

Earthquake Early Warning in Japan - Provision to the General Public and its Results –

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Japan Meteorological Agency started to provide Earthquake Early Warning to the general public in October 2007. It was followed by provision of EEW to a limited number of users who understand the technical limit of EEW and can utilize it for automatic control from August 2006.

A term of an earthquake early warning is not always defined as a unique meaning. It sometimes means a forecast of strong ground motions, sometimes means observational results of seismic waves such as a location and a magnitude of an earthquake, PGA, PGV, or seismic intensities. Earthquake Early Warning in Japan definitely means information of estimated amplitude and arrival time of a strong ground motion after fault rupture occurred. In other words, EEW is defined as a forecast of a strong ground motion.

EEW of JMA is to enable advance countermeasures to disasters caused by strong ground motions with providing expected seismic intensity and arrival time of the strong motion, as well as estimated hypocentral parameters, before the S wave arrival. However, due to its very short available time period, there should need some measures and ideas to provide rapidly EEW and utilize it properly.

- A technique to estimate hypocentral distance and magnitude of an earthquake by single station has been developed.
- Data are processed to make PGA, PGV including above mentioned parameters on site, and transmit to the processing server system together with wave form data simultaneously through dedicated telephone lines for earlier estimation of coming ground motion.
- Seismic intensity (JMA scale), which is well known to people in Japan to describe degrees of strong ground motions, is used for EEW so that those can easily understand what will happen.
- EEW is to be broadcast the broadcasting media and is delivered to cellular phones through cell broadcast system.

So that people can react properly to hear/see EEW, JMA sets issuance criteria as follows.

- EEW is issued when the maximum seismic intensity 5 lower or over is expected.
- EEW message contains origin time, epicentral region name, and names of areas (unit is about 1/3 to 1/4 of one prefecture) where seismic intensity 4 or over is expected. Expected arrival time is not included because it differs substantially even in one unit area.

JMA has settled the legal framework since December 2007 to clearly define the responsibility of JMA and EEWs itself as warnings and forecast of strong ground motions, and to assure the technical standard of EEWs that will be issued from private companies to provide expected seismic intensity and arrival time at individual house and building.

In the meeting, some examples of the actual issuance will be introduced.

EEW system has been developed by JMA, Railway Technical Research Institute, in collaboration with National Research Institute for Earth Science and Disaster Prevention.