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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An Inversion of NO_x and NMVOC Emissions using Satellite Observations during the KORUS-AQ Campaign and Implications for Surface Ozone over East Asia" *by* Amir H. Souri et al.

Anonymous Referee #2

Received and published: 22 May 2020

This manuscript performs an inversion using satellite data to estimate improvements to emission inventories of VOC's and NOx in East Asia. The research seems thorough, the results are interesting and the implications are relevant and important. I am happy to recommend publication subject to minor revisions.

Averaging Kernels are an important part of the work. They are mentioned in passing in the abstract, given a theoretical definition in the method section and then more discussion in the results. I would recommend adding a sentence in the abstract to help the non-specialist, and a more extensive explanation in the methods section to explain not

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Discussion paper

just the mathematical definition but also the physical interpretation.

In a similar vein, I felt that So and Se could be described in greater detail, especially giving more specific descriptions of the values used.

Line 258: “WRF-CMAQ largely underestimated (56%) tropospheric NO2 columns” – It would be interesting to also quote the bias in molec/cm2. CMAQ is too high in urban areas and too low in rural ones. Citing over/under predictions in molec/cm2 would give a useful perspective on some of these changes.

Minor language edits are needed throughout. For example, sometimes the text should say *the* US, *the* PRD. “representivity”, “intertwisted” need correcting.

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