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The importance of morphostructural control on the "long-term" landslides: a way for a prospective hazard mapping

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The climate change effect on hillslope dynamics is disciplinary or interdisciplinary studied to forecast the consequences of possible landslide reactivation that could be impact infrastructures. The two principal approaches of research are (i) the study of the present day geomorphologic processes and interpolate them according to evolving triggering factor conditions and (ii) the study of the relation between paleoclimate and landslide activity periods to eventually connect the global hillslope dynamic with the closest climatic pattern corresponding to IPCC forecasts. These kinds of studies are efficient but time-consuming and particularly complex. Another way of research, based on geomorphological observation, is used to analyze a watershed portion affected by numerous inherited (long term slide) and active landslides (recent or reactivate) in the Puy-en-Velay tertiary basin (hercynian mountain vulcanized during Miocene and Plio-pleistocene, Massif central, France). The relations between morphostructure, disconnection time of hillslope from the valley river and landslide spatial density and activity are studied. The two main controlling factors of landslides (active or inherited) along a hillslope gradient are (i) relative elevation of the top of granitic basement and (ii) disconnection time of the hillslope from the river. Three types of hillslopes are determined by their profiles, their geologic structures and their disconnection times, each one corresponding to a sensitivity level. By this approaches, it is possible to produce a “prospective hazard” map which determines the sensivity of hillslope related to climate change.