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## ***Interactive comment on “The climatology of dust aerosol over the arabian peninsula” by A. Shalaby et al.***

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1-About MODIS: - MODIS pixel resolution varies with wavelength, and the 10 km resolution is for pixel aggregates and with a viewing angle at nadir. From your description, it seems that the resolution is 10 km, but the data downloaded from GIOVANNI are at 1 degree resolution. - you will need to check that MODIS Deep Blue is Collection 5, as it may be 5.1. They are not the same, with some improvements in the retrieval algorithm for the latter

Thank you for this comment, I have downloaded MODIS collection 6 and redo the analysis, I had interpolate 10 km data to 0.5 degree resolution to be comparable with model's resolution. The full description of the new dataset has been written in the

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revised manuscripts.

2-About OMI: -the "high" resolution is at nadir only. -there are 2 retrieval algorithms: OMAERO (Torres et al., 2002) and OMAERUV (Torres et al., 2007). Both are compared in Livingstone et a. (2009). Which one do you use? - OMI retrieval is in nUV, how do you get AOD at 500 nm?

Thank you for this note, I have missed to describe them correctly, I have used OMAERUV. In Giovanni portal, there is AOD at 500  $\mu\text{m}$  wavelength for OMAERUV data. Actually I do not know how they create these data. However for OMAERO the available wavelength are the near UV wavelength.

3- About AERONET: - Are you using monthly, daily, or 10-minutes observations? This choice will influence your comparisons.

I have used the 10-minutes observations to do my order statistic

4-About dust sources: - dust sources geomorphology and anthropogenic activities have been studied in details by Prospero et al. (2002) and Ginoux et al. (2012a), respectively. Seasonal variation of dust optical depth compare to all aerosols optical depth has been studied at Solar Village (Ginoux et al., 2012a) and Kuwait (Ginoux et al., 2012b). You will notice that DOD does not contribute to AOD entirely. This was discussed by Eck et al.

Thank you for this critical point, I have address this point as one of the model uncertainties. The model does not account for anthropogenic dust source and and for this simulation we do not use the other potential aerosols as sulphate and black carbon, which limit the simulation accuracy. Also we rely on the conclusions by Kim et al. 2011, that in dust season, dust is the most abundant aerosol over the Arabian Peninsula. In future work we will account for such anthropogenic sources by modifying the corresponding land texture data, based on MODIS analysis as in (Ginoux et al., 2012a).

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