Geophysical Research Abstracts
Vol. 15, EGU2013-2316, 2013
EGU General Assembly 2013

Global distribution of halogenated tracers in the UTLS region during the TACTS/ESMVal campaigns using the HALO aircraft

Timo Keber, Andreas Engel, Harald Boenisch, and Stephan Sala

Goethe-University of Frankfurt, Institute for Atmospheric and Environmental Sciences, Germany
(keber@iau.uni-frankfurt.de)

The Upper Troposphere / Lower Stratosphere (UTLS) represents an important region for the exchange of air between the stratosphere and the troposphere. Tropospheric gaseous compounds such as greenhouse gases and ozone depleting substances (ODS) are transported into the lower stratosphere on different pathways. Especially the two-way horizontal transport across the subtropical jet was further investigated during the "TACTS – **T**ransport **a**nd **C**omposition in the U**T**/LM**S**" campaign.

We will present in-situ measurements of long-lived and very short-lived (VSLS) halocarbons and Sulfurhexafluoride (SF_6) in the UTLS region. The measurements were performed with a sophisticated two channel in-situ instrument on board of the new German research aircraft for atmospheric science HALO (The **H**igh **A**ltitude and **LO**ng Range Research Aircraft) during the two campaigns TACTS and "ESMVal – **E**arth **S**ystem **M**odell **Val**idation". The first channel is a gas chromatography (GC) system coupled with mass spectrometer (MS) which operates in negative chemical ionization mode. This GC/MS channel is able to measure halocarbons in ambient air with a time resolution of four minutes. For the measurement of SF_6 and CFC-12 the second channel provides its own GC system with an electron capture detector (ECD). With the GC/ECD we achieve a time resolution of 60 seconds. The dataset includes 13 flights with a total of 120 flight hours and a coverage from 80°N to 65°S with a maximum altitude of 15 km. The measurements include halogenated hydrocarbons with a wide span of chemical lifetimes reaching from 100 years for CFC-12 to 26 days for $CHBr_3$. On the basis of this distribution we can improve our understanding of transport timescales, compositions and pathways in the UTLS region. Furthermore we discuss the distribution in respect of atmospheric transport and lifetimes.