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Spatial calibration of Ensemble Forecasts Using High Resolution Analyses

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Ensemble prediction systems are designed to account for errors or uncertainties in the initial and boundary conditions, imperfect parameterizations, etc. However, due to sampling errors and underestimation of the model errors, these ensemble forecasts tend to be underdispersive, and to lack both reliability and sharpness. To overcome such limitations, statistical postprocessing methods are commonly applied to these forecasts. In this study, a full-distributional spatial post-processing method is applied to short-range precipitation forecasts over Austria using Standardized Anomaly Model Output Statistics (SAMOS). Following Stauffer et al. (2016), observation and forecast fields are transformed into standardized anomalies by subtracting a site-specific climatological mean and dividing by the climatological standard deviation. Due to the need of fitting only a single regression model for the whole domain, the SAMOS framework provides a computationally inexpensive method to create operationally calibrated probabilistic forecasts for any arbitrary location or for all grid points in the domain simultaneously.
Taking advantage of the Integrated Nowcasting through Comprehensive Analysis (INCA) system, high resolution analyses are applied for the computation of the observed climatology and for model training. The INCA system operationally combines station measurements, remote sensing data and NWP model data into real-time objective analysis fields at 1 km-horizontal resolution and 15min - 1h temporal resolution. The forecasts used in this study are obtained from the limited area model ensemble prediction system ALADIN-LAEF, which consists of 17-members at a horizontal resolution of 11 km and a temporal resolution of 1 hour.
Results for spatial calibration of temperature, wind and precipitation forecasts and the added value of exploiting high-resolution analysis fields will be demonstrated.