Cloud retrieval from sciamachy using broad band spectrometers and absorptions of o2 and o4

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The SCanning Imaging Absorption spectrometer for Atmospheric ChartographY (SCIAMACHY) on ENVISAT allow measurements of different tropospheric trace gases (e.g. $NO_2, SO_2, CH_4, HCHO, CO, BrO, H_2O$) using the DOAS technique. Cloud retrieval algorithms are essential for the calculation of precise vertical column densities.

This presentation describes the concept, validation and application of the Heidelberg Iterative Cloud Retrieval Utilities (HICRU), which retrieves cloud parameters directly from SCIAMACHY data. The most important cloud parameter is the effective cloud fraction. Especially a more accurate retrieval of cloud free pixels is needed with respect to the correction of the evaluation of tropospheric trace gases. The Heidelberg Iterative Cloud Retrieval Utilities (HICRU) determines cloud fraction using the Polarization Monitoring Devices (PMD). The advantage of these instruments is a higher spatial resolution compared to the instruments with high spectral resolution. This provides additional information about cloud heterogeneity. The algorithm combines the widely used threshold method with a sophisticated, iterative algorithm using image sequence analysis. Different wavelength bands are used for cloud retrieval. The cloud fraction received from the HICRU algorithm is combined with DOAS evaluation of O_2 and O_4 at 630nm to retrieve additional information about clouds.

The algorithm is validated through intercomparison with other cloud algorithms for GOME and SCIAMACHY as well as cloud information received from other satellite platforms.