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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "A closer look at Arctic ozone loss and polar stratospheric clouds" *by* N. R. P. Harris et al.

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* Page 6684: "The timing of the growth in ClO and ClOx coincides with the onset of PSCs." This point is not clearly made in Figure 1 as the PSC coverage is nearly constant at early times. That is, there is no time dependence or onset evident in the PSCs.

This section has been redrafted to more accurately reflect the contents of Figure 1.

* PSCs are assumed to be NAT but it is not clear what the overall sensitivity of this assumption is, although there is some discussion on page 6688.

We do not find much sensitivity to the assumed composition of the PSCs as stated in the discussion on p6688. This discussion has been clarified and our conclusion made



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clearer.

* Page 6688: delete (in molec cm-3 km-2 or 10(15) molec km-1)

done

* Page 6689: sp, bacground

done

* Page 6690: The qualitative text associated with R1-R3 is rather confusing. The comments are referring to the rates of these reactions and not the actual rate constants for these reactions. That is, the text should be “Rate is fast if PSCs are present”. I recommend that R1 include “het” over the arrow to indicate that this is a heterogeneous reaction rather than the added text. Delete “so” on this line. In this discussion it would also be worth mentioning the possible role of ClONO2 photolysis, which would counteract reaction R3.

The reactions have been tidied up as the reviewer suggests and we now refer to the possibility of ClONO2 photolysis although our modelling shows that it is not important in these conditions: “In the case of significant chlorine activation, R3 is sufficiently fast that most of the NO2 produced by the photolysis of ClONO2 reacts back to ClONO2 with a time constant of a few minutes, and so this reaction can be disregarded in these conditions.”

* Figure 2: It is not clear why the 5 years not included in the figure were excluded. This represents a significant fraction of the available data and requires a more quantitative explanation.

This is now explained more clearly in the figure caption.

* Figure 3: Change the scale of the y-axis for the 500 and 550 K plots to more clearly show the data points. Also, error bars on the data points should be included.

One of the points we want to make is the relative size of the ozone losses and so we



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think it is important to leave the scale of the y-axis alone.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 6681, 2010.