Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-87

Anonymous Referee #3

Referee comment on "Validation of tropospheric ties at the test setup GNSS co-location site Potsdam" by Chaiyaporn Kitpracha et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-87-RC1, 2021

General Comments

Four GNSS installations, with the antennas located at different heights, are used to compare the corresponding estimated equivalent zenith propagation delays. The observed offsets in the ZTD agrees with theory together with methods to determine the refractivity in the atmosphere in the layer(s) between the antenna installations.

There are no new findings. All results are predictable. Please excuse a simple example. The study reported in the manuscript is similar to dropping a ball from different heights and using a stop watch and conclude that the longer fall time observed when the ball is dropped from a higher level is in agreement with different models used to predict the value of the acceleration due to gravity.

Although the manuscript is reasonably well structured and parts are also interesting to read I miss new results as already said. Perhaps the authors are aware of this? The last paragraph in the conclusions starts with the sentence: "Further investigation is required as this experiment was conducted only for a short period of about five weeks." I recommend to extend the time series with many months, preferably covering at least one year in order to pin down systematic effects,
to quantify multipath effects (see e.g., King and Watson (2010)), to develop a model for the radome (see e.g., Liu et al. (2019)) and/or calibrate the antenna including the radome (see e.g. Schmid et al., (2016)).

King, M. A., and C. S. Watson (2010), Long GPS coordinate time series: Multipath and geometry effects,
J. Geophys. Res., 115, B04403, doi:10.1029/2009JB006543.

Liu, J., Li, L., Yong Zuo, Y., Huaming Chen, H., and Shaojie Ni, S. (2019),
Analysis of Performance Degradation Introduced by Radome for High-Precision GNSS Antenna,
Int. J. Antennas Propagat., Article ID 1529656, 13 pages,
https://doi.org/10.1155/2019/1529656.

Schmid, R., Dach, R., Collilieux, X., Jäggi, A., Schmitz, M., and Dilssner, F. (2016),
Absolute IGS antenna phase center model igs08.atx: status and potential improvements,
J .Geod., 90:343–364, doi:10.1007/s00190-015-0876-3.

Specific comments

In the abstract it is stated that the different atmospheric estimates obtained for the antenna with a radome is surprising. This is not consistent with the reference on page 8, line 158, to the IGS guidelines. It is well known that radomes can introduce offsets in atmospheric estimates and depending on the shape of the radome this offset may vary with the elevation cutoff angle used in the analysis.

In Subsection 3 there is a reference to an Appendix. I would certainly prefer to have this simple table with uncertainties directly in Subsection 3.3. Furthermore, the Appendix can be shortened significantly. The table itself is sufficient.

Concerning the data availability I think it shall be made available in an open repository with a doi number. (Who knows the availablility of the contact author some (many) years from now?)

Technical Corrections

page, line 6: a antenna --> an antenna

page 1, lines 6-7: a meteorological sensor was used for meteorological data recording.
--> sensors were used for meteorological data recording.

page 1, lines 15-16: "Nowadays" is followed by a reference from 2014?

page 1, line 21: water vapour distribution --> water vapour content

page 5, line 75: What is the meaning of SPKE? Please define!

page 3, line 77: to increasing --> to increase

page 3, lines 78-79: 300 seconds --> 300 s (SI rule)

pages 5-6, Figures 2-3: Fix the axis labels. They cannot be understood.

page 6, Table 1: there is no need to have a resolution of the result at the micrometre level. This shows that the offset correction is so simple so that any one of the methods can be used to achieve the same accuracy.
The resolution of the results presented in Table 4 is also much too high, i.e. not significant.

page 7, line 126: "cos" shall not be in an italic font.

page 8: The title "Results" of Section 4 is too general. Results have already been presented in Section 3. Perhaps "Results for the GNSS estimates" is better?

page 8, line 159: This reference appears first in the reference list. Why is not IGS in alphabetical order. It took some time until I found it ...

page 9, Figure 4: Only S0 and S4 can be identified in the graph.

Journal names do not adhere to standards, see e.g. according to:
https://www.library.caltech.edu/journal-title-abbreviations