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On the fly quality evaluation of GNSS ZTD estimates

Henrik Vedel (1), Rosa Pacione (2), Brigida Pace (2), Siebren de Haan (3), Roberto Lanotte (2), and Francesco Vespe (4)

(1) Danish Meteorological Institute, (DMI) (hev@dmi.dk), (2) E-GEOS, Centro di Geodesia Spaziale, (3) Royal Netherlands Meteorological Institute (KNMI), (4) Agenzia Spaziale Italiana (ASI)

Today Near-Real Time GNSS ZTDs data are used operationally by a number of meteorological institutes. In Europe such data are collected and distribution via the EUMENET observing Programme E-GVAP. While the vast majority of the NRT ZTDs are of high quality, there are, from time to time, a few which contain significant errors. Due to the intrinsic characteristics of the GNSS system and processing, the errors often occur simultaneously at many GNSS sites, and are strongly correlated. Correlated observation errors are poisonous to a NWP data assimilation system. To identify such events fast enough to avoid usage in data assimilation, E-GVAP is setting up a quality control system in which NRT ZTD data from special super sites, and other GNSS processed by many analysis centres (ACs), are inter compared.

If ZTDs from one AC deviates simultaneously at many sites, it is a strong signal warning, and the ACs data of the time will be flagged accordingly. On the other hand, if multi AC ZTDs from one specific GNSS site deviates simultaneously for many ACs, it is a strong signal warning about that site, and its data will be flagged accordingly as well. Different tools can be used for the quality evaluation of ZTD data, relying on different reference solutions against with to perform the evaluation: the median, the combined ZTD solution, and NWP data. The outcome of the quality control done with these three different methods will be presented along with an indication of pro and cons for each of them.