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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Comparison of two different sea-salt aerosol schemes as implemented in air quality models applied to the Mediterranean Basin" *by* P. Jimenez-Guerrero et al.

Anonymous Referee #2

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General comments:

This is a very interesting paper illustrating the application of two sea-salt production schemes in two regional air quality models: CHIMERE and CMAQ. The paper is well structured and presented the current status of sea-salt simulations in atmospheric models. The comparisons of two emission schemes offered some insights into various processes that impact the sea-salt simulation results. The reviewer especially appreciated the efforts by the authors to compare the model predictions of meteorology, e.g. 10 m wind speed, with observations before proceeding the comparisons of sea-salt pro-

duction schemes. The results and conclusions from the paper are useful for the future development of sea-salt aerosol in air quality models.

Specific comments:

(1) One major drawback of the paper is the lack of analysis of the inconsistency simulated between the surface wind, surface concentrations and the AOD (total column sea salts). The model overestimates the surface wind speed, underestimates of AOD and the surface levels of aerosols. There are many reasons for this to occur, such as deposition, emissions and transports. If an over-estimate of surface wind was predicted in the model, one would expect an over-estimate of sea-salt fluxes from the sea-salt emission schemes, which should result in an overestimates of the surface concentrations of sea-salt aerosols, which the models failed to predict. This offers an opportunity to look at the various components of the modeling systems and find out the reasons for it.

(2) Another concern for this paper is the lack of evaluation of the model performance for simulating sea-salt aerosol in terms of size distributions before its application to the calculation of AOD. The AOD of sea-salt is determined by the mass loading and the size distributions. There is no evidence from the paper how realistically the model can reproduce the sea-salt size distributions. Without a reasonable size distribution from the model, the AOD calculated may be right for the wrong reasons.

(3) Both dry and wet depositions were analyzed from the models. However, it seems the analysis did not provide any information about the model performance with respect to the inconsistency from point (1) above. If a budget information is presented with respect to emissions, dry and wet deposition for each model associated with each model performance on sea-salt surface concentrations and AODs, the inconsistency may be able to be explained and help future model development in sea-salt simulations.

(4) The Summary and Conclusion needs more scientific founding on the model intercomparison. From current writing, just some facts were stated on the models. What

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have we learnt?

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Interactive Comment