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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Dust optical properties over North Africa and Arabian Peninsula derived from the AERONET dataset" *by* D. Kim et al.

Anonymous Referee #2

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Review of "Dust optical properties over North Africa and Arabian Peninsula derived from the AERONET dataset" by Kim et al., submitted to Atmos. Chem. Phys.

The paper discusses absorption of mineral dust as measured by AERONET sites in North Africa and Arabia. The paper seems to repeat results and methodology from previous studies, and is not ambitious in its analysis. It also features an outdated view of mineral dust optical properties in global models. The authors should make clear what is original and new in their study, and discuss in more details the local differences in mineral dust optical properties.

Main comments:

- Mineral dust absorption has been the subject of quite of few studies already, most of

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them using AERONET. The authors should state clearly whether this study is a simple update of existing results, or if the methodology is new. From reading the paper as it stands now, it seems the former is true. In addition, it would have been helpful to discuss differences among the 14 sites in more details. The impact, or lack thereof, of different dust sources on dust absorption is valuable information.

- Page 20183, line 12, and page 20189, line 2: Most global models I know of upgraded their aerosol optical properties away from OPAC quite a few years ago now. The dataset by Balkanski et al. (2007) is popular for mineral dust in global models, and it would be interesting to compare against that dataset in this paper.

Other comments:

- Page 20184, line 21: How does the AERONET retrieval algorithm decide when to use spheroids in the retrieval? In other word, how does it know it is dealing with mineral dust aerosols? If there is an automatic way, then the method should be replicated in analysing mineral dust optical properties.

- Page 20185, line 10: If typical Angstrom exponents are between 0.2 and 0.6, and the authors use a ceiling of 0.2 to identify mineral dust, does it mean that the sites are actually dominated by species other than mineral dust, or that the assumption that mineral dust is mainly coarse mode is wrong?

- Page 20185, line 19: The assumption that sea-salt aerosols have a negligible impact on AERONET measurements is unsupported. For island and coastal sites, it is likely that sea-salt is in fact a dominant species.

- Page 20189, line 29: The sudden appearance of China is surprising. Surely it is outside of the area studied.

Technical comments:

- Page 20182, line 14: "the previously" should read "previous".

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- Page 20188, line 14: "that the" should read "the".

References:

Balkanski, Y., M. Schulz, T. Claquin, and S. Guibert. Reevaluation of mineral aerosol radiative forcing suggests a better agreement with satellite and AERONET data. Atmos. Chem. Phys., 7, 81-95, 2007.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 20181, 2011.