

The Engineering Geological Database for TSMIP (EGDT)

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ABSTRACT

Taiwan was created by the collision of the Philippine Sea Plate and the Eurasian Plate with a currently rate of about 80 mm/yr. The high-speed collision causes a great seismicity in and around the Taiwan Island as well as a high topographic deformation rate. This is why the geology, topography, and seismicity are so variable and complex in this island. The soft deposits overlaid on the hard bedrock can amplify seismic waves to cause increased damage during a large earthquake. This is the so-called site effect, a very important issue in strong ground motion studies. After the destructive Chi-Chi, Taiwan earthquake, it was considered necessary to understand the variable geological conditions at the free-field strong motion stations overspreading whole Taiwan and thus the critical site effect might be assessed. The Engineering Geological Database for TSMIP (EGDT), the Taiwan Strong Motion Instrumentation Program, has been under construction by the National Center for Research on Earthquake Engineering and the Central Weather Bureau in Taiwan since 2000. Site characterization, comprising surface investigations and logging measurements, was carried out throughout the project. EGDT contains 478 surveyed stations, 447 of which include completed logging measurements. We calculated V_{s30} (the average shear-wave velocity in the upper 30 m), which is a globally recognized parameter used by building codes of seismic design to identify different seismic site conditions, via the shear-wave velocity profiles of the logging data for those drilled stations and developed empirical S-wave velocity equations for Taiwan. Otherwise, the logging profiles of EGDT also attracted views from the international, for example, the Pacific Earthquake Engineering Research Center used the data for the well-known project of Next Generation Attenuation Relationships.

Keywords: S-wave velocity, V_{s30} , Site classification, TSMIP, Taiwan

