

Interactive comment on “The spatial distribution of mineral dust and its shortwave radiative forcing over North Africa: Modeling sensitivities to dust emissions and aerosol size treatments” by C. Zhao et al.

Anonymous Referee #2

Received and published: 19 June 2010

In this sensitivity study, two aerosol models and two emission schemes are applied and tested for their ability to simulated the spatial distribution of mineral dust, size distributions, and SW radiative forcing over North Africa. The manuscript is well written and structured, and, generally, fulfils the requirements for publication in ACP. I have only some minor comments which I would like the authors to consider.

P9757 line 21: Include a reference for DABEX. Also, how DABEX and AMMA are linked is not clear.

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P9759/9760: In the description of the satellite products it would be useful to discuss the overpass times of Terra (MODIS, MISR) and Aqua (MODIS). For instance, if MODIS samples a certain location only in the afternoon but emission occur mostly in the morning (e.g. frequently observed for low level jet related emissions in North Africa) then biases in the AOD product are expected. This should be discussed with respect to the comparison between model AOD and satellite-derived AOD presented in this paper (e.g. Fig 7).

It is stated later (P9768 line10) that the “Model results are sampled in the same over-path with satellites” which .

P9761 line 24: A short explanation why the meteorological conditions need to be reinitialized every 5 days would be useful.

P9761 line 28: It would be useful to outline the 170x120 box in one of the maps. In general, it is difficult for the reader to visualize which region is covered by a 200x150 grid with 36km resolution centered over Niamey. Lat/Lon boundaries would be helpful.

Section 3.1: It might be interesting for some readers which land surface model and PBL physics were used in the WRF/Chem model setup.

Fig 1, caption: Ginoux et al. (2001) reference should be included for the source function.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 9753, 2010.

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