

## **Effects of minor drainage networks on flood hazard evaluation**

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**Abstract** Scientific literature reports a plethora of numerical tools of different complexity (e.g. 1D, 2D raster-based or full 2D models) for flood hazard and flood risk evaluation. The correct identification of the appropriate model still represents a key aspect in the overall flood hazard process even though the potential of these modelling instruments are increased by the availability of high computational resources and by the amount of high-resolution topographic data provided by recent survey techniques. Given this context the present analysis investigates the effects of minor drainage networks on the estimation of flood hazard in a flood-prone area along the Enza River, close to the village of Sorbolo a Levante (RE, northern Italy). By means of a full 2D hydraulic model (Telemac-2D), the effects of the drainage system is analysed using three unstructured meshes with different degrees of complexity: (1) the minor drainage system allows the possibility to convey water outside the study area (REF); (2) the drainage system is reproduced only in terms of preferential flow-paths (REF-noFlow); (3) the drainage network is completely neglected (REF-noDN). The analysis indicates that the maximum flood extent seems not to be influenced by the mesh schematization, while water depths and the total volume are significantly related to the model schematization. Even if this analysis refers to a specific case study and further investigations are needed, it shows the fundamental role of the drainage network in controlling water depth distribution and the duration of the inundation, which should be accurately reproduced by numerical models.

**Key words** minor drainage network; mesh resolution; 2D model; River Enza