New perspective of great earthquakes along subduction zones

Convener:*Kyuichi Kanagawa(Graduate School of Science, Chiba University), Takashi Furumura(Center for Integrated Disaster Information Research (CIDIR) Interfaculty Initiative in Information Studies, The University of Tokyo), Shuichi Kodaira(Institute for Research on Earth Evolution Japan Agency for Marine-Earth Science and Technology), Masanobu Shishikura(Active Fault and Earthquake Research Center, GSJ/AIST), Chair:Saneatsu Saito(Japan Agency for Marine-Earth Science and Technology)

Mon. Apr 28, 2014 11:00 AM - 12:42 PM  Main Hall (1F)

We explore a new perspective of great earthquakes along subduction zones by integrating results of historical earthquake and tsunami surveys, seismic and geodetic observations and experiments, laboratory experiments, material analyses, and numerical modeling on pre- and co-seismic processes and slips, seismic links, and the recurrence. We welcome presentations not only on great earthquakes along Japan Trench, Nankai Trough, and other subduction zones in the world, but also on their precursory or inducing large inland earthquakes.

11:00 AM - 11:15 AM

High resolution seismic profiling in the northern Japan Trench axis area

3-min talk in an oral session

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Marine geological and geophysical surveys and analysis of their results have revealed that the ruptured area of the 2011 Tohoku earthquake extended up to the vicinity of the trench axis along the plate boundary fault. To investigate the geological structure, especially the faults and the deformation of the sediments, we have conducted reflection seismic surveys in the trench axis area of the Japan Trench off Miyagi and Iwate prefectures. Three seismic cruises have been carried out in 2011 and 2013 along 81 E-W (dip) lines and 17 N-S (strike) lines. We have used 320 or 380 inch³ cluster air guns and a 1200 m long streamer cable to obtain high resolution seismic data. Surveyed area covers the trench axis area along the trench strike from seaward of the hypocenter of the Tohoku earthquake around 38 N at south, to ~40 N at north. Seismic profiles around 38 N show that the trench axis is located on a graben with sediments which have been deformed by reverse faulting. Similar deformation structure is observed around 40 N, but the trench axis is located on a horst not a graben there. The thickness of the incoming sediments on the Pacific plate typically ranges ~ 0.3 0.5 s in two way time, however it is reduced down to