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THE PALAEO-LANDSLIDES OF THE MELANDRO RIVER BASIN, SOUTHERN APENNINES, ITALY

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The target of this study is the correlation of ages and geomorphic features of two Pleistocene palaeo-landslides with the values of uplift rates from the Melandro River basin area. Comparison between such different data-sets is in fact crucial to understand the genetic mechanism of these huge landslides. The Melandro River basin is a tectonic depression located in the axial zone of the Italian south-Apennines chain, a fold-and-thrust belt strongly uplifted and fragmented by neotectonics and therefore characterized by many Quaternary longitudinal and transversal morpho-structural depressions.

The uplift rates estimated in the study area have been calculated using geomorphological, stratigraphical and structural data. Geomorphic data consist essentially of elevation values, ages and arrangement of erosional gently dipping land surfaces and other morphotectonic indicators. The morpho-structural evolution of the Melandro River basin is characterized by stages of uplift alternated with slack periods in which the erosional surfaces developed. In particular, four generations of erosional surfaces have been detected on the basis of both field survey and map analysis. The age of these surfaces have been defined on the basis of morpho-stratigraphic relationships with Pliocene-Quaternary deposits. Specifically, the oldest two generations of surfaces cut the Pliocene deposits whereas the intermediate surface cuts the early Pleistocene deposits filling the main depression. The youngest surface is late Pleistocene in age, as verified for similar terraces in adjacent areas. The uplift rates have been calculated using the difference in height between the absolute (sea level) or local (present-day talweg) erosion base levels and the several generations of land surfaces. Further, in this study we calculated also the stage (or partitioned) uplift on the basis of the difference in height between a given order of land surfaces and that immediately younger,

aiming to consider the behaviour trend in specific time intervals. The trend of stage uplift is characterized by two increments: the first during the upper part of the early Pleistocene and the second during the late Pleistocene.

The age of the palaeo-landslides has been determined considering the relationships with Quaternary deposits and land surfaces. In particular, in the southern area of the basin a wide palaeo-landslide, whose foot is cut by a fragment of the middle Pleistocene land surface, is present. Furthermore, this palaeo-landslide formed a morphological high separating different sectors of the basin in which lower Pleistocene deposits was confined. Therefore, this landslide can be ascribed to the upper part of the early Pleistocene.

Another palaeo-landslide has been recognized in the northern sector of the basin. It is inserted in the upper Pleistocene land surfaces and fossilized by fan deposits and small erosional surfaces located 25 m above the present-day talweg. On this basis, the age of this landslide is the beginning of the late Pleistocene.

In both landslides the accumulation material is characterized by large rock blocks and fragmented beds in a fine-grained matrix. The rock blocks and beds belong to formations (i.e. *Scisti silicei* Fm and *Calcari con selce* Fm, *Lagonegro units*) that in the present geomorphic system are rarely involved in bedrock slide.

The correlation between the ages of the palaeo-landslides and the stage uplift trend allowed to remark that these landslides occurred in response to uplift picks, when strong earthquakes were more frequent and the mountain slopes destabilized by rapid relief growth. The peculiar features of the slide material are probably due to the deep weathering of the bedrock that a warm-humid climate could have caused during periods of increase of temperature and before the tectonic crises, as shown by two positive picks in the global sea-level reconstruction.