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FLOOD RISK MANAGEMENT IN TRANSITION: THE (UN)USUAL SUSPECTS

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(image from Bayón et al., 2024. *Flood Risk Management*. 2024;17:e13002)

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Summary: The Floods Directive (Directive 2007/60/EC), guides European governmental agencies and practitioners in flood risk management. It includes only a shy suggestion to consider transported sediments and debris in flood risk assessment. Consequently, in practice, flood management focus narrowly in on water surface level and limited consideration of flow velocity. Based on an analysis of the devasting flood events occurred in July 2021 in northwestern Germany, and considering the demands which post-Anthropocene will bring in terms of extreme weather events, we reflect on a necessary evolution of flood hazard evaluation. From our experience we argue that further attention is needed to: the history of the landscape; the constantly changing boundaries of river systems which happens at multi-scales; sediment and debris which are as hazardous as water; complex hydrodynamic processes and landscape singularities. As demonstrated in the recent extreme floods in Europe (northwestern Germany and Valencia region), urban debris is a post-industrial and overlooked amplifier of flood hazard. Our research has thus focused on understanding the hydraulic transport of debris during floods, including inception of motion and transport mechanics. We will share insights from this work, including results on the transport of plastics in rivers, the inception of motion of debris during floods, and the transport of urban litter caused by pluvial floods.



Mário Franca is a Full Professor of Hydraulic Engineering and Water Resources Management at the Institute for Water and Environment (IWU) of the Karlsruhe Institute of Technology (KIT) in Germany. Mário's research focuses on the mechanics of flowing water and its interactions with various riverine organic and non-organic elements, aiming to develop generalized and scalable solutions with societal relevance. More specifically, his work covers such areas as turbulent processes in open channel flows, sediment transport, fluvial hydro-morphodynamics, flood hazard and risk analysis, wood and plastic transport, density currents, and non-conventional hydropower production. With over 25 years of consulting experience in hydraulic engineering, Mário has contributed to and led applied projects on emergency planning for natural and dam-break floods, dam design, hydropower, water supply, river engineering, and the safety of hydraulic infrastructures.