

Interactive comment on “A global stratospheric bromine monoxide climatology based on the BASCOE chemical transport model” by N. Theys et al.

Anonymous Referee #1

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Theys and coworkers present a stratospheric BrO climatology, derived from stratospheric chemical transport model (CTM) calculations, that is specifically designed to be used in the retrieval of tropospheric BrO from satellite observations. The underlying CTM is extensively validated against available observations of ozone, NO₂, and BrO and found to be in good agreement with available observations. A novel feature of the constructed BrO climatology is use of ozone and NO₂ columns as a classification of the BrO climatology. I expect that such a climatology will be of great benefit for the retrieval of tropospheric BrO columns. It would have been nice, if an application of this newly constructed BrO climatology could have been presented here as well. However, this will probably be done in more detail in a future paper.

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The manuscript is generally well written and I recommend publication in ACP after taking into account a few (mostly minor) comments.

Specific comments:

page 17586: Why are reaction rate data from JPL eval 15 are taken only for bromine chemistry into account, and using eval 14 for all other reactions? (Actually, the reaction $\text{BrONO}_2 + \text{O}(3\text{P})$ is now part of JPL eval 15.)

page 17595: Comment: The BASCOE model apparently underestimates BrO in the lowermost stratosphere, when compared to SCIAMACHY (Fig. 7). Could this be partly due to the fact that the model considers all bromine from short-lived compounds to be present in the form of CH_2Br_2 , which has the longest lifetime of all the short-lived compounds listed?

page 17603: I don't really understand the meaning of section 4.4. Are trends in bromine implemented in the current climatology or not? If not, a few general sentences should be sufficient, without the need to include an extra section.

Technical corrections:

p. 17584, l. 28: "Frieß et al." -> "Frieß et al."

p.17586, l. 8: Notation Ha-1211 is not standard. Better use Halon-1211 instead

p.17586, l. 21: "Sinnhuber et al." -> "Sinnhuber and Folkins"

p. 17588, l. 24: insert "+M" on the RHS of the reaction

p. 17589, l. 23: "few measurements": I don't see that there are only few measurements available. Suggestion: simply remove this phrase.

p. 17591, l.13: "reproduced" -> "shown"

p. 17592, l. 8: "lower" -> "better"

p. 17593, l. 21: ECMWF is already defined

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p. 17593, l. 23: as the paper by Hendrick et al. is apparently not available yet, a reference to it is not helpful

p. 17597, l. 8: Bry is already defined

p. 17599, l. 16: is this mass or area weighting?

p. 17603, l. 13: remove "and the impact of the Montreal protocol"

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17581, 2008.

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