

Assessment of integrated water vapor inferred by GPS, miscellaneous measurements and atmospheric models

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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. Due to its important role in the atmosphere, water vapor is also an important part of the reanalysis performed within the Hans Ertel Centre. This regional reanalysis is produced with the COSMO-DE (Consortium for Small-scale Modeling) model of Deutscher Wetterdienst. To evaluate the integrated water vapor (IWV) of the reanalysis, the Global Positioning System (GPS) network of Geoforschungszentrum Potsdam (GFZ) is used. It provides independent measurements with a good spatial coverage of the model domain.

Apart from GPS, atmospheric water vapor can be derived from measurements of several other instruments. At Jùlich Observatory for Cloud Evolution (JOYCE) , in addition to the GPS antenna of the GFZ, a microwave radiometer, and a sunphotometer provide continuous measurements of the IWV. Also for the two-months of HD(CP)² Observational Prototype Experiment (HOPE) a large number of radiosoundings is available. These measurements and the infrared and near infrared measurements of MODIS are compared to each other and the model output of ICOSahedral Nonhydrostatic general circulation model (ICON).