

***Interactive comment on “Enhancement of marine cloud albedo via controlled sea spray injections: a global model study of the influence of emission rates, microphysics and transport” by H. Korhonen et al.***

**Anonymous Referee #1**

Received and published: 15 February 2010

General Comments

This is a nice paper, clearly presented, suggesting that geoengineering via sea-spray generation will require a greater effort to achieve its goals than is currently assumed by its proponents.

Specific Comments

1. Page 739, line 13, and throughout the paper. Make it clear whether the values refer to particle radius or diameter.

C137

2. Page 740, lines 8-14. This paragraph raises a couple of points:

- The authors should explain why they do not include precipitation scavenging from low-level clouds. This seems an odd omission, as drizzle from stratocumulus is an important and common part of the boundary-layer processes in these areas. Can the authors speculate on the impact on their results of including this process?
- Why do they use ECMWF analyses for frontal and convective clouds but ISCCP products for boundary-layer clouds? Do ECMWF analyses not include boundary-layer clouds?

3. Page 741, lines 14 & 15. This is unclear: how does the clause in parentheses, which mentions either 10% or 100% of spray particles activating to form cloud droplets, relate to the single CDNC figure of 400 cm<sup>-3</sup> ?

4. Page 741, line 25. A couple of questions:

- At what height above the surface were the sea-spray particles emitted in the model?
- What is the vertical resolution of the model in the boundary layer?

5. Methods section in general. Somewhere in this section it should be clearly stated that the model used is coupled in one direction only, i.e. that cloud cover & meteorology can affect the aerosol microphysics and predicted CDNC, but that the latter has no impact on model clouds, boundary layer structure etc.

6. Page 744, lines 7-9. I suggest adding something like "...for the spray rates currently being considered (Ref)." to the end of this sentence. Otherwise it ends up sounding too much like "it can't be done", rather than "it can't be done using these spray rates."

7. Page 745, discussion of supersaturation suppression. Is this argument in any way affected by the extra water injected (and then evaporated) into the boundary layer as part of the sea-spray process?

8. Page 748, line 26. The concept of an "individual stratocumulus cloud" is rather a

C138

vague one - arguably an entire sub-tropical Sc cloud deck could be considered as one cloud, and therefore entirely resolvable by a large-scale model. Perhaps the phrase "individual stratocumulus cloud cell" should be used instead.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 735, 2010.