Results and expected dating research for the Nankai Trough megasplay and frontal thrusts

Gaku Kimura[1]

[1] Earth and Planetary Science . Inst., Univ. of Tokyo (Jamstec, IFREE)

Gaku Kimura, Elizabeth J. Screaton, Daniel Curewitz, and Expedition 316 Scientists

Integrated Ocean Drilling Program (IODP) Expedition 316 is the third drilling expedition of the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE), which is designed to investigate the processes that govern the strength, physical character, and distribution of slip along subduction zone plate boundary fault systems.

The first target of Expedition 316 was the shallow portion of the megasplay fault system, just seaward of the break in slope marking the boundary between the inner and outer accretionary wedge. The scientific objectives of drilling the shallow portion of the megasplay fault system are to characterize the slip, deformation, and fluid flow behavior and evolution of the updip region of the megasplay, in particular to assess whether it is an active blind fault or an inactive fault. Two sites were drilled to investigate the shallow region of the megasplay fault system. Site C0004 was selected to cross the splay fault at a depth of ˜300 mbsf; the total drilling depth was 400 mbsf to sample underthrust slope basin material. Site C0008 sampled the material of the slope basin 1 km seaward of Site C0004. This site was selected to provide age control on splay fault movement and reference material for sediments being overridden by splay fault movement. Samples of the fault zone sample were successfully recovered and reveal a long term history of activity spanning more than a few hundreds thousand of years.

The second target of Expedition 316 was the frontal thrust system. The scientific objectives of drilling this region are to understand the function of the frontal thrust, including its slip and fluid flow behavior, with respect to large earthquakes. An important component of this understanding is to reveal why this particular frontal thrust behaves differently (as evidenced by its longevity and large taper angle) from frontal thrusts in other accretionary margins. The results suggest that the lowest part of the accretionary prism is composed of Plio-Miocene Upper Shikoku Basin sediments and abruptly changes to very coarse underthrust trench-filling deposits accross the narrow plate boundary frontal thrust. Thrust faults within the frontal part of the prism appear to be inactive and are starting to gravitationally collapse due to over-critical state.

To investigate more precise history of the activity of the megasplay fault and frontal thrust, multiple studies for the dating are expected.