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Hydrological remarks about the safety of Venice

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Present paper deals with hydrologic studies relevant to the preservation of Venice. We discuss in some detail the methodology and field validation of a general hydrologic model (and its hydrodynamic couplings within tidally affected reaches of the hydraulic networks) of the mainland contributing runoff to the Lagoon of Venice. The dimensions of the catchments, and their complexity therein, are such that usual simplifications prove indeed inadequate - both practically and theoretically - to provide significant forecasts of the behaviour of the system. The model is applied to evaluate the effects of prolonged closures of the forthcoming mobile system of gates (the MOSE system) on possible freshwater-induced flooding of the city. The relevance of the work lies in assessing the validity of recent claims of obsolescence of such system precisely because of the flooding external regimes including run-through discharges bypassing the mobile gates and mainland runoff volumes whole lead time falls within closures. Our studies show without any ambiguity the adequacy of the design of temporary closures, and the rather compelling inadequacy of claims to the contrary.