

Recall the past to address future scientific challenges from legacy data to advance understanding of seismogenic subduction zone: An IODP workshop Core-Log-Seismic investigation at Sea

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Subduction zones are host to the greatest magnitude earthquakes, potentially generating tsunamis with catastrophic impacts on populated coastal regions. From January 12 to February 7 2018, for the first time in seismicity research, International Ocean Discovery Program (IODP) Expedition 380 and Core-Log-Seismic Integration at Sea (CLSI@Sea) workshop, together dedicated to the observation of tsunamigenic earthquakes, were simultaneously organized on board the D/V-Chikyu across the Nankai Trough, off-Kumano in southwest Japan. These research programs happened in the frame of the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE), initiated from 2007. NanTroSEIZE involves 11 drilling expeditions and a large amount of related geophysical studies, coring and logging data, and connection of long-term borehole monitoring systems (LTBMS), recording in situ data, to the Dense Oceanfloor Network System for Earthquakes and Tsunamis (DONET). The NanTroSEIZE achievements have improved the knowledge of deformation and accretion evolutionary processes in the shallower portion of accretionary prisms (e.g. Strasser et al; 2009). Furthermore, these results have shown stress state (e.g. Lin et al 2016), observed slow earthquakes (e.g. Araki et al., 2016), and indicated a potential applicable to slip to the trench such as what happened during 2011 Tohoku-oki earthquake (e.g. Sakaguchi et al., 2011).

The singularity of CLSI@Sea workshop lies in the fact that expedition 380 aimed to install a new LTBSMS in toe of the prism, while the CLSI@Sea participants were revisiting the legacy data acquired at the same site during previous expeditions. The well-preserved cores drilled 10 years ago were specially stored on board Chikyu and available for new sampling and analysis, demonstrating the value of archived data. The goal was to develop discussions about integrative and interdisciplinary research to address outstanding questions regarding the processes at the origin of tsunamigenic- and slow earthquakes in subduction zones, crucial topics for the regional tectonics, but also fundamental aspects of the Earth's geodynamic. A challenging aspect of CLSI@Sea was to connect together expert mentors scientists in subducting margin with 14 early career workshop participants from different backgrounds, to work on common scientific questions. The multi-thematic debates organised during CLSI@Sea successfully resulted in a transfer of knowledge between both parties, highlighting the value of multi-disciplinary collaboration in parallel of individual research activities, as well as the importance to quantify interactive scientific processes from

different spatiotemporal scales. Lively discussions in a cordial atmosphere, and teamwork between mentors, participants and IODP staff in the Chikyu focused environment, were key components to the synthesis of crucial research questions and efficient development of both individual and collective research, and publication plans.

This talk will summarize the workshop and present the ongoing new researches organized by CLSI@Sea participants during workshop 380.

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