



Stability analysis on hillslope by using site-reference-spectral ratio

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The extreme climatic patterns such as strong and prolonged rainfall frequently occurred in Taiwan during summer season, which are major triggered factors to hazardous large-scale collapse events. Thus, it is important to explore the possible failure areas before the collapse occurrence. Taiwan is located at the plate boundary, resulting the high seismicity to provide the high quality seismic records. Aforementioned condition provides a good opportunity to test the site-reference-spectral ratio (SRSR) method for the characterization of site stability. First, we installed five seismometers around the high failure potential landslide area. During the monitoring period, there are a total of 32 crustal (focal depth of 3-35 km) earthquakes (local magnitude (M_L) greater than 4.0) resulting the shaking intensity ranging from 1 to 5 (intensity scale of Central Weather Bureau). The farthest epicentral distance is 150 km. Station CS03 was selected to be a reference station, which generally recorded the smaller peak ground acceleration (PGA) for each earthquake. Results show the SRSR value with a range of 0.3-30. The amplification effect related to reference station can be observed at higher frequency (> 12 Hz) portion and mainly concentrated on the azimuth between 100 and 160 degrees, which probably corresponding to subsurface structure with northwest-to-southeast trend. Furthermore, we also applied SRSR analysis to other sites to provide comprehensive test of method feasibility. In practical, SRSR method is useful and invasive tool to map the possible landslide area by using dense and averaged-distribution seismic array.

Keywords: Site-reference-spectral ratio (SRSR), Stability, Peak ground acceleration (PGA)