



## **Spatial evaluation and mapping of landslide consequences at meso scales.**

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Standardized methods for landslide consequence evaluation and mapping are lacking for three main reasons.

First, landslide hazard is characterized by insufficient statistics of past landslides losses and fatalities and by the absence of reference event of a given landslide type for a certain region compared to other type of geo-hazards. Many landslide hazards have no or limited historical-event precedents upon which we can assess the consequences, particularly for rare or extreme events that can have the largest impact on society. Second, impacts of hazardous events can be quite diverse according to the type of movement. For example, estimating the potential damage of a building with engineering vulnerability functions is a complex task difficult to apply in practice and necessitating detailed engineering databases. Third, consequence assessment suffers of the unavailability of robust social, economic or patrimonial values on the elements at risk and on their vulnerabilities.

The objective of this study is to review the methods of landslide consequence analysis and then propose a general methodology to assess and map landslide consequences at meso scales (1:10,000 to 1:25,000) through the development of a composite index. As will be discussed, the proposed methodology is very general in scope, uses the best available information to locate the high-sensitive areas, and can be applied independently of the type of landslide hazard and the type of environmental and socio-economic context. The procedure uses some basic social and environmental criteria to analyze on a hierarchical basis the direct stakes (*i.e.* structural, functional and human damage potentials) as well as the indirect stakes. The method has been developed

within the framework of the EC-funded project ALARM '*Assessment of Landslide Risk and Mitigation in Mountain Areas*'. Its application to two landslide-prone catchments in the South French Alps has allowed to produce potential consequence maps and to locate the most vulnerable areas such as roads or ski-lifts. The potential consequence maps can be crossed with hazard maps to evaluate and map real landslide risks.