Simulation of strong ground motion using hybrid scheme in Metro Manila,the Philippnes

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We simulated strong motion using hybrid scheme in Metro Manila, the Philippines. First, we constructed geological models for deep and shallow parts of the sedimentary layers over the basement with an S-wave velocity of 3km/s. The deep sedimentary model proposed by Takezono(2001) is used in this study. We made shallow geological model with S-wave velocities less than 0.4km/s by using shallow bore hole logging data that were gathered by Philippine Institute of Volocanology and Seismology and Kanto Gakuin University. We, next, prepare two types of fault models. One is an inhomogeneous fault model based on Irikura(2001) and the other is a source model with a uniform slip. In the hybrid simulation, 3D finite difference method and stochastic green's function method are used with matching filter with a filter frequency of 1 sec. We, first, estimated motion at engineering bedrock with an S-wave velocity of 0.4km/s. Next, ground motion at the free surface is estimated considering site amplification of shallow soils estimated by SHAKE. The results of simulation show the differences of the distributions of peak horizontal-velocities between the homogeneous and inhomogeneous source models. The formers large amplitudes can be seen over a wide area because of the influence of homogeneous slip and directivity. On the other hand, peak velocity distribution shows the complex pattern. However, features of subsurface structural model for the deep and shallow sedimentary layers can be clearly seen in the two distributions. Ground motions in the coastal lowland are characterized by large long- and short-period components. In the Marikina valley, only short-period motion is dominant. On the other hand, such a short-period motion is lack in ground motion in the central plateau.