

Interactive comment on “Seasonality of halogen deposition in polar snow and ice” by A Spolaor et al.

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This is an interesting and useful contribution towards understanding the behavior of Br and I in the sea ice/ice sheet system. The study will contribute towards our understanding of the possible utility of ice sheet Br and I as paleoproxies.

Some specific comments/questions:

1. The Conclusions section should do a better job of pulling together the Arctic and Antarctic results. The striking differences in behavior of I should be noted and explained. If the authors themselves don't have a clear explanation, that makes the paper more interesting and should be highlighted both here and in the Abstract. The sentence “In Antarctica, Bromine and Iodine seasonal cycles are clearly preserved. . .”

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gives the misleading (at least for I) impression that the atmospheric seasonality is preserved. That impression is strengthened by the following sentence, stating that “These results illustrate that halogen production events observed by satellites are successfully preserved in polar snow and ice.”

2. Is it of any possible importance that the Arctic measurements were done on firn, while the Antarctic measurements were on ice? Is it possible that the apparent iodine seasonality evolves over time in the firn?

3. If the seasonal mobility of Antarctic iodine involves emission to the atmosphere, then variations in wintertime atmospheric transport could influence the amplitude of the local signal in ice year to year. Perhaps that could influence the interpretation of the signal as a paleoproxy.

4. In this study, Br_{enrichment} is used to quantify the bromine signal and iodine concentration is used to describe the iodine signal. That is like comparing apples and oranges - one is a ratio and the other is a concentration. I can see the utility of Br_{enrichment} for detecting timing of seasonality, but not quantitative comparisons. For example, interannual variations in Br_{enrichment} could easily be influenced by changes in seasalt rather than reactive Br. Br_{excess} (Br_{total} minus Br_{seasalt}) is a better quantity to compare to bromine levels between various years or to compare bromine and iodine levels.

5. If the authors feel there is a compelling reason to use Br-enrichment, they should explicitly define it is calculated, how Na was measured, and how analytical errors were propagated. Also, the Na data itself should also be presented so the reader can compute Br-excess if they wish.

6. Element names (bromine, iodine) should not be capitalized unless abbreviated.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 8185, 2014.