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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Contribution of very short-lived substances to stratospheric bromine loading: uncertainties and constraints" *by* J. Aschmann and B.-M. Sinnhuber

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We thank the referee for her/his careful reading and the thoughtful comments to improve the manuscript. In the following, the original remarks of the referee are in *italics*.

17. Page 30306, lines 23–25 & Page 30285 line 10. I have to say the tone of this conclusion is a bit on the strong side. It is important to point out that the upper range of 6 ppt contribution is pre–set by the B3DCTM structural design, which assumes a uniform 5 ppt for CHBr3 and CH2Br2 in the upper troposphere. This assumption

sets the upper limit of how much CHBr3 and CH2Br2 are available to start with. In reality, high VSLS emission regions tend to collocate with deep convection, therefore potentially delivering higher levels of CHBr3 and CH2Br2 into the upper troposphere, and subsequently to the lower stratosphere. The TC4 measurement from Figure 6 is a clear example of such situations. The western Pacific is a more typical region when high oceanic emissions of VSLS collocate with active troposphere–to–stratosphere transport region. I understand it is not easy to address this with B3DCTM, but it is noteworthy to add a short discussion explaining the caveats of the pre–set uniform boundary condition.

We absolutely concur that our range of VSLS contribution (4.5–6 pptv) is directly dependent on the assumed detrainment mixing ratio. Therefore, in this study we focus primarily on the relative importance of the associated processes which is largely independent from the assumed sources. However, the generally good agreement between our model and observations (Figure 6) indicates that our simplistic assumptions regarding the detrainment mixing ratios probably represents the best choice within our modeling framework, given our current knowledge of VSLS source strengths. Nevertheless we will try to point out in the revised manuscript the limitations of our range of VSLS contribution more carefully as suggested.

1. The chemical formula for Halon–1211. Sometimes CClBrF2 is used and sometimes CBrClF2 is used, please choose one and stick with it.
2. The word "gasphase" is used in at least three places, replace with "gas phase" or "gas–phase".
3. The word "unpertubated" is used in at least three places, replace with "unperturbed".
4. Page 30289, line 2: Change to "JPL recommendations 2010".
5. Page 30289, line 24: change to "started in 2004".
6. Page 30289, line 25: change to "until the end of ...".
7. Page 30291, line 22: change to "more than half of ...".

8. Page 30292, line 26: change to "with an opposite change ...".
9. Page 30292, line 27–28: "as one ... modifications." Awkward. Please rephrase.
10. Page 30295, line 9: delete "as well".
11. Page 30296, line 10: change to "the reactions of Br with HCHO ...".
12. Page 30299, line 20: change to "which correspondes to an average effective particle radius of 10 um according to the utilized parameterization by Bohm (1989)."
13. Page 30300, line 9: change "is" to "are".
14. Page 30300, line 11: change "conditions" to "condition".
15. Page 30302, line 16: change to "high biased".
16. Page 30302, line 28: change to "longer–lived".

We have fixed all of the editorial comments above and thank again the referee for the careful reading.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 30283, 2012.