Relationship between slope movements and structural setting in the Tornada river basin (central western Portugal)

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A research on the relationships between the geological and structural settings and the distribution of slope movements was carried out in the Tornada river basin, Central western Portugal (107 km2). The basin was chosen for its geological and tectonic features and for the abundance of slope movements. The study area is situated in a dissected old quaternary coastal plateau with an evident syncline structure, where crop out mainly upper Jurassic sandstones and claystones.

A detailed structural-geological map at 1:10 000 scale and a detailed landslide inventory map were prepared through the interpretation of stereoscopic aerial photographs and extensive field surveys. The landslides were classified according to the type of movement and the relative age into shallow and deep-seated failures (mainly translational), recent and old in age.

The distribution of the landslides and their relationship with lithology and bedding attitude were studied considering in particular: i) the presence of weak lithological layers; ii) the attitude of planar and continuous bedding planes dipping towards the free-face of slope; iii) the presence of favourable hydrogeological conditions; and iv) the occurrence of normal faults.

The relationship between structural setting, geological information and landslides was studied in order to understand the factors that mainly describe the instability conditions of the area.