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Large scale earthslides - earthflows: site characterization, monitoring and modelling vs the fortune or downfall of structural mitigation measures

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When dealing with large scale earthslides - earthflows, a thin line separates fortune from downfall of mitigation measures designed to reduce their impact on structures and human activities. This because instability processes are generally complex and the extent and depth of mass movements considerable. Consequently, even extensive studies might only reach a limited insight on the various characteristics and causes of the phenomena. Nonetheless, there is no other way to go than to investigate, monitor and model (with a variety of technical approaches), in order to identify possible solutions, to pre-assess what to expect from their implementation (in terms of safety factor or reduced movement rate) and, finally, to post-assess if the expected benefits have actually been achieved.
The presentation aims to stress the inherent difficulties that scientists and practitioners have to face when confronting with the mitigation of large scale earthslides – earthflows, by presenting some paradigmatic case studies in the northern Apennines of Italy in which consolidation works have had (so far) fortune or downfall. In doing so, the integration of multi-methods investigation, dating, monitoring and modelling results (ranging from borehole to geophysics, inclinometers, piezometers, differential Lidar, DInSAR, total station monitoring and FEM) will be presented and discussed with reference to: their contribute in supporting a correct understanding of style and state of past and present activity, of triggering and controlling factors and of possible evolution of the phenomenon; their use in the process of define and design consolidation works, estimate their expected effects and verify performances. Finally, it will also be pointed out that, after all, crossing the thin line between fortune and downfall, might not only be a matter of appropriately understanding the processes at slope scale but, also, a consequence of maintenance of mitigation works or, ultimately, of overarching natural processes that cannot be realistically fully contained.