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Statistical analysis of high resolution rainfall data from Coimbra, Portugal

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A correct characterization of the rainfall process along infrastructures like a high-speed rail system is very important, as it represents a hazard that can easily damage these systems and cause accidents. A risk analysis of the rainfall process is necessary, for example, for the assessment of flood hazard. This work presents an exploratory analysis of point rainfall data from Coimbra, which will be crossed by the future high-speed rail track that is being designed for Portugal.

Coimbra meteorological station of IGUC - “Instituto Geofísico da Universidade de Coimbra”, one of the oldest of Europe, was installed in 1864 at a town hill (Coimbra, Portugal), 141 m altitude. The siphon udograph daily charts from 1935 to 2005 (approximately 25000 charts) were recently digitalized. The daily charts have the x-axis graduated in ten minutes intervals and the y-axis in decimal of millimetre, having a maximum value of 10 mm. The dataset was digitalized by INAG, the Portuguese Water Institute, using the SIFDIA program that allows one minute discretization.

Some of the most representative statistical characteristics of the time series are investigated in order to have a first insight into the behaviour of this long historical rainfall record. Also, characteristics of rainfall extremes are investigated using methods based on annual maxima series and peaks over threshold values.

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