

## Structural perspective of shallow megasplay fault and frontal thrust: initial shipboard results of Expedition 316

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Integrated Ocean Drilling Program (IODP) Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) Expedition 316 took place from December 19, 2007 to February 5, 2008. Four sites were selected in order to cross the shallow parts of the megasplay faults and the frontal thrust. Site C0004 (proposed site NT2-01I) and C0008 (proposed site NT2-10) are located close to where the megasplay fault reaches the seafloor, while site C0006 (proposed site NT1-03B) and site C0007 (proposed site NT1-03A) are in the frontal thrust area. Here we report the preliminary results of Expedition 316 shipboard structural studies.

Sediments near the seafloor generally dip moderately to steeply but their dip angles with depth. Compaction related bedding-parallel foliations (fissility) tend to occur below ~200 mbsf. Faults are seen both in slope sediments and prism. One notable structure is conjugate sets of deformation bands with reverse offset, observed at site C0006 and C0007. Their orientations indicate horizontal shortening along NW-SE, in accordance with the local direction of relative plate convergence.

Based on X-CT image analysis and visual core descriptions, several fault zones are defined in the megasplay fault and frontal thrust areas. At site C0004 (megasplay fault area), a fractured and brecciated zone is recognized at 256-315 mbsf. Biostratigraphic age reversal and distribution of highly fractured and brecciated rocks suggest the presence of two intervals of highly deformed rocks: 270-280 mbsf and 305-315 mbsf. Site C0008 has no remarkable fault zones.

At site C0006 (frontal thrust area), drilling did not reach the depth of a strong seismic reflector (possible frontal thrust) but crossed a fractured and brecciated zone between 277 and 545 mbsf. Although distribution of fault breccia is heterogeneous, thick fault breccias at 277-297 mbsf and at 533-543 mbsf suggests that these two intervals may correspond to faults branching from frontal thrust. At site C0007, Hole C0007D, three fault zones (237.5-259.3 mbsf, 341.5-362.3 mbsf, and 398.5-446.0 mbsf) have been recognized in the prism. All these fault zones account for lithological changes, and the two deepest zones have fault gouges. Especially the deepest part of the 398.5-446.0 mbsf fault zone is characterized by a 2mm-thick fine-grained dark layer.

These initial shipboard results bring the first real information of deformation features in the of shallow portion of the megasplay fault-frontal thrust system in the Kumano basin area, eastern Nankai Trough. Post-cruise researches and Stage 2 and 3 drillings in the near future are expected to bring further insights into subduction thrusts.