



Inversion of trace gases profiles from SCIAMACHY Limb observations

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The SCIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric Chartography) on ENVISAT measuring solar UV-vis-NIR radiation transmitted and backscattered by the atmosphere scans the atmosphere alternatively in nadir and limb modes. The limb scans are performed in the direction of flight of the satellite with approximately 3 km elevation steps projecting entrance slit of the spectrometer by azimuth and elevation mirror. From the limb scans information on stratospheric trace gas profiles can be extracted. Our retrieval is based on two successive steps:

In the first step slant column densities (SCDs) for trace gases: ozone, nitrogen dioxide, bromine oxide and chlorine dioxide, are derived from the SCIAMACHY limb measurements by the Differential optical absorption (DOAS) method. The DOAS fit is done in UV spectral range for wavelengths where ozone absorption is assumed as not leading to considerable non-linear effects. The influence of using a sun spectrum from azimuth or elevation scanning mirror or a tangent height spectrum as Fraunhofer reference on the quality of the fit is investigated.

In the second step radiative transfer modeling with full spherical three-dimensional Monte Carlo RTM "Tracy" is performed. The modeled data kernels or "box" air mass factors are applied to derive the vertical distribution of the trace gases in the stratosphere. The linear optimal estimation inversion method is used to fit the profiles of the trace gases. First results on the profile retrieval for selected orbits during austral winter and spring of 2004 are presented.