

Generalized Extreme Value Regression with Binary Dependent Variable: An Application for Predicting Meteorological Drought Probabilities

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Abstract : Logistic regression model is the most used regression model to predict meteorological drought probabilities. When the dependent variable is extreme, the logistic model fails to adequately capture drought probabilities. In order to adequately predict drought probabilities, we use the generalized linear model (GLM) with the quantile function of the generalized extreme value distribution (GEVD) as the link function. The method maximum likelihood estimation is used to estimate the parameters of the generalized extreme value (GEV) regression model. We compare the performance of the logistic and the GEV regression models in predicting drought probabilities for Zimbabwe. The performance of the regression models are assessed using the goodness-of-fit tests, namely; relative root mean square error (RRMSE) and relative mean absolute error (RMAE). Results show that the GEV regression model performs better than the logistic model, thereby providing a good alternative candidate for predicting drought probabilities. This paper provides the first application of GLM derived from extreme value theory to predict drought probabilities for a drought-prone country such as Zimbabwe.

Keywords : generalized extreme value distribution, general linear model, mean annual rainfall, meteorological drought probabilities

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