Spatial distribution of stress state in the NanTroSEIZE transect and a comparison with JFAST at frontal thrust

*Weiren Lin[1], Timothy Byrne[2], Masataka Kinoshita[3]

1.Kochi Institute for Core Sample Research, Japan Agency for Marine-Earth Science and Technology, 2.Connecticut University, USA, 3.ERI, The University of Tokyo

To better understand the distribution of three dimensional stress states in the Nankai subduction zone, southwest Japan, we review various stress-related investigations carried out in the first and second stage expeditions of the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) by the Integrated Ocean Drilling Program (IODP) and compile the stress data. Overall, the maximum principal stress $SIGMA_1$ in the shallower levels (<~1km) is vertical from near the center of forearc basin to near the trench and; the maximum horizontal stress S_{Hmax} (interpreted to be the intermediate principal stress $SIGMA_2$) is generally parallel to the plate convergence vector. The exception to this generalization occurs along the shelf edge of the Nankai margin where S_{Hmax} is along strike rather than parallel to the plate convergence vector. Reorientation of the principal stresses at deeper levels (e.g., >~1km below seafloor or in underlying accretionary prism) with s_1 becoming horizontal is also suggested at all deeper drilling sites. We also make a comparison of the stress state in the hanging wall of the frontal plate-interface between Site C0006 in the Nankai and Site C0019 in the Japan Trench subduction zone drilled after the 2011 Mw9.0 Tohoku-Oki earthquake. In the Japan Trench, the comparison between stress state before and after the 2011 mega-earthquake shows that the stress changed from compression before the earthquake to extension after the earthquake. As a result of the comparison between the Nankai Trough and Japan Trench, a similar current stress state with trench parallel extension was recognized at both C0006 and C0019 sites.

Keywords: NanTroSEIZE, JFAST, Stress