Simulation of Long-period Ground Motion around The Fujikawa-kako Fault Zone during the 2018 Northern Osaka Earthquake

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Abstract

The Fujikawa-kako fault zone is an active fault that is suggested to be associated with the Nankai Trough in Suruga Bay, and the activity interval of this fault is a relatively high as compared to the other general active faults. Furthermore, this area is so important for the transportation network for our lives near this fault zone. A high-reliable prediction of strong ground motion in this area is important in earthquake disaster prevention in the area. In this study, we have installed strong motion observation instruments in Fujinomiya City and Fuji City to acquire strong motion records during small earthquakes since April 2018. From the earthquake records obtained at the observation points, it was found that the duration of the shaking was as long as nearly 2 minutes, and the long period component was dominant in the 2018 Northern Osaka Earthquake with a magnitude of 6.1. Then, using the deep S-wave velocity structure model of J-SHIS, we conducted seismic motion simulation of Northern Osaka Earthquake. We also assumed appoint source model, based on the CMT solution released by the Meteorological Agency. First, we compared the synthetic waveform of the rock site (YMNH10) with the observed one. The calculated waveform had similar characteristics of the observed waveform. By using the snapshots, we found that the major phases observed mainly in this area were surface waves with a north-south oriented wavefront arriving a right after the S wave arrival. We also found the later phases arriving from the southwestern part of Yamanashi Prefecture where the depth of the seismic bedrock is suddenly increases. On the other hand, the reproducibility of the observed frequency characteristics in the vicinity of Shizuoka City was low in a period range of 3-20 seconds. We need further improvement in the S-wave velocity model of the sedimentary layers.

Acknowledgements

A part of this study was carried out as an integrated research project for observation for the Fujikawa estuary fault zone by Ministry of Education, Culture, Sports, Science and Technology-Japan.

Keywords: The Fujikawa-kako Fault Zone , the 2018 Northern Osaka Earthquake, Simulation of Long-period Ground Motion , strong motion observation

