



Development of a wind energy climate service based on seasonal climate prediction

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Climate predictions tailored to the wind energy sector represent an innovation to better understand the future variability of wind energy resources. At seasonal time scales current energy practices employ a simple approach based on a retrospective climatology. Instead, probabilistic climate forecasting can better address specific decisions that affect energy demand and supply, as well as decisions relative to the planning of maintenance work. Here we illustrate the advantages that seasonal climate predictions might offer to a wide range of users and discuss the best way to provide them with this information.

We use the predictions of 10-meter wind speed from the ECMWF seasonal forecast System 4 (S4). S4, as every operational seasonal forecast system, is affected by a range of biases. Hence, to produce usable climate information from the predictions, different bias-adjustment techniques and downscaling methods should be applied, their choice depending on the user requirements. An ensemble of post-processing methods is described, and their relative merit evaluated as a function of their impact of the characteristics of the forecast error and the usability of the resulting forecasts. Both reanalyses (ERA-Interim, JRA-55, MERRA) and in-situ observations are used as observational references. As an illustration of the downstream impact of the forecasts as a source of climate information, the post-processed seasonal predictions of wind speed will be used as input in a transfer model that translates climate information into generated power at different spatial scales.