

Interactive comment on “pH-Dependent production of molecular chlorine, bromine, and iodine from frozen saline surfaces” by John W. Halfacre et al.

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Dear John Halfacre

I read your manuscript with great interest and wish the best for publication in ACP. In particular, I like the increased complexity of your experiments compared to other laboratory studies and the comparison to field data.

Would you mind elaborating in more detail where you think the chemistry is occurring in your samples: the liquid fraction or the ice with its disordered interface? You clearly state that the temperature of of the sample was above the eutectic of NaCl, so we

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can expect the presence of liquid in your system. By the way, what the would be the volume of liquid compared to that of ice? Then, later in the discussion the focus is placed on the disordered interface as host of the reactions - as far as I understand the manuscript. I assume you refer to the disordered interface if ice. Could you specify the role of the liquid fraction and of the ice as host for the chemistry? I think at the end this is a semantic issue, as your data are very nicely compared to studies with liquid samples (L. Artiglia, J. Edebeli, F. Orlando, S. Chen, M.-T. Lee, P. Corral Arroyo, A. Gilgen, T. Bartels-Rausch, A. Kleibert, M. Vazdar, M. A. Carignano, J. S. Francisco, P. B. Shepson, I. Gladich and M. Ammann, *Nat Comms*, 2017, 8, 700.) and to those with frozen samples with a considerable liquid fraction (N. W. Oldridge and J. P. D. Abbatt, *J. Phys. Chem. A*, 2011, 115, 2590–2598.) Indeed, Oldridge proposed that the reaction occurs in the liquid fraction of their samples.

best regards, Thorsten Bartels-Rausch

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