



## **Multi-temporal analysis of slope movements in the Southern Apennines of Italy**

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Many types of thematic maps dealing with slope movements have been proposed in the scientific literature to describe the features and activity of landslides. One of the most common is the classical landslide inventory map: this can be defined as a photograph of the landscape at a given time, that is the moment of the field surveys, or the date of the air photographs and/or satellite images used for mapping. Unless further data (such as dates of occurrence of the landslides, frequency of movement, etc.) are not added, it does nothing more than depicting the instability situation at that given time. In order to reach more insights into the history and evolution of unstable slopes, a multi-time approach must be performed. This can be carried out through a multi-temporal analysis, based upon aerial photo interpretation of different years, possibly integrated by field surveys. Production of landslide inventory map for each available set of air photos results in the final output of landslide activity maps (LAMs), deriving from comparison of the individual inventory map. LAMs provide insights into the evolution of the landslide process, allowing to reconstruct a relative history of the mass movement, and to highlight the most active sectors in time. All these information may result extremely useful to correlate likely movements to anthropogenic activity or specific triggering factors, such as a seismic event or a rainstorm. In addition, LAMs can also be of effective use in evaluating the efficiency of remediation works.

The Southern Apennines of Italy are intensely affected by a variety of slope movements, that interest very different settings and are at the origin of severe damage to the built-up environments, claiming every year a high number of casualties. Notwithstanding the availability of landslide maps for the whole Italian territory, with very good detail at local sites of interest, what is often lacking over the country is a thorough knowledge of the overall history of the slopes, in terms of temporal evolution of the phenomena. LAMs can provide a significant contribution in covering this lack, and allowing one to better understand the presently observed situation within a more general framework. Starting from the above considerations, some examples of LAMs are presented in this article, covering different geological and morphological contexts of the Southern Apennines of Italy, aimed at highlighting the potentiality of such an approach for the understanding of the landsliding activity, at the same time giving significant hints to be used for remediation and/or stabilization works and for land management issues.