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# ***Interactive comment on “The very short-lived ozone depleting substance $\text{CHBr}_3$ (bromoform): revised UV absorption spectrum, atmospheric lifetime and ozone depletion potential” by D. K. Papanastasiou et al.***

## **Anonymous Referee #2**

Received and published: 4 February 2014

This is a well written paper describing careful work related to measuring the UV absorption spectrum of  $\text{CHBr}_3$ . The paper describes experimental improvements that suggest this study provides substantially improved estimates of the  $\text{CHBr}_3$  UV cross-section compared to past measurements. Experimental details are well described, results are presented, and a good discussion regarding the potential atmospheric impacts of the new results are included. As a result I find it appropriate for publication in ACP.

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I only have minor comments:

Indicate in figures (at least one) the regions where results are extrapolated and therefore less reliable (lower temperature regions). It would be useful for these regions be readily identifiable in at least some of the figures even if those regions aren't precisely definable. I'd like to be able to easily understand the altitude in the different panels of Figure 3 above which the mean temperature <260K, and whether or not the uncertainties shown in this figure include any additional magnitude associated with extrapolation.

Make the Abstract more informative. Other than the ODP estimates, the abstract provides little concrete information regarding the new results. I'd suggest you mention how the new results differ from earlier ones (even in general terms), and highlight one or more of the four points discussed in the figures with respect to changes in our understanding of atmospheric loss of CHBr<sub>3</sub> (e.g., lines 20-22 on p. 32976, or lines 3-5 on p. 32977, or lines 3-5 on p. 32978).

Be clearer about conclusions related to quantum yields of CHBr<sub>3</sub> (p. 32974, lines 3-8). Is there a possibility that the dissociative quantum yield of CHBr<sub>3</sub> is much less than 1.0 from 324 to 436 nm, making discussions of lifetime related to photolysis in this region inappropriate? Quantum yield of Br at 300-324 is indicated as being "less than unity" but with the large error bars can one say if it is likely to be different from unity? Line 21, p. 32966, don't you mean: at wavelengths between 300 and 436 nm?

Improve wording. p. 32965, the WMO Assessment did not list a "global lifetime" for CHBr<sub>3</sub> from all loss processes or from OH. It provided a local lifetime estimated for specific conditions. Different wording is required here. Also, 22 ppt total Br discussed in WMO(2011) was for 2008, not present-day, is it the same number now?

p. 32977, line 4, do you mean a shift in the spatial "distribution" or "relative contribution" of the different loss processes? p. 32977, line 21, perhaps "most efficient transport" rather than "greatest transport". Those authors didn't argue that Asia is a large source. p. 32978, line 20, why "potent"? What defines potent from not? You've chosen to give

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OPDs for emissions from the region with the largest ODPs. Are emissions from other regions also potent? More precise wording seems warranted here.

Supplement Figures S1-S11, describe what is different about the isothermal results indicated with different symbols.

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 32963, 2013.

**ACPD**

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