

## ***Interactive comment on “First-year sea-ice contact predicts bromine monoxide (BrO) levels better than potential frost flower contact” by W. R. Simpson et al.***

**W. R. Simpson et al.**

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This reviewer understood our intention to take extremely simple models for how sea ice formations may affect airmasses and compare them with a long timeseries of accurate data on halogen activation (BrO) in a “blind” statistical manner. It is clear that the actual process is very complex, but our finding that one simple parameter – the time of contact with first year sea ice is capable of predicting more than half the variance in BrO is a novel and important result. We would differ with the opinion that our analysis is “preliminary”. It is simple, but that simplicity is its virtue. Based upon the literature, we would have expected that PFF would be responsible for BrO in our data set (Kaleschke et al., 2004). We tried to use the PFF method for our data set of BrO at Barrow, and found it to not correlate for these data. Based upon the advice of Udo Friess,

we tried simple FYI contact, which succeeded. This success is a novel finding that should be published in as simple as possible concept. One could cloud the analysis by including all kinds of factors, but that masks the key importance of FYI that we have found. The analysis of Bottenheim and Chan [2006] is mentioned in the review, and we have included a major discussion of this recent publication. Lastly, it is mentioned that other data could be possibly analyzed. We do not have access to any other data that could be used for this analysis. We feel that the data mentioned (Hoenninger and Platt AE 2002) only really involves one major event and this is not appropriate to this analysis due to lack of meteorological variability. Additionally, Alert is far removed from both polynyas and first year ice (most ice in the area is multi-year), and thus will be more suspect to meteorological analysis errors. Lastly, one of the co-authors, Gerd Hoenninger, was involved with this Alert BrO data, but he is tragically deceased.

Study site: We have added text to the discussion regarding Bottenheim and Chan [2006] that describes the Barrow versus Alert (or NyAlesund) sites.

Choice of BrO versus O<sub>3</sub>: This choice is discussed in a new paragraph at the end of the introduction that motivates our work and explains the philosophy behind the air mass history analysis. This point is revisited in the new discussion of Bottenheim and Chan [2006] that appears in the “discussion” section.

Discuss future steps: We have expanded our discussion to include these concepts.

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Interactive comment on Atmos. Chem. Phys. Discuss., 6, 11051, 2006.

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