**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Atmospheric histories and growth trends of C_4F_{10}, C_5F_{12}, C_6F_{14}, C_7F_{16} and C_8F_{18}" *by* D. J. Ivy et al.

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We would like to thank the Dr. Laube for his helpful review. We have listed Dr. Laube's comments in italics and then written a response below each comment. We've additionally included text from the paper when it has been changed based on a comment.

Laube: "page 4169, line 5pp: How small is the blank exactly? And was its variability checked and added to the uncertainties?"
Author Response: The blanks were checked almost daily and did not vary significantly over the measurement time period.

"A small blank was detected for C_6F_{14}, C_7F_{16} and C_8F_{18} (0.008 and 0.005 ppt for C_6F_{14}, 0.012 and 0.013 ppt for C_7F_{16}, 0.017 and 0.016 ppt for C_8F_{18} on the CSIRO and SIO instruments, respectively), most likely due to the Nafion dryers used in the Medusa, and the observations were corrected accordingly."

Laube: "page 4170, line 13pp: How nonlinear were the instruments i.e. what were the actual values of the nonlinearity values? If there was a significant non-linearity the respective uncertainties might well impact on the error bars."
Author Response: After blank correction, the nonlinearities were relatively small. We have included their range of values.
"These nonlinearity parameters were relatively small and ranged from 0 to 0.047, with the largest nonlinearity correction for C_8F_{18}."

Laube: "Section 2.2.: C6F14, C7F16 and C8F18 are liquid at room temperature with the latter two having considerably high boiling points of arnound 81 and 100 degrees Celsius. CFC-12 as a low-boiling compound would not experience such loss. What measures where taken to avoid loss from condensation of these compounds during the preparation of the dilutions? Also, when spiking always with the same amount of PFC reproducable results might well be achieved even when a loss occurs."
Author Response: The standards were prepared with N_2O used as the balance gas with a maximum molar ratio of PFC to N_2O of 6.8e-6. Therefore, the final maximum partial pressure of PFC in each PFC/CFC-12/N_2O mixture was 0.00273 psia, which is well below the vapor pressure of C_8F_{18}, which is 0.413 psia at 20 C. Therefore, we can assume that none of the PFCs were lost to condensation. Furthermore, a 10 ppt spike of each PFC was prepared and agrees with the calibration scale presented here.

Laube: "Page 4173, line 2: 0.0088 ppt is about three times the standard precision for C8F18 as stated in Table 2, and this at the comparably mixing ratios in the standard.

How can that be "good agreement"?"

<u>Author Response</u>: Thank you for noticing this. Indeed, this was the worst of all of the observations. The PFCs (not including C_8F_{18} subsamples agreed within their measurement uncertainty. We have updated the text and hopefully clarified this.

"Generally, the measurements on the two systems agreed well within the measurement uncertainty. The most notable difference between the two instruments was for C_8F_{18}, with a maximum difference of 0.009 ppt, which was 12% of the concentration of that sample."

<u>*Laube:*</u> *"page 4183 and 4184: It would be good to increase the readability of both figures. Also, if a data point is below detection limit, how can its precision be much smaller than the detection limit?"*

<u>Author Response</u>: We have removed Figures 1 and 2 and replaced them with Figures 1-5 to improve readability. We've also updated the figure to represent observations under the detection limit as having an uncertainty equal to that of the detection limit and have edited the text.

"The measurement errors on the samples are estimated as the 1-σ standard deviations of the repeat measurements, and samples below the detection limit of the Medusa were assigned a measurement error equal to that of the detection limit for the data fits. "

<u>*Laube:*</u> *"In general I would like to encourage the authors to publish their results in numerical form as this will aid in a) future studies on these compounds, b) later comparisons with other studies, and to c) simplifying access to the data for authors of international assessments such as the upcoming IPCC report."*

<u>Author Response</u>: We have included our numerical fits to the data in Tables 3-7 and our archived measurements in the supplementary material.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 4165, 2012.