Summary

3rd IUP cloud meeting, 13.06.2005

The 3rd IUP meeting was devoted to the discussion of the current status of cloud research at IUP. **A. Richter and X. Yan** reported on the status of the SCIAMACHY PMD Cloud fraction Algorithm (SPCA). The algorithm for the cloud fraction determination is based on pre-calculated databases of minimal and maximal SCIAMACHY broadband(450-520nm) reflectivities. The cloud fraction is determined as a coefficient of a linear mixture of these reflectivities for a given pixel. Unlike DLR OCRA PMD algorithm (D. Loyola, 2004), SPCA does not use the notion "whiteness" and color space analysis (e.g., the cloud fraction can be related to the distance from the measurement point to the single "white" point in a color space). Currently SPCA underestimates cloud fractions, probably as the result of the choice of the brightest cloud as upper intensity limit. Comparison of SPCA and OCRA indicates that OCRA is overestimating cloud fraction at the outer parts of a scan, probably due to the use of a cos(LOS) correction which other approaches do not use. **M. Buchwitz** reported on the PMD-1 (320-380nm) Cloud Screening Algorithm (CSA) for SCIAMACHY. Using a threshold technique, he was able to effectively screen clouds, which is an important issue in CO_2 vertical columns retrievals. The technique can be also used in the aerosol remote sensing applications. However, a special care must be taken for heavy aerosol events, which can be screened as clouds by an algorithm. However, the technique is suitable for background aerosol studies. Both SPCA and CSA are not capable to distinguish clouds and snow. This can be avoided in future by a simultaneous application of a number of tests with respect to IR, visible, and O_2 A-band reflectivities for a full SCIAMACHY pixel. **V. Rozanov** reported on the progress with the development of SemiAnalytical CloUd Retrieval Algorithm (SACURA). Currently, the algorithm is capable to retrieve cloud optical thickness, cloud albedo, cloud top height (CTH) for fully cloudy pixels. The cloud fraction for a partially cloudy pixel is determined assuming that the cloud optical thickness is equal to 10. The algorithm was improved as compared with its initial version prepared 2 years ago. It was transferred to DLR for generation of operational cloud parameters for SCIAMACHY. It is planned that SACURA will run in combination

with OCRA at DLR. Currently, SACURA processes 1 GOME orbit (2000 pixels) in 3 min. He also presented the comparison of CTH obtained from GOME data using SACURA and from ATSR-2 data with the application of RAL algorithm. The differences of both cloud products are below 1.0-1.5km for most of cases. **A. Kokhanovsky and M. Vountas** reported on annual SCIAMACHY products generated using subset of all SACURA retrievals for year 2004. The subset included only optically thick clouds with the optical thickness larger than 10 with estimated cloud fractions above 0.95. It has appeared that such systems have CTH equal to approximately 6km on average. Low clouds were not analyzed. **M. Schreier** presented his recent study on the modification of a cloud field near Vancouver harbor due to ship emissions of particulate matter. He studied the spatial distributions of cloud optical thickness, cloud droplet radius, and cloud number concentration. The screening of possible influences of contrails was performed using brightness temperature measurements. Only low maritime clouds were selected for this study. **M. Weber** introduced the weighting function DOAS ozone retrieval algorithm based on satellite measurements of backscattered light in Huggins bands and the use of cloud information in the DOAS retrieval. The agreement with ground-based instruments is to within 1% globally for GOME. FRESCO was used for deriving cloud parameters in the GOME data. It is planned to use SACURA cloud products for SCIAMACHY analysis and future GOME reprocessing. In the conclusion of the meeting, **O. Jourdan** reported on a new technique to determine the cloud thermodynamic state from synergy of SCIAMACHY (1.55, 1.67 μm) and AATSR (12 μm) measurements. An interesting possibility to recognize regions with supercooled liquid droplets in hurricanes was proposed. He reported that SACURA derived CTH well correlates with AATSR brightness temperatures(BT). Also he made an attempt to convert BT to cloud top heights using EMCWF data. It was found that such a conversion technique can not be applied to hurricanes.