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Current status of validating operational model forecasts at the DWD site Lindenberg

F. Beyrich, C. Heret, and G. Vogel

Deutscher Wetterdienst, Meteorologisches Observatorium Lindenberg, Tauche - OT Lindenberg, Germany
(frank.beyrich@dwd.de, +49 33677 60280)

Based on long experience in the measurement of atmospheric boundary layer parameters, the Meteorological Observatory Lindenberg / Richard - Aßmann-Observatory is well qualified to validate operational NWP results for this location. The validation activities cover a large range of time periods from single days or months up to several years and include much more quantities than generally used in areal verification techniques. They mainly focus on land surface and boundary layer processes which play an important role in the atmospheric forc-ing from the surface. Versatility and continuity of the database enable a comprehensive evaluation of the model behaviour under different meteorological conditions in order to esti-mate the accuracy of the physical parameterisations and to detect possible deficiencies in the predicted processes. The measurements from the boundary layer field site Falkenberg serve as reference data for various types of validation studies:

1. The operational boundary-layer measurements are used to identify and to document weather situations with large forecast errors which can then be analysed in more de-tail. Results from a case study will be presented where model deficiencies in the cor-rect simulation of the diurnal evolution of near-surface temperature under winter con-ditions over a closed snow cover where diagnosed.
2. Due to the synopsis of the boundary layer quantities based on monthly averaged di-urnal cycles systematic model deficiencies can be detected more clearly. Some dis-tinctive features found in the annual cycle (e.g. near-surface temperatures, turbulent heat fluxes and soil moisture) will be outlined. Further aspects are their different ap-pearance in the COSMO-EU and COSMO-DE models as well as the effects of start-ing time (00 or 12 UTC) on the prediction accuracy.
3. The evaluation of the model behaviour over several years provides additional insight into the impact of changes in the physical parameterisations, data assimilation or nu-merics on the meteorological quantities. The temporal development of the error char-acteristics of some near-surface weather parameters (temperature, dewpoint tem-perature, wind velocity) and of the energy fluxes at the surface will be discussed.