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Risk-mitigation strategies for large earth flows in Northern Apennines (Italy)

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This presentation proposes an overview on ancient earth flows of the Northern Apennines and their reactivation mechanisms, with a view to gleaning information that can subsequently be utilized to implement risk-reduction strategies for land-use planning and mitigation measures.
These large landslide bodies are the result of multi-phase events occurred during the last 13.000 years, but, in spite of the ancient origin, they are still dangerous, due to the repetitiveness of the reactivation events. Damages deriving from the recurrent reactivation of these ancient landslides exceeds the 90% of the total. The hazard assessment of these landslides, which are of slope scale, constitutes a thorny problem, especially in view of the inapplicability of traditional deterministic models such as limit equilibrium stability analysis. The usual set of factors that form the basis of deterministic methods is insufficient to make reliable predictions about the future behaviour of these landslides and their related hazard. Nevertheless, a site-specific assessment of probability of reactivation is fundamental to effective land-use planning. The observation of real, recent events (e.g. Boschi di Valoria, Corniglio and Cà Lita) has proved to be an useful mean for understanding which are the conditions and behaviours that usually lead to the reactivation of an ancient earth flow. More in general, the analysis of the evolution of earth flows during actual reactivation acknowledges a typical, recurring succession of events that precede the failure of the slope. In order to perform an effective risk-reduction strategy, a site-specific, interdisciplinary and partially heuristic approach should be implemented, pooling together many elements of evaluation. Most importantly, using detailed field observation and all other available means, the hazard estimate must consider possible indicators of present and recent movement, or situations that could lead to future reactivation, with special attention to present or historical local instability in the source area.