



Analysis of the influence of the digital elevation model characteristics on hydrodynamic simulations: the case of the Tagus River

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Floods are one of the major and hazardous natural events, with the potential to cause fatalities, displacement of people and damage to the environment, to severely compromise economic development and to undermine the economic activities, as the Floods Directive of the European Union clearly recalls (Directive 2007/60/EC). This Directive establishes a framework for the assessment and management of flood risks. As such, it relies on hydrodynamic simulation of floods. For this a single digital elevation model valid for the whole study area is a requirement and its construction usually implies the use of topographic and bathymetric data collected by distinct equipment and methods, at different times and acquired with a variety of spatial resolutions and accuracies.

In this paper we present a comparison of hydrodynamic simulation results, in flood extension and water elevation level, of a Tagus River flood event cover the period between 5pm of December 29th, 2000 until 1am of January 9th, 2001, by using the combined digital elevation model resampled at a cell size of 15m, 30m and 50m. The study area is a section of 70 km of the Tagus River, between Tramagal and Santarém. The Tagus River is the longest of the Iberian Peninsula and is responsible for periodical floods in one of the most important agricultural areas in Portugal. For this area a digital elevation model acquired in 2008 by advanced interferometric techniques is available (5m of spatial resolution), accurate in the floodplain area but with no information in river channel since the radar signal has no ability to penetrate into water, and 29 cross-sections acquired by eco-sounder equipment in 2012, with 3km intervals are available. In order to analyse and validate those differences, a dataset with SAR imagery, provided by ESA, and the water levels measured at Almourol hydrometric station were used.