

Microtremor observation in Adapazari and Duzce areas, Turkey, for estimation site amplifications

Masato Kato[1], Hiroaki Yamanaka[2]

[1] Environmental Sci. and Tech., Tokyo Inst. of Tech., [2] T.I.Tech

<http://yama1.depe.titech.ac.jp/>

We conducted single-point measurements and array measurements of microtremors in Adapazari and Duzce areas 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 5 sites in Adapazari from microtremor array explorations. The basement is as deep as 1 km at the sites in the northern part of the city, while it becomes shallow in the southern sites. From the single-station measurements of microtremors were conducted along a line from the north to the south in Duzce area. The ratio of horizontal spectra to vertical ones was compared with theoretical ellipticity of Rayleigh waves for the subsurface structural model proposed by Kanno and Kudo (2000). An agreement of the ratio with the theoretical ellipticity allows us to deduce subsurface structural model at each site. The model forms a basin structure with maximum thickness of about 1 km.

Earthquake observation has been conducted in Adapazari by installing 4 stations including a station near the strong motion instrument that recorded strong ground motion during the main shock. From travel time analysis of initial P- and S-waves from small events, we validated the subsurface structural models. Site amplification factors were also compared with theoretical transfer functions calculated from the models. The agreement of these amplification factors again indicated validity of the models. We, finally, discussed about damage distribution of the 1999 Kocaeli earthquake using the site amplification factors of the subsurface structural models.