



## **Palaeoflood response to climate and landuse changes in a Mediterranean river (Castellón, NE Spain)**

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The Rambla de la Viuda (drainage area of 1500 km<sup>2</sup>) is a Mediterranean ephemeral river, dry most of the year. The fluvial geomorphology of the rambla is dominated by transversal bars typical of short-lived flows. The short-lived and occasionally large floods, are produced by mesoscale convective systems fed by humidity from the Mediterranean sea during autumn months. For the past 120 years the largest floods recorded took place in: 1920, 1962 y 2000.

The study rambla has recorded an excellent palaeoflood archive from which hydrological and environmental history (landuse and landcover) can be reconstructed.

The methodology used in the study of the palaeohydrological and palaeolandscape changes during the last 500 yrs (sedimentary records timespan) involved: 1) Reconstruction of palaeoflood records ( Stratigraphic description of slack-water flood deposits, Geochronology of individual floods with Radiocarbon and Optically Stimulated Luminescence, and the estimation of discharges associated with the different flood units/features by computing the water surface profiles using one-dimensional hydraulic modeling (HEC-RAS); and 2) Reconstruction of palaeoenvironmental conditions (Edaphological characterization of the soil horizons developed on flood units as well as the textural, geochemical and biomineralogical analysis of all sedimentary units).

Four hydro/environmental phases were identified during the last 500 years, corresponding to different flood magnitud and frequency periods, associated to climate and/or land-use conditions.

A high frequency and high magnitude palaeoflood period took place during the 15th-middle 16th century (Phase I) which seems to correlate in time with general wetter conditions and three main soil development episodes. Another important hydrological period took place until early 18th century (Phase III), though with a low frequency/ high magnitude floods, correlating in time with geochemical evidences of important changes on land use (deforestation and grazing). Poorer developed soils can be found at upper stratigraphic sequences (19th century), culminating sequences (sets) of slackwater flood units.