



NMRF/OR/01/2024



सत्यमेव जयते

OBSERVATION REPORT

**NCMRWF
MONTHLY DATA
MONITORING REPORT**

January 2024

* Permission to quote from this report should be obtained from Head, NCMRWF.

**National Centre for Medium Range Weather Forecasting
Ministry of Earth Sciences, Government of India
A-50, Sector-62, NOIDA-201309, INDIA**

CONTENTS

	Page
1. Introduction	3
2. NCMRWF Monitoring Statistics	4
3. Explanatory note on tables and figures	5
4. Table-1 : Results of Complex Quality Control of Radiosonde	7
5. Table-2 : Total Upper Air Data Reports	8
6. Table-3a : 100 hPa Geo-potential Height Increments for 00z	9
7. Table-3b : 100 hPa Geo-potential Height Increments for 12z	10
8. Table-4a : 500 hPa Geo-potential Height Increments for 00z	11
9. Table-4b : 500 hPa Geo-potential Height Increments for 12z	12
10. Table-5a : 100 hPa Dry Temperature Increments for 00z	13
11. Table-5b : 100 hPa Dry Temperature Increments for 12z	14
12. Table-6a : 500 hPa Dry Temperature Increments for 00z	15
13. Table-6b : 500 hPa Dry Temperature Increments for 12z	16
14. Table-7a : 100 hPa Zonal Wind Increments for 00z	17
15. Table-7b : 100 hPa Zonal Wind Increments for 12z	18
16. Table-8a : 500 hPa Zonal Wind Increments for 00z	20
17. Table-8b : 500 hPa Zonal Wind Increments for 12z	21
18. Table-9a : 100 hPa Meridional Wind Increments for 00z	22
19. Table-9b : 100 hPa Meridional Wind Increments for 12z	23
20. Table-10a: 500 hPa Meridional Wind Increments for 00z	24
21. Table-10b: 500 hPa Meridional Wind Increments for 12z	25
22. Global Charts for Seven Types of Observations	
i) SYNOP Pressure	Fig 1.1
ii) TEMP 500 hPa Geopotential	Fig 1.2
iii)TEMP/PILOT 300 hPa Wind	Fig 1.3
iv) AIRCRAFT Winds 150-300 hPa	Fig 1.4
v) NOAA-18 ATOVS : AMSU-A	Fig 1.5
vi) AMV Winds 400-150 hPa	Fig 1.6(a)
vii) AMV Winds 1000-700 hPa	Fig 1.6(b)
viii) Buoy Pressure	Fig 1.7
23. AMV WINDS (Mean Observed): 700 - 1000 hPa	Fig 2.1
24. AMV WINDS (Wind Bias): 700 - 1000 hPa	Fig 2.2
25. AMV WINDS (Mean Observed): 150 - 400 hPa	Fig 2.3
26. AMV WINDS (Wind Bias): 150 - 400 hPa	Fig 2.4
27. Doppler Weather Radar (DWR) Data Monitoring at NCMRWF	38

1. INTRODUCTION

As a monthly publication, the NCMRWF Data Monitoring Report presents a general view of the data availability for the whole month. Data produced by the Global Observation System, transmitted through the Global Telecommunication System (GTS) are received by the India Meteorological Department (IMD) at New Delhi is relayed to the NCMRWF data processing system. This report consists of the results of monitoring of all the data received at NCMRWF within the global data assimilation cycle cut-off period (~4 hours). Besides quantity monitoring, the report also presents results of quality monitoring for the Indian sub-continent (blocks 42 and 43) RSRW Data.

Objective monitoring of the quality of the data (for blocks 42 and 43 only) is undertaken by NCMRWF as a monthly activity. Tables are prepared following the Commission for Basic System (CBS) recommended format so that the monitoring results can be readily compared with those from other meteorological centers. This is an important task, because frequent comparisons of this kind are absolutely necessary for the improvement of the quality of the Tropical data.

Following the established procedure at other major weather forecasting centers, the first guesses produced by the Global Data Assimilation System (GDAS) (NGFS) have been used in determining data quality. This approach assumes a very accurate first guess, which is not necessarily valid in data sparse regions like the tropics and also due to the model systematic errors. As a result the quality monitoring of tropical data is a difficult task and any judgement has to be arrived carefully.

Comments and Suggestions are welcome and should be send to:
Director, NCMRWF
Ministry of Earth Sciences,
A-50, Sector-62,
NOIDA (U.P.) - 201 309, INDIA.

2. NCMRWF MONITORING STATISTICS

Availability (global) and data quality (for WMO blocks 42 and 43 only) are presented in figures and tables, of which only a brief descriptions are given below.

Data Availability (Monthly average of Global Observations)

Figures 1.1 - 1.7 are global charts for all seven types of observations, received at NCMRWF. Each number is the average for 24 hours, over all observations of the particular type received in a 5-degree box.

Figure	Observation Type	Parameter	Level/Layer
1.1	SYNOP/SHIP	MSL Pressure	Surface
1.2	TEMP	Geo-potential	500 hPa
1.3	TEMP/PILOT	Wind	300 hPa
1.4	AIRCRAFT	Wind	300 to 150 hPa
1.5	Satellite Sounding	Radiance	All
1.6	Atmospheric Motion Vector Wind		400-150 hPa 1000-700 hPa
1.7	BUOY	MSL Pressure	Surface

The monthly mean observed satellite wind (low (700 - 1000 hPa) and (high (150 - 400)) and the wind bias (observation - first guess) are shown in figures 2.1, 2.2, 2.3 and 2.4.

Data Availability (Number of Daily Reports)

Figures 3.1 - 3.7 are bar diagrams for all seven types of observations received at NCMRWF. Each figure represents number of observations of the particular type for each of the month.

Figure	Observation Type
3.1	SYNOP
3.2	TEMP
3.3	PILOT
3.4	AIRCRAFT
3.5	Satellite Radiance
3.6	AMV Wind
3.7	BUOY

3. EXPLANATORY NOTE ON TABLES AND FIGURES

General

The material presented in this report is based on the data received by the IMD and relayed to NCMRWF. Analysis is performed for all the four synoptic hours (0000, 0006, 0012 and 0018 z) and, therefore the assimilation cycle of NGFS is run four times to produce the first-guess (six hour forecast) for the analysis step.

Data Availability

The average number of reports of each type received per day in a 5-degree square box and rounded off to the nearest integer is indicated for the whole globe (Figures 1.1 - 1.7). Four such numbers are actually displayed inside a 10-degree box for convenience. The integer 0 means that the average number of observations in the smaller box was less than 0.5. If no observations was received at all in the smaller box, then no number is printed for that smaller box.

Bar diagrams for the number of daily reports of a particular type received at NCMRWF are shown in Figures 3.1 to 3.7. This is important in monitoring the steadiness of the reception rate. It can be seen that on some days the number of reports received fall off drastically. In most of the cases they are traced to computer problems at the data reception centre.

Monitoring of Global Radiosonde Reports (Land) is based on the results of quality control steps within NGFS data assimilation cycle.

Table 1 presents the total number of land radiosonde reports received for the month (0000 and 0012 z) (WMO blocks 42 and 43), the number of hydrostatic errors detected in these reports by the CQC and the percent of corrections performed that are confident corrections.

Indian Data Frequency

Table 2 shows the number of times an upper air station within WMO blocks 42 or 43 reported in this month. The lists of stations are in accordance with the latest WMO directory. The numbers for 0000, 0006, 0012, and 0018 z are listed in separate columns. All stations that are expected to report are listed including those stations, which never report even once during the whole month. It is seen that there are variations in reporting frequencies.

Indian Data Quality

Tables 3-10 represent the results of quality monitoring statistics carried out at NCMRWF for the upper air stations under the WMO blocks 42 and 43 only. The conventional procedure is followed, which is that of first computing the normalized magnitude of the observation minus first guess interpolated to the observation point (the residual) and then comparing this value against a preset limit as well as checking the consistency of this value against similar values in the neighbourhood. The rationale of this approach is based on the work of A. Hollingsworth et al., Monthly Weather Review, Vol.114, No.5, May 1986, where the authors demonstrated the ability of modern data assimilation system to monitor the quality of an observational network. However, in the tropics these results have to be accepted with caution for two reasons:

- (1) As mentioned before, the above procedure assumed high quality first guess which is not guaranteed in data sparse area like the tropics.
- (2) Since small scale features like convection play a dominant role in the tropical atmosphere, sometimes there might be mismatch between this scale and that of the first guess which is determined by the forecast model.

Tables 3a and 3b present the number of observations received (count), rejection by the analysis (in percentage), standard deviation, total bias and root mean square error for the 100 hPa geopotential heights for 0000 and 0012 z respectively in units of meter. Tables 4a and 4b are the similar tables for 500 hPa geopotential heights. Tables 5a and 5b present similar results for 100 hPa dry temperatures and tables 6a and 6b present similar results for 500 hPa dry temperatures in units of kelvin. Tables 7a and 7b show similar results for 100 hPa zonal winds, and tables 8a and 8b similar results for 500 hPa zonal winds in units of m/s. Tables 9a and 9b show similar results for 100 hPa meridional winds and tables 10a 10b present similar results for 500 hPa meridional winds in units of m/s.

42809	CALCUTTA/DMDM	31 31	0 30	31 31	0 25
42867	NAGPUR SONEGN	24 21	0 28	22 22	0 30
42874	RAIPUR	31 28	0 0	31 31	0 0
42886	JHARSUGUDA	14 28	0 0	14 28	0 21
42895	BALASORE	0 31	0 0	0 29	0 29
42909	VERAVAL	0 27	0 0	0 29	0 29
42971	BHUBANESWAR	30 31	0 26	20 23	0 29
43003	BOMBAY/SANTCR	31 30	0 30	31 31	0 30
43014	AURNGABAD/AER	31 28	0 30	0 0	0 0
43041	JAGDALPUR	31 30	0 28	0 29	0 26
43049	GOPALPUR	26 26	0 0	1 29	0 29
43063	POONA	30 29	0 0	29 28	0 0
43110	RATNAGIRI	0 0	0 0	0 0	0 0
43128	HYDERABAD AER	31 30	22 31	31 29	31 31
43150	VISHAKHAPATNM	31 29	1 28	0 3	19 19
43185	MACHILIPATNAM	29 29	0 23	29 29	0 25
43192	GOA/PANJIM	0 0	0 0	0 0	0 0
43194	GOA/DABOLIM	0 0	0 0	0 0	0 0
43201	GADAG	26 26	0 0	28 28	27 27
43237	ANANTAPUR	0 0	0 0	0 0	0 0
43279	MADRAS/MINAMB	31 31	0 24	17 30	0 27
43284	MANG/BAJPE	0 0	0 0	0 0	0 0
43285	MANG/PANAMBUR	7 30	0 0	0 0	0 19
43295	BANGALORE	27 25	4 4	1 16	4 4
43311	AMINI DIVI	0 0	0 1	0 0	0 0
43333	PORT BLAIR	31 31	9 20	31 30	7 15
43344	TIRUCHIRAPLLI	0 0	0 0	0 0	0 0
43346	KARAIKAL	30 29	23 29	30 28	0 27
43353	COCHIN/WILING	31 29	0 0	30 28	0 0
43368	CAR NICOBAR	0 0	0 0	0 0	0 0
43369	MINICOY	3 7	0 6	3 8	0 13
43371	TRIVANDRUM	0 19	0 13	0 18	0 18
43373	TRIVANDRUM/TH	0 0	0 0	0 0	0 0

TABLE 3a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa GEOPOTENTIAL HEIGHT INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS GEOPOTENTIAL METERS

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	19	10	118.7	-21.9	120.7
42056	1	100	0.0	1159.0	1159.0
42079	6	33	292.3	-235.0	375.1
42101	1	0	0.0	-14.0	14.0
42111	26	7	71.5	-28.4	76.9
42182	31	0	11.7	-6.6	13.5
42314	23	4	38.9	25.6	46.6
42339	28	3	44.6	26.0	51.6
42348	31	0	15.2	32.1	35.5
42361	14	7	803.1	-217.5	832.1
42369	29	0	9.7	-8.7	13.0
42399	21	0	18.7	3.3	19.0
42410	21	0	1168.7	-351.4	1220.4
42492	19	0	11.4	-13.5	17.7
42634	4	25	92.3	41.0	101.0
42647	30	0	15.9	-5.2	16.7
42675	8	12	1282.6	-457.8	1361.8
42701	29	3	87.0	7.4	87.3
42724	29	0	22.4	15.2	27.1
42809	25	0	453.4	-100.4	464.4
42867	22	0	10.5	-1.5	10.6
42874	30	3	63.5	38.8	74.4
42886	10	0	1243.3	-410.2	1309.2
42971	24	0	17.5	16.4	24.0
43003	29	3	404.9	76.6	412.1
43014	30	0	10.7	-16.9	20.0
43041	28	3	26.6	30.6	40.6
43049	25	0	25.5	29.7	39.1
43063	27	11	54.5	-31.5	62.9
43128	26	7	1200.6	-204.9	1217.9
43150	29	0	5.1	5.4	7.5
43185	27	0	19.2	10.9	22.1
43279	30	0	24.6	20.1	31.7
43285	28	0	17.5	13.5	22.0
43295	11	18	1923.7	-401.1	1965.1
43333	27	0	17.7	-7.4	19.2
43346	29	6	64.2	43.7	77.7
43353	27	0	12.3	23.7	26.7
43369	3	33	55.4	81.3	98.4

TABLE 3b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa GEOPOTENTIAL HEIGHT INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS GEOPOTENTIAL METERS

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	14.2	45.0	47.2
42056	26	0	26.4	57.8	63.6
42111	1	0	0.0	30.0	30.0
42182	31	3	471.5	-59.3	475.2
42339	29	6	196.4	117.9	229.1
42348	31	9	35.1	93.9	100.3
42361	10	0	22.8	35.5	42.2
42369	23	0	23.8	10.9	26.1
42410	25	4	63.3	58.8	86.4
42492	1	0	0.0	11.0	11.0
42647	28	0	25.5	57.6	63.0
42809	26	0	81.0	4.9	81.2
42867	20	0	13.6	35.7	38.2
42874	8	0	20.9	51.0	55.1
42886	14	0	32.1	17.4	36.5
42971	16	0	14.8	19.6	24.5
43003	29	0	24.1	26.4	35.8
43049	1	0	0.0	62.0	62.0
43063	25	4	52.0	24.0	57.2
43128	23	21	43.0	85.0	95.3
43185	26	0	23.2	37.7	44.3
43279	27	0	15.0	42.8	45.3
43333	28	0	12.1	7.4	14.2
43346	28	7	77.6	78.3	110.3
43353	27	0	19.1	59.8	62.8
43369	3	33	13.5	79.3	80.5

TABLE 4a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa GEOPOTENTIAL HEIGHT INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS GEOPOTENTIAL METERS

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	25	20	557.8	-145.1	576.4
42056	1	100	0.0	137.0	137.0
42079	12	8	54.7	-23.2	59.4
42101	6	0	5.8	2.3	6.3
42111	26	3	30.4	-16.1	34.4
42182	31	0	6.9	-8.8	11.2
42314	27	3	16.3	-0.3	16.3
42339	31	3	55.5	32.5	64.3
42348	31	0	18.5	31.2	36.2
42361	28	7	76.0	-26.5	80.5
42369	29	0	5.7	-2.5	6.2
42399	31	0	15.3	1.3	15.3
42410	29	0	15.5	17.9	23.7
42492	22	0	5.7	-5.9	8.2
42623	21	23	1027.5	-109.5	1033.3
42634	6	0	4.3	-12.0	12.8
42647	31	3	11.2	-3.6	11.8
42675	26	7	159.0	45.0	165.2
42701	30	3	96.3	-0.2	96.3
42724	30	0	20.0	12.8	23.7
42809	31	0	5.4	-6.3	8.3
42867	24	0	6.1	1.0	6.2
42874	30	6	84.5	42.0	94.4
42886	13	7	10.1	2.1	10.3
42971	30	0	10.3	25.7	27.6
43003	31	0	8.6	-0.2	8.6
43014	30	0	6.5	-14.7	16.1
43041	30	3	34.4	28.2	44.5
43049	25	4	29.9	27.6	40.7
43063	27	7	20.8	-5.0	21.4
43128	29	3	41.0	21.9	46.5
43150	29	0	4.6	12.6	13.4
43185	26	0	4.5	-1.8	4.9
43279	31	0	5.7	8.2	10.0
43285	29	0	6.0	15.8	16.9
43295	13	15	63.7	46.1	78.6
43333	29	0	12.9	-6.7	14.5
43346	30	10	88.6	46.2	99.9
43353	29	0	6.3	19.0	20.0
43369	3	33	48.1	41.3	63.4

TABLE 4b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa GEOPOTENTIAL HEIGHT INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS GEOPOTENTIAL METERS

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	5.4	29.3	29.8
42056	27	0	19.9	22.4	30.0
42111	1	0	0.0	-14.0	14.0
42182	31	0	12.4	0.5	12.4
42339	31	19	202.7	93.5	223.2
42348	31	9	24.6	49.8	55.6
42361	31	0	8.0	1.3	8.1
42369	23	0	9.1	-1.1	9.1
42410	28	3	67.2	46.0	81.4
42492	1	0	0.0	-5.0	5.0
42647	30	0	6.8	11.2	13.1
42809	30	0	7.0	-3.7	7.9
42867	22	0	8.2	10.4	13.3
42874	27	7	26.5	37.8	46.2
42886	14	0	5.2	8.3	9.8
42971	19	0	10.5	26.3	28.3
43003	30	0	8.4	5.0	9.8
43049	1	0	0.0	36.0	36.0
43063	26	3	18.1	2.5	18.2
43128	29	17	43.8	41.1	60.1
43185	27	0	332.5	-60.1	337.9
43279	27	0	6.2	13.7	15.0
43333	28	0	7.7	3.3	8.4
43346	28	10	32.0	36.9	48.8
43353	27	0	8.3	30.8	31.9
43369	3	33	17.3	51.7	54.5

TABLE 5a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa DRY TEMPERATURE INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS DEGREE KELVIN

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	20	15	10.9	2.2	11.1
42056	1	100	0.0	13.6	13.6
42079	6	33	1.7	0.3	1.7
42101	1	0	0.0	-1.0	1.0
42111	26	7	1.7	-0.5	1.7
42182	31	0	1.4	-0.4	1.4
42314	23	4	1.0	1.4	1.7
42339	28	3	1.0	-0.4	1.1
42348	31	0	1.5	-0.4	1.5
42361	15	6	22.2	5.4	22.9
42369	27	0	1.2	-0.1	1.2
42399	21	0	1.1	0.0	1.1
42410	21	0	17.9	5.8	18.8
42492	19	0	1.4	-0.1	1.4
42634	4	25	1.1	0.1	1.1
42647	30	0	1.1	-0.3	1.1
42675	8	12	20.9	7.3	22.2
42701	29	3	1.4	0.1	1.4
42724	29	0	1.2	0.2	1.2
42809	25	0	19.5	4.0	19.9
42867	22	0	1.4	-0.6	1.5
42874	30	3	1.4	-0.1	1.4
42886	10	0	18.7	6.1	19.7
42971	24	0	1.0	-0.7	1.2
43003	29	3	14.2	2.6	14.4
43014	30	0	1.2	-0.1	1.2
43041	28	3	1.2	0.2	1.2
43049	25	0	1.0	-0.3	1.1
43063	27	11	1.4	-0.2	1.4
43128	26	7	26.6	5.3	27.1
43150	29	0	0.7	-0.3	0.8
43185	28	0	1.1	0.1	1.1
43279	30	0	1.2	-0.3	1.3
43285	29	3	2.9	-0.0	2.9
43295	11	18	32.4	16.0	36.2
43333	27	0	1.0	-0.7	1.2
43346	29	6	0.9	-0.3	1.0
43353	27	0	1.3	0.0	1.3
43369	3	33	0.7	0.8	1.0

TABLE 5b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa DRY TEMPERATURE INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS DEGREE KELVIN

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	1.2	0.6	1.4
42056	26	0	0.9	0.9	1.3
42111	1	0	0.0	0.5	0.5
42182	31	3	1.1	0.5	1.2
42339	29	6	1.4	0.3	1.4
42348	31	9	1.2	1.2	1.6
42361	10	0	1.5	1.1	1.8
42369	23	0	1.4	0.3	1.5
42410	25	4	0.9	-0.2	0.9
42492	1	0	0.0	0.0	0.0
42647	28	0	1.2	1.6	2.0
42809	26	0	1.2	-0.4	1.2
42867	20	0	1.1	1.1	1.5
42874	9	0	1.1	0.5	1.1
42886	14	0	1.0	-0.4	1.0
42971	16	0	1.5	0.1	1.5
43003	30	0	1.2	1.0	1.5
43049	1	0	0.0	1.5	1.5
43063	25	4	1.6	1.4	2.1
43128	23	21	1.2	0.9	1.5
43185	26	0	1.6	0.8	1.8
43279	27	0	1.1	0.8	1.4
43333	28	0	0.8	-0.2	0.9
43346	28	7	1.6	0.9	1.8
43353	27	0	1.2	1.3	1.8
43369	3	33	0.9	1.5	1.7

TABLE 6a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa DRY TEMPERATURE INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS DEGREE KELVIN

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	25	20	11.8	-5.8	13.1
42056	1	100	0.0	14.4	14.4
42079	12	16	6.5	-0.9	6.6
42101	6	0	1.1	0.0	1.1
42111	26	3	1.5	-0.7	1.7
42182	31	0	0.8	-0.1	0.8
42314	27	3	1.2	0.1	1.2
42339	31	3	0.9	-0.4	0.9
42348	31	0	0.7	-0.4	0.8
42361	28	7	3.9	-1.3	4.2
42369	29	0	0.7	-0.1	0.7
42399	31	0	0.8	-0.2	0.9
42410	29	0	1.0	0.1	1.0
42492	22	0	0.9	-0.4	1.0
42623	21	23	6.2	-1.8	6.5
42634	6	0	0.7	-0.2	0.7
42647	31	3	1.3	-0.9	1.5
42675	26	7	8.9	1.5	9.0
42701	30	3	1.4	-0.3	1.4
42724	30	0	1.2	-0.5	1.3
42809	31	0	1.2	-0.5	1.3
42867	24	0	1.2	-0.7	1.4
42874	30	3	0.8	-0.4	0.9
42886	13	7	1.1	-0.6	1.3
42971	30	0	1.1	-0.5	1.3
43003	31	0	0.9	-0.3	0.9
43014	30	0	0.8	-0.5	0.9
43041	30	3	0.8	-0.2	0.8
43049	25	0	0.7	0.2	0.7
43063	27	7	1.1	-0.8	1.4
43128	29	3	0.7	-0.5	0.9
43150	29	0	0.7	-0.1	0.8
43185	26	0	0.6	-0.3	0.7
43279	31	0	0.5	-0.4	0.6
43285	29	0	0.8	-0.3	0.9
43295	13	23	6.5	2.5	6.9
43333	29	0	0.8	-0.5	0.9
43346	30	6	0.8	-0.3	0.9
43353	29	0	0.6	-0.3	0.7
43369	3	33	0.6	-0.4	0.7

TABLE 6b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa DRY TEMPERATURE INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS DEGREE KELVIN

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	0.8	-0.1	0.8
42056	27	0	0.9	0.2	0.9
42111	1	0	0.0	0.9	0.9
42182	31	0	0.8	0.4	0.9
42339	31	6	1.5	-0.3	1.5
42348	31	9	0.7	0.3	0.8
42361	31	0	0.8	0.1	0.8
42369	23	0	0.6	-0.1	0.6
42410	28	3	0.9	-0.1	0.9
42492	1	0	0.0	-0.3	0.3
42647	30	0	0.8	0.5	0.9
42809	30	0	0.9	-0.6	1.1
42867	22	0	1.0	-0.3	1.1
42874	27	0	0.8	0.2	0.8
42886	14	0	0.6	-0.5	0.8
42971	19	0	0.7	-0.7	1.0
43003	30	0	0.7	0.1	0.7
43049	1	0	0.0	0.4	0.4
43063	26	3	0.8	-0.2	0.9
43128	29	17	0.8	0.2	0.8
43185	27	0	13.3	-2.6	13.5
43279	27	0	0.7	-0.2	0.7
43333	28	0	0.8	-0.2	0.8
43346	28	7	0.6	-0.0	0.6
43353	27	0	0.7	-0.1	0.7
43369	3	33	0.6	-0.1	0.6

TABLE 7a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa ZONAL WIND INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	20	0	15.3	-9.8	18.1
42056	1	0	0.0	-37.4	37.4
42079	6	0	14.9	-4.1	15.5
42101	1	0	0.0	-0.2	0.2
42111	26	0	5.2	0.2	5.2
42182	31	0	4.8	-0.1	4.8
42314	23	0	4.3	-0.4	4.3
42339	28	0	3.4	-0.0	3.4
42348	31	0	4.3	-0.3	4.3
42361	14	0	8.9	3.9	9.7
42369	29	0	3.4	-0.2	3.4
42399	21	0	4.3	-1.2	4.4
42410	21	0	9.0	2.8	9.4
42492	19	0	4.6	0.7	4.6
42634	4	0	2.8	-3.0	4.0
42647	30	0	3.2	-0.1	3.2
42675	8	0	5.9	3.3	6.8
42701	29	0	4.7	-0.3	4.8
42724	29	0	2.5	0.1	2.5
42809	25	0	2.9	0.8	3.0
42867	22	0	2.6	1.2	2.9
42874	30	0	2.6	-0.1	2.6
42886	10	0	7.7	-1.0	7.8
42971	24	0	2.9	-2.3	3.7
43003	29	0	2.5	-1.1	2.7
43014	30	0	2.3	0.2	2.3
43041	28	0	2.6	-0.6	2.7
43049	25	0	2.5	-0.1	2.6
43063	27	0	2.0	-0.7	2.1
43128	26	0	2.1	0.5	2.2
43150	29	0	2.7	-0.0	2.7
43185	27	0	2.7	0.0	2.7
43279	30	0	2.5	0.3	2.5
43285	29	0	3.7	-1.3	3.9
43295	11	0	3.5	-2.7	4.4
43333	27	0	2.3	-2.1	3.1
43346	29	0	2.5	-1.1	2.7
43353	27	0	2.6	-0.4	2.7
43369	3	0	0.8	-1.4	1.6

TABLE 7b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa ZONAL WIND INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	4.1	-0.3	4.1
42056	26	0	3.4	0.2	3.5
42111	1	0	0.0	9.3	9.3
42182	31	0	5.9	0.6	5.9
42339	29	0	3.1	1.1	3.3
42348	31	0	4.3	-1.4	4.6
42361	10	0	5.4	3.6	6.4
42369	23	0	3.6	-0.8	3.7
42410	25	0	4.3	0.2	4.3
42492	1	0	0.0	1.5	1.5
42647	28	0	3.3	-1.1	3.5
42809	26	0	6.0	0.0	6.0
42867	20	0	2.8	-1.1	3.0
42874	10	0	4.4	-1.1	4.5
42886	14	0	3.5	1.3	3.7
42971	16	0	3.7	-3.4	5.0
43003	29	0	3.0	-0.2	3.0
43049	1	0	0.0	-4.2	4.2
43063	25	0	2.6	-1.1	2.8
43128	23	0	1.9	-0.7	2.0
43185	26	0	2.5	-0.4	2.6
43279	27	0	2.6	-0.4	2.6
43333	28	0	2.5	-0.6	2.6
43346	28	0	3.1	-1.1	3.3
43353	27	0	3.3	-0.8	3.3
43369	3	0	1.2	0.0	1.2

TABLE 8a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa ZONAL WIND INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	25	0	10.1	1.8	10.3
42056	1	0	0.0	-11.0	11.0
42079	12	0	6.0	-4.3	7.3
42101	6	0	3.4	0.0	3.4
42111	26	0	3.6	-0.8	3.6
42182	31	0	2.2	0.3	2.2
42314	27	0	4.8	-1.1	5.0
42339	31	0	2.1	0.3	2.1
42348	31	0	1.9	0.6	1.9
42361	28	0	3.7	1.0	3.8
42369	29	0	2.7	0.3	2.7
42399	31	0	3.1	1.1	3.3
42410	29	0	3.1	0.1	3.1
42492	22	0	3.3	0.6	3.4
42623	21	0	9.3	3.4	9.9
42634	6	0	1.9	1.1	2.2
42647	31	0	2.3	-0.3	2.3
42675	26	0	3.1	0.0	3.1
42701	30	0	2.3	-1.5	2.8
42724	30	0	2.9	0.8	3.0
42809	31	0	2.3	1.3	2.7
42867	24	0	2.0	-0.6	2.1
42874	30	0	2.5	-0.3	2.5
42886	13	0	1.5	-0.9	1.8
42971	30	0	3.3	-2.4	4.1
43003	31	0	1.9	0.3	1.9
43014	30	0	2.2	-0.1	2.2
43041	30	0	2.1	1.4	2.5
43049	25	0	1.9	1.4	2.3
43063	27	0	2.2	0.6	2.2
43128	29	0	2.0	-0.1	2.0
43150	29	0	1.6	0.7	1.8
43185	26	0	1.6	0.1	1.6
43279	31	0	2.3	0.2	2.3
43285	29	0	1.9	-0.1	1.9
43295	13	0	1.7	-0.3	1.8
43333	29	0	1.7	-0.5	1.8
43346	30	0	1.7	0.2	1.7
43353	29	0	1.8	-0.4	1.9
43369	3	0	0.8	-0.6	1.0

TABLE 8b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa ZONAL WIND INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	2.8	-2.3	3.6
42056	27	0	3.3	-1.1	3.5
42111	1	0	0.0	4.8	4.8
42182	31	0	2.7	-0.1	2.7
42339	31	0	2.6	1.1	2.9
42348	31	0	2.0	1.0	2.2
42361	31	0	2.0	0.1	2.0
42369	23	0	2.1	0.0	2.1
42410	28	0	3.0	1.2	3.2
42492	1	0	0.0	-1.5	1.5
42647	30	0	1.8	-0.3	1.8
42809	30	0	2.3	0.7	2.4
42867	22	0	1.9	0.1	1.9
42874	29	0	5.1	-1.8	5.5
42886	14	0	2.5	-0.2	2.5
42971	19	0	2.6	-3.4	4.3
43003	30	0	1.7	0.8	1.9
43049	1	0	0.0	5.5	5.5
43063	26	0	1.9	-0.5	1.9
43128	29	0	1.7	-0.3	1.7
43185	27	0	2.5	0.4	2.6
43279	27	0	2.2	0.1	2.2
43333	29	0	1.9	-0.2	1.9
43346	28	0	1.8	-0.6	1.9
43353	27	0	1.8	-0.0	1.8
43369	3	0	1.0	1.1	1.5

TABLE 9a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa MERIDIONAL WIND INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	20	0	4.3	1.1	4.5
42056	1	0	0.0	1.6	1.6
42079	6	0	6.8	-2.0	7.1
42101	1	0	0.0	5.8	5.8
42111	26	0	4.2	-0.0	4.2
42182	31	0	4.6	-0.6	4.6
42314	23	0	4.3	1.7	4.6
42339	28	0	4.9	0.2	4.9
42348	31	0	3.3	-0.5	3.3
42361	14	0	4.9	-1.0	5.0
42369	29	0	4.7	0.9	4.8
42399	21	0	3.7	-0.5	3.8
42410	21	0	4.4	2.0	4.8
42492	19	0	3.5	-0.8	3.6
42634	4	0	0.4	-1.7	1.7
42647	30	0	3.1	-0.5	3.1
42675	8	0	5.1	-0.5	5.1
42701	29	0	3.6	2.6	4.4
42724	29	0	4.1	1.4	4.3
42809	25	0	3.8	-0.8	3.9
42867	22	0	4.4	0.3	4.4
42874	30	0	4.2	0.4	4.2
42886	10	0	4.4	-1.1	4.6
42971	24	0	5.5	-4.4	7.0
43003	29	0	3.6	-0.9	3.8
43014	30	0	5.4	0.6	5.4
43041	28	0	2.7	-0.3	2.7
43049	25	0	4.1	0.3	4.1
43063	27	0	4.0	0.0	4.0
43128	26	0	3.7	0.5	3.7
43150	29	0	2.5	-0.8	2.6
43185	27	0	4.0	0.6	4.0
43279	30	0	3.7	0.0	3.7
43285	29	0	3.6	0.2	3.6
43295	11	0	3.1	-1.2	3.3
43333	27	0	2.7	0.4	2.8
43346	29	0	3.6	0.2	3.6
43353	27	0	3.1	0.6	3.2
43369	3	0	2.5	2.7	3.7

TABLE 9b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
100 hPa MERIDIONAL WIND INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	3.4	-0.7	3.5
42056	26	0	3.0	0.2	3.0
42111	1	0	0.0	-4.5	4.5
42182	31	0	4.8	-1.1	5.0
42339	29	0	4.0	-0.4	4.0
42348	31	0	3.6	-0.1	3.6
42361	10	0	4.0	2.0	4.4
42369	23	0	4.7	1.1	4.8
42410	25	0	4.5	1.9	4.9
42492	1	0	0.0	3.0	3.0
42647	28	0	3.7	-0.9	3.8
42809	26	0	4.0	0.1	4.0
42867	20	0	3.8	0.3	3.8
42874	10	0	4.3	-1.3	4.5
42886	14	0	3.7	-0.2	3.7
42971	16	0	5.4	-7.6	9.4
43003	29	0	3.2	1.4	3.4
43049	1	0	0.0	10.5	10.5
43063	25	0	3.3	1.1	3.5
43128	23	0	4.2	0.5	4.2
43185	26	0	3.4	0.0	3.4
43279	27	0	3.4	1.4	3.7
43333	28	0	3.8	-0.6	3.8
43346	28	0	3.4	1.2	3.6
43353	27	0	3.2	-0.0	3.2
43369	3	0	0.7	4.7	4.8

TABLE 10a: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa MERIDIONAL WIND INCREMENTS - 01012024 to 31012024 (00Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	25	0	3.4	0.1	3.4
42056	1	0	0.0	2.1	2.1
42079	12	0	2.8	-1.0	3.0
42101	6	0	2.0	1.3	2.3
42111	26	0	2.1	0.6	2.2
42182	31	0	1.7	0.3	1.7
42314	27	0	2.2	-0.5	2.3
42339	31	0	2.3	0.0	2.3
42348	31	0	2.5	0.5	2.5
42361	28	0	1.8	0.7	1.9
42369	29	0	2.3	0.0	2.3
42399	31	0	1.8	0.1	1.8
42410	29	0	3.0	-0.1	3.0
42492	22	0	2.7	0.3	2.8
42623	21	0	3.7	-0.8	3.8
42634	6	0	1.8	-0.2	1.8
42647	31	0	2.4	-0.0	2.4
42675	26	0	2.6	1.2	2.9
42701	30	0	2.2	0.4	2.2
42724	30	0	2.7	0.7	2.7
42809	31	0	2.9	0.2	2.9
42867	24	0	3.3	-0.0	3.3
42874	30	0	1.9	0.9	2.1
42886	13	0	2.2	0.4	2.3
42971	30	0	4.6	-4.2	6.2
43003	31	0	2.8	-0.1	2.8
43014	30	0	3.5	1.0	3.6
43041	30	0	2.3	0.6	2.4
43049	25	0	2.4	0.7	2.5
43063	27	0	2.5	-0.3	2.5
43128	29	0	2.2	0.3	2.2
43150	29	0	2.0	0.2	2.0
43185	26	0	1.9	0.6	2.0
43279	31	0	2.6	-0.2	2.7
43285	29	0	2.3	-0.1	2.3
43295	13	0	1.7	-0.3	1.8
43333	29	0	2.5	-0.6	2.5
43346	30	0	2.0	-0.5	2.1
43353	29	0	2.2	-0.5	2.3
43369	3	0	1.0	-0.6	1.2

TABLE 10b: NCMRWF RADIOSONDE MONITORING STATISTICS
FOR WMO BLOCK 42 AND 43 STATIONS ONLY
500 hPa MERIDIONAL WIND INCREMENTS - 01012024 to 31012024 (12Z)
UNIT IS METER/SEC

STNID	COUNT	%REJC	SD	BIAS	RMS
42027	29	0	2.8	0.9	3.0
42056	27	0	3.0	0.1	3.0
42111	1	0	0.0	2.8	2.8
42182	31	0	2.3	-0.3	2.3
42339	31	0	2.5	-0.2	2.6
42348	31	0	2.2	0.5	2.2
42361	31	0	1.7	0.3	1.7
42369	23	0	2.0	-0.5	2.1
42410	28	0	2.6	0.3	2.6
42492	1	0	0.0	0.8	0.8
42647	30	0	2.0	-0.2	2.0
42809	30	0	2.4	1.1	2.7
42867	22	0	2.0	0.2	2.0
42874	29	0	2.5	1.1	2.7
42886	14	0	1.9	-0.2	1.9
42971	19	0	3.9	-6.7	7.8
43003	30	0	2.2	-0.1	2.2
43049	1	0	0.0	-2.2	2.2
43063	26	0	2.5	0.1	2.5
43128	29	0	2.0	0.4	2.1
43185	27	0	3.5	1.1	3.6
43279	27	0	2.7	0.2	2.7
43333	29	0	2.4	-0.9	2.5
43346	28	0	2.2	-0.1	2.2
43353	27	0	2.0	-0.1	2.0
43369	3	0	1.5	-0.5	1.6

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability - SYNOP/SHIP PRESSURE

Average number of observations in 24 hours - 103902

LAND - WMO REGION I: 5498 II:15408 III: 2180 IV: 5996 V:14746 VI:37238 VII: 840

OCEAN - N. Atlantic: 9697 S. Atlantic: 1517 Indian: 2948 Pacific: 6857

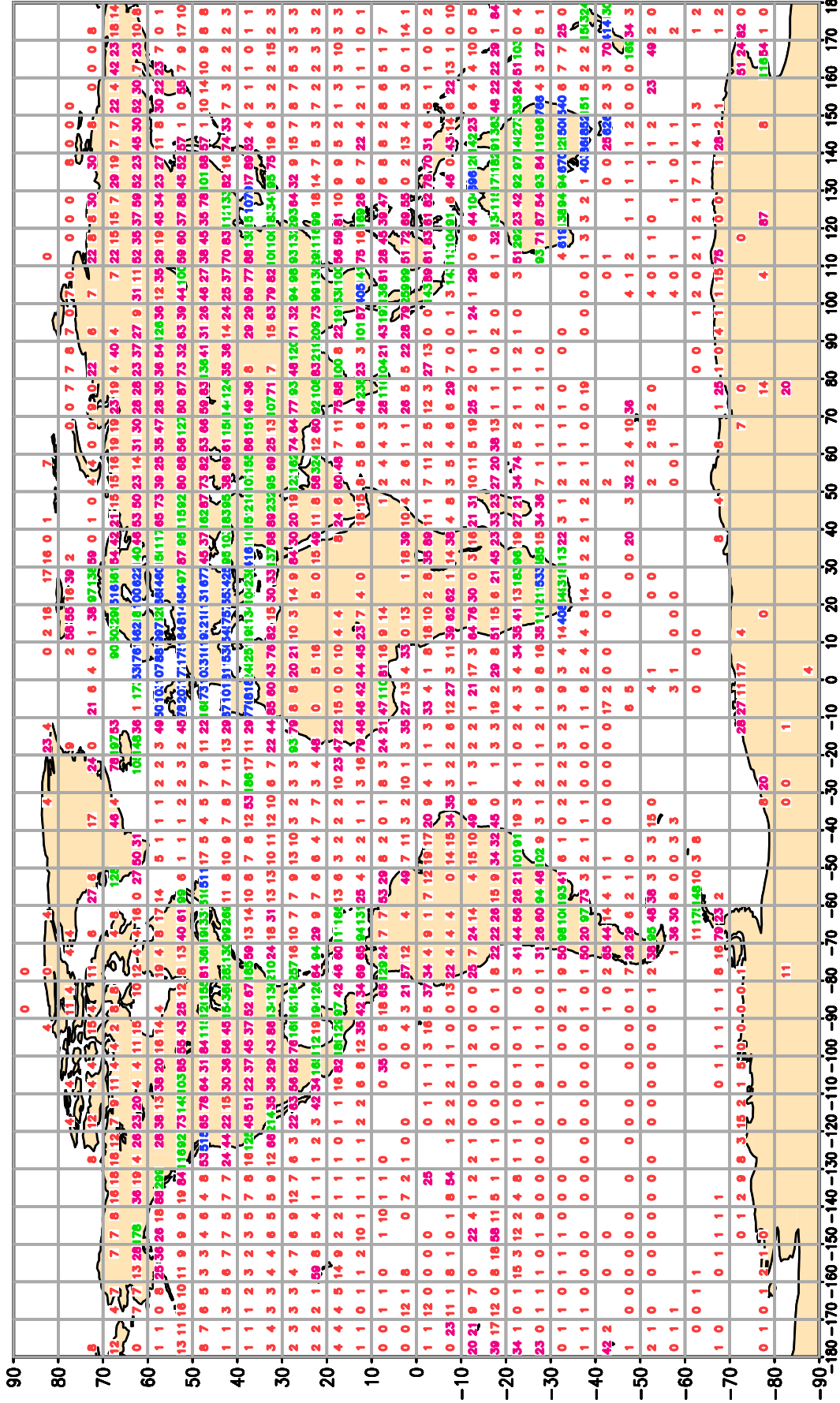


Fig 1.1

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability - TEMP 500 hPa geopotential

Average number of observations in 24 hours - 1241

LAND - WMO REGION I: 31 II: 474 III: 72 IV: 257 V: 138 VI: 191 VII: 18

OCEAN - N. Atlantic: 0 S. Atlantic: 0 Indian: 0 Pacific: 0

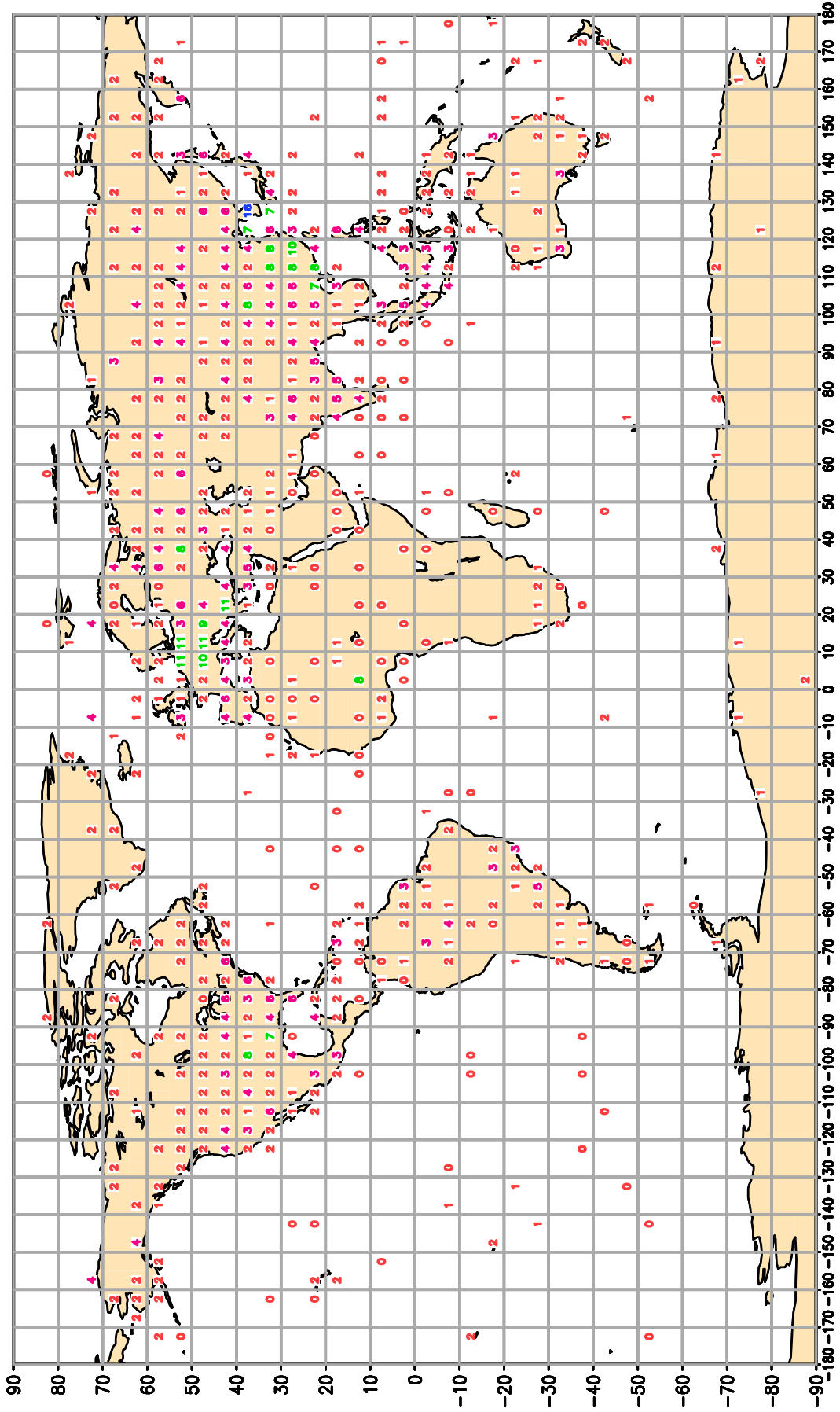


Fig 1.2

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability – TEMP/PILOT 300 hPa wind

Average number of observations in 24 hours – 1483

LAND – WMO REGION I: 52 II: 531 III: 89 IV: 329 V: 227 VI: 193 VII: 19

OCEAN – N. Atlantic: 0 S. Atlantic: 0 Indian: 0 Pacific: 0

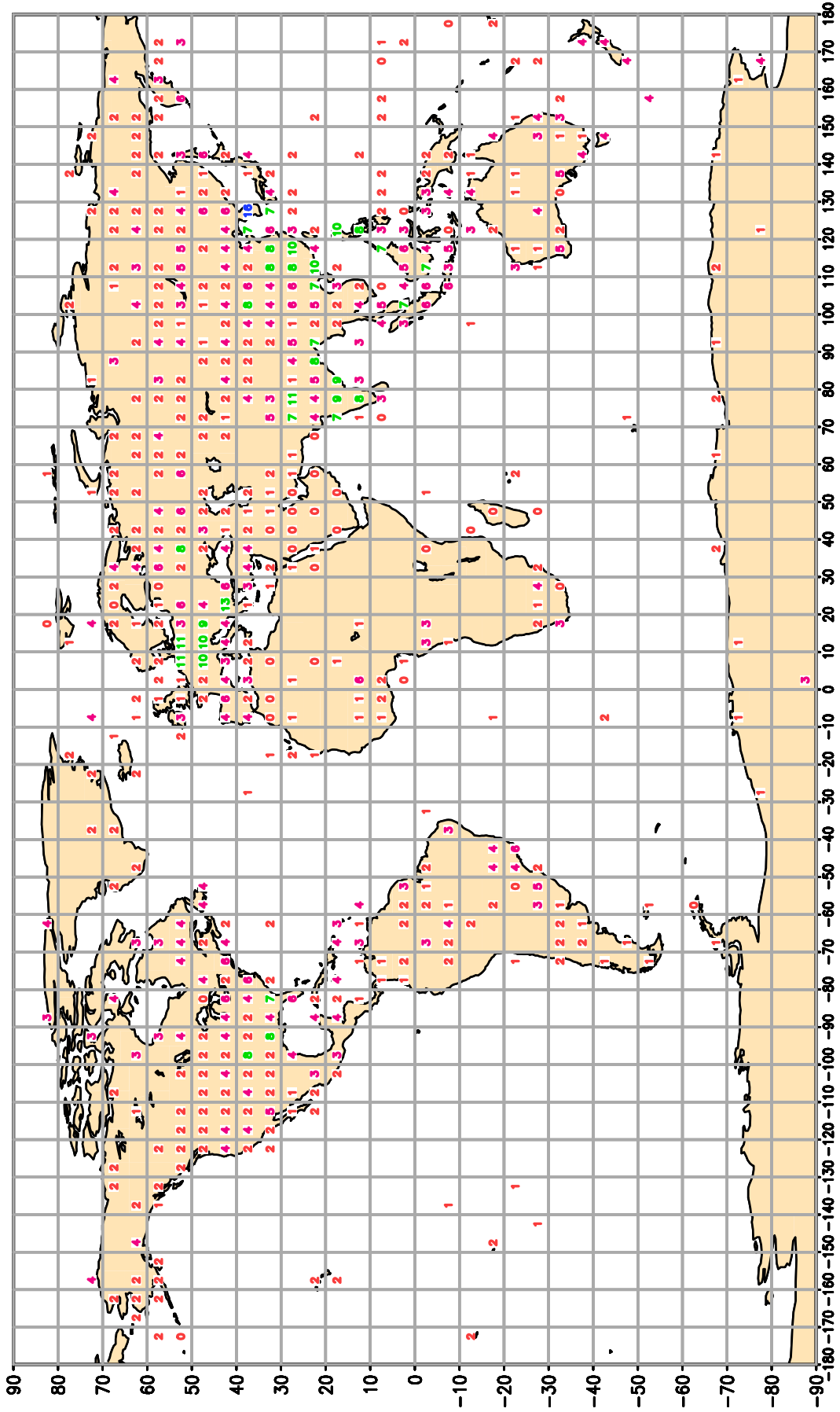


Fig 1.3

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability – AIRCRAFT winds 300–150 hPa

Average number of observations in 24 hours – 161646

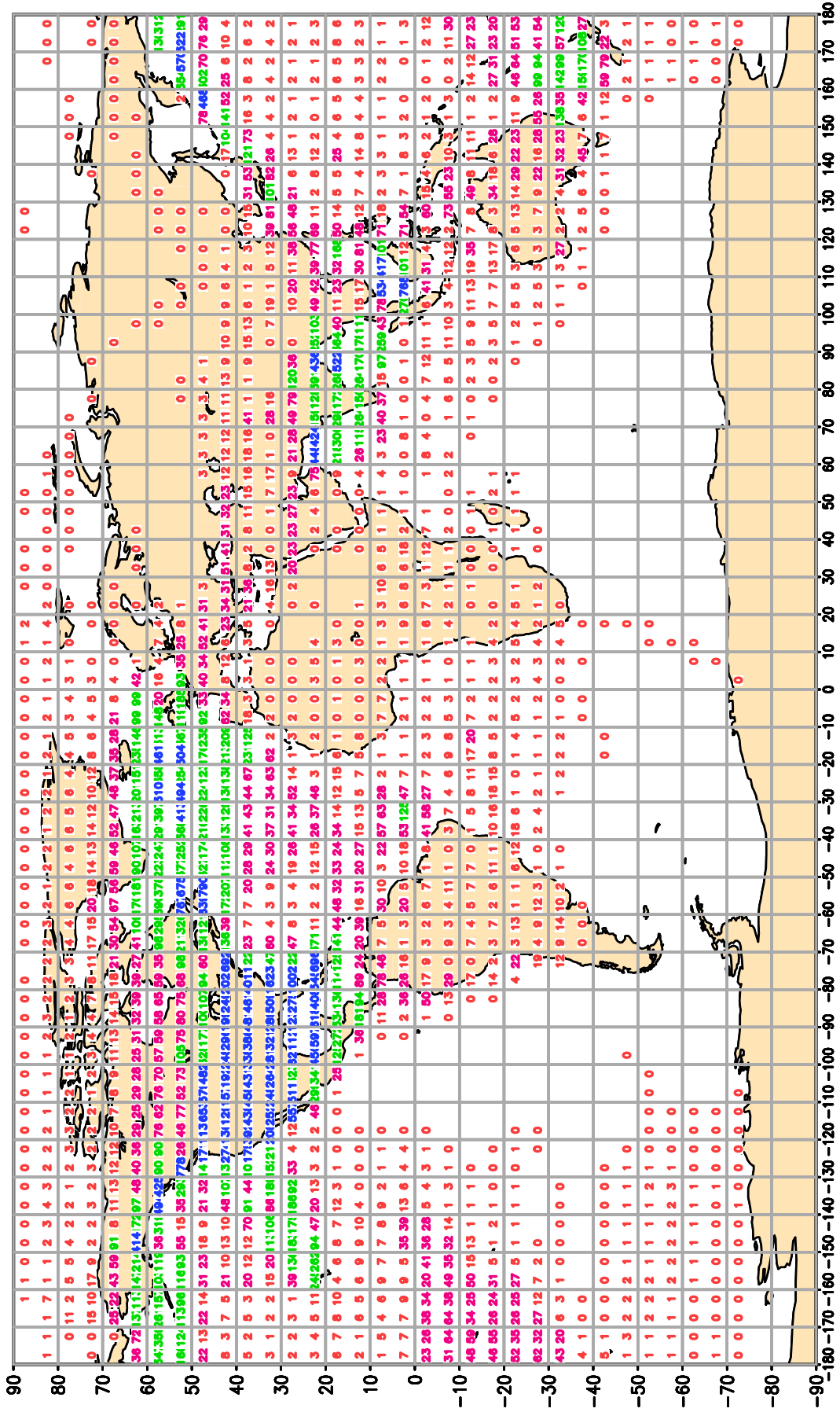


Fig 1.4

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability - NOAA 18 ATOVS : AMSU-A
Average number of observations in 24 hours - 209803

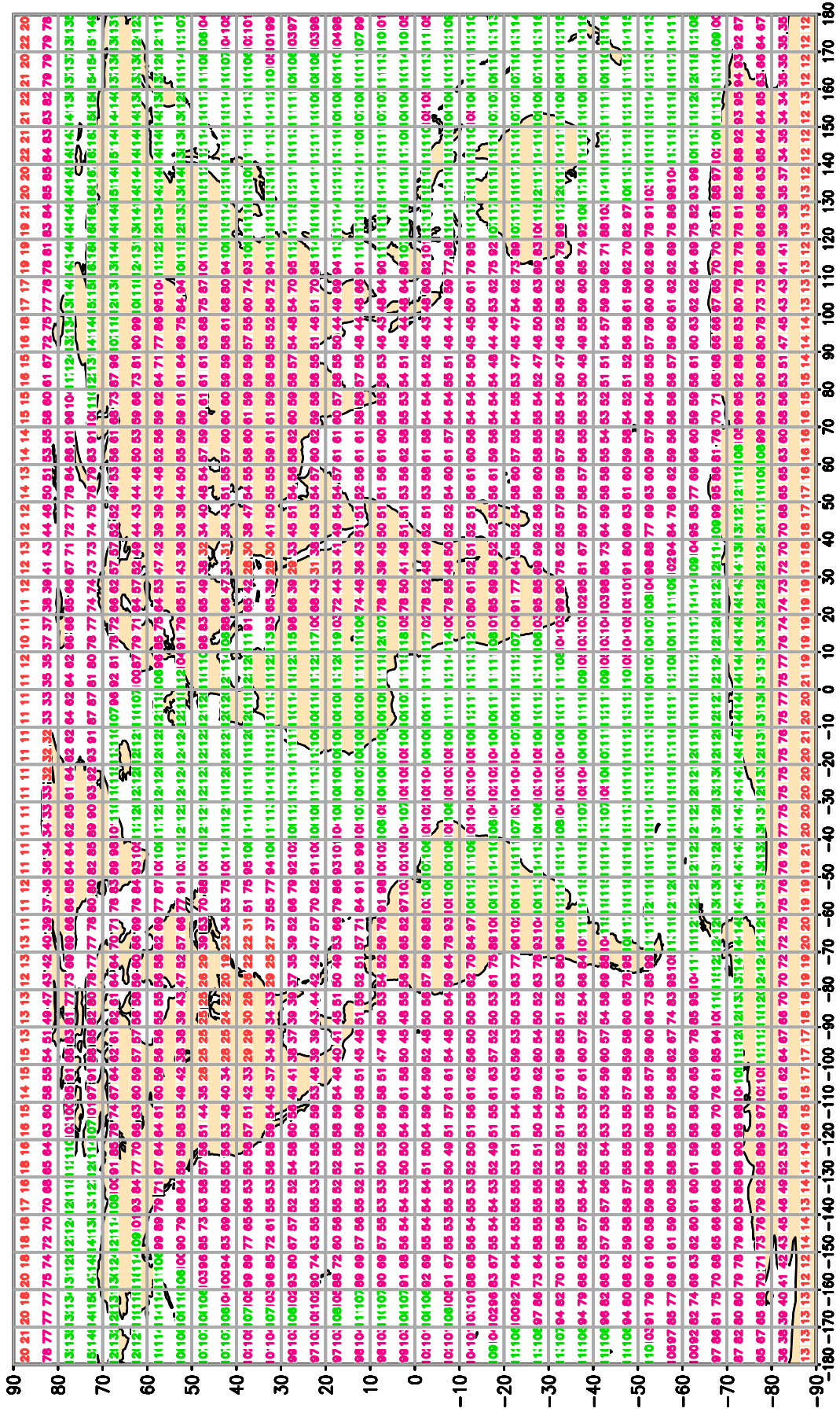


Fig 1.5

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability – AMV winds 400–150 hPa

Average number of observations in 24 hours – 680922

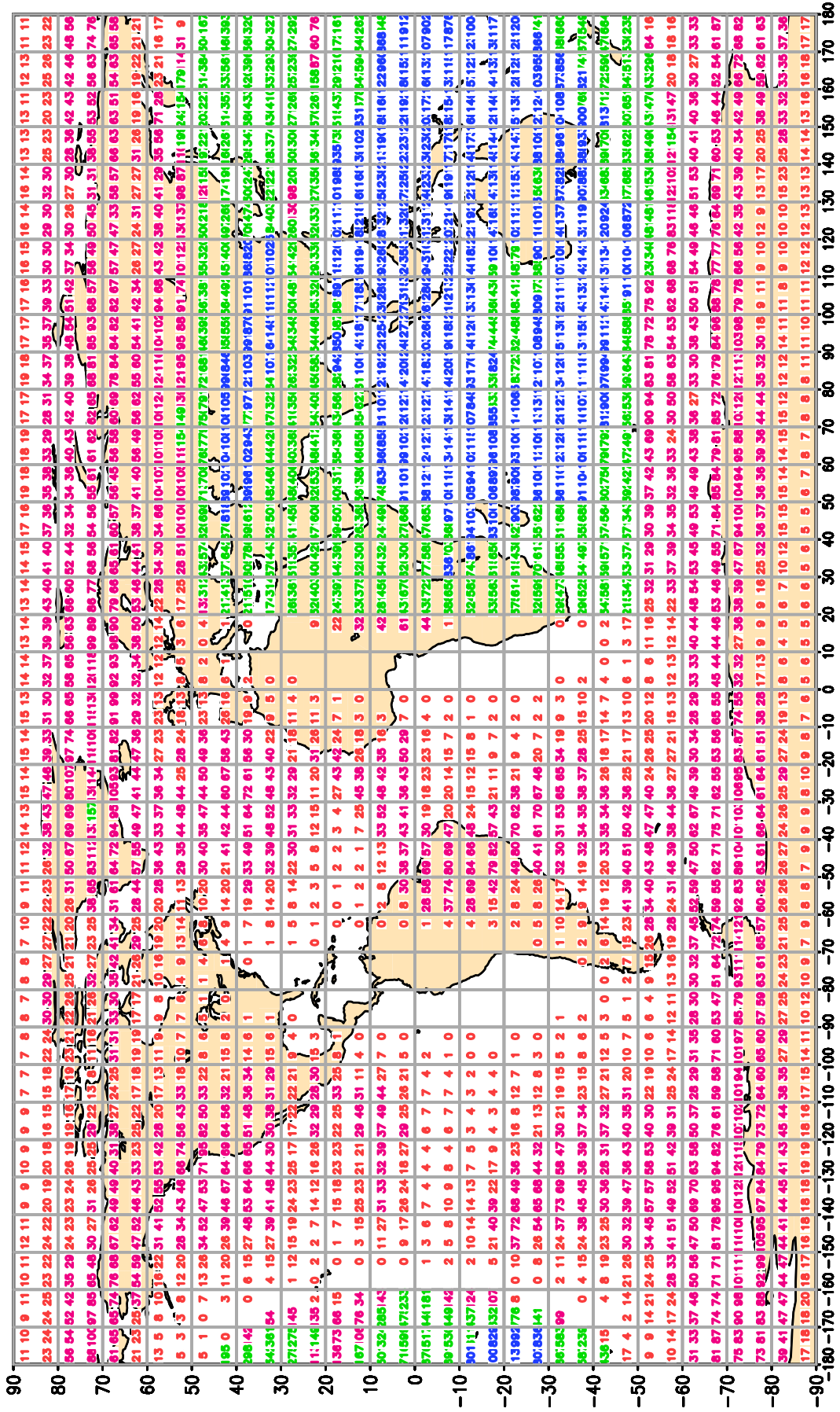


Fig 1.6(a)

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability – AMV winds 1000–700 hPa

Average number of observations in 24 hours – 422927

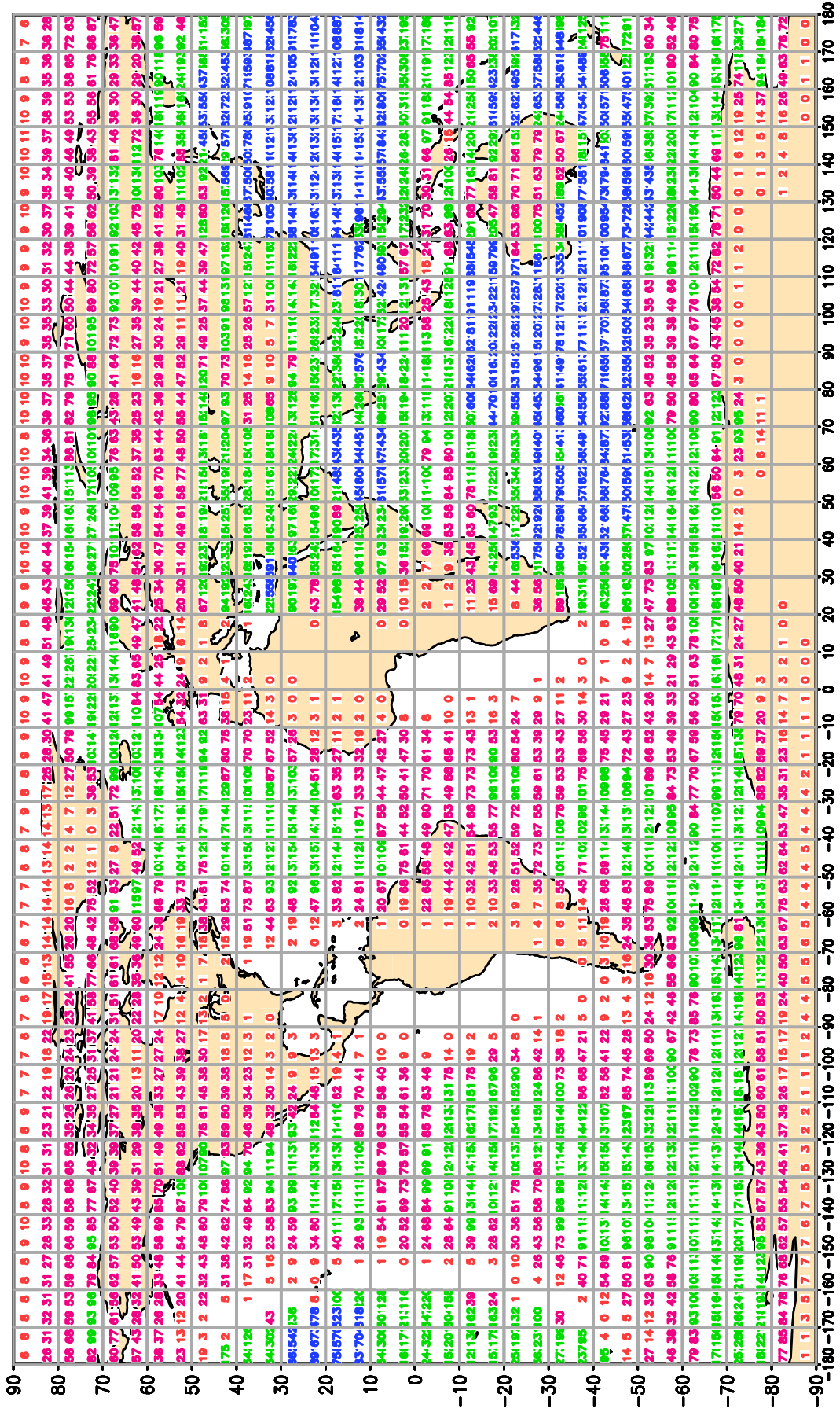


Fig 1.6(b)

NCMRWF Monitoring Statistics 01 01 24 TO 31 01 24

Availability - BUOY PRESSURE

Average number of observations in 24 hours - 33622

OCEAN - N. Atlantic: 8654 S. Atlantic: 2290 Indian: 3752 Pacific:18423

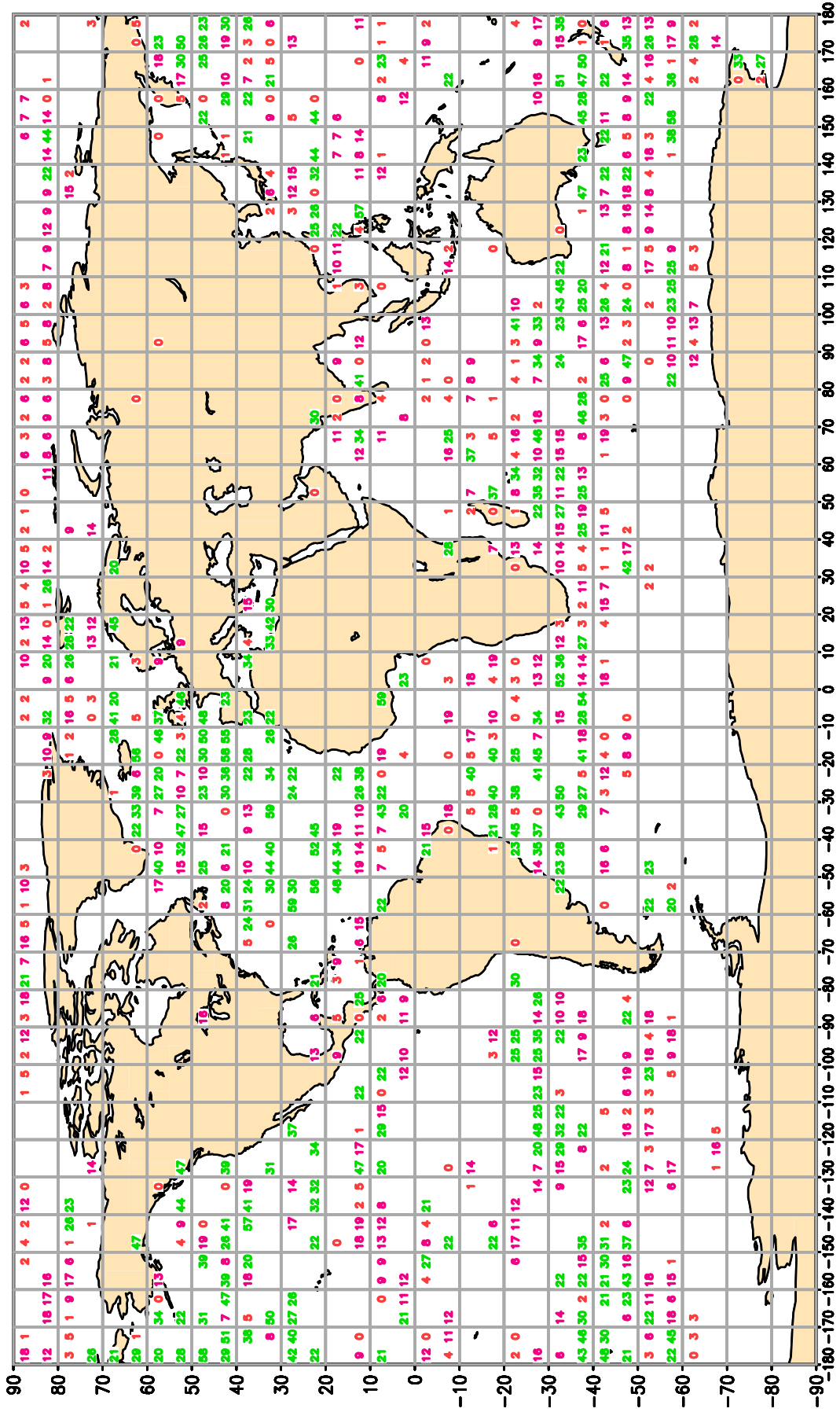


Fig 1.7

NCMRWF Monitoring Statistics: January 2024

AMV WINDS: 700 - 1000 hPa

Mean Observed Wind

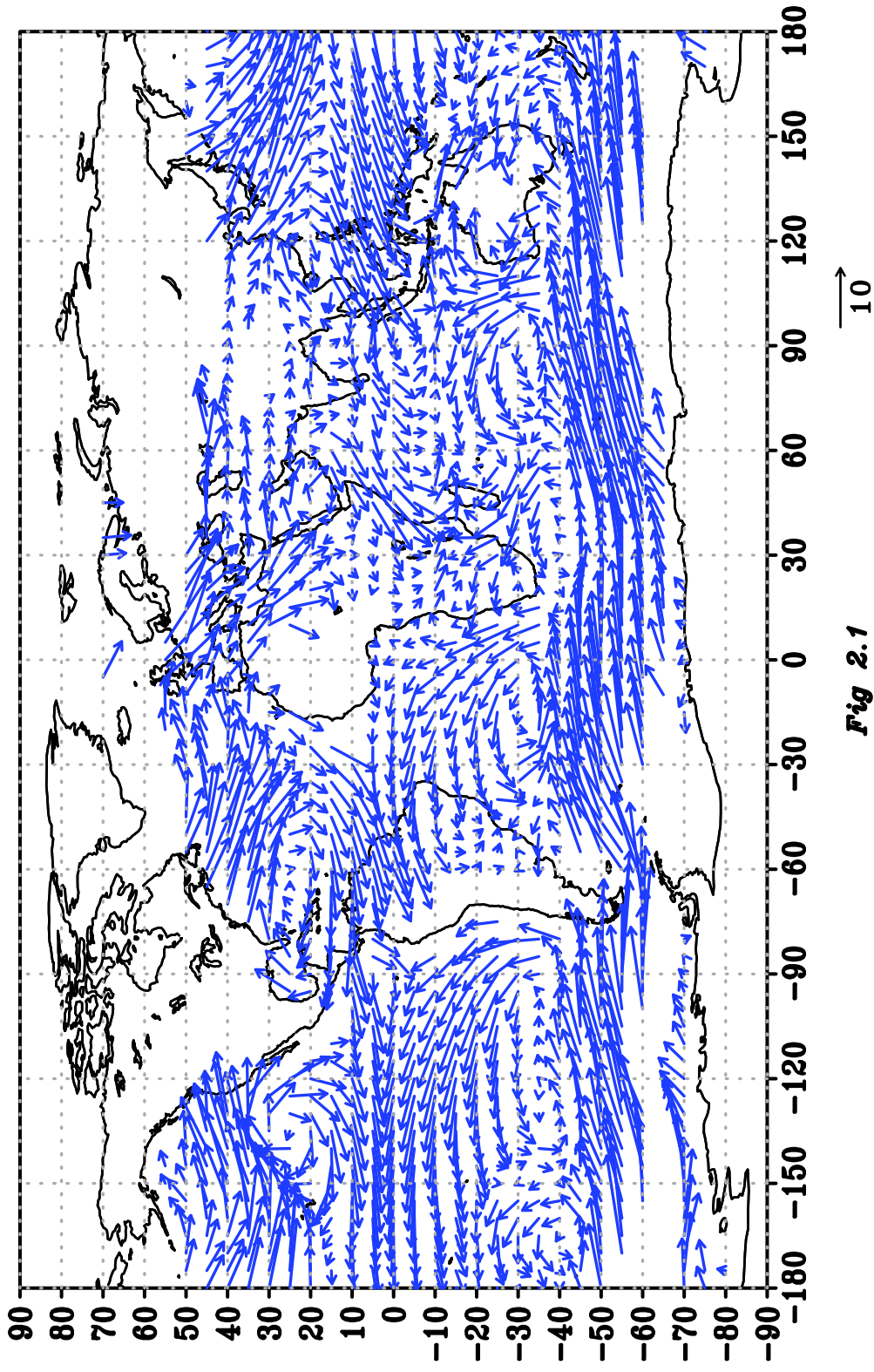


Fig 2.1

NCMRWF Monitoring Statistics: January 2024

AMV WINDS: 700 - 1000 hPa

WIND BIAS: Observation - First Guess

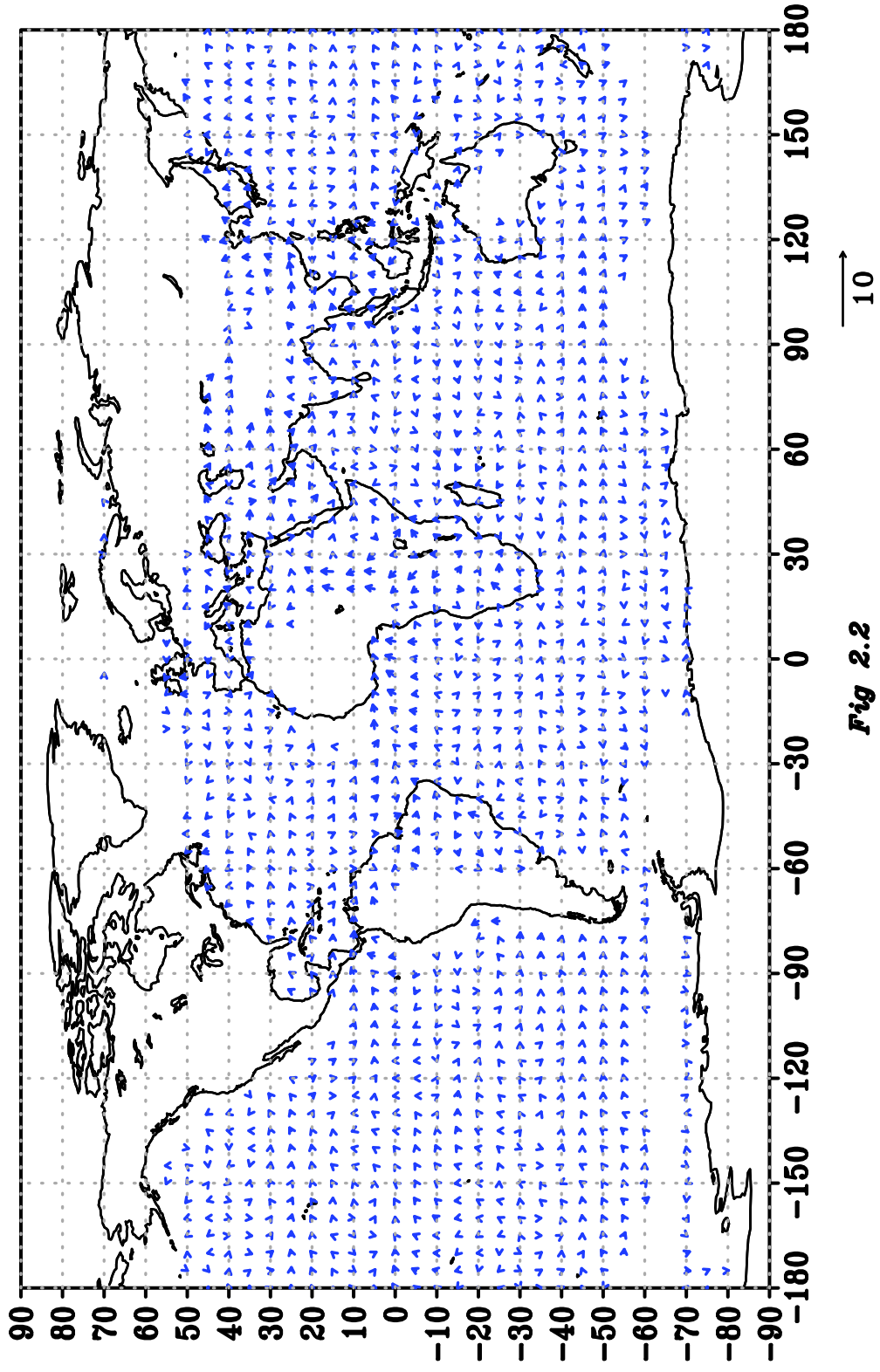


Fig 2.2

NCMRWF Monitoring Statistics: January 2024

AMV WINDS: 150 - 400 hPa

Mean Observed Wind

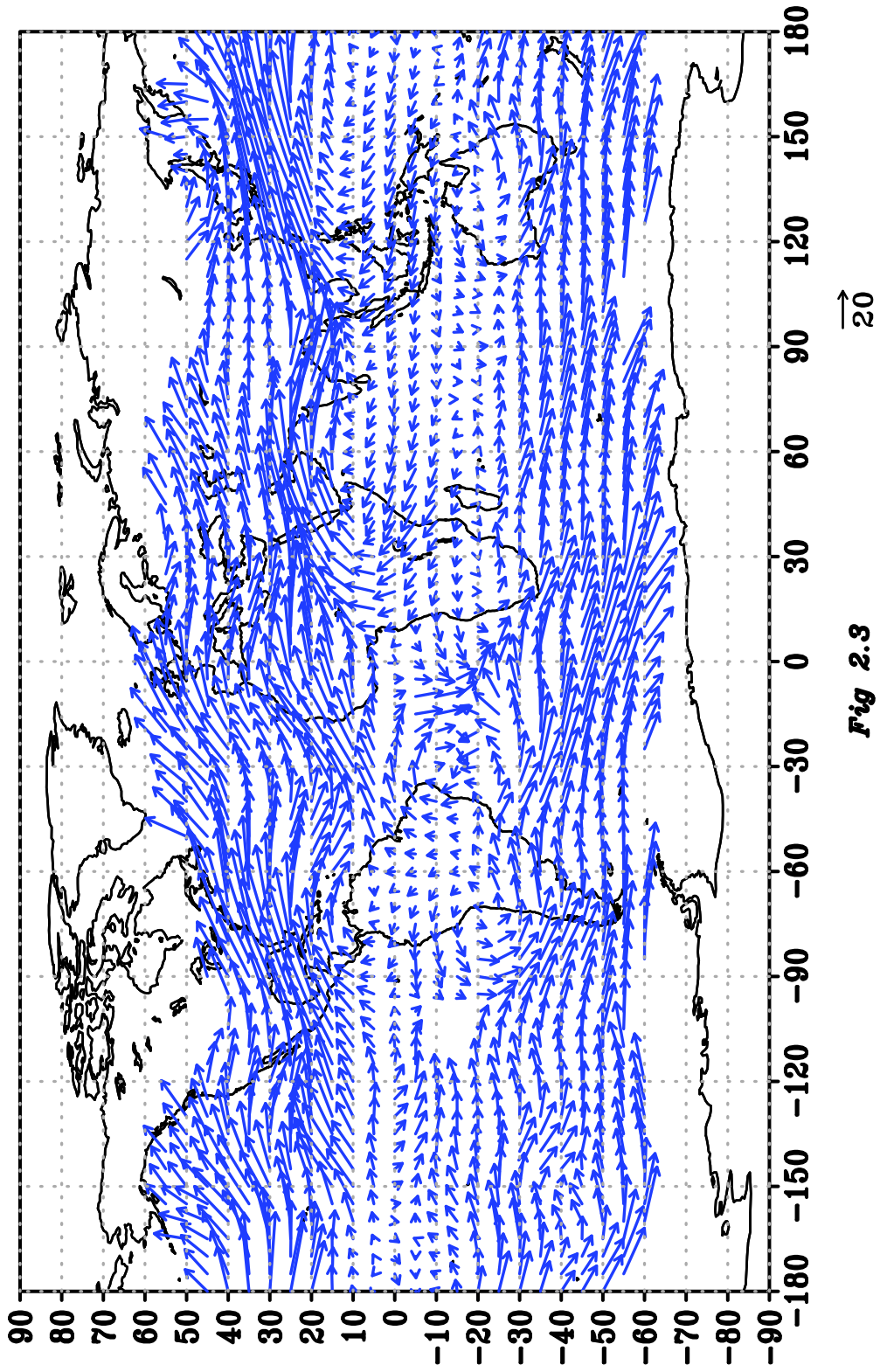


Fig 2.3

20

NCMRWF Monitoring Statistics: January 2024

AMV WINDS: 150 - 400 hPa

WIND BIAS: Observation - First Guess

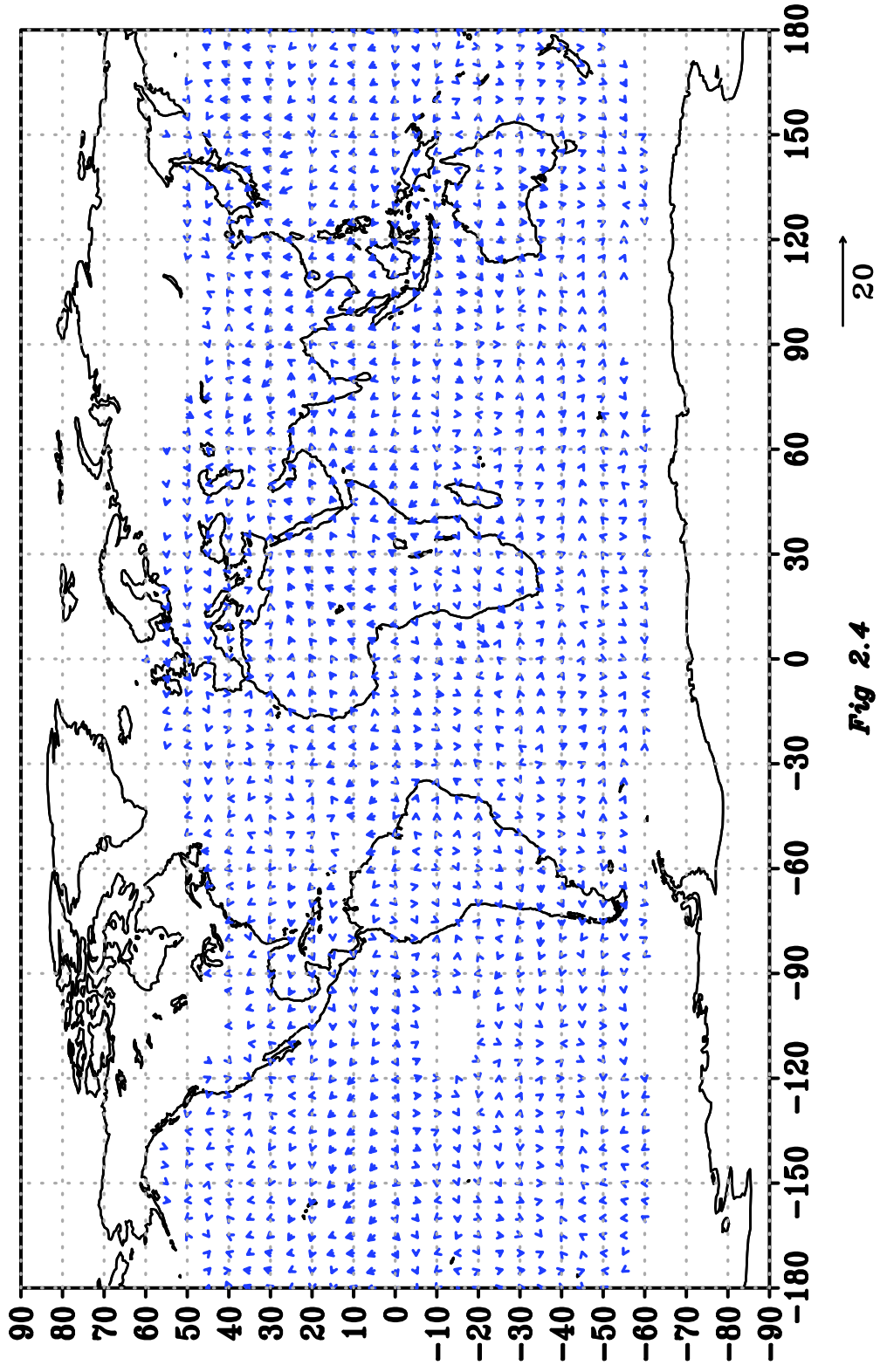


Fig 2.4

