

EGU2020-673

<https://doi.org/10.5194/egusphere-egu2020-673>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Socio-hydrological modelling: the influence of reservoir management and societal responses on flood impacts

Cinzia Albertini¹, Maurizio Mazzoleni^{2,3}, Vincenzo Totaro¹, Vito Iacobellis¹, and Giuliano Di Baldassarre^{2,3}

¹Politecnico di Bari, Bari, Italy (c.albertini@studenti.poliba.it)

²Department of Earth Sciences, Uppsala University, Uppsala, 75236, Sweden

³Centre of Natural Hazards and Disaster Science (CNDS), Sweden

Over the last few years, several socio-hydrological studies have investigated the dynamics of risk generated by feedback mechanisms and interactions between floods and societies, with a focus on either changing reservoir operation rules or raising levees. In this study, we propose a new socio-hydrological model of human-flood interactions that represents both changes in the operating rules of reservoirs and updating of the levee system. Our model is applied to simulate three prototypes of floodplain management strategies: green systems, in which societies cope with flood risk by resettling outside the flood-prone area; technological systems, in which societies cope with flood risk also via structural measures, such as levees; and green-to-techno systems, in which societies shift from green to technological approaches. Floodplain dynamics are explored simulating future scenarios in the city of Brisbane, Australia. Results show that flood risk is strongly influenced by the flood memory of reservoir operators and their risk-awareness levels control the development of communities. Furthermore, scenarios of more frequent and higher magnitude events prove to enhance social preparedness levels in green systems, while technological systems experience much higher losses.