VALIDATION OF THE NWP MODEL HRM WITH CHAMP AND SAC-C RADIO OCCULTATION DATA

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Water vapor is the most variable of the major components of the atmosphere and a critical element in short-term numerical weather prediction. Due to the transfer of energy via its phase changes it drives atmospheric circulations.

In order to investigate the water and energy balance over the Baltic Sea and its catchment the High resolution Regional weather forecast Model HRM of the DWD (Deutscher Wetterdienst) is validated with tropospheric specific humidity profiles derived from CHAMP/GPS and SAC-C/GPS radio occultation data.

The HRM model used as boundary conditions 6-hourly analyses of the ECMWF. The time step was chosen to 90 s. Consecutive 30 h forecast starting each day at 0 UTC were performed during the BALTEX/BRIDGE period (between October 1999 and February 2002). CHAMP and SAC-C/GPS refractivity profiles determined by GFZ and JPL using a geometric optics approach and an algorithm similar to that of Gorbunov and Sokolovskij (1993) to determine the specific humidity profiles are applied.

The model shows larger specific humidities compared with CHAMP and SAC-C radio occultation data, increasing with decreasing height. Vertically integrated specific humidity profiles show with about 2.7 kg/m2 similar standard deviations between model and data like between the model and groundbased GPS data from the network of the GFZ over Germany.

Gorbunov, M. and Sokolovskij, S.: Remote sensing of refractivity from space for global observations of atmospheric parameters, Tech.Rep.119, Max-Plack-Institute for Meteorology, Hamburg, Germany, 1993.