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Atmospheric Measurement Techniques Discussions

Interactive comment on "Analysis of internal gravity waves with GPS RO density profiles" *by* P. Šácha et al.

P. Šácha et al.

petr.sacha@mff.cuni.cz

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We would like to thank Referee #1 for his rightful major comment and helpful minor comments.

Major comment:

Referee #1:..Probably, an analysis of increasing underestimation of spectral power toward higher wavenumbers from GPS RO needs to be improved..

The aim of this study is to present and evaluate a method for analysis of IGWs from GPS RO density profiles. Figure 4 and related discussion are not intended to represent an attempt to analyze causes of the increasing underestimation of RO spectral power

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toward higher wavenumbers. The general correspondence of spectral power of GPS RO dry temperature fluctuations to the theoretical spectra was studied for example by Steiner and Kirchengast (2000) and their key findings are cited in the text. What we show is that one of the advantages of using the density profiles (instead of dry temperature profiles) is an increase of the spectral power toward higher wavenumbers. That is obvious in comparison to the dry temperature profiles with background separation giving similar values at lower wavenumbers. On the other hand, the effect of filtering the RO data for ionosphere subtraction should be mentioned before the standard density or temperature retrieval. Therefore we add following text:

Page 8314, line 9: Nevertheless, filtering the RO data for ionospheric correction remains a factor influencing the spectral density of the signal prior to the standard density or temperature retrieval.

Technical corrections: Thank you very much, the suggested corrections 1), 2), 3) were implemented as proposed:

1)Referee #1: Page 8330, line 10: please change from "2012." to "doi:10.1134/S0010952512010029, 2012." Page 8330, line 10: The reference is now: Gubenko, V. N., Pavelyev, A. G., Salimzyanov, R. R., and Andreev, V. E.: A method for determination of internal gravity wave parameters from a vertical temperature or density profile measurement in the Earth's atmosphere, Cosmic Res., 50, 21–31, doi:10.1134/S0010952512010029, 2012.

2)Referee #1: Page 8331, lines 1–2: please change from "Springer, Berlin Heidelberg, 165 – 178, 2009." to "in: New Horizons in Occultation Research: Studies in Atmosphere and Climate, edited by: Steiner, A., Pirscher,B., Foelsche, U., Kirchengast, G., Springer-Verlag, Berlin Heidelberg, 165 – 178, doi:10.1007/978-3-642-00321_9, 2009. The reference is now: Pavelyev, A. G., Liou, Y. A., Wickert, J., Gubenko, V. N., Pavelyev, A. A., and Matyugov, S. S.: New Applications and Advances of the GPS Radio Occultation Technology as Recovered by Analysis of the FORMOSAT-3/COSMIC and CHAMP

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7, C3358–C3360, 2014

Data-Base, in: New Horizons in Occultation Research: Studies in Atmosphere and Climate, edited by: Steiner, A., Pirscher, B., Foelsche, U., Kirchengast, G., Springer, Berlin Heidelberg, 165 – 178, doi:10.1007/978-3-642-00321-9, 2009.

3)Referee #1: Page 8332, lines 8–9: please make an analogous correction in this Reference. The reference was changed to: Wickert J., Schmidt T., Michalak G., Heise S., Arras C., Beyerle G., Falck C., König R., Pingel D., and Rothacher M.:GPS radio occultation with CHAMP, GRACE-A, SAC-C, TerraSAR-X, and FORMOSAT-3/COSMIC: brief review of results from GFZ, in: New horizons in occultation research, edited by: Steiner, A., Pirscher, B., Foelsche, U., Kirchengast, G., Springer, Berlin Heidelberg, 3–15, doi:10.1007/978-3-642-00321-9, 2009.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 8311, 2014.