

Interactive comment on “Assimilation of GNSS tomography products into WRF using radio occultation data assimilation operator” by Natalia Hanna et al.

Anonymous Referee #1

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The authors present the assimilation of GNSS tomography products into WRF during the period when heavy precipitation events occurred. Two tomography models and three SWD sets were tested. Results of the GNSS tomography data assimilation were validated by radiosonde measurements in terms of relative humidity, temperature and wind.

In general content of the article is abundant and well written, however, there are some points that the authors should consider before it would be suitable for publication.

Remarks:

- 1) The time resolution of the tomographic results has not been clearly indicated in the
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paper. In line 5 of page 4, the ZTD estimates have a 1 h time resolution. In line 7 of page 13, it shows the solutions have a 6 h resolution. It is not clear how long of the SWD data are stacked for each tomographic solution. Under extreme weather conditions, the water vapor changes quickly thus a reasonable resolution is very important. 2) Three sets of SWD observations were tested: set0 without compensation for hydrostatic anisotropic effects, set1 with compensation of this effect and set2 cleaned by wet delays outside the inner voxel model. First, why not test the set2 by also considering the compensation of hydrostatic anisotropic effects. Another concern is that why not test set2 for WUELS model? 3) In the voxel discretization, authors divide the region into an inner voxel and an out voxel. The outer voxel is used to also include those signals penetrate the model from the laterals. However, authors should explain how to model the SWDs in the outer voxel. As seen in Figure 3, it seems the outer voxels are too coarse to model the SWDs. 4) Line 4 of page 7, how did you get the number of 120 times in the quality control? 5) For Figures 8, 9, since the wet refractivity varies greatly over the time and space. It is not convenient to compare your results with previous studies. I thus suggest authors to also give the statistics of relative RMS.

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