

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

January – June 2021

No. 61

November 2021

**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. 61)
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Summary

In its role as a Lead Center, RSMC Tokyo has issued the 61th report on the land surface observation quality monitoring for the period from January to June 2021. The report includes a consolidated list of stations suspected of producing low-quality observation data.

(1) SLP

As a result of monitoring, six stations (36090, 40785, 40942, 40945, 48935, 51467) were excluded from the consolidated lists of the previous report (July – December 2020), and one station (38232) was newly added to the lists.

(2) MSLP

As a result of monitoring, one station (40621) was excluded from the consolidated lists of the previous report (July – December 2020).

(3) GZ

As a result of monitoring, one station (38878) was excluded from the consolidated lists of the previous report (July – December 2020).

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	1882
MSLP	1980
GZ	87

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 2021

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
35284	50.6	70.0	384	324	SLP	724	0	0.7	6.6	6.6
					MSLP	724	0	0.8	0.7	1.1
38232	43.0	54.1	78	89	SLP	599	61	6.7	10.0	12.0
					MSLP	599	60	0.5	14.3	14.3
38262	43.0	59.8	93	58	SLP	724	0	0.8	3.8	3.9
					MSLP	724	0	0.9	0.6	1.1
38313	43.7	69.0	405	709	SLP	558	78	0.8	14.1	14.1
					MSLP	558	0	2.6	-1.1	2.8
38318	42.1	68.1	183	221	SLP	522	0	0.7	-3.3	3.4
					MSLP	522	0	0.8	1.0	1.3
38719	39.1	68.9	3373	3163	SLP	360	1	3.2	4.9	5.9
					GZ700	722	11	26.8	46.5	53.7
38836	38.6	68.7	800	1188	SLP	720	1	3.2	-3.6	4.8
					MSLP	719	2	4.7	-3.8	6.0
38875	39.0	73.6	3930	4306	SLP	359	100	*****	*****	*****
					-	-	-	-	-	-
38880	38.0	58.4	312	308	SLP	724	1	1.0	11.8	11.8
					MSLP	724	0	1.0	0.0	1.0
38944	37.5	69.4	447	586	SLP	722	0	1.4	-5.8	6.0
					MSLP	723	0	1.8	-6.3	6.6
40587	29.3	47.7	55	79	MSLP	723	5	7.1	3.5	7.9
					-	-	-	-	-	-
40700	39.6	47.9	32	84	SLP	724	0	0.8	-6.3	6.4
					MSLP	724	0	0.8	-0.3	0.9
40713	37.4	46.2	1478	1536	SLP	724	4	0.9	12.6	12.6
					MSLP	724	0	2.8	-2.8	4.0
40741	36.5	61.2	235	290	SLP	724	0	0.8	-5.1	5.2
					MSLP	724	0	0.9	-0.1	0.9
40854	29.1	58.4	940	1157	SLP	709	12	0.6	-13.9	13.9
					MSLP	709	0	2.1	-2.3	3.1
40877	28.0	57.7	470	682	SLP	720	0	0.6	-4.0	4.0
					MSLP	720	0	1.2	-4.4	4.6
41265	22.8	58.5	469	592	SLP	710	0	0.6	-5.2	5.2
					MSLP	709	0	0.8	-2.2	2.3
41573	33.9	73.4	2127	1312	SLP	667	0	1.6	9.1	9.2
					GZ850	667	0	12.9	-1.8	13.0
42056	32.7	74.8	323	308	SLP	703	0	0.8	-6.8	6.8
					-	-	-	-	-	-

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
42083	31.1	77.2	2202	1560	SLP	356	90	0.2	14.8	14.8
42111	30.3	78.0	683	871	SLP	718	0	0.9	5.7	5.8
					MSLP	717	0	1.5	-2.0	2.5
42114	30.4	78.5	770	1525	SLP	357	100	*****	*****	*****
42147	29.5	79.7	2311	1571	SLP	358	0	0.5	4.6	4.6
42295	27.1	88.3	2134	1270	SLP	302	71	0.3	14.7	14.7
					GZ850	302	100	*****	*****	*****
42299	27.3	88.6	1756	1989	SLP	361	0	0.8	0.3	0.9
					GZ850	361	1	10.2	56.3	57.2
43418	8.6	81.3	79	8	SLP	711	0	0.4	4.4	4.4
					MSLP	711	0	0.4	-0.4	0.6
43479	7.0	81.1	670	862	SLP	482	1	0.5	-9.6	9.6
44406	29.3	81.0	617	1547	SLP	484	0	2.1	4.0	4.5
					MSLP	484	0	3.6	-3.3	4.9
44424	29.3	82.2	2300	3288	SLP	462	0	1.3	-6.1	6.2
					GZ700	462	0	14.6	-49.2	51.3
44429	28.1	82.5	634	884	SLP	489	0	0.7	-3.7	3.8
					MSLP	488	0	1.9	0.3	1.9
47037	40.0	125.3	99	215	SLP	724	0	1.7	-3.9	4.3
					MSLP	724	0	1.7	-3.9	4.3
47102	38.0	124.7	146	4	SLP	724	0	0.7	12.2	12.2
					MSLP	724	0	0.6	-1.2	1.3
47145	36.8	127.3	26	112	SLP	723	0	0.7	-6.2	6.2
					MSLP	723	0	0.7	0.9	1.1
47152	35.6	129.3	36	121	SLP	724	0	0.7	-5.8	5.8
					MSLP	724	0	0.7	-0.5	0.9
48001	27.3	97.4	434	794	SLP	470	100	*****	*****	*****
					MSLP	470	1	1.9	-1.1	2.2
48018	24.2	96.3	95	197	SLP	465	0	1.1	3.9	4.1
					MSLP	466	0	1.2	-0.4	1.3
48062	20.1	92.9	5	3	SLP	516	0	1.1	6.3	6.4
					MSLP	516	0	0.6	-0.3	0.7
48085	17.6	94.6	3	78	SLP	514	0	1.1	6.6	6.7
					MSLP	513	0	0.8	-0.5	0.9
48107	15.3	97.9	7	89	SLP	351	0	0.9	-3.5	3.6
					MSLP	351	0	0.9	0.1	0.9
48802	22.4	103.8	1584	1306	SLP	724	0	3.9	-3.7	5.4
					GZ850	724	8	33.6	-30.7	45.5
48921	21.6	101.9	1360	1072	SLP	522	1	1.6	-4.0	4.3
					GZ850	516	100	40.2	36.8	54.5

WMO IDENT	LAT (N)	LON (E)	H (m)	HM (m)	ELEM	NOBS	PGE (%)	SD	BIAS	RMS
48935	19.5	103.1	1094	1196	SLP	527	2	1.9	1.5	2.4
					GZ850	527	9	17.0	-74.8	76.7
48952	15.7	106.4	180	334	SLP	528	0	1.2	3.8	4.0
					MSLP	527	0	1.3	2.4	2.7
54945	35.5	119.6	37	22	SLP	724	0	0.6	-3.5	3.6
					MSLP	724	0	0.6	0.0	0.6
56946	23.6	99.4	1104	1396	SLP	724	0	0.8	-4.1	4.2
					MSLP	724	0	2.8	0.4	2.8
56951	24.0	100.2	1503	1839	SLP	723	1	0.8	-12.9	12.9
					MSLP	723	0	3.3	0.9	3.4
57731	28.0	108.3	418	727	SLP	724	100	0.0	-14.7	14.7
					MSLP	724	0	1.2	0.9	1.5
58921	26.0	117.4	204	530	SLP	723	0	0.7	-6.5	6.5
					MSLP	723	0	0.9	0.0	0.9
59632	22.0	108.6	6	25	SLP	724	0	0.5	-5.1	5.1
					MSLP	724	0	0.5	0.1	0.5

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)

KAZAKHSTAN

35284 - Positive bias of O-G at the station level (Figures 2 and 3)

38232 - Positive bias of O-G at the mean sea level (Figure 4)

38313 - Positive bias of O-G at the station level (Figures 7 and 8)

38318 - Negative bias of O-G at the station level (Figures 7 and 9)

UZBEKISTAN

38262 - Positive bias of O-G at the station level (Figures 5 and 6)

TAJIKISTAN

38719 - Mostly positive bias of O-G at the station level (Figures 7 and 10)

38836 - Mostly negative bias of O-G at the station level and at the mean sea level (Figures 7 and 11)

38875 - Positive bias of O-G at the station level (Figures 7 and 12)

38944 - Negative bias of O-G at the station level and at the mean sea level (Figures 7 and 14)

TURKMENISTAN

38880 - Positive bias of O-G at the station level (Figures 5 and 13)

KUWAIT

40587 - Observed values were constant during the period. (Figure 15)

IRAN, ISLAMIC REPUBLIC OF

40700 - Negative bias of O-G at the station level (Figures 16 and 17)

40713 - Positive bias of O-G at the station level (Figures 16 and 18)

40741 - Negative bias of O-G at the station level (Figures 5 and 19)

40854 - Negative bias of O-G at the station level (Figures 20 and 21)

40877 - Negative bias of O-G at the station level and at the mean sea level (Figures 20 and 22)

OMAN

41265 - Negative bias of O-G at the station level (Figures 23 and 24)

PAKISTAN

41573 - Positive bias of O-G at the station level (Figures 25 and 26)

INDIA

42056 - Negative bias of O-G at the station level (Figures 25 and 27)

42083 - Positive bias of O-G at the station level (Figures 25 and 28)

42111 - Positive bias of O-G at the station level (Figures 25 and 29)

42114 - Negative bias of O-G at the station level (Figures 25 and 30)

42147 - Positive bias of O-G at the station level (Figures 25 and 31)

42295 - Positive bias of O-G at the station level and at 850 hPa (Figures 32 and 33)

42299 - Positive bias of O-G at 850 hPa (Figure 34)

SRI LANKA

43418 - Positive bias of O-G at the station level (Figures 35 and 36)

43479 - Negative bias of O-G at the station level (Figures 35 and 37)

NEPAL

44406 - Mostly positive bias of O-G at the station level (Figures 38 and 39)

44424 - Negative bias of O-G at the station level and at 700 hPa (Figures 38 and 40)

44429 - Negative bias of O-G at the station level (Figures 38 and 41)

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF

47037 - Mostly negative bias of O-G at the station level and at the mean sea level (Figures 42 and 43)

KOREA, REPUBLIC OF

- 47102** - Positive bias of O-G at the station level (Figures 42 and 44)
47145 - Negative bias of O-G at the station level (Figures 42 and 45)
47152 - Negative bias of O-G at the station level (Figures 42 and 46)

REPUBLIC OF THE UNION OF MYANMAR

- 48001** - Positive bias of O-G at the station level (Figures 47 and 48)
48018 - Positive bias of O-G at the station level (Figures 47 and 49)
48062 - Positive bias of O-G at the station level (Figures 47 and 50)
48085 - Positive bias of O-G at the station level (Figures 51 and 52)
48107 - Negative bias of O-G at the station level (Figures 51 and 53)

VIET NAM

- 48802** - Negative bias of O-G at the station level and at 850 hPa (Figures 54 and 55)
However, the negative bias of O-G at the station level and at 850 hPa has improved since April 2021.

LAO PEOPLE'S DEMOCRATIC REPUBLIC

- 48921** - Negative bias of O-G at the station level and at 850 hPa (Figures 54 and 56)
48935 - Negative bias of O-G at 850 hPa (Figure 57)
48952 - Positive bias of O-G at the station level (Figures 58 and 59)

CHINA

- 54945** - Negative bias of O-G at the station level (Figures 42 and 60)
56946 - Negative bias of O-G at the station level (Figures 54 and 61)
56951 - Negative bias of O-G at the station level (Figures 54 and 62)
57731 - Negative bias of O-G at the station level (Figures 63 and 64)
58921 - Negative bias of O-G at the station level (Figures 65 and 66)
59632 - Negative bias of O-G at the station level (Figures 67 and 68)

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
38232	43.0	54.1	78	89	SLP MSLP	599 599	61 60	6.7 0.5	10.0 14.3	12.0 14.3

KAZAKHSTAN

38232 - Positive bias of O-G at the station level (Figures 5 and 69)

The positive bias of O-G at the station level appears to have been observed since January 2021.

4.3 Stations improved and excluded from the previous consolidated list

RUSSIAN FEDERATION IN ASIA

36090 - Improved at the station level (Figure 70)

TAJIKISTAN

38878 - Improved at 700 hPa (Figure 71)

IRAQ

40621 - Improved at the mean sea level (Figure 72)

4.4 Stations removed from the previous consolidated list

IRAN, ISLAMIC REPUBLIC OF

40785 - Although station 40785 still displays positive biases of O-G at the station level, it was removed from the consolidated list because the biases did not exceed the threshold. (Figure 73)

AFGHANISTAN

40942 - No reports during the period

40945 - Although station 40945 still displays negative biases of O-G at the station level, it was removed from the consolidated list because the number of reports (125) was insufficient for quality checking. (Figure 74)

LAO PEOPLE'S DEMOCRATIC REPUBLIC

48935 - Although station 48935 still displays positive biases of O-G at the station level, it was removed from the consolidated list because the biases did not exceed the threshold. (Figure 75)

CHINA

51467 - Although station 51467 still displays negative biases of O-G at the station level, it was removed from the consolidated list because the difference between the station elevation and the model elevation (1,007 m) was greater than 1,000 m.

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.

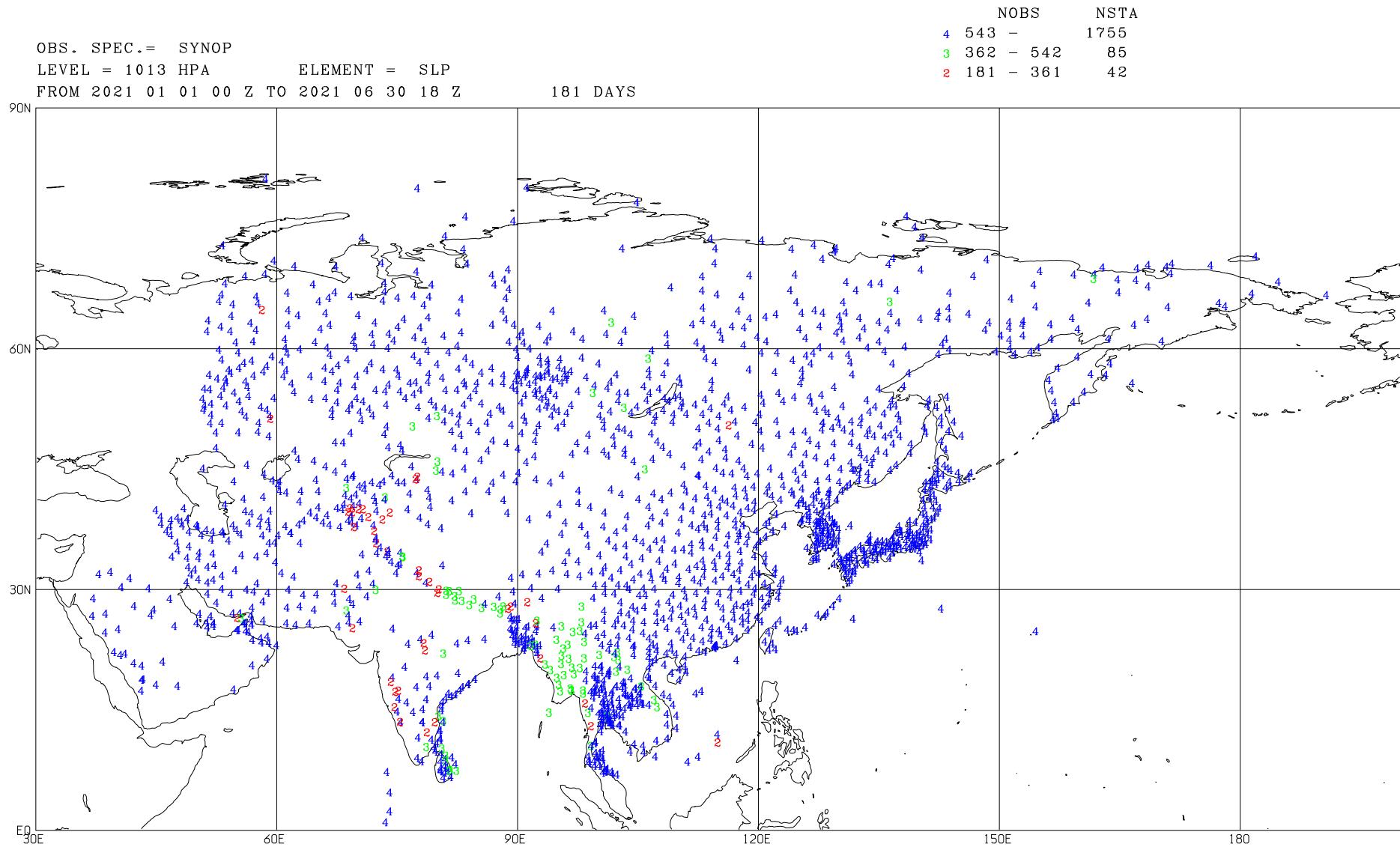


Figure 1(a) Location of all land surface stations reporting station level pressure (SLP) observations in Region II over the six-month period from January to June 2021. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting SLP are shown at the top of the figure.

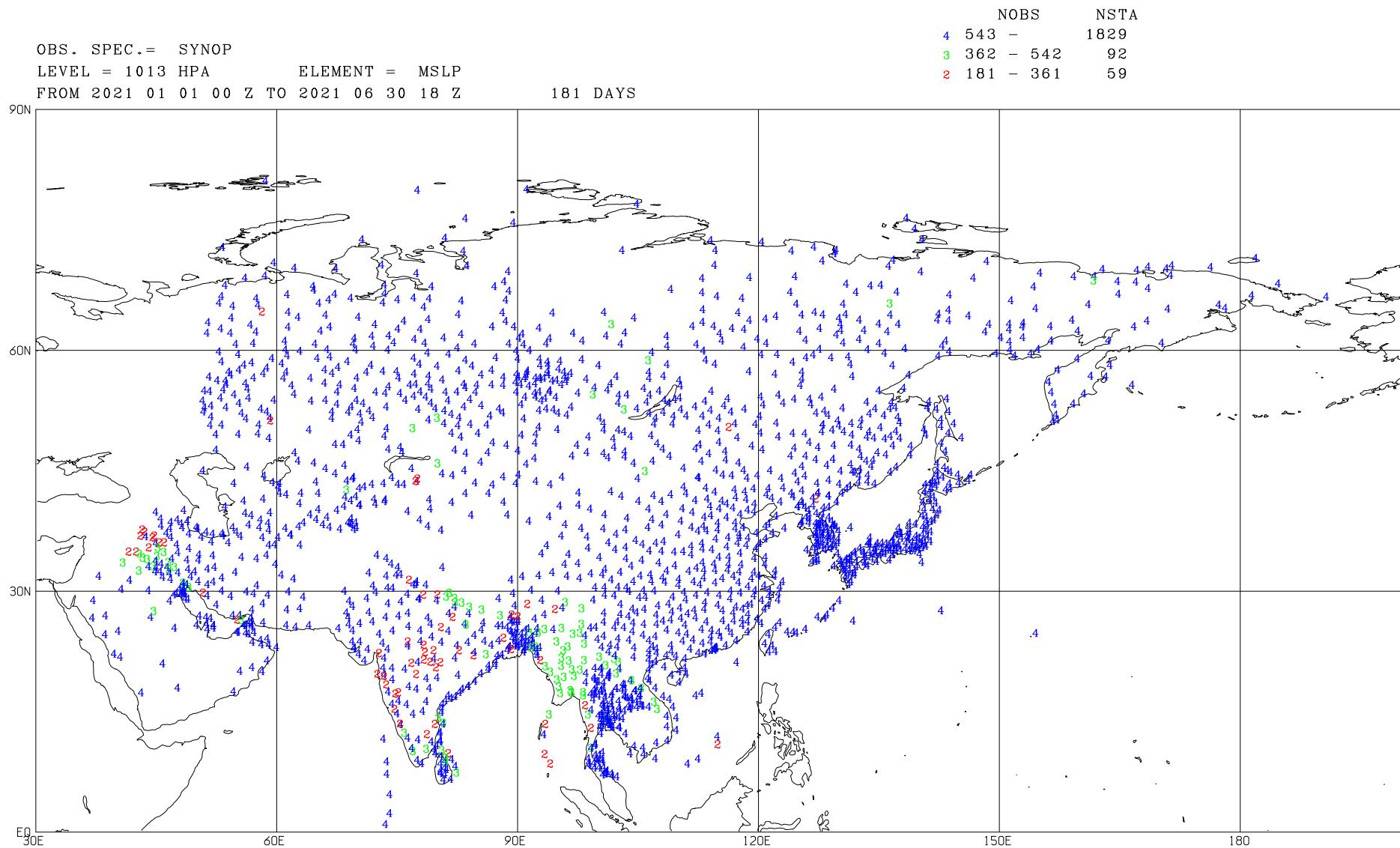


Figure 1(b) Location of all land surface stations reporting mean sea level pressure (MSLP) observations in Region II over the six-month period from January to June 2021. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting MSLP are shown at the top of the figure.

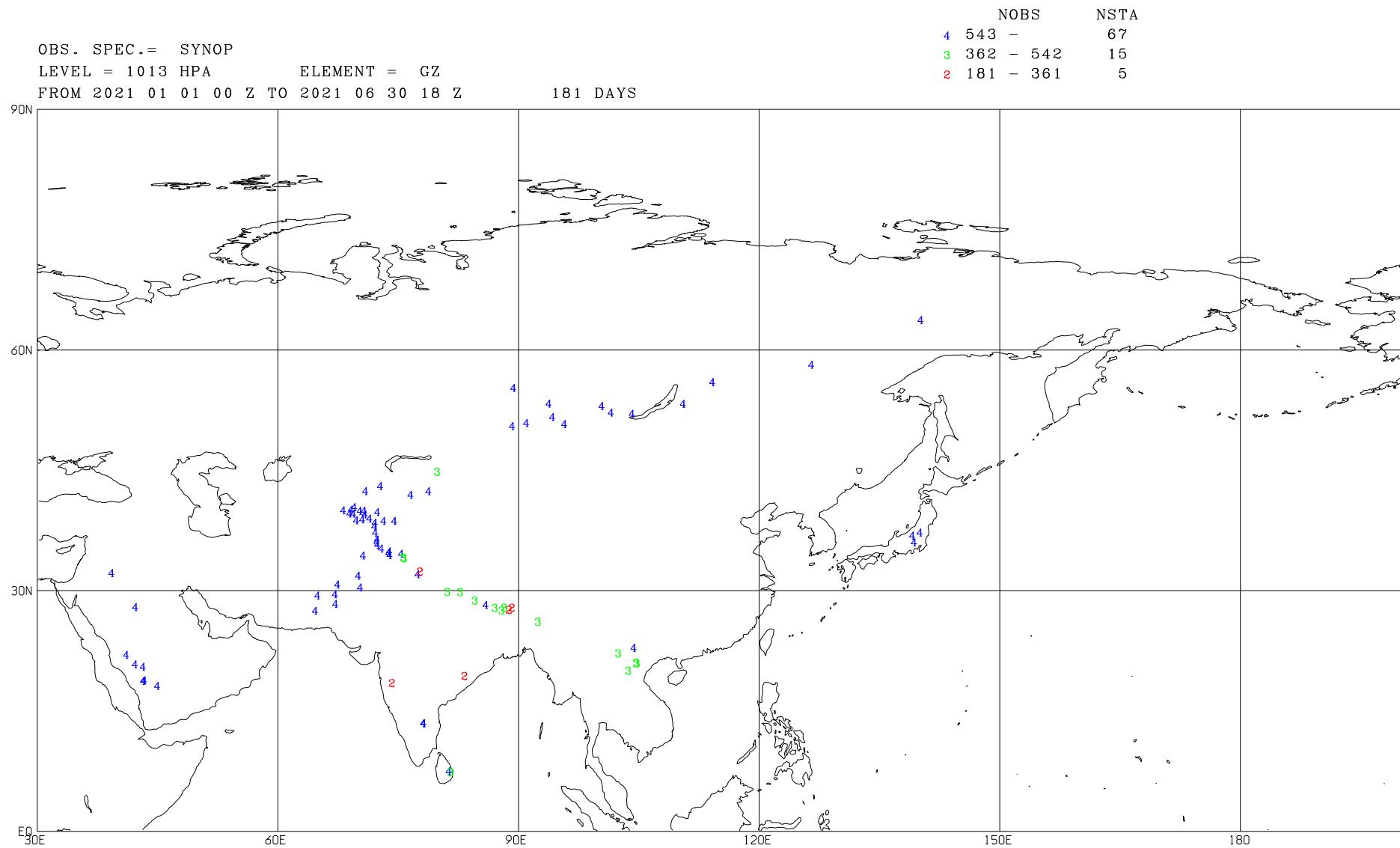
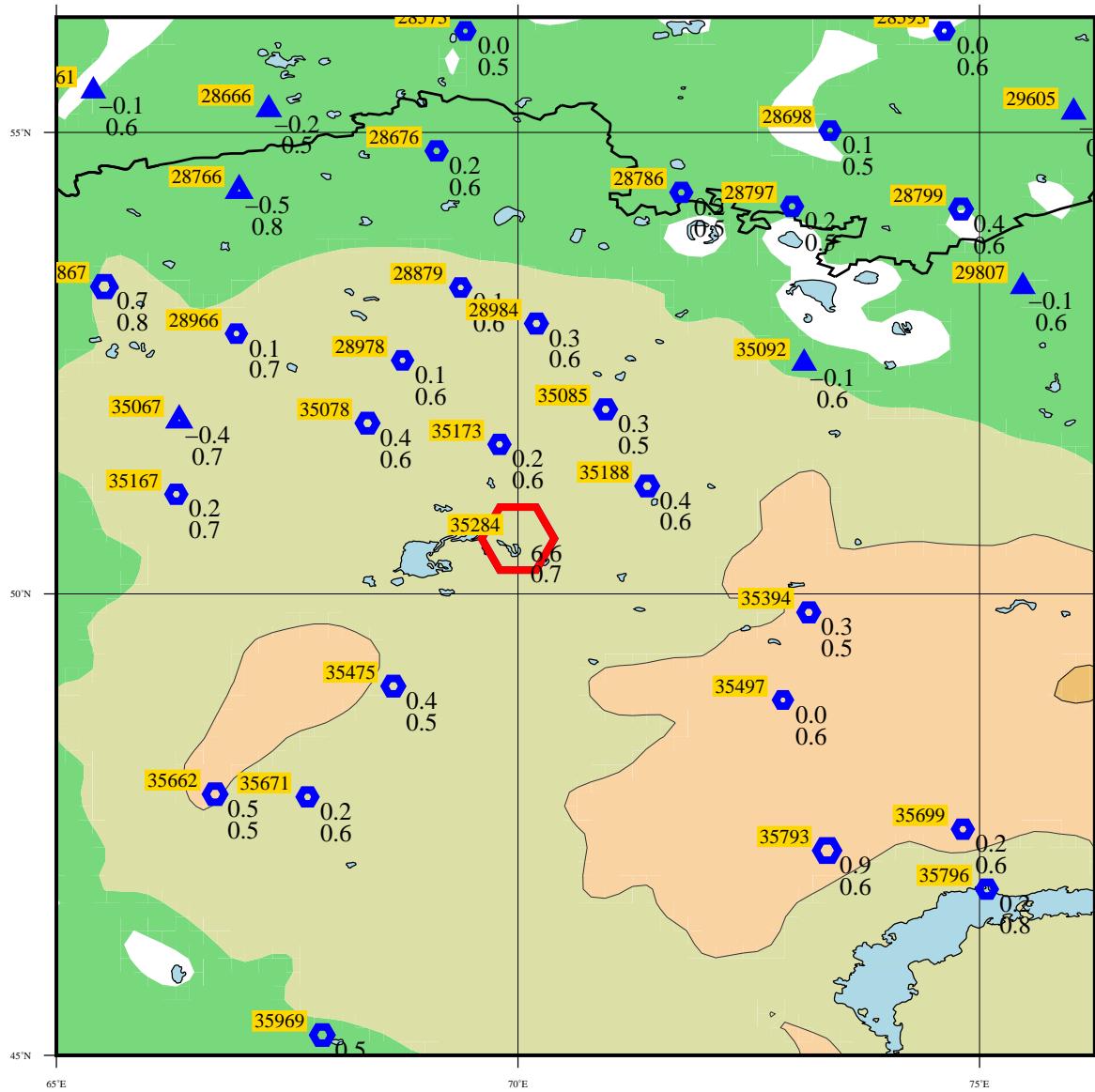


Figure 1(c) Location of all land surface stations reporting geopotential height (GZ) observations in Region II over the six-month period from January to June 2021. Numbers (2, 3, 4) show the total number of observations (NOBS) received at RSMC Tokyo. The total numbers of stations (NSTA) reporting GZ are shown at the top of the figure.

LEVEL = SUR ELEMENT = SI

LEVEL = SUR ELEMENT = SI

2021 01 01 00 UTC -> 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

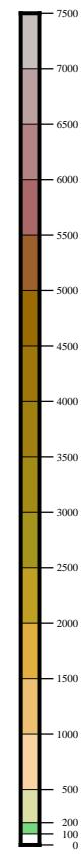


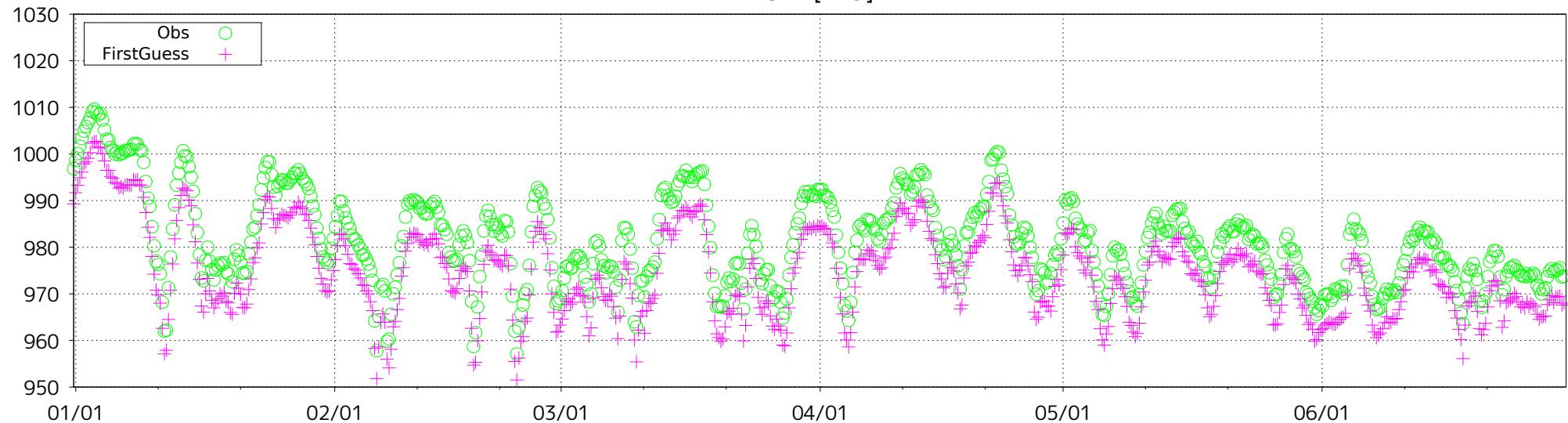
Figure 2 BIAS and SD of SLP for station 35284 (red) and surrounding stations (blue).

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 number to the upper-left of each symbol is the W_{BIAS} , and those to the lower-right are the values of SD_{BIAS} and SD_{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)

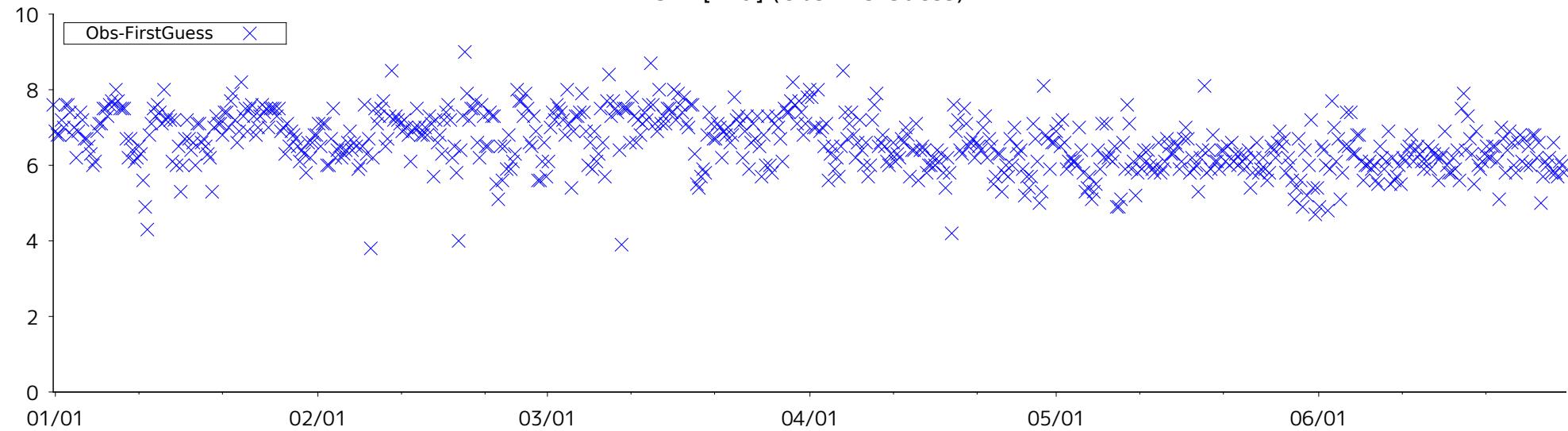
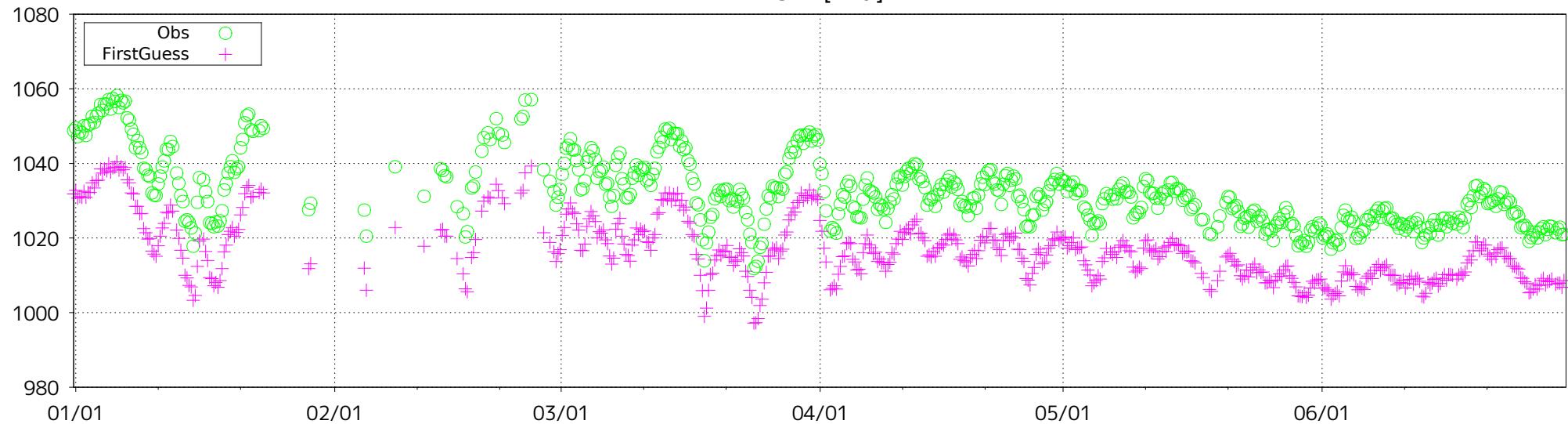


Figure 3 Time-series representation of SLP Obs minus FirstGuess for station 35284

ID: 38232 (lat: 43.0N, lon: 54.1E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

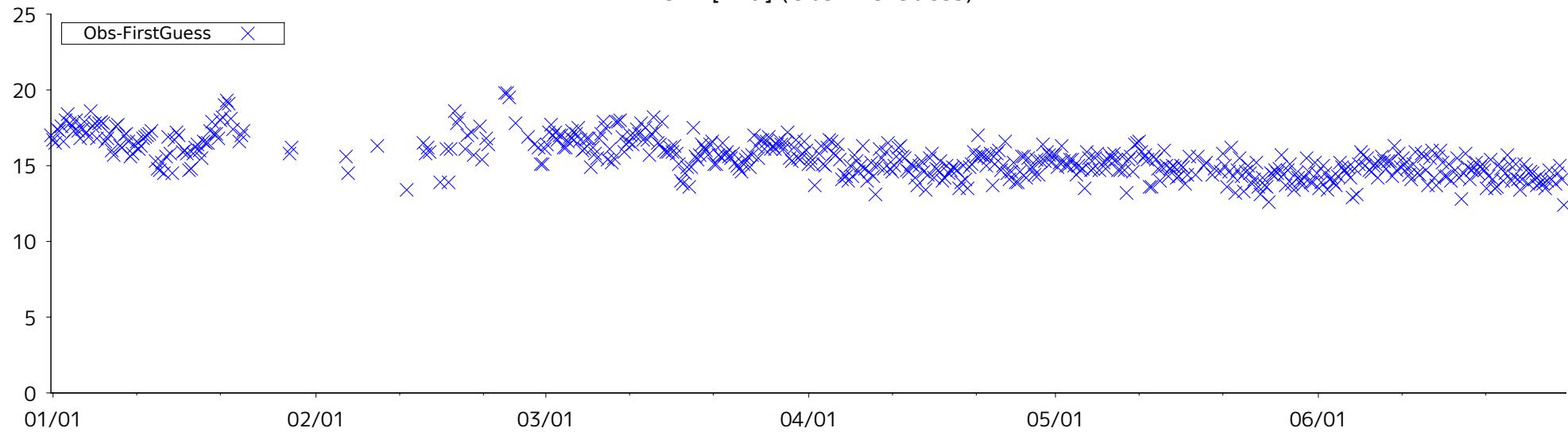
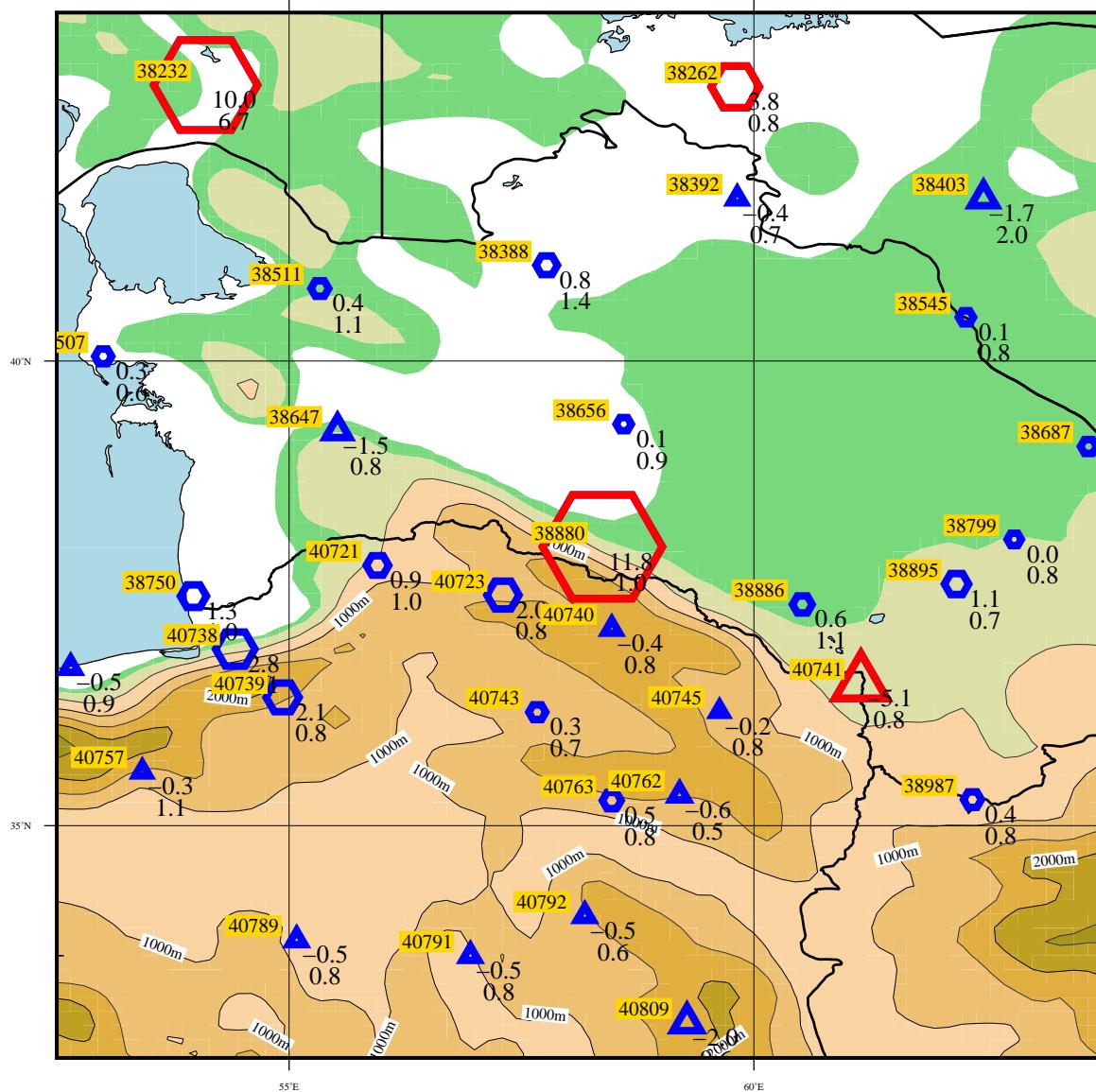


Figure 4 Time-series representation of MSLP Obs minus FirstGuess for station 38232

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

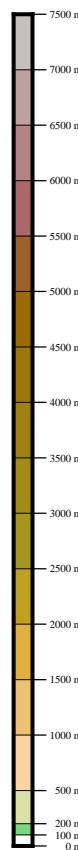


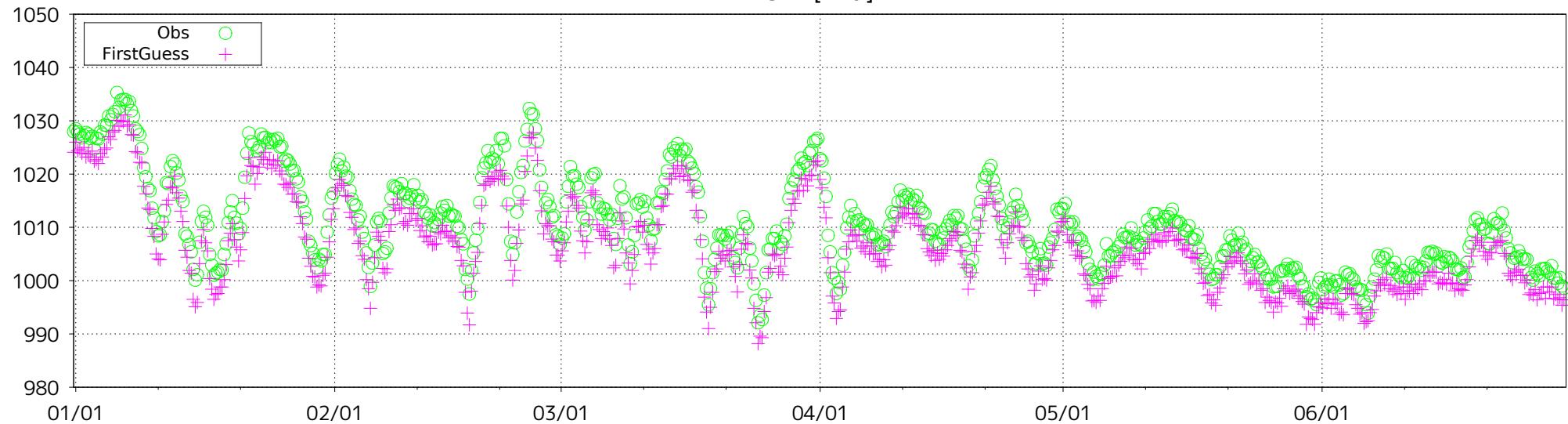
Figure 5 BIAS and SD of SLP for station 38232, 38262, 38880, 40741 (red) and surrounding stations (blue).

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)

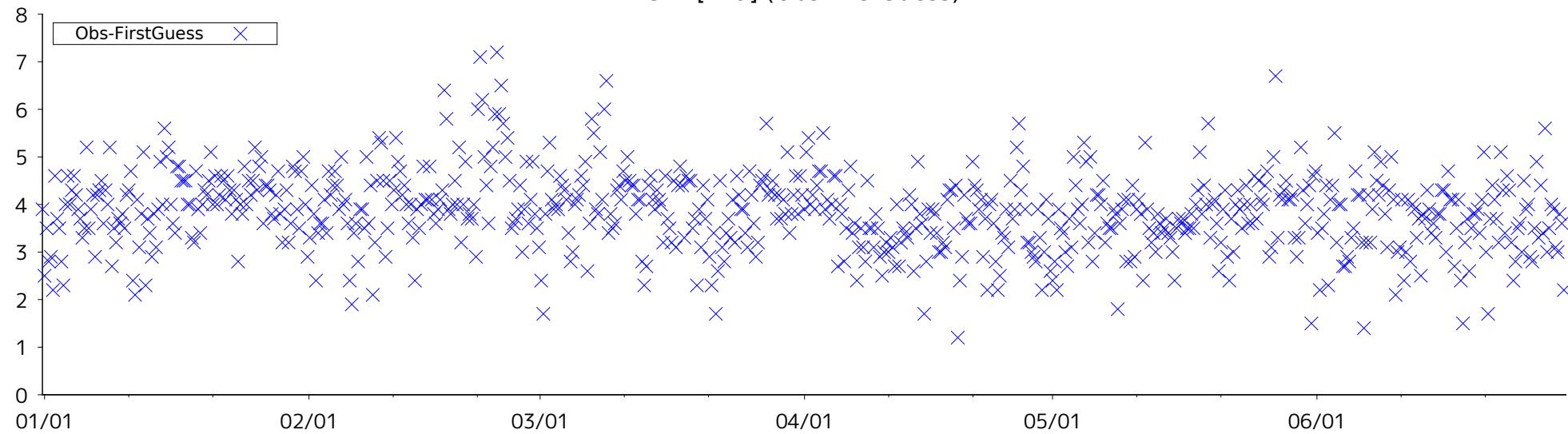
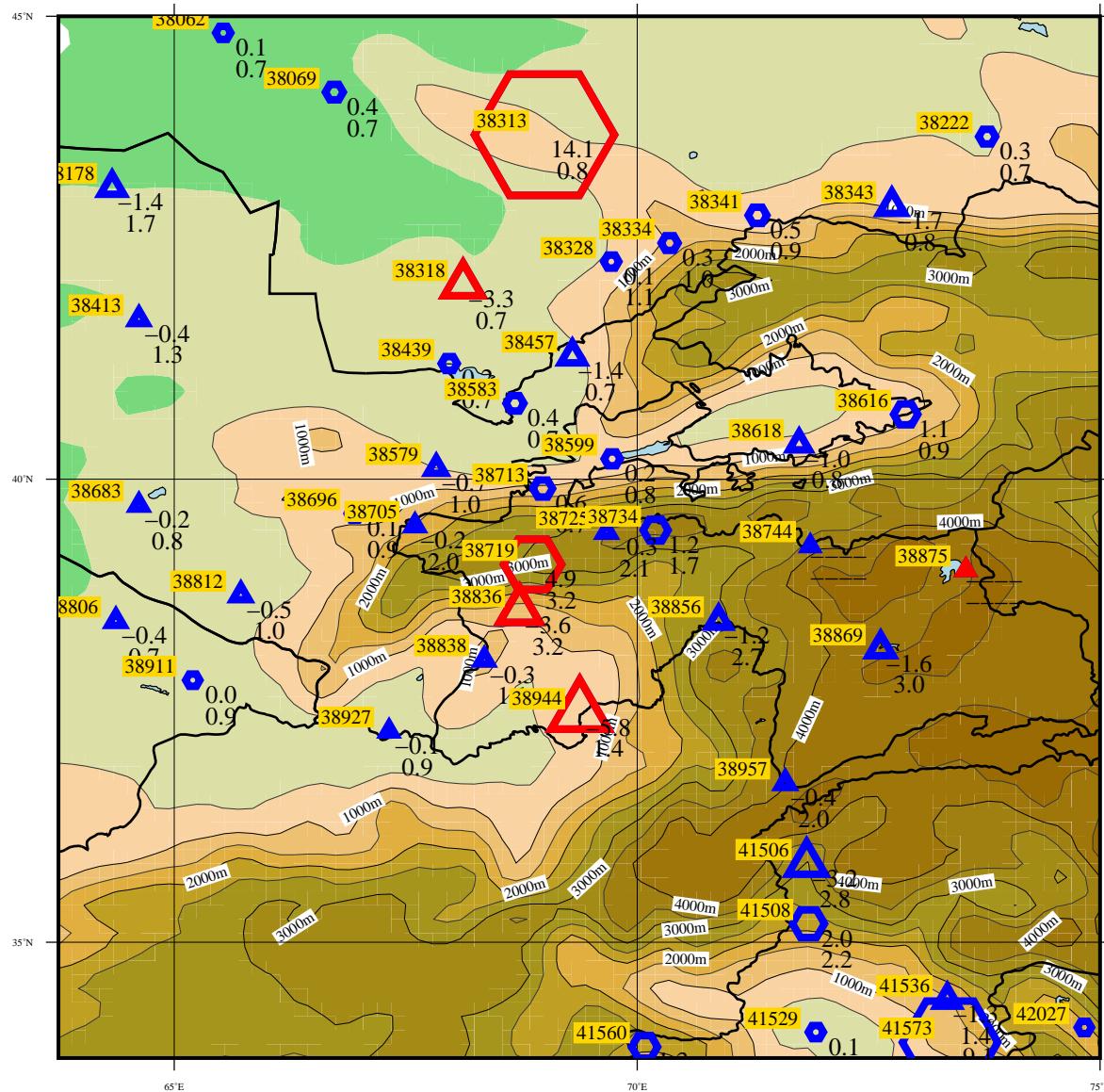


Figure 6 Time-series representation of SLP Obs minus FirstGuess for station 38262

LEVEL = SUR ELEMENT = S

LEVEL = SUR ELEMENT = SLP
2021 01 01 00 UTC -> 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

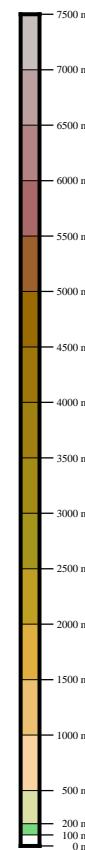


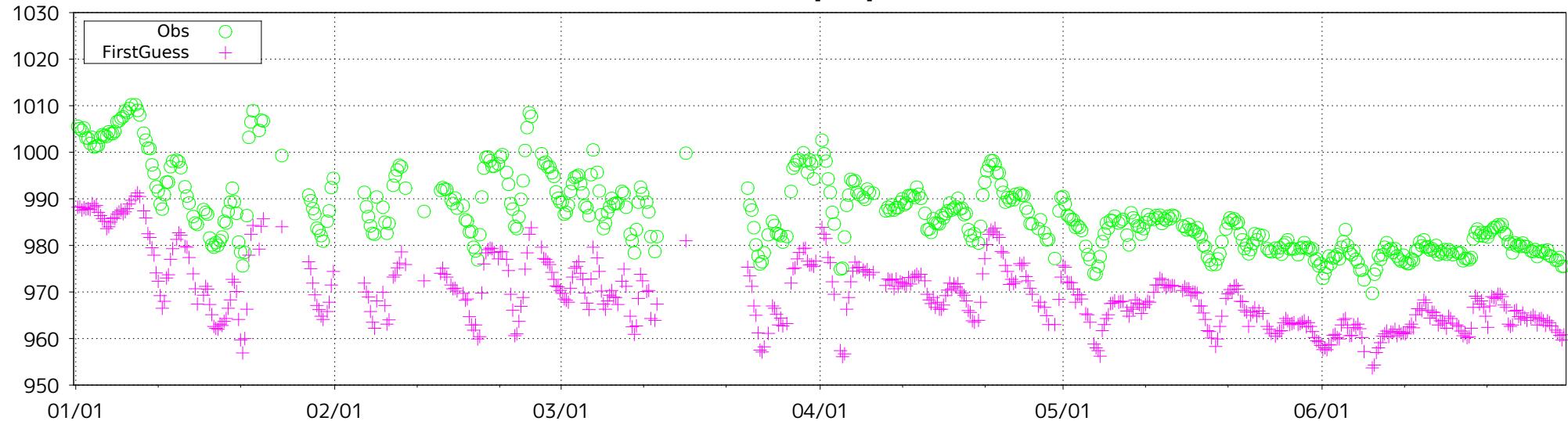
Figure 7 BIAS and SD of SLP for station 38313, 38318, 38719, 38836, 38875, 38944 (red) and surrounding stations (blue).

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 number to the upper-left of each symbol is the **WEIGHT**, 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)

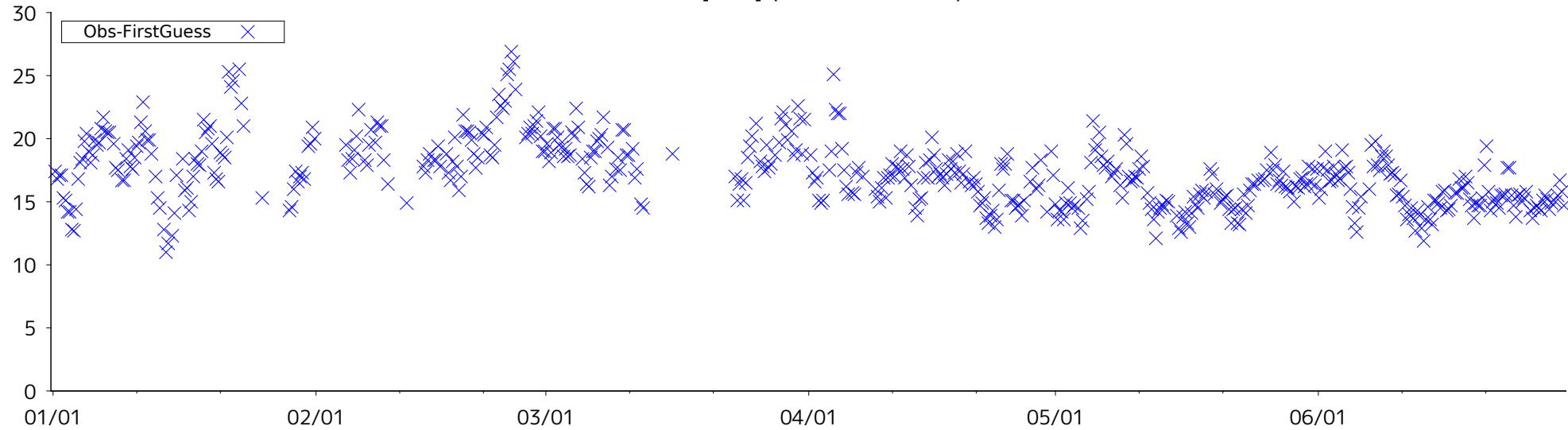
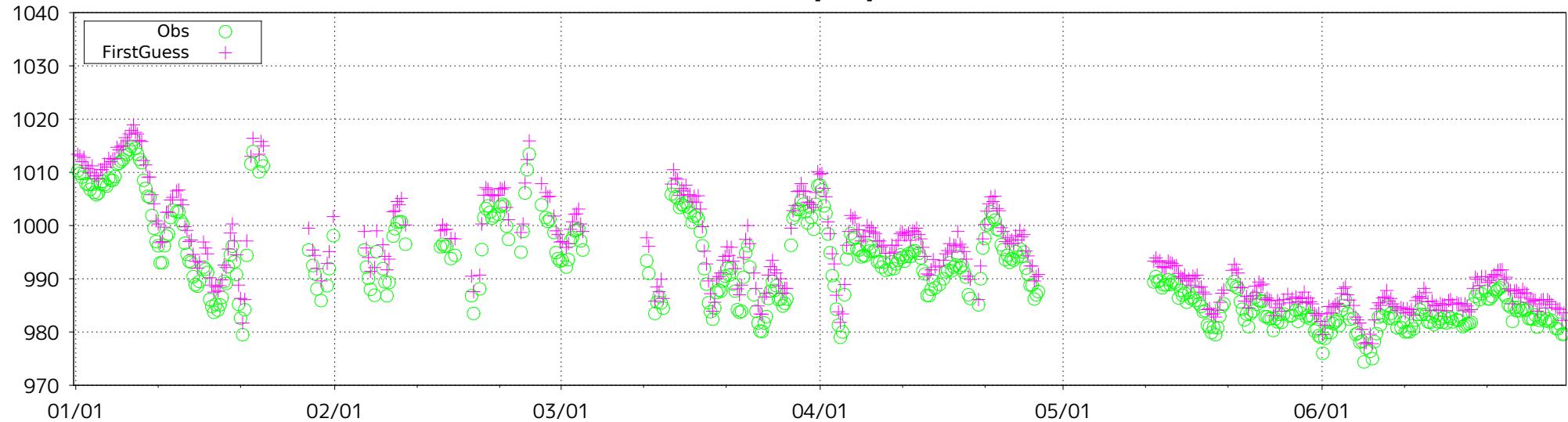


Figure 8 Time-series representation of SLP Obs minus FirstGuess for station 38313

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

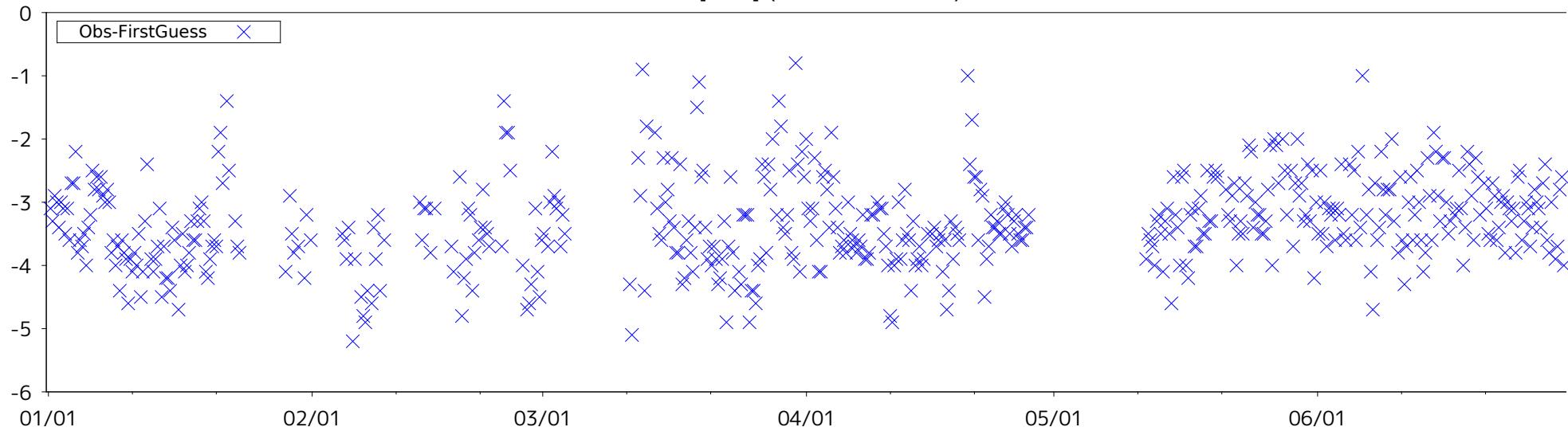
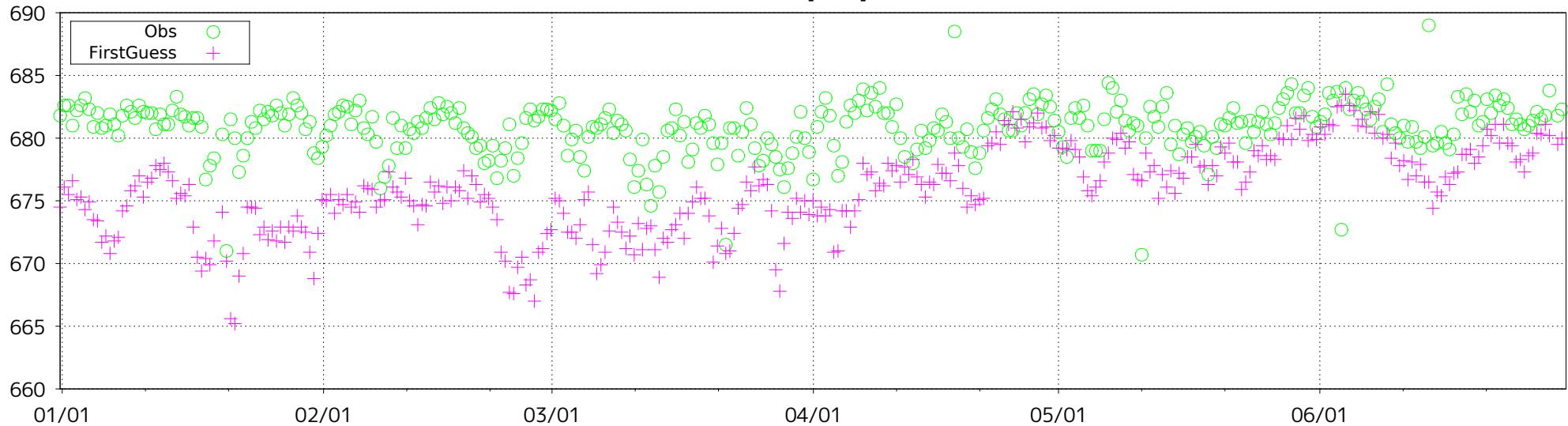


Figure 9 Time-series representation of SLP Obs minus FirstGuess for station 38318

ID: 38719 (lat: 39.1N, lon: 68.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

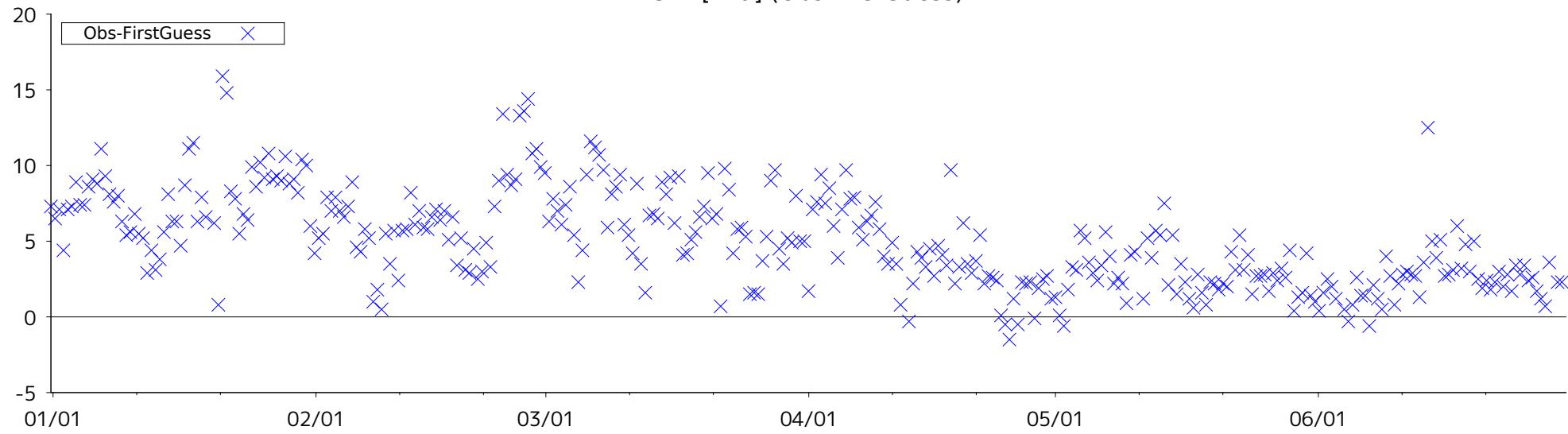
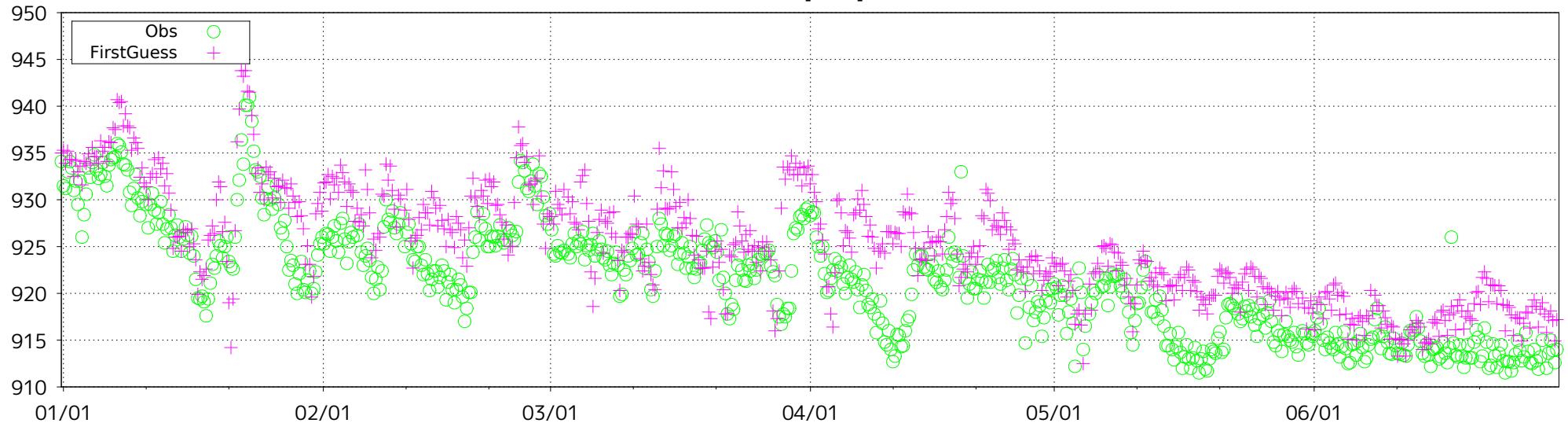


Figure 10 Time-series representation of SLP Obs minus FirstGuess for station 38719

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

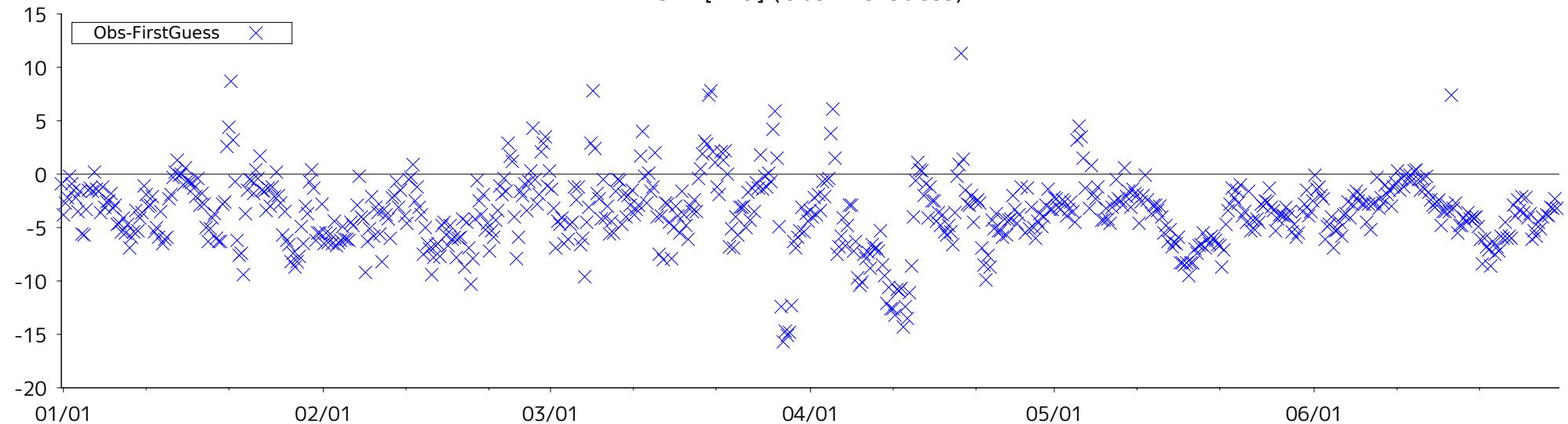
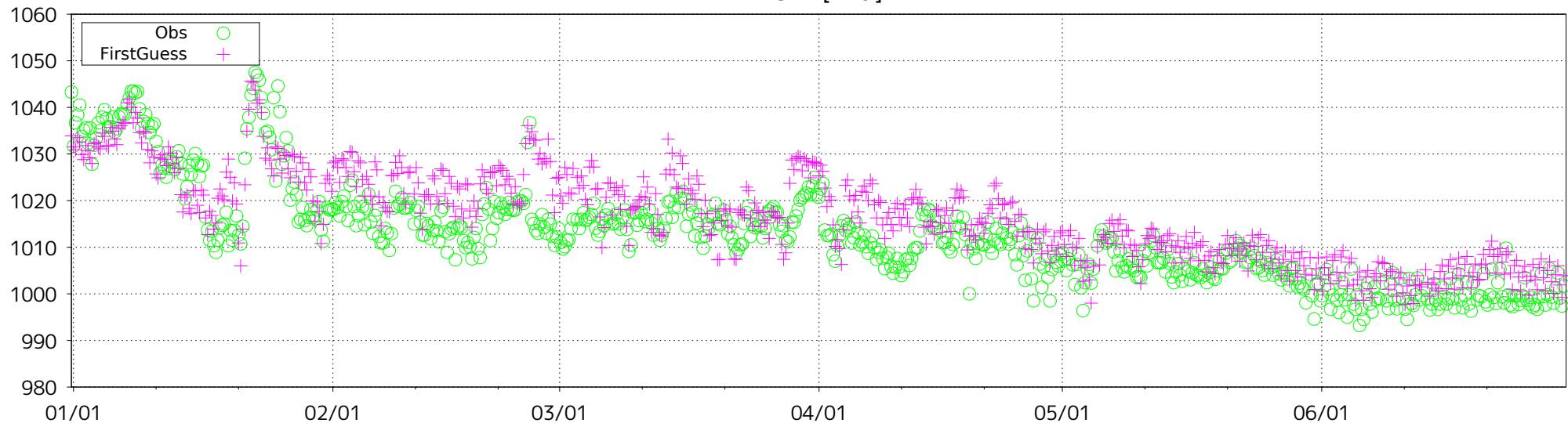


Figure 11(a) Time-series representation of SLP Obs minus FirstGuess for station 38836

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

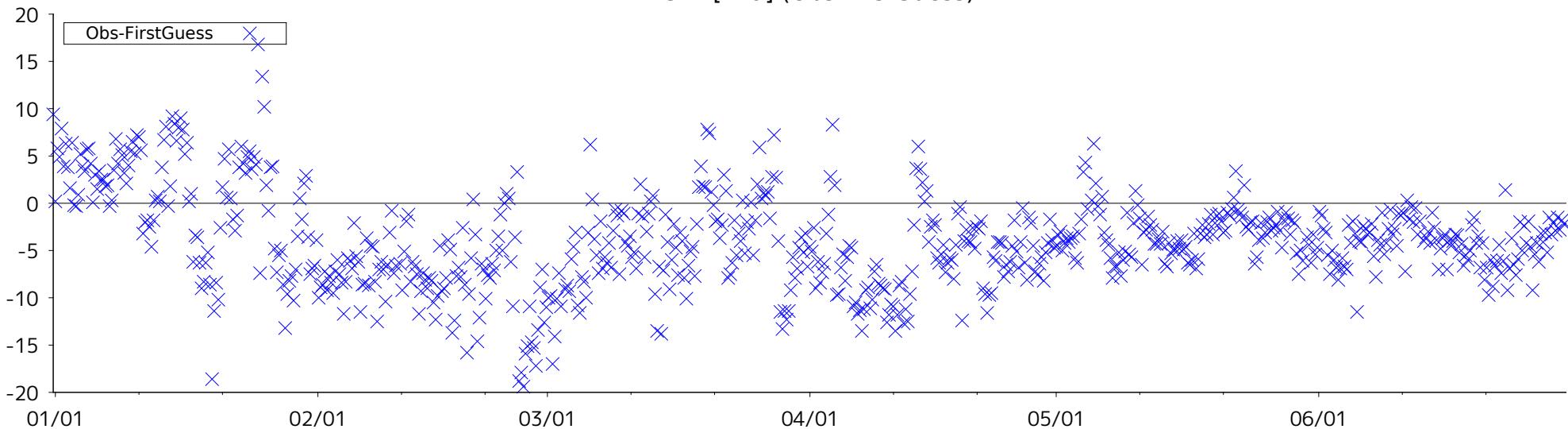
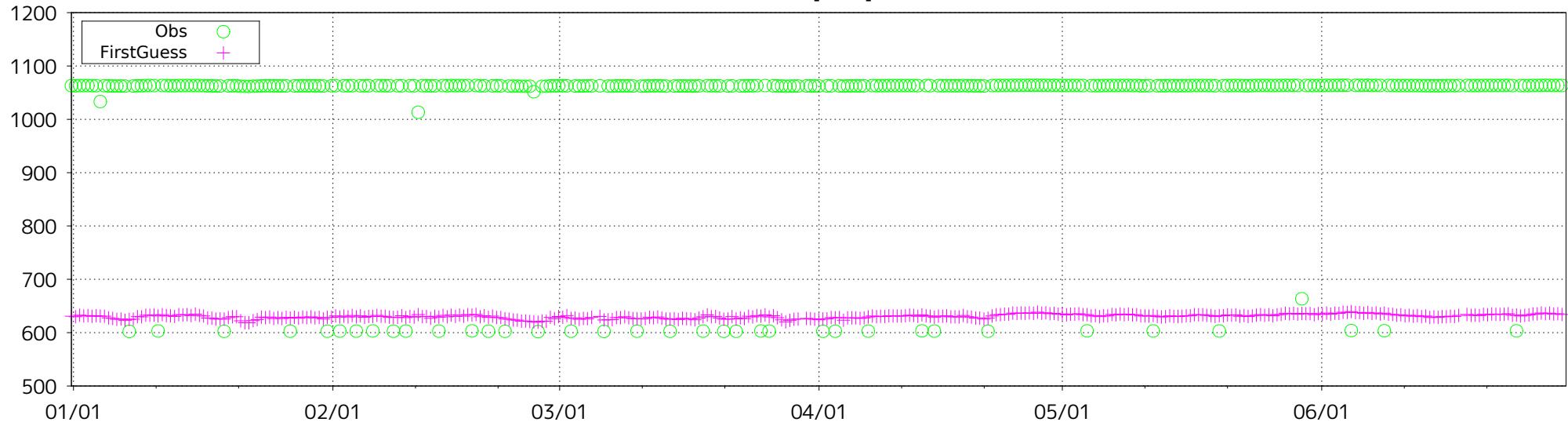


Figure 11(b) Time-series representation of MSLP Obs minus FirstGuess for station 38836

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

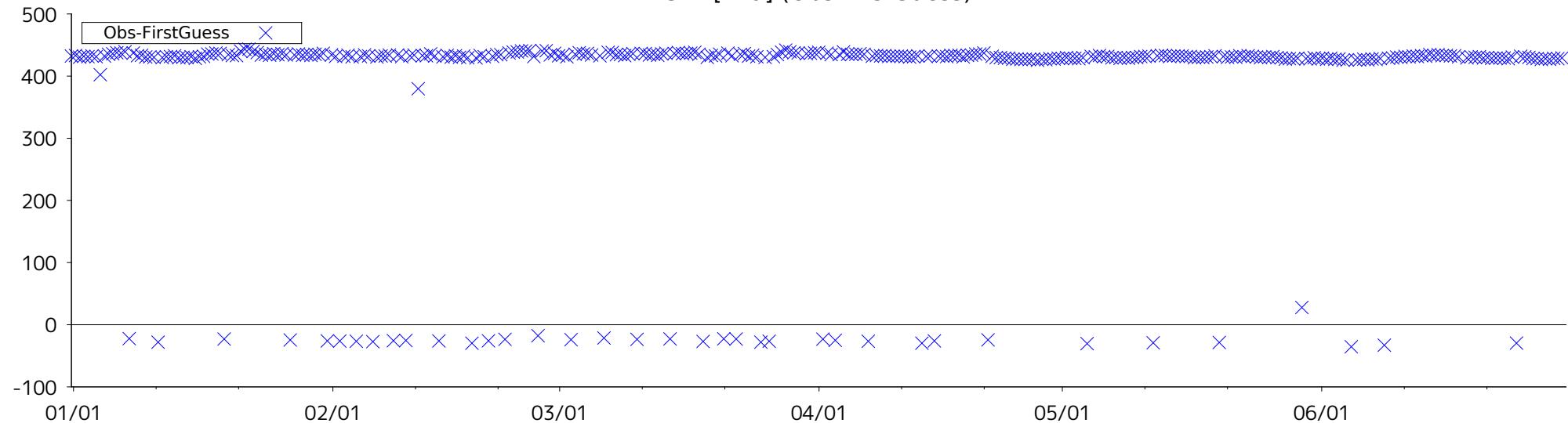
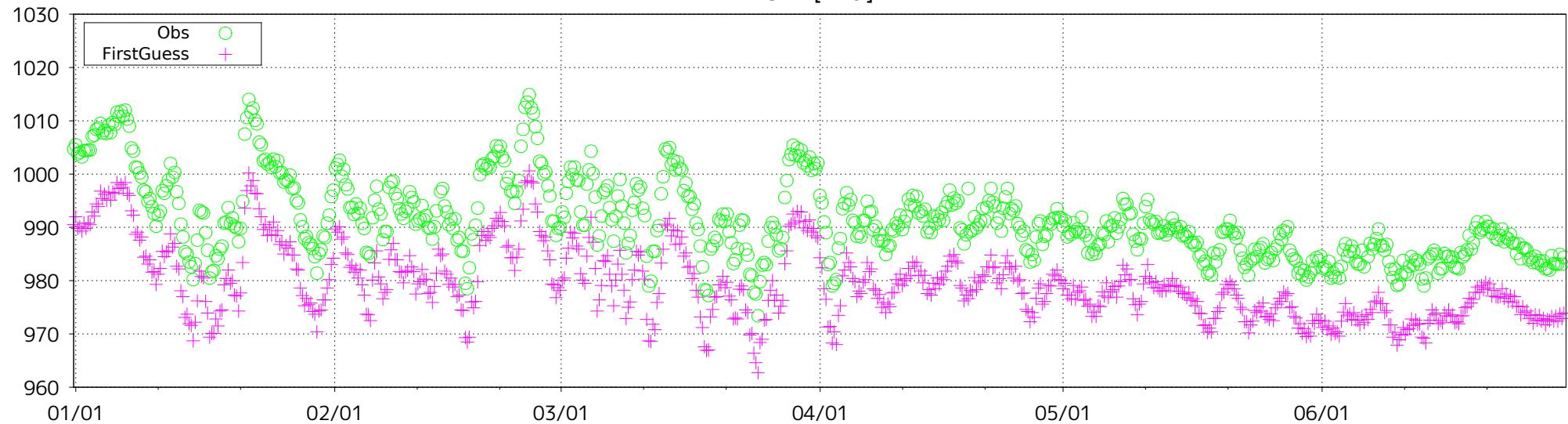


Figure 12 Time-series representation of SLP Obs minus FirstGuess for station 38875

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

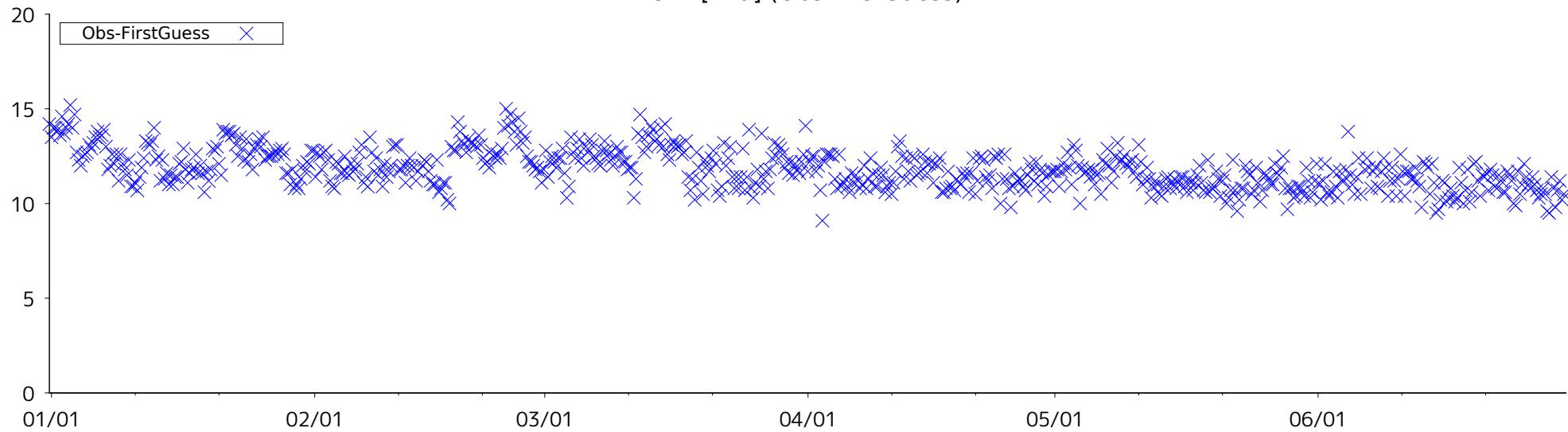
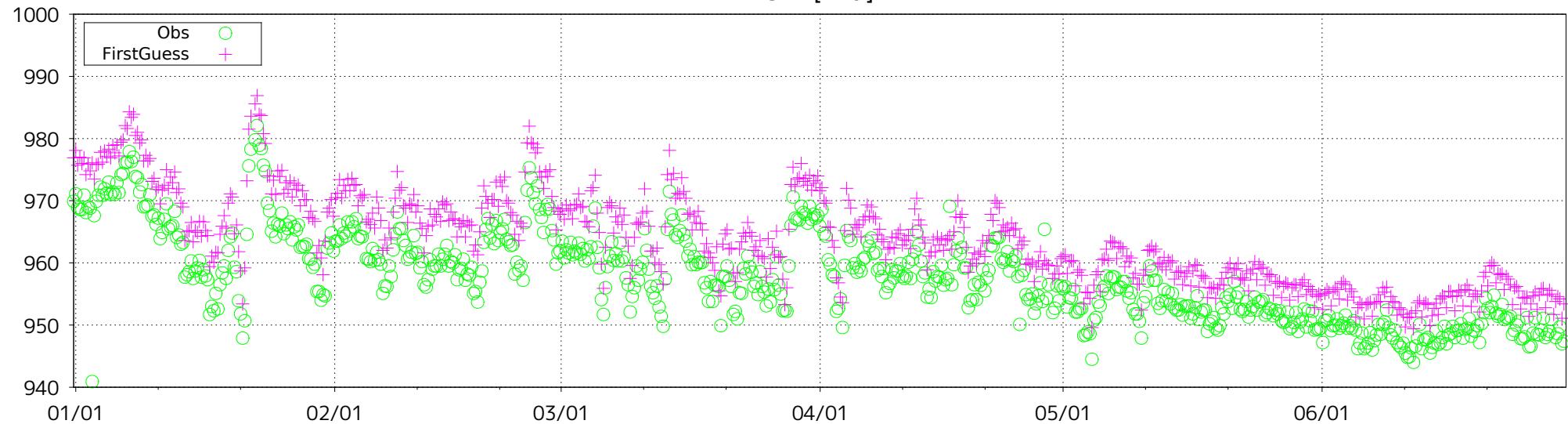


Figure 13 Time-series representation of SLP Obs minus FirstGuess for station 38880

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

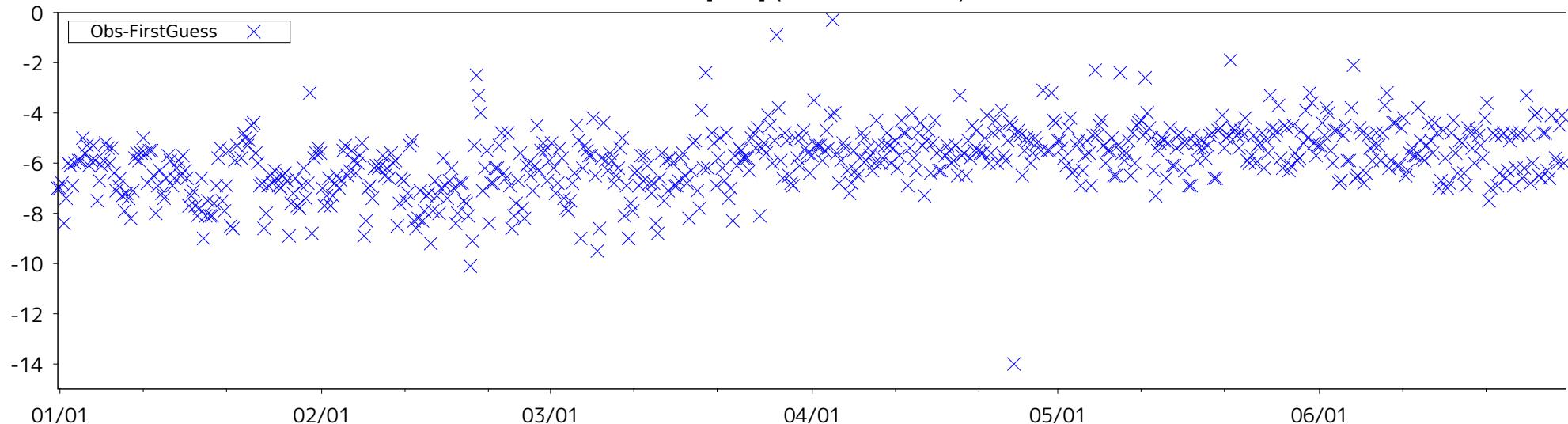
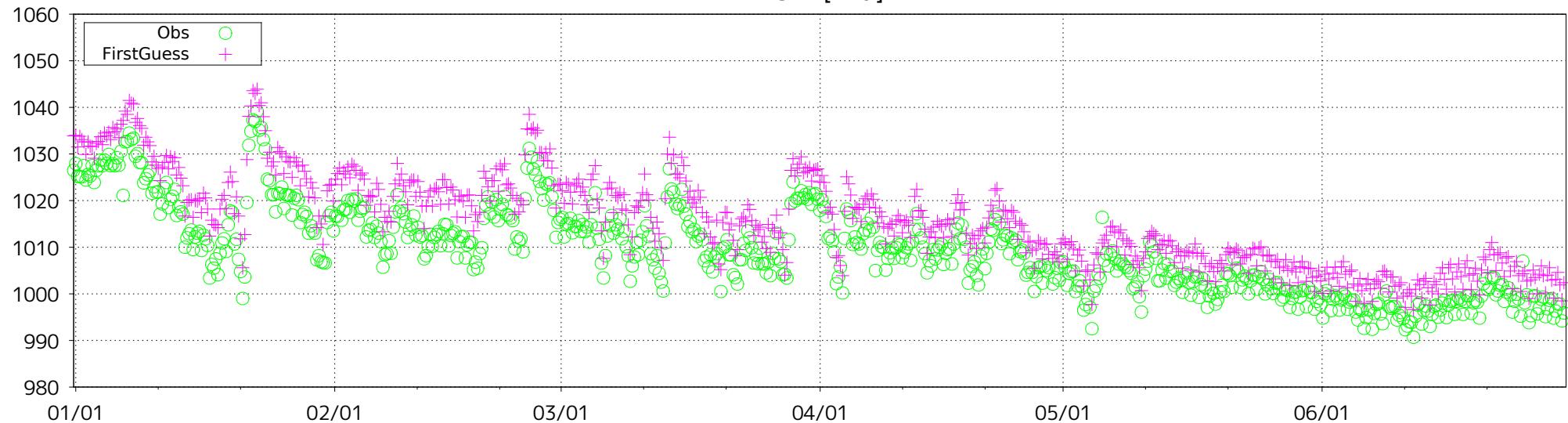


Figure 14(a) Time-series representation of SLP Obs minus FirstGuess for station 38944

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

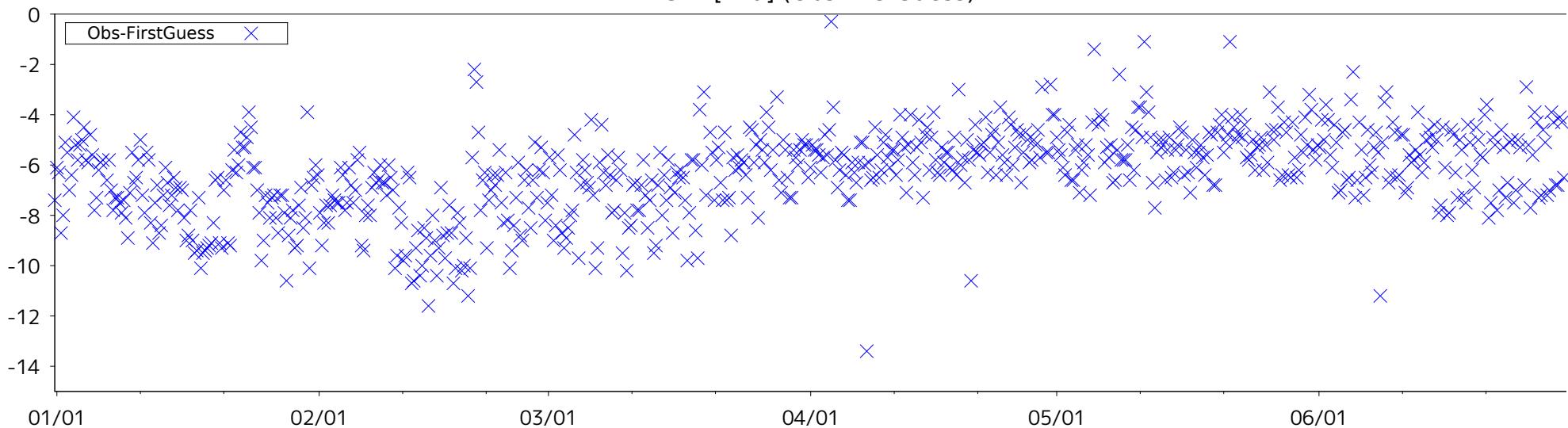
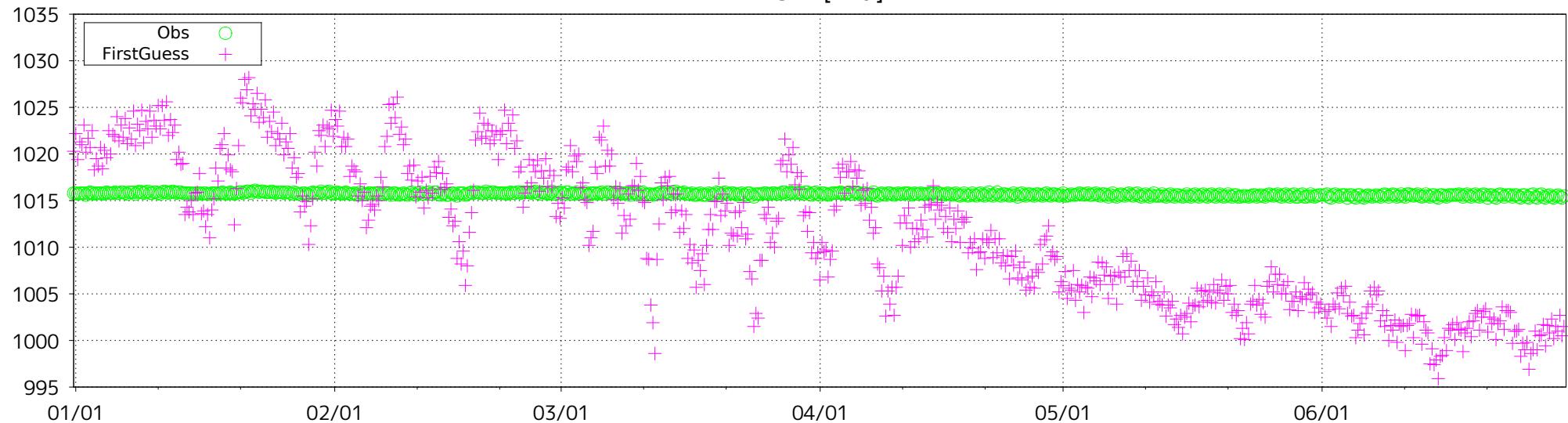


Figure 14(b) Time-series representation of MSLP Obs minus FirstGuess for station 38944

ID: 40587 (lat: 29.3N, lon: 47.7E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

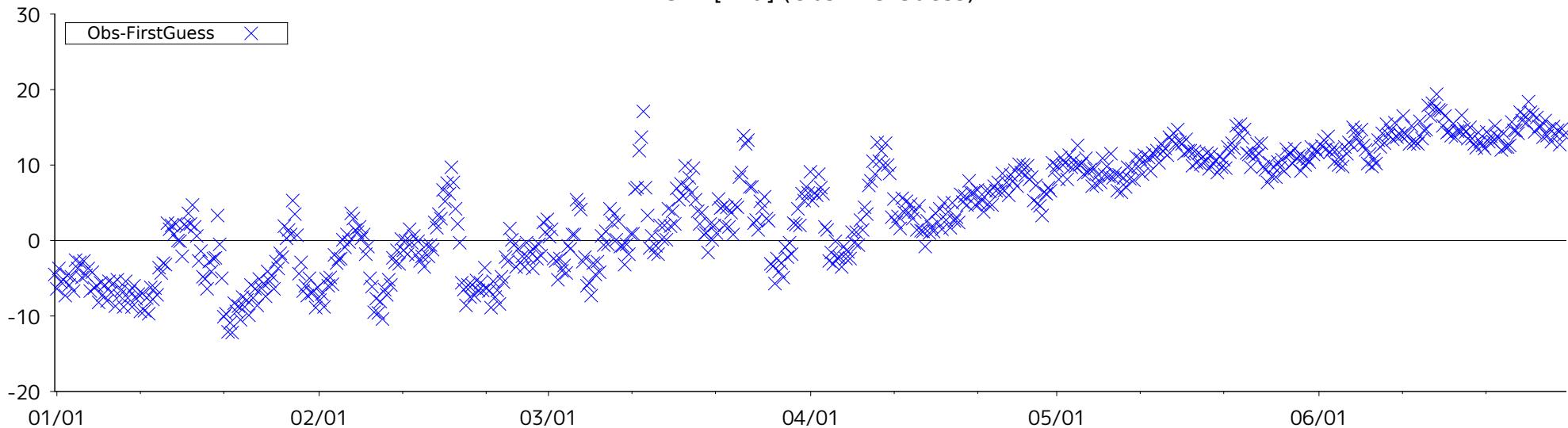
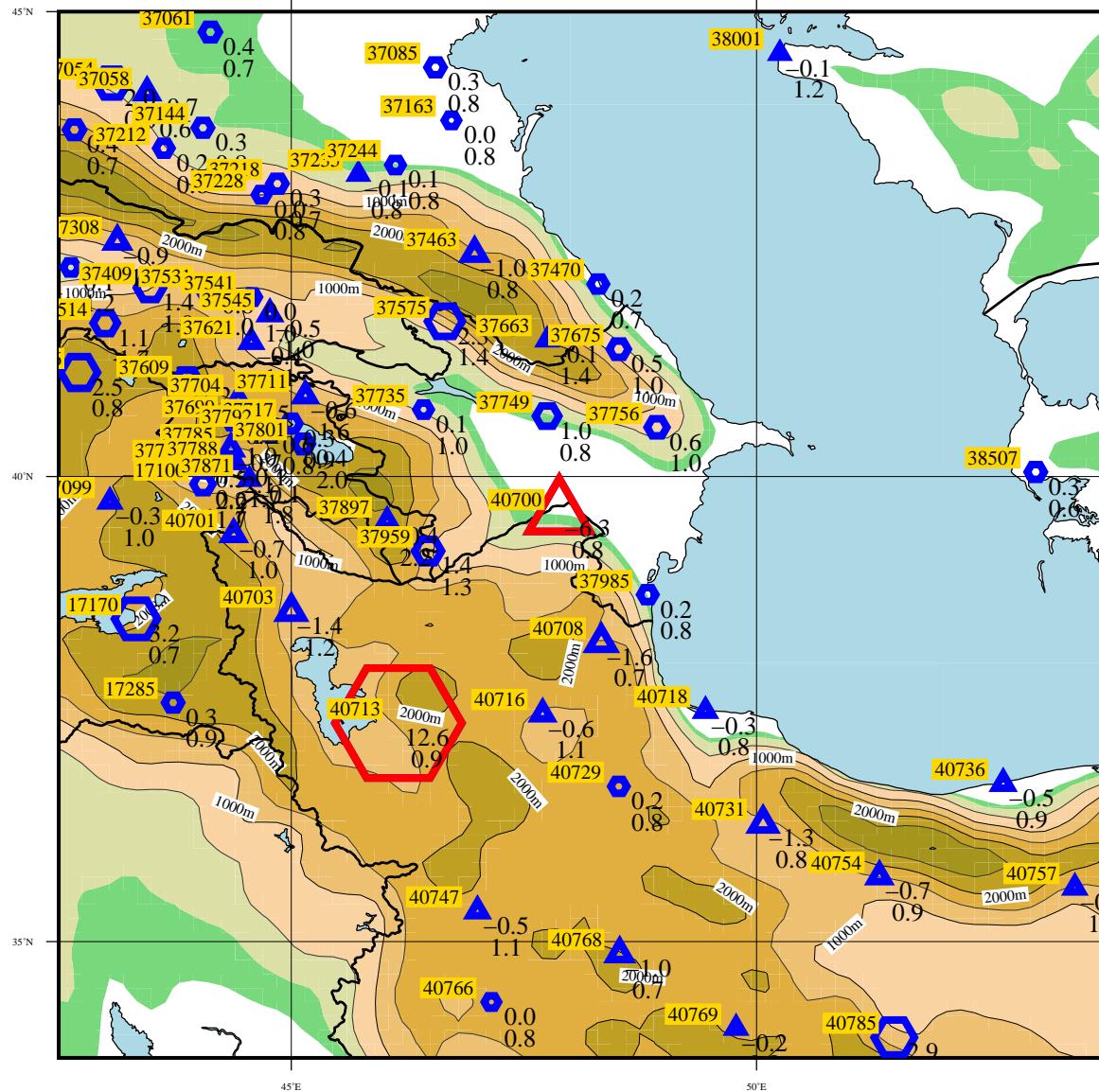


Figure 15 Time-series representation of MSLP Obs minus FirstGuess for station 40587

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

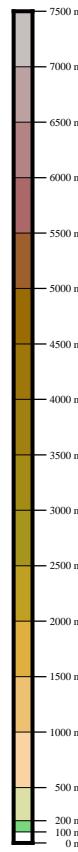


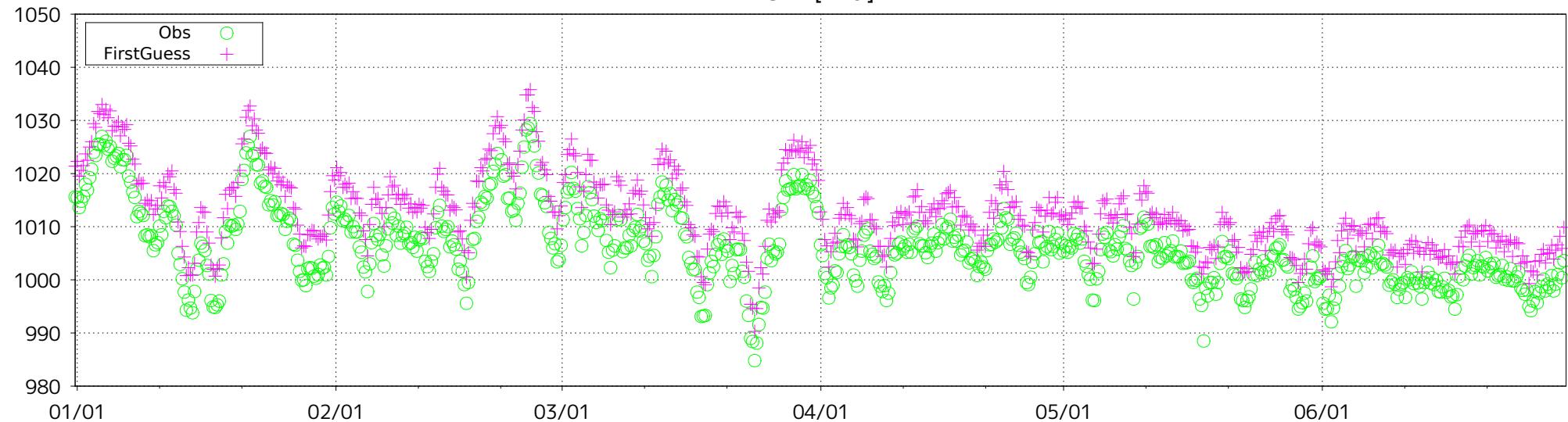
Figure 16 BIAS and SD of SLP for station 40700, 40713 (red) and surrounding stations (blue).

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: 40700 (lat: 39.6N, lon: 47.9E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

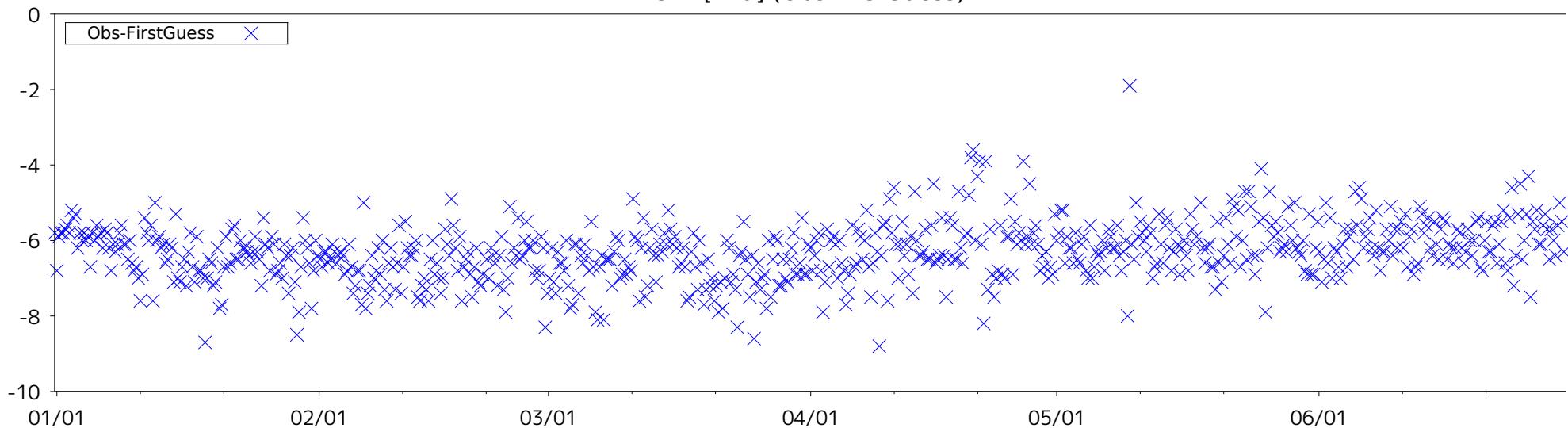
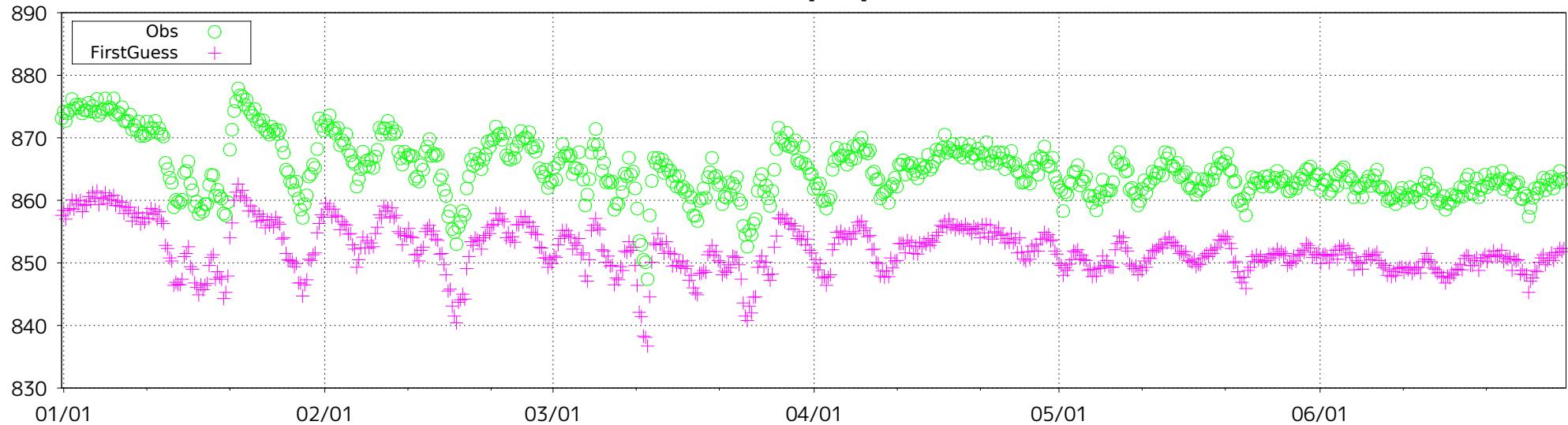


Figure 17 Time-series representation of SLP Obs minus FirstGuess for station 40700

ID: 40713 (lat: 37.4N, lon: 46.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

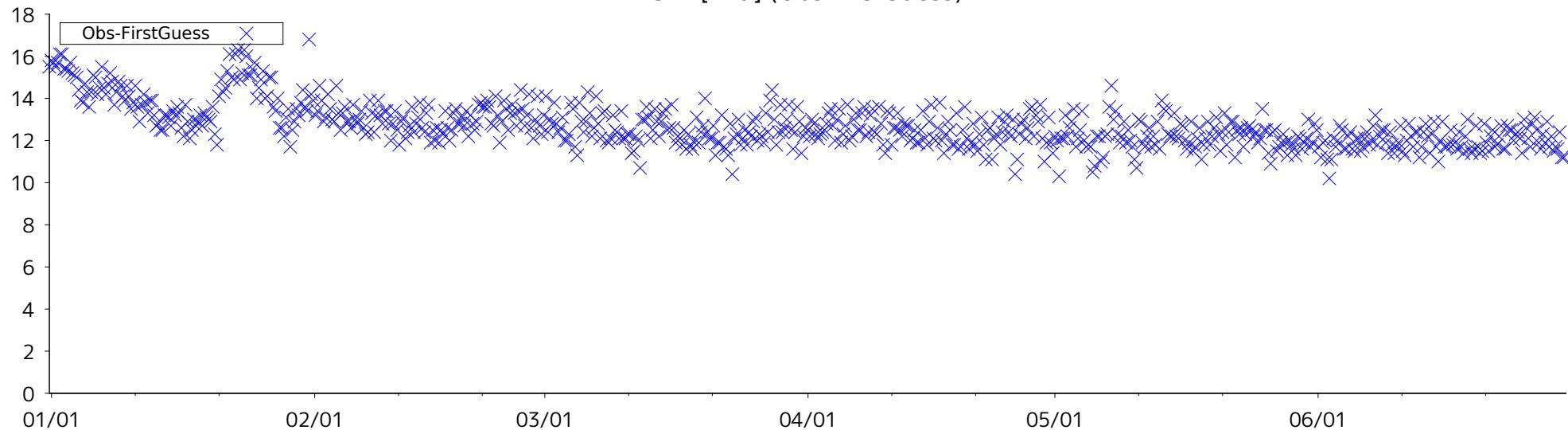
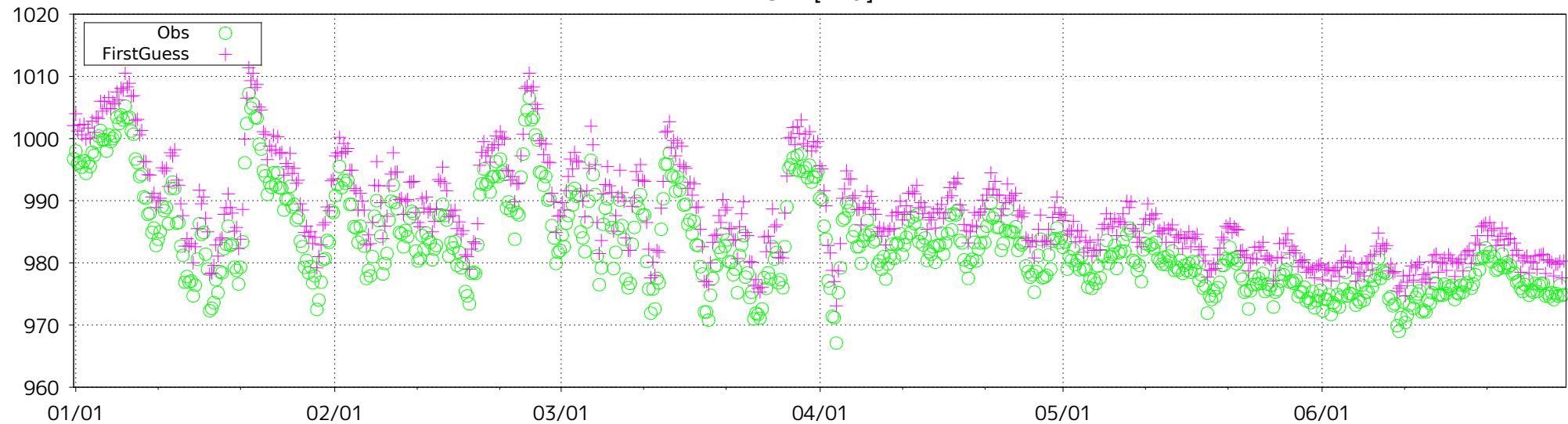


Figure 18 Time-series representation of SLP Obs minus FirstGuess for station 40713

ID: 40741 (lat: 36.5N, lon: 61.2E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

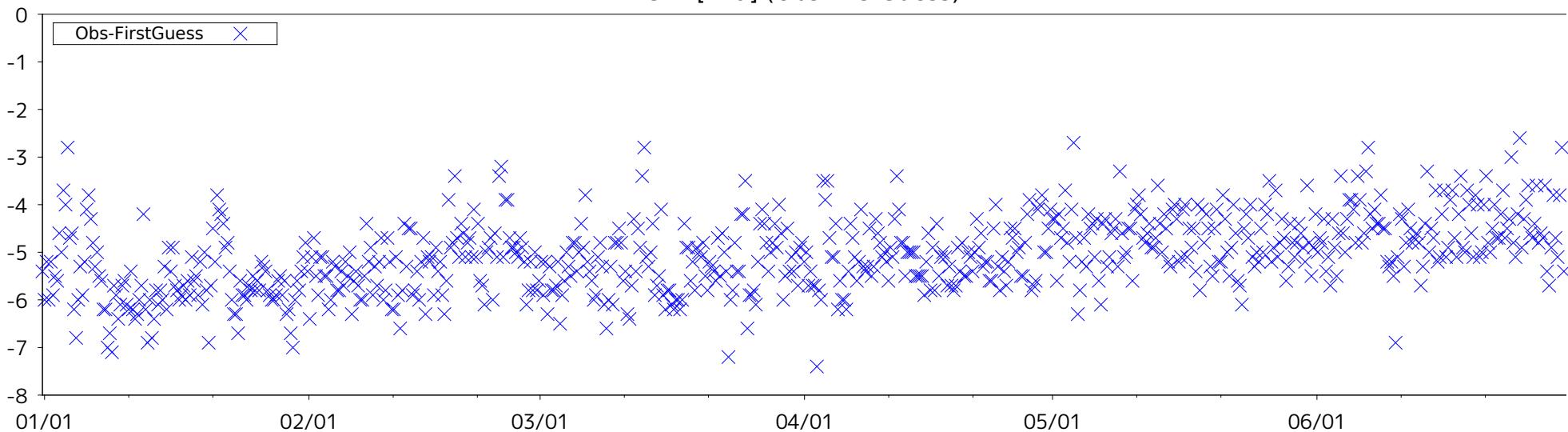
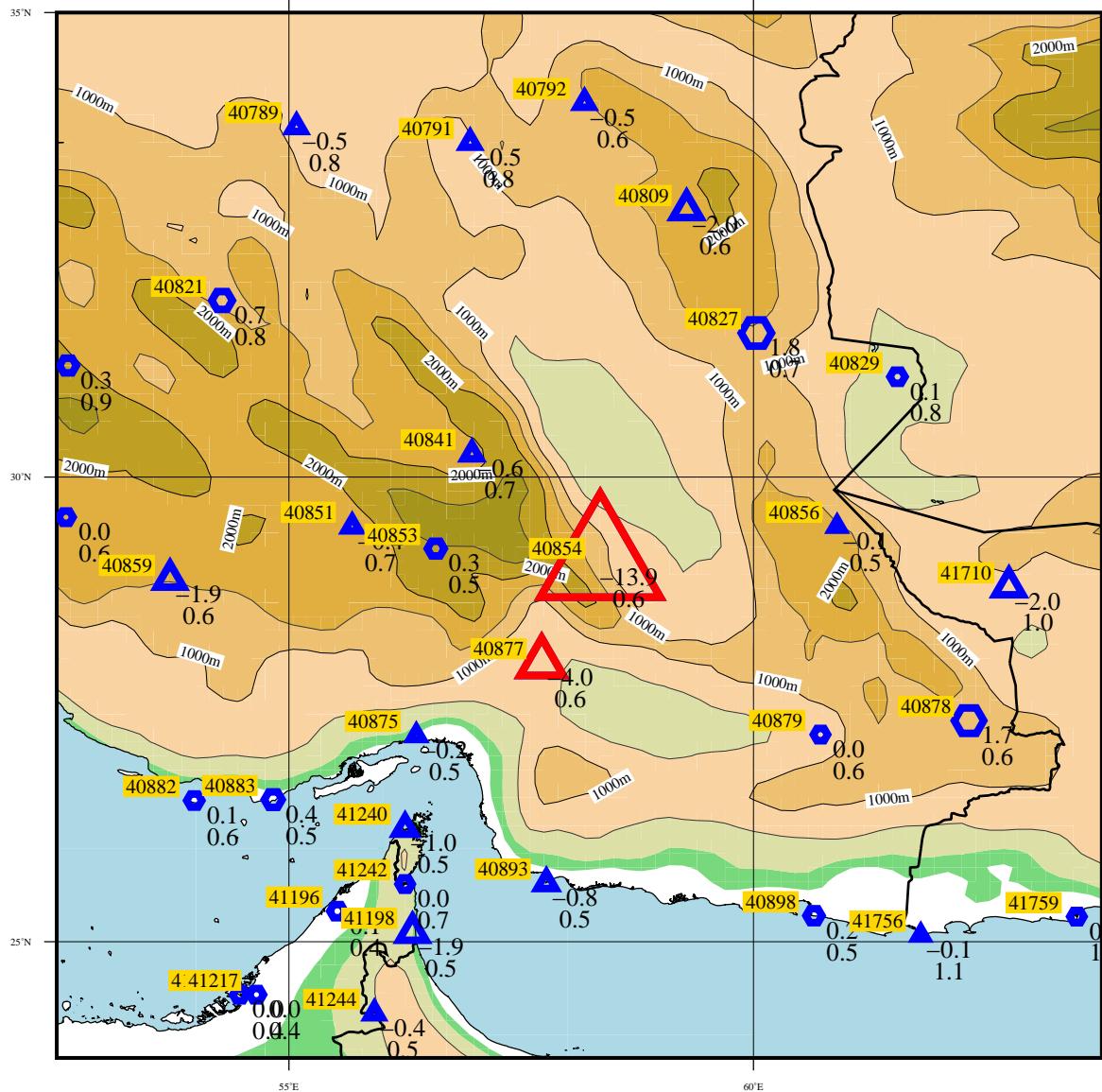


Figure 19 Time-series representation of SLP Obs minus FirstGuess for station 40741

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

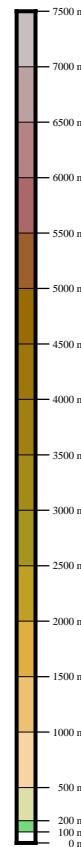


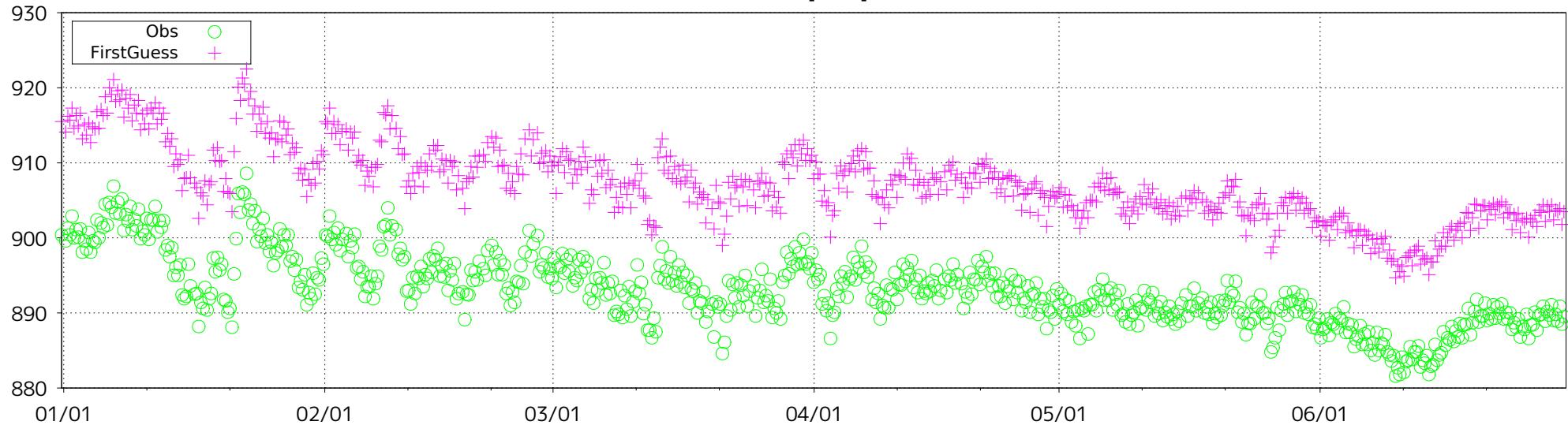
Figure 20 BIAS and SD of SLP for station 40854, 40877 (red) and surrounding stations (blue).

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: 40854 (lat: 29.1N, lon: 58.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

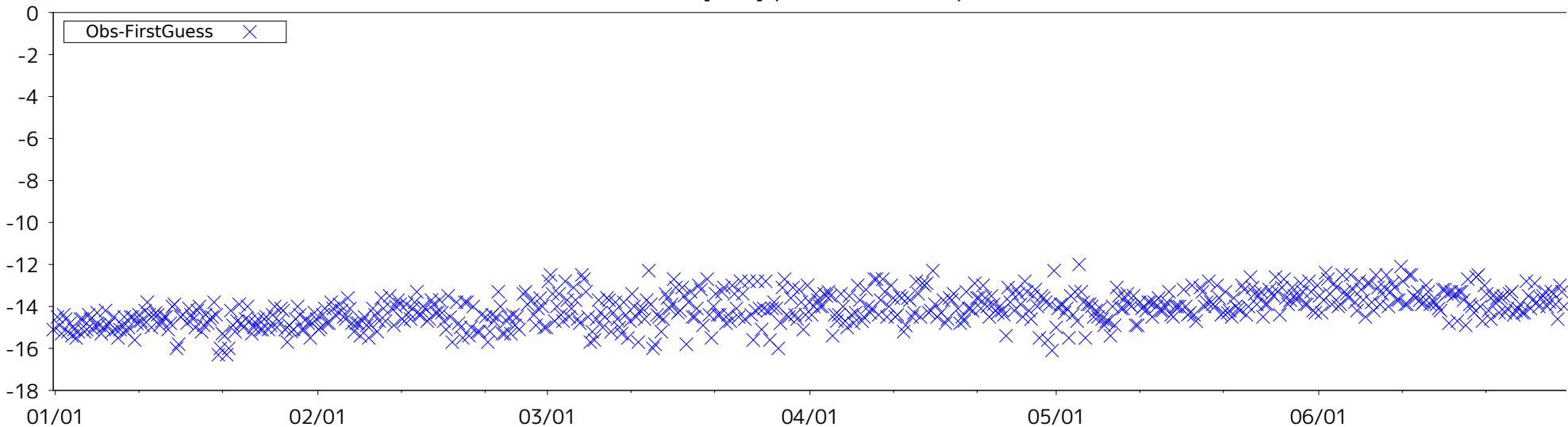
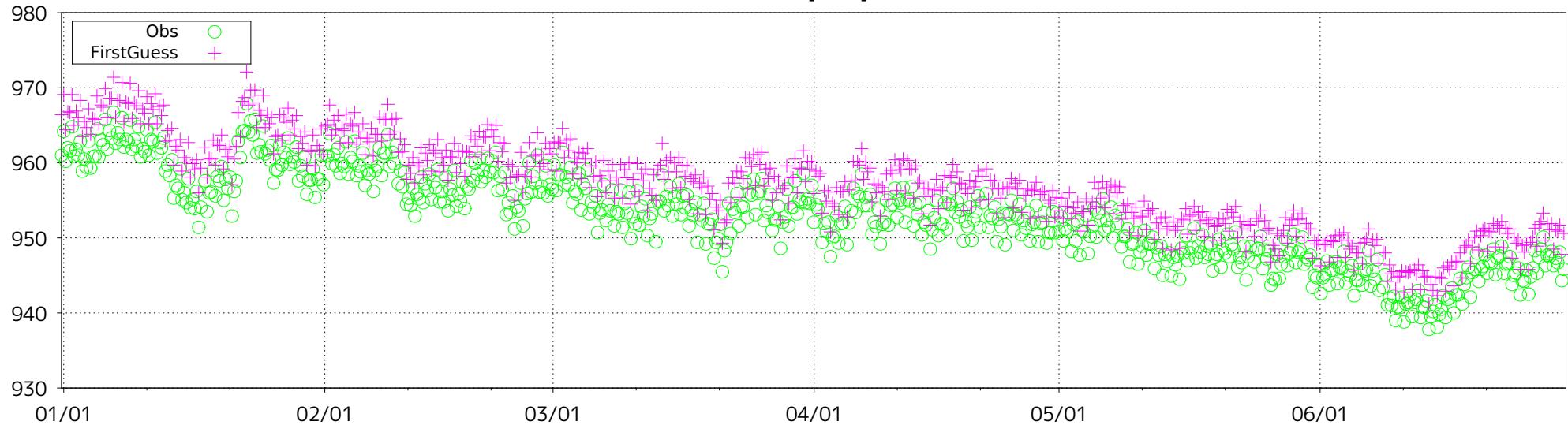


Figure 21 Time-series representation of SLP Obs minus FirstGuess for station 40854

ID: 40877 (lat: 28.0N, lon: 57.7E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

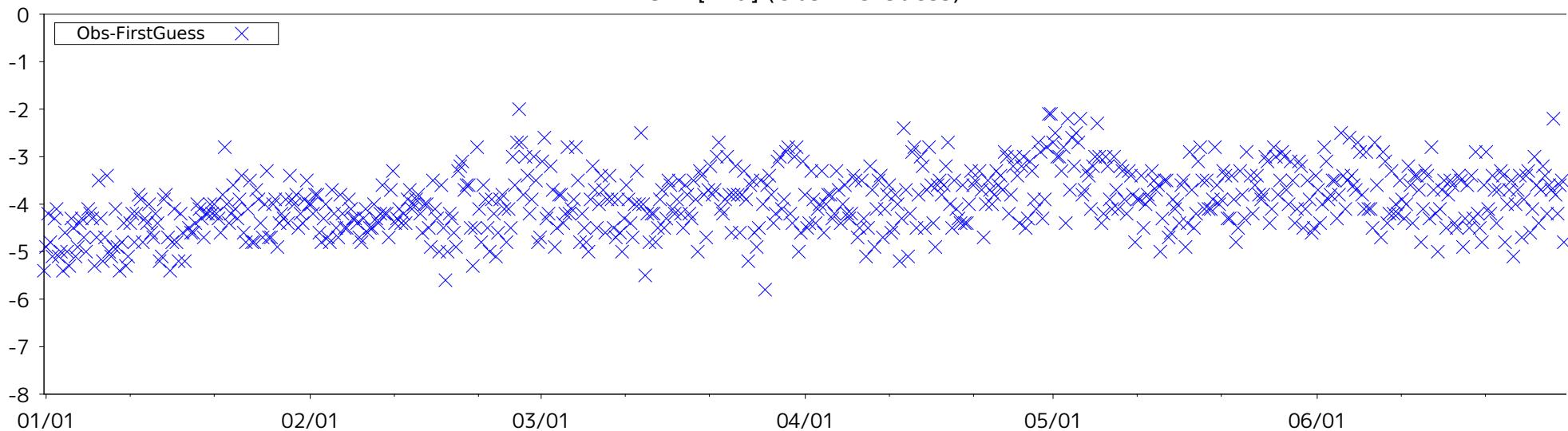
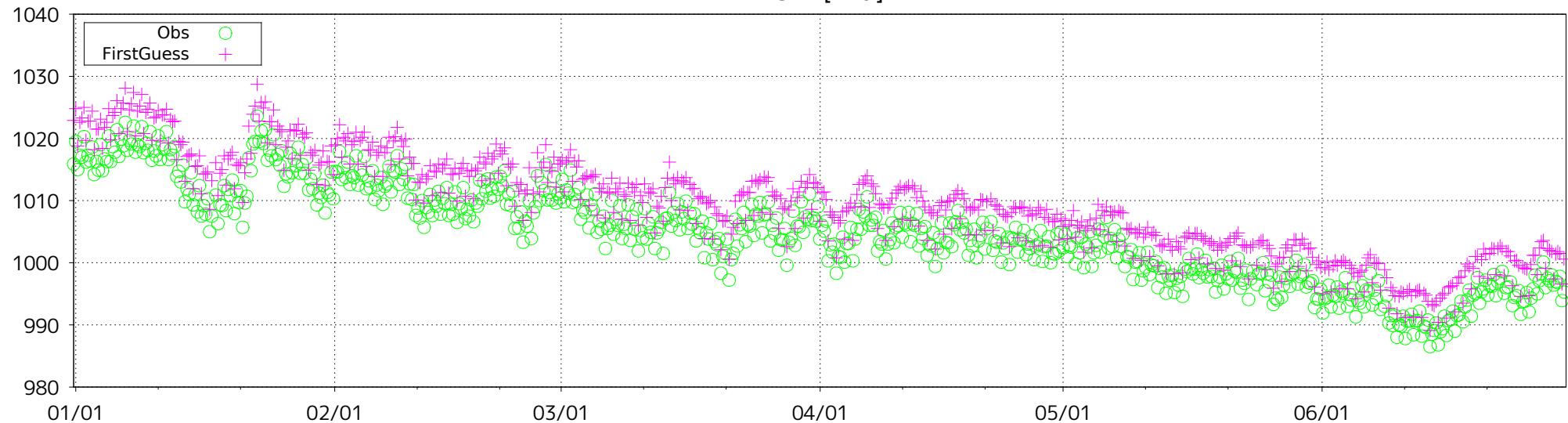


Figure 22(a) Time-series representation of SLP Obs minus FirstGuess for station 40877

ID: 40877 (lat: 28.0N, lon: 57.7E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

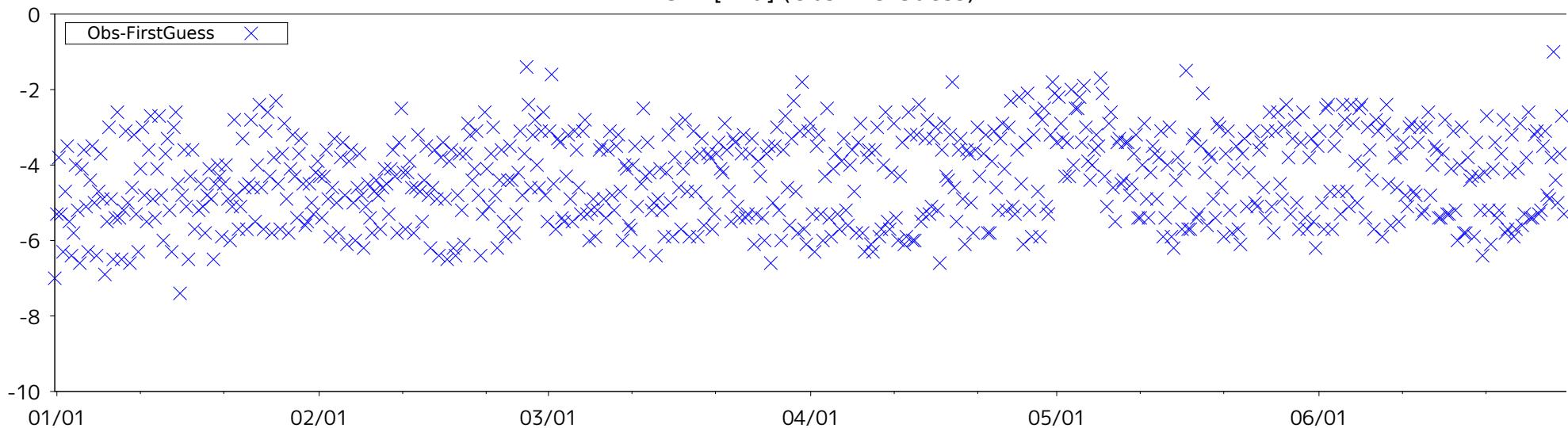
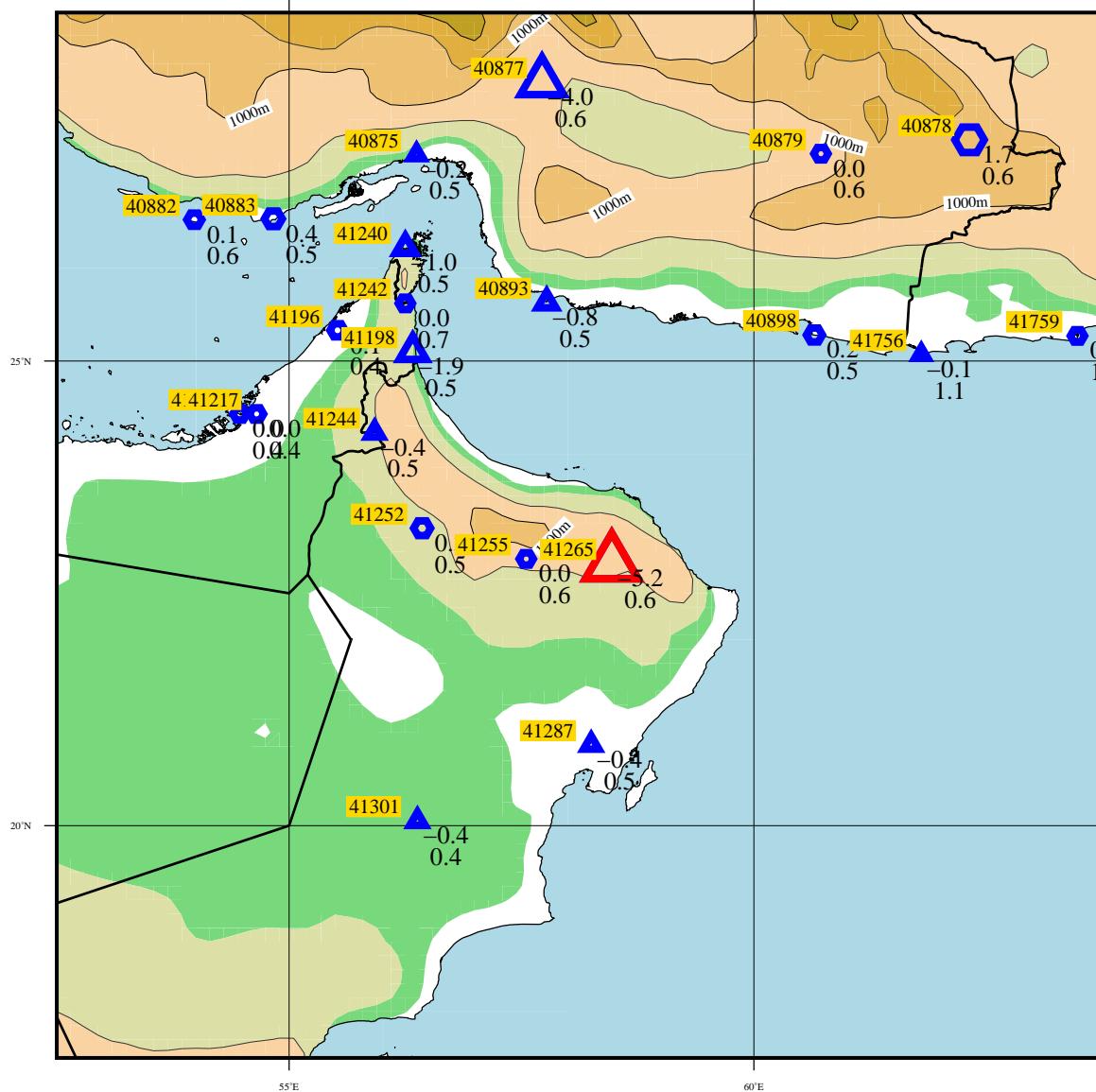


Figure 22(b) Time-series representation of MSLP Obs minus FirstGuess for station 40877

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

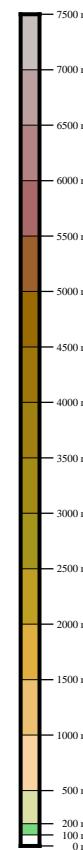


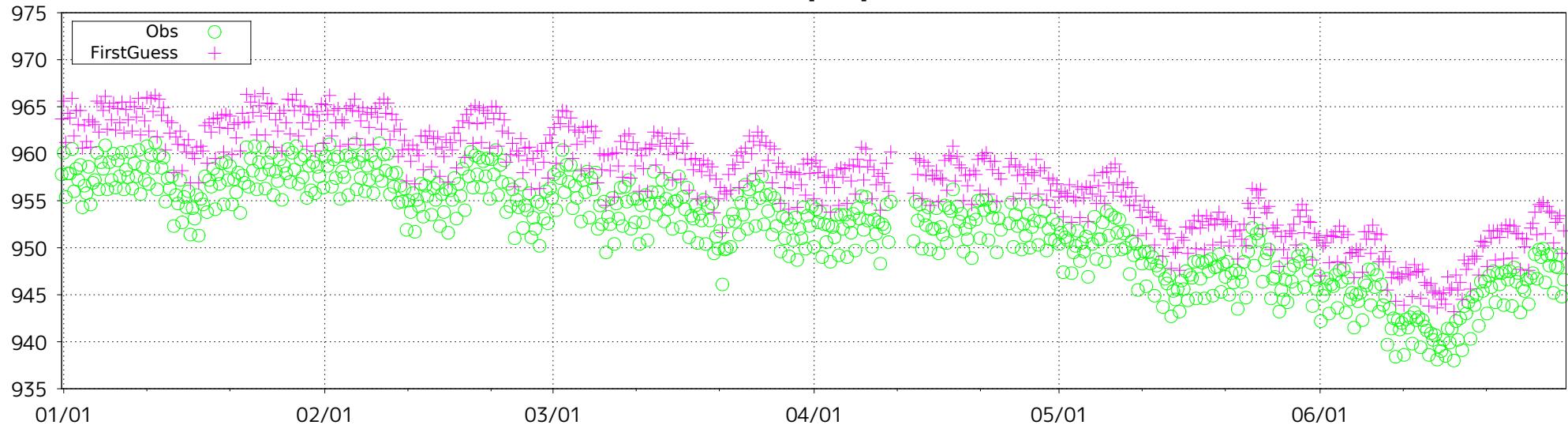
Figure 23 BIAS and SD of SLP for station 41265 (red) and surrounding stations (blue).

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.

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

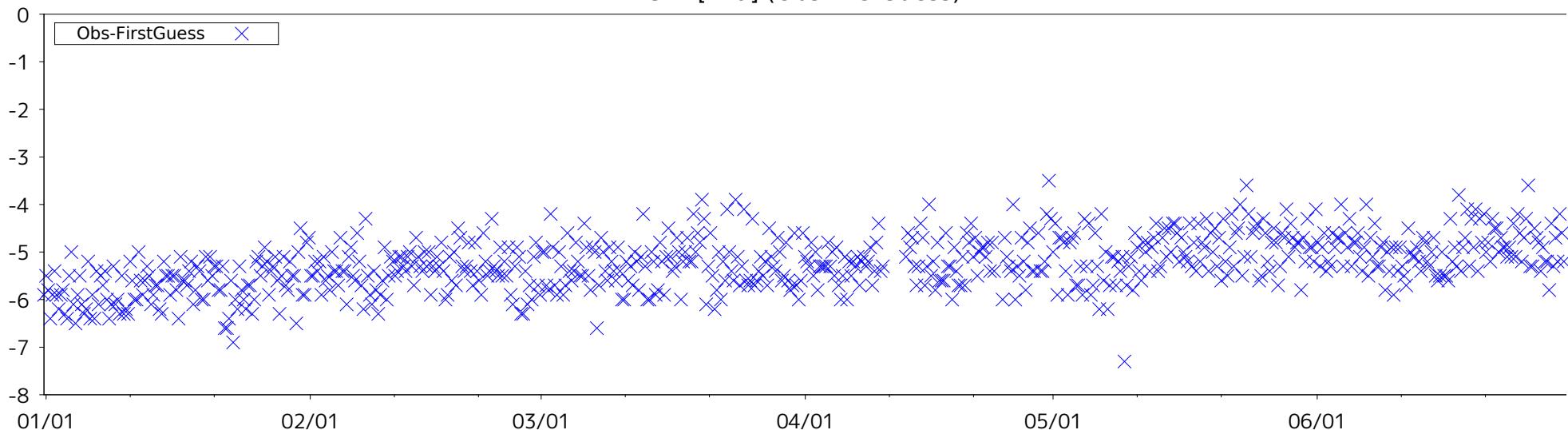


Figure 24 Time-series representation of SLP Obs minus FirstGuess for station 41265

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)

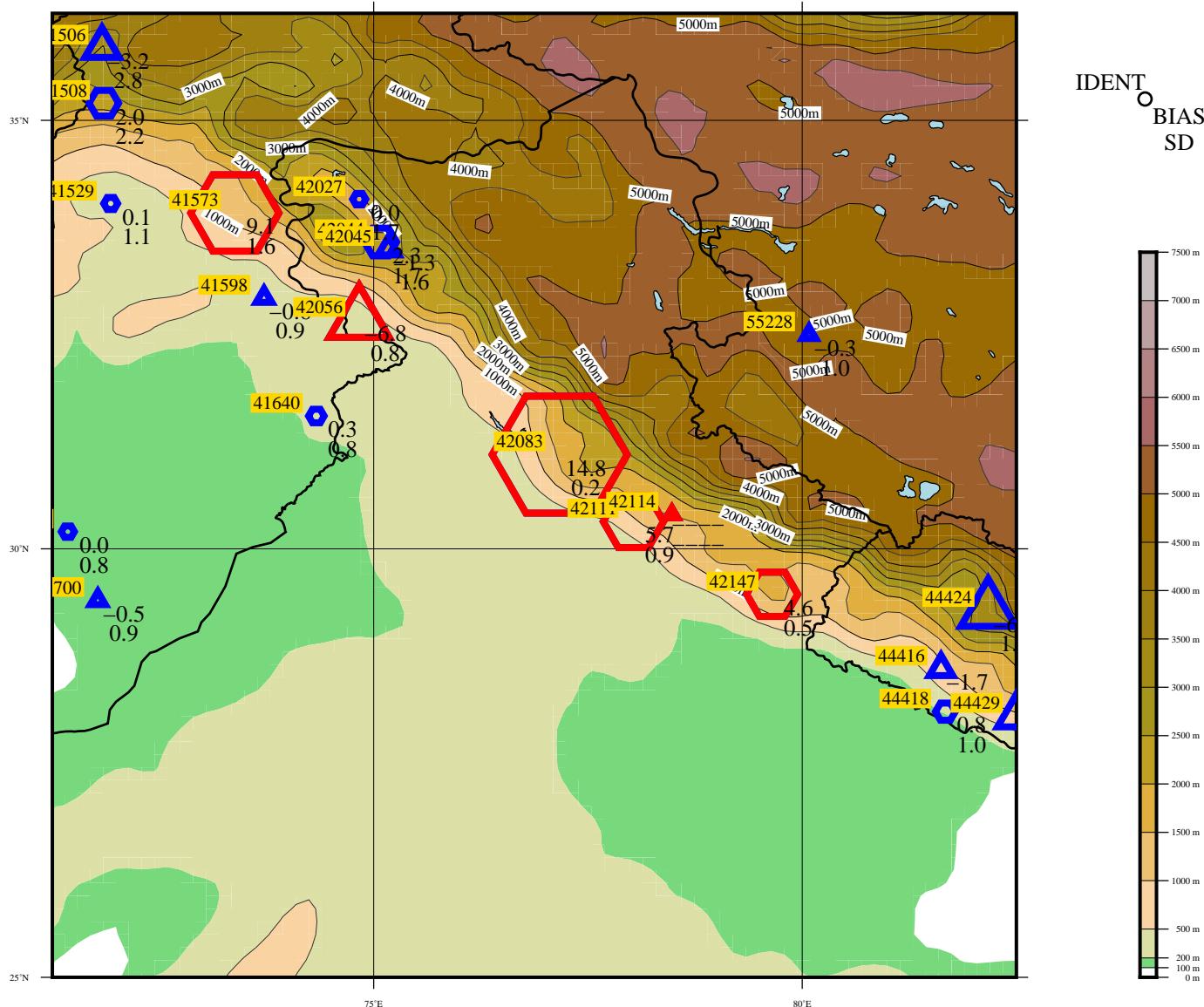
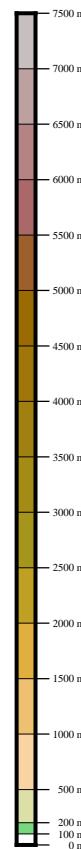


Figure 25 BIAS and SD of SLP for station 41573, 42056, 42083, 42111, 42114, 42147 (red) and surrounding stations (blue).

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.

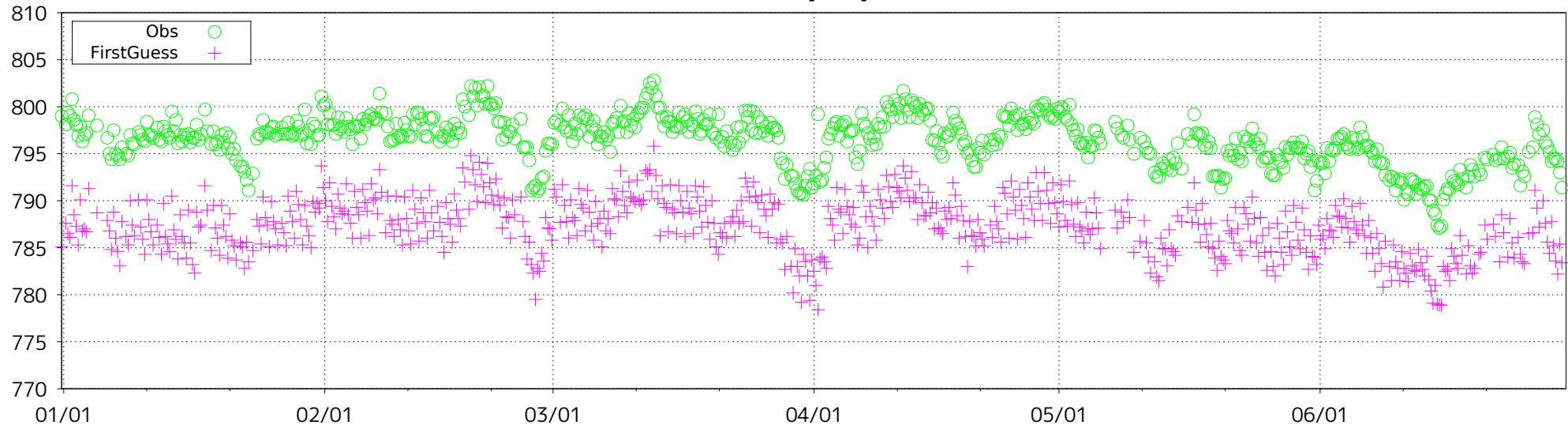
The size of each symbol is proportional to the value of BIAS, with hexagonal forms representing positive bias and triangular forms representing negative bias.

IDENT
O BIAS
SD



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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

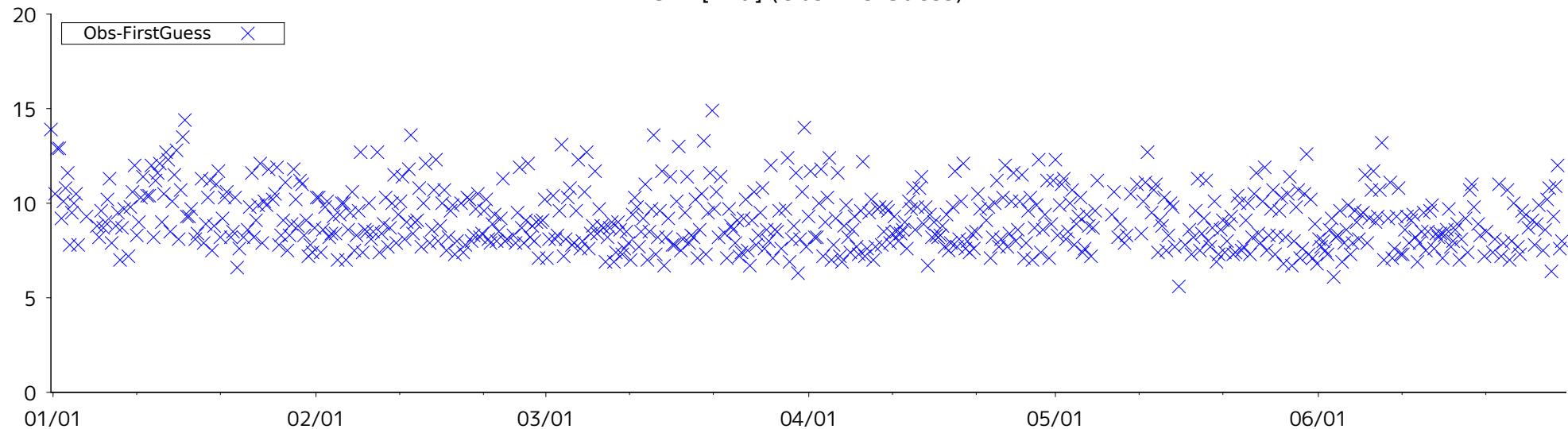
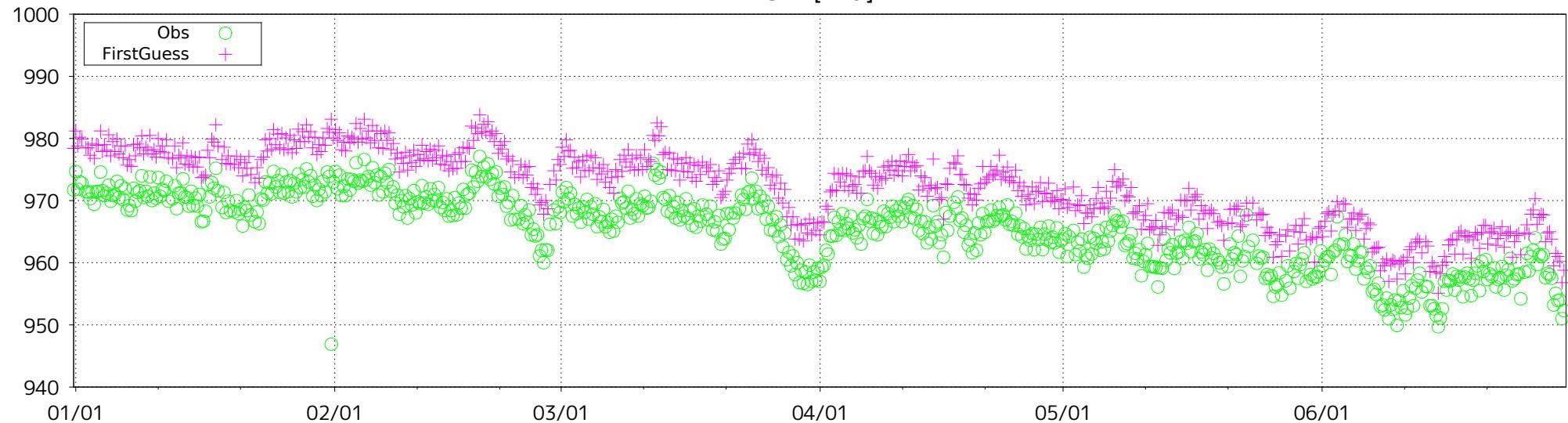


Figure 26 Time-series representation of SLP Obs minus FirstGuess for station 41573

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

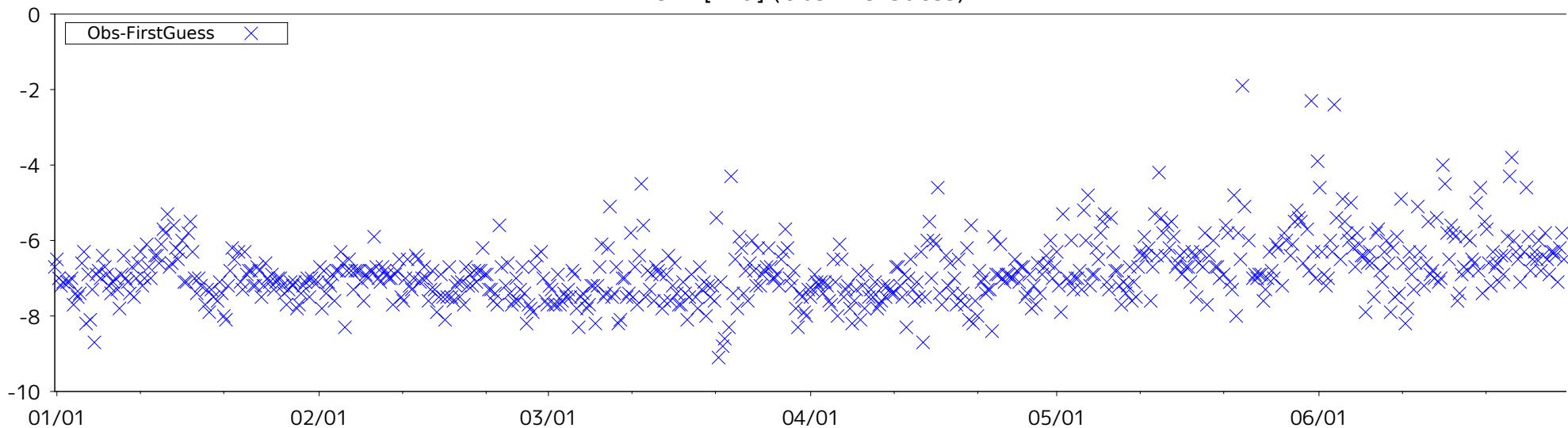
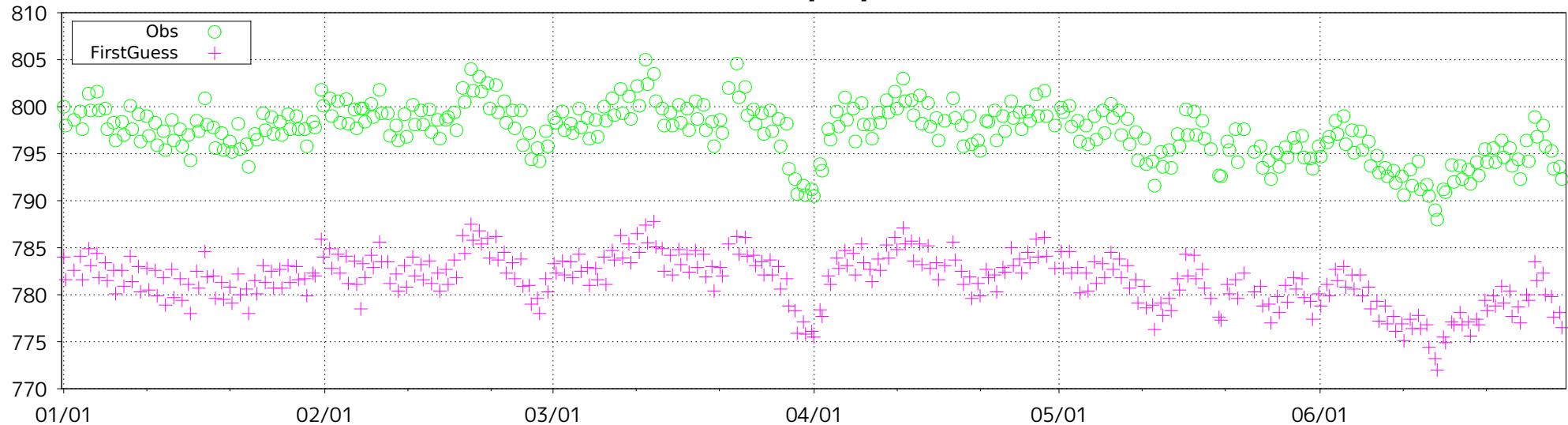


Figure 27 Time-series representation of SLP Obs minus FirstGuess for station 42056

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

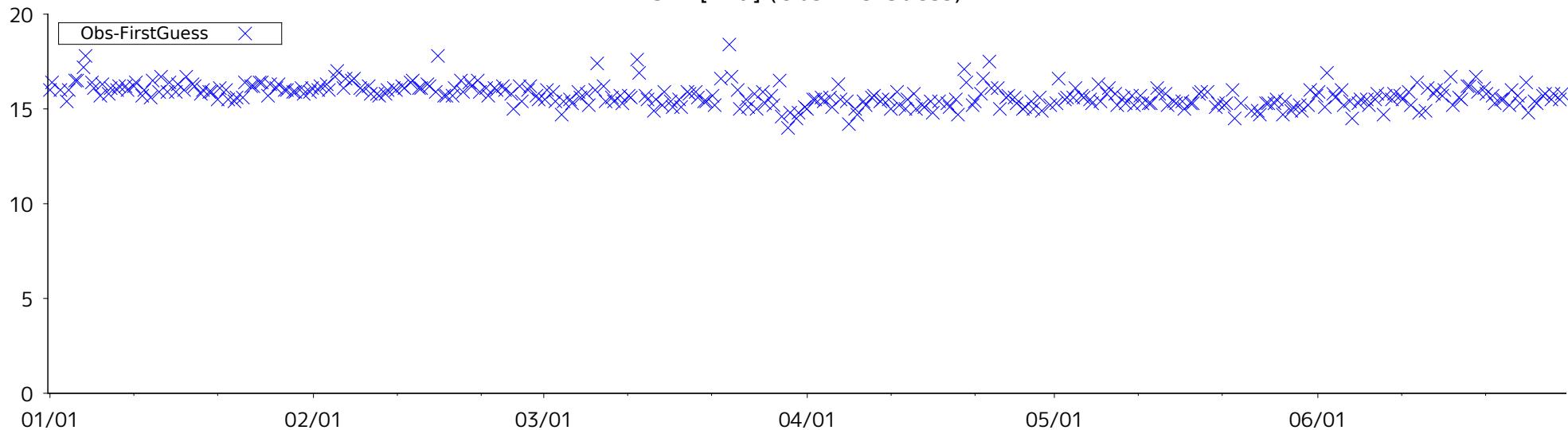
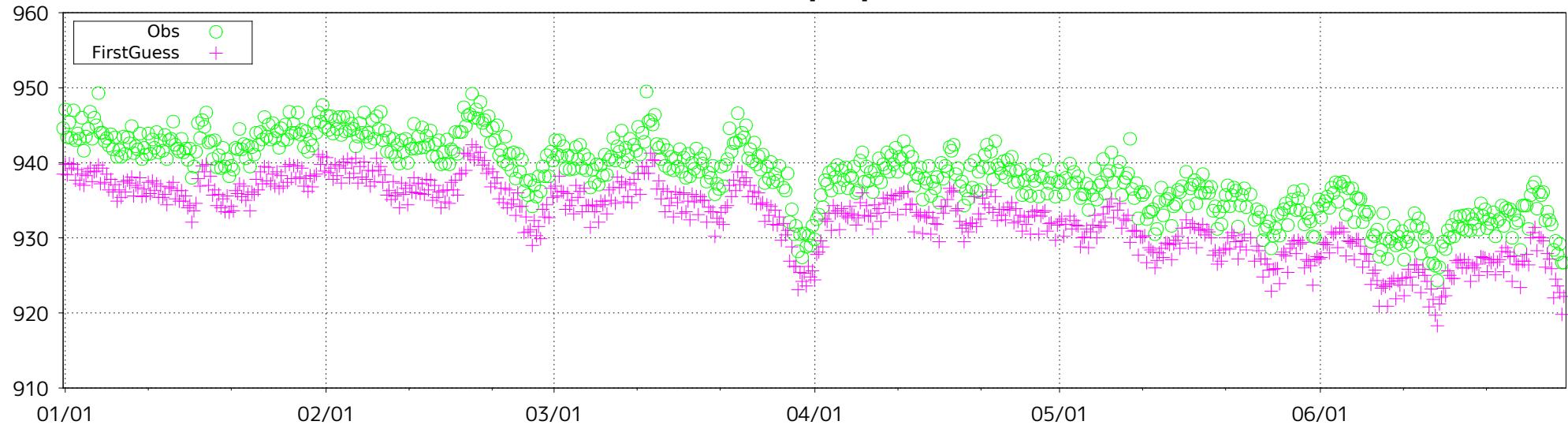


Figure 28 Time-series representation of SLP Obs minus FirstGuess for station 42083

ID: 42111 (lat: 30.3N, lon: 78.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

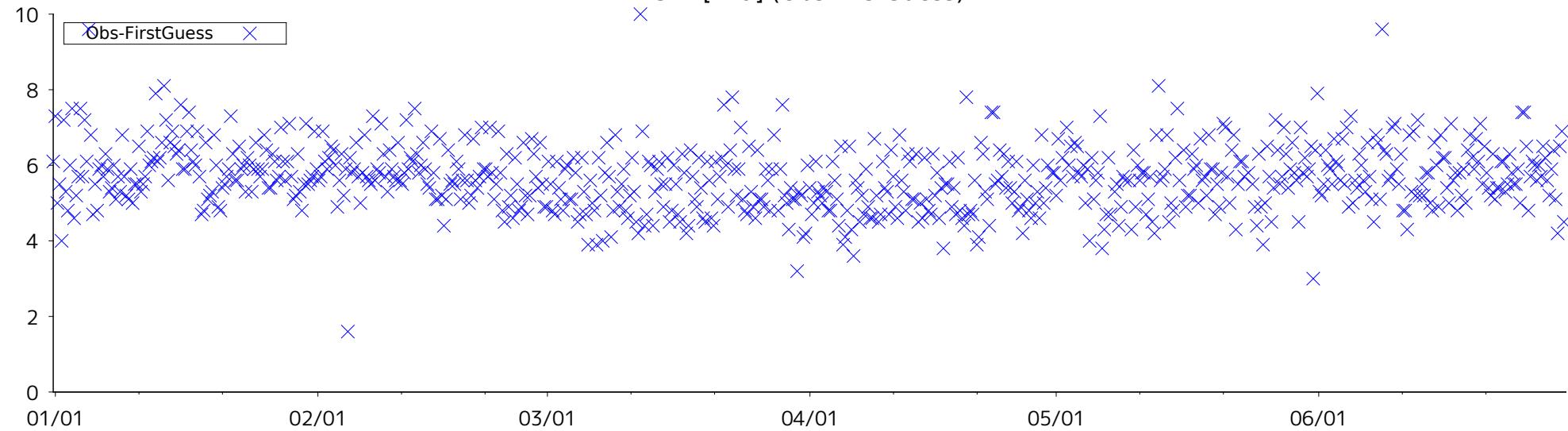
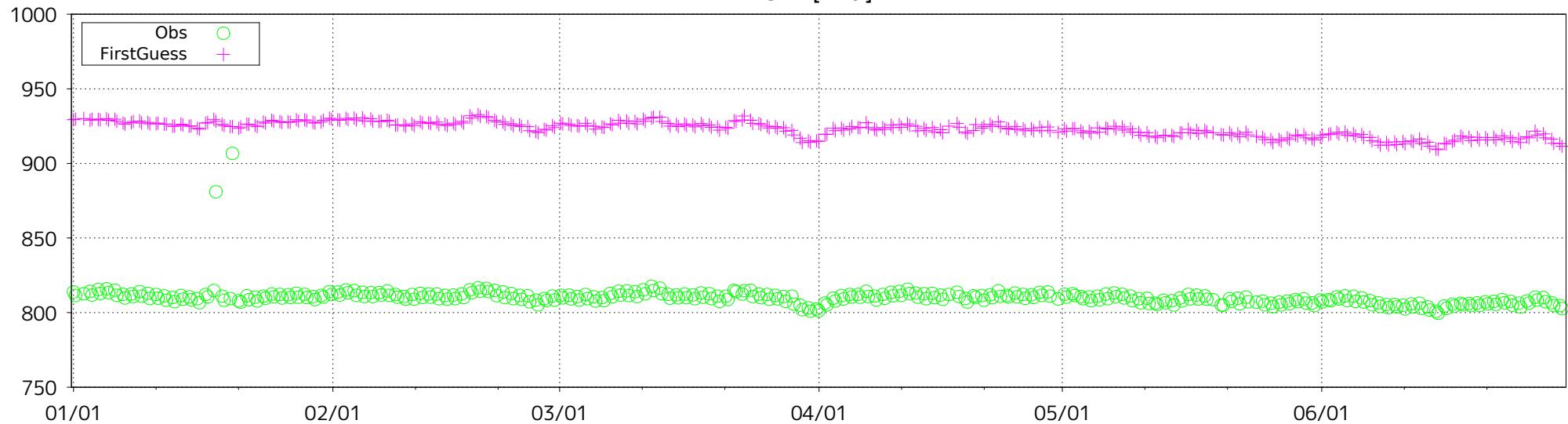


Figure 29 Time-series representation of SLP Obs minus FirstGuess for station 42111

ID: 42114 (lat: 30.4N, lon: 78.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

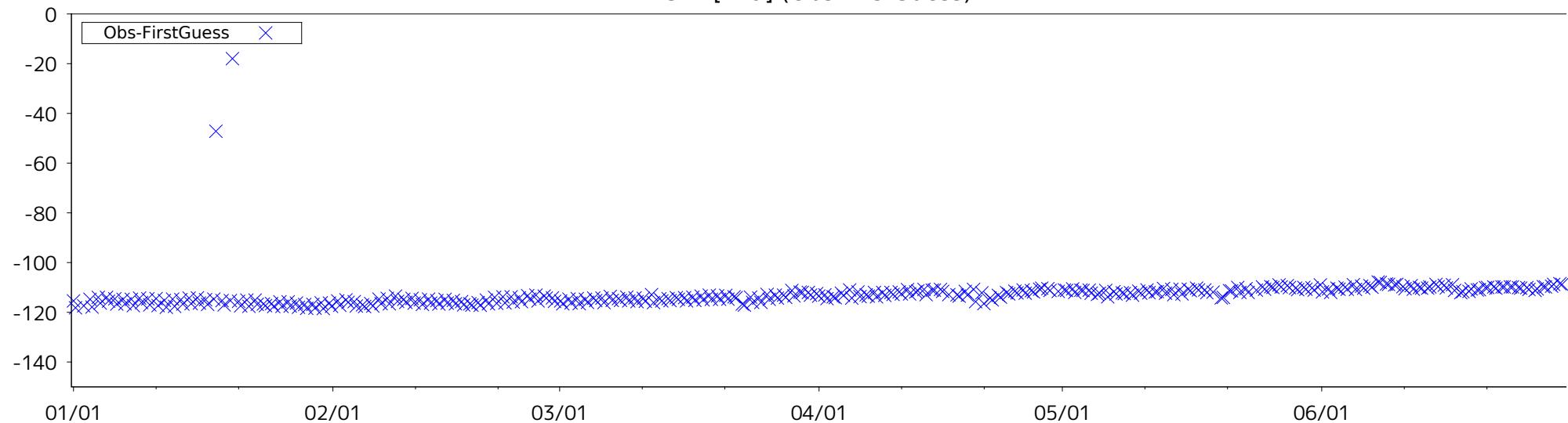
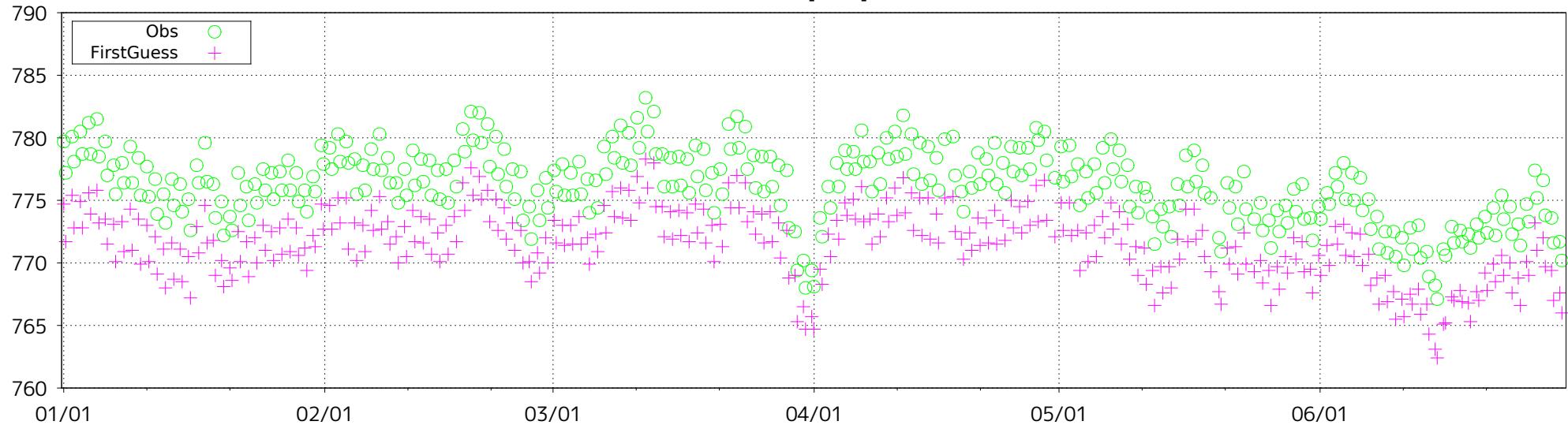


Figure 30 Time-series representation of SLP Obs minus FirstGuess for station 42114

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

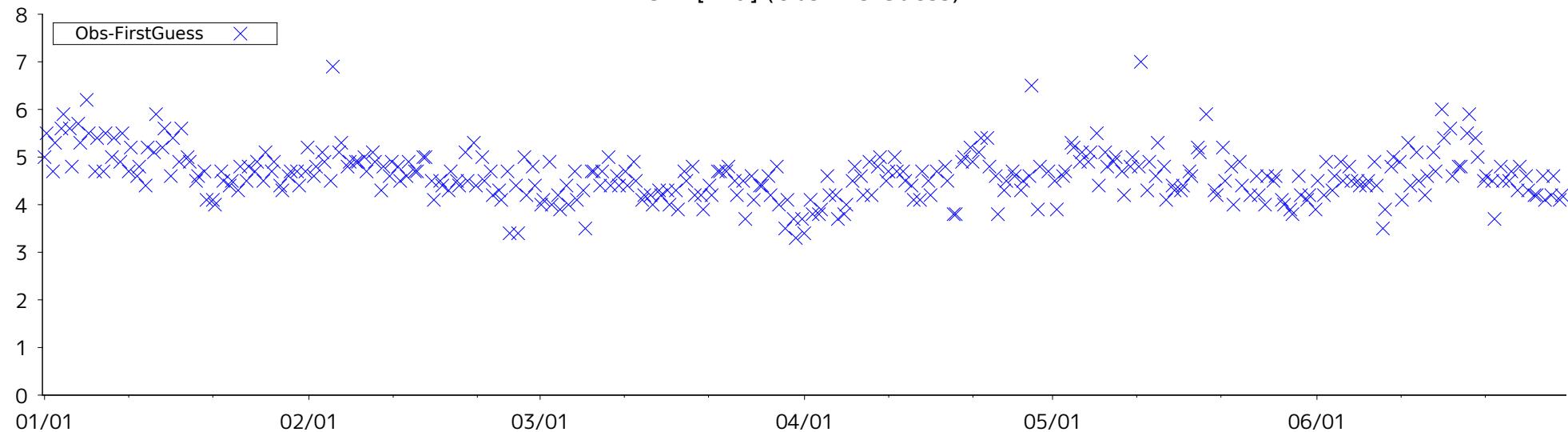
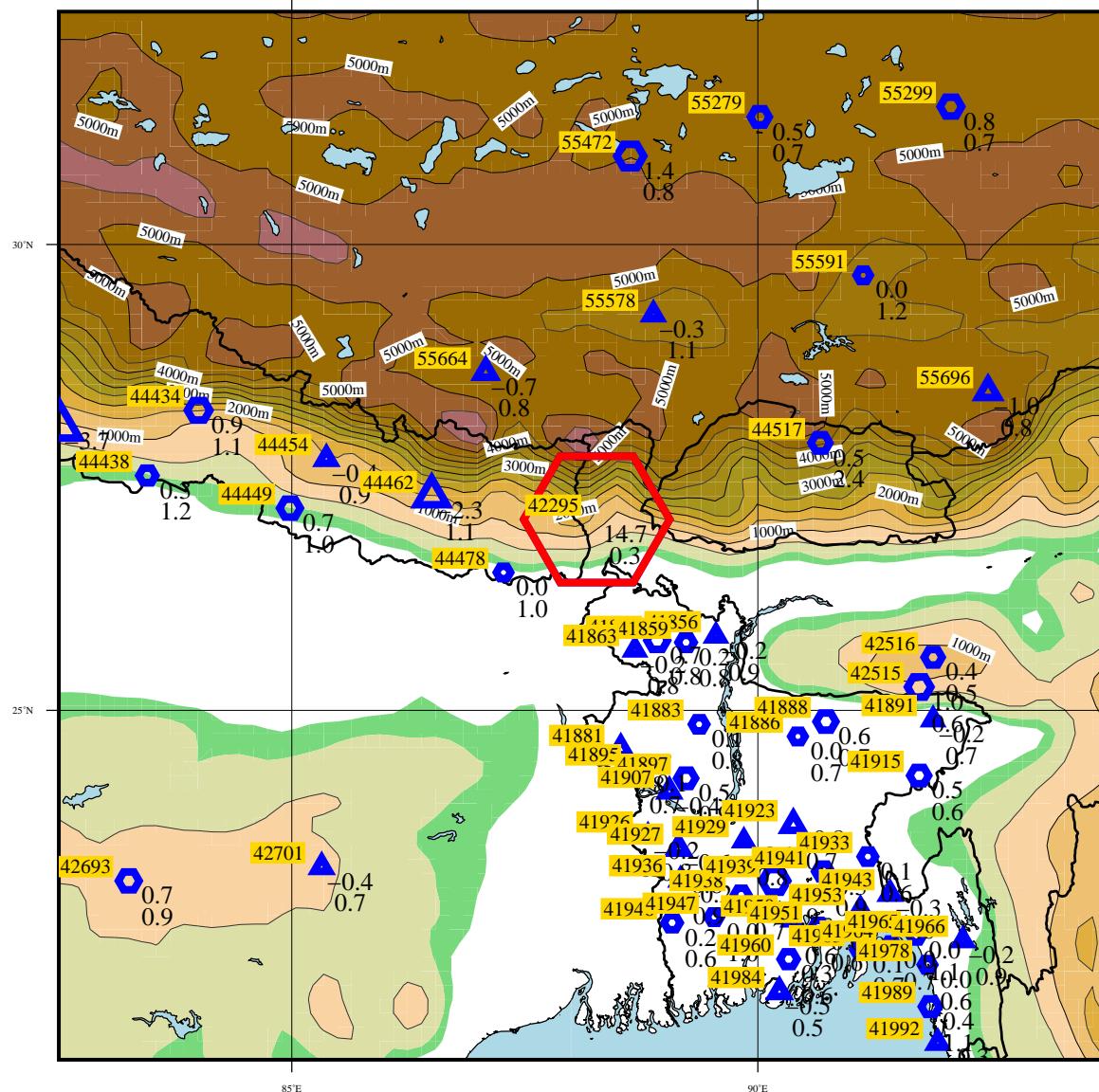


Figure 31 Time-series representation of SLP Obs minus FirstGuess for station 42147

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

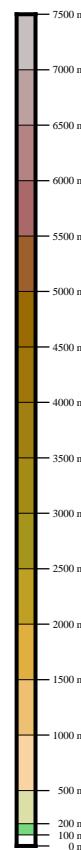


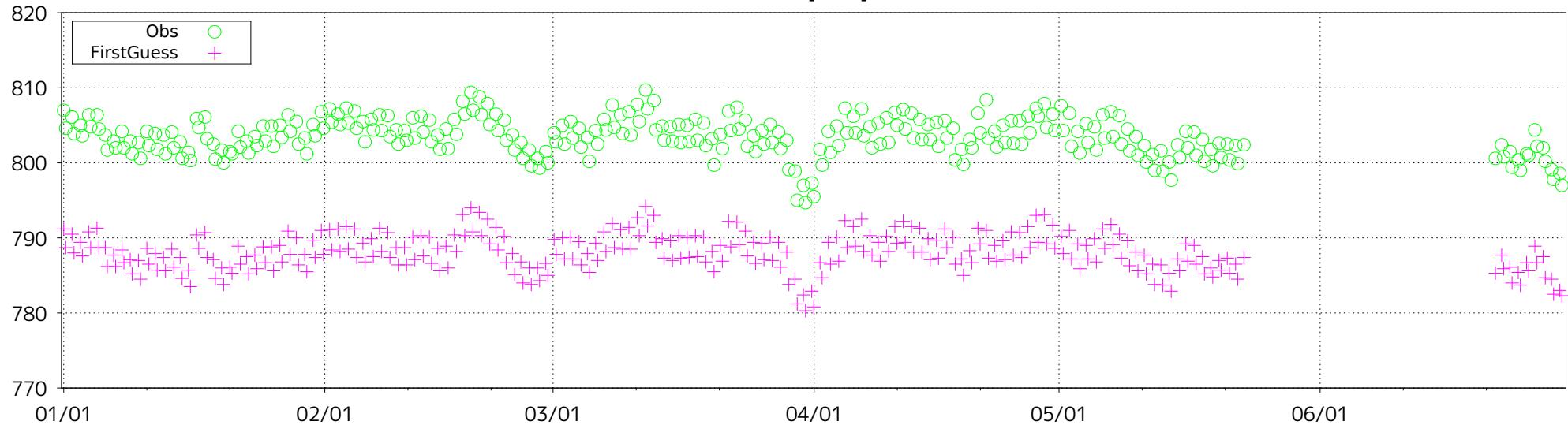
Figure 32 BIAS and SD of SLP for station 42295 (red) and surrounding stations (blue).

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: 42295 (lat: 27.1N, lon: 88.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

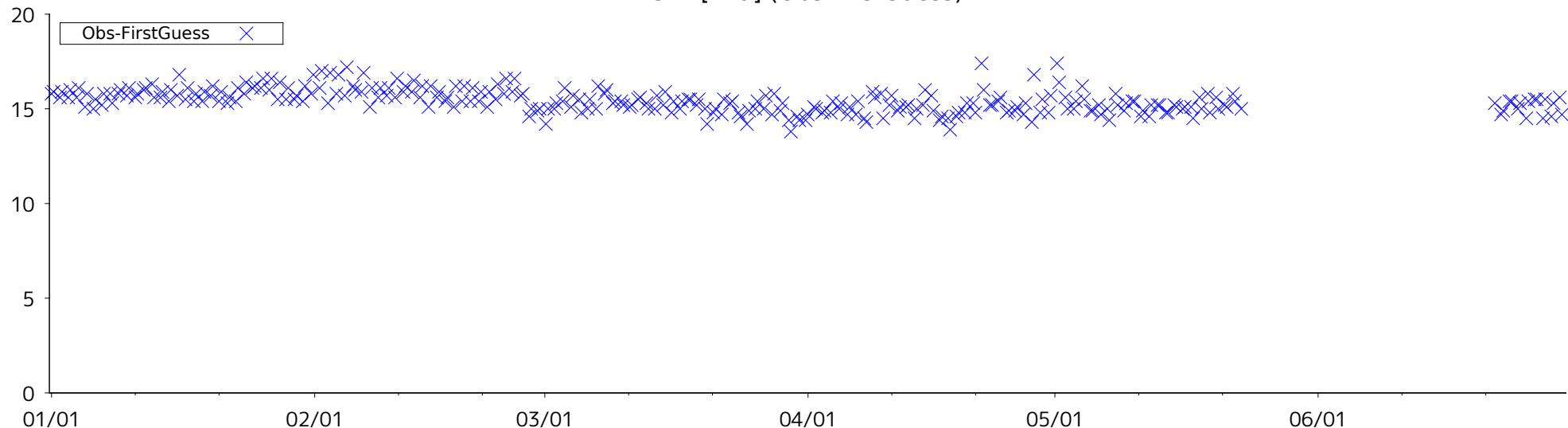
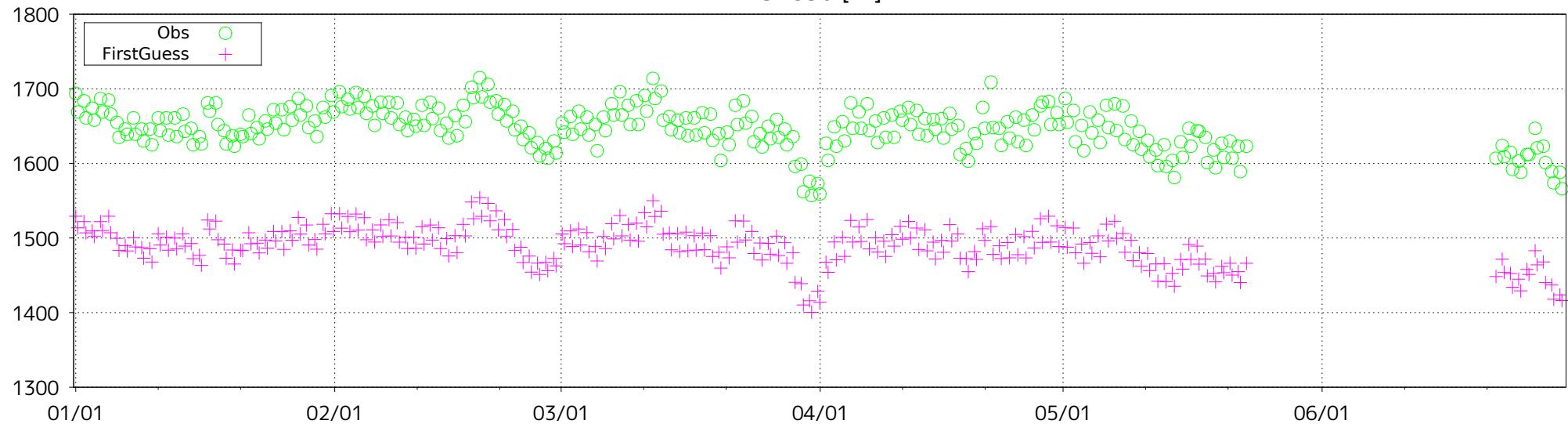


Figure 33(a) Time-series representation of SLP Obs minus FirstGuess for station 42295

ID: 42295 (lat: 27.1N, lon: 88.3E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

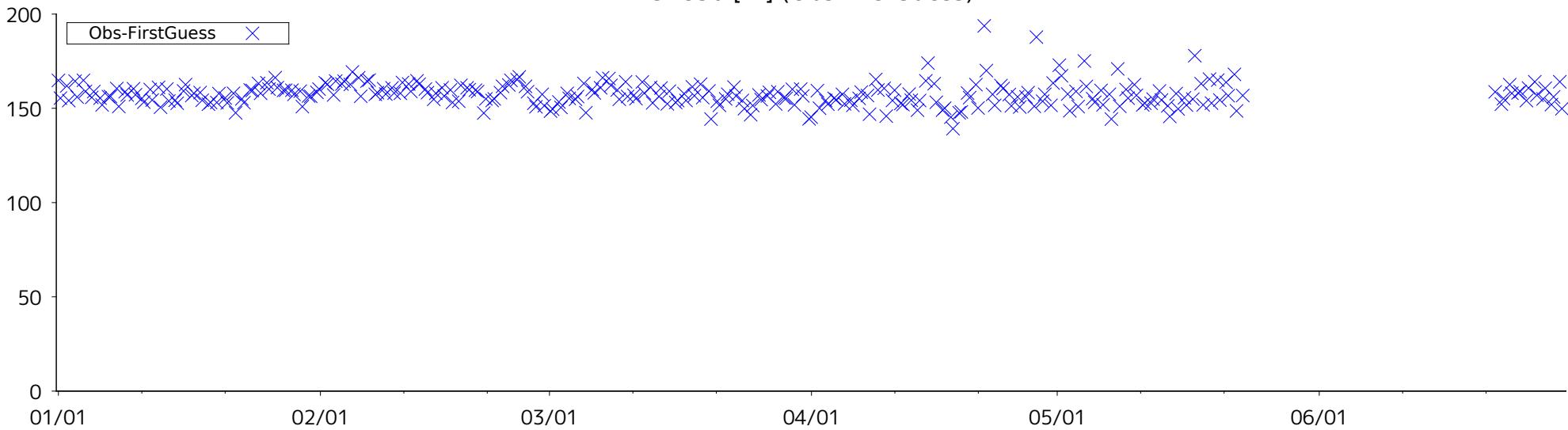
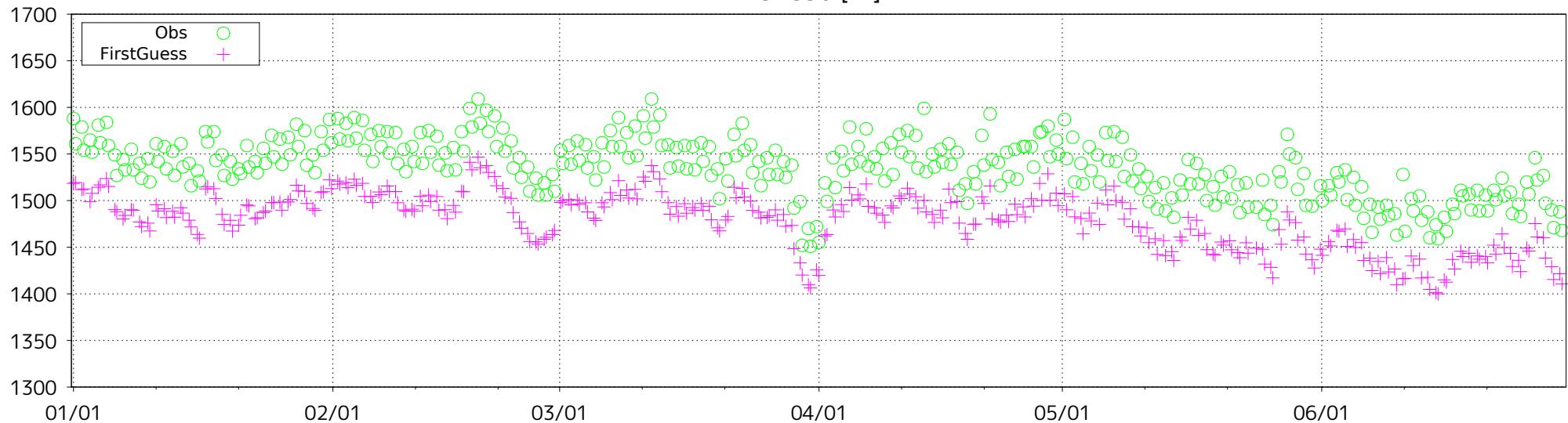


Figure 33(b) Time-series representation of GZ850 Obs minus FirstGuess for station 42295

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

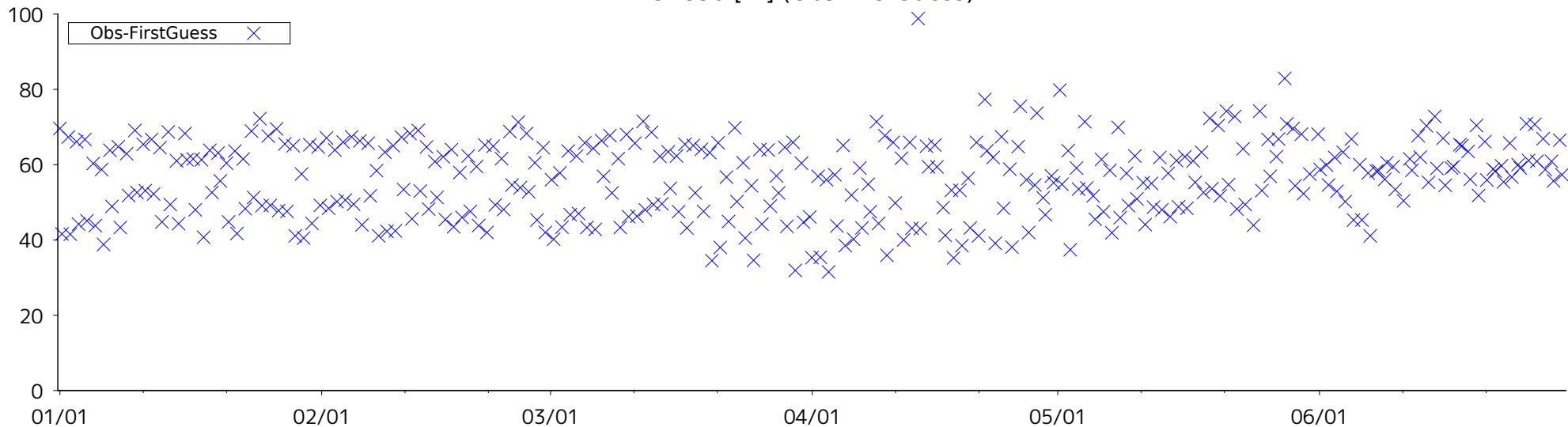
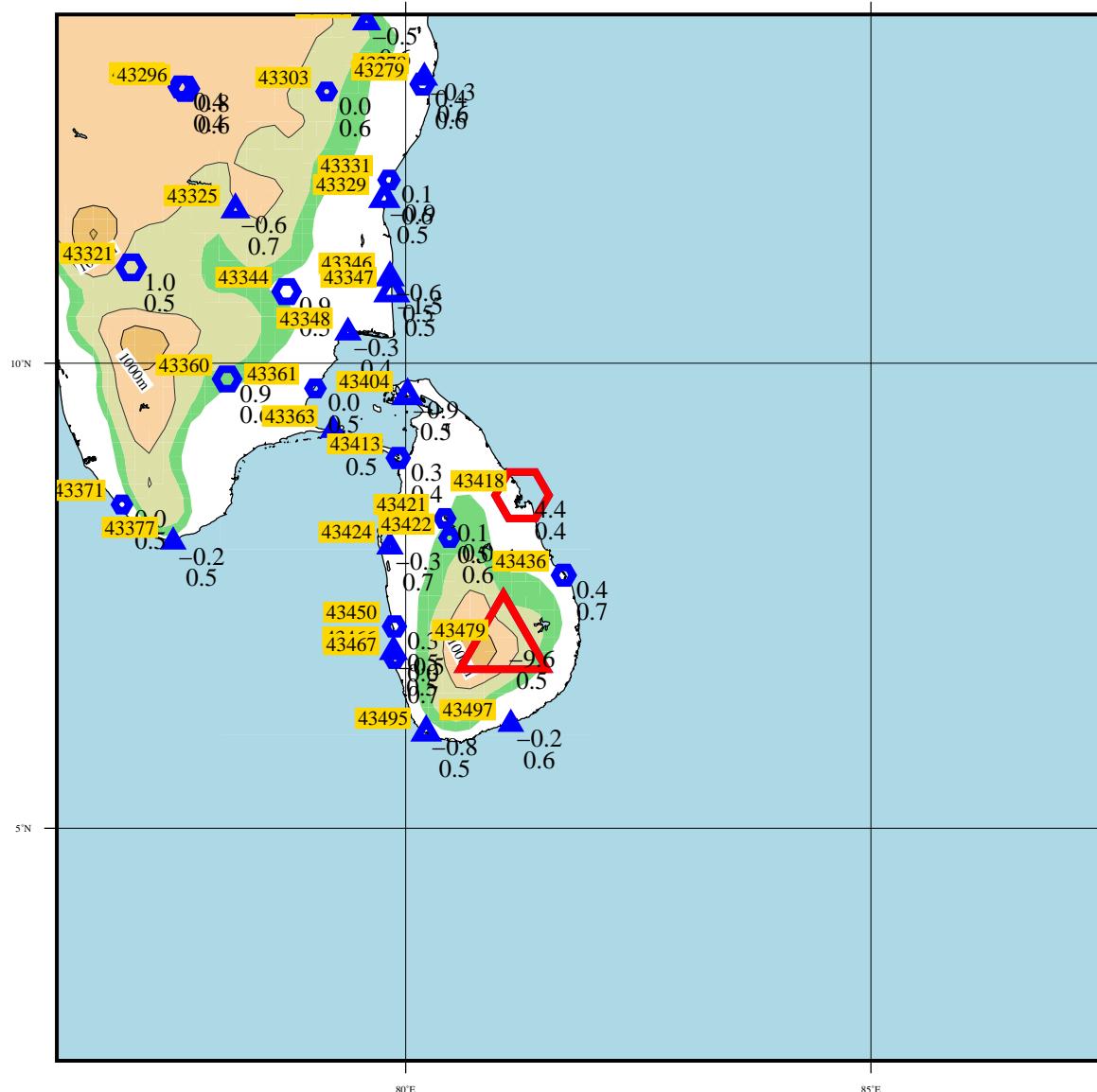


Figure 34 Time-series representation of GZ850 Obs minus FirstGuess for station 42299

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

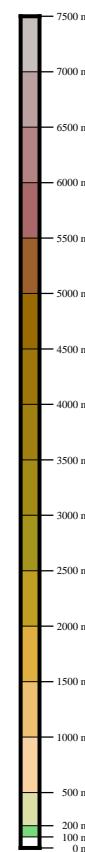


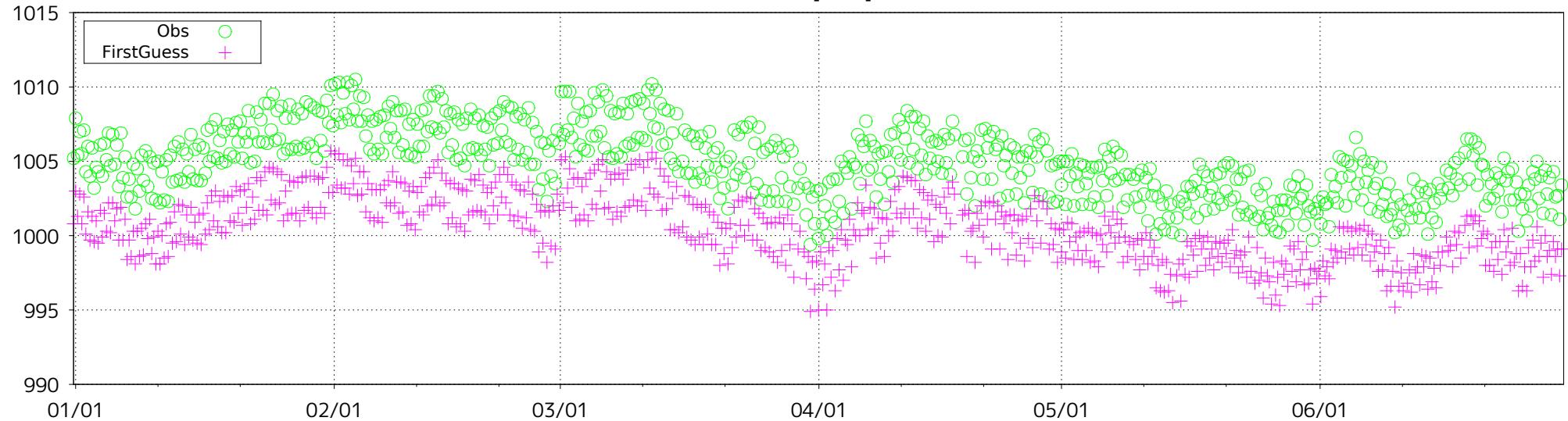
Figure 35 BIAS and SD of SLP for station 43418, 43479 (red) and surrounding stations (blue).

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: 81.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

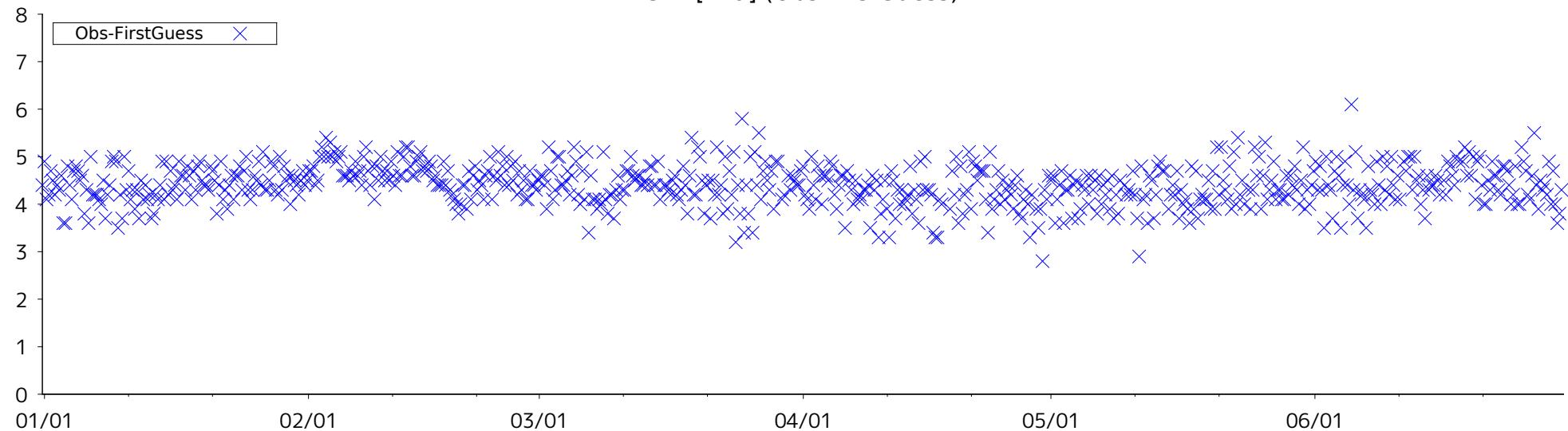
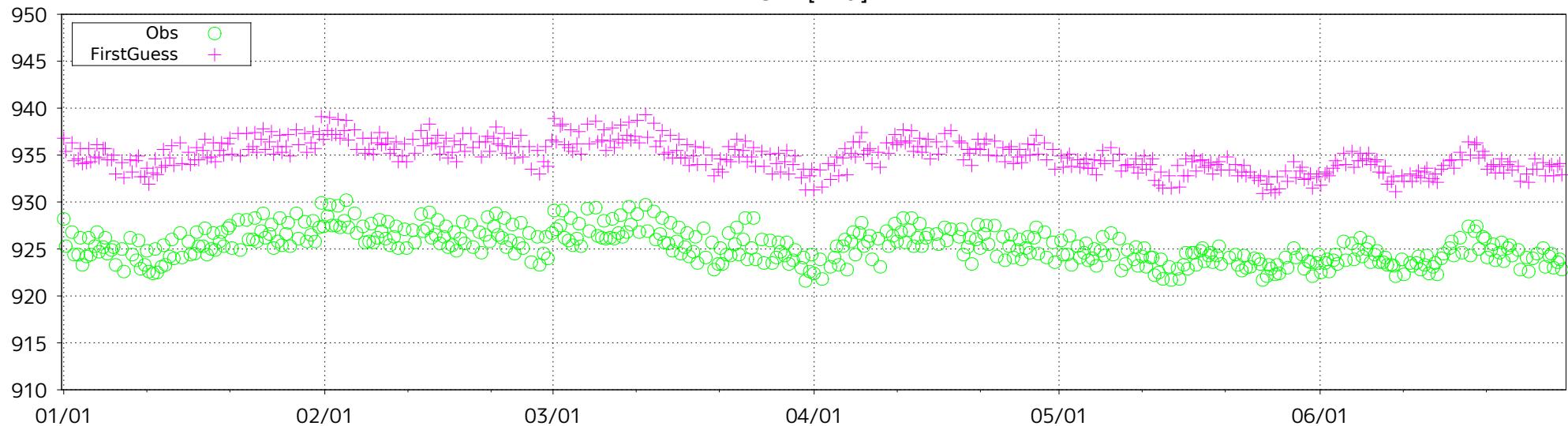


Figure 36 Time-series representation of SLP Obs minus FirstGuess for station 43418

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

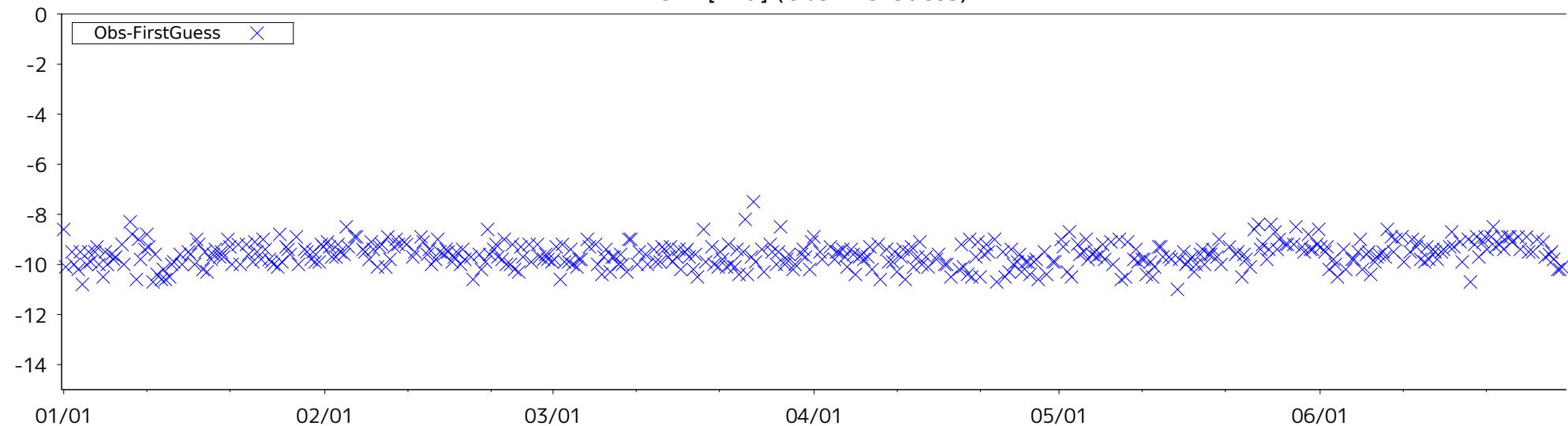
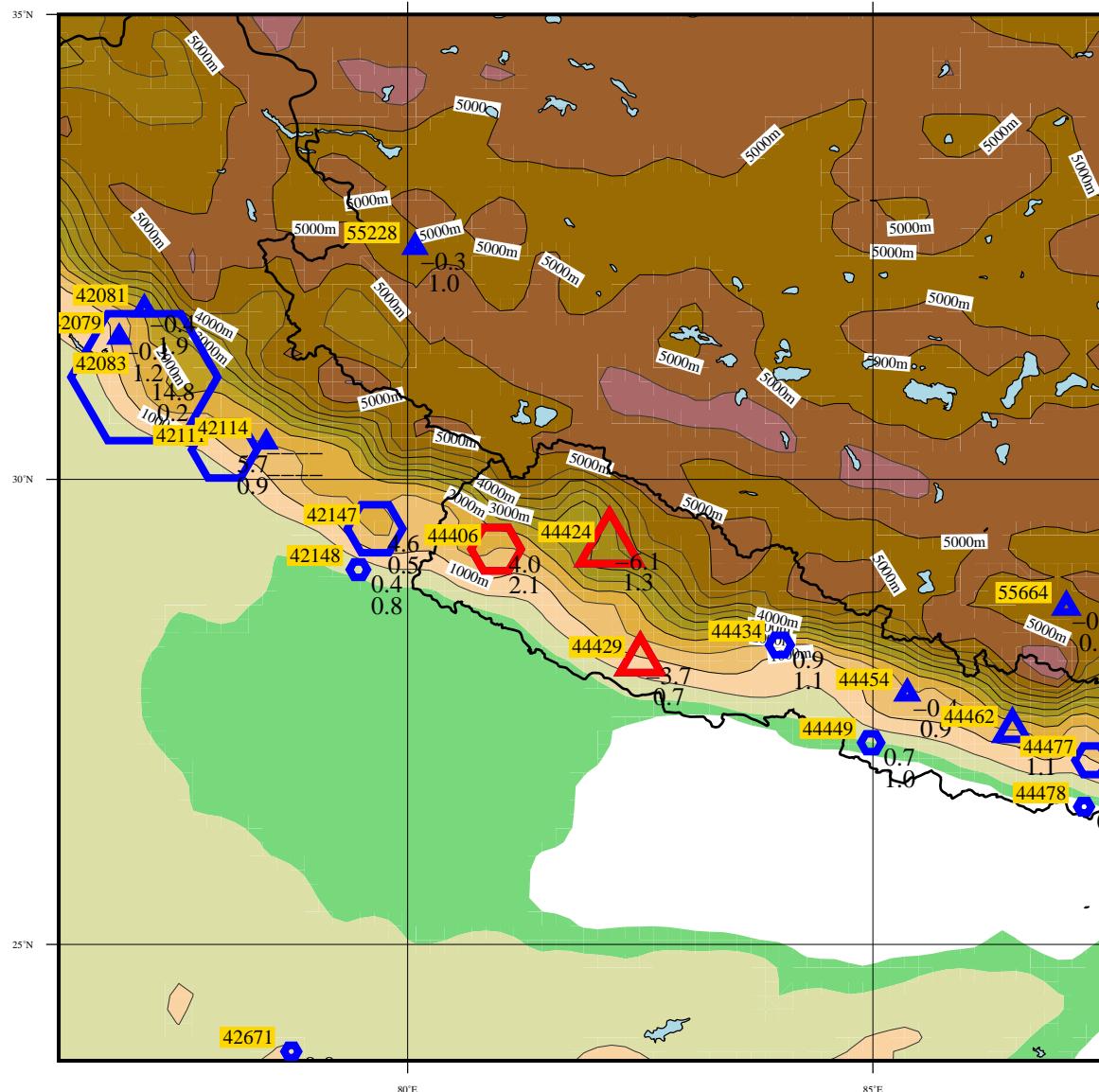


Figure 37 Time-series representation of SLP Obs minus FirstGuess for station 43479

LEVEL = SUR ELEMENT = S

LEVEL = SUR ELEMENT = SLP
2021 01 01 00 UTC -> 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

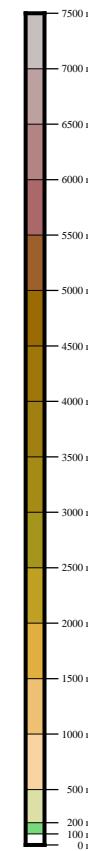


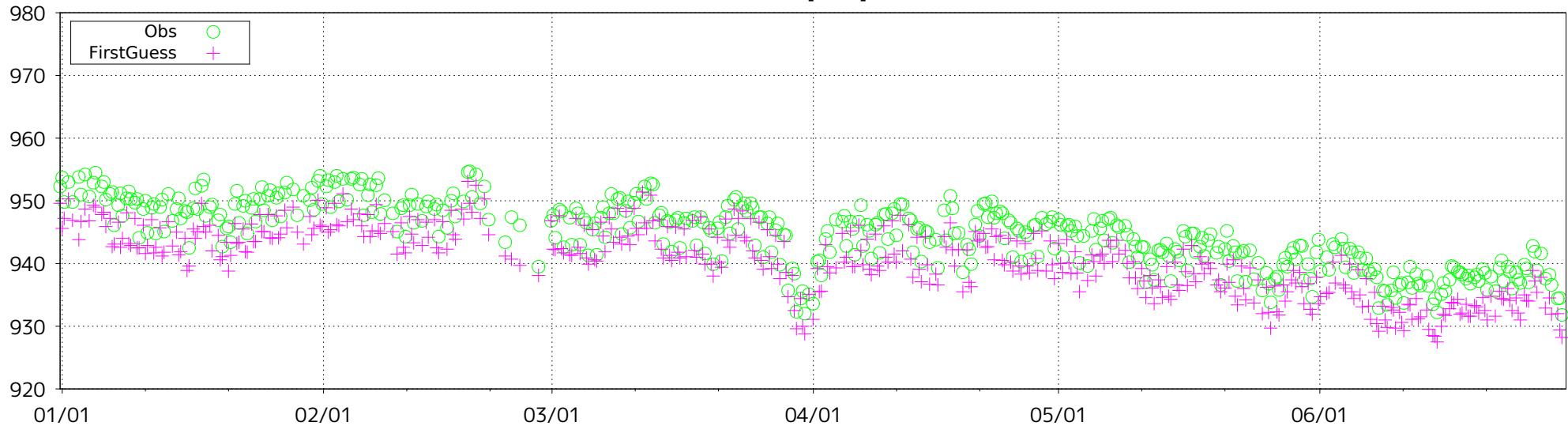
Figure 38 BIAS and SD of SLP for station 44406, 44424, 44429 (red) and surrounding stations (blue).

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 number to the upper left of each symbol is the VNR value, 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: 44406 (lat: 29.3N, lon: 81.0E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

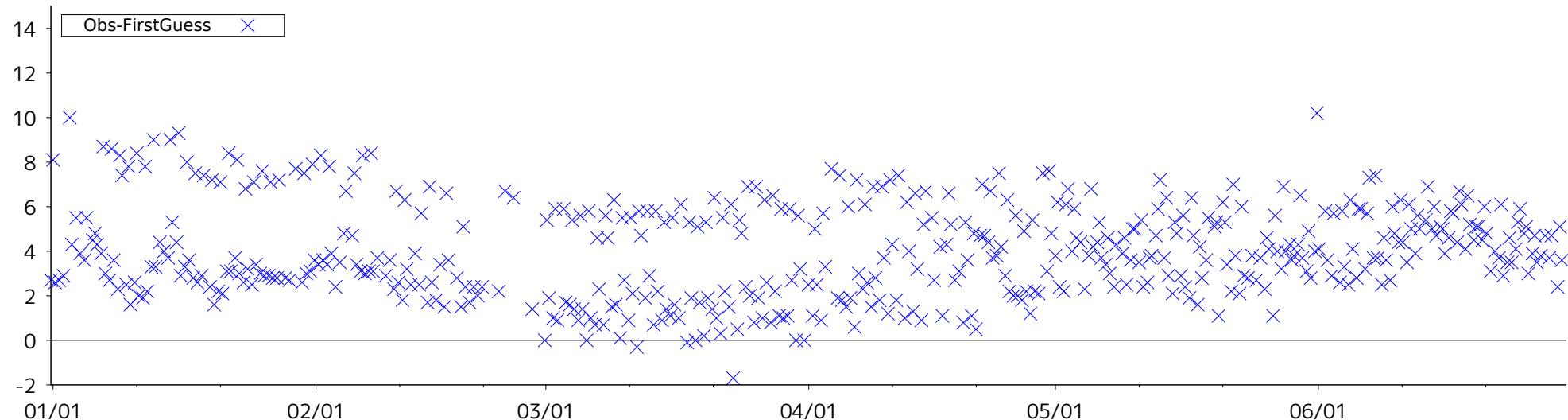
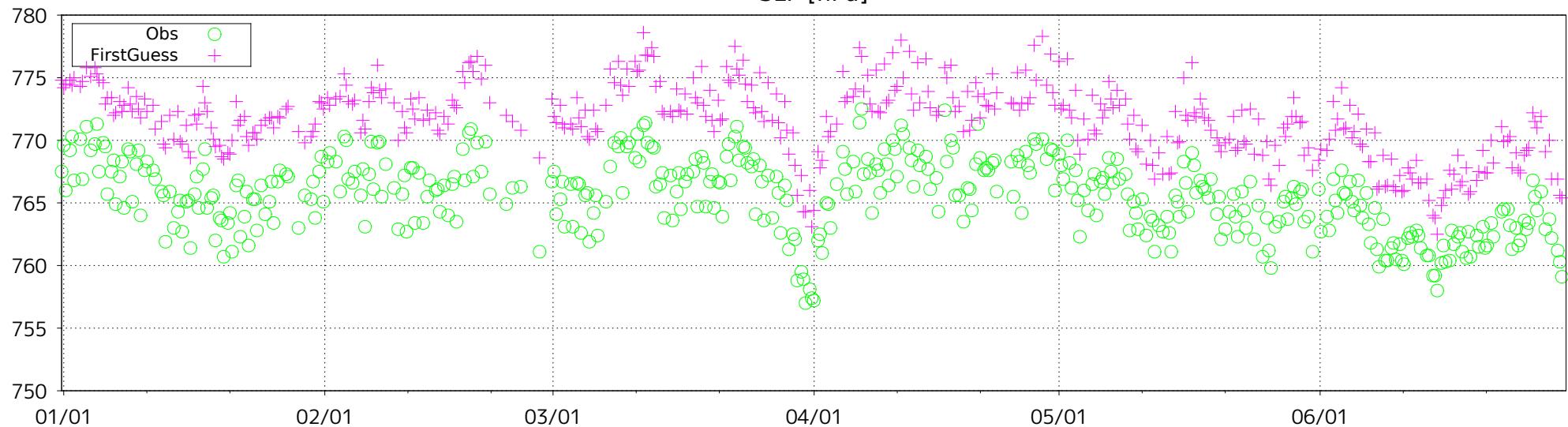


Figure 39 Time-series representation of SLP Obs minus FirstGuess for station 44406

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

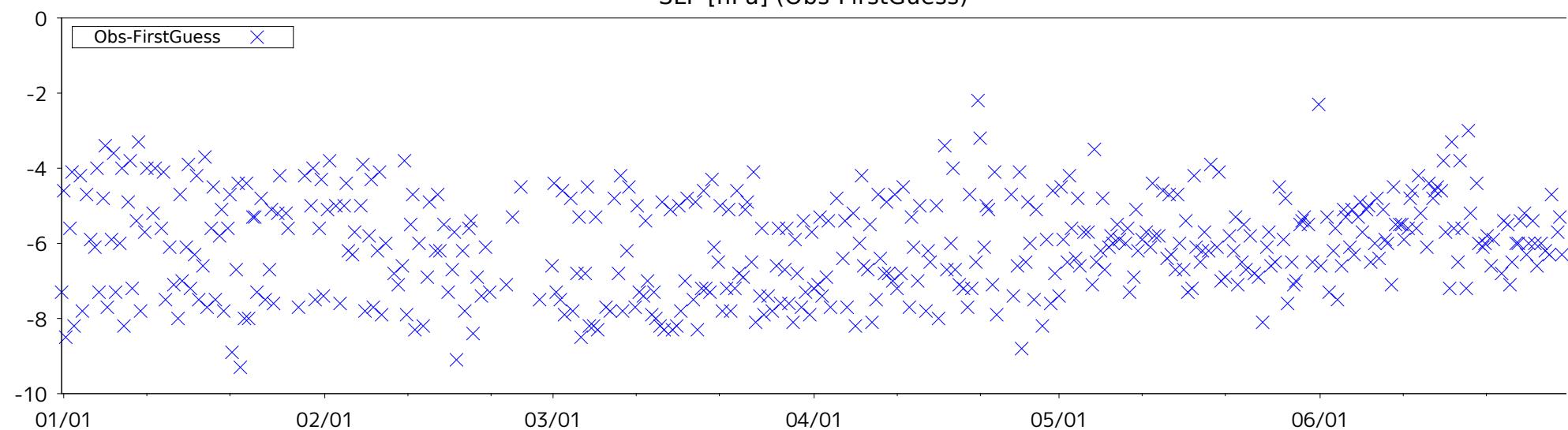
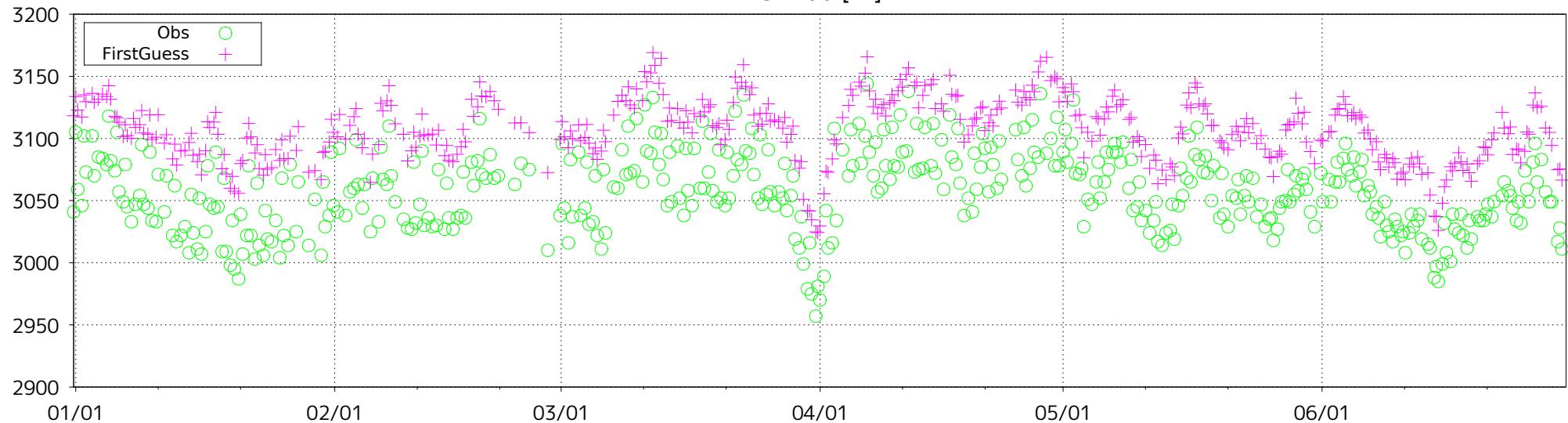


Figure 40(a) Time-series representation of SLP Obs minus FirstGuess for station 44424

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

GZ700 [m]



GZ700 [m] (Obs-FirstGuess)

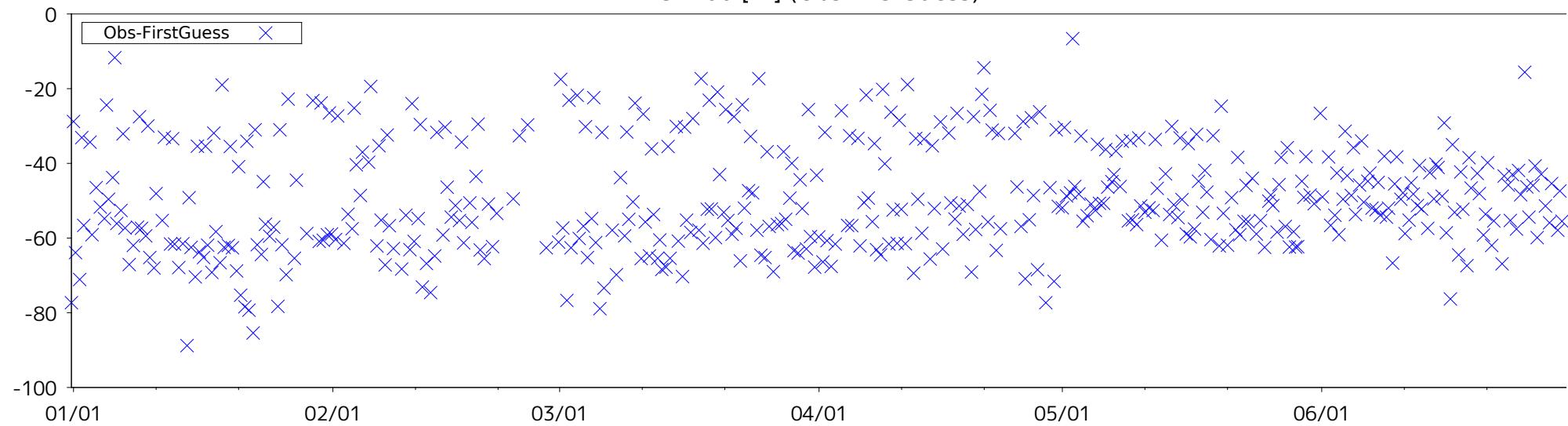
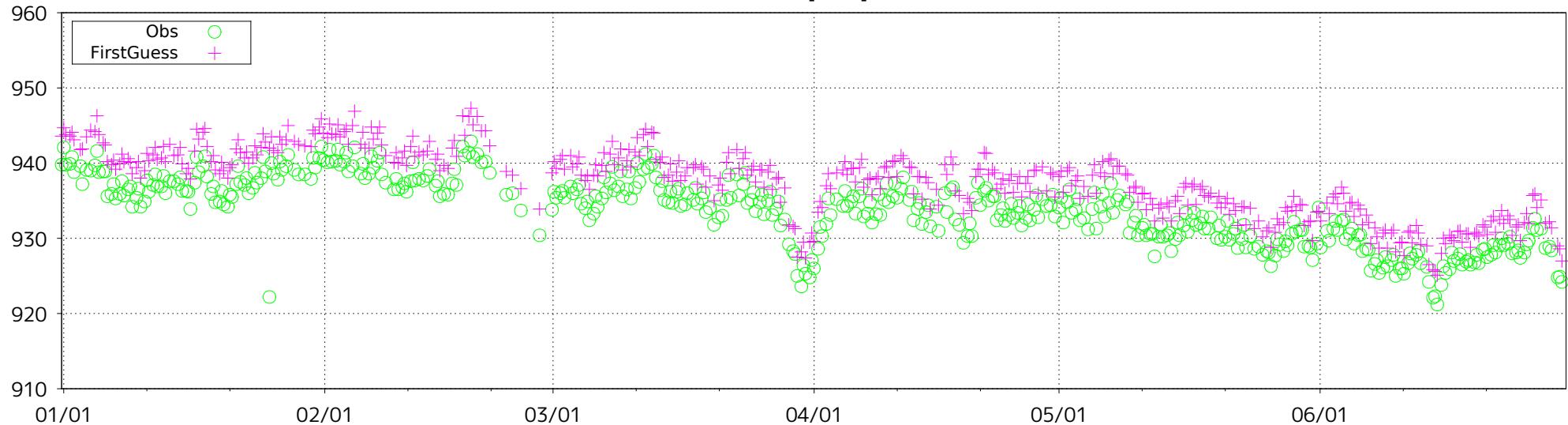


Figure 40(b) Time-series representation of GZ700 Obs minus FirstGuess for station 44424

ID: 44429 (lat: 28.1N, lon: 82.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

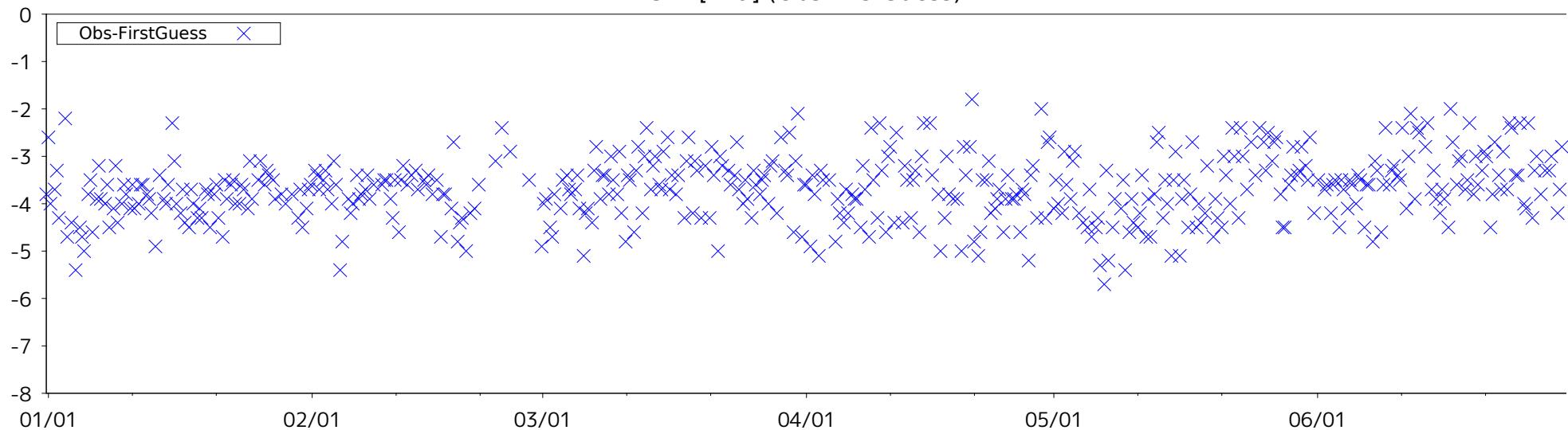


Figure 41 Time-series representation of SLP Obs minus FirstGuess for station 44429

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)

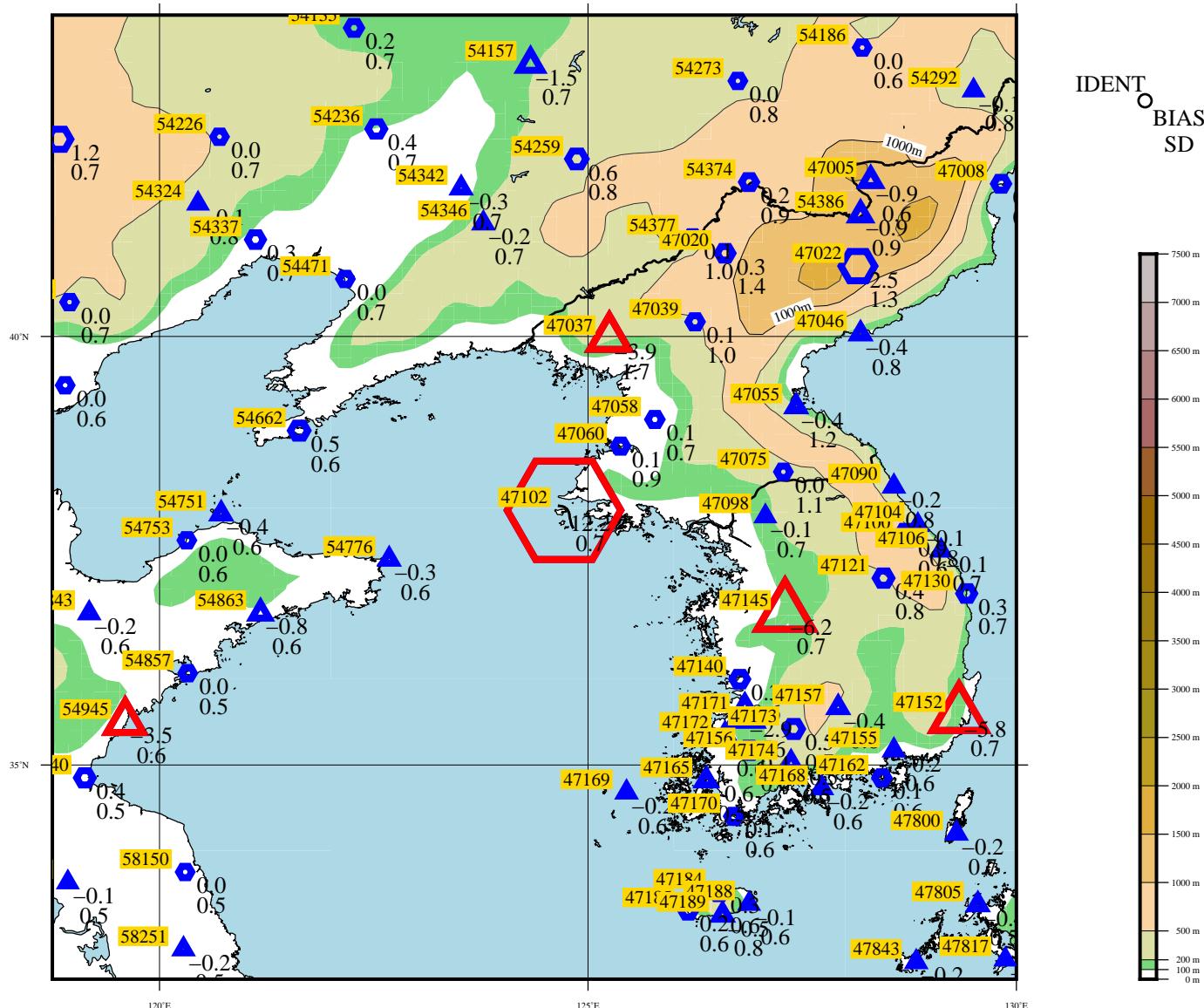


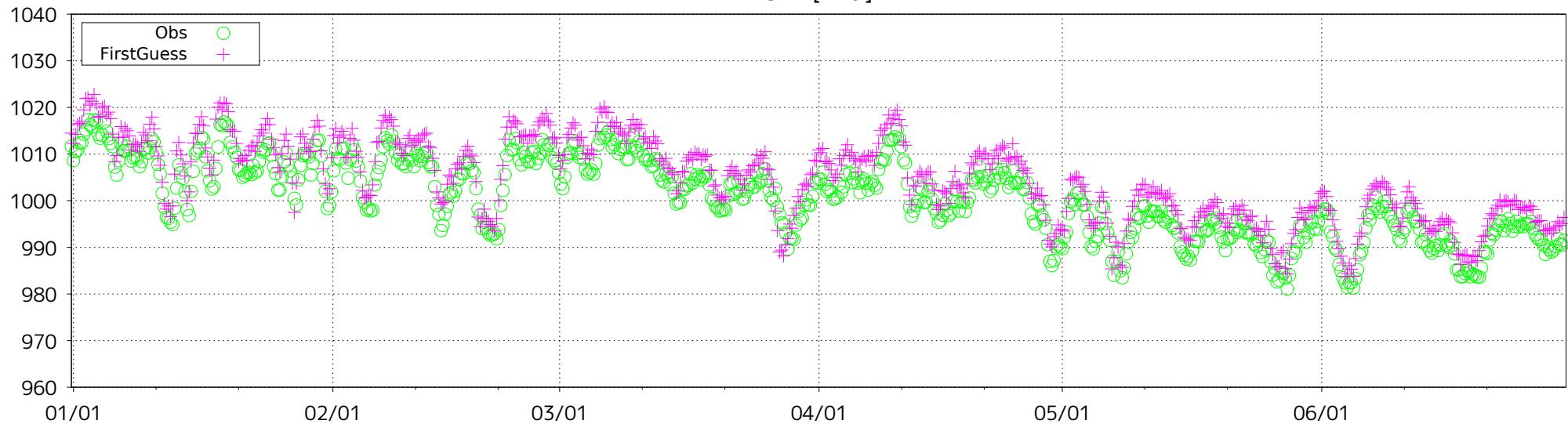
Figure 42 BIAS and SD of SLP for station 47037, 47102, 47145, 47152, 54945 (red) and surrounding stations (blue).

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)

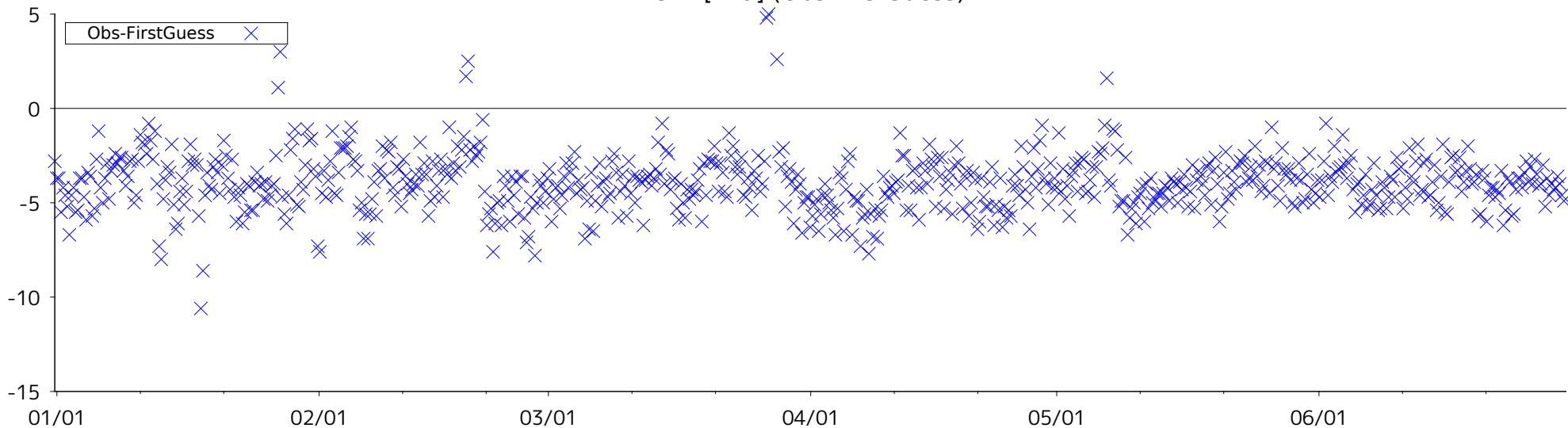
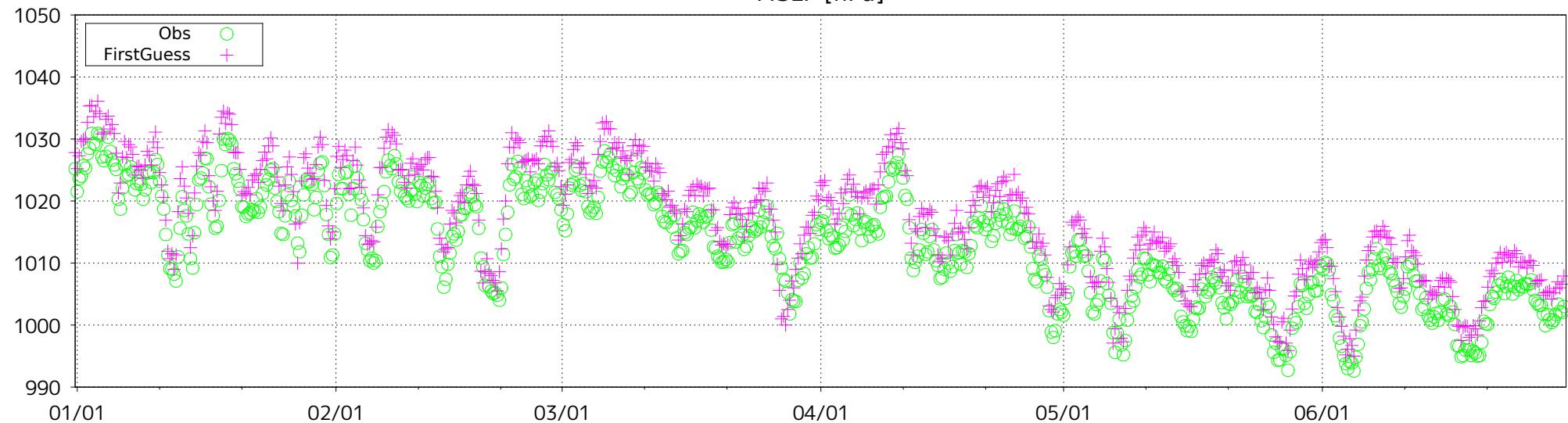


Figure 43(a) Time-series representation of SLP Obs minus FirstGuess for station 47037

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

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

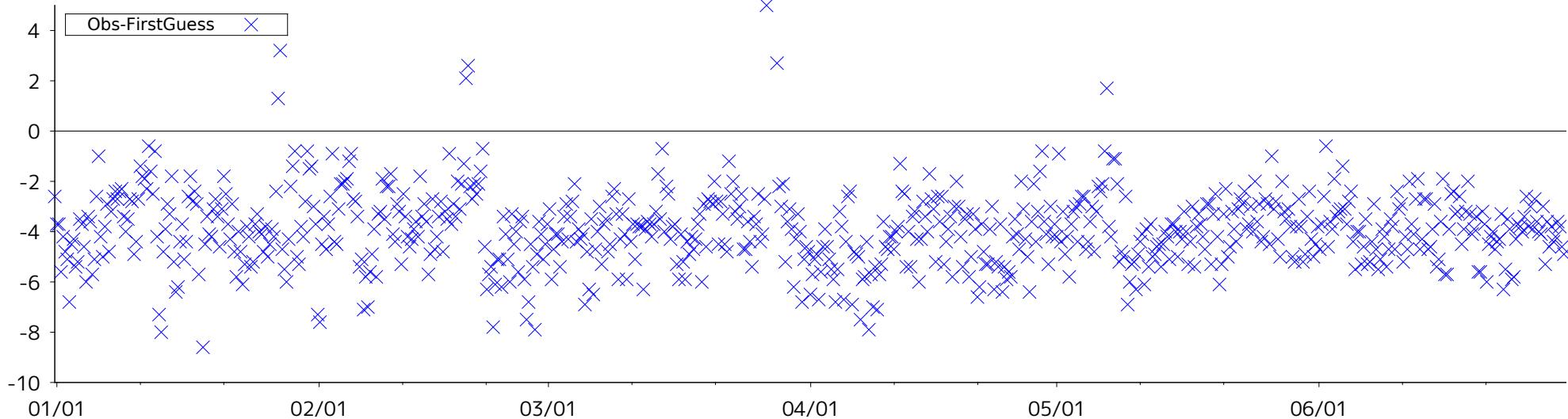
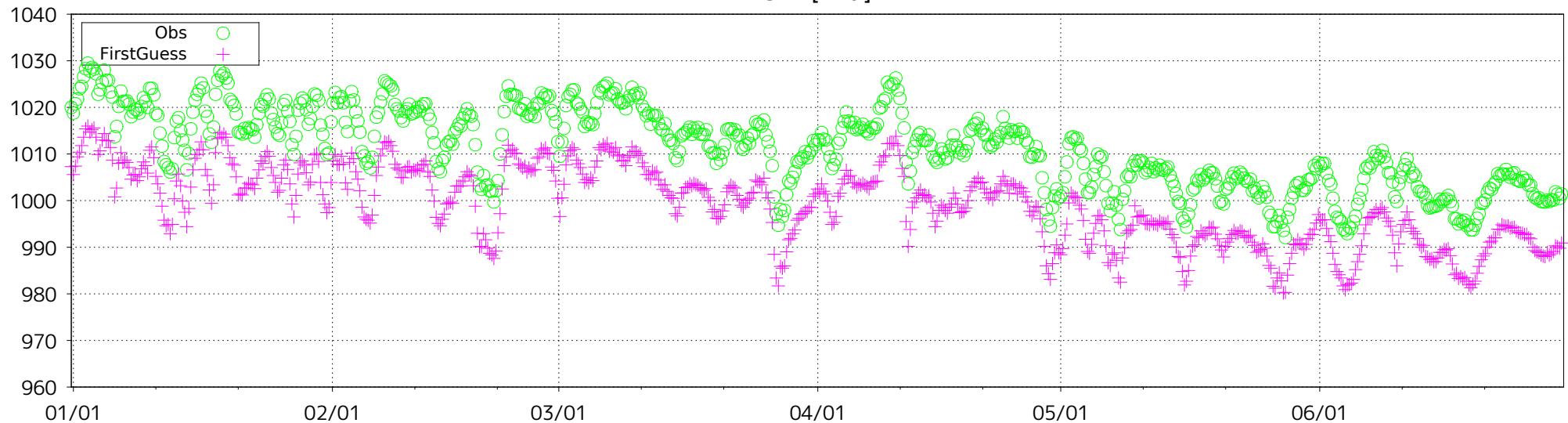


Figure 43(b) Time-series representation of MSLP Obs minus FirstGuess for station 47037

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

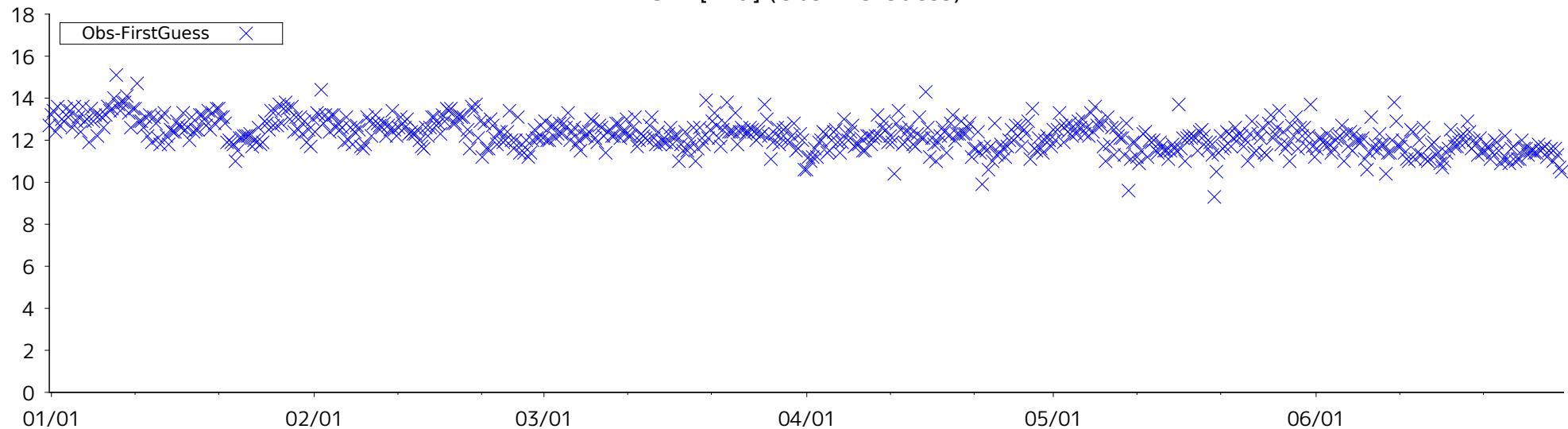
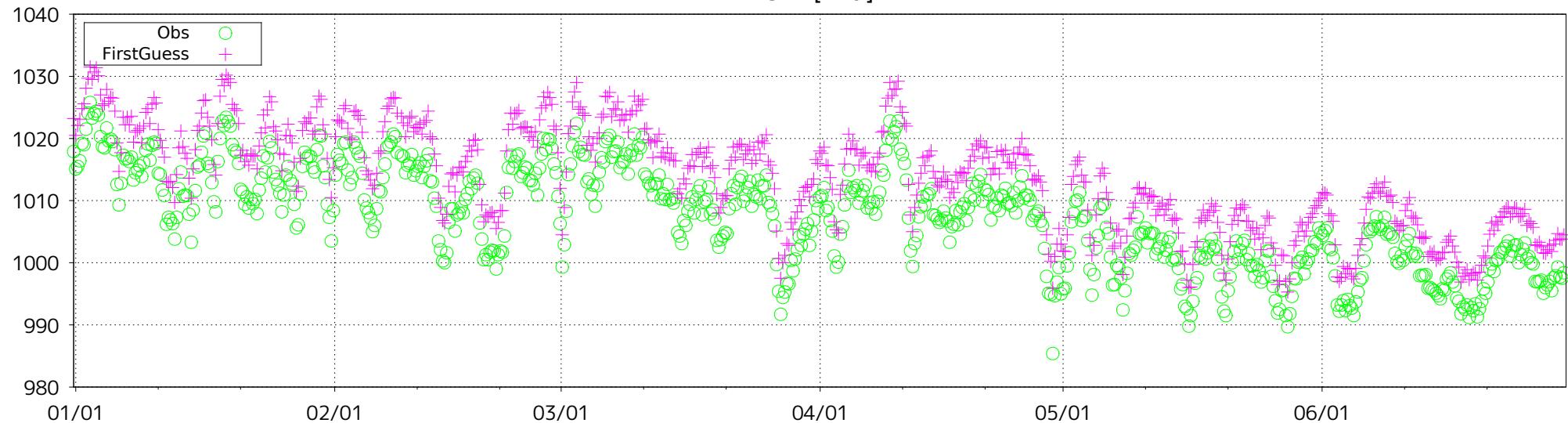


Figure 44 Time-series representation of SLP Obs minus FirstGuess for station 47102

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

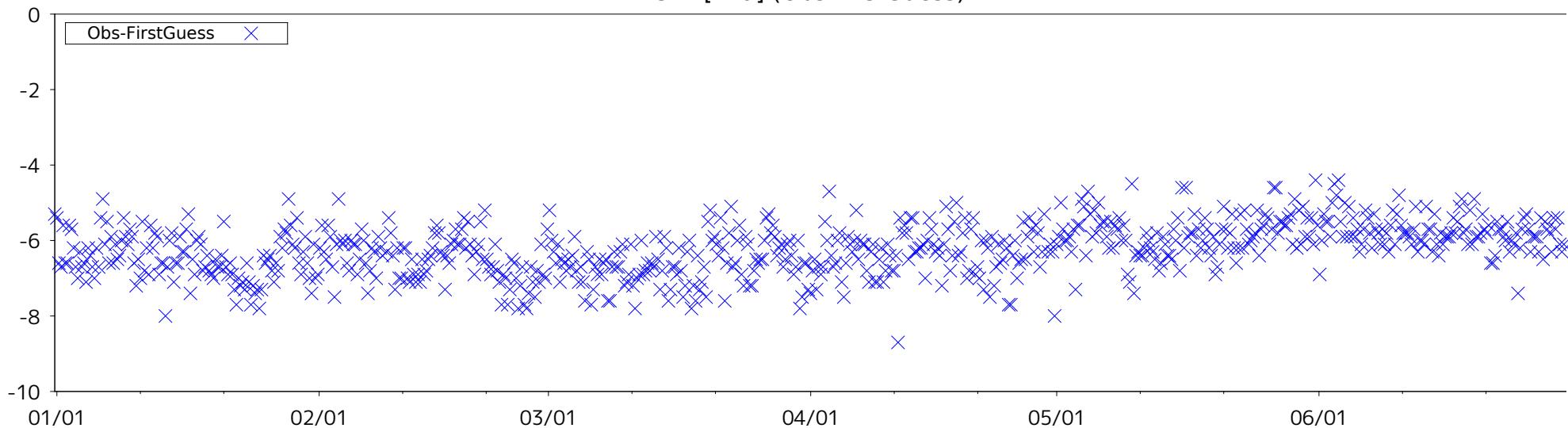
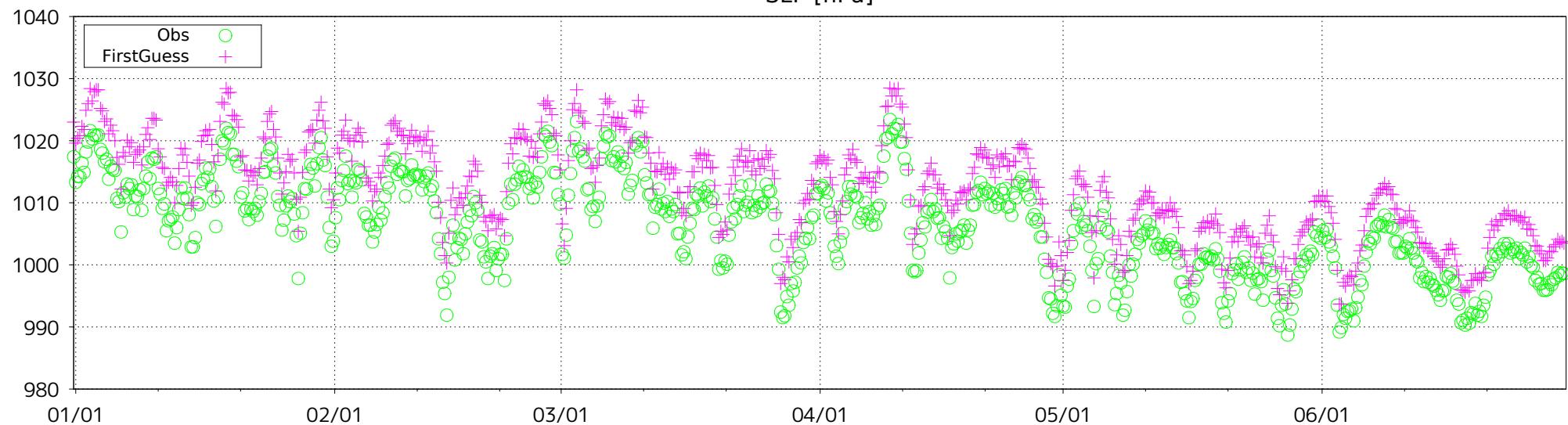


Figure 45 Time-series representation of SLP Obs minus FirstGuess for station 47145

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

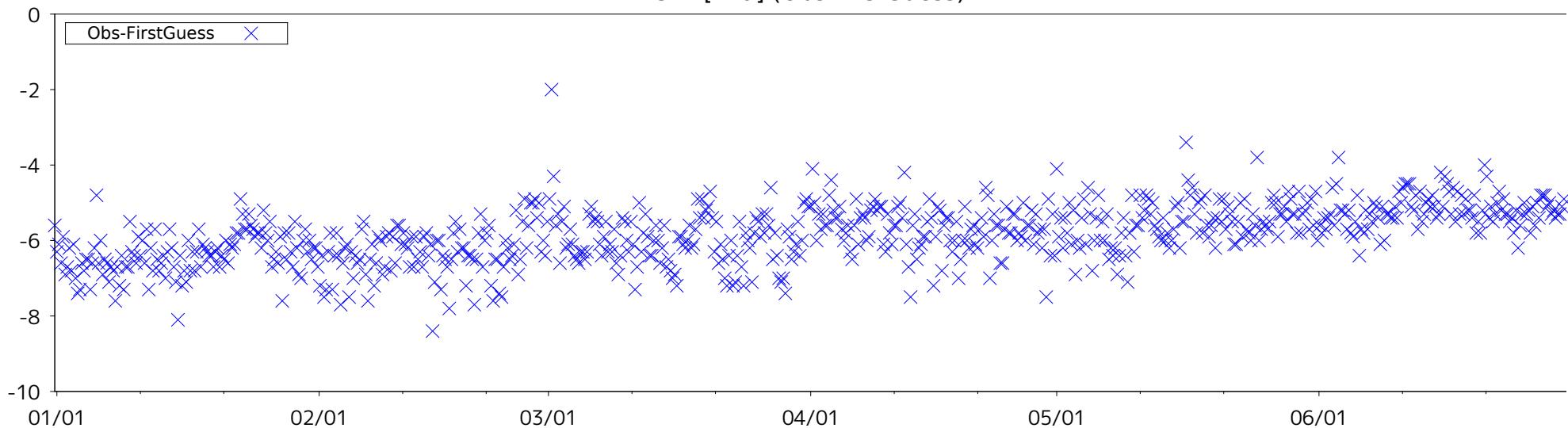
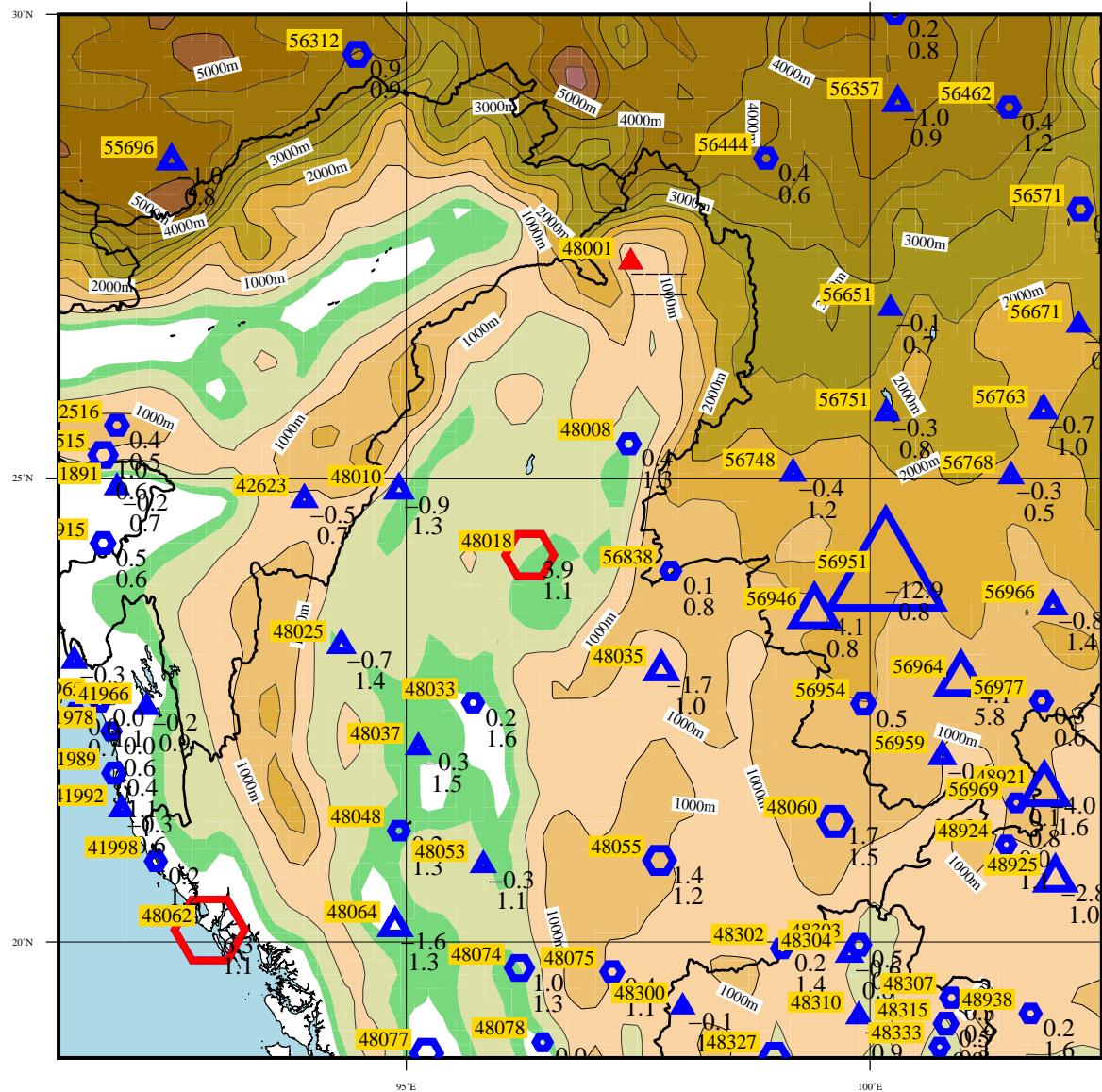


Figure 46 Time-series representation of SLP Obs minus FirstGuess for station 47152

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

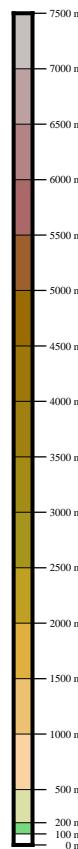


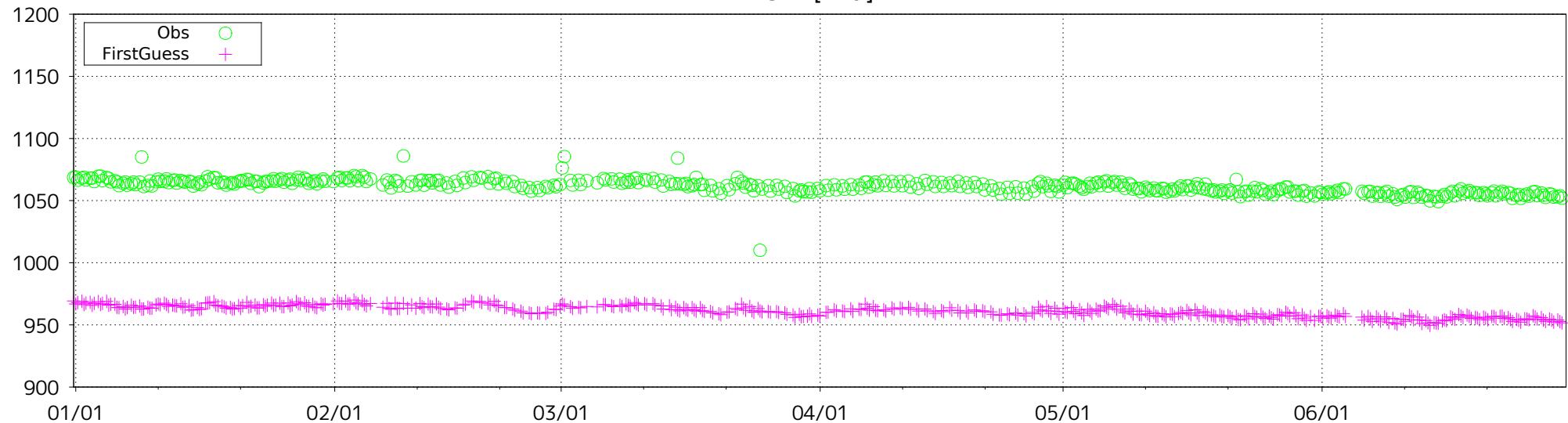
Figure 47 BIAS and SD of SLP for station 48001, 48018, 48062 (red) and surrounding stations (blue).

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 numbers to the upper-left of each symbol is the **WEIGHTS**, 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: 48001 (lat: 27.3N, lon: 97.4E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

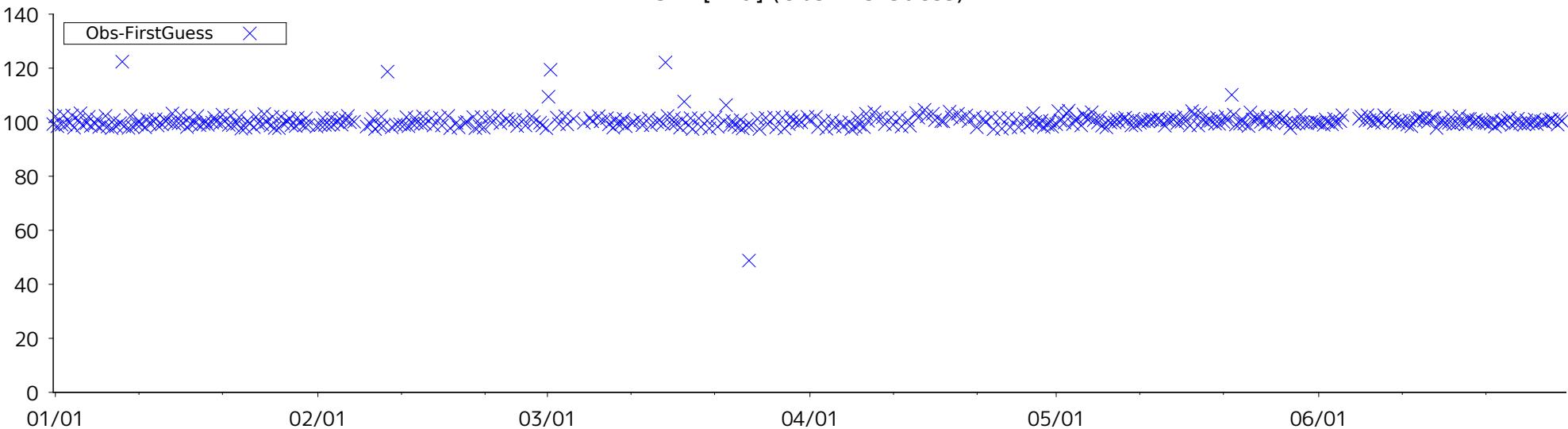
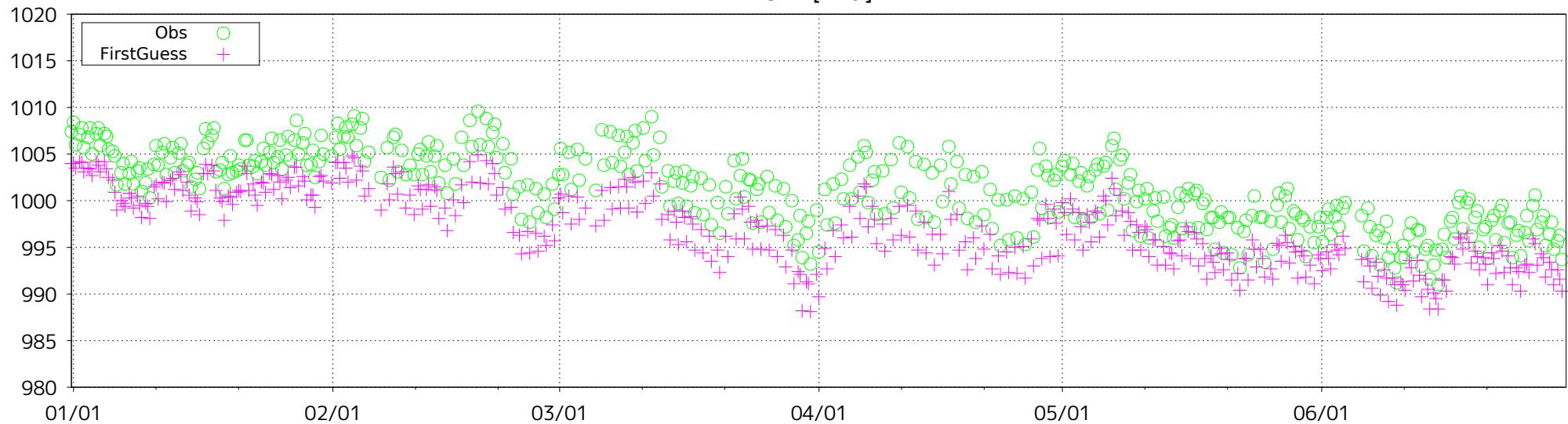


Figure 48 Time-series representation of SLP Obs minus FirstGuess for station 48001

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

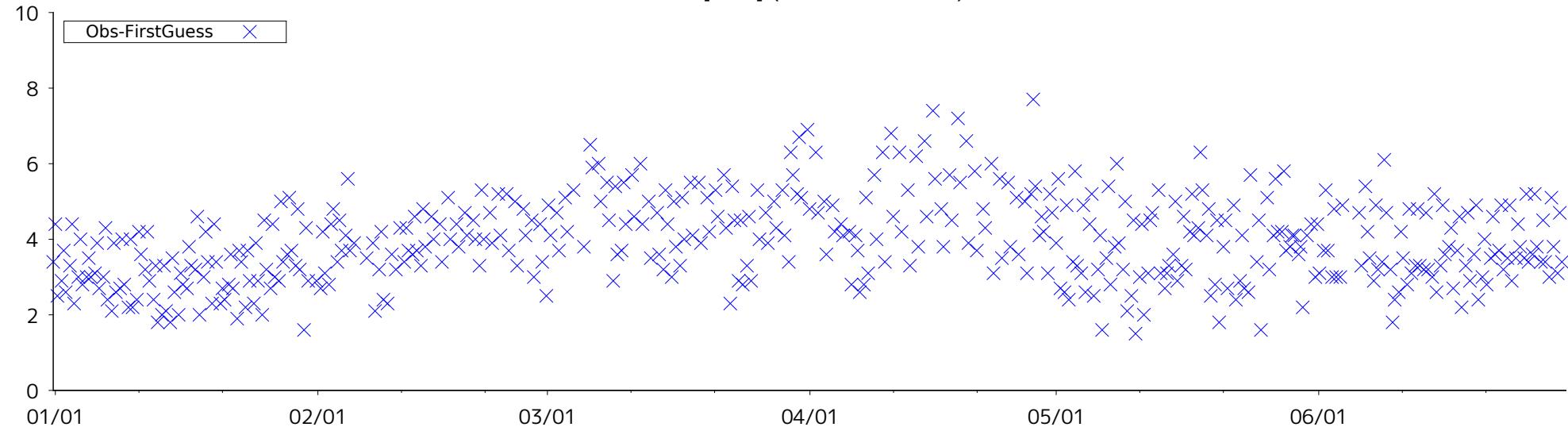
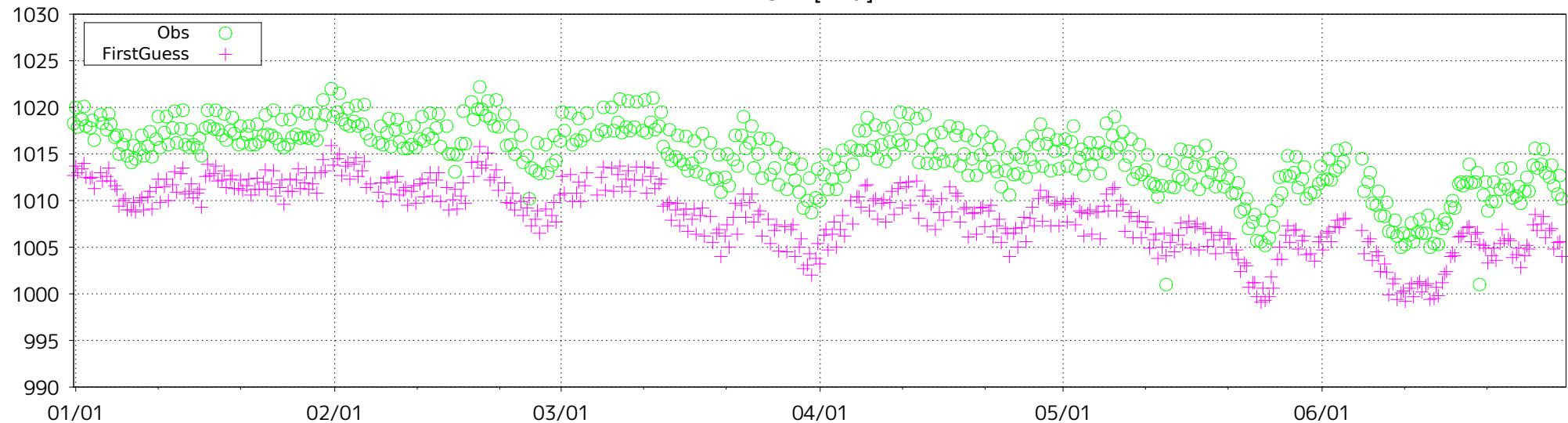


Figure 49 Time-series representation of SLP Obs minus FirstGuess for station 48018

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

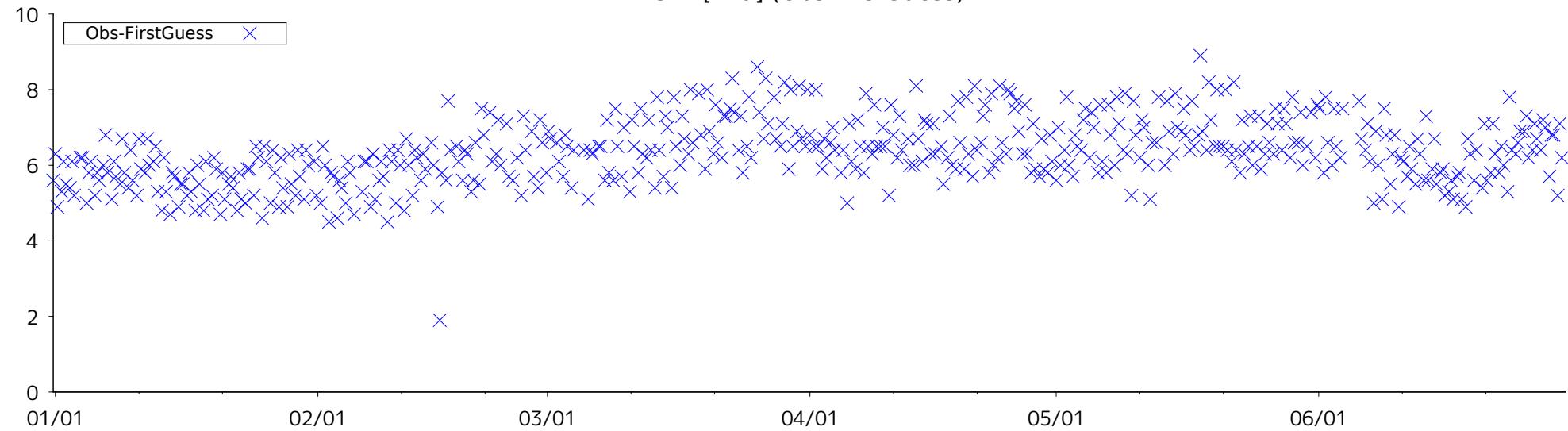


Figure 50 Time-series representation of SLP Obs minus FirstGuess for station 48062

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)

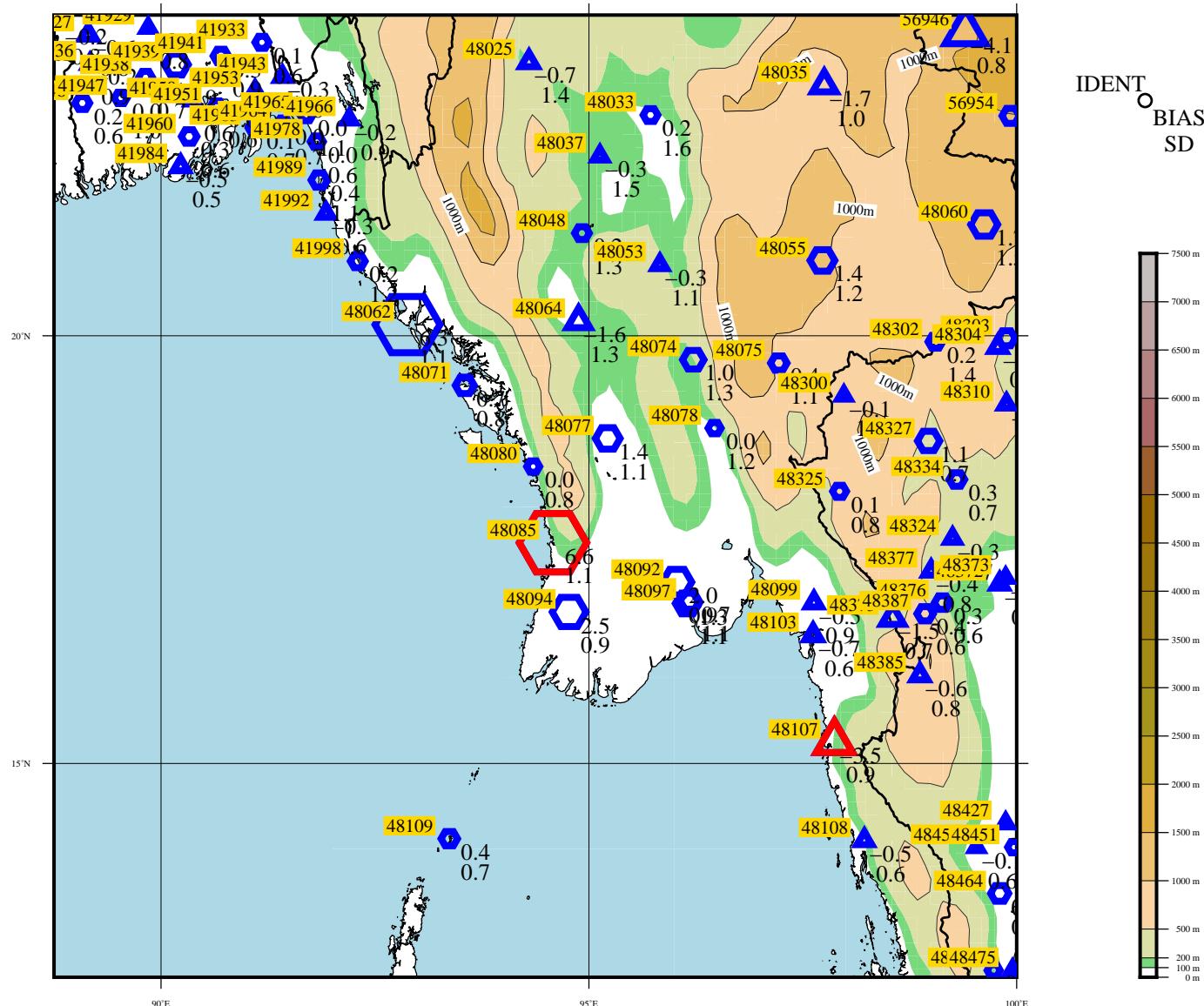


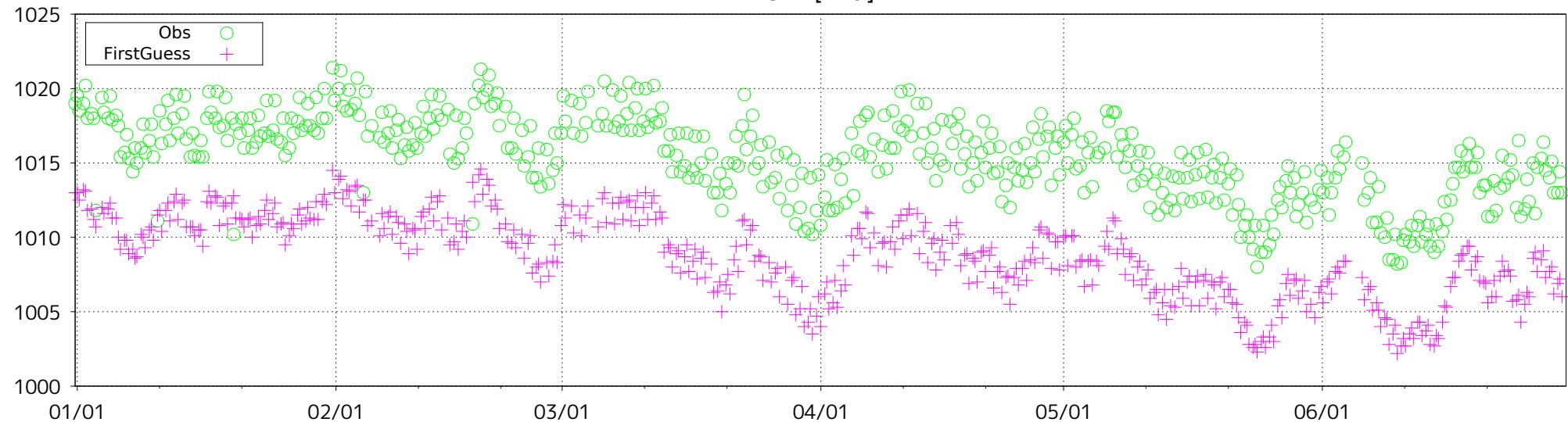
Figure 51 BIAS and SD of SLP for station 48085, 48107 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

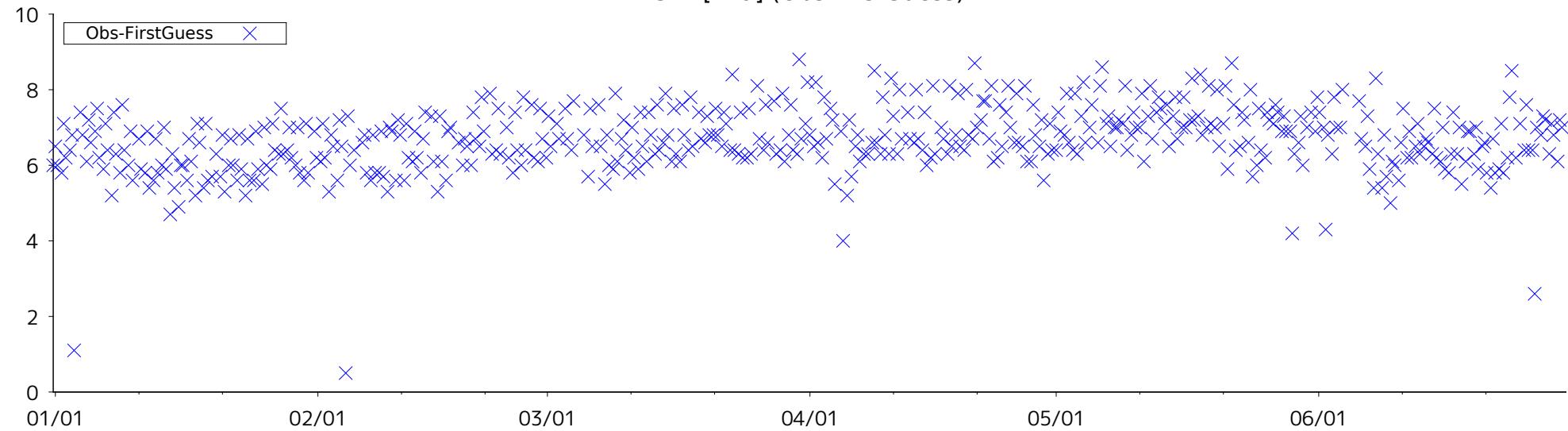
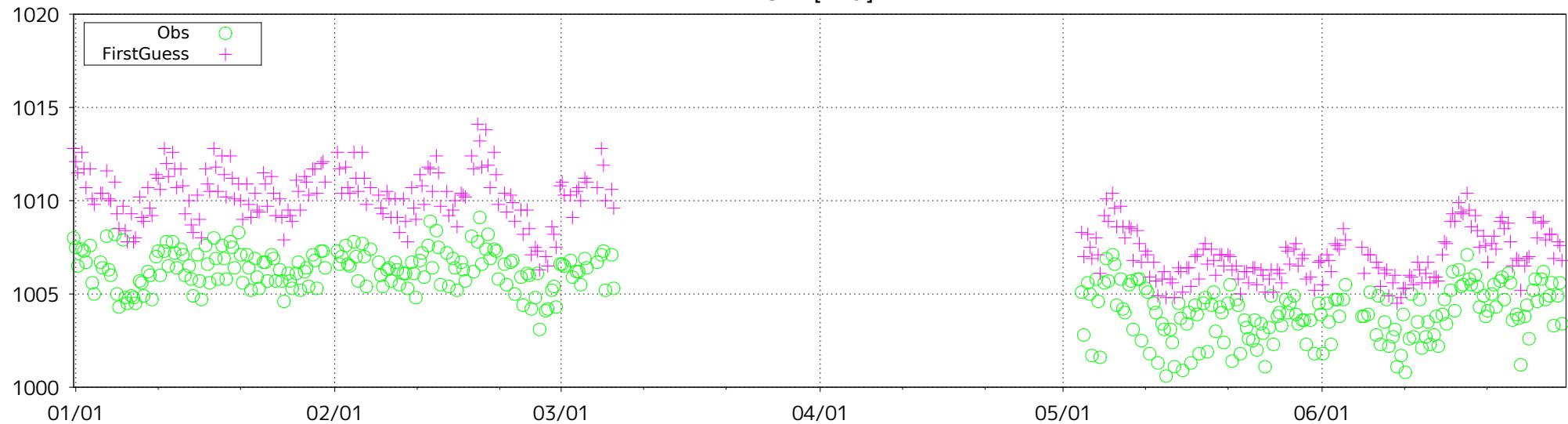


Figure 52 Time-series representation of SLP Obs minus FirstGuess for station 48085

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

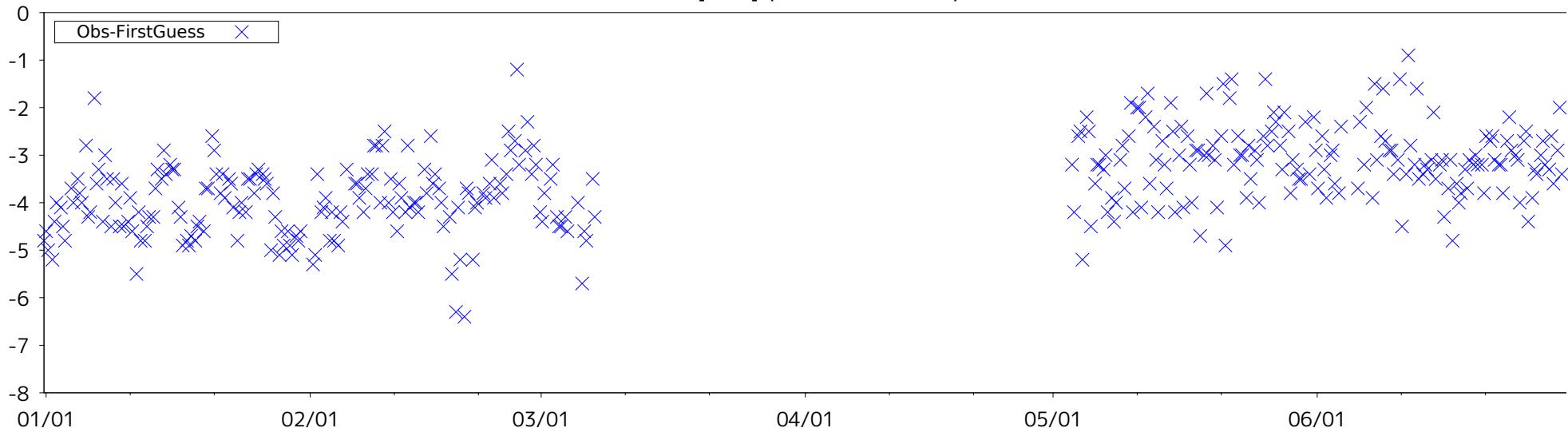
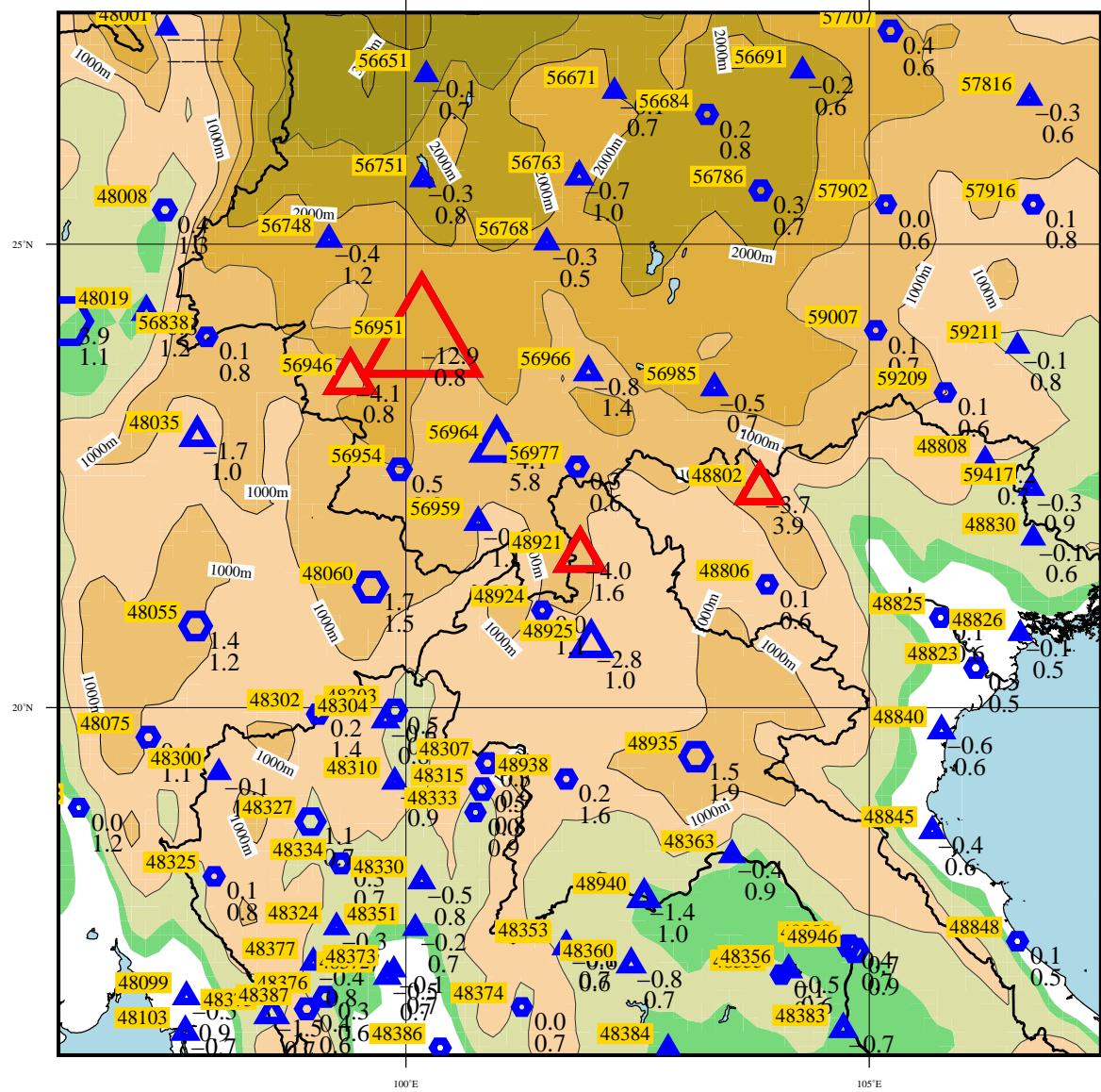


Figure 53 Time-series representation of SLP Obs minus FirstGuess for station 48107

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

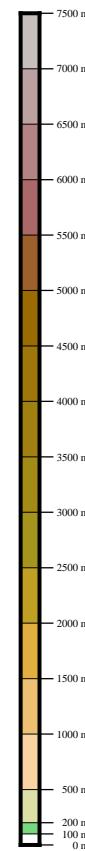


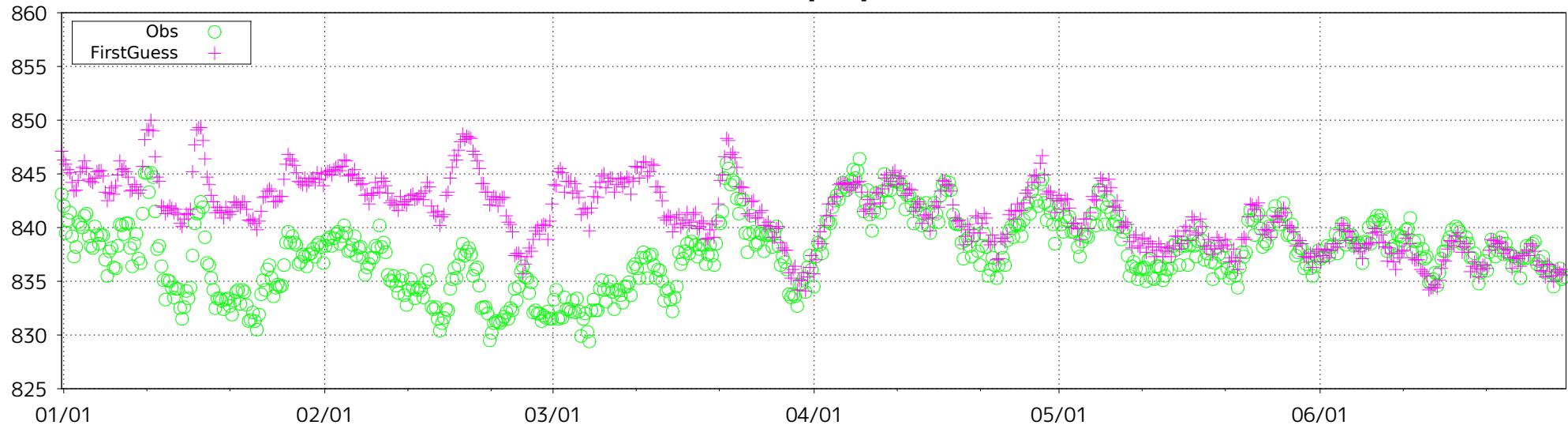
Figure 54 BIAS and SD of SLP for station 48802, 48921, 56946, 56951 (red) and surrounding stations (blue).

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.

ID: 48802 (lat: 22.4N, lon: 103.8E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

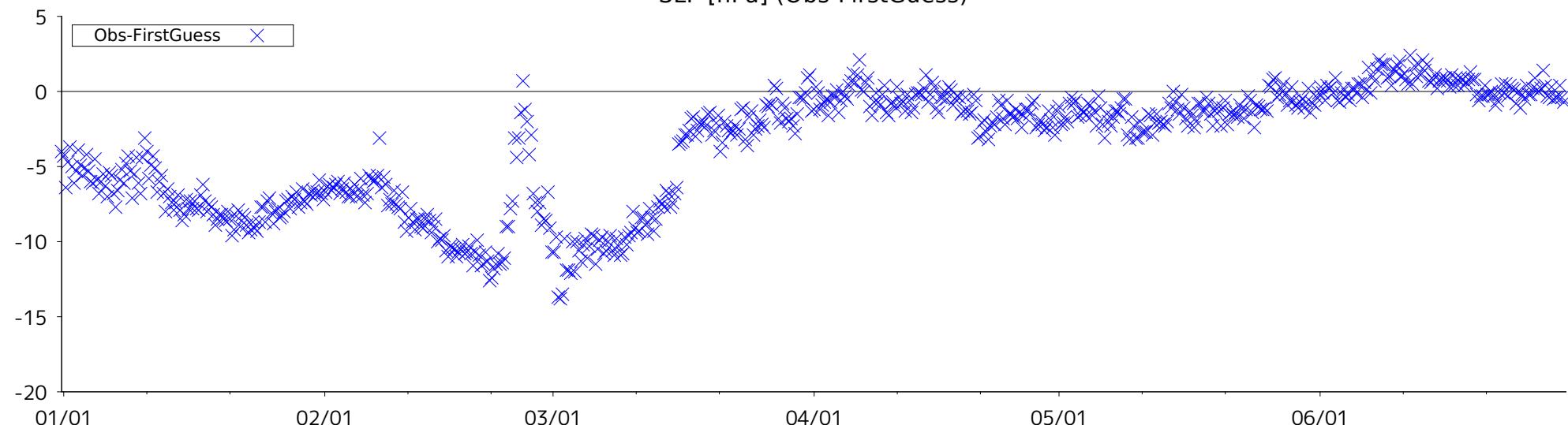
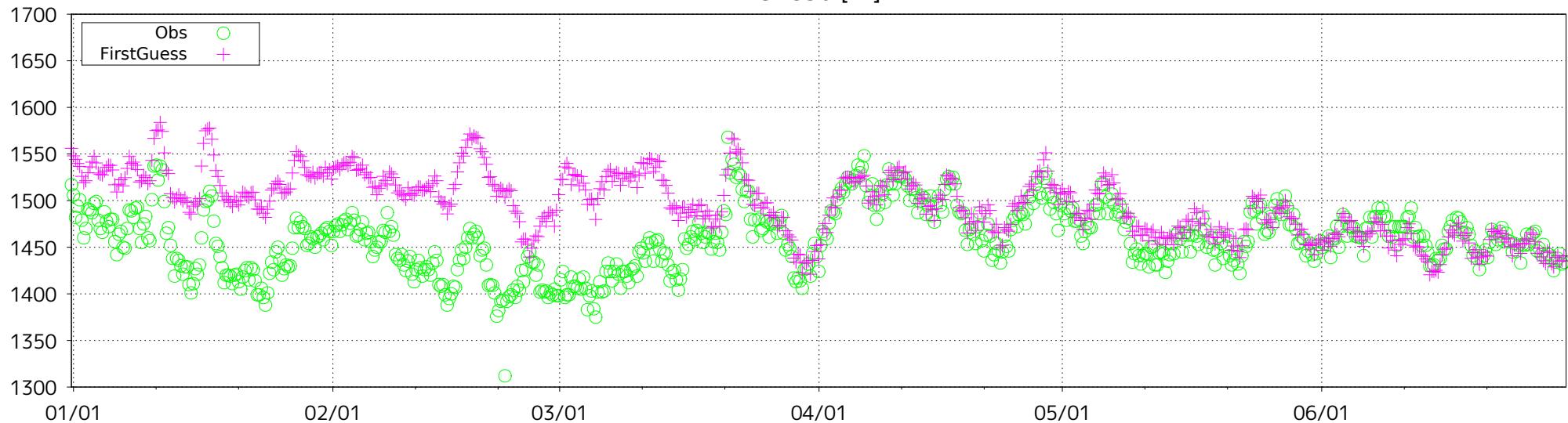


Figure 55(a) Time-series representation of SLP Obs minus FirstGuess for station 48802

ID: 48802 (lat: 22.4N, lon: 103.8E)

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

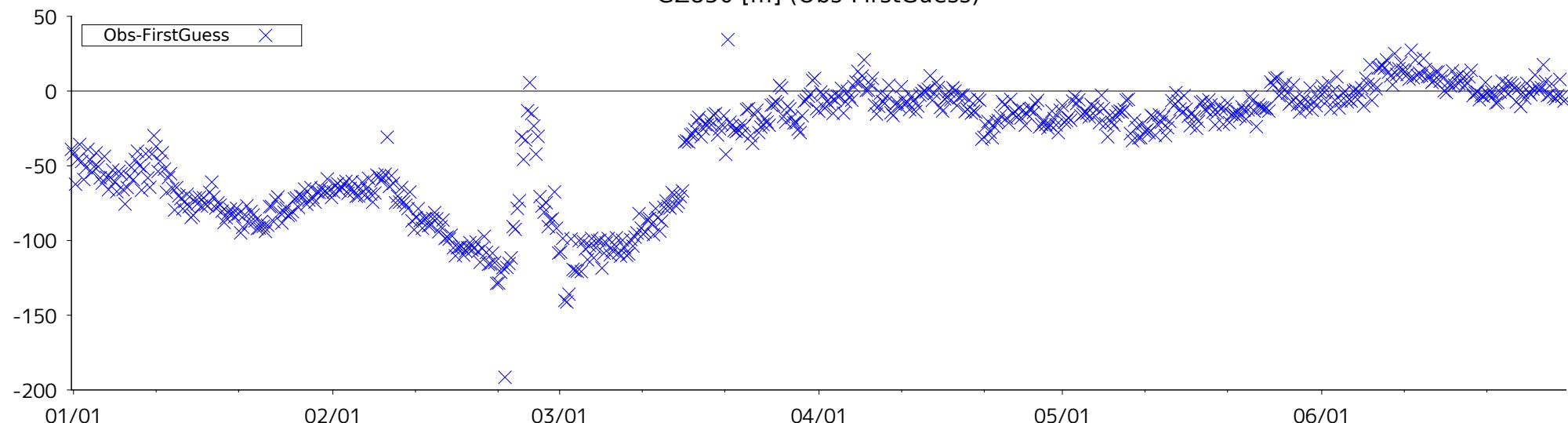
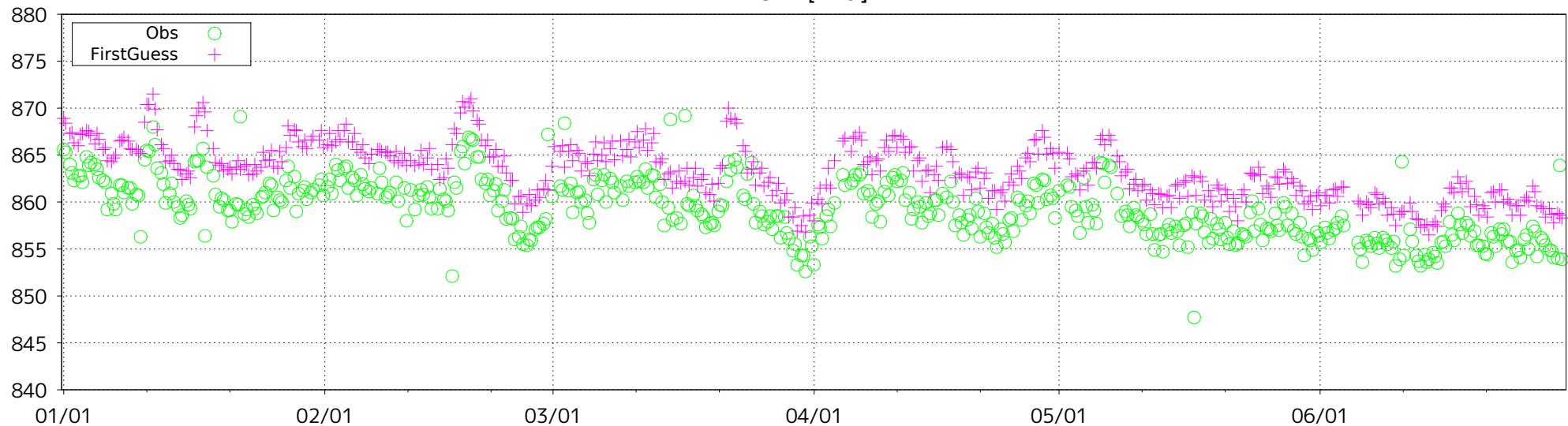


Figure 55(b) Time-series representation of GZ850 Obs minus FirstGuess for station 48802

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

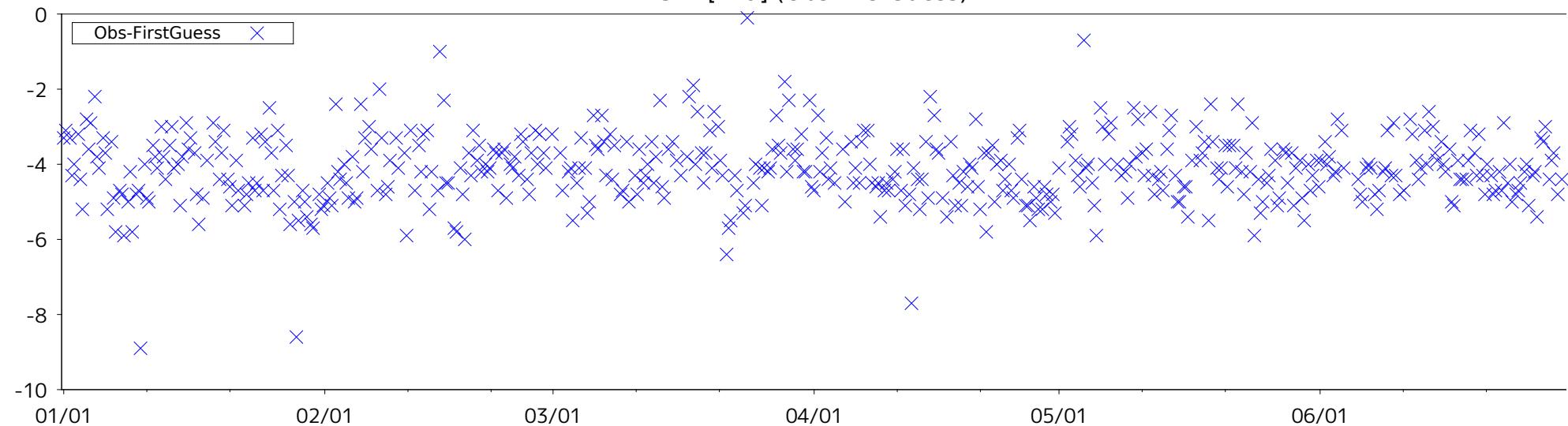
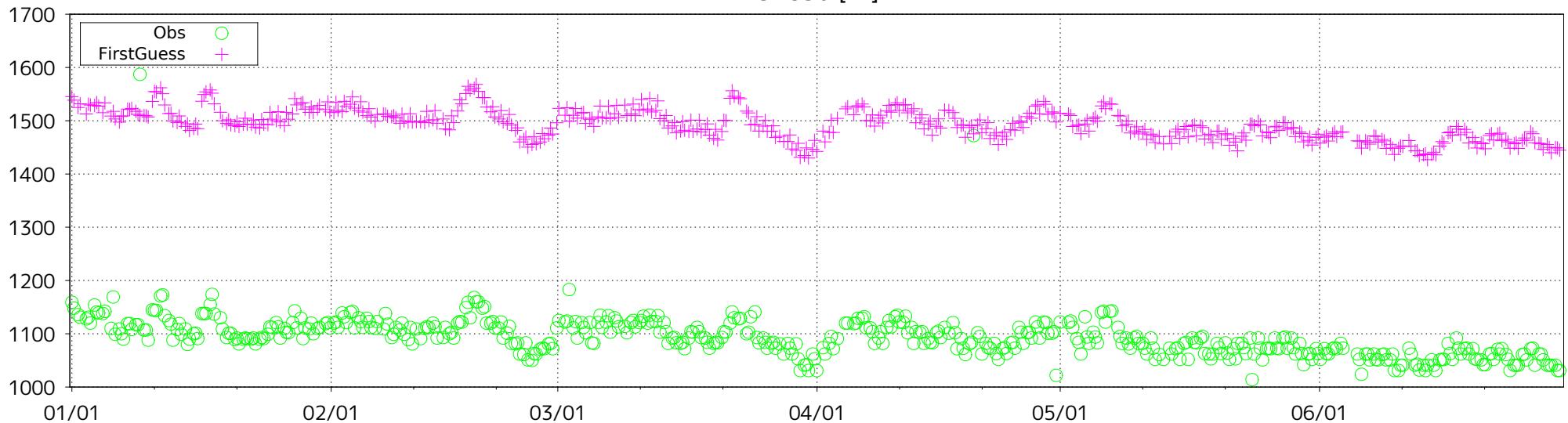


Figure 56(a) Time-series representation of SLP Obs minus FirstGuess for station 48921

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

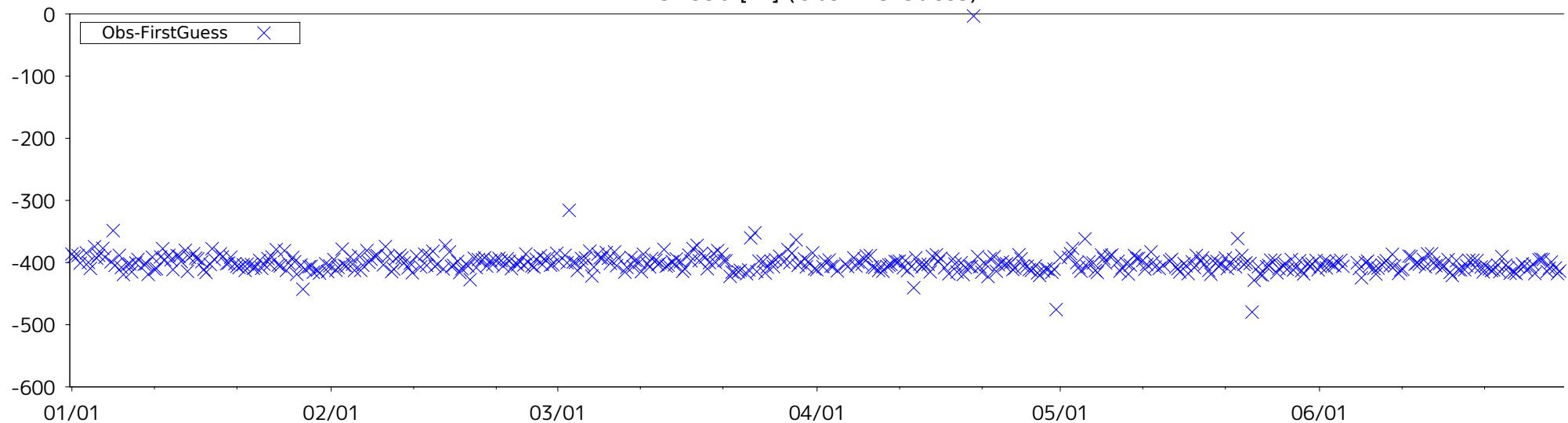
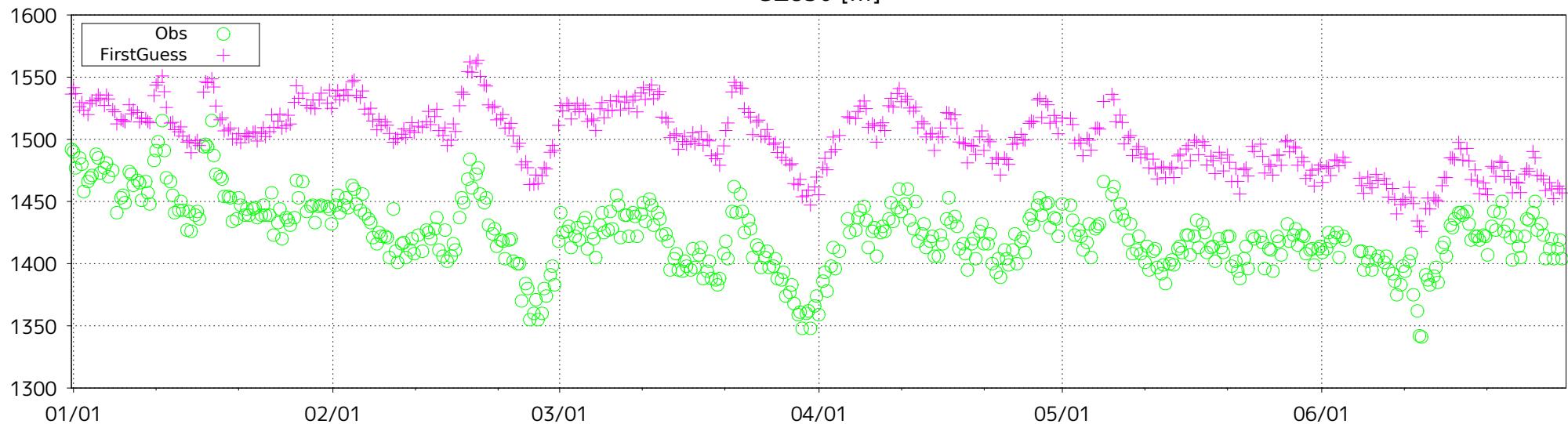


Figure 56(b) Time-series representation of GZ850 Obs minus FirstGuess for station 48921

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

GZ850 [m]



GZ850 [m] (Obs-FirstGuess)

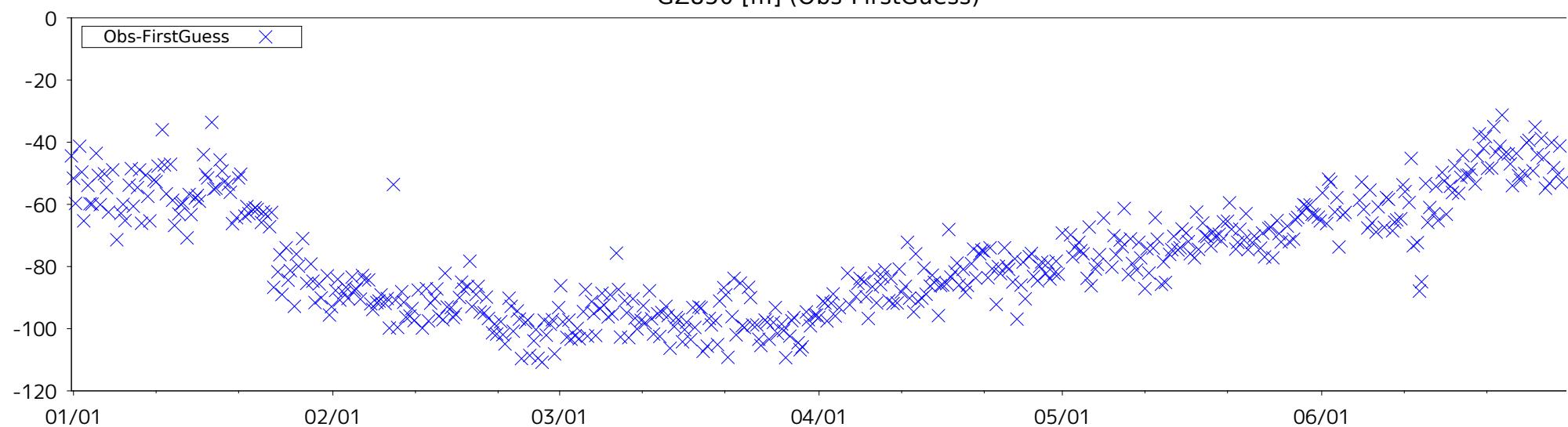
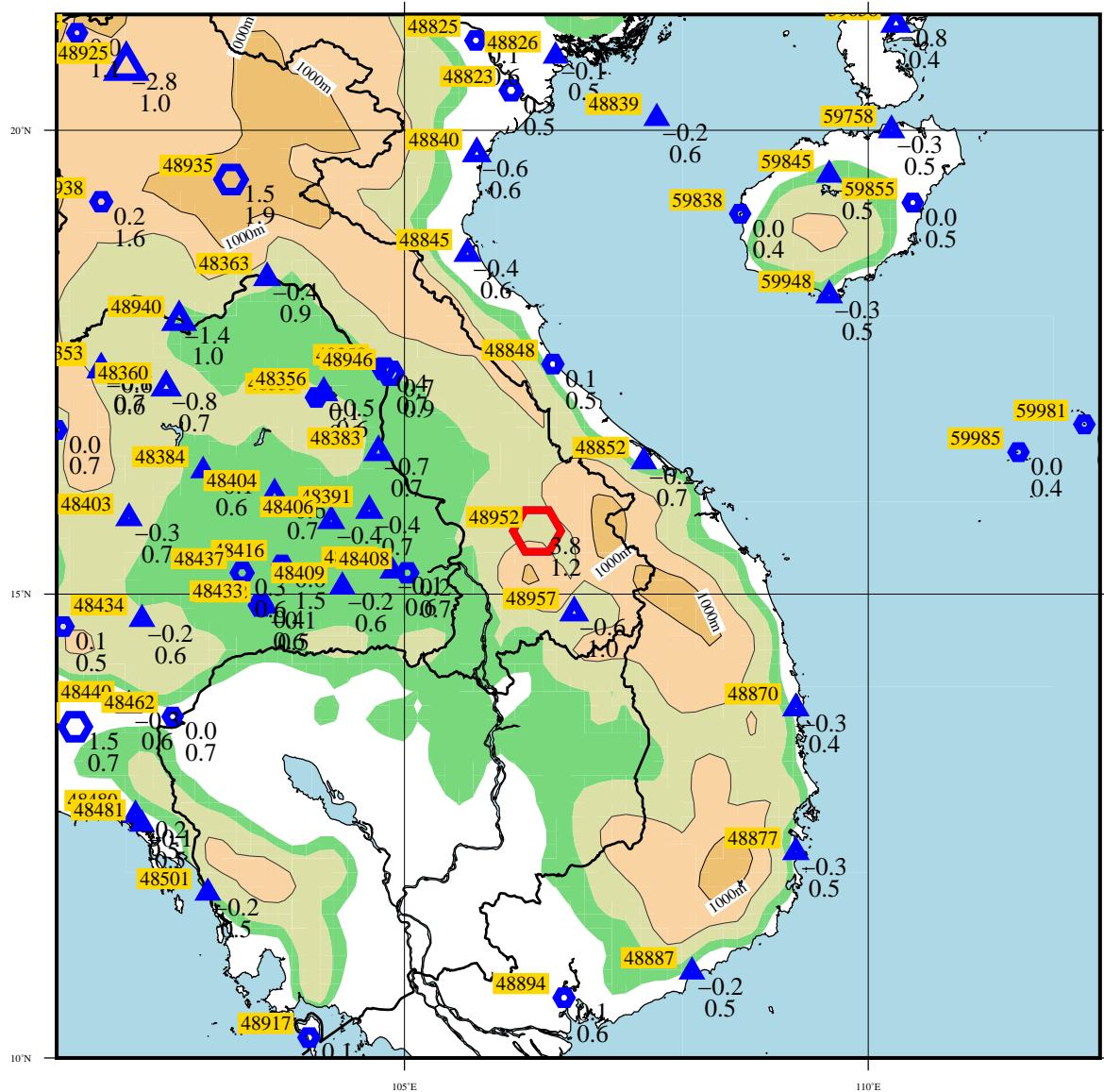


Figure 57 Time-series representation of GZ850 Obs minus FirstGuess for station 48935

LEVEL = SUR ELEMENT = SLP
 2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

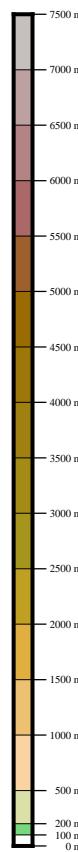


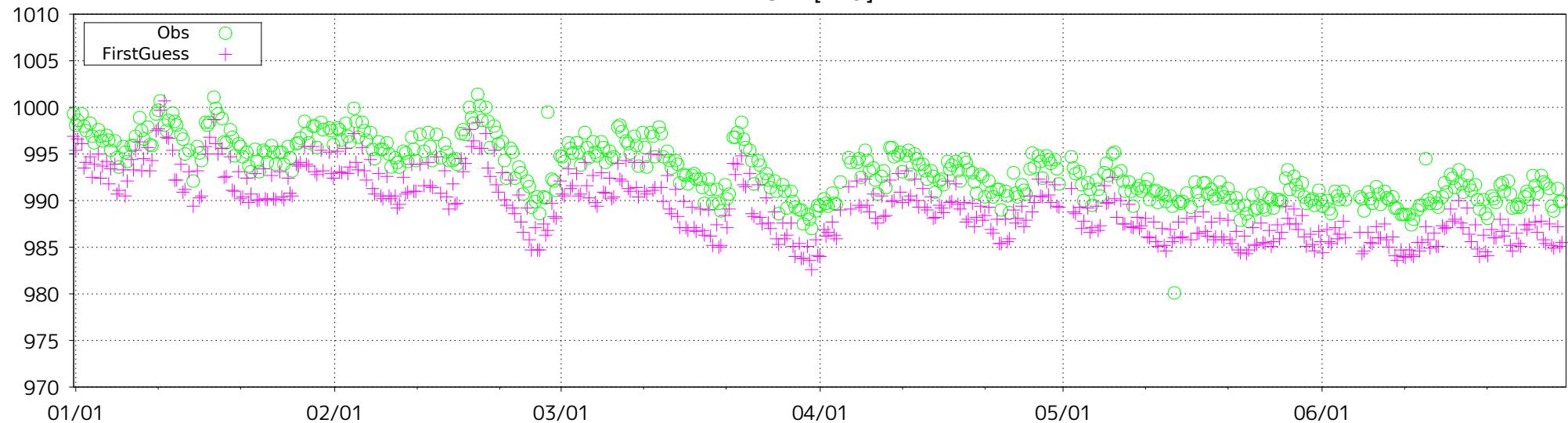
Figure 58 BIAS and SD of SLP for station 48952 (red) and surrounding stations (blue).

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

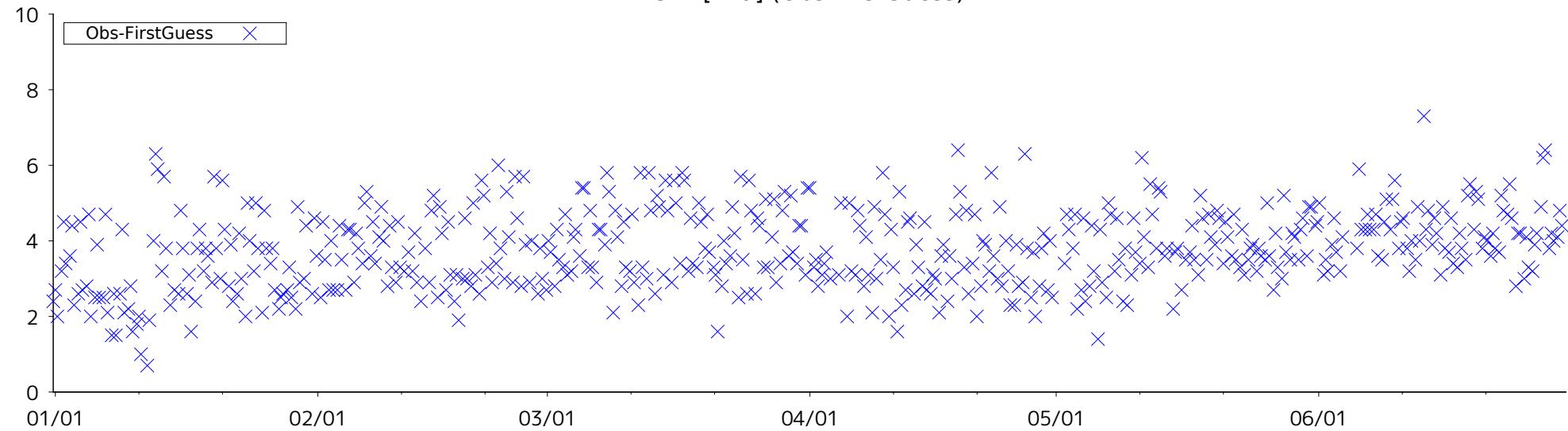
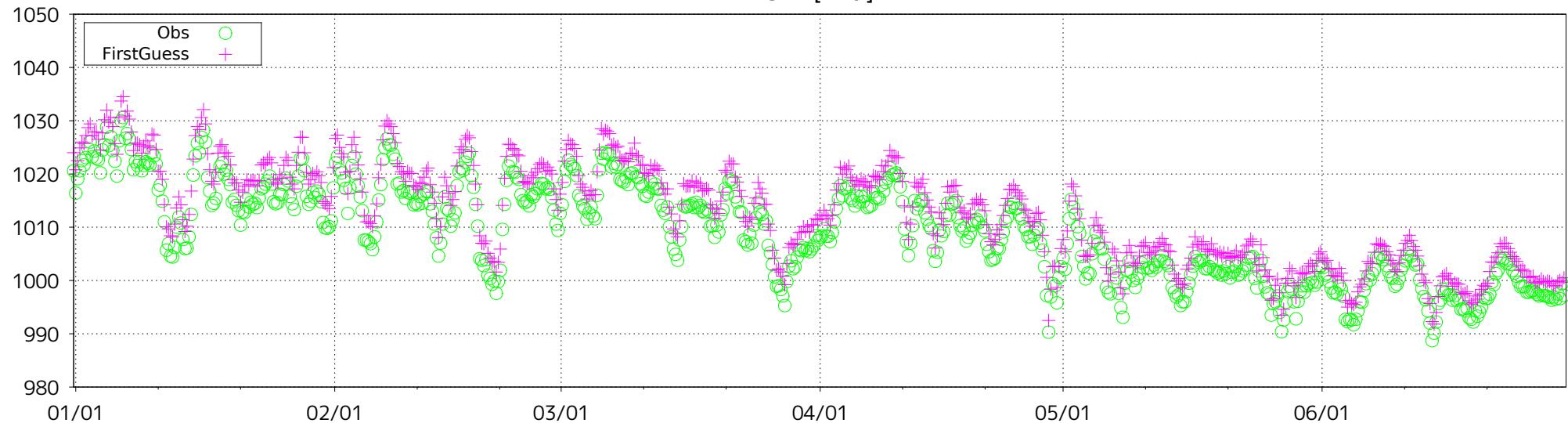


Figure 59 Time-series representation of SLP Obs minus FirstGuess for station 48952

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

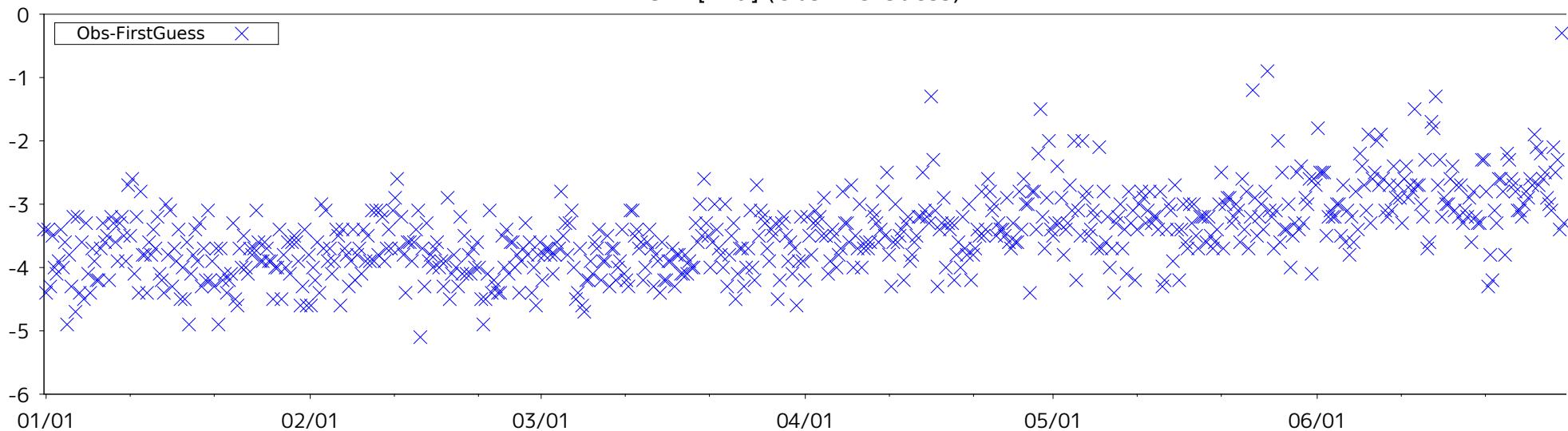
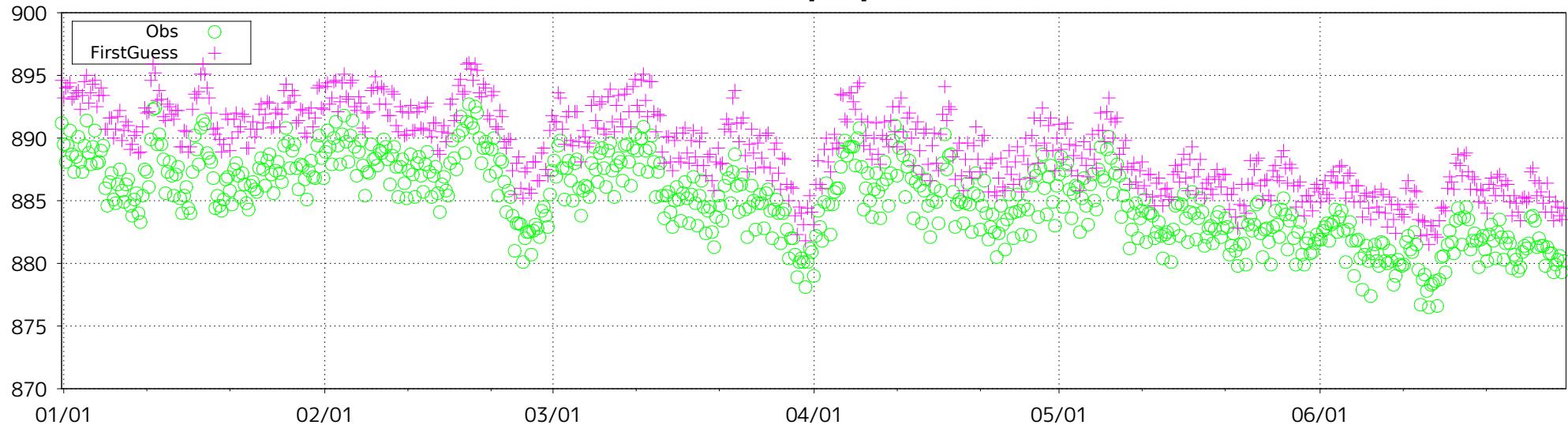


Figure 60 Time-series representation of SLP Obs minus FirstGuess for station 54945

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

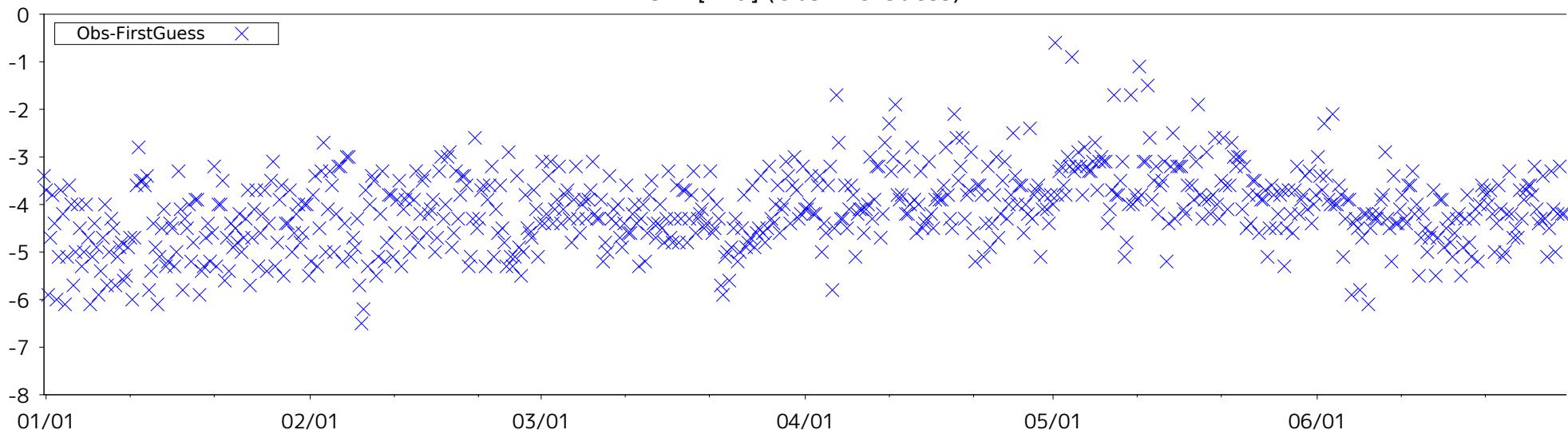
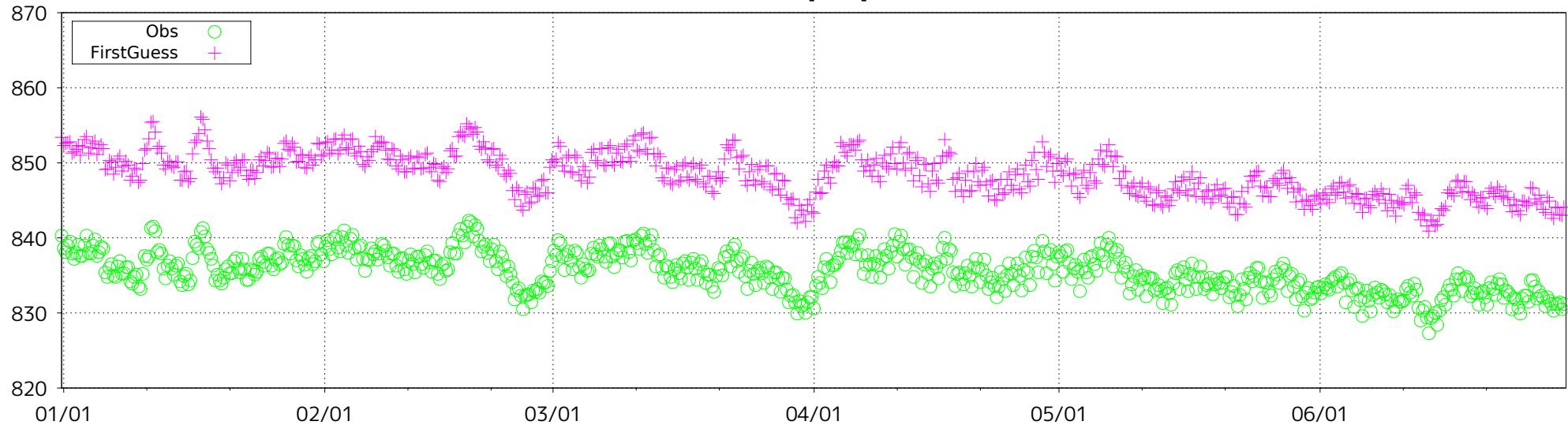


Figure 61 Time-series representation of SLP Obs minus FirstGuess for station 56946

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

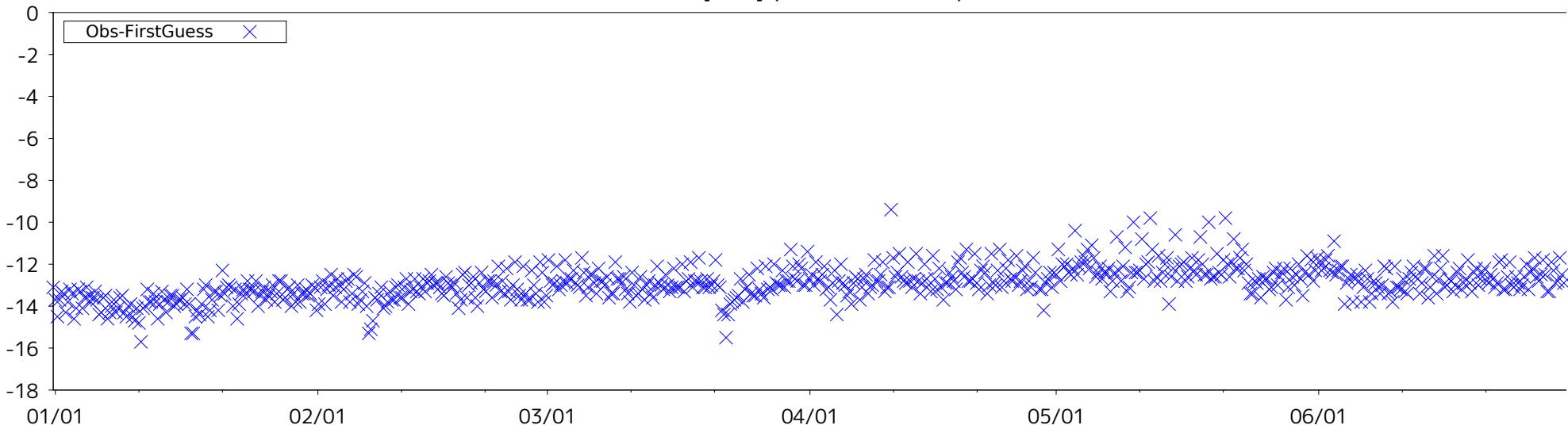


Figure 62 Time-series representation of SLP Obs minus FirstGuess for station 56951

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)

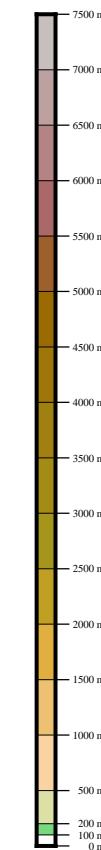
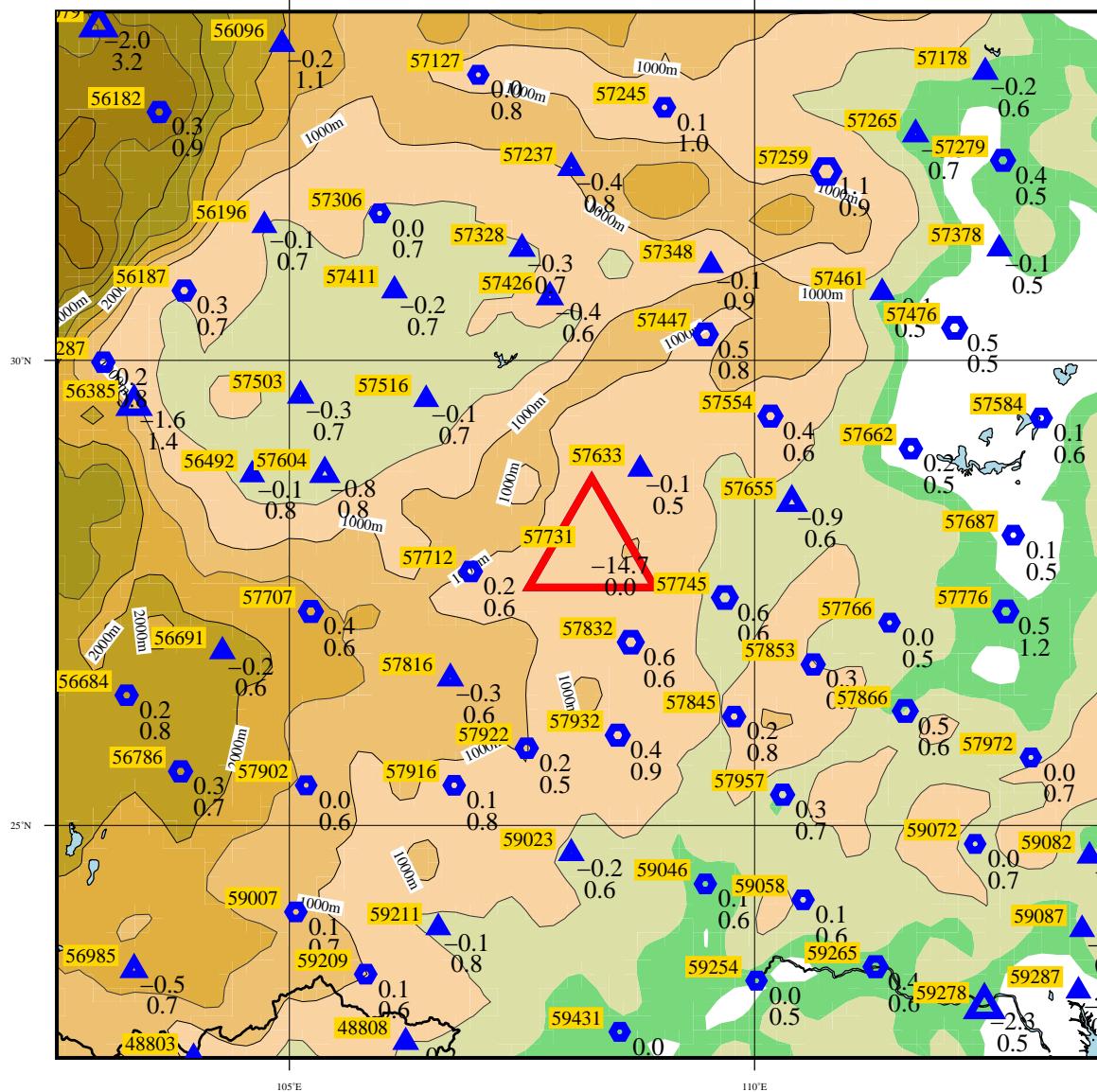


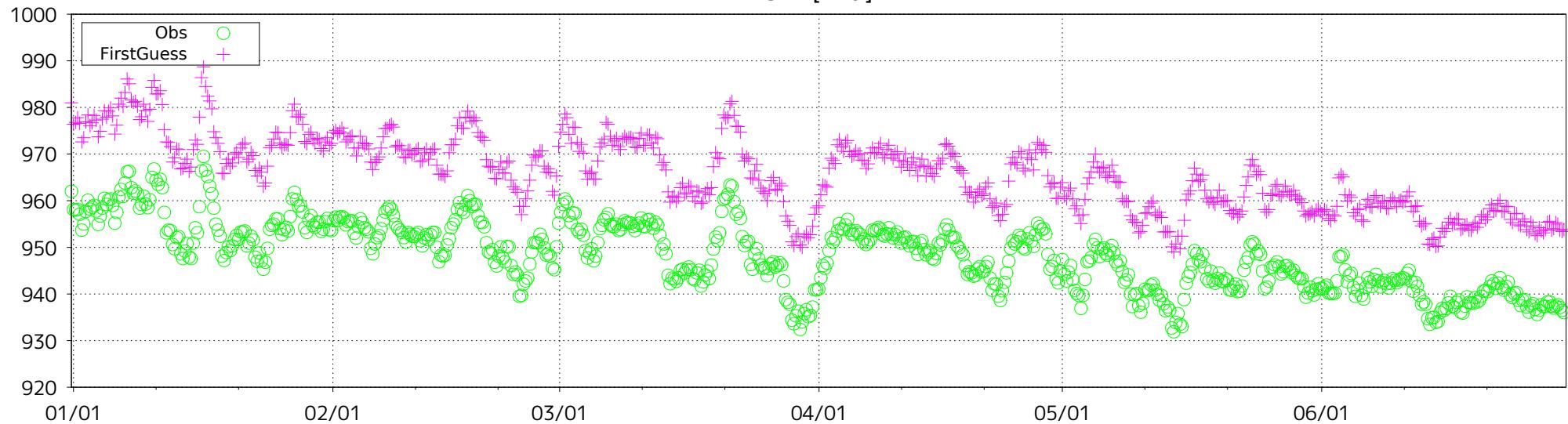
Figure 63 BIAS and SD of SLP for station 57731 (red) and surrounding stations (blue).

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.

ID: 57731 (lat: 28.0N, lon: 108.3E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

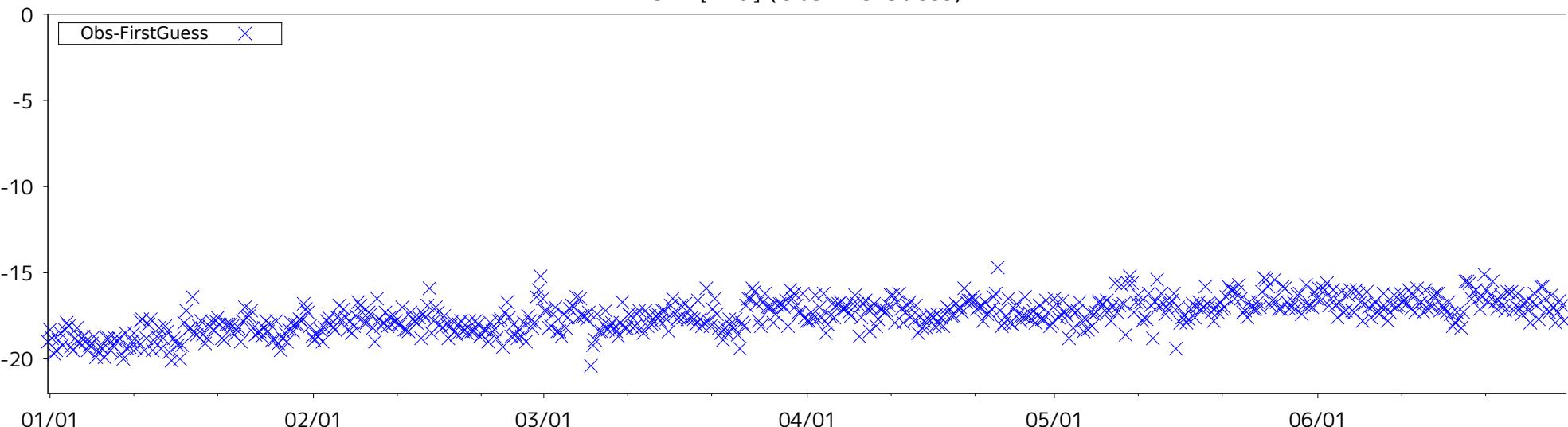
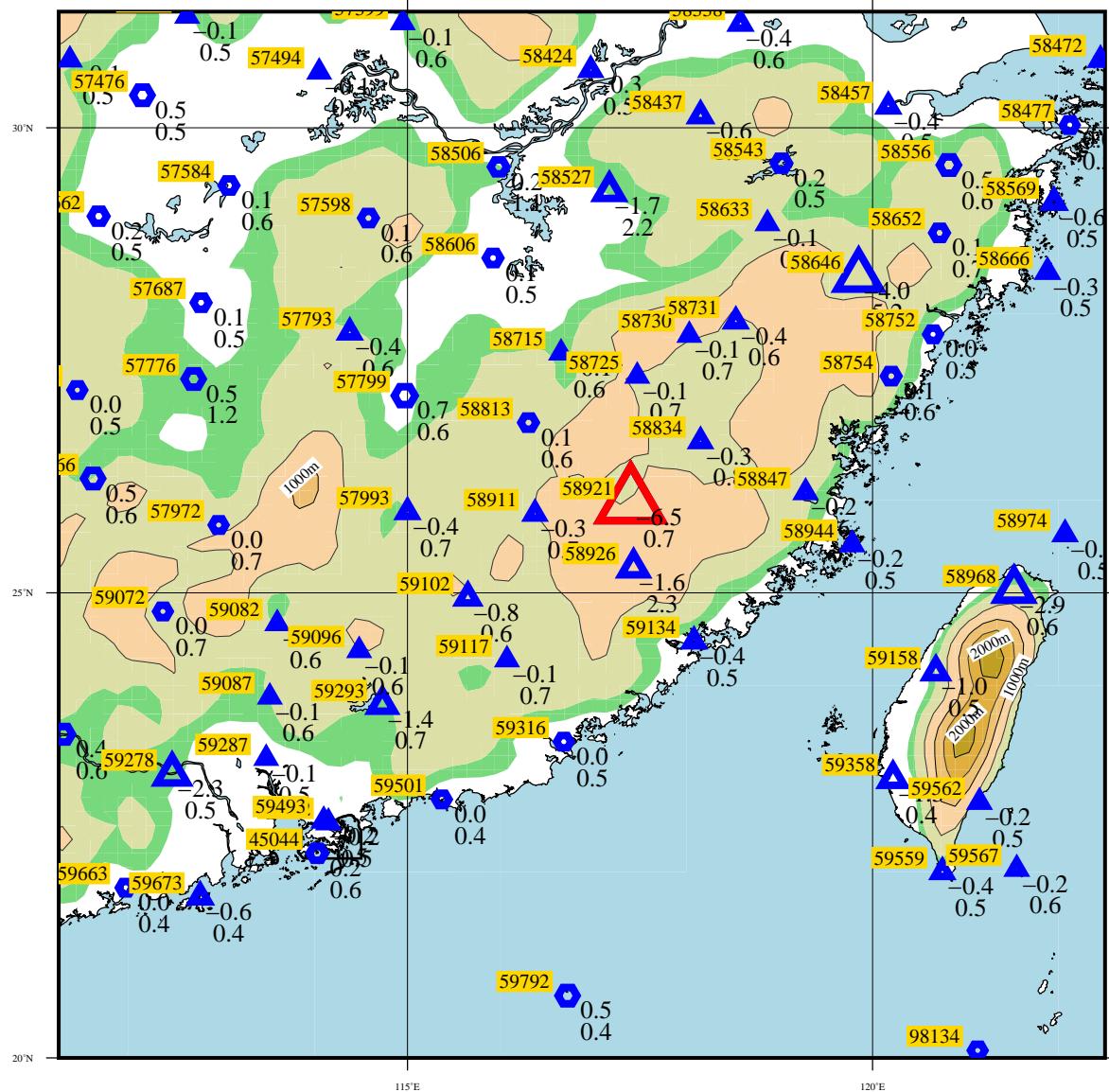


Figure 64 Time-series representation of SLP Obs minus FirstGuess for station 57731

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
O BIAS
SD

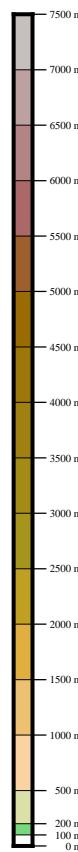


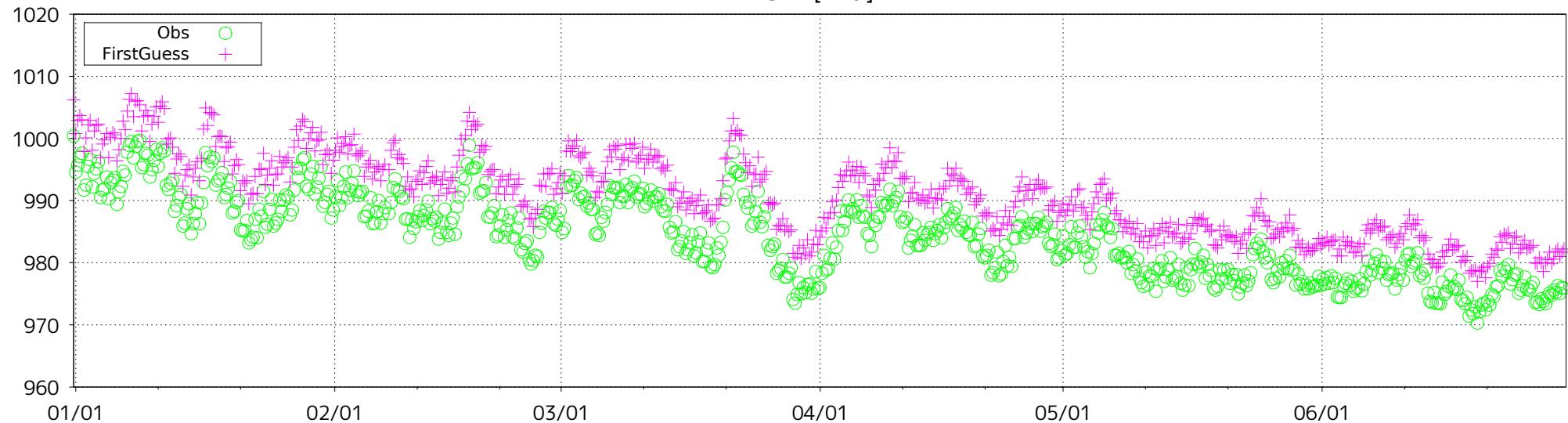
Figure 65 BIAS and SD of SLP for station 58921 (red) and surrounding stations (blue).

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 number to the upper-left of each symbol is the **WEIGHT**, 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)

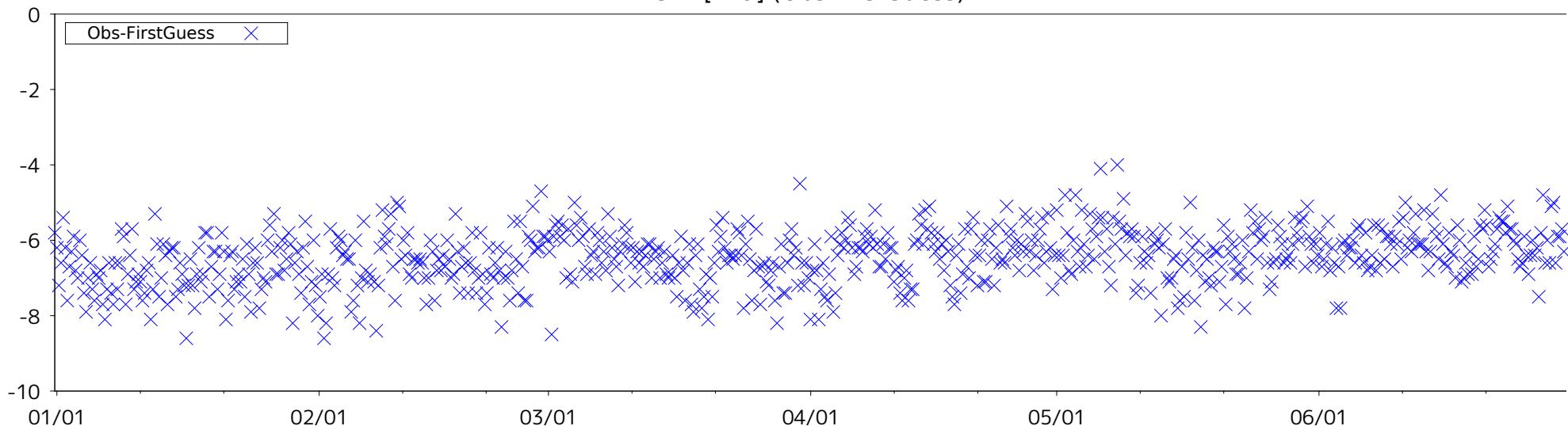
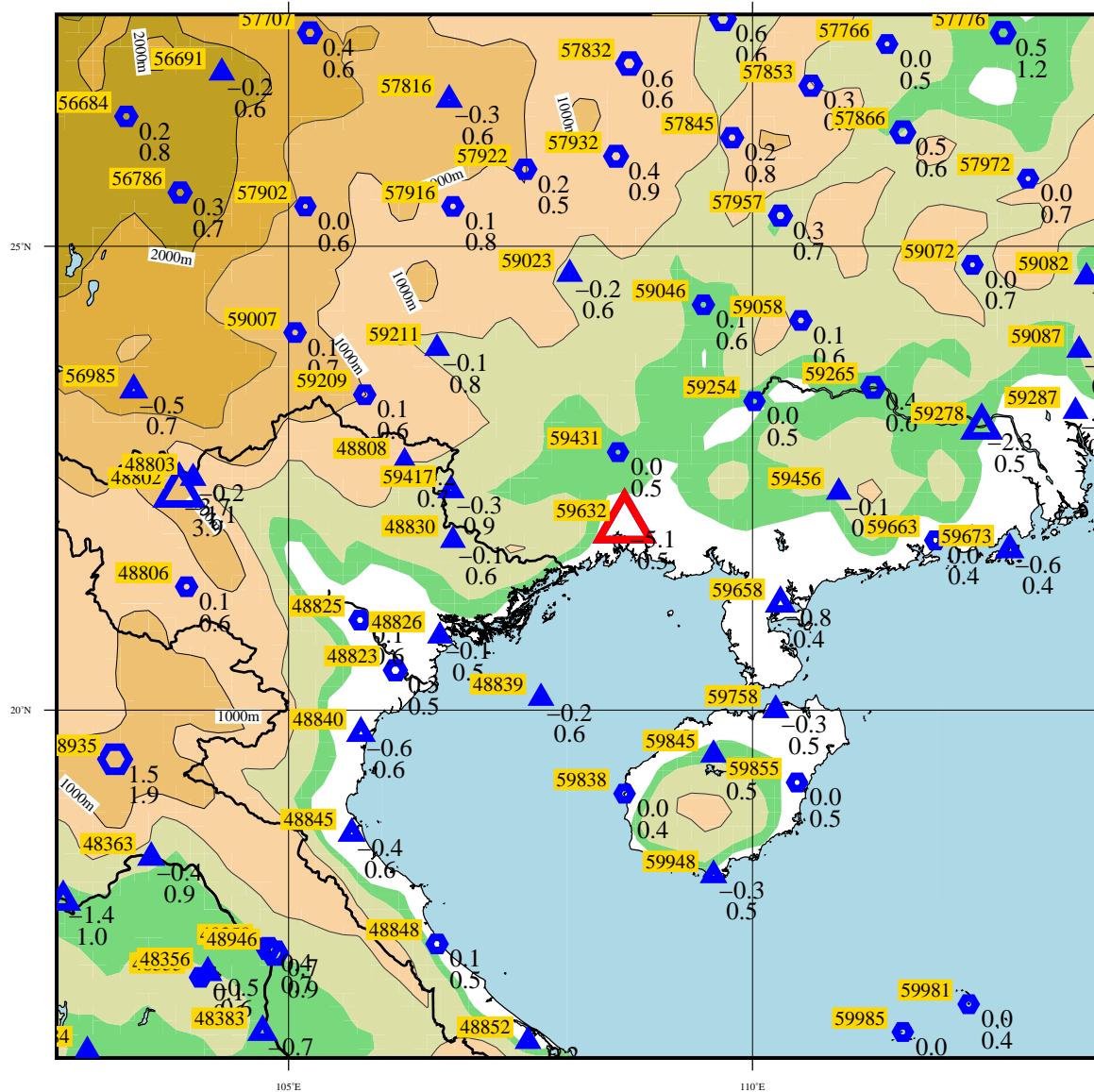


Figure 66 Time-series representation of SLP Obs minus FirstGuess for station 58921

LEVEL = SUR

ELEMENT = SLP

2021 01 01 00 UTC → 2021 06 30 18 UTC (181 DAYS)



IDENT
BIAS
SD

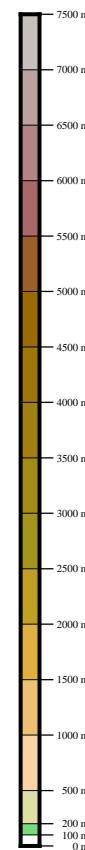


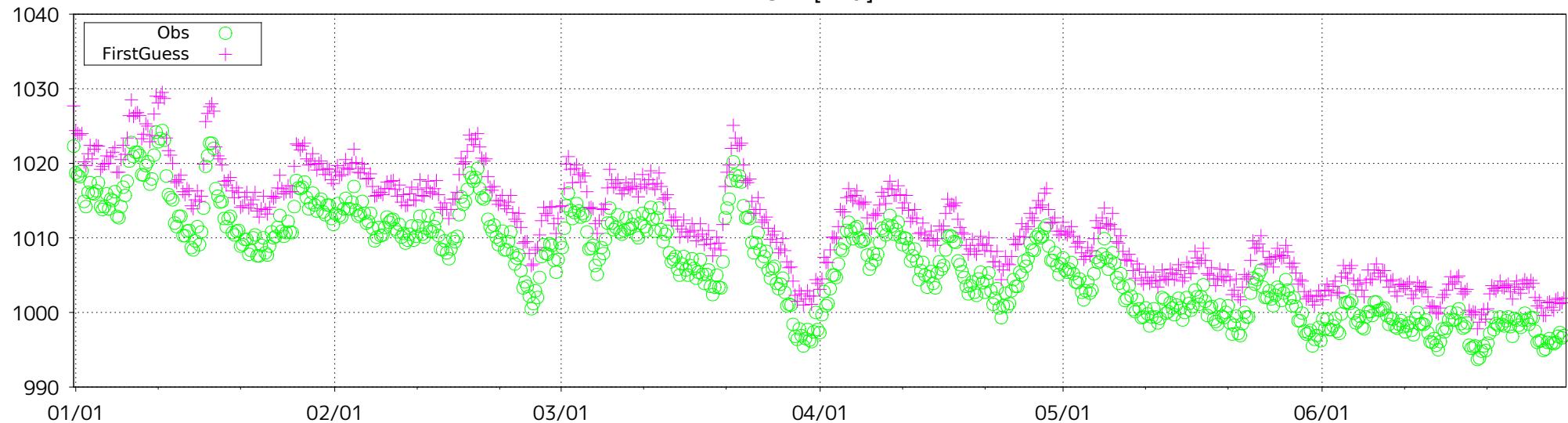
Figure 67 BIAS and SD of SLP for station 59632 (red) and surrounding stations (blue).

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)

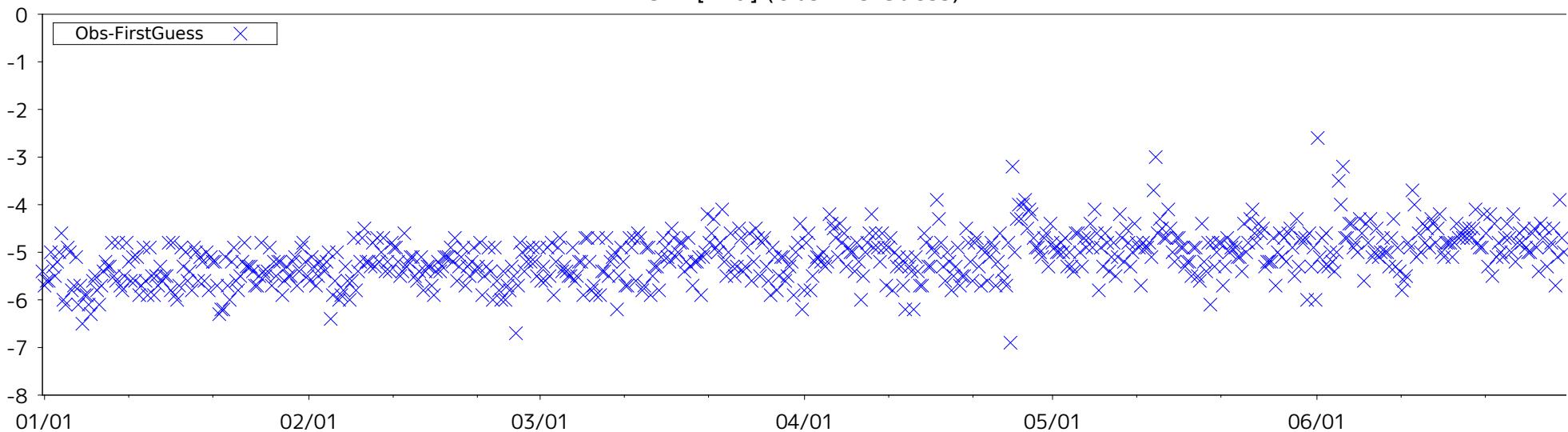
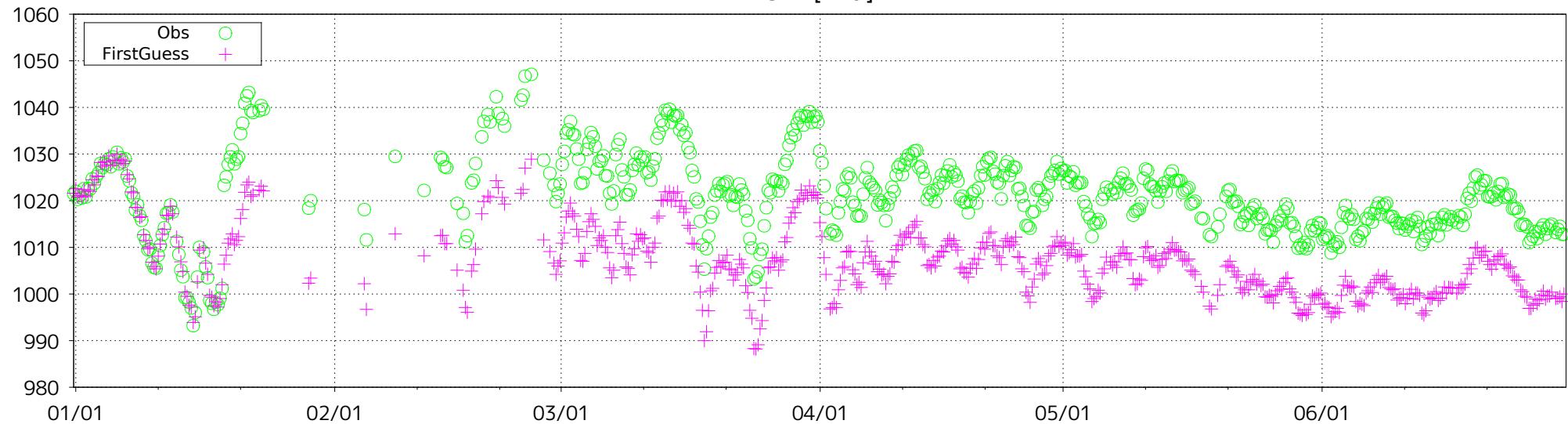


Figure 68 Time-series representation of SLP Obs minus FirstGuess for station 59632

ID: 38232 (lat: 43.0N, lon: 54.1E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

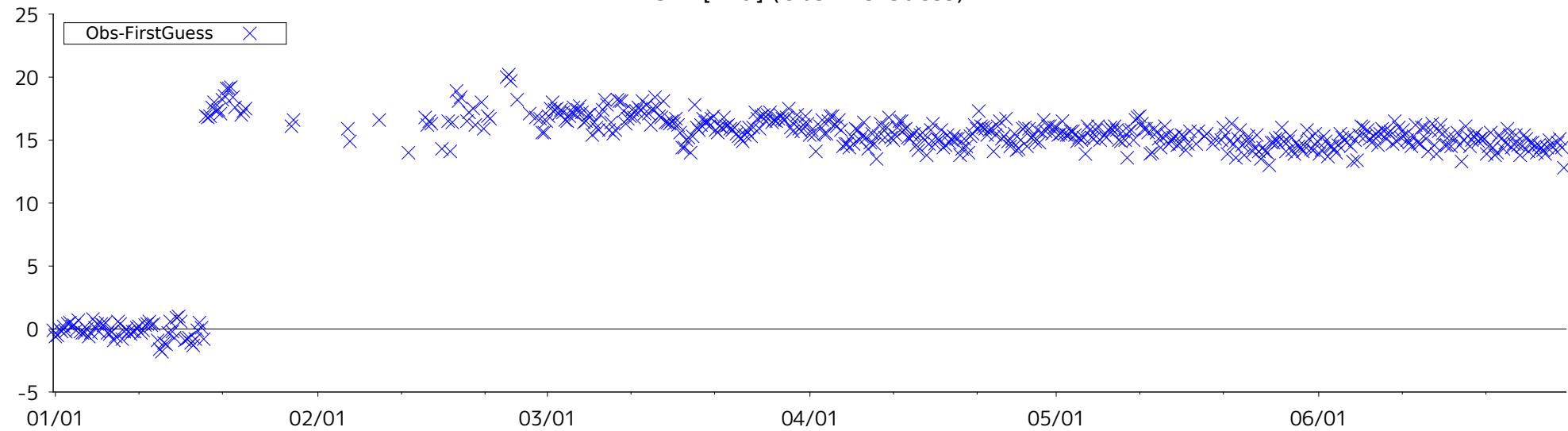
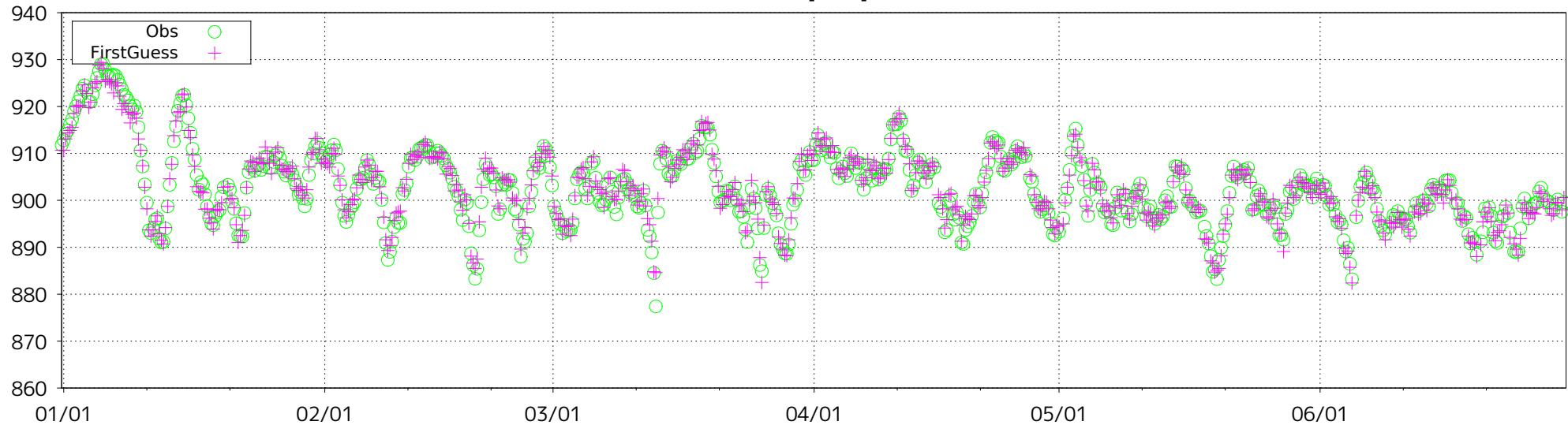


Figure 69 Time-series representation of SLP Obs minus FirstGuess for station 38232

ID: 36090 (lat: 51.1N, lon: 93.7E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

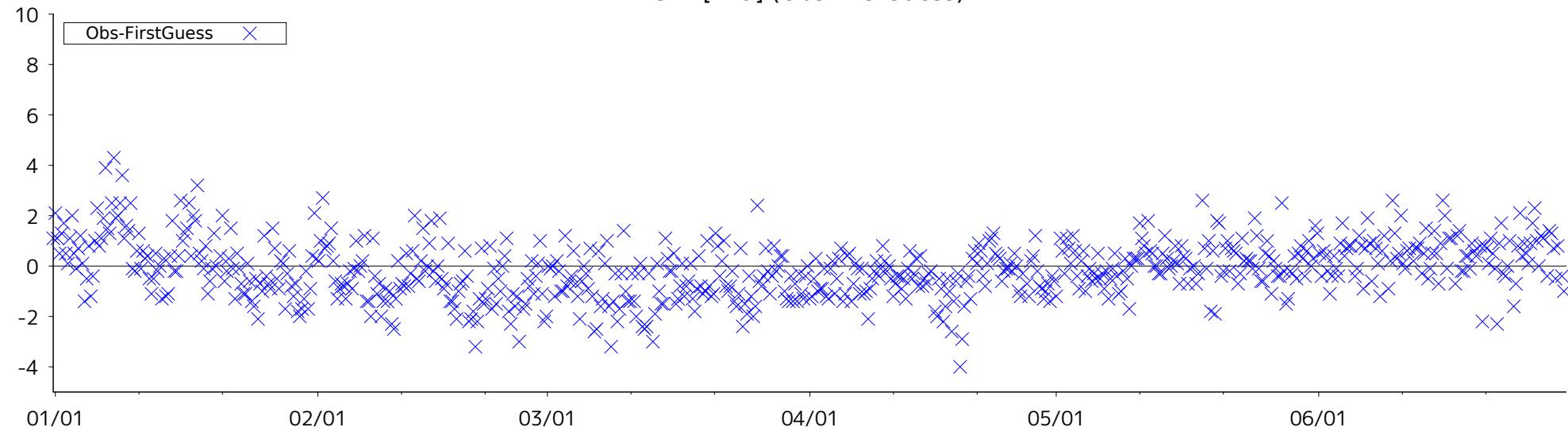
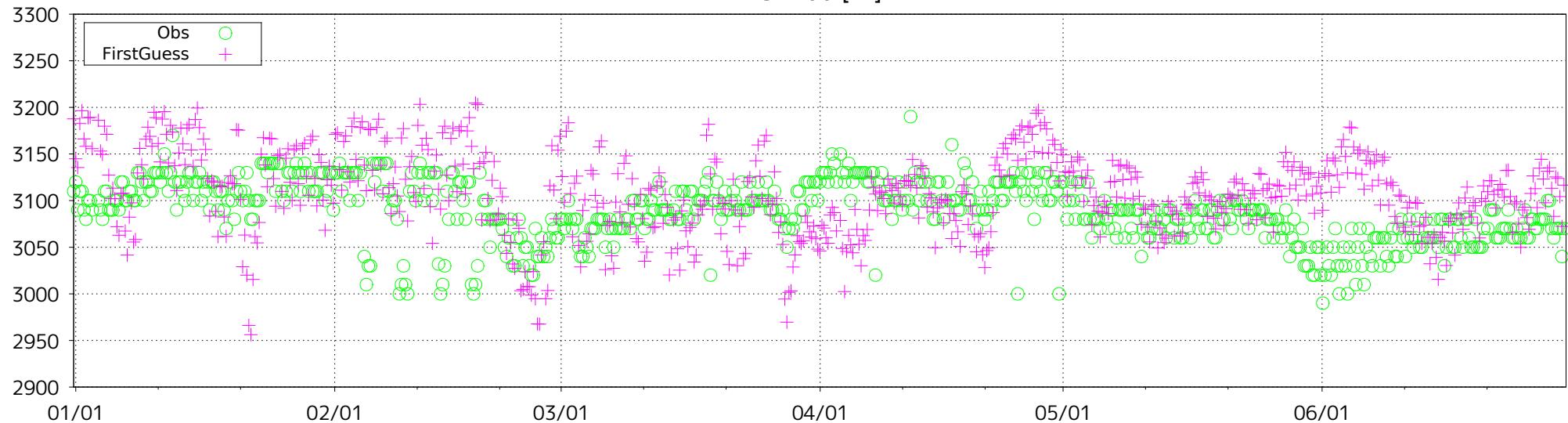


Figure 70 Time-series representation of SLP Obs minus FirstGuess for station 36090

ID: 38878 (lat: 38.2N, lon: 74.0E)

GZ700 [m]



GZ700 [m] (Obs-FirstGuess)

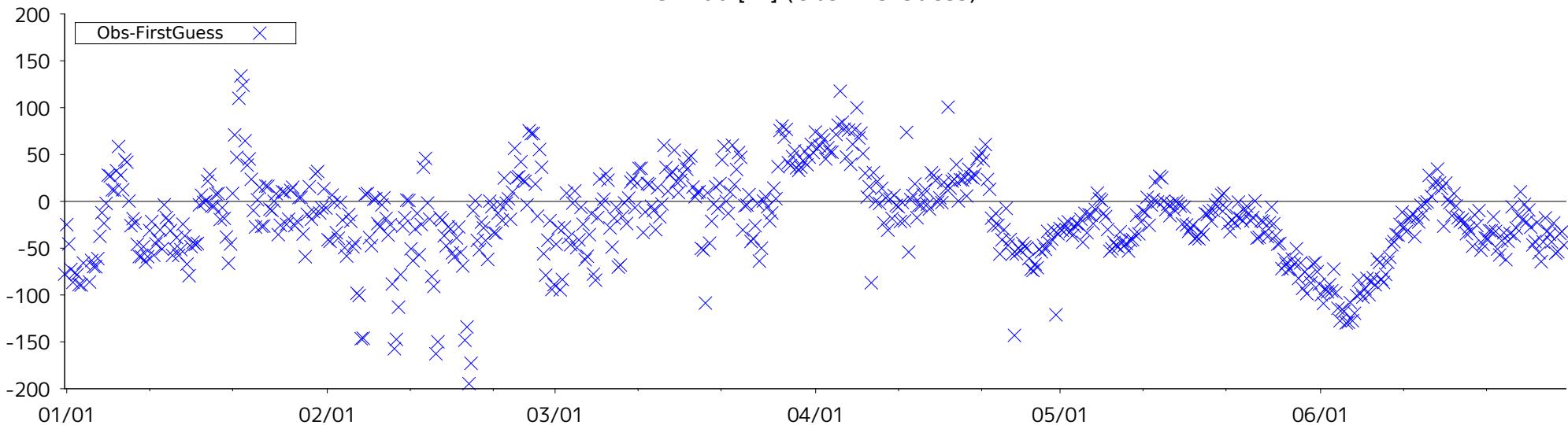
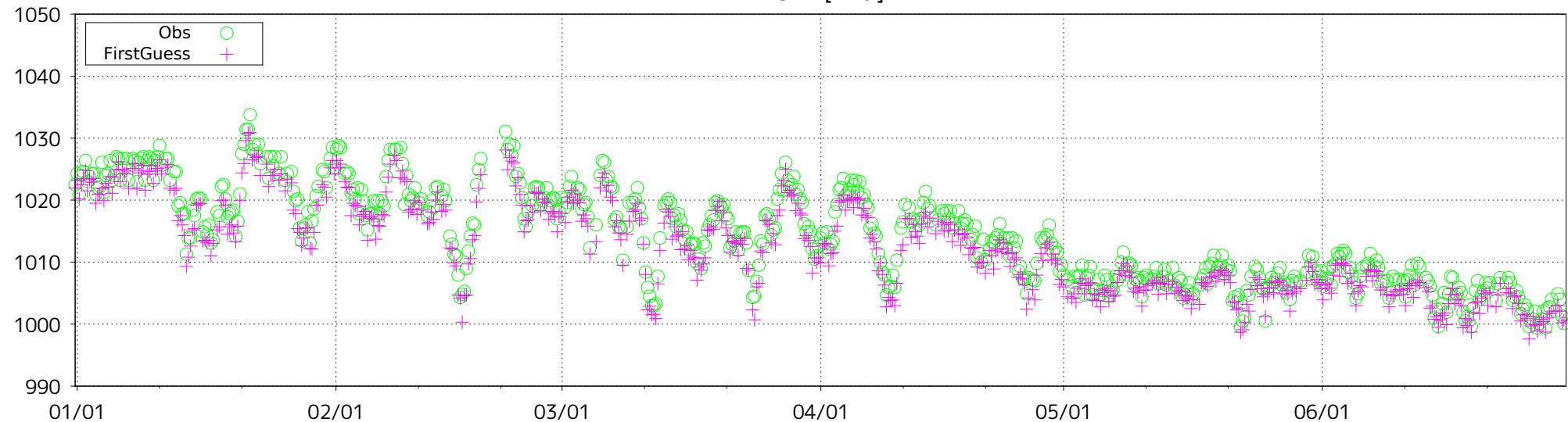


Figure 71 Time-series representation of GZ700 Obs minus FirstGuess for station 38878

ID: 40621 (lat: 35.5N, lon: 44.4E)

MSLP [hPa]



MSLP [hPa] (Obs-FirstGuess)

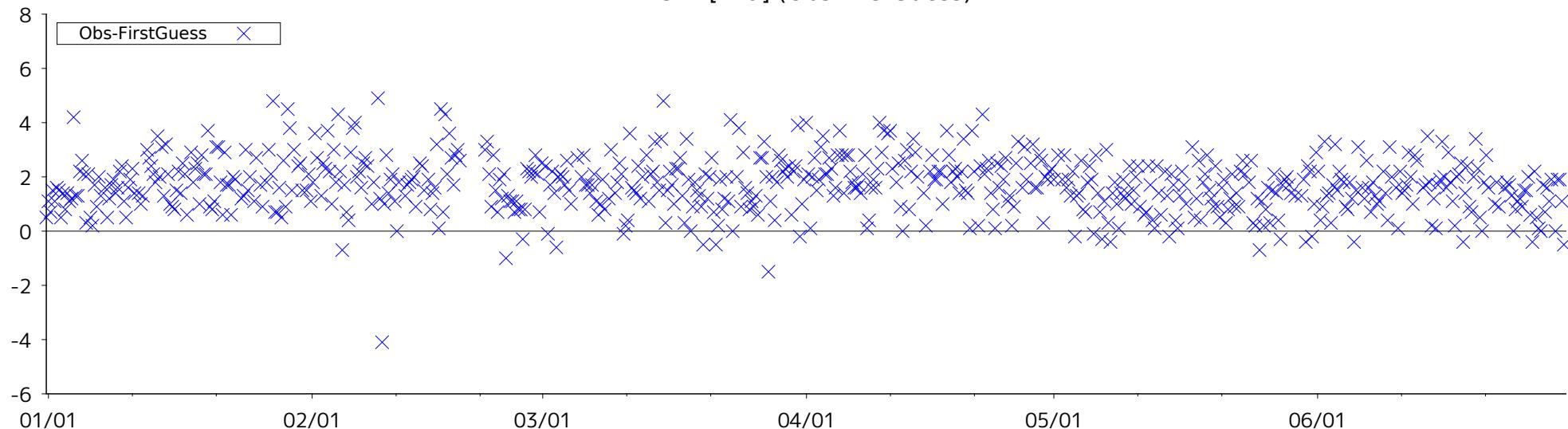
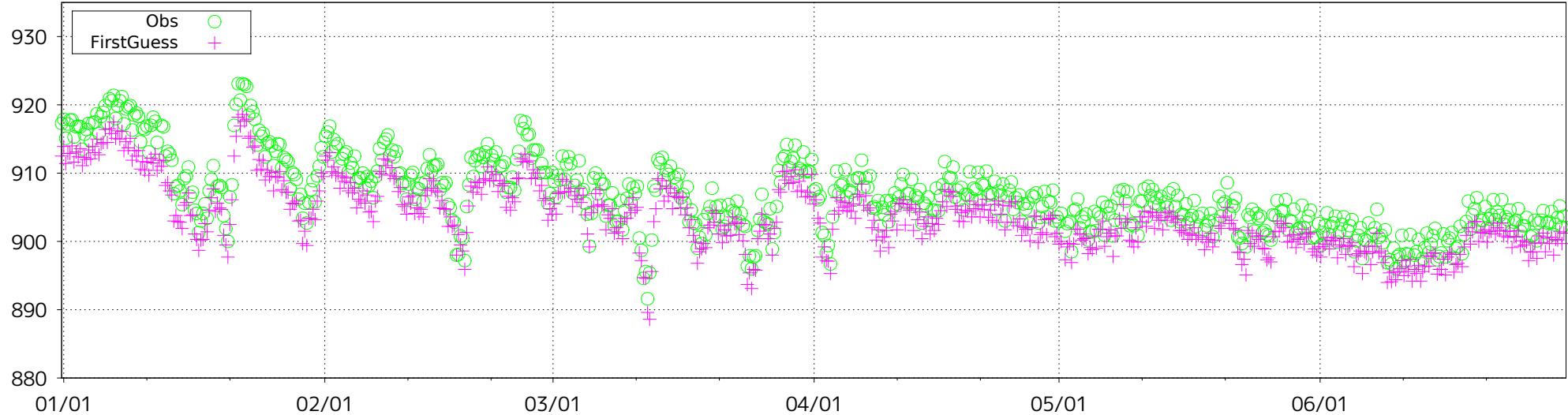


Figure 72 Time-series representation of MSLP Obs minus FirstGuess for station 40621

ID: 40785 (lat: 34.0N, lon: 51.5E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

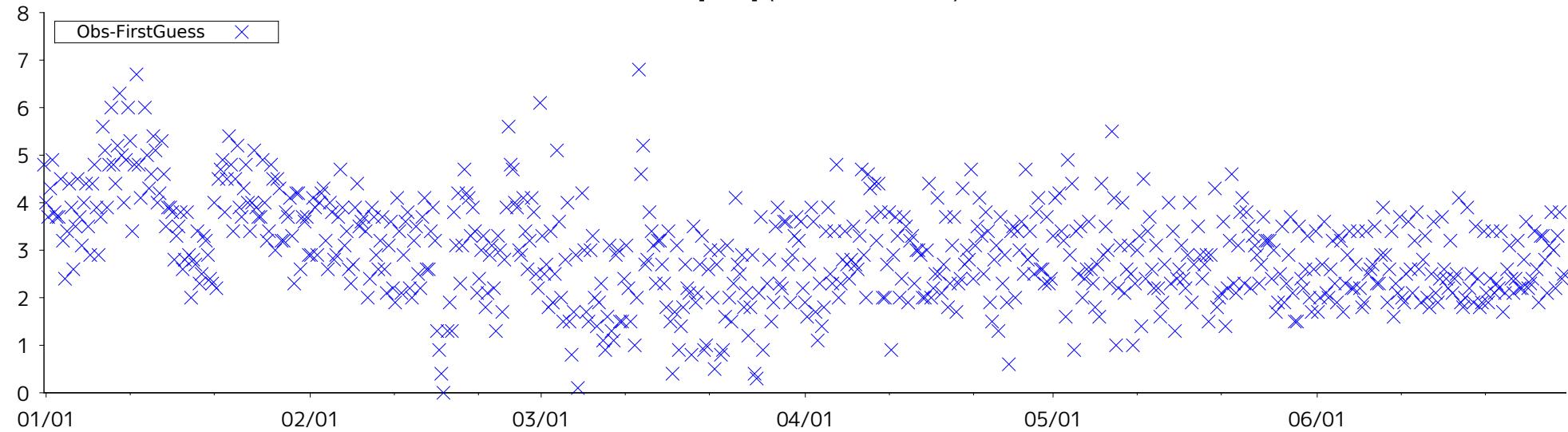
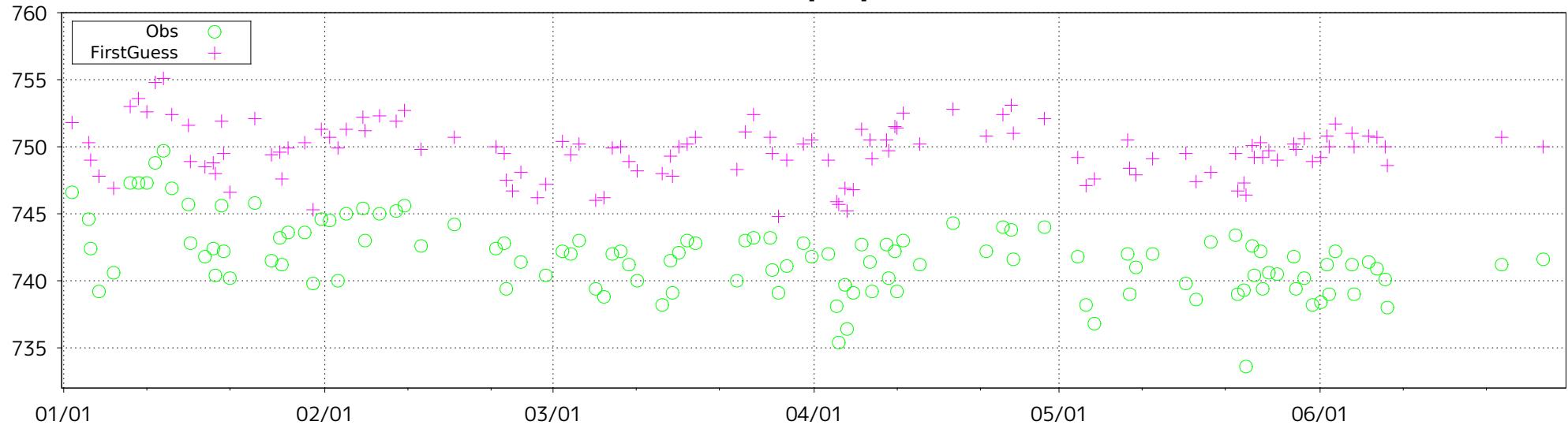


Figure 73 Time-series representation of SLP Obs minus FirstGuess for station 40785

ID: 40945 (lat: 34.8N, lon: 67.8E)

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

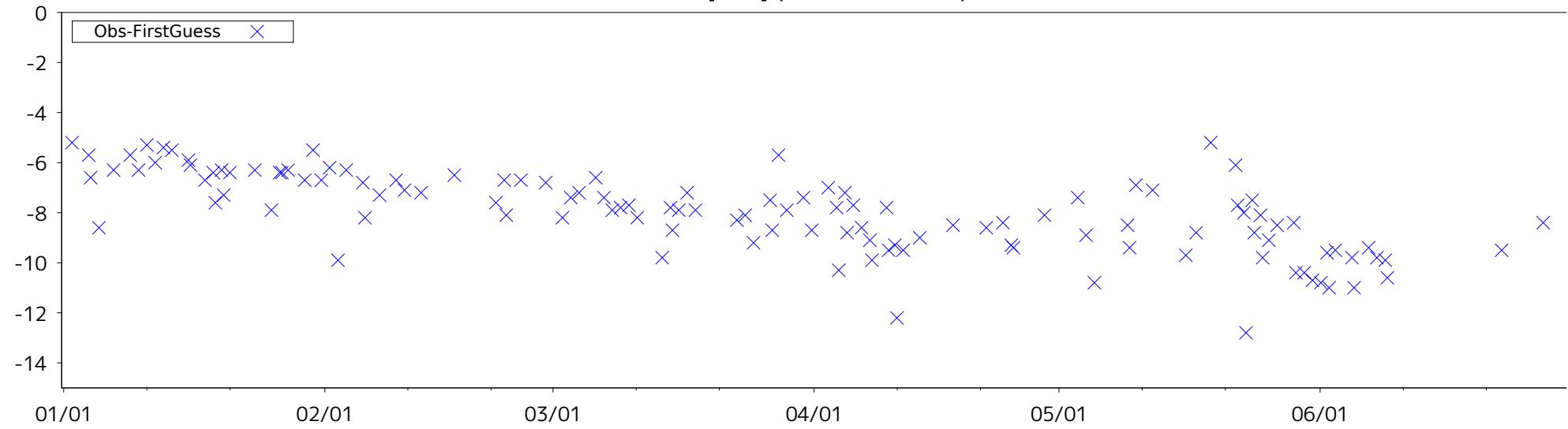
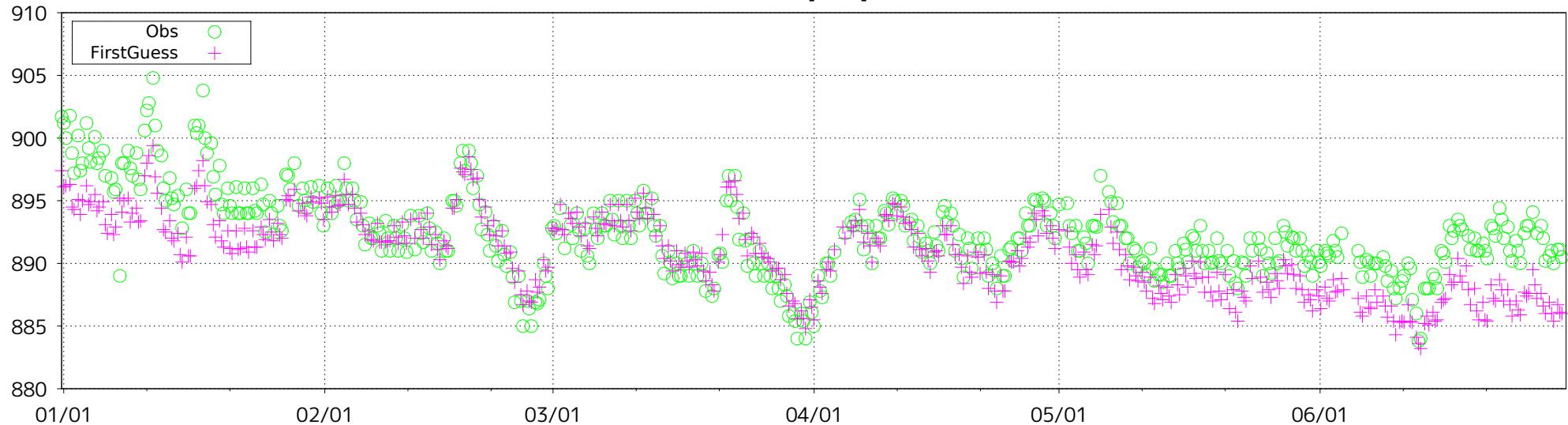


Figure 74 Time-series representation of SLP Obs minus FirstGuess for station 40945

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

SLP [hPa]



SLP [hPa] (Obs-FirstGuess)

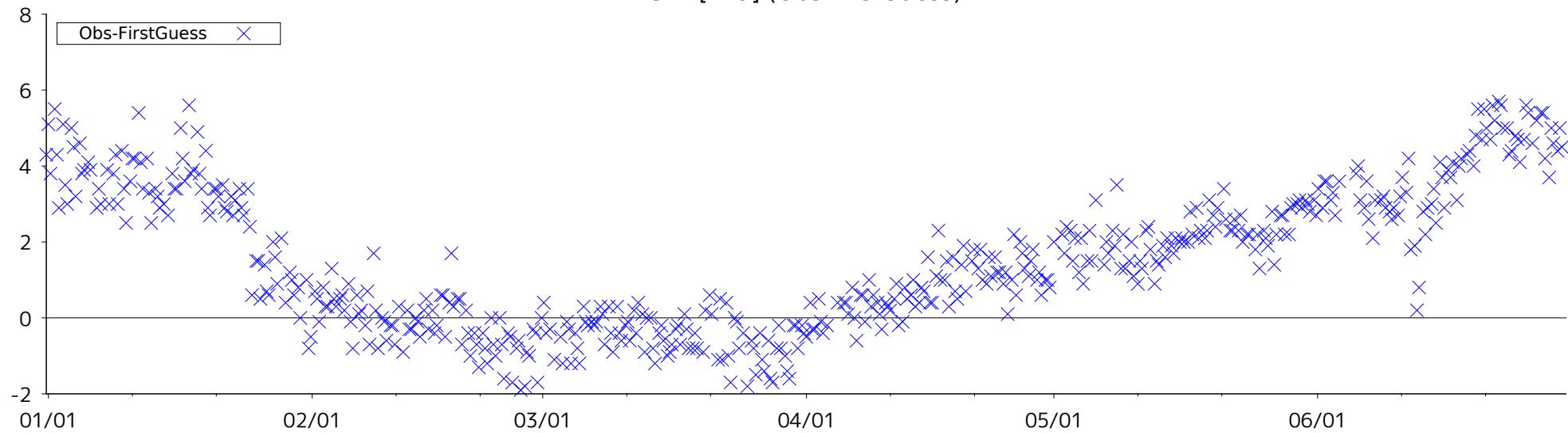


Figure 75 Time-series representation of SLP Obs minus FirstGuess for station 48935