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

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The authors would like to thank Dr. K. Bigg for reviewing our manuscript and for these additional comments. We are aware of the extensive studies by Bigg and coworkers which involved particle collection and characterization (e.g., Bigg et al., 1995; Leck et al., 2002; Leck and Bigg, 2005a,b; Bigg, 2007; Bigg and Leck, 2008). These studies have and will continue to advance our knowledge of marine aerosol particle morphology and composition in the future.

In our study under discussion here, we show that intact diatoms and even the smallest fragments of diatoms can act as efficient ice nuclei (IN) in aqueous NaCl droplets (Alpert et al., 2011). Sea salt aerosol particles over the ocean surface waters are ubiquitous (Lewis and Schwartz, 2004). Recent studies, in fact have shown that ma-

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rine sub-micron aerosol particles can be composed of sea salt and biogenic material (O'Dowd et al., 2004; Hawkins and Russell, 2010; Russell et al., 2010; Ovadnevaite et al., 2011). Even if biogenic particles are not associated with sea salt when aerosolized from the sea surface microlayer, it is highly likely that in the atmosphere, they will coagulate when present with high concentrations of sea salt aerosol particles and cloud droplets containing dissolved sea salt (Andreae et al., 1986; Lewis and Schwartz, 2004). For these reasons, we cannot exclude the possibility that fragments of diatoms are not associated with sea salt. Given this, we feel that it is appropriate to account for internally mixed sea salt and biogenic particles which due to the presence of sea salt, are highly hygroscopic, and therefore, potentially deliquesce resulting in an aqueous saline droplet with insoluble biogenic material immersed. In addition to the experiments described in this publication, we have also investigated the ice nucleation potential of intact and fragments of diatoms not associated with sea salt (Knopf et al., 2011). As described in another recent publication, there is a high ice nucleating efficiency for temperatures as high as 250 K and relative humidity with respect to ice as low as 125% (Knopf et al., 2011). Obviously, there is still much work to be done to extend and more generalize our studies and to address the mixing state of primary marine organic aerosol. We thank the reviewer for raising this important issue.

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