

Observations of microtremors and earthquake ground motion in Duzce, Turkey

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Strong shaking was experienced in Duzce city in the eastern part of Turkey during the Kocaeli and Duzce-Bolu earthquakes in 1999. This strong generates heavy damage of buildings in the area. The area is surrounded by mountains and effects of the basin structure are one of the important factors in understanding strong motion characteristics. In order to understand site amplification factors, we conducted microtremor and earthquake observations in Duzce city.

First, we conducted array measurements of microtremors at 4 sites in Duzce city in the eastern part of Turkey for estimation site amplification factors. S-wave profiles down to the basement with an S-wave velocity of 3 km/s were revealed at 4 sites in from genetic inversion of phase velocities derived in frequency-wavenumber spectral analysis. The basement is as deep as 1.2 km at the site with a distance of 5km from the southern end of the basin. However, the basement depths at the other three sites including the site in the center of the basin are 1.8km. The S-wave velocities of the sedimentary layers are 0.3km/s, 0.8km/s, 1.4km/s, respectively. The basement S-wave velocity is assumed to be 3km/s in the inversion of the phase velocity.

Earthquake observation has been conducted in the area by installing 4 stations including a station at the meteorological station in Duzce where strong ground motion was recorded during the main shock. From travel time analysis of initial P- and S-waves from small events, we validated the above subsurface structural models. We will discuss site amplification factors using the observed records.

This study is conducted with cooperation of researchers in Department of Geotechnical Engineering, Istanbul Technical University. We express our thanks to Prof. A. Ansal, Prof. R. Iyisan, and Dr. U. Gulerce at ITU.