



Flood risk mitigation strategies for the Po river: a quasi-2D hydraulic model for a large-scale analysis

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This study develops and tests the potentiality of a quasi-2D hydraulic model to aid the identification of large-scale flood risk mitigation strategies for the middle-lower reach of River Po, the longest Italian river and the largest in terms of streamflow. This paper focuses on the identification of flood-risk mitigation strategies relative to high magnitude flood event (time of recurrence 500-year) other than levee heightening, which is not technically viable nor economically conceivable for River Po.

Different geometrical configurations of the embankment system are analysed and modelled in the study: no-overtopping; overtopping and levee breaching; overtopping without levee breaching. The quasi-2D model resulted in being a very useful tool for (1) addressing the problem of flood-risk mitigation from a global - perspective (i.e. entire middle-lower reach of River Po), (2) identifying critical reaches, flooded areas and corresponding overflow volumes, and (3) generating reliable boundary conditions for smaller scale studies aimed at further analyzing the hypothesized flood mitigation strategies using more complex modelling tools (e.g., fully 2D approaches). Study results highlight the potential and advantages associated with a controlled-flooding strategy for the middle-lower reach of River Po. At the light of the recent Directive 2007/60/EC on the assessment and management of flood risks (European Parliament, 2007), the development of these hydraulic models is a crucial task for institutions and public bodies in charge of formulating robust flood risk management strategies for large European rivers.