P14 A new forward operator for assimilating water-vapor mixing ratio profiles into the WRF-DA system and its impact study.

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New active remote sensing systems for water-vapor profiling such as differential absorption lidar (WVDIAL) and temperature rotational Raman lidar (TRRL) with high accuracy and range-resolution are now operational and commercially available to be operated in networks. For extracting the full information contents of their observations, data assimilation (DA) systems of weather forecast models must contain a suitable forward operator for absolute humidity and/or mixing ratio, respectively. Surprisingly, so far, no corresponding forward operator was available in the WRF-DA system.
In this work, we present the modification and test of an existing forward operator for AIRS retrievals within the WRF-DA for assimilating water-vapor profiles. This advanced operator is applied to high-resolution profiles measured with the WVDIAL and the TRRL of the University of Hohenheim.
The WRF model is configured with 100 levels, with about 30 layers up to 700 hPa and comprises a 2.5-km horizontal resolution over central Europe. Three different experiments were carried out: 1) Control Experiment, 2) TRRL in addition and 3) TRRL and WVDIAL in addition to the Control Experiment. First results of these impact studies will be presented and discussed.