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Estimation of the flash floods evolution in Barcelona County since the Middle Age until the 20th century

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Every year, during the summer or at the beginning of the autumn, some heavy rainfall events of a great intensity produce some flash flood events in the NE of Spain, and, particularly, near the Barcelona city. Usually the maximum cumulated rainfall is less than 100 mm, with instantaneous intensities above 5 mm/min, but more than a 75% of this rainfall with more than 35 mm/h of 5-min intensity. Depending on the orography, human settlements and other factors, flash floods can produce catastrophic impacts: flash flood cases like July 2002, June 2000, September 1995 and September 1962. However, the research in historical climatology shows that this is a natural behaviour in this region in despite of natural climatic variability. Reconstruction of historical flood chronologies for the past 750 years can identify different patterns of rainfall events. Sometimes, these chronologies contain some indirect or direct meteorological information about a flood event that allows determining if it could be considered as a flash flood event or not. The first case recorded in Barcelona was in September 1389, but other catastrophic events occurred in June 1500, September 1678 or October 1843. The case of Barcelona allows study 4 patterns of human answer in front of this natural hazard: a) human settlement accepting natural conditions; b) structural protections (walled perimeters with hydraulic functions); c) living with the natural conditions without agreement with the phenomena (urban growing with no planning or prevention); d) non obstructive structural actuations (drainage networks). This contribution shows the frequency of those events, into the framework of all the floods produced in Barcelona since 14th century, but also the description of the flooded area, impacts and weather conditions for any of most severe events.