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## Performance of Earthquake Early Warning of JMA ? present status and improvement

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Japan Meteorological Agency(JMA) started to provide EEW to a limited number of users from August 2006, and started to the public through TV and radio in October 2007. The Meteorological Law amended in December 2007 was provided that EEW should be as forecast or warning of strong ground motions caused by an earthquake.

From October, 2007 to December, 2010, JMA issued 17 warnings to the public and issued 1756 forecasts. For 7 cases for which maximum seismic intensity "5 lower" was actually observed, JMA did not issue warnings because of underestimation of the strong ground motion. .

In 2010, warnings were issued for 5 events - M7.2 earthquake occurred at Near Okinawajima island on 27,February, M6.7 earthquake occurred East off Fukushima prefecture on 14 March, M5.7 earthquake occurred Western Fukushima prefecture on 29,September, M4.7 earthquake occurred Mid Niigata prefecture on 3,October and M4.6 earthquake occurred Ishikari depression on 2 December. For Western Fukushima prefecture event, EEW system estimated focal depth deeper than the actual one. (depth of JMA catalogue:8km -> depth of EEW Warning:120km) Therefore, EEW system overestimated its magnitude ( magnitude of JMA catalogue:M5.7 -> magnitude of EEW warning:M6.6), and issued Warning including area where observed intensity was much smaller than "5lower".

JMA has been enhancing seismic observation network, and improving the method in order to issue more accurate and more rapid EEW.

For example, until March 2011, JMA is going to apply empirically estimated site amplification factors for predicting seismic intensities. JMA is going to use new seismic stations - 10 free surface stations in Nansei-shoto Islands in Kagoshima and Okinawa prefecture , Niijima island in Tokyo prefecture and Beppu in Oita prefecture.

In addition, we are planning to use data from NIED's seismometers installed in boreholes at depth of more than 1000m from surface in Tokyo metropolitan area.

In this presentation, we will present evaluation of the performance of EEW issuance, problem and various efforts to improve EEW of JMA.

Keywords: Earthquake Early Warning, Warning event