

REVCOM Meeting

Expeditions 304 and 305
Oceanic Core Complex

July 28th – 29th, 2005
Washington, D.C.

REVCOM 304/305 REVCOM PARTICIPANTS

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INTRODUCTION

Expedition Summary

Expedition 304, November 17, 2004 - January 8, 2005; Ponta Delgada, Azores

Expedition 305, January 8 - March 2, 2005; Ponta Delgada, Azores

IODP Expeditions 304 and 305 were back-to-back hard-rock drilling legs at Atlantis Massif, which formed in the past 0.5-2 Myr on the western flank of the Mid-Atlantic Ridge axis at 30°N. The project was designed to investigate the processes that control oceanic core complex (OCC) formation, and exposure of ultramafic rocks at the seafloor in young oceanic lithosphere. Geophysical interpretations of unaltered mantle rock occurring <1 km below the seafloor suggested we could drill through an alteration front in ultramafic rocks (the Moho) and obtain fresh mantle peridotite. In order to accomplish these objectives, two sites were drilled: one on the massif's central dome, through an exposed detachment fault and into the lower crustal/perhaps upper mantle footwall, and one in the upper crustal hanging wall, exposed to the east.

Attempts to drill the hanging wall during Expedition 304 were thwarted by difficulties associated with working in very young, fractured, basalt with negligible sediment cover. Drilling at the footwall site was quite successful. A single-bit pilot hole (U1309B) reached just over 100 m depth and was logged. The main effort was at Hole U1309D, initiated during Expedition 304 and extended from 401 to 1415.5 mbsf during Expedition 305, with an average recovery of 75%. Downhole geophysical measurements and electrical/acoustic imaging, together with the very high recovery accomplished in Hole U1309D provide an unprecedented opportunity for core-log integration for a deep borehole in the oceanic lithosphere. Hole U1309D is the third deepest hole in the oceanic crust, below the sediment cover, and the second deepest hole in lower

crustal/upper mantle rocks. Rocks recovered from the hole are the most primitive ever recovered from slow spreading ocean lithosphere, and provide an exceptional record of magmatic and tectonic accommodation of extension in this environment. At the end of Expedition 305 the hole was left open and in good condition for future work.

Shallow penetration holes through the sediment carapace on the footwall and into basement provided limited samples whose composition/structure add support for the hypothesis that the corrugated dome coincides with an exposed detachment fault.

Meeting Format

The REVCOM 304/305 met on July 28th – 29th at the IODP-MI headquarters in Washington DC to review operational aspects of Expeditions 304 and 305. The review concentrated on “lessons learned” from the expedition with an emphasis on “what should be done differently in the future.” The committee review was based upon confidential reports submitted by the US Implementing Organization (USIO) and the Expedition 304/305 Co-chief scientist.

The meeting began with oral presentations by Donna Blackman and Jay Miller summarizing the Co-Chief Scientist and USIO reports, respectively. Following these oral presentations, the review committee identified specific pre-cruise, syn-cruise, and post-cruise topics for discussion. The committee spent the remainder of the meeting discussing these issues and developing specific recommendations for the USIO, for IODP-MI, and for the Science Advisory Structure. These recommendations are listed in the next section of this report.

RECOMMENDATIONS BY REVCOM 304/305

REVCOM 304/305 identified several main areas of improvement for future operations including:

- Lead-time planning
- Staffing
- Multiple Expedition issues
- Shipboard Operations/Facilities
- Miscellaneous

Many of the items are inter-related and, in some sense, the above divisions are artificial. However, they help in categorizing the issues and determining key problems to solve before the start of the next phase of IODP operations.

While the primary focus of REVCOM 304/305 was on USIO (JOI Alliance) operations during Expeditions 304 and 305, many recommendations in this report are equally valuable for other IODP operators, IODP management, and to the Science Advisory Structure. As such, many recommendations are also directed to these entities.

A) Lead Time Issue

Numerous pre-cruise (lead-time) planning issues were raised during the meeting. The source of many of the issues can be traced back to: (1) limited lead time with respect to planning of USIO Phase 1 operations, (2) poorly understood roles and responsibilities for many individuals and entities and (3) the lack of (or poorly defined) specific IODP policies and procedures (e.g. staffing, logging, etc) associated with the start-up of the IODP.

Expeditions 304/305 suffered from a very compressed planning schedule. Less than 13 months separated the time from when SPC/OPCOM scheduled the expeditions to the initial sailing date for Expedition 304. This compressed time frame resulted in limited early planning discussions between the operator and co-chief scientists (e.g., only 1 month between time of co-chief acceptance and pre-cruise meeting). This delay, in turn, rippled through the system resulting in, among many things, little budget flexibility, a delay in prospectus development (and thus delays in developing operational and logistical planning), and limited staffing notice (which resulted in the loss of good candidates). Delays in prospectus development also meant participants did not fully understand the scope of project before accepting invitations to sail. In addition, the operator was experiencing a large turnover in staff (technical, operations and staff scientists), and the TAMU staff often found it difficult to abreast of rapidly evolving operational plans. Finally, these lead-time issues were exacerbated by the lack of formal procedures and policies in the new IODP forcing the USIO and the National/Consortia Program Offices to respond to issues in an ad hoc fashion.

The IODP management, operators and advisory structure have been slowly moving towards a 24 month lead-time process for scheduling of expedition operations in order to alleviate much of these lead-time issue. Once fully implemented, this process should resolve many of the issues identified in this report. In addition, the experience gained by the IOs and National Offices during the first phase of IODP operations will help significantly in defining pre-expedition staffing procedures and protocols.

The IODP REVCOM members, however, made a series of recommendations meant to assist this process of formalizing the timing for pre-expedition planning, developing IODP protocols and procedures, and defining roles and responsibilities with respect to pre-expedition planning

Recommendation 304-305-01

IODP-MI to work with the IOs and National/Consortia Program offices to formalize the timing for prospectus development, co-chief selection, call for applications, etc. The goal will be an implementation checklist that defines a series of events leading up to an expedition and a set of documents/guidelines (e.g., Co-chief responsibilities, staffing procedures, etc.) providing roles and responsibilities of all entities (IOs, IODP-MI, Program offices, etc) during this expedition planning process.

Recommendation 304-305-02

Pre-prospectus documents and media are needed for advertising expeditions between the time the schedule is approved by the Science Planning Committee and the publication of the prospectus (potentially 6-8 months). IODP-MI will work with SPC and IOs to

determine what information is needed and who will supply the information. IODP-MI will be responsible for coordinating the production of this interim information for each expedition.

B) Staffing

A number of issues were discussed by the Expedition 304/305 REVCOM members that related to staffing, including deadlines for staffing, “trading” of berths between National/Consortia programs, roles and responsibilities of IO shipboard personnel, and the staffing of appropriate scientific disciplinary expertise.

National balance

The USIO and Expedition 304/305 Co-chief scientists experienced staffing problems associated with under-represented scientific disciplines and a limited number of applicants from some member countries, exacerbated by the withdrawal of several applicants/invitees. The 8:8:8:1 staffing ratio requirement proved difficult to maintain. The REVCOM members saw a need to develop protocols for exchanging berths among National/Consortia offices to assist the IOs and Co-chief scientists in properly staffing the various scientific disciplines according to the needs of each expedition. In addition, as berth space is a limiting factor in staffing, expeditions that have heavy technical and/or engineering support needs can only supply this expertise if the overall science staff numbers are reduced. As the staffing ratio is defined in Lead Agency MOUs, science staff reductions to accommodate increased technical/engineering needs will need to be discussed with the Lead Agencies.

Recommendation 304-305-03

IODP-MI to work with National/Consortia Offices and IOs to develop procedures and protocols for staffing, specifically with respect to “trading berths” between National/Consortia Programs to ensure proper support for expedition specific disciplinary needs and reducing overall scientific staff numbers when increased technical/engineering support is required.

Recommendations 304-305-04

IODP-MI to discuss with Lead Agencies the reduction of scientific staff below MOU requirements when expedition needs require increased technical and engineering support.

Co-Chief experience/training

Co-chief scientists vary in the amount/type of expertise they have with respect to ocean drilling and thus need different levels of instruction/training on the use of coring tools, understanding common (and uncommon) drilling procedures, staffing protocols, and the background/history of the expedition proposal(s). REVCOM 304/305 members discussed various mechanisms to increase the level of co-chief education, including the use of “tool primers”, increasing the number and/or length of pre-cruise meetings, workshops on drilling operations, better access to SAS planning documents and so on.

Recommendation 304-305-05

IOs to work with co-chiefs soon after their invitation and acceptance to determine their level of expertise and thus allocate more time/meetings/informational materials as required to educate them on tool issues, drilling procedures, and proposal history.

Recommendations 304-305-06

IODP-MI to work with IOs (as part of Annual Program Plan) to identify resource needs required to properly educate co-chief scientists for their role on the drilling vessels/platforms.

Roles and responsibilities

The REVCOM members discussed an issue relating to roles/responsibilities/expertise of logging scientists. The nature of the logging position often means that many days/weeks pass where logging scientists may not be integrally involved in day-to-day work. This is followed by a 2-3 day period of very intense activity when logging scientists are often working 20-24 hours/day. In addition, it was not clear to most committee members what expertise/experience is expected of the logging scientist. The committee discussed potential mechanisms to involve the logging scientists more into the day-to-day laboratory operations, reduce the level of intense activity during logging and determine the expectations of expertise/experience for logging scientists. While a number of suggestions and ideas were offered, the committee thought that it would be best for IODP-MI to work with the IOs to explore possible solutions to the obtaining consistent logging expertise and potentially revising the roles and responsibilities of logging scientists (or sharing of those roles with other science party members).

Recommendation 304-305-07

IODP-MI to work with IOs to better define Loggers Roles/Responsibilities/Expertise with the goal to provide more consistent expertise and potentially even out the current highly variable logging scientist workload.

C) Multiple expedition issues

Complex, multiple expedition programs such as Expeditions 304 and 305 are becoming a frequent occurrence in IODP. The SAS has recommended, when feasible, that the science parties on these multiple expedition be considered as a single science party. While this is a sensible suggestion, it does pose a number planning and execution wrinkles. Issues arising out of this multiple expedition/single-science party concept were discussed by the REVCOM participants. Several recommendations resulted to hopefully smooth pre-expedition planning, post-expedition editing and sampling, and consistency of operations between expeditions in multi-expedition programs.

Awareness

Multiple expedition programs such a Expedition 304/305 require different implementation strategies regarding staffing, travel, publications, meetings, allocation of IO staff, etc. It is

important that the funding agencies, SAS, and National/Consortia Program Offices are aware of these issues so that they can plan strategies for funding, staffing, etc. accordingly.

Recommendation 304-305-08

IODP-MI to discuss the issues and implications of frequent complex, multiple expedition programs with Funding Agencies, SPC, National/Consortia program offices.

Interaction between science parties

Harnessing the abilities and interests of different scientific parties in multi-expedition programs is difficult. REVCOM 304/305 members discussed the need for participants in multi-expedition operations to interact at the pre-expedition stage (e.g., writing explanatory notes), during expeditions (e.g., when changes in operations are required), between expeditions (e.g., to coordinate consistent data sets) and after the expeditions (e.g., at post-expedition sampling parties). This interaction will require creative efforts by the IOs and IODP-MI to coordinate this increased need for interaction. Upcoming expeditions like NanTroSEIZE will only increase this need for interaction manifold between expeditions and science parties. A number of suggestions were put forth as ways to increase interaction between the shipboard co-chief scientists and scientists and those on the shore. However, it is clear that the IOs and IODP-MI need to address this issue more fully outside of REVCOM, perhaps via discussion at upcoming IO meetings and/or through discussion with current NanTroSEIZE Project Management Team.

Recommendation 304-305-09

IODP-MI and IOs to discuss at next IO meeting (Fall 2005) how to best address the pre/syn/post expedition coordination of science parties in multi-expedition programs.

Post-expedition editing party

The production process for Expedition Reports for multi-expedition programs is much more complex than for single expeditions. Without an increased level of coordination, inconsistent results can be generated and significant time can be wasted by scientists and editors producing redundant ER sections/chapters. The REVCOM 304/305 participants discussed a number of problems that arose in the editing process and made suggestions for improvement, including such things as the need for subgroups for each discipline to have “pre-editing meetings to combine reports from multiple legs, and separate electronic VCD editing prior to the editorial meeting. The group suggested that the publication personnel at the IOs and IODP-MI examine the issues associated with editorial process for multi-expedition programs and make the required changes prior to the next multi-expedition program.

Recommendation 304-305-10

IODP-MI and IOs to examine post-expedition editing issues for multi-expedition programs and implement the required changes.

Post-expedition sampling

Given that the level of research projects remains essentially the same for two expeditions (in a multi-expedition program) as for one expedition, the number of scientists has now doubled (at least) and hence the collaboration level must double. Equitable access to samples for both shipboard parties is difficult and can only be done via a single coordinated sampling party after the second expedition. However, twice the level of participation at these post-expedition sampling parties poses problems with respect with logistics (space), sampling (enough material for all), and funding.

REVCOM members agreed there is great scientific value to the combined post-cruise sampling party. Identifying funding for all participants is of paramount importance if these post-cruise efforts are to be successful (**See Recommendation 304-305-17; below**)

D) Shipboard Operations/Facilities

The Expedition 304/305 Co-chief scientists identified a number of shipboard laboratory related issues. Specific facility issues involved the need to isolate the rock saws from the main lab (noise and dust concerns), the upgrade of digital-image capture capabilities for hard rock descriptions, and upgrade/replacement of the pycnometers. Software issues revolved around inefficient data acquisition and processing for track-based and discrete physical property software, the need for improved plotting/processing tools for paleomagnetic data, and the ever-problematic VCD software for hard-rock descriptions. Computing concerns focused on issues surrounding the export functions of the email application “Groupwise” and restrictive administrative privileges on desktop PCs for basic operating system changes. Finally, the co-chief scientists noted a shortage of some drilling, laboratory and curation supplies. This latter issues was probably the result of the “drawdown” of supplies when the USIO had anticipated the end of Phase 1 operations in May 2005

REVCOM participants discussed how to best address the laboratory issues in light of the end of Phase 1 operations (as of December, 2005) and the start of new operations sometime in FY2007. The committee decided that it was best for IODP-MI to bring these issues forward to the USIO in context of the planning for the new vessel (currently named the Scientific Ocean Drilling Vessel), which will conduct riserless operations for the USIO. Some shorter-term issues (e.g. rock saw noise and dust) have immediate health/safety ramifications and should be dealt with in the near term (as there will be another hard-rock expedition before the end of phase 1 operations).

Recommendation 304-305-11

The USIO to investigate and implement solutions for noise and dust problems associated with the use of rock saws for upcoming “Phase 1” expeditions.

Recommendation 304-305-12

IODP-MI will bring forth specific Expedition 304/305 laboratory-related issues to the STP and the USIO for discussion and prioritization during the planning phases for the SODV.

Coordinate verification protocols

A fortuitous similarity of the coordinates of prospectus site AMFW-01A between latitude/longitude degrees and decimal minutes and the bridge coordinates of degrees/minutes/seconds led to the location of Hole 1309B being about 400 m SE of the intended location. While the scientific party decided to stay at the new location (as the basic setting was close enough to what was expected) this variable use of site coordinate systems in IODP was of concern to the committee. REVCOM members agreed that a more formal set of protocols needs to be developed for verifying site coordinates.

Recommendation 304-305-13

IODP-MI and IOs to develop protocols/procedures for ensuring that the same coordinate system is used from the proposal submittal stage to final input of site coordinates into the DP system

Active heave compensation

Active heave compensation was not working (despite the effort to fix it in port prior to the expeditions so plans to test the ADCB could not be realized. Significant funds were expended to get the system/engineer onboard for these tests so having the necessary heave compensation system operable should have been an integral part of that planning. REVCOM participants discussed the issues surrounding active heave compensation. The problems with active heave compensation are myriad and beyond the scope of this review. The committee recommends that the continued support of the system in Phase 2 needs to be seriously examined as part of the USIO SODV process over the coming year.

Recommendation 304-305-14

The USIO and IODP-MI to review the continued support of active heave compensation as part of the SODV planning process.

E) Miscellaneous

A number of additional one-item topics were also discussed throughout the course of the REVCOM 304/305 meeting, including press release coordination, post-cruise support, science party evaluations, and the process for writing Expedition Reports for multiple expeditions.

Site Survey Data Bank

The Expedition 304/305 co-chief scientists experienced numerous difficulties with the Site Survey Data Bank (SSDB) including formatting issues, Operations Package preparation, and unnecessary (useless) reformatting of data among the problems. It was not clear to the REVCOM members how much of the co-chief's experience with the SSDB was the result of it being caught in the transition between ODP and IODP. The details of the new Site Survey Data Bank operation were provided to the group and it appears that many of the issues presented by the co-chief scientists would not be issues in the future. However, the committee felt it best to refer the problems to Hans Christian Larsen at IODP-MI to ensure they were properly addressed in the operation of the new Site Survey Data Bank located at Scripps.

Recommendation 304-305-15

T. Janecek to refer issues Site Survey Data Bank (SSDB) issues discussed at this REVCOM are referred to Hans Christian Larsen and new SSDB to ensure proper processing and distribution protocols in place

Media / Press release coordination

Early reporting of the Expedition 304/305 bypassed the co-chief scientists and IODP-MI and tended to give a negative impression of the overall results. In addition, essentially no post-cruise public relations regarding Expedition 304/305 occurred in Japan. These issues (and several other related ones) speak to a need for IODP-MI to increase efforts toward coordination of pre- and post-cruise news releases.

Recommendation 304-305-16

T. Janecek to discuss the media/press release issues from Expedition 304/305 with the IODP-MI Director of Communications to ensure the overarching IODP media policy and protocols will facilitate effective communication between co-chief scientists and reporters and also result in more consistent international coverage of expedition results.

Post-Cruise Sampling

Utilizing a post-cruise sampling party after an expedition is becoming standard operating procedure for both “hard-rock” or “soft rock” expeditions. Deferring the majority of sampling until after the expedition maximizes the scientific use of the core in that it allows the shipboard science party to approach sampling in a more holistic fashion once they have seen all the core. From a curation viewpoint, a well-thought out sampling party provides for a much more efficient use of cores.

Uncertainties about support for post-cruise travel for several of the member country scientists made planning for post-cruise editing and sampling very difficult. Much collaboration begins at sea and is conducted at post-expedition editing and sampling parties. If member countries/consortia cannot commit to travel funds for these important meetings, the effectiveness of the scientific party is reduced. REVCOM members identified a clear need for member country/consortia to develop well-defined policies regarding post-expedition travel support. In addition, the IOs and IODP-MI need to provide more information to the scientific part at the pre-expedition stage about the deferment of major sampling to after the expedition.

Recommendation 304-305-17

IODP-MI will request the National/Consortia Program Offices to clearly define post-expedition travel support policies for their participants and encourage the individual programs to maintain a basic level of support for editorial and sampling meetings.

Evaluations

The REVCOM members discussed mechanisms to enhance the input from scientists for the end-of expedition evaluations. Getting scientists to fill out these evaluations has always been a difficult process. No consensus came forth from the discussion as how to improve the process.