ECMWF Global Data Monitoring Report

July 2019

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 28 (June 15) – Monitoring of SYNOP and SYNOP-SHIPs now includes BUFR encoded observations for those which were assimilated as well as for those without TAC counterpart.

Revision 27 (Feb 15) – Selection criteria for SHIPs are modified as per SOT-7/Doc.9.1.1.
Different criteria applied to Manual and Automatic SHIPs.

Revision 26 (Dec 14) – Coverage chart for ATOVS AMSU-A for Noaa_16 removed

Revision 25 (Mar 13) – Monitoring of Radiosondes and ASAPs now includes BUFR encoded observations for those which were assimilated as well as for those without TAC counterpart.
Tables 24 and 25 are also added to show the identifiers of these BUFR observations separately.

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 of Evaluation Section
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	Jun	Jul	Ident	Time	Jun	Jul
06060	(00)	16	2	40437	(00)	14	30
17130	(00)	28	3	43150	(12)	0	29
17130	(12)	27	9	43185	(00)	12	29
31300	(00)	14	0	43185	(12)	7	28
31300	(12)	11	0	43333	(12)	0	31
47681	(00)	30	0	43371	(12)	0	29
47681	(12)	30	0	64400	(12)	0	11
48407	(00)	29	0	64500	(12)	0	32
48568	(00)	23	0	65344	(12)	0	23
61660	(00)	32	0	72317	(12)	18	39
61660	(12)	32	0	76394	(00)	0	27
63985	(12)	29	0	76526	(00)	8	22
68906	(12)	27	4	76526	(12)	11	31
70026	(00)	30	3	76595	(12)	3	25
70026	(12)	29	3	76644	(00)	6	28
70219	(00)	30	3	76644	(12)	8	26
70219	(12)	30	3	78897	(00)	20	31
70231	(00)	16	3	82281	(12)	11	31
70231	(12)	25	9	82400	(00)	3	21
70261	(00)	30	3	82400	(12)	5	22
70261	(12)	29	3	82765	(12)	0	28
70308	(00)	25	3	83554	(00)	5	19
70308	(12)	23	3	83554	(12)	6	18
70326	(00)	26	3	83779	(00)	5	31
70326	(12)	27	3	83779	(12)	5	31
70350	(00)	30	4	-	-	-	-
70350	(12)	29	3	-	-	-	-
70361	(00)	30	3	-	-	-	-
70361	(12)	27	3	-	-	-	-
70398	(00)	30	3	-	-	-	-
70398	(12)	30	3	-	-	-	-
71823	(00)	18	5	-	-	-	-
71823	(12)	17	5	-	-	-	-
72694	(12)	35	24	-	-	-	-
78397	(12)	20	0	-	-	-	-
78583	(00)	30	8	-	-	-	-
78583	(12)	30	7	-	-	-	-
80210	(12)	13	0	-	-	-	-
83827	(00)	30	16	-	-	-	-
83827	(12)	30	16	-	-	-	-
91680	(12)	16	0	-	-	-	-
94430	(00)	12	0	-	-	-	-

2.2 Drifting Buoys

Surface pressure observations from **1821** 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

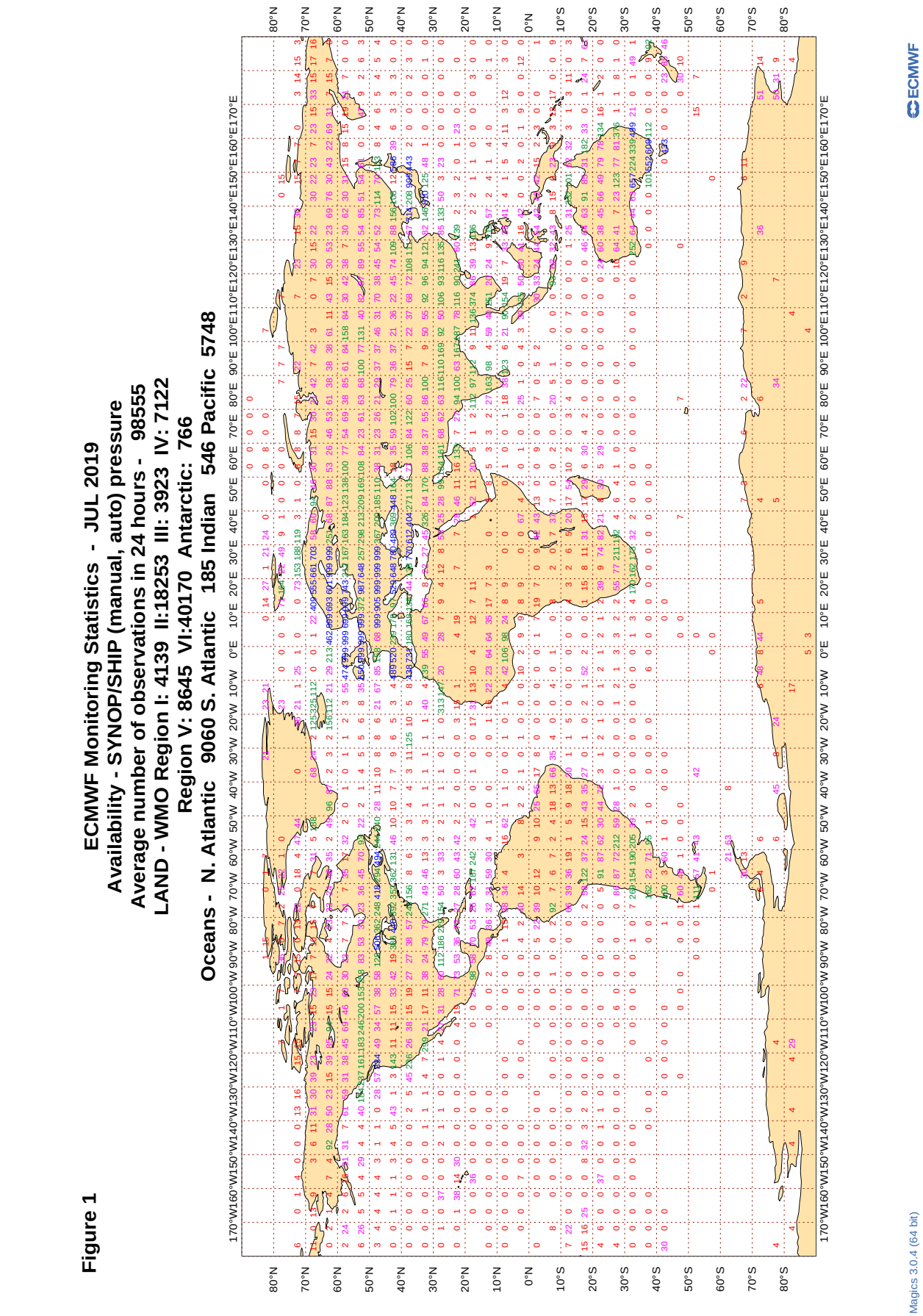


Figure 1

3.2.2 Figure 2 - Availability - DRIFTER PRESSURE

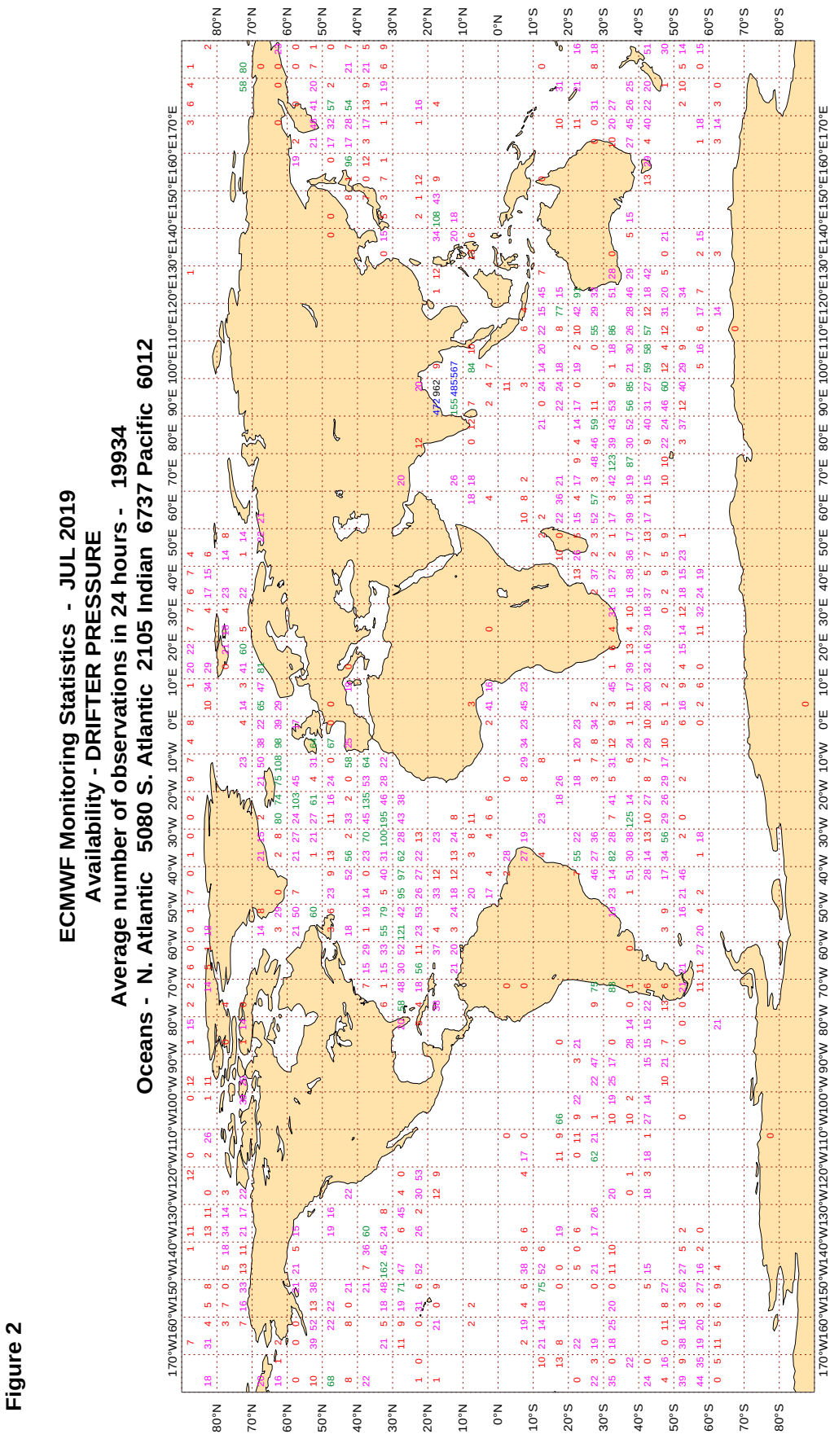


Figure 2

3.2.3 Figure 3 - Availability - TEMP 500 hPa geopotential

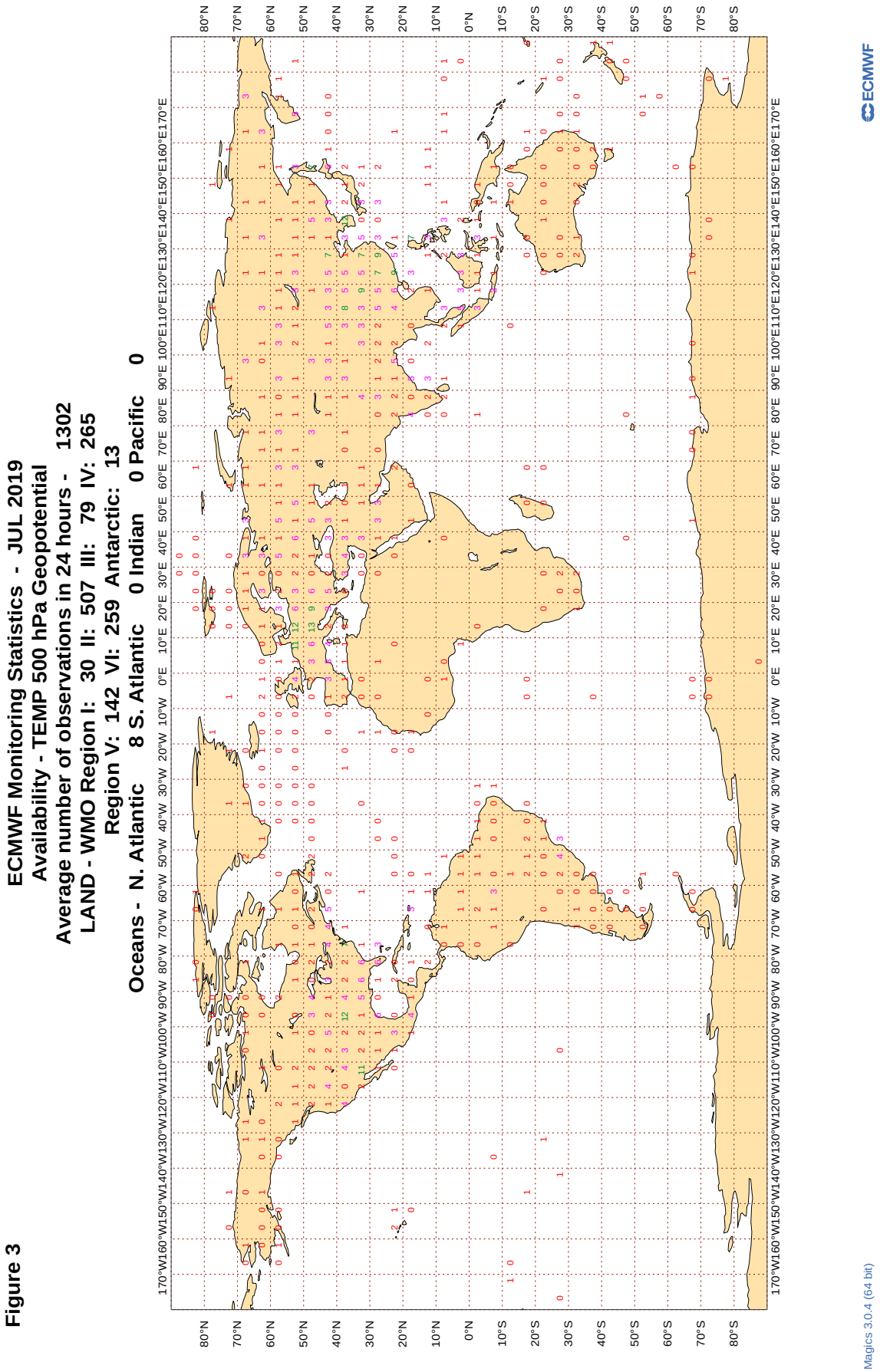


Figure 3

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

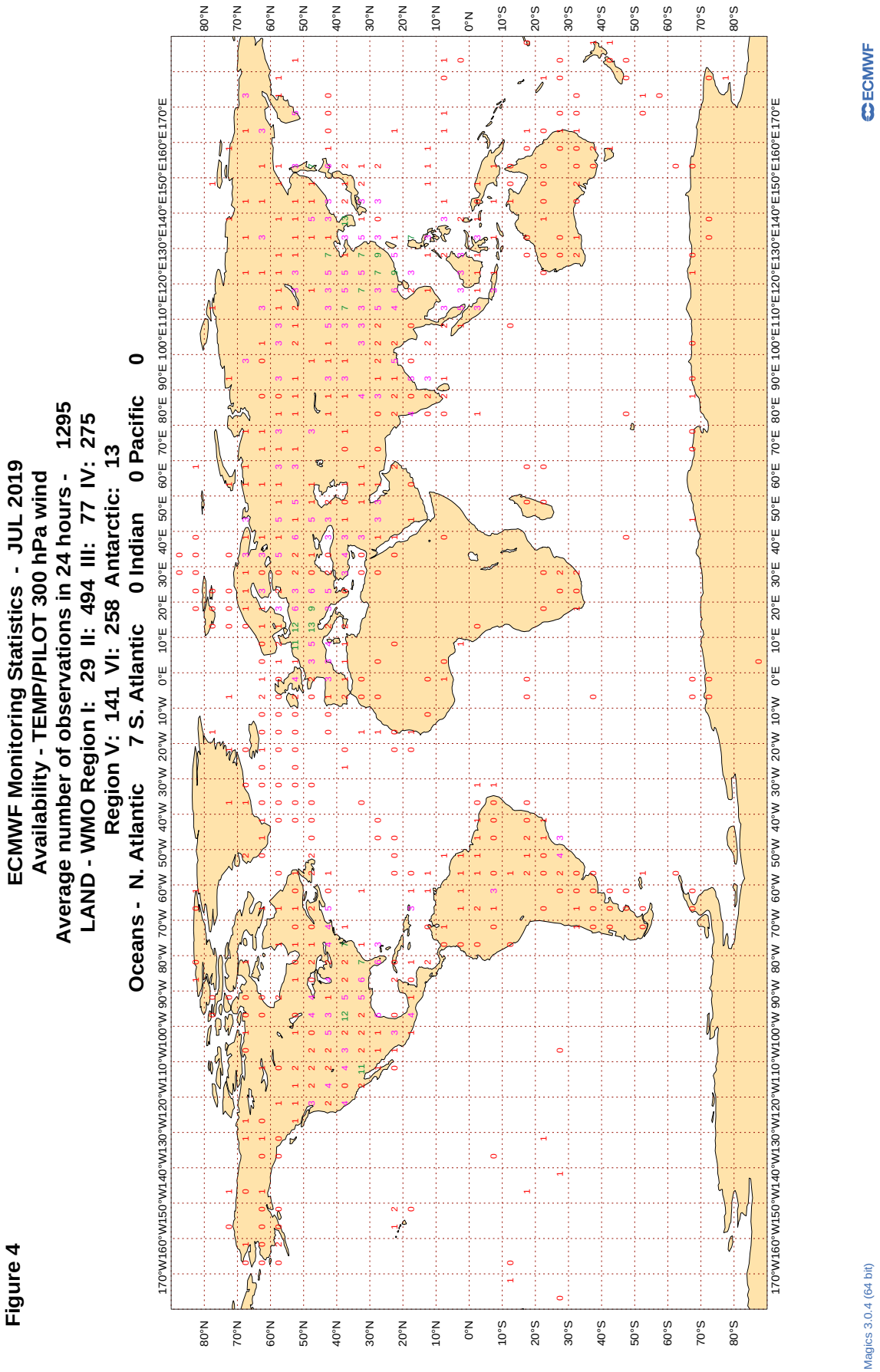


Figure 4

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

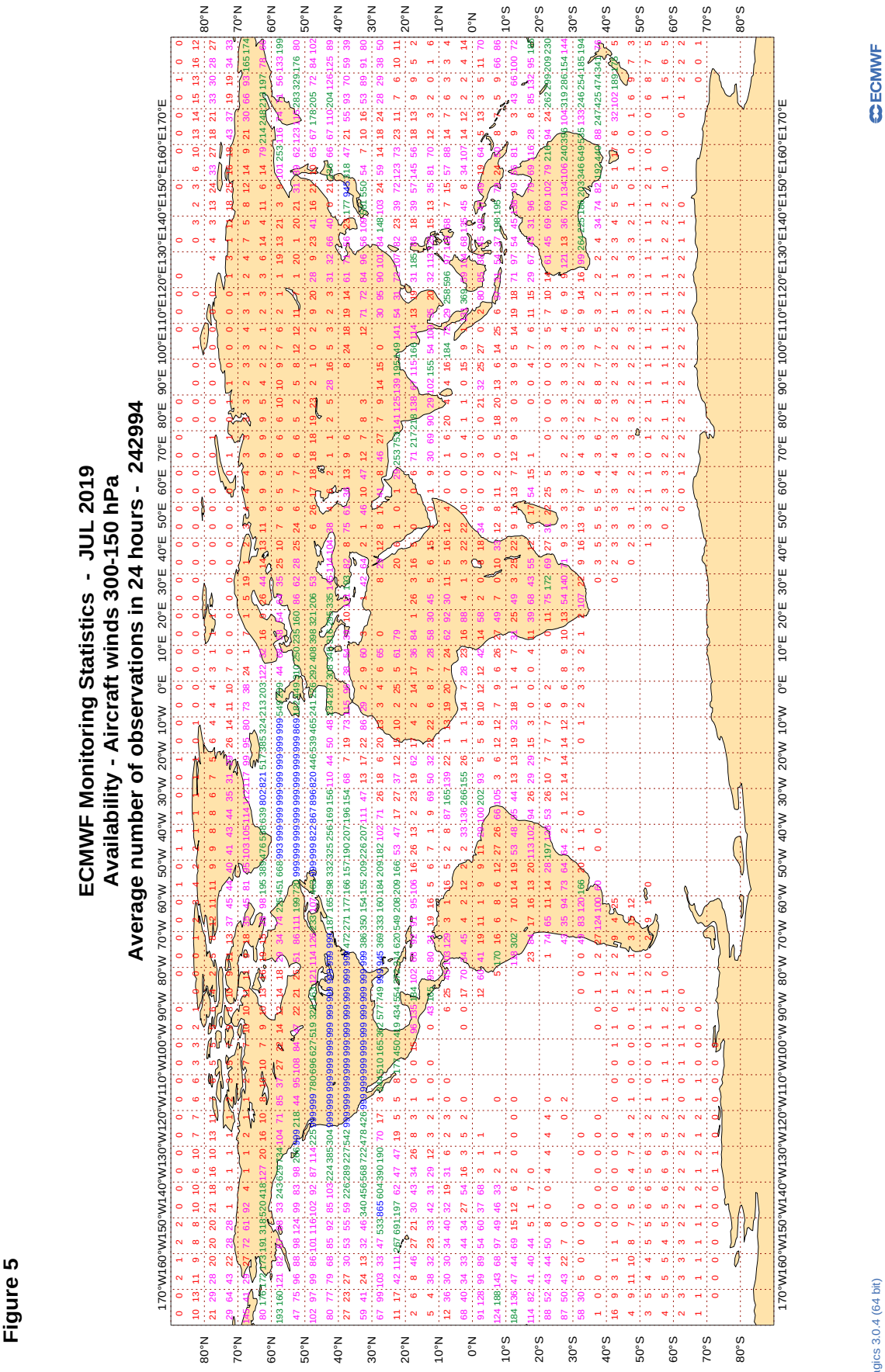


Figure 5

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

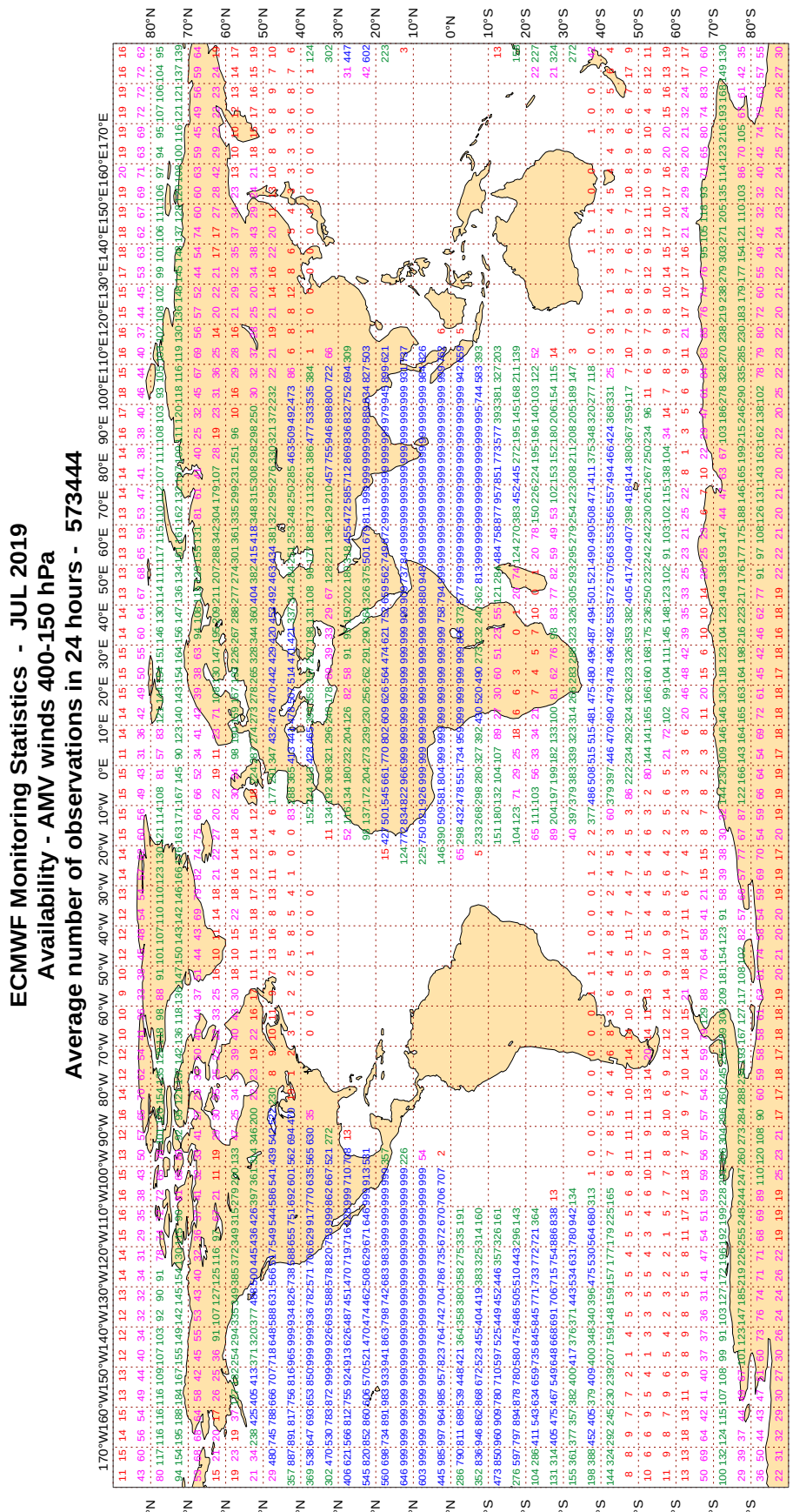


Figure 6

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

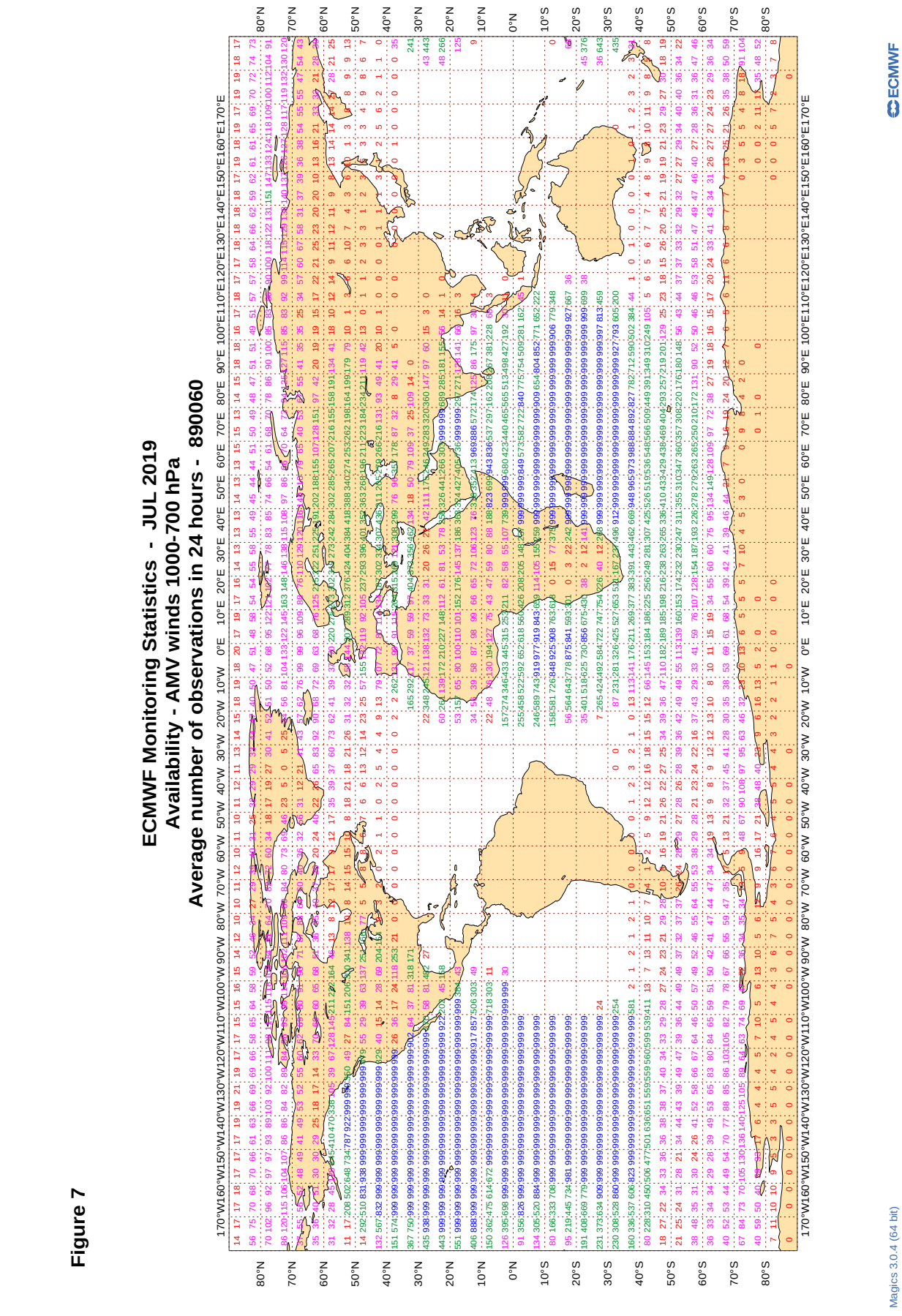
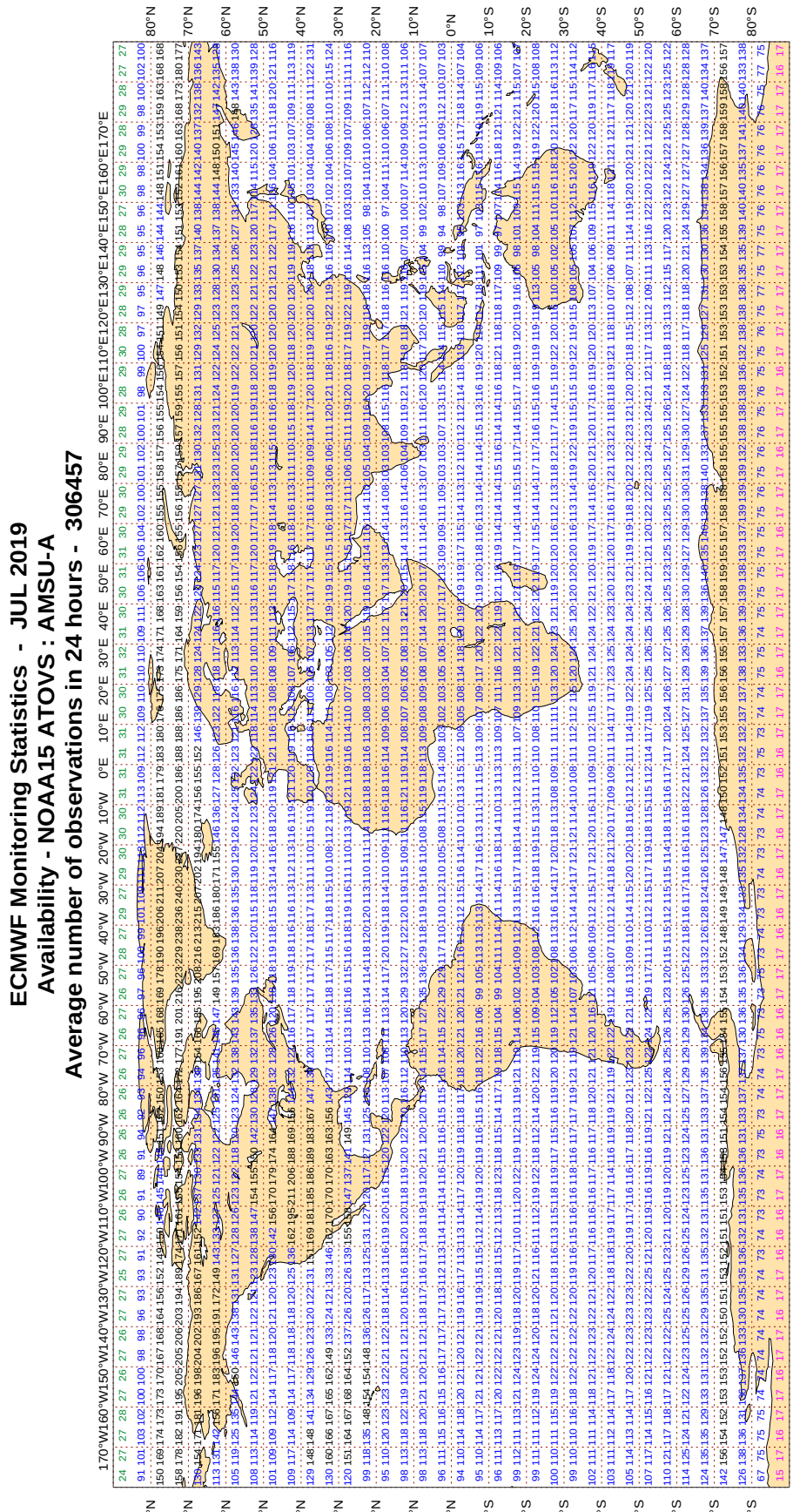
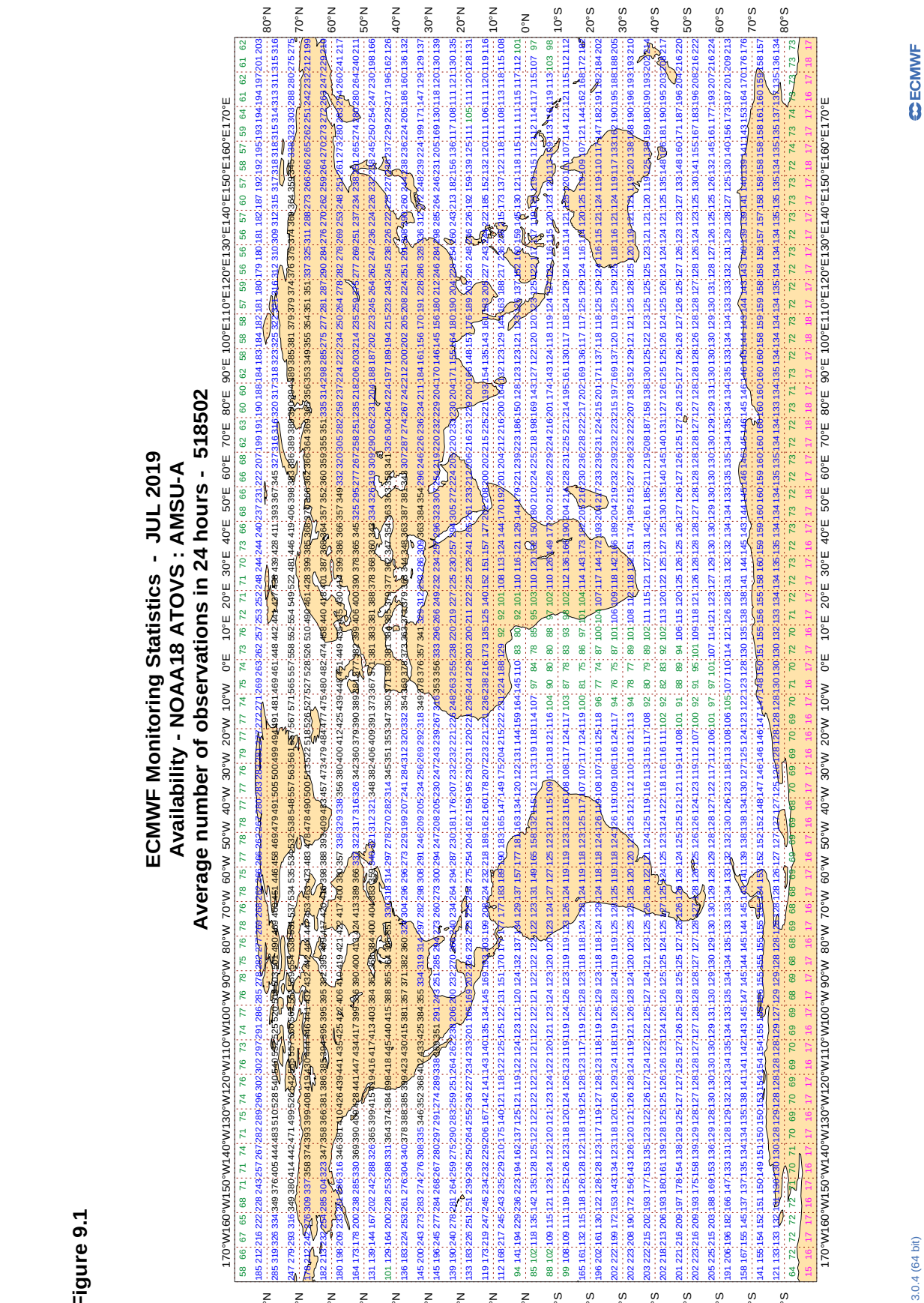


Figure 7

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



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



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

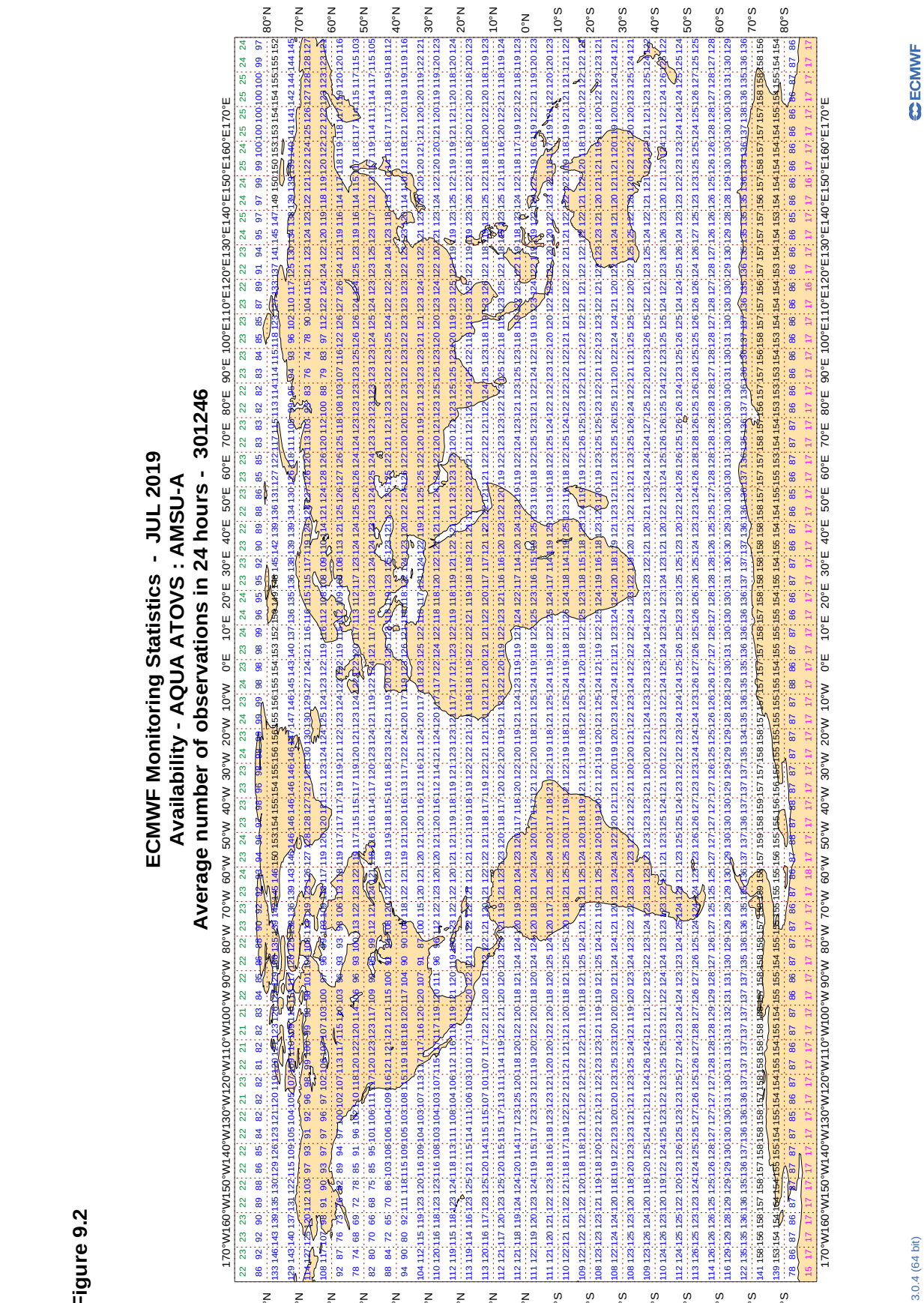


Figure 9.2

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

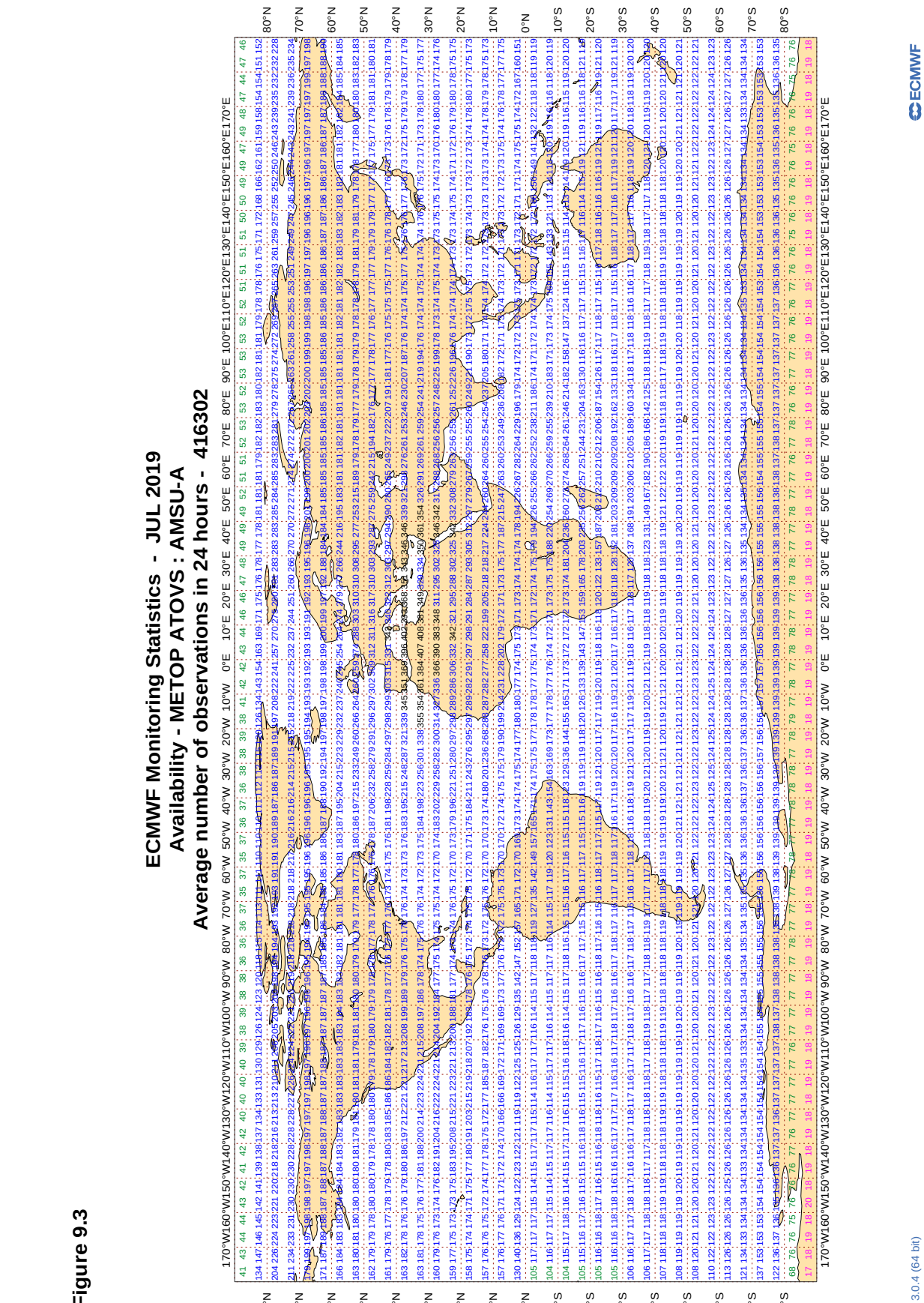


Figure 9.3

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                : JUL 2019
                    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
3FSR7	99	P	SUR	30	0	3.1	4.5	5.4
45169	99	P	SUR	190	0	0.5	3.5	3.6
9HA3097	99	P	SUR	17	0	1.6	-3.5	3.8
9HJB9	99	P	SUR	58	0	1.4	10.4	10.5
9HJD9	99	P	SUR	38	0	1.2	5.5	5.6
9HRJ9	99	P	SUR	36	0	3.5	3.4	4.8
9V3867	99	P	SUR	48	0	6.8	1.1	6.9
9V6221	99	P	SUR	20	0	0.8	-4.2	4.3
9V7987	99	P	SUR	44	0	4.4	7.3	8.5
9V8827	99	P	SUR	44	0	0.8	7.1	7.1
9V8838	99	P	SUR	46	0	1.0	5.0	5.0
9V9268	99	P	SUR	42	0	2.9	5.9	6.5
9V9404	99	P	SUR	22	2	2.9	8.9	9.3
9V9408	99	P	SUR	48	0	4.0	7.9	8.9
9V9498	99	P	SUR	35	0	2.7	3.0	4.1
9V9558	99	P	SUR	29	5	3.9	8.7	9.5
9V9793	99	P	SUR	22	0	0.7	4.7	4.7
9VFL3	99	P	SUR	62	0	0.9	-3.4	3.5
9VFV5	99	P	SUR	111	0	1.7	7.3	7.5
A8OS6	99	P	SUR	50	0	0.7	3.7	3.8
A8YD3	99	P	SUR	30	0	0.5	3.1	3.1
AUCE	99	P	SUR	92	45	2.3	-0.1	2.3
AWUU	99	P	SUR	16	0	3.3	3.5	4.8
C6CX3	99	P	SUR	24	0	2.1	4.0	4.6
C6TX6	99	P	SUR	17	0	2.0	5.2	5.6
CQHW	99	P	SUR	20	0	0.9	-4.5	4.6
CZ3695	99	P	SUR	104	66	0.7	0.0	0.7
D5LD4	99	P	SUR	46	0	1.4	3.1	3.4
J8QB8	99	P	SUR	34	0	0.9	3.3	3.4
KAO107	99	P	SUR	15	6	0.3	0.9	1.0
KDBG	99	P	SUR	25	0	0.9	-3.2	3.3
LAQL7	99	P	SUR	25	0	1.3	4.1	4.3

LIST OF SUSPECT STATIONS : SHIPS + FIXED MARINE PLATFORMS
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : SURFACE PRESSURE (HPA)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	NUM OBS	NUM GROSS	SD	BIAS	RMS
ONFZ	99	P	SUR	40	0	3.3	3.8	5.1
OUJI2	99	P	SUR	22	0	3.2	5.6	6.4
OWJD2	99	P	SUR	17	0	5.2	0.9	5.2
OWJI2	99	P	SUR	20	0	6.0	2.1	6.4
OWQN2	99	P	SUR	18	15	0.8	14.2	14.2
OXES2	99	P	SUR	60	1	2.3	5.4	5.8
OXGX2	99	P	SUR	86	0	4.7	3.2	5.7
OXSQ2	99	P	SUR	27	0	1.1	-4.1	4.2
OYGQ2	99	P	SUR	37	0	1.0	3.3	3.4
OZ2049	99	P	SUR	49	0	0.9	-6.0	6.0
OZDL2	99	P	SUR	46	12	2.9	-0.9	3.0
UAEV	99	P	SUR	28	0	2.7	4.5	5.2
VRBH6	99	P	SUR	39	0	2.7	6.3	6.9
VRBI2	99	P	SUR	24	0	1.6	5.7	5.9
VRCS2	99	P	SUR	16	0	1.1	4.6	4.8
VRFX2	99	P	SUR	43	0	0.6	-4.2	4.3
VRIB3	99	P	SUR	48	0	1.0	-4.7	4.8
VRJS2	99	P	SUR	20	0	0.9	-3.0	3.2
VRKC8	99	P	SUR	28	0	2.6	4.1	4.9
VRKE9	99	P	SUR	17	0	2.4	3.5	4.3
VRLA6	99	P	SUR	19	0	1.9	3.7	4.2
VRMW7	99	P	SUR	40	0	1.6	3.6	4.0
VRNR5	99	P	SUR	49	0	1.6	6.1	6.3
VROS7	99	P	SUR	22	0	2.7	4.0	4.8
VRRA4	99	P	SUR	16	0	1.6	-3.8	4.2
VRRB6	99	P	SUR	32	0	1.3	3.5	3.7
VRRI4	99	P	SUR	82	0	1.6	3.1	3.5
VWSK	99	P	SUR	106	0	0.5	-3.4	3.4
VWTI	99	P	SUR	42	0	0.7	-3.3	3.4
WCEU	99	P	SUR	74	1	2.0	5.8	6.2
WCQ6174	99	P	SUR	100	0	2.0	-3.2	3.8
WXY6216	99	P	SUR	27	27	0.0	0.0	0.0
WYT8569	99	P	SUR	67	0	2.2	3.9	4.5

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                : JUL 2019
                    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

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                : JUL 2019
                    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
44072	99	DIRN	SUR	67	0	0	21.9	-82.8	85.6
45141	99	DIRN	SUR	47	0	0	21.0	43.6	48.4
45150	99	DIRN	SUR	38	0	0	20.4	99.4	101.5
45166	99	DIRN	SUR	47	0	0	35.1	-41.3	54.2
45175	99	DIRN	SUR	116	0	0	73.1	-39.7	83.1
45176	99	DIRN	SUR	30	0	0	78.8	-33.1	85.5
46118	99	DIRN	SUR	62	0	0	41.9	-42.4	59.6

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                 : JUL 2019
                    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
0022957	99	P	SUR	33	125	279	177	0.6	0.6	0.9
1601573	99	P	SUR	-43	70	703	10	2.6	4.3	5.0
1701574	99	P	SUR	-57	7	201	67	5.3	6.7	8.5
2301714	99	P	SUR	25	62	656	309	9.2	-1.6	9.3
2301719	99	P	SUR	22	89	641	248	8.5	-0.8	8.5
3101544	99	P	SUR	-38	-43	483	0	2.1	4.1	4.7
3301521	99	P	SUR	-30	-43	559	18	2.4	5.0	5.5
3301564	99	P	SUR	-57	-47	55	0	2.9	8.9	9.3
3401501	99	P	SUR	-29	-95	184	56	5.9	-5.6	8.1
4500001	99	P	SUR	48	-88	4450	4450	0.0	0.0	0.0
4500002	99	P	SUR	45	-86	4284	4284	0.0	0.0	0.0
4500003	99	P	SUR	45	-83	741	741	0.0	0.0	0.0
4500004	99	P	SUR	48	-87	4457	4457	0.0	0.0	0.0
4500005	99	P	SUR	42	-82	4436	4436	0.0	0.0	0.0
4500006	99	P	SUR	47	-90	739	736	0.5	0.8	1.0
4500007	99	P	SUR	43	-87	4452	4449	0.0	-14.7	14.7
4500008	99	P	SUR	44	-82	4456	4456	0.0	0.0	0.0
4500012	99	P	SUR	44	-77	4450	0	0.4	-9.3	9.3
4500026	99	P	SUR	42	-87	4330	4329	0.0	-14.4	14.4
4500029	99	P	SUR	43	-86	4398	4396	0.0	-14.9	14.9
4500168	99	P	SUR	42	-86	4386	4386	0.0	0.0	0.0
4800770	99	P	SUR	68	-30	622	622	0.0	0.0	0.0
4802508	99	P	SUR	81	-114	286	261	3.3	10.4	10.9
5401535	99	P	SUR	-25	-145	181	32	5.6	-7.5	9.3
5601548	99	P	SUR	-13	97	688	107	5.7	-4.3	7.2
5601571	99	P	SUR	-44	92	193	0	1.3	4.6	4.7
6203527	99	P	SUR	61	-3	193	1	2.4	8.8	9.2
6301500	99	P	SUR	88	118	56	0	3.4	-4.1	5.4

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                : JUL 2019
                    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
23451	99	SPEED	SUR	15	69	194	0	0	2.3	-5.3	5.7

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

```
          LIST OF SUSPECT STATIONS         : DRIFTER
                    MONITORING CENTRE      : ECMWF
                    ELEMENT MONITORED      : WIND DIRECTION (DEGREES)
                    PERIOD                 : JUL 2019
                    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
1500001	99	DIRN	SUR	-10	-10	664	0	0	109.4	-53.0	121.5
1500002	99	DIRN	SUR	0	-10	244	0	0	132.3	90.5	160.3
15002	99	DIRN	SUR	0	-10	232	0	0	133.6	87.6	159.8
2200102	99	DIRN	SUR	35	126	351	0	0	25.0	22.6	33.7
2300007	99	DIRN	SUR	8	89	699	0	0	86.9	-58.6	104.8
23091	99	DIRN	SUR	18	89	118	0	0	24.5	-21.4	32.6
23093	99	DIRN	SUR	16	88	165	0	0	31.6	95.1	100.2
23094	99	DIRN	SUR	14	84	264	0	0	21.2	-35.6	41.4
23452	99	DIRN	SUR	12	69	171	0	0	95.7	-46.2	106.3
23456	99	DIRN	SUR	18	67	174	0	0	172.4	-1.7	172.4
23459	99	DIRN	SUR	14	87	173	0	0	11.0	-22.4	25.0
23460	99	DIRN	SUR	7	88	178	0	0	18.1	-21.5	28.1
23492	99	DIRN	SUR	11	72	177	0	0	55.6	-48.2	73.6
3100003	99	DIRN	SUR	-8	-31	255	0	0	15.3	25.3	29.6
3100231	99	DIRN	SUR	-27	-47	182	5	0	111.0	90.3	143.1
31003	99	DIRN	SUR	-8	-31	253	0	0	15.4	25.1	29.4
31231	99	DIRN	SUR	-27	-47	182	7	0	111.1	91.0	143.6
4100064	99	DIRN	SUR	34	-77	599	0	0	17.4	-24.5	30.0
41064	99	DIRN	SUR	34	-77	595	0	0	18.7	-25.3	31.5
4400013	99	DIRN	SUR	42	-71	484	0	0	23.5	23.6	33.3
4400062	99	DIRN	SUR	39	-76	1593	0	0	31.6	-20.6	37.7
4400063	99	DIRN	SUR	39	-76	3364	0	0	30.8	-23.5	38.7
4400072	99	DIRN	SUR	37	-76	1443	0	0	24.4	-77.2	81.0
44013	99	DIRN	SUR	42	-71	452	0	0	22.6	23.0	32.3
44062	99	DIRN	SUR	39	-76	618	0	0	34.6	-20.6	40.2
44063	99	DIRN	SUR	39	-76	777	0	0	33.9	-24.8	42.0
44072	99	DIRN	SUR	37	-76	359	0	0	28.6	-78.5	83.5
44139	99	DIRN	SUR	44	-57	577	0	0	15.5	-21.8	26.7
4500001	99	DIRN	SUR	48	-88	2803	0	0	22.5	21.8	31.3
4500004	99	DIRN	SUR	48	-87	2771	0	0	21.6	21.4	30.4
4500024	99	DIRN	SUR	44	-87	2509	0	0	21.7	26.3	34.1

LIST OF SUSPECT STATIONS : DRIFTER
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
4500166	99	DIRN	SUR	45	-73	889	0	0	26.5	-46.6	53.7
4500168	99	DIRN	SUR	42	-86	2106	0	0	42.1	22.9	47.9
4500173	99	DIRN	SUR	47	-87	1115	0	0	25.1	-21.7	33.1
4500175	99	DIRN	SUR	46	-85	2119	0	0	78.2	-35.7	85.9
4500176	99	DIRN	SUR	42	-82	596	0	0	78.7	-48.8	92.6
4500186	99	DIRN	SUR	42	-88	881	0	0	26.1	27.4	37.8
45024	99	DIRN	SUR	44	-87	750	0	0	22.1	25.1	33.5
45141	99	DIRN	SUR	61	-115	277	0	0	28.2	40.4	49.2
45149	99	DIRN	SUR	44	-82	433	0	0	22.2	23.1	32.0
45150	99	DIRN	SUR	62	-114	247	0	0	22.8	93.3	96.1
45166	99	DIRN	SUR	45	-73	316	0	0	27.6	-47.1	54.6
45168	99	DIRN	SUR	42	-86	494	0	0	42.3	22.2	47.7
45173	99	DIRN	SUR	47	-87	504	0	0	27.2	-21.5	34.7
45175	99	DIRN	SUR	46	-85	501	0	0	78.8	-42.9	89.8
45176	99	DIRN	SUR	42	-82	237	0	0	80.1	-59.8	99.9
45186	99	DIRN	SUR	42	-88	334	0	0	27.7	26.7	38.5
4600011	99	DIRN	SUR	35	-121	42	0	0	129.0	4.4	129.1
4600081	99	DIRN	SUR	61	-148	118	0	0	68.4	29.7	74.6
4600087	99	DIRN	SUR	48	-125	386	0	0	19.4	31.5	37.0
4600092	99	DIRN	SUR	37	-122	458	0	0	15.9	20.5	26.0
4600118	99	DIRN	SUR	49	-123	420	0	0	42.0	-44.8	61.4
46011	99	DIRN	SUR	35	-121	47	0	0	126.0	2.3	126.1
46081	99	DIRN	SUR	61	-148	123	0	0	68.0	26.7	73.1
46087	99	DIRN	SUR	49	-125	190	0	0	22.2	27.8	35.6
46118	99	DIRN	SUR	49	-123	408	0	0	42.6	-42.3	60.1
5300040	99	DIRN	SUR	-8	95	738	0	0	173.2	7.7	173.4
5300056	99	DIRN	SUR	-5	95	726	0	0	148.4	82.1	169.6
53040	99	DIRN	SUR	-8	95	738	0	0	172.4	13.3	172.9
53056	99	DIRN	SUR	-5	95	724	0	0	150.5	77.5	169.3
6101003	99	DIRN	SUR	40	25	59	0	0	32.2	38.6	50.3

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                : JUL 2019
                    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
01400	12	Z	1000	57	3	27	0	5.6	78.1	78.3
01400	00	Z	1000	57	3	29	0	5.7	80.5	80.7
04417	00	Z	1000	73	-38	31	29	0.0	-97.4	97.4
08522	12	Z	1000	33	-17	32	2	25.9	50.2	56.5
24343	00	Z	200	67	123	27	1	68.9	112.0	131.5
24343	12	Z	200	67	123	27	1	79.0	89.7	119.5
38064	00	Z	100	45	66	27	1	51.6	111.1	122.5
38064	12	Z	100	45	66	30	2	114.7	106.9	156.8
42299	00	Z	925	27	89	31	0	6.2	-47.9	48.3
42634	00	Z	850	23	70	12	0	4.6	52.3	52.5
42706	00	Z	1000	23	87	15	0	26.8	21.6	34.4
56492	00	Z	50	29	105	24	0	164.3	-58.1	174.3
56651	00	Z	70	27	100	28	0	128.3	47.4	136.8
5QPW8X	12	Z	1000	61	-50	10	0	17.1	31.9	36.2
61687	12	Z	1000	14	-14	10	0	2.7	-37.4	37.5
68842	12	Z	1000	-34	26	29	0	27.9	21.6	35.3
76394	00	Z	200	26	-100	27	0	108.5	132.4	171.2
89625	12	Z	925	-75	123	29	23	6.0	-91.3	91.5
98233	00	Z	1000	18	122	20	0	29.3	42.5	51.6

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                : JUL 2019
                    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

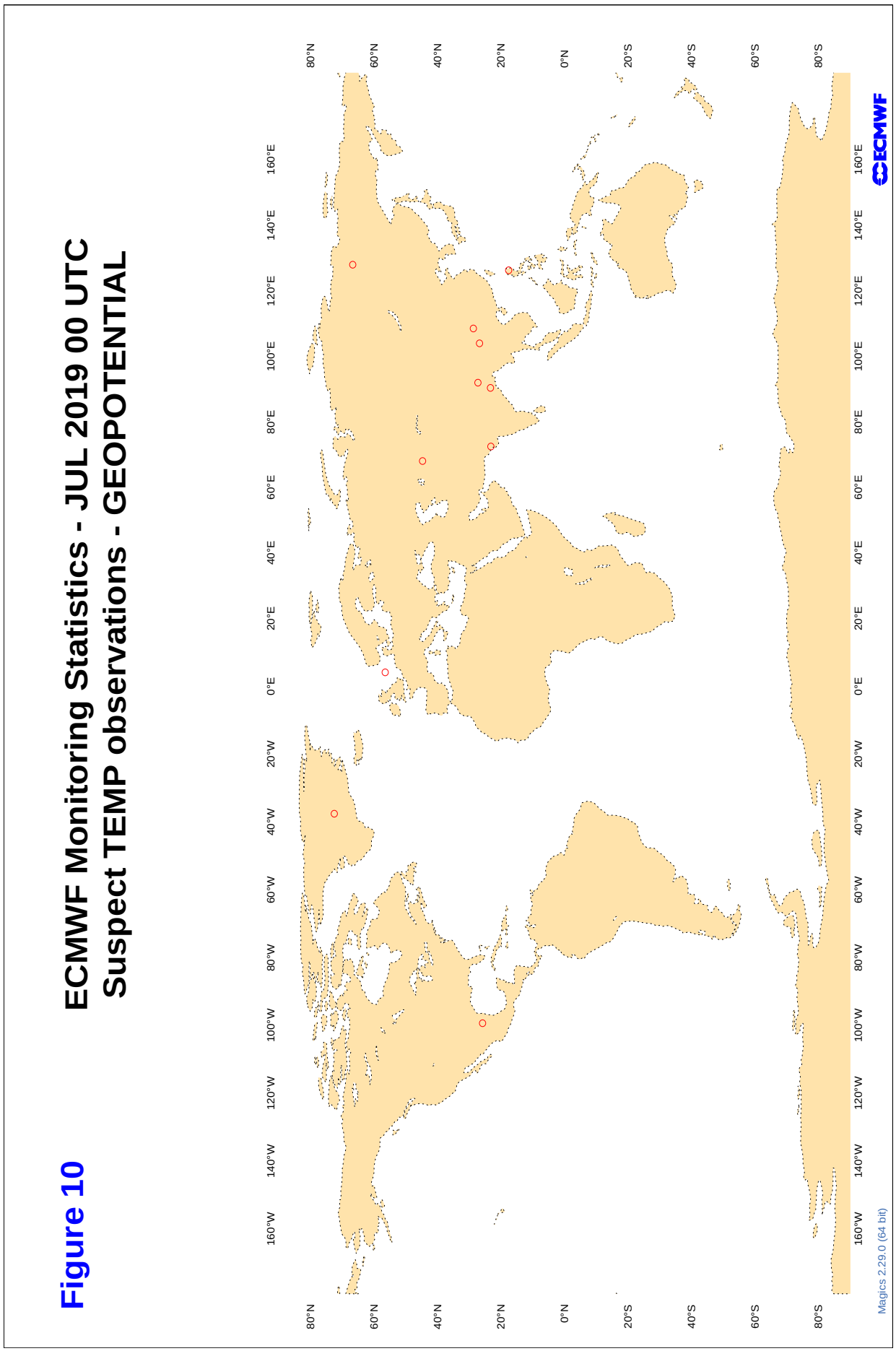
3.2.20 Table 9 - Suspect radiosondes: Wind direction (degrees)

```
          LIST OF SUSPECT STATIONS        : RADIOSONDES
                    MONITORING CENTRE     : ECMWF
                    ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                    AREA                  : GLOBAL
                    PERIOD                : JUL 2019
                    STANDARD OF COMPARISON: FIRST-GUESS FIELD

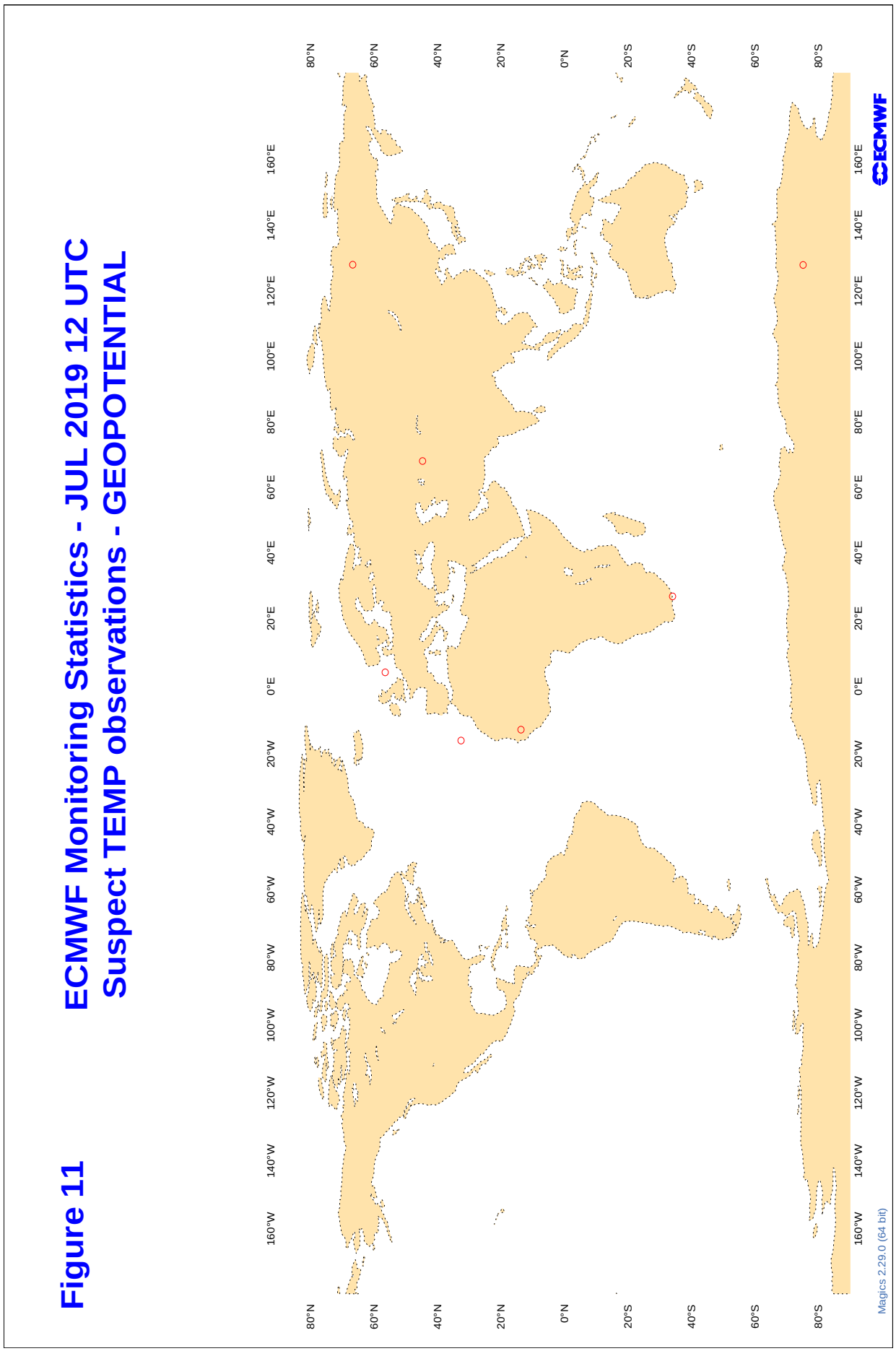

SELECTION CRITERIA: OBSERVED/FORECAST WIND SPEEDS >= 5 M/S
                    NO. OF OBSERVATIONS   >= 5, AND,
                    ABSOLUTE BIAS         >= 10 DEGREES, WITH
                    STANDARD DEVIATION    <  30 DEGREES, AND,
                    VERTICAL SPREAD       < 10 DEGREES
         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

WMO IDENT	OBS TIME	ELM	LAT	LONG	NUM OBS	BIAS	MAX SPREAD	SD
48565	00	DD	8	98	21	12.3	5.5	14.9

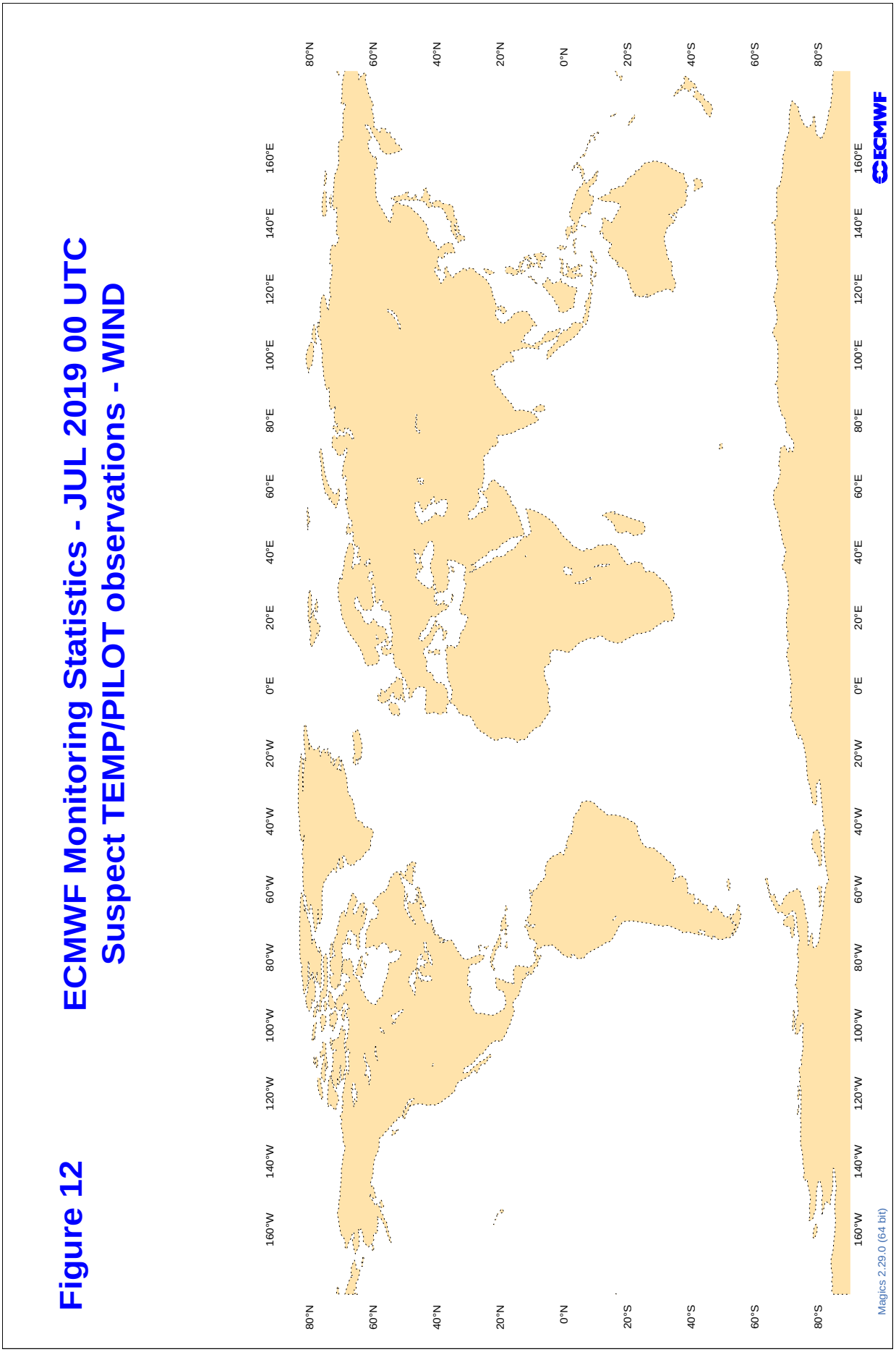
3.2.21 Figure 10 - Suspect TEMP observations - geopotential : 00 UTC



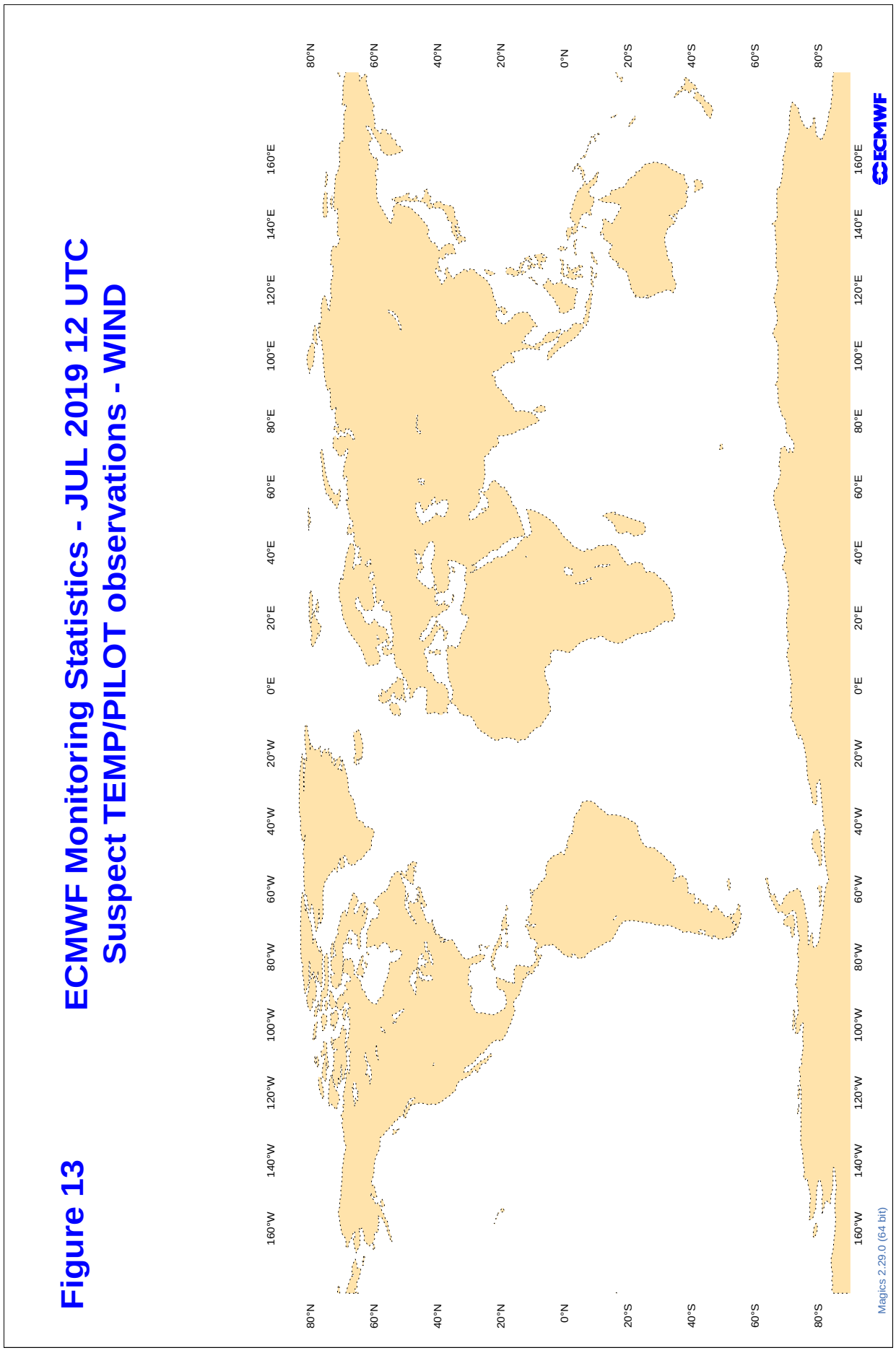
3.2.22 Figure 11 - Suspect TEMP observations - geopotential : 12 UTC



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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
5QPW8X	12	Z	100	10	26.3	21.2
5QPW8X	00	Z	100	10	20.2	19.6
7JUNA4	12	Z	100	1	0.0	0.0
7JUNA4	00	Z	100	2	45.7	45.7
ASDE09	12	Z	100	1	27.2	27.2
FHM5UJ	12	Z	100	13	19.8	-1.3
FHM5UJ	00	Z	100	13	19.7	5.3
FPUW5G	12	Z	100	4	5.6	5.5
HTXUH4	12	Z	100	9	6.3	2.7
HTXUH4	00	Z	100	10	5.0	-2.8
JGQH	12	Z	100	4	5.3	-0.5
JGQH	00	Z	100	3	4.3	2.3
JNKN7J	12	Z	100	6	48.7	48.0
JNKN7J	00	Z	100	3	36.6	36.5
KJJF9X	00	Z	100	7	35.6	30.0
KJJF9X	12	Z	100	7	26.7	25.1
KMPLHP	12	Z	100	7	43.7	35.8
KMPLHP	00	Z	100	7	6.1	-0.2
WDK38H	12	Z	100	12	8.9	-7.2
XKQLWQ	12	Z	100	9	24.2	22.2
XQFJRG	12	Z	100	1	1.4	-1.4
XQFJRG	00	Z	100	0	0.0	0.0
YLV96W	12	Z	100	7	75.6	71.1
YLV96W	00	Z	100	5	40.1	38.8
ZVQEQC	12	Z	100	23	18.8	17.8

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
5QPW8X	12	V	100	10	2.1	0.5	0.1
5QPW8X	00	V	100	10	1.9	-0.2	0.6
7JUNA4	12	V	100	1	1.0	0.7	-0.7
7JUNA4	00	V	100	1	0.3	0.0	0.3
ASDE09	12	V	100	1	5.0	-1.2	-4.9
FHM5UJ	12	V	100	13	2.5	0.2	0.5
FHM5UJ	00	V	100	13	2.3	-0.7	-0.4
FPUW5G	12	V	100	4	2.4	0.4	-0.7
HTXUH4	12	V	100	9	2.0	-0.3	-0.1
HTXUH4	00	V	100	9	2.5	0.3	-0.4
JGQH	12	V	100	4	2.9	0.7	-2.1
JGQH	00	V	100	3	2.2	0.2	1.7
JNKN7J	12	V	100	6	2.3	0.2	0.0
JNKN7J	00	V	100	2	2.2	0.3	0.5
KJJF9X	00	V	100	7	2.9	-0.5	-0.5
KJJF9X	12	V	100	6	1.5	0.0	0.0
KMPLHP	12	V	100	7	2.3	-0.9	0.3
KMPLHP	00	V	100	6	3.1	0.4	-2.0
WDK38H	12	V	100	12	2.1	0.1	-0.3
XKQLWQ	12	V	100	9	4.0	-0.9	2.1
XQFJRG	12	V	100	1	1.0	-0.8	0.6
XQFJRG	00	V	100	0	0.0	0.0	0.0
YLV96W	12	V	100	6	2.3	0.1	-0.4
YLV96W	00	V	100	5	1.9	-0.2	0.7
ZVQEQC	12	V	100	23	6.0	1.8	1.4

3.2.27 Figure 14 - SATOB Winds: 700-1000hPa

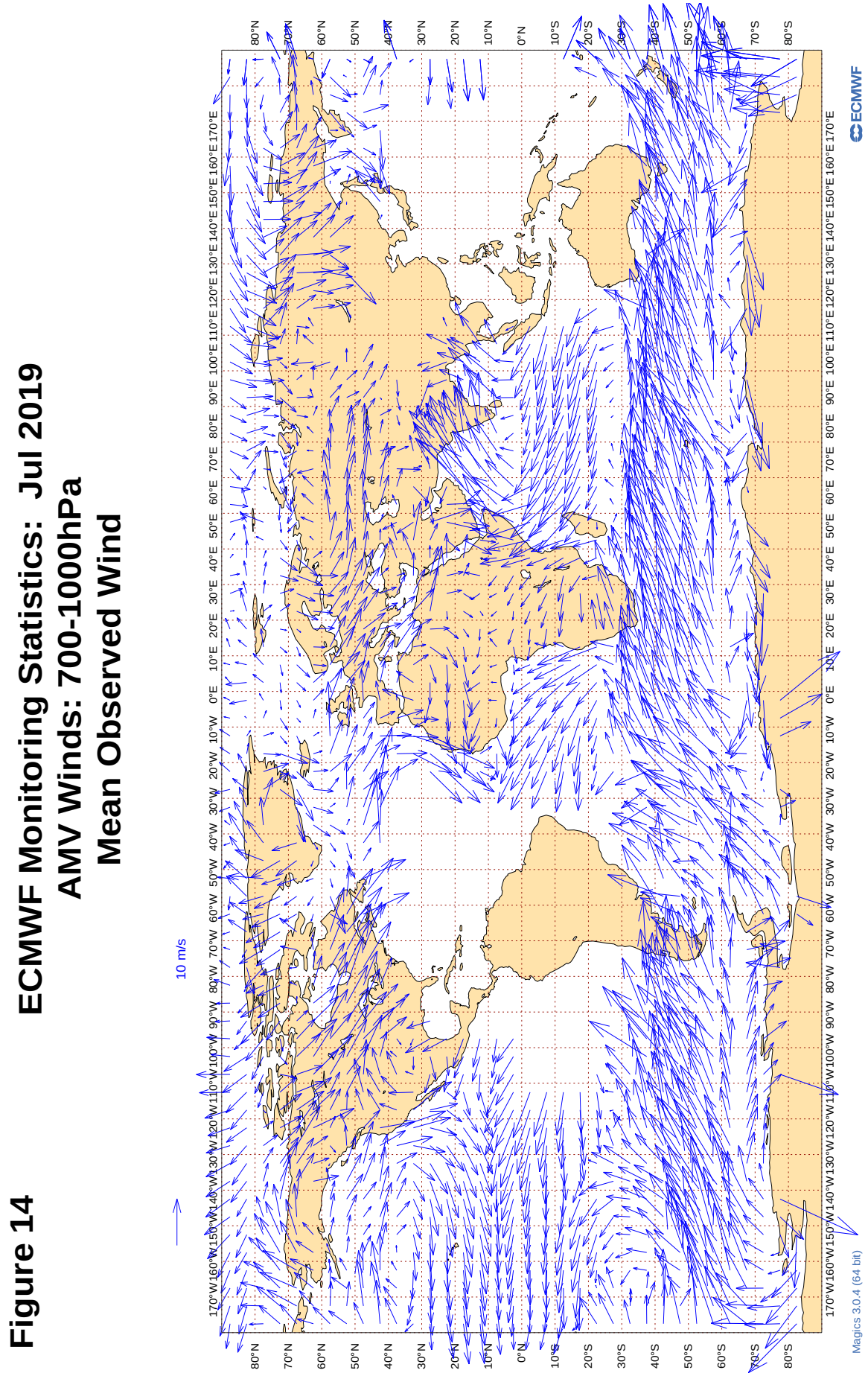


Figure 14

3.2.28 Figure 15 - SATOB Winds: 150- 400hPa

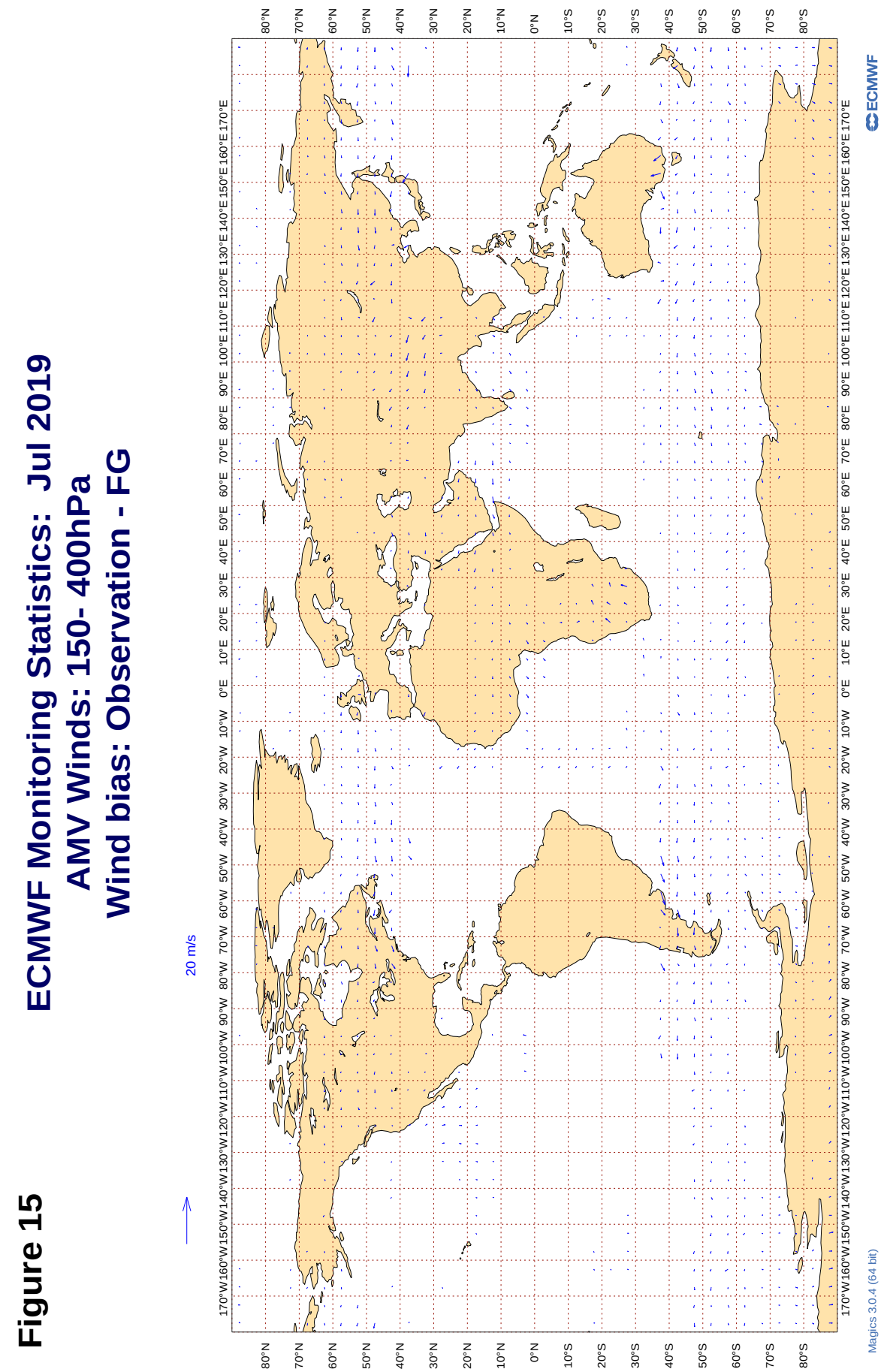


Figure 15

3.2.29 Figure 16 - SATOB Winds: 700-1000hPa

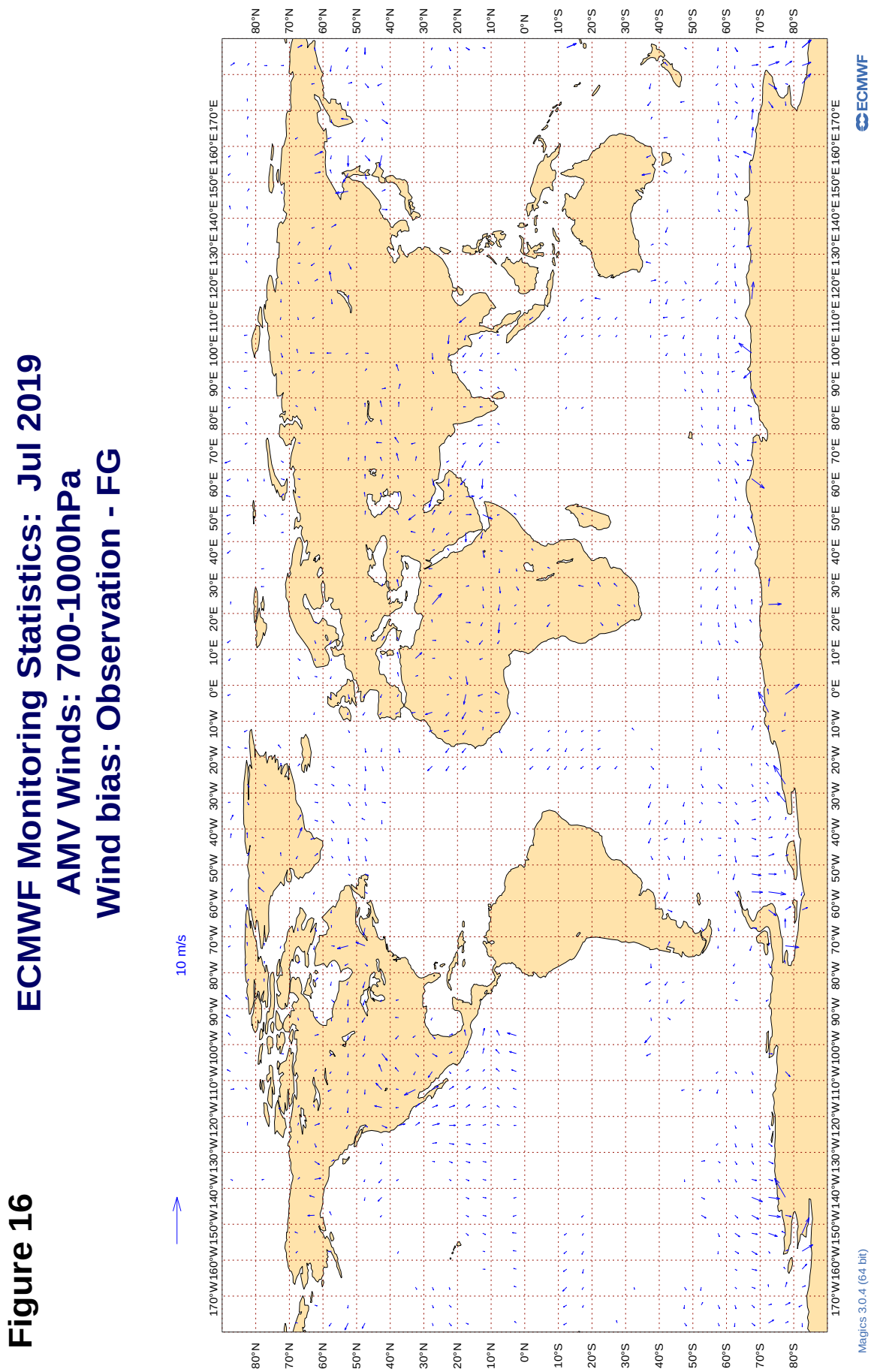


Figure 16

3.2.30 Figure 17 - SATOB Winds: 150- 400hPa

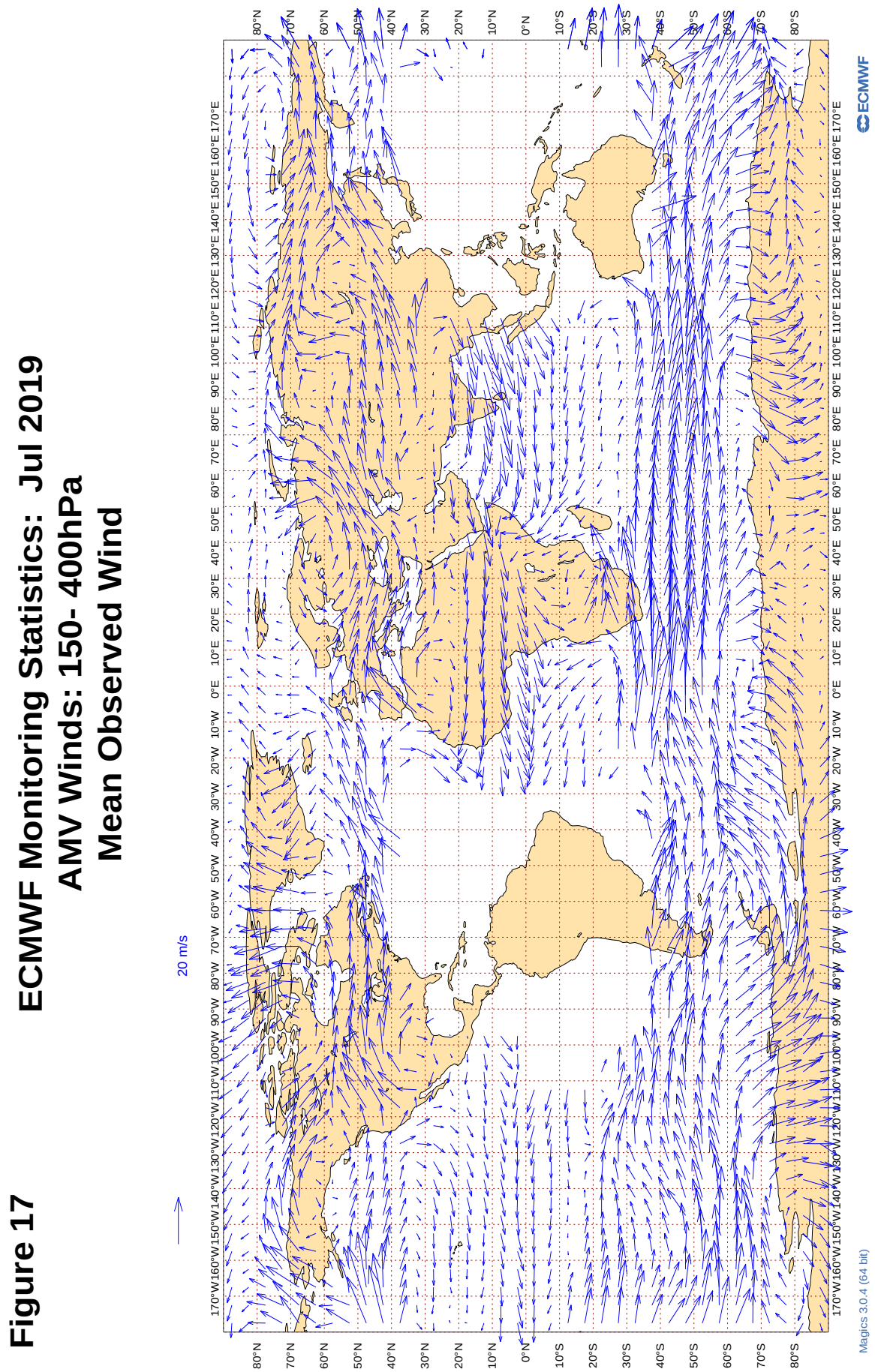


Figure 17

3.2.31 Figure 18 - AIRCRAFT Winds: 150- 300hPa

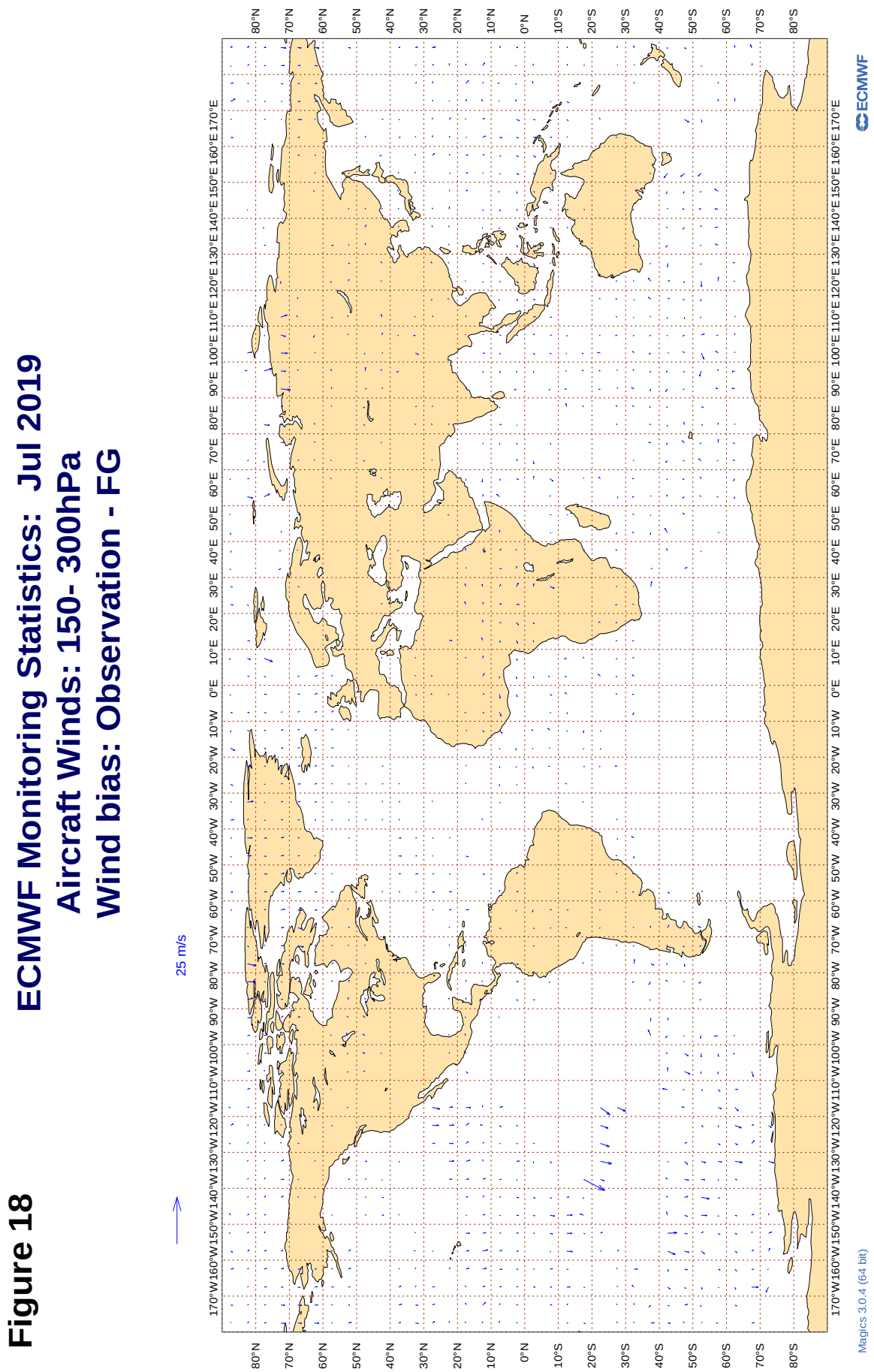


Figure 18

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 : JUL 2019
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
AAB	99	V	300-150	49	0	0	2.8	0.1
AAL	99	V	300-150	71642	2	0	5.6	0.3
AAR	99	V	300-150	275	1	0	4.1	-1.2
ABB	99	V	300-150	42	0	0	2.8	-0.0
ABD	99	V	300-150	488	0	0	3.9	0.1
ABW	99	V	300-150	779	0	0	3.3	-0.2
ACA	99	V	300-150	37544	2	0	6.4	0.2
ACI	99	V	300-150	2989	0	0	3.4	0.4
AEA	99	V	300-150	693	1	1	4.3	0.4
AFL	99	V	300-150	2407	0	0	3.2	0.4
AFR	99	V	300-150	33029	1	0	4.3	0.3
AHO	99	V	300-150	70	0	0	3.4	0.2
AHY	99	V	300-150	191	3	0	12.0	-0.1
AIC	99	V	300-150	1941	0	0	3.6	0.3
AIZ	99	V	300-150	32	0	0	5.6	0.7
ALK	99	V	300-150	620	0	0	4.9	0.4
AMX	99	V	300-150	3621	11	0	11.1	-0.0
ANG	99	V	300-150	22	0	0	2.7	-0.8
ANZ	99	V	300-150	32121	1	0	4.6	0.5
ASA	99	V	300-150	73	0	4	6.3	-0.3
ASL	99	V	300-150	839	0	0	3.2	0.6
ASY	99	V	300-150	422	0	0	4.5	0.9
ATN	99	V	300-150	128	1	0	4.8	1.1
AUA	99	V	300-150	5858	0	0	3.9	0.1
AUH	99	V	300-150	96	6	0	9.5	1.2
AUI	99	V	300-150	1081	0	0	3.2	0.3
AVA	99	V	300-150	725	10	0	8.6	0.1

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
AWC	99	V	300-150	57	0	0	3.7	0.9
AXM	99	V	300-150	149	0	1	5.9	1.0
AZA	99	V	300-150	10501	0	0	3.3	0.4
AZG	99	V	300-150	220	0	0	3.0	0.3
AZU	99	V	300-150	29	14	3	10.0	0.0
BAW	99	V	300-150	57123	2	0	5.3	0.2
BBA	99	V	300-150	52	0	0	2.8	0.1
BBC	99	V	300-150	132	0	0	5.7	-0.8
BCS	99	V	300-150	164	0	0	2.9	0.2
BEL	99	V	300-150	2848	0	0	3.2	0.4
BIA	99	V	300-150	37	0	0	2.4	-0.4
BLU	99	V	300-150	137	0	0	3.8	0.3
BMW	99	V	300-150	121	0	0	3.0	0.0
BOS	99	V	300-150	1536	0	0	3.4	0.5
BOX	99	V	300-150	2848	0	0	3.3	0.1
BOX	99	V	300-150	61	0	0	3.3	0.3
BVR	99	V	300-150	86	0	0	3.0	0.4
CAL	99	V	300-150	420	0	0	3.8	0.5
CAZ	99	V	300-150	85	0	0	3.3	-0.2
CCA	99	V	300-150	865	3	0	4.3	0.6
CEB	99	V	300-150	85	0	0	4.7	0.3
CES	99	V	300-150	2063	0	0	3.4	0.3
CFC	99	V	300-150	380	0	0	3.7	0.2
CFG	99	V	300-150	6019	0	0	3.8	-0.0
CHH	99	V	300-150	247	1	0	8.0	0.4
CJT	99	V	300-150	291	0	0	4.0	0.2
CKS	99	V	300-150	1520	0	0	3.3	-0.2
CLF	99	V	300-150	47	74	0	23.6	1.2
CLU	99	V	300-150	807	0	0	3.7	-0.5
CLX	99	V	300-150	3374	0	0	3.7	-0.2
CMB	99	V	300-150	1055	0	0	3.8	0.1
CNK	99	V	300-150	88	0	0	2.9	0.4
CNV	99	V	300-150	154	0	0	3.4	0.4
COO	99	V	300-150	54	0	0	3.5	-0.2
CPA	99	V	300-150	963	0	0	3.8	1.2
CRL	99	V	300-150	2230	0	0	3.4	0.3
CSC	99	V	300-150	240	0	0	3.8	0.7
CSN	99	V	300-150	916	2	0	6.4	0.7
CTM	99	V	300-150	28	0	7	2.8	-0.7
CWG	99	V	300-150	31	0	0	3.8	0.4
CXB	99	V	300-150	87	0	0	3.0	0.4
DAH	99	V	300-150	1190	0	0	3.5	0.3
DAL	99	V	300-150	87085	0	0	3.4	0.2

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
DHK	99	V	300-150	1283	0	0	4.6	-0.7
DJT	99	V	300-150	2323	0	0	3.8	0.4
DLH	99	V	300-150	35529	0	0	3.2	0.1
DUB	99	V	300-150	79	0	0	3.1	0.4
EAV	99	V	300-150	22	0	0	4.6	1.1
EDC	99	V	300-150	34	0	3	3.2	0.8
EDG	99	V	300-150	227	0	0	3.8	-0.1
EDW	99	V	300-150	2680	0	0	3.2	0.3
EGS	99	V	300-150	28	0	0	5.0	-0.5
EIN	99	V	300-150	16236	0	0	3.3	0.3
EJM	99	V	300-150	1120	1	0	4.7	0.3
ELY	99	V	300-150	4806	8	0	7.9	0.1
ETD	99	V	300-150	5194	2	0	5.5	0.2
ETH	99	V	300-150	3318	2	0	6.2	0.3
EVE	99	V	300-150	32	0	0	4.5	0.0
EWG	99	V	300-150	4692	0	0	3.4	0.3
EXS	99	V	300-150	189	0	1	3.1	0.2
FBU	99	V	300-150	662	0	0	4.0	0.3
FDX	99	V	300-150	6554	0	0	3.3	0.1
FGR	99	V	300-150	31	0	0	6.3	0.5
FIN	99	V	300-150	911	0	0	3.0	0.2
FJI	99	V	300-150	8952	0	0	4.0	0.7
FWI	99	V	300-150	2021	0	0	3.3	0.2
GAF	99	V	300-150	107	0	0	3.0	0.1
GAJ	99	V	300-150	83	0	0	6.5	0.3
GCT	99	V	300-150	34	0	0	4.0	0.8
GEC	99	V	300-150	2201	0	0	3.4	0.1
GES	99	V	300-150	219	0	0	3.6	-0.0
GFA	99	V	300-150	538	0	0	3.9	0.0
GIA	99	V	300-150	640	0	0	5.2	0.5
GLO	99	V	300-150	50	4	14	13.2	-0.6
GOL	99	V	300-150	115	0	0	4.6	0.1
GTH	99	V	300-150	76	0	0	3.0	0.0
GTI	99	V	300-150	3451	0	0	3.8	-0.1
HAL	99	V	300-150	4640	0	0	4.2	0.8
HRT	99	V	300-150	53	25	0	17.2	0.4
HUA	99	V	300-150	89	0	0	3.7	1.2
HWA	99	V	300-150	21	0	0	5.9	-0.4
HZS	99	V	300-150	52	0	0	3.3	-0.3
IAM	99	V	300-150	44	0	0	4.2	0.7
IBE	99	V	300-150	4448	0	0	3.4	0.3
IBK	99	V	300-150	1013	0	0	3.3	0.4
ICE	99	V	300-150	1037	0	1	4.0	0.4

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
ICL	99	V	300-150	710	0	0	4.9	-0.3
ICV	99	V	300-150	267	0	0	4.4	-0.6
IFA	99	V	300-150	45	0	0	4.2	-0.0
IJM	99	V	300-150	50	0	0	5.8	-1.2
ISS	99	V	300-150	3308	0	0	3.2	0.2
IXR	99	V	300-150	21	0	0	2.7	-0.2
JAF	99	V	300-150	1044	12	0	9.8	0.0
JAS	99	V	300-150	267	0	0	3.4	0.1
JCL	99	V	300-150	31	0	0	4.2	-0.0
JCO	99	V	300-150	42	0	0	3.4	1.3
JET	99	V	300-150	41	0	0	3.7	1.2
JJA	99	V	300-150	56	2	5	5.9	0.5
JME	99	V	300-150	73	0	0	4.1	0.1
JST	99	V	300-150	2993	0	0	5.3	0.5
JTL	99	V	300-150	24	29	4	22.4	1.5
KAC	99	V	300-150	1268	0	0	3.6	0.2
KAI	99	V	300-150	69	0	0	4.0	0.4
KAL	99	V	300-150	1241	2	0	5.0	0.6
KFE	99	V	300-150	20	0	0	4.3	-2.1
KHA	99	V	300-150	39	0	0	3.6	1.3
KIW	99	V	300-150	124	0	0	3.7	1.1
KLM	99	V	300-150	18874	2	0	5.2	0.1
KNE	99	V	300-150	147	0	0	4.9	-0.2
KQA	99	V	300-150	282	14	1	8.9	0.5
KTK	99	V	300-150	352	0	0	3.7	0.4
LAN	99	V	300-150	2852	10	0	9.4	0.0
LCO	99	V	300-150	22	0	0	3.1	0.0
LEA	99	V	300-150	25	0	0	3.4	0.3
LHO	99	V	300-150	21	0	0	2.6	0.5
LMJ	99	V	300-150	22	0	0	4.5	-0.8
LOT	99	V	300-150	5470	4	0	8.6	0.0
LUC	99	V	300-150	75	0	0	2.9	-0.2
LXG	99	V	300-150	51	0	0	3.2	0.2
LXJ	99	V	300-150	140	5	0	8.4	0.3
MAS	99	V	300-150	604	0	0	3.8	0.2
MAU	99	V	300-150	176	0	0	5.5	1.3
MED	99	V	300-150	141	0	0	4.1	-0.1
MHV	99	V	300-150	31	0	0	3.7	2.0
MLM	99	V	300-150	64	0	0	4.1	0.3
MMD	99	V	300-150	240	0	0	3.3	0.2
MPH	99	V	300-150	698	0	0	3.6	-0.3
MSR	99	V	300-150	2138	1	0	5.5	0.2
NAS	99	V	300-150	489	0	0	3.9	0.1

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
NAX	99	V	300-150	14986	9	0	10.6	0.1
NCA	99	V	300-150	217	0	0	3.7	-0.6
NJE	99	V	300-150	398	0	1	3.2	0.5
NOS	99	V	300-150	210	3	0	8.5	-1.1
NRS	99	V	300-150	9273	7	0	8.6	0.2
NWS	99	V	300-150	183	0	0	2.9	-0.0
OAE	99	V	300-150	1458	0	0	3.8	0.1
OMA	99	V	300-150	442	0	0	4.7	0.5
OSY	99	V	300-150	47	0	0	5.4	0.0
PAC	99	V	300-150	166	0	0	4.0	0.2
PAL	99	V	300-150	841	0	0	4.0	0.5
PAO	99	V	300-150	38	0	32	7.3	0.8
PAT	99	V	300-150	34	0	0	3.3	-0.4
PEG	99	V	300-150	55	0	0	4.2	0.2
PIA	99	V	300-150	195	0	0	2.6	0.3
PJZ	99	V	300-150	51	0	0	3.4	0.1
PLM	99	V	300-150	93	0	0	4.6	0.1
PRD	99	V	300-150	32	0	0	3.3	1.0
PVJ	99	V	300-150	35	0	0	2.8	0.5
QAF	99	V	300-150	170	0	0	2.8	0.3
QFA	99	V	300-150	19570	1	0	4.9	0.2
QQE	99	V	300-150	122	0	1	3.4	0.2
QTR	99	V	300-150	14297	0	0	4.0	0.2
RAM	99	V	300-150	807	5	0	7.7	0.5
RBA	99	V	300-150	82	0	0	4.8	-0.2
RCH	99	V	300-150	4399	0	0	4.5	0.3
RDN	99	V	300-150	57	0	0	3.7	0.2
RJA	99	V	300-150	1986	6	0	10.1	0.1
ROJ	99	V	300-150	160	0	0	3.2	0.4
ROM	99	V	300-150	66	0	0	3.7	0.6
ROU	99	V	300-150	13525	0	0	4.0	-0.1
RRR	99	V	300-150	211	0	0	3.0	0.4
RUM	99	V	300-150	52	0	0	3.8	-0.3
RWD	99	V	300-150	25	0	0	3.9	-0.4
RZO	99	V	300-150	170	0	2	4.0	1.0
SAM	99	V	300-150	309	0	0	4.2	0.7
SAS	99	V	300-150	4879	0	0	3.0	0.1
SAZ	99	V	300-150	48	0	0	3.3	-0.1
SCX	99	V	300-150	547	0	0	3.4	0.3
SHE	99	V	300-150	31	0	0	3.6	1.0
SHJ	99	V	300-150	36	0	0	3.2	1.2
SIA	99	V	300-150	3440	0	0	3.6	0.0
SIS	99	V	300-150	46	0	0	4.0	0.7

AIREP MONITORING STATISTICS FOR AIRLINE CARRIERS
(CONTINUED)

IDENT	OBS TIME	ELM	LEVEL	NUM OBS	% GROSS	% CALM	VECTOR RMS	SPEE D BIAS
SLM	99	V	300-150	106	0	0	2.9	0.1
SOO	99	V	300-150	553	0	0	4.0	0.1
SPA	99	V	300-150	125	0	0	4.5	0.7
SVA	99	V	300-150	4698	0	0	3.9	0.5
SVW	99	V	300-150	192	0	0	2.9	0.6
SWA	99	V	300-150	84	0	1	3.0	0.5
SWR	99	V	300-150	11621	0	0	3.4	0.4
TAM	99	V	300-150	44	0	2	8.6	0.3
TAP	99	V	300-150	1808	0	0	3.7	0.5
TAR	99	V	300-150	602	0	0	2.8	0.1
TAY	99	V	300-150	354	0	0	3.9	-0.1
TCX	99	V	300-150	7168	0	0	3.3	0.3
TFF	99	V	300-150	55	0	0	6.0	1.2
TFL	99	V	300-150	1505	10	0	10.6	0.1
TGW	99	V	300-150	57	0	0	5.0	-0.1
THA	99	V	300-150	473	5	0	6.6	0.3
THT	99	V	300-150	3911	1	0	6.8	0.5
THY	99	V	300-150	9885	0	0	3.7	0.2
TMN	99	V	300-150	248	0	0	4.0	0.6
TOM	99	V	300-150	6137	11	0	10.6	0.1
TOW	99	V	300-150	79	0	0	3.4	-0.0
TPA	99	V	300-150	226	0	0	3.2	0.2
TRE	99	V	300-150	182	0	0	4.1	-0.6
TSC	99	V	300-150	21947	0	0	3.4	0.3
TWY	99	V	300-150	502	0	0	3.9	0.5
UAE	99	V	300-150	15812	0	0	3.9	0.2
UAL	99	V	300-150	88745	2	1	5.6	0.2
ULC	99	V	300-150	112	0	0	3.4	0.5
UPS	99	V	300-150	4740	0	0	3.8	-0.2
UZB	99	V	300-150	179	4	0	9.4	-0.5
VCG	99	V	300-150	64	0	0	2.6	0.1
VIR	99	V	300-150	25695	2	0	5.4	0.2
VJT	99	V	300-150	1359	0	0	3.3	0.4
VOZ	99	V	300-150	6860	0	0	3.8	0.4
WGT	99	V	300-150	101	0	0	3.2	-0.1
WJA	99	V	300-150	6513	1	0	5.2	0.2
WWI	99	V	300-150	29	0	0	2.7	0.0
XLF	99	V	300-150	2006	0	0	3.2	0.5
XRO	99	V	300-150	50	0	0	4.1	-0.2

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)

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RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : GEOPOTENTIAL HEIGHT (METRES)
         LEVEL                 :  50 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
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WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	50	31	6.4	4.6
01001	00	Z	50	28	6.6	4.3
01028	00	Z	50	31	7.6	6.0
01028	12	Z	50	30	7.4	2.2
01400	12	Z	50	25	86.7	86.3
01400	00	Z	50	29	95.5	95.2
01415	00	Z	50	28	16.6	14.6
01415	12	Z	50	31	9.1	7.5
02365	00	Z	50	21	12.0	11.7
02365	12	Z	50	30	5.3	1.9
02591	00	Z	50	30	23.4	23.0
02591	12	Z	50	31	12.3	11.5
02836	12	Z	50	31	6.3	1.1
02836	00	Z	50	31	9.6	7.8
02963	00	Z	50	31	14.8	13.4
02963	12	Z	50	30	8.1	5.8
03005	12	Z	50	28	8.5	3.9
03005	00	Z	50	30	11.0	8.5
03238	00	Z	50	24	17.5	16.9
03238	12	Z	50	4	11.2	10.1
03808	00	Z	50	30	17.5	16.8
03808	12	Z	50	30	9.4	6.2
03918	00	Z	50	21	20.4	19.7
03918	12	Z	50	3	16.2	15.0
03953	00	Z	50	30	19.0	16.3
03953	12	Z	50	28	24.9	21.9
04018	12	Z	50	27	6.0	3.0
04018	00	Z	50	26	12.8	6.7
04220	00	Z	50	31	6.6	5.3
04220	12	Z	50	31	6.3	3.1
04270	12	Z	50	30	5.4	3.5
04270	00	Z	50	31	5.5	3.8
04320	00	Z	50	31	15.3	0.0
04320	12	Z	50	30	16.8	-0.3
04339	12	Z	50	31	6.0	2.3
04339	00	Z	50	30	6.3	2.3
04360	00	Z	50	29	16.5	-10.0
04360	12	Z	50	27	14.5	-0.7
06011	12	Z	50	30	16.9	13.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	50	29	11.8	9.6
06260	12	Z	50	4	13.8	13.0
06260	00	Z	50	31	19.5	18.9
06610	12	Z	50	31	10.6	9.0
06610	00	Z	50	31	21.8	21.2
07110	00	Z	50	31	15.2	12.6
07110	12	Z	50	30	13.8	11.1
07510	12	Z	50	31	32.3	29.4
07510	00	Z	50	28	34.7	34.0
07645	12	Z	50	29	21.2	16.9
07645	00	Z	50	27	27.4	26.5
07761	12	Z	50	31	24.0	22.6
07761	00	Z	50	30	34.8	34.0
08001	00	Z	50	30	24.7	23.6
08001	12	Z	50	30	13.3	11.2
08221	00	Z	50	31	23.0	22.5
08221	12	Z	50	30	15.4	14.6
08302	00	Z	50	29	18.5	17.4
08302	12	Z	50	28	6.7	3.7
08508	12	Z	50	30	14.4	13.2
08522	12	Z	50	31	13.1	11.8
08579	12	Z	50	31	18.9	17.7
10035	12	Z	50	25	12.4	11.6
10393	12	Z	50	31	9.5	7.4
10393	00	Z	50	30	17.2	16.1
10410	12	Z	50	31	8.9	7.1
10410	00	Z	50	30	15.3	14.5
10739	00	Z	50	30	19.1	17.4
10739	12	Z	50	31	11.3	10.0
11035	00	Z	50	29	28.5	27.7
11035	12	Z	50	32	66.1	42.9
12982	12	Z	50	31	24.4	23.4
12982	00	Z	50	30	25.2	22.6
16080	00	Z	50	31	18.7	18.2
16080	12	Z	50	32	6.3	3.5
16245	12	Z	50	31	5.9	4.4
16245	00	Z	50	31	22.5	21.1
16320	12	Z	50	30	17.6	10.6
16320	00	Z	50	31	28.2	24.4
16429	12	Z	50	31	14.4	13.3
16429	00	Z	50	31	26.4	25.7
16622	00	Z	50	23	31.8	30.8
16754	00	Z	50	29	29.5	28.9

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
17607	12	Z	50	25	13.6	12.9
26435	12	Z	50	15	8.9	2.6
5QPW8X	12	Z	50	10	32.9	29.2
5QPW8X	00	Z	50	10	27.6	27.0
60018	00	Z	50	31	22.3	21.5
60018	12	Z	50	31	12.7	11.6
7JUNA4	12	Z	50	0	0.0	0.0
7JUNA4	00	Z	50	0	0.0	0.0
ASDE09	12	Z	50	1	52.0	52.0
FHM5UJ	12	Z	50	13	20.7	4.4
FHM5UJ	00	Z	50	12	23.6	14.2
FPUW5G	12	Z	50	3	11.4	11.2
HTXUH4	12	Z	50	8	9.3	7.9
HTXUH4	00	Z	50	9	8.2	6.3
JNKN7J	12	Z	50	6	66.3	64.4
JNKN7J	00	Z	50	2	43.9	43.6
KJJF9X	00	Z	50	4	52.4	49.3
KJJF9X	12	Z	50	6	34.8	33.2
KMPLHP	12	Z	50	6	44.5	44.3
KMPLHP	00	Z	50	4	10.0	8.6
WDK38H	12	Z	50	11	6.9	0.1
XKQLWQ	12	Z	50	8	37.8	35.8
XQFJRG	12	Z	50	1	18.8	18.8
XQFJRG	00	Z	50	0	0.0	0.0
YLV96W	12	Z	50	4	95.7	94.6
YLV96W	00	Z	50	4	45.4	42.2
ZVQEQC	12	Z	50	22	22.0	20.7

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	50	31	2.3	0.3	-0.4
01001	00	V	50	20	3.0	0.0	-0.5
01028	00	V	50	23	2.3	-0.4	0.0
01028	12	V	50	30	2.6	-0.6	0.1
01400	12	V	50	25	3.2	0.6	-0.3
01400	00	V	50	24	2.8	0.7	0.0
01415	00	V	50	24	3.5	-0.1	-1.0
01415	12	V	50	31	3.5	0.6	-0.1
02365	00	V	50	17	2.7	1.2	0.3
02365	12	V	50	29	3.1	0.5	-0.7
02591	00	V	50	24	3.3	-0.2	1.0
02591	12	V	50	30	3.1	0.1	0.4
02836	12	V	50	31	3.2	-0.1	-0.3
02836	00	V	50	27	2.6	0.1	-0.4
02963	00	V	50	23	2.6	0.2	0.7
02963	12	V	50	30	3.0	0.3	0.0
03005	12	V	50	28	2.9	-0.8	-0.3
03005	00	V	50	23	2.8	-0.2	0.2
03238	00	V	50	17	3.0	0.4	0.4
03238	12	V	50	4	2.3	-0.4	0.9
03808	00	V	50	24	2.9	0.5	-0.3
03808	12	V	50	30	2.6	-0.4	-0.1
03918	00	V	50	18	2.4	0.5	0.2
03918	12	V	50	3	3.5	0.9	2.0
03953	00	V	50	23	2.6	-0.4	-0.9
03953	12	V	50	28	2.4	-0.2	-0.1
04018	12	V	50	27	2.1	0.1	0.0
04018	00	V	50	21	3.3	1.4	0.0
04220	00	V	50	24	2.3	0.1	0.5
04220	12	V	50	31	2.6	0.3	0.0
04270	12	V	50	30	2.7	0.6	-0.2
04270	00	V	50	21	2.9	0.2	0.0
04320	00	V	50	25	2.8	0.7	-0.3
04320	12	V	50	30	2.8	0.4	-0.4
04339	12	V	50	31	2.8	0.5	-0.1
04339	00	V	50	24	2.8	0.8	0.4
04360	00	V	50	19	2.3	0.2	-0.1
04360	12	V	50	27	2.3	0.5	0.0
06011	12	V	50	30	3.0	0.2	-0.8

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	50	22	2.5	-0.1	-0.4
06260	12	V	50	4	2.5	0.5	0.0
06260	00	V	50	24	3.3	0.7	-0.8
06610	12	V	50	31	3.2	0.9	-0.6
06610	00	V	50	24	3.3	0.3	0.1
07110	00	V	50	25	2.6	-0.6	-0.3
07110	12	V	50	30	3.1	0.6	0.2
07510	12	V	50	31	3.0	0.2	0.0
07510	00	V	50	24	3.3	0.6	-0.1
07645	12	V	50	29	3.0	0.4	-0.4
07645	00	V	50	22	2.5	-0.4	0.0
07761	12	V	50	31	2.3	0.4	-0.1
07761	00	V	50	23	3.3	0.2	-0.4
08001	00	V	50	22	2.8	0.2	0.3
08001	12	V	50	29	3.3	0.9	0.6
08221	00	V	50	23	2.8	0.1	-0.2
08221	12	V	50	30	3.1	0.4	0.5
08302	00	V	50	22	3.3	0.3	1.2
08302	12	V	50	28	3.0	0.4	-0.5
08508	12	V	50	30	3.0	0.5	0.0
08522	12	V	50	29	2.4	0.1	0.2
08579	12	V	50	31	2.6	0.7	-0.2
10035	12	V	50	25	2.5	0.3	0.0
10393	12	V	50	31	3.1	-0.5	0.1
10393	00	V	50	28	3.4	-0.5	0.1
10410	12	V	50	31	2.7	-0.2	-0.8
10410	00	V	50	29	3.1	0.1	-0.4
10739	00	V	50	29	2.8	1.0	-0.5
10739	12	V	50	31	3.2	0.5	0.0
11035	00	V	50	23	3.1	0.0	-0.6
11035	12	V	50	31	2.7	0.2	-0.2
12982	12	V	50	31	3.0	0.4	-0.1
12982	00	V	50	24	3.5	1.3	-0.4
16080	00	V	50	24	2.9	0.5	0.2
16080	12	V	50	31	2.6	0.7	-0.4
16245	12	V	50	31	3.4	0.8	0.5
16245	00	V	50	25	2.8	0.7	-0.1
16320	12	V	50	30	3.7	0.7	0.1
16320	00	V	50	25	3.4	0.5	0.8
16429	12	V	50	31	3.5	0.9	-0.2
16429	00	V	50	23	3.4	0.2	-0.4
16622	00	V	50	19	3.2	0.6	0.6
16754	00	V	50	19	3.6	1.0	-0.6

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
17607	12	V	50	25	3.8	0.5	-0.1
26435	12	V	50	15	3.8	-0.4	-0.4
5QPW8X	12	V	50	10	2.4	0.1	-0.6
5QPW8X	00	V	50	10	2.6	0.6	0.2
60018	00	V	50	23	3.4	-1.3	0.6
60018	12	V	50	31	3.3	1.2	0.4
7JUNA4	12	V	50	0	0.0	0.0	0.0
7JUNA4	00	V	50	0	0.0	0.0	0.0
ASDE09	12	V	50	1	3.5	0.0	3.5
FHM5UJ	12	V	50	13	2.7	0.3	0.7
FHM5UJ	00	V	50	12	3.1	0.3	-0.1
FPUW5G	12	V	50	3	2.5	0.4	1.8
HTXUH4	12	V	50	8	3.3	0.9	0.0
HTXUH4	00	V	50	9	2.4	0.6	0.3
JNKN7J	12	V	50	6	2.2	1.5	0.4
JNKN7J	00	V	50	2	1.6	1.4	-0.6
KJJF9X	00	V	50	4	4.8	-1.3	-0.3
KJJF9X	12	V	50	5	4.1	-0.5	0.6
KMPLHP	12	V	50	5	2.6	1.2	-0.3
KMPLHP	00	V	50	4	2.3	0.8	0.2
WDK38H	12	V	50	11	2.8	-1.3	-0.7
XKQLWQ	12	V	50	7	3.4	1.5	-0.8
XQFJRG	12	V	50	1	1.3	-0.5	1.2
XQFJRG	00	V	50	0	0.0	0.0	0.0
YLV96W	12	V	50	4	2.1	1.5	0.8
YLV96W	00	V	50	4	1.6	0.0	-0.2
ZVQEQC	12	V	50	22	5.0	0.0	-0.6

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	100	31	4.1	-2.7
01001	00	Z	100	28	5.9	-4.3
01028	00	Z	100	31	3.8	-1.9
01028	12	Z	100	30	6.1	-3.9
01400	12	Z	100	26	78.2	77.9
01400	00	Z	100	29	84.5	84.3
01415	00	Z	100	29	7.6	4.6
01415	12	Z	100	32	4.0	0.3
02365	00	Z	100	23	3.6	2.3
02365	12	Z	100	30	6.2	-5.0
02591	00	Z	100	31	13.3	12.7
02591	12	Z	100	31	5.2	3.4
02836	12	Z	100	31	6.6	-5.0
02836	00	Z	100	31	4.9	-0.5
02963	00	Z	100	31	6.4	4.2
02963	12	Z	100	31	5.0	-2.4
03005	12	Z	100	32	6.3	-3.8
03005	00	Z	100	31	5.6	-0.2
03238	00	Z	100	25	8.0	6.1
03238	12	Z	100	4	4.2	1.1
03808	00	Z	100	31	7.7	6.3
03808	12	Z	100	31	5.1	-0.6
03918	00	Z	100	27	8.0	7.0
03918	12	Z	100	3	7.3	7.0
03953	00	Z	100	30	11.2	2.2
03953	12	Z	100	28	11.4	7.4
04018	12	Z	100	29	4.7	-3.2
04018	00	Z	100	26	8.6	-2.1
04220	00	Z	100	31	3.7	-1.5
04220	12	Z	100	31	4.6	-2.5
04270	12	Z	100	30	4.2	-2.5
04270	00	Z	100	31	4.4	-3.1
04320	00	Z	100	31	14.4	-6.3
04320	12	Z	100	30	14.9	-5.4
04339	12	Z	100	31	6.0	-4.1
04339	00	Z	100	30	7.0	-4.9
04360	00	Z	100	29	17.1	-15.7
04360	12	Z	100	28	11.7	-7.9
06011	12	Z	100	30	9.1	4.3

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	100	29	6.6	0.7
06260	12	Z	100	5	7.7	7.3
06260	00	Z	100	31	9.1	7.8
06610	12	Z	100	32	4.9	0.6
06610	00	Z	100	31	9.7	8.6
07110	00	Z	100	31	6.8	3.1
07110	12	Z	100	30	5.3	0.8
07510	12	Z	100	31	18.5	15.9
07510	00	Z	100	30	18.8	17.7
07645	12	Z	100	30	11.3	7.0
07645	00	Z	100	31	13.1	12.0
07761	12	Z	100	31	13.6	12.1
07761	00	Z	100	30	19.5	18.3
08001	00	Z	100	31	11.9	10.9
08001	12	Z	100	31	6.5	4.7
08221	00	Z	100	31	16.3	15.4
08221	12	Z	100	31	8.2	7.0
08302	00	Z	100	29	8.7	6.1
08302	12	Z	100	28	7.3	-5.0
08508	12	Z	100	30	8.6	7.6
08522	12	Z	100	31	7.5	5.8
08579	12	Z	100	31	13.6	12.0
10035	12	Z	100	25	4.8	2.7
10393	12	Z	100	31	4.4	-0.9
10393	00	Z	100	31	7.7	6.6
10410	12	Z	100	31	5.1	-3.0
10410	00	Z	100	30	6.9	5.0
10739	00	Z	100	30	11.8	10.2
10739	12	Z	100	31	5.4	2.5
11035	00	Z	100	31	19.5	18.3
11035	12	Z	100	32	45.1	26.7
12982	12	Z	100	31	11.5	9.8
12982	00	Z	100	30	16.5	13.3
16080	00	Z	100	31	7.1	5.9
16080	12	Z	100	32	5.0	-3.5
16245	12	Z	100	31	4.6	-2.3
16245	00	Z	100	31	12.3	9.3
16320	12	Z	100	30	13.3	2.7
16320	00	Z	100	31	17.8	12.1
16429	12	Z	100	31	6.2	3.6
16429	00	Z	100	31	14.2	13.2
16622	00	Z	100	29	20.3	19.3
16754	00	Z	100	29	20.9	20.1

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
17607	12	Z	100	28	8.0	7.0
26435	12	Z	100	15	9.3	-5.3
5QPW8X	12	Z	100	10	26.3	21.2
5QPW8X	00	Z	100	10	20.2	19.6
60018	00	Z	100	31	15.9	15.6
60018	12	Z	100	31	9.0	7.3
7JUNA4	12	Z	100	1	0.0	0.0
7JUNA4	00	Z	100	2	45.7	45.7
ASDE09	12	Z	100	1	27.2	27.2
FHM5UJ	12	Z	100	13	19.8	-1.3
FHM5UJ	00	Z	100	13	19.7	5.3
FPUW5G	12	Z	100	4	5.6	5.5
HTXUH4	12	Z	100	9	6.3	2.7
HTXUH4	00	Z	100	10	5.0	-2.8
JNKN7J	12	Z	100	6	48.7	48.0
JNKN7J	00	Z	100	3	36.6	36.5
KJJF9X	00	Z	100	7	35.6	30.0
KJJF9X	12	Z	100	7	26.7	25.1
KMPLHP	12	Z	100	7	43.7	35.8
KMPLHP	00	Z	100	7	6.1	-0.2
WDK38H	12	Z	100	12	8.9	-7.2
XKQLWQ	12	Z	100	9	24.2	22.2
XQFJRG	12	Z	100	1	1.4	-1.4
XQFJRG	00	Z	100	0	0.0	0.0
YLV96W	12	Z	100	7	75.6	71.1
YLV96W	00	Z	100	5	40.1	38.8
ZVQEQC	12	Z	100	23	18.8	17.8

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	100	31	2.2	0.1	-0.2
01001	00	V	100	20	2.1	0.3	-0.1
01028	00	V	100	23	2.5	-0.4	-0.2
01028	12	V	100	30	2.5	-0.2	-0.5
01400	12	V	100	25	2.3	0.1	0.1
01400	00	V	100	24	2.1	0.0	0.0
01415	00	V	100	26	2.8	-0.1	0.1
01415	12	V	100	31	2.7	1.0	0.3
02365	00	V	100	19	2.6	1.2	0.2
02365	12	V	100	30	2.5	0.9	0.2
02591	00	V	100	24	2.1	0.0	-0.2
02591	12	V	100	31	1.9	0.3	-0.3
02836	12	V	100	31	2.4	-0.5	0.3
02836	00	V	100	27	2.3	0.1	0.1
02963	00	V	100	24	2.9	0.5	1.1
02963	12	V	100	30	2.8	0.2	-0.3
03005	12	V	100	31	2.2	0.9	-0.1
03005	00	V	100	23	2.7	-0.2	0.3
03238	00	V	100	18	2.9	0.9	-0.8
03238	12	V	100	4	2.8	-1.1	-1.4
03808	00	V	100	24	2.7	-0.2	0.4
03808	12	V	100	31	2.6	-0.1	0.3
03918	00	V	100	25	3.1	0.0	0.9
03918	12	V	100	3	2.3	0.8	0.7
03953	00	V	100	23	3.5	0.6	0.1
03953	12	V	100	28	3.2	0.7	-0.2
04018	12	V	100	29	2.5	0.4	0.4
04018	00	V	100	24	2.7	0.5	0.8
04220	00	V	100	30	2.3	0.0	0.1
04220	12	V	100	31	2.4	-0.3	0.3
04270	12	V	100	30	1.9	0.4	-0.3
04270	00	V	100	28	2.2	0.0	0.1
04320	00	V	100	26	2.3	-0.5	0.2
04320	12	V	100	30	2.3	-0.5	-0.5
04339	12	V	100	31	2.1	0.0	0.1
04339	00	V	100	25	2.3	-0.3	-0.3
04360	00	V	100	25	2.1	-0.2	-0.3
04360	12	V	100	28	1.8	0.3	0.4
06011	12	V	100	30	2.4	0.4	0.7

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	100	27	2.3	0.5	0.5
06260	12	V	100	4	1.4	0.9	-0.1
06260	00	V	100	24	2.2	0.1	-0.4
06610	12	V	100	31	3.3	0.2	-0.3
06610	00	V	100	30	2.7	0.3	-0.6
07110	00	V	100	25	2.3	0.1	0.4
07110	12	V	100	30	2.5	0.8	-0.2
07510	12	V	100	31	3.3	0.5	0.5
07510	00	V	100	25	2.4	-0.5	0.4
07645	12	V	100	30	3.5	-0.2	-0.2
07645	00	V	100	24	4.0	0.5	0.7
07761	12	V	100	31	3.0	-0.4	0.0
07761	00	V	100	23	3.3	1.3	0.5
08001	00	V	100	23	3.2	0.3	-0.1
08001	12	V	100	31	2.8	-0.5	0.1
08221	00	V	100	23	3.2	0.5	0.2
08221	12	V	100	31	3.7	0.4	-0.5
08302	00	V	100	23	3.2	-0.2	0.6
08302	12	V	100	28	2.9	0.0	0.0
08508	12	V	100	30	3.0	0.3	0.5
08522	12	V	100	30	3.3	0.3	0.0
08579	12	V	100	31	3.9	0.6	0.1
10035	12	V	100	25	2.2	0.8	-0.2
10393	12	V	100	31	2.4	0.1	-0.4
10393	00	V	100	30	3.0	0.5	0.2
10410	12	V	100	31	3.3	1.0	-0.4
10410	00	V	100	29	2.9	0.1	0.5
10739	00	V	100	29	3.1	0.3	0.1
10739	12	V	100	31	2.3	-0.5	-0.2
11035	00	V	100	24	2.8	0.2	0.0
11035	12	V	100	31	3.1	0.2	-0.9
12982	12	V	100	31	2.8	0.4	-0.5
12982	00	V	100	23	3.2	-0.1	0.2
16080	00	V	100	27	3.9	-0.4	-0.6
16080	12	V	100	31	3.6	0.0	-0.3
16245	12	V	100	31	3.6	0.1	-0.6
16245	00	V	100	25	3.0	0.5	-0.5
16320	12	V	100	30	3.8	-0.1	-0.5
16320	00	V	100	24	3.4	0.1	0.1
16429	12	V	100	31	3.2	0.7	-0.2
16429	00	V	100	27	3.4	-0.4	1.2
16622	00	V	100	25	3.5	0.1	-0.1
16754	00	V	100	19	3.9	-0.5	-0.3

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
17607	12	V	100	28	4.1	0.8	0.8
26435	12	V	100	15	2.2	-0.8	0.2
5QPW8X	12	V	100	10	2.1	0.5	0.1
5QPW8X	00	V	100	10	1.9	-0.2	0.6
60018	00	V	100	23	4.0	0.0	0.8
60018	12	V	100	31	4.1	-1.0	-0.6
7JUNA4	12	V	100	1	1.0	0.7	-0.7
7JUNA4	00	V	100	1	0.3	0.0	0.3
ASDE09	12	V	100	1	5.0	-1.2	-4.9
FHM5UJ	12	V	100	13	2.5	0.2	0.5
FHM5UJ	00	V	100	13	2.3	-0.7	-0.4
FPUW5G	12	V	100	4	2.4	0.4	-0.7
HTXUH4	12	V	100	9	2.0	-0.3	-0.1
HTXUH4	00	V	100	9	2.5	0.3	-0.4
JNKN7J	12	V	100	6	2.3	0.2	0.0
JNKN7J	00	V	100	2	2.2	0.3	0.5
KJJF9X	00	V	100	7	2.9	-0.5	-0.5
KJJF9X	12	V	100	6	1.5	0.0	0.0
KMPLHP	12	V	100	7	2.3	-0.9	0.3
KMPLHP	00	V	100	6	3.1	0.4	-2.0
WDK38H	12	V	100	12	2.1	0.1	-0.3
XKQLWQ	12	V	100	9	4.0	-0.9	2.1
XQFJRG	12	V	100	1	1.0	-0.8	0.6
XQFJRG	00	V	100	0	0.0	0.0	0.0
YLV96W	12	V	100	6	2.3	0.1	-0.4
YLV96W	00	V	100	5	1.9	-0.2	0.7
ZVQEQC	12	V	100	23	6.0	1.8	1.4

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	500	31	2.2	-0.2
01001	00	Z	500	30	3.6	0.3
01028	00	Z	500	31	4.4	0.3
01028	12	Z	500	31	3.3	1.4
01400	12	Z	500	27	79.4	79.2
01400	00	Z	500	29	81.4	81.3
01415	00	Z	500	29	5.3	4.3
01415	12	Z	500	32	4.4	3.1
02365	00	Z	500	24	3.6	2.2
02365	12	Z	500	30	3.7	1.3
02591	00	Z	500	31	9.3	8.8
02591	12	Z	500	31	7.7	7.2
02836	12	Z	500	31	2.8	1.5
02836	00	Z	500	31	3.4	2.4
02963	00	Z	500	31	4.4	3.8
02963	12	Z	500	31	3.2	1.9
03005	12	Z	500	32	2.8	-1.0
03005	00	Z	500	32	2.4	0.2
03238	00	Z	500	25	4.5	3.4
03238	12	Z	500	4	2.1	1.1
03808	00	Z	500	32	5.2	4.0
03808	12	Z	500	31	2.4	1.3
03918	00	Z	500	27	7.8	7.1
03918	12	Z	500	3	4.5	4.5
03953	00	Z	500	32	11.0	-3.1
03953	12	Z	500	32	5.5	2.3
04018	12	Z	500	29	3.8	-1.1
04018	00	Z	500	28	3.0	0.3
04220	00	Z	500	31	3.2	1.7
04220	12	Z	500	31	2.7	1.2
04270	12	Z	500	31	3.1	-0.1
04270	00	Z	500	31	3.2	0.2
04320	00	Z	500	31	13.5	-2.1
04320	12	Z	500	31	12.4	-2.2
04339	12	Z	500	31	3.9	-1.3
04339	00	Z	500	31	4.6	-1.0
04360	00	Z	500	30	9.7	-8.2
04360	12	Z	500	29	6.8	-6.0
06011	12	Z	500	31	6.7	3.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	500	31	4.8	2.6
06260	12	Z	500	5	3.8	-0.3
06260	00	Z	500	31	4.3	3.4
06610	12	Z	500	32	4.1	1.7
06610	00	Z	500	31	4.9	3.2
07110	00	Z	500	31	4.3	-1.2
07110	12	Z	500	31	4.9	-1.7
07510	12	Z	500	31	8.6	7.5
07510	00	Z	500	30	8.0	6.2
07645	12	Z	500	31	4.3	2.5
07645	00	Z	500	31	3.7	1.3
07761	12	Z	500	31	6.4	5.8
07761	00	Z	500	30	6.1	4.8
08001	00	Z	500	31	5.1	4.2
08001	12	Z	500	31	4.0	2.3
08221	00	Z	500	31	9.1	8.5
08221	12	Z	500	31	5.8	5.3
08302	00	Z	500	29	3.6	-0.4
08302	12	Z	500	28	4.9	-4.1
08508	12	Z	500	31	6.7	5.2
08522	12	Z	500	32	6.4	6.0
08579	12	Z	500	31	9.6	8.3
10035	12	Z	500	25	4.2	2.8
10393	12	Z	500	31	2.4	-0.5
10393	00	Z	500	31	3.9	2.2
10410	12	Z	500	32	3.2	-1.5
10410	00	Z	500	30	3.0	2.1
10739	00	Z	500	30	7.2	6.4
10739	12	Z	500	31	4.3	3.1
11035	00	Z	500	33	11.5	10.9
11035	12	Z	500	32	18.9	15.7
12982	12	Z	500	31	6.9	4.8
12982	00	Z	500	31	6.8	5.5
16080	00	Z	500	31	3.3	0.4
16080	12	Z	500	32	3.2	-1.8
16245	12	Z	500	31	4.4	-3.1
16245	00	Z	500	31	2.9	0.0
16320	12	Z	500	30	16.0	1.9
16320	00	Z	500	31	16.7	5.1
16429	12	Z	500	31	5.4	3.6
16429	00	Z	500	31	8.0	5.7
16622	00	Z	500	30	10.6	9.5
16754	00	Z	500	30	8.3	7.6

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
17607	12	Z	500	28	5.9	5.0
26435	12	Z	500	15	2.8	-0.3
5QPW8X	12	Z	500	10	32.2	28.3
5QPW8X	00	Z	500	10	25.3	25.0
60018	00	Z	500	31	5.9	5.4
60018	12	Z	500	31	5.8	5.1
7JUNA4	12	Z	500	6	8.8	5.8
7JUNA4	00	Z	500	5	8.5	7.3
ASDE09	12	Z	500	1	1.5	1.5
FHM5UJ	12	Z	500	14	20.8	-1.2
FHM5UJ	00	Z	500	14	20.6	5.4
FPUW5G	12	Z	500	4	3.7	1.5
HTXUH4	12	Z	500	12	3.5	1.3
HTXUH4	00	Z	500	10	4.0	1.3
JNKN7J	12	Z	500	6	43.7	43.5
JNKN7J	00	Z	500	4	38.5	38.0
KJJF9X	00	Z	500	7	20.0	15.1
KJJF9X	12	Z	500	7	22.1	21.1
KMPLHP	12	Z	500	7	38.8	16.5
KMPLHP	00	Z	500	6	4.3	-2.2
WDK38H	12	Z	500	12	9.3	-8.2
XKQLWQ	12	Z	500	9	9.5	9.0
XQFJRG	12	Z	500	1	8.7	-8.7
XQFJRG	00	Z	500	1	10.4	-10.4
YLV96W	12	Z	500	8	65.7	65.5
YLV96W	00	Z	500	8	62.7	62.4
ZVQEQC	12	Z	500	23	10.7	10.2

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	500	31	2.1	-0.1	-0.2
01001	00	V	500	29	2.3	0.3	-0.1
01028	00	V	500	30	2.4	0.3	-0.6
01028	12	V	500	31	1.9	0.3	0.2
01400	12	V	500	26	1.8	-0.1	-0.3
01400	00	V	500	28	2.3	0.5	0.2
01415	00	V	500	28	2.3	-0.4	0.2
01415	12	V	500	31	2.4	0.4	0.5
02365	00	V	500	23	2.1	0.4	0.1
02365	12	V	500	30	2.3	-0.5	-0.4
02591	00	V	500	29	2.9	-0.1	0.7
02591	12	V	500	31	2.4	0.2	-0.2
02836	12	V	500	31	2.1	-0.3	0.3
02836	00	V	500	30	2.4	-0.4	0.1
02963	00	V	500	30	2.5	0.1	0.4
02963	12	V	500	31	2.5	0.1	0.0
03005	12	V	500	31	3.2	0.3	0.0
03005	00	V	500	29	2.7	-0.1	-0.1
03238	00	V	500	24	2.5	1.0	0.1
03238	12	V	500	4	2.5	0.7	-0.7
03808	00	V	500	30	2.5	0.0	0.6
03808	12	V	500	31	2.5	0.4	0.4
03918	00	V	500	26	2.2	0.1	0.4
03918	12	V	500	3	2.5	-1.8	0.3
03953	00	V	500	30	2.5	-0.4	0.0
03953	12	V	500	31	3.1	-0.2	0.9
04018	12	V	500	29	2.3	0.5	0.4
04018	00	V	500	25	2.1	-0.2	-0.1
04220	00	V	500	30	2.1	-0.5	0.0
04220	12	V	500	31	2.1	0.0	0.2
04270	12	V	500	31	2.5	-0.1	0.5
04270	00	V	500	30	2.5	0.6	-0.1
04320	00	V	500	30	2.4	0.4	-0.7
04320	12	V	500	31	2.3	0.1	0.5
04339	12	V	500	31	2.1	-0.3	0.0
04339	00	V	500	30	2.4	-0.3	-0.5
04360	00	V	500	29	2.7	0.0	0.2
04360	12	V	500	29	2.9	0.2	0.6
06011	12	V	500	31	2.2	0.1	-0.5

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	500	30	2.6	-0.1	-0.2
06260	12	V	500	5	2.3	0.5	0.1
06260	00	V	500	29	2.8	0.2	0.7
06610	12	V	500	31	2.7	0.6	-0.5
06610	00	V	500	30	4.0	0.0	0.5
07110	00	V	500	30	2.9	0.3	0.2
07110	12	V	500	31	3.2	-0.5	0.4
07510	12	V	500	31	2.5	0.2	0.4
07510	00	V	500	29	2.6	-0.6	0.3
07645	12	V	500	31	2.0	0.7	-0.1
07645	00	V	500	30	2.5	-0.4	0.3
07761	12	V	500	31	2.0	-0.1	0.1
07761	00	V	500	29	2.7	0.3	0.0
08001	00	V	500	30	2.8	0.6	0.5
08001	12	V	500	31	2.3	0.2	0.4
08221	00	V	500	30	3.2	0.0	0.7
08221	12	V	500	31	2.9	-0.1	0.2
08302	00	V	500	28	2.6	0.2	0.1
08302	12	V	500	28	3.3	0.6	0.1
08508	12	V	500	31	2.2	-0.1	-0.3
08522	12	V	500	31	2.5	0.7	0.1
08579	12	V	500	31	2.3	0.3	0.3
10035	12	V	500	25	2.1	0.1	-0.1
10393	12	V	500	31	2.2	0.4	-0.1
10393	00	V	500	30	2.2	-0.1	0.2
10410	12	V	500	31	1.9	0.0	-0.4
10410	00	V	500	29	2.3	0.5	-0.1
10739	00	V	500	29	1.9	0.2	-0.2
10739	12	V	500	31	2.4	0.2	-0.3
11035	00	V	500	29	2.6	0.4	-0.2
11035	12	V	500	31	2.7	0.1	-0.2
12982	12	V	500	31	3.0	-0.5	-0.3
12982	00	V	500	28	2.8	-0.3	0.8
16080	00	V	500	30	2.8	0.7	0.1
16080	12	V	500	31	2.7	0.4	-0.3
16245	12	V	500	31	2.6	0.3	-0.7
16245	00	V	500	30	2.8	0.1	0.6
16320	12	V	500	30	2.1	0.5	0.1
16320	00	V	500	30	2.3	0.2	0.1
16429	12	V	500	31	2.3	0.3	-0.3
16429	00	V	500	30	2.3	0.2	-0.3
16622	00	V	500	29	2.5	0.4	0.1
16754	00	V	500	23	2.4	1.0	-0.7

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
17607	12	V	500	28	1.8	0.7	0.0
26435	12	V	500	15	2.2	0.0	0.0
5QPW8X	12	V	500	10	1.6	-0.4	0.0
5QPW8X	00	V	500	10	2.1	-0.7	-0.1
60018	00	V	500	30	2.5	-0.3	-0.3
60018	12	V	500	31	2.2	0.3	-0.3
7JUNA4	12	V	500	6	2.3	0.0	0.1
7JUNA4	00	V	500	5	1.2	0.7	-0.2
ASDE09	12	V	500	1	1.8	1.4	-1.1
FHM5UJ	12	V	500	14	2.3	0.2	0.0
FHM5UJ	00	V	500	14	1.7	-0.1	0.3
FPUW5G	12	V	500	4	3.6	-2.3	-0.7
HTXUH4	12	V	500	12	2.5	-0.8	0.0
HTXUH4	00	V	500	10	2.2	0.2	-0.4
JNKN7J	12	V	500	6	2.3	-0.5	0.1
JNKN7J	00	V	500	4	20.4	-5.5	-8.0
KJJF9X	00	V	500	7	1.7	0.2	-0.6
KJJF9X	12	V	500	6	1.9	-0.4	-0.3
KMPLHP	12	V	500	7	1.8	0.3	0.0
KMPLHP	00	V	500	6	1.3	0.7	0.2
WDK38H	12	V	500	12	2.6	-0.3	0.4
XKQLWQ	12	V	500	9	3.6	-0.7	1.7
XQFJRG	12	V	500	1	1.5	-1.1	-1.0
XQFJRG	00	V	500	1	2.7	-2.6	-0.8
YLV96W	12	V	500	8	2.8	0.2	-1.6
YLV96W	00	V	500	8	1.5	0.6	0.1
ZVQEQC	12	V	500	23	3.3	-0.9	-0.5

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                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
01001	12	Z	850	31	3.4	0.0
01001	00	Z	850	31	4.0	1.4
01028	00	Z	850	31	4.4	3.1
01028	12	Z	850	31	5.0	2.9
01400	12	Z	850	27	79.4	79.2
01400	00	Z	850	29	81.1	80.9
01415	00	Z	850	29	5.2	4.8
01415	12	Z	850	32	4.6	3.9
02365	00	Z	850	24	4.3	3.9
02365	12	Z	850	30	2.7	2.1
02591	00	Z	850	31	9.3	9.1
02591	12	Z	850	31	9.3	9.1
02836	12	Z	850	31	3.7	3.2
02836	00	Z	850	31	4.5	3.9
02963	00	Z	850	31	4.5	4.0
02963	12	Z	850	31	4.3	3.9
03005	12	Z	850	32	2.2	0.2
03005	00	Z	850	32	3.0	0.6
03238	00	Z	850	25	4.2	3.5
03238	12	Z	850	4	3.2	2.8
03808	00	Z	850	32	3.8	3.3
03808	12	Z	850	31	2.7	1.9
03918	00	Z	850	27	7.6	7.4
03918	12	Z	850	3	8.1	7.9
03953	00	Z	850	32	4.6	3.5
03953	12	Z	850	32	4.7	3.6
04018	12	Z	850	30	1.5	-0.1
04018	00	Z	850	30	2.7	1.9
04220	00	Z	850	31	3.5	2.1
04220	12	Z	850	31	3.5	2.3
04270	12	Z	850	31	2.8	1.5
04270	00	Z	850	31	3.1	1.3
04320	00	Z	850	31	15.0	1.0
04320	12	Z	850	31	14.2	1.1
04339	12	Z	850	31	4.3	0.9
04339	00	Z	850	31	3.9	0.4
04360	00	Z	850	30	6.5	-5.3
04360	12	Z	850	29	6.6	-6.0
06011	12	Z	850	31	5.3	4.7

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
06011	00	Z	850	31	5.3	4.6
06260	12	Z	850	5	1.9	0.6
06260	00	Z	850	31	3.1	1.7
06610	12	Z	850	32	3.3	2.2
06610	00	Z	850	31	5.4	4.6
07110	00	Z	850	31	2.3	-0.7
07110	12	Z	850	31	3.0	-2.0
07510	12	Z	850	31	4.8	4.0
07510	00	Z	850	31	6.4	5.9
07645	12	Z	850	30	2.7	-0.1
07645	00	Z	850	31	3.3	1.0
07761	12	Z	850	31	3.4	2.7
07761	00	Z	850	30	5.8	4.3
08001	00	Z	850	31	3.2	2.7
08001	12	Z	850	31	2.4	0.8
08221	00	Z	850	31	4.7	4.3
08221	12	Z	850	31	4.3	3.9
08302	00	Z	850	29	4.4	-3.5
08302	12	Z	850	28	5.3	-4.9
08508	12	Z	850	31	5.3	3.2
08522	12	Z	850	32	37.2	27.1
08579	12	Z	850	31	9.2	7.7
10035	12	Z	850	25	5.8	5.5
10393	12	Z	850	31	2.0	1.0
10393	00	Z	850	31	2.3	1.0
10410	12	Z	850	32	1.8	-0.3
10410	00	Z	850	30	2.6	-0.3
10739	00	Z	850	30	4.9	4.7
10739	12	Z	850	31	5.2	4.9
11035	00	Z	850	34	12.0	11.2
11035	12	Z	850	31	19.3	16.3
12982	12	Z	850	31	6.6	6.3
12982	00	Z	850	31	6.2	5.4
16080	00	Z	850	31	3.0	0.8
16080	12	Z	850	32	3.0	-1.2
16245	12	Z	850	31	2.8	-1.9
16245	00	Z	850	31	2.1	-0.4
16320	12	Z	850	30	18.1	2.1
16320	00	Z	850	31	18.0	4.3
16429	12	Z	850	31	5.4	3.5
16429	00	Z	850	31	7.3	4.8
16622	00	Z	850	30	9.7	8.8
16754	00	Z	850	31	5.9	5.0

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	BIAS
17607	12	Z	850	29	3.8	3.3
26435	12	Z	850	15	3.5	2.9
5QPW8X	12	Z	850	10	36.5	31.7
5QPW8X	00	Z	850	11	27.9	27.5
60018	00	Z	850	31	3.0	2.0
60018	12	Z	850	31	3.7	2.1
7JUNA4	12	Z	850	10	3.4	-0.4
7JUNA4	00	Z	850	5	8.3	7.1
ASDE09	12	Z	850	1	0.3	0.3
FHM5UJ	12	Z	850	14	21.2	-0.8
FHM5UJ	00	Z	850	14	22.5	6.0
FPUW5G	12	Z	850	4	4.7	4.5
HTXUH4	12	Z	850	13	3.9	2.1
HTXUH4	00	Z	850	10	3.1	1.8
JNKN7J	12	Z	850	6	43.3	42.7
JNKN7J	00	Z	850	4	44.6	44.2
KJJF9X	00	Z	850	6	19.3	16.8
KJJF9X	12	Z	850	6	18.8	18.3
KMPLHP	12	Z	850	6	3.8	-0.5
KMPLHP	00	Z	850	7	4.2	2.1
WDK38H	12	Z	850	12	8.9	-7.6
XKQLWQ	12	Z	850	9	5.8	4.5
XQFJRG	12	Z	850	3	16.1	-15.9
XQFJRG	00	Z	850	1	13.4	-13.4
YLV96W	12	Z	850	8	68.6	68.2
YLV96W	00	Z	850	8	70.7	70.4
ZVQEQC	12	Z	850	23	7.3	6.8

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

```
RADIOSONDE MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE     : ECMWF
         ELEMENT MONITORED     : WIND (M/S)
         LEVEL                 : 850 HPA
         AREA                  : 0 - 90N, 100W - 40E
         PERIOD                : JUL 2019
         STANDARD OF COMPARISON: FIRST-GUESS FIELD
```

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
01001	12	V	850	31	3.1	0.1	-0.9
01001	00	V	850	30	3.0	0.0	0.5
01028	00	V	850	30	2.8	-0.9	0.6
01028	12	V	850	31	2.6	-0.2	0.5
01400	12	V	850	27	2.2	0.1	0.1
01400	00	V	850	28	2.3	0.1	0.1
01415	00	V	850	28	2.4	0.2	0.2
01415	12	V	850	31	3.0	0.6	-0.4
02365	00	V	850	23	2.5	-0.4	0.4
02365	12	V	850	30	3.0	0.1	-0.2
02591	00	V	850	30	2.5	0.4	-0.8
02591	12	V	850	31	2.8	0.6	0.3
02836	12	V	850	31	2.9	-0.3	-0.3
02836	00	V	850	30	2.6	-1.0	0.0
02963	00	V	850	30	2.2	0.4	0.6
02963	12	V	850	31	2.1	0.1	0.2
03005	12	V	850	31	2.7	0.6	0.1
03005	00	V	850	29	3.0	0.1	-0.5
03238	00	V	850	24	2.7	0.2	0.2
03238	12	V	850	4	1.2	0.6	0.4
03808	00	V	850	30	2.3	-0.2	-0.2
03808	12	V	850	31	2.4	-0.3	-0.2
03918	00	V	850	26	2.8	-0.1	0.1
03918	12	V	850	3	2.4	0.6	-1.2
03953	00	V	850	30	2.2	0.0	0.5
03953	12	V	850	31	2.1	-0.1	0.6
04018	12	V	850	29	2.4	-0.3	0.4
04018	00	V	850	27	2.7	0.2	0.2
04220	00	V	850	30	2.9	0.2	-0.6
04220	12	V	850	31	2.8	0.1	0.3
04270	12	V	850	31	3.4	-1.3	0.1
04270	00	V	850	30	3.0	0.0	-0.3
04320	00	V	850	30	2.6	-0.1	-0.9
04320	12	V	850	31	2.5	-0.1	-0.4
04339	12	V	850	31	4.4	-0.9	-1.0
04339	00	V	850	30	3.4	-1.3	-0.7
04360	00	V	850	29	3.7	-0.5	0.3
04360	12	V	850	29	4.2	0.6	0.4
06011	12	V	850	31	2.7	-0.4	0.2

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
06011	00	V	850	30	2.5	0.3	0.2
06260	12	V	850	5	2.6	-0.7	-0.5
06260	00	V	850	29	2.1	-0.1	-0.3
06610	12	V	850	31	3.4	0.6	0.7
06610	00	V	850	30	3.7	1.7	0.8
07110	00	V	850	30	2.1	-0.1	0.0
07110	12	V	850	31	2.0	-0.2	0.1
07510	12	V	850	31	3.3	0.3	0.2
07510	00	V	850	30	4.1	0.2	-0.6
07645	12	V	850	30	2.4	0.1	0.6
07645	00	V	850	30	3.1	0.3	0.7
07761	12	V	850	31	2.4	-0.2	-0.2
07761	00	V	850	29	3.3	0.9	0.0
08001	00	V	850	30	3.5	1.3	0.7
08001	12	V	850	31	2.5	0.6	-0.1
08221	00	V	850	30	5.0	0.5	1.0
08221	12	V	850	31	2.8	0.1	0.5
08302	00	V	850	28	2.5	-0.3	0.5
08302	12	V	850	28	2.8	-0.2	-0.4
08508	12	V	850	31	2.3	0.6	-0.3
08522	12	V	850	31	8.3	-3.1	-0.9
08579	12	V	850	31	2.2	0.4	-0.1
10035	12	V	850	24	2.0	-0.2	0.2
10393	12	V	850	31	2.8	0.5	0.3
10393	00	V	850	30	3.0	0.5	-0.6
10410	12	V	850	31	2.4	0.4	-0.2
10410	00	V	850	29	2.3	0.0	-0.5
10739	00	V	850	29	3.1	0.3	0.4
10739	12	V	850	31	2.6	0.4	0.7
11035	00	V	850	30	2.6	0.3	-0.1
11035	12	V	850	31	2.9	0.7	0.1
12982	12	V	850	31	2.3	0.5	0.0
12982	00	V	850	29	2.3	-0.2	0.0
16080	00	V	850	30	3.3	0.8	-0.4
16080	12	V	850	31	2.6	0.0	-0.6
16245	12	V	850	31	2.8	-0.2	0.2
16245	00	V	850	30	2.5	0.3	-0.6
16320	12	V	850	30	2.8	0.6	-0.1
16320	00	V	850	30	2.8	0.5	-0.5
16429	12	V	850	31	1.9	-0.5	0.0
16429	00	V	850	30	2.3	0.4	0.0
16622	00	V	850	29	3.2	0.2	-1.6
16754	00	V	850	25	2.3	-0.4	0.4

RADIOSONDE MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	OBS RECD	RMS	UBIAS	VBIAS
17607	12	V	850	29	2.9	-0.2	0.2
26435	12	V	850	15	2.1	0.0	0.2
5QPW8X	12	V	850	10	2.2	0.1	-0.6
5QPW8X	00	V	850	11	2.6	0.6	0.5
60018	00	V	850	30	3.2	0.3	1.2
60018	12	V	850	31	3.5	-0.7	1.2
7JUNA4	12	V	850	10	3.5	0.8	-0.2
7JUNA4	00	V	850	5	2.9	-0.7	-1.0
ASDE09	12	V	850	1	0.3	0.3	0.0
FHM5UJ	12	V	850	14	3.6	0.7	-0.3
FHM5UJ	00	V	850	14	1.8	0.1	0.0
FPUW5G	12	V	850	4	2.0	1.4	0.5
HTXUH4	12	V	850	13	2.3	-0.1	0.1
HTXUH4	00	V	850	10	1.8	0.5	0.1
JNKN7J	12	V	850	6	1.6	0.0	-0.4
JNKN7J	00	V	850	4	1.5	-0.6	-1.2
KJJF9X	00	V	850	6	1.2	0.1	0.1
KJJF9X	12	V	850	6	2.2	-0.7	0.9
KMPLHP	12	V	850	6	1.4	-0.2	0.7
KMPLHP	00	V	850	7	2.3	0.9	0.7
WDK38H	12	V	850	12	2.6	-0.5	0.4
XKQLWQ	12	V	850	9	2.0	0.1	0.0
XQFJRG	12	V	850	3	1.8	-1.4	0.0
XQFJRG	00	V	850	1	1.8	1.7	-0.5
YLV96W	12	V	850	8	2.6	-1.2	-0.6
YLV96W	00	V	850	8	2.1	0.7	0.4
ZVQEQC	12	V	850	23	2.6	-0.1	0.3

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

```
DRIFTER MONITORING STATISTICS (EUCOS)
         MONITORING CENTRE      : ECMWF
         ELEMENT MONITORED      : SURFACE PRESSURE (HPA)
         AREA                   : 10N - 90N, 70W - 40E
         PERIOD                 : JUL 2019
         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
0062087	99	P	SUR	55	7	28	0	0.3	0.1	0.3
0066022	99	P	SUR	54	14	18	0	0.3	0.1	0.3
0066023	99	P	SUR	55	11	28	0	0.3	0.3	0.4
03380	99	P	SUR	54	0	790	0	0.4	0.0	0.4
1300001	99	P	SUR	11	-23	670	0	0.4	-0.0	0.4
1300008	99	P	SUR	15	-38	706	0	0.3	-0.1	0.3
1300130	99	P	SUR	28	-16	744	0	0.3	0.1	0.3
1301569	99	P	SUR	25	-37	702	0	0.2	0.1	0.2
1301603	99	P	SUR	31	-59	732	0	0.3	-0.0	0.3
1301605	99	P	SUR	23	-58	734	0	0.3	0.2	0.4
1301607	99	P	SUR	21	-49	728	0	0.2	0.6	0.6
1301608	99	P	SUR	29	-42	733	0	0.3	0.9	1.0
1301609	99	P	SUR	22	-65	725	0	0.3	0.6	0.7
1301610	99	P	SUR	22	-54	741	0	0.2	0.4	0.4
1301612	99	P	SUR	25	-45	741	0	0.2	0.1	0.3
1301618	99	P	SUR	16	-31	746	0	0.5	0.9	1.0
1301619	99	P	SUR	36	-18	730	0	0.2	0.5	0.6
1301620	99	P	SUR	12	-35	742	0	0.3	0.3	0.4
1401600	99	P	SUR	49	2	6	0	0.8	-6.8	6.8
1402554	99	P	SUR	23	-67	743	0	0.4	0.4	0.6
1402559	99	P	SUR	28	-49	743	0	0.4	0.3	0.5
1501529	99	P	SUR	20	-43	101	0	0.2	0.4	0.4
1501531	99	P	SUR	27	-57	704	0	0.3	-0.2	0.4
1501534	99	P	SUR	23	-65	703	0	0.3	-1.0	1.1
1501581	99	P	SUR	15	-58	706	0	0.3	0.2	0.4
2501641	99	P	SUR	88	17	655	0	0.3	-0.0	0.3
2501643	99	P	SUR	89	-14	656	0	0.4	-0.2	0.4
2501647	99	P	SUR	89	-49	655	0	0.3	0.0	0.3
2501653	99	P	SUR	89	25	656	0	0.3	-0.2	0.4
2501661	99	P	SUR	85	19	744	0	0.3	-0.0	0.3
2601623	99	P	SUR	76	31	744	0	0.4	-0.0	0.4
2601624	99	P	SUR	81	13	745	0	0.4	0.0	0.4
2601625	99	P	SUR	79	26	740	3	0.3	-0.0	0.3
3100735	99	P	SUR	35	-61	735	0	0.7	0.2	0.7
3101532	99	P	SUR	12	-68	701	0	0.5	0.1	0.5
31735	99	P	SUR	35	-62	735	0	0.7	0.2	0.7

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
3732621	99	P	SUR	35	25	66	0	0.4	-0.5	0.6
4100040	99	P	SUR	15	-53	4402	0	0.3	-0.8	0.8
4100043	99	P	SUR	21	-65	4396	0	0.3	0.3	0.4
4100044	99	P	SUR	22	-59	4401	0	0.3	0.4	0.4
4100046	99	P	SUR	24	-68	4376	0	0.3	-0.4	0.5
4100048	99	P	SUR	32	-70	4281	0	0.4	-0.7	0.8
4100049	99	P	SUR	27	-63	4379	0	0.6	-0.0	0.6
4100052	99	P	SUR	18	-65	4426	0	0.3	-1.1	1.2
4100053	99	P	SUR	18	-66	4408	0	0.4	-0.6	0.7
4100056	99	P	SUR	18	-65	4386	0	0.3	-0.7	0.8
4100139	99	P	SUR	20	-38	692	0	0.2	-0.1	0.2
4100300	99	P	SUR	16	-57	714	0	0.3	0.1	0.3
4100597	99	P	SUR	32	-33	732	0	0.2	0.4	0.5
4100729	99	P	SUR	35	-26	722	0	0.2	0.3	0.4
4100730	99	P	SUR	37	-22	729	0	0.2	0.5	0.6
4101529	99	P	SUR	26	-61	738	0	0.3	-0.9	0.9
4101530	99	P	SUR	31	-27	701	0	0.2	0.7	0.7
4101531	99	P	SUR	37	-18	743	0	0.3	0.8	0.8
4101533	99	P	SUR	54	-22	672	0	0.4	0.6	0.7
4101534	99	P	SUR	53	-26	597	0	0.3	0.5	0.6
4101536	99	P	SUR	42	-28	740	0	0.3	0.4	0.5
4101537	99	P	SUR	38	-14	724	0	0.3	0.5	0.6
4101539	99	P	SUR	39	-48	743	0	0.5	0.2	0.5
4101554	99	P	SUR	26	-59	738	0	0.3	0.5	0.6
4101556	99	P	SUR	39	-12	735	0	0.3	0.9	0.9
4101557	99	P	SUR	35	-29	735	0	0.2	0.4	0.5
4101558	99	P	SUR	23	-46	735	0	0.2	0.6	0.7
4101560	99	P	SUR	38	-36	744	0	0.3	0.7	0.8
4101562	99	P	SUR	32	-51	696	0	0.2	0.6	0.6
4101564	99	P	SUR	29	-43	729	0	0.2	0.1	0.3
4101565	99	P	SUR	27	-31	641	0	0.2	0.7	0.8
4101567	99	P	SUR	36	-51	741	0	0.4	0.3	0.5
4101570	99	P	SUR	27	-61	744	0	0.3	0.4	0.5
4101572	99	P	SUR	50	-15	721	0	0.4	0.6	0.7
4101573	99	P	SUR	33	-44	744	0	0.3	0.3	0.4
4101596	99	P	SUR	60	-2	734	0	0.3	0.8	0.8
4101598	99	P	SUR	16	-61	735	0	0.4	-0.2	0.4
4101604	99	P	SUR	10	-62	657	0	0.5	-0.2	0.5
4101606	99	P	SUR	43	-9	375	0	1.9	-0.1	1.9
4101607	99	P	SUR	43	-14	744	0	0.3	0.5	0.6
4101608	99	P	SUR	62	-6	744	0	0.3	0.4	0.5
4101609	99	P	SUR	36	-23	744	0	0.2	0.4	0.4
4101610	99	P	SUR	65	-10	744	0	0.3	0.3	0.5

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
4101613	99	P	SUR	37	-22	744	0	0.3	0.7	0.7
4101614	99	P	SUR	32	-31	744	0	0.2	0.2	0.3
4101616	99	P	SUR	36	-22	744	0	0.2	0.2	0.3
4101617	99	P	SUR	31	-26	741	0	0.2	0.6	0.6
4101618	99	P	SUR	35	-24	744	0	0.2	0.5	0.5
4101619	99	P	SUR	52	-11	744	0	0.3	0.1	0.3
4101620	99	P	SUR	51	-7	744	0	0.3	0.5	0.6
4101621	99	P	SUR	38	-34	744	0	0.2	0.3	0.4
4101622	99	P	SUR	70	-12	744	0	0.3	0.2	0.4
4101623	99	P	SUR	57	-51	744	0	0.4	0.1	0.4
4101625	99	P	SUR	65	-55	743	0	0.4	0.2	0.4
4101627	99	P	SUR	59	-31	744	0	0.3	0.0	0.3
4101662	99	P	SUR	61	-10	744	0	0.3	0.1	0.3
4101663	99	P	SUR	63	-17	744	0	0.4	0.0	0.4
4101664	99	P	SUR	62	-24	744	0	0.3	0.2	0.4
4101666	99	P	SUR	62	-13	744	0	0.3	-0.0	0.3
4101690	99	P	SUR	52	-54	702	0	0.3	0.3	0.5
4101700	99	P	SUR	29	-58	725	0	0.3	-0.3	0.4
4101702	99	P	SUR	35	-69	731	0	0.4	-0.0	0.4
4101705	99	P	SUR	30	-28	733	0	0.2	0.2	0.3
4101706	99	P	SUR	34	-28	738	0	0.2	-0.6	0.6
4101707	99	P	SUR	35	-30	460	0	0.3	0.1	0.3
4101708	99	P	SUR	26	-49	735	0	0.2	-0.4	0.5
4101712	99	P	SUR	36	-31	736	0	0.2	0.1	0.2
4101713	99	P	SUR	36	-61	730	0	0.3	-0.2	0.4
4101714	99	P	SUR	31	-30	738	0	0.2	0.1	0.2
4101715	99	P	SUR	29	-49	734	0	0.5	-0.5	0.8
4101716	99	P	SUR	26	-53	743	0	0.3	-0.8	0.8
4101717	99	P	SUR	27	-56	741	0	0.2	-0.0	0.2
4101718	99	P	SUR	33	-27	741	0	0.2	0.2	0.3
4101719	99	P	SUR	34	-55	738	0	0.3	-0.0	0.3
4101720	99	P	SUR	44	-58	740	0	0.3	0.5	0.6
4101721	99	P	SUR	32	-55	735	0	0.3	0.4	0.5
4101742	99	P	SUR	35	-39	731	0	0.2	-0.0	0.2
4101743	99	P	SUR	30	-61	729	0	0.3	0.6	0.7
4101752	99	P	SUR	14	-47	228	0	0.3	0.0	0.3
4101754	99	P	SUR	12	-44	202	0	0.3	-0.0	0.3
4101756	99	P	SUR	10	-41	203	0	0.3	-0.0	0.3
4101760	99	P	SUR	31	-53	743	0	0.5	0.2	0.5
4101762	99	P	SUR	25	-68	738	0	0.3	0.4	0.5
4101764	99	P	SUR	75	17	681	1	1.0	0.5	1.1
4101765	99	P	SUR	61	-10	737	0	0.4	0.3	0.5
4101767	99	P	SUR	13	-30	743	0	0.3	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
41040	99	P	SUR	15	-53	1300	0	0.3	-0.4	0.5
41043	99	P	SUR	21	-65	1278	0	0.3	0.7	0.8
41044	99	P	SUR	22	-59	1283	0	0.2	0.8	0.8
41046	99	P	SUR	24	-68	1737	0	0.4	0.1	0.4
41048	99	P	SUR	32	-70	1315	0	0.4	-0.3	0.5
41049	99	P	SUR	28	-63	1019	0	0.3	0.6	0.7
41052	99	P	SUR	18	-65	1883	0	0.4	-1.1	1.1
41053	99	P	SUR	19	-66	1964	0	0.4	-0.6	0.7
41056	99	P	SUR	18	-66	1879	0	0.4	-0.8	0.8
41300	99	P	SUR	16	-57	714	0	0.3	0.1	0.3
41597	99	P	SUR	32	-33	732	0	0.2	0.4	0.5
41729	99	P	SUR	35	-26	722	0	0.2	0.3	0.4
41730	99	P	SUR	37	-22	729	0	0.2	0.5	0.6
4200059	99	P	SUR	15	-67	4343	0	0.4	0.1	0.4
4200060	99	P	SUR	16	-63	292	0	0.5	0.1	0.5
4200085	99	P	SUR	18	-67	1844	0	0.3	-0.8	0.9
42059	99	P	SUR	15	-68	1318	0	0.4	0.4	0.6
42060	99	P	SUR	16	-63	133	0	0.5	0.5	0.7
42085	99	P	SUR	18	-67	1219	0	0.4	-0.8	0.9
4400005	99	P	SUR	43	-69	741	0	0.4	0.5	0.7
4400008	99	P	SUR	41	-69	4450	0	0.4	0.1	0.4
4400011	99	P	SUR	41	-67	4448	0	0.4	-0.1	0.4
4400027	99	P	SUR	44	-67	739	0	0.4	-0.1	0.5
4400032	99	P	SUR	44	-69	713	0	0.4	-0.8	0.9
4400033	99	P	SUR	44	-69	722	0	0.4	-0.1	0.4
4400034	99	P	SUR	44	-68	717	0	0.4	0.1	0.4
4400037	99	P	SUR	43	-68	456	0	0.4	-0.4	0.5
44005	99	P	SUR	43	-69	781	0	0.4	0.5	0.7
4400513	99	P	SUR	54	-10	655	0	0.3	-0.3	0.4
4400517	99	P	SUR	30	-68	735	0	0.4	0.1	0.4
4400521	99	P	SUR	27	-35	678	0	0.2	-0.8	0.8
4400746	99	P	SUR	33	-30	729	0	0.2	0.3	0.4
4400777	99	P	SUR	27	-49	726	0	0.2	0.4	0.4
4400778	99	P	SUR	32	-57	273	0	0.4	0.1	0.4
44008	99	P	SUR	41	-69	1758	0	0.4	0.5	0.7
4400857	99	P	SUR	34	-28	727	0	0.2	0.5	0.6
4400874	99	P	SUR	35	-31	732	0	0.2	-0.4	0.5
44011	99	P	SUR	41	-67	1693	0	0.4	0.3	0.5
4401531	99	P	SUR	37	-36	735	0	0.3	0.4	0.5
4401536	99	P	SUR	31	-16	696	0	0.3	0.8	0.8
4401537	99	P	SUR	28	-44	696	0	0.5	-0.8	1.0
4401539	99	P	SUR	41	-15	697	0	0.3	-0.2	0.3
4401540	99	P	SUR	32	-40	735	0	0.2	0.3	0.3

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
4401541	99	P	SUR	30	-28	735	0	0.2	-0.0	0.2
4401549	99	P	SUR	66	11	694	0	0.3	0.3	0.5
4401551	99	P	SUR	37	-22	711	0	0.2	0.3	0.4
4401556	99	P	SUR	25	-29	731	0	0.2	0.2	0.3
4401557	99	P	SUR	30	-29	730	0	0.2	0.3	0.4
4401558	99	P	SUR	66	12	730	0	0.4	-0.1	0.4
4401559	99	P	SUR	46	-7	729	0	0.3	0.4	0.5
4401561	99	P	SUR	28	-44	731	0	0.2	0.0	0.2
4401562	99	P	SUR	29	-23	730	0	0.2	-0.1	0.2
4401563	99	P	SUR	27	-48	733	0	0.2	-0.4	0.5
4401564	99	P	SUR	37	-26	737	0	0.4	0.6	0.7
4401565	99	P	SUR	62	-17	731	0	0.4	0.1	0.4
4401567	99	P	SUR	53	-25	740	0	0.3	0.3	0.5
4401568	99	P	SUR	54	-25	739	0	0.3	0.2	0.3
4401569	99	P	SUR	52	-36	739	0	0.3	0.0	0.3
4401570	99	P	SUR	46	-16	742	0	0.3	0.1	0.3
4401572	99	P	SUR	45	-41	742	0	0.5	0.2	0.6
4401573	99	P	SUR	52	-28	741	0	0.4	-0.0	0.4
4401574	99	P	SUR	55	-32	743	0	0.4	0.1	0.4
4401575	99	P	SUR	49	-46	738	0	0.4	0.4	0.6
4401576	99	P	SUR	44	-31	743	0	0.4	0.3	0.5
4401577	99	P	SUR	42	-43	740	0	0.4	-0.0	0.4
4401578	99	P	SUR	42	-43	738	0	0.4	-0.0	0.4
4401579	99	P	SUR	44	-38	738	0	0.4	0.1	0.4
4401611	99	P	SUR	42	-39	655	0	0.9	0.8	1.2
4401613	99	P	SUR	33	-11	657	0	0.3	0.8	0.8
4401633	99	P	SUR	30	-21	78	0	0.2	-0.2	0.3
4401750	99	P	SUR	66	6	690	0	0.3	-1.2	1.2
4401751	99	P	SUR	65	-4	677	0	0.4	0.4	0.5
4401753	99	P	SUR	62	-2	659	0	0.3	0.6	0.7
4401799	99	P	SUR	24	-57	731	0	0.2	0.4	0.5
4401802	99	P	SUR	37	-16	657	0	0.2	0.2	0.3
4401893	99	P	SUR	52	-54	700	0	0.3	0.4	0.5
4401894	99	P	SUR	53	-54	702	0	0.4	0.5	0.7
44027	99	P	SUR	44	-67	781	0	0.4	-0.1	0.5
44032	99	P	SUR	44	-69	725	0	0.4	-0.8	0.9
44033	99	P	SUR	44	-69	733	0	0.4	-0.1	0.4
44034	99	P	SUR	44	-68	729	0	0.4	0.1	0.4
44037	99	P	SUR	44	-68	464	0	0.4	-0.4	0.5
44137	99	P	SUR	42	-62	733	0	0.4	-0.1	0.4
44139	99	P	SUR	44	-57	733	0	0.4	-0.0	0.4
44150	99	P	SUR	43	-64	740	0	0.4	0.2	0.4
44258	99	P	SUR	45	-63	741	0	0.4	0.0	0.4

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
44513	99	P	SUR	54	-10	655	0	0.3	-0.3	0.4
44517	99	P	SUR	30	-68	735	0	0.4	0.1	0.4
44521	99	P	SUR	27	-35	678	0	0.2	-0.8	0.8
44746	99	P	SUR	33	-30	729	0	0.2	0.3	0.4
44777	99	P	SUR	27	-49	726	0	0.2	0.4	0.4
44778	99	P	SUR	32	-57	273	0	0.4	0.1	0.4
44857	99	P	SUR	34	-28	727	0	0.2	0.5	0.6
44874	99	P	SUR	35	-31	732	0	0.2	-0.4	0.5
45138	99	P	SUR	50	-66	744	0	0.5	-0.2	0.5
4602501	99	P	SUR	70	0	324	0	0.3	0.2	0.4
4602504	99	P	SUR	70	2	324	0	0.4	0.4	0.6
4700546	99	P	SUR	30	-56	632	0	0.3	0.0	0.3
4701669	99	P	SUR	44	-23	657	0	0.3	0.3	0.4
4800770	99	P	SUR	68	-30	622	622	0.0	0.0	0.0
4802505	99	P	SUR	84	-57	652	0	0.4	-0.1	0.4
4802512	99	P	SUR	84	-67	652	0	0.4	-0.9	1.0
5301764	99	P	SUR	63	-13	743	0	0.4	0.1	0.5
5301765	99	P	SUR	62	-10	743	0	0.3	0.3	0.4
6100001	99	P	SUR	43	8	716	0	0.5	0.6	0.7
6100002	99	P	SUR	42	5	722	0	0.4	0.1	0.4
61001	99	P	SUR	43	8	716	0	0.5	0.6	0.7
6100196	99	P	SUR	42	4	744	0	0.4	0.3	0.5
6100197	99	P	SUR	40	4	744	0	0.5	0.4	0.6
6100198	99	P	SUR	37	-2	744	0	0.5	0.2	0.6
61002	99	P	SUR	42	5	722	0	0.4	0.1	0.4
6100280	99	P	SUR	41	1	744	0	0.4	0.2	0.5
6100281	99	P	SUR	40	0	744	0	0.5	0.2	0.5
6100417	99	P	SUR	38	0	744	0	0.5	0.3	0.6
6100430	99	P	SUR	40	2	744	0	0.5	0.1	0.5
6101001	99	P	SUR	38	24	38	0	0.3	0.4	0.5
6101003	99	P	SUR	40	25	106	0	0.4	0.8	0.9
6101005	99	P	SUR	38	26	191	0	0.5	0.8	1.0
6101007	99	P	SUR	36	25	2	0	0.3	0.5	0.6
6101008	99	P	SUR	37	22	38	0	0.4	0.9	1.0
6102505	99	P	SUR	44	9	615	1	0.7	1.0	1.2
6200024	99	P	SUR	44	-3	744	0	0.5	0.3	0.5
6200025	99	P	SUR	44	-6	744	0	0.4	0.2	0.5
6200082	99	P	SUR	44	-8	735	0	0.4	0.1	0.4
6200083	99	P	SUR	43	-9	744	0	0.4	0.2	0.4
6200084	99	P	SUR	42	-9	743	0	0.4	0.3	0.5
6200085	99	P	SUR	36	-7	744	0	0.4	0.4	0.6
6200091	99	P	SUR	53	-5	565	0	0.4	-0.0	0.4
6200092	99	P	SUR	51	-11	742	0	0.4	-0.0	0.4

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
6200093	99	P	SUR	55	-10	742	0	0.4	0.0	0.4
6200094	99	P	SUR	52	-7	740	0	0.4	0.2	0.5
6200095	99	P	SUR	53	-16	741	0	0.4	-0.2	0.4
62001	99	P	SUR	45	-5	773	0	0.4	0.3	0.5
6200191	99	P	SUR	41	-10	594	0	0.4	-0.1	0.4
6200192	99	P	SUR	40	-10	461	0	0.5	0.2	0.5
6200199	99	P	SUR	40	-9	566	0	0.3	0.3	0.4
6200200	99	P	SUR	36	-8	441	0	0.3	-0.2	0.4
62010	99	P	SUR	55	7	1	0	0.0	0.0	0.0
6201030	99	P	SUR	44	-4	700	0	0.4	0.2	0.5
62023	99	P	SUR	51	-8	368	0	0.3	0.1	0.3
6202640	99	P	SUR	20	-43	744	0	0.2	0.3	0.4
6202641	99	P	SUR	11	-50	744	0	0.3	0.3	0.5
6202642	99	P	SUR	14	-48	744	0	0.2	0.2	0.3
6202643	99	P	SUR	17	-44	744	0	0.2	0.3	0.4
6202644	99	P	SUR	23	-39	744	0	0.2	0.4	0.4
6202675	99	P	SUR	58	-23	702	0	0.3	0.2	0.4
6202676	99	P	SUR	60	-22	698	0	0.3	0.2	0.4
6202677	99	P	SUR	58	-23	702	0	0.3	0.1	0.3
6202678	99	P	SUR	57	-29	697	0	0.3	0.2	0.4
6202679	99	P	SUR	60	-28	690	0	0.3	0.2	0.4
6202680	99	P	SUR	58	-23	693	0	0.4	0.1	0.4
6202681	99	P	SUR	57	-20	702	0	0.4	0.1	0.4
6202682	99	P	SUR	58	-20	699	0	0.4	0.1	0.4
6202683	99	P	SUR	57	-23	691	0	0.4	0.2	0.4
6202684	99	P	SUR	60	-23	699	0	0.4	0.3	0.5
62029	99	P	SUR	49	-12	1409	0	0.3	0.1	0.3
62030	99	P	SUR	50	-4	1297	0	0.5	-0.4	0.7
6203503	99	P	SUR	45	-8	741	0	0.4	0.0	0.4
6203523	99	P	SUR	67	6	662	0	0.3	-0.5	0.6
6203525	99	P	SUR	71	16	525	0	0.3	-0.6	0.7
6203527	99	P	SUR	61	-3	193	1	2.4	8.8	9.2
6203528	99	P	SUR	28	-23	655	0	0.3	-0.0	0.3
6203574	99	P	SUR	64	-27	704	0	0.4	0.5	0.6
6203576	99	P	SUR	61	-51	692	0	0.4	0.3	0.5
6203577	99	P	SUR	66	-20	702	0	0.4	0.5	0.6
6203579	99	P	SUR	65	-35	704	0	0.5	0.3	0.6
6203580	99	P	SUR	67	-12	686	0	0.3	0.4	0.5
6203581	99	P	SUR	64	-11	705	0	0.4	-0.0	0.4
6203582	99	P	SUR	62	-20	700	0	0.3	0.4	0.5
6203583	99	P	SUR	62	-25	704	0	0.4	0.1	0.4
6203601	99	P	SUR	40	-11	727	0	0.3	0.7	0.8
6203607	99	P	SUR	30	-38	733	0	0.2	0.2	0.3

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
6203608	99	P	SUR	50	-8	734	0	0.3	0.2	0.4
6203609	99	P	SUR	44	-13	735	0	0.3	0.1	0.3
6203610	99	P	SUR	49	-7	709	0	0.4	0.3	0.5
6203706	99	P	SUR	28	-62	743	0	0.6	0.2	0.6
6203707	99	P	SUR	30	-32	742	0	0.2	0.5	0.5
6203708	99	P	SUR	28	-37	743	0	0.5	0.4	0.6
6203710	99	P	SUR	61	-16	743	0	0.4	0.1	0.4
6203711	99	P	SUR	63	-16	737	0	0.4	0.2	0.5
6203715	99	P	SUR	73	18	742	0	0.4	0.3	0.5
62050	99	P	SUR	50	-4	784	0	0.3	0.4	0.5
62081	99	P	SUR	51	-13	538	22	0.4	-0.1	0.4
62091	99	P	SUR	53	-5	565	0	0.4	-0.0	0.4
62092	99	P	SUR	51	-11	565	0	0.4	-0.1	0.4
62093	99	P	SUR	55	-10	565	0	0.4	0.0	0.4
62094	99	P	SUR	52	-7	564	0	0.3	0.2	0.4
62095	99	P	SUR	53	-16	565	0	0.4	-0.2	0.4
62102	99	P	SUR	58	2	788	0	0.4	0.4	0.6
62103	99	P	SUR	50	-3	785	0	0.3	0.7	0.8
62104	99	P	SUR	57	1	788	0	0.3	0.2	0.4
62105	99	P	SUR	55	-13	882	0	0.4	-0.1	0.4
62107	99	P	SUR	50	-6	1424	2	0.3	0.6	0.7
62112	99	P	SUR	58	0	790	0	0.3	0.6	0.6
62113	99	P	SUR	58	0	788	0	0.4	0.1	0.4
62114	99	P	SUR	58	0	1422	0	0.4	0.5	0.6
62115	99	P	SUR	58	-3	787	0	0.3	0.3	0.5
62116	99	P	SUR	58	1	788	0	0.4	0.3	0.5
62118	99	P	SUR	58	1	788	0	0.3	0.7	0.8
62119	99	P	SUR	57	2	739	0	0.5	0.5	0.6
62120	99	P	SUR	56	2	720	0	0.4	0.2	0.5
62121	99	P	SUR	54	3	786	0	0.4	0.5	0.7
62122	99	P	SUR	57	2	1422	0	0.4	0.3	0.5
62124	99	P	SUR	54	-4	790	0	0.3	0.3	0.4
62127	99	P	SUR	54	1	160	0	0.2	1.0	1.0
62129	99	P	SUR	58	0	788	0	0.3	0.2	0.4
62130	99	P	SUR	59	1	784	0	0.4	0.2	0.4
62131	99	P	SUR	54	1	788	0	0.4	0.8	0.8
62132	99	P	SUR	56	2	787	0	0.5	0.7	0.9
62133	99	P	SUR	57	1	788	0	0.4	0.3	0.5
62134	99	P	SUR	58	1	789	0	0.3	0.7	0.8
62135	99	P	SUR	54	2	762	0	0.4	0.6	0.7
62136	99	P	SUR	54	3	730	0	0.3	0.8	0.9
62138	99	P	SUR	54	0	1419	0	0.4	1.0	1.1
62139	99	P	SUR	53	2	1407	0	0.4	0.7	0.8

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
62140	99	P	SUR	57	1	1225	0	0.4	0.3	0.5
62141	99	P	SUR	58	-4	773	0	0.3	-1.8	1.9
62143	99	P	SUR	58	2	788	0	0.4	1.0	1.1
62144	99	P	SUR	53	2	790	0	0.4	0.5	0.7
62145	99	P	SUR	53	3	1397	0	0.4	0.7	0.8
62146	99	P	SUR	57	2	788	0	0.4	0.2	0.4
62148	99	P	SUR	54	2	790	0	0.4	0.7	0.8
62149	99	P	SUR	54	1	764	0	0.4	1.0	1.1
62150	99	P	SUR	54	1	790	0	0.4	1.6	1.6
62151	99	P	SUR	57	2	1421	0	0.3	0.4	0.5
62152	99	P	SUR	57	2	789	0	0.3	0.6	0.7
62153	99	P	SUR	57	2	1423	0	0.3	0.5	0.6
62154	99	P	SUR	56	2	788	0	0.3	0.3	0.4
62155	99	P	SUR	58	1	785	0	0.3	0.6	0.7
62157	99	P	SUR	58	0	786	0	0.3	0.2	0.4
62160	99	P	SUR	57	2	1423	0	0.3	0.6	0.7
62161	99	P	SUR	58	1	787	0	0.4	0.1	0.4
62162	99	P	SUR	57	1	759	0	0.3	0.3	0.5
62163	99	P	SUR	48	-8	773	0	0.4	0.5	0.6
62165	99	P	SUR	54	1	752	0	0.4	0.8	0.9
62168	99	P	SUR	58	1	791	0	0.3	0.3	0.5
62296	99	P	SUR	53	2	782	0	0.4	0.4	0.5
62297	99	P	SUR	59	2	1417	0	0.3	0.3	0.5
62302	99	P	SUR	61	-2	790	0	0.4	0.2	0.4
62304	99	P	SUR	51	2	633	0	0.5	1.0	1.1
62305	99	P	SUR	50	0	787	0	0.4	0.4	0.6
62442	99	P	SUR	49	-16	335	0	0.4	0.1	0.4
6301501	99	P	SUR	83	11	704	0	0.4	0.2	0.4
6301505	99	P	SUR	83	8	704	0	0.4	0.0	0.4
6301507	99	P	SUR	82	33	688	0	1.0	0.1	1.0
6301558	99	P	SUR	66	-15	737	0	0.5	0.4	0.6
6301562	99	P	SUR	59	-48	728	0	0.5	0.2	0.5
6301563	99	P	SUR	59	-50	735	0	0.7	0.7	0.9
6301564	99	P	SUR	66	-8	735	0	0.3	0.4	0.5
6301681	99	P	SUR	69	4	324	0	0.4	0.3	0.5
63055	99	P	SUR	61	2	790	0	0.3	0.1	0.3
63056	99	P	SUR	60	2	788	0	0.3	0.5	0.6
63057	99	P	SUR	59	2	787	0	0.3	0.2	0.3
63058	99	P	SUR	53	2	1898	0	0.4	0.6	0.7
63059	99	P	SUR	58	-1	787	0	0.3	0.7	0.8
63101	99	P	SUR	61	1	790	0	0.4	0.3	0.5
63102	99	P	SUR	61	1	785	0	0.3	0.2	0.3
63103	99	P	SUR	61	1	788	0	0.3	0.3	0.4

DRIFTER MONITORING STATISTICS (EUCOS)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS
63104	99	P	SUR	61	2	789	0	0.3	0.2	0.4
63108	99	P	SUR	61	2	790	0	0.3	0.0	0.3
63109	99	P	SUR	60	2	789	0	0.3	-0.1	0.3
63110	99	P	SUR	60	2	787	0	0.3	0.1	0.3
63111	99	P	SUR	61	2	1402	0	0.3	-0.0	0.3
63112	99	P	SUR	61	1	790	0	0.3	-0.1	0.3
63115	99	P	SUR	62	1	790	0	0.3	0.2	0.4
63117	99	P	SUR	61	1	1421	0	0.4	0.5	0.6
63118	99	P	SUR	57	2	1415	0	0.3	0.2	0.4
63120	99	P	SUR	54	2	728	0	0.3	0.8	0.8
6401502	99	P	SUR	73	13	682	0	0.4	0.3	0.5
6401503	99	P	SUR	65	2	660	0	0.4	0.5	0.6
6401506	99	P	SUR	65	2	672	0	0.4	0.6	0.7
6401507	99	P	SUR	78	11	1	0	0.0	-5.5	5.5
6401531	99	P	SUR	58	-39	701	0	0.3	0.3	0.4
6401539	99	P	SUR	58	-56	688	0	0.4	0.6	0.7
6401550	99	P	SUR	68	12	469	0	0.3	0.0	0.3
6401556	99	P	SUR	71	17	741	0	0.4	0.3	0.5
6401561	99	P	SUR	66	1	737	0	0.3	0.2	0.4
6401565	99	P	SUR	71	30	716	0	0.5	0.1	0.5
6401568	99	P	SUR	62	-5	743	0	0.3	0.3	0.5
6401569	99	P	SUR	63	-1	740	0	0.3	0.3	0.5
6401570	99	P	SUR	69	11	739	0	0.3	0.2	0.3
6401571	99	P	SUR	66	5	203	0	0.3	0.3	0.4
64041	99	P	SUR	61	-3	790	0	0.3	0.3	0.4
64045	99	P	SUR	59	-12	767	0	0.4	-0.1	0.4
64046	99	P	SUR	61	-4	782	0	0.3	0.0	0.3
6501556	99	P	SUR	73	11	728	0	0.5	0.4	0.7
66023	99	P	SUR	55	11	797	0	0.3	0.3	0.4

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

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          DRIFTER MONITORING STATISTICS (EUCOS)
                   MONITORING CENTRE     : ECMWF
                   ELEMENT MONITORED     : WIND SPEED (M/S)
                   AREA                  : 10N - 90N, 70W - 40E
                   PERIOD                : JUL 2019
                   STANDARD OF COMPARISON: FIRST-GUESS FIELD


TIME = 99 => AVERAGE OF ALL OBSERVATIONS


GROSS ERROR LIMIT FOR VECTOR WIND = 25 M/S
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WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
0066022	99	SPEED	SUR	54	14	18	0	0	1.2	-0.2	1.2
0066023	99	SPEED	SUR	55	11	28	0	0	2.7	0.8	2.8
0066024	99	SPEED	SUR	55	13	19	0	0	1.5	0.6	1.6
1300001	99	SPEED	SUR	11	-23	670	0	0	1.3	0.4	1.3
1300002	99	SPEED	SUR	20	-23	690	0	0	0.8	-0.0	0.8
1300008	99	SPEED	SUR	15	-38	706	0	0	1.0	0.4	1.1
3732621	99	SPEED	SUR	35	25	66	0	0	1.0	1.3	1.7
4100026	99	SPEED	SUR	12	-38	270	0	0	1.0	0.4	1.1
4100040	99	SPEED	SUR	15	-53	4402	0	0	0.9	0.2	0.9
4100043	99	SPEED	SUR	21	-65	4395	0	0	0.8	-0.3	0.9
4100044	99	SPEED	SUR	22	-59	4401	0	0	0.7	-0.1	0.7
4100046	99	SPEED	SUR	24	-68	3184	0	0	0.9	-0.2	1.0
4100048	99	SPEED	SUR	32	-70	4281	0	0	1.0	0.0	1.0
4100049	99	SPEED	SUR	27	-63	4412	0	0	1.1	-0.0	1.1
4100052	99	SPEED	SUR	18	-65	4426	0	0	0.8	-0.5	0.9
4100053	99	SPEED	SUR	18	-66	4408	0	0	1.3	1.4	1.9
4100056	99	SPEED	SUR	18	-65	4389	0	0	1.1	-0.9	1.4
4100139	99	SPEED	SUR	20	-38	692	0	0	0.8	-0.1	0.8
4100300	99	SPEED	SUR	16	-57	714	0	0	0.8	-0.3	0.9
41026	99	SPEED	SUR	12	-38	270	0	0	1.1	0.4	1.1
41040	99	SPEED	SUR	15	-53	1300	0	0	1.0	-0.2	1.0
41043	99	SPEED	SUR	21	-65	1284	0	0	0.8	-0.3	0.9
41044	99	SPEED	SUR	22	-59	1292	0	0	0.7	-0.3	0.8
41046	99	SPEED	SUR	24	-68	1230	0	0	1.0	-0.2	1.1
41048	99	SPEED	SUR	32	-70	1329	0	0	1.0	-0.1	1.0
41049	99	SPEED	SUR	28	-63	1669	0	0	1.2	-0.1	1.2
41052	99	SPEED	SUR	18	-65	1883	0	0	0.9	-0.3	1.0
41053	99	SPEED	SUR	19	-66	1964	0	0	1.3	0.7	1.5
41056	99	SPEED	SUR	18	-66	1880	0	0	1.1	-0.6	1.3
41300	99	SPEED	SUR	16	-57	714	0	0	0.9	-0.2	0.9
4200059	99	SPEED	SUR	15	-67	4340	0	0	0.9	0.1	0.9
4200060	99	SPEED	SUR	16	-63	292	0	0	1.2	-0.3	1.2
4200085	99	SPEED	SUR	18	-67	1831	0	0	1.2	-0.4	1.3
42059	99	SPEED	SUR	15	-68	1316	0	0	0.9	-0.1	0.9

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND SPEED (M/S) (CONTINU

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
42060	99	SPEED	SUR	16	-63	133	0	0	1.1	-0.1	1.1
42085	99	SPEED	SUR	18	-67	1212	0	0	1.3	0.0	1.3
4400005	99	SPEED	SUR	43	-69	741	0	0	1.2	-0.9	1.5
4400008	99	SPEED	SUR	41	-69	4448	0	0	1.4	-0.4	1.5
4400011	99	SPEED	SUR	41	-67	4447	0	0	1.5	-0.6	1.6
4400027	99	SPEED	SUR	44	-67	739	0	0	1.3	-0.8	1.5
4400032	99	SPEED	SUR	44	-69	713	0	0	1.2	-1.0	1.5
4400033	99	SPEED	SUR	44	-69	723	0	0	1.3	-0.6	1.4
4400034	99	SPEED	SUR	44	-68	717	0	0	1.4	-1.3	1.9
4400037	99	SPEED	SUR	43	-68	456	0	0	1.1	-0.5	1.2
44005	99	SPEED	SUR	43	-69	781	0	0	1.2	-0.9	1.5
44008	99	SPEED	SUR	41	-69	1773	0	0	1.4	-0.8	1.6
44011	99	SPEED	SUR	41	-67	1692	0	0	1.5	-0.8	1.7
44027	99	SPEED	SUR	44	-67	781	0	0	1.3	-0.7	1.5
44032	99	SPEED	SUR	44	-69	725	0	0	1.2	-0.9	1.5
44033	99	SPEED	SUR	44	-69	734	0	0	1.3	-0.4	1.4
44034	99	SPEED	SUR	44	-68	729	0	0	1.5	-1.2	1.9
44037	99	SPEED	SUR	44	-68	464	0	0	1.2	-0.5	1.3
44139	99	SPEED	SUR	44	-57	733	0	0	1.2	-0.4	1.3
44150	99	SPEED	SUR	43	-64	739	0	0	1.4	-0.4	1.5
44258	99	SPEED	SUR	45	-63	741	0	0	1.4	-0.4	1.4
45138	99	SPEED	SUR	50	-66	744	0	0	1.8	0.0	1.8
6100001	99	SPEED	SUR	43	8	713	0	0	1.7	-0.1	1.7
6100002	99	SPEED	SUR	42	5	722	0	0	1.2	0.0	1.2
61001	99	SPEED	SUR	43	8	713	0	0	1.9	-0.3	1.9
6100196	99	SPEED	SUR	42	4	736	0	0	1.6	-0.6	1.7
6100197	99	SPEED	SUR	40	4	726	0	0	1.3	0.0	1.3
6100198	99	SPEED	SUR	37	-2	732	0	0	1.9	-0.8	2.1
61002	99	SPEED	SUR	42	5	722	0	0	1.3	-0.4	1.4
6100280	99	SPEED	SUR	41	1	717	0	0	1.5	-0.5	1.6
6100281	99	SPEED	SUR	40	0	727	0	0	1.7	0.1	1.7
6100417	99	SPEED	SUR	38	0	743	0	0	1.2	0.1	1.2
6100430	99	SPEED	SUR	40	2	709	0	0	1.6	0.0	1.6
6101001	99	SPEED	SUR	38	24	38	0	0	1.7	0.3	1.7
6101003	99	SPEED	SUR	40	25	106	0	0	1.4	-0.6	1.5
6101005	99	SPEED	SUR	38	26	198	0	0	1.5	-0.8	1.7
6101007	99	SPEED	SUR	36	25	2	0	0	0.4	-0.8	0.9
6101008	99	SPEED	SUR	37	22	146	0	0	2.9	-3.8	4.7
6200024	99	SPEED	SUR	44	-3	739	0	0	1.3	0.1	1.3
6200025	99	SPEED	SUR	44	-6	734	0	0	1.2	-0.2	1.2
6200082	99	SPEED	SUR	44	-8	741	0	0	1.0	-0.3	1.1

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND SPEED (M/S) (CONTINU

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
6200083	99	SPEED	SUR	43	-9	737	0	0	1.0	-0.7	1.2
6200084	99	SPEED	SUR	42	-9	736	0	0	1.1	-0.4	1.1
6200085	99	SPEED	SUR	36	-7	731	0	0	1.4	-0.5	1.5
6200091	99	SPEED	SUR	53	-5	565	0	0	1.3	0.1	1.3
6200092	99	SPEED	SUR	51	-11	742	0	0	0.9	0.0	0.9
6200093	99	SPEED	SUR	55	-10	742	0	0	1.1	-0.0	1.1
6200094	99	SPEED	SUR	52	-7	740	0	0	1.1	0.1	1.1
6200095	99	SPEED	SUR	53	-16	741	0	0	1.1	-0.0	1.1
62001	99	SPEED	SUR	45	-5	773	0	0	1.1	0.6	1.2
6200192	99	SPEED	SUR	40	-10	464	0	0	1.1	0.1	1.1
6200199	99	SPEED	SUR	40	-9	567	0	0	1.4	-0.7	1.6
6200200	99	SPEED	SUR	36	-8	562	0	0	1.2	0.1	1.2
62010	99	SPEED	SUR	55	7	1	0	0	0.0	1.5	1.5
6201030	99	SPEED	SUR	44	-4	689	0	0	1.3	-0.1	1.3
62023	99	SPEED	SUR	51	-8	368	0	0	1.5	-0.3	1.5
62029	99	SPEED	SUR	49	-12	1409	0	0	0.9	0.6	1.0
62050	99	SPEED	SUR	50	-4	784	0	0	1.0	0.4	1.1
62081	99	SPEED	SUR	51	-13	539	0	0	1.2	0.5	1.3
62091	99	SPEED	SUR	53	-5	565	0	0	1.3	0.2	1.3
62092	99	SPEED	SUR	51	-11	565	0	0	1.0	-0.0	1.0
62093	99	SPEED	SUR	55	-10	565	0	0	1.2	0.0	1.2
62094	99	SPEED	SUR	52	-7	564	0	0	1.1	0.1	1.1
62095	99	SPEED	SUR	53	-16	565	0	0	1.1	-0.2	1.2
62102	99	SPEED	SUR	58	2	788	0	0	1.8	-0.5	1.8
62103	99	SPEED	SUR	50	-3	760	0	0	1.3	0.9	1.6
62104	99	SPEED	SUR	57	1	788	0	0	1.2	0.1	1.2
62105	99	SPEED	SUR	55	-13	882	0	0	0.9	0.2	1.0
62107	99	SPEED	SUR	50	-6	1424	0	0	1.3	0.9	1.5
62112	99	SPEED	SUR	58	0	790	0	0	1.6	-0.4	1.7
62113	99	SPEED	SUR	58	0	788	0	0	1.9	0.6	2.0
62114	99	SPEED	SUR	58	0	1422	0	0	1.7	1.1	2.0
62118	99	SPEED	SUR	58	1	788	0	0	1.4	1.0	1.7
62119	99	SPEED	SUR	57	2	789	0	0	1.4	-0.2	1.5
62120	99	SPEED	SUR	56	2	788	0	0	1.3	0.3	1.3
62121	99	SPEED	SUR	54	3	350	0	0	1.1	-0.1	1.1
62122	99	SPEED	SUR	57	2	1422	0	0	1.1	0.3	1.2
62129	99	SPEED	SUR	58	0	788	0	0	1.6	0.5	1.6
62131	99	SPEED	SUR	54	1	788	0	0	1.9	-0.1	1.9
62132	99	SPEED	SUR	56	2	781	0	0	3.0	-2.3	3.8
62133	99	SPEED	SUR	57	1	788	0	0	1.5	0.6	1.6
62134	99	SPEED	SUR	58	1	789	0	0	1.7	0.4	1.7

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND SPEED (M/S) (CONTINU

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
62140	99	SPEED	SUR	57	1	1426	0	0	1.2	0.2	1.2
62143	99	SPEED	SUR	58	2	787	0	0	1.9	-0.5	2.0
62144	99	SPEED	SUR	53	2	790	0	0	2.0	-0.2	2.0
62145	99	SPEED	SUR	53	3	1397	0	0	1.7	0.7	1.9
62146	99	SPEED	SUR	57	2	788	0	0	1.2	0.3	1.3
62148	99	SPEED	SUR	54	2	790	0	0	1.6	0.1	1.6
62149	99	SPEED	SUR	54	1	765	0	0	2.0	-0.3	2.0
62150	99	SPEED	SUR	54	1	790	0	0	1.8	-0.3	1.8
62152	99	SPEED	SUR	57	2	789	0	0	1.2	-0.4	1.3
62153	99	SPEED	SUR	57	2	1423	0	0	2.0	-0.7	2.1
62154	99	SPEED	SUR	56	2	787	0	0	1.5	0.0	1.5
62155	99	SPEED	SUR	58	1	706	0	0	1.2	0.1	1.2
62163	99	SPEED	SUR	48	-8	773	0	0	1.0	0.3	1.0
62165	99	SPEED	SUR	54	1	752	0	0	1.5	-0.1	1.5
62305	99	SPEED	SUR	50	0	787	0	0	1.5	0.5	1.6
62442	99	SPEED	SUR	49	-16	335	0	0	1.1	-0.0	1.1
63055	99	SPEED	SUR	61	2	790	0	0	1.2	-0.6	1.4
63056	99	SPEED	SUR	60	2	788	0	0	1.5	0.3	1.5
63057	99	SPEED	SUR	59	2	783	0	0	1.7	0.5	1.8
63058	99	SPEED	SUR	53	2	1481	0	0	1.7	0.4	1.8
63101	99	SPEED	SUR	61	1	790	0	0	1.6	0.1	1.6
63103	99	SPEED	SUR	61	1	788	0	0	1.7	-0.1	1.7
63104	99	SPEED	SUR	61	2	787	0	0	1.6	0.1	1.6
63108	99	SPEED	SUR	61	2	790	0	0	1.7	0.2	1.7
63109	99	SPEED	SUR	60	2	763	0	0	1.5	0.5	1.5
63110	99	SPEED	SUR	60	2	787	0	0	1.5	0.2	1.6
63112	99	SPEED	SUR	61	1	790	0	0	1.5	-0.1	1.5
63113	99	SPEED	SUR	61	2	787	0	0	1.4	-0.0	1.4
63115	99	SPEED	SUR	62	1	790	0	0	1.4	0.0	1.4
63117	99	SPEED	SUR	61	1	1421	0	0	1.7	0.1	1.7
64041	99	SPEED	SUR	61	-3	783	0	0	1.5	0.3	1.6
64045	99	SPEED	SUR	59	-12	767	0	0	1.1	0.3	1.2
64046	99	SPEED	SUR	61	-4	781	1	0	1.0	0.4	1.1
66021	99	SPEED	SUR	55	14	721	0	0	1.7	0.7	1.8
66022	99	SPEED	SUR	54	14	979	0	0	1.2	0.3	1.2
66023	99	SPEED	SUR	55	11	796	0	0	1.5	1.2	1.9
66024	99	SPEED	SUR	55	13	689	0	0	1.2	0.7	1.4

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

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          DRIFTER MONITORING STATISTICS (EUCOS)
                   MONITORING CENTRE     : ECMWF
                   ELEMENT MONITORED     : WIND DIRECTION (DEGREES)
                   AREA                  : 10N - 90N, 70W - 40E
                   PERIOD                : JUL 2019
                   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
1300001	99	DIRN	SUR	11	-23	443	0	0	22.6	-3.9	23.0
1300002	99	DIRN	SUR	20	-23	688	0	0	7.7	-1.7	7.9
1300008	99	DIRN	SUR	15	-38	705	0	0	9.0	4.9	10.2
4100001	99	DIRN	SUR	35	-73	3530	0	0	24.0	8.3	25.4
4100002	99	DIRN	SUR	32	-75	3379	0	0	25.3	6.0	26.0
4100004	99	DIRN	SUR	33	-79	3383	0	0	19.3	3.0	19.5
4100008	99	DIRN	SUR	31	-81	599	0	0	22.5	-5.5	23.2
4100009	99	DIRN	SUR	29	-80	2591	0	0	20.7	6.0	21.6
4100010	99	DIRN	SUR	29	-78	2149	0	0	19.1	8.3	20.8
4100013	99	DIRN	SUR	33	-78	3544	0	0	17.8	3.5	18.2
4100024	99	DIRN	SUR	34	-78	614	0	0	23.2	-8.0	24.5
4100025	99	DIRN	SUR	35	-75	3724	0	0	18.2	7.0	19.5
4100026	99	DIRN	SUR	12	-38	247	0	0	14.5	8.2	16.6
4100029	99	DIRN	SUR	33	-80	556	0	0	27.3	-13.8	30.6
4100033	99	DIRN	SUR	32	-80	591	0	0	24.0	-16.0	28.9
4100037	99	DIRN	SUR	34	-77	613	0	0	18.2	-19.0	26.3
4100038	99	DIRN	SUR	34	-78	597	0	0	20.8	-8.5	22.5
4100040	99	DIRN	SUR	15	-53	4283	0	0	9.3	4.8	10.5
4100043	99	DIRN	SUR	21	-65	4280	0	0	10.9	-9.8	14.7
4100044	99	DIRN	SUR	22	-59	4314	0	0	9.7	1.6	9.8
4100046	99	DIRN	SUR	24	-68	2992	0	0	14.5	6.0	15.7
4100047	99	DIRN	SUR	28	-71	2491	0	0	13.5	-8.7	16.1
4100048	99	DIRN	SUR	32	-70	3329	0	0	16.6	6.8	18.0
4100049	99	DIRN	SUR	27	-63	2600	0	0	17.2	-0.5	17.2
4100052	99	DIRN	SUR	18	-65	4418	0	0	9.8	5.0	11.0
4100053	99	DIRN	SUR	18	-66	3643	0	0	12.2	2.9	12.5
4100056	99	DIRN	SUR	18	-65	4337	0	0	16.6	5.4	17.5
4100064	99	DIRN	SUR	34	-77	599	0	0	17.4	-24.5	30.0
41001	99	DIRN	SUR	35	-73	1015	0	0	19.9	7.0	21.1
4100139	99	DIRN	SUR	20	-38	672	0	0	8.5	2.2	8.8
41002	99	DIRN	SUR	32	-75	958	0	0	21.5	8.0	23.0
4100300	99	DIRN	SUR	16	-57	707	0	0	10.4	3.2	10.9

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
41004	99	DIRN	SUR	33	-79	1057	0	0	20.7	1.6	20.7
41008	99	DIRN	SUR	31	-81	610	0	0	22.3	-5.9	23.1
41009	99	DIRN	SUR	29	-80	733	0	0	20.0	2.2	20.2
41010	99	DIRN	SUR	29	-79	592	0	0	17.3	9.5	19.8
41013	99	DIRN	SUR	33	-78	1068	0	0	16.9	4.0	17.4
41024	99	DIRN	SUR	34	-79	614	0	0	23.5	-8.4	25.0
41025	99	DIRN	SUR	35	-75	1160	0	0	19.4	7.0	20.6
41026	99	DIRN	SUR	12	-38	243	0	0	13.8	8.2	16.1
41029	99	DIRN	SUR	33	-80	769	0	0	29.0	-13.3	31.9
41033	99	DIRN	SUR	32	-80	591	0	0	24.4	-16.9	29.6
41037	99	DIRN	SUR	34	-77	616	0	0	20.1	-19.1	27.8
41038	99	DIRN	SUR	34	-78	574	0	0	20.1	-8.6	21.8
41040	99	DIRN	SUR	15	-53	1269	0	0	10.6	6.3	12.3
41043	99	DIRN	SUR	21	-65	1222	0	0	10.6	-12.1	16.1
41044	99	DIRN	SUR	22	-59	1227	0	0	9.8	1.2	9.9
41046	99	DIRN	SUR	24	-68	1120	0	0	14.2	5.7	15.3
41047	99	DIRN	SUR	28	-72	710	0	0	13.6	-10.1	17.0
41048	99	DIRN	SUR	32	-70	946	0	0	17.3	6.9	18.6
41049	99	DIRN	SUR	28	-63	915	0	0	17.2	0.3	17.2
41052	99	DIRN	SUR	18	-65	1880	0	0	10.3	4.5	11.3
41053	99	DIRN	SUR	19	-66	1710	0	0	12.7	2.4	13.0
41056	99	DIRN	SUR	18	-66	1851	0	0	16.9	6.1	18.0
41064	99	DIRN	SUR	34	-77	595	0	0	18.7	-25.3	31.5
41300	99	DIRN	SUR	16	-57	706	0	0	10.0	3.3	10.6
4200013	99	DIRN	SUR	27	-83	793	0	0	21.6	-2.2	21.7
4200022	99	DIRN	SUR	28	-84	755	0	0	20.1	5.4	20.8
4200023	99	DIRN	SUR	26	-83	807	0	0	22.8	-4.4	23.2
4200026	99	DIRN	SUR	25	-83	350	0	0	19.8	10.8	22.6
4200036	99	DIRN	SUR	29	-85	2244	0	0	23.2	6.5	24.1
4200056	99	DIRN	SUR	20	-85	3930	0	0	16.4	5.0	17.2
4200057	99	DIRN	SUR	17	-81	4188	0	0	11.0	0.5	11.0
4200058	99	DIRN	SUR	15	-75	4328	0	0	4.8	3.9	6.2
4200059	99	DIRN	SUR	15	-67	4313	0	0	9.0	-4.7	10.1
4200060	99	DIRN	SUR	16	-63	248	0	0	8.4	3.2	9.0
4200085	99	DIRN	SUR	18	-67	1820	0	0	15.1	12.5	19.6
42013	99	DIRN	SUR	27	-83	753	0	0	21.3	-2.7	21.4
42022	99	DIRN	SUR	28	-84	697	0	0	20.5	4.9	21.0
42023	99	DIRN	SUR	26	-83	654	0	0	23.0	-4.5	23.4
42026	99	DIRN	SUR	25	-84	320	0	0	20.0	10.4	22.5
42036	99	DIRN	SUR	29	-85	874	0	0	24.3	8.2	25.7
42056	99	DIRN	SUR	20	-85	1093	0	0	15.3	4.5	15.9

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
42057	99	DIRN	SUR	17	-81	1262	0	0	11.8	2.6	12.1
42058	99	DIRN	SUR	15	-75	1321	0	0	5.8	1.5	6.0
42059	99	DIRN	SUR	15	-68	1310	0	0	8.7	-7.5	11.5
42060	99	DIRN	SUR	16	-63	123	0	0	7.9	-1.4	8.0
42085	99	DIRN	SUR	18	-67	1180	0	0	14.7	12.5	19.3
4400005	99	DIRN	SUR	43	-69	454	0	0	18.2	15.2	23.7
4400007	99	DIRN	SUR	44	-70	391	0	0	24.9	3.3	25.1
4400008	99	DIRN	SUR	41	-69	2828	0	0	19.3	13.5	23.6
4400009	99	DIRN	SUR	38	-75	502	0	0	17.2	11.3	20.6
4400011	99	DIRN	SUR	41	-67	2761	0	0	17.6	5.8	18.5
4400013	99	DIRN	SUR	42	-71	484	0	0	23.5	23.6	33.3
4400014	99	DIRN	SUR	37	-75	562	0	0	23.6	0.5	23.6
4400017	99	DIRN	SUR	41	-72	3112	0	0	16.5	5.2	17.3
4400018	99	DIRN	SUR	42	-70	483	0	0	23.2	16.9	28.7
4400020	99	DIRN	SUR	41	-70	1447	0	0	21.1	-0.2	21.1
4400022	99	DIRN	SUR	41	-74	271	0	0	26.7	5.2	27.2
4400025	99	DIRN	SUR	40	-73	527	0	0	16.3	0.7	16.3
4400027	99	DIRN	SUR	44	-67	404	0	0	19.6	11.2	22.6
4400029	99	DIRN	SUR	43	-71	446	0	0	19.9	9.4	22.0
4400030	99	DIRN	SUR	43	-70	421	0	0	20.8	9.6	22.9
4400032	99	DIRN	SUR	44	-69	387	0	0	22.4	10.2	24.6
4400033	99	DIRN	SUR	44	-69	325	0	0	30.9	5.6	31.4
4400034	99	DIRN	SUR	44	-68	311	0	0	22.1	11.8	25.0
4400037	99	DIRN	SUR	43	-68	309	0	0	20.3	9.0	22.2
4400040	99	DIRN	SUR	41	-74	298	0	0	38.8	4.4	39.1
4400042	99	DIRN	SUR	38	-76	2	0	0	14.0	-14.1	19.9
4400062	99	DIRN	SUR	39	-76	1593	0	0	31.6	-20.6	37.7
4400063	99	DIRN	SUR	39	-76	3364	0	0	30.8	-23.5	38.7
4400064	99	DIRN	SUR	37	-76	2461	0	0	28.8	-16.3	33.0
4400065	99	DIRN	SUR	40	-74	2979	0	0	17.6	7.4	19.1
4400066	99	DIRN	SUR	40	-73	3556	0	0	15.5	3.4	15.8
4400072	99	DIRN	SUR	37	-76	1443	0	0	24.4	-77.2	81.0
4400073	99	DIRN	SUR	43	-71	104	0	0	14.2	15.7	21.2
44005	99	DIRN	SUR	43	-69	449	0	0	18.3	15.0	23.7
44007	99	DIRN	SUR	44	-70	371	0	0	25.4	3.0	25.5
44008	99	DIRN	SUR	41	-69	969	0	0	20.3	11.8	23.5
44009	99	DIRN	SUR	39	-75	500	0	0	16.9	10.5	19.8
44011	99	DIRN	SUR	41	-67	984	0	0	18.4	7.2	19.8
44013	99	DIRN	SUR	42	-71	452	0	0	22.6	23.0	32.3
44014	99	DIRN	SUR	37	-75	575	0	0	23.5	0.4	23.5
44017	99	DIRN	SUR	41	-72	1056	0	0	15.0	5.6	16.0

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
44018	99	DIRN	SUR	42	-70	483	0	0	22.6	15.1	27.2
44020	99	DIRN	SUR	42	-70	769	0	0	23.3	-0.8	23.3
44022	99	DIRN	SUR	41	-74	102	0	0	23.6	7.0	24.6
44025	99	DIRN	SUR	40	-73	542	0	0	15.7	0.4	15.7
44027	99	DIRN	SUR	44	-67	403	0	0	19.8	9.7	22.1
44029	99	DIRN	SUR	43	-71	530	0	0	19.7	9.2	21.7
44030	99	DIRN	SUR	43	-70	396	0	0	21.9	10.6	24.3
44032	99	DIRN	SUR	44	-69	349	0	0	20.1	9.1	22.1
44033	99	DIRN	SUR	44	-69	286	0	0	28.5	3.8	28.7
44034	99	DIRN	SUR	44	-68	307	0	0	23.1	11.8	25.9
44037	99	DIRN	SUR	44	-68	308	0	0	20.2	9.3	22.2
44040	99	DIRN	SUR	41	-74	132	0	0	37.0	3.9	37.2
44042	99	DIRN	SUR	38	-76	2	0	0	9.0	-25.0	26.6
44062	99	DIRN	SUR	39	-76	618	0	0	34.6	-20.6	40.2
44063	99	DIRN	SUR	39	-76	777	0	0	33.9	-24.8	42.0
44064	99	DIRN	SUR	37	-76	755	0	0	27.4	-18.5	33.1
44065	99	DIRN	SUR	40	-74	871	0	0	18.1	4.0	18.6
44066	99	DIRN	SUR	40	-73	1284	0	0	16.2	1.0	16.2
44069	99	DIRN	SUR	41	-73	564	0	0	21.4	-1.9	21.5
44072	99	DIRN	SUR	37	-76	359	0	0	28.6	-78.5	83.5
44073	99	DIRN	SUR	43	-71	104	0	0	17.1	15.3	23.0
44139	99	DIRN	SUR	44	-57	577	0	0	15.5	-21.8	26.7
44150	99	DIRN	SUR	43	-64	499	0	0	18.3	2.8	18.5
44258	99	DIRN	SUR	45	-63	474	0	0	19.3	-4.7	19.9
4500003	99	DIRN	SUR	45	-83	443	0	0	27.8	12.2	30.3
4500005	99	DIRN	SUR	42	-82	2760	0	0	30.6	7.4	31.5
4500008	99	DIRN	SUR	44	-82	2582	0	0	21.6	11.3	24.4
4500012	99	DIRN	SUR	44	-77	2471	0	0	22.4	12.8	25.8
4500162	99	DIRN	SUR	45	-83	1118	0	0	21.0	6.8	22.1
4500163	99	DIRN	SUR	44	-84	1495	0	0	25.0	-1.2	25.1
4500165	99	DIRN	SUR	42	-83	2404	0	0	35.1	4.2	35.4
4500166	99	DIRN	SUR	45	-73	889	0	0	26.5	-46.6	53.7
4500169	99	DIRN	SUR	42	-82	2259	0	0	31.4	-15.7	35.1
4500175	99	DIRN	SUR	46	-85	2119	0	0	78.2	-35.7	85.9
4500176	99	DIRN	SUR	42	-82	596	0	0	78.7	-48.8	92.6
4500178	99	DIRN	SUR	45	-73	198	0	0	27.5	-12.8	30.4
4500188	99	DIRN	SUR	44	-73	6	0	0	8.2	18.2	19.9
45003	99	DIRN	SUR	45	-83	417	0	0	29.3	11.2	31.3
45005	99	DIRN	SUR	42	-82	828	0	0	32.8	9.6	34.2
45008	99	DIRN	SUR	44	-82	968	0	0	19.9	9.2	21.9
45012	99	DIRN	SUR	44	-77	806	0	0	23.4	7.0	24.4

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
45132	99	DIRN	SUR	43	-81	459	0	0	23.3	2.7	23.4
45135	99	DIRN	SUR	44	-77	447	0	0	22.7	6.9	23.7
45137	99	DIRN	SUR	46	-81	548	0	0	16.0	0.1	16.0
45138	99	DIRN	SUR	50	-66	501	0	0	25.9	2.5	26.0
45139	99	DIRN	SUR	43	-80	7	0	0	14.8	-6.8	16.3
45142	99	DIRN	SUR	43	-79	442	0	0	21.2	-3.4	21.4
45143	99	DIRN	SUR	45	-81	406	0	0	21.7	4.5	22.1
45147	99	DIRN	SUR	42	-83	385	0	0	26.3	5.0	26.8
45149	99	DIRN	SUR	44	-82	433	0	0	22.2	23.1	32.0
45151	99	DIRN	SUR	45	-79	345	0	0	20.3	-0.5	20.3
45152	99	DIRN	SUR	46	-80	400	0	0	21.5	0.8	21.5
45154	99	DIRN	SUR	46	-83	432	0	0	25.2	3.6	25.5
45159	99	DIRN	SUR	44	-79	243	0	0	26.9	4.2	27.2
45162	99	DIRN	SUR	45	-83	445	0	0	20.8	5.6	21.5
45163	99	DIRN	SUR	44	-84	608	0	0	23.9	-1.1	23.9
45165	99	DIRN	SUR	42	-83	570	0	0	35.1	2.0	35.1
45166	99	DIRN	SUR	45	-73	316	0	0	27.6	-47.1	54.6
45169	99	DIRN	SUR	42	-82	569	0	0	29.3	-16.7	33.7
45175	99	DIRN	SUR	46	-85	501	0	0	78.8	-42.9	89.8
45176	99	DIRN	SUR	42	-82	237	0	0	80.1	-59.8	99.9
45178	99	DIRN	SUR	45	-73	197	0	0	30.6	-16.0	34.5
45188	99	DIRN	SUR	44	-73	50	0	0	29.7	11.3	31.8
6100198	99	DIRN	SUR	37	-2	465	0	0	23.7	2.5	23.8
6100281	99	DIRN	SUR	40	0	245	0	0	40.6	-8.0	41.4
6100417	99	DIRN	SUR	38	0	509	0	0	18.6	2.3	18.8
6200024	99	DIRN	SUR	44	-3	422	0	0	21.7	10.1	23.9
6200025	99	DIRN	SUR	44	-6	368	0	0	14.9	1.0	15.0
6200082	99	DIRN	SUR	44	-8	529	0	0	14.9	10.5	18.2
6200083	99	DIRN	SUR	43	-9	549	0	0	14.7	0.9	14.7
6200084	99	DIRN	SUR	42	-9	537	0	0	10.2	-2.5	10.5
6200085	99	DIRN	SUR	36	-7	397	0	0	20.7	3.2	21.0
6200091	99	DIRN	SUR	53	-5	452	0	0	14.3	3.1	14.6
6200092	99	DIRN	SUR	51	-11	657	0	0	13.0	6.1	14.3
6200093	99	DIRN	SUR	55	-10	645	0	0	13.1	3.2	13.5
6200094	99	DIRN	SUR	52	-7	593	0	0	11.4	-3.5	12.0
6200095	99	DIRN	SUR	53	-16	611	0	0	12.2	3.5	12.6
62001	99	DIRN	SUR	45	-5	548	0	0	15.5	3.7	15.9
6200192	99	DIRN	SUR	40	-10	401	0	0	13.0	-3.5	13.5
6200199	99	DIRN	SUR	40	-9	395	0	0	14.7	-1.7	14.8
6200200	99	DIRN	SUR	36	-8	452	0	0	13.4	2.9	13.7
6201030	99	DIRN	SUR	44	-4	368	0	0	22.2	-2.4	22.3

DRIFTER MONITORING STATISTICS (EUCOS)
MONITORING CENTRE : ECMWF
ELEMENT MONITORED : WIND DIRECTION (DEGREES)
(CONTINUED)

WMO IDENT	OBS TIME	ELM	LEVEL	MEAN LAT	MEAN LONG	NUM OBS	NUM GROSS	% GROSS	SD	BIAS	RMS
62023	99	DIRN	SUR	51	-8	341	0	0	12.0	10.7	16.1
62029	99	DIRN	SUR	49	-12	1251	0	0	11.0	7.7	13.4
62050	99	DIRN	SUR	50	-4	606	0	0	13.3	0.8	13.3
62081	99	DIRN	SUR	51	-13	450	0	0	13.2	5.5	14.3
62091	99	DIRN	SUR	53	-5	444	0	0	14.1	2.7	14.3
62092	99	DIRN	SUR	51	-11	497	0	0	13.2	6.2	14.6
62093	99	DIRN	SUR	55	-10	501	0	0	13.6	3.7	14.1
62094	99	DIRN	SUR	52	-7	477	0	0	11.9	-4.2	12.6
62095	99	DIRN	SUR	53	-16	492	0	0	12.4	2.9	12.8
62103	99	DIRN	SUR	50	-3	622	0	0	21.1	7.8	22.5
62105	99	DIRN	SUR	55	-13	757	0	0	11.6	7.7	13.9
62107	99	DIRN	SUR	50	-6	1220	0	0	16.6	2.3	16.8
62112	99	DIRN	SUR	58	0	706	0	0	12.9	-3.0	13.2
62114	99	DIRN	SUR	58	0	1336	0	0	13.6	-4.0	14.2
62163	99	DIRN	SUR	48	-8	687	0	0	11.4	-0.6	11.4
62305	99	DIRN	SUR	50	0	614	0	0	18.7	7.9	20.3
62442	99	DIRN	SUR	49	-16	300	0	0	12.3	1.2	12.3
64041	99	DIRN	SUR	61	-3	673	0	0	13.3	3.8	13.9
64045	99	DIRN	SUR	59	-12	633	0	0	13.8	6.7	15.3
64046	99	DIRN	SUR	61	-4	655	1	0	19.4	2.2	19.5

4.12 Table 24 - List of Assimilated BUFR Encoded Radiosonde Stations

ASDE09	FHM5UJH	FPUW5GN	HTXUH4H	JNKN7JF	KJJF9XN	KMPLHPW	WDK38HS	XKQLWQB
XQFJRGX	YLV96WM	ZVQEQCM	5QPW8XG	7JUNA4N	01001	01004	01010	01028
01241	01400	01415	01492	02185	02365	02527	02591	02836
02963	03005	03238	03354	03502	03743	03808	03882	03918
03953	04018	04220	04270	04320	04339	04360	06011	06060
06260	06458	06610	07110	07145	07510	07645	07761	08001
08023	08190	08221	08302	08383	08430	08508	08522	08579
10035	10113	10184	10238	10304	10393	10410	10548	10618
10739	10771	10868	10954	10962	11010	11035	11120	11240
11520	11747	11952	12120	12374	12425	12843	12982	13275
13388	14015	14240	14430	15420	15614	16045	16080	16113
16144	16245	16320	16429	16546	16622	16716	16754	17030
17064	17095	17130	17220	17240	17281	17516	17607	22008
23205	23472	23884	26038	26435	27707	27713	29612	33008
33041	37789	40179	40186	43599	45004	47102	47104	47138
47155	47169	47186	47401	47412	47418	47582	47600	47646
47678	47741	47778	47807	47827	47909	47918	47945	47971
47991	48698	60018	60155	60390	60571	60630	60656	60680
61901	61980	61998	67083	68263	68424	68442	68538	68816
68842	70026	70133	70200	70219	70231	70261	70308	70316
70326	70350	70361	70398	71043	71081	71082	71109	71119
71600	71603	71722	71802	71811	71815	71816	71823	71836
71845	71867	71906	71907	71908	71909	71913	71917	71924
71925	71926	71934	71945	71957	71964	72201	72206	72208
72210	72214	72215	72230	72233	72235	72240	72248	72249
72250	72251	72261	72265	72274	72293	72317	72327	72340
72363	72364	72365	72376	72388	72426	72440	72451	72476
72489	72493	72501	72518	72520	72528	72558	72562	72572
72582	72597	72632	72634	72645	72649	72659	72662	72672
72694	72712	72747	72764	72768	72776	72786	72797	73033
74389	74494	74560	76225	76405	76458	76526	76612	76679
76692	76743	76805	76903	78897	78954	81405	82397	82983
85442	85469	85586	85799	85934	87155	87344	87418	87576
87623	87715	87860	88889	89002	89062	89564	89571	89611
89625	89642	89859	91212	91285	91592	91765	91925	91938
91948	91958	93112	93417	93817	93844	93997	94120	94150
94170	94203	94294	94299	94302	94312	94326	94332	94374
94403	94461	94510	94578	94610	94637	94638	94653	94659
94672	94711	94767	94776	94802	94821	94866	94910	94975
94995	94996	94998	95527	96996				

4.13 Table 25 - List of BUFR Encoded Radiosonde Stations with no TAC Counterpart

ASDE09	FHM5UJH	FPUW5GN	HTXUH4H	JNKN7JF	KJJF9XN	KMPLHPW	WDK38HS	XKQLWQB
XQFJRGX	YLV96WM	ZVQEQCM	5QPW8XG	7JUNA4N	01001	01010	01028	01241
01400	01415	01492	02836	02963	06610	07110	07145	07510
07645	07761	17607	40186	47155	73033	76743	76903	89642
94653	94767							

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.

Table 24 shows list of Assimilated BUFR Encoded Radiosonde Stations monitored within the month.

Table 25 shows list of BUFR Encoded Radiosonde Stations with no TAC Counterpart monitored within the month.