2017 Co-Chief Review of JRSO FY16 Operations

27-28 February 2017

JOIDES Resolution Science Operator,

Texas A&M University College Station, Texas

Expeditions (FY16)

Expedition 359, Maldives Monsoon and Sea Level

Christian Betzler, Gregor Eberli

Expedition 360, SW Indian Ridge Lower Crust/Moho

Henry Dick, Chris MacLeod

Expedition 361, Southern African Climates/Agulhas Current Density Profile

Ian Hall, Sidney Hemming

Expedition 362, Sumatra Seismogenic Zone

Lisa McNeill, Brandon Dugan

Executive Summary

Overall, the Co-Chief Scientists who sailed during the 2016 financial year had overwhelmingly positive experiences with their expeditions. The *JOIDES Resolution* facility is run to such a high level that the vast majority of the scientific objectives were achieved. The *JOIDES Resolution* is an exceptional, well-maintained, and constantly improved platform that provides the scientific community a unique facility to pursue a wide range of Earth science research topics of societal relevance. All personnel involved with the projects before, during, and after expeditions were professional, well qualified, and dedicated. The infrastructure, logistics, and processes associated with expeditions have been optimized over the past decades, resulting in a highly cost-effective program. This high level of operation results from professional management and solution-oriented planning by all involved, and benefits from a productive review process.

Co-Chief Consensus Recommendations

We note that the items below are not in any priority order or order of significance, and, from (2) onwards, are laid out generally chronologically with respect to an expedition.

1. Co-Chief Review Process

This is the second year of this format of the facility review process. Overall, we appreciate the opportunity to openly discuss potential improvements in a constructive and supportive environment.

Recommendations

- The review process would benefit from earlier instructions to the Co-Chiefs so they can record relevant information to inform the review. In addition, earlier details of the format of the meeting and presentation requirements would be helpful.
- We recommend providing a response to this report to this group of Co-Chiefs and sharing it with the Co-Chiefs of the subsequent year.
- All of the Co-Chiefs also see the value of reporting scientific results of each expedition to the relevant panel (e.g., SEP) to close the loop.

2. Clearances

We recognize the difficulty of working in territorial waters. We very much appreciate all the efforts of the JR Science Operator and NSF and other personnel in pursuing permissions.

Three of the four expeditions included sites in territorial waters (Maldives, South Africa, Mozambique, and Indonesia). Two of these had serious issues, one ultimately did not receive permission and sites were moved into international waters, and one gained permissions for certain sites ~6 weeks into the expedition.

Clearance issues lead to changes in operational plans, increase lost time and transit, impact science objectives, and cause stress and frustration to the science party.

However, we felt that starting the clearance process earlier (in these cases, preparations started at least 1.5 years in advance) would not have changed the final outcome.

In spite of these issues and changes, the expeditions were highly successful operationally and scientifically.

Recommendations

We stress the importance of regular review (e.g., multi-year and relevant to the future ship track) of the clearance potential in specific countries.

3. Staffing

Overall, the staffing process was very efficient and smooth.

We have a number of recommendations that concern increasing flexibility and uniformity of the Program Member Office (PMO) application recommendation process.

Recommendations

- We would like to see more options from PMO applicant pools (i.e., where possible, there should be more applicants than berths per PMO and applicants with a range of areas of expertise).
- We feel there needs to be clearer terms of reference for the staffing from each PMO (e.g., quotas, graduate students, early career priorities), with some additional justification of rankings in order to explain the prioritization and to provide further flexibility in discussion of choices.

- It should be emphasized to PMOs and applicants that scientists sail as individuals and the scientific research program should be for that individual.
- We hope that the newly implemented annual PMO meeting will continue and will offer an opportunity to share and discuss these points.

4. Co-Chief Communication

There were several occasions when PMOs made initial communications only with one of the Co-Chiefs and the Staff Scientist. This included preparations for the webinar; participant staffing; appointment of education and outreach officers; and scientist attendance at the post-cruise editorial meeting.

Recommendation

The full team of Co-Chiefs and Staff Scientist should be included when there are expedition-related communications from individual PMOs.

5. Improving Technical Capability and Tools

There needs to be improved communication and information on the status of tools (including third-party tools). If tools are to be available, they need to be functional.

Recommendations

- We suggest a system of red, amber, green operational status for tools (made available to proponents via the JRSO website, linked from the proposal instructions page) and a check and discussion to proposal proponents and at the pre-cruise meeting.
- There needs to be a clear plan for responsibility for usage and functionality of these tools. Steps should be taken to test functionality and suitability well ahead of expeditions.
- For expeditions with challenging operations and engineering (e.g., hard rock drilling), there should be better usage of external expertise (e.g., industry) and sharing of knowledge and experience within all branches of IODP. We recommend that technical scoping groups be convened on a project-by-project basis to bring the appropriate people together.

6. Labs and Equipment

Space

We realize lab space is limited, but the core lab could benefit from more versatility to accommodate the needs of different disciplines/types of expedition.

Recommendation: Discuss lab space layout options at the pre-cruise meeting.

Physical properties measurements

There were a number of problems with functionality of core physical property equipment (core logging and discrete measurements).

Recommendation: Follow up and improve reliability of measurements where possible.

TeKa thermal conductivity

There are long-standing issues with thermal conductivity measurements related to the black box software, and these should be addressed.

Recommendation: Improve ability to take effective and interpretable thermal conductivity measurements.

Manuals

Some manuals were non-existent or incomplete. For example, Correlator needs a manual for the new user, and there should be more content on QA/QC of physical property data beyond calibration.

Recommendation: Improve or update relevant manuals. Ask science party members to indicate issues or gaps by annotating manuals onboard.

Meetings

We recommend introduction of regular meetings (e.g., once a week) between the Co-Chiefs, Staff Scientist, Lab Officer, and Assistant Lab Officers during the expedition.

Recommendation: Implement regular meeting.

7. IT/software/databases

We recognize there have been many improvements to software (e.g., LIMS/LORE, DescLogik, Sample Master, Correlator), and these are ongoing.

Databases: a number of errors (e.g., incorrect units or incorrect calculations of values) were discovered by the science party within the LIMS database. Sample Master also incorrectly printed information on labels at times.

A number of software upgrades were made during 2016. Some were made immediately before or during certain expeditions and generated teething problems.

Recommendations

- Please continue with these software improvement efforts.
- The LIMS/LORE database should have a systematic check for errors.
- We recommend not implementing software upgrades midway through expeditions. We suggest that Co-Chiefs, Staff Scientists, Lab and Assistant Lab Officers discuss together software upgrades before implementation to determine likely impacts.

8. Logging

With logging no longer contracted to LDEO, a few issues arose.

Some issues concerning usage and configurations of individual wireline tools were not raised during the pre-cruise meeting and resulted in some options not being available. The role of LDEO was sometimes unclear in terms of logging data processing. This lack of clarity caused some tensions between the ship and LDEO during one of the expeditions.

For usage of LWD, there could be more discussion and advice at earlier stages of the project (e.g., proposal stage, and/or pre-cruise meeting).

Recommendations

- The importance of having logging expertise within the science party (if relevant to the expedition) should be stressed more to the Co-Chiefs in advance of the staffing process.
- If no logging scientist is onboard, the relevant technician needs to be appropriately trained.
- Clear guidance should be provided to the Co-Chiefs as to the extent and limits of LDEO's responsibilities with regard to the processing of logging data.
- There needs to be more detailed discussion of potential limitations to logging and combinations of tools at the pre-cruise meeting, and input from the Schlumberger engineer on the logging plan pre-cruise.
- Encourage more discussion about the possibilities of LWD and provide a set of ideas for pursuing LWD funding.

9. Paleomagnetic orientation data

During Expedition 362 we encountered a problem with incorrect paleomagnetic declination orientations. The source of the problem remains unresolved 6 months post-expedition.

Recommendation

We look forward to resolution of this problem and would appreciate communication of progress or updates.

10. Education and Outreach

We strongly recognize the importance of both education and outreach. We also recognize that the skills involved with good education and outreach are very different, and currently there is most focus on the former. We appreciate that Education and Outreach (EO) is not the responsibility of the facility; however, many of us feel the IODP program needs a coherent plan and approach for these activities. This should result in a more efficient program, improved educational and outreach deliverables, and data on the impact of this program.

Recommendations

- There should be a clearer set of education and outreach program-level objectives, an assessment of what activities work, and a method for gathering impact data.
- We recommend a workshop to support achieving the above.
- The following would improve the effectiveness of EO activities:
    - Start the EO officer recruitment process earlier in order to integrate them into the science party and science program
    - Institute a clear line of management on board
    - Work toward better integration of E&O between the PMOs
    - Establish agreement of the activities and fit to the program-level objectives as part of the pre-cruise planning process.

- Hold a pre-cruise meeting (actual or virtual) between the Co-Chiefs, Staff Scientists, the responsible party at USSSP and the E&O personnel once selected to plan EO activities.

11. Publications

The publications process is running very smoothly and the expedition scientists receive clear support and instruction.

Editorial meeting: We wish to emphasize the importance and value of the editorial meeting for finalizing results and for continued scientific discussion.

Synthesis paper: We feel there should be some flexibility on the nature, content, and requirements of the synthesis outputs.

12. Web Report Usage

Following one of the expeditions, material from online daily reports and site summaries were used in a submitted publication (no expedition participants as authors), before the *Preliminary Report* was published. This potentially risks lack of credit for work put in, scientists unable to meet funding organization requirements for post-cruise research, usage of material that is not peer reviewed, and misunderstanding of the material.

Recommendation

We recommend an appropriate usage statement on the daily reports web page.

13. Succession Planning

Overall, the operational and drilling teams offer invaluable experience and knowledge. Many of the personnel represent potential single points of failure in terms of this experience and knowledge.

Recommendation:

We hope there is succession planning for highly skilled drilling and operations personnel to ensure appropriate knowledge transfer and to mitigate these risks.

Additional items raised following the presentation to the JRSO (but discussed during the meeting):

14. Curatorial Issues

The sampling strategy is normally discussed and decided upon during the pre-cruise meeting. The sampling strategies for paleoclimate/oceanographic expeditions versus those for other expeditions are different. For the former case, much of the sampling is normally done post-cruise, whereas for the latter it is done onboard. It should, however, be recognized – and made clear to Co-Chief Scientists – that, for the former type of expedition, where indurated cores or cores that are not to be spliced are recovered, it is possible to take individual samples onboard. By so doing the sampling load during post-cruise sampling meetings can be reduced substantially, samples can be provided in a more timely

fashion to the scientists, and the costs of the post-cruise sampling meetings reduced.

Recommendation

We recommend that there be sufficient flexibility in the system that the sampling strategy can be modified during the course of an expedition. For those expeditions for which post-cruise sampling had originally been planned, it should be possible to modify the strategy such that individual sampling can be done onboard for sites at which no splice has to be produced.

15. Scheduling

The proposal leading to Expedition 360 was the first part of a multi-expedition project, approved by SEP for drilling to 3 km. This required two expeditions assuming average transits. Despite a 17 year wait to return to the Indian Ocean, one expedition was scheduled with a long transit that precluded the 1,500 mbsf objective. This has resulted in a two-expedition program potentially becoming a three-expedition program to reach the 3-km bsf project goal, with a likely long delay in completing the project.

For multi-expedition type projects such as this, which ultimately contribute to the broader-scale Challenges of the IODP New Science Plan, significant progress within the current timeline of the International Ocean Discovery Program is hampered by not scheduling to allow completion of projects.

Recommendation

The Facility Board should retain sufficient flexibility in its ship schedule planning such that multi-expedition drilling programs can be implemented on realistic timescales, particularly for remote regions of the oceans rarely visited by the *JOIDES Resolution*.