Session:

OSA 1.9 Machine Learning and Computer Vision in Weather and Climate

Title:

New cloud detection method for a stand-alone ground based microwave radiometer

Autoren: Moritz, Christine, Jasmin, Ulrich Görsdorf, Ulrich Löhnert,

Text

Microwave radiometers (MWR) are moving into the focus of national and trans-national meteorological agencies which already operate or which intend to deploy MWR in network setups. The centralized processing of MWR data products within ACTRIS and the imminent integration of MWR into the EUMETNET E-Profile network are two prominent examples for this development. The developments within E-Profile correspond to efforts made by weather services towards directly assimilating MWR brightness temperature (TB) data.

At DWD we are evaluating data availability, quality, observation impact and operational sustainability of an MWR in a testbed setup, the so-called “Pilotstation”. In this framework first assimilation experiments of MWR TB at DWD were successful. The data assimilation (DA) requires a priori quality checks and an a priori detection of liquid water clouds. Currently the most frequent reason for rejecting data from DA is the suspected presence of clouds. Consequently, reliably identifying clouds without excessively rejecting clear-sky data is especially effective for increasing the availability of suitable data.

We will present a new approach for detecting the presence of liquid water clouds from the observed zenith TB. We employ a machine learning (ML) based algorithm which exploits the spectral signature and the variability of the observation. Using the CloudNet target classification as a reference we will demonstrate the overall performance. We will also highlight some issues faced and methods used during the development of this ML application.

TB observations at lower elevation angles increase the information content of the overall MWR observation. To ensure a proper interpretation of the TB the cloud detection scheme must be enhanced so that it also applies to off-zenith observations. We will present our approaches and first results at addressing this matter.