

Interactive comment on “Sensitivity of stratospheric Br_y to uncertainties in very short lived substance emissions and atmospheric transport” by R. Schofield et al.

Anonymous Referee #3

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This paper evaluates the sensitivity of Br_y entering the stratosphere from short lived source gases emitted in the boundary layer with a simplified conceptual model based on backward trajectory calculations. The model includes parameters that allow to study the sensitivity of bromine delivery to convection and washout as well as source strength and transport characteristic time scales. The approach is sound and interesting and the paper is clear and overall well written, although a style correction can make reading easier. I do not have any major criticism, hence I recommend its publication in ACP after some mainly minor corrections listed below.

Specific comments and technical corrections:

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Abstract: about the interpretation of the results, is it the case that 2 ppt is a slight change but 2.9 is significant?

The introduction is rather succinct, and it could be helpful to include some more of the motivation/rationale of the study, the importance of bromine in stratospheric chemistry, etc.

P24174 I22: The definition of χ^{SG} could be made more explicit.

P24175 I19: Doesn't read well: 'how many' > 'the number of'?

P24176 I24: "is replaced by air with characteristics of the convective detrainment" doesn't read well: maybe replace with "is replaced with air from the convective detrainment".

P24177 I3: Include a more explicit definition of d_c

I18: borne > kept?

P24179 I17: Include a space after :

I20: i.e. > e.g.

P24180 Eq (4): Define more clearly α_i .

P24183: The year 2000 is mentioned in line 19, it may be better to mention it before, in line 11 by example.

I19: "cluster" may be confusing, maybe use "sit" or "aggregate"?

I23: Include a parenthesis after "(Fig.6".

P 24184 I7: "CPTs are limited between 20N and 20S irrespective of season": do you mean that CPT crossings are only found between 20N and 20S?

I23: Does FT stand for free troposphere?

P 24185 I9: Explicit where CH₃Br is more abundant and respect to what.

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I23: complexer?

P 24186 I11: most short-lived > shortest lived?

I12: What is the main verb of this phrase?

P 24187 I13: Do you mean that a larger chemical lifetime implies less concentration at the top of the TTL?

P 24187 I7: It may be worth to underline the dependence on the description of the convection in the analysed meteorological fields.

Fig 1, caption: subjected to convective injection?

Fig 6: You could add a circle or some kind of mark to point more clearly to the interesting feature of the graph.

Fig 8 caption: megneta > magenta.

"The dashed line provides the Halons+CH₃Br contribution": where is this information coming from?

Fig 9 caption: Make explicit if the average include all years and the source for Halons + CH₃Br contribution in the last phrase.

Include a more precise definition of the convective efficiency to make the figure self explanatory.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24171, 2010.