NWP BASED MONITORING CAPABILTIES – EUMETNET (future RA-VI RWC)

RA-V Working Group on Infrastructure

Singapore, 7-9th November 2017

EUMETNET Observations Programme Management Team
Stefan Klink and Tanja Kleinert

Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

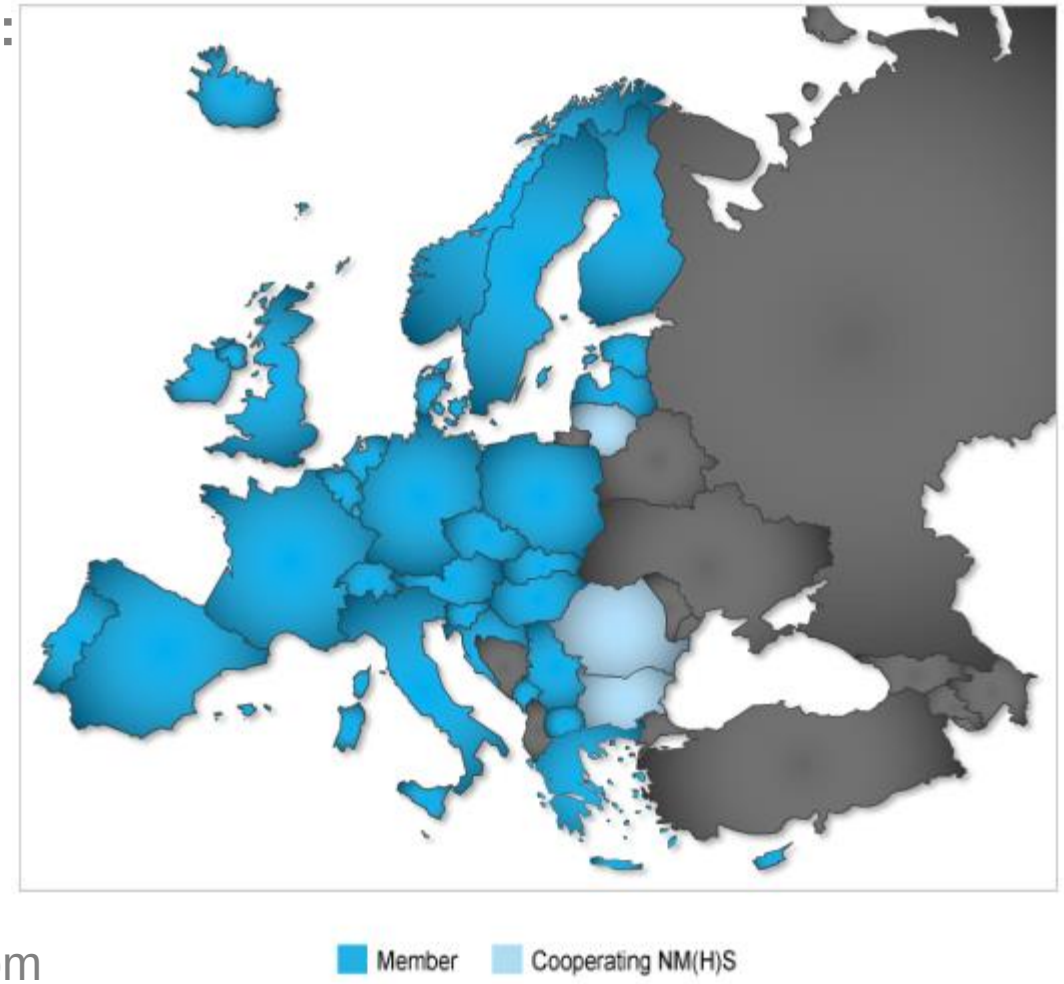
Content

- **Background information on EUMETNET Observations Programme**
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

31 EUMETNET Members

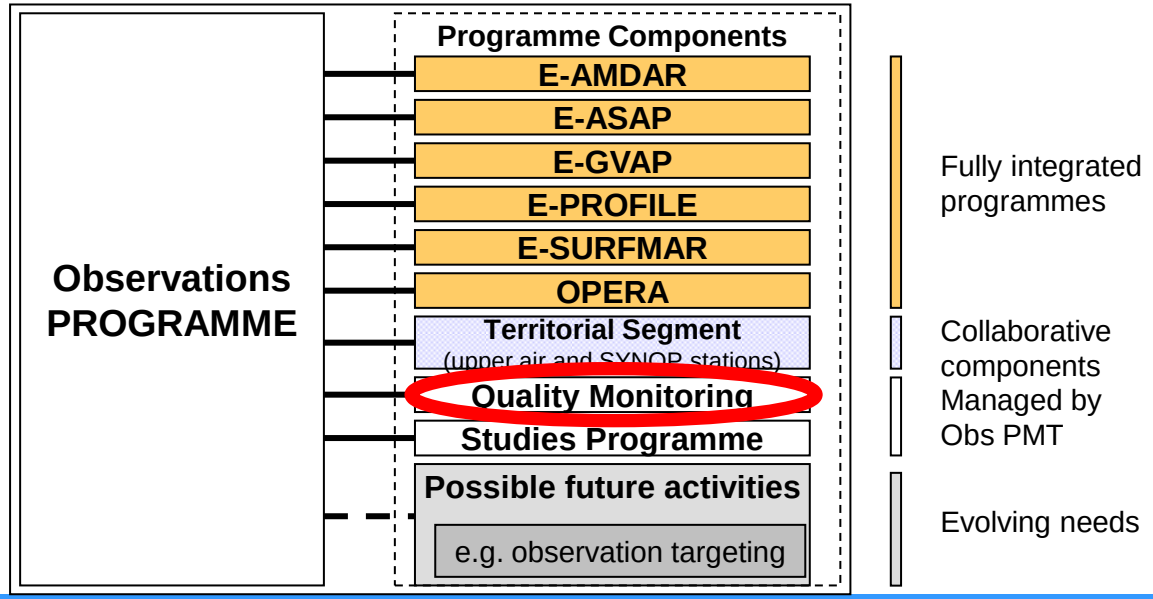
The National Met Services of:

Austria
Belgium
Croatia
Cyprus
Czech Rep.
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Luxemburg
Montenegro
Netherlands
Malta
Norway
Poland
Portugal
Slovakia
Serbia
Slovenia
Spain
Sweden
The FYROM
Switzerland
United Kingdom

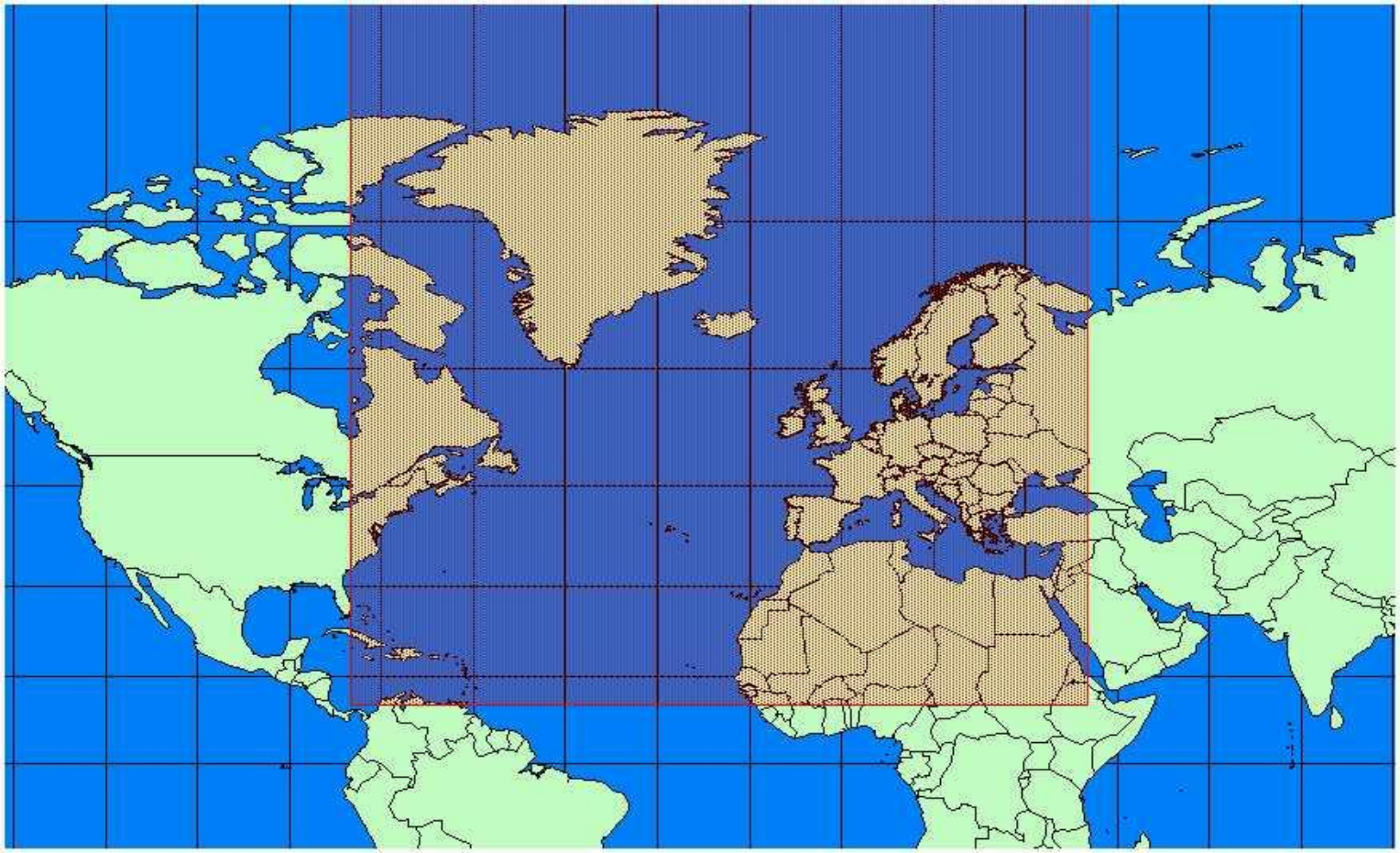


Observations Programme Management Tasks:

- Coordinating the evolution of the ground based EUMETNET Composite Observing System (EUCOS),
- Monitoring the EUCOS performance,
- Supporting Members' observation activities where possible and
- Organising a studies programme.



EUCOS area (10N-90N, 70W-40E)



The current EUCOS networks





- 92 selected European radiosonde stations
- 305 selected European synoptic weather stations
- All AMDAR measurements from European commercial aircraft (daily appr. 700 aircraft)
- All European ships of the Automated Shipboard Aerological Programme (currently 18 ASAP ships)
- 4 selected moored buoys and all European drifting buoys,
- all European Voluntary Observing Ships
- 31 selected European wind profilers and 119 weather radars delivering vertical wind profiles
- 152 selected European weather radars (OPERA)
- Selected European GNSS sites/36 Analysing Centres; 12 super sites

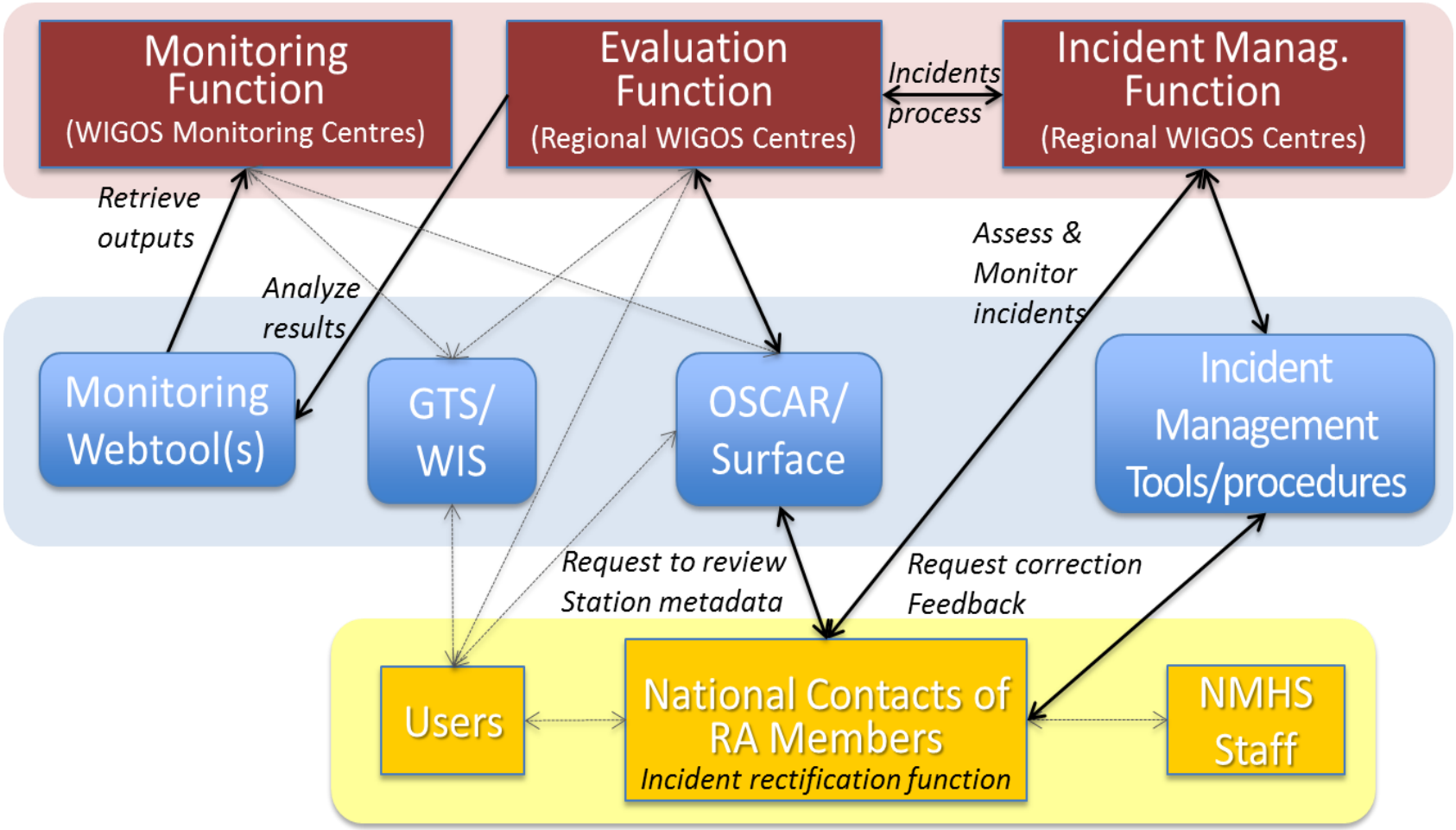




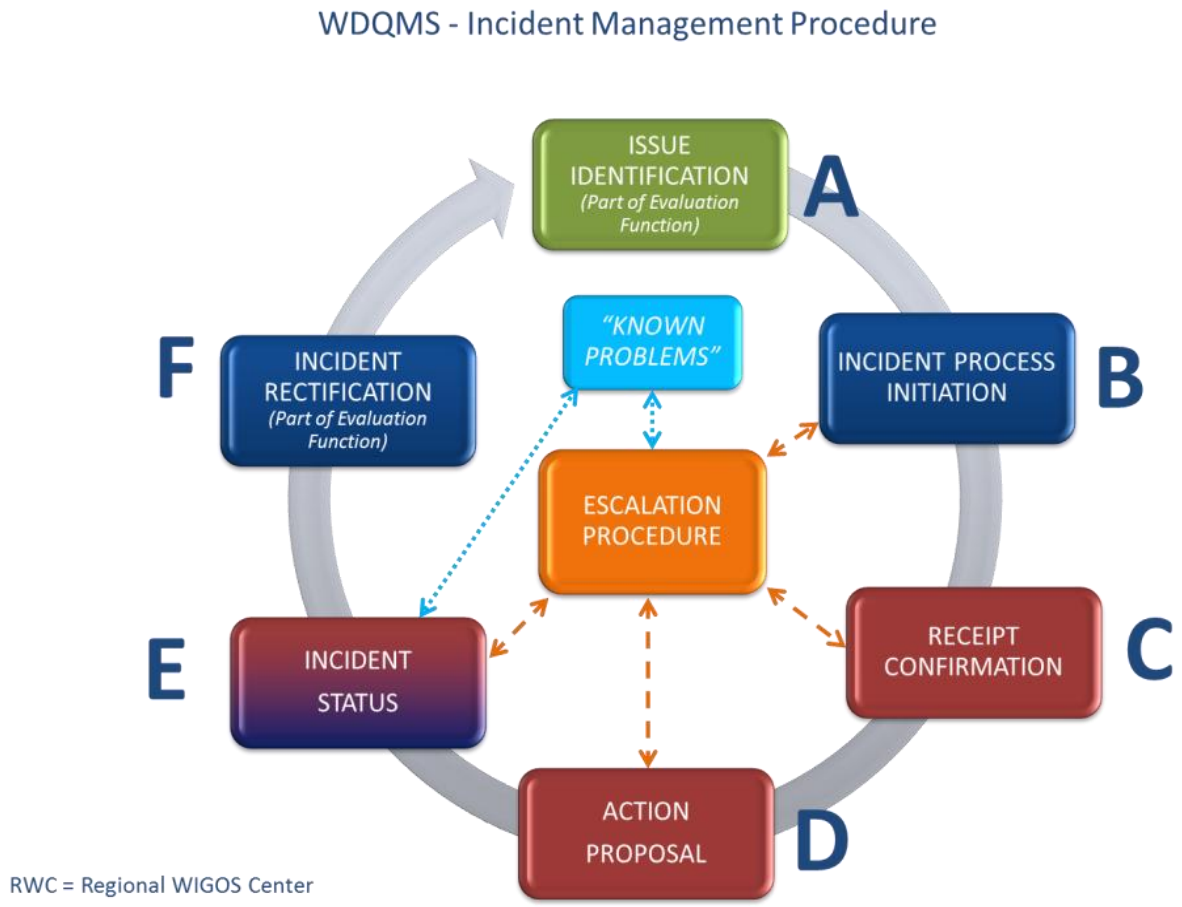
Content

- Background information on EUMETNET Observations Programme
- **WDQMS and the role of RWCs**
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

WIGOS Data Quality Monitoring System (WDQMS)



WDQMS Incident Management Procedure



Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- **EUCOS Quality Monitoring**
  - **Quality Monitoring Portals (Monitoring and Evaluation Function)**
  - Fault reporting
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

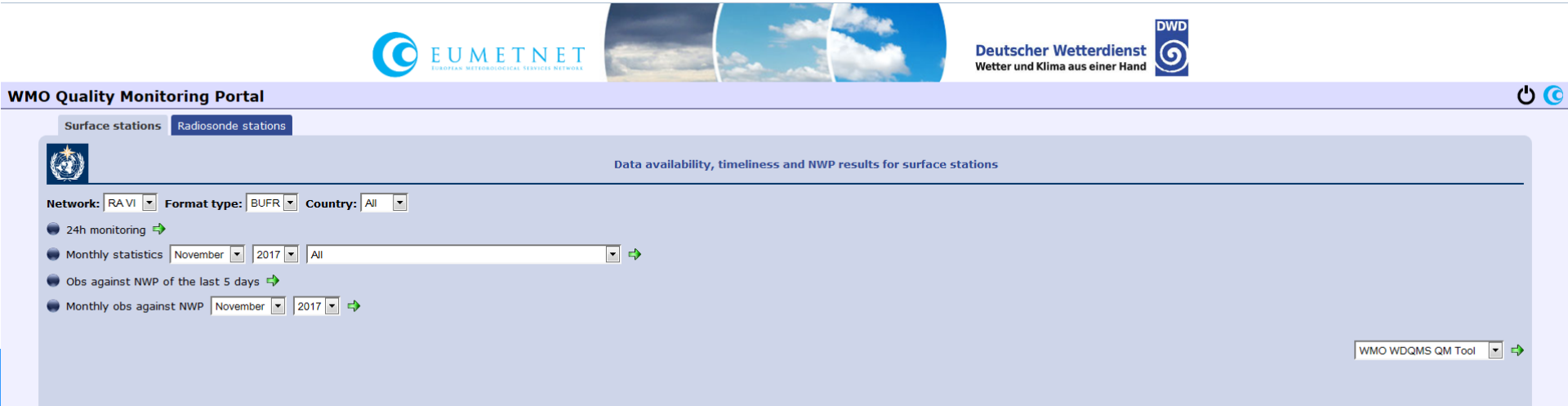
EUCOS Quality Monitoring

- One of the major tasks of the EUCOS Programme Management Team is to monitor the observations of all EUCOS networks regarding the agreed performance standards;
- EUCOS has set up a web based EUCOS Quality Monitoring Portal (QMP) for all EUCOS networks as well as a WMO QMP for RBSN surface land stations and radiosonde stations of RA VI and GCOS stations globally;

https://eucos.dwd.de

WMO Quality Monitoring Portal

- Offers selection of RA VI or GCOS network monitoring
  - RA VI = RBSN surface land stations (883) and radiosonde stations (141) in RA VI Europe
  - GCOS = GSN surface land stations (955) and GUAN radiosonde stations (166) worldwide
- Station lists are uploaded to the portal rather than collecting all available data → chance to identify silent stations
- Selection of a particular country
- Selection of either TAC or BUFR data monitoring



The EUCOS/WMO QMP

- Provides quality monitoring information for several stations or a particular station on the basis of observations archived in DWD's database:
  - on observation totals/data availability and
  - Timeliness
  - Achieving geopotential heights 100/50 hPa (radiosonde stations/ASAP)
- The statistics are provided as tables on a daily and monthly basis;
- storage of the information for 12 months;
- Color-coding if agreed EUCOS targets are exceeded (deactivated for WMO QMP).
- Providing monthly observation totals and average timeliness and percentage achieving EUCOS targets (only EUCOS QMP)

EUMETNET
EUROPEAN METEOROLOGICAL SERVICES NETWORK

The EUCOS/WMO QMP

Surface stations | Radiosonde stations

Monthly statistic of GCOS surface synoptic data BUFR
month 10 year 2017 country code IDN station All

Back

Export as CSV

18 stations found.

SURFACE LAND STATIONS - BUFR

Legend

Identifier	Station	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Σ / Ø
96073	SIBOLGA/PINANGSORI	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		15	15	15	15	15	15	15	15	15	17	15	15	15	15	15	17	15	15	15	15	15	15	15	15	55	14	18	15	14	15	15	16
96145	TAREMPA	8	8	8	7	8	8	8	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	7	8	8	8	8	8	242
		17	15	15	19	15	15	15	15	15	17	15	42	22	15	27	15	15	15	15	15	24	27	15	23	55	14	15	23	16	21	15	19
96163	PADANG/TABING	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		15	17	15	15	15	23	17	15	17	15	15	15	16	15	15	15	15	15	17	15	16	15	15	15	55	14	15	15	14	15	21	17
96745	JAKARTA/OBSERVATORY	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		15	15	20	29	21	15	15	15	17	15	15	21	15	31	15	15	17	22	17	21	49	15	17	15	55	14	15	15	14	15	15	19
96805	CILACAP	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		17	15	15	15	15	21	17	15	15	15	24	15	15	15	15	19	15	15	15	15	15	15	15	15	55	14	15	15	14	15	15	17
96925	SANGKAPURA (BAWEAN IS.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		15	15	22	15	15	15	15	15	21	15	15	15	15	15	15	15	15	15	17	15	15	15	15	15	55	14	15	15	14	15	17	16
97014	MENADO/ SAM RATULANGI	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		15	15	15	15	17	15	15	15	15	21	18	15	15	15	15	15	15	15	15	15	15	15	15	15	57	14	17	15	14	15	15	16
97146	KENDARI/WOLTER MONGINSIDI	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	154
		15	18	15	19	15	15	21	23	21	15	18	24	21	15	15	15	15	21	18	15	25	18	15	15	85	21	18	18	14	19	15	19
97240	MATARAM/LOMBOK INTERNATIONAL AIRPORT	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245
		38	15	15	18	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17	15	15	15	15	94	15	15	15	14	15	20	18
97340	WAINGAPU/MAU HAU	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	6	7	8	8	8	8	8	8	245

Surface stations | Radiosonde stations

Monthly statistic of GCOS radiosonde data BUFR
month 10 year 2017 country code AUS station All

Back

Export as CSV

12 stations found.

RADIOSONDE STATIONS - BUFR

Legend

Identifier	Station	01		02		03		04		05		06		07		08		09		10		Ø / Σ	
94120	DARWIN	2	19	2	18	2	18	2	17	2	20	2	14	2	23	2	15	2	18	2	14	20	17
		16	43	13	43	31	63	20	46	20	52	21	57	18	47	23	54	19	49	15	52	9	25
		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20	20
94203	BROOME	1	10	1	15	1	10	1	17	1	10	1	10	1	13	1	10	1	10	1	10	10	11
		57	95	31	67	29	69	24	55	18	60	52	97	27	62	32	74	26	72	42	89	16	37
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
94294	TOWNSVILLE	1	10	1	9	1	13	1	9	1	9	1	10	1	10	1	10	1	10	1	10	10	10
		32	75	17	64	13	51	23	71	19	59	15	63	29	70	15	53	32	71	19	64	10	32
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
94299	WILLIS ISLAND	1	15	1	13	1	10	1	10	1	30	1	27	1	10	1	13	1	10	1	16	10	15
		12	48	7	47	14	49	18	68	46	61	26	44	14	52	25	60	13	47	11	40	9	25
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
94461	GILES	1	19	1	10	1	10	1	14	1	10	1	10	1	14	1	13	1	9	1	10	10	12
		11	40	32	68	29	70	25	55	19	64	19	62	23	66	29	67	16	68	12	59	10	30
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	10
94510	CHARLEVILLE	-	-	-	-	-	-	-	-	1	100	1	10	1	10	1	14	1	15	1	8	6	26
		-	-	-	-	-	-	-	-	25	-	20	58	48	84	18	50	17	49	15	61	11	30
		-	-	-	-	-	-	-	-	1	-	1	1	1	1	1	1	1	1	1	1	6	5
94610	PERTH	2	12	2	19	2	24	2	22	2	22	2	16	2	20	2	29	2	20	2	28	20	21
		20	58	23	52	12	42	20	44	10	34	7	40	7	37	13	40	9	43	15	37	6	21

The EUCOS/WMO QMP

- Provides accuracy monitoring information for particular stations on the basis of obs minus background of ECMWFs´ first guess
- Parameters depending on the network (temperature, wind, humidity, pressure,…)
- The statistics are provided as tables/time-series plots on a daily and monthly basis;
- Storage of the information for 12 months. Color-coding if agreed EUCOS targets are exceeded.

Surface stations | Radiosonde stations

GCOS Surface stations monthly obs against NWP selection (11/2017)
country code IDN

Back

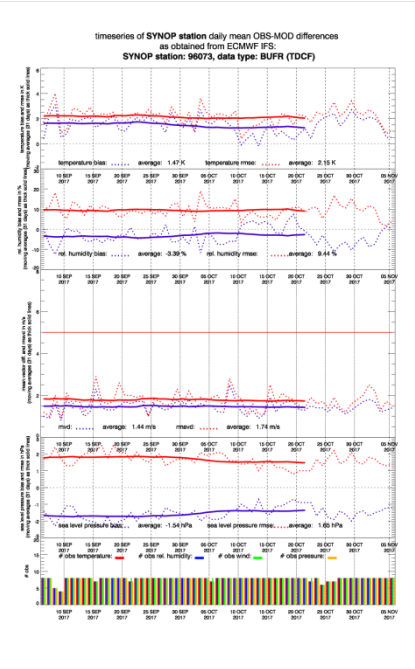
Export as CSV

18 stations found.

Issue: constant P bias (-1.5 hPa) → station meta data?

96073

Identifier	01	02	03	04	05	06	07	08	09	10
	8	8	8	8	8	-	-	-	-	-
	2.1	2.0	1.5	0.5	0.5	-	-	-	-	-
	2.7	2.4	1.6	0.8	1.1	-	-	-	-	-
	8	8	8	8	8	-	-	-	-	-
	1.8	1.7	1.2	1.3	1.4	-	-	-	-	-
	2.5	2.2	1.3	1.7	1.5	-	-	-	-	-
	8	8	8	8	8	-	-	-	-	-
	2.6	3.7	7.3	4.3	4.3	-	-	-	-	-
	11.7	10.4	2.7	1.9	4.0	-	-	-	-	-
	8	8	8	8	8	-	-	-	-	-
	-1.7	-1.5	-1.4	-1.2	-1.2	-	-	-	-	-
	1.8	1.7	1.4	1.3	1.4	-	-	-	-	-
96145	8	8	7	8	8	-	-	-	-	-
	0.6	0.6	1.5	0.6	1.8	-	-	-	-	-
	1.3	1.2	2.6	2.3	2.6	-	-	-	-	-
	8	8	8	8	8	-	-	-	-	-
	4.0	3.0	6.4	2.0	3.0	-	-	-	-	-
	4.1	3.2	13.5	2.5	3.2	-	-	-	-	-
	8	8	7	8	8	-	-	-	-	-
	4.8	5.2	4.3	4.4	5.7	-	-	-	-	-



Radiosonde (and ASAP units in EUCOS QMP)

Additional information for radiosonde stations in TAC and BUFR, e.g.

- 5-days statistics on availability of TEMP parts and achieved burst heights

Surface stations | Radiosonde stations

GCOS 5 days statistic of Station: DARWIN (94120) BUFR

Back

BUFR

07.11.2017

Time	Up to 100hPa	Entire sounding	Burst[hPa]	Link
00	✓ 07.11.2017 00:06:12	✓ 07.11.2017 00:44:32	13	Plot

06.11.2017

Time	Up to 100hPa	Entire sounding	Burst[hPa]	Link
00	✓ 06.11.2017 00:21:38	✓ 06.11.2017 01:03:06	10	Plot
12	✓ 06.11.2017 12:14:13	✓ 06.11.2017 12:31:10	30	Plot

05.11.2017

Time	Up to 100hPa	Entire sounding	Burst[hPa]	Link
00	✓ 05.11.2017 00:20:14	✓ 05.11.2017 01:11:10	10	Plot
12	✓ 05.11.2017 12:13:07	✓ 05.11.2017 12:30:09	30	Plot

04.11.2017

Time	
00	
12	

03.11.2017

Time	
00	
12	

Surface stations | Radiosonde stations

GCOS 5 days statistic of Station: DARWIN (94120) FM35

Back

Issue: launch time 8GGgg only reported in TEMP part B

FM35

07.11.2017

Time	A	B	C	D	Burst[hPa]	Link
00	✓ 07.11.2017 01:31:32	✗ -	✓ 07.11.2017 01:31:32	✗ -	20	Plot
00	✗ -	✓ 07.11.2017 01:31:32	✗ -	✓ 07.11.2017 01:31:32	13	Plot

06.11.2017

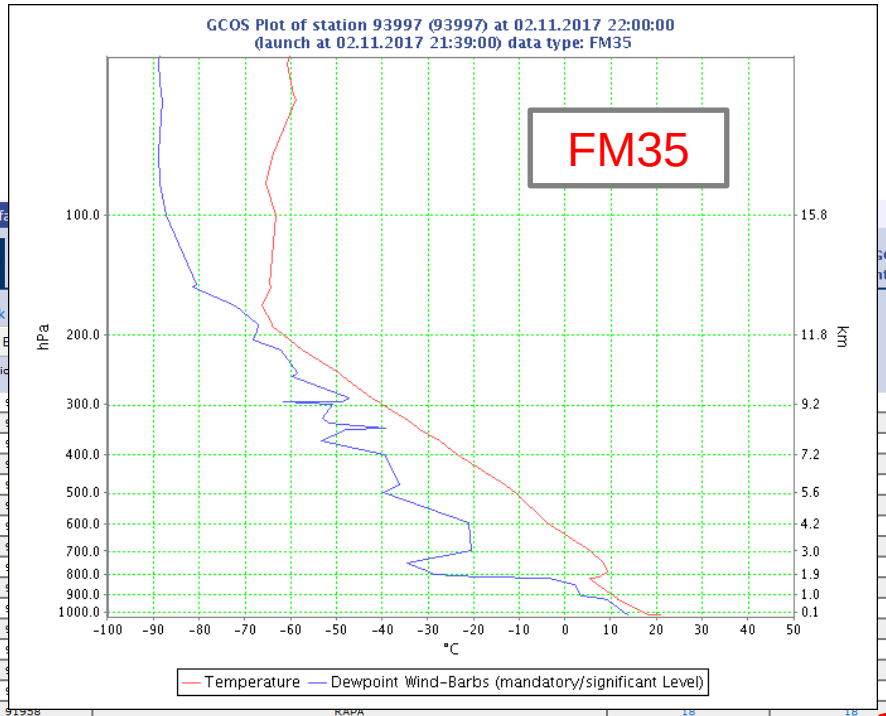
Time	A	B	C	D	Burst[hPa]	Link
00	✓ 06.11.2017 01:32:09	✗ -	✓ 06.11.2017 01:32:09	✗ -	20	Plot
00	✗ -	✓ 06.11.2017 01:32:09	✗ -	✓ 06.11.2017 01:32:09	12	Plot
12	✓ 06.11.2017 13:32:14	✗ -	✓ 06.11.2017 13:32:14	✗ -	30	Plot
12	✗ -	✓ 06.11.2017 13:32:14	✗ -	✓ 06.11.2017 13:32:14	30	Plot

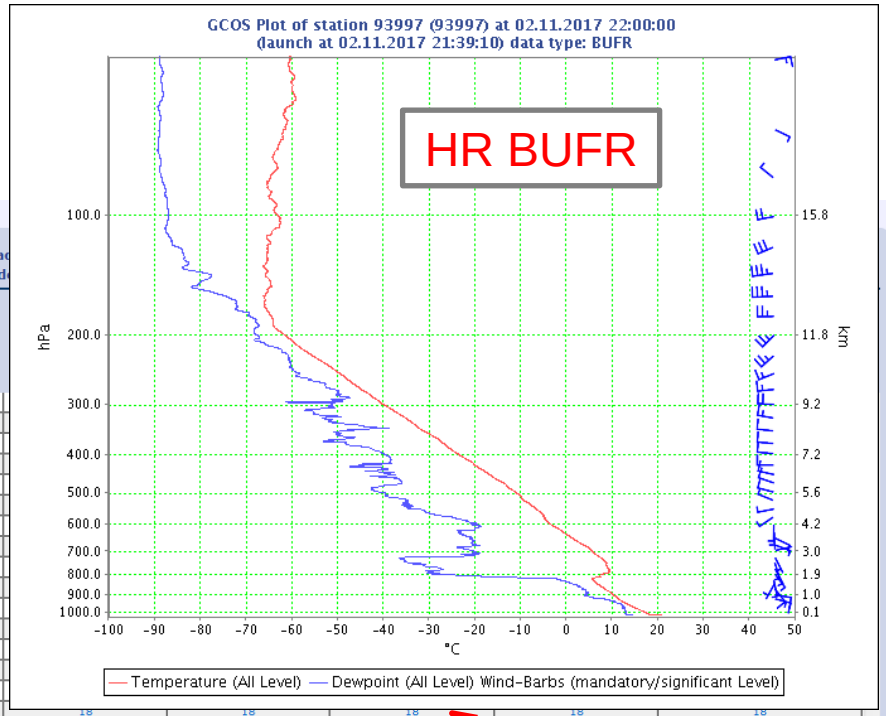
05.11.2017

Radiosonde (and ASAP units in EUCOS QMP)

Additional information for radiosonde stations in TAC and BUFR, e.g.

- Weekly statistics of radiosonde ascents
- Selection of a particular sounding → display of sounding plots



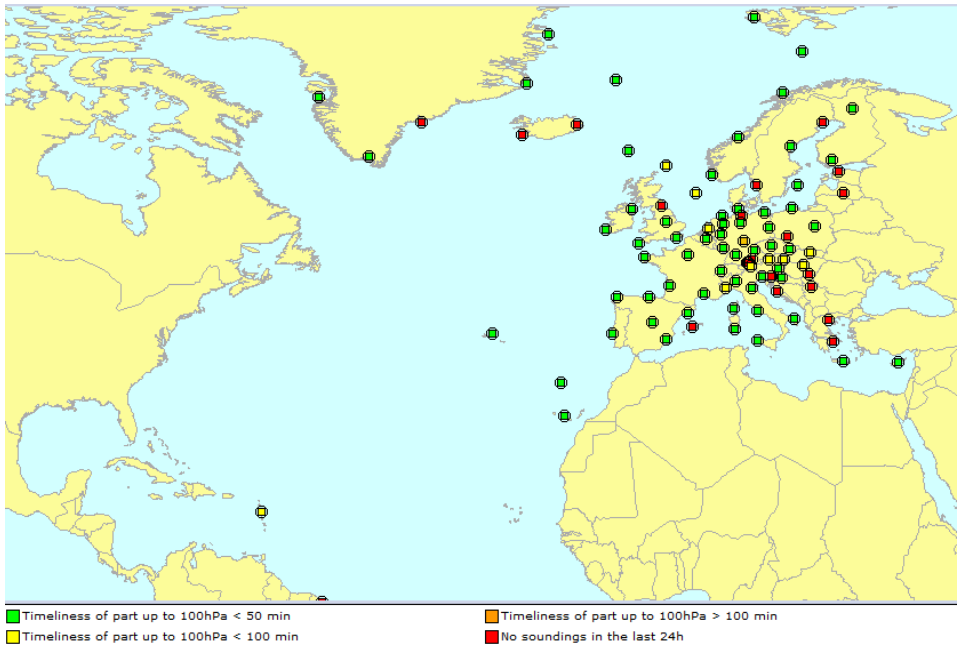


93997 RAOUL ISLAND

EUCOS QMP: Radiosonde and ASAP units

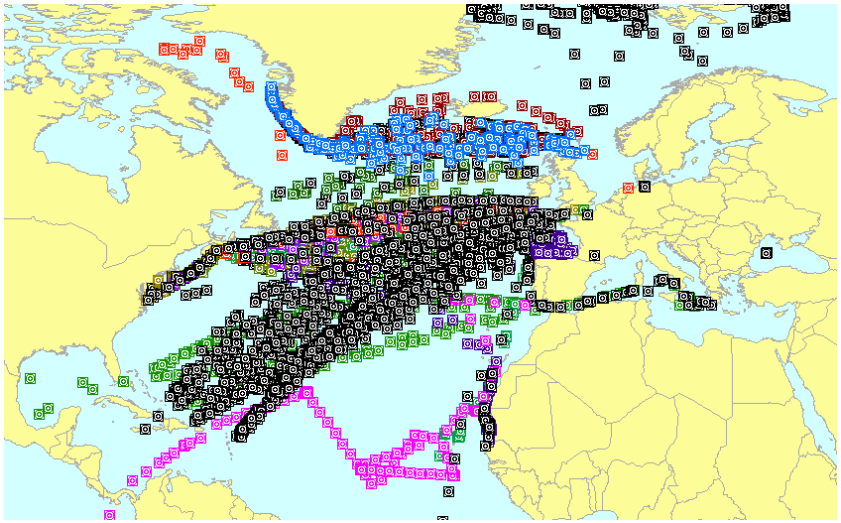
Additional information for radiosonde stations in TAC and BUFR, e.g.

- Station or routing maps
- Radiosonde station map might be additionally introduced to WMO QMP



Radiosonde station map 07/11/17 displaying data availability and timeliness of latest soundings

E-ASAP routes 01/01/17 till 07/11/17 (BUFR data)



Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - **Fault reporting (Incident Management Function)**
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

Fault reporting (IMS)

- Obs PMT contacts NMHSes or Operational Service Managers in case of missing or erroneous data (on the basis of EUCOS QMP) via email
- Fault reports are raised either via email or Word document
- Raised fault reports, status update, closure of faults are documented in a fault log chaser (EUMETNET Portal)
- Not all Members answer to these emails → automated fault reporting is envisaged for the future

EUMETNET Observations Programme Management

OBS FAULT REPORT

PART A: FAULT IDENTIFICATION (Completed by fault reporter)

Reporters Details

Date	13.07.2017	Name	David Knott	Email	david.knott@metoffice.gov.uk
Time	09:00	NMS	Met Office	Tel	+44 (0)7919 880 482

Platform Details

Type of Platform	AMDAR	WMO Number	BAW AFR KLM & EZY

Fault Description

Data stopped from BAW AFR KLM & EZY aircraft from 1600 on 12/07/2017 due to incorrect server started inadvertently by NIM on E-ADAS1.

PART B: PROCESS INITIATION (Completed by OBS PMT)

Date	12.07.2017	Assigned to	E-AMDAR Technical Co-ordinator
Time	09:00	Email	david.knott@metoffice.gov.uk
Fault Number	OBS_FR_223	Priority (low/Medium/high/very high)	

PART C: RECEIPT CONFIRMATION (Completed by responsible PM or National Contact)

Date		Do you confirm responsibility for correcting this fault (Yes/No)	YES
Time		If 'NO' please state reason why	

Details of Proposed Action

Will data continue to be exchanged over the GTS (Yes/No)? YES

PART D: FAULT STATUS (Completed by responsible PM or National Contact)

(Updates are required monthly and when any significant action is taken)

Date	Time	Details of action taken / fault status
13.07.2017	09:15	Senior Tech Coordinator contacted Rockwell Collins (ARINC) about the FTP out connection.
13.07.2017	10:00	Queue of backed up messages from airlines diminished. FR closed and will monitor for any further incidences of the problem.

PART E: Confirmation of Successful Fault Rectification

(To be completed by responsible PM or National Contact and OBS PMT)

	Date	Time
Fault Successfully Corrected	13.07.2017	10:00
Participants informed and fault removed from OBS Faults Log	13.09.2017	13:30

PLEASE RETURN TO EUCOS.PMT@dwd.de or Tanja.Kleinert@dwd.de

	A	B	C	D	E	F	G	I	J	K	BK	BL	BM	BN	BO	BP	BQ	BR	BS
1		230 raised				15 still open				215 resolved									
2																			
3																			
4	Ye	FR no.	Operational service	ID	Station name	NMHS/Operat	Fault raised by/to	Date	Fault description/status updates	resolved	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
												2017							
1048	2017	OBS_FR_216	Surface land stations	06590	Luxembourg	MeteoLux	Joerg Bareiss	03.05.2017 13:00	BUFR messages don't contain T, Td values	05.05.2017		assigned	resolved						
1052	2017	OBS_FR_217	E-AMDAR	EU2593			Stewart Taylor	26.05.2017 00:15	Aircraft reporting incorrect phase of flights. This is resulting in gross errors in the monitoring statistics	25.08.2017		assigned							
1056	2017	OBS_FR_218	Surface land stations	08554	Faro AP	IPMA	Manuel Mendes	06.06.2017 08:30	No SYNOP data received from 08554 since 26.05.17, 18 UTC	07.06.2017			assigned	resolved					
1060	2017	OBS_FR_219	Surface land stations	04005	Bolungarvik	IMO	Sibylle von Löwis	06.06.2017 08:30	No SYNOP data received from 04005 since 21.05.17, 09 UTC	15.06.2017			assigned						
1064	2017	OBS_FR_220	E-AMDAR	EU5643			David Knott	08.06.2017 14:30	Aircraft sending incorrect AMDAR reports and the MetConcentrator was unable to handle them.	29.08.2017			assigned						
1067	2017	OBS_FR_221	E-AMDAR	BAW & EZY			David Knott	11.07.2017 15:00	Data outage of BAW & EZY aircraft missing between 0828-1328UTC due to E-ADAS1 going off line.	11.07.2017				assigned	resolved				
1069	2017	OBS_FR_222	E-AMDAR	EU5612			David Knott	11.07.2017 15:30	SAS aircraft EU5612 has deferred back to 1 minute ENR reporting – should be 15 minutes.					assigned					
1070			E-AMDAR					11.07.2017 15:30	Contact with airline to change back to 15 minute ENR reporting										
1071			E-AMDAR					30.08.2017 10:00	7 more SAS A/C have been identified that are reporting 1 minute ENR: EU0650, EU0016, EU0183, EU5777, EU2598, EU8520, EU0824 and have been excluded in E-ADOS.										
1072			E-AMDAR					30.08.2017 11:00	Still an ongoing issue. Due to the "ad hoc" nature of the fault it is difficult to capture the underlying cause. Investigations continue with SAS & Lufthansa Systems										
1073	2017	OBS_FR_223	E-AMDAR	BAW AFR KLM & EZY			David Knott	13.07.2017 09:00	Data stopped from BAW AFR KLM & EZY aircraft from 1600 on 12/07/2017 due to incorrect server started inadvertently by NIM on E-ADAS1.	13.07.2017				assigned	resolved				
	2017	OBS_FR_224	Radiosonde stations	14015	Ljubljana	SEA	Stane Pajk	13.07.2017 19:30	BUFR radiosonde reports from 14015 sometimes show occasional					assigned					

Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - **Quarterly QM Reports**
  - Monitoring migration to BUFR
- Benefits for EUMETNET Members and lessons learnt

Monitoring: EUCOS network performance Q2 2017

Q2 2017 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%** **94.9%** →	**Target: 90%** **99.6%** →	**Target: 95%** **99.9%** →	---	---	---
Radiosonde stations (Monitoring of BUFR data)	**Target: 95%** **81.0%** ↓	**Target: 75%** **93.9%** ↑	**Target: 95%** **98.4%** →	**Target: 97%** **97.7%** →	**Target: 95%** **92.7%** ↓	---
E-AMDAR						
AMDAR aircraft	**Annual target:** **11 Mio. obs** **3.4 Mio. obs** **(equals 31%)** **EUMETNET funded observations incl. humidity obs.**	**Target: 90%** **92.0%** →	**Target: 95%** **98.4%** →	---	---	***Profile distribution*** **daily profiles** **Target: 718** **1368** ↑ **daily airports** **Target: 129** **209** ↑
E-ASAP						
ASAP units (Monitoring of BUFR data)	**Annual target:** **4,100 obs** **963 obs** **(equals 23%)**	**Target: 75%** **89.2%** ↓	**Target: 95%** **86.7%** ↓	**Target: 90%** **93.5%** ↓	**Target: 75%** **80.3%** ↑	---
E-GVAP		**Timeliness HH+90**				
at least one ZTD timely	**Target: 85%**	**Target: 85%**		-	-	-
12 supersites	90.8% ↑	96.5% ↑				
All sites/Acs	**89.4%** ↑	**97.2%** →				
15 operational Acs	90.3% ↑	97.3% →				
21 non-operational Acs	87.3% ↑	96.8% ↑				
E-PROFILE		**Timeliness HH+60**				
Wind profilers (WP)	**Target: 85%**	**Target: 85%**		---	---	---
Total WP network	70.9% ↓	**99.8%** ↑				
23 operational WP	79.3% ↓	99.8% ↑				
7 non-operational WP **	42.9% ↓	100.0% ↑				
Weather radars (WRWP)	**No target defined***	**Target: 85%**		---	---	---
Total WRWP network	**78.2%** ↑	**99.9%** →				
60 operational WRWP	81.4% ↑	99.9% →				

Monitoring: EUCOS network performance Q2 2017

Q2 2017 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** **1.82 K** ⇑	**Target: 5.0 m/s** **2.50 m/s** ⇑	**Target: 10%** **7.94%** ⇑	---	**Target: 1 hPa** **0.63 hPa** ⇒	---	---
Radiosonde stations	**Target: 1 K** **0.92 K** ⇑	**Target: 5.0 m/s** **3.33 m/s** ⇑	**Target: 10%** **5.86%** ⇑ **10.16%** ⇒ **RH RMSE**	**Target: 65 m** currently not available	---	---	---
E-AMDAR							
AMDAR aircraft	**Target: 1.5 K** **0.96 K** ⇒	**Target: 5.0 m/s** **3.27 m/s** ⇑	**(dq/q* Target: 10%)** **13.66%** ⇓ **RH RMSE**	---	---	---	---
E-ASAP							
ASAP units	**Target: 1 K** **1.26 K** ⇓	**Target: 5.0 m/s** **3.17 m/s** ⇑	**Target: 10%** **6.65%** ⇓ **9.79%** ⇒ **RH RMSE**	**Target: 65 m** currently not available	---	---	---
E-GVAP							
GNSS sites-AC 12 super sites in Q2 2017 9.022 sites in Q2 2017	---	---	---	---	---	---	**NRT ZTD accuracy** **RMS OmB in mm** **Target: 15 mm** **9.74 mm** ⇑ **10.39 mm** ⇓
E-PROFILE							
Wind profilers (WP) **Total WP network** 23 operational WP 6 non-operational WP *	---	**Target: 5.0 m/s** **3.46 m/s** 3.37 m/s ⇑ 4.29 m/s ⇑	---	---	---	---	---
Weather radars (WRWP) **Total WRWP network** 59 operational WRWP 60 non-operational WRWP	---	**Target: 5.0 m/s** **5.35 m/s** 4.21 m/s ⇑ 5.58 m/s ⇑	---	---	---	---	---
E-SURFMAR							
Moored buoys (only 62095, 64045)	**Target: 1 K** **0.42 K** ⇑	**Target: 5.0 m/s** **2.00 m/s** ⇑	**Target: 10%** **5.95%** ⇑	---	**Target: 1 hPa** **0.38 hPa** ⇑	**Target: 1 K** not provided yet	**Wave direction** **Target: 20°**
Drifting buoys	---	---	---	---	**Target: 1 hPa** **0.55 hPa** ⇑	**Target: 1 K** not provided yet	---
VOS ships Automated Conventional	Target: 2 K 1.14 K ⇒	Target: 5.0 m/s 3.68 m/s ⇓	Target: 15% 5.58% ⇑	---	Target: 1 hPa 0.66 hPa ⇑	Target: 1 K not provided yet	---

Quarterly QM Reports

- Per network a summary table of all countries with national data availability, timeliness and accuracy figures are presented
- Color coding whether EUCOS targets have been achieved or not

7.1 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 wherever available. Only for those stations which haven´t provided BUFR data yet FM12 messages have been considered (see chapter 5).

Overview surface land stations - Q2 2017	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	T RMSE	WIND RMSVD	HUM dq/q*	P RMSE
Austria	4,911	99.6%	98.4%	98.4%	3.3K	3.5m/s	12.0%	2.5hPa
Belgium	6,025	92.0%	98.8%	100.0%	1.2K	2.2m/s	9.5%	0.5hPa
Croatia	7,801	99.8%	99.8%	99.9%	2.1K	2.3m/s	7.7%	0.6hPa
Cyprus	3,625	99.3%	98.8%	99.2%	2.1K	2.3m/s	8.8%	0.8hPa
Czech Republic	8,491	97.2%	99.7%	99.9%	1.7K	2.5m/s	6.0%	0.4hPa
Denmark	35,522	84.0%	99.1%	100.0%	2.1K	3.5m/s	12.4%	0.5hPa
Estonia	6,552	100.0%	99.9%	100.0%	1.4K	2.2m/s	6.2%	0.5hPa
Finland	38,990	99.2%	99.9%	100.0%	1.7K	2.0m/s	8.0%	0.4hPa
France	49,950	99.4%	99.9%	100.0%	1.5K	2.1m/s	6.1%	0.5hPa
The FYROM	605	83.1%	100.0%	100.0%	2.1K	2.8m/s	10.3%	1.1hPa
Germany	32,760	100.0%	99.9%	100.0%	1.7K	2.4m/s	6.3%	0.4hPa
Greece	5,479	83.7%	98.6%	98.8%	1.8K	2.7m/s	8.1%	0.8hPa
Hungary	7,270	83.2%	99.6%	99.8%	1.6K	2.1m/s	6.4%	0.5hPa
Iceland	3,287	90.3%	99.8%	99.9%	1.9K	3.4m/s	9.2%	0.5hPa
Ireland	13,104	100.0%	100.0%	100.0%	1.0K	2.0m/s	5.5%	0.3hPa
Italy	44,443	94.6%	98.6%	99.9%	2.5K	3.2m/s	11.3%	1.5hPa
Latvia	4,329	33.0%	100.0%	100.0%	1.6K	2.1m/s	6.5%	1.0hPa
Luxembourg	2,022	92.6%	99.0%	100.0%	1.9K	2.2m/s	5.7%	0.5hPa
Malta	720	98.9%	98.5%	99.7%	1.8K	2.3m/s	6.3%	0.6hPa
Montenegro	2,693	74.0%	99.7%	100.0%	3.7K	2.4m/s	18.7%	2.0hPa
The Netherlands	15,166	99.2%	99.8%	99.9%	1.0K	1.9m/s	4.9%	0.4hPa
Norway	47,656	99.2%	99.0%	99.4%	1.5K	3.0m/s	7.5%	0.4hPa
Poland	32,755	100.0%	100.0%	100.0%	1.4K	2.1m/s	5.3%	0.6hPa
Portugal	18,603	91.4%	99.8%	100.0%	1.6K	3.0m/s	6.2%	0.6hPa
Serbia	10,802	98.9%	99.9%	100.0%	2.2K	1.9m/s	9.5%	0.8hPa
Slovac Republic	8,728	99.9%	99.9%	100.0%	1.6K	2.5m/s	6.5%	0.5hPa
Slovenia	2,179	99.8%	99.3%	99.4%	2.8K	3.8m/s	8.2%	0.4hPa
Spain	44,935	99.8%	99.9%	99.9%	1.8K	2.4m/s	7.3%	0.5hPa
Sweden	32,179	98.4%	99.8%	99.9%	1.8K	2.1m/s	7.3%	0.6hPa
Switzerland	15,275	99.9%	99.7%	99.8%	5.0K	2.6m/s	17.0%	0.7hPa
United Kingdom	25,967	99.1%	99.7%	99.8%	1.1K	2.2m/s	5.5%	0.3hPa

Quarterly QM Reports

- Table with national data availability, timeliness and accuracy figures
- Highlighting
  - Ongoing issues
  - Problems resolved
  - New issues

CHMI, CZECH REPUBLIC

Networks of Member: Czech Republic - Q2 2017	Obs. totals	Data availability	Timeliness HH+50	Timeliness HH+100	Achieving 100 hPa	Achieving 50 hPa	T RMSE	WIND RMSVD	HUM dq/q*	PRMSE/ O-B gph
Territorial network										
Surface network	8,491	97.2%	99.7%	99.9%			1.7K	2.5m/s	6.0%	0.4hPa
Radiosonde network	455	100.0%	98.2%	98.9%	99.8%	98.5%	1.0K	3.3m/s	4.5%	-
E-ASAP fleet										
E-PROFILE			HH+60							
Wind profilers	34,942	100.0%	100.0%					3.9m/s		
Weather radars WRWP	48,374		100.0%					6.0m/s		
E-SURFMAR										
Automated VOS										
Conventional VOS										
Moored buoys										
OPERA			HH+08	HH+10		E-AMDAR:		Profiles	HUM profiles	
Weather radar ICD	16,679	95.4%	98.3%	98.9%		Visited airports (quarterly avg)		2	1	
Weather radar PPD	16,655	95.3%				Profile totals (quartrely total)		579	51	

To be noted:

- The E-AMDAR fleet of 9 WVSS-II humidity sensor equipped aircraft provided 51 humidity profiles at Czech airport Prague in Q2 2017. 579 AMDAR profiles without humidity information have been issued from 2 different Czech airports in Q2 2017.

New issues:

- *OPERA:* Czech weather radar OKPR_50 Skalky had a data outage from 14.06.17, 01 UTC till 19.06.17, 16 UTC leading to a low ICD data availability performance in June 2017. But the target was met on quarterly average (Jun 2017: 75.2%, quarterly avg: 91.4%).

Ongoing issues:

- *Surface land stations:* Czech designated EUCOS surface land stations 11423, 11518, 11782 had several data outages of BUFR SYNOP messages in March and April 2017 and therefore performed below the data availability target these months but achieved the data availability target on quarterly average (Apr 2017: 11423 91.1%, 11518 93.1%, 11782 92.1%).
- *E-PROFILE weather radars:* Czech weather radar 11480 and 11718 showed low performances of ECMWF results obs minus background regarding wind RMSVD values in Q2 2017 again (quarterly avg 11480: 6.4 m/s, 11718: 5.6 m/s).

Problems resolved:

- *OPERA:* Czech weather radars OKPR_50 Skalky and OKPR_60 Brdy-Praha showed occasional delays in data provision of incoming radar data to Odyssey starting beginning of February till 05.04.17, 11 UTC leading to a low timeliness performance (quarterly avg HH+08: OKPR_50 89.9%, OKPR_60 87.4%, HH+10: OKPR_50 95.0%, OKPR_60 92.5%). The situation improved after 05.04.2017, 11 UTC and the timeliness targets were met again (quarterly avg HH+08: OKPR_50 98.4%, OKPR_60 98.2%, HH+10: OKPR_50 99.0%, OKPR_60 98.8%).

Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - Quarterly QM Reports
  - **Monitoring migration to BUFR**
- Benefits for EUMETNET Members and lessons learnt

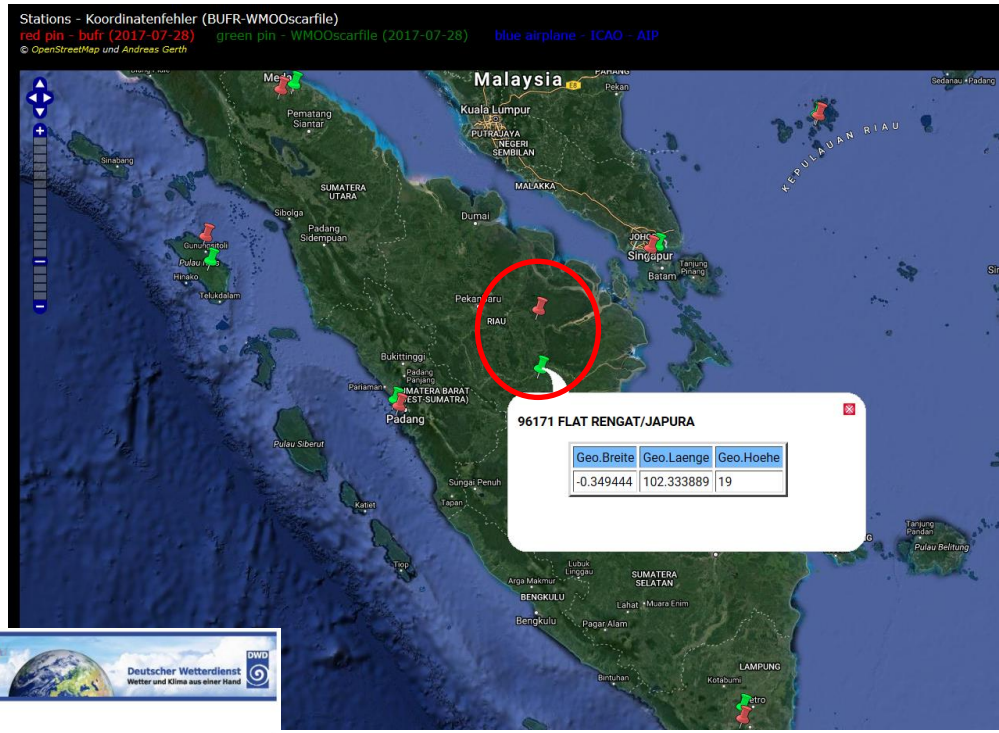
Monitoring Migration to BUFR

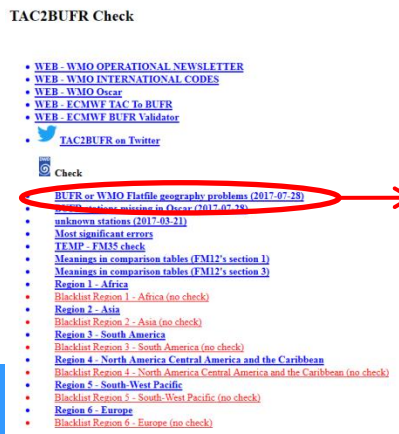
- Obs PMT monitors the migration to BUFR since years
- Within the EUCOS networks the migration to BUFR is completed for E-AMDAR, E-ASAP, E-PROFILE, E-SURFMAR drifting and moored buoys
- Still in progress: surface land station network (one EUCOS station still producing FM12 only), upper-air network (3 EUCOS radiosonde still producing FM35 only), E-SURFMAR VOS
- National monitoring of BUFR distribution via GTS not operational yet! → Members do not always realize outages
- EUCOS/WMO QMP helps to identify data outages or problems with data provision

Some issues with BUFR data (I)

Meta data information (e.g. station position, station height, barometer height) are important for (NWP) users but are not provided by all members in BUFR or are erroneous:

harmonization of BUFR and OSCAR/Surface required

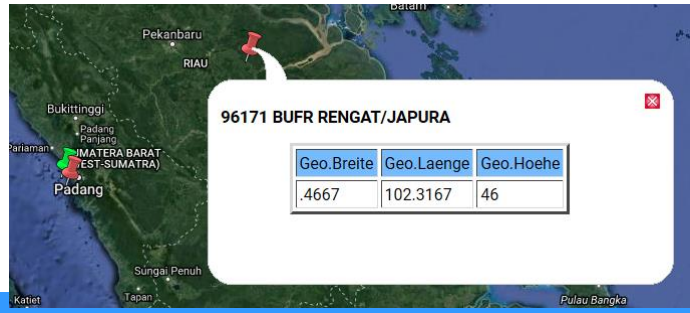




DWD website: http://www.deutscher-wetterdienst.de/TAC2BUFR/SV/webt2b_main.html

'BUFR or WMO Flatfile geography problems'

96171 Rengat/Japura



Some issues with BUFR data (II)

- Differences in temperature values of BUFR and ASCII coded FM35-TEMP radiosonde data due to rounding procedures in TEMP
- Erroneous observation values in BUFR e.g.
  - temperature values > 100°C
  - wind directions > 360°
  - pressure values > 1100 hPa
- No negative pressure tendency reported in BUFR
- Suspicious 24h precipitation amounts (999.8mm)
- Several parameters cannot be reported in BUFR (fresh snow depth)
- Many issues with radiosonde BUFR data:
  - Avoiding the distribution of 4 BUFR bulletins (= 4 TEMP parts)
  - Significant levels are calculated differently than 2s interval levels
  - Sending only one BUFR message (complete sounding)
  - Radiosonde meta data information should be harmonized

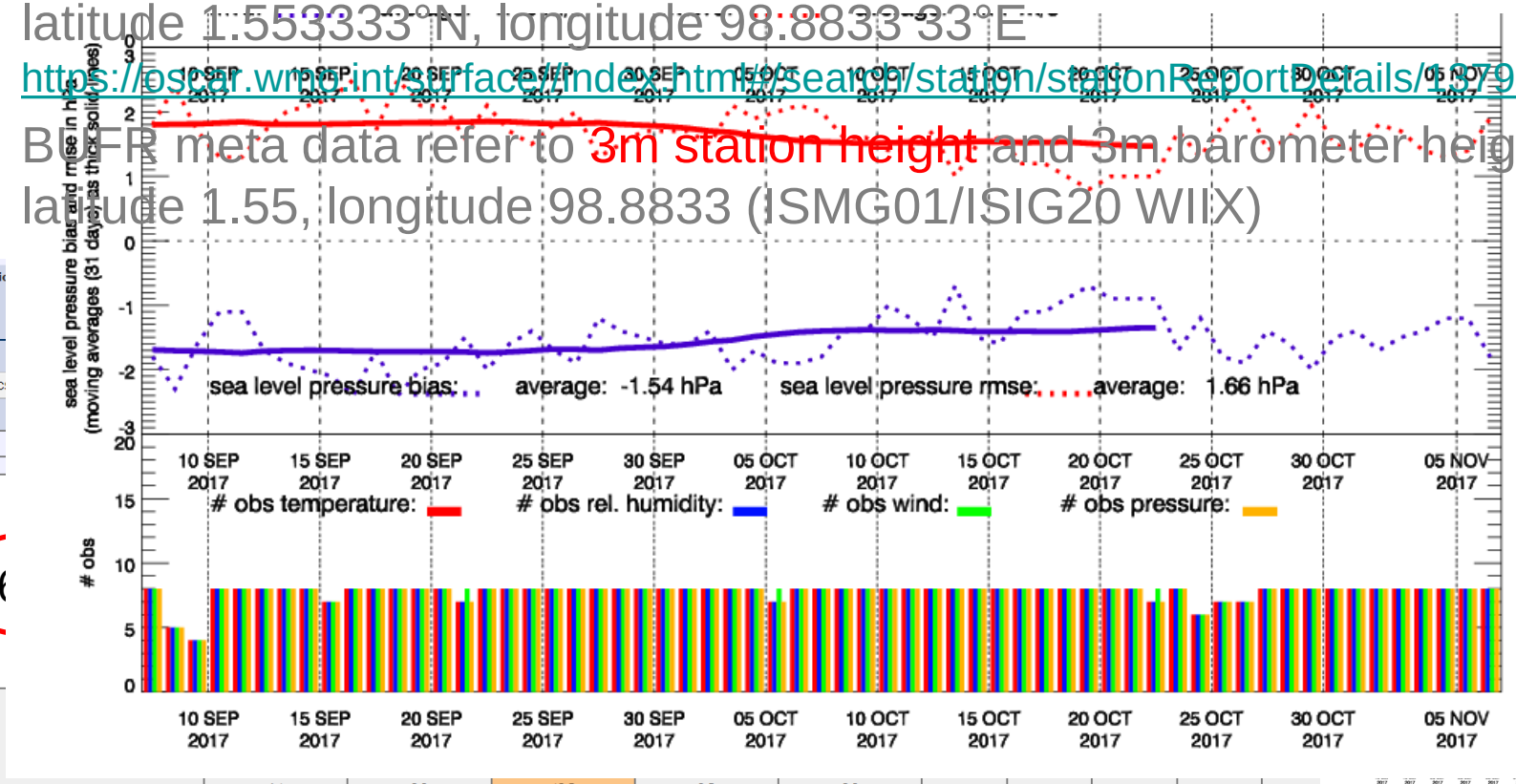
Lessons learnt from recent switches to BUFR

- NMHSes should provide new BUFR data in parallel to operational TAC data transmission via GTS for users to allow them to test and check new formats
- Time line: at least 4-6 weeks up to 2 months
- Inform data users about parallel data provision and ask for feedback concerning format and content
- Stop of TAC data GTS distribution only if
  - BUFR data are compliant with WMO templates
  - if BUFR data can be read/processed by users/Global Lead Centres
- **Information about cessations shall be provided at least 2 months in advance via WMO Newsletter and METNOs (GTS)**

➢ See also latest WIGOS Newsletter, no. 7: http://www.wmo.int/pages/prog/www/wigos/documents/WIGOS_Newsletter_Vol3_N4_Oct2017.pdf

Important: correctness of station meta data

- *Recall:* constant pressure bias (-1.5 hPa) of Indonesian surface land station 96073 SIBOLGA/PINANGSORI
- Either caused by malfunctioning pressure sensor or incorrect meta data
- OSCAR/Surface refers to 10m station height and 3m barometer height, latitude 1.553333°N, longitude 98.8833°E
  https://oscar.wmo.int/surface/index.html#/search/station/stationReportDetails/19794
- BUFR meta data refer to 3m station height and 3m barometer height, latitude 1.55, longitude 98.8833 (ISMG01/ISIG20 WIIX)



Content

- Background information on EUMETNET Observations Programme
- WDQMS and the role of RWCs
- EUCOS Quality Monitoring
  - Quality Monitoring Portals
  - Fault reporting
  - Quarterly QM Reports
  - Monitoring migration to BUFR
- **Benefits for EUMETNET Members and lessons learnt**

Benefits for EUMETNET Members

- EUMETNET Members are provided with
  - Fault reports in cases of outages or whenever EUCOS targets are exceeded
  - Quarterly and annual network performance summaries
- EUMETNET Members can monitor the performance of their national stations by using the EUCOS QMP themselves
- EUMETNET Members are welcomed to add additional stations to the EUCOS QMP besides the defined EUCOS stations to monitor all national stations.
- The EUCOS QMP helps to identify any data transmission problems via GTS due to the fact that the QM information bases on observations archived in DWDs and ECMWFs database.
- The EUCOS QMP offers a download functionality for further processing of the monitoring data on national level.
- A survey on the usage of this tool gave very positive feedback.

Lessons learnt…

- Solving problems by individual Members is sometimes a slow process, only few reactions to quarterly monitoring reports but situation improving due to continuous promotion of EUCOS QMP and QM reports at EUMETNET meetings;
- Usually sending of individual emails to known points of contact helps accelerating the incident management procedure
- Obs PMT asked for GTS contact points of all EUMETNET Members to report about issues

EUMETNET
European Meteorological Services Network

Questions and comments?

Contact Details

Stefan Klink
EUMETNET Observations Programme Manager
GIE/EIG EUMETNET

EUMETNET Observations Programme Manager
Deutscher Wetterdienst
Frankfurter Str. 135
63067 Offenbach, Germany

Tel: + 49 69 8062 4492
Fax: + 49 69 800 863 410
Email: stefan.klink@dwd.de
Web: www.eumetnet.eu

GIE EUMETNET Secretariat
c/o L'Institut Royal Météorologique de Belgique
Avenue Circulaire 3
1180 Bruxelles, Belgique

Tel: +32 (0)2 373 05 18
Fax: +32 (0)2 890 98 58
Email: info@eumetnet.eu
Web: www.eumetnet.eu