

## ***Interactive comment on “Analysis of vertical wave number spectrum of atmospheric gravity waves in the stratosphere using COSMIC GPS radio occultation data” by T. Tsuda et al.***

**Anonymous Referee #1**

Received and published: 29 April 2011

This manuscript addresses a potentially interesting topic, which is the possible description of vertical wave number spectra of gravity waves (GW) in the stratosphere with high resolution retrieval of data from GPS radio occultations (RO). However, it contains two problems that are ignored by a portion of the GW community: 1) it lacks a discrimination method that allows to determine the presence or the absence of GW in each GPS RO, 2) it has an inconsistency between estimated errors and wave amplitudes. Therefore, I cannot recommend publication. In the first problem a clear criterium for the differentiation must be given and applied. In the second problem the inconsistency must be solved. Although these are not particular defects of this manuscript, but rather inconvenients even avoided in some unfortunately published articles, I cannot consent

C466

procedures which I am convinced are wrong.

Main items

Regardless of the noise issue which is appropriately addressed in Section 5, one cannot ignore that GW are not omnipresent and permanent, as outlined e.g. by M.J. Alexander and C. Barnett (2007) in their Section 2a. Therefore statistical calculations cannot be straightforwardly applied to a large number of GPS RO, but some criterium must be established to separate cases including or not GW. Otherwise the statistical outcomes just reflect an average state of all the atmospheric structures detected by the observational window of the measurement technique.

P 2079, I 6: what is being stated here is that uncertainty in average may approach 0.5 K (2 K in individual profiles if one considers standard deviation intervals), i.e. a typical GW amplitude, which is what the authors are trying to measure. P 2083, I 23: here the estimated error is 1 K, same argument as above.

Minor points

Page 2072, line 25 and P 2084, I 14: the ionosphere is part of the atmosphere, I guess that neutral atmosphere and ionosphere is meant. P 2073, I 17: data points per day. P 2076, I 6-7: this is too optimistic, please see later references, e.g. G.A. Hajj et al. (2004). , I 27: I guess L1 is missing. P 2078, I 10: a horizontal distance of 400 km is marginally acceptable from my point of view, so it should be at least specified if the distance is being measured between the balloon launch site and the RO average position in the neutral atmosphere or to the RO closest position or . . . P 2081, I 5: show. P 2082, I 4: While, . . . , moreover. . . the sentence must be written in another way. , I 15: Can you guess what other noise ? P 2083, I 24: What standard atmospheric model ? Can you give a reference ? Figure 4: Number of pairs. There are no references for each curve. Figures 5,6 and 7: where do the N2 values come from ? As far as I know spectral density should be in m<sup>2</sup>/cycle. In Figure 6 it should be “is shown” and “in parentheses”.

C467

-Alexander, M. J. and Barnett, C.: Using Satellite Observations to Constrain Parameterizations of Gravity Wave Effects for Global Models, *J. Atmos. Sci.*, 64, 1652–1665, 2007.

-Hajj, G. A., Ao, C. O., Iijima, B. A., Kuang D., Kursinski, E. R., Mannucci, A. J., Meehan, T. K., Romans, L. J., de la Torre Juarez, M., and Yunck, T. P.: CHAMP and SAC-C atmospheric occultation results and intercomparisons, *J. Geophys. Res.*, 109, D06109, doi:10.1029/2003JD003909, 2004.

---

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 4, 2071, 2011.