Efficiency Test Between MLE and MDE Fitting Techniques Department of Mathematics & Physical Sciences, Maasai Mara University, Kenya

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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 accurate 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 maximum likelihood estimation and minimum distance estimation techniques to find the best and efficient 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 distributions 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 maximum likelihood estimation and minimum distance estimation techniques. The best distribution was identified using Akaike's Information Criterion (AIC) and Bayesian Information criterion (BIC) and efficiency was investigated using relative efficiency. The study conclude that MLE is the efficient estimation technique and gamma distribution with three parameters is the best and efficient distribution for fitting wind speed data with the three parameters given as; threshold parameter of 0.1174, shape parameter of 2.0718 and scale parameter of 1.1209.

Key Words: Efficiency test, wind distribution, speed