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The Cryosphere Discussions

Interactive comment on "Sea ice dynamics influence halogen deposition to Svalbard" *by* A. Spolaor et al.

Anonymous Referee #2

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Spolaor et al present a very interesting study of iodine and bromine contents in a glacier ice core from Spitzbergen. They find an intriguing positive correlation between bromine and seasonal sea-ice extent and a negative correlation for iodine and spring maximum sea ice extent which the authors argue is consistent with the likely sources for bromine and iodine. Overall this is a very interesting and well written paper. The main weakness is the lack of attempts to investigate the wind climatology as well as the seasonal changes in sea ice cover, extent and variability around Spitzbergen in order to substantiate a cause and effect relationship between sea ice extent and transport followed by deposition onto the glacier. I don't think it is appropriate to use total Arctic sea ice data especially given the very special location of Spitzbergen. The conclusions drawn are very plausible but there is no actual proof of the mentioned source mechanisms for bromine and iodine just using the presented data. This should be acknowledged more

explicitly throughout the text and in the abstract which sounds rather definitive (esp. l. 8-12).

Minor comments

p. 1078, l. 26: The idea of lofting aerosol from frost flowers has largely been discounted, see e.g. Roscoe et al., JGR, 2011

p. 1082, l. 18: Change unit at end of line from "mg L^1" to "mg L^{-1}"

section 3.2, 1st para: I'm not sure how useful the seawater I/Na ratio is in this regard as it has been shown since the 1960s that iodine is strongly (up to 1000x) enriched in airborne particles.

p. 1086, l. 5-7 vs. 9-12: Please explain better as currently this sounds like a contradiction. This is also linked to the main weakness that I mentioend above - I don't think this is a good justification to use Arctic basin rather than regional sea ice data.

p. 1087, l. 2-4: Please explain this correction in more detail. Don't you remove part of the signal by doing this?

p. 1087, l. 15: I don't think that based on your data you can draw any conclusions about bromine losses – simply because you can't measure it and the deposited amount of bromine might have been much higher then what is measured.

Figure 2, caption: It would be more logical to explain panel (a) before panel (b).

Interactive comment on The Cryosphere Discuss., 7, 1075, 2013.