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Atmospheric Chemistry and Physics Discussions

Interactive comment on "LACIS-measurements and parameterization of sea-salt particle hygroscopic growth and activation" *by* D. Niedermeier et al.

Anonymous Referee #2

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General Comments

The authors present a nice study of the hygroscopic and cloud-activation properties of sea salt particles generated in the lab by atomizing sea water samples obtained from various locations.

The work is an effective use of the cloud chamber and provides a parameterization for the activation of sea salt particles that could be useful to climate modelers.

It would be interesting if the authors could extend the work in the future to examine the potential role of organics on the activation and hygroscopic properties of sea salt

particles.

On page 4, 4th paragraph, 2nd column: repeat the sentence 'Sea salt particles exhibit reduced growth compared to NaCl.. ' in the abstract. This is an interesting finding. Given the observed chemical composition of the sea water samples, is the reduced growth consistent with the differences in chemical composition? Or does there need to be some unobserved insoluble component invoked to explain the reduced growth?

Specific Comments

On page 2, last paragraph: were blanks also analyzed to verify no contaminants were introduced (for example ultrapure water in same containers used to store the sea water, filled at same time as sea water samples taken, and analyzed simultaneously)

On page 3, when atomizing and drying the sea water-derived particles, if super-saturated sea salt solutions are created during the drying process are the pairings between the various elements changed due to solubility issues?

On page 3 - how 'dry' is 'dry'? How did you verify that the particles being selected by the DMA were in fact free of water? Were there any droplet shatter patterns on the ELPI grids that may have indicated some water remaining on the particles?

On page 4, 2nd paragraph: If the sea water contained organic species that potentially formed monolayer coatings on the droplets, do you think a 2 second residence time in LACIS would bring them to their equilibrium size?

On page 4, 2nd paragraph, 2nd column: would larger sea salt particles also be of interest? 185 nm still seems slightly small compared to 'typical' ambient sea salt particle diameters.

Do you think ammonium sulfate might also require a shape factor correction? If you repeat the shape factor tests conducted on the sea water and sea salt samples with ammonium sulfate, do you observe a shape factor of unity?

ACPD

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Technical Corrections

On page 2, 2nd paragraph, the sentence starting 'In this context...' is difficult to follow and should be rewritten. The following sentence should read: 'To explore the affect sea water chemical composition may have,...'

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 11511, 2007.