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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The MIPAS HOCl climatology" *by* T. von Clarmann et al.

Anonymous Referee #1

Received and published: 19 September 2011

General comments:

The paper presents a stratospheric vertically resolved HOCl climatology base on MIPAS satellite measurements. The climatology provides nearly two full annual cycles of the first global HOCl measurements and is therefore a valuable tool for the evaluation of coupled Chemistry-Climate Models (CCMs) and Chemical Transport Models (CTMs). In general the paper is well written and the important features of the HOCl climatology are presented clearly. However, some more detailed scientific background information on the presented features is missing. Also, the evaluation of the model data needs a more thorough discussion to understand the conclusions made regarding the rate coefficients. At the moment it seems that the model results presented here do not add anything new to the discussion of the rate coefficients. Publication of the manuscript is recommended after addressing these issues which are explained more in detailed in the specific comments below.

Specific comments:

Page 20795, line 16: Only model calculations based on one set of rate coefficients are presented in the manuscript. However, I agree that a comparison of model calculations based on the two different rate coefficients would be interesting and add scientific value to the presentation of the model results.

Page 20796, line 5 and following: So the MIPAS HOCl has only been retrieved for 2002-2004? Please clarify.

Page 20797, line 6-7: What kind of earlier measurements? Please provide more information. Has the good agreement with the earlier measurements been published somewhere? What exactly is meant by 'good agreement'?

Page 20799, line 10-15: Additionally, there are in general higher mixing ratios in the summer hemisphere than in the winter hemisphere with a maximum in midlatitudes. Please provide and explain this information including relevant references.

Page 20799, line 13-18: Please provide (if possible) a short explanation (including references) why the altitude of the maximum mixing ratio is lower in the summer hemisphere and during daytime. Also, the latitudinal structure (with higher mixing ratios in the summer hemisphere) apparent from am panels in Figure 2 and 5 changes for pm measurements as the comparison between Figure 5, panel 2 and figure 6, panel 1 reveals.

Page 20799, line 23-26: Is the semiannual oscillation of the peak mixing ratios connected to the SAO in zonal wind and temperature? Please provide some scientific background to explain the observed features.

Page 20800, line 1-4: Why are particularly low values found in early winter midlatitudes? To explain this one would need to understand the general latitudinal structure of the HOCl mixing ratios (see also comment for page 20799, line 10-15).

Page 20800, line 18-22: Why are there no elevated HOCl abundances in the very inner

part of the SH 2002 polar vortex (see Figure 6 panel 1). Please also provide some information if this feature is independent of am/pm separation of the measurements (which seems to strongly influence the latitudinal structure of the HOCl abundances).

Page 20800, line 20: What means regularly? Is this phrase based on the two winters of MIPAS observations or on independent observations as well? Please rephrase and/or add references. The same argument holds for the phrase 'occasional' for the NH winter. Observations for two winters do not really imply the use of terms like regular or occasional. Also Figure 7 shows this event for the 2003 and 2004 NH winter!

Page 20801, line 12: Would the overestimation of HOCl during polar night be contradicting the assumption that Stimpfle rate coefficients are more appropriate?

Page 2804, line 10-11: How do we know that observations agree better with kinetic data reported by Stimpfle? From this manuscript? Earlier publications?

Figures 2, 3, 5, and 6: The panels are too small. A better way of presenting the figure would be a 2x2 panel plot which extends over the width of the whole page.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 20793, 2011.