Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2017-371-RC1, 2018

Atmospheric Measurement Techniques Discussions

Interactive comment on "Reduction of ZTD outliers through improved GNSS data processing and screening strategies" *by* Katarzyna Stepniak et al.

Anonymous Referee #1

Received and published: 15 January 2018

Meteorology and climate research benefits from relatively stable Zenith Total Delay (ZTD) time series delivered from regional and continental/global GNSS networks. However, no measurements are perfect and a lot of effort is made for cleaning the data before it can be used. This article is targeted on usage of different GNSS data processing and screening strategies for reduction of deteriorating impact caused by ZTD outliers, particularly due to the gaps in GNSS data time series and temporary reconfiguration of network geometry.

The topic is relevant to the scope of AMT and the results are attractive for any GNSS data analyst working for meteorological or climate applications, including cal-

ibration/validation of different instrumentation.

The techniques and baseline design strategies suggested and demonstrated by the authors are applicable on double differenced strategy of GNSS data processing, particularly for using Bernese v.5.2 software. The post-processing screening strategies used and demonstrated can be considered generic. The impact of data gaps on the number of outliers is properly analysed and improvement of data quality is demonstrated by different pre-configuration of the GNSS network. A new baseline strategy is elaborated and tested, significantly reducing the number of outliers compared to the "old" widely-used strategy in GNSS software for positioning.

Detailed analysis (based on experimental work with data from Polish national network and EPN) is given for each strategy, the efficacy of different strategies is compared between each other and the quality of resulting ZTD time series is compared with data from ERA-Interim reanalysis.

The results are illustrated with appropriate graphs and tables.

The abstract provides a brief overview and a concise summary. The overall structure of the article is clear.

Questions:

1. P.1, Line 17: "... maximizing the number of observations strategy" in many GNSS software ...". The work is done with Bernese v.5.2. Any suggestions for non-Bernese, where the suggested network design could be possible? Is it so, that the automatic network modification (p. 5, line 1), happens with Bernese by default and the new baseline strategy (section 4) has something to do with post-processing, or is it like reconfiguring the Bernese-processing according to the results from initial solution?

2. Initial data processing strategy (section 2): According to Tregoning and Herring (2006) a priori zenith hydrostatic delay errors project into GPS height estimates and errors in zenith delay estimates. Is there any reason why the realistic meteorological

situation is not considered important, or is this effect estimated negligible for initial data processing strategy? Not always can be relied on standard atmosphere model.

Tregoning, P., and T. A. Herring (2006), Impact of a priori zenith hydrostatic delay errors on GPS estimates of station heights and zenith total delays, Geophys. Res. Lett., 33, L23303, doi:10.1029/2006GL027706.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-371, 2017.