

Changes in northern European wind climate: climate models and observational data

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Abstract

Future changes in the wind climate can be simulated by climate models. As global climate models operate at relatively coarse horizontal scales they do not provide adequate information on smaller scales. Dynamical downscaling by regional climate models can improve the situation by providing information on finer horizontal scales, typically 10-50 km. The regional climate model adds local and regional detail to the large scale features that are mostly determined by the global model. The more explicit resolution of fine-scale structures in land-sea distribution and orography together with a better representation of relevant atmospheric processes helps in improving the useability of the results on these finer scales. In the presentation results from a regional climate model will be presented both for the last couple of decades in the 20th century as well as for a range of climate change scenarios for the 21st century. The simulation of the 20th century with so called perfect boundary conditions from an atmospheric reanalysis on the boundaries of the regional climate model allows us to evaluate it against the observed climate. Here, both direct wind observations and indirect measures as the geostrophic wind (calculated from differences in surface pressure at different locations) can be used. For the future climate the relatively large range of regional climate change scenarios allows us to explore some of the uncertainties related to climate change. These are; uncertainties in emissions of greenhouse gases and thereby forcing, uncertainties in model response to a changing forcing and uncertainties related to the natural variability in the climate system which may obscure changes and trends.