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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Ice nucleation from aqueous NaCl droplets with and without marine diatoms" *by* P. A. Alpert et al.

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This paper presents a very thorough examination of the ice nucleating properties of one particular marine organism when immersed in aqueous sodium chloride. There are however some potential difficulties in applying the results to ice formation in the atmosphere Airborne marine organisms revealed by transmission electron microscopy, whether collected by impaction or electrostatic precipitation, very rarely show the presence of associated sea salt. It is possible that the sea salt becomes detached from the particles when subjected to a high vacuum, although there is no obvious evidence of this. If submicrometre fragments of organisms or bacteria that are thin compared to their length are mostly produced by breaking of the film of air bubbles rather than by the jet drops, it might be expected that exopolymer material rather than sea salt

would accompany them into the air. It forms a transparent coating that breaks down quite quickly in the atmosphere. The use of a saline solution to detect ice nucleating properties might therefore not reveal what would happen in the atmosphere. I have made extensive collections of the aerosol over the South Indian Ocean, the Southern Ocean between Australia and Antarctica, Cape Grim, Tasmania, the Great Barrier Reef in northern Australia and on three voyages to the central Arctic Ocean, including the North Pole on each. Diatom frustules or larger parts of diatoms have been found on each but represent only a few percent of the total marine biogenic particles. Figure 1 illustrates the variety of marine organisms found in 2l of air on one occasion and the apparent absence of salt on any of them. A possible conclusion is that the choice of organism to test for ice nucleating properties when immersed in a saline solution might not tell us very much about the influence of marine bioaerosols on ice formation in the atmosphere. However, the paper is valuable because it shows an excellent experimental method that might be applied to a broader range of marine organisms.

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Figure 1 caption Suspected airborne marine organisms collected from 2l of air at Cape Grim Baseline Atmospheric Monitoring Station, Tasmania on December 8, 2007.

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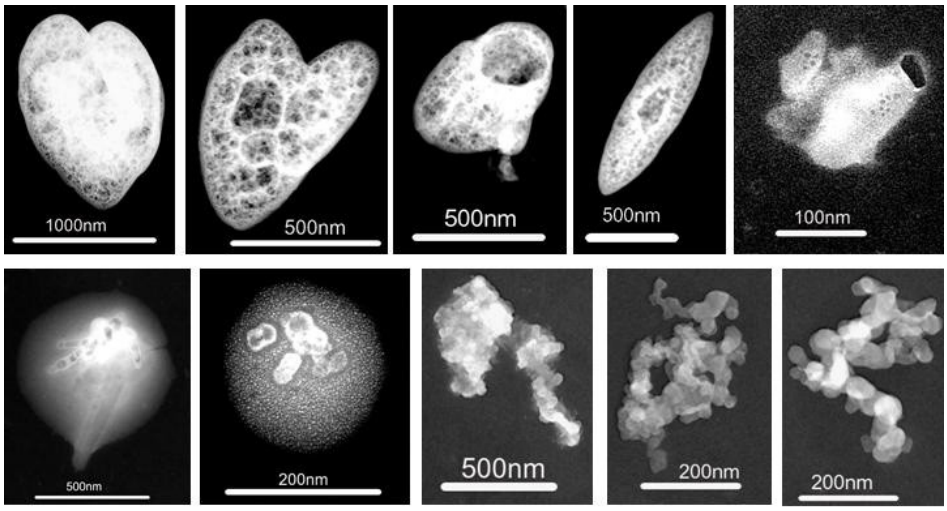
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Fig. 1.