

## **Interactive comment on “Cross-validation of GPS tomography models and methodological improvements using CORS network” by Hugues Brenot et al.**

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Received and published: 25 March 2019

The answer is in pdf format

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2018-292, 2018.

C1

### Author's Response to RC2 (25 February 2019):

In this author's response, the text (normal style) answers point by point to the comment of the anonymous Referee #3 (text in bold). The text in blue correspond to author's change in the manuscript.

#### RC2 from the anonymous Referee #3:

General Comment: The manuscript presented the assessments of the tomographic water vapor fields solved from 5 models. Authors have tested the impacts of various factors including initial conditions, data stacking, pseudo-slant observations and the uncertainty of GPS observations on the tomographic solutions. This paper is well written and structured. I thus recommend it for publication in AMT after a moderate modification.

Specific comments: 1 It is mentioned in section 3 that the voxels of the outer grid are considered inside a band with a width of about 400 km. Since the water vapor is assumed to be homogeneous distribution within each voxel, the huge outer voxels may bring nonnegligible errors to the tomographic solution. Please show more details on how to include the outer voxel in the tomography model?

The reason behind this outer grid, is to keep considering in our calculations  $\text{slant}_{\text{dose}}$  of stations located close to the edge of the inner grid, and for which the ray does not reach the top of the tomographic grid inside the inner grid. With this respect this allows our tomography models to use more data than without using the outer grid. We are aware that the retrievals obtained for the outer grid are not high-quality estimates, and hence these values were not used for analysis presented in the manuscript. Moreover, the outer grid voxels were design to absorb (in a numeric sense) biases that would be introduced otherwise by not taking into account the part of the delay out of the model. Studies using outer and inner grid and only inner with removal of excessive path delay (Hanna et al., 2019) using raytracing shows very limited impact of the later solution. Therefore we don't think the use of outer grid bring error to our retrievals (especially because the error concern voxels for high troposphere with very low water vapour density).

Hanna, N., Trzcina, E., Möller, G., Rohm, W., and Weber, R.: Assimilation of GNSS tomography products into WRF using radio occultation data assimilation operator, Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2018-419>, in review, 2019.

2 Line 16 of page 22, 'applied' to 'applied'

Ok thank you this has been modified, L16P22: "applied"

**Fig. 1.**

C2