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Verification of operational ECMWF-EPS and COSMO-LEPS precipitation forecasts for the Rhine catchment area

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This paper demonstrates the results of a verification study of precipitation for two probabilistic Numerical Weather Prediction (NWP) models, for the river Rhine, a large river catchment in Central Europe. The operational forecasting system from the Water Management Centre Netherlands produces regular updates of forecasts of discharges and water levels. The primary function of the operational forecasting system is to provide reliable and accurate forecasts during periods of high water. The secondary main function is producing daily predictions for water management and water transport in The Netherlands. In addition, predicting water levels during drought periods is becoming increasingly important as well.

At this moment seven different NWP models are used in the operational system. These different weather predictions should give the forecaster qualitative insight in the uncertainty in a particular weather situation. In this case the suitability of COSMO-LEPS and ECMWF-EPS were compared for precipitation averaged to the 134 Rhine subcatchments with a forecast dataset from 2012 to 2015. Actual precipitation and climatology were derived for each catchment by interpolating from the dense network of precipitation gauges available. The ensemble verification system tool (EVS) was used to calculate verification metrics, such as the RMSE, Mean Error, Brier Skill Score and Relative Operating Characteristic (ROC) Skill Score.

Both the precipitation predictions for COSMO-LEPS and ECMWF-EPS generally demonstrate added value in comparison to the climatology for the Rhine subcatchments, although the forecast skill decreases with increasing lead times. COSMO-LEPS demonstrates a greater accuracy than ECMWF-EPS in general. ECMWF-EPS shows a positive bias for precipitation in this dataset.