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New perspectives for landslide analysis and management

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ABSTRACT

Landslides are widespread all over the world and their occurrence often causes significant consequences in terms of loss of life and damage to properties. This explains why researchers have long been engaged in solving complex problems of both theoretical and practical interest while authorities in charge of the landslide risk management often enact measures to mitigate the risk to life and property.

Focusing on the technical-scientific issues, it should be emphasized that a leading role has been played, since the past, by Geology and Geomorphology, which have systematically investigated various topics including the classification systems of landslides for which the literature provides more than 100 proposals. However, these classification systems, which identify common characteristics of landslides, do not and cannot provide information on the general laws that govern their triggering and evolution stages. A question that has not yet been addressed by Geotechnics and Geomechanics, although both have so far implemented models capable of solving a variety of theoretical and practical problems.

This knowledge gap leads to believe that the dynamic equilibrium of localized failures along an existing and/or new slip surface must necessarily be analyzed for each individual case study and not by referring to the entire class of these phenomena. This is also the case with shallow landslides, which can cause huge consequences when they threaten large areas in short periods of time, too often analyzed without making use of the experience acquired in other geological contexts.

With the aim of creating a bridge between the disciplines that deal with landslides and by making use of the efforts made over time by researchers from all over the world, this lecture seeks to lay the foundations for a deepening of knowledge on both issues. For this purpose, it proposes *i)* an approach that frames the triggering and evolution stages of localized failures in a unitary mechanical scheme and *ii)* a new vision to develop multidisciplinary analysis of shallow landslides in complex geomorphological contexts. Both proposed approaches highlight the possibility of an increasingly advanced landslide management in step with the times and new technologies.