

# **IODP Operations Review Task Force Meeting**

Expeditions 319/322  
NanTroSEIZE Stage 2

August 12<sup>th</sup>-13<sup>th</sup>, 2010  
Japan Agency for Marine-Earth  
Science and Technology (JAMSTEC),  
Tokyo

## **Expedition 319&322 Operation Review Task Force Members**

### **NanTroSEIZE Co-Chief Scientists**

Timothy Byrne – Expedition 319  
Lisa McNeill – Expedition 319  
Demian Saffer – Expedition 319  
Eiichiro Araki – Expedition 319  
Saneatsu Saito – Expedition 322  
Michael Underwood – Expedition 322

### **NanTroSEIZE Project Chief Scientists**

Masataka Kinoshita – JAMSTEC

### **Specialty Coordinators**

Toshiya Kanamatsu – JAMSTEC  
Gaku Kimura – Tokyo University  
Greg Moore – University of Hawaii

### **CDEX participants**

Nobu Eguchi  
Sean Toczko  
Kunihiro Muta  
Tomokazu Saruhashi  
Teruaki Kobayashi  
Shigemi Matsuda  
Takashi Agatsuma  
Yusuke Kubo  
MOE Kyaw Thu

### **External members**

Haruki Inooka – JAPEx  
Hiroshi Asanuma – Tohoku University  
Yoshiyasu Watanabe – Tokai University

### **IODP Management International**

Kiyoshi Suyehiro  
Yoshi Kawamura  
Issa Kagaya

### **Observers**

Jamie Allan – National Science Foundation  
David Divins – USIO Representative  
Colin Graham – ESO Representative  
Toshikatsu Kuramoto – Marine Works Japan

## **MEETING FORMAT**

The IODP-MI Operations Review Task Force met on August 12<sup>th</sup> – 13<sup>th</sup> at the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Tokyo to review the operational aspects of IODP Expedition 319 & 322 (NanTroSEIZE stage 2). The review concentrated on “lessons learned” from the expedition with an emphasis on “what should be done differently in the future.” The Task Force review was based upon confidential reports submitted by the Center for Deep Earth Exploration (CDEX), the Expedition 319 & 322 Co-chief scientists, and NanTroSEIZE Specialty Coordinators.

The meeting began with oral presentations by Demian Saffer, Mike Underwood, Greg Moor (represented SC) and Tomokazu Saruhashi, summarizing the Co-chief Scientists, Specialty Coordinators and CDEX reports respectively. Following these oral presentations, the Task Force identified specific pre-expedition, expedition, and post-expedition phase’s topics for discussion. On the second day of the meeting, the Task Force reviewed the recommendations and came to a consensus on each one. These recommendations are presented in this report.

## **EXPEDITION SUMMARY**

Expedition 319 and 322 are part of the Nankai Trough Seismogenic Zone Experiment project. The Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) is a coordinated, multi-expedition drilling project designed to investigate fault mechanics and seismogenesis along subduction mega-thrusts through direct sampling, in situ measurements, and long-term monitoring in conjunction with allied laboratory and numerical modeling studies.

The fundamental scientific objectives of the NanTroSEIZE project include characterizing the nature of fault slip and strain accumulation, fault and wall rock composition, fault architecture, and state variables throughout the active plate boundary system.

**Expedition 319:** May 5<sup>th</sup> – August 31<sup>st</sup>, 2009

*Co-Chief Scientists: Eiichiro Araki, Lisa McNeill, Tim Byrne, Demian Saffer*

*Expedition Project Managers: Nobu Eguchi, Kyoma Takahashi, Sean Toczko*

*CDEX Operations Superintendent (OSI): Ikuo Sawada, Tsuyoshi Abe*

IODP Expedition 319 included riser drilling, analyses of cuttings and core samples, downhole measurements and logging, and casing at Site C0009 in the Kumano forearc basin as well as riserless drilling, logging while drilling (LWD), casing, and observatory operations at Site C0010 across a major splay fault (termed the “megasplay”) that bounds the seaward edge of the forearc basin near its updip terminus. In addition, a contingency Site C0011 was drilled to collect logging-while-drilling data in advance of planned coring operations scheduled as part of IODP Expedition 322.

Site C0009 marked the first riser drilling in IODP history. This allowed several scientific operations unprecedented in IODP, including carefully controlled measurements of in situ pore pressure, permeability and minimum principal stress magnitude, real-time mud gas analysis, and laboratory analyses of cuttings throughout the entire riser-drilled depth range (~700–1600 meters below seafloor [mbsf]).

Integration of data from cuttings, wireline logging, and cores (from a limited depth interval) allowed definition of a single integrated set of lithologic units and comparison with previously drilled IODP Site C0002 to determine the evolutionary history of the forearc basin. After casing the borehole, a long-offset (up to 30 km) two-ship active seismic experiment was conducted recording shots within the borehole to image the megasplay and master décollement beneath the borehole, and to evaluate seismic velocity and anisotropy of the forearc basin and accretionary prism sediments around the borehole. At riserless Site C0010, operations included drilling with measurement while drilling (MWD)/LWD across the megasplay fault to 555 mbsf, casing the borehole with screens at the depth of the fault, conducting an observatory dummy run to test future strain meter and seismometer deployment procedures, and installation of a temporary pore pressure and temperature monitoring system in advance of planned future permanent observatory emplacement. The observatory system (termed a “smart plug”) marks the first observatory installation of the NanTroSEIZE project. MWD/LWD data at this site were used to define unit boundaries and the fault zone target interval for placement of the casing screens. Through comparison with previously drilled Site C0004 these data also provide insights into along-strike differences in the architecture of the megasplay fault and hanging wall.

**Expedition 322:** September 1<sup>st</sup> – October 10<sup>th</sup>, 2009

*Co-Chief Scientists: Michael Underwood, Saneatsu Saito*

*Expedition Project Managers: Yusuke Kubo*

*CDEX Operations Superintendent (OSI): Ikuo Sawada, Tsuyoshi Abe*

Thorough documentation of the subduction inputs to Nankai Trough is an essential component of the science plan for the Nankai Trough Seismogenic Zone Experiment. The initial conditions must be established prior to subduction before we can determine how fundamental geologic properties change down-dip along the plate boundary. The primary goal of Expedition 322 was to core and log at two sites in the Shikoku Basin. Site C0011 is located along the NW flank of Kashinosaki Knoll, and Site C0012 is located at the crest of the bathymetric high. We obtained LWD and MWD data at Site C0011 during the final days of Expedition 319, but the coring program at Site C0011 was incomplete. We began at a depth of 340 m CSF (because of time constraints) and terminated roughly 200 m above the anticipated TD (because of premature destruction of the drill bit). The plan to deploy the SET-P tool was also aborted because of ambiguities in the depth of the primary sand(stone) target bed, uncertainties in material properties due to a lack of recovery above the target bed, and sporadic occurrences of hard layers cemented by carbonate. Hole C0011B was abandoned with 15 days remaining in the expedition, so operations moved to Site C0012, where we experienced successful recovery of the lower strata of Shikoku Basin and upper igneous basement (basalt). Attempts to acquire wireline logs at Site C0012 failed because of damage inflicted to the borehole during a wiper trip.

## **RECOMMENDATIONS OF THE EXPEDITION 319&322 REVIEW TASK FORCE**

Overall, the Expedition 319/322 Operations Review Task Force found that:

At the NanTroSEIZE Stage2 Expedition, most of the operations were reasonably conducted and almost all the scientific goals were achieved. This success resulted from a combination of factors including, “Lessons Learned (ORTF results)” from the previous Exp.314/315/316, experience gained by CDEX working in the “IODP” environment, close collaboration between the Co-chief scientists and operators, and a professionalism, willingness and hard-work shown by all parties to work through issues as they arose at sea and onshore.

The Review Task Force identified a few areas of improvement for future operations including, pre-expedition planning/preparations, during-expedition operations, and post-expedition reporting.

Many of the issues discussed during this review were related to communication /information sharing between Co-chiefs/Science Party and Implementing Organization Management. Especially, the Review Task Force identified/expressed the importance of communication between scientists and operators to achieve successful goals of the following Expeditions. To make easy finding solutions, the Review Task Force made specific recommendations by the situations.

While the primary focus of this review was on CDEX operations during Expedition 319 & 322, many recommendations in this report are equally valuable for other IODP operators, IODP management, and to the Science Advisory Structure. As such, some recommendations are also directed to these entities.

### **Pre-Expedition**

**Recommendation 319/322-01:** ORTF recommends CDEX to consider a scheme to have at least one year lead time before Expedition for successful preparation and staffing.

Routing: CDEX, PMOs

Background: The staffing schedule was delayed significantly. There was very short time for “call for participation” and it caused the difficulty on “selection of science party”, due to uncertainty of JAMSTEC operation budget, and Japanese budgeting system/timeline.

**Recommendation 319/322-02:** ORTF recommends a pre-expedition meeting with all the science parties in attendance during pre-Expedition. ORTF also recommends longer crossover of science parties on board during Expedition with support of SC for better transition. (need discussion with PMOs)

Routing: CDEX, PMOs

Background: Especially Exp.319, it was very first time in IODP, expedition period became over 100days, and it required four Co-Chiefs and divided science party worked different period of expedition. Such long, complicated expedition will require solid crossover to make its success.

**Recommendation 319/322-03:** ORTF recommends that CCs (supported by EPM and SCs) define task of each Science Party members prior to Expedition and make necessary

modification during Expedition.

Routing: CDEX

Background: The same as Recommendation 319/322-03 background, such a long, complicated expedition will require clear tasks and work-sharing plan, prior to expedition start and timely update, during expedition.

**Recommendation 319/322-04:** ORTF recommends that CDEX create an appropriate plan for contingency operation in collaboration with CCs in timely manner. It is also recommended that CDEX make necessary preparation of hardware, software, human resources and procedures (e.g. EPSP) for contingency operation.

Routing: CDEX

Background: During PMT and pre-expedition meeting, Co-chiefs, Chief Project Scientists, Specialty Coordinator and CDEX discussed and examined contingency plan in detail, however, there were a few occasions, the contingency plan could not be performed, due to lack of resources.

**Recommendation 319/322-05:** ORTF recommends that CDEX communicate with other IOs to share their knowledge and experience.

Routing: CDEX, IODP-MI, IOs (IO meeting)

Background: Individual Implementing Organizations' experience/operation knowhow has not been shared well among them.

**Recommendation 319/322-06:** ORTF recommends that CDEX improve coring technology (e.g. AHC) and train drilling technicians for better core quality and recovery.

Routing: CDEX, MQJ

Background: Core quality and recovery were still not enough, especially in riserless drilling. More efforts must be given.

**Recommendation 319/322-07:** ORTF recommends that CDEX improve protocols for wireline logging during riserless operation on Chikyu.

Routing: CDEX, MQJ

Background: Poor (or no) logs have been collected during riserless wireline operations on Chikyu.

**Recommendation 319/322-08:** ORTF recommends that CDEX experimentally learn operation of tools in high current area to prevent any incident and operational troubles.

Routing: CDEX, MQJ

Background: Permanent observatory deployment dummy test/run was performed. The dummy run provided lots of valuable information to CDEX and MQJ. ORTF encourage CDEX/MQJ to conduct such technical/engineering tests.

### **During Expedition**

**Recommendation 319/322-09:** ORTF recommends that CDEX establish regular maintenance plan for reduction of mechanical down time.

Routing: CDEX, MQJ

Background: The CHIKYU equipment/hardware down time is still high compared to industry and IODP average. The down time caused difficulty to achieve science goals and complete plan.

**Recommendation 319/322-10:** ORTF recommends that the ROP used in the expedition planning should reflect the result of IODP-MI's Coring Scoping Studies and record of Chikyu's ROP in preparation of drilling program.

Routing: CDEX, MQJ, IODP-MI, EDP

Background: CDEX ROP estimation for operation planning is very vague without supporting information/data.

**Recommendation 319/322-11:** ORTF recommends that LSS (Logging Staff Scientist) and IT supporting staff to be on Chikyu all through the Expedition period.

Routing: CDEX

Background: On several occasions, there was a shortage of LSS and IT support on board CHIKYU, mainly due to availability of accommodation.

**Recommendation 319/322-12:** ORTF strongly recommends that CDEX/JAMSTEC/MEXT enter discussion with Japanese government concerning permission to use reasonable-cost High-Speed Internet connection on Chikyu for better communication to on-shore side.

Routing: CDEX, JAMSTEC

Background: Japanese Government does not allow V-sat (high speed cheap satellite network) in Japan EEZ.

**Recommendation 319/322-13:** ORTF recommends that CDEX maintain excellent performance of onboard Executive Committee which was used during these two Expeditions.

Routing: CDEX

Background: Such communications worked very well during Stage 1 and again during Stage 2.

**Recommendation 319/322-14:** ORTF recommends that J-CORES have third-party evaluation (e.g. STP) for better future operation.

Routing: CDEX, IODP-MI, STP, SPC

Background: There were still several issues, related to J-CORES data entry as well as extract, although CDEX worked hard to modify/up-grade the system. ORTF has serious concern on the current situation and future development.

**Recommendation 319/322-15:** ORTF recommends that IODP-MI re-consider procedures for sample requests.

Routing: IODP-MI, CDEX

Background: Core sample request system (SMCS: Sample Material Curation System) software/hardware had not performed well, caused lots of excess work for SAC (Sample Allocation Committee).

**Recommendation 319/322-16:** ORTF recommends that CDEX provide information and discuss with Science Party on important operations (e.g. Cementing) which effect any scientific measurement on Expedition.

Routing: CDEX

Background: Several operation results cause huge impacts on the science goals and results, such as cementing seal capability (formation pressure & stress measurement, future casing plan), cement bonding to formation (VSP, observatory sensor measurements), mud type & weight (coring). When CDEX needs to choose a plan from several operations options which may result in different results and cause different

impacts on the science, Co-chief scientists and science party has to be informed and be asked their consultation, such as priority of science goals.

## **Post Expedition**

**Recommendation 319/322-17:** ORTF recommends that IODP-MI hold ORTF meetings for NanTroSEIZE far enough in advance of the next phase of NanTroSEIZE drilling so that recommendations can actually be implemented in time to improve operations.

Routing: IODP-MI

Background: This ORTF occurred after NanTroSEIZE stage 3 started and, thus, was not able to have much influence on stage 3 operations.

**Recommendation 319/322-18:** ORTF recommends that IODP-MI assign appropriate persons (e.g. STP member) as external reviewers for future ORTF meetings considering the Expedition reports.

Routing: IODP-MI, STP, EDP

Background:

**\*Recommendation 319/322-19:** ORTF recommends that IODP-MI assign Specialty Coordinators to study how to better utilize cuttings for science and the result/report will be examined by STP to be an IODP guideline and apply to the future riser operation.

Routing: IODP-MI, Specialty Coordinators (PMT), STP

Background: The first riser cuttings scientific measurement and analysis had been performed during Exp.319 and after the expedition. However, there is no consolidated (include all science areas) report has been planned. The data and report will be very important for future riser operation.

\*recommendation 19 was not discussed during executive session, but arose at second day meeting.