

Interactive comment on “The very short-lived ozone depleting substance CHBr₃ (bromoform): revised UV absorption spectrum, atmospheric lifetime and ozone depletion potential” by D. K. Papanastasiou et al.

Anonymous Referee #1

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This paper deals with a new determination of the near-UV absorption cross sections of CHBr₃ (bromoform) in the actinic wavelength range 300–345 nm. The authors used the sensitive cavity ring-down spectroscopy technique for the measurements of the absorption spectra at seven temperatures in the atmospheric relevant temperature range 260 to 330 K. This paper reports new results of a carefully executed study in which weak absorptions were measured while accurately taking into account for the contribution from Rayleigh scattering. This new study in this critical wavelength region improves the current JPL 10-6 recommended absorption cross sections, which were measured

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with a lower spectrometer resolution and possible contributions of sample impurities and/or adsorption of CHBr₃ on the cell windows. Spectral parameterization of the data is presented for use in atmospheric models and applied for photolysis rate calculations to compare the impact of the new revised cross sections with the current recommended values. Seasonal local and global atmospheric photolysis lifetimes of CHBr₃ were calculated for the troposphere and compared to loss by reaction by OH radicals (using new OH kinetic data). In addition seasonal ozone depletion potentials (ODP's) were evaluated for CHBr₃ for the Indian sub-continent. The data photochemical derived from this study are important for understanding of the photolysis process of bromoform in the atmosphere. The work seems to have been performed with extreme care. This paper is well organized and the results of this study are well presented and convincingly supported (as supplementary material) by experimental plots of absorption coefficient data at 10 different wavelengths between 300 and 350 nm and appropriate temperatures in the range 260–330 K. Experimental evidence was provided for the contribution of Rayleigh scattering.

This article should be published taking into account only the small comments given below before acceptance for publication.

Page 32964, line 18. Is it possible to specify sources of bromoform into the atmosphere? Page 32969, line 14. What is meant by “had pathlengths”? Page 32972, line 16. Correct: the 532 nm measurements (not: the 532 measurements) Page 32972, line 26. Equation 3: It would be useful to give the wavelength and temperature range for the use of Eq. 3 for the calculation of absorption cross sections. Page 32974, line 14. In equation 4, the altitude symbol should be capital Z.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/13/C11306/2014/acpd-13-C11306-2014-supplement.zip>

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