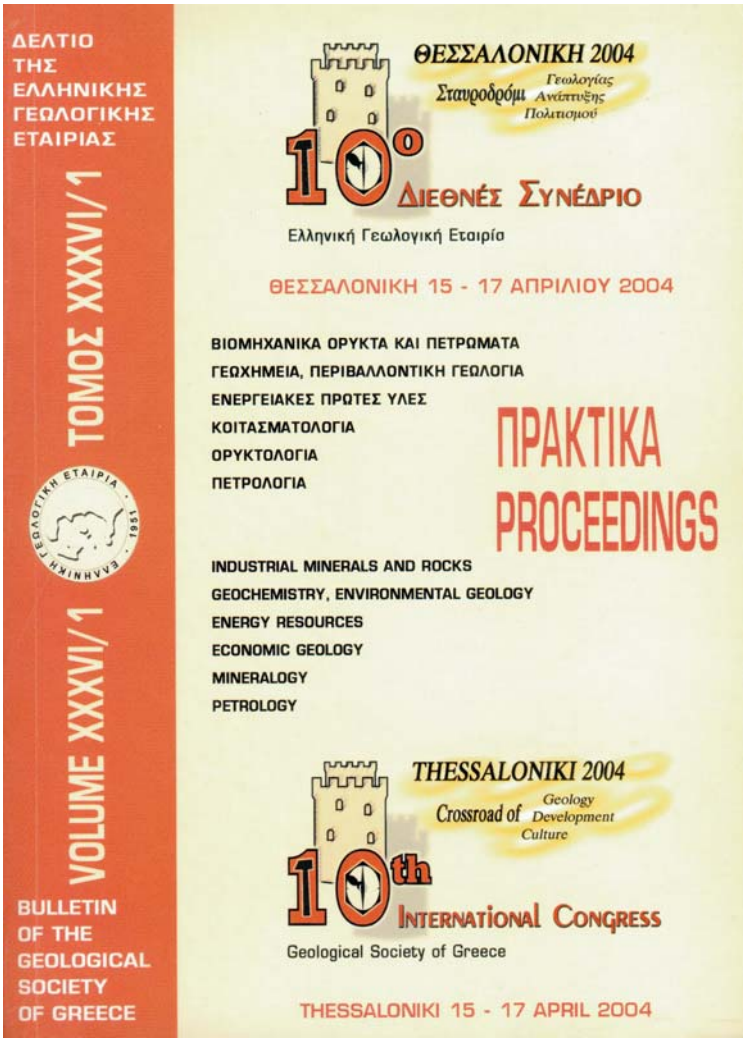
ΔΗΜΟΣΙΕΥΣΗ No 102



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SLOPE STABILITY PROBLEMS AND DEFORMATION OF ANCIENT WALL IN OLYMPIA ARCHAEOLOGICAL SITE, GREECE

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ABSTRACT

The supporting wall at the Anderon of the Treasuries is located at the foot of Cronion hill, near the entrance of the archaeological site of the ancient Stadium of Olympia, Greece, where the first Olympic Games were held, in 776 BC. This wall was built to protect the sanctuary downhill, from landslide masses from uphill. There is no specific data about the time of construction; the area of the Cronion hill though is proved by archaeological data to have been inhabited since the 3rd millennium BC. The style of construction and building material, widely used in temple construction in Greece, such as the construction of the Temple of Zeus nearby, suggest a Classical (500-323 BC) or Hellenistic period (323-30 BC) age of construction.

After the destruction of the Sanctuary of Olympia, landslides on the Cronion hill, and floods of the adjacent Kladaios River, buried the wall and all deserted monuments under a thick layer of sediments. The wall was discovered during the systematic excavations of the German Archaeological Institute, (1875 – 1881). At that time, a number of pines were planted right above the freshly exposed wall. The wall consists of parallelepiped bioclastic limestone blocks, sized 0.5x0.5x1m, and brace struts of the same material support the whole construction, in 5-meter intervals. The area of foundation and the uphill slope, are particularly unfavourable geotechnically, having led to the deterioration of the damages on the wall, especially lately.

In order to confront the problem efficiently, the research activities combined detailed morphological, geological, tectonic and technicogeological mapping of the wall deformation and surrounding area in various scales, a sampling drill, in situ and laboratory tests and analysis for the gathering of all necessary data to determine the mechanism of the phenomenon causing deformation, or even destruction of the wall, so that the appropriate measures are proposed.

The study pointed out that the creep phenomena and all soil mass movements in the whereabouts, compose a complicate multiparametric technicogeological problem.

The factors involved are: the lithostratigraphy of the basement, the high slope vector of the Cronion hill, the erosion caused by routes of the pines, the tectonic and neotectonic deformation of the area, the hydrogeology and the subsurface drainage, the intense seismic activity of the area, the vibration caused by the heavy truck traffic on the road between the wall and Cronion hill and the loss of slope support, due to excavation.

Permanent measures were finally proposed, including cutting and eradication of pines affecting the wall, planting of bushes on the marly masses uphill, drainage of precipitation via non-permeable canals and construction of internal self-drained supporting wall inside of the ancient wall, with permeable matrix in the space between the two walls.