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When Rivers and Cities Collide

Modelling Flood Processes and Impacts on Structures and People

April 17th, 2026, 11:30 -13:00

KIT, Bldg.10.83, seminar room IWU

or online:

<https://kit-lecture.zoom-x.de/j/67236383937>

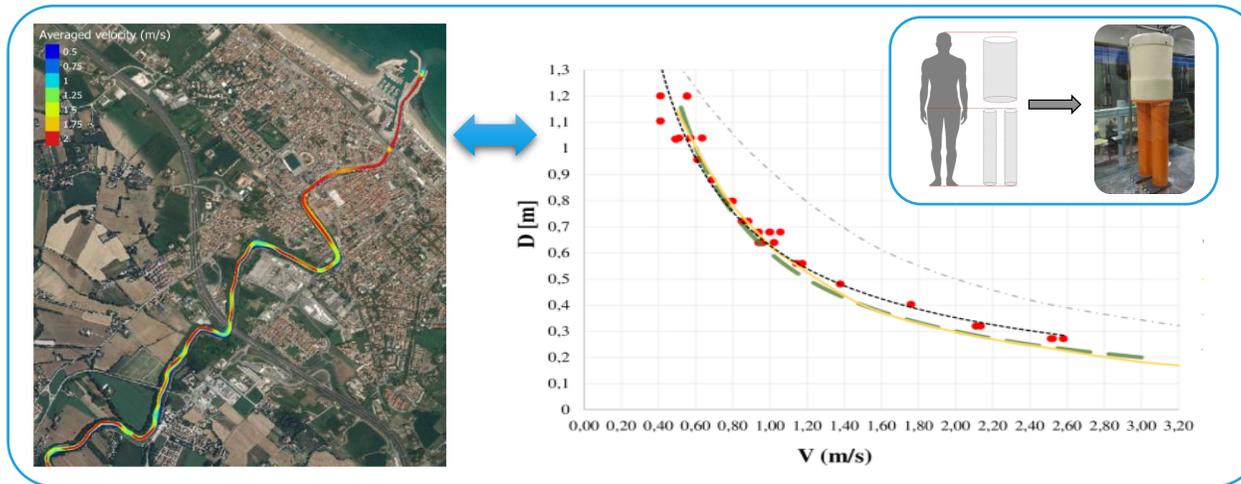
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Abstract

Urban flooding represents a significant threat to densely populated areas. To help address this issue, integrated frameworks for flood risk assessment can be developed by combining hydraulic modeling and experimental evidence. In this context, starting from the hydraulic modeling of the Misa River microtidal estuary (Italy) and leveraging field measurements for model calibration, the impact of river–sea interactions on urban hydrodynamics is assessed. Specifically, the flow analysis allows the identification of urban flood scenarios – such as levee overtopping or breaches – which may lead to the inundation of residential districts. Within this context, particular attention is devoted to pedestrian safety, as well as to the structural integrity of buildings and critical infrastructures. The integration of deterministic hydraulic force analysis with probabilistic logistic regression models – calibrated through quasi-natural scale laboratory experiments – leads to the definition of new stability thresholds for individuals exposed to floodwater conditions. The combination of high-resolution numerical modeling and statistical instability analysis provides a robust framework for supporting urban emergency planning and for developing effective strategies in flood-prone environments.



Biography

Matteo Postacchini specializes in maritime, fluvial, and urban flooding hydraulics. His expertise integrates the numerical modeling of shallow flows with extensive laboratory research on wave propagation and human stability in flood conditions. He has participated in numerous field studies along the Misa River and its estuarine area (Central Italy). Currently Associate Professor at Università Politecnica delle Marche and Visiting Professor at University of Strasbourg – ENGEES (France) and Tongren University (China), he actively contributes to major flood-related projects. He has authored over 50 peer-reviewed publications and serves as an Associate Editor for leading marine journals.

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