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Atmospheric Measurement Techniques Discussions

Interactive comment on "Results from the International Halocarbons in Air Comparison Experiment (IHALACE)" *by* B. D. Hall et al.

Anonymous Referee #1

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This paper discusses and results from the International Halocarbons in Air Comparison Experiment.

This will be a good contribution to the literature and should be published with modifications suggested below. The authors did a careful job in putting this paper together and a huge amount of work was put into it. Comparisons between research groups and harmonization of measurements between research groups are VERY important activities that are often overlooked. The suggested modifications follow:

General perceptions of the paper:

Papers such as these are difficult to write because presenting the data to an audience wider than those directly involved in a clear and succinct way is challenging. As a

reviewer, even reading the paper carefully, it was difficult to follow and catch the important points. The paper seems to have been written to the circle of participants rather than to a wider, slightly more general, audience. The authors know the jargon but the wider audience likely will not. For instance there is a lot of discussion on scales/scale differences/scale propagation/scale transfer etc. with little explanation. For example, the term scale transfer appears for the first time on page 8031 with no explanation as to what this really means. It might be more useful to the reader to change the terminology from "scales" to "reference calibration A" or something like that. If the scale term is still desired then define it better.

Seems as though completely stable gas phase standards are needed to establish a scale at each respective laboratory that prepares such standards. Then these standards, from the various laboratories, would have to be compared by an independent reference laboratory that has very good instrumentation that measures with high precision – high enough to determine small differences that are statistically meaningful to then establish the scales. The question is how does one know if the mixtures are completely stable? How often are they checked? Does the reference laboratory have standards that are completely stable? Are the standards/calibration scales actually different when all the uncertainties in preparation of the mixtures and analysis and comparison with other mixes are considered? How independent are the scales? I am sure the authors have thought about all of these things and it is discussed in the paper with respect to individual chemical species but I think a more general discussion of the issues are in order at the beginning of the paper. Perhaps there is a paper to reference that discusses these issues. In summary, the reader can get lost in the confusing discussion of scales, scale transfer etc.

I would suggest that the authors rewrite portions of the paper so it can be easily followed by a more general audience and concisely address what is important, i.e., how comparable are the measurements from the various groups that participated in the comparison? are things good enough? and if not, what can we do to improve the

comparability and accuracy of the measurements? Should one calibration standard be used? Etc.

Specifics

p.8026 line 19: “Dry synthetic zero-grade air was added to two cylinders to create sub-ambient air samples”. Suggest changing to “Dry synthetic zero-grade air was added to two cylinders to create mixtures having mixing ratios that are lower than the ambient air samples”

p 8026 line 23: “At Niwot Ridge, air was pumped through a 6-m stainless steel inlet line (2.54 cm O. D.).” this sentence just sort of hangs there – maybe combine it with the following sentence and give context to it.

p 8027 line 4-6: “Three stainless steel cylinders (one diluted, two undiluted) were filled sequentially on 17 March 2004 during strong westerly synoptic flow. A second set of three cylinders 5 was filled on 8 July 2004.” – first sentence states the conditions of the fill the second does not.

p 8027 line 11-: “Most participants employ gas chromatography with electron capture-, mass selective-, or flame ionization detection. While laser-based systems have been developed for some species (e.g., N2O and CH4),they were not widely used at the time of this experiment." Were laser-based systems used at all in this experiment?

(p. 8030) Is it justified to speak of factors such as 1.0108 to this number of significant figures?

P 8031 line 10 (Rhoderick misspelled)

P 8034 line 10 “These results imply that one needs to be careful when accessing data collected by different instruments.” Perhaps the authors mean using the data rather than accessing it.

P8035 line 7: suggest: Thus, one might expect that the development of measurement

scales for HCFCs is less advanced.

Tables and Figs:

Table 1 lists laboratory 19 as UCI-2 but in the figures laboratory 19 is sometimes UCI-2 and sometimes/mostly NCAR/UM. Table 1 lists laboratory 15 as UM-2 but in the figures it is NCAR or NCAR-P or NCAR/UM. Often the figures show NCAR/UM for both laboratory 15 and 19. Very confusing.

Figures – general – fonts are too small

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