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Interactive comment on "Sensitivity of polar stratospheric ozone loss to uncertainties in chemical reaction kinetics" *by* S. R. Kawa et al.

Anonymous Referee #2

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1 General comments

The paper is a useful study on the effects of uncertainties of laboratory data on model results. Its main focus is on the photolysis of the ClO-dimer, where it clearly shows that the measurements of Pope et al (2007) do not agree with field observations and the current understanding of stratospheric polar chemistry. On this subject are now plenty of papers and conference contributions coming to the same conclusion. I think the paper by Kawa et al would gain by some more discussion of the bromine reactions and maybe other reactions since people are not so aware of that. How critical is for example the branching ratio of the different product channels of $ClONO_2$ photolysis?

2 Specific comments

The result that Pope et al (2007) Cl_2O_2 cross sections are beyond the observational constraints is supported by recent laboratory studies of v.Hobe et al. (2009) and Chen et al. (2009) which should be cited and discussed in the conclusions or/and the introduction.

In section 2 a sentence on the treatment of PSCs should be included. Are the uncertainties of heterogeneous reactions included in the Monte Carlo studies? From the text it looks like, that they are not, but it should be said clearly.

The wording of the explanation of the too fast ozone depletion in the box model with JPL06 in Fig. 5 should be improved in section 3.1 (line 26ff).

A figure like Fig4a on the impact of reaction R3b using JPL06 Cl_2O_2 cross sections would be useful (section 4).

Table 1 might be expended. If the impact of other reactions is less than 0.12 days this should be said in the text.

3 Technical

Section 2.1: Should be Pierson et al. 2000.

Reference Canty et al not cited in text.

Caption of Table 1 too short, please include location and definition of Δt.

Caption of Fig.1, last sentence: better say +/-40% (see text) or mention the UV part with $\lambda > 300$nm also here.

Fig. 6: The markers for Burkholder are incomplete. Also the figure appears only

complete with the most recent version of Acroread.

4 References

von Hobe, M., F. Stroh, H. Beckers, T. Benter,and H. Willner: The UV/Vis absorption spectrum of matrix-isolated dichlorine peroxide, ClOOCl. Phys.Chem.Chem.Phys., 11, 1571-1580, 2009.

H.-Y. Chen, C.-Y. Lien, W.-Y. Lin, Y.T. Lee, J.J. Lin: UV absorption cross sections of ClOOCl are consistent with ozone degradation models. Science, 324, 781-784, 2009.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 13327, 2009.