Oral | Symbol M (Multidisciplinary and Interdisciplinary) | M-AG Applied Geosciences

[M-AG39_1AM1]Special Project for Reducing Vulnerability for Urban Mega Earthquake Disasters

Convener:*Naoshi Hirata(Earthquake Research Institute, the University of Tokyo), Hiroshi Sato(Earthquake Prediction Research Center, Earthquake Research Institute, The University of Tokyo), Kenji Satake(Earthquake Research Institute, University of Tokyo), Hiroshi Tsuruoka(Earthquake Research Institute, Tokyo Univ.), Muneo Hori(Earthquake Research Institute, The University of Tokyo), Shin'ichi Sakai(Earthquake Research Institute, University of Tokyo), Chair:Takeo Ishibe(Earthquake Research Institute, Univ. of Tokyo), Akinori Hashima(Earthquake Research Institute, The University of Tokyo)

Thu. May 1, 2014 9:00 AM - 10:45 AM 502 (5F)

Human beings have experienced devastating earthquakes in this century (e.g. 2004 Sumatra, 2008 Wenchuan, 2010 Maule, 2011 Tohoku earthquake). These earthquakes have caused strong ground motions and/or large tsunamis. The 2011 Tohoku, Japan, earthquake, for instance, produced widespread complex disasters product of nation-wide ground shaking and large tsunami waves. In the Tokyo metropolitan area, many problems specific to urban regions have been exposed: liquefaction damage, stranded commuters, paralyzed traffic, suspensions of business activities, power blackout, lost of lifelines, etc. Metropolitan areas in Japan concentrate sophisticated social functions and are the political and economic nerve centers of the country. As such, they are particularly vulnerable to natural hazards like earthquakes. When large earthquakes occur, unforeseen consequences are exposed and considerable damages may happen. We have started the Special Project for Reducing Vulnerability in Urban Mega Earthquake Disasters (2012?2016) from two years ago, which is sponsored by the Japanese Ministry of Education, Culture, Sports, Science and Technology. This project is composed of three academic disciplines: Earth and physical sciences, engineering, and human social sciences. It seeks to (1) clarify the earthquake mechanism of southern Kanto region and develop evaluation technology for seismic damages in urban areas; (2) develop technology for rapid damage assessment of high-rise office buildings which may be damaged during earthquakes, and (3) develop strategies to increase earthquake social resilience. These three disciplines are usually studied independently. However, we have one common mission, to reduce the impact of seismic events. Multidisciplinary collaboration has an important role in our project. This session will be the important activity to foster collaborations through academic discussions between participating researchers.

10:30 AM - 10:45 AM

[MAG39-P03_PG]Publication of the Japan University Network Earthquake Catalog of First-Motion Focal Mechanisms (JUNEC FM^2)

3-min talk in an oral session

*Takeo ISHIBE[1], Hiroshi TSURUOKA[1], Kenji SATAKE[1], Masao NAKATANI[1] (1.Earthquake Research Institute, the University of Tokyo)

Keywords:first-motion focal mechanism solution, Japan University Network Earthquake Catalog (JUNEC)

We determined focal mechanism solutions for 14,544 earthquakes that occurred in and around the Japanese Islands from July 1985 to December 1998 by using first-motion polarities reported by the Japan University Seismic Network, and compiled the Japan University Seismic Network Earthquake Catalog of First-Motion Focal Mechanisms (JUNEC FM^2). JUNEC can be obtained from ftp site provided

by ERI: ftp://ftp.eri.u-tokyo.ac.jp/pub/data/junec/hypo/. JUNEC FM[2] also can be obtained via ftp site: ftp://ftp.eri.u-tokyo.ac.jp/pub/data/junec/mech/. The Earthquake Research Institute, the University of Tokyo has compiled observed data with the cooperation of universities and determined hypocenters amounting to about 190,000. This catalog covers small-magnitude earthquakes (M≥2.0) prior to the recent development of seismic observation networks and automated waveform data processing systems, and it will prove helpful in understanding the spatial and temporal heterogeneities of stress fields by combing recent focal mechanism solutions. Abundant focal mechanism solutions will be useful for statistical analyses. Their distribution is spatially and temporally heterogeneous, and it clearly reflects both the development of observation station network and spatial variations of first motion polarity report rate (i.e., first motion polarity report number / the number of picked onsets). Determined focal mechanisms are basically consistent with previously reported ones such as Full-range Seismograph Network of Japan (F-net; Okada et al., 2004) moment tensor solutions provided by National Research Institute for Earth Science and Disaster Prevention (NIED), or P-wave first motion focal mechanisms provided by the Japan Meteorological Agency (JMA) though some focal mechanisms are significantly different from them.In Japan, an abundance of first-motion focal mechanism solutions for earthquakes have been determined after the 1995 Kobe earthquake (magnitude according to JMA-, M_{JMA} 7.3) through the development of the High Sensitivity Seismograph Network Japan (Hi-net). In addition, moment tensor solutions for moderate- to large-magnitude earthquakes have been routinely determined since 1997 using the F-net and improved data processing systems. These focal mechanism solutions have provided a good understanding of the fault structures and the local/regional stress fields in which earthquakes occur. However, focal mechanism solutions for earthquakes covering the Japanese Islands prior to the development of recent seismic observation networks have been very limited, barring a few studies (e.g., Ichikawa, 1961, 1971). Following the 2011 off the Pacific coast of Tohoku earthquake (moment magnitude according to the JMA, Mw9.0), the distribution of focal mechanism solutions has drastically changed especially in and around the source region. This indicates that stress fields or focal mechanism solutions are temporally variable. In light of this, data on the focal mechanisms of earthquakes extending as far back as possible are desirable in order to investigate intermediate- to long-term spatial and temporal heterogeneities of focal mechanism solutions and local/regional stress fields.AcknowledgementsWe used a program modified from HASH (Hardebeck and Shearer, 2002) to estimate the focal mechanism solutions and the pick files observed by Hokkaido University, Hirosaki University, Tohoku University, the Earthquake Research Institute of the University of Tokyo, Nagoya University, the Disaster Prevention Research Institute of the Kyoto University, Kochi University, Kyushu University, and Kagoshima University. We also used focal mechanism solutions for earthquakes provided by NIED and JMA. This study was supported by the Special project for reducing vulnerability for urban mega earthquake disasters from the Ministry of Education, Culture, Sports, Science and Technology of Japan.