



## **Preliminary analysis of site effects at the stations located in the landslide-prone area in the western part of Istanbul, Turkey**

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In the frame of an EU-FP7 project titled as MARsite, a work package with the number of 6 (WP6) aims the characterization and modeling of landslides founding in the western part of Istanbul metropolitan area. In the first stage, we analyzed site effects at 8 stations located in the area by using weak motion earthquake data. The stations were deployed by TUBITAK in 2009 and two of them are still in the field. The largest distance among the stations is about 20 km. The instruments were equipped with Lennartz 1Hz sensors and RefTek 130 dataloggers. The stations work online and are acquiring 100 Hz data. Between 2009 and 2013, 36 earthquakes ranging from M3.4 to M5.2 were recorded by the instruments. Their epicenter distances range from 40 km to 150 km.

The study area takes place between Kucukcekmece and Buyukcekmece lakes. It is bordered by the Marmara Sea in the south. While the topography sharply increases from the sea coast to 50-100 m elevation in the south, it has plateau character elevated gently toward to the north. This plateau is incised and dissected by river channels flowing to the Marmara Sea. Both river slopes and coastal slopes are active landslide areas. The materials attached loosely on steep slopes flow downward. While the youngest geological units take place on the top of the plateau, it is possible to see the older units on the bottom of river channels and the coastal slopes.

Site response functions at each site were analyzed by using the Horizontal-to-Vertical Spectral Ratio (HVSr) and Standard Spectral Ratio (SSR) methods. The two methods show a general agreement in the estimation of the fundamental resonance frequencies including in some cases their amplitudes as well. On the other hand, the results of the HVSr method show less scattering than those of the SSR method. Two resonance frequencies on the spectral ratios attract attention especially at the stations close to the Marmara Sea corresponding to the deep and shallow transitions.

We also computed kappa value for each site, which is an additional site-dependent parameter representing near surface attenuation of seismic waves. High kappa values can be interpreted to sites which have materials attached loosely. Our results show that the sites on rock are represented with low kappa value, whereas the sites on soil show high kappa value.