

We would like to thank the reviewer for valuable and constructive comments and suggestions. We addressed each of them in the revised manuscript. New and/or modified sections in the revised version of manuscript are highlighted in red. Here we provide a detailed point-by-point reply.

*“...the authors’ previous works discuss that the RR method works when the isolines provided by the ratios are orthogonal and lead to unique solutions for alpha and beta. This has previously been established to be the case for the wavelengths chosen. As the MAS measures at 50 wavelengths, and there are corroborating ground-based spectral AOD measurements, this is a good opportunity to examine the consistency of RR retrievals from other possible combinations of wavelengths... I would strongly suggest but not require that the authors add this; if not added here, then when the scheme is tested with MODIS data in the future (as mentioned on page 1906), then I would suggest this is explored there.”*

We added a statement on potential application of the RR method to other wavelengths and the need for corresponding studies (pages 12-13)

*“.. I don’t know how well-characterised the MAS measurements are so some statement about this would be welcome. Some statement about MAS uncertainty should be added.”*

Statement about uncertainties of MAS measurements and related reference are added (page 13).

*“Figure 6. This shows the domain-averaged AOD as a function of assumed surface albedo at 870 nm. It would be useful to add the domain-averaged AOD for other wavelengths (not just 660 nm) to see how the spectral shape of AOD changes as a function of albedo.”*

*“I would also suggest adding a figure or text describing the PDF of the AODs as a function of assumed surface albedo. This could alternatively be examined by plotting the standard deviation of domain AOD on Figure 6”*

New figure with domain-averaged values of the RR-retrieved AOD at three wavelengths (470, 660 and 870 nm) and the corresponding values of standard deviation are added in the Appendix B (page 38). Also, we include the related description (page 37; page 17, first paragraph).

*“Figure 9. The centre of the colour scale consists of different shades of green, which are hard to distinguish between. This is also the ‘interesting’ range of AOD (0.2-0.3) where the majority of the data lies. I would suggest redrawing this with a different data range (perhaps something like 0.1-0.4?).”*

New figure with different range of AOD (0-0.4) is included (page 51).

*“Figure 10. The spectral dependence of the difference between the RR and MFRSR AODs is of the opposite sign to the error from simulated results from Figure 4(c) in Kassianov and Ovtchinnikov (2008). Do you have any additional comment on this?”*

We agree that the spectral dependence of the difference between the RR- and MFRSR-derived AODs does not match the corresponding “retrieval” error from the simulated results (Kassianov and Ovtchinnikov, 2008). The solution of the model-output problem was obtained for idealized conditions with known true values of AOD, parameters of cloudy atmosphere and surface (Kassianov and Ovtchinnikov, 2008). Thus, it represents the smallest possible differences.