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Daniele Bocchiola, Renzo Rosso

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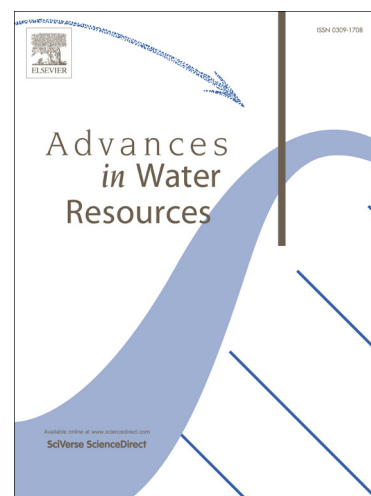
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Safety of Italian dams in the face of flood hazardDaniele Bocchiola¹, Renzo Rosso¹¹Politecnico di Milano, Dept. ICA, Leonardo da Vinci 32, 20133, Milano, Italy.daniele.bocchiola@polimi.it**Abstract**

Most rivers in Italy are segmented by dams that need rehabilitation because of (1) safety requirements by increasingly risk-averse societies, (2) changes in the downstream river and riparian system after dams building, (3) poor initial design at the time of completion and (4) modified priorities of watershed management. Safe design of flood spillways is a major concern, and requires to cope with low frequency flood hazard. One must estimate flood figures with high return periods ($R \geq 1000$ -10000 years) but statistical methods involve large uncertainties because of the short length of the available records. This paper investigates the return period of the design flood of existing spillways R_S of large dams in Italy. We used re-normalized flood frequency approach and regionalization using the Generalized Extreme Value distribution. The estimation of the site specific index flood is carried out by simple scaling with basin area at the regional level. The result show that 55% (245) of the 448 examined dams are equipped by spillway with $R_S > 10000$; and 71% (315) of the dams have $R_S > 1000$. Conversely, 29 % (130) of the dams display $R_S < 1000$ years, lower than acceptable hazard. The spillway of 14% (62) of the dams has $R_S < 100$ years, indicating potential exceedance of spillways capacity. Reservoir routing may dampen the outflow hydrograph, but one should carefully account for the need of achieving accurate dam safety assessment of these dams based on site specific investigations, also accounting for global change forcing.

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