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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Iodine and Bromine speciation in snow and the effect of elevation" *by* B. S. Gilfedder et al.

Anonymous Referee #2

Received and published: 2 March 2007

Gilfedder et al present very interesting data of iodine and bromine speciation in snow samples that they had sampled in the Black Forest in Germany. The halogens as well as many metals showed a clear correlation (decrease) with altitude. To my knowledge it is the first detailed study on this topic. The data is, however, somehwat limited as data from only 2 periods are presented in addition to some more samples from the surroundings of a high altitude lake. The data itself is very exciting and I suggest publication after minor changes.

Specific comments:

Abstract: Please write out the instrumental acronyms the first time they appear.

p. 997, l. 13/14: My impression was that it's rather the other way round: the enrichment

is more likely to come from the gas phase.

Section 2

The methods section is too brief. Please add more information/references to the technique, esp. errors/detection limits for species other iodine, blank treatment etc.

p. 1000, l. 9: You refer to fig 2a, right?

p. 1002, l. 16: Maybe you want to add the bromine enrichment to that figure as well (with a different scale).

p. 1002, discussion of fig 5: simply from looking at the firgure one might get the impression that the EF peaks at 800m and then declines with altitude. Could you comment on that?

Section 4.1

The discussion in section 4.1 is a bit weak and the reader is left alone in finding out why the relationship is linear or not or should be linear or not and why there are these differences for different compounds as shown in figure 2 and 4. Please expand this discussion. Even though the data seem to indicate that all the deposited ions are originally particulate (see the very high correlations in the table in the supplement), temperature dependent gas-particultae/snow partitioning might play a role. If this is sufficient to explain the different dependencies with altitude (fig. 4) is unclear, though, but it might be worth exploring this. Also, figure 4 in Borys et al might help.

p. 1004, l. 24: Pechtl et al., 2006 discuss mechanisms to change the IO_3^-:I^- ratio but not organic-I.

p. 1005, l. 20: "These same species.." - can you be certain that these are the same species or only the same peaks?

p. 1006, l. 9-17: Note, that many or even most fine particles in the marine boundary layer are not of marine origin, so that the mechanism should not rely on some sea-salt

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specific processes. Also note, that large sea spray droplets also carry a substantial amount of organic material as rising bubbles scavenge material from below the surface micro layer which then gets incorporated alos in large sea spray droplets (see, e.g., Turekian et al, 2003, JGR, 108, 4157, doi:10.1029/2002JD002053).

p. 1007, l. 27: Again: note that Pechtl et al do suggest a mechanism to reconcile models with measurements.

References

Please add DOI to Baker, 2004

Figures

Please add error bars to the Figs 2-5 and the figure in the supplement.

Supplemental material

Consider moving the figure into the main text. Why is the exact altitude only given for one sample?

Supplement Table 1: How strongly - if at all - diluted are the melted samples before analysis?

Supp. Table 1: typo: orano-I $\longrightarrow$ organo-I

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 995, 2007.