



Probability Density Functions for Wind Speed in Various Terrain

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A dataset consisting of 10 years of wind speed observations with a temporal resolution of 1 hour at 72 automatic weather stations in Iceland has been explored. The wind frequency distribution is characterized by the Weibull distribution which has two parameters, a shape factor and a scale factor. The shape factor ranges between 1 and 2 and the scale factor from 3 to 9, giving large variability in the apparent frequency distributions of the wind speed.

A closer examination of the data reveals a dependency of the distribution attributes to topographical and surface characteristics at each observation site. Both the shape factor and the scale factor are relatively high at sites with a smooth surface, far away from major topographic obstacles. However, weather stations in the vicinity of relatively rough surfaces and close to mountains tend towards having distributions with low values of the shape and the scale factors.