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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hemispheric average Cl atom concentration from $^{13}C/^{12}C$ ratios in atmospheric methane" *by* U. Platt et al.

Anonymous Referee #1

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General Comments: This is a good paper that builds on previous work by Allan et al. showing the potential influence of Cl atoms on measurements of C-13 in CH4, and it proposes a reasonable mechanism for significant Cl production. It is unclear if the purpose of the m/s is the Cl atom production mechanism or the portential impact on the methane budget. The impact of the proposed Cl production on the CH4 sink is small (3-4%), but its impact on the CH4 stable carbon isotope budget is large and warrants attention.

Specific Comments: 1. p 2284, l 12: It would be more useful to express the potential magnitude of the CH4 sink by reaction with Cl as a most likely value with reasonable uncertainty, rather than a maximum value. 2. p 2285, l 11: Do seasonal changes in temperature (and relative humidity) affect the phase of the seasonal cycle of OH in addition to solar zenith angle? 3. p 2286, l 25: Although the "source effects" on the plot

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of C-13 vs CH4 are described in Allan et al., a small summary of those results would be useful here. 4. p 2287, l 3-7: It would be interesting to look at a year after 1998 from to see if it changes the conclusions of this paper and to look at other data sets of C-13 at high southern latitudes to see if they are consistent with these results. 5. p 2290, l 6: What are the relative amounts of Cl production from RS8 and 9 vs recycling of Cl through R10 and photolysis of ClO? 6. Discussion: Is the amount of Cl necessary to explain C-13/CH4 elipse consistent with previously published estimates of tropospheric [Cl] based on observations of NMHC?

Editorial Suggestions: 1. p 2284, l 19: remove comma after both. 2. p 2285, l 6-7: ...from the atmosphere is hydrogen abstraction from methane by OH radical to form... 3. p 2285, l 25: ...in "delta" notation... 4. p 2287, l 3: ...from OH oxidation alone. For example, the... 5. p 2290, l 25 to p 2291, l 1: ...non-uniform seasonal cycles north of...

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 2283, 2004.