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Comment

## ***Interactive comment on “Temperature dependent halogen activation by N<sub>2</sub>O<sub>5</sub> reactions on halide-doped ice surfaces” by F. D. Lopez-Hilfiker et al.***

### **Anonymous Referee #1**

Received and published: 19 April 2012

This is a very nice study of reactive uptake of N<sub>2</sub>O<sub>5</sub> by halide-doped ice. It nicely indicates that the exposed (as far as heterogeneous reaction is concerned) surface of such ices consists of a region which behaves as though it was a liquid brine - as predicted by thermochemical models. Furthermore, the differential reactivity of bromide and chloride observed in liquid systems is maintained at the frozen surface, which has interesting implications given the different eutectic temperatures of NaBr and NaCl. I have only a couple of minor comments concerning the manuscript.

1. On page 6089, it may be good to give the other (non-NaX) components in the artificial seawater; in particular, are carbonates expected to be important? What is the

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pH of the pre-freezing solutions?

2. Page 6093: Is the result shown in Fig 2 (at 242 K) representative of the other temperatures as well?

Page 6094: Please expand/explain the "expected" diffusion-limited loss rate calculation. Also, please state whether the total ionic strength is constant for each type of experiment reported.

Figs 3-6: What (if anything) is the difference between "normalized yield" and "yield"? I assume the yield is per N<sub>2</sub>O<sub>5</sub> reacted; is that not the normalization?

Page 6097: At 230K, will not the bromide have precipitated, as I believe its eutectic is ~245K?

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

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