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Array observations of microtremors in Bandung basin, Indonesia

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We conducted microtremor explorations at 15 sites in the Bandung basin, Indonesia, to know S-wave velocity profiles of shallow and deep soils for estimating amplification of strong ground motion during large earthquakes in the area. We temporarily deployed an array of 10 vertical seismometers with station spacing of 0.2 to 1 km at each site using stand-alone recorders with a unit of receiving GPS timing signal to obtain microtremor data of 45 minutes. Small arrays were also deployed near the center of the large array by installing 7 vertical sensors in triangular configurations with spacing of 2-16 meters at each site. Vertical array records of microtremors in the two kinds of the arrays were used to estimate Rayleigh wave phase velocity using SPAC or FK methods. Preliminary analysis of the obtained records indicates that phase velocity at the sites in the basin margin exhibits higher values than those obtained in the central part of the basin in high and low frequencies ranges. This clearly indicates that the thickness of the sediments is larger in the center of the basin.
These phase velocity data were used to deduce S-wave velocity profiles for shallow and deep soils from the inversions based on a hybrid method of GA and SA by Yamanaka (2007). The S-wave velocity models for the shallow soils over the engineering basement with an S-wave velocity of 500m/s are divided into 4 groups with different AVS30 (Average Vs in the top 30meters). The eastern and western parts of the basin are characterized with low and high AVS30. On the other hands, the deep soils over the basement having an S-wave velocity of 3 km/s indicate different spatial variations of their thickness. The depth to the basement is the deepest at the center of the basin, and becomes shallow in the marginal part. These profiles are used for discussion of the site amplification factors in the area.

Keywords: site amplification, microtremor exploration, Bangdung, Indonesia, phase velocity, surface wave