

The following is a point-to-point response to the reviewer's comments.

Response to Referee #2:

### **General comments**

This paper examines some aspects of tropospheric tomography using GNSS signals via designed experiments. The main purpose is to investigate the impact of station density and multi-constellation systems involved in the process of estimating a better representation of water vapour in space.

### **Specific comments**

Did not quite understand the selection of the various schemes. For examples why 10 vs 14 stations? What is the basis for this choice? Do the differences between schemes in terms of RMSE as presented in Table 8 justify the main claim of the paper?

- ✓ Thanks for the reviewer's question, the selection of the various schemes in Section 4.1 have been re-designed according to the other reviewer's suggestion. Therefore, the schemes of single-GNSS (10 sites), multi-GNSS (10 sites), single-GNSS (14 sites) and multi-GNSS (14 sites) are determined to better investigate the number of GNSS rays used and coverage rate of the voxels penetrated by GNSS rays under different cases. Additionally, all the descriptions and conclusions related to this section have been rewritten, please see in P6-9.
- ✓ In our opinion, the differences between schemes in terms of RMSE as presented in Table 8 cannot justify the main claim of the paper completely, therefore, the further comparison of SWDs has been performed in the following part and the corresponding conclusion can be obtained from Figures 9 and 10 as well as Table 9.

### **Specific comments**

29 this was not as high as expected.

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

37 voxels in different directions

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

38 reconstructed under the assumption that the unknown

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

67 GNSS data, which is the focus

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

68 determine the optimal division of voxels in the horizontal direction

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

70 influence of the number of stations in a network

✓ Thanks for the reviewer's reminding, this expression has been revised.

72 the quality and reliability of tomographic atmospheric water vapour obtained from different

✓ Thanks for the reviewer's reminding, this expression has been revised.

80 single/multi-constellation GNSS observations on troposphere tomography are analysed in detail

✓ Thanks for the reviewer's reminding, this expression has been revised.

90-94 Wrong usage of former and latter must rephrase

✓ We appreciate for the reviewer's reminding, the location of ZHD and ZWD has been exchanged.

157 In the procedure of horizontal voxel division, an approach is developed which enables the determination

✓ Thanks for the reviewer's reminding, this expression has been revised.

177 Further to the conclusion above it can also be concluded

✓ Thanks for the reviewer's reminding, this expression has been revised.

178 for the entire region using two/three/four-GNSS observations both increase with the

✓ Thanks for the reviewer's reminding, this expression has been revised.

195 following analysis focuses on: (1) investigating of two schemes in

✓ Thanks for the reviewer's reminding, this expression has been revised.

204 difference of voxels crossed by rays between Schemes 2 and 1 is not as expected for the case of

✓ Thanks for the reviewer's reminding, this expression has been revised.

219 It should be noted that the number of Galileo satellite is lower

✓ Thanks for the reviewer's reminding, this expression has been revised.

223 the highest

✓ Thanks for the reviewer's reminding, the word 'highest' has been used here.

225 only by about 3% more than

✓ Thanks for the reviewer's reminding, the word 'by' has been added.

226 of voxels for the three Schemes

✓ Thanks for the reviewer's reminding, this expression has been revised.

288 lower than that

- ✓ Thanks for the reviewer's reminding, the word 'smaller' has been replaced by 'lower'.

292 Hence it was

- ✓ Thanks for the reviewer's reminding, this word has been corrected.

323 an iterative procedure

- ✓ Thanks for the reviewer's question, the term 'produce' has been replaced by 'procedure'.

379 The upcoming full operability of the multi-constellation GNSS, is expected

- ✓ Thanks for the reviewer's suggestion, this expression has been revised.

381 results is not as expected.

- ✓ Thanks for the reviewer's reminding, this expression has been revised.

We appreciate for reviewer's warm work earnestly, which has a significant improvement for our manuscript. And we hope that our corrections meet with the reviewer's requirement. Once again, thank you very much for your comments and suggestions.