EUMETNET Observations Programme Management

Third Quarterly Quality Monitoring Report Q3 2016

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For submission to: *EUMETNET Members*

Summary: This document intends to give an overview of the performance of the EUMETNET Composite Observing System (EUCOS) during the period 1st July till 30th September 2016.

Action required: *for information and comment*

Distribution: *restricted*

Reference	Date	Author(s)	Content
ObsPMT/REP/2016-004_QM	18th November 2016	Tanja Kleinert	Quarterly QM Report Q3 2016

CONTENT

Please note: *This quarterly report bases on the information being provided in the EUCOS Quality Monitoring Portal https://eucos.dwd.de. Observations are taken into account within the EUCOS area only. The performance statistics base on monthly targets.* ***The quarterly performances are calculated as arithmetic averages of the monthly averaged performances.*** *Timeliness is calculated as time delay between nominal observation time and the storage date in DWDs' database.* ***Differences between EUCOS monitoring and other monitoring statistics may occur due to the fact that no outliers filtering takes place to be able to identify problems and correct them at source (data provider) if possible. Thus it might happen that EUCOS monitoring statistics are worse compared to others, e.g. O-B results of VAD wind data from weather radars (E-PROFILE).***

Since Q3 2015 the monitoring statistics of surface land stations consider BUFR data regarding data availability and timeliness wherever available. Only for those stations which haven´t provided BUFR data yet FM12 SYNOP messages have been considered. ***The monitoring statistics of radiosonde stations, E-ASAP units as well as of E-SURFMAR VOS ships, drifting and moored buoys consider BUFR data regarding data availability and timeliness wherever available starting with the Q2 2016 QM report as well.***

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1. EUCOS performance summary

1.1 Data availability and timeliness

Q3 2016 Network	Data availability	Timeliness HH+50 (Radiosondes: TEMP AB)	Timeliness HH+100 (Radiosondes: TEMP CD)	Achieving 100 hPa	Achieving 50 hPa	Individual targets subprogrammes
Territorial networks						
Surface stations (Monitoring of BUFR data)	**Target: 95%** **94.7%** ⇨	**Target: 90%** **99.6%** ⇨	**Target: 95%** **99.8%** ⇨	---	---	---
Radiosonde stations (Monitoring of BUFR data)	**Target: 95%** **84.0%** ⇩	**Target: 75%** **88.6%** ⇧	**Target: 95%** **96.0%** ⇧	**Target: 97%** **98.3%** ⇨	**Target: 95%** **95.8%** ⇧	---
E-AMDAR						
AMDAR aircraft	**Annual target:** **11 Mio. obs** **4.0 Mio. obs** **(equals 36%)** **EUMETNET funded observations incl. humidity obs.**	**Target: 90%** **93.4%** ⇧	**Target: 95%** **98.9%** ⇧	---	---	***Profile distribution*** **daily profiles** **Target: 718** **1270** ⇧ **daily airports** **Target: 129** **204** ⇧
E-ASAP						
ASAP units (Monitoring of BUFR data)	**Annual target:** **4,300 obs** **3277 obs** **(equals 76%)**	**Target: 75%** **91.0%** ⇩	**Target: 95%** **87.8%** ⇩	**Target: 90%** **91.9%** ⇩	**Target: 75%** **83.5%** ⇩	---
E-GVAP		**Timeliness HH+90**				
at least one ZTD timely	**Target: 85%**	**Target: 85%**		-	-	-
Super sites	82.0%	96.8%				
All sites/Acs	76.5%	96.7%				
E-PROFILE		**Timeliness HH+60**				
Wind profilers (WP)	**Target: 85%**	**Target: 85%**		---	---	---
Total WP network	80.1% ⇧	**99.1%** ⇨				
23 operational WP	90.7% ⇧	99.9% ⇨				
8 non-operational WP **	45.6% ⇨	94.5% ⇩				
Weather radars (WRWP)	**No target defined***	**Target: 85%**		---	---	---
Total WRWP network	**75.9%** ⇧	**100.0%** ⇨				
59 operational WRWP	79.7% ⇧	100.0% ⇨				
60 non-operational WRWP	71.6% ⇧	100.0% ⇨				
E-SURFMAR	*Only E-SURFMAR observations in the EUCOS area are taken into account.*					
Moored buoys (Monitoring of BUFR data)	**Target: 90%** **95.5%** ⇧	**Target: 90%** **92.2%** ⇩	**Target: 95%** **97.9%** ⇩	---	---	---
Drifting buoys (Monitoring of BUFR data)	**Target: 88%** **98.2%** ⇧	**Target: 90%** **97.1%** ⇧	**Target: 95%** **99.4%** ⇧	---	---	---
Automated VOS ships (Monitoring of BUFR data)	**Daily avg target:** **2,000 obs** **2,126 obs** **(equals 106%)** ⇧	**Target: 90%** **92.7%** ⇨	**Target: 95%** **97.0%** ⇧	---	---	---
Conventional VOS ships (Monitoring of BUFR data)	**Daily avg target:** **250 obs** **182 obs** **(equals 73%)** ⇨	**Target: 90%** **80.5%** ⇨	**Target: 95%** **92.6%** ⇧	---	---	---
OPERA						
Incoming data (ICD)	**Target: 95%** **93.4%** ⇩	**Timeliness HH+08** **Target: 90%** **95.7%** ⇨	**Timeliness HH+10** **Target: 95%** **97.6%** ⇨	---	---	---
Pre-processed data (PPD)	**Target: 95%** **92.5%** ⇩	---	---	---	---	---
Composite products	**Target: 95%** **99.9%** ⇨	**Timeliness HH+20** **Target: 95%** **99.8%** ⇨		---	---	---

*: Several WRWP systems only provide data if hydrometeors are detected. Therefore no target on data availability is defined.
**: Only 4 out of 8 non-operational WP provided data within the period.

performance in comparison to previous quarter:
up ⇧
down ⇩
stable (<1% range) ⇨

target achieved
<10% below target
=>10% below target

Table 1: Performance summary of data availability and timeliness, Q3 2016

A summary of the network performances of the EUCOS network in the third quarter 2016 is given in Tables 1 and 2. Most of the network targets have been achieved in Q3 2016. Several performances decreased compared to the previous quarter but rarely led to an underperformance regarding the targets. The E-AMDAR fleet, operational E-PROFILE wind profiler (WP) network and E-PROFILE weather radar wind profiler (WRWP) network, E-SURFMAR

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automated VOS and drifting buoy and moored buoy fleets, OPERA providing composite products showed excellent performances throughout the period achieving all EUCOS targets.

The surface land station network performed slightly below the data availability target of 95% in Q3 2016 due to data outages of several stations operated by different countries within the period.

The radiosonde land station network achieved all targets besides the data availability target requesting 2 soundings per day from EUCOS radiosonde stations in Q3 2016 which in general cannot be achieved by all members due to national constraints.

The E-ASAP fleet met all targets besides the timeliness target transmitting high resolution BUFR data of the entire sounding within HH+100 due to issues with Iridium transmission in Q3 2016 again.

E-GVAP GNSS sites and super sites performed slightly below the target providing at least on ZTD per hour within the required time period HH+90 but achieved the target transmitting GNSS ZTD data in 90 min in 85%.

The conventional VOS ship fleet performed below all targets but showed a slightly improving trend in timeliness performance receiving data within HH+100 minutes.

OPERA performed slightly below the data availability target of incoming and pre-processed data mainly due to issues with radar data provision of a few national operators. OPERA composite products showed excellent performances throughout the period meeting data availability and timeliness targets.

1.2 Comparing observations against NWP model output of ECMWF

Q3 2016 Network	Temperature RMSE	Wind Mean Vector Difference RMSE	Specific Humidity Error dq/q*	O-B- Geopotential Height Difference	Pressure RMSE	Sea Surface Temperature	Individual targets subprogrammes
Territorial networks							
Surface stations	**Target: 1 K** ⇨ **1.79 K**	**Target: 5.0 m/s** ⇨ **2.49 m/s**	**Target: 10%** ⇩ **8.39%**	---	**Target: 1 hPa** ⇨ **0.58 hPa**	---	---
Radiosonde stations	**Target: 1 K** ⇨ **0.94 K**	**Target: 5.0 m/s** ⇧ **3.23 m/s**	**Target: 10%** ⇧ **6.01%** **10.28%** ⇧ **RH RMSE**	**Target: 65 m** currently not available	---	---	---
E-AMDAR							
AMDAR aircraft	**Target: 1.5 K** ⇨ **1.00 K**	**Target: 5.0 m/s** ⇧ **3.20 m/s**	**(dq/q* Target: 10%)** **13.60%** ⇧ **RH RMSE**	---	---	---	---
E-ASAP							
ASAP units	**Target: 1 K** ⇨ **1.35 K**	**Target: 5.0 m/s** ⇧ **3.68 m/s**	**Target: 10%** ⇧ **7.96%** **12.50%** ⇧ **RH RMSE**	**Target: 65 m** currently not available	---	---	---
E-GVAP							
GNSS sites-AC 212 super sites in Q3 2016 7166 sites in Q3 2016	---	---	---	---	---	---	**NRT ZTD accuracy** **|avg OmB in mm|** **Target: 15 mm** **11.25 mm** **12.58 mm** ⇩
E-PROFILE							
Wind profilers (WP) **Total WP network** 23 operational WP 6 non-operational WP *	---	**Target: 5.0 m/s** **3.55 m/s** 3.44 m/s ⇧ 4.25 m/s ⇩	---	---	---	---	---
Weather radars (WRWP) **Total WRWP network** 59 operational WRWP 60 non-operational WRWP	---	**Target: 5.0 m/s** **5.86 m/s** 4.20 m/s ⇩ 7.24 m/s ⇩	---	---	---	---	---
E-SURFMAR							
Moored buoys (only 62095, 64045)	**Target: 1 K** ⇧ **0.47 K**	**Target: 5.0 m/s** ⇩ **2.27 m/s**	**Target: 10%** ⇧ **4.87%**	---	**Target: 1 hPa** ⇩ **1.00 hPa**	**Target: 1 K** not provided yet	**Wave direction** **Target: 20°**
Drifting buoys	---	---	---	---	**Target: 1 hPa** ⇨ **0.60 hPa**	**Target: 1 K** not provided yet	---
VOS ships Automated Conventional	**Target: 2 K** **1.14 K** ⇨ **1.47 K** ⇧	**Target: 5.0 m/s** **3.10 m/s** ⇧ **3.80 m/s** ⇧	**Target: 15%** **5.23%** ⇧ **7.76%** ⇧	---	**Target: 1 hPa** **0.63 hPa** ⇨ **1.07 hPa** ⇨	**Target: 1 K** not provided yet	---

EUCOS target achieved
within WMO target
below WMO target

performance in comparison to previous quarter:
up ⇧
down ⇩
stable (< 0.1 range) ⇨

*: Only 2 out of 6 non-operational WPs provided data within the period.

Table 2: Performance summary of ECMWF NWP comparison results, Q3 2016

The majority of the EUCOS networks met accuracy targets in Q3 2016 and the performances of most of the networks slightly increased compared to the previous quarter. As usual the surface land station network showed a larger temperature RMSE than 1K within the period and the situation remained stable compared to the previous quarter. The E-ASAP fleet slightly exceeded the target on temperature RMSE of 1K again. The non-operational weather radars providing vertical wind profile data didn´t achieve the target on WIND RMSVD within the period (*Please note: differences between EUCOS monitoring and other monitoring statistics may occur due to the fact that no outlier filtering takes place to be able to identify problems and correct them at source (data provider) if possible. Thus it might happen that EUCOS monitoring statistics are worse compared to others*).

The conventional VOS ships exceeded the target on pressure RMSE in Q3 2016 again. Irish moored buoy 62095 showed large pressure RMSE in Q3 2016 exceeding the WMO target of 1 hPa leading to an overall large RMSE for the moored buoy network in Q3 2016 of 1.0 hPa.

The results of humidity RMSE of humidity sensor equipped E-AMDAR aircraft slightly improved compared to the previous quarter (RH RMSE Q3 2016: 13.6%). The quality of humidity data measured on board of aircraft is within the range of the quality of humidity data measured by radiosondes launched from land stations (RH RMSE performance Q3 2016: 10.28%) and measured by radiosondes launched from E-ASAP ships (RH RMSE Q3 2016: 12.50%).

2. Extraordinary problems within the Q3 2016

8 fault reports were raised within the third quarter of 2016. The following faults have been identified (status: green = resolved, red = ongoing):

- OBS_FR_184 – E-AMDAR: LSY communication systems issues 24-25th July. (raised 25.07.16, closed 01.08.16).
- OBS_FR_185 – Surface land stations: Austrian SYNOP station Sonnblick 11146 showed large T O-B results since 21th June 2016 (raised 25.07.16, closed 01.08.16).
- OBS_FR_186 – E-AMDAR: EU1426 position report error. (raised 03.08.16, closed 04.08.16).
- OBS_FR_187 – E-AMDAR: EU0016 Aircraft reporting ENR every 1min – not 15min as configured. (raised 09.08.16).
- OBS_FR_188 – E-AMDAR: EU6444 Aircraft reporting warm bias > 4K. (raised 09.09.16).
- OBS_FR_189 – E-AMDAR: E-ADOS data issues: no OUT-messages are received in EADOS from 30.08.16 till 07.09.16. (raised 09.09.16, closed 12.09.16).
- OBS_FR_190 – E-AMDAR: EU2450 position report error. (raised 12.09.16).
- OBS_FR_191 – Radiosonde stations: radiosonde station Egilsstadir 04089 hasn´t launched any soundings in September (winter season 2016/2017) due to technical issues. (raised 28.09.16).

The following fault reports raised in previous quarters were closed in Q3 2016:

- OBS_FR_154 – Surface land stations: Several Belgian BUFR SYNOP data are sent in 2 different BUFR templates (raised 11.02.16, solved 30.09.16).
- OBS_FR_180 – E-PROFILE: WP Cheb 11406 stopped reporting data on 18.05.16, 13 UTC. (raised 30.06.16, 30.08.16 12 UTC).
- OBS_FR_181 – E-PROFILE: No VAD data from UK and Italian WRWP displayed in EUCOS QMP and ECMWF O-B results since mid-May 2016. (raised 27.06.16, solved 15.09.16 for UK data).

The following fault reports raised in previous quarters are still open:

- OBS_FR_139 - E-AMDAR: BAW B747 reporting “zero” values for lat.lon (raised 27.10.2015).
- OBS_FR_148 - E-AMDAR: EU6626 reporting warm bias (raised 21.12.2015).
- OBS_FR_150 – Surface land stations: No SYNOP data of 04211 Mittarfik Upernavik available since 18.12.2015 due to a severe damage during a storm on 20th November 2015 damaging the temperature and humidity measurement. Due to the specific station setup it was not possible to exclude the ensuring erroneous temperature and humidity values (constant temperature = -60 ° C) from the bulletin and so DMI has all together stopped the dissemination of the bulletins from the station (raised 21.12.2015).

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- OBS_FR_152 – Radiosonde stations: Differences in TEMP and BUFR data of French radiosonde soundings - French TEMP and BUFR data sometimes are not compliant at several standard levels such as 100 hPa (raised 21.01.16).
- OBS_FR_153 – Surface land stations: Belgian BUFR SYNOP data show encoding errors for example in cloud cover (raised 29.01.16).
- OBS_FR_155 – Surface land stations: Incorrect temperature and dew-point values of PORTO TORRES, 16504 (raised 11.02.16).
- OBS_FR_156 – Surface land stations: Finnish BUFR SYNOP don´t provide metadata information on 'type of station' (raised 04.02.16) – still the case for several stations (e.g. 02701, 04.08.2016, 01 UTC)
- OBS_FR_158 – Surface land stations: Some BUFR synops from Italy (in Edition 4) contain a wrong encoded year in Section 1 (raised 11.02.16).
- OBS_FR_171 – E-AMDAR: EU0225, EU0217 (and occasionally EU0223, EU0227) reporting incorrect phase of flights. This is resulting in gross errors in the monitoring statistics. (raised 09.05.16).
- OBS_FR_175 – Surface land stations: Danish BUFR SYNOP data don´t contain 'Total sunshine' and 'Global solar radiation'. (raised 31.05.16).
- OBS_FR_176 – Surface land stations: Belgian BUFR SYNOP data report solid precipitation instead of fog. (raised 14.06.16).
- OBS_FR_177 – Surface land stations: Slovenian BUFR SYNOP data don´t contain 'Vertical significance' 0 08 002 for sequence < 3 02 005 > and descriptor 0 20 014 'Height of top of clouds above mean sea level' in case of clouds below station level. (raised 14.06.16).
- OBS_FR_179 – E-AMDAR: NCEP monitoring routines showing rate of climb exceeding aircraft capabilities. (raised 24.06.16).
- OBS_FR_181 – E-PROFILE: No VAD data from UK and Italian WRWP displayed in EUCOS QMP and ECMWF O-B results since mid-May 2016. (raised 27.06.16).
- OBS_FR_182 – Surface land stations: Swedish SYNOP station Gaddede 02219 showed large RH O-B results since 26th June 2016 (raised 12.07.16).
- Several fault reports concerning warm biases of E-AMDAR aircraft are still ongoing.

Details regarding the above mentioned fault reports and others, e.g. still ongoing fault reports of previous quarters are available in the frequently updated fault log chaser in the EUMETNET Portal (group *OBS Programme - Procedures and technical regulations*).

3. Network changes within Q3 2016 or in near future

- *Radiosonde stations:*
  Finnish sounding station Jyvaskyla Tikkakoski (02935) will be shut down end of 2016. The last sounding from Tikkakoski will be launched on 31st December at 18.00 UTC. FMI will start launching 4 PTU soundings / day in Jokioinen (02963) from the 1st December 2016 on.

4. Communication of issues

- *OPERA:*
  Den Helder radar will be replaced with a new dual – pol radar after the 26th September 2016. It is estimated Den Helder being offline from the ODC for up to 8 weeks until the new radar is built and ready to go operational.
  On 14th November 2016, radar Hudiksvall will be taken down for an upgrade. Data delivery to Odyssey shall be resumed on 12th December 2016.
  Hungarian weather radar HABP_43 Napar is currently upgraded. No incoming radar data have been provided to Odyssey since 24.10.2016, 10 UTC

5. BUFR migration

EUCOS surface land station network

No changes within the period. 3 EUCOS stations do not provide BUFR data yet:
13457 Tivat, 13462 Podgorica-Golubovci (both Montenegro), 16597 Luqa (Malta).

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Stop of FM12 SYNOP TAC distribution
Already reported in previous QM reports: AEMET, DWD, KNMI, Met Éireann, OMSZ and UKMO stopped distributing FM12 SYNOP data via GTS. The Cyprus Department of Meteorology terminated the simultaneous broadcast of TAC & TDCF bulletins after 30th September 2016.
New: ---
(see also ECMWFs' TAC2BUFR wiki page: https://software.ecmwf.int/wiki/display/TCBUF/SYNOP)

EUCOS radiosonde station network

The only remaining EUCOS station which doesn´t provide BUFR data yet is 26435 Skriveri (Latvia).
04018 Keflavik (Iceland) started distributing BUFR data converted from TEMP parts A-D with 28.09.16, 12 UTC sounding. Unfortunately the distribution of 4 BUFR messages is not WMO compliant and should be corrected as soon as possible. 04089 Egilsstadir will start distributing BUFR messages as soon as the technical problems at the site have been resolved (see fault report Obs_FR_191).

Besides Keflavik data of all Polish radiosonde data have been still converted from TEMPs into 4 BUFR messages within the period. The situation improved beginning of November 2016 when all 3 Polish radiosonde stations started to report high resolution BUFR radiosonde data transmitting 2 BUFR messages per sounding as required by WMO.

Stop of FM35 TEMP TAC distribution
Already reported in previous QM reports: KNMI stopped distributing FM35 TEMP data via GTS. AEMET stopped distributing FM35 TEMP data via GTS on 19th January 2016. The Cyprus Department of Meteorology terminated the simultaneous broadcast of TAC & TDCF bulletins after 30th September 2016.
New: Météo France announced to terminate TAC FM35 TEMP distribution via GTS on 01st November 2016.

(see also ECMWFs' TAC2BUFR wiki page: https://software.ecmwf.int/wiki/display/TCBUF/TEMP)

E-SURFMAR VOS ships and buoys

E-SURFMAR reports on the progress in migration of buoy and ship data to BUFR/TDCF on ECMWFs TAC2BUFR wiki site (https://software.ecmwf.int/wiki/display/TCBUF/E-SURFMAR).

Stop of FM18 BUOY TAC distribution
New: E-SURFMAR postponed the cessation of drifting buoys FM18 BUOY data ingestion to GTS on request of several users to 3rd November 2016.

(see also ECMWFs' TAC2BUFR wiki page: https://software.ecmwf.int/wiki/display/TCBUF/E-SURFMAR)

E-ASAP fleet

Migration to BUFR completed.

Stop of FM36 TEMP SHIP TAC distribution
Already reported in previous QM reports: E-ASAP, DWD, AEMET stopped distributing FM36 TEMPSHIP data via GTS. DMI ceased ASAP FM36 TEMPSHIP data ingestion to GTS for ASDK01, ASDK02 and ASDK03 on 11th May 2016.
New: Météo France announced to terminate TAC FM36 TEMPSHIP distribution via GTS on 01st November 2016.

(see also ECMWFs' TAC2BUFR wiki pages: https://software.ecmwf.int/wiki/display/TCBUF/E-ASAP and https://software.ecmwf.int/wiki/display/TCBUF/SHIP+and+TEMP+SHIP)

E-AMDAR fleet

Migration to WIGOS BUFR template completed (Dez 2014).

6. Quarterly performances of EUMETNETs Composite Observing System EUCOS

The following performances are compared to the targets agreed in the EUCOS Performance Standards (see EUMETNET Portal, group *OBS Programme - Procedures and technical regulations*). The performances are coloured green if the target has been achieved and coloured red if the network performed below the target.

In this chapter the performances of the EUMETNET Composite Observing System EUCOS in Q3 2016 are summarized by country. In chapter 7 the performances of EUMETNET operated networks are described in more detail whilst the performances of stations or sites **operated by NMHSes** are described in chapter 8.

6.1 EUCOS surface land station network

Requirement: data availability hourly or 3-hourly observations (according to notification by NMHS), timeliness HH+50 or HH+100 the latest – delay of decoding date in DWDs database compared to nominated observation time.

The monitoring statistics in this report consider BUFR data of surface land stations regarding data availability and timeliness wherever available. Only for those stations which haven´t provided BUFR data yet FM12 SYNOP messages have been considered (see chapter 5).

Overview surface land stations - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE
Austria	4,840	92.5%	99.8%	99.9%	2.9K	3.0m/s	11.8%	0.5hPa
Belgium	6,085	91.9%	99.9%	100.0%	1.1K	1.8m/s	9.3%	0.5hPa
Croatia	7,858	99.7%	99.7%	99.9%	1.9K	2.2m/s	7.4%	0.7hPa
Cyprus	3,660	99.7%	99.7%	99.8%	2.0K	2.5m/s	8.5%	0.9hPa
Czech Republic	8,771	99.3%	100.0%	100.0%	1.6K	2.0m/s	6.6%	0.4hPa
Denmark	39,573	90.5%	99.8%	100.0%	3.3K	2.8m/s	12.9%	0.5hPa
Estonia	6,624	100.0%	99.9%	100.0%	1.2K	2.1m/s	5.1%	0.5hPa
Finland	39,012	98.4%	99.9%	99.9%	1.5K	1.7m/s	5.7%	0.4hPa
France	50,418	99.3%	99.5%	99.6%	1.5K	2.0m/s	5.7%	0.5hPa
FYROM	708	96.2%	100.0%	100.0%	1.8K	2.6m/s	7.0%	0.6hPa
Germany	33,120	100.0%	99.9%	100.0%	1.5K	2.2m/s	5.7%	0.4hPa
Greece	4,680	70.2%	97.9%	98.9%	1.7K	2.6m/s	7.4%	0.8hPa
Hungary	8,832	100.0%	99.8%	99.9%	1.7K	1.8m/s	6.0%	0.4hPa
Iceland	3,466	94.2%	99.4%	99.9%	1.5K	3.0m/s	8.2%	0.5hPa
Ireland	13,225	99.8%	100.0%	100.0%	0.9K	2.1m/s	5.1%	0.4hPa
Italy	46,280	97.4%	98.6%	99.8%	2.3K	2.9m/s	11.1%	0.7hPa
Latvia	4,388	33.1%	99.5%	99.6%	1.4K	2.0m/s	5.6%	0.5hPa
Luxembourg	2,130	96.5%	99.9%	100.0%	1.8K	1.8m/s	5.9%	0.5hPa
Malta	719	32.6%	100.0%	100.0%	1.6K	2.5m/s	6.8%	0.6hPa
Montenegro	3,492	94.9%	99.6%	100.0%	2.6K	2.4m/s	12.6%	1.5hPa
The Netherlands	15,254	98.7%	99.1%	99.2%	0.8K	1.9m/s	3.6%	0.4hPa
Norway	47,917	98.6%	99.4%	99.6%	1.3K	2.9m/s	5.4%	0.5hPa
Poland	33,114	100.0%	99.7%	100.0%	1.4K	1.9m/s	5.5%	0.5hPa
Portugal	17,311	87.4%	99.6%	99.9%	1.6K	3.0m/s	5.3%	1.1hPa
Serbia	10,939	99.1%	100.0%	100.0%	1.8K	1.8m/s	8.8%	1.2hPa
Slovac Republic	8,828	100.0%	100.0%	100.0%	1.4K	2.3m/s	7.3%	0.5hPa
Slovenia	2,208	100.0%	100.0%	100.0%	2.6K	2.7m/s	8.6%	0.4hPa
Spain	40,356	97.0%	99.9%	99.9%	1.7K	2.4m/s	6.3%	0.6hPa
Sweden	33,051	99.8%	99.8%	100.0%	1.7K	1.9m/s	6.2%	0.4hPa
Switzerland	15,440	99.9%	100.0%	100.0%	3.9K	2.3m/s	14.6%	0.7hPa
United Kingdom	26,276	99.2%	99.5%	99.7%	1.0K	2.2m/s	4.8%	0.3hPa

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6.2 EUCOS radiosonde station network

Requirement: data availability 2 ascents per day, timeliness BUFR data up to 100 hPa (or TEMP parts AB) within HH+50 and BUFR data of entire sounding (or TEMP parts CD) within HH+100 – delay of decoding date in DWDs database compared to nominated observation time (00, 12 UTC)

The monitoring statistics in this report consider BUFR data of radiosonde stations regarding data availability and timeliness wherever available. Only for those stations which haven´t provided BUFR data yet FM35 TEMP messages have been considered (see chapter 5).

Overview radiosonde stations - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*
Austria	435	59.0%	97.7%	99.3%	93.8%	89.9%	1.0K	3.5m/s	7.3%
Belgium	86	46.8%	93.0%	98.8%	72.1%	59.3%	1.1K	3.3m/s	10.3%
Croatia	348	94.5%	100.0%	100.0%	96.3%	91.1%	1.0K	3.6m/s	5.9%
Cyprus	179	97.3%	100.0%	100.0%	97.8%	90.5%	0.9K	3.1m/s	4.0%
Czech Republic	460	100.0%	99.3%	99.3%	100.0%	99.6%	0.9K	3.2m/s	4.5%
Denmark	1,088	97.6%	98.3%	98.3%	96.5%	94.6%	0.9K	2.9m/s	6.3%
Estonia	92	50.0%	97.8%	96.7%	93.5%	90.2%	1.0K	3.0m/s	8.5%
Finland	546	98.7%	96.2%	98.4%	99.6%	99.3%	0.8K	3.0m/s	5.5%
France	846	90.6%	98.7%	100.0%	98.2%	94.8%	1.2K	3.9m/s	7.3%
Germany	2,756	99.4%	99.2%	99.8%	99.7%	98.8%	0.8K	3.0m/s	5.5%
Greece	309	54.7%	93.5%	95.8%	98.4%	89.3%	1.0K	3.6m/s	5.0%
Hungary	121	32.8%	92.6%	90.9%	95.0%	92.6%	1.1K	3.5m/s	7.7%
Iceland	186	98.4%	97.8%	97.3%	99.5%	98.9%	0.9K	3.3m/s	11.5%
Ireland	182	98.9%	100.0%	100.0%	99.5%	98.4%	1.0K	3.3m/s	5.9%
Italy	1,323	89.2%	99.0%	99.3%	98.5%	97.1%	0.8K	3.2m/s	5.9%
Latvia	44	23.9%	97.7%	100.0%	97.7%	97.7%	0.9K	3.1m/s	8.9%
The Netherlands	111	59.8%	94.6%	95.5%	97.3%	95.5%	1.1K	2.9m/s	5.8%
Norway	956	85.4%	90.3%	93.7%	97.8%	95.4%	0.9K	2.9m/s	4.9%
Poland	551	99.8%	0.0%	97.8%	99.5%	97.1%	1.6K	3.9m/s	1.1%
Portugal	275	49.8%	0.0%	0.0%	99.3%	98.9%	1.3K	3.8m/s	9.0%
Serbia	178	96.7%	0.0%	100.0%	100.0%	98.3%	1.0K	3.3m/s	6.8%
Slovac Republic	183	99.5%	98.4%	96.2%	100.0%	99.5%	0.8K	3.2m/s	6.4%
Slovenia	92	50.0%	0.0%	100.0%	87.0%	55.4%	1.0K	3.4m/s	8.3%
Spain	1,268	98.4%	95.0%	96.3%	99.1%	95.8%	0.9K	3.3m/s	5.4%
Sweden	497	67.2%	95.6%	98.8%	97.8%	94.0%	0.8K	2.9m/s	5.6%
Switzerland	184	100.0%	97.8%	98.4%	100.0%	99.5%	0.8K	3.2m/s	10.2%
United Kingdom	899	77.8%	79.3%	92.0%	99.6%	96.1%	0.9K	3.2m/s	5.7%

6.3 E-AMDAR

Requirement: timeliness HH+50 or HH+100 the latest – delay of decoding date in DWDs database compared to nominated report time.

Overview E-AMDAR aircraft - Q3 2016	Obs. totals	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	RH RMSE
AFR	564,101	90.1%	97.6%	1.1K	3.4m/s	
AUA	194,136	91.9%	98.5%	0.8K	3.2m/s	
BAW	139,176	95.9%	98.7%	1.2K	3.9m/s	
CLH	226,338	95.5%	97.4%	0.9K	3.1m/s	
DLH	1,429,546	82.7%	99.4%	1.0K	3.3m/s	13.6%
EZY	870,144	99.7%	100.0%	0.8K	3.0m/s	
FIN	147,906	87.6%	99.9%	0.9K	3.1m/s	
GEC	43,558	85.6%	99.1%	1.3K	4.1m/s	
GWI	445,925	94.3%	99.1%	0.9K	3.1m/s	
KLM	42,808	99.6%	99.9%	0.9K	3.1m/s	
NVR	2,969	100.0%	100.0%	0.8K	2.5m/s	
SAS	534,407	87.7%	98.1%	1.1K	3.3m/s	
VKG	72,889	83.2%	99.5%	0.9K	3.1m/s	

6.5 E-GVAP

Requirement: data availability hourly ZTD observations, at least one ZTS timely with a timeliness of maximum HH+90 – delay of decoding date in DWDs database compared to nominated observation time. NWP comparison results of ZTD observations against DMI HIRLAM model on a daily averaged basis are shown as near real time (NRT) ZTD accuracies 'avg RMS OmB' in mm.

Overview E-GVAP ACs - Q3 2016	Obs. totals	Timeliness HH+50	Timeliness HH+90	ZTD accuracy
ASI_	410,554	75.9%	99.3%	9.7mm
BKG_	141,869	63.4%	74.3%	9.5mm
GFZ_	481,435	76.6%	96.9%	13.7mm
GOPG	161,513	66.2%	84.3%	10.3mm
IGE2	554,914	78.2%	92.4%	11.7mm
KNM3	55,083	84.7%	100.0%	12.2mm
KNM4	32,230	77.8%	100.0%	15.8mm
LPT_	418,390	92.3%	99.7%	10.2mm
LPTR	88,296	90.9%	100.0%	15.2mm
METG	242,595	79.6%	100.0%	10.5mm
METO	489,507	86.6%	100.0%	10.0mm
NOAA	184,272	31.1%	73.7%	-
ROBH	644,015	82.0%	96.2%	11.4mm
SGN_	686,948	85.6%	100.0%	10.5mm
SGN1	838,380	82.8%	94.2%	10.8mm
SGNC	43,981	67.9%	99.8%	-

6.6 E-ASAP

Requirement: data availability 2 ascents per day, timeliness BUFR data up to 100 hPa (or TEMP parts AB) within HH+50 and BUFR data of entire sounding (or TEMP parts CD) within HH+100 – delay of decoding date in DWDs database compared to nominated observation time

The monitoring statistics in this report consider BUFR data of E-ASAP units regarding data availability and timeliness.

Overview E-ASAP units - Q3 2016	Obs. totals	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*
Denmark	273	84.6%	79.1%	86.4%	83.5%	1.0K	3.4m/s	5.7%
France	266	84.6%	82.3%	100.0%	89.8%	1.1K	4.1m/s	9.1%
Germany	202	99.0%	96.0%	93.1%	83.7%	1.2K	3.5m/s	9.4%
Spain	20	100.0%	100.0%	100.0%	100.0%	1.2K	3.7m/s	4.8%
EUMETNET	344	93.3%	93.3%	88.7%	77.6%	1.8m/s	3.8m/s	8.0%

6.7 E-SURFMAR

Please note: *the quarterly performances of drifting buoys can be found in chapter 7.4 as the drifting buoy network is operated by E-SURFMAR solely.*

The monitoring statistics in this report consider BUFR data of E-SURFMAR fleets regarding data availability and timeliness.

VOS ships

Requirement: timeliness HH+50 or HH+100 the latest – delay of decoding date in DWDs database compared to nominated observation time.

Automated VOS ships

Overview auto VOS - Q3 2016	Obs. totals	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE
Denmark	No data available within the EUCOS area in the evaluated period Q3 2016.						
France	38,659	95.9%	98.6%	1.0K	3.3m/s	4.3%	0.6hPa
Germany	31,252	66.0%	84.8%	0.9K	2.5m/s	5.9%	0.5hPa
Ireland	No data available within the EUCOS area in the evaluated period Q3 2016.						
Norway	No data available within the EUCOS area in the evaluated period Q3 2016.						
Spain	No BUFR data available within the EUCOS area in the evaluated period Q3 2016.						
Sweden	2,400	55.0%	92.1%	1.7K	3.5m/s	-	1.4hPa
United Kingdom	86,831	99.3%	99.8%	1.1K	2.8m/s	5.1%	0.6hPa
EUMETNET	32,363	99.6%	99.7%	1.9K	3.7m/s	7.3%	0.8hPa

Conventional VOS ships

Overview conv VOS - Q3 2016	Obs. totals	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE
Denmark	No data available within the EUCOS area in the evaluated period Q3 2016.						
France	No data available within the EUCOS area in the evaluated period Q3 2016.						
Germany	7,224	80.8%	92.9%	1.7K	3.7m/s	8.0%	1.0hPa
Greece	110	100.0%	100.0%	0.7K	4.5m/s	12.9%	0.6hPa
Hungary	No data available within the EUCOS area in the evaluated period Q3 2016.						
Iceland	6	0.0%	100.0%	1.0K	4.3m/s	-	2.5hPa
Ireland	2	100.0%	100.0%	Currently no OBS-NWP data available			
The Netherlands	1,747	92.0%	97.2%	1.4K	4.1m/s	8.4%	1.1hPa
Norway	No data available within the EUCOS area in the evaluated period Q3 2016.						
Poland	23	52.2%	78.3%	3.4K	2.5m/s	0.0%	0.5hPa
Sweden	375	91.7%	93.9%	1.0K	3.5m/s	-	1.9hPa
United Kingdom	7,242	76.6%	91.1%	1.2K	3.8m/s	6.8%	1.1hPa

Moored buoys

Requirement: data availability hourly observations, timeliness HH+50 or HH+100 the latest – delay of decoding date in DWDs database compared to nominated observation time.

The monitoring statistics in this report consider BUFR data of moored buoys regarding data availability and timeliness. Unfortunately ECMWF cannot provide obs minus background statistics on the basis of all moored buoy BUFR data at present.

Overview moored buoys - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE
France	2,201	99.7%	98.6%	100.0%	Currently no OBS-NWP data available			
Ireland	2,108	95.5%	99.1%	99.7%	0.5K	2.3m/s	4.8%	1.3hPa
Spain	1,924	87.1%	69.0%	91.6%	Currently no OBS-NWP data available			
United Kingdom	2,205	99.9%	99.3%	99.8%	0.4K	2.2m/s	4.9%	0.7hPa

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6.8 E-PROFILE

Wind profilers (WP)

<u>Requirement:</u> data availability at least hourly/half hourly observation cycles, timeliness HH+60 – delay of decoding date in DWDs database compared to nominated observation time.

Overview WP - Q3 2016	Obs. totals	Data availability	Timeliness HH+60	WIND RMSVD
Austria	No data available within the evaluated period Q3 2016.			
Czech Republic	29,413	83.3%	99.6%	3.5m/s
France	27,953	90.4%	99.8%	4.9m/s
Germany	30,517	98.7%	100.0%	2.6m/s
Hungary	13,390	75.8%	99.5%	4.1m/s
Italy	4,380	99.2%	100.0%	4.0m/s
The Netherlands	6,059	68.6%	100.0%	2.9m/s
Spain	17,654	66.6%	99.9%	5.3m/s
Sweden	1,437	32.5%	100.0%	5.4m/s
Switzerland	26,239	99.0%	99.9%	3.5m/s
United Kingdom	46,281	77.6%	100.0%	3.1m/s

Wind profiler weather radars (WRWP)

<u>Requirement:</u> no data availability target agreed; timeliness HH+60 b– delay of decoding date in DWDs database compared to nominated observation time.

Overview WRWP - Q3 2016	Obs. totals	Timeliness HH+60	WIND RMSVD
Austria	104,649	99.7%	14.3m/s
Belgium	No data available within the evaluated period Q3 2016.		
Croatia	17,426	100.0%	5.8m/s
Czech Republic	52,780	100.0%	6.6m/s
Finland	79,832	100.0%	3.8m/s
France	30,915	100.0%	5.3m/s
Germany	415,829	100.0%	5.0m/s
Hungary	17,734	100.0%	3.7m/s
Ireland	8,771	100.0%	3.3m/s
Italy	9,138	99.9%	No NWP data
The Netherlands	51,828	100.0%	2.7m/s
Norway	77,658	100.0%	3.9m/s
Poland	75,108	100.0%	3.5m/s
Portugal	25,617	100.0%	5.4m/s
Slovenia	11,091	100.0%	0.0m/s
Spain	192,655	100.0%	5.5m/s
Sweden	37,671	100.0%	11.8m/s
Switzerland	21,805	99.7%	7.9m/s
United Kingdom	52,382	100.0%	4.3m/s

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6.9 OPERA

<u>Requirement:</u> data availability of incoming radar data (ICD) according to notification by Odyssey, timeliness HH+50 or HH+100 the latest – delay of decoding date in Odysseys' database compared to nominated observation time.

Overview OPERA incoming radar data - Q3 2016	Obs. Totals ICD	Data availability ICD	Timeliness ICD HH+08	Timeliness ICD HH+10	Obs totals PPD	Data availability PPD
Austria	No data available within the evaluated period Q3 2016.					
Belgium	57,719	94.3%	99.7%	99.7%	16,372	92.7%
Croatia	17,368	98.3%	99.7%	99.7%	17,288	97.9%
Czech Republic	17,605	99.7%	100.0%	100.0%	17,557	99.4%
Denmark	63,880	96.5%	98.9%	99.7%	42,711	96.7%
Estonia	15,510	87.9%	90.4%	99.2%	15,301	86.6%
Finland	87,531	99.1%	99.8%	99.9%	87,543	99.1%
France	593,976	97.5%	100.0%	100.0%	197,960	97.5%
Germany	318,875	68.1%	99.6%	99.8%	100,707	67.1%
Greece	No data available within the evaluated period Q3 2016.					
Hungary	26,949	99.7%	99.4%	99.6%	26,031	98.2%
Iceland	16,846	95.3%	0.0%	51.1%	1	0.0%
Ireland	17,577	99.5%	99.7%	99.8%	17,543	99.3%
Latvia	9,550	71.6%	98.0%	98.7%	6,338	71.8%
The Netherlands	51,888	97.9%	99.5%	99.7%	17,279	97.8%
Norway	259,956	98.1%	99.6%	99.8%	86,571	98.0%
Poland	93,645	99.3%	96.0%	97.4%	60,063	97.2%
Portugal	36,928	98.9%	99.7%	99.7%	24,709	93.3%
Serbia	No data available within the evaluated period Q3 2016.					
Slovac Republic	No data available within the evaluated period Q3 2016.					
Slovenia	25,653	96.9%	95.2%	95.2%	8,441	95.6%
Spain	196,645	99.0%	99.1%	99.4%	130,656	98.6%
Sweden	96,687	91.2%	99.2%	99.5%	96,188	93.3%
Switzerland	26,184	98.8%	100.0%	100.0%	8,756	99.1%
United Kingdom	582,395	99.2%	99.9%	100.0%	122,372	96.7%

***Please note:** the quarterly performances concerning OPERA composite products can be found in chapter 7.*

7. Quarterly performances of EUMETNET operated networks

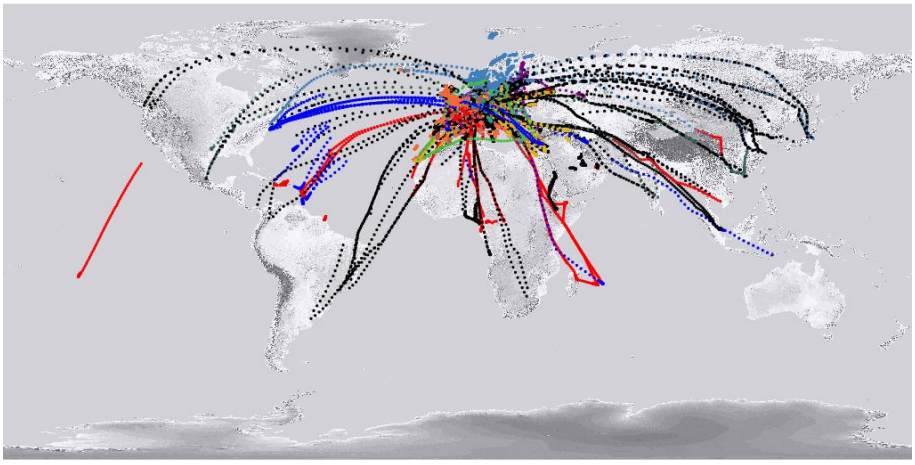
In this chapter the performances of EUMETNET operated networks in Q3 2016 are highlighted. The performances of stations or sites **operated by NMHSes** are described in chapter 8.

Networks: EUMETNET - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q* / RH RMSE (AMDAR)	P RMSE/ O-B gph
Territorial network										
Surface network										
Radiosonde network										
E-ASAP fleet	344		93.3%	93.3%	88.7%	77.6%	1.8K	3.8m/s	8.0%	-
E-AMDAR		daily aircraft			daily profiles	daily airports				
E-AMDAR fleet	3,987,324	755	93.4%	98.9%	1270	204	1.0K	3.2m/s	14.2%	
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS	32,363		99.6%	99.7%			1.9K	3.7m/s	7.3%	0.8hPa
Conventional VOS										
Moored buoys										
Drifting buoys	223,658	98.2%	97.0%	99.4%						0.6hPa
OPERA			HH+20							
Hourly accumulation	8,825	99.9%	99.8%							
Max reflectivitiy	8,826	99.9%	99.8%							
Surface rain rate	8,826	99.9%	99.8%							

7.1 E-AMDAR

The entire E-AMDAR fleet showed excellent performances in Q3 2016 achieving all targets.

Observation totals:
The E-AMDAR fleet achieved the target on observation totals: considering required 11 Mio observations on annual basis 3 Mio observations are required on quarterly basis. The E-AMDAR fleet provided 4.0 Mio E-AMDAR funded observations including humidity observations. To reduce the costs for humidity observations data provision of level flight data has been switched off. Thus, E-AMDAR provides only humidity data from ascent and descent now.



One day snapshot of global E-AMDAR data
(30.09.2016, colours indicating the different airlines participating in E-AMDAR)

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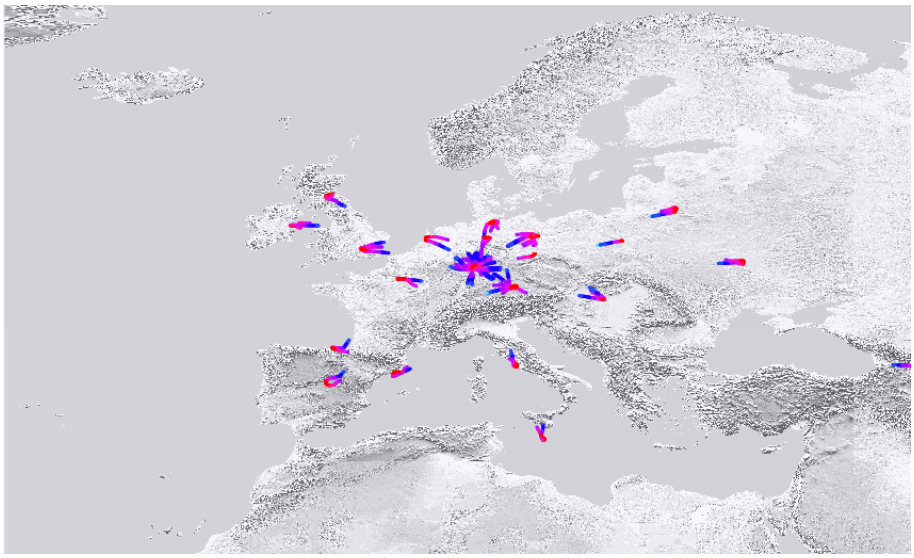


One day snapshot of E-AMDAR humidity data - 9 sensors operating
(30.09.2016, colours indicating pressure altitude: red = low altitude, bright blue = high altitude)

Timeliness performance:
Due to a configuration change from 7 to 15 minutes interval en-route data reporting for aircraft being optimized through the E-ADOS system to achieve cost reductions (compensating negative currency exchange rate $ / € trend) the timeliness performance of these aircraft decreased starting in February 2016 resulting in performances below the timeliness target (quarterly performance achieving timeliness target HH+50, DLH: 82.7%, FIN: 87.6%, SAS: 87.7%, VKG: 83.2%, see also chapter 6.3).

The following aircraft exceeded the accuracy targets on temperature (T RMSE) or wind (WIND RMSVD) on quarterly average (arithmetic average of monthly performance):

Aircraft significantly exceeding T RMSE (> 3K) on quarterly average	
Aircraft EU ID	**Quarterly avg ECWMF O-B results on T RMSE**
EU0740	3.20
EU1334	3.40
EU2450	5.23
EU3874	3.10
EU6444	4.40

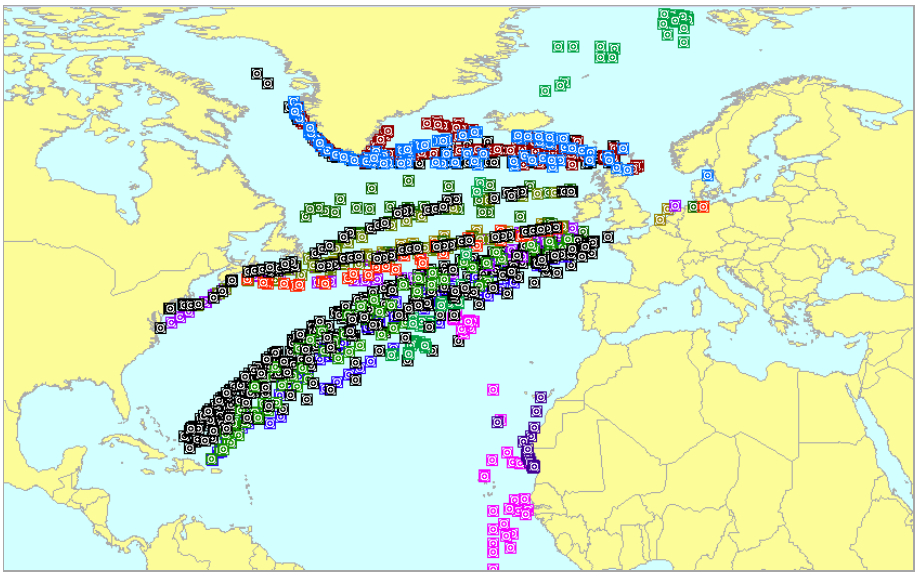
Aircraft exceeding WIND RMSVD > 5 m/s on quarterly average	
Aircraft EU ID	**Quarterly avg ECWMF O-B results on WIND RMSVD**
EU1294	5.23
EU1334	7.10
EU2450	6.93
EU3874	9.80
EU8000	8.33
EU8001	10.53

For particular issues see fault reports raised in Q3 2016 highlighted in chapter 2.

7.2 E-ASAP (ASAP units operated by Operational Service E-ASAP)

Observation totals:

The E-ASAP fleet provided 1,105 soundings in total in Q3 2016. The ASAP units ASEU01-ASEU06 operated by Operational Service E-ASAP provided 344 sounding from 01.07.2016 till 30.09.2016.
E-ASAP participated in the NAWDEX experiment (Sep/Oct 2016) and launched additional ASAP soundings on request (see further details under www.nawdex.org as well as STAC12 document EMN/XCO2.16 on the EUMETNET Portal).



Launches of the entire E-ASAP fleet in Q3 2016

ASEU01, ASEU02, ASEU05 and ASEU06 didn´t achieve the target transmitting the entire sounding in BUFR format within 100 minutes due to issues with Iridium transmission. A lot of empty 'entire BUFR files' were sent out or the transmission failed completely. These issues resulted in low performances concerning timeliness (transmitting BUFR files of the entire sounding within 100 min) and concerning the achieved geopotential heights. Work is in progress to find a solution for this problem.

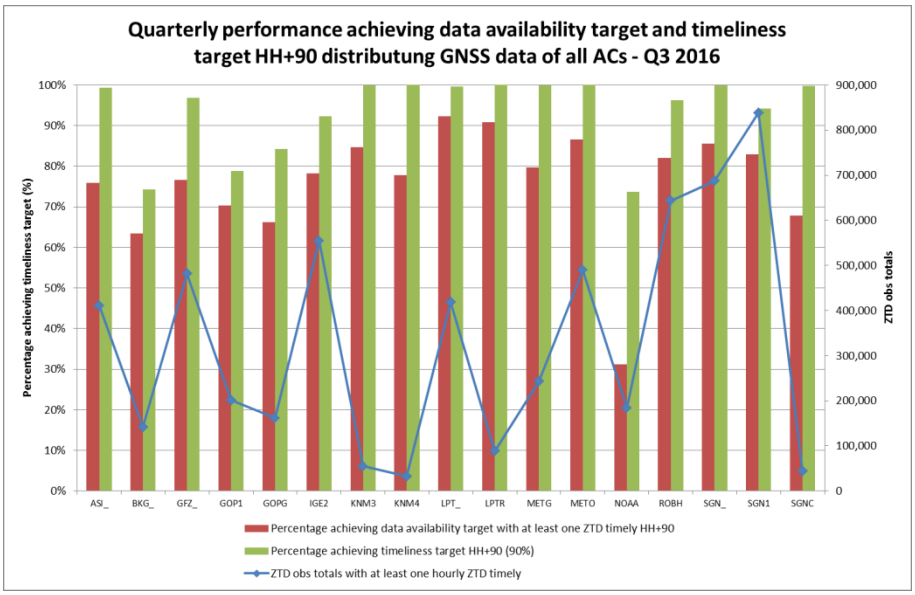
July till September 2016:

- ASEU01 operated close to coast and performed only 5 soundings in July 2016.
- Re-installation of ASEU05 on board the Atlantic Star in Hamburg in July 2016. Putting into service and training of the operators en route from Hamburg to Antwerp.
- Putting into service and training of the operators of ASDE01 during 5 days port call in Hamburg in July 2016.
- ASDE03 was removed from the Atlantic Concert in August 2016. The station shall be reinstalled on board the Atlantic Sea in September/October.
- ASEU05 was in the shipyard in Hamburg and performed no soundings in September 2016.
- ASDE03 was re-installed on board the Atlantic Sea in Hamburg in September 2016. Test and operator training en route from Hamburg to Antwerp.

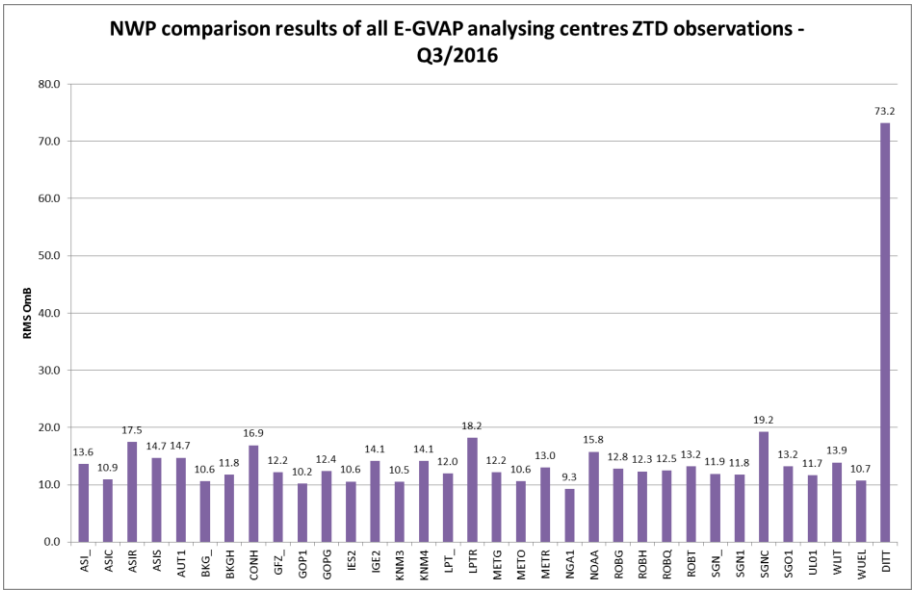
7.3 E-GVAP (GNSS sites and Analysing Centers operated by geodetic institutes)

The EUCOS QMP provides daily and monthly statistics regarding data availability and timeliness of E-GVAP ZTD observations being received at DWD. The first performance statistics of these results are shown below. Analysing Centres provide 1-12 ZTD observations on an hourly basis. The results below consider only those bulletins which contained at least "one ZTD timely" (within HH+90).

E-GVAP provided 5,674,963 ZTD observations being timely in Q3 2016 from all site-ACs (Analysing Centres). This reflects a percentage of 76.5% data availability. The timeliness target transmitting at least 85% of ZTD data within 90 minutes was achieved within the period (96.7%).



E-GVAP provides NWP comparison results of ZTD observations against DMI HIRLAM model on a daily averaged basis which are displayed in the EUCOS QMP. The results are shown as near real time (NRT) ZTD accuracies 'avg RMS OmB' in mm. According to the latest revision of the EUCOS Performance Standards document (see STAC12/Doc14, EMN-STAC12_Doc14_EUCOS_Performance_Standards_Agenda_Item_7.6_Rev1.pdf available on the EUMETNET Portal) the proposed target for NRT ZTD accuracy is 15 mm. The diagram below shows the quarterly averaged results NRT ZTD accuracies 'avg RMS OmB' in mm per E-GVAP analysing centre. 6 out of 34 analysing centres (AC) didn´t achieve the target RMS OmB ≤ 15 mm in Q3 2016: ASIR 17.5 mm, CONH 16.9 mm, LPTR 18.0 mm, NOAA 15.8 mm, SGNC 19.2 mm, **DITT 73.2 mm**.



Within Q3 2016 DMI monitored 7,166 site-ACs providing ZTD GNSS data to E-GVAP. Out of these 1230 site-ACs didn´t achieve the target RMS OmB ≤ 15 mm on quarterly average (17.2% of the entire network).

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7.4 E-SURFMAR (drifting buoys/automated VOS ships operated by Operational Service E-SURFMAR)

The entire E-SURFMAR drifting buoys network as well as the automated VOS ship fleet operated by Operational Service E-SURFMAR showed excellent averaged performances in Q3 2016 achieving all targets.

Data availability and timeliness issues:

New issues:

- *Drifting buoys:* The following drifting buoys didn´t meet the data availability target transmitting 88% of required hourly observations in Q3 2016: 1300871 (82.5%), 4100638 (75.4%), 6400526 (87.3%) and 6400606 (80.6%). Drifting buoy 6200557 (84.9%) was declared "ceased to be operational" on 02.09.2016.
  Drifting buoys 1300871, 4400868, 4400875, 6400555 and 6400606 didn´t meet the timeliness target HH+50 in Q3 2016 (HH+50 1300871 83.8%, 4400868 86.2%, 4400875 89.7%, 6400555: 78.0%, 6400606: 88.5%). 6400555 didn´t achieve the timeliness target HH+100 either (88.4%). The buoys are equipped with an Iridium transmitter and haven´t been declared as 'ceased to be operational'.

Ongoing issues:

- *Drifting buoys:* Drifting buoys 4100707 and 4400766 had timeliness issues throughout the period again (HH+50: 4100707 55.7%, 4400766 88.4%; HH+100: 4100707 82.7%). The buoys are equipped with an Iridium transmitter and haven´t been declared as 'ceased to be operational'.

Problems resolved:

- *Drifting buoys:* Drifting buoy 6400547 didn´t meet the timeliness target HH+50 in Q2 2016 (HH+50 86.7%). The situation improved in Q3 2016 and the target was met again (97.9%).

Quality issues:

New issues:

- *Automated VOS ships:* BATEU10 exceeded the target on pressure RMSE (quarterly average 2.5 hPa) and temperature RMSE (quarterly average 7.9 hPa) in Q3 2016. BATEU08 significantly exceeded the target on specific humidity (quarterly average 55.1 m/s) and temperature RMSE (quarterly average 12.2 hPa) in Q3 2016.
- *Drifting buoys:* drifting buoy 6200553 exceeded the target on pressure RMSE on a quarterly basis in Q3 2016: 1.6 hPa with large errors in September 2016: 4.2 hPa).

Ongoing issues:

- *Automated VOS ships:* Automated VOS ships BAREU51 and BAREU65 exceeded the target on pressure RMSE of 1 hPa in Q3 2016 again (BAREU51 and BAREU65 both 1.2 hPa).

Problems resolved:

- *Automated VOS ships:* Automated VOS ship BATEU01 showed large errors of temperature RMSE in Q2 2016 (7.7 K) as well as large errors in specific humidity (22.8%). The situation improved in Q3 2016 and the targets were met again (T RMSE 1.3K, specific humidity error 3.8%).
- *Drifting buoys:* the following drifting buoys exceeded the target on pressure RMSE on a quarterly basis in Q2 2016: 4100638 and 4400873: 1.1 hPa, 6400519: 1.3 hPa, 4400613: 2.7 hPa (large errors in June 2016: 6.9 hPa). The situation improved in Q3 2016 and the targets were met again (4100638: 0.4 hPa in July 2016, 4400873: 0.9 hPa Q3 avg, 6400519: 0.7 hPa Q3 avg but 1.2 hPa monthly avg September 2016).

7.5 OPERA (Odyssey pre-processed data PPD and OPERA composite products)

OPERA showed excellent performances in Q3 2016 achieving all targets on average regarding Odyssey pre-processed data (PPD) and OPERA composite products provision.

OPERA composite production:
On 13.07.2016 no OPERA composites were received from 11:15 till 12:15 UTC at DWD. The situation improved again afterwards.

8. Quarterly performances by EUMETNET Members

The following performances are compared to the targets agreed in the EUCOS Performance Standards (see EUMETNET Portal, group *OBS Programme - Procedures and technical regulations*). The performances are coloured green if the target has been achieved and coloured red if the network performed below the target.

According to the EUCOS Performance Standards 24 automated SYNOP reports or 8 manual SYNOP reports of EUCOS surface land stations and 2 daily soundings of EUCOS radiosonde land stations are required to fulfil the needs of regional NWP. Further targets on timeliness and achieving geopotential heights (radiosonde stations and ASAP units only) as well as accuracy targets regarding relevant parameters such as temperature, pressure, wind and humidity are defined in the EUCOS Performance Standards.

Please note: as most of the surface land stations and radiosonde stations exceed the targets on temperature RMSE and sometimes also on specific humidity (HUM dq/q*) these issues are usually not mentioned within the Members´ performances below. Therefore mainly issues with wind or pressure observations are highlighted.

ZAMG, AUSTRIA

Networks of Member: Austria - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	4,840	92.5%	99.8%	99.9%			2.9K	3.0m/s	11.8%	0.5hPa
Radiosonde network	435	59.0%	97.7%	99.3%	93.8%	89.9%	1.0K	3.5m/s	7.3%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	No data available within the evaluated period Q3 2016.									
Weather radars WRWP	104,649		99.7%					14.3m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	No data available within the evaluated period Q3 2016.									
Weather radar PPD										

National restrictions or ongoing issues: (not meeting EUCOS targets and requirements)

- *Surface land stations:* 11146 provides only SYNOP data at 05, 06, 09, 12 and 15 UTC rather than hourly observations as requested by the EUMETNET Observations Programme.
- *Radiosonde stations:* 11010, 11120, 11240 in general provide only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme. Further soundings of these stations are launched after 03 UTC (nominal observation time 06 UTC) leading to low timeliness performance due to assignment of launches to main synoptic hours 00, 06,12 and 18 UTC.
- *E-PROFILE wind profilers:* no wind profiler data of Vienna 11036 available (since November 2012)

New issues:

- *Radiosonde stations:* 11120 and 11240 didn´t launch radiosoundings on a daily basis in Q3 2016 (sounding totals in Q3 2016: 11120 83 launches, 11240 76 launches).

Ongoing issues:

- *Surface land stations:* ECMWF O-B results of temperature observations from Austrian surface land station 11146 showed large biases and RMSE up to 7K since 21st June 2016. The situation slightly improved in Q3 2016 but still ECMWF´s O-B results showed large errors in T RMSE of 5.8K on quarterly average.
- *Radiosonde stations:* 11010 and 11120 didn´t achieve the targets reaching 100 and 50 hPa in Q3 2016 again (11010: 100 hPa 92.3%, 50 hPa 89.0%; 11120: 100 hPa 79.5%, 50 hPa 69.9%). 11240 didn´t achieve the target reaching 50 hPa within the period again (reaching 50 hPa 93.4%).
- *E-PROFILE weather radars:* Austrian weather radars showed very low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again (quarterly average 14.3 m/s) with largest errors in July 2016 (monthly average 16.9 m/s). **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**
- *OPERA:* ZAMG hasn´t contributed to OPERA yet.

Problems resolved:

- *Surface land stations:* Data from Austrian surface land station 11146 exceeded the target on wind RMSVD within Q2 2016 due to large errors throughout the period (quarterly avg 5.8 m/s). The situation improved in Q3 2016 and the target was met again (4.9 m/s).
- *Radiosonde stations:* 11010 didn´t achieve the targets transmitting BUFR data up to 100 hPa within 50 minutes in Q2 2016. None of the sounding parts up to 100 hPa were transmitted within 50 min. in April and May 2016. The situation improved since June and the target was met again in Q3 2016 (avg Q3 2016: 98.9%).

RMI, BELGIUM

Networks of Member: Belgium - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	6,085	91.9%	99.9%	100.0%			1.1K	1.8m/s	9.3%	0.5hPa
Radiosonde network	86	46.8%	93.0%	98.8%	72.1%	59.3%	1.1K	3.3m/s	10.3%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	No data available within the evaluated period Q3 2016.									
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	57,719	94.3%	99.7%	99.7%						
Weather radar PPD	16,372	92.7%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* 06458 Beauvechain in general provides only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *OPERA:* Belgian weather radar EBUM_41 Wideumont didn´t provide incoming radar data to Odyssey from 13.09.2016, 00 UTC till 21.09.2016, 08 UTC (quarterly avg: 90.5%).

Ongoing issues:

- *Surface land stations:* Belgian surface land station 06459 Ernage performed below the data availability target in Q3 2016 (78.1%) due to a longer lasting data outage from 20th June 2016, 09 UTC till 20th July 2016, 13 UTC.
- *Radiosonde stations:* 06458 Beauvechain didn´t achieve the targets reaching geopotential heights of 100 and 50 hPa due to early balloon bursts throughout the period of Q3 2016 again (quarterly performance reaching 100 hPa: 72.1%, reaching 50 hPa: 59.3%).
- *E-PROFILE weather radars:* Belgian weather radar 06477 Wideumont stopped reporting VAD wind data on 13th November 2015, 08 UTC and weather radar 06451 Zaventem stopped reporting VAD wind data on 09th December 2015, 08 UTC. An alternative to the vertical wind profiles is awaited in the near future. E-PROFILE OSM has been in contact with RMI to find a solution.
- *BUFR issues:* station positions as well as station name given in OSCAR and encoded in BUFR metadata for Belgian surface land station 06407 do not coincide (link to OSCAR added to the station name):

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	06407	OOSTENDE (AIRPORT)	51.200278	2.887222	4
BUFR (red)	06407	MIDDELKERKE	51.19917	2.85278	5

Problems resolved:

- *Surface land stations:* Surface land station 06494 Mont-Rigi performed below the data availability target in Q2 2016 (84.2%) due to occasional data outages in April 2016 (76.1%). The situation improved in Q3 2016 and the data availability target was met again (98.5%).
- Belgian surface land station 06459 exceeded the target on pressure RMSE within Q2 2016 (2.3 hPa) due to large errors in May 2016 (monthly avg pressure bias 3.0 hPa). Surface land station 06494 exceeded the target

on wind RMSVD within Q2 2016 due to large errors in April and May 2016 (quarterly avg 12.0 m/s). The situation improved for both stations in Q3 2016 and the targets were met again (06459: 0.3 hPa, 06494: 2.4 m/s).

- *Radiosonde stations:* 06458 Beauvechain´s timeliness performance transmitting BUFR data of the entire sounding within 100 min. was below the target in Q2 2016. The situation improved in Q3 2016 and the target was met (soundings transmitted within 100 min: 98.8%).
- *BUFR issues:* Due to unknown reason FM12 TAC data of the 3 Belgian EUCOS stations 06414, 06459 and 06494 weren´t distributed via GTS since 01.06.2016 anymore. After contacting RMI the data transmission has been restored and first data were received in FM12 on 04.08.2016, 06 UTC again.

DHMZ, CROATIA

Networks of Member: Croatia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	7,858	99.7%	99.7%	99.9%			1.9K	2.2m/s	7.4%	0.7hPa
Radiosonde network	348	94.5%	100.0%	100.0%	96.3%	91.1%	1.0K	3.6m/s	5.9%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	17,426		100.0%					5.8m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	17,368	98.3%	99.7%	99.7%						
Weather radar PPD	17,288	97.9%								

New issues:

- *Radiosonde stations:* radiosonde station 1430 Zadar had several data outages in September and therefore didn´t achieve the data availability target in Q3 2016 (Q3 2106 avg: 88.9%). Additionally the station didn´t achieve the targets reaching 100 and 50 hPa in Q3 2016 (quarterly avg reaching 100 hPa: 93.3%, 50 hPa: 82.3 %) due to early balloon bursts in August and September 2016.

Ongoing issues:

- *Surface land stations:* Data from Croatian surface land station 14474 exceeded the target on pressure RMSE within Q3 2016 again due to large errors throughout the period (quarterly avg 1.8 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 42.5627777778°N, 18.2700°E, 157m and the barometer is located at 42.5627777778°N, 18.2700°, 167.2m (follow link). Height used in ECMWF monitoring: 167.0m. DHMZ is kindly asked to check the station metadata (position and station elevation) and to revise OSCAR database if required and/or the pressure measurements of this station.
- *E-PROFILE weather radars:* Both Croatian weather radars showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again (14256: 6.2 m/s, 14280: 5.3 m/s). **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**

Problems resolved:

- *Radiosonde stations:* radiosonde station 14240 Zagreb didn´t achieve the target reaching 50 hPa in Q2 2016 (quarterly avg: 93.9%) due to early balloon bursts in April 2016 (85.0%). The situation improved in Q3 2016 and the target was met (quarterly avg reaching 50 hPa: 98.9%).

Cyprus Meteorological Service, CYPRUS

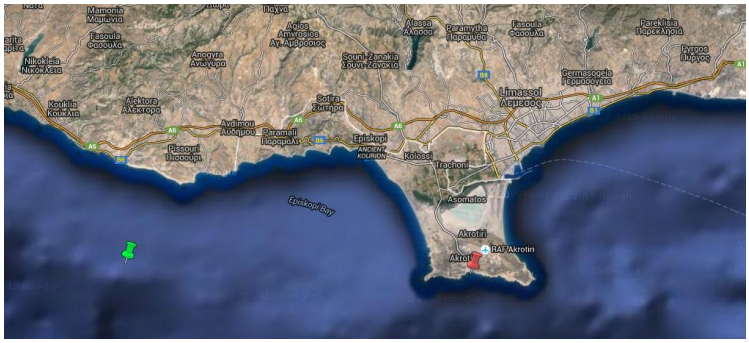
Networks of Member: Cyprus - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	3,660	99.7%	99.7%	99.8%			2.0K	2.5m/s	8.5%	0.9hPa
Radiosonde network	179	97.3%	100.0%	100.0%	97.8%	90.5%	0.9K	3.1m/s	4.0%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

New issues:
Nothing to report.

Ongoing issues:

- *Surface land stations:* Data from surface land station 17609 exceeded the target on pressure RMSE within Q3 2016 again due to large errors throughout the period (quarterly avg 1.5 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 34.8733333333°N, 33.6172222222°E, 2.99m and the barometer is located at 34.8733333333°N, 33.6172222222°E, 9.7m (follow link). Height used in ECMWF monitoring: 10.0m. BUFR data refer to 'Height of station ground above MSL' (descriptor 0 07 030) at 2.0m. The station elevation has been revised in OSCAR (from 9.8m to 2.99m) but the barometer height might have to be revised, too. CMS is kindly asked to check the station metadata (especially barometer height) and to revise OSCAR database if required and/or the pressure measurements of this station.
  Furthermore Descriptor 0 07 030 'Height of station above mean sea level' isn´t encoded in BUFR for 17609.
- *Radiosonde stations:* 17607 Athalassa didn´t achieve the target reaching 50 hPa on quarterly average due to early balloon bursts in July and August 2016 (quarterly avg 90.5%).
- *BUFR issues:* station positions given in OSCAR and encoded in BUFR metadata for surface land station 17601 do not coincide (link to OSCAR added to the station name). Descriptor 0 07 031 'Height of barometer above mean sea level' isn´t encoded in BUFR.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	17601	AKROTIRI	34.59277778	32.98778	22.55
BUFR (red)	17601	AKROTIRI	34.58	32.98	23.0



Problems resolved:
Nothing to report.

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CHMI, CZECH REPUBLIC

Networks of Member: Czech Rep - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	8,771	99.3%	100.0%	100.0%			1.6K	2.0m/s	6.6%	0.4hPa
Radiosonde network	460	100.0%	99.3%	99.3%	100.0%	99.6%	0.9K	3.2m/s	4.5%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	29,413	83.3%	99.6%					3.5m/s		
Weather radars WRWP	52,780		100.0%					6.6m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	17,605	99.7%	100.0%	100.0%						
Weather radar PPD	17,557	99.4%								

New issues:

Nothing to report.

Ongoing issues:

- *E-PROFILE wind profilers:* Czech wind profiler Cheb (11406) stopped reporting on 18th May 2016, 13 UTC due to technical issues and therefore didn´t achieve the data availability target in Q3 2016 (34.1%). The WP started providing data on 30.08.2016, 11 UTC.
- *E-PROFILE weather radars:* Czech weather radar 11480 showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again (quarterly avg: 8.3 m/s). **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**

Problems resolved:

- *E-PROFILE wind profilers:* Czech wind profiler Temelin (11538) exceeded the targets on wind RMSVD in Q2 2016 (quarterly average 5.3 m/s) due to large errors throughout the period. The situation improved in Q3 2016 and the target was met (quarterly average 3.6 m/s).

DMI, DENMARK (incl. Greenland stations)

Networks of Member: Denmark - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	39,573	90.5%	99.8%	100.0%			3.3K	2.8m/s	12.9%	0.5hPa
Radiosonde network	1,088	97.6%	98.3%	98.3%	96.5%	94.6%	0.9K	2.9m/s	6.3%	-
E-ASAP fleet	273		84.6%	79.1%	86.4%	83.5%	1.0K	3.4m/s	5.7%	-
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Conventional VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	63,880	96.5%	98.9%	99.7%						
Weather radar PPD	42,711	96.7%								

New issues:

- *Surface land stations:* 04416 Nuuk had a data outage from 06.07.16, 12 UTC till 11.07.16, 11 UTC and therefore performed slightly below the data availability target in Q3 2016 (94.3%).

In August and September BUFR data from 06011 Thorshavn were sporadically missing but the overall quarterly data availability target was achieved (95.4%).

- *Radiosonde stations:* 04360 Tasilaq performed slightly below the data availability target due to several data outages in July 2016 (quarterly average: 91.9%)

Ongoing issues:

- *Surface land stations:* The data outage of 04211 MITTARFIK UPERNAVIK is still ongoing (since 18th December 2015, 13 UTC). The station was severely damaged in a storm on 20th November 2015, damaging the temperature and humidity measurement. The repair is dependent on arrival of technician and spare parts. 04416 Summit had several data outages and timeliness issues throughout the period Q3 2016 again (Q3 2016 data availability performance: 26.3%, quarterly timeliness performance transmitting BUFR SYNOP data within 50 min: 84.5%).
- *Radiosonde stations:* As in the previous quarters 04360 didn´t achieve the targets on reaching geopotential heights of 100 hPa and 50 hPa due to occasionally early balloon bursts throughout the period (quarterly average reaching 50 hPa of 04360: 75.1% and 06011: 90.2%). 06011 didn´t achieve the targets on reaching geopotential heights of 100 and 50 hPa in the past but improved the performance in Q3 2016 (quarterly average reaching 100 hPa: 96.7% - slightly below the target, 50 hPa: 95.6%)
- *ASAP units:* the entire Danish ASAP fleet encountered problems in Q1 and Q2 2016 distributing high resolution BUFR data of the entire sounding due to Iridium communication issues. A lot of empty 'entire BUFR files' were sent out or the transmission failed completely. These issues resulted in low performances concerning timeliness (transmitting BUFR files of the entire sounding within 100 min) and concerning the achieved geopotential heights. The situation improved for ASDK02 (timeliness HH+100: 99.0%) but has been still an issue for ASDK01 (52.8%) and ASDK03 (92.5%) in Q3 2016. ASDK02 didn´t achieve the target reaching 100 hPa in Q3 2016 (87.8) and ASDK03 didn´t achieve both targets reaching 100 and 50 hPa within the period (reaching 100 hPa: 70.1%, 50 hPa: 68.7%).
- *OPERA:* Danish weather radar Bornholm (EKMI_44) performed slightly below the data availability target for incoming radar data in Q3 2016 again due to occasional short term outages throughout the period (quarterly avg: 89.3%).
- *BUFR issues:* station positions given in OSCAR and encoded in BUFR metadata for several Danish surface land stations (Greenland) didn´t coincide in the past. The positions and station heights have been corrected. But still BUFR metadata do not contain station names (link to OSCAR added to the station name). DMI is kindly asked to add the station names to descriptor '0 01 015'.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	04203	KITSISSUT (CAREY OEER)	76.633333	-73.0000	13.2
BUFR (red)	04203	*No station name*	76.73333	-73.000	13.2
WMO (green)	04208	KITSISSORSUIT (EDDERFUGLEOEER)	74.033333	-57.816667	37.7
BUFR (red)	04208	*No station name*	74.0334	-57.81667	37.7
WMO (green)	04214	NUUSSUAQ	70.683333	-54.616667	26.2
BUFR (red)	04214	*No station name*	70.68334	-54.61667	26.2
WMO (green)	04242	SIORALIK	65.016667	-52.5500	12
BUFR (red)	04242	*No station name*	65.01667	-52.550	12

Problems resolved:

- *Surface land stations:* 04312 MITTARFIK UPERNAVIK had occasional data outages in June 2016 leading to a low monthly performance in June 2016 (94.0%). The situation improved in Q3 2016 and the target was met again (99.7%).
  Data from surface land station 04250 exceeded the target on pressure RMSE within Q2 2016 due to large errors especially in April and May 2016 (quarterly avg 1.4 hPa). The situation improved in Q3 2016 and the target was met again (0.7 hPa).
- *Radiosonde stations:* The DMI automated radiosonde station in Greenland, 04360 Tasiilaq, unfortunately had bad timeliness for the 12 UTC-sounding during Q2 2016 due to specific issues now remedied. During the period 8 April – 5 July 2016 the settings for the automated planned launch concerning the 12 UTC-sounding were set to 'launch planned 11:45 UTC' instead of the usual 'launch planned 11:05 UTC'. Since 05.07.16 afternoon the settings at the station have been set back to the normal: 'launch planned 11:05 UTC' and 'launch planned 23:05 UTC' respectively.
- *OPERA:* Danish weather radar Virring (EKMI_45) performed below the data availability target for incoming radar data again due to a longer term data outage from 26th April 2016, 14 UTC till 24th May 2016, 04 UTC

besides the data outages from all Danish radar sites end of June 2016. The situation improved in Q3 2016 and the target was met on quarterly average providing ICD in 96.9% (besides the data outages of all Danish radar data in August).

- Danish weather radars Bornholm (EKMI_44) and Virring (EKMI_45) didn´t achieve the timeliness target HH+08 due to delays in data transmission from 24th May 2016, 20 UTC till 09th July 2016. The situation improved in Q3 2016 and both sites transmitted ICD data within the timeliness targets again (avg Q3 2016 EKMI_44: 98.2%, EKMI_45: 98.7%).

ESTEA, ESTONIA

Networks of Member: Estonia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	6,624	100.0%	99.9%	100.0%			1.2K	2.1m/s	5.1%	0.5hPa
Radiosonde network	92	50.0%	97.8%	96.7%	93.5%	90.2%	1.0K	3.0m/s	8.5%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	15,510	87.9%	90.4%	99.2%						
Weather radar PPD	15,301	86.6%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* 26038 in general provides only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *OPERA:* Estonian weather radar site Syrgavere (EEMH_41) didn´t provide incoming radar data to Odyssey within the period 09.08.16, 21 UTC till 30.08.16, 15 UTC (data availability of ICD on quarterly average: 76.3%).

Ongoing issues:

- *Radiosonde stations:* radiosonde station Tallinn (26038) performed below the target reaching geopotential heights of 100 hPa and 50 hPa in Q3 2016 again (reaching 100 hPa: 93.5%, 50 hPa: 90.2%).
- *OPERA:* radar data of Estonian weather radar site Harku (EEMH_40) were often transmitted to Odyssey later than HH+08 within the period again (ICD transmitted within HH+08 on quarterly average: 83.6%).

Problems resolved:

- *Radiosonde stations:* Tallinn (26038) performed below the target distributing BUFR data of sounding parts up to 100 hPa in Q2 2016 within 50 min especially in April and June (quarterly average transmitting BUFR data up to 100 hPa: 90.6%). The situation improved mid of July and the target was met in Q3 2016 (quarterly avg transmitting BUFR data up to 100 hPa within 50 min. = 96.7%).

FMI, FINLAND

Networks of Member: Finland - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	39,012	98.4%	99.9%	99.9%			1.5K	1.7m/s	5.7%	0.4hPa
Radiosonde network	546	98.7%	96.2%	98.4%	99.6%	99.3%	0.8K	3.0m/s	5.5%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	79,832		100.0%					3.8m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	87,531	99.1%	99.8%	99.9%						
Weather radar PPD	87,543	99.1%								

To be noted:

- FMI will shut down soundings in 02935 Jyvaskyla Tikkakoski. The last manual sounding will be launched on 31.12.2016, 18 UTC. In Jokioinen 02963 FMI will start to make 4 soundings per day starting from 01.12.2016. The sounding times in Jokioinen will be the main synop times, at 00, 06, 12 and 18 UTC. The launch time is - 30 minutes. In Sodankyla 02836 (GRUAN station) FMI will continue launching 2 soundings per day at 00, 12 UTC. The launch time is also - 30 minutes.

New issues:

- *Surface land stations:* 02755 YLIVIESKA had a data outage from 03.08.16, 10 UTC till 26.08.16, 10 UTC leading to a low data availability performance in Q3 2016 (Aug 2016 avg: 25.7%, quarterly avg: 75.2%).

Ongoing issues:

Nothing to report.

Problems resolved:

- *Radiosonde stations:* radiosonde station SODANKYLA (02836) transmitted BUFR data of the entire soundings with a significant delay in the past. Thus, the timeliness target receiving BUFR data of the entire sounding within 100 minutes wasn´t achieved in Q2 2016. BUFR data up to 100 hPa was transmitted within the required time of 50 minutes (quarterly performance transmitting BUFR data up to 100 hPa within 50 min: 97.3%; transmitting data containing the entire sounding within 100 min: 36.3%). The situation improved mid of July and the target was met in Q3 2016 (quarterly performance transmitting data containing the entire sounding within 100 min: 96.1%).

  Reply from FMI:

  It turned out that the reason for the performance differences between Sodankyla and Jokioinen were the amount of the hydrogen gas used in the balloons. FMI has increased the amount of gas in Sodankyla balloons which had a positive impact on the climb rate of Sodankyla soundings and leading to an earlier publishing time of the entire sounding BUFR.

Météo-France, FRANCE

Networks of Member: France - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	50,418	99.3%	99.5%	99.6%			1.5K	2.0m/s	5.7%	0.5hPa
Radiosonde network	846	90.6%	98.7%	100.0%	98.2%	94.8%	1.2K	3.9m/s	7.3%	-
E-ASAP fleet	266		84.6%	82.3%	100.0%	89.8%	1.1K	4.1m/s	9.1%	-
E-PROFILE			HH+60							
Wind profilers	27,953	90.4%	99.8%					4.9m/s		
Weather radars WRWP	30,915		100.0%					5.3m/s		
E-SURFMAR										
Automated VOS	38,659		95.9%	98.6%			1.0K	3.3m/s	4.3%	0.6hPa
Conventional VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Moored buoys	2,201	99.7%	98.6%	100.0%			Currently no OBS-NWP data available			
OPERA			HH+08	HH+10						
Weather radar ICD	593,976	97.5%	100.0%	100.0%						
Weather radar PPD	197,960	97.5%								

Please note: BUFR data of French moored buoy Lion (6100002) aren´t monitored by ECMWF obs minus background at present. Work is in progress to solve this issue.

New issues:

- *Surface land stations:* No BUFR SYNOP data have been received from 07057 Creil from 13.09.2016, 13 UTC till 17.09.2016, 17 UTC followed by a significant delay in data provision till 19.09.2016, 09 UTC. This led to a data availability and timeliness performance below the targets in September but the targets were achieved on quarterly average (data availability performance September: 90.0%, Q3 2016: 96.4%, timeliness performance HH+50 September: 89.0%, Q3 2016: 96.5%).
  BUFR data from 07190 Strasbourg-Enzheim were received at DWD with a significant delay in August 2016. Therefore the station performed below the timeliness targets in August but achieved the target on quarterly average (timeliness HH+50 August: 89.2%, Q3 2016: 95.0%).
- *Radiosonde stations:* Occasionally missing soundings from 07510 Brest in July 2016 led to a data availability performance slightly below the target in July but the target was achieved on quarterly average (July avg: 93.5%, quarterly avg: 96.2%). Occasionally missing soundings from 07145 in July and September 2016 led to a data availability performance below the target on quarterly average (quarterly avg: 92.9%).
- *ASAP units:* BUFR messages containing radiosonde data of the entire soundings of all French ASAP units were received with a significant delay in September 2016. Worst unit was ASFR2 transmitting only 38.5% of the BUFR messages containing the entire sounding within 100 min. from 52 soundings in September (September avg/quarterly avg ASFR1: 78.3%/91.4%, ASFR2: 38.5%/50.8%, ASFR3: 89.5%/97.1%, ASFR4: 72.0%/89.0%). Additionally the units ASFR2 and ASFR4 didn´t achieve the timeliness target transmitting BUFR messages containing radiosonde data up to 100 hPa within 50 min. in September 2016 (September avg/quarterly avg ASFR2: 44.2%/55.4%, ASFR4: 72.0%/90.4%).
  ASFR2 didn´t achieve the target reaching 50 hPa geopotential height in Q3 2106 due to early balloon bursts in September (September avg reaching 50 hPa geopotential heights: 69.2%).
- *Automated VOS ships:* French automated VOS ships FLAO and OS8154 didn´t provide SHIP data within the EUCOS area within the required time of HH+50 and HH+100 (percentage achieving timeliness target HH+50 in Q3 2016: FLAO 68.9%, OS8154 55.3%; HH+100: FLAO 94.2%, OS8154 84.8%).
- *E-PROFILE wind profilers:* French wind profiler Clermont-Ferrand (07453) stopped reporting data again on 19.07.2016, 16 UTC until the end of the evaluated period (data availability performance Q3 2016: 17.1%). Wind profiler 07626 Lannemezan exceeded the target on wind RMSVD in Q3 2016 (quarterly avg: 6.0 m/s).
- *E-PROFILE weather radars:* French weather radar 07629 showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 (5.6 m/s).
- *OPERA:* Several French weather radar sites didn´t achieve the data availability target in Q3 2016 due to several short term data outages: quarterly averaged ICD data availability performances Nimes (LFPW_49) 93.9%, Arcis (LFPW_52) 89.2%, Bollene (LFPW_55) 93.7%, Cherves (LFPW_64) 93.4%, Blaisy-Haut (LFPW_65) 88.2% and Montancy (LFPW_67) 92.0%.

Ongoing issues:

- *Sounding data from radiosonde stations and ASAP units:* According to several users French radiosonde data from radiosonde land stations and ASAP units show differences between BUFR messages up to 100 hPa and

BUFR messages of the entire sounding of the same launch when comparing temperature and dew point values in lower levels.

- *Radiosonde stations:* BUFR radiosonde data from 07645 were not received by DWD after 18.02.16, 00 UTC sounding. The data transmission to DWD has been reactivated on 28th July 2016. This led to a low data availability performance in July 2016 (July avg: 11.9%, quarterly avg: 70.4%).
  Occasionally missing soundings from Ajaccio in August 2016 led to a data availability performance slightly below the target (August avg: 91.9%, quarterly avg: 94.6%).
  07145 and 07510 didn´t achieve the targets reaching geopotential heights of 100 hPa and 50 hPa in Q3 2016 again (quarterly avg reaching 100hPa/50 hPa 07145: 96.6%/89.8%, 07510: 96.7%/92.2%).
- *ASAP units:* Data received from ASFR2 slightly exceeded the target on wind RMSVD in Q3 2016 again due to larger errors in September 2016 (quarterly avg: 5.1 m/s).
- *Automated VOS ships:* French automated VOS ship MINFR00 didn´t provide SHIP data within the EUCOS area within the required time of HH+50 and HH+100 in Q3 2016 again (percentage achieving timeliness target HH+50 in Q3 2016: 54.4%, HH+100: 83.1%).
- *E-PROFILE wind profilers:* Wind profiler Clermont Ferrand (1290 MHz) 07462 showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again but the situation slightly improved (quarterly avg: 5.5 m/s).
- *E-PROFILE weather radars:* French weather radar 07129 Falaise didn´t provide any VAD wind data in Q3 2016. 07223 Treilleires started reporting VAD wind data again on 11.07.2016, 12 UTC after a long-term outage since 07.03.2016, 14 UTC.
- French weather radars 07291 (6.2 m/s), 07637 (6.6 m/s) and 07658 (6.1 m/s) showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again. **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**

Problems resolved:

- *Surface land stations:* BUFR data of 07558 Millau weren´t received at DWD from 23rd April 2016, 09 UTC till 25th April 2016, 17 UTC followed by a significant delay in reception time of BUFR SYNOP data until 27th April 2016, 08 UTC (data availability performance April 2016: 91.1%). 07621 Tarbes Ossun had occasional data outages in May and June 2016 (until 03.06.16) and partly suffered from timeliness issues. Thus, the data availability target wasn´t achieved in Q2 2016 (quarterly avg 90.8%). BUFR data of 07335 Poitiers haven´t been provided on an hourly basis in April and May 2016; the situation improved in June 2016. BUFR data were sporadically missing although FM12 TAC SYNOP data were provided on an hourly basis. Thus the station didn´t achieve the data availability target in Q2 2016 (quarterly avg: 91.3%).The situation improved for all 3 stations in Q3 2016 and the targets were met again (data availability quarterly avg 07335: 99.7%, 07558: 98.9%, 07621 97.8%).
- *Radiosonde stations:* French radiosonde stations 07110 and 07761 didn´t meet the targets reaching geopotential heights of 50 hPa due to early balloon bursts in Q2 2016. The situation improved in Q3 2016 and the target was met on quarterly average. But 07761 performed slightly below the target in August 2016 reaching 50 hPa in 91.9% of the 57 soundings (quarterly avg reaching 50 hPa 07110: 97.8%, 07761: 95.4%).
- *Automated VOS ships:* Data provided by French automated VOS ship BATFR13 showed large pressure RMSE and specific humidity errors in April and June 2016. The situation improved in Q3 2016 regarding pressure RMSE and the target was met again (avg Q3 2016: 0.5 hPa P RMSE). The ship didn´t provide any humidity observations in Q3 2016. Data provided by BATFR22 exceeded the target on wind RMSVD in Q2 2016 mainly due to large errors in April and May 2016 (quarterly avg: 5.4 m/s). The situation improved in Q3 2016 and the target was met again (avg Q3 2016: 3.5 m/s).
- *E-PROFILE wind profilers:* Wind data of wind profiler Clermont-Ferrand 07453 slightly exceeded the target on wind RMSVD in Q2 2016 due to large errors in June 2016 (quarterly average Q2 2016: 5.3 m/s). The situation improved during the short period of reporting in Q3 2016 (quarterly avg 4.7 m/s).
- *OPERA:* French weather radar site Sembadel (LFPW_53) didn´t provide any data from 30.05.16, 08 UTC until 07.06.16, 07 UTC and therefore didn´t achieve the data availability target in Q2 2016. LFPW_62 Montclar had data outages from 07.06.16, 16 UTC till 23.06.16, 14 UTC. The situation improved for both sites in Q3 2016 and the ICD data availability target was met again (LFPW_53 96.9%, LFPW_62 97.5%).

HMS, FYROM (THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA)

Networks of Member: FYROM - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	708	96.2%	100.0%	100.0%			1.8K	2.6m/s	7.0%	0.6hPa
Radiosonde network										
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

New issues:

Nothing to report.

Ongoing issues:

Nothing to report.

Problems resolved:

- *Surface land stations:* sporadic data outages of BUFR SYNOP (and FM12 SYNOP TAC) data of 13591 Stip within the period Q2 2016 (especially in April) led to a data availability performance below the target of 95% (Q2 2016: 94.5%). The situation improved in Q3 2016 and the target was met (Q3 2016: 96.2%).

DWD, GERMANY

Networks of Member: Germany - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	33,120	100.0%	99.9%	100.0%			1.5K	2.2m/s	5.7%	0.4hPa
Radiosonde network	2,756	99.4%	99.2%	99.8%	99.7%	98.8%	0.8K	3.0m/s	5.5%	-
E-ASAP fleet	202		99.0%	96.0%	93.1%	83.7%	1.2K	3.5m/s	9.4%	-
E-PROFILE			HH+60							
Wind profilers	30,517	98.7%	100.0%					2.6m/s		
Weather radars WRWP	415,829		100.0%					5.0m/s		
E-SURFMAR										
Automated VOS	31,252		66.0%	84.8%			0.9K	2.5m/s	5.9%	0.5hPa
Conventional VOS	7,224		80.8%	92.9%			1.7K	3.7m/s	8.0%	1.0hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	318,875	68.1%	99.6%	99.8%						
Weather radar PPD	100,707	67.1%								

New issues:

- *ASAP units:* ASDE03 didn´t meet the target transmitting BUFR messages of the entire soundings within 100 min. in Q3 2016 (88.0%). Furthermore the soundings of the ship didn´t achieve the targets reaching 100 and 50 hPa within the period (reaching 100 hPa: 88.0%, 50 hPa: 68.0%). This might be caused by the Iridium transmission issues the E-ASAP fleet has been suffering for a while.
- *OPERA:* Due to problems caused by the movement of DWD´s file distribution system to another server on 27.07.2016 German weather radar data weren´t transferred into ODC format and routed to Odyssey until 25.08.2016. The issue has been solved at 07 UTC on 25.08.2016. Thus, none of the German weather radar sites achieved the data availability target providing radar incoming data (ICD) to Odyssey in Q3 2016.

Ongoing issues:

- *Automated VOS ships:* In Q3 2016 15 out of 18 German automated VOS ships observing within the EUCOS area didn´t provide BUFR SHIP data within the required time of HH+50. 9 ships didn´t provide data within HH+100 (DBBA, DBBT, DBBU, DBFC, DBFH, DBFR, DBFX, DBJM and DBND). DBFC again didn't transmit any SHIP data within HH+100 in the evaluated period (average timeliness DBFC: 586 min). DBFX used to transmit TAC SHIP data with a delay of more than 200 min in the past, too, but the situation slightly improved in Q3 2016 again regarding the transmission of BUFR SHIP data (average timeliness DBFX: 117 min, 60.0% of the data received within 100 min). The German automated VOS fleet transmitted only 66.0% of BUFR SHIP data within the required time of HH+50 and 84.8% within HH+100.
  DBEB exceeded the target on pressure RMSE in Q3 2016 again (quarterly average 1.2 hPa) due to sporadically large errors in O-B results of ECMWF model outputs in August and September 2016.
- *Conventional VOS ships:* 53.8% of 186 German conventional VOS ships providing BUFR SHIP data within the EUCOS area in Q3 2016 achieved the timeliness target HH+50 which is an improvement compared to the previous quarter (Q2 2106: 48.9%). 67.7% of all ships achieved the target HH+100 on quarterly average. Thus German conventional VOS didn´t achieve timeliness target HH+50 in Q3 2016 again (80.8%) and performed slightly below the target transmitting BUFR SHIP data within HH+100 (92.9%).
  The following ships didn´t provide any data within HH+50 in Q3 2016: LXLK, D5BU7, D5CU9, CQGT, DHNT2, LXBJ, A8KY2, A8MM3, A8GJ5, A8UY4. A8UY4 didn´t provide any data within 100 minutes either.
  19 out of 133 ships in total being monitored by ECMWF in Q3 2016 showed pressure RMSE errors > 1 hPa on quarterly average. Ships with worst errors (avg P RMSE > 3 hPa) were: A8SO9 (4.4 hPa), A8JX8 (5.3 hPa), A8XD5 (3.1 hPa), V7DS8 (3.2 hPa), V7LJ5 (5.0 hPa).
- *E-PROFILE weather radars:* several German weather radars 10204 (5.1m/s), 10339 (5.9 m/s), 10488 (8.1 m/s), 10557 (5.3 m/s) and 10908 (6.1 m/s) showed wind RMSVD exceeding the target of 5 m/s on quarterly average in Q3 2016 again. **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**
- *OPERA:* German weather radar site Flechtdorf EDZW_52 performed even a bit more below the data availability target providing radar incoming data (ICD) to Odyssey in Q3 2016 again due to a further data outage from 03.09.2016, 04 UTC till 05.09.2016, 07 UTC (65.1%).
- *BUFR issues:* due to a software error in the BUFR decoding software BUFR data from German automated VOS ships are not generated if 2 or more German ships are in short distance to each other (e.g. in harbour). Thus it might happen that traditional FM13 SHIP TAC messages are available but no corresponding BUFR data. Work is in progress to solve this issue.

Problems resolved:

- *Radiosonde stations:* 10238 Bergen didn´t achieve the target on reaching 50 hPa in Q2 2016 again due to early balloon bursts especially in April (10238: 92.4%). The situation improved in Q3 2016 and the target was met on quarterly average although the station performed slightly below the target in September (September avg reaching 50 hPa: 92.9%, quarterly avg: 95.3%).
- *ASAP units:* ASDE01 phased out from North Atlantic service in May. De-installation of ASDE01 in Hamburg in May and re-installation on the new ship in June 2016. First soundings were available on 27.07.16, 12 UTC.
- *Automated VOS ships:* Data provided by DBBC showed large errors of specific humidity in May and June 2016 (quarterly avg: 17.2%). The situation improved in Q3 2016 and the targets were met again (7.4%).
- *OPERA:* Offenthal (EDZW_61) didn´t provide radar incoming data to Odyssey from 29.03.16, 02 UTC till 12.04.16, 15 UTC and from 04th June 2016, 17 UTC till 06th June 2016, 10 UTC due to hardware issues (quarterly avg of ICD data availability 81.4%). The situation improved in Q3 2016.

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HNMS, GREECE

Networks of Member: Greece - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	4,680	70.2%	97.9%	98.9%			1.7K	2.6m/s	7.4%	0.8hPa
Radiosonde network	309	54.7%	93.5%	95.8%	98.4%	89.3%	1.0K	3.6m/s	5.0%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS	110		100.0%	100.0%			0.7K	4.5m/s	12.9%	0.6hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	No data available within the evaluated period Q3 2016.									
Weather radar PPD										

National restrictions: (not meeting EUCOS targets and requirements)

- *Surface land stations:* 16723 provides SYNOP data at main and intermediate synoptic hours between 03 and 15 UTC only, sometimes additionally at 00 and 18 UTC.
- *Radiosonde stations:* in general 16716 and 16754 provide only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *Surface land stations:* within the period 05.09.2016, 09 UTC till 20.09.2016, 06 UTC as well as from 22.09.2016, 18 UTC till 27.09.2016, 21 UTC no Greek BUFR SYNOPs were received leading to a data availability performance below the target for all Greek surface land stations in Q3 2016 (70.2%). Data being received end of September arrived with a significant delay which led to a low timeliness performance in September for all Greek stations, too.
- *Radiosonde stations:* 16622 Thessaloniki didn´t meet the data availability target in Q3 2016 due to data outages throughout the period (quarterly avg: 76.3%).

Ongoing issues:

- *Surface land stations:* 16648 Larissa still provides BUFR data at main synoptic hours at 00, 06, 12 and 18 UTC only and very few BUFR SYNOP data at 03, 09, 15 and 21 UTC although FM12 SYNOP data are provided on a 3-hourly basis. **HNMS is kindly asked to enhance the BUFR SYNOP data provision as soon as possible.**
  16622 exceeded the target on pressure RMSE in Q3 2016 due to constant large errors throughout the period (Q2 2016 avg: 1.2 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 40.5272222222°N, 22.9713888889°E, 6.7m and the barometer is located at 40.5272222222°N, 22.9713888889°E, 8.43m. Height used in ECMWF monitoring: 8.4m (barometer). The station location reported in BUFR doesn´t coincide entirely with OSCAR (BUFR: latitude 40.51667, longitude 22.96667, station height 6.7 m, barometer height 8.4 m). HNMS is kindly asked to check the station metadata (position and station elevation) and to revise OSCAR database if required and/or the pressure measurements of this station.
  16682 slightly exceeded the target on pressure RMSE in Q3 2016 again (quarterly avg: 1.2 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 37.9227777778°N, 21.2872222222°E, 16.76m and the barometer is located at 37.9227777778°N, 21.2872222222°E, 15.26m. Height used in ECMWF monitoring: 15.3m (barometer). The station location reported in BUFR doesn´t coincide entirely with OSCAR (BUFR: latitude 37.92389, longitude 21.28833, station height 16.8 m, barometer height 15.3 m). HNMS is kindly asked to check the station metadata (position and station elevation) and to revise OSCAR database if required and/or the pressure measurements of this station.
- *Radiosonde stations:* 16622 didn´t meet the target on transmitting BUFR data of the entire sounding within 100 minutes in Q3 2016 again due to significant delays throughout the period (quarterly avg: 89.7%).
  All three Greek radiosonde stations 16622, 16716 and 16754 didn´t meet the target reaching geopotential heights of 50 hPa in Q3 2016 again due to early balloon bursts throughout the period (reaching 50 hPa 16622: 86.5%, 16716: 92.4%, 16754: 90.1%).

- *OPERA:* HNMS hasn´t contributed to OPERA yet.
- *BUFR issues:* station positions and station height given in OSCAR and encoded in BUFR metadata for several Greek surface land stations don´t coincide (link to OSCAR added to the station name). Station metadata in BUFR and OSCAR showing discrepancies are coloured red.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	16624	CHRYSOPOULI (AIRPORT)	40.9202	24.6203	5.4
BUFR (red)	16624	CHRYSOPOULI (AIRPORT)	40.9202	24.6203	4.2
WMO (green)	16627	ALEXANDROUPOLI (AIRPORT)	40.857222	25.946944	7.32
BUFR (red)	16627	ALEXANDROUPOLI (AIRPORT)	40.8573	25.947	3.5
WMO (green)	16648	LARISSA (AIRPORT)	39.645833	22.46	71.02
BUFR (red)	16648	LARISSA (AIRPORT)	39.6461	22.4602	71.1
WMO (green)	16719	ZAKINTHOS	37.7514	20.8876	4.27
BUFR (red)	16719	ZAKYNTHOS (AIRPORT)	37.7514	20.8876	2.8
WMO (green)	16759	TYMBAKION (AIRPORT)	35.0665	24.7621	2.13
BUFR (red)	16759	TYMBAKION (AIRPORT)	35.0665	24.7621	6
WMO (green)	16765	KARPATHOS (AIRPORT)	35.4275	27.1470	20.1
BUFR (red)	16765	KARPATHOS (AIRPORT)	35.4171	27.1547	17.3

Problems resolved:

- *Surface land stations:* 16716 Athinai Airport had sporadically data outages again throughout the period which led to a lower data availability performance in Q2 2016 (quarterly avg: 78.7%). The situation improved in Q3 2016.
- *Conventional VOS ships:* Greek conventional VOS ship SYQO performed slightly below the target transmitting BUFR SHIP data within 100 minutes due to delays in April and May 2016 (quarterly avg HH+100: 94.4%). The situation improved in Q3 2016 and the target was met (quarterly avg HH+100: 100.0%).
  Greek conventional VOS ship SYQO exceeded the accuracy target on wind RMSVD within the period Q2 2016 (quarterly avg: 7.1 m/s). The situation improved in Q3 2016 and the target was met (4.3 m/s).

OMSZ, Hungary

Networks of Member: Hungary - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	8,832	100.0%	99.8%	99.9%			1.7K	1.8m/s	6.0%	0.4hPa
Radiosonde network	121	32.8%	92.6%	90.9%	95.0%	92.6%	1.1K	3.5m/s	7.7%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	13,390	75.8%	99.5%					4.1m/s		
Weather radars WRWP	17,734		100.0%					3.7m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	26,949	99.7%	99.4%	99.6%						
Weather radar PPD	26,031	98.2%								

To be noted:

- *OPERA:* Hungarian weather radar HABP_43 Napar is currently upgraded (no incoming radar data has been provided to Odyssey since 24.10.2016, 10 UTC).

New issues:

- *E-PROFILE wind profilers:* Hungarian wind profiler Siofok (12935) stopped reporting on 18.08.2016, 09 UTC (data availability performance Q3 2016: 52.4%).

Ongoing issues:

- *Radiosonde stations:* OMSZ still used two types of radiosounding systems in Hungary (Vaisala and GRAW) in Q3 2016. BUFR data of 12843 and 12982 Szeged have been only received from 00 UTC Vaisala soundings. At

00 UTC Vaisala sondes have been released in Budapest and Szeged, unlike at 12 UTC when GRAW sondes have been used in both stations in the past. Due to the fact that the Vaisala sounding system hasn´t been working in 12843 Budapest and the use of Graw sondes instead the data availability target of BUFR radiosonde data was far below the target for Budapest in Q3 2016 (18.3%). 12982 Szeged showed low data availability performances below 50%, too (47.2%).

Reply from OMSZ:

The Vaisala receiver currently isn't working, therefore OMSZ has been also using GRAW at 00 UTC (Budapest). OMSZ will install new Vaisala system middle of November and will change radiosonde practice: Vaisala on Budapest site and GRAW on Szeged.

12843 Budapest didn´t meet the timeliness target transmitting BUFR data containing the entire sounding within 100 min in Q3 2016 again (73.5%).

Both Hungarian radiosonde stations performed slightly below the target reaching 50 hPa geopotential heights in Q3 2016 again due to early balloon bursts (reaching 50 hPa 12843: 88.2%, 12982: 94.3%).

- *BUFR issues:* station positions, station height and partly station names given in OSCAR and encoded in BUFR metadata for several Hungarian surface land stations don´t coincide (link to OSCAR added to the station name).

  Reply from OMSZ:

  The mismatch in meta data information will be corrected early 2017.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	12805	Sopron	47.683333	16.6	233
BUFR (red)	12805	Sopron Fertorakos	47.71472	16.66583	116.8
WMO (green)	12812	Szombathely	47.266667	16.633333	220
BUFR (red)	12812	Szombathely	47.19833	16.64778	200.1
WMO (green)	12830	VESZPREM/SZENTKIRALYSZABADJA	47.066667	17.833333	280
BUFR (red)	12830	Szentkiralyszabadja	47.08278	17.97056	280.5
WMO (green)	12846	Agard	47.183333	18.616667	105
BUFR (red)	12846	Agard	47.19	18.58361	104.3
WMO (green)	12866	Poroszlo	47.65	20.633333	91
BUFR (red)	12866	Poroszlo	47.65611	20.65361	89.2
WMO (green)	12915	ZALAEGERSZEG/ANDRASHIDA	46.866667	16.8	179
BUFR (red)	12915	Zalaegerszeg Nagykut	46.92583	16.81278	239.1

Problems resolved:

- *Radiosonde stations:* radiosonde station Szeged 12982 didn´t meet the timeliness target transmitting BUFR data containing the entire sounding within 100 min in Q2 2016 (89.0%). The situation improved in Q3 2016 and the target was met (97.7%).
- *OPERA:* Hungarian weather radars HABP_41 Poganyvar (93.4%) and HABP_42 Budapest (91.8%) didn´t achieve the data availability targets for ICD and PPD data in Q2 2016 due to several data outages within the period. The situation improved in Q3 2016 and the target was met again (HABP_41: 99.1%, HABP_42: 99.9%).

IMO, ICELAND

Networks of Member: Iceland - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	3,466	94.2%	99.4%	99.9%			1.5K	3.0m/s	8.2%	0.5hPa
Radiosonde network	186	98.4%	97.8%	97.3%	99.5%	98.9%	0.9K	3.3m/s	11.5%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS	6		0.0%	100.0%			1.0K	4.3m/s	-	2.5hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	16,846	95.3%	0.0%	51.1%						
Weather radar PPD	1	0.0%								

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National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* Monitoring results of 04089 Egilsstadir aren´t considered in the Icelandic performance summaries of Q2 and Q3 QM reports because the station doesn´t launch soundings throughout the year (only during 'winter' season October till April).

New issues:

- *Surface land stations:* Stykkisholmur 04013 had a few data outages in August 2016 but achieved the data availability target on quarterly average (August 2016 avg: 94.0%, Q2 2016: 97.6%).
- *Radiosonde stations:* 04089 Egilsstadir didn´t start launching soundings for the winter season 2016/2017 in September due to technical problems at site.

Ongoing issues:

- *Surface land stations:* Bolungarvik 04005 performed slightly below the data availability (79.1%) again due to data outages from 22.07.2016, 12 UTC till 26.07.2016, 18 UTC as well as from 07.08.2016, 03 UTC till 17.08.2016, 12 UTC. Hofn 04082 had a few data outages in July 2016 but achieved the data availability target on quarterly average (July 2016 avg: 91.5%, Q2 2016: 96.0%).
- *Conventional VOS ships:* The conventional VOS ships OZ2049 and TFNA exceeded the accuracy target on pressure RMSE of 1 hPa in Q3 2016 again (OZ2049: 4.8 hPa, TFNA: 1.5 hPa).
- *OPERA:* ICD radar data from Keflavik (BIRK_40) and Fljotsdalsheioi (BIRK_41) again haven´t been used by Odyssey. None of the ICD data were transmitted to Odyssey within HH+08, whilst 97.5% of BIRK_40 data were transmitted to Odyssey within HH+10. None of the ICD data from radar site BIRK_41 were transmitted to Odyssey within HH+10.
- *BUFR migration:* 04018 Keflavik (Iceland) started distributing BUFR data converted from TEMP parts A-D with 28.09.16, 12 UTC sounding. Unfortunately the distribution of 4 BUFR messages is not WMO compliant and should be corrected as soon as possible. Work is in progress to solve this issue by switching to a new Vaisala sounding system in near future. 04089 Egilsstadir will start distributing BUFR messages as soon as the technical problems at site have been resolved.
- *BUFR issues:* station positions, station height and station names given in WMO flat file No. 9, Vol. A/OSCAR and encoded in BUFR metadata for several Icelandic surface land stations don´t coincide (link to OSCAR added to the station name).
  Reply from IMO:
  Discrepancies between BUFR and OSCAR will be corrected in due course.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	04082	HOFN	64.3	-15.216667	17
BUFR (red)	04082	HOFN I HORNAFIRDI	64.251	-15.213	4
WMO (green)	04115	DYNJANDIHEIDI	65.7	-23.083333	620
BUFR (red)	04115	STYKKISHOLMUR	65.072	-22.732	12.4
WMO (green)	04126	GRUNDARTANGI	64.35	-21.783333	4
BUFR (red)	04126	SURTSEY	64.299	-20.599	36

Problems resolved:

- *Surface land stations:* Hofn 04082 had a few data outages in May 2016 but achieved the data availability target on quarterly average (May 2016 avg: 94.8%, Q2 2016: 96.3%). The situation improved in Q3 2016.
- *Radiosonde stations:* Keflavik 04018 performed below the target reaching geopotential heights of 50 hPa in Q2 2016 due to early burst heights in June (quarterly average reaching 50 hPa: 86.4%, June avg: 66.7%). The situation improved in Q3 2016 and the target was met (98.9%).
- *Conventional VOS ships:* The conventional VOS ship TFEA exceeded the accuracy target on pressure RMSE of 1 hPa in Q2 2016 (1.3 hPa). The situation improved in Q3 2016 and the target was met again (0.8 hPa).

Met Éireann, IRELAND

Networks of Member: Ireland - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	13,225	99.8%	100.0%	100.0%			0.9K	2.1m/s	5.1%	0.4hPa
Radiosonde network	182	98.9%	100.0%	100.0%	99.5%	98.4%	1.0K	3.3m/s	5.9%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	8,771		100.0%					3.3m/s		
E-SURFMAR										
Automated VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Conventional VOS	2		100.0%	100.0%			Currently no OBS-NWP data available			
Moored buoys	2,108	95.5%	99.1%	99.7%			0.5K	2.3m/s	4.8%	1.3hPa
OPERA			HH+08	HH+10						
Weather radar ICD	17,577	99.5%	99.7%	99.8%						
Weather radar PPD	17,543	99.3%								

New issues:

- *Moored buoys:* M6 (62095) exceeded the accuracy target on pressure RMSE of 1 hPa in Q3 2016 (1.3 hPa).

Ongoing issues:

Nothing to report.

Problems resolved:

- *Moored buoys:* M6 (62095) didn´t achieve the data availability target in Q2 2016 (69.5%) due to data outages from 02.03.16, 17 UTC till 11.04.16, 11 UTC as well as from 02.05.16, 16 UTC till 19.05.16, 20 UTC. The situation improved in Q3 2016 and the target was met again (95.5%).

Italian Airforce - Operational Forces Command - Department for Meteorology (ItAF-ReMet), ITALY

Networks of Member: Italy - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	46,280	97.4%	98.6%	99.8%			2.3K	2.9m/s	11.1%	0.7hPa
Radiosonde network	1,323	89.2%	99.0%	99.3%	98.5%	97.1%	0.8K	3.2m/s	5.9%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	4,380	99.2%	100.0%					4.0m/s		
Weather radars WRWP	9,138		99.9%					No NWP data		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* in general 16144 provides only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *Surface land stations:* 16258 Monte S. Angelo exceeded the target on pressure RMSE on quarterly average in Q3 2016 (2.8 hPa).
- *Radiosonde stations:* Italian radiosonde station Brindisi (16320) launched only one sounding per day on 01. and 02.08.2016 as well as from 04.08.2016 till 10.08.2016. Thus the station didn´t achieve the data availability target in Q3 2016 (August performance: 83.9%, Q3 2016: 94.6%).
- *E-PROFILE weather radars:* Due to a change in Originating Center encoding to '247' ('Operational Programme for the Exchange of weather Radar information (OPERA) - EUMETNET') by CWINDE starting on 23rd May 2016

Italian weather radar VAD wind data neither entered DWD´s database nor ECMWF´s data assimilation. Thus, no monitoring statistics have been available from 23rd May 2016 till 28th July 2016. Monitoring statistics regarding data availability and timeliness basing on DWD´s database have been available again after adapting DWD´s decoding system to the new Originating Center setting end of July. Work is still in progress to provide ECMWF O-B results from these stations by changing the configuration of the Originating Center again.

Ongoing issues:

- *Surface land stations:* Pantelleria (16470) didn´t achieve the data availability target in Q3 2016 again (16088: 80.6%, 16470: 58.2%) because the station didn´t provide any BUFR data between 19 and 05 UTC starting on 08.02.16, 19 UTC till the end of the evaluated period (data availability Q3 2016: 58.2%).
  16134 slightly exceeded the target on wind RMSVD on quarterly average in Q3 2016 again but the RMS errors decreased compared to the previous quarter (Q3 2016 avg: 5.1 m/s, compared to Q2 2106 avg: 6.7 m/s). 16008 exceeded the temperature RMSE in Q3 2016 again (Q3 2016: 4.9K).
  16480 Cozzo Spadaro exceeded the target on pressure RMSE on quarterly average in Q3 2016 again (1.0 hPa).
- *Radiosonde stations:* Italian radiosonde station Cuneo-Levaldigi (16113) had a data outage from 17.08.2016, 00 UTC till 02.09.2016, 00 UTC. Thus the station didn´t achieve the data availability target in Q3 2016 again (78.4%). Additionally the station didn´t achieve the targets reaching 100 and 50 hPa in Q3 2016 (reaching 100 hPa: 93.8%, 50 hPa: 90.3%).
- *BUFR issues:* station positions, station height and station names given in OSCAR and encoded in BUFR metadata for several Italian surface land stations don´t coincide (link to OSCAR added to the station name).

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	16227	FUCINO	41.978333	13.605278	649
BUFR (red)	16227	FUCINO *(last reports received at DWD 23rd May 2016, 17 UTC)*	41.88	13.58	0
WMO (green)	16542	CAPO S.LORENZO	39.498056	9.629444	4
BUFR (red)	16542	CAPO S.LORENZO	39.5	9.5	4

Problems resolved:

- *Surface land stations:* Brescia/Ghedi (16088) didn´t achieve the data availability target in Q2 2016 (80.6%) because the station didn´t distribute SYNOP data of 20 to 04 UTC observation hours within the period 08.02.16 till 01.05.16, 04 UTC. The situation improved since May 2016 and the target was met in Q3 2016 (99.9%).
  Capo Caccia (16522) had sporadic data outages in June 2016 which led to a monthly data availability performance below the target of 95% (93.6%). The situation also improved in Q3 2016 and the target was met again (98.9%).
  Trieste (16110) exceeded the target on pressure RMSE on quarterly average in Q2 2016 (2.9 hPa) due to suspicious values in SYNOP message 21.06.16, 02 UTC (TAC/FM12: 1000.0 hPa pressure at station level, observation before and after this time 1019 hPa; in BUFR 0 hPa reported!). The situation also improved in Q3 2016 and the target was met again (0.6 hPa).
- *Radiosonde stations:* S. Pietro Capofiume Molinella (Bologna) 16144 and Trapani Birgi 16429 performed below the target reaching 50 hPa in Q2 2016 due to early balloon bursts in April 2016 (reaching 50 hPa 16144: 94.6%, 16429: 92.6%). The situation improved for both stations in Q3 2016 and the targets were met again (reaching 50 hPa 16144: 96.2%, 16429: 96.2%).

LEGMC, LATVIA

Networks of Member: Latvia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	4,388	33.1%	99.5%	99.6%			1.4K	2.0m/s	5.6%	0.5hPa
Radiosonde network	44	23.9%	97.7%	100.0%	97.7%	97.7%	0.9K	3.1m/s	8.9%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	9,550	71.6%	98.0%	98.7%						
Weather radar PPD	6,338	71.8%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Surface land stations:* in general Latvian surface land stations provide SYNOP data at main and intermediate hours only rather than on an hourly basis.
- *Radiosonde stations:* 26435 Skriveri provides soundings on even dates only.

New issues:

- *Radiosonde stations:* Skriveri (26435) performed below the target reaching 100 h Pa and 50 hPa in July 2016 due to early balloon bursts but the quarterly averaged performance still met the target (July 2016/Q3 2106 performance reaching 100 hPa as well as 50 hPa:92.9 % / 97.9%).

Ongoing issues:

- *OPERA:* due to a data outage from 30.03.16, 06 UTC till 14.04.16, 07 UTC as well as several short term outages in May 2016 weather radar Riga (EVRR_40) didn´t achieve the data availability target regarding incoming radar data ICD (71.6%) and pre-processed data PPD (71.8%). In addition only 65.6% of incoming data of EVRR_40 were received within HH+08 by Odyssey. ICD data arrived with a delay from 28.04.16 till 10.05.16, 06 UTC (May avg Odyssey receiving ICD within HH+08: 79.4%). The situation improved afterwards.
- *BUFR migration:* no BUFR data from radiosonde station 26435 were received so far.
  Reply from LEGMC:
  The sounding system generates BUFR message in old TAC format. RTH Norrköping has been asked to convert TEMP messages from TAC format to BUFR format messages but during the year this didn´t happen.
- *BUFR issues:* station positions and station height given in OSCAR and encoded in BUFR metadata for Latvian surface land station Riga (26422) don´t coincide (link to OSCAR added to the station name).
  Reply from LEGMC:
  Regarding the mistake in meta data of the station Riga LEGMC will inform RTH Norrköping, where the SYNOP message in TAC format is converted to BUFR format and ask them to correct it.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	26422	Riga	56.950556	24.116111	6
BUFR (red)	26422	Riga	56.91667	23.96667	*Missing value*

Problems resolved:

- *OPERA:* Only 65.6% of incoming data from Riga (EVRR_40) were received within HH+08 by Odyssey in Q2 2106. ICD data arrived with a delay from 28.04.16 till 10.05.16, 06 UTC. The situation improved afterwards and the target was met again in Q3 2016 (98.0%).

MeteoLux, LUXEMBOURG

Networks of Member: Luxembourg - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	2,130	96.5%	99.9%	100.0%			1.8K	1.8m/s	5.9%	0.5hPa
Radiosonde network										
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

New issues:

Nothing to report.

Ongoing issues:

Nothing to report.

Problems resolved:

- *Surface land stations:* BUFR SYNOP data from 06590 were rarely received within the period 14.03.16, 10 UTC till 14.04.16, 11 UTC which led to a low data availability performance in Q2 2016 (85.1%). Due to sporadic data outages of BUFR SYNOP data from 06590 in August 2016 the monthly data availability performance was slightly below the target but on quarterly average the target was met (August performance: 94.6%, Q3 2016: 96.5%).

MAMO, MALTA

Networks of Member: Malta - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	719	32.6%	100.0%	100.0%			1.6K	2.5m/s	6.8%	0.6hPa
Radiosonde network										
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

National restrictions: (not meeting EUCOS targets and requirements)

- *Surface land stations:* surface land station 16597 Malta provides SYNOP data at main and intermediate hours only.

New issues:

Nothing to report.

Ongoing issues:

- *Surface land stations:* Luqa 16597 performed below the data availability target in Q3 2016 again due to sporadically data outages of SYNOP (FM12 TAC) data throughout the period. MAMO is kindly asked to make sure that all data at main and intermediate hours are ingested onto GTS.

- *BUFR migration:* no BUFR data of surface land station 16597 have been received so far. MAMO is kindly asked to provide BUFR SYNOP data as soon as possible.

Problems resolved:
Nothing to report.

IHMS, MONTENEGRO

Networks of Member: Montenegro - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	3,492	94.9%	99.6%	100.0%			2.6K	2.4m/s	12.6%	1.5hPa
Radiosonde network										
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD										
Weather radar PPD										

National restrictions: (not meeting EUCOS targets and requirements)
- *Surface land stations:* surface land stations 13363 PLEVLJA and 13459 NIKSIC don´t provide SYNOP data at 01, 02, 22 and 23 UTC.

New issues:
- *Surface land stations:* EUCOS surface land station 13459 NIKSIC exceeded the target on pressure RMSE error of 1 hPa in Q3 2016 (1.7 hPa).

Ongoing issues:
- *Surface land stations:* EUCOS surface land stations 13363 PLEVLJA and 13459 NIKSIC didn´t provide BUFR SYNOP data at 01, 02, 22 and 23 UTC; 13363 didn´t provide data at 00 and 21 UTC either. Thus, 13363 performed below the data availability target in Q3 2016 again (92.2%).
  Reply from IHMS:
  IHMS are working on a software implementation to generate SYNOP reports automatically from AWSs every hour for the stations in the international exchange by the end of the year 2016: Pljevlja, Niksic, Bar and Podgorica.
  Unfortunately, for the Station in Niksic, 13459, AWS does not operate since June 2016 and we are not able to send reports at night, due to already defined schedule for observers.
  To send SYNOP reports automatically on an hourly basis it is required to ensure the Internet at the station and to adapt the software to create automatic reports from AWS, ensure the operational work and maintenance. Work is in progress to fulfill the requirements.
  EUCOS surface land station 13363 PLEVLJA exceeded the target on pressure RMSE error of 1 hPa in Q3 2016 again (1.4 hPa).
- *BUFR migration:* no BUFR messages of surface land stations 13457 and 13462 have been received so far.
  Reply from IHMS:
  IHMS plan to ingest data in BUFR code from airports Podgorica-Golubovci 13462 and Tivat 13457 to GTS end of 2016. 13462 and 13457 are property of the SMATSA LLC as provider for aeronautical meteorological services in Montenegro (SERBIA AND MONTENEGRO AIR TRAFFIC SERVICES – SMATSA LLC). Having in mind that in WMO community IHMS is recognized as national authority to redistribute data from the entire territory of Montenegro, including 13462 and 13457, in accordance with Conventions, national laws and agreement with SMATSA LLC.

Problems resolved:
Nothing to report.

KNMI, The NETHERLANDS

Networks of Member: The Netherlands - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	15,254	98.7%	99.1%	99.2%			0.8K	1.9m/s	3.6%	0.4hPa
Radiosonde network	111	59.8%	94.6%	95.5%	97.3%	95.5%	1.1K	2.9m/s	5.8%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	6,059	68.6%	100.0%					2.9m/s		
Weather radars WRWP	51,828		100.0%					2.7m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS	1,747		92.0%	97.2%			1.4K	4.1m/s	8.4%	1.1hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	51,888	97.9%	99.5%	99.7%						
Weather radar PPD	17,279	97.8%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* 06260 in general provides only one ascent per day at 00 UTC and further ascents on demand rather than 2 ascents daily as required by the EUMETNET Observations Programme.

To be noted:

- *OPERA:* Den Helder radar will be replaced with a new dual – pol radar after the 26th of September 2016. It is estimated Den Helder being offline from the ODC for up to 8 weeks until the new radar is built and ready to go operational.

New issues:

- *Surface land stations:* 06239 EHFD F/03 had significant timeliness issues and few short-term data outages in July and August and therefore the station didn´t achieve the timeliness target transmitting data within 100 min in 95% in July and August 2016 (performance HH+100 in July: 92.8%, August 2016: 92.4%) and didn´t achieve the data availability target in August 2016 (94.0%). On quarterly average both targets were achieved (Q3 2016 data availability: 96.6%, timeliness HH+100: 95.1%).
  06290 Twenthe had a data outage from 06.08.2016, 14 UTC till 10.08.2016, 01 UTC and therefore didn´t achieve the data availability target in August 2016 (89.4%). On quarterly average the target was achieved (Q3 2016: 96.1%).
- *Radiosonde stations:* 06260 DeBilt didn´t meet the target reaching 100 and 50 hPa geopotential heights in July 2016 (July 2016 avg reaching 100 hPa: 94.4%, reaching 50 hPa: 88.9%) but on quarterly average the targets were met in Q3 2016 (reaching 100 hPa: 97.3%, reaching 50 hPa: 95.5%). Furthermore didn´t the station achieve the target transmitting BUFR radiosonde data containing the entire soundings within 100 min. on monthly basis in July and September 2016 (July 2016: 94.4%, September 2016: 94.7%).
- *E-PROFILE wind profilers:* WP Cabauw (06348) didn´t provide any data from 08.02.16, 10 UTC till 28.07.16, 06 UTC and therefore didn´t achieve the data availability target in Q3 2016 again (68.6%).

Ongoing issues:

- *Conventional VOS ships:* 6 out of 19 Dutch conventional VOS ships providing BUFR ship data within the EUCOS area in Q3 2016 didn´t achieve the timeliness target HH+50 in ≥90%, whilst 2 ships (PDGS, YJRJ3) didn´t achieve the timeliness target HH+100 in ≥95%.
  19 out of 45 Dutch ships reporting either FM13 or BUFR ship data in the period exceeded the accuracy target on pressure RMSE of 1 hPa (worst quarterly averaged P RMSE errors within the period: OXOR2 3.55 hPa, OYGR2 4.9 hPa, VRGW3 9.4 hPa).

Problems resolved:

- *Conventional VOS ships:* Conventional VOS ship PCGM showing large pressure RMSE in the past (avg Q1 2016: 4.8 hPa) didn´t provide any pressure observations in Q2 2016. The ship reported pressure observations in Q3 2016 again and showed good O-B results (quarterly avg 0.6 hPa).

Met-Norway, NORWAY

Networks of Member: Norway - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	47,917	98.6%	99.4%	99.6%			1.3K	2.9m/s	5.4%	0.5hPa
Radiosonde network	956	85.4%	90.3%	93.7%	97.8%	95.4%	0.9K	2.9m/s	4.9%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	77,658		100.0%					3.9m/s		
E-SURFMAR										
Automated VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Conventional VOS	No data available within the EUCOS area in the evaluated period Q3 2016.									
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	259,956	98.1%	99.6%	99.8%						
Weather radar PPD	86,571	98.0%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Surface land stations:*
  01068 Hopen have at times timeliness problems. Hopen is communicating by satellite link. At this altitude, communication links are vulnerable to absorption in atmosphere. Hopen is a manned station, and alternative communication channel is to send observations by radio to another manned station, and let them send the observation. This is a time consuming procedure. Timeliness problems will occasionally occur at Hopen and there are no immediate solutions to the problem.
- *Radiosonde stations:*
  Radiosonde station 01004 launches only once per day and second ascents on demand.
  Radiosonde Station 01400 is located at the oil rig platform Ekofisk. It experiences higher frequency of high wind speeds that reduces number of releases. In addition the oil company have put restrictions on releases in some wind sectors dependent on wind speeds. By these reasons 01400 Ekofisk will usually have a yearly deliverance of maximum 75%. 01400 Ekofisk is using 200g balloons because the station uses helium instead of hydrogen. Thus early balloon burst and corresponding low geopotential height performance might happen.
  Ny-Alesund 01004 operated by Alfred Wegner Institute launches only one ascent per day (currently there aren´t any plans to permanently increase the number of radiosonde releases).
  01241 Ørland is an airport. When the balloon is ready to be released, the operator shall get a launch box to confirm free airway for the radiosonde. During network failure the operator does not get any launch box. Autosonde producer has today no possibility for re-sending the launch box, and without this the radiosonde release is impossible.

New issues:

- *Surface land stations:* 01102 Sklinna Lighthouse stopped reporting BUFR SYNOP data on 16.09.2016, 06 UTC and therefore didn´t achieve the data availability target in Q3 2016 (83.3%). The station started reporting again on 01.11.2016, 23 UTC.
  01400 Ekofisk had a few short-term data outages in July 2016 and therefore didn´t achieve the data availability target in July 2016 (89.0%). On quarterly average the target was achieved (Q3 2016: 95.9%).
- *Radiosonde stations:* Andoya 01010 didn´t achieve the data availability target in Q3 2016 due to sporadic missing soundings especially in July but also in September 2016 (quarterly avg providing 2 ascents per day: 88.6%).
  In Q3 2016 the timeliness targets transmitting BUFR messages containing radiosonde data up to 100 hPa within 50 min as well as transmitting BUFR messages containing the entire soundings within 100 min weren´t achieved by Ekofisk (HH+50: 66.7%, HH+100: 81.8%). Andoya 01010 had delays throughout the period Q3 2016 transmitting BUFR messages containing the entire soundings (Q3 2016 avg: 91.6%). Orland 01241 didn´t achieve the timeliness target transmitting BUFR messages containing the entire soundings within 100 min due to delayed data transmission in September 2016 (September avg: 86.9%, Q3 2016 avg: 94.3%) whilst Bjornoya 01028 didn´t achieve the timeliness target transmitting BUFR messages containing the entire soundings within 100 min due to delayed data transmission in July 2016 but achieved the target on quarterly average (July avg: 93.4%, Q3 2016 avg: 97.3%).

Ongoing issues:

- *Radiosonde stations:* Orland 01241 didn´t achieve the data availability target in Q3 2016 again due to sporadic missing soundings especially in July and September 2016 (quarterly avg providing 2 ascents per day: 91.9%).
  Reply from Met Norway:
  01241 Ørland radiosonde had several missing soundings in second quarter 2016. There are, as before, in case of short breaks in network connection problems with getting up the launch box. This will be solved in an eventual

upgrade, but there are no plans of upgrade within the next year. There had also been other smaller hardware problems. Some of these have appeared at the start of a weekend which leads to several lost soundings.
The radiosondes 01415 Sola was upgraded in the 2nd quarter 2016, 01010 Andøya was upgraded 3rd quarter 2016.
[Ekofisk provided 83.7% of 2 soundings per day in Q3 2016 and performed slightly below the generally agreed targets for radiosonde land stations but within the agreed target for Ekofisk. ***See box "National restrictions"****].*

Problems resolved:

- *Surface land stations:* the EUCOS QMP didn´t consider all BUFR messages from oil rig platforms Gullfaks (01300 = LF3J) and Ekofisk (01400 = LF5U) but only the 3-hourly data because it only considered BUFR reports which contained "Type of station" (Descriptor 0 02 001) 1 = Manned because the first BUFR received long end of 2014 contained this setting for "Type of station" = 1. Nowadays BUFR reports with "Type of station" = 1 (manned) at synoptic hours 00, 03, 06 UTC, etc. are provided whilst the intermediate hours refer to "Type of station" = 0 (automated) and don´t contain information on visibility, present weather and clouds. The EUCOS QMP has been adapted to consider both message types.
- *Surface land stations:* Svalbard 01008 had several short term outages and occasionally timeliness issues within the period 18.04.16 till 06.05.16 leading to lower data availability performance in Q2 2016 (90.3%). The situation improved in Q3 2016 and the target was met again (99.7%).
  Reply from Met Norway:
  01008 Svalbard Airport had several outages between 18/4 to 6/5 2016. Switch was changed at 6/5-16. Later there have been some problems in precipitation measurements, except this there have not been any outages since 6/5.

IMGW, POLAND

Networks of Member: Poland - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	33,114	100.0%	99.7%	100.0%			1.4K	1.9m/s	5.5%	0.5hPa
Radiosonde network	551	99.8%	0.0%	97.8%	99.5%	97.1%	1.6K	3.9m/s	1.1%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	75,108		100.0%					3.5m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS	23		52.2%	78.3%			3.4K	2.5m/s	0.0%	0.5hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	93,645	99.3%	96.0%	97.4%						
Weather radar PPD	60,063	97.2%								

New issues:

- *Conventional VOS ships:* BUFR SHIP data provided by Polish conventional VOS ship SQLZ within the EUCOS area didn´t meet the timeliness targets in Q3 2016 (transmitting BUFR SHIP data within 50 min: 52.2%, within 100 min: 78.3%).

Ongoing issues:

- *Surface land stations:* Lodz 12465 slightly exceeded the target on pressure RMSE in Q3 2016 again (1.2 hPa) due to pressure RMSEs exceeding the target of 1.0 hPa throughout the period.
- *Radiosonde stations:* Polish radiosonde stations didn´t achieve the timeliness target transmitting BUFR messages containing radiosonde data up to 100 hPa within HH+50 (0%) in Q3 2016 again because these messages (reformatted TEMP parts A and B) were sent out after balloon burst throughout the period. Furthermore IMGW still converted TEMPs into 4 BUFR messages. Work has been in progress to solve this issue. Since 15.11.2016, 00 UTC all 3 Polish radiosonde stations provided high resolution BUFR radiosonde data from Vaisala RS41 sondes fulfilling WMO requirements (2 BUFR messages: one containing data up to 100 hPa, the second containing the entire sounding, both containing additional meta data information).

Leba 12120 didn´t achieve the target reaching 50 hPa geopotential heights in Q3 2016 again due to early balloon bursts especially in July and August 2016 (Q3 2016 avg reaching 50 hPa: 92.9%).

- *E-PROFILE weather radars:* No VAD wind radar data have been received from radar site Pastewnik (12544) since 02.01.2016, 19 UTC.
- *OPERA*: Polish weather radar Pastewnik (SOWR_43) didn´t provide any radar ICD data to Odyssey since 02nd January 2016 till the end of the evaluated period.
- *BUFR issues:* station positions and station heights given in OSCAR and encoded in BUFR metadata for several Polish surface land stations don´t coincide (link to OSCAR added to the station name).

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	12210	RESKO-SMOLSKO	53.763611	15.393333	52.0
BUFR (red)	12210	RESKO	53.7666	15.4166	52.0
WMO (green)	12215	SZCZECINEK	53.714722	16.746667	139.41
BUFR (red)	12215	SZCZECINEK	53.71659	16.6833	137
WMO (green)	12285	OSTROLEKA	53.0675	21.5352777778	94.4
BUFR (red)	12285	OSTROLEKA	53.0833	21.5666	94.0
WMO (green)	12385	SIEDLCE	52.181111	22.244722	151.9
BUFR (red)	12385	SIEDLCE	52.1833	22.26659	152.0
WMO (green)	12435	KALISZ	51.781944	18.081944	137.29
BUFR (red)	12435	KALISZ	51.73329	18.08329	138.0
WMO (green)	12580	RZESZOW-JASIONKA	50.111389	22.0200	211.48
BUFR (red)	12580	RZESZOW-JASIONKA	50.09999	22.04999	195.0
WMO (green)	12595	ZAMOSC	50.697778	23.206389	222.17
BUFR (red)	12595	ZAMOSC	50.7	23.2499	212.0

Problems resolved:

Nothing to report.

IPMA, PORTUGAL

Networks of Member: Portugal - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	17,311	87.4%	99.6%	99.9%			1.6K	3.0m/s	5.3%	1.1hPa
Radiosonde network	275	49.8%	0.0%	0.0%	99.3%	98.9%	1.3K	3.8m/s	9.0%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	25,617		100.0%					5.4m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	36,928	98.9%	99.7%	99.7%						
Weather radar PPD	24,709	93.3%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Surface stations:* 08551 provides SYNOP data of main and intermediate synoptic hours (every 3 hours) only.
- *Radiosonde stations:* all Portuguese radiosonde stations provide only one ascent per day (at 12 UTC) rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *Surface land stations:* 08570 Castelo Branco had several short-term data outages in September and therefore didn´t achieve the data availability target in Q3 2016 (September avg: 79.3%, Q3 2016 avg: 92.9%).
- *E-PROFILE weather radars:* weather radar Faro 08553 exceeded the accuracy target regarding wind RMSVD values in Q3 2016 due to large errors throughout the period (6.2 m/s).
- *OPERA*: Radar site Arouca /Pico do Gralheiro (LPMG_43) had several data outages as well as timeliness issues providing radar incoming data with significant delays to Odyssey in August 2016 which led to a low data

availability performance of incoming data ICD and pre-processed data PPD in Q3 2016 (August avg data availability ICD: 90.3%, PDD: 62.1%, Q3 2016 ICD: 96.8, PPD: 86.4%).

Ongoing issues:

- *Surface stations:* Horta 08506 provided only 3-hourly BUFR SYNOPs throughout the period again whilst FM12 SYNOP data were available on an hourly basis on GTS. IPMA is kindly asked to ingest hourly BUFR SYNOP data of 08506 onto GTS as soon as possible.
- Data of a few Portuguese surface land stations showed constant pressure biases in Q3 2016 again. It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. The stations in question are (more details were given in the QM report Q2 2016): 08506 Horta (P RMSE 1.0 hPa), 08515 Santa Maria (1.2 hPa), 08548 Coimbra Cervache (1.5 hPa), 08554 Faro (0.8 hPa).
  Reply from IPMA:
  Regarding metadata, we only had some problems updating pressure height; they were submitted in OSCAR support form. At this time we have not yet received any feedback.
  However, we have successfully updated station Lat/Lon in OSCAR and we expect to include it in BUFR early next week.
- *Radiosonde stations:* Again all Portuguese radiosonde stations showed low timeliness performances regarding transmission of BUFR data up to 100 hPa within HH+50 as well as transmitting BUFR data containing the entire soundings within 100 min after nominal observation time. None of the data were provided within the timeliness targets in Q3 2016.
  Reply from IPMA:
  On the sounding problem, we have already defined a plan to correct it. Our first tests seem to have positive results. We hope it will be possible to improve our 'performance' before the end of 2016.

Problems resolved:

- *Surface stations:* Horta 08506 and Santa Maria 08515 suffered from timeliness issues from 15.03.2016 till 26.04.2016 with an averaged timeliness of > 60 minutes leading to a low timeliness performance in March and April 2016. The situation improved in Q3 2016 and the timeliness target HH+50 was achieved by both stations (08506: 99.7%, 08515: 99.6%).
  Flores 08501 showed a large specific humidity error since January 2016 with an increasing trend. The quarterly average of HUM dq/q* in Q2 2016 of 37.4% significantly exceeded the target of 10%. The situation improved again on 27.06.2016 and the target was met again in Q3 2016 (5.0%).
- *Radiosonde stations:* Funchal 08522 didn´t achieve the targets reaching 100 and 50 hPa in Q2 2016 due to occasional early balloon bursts throughout the period (reaching 100 hPa: 91.2%, reaching 50 hPa: 90.8%). The situation improved in Q3 2016 and the targets were met (reaching 100 hPa and 50 hPa both: 98.9%).

RHMSS, SERBIA

Networks of Member: Serbia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	10,939	99.1%	100.0%	100.0%			1.8K	1.8m/s	8.8%	1.2hPa
Radiosonde network	178	96.7%	0.0%	100.0%	100.0%	98.3%	1.0K	3.3m/s	6.8%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	No data available within the evaluated period Q3 2016.									
Weather radar PPD										

New issues:
Nothing to report.

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1180 Bruxelles, Belgique,
Reg. 0818.801.249 - RPM Bruxelles

Ongoing issues:

- *Surface land stations:* the following surface land stations exceeded the target regarding pressure RMSE in Q3 2016 again due to sporadic large errors in O-B results within the period: 13489 (1.8 hPa) and 13370 (1.3 hPa).
- *Radiosonde stations:* No BUFR messages up to 100 hPa have been provided by 13275 within Q3 2016 again. RHMSS has been contacted directly asking to make corresponding corrections to follow WMO regulations transmitting BUFR messages up to 100 hPa after reaching 100 hPa levels besides BUFR messages containing the complete ascent.
- *OPERA:* Serbia had started sending data from radar site Samos in the beginning of 2014 but unfortunately the radar data provision had to be stopped due to technical problems at the site in Q4 2014. No new radar data have been received since then.

Problems resolved:

- *Surface land stations:* surface land station 13388 exceeded the target regarding pressure RMSE in Q2 2016 due to sporadic large errors in O-B results within the period: (1.6 hPa). The situation improved in Q3 2016 and the target was met again (0.8 hPa).

SHMU, Slovak Republic

Networks of Member: Slovakia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	8,828	100.0%	100.0%	100.0%			1.4K	2.3m/s	7.3%	0.5hPa
Radiosonde network	183	99.5%	98.4%	96.2%	100.0%	99.5%	0.8K	3.2m/s	6.4%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP										
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	No data available within the evaluated period Q3 2016.									
Weather radar PPD										

New issues:

Nothing to report.

Ongoing issues:

- *OPERA*: Slovakian weather radars Maly Javornik (LZIB_41) and Kojsovska hola (LZIB_51) didn´t provide any ICD incoming data to Odyssey within the period Q2 2016 again.
- *BUFR issues:* station positions given in OSCAR and encoded in BUFR metadata for Slovakian surface land station 11816 BRATISLAVA-LETISKO don´t coincide (link to OSCAR added to the station name). SHMU has been contacted directly asking to make corresponding corrections either in OSCAR or BUFR:

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	11816	BRATISLAVA-LETISKO	48.2000	17.2000	133
BUFR (red)	11816	BRATISLAVA-LETISKO	48.1702	17.2073	133

Problems resolved:

- *BUFR issues:* station positions and station heights given in OSCAR and encoded in BUFR metadata for several Slovakian surface land stations didn´t coincide (link to OSCAR added to the station name) in the past. SHMU made corresponding corrections in BUFR:

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	11916	CHOPOK	48.983333333	19.6000	2005
BUFR (red)	11916	CHOPOK	48.98	19.6	2005

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	11933	STRBSKE PLESO	49.116666667	20.083333333	1354
BUFR (red)	11933	STRBSKE PLESO	49.11	20.08	1355

ARSO, Slovenia

Networks of Member: Slovenia - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	2,208	100.0%	100.0%	100.0%			2.6K	2.7m/s	8.6%	0.4hPa
Radiosonde network	92	50.0%	0.0%	100.0%	87.0%	55.4%	1.0K	3.4m/s	8.3%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers										
Weather radars WRWP	11,091		100.0%				Currently no OBS-NWP data available			
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	25,653	96.9%	95.2%	95.2%						
Weather radar PPD	8,441	95.6%								

Please note: currently VAD wind data of Slovenian weather radars cannot be monitored by ECMWF obs minus background. Work is in progress to solve this issue.

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* in general 14015 provides only one ascent per day rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:

- *OPERA*: Slovenian weather radar Pasja Ravan (LJLM_42) didn´t achieve the timeliness target transmitting ICD incoming data within 8 min. to Odyssey due to significant delays from 02.-06.07.2016 as well as from 10.-15.07.2016 but the timeliness target was achieved on quarterly average in Q3 2016 (avg July 2016: 71.9%, Q3 2016: 90.5%).

Ongoing issues:

- *Radiosonde stations:*. No BUFR messages up to 100 hPa have been provided by 14015 Ljubljana within Q3 2016. ARSO has been contacted directly asking to make corresponding corrections to follow WMO regulations transmitting BUFR messages up to 100 hPa after reaching 100 hPa levels besides BUFR messages containing the complete ascent.
  The targets reaching geopotential heights of 100 and 50 hPa weren´t achieved by Ljubljana 14015 in Q3 2016 again due to early balloon bursts throughout the period (reaching 100 hPa: 87.0%, reaching 50 hPa: 55.4%).

Problems resolved:

Nothing to report.

AEMet, SPAIN

Networks of Member: Spain - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	40,356	97.0%	99.9%	99.9%			1.7K	2.4m/s	6.3%	0.6hPa
Radiosonde network	1,268	98.4%	95.0%	96.3%	99.1%	95.8%	0.9K	3.3m/s	5.4%	-
E-ASAP fleet	20		100.0%	100.0%	100.0%	100.0%	1.2K	3.7m/s	4.8%	-
E-PROFILE			HH+60							
Wind profilers	17,654	66.6%	99.9%					5.3m/s		
Weather radars WRWP	192,655		100.0%					5.5m/s		
E-SURFMAR										
Automated VOS	No BUFR data available within the EUCOS area in the evaluated period Q3 2016.									
Conventional VOS										
Moored buoys	1,924	87.1%	69.0%	91.6%			Currently no OBS-NWP data available			
OPERA			HH+08	HH+10						
Weather radar ICD	196,645	99.0%	99.1%	99.4%						
Weather radar PPD	130,656	98.6%								

Please note: BUFR data of Spanish moored buoy Cabo Silleiro 62084 cannot be monitored by ECMWF obs minus background at present. Work is in progress to solve this issue.

New issues:

- *Radiosonde stations:* La Coruna 08001 didn´t meet the timeliness targets transmitting BUFR messages containing radiosonde data up to 100 hPa within 50 min as well as transmitting BUFR messages containing the entire soundings within 100 min in Q3 2016 (quarterly average transmitting BUFR data up to 100 hPa in 50 min: 73.9%, transmitting BUFR containing the entire soundings in 100 min: 92.9%).
- *ASAP units:* ASES01 couldn´t perform soundings in July and August 2016 due to technical problems. Last sounding in July was launched on 07.07.16, 12 UTC. First sounding in September was launched on 05.09.16, 12 UTC.
- *Moored buoys:* Since 20.07.2016, 21 UTC Cabo Silleiro (62084) either hasn´t provided any data or has provided BUFR buoy data with a significant delay resulting in low data availability and timeliness performances in Q3 2016 (Q3 2016 data availability performance: 87.1%, timeliness performance HH+50: 69.0%, HH+100: 91.6%). The situation remained unchanged until the end of the evaluated period.

Ongoing issues:

- *Surface stations:* no BUFR SYNOP messages of observation hours 00 UTC, 03 and 21 UTC have been received from Spanish surface land stations BADAJOZ TALAVERA LA REAL (08330) and MELILLA (60338) within the period Q3 2016 again leading to a low data availability performances (08330: 61.8%, 60338: 82.8%).
  Reply from AEMET:
  Automatic weather stations are going to be installed at surface land stations 08330 and 60338 (Automated weather station is already working in 08330) and all BUFR SYNOP messages from both stations will be transmitted on time before the end of this year.
- *Radiosonde stations:* 08023 SANTANDER again didn´t meet the target transmitting BUFR data containing the entire sounding within 100 min. (84.1%) due to late arrival of the data.
  08190 performed below the target reaching 50 hPa geopotential heights in Q3 2016 again as well as slightly below the target reaching 100 hPa geopotential heights due to occasional early balloon bursts throughout the period (percentage reaching 100 hPa: 95.6%, 50 hPa: 82.5%).
  Zaragoza Airport 08160 didn´t provide any radiosoundings within the period Q3 2016.
  Reply from AEMET:
  Stations 08001 and 08023: These stations are the two last manual radiosonde stations left in the AEMET obs. network, and this fact somewhat implies lower performance than of those automated. We have forwarded this issue to relevant people in order to do their best to achieve the targets stated. In this sense, I would like to point out that we have in mind to automate these two stations, but unfortunately, some budget cuts have forced us to put this task off for the time being.
  Station 08160: This station is going to be shut down for operational issues and the radiosonde station is going to be moved to the southwestern of Spain (the final location is to be decided in the following months).
- *E-PROFILE wind profilers:* again no data of wind profiler 08059 Punta Galea were provided in Q3 2016.
  Spanish wind profiler Madrid 08221 slightly exceeded the targets on wind RMSVD (quarterly average 5.3 m/s) in Q3 2016 again due to large errors throughout the period.

- *E-PROFILE weather radars:* Spanish weather radars 08019 (5.9 m/s), 08072 (5.6 m/s), 08162 (5.6 m/s), 08364 (6.8 m/s), 08475 (7.0 m/s) and 60028 (7.9 m/s) exceeded the targets on wind RMSVD in Q3 2016 again. Furthermore 08179 (5.2 m/s) and 08228 (5.8 m/s) exceeded the targets on wind RMSVD in Q3 2016. **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**
- *Automated VOS ships:* Spanish automated VOS ship ASES01 didn´t provide any BUFR SHIP data in Q3 2016 although hourly FM13 SHIP messages have been provided throughout the period. Due to the fact that Obs PMT moved to monitoring of BUFR SHIP data only no messages from ASES01 are considered in this quarterly QM report.
  Reply from AEMET:
  The technical issues have been resolved, and hopefully automated VOS ships will be providing BUFR SHIP data shortly.
- *OPERA*: Spanish weather radar LEMM_45 (Corbera) had several short-term data outages in July 2016 and therefore didn´t achieve the target on data availability on a monthly basis but achieved the target on quarterly average (July 2016 avg: 91.4%, Q3 2016 avg: 97.0%).
- *BUFR issues:* station positions given in OSCAR and encoded in BUFR metadata for several Spanish surface land stations still don´t coincide (link to OSCAR added to the station name).
  Reply from AEMET:
  We will update metadata of 08014 in our BUFR database, and the ones of 08330 and 60320 in Vol.A/OSCAR.

Source	WMO ID	Station name	Latitude	Longitude	Station height
WMO (green)	08014	GIJON-MUSEL	43.5600	-5.700833333	5
BUFR (red)	08014	GIJON, MUSEL	43.56	-5.70056	5
WMO (green)	08330	BADAJOZ/TALAVERA LA REAL	38.883333	-6.830556	185
BUFR (red)	08330	BADAJOZ/TALAVERA LA	38.8834	-6.81389	185
WMO (green)	60320	CEUTA	35.913056	-5.344444	87
BUFR (red)	60320	CEUTA	35.88873	-5.34697	87

Problems resolved:

- *Radiosonde stations:* 60018 Tenerife-Guimar didn´t meet the data availability target in Q2 2016 due to several data outages in April and May 2016 (92.3%). The situation improved in Q3 2016 and the target was met (98.9%). La Coruna 08001, Santander 08023 and Murcia 08430 didn´t meet the target reaching 50 hPa geopotential heights in Q2 2016 due to early balloon bursts throughout the period. The situation improved for all 3 stations in Q3 2016 (08001: 97.3%, 08023: 96.7%, 08430: 96.1%).
  Reply from AEMET:
  Station 60018: Such low performance was exceptional and the performance has been over the target during the third quarter.
- *OPERA*: Several Spanish weather radars didn´t achieve the target on data availability due to data outages during the period:
  LEMM_41 (Autilla Pino): 93.5% - data outage 23.04.2016, 19 UTC till 28.04.2016, 06 UTC,
  LEMM_46 (Cerceda): 94.3%- several short-term data outages in April 2016,
  LEMM_48 (Aguion): 94.9% - data outage 26.04.2016, 10 UTC till 29.04.2016, 18 UTC.
  Due to these data outages those weather radars didn´t achieve the target on data being pre-processed by Odyssey either within the period. The situation improved in Q3 2016 and the availability targets providing incoming radar data to Odyssey were achieved (LEMM_41: 98.3%, LEMM_46: 98.6%, LEMM_48: 99.9%).

SMHI, SWEDEN

Networks of Member: Sweden - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	33,051	99.8%	99.8%	100.0%			1.7K	1.9m/s	6.2%	0.4hPa
Radiosonde network	497	67.2%	95.6%	98.8%	97.8%	94.0%	0.8K	2.9m/s	5.6%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	1,437	32.5%	100.0%					5.4m/s		
Weather radars WRWP	37,671		100.0%					11.8m/s		
E-SURFMAR										
Automated VOS	2,400		55.0%	92.1%			1.7K	3.5m/s	-	1.4hPa
Conventional VOS	375		91.7%	93.9%			1.0K	3.5m/s	-	1.9hPa
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	96,687	91.2%	99.2%	99.5%						
Weather radar PPD	96,188	93.3%								

National restrictions: (not meeting EUCOS targets and requirements)

- *Radiosonde stations:* in general radiosonde stations 02185 LULEA-KALLAX and 02527 GOTEBORG/LANDVETTER provide only one ascent per day rather than 2 ascents required by the EUMETNET Observations Programme.

To be noted:

- *OPERA:* On 14 November 2016, radar Hudiksvall will be taken down for an upgrade. Data delivery to Odyssey shall be resumed on 12th of December 2016.

New issues:

- *Radiosonde stations:* Sundsvall 02365 performed below the data availability target in Q3 2016 due to missing soundings from 26.08.2016, 12 UTC till 29.08.2016, 12 UTC as well as from 19.09.2016, 00 UTC till 28.09.2016, 00 UTC (84.6%).
  Lulea-Kallax 02185 and Sundsvall 02365 performed below the target reaching 50 hPa geopotential heights in Q3 2016 due to several early balloon bursts throughout the period (reaching 50 hPa: 02185 87.2%, 02365: 94.2%). Lulea-Kallax 02185 didn´t achieve the target reaching 100 hPa geopotential heights in Q3 2016 either (92.3%).
- *Automated VOS ships:* SHIP data of automated VOS ship SMLQ exceeded the target on pressure RMSE of 1 hPa in Q3 2016 (1.4 hPa).
- *OPERA*: Swedish weather radar Angelholm (ESWI_50) didn´t achieve the data availability target of ICD incoming data and PPD pre-processed data in Q3 2016 (ICD: 82.4%) due to several short-term data outages in August and September 2016.

Ongoing issues:

- *Surface stations:* 02226 exceeded the accuracy target on pressure RMSE in Q3 2016 due to large errors throughout the period (Q3 2016 avg: 2.1 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 63.1955555556°N, 14.5002777778°E, 375.1m and the barometer is located at 63.1955555556°N, 14.5002777778°E, 359.2m (follow link). Height used in ECMWF monitoring: 359.0 m (BUFR 359.0 m). SMHI has been contacted directly asking to make the corresponding changes in OSCAR or BUFR if applicable.
- *Radiosonde stations:* Visby 02591 performed slightly below the data availability target in Q2 2016 due to data outages in April 2016 (94.5%). The situation improved in Q3 2016 and the target was achieved on quarterly average but the target wasn´t met on monthly average due to missing soundings in September 2016 (September 2016 data availability: 83.3%, Q3 2016: 95.6%).
  Goteborg/Landvetter 02527 performed below the target reaching 50 hPa geopotential heights in Q3 2016 again due to several early balloon bursts throughout the period (reaching 50 hPa: 89.7%).
- *E-PROFILE wind profilers:* no wind profiler data of Kiruna have been made available since May 2012. Kiruna started operations again on 25.08.2016, 13 UTC but encountered several short-term data outages in September 2016. Thus, the data availability target wasn´t achieved in Q3 2016 (32.5%) but should be achieved in the next quarter.

- *E-PROFILE weather radars:* all Swedish weather radars showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again (quarterly network average 11.8 m/s). Radar site 02092 showed worst results in Q3 2016 (21.3 m/s). **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**
- *Automated VOS ships:* Swedish automated VOS ship SKEC performed slightly below the timeliness target HH+50 within Q3 2106 (85.9%). Ship SMLQ didn´t achieve the timeliness targets HH+50 and HH+100 within the period (HH+50: 32.4%, HH+100: 88.5%).
- *Conventional VOS ships:* within the evaluated period 3 out of 7 ships providing BUFR SHIP data within the EUCOS area didn´t achieve the timeliness targets (percentage transmitting BUFR SHIP data within 100 min the latest: SLKR: 66.7%, SMGW 75.9%, SLKQ 83.3%).
  Swedish conventional VOS ships SHJC (5.6 hPa), SLKQ (2.6 hPa) and SLKR (2.0 hPa) exceeded the accuracy target on pressure RMSE of 1 hPa in Q3 2016.
- *OPERA*: Swedish weather radar Ostersund (ESWI_42) didn´t achieve the data availability target of ICD incoming data and PPD pre-processed data in Q3 2016 (47.8%) due to several short-term data outages in the beginning of August as well as a longer lasting data outage from 15.08.2016, 16 UTC till 27.09.2016, 10 UTC.
  Vara (ESWI_49) didn´t achieve the data availability target of ICD incoming data and PPD pre-processed data in Q3 2016 again (ICD: 92.8%) due to several short-term data outages in August 2016.

Problems resolved:

- *OPERA*: Swedish weather radars Ornskoldsvik (ESWI_43) and Leksand (ESWI_45) didn´t achieve the data availability target of ICD incoming data and PPD pre-processed data in Q2 2016 due to several short-term data outages. The situation improved in Q3 2016 and the targets were met again (ESWI_43: 96.3%, ESWI_45: 96.7%).

MeteoSwiss, SWITZERLAND

Networks of Member: Switzerland - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	15,440	99.9%	100.0%	100.0%			3.9K	2.3m/s	14.6%	0.7hPa
Radiosonde network	184	100.0%	97.8%	98.4%	100.0%	99.5%	0.8K	3.2m/s	10.2%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	26,239	99.0%	99.9%					3.5m/s		
Weather radars WRWP	21,805		99.7%					7.9m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10						
Weather radar ICD	26,184	98.8%	100.0%	100.0%						
Weather radar PPD	8,756	99.1%								

New issues:

Nothing to report.

Ongoing issues:

- *Surface stations:* SION 06720 exceeded the accuracy target on pressure RMSE in Q3 2016 again showing constant large errors throughout the period (Q3 2016 avg: 1.6 hPa). It is supposed that discrepancies in station and barometer heights given in OSCAR (former Pub 9, Vol. A) used by NWP might result in constant large pressure biases in ECMWF´s O-B results. According to OSCAR the station is located at 46.2186111111°N, 7.3302777778°E, 482m and the barometer is located at 46.2186111111°N, 7.3302777778°E, 482.48m (follow link). Height used in ECMWF monitoring: 482.0 m (BUFR 483.0 m). MeteoSwiss has been contacted directly asking to make the corresponding changes in OSCAR or BUFR if applicable.
- *E-PROFILE weather radars:* all Swiss weather radars showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q3 2016 again (quarterly network average 7.9 m/s). Radar sites Plaine Morte 06726 and Weissfluhgipfel 06776 showed worst results in Q3 2016 (both 10.1 m/s). **It has to be**

noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.

Problems resolved:
Nothing to report.

UKMO, UNITED KINGDOM

Networks of Member: UK - Q3 2016	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE/ O-B gph
Territorial network										
Surface network	26,276	99.2%	99.5%	99.7%			1.0K	2.2m/s	4.8%	0.3hPa
Radiosonde network	899	77.8%	79.3%	92.0%	99.6%	96.1%	0.9K	3.2m/s	5.7%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	46,281	77.6%	100.0%					3.1m/s		
Weather radars WRWP	52,382		100.0%					4.3m/s		
E-SURFMAR										
Automated VOS	86,831		99.3%	99.8%			1.1K	2.8m/s	5.1%	0.6hPa
Conventional VOS	7,242		76.6%	91.1%			1.2K	3.8m/s	6.8%	1.1hPa
Moored buoys	2,205	99.9%	99.3%	99.8%			0.4K	2.2m/s	4.9%	0.7hPa
OPERA			HH+08	HH+10						
Weather radar ICD	582,395	99.2%	99.9%	100.0%						
Weather radar PPD	122,372	96.7%								

National restrictions: (not meeting EUCOS targets and requirements)
- *Radiosonde stations:* The UK radiosonde stations 03238, 03354, 03882 and 03918 provide only one ascent per day and further ascents on demand rather than 2 daily soundings required by the EUMETNET Observations Programme.

New issues:
- *Radiosonde stations:* Camborne 03808 and Herstmonceux 03882 didn´t achieve the target transmitting BUFR data containing radiosonde data of the entire sounding within 100 min in Q3 2016 (03808: 94.0%, 03882: 94.1%). 03882 also showed low timeliness performances transmitting BUFR messages containing radiosonde data up to 100 hPa within HH+50 due to delays especially in July and also August 2016 (57.4%).
- *E-PROFILE weather radars:* Due to a change in 'Originating Center' encoding from '255' (undefined) to '247' ('Operational Programme for the Exchange of weather Radar information (OPERA) - EUMETNET') starting on 23rd May 2016 UK weather radar VAD wind data didn´t enter DWDs database. Thus, no monitoring statistics have been available from 23rd May 2016 till 28th July 2016.
  Weather radars Holehead 03142 (5.1 m/s) and Munduff Hill 03159 (6.4 m/s) exceeded the target regarding wind RMSVD in Q3 2016. **It has to be noted that EUCOS monitoring statistics do not filter out outliers to be able to identify problems and correct them at source (data provider) if possible. Thus, EUCOS monitoring statistics might be slightly worse than other statistics.**
- *Automated VOS ships:* SHIP data of automated VOS ships VRYO3 and ZDLS1 exceeded the target on pressure RMSE of 1 hPa in Q3 2016 (both ships 1.2 hPa). AMOUK11 significantly exceeded the target on T RMSE and specific humidity in Q3 2016 due to large errors in July (T RMSE: 17.0K, specific humidity: 59.1%).
- *OPERA:* Clee Hill (EGRR_43) didn´t provide any radar incoming data ICD to Odyssey from 10.07.2016, 13 UTC till 12.07.2016, 12 UTC as well from 31.07.2016, 18 UTC till 09.08.2016, 15 UTC. Therefore the data availability target of incoming radar data wasn´t achieved in Q3 2016 (August 2016 avg: 71.0%%, Q3 2016 avg: 90.1%).

Ongoing issues:
- *Radiosonde stations:* Albemarle 03238 and Nottingham/Watnall 03354 still showed low timeliness performances transmitting BUFR messages containing radiosonde data up to 100 hPa within HH+50 in Q3 2016 (03238: 63.8%, 03354: 61.9%). 03238 didn´t achieve the target transmitting BUFR data containing radiosonde data of the entire sounding within 100 min either (92.5%).
  Lerwick 03005 didn´t achieve the target transmitting BUFR data of the entire sounding within HH+100 in Q3 2016 again (81.2%).
  03238 didn´t achieve the target reaching 50 hPa in Q3 2016 due to early balloon bursts especially in July 2016 (quarterly avg reaching 50 hPa: 87.5%, July 2016 avg: 56.3%).

- *E-PROFILE wind profilers:* WP Cardington (03559) didn´t provide any data from 18.01.16, 14 UTC till the end of the evaluated period. WP Isle of Man (03203) stopped reporting on 27.01.16.
- *Automated VOS ships:* automated VOS ship VRYO3 providing 4 BUFR SHIP messages within the EUCOS area in Q3 2016 didn´t achieve the timeliness targets (HH+50: 25.0%, HH+100: 75.0%).
- *Conventional VOS ships:* 90 out of 119 conventional VOS ships (75.6%) providing SHIP data within the EUCOS area in Q3 2016 didn´t achieve the target transmitting 90% BUFR SHIP data within 50 minutes, 48.4% (59 ships) didn´t achieve the target HH+100.
  Data of 28 out of 79 British conventional VOS ships (35%) observing within the EUCOS area being assimilated by ECMWF exceeded the accuracy target on pressure RMSE of 1 hPa in Q3 2016 (worst quarterly averaged P RMSE errors: VRWR7 8.7 hPa, C6VR4 3.1 hPa).

Problems resolved:

- *Radiosonde stations:* No BUFR data of soundings from Albemarle (03238) and Nottingham/Watnall (03354) have been received since 15th May 2015, 00 UTC. 03354 provided first BUFR data from 23.05.2016, 00 UTC sounding, whilst 03238 provided first BUFR data from 20.07.2016, 12 UTC sounding.
  BUFR data up to 100 hPa of soundings from 03882 were rarely received in Q2 2016 (launches at 05.04.16, 23:15 UTC, 25.04.16, 11:23 UTC and 23:15 UTC, 11.05.16, 13:46 UTC, 10.06.16, 23:15 UTC, 24.06.16, 23:29 UTC). The situation improved since 03.08.2016, 00 UTC sounding. Since then BUFR data up to 100 hPa have been provided continuously.
  03005 didn´t achieve the target reaching 50 hPa in on monthly average due to early balloon bursts especially in June 2016 (reaching 50 hPa Apr 2016 avg: 94.8%, Jun 2016 avg: 91.7%) but achieved the target on quarterly average (95.0%). The situation improved in Q3 2016 and the target was met again (96.9%).
- *OPERA:* Holehead (EGRR_58) didn´t provide any radar incoming data ICD to Odyssey from 07.09.2015, 10 UTC till 18.05.2016, 08 UTC. Since the restart of operations Holehead showed excellent performance providing 100% of required ICD in June 2016. The situation remained stable in Q3 2016 showing excellent performance (100.0%).
  Although radar ICD data were provided by weather radar Chenies (EGRR_45) within the targeted limits of data availability (100.0%) and timeliness (HH+08: 99.9%, HH+10: 100.0%) these data weren´t pre-processed by Odyssey from 05.05.2016, 11 UTC till 15.06.2016, 08 UTC (Q2 2016 avg PPD: 53.1%). The situation improved in Q3 2016 and 97.8% of incoming data were pre-processed by Odyssey on quarterly average.

Annex 1: EUMETNET Members

1. Austrian Central Institute for Meteorology and Geodynamics (ZAMG), AUSTRIA
2. Royal Meteorological Institute of Belgium (RMI), BELGIUM
3. Meteorological and Hydrological Service of Croatia (DHMZ), CROATIA
4. Cyprus Meteorological Service, CYPRUS
5. Czech Hydrometeorological Institute (CHMI), CZECH REPUBLIC
6. Danish Meteorological Institute (DMI), DENMARK
7. Estonian Environment Agency (ESTEA), ESTONIA
8. Finnish Meteorological Institute (FMI), FINLAND
9. Météo-France, FRANCE
10. Deutscher Wetterdienst (DWD), GERMANY
11. Hellenic National Meteorological Service (HNMS), GREECE
12. Hungarian Meteorological Service (OMSZ), HUNGARY
13. Icelandic Meteorological Office (IMO), ICELAND
14. Irish National Meteorological Service (Met Éireann), IRELAND
15. Italian Airforce - Operational Forces Command - Department for Meteorology (ItAF-ReMet), ITALY
16. Latvian Environment, Geology and Meteorology Centre (LEGMC), LATVIA
17. Service météorologique de Luxembourg (MeteoLux), LUXEMBOURG
18. Royal Netherlands Meteorological Institute (KNMI), The NETHERLANDS
19. Malta Meteorological Office, MALTA
20. Institute of Hydrometeorology and Seismology of Montenegro (IHMS), MONTENEGRO
21. Norwegian Meteorological Institute (Met Norway), NORWAY
22. Institute of Meteorology and Water Management (IMGW), POLAND
23. Portuguese Institute of Ocean and Atmosphere (IPMA), PORTUGAL
24. Republic Hydrometeorological Service of Serbia (RHMSS), REPUBLIC OF SERBIA
25. Slovak Hydrometeorological Institute (SHMU), Slovak Republic
26. Slovenian Environment Agency (ARSO), Slovenia
27. Agencia Estatal de Meteorología (AEMet), SPAIN
28. Swedish Meteorological and Hydrological Institute (SMHI), SWEDEN
29. Swiss Federal Office of Meteorology and Climatology (MeteoSwiss), SWITZERLAND
30. The Former Yugoslav Republic of Macedonia (FYROM), THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA
31. UK Met Office (UKMO), UNITED KINGDOM

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