

Prototype Earthquake Early Warning System in the Beijing Capital Region of China

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The occurrence of the 2008 Wenchuan *Ms*8.0 earthquake highlighted the importance of constructing earthquake early warning (EEW) system in continental China, especially in the densely-populated areas such as north China. Since recent years, several projects related to EEW have been conducted, such as those in Fujian Province, providing experiences in the processing of near- real time data streams and the estimation of earthquake magnitude for early warning purposes. These projects are basically in connection with the demands of fast report of earthquake parameters, one of the most important seismological information service provided by seismological agencies to the public.

The Beijing Capital Region lies in north China where historical recordings show that there were strong earthquakes occurred, with magnitude up to 8 (the 1679 Sanhe-Pinggu earthquake). At present, there are some 130 real-time seismic stations distributed in this area, with average inter-station distance about 50 km. This network provides an ideal hardware platform for the prototype EEW system. In 2007, with the help of Prof. Yih-Min Wu, a testing EEW system was installed to process the data stream at 16 stations. Simulated experiments were conducted, and some theoretical problems, including the 'saturation' of magnitude estimation associated with short-period recordings, empirical relations for the estimation of magnitude using the first 3-second P waves, and the regionalized capability of EEW, were studied as preparatory works.

Regional seismicity and station distributions make the EEW design of the Beijing Capital Region a hybrid type in between the front-detection early warning and the on-site early warning. Low seismicity, separation of seismic and strong motion observation systems, and communication network at the present stage are challenges in the development of the EEW system in Beijing Capital Region, which calls for international exchange of experiences and international collaborations.