

Interactive comment on “Aerosol radiative forcing during African desert dust events (2005–2010) over South-Eastern Spain” by A. Valenzuela et al.

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Review of paper by Valenzuela et al., Aerosol Radiative Forcing during African desert dust events (2005–2010) over South-eastern Spain

All reviewers indicated serious issues in the several aspects of this manuscript, including unclear data generation, analysis and presentation of the results and writing style. Based on the reviews that raised numerous questions, I do not encourage the authors to submit the revised manuscript. Instead, I suggest taking into account all the reviewer comments, rewriting the paper and resubmitting it as a new article.

If the authors decide to rewrite the paper, I suggest them to pay a particular attention to the following aspects:

1. Presentation of the forcing calculation results. The description of aerosol forcing should be clearly described. The authors should clarify if they calculated instantaneous values or daily averages, how calculations were done (which properties of aerosol and surface reflectance were used, how their spectral variability was accounted). If the authors noted some important tendencies in the forcing variability it would be useful to discuss the causes of this variability. For example, if it is caused by variability in aerosol SSA, it could be useful to display and discuss values of SSA.

2. Generation of aerosol properties. One of the declared novelties of presented studies is the fact that authors used the aerosol properties derived from principle plane observation. However, the authors do not provide any description of their approach for assuring quality of their retrievals. For example, the standard AERONET products are filtered out by numerous cloud-screening and quality assurance criteria (e.g. see Dubovik et al. 2002). In these regards, the advantage of the observations in the almucantar is a possibility to filter out the partially cloudy data by checking symmetry of left and right almucantars scans. Such check is not possible for principle plane and therefore screening partially cloudy data is more challenging. In any case the authors should carefully describe the used procedure for quality assurance of the data. Also, I am aware that some radiances given by AERONET website for principle plane data are lower quality than the radiances for almucantar. I suggest that the authors contact the AERONET staff and verify that issue.

3. The details of the retrieval scheme/algorithm used by the authors should be well described. The text of the paper suggests that the authors used rather original approach. However, the originality and efficiency of the approach remain unclear. It seems that the authors used SKYRAD package (by Nakajima et al.) updated with spheroid-based model. Is this correct? Are there any other modification fo SKYRAD? How different the new spheroid model from the one used by AERONET. Are there any advantages of disadvantages? The authors stated that they used T-matrix calculation, but how they managed to make calculations for the particles with large size parameter, where

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T-matrix calculations do not converge? What is the range of axis ratios in generated kernels, etc.? How does the complex refractive index and SSA are retrieved? (cited paper of Nakajima et al. 1996 does not describe this). Some illustrations of aerosol retrievals also would be useful for understanding if there were any differences with AERONET products and if they can cause any differences in calculated values of forcing.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6593, 2012.

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