

# ***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.***

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Received and published: 21 July 2017

The authors describe the investigation of systematic errors in the current version of the OMAERUV AI product. Several years' worth of OMI radiances were simulated from realistic model aerosol scenarios and were fed both into the OMAERUV algorithm, and processed into a "true" AI for comparison. Good agreement was found for both products, but systematic differences on the order of 0.2 units were also observed. The main conclusion from the paper is that the quality of the current version of the algorithm is affected by a lack of nodes in surface pressure and angle (solar zenith, viewing, and relative azimuth angle) space.

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Although the technical approach and the used methods are valid and the study appears to be soundly performed, one is left with the question if the conclusions could not have been found in a much simpler way, involving much less computing time. Investigating if look-up-table (LUT) interpolation is sufficiently accurate is a rather trivial exercise, for which several tens of radiative transfer calculations should suffice. Can the authors comment on this, and possibly add a few lines to the manuscript explaining why such an extensive study was set up?

As the paper is technically and scientifically sound, I recommend it for publication if the comment above and the minor suggestions below are sufficiently addressed.

Page 2, line 10: pedantically, AOD is the integrated extinction. Hence "AOD profile" is inaccurate, but should read "extinction profile"

Page 2, lines 15-24: Please mention: that MISR measures aerosol height of optically thick layers; that ESA is planning the 3MI instrument, which is also dedicated to aerosol properties; that many aerosol characteristics have been obtained from the POLDER instrument (e.g. by Dubovik's GRASP algorithm, but also earlier by Waquet and co-workers)

Page 2, line 30: The AI is sensitive to the absolute values and spectral dependences of both AOD and SSA, in addition to altitude

Page 2, line 32: And OMPS on Suomi-NPP

Page 5, line 17: "updated research version of the what was used" - please correct

Page 5, Section 2.2.: please comment on sun-glint. I assume this is not simulated - or is it?

Page 6, Section 2.3.: What method is used for LUT interpolation?

Page 6, line 25: What does cf stand for? I was confused with cloud fraction, but this would have the opposite effect. You might consider using another symbol.

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Page 7, Section 3.1: Was the Tibetan Plateau also screened? It appears grey in all figures.

Page 12, conclusion 1: If the dependence of the AI difference on pressure is linear, can we use the old OMAERUV results and simply correct them using this observed dependence?

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Interactive comment on *Atmos. Meas. Tech. Discuss.*, doi:10.5194/amt-2017-87, 2017.

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