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Discussions

Interactive comment on "TROPOMI Aerosol Products: Evaluation and Observations of Synoptic Scale Carbonaceous Aerosol Plumes during 2018–2020" *by* Omar Torres et al.

Anonymous Referee #3

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This paper presents NASA aerosol product for TROPOMI obtained with TropOMAER retrieval algorithm.

In general, the manuscript is well-written, well-structured and demonstrates the possibilities of TropOMAER retrieval algorithm. First, the AOD and SSA products were evaluated using AERONET dataset for 12 representative sites. Then, the results of the algorithm application to a few important aerosol events were presented and total aerosol mass injection was estimated.

There are few remarks regarding AOD and SSA validation against AERONET.

1. Figure 1 and Table 1 clearly indicate the presence of positive bias in TropOMAER

AOD product at 380 nm over all 12 representative sites. Authors already provided some guess about the origin of this bias and mention that this issue is under investigations. Nevertheless, since the retrieval is carried out at 388 nm, and reported also at 354 and 500 nm, presenting AOD validation results in the manuscript for two wavelengths (for example, 380 and 500 nm) would be very useful to address the bias issue.

2. One of the parameters of AOD evaluation is 30% matchup criteria. What is the origin of these criteria? Is AOD product with 30% uncertainty sufficient for trace gases retrieval? For example, GCOS requirements on AOD are much more strict: 0.03 or 10%.

3. The results of SSA validation show reasonable correspondence with AERONET. Nevertheless, Figure 2 clearly shows overestimation of SSA especially for absorbing aerosol when SSA from AERONET < 0.9. Is this related to the same issues providing positive bias in AOD? Is this SSA overestimation a demonstration of limitation of aerosol model used in TropOMAER algorithm? More discussions here are necessary.

In general, I would recommend authors to reserve some space in the manuscript for discussions regarding identified issues in the retrieval. For example, the mentioned above issues for AOD and SSA retrieval as well as authors thoughts how to treat these issues would be highly appreciated by broad remote sensing community. These discussions would greatly increase the scientific strength of the paper.