

## **Storm rainfall study for Rio de Janeiro State, Brazil**

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Storm rainfall often cause considerable material damage and human loss. In order to avoid such disasters, the design of hydraulic structures (stormwater systems, culverts, sewers, dams) and flood plain occupation planning must take into account the risks associated with the occurrence of heavy storms. These risks are estimated by statistical analysis of temporal series of recording raingauge data, from which the intensity and duration of events can be estimated. This study has been motivated by recent episodes of extensive damages caused by heavy storms in Rio de Janeiro state, and by observing that the last state-wide statistical study has been carried out in the late fifties. In addition, the quality of that previous study has been limited by the statistical interference methods available at the time, and by the absence of a reasonable number of recording raingauge stations. The present study is based on data recorded at 44 raingauge stations, spread throughout the state's territory. In addition to this expressive volume of data, contemporary methodologies of regional analysis, based on the so-called L-Moments, improve parameter and quantile estimates, as associated to the probability distributions of extreme rainfall intensities. By defining homogeneous regions over the state of Rio de Janeiro, the intensity-duration-frequency (IDF) curves are estimated for each region, providing a good basis for defining the characteristic reference variables as used to design hydraulic structures and stormwater drainage systems.