Geophysical Research Abstracts, Vol. 7, 01274, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01274

Seasonal and latitudinal variations of stratospheric trace gases : observations and model calculations

J. Kuttippurath (1), H. Bremer (1), A. Kleinböhl (1, 2), B.-M. Sinnhuber (1), H. Küllmann (1), J. Notholt (1), S. Davis (3), M. Chipperfield (3)

(1) Institute of Environmental Physics, University of Bremen, Bremen, Germany., (2) Jet Propulsion Laboratory, California, USA., (3) School of the Environment, University of Leeds, Leeds, UK

The Airborne Submillimeter Radiometer (ASUR) is a passive heterodyne sensor. The receiver operates in a tuning frequency range of 604 GHz to 662 GHz. It is equipped with two spectrometers namely, Acousto optical spectrometer (AOS) and Chirp transform spectrometer (CTS). The AOS has a total bandwidth of 1.26 GHz, a resolution of 1.5 MHz whereas the CTS has a bandwidth of 178 MHz and a resolution of 278 kHz. The AOS is mainly used for stratospheric measurements. The high resolution CTS is used for probing mesospheric constituents. The sensor is operated onboard a high altitude research aircraft like the DLR (German Aerospace Center) Falcon at an altitude of about 10-13 km in order to avoid signal absorption due to tropospheric water vapour. The sensor looks upward at a zenith angle of 78°, detects the thermal emissions from the rotational lines of various molecules. From the pressure broadening of the detected thermal lines, vertical profiles of volume mixing ratio are retrieved applying the Optimal Estimation Method. Apart from ozone, ASUR measures a range of stratospheric molecules like ClO, HCl, HNO_3, N_2O, etc.

SCIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric ChartographY) is an atmospheric chemistry payload aboard ENVISAT (ENVIronmental SATellite). SCIA-VALUE (SCIAMACHY Validation Utilisation Experiment) was a validation campaign performed onboard the DLR Falcon research aircraft to validate SCIAMACHY data. The campaign was conducted in two deployments in September 2002 and in February-March 2003. ASUR measured a wide range of molecules from low latitudes (5.0°S) to high latitudes (80°N) during the deployments. Numerous measurements of O_3, N_2O and HCl were carried out in different latitude sections

and in various atmospheric conditions. This presentation discusses the seasonal and latitudinal distributions of the stratospheric gases and stratospheric transport process with respect to the ASUR measurements. Simulations from two different stratospheric chemical transport models, SLIMCAT and the Bremen CTM, are also used for interpreting the measured features.