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## **DEVELOPMENT OF LONG MEMORY MODEL TO FORECAST WEEKLY RAINFALL**

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Awareness of pattern of weekly rainfall and its variability facilitate to make effective decisions with respect to climate monitoring. Though various statistical and non statistical techniques have been developed for rainfall modeling with increasing degree of accuracy, there is still a noticeable gap for prediction of rainfall. The aim of this study was to model weekly rainfall in context of long memory along with the conditional heteroskedasticity. Weekly rainfall data (1990-2017) in Colombo city was obtained from the Department of Meteorology, Sri Lanka. Of the various types of long memory models developed for weekly series, the best fitted model is ARFIMA-GARCH for deseasonalized data. The model was trained using weekly rainfall data from 1990 to 2014 and validated using weekly data from 2015 to 2017. The forecasting performance of the new model is not much diluted with the increase of the forecasting length. The exact maximum likelihood estimation method was utilized to estimate the model parameters, and Monte Carlo simulation was carried out with various fractional differencing parameters to evaluate the suitability of the estimation method. The simulation study provided the empirical evidence to optimal accuracy of parameter estimation. The best fitted model developed is ARFIMA-GARCH for deseasonalized data. The forecasting performance of the model was evaluated based on the novel index developed using absolute error for an independent data set in addition to the classical indicators. The novel long range dependency model is recommended to be used in forecasting weekly rainfall in Colombo city in Sri Lanka.

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