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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric lifetimes and ozone depletion potentials of trans-1-chloro-3,3,3-trifluoropropylene and trans-1,2-dichloroethylene in a three-dimensional model" *by* K. O. Patten and D. J. Wuebbles

Anonymous Referee #2

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The authors present a determination of the atmospheric lifetime and ODP of two halogenated alkenes, both proposed and/or used as replacements for longer-lived halogenated species. The study seems solid and straightforward, with procedures and assumptions clearly presented. I have only a couple of questions that the authors might wish to address:

1) The lifetimes of the two species are about three times different, yet their OH rate coefficients differ by about a factor of 5 or more. Can the authors provide a reason for this non-linearity?

2) The authors assume that the intermediate product, HC(O)Cl, is rapidly destroyed, leading to immediate Cl release. I agree that some of the HC(O)Cl might be lost via heterogeneous processes, thus limiting the amount of overall Cl-release from the parent alkenes. However, I think HC(O)Cl is fairly resistant to gas-phase destruction in the troposphere. Could it thus act as an additional agent for the transport of Cl to the stratosphere, and could this process have any impact on the ODPs determined?

A couple of minor suggestions:

Page 16640, line 5/6: Should read “This is the first study. . .”

Page 16646, line 20, should be a period after the word “substances”, not a comma.

Page 16647, line 6/7: I think the sentence beginning “Notably, Table 4. . .” should be re-worded, replacing the words “much” and “most” with more quantitative language.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 16637, 2010.

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