



## **Fine-grained information collection from social media for supporting integrated approaches to flood risk analysis**

Margherita Lombardo<sup>1</sup>, Francesco Chiaravalloti<sup>2</sup>, **Vincenzo Totaro**<sup>1</sup>, and Olga Petrucci<sup>2</sup>

<sup>1</sup>DICATECh, Politecnico di Bari, Bari, Italy

<sup>2</sup>CNR-IRPI Research Institute for Geo-Hydrological Protection, Rende, Italy

Research in flood mitigation techniques is increasingly focused in investigating how proactive and bottom-up approaches can be effectively integrated in flood risk management. In particular, the role of stakeholders and communities has been recognized as relevant in planning strategies for risk prevention and management. In this framework, the scientific community is recognizing the added value of non-authoritative and unconventional sources to obtain precious details about flood events, including citizen contribution at different levels of engagement. Despite the high amount of information potentially retrievable, this research field still suffers from systematic data collection, especially in urban areas. In fact, citizens are rarely actively involved in monitoring programs, and their contribution is often limited to a spontaneous sharing of photos and videos on social platforms during or after the events. Despite not being systematically organized, these sources of information can support various applications related to flood studies, involving not only hydraulic and hydrological aspects but also the human dimension. Literature covering methods and applications exploiting social media data in different fields is widely diffused, including topics as flood mapping, flood modelling (constraint, calibration, and validation), risk assessment (vulnerability, hazard, impacts or damages), and human reactions to flood occurrence (sentiment analysis, human behavior), with the potential of applications for emergency management. However, research on this topic is often focused only single aspects, whereas an integrated perspective is needed to accomplish the requirements of flood risk management, which calls for information that is both physical and related to human response. In this study, a workflow is proposed for a systematic collection and analysis of video content to support the retrieval of different kind of fine-grained information about flood events dynamics and their impacts. The workflow applied to the case study of Crotona (southern Italy), which experienced a severe urban flood in 2020, produced an example of a georeferenced information collection, potentially suitable for integrated analysis on flood risk. Our research provides further insights about strengths and limitations of crowdsourced information and its potential role in the design of flood risk mitigation strategies.