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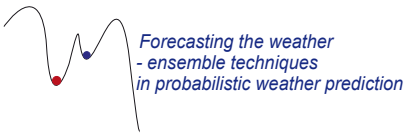

Probabilistic precipitation forecasts based on the COSMO-DE time-lagged ensemble

S. Bentzien and P. Friederichs

Meteorological Institute, University of Bonn, Germany (bentzien@uni-bonn.de)

High-resolution limited area models such as COSMO-DE are particularly developed in order to predict high-impact weather. An important process for extreme weather on the mesoscale is deep convection, which in COSMO-DE is not parameterized but resolved by the model dynamics. Nevertheless, high-resolution model forecasts show systematic errors and ensembles are not well calibrated. Thus reliable forecasts can only be achieved through a combination of dynamical and statistical analysis methods, where a stable and significant statistical model based on a-priori physical reasonings establishes a-posterior a statistical-dynamical model for mesoscale weather prediction.

We present a statistical post-processing for the time-lagged COSMO-DE ensemble in order to obtain probabilistic precipitation forecasts. The time-lagged ensemble consist of four successively started COSMO-DE forecasts. The COSMO-DE model has a horizontal grid spacing of 2.8 km and runs operationally at Deutscher Wetterdienst (DWD). A radar composite as well as rain gauge data are used for statistical model training and forecast verification.

Precipitation is characterized by a mixed discrete-continuous distribution, which consists of the probability of the occurrence and a continuous distribution of the amount of precipitation. Latter is clearly a non-Gaussian distribution. The statistical methods employ logistic regression, generalized linear models, censored quantile regression and extreme value theory. The different approaches are compared using probabilistic verification scores.