

Estimation of Seismic Ground Motion and Shaking Parameters Based on Microtremor Measurements at Palu City, Central Sulawesi Province, Indonesia

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Abstract : In this study, we estimated the seismic ground motion parameters based on microtremor measurements at Palu City. Several earthquakes have struck along the Palu-Koro Fault during recent years. The USGS epicenter, magnitude Mw 6.3 event that occurred on January 23, 2005 caused several casualties. We conducted a microtremor survey to estimate the strong ground motion distribution during the earthquake. From this survey we produced a map of the peak ground acceleration, velocity, seismic vulnerability index and ground shear strain maps in Palu City. We performed single observations of microtremor at 151 sites in Palu City. We also conducted 8-site microtremors array investigation to gain a representative determination of the soil condition of subsurface structures in Palu City. From the array observations, Palu City corresponds to relatively soil condition with $V_s \leq 300$ m/s, the predominant periods due to horizontal vertical ratios (HVSRS) are in the range of 0.4 to 1.8 s and the frequency are in the range of 0.7 to 3.3 Hz. Strong ground motions of the Palu area were predicted based on the empirical stochastic green's function method. Peak ground acceleration and velocity becomes more than 400 gal and 30 kine in some areas, which causes severe damage for buildings in high probability. Microtremor survey results showed that in hilly areas had low seismic vulnerability index and ground shear strain, whereas in coastal alluvium was composed of material having a high seismic vulnerability and ground shear strain indication.

Keywords : Palu-Koro fault, microtremor, peak ground acceleration, peak ground velocity, seismic vulnerability index

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