Post-processing methods for probabilistic convection forecasts based on the limited-area ensemble COSMO-DE-EPS of DWD

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Mainly in summer strong convective events can occur in Germany. These cases are often associated with severe and high-impact weather. Hence, probabilistic forecasts of such events are of increased interest in weather warnings in general and in aviation forecasts and air traffic management in particular. The main goal of the project is to develop a post-processing probabilistic convection forecast in order to support the air traffic management in decision making processes.

The probabilistic forecasts are based on the convection-permitting ensemble prediction system COSMO-DE-EPS, running in operations at DWD (German Meteorological Service) since May 2012. We develop post-processing products in the form of threshold-exceedance probabilistic products from direct model output (DMO) variables or so called indirect model output (IMO, e.g. thunderstorms), which are determined by a regression of DMO variables. An essential part of the development of regression methods is the use of observational data for training and verification. Pairs of observations of events (as predictands) and DMO EPS forecasts (as predictors) are used to quantify the underlying relation, which is then used as forecast directive for IMO parameters. The predictor selection is done here with the LASSO (least absolute shrinkage and selection operator) method. Logistic regression shows a gainful performance for extreme events, such as heavy precipitation in former studies and is therefore taken into account here, too.