

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-122

Anonymous Referee #1

Referee comment on "A minimum curvature algorithm for tomographic reconstruction of atmospheric chemicals based on optical remote sensing" by Sheng Li and Ke Du, Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-122-RC1>, 2021

General comments

The paper faces the problem to introduce the "smoothness" a priori information in the tomographic reconstruction of atmospheric chemicals based on optical remote sensing. In particular, a new minimum curvature (MC) algorithm is proposed and applied to multiple test maps. The performance of the new algorithm is compared with that of other existing algorithms. The MC algorithm shows almost the same performance as the low third derivative (LTD) algorithm but with significantly less computation time.

I think that the subject is correctly presented in the introduction and sufficiently put in the context of the existing literature on the argument; instead, I find that the description of the method is not given in all needed details. I suggest to improve the description of the method and below I give some suggestions.

I think that the paper deserves the publication on AMT after that the following issues are considered.

Specific comments:

- In the Tikhonov approach, an important issue is the choice of the value that is given to the regularization parameter, because this value determines how much a priori

Technical corrections:

The authors introduce many acronyms, but not all of them are then used. I suggest introducing only the acronyms that are used several times in the paper.

Line 26: equality ---> quality

Line 85: necessary ---> need

Line 136: what is the superscript 21 after "problem"?

Line: 174: well-posted ---> well-posed.

Line 212: It ---> it

Line 242: increase ---> increases

Line 286: equality ---> quality