Geophysical Research Abstracts
Vol. 12, EGU2010-10057-1, 2010
EGU General Assembly 2010

STRAPOLETE : Studying summer polar stratosphere

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The polar stratosphere in the summertime remains largely unexplored. Dynamical conditions are characterized by large scale transport and mixing between air masses of higher and lower latitude origins. Understanding these exchanges is crucial since they have a large impact on the distribution of trace gases and aerosols at polar latitudes, and thus on the stratospheric ozone budget. Ozone change affects the radiative balance, the coupling between troposphere and stratosphere, and therefore the climate.
In the framework of the International Polar Year, the STRAPOLETE project starts on January 2009. It is associated with a successful balloon borne campaign which took place close to Kiruna (Sweeden) from 2 August 2009 to 12 September 2009 with eight balloon flights. During this campaign the main characteristics of the summertime arctic stratosphere have been captured. The data set obtained using UV-visible and infrared instruments, remote and in situ sensing embarked spectrometers provided detailed information on vertical distributions of more than fifteen chemical tracers and reactive species from the upper troposphere to the middle stratosphere. A number of in situ optical aerosol counters, a UV-visible remote spectrometer for the aerosol extinction and a photopolarimeter provided information on the nature and size distribution of the stratospheric aerosols. These balloon measurements with high precision and high vertical resolution are relevant to qualify the dynamical processes occurring in this region during summertime, the aerosols variability, the bromine abundance and establish a reference state of the polar summer stratosphere. The data set is completed by satellite data offering large spatial coverage of the region of interest. Data analysis is made using relevant dynamical (trajectory calculations, contour advection model) and chemistry-transport models (CTM) to highlight major mechanisms that control the distribution of tracers, aerosols and bromine.
An overview of the project, its scientific issues, the measurement campaign and some balloon measurements obtained will be presented, as well as preliminary comparisons between measurements and models outputs.