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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Quantification of DMS aerosol-cloud-climate interactions using ECHAM5-HAMMOZ model in current climate scenario" *by* M. A. Thomas et al.

Anonymous Referee #1

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This manuscript employs a state-of-the-art aerosol-chemistry-climate general circulation model to explore the influence of oceanic DMS emissions on cloud properties and radiative forcing. The manuscript is easy to read and well written. It is certainly appropriate for ACP. I recommend publication after the authors consider the following points:

1. The authors review the model performance presented in previous papers. I appreciate that much work has been done to evaluate the model but since the production of sulfate from DMS is key to this paper I feel more details need to be shown here. The figures currently show column averaged burdens. At what altitude does particle production occur in the model? We know that new particle production in the MBL from

DMS is a rare occurrence. Is most of the DMS in the model going to existing particles? Does the model require new particles in the FT to be transported down to the MBL?

2. The manuscript briefly mentions and then dismisses sea salt as an alternative CCN source. Have you tried including the sea salt source function of Clarke et al to evaluate the relative importance of sea salt vs sulfate as a CCN source?

3. There is no mention in the manuscript of ocean derived organic particles as a source of CCN. Recent work suggests that this is the source of most sub-200nm diameter particles with sulfate contributing to make the smaller particles sufficiently large to act as CCN. I am not aware of a sea-to-air organic flux parameterization that could be applied to a GCM but it needs to be at least pointed out in the paper that DMS may only be a surrogate for the marine source of CCN over the remote oceans.

4. I feel that the numbers in the tables should include no more that 3 significant figures at best.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 3087, 2010.