Quantitative precipitation forecasts in the Alps – an assessment from the Forecast Demonstration Project MAP D-PHASE

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The main aim of the WWRP Forecast Demonstration Project MAP D-PHASE is to demonstrate the performance of today's models to forecast heavy precipitation and flood events in the Alpine region. Therefore an end-to-end, real-time forecasting system was installed and operated during the D PHASE Operations Period from June to November 2007. Part of this system are 30 numerical weather prediction models (deterministic as well as ensemble systems) operated by weather services and research institutes, which issue alerts if predicted precipitation accumulations exceed critical thresholds. Additionally to the real-time alerts, all relevant model fields of these simulations are stored in a central data archive. This comprehensive data set allows a detailed assessment of today's quantitative precipitation forecast (QPF) performance in the Alpine region.

We will present results of QPF verifications against Swiss radar and rain gauge data both from a qualitative point of view, in terms of alerts, as well as from a quantitative perspective, in terms of precipitation rate. Various influencing factors like lead time, accumulation time, selection of warning thresholds, or bias corrections will be discussed. Additional to traditional verifications of area average precipitation amounts, the performance of the models to predict the correct precipitation statistics without requiring a point-to-point match will be described by using modern Fuzzy verification techniques. Both analyses reveal significant advantages of deep convection resolving models compared to coarser models with parameterized convection. An intercomparison of the model forecasts themselves reveals a remarkably high variability between different models, and makes it worthwhile to evaluate the potential of a multi-model ensemble. Various multi-model ensemble strategies will be tested by combining D-PHASE models to virtual ensemble systems.