Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2022-472

Anonymous Referee #1

Referee comment on "Global seasonal distribution of CH_2Br_2 and $CHBr_3$ in the upper troposphere and lower stratosphere" by Markus Jesswein et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-472-RC1, 2022

This paper discusses the global and seasonal distribution of two short lived brominated compounds based on multiple aircraft measurement campaigns as well as two global models. The data compilation and discussion of the main features are well done and the comparison with the model output reveals some shortcomings in our ability to accurately model these compounds in certain seasons and hemispheres. The data discrepancy between instrument data sets in the fall SH lowermost stratosphere is significant and hampers the ability to make conclusions about transport differences between the SH and NH LMS. But this is important to point out as clearly as is done here since it shows the data are also not perfect and that we need more measurements in data poor regions to help us understand how models perform throughout the atmosphere.

Overall, I find this paper is acceptable for publication in ACP with consideration of the few minor comments listed below. In particular, Section 4.3 is far too heavy on the specific listing of mixing ratio values at various parts of the profiles to the detriment of reader comprehension of the main points of the section.

Specific comments:

Line 31: There's an extra 'to' here, maybe remove the first one.

Lines 49-50: Add 'tropospheric' after 'extratropical' here.

Figure 4: This is important to show the uncertainty that can exist between data from different instruments and how it can defy easy explanation. It's unfortunate that the discrepancy is so large in the region and time of interest but this makes it even more important to point out as you have done.

Line 261: ‘as’ should be ‘has’

Line 276: ‘tropospheric’ misspelled

Line 380: ‘close’ misspelled

Section 4.3: Starting at about line 370 I really had trouble staying focused while reading this section because there are far too many listing of exact ppt values for each species at various levels and seasons. This is in contrast to Sections 4.1 and 4.2 that were easy to follow and had many interesting features. I would suggest removing nearly all mention of exact mixing ratios in the text, the numbers are in the figures if anybody wants to see them, and stick with describing the main points you want to discuss.