



Estimating the value of regional reanalyses from the UERRA inter-comparison

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Regional reanalyses provide commonly requested meteorological parameters like wind speed, radiation, temperature and precipitation. Here uncertainty estimates are discussed resulting from the inter-comparison of three European regional reanalyses (based on numerical weather models COSMO, UM and HARMONIE-ALADIN), several downscaling products (based on MESCAN) and the observation-based E-OBS dataset recently produced within the EU FP7 project Uncertainties in Ensembles of Regional ReAnalysis (UERRA). All the regional reanalysis cover the region of Europe (CORDEX area). Commonly used meteorological parameters at various model, height and pressure levels are stored in the UERRA archive, allowing a detailed comparison. Here we compare with station data, gridded station data and satellite data, and discuss skill scores used in numerical weather prediction verification. The performance of the regional reanalyses depends on the location, the season and on the spatio-temporal scale of interest. Most pronounced is the value of reanalyses in locations of data sparse areas, where the numerical weather models are superior in transporting information compared to the traditional gridding procedures. For wind speed at heights relevant for wind energy, an added value over ERA-Interim could be demonstrated for all UERRA reanalyses products. Radiation fields show a model-dependent bias against satellite data. Station temperatures were generally found in agreement, however with a bias becoming severe for the (moderately) extreme values, with potential pitfalls for threshold applications such as climate indices. Comparisons of the precipitation fields in different areas of Europe demonstrate that the various reanalysis excel in different regions, coinciding with the respective areas the models are applied operationally. The multi-model ensemble was found to provide better uncertainty estimates than the ensemble of one model alone.