**Atmospheric
Chemistry
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Discussions**

Interactive
Comment

Interactive comment on "Atmospheric bromoform at Mace Head, Ireland: Evidence for a peatland source" *by* L. J. Carpenter et al.

Anonymous Referee #1

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Carpenter et al. present a 2.5 year data set of bromoform measurements at Mace Head, Ireland including an intensive field campaign where they could compare two different instruments. Based on the seasonal cycle and day-night variations that are correlated with wind mass changes they conclude that an additional, probably peatland source has to be assumed to explain the data. The existence of such a source could change our understanding of the tropospheric organic bromine budget, as the global source strength - as extrapolated by Carpenter et al - implies a 10% contribution to the known sources of $CHBr_3$.

The uncertainties in the approach used especially for the global upscaling, however, seem to be not very well constrained and are probably large. This section should be

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discussed more in depth, as also detailed below.

The topic is relevant for publication in ACP, the title and abstract are appropriate. I suggest to publish the paper after minor revisions.

Specific comments:

p. 5937, l. 16: Is there a reference for the global percentage of peat bog cover?

p. 5939: I found the explanation of the data sets somewhat confusing. Maybe you should state somewhere (if correct) that you mainly used the York data to calibrate the AGAGE $CHBr_3$.

p. 5940, l. 9: Is there a reason why you use the term "organic" correlation? If so please explain, it may make it easier to understand the procedure.

p. 5940, l. 22: "we attribute the increased scatter of the correlation compared to Fig. 1a to the shorter lifetime and hence greater natural variability of atmospheric $CHBr_3$." The measurements are taken every 40 mins, but the lifetime of $CHBr_3$ is about 3 weeks - how can this explain the scatter between the Bristol and York data?

p. 5941, l. 10: Maybe add that typical nocturnal continental boundary layers are more stable and shallow than BLs during the day, enhancing the loss of O_3 as only a shallow layer has to be depleted.

p. 5941, l. 12.: Replace "$<$" with "greater".

p. 5941, l. 21: "visual inspection.." is it possible to list the numbers of the correlation coefficients here?

p. 5942, eq. 1: This is the key assumption of the whole paper and I think it should be discussed a bit more thoroughly. How do you define an "event" - does it possibly include several maxima and minima which might indicate a change of airmass?

p. 5942, l. 12: Maybe add that the annual cycle is based on 2.5 years of data, meaning

that each data point represents the average of 2-3 numbers only.

p. 5943, l. 21-24: Is there a reference for these incubation experiments?

p. 5944, l. 21: How is "relative standard deviation" defined?

p. 5945, l. 12: Should the extrapolation from $CHCl_3$ to $CHBr_3$ not involve use of the ratio $\Delta CHCl_3$ to $\Delta CHBr_3$?

p. 5945, l. 12-14: This is the first time that the numbers of these ratios are mentioned, it would be more helpful to mention them earlier in the discussion of the data already. Also, you apparently used a factor of 1.1 to scale the $CHBr_3$ to the $CHCl_3$ emissions but mention 1.9 in the text, please clarify.

p. 5945, l. 13-14: You use the same ratios to upscale peatland and wetland sources - is there any reason to do this?

Figures:

Fig. 3.: The solid line is very hard to tell, please improve.

Fig. 4: Why do the error bars vary so strongly?

Fig. 6b: How can R^2 be negative?

References:

Mtolera et al: Correct spelling of pH.

In the following papers "et al." is used but in all other papers all authors are listed, please make consistent - preferably by always citing all authors:

Mtolera et al. (1996), O'Doherty et al. (2001, 2004), Prinn et al. (2000)

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 5935, 2005.