Relations between DSGSDs, morphostratigraphy of landslide deposits, tectonic and climatic events in central-eastern Sardinia.

Valentino Demurtas, Giacono Deiana, and Paolo Emanuele Orrù  
Department of Chemical and Geological Sciences, University of Cagliari, Italy.

Some cases of deep-seated gravitational slope deformations (DSGSDs) and paleo-landslides in central-eastern Sardinia are presented. This study focuses on the Quaternary landslide deposits preserved on the flanks of the Rio Pardu and Rio Ulassai valleys. The area is characterized by a wide plateau with a prominent Jurassic limestone scarp overlying Palaeozoic metamorphites. The Plio-Pleistocenic uplift, linked to the Tirrenian basin opening and the consequent basalt volcanism, generated high slopes. In the middle-lower Pleistocene, deepening of the valley has been accelerated by river capture processes. This litho-structural setting is prone to the development of rock falls, toppling and deep-seated gravitational slope deformations. During the upper-middle Pleistocene the gravitational and fluvial dynamics were dominated by the eustatic phases. The aim of this study is to determine the morpho-stratigraphy and main characteristics of the Quaternary landslide deposits using geomorphic, sedimentological and morphotectonic analysis. The use of high resolution UAV (Unmanned aerial vehicle) photogrammetry and geological, structural, geomorphological surveys allowed a detailed morphometric analysis and the creation of interpretative 3d models. This analysis allowed to recognize new morphostructural elements linked to a compound landslide with lateral spreading and sackung characteristics which involves giant carbonate blocks and the underlying foliated metamorphites. This high-resolution data allowed the formulation of new hypotheses about evolution and kinematics of DSGSD and landslides. The results of field surveys, geomorphological and sedimentological analysis of actual and paleo-landslide deposits show morphostratigraphic framework encompasses three order of rockfalls and three order of DSGSD. Cemented, quiescent and active landslide deposits were tentatively attributed to the Pliocene, Pleistocene and Holocene tectonic and climatic events, and compared with the traditional Quaternary stratigraphy of eastern Sardinia.