

## Evaluation of the real-time earthquake information system using not-yet-arrived data

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The real-time earthquake information system (REIS) of the Japanese seismic network is developed for automatically determining earthquake parameters within a few seconds after the P-waves arrive at the closest stations using both the P-wave arrival times and the timing data that P-waves have not yet arrived at other stations. REIS results are transmitted to the government and play a fundamental role in the real-time information for earthquake early warning (EEW). We show the rapidity and accuracy of REIS from the analysis of 4,050 earthquakes. On rapidness, about 44 percent of the first reports are issued within 5 seconds after the first P-wave arrival. About 80 percent of events have a difference in epicenter distance less than 20 km relative to manually determined locations. In addition to JMA magnitude ( $M_{JMA}$ ), which is estimated from moment magnitude, REIS estimates a new scaling parameter called intensity magnitude (MI), which is defined from observed P wave seismic intensity (Yamamoto *et al.*, 2007). Our statistical results show that these two kinds of magnitudes are reasonably determined. Either  $M_{JMA}$  or MI by REIS for 94 percent of events has differences less than 1.0 compared with reported JMA catalog.