GRUAN GNSS Precipitable Water Task Team

Goal: To develop explicit guidance on hardware, software and data management practices to obtain GNSS PW measurements of consistent quality at all GRUAN sites.

1. **New member:** Rosa Pacione from e-GEOS S.p.A., Matera Space Center, Italy.

2. **Uncertainty estimate:** Ning, T., Wang, J., Elgered, G., Dick, G., Wickert, J., Bradke, M., Sommer, M., Querel, R., and Smale, D., 2016: The uncertainty of the atmospheric integrated water vapour estimated from GNSS observations, Atmos. Meas. Tech., 9, 79-92, doi:10.5194/amt-9-79-2016.)

3. **Technical document:** TT, LC, GFZ & Bodeker Sci.

4. Develop **data collection client requirement** and initiate **data flow**

Discussions

1. **Technical document (12/2016):** TT, LC, GFZ & Bodeker Sci.

    - Who is leading the writing from B.S.?

    - 75% complete: Need efforts in Data processing and flow and site maintance

    - How to implement?

2. Certification of GNSS measurement program

3. Develop **data collection client requirement (LC, sites)**

4. Initiate **data flow (GFZ, sites)**

5. **Implementation of uncertainty estimate: GFZ**

6. **Interactions among TT, LC, GFZ and sites?**

7. **Assessment of data usage, issues and potential improvements**

8. **Update the site inventory for new sites (can Data client do this?)**

Additional issues (must be thought how to arise them) and comments to #2:

- Microwave absorbers – could be now pushed on to be installed at all new or Relatively new GNSS-sites (maybe could be organized some central delivery Through LC, like for RS-prelaunch calibrators)?
- The source(s) of Tm at central data processing (GFZ). Using NWP or reanalysis or Bevis etal approximation from surface temperature. NWP – then Which one (local weather service – but there are many). If reanalysis – then Good, but we have to think about data latency time – it pushes GNSS-PW Product more far from NRT.
- cut-off angle (one thing is for NT, or NRT processing, another thing is for Climate (trends). Both T.Ning & G.Elgered
And H.Keernik, K.Rannat have published research, that the
Best results for IPW trend analysis come with ca 15 degrees. IGS & EGVAP pushes on cut-off 0 degrees (i.e. everything is taken in, including the multipath). Higher cut-off angle will reduce effects of multipath, but increases ZTD Uncertainty – the main contributor to IPW uncertainty.
- Data flow (better if LC will comment).
- SOPs for Omnibus (asked from many sources, takes more time. In worst case TT needs to be an initiator to define them). TD6 describes general and gruan-Specific requirements, but it should be added what service/maintenance procedures Must be done and how often – i.e. the timing regulations to guarantee high-quali Service and data product.
- Data collection client – discussed with Michael today. Will be taken on