

OBSIP Prior Users' Retreat
Snowbird, UT
September 27, 2010
2-6 pm

Planning committee

Jeff Babcock, Gail Christeson (scribe), John Collins, Gabi Laske, Anne Tréhu (discussion leader)

Attendees

Francis Wu, Doug Wiens, Gail Christeson, Mark Williams, John Collins, Dan Lizarralde, John Orcutt, Jim Gaherty, Robert Dunn, Jochen Braunmiller, Alistair Harding, David Okaya, Rob Woolley, Martin Rapa, Andrew Barclay, Jeff Babcock, Uri ten Brink, Bob Woodward, Jim Fowler, Don Forsyth, Doug Toomey, Anne Trehu, Ralph Stephen, Gabi Laske (via i-chat)

Summary

On the afternoon before the OBSIP meeting, 24 prior users of the OBS IICs (Institutional Instrument Contributors) and representatives from each of the IICs met for the afternoon to discuss their experiences with the facilities and make recommendations for the future.

Overview of objectives

“Objective is to discuss what has worked well and what has been problematic during experiments serviced by the OBSIP over the past decade, focusing on improvements to procedures, communications and instrumentation to increase the success of future experiments. We hope to build on our collective experience as we embark on a new generation of instruments, experiments, and users.”

Preparation for the retreat

Prior to the workshop, Anne Trehu and Doug Toomey summarized the responses to post-cruise surveys submitted to the OBSIP oversight committee and distributed the results. The planning committee developed a follow-up questionnaire to further explore questions related to data quality. John Collins and Jeff Babcock provided a list of all experiments serviced by the IICs since the inception of the OBSIP in 2001, and the questionnaire was sent to all PIs on the list with a letter requesting that they distribute it among their group. Sixteen responses were received, and the responses were used to develop an agenda for the retreat. Of these responses, 9 respondents participated in the retreat and 7 were not able to attend, but none-the-less took the time to submit detailed and very helpful responses.

Disclaimer: This report represents a summary of discussions. Recommendations do not necessarily represent a consensus. We plan to establish a web-based forum for further discussion.

Precruise Communications

Issues:

Most PIs give the OBSIP high marks for this, but a few questions or suggestions emerged from the pre-retreat questionnaires:

- Some users questioned whether time estimates provided by IICs as guidelines for deployment/recovery for active source experiments are too generous, leading to unnecessarily expensive ship time requests.
- Some co-PIs commented that PIs and IIC staff should be more aware of the need to broadly circulate relevant discussions for multi-PI, multi-institutional experiments. In the past, communications between NSF, IIC staff and PIs have not always been copied to everyone concerned. Topics to be covered should include permitting as well as other precruise responsibilities.

Recommendations:

- One suggestion for improving ship time estimates is to incorporate water depth into the calculation. It is also important for PIs to be aware of the need for contingency time, and for a science plan for using contingency time effectively if it is not needed for OBS operations. The question was raised as to whether it would be useful to compile timing information from cruise reports of prior cruises to improve cruise planning algorithms.
- There was general agreement that a formal timetable of conference calls between PIs and IIC staff be set up once a project was recommended for funding. This would be a minimum timetable, with additional calls as needed. All concerned co-PIs, NSF program managers and staff from each IIC assigned to the project should be invited. It was suggested that there be additional communications with IIC personnel if non-UNOLS ships used for deployment.
- Development of a written OBS experiment planning primer might help new or returning users. New users could also be matched with experienced “mentors.”
- When the logistical or scientific requirements for an experiment rely on specific technical capabilities of a particular OBS design, it was suggested that PIs should have input into the decision about which IIC would service their experiment.
- Establishment of a relational database for OBS-related metadata of various types related to operations (deployment time, recovery time, rise/sink rates, water depth, etc.) would allow for compilation of statistics permitting more accurate cruise requests.

Communication during cruises

Issues:

Communications during cruises are generally excellent, with a few outliers related to language or cultural differences.

- The primary suggestion emerging from the pre-cruise questionnaire is that many PIs would like to be more involved in instrument testing and preparation. This is also important for training the next generation of OBS users and increasing the general level of technical/scientific competence in the absence of day-to-day involvement in oceanographic instrumentation.

Discussion:

There are pros and cons for increasing PI and student involvement in instrument preparation, deployment and recovery at sea:

Pro:

- trains people so they have a better idea of what is entailed
- lightens load on OBSIP personnel
- decreases possibility of mistakes if more eyes oversee instrument programming

- increases the general level of technical awareness in the ocean seismology community.

Con:

- increases possibility for confusion and mistakes
- diffuses responsibility for success. At present, IIC staff are ultimately responsible.

No consensus was reached on the optimum level of involvement. There was general agreement that students can be a big help during deployments, but they need to be trained in advance and it needs to be clear when cruise staffing is being decided how much help is needed.

Recommendations:

- PIs could be more involved in instrument programming without jeopardizing reliability if detailed programming checklists were designed and it became a PI responsibility to proofread these checklists to ensure that there have been no misunderstandings about program parameters. Input parameters might also be echoed back by the instruments for verification by PIs if they request this option.
- To obtain more hands-on experience with the OBSs in “non-critical” circumstances, PIs could be encouraged to visit the IIC responsible for their experiment prior to the cruise at a time when staff are present and have time to go over instrumentation.

Postcruise Communication

Issues:

- Some PIs indicate that responses from the IICs to post-cruise questions tend to be slower than responses to cruise planning questions. Some PIs have also indicated that there are sometimes delays in getting updated metadata such as instrument responses.
- IIC staff indicate that PIs are sometimes slow at providing post-cruise feedback. The response rate to the data evaluation forms, in particular, is very low. That feedback is needed by the IICs.

Recommendations:

- One proposed solution was to increase shore-based OBSIP staff, both for responding to questions and to “nag” PIs for their feedback concerning instrument performance.
- The OBSIP should be proactive about informing the community about things such as new instrument response functions, timing corrections, and other issues that may be relevant for several prior and future users.

Timing and calibration

Issues:

- Are there different issues for active and passive source experiments?
- There have been numerous reports of timing problems. Some are due to human error and simple to fix (e.g. clock drift correction applied with the wrong sign; typing error when inputting drift rate); some may be related to aging of clocks, non-linear drifts due to temperature variations or other problems that have not yet been identified.

Recommendations:

- Set up a small working group of instrument center staff and scientists to study these time problems and report back to the oversight committee.
- Test and develop software solutions that are currently used by individuals to be more widely applied (e.g. using earthquakes or background noise correlations to solve for time shifts).
- Standardize the approach of the different IICs to reporting of timing corrections and other timing-related metadata and document procedures for PIs to analyze those metadata.
- Move to new hybrid atomic TXCO clocks that are projected to sell for ~\$1000, similar in cost to the SEASCAN clocks currently used.

Signal/Noise (instrumental and environmental)

Issues:

- It is sometimes hard to separate the instrumental and environmental noise sources because they may occur in overlapping frequency bands and there may be coupling between the environment and self-noise source.
- Self-noise issues need to be tracked down and fixed.
- Package design can help mitigate effects of environmental noise. However, there is very little data available for testing models of the relationship between package design and environmental noise. Most of the data are anecdotal.

Discussion:

- A 6.5 Hz resonance that has been recognized in data from SIO OBS from recent deployments was discussed. This resonance has been particularly difficult to track down because the problem varies from instrument to instrument and is not reproduced in the lab. The current working hypothesis is that the noise results from a combination of environmental and electronic catalysts.
- Circumstantial evidence for resonances of the instrument package excited by bottom currents was reported. However, very few experiments have been done when bottom current was measured, and none have been done recently for the current instrument packages.
- Circumstantial evidence for site resonances excited by both currents and biological activity was reported, but again causal inferences are circumstantial and ancillary data are not available from recent experiments to confirm inferences.
- PIs sometimes ask for changes to instruments or want to deploy instruments in circumstances that go beyond the conditions for which they were designed (e.g. adding EM capability, deploying short-period instruments for a year). PIs should recognize that although this broadens the science, it also increases the risk.

Recommendations:

- OBSIP should be more proactive about communicating the recognition of problems and success fixing problems to the PI community.
- Ancillary data, such as current meter, temperature and seafloor photography, could be helpful for identifying sources of noise and evaluating how to improve instrument packaging. An inter-comparison experiment (huddle test) for which such ancillary data is available would be useful. However, there was no consensus on where to conduct such an experiment. There was also concern about whether the expense for such an experiment could be justified given limited funding available for research and disagreement about how useful the only previous major OBS inter-comparison experiment had been (held at Lopez Island WA in the late 1970s).
- When changes are made to instruments, there should be resources available to test instruments before using them in a PI-driven experiment. However, no consensus was achieved at the retreat on the proper balance between testing and servicing PI-driven experiments and on the degree of change needed to trigger an extensive testing program. No PI wants his/her experiment to be delayed for testing or not funded because the funds are needed for testing.
- There was a general consensus that instruments should be tested in a quiet vault if possible.
- A reference archive of the characteristics of various types of signals could be established. This could be a “living” web-based resource for the community.

Additional discussion/recommendations

- Mechanisms are needed to improve post-cruise communication between PIs and IICs. Both groups need to recognize that constructive discussion of problems as well as presentation of successes is important for a healthy program.
- A regular (annual or biennial) meeting of the marine seismology community (similar to meetings held by EarthScope, IRIS and UNAVCO) would be useful for generating a sense of community and transmitting information to junior scientists. These meetings would also provide a forum for technical discussions between PIs and IIC staff concerning evolving technology, instrumentation design and scientific results and needs.
- Perhaps a regular Ocean Bottom Seismology community meeting could be held in conjunction with the R/V Langeth user community? There is significant overlap between these communities, and some concerns related to ship scheduling and updating of metadata could be shared.

**Thanks to all who contributed to this exercise!
December, 2010**