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Testing the use of crowdsourced data for supporting post-event understanding and simulation of flooding impacts in ungauged basins

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The post-event understanding and reconstruction of flooding dynamics and impacts is not trivial task. This is especially critical for ungauged basins, lacking river flow monitoring networks, that are characterized by inundation dynamics falling outside specifications of Earth Observation (EO) and large-scale disaster emergency management systems. Satellite data provide, in fact, radar and multi-spectral images supporting inundation extent rapid mapping, but the coverage and quality of EO-based flood mapping is often not adequate for effective riverine inundation assessments in many complex urban, coastal and rural ecosystems where important flood damages occur. Rainfall-driven flash flooding occurring in most cities provide further cases with temporal (e.g. fast hydrologic response to extreme rainfall events) and spatial scales (e.g. floodplain landscape feature complex morphologies; urban micro-features like walls and culverts) determining an increased level of un-observed and uncertain, yet crucial, flood modelling variables. As a result, while technological progresses of remote sensing and flood modelling data and tools create advanced opportunities and support numerical simulations for real time or post event analysis, it is still often challenging to understand, reconstruct and accurately simulate flooding dynamics and related effects. Distributed and timely flood event observations are always taken by citizens fostering new means for real time or post event analysis of extreme events. This wealth of “new data”, namely Volunteer Geographic Information (VGI) or crowdsourced data, are surely a value for flood risk management, but several and diverse technical, administrative and procedural barriers are impacting their uptake. This work illustrates preliminary tests developed in using crowdsourced data for post-event simulation of flooding impacts in ungauged basins. Videos and images from social networks are used for calibrating both a detailed 2D hydraulic model and a cost-effective geomorphic floodplain extent rapid mapping algorithm to investigate on novel procedures, methods and tools of post-event flood hazard assessment and impact mapping.