[EE] Evening Poster | S (Solid Earth Sciences) | S-SS Seismology

[S-SS04]Nankai Trough Seismogenic Zone Experiment toward the final challenge

convener:Kyuichi Kanagawa(Graduate School of Science, Chiba University), Gregory F Moore (University of Hawaii at Manoa), Masataka Kinoshita(東京大学地震研究所, 共同), Keir Becker(University of Miami)
Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) is a multidisciplinary investigation of fault mechanics and seismogenesis along the megathrust at the Nankai Trough subduction zone, and includes reflection and refraction seismic imaging, direct sampling by drilling, in situ measurements, and long-term monitoring in conjunction with laboratory and numerical modeling studies. During the past 11 IODP expeditions off Kii Peninsula since 2007, 15 sites have been drilled by D/V "Chikyu" down to depths from 100s of meters to more than 3000 meters below seafloor, where the inner and outer wedge of the Nankai margin has been sampled extensively, and two state-of-the-art real-time downhole observatories are now in operation. NanTroSEIZE is now at the final stage with only two more expeditions planned for another downhole observatory installation at the toe site in early 2018, and for resuming riser drilling toward the megathrust at ~5200 meters below seafloor starting from late 2018.
In this session jointly held with AOGS, we expect presentations on scientific outcomes from the NanTroSEIZE project and discussions toward the final challenge. We welcome presentations on, but are not limited to, seismic imaging, borehole logging and monitoring, chemical analyses of pore water and mud gas, lithology, structures, physical properties and laboratory experiments of cuttings and core samples, and theoretical and numerical modeling.

[SSS04-P08]Postseismic fluid discharge chemically recorded in altered pseudotachylyte discovered from an ancient megasplay fault

*Hasegawa Ryota[1], Asuka Yamaguchi[1], Rina Fukuchi[2], Yohei Hamada[3], Yujin Kitamura[4], Gaku Kimura[5], Juichiro Ashi[1], Tsuyoshi Ishikawa[3] (1.Atmosphere and Ocean Research Institute, The University of Tokyo, 2.Research and Development (R&D) Center for Earthquake and Tsunami, Japan Agency for Marine-Earth Science and Technology, 3.Kochi Institute for Core Sample Research, Japan Agency for Marine-Earth Science and Technology, 4.Graduate School of Science and Engineering KAGOSHIMA UNIVERSITY, 5.Tokyo University of Marine Science and Technology School of Marine Resources and Environment)
Keywords:fluid-rock interaction, pseudotachylyte, megasplay fault

Megasplay fault blanching from plate boundaries at subduction zones are thought to be important source of earthquakes generating tsunami. In this study, we performed structural and geochemical analyses on a fossilized Megasplay fault (the Nobeoka Thrust of the Shimanto accretionary complex) to understand fluid-rock interaction and how the splay fault plays a role of fluid flow in the seismogenic zone. Nobeoka Thrust is a low-angle thrust which subdivides the Shimanto belt in Kyushu into the northern (Cretaceous and Tertiary) and the southern (Tertiary) subbelts, and is an exhumed analogue of an ancient megasplay fault. The hanging wall and the footwall of the Nobeoka Thrust show difference in lithology and metamorphic grade, and their maximum burial temperature is estimated from vitrinite reflectance analysis to be 320~330°C and 250~270°C, respectively.
As a result of structural observation, the principal slip zone (PSZ) of the Nobeoka thrust is composed of foliated cataclasite originated from sandstone-shale mélange including thin (~1.5 mm thick)

pseudotachylyte layer. Major and trace element composition analysis and EPMA element mapping revealed that the pseudotachylyte within the PSZ is enriched in Li and Cs, as well as slip zone of a minor fault in the footwall. Li- and Cs-enrichment in pseudotachylyte is interpreted as a result of fluid-rock interaction just after faulting (postseismic stage) because such an anomaly is only formed by large fluid/rock ratio (R >512 to 24 at 250 to 350 degrees C) under the existence of Li- and Cs-enriched fluid. X-ray diffraction analysis showed that the pseudotachylyte was devitrified to form palygorskite and muscovite, similar to the pseudotachylyte founded in minor shear zone of the hanging wall (Okamoto et al., 2006). The amount of fluid reacted with pseudotachylyte is estimated to be 4.8 × 10^0 to 1.64 × 10^4 m^3, based on empirical relationships among fault thickness, displacement and fault length.