



Application of block maxima model to Madeira Island's maximum annual rainfall data

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Madeira is a Portuguese island located in the Atlantic Ocean off the Northwest African coast, between latitudes $32^{\circ}30'N - 33^{\circ}30'N$ and longitudes $16^{\circ}30'W - 17^{\circ}30'W$, that presents a significant number of rainfall-induced flash floods along its history. The generalised extreme value distribution is widely used for modelling extremes of natural phenomena, being this distribution also used in this study to model the available data. Under a block maxima model or Gumbel's approach, with the annual maxima obtained from the data provided by the Portuguese Institute of Sea and Atmosphere, the Gumbel and the generalised extreme value distribution parameter estimates are determined by the method of maximum likelihood. In addition, the estimates and confidence intervals for return levels of 50 and 100 years are obtained. Also, the fitted Gumbel and generalised extreme value distributions in the statistical modelling of annual maxima rainfall in Madeira Island are compared.

Keywords: extreme rainfall; extreme value distributions; maximum likelihood; return levels.

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