Developing Earthquake Early Warning Prototype System in Beijing Capital Region

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The occurrence of the 2008 Wenchuan *M*s8.0 earthquake highlighted the importance of constructing earthquake early warning (EEW) system in continental China, especially in the densely-populated areas such as north China.

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 EEW prototype system. And based on the techniques of the first 3-second P wave, P_d method and τ_c method, an EEW prototype system has been put into operation with real data in this region since 14 January 2010. Real-time testing results show that this system works stably for events with magnitude greater than 2.0 occurred in the Beijing Capital Region. Averagely speaking, the system is capable of issuing an earthquake report within about 20 minutes with reasonable epicenter, occurring time and magnitude. Now, refining of this prototype system is conducted.

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 is challenges in the development of the EEW system in Beijing Capital Region, which calls for international exchange of experiences and international collaborations.

Keywords: Beijing Capital Region; EEW; prototype; real-time

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