Use of integrated profiling techniques for testing radiative transfer schemes

K. Ebell, U. Löhnert, S. Crewell

Institute for Geophysics and Meteorology, University of Cologne, Germany

The combination of active and passive remote sensing instruments for various wavelengths offers the unique opportunity to derive the atmospheric state as complete as possible. In particular, the Integrated Profiling Technique (IPT, Löhnert et al., 2004, 2006) has been successfully used to derive profiles of temperature, humidity and liquid water content and corresponding error estimates. The IPT uses a Bayesan based combination of ground-based microwave radiometer, cloud radar, ceilometer and a priori information. The method is currently applied to measurements taken with the ARM Mobile Facility and our multispectral microwave radiometes in the Black Forest, Germany from April to December 2007.
This longterm continuous dataset offers the possibility to test radiative transfer schemes of atmospheric models. Numerical weather prediction (NWP) and climate models often vary strongly in the representation of cloud-radiation interaction. The IPT output and additional measurements can be fed into single column versions of atmospheric models to derive surface radiative fluxes (shortwave and infrared). Though 3D effects will lead to some discrepancies between calculated and AMF observed fluxes, statistical comparisons and auxiliary information, e.g. aerosol measurements, will allow an assesment of the models' radiative schemes. As a first step, we will focus on the scheme of the German Weather Service's COSMO-Model, which is also used within the regional climate model CLM (CLimate Mode of COSMO-model).