東京大学地震研究所共同利用研究集会 2024：次世代のリアルタイム監視予測システムの探求：固体地球科学における即時解析・即時予測・情報利活用

Ground motion prediction equations for PGA and PGV at S-net sites and their test to N-net

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Ground motion prediction equations (GMPEs) are useful for estimating seismic intensities required for engineering and other applications such as earthquake early warning (EEW). The S-net has provided opportunities to study strong ground motions at the seafloor sites in the Japan Trench area after its operation began in 2016 (Aoi et al. 2020). Here we present the GMPEs, which we published in the last October, for peak ground accelerations (PGAs) and peak ground velocities (PGVs) based on the recorded data at the S-net stations (Dhakal et al. 2024). The records from earthquakes with moment magnitudes (Mw) between 5.5 and 7.4 and focal depths between about 5 and 90 km were used. Because the quality of the strong-motion data at the S-net stations is relatively lower compared to those from the land stations, selection and processing of records was carried out appropriately. An indirect approach was taken to address the effect of local site conditions and regression analysis was carried out on the site corrected data. The obtained standard deviations were approximately 0.25 in base-10 log scale. These GMPEs were used to predict the values at the fore-arc KiK-net sites, and relationships of the residuals were examined with respect to the average S-wave velocities in the top 30 m (Vs30), for the data from the same set of earthquakes. Regression lines were fitted between the residuals and the Vs30 values. We found that the standard deviation after the regression fit was approximately 0.3 in base-10 log scale for the PGV at the KiK-net sites. The detail results can be found in the abovementioned paper (Dhakal et al. 2024). N-net is still in construction, but 18 stations, which constitute the offshore half of the network, has been in operation (Aoi et al. 2023). We employed the GMPEs for two earthquakes in the Bungosuido Strait (Mw 6.2) and Hyuganada Sea (Mw 7.0), respectively, to understand the average trend of the data at the available N-net stations. We discuss these various analysis and results in the presentation.

References

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