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Landslide consequence assessment and mapping using quantitative data on elements at risk.

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Most of the methods available to assess and map the potential consequences of landslides are difficult to apply in practice, mainly because of the lack of valuable data on the historical damages or because of the lack of landslide damage functions.

A GIS-based method has been developed in order to identify the main assets and elements at risk, characterize their vulnerability, and assess the potential consequences. The method integrates qualitative and quantitative data in order to built potential consequence maps for several hazard scenarios.

The objective of this work is to present the methodology. First, the main categories of assets are defined according to the characteristics of the study area. Four categories of assets have been defined: corporal asset, structural asset, direct functional asset and indirect functional asset. Second, elements at risks are identified and their characteristics (type of element at risk, function, size, value, etc) are stored in a GIS database. Third, a quantitative and spatial expression of consequences is established using an index-based approach and a linear combination of factors and weights associated to the characteristics of the study area. The value of the index allows to define five classes of total potential consequences and to map consequence zones for the study area. Results obtained on the Barcelonnette basin (French South Alps) are presented. Potential consequence maps are proposed for the most hazardous zones of the study area and for several hazard scenarios. A tentative mapping of landslide risk is being performed

by crossing (using a matrix-based approach) the consequence map and a hazard map available for the area.

The method is reproducible as it allows to consider the socio-economic profile of the region, the period of landslide occurrence (eg. season, night & day) and the social perception of the inhabitants.