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Discussions

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# *Interactive comment on* "Saharan dust long-range transport across the Atlantic studied by an airborne Doppler lidar and the MACC model" *by* F. Chouza et al.

**Anonymous Referee #1**

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The authors use airborne measurements from the SALTRACE campaign, CALIPSO products and the MACC model simulations to describe case studies of Saharan dust long-range transport over the Atlantic. This is a work of very good quality where sophisticated data/models are used for the description of the SAL during an experimental campaign of high importance.

However, the focus of the paper is mostly on the MACC model evaluation, which puts a large portion of the work shown out of the scope of ACP. I think that the paper needs major revisions for being ACP-compatible and this can be achieved with a more in-depth analysis of the dust-related physical processes revealed during the experiment. In short, I propose to not just compare the model output with observations but dis-

cuss also the physical meaning of these results. This can be done in section 4 (case studies).

Beyond this major revision, I have only the following minor comments (sorted by importance):

Section 3.3: Aerosol extinction: Here I would urge the authors to revisit the related literature concerning the CALIPSO extinction underestimation for the dust case (see for example Tesche et al., JGR; Wandinger et al. in GRL; Amiridis et al. in ACP). It is possible that MACC performs better in terms of AOD than CALIPSO for the cases mentioned in the paper, especially because MODIS is assimilated over ocean.

Abstract: The authors mention: DWL measurements are validated against dropsondes. This task is not to be mentioned in the abstract (and out of the scope of ACP). Even though the evaluation exercise provides confidence on DWL retrievals, it doesn't have to be mentioned here.

Page 5, Line 22: Please revise the web link, you provide the site for CERES and not for CALIPSO.

Page 12, line26: It is Figure 9 I think (instead of 7)

Figure 8: Please use a different than white color for the non-available data in the left panel in order to distinguish from the right panel, where white stands for the zero values.

Too much info on MACC in Section 2. I think that appropriate references exist in the literature, so I would avoid so detailed description.

There are many typos throughout the document, please give it a thorough read and revise accordingly (e.g. be careful with the use of "where" instead of "were", a mistake repeated many times).

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