EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-323, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

On evaluation of ensemble precipitation forecasts with observation-based ensembles

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Spatial interpolation of precipitation data is uncertain. How important is this uncertainty and how can it be considered in evaluation of high-resolution probabilistic precipitation forecasts? These questions are discussed by experimental evaluation of the COSMO consortium's limited-area ensemble prediction system COSMO-LEPS. The applied performance measures are the often-used Brier skill score (BSS) and a newly developed information skill score. The observational references in the evaluation are (a) analyzed rain gauge data by ordinary Kriging and (b) ensembles of interpolated rain gauge data by stochastic simulation. This permits the consideration of either a deterministic reference (the event is observed or not with 100% certainty) or a probabilistic reference that makes allowance for un-certainties in spatial averaging. The evaluation experiments show that the evaluation uncertainties are substantial in watersheds of a few 1000 km2 and even for the large area (41 300 km2) of Switzerland with a mean rain gauge distance as good as 7 km: the one- to three-day precipitation forecasts have skill decreasing with forecast lead time but the one- and two-day forecast performances differ not significantly. The evaluation experiment is done for the year 2005 with special focus on the August 2005 flood event in Switzerland.