



Retrieval of cloud height from SCIAMACHY using oxygen absorption around 630nm

Michael Grzegorski (1,2), Tim Deutschmann (2), Ulrich Platt (2), Ping Wang (3), and Thomas Wagner (1)

(1) Max Planck Institute for Chemistry, Germany, (2) Ruprecht-Karls University Heidelberg, physics and astronomy, Heidelberg, (3) KNMI - Royal Netherlands Meteorological Institute, De Bilt, Netherlands

The Scanning Imaging Absorption spectrometer for Atmospheric Chartography (SCIAMACHY) on ENVISAT allows measurements of different atmospheric trace gases (e.g. O_3 , NO_2 , SO_2 , CH_4 , $HCHO$, CO , BrO , H_2O , O_2 , O_4) using the DOAS technique. The HICRU algorithm retrieves cloud height using the spectral analysis of the oxygen absorption around 630nm combined with results of the Monte-Carlo model TRACY-II and a new SCIAMACHY surface albedo database. The results are compared to:

- 1.) cloud height retrievals of other satellite instruments (MERIS, MODIS)
- 2.) ISCCP climatology
- 3.) SCIAMACHY cloud algorithms (SACURA, FRESCO+)
- 4.) LIDAR/RADAR measurements.

For low clouds, the HICRU algorithm retrieves cloud heights more close to the top, because of the assumption of an appropriate cloud model with a realistic estimation of the scattering inside the cloud. It is also demonstrated, that none of the three SCIAMACHY cloud algorithms HICRU, SACURA and FRESCO+ is able to retrieve the top of high clouds because of principal characteristics of the retrieval methods based on oxygen absorption. But oxygen absorptions can provide important additional information on the vertical cloud structure and multiple cloud layers if the method is combined with cloud-top-retrieval using windows in the thermal infrared. An application of these concepts to the GOSAT instrument will be discussed.