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Development of the IT Strong Motion Seismometer with Earthquake Early Warning System

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Earthquake early warning provided by the Japan Meteorological Agency (JMA) uses the seismic records of the JMA strong motion network and High Sensitibity Seismograph Network Japan (Hi-net) by National Research Institute for Earth Science and Disaster Prevention (NIED). It estimates the epicentral location and magnitude of the event from the P-wave of the strong motion waveforms and the maximum ground motion at a site from the attenuation relationship. This method is called "regional warning" since the multiple stations in the region are synthetically analyzed.

On the other hand, on-site warning is a concept to estimate the largest ground motion at a site from the P-wave recorded at the same site. We can also estimate the seismic parameter except maximum ground motion (for example, the direction of the epicenter, magnitude, probability that the station is near-source.)

In this research, we incorporate the existing algorithms of on-site warning to the IT strong motion seismometer (ITK-002) developed by Central Corporation (Takano et al., 2009 SSJ meeting) and estimate the magnitude of the event and the maximum ground motion at a site from the P-wave waveform. ITK-002 uses a GMR (Giant Magnetoresistance) sensor as an acceleration pickup, and output the digital data with 24 bit sampling directly to the internet. We use the Tau_c method proposed by Wu and Kanamori (2005) with the empirical function trained by the Japanese earthquake dataset. Our final goal is to propose an inexpensive IT strong motion seismometer with simple on-site warning system.