

IODP Operations Review Task Force Meeting

Expedition 317
Canterbury Basin

January 6th - 7th, 2011
TAMU, College Station
TX, USA

Expedition 317 Task Force Members

Co-Chief Scientists

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Observers

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MEETING FORMAT

The IODP-MI Operations Review Task Force met on January 6th – 7th at Texas A&M University (TAMU), College Station (USA) to review the operational aspects of IODP Expedition 317 (Canterbury Basin). The review concentrated on lessons learned from the expedition with an emphasis on what should be done differently in the future, while taking note of topics specific to Expedition 317 and items which had been or were in the process of being addressed. The Task Force review was based upon confidential reports submitted by the U.S. Implementing Organization (USIO) and the Expedition 317 Co-Chief Scientists, as well as on expedition daily and weekly reports available on-line.

The meeting began with oral presentations by the Co-Chief Scientists (Craig Fulthorpe and Koichi Hoyanagi), the Expedition Project Manager (EPM: Peter Blum) and the Logging Staff Scientist (Angela L. Slagle), who summarized the Co-Chief Scientists report and USIO reports, respectively. The Co-Chief Scientists presented their recommendations. Following these oral presentations, the Task Force identified specific topics for discussion from the pre-expedition, expedition, and post-expedition phases. 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 317: November 4th, 2009 – January 4th, 2010

Co-Chief Scientists: Craig Fulthorpe, Koichi Hoyanagi

Expedition Project Manager: Peter Blum

USIO Operations Superintendent: Stephen Midgley

Expedition 317 (Canterbury Basin) was devoted to understanding the relative importance of global sea level (eustasy) versus local tectonic and sedimentary processes in controlling continental margin sedimentary cycles in the Canterbury Basin off New Zealand. Coring operations at shallow water drill sites were a great success because of the deep penetration and reasonable recovery in the upper ~200 m of holes. Expedition 317 cored 6,000 m of sediment (74% recovery) in thirteen holes at four sites, ranging from 84 to 344 m water depth, and established that continental shelf scientific drilling with *JOIDES Resolution* is a feasible approach to testing sequence stratigraphic concepts. The records collected have exceeded expectations, which were relatively low based on past attempts at drilling in this environment (mainly New Jersey shelf, Leg 174B).

Operational challenges included accurate and precise positioning of the vessel in shallow water, impact of heave on the rig in shallow water, recovery of cores from proximal terrigenous (sandy) formations, and logging in unstable holes. In addition, scientific challenges included scarcity of biostratigraphic marker species in shelf sequences, the inherently incomplete stratigraphic record with numerous hiatuses (which is of course also part of the experiment), and the difficulty of estimating paleowater depth at a useful resolution. Despite all these odds, coring results were the best we could expect in this environment.

The science party is excited and optimistic that postcruise research will allow us to meet the major project goals. The shallower, recent to late Quaternary sequences (~100-200 m penetration) sections were well recovered and yielded the lithologic, biostratigraphic and environmental data to meet most of the project's objectives. In the deeper parts of the sections, both core recovery and logging success were limited and this will limit some of the science that can be achieved. However deeper objectives can be met to some extent with detailed postcruise analysis of spotty core samples and limited logging records.

See http://iodp.tamu.edu/scienceops/expeditions/canterbury_basin.html for more details regarding the background and objectives, the preliminary scientific results, and conclusions of Expedition 317.

RECOMMENDATIONS OF THE EXPEDITION 317 REVIEW TASK FORCE

Overall, the Expedition 317 Operations Review Task Force found that the Canterbury Basin Expedition was a major success. This success resulted from a combination of factors including the refurbishment of the *JOIDES Resolution* and its equipment, close collaboration and communication between science party and operators, and the professionalism shown by all parties who made a concerted effort to work through issues as they arose at sea and onshore. All parties involved in this operation are to be congratulated on a successful expedition. In particular, the ship operator successfully demonstrated the potential of the *JOIDES Resolution* to drill in deep holes at shallow water depths on continental shelves by setting a number of new scientific ocean drilling records.

The Review Task Force identified a few issues for improvement for future operations within the areas of pre-expedition planning/preparation, expedition operations, and post-expedition reporting. Various issues discussed during this review were related to further advancement of the *JOIDES Resolution*'s drilling technology to improve recovery in difficult lithologies such as the unconsolidated heterogeneous sediments encountered during Expedition 317. Although the primary focus of this review was on USIO operations during Expedition 317, the recommendations in this report are equally valuable for IODP operators, IODP management and the Lead Agencies. As such, some recommendations are also directed to these entities.

Drilling Tools and Equipment

Recommendation 317-01: The ORTF 317 recommends that the IO deploy the full range of applicable coring technologies available to IODP (e.g. PDC, MDCB, Core Catchers, Extended Nose Core Barrel, Drilling Mud, Gel Core Barrel, etc.) for expeditions where recovery is expected to be problematic.

Feasibility and cost implications need to be assessed early in the planning stage.

Routing: IOs

Background: Core recovery was frequently poor in difficult drilling conditions such in unconsolidated heterogeneous sediments in deeper intervals of the wells. Deploying the full range of drilling equipment

available to the *JOIDES Resolution* will give more opportunities to try new technologies in order to improve core recovery in challenging conditions.

Coring Technology Workshops

Recommendation 317-02: The ORTF 317 recommends that IODP-MI organize workshops to explore industry coring applications for surface and seabed drilling technologies. These workshops should be attended by representatives from all three IOs, industry and the scientific community. The deliverable should be a list of available technologies and evaluation of those worth exploring, as well as a written report for distribution to the wider community.

Routing: IODP-MI

Background: ORTF reviewers agreed on the importance of exploring new drilling technologies for IODP to meet the needs of the scientific community in order to enhance the achievements of the program. Some initial efforts have been made by IOs and SAS panels. However, renewed efforts are required.

Technology sharing

Recommendation 317-03: The ORTF 317 recognizes that a greater degree of technology exchange should occur between the IOs.

ORTF recommends that yearly technology exchange workshops be implemented by IODP-MI as a formal way for this to happen.

Routing: IODP-MI, IOs

Background: It might be possible to share some of the operational knowledge and drilling technologies available at individual IOs and make them available to the platforms of the other IOs to improve the overall drilling capability of IODP.

Drilling Technology and New SAS Structure

Recommendation 317-04: The ORTF 317 recommends to IODP-MI that the Technology Panel be involved in reviewing drilling proposals and recommending applicable technologies. This should provide early technical recommendations in order to achieve the scientific goals of the expedition.

Routing: IODP-MI, SAS

Background: Technical advice and review of drilling proposals has not always worked well under the current SAS structure. ORTF reviewers strongly agreed on the importance of providing technical recommendations to at the proposal stage. However, the proposed SAS structure for the new program, which starts in 2013, does not yet clearly address this function.

Future Resources for Engineering Improvement

Recommendation 317-05: The ORTF 317 recommends that IODP-MI discuss with LA about dedicating resources in the new IODP to enhance/adapt/develop and test new or existing tools/systems.

Routing: IODP-MI, USIO, LA

Background: USIO needs to explore the capability of *JOIDES Resolution* to improve core recovery in difficult conditions by enhancing/adapting/developing and testing new or existing tools/systems. However, ORTF acknowledges that USIO has limited resource with which to take action.

Logging/LWD

Recommendation 317-06: The ORTF 317 recognizes that in cases where the formations are expected to be unstable and logging is a high scientific priority, LWD is the preferable technology to be deployed..

The ORTF recommends to LAs that they allocate necessary funding to meet the expedition objectives.

Routing: LAs, IOs

Background: Results of wireline logging operations were limited at shallow-water sites , especially in the deeper parts of the sections where hole conditions were very poor. This result limits some of the scientific achievements of the expedition. USIO considered employing LWD before the expedition. However the decision was to not employ LWD because of the high cost of this system.

Drilling fluid plan

Recommendation 317-07: The ORTF 317 recommends to the IOs that each expedition develop a drilling fluid plan that takes into account primary and contingency operations in order to avoid running out of drilling fluid. This plan should be developed as early as possible and involve operations staff, logging staff scientist, staff scientist and Co-Chiefs. Alternatives to existing clay-based drilling fluids should be also explored (e.g., polymers, etc.).

Routing: USIO

Background: *JOIDES Resolution* carried a great deal of mud during this cruise for expected difficult drilling conditions and potential for hole collapse. However, more mud was used early in the expedition during drilling, coring, and logging operations than had been anticipated. As a result, USIO had to continue drilling and logging operations with reduced quantities of mud.

DESCLogik

Recommendation 317-08: The ORTF 317 recognizes the importance and success of DESCLogik, and recommends that the USIO improve the input/output GUI, particularly graphic object type input and provide a more flexible graphic output. The ORTF views this as a priority.

Routing: USIO

Background: There was some difficulty in using the *JOIDES Resolution*'s core description interface DESCLogik. Sedimentologists had to input core descriptions by selecting grain-size, texture, sedimentary structures, fossils, trace fossils, etc., from a large selection provided in pull down style menus. The Co-Chiefs requested that the menus for core description be converted to a more user friendly, with a GUI style pop-up menus for each category, such as texture, structures and fossils. Co-Chiefs also noted that it would be convenient to be able to output figures showing stratigraphic columns in various styles (e.g., straight or ledge-style stratigraphic columns).