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

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

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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-P09]Chemical characteristics and source of the fluid involved in the black fault rocks in the Kodiak accretionary complex

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Fluids in subduction zone are believed to play an essential role in triggering the earthquakes and inducing dynamic weakening of the earthquake faults. Recent geochemical studies have revealed that trace element and isotope characteristics recorded on the fault rocks are useful for evaluating fluid-rock interactions in fault zones during the past earthquakes. In this paper, we discuss the nature of the fluid involved in the fault zone in the Kodiak accretionary complex, which is regarded as a paleo-plate-boundary decollement at seismogenic depth (Rowe et al., 2005). It has been shown that ultrafine-grained black fault rocks in this locality exhibit clear depletions in Rb and Cs and enrichment in Sr relative to host rocks, consistent with the occurrence of coseismic fluid-rock interactions at the temperatures higher than 350 ˚C (Yamaguchi et al., 2014).

The distinct Sr enrichment in the black fault rocks is associated with a decrease in 87Sr/86Sr ratio, suggesting the involvement of fluids of external origin that has low 87Sr/86Sr ratios. The estimated 87Sr/86Sr for the end-component fluid is too low to be derived from sediments, but consistent with altered oceanic basalts. This suggests that the fluids were derived from underlying subducted oceanic crust. The black fault rocks are also characterized by slight enrichments in Li, which contrasts with distinct Li depletion observed in fault rocks that have experienced high-temperature fluid-rock interactions at shallower depths (Ishikawa et al., 2008; Hamada et al., 2011). The observed Li enrichment implies the involvement of Li-rich

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fluids in the Kodiak fault zone. The temperature and source required for the Kodiak fluids will be discussed based on the trace element and Li isotope characteristics.

References: Yamaguchi et al. (2014) Earth, Planets and Space, 66, 58; Rowe et al. (2005) Geology, 33, 937–940; Ishikawa et al. (2008) Nature Geoscience, 1, 679–683; Hamada et al. (2011) Journal of Geophysical Research, 116, B01302.

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