

TECHNIQUES FOR ESTIMATING SHORT DURATION DESIGN STORMS IN SOUTH AFRICA

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The limited amount and general unreliability of continuously recorded rainfall data has resulted in two approaches being developed for the estimation of short duration (< 24 h) design storms in South Africa. Both approaches utilise the characteristics of longer duration rainfall to estimate shorter duration design storms.

One method developed combines a regionalised index-storm approach with the scaling characteristics of extreme rainfall. Quantile growth curves have been developed for a range of durations for fifteen relatively homogenous clusters of rainfall stations in South Africa. Clusters were identified using site characteristics and evaluated independently for homogeneity using at-site data. At each location the growth curves for each duration are re-scaled using index values which are scaled from the more reliable and abundant rainfall recorded manually at daily intervals.

The second approach utilises a synthetic rainfall series generated using a modified Bartlett-Lewis Rectangular Pulse Model. The parameters of the model are derived both from the characteristics of the daily rainfall data and from characteristics for shorter durations rainfall, which are scaled from the daily rainfall data. The characteristics of and design storms computed from the synthetic rainfall series are good for durations as short as 1 h when the model parameters are derived using only daily rainfall data.