

***Interactive comment on* “STUDY OF AFRICAN DUST WITH MULTI-WAVELENGTH RAMAN LIDAR DURING THE “SHADOW” CAMPAIGN IN SENEGAL” by I. Veselovskii et al.**

Anonymous Referee #3

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The paper adds information on the existing literature for desert dust properties. Dust has been measured by means of lidar remote sensors and inversion techniques were applied to derive microphysics near the source and during a field campaign in Senegal. The paper is suitable for publication in ACP but I have 2 major comments that I would urge the authors to take into account:

1. The authors conclude that the negative values of the BAEs measured for dust are due to the enhanced absorption in the UV. This is not supported by independent measurements. It is also well-known that the spheroid model assumes a spectrally independent phase function at 180 degrees. A possible spectral dependence on the 180 phase function could also be the source of negative BAEs and this limitation of the

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spheroid model should be mentioned in the manuscript and in the conclusion section.

2. The paper gives the impression that the particle depolarization ratio does not provide significant information on the inversion. However, there is much discussion in the literature (see for example the work of Gasteiger) that the spheroid model cannot reproduce the lidar measurements of the linear particle depolarization ratio. Thus, how we expect that an inversion code based on the spheroid model would show that there is an added value on the microphysical retrievals by adding depolarization information? I think that the conclusions should be rephrased, such as to make clear that this could be a limitation of the spheroid model as well.

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