



Assessing and optimising flood control options along the Arachthos river floodplain (Epirus, Greece)

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We present a multi-criteria simulation-optimization framework for the optimal design and setting of flood protection structures along river banks. The methodology is tested in the lower course of the Arachthos River (Epirus, Greece), downstream of the hydroelectric dam of Pournari. The entire study area is very sensitive, particularly because the river crosses the urban area of Arta, which is located just after the dam. Moreover, extended agricultural areas that are crucial for the local economy are prone to floods. In the proposed methodology we investigate two conflicting criteria, i.e. the minimization of flood hazards (due to damages to urban infrastructures, crops, etc.) and the minimization of construction costs of the essential hydraulic structures (e.g. dikes). For the hydraulic simulation we examine two flood routing models, named 1D HEC-RAS and quasi-2D LISFLOOD, whereas the optimization is carried out through the Surrogate-Enhanced Evolutionary Annealing-Simplex (SE-EAS) algorithm that couples the strengths of surrogate modeling with the effectiveness and efficiency of the EAS method.