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Atmospheric Chemistry and Physics Discussions

Interactive comment on "First atmospheric observations of three chlorofluorocarbons" *by* J. C. Laube and A. Engel

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Synthetic samples of C2F3Cl were prepared as the pure compound could be obtained in this case. The measurements of these samples confirmed the correct identification. Furthermore the background subtraction of the averaged MS scan spectrum of C2F3Cl in the plume sample (Figure 2) was found to be an overcorrection as the nearby eluting CFC-12 signals were partially subtracted by accident. This affected mainly the ions with a mass/charge ratio of 50, 66, 85 and 87. A revised scan spectrum of the plume sample is now displayed in Figure 2 giving a better agreement with the NIST spectrum of C2F3Cl. The other two newly observed CFCs could not be obtained as pure compounds by now. To provide more evidence for the correct identification of these substances two Figures were added to the manuscript showing a comparison of the observed spectra from the plume sample and the corresponding NIST spectra.

Specific comments

Referee comment(s):

It is a fine and useful conclusion to draw from an initial study that the ozonedepleting halogen contribution of these new gases is likely to be small; there is no need to overestimate their importance (as is done now, in my mind). Arent mixing ratios in most samples quite small, and wouldnt you expect them to be even smaller in the tropics? And therefore isnt it likely that any contribution of these gases to Cl in the stratosphere should be small?

Author response: We agree with this critique. The corresponding conclusion was replaced. Nevertheless the authors recommend investigations to verify the assumption that the amounts of these substances that reach the stratosphere are really negligible ("But although their contribution to ozone depletion can be expected to be rather small it is important to find out more about their sinks and sources and their ability to reach the stratosphere.").

Referee comment(s): Finally, some of the manuscript is overly brief, imprecise, or unclear. Were detectors placed in parallel?

Author response: They were. The analytical procedure section was revised and expanded in order to provide a more detailed insight for the readers.

Referee comment(s): Would one expect COF2 and these other products to be analyzable in the instrument used?

Author response: We would expect the products to be analysable as their boiling points are within the boiling point range we cover with our chromatographic system. This information was added to the manuscript. However, the detection limits of the MS in scan mode are in the range of several hundred ppt, but this should be sufficient to detect the products in the plume sample.

Referee comment(s): Dont potential co-elution influences suggested for CFC-12 hinge

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critically on the ion used?

Author response: They do, but six main fragments of CFC-12 (m/z 31, 35, 50, 66, 85 and 87) are also main fragments of C2F3Cl. The affected ions were added to the manuscript.

Referee comment(s): Surely other compounds that are good indicators of anthropogenic input were measured from these samples, what do they say about the processes influencing these air samples? Are the smallest responses observed in the cleanest air?

Author response: The plume sample showed elevated mixing ratios for many trace gases such as CHF2Cl (HCFC-22, 287 ppt), CH3Cl (1500 ppt) or OCS (752 ppt). In the other air samples which contained only traces of the newly observed CFCs no unusually elevated concentrations in any of the quantified trace gases (i.e. CF2Cl2, CFCl3, CF2ClCFCl2, CF2ClCF2Cl, C2F5Cl, CF3CFCl2, CHF2Cl, CH3CFCl2, CH3CF2Cl, CHFClCF3, CH3Cl, CCl4, CH3CCl3, CH3Br, CF2ClBr, CF3Br, CF2BrCF2Br, CH2Cl2, CHCl3, CH2ClCH2Cl, C2HCl3, C2Cl4, CH2Br2 and OCS) were found.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 6683, 2008.