Comparison between observation and simulation of ground motions for the 2016 Gyeongju earthquake

Byeong Seok Ahn*, Hyun Jae Yoo, Tae-Seob Kang

Division of Earth Environmental System Science, Pukyong National University, Busan 48513, Republic of Korea

*e-mail address : 11196abs@gmail.com, *Phone: +821025693895

A stochastic simulation method has been generally used to develop ground-motion prediction equation (GMPE) of the Korean Peninsula due to insufficient strong ground-motion data. It has been controversial whether these GMPEs are proper models for predicting ground motions which might be generated by a large earthquake because these GMPEs have not been verified with observation data yet. The 2016 M_L 5.8 Gyeongju earthquake in Korea gives a good opportunity to check validity of these GMPEs with strong-motion data. We compared the observed data recorded at 201 stations which are administered by Korea Meteorological Administration and Korea Institute Geoscience and Mineral Resources with the predictions using GMPEs and simulated ground-motions. Overall predictions using GMPEs and simulations showed underestimation compared to the observations. These underestimations were considered to be caused by disregarding site effects due to the assumption that all stations are located on rock-sites in GMPE development or ground-motion simulation. We tried to estimate site-response functions at each station by devising a FIR filter approach and to correct the differences between observations and GMPEs or simulations. We present considerations in future development of GMPE in Korea.