

Interactive comment on “Simulation of the Ozone Monitoring Instrument Aerosol Index using the NASA Goddard Earth Observing System Aerosol Reanalysis Products” by Peter R. Colarco et al.

Anonymous Referee #1

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This paper uses MERRAero simulations of OMI radiances to generate an Aerosol Index (AI) based on OMAERUV algorithm assumptions (OMAERUV AI) and compare the results to an AI generated with appropriate (MERRAero generated) values of surface pressure and molecular radiative transfer. In light of prior literature by the first author and others, this work can be considered an incremental improvement. That said, the paper presents a justification for practical improvements in the OMAERUV algorithm, and in that sense is important. It is also very well written and organized. I recommend it for publication with minor technical modifications.

Specific comments:

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If I understand correctly, this analysis assumes no OMI measurement uncertainty on the part of either the MERRAero AI or the OMAERUV AI. I imagine there must be some characterization of the OMI random errors (via SNR) and systematic biases (via calibration tracking). Since you're working with large datasets, you could 'add' such measurement errors into your simulated observations. The reason for doing this would be to put the OMAERUV algorithm related biases and errors in context. I could imagine a scenario where it would make sense not to add the complexity required for the suggested changes because measurement uncertainty generates a larger product error. Of course, I would hope this is not the case, but it would have been nice to see this.

I appreciate seeing the modifications that were made to the OPAC properties to account for dust and brown carbon. That said, can you discuss what the implications of non-realistic aerosol properties in this analysis? Is it important just to span the range of possible aerosol conditions and to do so in a way that mimics the frequency of occurrence in nature? Could the conclusions change if you get this wrong?

One conclusion of this study is that OMAERUV could incorporate surface pressure fields from a weather prediction system. If you're doing that, you might as well also take surface winds to drive the glint over the ocean, rather than use the constant 6m/s. To some extent I was expecting to see an analysis of the consequences of this assumption.

Was there any specific reason for the choice of June-September timeframe for the analysis? Could any difference be expected for other seasons of the year?

There's a season dependent residual over the ocean, which means a geometric dependent bias. This is also indicated by the apparent swath dependent biases. Figure 6 indicates biases that are expressed in a geometrically dependent manner. Would fixing the lookup tables in the radiative transfer make all the geometrically depended biases go away?

The map figures show between 60°N and south. Are OMI retrievals not per-

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formed above 6000?

Typos: Page 9, line 24: "showed" -> shown Figure 4, caption: "white line" -> "red line"

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