



Comparison of measure-correlate-predict approaches

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The process of transformation of measured short-term wind data series to the long-term wind climate at the measurement site is a major source of uncertainty in wind resource assessment. The common approach is application of a measure-correlate-predict (MCP) method, which is based on the relationship between the local short-term measurement and a long-term reference wind data series.

The object of the proposed presentation is a comparison of various MCP methods and various reference data. The tested MCP methods include a simple method of ratios, linear regression methods, a matrix probability-based method and a "null method" just reproducing the measured short-term data. The methods were tested in various arrangements. For example, the data were grouped by various number of wind direction sectors at a reference site, by season or by daytime. The tested reference data series include a near-by wind measuring stations and wind data from reanalyses NCEP/NCAR, MERRA and ERA Interim. For reanalyses, the data from different pressure or height levels were investigated and the geostrophic wind was tested as an alternative to the original model wind. . Comparison of methods confirmed that grouping into 12 or 36 wind direction sectors strongly improves the MCP performance. In other aspects the result depended on individual qualities of the target/reference wind series pair. By comparison of reference data sources, the reanalyses were found to be at least competitive to using the near-by surface wind measurement. The best results were provided by the wind simulated by ERA Interim at 1000 hPa level and by MERRA at surface levels (2m, 10m and 50m), even though the ERA Interim data are of much coarser time resolution (6h) than MERRA (1h). The geostrophic wind provided slightly less accurate results than the original model wind.