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## Uncertainty in mapping flood hazard in Coghinas Basin

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**Abstract:** Water supply and flood mitigation are examples of reservoir utilization for beneficial purposes in reducing shortages, and for prevention and reduction of damages, respectively. Previous papers have recently presented an integrated approach composed of a water system simulation model (WARGI-SIM), which can simulate reservoir operation and a hydrodynamic model (HEC-RAS 2D) for its impacts to flood inundation within a river basin. For hydrodynamic simulations in floodplains, the state-of-the-art approach consists of 1D/2D modelling where generally the 1D model is used for flow routing along the open channel of river and the flow routing along the floodplain is performed using the 2D model. Within the framework of the original shallow water equations (SWE), simplified versions of SWE are the kinematic and diffusion equations. The choice of the model to be used (fully dynamic SWE, diffusive wave, kinematic wave, 1D or 2D, etc.) depends also on the available input data. The focus of this study is to extend the previous research of model and parameter uncertainty to the 2D model code HEC-RAS. HEC-RAS 2D has been applied in the framework of the above integrated approach to the Coghinas river basin (Sardinia, Italy) that is the pilot basin where the Sardinian Region Administration has to develop the Flood Risk Management Plans (FRMP), as required by EU and National legislation. The paper also investigates the impact of uncertainties on mapping flood hazard in the Coghinas basin that is a crucial phase in FRMP to select flood mitigation measures.

**Keywords:** flood mapping, HEC-RAS 2D, uncertainty, Coghinas river basin.