

Extreme Wind Calculation Applying Spectral Correction Method – Test and Validation

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This paper presents a test and validation of extreme wind calculation applying the Spectral Correction method.

The test and validation is based on four sites located in Denmark, one site located in the Netherlands and one site located in the USA, comprising both on-shore and off-shore sites.

Extreme wind calculations have been carried out using measured wind data from on-site meteorological masts as well as long-term reference wind data.

For each of the six sites, the extreme wind speeds were estimated from the spectral correction method and – for reference – by two traditional methods: the Annual Maxima (AM) method and the Peak Over Threshold (POT) method applied to the entire wind data period from the on-site Met mast. The Spectral Correction method was applied to each site to estimate a number of predicted extreme wind speeds from a number of one-year periods from the on-site Met mast in combination with an appropriate (CFSR or CFDDA) long-term reference wind data set. The accuracy of the Spectral Correction method was validated by comparing the average of the predicted extreme wind speeds (Spectral Correction method) to the two observed extreme wind speeds (AM and POT methods). The consistency of the Spectral Correction method was validated by checking the standard deviation of the predicted extreme wind speeds by this method.

For all six sites, the Spectral Correction method was found to be quite accurate and very consistent when applied to one-year on-site wind data periods.

It is concluded that the Spectral Correction method in combination with widely available long-term reference data is a valid alternative to estimate extreme winds in cases where only short-term on-site measured wind data are available.

(275 words)