Preliminary results of IODP Expedition 338

K. Kanagawa1, B. Dugan2, G. Moore3, M. Strasser4, S. Toczko5, L. Maeda5 and IODP Expedition 338 Scientists
(1 Chiba Univ., 2 Rice Univ., 3 Univ. Hawaii, 4 ETH, 5 JAMSTEC)

The Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) is a multi-expedition project of Integrated Ocean Drilling Program (IODP) designed to investigate fault mechanics and seismogenesis along subduction megathrusts through reflection and refraction seismic imaging, direct sampling, in situ measurements, and long-term monitoring in conjunction with laboratory and numerical modeling studies. We report here the preliminary results of IODP Expedition 338 (Moore et al., 2013, IODP Preliminary Report 338), one of the NanTroSEIZE expeditions conducted from October 1, 2012 to January 13, 2013.

During Expedition 338, riser operations including logging-while-drilling (LWD), mud gas monitoring and cuttings sampling were conducted in Hole C0002F from 856 meters below the sea floor (mbsf) to 2005.5 mbsf (Fig. 1). The following riserless operations included coring at Site C0002 (200–505, 902–940 and 1100.5–1120 mbsf), LWD at Sites C0012 (0–709 mbsf) and C0018 (0–350 mbsf), and LWD and coring at Sites C0021 (0–294 mbsf) and C0022 (0–420 mbsf) (Fig. 1).

LWD data, and mud-gas and cuttings analyses in Hole C0002F provided constraints on lithology, structure, physical properties, and geochemistry of the previously unaccessed deeper part of the Nankai accretionary prism. A highly fractured zone identified by LWD resistivity images, a change in lithology of cuttings and the presence of abundant cuttings with slickenlined surfaces suggest a prominent fault zone at ~1640 mbsf. Riserless coring in Holes C0002H, C0002J, C0002K and C0002L provided core samples across the previously unsampled gas hydrate zone of the Kumano Basin, across the unconformity between the Kumano Basin and the underlying accretionary prism, and in the uppermost accretionary prism. A methane- and propane-rich interval at 200–400 mbsf corresponds to the gas hydrate zone inferred from resistivity and sonic log data (Expedition 314 Scientists, 2009, IODP Proceedings 314/315/316). Although gas-rich sands were common, no massive gas hydrates were found in this interval, suggesting disseminated methane hydrate. The irregular erosional unconformity boundary between the Kumano Basin and the underlying accretionary prism was found at 926.7 mbsf in Hole C0002J.

LWD logs (Holes C0018B and C0021A) and cores (Hole C0021B) were collected to characterize and correlate mass transport deposits (MTDs) in the slope basin seaward of the megasplay fault zone. The thickest MTD of Hole C0021B (133.8–176.2 mbsf) is correlated with that of Hole C0018A (127.5–188.6 mbsf; Expedition 333 Scientists, 2012, IODP Proceedings 333), based on a traceable prominent seismic reflector at their top as well as such common features as steep and chaotic bedding inferred from resistivity images, structures observed in cores, an interval of undeterminable paleomagnetism, a low PO4 anomaly of interstitial water chemistry, and a lower interval of relatively high shear strength.

LWD and coring at Site C0022 provided logging data and cores across the tip of the megasplay fault, which had been drilled through and sampled at the interval of 256–315 mbsf in Hole C0004D (Expedition 316 Scientists, 2009, IODP Proceedings 314/315/316). The megasplay fault zone is inferred to be located at the interval of 80–145 mbsf in Hole C0022B, based on biostratigraphic reversals, bedding dips >20°, and a change in trend of interstitial water chemistry data.

LWD at a subduction input site of Site C0012 provided petrophysical data to complement coring during Expeditions 322 and 333 (Expedition 322 Scientists, 2010, IODP Proceedings 322; Expedition 333 Scientists, 2012), and revealed that the top ~100 m of the oceanic basement is altered to variable degrees.

![Fig. 1. Composite seismic line extracted from the 3-D seismic volume, showing Expedition 338 sites in addition to previous NanTroSEIZE sites (Moore et al., 2013).](image-url)