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Atmospheric Measurement Techniques Discussions

Interactive comment on "Validation of refractivity profiles derived from GRAS raw-sampling data" *by* F. Zus et al.

Anonymous Referee #1

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Page 1830, Line 15: *For the low-pass filtering of the L1/L2 excess phase paths and the simultaneous calculation of the L1/L2 excess phase path rates (derivative with respect to time) we apply a local polynomial regression of degree 3 using 71 samples (Savitzky-Golay smoothing filter).*

Here it should be specified to what spatial scale this filter window corresponds. Around 2.5 km?

Page 1831, Line 8: *The observation error variance is taken to be 1.2 μrad.*

The bending angle error estimate depends on the filter width. Does this estimate correspond to the filter width of 2.5 km?

Page 1832, Line 7: *Interpolation between grid points ($0.5^\circ \times 0.5^\circ$ horizontal resolution;*

91 model levels in the vertical) and linear interpolation in time is performed 10 between 6 h analyses fields.

Did you extract vertical profiles from ECMWF fields? How was the occultation point determined?

Page 1832, Section 2.4

It would be desirable to provide some more details on the QC. QC is a crucial point in all the processing.

Page 1833, Line 16: *The source of this bias is yet not well understood.*

Some ideas about the origin of the bias can be found in the following papers:

Sokolovskiy, S., C. Rocken, W. Schreiner, and D. Hunt (2010), On the uncertainty of radio occultation inversions in the lower troposphere, J. Geophys. Res., doi:10.1029/2010JD014058.

M. E. Gorbunov, K. B. Lauritsen, S. S. Leroy, Application of Wigner distribution function for analysis of radio occultations, Radio Science, 2010, V. 45, RS6011, doi:10.1029/2010RS004388.

Page 1834, Line 4: *Therefore, it can not be excluded that this negative bias stems from the ECMWF analysis.*

It is unlikely that the whole strong negative bias GRAS–ECMWF can be attributed to the positive bias of ECMWF data. However, some observations about the change of the COSMIC–ECMWF in years 2007–2009 can be found in the paper:

M. E. Gorbunov, A. V. Shmakov, S. S. Leroy, and K. B. Lauritsen, COSMIC radio occulta-tion processing: Cross-center comparison and validation, Journal of Atmospheric and Oceanic Technology, A-1489-HA, in press, 2011.

COSMIC bias is essntially the same as GRAS bias.

Page 1836, Line 24: *Figures 11 and 12 show the fractional refractivity deviation versus altitude for rising and setting occultations for both options: the case when the RO signal is/is not truncated.*

For a reader, it would be more convenient to see one figure for setting occultation with the refraction deviations for two case (signal is/is not truncated) and another similar figure for rising occultations.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1825, 2011.