Flood hazard assessment in the Raval District of Barcelona using a 1D/2D coupled model

Beniamino Russo[1] , David Suñer[2], Marc Velasco[3], Slobodan Djordjević[4]

[1] Clavegueram de Barcelona S. A. (CLABSA), Spain, Beniamino@clabsa.es; Engineering Technical College of La Almunia (EUPLA - University of Zaragoza), Spain, brusso@unizar.es
[2] Clavegueram de Barcelona S. A. (CLABSA), Spain, dsunyer@clabsa.es
[3] Centro Tecnológico del Agua (CETaqua – Agbar Group), Spain, mvelasco@cetaqua.com
[4] University of Exeter, United Kingdom, S.Djordjevic@exeter.ac.uk

ABSTRACT

CORFU is an interdisciplinary project funded by the European Commission in the framework of the 7th FP with the aim to improve the practice of urban flood risk management. In this context, eight case studies regarding European and Asian cities are being developed with the main objective to analyze and improve their resilience to flood impacts. This paper presents the results of a 1D/2D coupled model simulating surface and sewer flows in the Barcelona case study. The model covers 44 km^2 of the city land involving 238 km of sewers. The model was developed in order to assess the flood hazard in the Raval District, historically affected by flooding problems during heavy storm events. Special attention was paid to the hydraulic characterization of the inlet systems (representing the interface between surface and underground flows), through experimental expressions used to estimate the runoff amounts effectively introduced into the sewers in case of storms. 2D unstructured mesh was created on the basis of a detailed DTM with a resolution of 1 m^2 and a precision of 15 cm in terms of elevation. Hydrological and physical differences between pervious and impervious areas were taken into account in the 2D analyzed domain.

KEYWORDS

1D/2D coupled modelling, Flood hazard, Urban drainage