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Probabilistic forecast of daily areal precipitation focusing extreme events

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Adequate forecasting of daily areal precipitation is an important issue in flood forecasting. To provide precipitation fields with a high spatial resolution usually dynamical downscaling methods are used. Unfortunately, their forecasts have a high uncertainty concerning intensity and location especially during extreme events. Alternatively, statistical downscaling techniques can be used which can supply both deterministic and probabilistic forecasts. In the framework of this study a probabilistic forecasting system for daily areal precipitation is developed using statistical downcaling methods. For this purpose two downscaling methods are tested and evaluated: (1) An analogue sorting routine which uses a combination of the Pearson correlation and the euclidian distance. (2) An analogue sorting routine based on a nearest neighbor approach using a local variance reduction technique. The predictor variables are daily geopotential height and daily specific humidity fluxes at 1000, 850 and 700 hPa-level derived from the NCEP/NCAR-reanalysis project. The study is performed for two mesoscale catchments located in the Rhine basin in Germany. Both methods are validated by the jackknife method for a period of 44 years (1958-2001). Additionally, an operational version of this system is developed using data of the global weather forecast model GFS. Besides the outcome of the comparison of both downcaling methods also first results of the operational version are presented.