特別セミナー/Special seminar

講演者： Dun Wang 教授（China University of Geoscience, Wuhan）
日時/Time： 2017 年 10 月日 20（金）13 時 45 分～14 時 45 分
場所/Place： 理学研究科 2 号館の 129 号室 (http://www.sci.kyoto-u.ac.jp/ja/map.html)
Title (Authors)： Automated Determination of Magnitude and Source Length of Large Earthquakes
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Abstract:

Rapid determination of earthquake magnitude is of importance for estimating shaking damages, and tsunami hazards. However, due to the complexity of source process, accurately estimating magnitude for great earthquakes in minutes after origin time is still a challenge. Mw is an accurate estimate for large earthquakes. However, calculating Mw requires the whole wave trains including P, S, and surface phases, which takes tens of minutes to reach stations at teleseismic distances. To speed up the calculation, methods using W phase and body wave are developed for fast estimating earthquake sizes.

Besides these methods that involve Green's Functions and inversions, there are other approaches that use empirically simulated relations to estimate earthquake magnitudes, usually for large earthquakes.

The nature of simple implementation and straightforward calculation made these approaches widely applied at many institutions such as the Pacific Tsunami Warning Center, the Japan Meteorological Agency, and the USGS.

Here we developed an approach that was originated from Hara [2007], estimating magnitude by considering P-wave displacement and source duration. We introduced a back-projection technique [Wang et al., 2016] instead to estimate source duration using array data from a high-sensitive seismograph network (Hi-net). The introduction of back-projection improves the method in two ways.

Firstly, the source duration could be accurately determined by seismic array. Secondly, the results can be more rapidly calculated, and data derived from farther stations are not required. We purpose to develop an automated system for determining fast and reliable source information of large shallow seismic events based on real time data of a dense regional array and global data, for earthquakes that

occur at distance of roughly 30°- 85° from the array center. This system can offer fast and robust estimates of magnitudes and rupture extensions of large earthquakes in 6 to 13 min (plus source duration time) depending on the epicenter distances. It may be a promising aid for disaster mitigation right after a damaging earthquake, especially when dealing with the tsunami evacuation and emergency rescue.