



Post-Processing of NWP Models Forecasts: Case of Denmark and Greenland

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Any Numerical Weather Prediction (NWP) model generates forecasts with some degree of accuracy. Although NWP forecasts are continuously improving through more advanced model resolutions, refining existing and developing new parameterizations for physical processes, detalization of land-cover/use properties, etc. the verification results show that forecasts still have errors. As a possible solution, statistical corrections to forecasts can be applied. For that, in our study, the developed method uses forecasted meteorological parameters (2m air, dew point, and surface temperatures as well as 10m wind speed) and observations covering only a pre-historical period (up to 30 days). For faster calculations, the singular value decomposition method is applied. Afterwards, additional improvement/adjustment of forecasts is based on generated statistics of forecasted meteorological parameters. The DMI operationally runs two NWP models - HIRLAM (High Resolution Limited Area Model) and HARMONIE (Hirlam Aladin Regional/Meso-scale Operational NWP In Europe) for domains with Denmark and Greenland in focus. The HIRLAM-SKA model is run for Denmark at about 3 km horizontal resolution, and HIRLAM-K05 model is run for Greenland at 5 km horizontal resolution (these models runs are performed at 00, 06, 12, and 18 UTC). The HARMONIE-GLB is run for Greenland at 2.5 km horizontal resolution (runs at 03, 09, 15, and 21 UTC); and HARMONIE-DKA is run for Denmark at 2.5 km as well (at 00, 03, 06, 09, 12, 15, 18, and 21 UTCs). The statistical procedure (so-called NWPStatCor) for correction of the air temperature and wind speed forecasts is running for all models outputs covering 48 h forecast length. For each synoptical station, the steps are extraction of both observation and model forecast data, assigning these data to corresponding forecast lengths, calculation of statistical correction and evaluation of model performance (before vs. after correction applied). Long-term month-to-month verification results including changes in bias, mean absolute error, hit-rate, percentage of corrected cases, etc. for Denmark and Greenland synoptical stations for outputs of both models are presented and evaluated.