



Quality control of precipitation data

A. Mathes (1), A. Hense (2)

(1) Institute of Meteorology, (2) Bonn University (amathes@uni-bonn.de)

The Priority Program 'Quantitative Precipitation Forecast' (QPF) is funded by the German Research Foundation (DFG). There will be a general observation period in 2007 in order to validate the results of the various projects combined in the QPF program. A quality control of the observed precipitation data is needed. In order to assess the likelihood of the observed raw data, we developed a conditional probabilistic model for precipitation. Given the large scale atmospheric circulation the probability of precipitation exceeding a threshold is estimated. The model is applied to daily precipitation sums (1985-1999) of 250 rain gauge stations from the German Weather Service (DWD) network in Nordrhein-Westfalen and NCEP reanalysis data. The procedure is based on a generalised linear model (GLM) using logistic regression. Relative vorticity (in 850 hPa), relative humidity (in 850 hPa) and CAPE are used as predictor variables. The statistical model forecasts are validated with the observations in a cross validation modus using the Brier Skill Score (BSS) and the log-odds ratio. The BSS measures the percentage improvement of a forecast over a reference forecast, e.g. climatology. The log-odds ratio applies to a categorical forecast. Every rain gauge station is investigated separately. If the threshold is 0.1 mm for precipitation the model shows good results for the winter seasons; the BSS reaches values between 0.3 and 0.4, while the log-odds ratio reaches values of about 2.5. In spring, summer and autumn the probability forecasts reach also promising results (BSS of about 0.3, log odds ratio exceeding 2). For higher thresholds like precipitation events greater than 10 mm or greater than 20 mm the results are moderate. Currently we test longer time series of observation data (of about 40 years) from selected rain gauge stations in order to improve the robustness of the methodology.