



First Results from NanTroSEIZE LWD, IODP Expedition 314: Lithostratigraphy and Physical Properties of the Mega-splay Thrust Sheets and Forearc Basin Deposits

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The first IODP NanTroSEIZE expedition (Exp.314) was successfully completed using the Deep-Sea Drilling Vessel Chikyu of JAMSTEC-CDEX. We spent 56 days on site, carrying out scientific drilling in the Kumano basin off the Kii peninsula from September 21st to November 15th, 2007. The Nankai Trough Seismogenic Zone Experiments (NanTroSEIZE) is a multi-year, multi-leg and multi- platform project to investigate fault mechanics and seismogenesis along a subduction megathrust through direct sampling, in-situ measurements, and long-term monitoring.

During Expedition 314, we drilled into five NanTroSEIZE sites. Using the LWD (Logging-While-Drilling) technique, we obtained continuous vertical profiles of physical properties such as bulk density, resistivity, porosity, P-wave velocity, and borehole images. These sites include one frontal thrust site C0006 at toe of the accretionary prism, forearc basin deposits site C0002, a shallow part of the megasplay site C0004, and highly-deformed rocks of the interior of the accretionary prism sites C0001 and C0003.

Drilling conditions were severe at three sites due to strong deformation within the thrust sheet, caused by plate convergence and possibly by interseismic stress accumulation. Furthermore, operations were conducted under the strong Kuroshio Current, which was often stronger than 4 knots. However, with the drilling capability of Chikyu

we successfully completed drilling down to 400 m to 1400 m below the sea floor and obtained high quality in-situ physical properties as well as borehole images.

Log unit boundaries' geometry and bedding information were defined on the basis of borehole images and characterized from the LWD logs. Comparisons between different physical properties are made through cross-correlation plots to obtain empirical correlations between them.

At Site C0002, we identified a methane hydrate-rich zone at 220 to 400 m below the sea floor based on high resistivity image and low gamma ray data. Hydrates are concentrated in sandy layers of numerous turbidites in this zone.