Strong Motion of the 2018 Mw 6.4 Hualien, Taiwan Earthquake and Its Impact on Seismic Design Code in Taiwan

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The maximum observed PGA and PGV at various stations during the 2018 Hualien, Taiwan earthquake were 594 Gal and 146 cm/s, respectively. Pulse-like velocities were observed at all stations within a distance of 4 km from the Milun fault. The horizontal spectral accelerations of the pulse-like records indicated two obvious amplifications at periods of roughly 1 s and 2 s. Natural frequencies of 0.8 to 1.5 Hz were observed in the region near the Milun fault using microtremor measurements. The spectral acceleration peak at periods of roughly 2 s is mostly seen in the east-west direction, indicating a typical fault-normal seismic radiation from the fault rupture. Consequently, we contend that the amplifications of spectral acceleration at approximately 1 and 2 s were caused by site amplification and the rupture front, respectively. The site amplification at the period of approximately 1 s may have been one reason for the collapse of medium-rise buildings during this earthquake. Evident soil nonlinearity resulted in smaller horizontal than vertical PGA at many stations in the near-fault region. Return period of the Milun Fault is believed to be about 67 years (1951 and 2018) and thus it is a 53% probability of being exceeded in a 50-yr mean recurrence interval. The demand of seismic design in the Hualien City will have to be increased especially in the long-period according to the observed ground motions during this earthquake.

Keywords: Near-Fault Ground Motion, PGV, Pulse-like Velocity

