Seismic Intensity Measurement by IT Kyoshin Seismometer and Strong Motion Accelerometer at Campus Buildings

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Campus seismic observation of ground motions and building vibration is a useful tool to develop and explorer the frontier research issues. At the University of Tokyo, a campus building observation system of IT Kyoshin seismometers installed by Takano et al. (2004). The observed data are online via campus intranet, and monitoring for building response and simplified seismic intensity measurement are performed in real-time. At the Earthquake Research Institute of the University of Tokyo, strong motion observation system at the three different types of buildings as well as ground surface was deployed in 2005. The strong motion accelerometers are operated as a triggered system and measurement capability is up to 2097 cm/s/s. The three types of buildings of the Earthquake Research Institute composed a 7-story base-isolated RC building with a basement, a 6-story retrofitted RC building with 2-story basement, and a 4-story steel framed building. For each building, both the IT Kyoshin seismometers and strong motion accelerometers are installed at the lowest and top floors. To estimate prompt seismic intensity just after the earthquake is quite effective for evacuation and preparedness for the following disasters. We compare seismic intensity measure by two different seismometers. Generally the intensity show the good agreement within a difference of 0.3 in the Japan Meteorological Agency instrumental seismic intensity scale. However, the lowest and top floors tend to larger and smaller seismic intensity for strong motion accelerometers rather than IT Kyoshin seismometers, respectively. Takano and Ito (2010) already confirmed the JMA instrumental seismic intensity observed at campus is a function of 1.029 x -0.0092, where x is the simplified seismic intensity used in this study. We further investigate the difference of azimuth and period dependency using ground and building motion time histories, and design maximum and minimum ground motion levels of ground motion agreement.

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