Investigation of subsurface characteristics by using a vs30 parameter and a combination of the hvsr and spac methods for microtremor arrays

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Abstrak

Palu City is an active seismic area in Indonesia due to the very active Palu-Koro fault system. The development of the city area, therefore, must consider the risks induced by the seismic activities. The risk assessment has to be supported by information on subsurface characteristics. The aim of this study is to investigate the characteristics of the subsurface of the area by considering the value of Vs30 (top 30 m shear-wave velocity). This parameter has been related to the estimation of the site's ground shaking during the occurrence of an earthquake. The measurements taken in the deep soil sediment include the microtremor array, using the spatial auto correlations (SPAC) method, as well as the site's dominant period measurement, using the horizontal-to-vertical spectral ratio (HVSR) method. All these parameters were local site parameters, which could be subsequently related to a description of the potential impact in an area near to the epicenter. The measurement of Vs30 was conducted in collaboration between the Indonesian Agency for Meteorology, Climatology, and Geophysics (Badan Meteorologi, Klimatologi, dan Geofisika) (BMKG) and the University of Indonesia (Universitas Indonesia) (UI); the overall surveys included Vs30 measurements at 44 sites, microtremor array surveys at 10 sites, and the dominant period measurements at 74 sites. The overall results indicated that there is a good correlation between Vs30 and the dominant period. In general, Palu City is predominantly a class-D site, but the northwest part of the Palu area is a class-C site.