

# **E-GVAP**

**Input to the EUMENET 'glossy' report**

# **E-GVAP**

## **The**

### **EUMETNET GPS Water Vapour programme**

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The E-GVAP programme was started April 2004 in order to establish an observing system capable of delivering near real time GPS zenith total delay (ZTD) of high quality and with good geographical coverage for use in operational meteorology.

ZTD is a property closely related to the integrated water vapour (IWV) above a given location. Water vapour measurements are scarce in meteorology, nearly all water vapour data assimilated in regional NWP models come from radiosondes. Water vapour is a key ingredient in the atmosphere, hence in weather forecasting. Naturally is necessary to know the distribution of water vapour to forecast properly precipitation. But given the fact that about half the energy in the atmosphere is brought there by water vapour it becomes clear that also other properties are likely better forecast by improving our observations of the water vapour field.

From current and past GPS water vapour projects, such as MAGIC, COST 716 and TOUGH, indications are that ground based GPS ZTD data can indeed increase the skill of NWP models.

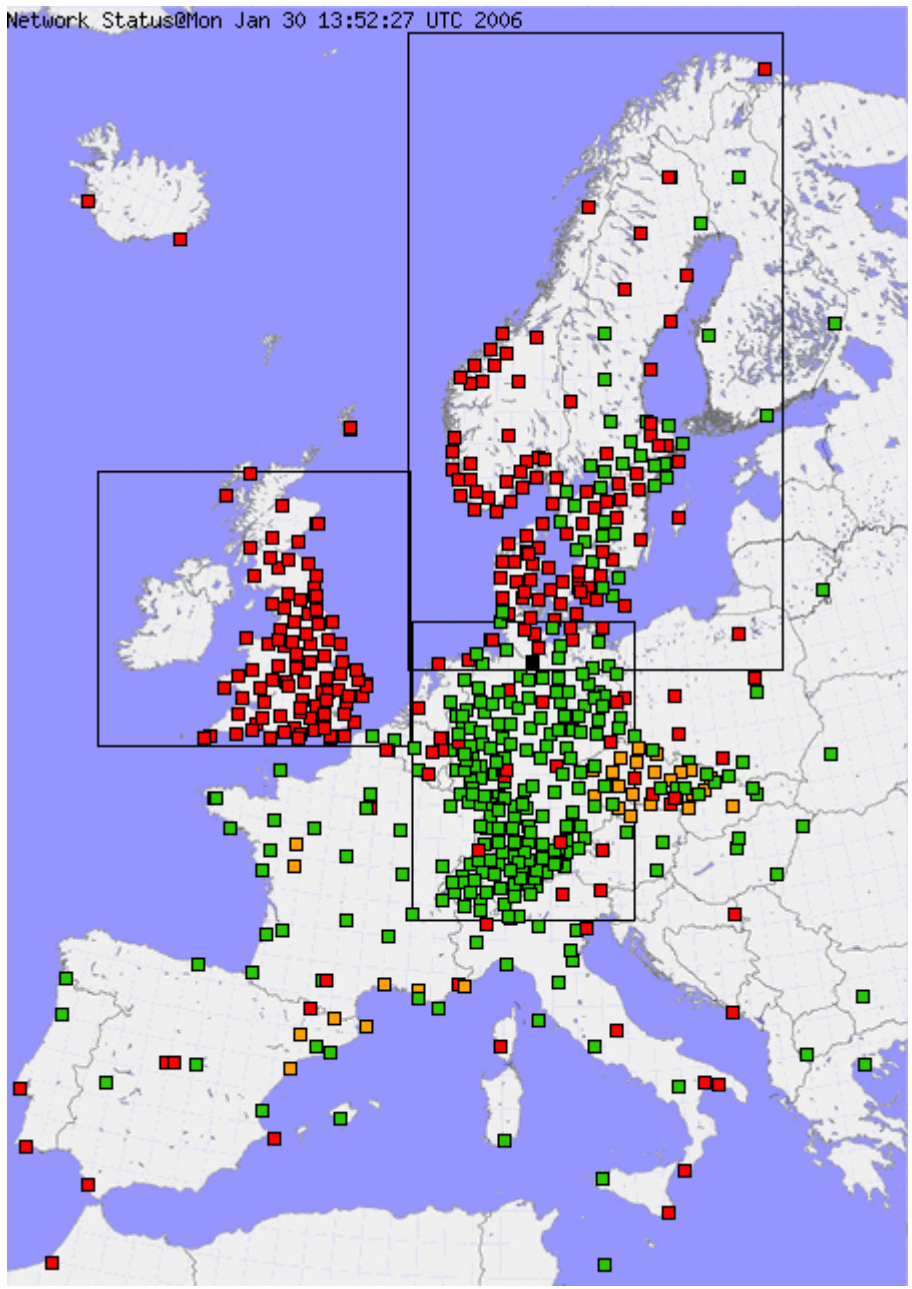
A particular drawback of the observing system for NRT GPS ZTD's, as it exists today, is its inhomogeneities, both when it comes to geographical extent and density, as well as regarding the quality and reliability of the observations. It is the purpose of E-GVAP to bring the NRT GPS ZTD observing system from its current experimental demonstration state to a state useful for operational meteorology.

This includes extending the observing system, both by bringing into processing GPS data from more of the existing GPS stations, and promoting the establishment of new GPS stations. The work will be done in liaison with the geodetic community, who is most often the owner of the existing high quality GPS stations, and without whose expertise the data cannot be processed properly. It includes improving and making more uniform the processing standards, resulting in a NRT ZTD product with smaller errors and smaller differences between sub networks. It includes running a data server for distribution of NRT ZTD data, running a processing centre for processing of some of the GPS sites. It includes running a system for monitoring and validation of the NRT GPS ZTD data, with feedback to the data processing centres in case of detection of problems. And it includes compiling of information helping and updating the E-GVAP partners on how to utilise ground based NRT GPS data in their forecasting and monitoring. That is an area of continued scientific research.

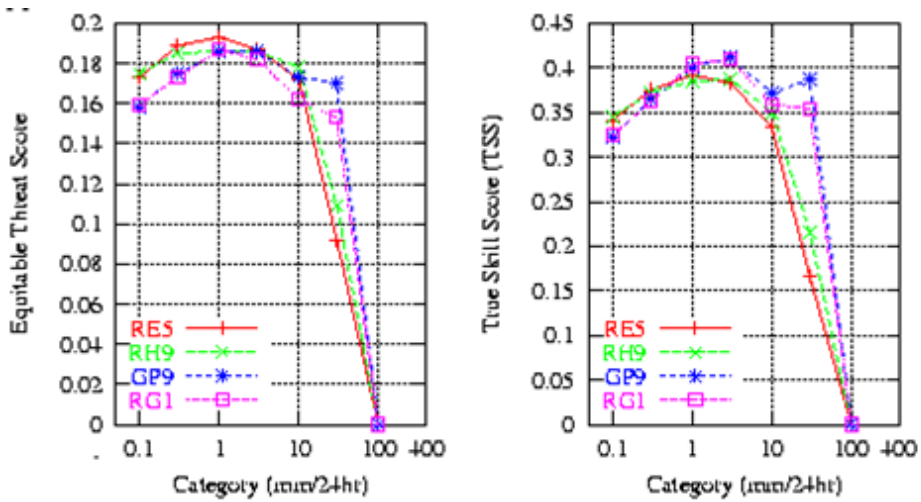
At the current stage, 10 months into E-GVAP, an ftp-server is in operation for exchange of ground based NRT GPS ZTD data. 13 processing centres are processing data for the server in NRT. Most of the data are further encoded into BUFR format and transmitted on the GTS. A processing centre is now running at the UK Met Office, currently processing data mainly from the UK, but negotiations are under way to include also data from Northern Ireland, Ireland, and Iceland. A validation and monitoring site is operating at KNMI, enabling real time monitoring of the NRT GPS ZTD's and IWV's against NWP data and radiosonde data. An E-GVAP plenary meeting was held,

resulting in an overview of the current GPS meteorological state in the member countries, detailing to the E-GVAP team important issues to work on. It was decided that access to the ZTD data at the E-GVAP server is not restricted to E-GVAP members, reflecting the fact that important parts of the data come from non E-GVAP countries. We hope that these countries will soon join E-GVAP. Some E-GVAP members are now making facilities for NRT processing of GPS ZTD data. At KNMI a centre for processing of Dutch GPS data has become operational. A new processing centre is being made for Nordic GPS data at SMHI. Previously, nearly all processing took place at geodetic institutes.

The E-GVAP home page is located at <http://tough.dmi.dk>. Visit that for further information.



Monitoring of the NRT GPS ZTD observing system performance on the E-GVAP validation site, at <http://www.knmi.nl/samenw/egvap/validation>. Colour coding is related to age of observations, sub regions and GPS station sites are clickable, leading to further information.



Study of impact on 24 hour precipitation scores over Spain with and without GPS data. 20040415 to 20040514. Red is control run, blue is with GPS, green is with 2mRH, violet is GPS and 2mRH. Produced by INM in the TOUGH research project.