

Methodologies for hydraulic hazard mapping in alluvial fan areas

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Abstract Hydraulic hazards in alluvial fan areas are mainly related to torrential floods and debris flows. These processes are characterized by their fast time evolution and relevant sediment load. Rational approaches for the estimation of hazard levels in flood-prone areas make use of the maps of depth and velocity, which are provided by numerical simulations of the event. This paper focuses on national regulations regarding quantitative debris-flow hazard mapping and compares them to a simple conceptual model for the quantification of the hazard levels on the basis of human stability in a flood. In particular, the proposed method takes into account, in a conceptual fashion, both the local slope and the density of the fluid, that are crucial aspects affecting stability for processes in mountain environments. Physically-based hazard criteria provide more comprehensible and objective maps, increasing awareness among stakeholders and providing more acceptable constraints for land planning.

Key words debris flows; hazard mapping; human stability; torrential floods