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Which model deficits survive in regional reanalysis and which are blown away?

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Energy system models need to have reliable and robust weather input data to simulate over many years the production of energy and the flow within the power grid. For weather data we rely on reanalysis/hindcast products which deliver various data of interest in 3D-space and time.
With respect to renewables the main challenge is that all information needed is related to variables hard to incorperate in a reanlysis framework: e.g. the radiation as final product of non-linear atmospheric interaction or the wind located at levels above the surface.
Therefore, not only reanalysis products but also hindcasts based on large-scale constraints and pure hindcasts are analyzed for their quality- with a focus on the planetary boundary layer.
Different measurement towers and remote sensing devices spread over Europe are taken as reference data for model evaluation. The profiles of temperature, humidity and wind speed are investigated and the different reanalysis products are intercompared. The intercomparison reveals the strength and weaknesses of each member. In addition, it is highlighted where the reanalysis systematically reduces model deficits compared to a hindcast, but also which model errors survive in the reanalysis. The verification aims to distinguish between different atmospheric regimes and furthermore assesses the temporal consistency of lower tropospheric variability by means of correlation and ramp statistics.
Finally, the turbulence intensity is analyzed because it originates from a complex interaction between the different variables mentioned before. Although the turbulence statistics is not explicitly resolved by the recent reanalysis products, the effect of turbulent fluxes on the mean atmospheric fields can be parameterized. It is shown to which extent the models are able to represent the mean characteristic of deviations from mean wind field.