Radiosonde-No.1-MOC-CMA(2025)

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

January 2025

Regional WIGOS Centre, Beijing

China Meteorological Administration

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Beijing, CHINA

Contents

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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 January 2025. 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 January

INDEX	STATION_CODE	STATION_NAME	COUNTRY	LAT	LON
1	40938	HERAT	Afghanistan	34.22	62.22
2	40948	KABUL AIRPORT	Afghanistan	34.55	69.22
3	43192	GOA/PANJIM	India	15.48	73.82
4	42701	M.O. RANCHI	India	23.32	85.32
5	43285	MANGALORE/PANAMBUR	India	12.95	74.83
6	42667	BHOPAL/BAIRAGHAR	India	23.28	77.35
7	43311	AMINIDIVI	India	11.12	72.73
8	42101	PATIALA	India	30.33	76.47
9	43333	PORT BLAIR	India	11.67	92.72
10	47418	KUSHIRO (47418-1)	Japan	42.95	144.44
11	40582	KUWAIT INTERNATIONAL AIRPORT (40582-1)	Kuwait	29.24	47.97
12	48042	MANDALAY	Myanmar	21.94	96.09
13	48097	YANGON	Myanmar	16.86	96.15
14	41661	QUETTA (SHEIKH MANDA)	Pakistan	30.27	66.92
15	41594	SARGODHA (41594-0)	Pakistan	32.05	72.67
16	30715	ANGARSK	Russian Federation	52.48	103.85
17	24944	OLEKMINSK (24944-1)	Russian Federation	60.37	120.42
18	25428	OMOLON	Russian Federation	65.23	160.53
19	31168	AYAN	Russian Federation	56.45	138.15

20	38836	DUSHANBE	Tajikistan	38.58	68.73
21	38954	KHOROG	Tajikistan	37.50	71.50
22	38507	TURKMENBASHI (38507-1)	Turkmenistan	40.03	52.98

The list is the stations that did not receive data from January, 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.

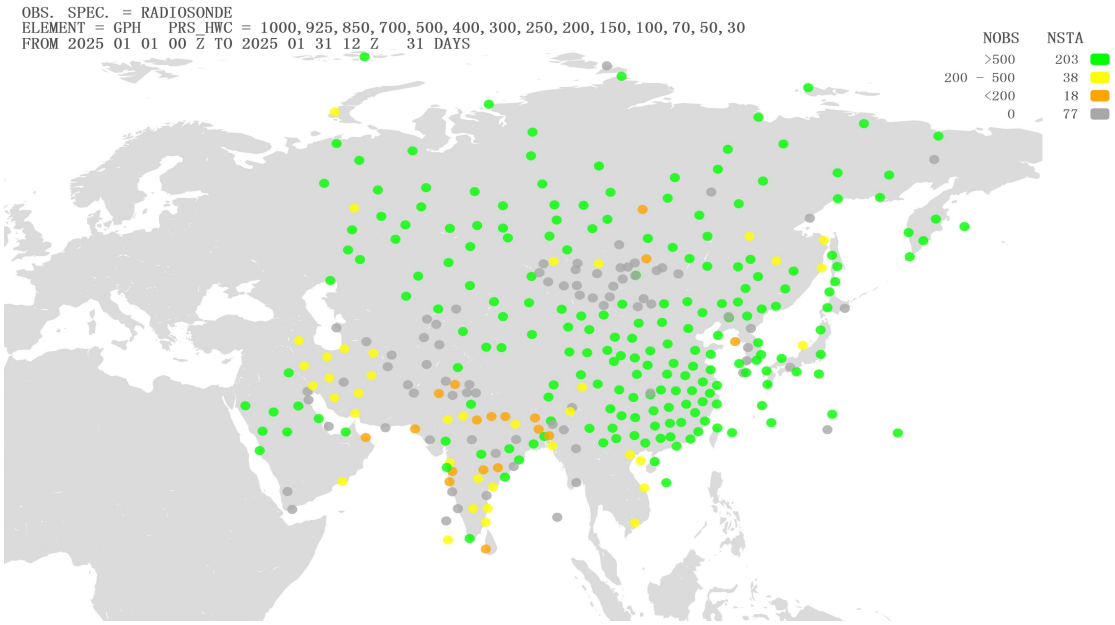
3.2 Geopotential Height (GPH)

3.2.1 List of Suspect Stations

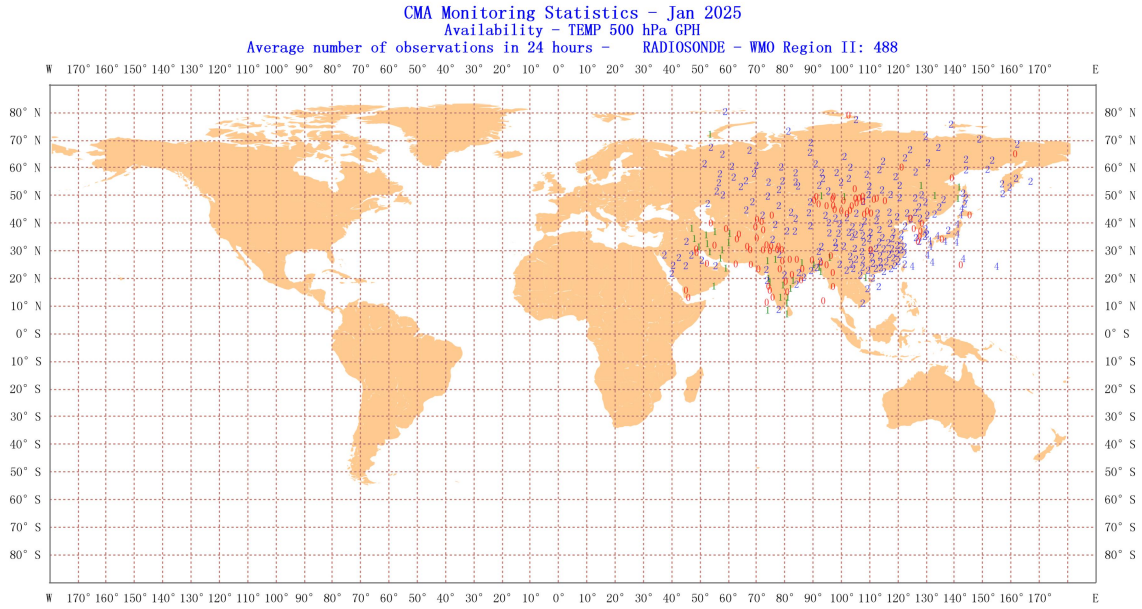
Table 2 List of GPH suspected in January 2025

INDEX	WMO IDENT	COUNTRY	OBS TIME	LEVEL	NUM OBS	NUM GRS	REJ （%）	BIAS	SD	RMS
1	32540	Russian Federation	00	70	30	0	0	15	126.3	127.2
2	32540	Russian Federation	12	50	25	2	0	38.7	142.5	147.7
3	35229	Kazakhstan	00	925	30	1	0	65.1	15.9	67
4	35229	Kazakhstan	12	925	30	1	0	67.3	19	70
5	36872	Kazakhstan	00	250	21	0	0	66.9	44.8	80.5
6	36872	Kazakhstan	12	150	21	0	0	69.6	63.4	94.1
7	38341	Kazakhstan	00	70	11	3	0	-96.5	142.1	171.7
8	38341	Kazakhstan	12	100	11	3	14.3	-55.8	128.1	139.7

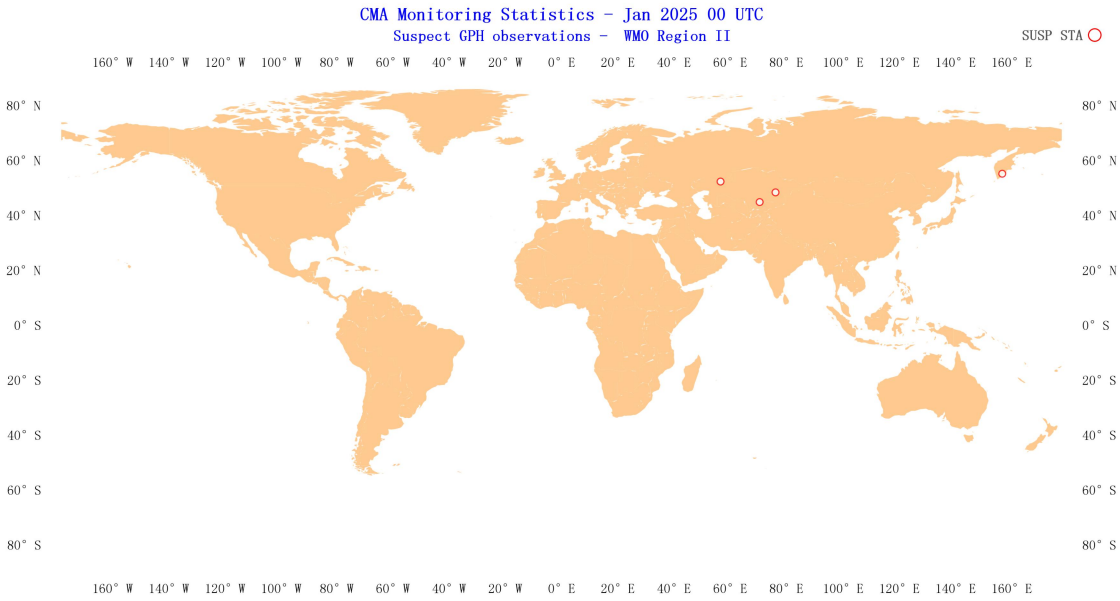
3.2.2 Suspect Station Analysis



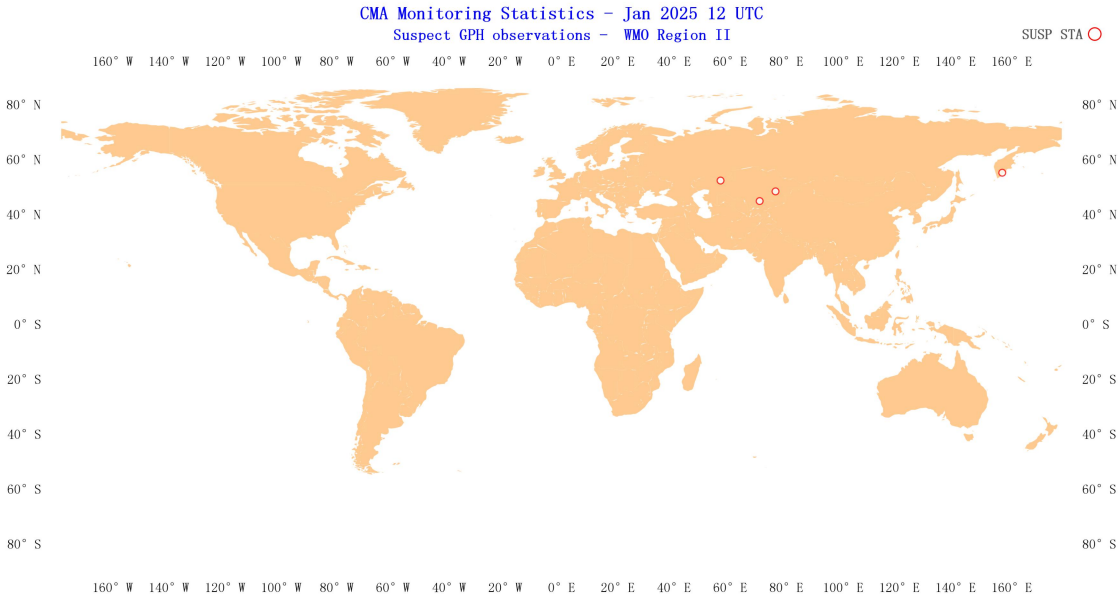
Location of all radiosonde stations reporting geopotential height observations in Region II over the month of January 2025. NOBS shows the total number of observations received at RWC-Beijing, corresponding total number of stations (NSTA) and color scale are shown at the top of the figure, color green 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.



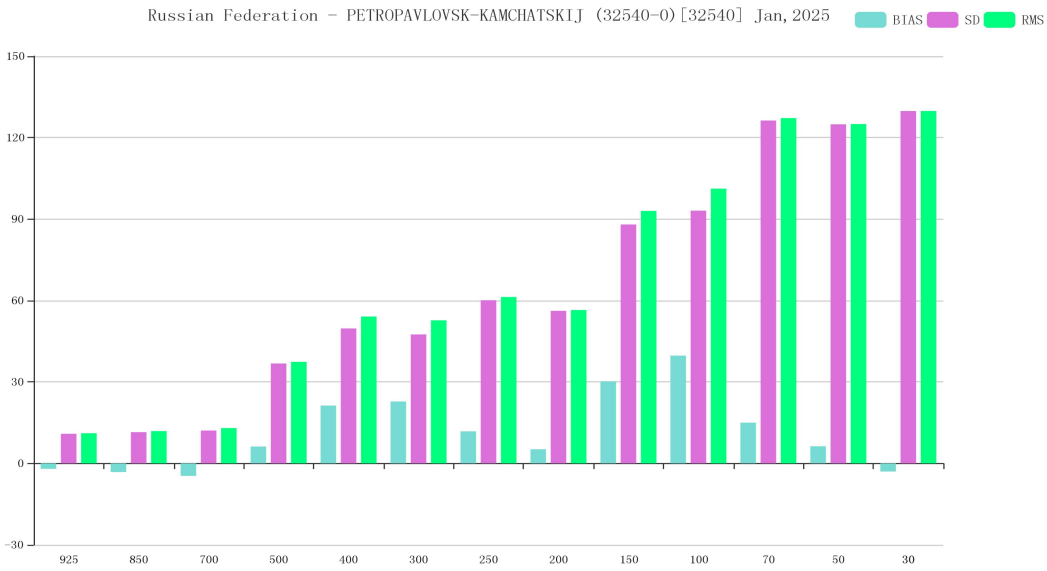
Location of all radiosonde stations reporting geopotential height average number of observations in 24 hours in Region II over the month of January 2025.



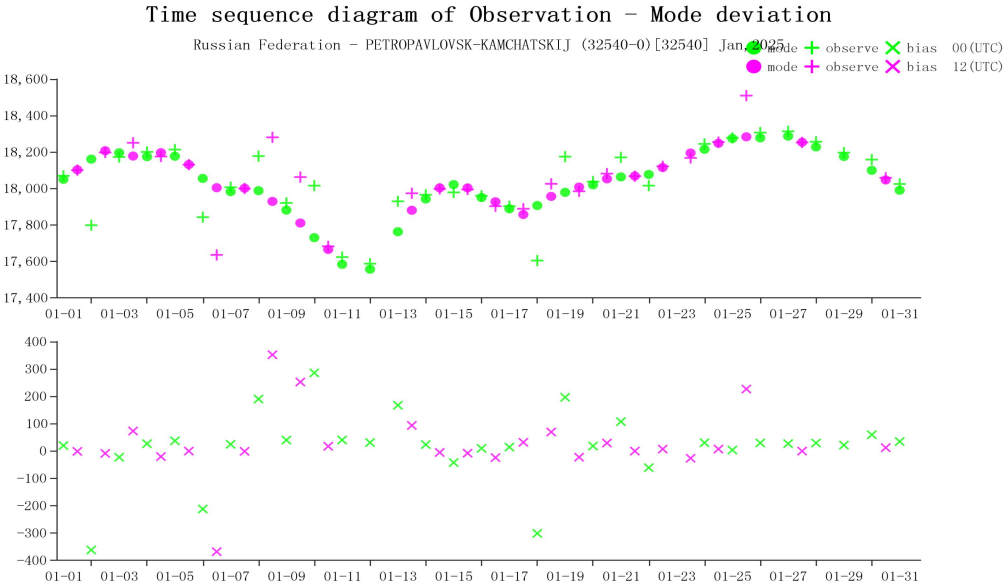
Distribution of suspect stations - Geopotential Height 00 UTC



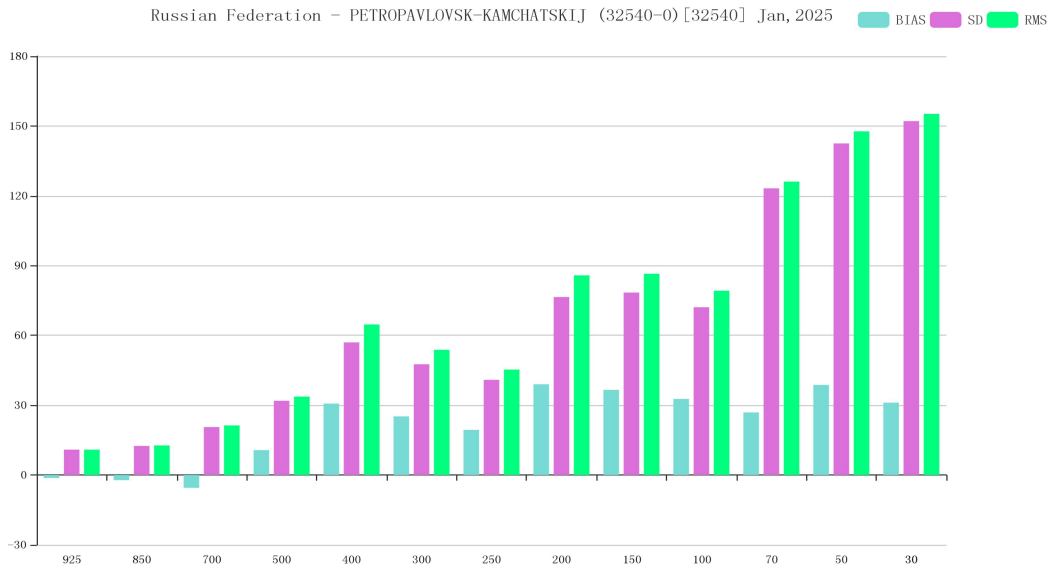
Distribution of suspect stations - Geopotential Height 12 UTC



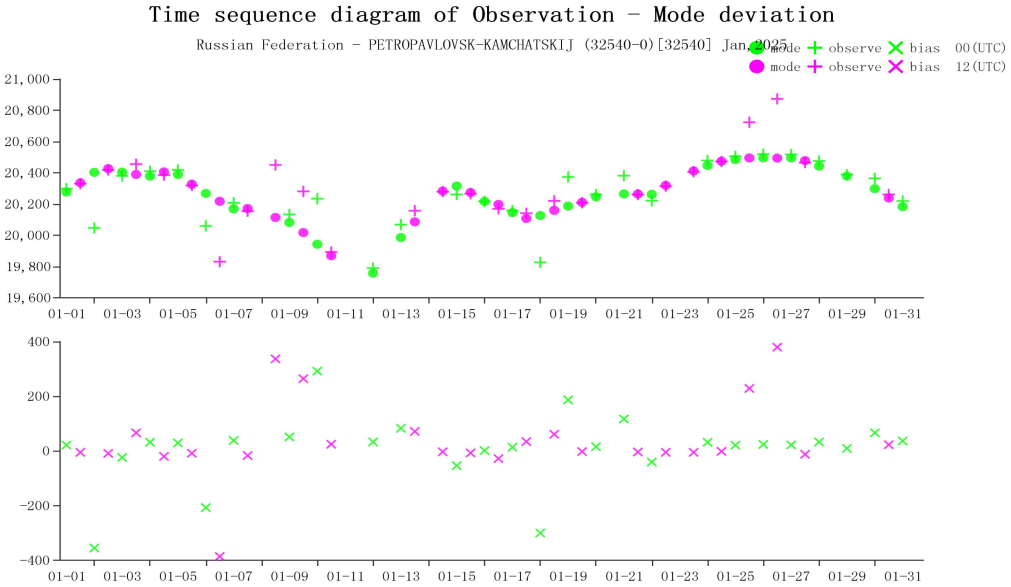
BIAS、SD and RMS of GPH for station 32540(OBS-TIME:00)



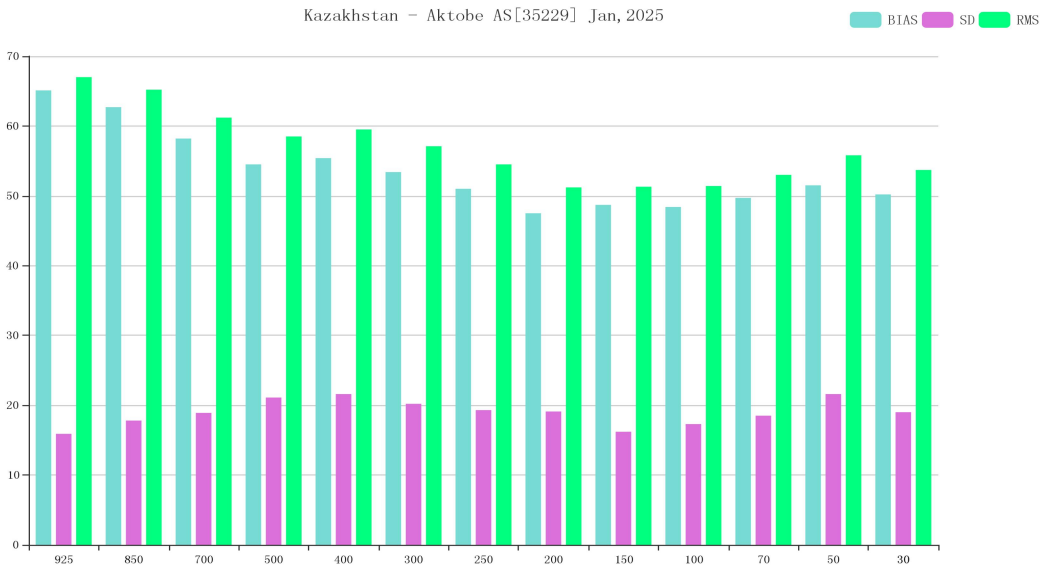
Time-series representation of GPH Obs minus first guess for station 32540(Level:70)



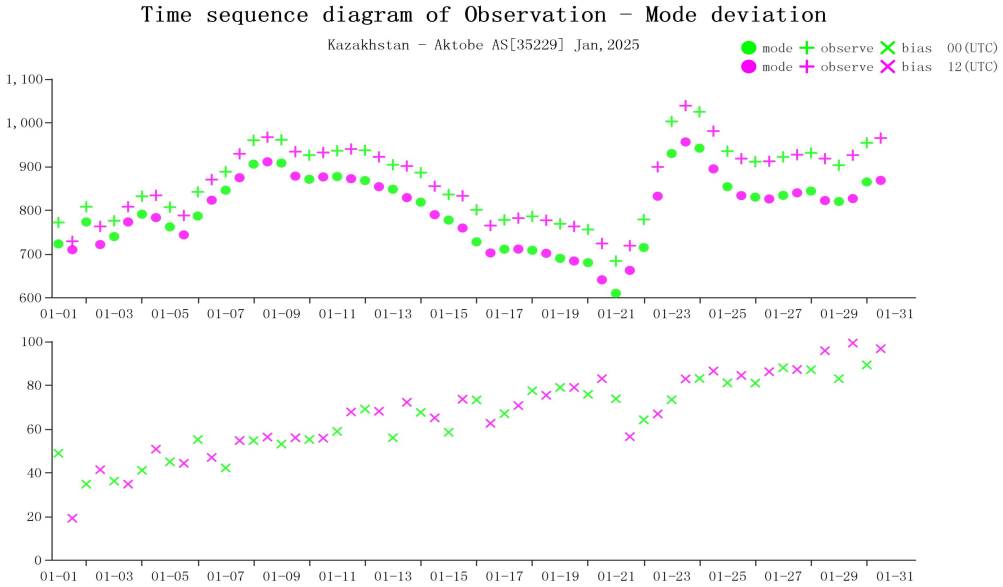
BIAS、SD and RMS of GPH for station 32540(OBS-TIME:12)



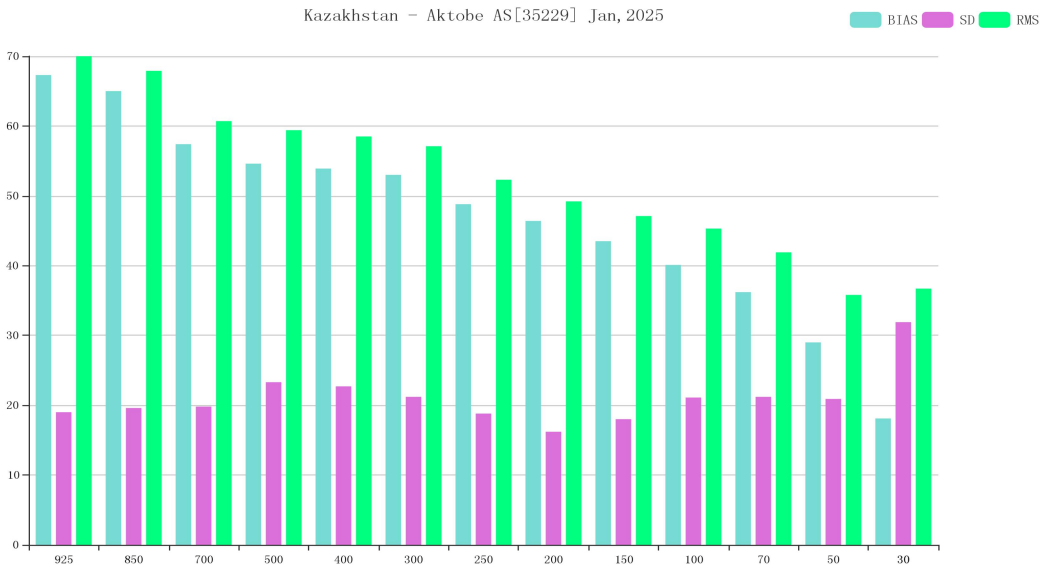
Time-series representation of GPH Obs minus first guess for station 32540(Level:50)



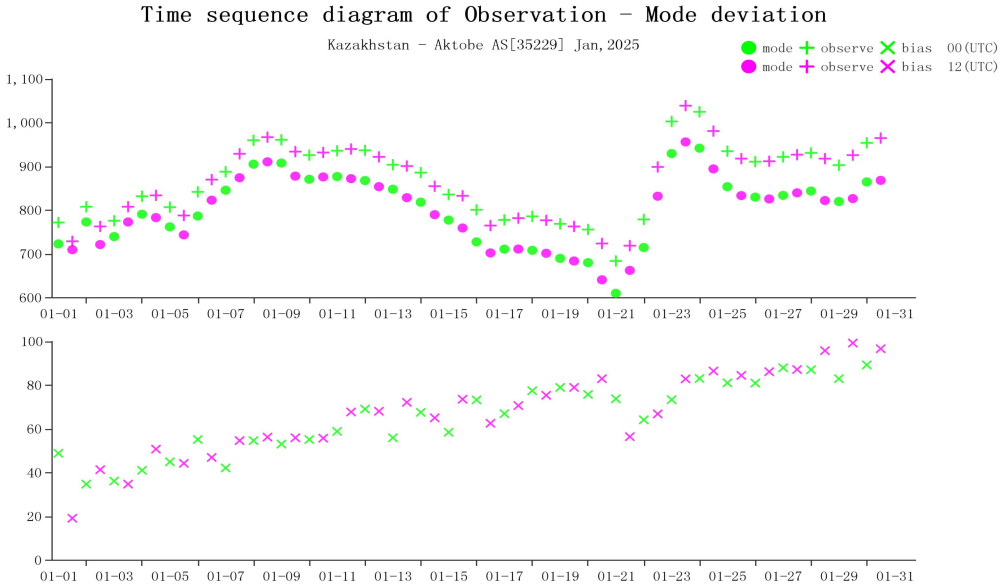
BIAS、SD and RMS of GPH for station 35229(OBS-TIME:00)



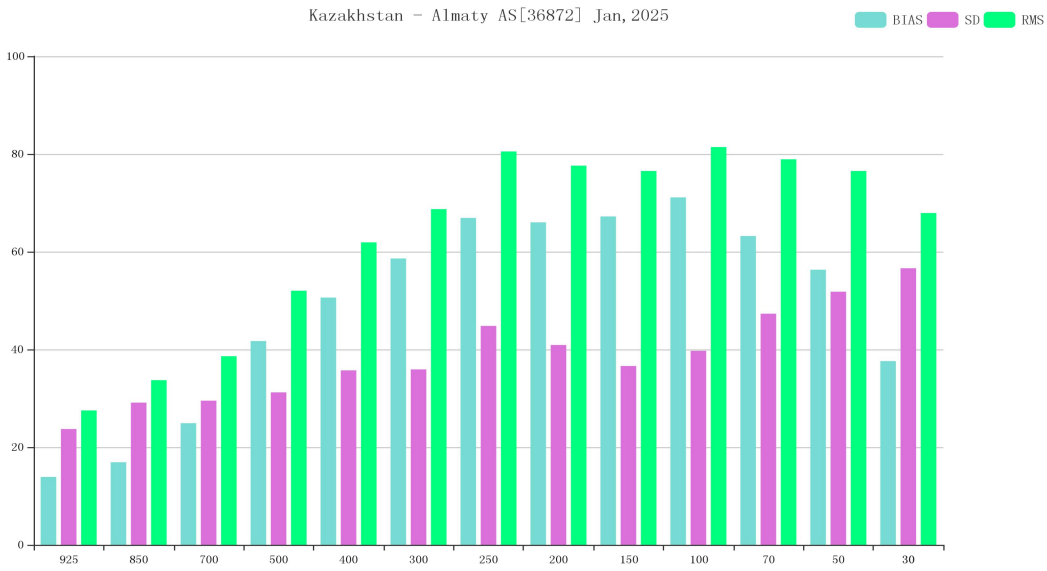
Time-series representation of GPH Obs minus first guess for station 35229(Level:925)



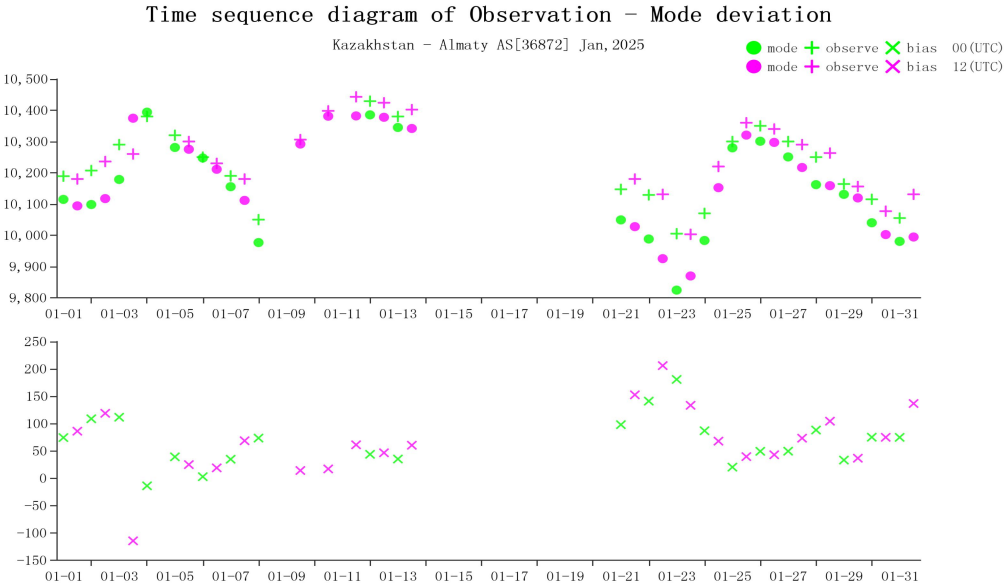
BIAS、SD and RMS of GPH for station 35229(OBS-TIME:12)



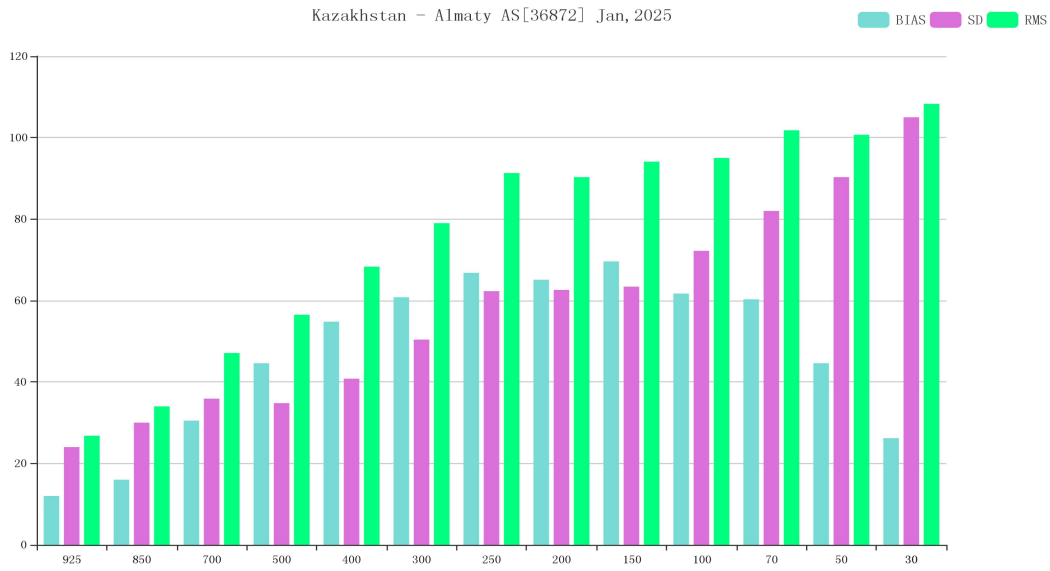
Time-series representation of GPH Obs minus first guess for station 35229(Level:925)



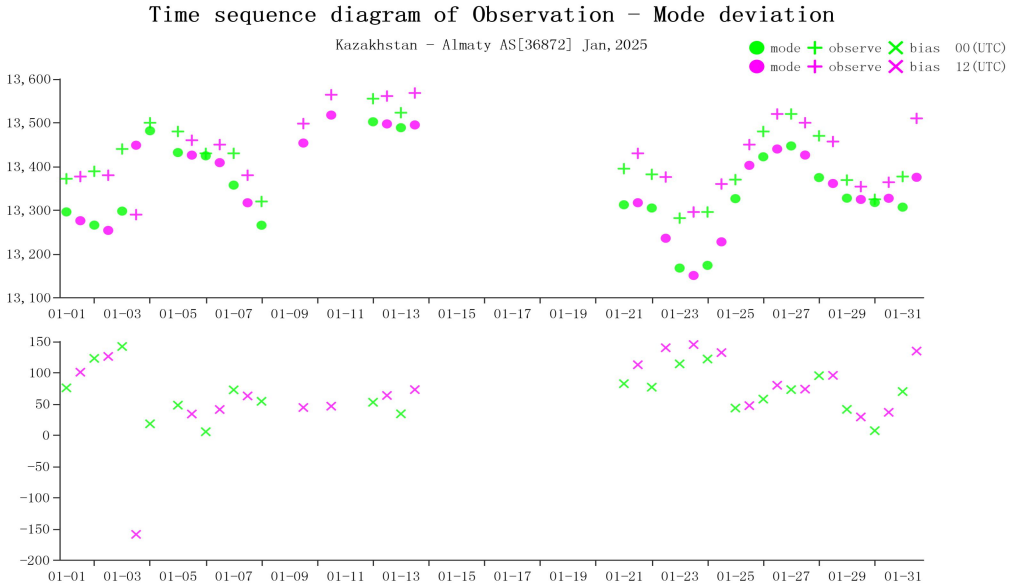
BIAS、SD and RMS of GPH for station 36872(OBS-TIME:00)



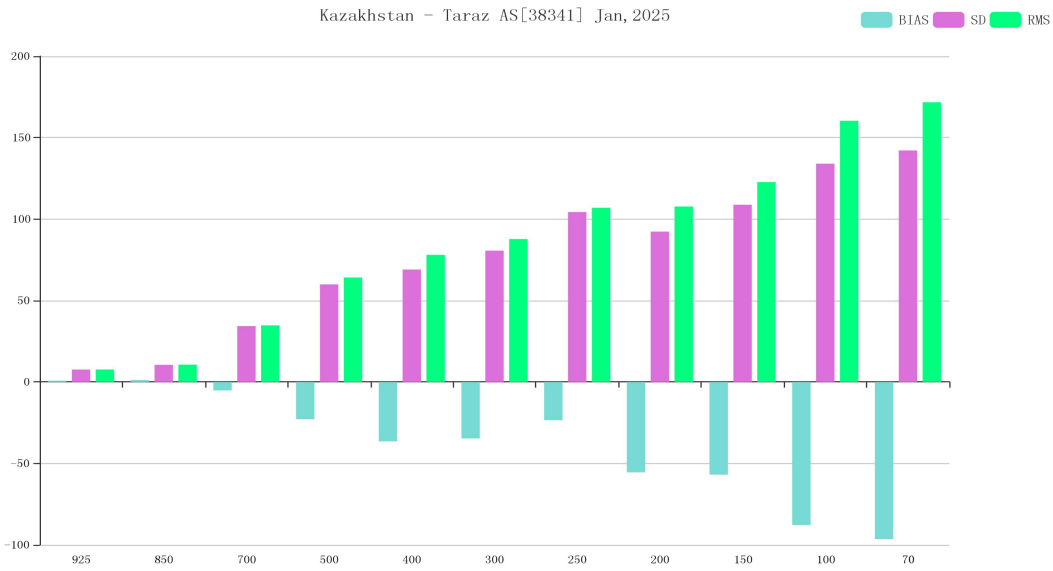
Time-series representation of GPH Obs minus first guess for station 36872(Level:250)



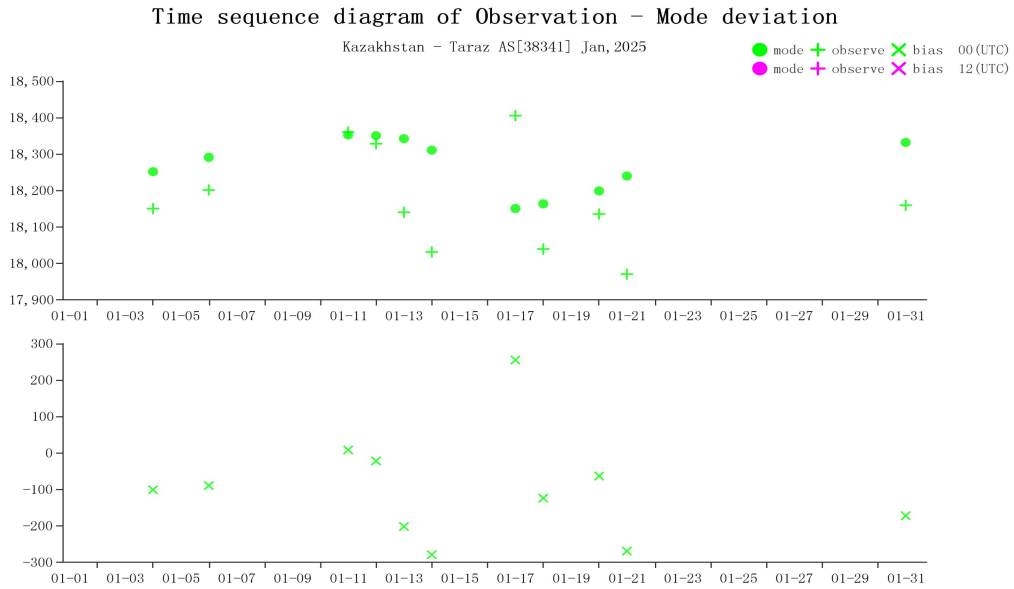
BIAS、SD and RMS of GPH for station 36872(OBS-TIME:12)



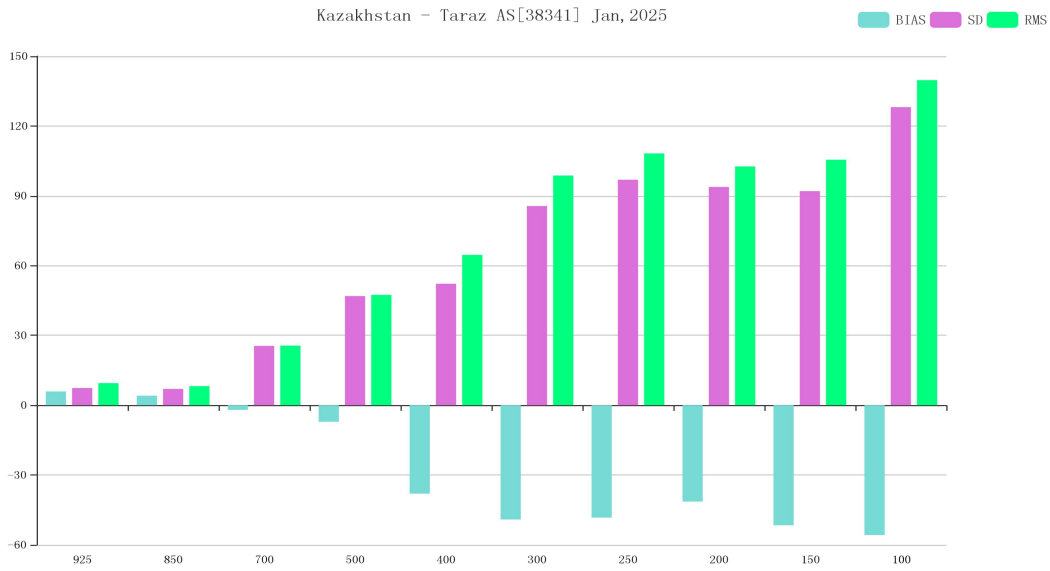
Time-series representation of GPH Obs minus first guess for station 36872(Level:150)



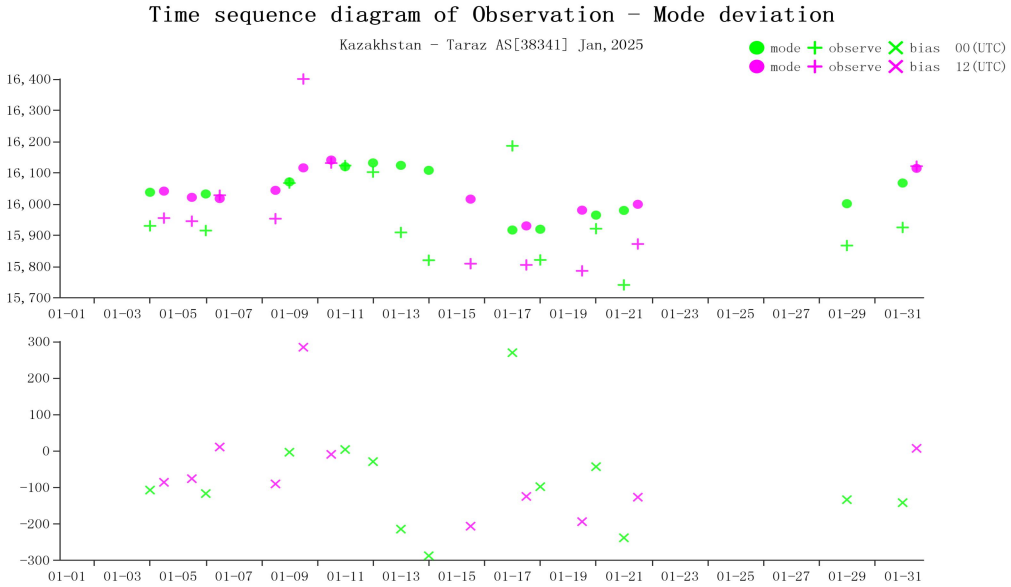
BIAS、SD and RMS of GPH for station 38341(OBS-TIME:00)



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



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:100)

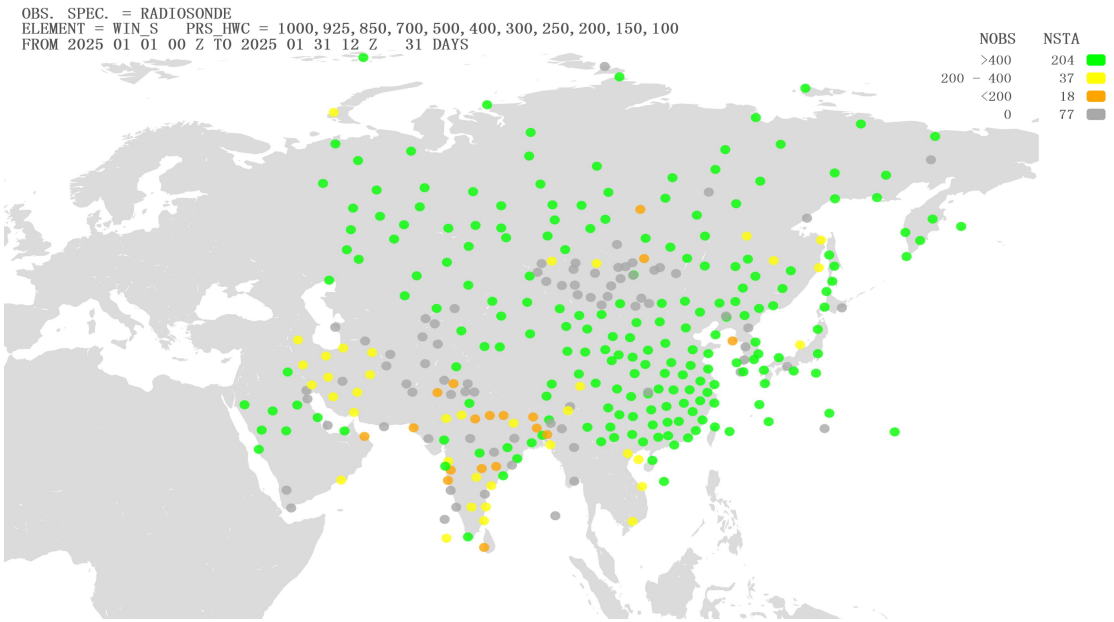
3.3 Vector Wind (WIN_S)

3.3.1 List of Suspect Stations

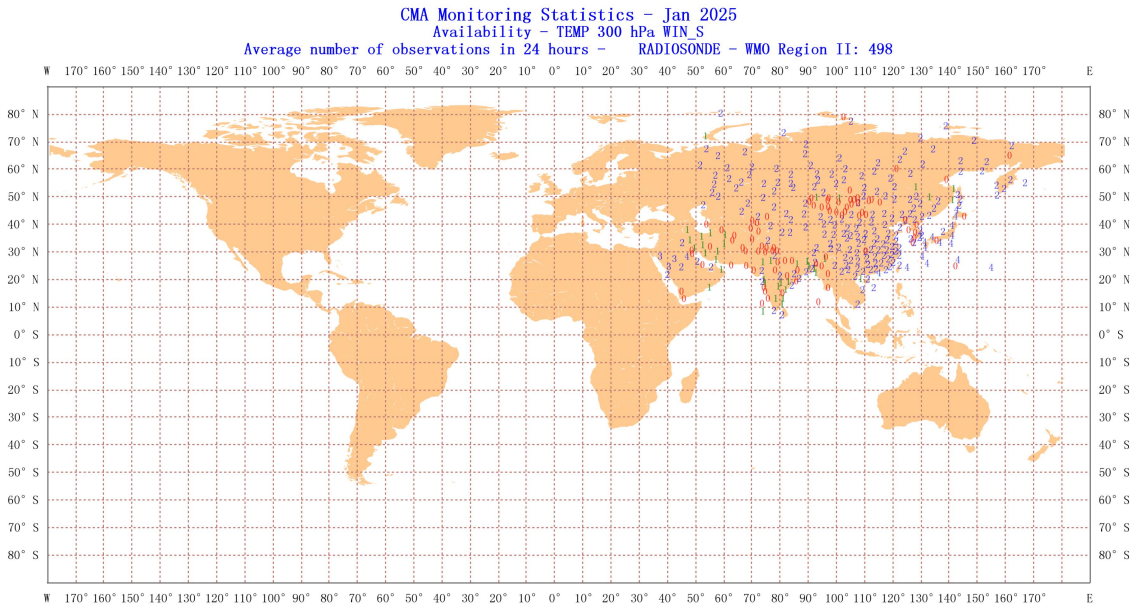
Table 3 List of WIN_S suspected in January 2025

INDEX	WMO IDENT	COUNTRY	OBS TIME	LEVEL	NUM OBS	NUM GRS	REJ （%）	BIAS	SD	RMS
1	38341	Kazakhstan	12	250	22	0	0	10.5	14.2	17.6

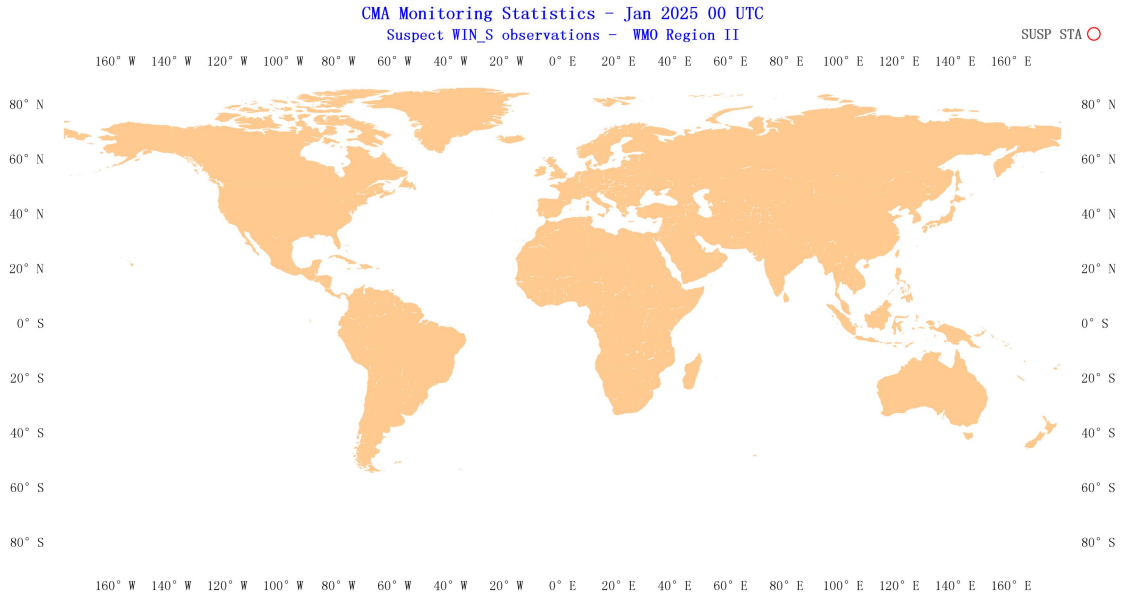
3.3.2 Suspect Station Analysis



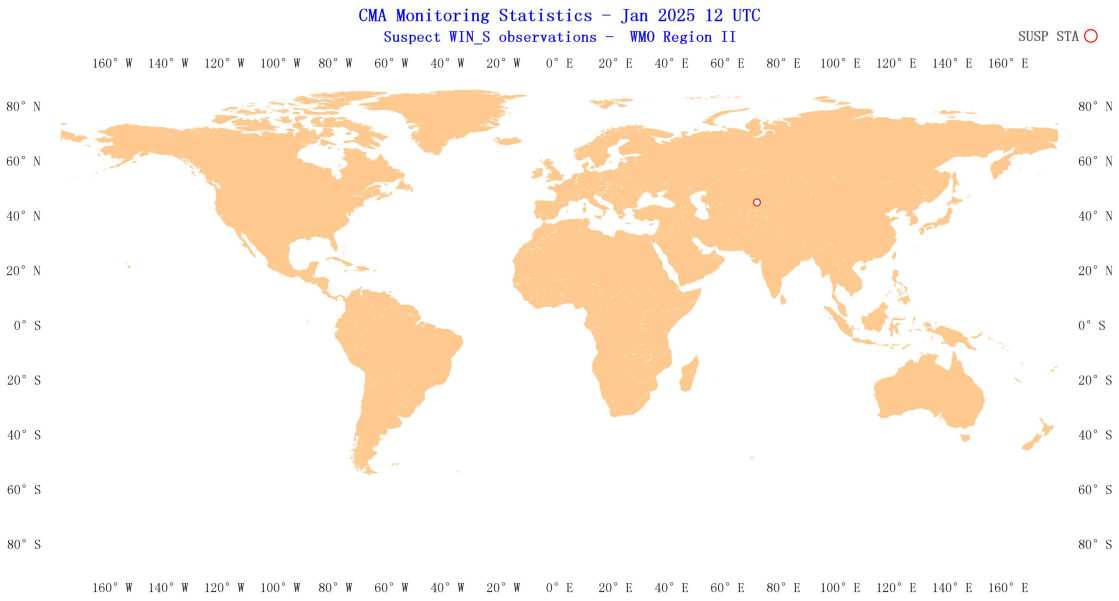
Location of all radiosonde stations reporting vector wind observations in Region II over the month of January 2025. NOBS shows the total number of observations received at RWC-Beijing, corresponding total number of stations (NSTA) and color scale are shown at the top of the figure, color green refers 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.



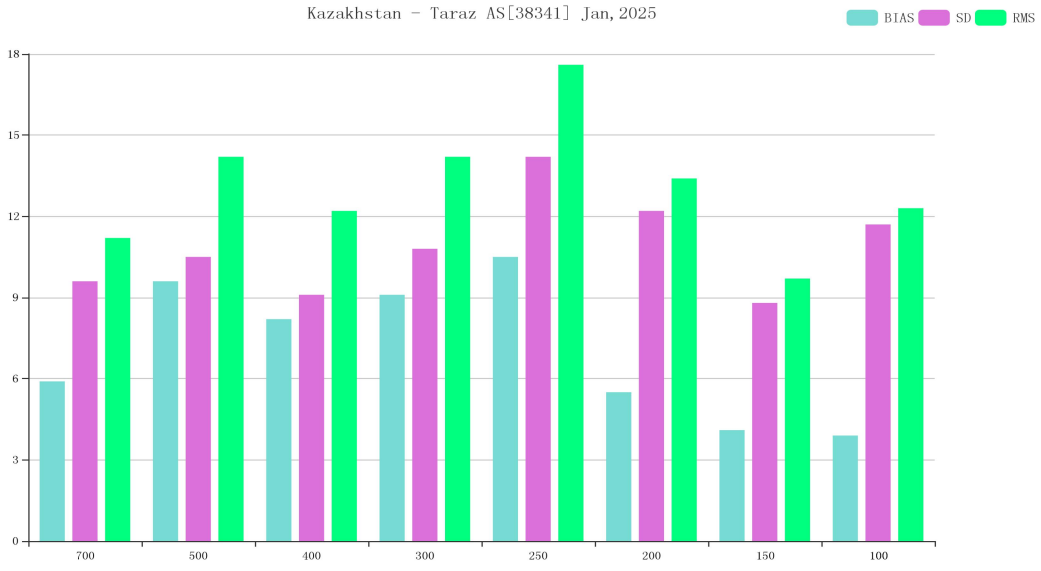
Location of all radiosonde stations reporting vector wind average number of observations in 24 hours in Region II over the month of January 2025.



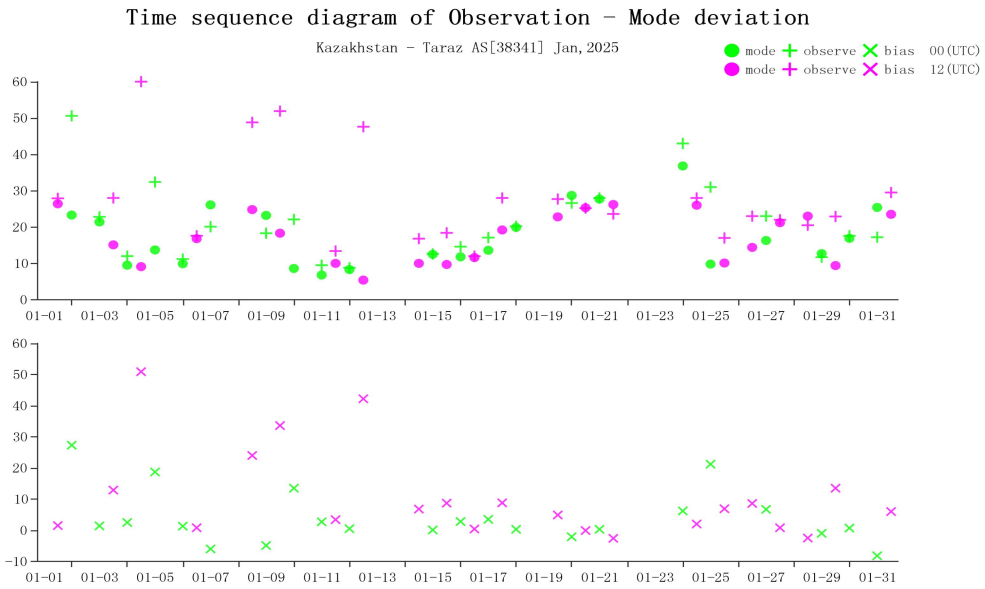
Distribution of suspect stations - Vector Wind 00 UTC



Distribution of suspect stations - Vector Wind 12 UTC



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



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

3.4 Wind Direction (WIN_D)

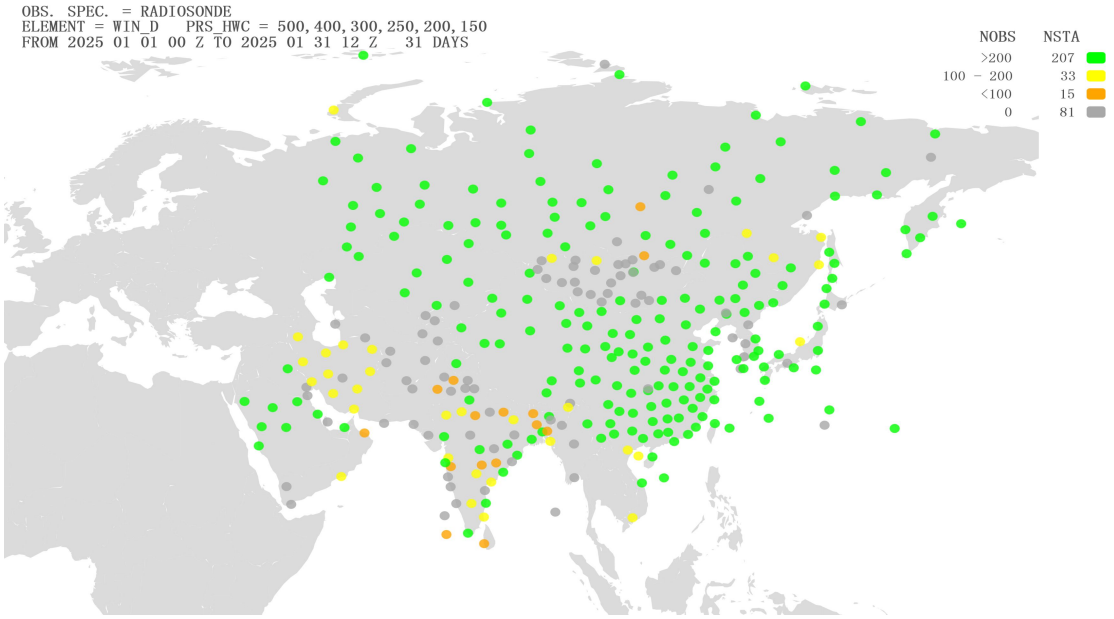
3.4.1 List of Suspect Stations

Table 4 List of WIN_D suspected in January 2025

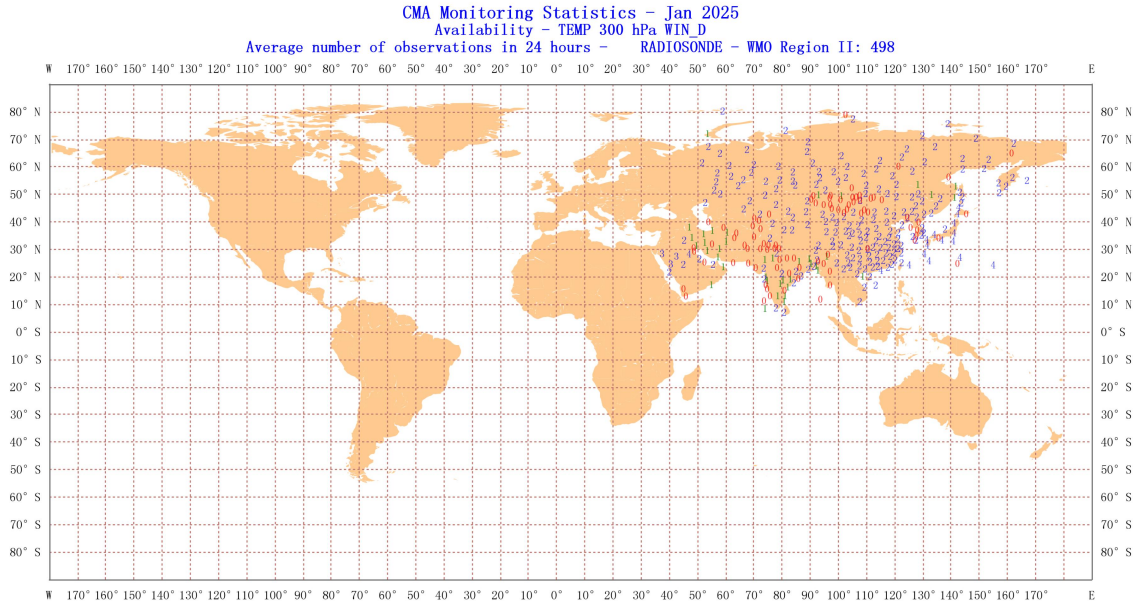
INDEX	WMO IDENT	COUNTRY	OBS TIME	NUM OBS	BIAS	SD	MAX SPREAD

No suspect station this month.

3.4.2 Suspect Station Analysis



Location of all radiosonde stations reporting wind direction observations in Region II over the month of January 2025. 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 January 2025.

4. Comparison with Other Results

Element	CMA				EC			
	Country	Station	Time	Level	Country	Station	Time	Level
Geopotential Height	Russian Federation	32540	00	70	Russian Federation	23933	12	300
	Russian Federation	32540	12	50	Russian Federation	23933	00	300
	Kazakhstan	35229	00	925	Russian Federation	25403	12	300
	Kazakhstan	35229	12	925	Russian Federation	25403	00	250
	Kazakhstan	36872	00	250	Russian Federation	32540	00	70
	Kazakhstan	36872	12	150	Russian Federation	32540	12	400
	Kazakhstan	38341	00	70	Kazakhstan	35229	12	1000
	Kazakhstan	38341	12	100	Kazakhstan	35229	00	1000
					Kazakhstan	38341	12	300
					Kazakhstan	38341	00	100
Vector Wind	Kazakhstan	38341	12	250	Kazakhstan	38341	00	200
					Kazakhstan	38341	12	200
Wind Direction					China	51463	12	
					China	51463	00	
					China	54340	00	
					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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Shi Lijuan (Ms.), Qin Shiguang (Mr.)

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