



Synergetic cloud product from EARTHCARE's imaging spectrometer and atmospheric lidar

Anja Hünerbein (1) and Ulla Wandinger (2)

(1) Deutscher Wetterdienst, Richard-Aßmann-Observatorium, Lindenberg, Germany (anja.huenerbein@dwd.de), (2) Leibniz Institute for Tropospheric Research, Leipzig, Germany

The intent of the present study is to combine active and passive measurements to derive cloud top height (CTH). The ESA's cloud and aerosol mission EarthCARE is the first satellite mission which will provide measurements from active sounders and passive imager as well as radiometer from one platform. The backscatter lidar (ATLID) will provide vertical profiles of cloud and aerosol parameters with high spatial resolution. ATLID profiles are obtained along track with a horizontal resolution of 200m and vertical resolution of about 100m. The multi-spectral imager (MSI) has a significantly broader swath than the active instrument of 150km and a pixel size of 500mx500m. The MSI gives information in the horizontal structure of the clouds. Because of the different observational geometry of the two instruments only the MSI pixels closest to nadir will be representative. The cloud top height from ATLID will have high accuracy compared to the cloud top height retrieval from passive instruments, especially high level cirrus and mid-level altocumulus which typically stretch over hundreds of square kilometers will be very useful. A combined retrieval will be developed which use the precise cloud top height information from ATLID profiles to calibrate the MSI cloud top height retrieval over the entire swath. The retrieval is based on a two-step approach. First the stand alone CTH retrievals from ATLID and MSI are collocated for the nadir pixel and a synergetic product are derived. The differences in the CTH for the nadir pixels and the cloud categorization via the MSI cloud phase and cloud optical thickness products are used for an empirical correction of the MSI CTH. In the second step, the corrections are applied to the whole MSI swath.