Radiosonde-No.5-MOC-CMA(2024)

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

May 2024

Regional WIGOS Centre, Beijing

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Introduction

In its role as a Regional WIGOS Centre (RWC) in Regional Association (RA) II, China Meteorological Administration (CMA) has issued the monthly report on the radiosonde observation quality monitoring of May 2024. The report includes a consolidated list of suspect stations that produced low-quality observation data.

CMA was designated as a Regional WIGOS Centre in RA II. The Centre is responsible for monitoring the quality of meteorological observations and maintaining consolidated lists of suspect stations of reporting low-quality observation data together with adequate evidence. The lists are to be passed on to the WMO secretariat and monitoring centres participating in the activity as well as to Members of RA II for their reference.

1. Data Acquisition

Radiosonde observation data are collected at GTS, including 2 times: 00 and 12(UTC). The observation elements are geopotential height(GPH), vector wind (WIN_S) and wind direction (WIN_D).

2. Monitoring Standard

2.1 Geopotential Height

*Standard of comparison: First guess field from CMA_GFS model

*Observation times : 00, 12 UTC

*Levels monitored : Standard levels from 1000 - 30 hPa

*Element monitored : Geopotential Height (m)

*Parameters monitored :

NUM OBS: Number of observations received excluding duplicates

NUM GRS: Number of observations with gross errors

% REJ: Percentage of observations rejected by quality control

SD: Standard deviation of differences of observations from first guess field

BIAS: Mean difference of observations from first guess field

RMS: Root mean square of differences of observations from first guess field

(SD, BIAS and RMS are estimated excluding observations with gross errors)

*GROSS ERROR LIMIT :

Level (hPa)	Geopotential Height (m)
1000	100
925	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

*SELECTION CRITERIA :

at least 3 levels with NUM OBS ≥ 10 and 100 m weighted RMS

only the worst level is shown (with unweighted RMS)

2.2 Vector Wind

*Standard of comparison: First guess field from CMA_GFS model

*Observation times : 00, 12 UTC

*Levels monitored : Standard levels from 1000 - 100 hPa

*Element monitored : Vector Wind (m/s)

*Parameters monitored :

NUM OBS: Number of observations received excluding duplicates

NUM GRS: Number of observations with gross errors

% REJ: Percentage of observations rejected by quality control

U,V BIAS: Mean difference of observations from first guess field

RMS: Root mean square of differences of observations from first guess field

(BIAS and RMS are estimated excluding observations with gross errors)

*GROSS ERROR LIMIT :

Level (hPa)	Vector Wind (m/s)
1000	35
925	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45

SELECTION CRITERIA :

at least 1 level with NUM OBS ≥ 10 and RMS ≥ 15 m/s

standard level (1000 - 100 hPa) with highest RMS is shown

2.3 Wind Direction

*Standard of comparison: First guess field from CMA_GFS model

*Observation times : 00, 12 UTC

*Levels monitored : Standard levels from 500 - 150 hPa

*Element monitored : Wind Direction (degrees, clockwise)

*Parameters monitored :

NUM OBS: Minimum number of observations received excluding duplicates at each level

(excluding gross errors and data with wind speed < 5 m/s)

BIAS: Mean difference of observation from first guess field, averaged over the monitoring levels

MAX SPREAD: Maximum absolute difference of SD at any level from SD at all levels

SD: Standard deviation of differences of observations from first guess field at all levels

(BIAS, MAX SPREAD and SD are estimated excluding observations with gross errors and low wind speed)

GROSS ERROR LIMIT :

Level (hPa)	Wind Direction (°)
500	45
400	50
300	60
250	60
200	50
150	50

SELECTION CRITERIA :

NUM OBS ≥ 5 and

|BIAS| ≥ 10 degrees with

SD < 30 degrees and

MAX SPREAD < 10 degrees

3. Monitoring Results

3.1 Silent Stations

Table 1 List of silent stations from May

NUM	STATION_CODE	STATION_NAME	COUNTRY	LAT	LON
1	43192	GOA/PANJIM	India	15.48	73.82
2	40745	MASHHAD	Iran, Islamic Republic of	36.24	59.63
3	40811	AHWAZ	Iran, Islamic Republic of	31.34	48.74
4	47600	WAJIMA	Japan	37.39	136.90
5	47418	KUSHIRO	Japan	42.95	144.44
6	40582	KUWAIT INTERNATIONAL AIRPORT	Kuwait	29.24	47.97
7	43599	GAN	Maldives	-0.69	73.16
8	48097	YANGON	Myanmar	16.86	96.15
9	48042	MANDALAY	Myanmar	21.94	96.09
10	41594	SARGODHA	Pakistan	32.05	72.67
11	41661	QUETTA (SHEIKH MANDA)	Pakistan	30.27	66.92
12	31168	AYAN	Russia	56.45	138.15
13	30715	ANGARSK	Russia	52.48	103.85
14	24944	OLEKMINSK	Russia	60.37	120.42
15	38836	DUSHANBE	Tajikistan	38.58	68.73
16	38954	KHOROG	Tajikistan	37.50	71.50
17	38507	TURKMENBASHI	Turkmenistan	40.03	52.98

The list is the stations that did not receive data from May, please check the status of the stations according to the list, if it is closed or silent, please go to the OSCAR/Surface to modify the declared status.

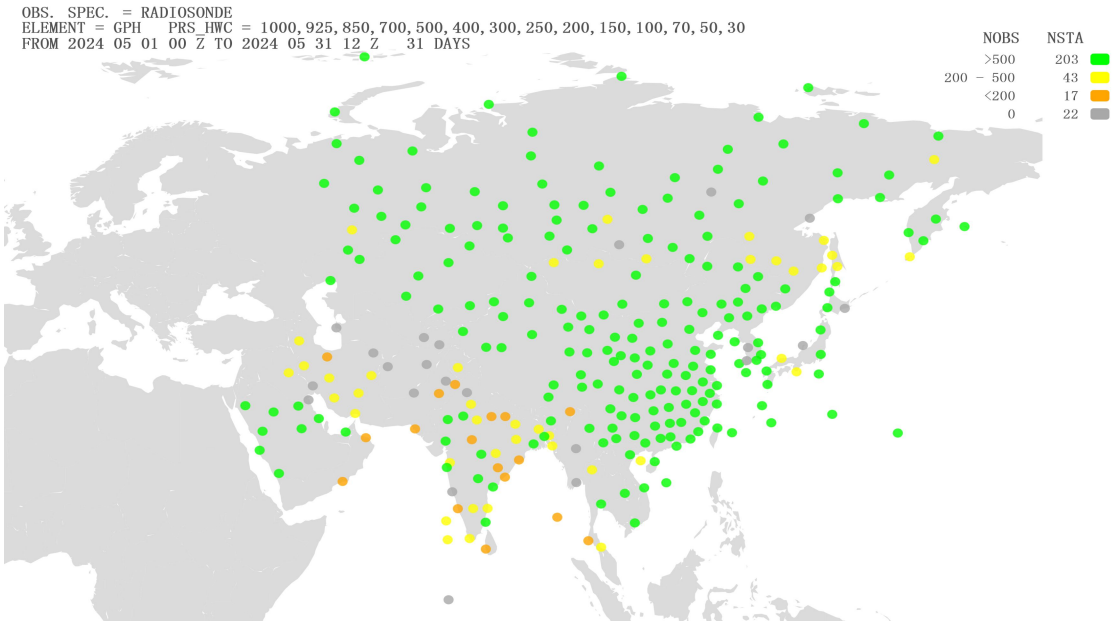
3.2 Geopotential Height (GPH)

3.2.1 List of Suspect Stations

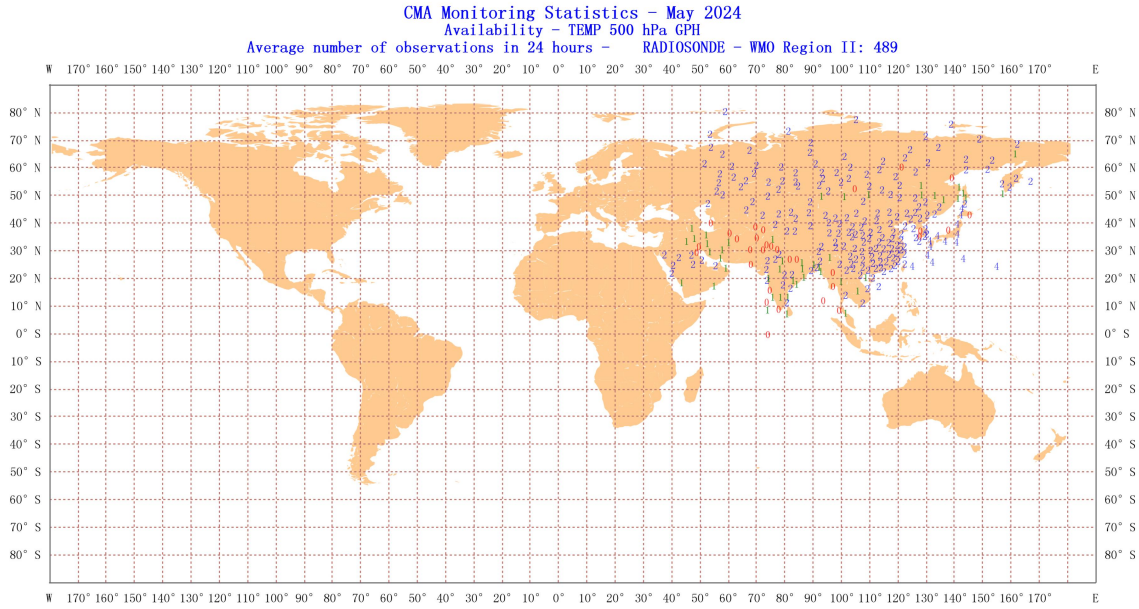
Table 2 List of GPH suspected in May 2024

LINE NUM	WMO IDENT	COUNTRY	OBS TIME	LEVEL	NUM OBS	NUM GRS	REJ （%）	BIAS	SD	RMS
1	36003	Kazakhstan	12	30	12	0	0	117.3	110.2	160.9
2	38341	Kazakhstan	00	50	19	4	0	52.4	170.9	178.8
3	38341	Kazakhstan	12	70	12	2	0	-42.4	124.7	131.7
4	42339	India	00	700	29	1	0	32.6	18.9	37.7
5	42339	India	12	30	29	1	0	177.1	42	182
6	42348	India	00	250	27	0	0	68.8	30.5	75.3
7	42348	India	12	100	25	1	3.7	151.9	21.7	153.5
8	42724	India	00	850	28	0	0	23.6	21.9	32.2
9	42867	India	12	30	25	1	0	185.9	34.8	189.1
10	42874	India	12	500	21	1	0	45.6	21.2	50.3
11	43041	India	12	300	14	0	0	64.3	18	66.7
12	43295	India	00	400	24	1	0	49.7	39.1	63.2
13	43346	India	12	700	29	1	0	35.1	19.1	40
14	52533	China	00	30	28	0	6.9	223.8	151.1	270.1
15	52533	China	12	30	27	0	0	155.7	110.6	191
16	54374	China	00	30	26	0	0	223.9	136.5	262.2
17	55591	China	12	30	22	0	0	148.1	57.7	158.9
18	58027	China	00	30	25	1	7.4	205.1	140.6	248.7

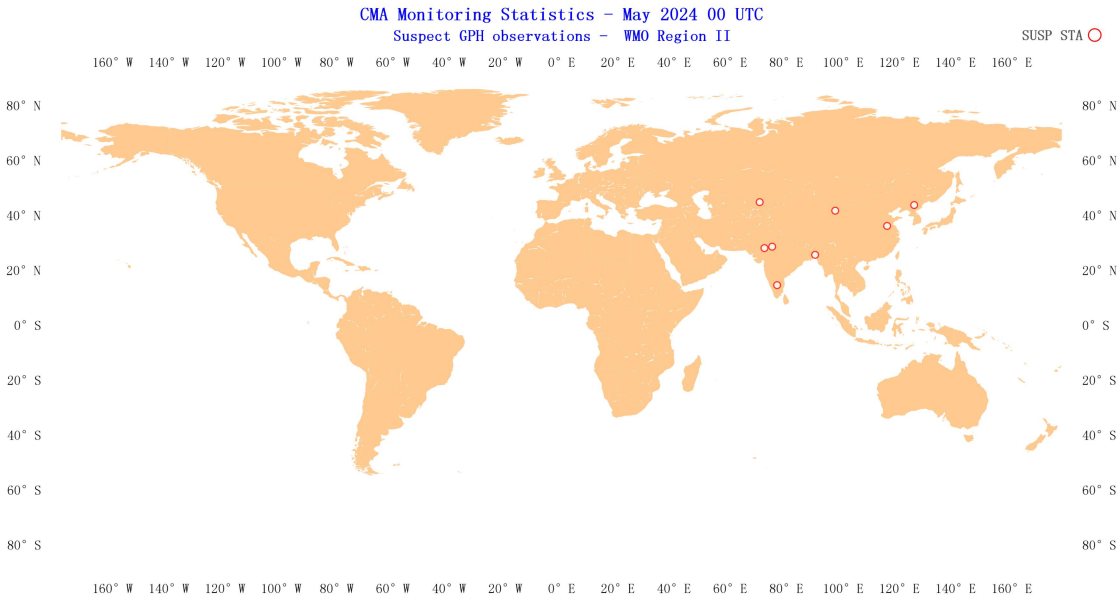
3.2.2 Suspect Station Analysis



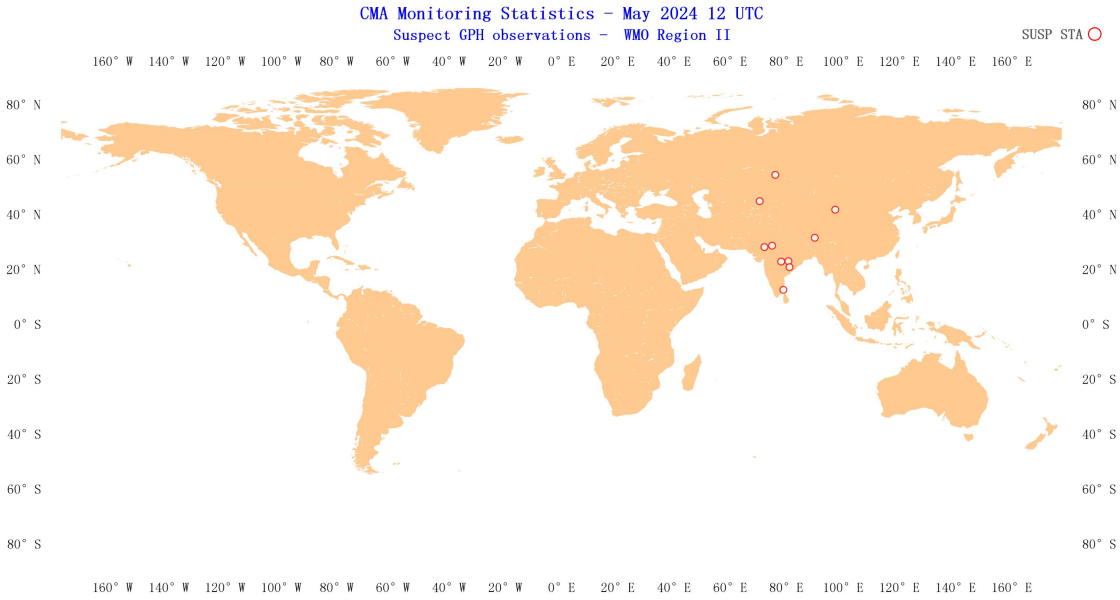
Location of all radiosonde stations reporting geopotential height observations in Region II over the month of May 2024. NOBS shows the total number of observations received at RWC-Beijing, corresponding total number of stations (NSTA) and color scale are shown at the top of the figure, color green refers to NOBS is higher than 500, color yellow refers to NOBS is between 200 and 500(including 500), color orange refers to NOBS is between 0 and 200(including 200), and color gray refers to NOBS is 0.



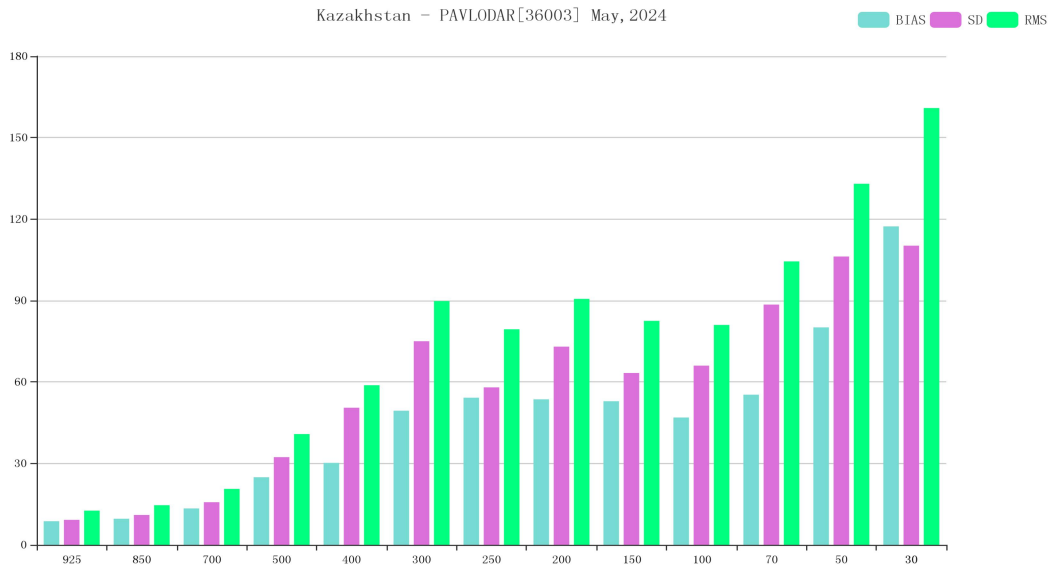
Location of all radiosonde stations reporting geopotential height average number of observations in 24 hours in Region II over the month of May 2024.



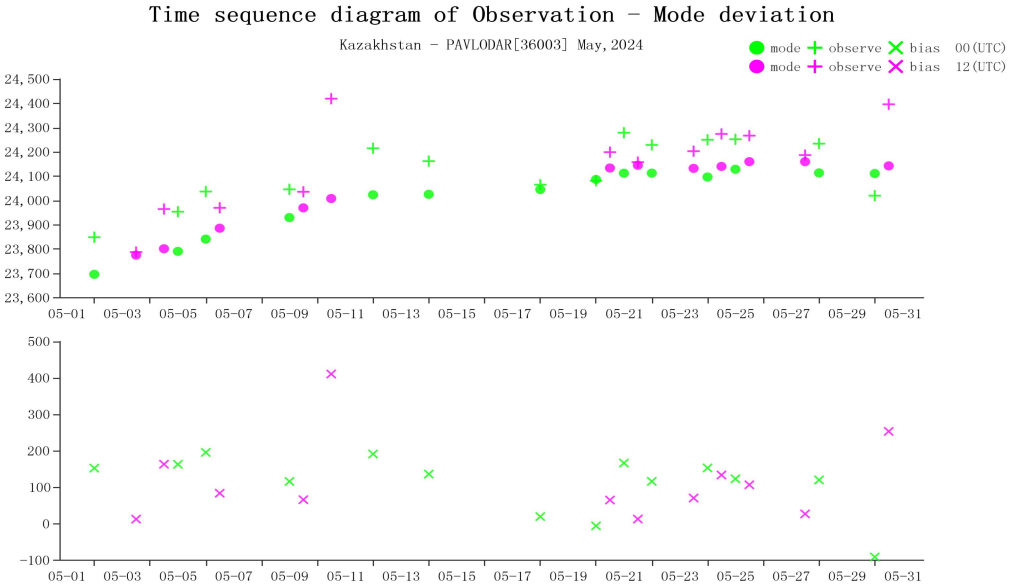
Distribution of suspect stations - Geopotential Height 00 UTC



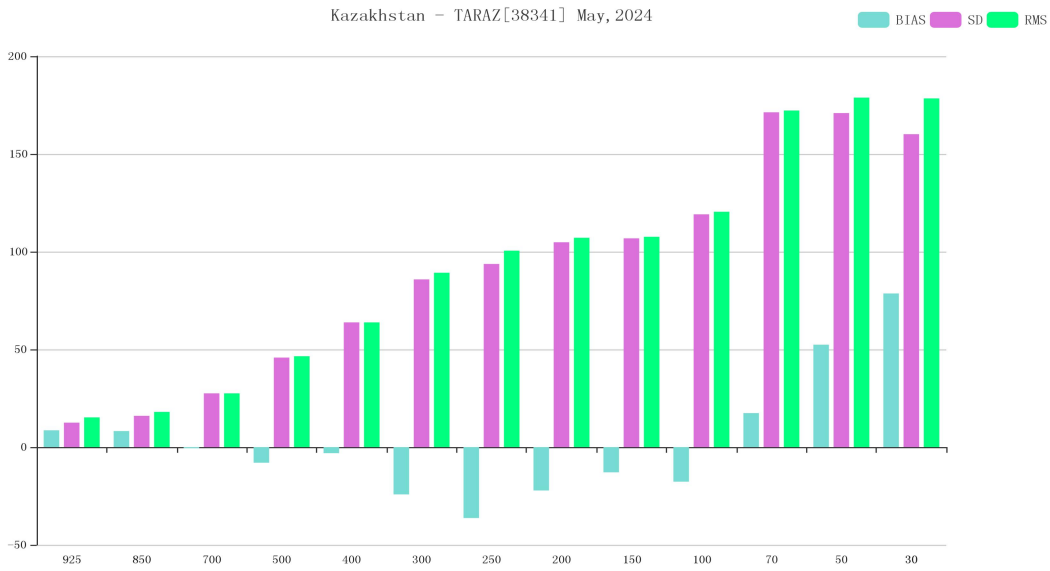
Distribution of suspect stations - Geopotential Height 12 UTC



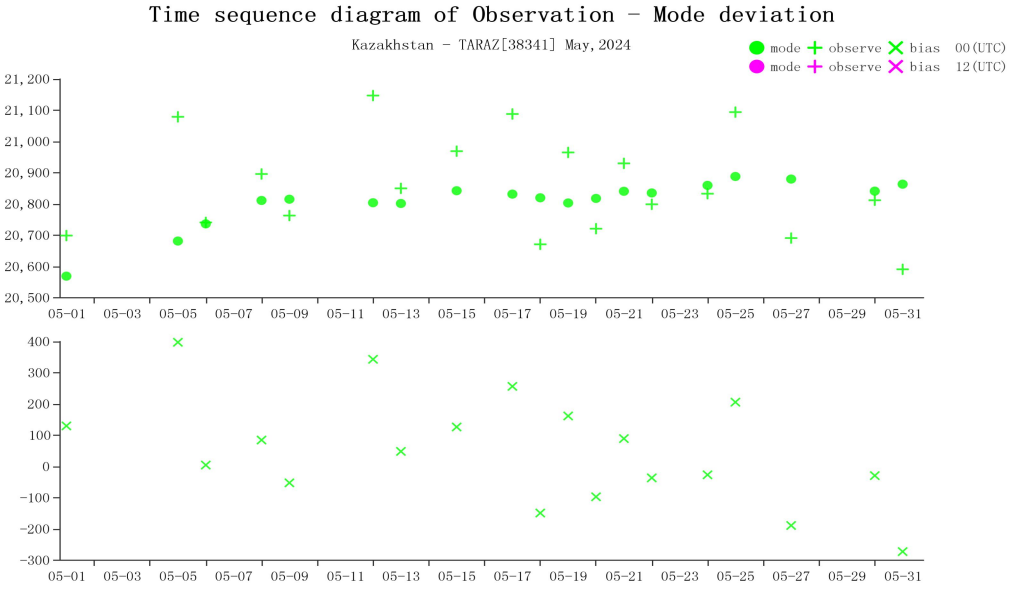
BIAS、SD and RMS of GPH for station 36003(OBS-TIME:12)



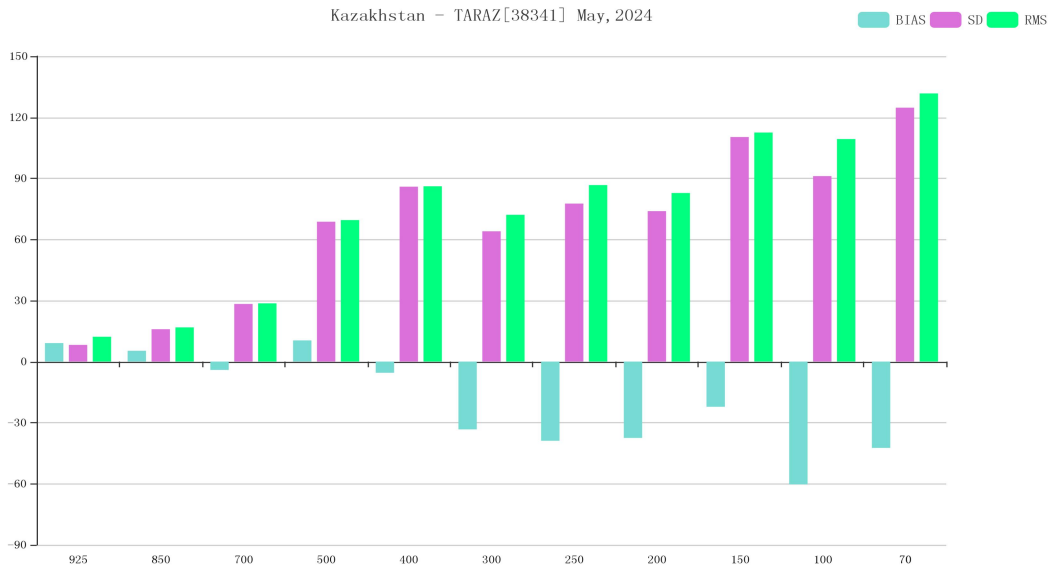
Time-series representation of GPH Obs minus first guess for station 36003(Level:30)



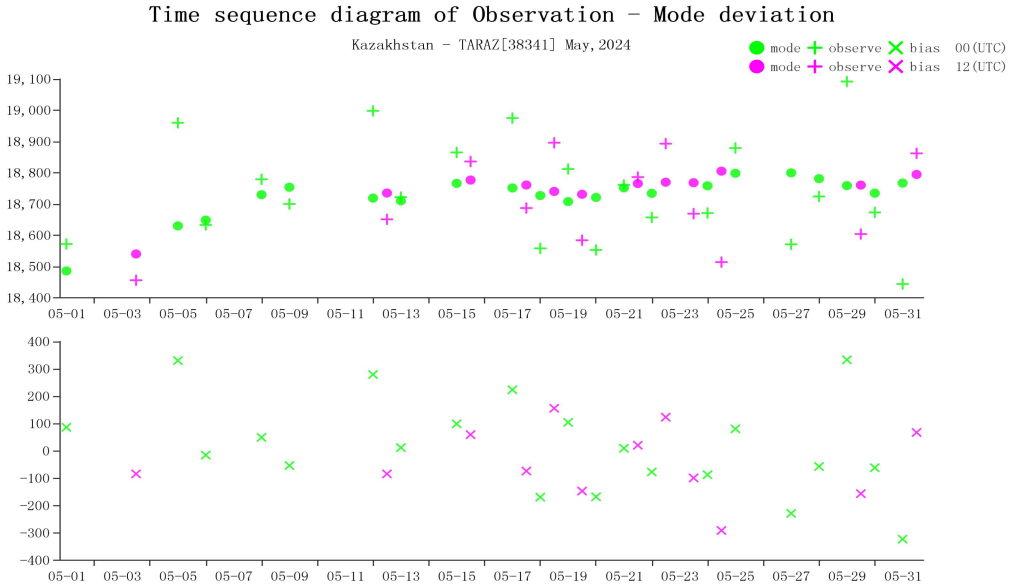
BIAS、SD and RMS of GPH for station 38341(OBS-TIME:00)



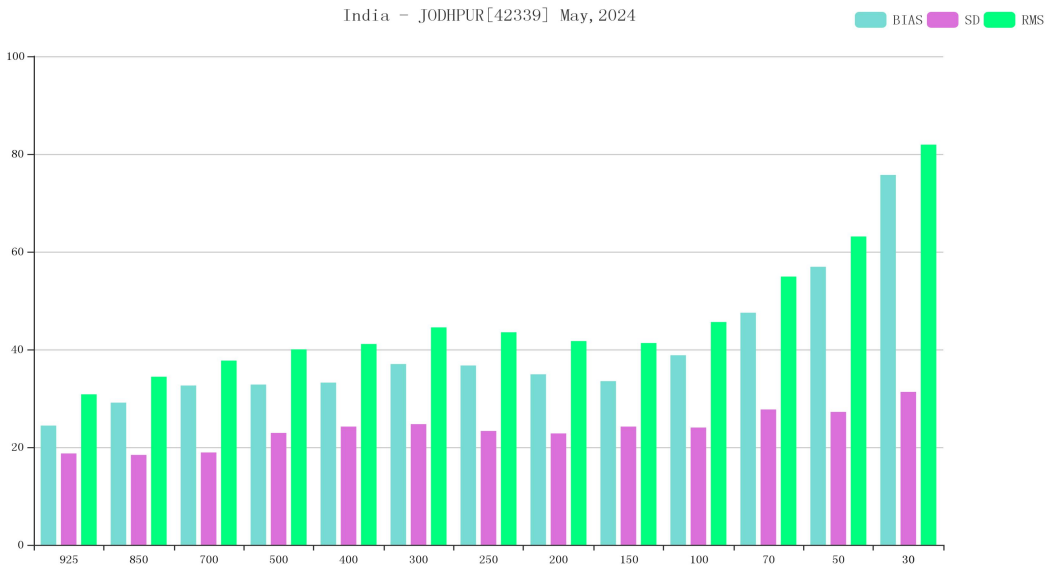
Time-series representation of GPH Obs minus first guess for station 38341(Level:50)



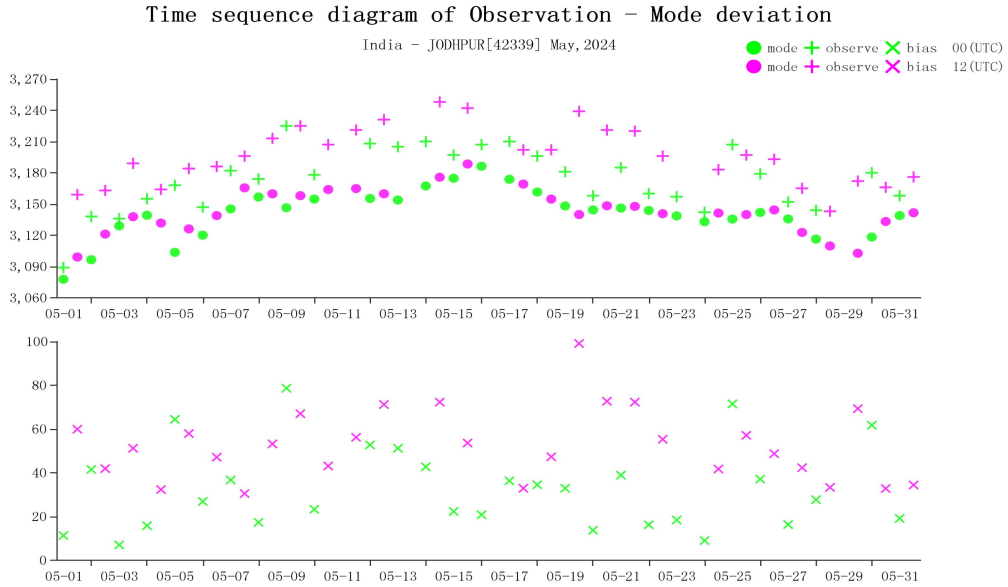
BIAS、SD and RMS of GPH for station 38341(OBS-TIME:12)



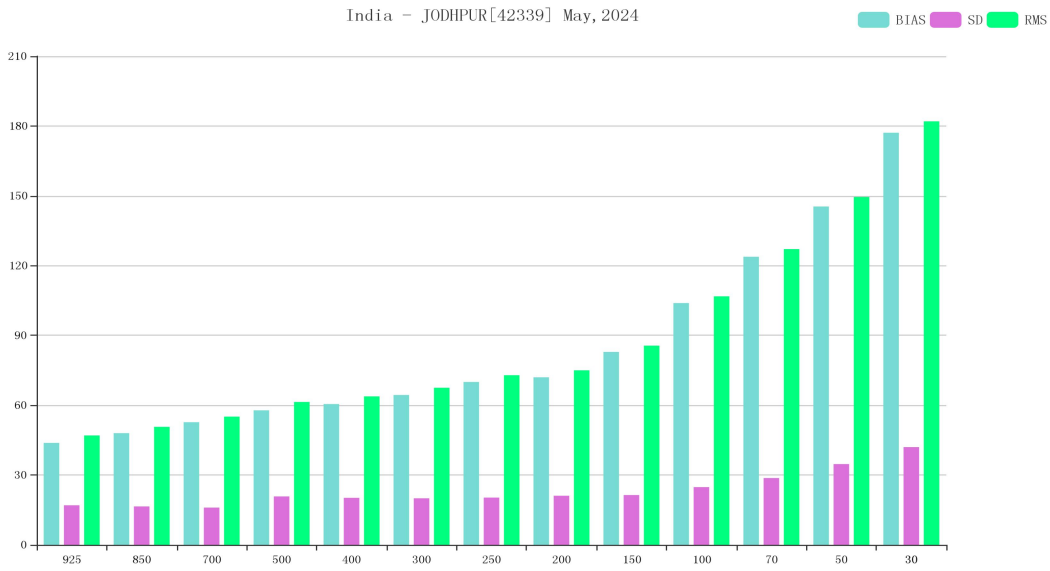
Time-series representation of GPH Obs minus first guess for station 38341(Level:70)



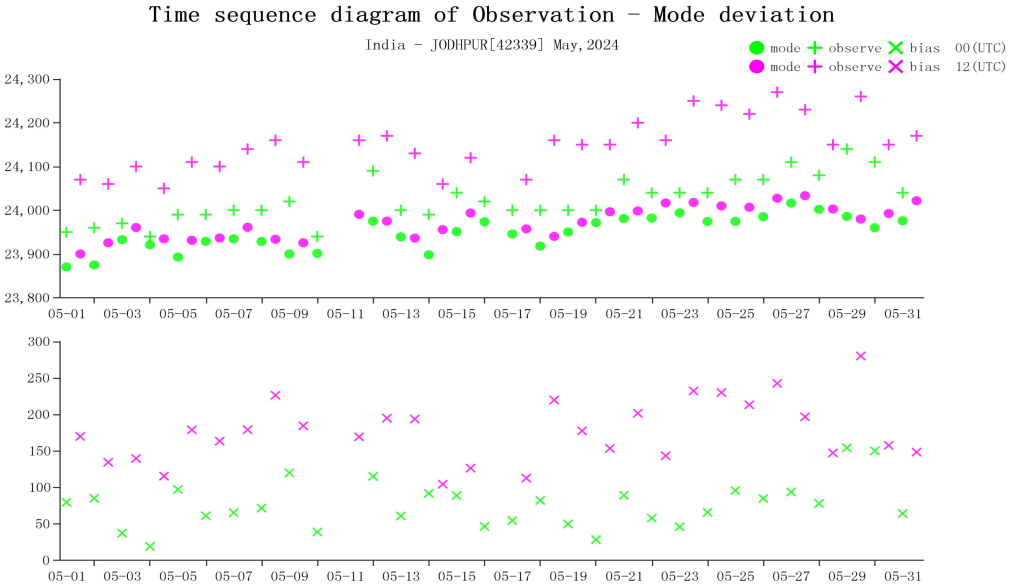
BIAS、SD and RMS of GPH for station 42339(OBS-TIME:00)



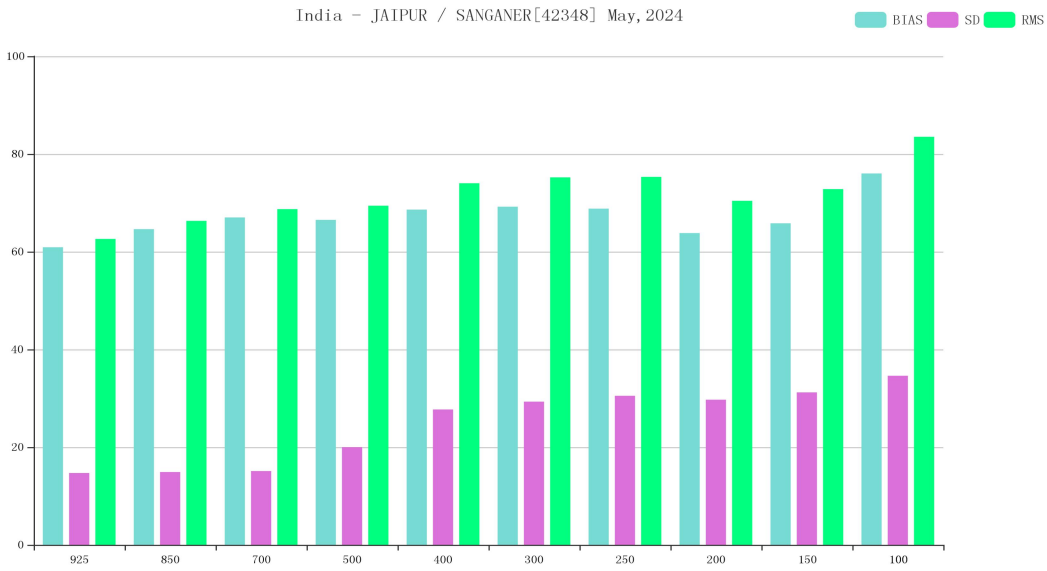
Time-series representation of GPH Obs minus first guess for station 42339(Level:700)



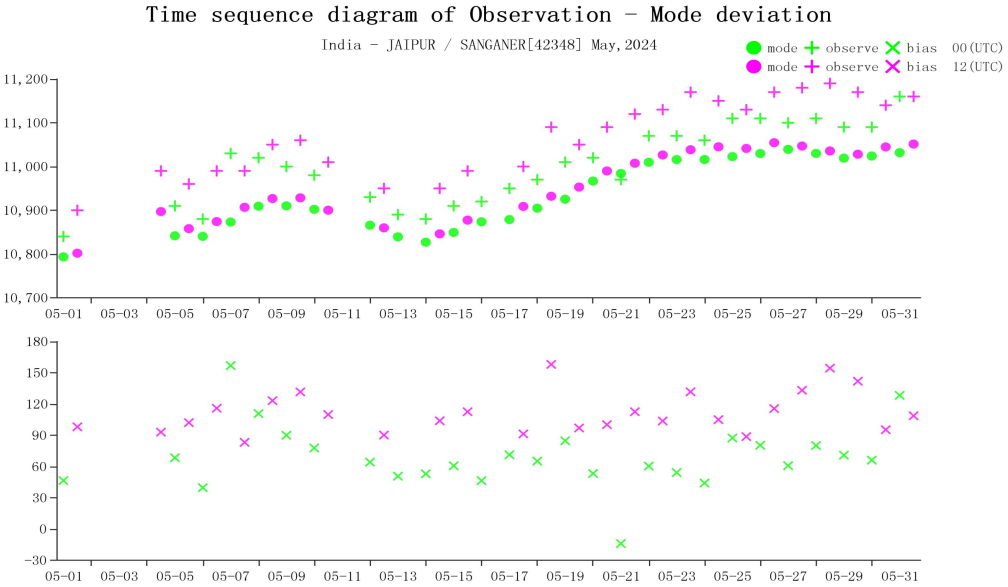
BIAS、SD and RMS of GPH for station 42339(OBS-TIME:12)



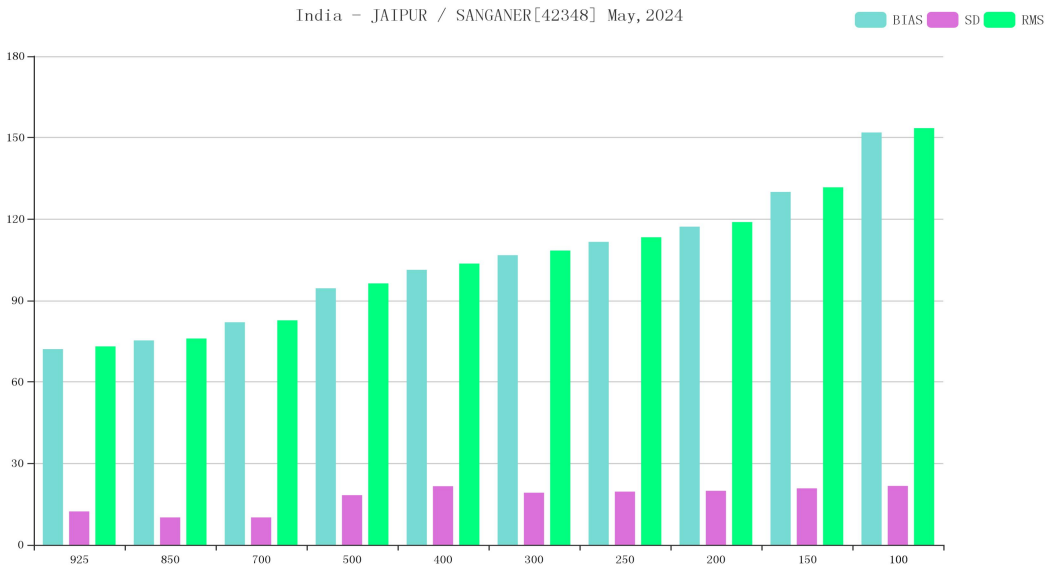
Time-series representation of GPH Obs minus first guess for station 42339(Level:30)



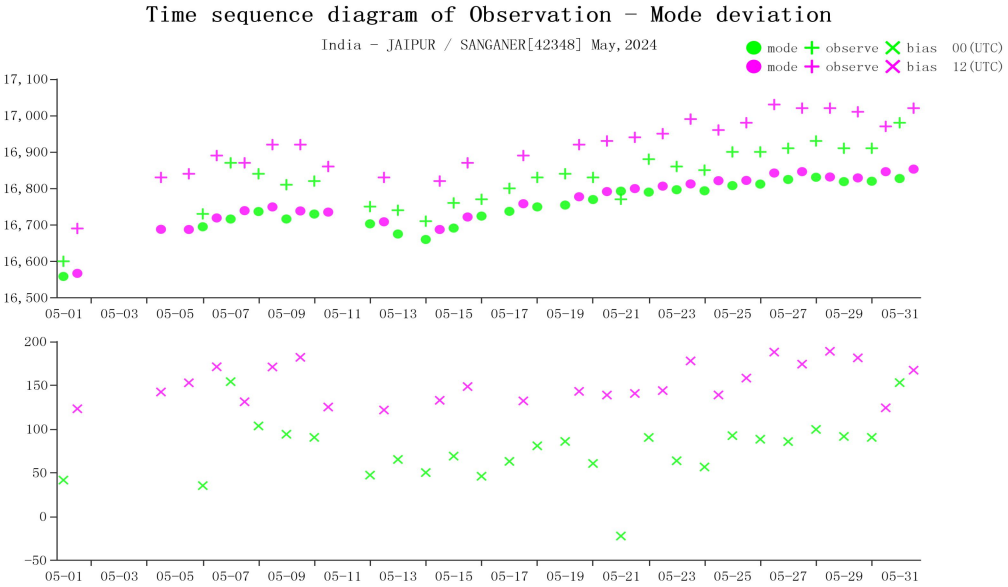
BIAS、SD and RMS of GPH for station 42348(OBS-TIME:00)



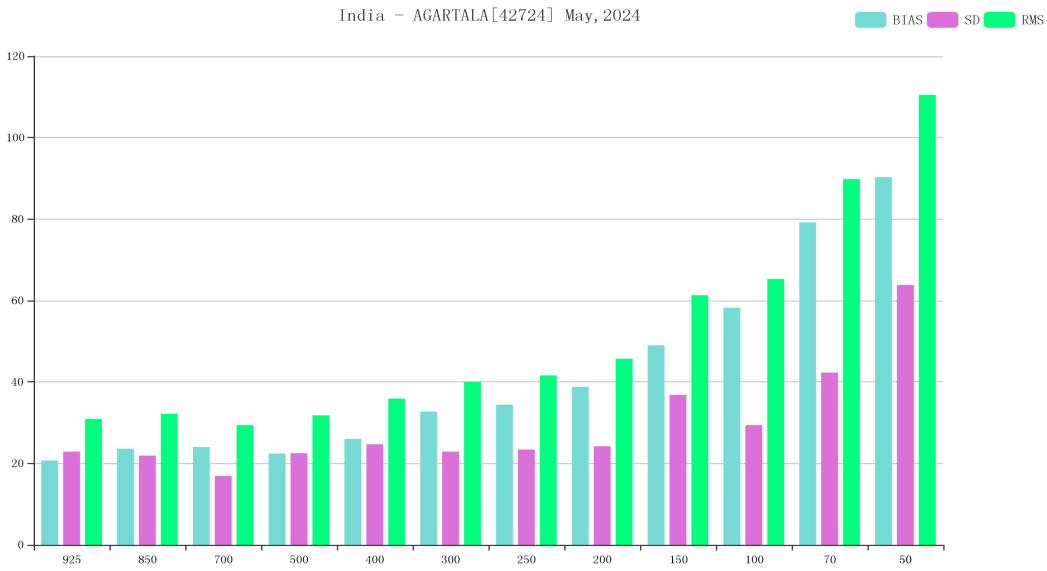
Time-series representation of GPH Obs minus first guess for station 42348(Level:250)



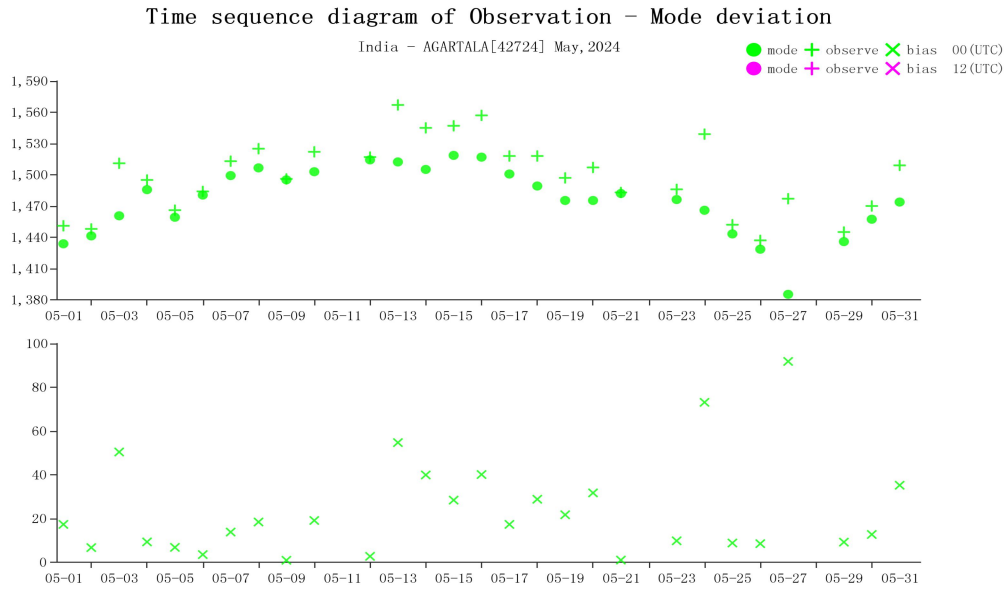
BIAS、SD and RMS of GPH for station 42348(OBS-TIME:12)



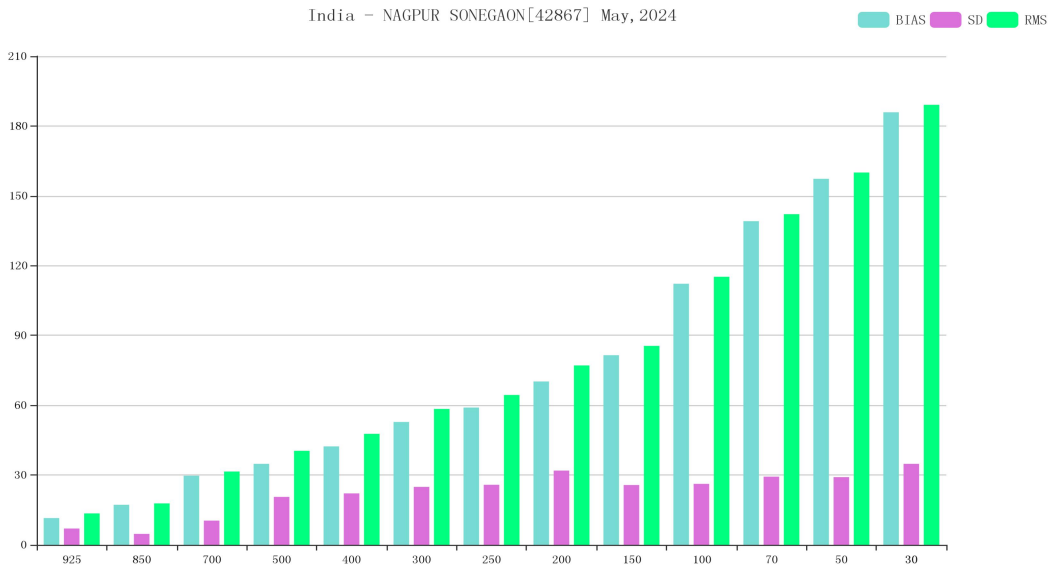
Time-series representation of GPH Obs minus first guess for station 42348(Level:100)



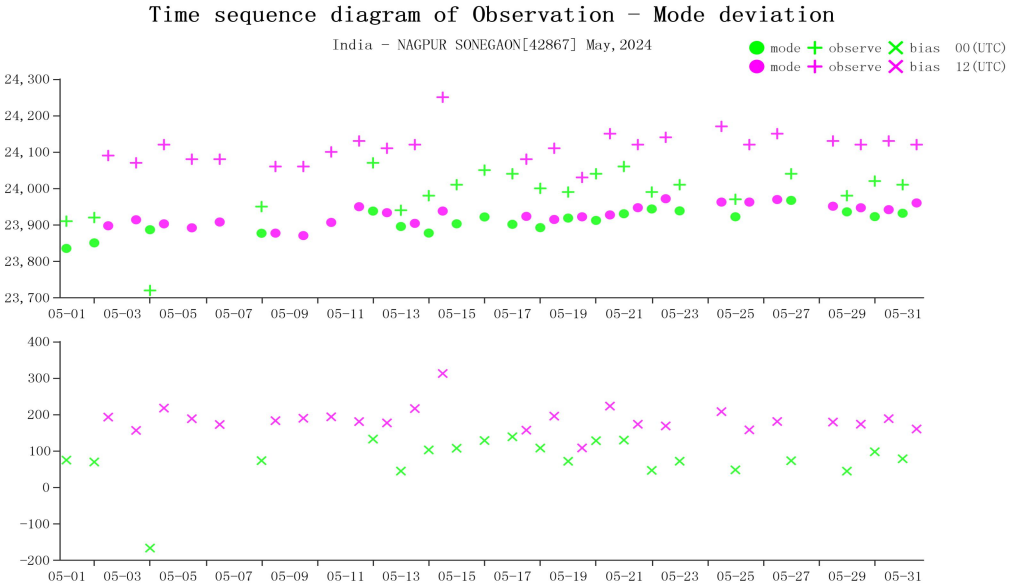
BIAS、SD and RMS of GPH for station 42724(OBS-TIME:00)



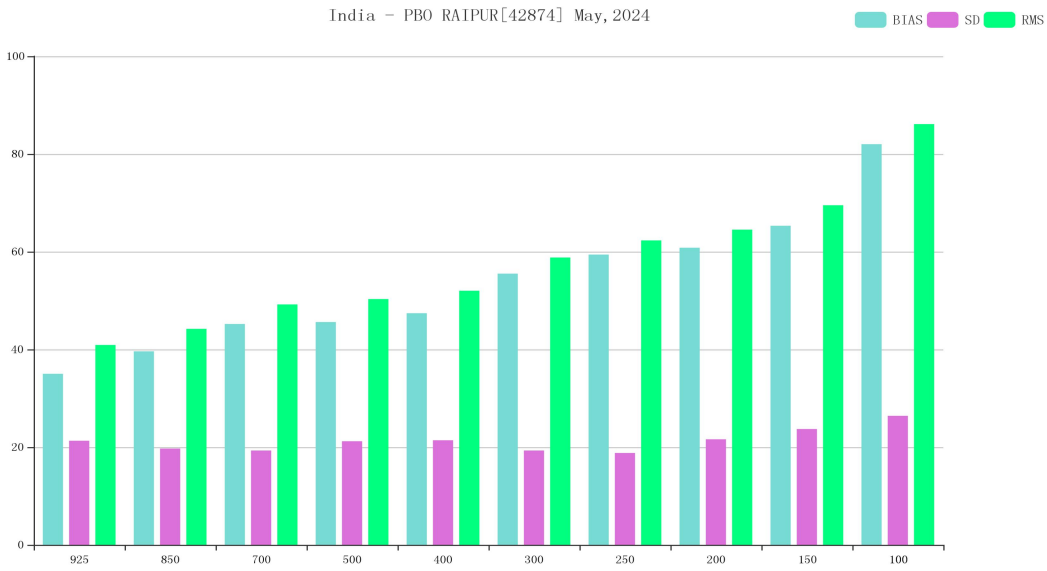
Time-series representation of GPH Obs minus first guess for station 42724(Level:850)



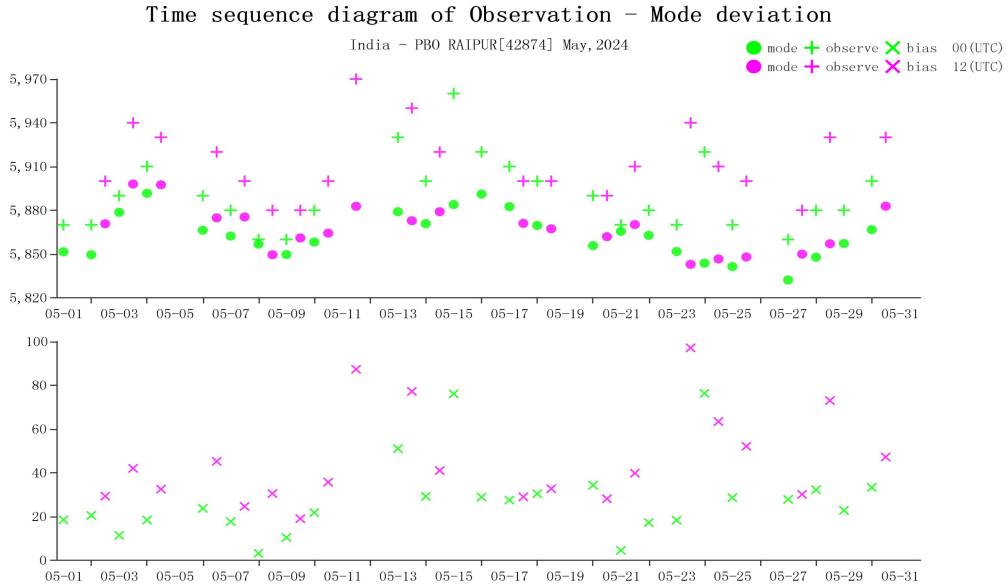
BIAS、SD and RMS of GPH for station 42867(OBS-TIME:12)



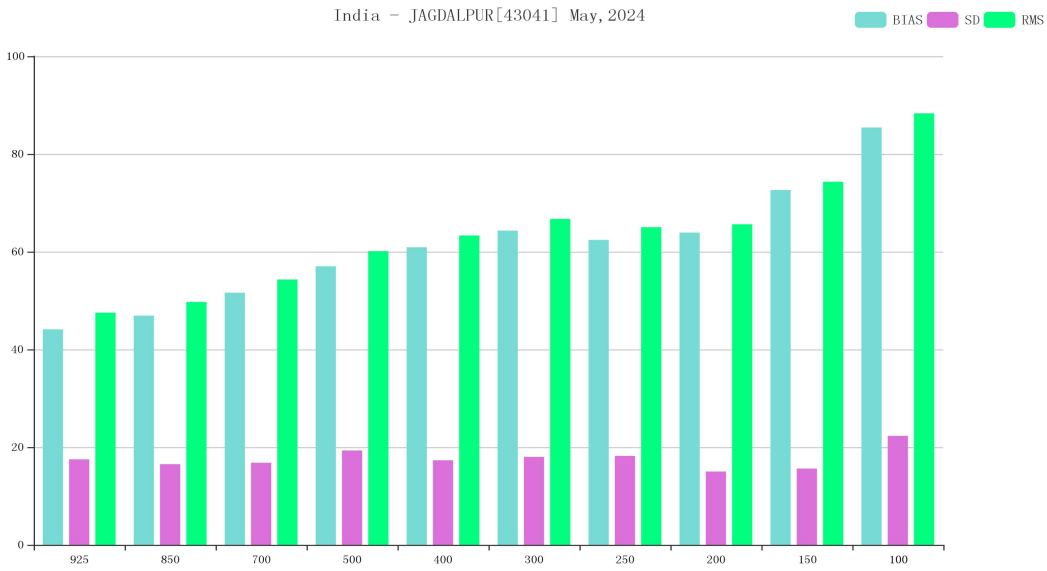
Time-series representation of GPH Obs minus first guess for station 42867(Level:30)



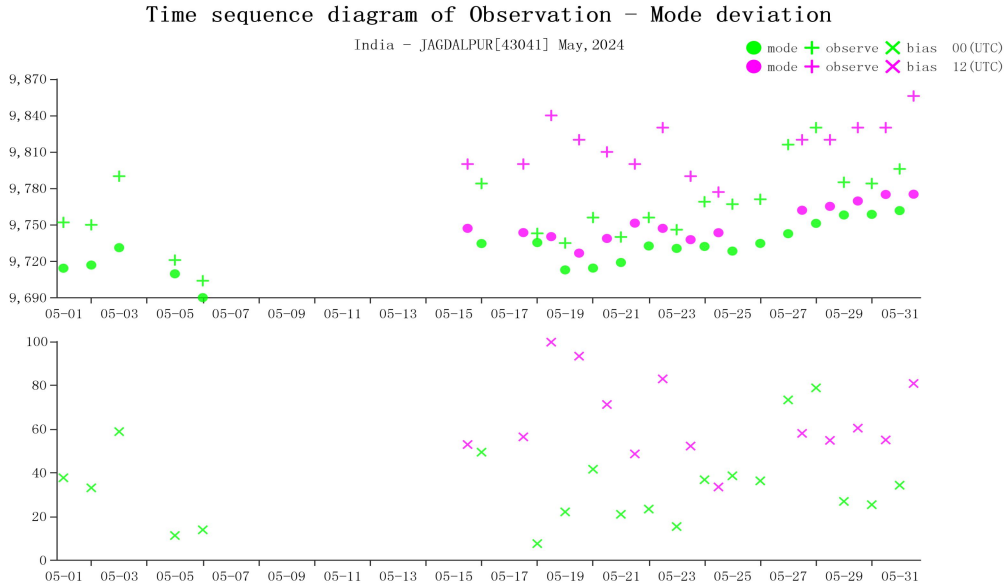
BIAS、SD and RMS of GPH for station 42874(OBS-TIME:12)



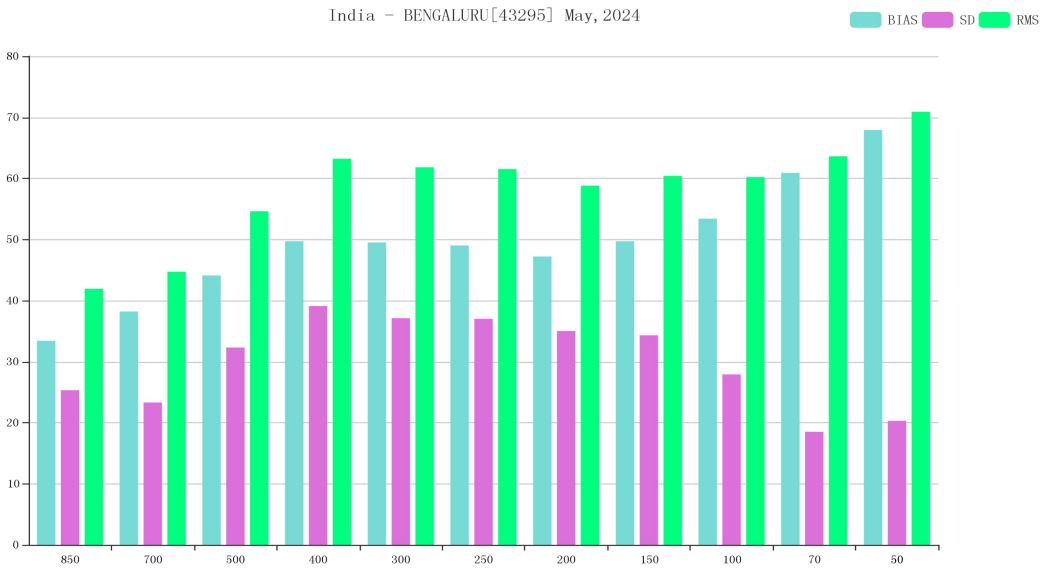
Time-series representation of GPH Obs minus first guess for station 42874(Level:500)



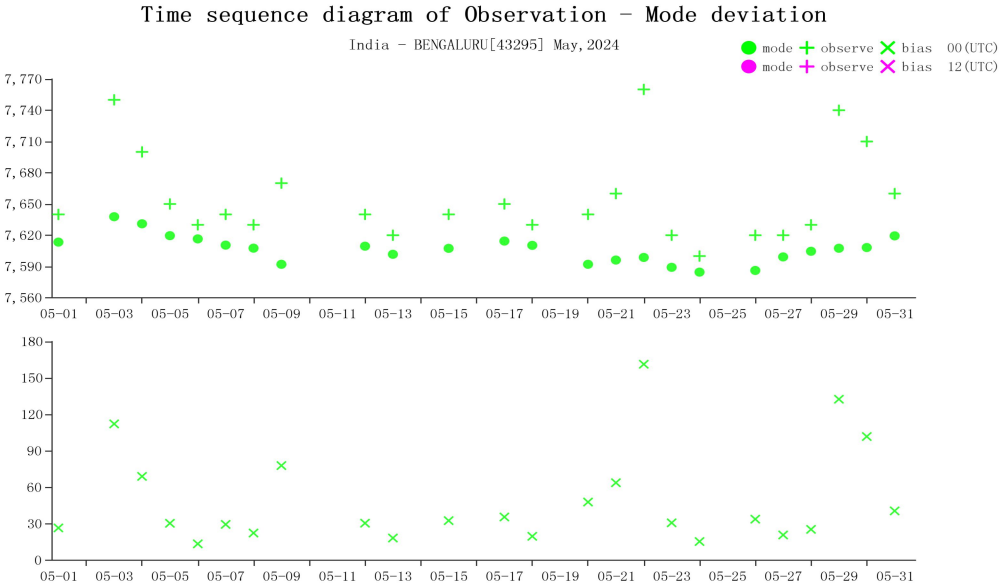
BIAS、SD and RMS of GPH for station 43041(OBS-TIME:12)



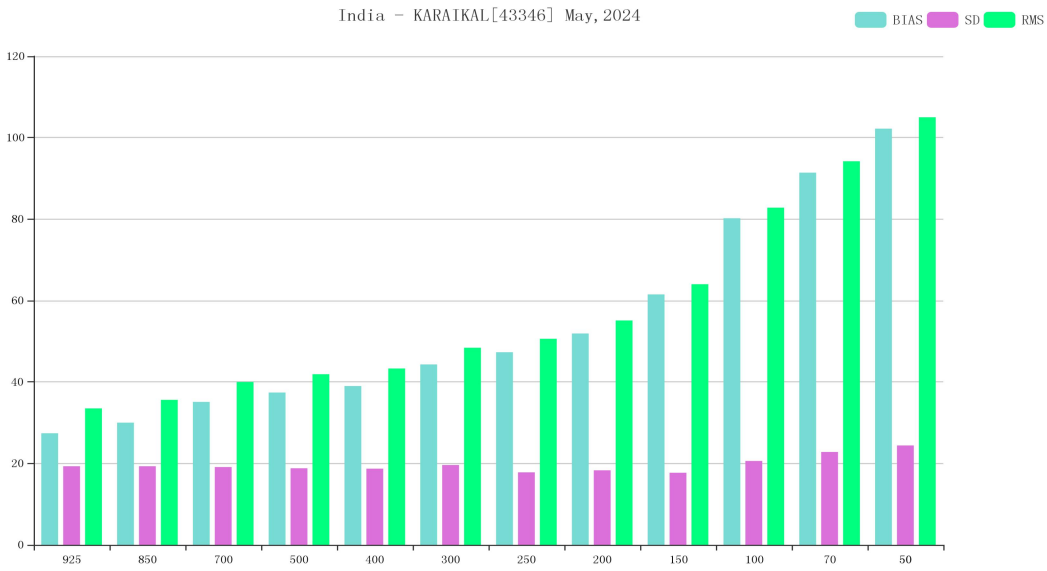
Time-series representation of GPH Obs minus first guess for station 43041(Level:300)



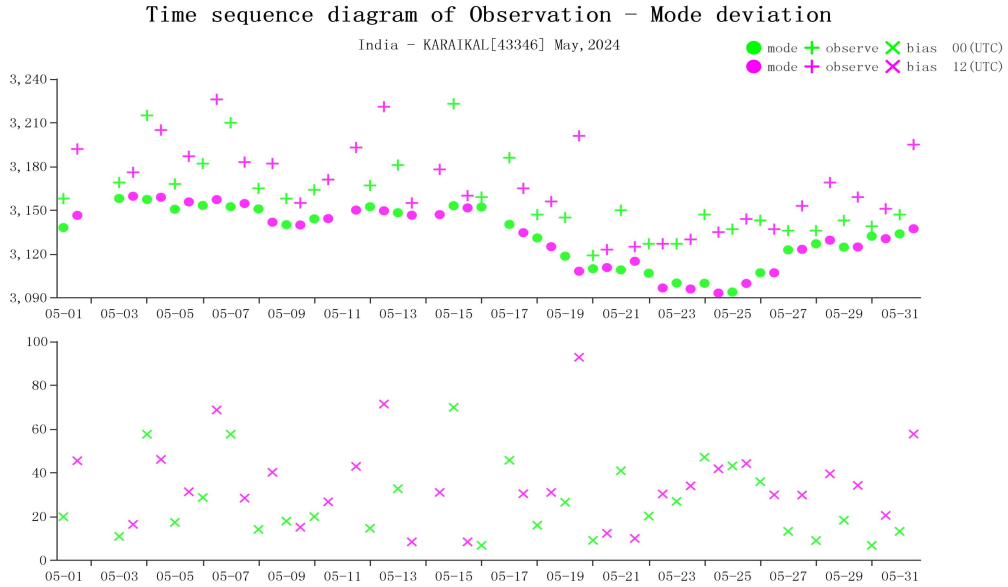
BIAS、SD and RMS of GPH for station 43295(OBS-TIME:00)



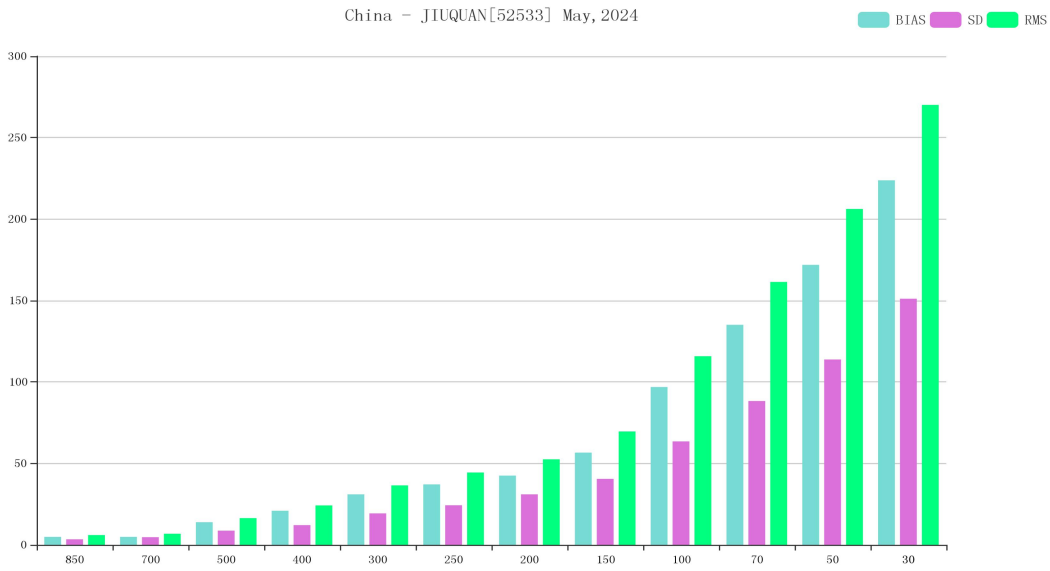
Time-series representation of GPH Obs minus first guess for station 43295(Level:400)



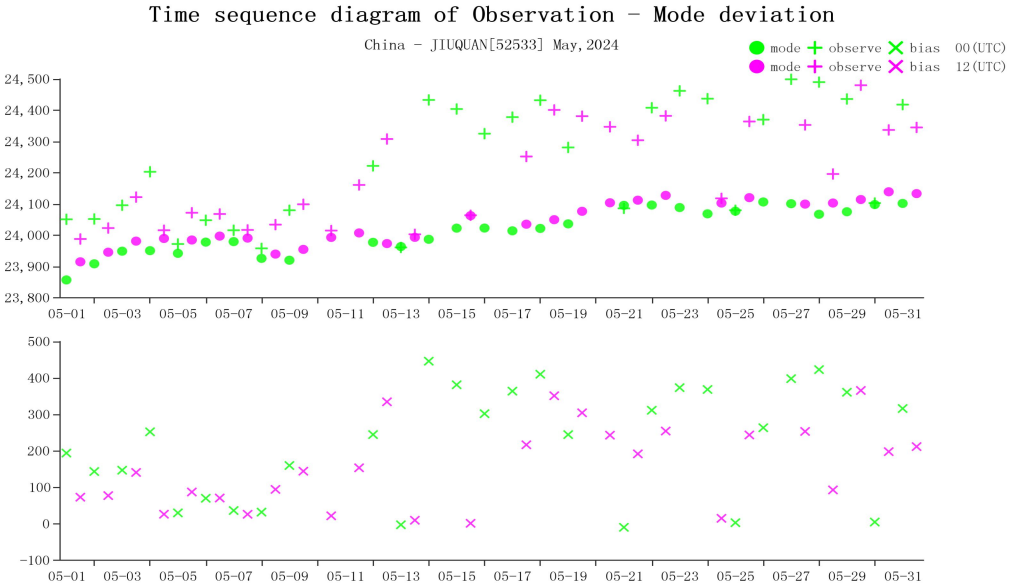
BIAS、SD and RMS of GPH for station 43346(OBS-TIME:12)



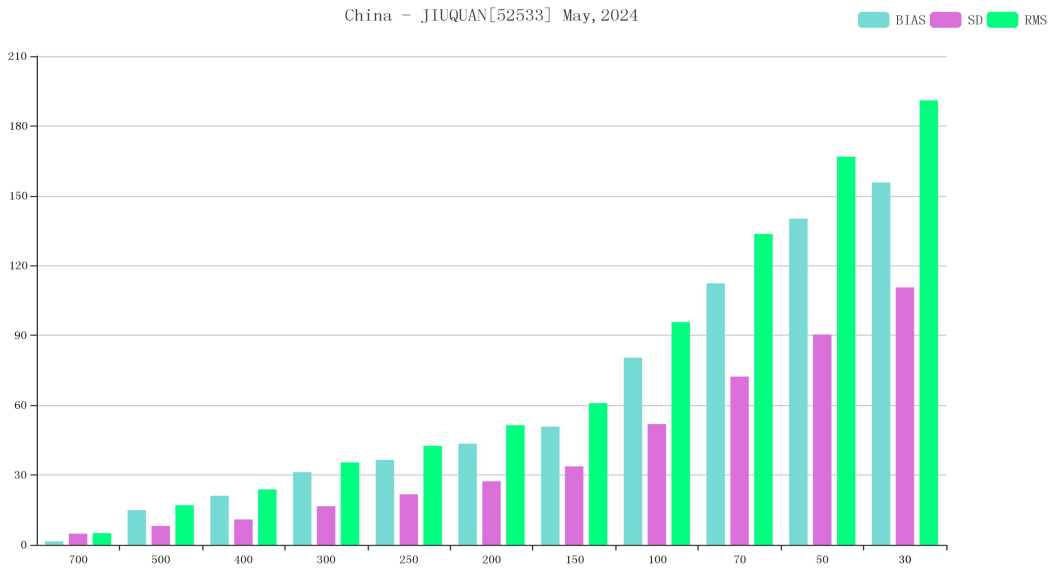
Time-series representation of GPH Obs minus first guess for station 43346(Level:700)



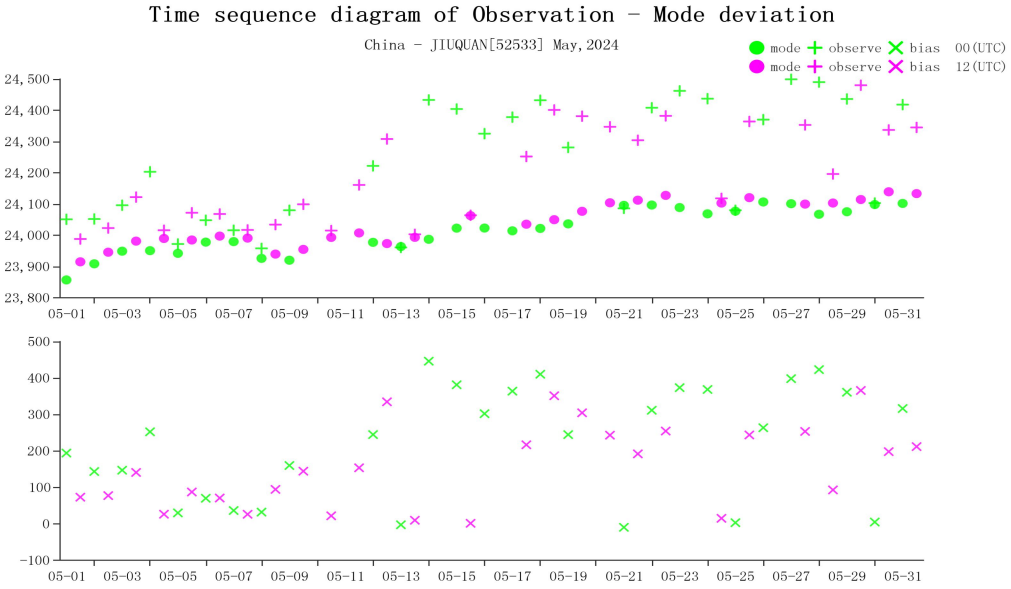
BIAS、SD and RMS of GPH for station 52533(OBS-TIME:00)



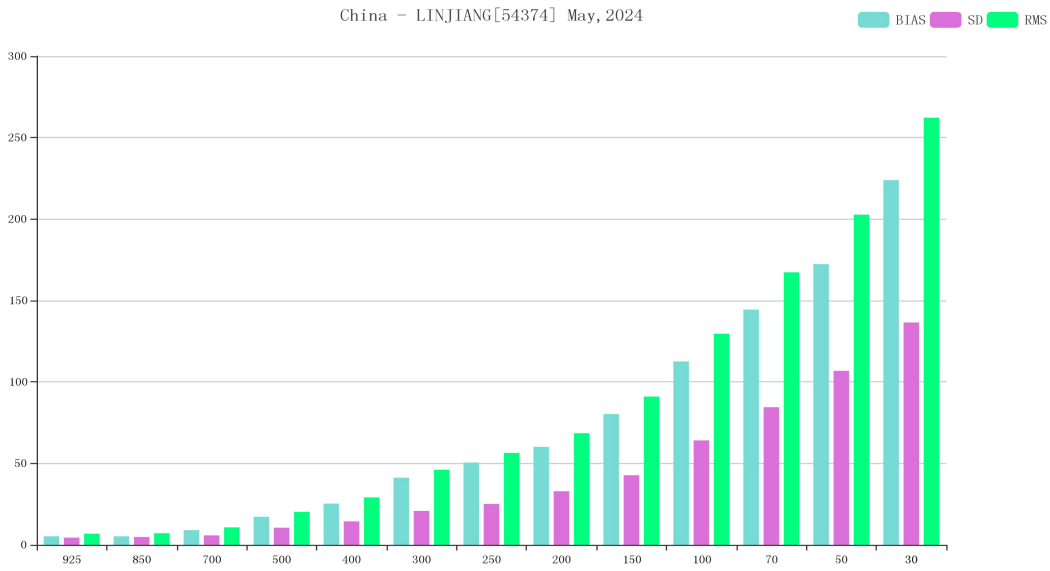
Time-series representation of GPH Obs minus first guess for station 52533(Level:30)



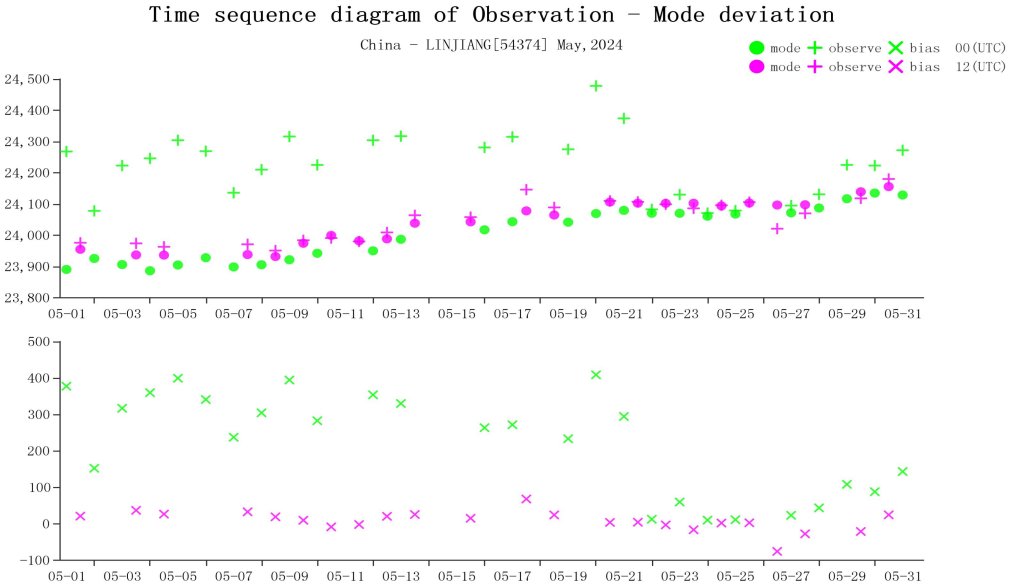
BIAS、SD and RMS of GPH for station 52533(OBS-TIME:12)



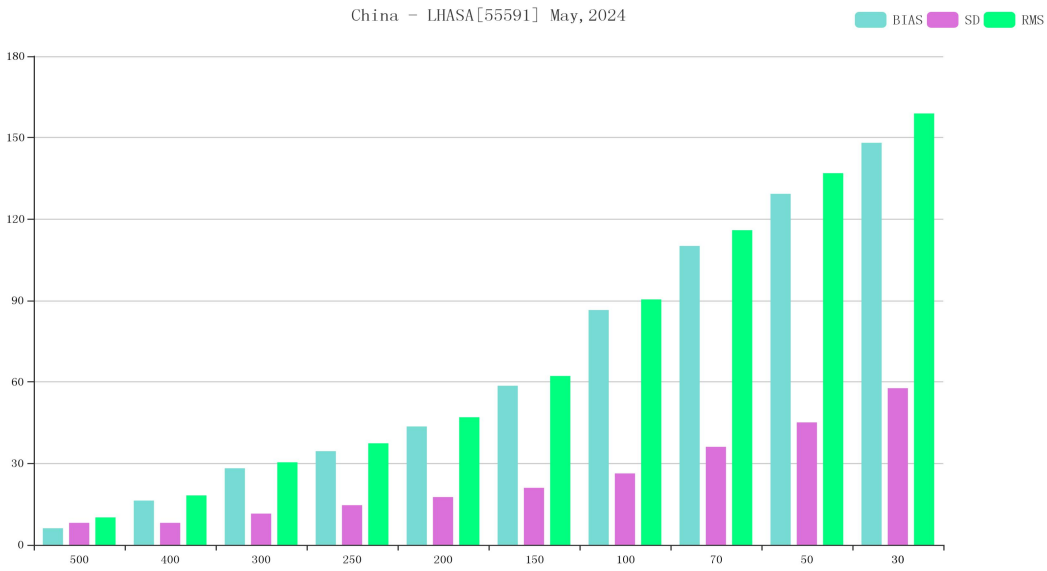
Time-series representation of GPH Obs minus first guess for station 52533(Level:30)



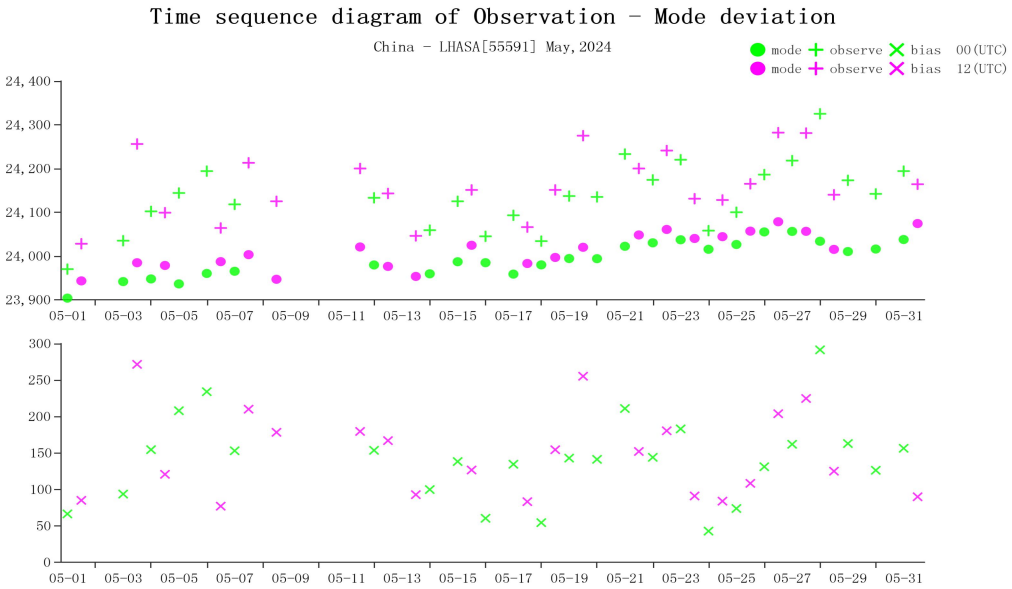
BIAS、SD and RMS of GPH for station 54374(OBS-TIME:00)



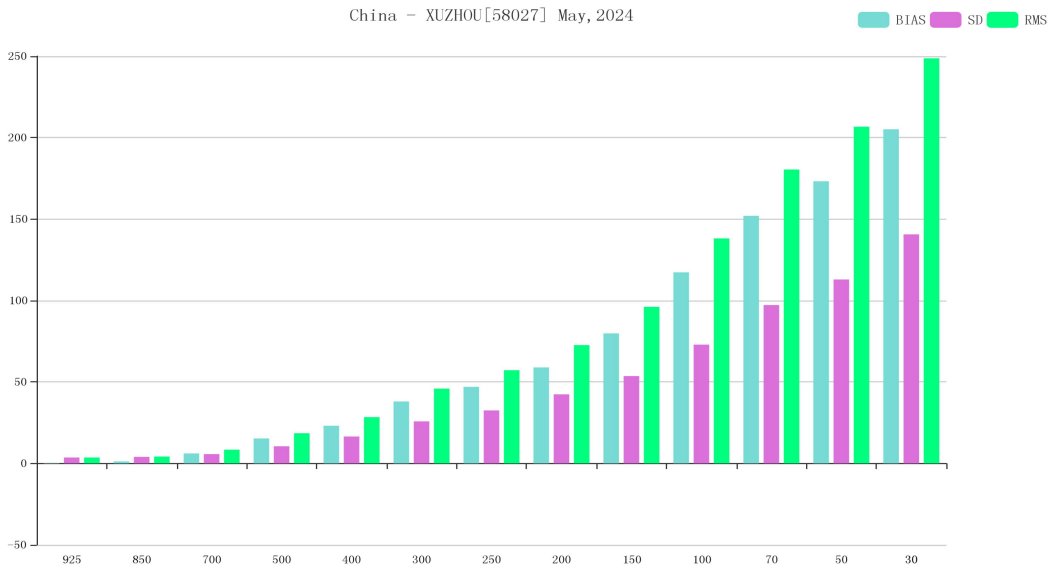
Time-series representation of GPH Obs minus first guess for station 54374(Level:30)



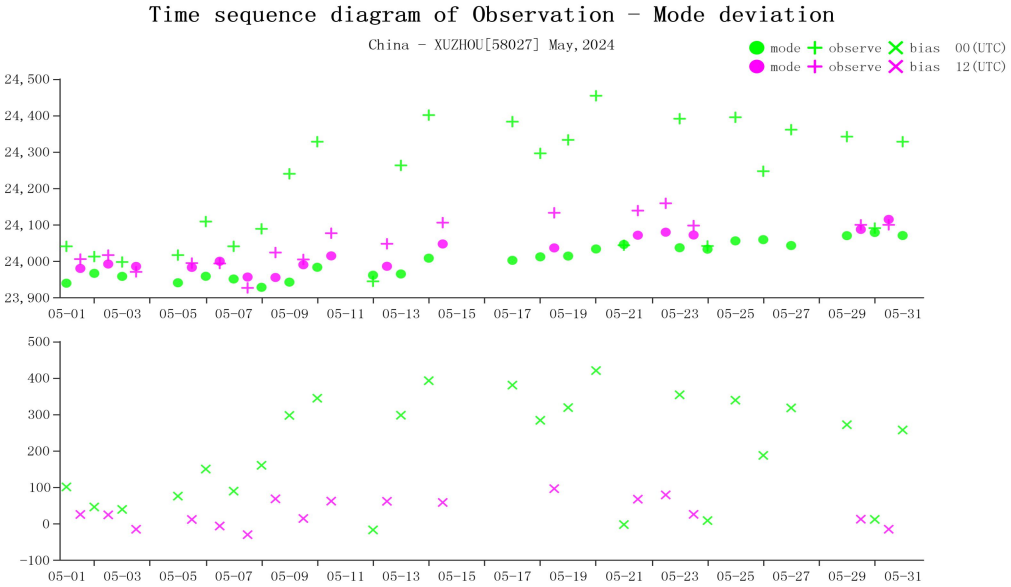
BIAS、SD and RMS of GPH for station 55591(OBS-TIME:12)



Time-series representation of GPH Obs minus first guess for station 55591(Level:30)



BIAS、SD and RMS of GPH for station 58027(OBS-TIME:00)



Time-series representation of GPH Obs minus first guess for station 58027(Level:30)

3.3 Vector Wind (WIN_S)

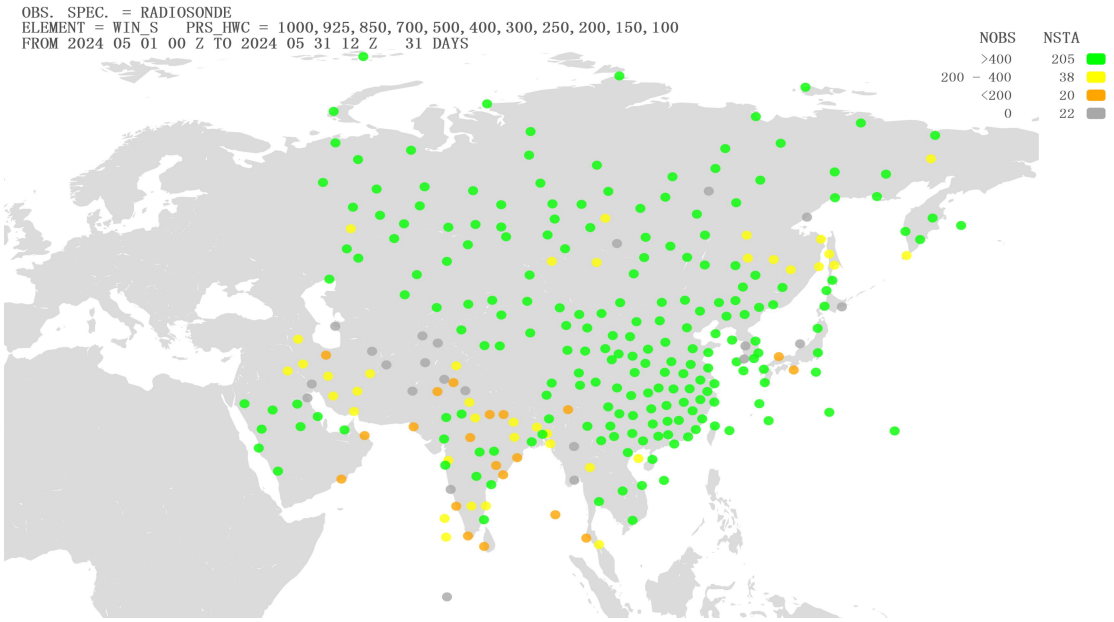
3.3.1 List of Suspect Stations

Table 3 List of WIN_S suspected in May 2024

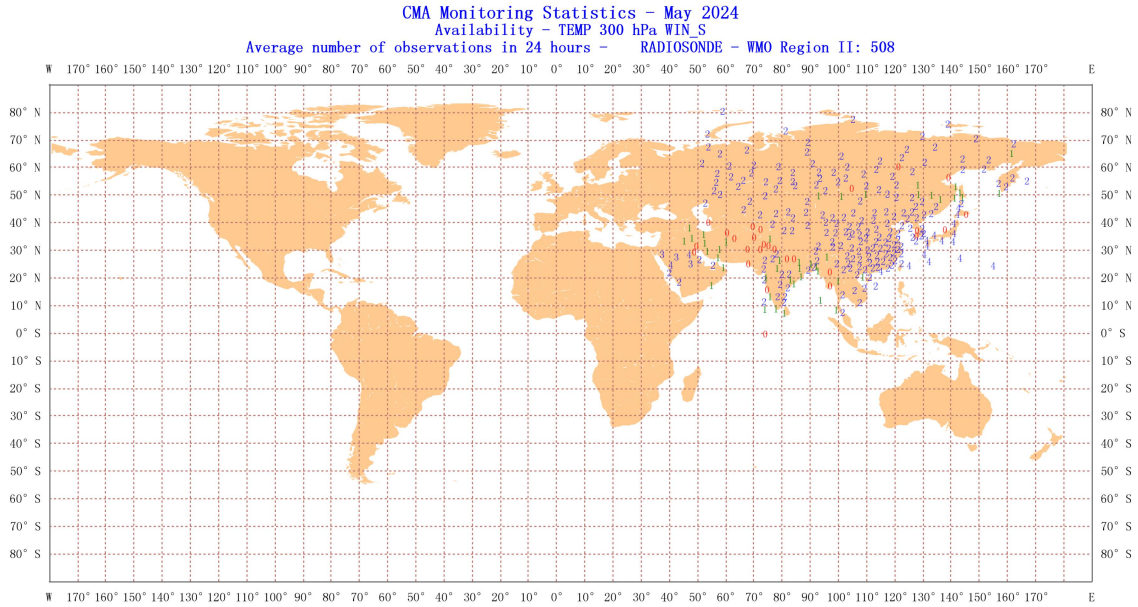
LINE NUM	WMO IDENT	COUNTRY	OBS TIME	LEVEL	NUM OBS	NUM GRS	REJ （%）	BIAS	SD	RMS

1	38341	Kazakhstan	00	250	25	1	0	7.2	14.5	16.2
2	38341	Kazakhstan	12	500	26	1	0	11.1	13.7	17.6

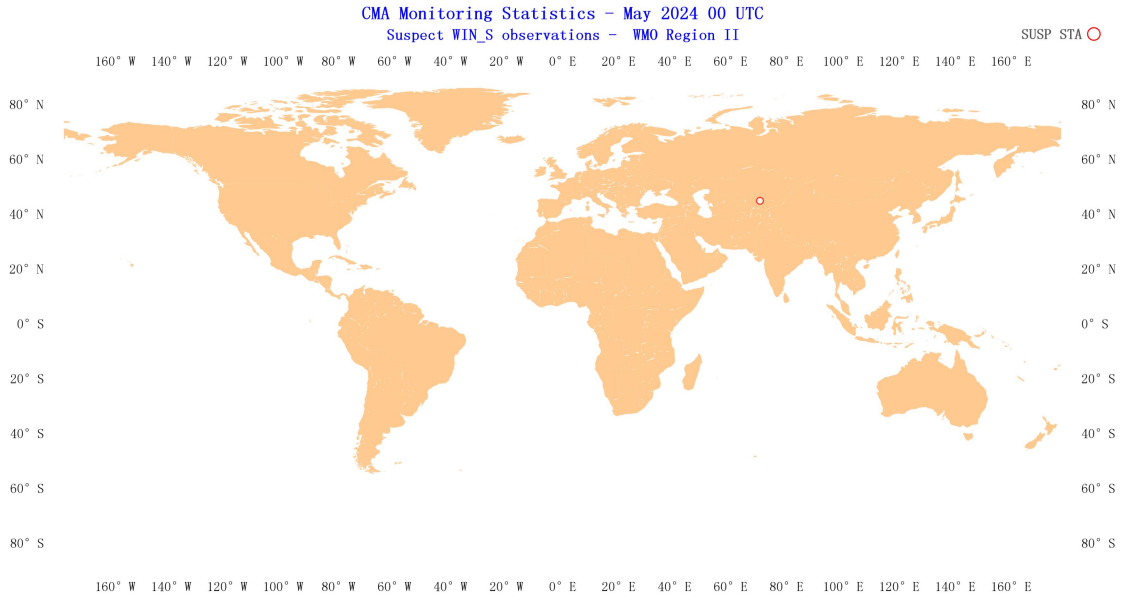
3.3.2 Suspect Station Analysis



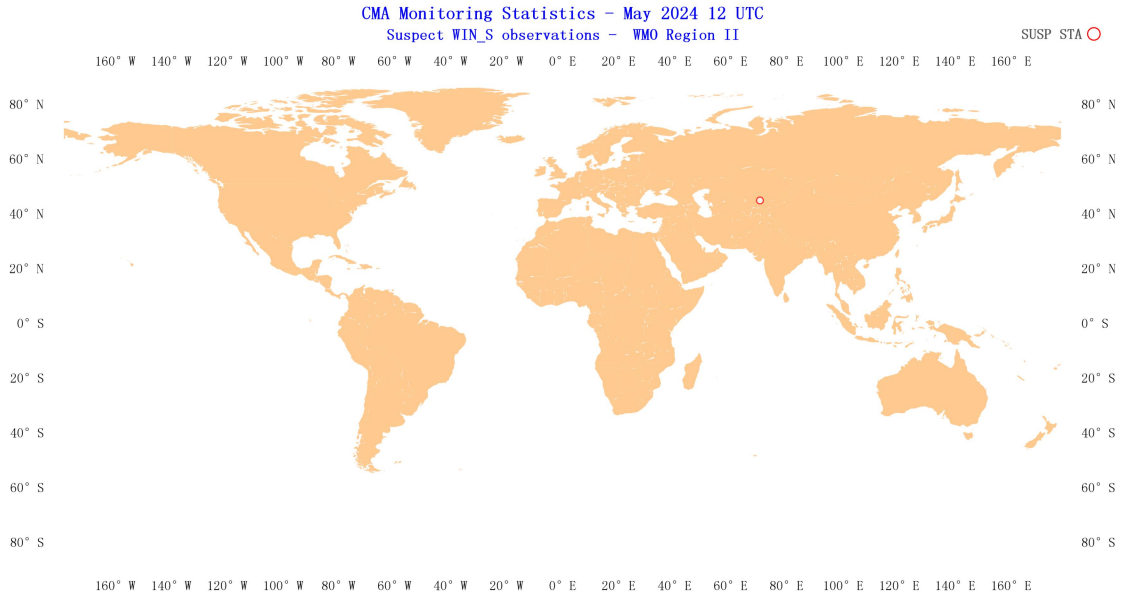
Location of all radiosonde stations reporting vector wind observations in Region II over the month of May 2024. NOBS shows the total number of observations received at RWC-Beijing, corresponding total number of stations (NSTA) and color scale are shown at the top of the figure, color green refers to NOBS is higher than 400, color yellow refers to NOBS is between 200 and 400(including 400), color orange refers to NOBS is between 0 and 200(including 200), and color gray refers to NOBS is 0.



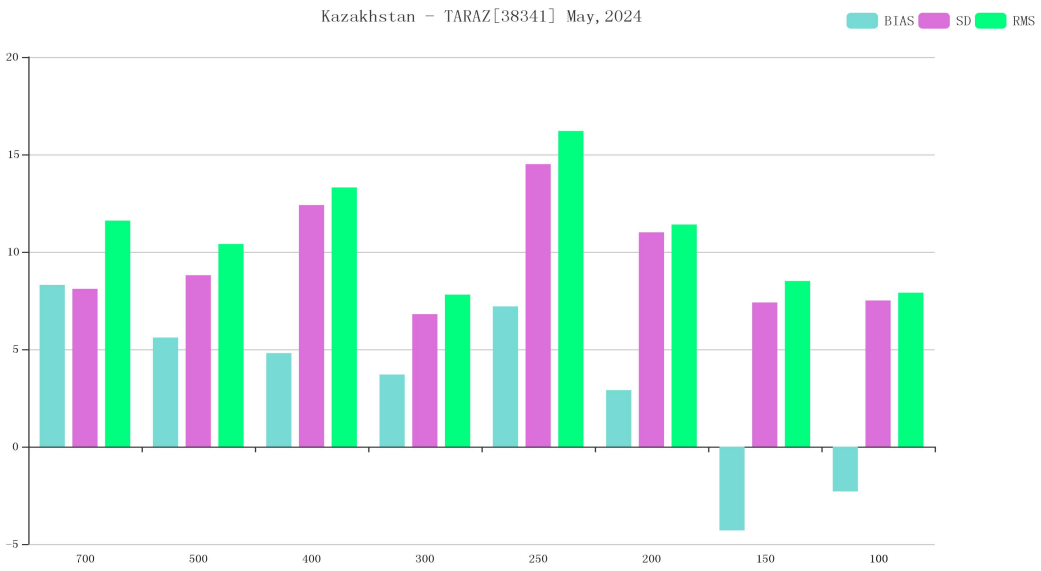
Location of all radiosonde stations reporting vector wind average number of observations in 24 hours in Region II over the month of May 2024.



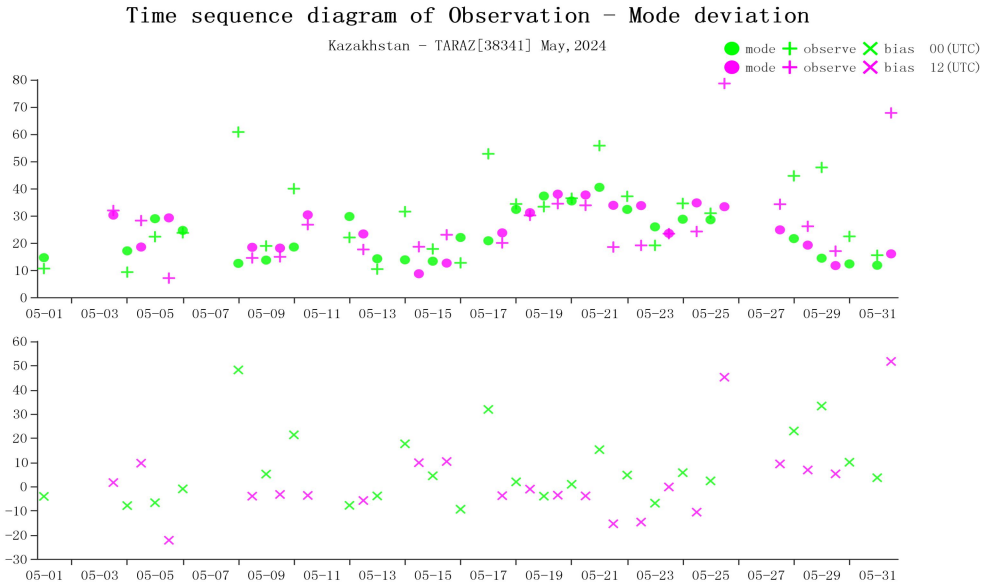
Distribution of suspect stations - Vector Wind 00 UTC



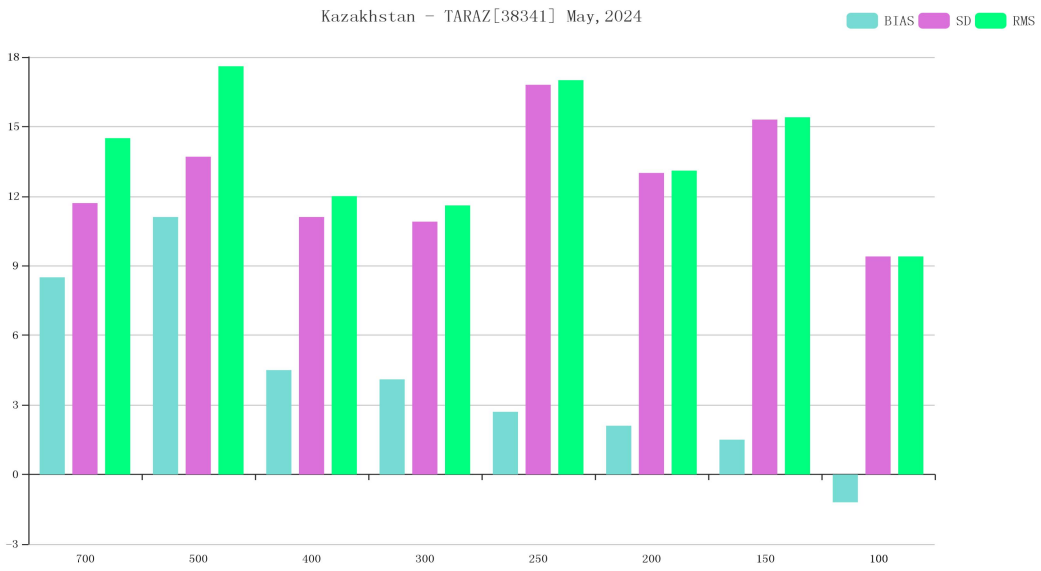
Distribution of suspect stations - Vector Wind 12 UTC



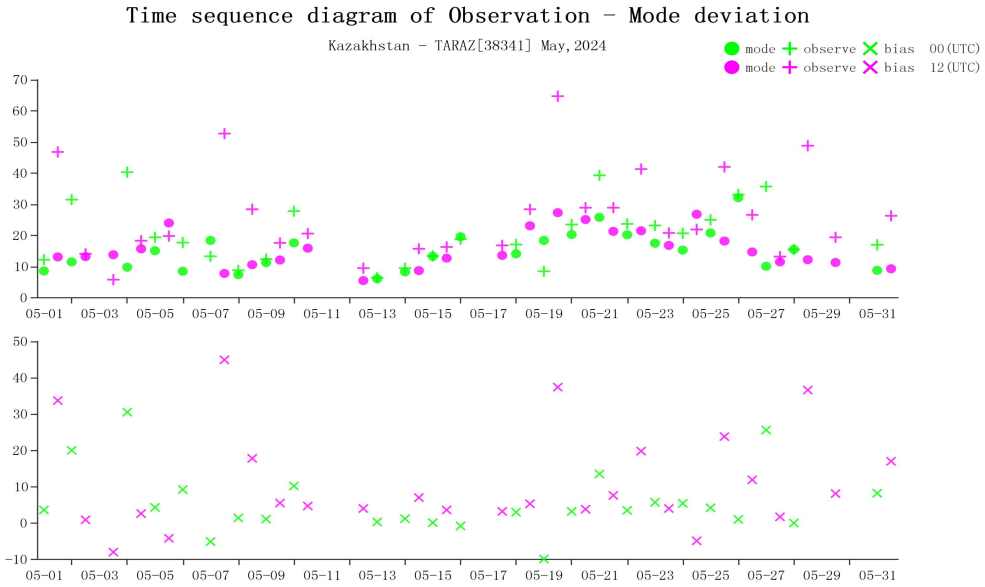
BIAS、SD and RMS of WIN_S for station 38341(OBS-TIME:00)



Time-series representation of WIN_S Obs minus first guess for station 38341(Level:250)



BIAS、SD and RMS of WIN_S for station 38341(OBS-TIME:12)



Time-series representation of WIN_S Obs minus first guess for station 38341(Level:500)

3.4 Wind Direction (WIN_D)

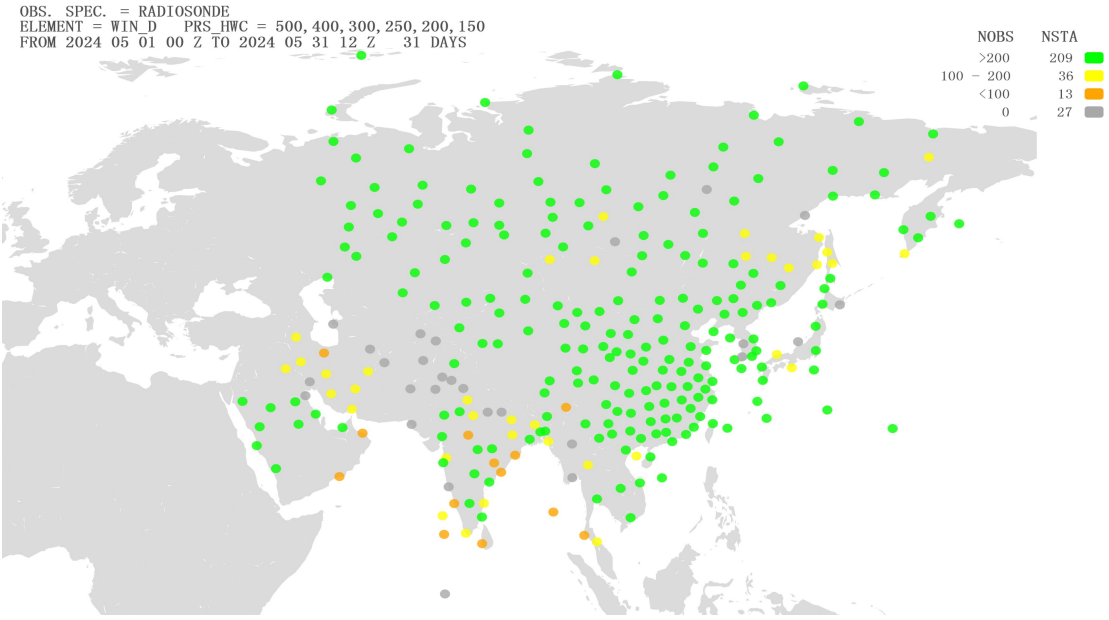
3.4.1 List of Suspect Stations

Table 4 List of WIN_D suspected in May 2024

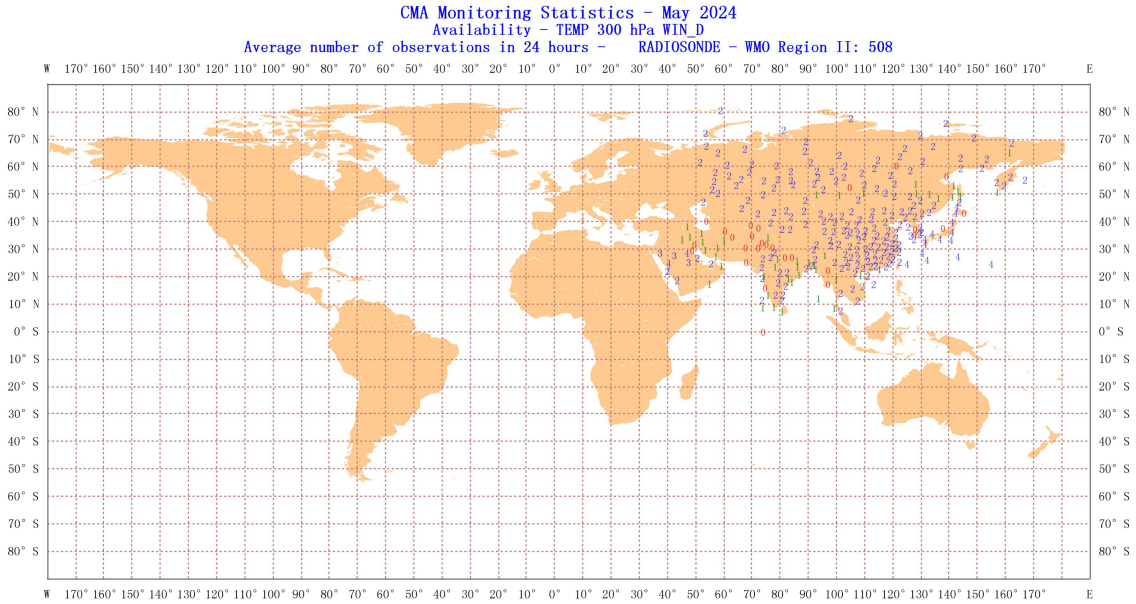
LINE NUM	WMO IDENT	COUNTRY	OBS TIME	NUM OBS	BIAS	SD	MAX SPREAD

1	30372	Russia	12	22	10.1	10.9	3.2
2	38341	Kazakhstan	00	24	10.7	17.9	3.3
3	38341	Kazakhstan	12	18	11.6	18.5	3.8
4	48327	Thailand	00	18	12.4	13	3.5
5	54340	China	00	26	12.7	8.5	4.3
6	54340	China	12	27	13.6	7.1	1.8

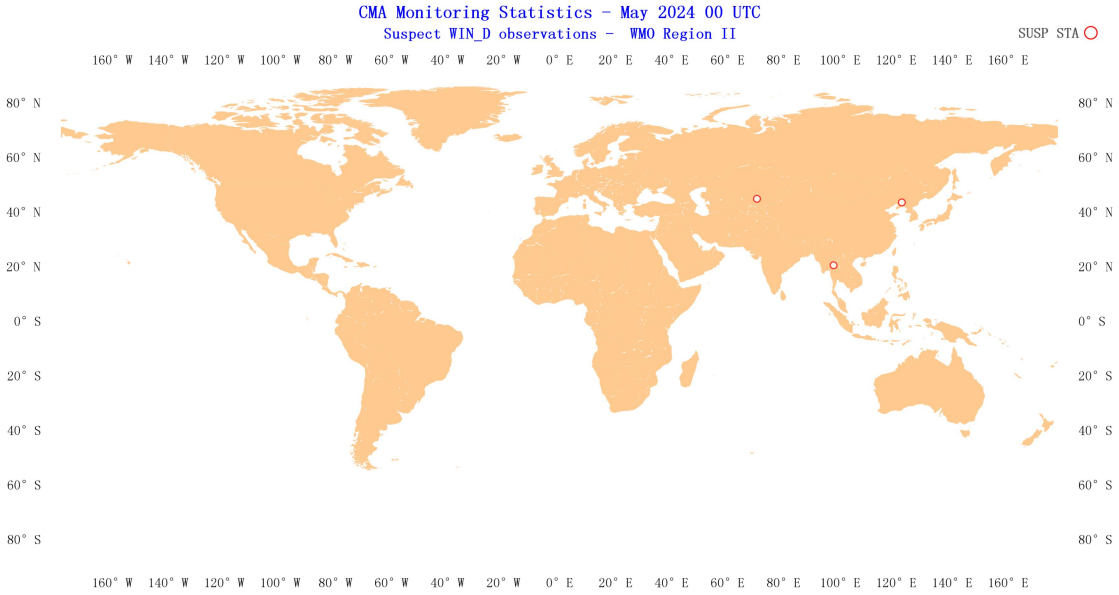
3.4.2 Suspect Station Analysis



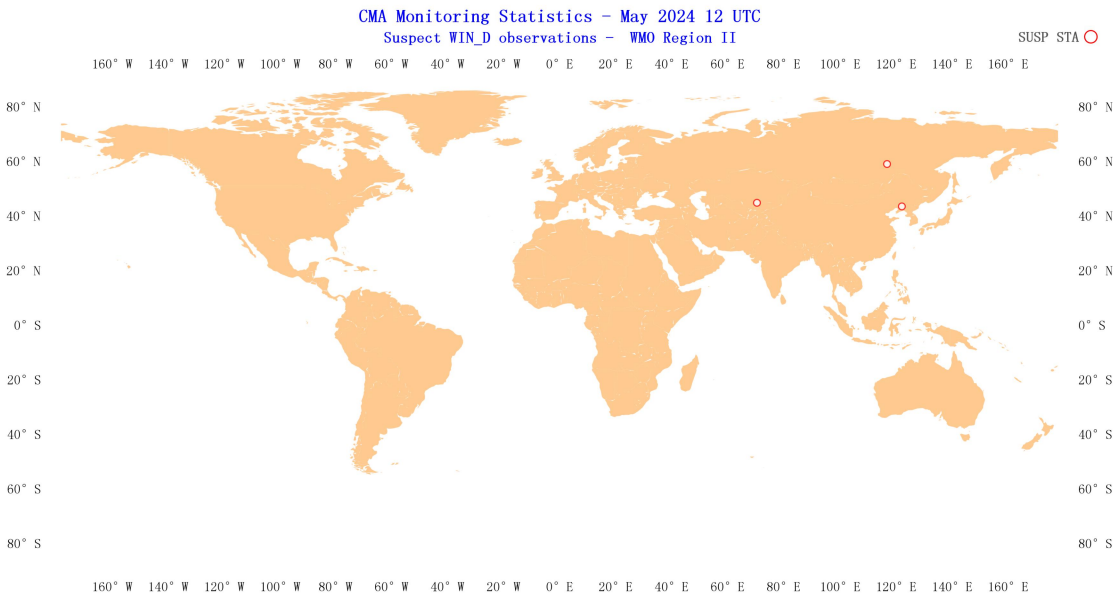
Location of all radiosonde stations reporting wind direction observations in Region II over the month of May 2024. NOBS shows the total number of observations received at RWC-Beijing, corresponding total number of stations (NSTA) and color scale are shown at the top of the figure, color green refers to NOBS is higher than 200, color yellow refers to NOBS is between 100 and 200(including 200), color orange refers to NOBS is between 0 and 100(including 100), and color gray refers to NOBS is 0.



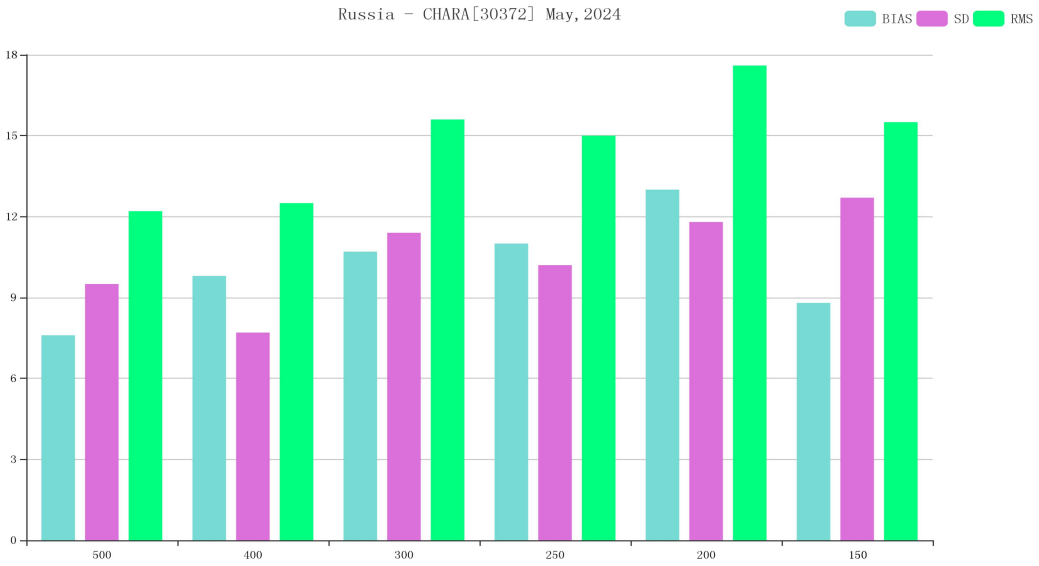
Location of all radiosonde stations reporting wind direction average number of observations in 24 hours in Region II over the month of May 2024.



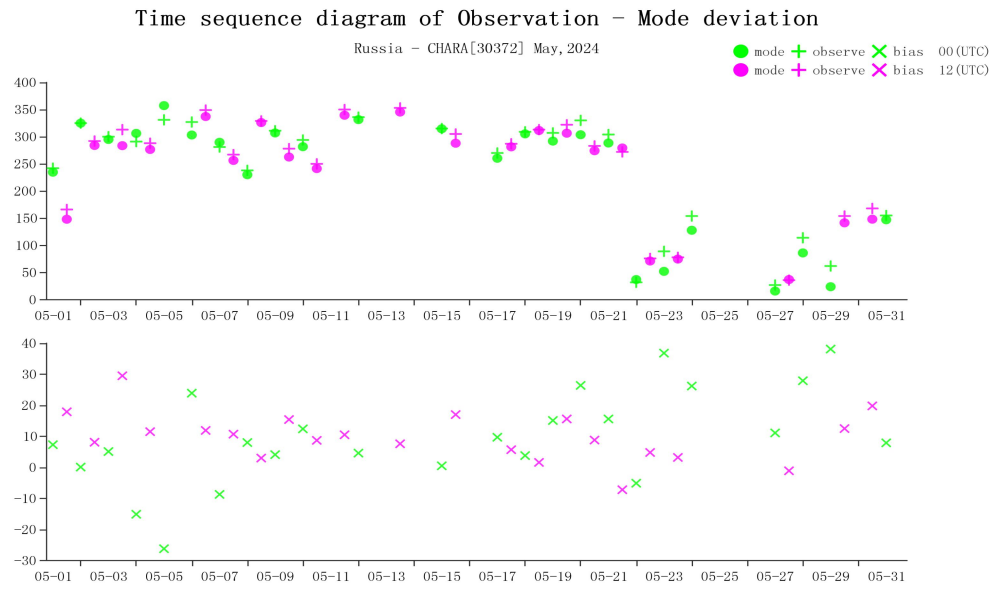
Distribution of suspect stations - Wind Direction 00 UTC



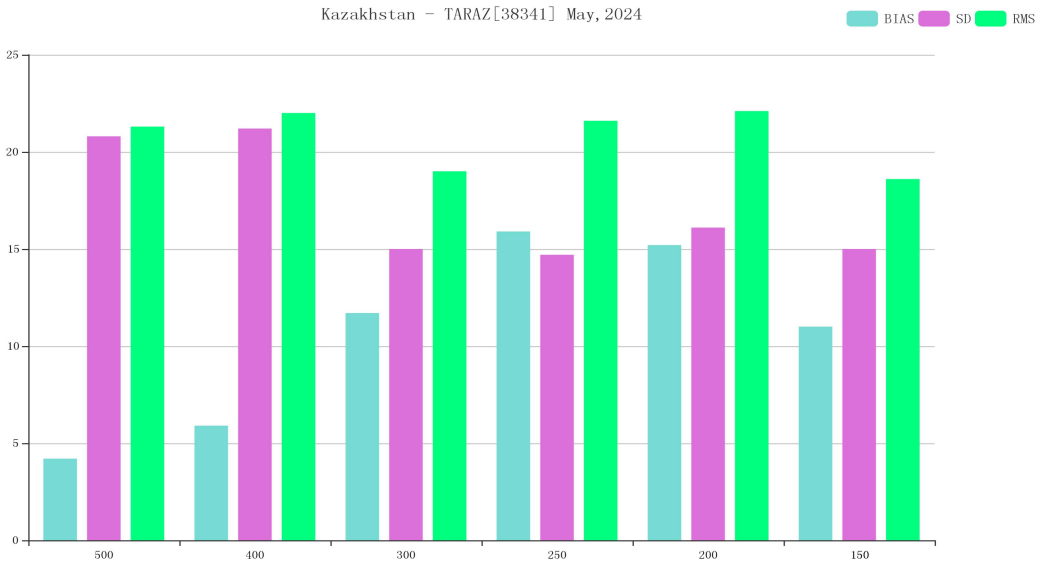
Distribution of suspect stations - Wind Direction 12 UTC



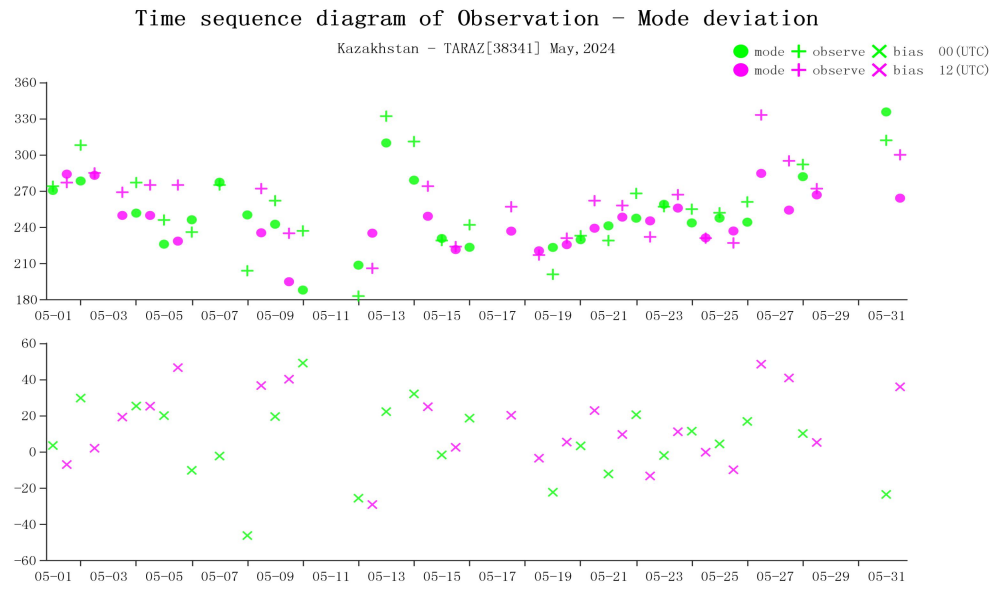
BIAS、SD and RMS of WIN_D for station 30372(OBS-TIME:12)



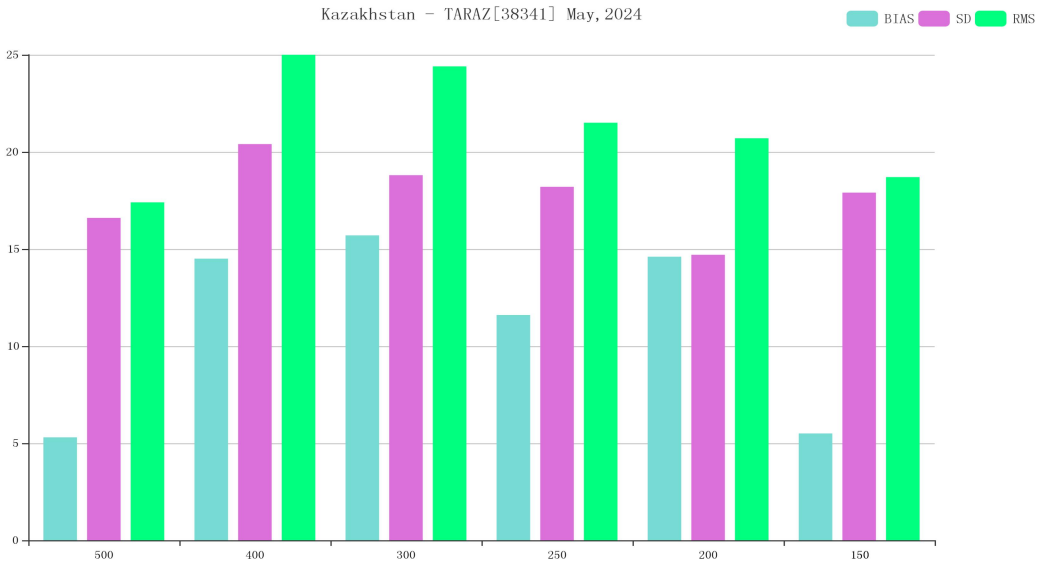
Time-series representation of WIN_D Obs minus first guess for station 30372(Level:400)



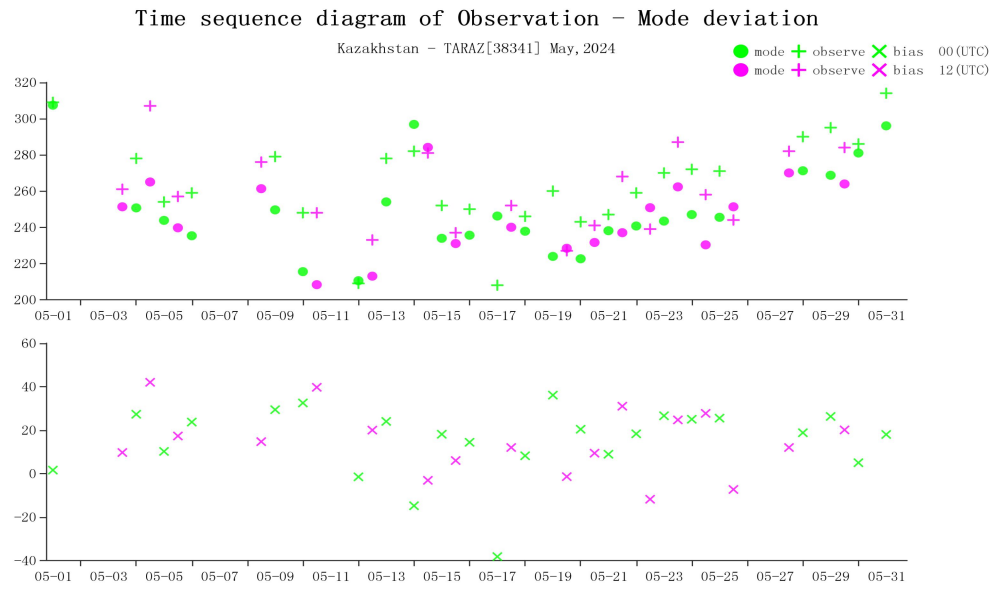
BIAS、SD and RMS of WIN_D for station 38341(OBS-TIME:00)



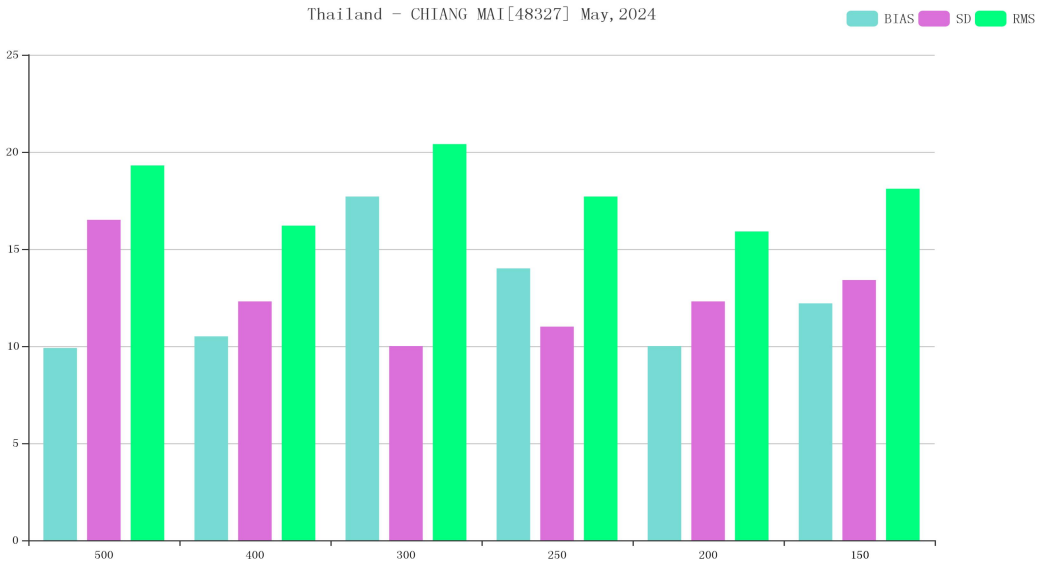
Time-series representation of WIN_D Obs minus first guess for station 38341(Level:400)



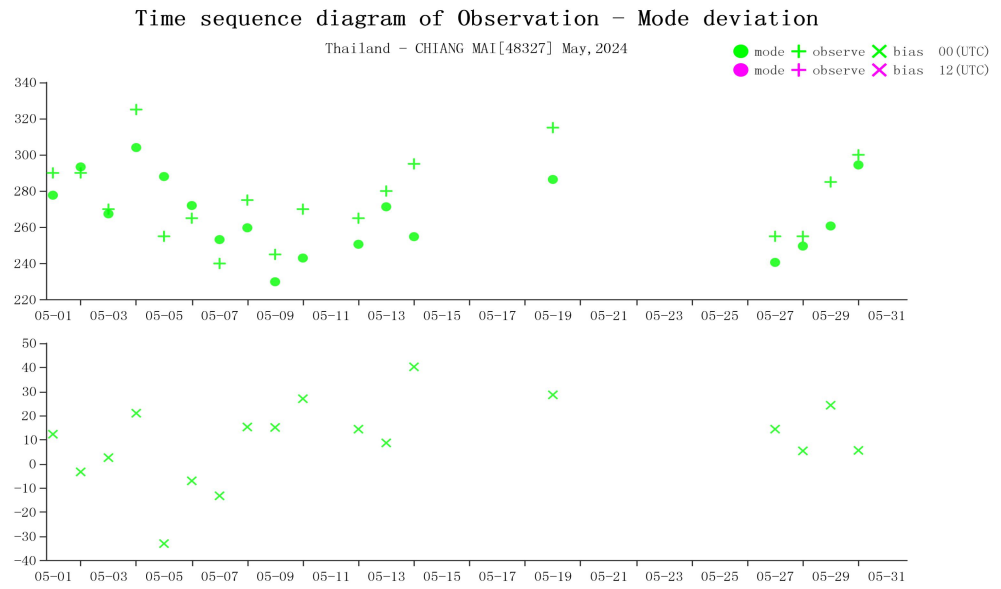
BIAS、SD and RMS of WIN_D for station 38341(OBS-TIME:12)



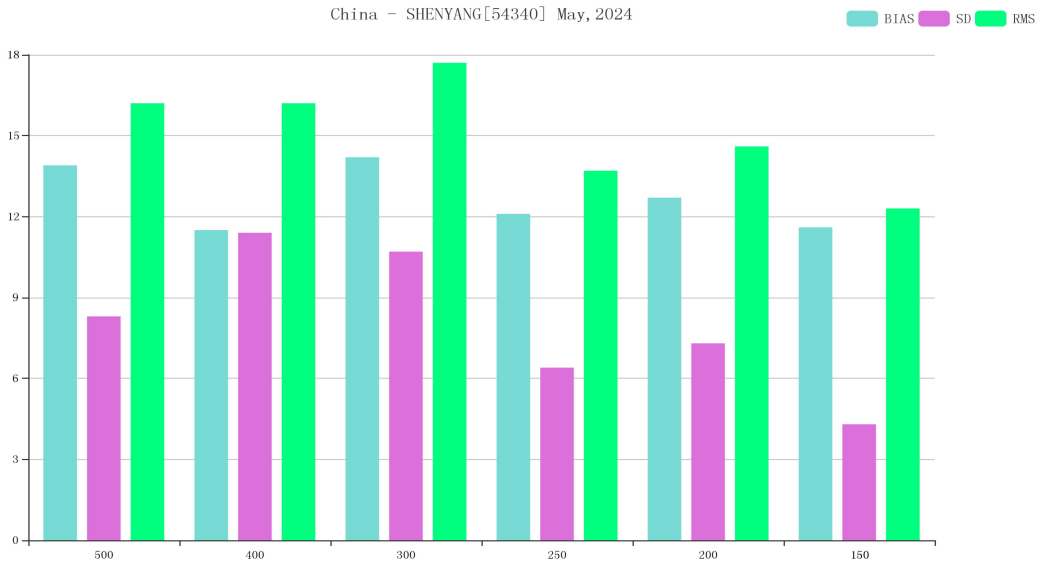
Time-series representation of WIN_D Obs minus first guess for station 38341(Level:200)



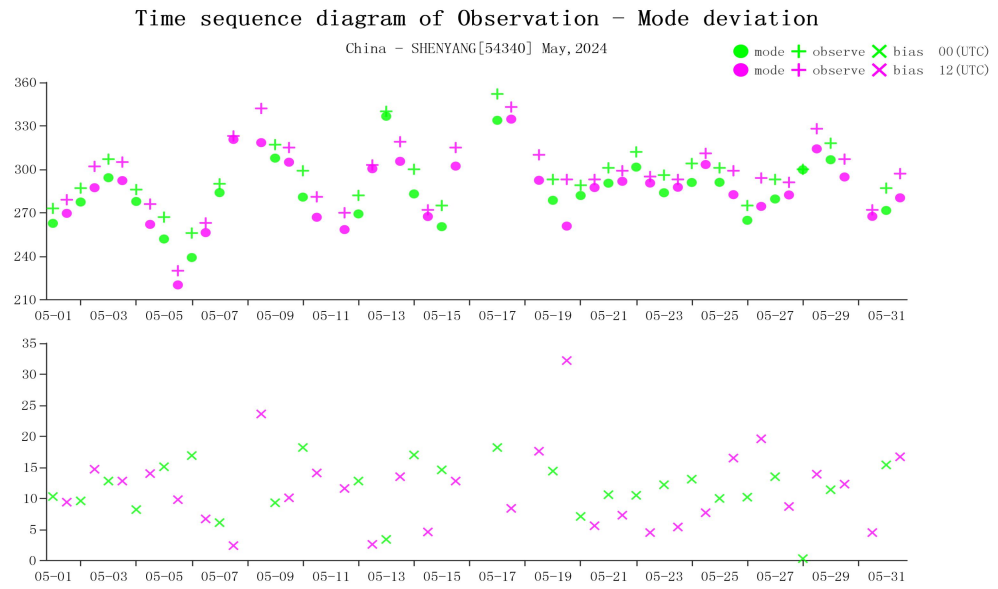
BIAS、SD and RMS of WIN_D for station 48327(OBS-TIME:00)



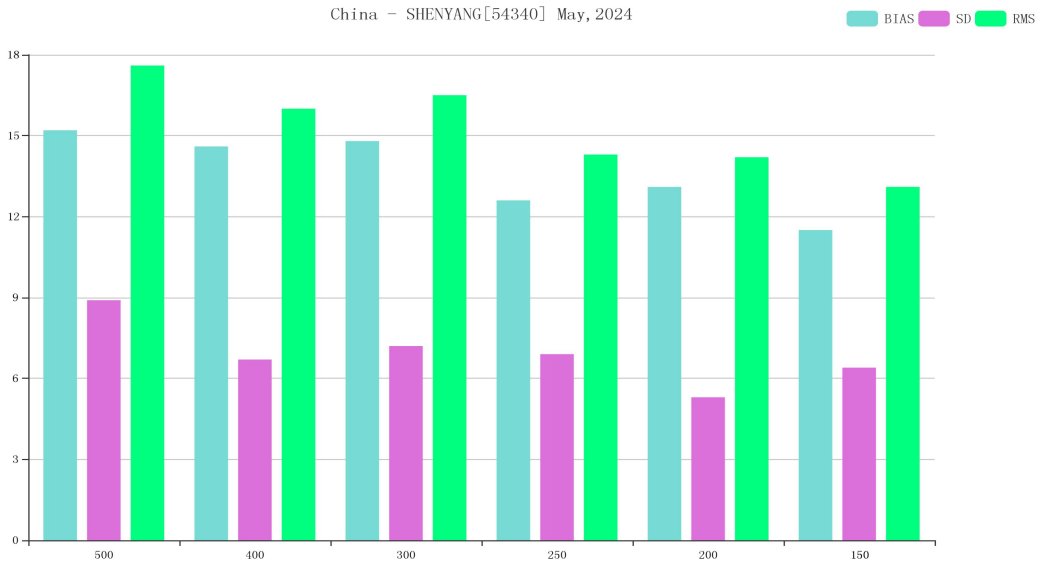
Time-series representation of WIN_D Obs minus first guess for station 48327(Level:500)



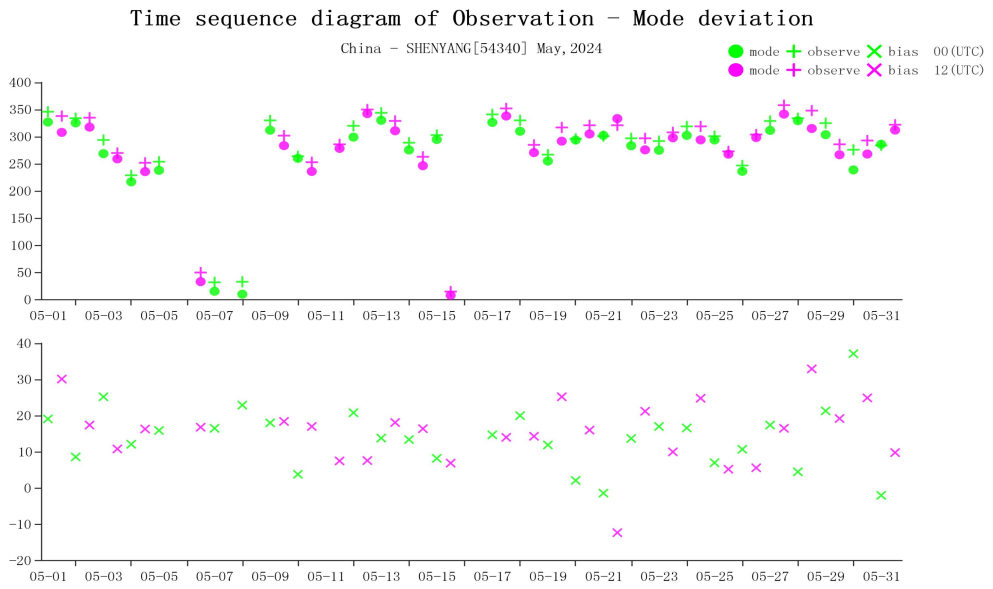
BIAS、SD and RMS of WIN_D for station 54340(OBS-TIME:00)



Time-series representation of WIN_D Obs minus first guess for station 54340(Level:150)



BIAS、SD and RMS of WIN_D for station 54340(OBS-TIME:12)



Time-series representation of WIN_D Obs minus first guess for station 54340(Level:500)

4. Comparison with Other Results

Element	CMA				JMA				EC			
	Country	Station	Level	Time	Country	Station	Level	Time	Country	Station	Level	Time
Geopotential Height	Kazakhstan	36003	30	12	Kazakhstan	36003	300	12	Kazakhstan	36003	50	12
	Kazakhstan	38341	50	00	Kazakhstan	38341	250	00	Kazakhstan	38341	500	12
	Kazakhstan	38341	70	12	Kazakhstan	38341	500	12	Kazakhstan	38341	250	00
	India	42339	700	00	India	42339	850	12	India	42339	700	12
	India	42339	30	12	India	42724	850	00	India	42867	200	12
	India	42348	250	00	India	42867	50	12	India	42874	700	12
	India	42348	100	12	India	42874	850	12	China	52533	30	00
	India	42724	850	00	India	43041	850	12	China	52533	50	12
	India	42867	30	12	India	43295	850	00	China	54374	30	00
	India	42874	500	12	India	43346	850	12	China	58027	50	00
	India	43041	300	12	China	52533	30	00				
	India	43295	400	00	China	52533	50	12				
	India	43346	700	12	China	54374	30	00				
	China	52533	30	00	China	58027	50	00				
	China	52533	30	12								
	China	54374	30	00								
	China	55591	30	12								
	China	58027	30	00								
Vector Wind	Kazakhstan	38341	250	00	Kazakhstan	36003	250	12	Kazakhstan	36003	250	12
	Kazakhstan	38341	500	12					Kazakhstan	38341	200	00
									Kazakhstan	38341	200	12
									India	42361	200	00
Wind Direction	Russia	30372		12	India	42667		00	Kazakhstan	38341		00
	Kazakhstan	38341		00	Thailand	48327		00	China	54340		12
	Kazakhstan	38341		12	China	52533		12	China	54340		00
	Thailand	48327		00	China	54340		00				
	China	54340		00	China	54340		12				
	China	54340		12								

5. Possible Causes of Remarkable Biases

The following are possible causes of remarkable and sustained biases:

(1) The radiosonde has significant error.

(2) 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.

(3) Biases are specific to the NWP model used in quality monitoring.

Technical Support

Any comments on the contents and the format of the report are welcome and should be contacted to:

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