



Comparisons on Site Transfer Functions Obtained by Velocity and Accelerometer Seismometers: Büyücekmece (Istanbul) Case

Ferhat Ozcep (1), Savas Karabulut (2), Nazire Imre (3), Okan Tezel (4), Hatice Yeziz (1), Faruk Çağlak (5), Tazegül Ozcep (6), Nuray Alpaslan (7), Muammer Tun (8), and Oğuz Ozel (2)

(1) Istanbul University, Faculty of Engineering, Department of Geophysical Engineering, Division for Physics of the Earth, 34320, Avcilar, Istanbul, (2) Istanbul University, Faculty of Engineering, Department of Geophysical Engineering, Division of Seismology, 34320, Avcilar, Istanbul, (3) Emek Geophysical&Geotechnical Company in Buyukcekmece, (4) Istanbul University, Faculty of Engineering, Department of Geophysical Engineering, Division of Applied Geophysics, 34320, Avcilar, Istanbul, (5) Istanbul University, Vocational School of Technical Sciences, Division of Underwater Technology, (6) Ministry of National Education, Sirinevler Primary School, Sirinevler Istanbul, Turkey, (7) Batman University, Department of Conservation and Restoration of Cultural Heritage, Batman, Turkey, (8) Anadolu University, Satellite and Space Sciences Research Institute, Eskisehir, Turkey

Site transfer function is an important key parameter to determine local soil effect/behaviour in seismic microzonation and significant in civil engineering projects. Especially, earthquake damage depends strongly on the soil dynamic properties. Local site effect is feasibly and economically determined by seismometers. But there are different types of sensors, signal conditions and recording units to measure tremors/ambient noise/earthquakes. The properties of these systems have been developed for diffent purposes and frequency range. For this reason, all instruments have a different dynamic range. Incorrect use of these instruments has caused many problems in engineering practice. However, features of the equipment used in study have some restrictions. Spectra obtained from measurements made using velocity or accelerometer type seismometers can be different from each other. The main reason is the different frequencies sensitivity of used equipment. A strong ground motion recorder is very sensitive to high-frequency motions and the relatively stronger effects, especially where the bedrock is deeper than normal (predominant frequency value is below 1 Hz) when there is suspicion to determine the dominant frequency value accurately. In recent years, microtremors have been used to determine soil fundamental frequency and besides also oscillation periods of engineering structures. We will investigate "Which type of seismometer (velocity or acceleration) is more sensitive to obtain more reliable results?" too. Buyukcekmece is located in the south eastern part of Istanbul and divided into two geological formation, namely Istanbul Zone and Strandja Massive. Recently, the same studies connected the sediment thicknesses and faulting. In addition, damage distribution in the study area during the 17 August 1999 Izmit earthquake and also considering its proximity to the North Anatolian Fault zone, a possible effect of site effect encountered in the region during the possible Marmara earthquake (site effect) experienced problems where, based on microtremor measurements will be designated by the general microzonation maps. The aim of this study is to compare data obtained by velocity and accelometer seismometers at the same location. As data properties, frequency content, amplification levels are considered in Buyukcekmece (Istanbul) region, sediment thickness in the region has been reported to be average 400 meters. According to primary results, when frequency content of each record is investigated, H/V results of frequencies above 1 Hz are generally in agreement for each seismometer in the same locations. In the some locations, the fundamental frequency values obtained by accelerometers are shifted to a higher frequency.