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Atmospheric Measurement Techniques Discussions

Interactive comment on "Quality Aspects of the Wegener Center Multi-Satellite GPS Radio Occultation Record OPSv5.6" *by* Barbara Angerer et al.

Anonymous Referee #1

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General comments

The paper "Quality Aspects of the Wegener Center Multi-Satellite GPS Radio Occultation Record OPSv5.6" by Angerer et al. describes Wegener Center's RO processing system, with a focus on the quality control steps included in the processing chain, and on quality aspects of the resulting data records. Two factors in particular are discussed: time dependence and satellite/mission dependence. The paper leads up to a discussion of bending angle quality as a function of time and satellite, and a short discussion of the impact of sampling-error correction on dry temperature climatologies.

The paper is primarily of interest for those working on RO processing or in related

fields. However, the concluding discussions, in Section 5 and some of the Figures, should be of interest also to a wider audience. Many of the results should be useful to anyone working with, or planning to work with, long-term RO climate data records.

For those themselves working on RO processing there are many interesting details discussed: the QC procedures is an issue that turns out to be important, and the overview of the RO satellite missions, instruments, and differencing methods is quite useful. With this overview as background, the time series showing QC statistics and bending angle quality give a good overall picture of the level of consistency amongst the RO data sets.

The paper is well suited for publication in AMT.

Specific comments

(i) Much of the quality control and quality monitoring is based on the bias and standard deviation (noise) of the bending angle profile in the height interval 65-80 km. What vertical resolution does the raw ionospheric-corrected bending angle profiles have? Is it just corresponding to the excess-phase sampling frequency? Note that the noise may be affected by this resolution, and also by filtering of the excess-phase time series. Any comments on this issue?

(ii) One way to minimize time dependencies when generating long-term climate data records is to take a priori information from reanalyses rather than from operational NWP models. What are the considerations here?

(iii) The sampling errors are estimated as the difference between the sub-sampled and the full ECMWF field. It seems lika a good practice to subtract these errors from the observed climatology, and the results clearly show that it is efficient in removing a large fraction of sampling-related artefacts. But is there any risk that one accidentally add something to the climatology that shouldn't be added? Suppose you have a bin,

in which you do your averaging, and in your model there is an overall gradient across the bin whereas in the real atmosphere there is no gradient. With a non-uniform sampling, your estimated sampling error would include a component that shouldn't be there. The same type of reasoning could be made for, e.g., a diurnal cycle that is not perfectly described by the model. Any comments on these risks, and the suitability of the chosen approach?

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