



A new practical approach for risk assessment in the Tinne torrent catchment that considers the response of control structures exposed to extreme sediment transport and debris flow events.

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This paper presents the application of a new practical approach for risk assessment in the Tinne torrent catchment that considers the response of control structures exposed to extreme sediment transport events.

Mostly the influence on risk due to control structures is taken into account only in a qualitative way; the approach presented in this paper first of all permits, accordingly to probability and fuzzy set theory, to define a failure probability for each weir, called a component of the protection system, along the torrent and then allows to investigate the system as a whole, in order to determine the efficiency and reliability of such protection systems.

Different scenario simulations can be performed in order to identify weak components in the system and to optimize future protection planning.

Particularly interesting in relation to that context are Alpine catchments, such as the Tinne torrent catchment, with a huge number of rather old consolidation protection structures. Truly in some cases these structures feign a false sense of security.

If these key structures fail, the solid material temporarily stored behind is suddenly remobilized. It will depend on the failure mechanism if a dam break like or an erosion process like remobilization will take place, producing destabilization effects also for other structures below and upward.

Taking into consideration this dynamics means also adjust hazard zoning maps and a

more cautious land use planning.

Keywords: risk zoning, flood control; flood damage; flood hazard; torrent, sediment transport, debris flow, control structure reliability

Basin management; risk analysis