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Deep seated gravitational slope deformations and large landslides: implications on landslide hazard of urban areas and coastal erosion phenomena of Mount Poro headland

A. Guerricchio (1) and V. Simeone (2)

(1) University of Calabria, Dept. of Soil Defence, Italy, (2) Technical University of Bari, Dept. of Civil Engineering and Architecture, Italy

Deep seated gravitational slope deformations (DSGSD) characterize the north west and south side of Mount Poro headland, mid Calabria, south Italy, as reported by Guerrichio (2000). This work investigates the DSGSD of Mount Poro headland, in particular the gravitational collapses, occurring between the coast and the western flank of the headland up to an elevation of about 500-600 m AMSL. These collapses seem to be inconsistent with the local lithotypes, made by the substratum of granitic complex of Polia-Copanello. In particular, Ietto and Calcaterra (1988) identified DSGSDs in the area of Zaccanopoli. They assumed these phenomena on the edge between post-uplift gravitative tectonics and deep seated gravitational deformations that were referred to morphologies sub-parallel to the banks of two important local rivers.
The local geology comprises severely fractured and sometimes cataclastic granitic rocks. These show deep sub-vertical fracture, bow-shaped and oriented along the direction NNE-SSW in the upstream areas, at an elevation between 500 and 600 m AMSL. For those areas on the right side of the headland, fractures are oriented along NE-SW, N-S and NW-SE, while on the left side of the headland fractures are oriented W-E and NW-SE. In the upstream areas, there are frequent depressed and stretched stripes of land, which are crossed by fractures, which affect granitic masses for a difference of elevation ranging between few tens of meters and one hundred meters. Similar differences of elevation can also be observed either inside the DSGSDs, and the large landslides, like that located immediately upstream Dropia town, where for instance a one hundred meters concave scarp shows.
Inside the DSGSDs and inside the topping Pleistocenic deposits, there are frequent twofold terraces, which can be hardly dated. In fact, no fossils are present, and then it is possible to assume their age just on a geomorphologic base. The entire area involved by the DSGSD is few tens of square kilometers. Its movement towards NW produced a typical coastline, with a strong progradation towards NW and W from Punta della Tonnara to Parghelia and up to Fiumara della Ruffa (WSW of Tropea). The DSGSD involves the granitic bedrock as well as the transgressive Tortonian deposits, made by sands with the presence of Clypeasters, which are topped by arenaceous banks, for a total depth of 150 m. DSGSDs involving granitic rocks were probably due to more deformable lithotypes, like biotite schists, which work as substratum of granitic rocks at a not very deep depth, like in other areas of Calabria. Finally, the slow sliding towards N and NW of the landslide shapes the coast like a bow, thus causing strong erosion phenomena of the coastline.

Ietto A & Calcaterra D. (1988). Deformazioni gravitative profonde e tettonica presso Tropea (M.te Poro, Calabria)", Memorie della Societa Geologica Italiana, 41, pp. 911-915, Rome, Italy.
Guerricchio A. (2000). La fragilità del territorio dell'Italia centro-meridionale desumibile da immagini da satellite. X Congr. Naz. dei Geologi. International Conference: Il Territorio fragile; I, 443-482, Rome, Italy.