

Comparison of Inorganic Chlorine in the Antarctic and Arctic lowermost stratosphere by separate Late Winter aircraft measurements

We would like to thank again for the constructive comments on our manuscript. Reviewer comments are in normal font. Our answers are in italic.

Response to Michelle Santee

- L186: the descending generally stops --> descent generally stops

Done.

- L196: unique --> uniquely

Done.

- L254: where no measurements of all major chlorine containing substances are available --> where measurements of all major chlorine-containing substances are not available

Done.

- L273: indirectly determine --> indirectly determined

Done.

- L355: difference between Cl_{total} from controlled substances during PGS and SouthTRAC --> difference between Cl_{total} from controlled substances during PGS and that during SouthTRAC

Done.

- L383: SouhTRAC --> SouthTRAC

Done.

- L384-386: This wording is confusing. I think this would be clearer: "Taking into account the difference in Cl_{total} between the two campaigns would reduce the observed differences in the mid-latitudes, where mixing ratios of Cl_y were higher during PGS, but would increase the differences in the high latitudes, where higher Cl_y was derived for SouthTRAC."

We have adopted the suggested sentence.

- L387: than they can --> than can; difference of Cl_{total} --> difference in Cl_{total}

Done; Done.

- L390: “transported” is not the right word; “converted” or “transformed” would be better

We agree and have replaced “transported” with “converted”.

- L391-392: It would be more appropriate to state that the results of this work are consistent with those of Konopka et al. (2015), since that study came first: “Therefore, the observed differences in Cl_y , with higher Cl_y values in the southern high latitudes than in the northern high latitudes (see Fig. 9 and 10), are consistent with the differences in the age of air found by Konopka et al. (2015).”

We have adopted the suggested sentence.

- L393-394: showed an updated report to the long-term total column data for HCl and $ClONO_2$ (representing Cl_y) by Mahieu et al. (2014) --> updated the long-term total column HCl and $ClONO_2$ (representing Cl_y) record reported by Mahieu et al. (2014); also: though --> through

Done; Done.

- L396: add a comma after “stations”

Done.

- L401: I do not understand what is meant by “the trends given are indicative of the interhemispheric differences in Cl_y ”. Why would the rates of change in Cl_y necessarily reflect its absolute abundances in the two hemispheres?

You are right, the trends do not reflect its absolute abundance in the two hemispheres. Rather, the trends indicate the interhemispheric difference in Cl_y decline. Thus, we include the word decline after Cl_y in this sentence.

- L402: of about 200 ppt and above --> of 200 ppt or more; also, why is the word “explicitly” used here? It does not seem appropriate and probably should be deleted.

Done; “explicitly” was deleted.

- L442: was found --> were found (in two places)

Done.

- L444-445: reanalyses data --> reanalysis data

Done.