

STATISTICAL MODELING OF EXTREME DAILY RAINFALL IN
COLOMBO

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The occurrence of heavy rainfalls in Sri Lanka results in significant damage to agriculture, ecology, infrastructure systems, disruption of human activities, injuries and the loss of life. The modeling of extreme rainfall has to be developed to manage the natural resources and built environment to face the impacts of climate change. The main goal of this study is to find the best fitting distribution to the extreme daily rainfalls measured over the Colombo region for the years 1900-2009 by the maximum likelihood approach. The study also predicts the extreme rainfalls for return periods and their confidence bands. In this study extreme rainfall events are defined by two different methods; (1) the annual maximums of the daily rainfalls and (2) the daily rainfalls exceed some specific threshold value. The Generalized Extreme Value distribution and the Generalized Pareto distribution are well fitted to data corresponding to the methods 1 and 2 to describe the extremes of rainfall and to predict its future behaviour. Finally, we find the evidence to suggest that the Gumbel distribution provides the most appropriate model for the annual maximums of daily rainfall and the Exponential distribution gives the reasonable model for the daily rainfall data over the threshold value of 100 mm for the Colombo location. Further we analysed 2, 4, 7 and 10 days rainfall and the rainfall during four seasons by considering the annual maximums. We derive estimates of 5, 10, 20, 50 and 100 years return levels and its corresponding confidence intervals for extreme rainfalls.

Keywords: Annual maximum, Threshold value, Generalized Extreme Value distribution, Pareto distribution, Maximum likelihood estimation