Strong motion observation of aftershocks of the 2016 Kumamoto Earthquake at temporary stations

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The Japanese seismic intensity scale of 7 was observed in Mashiki and Nishihara, Kumamoto Prefecture, Japan during the 2016 Kumamoto Earthquake which caused heavy damages to many buildings and huge landslides. JMA reported that ground motion with the intensity above 1 has been observed more than 1,000 times due to the many aftershocks. We then have begun to perform temporary strong motion observation in Mashiki town, Nishihara village, Kumamoto city and Minami-Aso village to investigate the cause of the heavy damages.

We have installed a temporary strong motion network since 2016 April 16. We have deployed accelerometers at the town office of Mashiki where the intensity of 7 was observed, and near the strong motion station of the KiK-net Mashiki, operated by NIED. We also deployed stations in heavily damaged area along route 28, southern and northern part of the route, and also, perpendicular to the fault. In addition to the stations in Mashiki town, we installed the instruments at village office of Nishihara and Kurokawa-district in Minami-Aso village, etc. The instruments have also been deployed along a line from the east to the west in Kumamoto city. We used the accelerometer JEP-6A3 with sensitivities of 10V/G or 2V/G by Mitutoyo Corp. and the data loggers of LS7000XT or LS8800 manufactured by Hakusan Corp. The acceleration records are continuously obtained with a sampling of 100 Hz.

For the moment, we have collected the aftershock records from the temporary network in Mashiki town, including records due to events with the JMA Magnitudes of above 5 and seismic intensity of about 4. We observed high spatial variation of ground motion features in Mashiki town. The ground motion observed at the town office exhibits higher value than that observed at KiK-net Mashiki. The peak ground acceleration and peak ground velocity observed at the southern part of route 28 show larger values than those at the town office. The ground motion in agricultural field zone in the center of Mashiki town or the northern part of the town shows same level or smaller level to that at town office. We found a dominant peak at a period of about 0.5 seconds in the 5% damping velocity response spectra at the Mashiki town office, the site along route 28 and the southern part of the route.

The collection and the analysis of all records in the temporary network is remind work. We continue to investigate the spatial variety of ground motions by using those records. We are also planning to estimate S-wave velocity profiles using microtermor exploration to discuss about the ground motion characteristics of observed records.

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