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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the impacts of phytoplankton-derived organic matter on the properties of the primary marine aerosol – Part 2: Composition, hygroscopicity and cloud condensation activity" *by* E. Fuentes et al.

Anonymous Referee #1

Received and published: 11 December 2010

There appears to be a different version of the discussion paper on the ACP web site now than the one I downloaded and printed a few weeks ago. Figures as well as text have changed. This makes writing the review more difficult than usual.

The experimental work described in the paper appears to have been done with great care. The work is novel in that natural seawater was used for the addition of the cultured algal exudates and the hygroscopicity and CCN activity was thoroughly assessed. In addition, the paper does a very good job of placing the results in the context of previous published papers. This type of critical analysis helps the field advance to the next level

in terms of developing and answering scientific questions. My major issue with the paper is how the concentrations of organic material in the experiments described here relate to what is present in the real world. The authors should give a sense of typical concentrations of exudates in sea water so the reader can understand the significance of the results using concentrations on the order of 512 uM. The paper is publishable in ACP after this concern and the comments below have been addressed.

p. 26159, lines 17 – 18: "Atmospheric sea spray" is not an appropriate term for the aerosol sampled by O'Dowd et al. The term implies that it is only sea spray aerosol and does not recognize that it most likely was chemically modified by secondary processes after being emitted from the ocean.

Section 2: A figure showing a flow chart of sample preparation for the various aqueous media (artificial seawater, natural seawater, etc.) would help clarify the methods used for the reader.

p. 26170, lines 5 – 8: The correlation between chl-a and particle organic fraction in O'Dowd et al. (2008) is quite poor (r^2 = 0.25). It is likely that the small degree of variance accounted for by chl-a is due to primary emissions of sea spray collected on the filter. The remaining variance is most likely due to secondary processing incorporating organics that may or may not be of marine origin.

p. 26171, line 26: Why was a 0.2 um filter used? Because this is how seawater dissolved organic matter is usually defined?

p. 26178, lines 1 – 2: "Most of the organic fraction of the dry particles is dominated by sea salt. . .." This statement doesn't make sense since "sea salt" is typically taken to mean inorganic.

Minor corrections:

p. 26159, line 27: change to "has shown high organic mass fractions. . ."

p. 26179, line 9: change to "due to an increase in the. . .."

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p. 26179, line 12: change to “Similar CCN to that presented. . .”

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Interactive Comment