

Interactive comment on “The origin of sea salt in snow on Arctic sea ice and in coastal regions” by F. Domine et al.

Anonymous Referee #1

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This is an interesting discussion paper, but the limited amount of data prevents the authors from making a strong case one way or the other. The main goal of the paper is to investigate what would determine the composition of the top layer of Arctic snow packs. In particular, what is the relative importance of upward migration of sea salt ions from the underlying sea ice, or wind driven processes.

After reading this paper I come away with the message that upward migration does occur, but that it does not appear to determine the composition of the top snow layer. The importance of wind blown frost flowers remains completely open to question. The authors discuss one case where this is unlikely but this hardly proves that frost flowers are unimportant, in particular since one would not expect frost flowers to be anywhere near to the measurement site anyway.

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Curiously, the discussion appears to ignore completely the composition of freshly deposited snow; as formulated one could conclude that freshly deposited snow does not contain any sea salt components. The Toom-Sauntry and Barrie (2002) paper deals extensively (exclusively?) with fresh snow, and a comparison would have been instructive. In fact, the strong enrichment of bromide in snow deposited after sunrise reported in that paper seems a much more convincing argument that ozone depletion chemistry plays a role in the bromide enrichment in the upper snow layers.

I was planning to discuss this and other aspects of this paper in more detail but most of my comments would be similar to those by referee #0 (?) which seems hardly useful. I concur that this paper is of sufficient value to be published in a shortened version.

The information presented in figure 11 should be summarized in a table rather than a figure which suggests more than there is to the limited amount of data.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 4737, 2004.

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