

## Real-time Earthquake Magnitude Estimation by the GEONET real-time analysis system: REGARD

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Geospatial Information Authority of Japan (GSI) and Tohoku University have jointly developed a real-time analysis system in the Japan's national GNSS network, GEONET: the Real-time GEONET Analysis system for Rapid Deformation monitoring (REGARD). The goal is to estimate the magnitude and finite fault models for large earthquake in real-time. The obtained magnitude is free from the saturation problem, thus it constrains the size of a subsequent tsunami and potentially improves the tsunami warning system that rely only on the seismic data. Currently REGARD involves about 1300 GNSS stations, RAPiD algorithm (Ohta et al., 2012) for automatic event detections, and two real-time fault modeling routines: a single rectangular fault modeling routine and a slip distribution fault modeling routine.

We evaluate the two fault modeling procedures for the 2003 Tokachi-oki earthquake, the 2011 Tohoku earthquake and the 1707 Hiei type Nankai trough earthquake in the real-time situations. The real-time waveform data for the Nankai trough earthquake are based on the simulation (Todoriki et al., 2013). Both routines gave magnitudes with high variance reduction over 90% for the 2003 Tokachi-oki earthquake and the 2011 Tohoku earthquake within 3 minutes. Moreover, the slip distribution model provided reasonable magnitude for the simulated Nankai trough earthquake, which was based on heterogeneous dynamic fault rupture.