Multi-instrument comparison of integrated water vapor on high spatio-temporal resolution during the field campaign HOPE

S. Steinke[1], S. Reitter[1], S. Crewell[1]

[1]Universität zu Köln, Cologne, Germany

Water vapor is the most important and frequent atmospheric green house gas. It influences the Earth's radiation budget, cloud evolution, and with that precipitation formation. Various techniques exist to measure the amount of integrated water vapor (IWV) and they differ greatly in temporal and spatial resolution, accuracy, continuity and atmospheric conditions under which they are applicable.

The High Definition Clouds and Precipitation for advancing Climate Prediction (HD(CP)²) Observational Prototype Experiment (HOPE) took place in April and May 2013 in the rural environment of Jülich, Germany. During this two-month period, the standard instrumentation for detecting water vapor at Jülich Observatory for Cloud Evolution (JOYCE), i. e. the GPS antenna of the Geoforschungszentrum Potsdam, a scanning microwave radiometer, and a sunphotometer, was complemented by frequent radiosoundings, additional microwave radiometers and BASILicate Raman Lidar system (BASIL). Additionally, IWV from two Moderate Resolution Imaging Spectroradiometer (MODIS) retrievals, infrared and near infrared, are available from Terra and Aqua overflights. With these data the present study performs a multi-instrument comparison of IWV focusing on small-scale variability. In particular we will show how the high spatio-temporal variability of water vapor influences the assessment of accuracy of larger scale atmospheric model simulations and spaceborne observations like the Infrared Atmospheric Sounding Interferometer (IASI).