

Geophysical investigations on landslide area in Buyukcekmece, Istanbul

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In the western part of Istanbul metropolitan area where is heavily urbanized, there are many landslides of various sizes. Under the EU-FP7 project titled with MARsite (Work Package 6), it has been performed a number of near surface geophysical measurements on a pilot landslide. The study aims to discuss the achievement of the integrated geophysical methods in revealing physical and geometrical characteristics of sliding mass. The Buyukcekmece landslide involves upper Oligocene to lower Miocene deposits consisting of silty clays, tuffs and sands. The width and length of the landslide are about 1.5 km and 2 km, respectively. The measurements on the landslide consist of 27 profiles of P-wave refraction, MASW and REMI, 4 profiles of resistivity, and 32 points of ambient noise. It is observed that the soil in the landslide area is highly rugged and disturbed, so caused many problems in the geophysical measurements, for example, affecting the geophone-soil coupling, attenuating the seismic waves rapidly, generating scattered waves, and changing the values in short distance. The penetration depth is the lowest in the refraction method, being 10-20 m, so this method failed for detecting deep-sliding surfaces. The MASW and REMI methods provided information up to a depth of 30 m and 80 m, respectively, but a clear sliding surface could not be detected, depending on both resolution of the methods applied and the lithological character of landslide. The H/V method provides a resonance frequency, but it changes in short distances depending on the complex structure of the landslide.

Key words: Landslide, Istanbul, Geophysical measurement, Site characterization