

Interactive comment on “Temperature dependent halogen activation by N₂O₅ reactions on halide-doped ice surfaces” by F. D. Lopez-Hilfiker et al.

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Authors' Response to Referee 2

This is a fantastic manuscript describing a set of well-thought laboratory experiments on the reaction of N₂O₅ with brine solutions of ice. The paper discusses two points of high relevance and interest: The products of this reaction at varying chemical composition of the brine are investigated and this is then used to discuss the brine composition as function of temperature. I find the paper very clear, the argumentation very careful, and the conclusions well justified. I have no questions or suggestions except one small point: Could you discuss the relevance of the experiments above Br:Cl 1:100 a little bit

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more in detail? From the introduction, I got the impression that those concentrations are not realistically expected in the field, but the discussion stays somehow vague on this point.

We thank the referee for their reading of the manuscript and general interest in the topic. The specific Cl:Br ratios we used to probe the temperature dependence of the halogen yield are not of particular relevance. They were chosen to allow observation of the temperature dependence and to check its consistency with the kinetics determined at one temperature. Cl:Br of 100:1 exhibits essentially the same behavior as Cl:Br 650:1 (sea water) in terms of the temperature-dependent product yields so we didn't show any results for Cl:Br > 100:1 when studying the temperature dependence. As for the general environmental relevance, the Cl:Br ratio in snowpacks is known to change with distance from sea spray source, with depth, and with season (see introduction), so that Cl:Br between 650:1 and < 1:1 are possible depending on location, season, and processing history.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6085, 2012.

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