

# **IODP Operations Review Task Force Meeting**

Expedition 325  
Great Barrier Reef Environmental  
Changes

July 18<sup>th</sup> – 19<sup>th</sup>, 2011  
British Geological Survey (BGS),  
Edinburgh

## EXPEDITION 325 OPERATIONS REVIEW TASK FORCE PARTICIPANTS

### Expedition 325 Task Force Members

Jody M. Webster	Co-chief, University of Sydney, Australia
Yusuke Yokoyama	Co-chief, University of Tokyo, Japan
John Thorogood	External reviewer, Drilling Global Consultant, UK
Paul Wilson	External reviewer, NOCS, University of Southampton, UK
Pascal Kindler	External reviewer, University of Geneva, Switzerland
Carol Cotterill	ECORD Science Operator/British Geological Survey, UK
Dave McInroy	ECORD Science Operator/British Geological Survey, UK
David Smith	ECORD Science Operator/British Geological Survey, UK
Colin Graham	ECORD Science Operator/British Geological Survey, UK
Mary Mowat	ECORD Science Operator/British Geological Survey, UK
Sophie Green	ECORD Science Operator/British Geological Survey, UK
Sarah Davies	ECORD Science Operator/University of Leicester, UK
Louise Anderson	ECORD Science Operator/ University of Leicester, UK
Ursula Röhl	ECORD Science Operator/University of Bremen, Germany
Dan Evans	former ECORD Science Operator, UK
David Divins	Consortium for Ocean Leadership, USA
Nobu Eguchi	Center for Deep Earth Exploration, Japan
Issa Kagaya	IODP-MI
Yoshi Kawamura	IODP-MI

### Observers

Tom Janecek	National Science Foundation, USA
Catherine Mével	ECORD Management Agency, France

## **MEETING FORMAT**

The IODP-MI Operations Review Task Force met on July 18<sup>th</sup> - 19<sup>th</sup> at the British Geological Survey (BGS), Edinburgh to review the operational aspects of IODP Expedition 325 (Great Barrier Reef Environment Changes). 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 ECORD Science Operator (ESO) and the Expedition 325 Co-chief scientists.

The meeting began with oral presentations by Jody Webster and Yusuke Yokoyama and Carol Cotterill, summarizing the Co-chief and ESO reports, respectively. Following the presentations, the Task Force identified specific pre-expedition, expedition, and post-expedition phase topics for discussion. On the second day of the meeting, the Task Force reviewed these topics and formulated a number of recommendations. These recommendations are presented in this report.

## **EXPEDITION 325 SUMMARY**

Expedition 325: Offshore Portion, February 11<sup>th</sup> – April 6<sup>th</sup>, 2010

Expedition 325: Onshore Science Party, Bremen, July 4<sup>th</sup> – July 18<sup>th</sup>, 2010

*Co-Chief Scientists: Jody Webster, Yusuke Yokoyama*

*Staff Scientist: Carol Cotterill*

*ESO Operations Superintendent: David Smith*

The timing and courses of deglaciations are considered an essential component for understanding the dynamics of large ice sheets, their effects on Earth’s isostasy and thermohaline circulation and hence global climate. Coral reefs are excellent sea level indicators, and their accurate dating by mass spectrometry is of primary importance for determining the timing of deglaciation events and thus for understanding the mechanisms driving glacial-interglacial as well as millennial scale cycles.

To address these important scientific questions, a succession of fossil reef structures on the shelf edge seaward of the modern Great Barrier Reef (GBR), were cored. IODP Exp. 325 coring was conducted from dynamically positioned vessel *RV Greatship Maya* in February – April 2010. The Onshore Science Party (OSP) to split, describe, and subsample the cores was carried out in July, 2010 at the IODP Bremen Core Repository (BCR) and Laboratories in the Center for Marine Environmental Research (MARUM) on the campus of Bremen University, Germany.

High quality fossil coral reef material (particularly at transect NOG-01B) was recovered from exciting time intervals and growth periods that were not cored during Exp.310, Tahiti Sea Level. Despite the difficult operational conditions and amount of core recovery, preliminary core catcher dating and initial observations at the OSP confirm that the majority of the scientific objectives can still be met.

See <http://www.eso.ecord.org/expeditions/325/325.php> for more details regarding the background and objectives, the preliminary scientific results, and conclusions of Expedition 325.

## **RECOMMENDATIONS OF THE EXPEDITION 325 REVIEW TASK FORCE**

Overall, the Expedition 325 Operations Review Task Force found that the Great Barrier Reef Environmental Changes Expedition was a success. This success resulted from a combination of factors including, “Lessons Learned” from the previous expeditions, experience gained by ESO 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. Although some of the operation results were under the Science Party’s expectations, the Task Force believes that the acquired data will produce a wealth of scientific knowledge for years to come.

### **Acknowledgement 325-01:**

ORTF Exp.325 considers that Exp. 325 was successfully carried out under extremely difficult and unusual circumstances, and wishes to commend ESO, the Co-chiefs and the entire Science Party for delivering a dataset that will address the objectives of the expedition.

The Review Task Force identified the following areas of improvement for future MSP operations including:

- Pre-expedition
  - Staffing Offshore Party
  - New Vessel Implementation
- During-expedition
  - Operational Decision-making
- Onshore Science Party (post-expedition)
  - Sampling and Curatorial Preparation
  - Definition of “Ship-board Measurements”

The Review Task Force made a number of specific recommendations to improve communications and information sharing in conjunction with promotion of a common understanding between Co-chiefs/Science Party and Implementing Organization Management, based on the different expectations and perceptions by the groups. While the primary focus of this review was on ESO operations during Expedition 325, 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**

#### **Staffing Offshore Party**

A number of delays to the start date of the expedition impacted some individuals’ ability to participate. Several scientists were unable or unwilling to go offshore, and the sedimentology posts had to be filled by two ‘technicians’, (one a post-doc with Jody Webster and the other a BGS petrologist). These technicians performed extremely well and provided significant contributions. However, because of the status as ‘technician’,

they were unable to join the OSP. This lack of offshore sedimentologists' participation and familiarity with the coring operations and recovered lithologies caused some confusion and slowed progress during initial stage of the OSP.

**Recommendation 325-01:**

ORTF Exp. 325 recommends that Co-Chiefs and ESO first try to fill vacancies from the OSP. If this is not successful then they seek a substitute candidate from the pool of unsuccessful applicants. The substitute candidate can attend the OSP. However, if for any reason the substitute candidate does not sail then they cannot attend the OSP. If there is no substitute candidate from the unsuccessful applicants, then the Co-Chiefs and ESO are authorized to fill the vacancy as they see fit.

New Vessel Implementation

The *RV Greatship Maya* is a very comfortable and powerful vessel and should have been more than adequate for Exp.325's needs. However, several of the ship's systems, those absolutely vital for the success and safe drilling operations failed repeatedly. These problems had a negative impact on the expedition operationally and scientifically, and can likely be attributed to delays of construction and commissioning and then great rush to get the *RV Greatship Maya* ready for the expedition.

Despite significant changes to the vessel (newly built) and shipyard schedule, all ESO parties were able to implement adaptations at short notice to their operational timelines to ensure that all ESO equipment was ready to sail on time.

ESO sought and received a measure of independent advice on the robustness of the ship construction and scoping of the sea trials. ESO accepts that this should have been done more rigorously.

To meeting the tight deadlines, mobilization of the drilling platform *Greatship Maya* took place in two stages; before and after the sea trials (18 – 29 January), which assessed its operational capability.

**Recommendation 325-02:**

ORTF Exp. 325 recommends that in the case of new vessel, ESO should take independent advice on the robustness of the construction, commissioning and trials schedule.

**During Expedition**

HSE Responsibilities

Two main organizations were responsible for the Health, Safety and Environment relating to the ship and the drilling systems. These were GC Rieber and Bluestone Offshore PTE. It was unclear which organization was responsible for which aspect of HSE offshore, resulting in confusion at the start of operations. At same time, several Science Party members had potentially dangerous slips/falls on the deck. The lack of a HSE committee at the start of the project didn't help such situation at all, and it was many weeks before such a structure was implemented, following numerous requests from the ESO Operations Superintendent.

Although there was good HSE documentation prior to the start of the project from all parties involved, there was an apparent lack of awareness for many basic HSE issues by

Bluestone staff. ESO aims to uphold the highest standards of H&S and environment awareness during all operations. ESO staff was vigilant in addressing all potential issues and reporting to the ESO Operations Superintendent, for discussion with GC Rieber and Bluestone staff at the daily meeting.

The external reviewers questioned ESO on where the liability lies in case of serious personal injury, especially in the case of weak implementation by the “duty holder”, and the role of ESO in such an eventuality on the platform in future expedition. ESO demonstrated a clear understanding of the liability issues and how to maintain good HSE conditions on board through carefully prepared contracts.

### Operational Decision-making

From the outset, the drilling conditions (weather, sea current, cored lithologies; more coral reef) at the Great Barrier Reef, were always expected to be more challenging than those encountered during Exp. 310 (Tahiti Sea Level). The Co-chief Scientists did not expect the high level of core recovery and quality that were obtained in Tahiti.

However, a cascade of additional problems with drilling/coring system provided further challenges, which persisted throughout the expedition. And for the logging operation, although most of the slim hole logging tools worked in the API-drilled holes, the acoustic imaging tool was an exception because where the signal produced was too degraded from these washout holes.

The Co-chiefs and ESO were faced with particularly difficult decision making at the end of the expedition, regarding of the maximizing the scientific results within the limited operational time remaining.

In part, these problems may be the result of a lack of contingency planning and unfamiliarity with decision making processes and changing in procedure/oversight for all parties were involved.

### **Recommendation 325-03:**

ORTF Exp. 325 acknowledge and fully support ESO engaging at an early stage with proponents to refine project plans, coring systems and optimize data collection. To aid effective decision-making in the field, ORTF Exp. 325 recommends that the finalized prospectus is subjected to an independently moderated stress test. Stress test findings should be closed out before departure to the area of operations. The ESO and Co-chiefs must participate. Ideally, the MSP owner and any available members of the science party should be involved.

\* Stress Test: table-top exercises facilitated by an external moderator. Based on scenarios likely to be encountered on the expedition, attendees evaluate contingency plans and identify/practice decision making procedures.

### **Onshore Science Party (Post-Expedition)**

#### Sampling and Curatorial Preparation

The Onshore Science Party was held at the IODP Bremen Core Repository (BCR) and Laboratories in the MARUM - Center for Marine Environmental Sciences building on the campus of Bremen University.

The sampling/curatorial process was handled with great skill and perception by the IO and

MARUM support staff. They executed the exceedingly complicated and dynamic core flow/sampling protocols with good humor, flexibility and robust curatorial standards. To allow more targeted sub-sampling and alleviate many sample request issues, the Co-chiefs and ESO considered, but didn't implement, sub-sampling after completion of the minimum and standard measurements.

**Recommendation 325-04:**

ORTF Exp. 325 recommends that personal sampling, where appropriate and in consultation with the ESO and Co-Chiefs, be deferred until all cores have been split, described and reported in the draft Expedition Report.

Definition of "Shipboard Measurements"

During Exp. 325, there was large amount of goodwill shown by those dating labs and scientists involved in producing a set of 69 preliminary dates from core catcher material, prior to the OSP. This was vital in guiding detailed sampling discussions, targeted sampling strategies and minimizing core over sampling.

These dates were shared amongst the Science Party, due to their availability before the end of the OSP, and therefore, these results are considered by IODP to be part of the "Shipboard Measurements". This is also true for certain microbiological analyses and ephemeral analyses that need to be completed prior to the OSP due to timing and sample degradation.

Although these data should, in principle be included/published in Preliminary and Expedition reports within the expedition moratorium period, this potentially enables access to datasets that could enable high profile publications by third parties before the original researchers have completed their full analysis.

**Recommendation 325-05:**

ORTF Exp. 325 acknowledges that making available the geochemical dating to the scientific party has proved to be highly beneficial for the scientific outcome of Expedition 325. ORTF Exp. 325 recommends that IODP-MI consider not publishing non-standard measurement data (such as geochemical dating) in the Preliminary and Expedition reports to maintain Science Party right.