



## **Maximum rain intensity and discharge of the Santa Tecla flash flood (1874) in Conesa (Catalonia, NE Iberian Peninsula) from the step-backwater method and hydrological modelling**

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Flash floods cause most of the deaths and economic loss due to natural risks in the western Mediterranean region. However, these phenomena have not been deeply studied so far. In this study, we provide new results for the analysis of one of the most devastating flash floods in Catalonia: 22-23 September 1874, known as Santa Tecla floods. More specifically, we studied this flood in the small town of Conesa, in the headwaters of the Corb River basin.

We have calculated the flood's peak flow and the rainstorm's hyetograph using flood marks and hydraulic and hydrological models. The hydrological model was calibrated with the 2 September 2015 flood event.

Santa Tecla flood in Conesa was caused by a rain of 188 mm in six hours, with a maximum intensity of 84 mm·h<sup>-1</sup>. The peak flow was 60 m<sup>3</sup>·s<sup>-1</sup> that, in a 3.2 km<sup>2</sup> basin is a specific peak flow of 18.7 m<sup>3</sup>·s<sup>-1</sup>·km<sup>-2</sup>. These numbers confirm the exceptional quality of the event, and place it among the most extreme known events in the Mediterranean region. It has an approximate return period of 500 years. A sensitivity analysis on the hydrologic modelling estimated a minimum error of 10-15%, which is acceptable in this kind of study.