

Interactive comment on “Impact of January 2005 solar proton events on chlorine species” by A. Damiani et al.

Anonymous Referee #2

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The paper presents the results of the MLS and MIPAS observations of the chlorine species during the SPEs of January 2005 which are compared to WACCM4 model results. The paper is interesting, it gives some new insights and deserves publication on ACP. My comments are below:

COMMENTS

- 1) p. 1936 lines 8-9: Please explain more clearly the investigated altitudes.
- 2) p. 1938 line 6: Please explain why there are only a few HOCl observations available.
- 3) p. 1939 lines 16-18: But HCl goes via R2 to Cl which is also a ODS, could you please say which of the reactions, i.e. R2 or R5, is faster.

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- 4) p. 1944 lines 14-16: You just can say by making (not shown) one sentence out of the two.
- 5) p. 1944 lines 16-19: It is not clearly visible the HCl decrease, please ameliorate Fig. 1
- 6) p. 1945 lines 10-11: Please say in which figure we see the HCl peak at 2 hPa in late February.
- 7) p. 1946 lines 10-11: Why did you not implement the energetic electrons? In the mesospheric regions these particles can have a impact which should not be underestimated.
- 8) p. 1950 lines 4-5: You show the temporal evolution with respect to January average, why not take some days before the solar proton event started? Please explain your decision.
- 9) p. 1950 line 8 and p. 1962 line 10: Saying 'of less than 0.25 ppbv' could mean everything, i'd rather say 'of up to xy ppbv'.
- 10) p. 1955 line 16: The sentence '...this long lasting tail of HCl decrease seems to be not connected...' it is better to say '...this long lasting tail of HCl decrease seems not to be connected.'
- 11) p. 1956 lines 20-21: Why not showing the plot where we see the even more intense HCl depletion, i would appreciate this.
- 12) p. 1957 lines 13-15: It is just written that on 27 January we see ClONO₂ changes, you don't say when the first changes are visible, please add this information to the text.
- 13) p. 1960 line 21: It is written that the modelled ClO VMRs are similar to experimental values, but what experimental values are meant? Please explain.
- 14) p. 1963 line 11: Again, please explain what you mean when you write 'experimental data'.

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15) p. 1972: Figure 1 shows a good idea but it is too small and there are too many lines, in this figure I would say less lines gives a better understanding.

16) p. 1974 Figure 3: It is written '.. with respect to the average...' average of what, please be more precise what you mean.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 1935, 2012.

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