Geophysical Research Abstracts
Vol. 14, EGU2012-3067, 2012
EGU General Assembly 2012

Investigation of atmospheric light path distributions using GOSAT satellite observations

B. Kremmling, M. Penning de Vries, and T. Wagner
Max-Planck-Institut für Chemie, Otto-Hahn-Institut, Hahn-Meitner-Weg 1, 55128 Mainz, Germany

The presented work investigates the effect of different cloud scenarios on the radiative transfer in the atmosphere, especially on the path length distributions of the scattered sun light. Path lengths distributions suffer significant alterations in presence of clouds due to multiple scattering inside and between clouds. As cloudy skies in realistic conditions show a lot of inhomogeneities, these effects also have to be considered.

We retrieve atmospheric light path distributions from spectra of the oxygen-A-band measured by the Japanese Greenhouse Gases Observing Satellite (GOSAT). The oxygen-A-band shows strong and narrow absorption features, which can clearly be separated in the GOSAT spectra. The analysis of the spectral signatures allows the derivation of cloud properties and the underlying path length distributions.

As the GOSAT satellite was successfully launched in 2009, a large number of datasets is available to users. The spectra from GOSAT are especially suitable for our purposes because their high spectral resolution allows to (almost) resolve individual lines of the oxygen-A-band. In addition, GOSAT provides images of clouds and aerosols with high spatial resolution. These images can be used to distinguish and select defined atmospheric situations.

We compare GOSAT measurements with results of radiative transfer simulations. The different simulation routines use solutions of the radiative transfer equation by discrete ordinate methods as well as a Monte Carlo model. The simulated spectra are analysed and compared to the spectra retrieved from the satellite.

We will present an outline of our research project and show results of selected case studies. The case studies include cloud-free scenarios as well as different cloud situations.