

## ***Interactive comment on “A quantitative analysis of the reactions involved in stratospheric polar ozone depletion” by Ingo Wohltmann et al.***

### **Anonymous Referee #2**

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#### **1 General Comments**

The paper presents an interesting review of the known ozone hole chemistry, including the temporal development of contributions of different reaction cycles using a CTM. Unfortunately there appears to be a severe problem with the chlorine activation from HCl in both hemispheres which does not occur in state of the art CCMs or in CLaMS (see e.g. Grooß et al., 2002). A partial discussion of the problem in an Appendix is not sufficient since this is important for the main conclusions. Major revision is required here.

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#### **2 Specific Comments**

Appendix A: There appears to be a problem with the timing of the HCl-activation in case of the introduced artificial temperature offset. More chlorine activation in midwinter means also too early ozone depletion which can be seen in Figures 21 and 22. What happens if the analysis is done with the vortex criterion as in the rest of the paper? Are there also these artifacts? Is there a problem with photolysis rates for twilight conditions? Is the problem related to reactions on NAT and ice and the assumption of a constant supersaturation at ECMWF grid point temperatures ignoring mountain wave effects (page 3)? More information is needed here since this is critical for usefulness of the results in the main part. The discussion of the uncertainties should be a section in the main part and not an appendix.

Page 6, line 17: There should be a study with MIPAS/ENVISAT data on that.

Page 22, Fig. 13: The large HCl decreases in November/December and May are in contradiction to the observations in Figs. 21 and 22. The strongest decreases should be later.

Page 37, Wegner reference: Is the PICO-poster presented at the EGU-meeting in the polar ozone session available online? Please provide the link.

#### **3 Technical Corrections**

Please give full reference including city for Montzka et al 2012; Peter, Grooß 2012; vanHobe, Strohm 2012. Is Müller et al the same book? In such case one of the years is wrong.

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