

## **2D numerical flow modelling of a river reach near to its mouth to assess results of backwater effect.**

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1D hydraulic models are commonly used in reconstruction of historical floods because of their simplicity and a well-tested set of assumptions. Despite this, the development of 2D models is justified to overcome the limitations of 1D models, such as the establishment of 3D channel geometry using DEM files, and the use of additional capabilities. A 2D numerical flow model (IBER) has been applied in a reach of 50 km of the river Ebro, Iberian Peninsula, just upstream from the river mouth.

In the case study the aim was to assess the possible consequences of the backwater effect in two different situations. Firstly, to determine the influence of some natural channel constrictions in generating a relevant backwater effect. Secondly, to determine the development of the same effect along river reaches near to the mouth by cause of strong marine winds from the sea to the coast.

The modelling has been done with several simulated hydrographs concerning the main historical floods (1787, 1907). There were some floodmarks available of those floods in the modelled river reach to test the results. In the case of constrictions influence on development of floods, modelling was relevant to know above which water discharge constrictions were influential. Some of the floodmarks showed this effect. Regarding the influence of strong winds opposed to the flow direction in river reaches near to the mouth in flood stages, modelling was appropriate to test how important this process could be in creating backwater effect and accordingly in creating patterns of water storage.