

Anonymous Referee #2

This manuscript provides the first SO₂ emissions estimates for ~278 point sources using TROPOMI observations. The method applied has been used before on OMI and OMPS SO₂ data. Results are compared with OMI and OMPS estimates, and specific issues related to the higher spatial resolution of TROPOMI and specific biases in TROPOMI are discussed. The paper is well suited for this journal. I have the following comments.

We would like to thank the reviewer for the evaluation and comments that helped us improve the manuscript.

- p.5 l. 11-12 'To eliminate ..days then ..' somehow this sentence does not make sense to me.

It was a typo, it should be "when" instead of "then". Corrected.

- P.6 l. 8 what is meant with THIS systematic difference ?

We changed the text to:

"To remove the systematic difference with OMI/OMPS data caused by the difference in cross section temperature (203 K for TROPOMI vs. 293 K for OMI/OMPS), we increased the TROPOMI SO₂ VCDs by 22% (see Theys et al., (2017), their Figure 6, for justification). "

- P.6 l9 is the 22% the result of this different use of absorption cross sections at different temperatures ?

Yes. We edited that paragraph to make the cross-section temperature difference clear.

- P.6 l. 23 What do you mean with shorter exposure times at the edge of the swath. This is not correct I think. The SNR could be lower due to less binning across track, but that has nothing to do with shorter exp. times.

We agree with the reviewer and changed the text as suggested.

- P.8 if the biases are seasonal dependent what is its effect on the emissions calculated using annual means SO₂ ?

The actual calculations were done for individual seasons. We added the explanation to page 10:

"To remove the local biases mentioned above, the average SO₂ VCD for the area located upwind from the source was calculated and then subtracted from the data. As the biases may be different from season to season, all calculation were done for 3-month periods (seasons) and then the annual emission rate was calculated by averaging seasonal emission rates. "

- Data availability: Should the locations (Fig. 9) and emissions (Fig. 10) not be made available through some database connected to the manuscript ? Otherwise other people can not use those.

We added a supplement with this information. Note that we also re-examined the set of emission sources and excluded four additional sources with the ratio of the estimated emission to its uncertainty below 4.