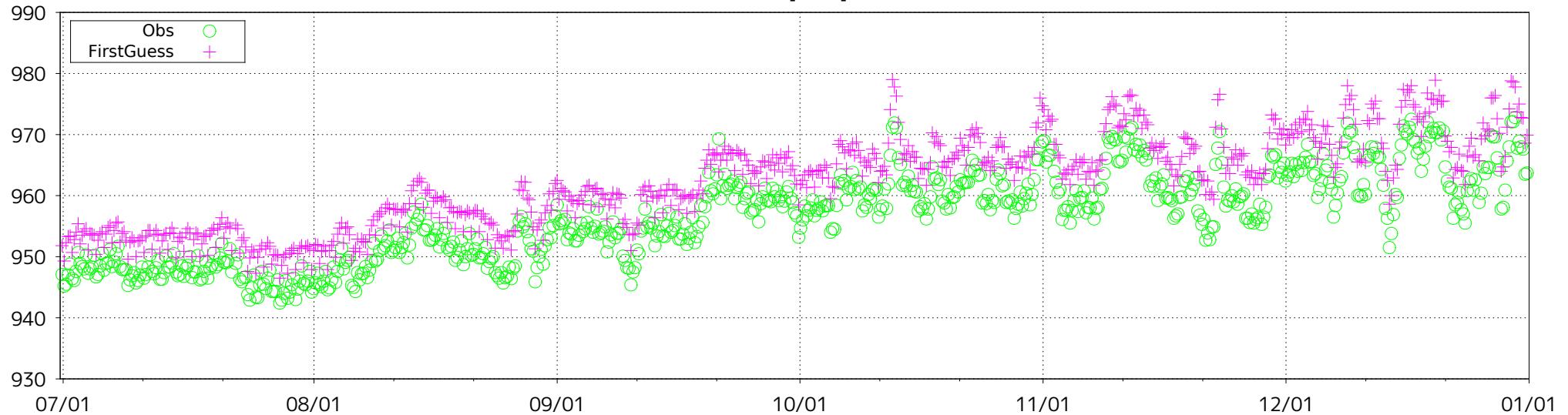


Figure 21 Time-series representation of SLP Obs minus FirstGuess for station 38880

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

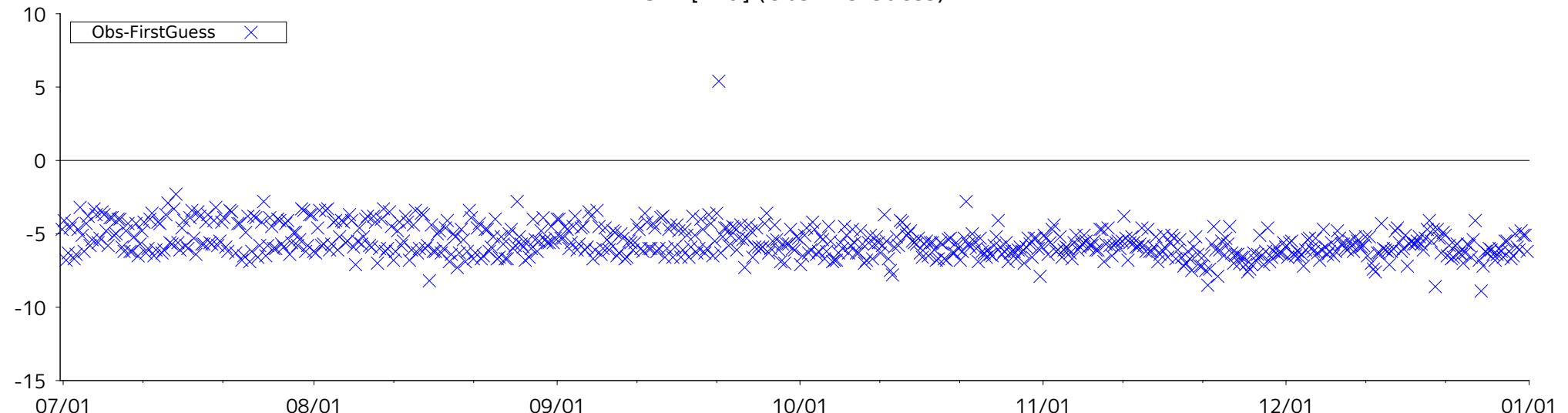
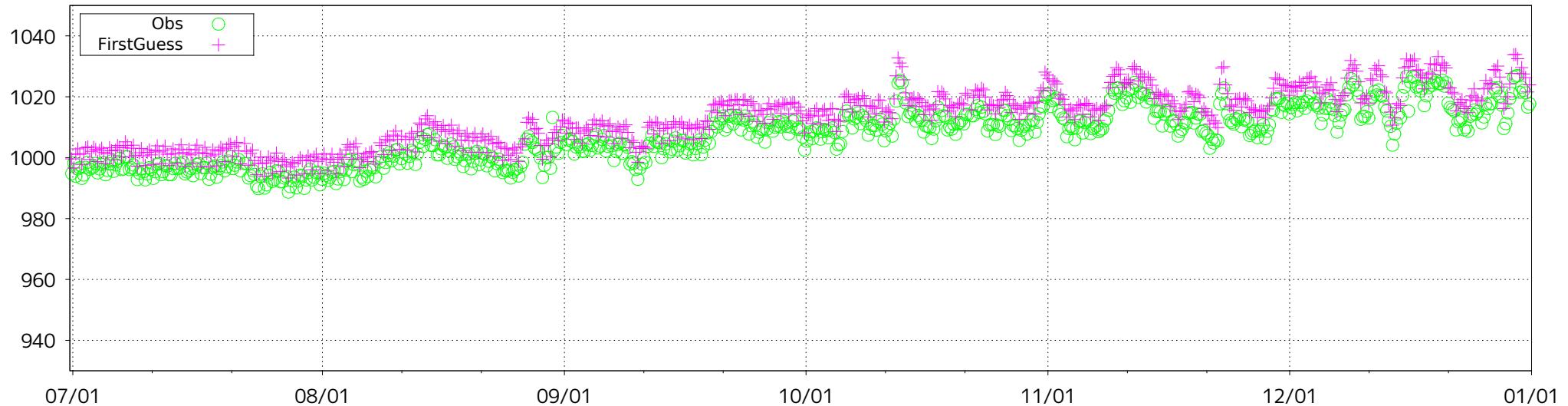


Figure 22(a) Time-series representation of SLP Obs minus FirstGuess for station 38944

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

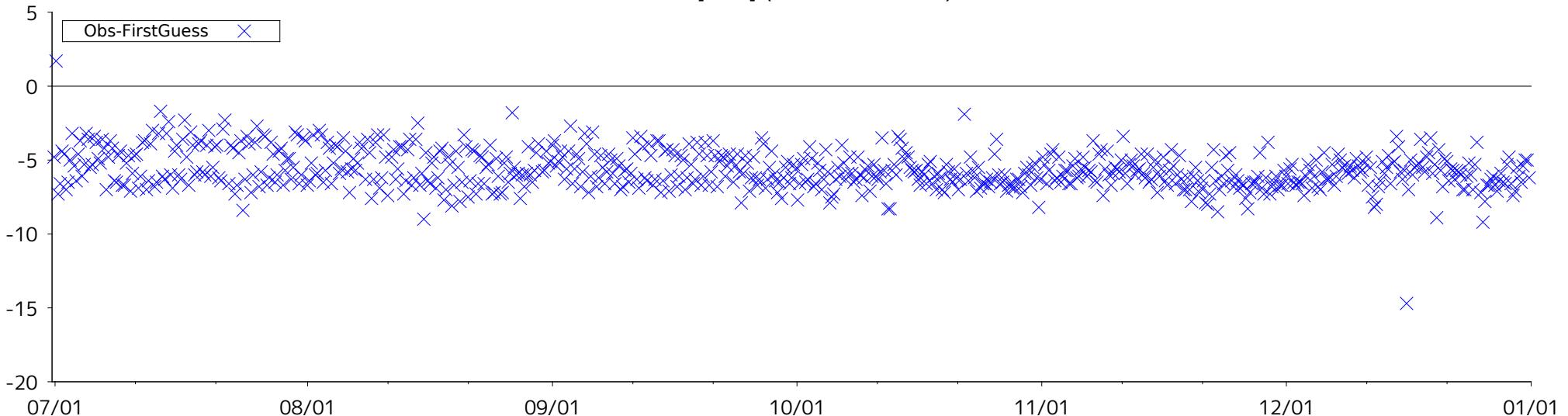
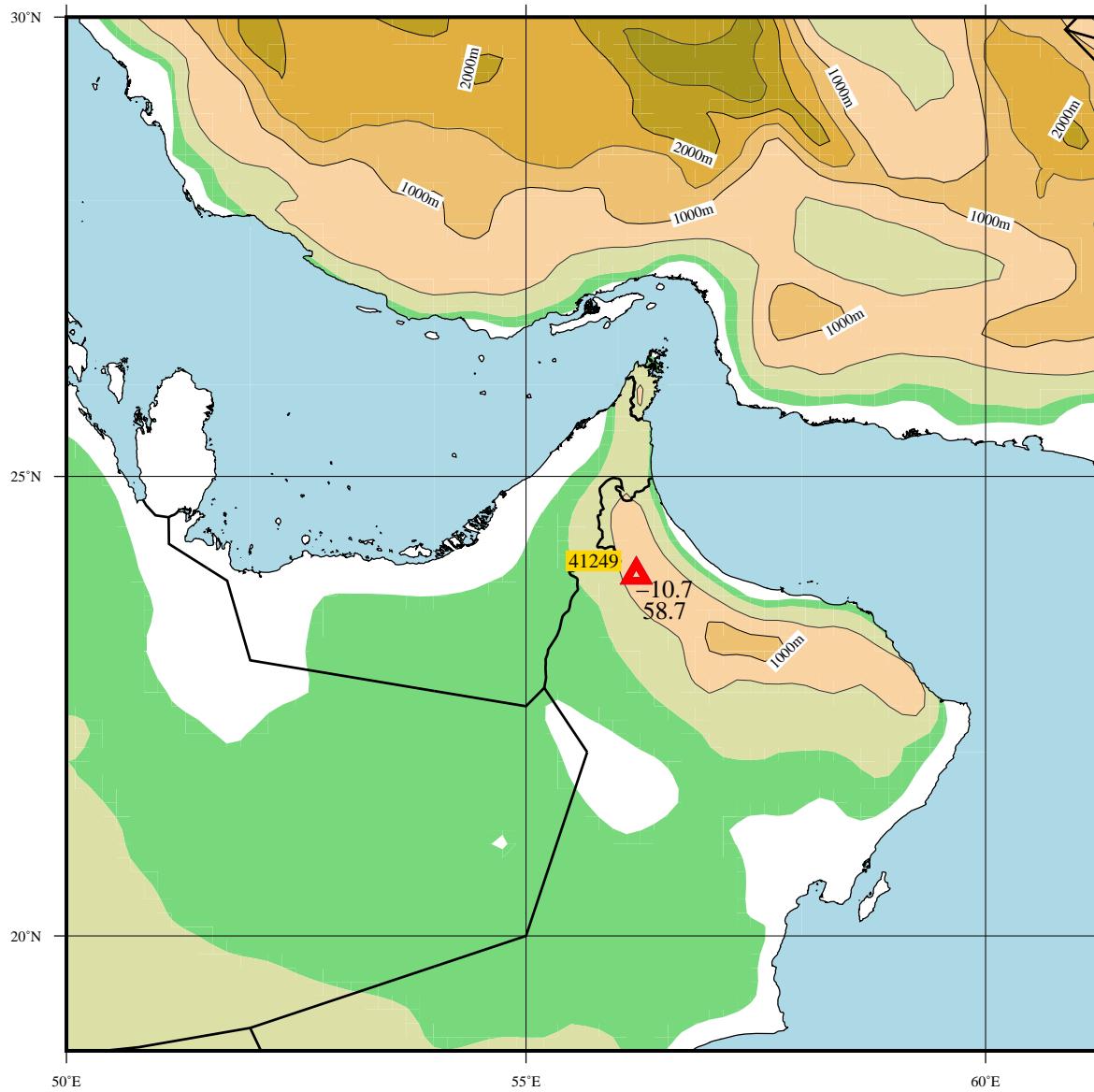


Figure 22(b) Time-series representation of MSLP Obs minus FirstGuess for station 38944

LEVEL = SUR ELEMENT = GZ
2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

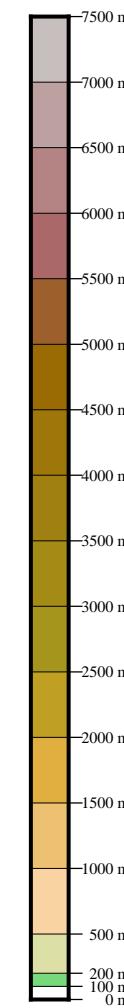


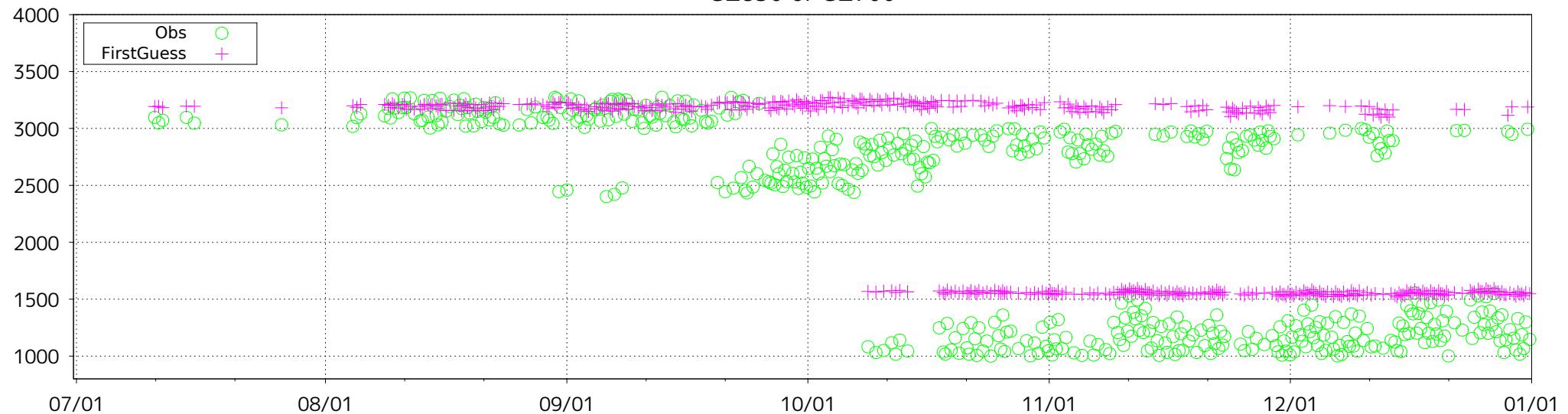
Figure 23 BIAS and SD of GZ for station 41249 (red) and surrounding stations (blue).

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

GZ850 or GZ700



GZ850 or GZ700 (Obs-FirstGuess)

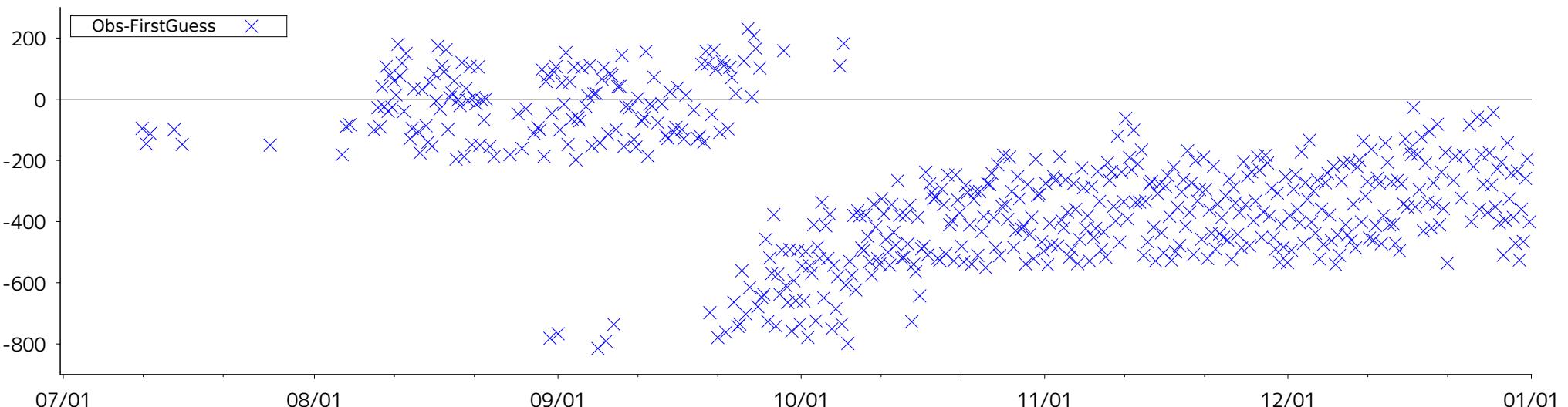


Figure 24 Time-series representation of GZ850 or GZ700 Obs minus FirstGuess for station 41249

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)

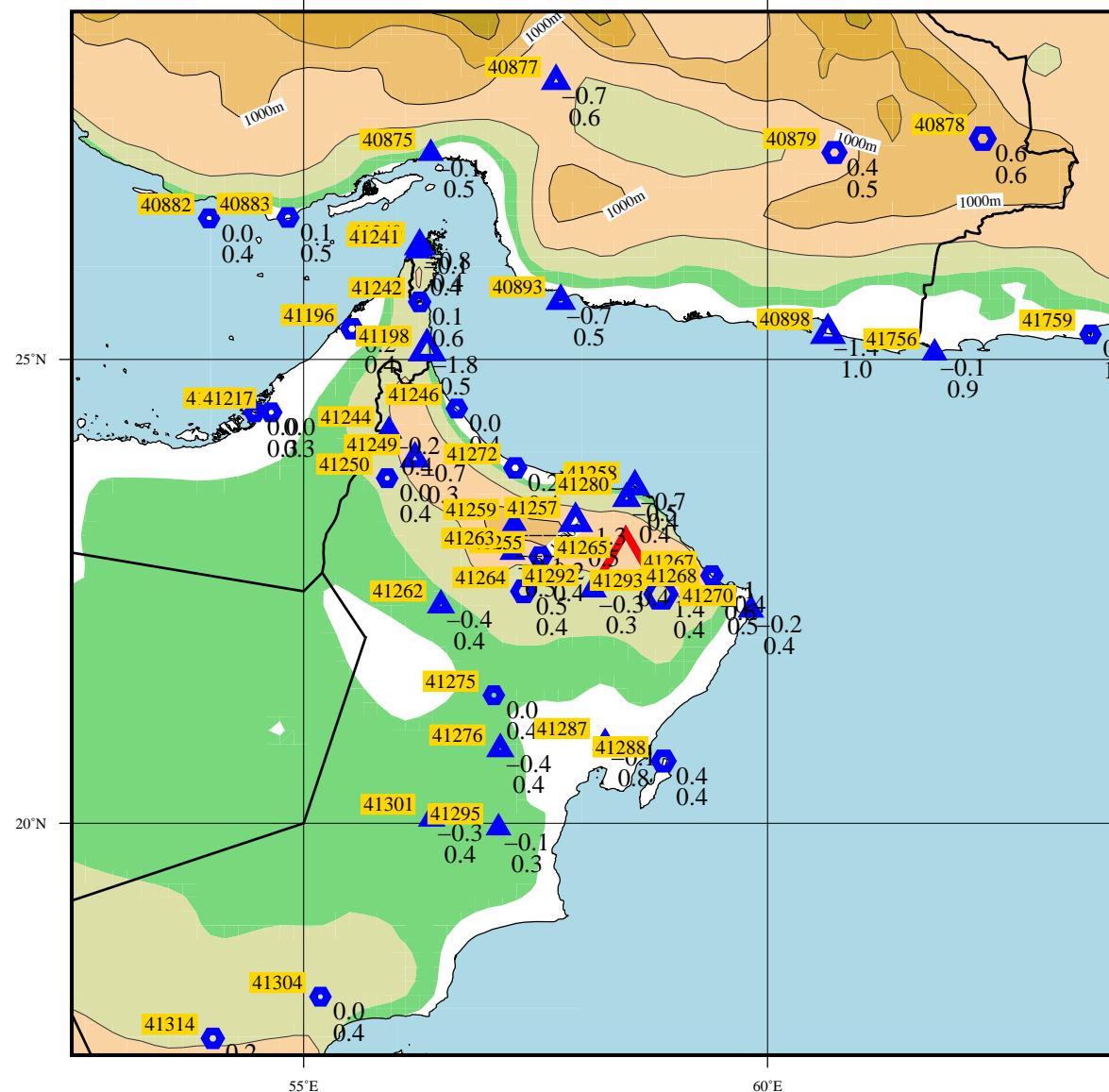
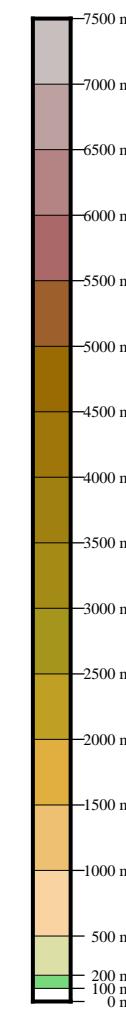


Figure 25 BIAS and SD of SLP for station 41265 (red) and surrounding stations (blue).

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.

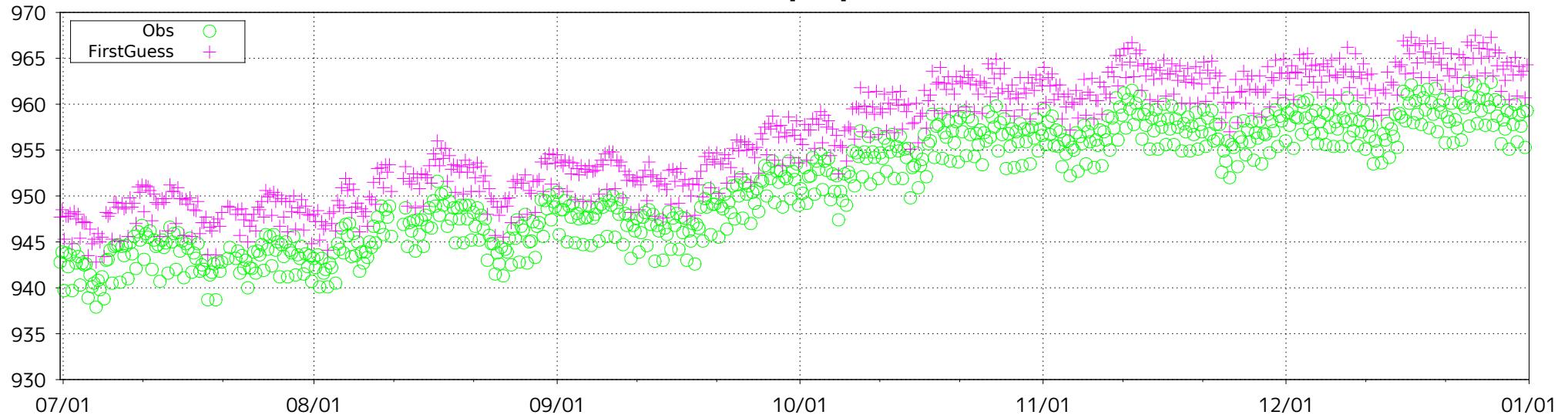
The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

IDENT
BIAS
SD



ID: 41265 (lat: 22.8N, lon: 58.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

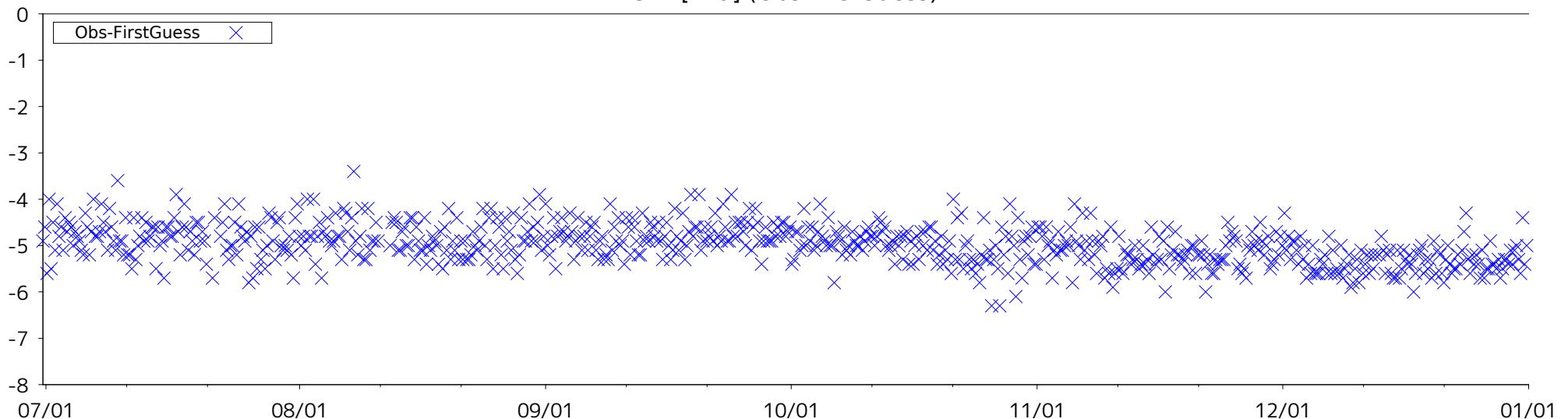


Figure 26 Time-series representation of SLP Obs minus FirstGuess for station 41265

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)

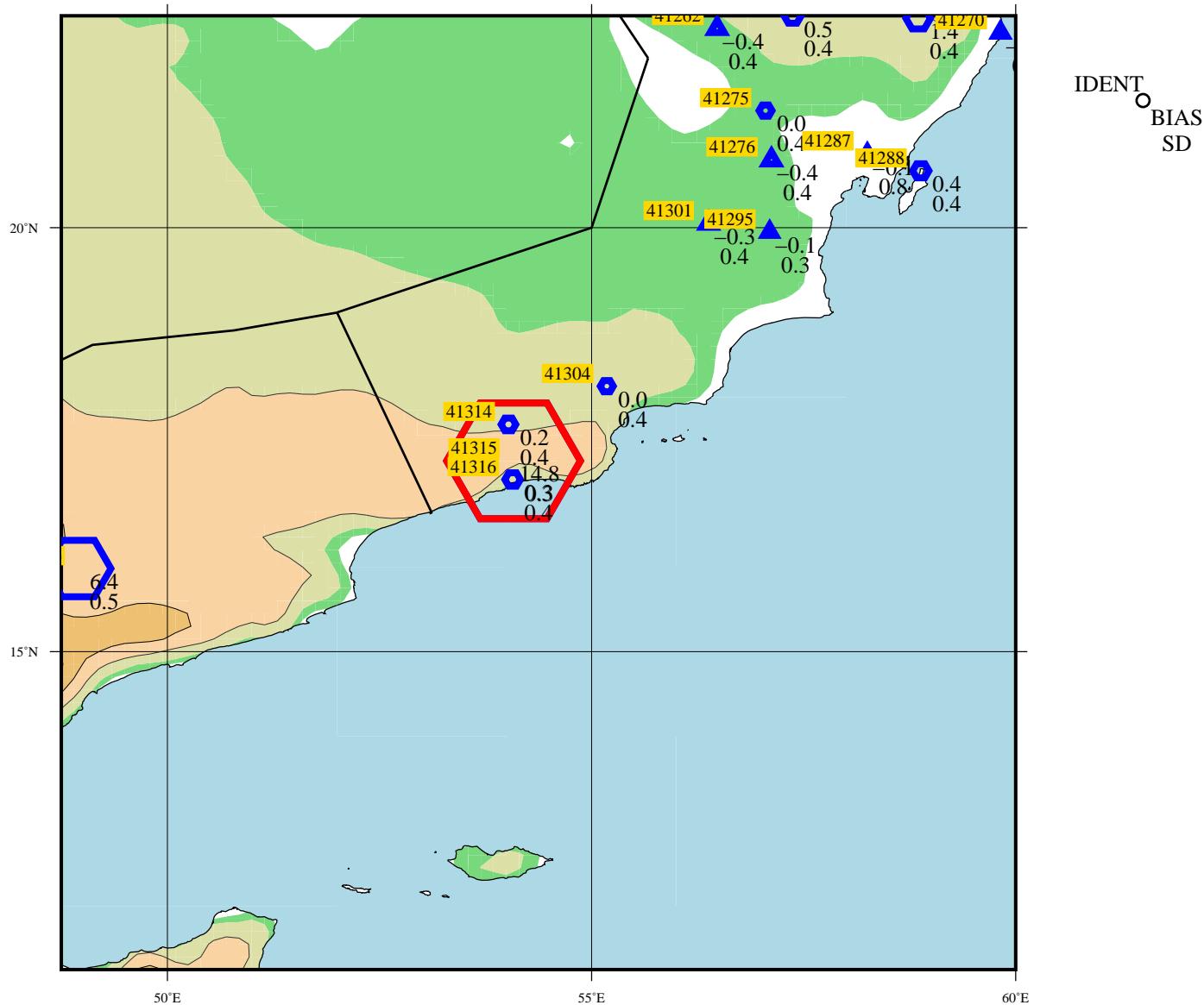
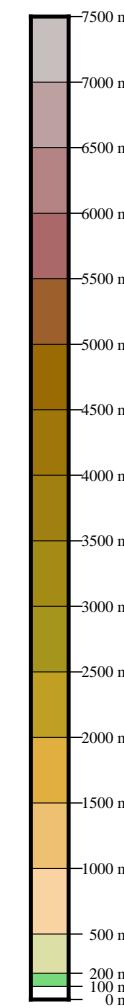


Figure 27 BIAS and SD of SLP for station 41315 (red) and surrounding stations (blue).

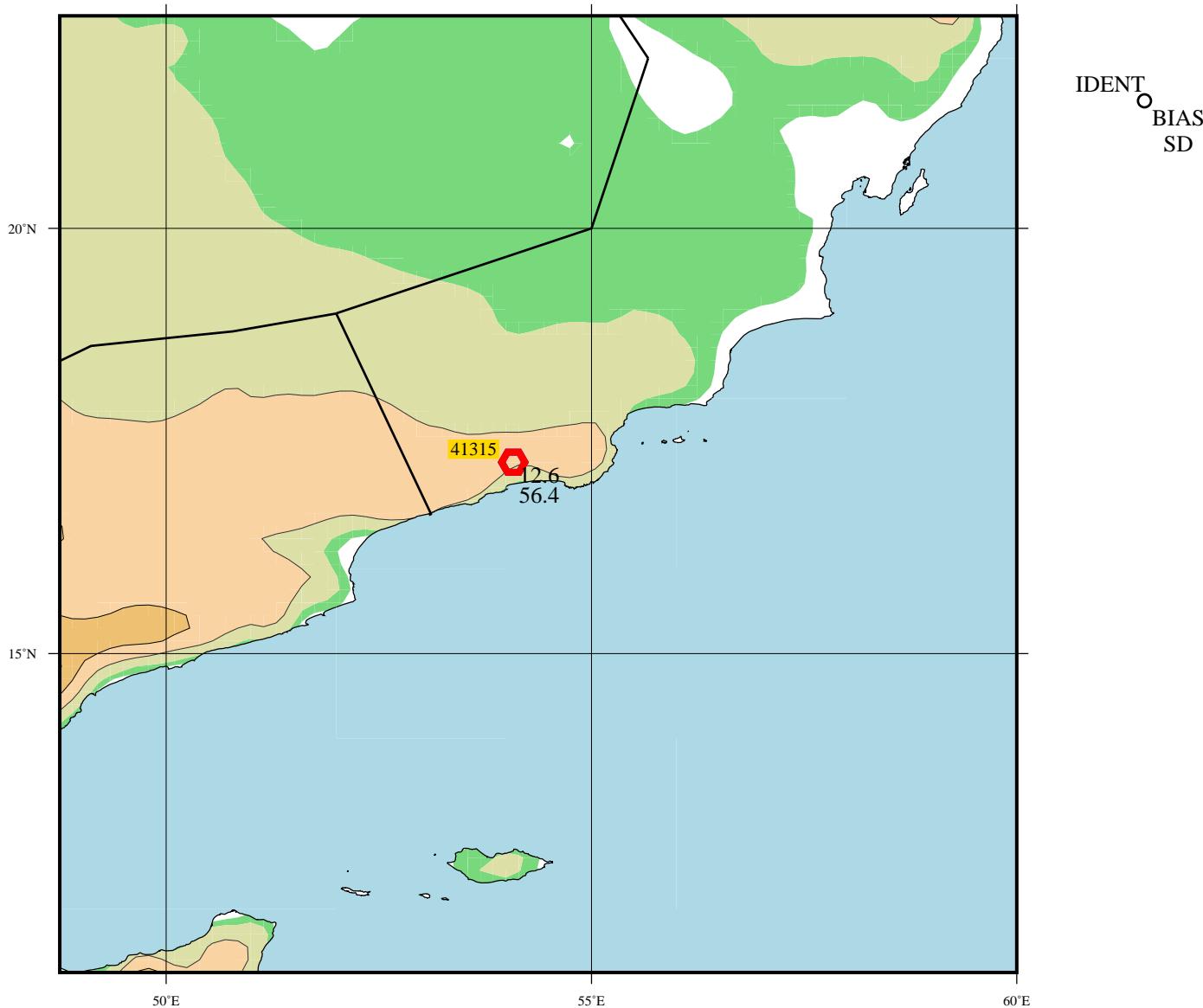
The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.

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

IDENT
O BIAS
SD



LEVEL = SUR ELEMENT = GZ
2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
O BIAS
SD

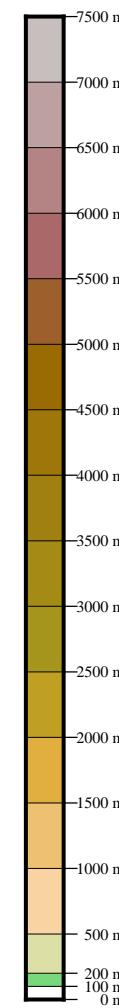


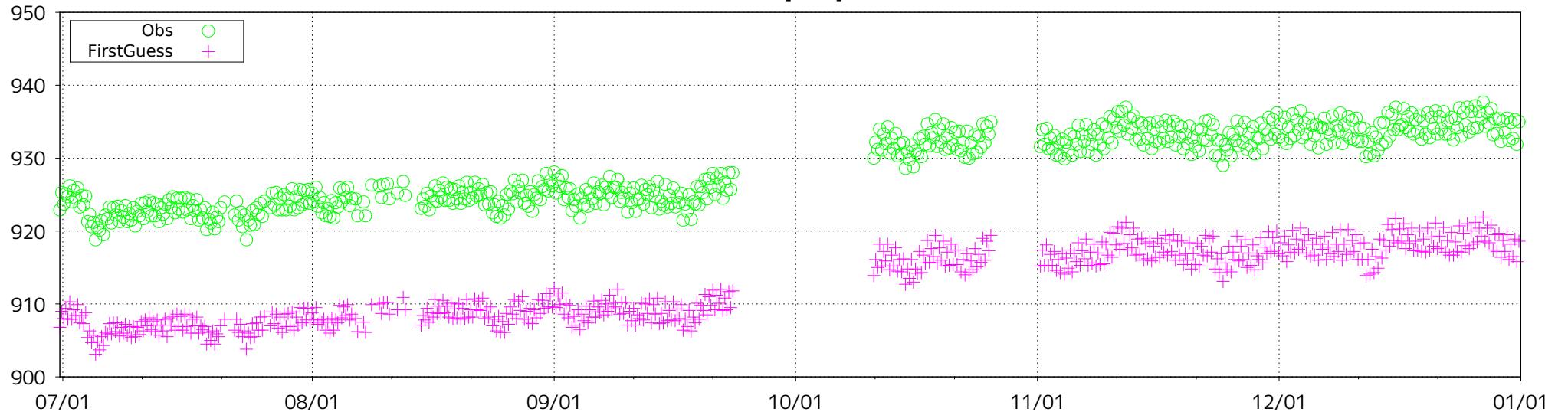
Figure 28 BIAS and SD of GZ for station 41315 (red) and surrounding stations (blue).

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)

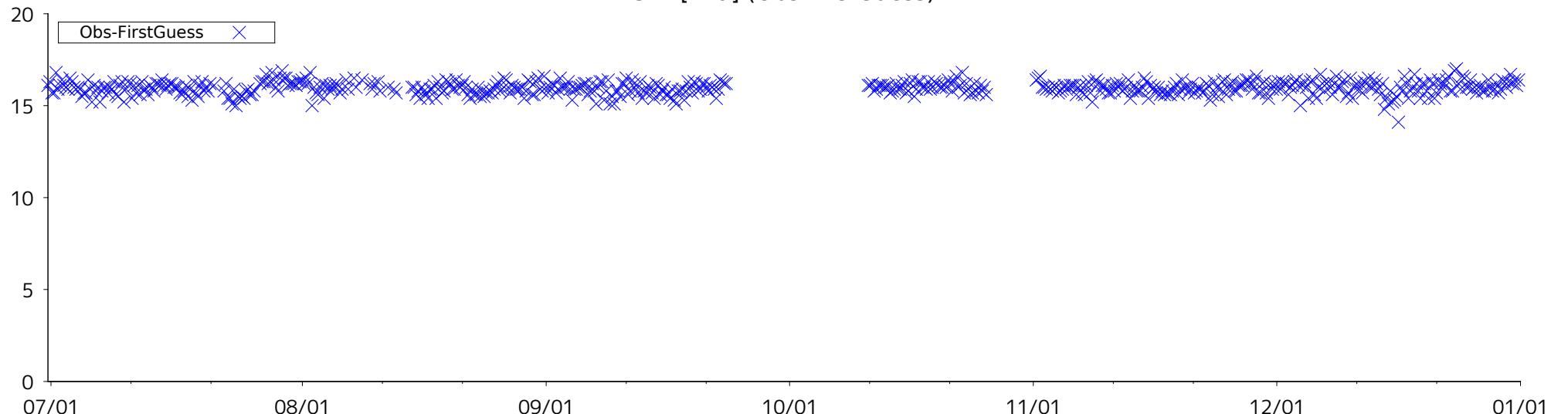
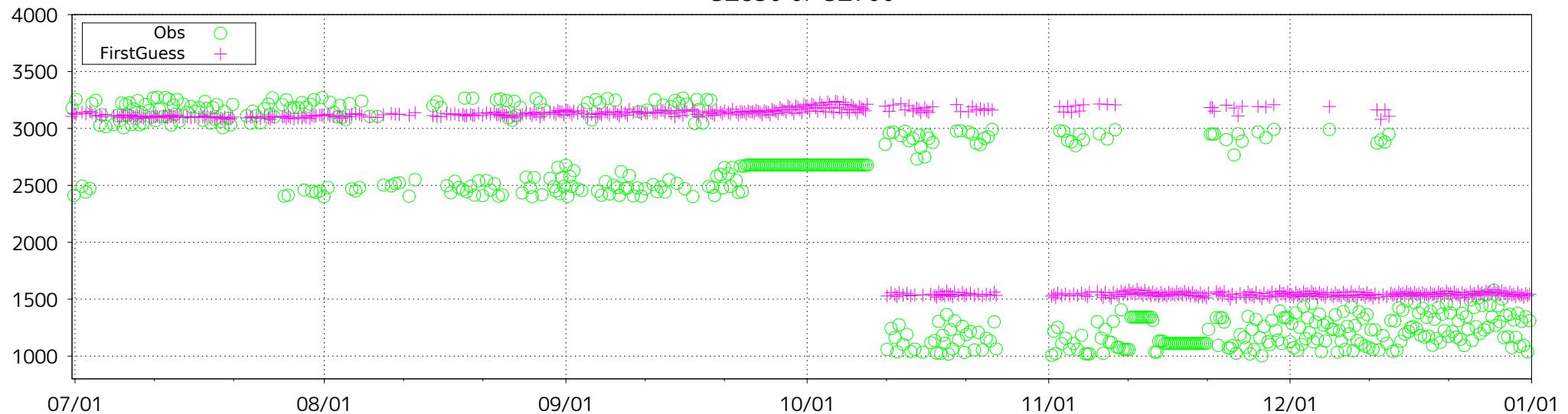


Figure 29(a) Time-series representation of SLP Obs minus FirstGuess for station 41315

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

GZ850 or GZ700



GZ850 or GZ700 (Obs-FirstGuess)

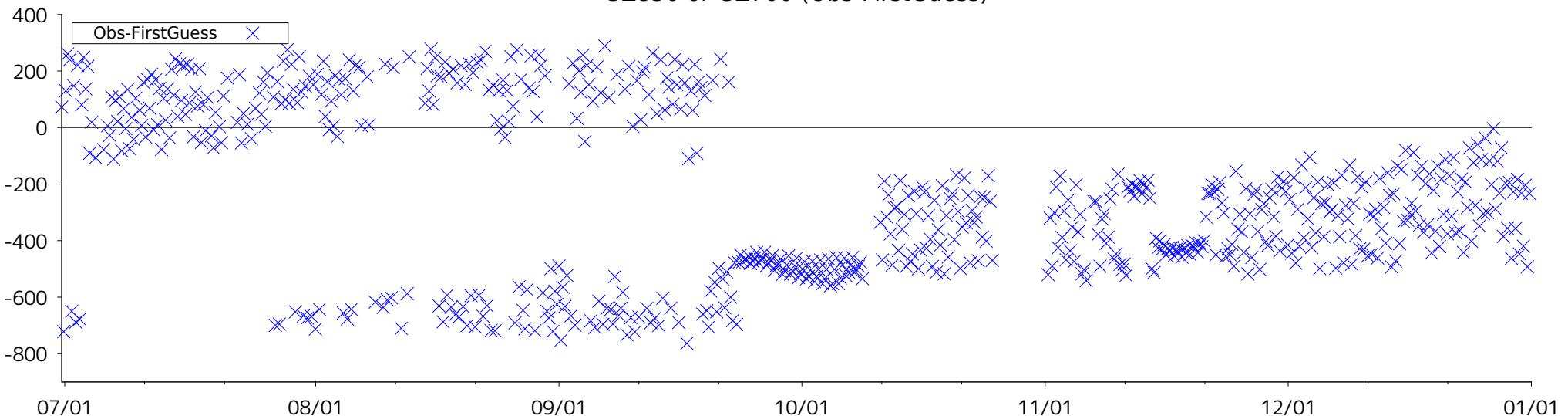
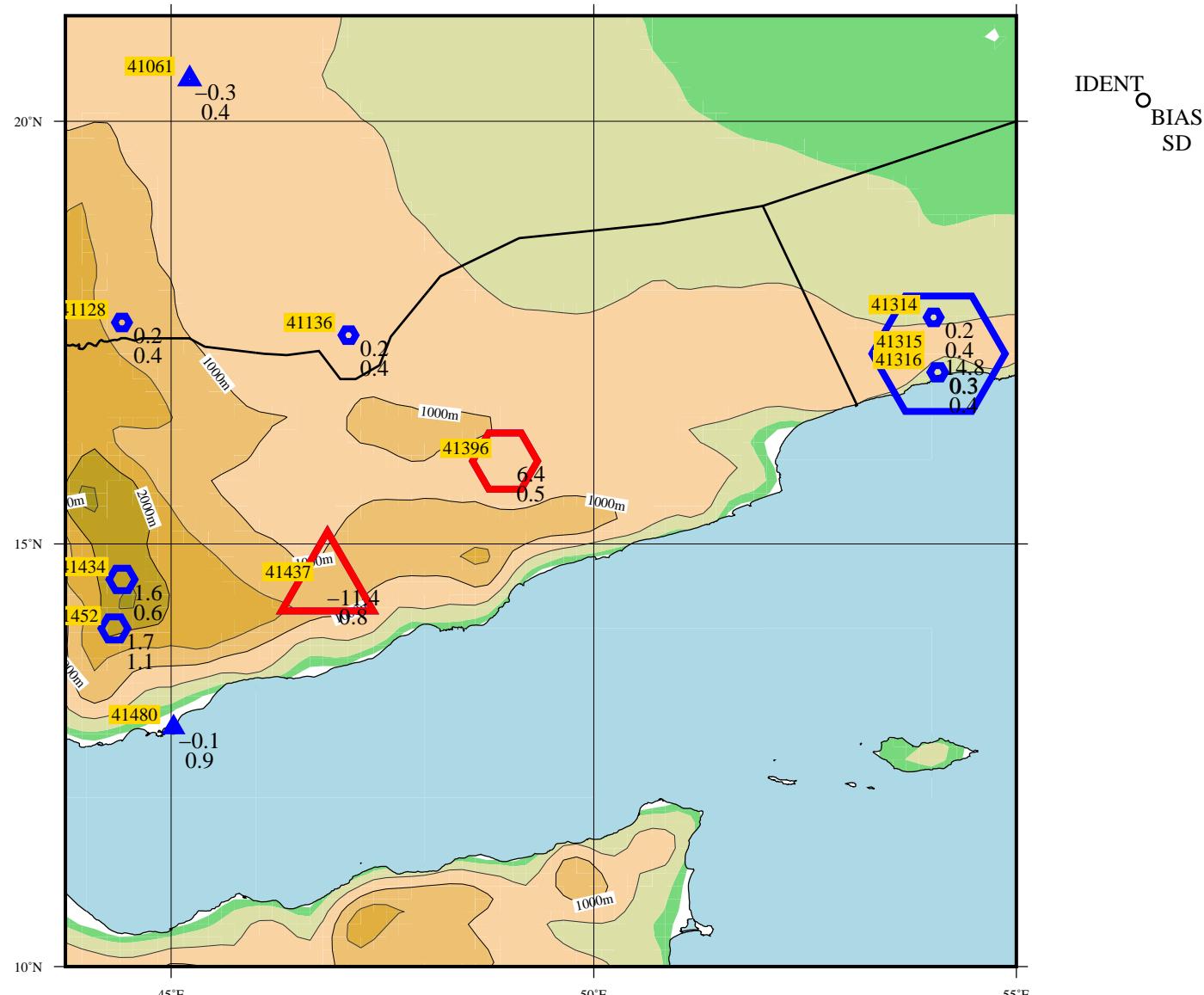


Figure 29(b) Time-series representation of GZ850 or GZ700 Obs minus FirstGuess for station 41315

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
O BIAS
SD

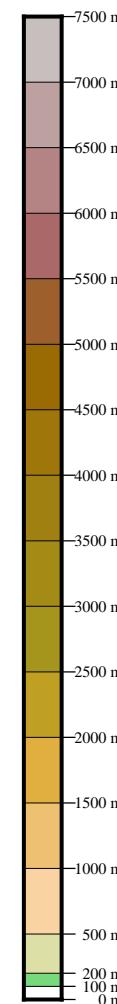


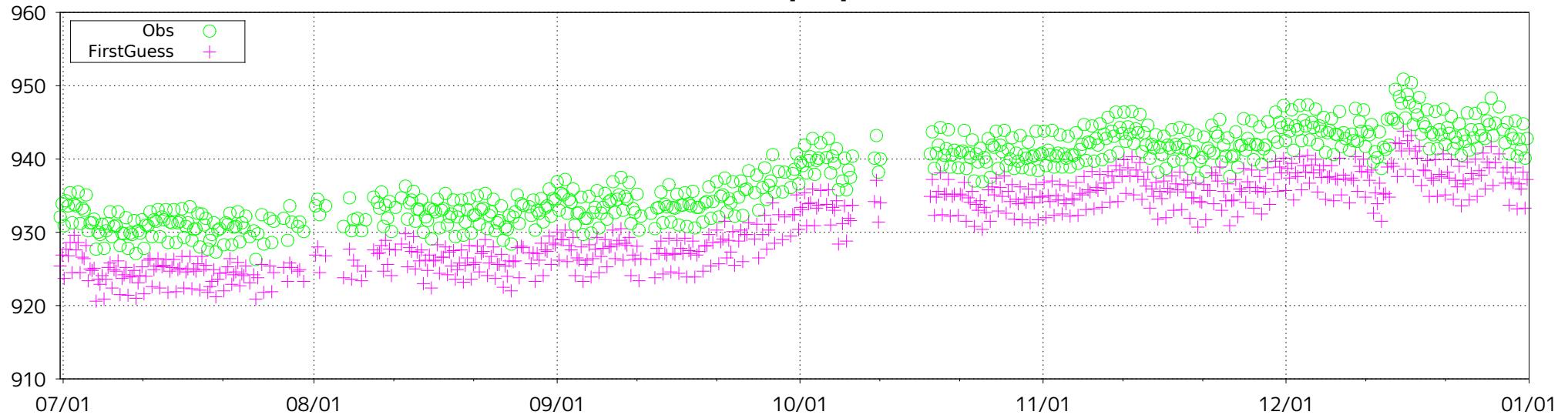
Figure 30 BIAS and SD of SLP for station 41396, 41437 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

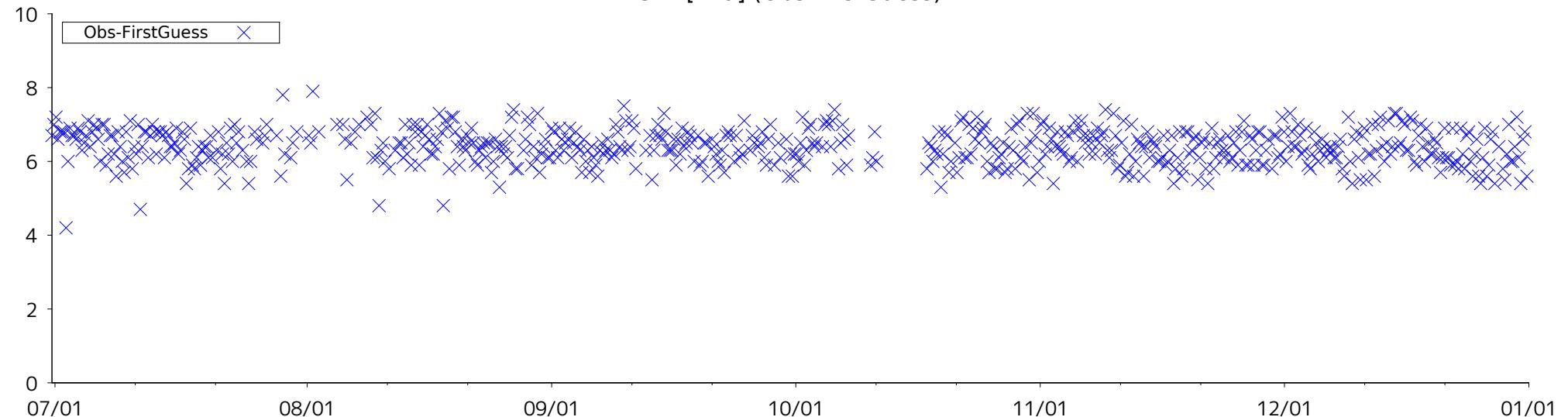


Figure 31 Time-series representation of SLP Obs minus FirstGuess for station 41396

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)

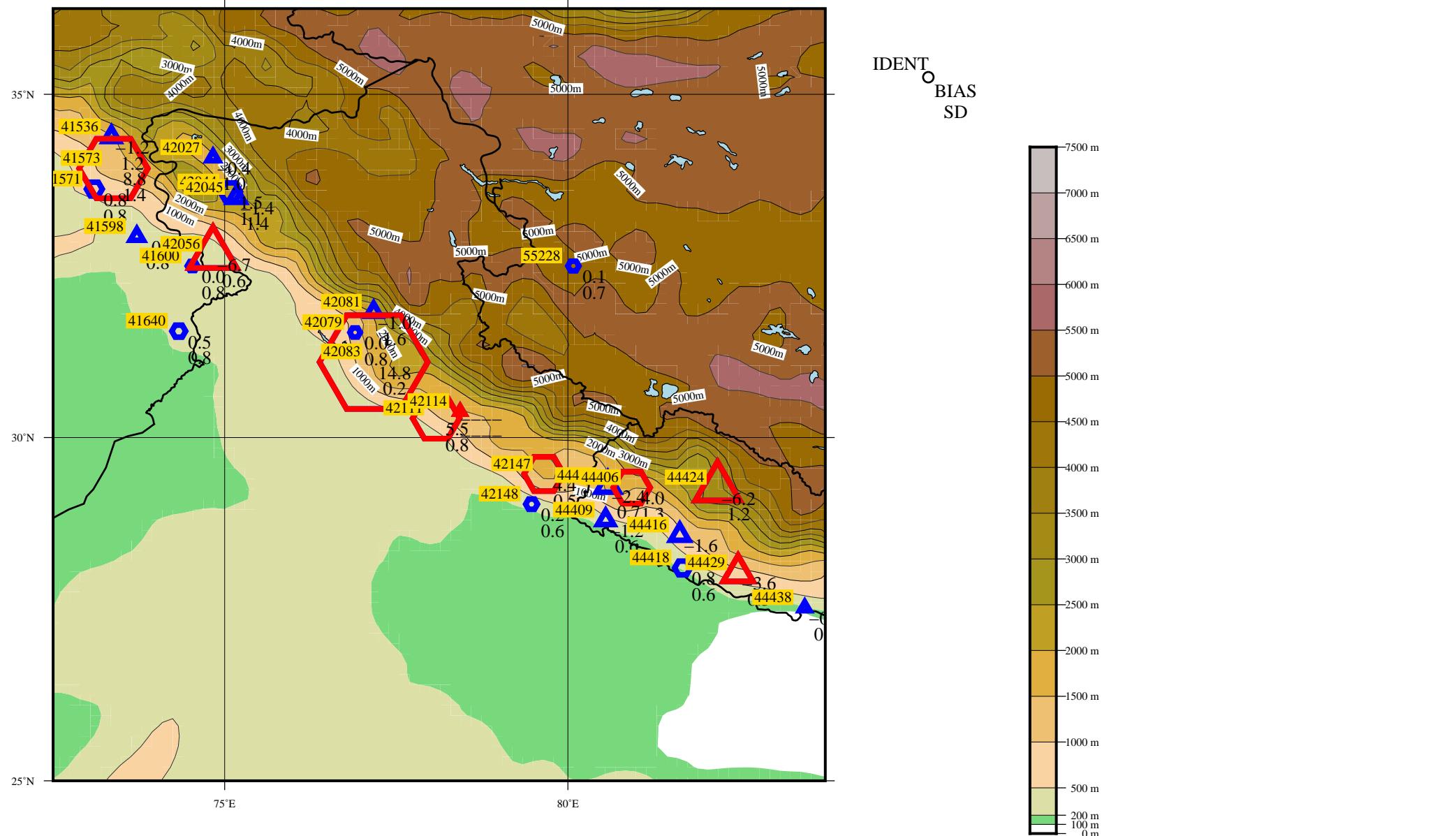
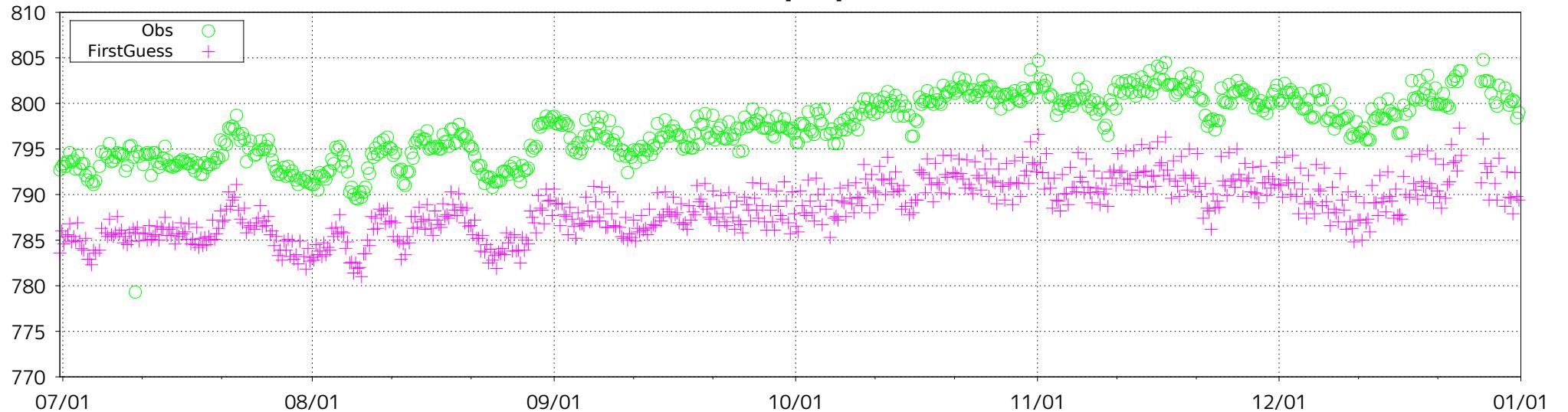


Figure 32 BIAS and SD of SLP for station 41573, 42056, 42083, 42111, 42114, 42147, 44406, 44424, 44429 (red) and surrounding stations (blue).
 The number to the upper left of each symbol is the WMO IDENT, and those to the lower right are the values of BIAS and SD.
 The size of each symbol is proportional 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)

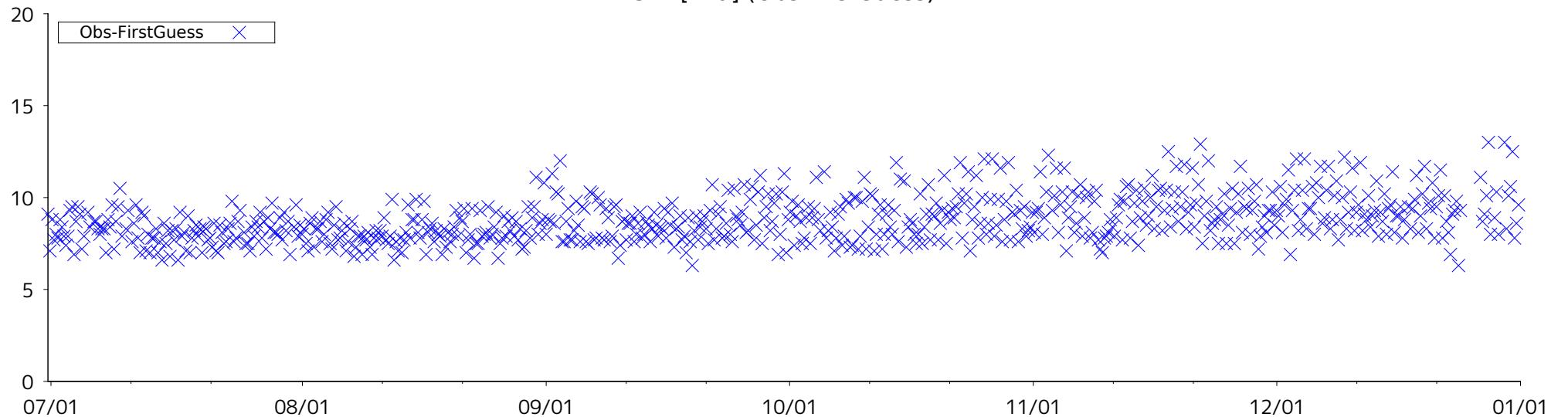
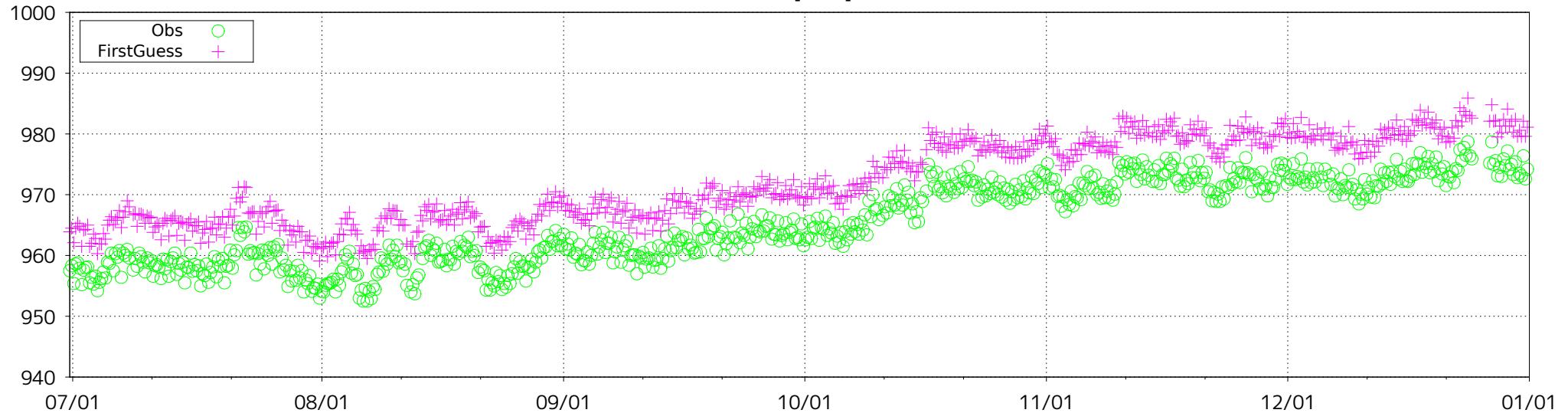


Figure 33 Time-series representation of SLP Obs minus FirstGuess for station 41573

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

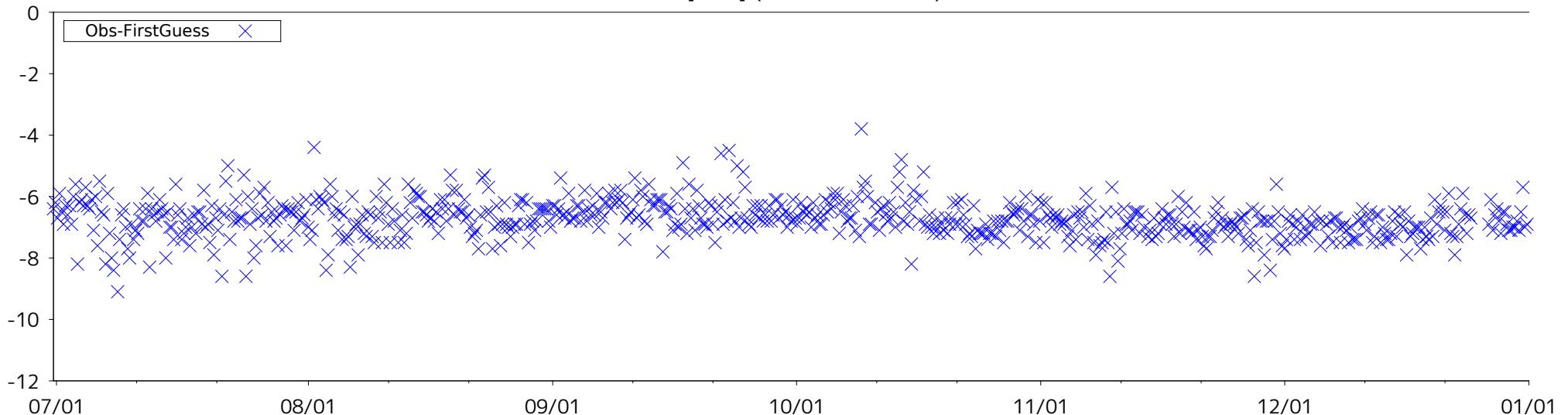
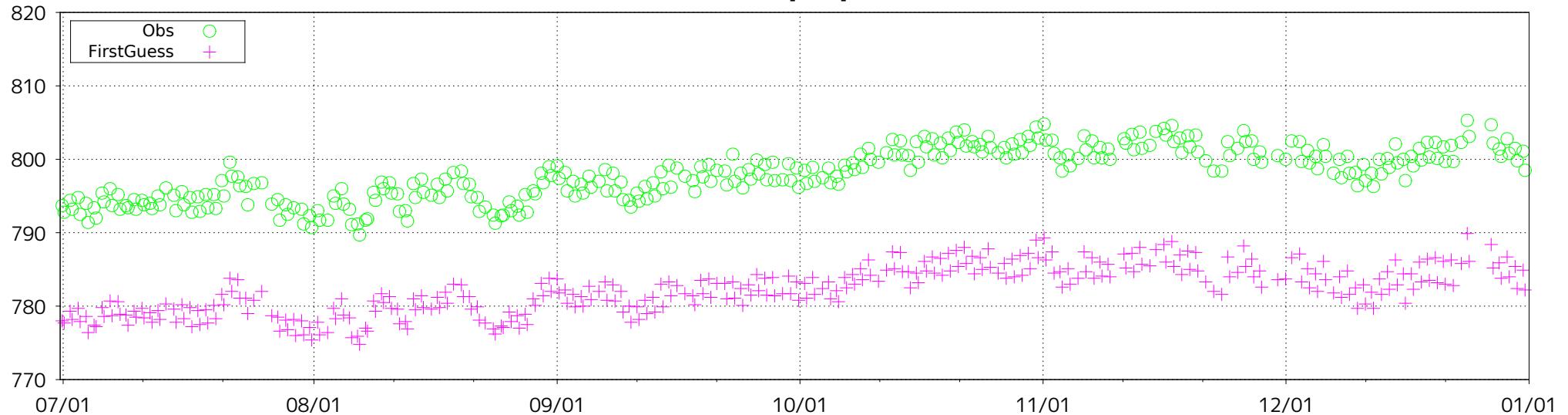


Figure 34 Time-series representation of SLP Obs minus FirstGuess for station 42056

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

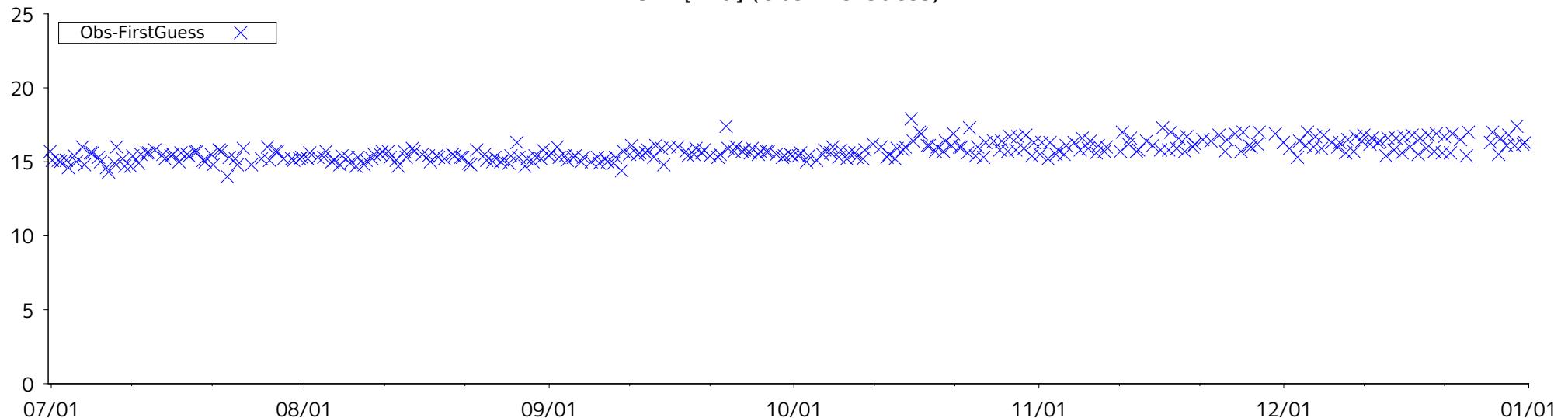
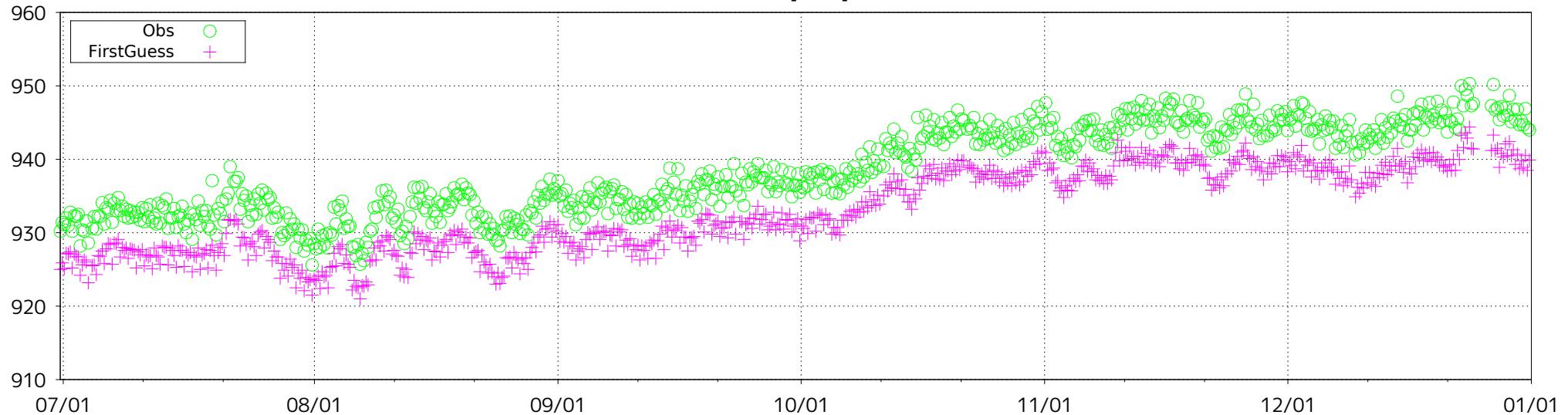


Figure 35 Time-series representation of SLP Obs minus FirstGuess for station 42083

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

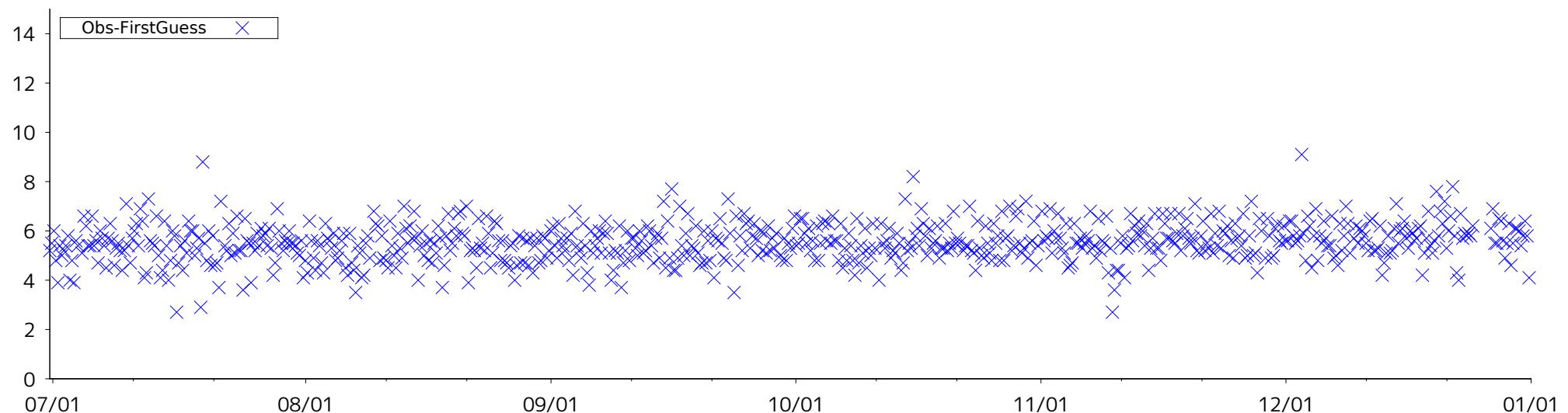
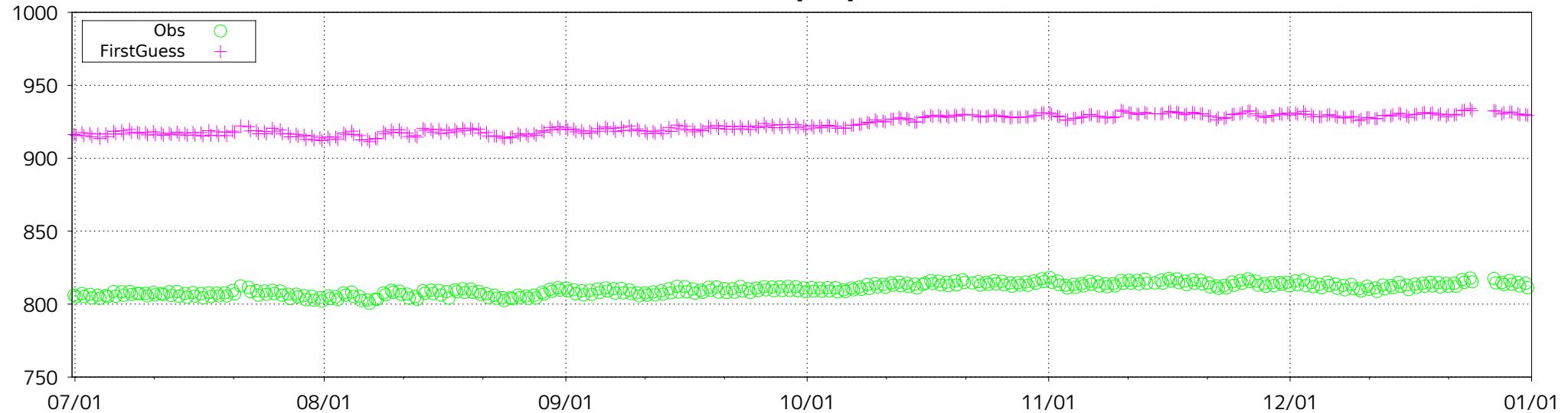


Figure 36 Time-series representation of SLP Obs minus FirstGuess for station 42111

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

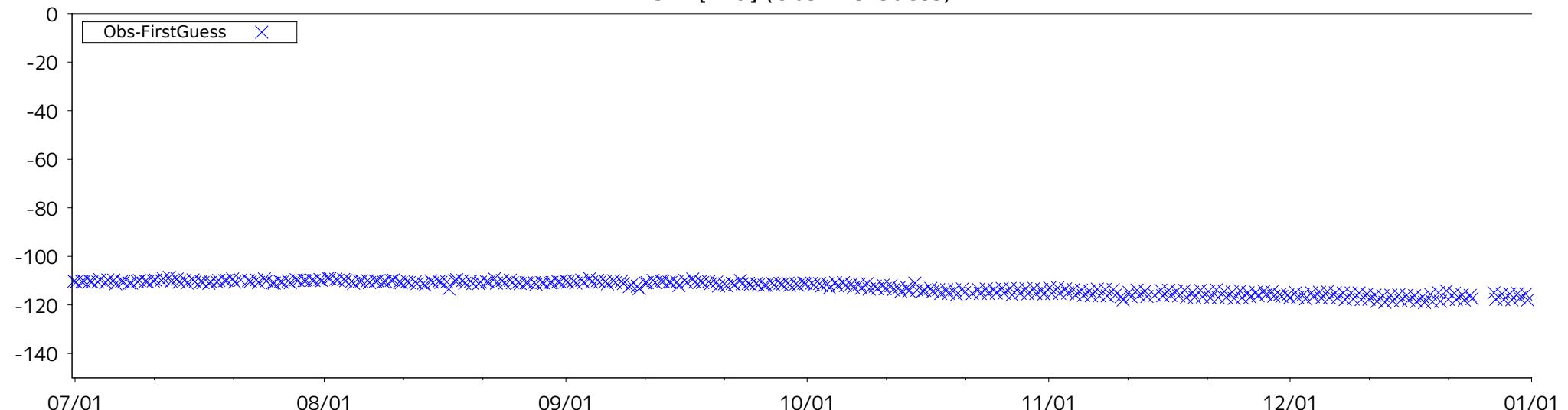
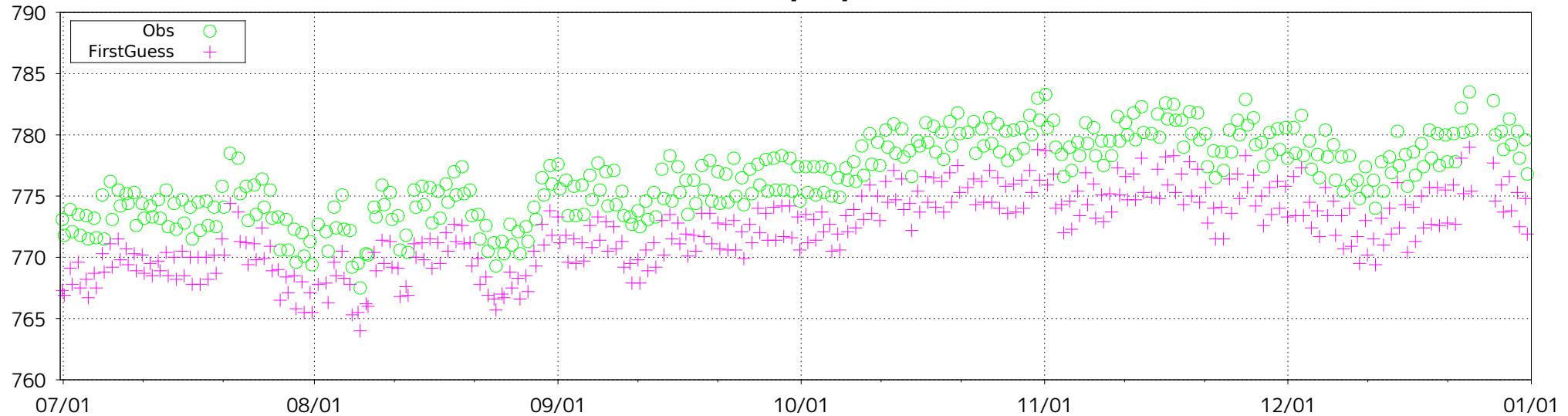


Figure 37 Time-series representation of SLP Obs minus FirstGuess for station 42114

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

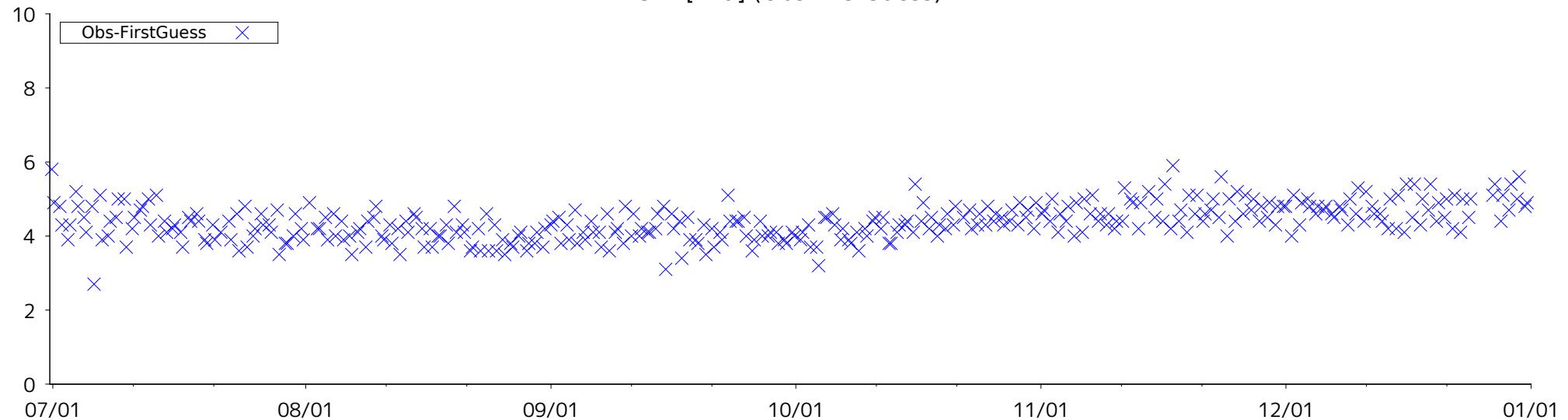
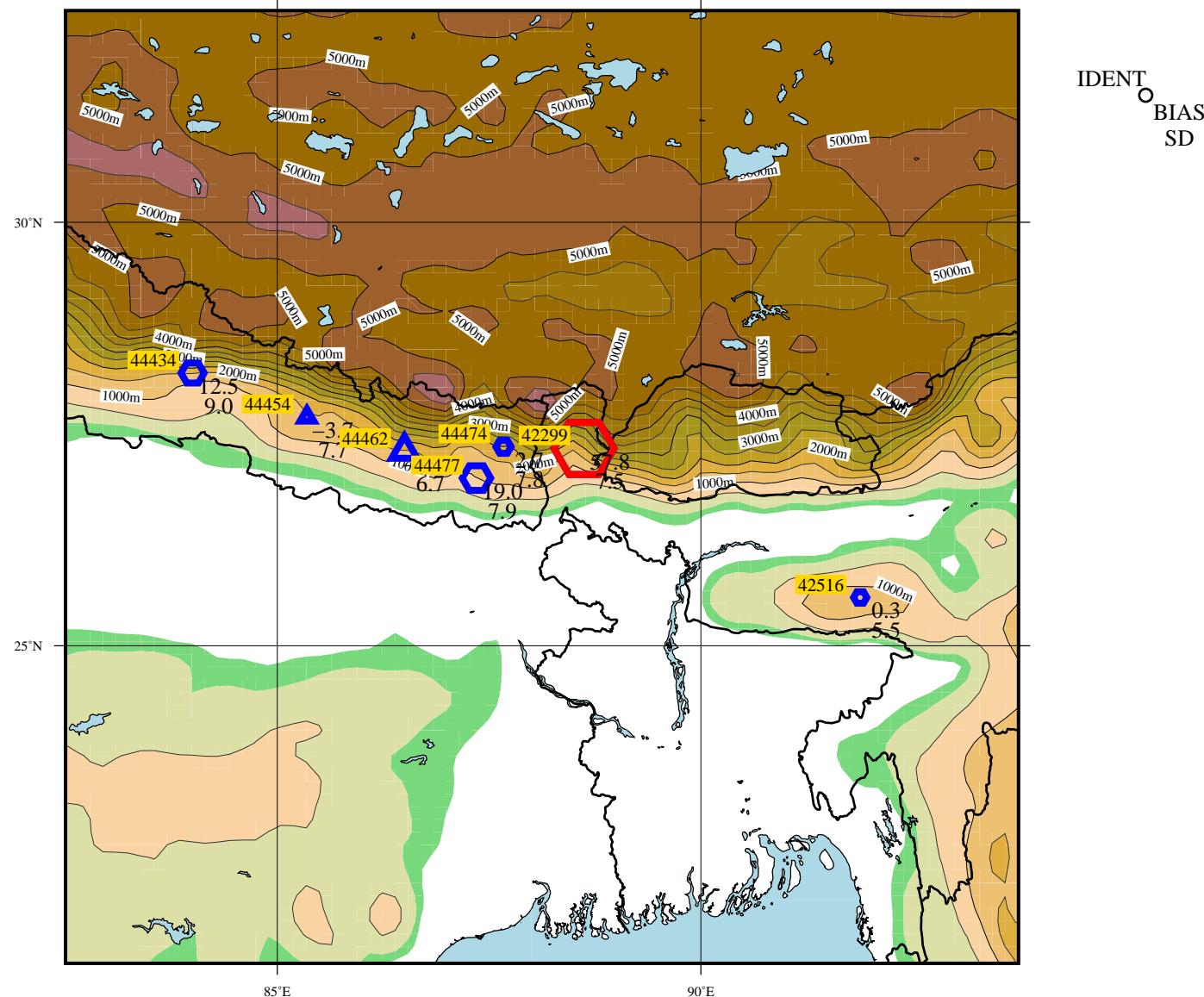


Figure 38 Time-series representation of SLP Obs minus FirstGuess for station 42147

LEVEL = SUR ELEMENT = GZ
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

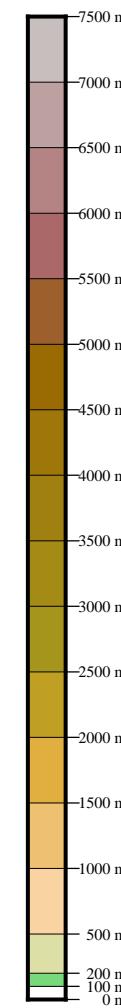


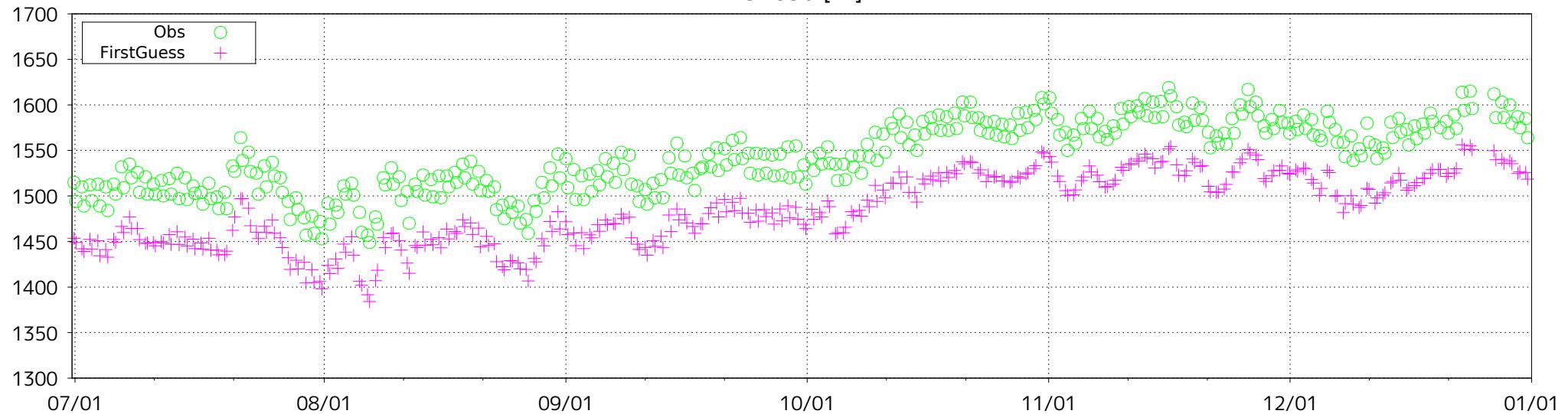
Figure 39 BIAS and SD of GZ for station 42299 (red) and surrounding stations (blue).

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

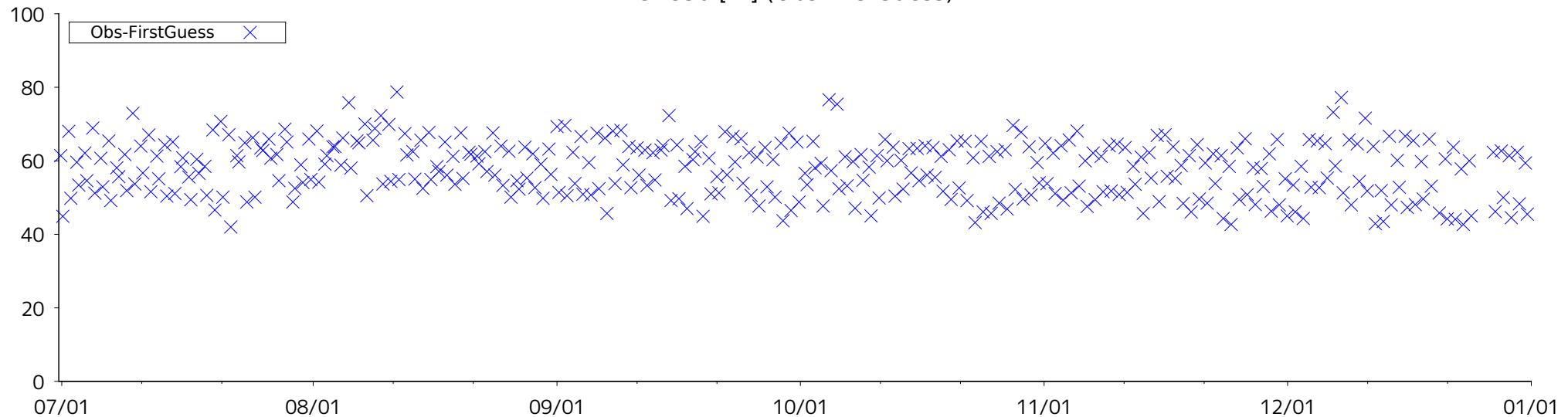
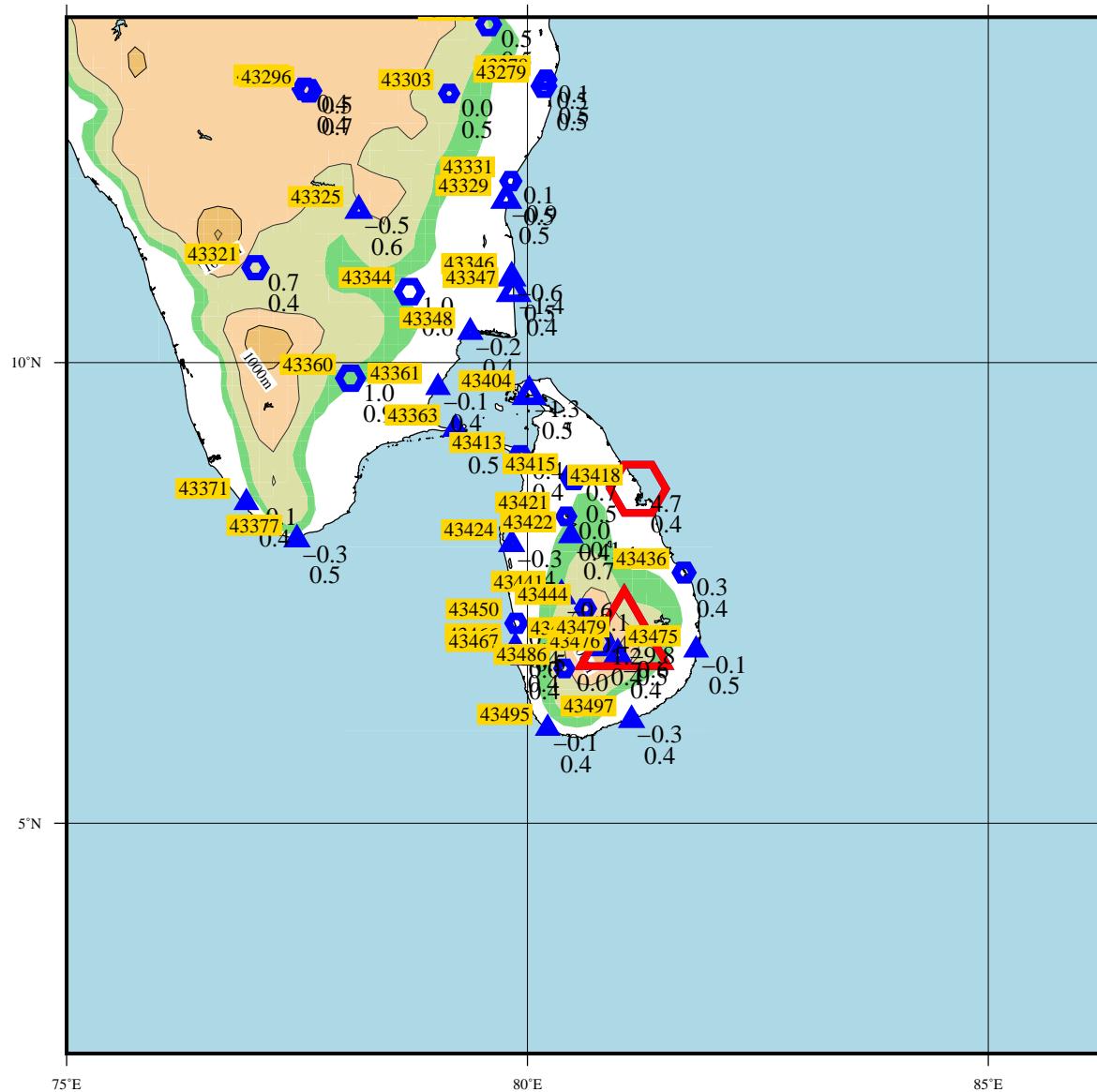


Figure 40 Time-series representation of GZ850 Obs minus FirstGuess for station 42299

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
O BIAS
SD

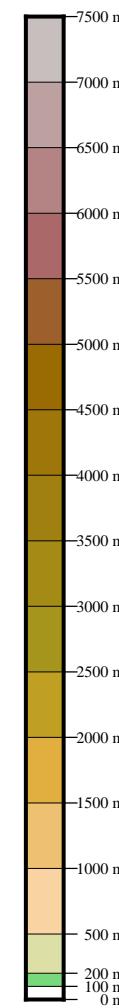


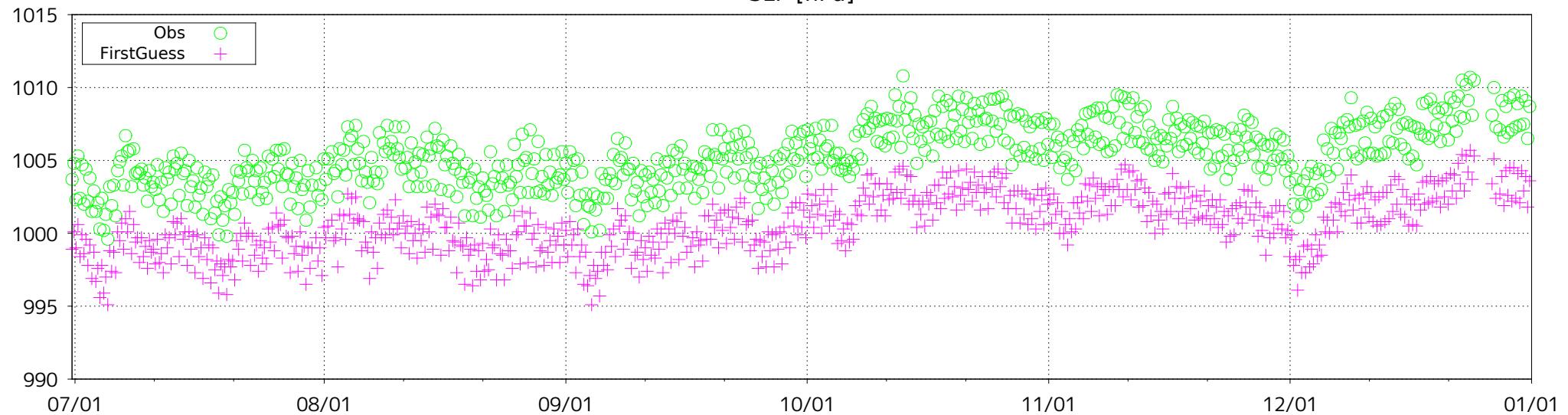
Figure 41 BIAS and SD of SLP for station 43418, 43479 (red) and surrounding stations (blue).

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: 43418 (lat: 8.6N, lon: 81.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

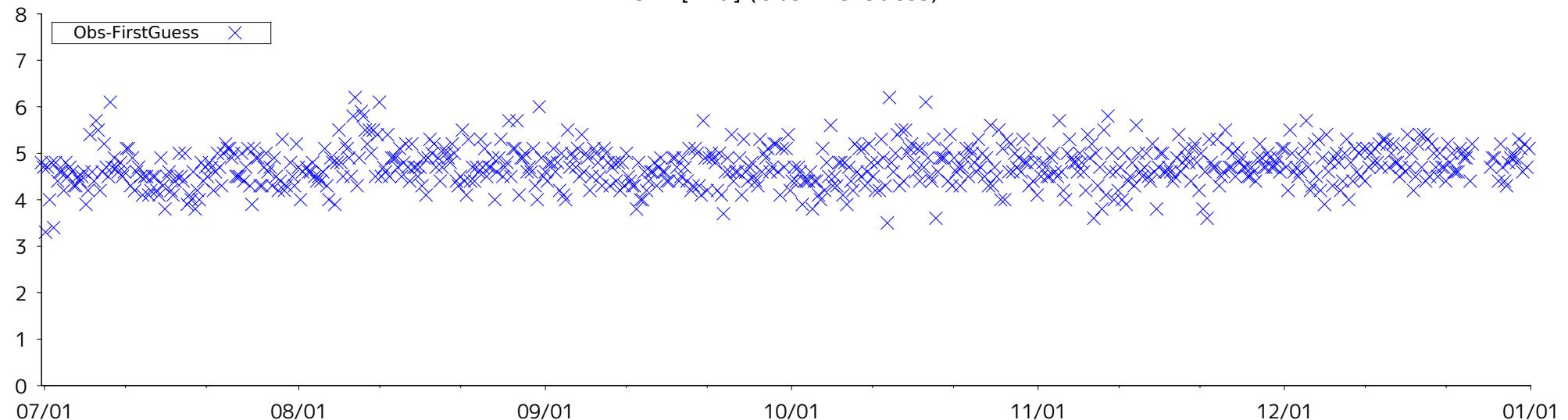
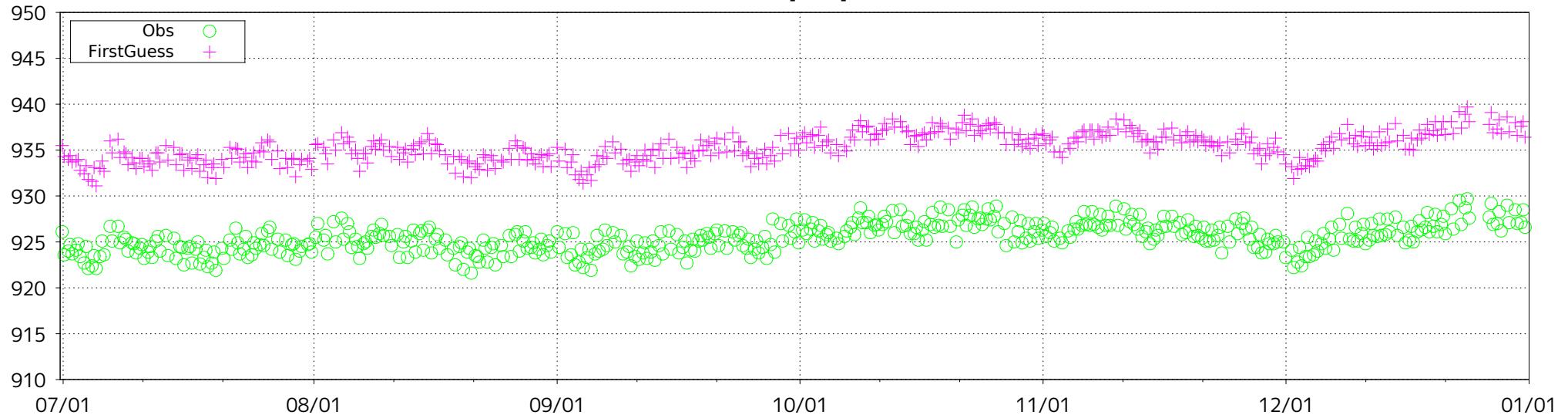


Figure 42 Time-series representation of SLP Obs minus FirstGuess for station 43418

ID: 43479 (lat: 7.0N, lon: 81.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

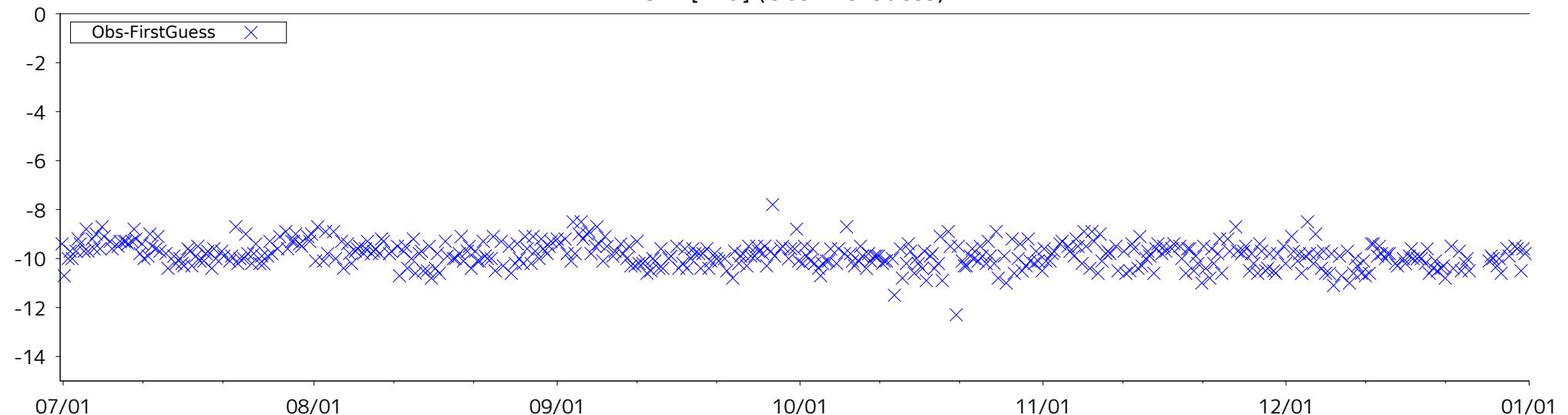
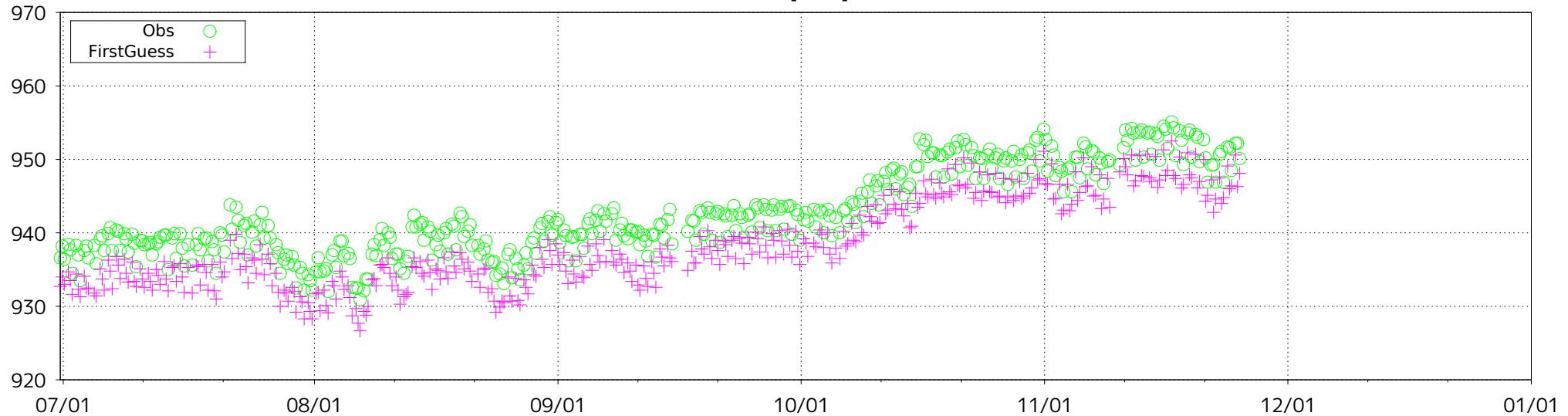


Figure 43 Time-series representation of SLP Obs minus FirstGuess for station 43479

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

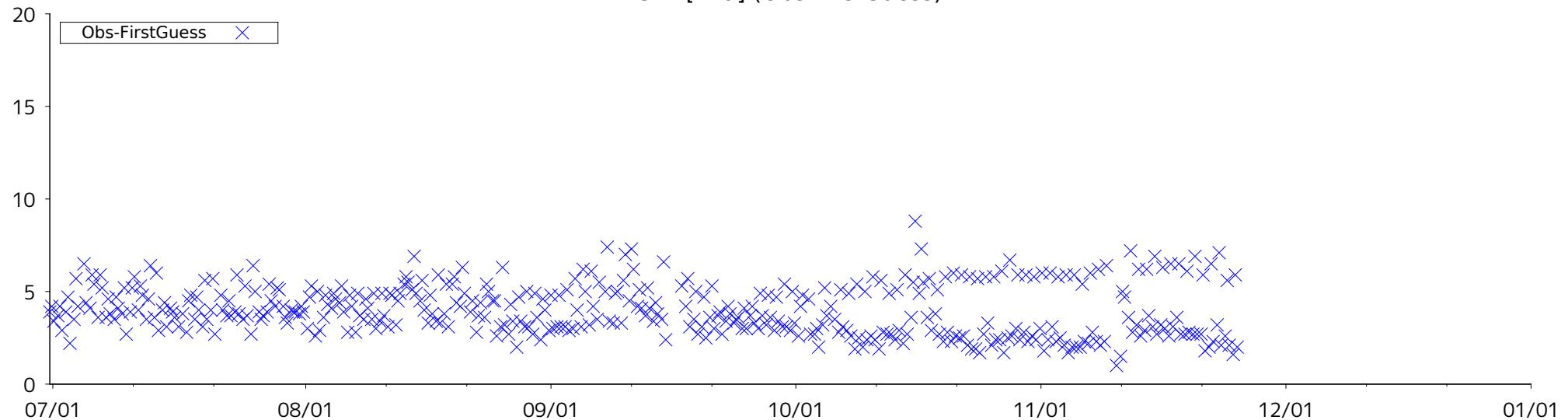
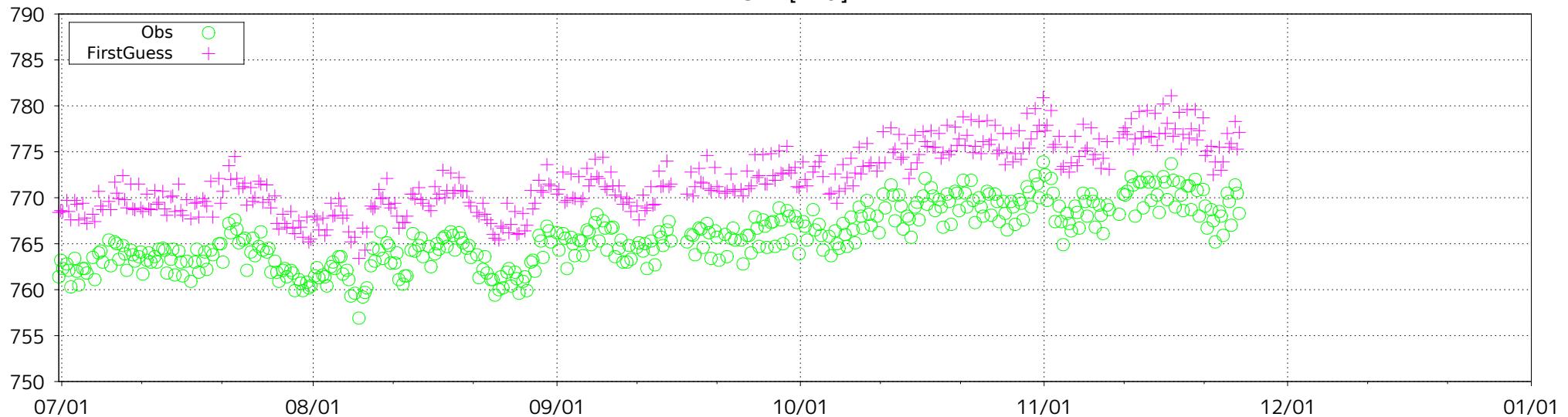


Figure 44 Time-series representation of SLP Obs minus FirstGuess for station 44406

ID: 44424 (lat: 29.3N, lon: 82.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

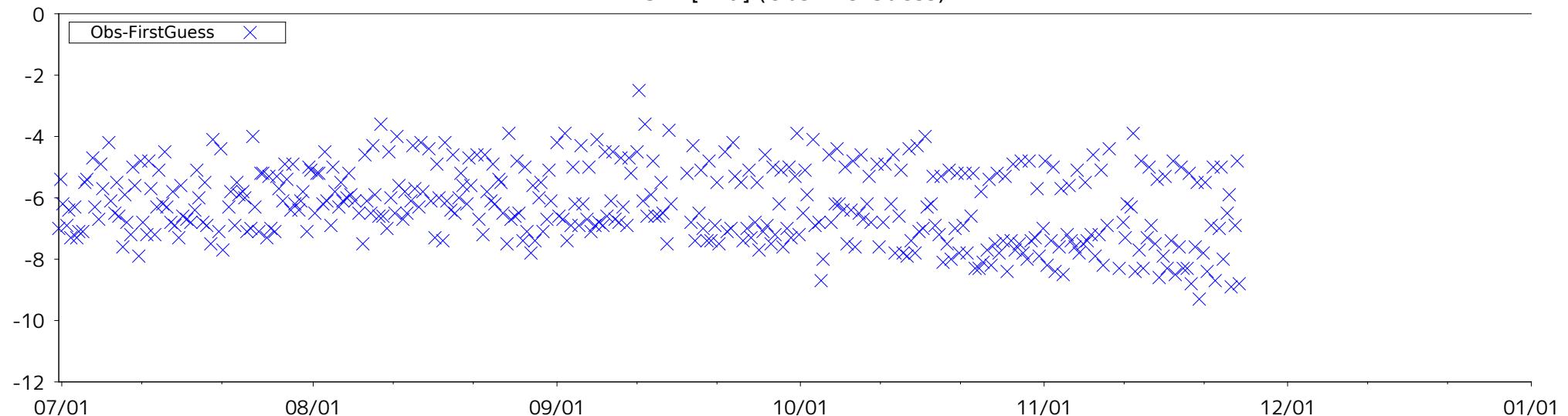
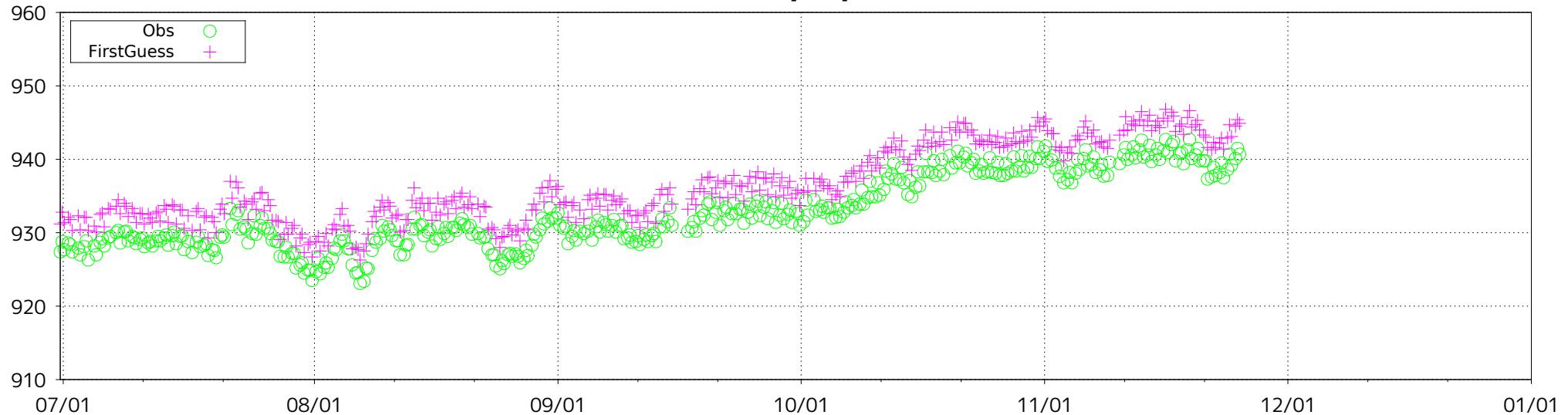


Figure 45 Time-series representation of SLP Obs minus FirstGuess for station 44424

ID: 44429 (lat: 28.0N, lon: 82.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

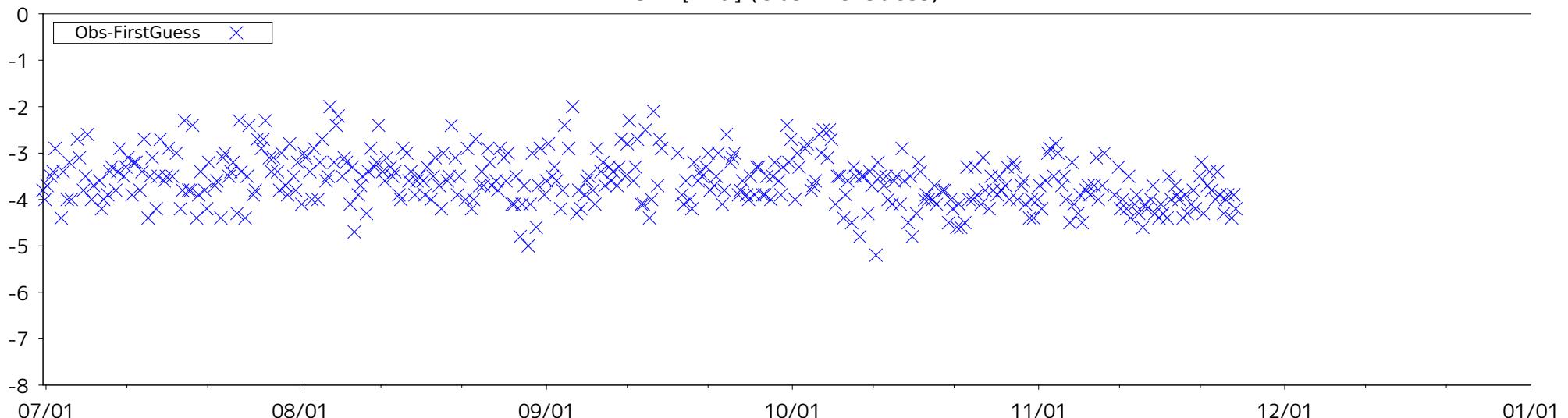
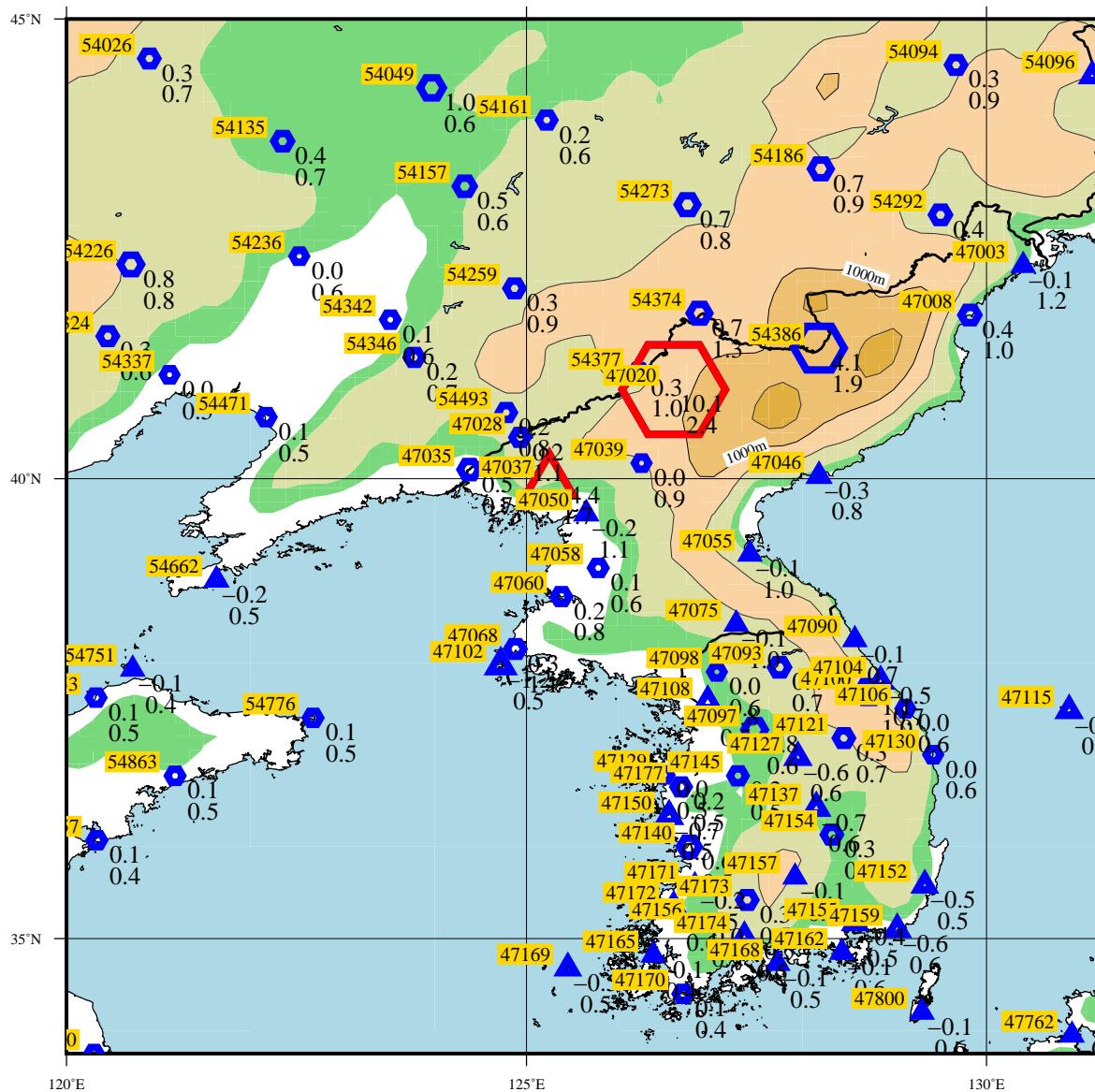


Figure 46 Time-series representation of SLP Obs minus FirstGuess for station 44429

LEVEL = SUR ELEMENT = MSLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



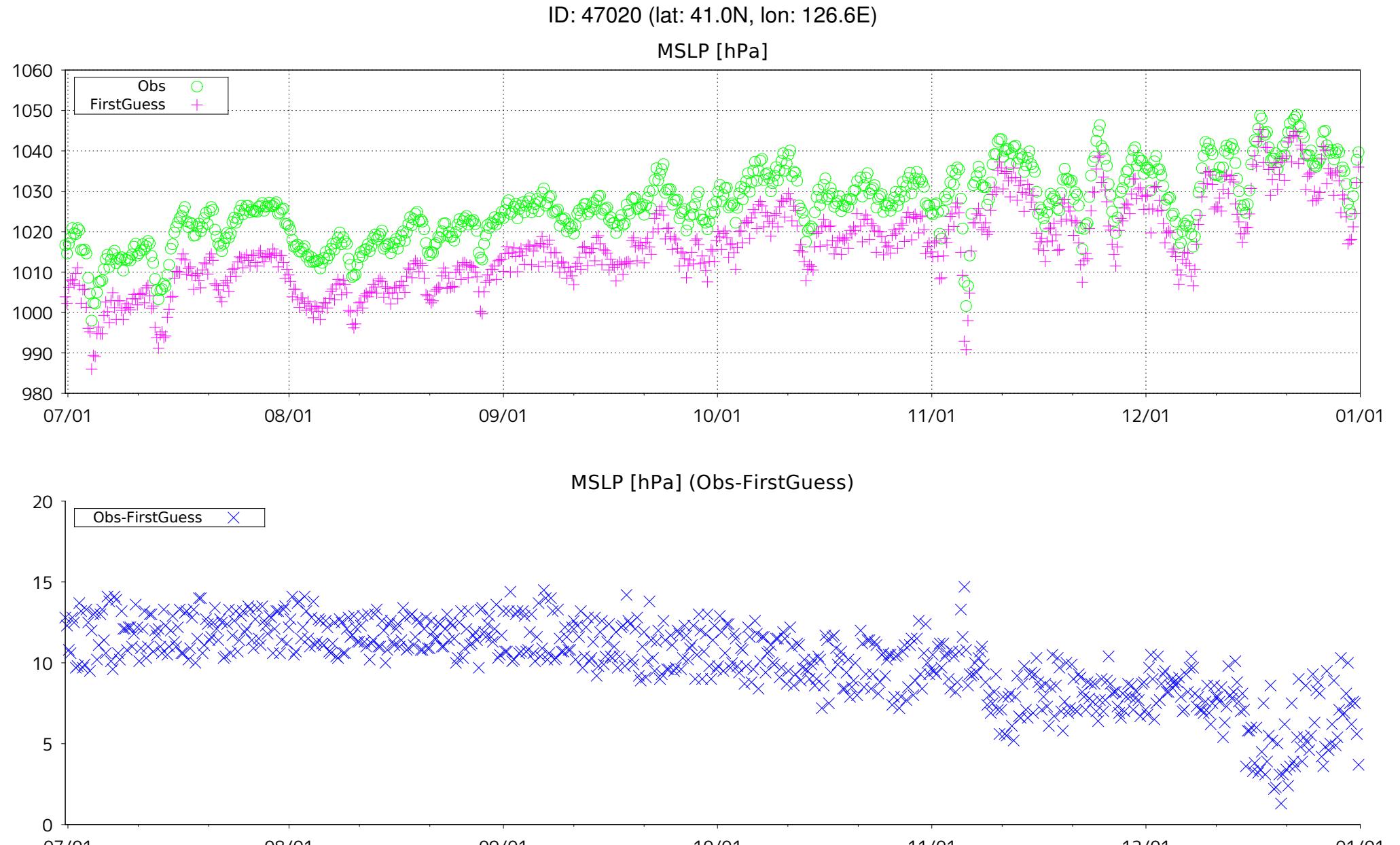
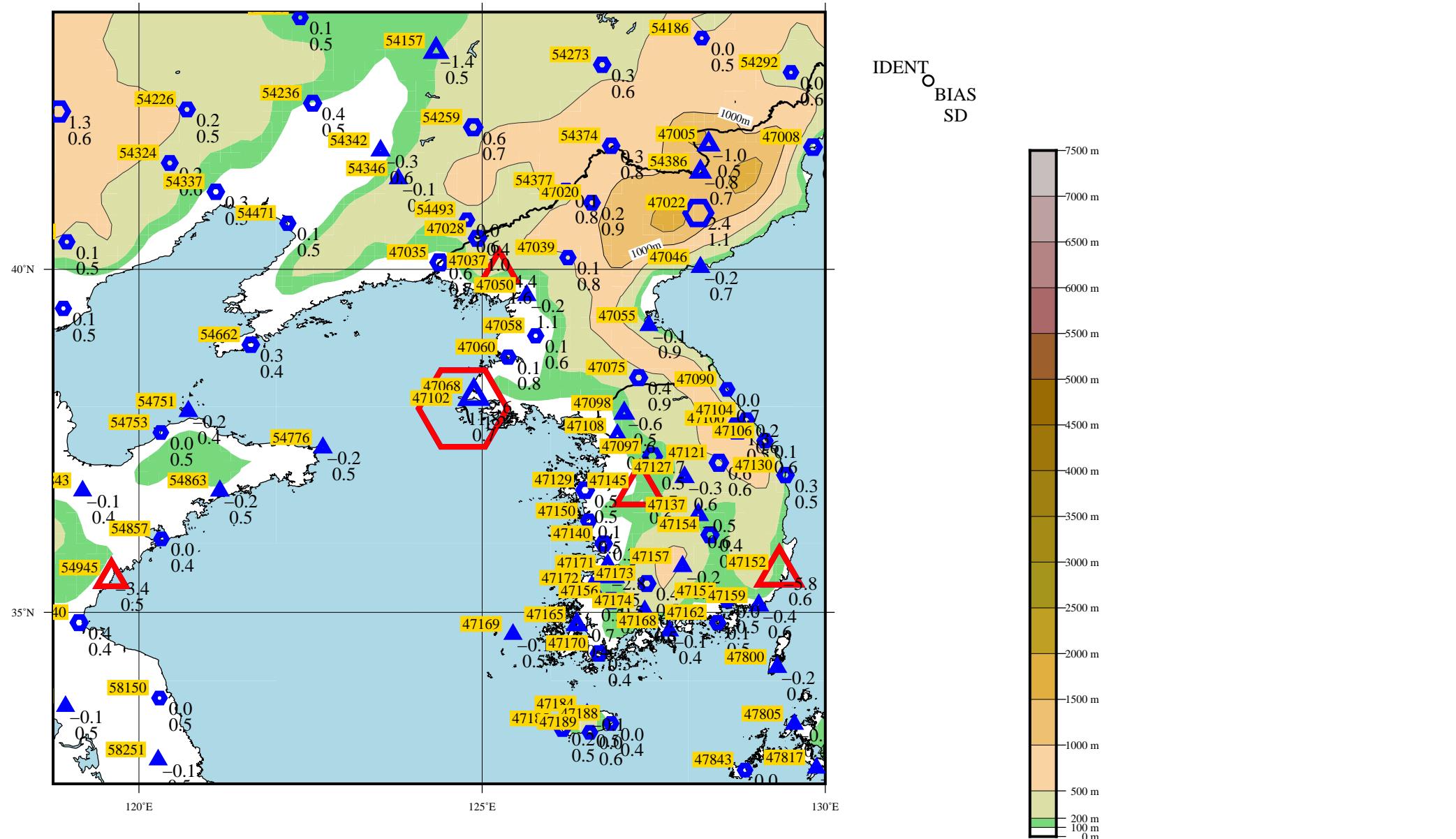


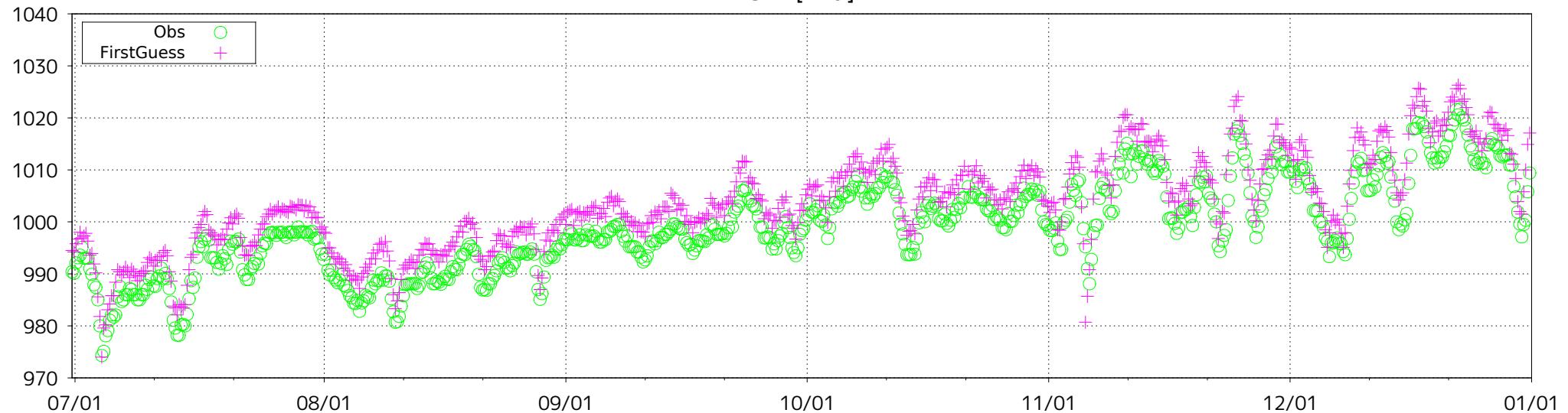
Figure 48 Time-series representation of MSLP Obs minus FirstGuess for station 47020

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

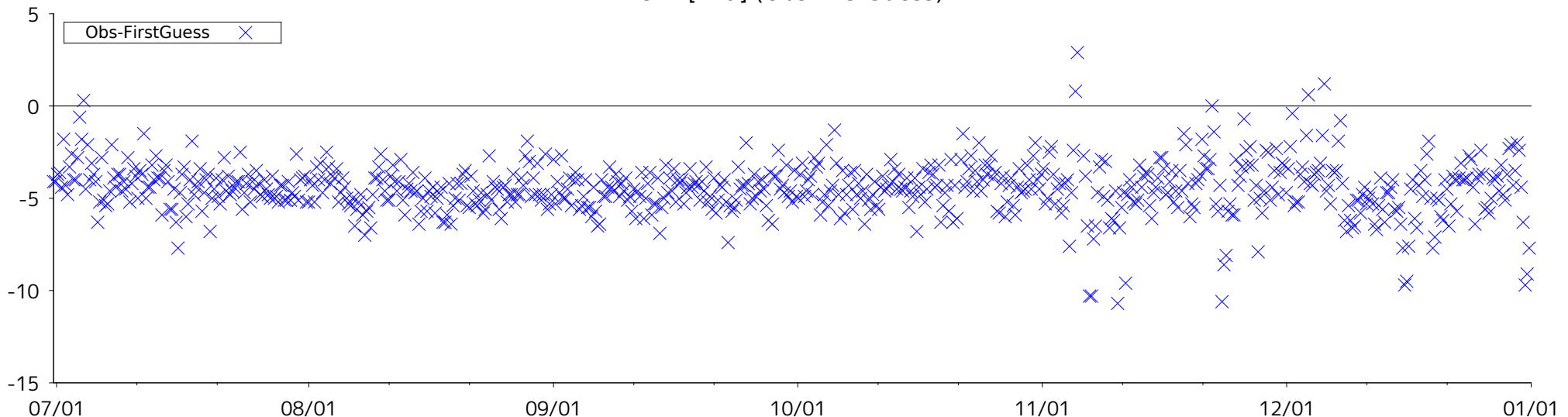
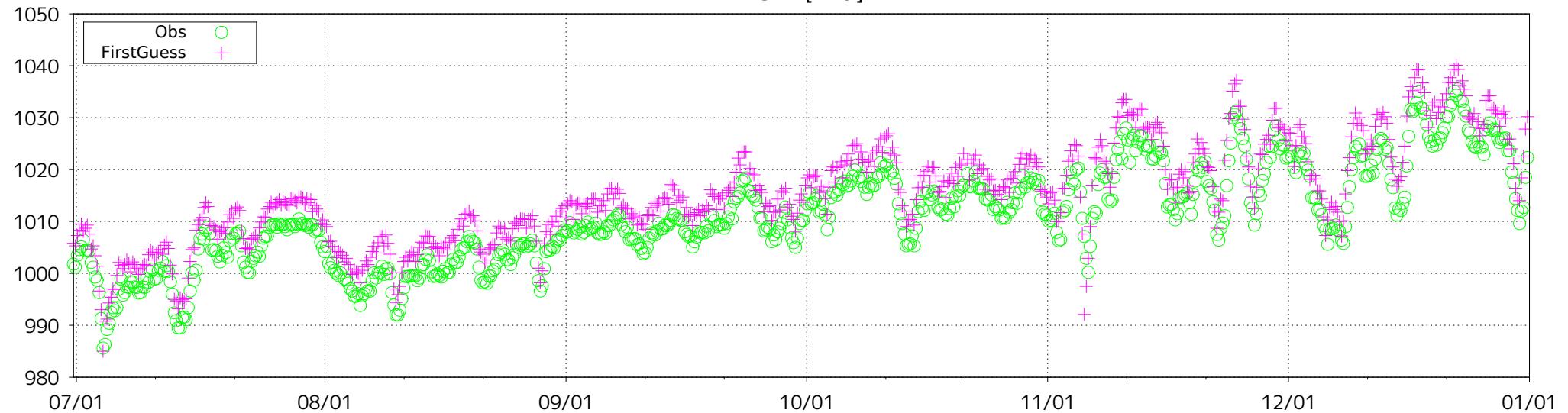


Figure 50(a) Time-series representation of SLP Obs minus FirstGuess for station 47037

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

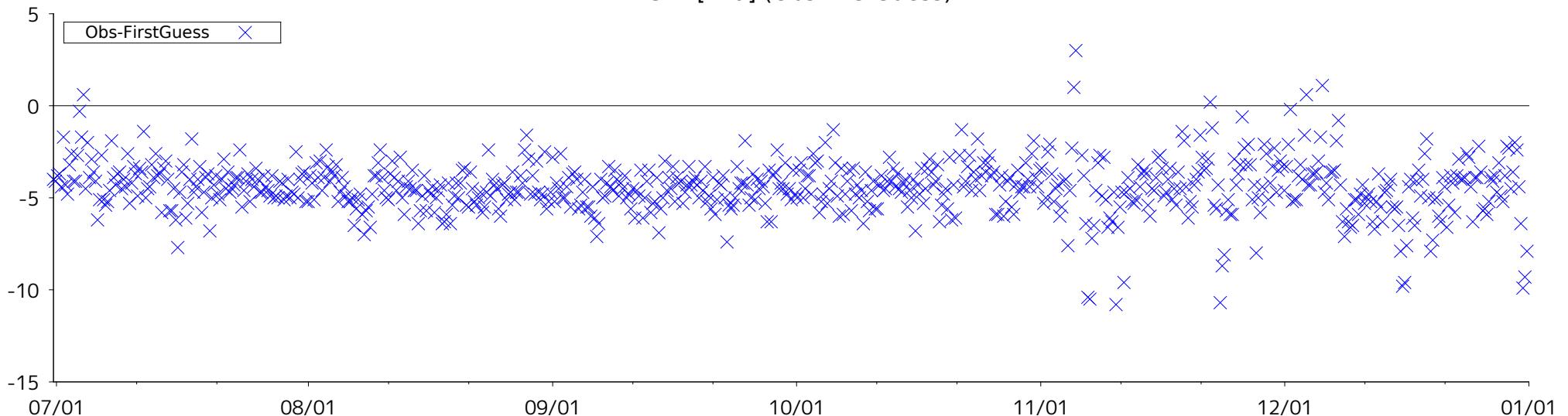
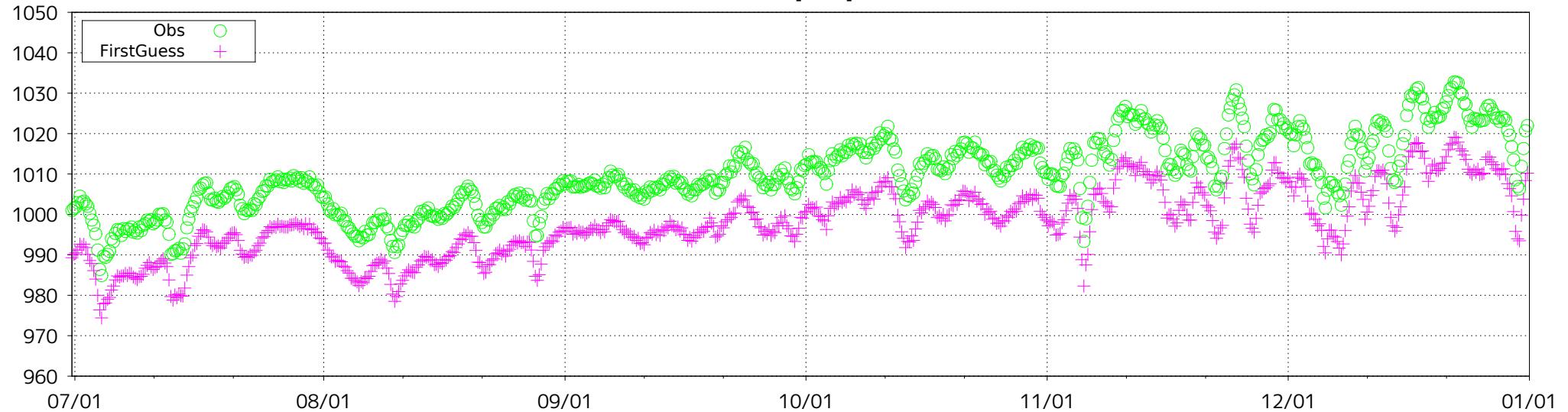


Figure 50(b) Time-series representation of MSLP Obs minus FirstGuess for station 47037

ID: 47102 (lat: 38.0N, lon: 124.7E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

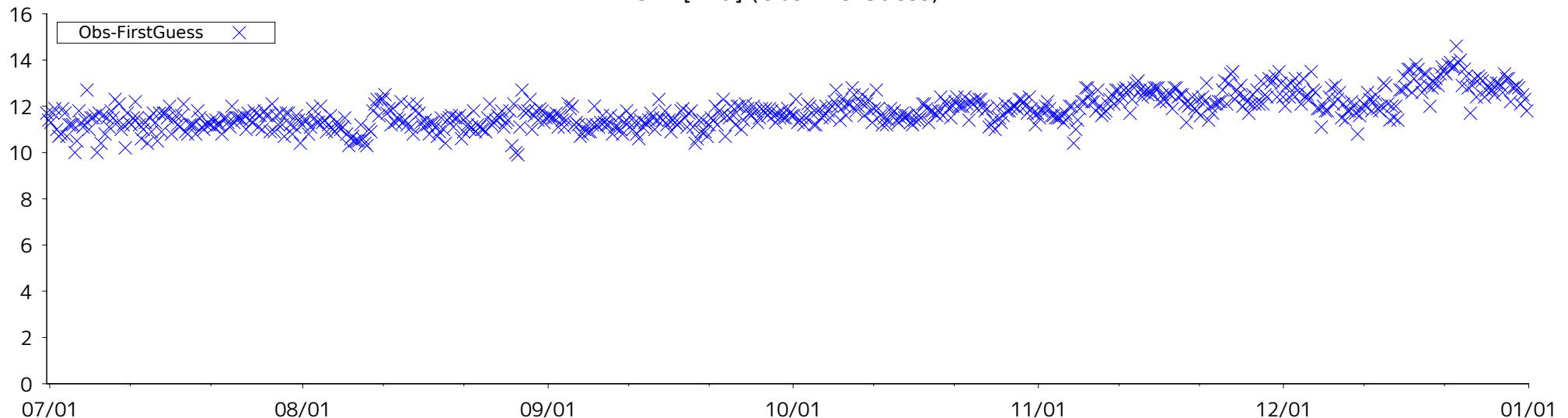
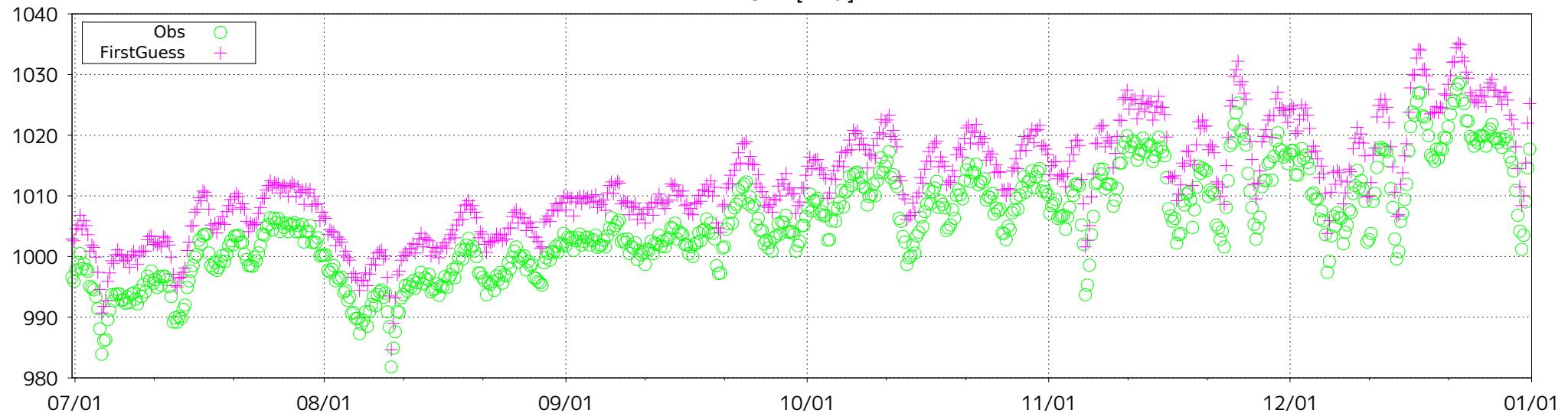


Figure 51 Time-series representation of SLP Obs minus FirstGuess for station 47102

ID: 47145 (lat: 36.8N, lon: 127.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

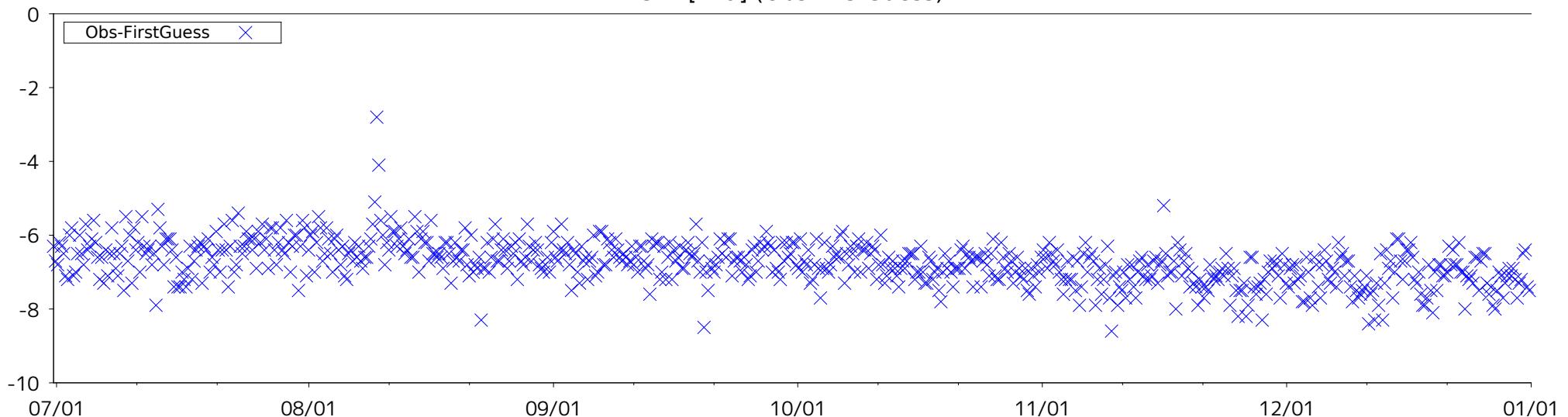
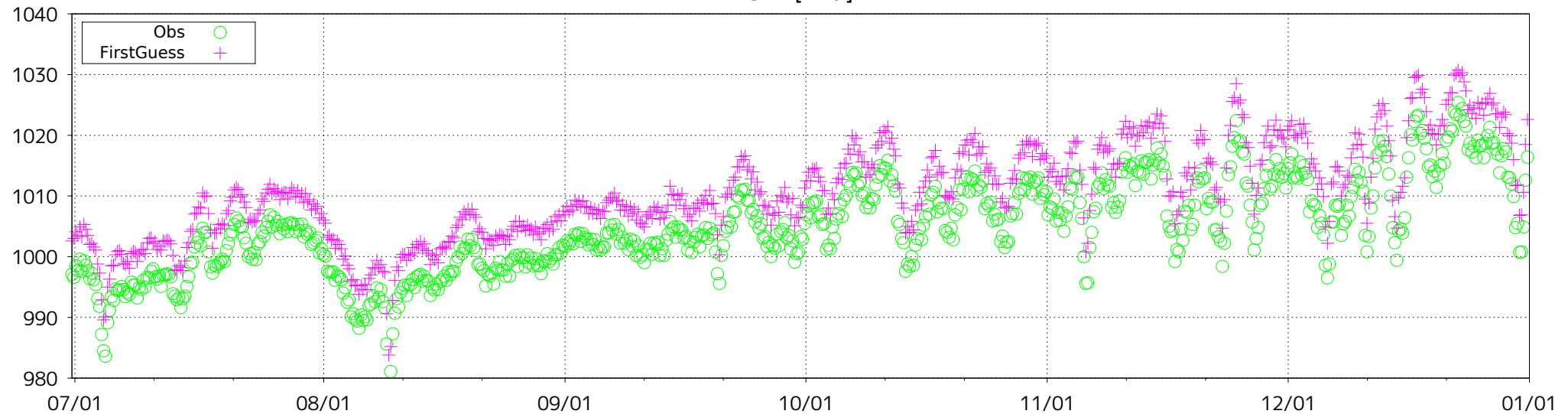


Figure 52 Time-series representation of SLP Obs minus FirstGuess for station 47145

ID: 47152 (lat: 35.6N, lon: 129.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

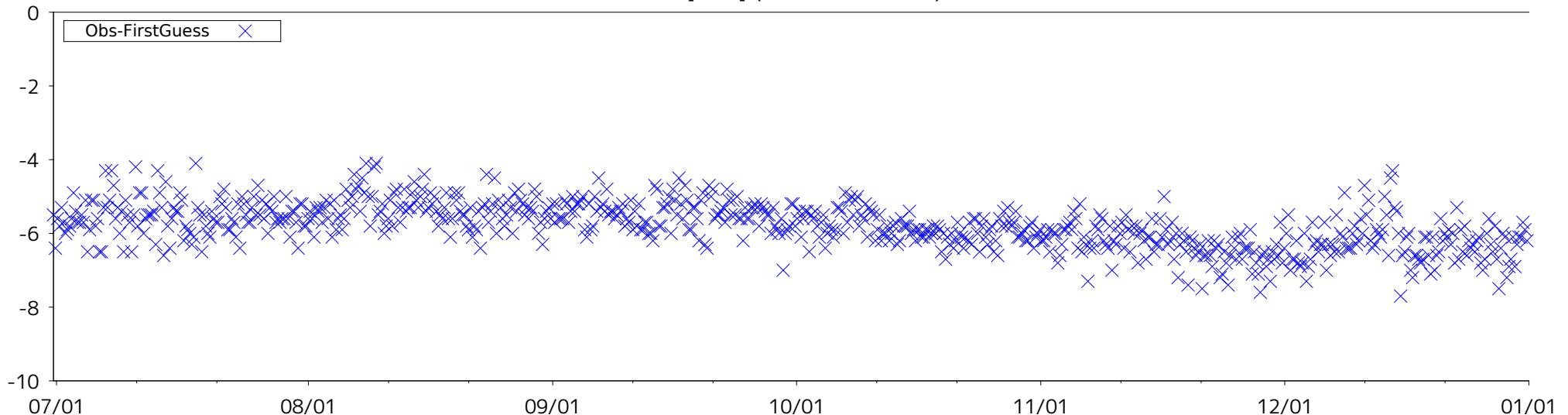
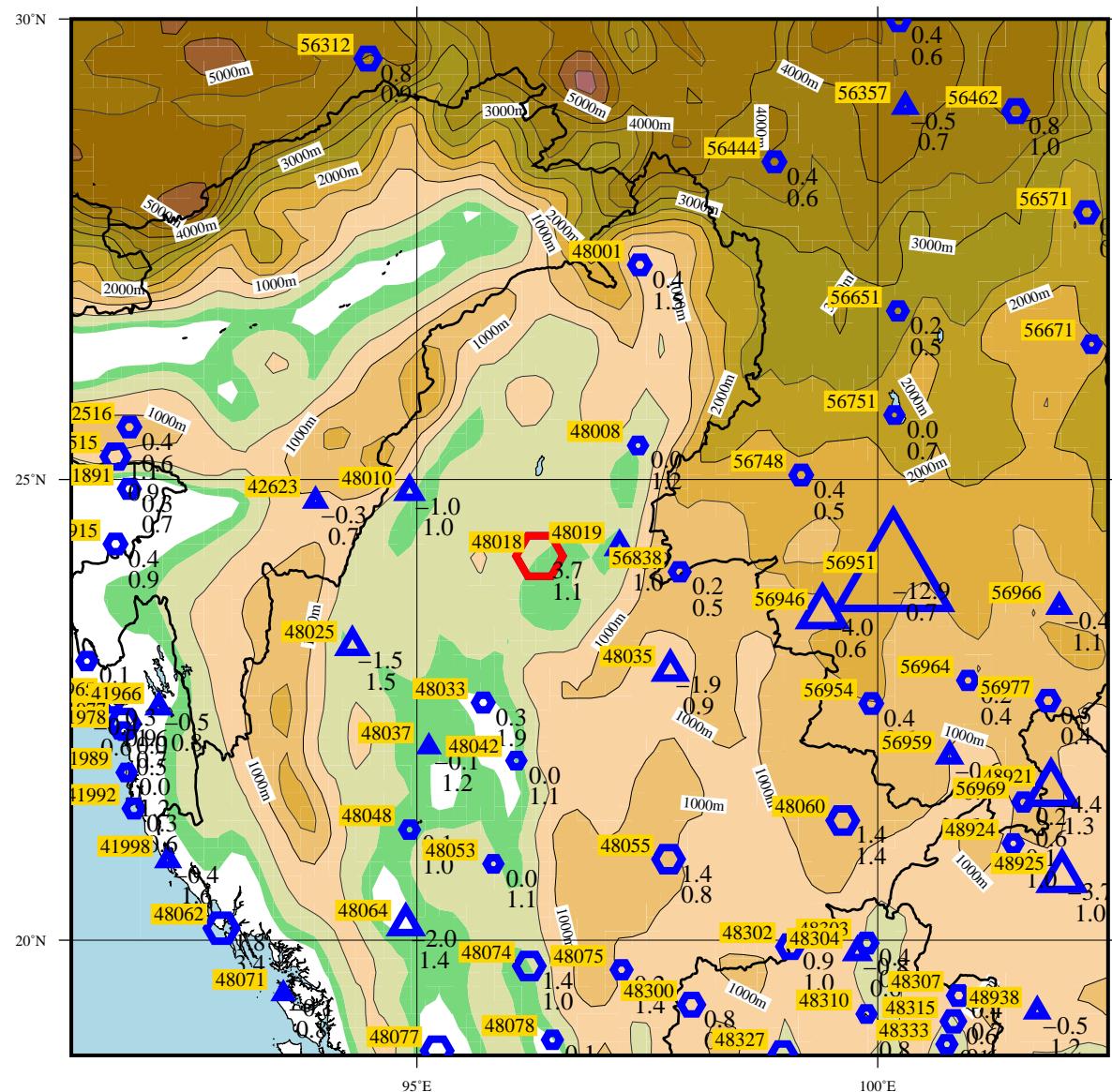


Figure 53 Time-series representation of SLP Obs minus FirstGuess for station 47152

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
O BIAS
SD

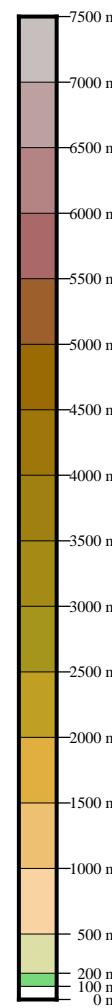


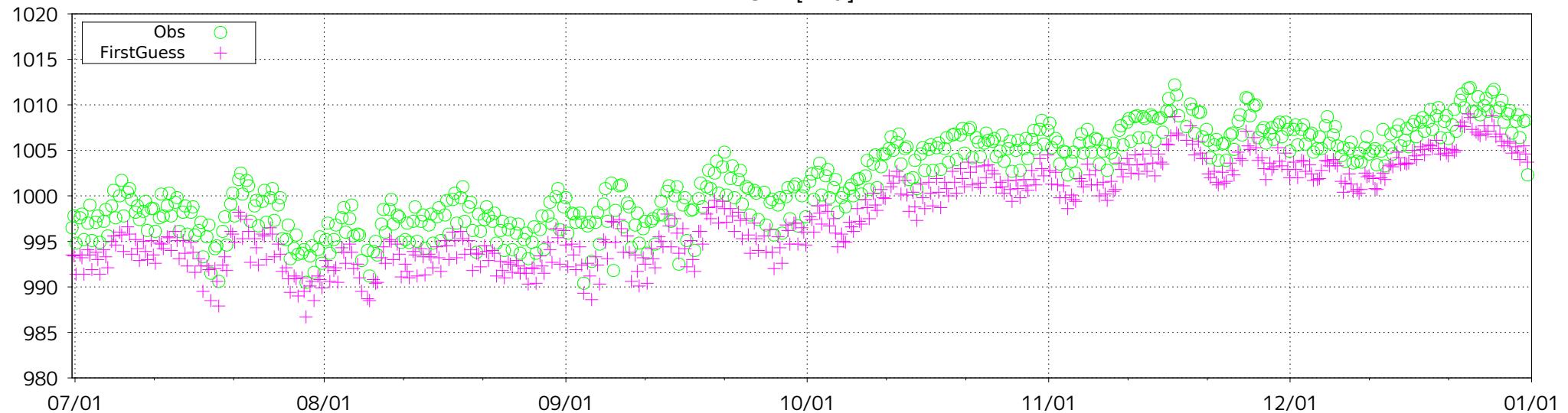
Figure 54 BIAS and SD of SLP for station 48018 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

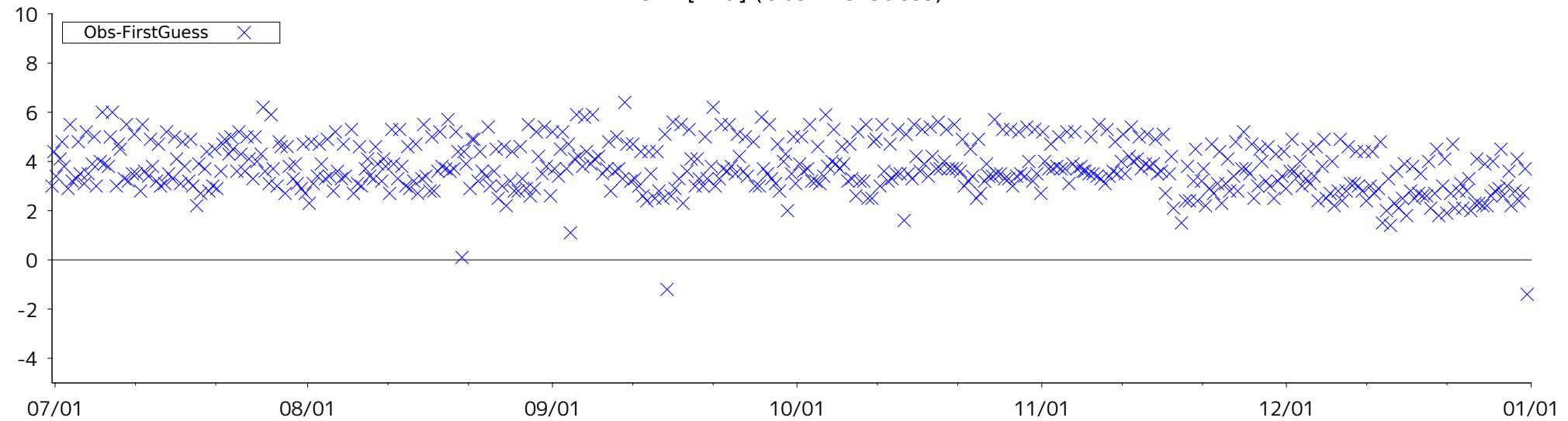
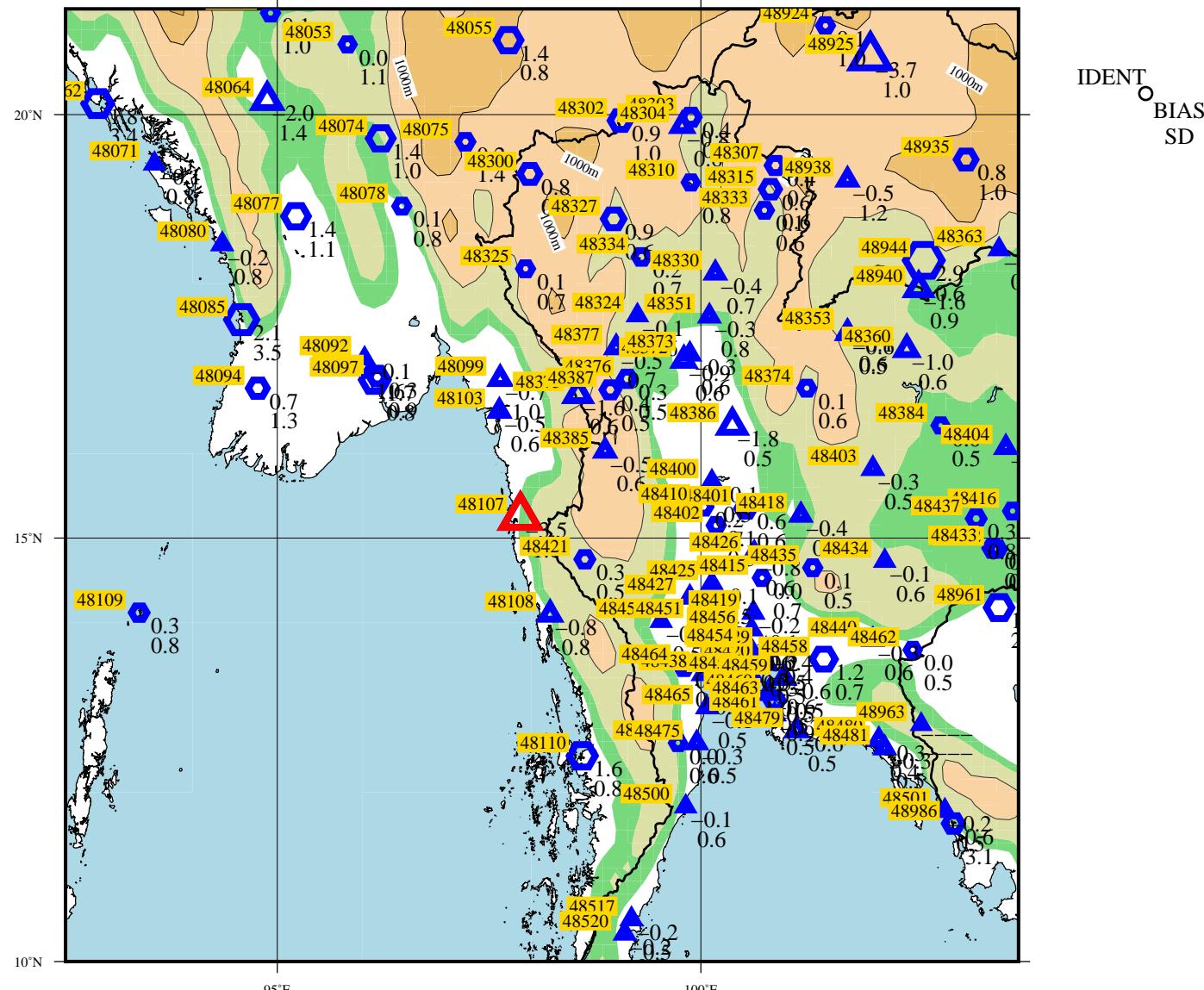


Figure 55 Time-series representation of SLP Obs minus FirstGuess for station 48018

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

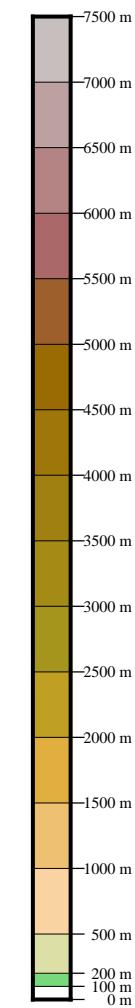


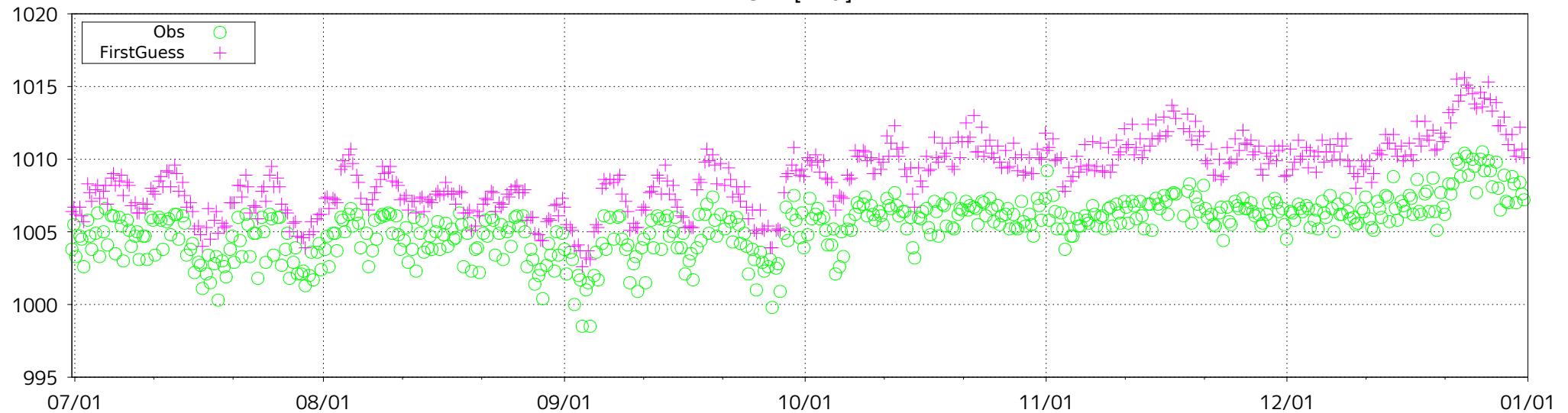
Figure 56 BIAS and SD of SLP for station 48107 (red) and surrounding stations (blue).

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: 48107 (lat: 15.3N, lon: 97.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

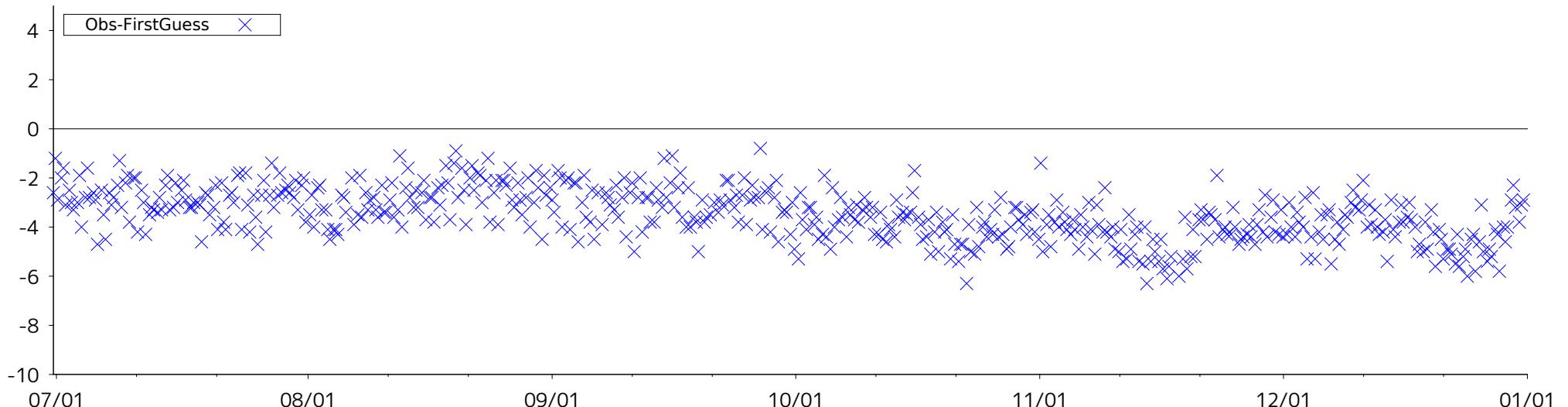


Figure 57 Time-series representation of SLP Obs minus FirstGuess for station 48107

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)

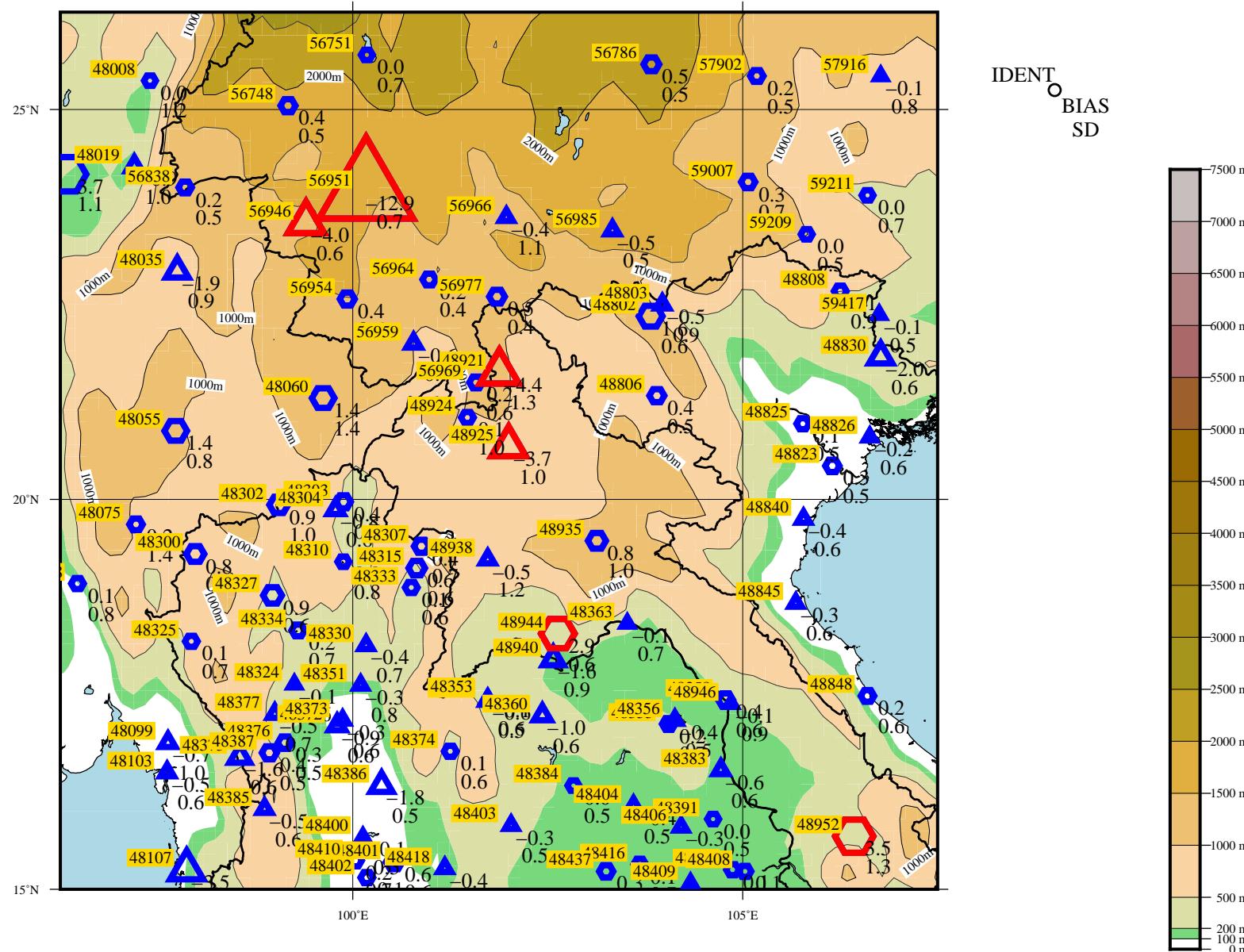
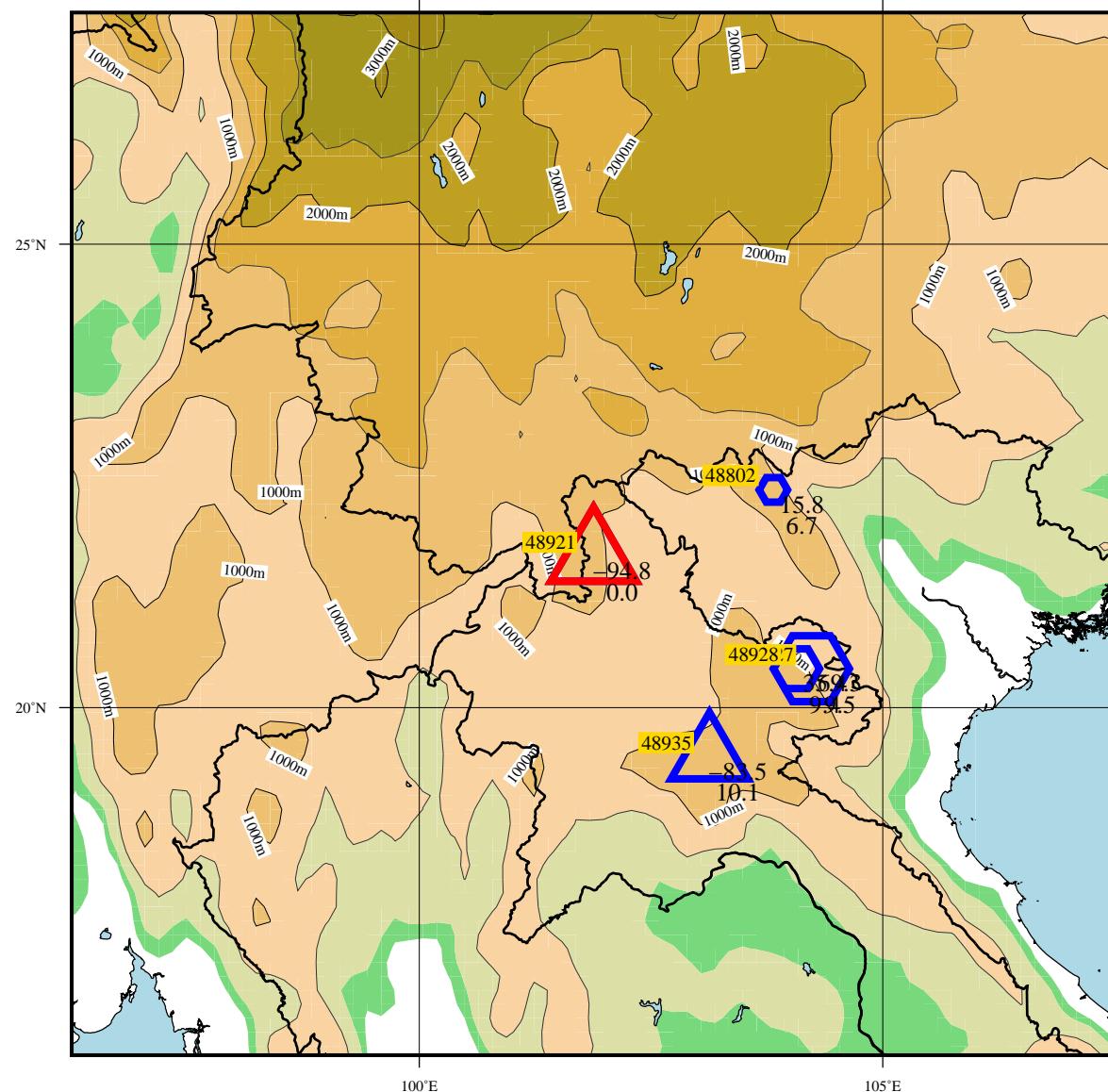


Figure 58 BIAS and SD of SLP for station 48921, 48925, 48944, 48952, 56946, 56951 (red) and surrounding stations (blue).

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 = GZ
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
O BIAS
SD

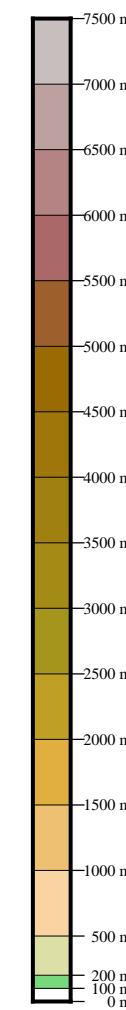


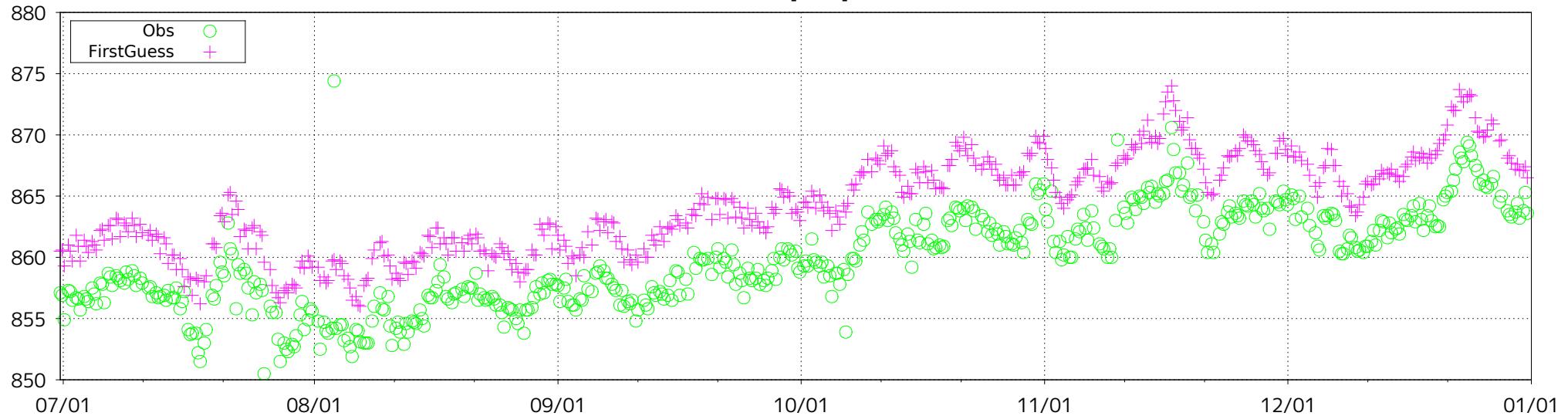
Figure 59 BIAS and SD of GZ for station 48921 (red) and surrounding stations (blue).

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)

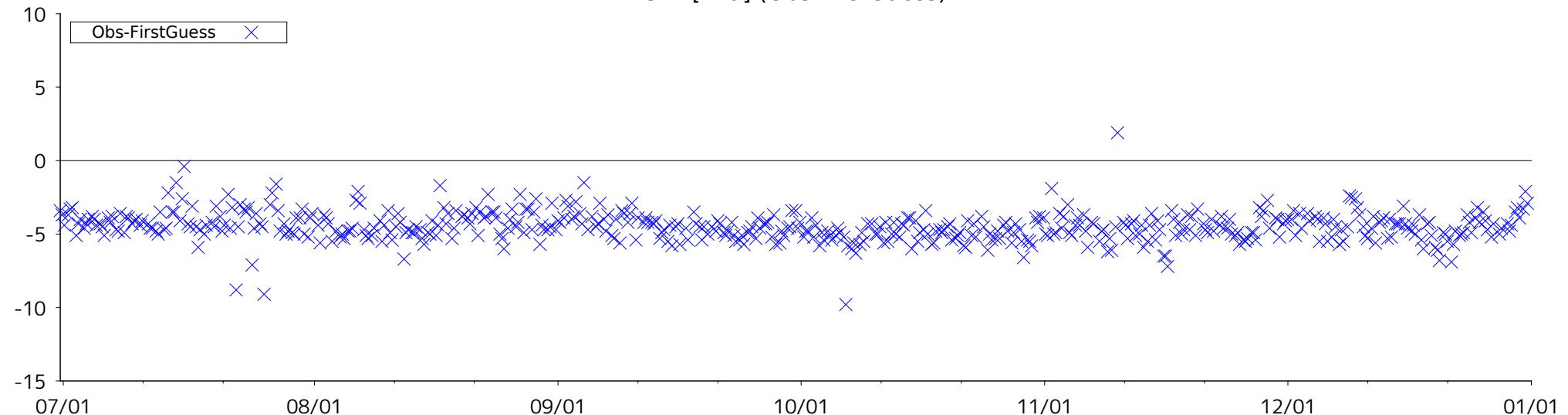
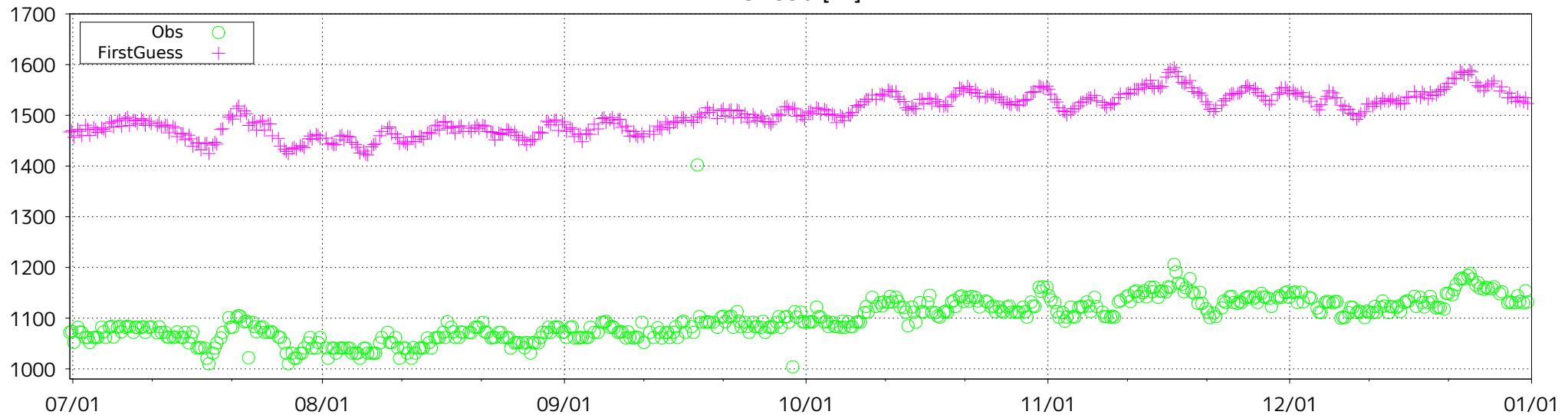


Figure 60(a) Time-series representation of SLP Obs minus FirstGuess for station 48921

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

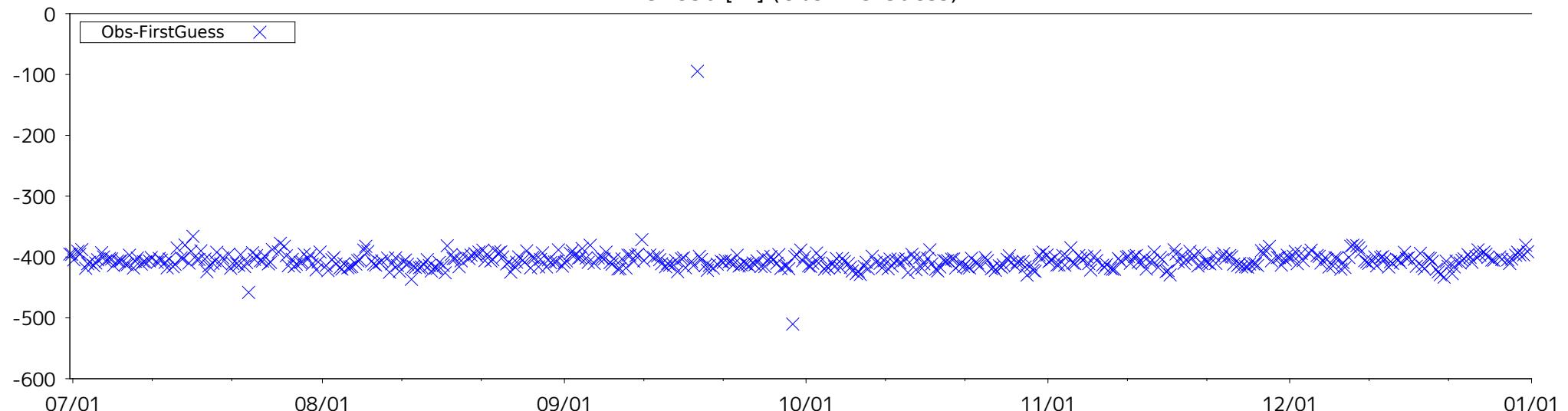
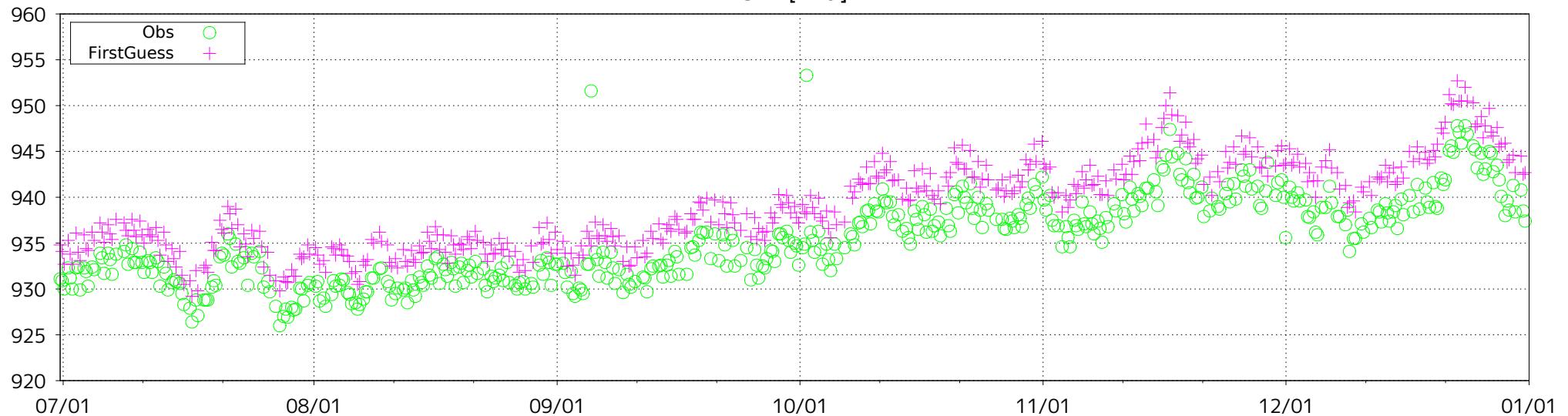


Figure 60(b) Time-series representation of GZ850 Obs minus FirstGuess for station 48921

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

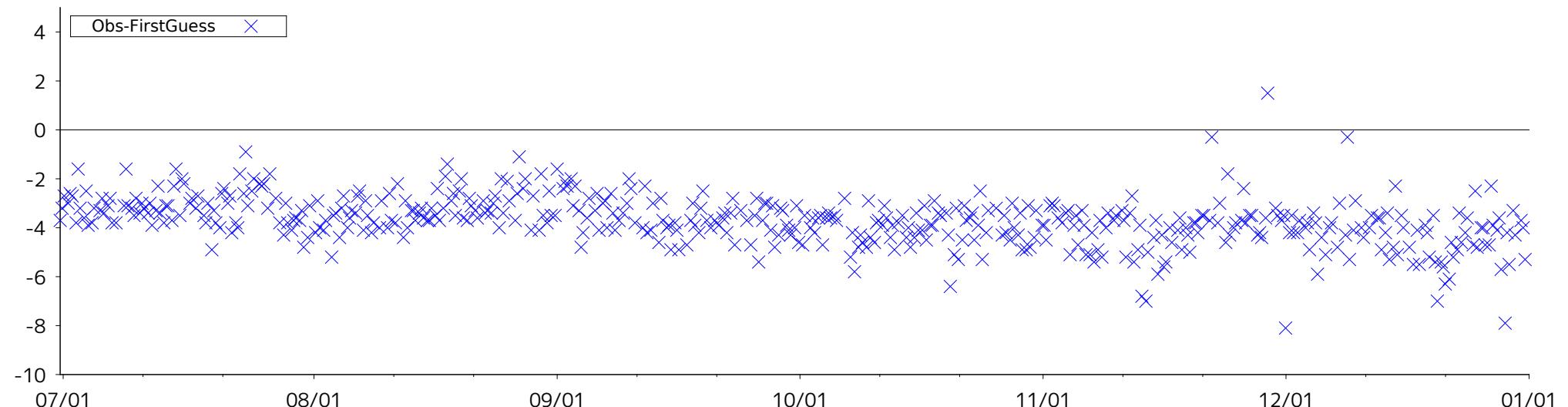
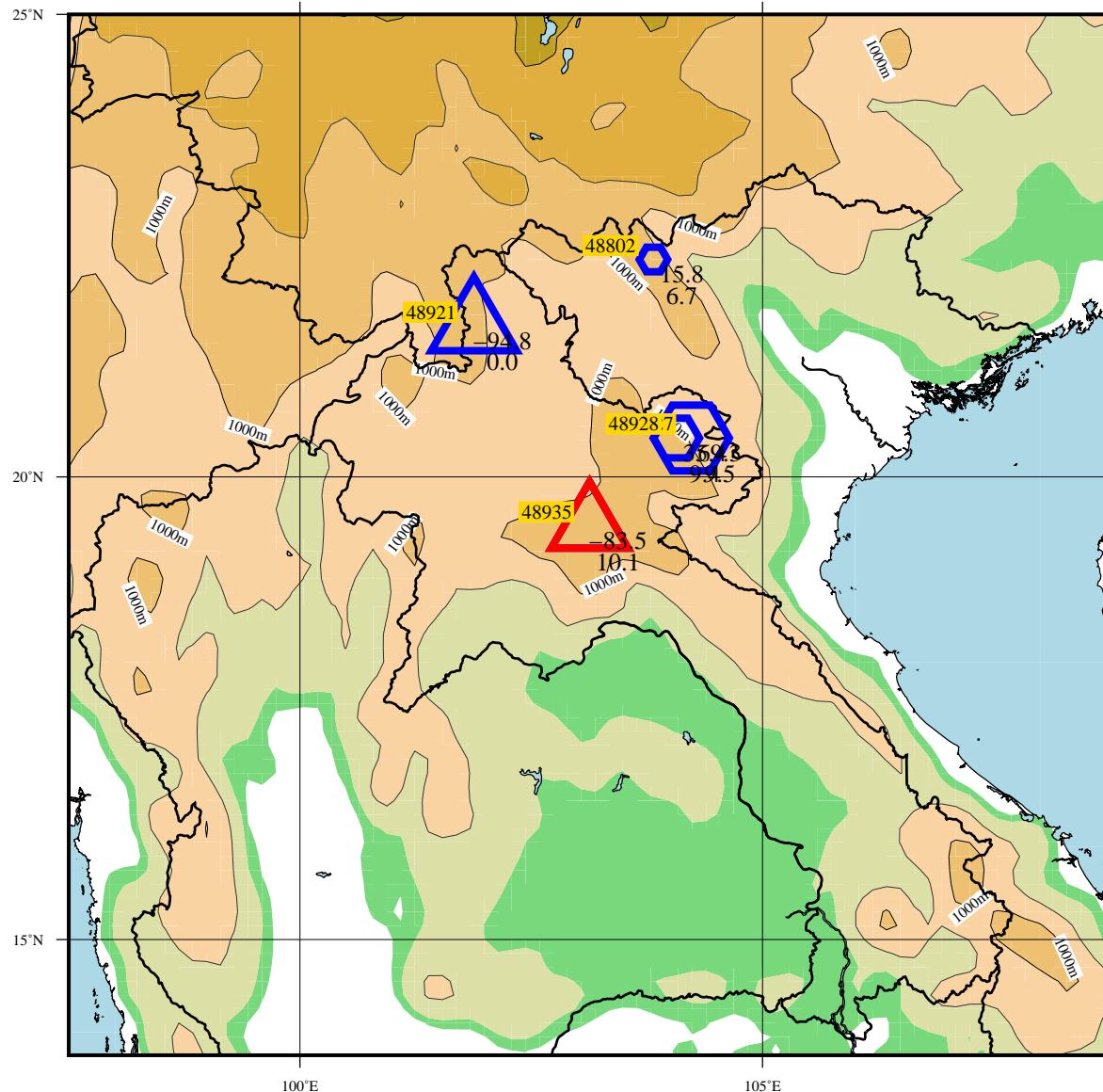


Figure 61 Time-series representation of SLP Obs minus FirstGuess for station 48925

LEVEL = SUR ELEMENT = GZ
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
 O BIAS
 SD

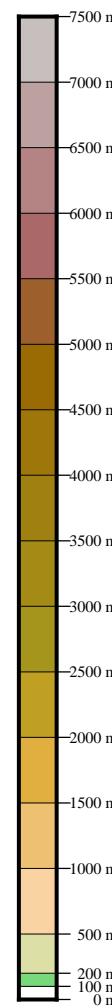


Figure 62 BIAS and SD of GZ for station 48935 (red) and surrounding stations (blue).

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.

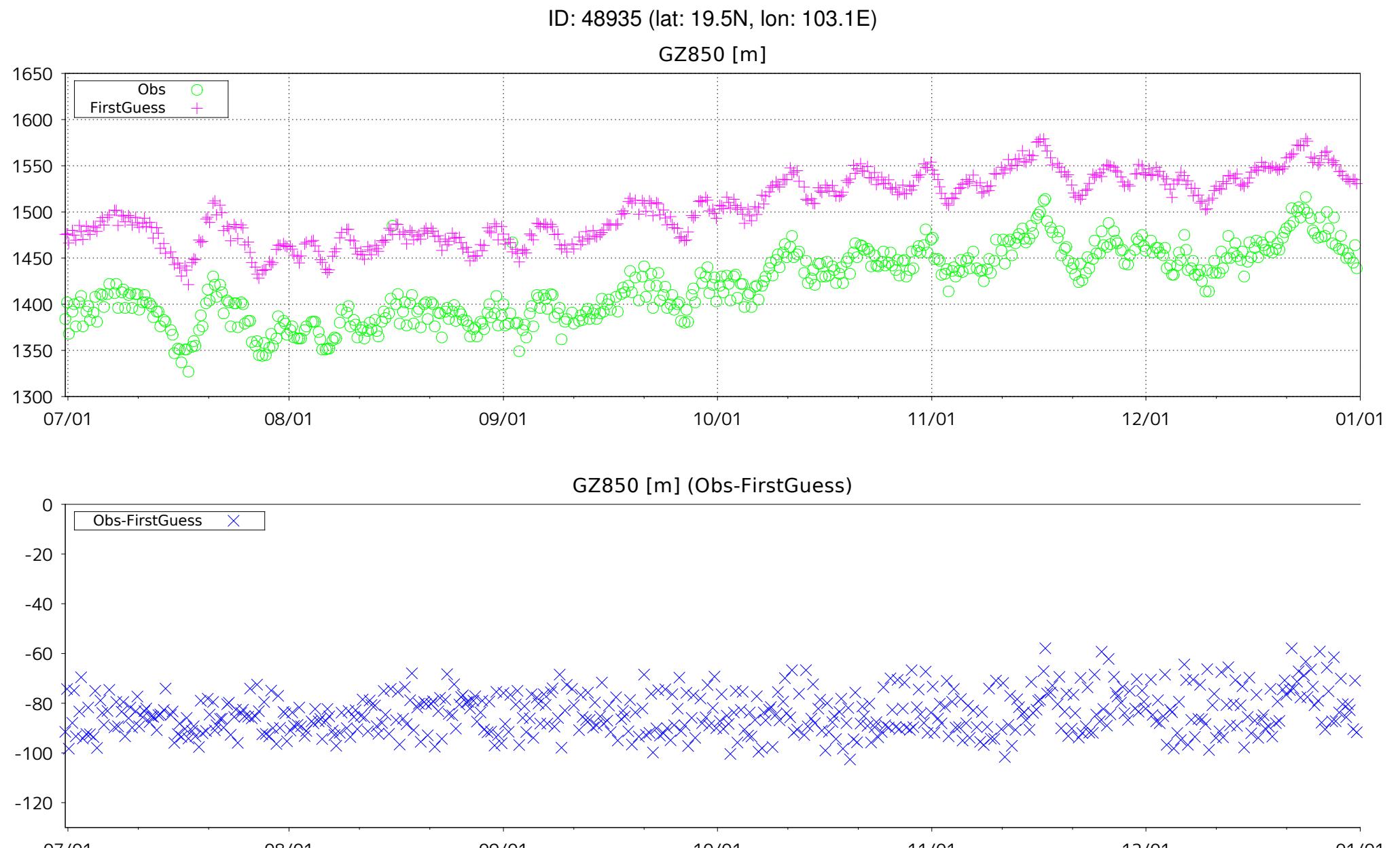
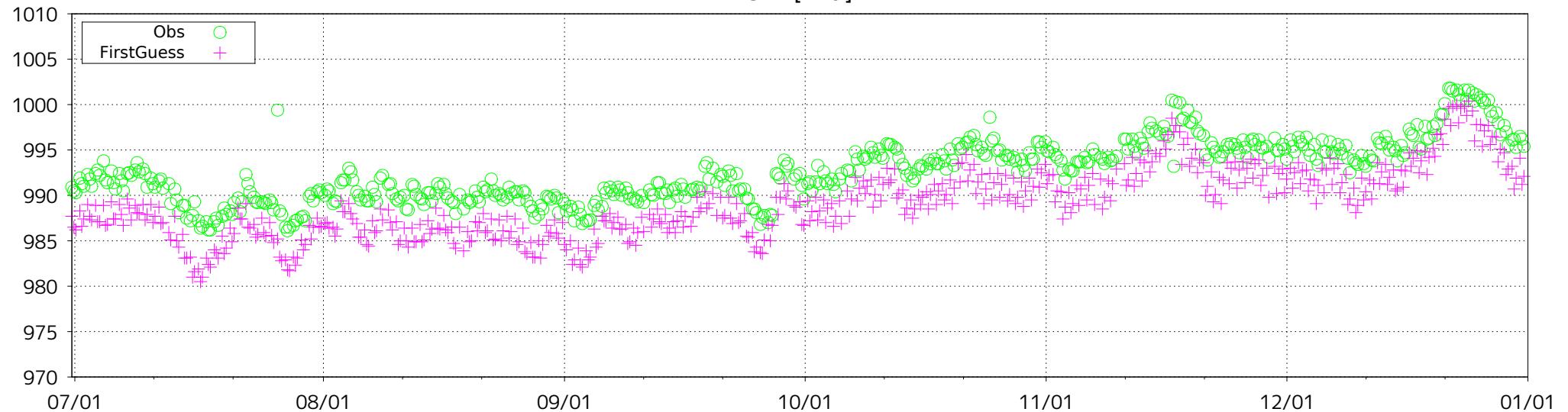


Figure 63 Time-series representation of GZ850 Obs minus FirstGuess for station 48935

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

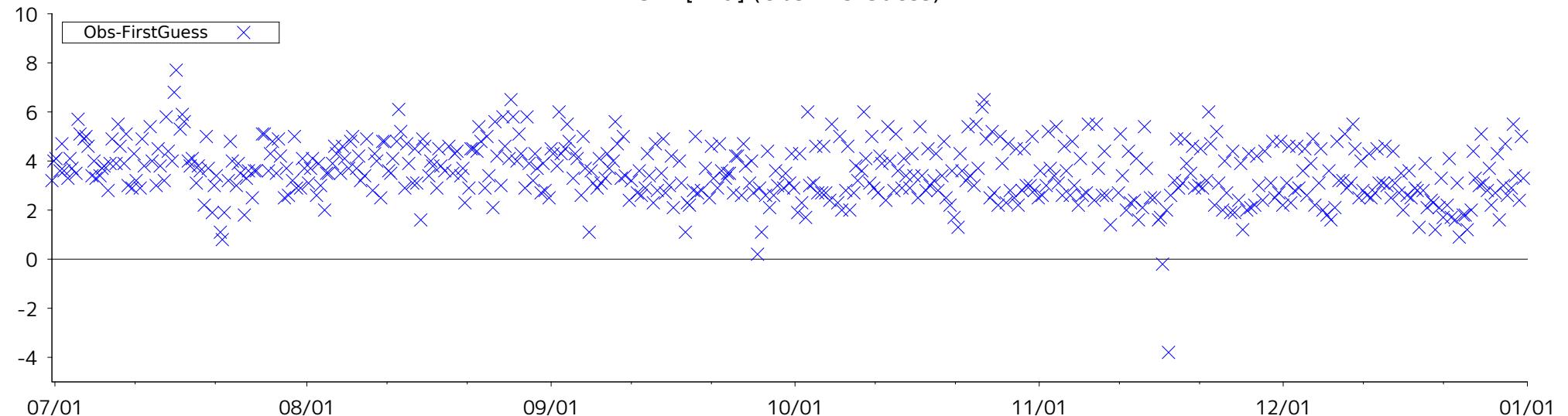
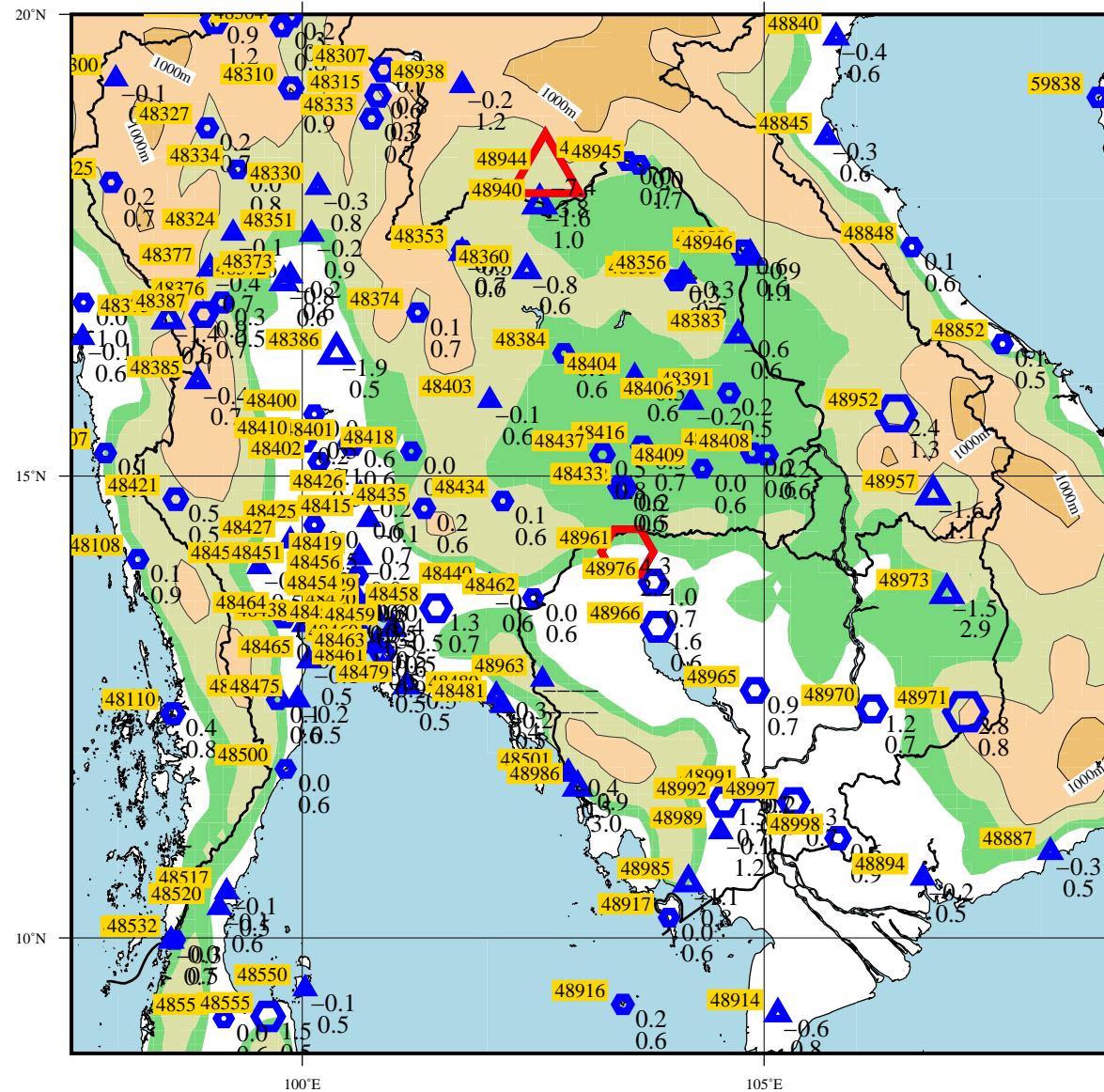


Figure 64 Time-series representation of SLP Obs minus FirstGuess for station 48952

LEVEL = SUR

ELEMENT = MSLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

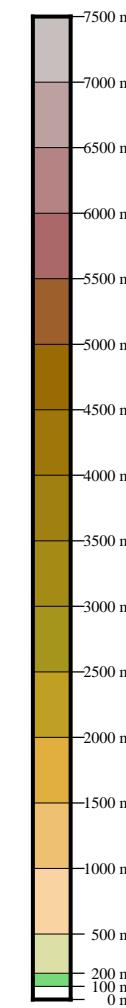


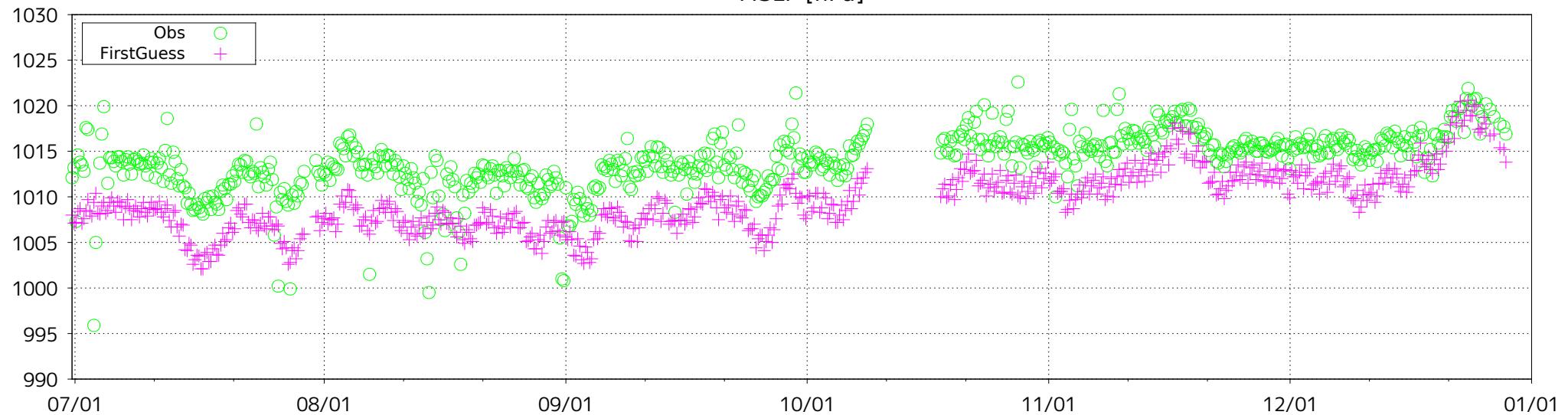
Figure 65 BIAS and SD of MSLP for station 48944, 48961 (red) and surrounding stations (blue).

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

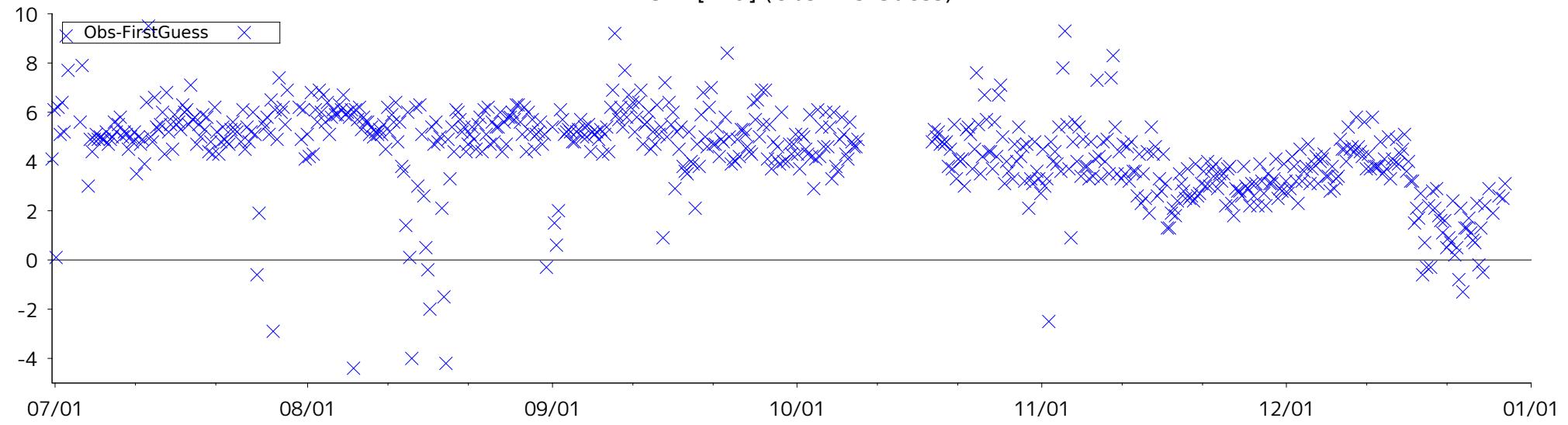
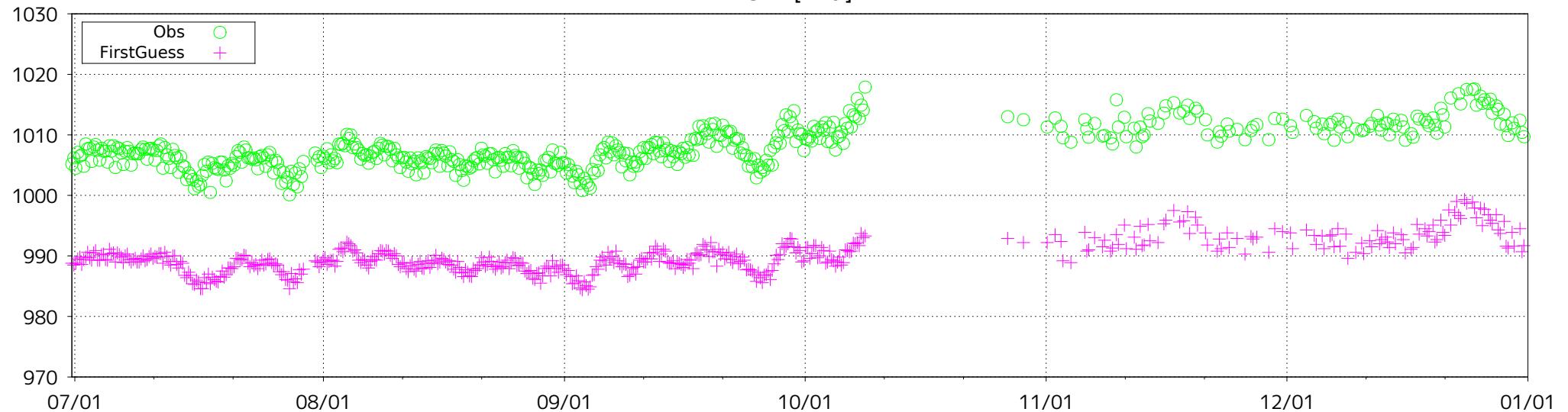


Figure 66 Time-series representation of MSLP Obs minus FirstGuess for station 48961

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

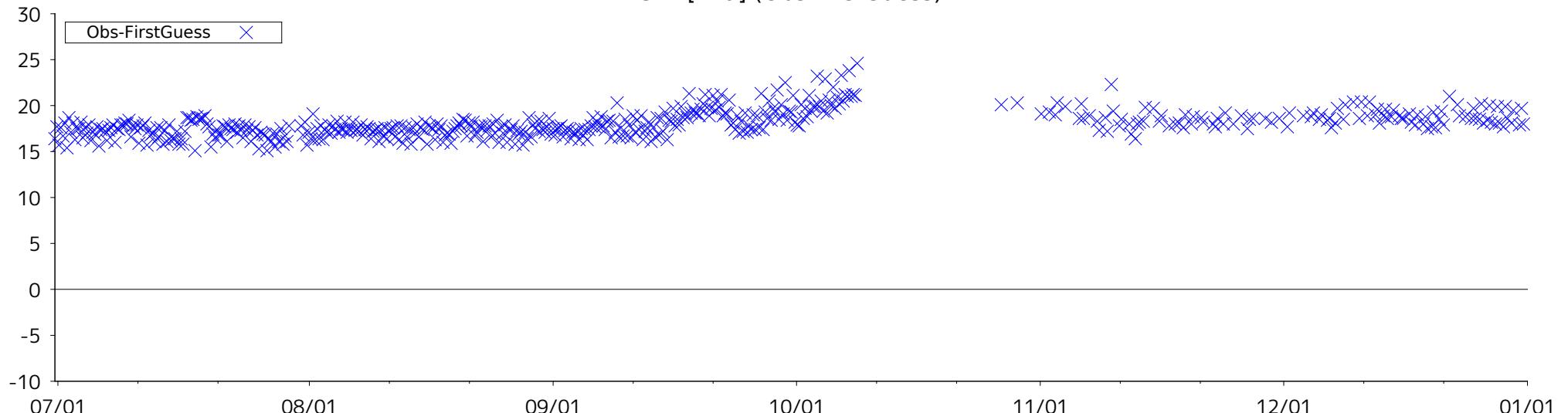
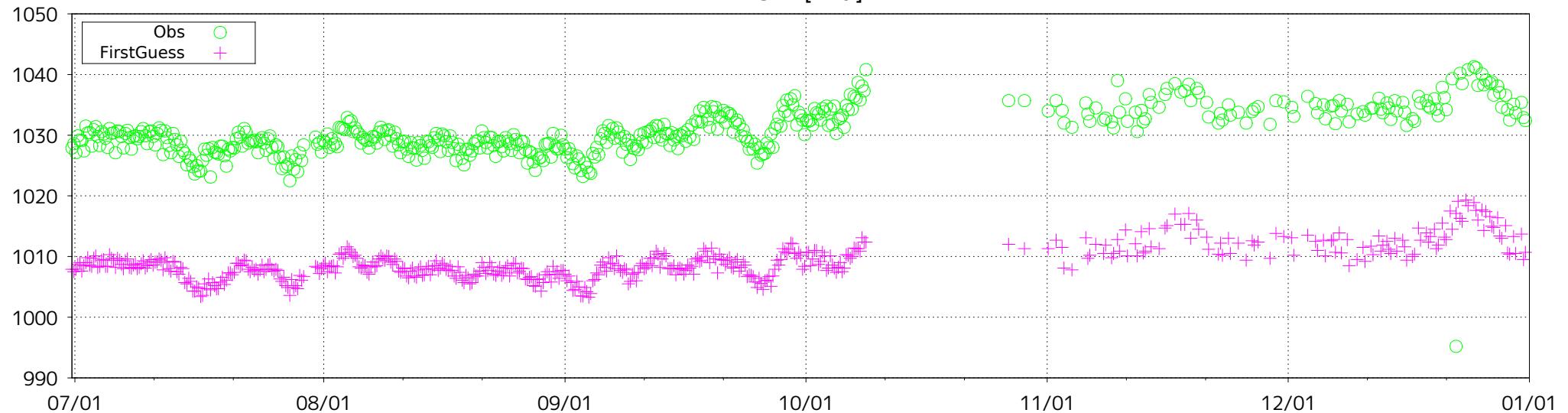


Figure 67(a) Time-series representation of SLP Obs minus FirstGuess for station 48963

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

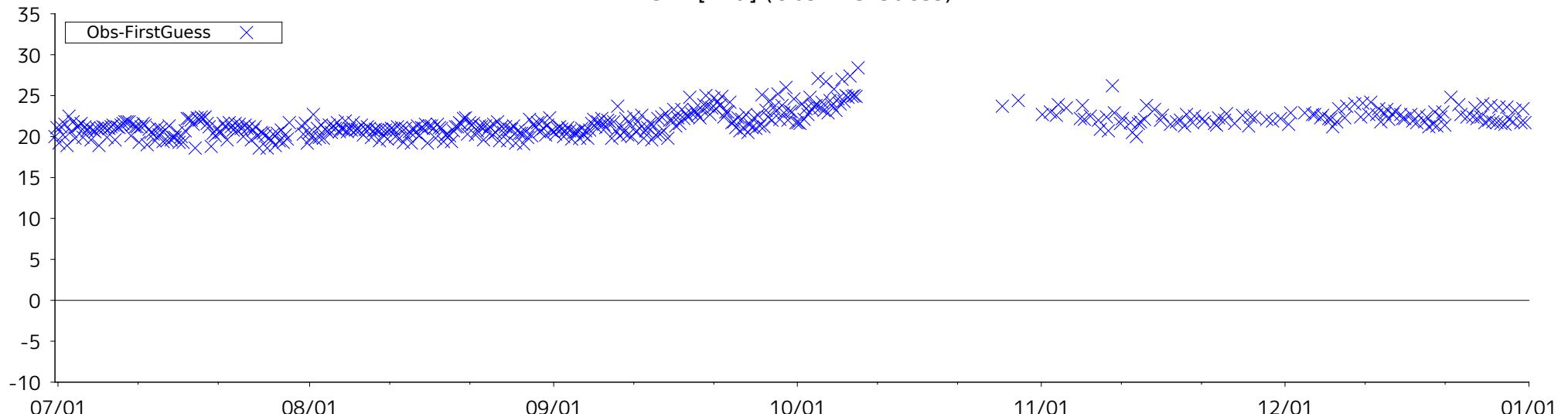
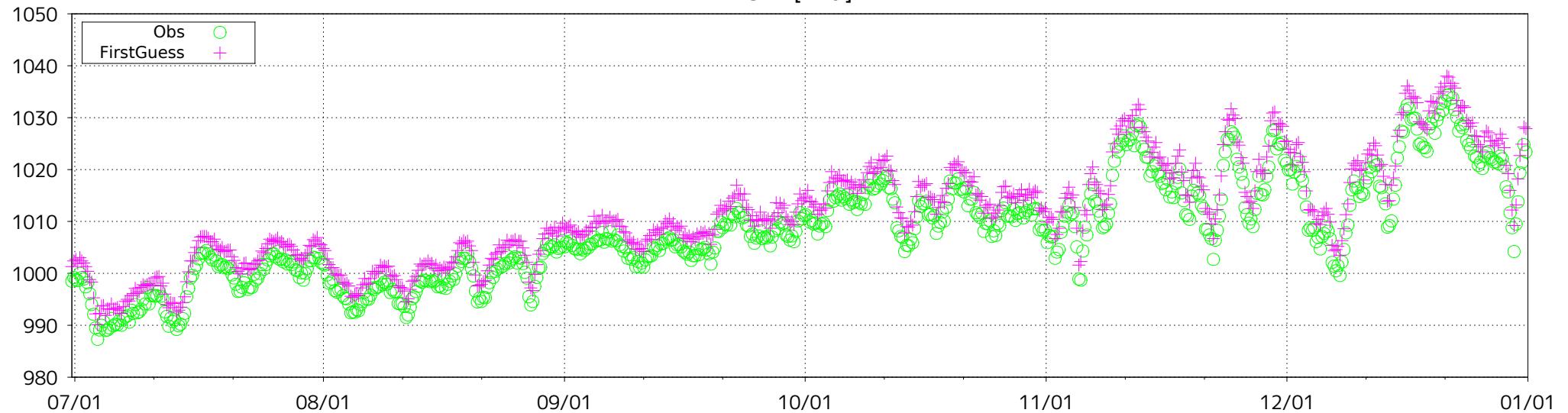


Figure 67(b) Time-series representation of MSLP Obs minus FirstGuess for station 48963

ID: 54945 (lat: 35.5N, lon: 119.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

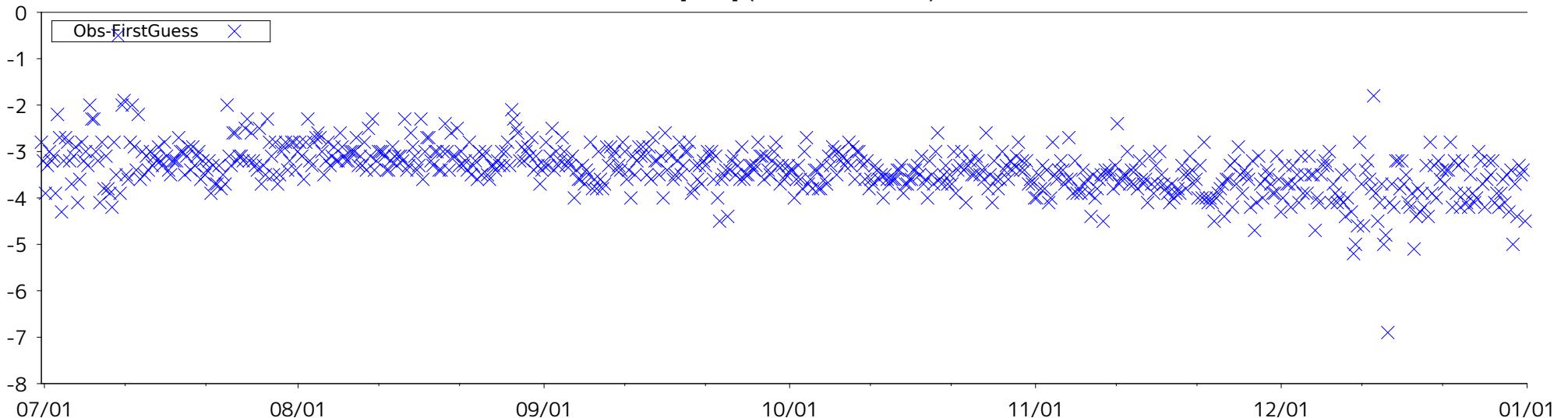
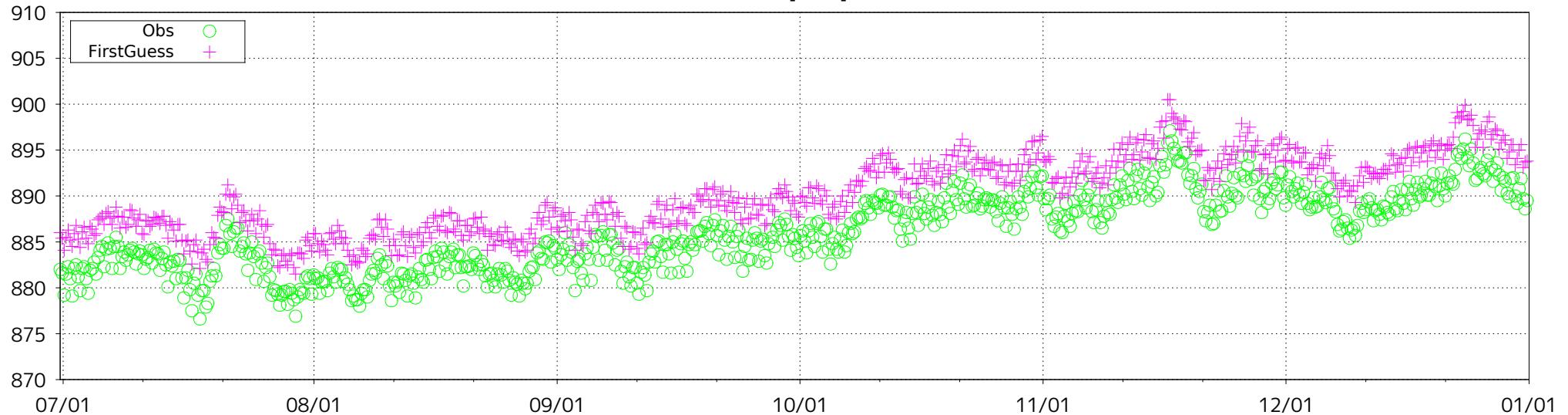


Figure 68 Time-series representation of SLP Obs minus FirstGuess for station 54945

ID: 56946 (lat: 23.6N, lon: 99.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

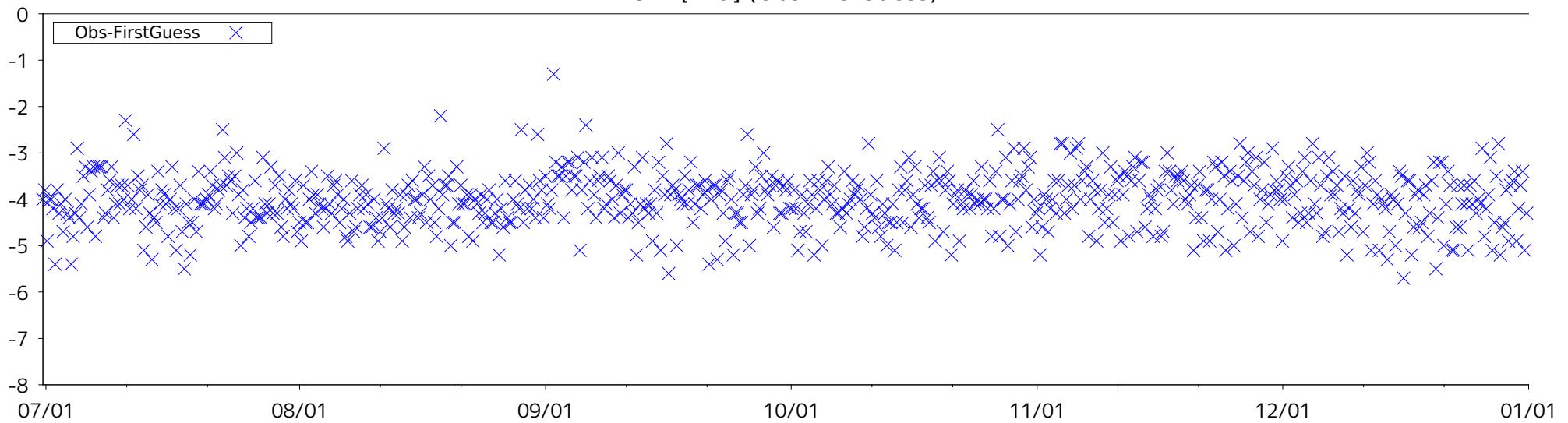
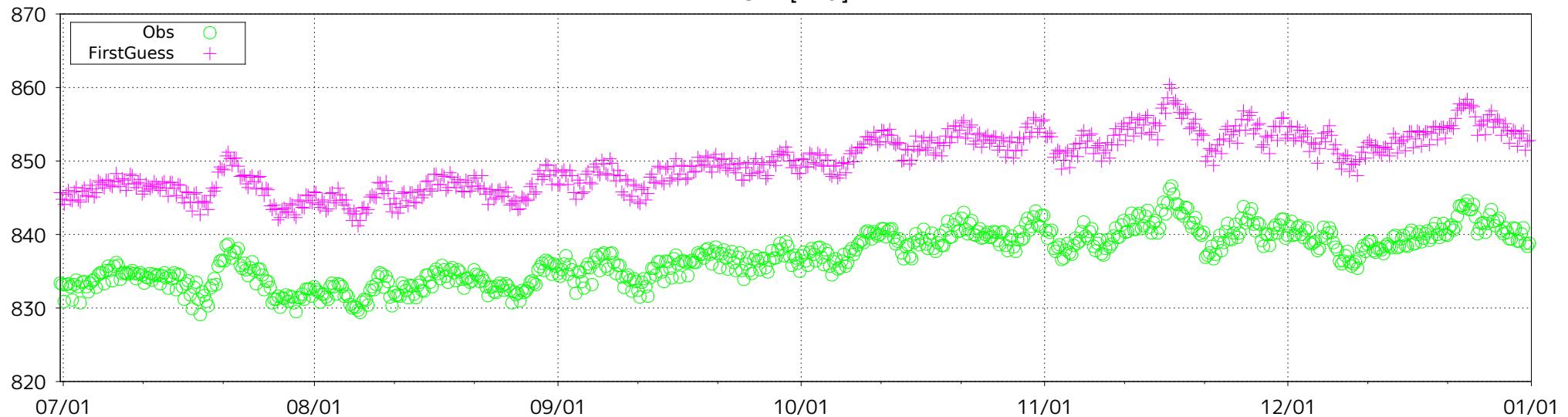


Figure 69 Time-series representation of SLP Obs minus FirstGuess for station 56946

ID: 56951 (lat: 24.0N, lon: 100.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

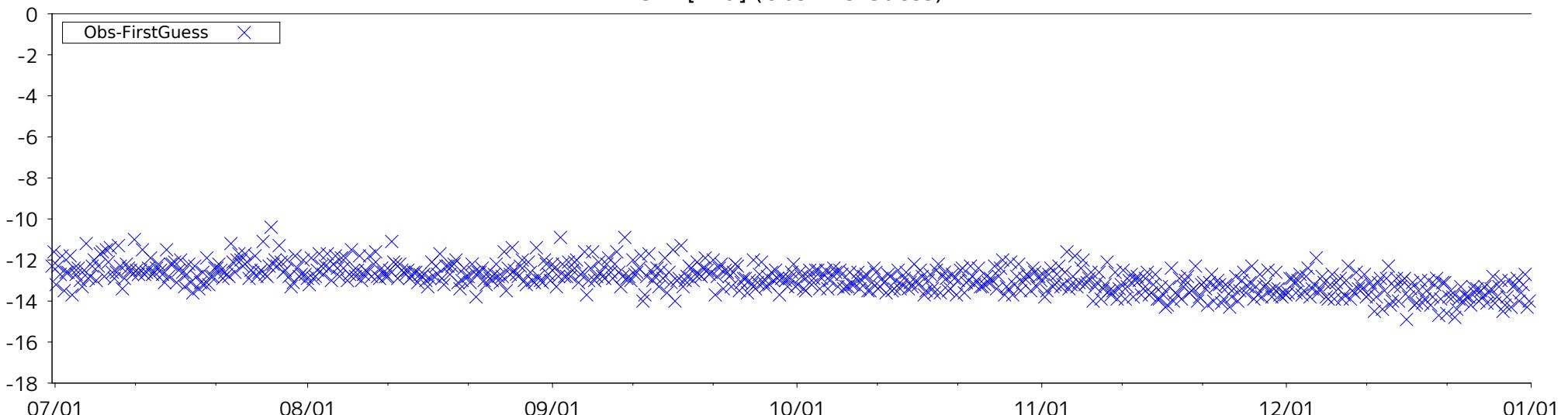
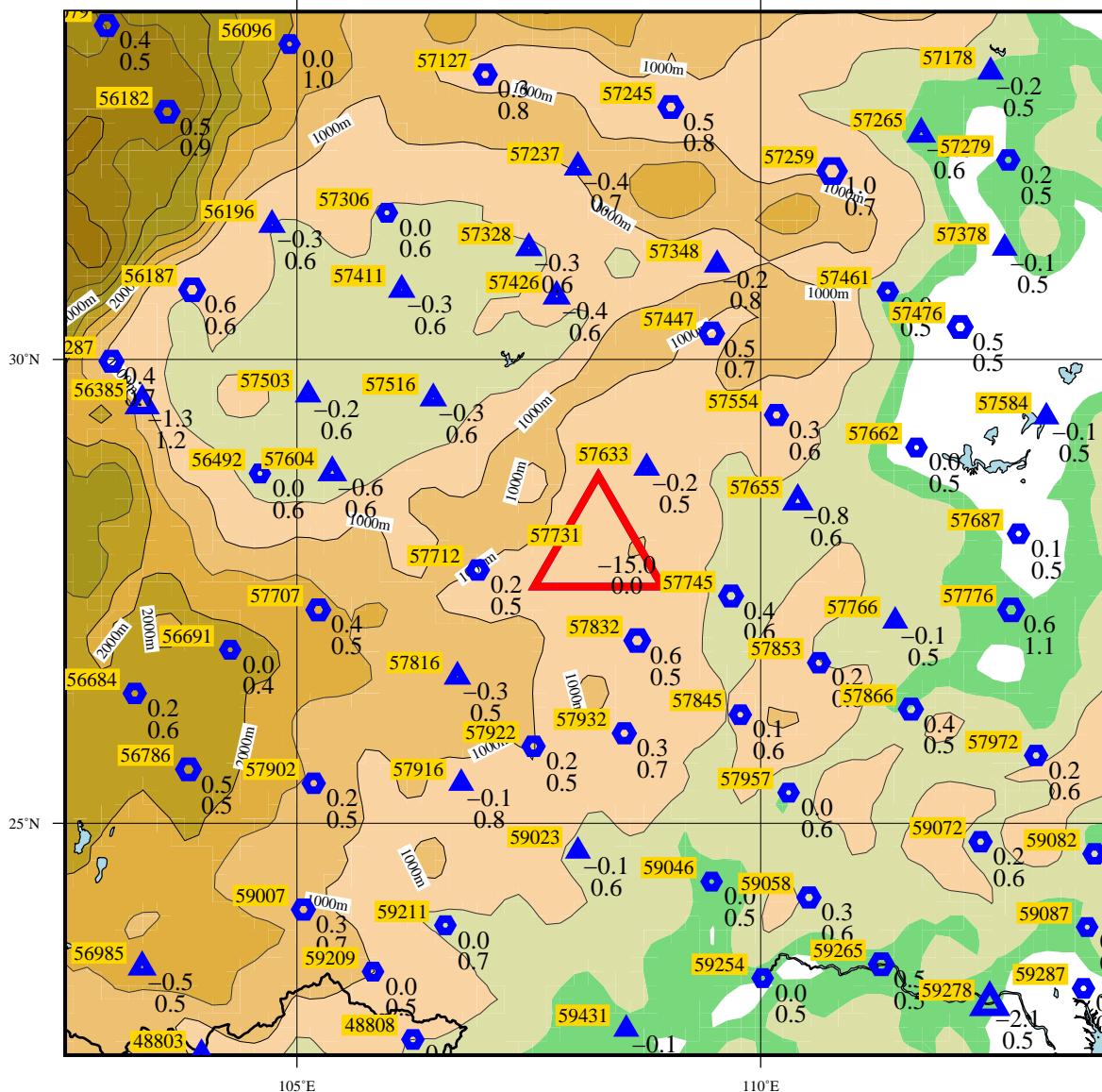


Figure 70 Time-series representation of SLP Obs minus FirstGuess for station 56951

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

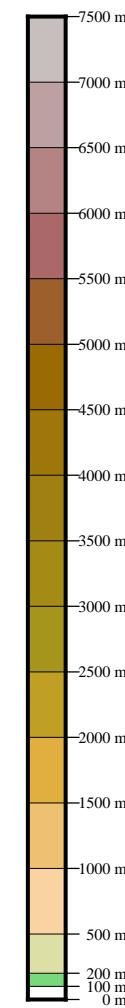


Figure 71 BIAS and SD of SLP for station 57731 (red) and surrounding stations (blue).

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.

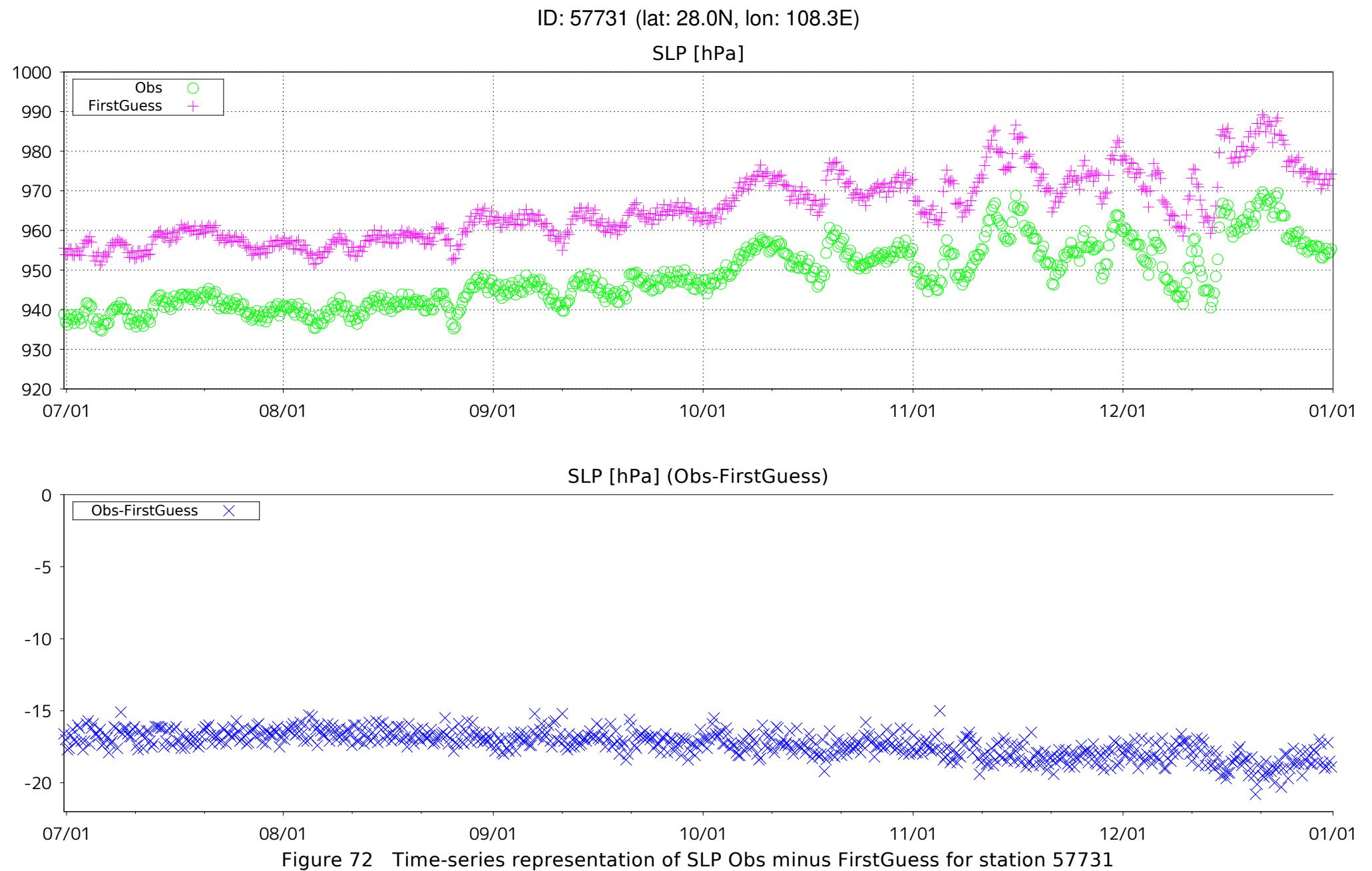


Figure 72 Time-series representation of SLP Obs minus FirstGuess for station 57731

LEVEL = SUR ELEMENT = SLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)

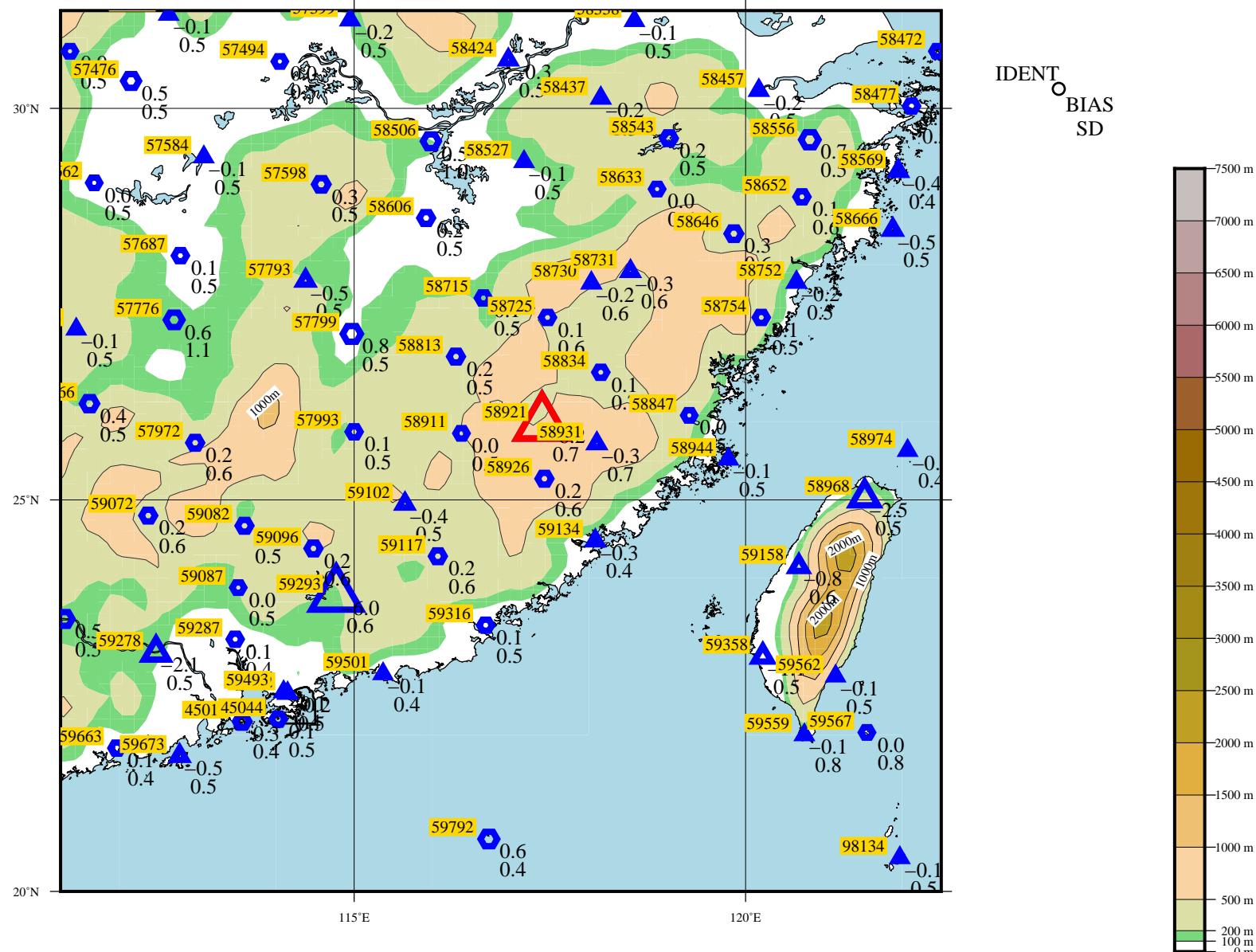


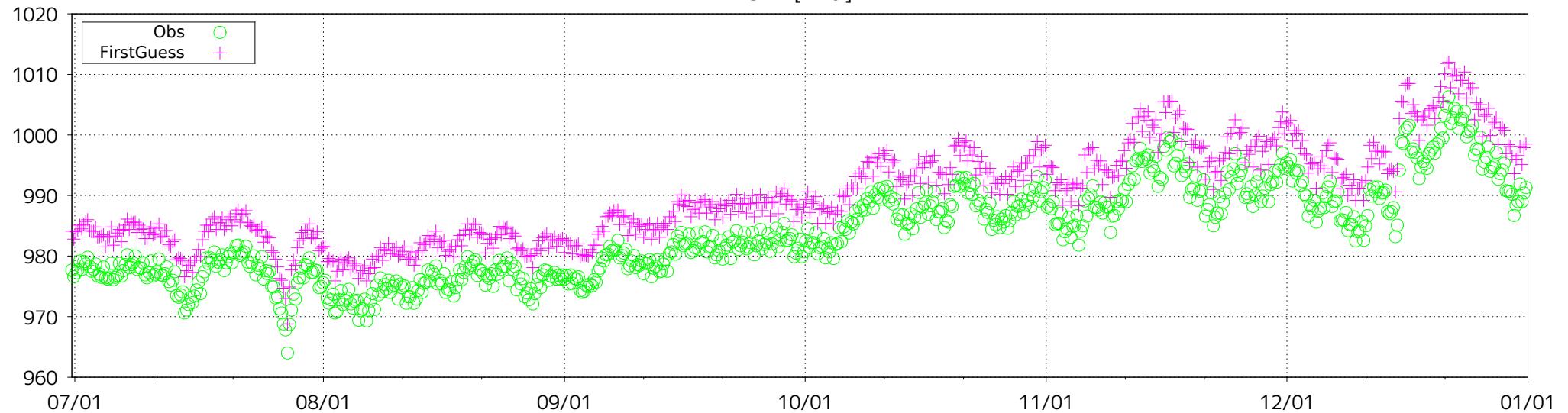
Figure 73 BIAS and SD of SLP for station 58921 (red) and surrounding stations (blue).

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: 58921 (lat: 26.0N, lon: 117.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

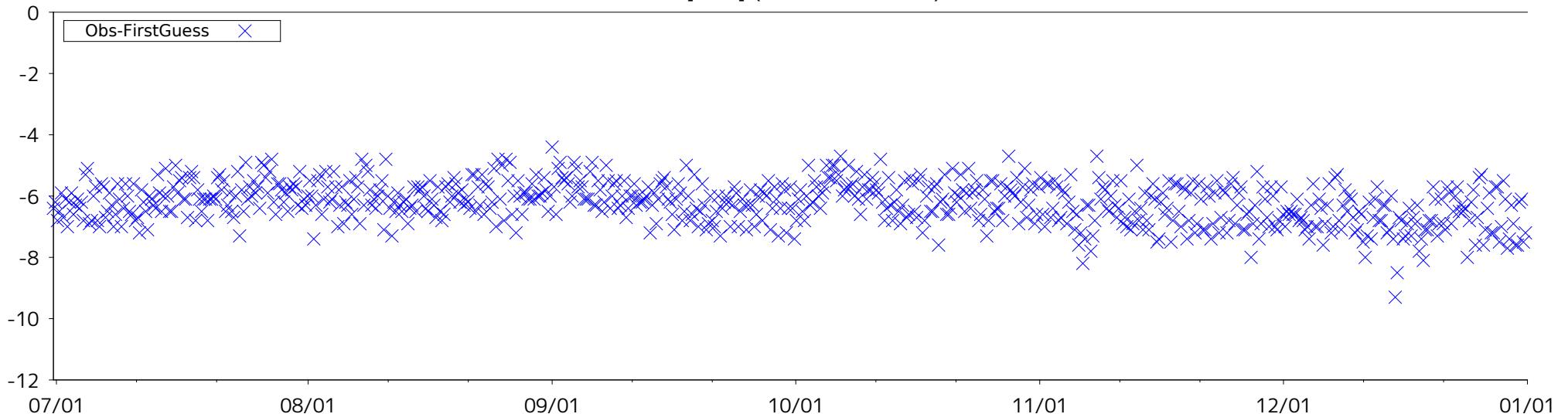
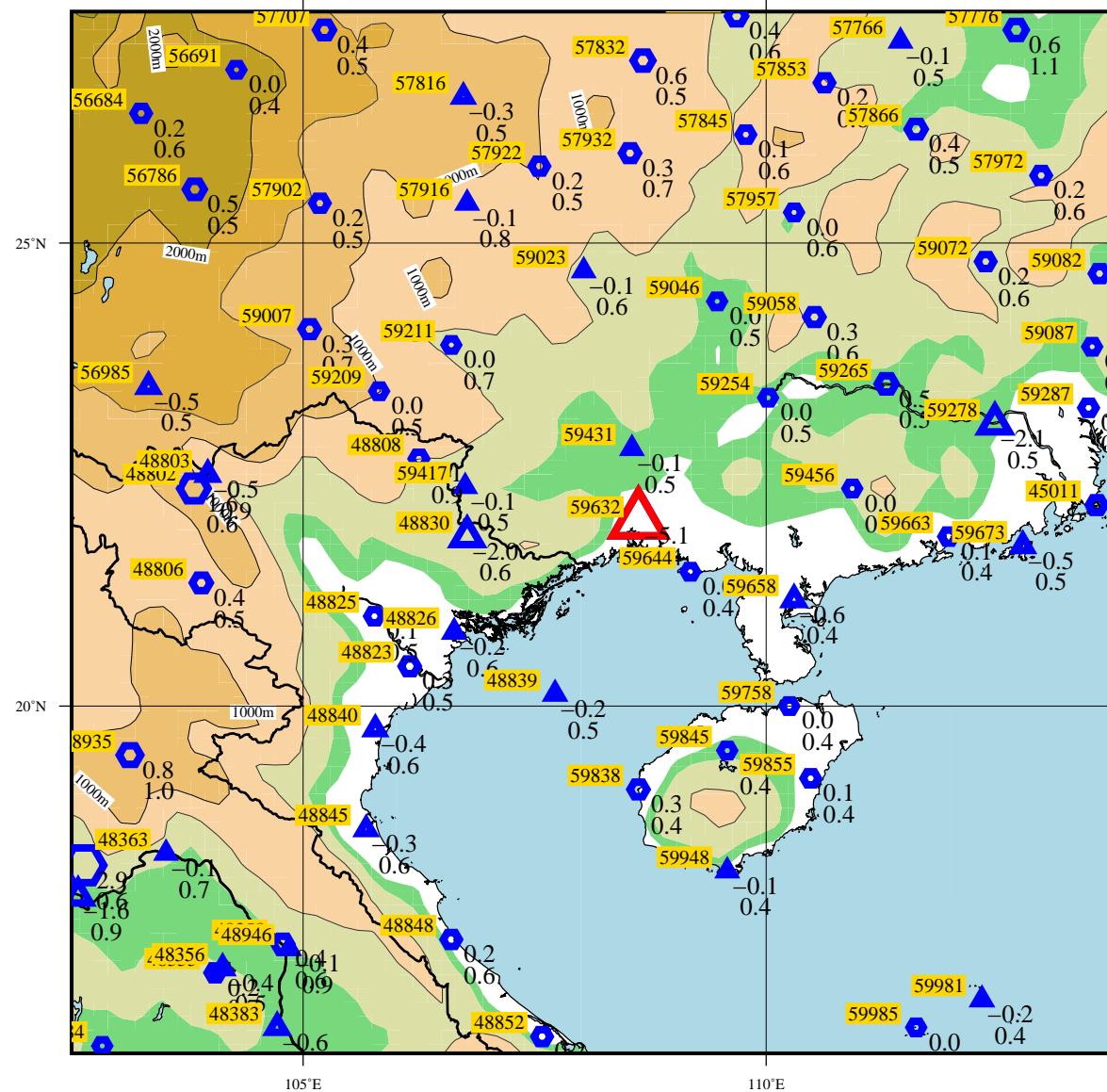


Figure 74 Time-series representation of SLP Obs minus FirstGuess for station 58921

LEVEL = SUR

ELEMENT = SLP

2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT O BIAS SD

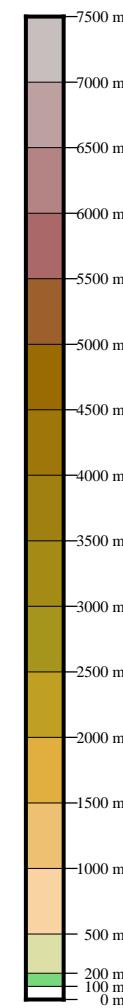


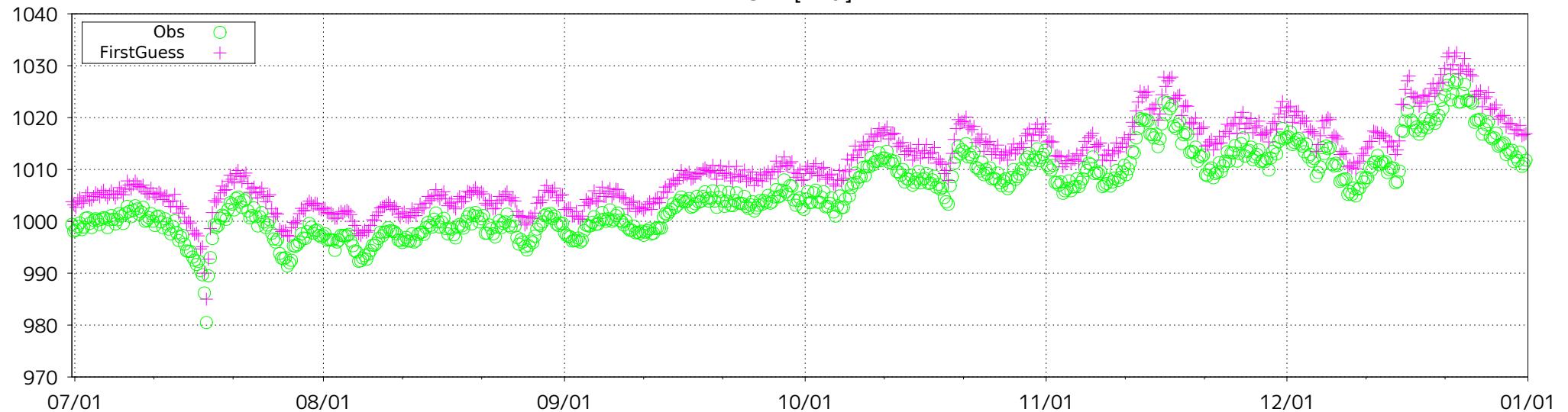
Figure 75 BIAS and SD of SLP for station 59632 (red) and surrounding stations (blue).

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: 59632 (lat: 22.0N, lon: 108.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

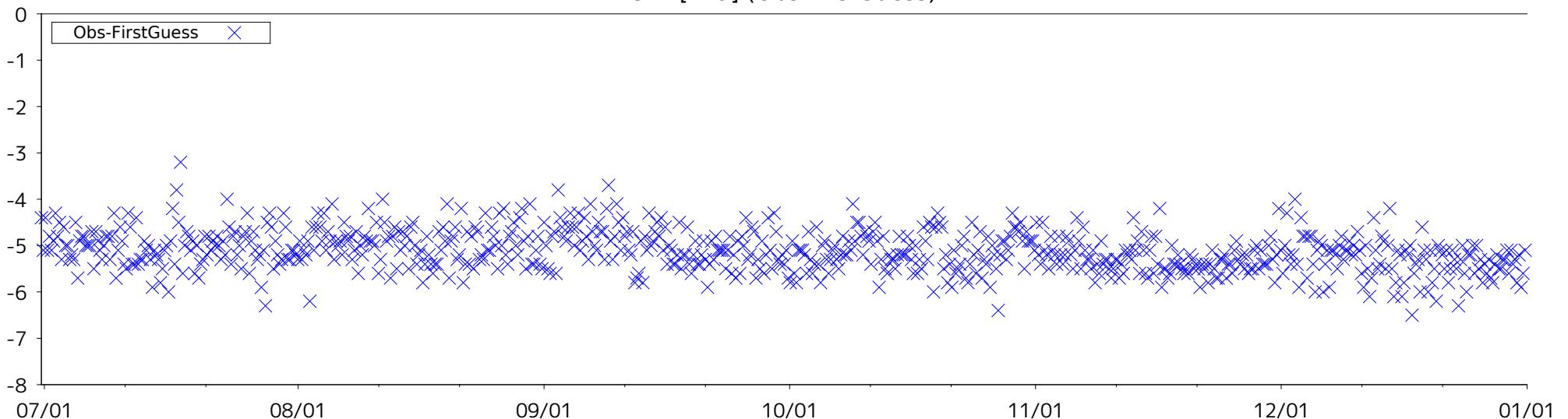
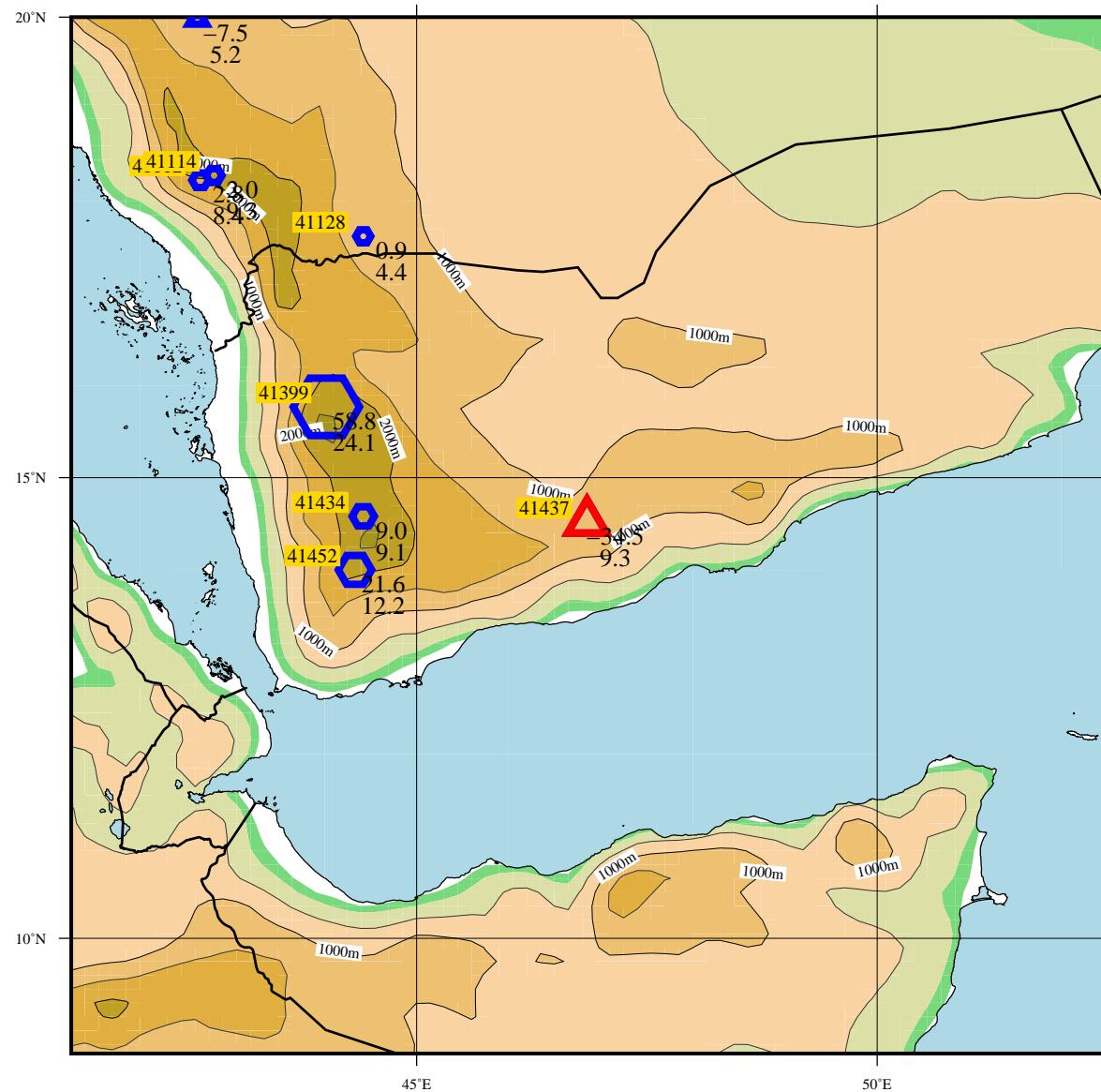


Figure 76 Time-series representation of SLP Obs minus FirstGuess for station 59632

LEVEL = SUR ELEMENT = GZ
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
 O BIAS
 SD

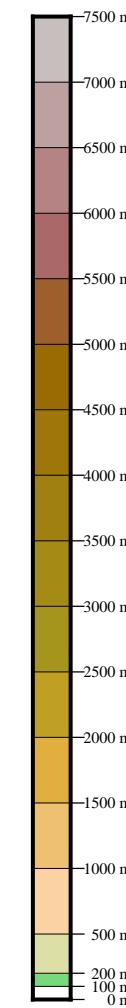


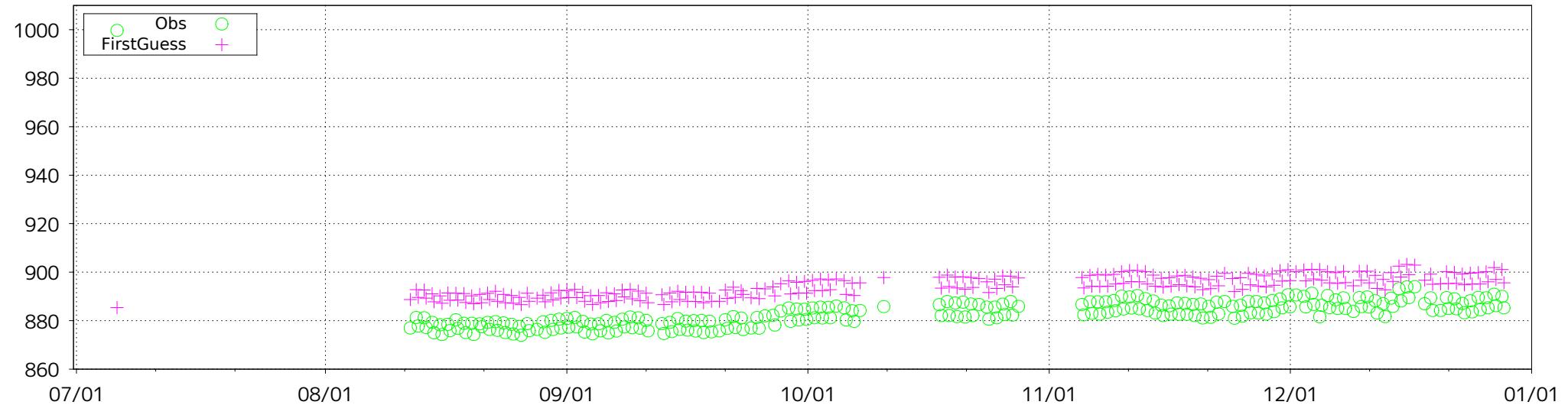
Figure 77 BIAS and SD of GZ for station 41437 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

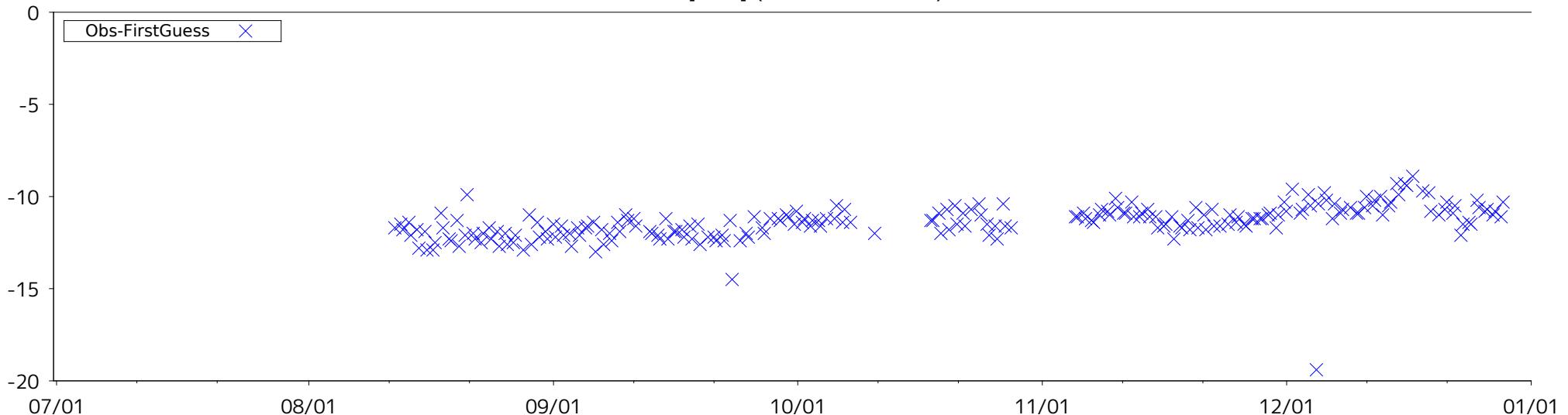
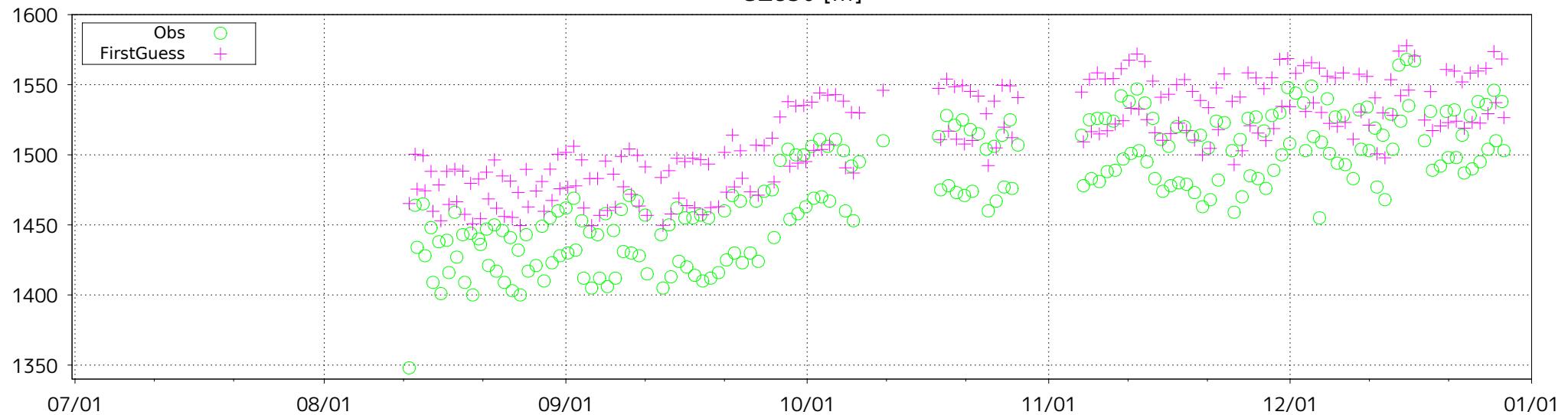


Figure 78(a) Time-series representation of SLP Obs minus FirstGuess for station 41437

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

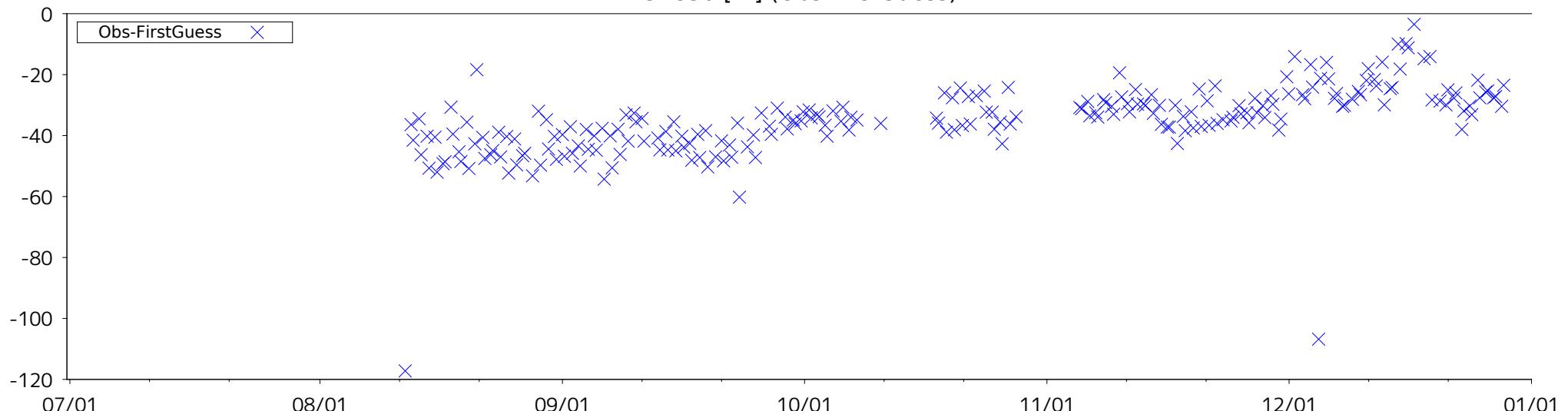
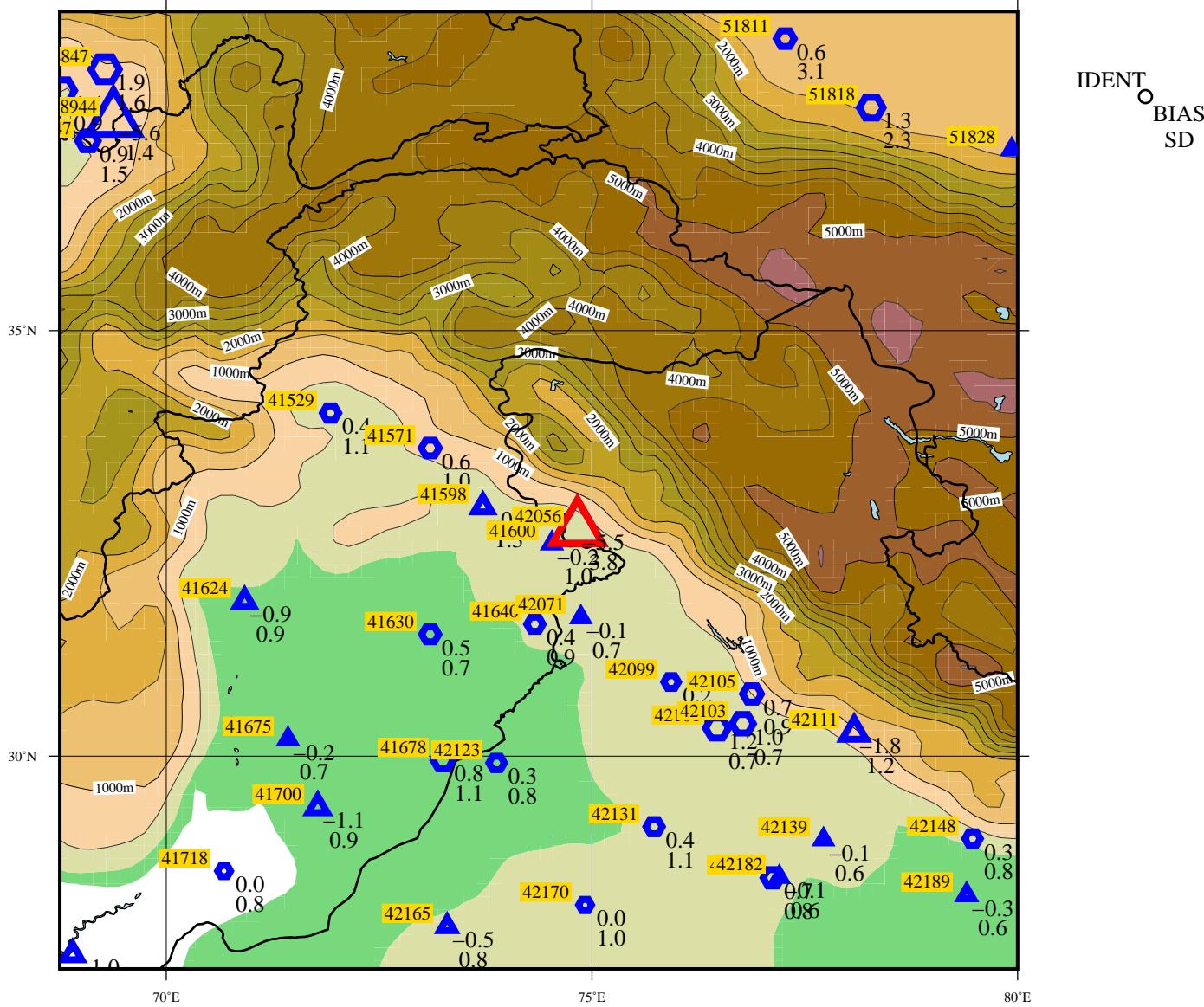


Figure 78(b) Time-series representation of GZ850 Obs minus FirstGuess for station 41437

LEVEL = SUR ELEMENT = MSLP
 2023 07 01 00 UTC → 2023 12 31 18 UTC (184 DAYS)



IDENT
BIAS
SD

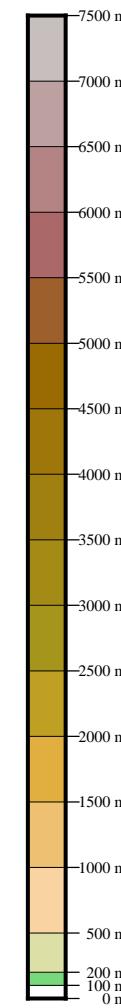


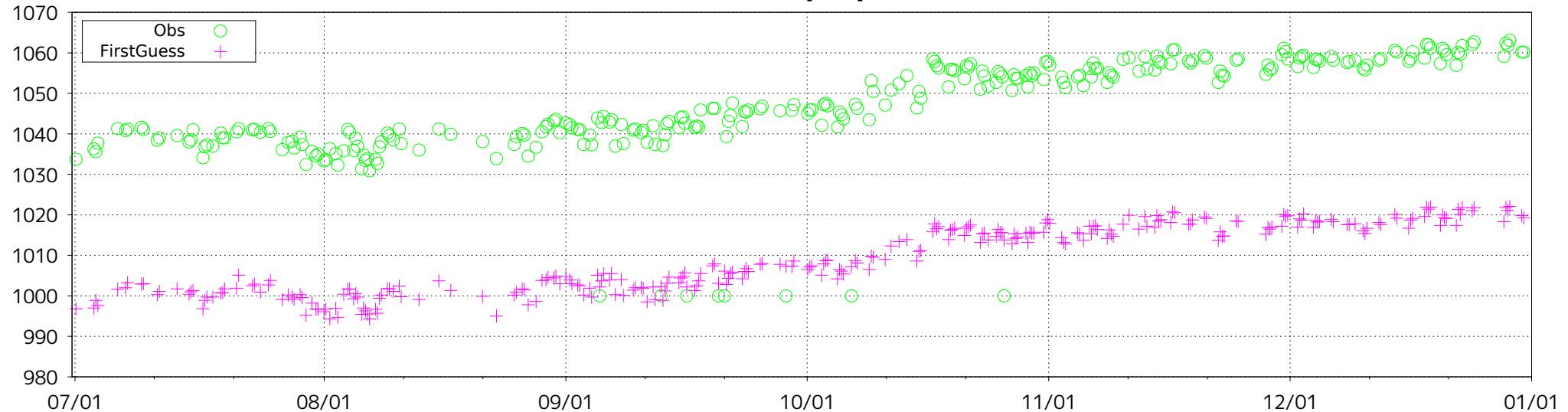
Figure 79 BIAS and SD of MSLP for station 42056 (red) and surrounding stations (blue).

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

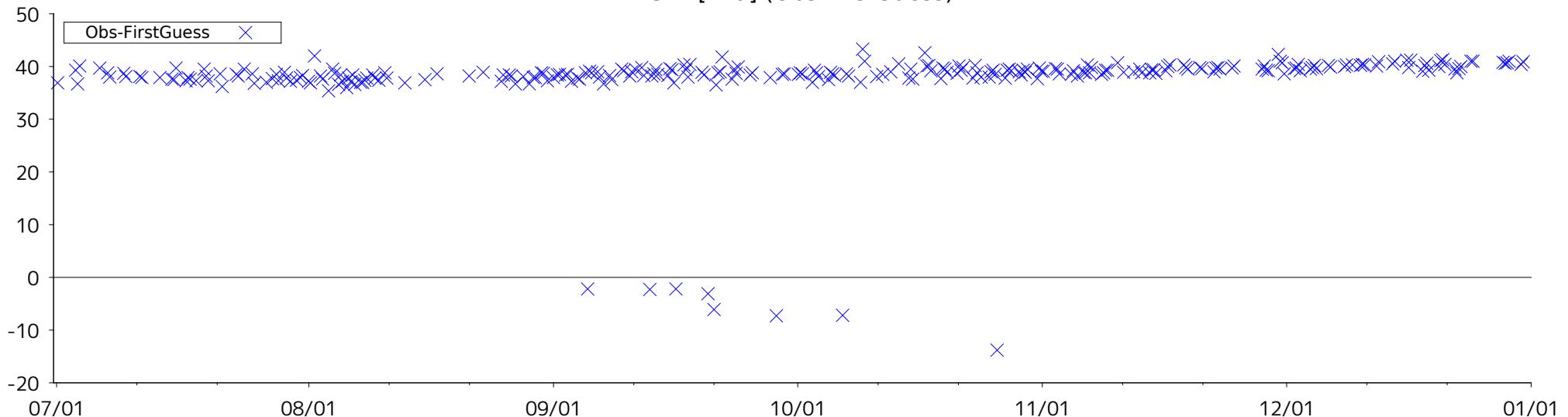
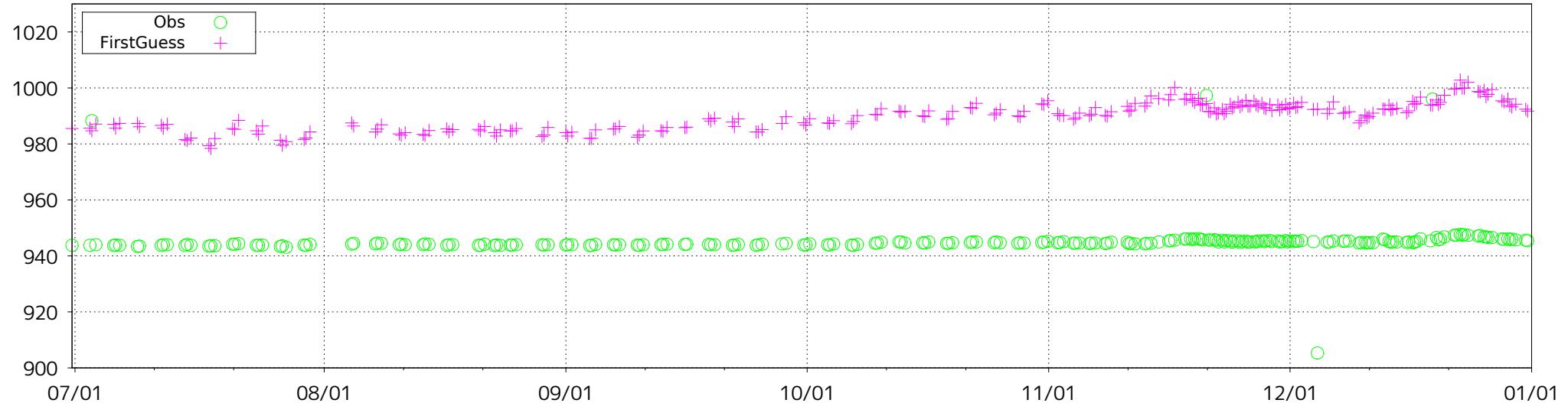


Figure 80 Time-series representation of MSLP Obs minus FirstGuess for station 42056

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

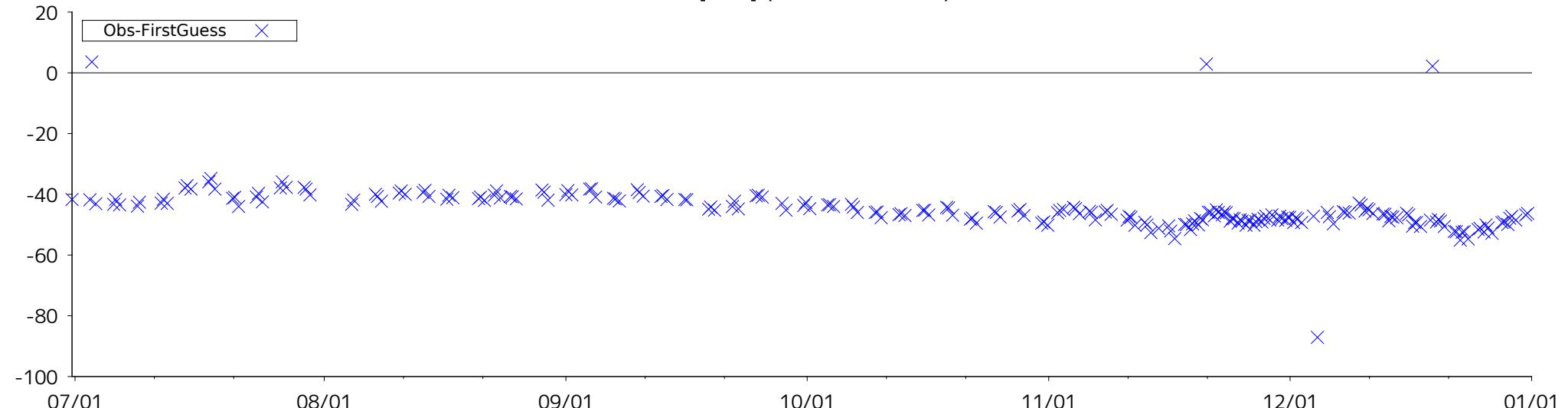
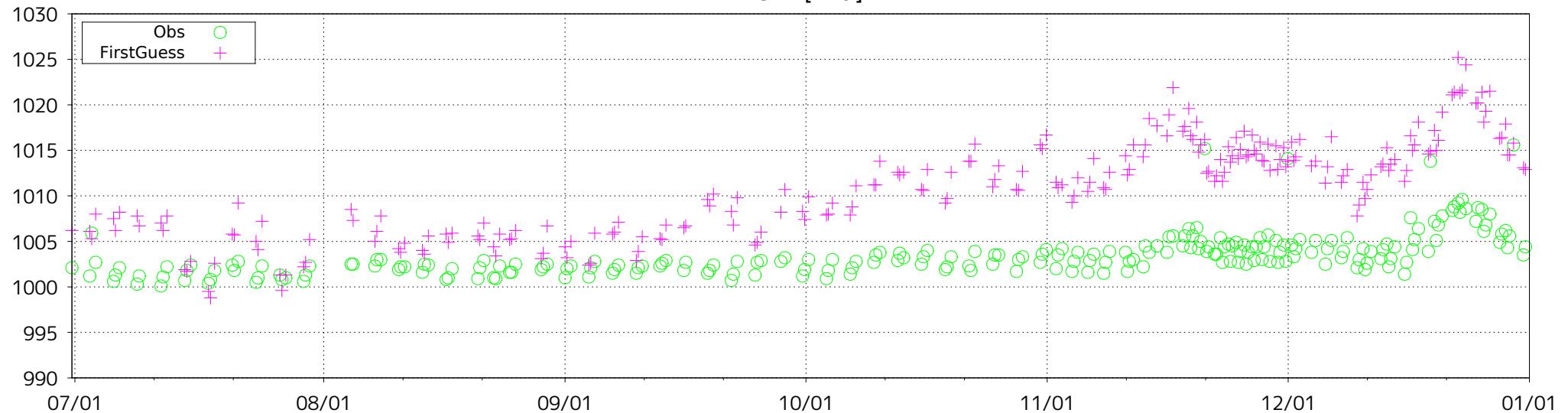


Figure 81(a) Time-series representation of SLP Obs minus FirstGuess for station 48944

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

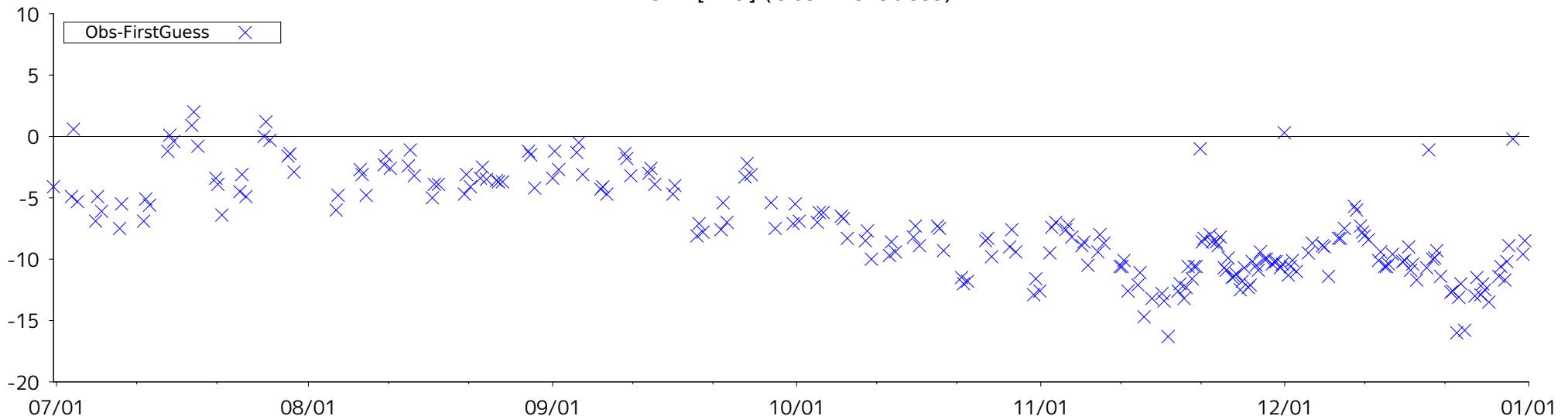
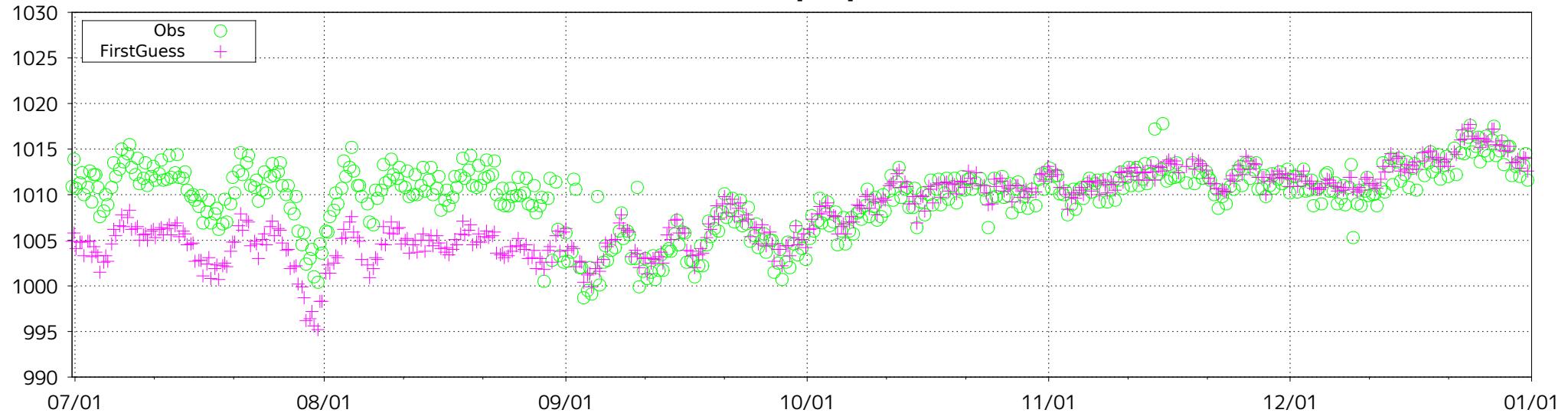


Figure 81(b) Time-series representation of MSLP Obs minus FirstGuess for station 48944

ID: 48062 (lat: 20.1N, lon: 92.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

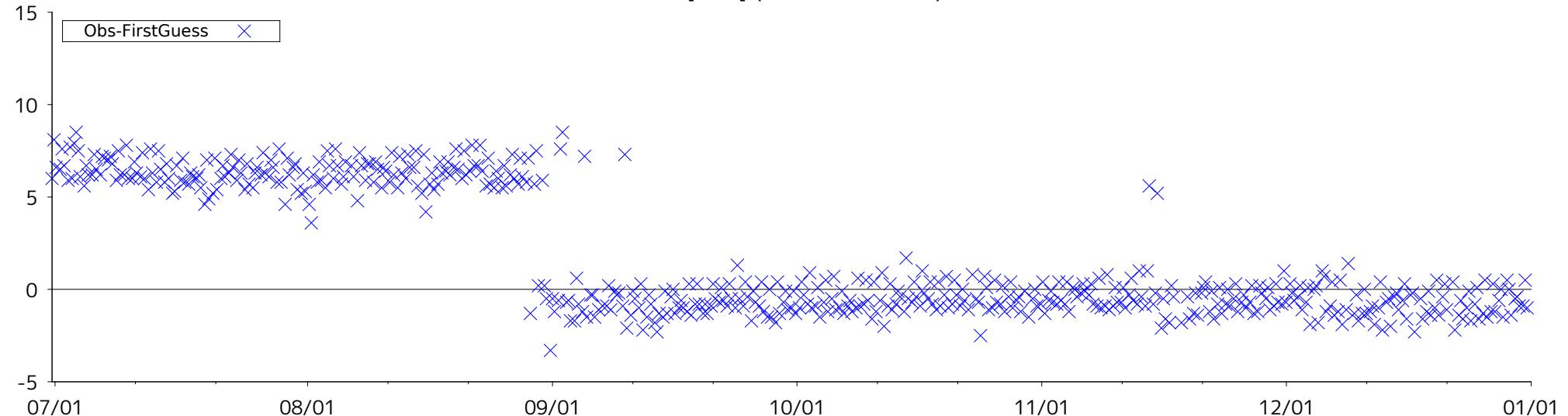
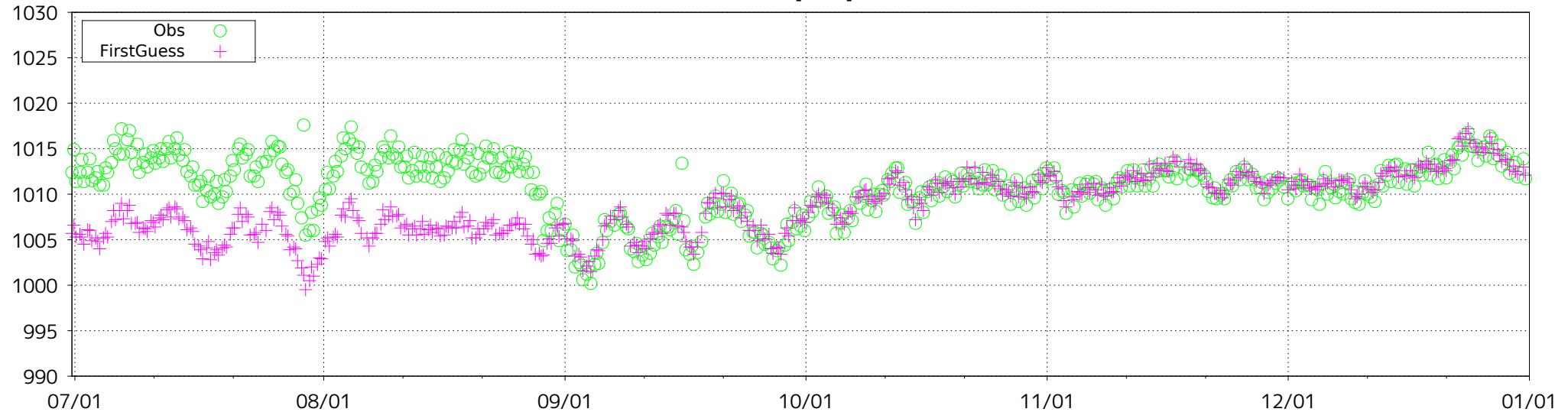


Figure 82 Time-series representation of SLP Obs minus FirstGuess for station 48062

ID: 48085 (lat: 17.6N, lon: 94.6E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

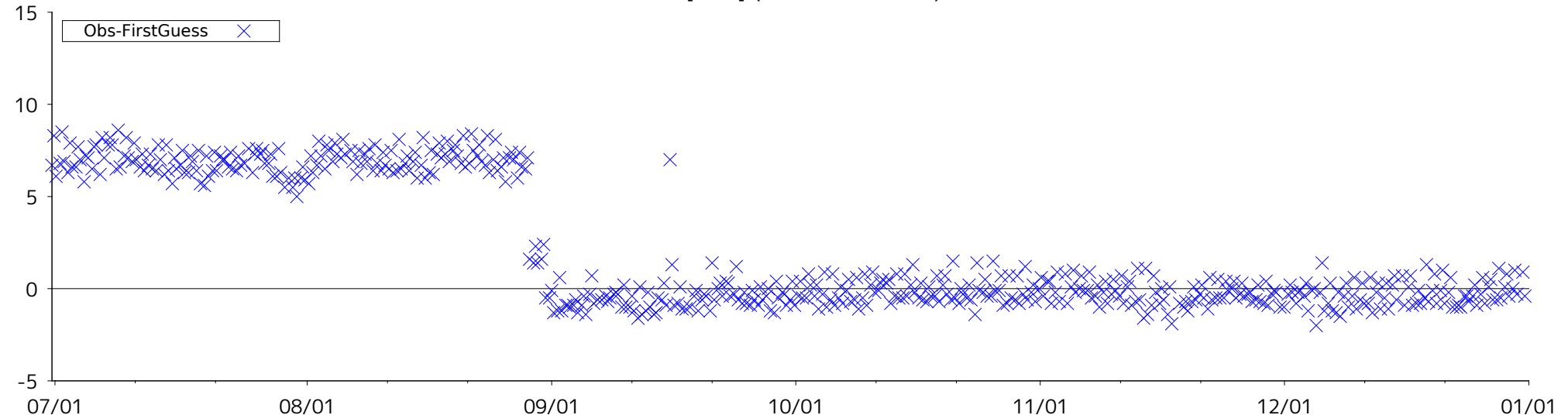
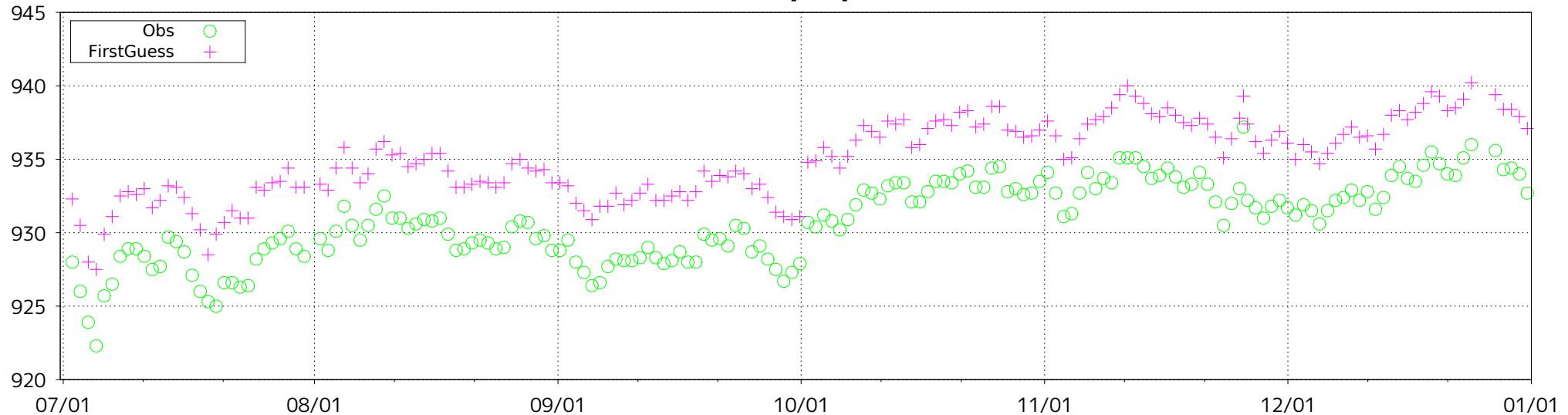


Figure 83 Time-series representation of SLP Obs minus FirstGuess for station 48085

ID: 43113 (lat: 17.5N, lon: 74.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

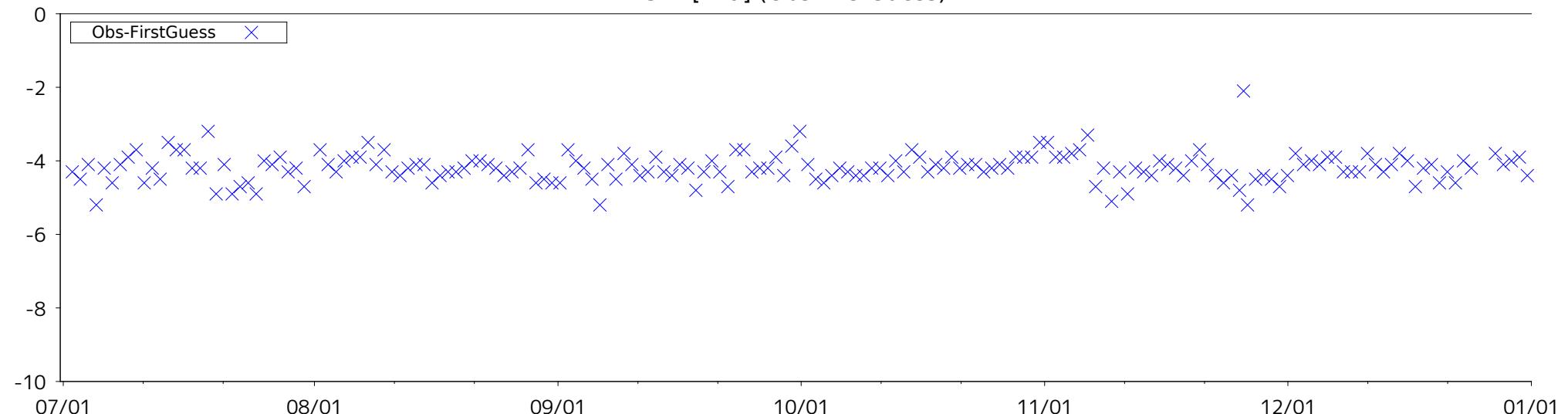


Figure 84 Time-series representation of SLP Obs minus FirstGuess for station 43113