

# E-GVAP-III

## The EIG EUMETNET GNSS Water Vapour Programme, phase III

**1<sup>st</sup> expert team & panel meeting (= kickoff meeting!)  
November 28-29, 2013, DMI, Copenhagen, Denmark**

**From meeting Nov. 2013 at AEMET, regarding the future of E-GVAP, which was at the time not certain:**

**The recommendations from the advising bodies (STAC and PFAC and a separate expert team) have been positive.**

**The informal answers from the EUMETNET members whether to join E-GVAP-III have also been positive.**

**Ultimo November EUMETNET Assembly will meet and decide whether to launch E-GVAP-III.**

**We cannot guaranty the continuation now, but will be really surprised if the programme is not continued.**

# Reporting from experts & members

**AEMET. See separate presentation made by Jana Sanchez, presented by Henrik.**

## Ground-based GNSS data. Access and processing.

- **DMI is collaborating with the NRT GPS processing centre NGAA at SMHI, such that Danish GPS data are processed at SMHI.**
- **The Danish GPS data currently come from one source, the national Danish mapping agency.**
- **A setup in which the NMA uploads hourly 30 s files to DMI shortly after the full hour has just been put into operation. The files are available with a very small delay. This bypasses the non operational server at Chalmers.**
- **Potentially data from two private networks are available, the ftp setup has been prepared for that, but currently there is no agreement on access to those data**
- **We consider starting GNSS data processing at DMI in connection with subhourly data processing for use in NWP nowcasting.**



# GPSnet (green, names) + Trimble network (red, numbers)



- **Extraction of O-B site&AC specific statistics from passive assimilation of all data uploaded data to E-GVAP as "operational" (though only one ZTD per AC solution per site per assimilation cycle). Calculation of offset statistics. Continuously since July 2007**
- **Derived preprocessing/data selection algorithms enabling selection of "good and robust" ZTD data with Gaussian O-B distributions for assimilation resulting in whitelists.**
  - **Both processing centre and station dependent investigation.**
  - **Long term bias correction (more than a month of data).**
  - **Obserror from above statistics.**
- **Due to low number of Danish sites and instabilities in NGAA solution currently no active use of ZTDs.**

# NWP nowcasting system at DMI

- **The purpose of the NWP nowcasting is to predict important weather phenomena that has low predictability because they occur on small scales in time and space, leaving them very difficult to predict properly with traditional NWP setups.**
- **Examples of importance to DMI are:**
  - **Convective, heavy, local precipitation (risk of floodings).**
  - **Road temperatures, humidity, precip., cloud cover (e.g. slippery road forecasts, used by road authorities when planning salting)**
  - **Short term changes in wind and cloudiness, changing energy production from wind turbines and solar panels.**
- **Important components of a NWP nowcasting system are**
  - **Observations providing relevant information with high time frequency, high timeliness, and high spatial resolution.**

**The most promising are radar data, ground-based GNSS data, Mode-S data, and certain types of satellite cloud data. Exchange of more SYNOP data with some nearby countries would also help.**
  - **An NWP/computer system capable of doing frequent assimilation and short range NWP forecasts, so-called "rapid update cycling" (RUC). With new runs every hour (or more often) and 6 to 12 hour forecasts.**

**The RUC system data assimilation is a two step procedure**

- 1. 3DVar of "standard" observations with a cutoff of about 1:30 h.**
- 2. Nudging of satellite cloud data and 2D radar composite "rain" observations that have arrived since the nominal time of the 3DVar analysis. The youngest observations have an age of just about 10-15 min relative to the wall clock time for the start of the forecast cycle. The DMI radar observations are available with 10 min intervals.**

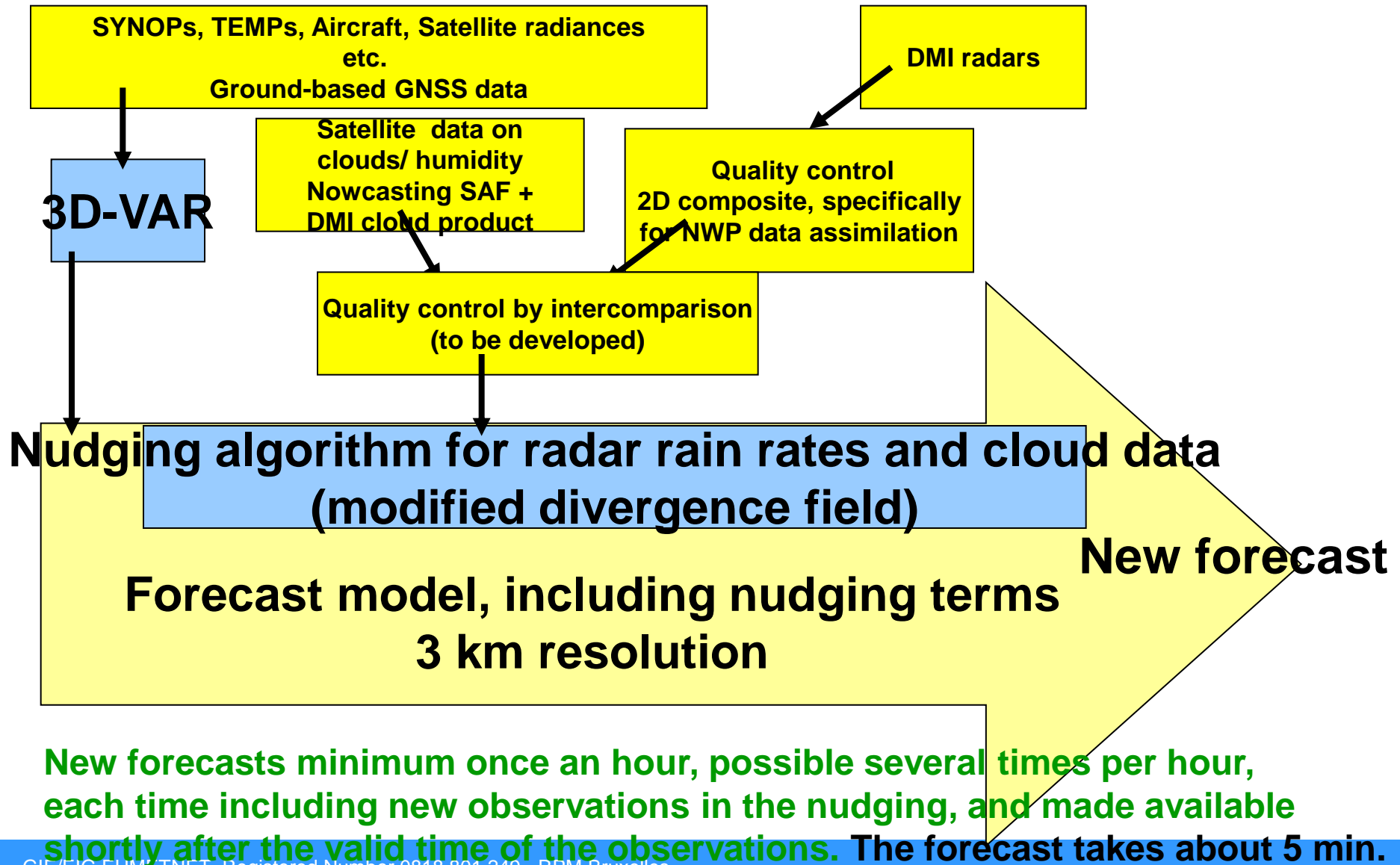
**The radar data are included via nudging of the divergence term in the continuity equation, with the strength of the forcing being determined from a relation between enhanced convergence/divergence and precipitation.**

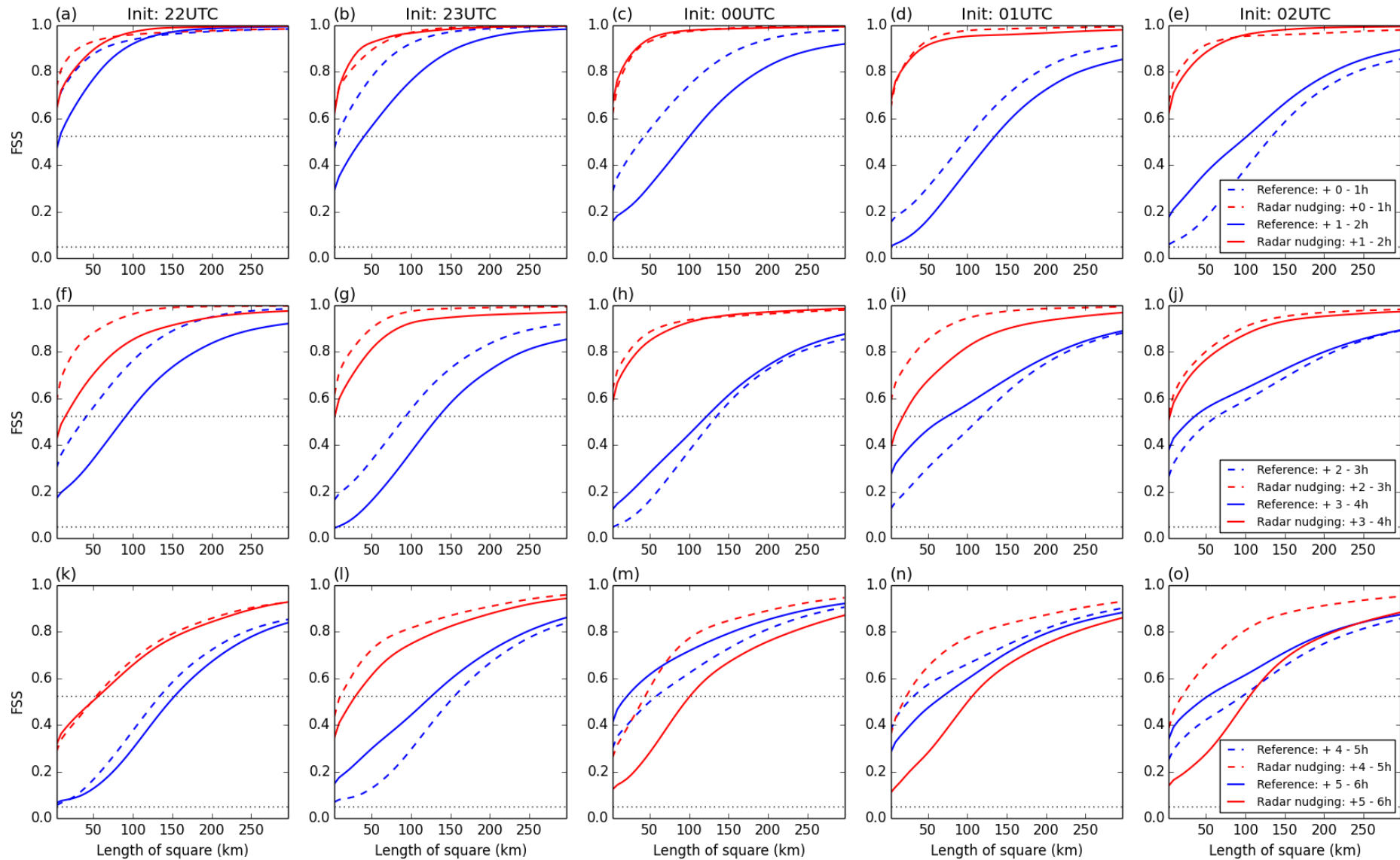
**The idea is somewhat similar to use of latent heat nudging: that changes in precipitation are related to changes in convergence/divergence and associated vertical motions. We here work on the velocity field, because on the small scales velocities drive the mass, while on larger scales the mass force the velocities. The scheme is found to be very efficient, with a quick forcing of the precipitation field.**

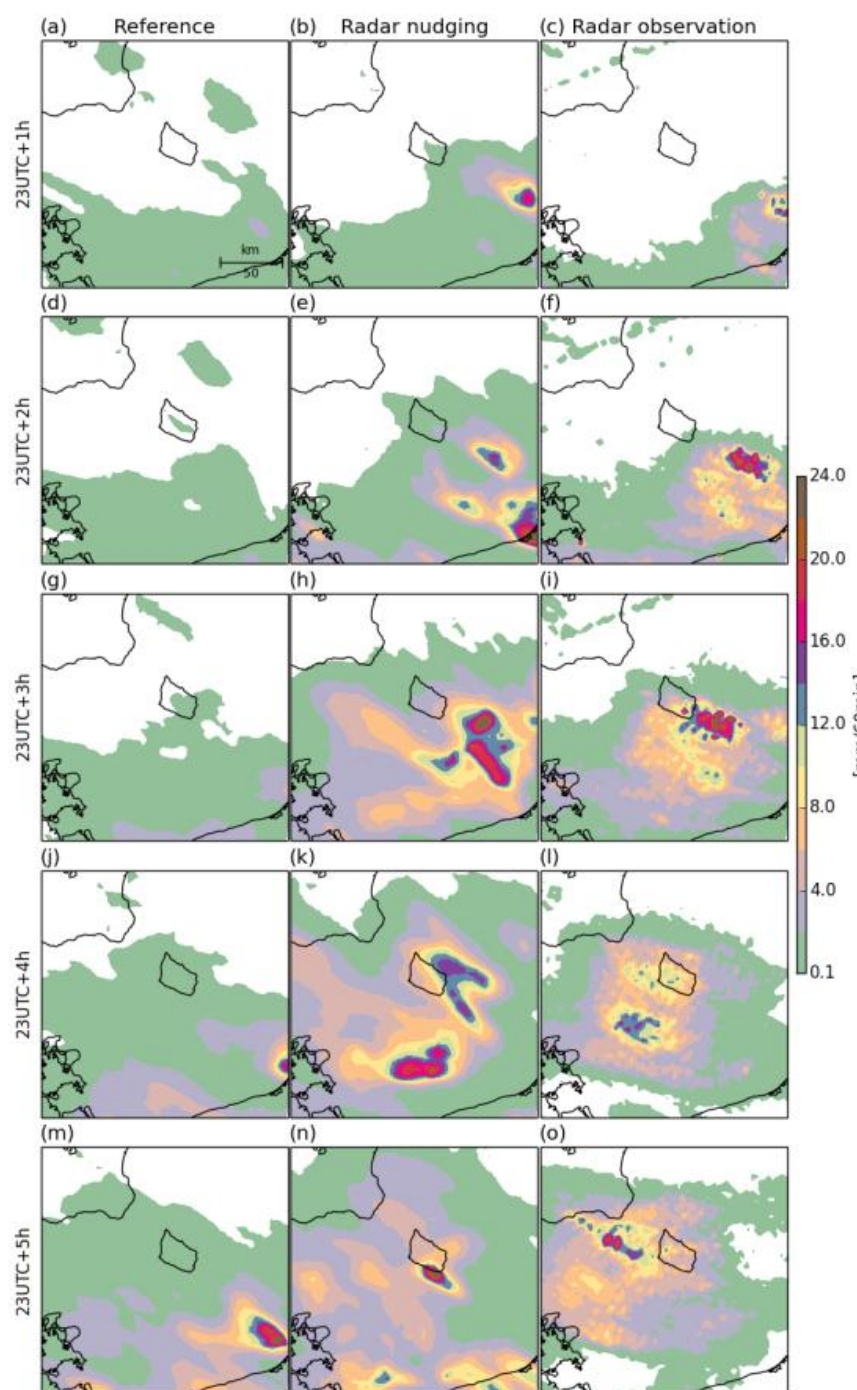
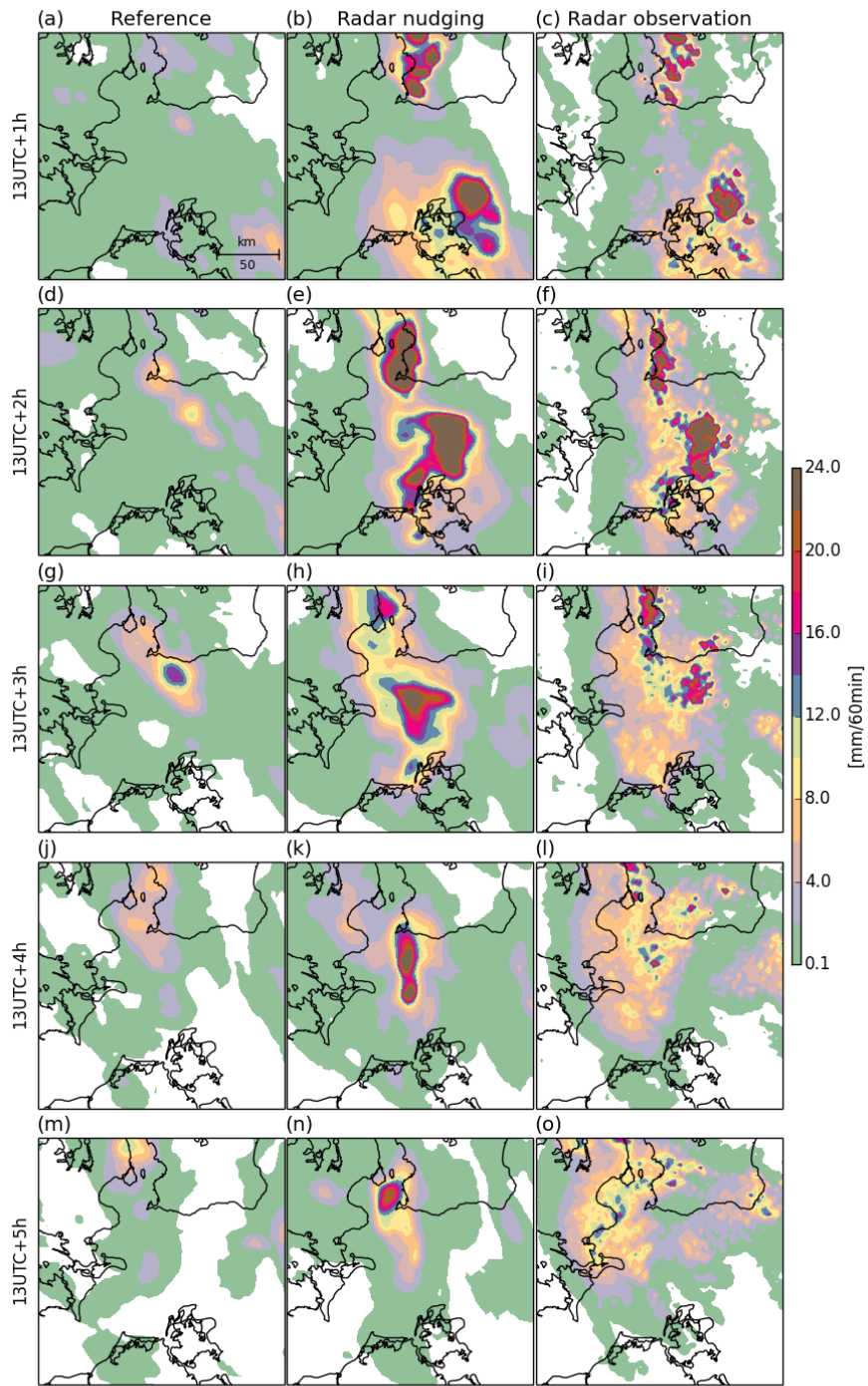


**1: 3DVAR, done hourly, with cut-off time of approx. 1.5 h.**

**2: Nudging, done hourly with very small cut-off time.**







- **Together with vertical motions the second important ingredient for creation of precipitation is water vapour.**
- **Improving the analysis of water vapour by use of GNSS ZTDs is an important next step in the RUC development. For that reason inclusion of more Danish data in the processing is central to DMI.**
- **Other improvements will include including more radar data (use of data from neighbouring countries), improved filtering and quality control of the radar data, interpolation of radar fields to obtain higher, more realistic time resolution.**
- **In a parallel "branch" DMI focus on improving short range prediction using the Arome model in the Harmonie Suite. Arome is a more advanced NWP model than DMI-HIRLAM, with the capacity to use both GNSS data and radar volume data (reflectivities and doppler winds).**
- **Running Arome is currently cpu-costly, and there is an interesting balance to be found between frequent running with inclusion of the latest data versus obtaining a better, but older analysis, as regards forecasting of short lived phenomena.**

Luxembourg and Portugal are new members. Serbia is no longer a member.

Otherwise nothing new from above NMSES or NMAS relative to Madrid meeting

## **GNSS data from Bulgaria**

Agreement made about access to data from Bulgarian Bulipos GNSS sites. Will be processed either at METO or GOP.

Contacts

Guergana Guerova, Department of Meteorology and Geophysics, Sofia University

Prof. Milev, director of the Bulipos network.

Data exchange and processing status?

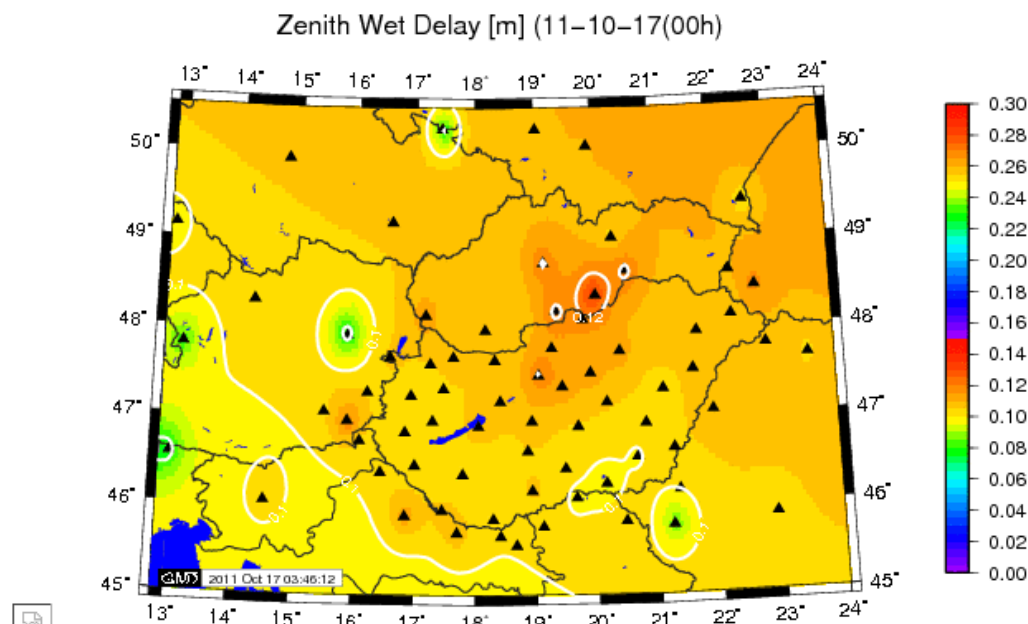
# Hungary

A nationally funded project between geodesists and meteorologists have been set up.

Ambrus Kenyeres from the Geodetic Observatory, Institute of Geodesy, Cartography and Remote Sensing in Budapest. Szabolcs Rozsa, Budapest University of Geodesy and Economics. Gergely Boloni and Balint Varga, OMSZ.

See: <http://gpsmet.agt.bme.hu/indexen.php>

OMSZ very keen to start using ground based GNSS data in NWP.



**The new AC is now operational!**

**The AC name is SGOB.**

**Data are uploaded in COST format, and available in the test/nrt directory on the ftp-server.**

**See separate presentation by Balint Varga!**



# Iceland

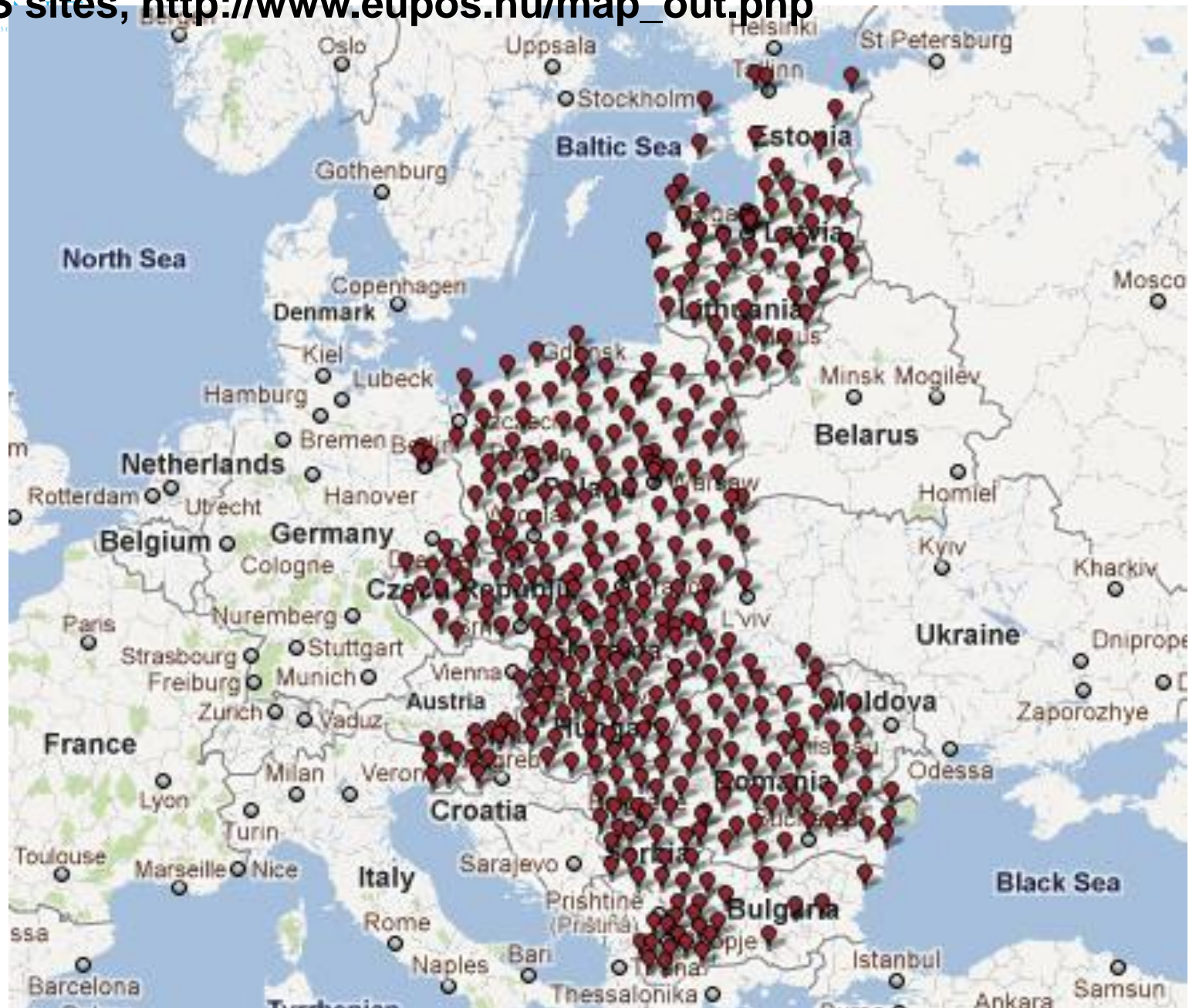
- **Historically Iceland have many GNSS sites, but no good access to the data.**
- **Access to many of the GNSS sites on Iceland have been upgraded, enabling usage in NRT processing.**
- **Contact Benedikt Gunnar Ofeigsson from the Icelandic Meteorological Institute regarding access to data (he's partaking in GNSS4SWEC).**
- **To be processed at METO or NGAA?**



- **ASI. See separate presentation made by Rosa Pacione, presented by Henrik**



**EUPOS sites, [http://www.eupos.hu/map\\_out.php](http://www.eupos.hu/map_out.php)**



## **EUPOS sites**

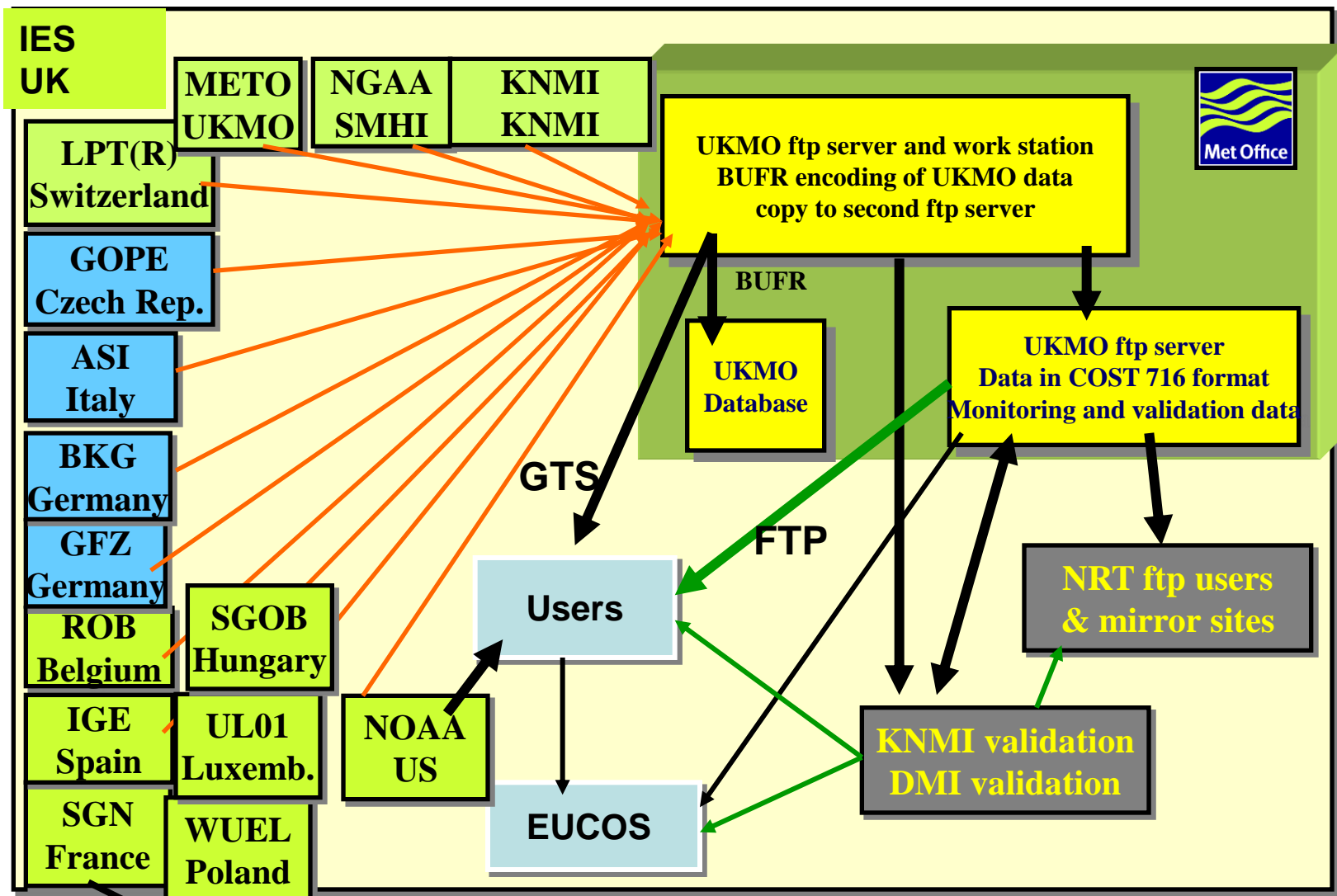
**An MoU between EUPOS and EUMETNET has been signed.**

**This will function as a tophat MoU. Under this national MoUs between EUPOS members and EUMETNET members can be made about collaboration, or MoUs with EUMETNET/E-GVAP if no national met member is active, as necessary.**

**The collaboration with EUPOS is in part related to the preparation and launching of GNSS4SWEC. Already we see NRT ZTD data from Poland (AC WUEL) and Hungary (AC SGOB), in addition GPS data available from Bulgaria.**

- **E-GVAP has been in "contact with HYMEX" for a long time, via Olivier Bock, IGN, France. (= SGN processing centre in E-GVAP)**
- **The E-GVAP team met with Olivier and geodesists from Spain, Morocco, Tunisia, and Algeria, in connection with the EUREF annual symposium, June 2012, to discuss HYMEX and other issues.**
- **The amount of extra GNSS data from the HYMEX campaigns is modest, and it is straight forward for E-GVAP to support HYMEX as regards facilities for upload of data and inter comparison (quality control) with other ACs and with NWP.**
- **E-GVAP only distributes data considered of "operational quality" via normal GTS. This does not include HYMEX campaign data.**
- **But download of HYMEX data via E-GVAP ftp, and distribution of HYMEX data via an extra GTS service for experimental data (different header messages), can be used to access HYMEX GNSS data.**
- **It is our hope, that some of the providers of HYMEX campaign data will continue as data providers also outside HYMEX campaign periods!**

# E-GVAP status and outlook.



Analysis centres (ACs), each processing raw GNSS data from many sites.  
In many cases only national AC can get access to the raw data.

AC	Institution
ASI	e-geos/Telespazio, Italy
BKG	Federal Agency for Cartography and geodesy, Germany
GFZ	Helmholz Centre Potsdam, GFZ German Res. Cen. f Geosciences
GOPE	Geodetic Observatory Pecny, Czech Republic
IES	Inst. of Eng., Surv. And Space Geodesy, Univ of Nottingham, UK
IGE	Instituto Geografica National, Spain
KNMI	Royal Meteorological Institute of the Netherlands
LPT	SwissTopo, Switzerland
METO	UK Met Office
NGAA	Norrköping GNSS Analysis Agency, SMHI, Sweden
NOAA	NOAA/NCEP, USA
ROB	Royal Observatory of Belgium
SGN	Institut Geographique National, France
SGOB	Satellite Geod. Obs, IGCERS + Technical Univ. Budapest, Hungary
UL01	University of Luxembourg, Fac. Of Science and Communication
WUEL	Wroclaw University + Inst. Of Geodesy and Geoinformatics, Poland



## **NORTH AMERICAN DATA**

- **Finally NOAA/NCEP data have become available, both via ftp in COST format and via GTS in BUFR format!**
- **NOAA/NCEP has accepted usage of the WMO approved BUFR format used in E-GVAP.**
- **The BUFR encoding and GTS distribution of the North American data is done by NOAA/NCEP.**
- **A sub MoU to be made between NOAA/NCEP and E-GVAP/EUMETNET on the GNSS met collaboration, under the umbrella of an existing NOAA/NCEP EUMETNET general MoU.**

## **South African data**

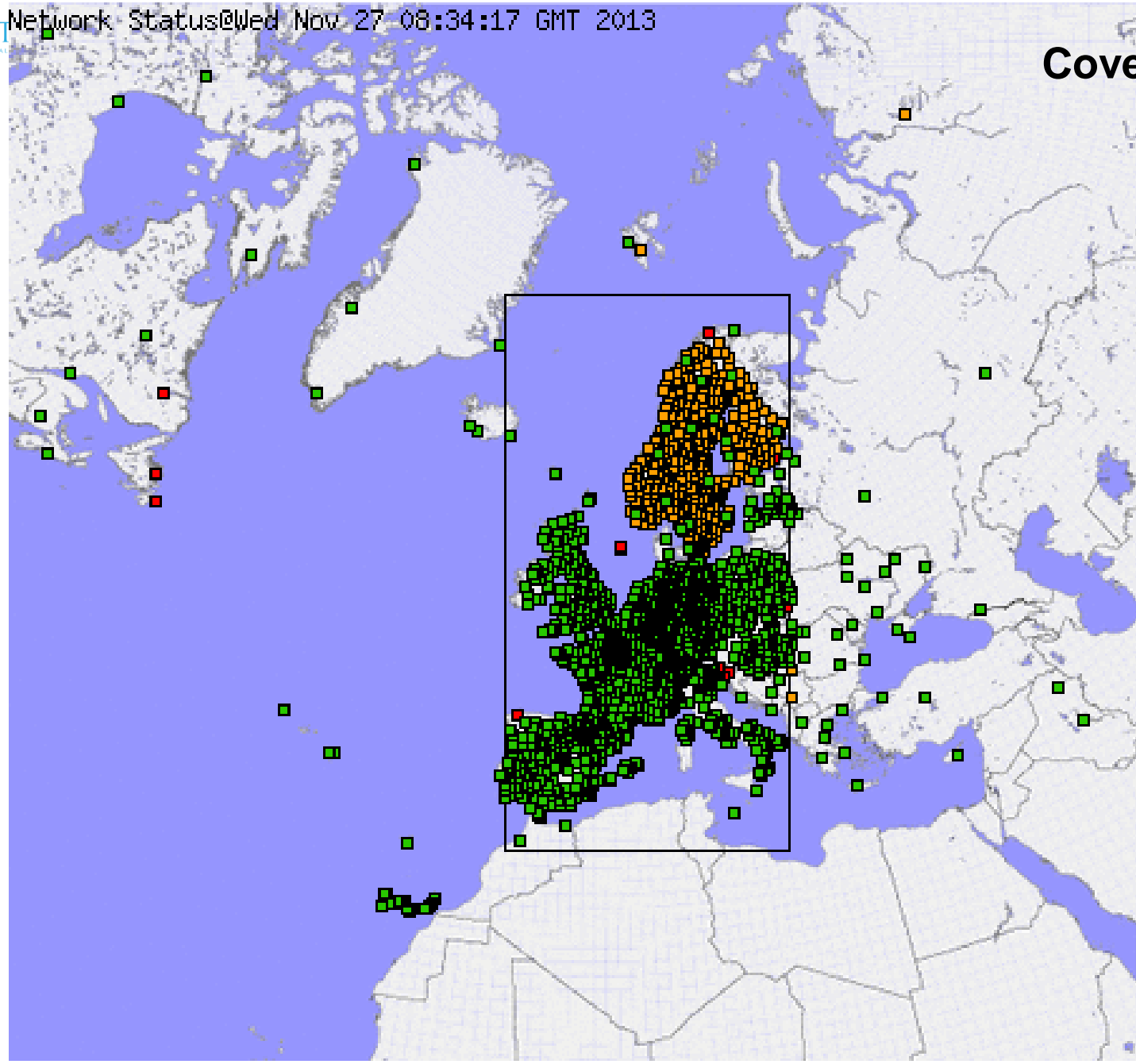
- **Very recently collaboration between NOAA/NCEP and TrigNet in South Africa have made data from a number of sites South African sites available.**

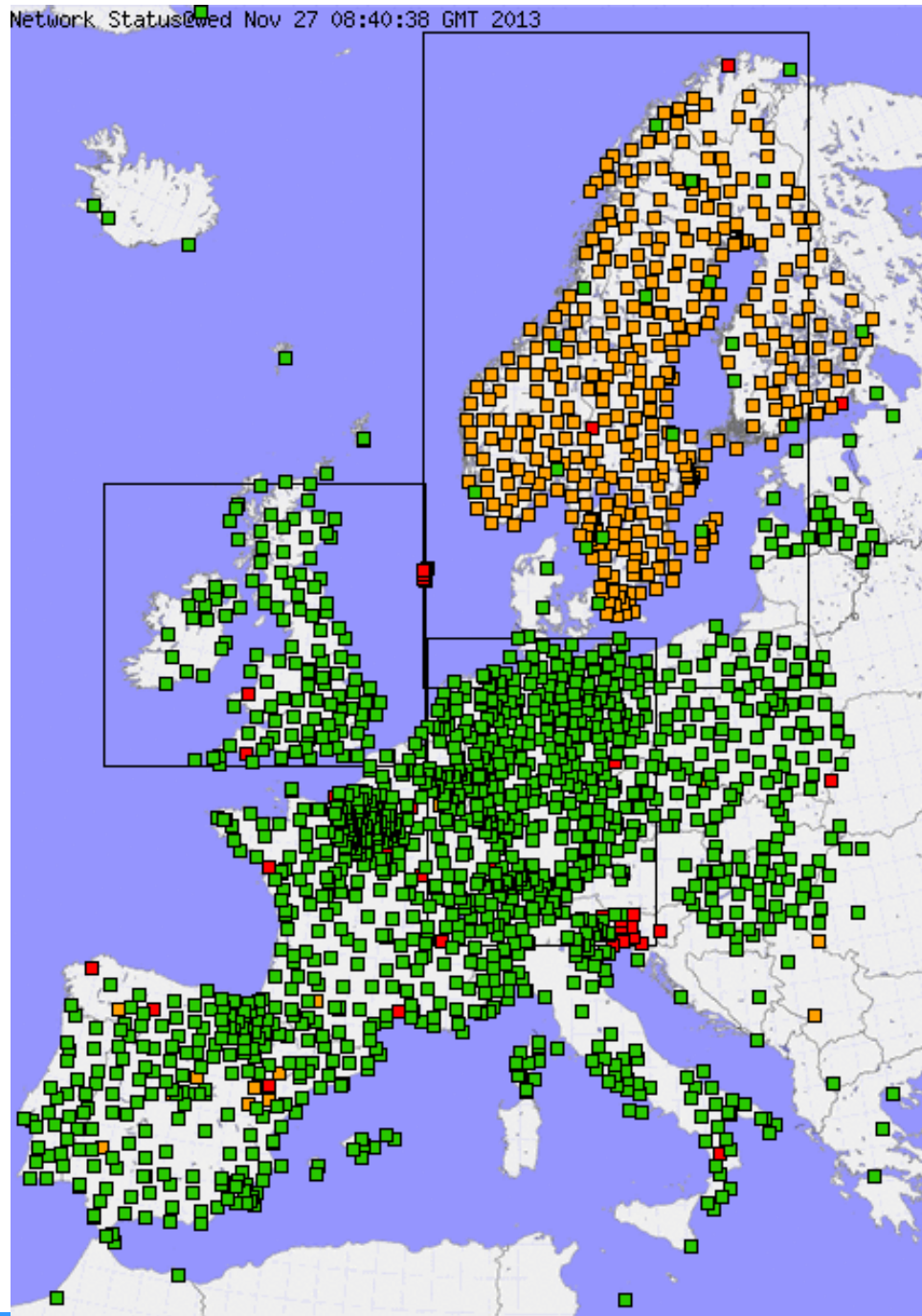
**With the NOAA/NCEP acceptance of a common BUFR format, we are now in a fine position to ask for exchange of data with other institutions producing ZTDs overseas, with good arguments for the use of our format.**





# Coverage



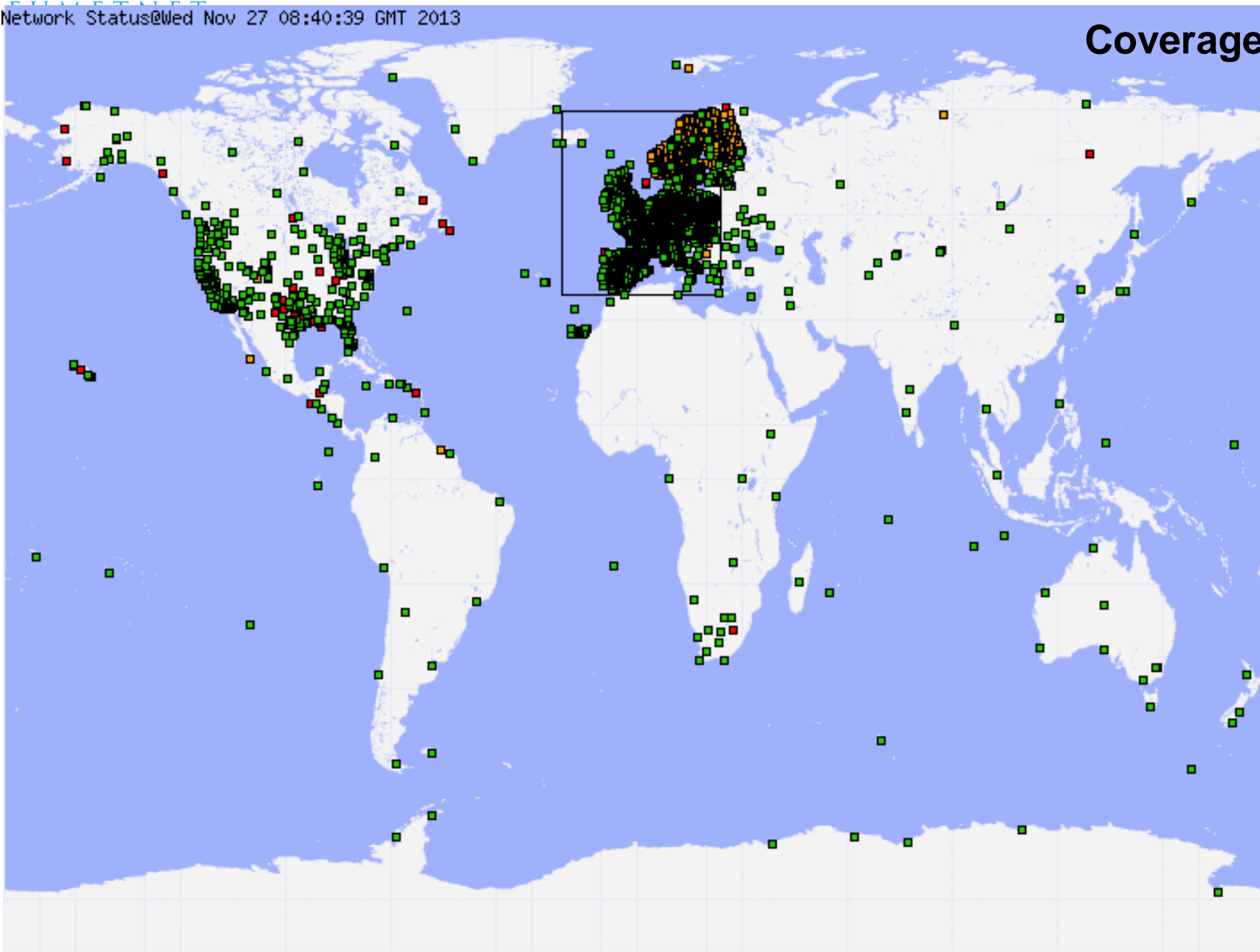


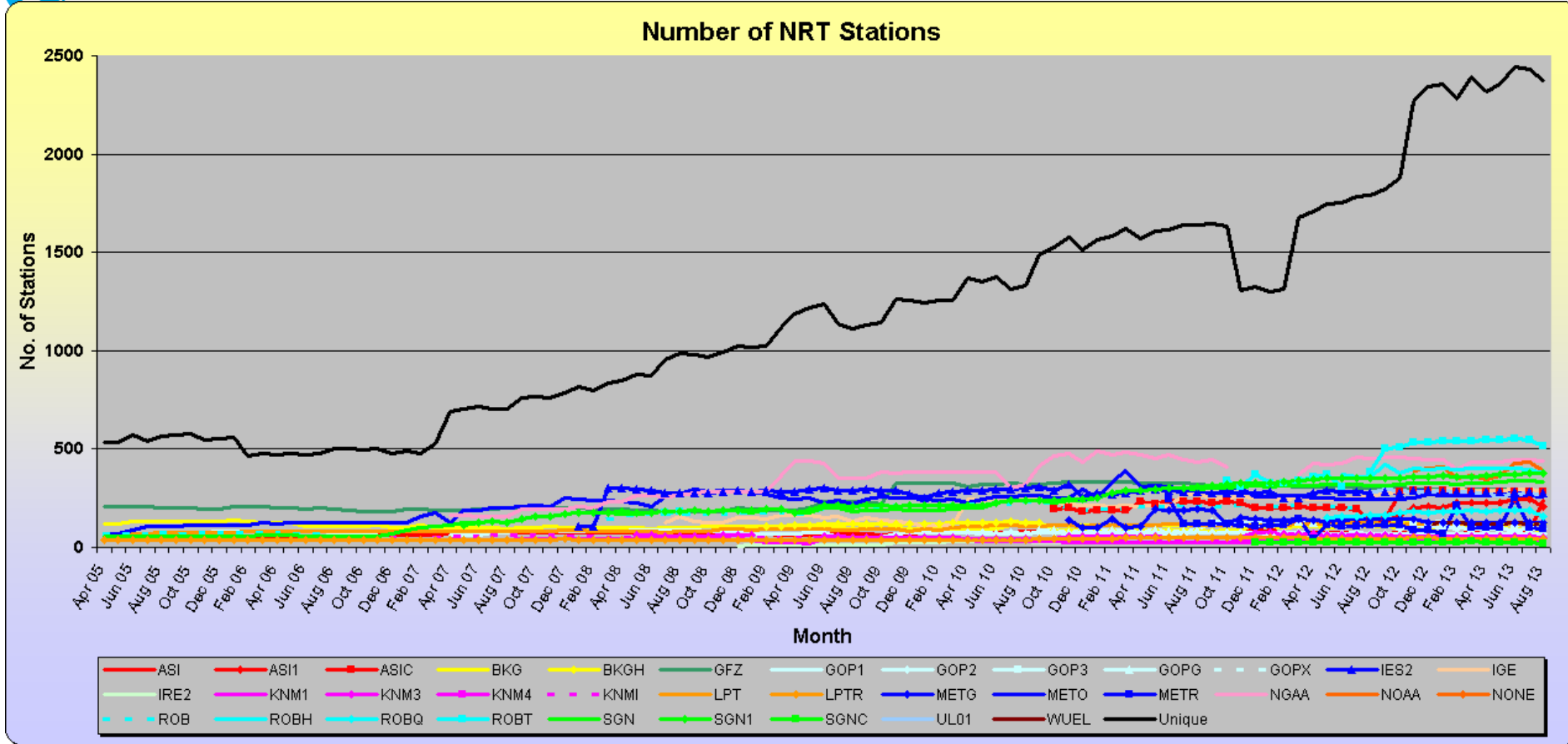
## Coverage



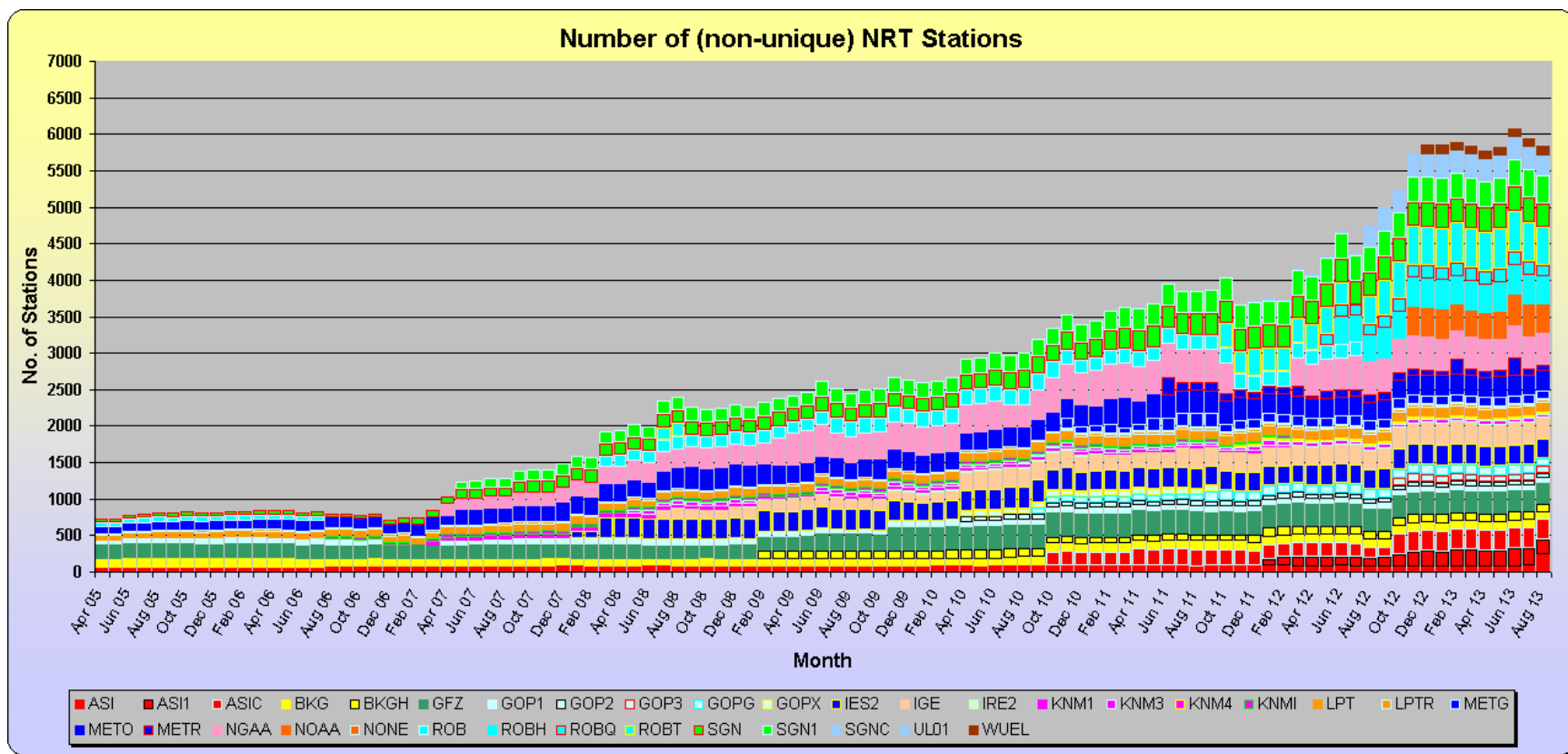
Network Status@Wed Nov 27 08:40:39 GMT 2013

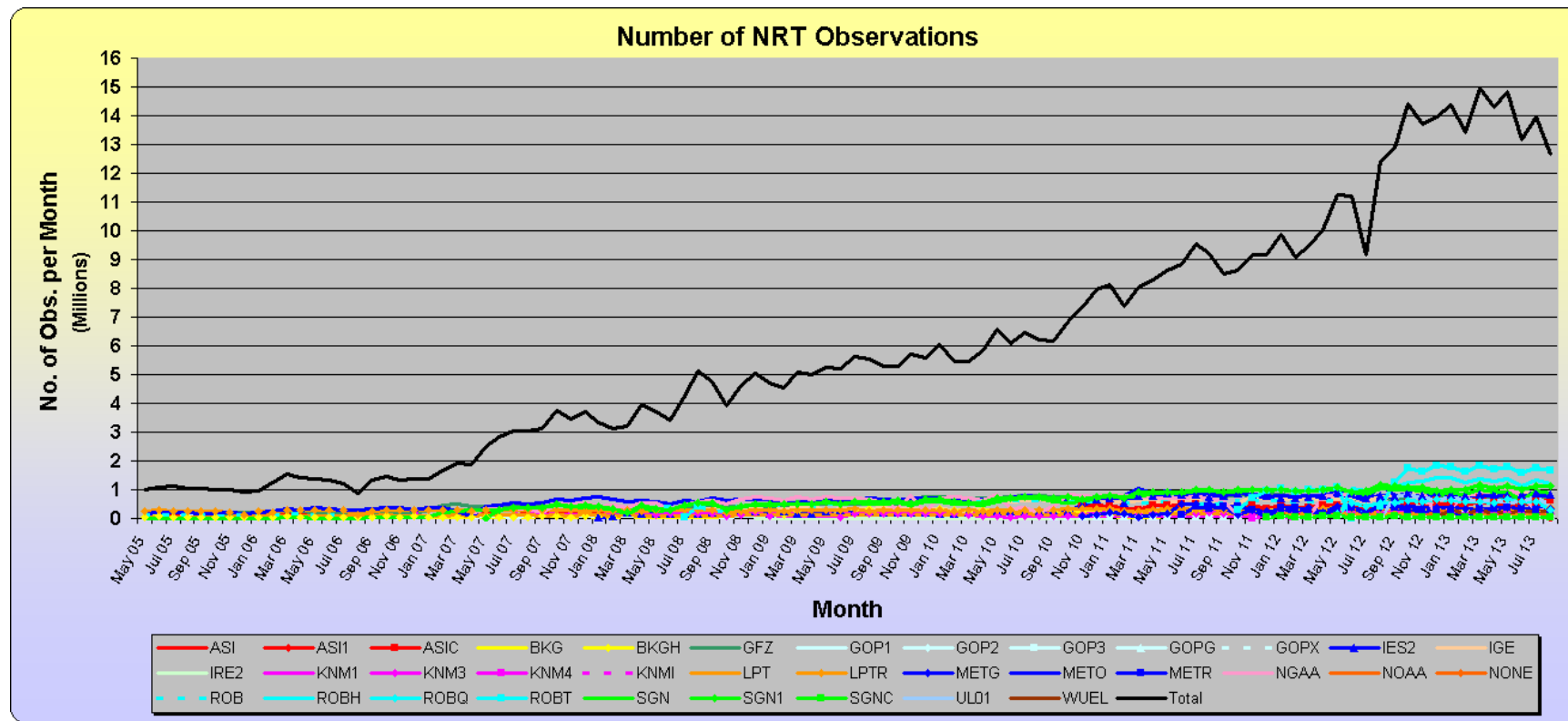
## Coverage





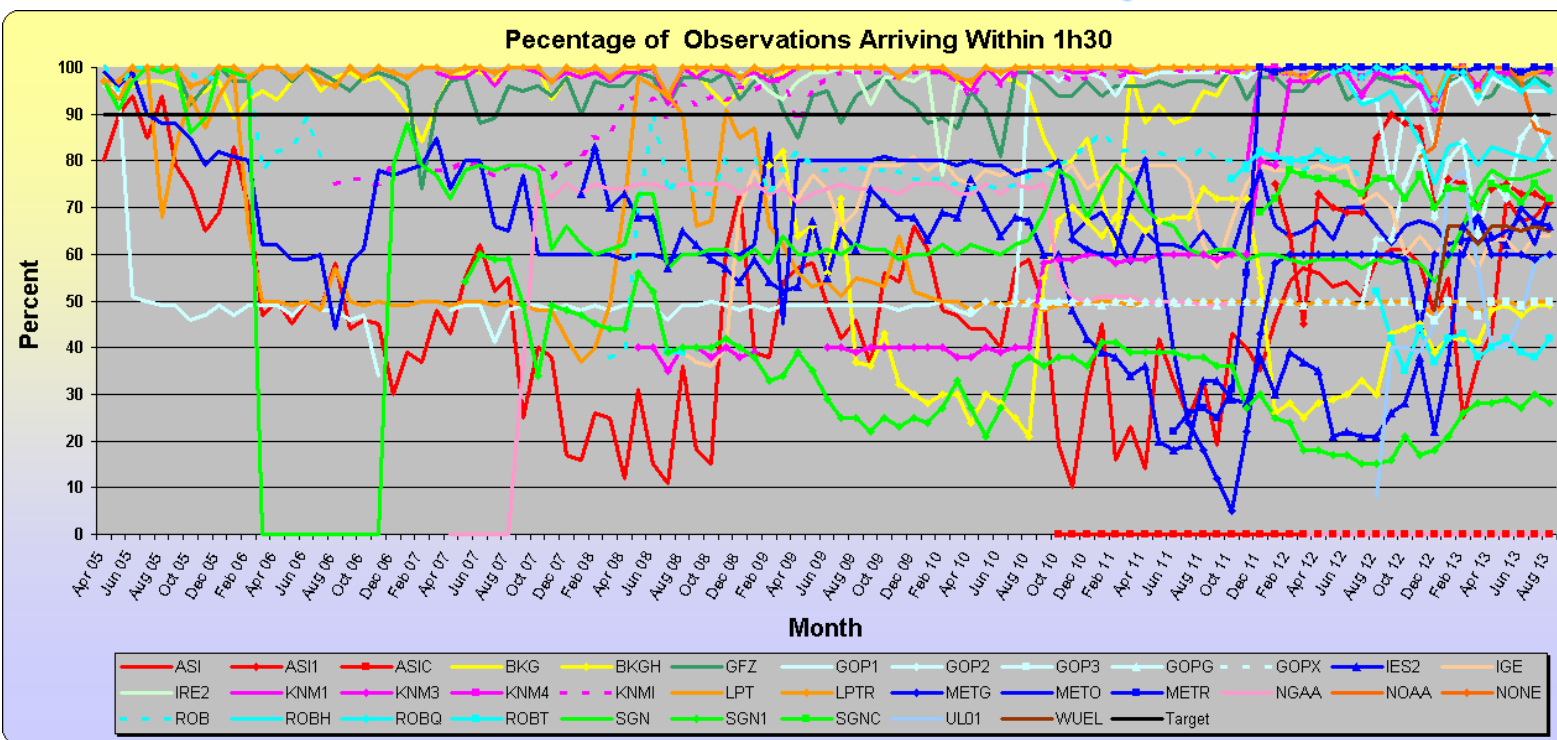
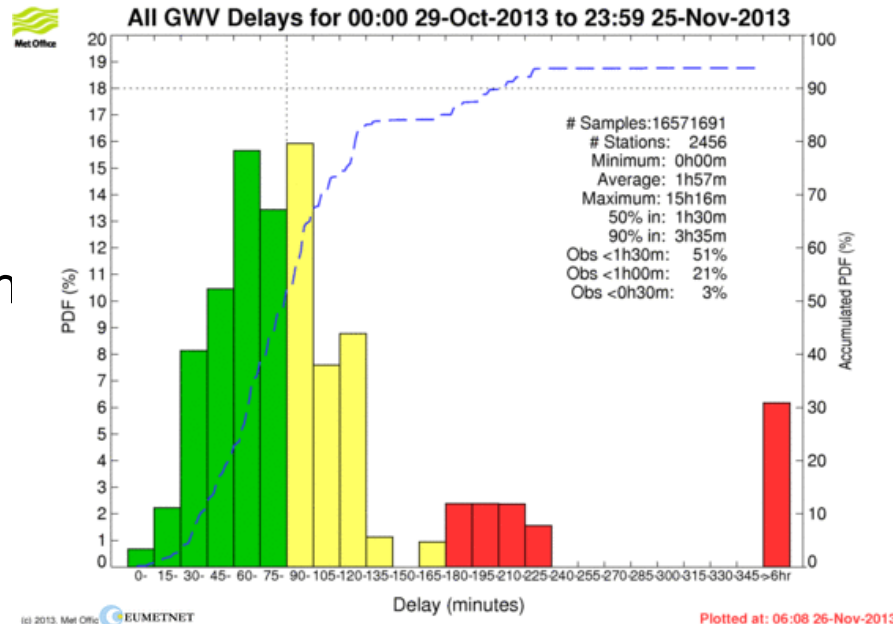
Number of unique GNSS sites versus time.





# Delivery timeliness

- Most (non-TEST) ACs providing data with good timeliness – on average, 90% of all ZTD obs arrive within 1h50m (*target 1h30m*)
- Future trends to shorter NWP model cut-off times will demand reduced latency





EUMETNET  
EUROPEAN METEOROLOGICAL SERVICES NETWORK

# EUCOS Quality Monitoring Portal (QMP)



Federal Ministry  
of Transport, Building  
and Urban Development



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## EUCOS Quality Monitoring Portal

### EUCOS Quality Monitoring Portal

Surface stations

Radiosonde stations

E-SURFMAR

E-GVAP

OPERA

E-ASAP

E-AMDAR

E-WINPROF



Data availability, timeliness and NWP results for E-GVAP stations



☐ Station map

☐ Monthly statistics

October

2011

Supersites



All

One ZTD timely ☒

☐ Obs against NWP of the last 5 days

Supersites



☐ Monthly obs against NWP

October

2011

Supersites



E-GVAP validation tool (KNMI)



Contact: EUCOS.PMT@dwd.de

Site map | Imprint | Data Protection | Disclaimer | Quality Management | Recommend Page | Add Bookmark

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Surface stations

Radiosonde stations

E-SURFMAR

E-GVAP

OPERA

E-ASAP

E-AMDAR

E-WINPROF



Monthly statistic of E-GVAP data (09/2011)  
Analysing Centre: METO one ZTD timely: true


[← Back](#)
[Legend](#)


291 stations found.

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	Σ / Ø	%
ABEP	METO	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	718	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
ABYW	METO	-	-	-	-	-	-	12	-	-	-	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	5
		-	-	-	-	-	-	54	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	100
ACOR	METO	23	24	24	24	24	24	24	23	24	24	24	24	24	24	24	24	23	23	23	24	23	23	24	24	23	24	24	24	24	23	711	99
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
ADAR	METO	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	718	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
AILT	METO	6	9	13	12	13	16	13	15	17	17	21	22	21	23	23	24	17	21	24	24	23	22	23	23	23	22	20	24	24	23	578	80
		53	52	55	56	56	55	53	52	52	53	53	51	51	52	52	52	50	52	51	53	52	51	52	51	52	53	51	53	53	52	52	100
ALDB	METO	24	24	24	24	24	24	24	24	24	24	23	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	717	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
ALME	METO	24	22	24	23	24	23	23	23	24	24	23	23	23	21	24	22	23	23	24	22	22	22	24	23	23	23	23	23	23	23	691	96
		49	51	55	55	55	55	53	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
AMBE	METO	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	718	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
AMER	METO	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	718	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
ANKR	METO	-	-	-	-	-	-	-	-	1	-	3	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	11	2
		-	-	-	-	-	-	-	-	53	-	51	-	52	53	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-	51	52	79
ANLX	METO	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	717	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100
APPI	METO	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	24	24	24	23	24	24	24	24	24	24	24	24	24	718	100
		49	51	55	55	55	55	54	52	52	53	53	50	51	52	52	52	50	52	51	53	52	51	52	51	52	53	50	53	53	52	52	100

**The EUCOS and E-GVAP monitoring and validation is supplementary.**

**The EUCOS monitoring provides members a QM product that is as similar to the the monitoring done by EUCOS of other obs programmes as possible, given the differences between the different observing systems.**

**For use in E-GVAP: Make monthly condensed extracts of EUCOS monitoring, when O-B input has been updated.**

**There is a wish for distribution of sub-hourly data. That requires a new file naming rule, which was proposed at the expert team meeting in Madrid.**

**I was commented that simultaneously the COST file header content should be updated, to include the possibility of unique site naming (DOME numbers) and a more precise description of the processing performed.**

**A proposal, version 2.2, ‘COST-format’ File Specification for Ground-based GNSS delay and Water Vapour data” has been made, with a most recent update to 2.2a.**

**Regarding naming it is close to the original proposal.**

**Besides identifying the timeinterval of the data in the file the naming scheme enables automatic BUFR encoding and routing of the file to GTS, GTS demo, or no BUFR encoding and GTS transmission.**

**The COST files header format is slightly changed**

**Specific possibility for inclusion of DOME numbers have been added, the intended content of processing specific entries has been clarified, to reduce errors in the specifications.**

**It is proposed also to change the representation of total electron content, TEC, enabling higher precision and moving away from a  $\log(N)$  representation.**

**Discussion of eventual inclusion of DOME numbers in the BUFR format and of eventually proposing a BUFR format update to WMO.**

# File naming & formats..

**If unique site names are introduced in the COST format files, how and and which speed should they move into the BUFR format files?**

**Some possibilities**

**1. In principle the site identifier, which is currently "xxxx-yyyy", where xxxx is site and yyyy is AC, in the BUFR files. The string is 20 characters long, in principle there is space for the DOMES number. But how are different DA systems handling this string?**

**2. Add extra table B descriptor. Requires acceptance by WMO. Does not require change of the table D master sequence descriptor, can be ignored by NWP centres not interested.**

**3. New table B descriptor in a new table D master sequence. Needs WMO approval for a number of changes. Enables update of a couple of inadequate properties of the current BUFR template:**

- Adopting TECU description of TEC instead of log(N)**
- Improve range of possible STD values, current range is too small for low elevation slants (below approx 10 degrees)**

# File naming, formats..

**In view of the increasing number of AC doing sub-hourly processing and of the increasing number of Acs, now and in the near future, it would be preferable to decide on a naming and COST format system this side of Christmas, and introduce it in the first half year of 2014. Such that Acs have a fair timeslot within which to change.**

**It should be such that nobody shifts to the new COST file format without simultaneously shifting to the new naming system.**

**Currently a few AC's upload data using the new naming system. One AC is uploading using an in between naming system.**



# Site naming, sharing of occupied names

- **DOMES numbers are unique names for GNSS sites, but there is no current push in geodesy for all sites having DOMES numbers.**
- **In meteorology sites have unique names (numbers).**
- **At UK Met Office a list is kept of all "occupied" 4 character sitenames, with a division into currently used and total.**
- **The list is available via the ftp-server. But the most easy way to access it is via Dave Offilers private home pc..**
- **It would make sense to move/mirror this system to www sites where it is very visible to GNSS geodesists. Where to?**
- **Probably UK Metoffice today receives data (name + location) from more sites than any other institution. The control of name clashes should be done there, as well as making the list of used names.**
- **For AC's uploading data to E-GVAP, we kindly ask them to check the list for eventual name clashes, and adjust accordingly.**



## **Standard rules for declairing test uploads ready for operations. For discussion.**

**Since NWP is not good at humidity, since height offsets are handled differently in diff. NWP models, and since observations operators have different precision, basic estimation of bias and standard deviation should be done against GNSS ZTDs.**

**Comparison against operational ZTDs from supersites sites, or against post processed data.**

**Biases < ? Stdev < ?**

**Comparison against NWP (O-B) to identify and investigate eventual problems with single sites. Stdev < ?**

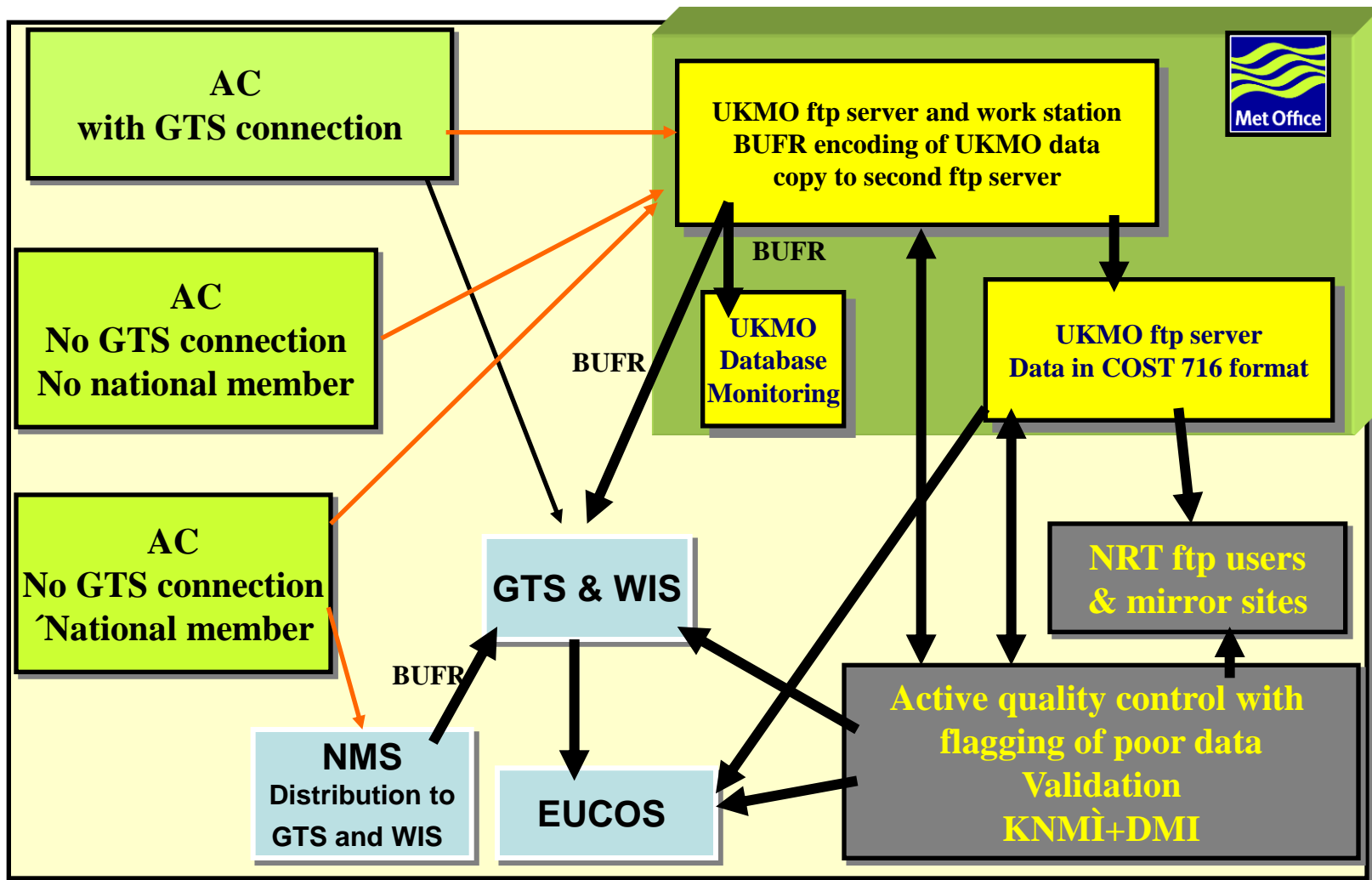
**Data should be monitored for minimum 3 months. When requirements fullfilled, data can be uploaded as operational.**

**For an AC already uploading ZTDs operationally for the same sites, an additional requirement is that the new solution is more precise or has a smaller latency.**



- **Active quality control, AQC, will be set up.**
- The distributions per AC of ZTD offsets relative to the MoM (median of medians) for sites processed by at least 4 ACs have been studied. Based on that, thresholds of 20 and 40 mm for “small”, respectively, “large” outliers have been found to be useful in AQC outlier detection.
- It is planned to run the AQC for the entire E-GVAP database, to provide a “cleaned” NRT ZTD dataset.
- This set can be converted to IWV as well. But this should await a general accepted approach to the ZTD to IWV conversion.

**AQC can be used to on the fly detect whether an AC has a system wide problem.**



ACs which are not at an NMS, will have to transmit BUFR via NMS to GTS and WIS



## Meetings

- **E-GVAP joint expert teams and plenary meeting, November 14-15/11, 2012, AEMET, Madrid.**
- AGU meeting, Dec 2012
- EUMETNET PM meeting, Brussels, January 2013
- EUCOS PM meeting, Helsinki, February 2013
- EGU general assembly, Vienna, April 2013
- STAC meeting, Vienna, April 2013
- GfG2 second workshop, 11-12 April 2013.
- **GNSS4SWEC EU Cost action kick-off meeting, Brussels, May 17, 2013**
- **EUREF annual symposium, Budapest, May 2013.**
- E-SAT meeting, Reading, July 2013.
- IAG, October 2013
- GNSS4SWEC, 16-17 October 2013, Valencia
- **E-GVAP expert team and plenary meeting, November 2013, DMI**
- AGU, December 2013
- EUCOS PM & EUMETNET Core Team meeting, January 13-17, 2014, DWD
- GNSS4SWEC
- EGU, April 2014, Vienna
- **EUREF annual symposium, May 2014.**

# 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**

**Martin Ridal/Jan Johansson, SMHI/Chalmers Tech. Univ., Sweden**

**Marcelino Valdes/Miquel Angel Cano/Jose Sabrino, IGE, Spain**

**Romain Fages/Sylvain Dauriach, SGN/IGN, France.**

**Eric Pottiaux/Carine Bruyninx, ROB, Belgium**

**Wolfgang Soehne/Yuksel Altiner, BKG, Germany**

**Ambrus Kenyeres /Szabolcs Rozsa, Hungary**

**To add:**

**Norman Terfele, University of Luxemburg, Luxemburg**

**Jaroslav Bosy, Poland**

**Guergana Guerova, Univ. Sofia, Bulgaria**

**Jonathan Jones, Siebren de Haan, Henrik Vedel.**

**Responsible person: Jonathan Jones.**

## Inter European scale (EUREF)

- Joao Agria Torres, Chairman of EUREF.
- Elmar Brockmann, Swisstopo
- Ambrus Kenyeres, Hungary.
- Carine Bruyninx, Roy. Obs. Belgium, EUREF coordinator
- Henrik Vedel E-GVAP, DMI
- Jonathan Jones E-GVAP, UK Metoffice
- Siebren de Haan E-GVAP, KNMI

Responsible person: Henrik Vedel.

Very fine collaboration with both above geodesists.

## National scale.

- E-GVAP team.

Responsible person: Henrik Vedel.

- EUMETNET directors prefer national arrangements.
- Practical matters, e.g. national GPS data obtained by a national mapping agency also points to national arrangements.
- A changing liaison group, involving persons from currently active partners
- Database with examples of agreements/contracts between data owners and met. inst.
- EUMETNET Council: Agreements made between met. Offices and GPS providers
- Formally each E-GVAP member institute is responsible for making available GPS data from that country for E-GVAP, or trying to, depending on the current level of national GPS meteorological collaboration. Help in this process can be provided from the E-GVAP team.



# 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.

Gemma Bennitt & Dave Officer, UKMO,  
(Daniel Leuenberger, MeteoSwiss, not working on GNSS usage currently)  
Jana Sanchez Arriola, AEMET, Spain  
Patrick Moll, Meteo-France.  
Klaus Stephan, DWD.  
Henrik Vedel, DMI and E-GVAP  
Jonathan Jones, UKMO 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.

# 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 Metoffice
•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.

Details in excel.



# Spam mails

- **The E-GVAP mail lists suffer from mis-use by spammers.**
- **Reaction?**

**O-B and other NWP data for statistics (E-GVAP), and for use in realtime positioning experiments (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 GNSS4SWEC need ZTD, surface pressure, T2m and  $\langle T \rangle$ .**

## General goals.

- Enlarge network – currently extremely successful
- Monitor and secure quality and timeliness. More systematic monitoring (O-B) and GNSS versus GNSS would be good. Operational AQC.
- Prepare for next generation GNSS meteorology. Launch of GNSS4SWEC makes this strait forward.

**EUMETNET STAC wants the programmes to be consolidated against sudden loss of key personnel.**

**For E-GVAP this is in general not a problem, since the team is based at three institutes, and there is expertise available to both coordinate the programme, and run the monitoring and distribution, should one of the team members disappear.**

**As regards expertise on developing BUFR format and dealing with WMO we rely on Dave Offiler.**

- List of cut off times at NWP centres
- Requirements regarding solution updates. Notification if bias is larger than something?

**Next meeting?**

In connection with another meeting?

**Any other matter?**

FIN

# Contact Details

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GIE/EIG EUMETNET

E-GVAP Programme Manager

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