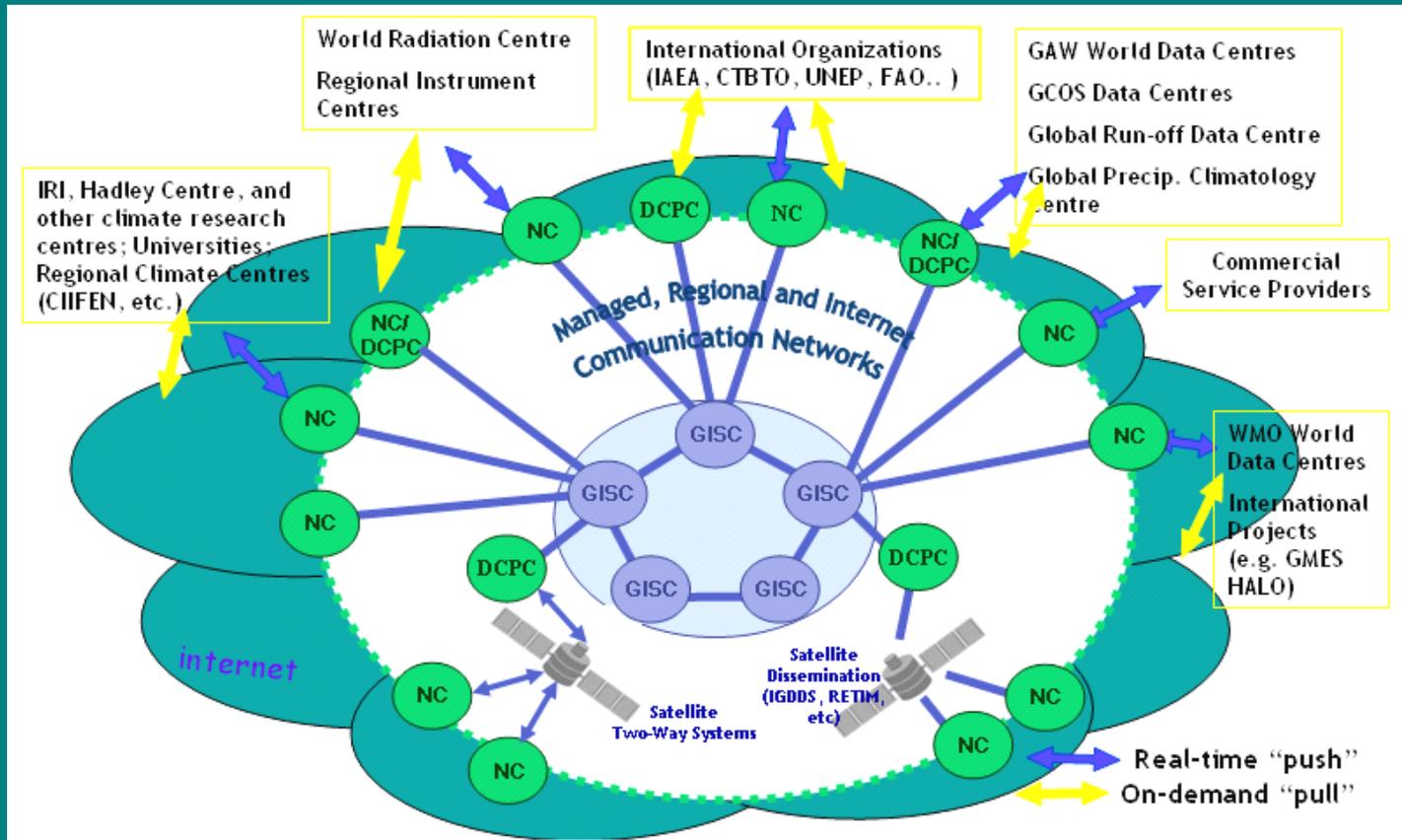


Future access to ground based GNSS data

E-GVAP-II

- The current phase of E-GVAP ends by March 2009
- E-GVAP was planned to become implemented in EUCOS (EUCOS is a large observing programme under EUMETNET, taking care of a number of well established observing systems (e.g. AMDAR (from airplanes), ships, bouys, and other).
- For various reasons this is not practical for the moment
 - EUCOS resources hard pressed on resources, on no implementation plan on EUCOS side.
 - Big changes in the WMO system for distribution and exchange of meteorological observations to take place in near future (WMO Information System = "WIS")
 - Large potential for improving NRT ZTD product via centralised, real-time monitoring and validation of NRT ZTD. Requires data kept "close to the experts", at least during development phase.
- Conclusion – Apply for a second E-GVAP phase.

WMO Information System (WIS)



- Mid October EUMETNET Council (the directors of the met. offices) agreed to the proposal for E-GVAP-II.
- E-GVAP-II will start April 2009 and run for 4 years and 9 months.
- Midterm review at 2 year, 9 months considering whether programme shall continue as independent, or be placed under EUCOS.
- The working team behind E-GVAP will continue in E-GVAP-II (DMI+KNMI+UKMO).

Main objectives

- Make the European ground based near real time GNSS zenith total delay and water vapour network continue to function operationally.
- Expand network.
- Improve homogeneity and quality of GNSS ZTD product.
- Connect to EUCOS and WIS.

Objectives

The main objectives of the E-GVAP-II programme are of two types.

The first type is ensuring continuation of the current data delivery.

The other will focus on improving the products and preparing implementation in the emerging common European distribution system for meteorological observations.

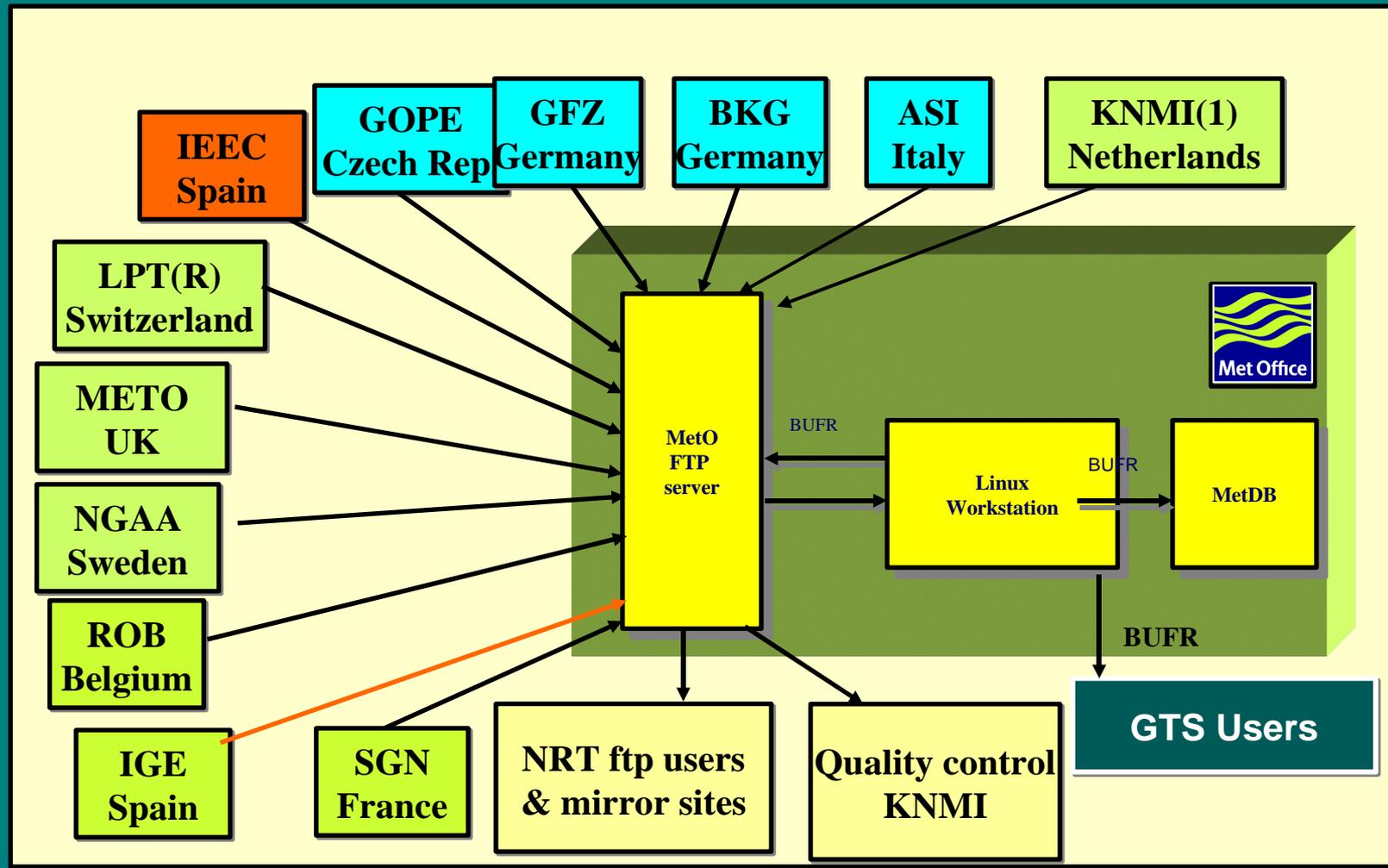
7. Ensure the system built up in E-GVAP-I is maintained and continue to run, to make available for assimilation and now-casting data from the sites currently available in E-GVAP-I beyond March 2009.

1. Continue the established, fruitful close collaboration with the geodetic community. Thereby increase the number of sites, in particular in regions with poor coverage and data, and increase the homogeneity and quality of the NRT ZTDs.
2. Further and improve the construction of IWV maps and animations for use in now-casting.
3. Ensure that data server and data monitoring facilities have backups in case of failure, minimising the risk of a complete lack of ZTD/IWV data.
4. In collaboration with the geodetic community, and possibly EUMETSAT, attempt to improve quality and security of access to so-called “satellite orbit and clock estimates”, which are used in the data processing by the processing centres.

1. Set up methods for monitoring that enable near real time detection and subsequent withhold or flagging of certain types of incorrect NRT ZTD data.
2. Formalise and improve the use of the “supersites” introduced in E-GVAP-I for monitoring of system stability and errors.
3. Collaborate closely with the EUCOS team, both regarding future implementation of E-GVAP into EUCOS, and regarding construction of the planned “EUCOS portal” for access to EUMETNET programme observational data.
4. Convince EUMETNET members using E-GVAP data to become members of E-GVAP.
5. Follow the development of the WIS and VGISC. Prepare for the E-GVAP data monitoring and distribution system to become a DCPC relative to the WIS.

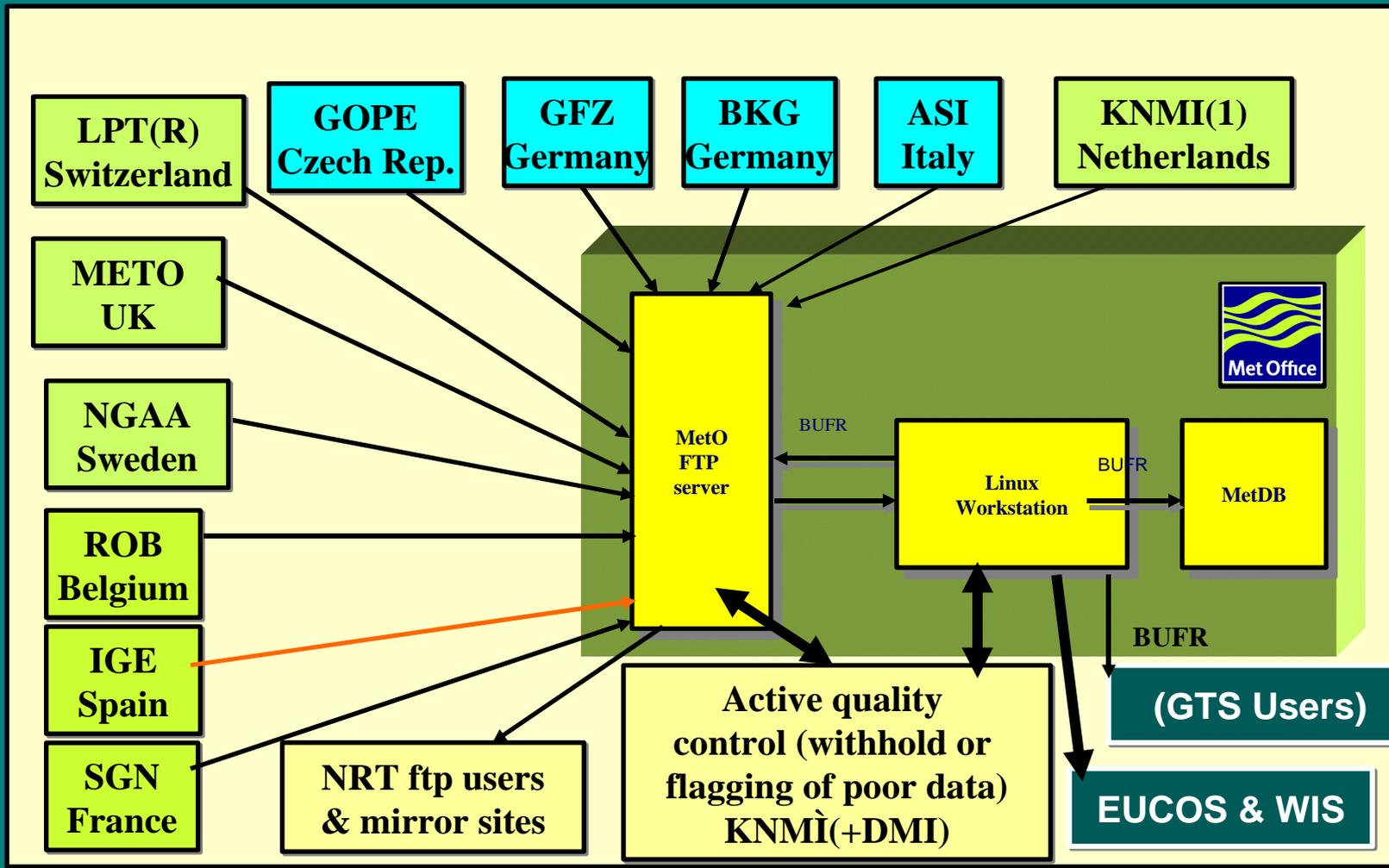
1. To co-ordinate the meteorological exploitation of national sources of GNSS data by cost-effective agreements and provide meteorological support for expansion of GNSS observing networks.
2. To report on the progress of water vapour /zenith total delay data assimilation research and promote the use of GNSS water vapour measurements in operational meteorology by the provision of suitable teaching material and documentation
3. Follow and report on the developments in the field of assimilation of slants and gradient. Enable and encourage production and distribution of gradients and slant delays via E-GVAP facilities.
4. To explore the possibilities for long-term central archiving of both raw (RINEX) and processed (ZTD) data for off-line research and potential future re-processing for climate applications.

NRT GPS Processed Data Flow. Now



Green = nation member of E-GVAP. Blue = nation not member of E-GVAP.
Orange = no updates to processing.

NRT GPS Processed Data Flow Future



Green = nation member of E-GVAP. Blue = nation not member of E-GVAP.

Examples cases for "corrective actions".

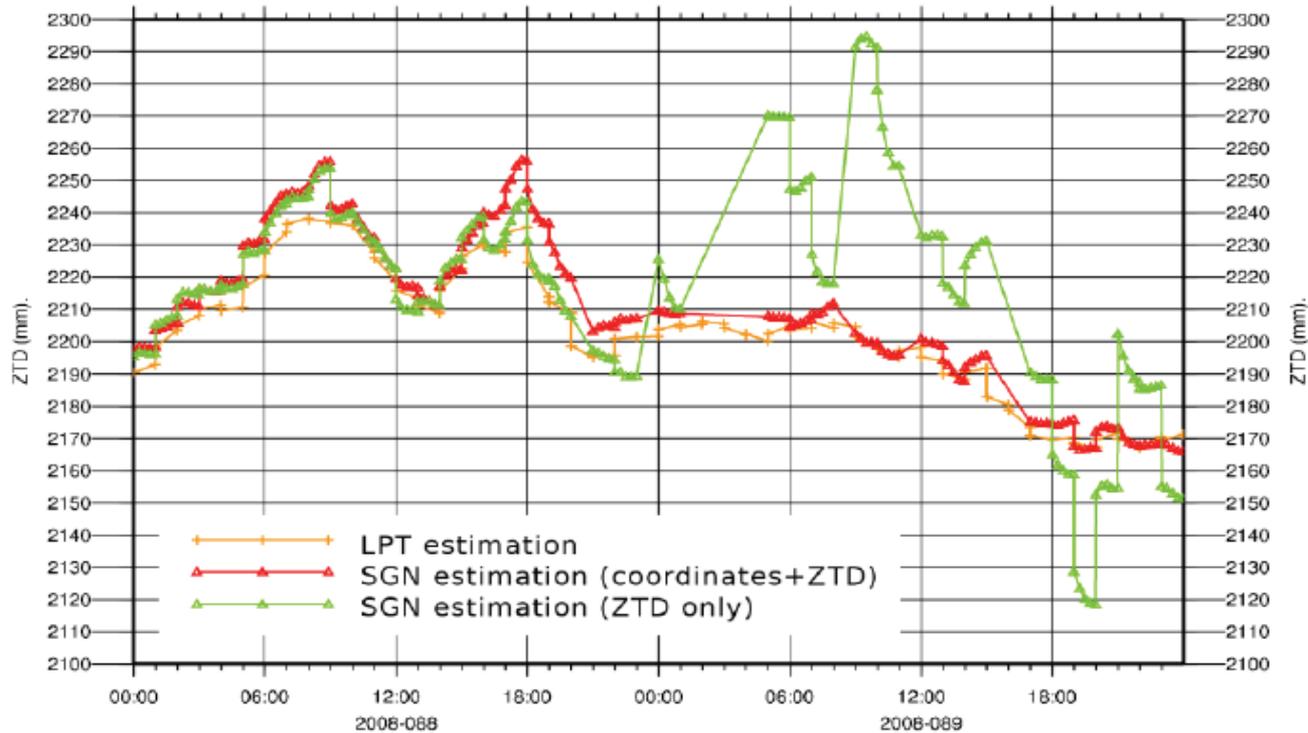
On day 88 of 2008, a Friday afternoon, a GNSS station was moved 40 m by a site owner. Processing centre was not informed. Because processing is based on a "network" solution it effected ZTD estimates at ALL sites in the network.

Days 2008/088-091 problem

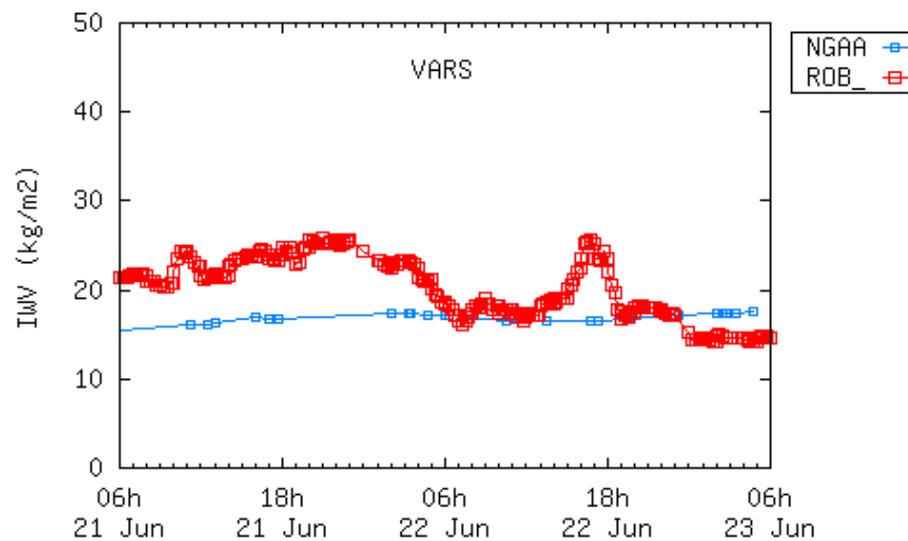
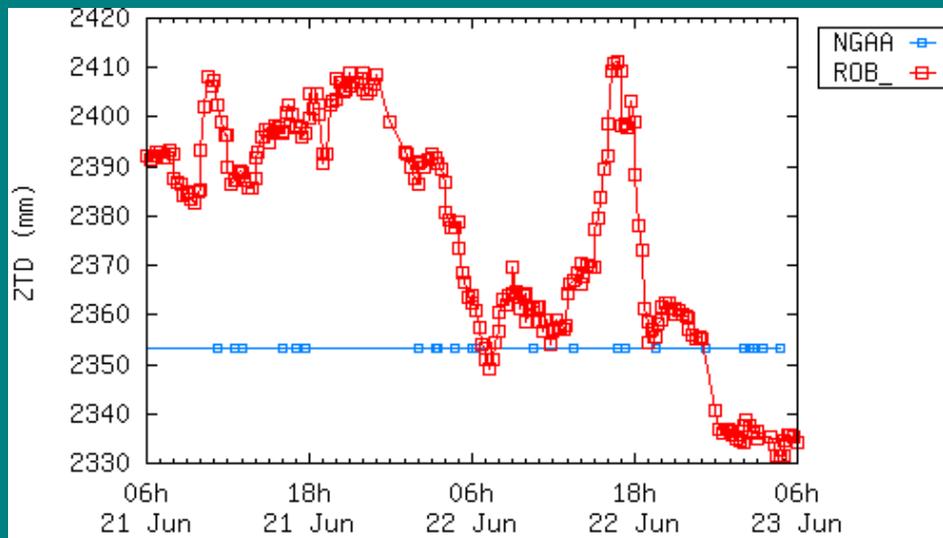
- Station moved : 40m
- Same acronym, same Domes number
- Switch on at new location on **Friday, 6 PM**



EGLT 2008/088-a -> 2008/089-x



The purpose of "active quality control", that withhold or flag poor data, is to guard against such things. It is most easily set up and done at a central facility, passed by all GNSS data and comparison meteorological data.

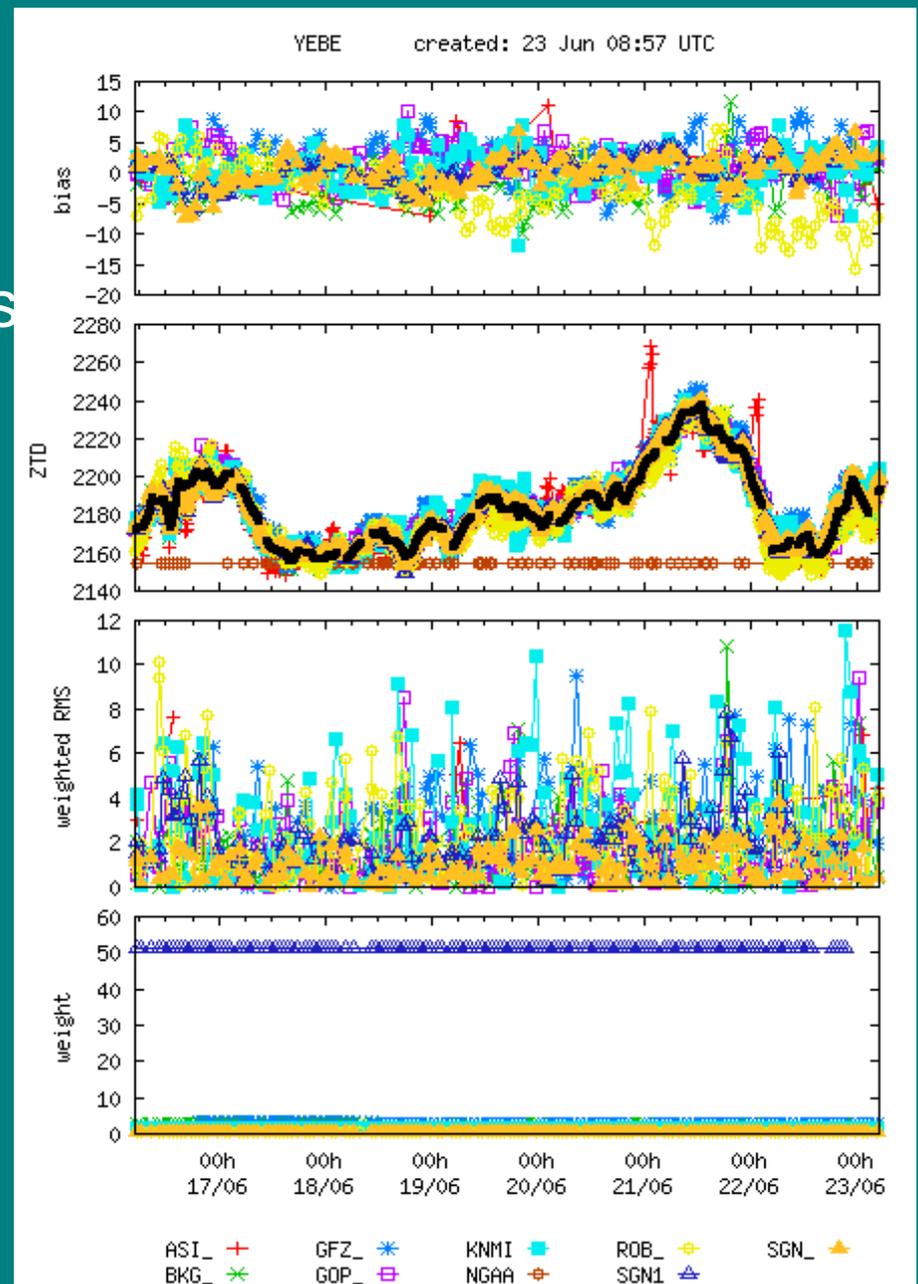


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(c) KNMI/EGVAP

Develop automatic
intercomparison of supersites

Include comparison to
NWP data.



Conclusion

- Ground based GNSS data for meteorology will continue to be available.
- Their number, geographical coverage and quality is expected to improve.
- Today two European met offices use the data operationally, with good results.
- Many met offices plan to start operational use.
- For the NWP model systems used at the majority of the European met offices software enabling assimilation exist.
- Data selection procedures and quality control can be improved – this is an area which can require much manpower and where close collaboration can help us.
- The coordination of this and exchange of information can take place via E-GVAP. Future workshops and expert team meeting are planned in E-GVAP-II.