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Consistency of site response in Istanbul based on data from the Istanbul Earthquake Rapid Response System

C. Zülfikar, Z. Cagnan, E. Durukal, M. Erdik

Bogazici University, Kandilli Observatory and Earthquake Research Institute, Department of Earthquake Engineering, 34684, İstanbul, Turkey (can.zulfikar@boun.edu.tr, zcagnan@gmail.com, durukal@boun.edu.tr, erdik@boun.edu.tr,)

The Istanbul Earthquake Rapid Response and Early Warning System (IEREWS) consist of 100 strong motion recorders installed in dial-up mode throughout the city to form damage maps immediately after an earthquake for rapid response purposes. The stations consist of external, tri-axial (three orthogonal axis), force-balance (servo) type accelerometers, recorders, timing and communication modules. There are also ten strong motion stations installed for the generation of the earthquake early warning information at locations in closest possible proximity to the Main Marmara fault. Since its deployment in 2001 the IEREWS recorded eight events with magnitudes ranging from 3.1 to 5.2. We make use of these recordings to investigate whether classical site response tools such as H/V and spectral ratios yield consistent results throughout the city. In other words we would like to see whether spectral shapes and predominant frequencies obtained are stable. The number of stations triggered during these eight earthquakes varies between 2 and 86. The number of recordings obtained at one station alone change between 1 and 6. In calculating H/V and spectral ratios we chose those stations where the number of recordings is three and above. This corresponds to 58 stations within the IEREWS. We refrain from the association of the results with the surface geology in the city during the analysis stage and leave this to the end of the study to be able to make an independent comparison.