EUMETNET
European Meteorological Services Network

E-GVAP-III

The EIG EUMETNET GNSS Water Vapour Programme, phase III

Expert team & members meeting
November 28-29, 2017, KNMI, the Netherlands

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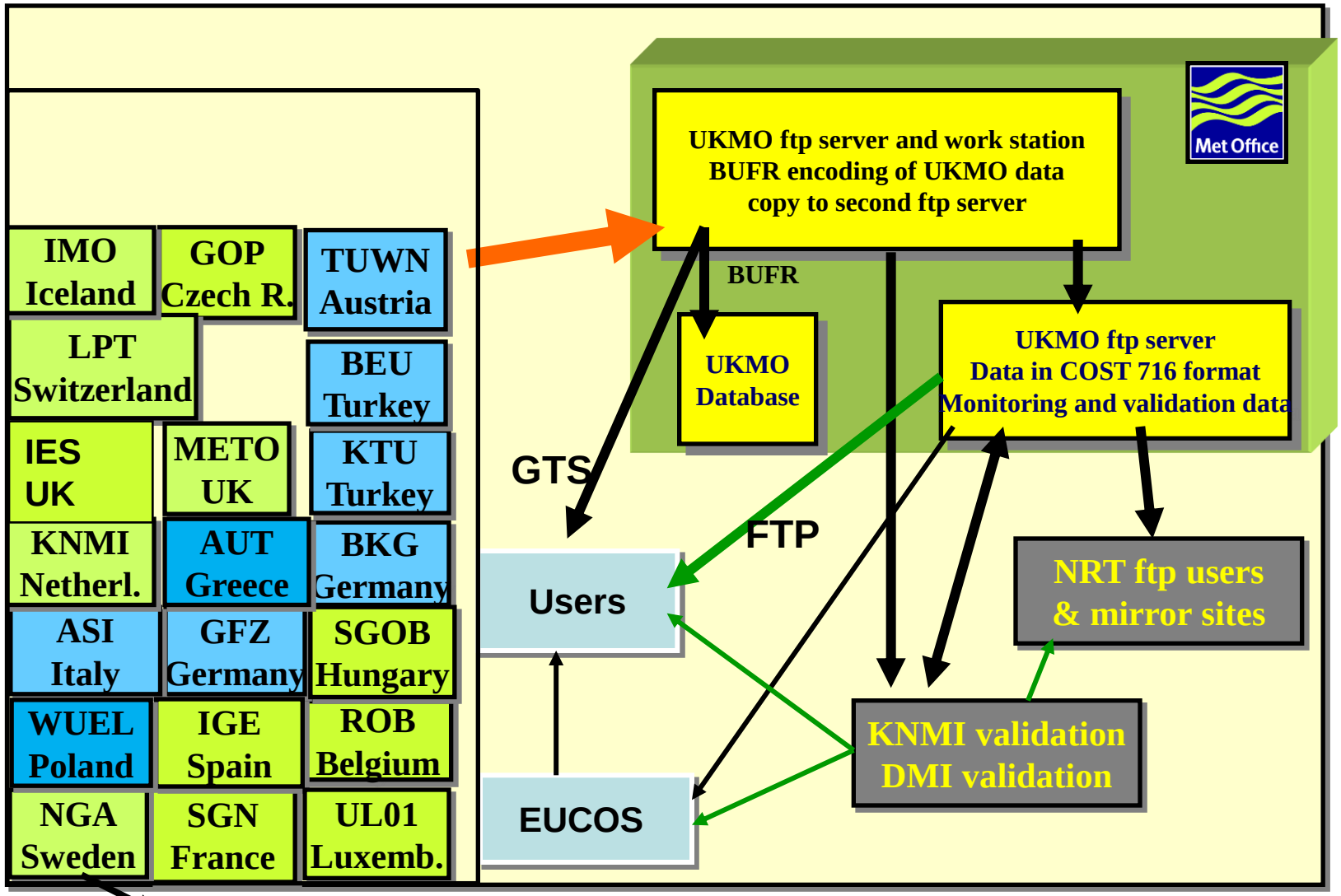
European Meteorological Services Network

E-GVAP status and outlook.

OBS system overview

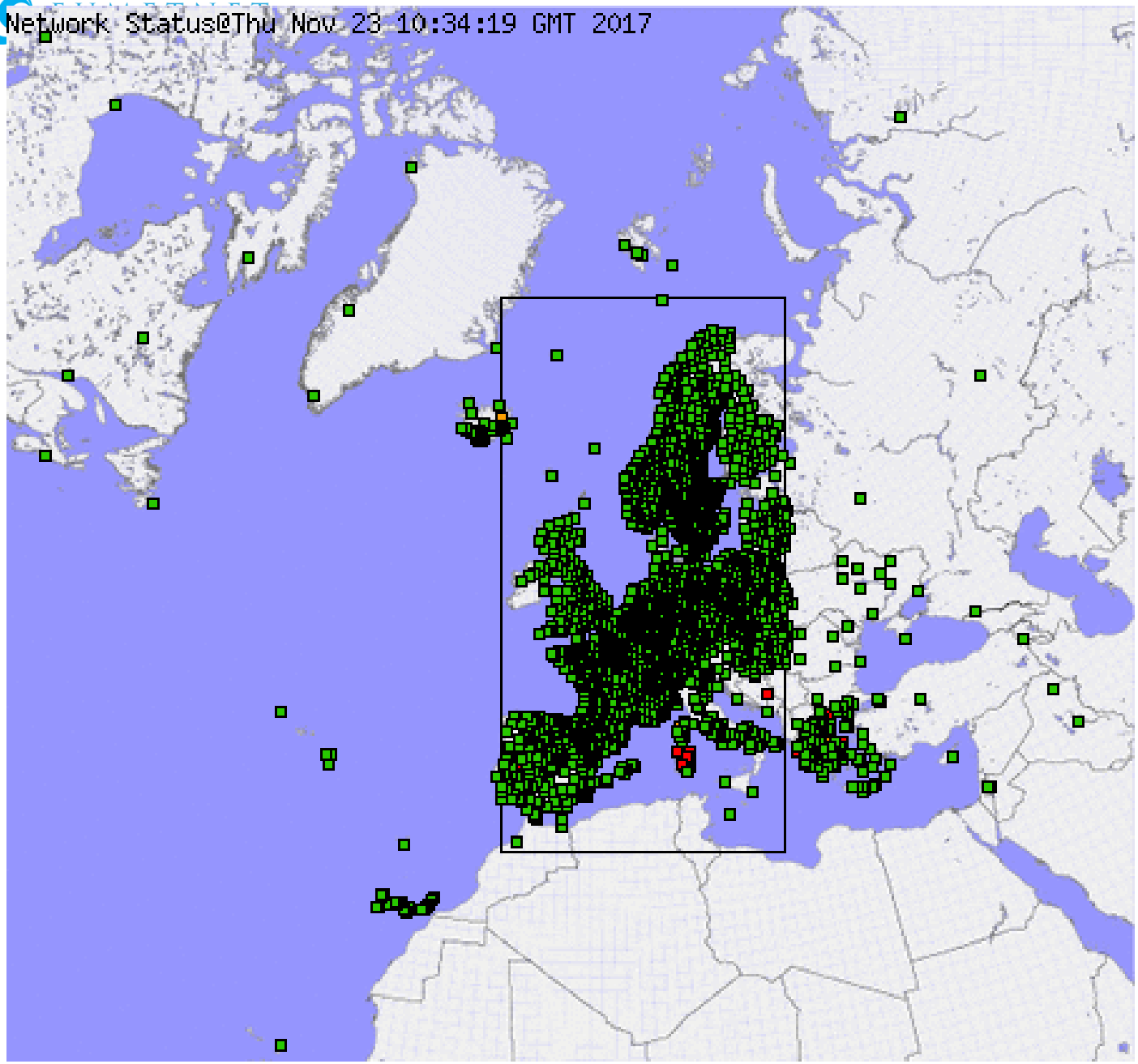
NRT GNSS ZTD data flow



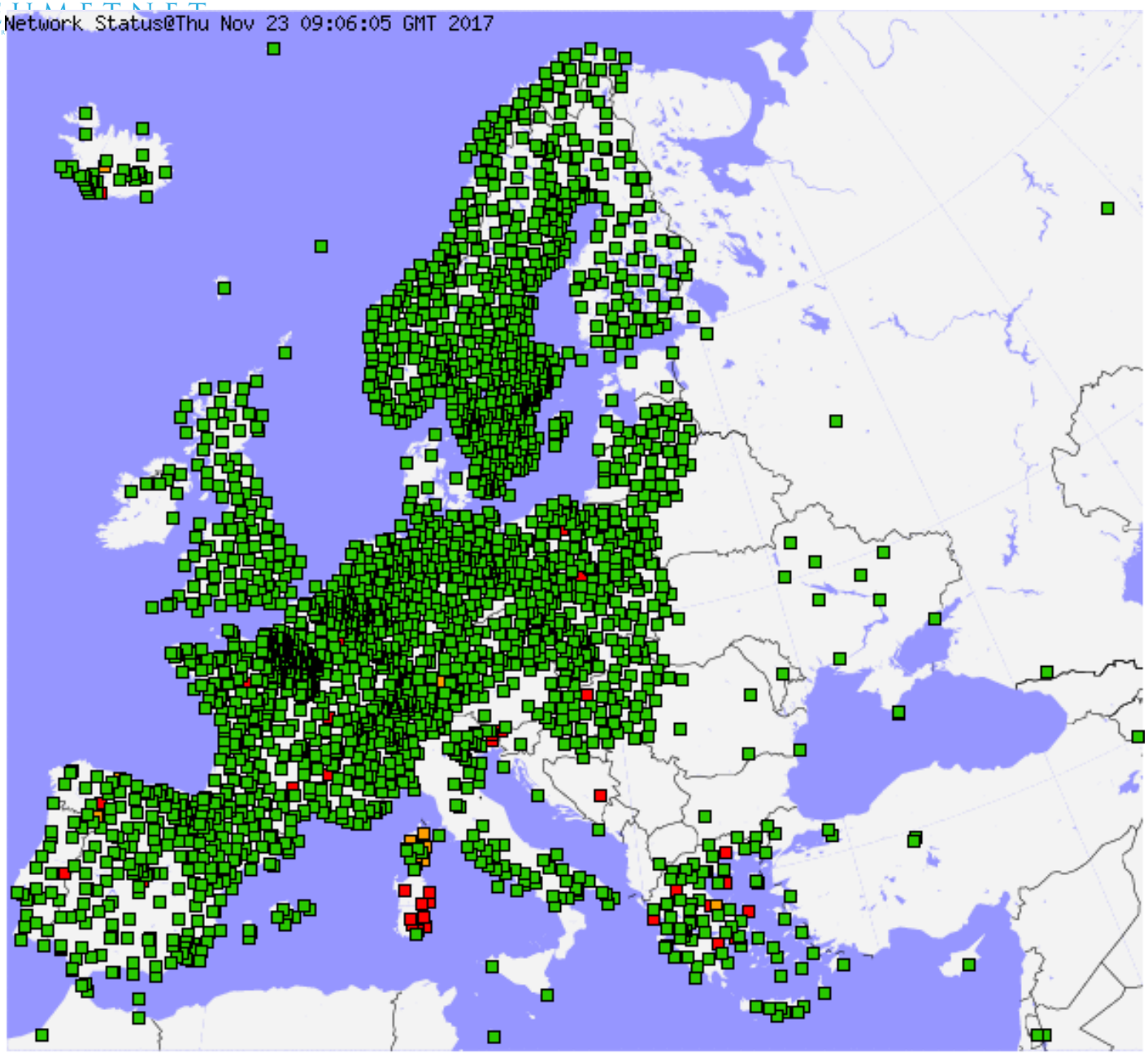
Analysis centres (ACs), each processing raw GNSS data from many sites. Each AC send data to UKMO.

AC	Institution
AUT	Aristotle Univ. of Thessaloniki Analysis Center, Greee.
ASI	e-geos/Telespazio, Italy
BEU	Zonguldak University of Technology, Turkey
BKG	Federal Agency for Cartography and geodesy, Germany
GFZ	Helmholz Centre Potsdam, GFZ German Res. Cen. f Geosciences
GA01	Geoscience Australia New
GOPE	Geodectic Observatory Pecny, Czech Republic
IES	Inst. of Eng., Surv. And Space Geodesy, Univ of Nottingham, UK
IGE	Instituto Geografica National, Spain
IMO	Icelandic Met Office
KNMI	Royal Meteorological Institute of the Netherlands
KTU	Karadeniz Technival Univ. Analsis Center, Turkey
LPT	SwissTopo, Switzerland
METO	UK Met Office
NGA1	Lantmateriet (Swedish Mapping, Cadestre and Land Reg. Authority), Gavle, Sweden
NOAA	NOAA/NCEP, USA - Stopped, autumn 2016
ROB	Royal Observatory of Belgium
SGN	Institut Geographique National, France
SGOB	Satellite Geod. Obs, IGCRS + Technical Univ. Budapest, Hungary
TUWN	Technical University Vienna, Austria
UL01	University of Luxembourg, Fac. Of Science and Communication
WUEL WUT	Wroclaw University + Inst. Of Geodesy and Geoinformatics, Poland

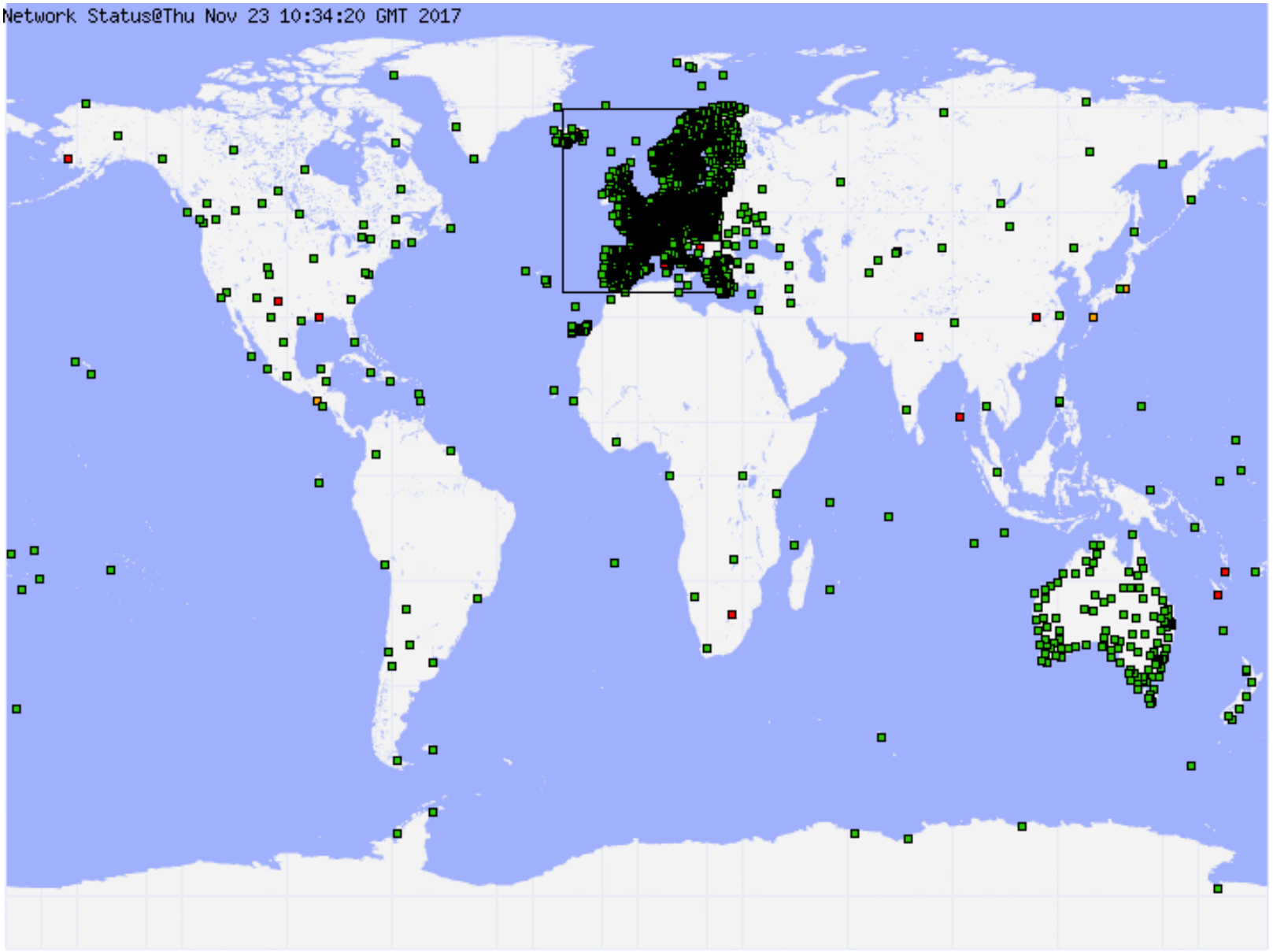
Coverage

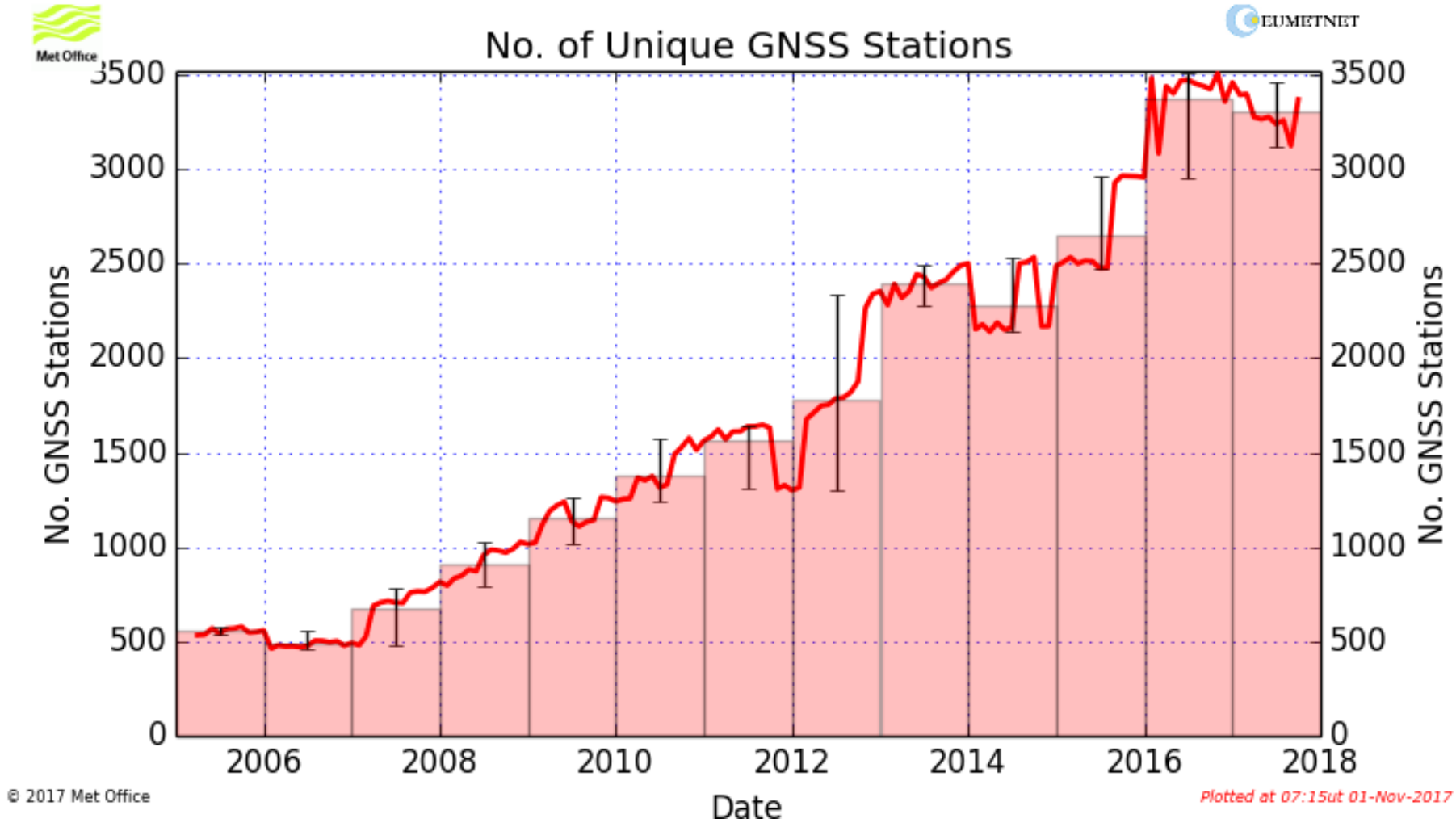


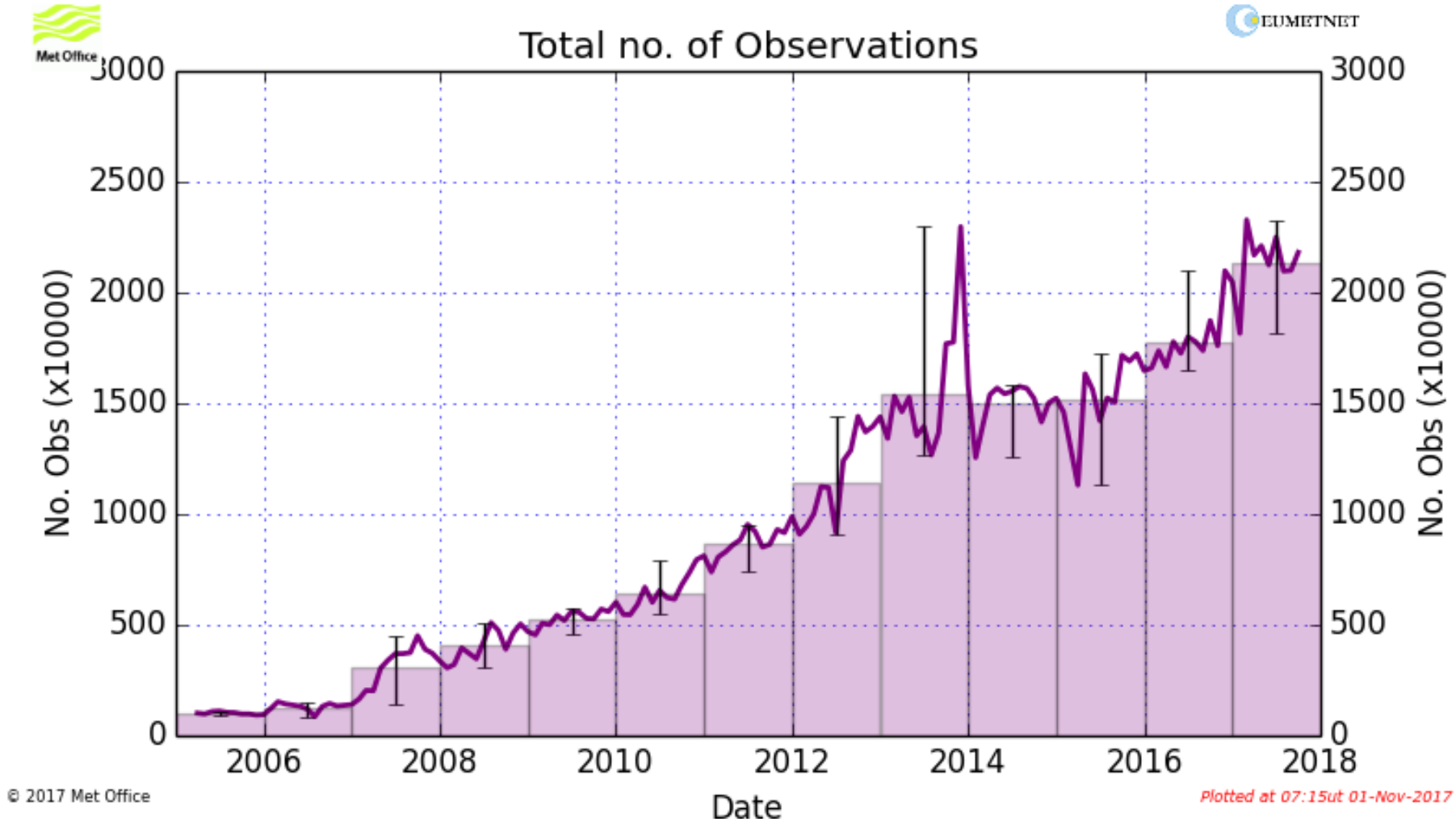
Coverage

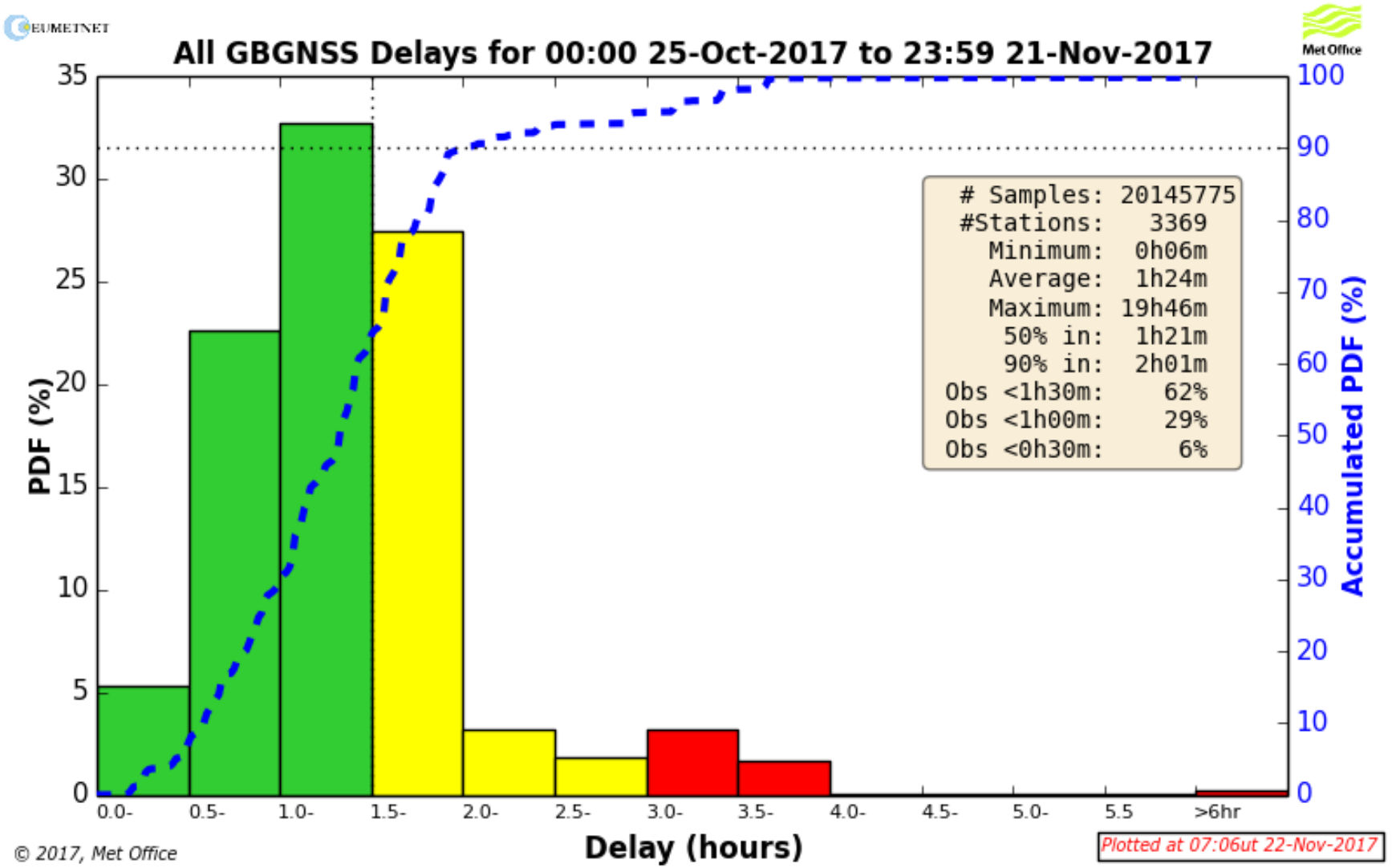


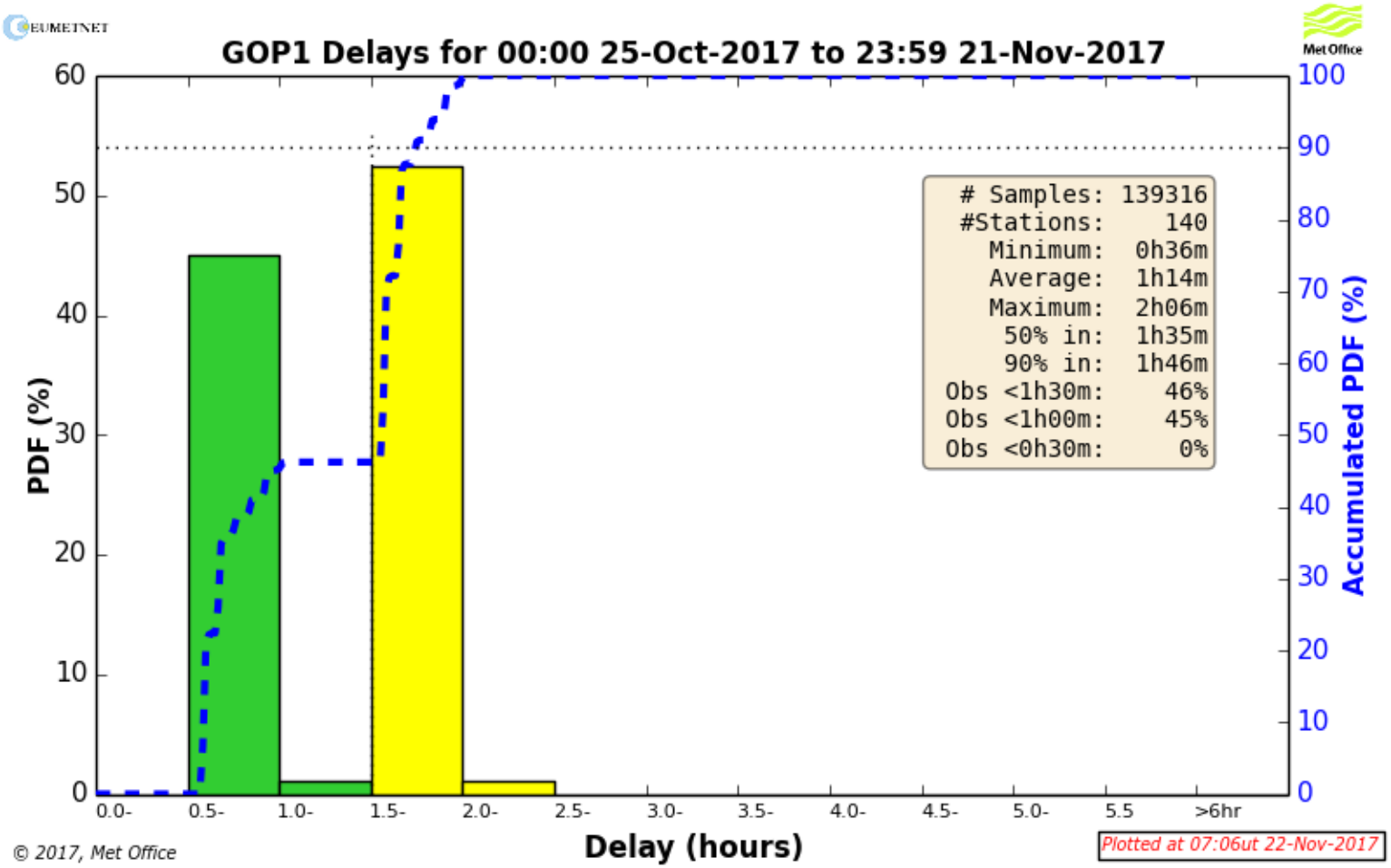
Coverage

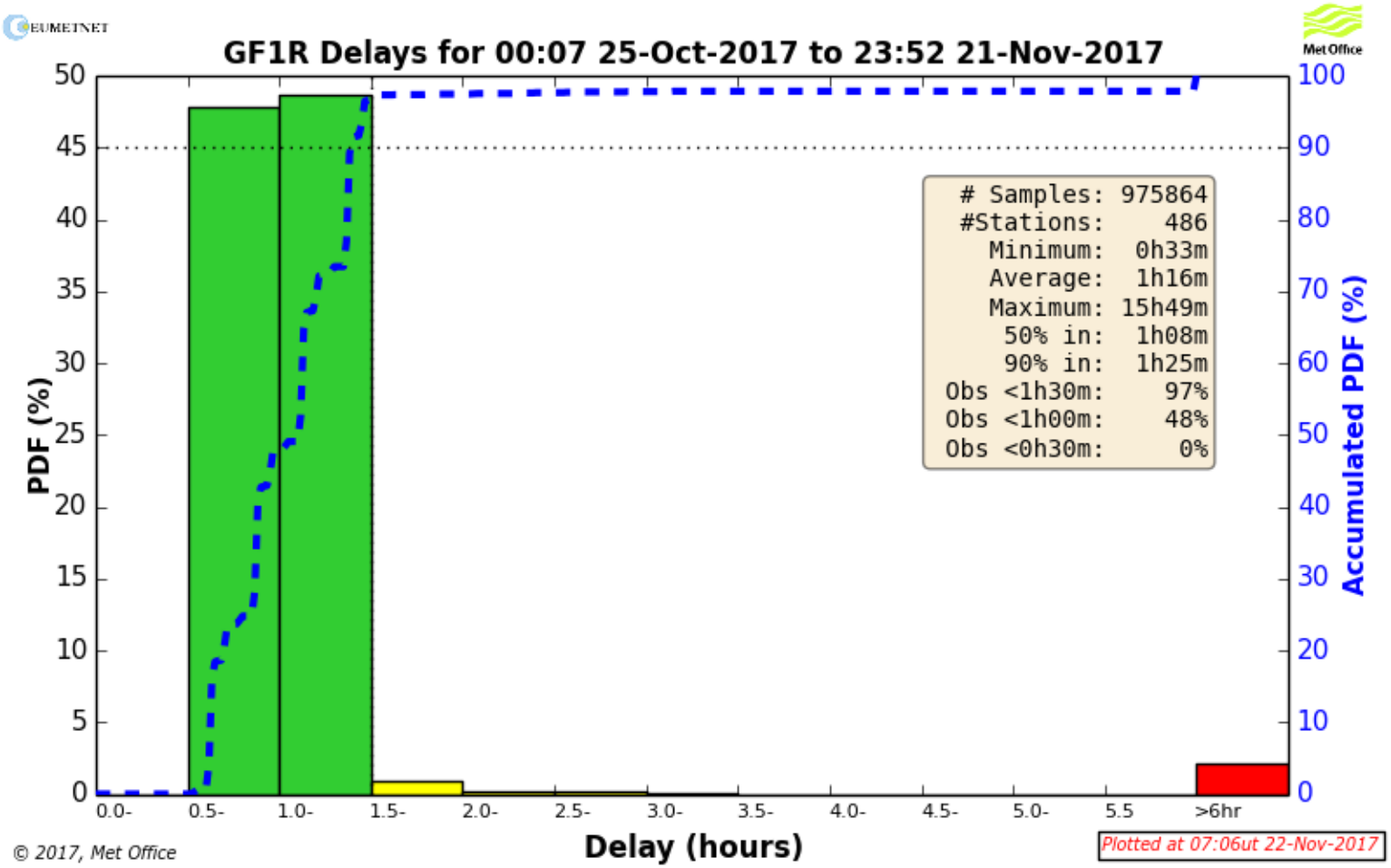


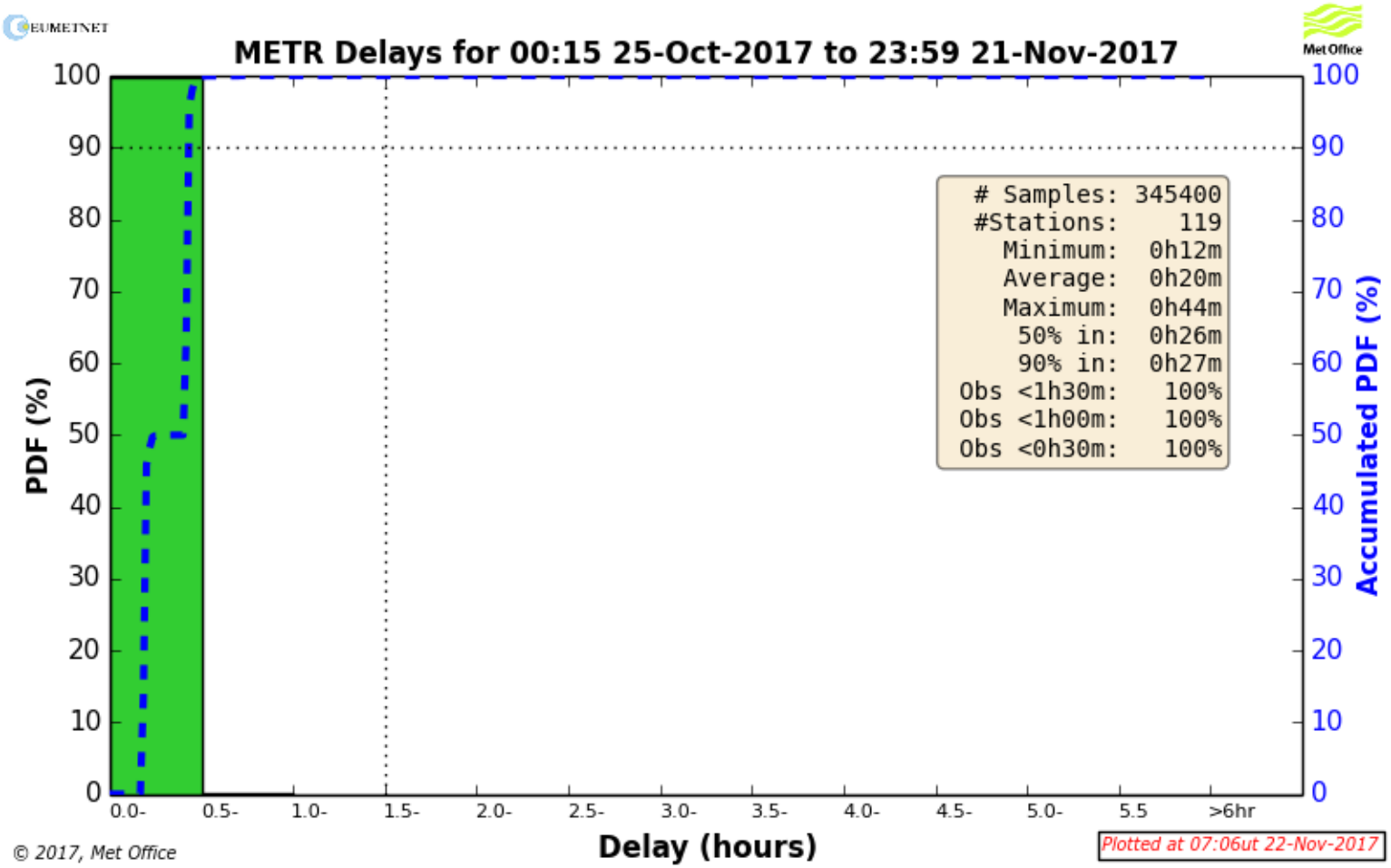

Met Office
EUMETNET
No. of Unique GNSS Stations
No. GNSS Stations
0
500
1000
1500
2000
2500
3000
3500
2006
2008
2010
2012
2014
2016
2018
Date
© 2017 Met Office
Plotted at 07:15ut 01-Nov-2017


Met Office
EUMETNET
Total no. of Observations
No. Obs (x10000)
3000
2500
2000
1500
1000
500
0
2006
2008
2010
2012
2014
2016
2018
Date
© 2017 Met Office
Plotted at 07:15ut 01-Nov-2017


EUMETNET
Met Office
All GBGNSS Delays for 00:00 25-Oct-2017 to 23:59 21-Nov-2017
Samples: 20145775
#Stations: 3369
Minimum: 0h06m
Average: 1h24m
Maximum: 19h46m
50% in: 1h21m
90% in: 2h01m
Obs <1h30m: 62%
Obs <1h00m: 29%
Obs <0h30m: 6%
PDF (%)
Accumulated PDF (%)
0
5
10
15
20
25
30
35
0
10
20
30
40
50
60
70
80
90
100
0.0-
0.5-
1.0-
1.5-
2.0-
2.5-
3.0-
3.5-
4.0-
4.5-
5.0-
5.5
>6hr
Delay (hours)
© 2017, Met Office
Plotted at 07:06ut 22-Nov-2017


EUMETNET
GOP1 Delays for 00:00 25-Oct-2017 to 23:59 21-Nov-2017
Met Office
PDF (%)
Accumulated PDF (%)
60
50
40
30
20
10
0
100
90
80
70
60
50
40
30
20
10
0
Samples: 139316
#Stations: 140
Minimum: 0h36m
Average: 1h14m
Maximum: 2h06m
50% in: 1h35m
90% in: 1h46m
Obs <1h30m: 46%
Obs <1h00m: 45%
Obs <0h30m: 0%
0.0-
0.5-
1.0-
1.5-
2.0-
2.5-
3.0-
3.5-
4.0-
4.5-
5.0-
5.5
>6hr
Delay (hours)
© 2017, Met Office
Plotted at 07:06ut 22-Nov-2017


EUMETNET
GF1R Delays for 00:07 25-Oct-2017 to 23:52 21-Nov-2017
Met Office
Samples: 975864
#Stations: 486
Minimum: 0h33m
Average: 1h16m
Maximum: 15h49m
50% in: 1h08m
90% in: 1h25m
Obs <1h30m: 97%
Obs <1h00m: 48%
Obs <0h30m: 0%
PDF (%)
Accumulated PDF (%)
0.0-
0.5-
1.0-
1.5-
2.0-
2.5-
3.0-
3.5-
4.0-
4.5-
5.0-
5.5
>6hr
Delay (hours)
© 2017, Met Office
Plotted at 07:06ut 22-Nov-2017


EUMETNET
METR Delays for 00:15 25-Oct-2017 to 23:59 21-Nov-2017
Met Office
Samples: 345400
#Stations: 119
Minimum: 0h12m
Average: 0h20m
Maximum: 0h44m
50% in: 0h26m
90% in: 0h27m
Obs <1h30m: 100%
Obs <1h00m: 100%
Obs <0h30m: 100%
PDF (%)
Accumulated PDF (%)
0
10
20
30
40
50
60
70
80
90
100
0.0-
0.5-
1.0-
1.5-
2.0-
2.5-
3.0-
3.5-
4.0-
4.5-
5.0-
5.5
>6hr
Delay (hours)
© 2017, Met Office
Plotted at 07:06ut 22-Nov-2017

1. EUCOS performance summary

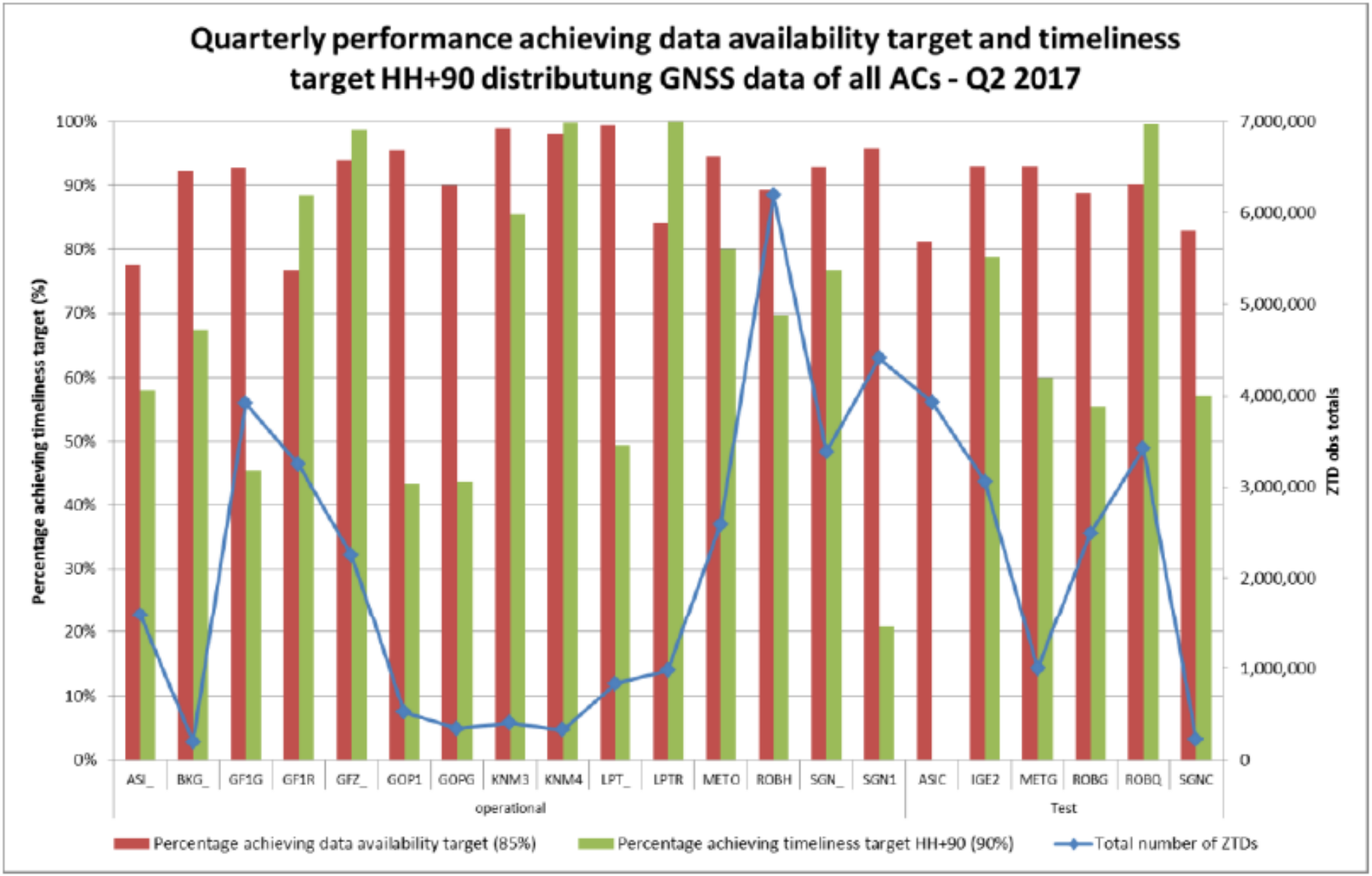
1.1 Data availability and timeliness

Q2 2017 Network	Data availability	Timeliness HH+50 (Radiosondes: TEMP AB)	Timeliness HH+100 (Radiosondes: TEMP CD)
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% →
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% →
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% ↓
E-GVAP		**Timeliness HH+90**	
at least one ZTD timely 12 supersites	Target: 85% 90.8% ↑	Target: 85% 96.5% ↑	
All sites/Acs	89.4% ↑	97.2% →	
15 operational Acs	90.3% ↑	97.3% →	
21 non-operational Acs	87.3% ↑	96.8% ↑	

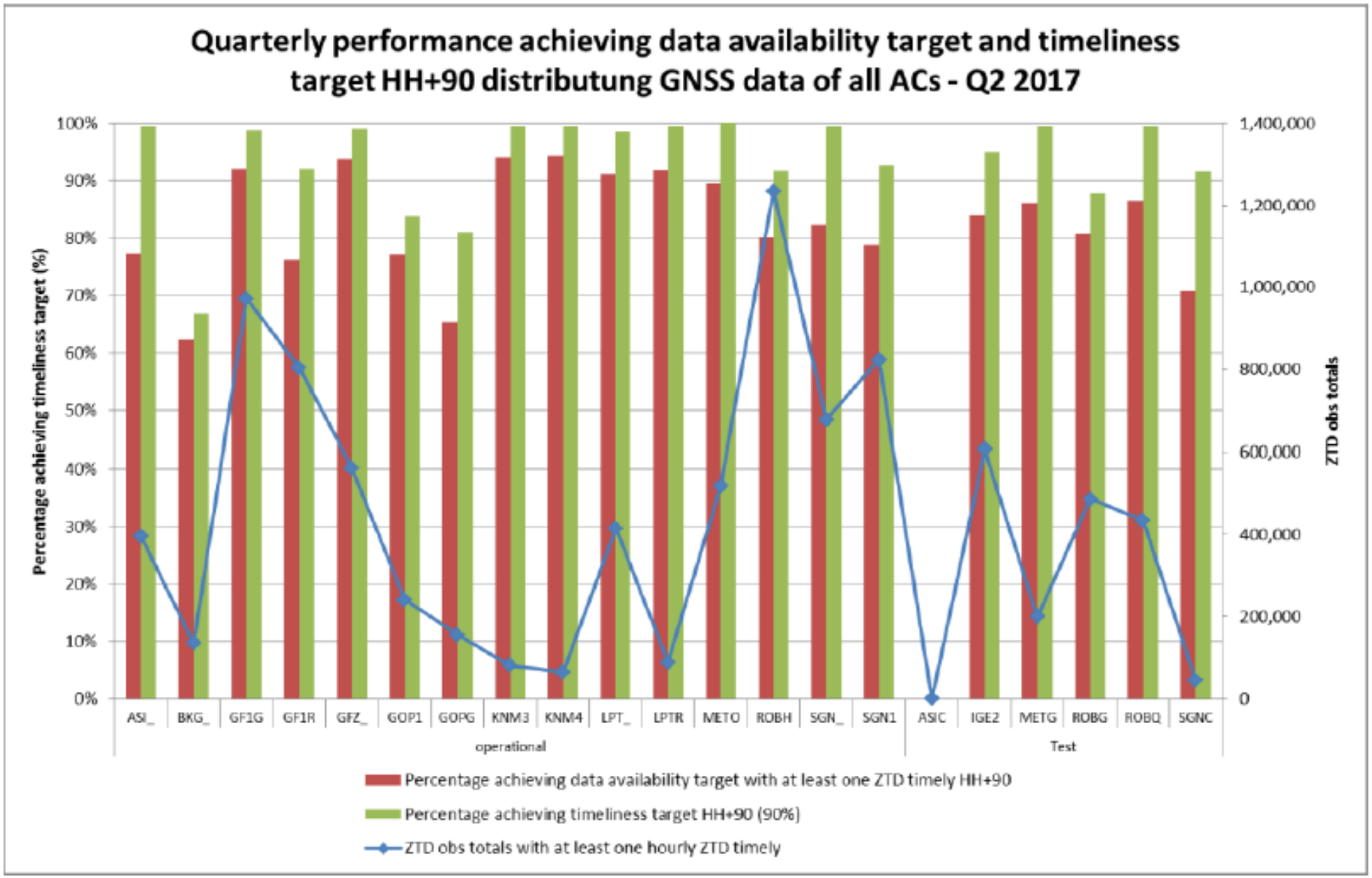
1.2 Comparing observations against NWP model output of ECMWF

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% ⇑ 5.77% 10.06% ⇨ 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 ⇩

Fraction of all data reaching timeliness target



Fraction of youngest ZTD in each file reaching timeliness target



Update on data format developments and needs.

On alternative sources of North American NRT ZTDs

See separate presentation by Owen Lewis.

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First column is average O-B over all the sites of the AC. Second column is the standard deviation. Third column is the number of AC sites

All calculations based on O-B from UKMO Global NWP model.

June 2017

1.0	11.4	563	1.0	11.3	562	ASIC
3.0	17.7	34	3.0	17.7	34	ASIR
-0.6	13.1	14	-0.6	13.1	14	ASIS
1.1	12.9	231	1.2	12.7	229	ASI_
9.5	14.0	115	9.5	14.0	115	AUT1
3.9	11.1	27	3.9	11.1	27	BEU1
2.1	12.0	125	2.1	12.0	125	BKGH
0.8	11.1	100	0.8	11.1	100	BKG_
6.2	14.6	501	6.2	14.6	501	CONH
6.7	14.5	19	6.7	14.5	19	DITT
0.6	10.0	499	0.6	10.0	499	GF1G
0.6	9.9	462	0.7	9.8	461	GF1R
1.3	9.6	273	1.3	9.6	273	GFZ_
2.2	10.9	143	2.2	10.9	143	GOP1
1.5	11.6	113	1.5	11.6	113	GOPG
0.4	10.3	252	0.4	10.3	252	IES2
2.9	13.5	342	4.3	13.1	338	IGE2
2.5	8.4	93	2.5	8.4	93	IMO1
2.5	11.4	40	2.5	11.4	40	KNM3
1.6	13.5	32	0.1	12.5	31	KNM4
3.7	11.0	28	3.7	11.0	28	KTU1
-4.4	20.0	44	-3.6	18.7	43	LPTR
0.5	13.0	209	1.2	11.6	202	LPT_
1.8	11.3	110	1.8	11.3	110	METG
-0.3	10.3	260	-0.3	10.3	260	METO
0.4	13.7	126	0.3	13.1	124	METR
-0.4	8.5	585	-0.4	8.4	583	NGA1
3.7	12.4	286	3.8	12.3	285	ROBG
1.1	14.4	655	1.2	14.2	653	ROBH
2.0	11.5	230	2.0	11.5	230	ROBQ
1.8	15.4	674	1.8	15.2	670	ROBT
-0.9	12.4	472	-0.8	12.3	471	SGN1
10.8	15.5	30	10.8	15.5	30	SGNC
0.3	12.7	375	0.3	12.6	374	SGN_
1.6	13.3	101	1.6	13.3	101	SGO1
-0.5	19.8	10	-0.5	19.8	10	TUWN
1.4	12.3	47	1.4	12.3	47	WLIT
-1.1	11.1	135	-1.1	11.1	135	WUEL

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First column is average O-B over all the sites of the AC. Second column is the standard deviation. Third column is the number of AC sites

October 2017

1.0	9.8	562	1.3	9.3	560	ASIC
1.9	15.7	39	1.8	14.5	38	ASIR
-2.3	11.7	18	-2.3	11.7	18	ASIS
0.4	10.3	229	1.0	9.6	225	ASI_
6.8	10.4	118	6.8	10.4	118	AUT1
3.7	8.1	24	3.7	8.1	24	BEU1
2.7	9.5	120	2.7	9.5	120	BKGH
2.3	8.1	100	2.3	8.1	100	BKG_
-0.8	11.1	491	-0.8	11.0	489	CONH
5.4	30.2	148	5.4	30.2	148	GA01
1.4	8.3	508	1.4	8.3	508	GF1G
1.4	8.1	505	1.4	8.1	505	GF1R
1.0	8.1	274	0.9	7.9	273	GFZ_
3.0	8.8	120	3.0	8.8	120	GOP1
0.4	10.5	114	0.3	10.3	113	GOPG
-1.8	10.9	241	-1.3	10.0	240	IES2
1.9	11.1	343	1.2	10.0	340	IGE2
1.7	7.9	87	1.7	7.9	87	IMO1
1.5	10.7	40	1.5	10.7	40	KNM3
0.3	14.3	31	0.3	14.3	31	KNM4
3.4	8.3	25	3.4	8.3	25	KTU1
-14.7	21.6	45	-8.1	12.6	41	LPTR
-1.1	14.2	207	1.9	9.6	199	LPT_
0.8	10.5	124	0.8	10.1	122	METG
-1.7	10.4	279	-1.3	9.6	278	METO
-2.6	15.5	119	-2.6	14.2	116	METR
0.4	7.2	580	0.5	7.1	578	NGA1
3.8	11.1	248	3.7	10.7	245	ROBG
1.2	12.1	636	1.4	11.6	633	ROBH
-0.2	12.3	207	-0.2	12.3	207	ROBQ
1.3	12.0	655	1.5	11.5	652	ROBT
0.2	11.7	476	0.6	11.2	474	SGN1
6.6	14.1	28	6.6	14.1	28	SGNC
-0.7	11.4	381	-0.3	10.7	379	SGN_
171.5	542.8	62	171.5	542.8	62	SG01
0.2	15.2	11	0.2	15.2	11	TUWN
4.8	10.6	46	4.8	10.6	46	WLIT
2.0	9.8	166	2.0	9.8	166	WUEL

First column is average O-B over all the sites of the AC. Second column is the standard deviation. Third column is the number of AC sites

November 2017

1.8	8.3	556	2.1	7.8	554	ASIC
3.1	21.1	37	3.1	21.1	37	ASIR
-2.1	10.1	17	-2.1	10.1	17	ASIS
2.0	8.6	221	2.2	8.2	218	ASI_
6.1	9.0	117	6.1	9.0	117	AUT1
3.7	7.0	25	3.7	7.0	25	BEU1
3.2	7.8	119	3.2	7.8	119	BKGH
3.6	6.6	99	3.6	6.6	99	BKG_
-0.4	9.8	485	-0.4	9.7	483	CONH
10.6	15.7	18	10.6	15.7	18	DITT
5.3	19.6	141	5.3	19.6	141	GA01
2.6	7.1	483	2.7	7.1	482	GF1G
2.8	6.9	482	2.8	6.8	479	GF1R
3.1	6.4	266	3.1	6.4	266	GFZ_
3.4	6.9	138	3.4	6.9	138	GOP1
0.6	9.5	110	0.6	9.3	109	GOPG
-0.6	8.7	238	-0.1	7.9	237	IES2
2.7	8.4	321	2.8	8.1	318	IGE2
2.7	7.6	83	2.7	7.6	83	IMO1
2.7	8.0	40	2.7	8.0	40	KNM3
1.8	11.6	31	1.8	11.6	31	KNM4
3.1	7.1	25	3.1	7.1	25	KTU1
-13.7	16.7	45	-9.7	11.2	42	LPTR
0.6	10.7	209	2.9	7.4	201	LPT_
1.6	9.7	124	1.5	9.3	122	METG
-0.6	8.5	276	-0.1	7.7	275	METO
-0.4	12.6	118	-0.4	12.1	117	METR
1.1	6.5	581	1.2	6.4	579	NGA1
3.8	9.7	234	3.8	9.7	234	ROBG
1.3	9.1	627	1.6	8.6	624	ROBH
1.1	9.1	222	1.1	9.1	222	ROBQ
1.4	9.1	645	1.7	8.6	642	ROBT
1.0	9.7	476	1.4	9.1	474	SGN1
7.7	13.8	25	7.7	13.8	25	SGNC
0.1	9.9	386	0.6	9.1	384	SGN_
207.3	664.9	44	207.3	664.9	44	SGO1
4.9	10.3	11	4.9	10.3	11	TUHN
3.9	9.8	47	3.9	9.8	47	WLIT
3.3	8.1	247	3.3	8.1	247	WUEL

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Similar, but for sites, not ACs.

For individual sites, the variation can be quite large, indicating O-B based white/black listing is still important.

2.0	7.2	7.5	135	ZIGR-AUEL
5.4	5.4	7.6	1996	ZIM2-ASIC
4.9	9.4	10.6	2964	ZIM2-ASIR
7.4	6.5	9.8	2020	ZIM2-BKGH
8.0	5.9	9.9	420	ZIM2-BKG_
4.6	5.9	7.5	1864	ZIM2-GF1G
4.8	5.9	7.6	1760	ZIM2-GF1R
4.5	5.7	7.2	2315	ZIM2-IES2
-7.3	10.0	12.3	5162	ZIM2-LPTR
6.8	6.7	9.5	986	ZIM2-LPT_
-0.7	6.0	6.0	2470	ZIM2-METG
4.1	5.9	7.2	2475	ZIM2-METO
6.0	6.3	8.7	2510	ZIM2-ROBG
4.8	6.7	8.3	2510	ZIM2-ROBH
1.7	4.1	4.4	75	ZIM2-ROBQ
4.8	6.8	8.4	2500	ZIM2-ROBT
6.9	11.2	13.2	994	ZIM2-TUWN
6.7	6.6	9.4	986	ZIM3-LPT_
5.8	5.4	7.9	1996	ZIMM-ASIC
5.0	6.5	8.2	1964	ZIMM-ASI_
7.3	6.2	9.6	1020	ZIMM-AUT1
6.3	6.0	8.7	928	ZIMM-BEU1
6.1	5.8	8.4	420	ZIMM-BKG_
4.8	6.0	7.7	1916	ZIMM-GF1G
4.9	6.0	7.8	1872	ZIMM-GF1R
1.9	6.3	6.5	1812	ZIMM-GFZ_
5.6	6.1	8.3	1017	ZIMM-GOP1
5.1	5.7	7.7	2310	ZIMM-IES2
5.2	5.4	7.5	2336	ZIMM-IGE2
6.1	6.2	8.7	1020	ZIMM-IMO1
6.1	6.3	8.7	1020	ZIMM-KTU1
7.0	6.6	9.7	984	ZIMM-LPT_
0.4	6.0	6.0	2470	ZIMM-METO
6.7	6.9	9.6	1964	ZIMM-NGA1
6.2	6.3	8.9	2510	ZIMM-ROBG
4.8	6.9	8.4	2510	ZIMM-ROBH
4.9	7.0	8.5	2500	ZIMM-ROBT
7.2	7.9	10.7	1735	ZIMM-SGN1
2.0	8.3	8.5	1420	ZIMM-SGN_
-4.5	9.2	10.2	1018	ZJX1-CONH
-2.0	13.4	13.6	1008	ZMA1-CONH

Similar, but for sites, not ACs.

For individual sites, the variation can be quite large, indicating O-B based bias correction and white/black listing is still important. Not investigated whether offsets are related to NWP or GNSS biases.

-4.4	9.8	10.7	2420	CHTG-SGN1
-1.3	9.5	9.6	2405	CHTG-SGN_
2.8	8.2	8.6	1684	CHTI-GF1G
3.3	9.3	9.9	1526	CHTI-ROBG
-33.0	21.7	39.4	108	CHTL-ASIC
-32.7	21.9	39.3	64	CHTL-LPT_
-31.7	20.8	37.9	165	CHTL-SGN1
-31.1	20.5	37.3	155	CHTL-SGN_
3.3	7.8	8.4	1836	CHUM-ASIC
-1.9	8.0	8.2	902	CHUM-GOPG
0.4	8.1	8.1	2430	CHUM-METG
2.6	8.4	8.7	2381	CHUM-ROBG
4.2	3.3	5.4	1824	CHUR-ASIC
3.6	3.8	5.2	1748	CHUR-GF1G

Update of Product Requirements doc?

Sub-hourly processing +file naming & formats

It would be helpful to the handling of COST files at UKMO, as well as to NWP users of COST data, if ACs that have not already done so, switch to the latest version of the COST format and the file naming scheme described in the same document.

The latest version is egvap_cost_v22a.pdf. It is available both at the E-GVAP homepage (under ”support”) and from the download ftp-server at UKMO.

Notice that it is possible to write a few words in the top of the COST 716 file, enabling users (and one self) to follow/remember changes done to the processing, providing a contact point if questions arise, etc.

- GNSS4SWEC summer school and working group meeting, September
- E-GVAP expert team and members meeting, December 2016
- EUMETNET PM meeting, Jan 2017, Budapest, Hungary
- Obs programme meeting, Feb 2017, Exeter UK
- GNSS4SWEC final workshop & MC meeting, March 2017
- EGU, April 2017, Vienna
- ObsSet expert team meeting, May 2017, ECMWF
- EUREF annual symposium, June 2017, Wroclaw
- Several EUMETNET meetings on the ”next phase”, summer, autumn 2017
- E-GVAP annual, November 2017, KNMI de Bilt.

Expert team on data processing

The primary contact point between the meteorological and geodetic side.

Team involves both the real processing experts, and people from institutes starting to process GNSS data for delivery to E-GVAP.

Rosa Pacione/Brigida Pace, e-geos, Italy

Jan Dousa, GOP, Czeck Republic.

Elmar Brockmann, Swisstopo, Switzerland

Galina Dick/Florian Zus, GFZ, Germany

Tong Ning, Swedish Mapping Agency (Lantmaeteriet)

Jose Antonio Sánchez Sobrino, IGE/IGN, Spain

Lila Jean-Louis, SGN/IGN, France.

Eric Pottiaux/Carine Bruyninx, ROB, Belgium

Wolfang Soehne/Yuksel Altiner, BKG, Germany

Ambrus Kenyeres /Szabolcs Rozsa/Tivadar Horvath, SGOB, Hungary

Norman Terfele, UL01, University of Luxemburg, Luxemburg

Jaroslaw Bosy, Jan Kaplon, WUEL, Poland

Jonathan Jones, Siebren de Haan, Henrik Vedel.

Responsible person: Jonathan Jones.

Expert team on GNSS observation usage

Purpose: To further the use of gb GNSS data in NWP and now-casting through sharing of results and expertise, to provide guidance material for others, and to provide feedback to processing centres.

Owen Lewis and Gemma Halloran, UKMO,
Jana Sanchez Arriola, AEMET, Spain
Patrick Moll, Meteo-France.
Klaus Stephan/Michael Bender, DWD.
Henrik Vedel, DMI and E-GVAP
Jonathan Jones, UK Met Office and E-GVAP
Siebren de Haan, KNMI and E-GVAP.

Other?
The experts should cover the ”big nwp consortia” and be people active in using ground-based GNSS data in NWP and/or forecasting.

Responsible person: Henrik Vedel.

O-B and other NWP data for statistics (E-GVAP), and for use in realtime positioning experiments (post GNSS4SWEC).

- **Currently O-B from UK Metoffice global model as regards EUCOS QMP, and from KNMI HIRLAM regarding the E-GVAP validation page.**
- **Need global coverage.**

  Need also European coverage with higher resolution models.
  - **For E-GVAP O-B.**
  - **For post GNSS4SWEC need ZTD, surface pressure, T2m and <T>?**

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E-GVAP economy

The ordinary yearly E-GVAP-II budget is:

•Project manager	43.0 k€	DMI
•Contract to support hub/central processing	25.5 k€	UK Met Office
•Contract to quality control facility	25.5 k€	KNMI
•Expert teams, liaison and project travel	25.0 k€	
•Total	119.0 k€	

The actual payment from members is less these years, due to the use of surplus money from previous years.

The surplus money are handled by the EUMETNET Secretariat in Brussels.

Milestones 2016 and 17.

Year 4

- Continuation of existing E-GVAP-II data processing and distribution
- A review/discussion of the future route for European ground based GNSS observations for meteorology
- Draft proposal for the future of E-GVAP.
- Reports from expert teams and E-GVAP team

Year 5

- Continuation of existing E-GVAP-II data processing and distribution.
- Preparation for the next phase. Including enhancing the portability of the current system to ease potential takeover by another team, e.g., implementation into EUCOS as a mandatory programme, by using "standard" software where practical, and by documenting the setup, making it easier for other, to setup what cannot be copied directly.
- Reports from expert teams and E-GVAP team
- Final report

The decision to extend the EUMETNET obs. programmes by a year, to end 2018, means the review of the future of European GB GNSS meteorology and planning the next phase is postponed. Most of it will take place in 2017 and early 2018. E-GVAP is a so-called ”fast track programme”

Other key focus areas

- **More upload and distribution of sub-hourly GNSS delay data.**
- **Active quality control, AQC.**
- **Expanded coverage in data poor areas, both European and global.**

Timeliness questionnaire (send to members)

All EUMETNET programmes are to be renewed, with the next phase running 2019-2023. In connection with this the programme requirements need to be updated, in order to match the needs of operational meteorology in the period. This is happening now.

To do this properly, we need information from the end-users. Both existing ones, and from institutes planning to start using such data in the period 2019-2023.

For E-GVAP the most pressing issue is the timeliness criteria. To revise those, we need a good understanding of the end-user constraints.

As regards NWP, please list for each of the NWP setups in which you use/plan to use E-GVAP GNSS data the following:

1 Modelname

2 Approx. area (eg. country, region of Europe, coordinates, etc.)

3 Horisontal resolution

4 Cut-off time (difference between wall clock time and start time of the forecast)

5 Width of the data assimilation time window

6 Type of data assimilation (3DVar, 4Dvar, etc.)

7 If you use more than one obs for each site, how many do you use, and at which frequency?

8 Your own evaluation of timeliness requirements for this model, both in terms of the maximum age of observation data to be of use in your system, and in terms of the ideal timeliness.

Next meeting?

Any other matter?

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European Meteorological Services Network

FIN

Contact Details

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