Atmospheric Measurement Techniques Discussions

Interactive comment on "Statistically optimized inversion algorithm for enhanced retrieval of aerosol properties from spectral multi-angle polarimetric satellite observations" *by* O. Dubovik et al.

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We thank Dr. Zege for her very positive encouraging comments.

In the revised manuscript and in the answers below we have addressed all the comments and suggestions:

1. The text of paper was corrected and edited.

2. Comment: "-Table 7. It is a little bit strange that retrieval at wavelength $0,44\mu$

looks better than at 1.02, be- cause the channel $0.44\mu$is not the best. Of course, this result may arrive from statistical optimization with the set of data. A comment is recommended."

Response: Table 7 shows the retrieval errors observed in the numerical test with simulated noise of the same magnitude for all spectral channels. At the same, it is correct that the errors in the aerosol properties in the inversion of real PARASOL over Mongu were higher for aerosol properties at 1.02 μm than for those at 0.44 μm. This can be explained by the fact the fine mode dominated biomass burning aerosol, the aerosol optical thickness at 0.44 μm is several times higher than at 1.02 μm. In a contrast, the surface reflectance at $0,44$ μm is several times lower than at 1.02 μm. Therefore the contribution of aerosol scattering to the reflection observed by PARASOL at 0.44 μm is significantly higher than the contribution of aerosol to the reflection at 1.02 μm.

Please, note that we have included modifications and explanations for Table 7 and in the section discussing results of real data inversion.

3. Comment: "-In spite of the details of aerosol characteristic are very important, still the accuracy of the retrieval of spectral AOT is of a primary importance for climatology. I recommend to include a clear statement about this accuracy achieved with POLDER-PARASOL instrument and used retrieval technique."

Response: We agree that the accuracy of the retrieval of spectral AOT is of a primary importance for climatology. However, the goal of this paper was to describe the algorithm. Currently, we are working on the next paper that should be focused on the comprehensive assessment of the aerosol retrieval accuracy. At the same time, in the revised version of current paper we have clarified Table 7 and some statements regarding retrieval errors in the observed limited tests conducted in frame of current paper study.