

Interactive comment on “Longpath DOAS observations of surface BrO at Summit, Greenland” by J. Stutz et al.

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Response to Interactive comment on “Longpath DOAS observations of surface BrO at Summit, Greenland” by J. Savarino

(Response is in italics)

The authors present an interesting observation showing that significant reactive bromine species can be found on the top of the greenland ice sheet, the question that remains open is the source of this local bromide. In this context, I'm wondering if the authors have considered the potential source of halides generated by the take off of the C-130 on the site, especially when pilots use the jeto (Jet Assisted Take Off) which

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are solid propellants, some made of perchlorate which may content bromine as well.

We have, in fact, considered this as a possibility. To test the hypothesis that bromine, and in particular surface snow bromide, could originate from JATO plumes, we collected surface snow at the Summit runway in an area that was impacted by JATO exhaust. While we found elevated chloride in this snow patch, we could not find any elevated bromide in the snow. In addition, we compared snow samples collected in surface snow at various distances from the runway and the main station at Summit. This sampling strategy was chosen as the dilution of potential emissions should lead to snow bromide levels decreasing with distance from the runway and the station. The furthest sample was taken at the end of the LP-DOAS light path ~4.5 km south of the runway. No significant difference in surface snow bromide levels were found between the different samples

Both tests lead to the conclusion that that snow bromine at Summit did not originate from the JATO propellants. As the bromide levels in surface snow did not change with distance from the station, one can also conclude that bromide did not originate at Summit Station itself.

The following sentence in the manuscript now clarifies this point: “Summit station and aircraft operation at Summit have been excluded as possible sources of bromine based on a comparison of snow samples collected close to these possible sources, with samples collected at 0.5 – 4 km distance from the station.”

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