



Model Output Statistics for Point Forecasts at Deutscher Wetterdienst: Current Status and Future Developments

Andreas Veira (1), Reinhold Hess (1), Sebastian Trepte (1), Gernot Vogt (1,2), and Bernhard Reichert (1)

(1) Deutscher Wetterdienst, Research and Development, Offenbach am Main, Germany, (2) Now at: TNL Umweltplanung, Weiden, Germany

Point forecasts based on Model Output Statistics (MOS) represent an important and well-established part of the Deutscher Wetterdienst (DWD) portfolio. Based on historical data sets of numerical weather prediction models and observations, equations of statistically optimized forecasts are derived by means of multiple linear regressions. In a related probabilistic-based MOS-System, logistic regression is used for probabilistic parameters. The MOS system implicitly corrects model biases resulting from simplifying parametrizations as well as limited model resolution. Thus, it adapts the forecasts to the specific characteristics of a location, e.g. orographic features. In a first step, the regression techniques are applied separately to forecasts of the ICON model provided by DWD and the IFS provided by ECMWF. In a second step, a statistically optimized combination of the two individual MOS forecasts into one 'mixed' forecast product called 'MOSMIX' is calculated.

MOSMIX offers operational forecasts for more than 250 predictands including basic deterministic surface weather variables like 2m-temperature as well as derived probabilistic parameters, e.g. probabilities for the exceedance of specific wind gust thresholds. These point forecasts are available for more than 4500 locations worldwide. In order to provide not only optimized medium range forecasts, but also rapidly updated short-term forecasts, MOSMIX has recently been further developed at DWD. Previously, MOSMIX forecasts have been calculated every six hours with a forecast step of three hours. The new system now provides hourly updates which include the latest observations as well as model runs. Thus, optimized hourly forecasts up to 240 hours in advance are made available 24 times a day. The analysis of statistical scores for surface weather parameters indicates that the DWD MOSMIX represents one of the best systems for medium-range point forecasts in Europe. Due to the newly implemented rapid update cycle, this system can also be used as an objective guidance for the first 6 to 12 forecast hours.

In our presentation we will show an overview of the further developed DWD MOSMIX system, an extended verification analysis and an outlook of current and future plans. These include the operationalization of recently implemented features like optional weather status variables which are designed to provide early warning signals for operational forecasters and the novel development of a MOSMIX based Air Quality MOS system as an optimized operational air quality forecasting product.