Xie et al., Sensitivity of airborne radio occultation to tropospheric properties over ocean and land

We thank the editor and the two reviewers for the very insightful and constructive comments. A list of comments with detailed responses are shown below.

Response to the Anonymous Referee #2:

General comments
This is an involved paper, which examines various aspects of an Airborne Radio Occultation mission: the type of data, the nature of the processing, the antenna type and orientation, and the degree to which the results agree with various reference data sources. The resulting profiles compare favourably with those from reanalyses, and are worth publishing.

We thank the reviewer's very positive comments.

Specific comments

1. Why do the bending angle curves turn over at 13 km? Why are there two bending angles for each impact height below that? Please explain (in the text, not to me).

   Thanks for the suggestion. We have added the following paragraph into Section 4.1 (ARO retrievals with near-coincident ERA-I profiles) to further discuss the unique aspect of the ARO bending angle measurements.

   L13-27, pp11: "*Note the ERA-I bending angle profile is simulated based on the modified forward Abel integration of the refractivity (e.g., Xie et al., 2008). For an ARO receiver located inside the atmosphere, the GNSS signals from both the positive and negative elevation angle (typically $\pm 5^\circ$ reference to the local horizon) are recorded to retrieve the bending angles from the surface up to the receiver altitude. Assuming a spherically symmetric atmosphere, for every negative elevation ray bending angle, there is a corresponding positive elevation bending angle with the same impact parameter. The partial bending angle, i.e., the difference between the negative and positive elevation bending angle, can then be derived and converted to refractivity through a modified inverse Abel transformation (Healy et al., 2002; Lesne et al., 2002; Xie et al., 2008). For illustration purposes in Figure 5, the impact height is used, which is simply the difference between the impact parameter and the local curvature radius of the Earth. Because impact height depends on refractivity, it is typically a value of about 2 km at the surface in the tropics. Note the simulated bending angles from positive elevation angles (e.g., close to +5°) are* *generally very small, because the GNSS signals go through the relatively dry and low density atmosphere above the aircraft altitude. The bending angles increase up to ~0.15° (Fig. 5d) at zero elevation (at the local horizon), when the tangent point of the ray is at the aircraft location at ~13.5 km altitude (corresponding to the maximum impact height of ~14 km, in Fig. 5d). The bending angles continue to increase at lower negative elevation angle as the GPS signals go through the denser and moister atmosphere."*

Technical corrections

1. P8, L26: dimentional –> dimensional.

   Corrected, thanks.

2. P9, L12: On the contrary –> In contrast.

   Corrected, thanks.

3. All figures OK, except for the strange bending angle business.

   Corrected, thanks.