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Call for Participation in IODP Exp 358:

NanTroSEIZE Deep Riser Drilling: Nankai Seismogenic/Slow Slip Megathrust

CDEX/JAMSTEC

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CDEX plans to implement IODP Expedition 358: NanTroSEIZE Plate Boundary Riser 4, beginning on 7 October 2018. The main expedition goal is to deepen riser hole C0002F/N/P from 3000 mbsf to the primary megathrust fault target at ~5200 mbsf, using logging-while-drilling (LWD), downhole measurements, and drill cuttings analysis extensively, in addition to limited coring intervals. This expedition will be the culmination of 10 years of IODP NanTroSEIZE deep drilling efforts to reach the plate interface fault system at seismogenic / slow slip depths.

IODP NanTroSEIZE Complex Drilling Project

The IODP Complex Drilling Project (CDP) known as the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) Project has been made up of multiple expeditions over a nine-year period, aimed at sampling and instrumenting the subduction zone megathrust at a location near the up-dip transition into the subduction seismogenic zone. Previous IODP expeditions at Site C0002 have investigated the Kumano forearc basin and the inner accretionary wedge that forms the hanging wall of the plate interface fault system. Riser Site C0002F/N/P has been drilled to a depth of 3056 mbsf (currently the deepest hole in scientific ocean drilling), and cased to the depth of 2922 mbsf. The primary target of NanTroSEIZE is reaching, sampling, logging, and ultimately instrumenting a prominent low-angle fault reflector at ~5000 mbsf. The target depth is based on the most recent reprocessed 3D seismic data set.

Scientific Objectives of the expedition

IODP Expedition 358 drilling at Site C0002F/N/P aims to further deepen this hole to access the subduction plate boundary fault system, testing hypotheses for the mechanics and geological/geochemical evolution of megathrust faults, as well as

determining the nature of the prominent seismic reflector. Sampling and characterization of rock lithology, chemical and physical properties, structure, and in situ stress & pore pressure conditions of the lower wedge, immediate hanging wall, fault zone and upper footwall are the primary objectives. At the end of this expedition, the borehole will be cased to greater depth and left in a suspended state for possible future re-entry and installation of long-term monitoring instrumentation. Please read the Expedition 358 mini-Prospectus (see PMO announcement for link) for further details.

Operation Plan

For such deep riser drilling, operations differ from the typical IODP expedition. There is a strong emphasis on using logs and cuttings to sample the formation, and only limited coring in the fault zone target is planned. Accordingly, operations planned for Expedition 358 include:

- Deepen the existing Site C0002F/N/P from ~2900 to ~5200 meters below sea floor (mbsf).
- Install three casing strings to sequentially to a depth of 4700 mbsf.
- Carry out an extensive program of downhole observations, including:
    - Logging-while-drilling (LWD) continuously throughout drilling with an advanced LWD suite of tools and measurements.
    - Full characterization of lithology, physical properties, microstructure, and micropaleontology based on continuous sampling of cuttings.
    - Fluid phase analysis based on continuous mud gas sampling.
    - Downhole drill stem measurements to determine stress and other parameters.
    - Complete characterization and analysis of ~ 100 m of core samples, to be taken near the full target depth.

Expedition Schedule

Current plans have Expedition 358 beginning on 7 October 2018 (including 3-day port-call) and finishing on 21 March 2019 (164 days). This schedule may change as operational and weather conditions dictate.

Science Staffing Needs

This expedition is planned for more than five months at sea, with limited and highly variable needs for real-time scientific analysis of samples and log data, as well as considerable uncertainty in the timing of specific operations during the offshore period. Therefore, it will *not* be staffed in the standard expedition "shipboard scientific party" model. Rather, we solicit applicants for the scientific party who can commit to two activities:

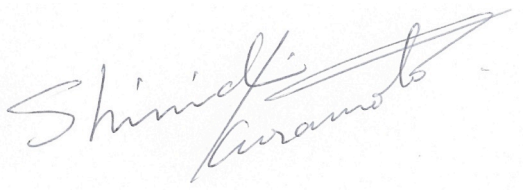
A) participating in a final analysis and sampling meeting at the end of the whole Expedition (anticipated to require several weeks in March or April of 2019). All members of the scientific party will be expected to participate.

B) Making themselves *available* for time windows of 2-3 months' duration, during which they will likely be asked to board *Chikyu* for one or more 2 to 4 week "shifts." The shipboard tasks of cuttings, log, and downhole experiment analysis will take place in these concentrated efforts during the expedition. The exact timing of these boarding periods for shipboard team work (within the broader time windows) will be determined by the science leadership team as operations develop. Members of the scientific party will be asked to maintain flexible schedules to accommodate this need. For the expedition, the science leadership will form teams based on scientific specialty to board for up to two shifts.

Participants will require helicopter underwater escape training (HUET) certification from an approved OPTIO training center. Costs for this certification will be the responsibility of each participant's Program Member Office (PMO), where applicable.

Scientists with interest and expertise in: fault zone structure and mechanics, accretionary complex geology and evolution, lithostratigraphy, physical and hydrogeological properties, diagenetic/metamorphic processes and effects, micropaleontology, microbiology, rock magnetism, and core-log-seismic integration (CLSI) in structurally-complex settings are all invited to apply. Because of the nature of the drilling operation and need for near-real time analysis, expertise in the use of

drill cuttings, mud gas, and modern well logging to address sedimentary petrology, structure, physical properties and geomechanics are all especially useful.



Shin'ichi Kuramoto
CDEX Director General

Table 1. D/V *Chikyu* Schedule for FY18

Exp.#	Expedition Name	Schedule	Duration	Co-chief Scientists	EPM
358	NanTroSEIZE Plate Boundary Deep Riser 4 [or a new name as above]	7[(1)] October 2018 – 21 March 2019[(2)]	164 days	Science Leadership Team[(3)]	Sean Toczko[(4)], Lena Maeda, Yusuke Kubo

Remarks:

(1) Includes three days portcall in the beginning of the expedition.
(2) All expedition schedules are subject to change based on FY budgetary situation, engineering considerations, and site conditions.
(3) The Science Leadership Team will comprise a larger than usual number of scientists, some of whom will not board D/V *Chikyu*. More details will be announced at a later date.
(4) Lead EPM for Exp. 358.