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

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The paper entitled 'Seasonality of halogen deposition in polar snow and ice' by Spolaor et al. describes measurements of the iodine and bromine content in both Arctic and Antarctic ice cores. Such measurements are crucial for the understanding of the atmospheric bromine and iodine cycling in the polar boundary layer, as they quantify the amount of deposition of halogen compounds from the atmosphere to the snowpack. Conversely, the snowpack potentially represents a source for reactive halogens.

With respect to the seasonality of iodine in the Antarctic snowpack, I would like to draw your attention to a study that I have previously published in ACP (Frieß, U., T. Deutschmann, B. S. Gilfedder, R. Weller and U. Platt, Iodine monoxide in the Antarctic

snowpack, Atmos. Chem. Phys., 10, 2439-2456, 2010, doi: 10.5194/acp-10-2439-2010). Unfortunately, our paper did not find any attention in your manuscript although our study includes very similar findings regarding iodine chemistry and cycling, and we drew conclusions very similar to yours.

From near-surface snow samples inside a snow pit near Neumayer Station at the coast of West Antarctica, we derived a very similar seasonality with a maximum in winter and a minimum in summer, but with a much higher summer maximum (650 ng/l) than in the ice core at Law Dome (probably due to the closer distance to the shore). In addition, co-located MAX-DOAS measurements indicated that extremely high concentrations of IO are present in the interstitial air of the snowpack during summer, when iodine in the snowpack disappeared. The amount of iodine that was accumulated during winter was sufficient to explain the observed levels of reactive iodine during summer, which led us to the conclusion that iodine accumulated during winter time is photochemically released during summer. Exact details of this release mechanisms are, however, still unclear, but might represent a transportation pathway of iodine from the coast to the Antarctic inland.

A further study worth mentioning is the measurement of the iodine speciation in Greenland snow by Gilfedder et al. (Gilfedder, B. S., S. C. Lai, M. Petri, H. Biester and T. Hoffmann, Iodine speciation in rain, snow and aerosols, Atmos. Chem. Phys., 8, 6069-6084, 2008, doi: 10.5194/acp-8-6069-2008) and also the pioneering findings on deposition of iodine compounds on Antarctic meteorites and rocks (e.g., Dreibus, G. and Wänke, H.: Halogens in Antarctic Meteorites, Meteoritics, 18, 291–292, 1983; Heumann, K., Gall, M., and H., W.: Geochemical investigations to explain iodine-overabundances in Antarctic meteorites, Geochim. Cosmochim. Acta, 51, 2541–2547, doi:10.1016/0016-7037(87)90304-8, 1987; Langenauer, M. and Krähenbühl, U.: Depth-profiles and surface enrichment of the halogens in four Antarctic H5 chondrites and in two non-Antarctic chondrites, Meteoritics, 28, 98–104, 1993.).