

## ***Interactive comment on “Frost flower chemical signature in winter snow on Vestfonna ice cap (Nordaustlandet, Svalbard)” by E. Beaudon and J. Moore***

**E. Beaudon and J. Moore**

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REF: The paper presents chemistry data from Nordaustlandet ice cores and interpretes winter sea salt signals for the occurrence of frost flowers on young sea ice. The data were collected in the IPY Kinnvika project. The hypothesis is that at glacier locations close to frequently occurring young ice formation regions, sea salt accumulation rates are high. The mechanism for the salt transport is frost flower formation and disintegration on the surface of young sea ice.

ANSWER: Our paper presents chemistry data from Vestfonna snow pits (not from ice cores) and as well as interpreting winter sea salt for the occurrence of frost flowers on young sea ice, it points out Hinlopen strait as the most probable young sea ice

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formation area in winter around Nordaustlandet.

REF: Sampling and data analysis have been very well done and described in the paper properly. The reasoning of the salt transport is clear and qualitatively correct. No estimate is provided for the mass flux by the frost flower mechanism which would be necessary for the final judgement. Such quantification is, however, difficult and can be considered as a topic of a future work. The mechanism has been suggested earlier in Antarctica but so far not in the Arctic. Potentially, if the hypothesis can be verified, it would become an important tool in interpretation of ice core data for local climatological conditions. Supporting the Antarctic result and extending that to north, this paper makes a significant contribution to the cryosphere literature. Technically the paper is well constructed as it is.

ANSWER: Thank you for these comments and your remark about the mass flux. Now that we found the first frost flowers chemical signature in Vestfonna snow, we will carry on further studies of the sea salt budget in the snow and pay a special attention to the frost flowers mechanism during our next sampling seasons (the coming spring field campaign for instance) in Nordaustlandet.

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Interactive comment on The Cryosphere Discuss., 3, 159, 2009.

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