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Atmospheric Chemistry and Physics Discussions

Interactive comment on "

First results from the GPS atmosphere sounding experiment TOR aboard the TerraSAR-X satellite" *by* G. Beyerle et al.

Anonymous Referee #2

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General comments:

The paper presents the first results from the TerraSAR-X RO measurements. The data are analysed according to standard statistical analyses and compared to ECMWF fields and GRACE-A RO data. The paper also presents comparisons of different differencing methods and various aspects related to open loop data and processing and makes suggestions for future studies.

I find the paper well-written and easy to read. The results are relevant and important and adds to the understanding of the behavior of RO data and associated process-

ing. I recommend that the paper is published after taking into account the following comments.

Specific comments:

p.1, line 4-5: 'Standard deviations are...'. There are three 'abouts' in that sentence and the logic concerning what is decreasing is unclear. Consider to e.g. write: Standard deviations are about ... at 5 km and about ... at 10 km altitude.

p.7, line 175, 179: an assumption is made that a subsequent analysis shows is not valid. Isn't is possible to obtain a more detailed explanation of the behavior of the instrument such that one doesn't have to speculate about the behavior? What are the implications for the paper if the assumption is not valid?

p.9, line 222: Thanks for adding such a table. I'm a little confused about what you refer to as 'first processing step' and 'second processing step'. E.g. the table seems to indicate that the first step is raw data to excess phase but in the caption it is said that the first step is to bending angles. Please check table, caption, and text and make them consistent.

p.11, fig.5: There seems to be some skew structure of the biases, mainly for the Northern data set. Around 5-10 km all the biases are very close to 0 but at 25 km the solid line is at -0.5%. The corresponding biases for UCAR's processing of COSMIC data and M. Gorbunov's processing of COSMIC data are about -0.2% at 25 km. The data in Fig. 11 shows GRACE-A data and here the bias at 25 km seems to be smaller than for the TerraSAR-X data. I think this point needs to be addressed in the current paper. If the cause of this difference cannot be found it should at least be carefully discussed in the paper.

p.11, line 260: refer to section 4.4 for the description of the ECMWF fields and extracted profiles.

p.14, Fig.8: please clarify if this is SD data (in caption and text).

ACPD

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p.16, line 380: what is the reason that 29 ECMWF profiles are missing?

p.17, Fig.10: please clarify if this is SD data (in caption and text). Editorial: '.' missing after 'results' in caption.

p.17, line 391: There are new results by Sokolovskiy et al and Gorbunov et al that indicate that at least part of the negative bias for COSMIC data is due to the way the data are cutoff and filtered. By carefully adjusting these parameters the bias can be reduced to less than -1% for non-tropical and about -2% for tropical occultations all the way down to the surface. I think this point should be added to the discussion.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 28821, 2010.