

Statistical Modeling for Wind Direction and Velocity in Utradith, Thailand

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Abstract: Wind is air in motion relative to the earth's surface. Its principal characteristics are its direction, speed, and gustiness. The wind characteristics are widely varied with time and localities. The objectives of this study are to analyse wind characteristics and improve the method for plotting continuous graphs for wind directions in visualization part. In this study, the data were collected at Utradith automatic weather stations (AWS) in Thailand from year 2011 to 2015 and converted to hourly data. The graphical methods were used to visualize wind data and statistical models were fitted such as binary logistic regression, linear time-series model and multinomial logistic model. The autocorrelation were handled and filtered, non-normality, and speed-direction association were checked. The results revealed that applying logistic regression to averages in four-hourly periods for different speed-direction sectors provides an appropriate methodology, and areas under Receiver Operating Characteristic (ROC) curves are useful for comparing goodness-of-fit of models. Application of this study can be applied to wind data of other area worldwide (with the same data structure and file format). The wind cycles can be shown by plotting continuous graphs and trend can be investigated by plotting 95% confidence intervals over time.

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