Geophysical Research Abstracts
Vol. 13, EGU2011-8461, 2011
EGU General Assembly 2011

Ozone Loss within the 2010 Arctic Vortex derived from in situ observations with the Geophysica

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We quantify chemical ozone loss in the Arctic vortex up to mid March 2010 by analysing the evolution of the O3-N2O relation during the RECONCILE Campaign. Ozone was measured on board the Geophysica by the Fast Ozone Analyser (FOZAN). N2O and CO2, along with CFC-11, CFC-12, H-1211, CH4, SF6, and H2, were simultaneously measured by the High Altitude Gas Analyzer (HAGAR) during 13 Geophysica flights. An O3 versus tracer reference before substantial ozone loss occurred is provided by the satellite experiment ACE-FTS.

As the majority of the flights encountered both air within and outside the vortex, the observed N2O mixing ratio as a function of potential temperature is first used to identify true vortex air for each flight. Subsequently, cumulative ozone loss is derived from the O3-N2O relation as a function of the respective tracer and finally potential temperature. We find significant ozone loss of about 0.5 ppm above 430 K in early February. Comparisons will be made with numerical simulations by the Chemical Lagrangian Model of the Stratosphere (CLaMS).