Historical extreme values on Mediterranean floods in Languedoc-Roussillon, France, within the INONDHIS-LR project

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This paper presents the main steps of a flood frequency analysis using historical data: a) identification and collection of historical floods from archive sources; b) reconstruction of flood discharges by hydraulic modelling taking into account morphological changes; c) flood frequency analysis (FFA) based on a set of systematic data and a set of historical floods. A Bayesian frequency analysis is performed with two kinds of uncertainties, random errors related to the water level readings and systematic errors related to over- or underestimation of the rating curve. An application to several French Mediterranean catchments shows that the uncertainty affecting discharges should be carefully evaluated and taken into account in the FFA. The introduction of historical data has two opposite effects on the quantile confidence interval, with a reduction of the sampling uncertainty, and additional uncertainty on old discharge. It can therefore decrease or increase the final uncertainty on extreme events, as shown with the various case studies.