2016 Co-Chief Review of JRSO FY15 Operations

22–23 February 2016
***JOIDES Resolution* Science Operator, Texas A&M University**
College Station, Texas

Expeditions

Expedition 353 Indian Monsoon Rainfall
Steven Clemens and Wolfgang Kuhnt

Expedition 354 Bengal Fan
Christian France-Lanord and Volkhard Spiess

Expedition 355 Arabian Sea Monsoon
Dhananjai Pandey (absent) and Peter Clift

Expedition 356 Indonesian Throughflow
Stephen Gallagher and Craig Fulthorpe

Introduction

The Co-Chief Review Meeting is a component of an extensive system of feedback to the JRSO that includes direct feedback during each expedition, interviews with science parties during port calls, and cruise evaluations. The Issues Management Team (IMT) meets every Monday to manage emergent issues, and Laboratory Working Groups (LWGs) meet to improve laboratory services and decide where to allocate resources. LWGs are now seeking input from outside scientists, usually those about to go to sea. These discussions feed into Project Portfolio Management (PPM), which prioritizes proposals for improvement projects to make best use of limited resources.

Co-Chief Consensus Recommendations

The co-chiefs expressed a highly favorable view of the program, JRSO management, staff scientists, technicians, and operations personnel. Thanks to their support, all four expeditions achieved their scientific objectives. The issues outlined below should not be seen as diminishing in any way our enthusiasm and support for the program.

1) Clearances

Clearances are handled through the US State Department and the Office of Ocean and Polar Affairs (OPA). Currently all documents must be submitted to the State Department about 7 months before an expedition so that applications for clearance can be transmitted to the relevant coastal state by 6 months precruise. Communications come back to the JRSO via the relevant US embassy. The Law of the Sea Convention requires formal written consent for operations in an Economic Exclusion Zone (EEZ) and on extended continental shelves.

Of the recent expeditions, 353 (India) and 356 (Australia) needed clearance. During Expedition 353, 4280 m of sediment section was recovered during 32.9 days of on-site operations. One hole was logged. As initially planned, the expedition targeted 6256 m of recovery and three logged holes. The lost logging holes and nearly 2000 m of unrecovered sediment section are accounted for by close to 14.5 days of lost operational time. Weather accounted for 1.6 days of lost operations. Mechanical breakdowns including four broken core barrels, rusted winch wire, and parting of the winch wire (twice, once necessitating fishing the core barrel) accounted for 1.98 days of lost operations.

The large majority of the lost operational time was due to delays in attaining the necessary permissions to operate in Indian EEZ waters (5.5 days) and protracted negotiations over concern that the *JOIDES Resolution* would incur excessive fees/duties upon entering port for inspection (5.3 days). These issues are typically addressed and resolved prior to an expedition and would not normally impact operational time.

As such, Expedition 353 had to compensate by cutting two of the three planned logging operations, canceling one primary site in the Mahanadi Basin, and canceling or shortening additional holes required to ensure complete spliced records to full target depths in the Mahanadi Basin and Andaman Sea. Finally, one site on the Bengal Fan (U1444) that was not part of the Expedition 353 Scientific Prospectus/goals was drilled in order to occupy time required for ongoing negotiations to operate in the Indian EEZ.

In contrast the Expedition 356 experience was fairly standard. Two sites in a Commonwealth Marine Reserve required additional documentation. Drilling in active oil and gas leases was involved. The JRSO asked repeatedly through the embassy whether communication with companies was required but received no formal response. Nevertheless, permission was granted.

It was suggested that if a US, or other international, research vessel has not had permission to operate in a nation's waters for a few years, it should be flagged as a risk and alternatives (e.g., sites in international waters) investigated (the JRSO is currently having a problem with Mozambique, where the last scientific ocean drilling cruise was in the 1990s; Indonesia is also a problem). An additional issue is that the State Department rotates embassy staff every 2 years, so institutional memory is limited.

This is a bigger issue than IODP, although prohibition of activities on the extended continental shelf affects drilling, but not oceanography. Therefore, there is a need to promote concern for the future of marine science in general and to collaborate with other organizations in addition to mitigating risk within IODP.

Recommendations

The JRSO should proactively follow the process of the application to check for blockages and, if possible, begin the process earlier, ideally after approval, but before scheduling. The JRSO should draw upon the local knowledge and contacts of the proponents during this process when possible.

IODP should consider increasing resources provided for monitoring and proactively pursuing clearances.

We have concerns about flagging regions and associated proposals as high risk on the basis of EEZ concerns. The difficulty of gaining access should not lead to a tendency to exclude certain countries or regions.

2) Staffing

Guiding principles are to meet science objectives, both expedition and IODP program objectives. Scientists apply to Program Member Offices (PMOs), which prioritize and forward applications. This activity follows expedition scheduling by the Facilities Board and the JRSO.

Ideally staffing takes place 9–10 months before an expedition, but the staffing window was short for Expedition 353. However, some PMOs nominate only the exact number of scientists allotted to them, which may be only one, providing no options and making it difficult to staff expeditions in terms of expertise and international balance. This approach means that the more flexible PMOs are forced to accommodate disciplinary, age, and gender diversity.

Recommendations

We support the effort to organize a PMO meeting to discuss common problems. This could be a forum for discussing the need to submit additional nominees, to consider disciplinary diversity and flexibility, and also to consider the importance of including early career scientists and of gender diversity.

We also request that the PMOs provide information about how they perform their rankings of applicants in order to increase transparency. More Co-Chief and Expedition Project Manager involvement at the ranking stage would be beneficial.

The discipline-specific roles and duties of shipboard scientists should be clearly spelled out up front in a short summary, including the necessity of fair distribution of samples and postcruise research topics.

All expeditions, including Complementary Project Proposals (CPPs), must follow IODP publication and sampling practices, and this must be communicated as early and as clearly as possible to all scientists. Scientists must understand that sampling during the moratorium period is for personal research in the scientists' own fields of expertise. Additional samples may be requested later.

English conversational ability is required of all scientists.

Postcruise science support

The initial investment by PMOs in expeditions is very high, but postcruise research funding, excluding salary, is currently low and highly variable among the PMOs (from zero to ~$30,000).

Recommendation

We encourage PMOs to consider increasing funding for postcruise research for shipboard scientists. Such support is essential to achieve expedition scientific objectives, adds to the productivity of the program, and makes participation more attractive to the scientific community.

Outreach

We acknowledge the importance of outreach activities and support the participation of shipboard Education Officers (EOs) on all expeditions including CPPs.

Recommendations

We support the formalization of the goals and criteria for success of US EO activities, but recommend that this formalization should also apply to EOs from other PMOs.

We encourage further outreach to universities at the undergraduate level, with higher scientific content, while maintaining the current emphasis on outreach to younger school children.

3) Operations

Planning

The JRSO representative is now an official watchdog on proposals at the Science Evaluation Panel (SEP) and can provide full time estimates, preventing disconnects between what panels rank highly and what is feasible. This is a positive development.

During Expedition 354, difficulty was encountered with sand recovery during fan drilling and with logging. These problems had to be addressed at sea. It would have been helpful to have discussed these issues with experienced JRSO operations personnel earlier in the planning process, possibly allowing for provision of logging while drilling (LWD). There was also little awareness in advance of potential additional equipment that may have been beneficial (e.g., Laser Grain Size Analyzer).

Recommendations

Ideally, there should be more time precruise for contact between the JRSO and proponents to discuss and plan for complex drilling operations such as fan drilling:

i) When operating in challenging environments, plan as much as 2 years ahead, with provision of financial support to enable use of coring and logging equipment appropriate to expedition objectives (e.g., LWD, casing).

ii) Proponents and co-chiefs should be encouraged to list desirable shipboard equipment requirements for their expedition in consultation with the JRSO. Financial support should be considered to enable the inclusion of such equipment.

Drilling Information

RigWatch data allow derivation of valuable information such as penetration rate relevant to documenting sediment properties. These data are not routinely available to the science party. Consequently, these data are underutilized.

Recommendation

The JRSO should develop the capacity to make drilling operation data generated by RigWatch part of the shipboard data set.

APC/HLAPC Coring

All expeditions found Half-Length Advanced Piston Corer (HLAPC) coring valuable in its ability to extend the interval of high recovery to greater depths (>300 m). However, such cores cannot currently be oriented for paleomagnetic measurements. Furthermore, results from Expedition 356 suggest that such coring may be causing unforeseen sediment disturbance. For examples, at Site U1464, *P*-wave velocities were measured in sediments obtained within an interval where three different coring techniques (HLAPC, Extended Core Barrel [XCB], and Rotary Core Barrel [RCB]) overlapped. HLAPC cores gave anomalously low velocities. Lithostratigraphers also described HLAPC-cored sediments as muddier (wackestone) than biscuits of sediment (packstone) cored in the same interval by XCB.

Recommendations

The JRSO should develop a method for orienting HLAPC cores.

We encourage investigation of the impact of APC/HLAPC coring on sediments, both at extreme depths near HLAPC refusal and higher in the section (traditional APC).

4) Cruise evaluations of labs

The JRSO has identified and is already addressing issues with color spectrophotometer performance, Superconducting Rock Magnetometer software, Correlator software, DESClogik, LIMSpeak, and the whole-round loggers.

Recommendations

We strongly support the ongoing allocation of JRSO resources to maintaining, upgrading and replacing lab equipment and software crucial to the success of all expeditions.

We also encourage allocation of sufficient resources to allow the JRSO to continue to hire, train, and retain their excellent technical support staff.

5) IT and Databases

The JRSO is addressing a number of challenges effectively. Long-term challenges include i) bandwidth: the JRSO is investigating the feasibility and cost of changing over the next 5 years and ii) DESClogik performance: the JRSO Geology Laboratory Working Group recommends overhaul of the DESClogik architecture.

Recommendation

The JRSO (and Siem) should work toward the goal of enabling all scientists to use their personal laptops for efficient access to their institutional email accounts and increase the number of computers for internet access.

6) Publications and postcruise editorial meeting

It was noted that some PMOs feel that the editorial postcruise meetings are expensive and should be canceled.

Recommendation

We strongly believe that editorial postcruise meetings serve a vital purpose and should be retained. The scientific quality of the publications would suffer greatly if they were dropped. The PMOs should support the participation of scientists nominated to attend.

The value of the synthesis paper was questioned in view of the time being taken to publish results in a period of limited research funding. The synthesis was valuable when originally developed in the time of a dedicated *Proceedings* volume, but has become a burden that may have little impact.

Recommendation

The impact of synthesis papers, in terms of citations, should be addressed with a view to revising or eliminating this requirement.

Regional syntheses covering more than one expedition may be more valuable alternatives.

7) Sampling

Traditionally, high recovery expeditions have always had postcruise sampling parties. However, we also realize that other types of expeditions may benefit from development of a scientifically well-designed sampling plan based on full knowledge of all material recovered during the course of the expedition. Nevertheless, there has been some resistance to postcruise sampling.

Recommendation

We encourage that careful consideration be given to postcruise sampling for each expedition regardless of anticipated core recovery. Carefully considered sampling reduces speculative sampling and preserves more of the core for future research.

8) Science Party Crossover

There is currently minimal communication between co-chiefs and science parties between expeditions.

Recommendations

It is essential that opportunity be provided for crossover meetings of co-chiefs and science party representatives of each laboratory group. This would provide a means to communicate operational and instrumental issues and pass on experience.

Consideration should be given to reinstating the crossover party.

Concluding Remarks

Many of the items discussed (e.g., PMO nominations of expedition participants that allow no staffing flexibility, sampling, and other issues surrounding CPPs, and 353 EEZ issues that ultimately required high-level intervention to resolve) can be considered in the context of communication among JRSO and partner PMOs. At some level there may be a need for enhanced free, open and direct communication among PMOs that might help to head off some of these reoccurring and one-off problems that we have discussed. A PMO meeting to address these issues would be an excellent step toward enhancing communications.