



## **Analysis of post-failure deformation in landslides involving structurally complex clay**

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Roto-translational slides, earthflows and complex landslides typically affect mountain slopes throughout Northern Apennines. Most of failures involve the weathered surficial horizon of clay shales formations because of its poorer mechanical properties respect to the underlying bedrock. Landslides usually occur by periodic reactivation of pre-existing landslide bodies. Historical data on major landslides suggest that re-activations occur with relatively long return period (30-100 years). As regards to the state of activity, approximately one third of them have been classified as “active” and the rest as “dormant” in official maps. Slope movement usually shows strong differences both in the velocity and in the thickness of the involved material along the landslide itself. Monitoring devices (inclinometers) installed on several sites show velocity ranging from few centimeters to some decimeters per year; according to Cruden and Varnes (1996) such landslides should be considered as active with a velocity varying between very slow to moderate. In this work inclinometric data (1995-2003 period) of some monitored landslides in the Bologna Apennines have been used to investigate the possible relationship between amount, depth and direction of movement. The role of rainfall on the recorded movements at depth has been investigated analysing if typical time responses exist in relation to certain rainfall amount and if delays with depth can be observed, both inside and outside the landslide body. Aspects related to the geomorphology of the hazardous areas are also considered. The distinction between active and dormant landslides by local administration is mainly carried out on the basis of geomorphological features and reactivating periods. On the other hand, we consider that the knowledge of the real velocity of these phenomena can largely improve the assessment of landslide activity in this region.