

Spatial and temporal flood variability in the Ebro Basin (Iberian Peninsula) since 1600 AD



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The Ebro River (Iberian Peninsula) has two very distinct runoff-producing sub-catchments: Upper Ebro (rainy Oceanic climate, mainly) and Segre-Cinca system (Mediterranean climate, mainly). We here compare the systematic and the historical flood records of Zaragoza (Upper Ebro), Lleida (Segre) and Tortosa (Lower Ebro), for spatial and time variability in floods since 1600 (Figure 1).

The period 1650-1750 seems to be of low occurrence of extreme floods in all three sites; 1750-1950 has a higher frequency of this kind of events; since 1950, reservoirs have reduced this frequency (1st column in Figure 2).

In Upper Ebro (Zaragoza), ordinary and extraordinary flows seem to fall in a single line when plotted against their return period, whereas both in Segre (Lleida) and Lower Ebro (Tortosa), these two types of data produce two distinct populations (2nd column in Figure 2). These could be caused by differences in the flood-causing meteorological processes and in the hydrological behaviour of the sub-catchments.

Moderately high flows (i.e. ordinary annual maxima) occur in Tortosa mainly in winter and spring and most come down from Upper Ebro (Zaragoza, 3rd column in Figure 2). Extreme high flows (i.e. the greatest historical floods) occur in Tortosa mainly in autumn and most come down from Segre-Cinca (Lleida, 4th column in Figure 2).

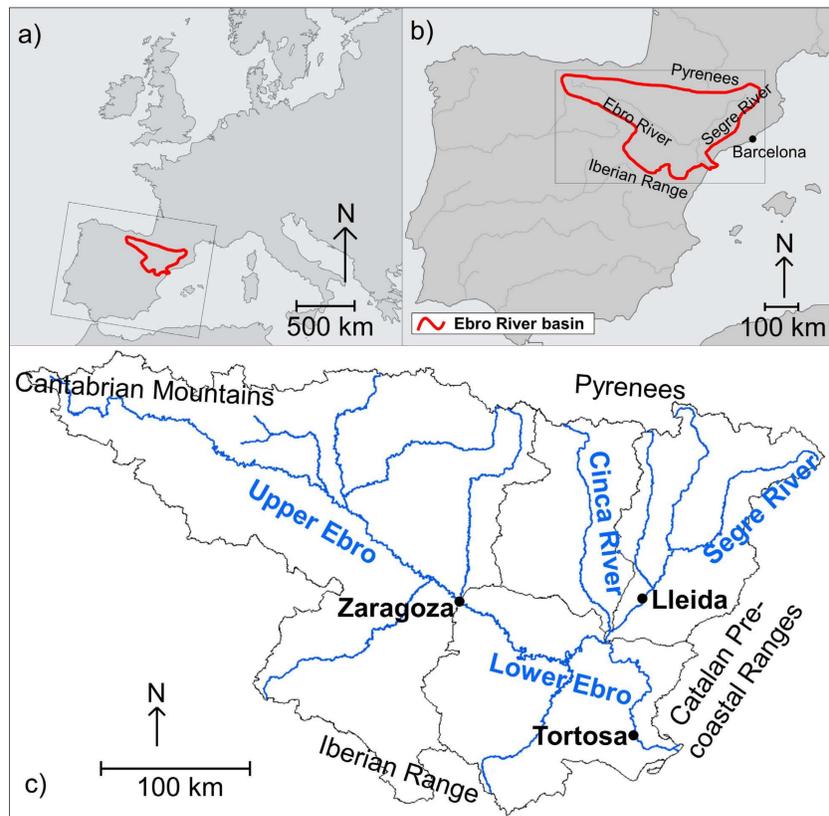


Figure 1. Location of the towns of Zaragoza, Lleida and Tortosa, within the Ebro basin. Source: Own elaboration from a map Copyright © 2009 National Geographic Society, Washington, D.C.

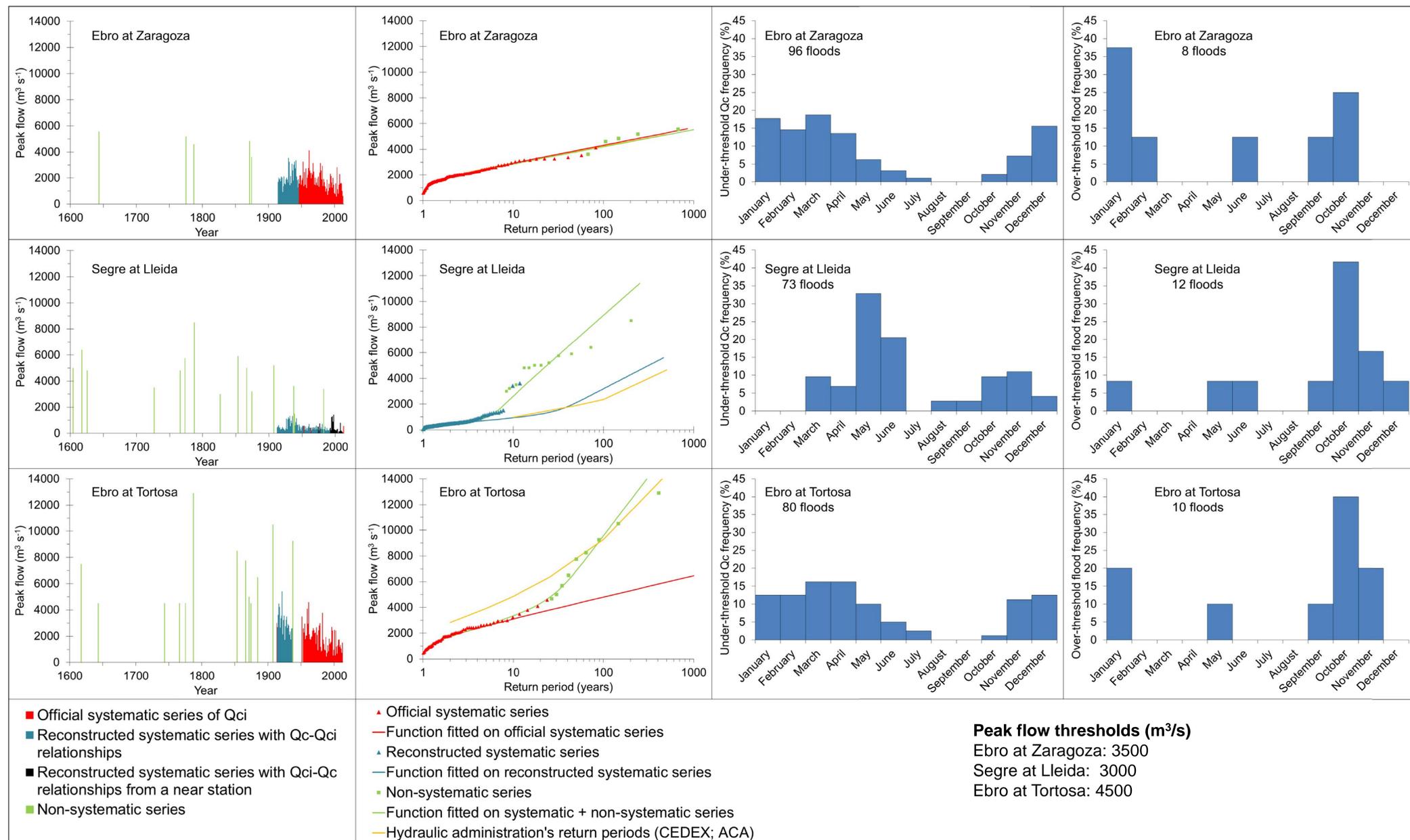


Figure 2. Peak flow series (1st column), TCEV function fit (2nd column), month of occurrence of under-threshold Q_c and over-threshold floods within the systematic series (3rd and 4th columns) in Zaragoza, Lleida and Tortosa.