FITTING WIND SPEED TO A PROBABILITY DISTRIBUTION USING MINIMUM DISTANCE ESTIMATION TECHNIQUE

BY

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Abstract

From the past studies, we realized that minimum distance estimation technique is not commonly used for fitting wind speed data to a distribution yet it is believed to the best alternative for Maximum Likelihood Estimation (MLE) method which is known to give good estimates than Least Square Estimates (LSE) and Method of Moments (MOM). To achieve this, the study aims at fitting data to a probability distribution using minimum distance estimation techniques to find the best distribution. The study uses wind speed data from five sites in Narok county namely; Irbaan primary, Imortott primary, Mara conservancy, Oldrkesi and Maasai Mara University. The best wind speed models were examined using the Cullen and Frey graph and a suitability test on the models done using Kolmogorov-Smirnov statistical test of goodness of fit. The wind speed data are fitted to the recommended distributions using minimum distance estimation techniques. The best distribution was identified using Akaike's Information Criterion (AIC) and Bayesian Information criterion (BIC). From the distribution comparison for the two and three parameter distributions, gamma is the best in all cases. Gamma with three parameter distribution gives lower AIC and BIC values and model comparison test showing that gamma 3parameter is the better than gamma with 2-parameters. The study concluded that gamma distribution with three parameters is the best distribution for fitting wind speed data with the three parameters given as; threshold parameter of 0.1174, shape parameter of 1.8646 and scale parameter of 0.9937.

Key words: Wind speed, probability distribution