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Can uncertainty in flood hazard estimation be reduced by using high detailed topographic data for floodplain modelling?

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Floods are considered the most frequent natural disaster world-wide and may have serious socio economic impacts in a community. In order to accomplish flood risk mitigation, flood risk analysis and assessment are required to provide information on current or future flood hazard and risks. Hazard and risk maps involve different data, expertise and effort, depending also on the end-users. More or less advanced deterministic approaches can be used, but intuitively probabilistic approaches seem to be more correct and suited for modelling flood inundation given typical uncertainties. Two very important matters remain open for research: the calibration of hydraulic models (oriented towards the estimation of effective roughness parameters) and the uncertainties (e.g. related to data, model structure and parameterisation) affecting flood hazard mapping results.
Here, we test the ability of high resolution topographic data to reduce the uncertainty in probabilistic flood inundation maps for two hydraulic models: a two-dimensional hyperbolic finite element model and a recently developed version of the LISFLOOD-FP model which solves a reduced form of the full shallow water equations in a highly efficient manner. These models are applied to the Imera River basin in Sicily using both high and low resolution topographic data sets and probabilistic flood inundation maps accounting given uncertainty in the observed inflow hydrograph to the reach constructed for each model/terrain data combination. Through a comparison of the resulting hazard maps, the influence of topographic data on probabilistic flood mapping will be shown.