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Expectation of ground motion using real time data of neighbor and front stations

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Earthquake Early Warning(EEW) has been operated nationwide in Japan by Japan Meteorological Agency(JMA). JMA EEW basically adopts a network method, in which hypocenter and magnitude (source parameters) are determined quickly, and then issue warnings. In this method, though we can expect ground motions using a few parameters (location of hypocenter, magnitude, site factors), error of source parameters leads directly to the error of the expectation, and it is not easy to take the effects of rupture directivity and source extent into account. In this presentation, we propose a method which uses real time waveform data of neighbor and front stations, In the method, though real time data is needed, relatively precise prediction is expected even when effects of rupture directivity or source extent are dominant.

For the analysis, we use borehole data (depth of borehole ranges 500 to 3500m), and also data from 2003 Tokachi Oki Earthquake (M:8.0) and 1994 Sanriku Haruka Oki Earthquake(M7.6).

Regarding the borehole, at SITH01, for instance, the accelerometers are located at surface and at a depth of 3500m. The borehole accelerometer detects S waves 3 sec earlier than the surface. The difference of site factors corresponds 1.3 on JMA intensity. The intensity at surface is expected 3 sec earlier by simply adding 1.3 to the observed intensity at borehole in real time manner. Regarding the Tokachi Oki Earthquake, the intensity is expected 7 sec earlier by using data at station which located 30km apart. For Sanriku earthquake, we try to modify the fault extent.

Acknowlegments. Data from K-NET, KiK-net of NIED, and JMA seismic intensity meters are used.

Keywords: Earthquake Early Warning, Expectation of seismic intensity, Deep borehole, real time manner, source region