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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Stratospheric lifetime ratio of CFC-11 and CFC-12 from satellite and model climatologies" *by* L. Hoffmann et al.

Anonymous Referee #1

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This is a timely revisit and application of the formalism from Volk et al. I have one technical question and several suggestions for presentation.

Technical question: I would like the authors to say a few more words to justify the assumption that C is linear in time (Figure 2). The values for 2003 and 2006 are used in the calculation. I feel comfortable with the 2006 values since it corresponds to the value calculated by Brown et al. The 1994 value is from Volk et al and the effective linear growth rates for CFC-11 and CFC-12 are both positive. (This is a little surprising in that Figure 1 shows that the tropospheric burden was just about to turn over in 1994.) Between 1994 and 2006, the linear growth rates change sign, but not at the same time. Is it OK to assume that C is linear? I would prefer you just extrapolate the Brown et al results to 2003.

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Suggestions

p. 16868, line 3: The use of the term “stratospheric lifetimes”, even in quotation marks, should be avoided. The use of the term should be restricted to refer to the proper definition (partial lifetime due to stratospheric loss) as was used at the bottom of the page.

p. 16870, line 8 “The slope of the correlation curve equals the ratio of the net global fluxes of the two species through the corresponding surface of constant volume mixing ratio, if that surface lies below all sinks.” The sentence should be fixed. The first part is always true. The qualifier applies when you try to related flux to partial lifetime.

p. 16882 I would like to suggest adding a table or use a table to replace the text. The rows of the table will be: data range, reference year, alpha factor for burden, sigma ratio, gradient, C, lifetime ratio; the columns will be the different data set.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 16865, 2014.