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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aircraft and ground measurements of dust aerosols over the West Africa coast in summer 2015 during ICE-D and AER-D" *by* Dantong Liu et al.

Anonymous Referee #1

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I read with interest this paper that provides new data from a recent field campaign in Cabo Verde. The novelty of the dataset resides in particular in the inclusion of the SP2 measurements of BC and hematite content in aerosols, which could apport key information to better understand the absorption properties of dust. Also, the size distribution of dust and its changes in link to different aging times and as a function of the source region are analysed. The relation between size, composition, and optical properties is also studied.

The paper is well structured, well written and globally clear. Probably too long and with too many figures in my opinion, but this could be understandable concerning the fact

that many data from an intensive field campaign are described and discussed.

The main conclusions of the paper concern the size distribution and the optical properties of dust : 1. For the size, the paper confirms the changes in the dust size distribution with transport, in agreement with previous analyses close to sources and mid-transport ; 2. For optical properties, it confirms the lower imaginary refractive index for dust compared to the OPAC database, as already evidenced by previous studies, and highligths the importance of having size resolved compositional data to properly retrieve optical properties by Mie calculations.

The paper and the associated dataset deserve publication to ACP. I have only few (mostly) minor comments below :

1. Section 2.3 : I am not a specialist in SP2 measurements and its data analysis, but most of this section is quite unclear to me. I ask the authors to better explain the Fig. 3, as well as the principles, the data analysis and the retrieval procedure from SP2 measurements.

2. Globally, I found that the uncertainites are not well discussed. I encourage the authors to better expalin how uncertainties on measured and retreieved quantities are derived. For instance, on the refractive index or SSA. You consider both SLR variability and measurement uncertainty in your data? How the uncertainties propagate and affect your results and conclusions ?

3. there is a typo in page 8, line 8, probably you mean "smaller range" ?

4. page 12, you use GADS meteorological data for your backtrajectory study. Why not using NCEP reanalyses ? Has this choice an influence on your results ?

5. page 13, line 21-23 : I do not understand what the mass fraction threshold of 5% represents. Could you please better explain the trajectories classification procedure ?

6. Section 5 : I do not find that the discussion on the changes of Deff (0.1-1μm) with transport days is supported by data. From Fig. 15C I have the impression that Deff is

mostly at 0.30-0.35 μm independently on the transport days, except from few outliers. I would probably smooth this part of the discussion.

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