



Supplement of

Comparison of inorganic chlorine in the Antarctic and Arctic lowermost stratosphere by separate late winter aircraft measurements

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S 1 Vortex and mid-latitude profiles

Figure S 1 displays the filter procedure as a Flowchart for the task using $\Delta\Theta$ or Θ as the vertical coordinate.

S 2 Correlations between CFC-12 and the other organic source gases

Up-sampling the GhOST-MS measurements requires good correlations between CFC-12 and the other organic source gases, which are used for the calculation of inorganic chlorine. Figure S 4 and S 5 display the correlations with the respective polynomial or linear fit.

S 3 Vortex and mid-latitude profile during second phase of PGS

For the comparison of Arctic and Antarctic polar Cl_y , the vortex and the mid-latitude profiles during PGS are needed. To generate these profiles, only the flights of the second main phase of PGS were used, as this is the comparable time domain to the SouthTRAC campaign. Reference profiles can be seen in Fig. S 6.

S 4 Correlation function for the time period of the PGS campaign

$$\chi_{\text{Cl}_y} = c_0 + c_1\chi_{\text{ref}} + c_2(\chi_{\text{ref}})^2 \quad (1)$$

Table S 1. Coefficients of the correlation function to derive Cl_y with the respective reference substance for the time of the PGS campaign. Calculation of Cl_y with CFC-12 or N_2O and coefficients based on the balloon observations in 2009 and 2011 (Balloon).

Data source	χ_{ref}	c_0 [ppt]	c_1	c_2 [ppt ⁻¹]
Balloon	CFC-12	3011.05	-2.77406	$-5.88360 \cdot 10^{-3}$
Balloon	N_2O	3034.75	-2.11561	$-2.12169 \cdot 10^{-2}$

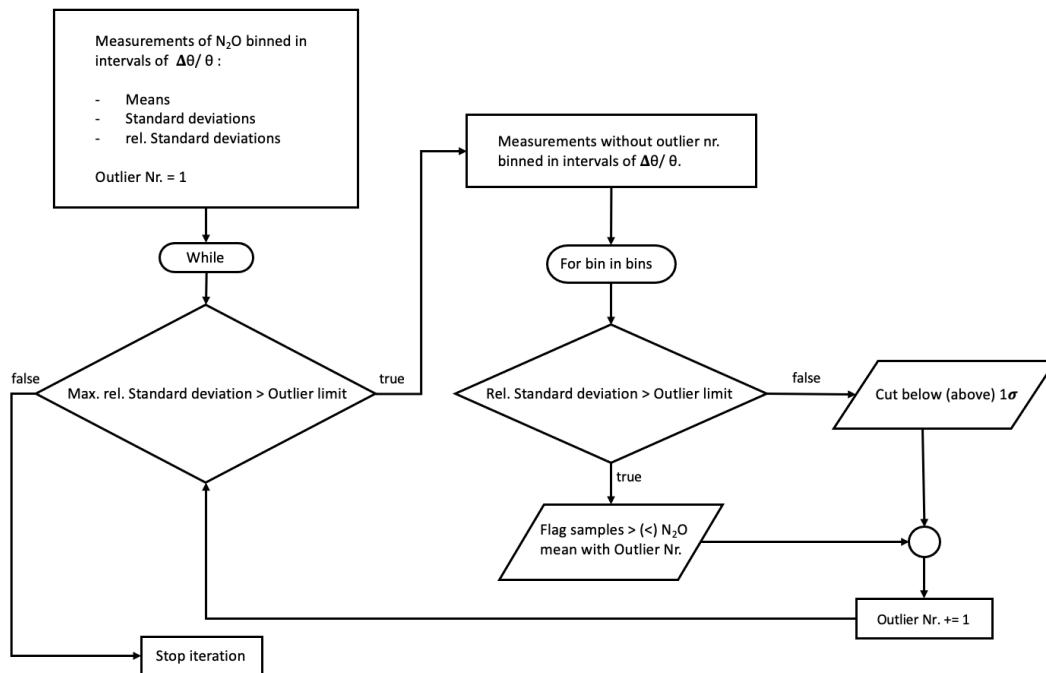
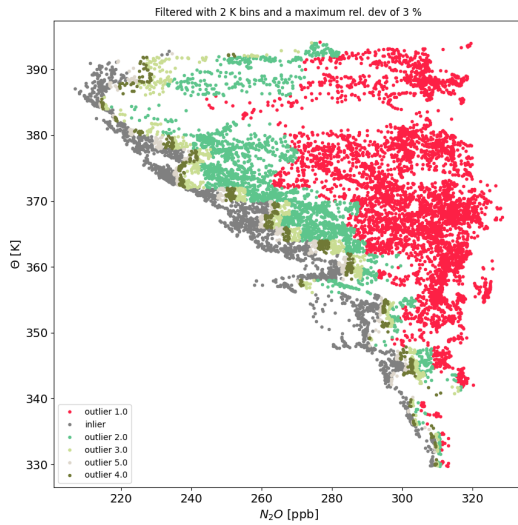
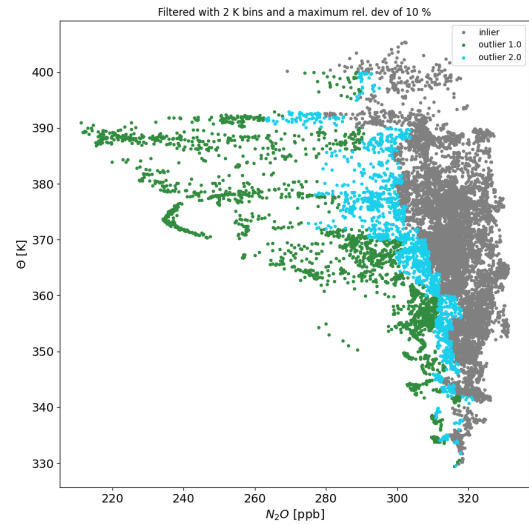


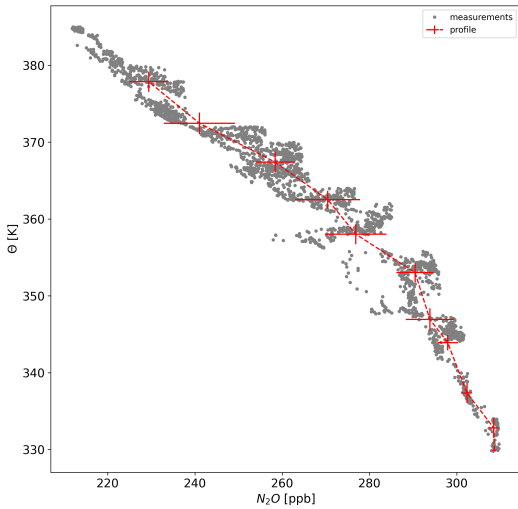
Figure S 1. Flowchart for the outlier identification to generate the vortex profile and mid-latitude profile



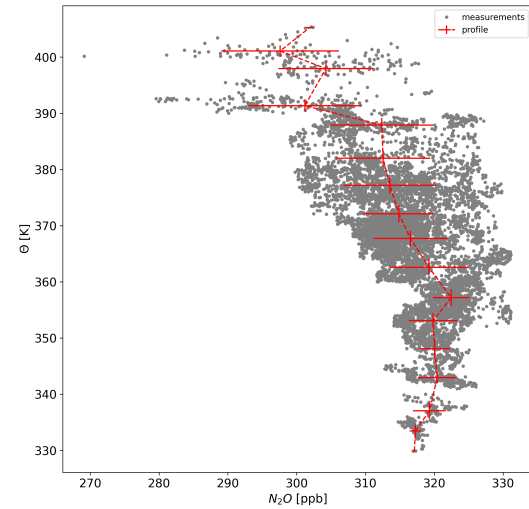
(a) Vortex filtering procedure



(b) Mid-latitudes filtering procedure

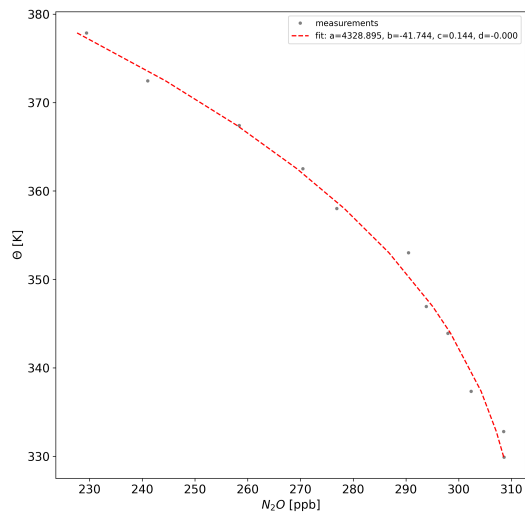


(c) Vortex remaining measurements

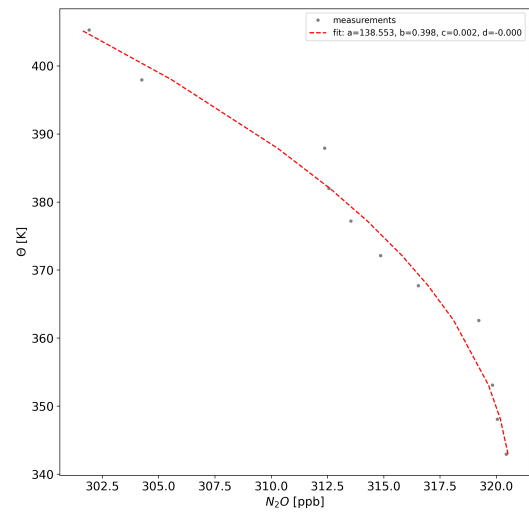


(d) Mid-latitudes remaining measurements

Figure S 2. Measurements included for generating the vortex profile (a) and mid-latitude profile (b) during the SouthTRAC campaign. Colors indicate the iteration over the measurement data to get remaining data for the final lower left envelope. Remaining measurements after filtering for the vortex profile (c) and mid-latitude profile (d), binned in 5 K intervals of $\Delta\Theta$.



(a) Vortex fit



(b) Mid-latitude fit

Figure S 3. Mean values of the binned profiles and the fit functions for the vortex and mid-latitude profile.

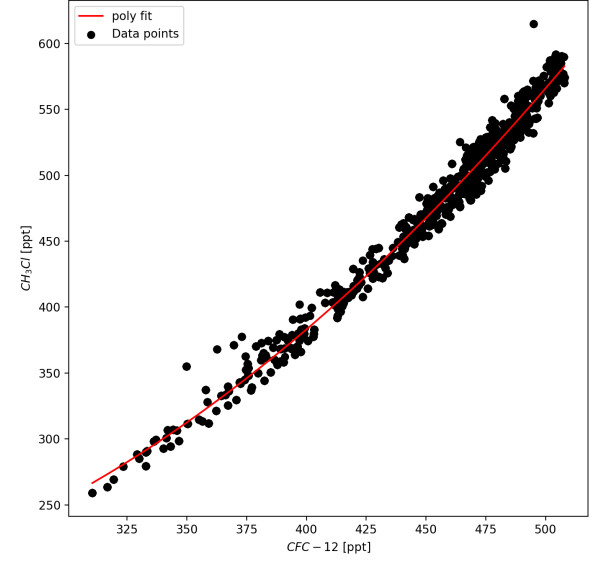
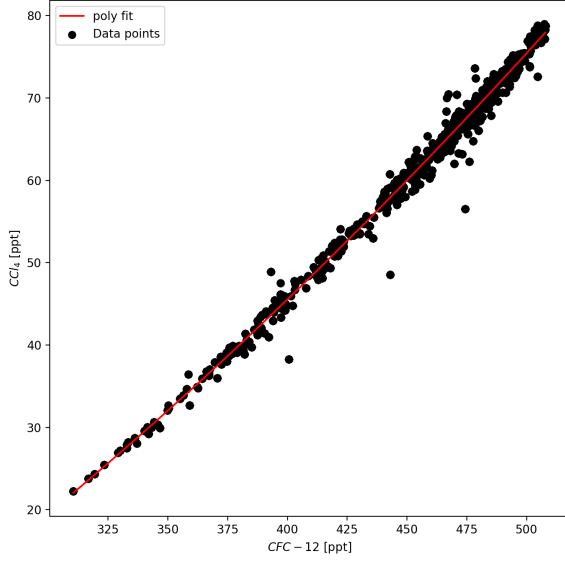
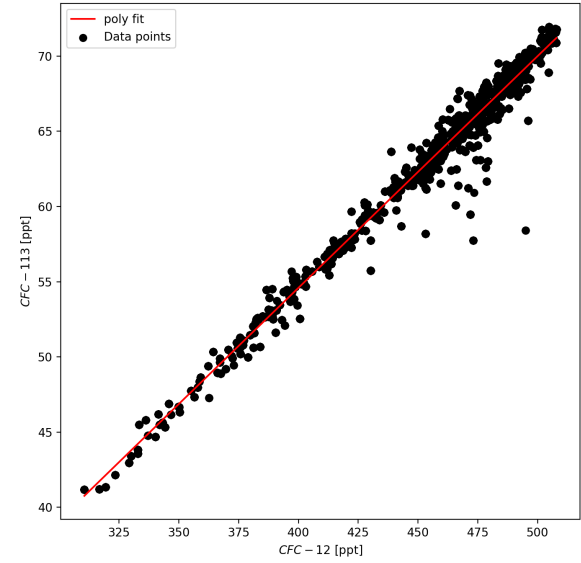
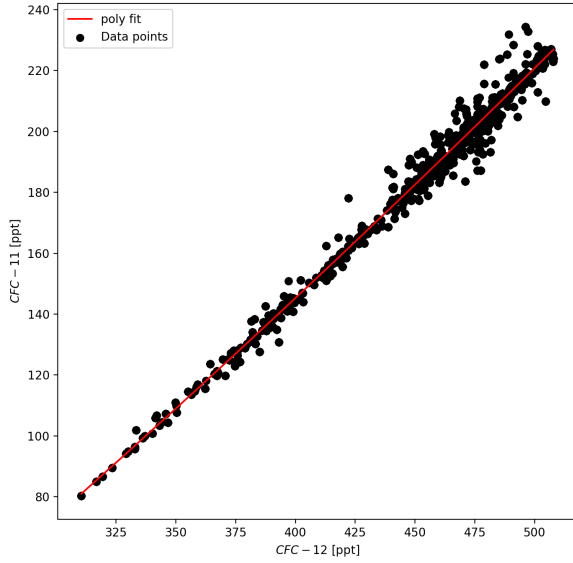


Figure S 4. Correlations between CFC-12 and CFC-11, CFC-113, CCl₄, and CH₃Cl from the GhOST-MS channel, which are used for the calculation of inorganic chlorine.

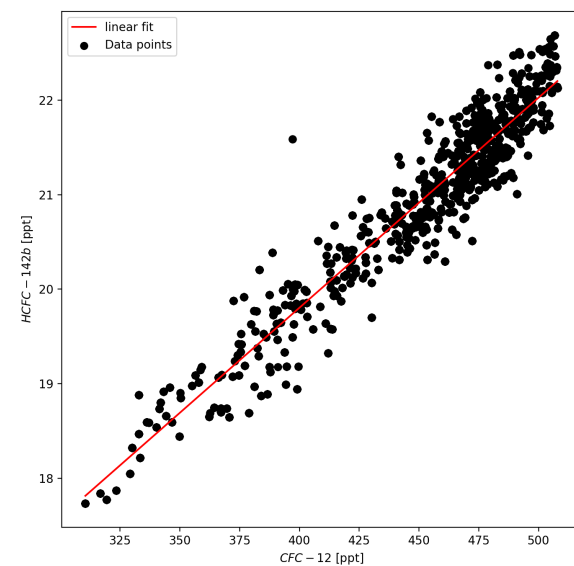
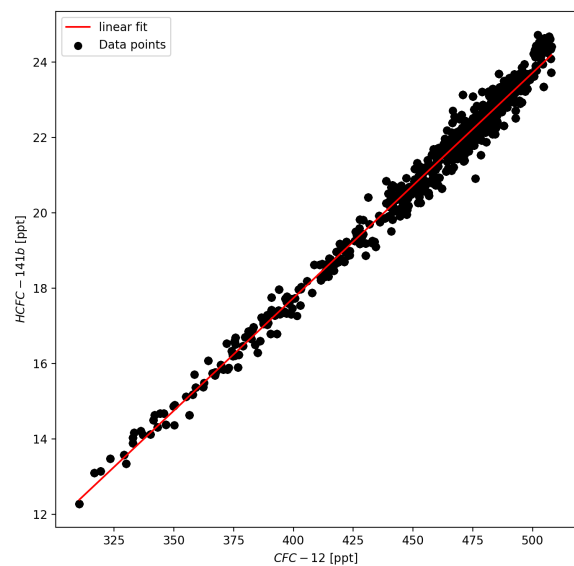
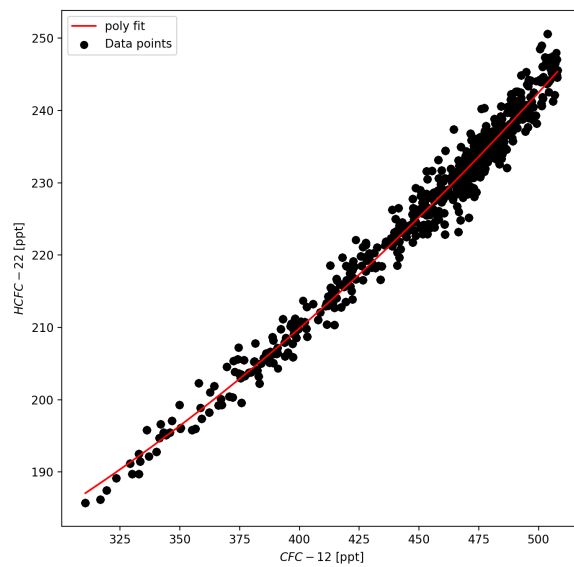
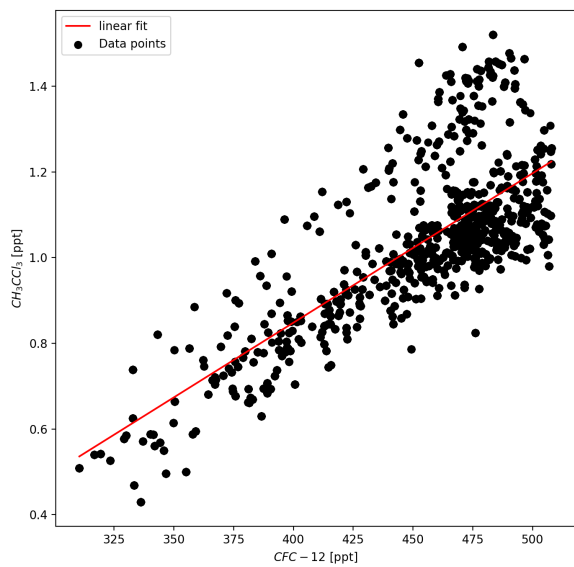


Figure S 5. Correlations between CFC-12 and CH₂CCl₃, HCFC-22, HCFC-141b, and HCFC-142b from the GhOST-MS channel, which are used for the calculation of inorganic chlorine.

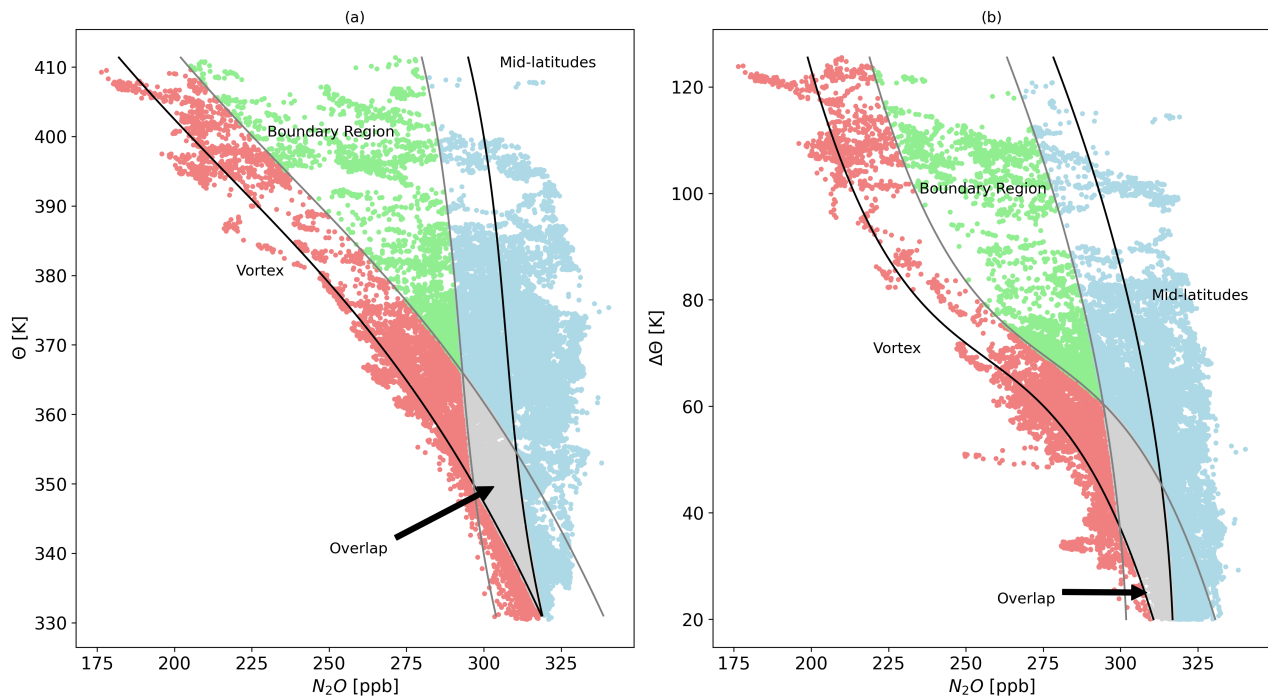


Figure S 6. Vortex and mid-latitude reference profiles during the second main phase of PGS.

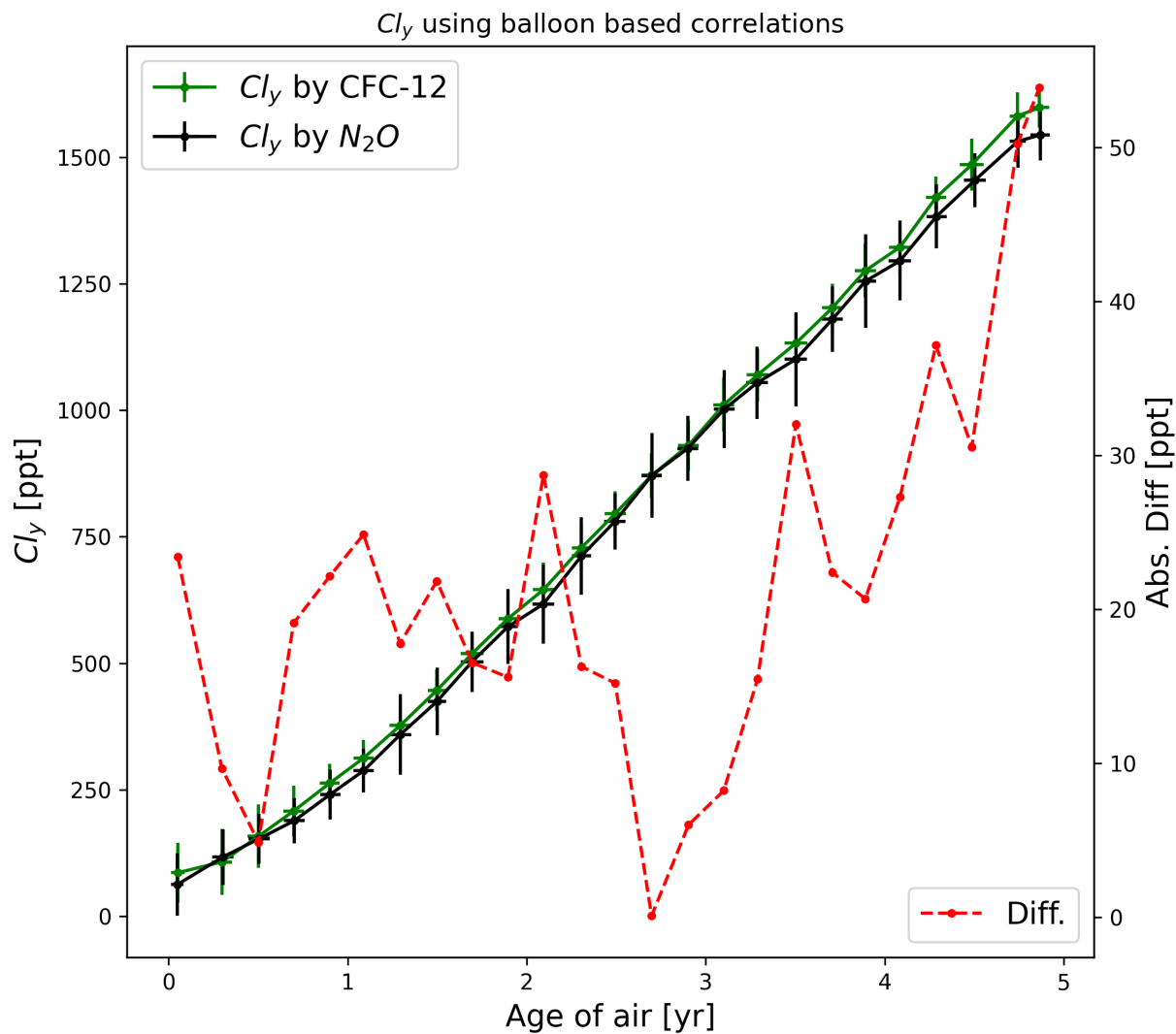


Figure S 7. Indirectly determined inorganic chlorine using balloon based correlations and CFC-12 from the GhOST-ECD (green) and N_2O from UMAQS (black) during the SouthTRAC campaign as the reference substance. Absolute difference in red.