ECMWF Global Data Monitoring Report

January 2015

European Centre for Medium-Range Weather Forecasts
Europäisches Zentrum für mittelfristige Wettervorhersage
Centre européen pour les prévisions météorologiques à moyen terme

Contents

Summary of Revisions (in reverse order)

Revision 25 (Dec 14) - Coverage chart for ATOVS AMSU-A for Noaa_16 removed

Revision 24 (Aug 06) - North Atlantic Monitoring statistics replaced by EUCOS Area Monitoring Statistics (tables 13 to 23). Airep tables removed from this section.

Revision 23 (Dec 00) - Coverage charts for Noaa_14 MSU replaced by ATOVS AMSU-A for Noaa_16.

Revision 22 (Aug 99) - Coverage charts for TOVS thickness 300-100 hPa replaced by (A)TOVS AMSU-A and MSU (Noaa_15 and Noaa_14).

Revision 21 (May 99) - Monitoring statistics ceased for Noaa_11 as satellite is no more available.

Revision 20 (Sep 98) - Changes to tables and annex to remove all mention about data usage. Two more levels (50 and 850 hPa) added to the COSNA statistics for Sondes.

Revision 19 (Jul 98) - From June 29th, 1998 ECMWF model assimilates temperature data instead of geopotential from radiosondes. As a consequence the number of used geopotential data drops to zero in tables 7, 10, 13 and 15.

Revision 18 (Apr 98) - Changes to tables and annex to introduce the usage of accepted numbers and observations instead of precentage of rejection.

1 Introduction

The ECMWF global data monitoring report is a monthly publication intended to give an overview of the availability and quality of observations from the Global Observing System within the World Weather Watch of the World Meteorological Organisation. It should be recognised that the statistics given in this report refer to data as received at ECMWF in time for the appropriate analysis. The annex of the report gives further explanations of the methods applied to compile the statistics and on the reference used to establish the quality of observations.

The information presented on data quality is based on differences between observations and the values of the most recent ECMWF forecast ("first guess") of the same parameter. Depending on the time of the observation, the forecast range is between 9 and 15 hours. It should be recognised that although the quality of the first-guess is of a generally high standard this is only true to a limited extent in certain areas, such as the tropics and data-sparse areas of both northern and southern hemispheres. The data quality results should therefore be used with care when assessing the absolute quality of a particular observing platform. Other indicators such as long-term trends of station performance, particularly in comparison with nearby stations, can be more useful in this respect.

The global monitoring results presented in this report are meant to serve a wider meteorological community as well as to support special WMO programmes such as TOGA and EUCOS. The contents of the report may therefore be adapted for special requirements as necessary.

As recommended at the ninth session of the Commission for Basic Systems at Geneva 1988, lead centres have been appointed for each main type of observation which should liaise with the participating centres and co-ordinate all the results, inform the WMO Secretariat immediately of obvious problems, and produce every six months a consolidated list of observations of that particular type believed to be of low quality. The presently nominated centres are: RSMC Exeter for marine surface observations; RSMC ECMWF for radiosonde and pilot observations; WMC Washington for aircraft and satellite observations.

ECMWF produces this monthly report as part of its routine monitoring activity in order to facilitate the exchange of monitoring information. Tables are presented according to the CBS recommended standards for the exchange of monitoring results. Copies of the report will be provided to major GDPS centres participating in data monitoring activities as initiated and recommended at the ninth session of the Commission for Basic Systems in Geneva 1988, and to the WMO Secretariat and the International TOGA office in Geneva.

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

ECMWF
Attn. Head, Operations Department
Shinfield Park
Reading, Berkshire, RG2 9AX
United Kingdom

2 Data summary - History of events

2.1 Radiosondes

The following is a list of land-based stations showing a change in reporting frequency (of 500 hPa geopotential) of at least 10 observations compared with the average over the previous 3 months. The number of reports received at ECMWF for the current and previous month is shown in addition to the observation time.

Ident	Time	Dec	Jan	Ident	Time	Dec	Jan
17607	(12)	30	10	12982	(12)	8	27
20046	(12)	29	0	31538	(12)	10	30
20292	(12)	31	0	40650	(12)	0	11
20674	(12)	27	0	40811	(00)	0	30
20744	(12)	28	0	42369	(00)	0	14
21432	(00)	31	1	42874	(00)	2	22
21824	(00)	31	0	42971	(00)	5	31
21946	(00)	28	0	43369	(00)	2	18
22113	(12)	31	0	48407	(00)	15	31
22217	(12)	31	0	60680	(00)	18	31
22271	(12)	30	0	60680	(12)	20	31
22522	(12)	30	0	63741	(00)	0	18
22543	(12)	31	0	63985	(00)	11	28
22820	(12)	30	0	65503	(12)	10	31
22845	(12)	31	0	78016	(00)	6	26
23205	(12)	31	0	85586	(00)	0	18
23415	(12)	27	0	97502	(00)	12	27
23802	(12)	31	0	-	-	-	-
23955	(12)	30	0	-	-	-	-
24125	(00)	29	0	-	-	-	-
24266	(00)	30	0	-	-	-	-
24343	(00)	30	0	-	-	-	-
24641	(00)	31	0	-	-	-	-
24688	(00)	31	0	-	-	-	-
24944	(00)	31	0	-	-	-	-
24959	(00)	30	0	-	-	-	-
25123	(00)	29	0	-	-	-	-
25400	(00)	31	0	-	-	-	-
25428	(00)	31	0	-	-	-	-
25703	(00)	31	0	-	-	-	-
25913	(00)	32	2	-	-	-	-
26063	(12)	30	0	-	-	-	-
26298	(12)	30	0	-	-	-	-
26477	(12)	29	0	-	-	-	-
26702	(12)	29	0	-	-	-	-
26781	(12)	31	0	-	-	-	-
27038	(12)	31	0	-	-	-	-
27199	(12)	30	0	-	-	-	-
27459	(12)	31	0	-	-	-	-
27595	(12)	28	0	-	-	-	-
27612	(12)	27	0	-	-	-	-
27707	(12)	31	0	-	-	-	-
27730	(12)	30	0	-	-	-	-
27962	(12)	30	0	-	-	-	-
27995	(12)	30	0	-	-	-	-
28722	(12)	30	0	-	-	-	-
29231	(12)	30	0	-	-	-	-
29612	(12)	31	0	-	-	-	-
29634	(12)	28	0	-	-	-	-
29698	(12)	31	0	-	-	-	-
29839	(12)	31	0	-	-	-	-
30054	(00)	28	0	-	-	-	-
30230	(12)	31	0	-	-	-	-
30309	(12)	31	0	-	-	-	-
30372	(00)	31	0	-	-	-	-
30554	(00)	28	0	-	-	-	-
30635	(00)	31	0	-	-	-	-
30673	(00)	30	0	-	-	-	-
30715	(12)	29	0	-	-	-	-
30758	(00)	31	0	-	-	-	-

30935	(00)	29	0	-	-	-	-
30965	(00)	31	0	-	-	-	-
31004	(00)	31	0	-	-	-	-
31088	(00)	31	0	-	-	-	-
32061	(00)	31	10	-	-	-	-
32389	(00)	31	0	-	-	-	-
32540	(00)	30	0	-	-	-	-
32618	(00)	30	0	-	-	-	-
34009	(12)	30	0	-	-	-	-
34122	(12)	30	0	-	-	-	-
34172	(12)	30	0	-	-	-	-
34247	(12)	29	0	-	-	-	-
34467	(12)	31	0	-	-	-	-
34731	(12)	30	0	-	-	-	-
34858	(12)	31	0	-	-	-	-
34882	(12)	30	0	-	-	-	-
35121	(12)	30	0	-	-	-	-
37011	(12)	31	0	-	-	-	-
37055	(12)	30	0	-	-	-	-
37259	(12)	28	0	-	-	-	-
40706	(12)	12	0	-	-	-	-
43150	(00)	12	0	-	-	-	-
64500	(00)	26	0	-	-	-	-
64700	(00)	29	1	-	-	-	-
64700	(12)	28	1	-	-	-	-
78807	(00)	23	5	-	-	-	-
89662	(12)	25	0	-	-	-	-
96315	(12)	27	0	-	-	-	-

2.2 Drifting Buoys

Surface pressure observations from **1452** drifting buoys were received during the month.

3 Global monitoring statistics

The following figures and tables provide information on both the availability and quality of various data types as received at ECMWF during the month. A brief description of each figure/table is given below. For a full explanation please refer to the Annex.

3.1 Data Availability

Figures 1-9 are global charts for each data type showing the average number of observations received in 24 hours in 5 degree boxes. The average daily number of observations (global) is also displayed with a breakdown, where appropriate, for each WMO region (figures 1, 3 and 4) and Ocean (figures 1-4).

Fig	Observation Type	Parameter	Level/Layer
1	SYNOP/SHIP	MSL Pressure	Surface
2	DRIFTER	MSL Pressure	Surface
3	TEMP	Geopotential	500 hPa
4	TEMP/PILOT	Wind	300 hPa
5	AIRCRAFT (AIREP/AMDAR etc.)	Wind	300-150 hPa
6	SATOB	Wind	400-150 hPa
7	SATOB	Wind	1000-700 hPa
9	TOVS (120 km) - NOAA14	Thickness	300-100 hPa

(Figure 1 includes data from fixed marine platforms e.g. moored buoys.)

3.2 Data Quality

Tables 1-8 contain lists of suspect stations in the format according to Recommendation 3 CBS-Ext(85).

Tab	Observation Type	Parameter	Level/Layer
1	SHIP	MSL Pressure	Surface
2	SHIP	Wind Speed	Surface
3	SHIP	Wind Direction	Surface
4	DRIFTER	MSL Pressure	Surface
5	DRIFTER	Wind Speed	Surface
6	DRIFTER	Wind Direction	Surface
7	TEMP	Geopotential	1000- 30 hPa
8	TEMP/PILOT	Wind	1000-100 hPa
9	TEMP/PILOT	Wind Direction	500-150 hPa

(SHIP tables include data from fixed marine platforms e.g. moored buoys.)

Figures 10-13 show the locations of suspect stations given in tables 7 and 8.

Fig	Observation Type	Parameter	Observation Time
10	TEMP	Geopotential	00 UTC
11	TEMP	Geopotential	12 UTC
12	TEMP/PILOT	Wind	00 UTC
13	TEMP/PILOT	Wind	12 UTC

Tables 10 and 11 provide quality statistics for all TEMPSHIPS and PILOTSHIPS received during the month.

Tab	Parameter	Observation Time
10	Geopotential	00 and 12 UTC
11	Wind	00 and 12 UTC

Figures 14–18 show global charts of SATOB and aircraft wind statistics in the form of wind vectors averaged over 5 degree boxes.

Fig	Parameter	Level/Layer
14	SATOB - Mean observed wind	1000-700 hPa
15	SATOB - Mean observed wind	400-150 hPa
16	SATOB - Mean observed minus first-guess wind	1000-700 hPa
17	SATOB - Mean observed minus first-guess wind	400-150 hPa
18	AIRCRAFT WIND - Mean observed minus first-guess	300-150 hPa

Table 12 provides quality statistics of aircraft wind observations stratified by airline carrier.

3.2.1 Figure 1 - Availability - SYNOP PRESSURE

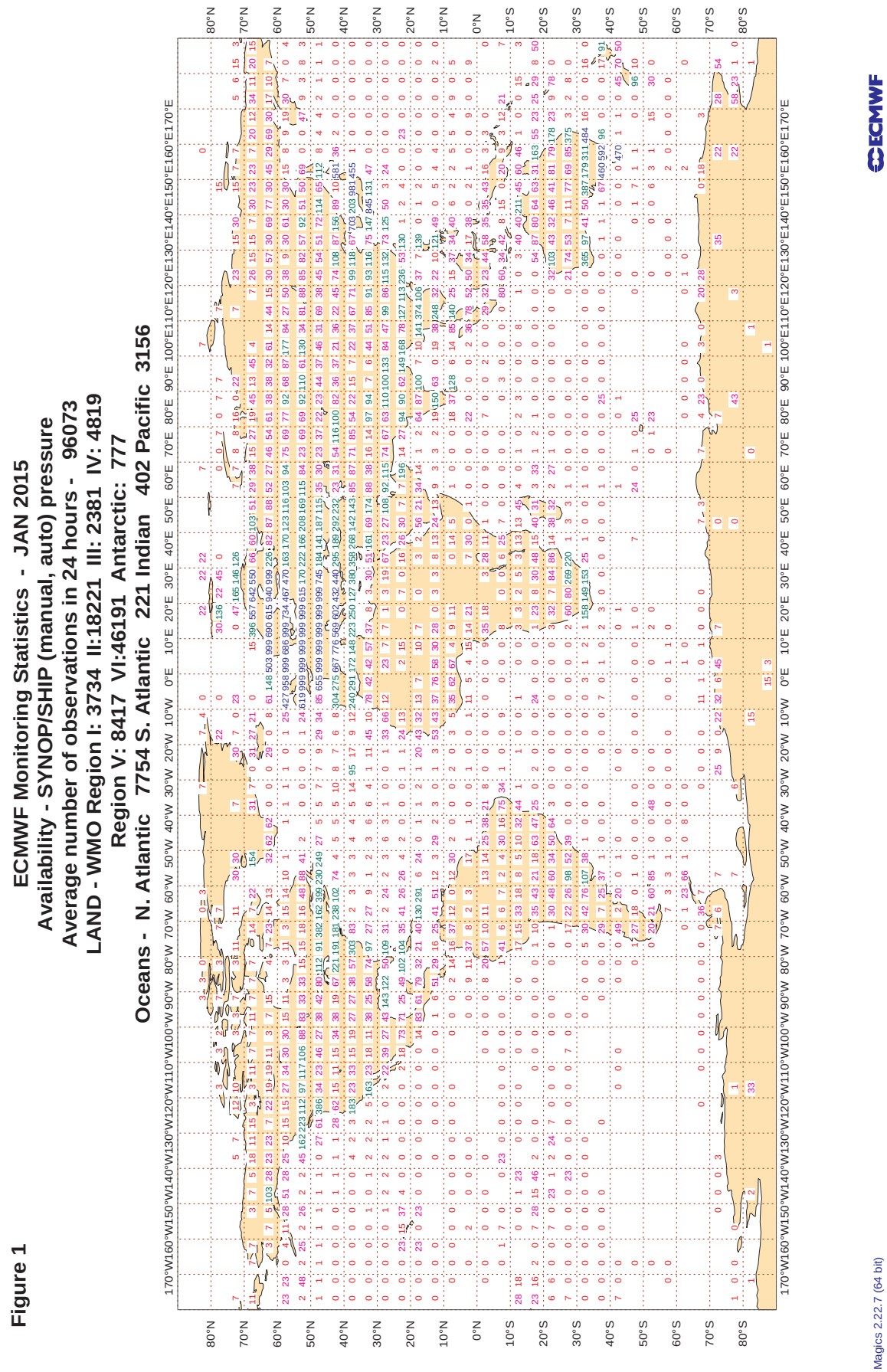


Figure 1

3.2.2 Figure 2 - Availability - DRIFTER PRESSURE

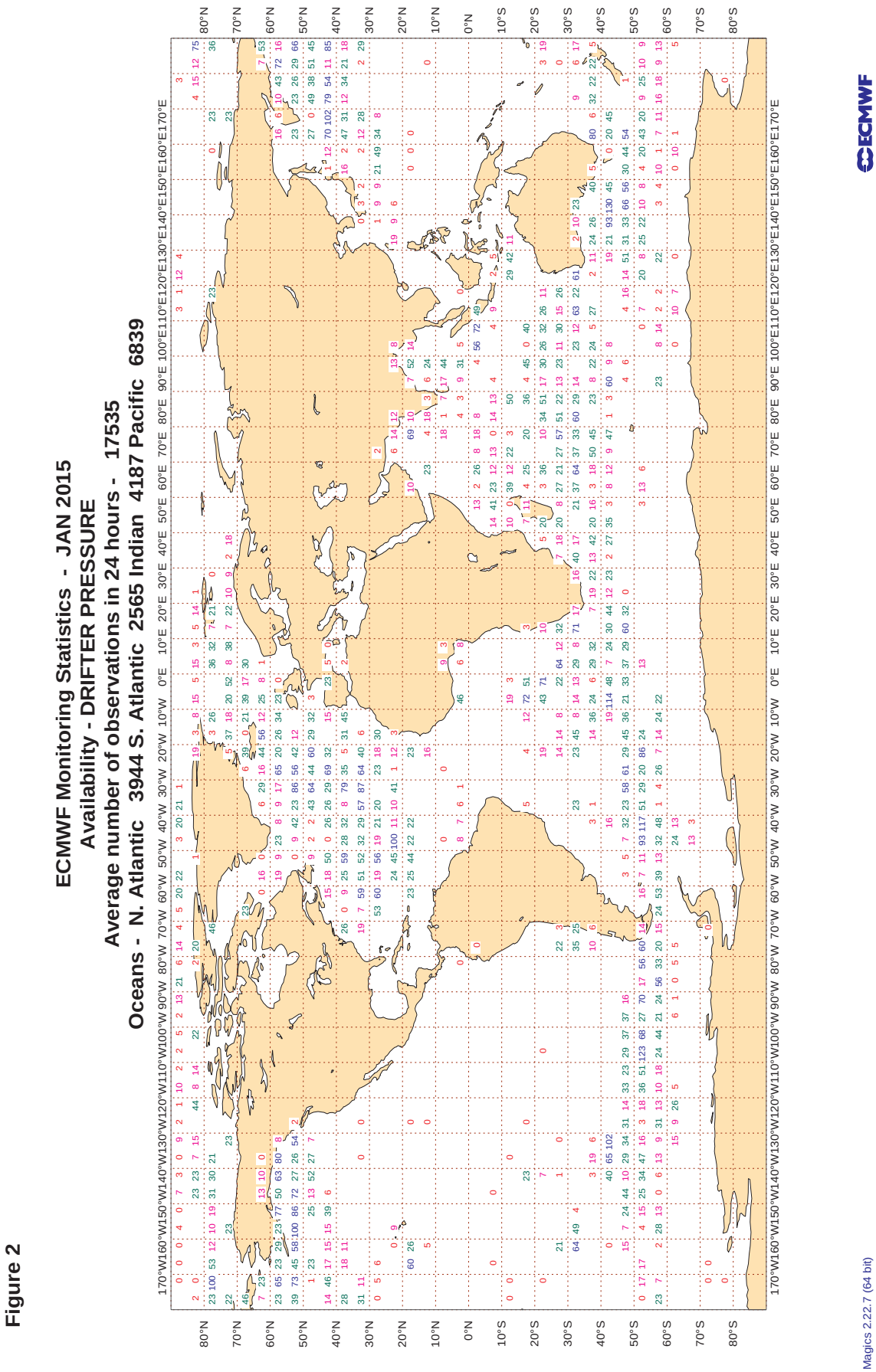


Figure 2

3.2.3 Figure 3 - Availability - TEMP 500 hPa geopotential

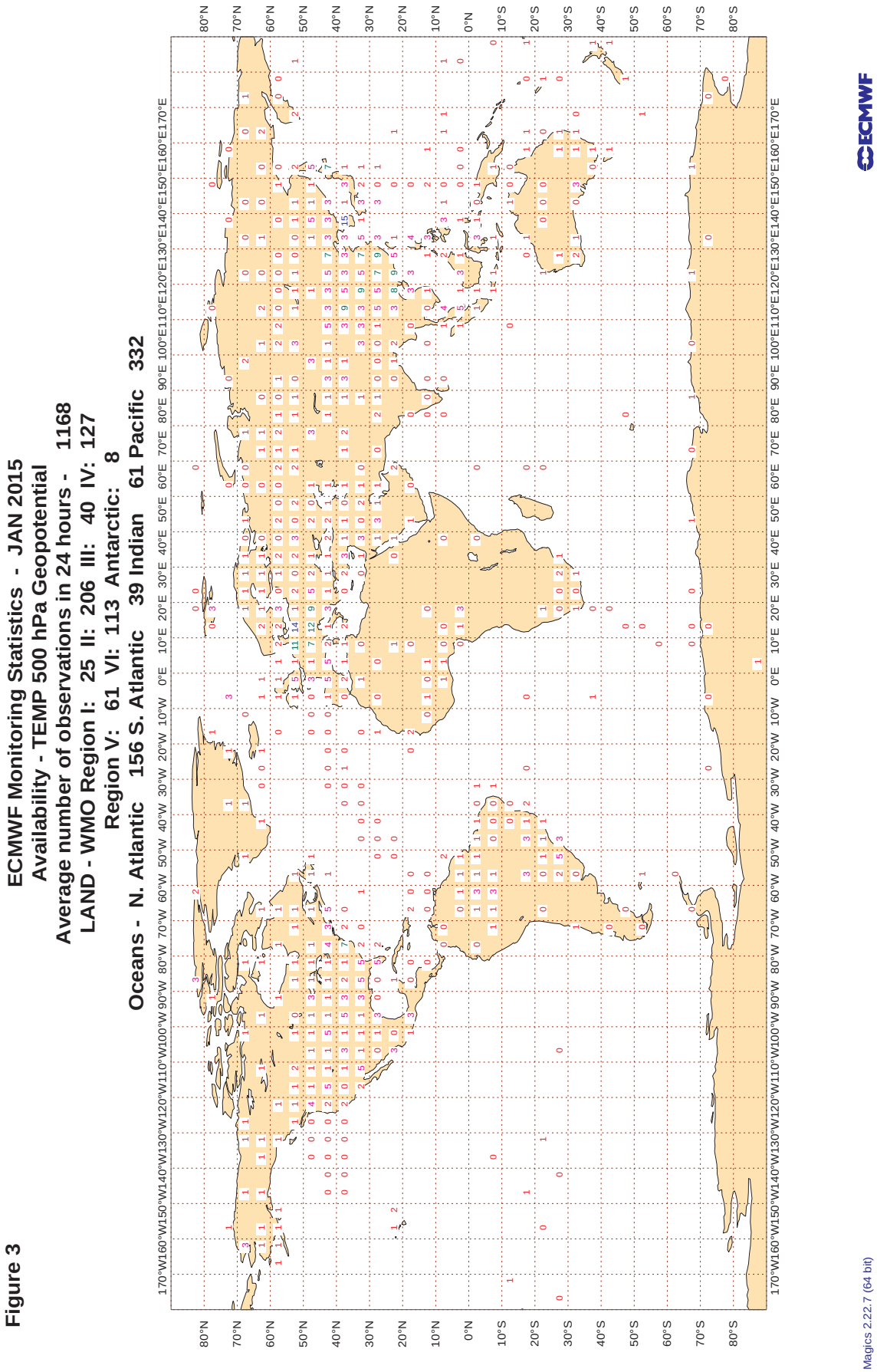


Figure 3

3.2.4 Figure 4 - Availability - TEMP/PILOT 300 hPa wind

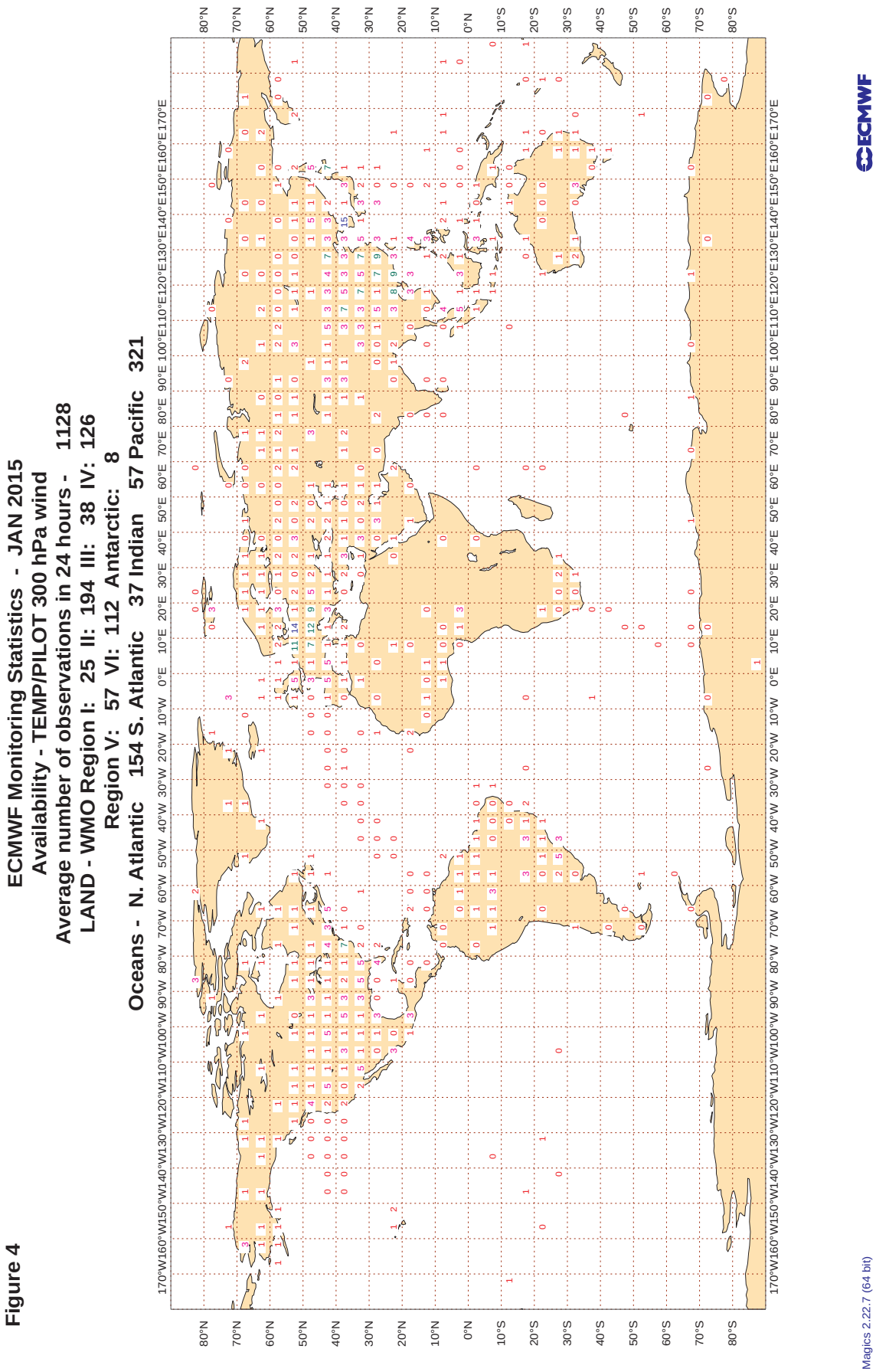


Figure 4

3.2.5 Figure 5 - Availability - AIRCRAFT winds 300-150 hPa

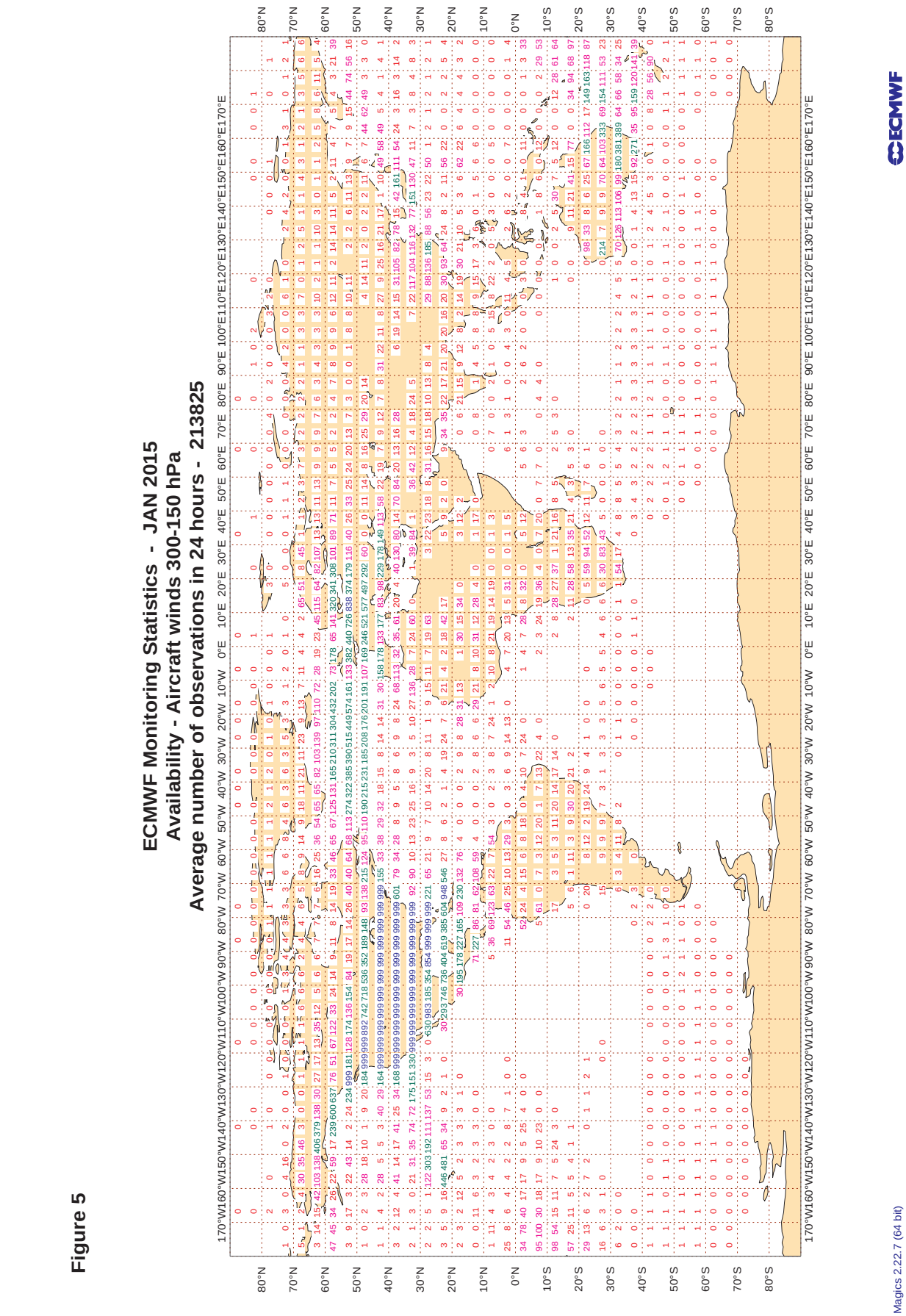
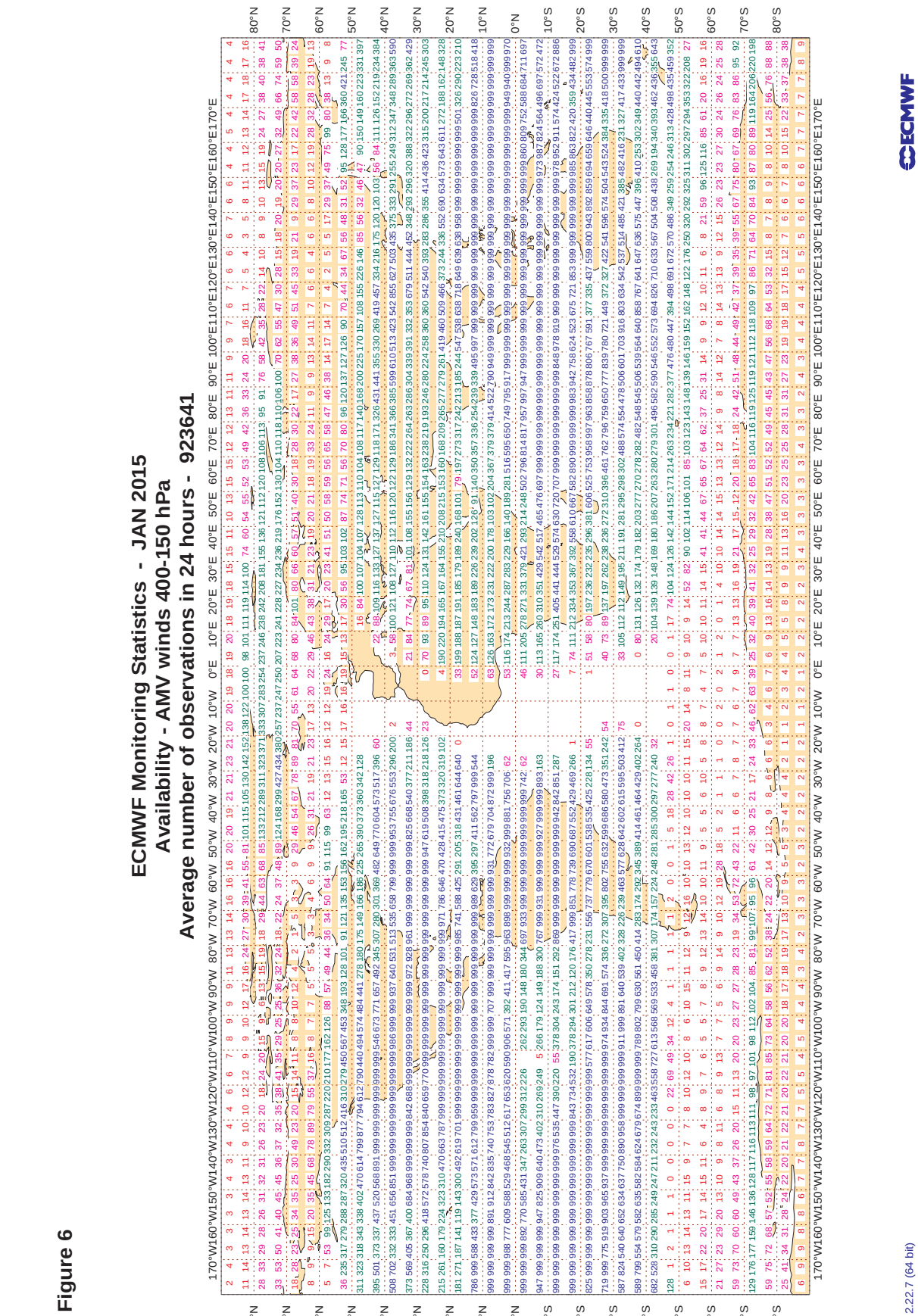


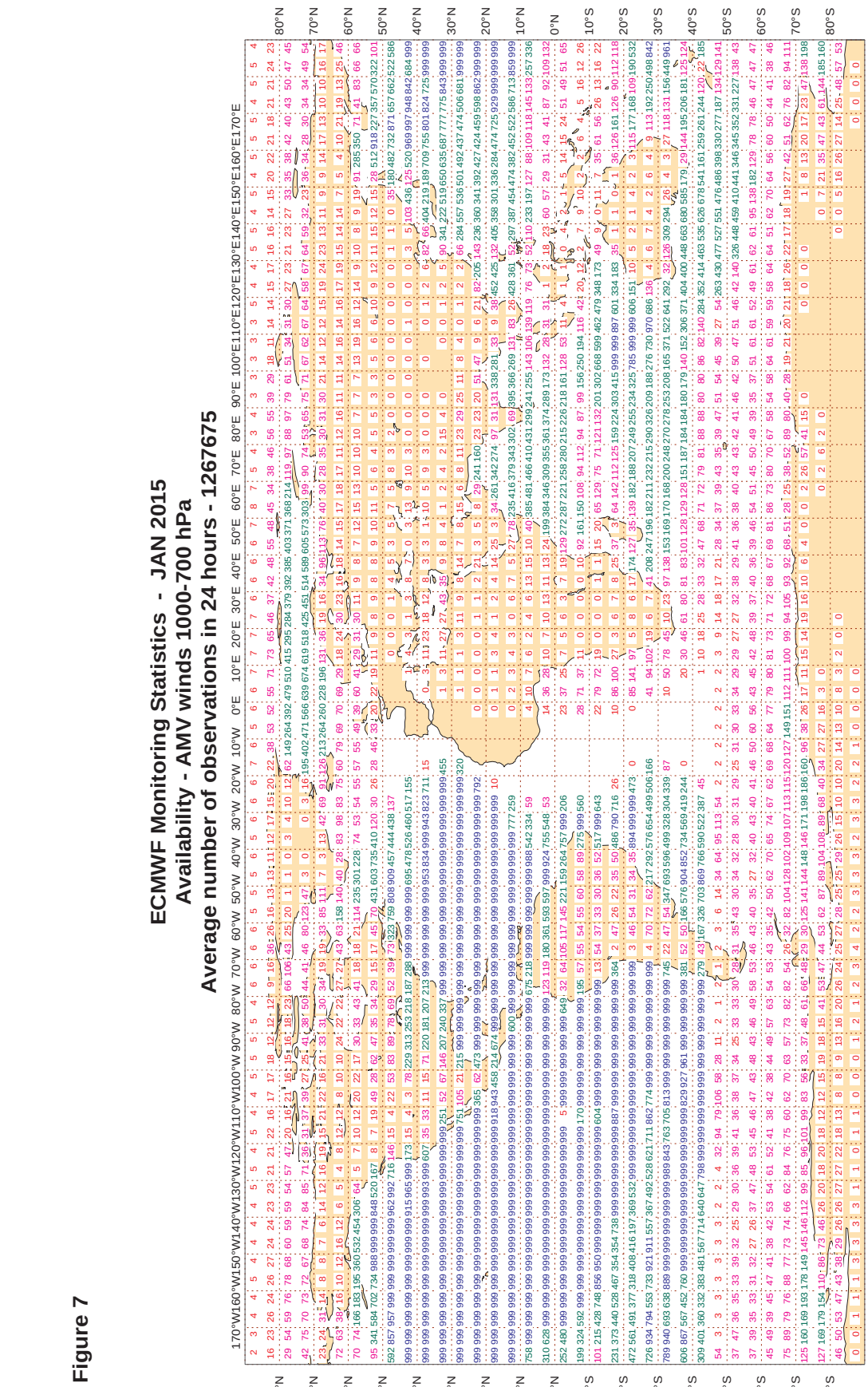
Figure 5

3.2.6 Figure 6 - Availability - SATOB winds 400-150 hPa

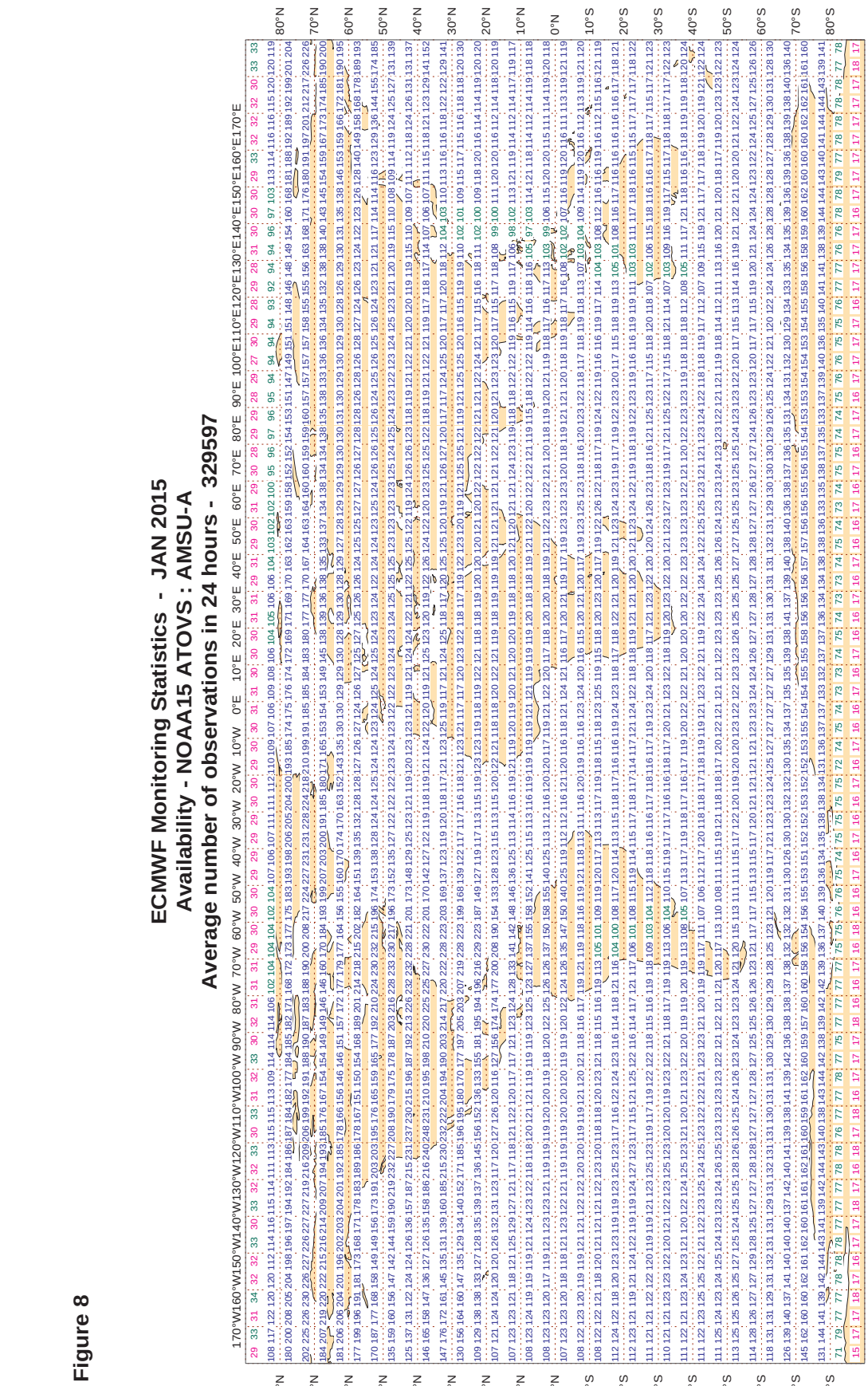
Figure 6



3.2.7 Figure 7 - Availability - SATOB winds 1000-700 hPa

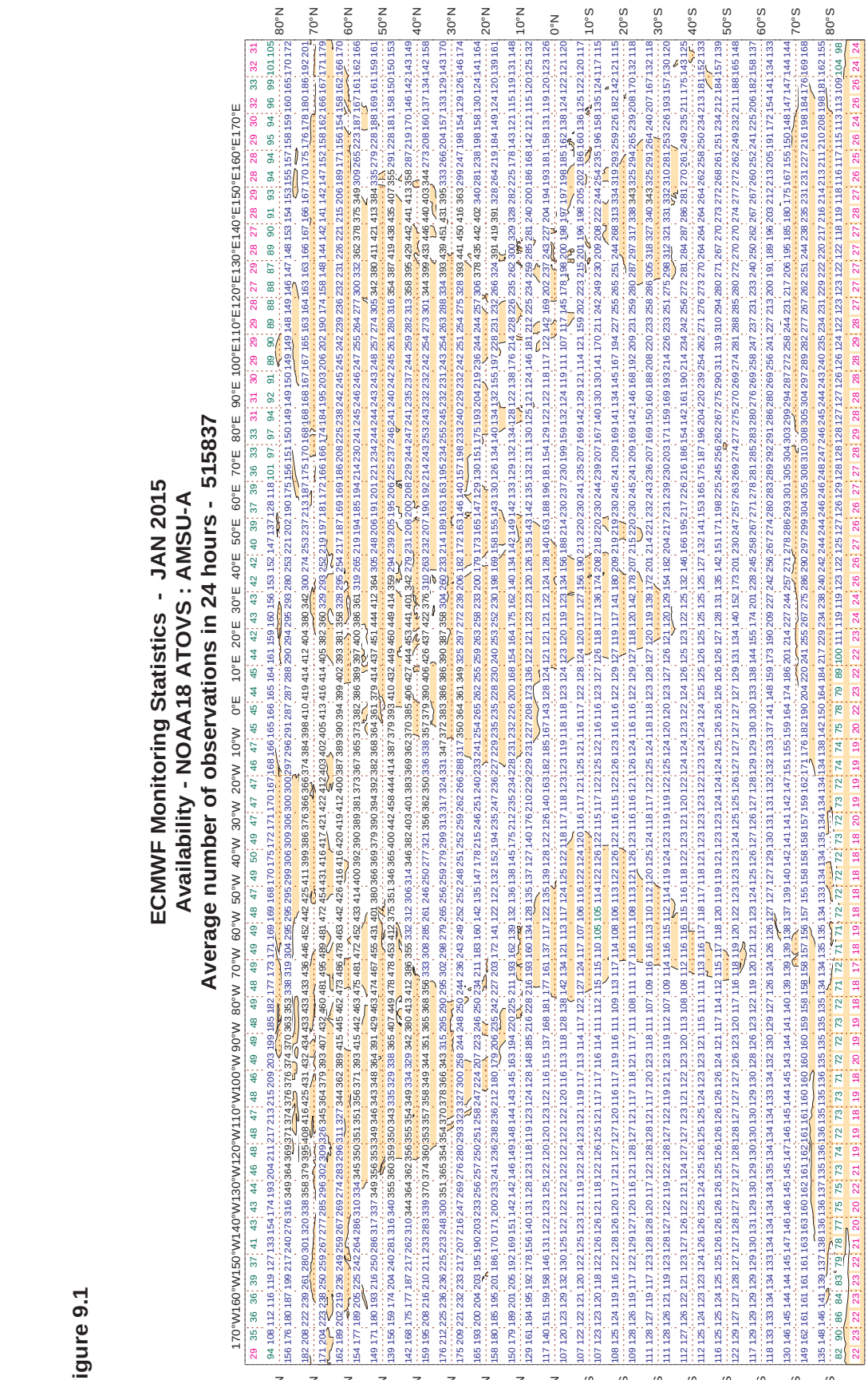


3.2.8 Figure 8 - Availability - NOAA15 ATOVS : AMSU-A



3.2.9 Figure 9.1 - Availability - NOAA18 ATOVS : AMSU-A

Figure 9.1



3.2.10 Figure 9.2 - Availability - AQUA ATOVS : AMSU-A

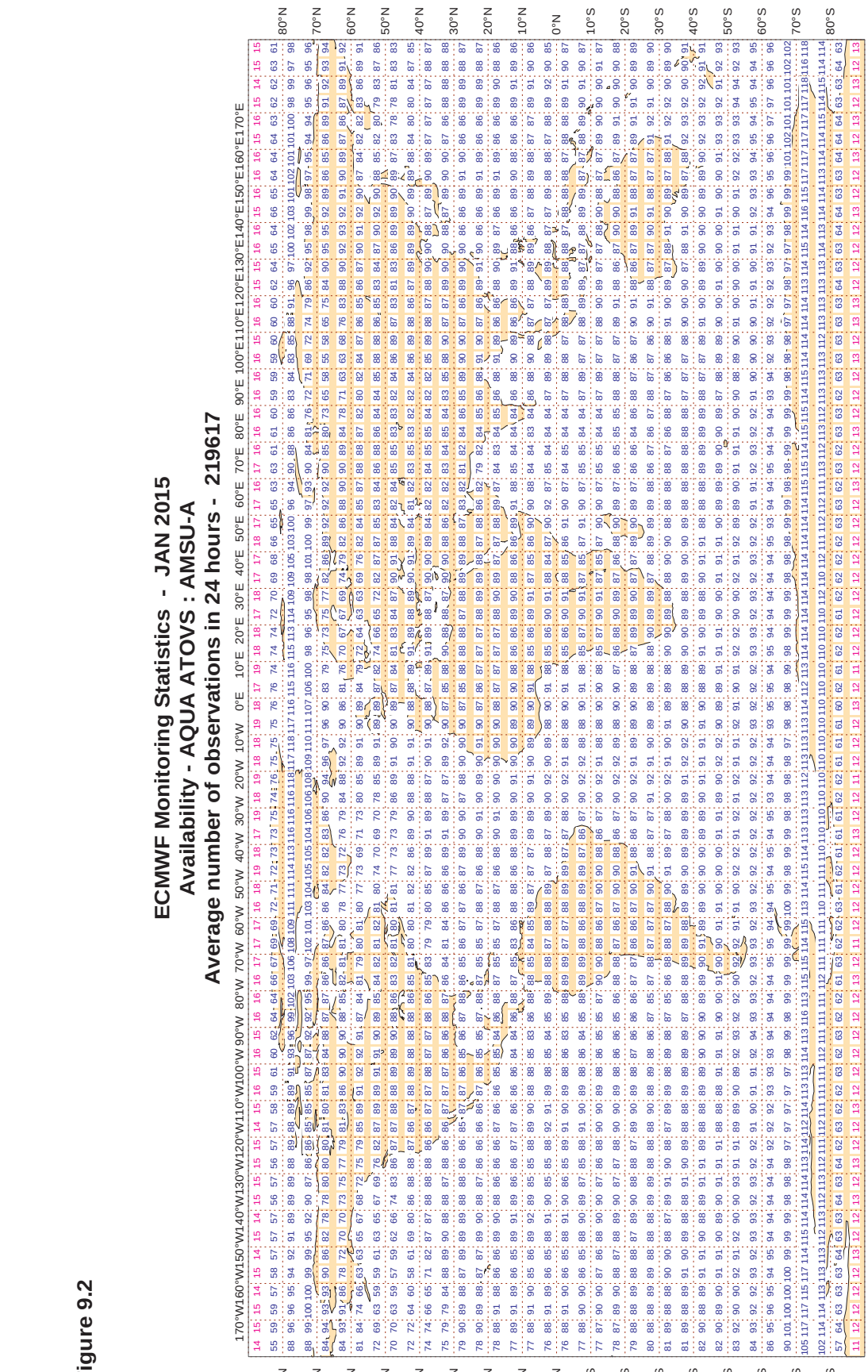
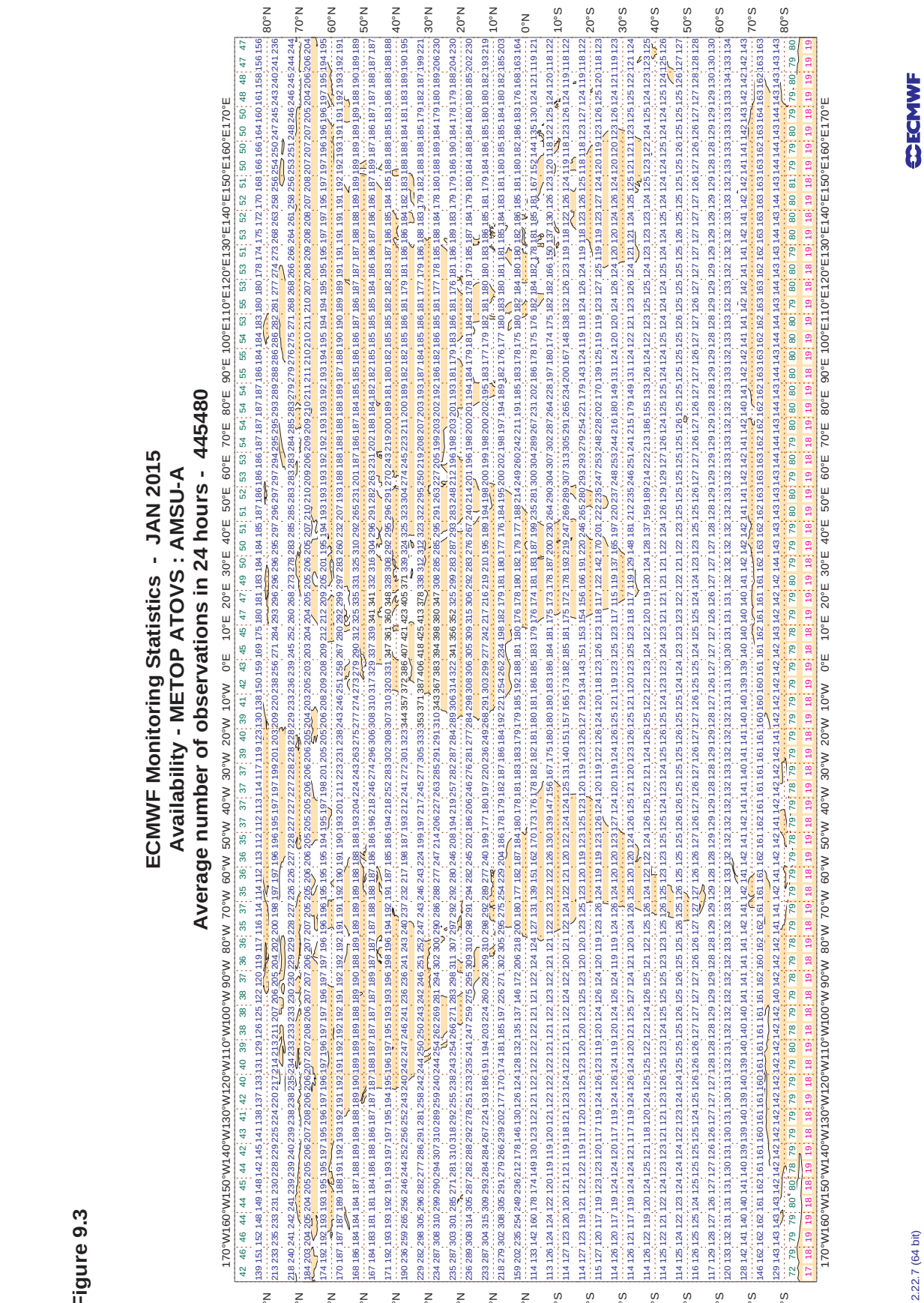


Figure 9.2

3.2.11 Figure 9.3 - Availability - METOP ATOVS : AMSU-A



3.2.12 Table 1 - Suspect ships and fixed marine platforms: Surface pressure - (hPa)

```
          LIST OF SUSPECT STATIONS        : SHIPS + FIXED MARINE PLATFORMS
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : SURFACE PRESSURE (HPA)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.           >= 15(50), AND,
Manual (Automatic)  ABSOLUTE BIAS         >= 3(2) HPA, OR,
                    STANDARD DEVIATION    >= 5(4) HPA, OR,
                    % GROSS ERROR         >= 25(15)
                    (GROSS ERROR LIMIT = 15 HPA)

TIME = 99 => AVERAGE OF 00, 06, 12 AND 18 UTC OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	NUM OBS	NUM GROSS	SD	BIAS	RMS
C6YM6	99	P	SUR	18	0	2.1	3.1	3.8
J8NZ	99	P	SUR	15	0	3.5	3.3	4.8
V7RP7	99	P	SUR	18	0	0.8	5.8	5.9
WAHV	99	P	SUR	16	0	1.1	3.1	3.3

3.2.13 Table 2 - Suspect ships and fixed marine platforms: Wind speed (m/s)

```
          LIST OF SUSPECT STATIONS        : SHIPS + FIXED MARINE PLATFORMS
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND SPEED (M/S)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.           >= 15(50), AND,
Manual (Automatic)  ABSOLUTE BIAS         >= 4(4) M/S, OR,
                    % GROSS ERROR         >= 25(15)
                    (GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S)


TIME = 99 => AVERAGE OF 00, 06, 12 AND 18 UTC OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
46087	99	SPEED	SUR	62	0	0	2.0	4.8	5.2

3.2.14 Table 3 - Suspect ships and fixed marine platforms: Wind direction (DEGREES)

```
          LIST OF SUSPECT STATIONS        : SHIPS + FIXED MARINE PLATFORMS
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.           >= 15(50) (WIND SPEEDS > 3M/S), AND ,
Manual (Automatic)  ABSOLUTE BIAS         >= 30(25) DEGREES, OR,
                    STANDARD DEVIATION    >= 70(50) DEGREES
                    (GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S)


TIME = 99 => AVERAGE OF 00, 06, 12 AND 18 UTC OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS

3.2.15 Table 4 - Suspect drifters: Surface pressure (HPA)

```
          LIST OF SUSPECT STATIONS         : DRIFTER
                    MONITORING CENTRE      : ECMWF
                    ELEMENT MONITORED      : SURFACE PRESSURE (HPA)
                    AREA                   : GLOBAL
                    PERIOD                 : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.            >= 20, AND,
                    ABSOLUTE BIAS          >= 4 HPA, OR,
                    STANDARD DEVIATION     >= 6 HPA, OR,
                    % GROSS ERROR          >= 25
                    (GROSS ERROR LIMIT = 15 HPA)

TIME = 99 => AVERAGE OF ALL OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
16535	99	P	SUR	-36	56	48	0	5.2	-5.8	7.8
21626	99	P	SUR	58	156	220	106	1.4	0.3	1.4
21705	99	P	SUR	33	173	27	2	2.2	10.1	10.3
23991	99	P	SUR	9	87	33	33	0.0	0.0	0.0
23996	99	P	SUR	6	89	244	80	0.4	-0.2	0.4
25524	99	P	SUR	79	105	225	225	0.0	0.0	0.0
25602	99	P	SUR	0	0	38	17	9.2	3.2	9.7
46722	99	P	SUR	57	169	109	28	0.6	0.0	0.6
47579	99	P	SUR	62	-21	139	95	6.4	-0.2	6.4
48627	99	P	SUR	0	0	34	32	0.5	11.4	11.5
51754	99	P	SUR	20	-156	143	2	0.5	-13.9	13.9
63546	99	P	SUR	74	-7	217	70	5.2	-1.8	5.5
71236	99	P	SUR	-68	0	133	63	0.3	-0.1	0.3
72511	99	P	SUR	27	-173	40	40	0.0	0.0	0.0

3.2.16 Table 5 - Suspect drifters: Wind speed (m/s)

```
          LIST OF SUSPECT STATIONS        : DRIFTER
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND SPEED (M/S)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.           >= 20, AND,
                    ABSOLUTE BIAS         >= 5 M/S, OR,
                    % GROSS ERROR         >= 25
                    (GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S)


TIME = 99 => AVERAGE OF ALL OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
51747	99	SPEED	SUR	20	-163	62	0	0	2.9	7.9	8.4
51749	99	SPEED	SUR	15	-163	43	0	0	2.3	7.3	7.6
51750	99	SPEED	SUR	16	-167	74	0	0	1.9	7.2	7.5
51751	99	SPEED	SUR	17	-166	65	0	0	1.8	7.2	7.4
51754	99	SPEED	SUR	20	-156	26	0	0	0.6	10.4	10.4

3.2.17 Table 6 - Suspect drifters: Wind direction (degrees)

```
          LIST OF SUSPECT STATIONS        : DRIFTER
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: NO. OF OBS.           >= 20 (WIND SPEEDS > 3M/S), AND ,
                    ABSOLUTE BIAS         >= 20 DEGREES, OR,
                    STANDARD DEVIATION    >= 60 DEGREES
                    (GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S)


TIME = 99 => AVERAGE OF ALL OBSERVATIONS
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
23092	99	DIRN	SUR	18	90	52	0	0	20.0	20.7	28.8
23097	99	DIRN	SUR	15	69	58	0	0	14.2	22.4	26.5
31053	99	DIRN	SUR	-32	-50	154	0	11	28.5	50.3	57.9
31260	99	DIRN	SUR	-16	-38	163	0	75	33.4	67.2	75.0
31374	99	DIRN	SUR	-25	-45	150	0	15	44.7	-48.6	66.0
32303	99	DIRN	SUR	5	-95	81	0	5	32.1	31.9	45.3
51749	99	DIRN	SUR	15	-163	43	0	19	57.6	-20.6	61.2
51754	99	DIRN	SUR	20	-156	26	0	42	6.4	-56.0	56.4

3.2.18 Table 7 - Suspect radiosondes: Geopotential height (metres)

```
          LIST OF SUSPECT STATIONS        : RADIOSONDES
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: AT LEAST 3 LEVELS WITH
                    10 OBS AND 100 M WEIGHTED RMS


ONLY THE WORST LEVEL IS SHOWN (WITH UNWEIGHTED RMS)
```

WMO IDENT	OBS TIME	ELM	LEV	LAT	LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
04417	12	Z	1000	73	-38	30	20	8.4	-88.8	89.2
04417	00	Z	1000	73	-38	29	23	12.4	-84.5	85.4
42182	00	Z	400	29	77	22	1	66.4	-63.8	92.1
42361	00	Z	500	26	78	14	1	44.0	-41.5	60.5
42369	00	Z	400	27	81	13	0	63.1	68.2	92.9
42410	00	Z	300	26	92	15	1	69.8	63.3	94.2
43003	00	Z	500	19	73	18	0	38.4	-60.9	72.0
60760	12	Z	1000	34	8	13	0	37.2	23.3	43.9
76405	00	Z	500	24	-110	23	3	48.0	28.1	55.6
76654	00	Z	700	19	-104	29	1	33.3	34.8	48.2
76679	00	Z	1000	19	-99	26	3	16.0	-79.0	80.6
83566	12	Z	1000	-20	-44	31	0	4.5	-50.0	50.2
83566	00	Z	1000	-20	-44	28	0	11.4	-58.9	60.0
91680	12	Z	925	-18	177	30	0	3.5	30.4	30.6
96471	00	Z	250	6	116	28	2	59.8	45.7	75.3

3.2.19 Table 8 - Suspect radiosondes: Wind (m/s)

```
          LIST OF SUSPECT STATIONS        : RADIOSONDES
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND (M/S)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD


SELECTION CRITERIA: AT LEAST 10 OBS AND 15 M/S RMS VECTOR WIND


STANDARD LEVEL (1000-100 HPA) WITH HIGHEST RMS IS SHOWN
```

WMO IDENT	OBS TIME	ELM	LEV	LAT	LONG	NUM OBS	NUM GROSS	UBIAS	VBIAS	RMS
48327	00	V	100	19	99	10	0	-3.2	-4.1	15.9
48407	00	V	1000	15	105	20	0	-8.6	6.1	17.5

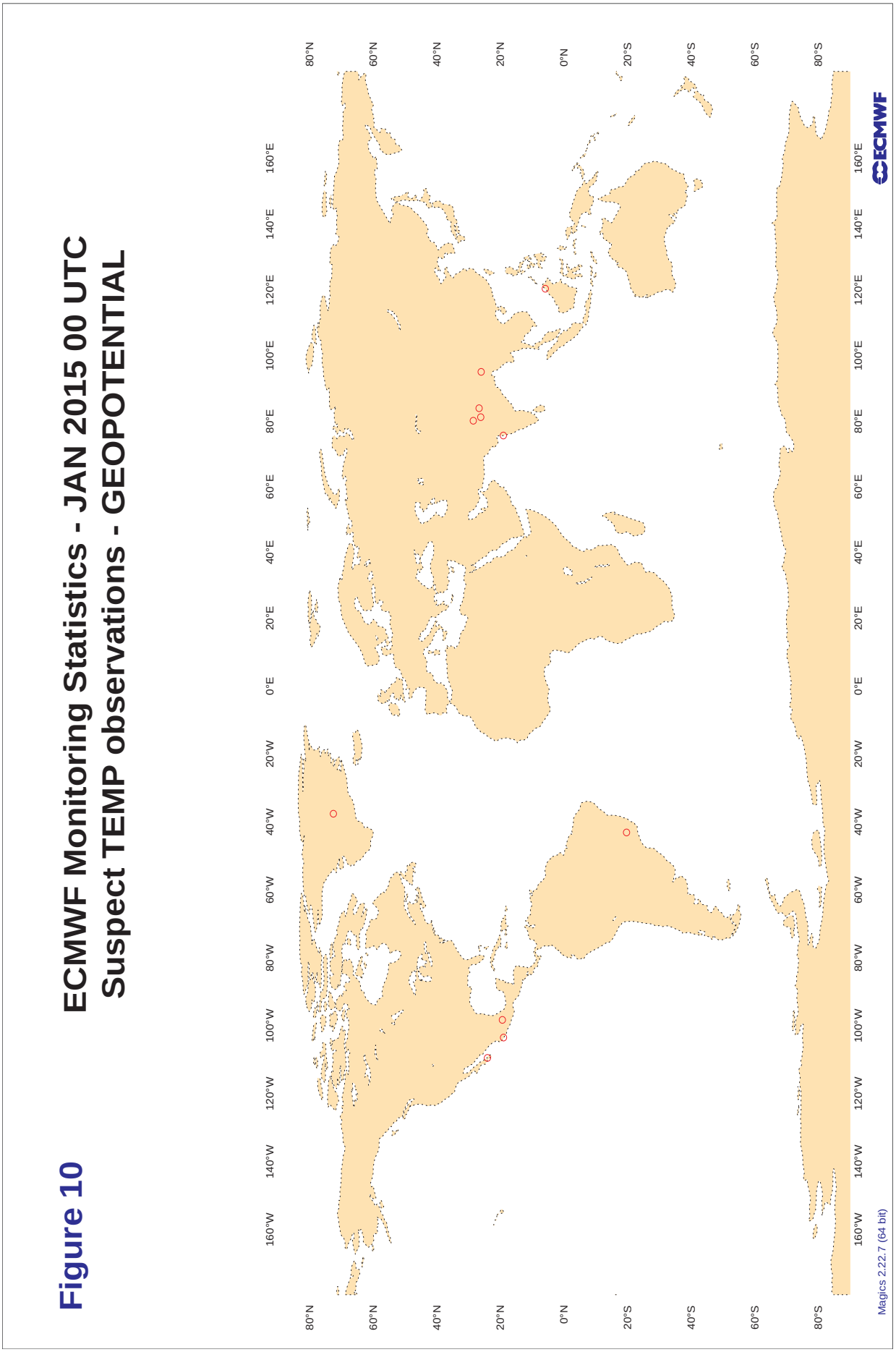
3.2.20 Table 9 - Suspect radiosondes: Wind direction (degrees)

```
          LIST OF SUSPECT STATIONS        : RADIOSONDES
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                    AREA                  : GLOBAL
                    PERIOD                : JAN 2015
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD

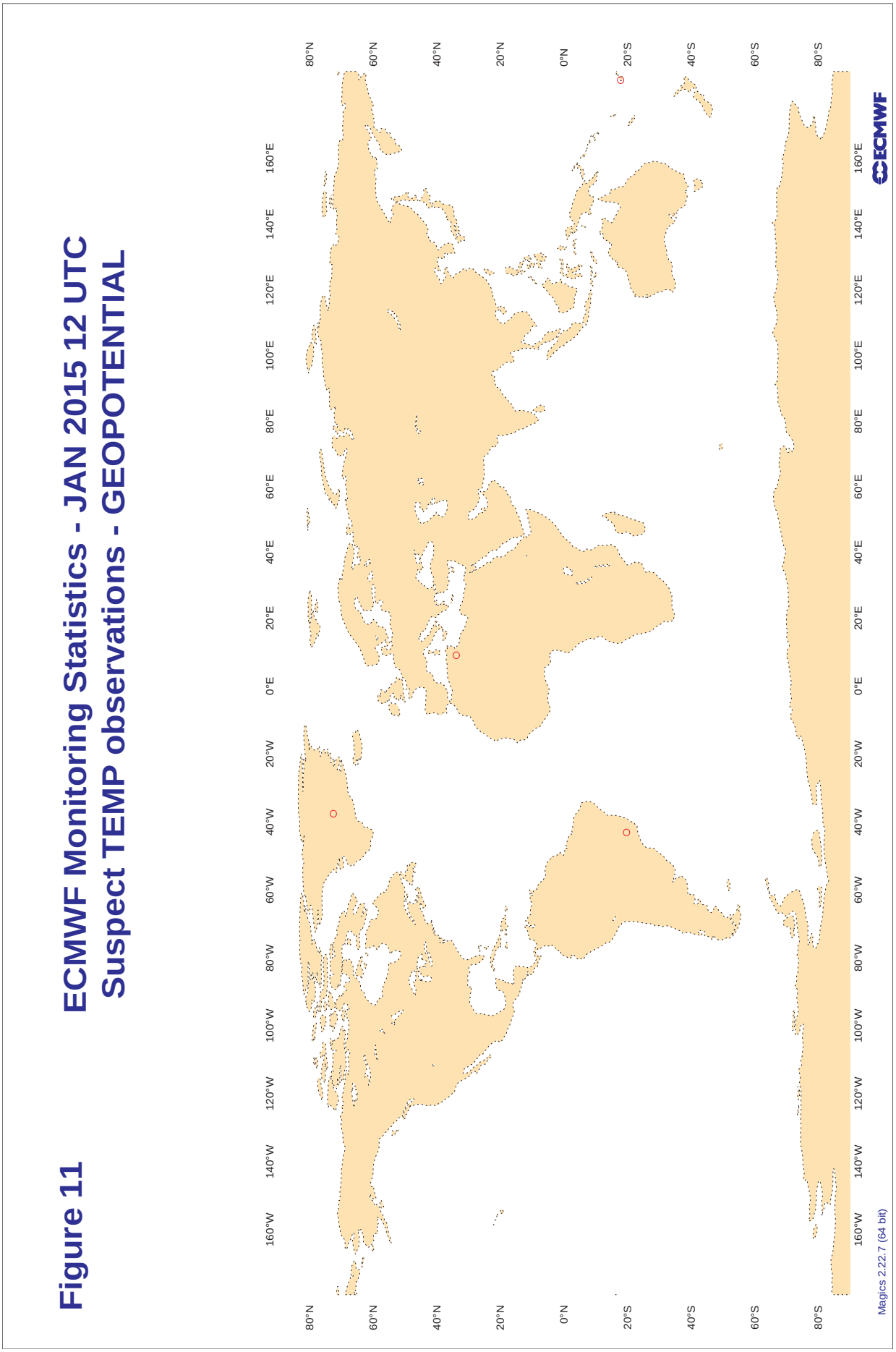

SELECTION CRITERIA: OBSERVED/FORECAST WIND SPEEDS >= 5 M/S
                    NO. OF OBSERVATIONS   >= 5, AND,
                    ABSOLUTE BIAS         >= 10 DEGREES, WITH
                    STANDARD DEVIATION    <  30 DEGREES, AND,
                    VERTICAL SPREAD       < 10 DEGREES
                    (AVERAGE BETWEEN 500 AND 150 HPA)
```

WMO IDENT	OBS TIME	ELM	LAT	LONG	NUM OBS	BIAS	MAX SPREAD	SD

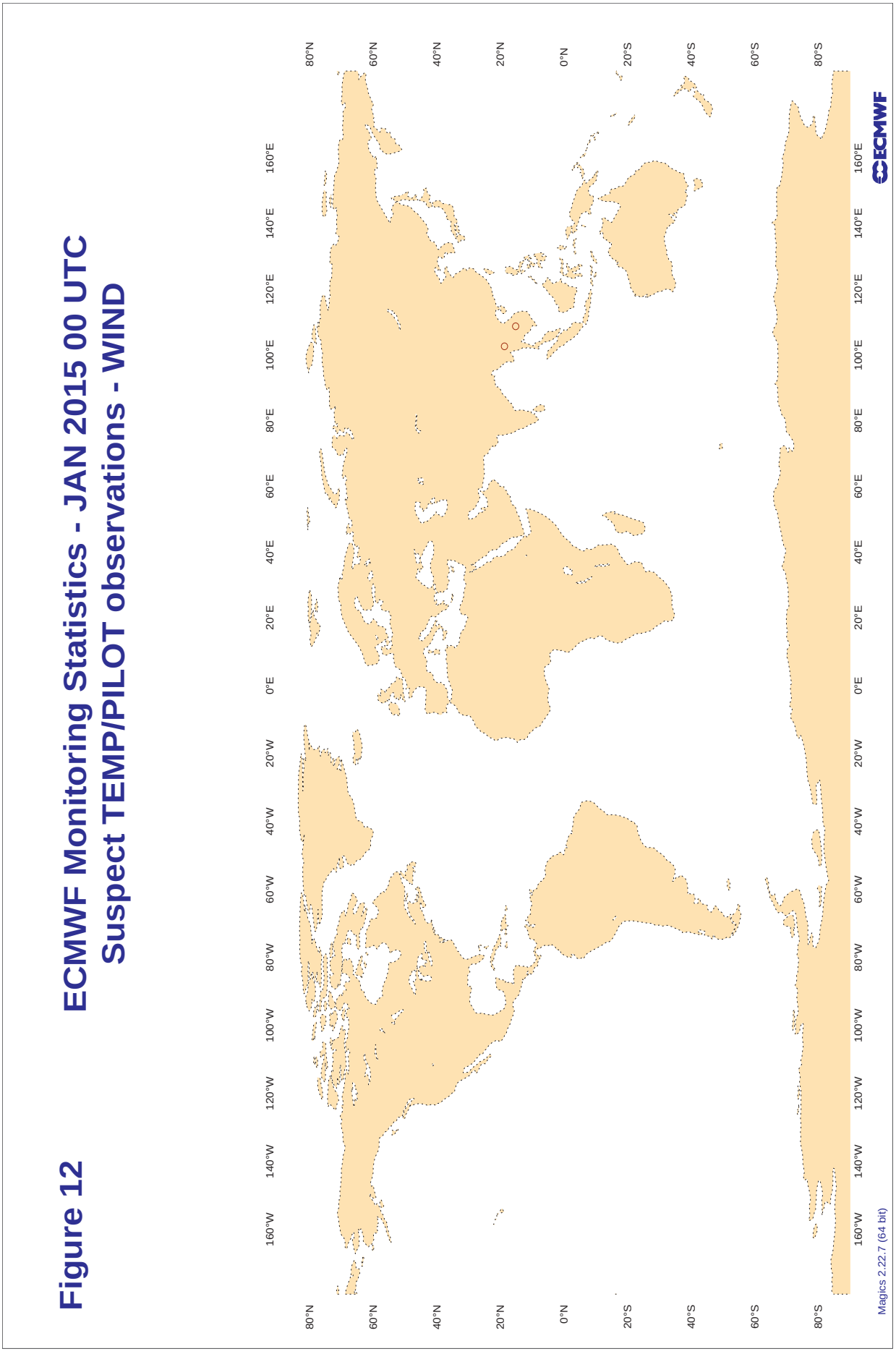
3.2.21 Figure 10 - Suspect TEMP observations - geopotential : 00 UTC



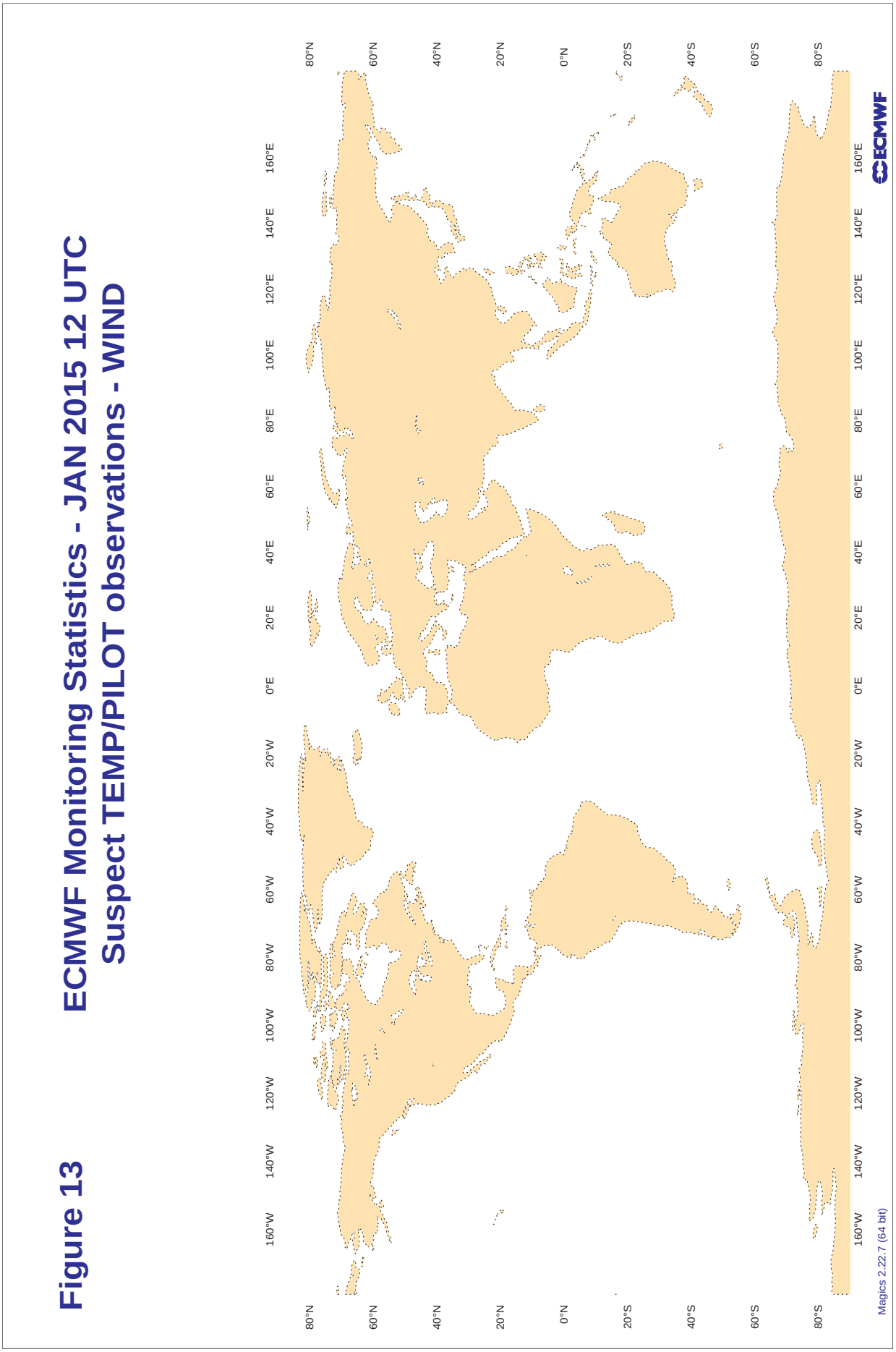
3.2.22 Figure 11 - Suspect TEMP observations - geopotential : 12 UTC



3.2.23 Figure 12 - Suspect TEMP/PILOT observations - wind : 00 UTC



3.2.24 Figure 13 - Suspect TEMP/PILOT observations - wind : 12 UTC



3.2.25 Table 10 - Radiosonde monitoring statistics (SHIPs): Geopotential height (metres)

```
RADIOSONDE MONITORING STATISTICS (SHIPS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 : 100 HPA
         AREA                  : GLOBAL
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
ASDK1	12	Z	100	0	0.0	0.0
ASDK1	00	Z	100	0	0.0	0.0
ASDK2	12	Z	100	25	19.3	17.6
ASDK2	00	Z	100	3	14.3	13.5
ASFR1	12	Z	100	14	8.2	1.1
ASFR1	00	Z	100	11	10.2	-2.3
ASFR2	12	Z	100	8	13.9	11.4
ASFR2	00	Z	100	6	9.9	8.1
ASFR3	12	Z	100	12	11.2	9.0
ASFR3	00	Z	100	11	13.7	11.0
ASFR4	12	Z	100	13	19.3	17.1
ASFR4	00	Z	100	7	16.6	15.9
CEWM	00	Z	100	0	0.0	0.0
JGQH	12	Z	100	12	18.0	17.4
JGQH	00	Z	100	11	19.6	18.9
JNSR	12	Z	100	4	11.0	1.8
JNSR	00	Z	100	8	8.7	6.9
LGKI	00	Z	100	7	9.7	-7.0
LGKI	12	Z	100	9	5.9	-1.4

3.2.26 Table 11 - Radiosonde monitoring statistics (SHIPs): Wind (m/s)

```
RADIOSONDE MONITORING STATISTICS (SHIPS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 : 100 HPA
         AREA                  : GLOBAL
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
ASDK1	12	V	100	0	0.0	0.0	0.0
ASDK1	00	V	100	0	0.0	0.0	0.0
ASDK2	12	V	100	24	3.4	0.0	-0.1
ASDK2	00	V	100	3	1.6	0.6	0.3
ASFR1	12	V	100	11	2.3	0.6	-0.4
ASFR1	00	V	100	10	3.9	0.3	-1.0
ASFR2	12	V	100	7	4.8	1.6	-1.3
ASFR2	00	V	100	5	3.5	0.3	-0.6
ASFR3	12	V	100	12	3.5	0.7	-0.9
ASFR3	00	V	100	11	4.1	1.2	-1.1
ASFR4	12	V	100	13	2.6	0.5	-0.2
ASFR4	00	V	100	7	4.1	-1.8	-0.8
CEWM	00	V	100	0	0.0	0.0	0.0
JGQH	12	V	100	12	4.8	0.1	-0.1
JGQH	00	V	100	11	4.9	-1.3	0.3
JNSR	12	V	100	3	5.8	-5.0	-1.4
JNSR	00	V	100	5	12.7	-9.8	-1.4
LGKI	00	V	100	7	3.1	0.9	-1.9
LGKI	12	V	100	9	3.1	1.0	-0.2

3.2.27 Figure 14 - SATOB Winds: 700-1000hPa

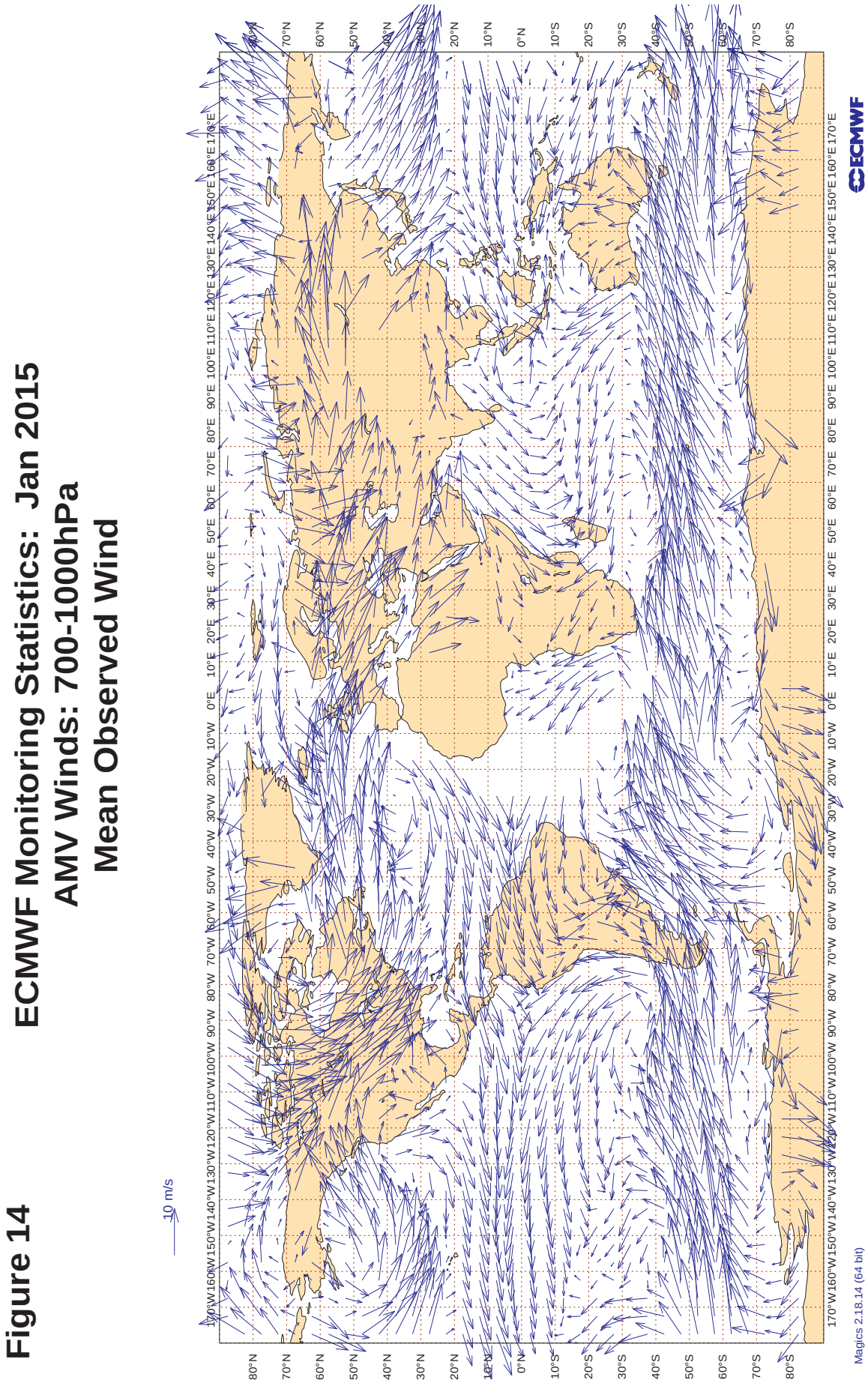


Figure 14

3.2.28 Figure 15 - SATOB Winds: 150- 400hPa

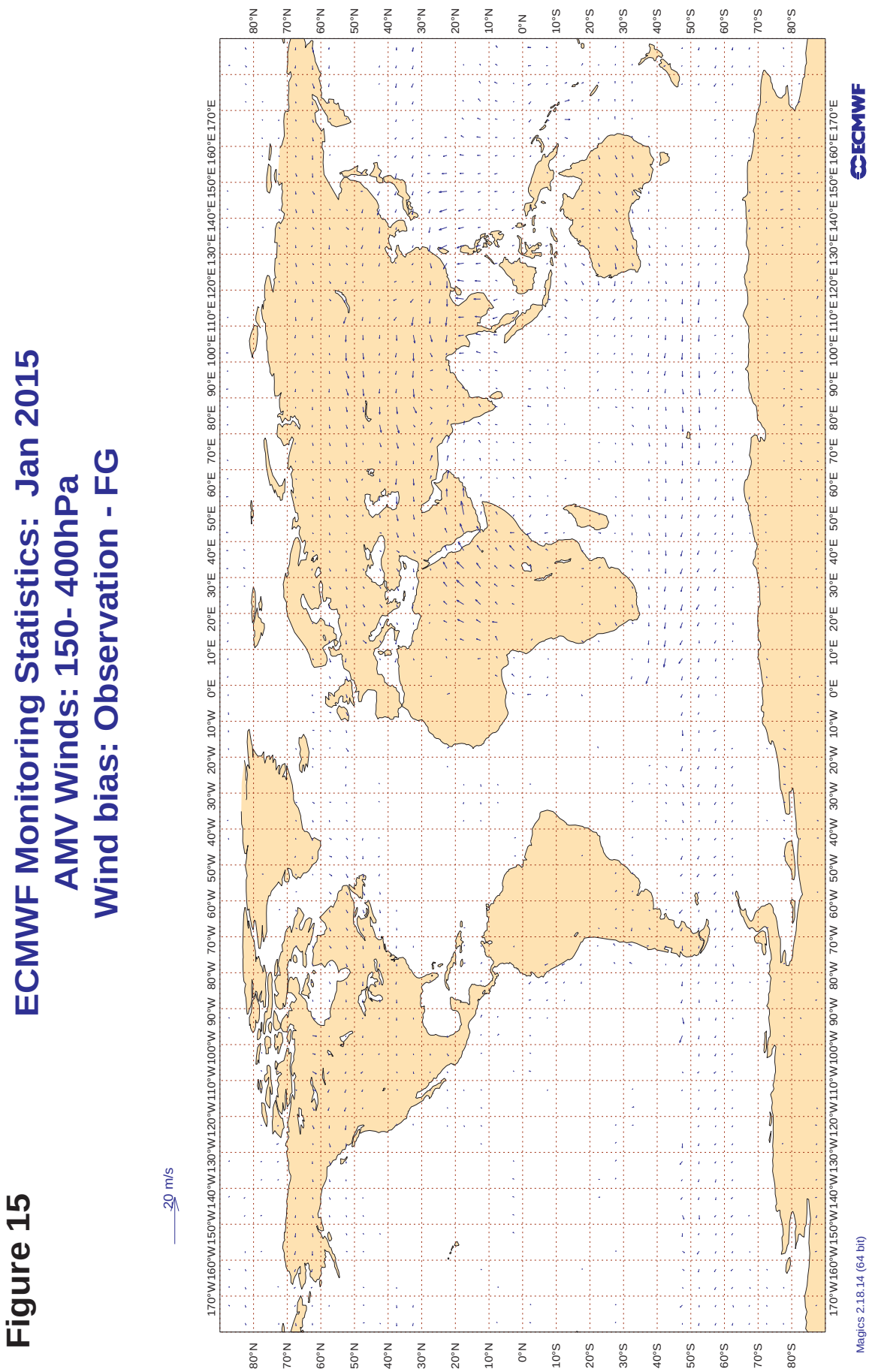


Figure 15

3.2.29 Figure 16 - SATOB Winds: 700-1000hPa

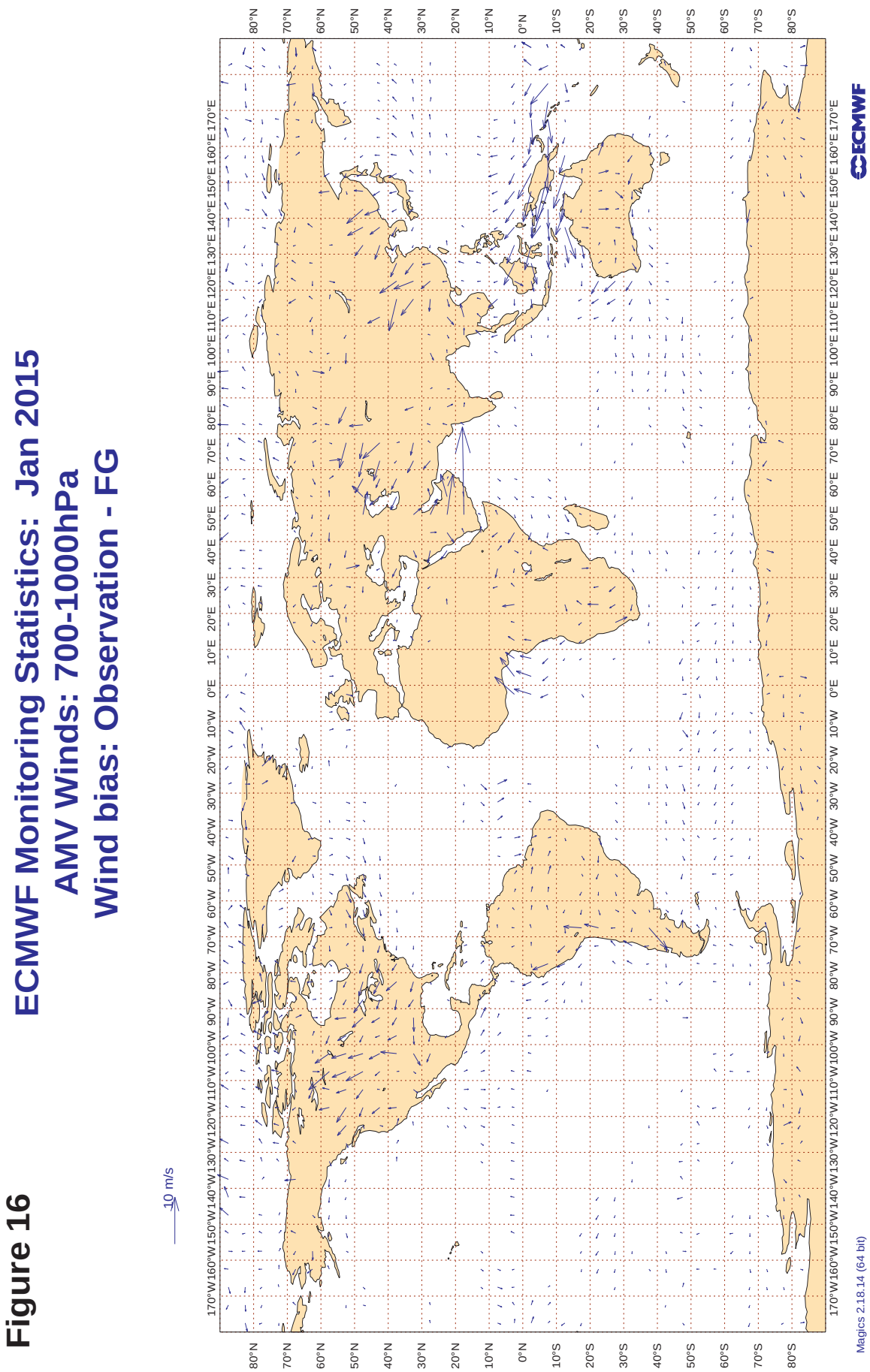


Figure 16

3.2.30 Figure 17 - SATOB Winds: 150- 400hPa

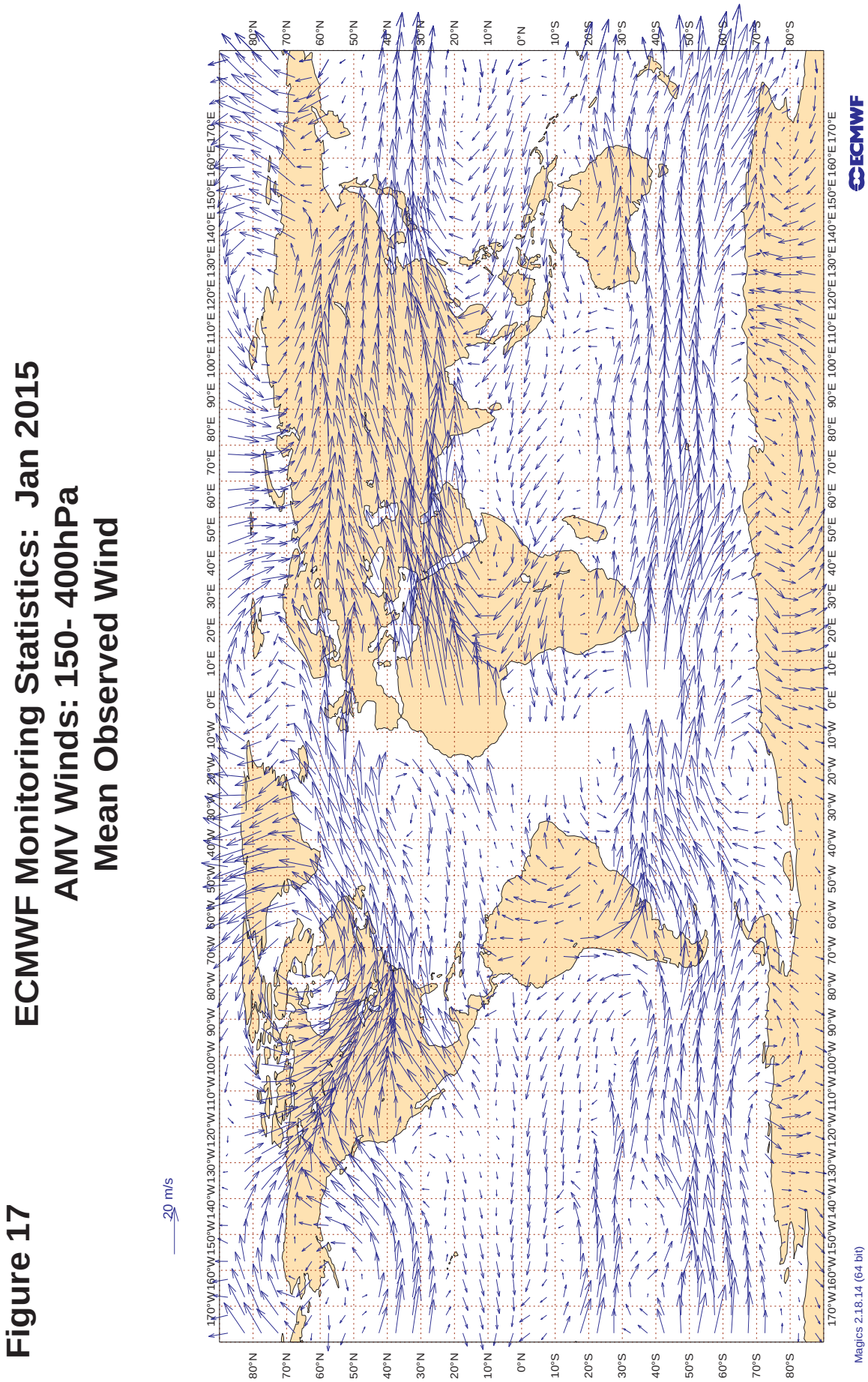


Figure 17

3.2.31 Figure 18 - AIRCRAFT Winds: 150- 300hPa

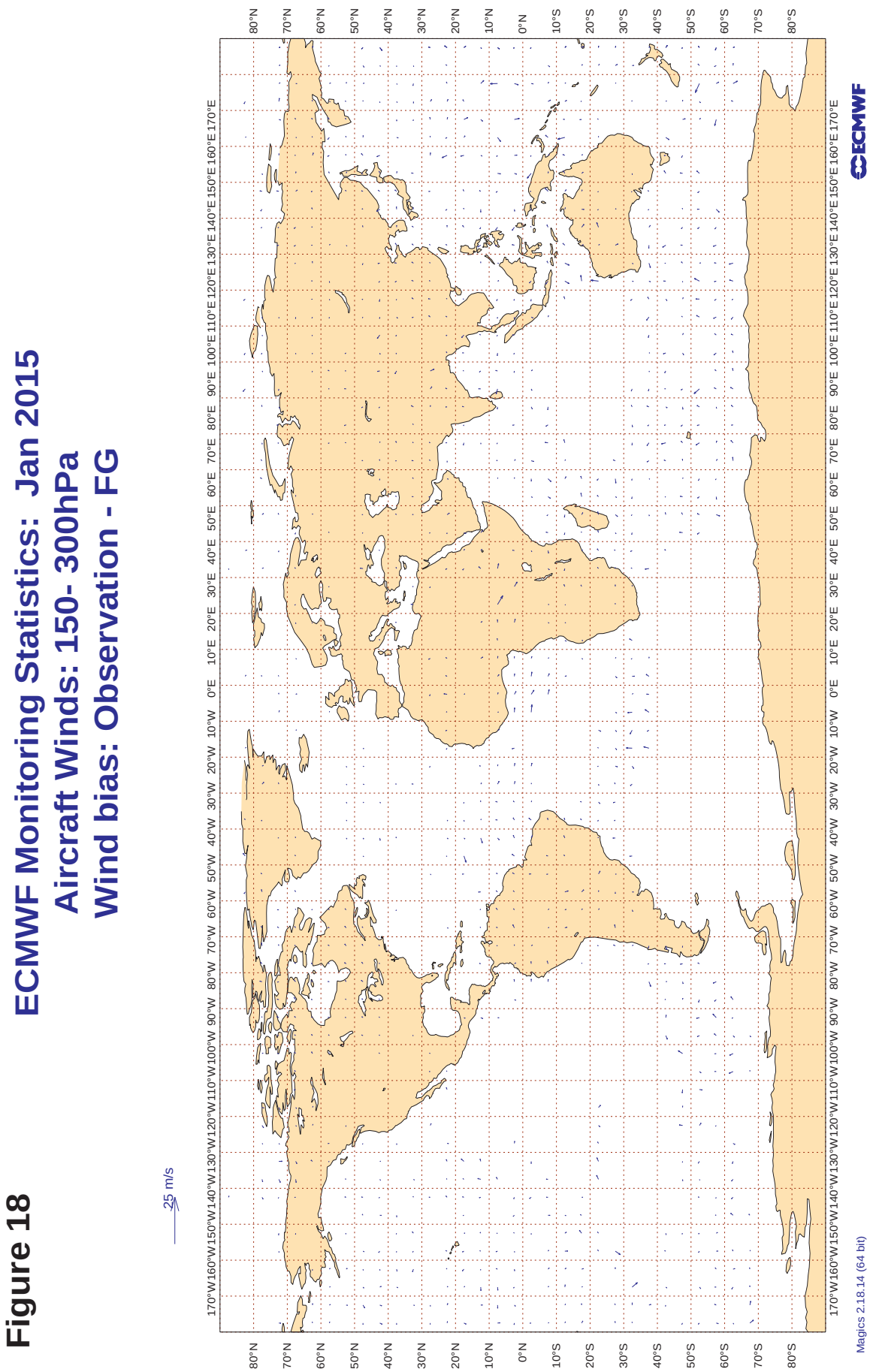


Figure 18

3.2.32 Table 12 - Airep Monitoring Statistics For Airline Carriers (Global)

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : VECTOR WIND (M/S)
AREA : GLOBAL
PERIOD : JAN 2015
STANDARD OF COMPARISON: FIRST-GUESS FIELD

SELECTION CRITERIA: NO. OF OBS. >= 20

TIME = 99 => AVERAGE OF ALL OBSERVATIONS
GROSS ERROR LIMIT ON VECTOR WIND = 40 M/S

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
AAL	99	V	300-150	1856	0	0	5.3	-0.7
AAY	99	V	300-150	209	1	0	6.2	-0.2
ABW	99	V	300-150	29	0	0	3.4	0.2
ABX	99	V	300-150	41	0	0	7.0	-1.7
ACA	99	V	300-150	1694	1	0	4.4	-0.4
ACI	99	V	300-150	869	0	0	4.3	0.4
AFL	99	V	300-150	365	0	0	3.9	0.6
AFR	99	V	300-150	1937	0	0	4.7	0.1
AIC	99	V	300-150	700	0	0	4.0	-0.1
AMX	99	V	300-150	339	14	0	6.8	0.3
ANZ	99	V	300-150	3536	2	0	6.4	0.7
ASA	99	V	300-150	2940	1	0	5.5	0.4
ASY	99	V	300-150	103	0	0	5.5	0.9
ATN	99	V	300-150	20	5	0	4.8	0.4
AUA	99	V	300-150	665	0	0	5.3	-1.7
AVN	99	V	300-150	66	0	0	5.5	0.3
AWE	99	V	300-150	1249	1	0	5.4	0.8
AXM	99	V	300-150	50	0	0	6.7	1.3
AZA	99	V	300-150	348	0	0	4.6	0.8
BAW	99	V	300-150	3183	2	0	4.6	-0.1
BEL	99	V	300-150	203	0	0	5.0	-0.7
BER	99	V	300-150	1455	0	0	5.3	0.7
BLX	99	V	300-150	44	0	0	4.7	-1.8
BOX	99	V	300-150	48	0	0	3.6	0.9
BOX	99	V	300-150	27	0	0	5.9	-0.5
CAL	99	V	300-150	74	0	0	5.4	-0.2
CES	99	V	300-150	341	0	0	5.3	0.8
CFG	99	V	300-150	329	0	0	4.7	-1.1
CKS	99	V	300-150	329	0	0	5.2	0.4
CLX	99	V	300-150	250	0	0	3.9	0.0
CMB	99	V	300-150	49	4	2	6.4	-0.1
CNV	99	V	300-150	27	0	0	6.5	0.5

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
CPA	99	V	300-150	21	5	0	2.8	0.2
CSN	99	V	300-150	240	3	0	8.0	0.8
DAH	99	V	300-150	60	0	0	4.8	0.2
DAL	99	V	300-150	5915	0	0	4.9	-0.6
DHK	99	V	300-150	171	0	0	4.3	0.7
DLH	99	V	300-150	2940	0	0	4.9	-0.3
EDG	99	V	300-150	21	0	0	7.0	0.9
EIN	99	V	300-150	691	0	0	4.9	-0.6
EJM	99	V	300-150	126	6	0	8.0	-0.8
ELY	99	V	300-150	314	0	0	4.1	0.1
ETD	99	V	300-150	189	0	0	3.9	0.1
ETH	99	V	300-150	95	0	0	3.8	-0.3
FDX	99	V	300-150	1151	0	0	4.1	0.3
FIN	99	V	300-150	304	0	0	3.6	0.1
FJI	99	V	300-150	1593	0	0	4.5	0.3
FWI	99	V	300-150	99	0	0	4.2	0.3
GEC	99	V	300-150	196	0	0	3.8	0.0
GTI	99	V	300-150	291	0	0	3.8	0.0
HAL	99	V	300-150	756	0	0	4.9	0.8
HBJ	99	V	300-150	31	0	0	3.8	-0.5
IBE	99	V	300-150	258	0	0	5.2	0.8
JAF	99	V	300-150	51	20	0	5.5	-1.2
JAI	99	V	300-150	416	0	0	5.0	0.4
JST	99	V	300-150	1440	0	0	5.4	0.4
KAI	99	V	300-150	61	0	0	4.8	0.3
KAL	99	V	300-150	198	0	0	6.0	1.5
KLM	99	V	300-150	1598	0	0	5.0	-0.5
LAN	99	V	300-150	148	0	0	4.9	0.4
LOT	99	V	300-150	135	16	0	9.4	0.2
MAS	99	V	300-150	88	0	0	4.4	0.2
MMN	99	V	300-150	46	0	0	5.8	-1.1
MON	99	V	300-150	21	0	0	4.2	0.5
MSR	99	V	300-150	219	0	0	4.3	0.4
NAX	99	V	300-150	165	20	0	9.4	0.9
NCA	99	V	300-150	30	0	0	5.1	-1.5
NWS	99	V	300-150	86	0	0	4.4	0.5
OAE	99	V	300-150	83	1	0	4.5	0.4
PAC	99	V	300-150	38	0	0	4.8	0.0
PIA	99	V	300-150	48	0	0	4.5	-1.0
PRW	99	V	300-150	20	0	0	4.9	-0.6
QFA	99	V	300-150	1962	0	0	4.8	0.0
QTR	99	V	300-150	135	0	0	3.6	-0.2
RCH	99	V	300-150	394	0	0	4.9	0.7

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
RJA	99	V	300-150	89	9	0	5.3	-0.3
RRR	99	V	300-150	53	0	0	4.9	1.8
SAM	99	V	300-150	73	16	0	4.1	-0.9
SAS	99	V	300-150	594	0	0	4.4	-0.1
SIA	99	V	300-150	347	0	0	4.2	0.1
SQC	99	V	300-150	34	0	0	5.1	-1.6
SVA	99	V	300-150	351	0	0	4.6	0.1
SWR	99	V	300-150	828	0	0	4.8	0.3
TAM	99	V	300-150	87	0	0	3.5	-0.1
TAP	99	V	300-150	59	0	0	6.5	1.5
TAY	99	V	300-150	25	0	0	4.1	-0.9
TCV	99	V	300-150	25	0	0	5.1	-1.7
TCX	99	V	300-150	113	0	0	5.3	0.8
TFL	99	V	300-150	89	11	0	6.0	-2.2
THA	99	V	300-150	98	0	0	4.7	0.0
THT	99	V	300-150	278	0	0	4.8	0.9
THY	99	V	300-150	333	0	0	4.2	0.5
TOM	99	V	300-150	556	7	0	7.9	0.7
TSC	99	V	300-150	54	0	0	5.1	0.8
TSO	99	V	300-150	252	0	0	4.0	-0.3
TWY	99	V	300-150	34	38	0	4.2	0.3
UAE	99	V	300-150	776	0	0	4.9	-0.2
UAL	99	V	300-150	8582	0	0	5.6	-0.3
UPS	99	V	300-150	962	0	0	4.7	0.6
VIR	99	V	300-150	1384	1	0	4.8	-0.2
VOZ	99	V	300-150	1152	0	0	4.9	0.2
VPB	99	V	300-150	54	0	0	3.8	-0.4
VPC	99	V	300-150	26	0	0	5.6	-0.7
WJA	99	V	300-150	501	1	0	5.4	0.5
XLF	99	V	300-150	39	0	0	3.7	0.3
XOJ	99	V	300-150	24	4	0	9.1	-0.8

4 EUCOS Area Monitoring Statistics

The following tables provide information on the quality of upper-air data and surface DRIFTER data over the EUCOS area as received at ECMWF during the month.

Tables 13, 14 (50 hPa level), 15, 16 (100 hPa level) 17, 18 (500 hPa level) 19 and 20 (850 hPa level) provide quality statistics for all TEMPSHIPS and PILOTSHIPS received during the month in the area $10\,^{\circ}$N - $90\,^{\circ}$N, $70\,^{\circ}$W - $40\,^{\circ}$E and for TEMPS and PILOTS from selected land stations within the same area. The statistics are in the same form as tables 10 and 11.
Tables 21-23 provides quality statistics of pressure and wind for all DRIFTER reports received in the area $10\,^{\circ}$N - $90\,^{\circ}$N, $70\,^{\circ}$W - $40\,^{\circ}$E. The statistics are in the same form as tables 4-6.

4.1 Table 13 - Radiosonde Monitoring Statistics (EUCOS): 50 hPa Geopotential height (metres)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 :  50 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	50	30	33.6	9.8
01001	00	Z	50	31	15.0	3.7
01028	12	Z	50	26	14.5	10.4
01028	00	Z	50	28	16.2	11.3
01400	12	Z	50	19	52.0	47.1
01400	00	Z	50	15	43.8	41.5
01415	12	Z	50	29	20.6	13.9
01415	00	Z	50	28	18.7	3.5
02365	00	Z	50	30	14.7	0.8
02365	12	Z	50	31	23.6	9.2
02591	00	Z	50	29	19.7	13.3
02591	12	Z	50	30	22.8	18.4
02836	00	Z	50	29	13.6	1.0
02836	12	Z	50	31	12.8	1.0
02963	00	Z	50	29	13.7	6.5
02963	12	Z	50	30	15.6	3.9
03005	12	Z	50	29	18.7	4.5
03005	00	Z	50	30	16.9	0.6
03238	12	Z	50	4	16.9	12.0
03238	00	Z	50	26	19.5	9.8
03808	00	Z	50	27	16.4	2.1
03808	12	Z	50	30	13.4	7.8
03918	00	Z	50	28	15.3	6.8
03918	12	Z	50	19	20.5	16.3
03953	12	Z	50	29	19.6	12.4
03953	00	Z	50	31	18.2	5.1
04018	00	Z	50	23	23.9	6.0
04018	12	Z	50	19	17.7	7.0
04220	00	Z	50	25	22.8	-11.3
04220	12	Z	50	27	20.0	-16.8
04270	12	Z	50	30	33.2	-19.0
04270	00	Z	50	26	24.1	-15.6
04320	12	Z	50	27	21.1	-12.9
04320	00	Z	50	27	21.8	-13.7
04339	12	Z	50	25	39.1	28.7
04339	00	Z	50	27	48.2	29.5
04360	12	Z	50	20	22.2	-7.7
04360	00	Z	50	18	21.1	-1.2
06011	12	Z	50	24	21.3	-6.9

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	50	24	34.9	1.6
06260	12	Z	50	4	21.5	19.8
06260	00	Z	50	28	14.7	7.5
06610	00	Z	50	31	19.7	2.3
06610	12	Z	50	30	41.0	14.6
07110	12	Z	50	25	18.9	10.4
07110	00	Z	50	28	18.4	7.0
07510	00	Z	50	22	13.4	-5.8
07510	12	Z	50	24	18.8	6.2
07645	00	Z	50	23	62.3	60.7
07645	12	Z	50	20	61.0	59.8
07761	00	Z	50	19	16.5	13.7
07761	12	Z	50	23	16.7	12.2
08001	12	Z	50	23	29.1	24.3
08001	00	Z	50	25	16.5	13.7
08221	00	Z	50	29	16.9	14.8
08221	12	Z	50	31	25.8	22.3
08302	12	Z	50	31	14.7	10.5
08302	00	Z	50	30	15.2	8.6
08508	12	Z	50	31	34.0	32.7
08522	12	Z	50	17	21.3	19.7
08579	12	Z	50	30	22.1	18.1
10035	00	Z	50	31	12.7	3.7
10035	12	Z	50	31	17.7	10.9
10393	12	Z	50	31	10.9	2.1
10393	00	Z	50	29	9.3	0.4
10410	12	Z	50	30	16.8	7.8
10410	00	Z	50	30	11.7	-1.9
10739	00	Z	50	31	13.4	5.3
10739	12	Z	50	31	19.5	13.1
11035	12	Z	50	31	19.7	2.3
11035	00	Z	50	31	60.6	14.5
12982	00	Z	50	30	11.9	3.7
12982	12	Z	50	28	41.2	38.7
16044	00	Z	50	31	17.3	12.1
16044	12	Z	50	31	16.9	9.9
16080	12	Z	50	31	16.2	6.6
16080	00	Z	50	31	16.6	8.6
16245	12	Z	50	30	11.1	3.8
16245	00	Z	50	31	11.1	6.0
16320	00	Z	50	26	10.3	8.1
16320	12	Z	50	27	11.0	4.5
16429	00	Z	50	30	11.2	8.5

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
16429	12	Z	50	31	12.4	8.0
16622	00	Z	50	15	33.9	32.1
16754	00	Z	50	23	23.9	11.9
17607	12	Z	50	6	25.9	-22.4
26435	00	Z	50	12	15.4	3.7
60018	12	Z	50	27	15.1	11.1
60018	00	Z	50	28	16.5	15.3
ASDK1	12	Z	50	0	0.0	0.0
ASDK1	00	Z	50	0	0.0	0.0
ASFR1	12	Z	50	13	13.1	8.3
ASFR1	00	Z	50	11	10.4	4.3
ASFR2	12	Z	50	0	0.0	0.0
ASFR2	00	Z	50	0	0.0	0.0
ASFR3	12	Z	50	12	13.9	11.5
ASFR3	00	Z	50	10	19.2	17.0
ASFR4	12	Z	50	13	25.8	23.4
ASFR4	00	Z	50	7	21.1	20.9
CEWM	00	Z	50	0	0.0	0.0
LGKI	00	Z	50	8	14.4	-6.7
LGKI	12	Z	50	9	8.4	-1.1

4.2 Table 14 - Radiosonde Monitoring Statistics (EUCOS):50 hPa Wind (m/s)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 :  50 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	50	29	4.8	1.1	-0.6
01001	00	V	50	31	3.9	0.2	-1.1
01028	12	V	50	24	4.2	0.3	-1.7
01028	00	V	50	27	3.6	-0.4	-0.3
01400	12	V	50	12	4.2	1.4	1.0
01400	00	V	50	9	2.6	1.6	-0.5
01415	12	V	50	28	6.2	-0.6	-0.4
01415	00	V	50	26	6.7	-0.4	-1.4
02365	00	V	50	29	3.9	0.3	-1.0
02365	12	V	50	30	3.8	-0.3	-0.9
02591	00	V	50	27	5.1	-0.1	-1.4
02591	12	V	50	26	4.2	-0.7	-0.9
02836	00	V	50	28	4.4	0.4	-0.4
02836	12	V	50	30	3.9	0.6	-0.5
02963	00	V	50	27	4.6	-0.3	-1.0
02963	12	V	50	30	4.0	0.6	-0.9
03005	12	V	50	29	5.1	0.0	-0.1
03005	00	V	50	27	5.1	0.1	-1.7
03238	12	V	50	4	8.0	-4.7	4.0
03238	00	V	50	25	8.0	-1.1	1.1
03808	00	V	50	24	5.7	1.2	0.5
03808	12	V	50	30	4.2	0.5	-0.4
03918	00	V	50	28	5.3	0.9	-0.7
03918	12	V	50	19	7.2	-0.6	1.8
03953	12	V	50	27	4.1	0.3	0.5
03953	00	V	50	26	3.9	0.5	-0.9
04018	00	V	50	16	5.4	-0.6	-1.7
04018	12	V	50	16	4.7	0.3	-1.9
04220	00	V	50	25	4.3	0.2	-0.6
04220	12	V	50	27	4.0	-0.2	-0.8
04270	12	V	50	30	5.7	-0.6	-0.2
04270	00	V	50	26	6.0	0.4	0.1
04320	12	V	50	27	3.5	-0.2	-0.4
04320	00	V	50	27	2.8	0.0	-0.5
04339	12	V	50	25	3.6	-0.5	0.3
04339	00	V	50	25	4.0	-0.9	-1.2
04360	12	V	50	20	4.8	-0.1	0.8
04360	00	V	50	18	5.3	1.3	0.6
06011	12	V	50	24	4.4	-0.4	0.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	50	24	4.5	-0.9	-1.2
06260	12	V	50	4	3.9	1.2	0.7
06260	00	V	50	27	5.7	-0.5	-1.0
06610	00	V	50	30	7.2	0.4	0.7
06610	12	V	50	30	4.4	-0.3	0.1
07110	12	V	50	25	4.6	0.2	0.6
07110	00	V	50	28	3.6	0.7	-0.7
07510	00	V	50	19	3.6	-0.8	0.7
07510	12	V	50	24	4.7	0.7	-0.2
07645	00	V	50	22	5.0	0.4	0.0
07645	12	V	50	20	5.0	0.9	0.0
07761	00	V	50	19	3.5	1.2	-0.8
07761	12	V	50	21	5.3	1.0	1.0
08001	12	V	50	21	4.0	0.6	0.5
08001	00	V	50	22	4.0	-0.3	0.8
08221	00	V	50	28	3.9	0.5	-0.2
08221	12	V	50	31	5.2	-0.1	0.4
08302	12	V	50	31	4.8	1.1	-0.3
08302	00	V	50	30	3.6	0.1	0.7
08508	12	V	50	28	3.4	-0.9	-0.1
08522	12	V	50	17	3.9	0.4	-0.5
08579	12	V	50	29	3.5	0.1	0.6
10035	00	V	50	29	6.0	-0.8	-1.3
10035	12	V	50	30	7.4	1.3	-1.0
10393	12	V	50	31	5.4	-0.2	-1.0
10393	00	V	50	28	5.5	-0.3	-0.3
10410	12	V	50	30	4.5	0.4	-0.5
10410	00	V	50	30	4.5	-1.2	0.0
10739	00	V	50	31	5.0	-0.6	0.4
10739	12	V	50	31	4.0	0.5	0.1
11035	12	V	50	31	4.5	0.6	-1.1
11035	00	V	50	30	7.2	0.5	1.1
12982	00	V	50	30	5.0	-0.8	0.5
12982	12	V	50	28	5.4	-0.7	-0.8
16044	00	V	50	29	4.0	0.3	-0.4
16044	12	V	50	31	3.9	-0.1	-0.7
16080	12	V	50	30	4.9	1.6	-0.1
16080	00	V	50	30	7.2	1.6	1.1
16245	12	V	50	30	4.7	1.0	-0.9
16245	00	V	50	31	5.2	0.8	-0.6
16320	00	V	50	24	4.6	2.0	0.9
16320	12	V	50	27	4.4	1.0	0.1
16429	00	V	50	29	4.8	0.7	0.1

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
16429	12	V	50	31	4.7	0.5	-0.1
16622	00	V	50	7	5.1	1.5	-1.4
16754	00	V	50	21	4.2	1.3	-1.4
17607	12	V	50	6	7.6	0.6	1.4
26435	00	V	50	12	4.2	1.7	-0.7
60018	12	V	50	27	3.5	0.6	0.8
60018	00	V	50	28	2.8	-0.1	-0.1
ASDK1	12	V	50	0	0.0	0.0	0.0
ASDK1	00	V	50	0	0.0	0.0	0.0
ASFR1	12	V	50	13	3.2	-0.1	0.9
ASFR1	00	V	50	11	4.2	1.6	-1.2
ASFR2	12	V	50	0	0.0	0.0	0.0
ASFR2	00	V	50	0	0.0	0.0	0.0
ASFR3	12	V	50	12	2.9	-0.2	-0.1
ASFR3	00	V	50	10	3.2	0.6	0.5
ASFR4	12	V	50	13	2.9	-0.1	-0.3
ASFR4	00	V	50	7	3.0	0.0	-0.5
CEWM	00	V	50	0	0.0	0.0	0.0
LGKI	00	V	50	7	4.7	1.0	-1.9
LGKI	12	V	50	9	5.4	-1.7	-1.4

4.3 Table 15 - Radiosonde Monitoring Statistics (EUCOS): 100 hPa Geopotential height (metres)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 : 100 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	100	30	26.4	6.5
01001	00	Z	100	31	10.9	0.8
01028	12	Z	100	26	7.5	3.2
01028	00	Z	100	30	9.3	5.8
01400	12	Z	100	21	39.7	38.2
01400	00	Z	100	21	34.3	32.7
01415	12	Z	100	29	16.1	3.5
01415	00	Z	100	29	11.9	2.0
02365	00	Z	100	31	9.6	0.7
02365	12	Z	100	31	17.9	6.9
02591	00	Z	100	31	13.3	10.2
02591	12	Z	100	30	17.2	14.5
02836	00	Z	100	30	9.1	0.3
02836	12	Z	100	31	7.8	-1.3
02963	00	Z	100	30	9.1	1.4
02963	12	Z	100	30	10.3	3.1
03005	12	Z	100	30	11.1	0.2
03005	00	Z	100	30	10.5	1.7
03238	12	Z	100	4	20.6	-1.2
03238	00	Z	100	29	17.9	6.5
03808	00	Z	100	30	11.8	1.7
03808	12	Z	100	30	10.9	5.5
03918	00	Z	100	31	15.2	10.2
03918	12	Z	100	20	18.2	15.4
03953	12	Z	100	30	14.1	8.0
03953	00	Z	100	29	11.2	4.5
04018	00	Z	100	24	12.8	3.1
04018	12	Z	100	20	15.9	7.5
04220	00	Z	100	26	18.7	-4.5
04220	12	Z	100	27	15.7	-14.1
04270	12	Z	100	30	23.0	-15.1
04270	00	Z	100	28	19.0	-6.9
04320	12	Z	100	30	16.3	-12.1
04320	00	Z	100	30	15.4	-10.8
04339	12	Z	100	28	24.9	16.1
04339	00	Z	100	27	33.8	20.3
04360	12	Z	100	24	16.5	-8.0
04360	00	Z	100	21	12.7	5.4
06011	12	Z	100	27	17.4	-11.0

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	100	29	19.9	-2.8
06260	12	Z	100	4	16.2	14.9
06260	00	Z	100	29	11.0	6.3
06610	00	Z	100	31	17.4	3.0
06610	12	Z	100	30	28.3	8.7
07110	12	Z	100	30	13.6	4.9
07110	00	Z	100	29	13.1	7.0
07510	00	Z	100	28	10.0	-6.4
07510	12	Z	100	29	10.4	3.4
07645	00	Z	100	30	42.9	41.6
07645	12	Z	100	25	46.2	45.3
07761	00	Z	100	28	13.6	8.7
07761	12	Z	100	27	10.7	8.0
08001	12	Z	100	28	25.7	19.6
08001	00	Z	100	29	11.9	10.1
08221	00	Z	100	30	16.1	14.5
08221	12	Z	100	29	19.3	16.1
08302	12	Z	100	31	12.0	8.5
08302	00	Z	100	31	13.5	6.5
08508	12	Z	100	31	28.7	27.1
08522	12	Z	100	17	18.3	16.3
08579	12	Z	100	30	15.8	12.8
10035	00	Z	100	31	9.7	3.4
10035	12	Z	100	31	10.7	7.7
10393	12	Z	100	31	7.6	-0.9
10393	00	Z	100	31	8.3	-1.3
10410	12	Z	100	30	9.0	2.5
10410	00	Z	100	30	7.8	-3.3
10739	00	Z	100	31	10.9	6.8
10739	12	Z	100	32	11.1	8.6
11035	12	Z	100	32	21.7	-2.8
11035	00	Z	100	31	14.3	2.2
12982	00	Z	100	31	10.8	3.5
12982	12	Z	100	27	26.6	24.7
16044	00	Z	100	32	12.9	5.6
16044	12	Z	100	31	12.4	6.0
16080	12	Z	100	31	11.3	2.1
16080	00	Z	100	30	17.4	8.1
16245	12	Z	100	30	8.6	-2.5
16245	00	Z	100	31	11.2	0.2
16320	00	Z	100	29	8.9	2.9
16320	12	Z	100	30	18.3	3.3
16429	00	Z	100	30	9.5	5.8

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
16429	12	Z	100	31	10.0	4.8
16622	00	Z	100	17	26.6	24.6
16754	00	Z	100	24	17.3	7.2
17607	12	Z	100	10	11.8	-9.1
26435	00	Z	100	13	9.2	0.7
60018	12	Z	100	28	10.9	7.5
60018	00	Z	100	29	11.2	9.4
ASDK1	12	Z	100	0	0.0	0.0
ASDK1	00	Z	100	0	0.0	0.0
ASFR1	12	Z	100	14	8.2	1.1
ASFR1	00	Z	100	11	10.2	-2.3
ASFR2	12	Z	100	8	13.9	11.4
ASFR2	00	Z	100	6	9.9	8.1
ASFR3	12	Z	100	12	11.2	9.0
ASFR3	00	Z	100	11	13.7	11.0
ASFR4	12	Z	100	13	19.3	17.1
ASFR4	00	Z	100	7	16.6	15.9
CEWM	00	Z	100	0	0.0	0.0
LGKI	00	Z	100	7	9.7	-7.0
LGKI	12	Z	100	9	5.9	-1.4

4.4 Table 16 - Radiosonde Monitoring Statistics (EUCOS): 100 hPa Wind (m/s)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 : 100 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	100	30	2.8	1.2	-0.1
01001	00	V	100	31	3.0	-0.1	-0.5
01028	12	V	100	26	3.9	0.6	-1.2
01028	00	V	100	30	3.3	0.8	0.0
01400	12	V	100	16	4.3	-1.0	0.3
01400	00	V	100	15	3.8	-0.2	0.6
01415	12	V	100	29	4.1	0.2	-0.6
01415	00	V	100	27	4.8	-0.4	-1.0
02365	00	V	100	31	3.3	-0.2	-0.1
02365	12	V	100	31	3.3	0.2	0.4
02591	00	V	100	31	5.3	-1.8	-0.8
02591	12	V	100	30	4.1	0.7	0.3
02836	00	V	100	30	3.3	0.1	0.4
02836	12	V	100	30	3.1	0.4	-0.5
02963	00	V	100	28	4.6	-0.4	0.2
02963	12	V	100	30	3.0	1.1	-0.5
03005	12	V	100	30	4.2	-0.2	-0.5
03005	00	V	100	27	5.3	-1.8	-0.5
03238	12	V	100	4	7.5	2.6	-0.4
03238	00	V	100	27	7.2	-0.1	0.4
03808	00	V	100	27	4.2	-0.6	-0.6
03808	12	V	100	30	5.2	-0.3	-0.4
03918	00	V	100	31	5.0	-1.6	-0.5
03918	12	V	100	20	6.1	-0.8	-0.7
03953	12	V	100	29	5.1	0.8	-0.3
03953	00	V	100	29	4.8	-0.5	-0.5
04018	00	V	100	23	4.4	0.1	-1.1
04018	12	V	100	20	4.1	0.1	-1.9
04220	00	V	100	26	3.5	-1.0	-0.7
04220	12	V	100	27	3.2	-0.3	0.0
04270	12	V	100	30	7.3	-0.8	-0.8
04270	00	V	100	28	4.6	-1.3	-0.2
04320	12	V	100	30	2.3	0.0	0.0
04320	00	V	100	30	3.6	-0.5	-0.4
04339	12	V	100	27	3.2	-0.3	0.0
04339	00	V	100	27	2.8	0.0	-0.4
04360	12	V	100	24	3.2	0.1	0.6
04360	00	V	100	21	4.5	-0.3	-1.2
06011	12	V	100	27	4.4	0.0	0.0

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	100	29	3.6	0.3	-0.4
06260	12	V	100	4	4.0	2.9	0.3
06260	00	V	100	28	4.7	-0.9	-0.3
06610	00	V	100	30	5.2	1.8	-0.5
06610	12	V	100	30	6.1	0.6	0.3
07110	12	V	100	30	3.3	0.7	0.1
07110	00	V	100	29	3.1	0.0	0.0
07510	00	V	100	25	4.2	0.2	0.3
07510	12	V	100	28	3.7	0.0	-0.5
07645	00	V	100	26	4.7	0.5	-0.2
07645	12	V	100	23	5.4	0.7	-0.6
07761	00	V	100	25	4.5	0.4	-0.3
07761	12	V	100	25	3.9	0.7	-0.2
08001	12	V	100	27	4.1	-1.0	0.6
08001	00	V	100	29	5.0	0.9	1.3
08221	00	V	100	30	3.8	0.2	0.6
08221	12	V	100	29	4.6	-1.3	0.8
08302	12	V	100	31	4.0	-0.4	0.7
08302	00	V	100	30	3.9	-0.2	0.6
08508	12	V	100	30	4.0	-1.0	0.0
08522	12	V	100	17	2.9	0.9	0.7
08579	12	V	100	30	4.6	0.7	0.9
10035	00	V	100	30	5.0	-0.6	-1.0
10035	12	V	100	30	4.8	0.4	0.9
10393	12	V	100	31	4.5	-0.5	0.3
10393	00	V	100	31	4.6	0.0	-0.6
10410	12	V	100	30	5.3	0.2	0.4
10410	00	V	100	30	4.8	0.0	-0.7
10739	00	V	100	31	4.2	0.4	-0.4
10739	12	V	100	31	4.6	0.5	0.6
11035	12	V	100	31	7.7	0.2	0.5
11035	00	V	100	30	4.1	-0.7	0.0
12982	00	V	100	31	4.6	-1.0	-0.4
12982	12	V	100	27	4.2	0.8	0.5
16044	00	V	100	29	4.9	0.3	-0.8
16044	12	V	100	31	5.5	1.6	-0.4
16080	12	V	100	31	6.1	2.0	1.3
16080	00	V	100	29	9.4	-0.1	1.7
16245	12	V	100	30	4.7	1.1	-0.3
16245	00	V	100	31	5.6	-0.1	-0.7
16320	00	V	100	28	5.0	1.2	0.6
16320	12	V	100	29	5.1	0.7	-0.5
16429	00	V	100	29	3.8	-0.7	0.7

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
16429	12	V	100	31	4.2	1.2	0.1
16622	00	V	100	8	3.3	0.0	-1.3
16754	00	V	100	23	5.4	0.3	-0.6
17607	12	V	100	6	4.0	-1.5	0.8
26435	00	V	100	13	3.5	-0.3	-0.6
60018	12	V	100	28	3.9	0.3	0.1
60018	00	V	100	29	4.2	1.2	0.4
ASDK1	12	V	100	0	0.0	0.0	0.0
ASDK1	00	V	100	0	0.0	0.0	0.0
ASFR1	12	V	100	11	2.3	0.6	-0.4
ASFR1	00	V	100	10	3.9	0.3	-1.0
ASFR2	12	V	100	7	4.8	1.6	-1.3
ASFR2	00	V	100	5	3.5	0.3	-0.6
ASFR3	12	V	100	12	3.5	0.7	-0.9
ASFR3	00	V	100	11	4.1	1.2	-1.1
ASFR4	12	V	100	13	2.6	0.5	-0.2
ASFR4	00	V	100	7	4.1	-1.8	-0.8
CEWM	00	V	100	0	0.0	0.0	0.0
LGKI	00	V	100	7	3.1	0.9	-1.9
LGKI	12	V	100	9	3.1	1.0	-0.2

4.5 Table 17 - Radiosonde Monitoring Statistics (EUCOS): 500 hPa Geopotential height (metres)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 : 500 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	500	30	15.4	5.9
01001	00	Z	500	31	6.9	0.7
01028	12	Z	500	29	10.7	6.2
01028	00	Z	500	30	9.6	6.2
01400	12	Z	500	22	34.0	33.2
01400	00	Z	500	24	30.2	28.6
01415	12	Z	500	29	6.8	2.1
01415	00	Z	500	30	8.1	3.0
02365	00	Z	500	31	6.7	2.9
02365	12	Z	500	31	7.6	4.8
02591	00	Z	500	31	11.9	11.0
02591	12	Z	500	31	14.7	13.4
02836	00	Z	500	30	4.3	0.9
02836	12	Z	500	32	3.6	0.3
02963	00	Z	500	31	6.4	2.6
02963	12	Z	500	30	5.0	2.7
03005	12	Z	500	30	5.5	-0.6
03005	00	Z	500	32	5.4	1.4
03238	12	Z	500	5	10.9	9.7
03238	00	Z	500	29	13.1	9.6
03808	00	Z	500	33	6.8	4.2
03808	12	Z	500	30	8.5	6.0
03918	00	Z	500	31	10.7	8.7
03918	12	Z	500	20	13.3	12.5
03953	12	Z	500	31	9.6	6.9
03953	00	Z	500	31	11.0	7.3
04018	00	Z	500	25	4.4	1.1
04018	12	Z	500	20	7.5	5.1
04220	00	Z	500	27	12.4	3.1
04220	12	Z	500	30	9.7	0.4
04270	12	Z	500	31	8.6	-5.7
04270	00	Z	500	30	6.0	-3.6
04320	12	Z	500	30	7.0	2.6
04320	00	Z	500	31	7.6	4.4
04339	12	Z	500	28	10.1	3.4
04339	00	Z	500	28	10.6	4.8
04360	12	Z	500	28	7.8	-1.3
04360	00	Z	500	30	11.3	2.6
06011	12	Z	500	29	18.6	4.6

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	500	30	11.1	1.6
06260	12	Z	500	4	8.4	6.3
06260	00	Z	500	29	7.2	5.3
06610	00	Z	500	31	9.6	7.5
06610	12	Z	500	31	11.2	9.4
07110	12	Z	500	30	12.1	2.5
07110	00	Z	500	31	5.4	2.4
07510	00	Z	500	29	5.7	-3.5
07510	12	Z	500	31	5.0	0.4
07645	00	Z	500	31	19.1	17.4
07645	12	Z	500	34	20.1	19.1
07761	00	Z	500	32	4.5	0.5
07761	12	Z	500	34	7.1	4.9
08001	12	Z	500	30	11.5	8.8
08001	00	Z	500	30	10.9	8.4
08221	00	Z	500	30	12.3	11.4
08221	12	Z	500	29	13.5	11.6
08302	12	Z	500	31	7.6	4.7
08302	00	Z	500	31	7.1	5.2
08508	12	Z	500	31	23.9	23.0
08522	12	Z	500	17	12.4	11.0
08579	12	Z	500	30	10.3	8.5
10035	00	Z	500	32	7.2	1.0
10035	12	Z	500	32	8.1	3.8
10393	12	Z	500	31	5.0	-2.6
10393	00	Z	500	31	5.4	-1.2
10410	12	Z	500	30	4.9	2.0
10410	00	Z	500	30	5.3	-2.4
10739	00	Z	500	31	10.0	8.9
10739	12	Z	500	32	10.7	9.4
11035	12	Z	500	32	17.0	-3.4
11035	00	Z	500	31	6.4	-0.2
12982	00	Z	500	31	6.5	4.0
12982	12	Z	500	27	10.8	6.3
16044	00	Z	500	32	6.0	4.3
16044	12	Z	500	31	5.6	0.7
16080	12	Z	500	31	5.2	0.4
16080	00	Z	500	30	6.8	1.6
16245	12	Z	500	30	7.8	-5.7
16245	00	Z	500	31	8.0	-3.7
16320	00	Z	500	30	4.2	1.5
16320	12	Z	500	31	5.8	-1.2
16429	00	Z	500	30	6.4	-0.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
16429	12	Z	500	31	5.5	1.3
16622	00	Z	500	24	19.7	17.1
16754	00	Z	500	25	14.1	3.7
17607	12	Z	500	10	5.5	1.3
26435	00	Z	500	13	8.0	5.4
60018	12	Z	500	28	6.5	4.8
60018	00	Z	500	29	7.6	6.0
ASDK1	12	Z	500	2	10.8	4.7
ASDK1	00	Z	500	1	2.2	-2.2
ASFR1	12	Z	500	16	11.5	-6.1
ASFR1	00	Z	500	15	11.5	-7.3
ASFR2	12	Z	500	9	6.5	1.7
ASFR2	00	Z	500	6	4.6	-2.4
ASFR3	12	Z	500	12	4.5	1.2
ASFR3	00	Z	500	13	7.0	3.3
ASFR4	12	Z	500	13	5.8	-0.2
ASFR4	00	Z	500	7	4.4	1.6
CEWM	00	Z	500	1	5.0	5.0
LGKI	00	Z	500	7	6.8	-4.8
LGKI	12	Z	500	9	3.4	-1.1

4.6 Table 18 - Radiosonde Monitoring Statistics (EUCOS): 500 hPa Wind (m/s)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 : 500 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	500	30	3.5	-0.3	-0.8
01001	00	V	500	31	3.6	-0.1	-0.1
01028	12	V	500	29	2.7	-0.5	-0.4
01028	00	V	500	30	3.0	-0.4	-0.2
01400	12	V	500	22	3.1	-0.3	0.1
01400	00	V	500	24	3.8	0.2	-0.7
01415	12	V	500	29	4.8	0.3	-0.6
01415	00	V	500	28	4.0	0.4	-0.5
02365	00	V	500	31	2.9	0.2	0.0
02365	12	V	500	31	3.9	1.0	0.6
02591	00	V	500	31	3.3	-0.6	-0.6
02591	12	V	500	31	3.2	-0.4	0.9
02836	00	V	500	30	2.8	0.2	-0.1
02836	12	V	500	31	2.9	-0.7	-0.5
02963	00	V	500	29	3.3	-0.1	0.7
02963	12	V	500	30	3.0	-0.2	-0.3
03005	12	V	500	30	6.2	0.6	0.9
03005	00	V	500	29	4.4	0.3	0.5
03238	12	V	500	5	4.6	0.0	-0.8
03238	00	V	500	28	4.3	-1.0	-0.4
03808	00	V	500	29	3.4	0.4	0.5
03808	12	V	500	30	3.1	0.0	0.9
03918	00	V	500	31	4.3	-0.1	0.2
03918	12	V	500	20	5.6	0.9	-0.2
03953	12	V	500	31	4.1	-0.1	0.4
03953	00	V	500	31	5.7	0.6	-0.2
04018	00	V	500	23	4.1	0.3	-1.2
04018	12	V	500	20	3.5	-0.3	-1.2
04220	00	V	500	27	3.6	0.7	0.1
04220	12	V	500	30	3.4	0.1	0.5
04270	12	V	500	31	3.9	-0.2	-0.2
04270	00	V	500	30	3.8	0.4	0.6
04320	12	V	500	30	3.1	-0.5	0.1
04320	00	V	500	31	3.3	-0.7	0.1
04339	12	V	500	28	4.7	0.7	-0.8
04339	00	V	500	28	3.3	-0.3	-0.5
04360	12	V	500	28	3.7	-1.3	0.0
04360	00	V	500	30	3.3	0.2	-0.3
06011	12	V	500	29	4.3	0.1	-1.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	500	30	3.8	-0.2	-0.3
06260	12	V	500	4	4.7	1.9	0.5
06260	00	V	500	29	2.8	0.3	-0.8
06610	00	V	500	30	2.9	0.7	-0.1
06610	12	V	500	31	3.9	0.6	-1.0
07110	12	V	500	30	3.7	-0.4	0.1
07110	00	V	500	31	3.6	0.6	-0.3
07510	00	V	500	27	4.9	0.8	-0.1
07510	12	V	500	30	3.6	0.2	0.0
07645	00	V	500	30	2.9	0.0	-0.7
07645	12	V	500	31	3.5	0.9	-0.4
07761	00	V	500	31	3.4	-0.1	-0.9
07761	12	V	500	31	4.0	1.4	-0.2
08001	12	V	500	30	2.8	0.3	-0.4
08001	00	V	500	30	4.2	0.9	0.9
08221	00	V	500	30	3.4	-0.5	-0.2
08221	12	V	500	29	2.9	0.1	0.0
08302	12	V	500	31	5.0	0.2	0.3
08302	00	V	500	31	2.7	0.0	0.0
08508	12	V	500	30	2.8	0.4	-0.5
08522	12	V	500	17	2.3	-0.1	-0.6
08579	12	V	500	30	2.8	0.4	0.2
10035	00	V	500	31	4.1	0.5	0.4
10035	12	V	500	30	3.6	0.4	-0.2
10393	12	V	500	31	3.2	0.3	-0.3
10393	00	V	500	31	3.3	-0.2	-0.3
10410	12	V	500	30	4.3	1.3	-0.3
10410	00	V	500	30	2.9	0.0	-0.2
10739	00	V	500	31	2.9	0.4	-0.7
10739	12	V	500	31	3.4	-0.2	0.0
11035	12	V	500	31	3.7	0.1	-0.4
11035	00	V	500	30	3.6	-0.4	-1.0
12982	00	V	500	31	3.3	-0.2	0.0
12982	12	V	500	27	4.0	1.1	0.6
16044	00	V	500	30	3.4	0.1	-0.4
16044	12	V	500	31	3.3	0.1	-0.4
16080	12	V	500	31	3.8	0.8	-0.2
16080	00	V	500	29	3.6	0.2	-1.1
16245	12	V	500	30	4.0	0.4	-0.3
16245	00	V	500	31	3.3	0.7	0.4
16320	00	V	500	29	4.0	1.0	0.6
16320	12	V	500	31	3.3	0.4	0.1
16429	00	V	500	29	3.1	0.7	0.3

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
16429	12	V	500	31	3.4	0.9	0.2
16622	00	V	500	14	4.3	-0.4	-0.4
16754	00	V	500	25	5.2	-0.8	1.1
17607	12	V	500	6	3.5	2.4	0.3
26435	00	V	500	13	3.0	0.1	0.8
60018	12	V	500	28	3.4	0.8	-0.3
60018	00	V	500	29	2.8	-0.1	0.0
ASDK1	12	V	500	0	0.0	0.0	0.0
ASDK1	00	V	500	0	0.0	0.0	0.0
ASFR1	12	V	500	16	3.5	0.2	-0.2
ASFR1	00	V	500	15	3.9	1.3	0.5
ASFR2	12	V	500	9	3.0	1.1	-0.2
ASFR2	00	V	500	6	3.0	-1.2	0.3
ASFR3	12	V	500	12	3.0	0.8	0.5
ASFR3	00	V	500	13	3.2	0.7	0.1
ASFR4	12	V	500	13	2.8	0.4	0.9
ASFR4	00	V	500	7	2.7	-1.0	-0.5
CEWM	00	V	500	1	3.5	-3.5	0.0
LGKI	00	V	500	7	2.6	0.5	-1.2
LGKI	12	V	500	9	2.1	0.7	-0.9

4.7 Table 19 - Radiosonde Monitoring Statistics (EUCOS): 850 hPa Geopotential height (metres)

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 : 850 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	850	30	7.6	1.2
01001	00	Z	850	31	6.3	-2.6
01028	12	Z	850	29	3.9	2.3
01028	00	Z	850	30	4.7	1.1
01400	12	Z	850	23	28.4	27.9
01400	00	Z	850	24	26.7	26.0
01415	12	Z	850	30	4.2	1.6
01415	00	Z	850	30	4.0	1.8
02365	00	Z	850	31	4.2	2.2
02365	12	Z	850	31	3.1	1.7
02591	00	Z	850	31	8.9	8.4
02591	12	Z	850	31	9.6	9.2
02836	00	Z	850	30	3.6	1.6
02836	12	Z	850	32	2.9	0.9
02963	00	Z	850	31	3.8	1.8
02963	12	Z	850	30	3.0	0.8
03005	12	Z	850	31	5.6	0.3
03005	00	Z	850	32	4.6	-0.8
03238	12	Z	850	5	7.5	6.7
03238	00	Z	850	29	6.4	5.4
03808	00	Z	850	33	3.9	2.0
03808	12	Z	850	30	4.2	2.9
03918	00	Z	850	31	8.8	8.1
03918	12	Z	850	20	9.0	8.7
03953	12	Z	850	31	6.8	5.9
03953	00	Z	850	31	5.6	4.2
04018	00	Z	850	25	3.2	1.0
04018	12	Z	850	21	4.2	1.7
04220	00	Z	850	27	8.4	1.9
04220	12	Z	850	30	8.4	-1.1
04270	12	Z	850	31	4.0	-2.8
04270	00	Z	850	30	4.1	-2.7
04320	12	Z	850	30	5.6	4.3
04320	00	Z	850	31	6.5	4.5
04339	12	Z	850	28	6.7	-3.2
04339	00	Z	850	28	18.7	-4.1
04360	12	Z	850	29	9.1	-4.3
04360	00	Z	850	30	11.1	-0.8
06011	12	Z	850	28	10.0	6.7

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	850	30	10.8	5.4
06260	12	Z	850	5	3.9	1.7
06260	00	Z	850	29	5.1	3.6
06610	00	Z	850	31	4.8	3.0
06610	12	Z	850	31	4.7	3.7
07110	12	Z	850	30	4.4	1.9
07110	00	Z	850	31	3.5	-0.1
07510	00	Z	850	29	5.3	-4.1
07510	12	Z	850	31	4.4	-3.5
07645	00	Z	850	31	4.3	2.7
07645	12	Z	850	34	5.4	4.1
07761	00	Z	850	32	4.3	-0.3
07761	12	Z	850	34	3.4	1.1
08001	12	Z	850	30	7.0	3.6
08001	00	Z	850	30	7.5	1.8
08221	00	Z	850	30	6.5	5.9
08221	12	Z	850	29	7.9	6.8
08302	12	Z	850	31	3.7	1.7
08302	00	Z	850	31	3.2	-0.6
08508	12	Z	850	31	18.3	17.2
08522	12	Z	850	17	7.1	6.0
08579	12	Z	850	30	6.1	5.1
10035	00	Z	850	32	4.7	0.6
10035	12	Z	850	32	4.9	2.0
10393	12	Z	850	31	3.5	-2.9
10393	00	Z	850	31	3.9	-2.1
10410	12	Z	850	30	2.6	0.4
10410	00	Z	850	30	3.8	-2.6
10739	00	Z	850	31	7.5	7.2
10739	12	Z	850	32	8.5	8.1
11035	12	Z	850	32	15.8	-4.3
11035	00	Z	850	31	4.2	-3.4
12982	00	Z	850	31	3.5	-0.5
12982	12	Z	850	27	5.2	3.3
16044	00	Z	850	32	2.7	-0.6
16044	12	Z	850	31	6.0	-4.4
16080	12	Z	850	31	6.3	-4.5
16080	00	Z	850	30	5.1	-3.0
16245	12	Z	850	31	11.0	-9.6
16245	00	Z	850	31	9.7	-7.9
16320	00	Z	850	30	3.9	0.3
16320	12	Z	850	31	6.1	-3.6
16429	00	Z	850	30	5.1	-1.3

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
16429	12	Z	850	31	5.3	-2.2
16622	00	Z	850	24	12.9	10.8
16754	00	Z	850	25	9.7	1.9
17607	12	Z	850	10	4.4	3.5
26435	00	Z	850	13	3.9	2.7
60018	12	Z	850	28	4.3	-1.5
60018	00	Z	850	29	3.7	-1.4
ASDK1	12	Z	850	4	10.1	8.5
ASDK1	00	Z	850	6	15.9	-3.1
ASFR1	12	Z	850	16	10.8	-9.3
ASFR1	00	Z	850	15	10.9	-9.2
ASFR2	12	Z	850	9	5.7	-2.4
ASFR2	00	Z	850	7	7.8	-6.3
ASFR3	12	Z	850	12	3.6	-1.9
ASFR3	00	Z	850	13	5.5	-0.6
ASFR4	12	Z	850	13	7.2	-6.5
ASFR4	00	Z	850	7	4.2	-3.7
CEWM	00	Z	850	1	2.9	-2.9
LGKI	00	Z	850	7	5.8	-4.4
LGKI	12	Z	850	9	6.7	-5.7

4.8 Table 20 - Radiosonde Monitoring Statistics (EUCOS): 850 hPa Wind (m/s)

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RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 : 850 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
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WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	850	30	4.2	0.7	0.7
01001	00	V	850	31	4.1	0.3	0.4
01028	12	V	850	29	3.2	-0.3	0.0
01028	00	V	850	30	2.6	0.1	0.1
01400	12	V	850	23	2.8	0.5	-0.4
01400	00	V	850	24	2.2	0.4	0.0
01415	12	V	850	29	3.1	-0.1	0.5
01415	00	V	850	28	4.2	0.0	0.2
02365	00	V	850	31	3.2	0.2	-0.2
02365	12	V	850	31	3.1	0.3	0.0
02591	00	V	850	31	2.7	-0.2	-0.3
02591	12	V	850	31	2.7	-0.1	-0.2
02836	00	V	850	30	2.7	-0.1	-0.4
02836	12	V	850	31	2.4	0.1	0.3
02963	00	V	850	29	2.6	-0.2	-0.2
02963	12	V	850	30	2.5	0.4	-0.1
03005	12	V	850	31	3.0	-0.8	0.2
03005	00	V	850	29	3.8	-0.8	0.2
03238	12	V	850	5	3.3	-0.8	0.7
03238	00	V	850	28	3.5	0.7	0.2
03808	00	V	850	29	4.3	0.5	-0.3
03808	12	V	850	30	2.6	0.7	-0.2
03918	00	V	850	31	3.5	-0.7	-0.5
03918	12	V	850	20	3.7	-0.9	-1.8
03953	12	V	850	31	3.1	-0.1	0.2
03953	00	V	850	31	3.0	0.0	0.3
04018	00	V	850	23	3.5	0.5	0.6
04018	12	V	850	21	3.6	-0.1	-0.6
04220	00	V	850	27	3.1	-0.2	-0.3
04220	12	V	850	30	3.5	-0.1	0.0
04270	12	V	850	31	4.1	0.1	0.7
04270	00	V	850	30	3.2	0.9	0.8
04320	12	V	850	30	3.1	0.0	1.0
04320	00	V	850	31	3.8	-1.1	0.3
04339	12	V	850	28	4.4	0.9	0.4
04339	00	V	850	28	6.0	2.2	2.9
04360	12	V	850	29	6.0	1.9	1.2
04360	00	V	850	30	6.2	2.5	1.4
06011	12	V	850	28	3.9	0.3	0.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	850	30	3.3	-0.5	-0.6
06260	12	V	850	5	3.0	-2.0	-0.3
06260	00	V	850	29	1.8	-0.4	-0.5
06610	00	V	850	30	3.3	1.0	-0.2
06610	12	V	850	31	3.7	0.2	0.2
07110	12	V	850	30	3.4	0.7	-0.7
07110	00	V	850	31	3.5	0.7	0.0
07510	00	V	850	27	3.4	-0.6	0.3
07510	12	V	850	30	2.8	-0.6	-0.2
07645	00	V	850	30	3.8	-0.2	0.6
07645	12	V	850	31	4.5	0.4	0.6
07761	00	V	850	31	4.8	0.7	0.0
07761	12	V	850	31	4.7	-0.1	1.2
08001	12	V	850	30	3.3	0.1	-0.2
08001	00	V	850	30	2.6	0.5	-0.3
08221	00	V	850	30	2.8	0.1	0.3
08221	12	V	850	29	3.4	-0.6	0.6
08302	12	V	850	31	3.6	-0.5	0.6
08302	00	V	850	31	3.7	0.0	0.0
08508	12	V	850	31	2.9	0.5	0.3
08522	12	V	850	17	4.1	-0.8	-0.6
08579	12	V	850	30	2.6	0.1	-1.0
10035	00	V	850	31	2.5	-0.2	-0.3
10035	12	V	850	30	3.1	0.4	-0.7
10393	12	V	850	31	3.0	-0.8	-0.3
10393	00	V	850	31	2.5	0.1	-0.2
10410	12	V	850	30	2.9	0.9	-0.4
10410	00	V	850	30	2.2	-0.2	-0.4
10739	00	V	850	31	3.2	-0.1	0.0
10739	12	V	850	31	3.8	0.5	-0.6
11035	12	V	850	31	3.4	0.5	0.3
11035	00	V	850	30	3.2	0.1	-0.9
12982	00	V	850	31	3.9	-0.7	0.6
12982	12	V	850	27	4.0	-0.6	0.1
16044	00	V	850	30	3.5	0.0	0.9
16044	12	V	850	31	3.5	0.8	0.4
16080	12	V	850	31	4.2	0.3	-0.8
16080	00	V	850	29	3.6	0.2	-0.9
16245	12	V	850	30	4.0	0.8	-0.4
16245	00	V	850	31	3.8	1.2	-0.4
16320	00	V	850	29	3.3	0.8	-1.1
16320	12	V	850	31	3.4	0.7	-0.6
16429	00	V	850	29	2.9	-0.1	0.5

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
16429	12	V	850	31	3.7	0.0	1.2
16622	00	V	850	14	3.0	1.0	1.1
16754	00	V	850	25	3.2	-0.1	0.5
17607	12	V	850	6	2.1	-0.6	-0.4
26435	00	V	850	13	2.4	-0.7	0.8
60018	12	V	850	28	4.6	1.2	-2.1
60018	00	V	850	29	4.2	0.6	-0.8
ASDK1	12	V	850	3	2.6	0.1	1.8
ASDK1	00	V	850	4	4.3	-2.5	1.8
ASFR1	12	V	850	16	2.7	-0.3	0.6
ASFR1	00	V	850	15	2.5	-0.4	-0.1
ASFR2	12	V	850	9	3.5	0.8	1.5
ASFR2	00	V	850	7	2.7	0.0	0.0
ASFR3	12	V	850	12	3.6	0.2	0.1
ASFR3	00	V	850	13	2.4	-0.6	0.1
ASFR4	12	V	850	13	3.7	-0.8	-1.3
ASFR4	00	V	850	7	3.4	0.7	0.7
CEWM	00	V	850	1	4.3	-1.2	-4.1
LGKI	00	V	850	7	1.2	0.0	0.2
LGKI	12	V	850	9	1.1	-0.6	-0.3

4.9 Table 21 - Drifter Monitoring Statistics (EUCOS): Surface pressure (hpa)

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DRIFTER MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE      : ECMWF
         ELEMENT MONITORED      : SURFACE PRESSURE (HPA)
         AREA                   : 10N - 90N, 70W - 40E
         PERIOD                 : JAN 2015
         STANDARD OF COMPARISON: FIRST-GUESS FIELD


TIME = 99 => AVERAGE OF ALL OBSERVATIONS
GROSS ERROR LIMIT = 15 HPA
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
13001	99	P	SUR	11	-23	131	0	0.4	0.0	0.4
13008	99	P	SUR	15	-38	94	0	0.4	0.0	0.4
13515	99	P	SUR	21	-34	124	0	0.3	0.3	0.4
13517	99	P	SUR	13	-23	68	0	0.5	0.4	0.6
13519	99	P	SUR	13	-23	76	0	0.4	0.3	0.6
13529	99	P	SUR	17	-24	104	0	0.5	0.3	0.6
13530	99	P	SUR	17	-24	100	0	0.5	0.3	0.5
13569	99	P	SUR	31	-29	208	0	0.3	0.0	0.3
13570	99	P	SUR	33	-31	220	0	0.3	0.7	0.8
13572	99	P	SUR	36	-30	228	0	0.3	0.1	0.3
13590	99	P	SUR	34	-30	194	0	0.3	0.6	0.7
13633	99	P	SUR	36	-31	220	0	0.3	-0.4	0.5
13659	99	P	SUR	24	-49	217	0	0.3	-0.2	0.3
13660	99	P	SUR	33	-53	217	0	0.8	-0.4	0.8
13662	99	P	SUR	26	-37	215	0	0.3	-0.1	0.3
13664	99	P	SUR	23	-47	217	0	0.3	0.3	0.4
13868	99	P	SUR	38	-13	217	0	0.3	0.2	0.4
13869	99	P	SUR	25	-19	217	0	0.3	0.3	0.4
14046	99	P	SUR	16	-53	77	0	0.7	-0.1	0.7
21942	99	P	SUR	34	-26	215	0	0.4	0.4	0.6
25540	99	P	SUR	88	-65	225	0	1.1	0.3	1.2
25648	99	P	SUR	82	6	217	0	0.5	-0.4	0.6
26538	99	P	SUR	83	22	217	0	0.5	0.0	0.5
31717	99	P	SUR	16	-51	217	0	0.3	0.2	0.3
31863	99	P	SUR	21	-49	217	0	0.3	0.8	0.9
41139	99	P	SUR	20	-38	118	0	0.3	-0.3	0.4
41560	99	P	SUR	34	-20	221	0	0.3	0.7	0.7
41564	99	P	SUR	30	-40	219	0	0.3	0.4	0.5
41580	99	P	SUR	17	-42	196	0	0.3	0.1	0.3
41590	99	P	SUR	16	-50	191	0	0.3	0.1	0.3
41591	99	P	SUR	17	-47	188	0	0.3	0.1	0.3
41594	99	P	SUR	20	-34	146	0	0.3	0.3	0.4
41596	99	P	SUR	20	-58	217	0	0.3	0.0	0.3
41597	99	P	SUR	22	-51	217	0	0.3	0.4	0.5
41598	99	P	SUR	23	-49	217	0	0.4	0.0	0.4
41599	99	P	SUR	17	-63	217	0	0.2	0.4	0.5

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
41600	99	P	SUR	16	-56	217	0	0.3	0.7	0.8
41632	99	P	SUR	25	-64	214	0	0.3	-0.3	0.4
41705	99	P	SUR	32	-54	215	0	0.4	-0.3	0.5
41706	99	P	SUR	26	-67	217	0	0.3	-0.3	0.5
41709	99	P	SUR	26	-66	217	0	0.3	0.0	0.3
41711	99	P	SUR	31	-49	217	0	0.4	-0.1	0.4
41737	99	P	SUR	25	-57	217	0	0.5	0.6	0.8
41800	99	P	SUR	23	-49	104	0	0.2	0.3	0.4
41933	99	P	SUR	32	-58	221	0	0.6	-0.5	0.8
41936	99	P	SUR	33	-65	172	0	0.5	0.1	0.5
41938	99	P	SUR	37	-62	94	0	0.7	-0.4	0.8
41969	99	P	SUR	25	-30	195	0	0.3	-0.5	0.6
41970	99	P	SUR	29	-62	217	0	0.3	-0.2	0.4
41971	99	P	SUR	31	-36	212	0	0.3	0.1	0.3
41972	99	P	SUR	26	-41	203	0	0.3	0.0	0.3
41975	99	P	SUR	35	-50	204	0	0.6	-0.1	0.6
44505	99	P	SUR	47	-27	397	0	2.6	0.9	2.8
44516	99	P	SUR	26	-62	211	0	0.3	0.1	0.3
44546	99	P	SUR	30	-21	216	0	0.2	0.0	0.3
44547	99	P	SUR	54	-40	189	0	0.6	0.0	0.6
44548	99	P	SUR	55	-44	217	0	0.7	0.0	0.7
44549	99	P	SUR	48	-30	217	0	0.5	0.0	0.5
44550	99	P	SUR	52	-31	217	0	0.6	0.0	0.6
44551	99	P	SUR	52	-35	217	0	0.7	0.2	0.8
44554	99	P	SUR	32	-39	224	0	0.3	0.0	0.3
44558	99	P	SUR	32	-61	222	0	0.4	0.2	0.5
44560	99	P	SUR	47	-41	226	0	0.6	-0.1	0.6
44601	99	P	SUR	48	-37	217	0	0.7	-0.3	0.7
44602	99	P	SUR	53	-28	217	0	0.5	-0.3	0.6
44603	99	P	SUR	42	-59	216	0	0.7	-0.3	0.8
44605	99	P	SUR	44	-5	217	0	0.4	-0.4	0.5
44606	99	P	SUR	47	-34	217	0	0.5	-0.3	0.6
44608	99	P	SUR	46	-25	134	7	0.9	0.1	0.9
44610	99	P	SUR	57	-7	7	0	0.3	0.5	0.6
44612	99	P	SUR	52	-36	217	0	1.3	-0.3	1.4
44613	99	P	SUR	37	-17	217	0	0.3	-0.2	0.4
44614	99	P	SUR	49	-24	216	0	0.5	0.0	0.5
44615	99	P	SUR	62	-24	203	0	1.0	-0.2	1.0
44620	99	P	SUR	54	-34	217	0	0.6	0.2	0.6
44621	99	P	SUR	56	-31	211	0	0.6	0.1	0.6
44622	99	P	SUR	56	-9	202	0	0.6	0.0	0.6
44624	99	P	SUR	26	-18	213	0	0.3	0.1	0.3
44625	99	P	SUR	55	-28	210	0	0.5	0.1	0.5

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
44725	99	P	SUR	29	-64	217	0	0.4	-0.3	0.5
44739	99	P	SUR	43	-55	217	0	0.7	0.2	0.8
44740	99	P	SUR	25	-46	153	0	0.3	-0.4	0.5
44747	99	P	SUR	62	-38	186	0	1.0	-0.7	1.2
44765	99	P	SUR	40	-15	216	0	0.4	0.2	0.4
44773	99	P	SUR	21	-40	210	0	0.2	0.0	0.3
44775	99	P	SUR	33	-62	217	0	0.4	-0.1	0.4
44776	99	P	SUR	38	-57	217	0	0.8	0.2	0.8
44777	99	P	SUR	38	-48	217	0	0.4	0.0	0.4
44778	99	P	SUR	35	-44	217	0	0.4	0.2	0.4
44779	99	P	SUR	43	-44	217	0	0.5	0.1	0.5
44835	99	P	SUR	39	-34	217	0	0.4	-0.3	0.5
44836	99	P	SUR	52	-35	217	0	0.9	-0.3	0.9
44837	99	P	SUR	48	-20	217	0	0.5	-0.3	0.6
44839	99	P	SUR	40	-29	196	0	0.4	0.0	0.4
44846	99	P	SUR	31	-30	217	0	0.3	0.6	0.7
44847	99	P	SUR	41	-36	217	0	0.4	0.2	0.5
44848	99	P	SUR	41	-39	217	0	0.5	0.0	0.5
44863	99	P	SUR	30	-33	203	0	0.3	-0.1	0.3
44866	99	P	SUR	55	-43	218	0	0.7	-0.4	0.8
44867	99	P	SUR	50	-47	217	0	0.5	-0.3	0.6
44868	99	P	SUR	27	-51	214	0	0.4	-0.2	0.4
44871	99	P	SUR	49	-34	216	0	0.7	-0.2	0.7
44872	99	P	SUR	44	-55	217	0	0.7	-0.5	0.9
44876	99	P	SUR	35	-53	216	0	0.5	0.4	0.6
44877	99	P	SUR	41	-26	217	0	0.4	0.0	0.4
44878	99	P	SUR	41	-28	217	0	0.4	0.1	0.4
44880	99	P	SUR	44	-53	217	0	0.7	-0.3	0.8
44885	99	P	SUR	44	-29	216	0	0.4	-0.3	0.5
44887	99	P	SUR	36	-52	217	0	0.5	-0.3	0.6
44888	99	P	SUR	39	-34	217	0	0.4	-0.1	0.4
44889	99	P	SUR	32	-46	182	0	0.2	-0.1	0.3
44890	99	P	SUR	35	-59	206	0	0.6	-0.4	0.7
44891	99	P	SUR	31	-31	217	0	0.3	0.0	0.3
44892	99	P	SUR	42	-47	196	0	0.7	-0.4	0.8
44896	99	P	SUR	35	-33	202	0	0.8	-0.3	0.9
47503	99	P	SUR	86	-36	225	1	0.9	0.0	0.9
47577	99	P	SUR	83	-55	13	0	0.5	-0.5	0.7
47579	99	P	SUR	62	-21	139	95	6.4	-0.2	6.4
47585	99	P	SUR	68	-67	217	0	0.5	0.2	0.5
47586	99	P	SUR	61	-58	217	3	1.9	-0.6	2.0
48568	99	P	SUR	76	-13	217	0	0.6	0.1	0.6
48597	99	P	SUR	85	-59	217	0	0.6	-0.2	0.6

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
48778	99	P	SUR	86	-42	217	0	0.7	-0.3	0.7
48779	99	P	SUR	84	-20	217	0	0.5	-0.5	0.7
62091	99	P	SUR	53	-5	217	0	0.6	-0.5	0.8
62092	99	P	SUR	51	-11	216	0	0.6	-0.3	0.7
62093	99	P	SUR	55	-10	112	1	0.7	-0.8	1.1
62094	99	P	SUR	52	-7	90	0	0.7	-0.5	0.9
62514	99	P	SUR	66	-10	217	0	0.5	0.2	0.5
62516	99	P	SUR	37	-16	217	0	0.3	0.4	0.5
62536	99	P	SUR	56	-21	217	0	0.7	-0.5	0.9
62537	99	P	SUR	53	-25	217	0	0.6	-0.5	0.8
62539	99	P	SUR	55	-30	217	0	0.5	0.1	0.5
62551	99	P	SUR	57	-23	207	0	0.6	-0.5	0.7
62552	99	P	SUR	49	-23	217	0	0.5	-0.1	0.5
62553	99	P	SUR	71	7	217	0	0.6	0.2	0.6
62681	99	P	SUR	45	-15	217	0	1.5	-0.1	1.5
62687	99	P	SUR	76	6	216	0	0.5	0.0	0.5
62695	99	P	SUR	26	-27	216	0	0.3	0.3	0.4
62713	99	P	SUR	25	-52	213	0	0.3	-0.3	0.4
62714	99	P	SUR	22	-48	202	0	0.3	-0.2	0.4
62940	99	P	SUR	35	-28	214	0	0.3	0.2	0.3
62941	99	P	SUR	35	-38	217	0	0.3	-0.1	0.3
63546	99	P	SUR	74	-7	217	70	5.2	-1.8	5.5
63640	99	P	SUR	73	38	127	0	1.4	0.4	1.4
63644	99	P	SUR	72	38	167	6	2.2	-0.8	2.3
64471	99	P	SUR	83	21	63	0	0.4	-0.2	0.4
64516	99	P	SUR	77	8	144	0	2.2	-0.6	2.3
64517	99	P	SUR	59	-16	209	0	0.6	0.1	0.7
64518	99	P	SUR	61	-18	206	0	0.5	-0.2	0.5
64519	99	P	SUR	61	-12	84	0	0.5	0.1	0.5
64520	99	P	SUR	70	-10	217	0	1.7	-0.4	1.8
64521	99	P	SUR	73	-1	210	0	0.8	-0.2	0.8
64522	99	P	SUR	64	0	217	0	0.5	-0.1	0.5
64523	99	P	SUR	63	-16	217	0	0.6	0.0	0.6
64524	99	P	SUR	62	-9	217	0	0.7	-0.3	0.8
64525	99	P	SUR	69	-10	217	0	1.7	0.0	1.7
64526	99	P	SUR	60	-29	208	0	0.8	0.0	0.8
64527	99	P	SUR	61	-27	180	0	0.9	0.4	1.0
64532	99	P	SUR	72	-17	226	0	2.1	0.1	2.1
64533	99	P	SUR	79	-11	229	0	0.5	0.2	0.5
64534	99	P	SUR	76	-13	224	0	0.6	-0.1	0.6
64535	99	P	SUR	83	-13	225	0	1.3	0.2	1.3
64606	99	P	SUR	63	-14	35	0	0.5	0.6	0.8
64607	99	P	SUR	75	9	153	8	3.2	-1.0	3.3

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
64613	99	P	SUR	72	17	217	0	0.9	0.4	1.0
64614	99	P	SUR	57	-40	210	0	0.5	-0.2	0.5
64615	99	P	SUR	73	24	217	0	1.0	0.5	1.1
64622	99	P	SUR	68	1	217	0	0.4	0.2	0.5
64623	99	P	SUR	75	18	217	0	0.9	0.5	1.0
64665	99	P	SUR	72	8	217	0	0.7	0.3	0.8
64666	99	P	SUR	71	-6	217	0	1.3	0.4	1.3
64667	99	P	SUR	63	-22	134	0	0.7	-0.4	0.8
64668	99	P	SUR	75	9	132	0	3.1	-0.4	3.1
64669	99	P	SUR	65	-23	217	0	0.7	0.2	0.8
64691	99	P	SUR	57	-57	198	17	2.7	0.7	2.8
64692	99	P	SUR	68	-1	217	0	0.4	0.5	0.6
65595	99	P	SUR	60	-61	27	3	3.4	0.1	3.4
65596	99	P	SUR	55	-49	217	0	0.7	-0.1	0.7
65597	99	P	SUR	60	-34	217	0	1.0	0.2	1.0
65598	99	P	SUR	48	-33	217	0	0.8	-0.5	1.0

4.10 Table 22 - Drifter Monitoring Statistics (EUCOS): Wind speed (m/s)

```
          DRIFTER MONITORING STATISTICS (EUCOS)
                   MONITORING CENTRE     : ECMWF
                   ELEMENT MONITORED     : WIND SPEED (M/S)
                   AREA                  : 10N - 90N, 70W - 40E
                   PERIOD                : JAN 2015
                   STANDARD OF COMPARISON: FIRST-GUESS FIELD


TIME = 99 => AVERAGE OF ALL OBSERVATIONS


GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
13001	99	SPEED	SUR	11	-23	119	0	0	1.0	0.8	1.2
13002	99	SPEED	SUR	20	-23	81	0	0	0.7	0.1	0.7
13008	99	SPEED	SUR	15	-38	94	0	0	1.0	0.2	1.0
14046	99	SPEED	SUR	16	-53	77	0	0	3.0	-0.5	3.1
41026	99	SPEED	SUR	12	-38	70	0	0	1.0	0.1	1.0
41139	99	SPEED	SUR	20	-38	118	0	0	1.2	-0.3	1.2
62091	99	SPEED	SUR	53	-5	217	0	0	1.2	0.4	1.3
62092	99	SPEED	SUR	51	-11	216	0	0	1.5	-0.8	1.7
62093	99	SPEED	SUR	55	-10	217	0	0	1.6	-1.0	1.9
62094	99	SPEED	SUR	52	-7	90	0	0	1.1	-0.3	1.1

4.11 Table 23 - Drifter Monitoring Statistics (EUCOS): Wind direction

```
          DRIFTER MONITORING STATISTICS (EUCOS)
                   MONITORING CENTRE     : ECMWF
                   ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                   AREA                  : 10N - 90N, 70W - 40E
                   PERIOD                : JAN 2015
                   STANDARD OF COMPARISON: FIRST-GUESS FIELD


TIME = 99 => AVERAGE OF ALL OBSERVATIONS
GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S
WIND SPEEDS > 3M/S USED
```

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
13001	99	DIRN	SUR	11	-23	119	0	5	18.4	-2.0	18.5
13002	99	DIRN	SUR	20	-23	81	0	0	6.4	3.1	7.1
13008	99	DIRN	SUR	15	-38	94	0	0	8.2	-4.0	9.1
14046	99	DIRN	SUR	16	-53	69	0	0	29.9	4.5	30.2
41026	99	DIRN	SUR	12	-38	70	0	3	17.8	2.4	18.0
41139	99	DIRN	SUR	20	-38	113	0	0	10.5	14.2	17.7
62091	99	DIRN	SUR	53	-5	207	0	0	9.5	-0.9	9.6
62092	99	DIRN	SUR	51	-11	205	0	0	13.6	-0.9	13.6
62093	99	DIRN	SUR	55	-10	204	0	0	10.7	-7.3	13.0
62094	99	DIRN	SUR	52	-7	90	0	0	10.0	2.0	10.2

5 Annex - Explanations of figures and tables

5.1 General

All information presented in this report is based on data received at ECMWF before the appropriate analysis. Approximate cut-off times (UTC) are shown below:

Analysis	Obs Time	Cut-off
0000	2101-0300	1530 (16 hours)
1200	0901-1500	1900 (7 hours)

5.2 Data Availability

For each observation type/parameter the average number of reports received per day is displayed in boxes of 5 degrees square. The numbers plotted are the nearest integer values - e.g. if 40 reports were received during the month then the average daily value plotted will be 1. If the average number is greater than 1000 then 999 will be plotted. If the average number is less than 0.5 then the digit 0 will be plotted. If no observations were received then the box will be left blank.

5.3 Data Quality

The information presented on data quality is based on differences between observations and the values of the most recent ECMWF forecast ("first guess") of the same parameter. Depending on the time of the observation, the forecast range is between 9 and 15 hours. The ability of a modern data assimilation system to provide the diagnostic facilities to monitor the performance of the observational network is demonstrated by A. Hollingsworth et. al., Monthly Weather Review, Vol 114, No. 5, May 1986.

It should be noted that:

(i) all results are based on software that may undergo further development;

(ii) although the quality of the ECMWF first-guess fields is of a generally high standard this is only true to a limited extent in the tropics, where small-scale processes such as convection are of much greater importance than in mid-latitudes, and the observations will sometimes not be representative of the scales of motion given by the first-guess;

(iii) the first-guess fields themselves will vary in accuracy depending on the density and quality of data, particularly in the upstream regions and over Antarctica and the southern hemisphere mid-latitudes. Direct comparisons between stations (or airlines) should preferably be restricted to observations in a reasonably homogeneous climatic region.

Tables 1-9 contain lists of SHIPs (including fixed marine platforms), DRIFTERs, TEMPs and TEMPs/PILOTs believed to have supplied suspect reports of surface pressure, geopotential height or wind during the month. The format of the tables is according to Recommendation 3 CBS-Ext(85) and the criteria for stations or data platforms to be classified as suspect are given at the top of each table. For tables 7 and 8 data for the worst

standard pressure level are shown. Units of RMS, standard deviation and bias are hPa in tables 1 and 4, m in table 7 and ms^{-1} in tables 2, 5 and 8. In tables 7 and 8 the station position is indicated; in the case of TEMPSHIPs and PILOTSHIPs this position is obtained from the first report of the month. The gross error limits for first-guess deviations of geopotential in table 7 are as follows:

Level	Geop
1000	100m
925	100m
850	100m
700	100m
500	150m
400	175m
300	200m
250	225m
200	250m
150	275m
100	300m
70	375m
50	400m
30	450m

The corresponding limits for wind (table 8) are:

Level	Wind
1000	$35ms^{-1}$
925	$35ms^{-1}$
850	$35ms^{-1}$
700	$40ms^{-1}$
500	$45ms^{-1}$
400	$50ms^{-1}$
300	$60ms^{-1}$
250	$60ms^{-1}$
200	$50ms^{-1}$
150	$50ms^{-1}$
100	$45ms^{-1}$

In table 7 the weighted RMS values at standard levels are calculated using the following weights:

Level	Weight
1000	3.70
925	3.55
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

Tables 10 and 11 provide geopotential and wind quality statistics (100 hPa level) for TEMPSHIPs and PILOTSHIPs received during the month. Units and display format are identical to those in tables 7 and 8 respectively. Tables 13, 14 (50 hPa), 15 and 16 (100 hPa), 17 and 18 (500hPa), 19 and 20 (850hPa) provide similar radiosonde statistics for the EUCOS area.

Tables 21-23 are similar to tables 4-6 with data coverage restricted to the EUCOS area.

Figures 14-18 show global charts of SATOB and aircraft wind quality, where the statistics have been averaged over latitude/longitude boxes of 5 degrees square, and the mean observed minus first-guess (or 'bias') wind vectors have been plotted. All observations in the specified layers have been used. For comparison the mean observed wind (from the SATOB reports only) for each layer is shown in figures 14 and 15. A reference value of wind speed is plotted in the top right corner of each figure. An arrow is only plotted if 10 or more observations have been received in that 5 degree square.

Table 12 provides quality statistics of aircraft wind observations in the layer 300-150 hPa stratified by airline carrier. The format and specifications of the table have been defined by NMC Washington, the lead centre for the monitoring of aircraft and satellite data.