

Interactive comment on “Halogenated organic species over the tropical rainforest” by S. Gebhardt et al.

S. Gebhardt et al.

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General remark from the authors:

Subsequent to the submission of this paper we have developed a new method to determine the total uncertainty of the measurements, which takes into account the sensitivity loss of the MS detector. The overall uncertainty was calculated by quadratic addition of the calibration gas uncertainty and the measurement uncertainty. The latter one is derived from a fit, which calculates the deviation of the calibration gas measurements from a regression curve taking into account the loss of detector sensitivity with time. Before we just applied the standard deviation of the calibration gas measurements. Using this method all possible errors, which occur during the sampling, preconcentration, measuring and data analysis (e.g. statistical noise of the detector, errors done by manual integration, pressure/sample volume uncertainty etc.) are included, because

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they affect the calibration gas measurements and cause their deviation. Therefore the standard deviation of the calibration gas measurements or in case of a drifting detector like an MS the deviation from a sensitivity loss corrected regression line is a good and easily accessible parameter to describe the measurements uncertainty. As calibration gas measurements are used to determine this parameter, it accounts for the errors corresponding to the peak area of the calibration gas and therefore it is strictly speaking only valid for measurements within the same mixing ratio range. Since our working standard was ambient air bottled in a remote site on the coast of northern Germany this should be valid for most of the investigated compounds. Needless to say that very small mixing ratios close to the detection limit will have higher uncertainties. However, with this new method the uncertainty of the mixing ratios is more accurately determined. The updated numbers for the overall uncertainty are based on the accuracy of the calibration standard (5%) and its precision (CH₃Cl 3.2%, CHCl₃ 6.3%, CH₃Br 6.0%). This resulted in an overall uncertainty of 5.9% for CH₃Cl, 8% for CHCl₃ and 7.8% for CH₃Br.

The method to calculate the τ_{TOL} was also improved. It is now no longer restricted to 30 min time steps, but uses 1 min time steps. We are aware that it makes no sense at all to determine the TOL to the minute. In order to take into account uncertainty of the trajectories uncertainty we applied an estimated error of ± 2 h. Following reviewer 1's advice we used the updated mixing ratio uncertainty and the estimated TOL uncertainty to perform an orthogonal distance regression analysis. The slope of the fit and therefore the calculated fluxes do not change significantly from those presented in the ACPD version of this paper, but are implemented nonetheless in the revised version. The error bars, fit line and formula are shown in the updated Figure 5.

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