

The new version is significantly improved in relation to the original.

The authors seem to use the terms OMI aerosol record and OMAERUV interchangeably. For readers unfamiliar with the OMI aerosol products, there may be some confusion, since officially two OMI aerosol records are available. I would suggest the authors to either stick to the 'OMAERUV record' on every instance they refer to it, or include an initial statement stating that the expressions OMAERUV and OMI aerosol record are used interchangeably throughout in the manuscript.

A few specific comments on the current version are listed below.

Line 22. Replace 'acceptable' with 'encouraging'

Line 34: Just saying that λ_0 denotes the reference wavelength does not provide useful information. It should be stated that this is the longer wavelength in the pair, and it is used to calculate an assumed wavelength-independent-scene-reflectivity, needed for calculation of the of the I_{λ} Rayleigh term in Equation (1).

Line 42. In addition to the listed aerosol related parameters, the magnitude of the observed UVAI also depends on non-aerosol-related factors such as spectral dependence of land surfaces and ocean color effects, sun-glint effects, and cloud effects. This clarification should be included.

This issue was raised in the earlier review to which the authors reply with the statement

'... the radiance itself is also affected by surface conditions, clouds, atmospheric gases and aerosols. On the other hand, the UVAI only contains the information of aerosol absorption...'

Their reply reveals a poor understanding of the UVAI concept, since the UVAI is just the measured radiance conveniently packed in a single parameter. It includes any observed spectral dependence other than Rayleigh scattering.

Line 151. An explanation for the selection criteria UVAI > 1 and CF larger than 0.3 should be added. Is this the MODIS CF? If so, 0.3 represents significant contamination.

Line 183. Replace 'better' with 'closer to AERONET retrieved SSA'. As stated AERONET SSA does not represent the true SSA value.

Line 245. Although the same wavelength pair (354, 388) is used in the OMAERUV UVAI definition, the way the observed radiances are calculated have changed [Torres et al., 2018]. The new definition handles the effect of clouds using of Mie Theory (instead of the Lambertian approximation), and reduces significantly the across-track angular dependence. It also accounts for wavelength dependence of surface reflectance as well as sun glint over the oceans. For cloud-free conditions, the Mie-UVAI is slightly larger than LER-UVAI (~0.3) for nadir-viewing conditions. The original definition (consistent with that in TROPOMI) is still reported in the OMAERUV as a parameter labeled 'RESIDUE'. Thus, the original definition should be used for algorithm training purposes. This is important because the difference between the LER and Mie definitions increases with viewing sensor solar zenith angle.

Line 246. In the description of the OMAERUV record, it should be stated that AOD retrievals have been validated using the multi-year AERONET aerosol record [Ahn et al., 2014], and, similarly, the SSA parameter have been evaluated with AERONET Almucantar retrievals [Jethva, et al., 2014].

Line 426 'Acceptable' is a subjective interpretation. Replace 'acceptable (+/- 0.02)' with '+/- 0.02'

Cited References

Torres, O., Bhartia, P. K., Jethva, H., and Ahn, C.: Impact of the ozone monitoring instrument row anomaly on the long-term record of aerosol products, *Atmos. Meas. Tech.*, **11**, 2701-2715, <https://doi.org/10.5194/amt-11-2701-2018>, 2018.

Jethva, H., O. Torres, and C. Ahn (2014), Global assessment of OMI aerosol single-scattering albedo using ground-based AERONET inversion, *J. Geophys. Res. Atmos.*, **119**, doi:10.1002/2014JD021672.

Ahn, C., O. Torres, and H. Jethva (2014), Assessment of OMI near-UV aerosol optical depth over land, *J. Geophys. Res. Atmos.*, **119**, 2457–2473, doi:10.1002/2013JD020188.