



UK Status

E-GVAP II, MeteoFrance, Toulouse, 20th October 2011



Operational Processing



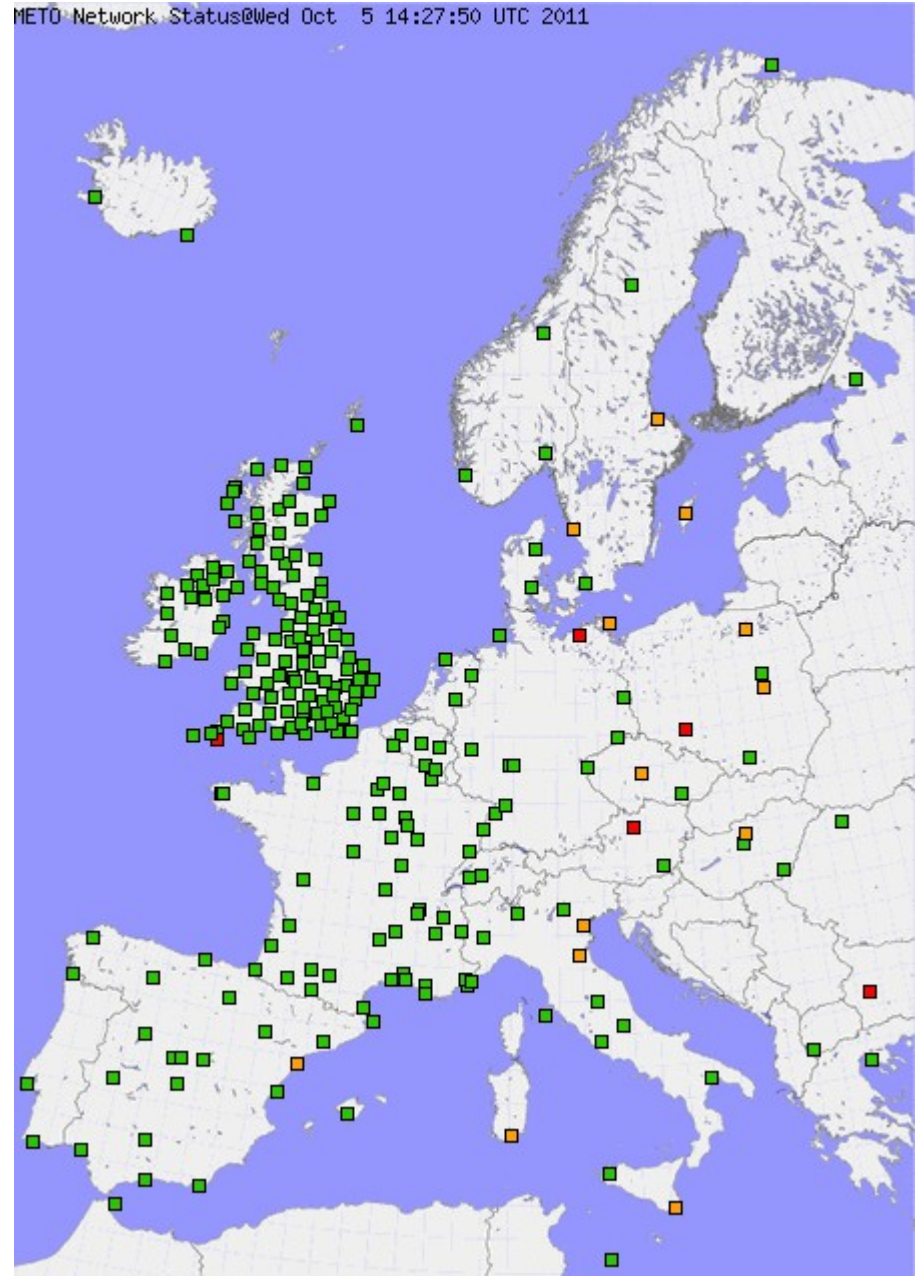
Operational Processing (METO)

- System developed in conjunction with the University of Nottingham since 2005
- Operational roll-out (assimilation) in April 2007
- System aimed at delivering data for NAE NWP model
- European network of sites processed
- Agreements in place with data providers as well as with system developers for operational support



METO

- Hourly/30-sec RINEX
- 200-250 sites processed
- Processing starts at HH+20
- Processing takes ~20mins
- ZTD estimates at 00, 15, 30, 45 and 59mins
- Oldest data ~1h40mins old, youngest data ~40mins old
- Working with Icelandic Met Service to access additional stations



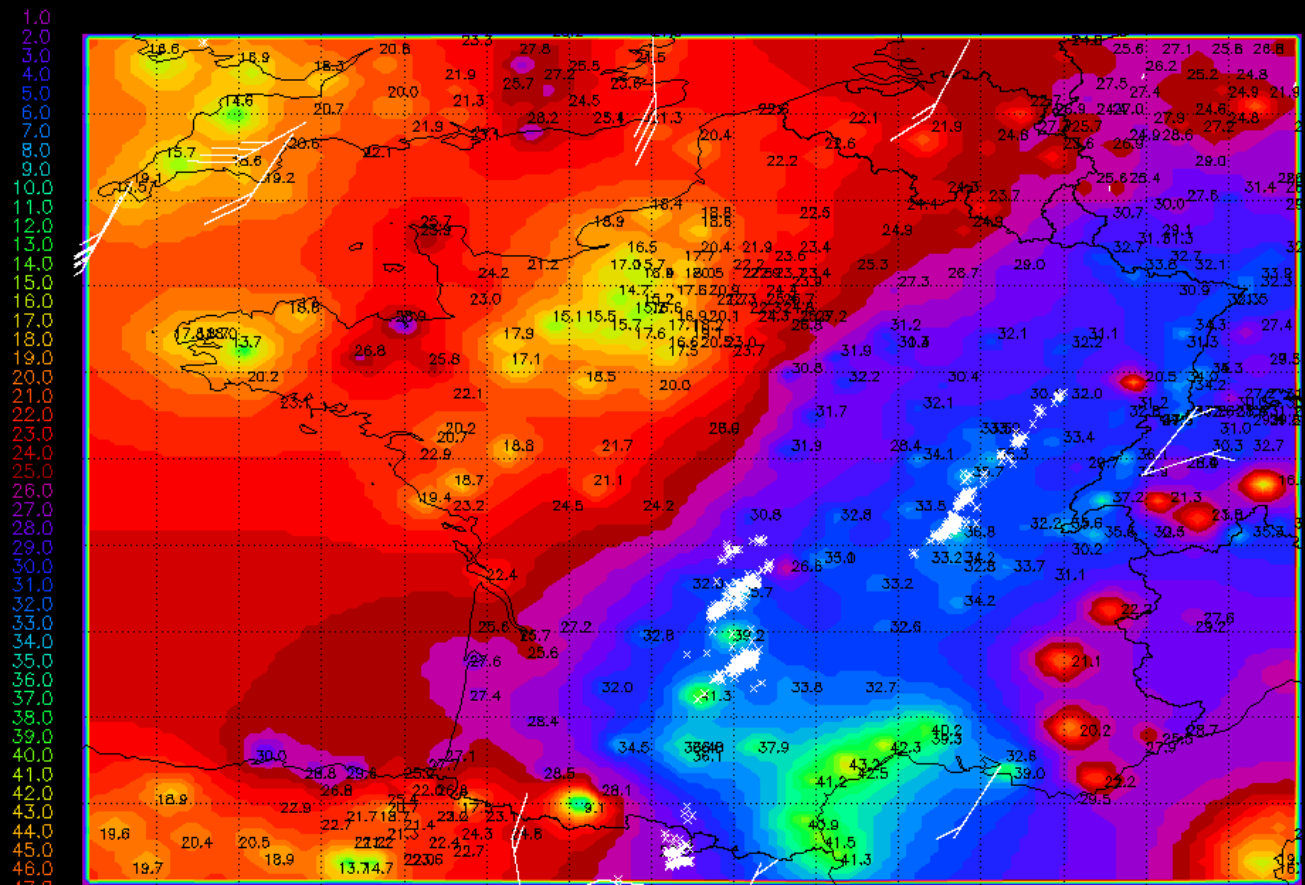


Operational Processing (METO)

- BSW50 use in DD network strategy mode
- 4 NEQ files added to current hour
- Based on IGS08
- FES2004 OTL model
- Absolute Antenna Phase centres
- Abs/Rel trop constraints = 1m/10mm
- COST files produced and converted to BUFR - ingested into MetDB for NWP use and put on GTS for dissemination to Intl. met community

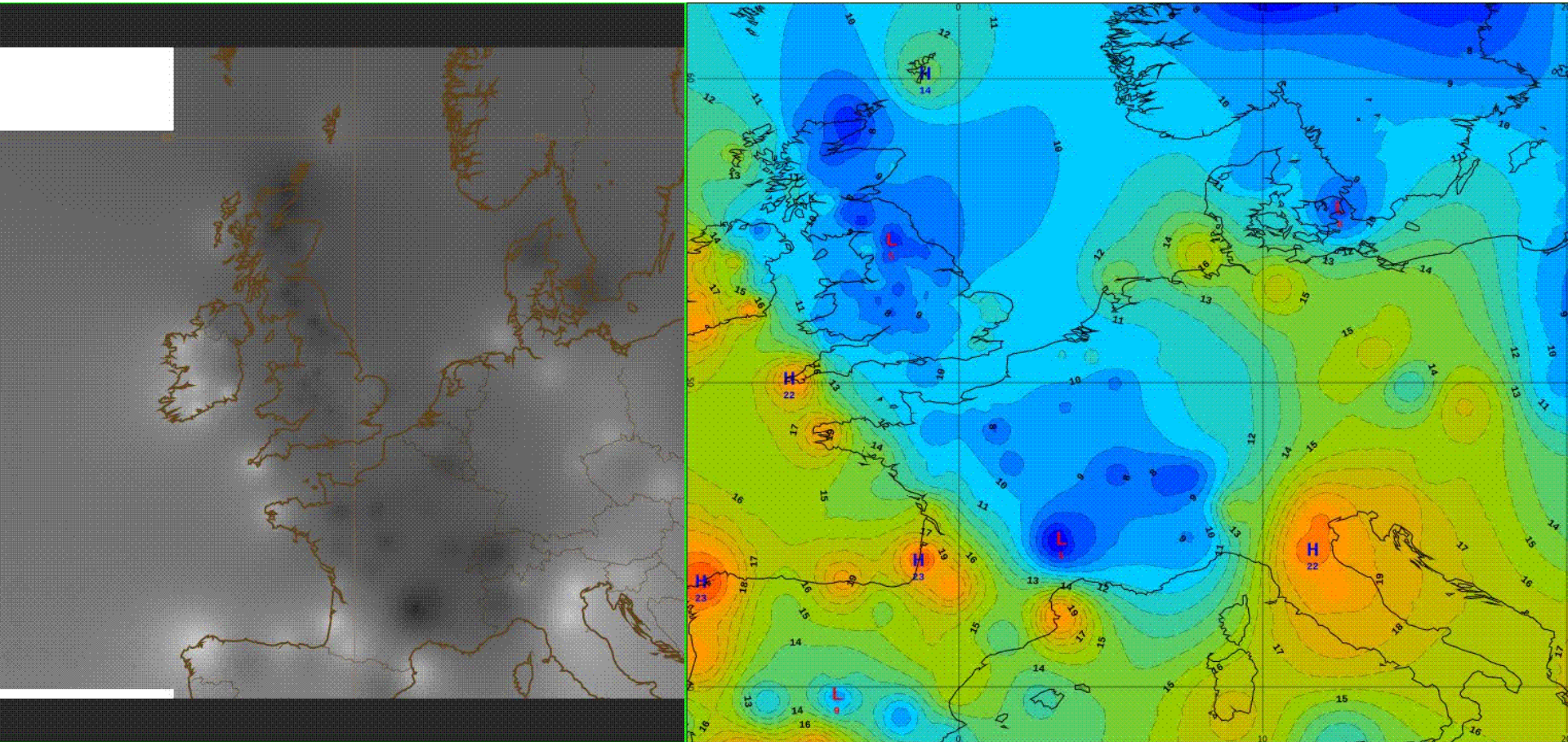
IWV Maps

Ground Based GNSS IWV – france 2011 08 25 05 59 UTC (Units= kgm^{-2})



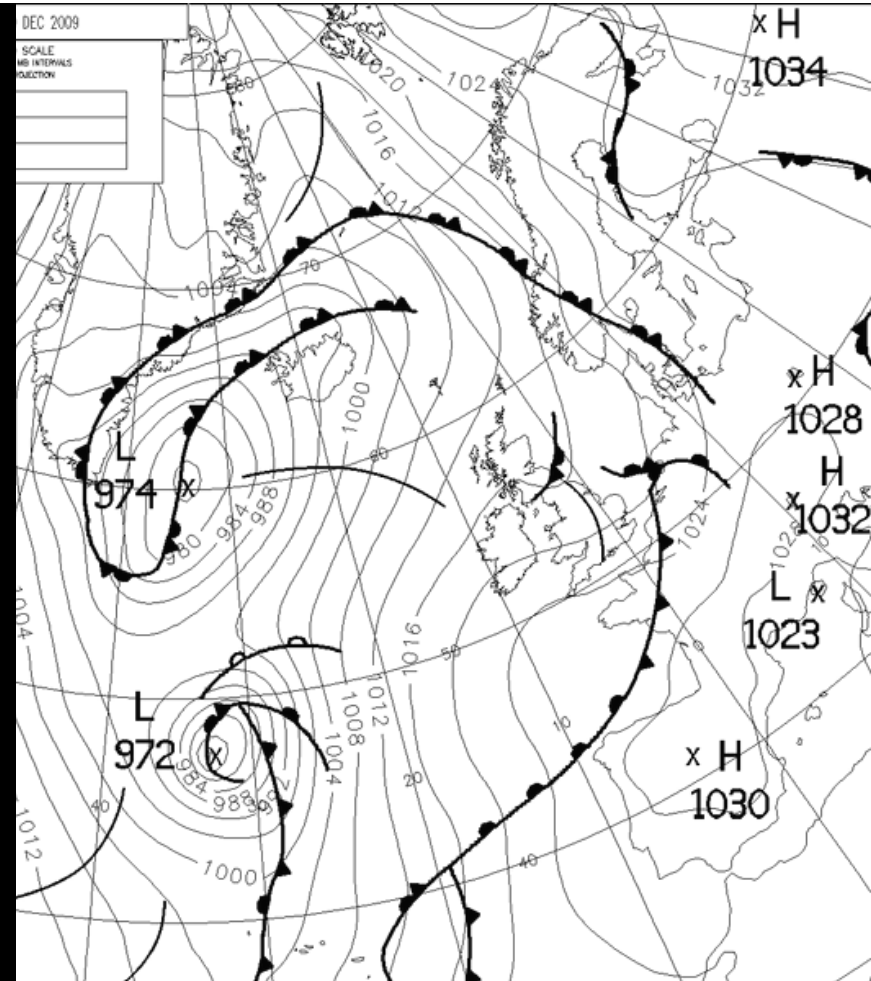
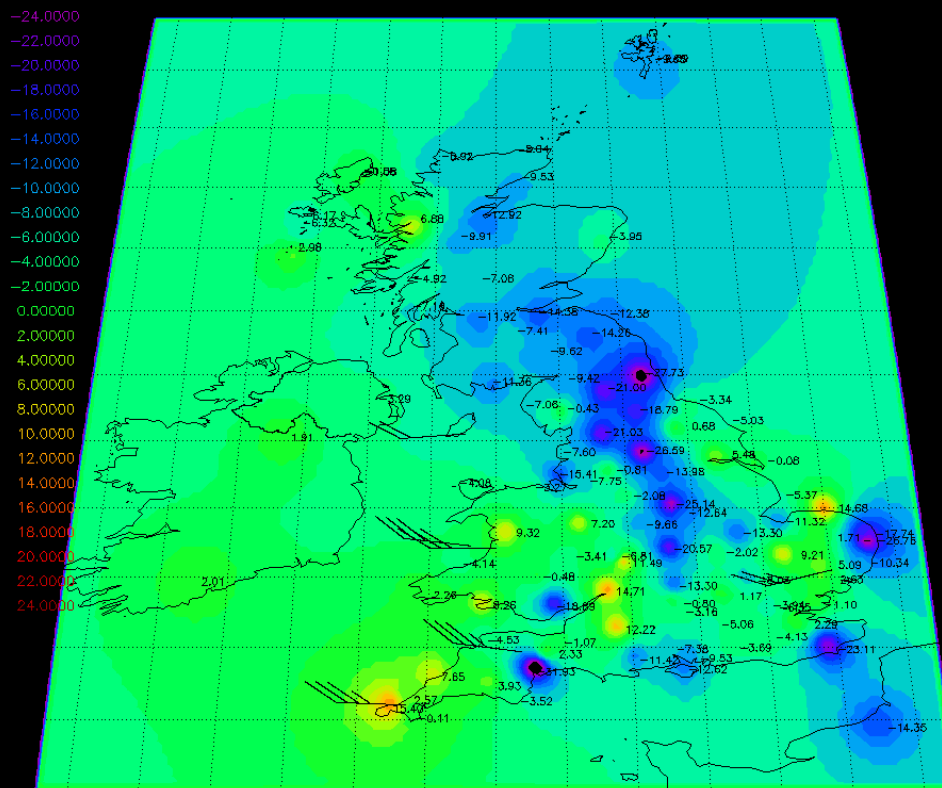
Wind barbs at 1km. Lightning Data (White Xs) provided by the UK Met Office lightning detection system

New IWV Plots (SWIFT)



O-B Features

UK Region O-B ZTD Plot 2009 12 10 00 UTC (Units=mm of ZTD)





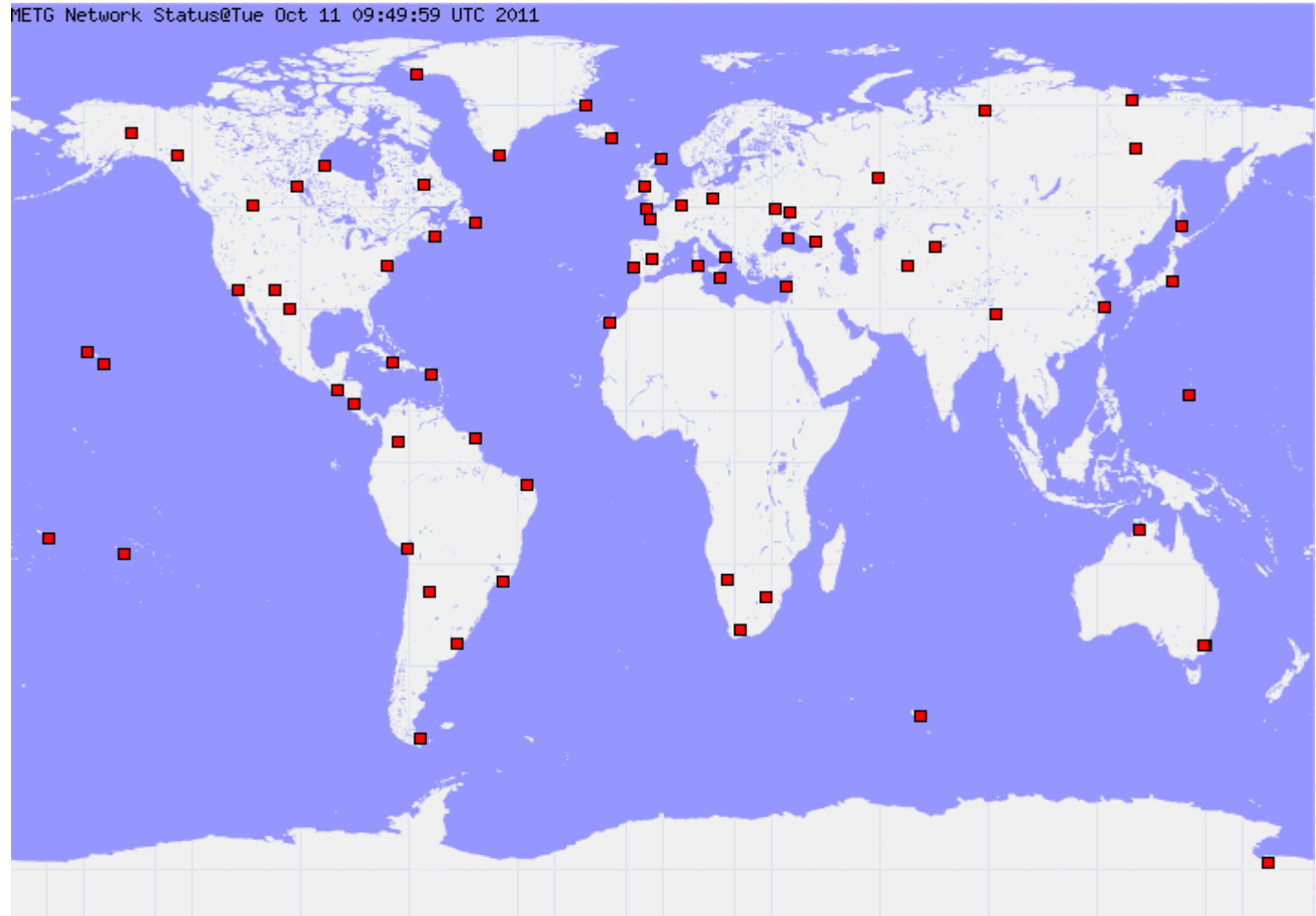
Non-operational Processing



New (non-operational) Processing Systems

- METG - global processing for assimilation into global NWP (same processing scheme as METO but different network)
- METR – sub-hourly processing for assimilation into UKV (1.5km high res model)
- METI established for ionospheric Total Electron Content (TEC) outputs for Space Weather community

Current METG Network



- Based on IGS network but looking to expand...



METR

- Sub-hourly processing necessary to meet needs of UK1.5km model (~30min timeliness cut-off for DA)
- Need to access RT data streams (NTRIP) – need server external to firewalls, then write 15min/30sec RINEX
- Focus on UK domain but with some Euro stations to improve solution (~200 sites in total)
- Aim to have sub-hourly processing system operational before Christmas 2011





METI

- Met Office has committed to establishing a Space Weather centre to mirror one at NOAA
- METI delivering TEC estimates to:
 - NWP Space Weather model
 - Met Office Hazard Centre (telecomms disruption etc)
 - External scientific community
- METI processing same network as METG (at the moment) and based in IGU orbits and clocks
- BSW5.0 estimates the TEC as a spherical harmonic model and converts it to gridded 0.1TECU values in IONEX file
- Also looking at TEC anomalies/ROT and possible link between TEC anomalies and tectonic activity

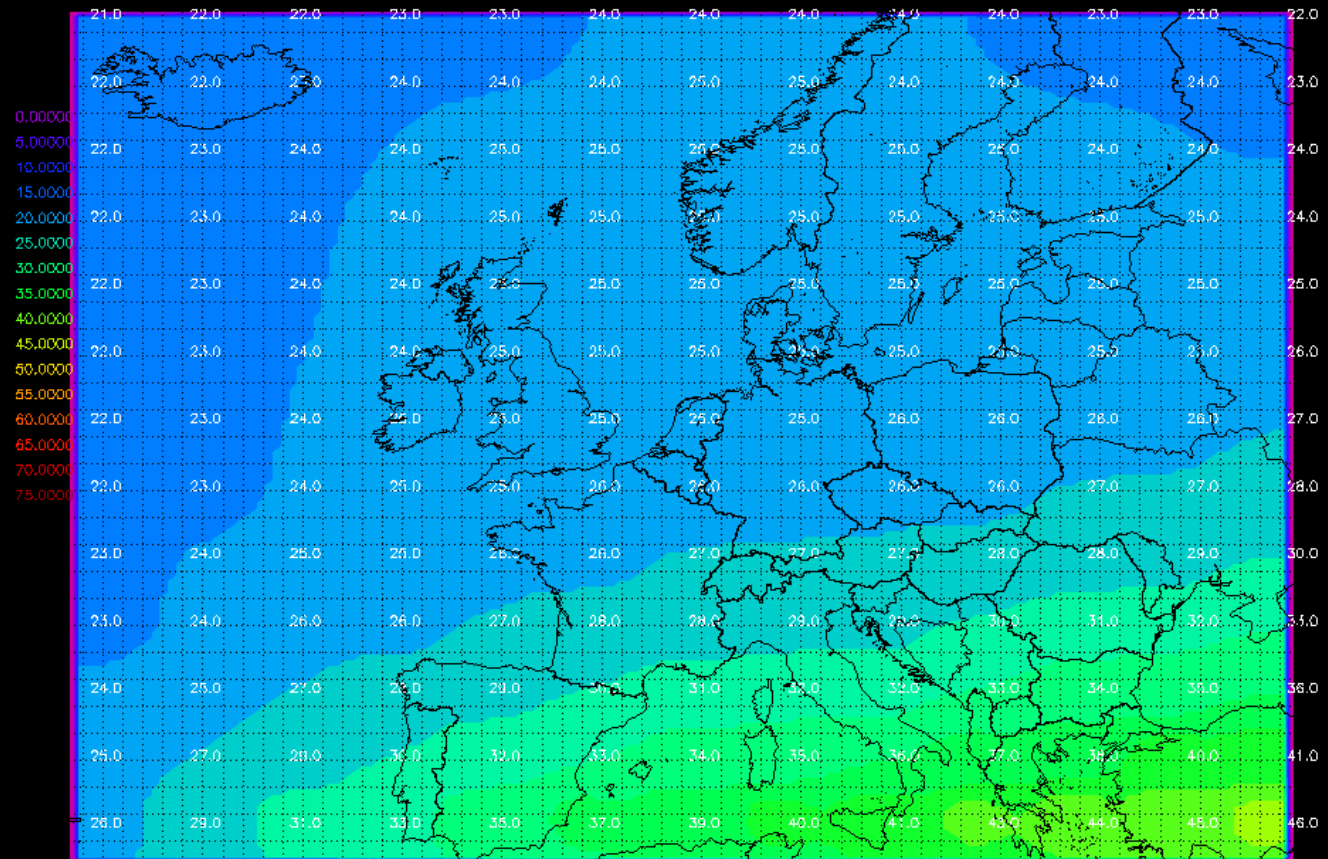


TEC Quality Assessment

- QC of METI NRT solution vs. AIUB daily post processed product
- Results show that quality is dictated by location of GNSS receivers:
 - Max bias of 40 TECU considering both hemispheres;
 - Max bias of 25 TECU considering only the N. hemisphere;
 - Max bias of 10 TECU considering only between 32.5 and 77.5 degrees in the northern hemisphere
- Therefore important only to trust data from regions where observations have been made

European TEC Maps

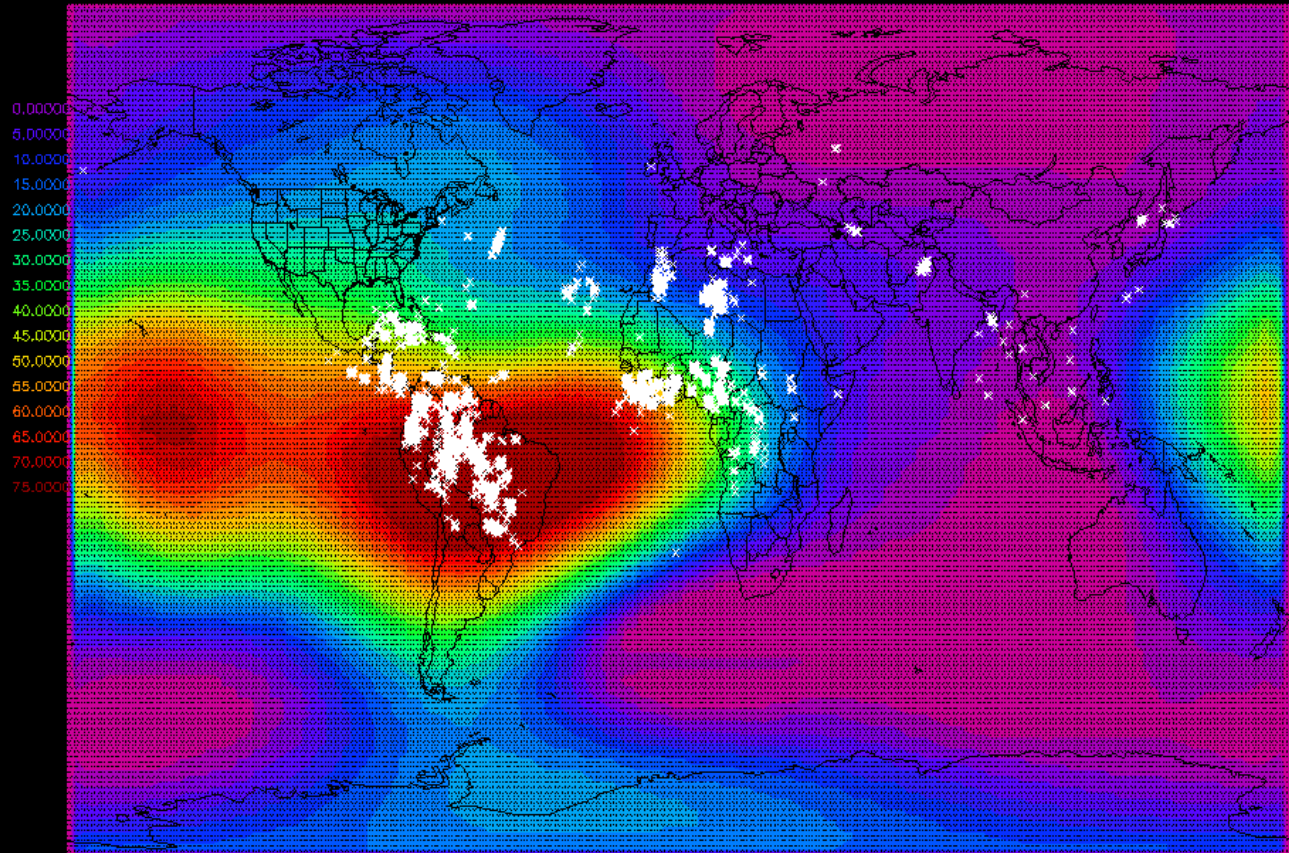
GNSS TEC Plot – europe 2011 10 10 12 00 UTC (Units=TECU)



Spherical harmonic expansion of degree 12, order 8, in geographic reference frame and assuming a single 450km layer

Global TEC Maps

GNSS TEC Plot – global 2011 10 05 21 00 UTC (Units=TECU)



Spherical harmonic expansion of degree 12, order 8, in geographic reference frame and assuming a single 450km layer



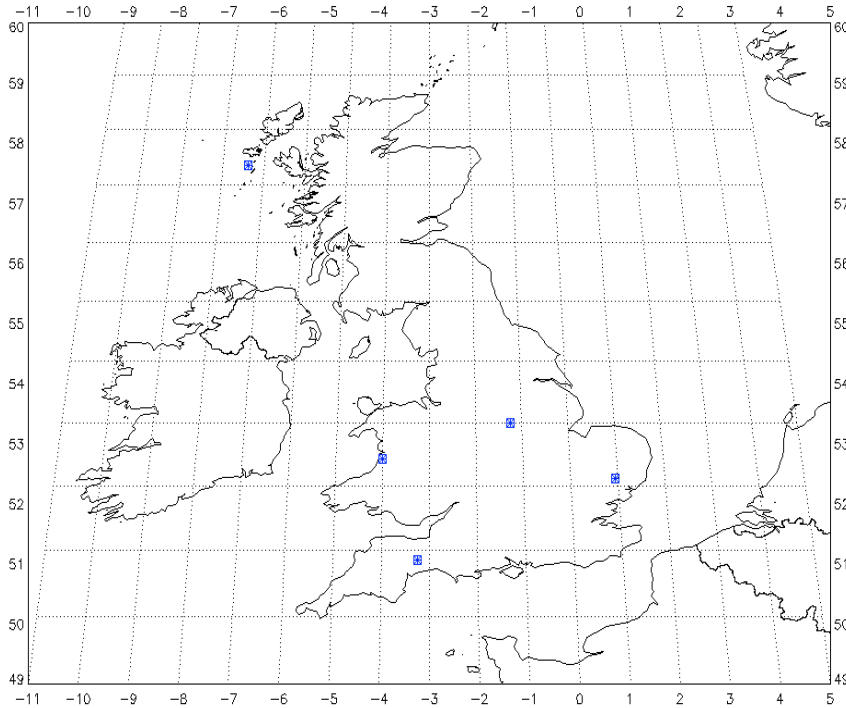
Future Developments at UK Met Office

- Operational METG processing/assimilation
- Operational METR processing/assimilation
- Operational METI TEC processing/use
- Reprocessed GNSS ZTD for climate applications (with Nottingham Uni.)
- Rate of IWV change and GNSS-R
- Network renewal/expansion
- Slants/tomography/Single Frequency ZTD

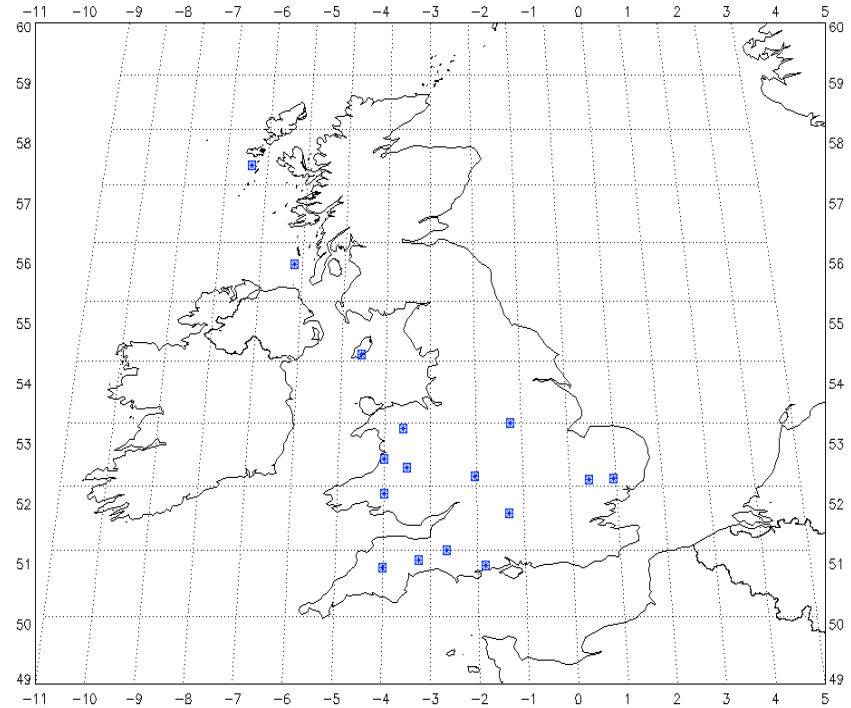


Network Renewal/Expansion

Operational Met Office GPS Network as of 2011 08 08



Future Met Office GPS Network as of 2011 08 08



- Primarily for gap-filling (+ also resilience)
- 2012-2014



Questions