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***Interactive comment on* “Simulation of the mineral dust content over Western Africa with the CHIMERE-DUST model from the event to the annual scale” by C. Schmechtig et al.**

Anonymous Referee #2

Received and published: 18 April 2011

Throughout this manuscript the comparisons between simulated and observed surface PM and AOD are defined as good or fairly good, even when these comparisons are sometimes poor. Consequently, there is no discussion in the paper about the possibility of improving the comparisons, by working on specific aspects of the model used. The paper is interesting, well written and it presents a comprehensive overview of the model and its results. However, in my opinion, there is a lack of comments regarding the degree of agreement between observed and simulated variables. Thus, the validation of the model should be done. The validation of the model is necessary also because both modelled and measured data are provided without errors in the manuscript. It is consequently difficult to have an idea about the goodness of the simulation. The authors

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used R and NME to evaluate the model performance but without any discussion about the acceptability of the reported values for these two statistic parameters. For example, what is the acceptable range of values for NME? What are the values for R2 (not only R)?

It is clearly recognized that the simulation of atmospheric PM and AOD is a very difficult task. Consequently, the authors should define as poor the correlation if necessary and if a possible explanation for the disagreement is provided.

To my opinion, it would be interesting to add a short paragraph (or Supporting Information) where to provide the scatter-plots (with slopes and intercepts) relative to the comparisons between modelled and measured data reported in the Figures of the manuscript (Figures 9, 10, 11, 12, 13, 14, 16, and 17). Moreover, a Table with the values of the statistical parameters used to evaluate the degree of goodness of the comparisons (for each scatter-plot) should be also added. The statistical parameters R and NME can be used, but also R2, Mean Bias (MB), Mean Fractional Error (MFE), Mean Normalized Gross Error (MNGE), Mean Fractional Bias (MFB), Unpaired Peak Prediction Accuracy (UPA) are useful and should be used. The range of acceptability for these statistical parameters should also be included.

In such a way, a reader can get the picture of the performance of the model. At the same time the authors have the possibility of showing scatter-plots and statistical parameters for the whole year as well as for specific periods/seasons for which the comparison improves or fails compared with the mean by explaining the possible reasons for the observed differences in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 8027, 2011.

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