

## ***Interactive comment on “Impact of land convection on the thermal structure of the lower stratosphere as inferred from COSMIC GPS radio occultations” by S. M. Khaykin et al.***

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The authors thank the reviewer for the constructive remarks and suggestions.

Responses to specific comments

1) Indeed, according to the recent studies by Scherllin-Pirscher (2011a,b) the error of GPS RO profiles is minimum between 10 and 25 km and increases rapidly above. The respective paragraph has been corrected and references to Scherllin-Pirscher (2011a,b) have been added. The quality of RO climatologies depends on the number of RO profiles involved in an analysis. Pirscher et al., (2010) uses two-year-long dataset of COSMIC temperature profiles for retrieving tidal parameters up to 35 km and

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concludes that COSMIC data is fully suitable for quantifying the tidal climatologies up to this level. We use a six-year dataset and report tidal amplitudes at these altitudes consistent with Pirscher et al., (2010) and references therein. As a matter of fact, the quantification of temperature anomalies in the upper stratosphere is not the primary focus of our study, and the tidal parameters for upper levels are reported to demonstrate the validity of our analysis by comparing the results against the previous more detailed studies on tides. 2) The description of the COSMIC dataset in our manuscript is fully consistent with the one given in both Biondi et al. (2011) and (2012). We therefore do not understand why the statement regarding wetPrf is incorrect. A reference to Biondi et al., (2012) has been added. 3) Although this sentence is indeed more connected to the general methodology, it refers to the particular plots in Fig. 5 and is meant to prove the sampling credibility of the data involved in the respective analysis. The sentence would have a much lesser relevance, had it been placed in Section 2. 4) We can not provide quantitative estimates of correlation between geographical distribution of temperature anomalies and that of maximum TRMM OPFs since TRMM data are not directly involved in the analysis. The plots adopted from LZ05 are given for a qualitative demonstration of the spatial coincidence. However, it is true that coincidence is less apparent above Australia/Indonesia. The respective part of the text has been changed as follows: “The coincidence between the location of late afternoon cooling and overshooting convection above continental areas is nearly perfect in DJF. The largest OPFs frequency and the largest afternoon cooling are observed over Africa and South America. Although more dispersed and of smaller amplitude, collocated cooling features and OPFs are also observed over Indonesian islands and Northern Australia.”

Technical corrections Figure 1 and 3: the dashed lines denoting CPT and LRT levels have been made better distinguishable Figure 2: a color scale bar has been added Figure 5: the caption has been corrected

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