

Source Characteristics of Large Earthquakes Inferred from Waveform Analysis

Yoshiko Yamanaka

Graduate school of Environmental Studies, Nagoya University, Japan

E-mail : sanchu@seis.nagoya-u.ac.jp

Abstract

Source process analysis inferred from seismic waveform has two important roles. The first is the real-time analysis for disaster mitigation. Whenever a large earthquake or damage event occurs in the world, we are ready to analyze the source rupture process as early as possible. Our analysis is based on Kikuchi and Kanamori (1991) to use teleseismic broadband body waves downloaded from IRIS Web site. Our results are made open to the public at the following Web site;

http://www.seis.nagoya-u.ac.jp/sanchu/Seismo_Note/index-e.html

http://www.seis.nagoya-u.ac.jp/sanchu/Seismo_Note/index.html (Japanese)

The second is extracting the feature of source processes from accumulation of results. Results can be directly compared by using similar data and the same analysis technique. We extracted the regional feature of rupture processes for the earthquakes occurred along the Japan Trench. Offshore from the Ibaraki Prefecture, a large seamount has been found to subduct near the region where earthquakes of magnitude 7 class occur with a fairly constant recurrence period of 20 years. We analyzed the source process of the 1982 Ibaraki-oki earthquake with magnitude 7.0 which occurred near the large subducting seamount (~ 50 km in diameter, ~ 3 km in height). A large rupture area with small slip was found in front of the seamount. Both the pattern of rupture propagation for the 1982 event and the observed seismicity imply that interplate coupling is weak over the seamount. But the rupture pattern of the 2008 Ibaraki-oki earthquake was quite different from the pattern of the 1982 event. Fluid migration may play an important role to determine seismogenic character around the subducted seamount.