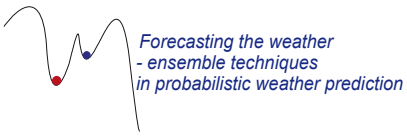
EMS Annual Meeting Abstracts
Vol. 8, EMS2011-618, 2011
11th EMS / 10th ECAM



WarnMOS - A MOS-based weather warning guidance

S. Trepte
Deutscher Wetterdienst, Central Development, Offenbach, Germany (sebastian.trepte@dwd.de)

MOS (Model Output Statistics) is a standard method of forecasting model post-processing. It is used by many Weather Services to adapt the direct model output on local sites providing optimized guidance to human forecasters or as a fully automatic system. MOS can remove model biases or derive additional parameters which are not forecasted by the model itself, e.g. probabilistic elements or weather conditions. Adjacent to the single-station downscaling of MOS, it also can be used for interpretation on regular grids or on areas such as counties.
The MOS system WarnMOS of the Deutscher Wetterdienst gives an automatic warning guidance on the nowcast and very short-term scale. Probability forecasts are calculated for German counties based on model forecasts (GME and IFS), synop reports, and high frequent observations of precipitation radar and lightning strikes (remote sensing). The linear regression equations are derived for synop stations which are clustered for regions with similar climate characteristics resulting in multi-station equations. For this reason rarely observed events become more representative and give more stable statistical relationships due to the larger number of cases. So-called observation-advection predictors for synop, radar and lightning are introduced which account for the short-term influence of upstream observations. Operationally a trajectory path is calculated at the county centre point for the five most representative stations around. The derived current observation at this point is the weighted mean of the nearest observations.
Since WarnMOS should give probabilities that an event occurs somewhere within the county a translation from (county centre) point forecast probability to area probability takes place using empirical autocorrelation functions which also account for the county size.
WarnMOS runs every 15 minutes with current remote sensing data, every hour with current synop observations and every 12 hours with new model forecasts. A large number of single predictands (more than 170) is calculated due to the many different reference periods which range from 1 hour to 48 hours. A system of rules condenses these forecasts to obtain the warning elements specified for operational use at the DWD.
WarnMOS forecasts serve as one warning proposal besides other DWD systems. The goal is to provide an integrated high-resolution grid-based warning field as an automatic proposal. Therefore the WarnMOS multi-station equations are mapped in two steps on a 1-km-grid in consideration of high-resolution ground level elevations.