



## **Project ‘Megacity Istanbul’: Estimation of site effects and ground motion scenarios**

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Recent studies showed that only 15 km south of Istanbul underneath the Sea of Marmara a seismic gap exists along the North Anatolian Fault Zone. Not only this proximity to a hazardous fault, but also local site effects due to the sedimentary cover (primarily on the European side of the city), the sub-surface geometry, as well as topography will contribute to damages in Istanbul in case of an earthquake. One of the aims of the project ‘Megacity Istanbul’ is therefore to improve the knowledge about the influence of local geology in the city on the expected earthquake ground motion. For that purpose, ambient seismic noise measurements were conducted at sites of the Istanbul Earthquake Rapid Response System (IERRS; accelerometric stations) operated by the Kandilli Observatory and Earthquake Research Institute of Bogazici University. A comparison of the results obtained by the Nakamura technique with those based on the analysis of local earthquakes recorded at the IERSS stations is achieved. Furthermore, array recordings of seismic noise for obtaining local shear wave profiles were carried out at two sites. At one of these sites, in the district of Ataköy, the ground motion during past events recorded by the corresponding IERRS station was consistently higher compared to the ground motion levels recorded at other stations of the array. Therefore, this site was selected for the installation of a vertical array. Four boreholes were drilled and accelerometers placed at 25, 50, 75, and 150m depth to study the wave propagation through the uppermost crustal layers. Geotechnical testing was conducted in situ and on samples. Modelling of expected earthquake ground motion at the IERRS stations for different scenarios reflecting the possibilities for the

earthquake source and crustal structure completes the investigations on the influence of local geology on the incoming seismic wave field.