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Atmospheric Chemistry and Physics Discussions

Interactive comment on "How relevant is the deposition of mercury onto snowpacks? – Part 1: A statistical study on the impact of environmental factors" *by* D. A. Durnford et al.

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Dear Dorothy Durnford et al.

Congratulations to this very interesting manuscript. May I use the opportunity to mention results from a few recent laboratory based studies on the interaction of mercury with snow and ice?

On page 407 you mention that some Hg-halogen compounds are stable and that this reduces the re-emission of Hg from snow in presence of halogens. Our recent laboratory study on the photolytic reduction and re-emission of Hg from snow supports this role of halogens (Bartels-Rausch, T. et al., 2011. Photoinduced reduction of divalent

mercury in ice by organic matter. Chemosphere, 82(2), pp.199–203). In that work, we discussed a further possible mechanism: Cl2- which are formed during irradiation in presence of Cl- and organic chromophreres (Jammoul, A. et al., 2009. Photoinduced oxidation of sea salt halides by aromatic ketones: a source of halogenated radicals. Atmospheric Chemistry and Physics, 9(13), pp.4229–4237. Available at: http://www.atmos-chem-phys.net/9/4229/2009/.) might oxidize the intermediate Hg(I) back to Hg(II) and thus limit the production of Hg(0).

Also, the immediate re-emission of GEM from snow surfaces is also supported by our earlier work, where we characterized the adsorption of Hg(0) to snow and ice and found it to be negligible at environmental temperatures. (Bartels-Rausch, T. et al., 2008. Interaction of gaseous elemental mercury with snow surfaces: laboratory investigation. Environmental Research Letters, 3(4), p.045009.)

I hope you find this suggestions useful, kind regards, Thorsten Bartels-Rausch

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 387, 2012.