Operations Task Force Report

Summary of activity from 1 August 2008 – 31 December 2008

PREFACE

This report provides a summary of the IODP-MI Operations Task Force (OTF) for the period following from early August 2008 through December 2008. Section 1 of the report describes the SPC-approved FY2009 IODP operations as of the August 2008 SPC meeting. Section 2 describes changes to the FY2009 IODP platform schedules following the August 2008 SPC meeting and up through December 2008. Section 3 shows a graphical summary of the FY09 Expedition schedule. This report incorporates email discussion among OTF members and a report from NanTroSEIZE Project Management Team.

1.0 Status as of August SPC meeting

Figure OTF-1 (below) shows the IODP platform schedule recommended by the OTF based upon discussion over the period from March – August 2008 and presented to the Science Planning committee in August 2008. This schedule was included in the Fall 2008 (Sept) submission of the IODP Annual Program Plan

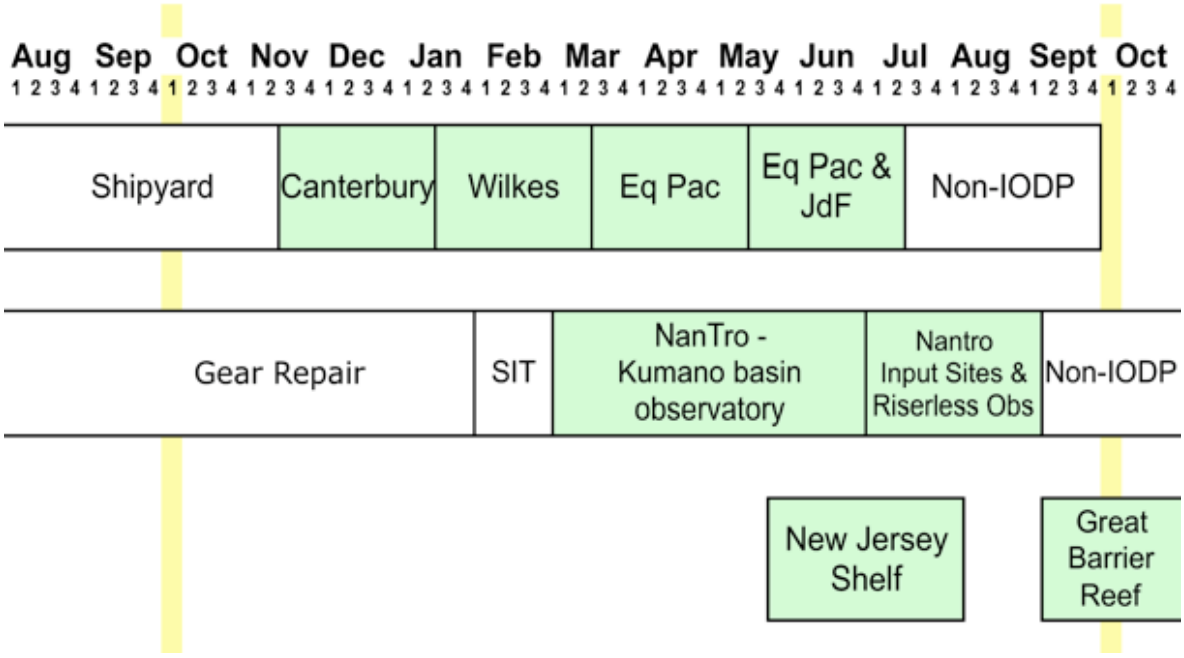


Figure OTF-1. *Summary of OTF-recommended and SPC-approved IODP platform operations following the August 2008 SPC meeting.*

Note: Figure OTF-1 differs in one minor area from the schedule detailed at the end of the previous OTF report (Mar- Aug, 2008; Fig OTF-3; page 13). As of early August 2008, the Riserless Observatory and Input Site operations were planned as two separate expeditions. By the end of August 2008, the expeditions had been combined for logistical purposes (as shown in Figure OTF-1 in this report). No changes in actual science operations were made.

2.0 FY09 Scheduling Issues – Aug to Dec 2008

2.1 USIO Schedule Changes

On September 15, the community was informed by the USIO (see letter from Bob Gagosian –**Appendix A)** that the target date for the start of international IODP operations for the *JOIDES Resolution* had changed. In sum, the USIO indicated that the ship would sail from Singapore by the end of January 2009. This sail-away date would have the vessel ready for international operations sometime around 1 March 2009.

The ramifications to this schedule change were large. Clearly, at a minimum, the Canterbury/Wilkes operations scheduled in the mid Nov 2008- mid March 2009 time frame would have to be deferred or cancelled. OTF would have to examine these changes as well as evaluate the most logistically effective remaining package of options for FY09.

Based upon this information the OTF chair began working with the USIO to determine the ramifications of this change in shipyard schedule to the JR FY09 operations (especially Canterbury and Wilkes) and to develop a series of options for the OTF to discuss.

The environmental risks were examined first. By combining data on average wave heights for each month of the year with data on typhoons, hurricanes, currents, visibility, ice, etc., a spreadsheet matrix was developed to show the preferred weather windows for each proposal (**see Appendix B**). Some of the proposals are spread out over large geographic areas, so the USIO weather consultants broke down the data into separate geographic regions.

For the examination of options for FY2009, March 1, 2009 was used as the start date for international IODP operations (i.e., the start of actual IODP programs…not transit, shakedown, evaluation, etc). Given this start date and the weather windows associated with the Canterbury and Wilkes Land programs (**See APPENDIX B**), it is clear that these two operations should not be implemented in FY09. Operational risks associated with the ice and sea-state conditions for Wilkes and sea-state conditions for a shallow-water program like Canterbury in these weather windows, especially for the initial set of operations, are too high.

In addition to the change in start date, the USIO indicated that it would prefer, if possible, to develop a contiguous six-expedition (12-month) package spanning the FY2009/FY2010 fiscal years. This operational mode helps to maximize IODP operational time for *JOIDES Resolution* operations immediately after coming out of the shipyard and to minimize transits associated with those operations. This set of operations would have the bulk of four expeditions in FY09 and the remaining two expeditions in FY10. Any additional operations in FY10 would depend upon several factors not known at this time, including formal budget guidance from the Lead Agencies and location/length of non-IODP operations (if any).

Thus, with the above information in hand, a set of six-expedition packages for FY2009 and early FY2010 were developed for review by OTF.

In developing this new schedule, the scheduling protocols presented at the August 2008 SPC meeting (**Appendix C**) were utilized. Additional factors, such as the short lead-time to the start of IODP expeditions and the fact that Canterbury/Wilkes would not fit into the start of the FY2009 schedule were taken into account. Specifically, these additional factors included:

1. Given the short lead-time to the start of the initial expeditions options were developed that would insure the first two expeditions were very easy to implement (i.e., essentially fully scoped and planned, no lead-time issues). The start of the first expedition was ~ 5 months away at the time of this discussion.

2. Keep as many currently scheduled programs as possible and include other previously scheduled (but deferred) programs, if possible. The latter includes Bering Sea, Canterbury and Wilkes Land.

3. Put together a six-expedition package, spanning the FY2009 /FY2010 fiscal years that would still leave the *JOIDES Resolution* with potentially 1-2 additional to-be-determined programs that could be added once formal FY2010 fiscal guidance was received from the Lead Agencies.

Taking these additional factors into account and the scheduling hierarchy outlined in **Appendix C**, a scheduling priority matrix was developed for OTF to utilize while examining appropriate options (**See Appendix D**). This spreadsheet has reorganized the Initial Summary spreadsheet (**Appendix B**) to (1) separate Tier 1 and Tier 2 operations, (2) include global rankings of Tier 2 programs (in parentheses next to the proposal name), and (3) incorporate some cost elements.

From this prioritized spreadsheet two basic options were developed, each with several sub-options. All options retain the Canterbury and Wilkes Land programs but defer them to FY10.

Option 1: Juan de Fuca Cementing / Bering Sea option

This option (**See Figure OTF-2, below**) retains a commitment to the Juan de Fuca program, re-inserts the Bering Sea program that was deferred after previous SODV delays, and also shifts the Canterbury Basin and Wilkes Land programs to FY10. In most of the Group 1 options only one program was added that had not been previously scheduled (Option 1E has two previously un-scheduled programs). This preparation factor is an important consideration given the short lead times associated with planning any expedition that is to be implemented in the next 12-16 months. All Group 1 options start with Pacific Equatorial Age Transect. OTF has repeatedly stressed the importance of starting with a non-complex program immediately out of the shipyard. That program is

an ideal first program as it is planned, staffed, and effectively "ready-to-go". The weather windows associated with some of the other expeditions (particularly JdF, Bering Sea and Wilkes) drive the schedule options for Group 1 to a large extent, with the only flexibility being associated with the fourth slot. Below is a graphical and text summary of the Option 1 packages.

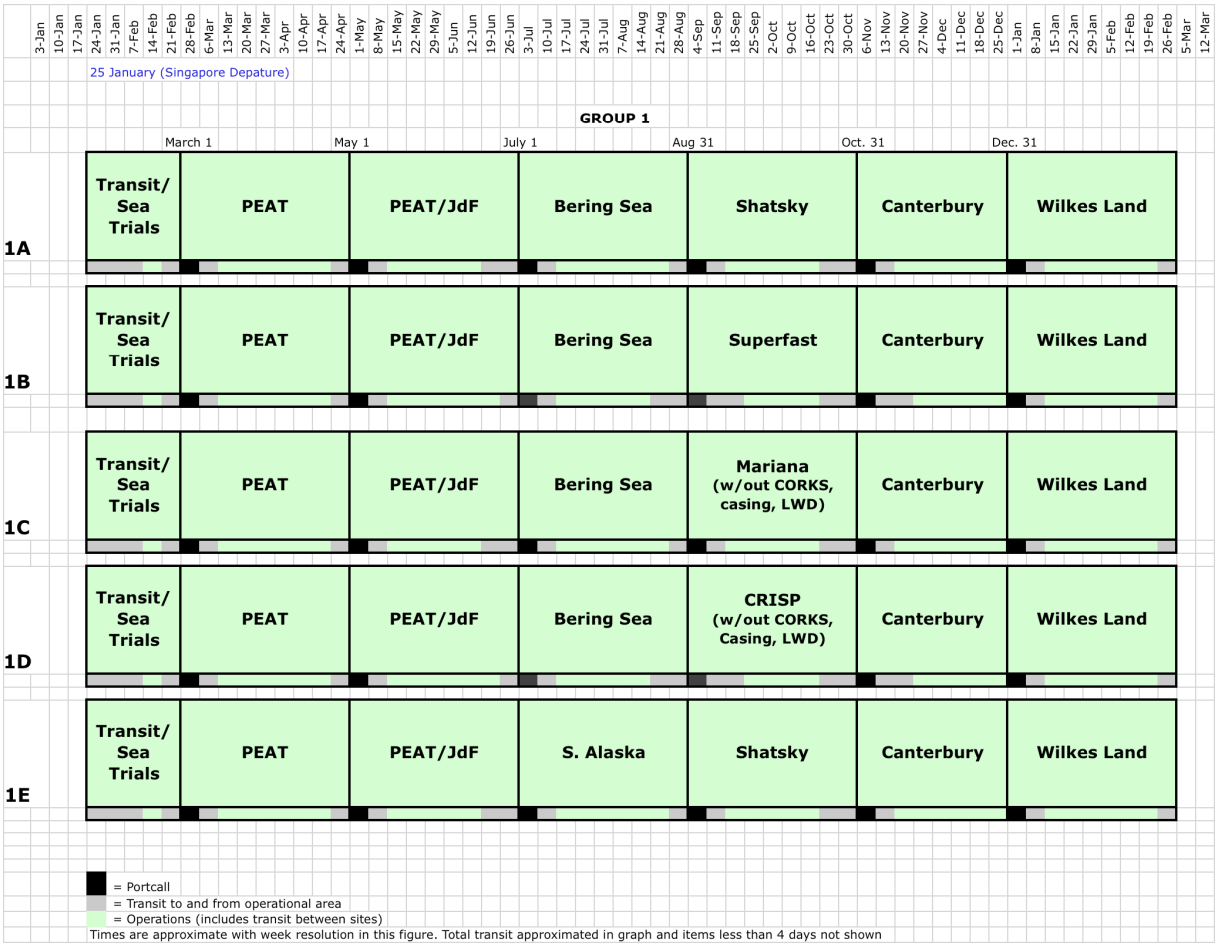


Figure OTF-2: *Potential options for FY09 JOIDES Resolution operations that incorporate Juan de Fuca remedial cementing*

Summary points for Group 1 packages

Group 1A: PEAT, PEAT/JdF cementing, Bering Sea, Shatsky, Canterbury, Wilkes

- 116 days transit, 257 days operations:
- Good weather windows for JdF cementing, Bering Sea, Canterbury, and Wilkes Land. Shatsky is in typhoon season, but low risk at its location (same window as Leg 198)

Group1B: PEAT, PEAT/JdF cementing, Bering Sea, Superfast, Canterbury, Wilkes

- 129 days transit, 244 days operations:
- Only 28 days operations for Superfast (<300 m penetration)

Group 1C: PEAT, PEAT/JdF cementing, Bering Sea, Mariana, Canterbury, Wilkes

- 113 days transit, 260 days operations
- Mariana is in a very poor weather window. However, given the shallow holes associated with Mariana and thus the ability to pull out of the hole quickly and move away from the typhoon, this option was included here.
- Mariana is at the height of typhoon season, which averages 2 typhoons with as many as 4 in some years. This has potential for ~10-20 days of lost operations or up to half of the operational time (1 typhoon = 5 days of lost operations).
- Previous expeditions to this area (Legs 125/195) suggest Mariana is probably best run with an LWD program due to the poor recovery and drilling conditions. This additional operational aspect would be cost-prohibitive at this time.

Group 1D: PEAT, PEAT/JdF, Bering Sea, CRISP A, Canterbury, Wilkes

- 131 days of transit, 242 days of operations
- Only 26 days of operations for CRISP

Group 1E: PEAT, PEAT/JdF, S. Alaska, Shatsky, Canterbury, Wilkes

- 116 days of transit, 257 days of operations
- Good weather windows for JdF cementing, S.Alaska Canterbury, and Wilkes Land Shatsky in typhoon season but low risk at location (same time as Leg 198)

Other discussion points for Group 1 packages:

Tier 1 Options

- The only Tier 1 program that could be included into any of these options was Mariana. Juan de Fuca II and Okinawa Trough have lead-time, technical, and/or cost issues that prevent them from being properly implemented within the next 12 months.

Tier 2 Options

- Asian Monsoon: It would be nearly impossible to schedule Asian Monsoon in addition to Bering Sea and Juan de Fuca remedial cementing (given PEAT 1 operates in March/April) as the weather windows are too restrictive. In addition, Asian Monsoon will require multiple clearances and even with "friendly" countries, this can require extensive lead times.

- South Alaska Margin: If Bering Sea and JdF cementing are to be implemented, the only potential weather window for South Alaska is that currently occupied by second PEAT program in the PEAT/JdF slot. As JdF cementing should be conducted towards the end of that 2-month window (to maximize weather conditions), this would mean that S. Alaska sites would need to be implemented in the May and early June. This is a poor weather window, primarily due to icing issues and storms in May. In addition, because this option is paired with JdF cementing, only a limited number of sites could be implemented and thus IODP would need to come back to finish this program at another time.

- Costa Rica Mud Mounds: This program has an extensive CORK package with potential ROV monitoring and thus has lead-time/expense issues that exclude it from implementation in FY2009.

- South Pacific Gyre: The only potential option for this program would be to insert it (or portions of it) following Wilkes Land. Given that we do not yet know budgets for FY2010 and non-IODP locations, it is impossible to schedule anything in FY2010 past the first two expeditions.

Summary: Advantages to Group 1 programs

- Completes numerous previously scheduled programs
- Maintains commitment to the Juan de Fuca program
- Completes two polar programs (except for option 1E)
- Completes both the Neogene and Paleogene portion of the PEAT transects. A related point here is that having 1.5 expeditions related to PEAT at the start of *JOIDES Resolution* IODP operations provides an added contingency for addressing technical and operational issues associated with this first program out of the shipyard (should they arise
- Easier to implement in a short time frame, as all programs (except Shatsky/Superfast/CRISP; that is, slot 4) have been essentially planned
- One option provides for some CRISP top-hole drilling (to prepare for CRISP B)
- Easy start for *JOIDES Resolution*: Previously OTF recommended starting with PEAT or a similar "non-complex" program.

Group 2: Non-JdF cementing / reduced PEAT options

This option removes restrictions associated with the Juan de Fuca cementing (i.e. weather windows and coupling with the second PEAT program). Each Group 2 option begins with a single Pacific Equatorial Age Transect expedition. In Group 2, only one PEAT expedition is conducted (combining elements of the two previously

scheduled expedition and eliminating Juan de Fuca cementing). Group 2 options are further divided into two sub-groupings for ease of presentation. The first sub-grouping (**Figure OTF-3**, below) includes Tier 1 Mariana (in its ideal weather window); the second sub-grouping (**Figure OTF-4**; below) examines expeditions without the restriction of Mariana and its weather window.

Group 2 "Mariana" options

In this sub-group, the differences between options are centered on the programs conducted in the third and fourth slots. The first two and last two remain the same.

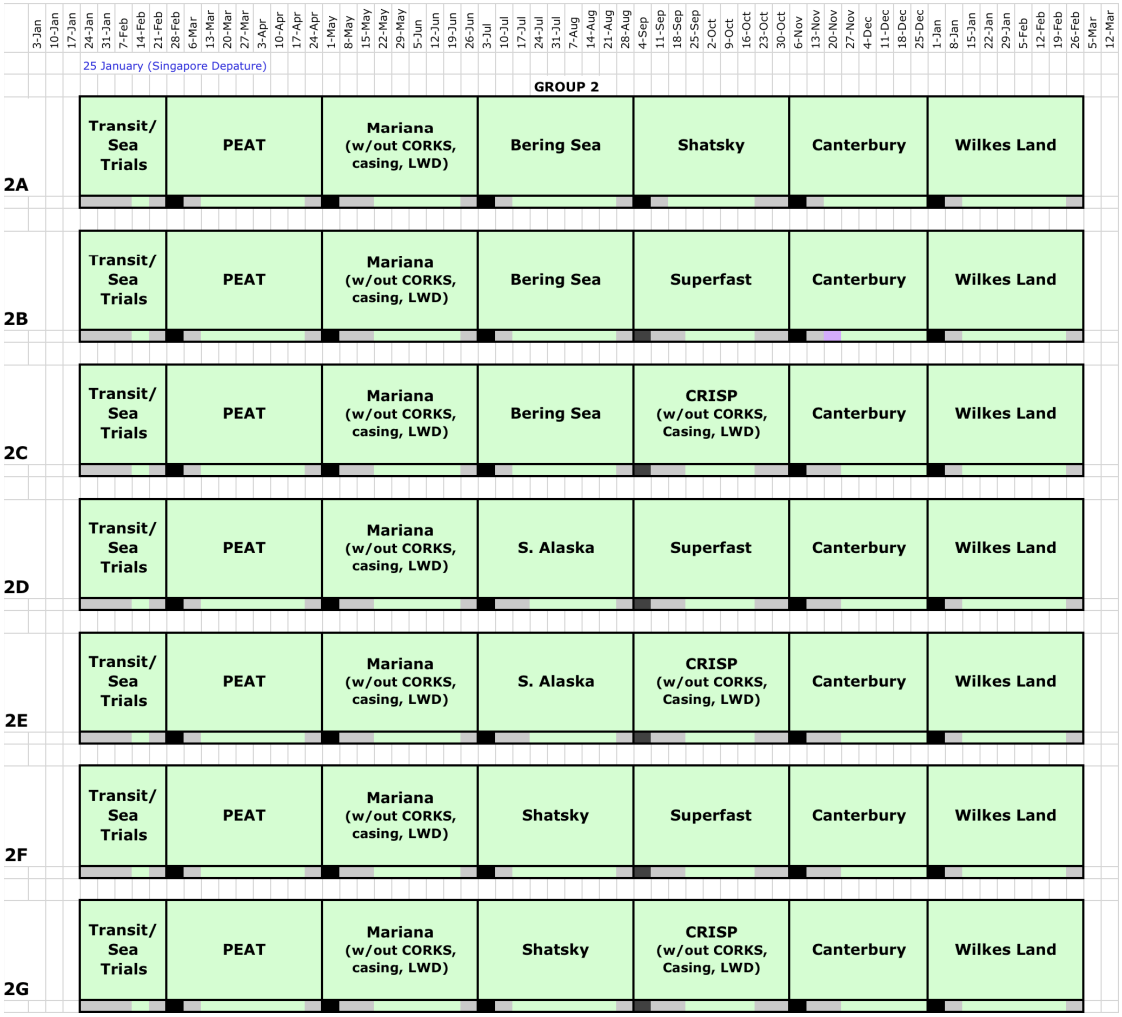


Figure OTF-3: *Potential options for JOIDES Resolution in FY09 that remove the commitment to Juan de Fuca operations and insert Mariana as an alternate Tier 1 choice.*

Summary points for Group 2 "Mariana" packages

Group 2A: PEAT Mariana Bering Sea, Shatsky, Canterbury and Wilkes

- 116 days transit, 257 days operations

Group 2B: PEAT, Mariana, Bering Sea, Superfast, Canterbury, and Wilkes Land

- 128 days transit, 245 days operations
- Only 28 days operations in Superfast

Group 2C: PEAT, Mariana, Bering Sea, CRISP, Canterbury, and Wilkes Land

- 130 days transit, 243 days operations
- Only 26 days operations in CRISP

Group 2D: PEAT, Mariana, South Alaska, Superfast, Canterbury, and Wilkes Land

- 129 days transit, 244 days operations
- Only 28 days operations for Superfast

Group 2E: PEAT, Mariana, South Alaska, CRISP, Canterbury, and Wilkes Land

- 131 days transit, 242 days operations
- Only 26 days of operations in CRISP

Group 2F: PEAT, Mariana, Shatsky, Superfast, Canterbury, and Wilkes Land

- 129 days transit, 244 days operations
- Only 25 days operations for Superfast

Group 2G:PEAT, Mariana, Shatsky, CRISP, Canterbury, and Wilkes Land

- 131 days transit, 242 days operations
- Only 23 days of operations in CRISP

Note that in all options in this grouping (except option 2A) Superfast and CRISP have severely reduced operational times (on the order of 23-28 days). In addition, the issues associated with coring recovery and LWD options for Mariana are the same as those identified in the Group 1 discussion. However, as Mariana is the only "viable" Tier 1 program at OTF, schedule options were developed for OTF to consider.

Group 2 "non-Mariana" options:

In this sub-group, the differences between options are centered on the programs conducted in the third and fourth slots. The first two and last two remain the same.

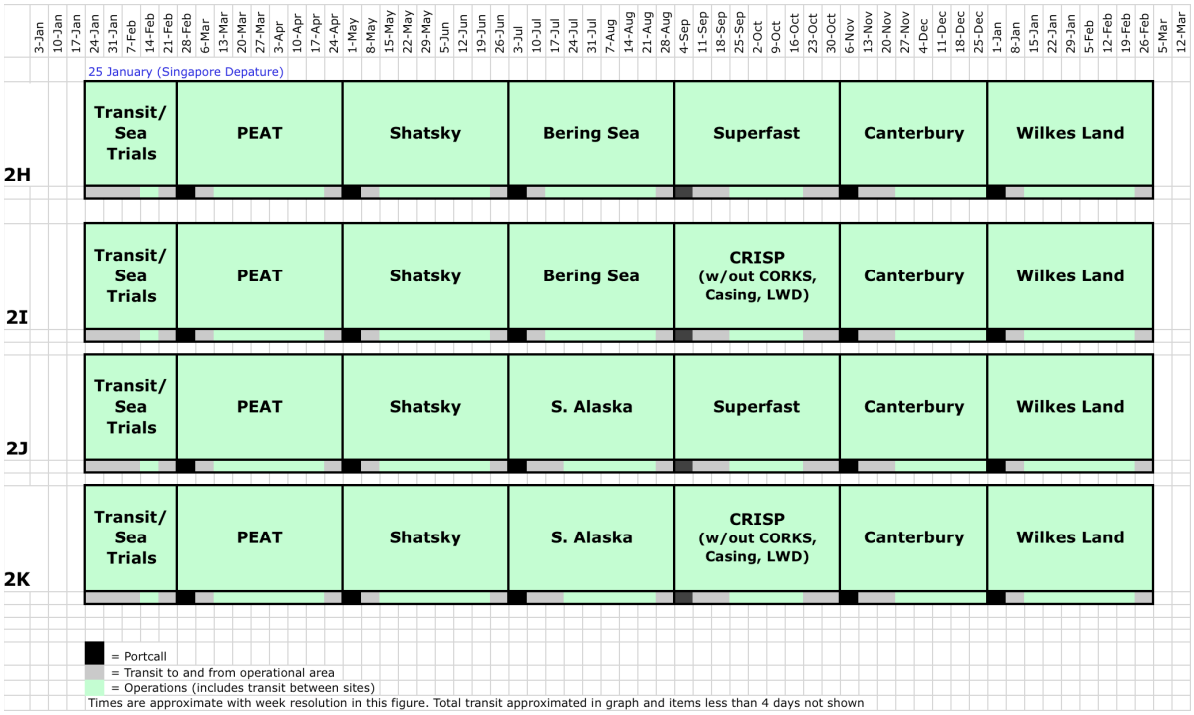


Figure OTF-4: *Potential options for the JOIDES Resolution in FY09 that don't included either Marianna or Juan de Fuca operations.*

<u>Summary points for Group 2 "non-Mariana" packages</u>

Group 2H: PEAT, Shatsky, Bering, Superfast, Canterbury, and Wilkes Land

- 125 days transit, 248 days operations
- Only 28 days operations for Superfast

Group 2I:PEAT, Shatsky, Bering, CRISP, Canterbury, and Wilkes Land

- 127 days transit, 246 days operations
- Only 26 days of operations in CRISP

Group 2J: PEAT, Shatsky, South Alaska, Superfast, Canterbury, and Wilkes Land

- 129 days transit, 244 days operations
- Only 28 days of operations in Superfast

Group 2K: PEAT, Shatsky, South Alaska, CRISP, Canterbury, and Wilkes Land

- 131 days transit, 242 days operations
- Only 26 days of operations in CRISP

Note that all of the options in this sub-group have a program (either CRISP or Superfast) with severely reduced operational days.

Other discussion points for Group 2 packages:

Tier 1 Options

- As with the Group 1 options, the only Tier 1 program that could be included in any of these options was Mariana. Juan de Fuca II and Okinawa Trough have lead-time, technical, and/or cost issues that prevent them from being properly implemented within the next 12 months.

Tier 2 Options

- Asian Monsoon: Asian Monsoon will require multiple clearances and even in "friendly" countries, this can require extensive lead times. Thus this option was not included because of lead-time restrictions.
- Costa Rica Mud Mounds: This program has an extensive CORK package with potential ROV monitoring and thus has lead-time/expense issues that exclude it from implementation in the year.
- South Pacific Gyre: The only potential option for this program would be to insert it (or portions of it) following Wilkes Land. Given that we do not yet know budgets for FY10 and non-IODP locations, it is impossible to schedule anything in FY10 past the first two expeditions.

Summary: Advantages to Group 2 programs

- Completes numerous previously scheduled programs
- Some options will complete two polar programs
- Easier start for *JOIDES Resolution*: Previously OTF recommended starting with PEAT or similar "non-complex" program.
- Some options allow CRISP top-hole drilling (to help prepare for CRISP B)
- Allows for South Alaska program in some options

Differences with Group 1 packages

- Severely hampers, and perhaps eliminates, finishing the Juan de Fuca Program
- Some options only complete one polar program
- Not as many programs have been planned by USIO, thus requiring rapid scoping and planning of many operations in very compressed time.
- Won't complete both the Paleogene and Neogene PEAT Transects.
- Doesn't contain any contingency in PEAT to address technical/operational issues that might arise with a first expedition out of the shipyard.

OTF discussion of JOIDES Resolution options
OTF then began a discussion of the Option 1 programs. After a few rounds of email, a consensus began to emerge on several main issues.

- A commitment to conducting polar programs in the coming fiscal year (FY2009)
- Support for continuing Juan de Fuca (and thus the cementing program in FY2009)
- Completing operations on programs IODP has started and/or previously scheduled but are now deferred
- Making progress on a portfolio of science that touches on each of the major ISP themes

In addition, there appeared to be a consensus with the concept of inserting Canterbury and Wilkes as early FY10 programs.

Taking these issues into account led to the consensus by OTF to focus on the Group 1 options. The main difference between Group 1 packages is the 4th slot.

OTF examined the five group 1 options (See **Figure OTF-2**) and eliminated two of the options from further discussion for FY2009 scheduling (1C- Marianna; 1E – S Alaska). The Mariana option (1C), while incorporating a Tier 1 program, could have significant downtime related to typhoons. Given the other options had much better weather windows and hence, greater chances of success in this operational window, OTF members felt that this Tier 1 program deserved a better weather window slot in subsequent fiscal years. In addition, previous drilling experience (Legs 125 and 195) strongly suggests that there will be poor recovery / difficult drilling conditions during this expedition and thus LWD operations should be considered. Budget restrictions, however, would have precluded the inclusion of an LWD program for FY2009. Deferring Marianna to a subsequent fiscal year would allow IODP to investigate the LWD issue in more detail as well as schedule this program in a better weather window.

Option 1 E is similar to Option 1A but substitutes South Alaska Margin for Bering Sea. The combination of Bering Sea (1) having a higher Tier 2 ranking than South Alaska (but in different ranking sessions), (2) having been previously scheduled but deferred, and (3) being essentially "ready-to-go" led OTF members to prefer 1A over option 1E.

These three remaining expeditions vying for the 4th slot (CRISP A, Shatsky, Superfast) were all ranked at the March 2008 SPC meeting and thus can be compared them directly in terms of prioritization. They were ranked 11th (CRISP A), 12th (Shatsky) and 13th (Superfast). These positions are essentially statistically the same (see ranking discussion in SPC March 2008 meeting minutes) and thus no simple ranking priority could guide an OTF decision.

OTF then examined the risks and benefits of each program, including the consideration that two of the programs (Superfast and CRISP A) had severe transit penalties associated with them.

Superfast:
Superfast (Hole 1256D) has been drilled already in IODP. In addition, given the decreased operational aspect due to the cross-Pacific transit, it is not clear how much could be drilled during a shortened expedition and thus how much additional information would be gained. The USIO estimated that ~28 days of on-site time (the amount of time that could be allocated to that program in this particular time slot) would result in less than 300 m of additional penetration. This estimate includes time for hole remediation/cleanout and logging. A suggestion was put forth by an OTF member that by going to Superfast (in an abbreviated expedition mode) we could at least determine the stability of the hole, get some drilling accomplished, and then evaluate the results to determine if we need to go back again.

However, a counterargument was made that that the scientific return and operational unknowns associated with this abbreviated expedition scenario (i.e., will we get enough core, and thus science, with the time invested?), along with the limited drilling available time (not only for the expedition, but in IODP overall) makes this a very risky choice given that there is another viable option (Shatsky) that would not suffer the transit penalties associated with Superfast.

In the end, OTF felt that the benefit/risk ratio is not high enough to justify the transit and operational time, given other viable candidate programs for the slot. Should IODP wish to invest effort here, OTF felt that it should be done in a maximum capability (i.e., a full expedition).

CRISP A
It was not immediately clear to the OTF members what an abbreviated CRISP A could accomplish. Thus, the OTF chair asked the proposal proponents to prioritize holes and operations, especially in light of how the results could help in moving CRISP B (i.e., subsequent riser drilling) forward. The proponents responded that a first priority of CRISP A would be to establish the geology and physical properties of the unknown environment that will be penetrated during the CRISP B riser drilling. Two sites were high priorities: Site CRIS 3A (700m sediment/100m-200m basement) and Site 4A (850m of sediment and 200m of basement). Although three holes were proposed at the base of slope to document fluid flow and chemistry, the proponents feel that the preparation for riser drilling is the practical approach to address a minimum-time program for CRISP. They feel that fluid flow objectives can be better designed after 3A and 4A are sampled and after the proposed Costa Rica Mounds drilling is accomplished. The USIO estimated that a drilling and logging program at sites 3A and 4A (along with 3D VSP) would take on the order of 26 days. The USIO does note that there have been hole stability issues in some (but not all) holes on the Costa Rica margin (Legs 84, 170, 205) so this may be an optimistic assessment.

CRISP-A was put forth as an option because it has potential benefits with respect to CRISP-B drilling and that *JOIDES Resolution* drilling at CRISP would help validate the integrated character of IODP. Both are valid concepts. However, moving forward with CRISP-A at this time, as pointed out by an OTF member, would be a "de facto major

long-term science planning and priority setting to initiate one more large seismogenic zone experiment". In addition, as another OTF member noted, the "outcome of the riser discussions at the last SPC meeting [indicated that] that there is strong support for CRISP as a highly ranked proposal, however the discussion of what is the next riser project will be done at the March [2009 SPC] meeting". This uncertainty in future IODP riser program selection also suggested that there is a distinct possibility that if a reduced CRISP-A program was conducted, and IODP did not move forward with CRISP-B, there could be limited scientific gain. Again, as with Superfast, the benefit/risk ratio did not appear to be high enough (given a viable alternative such as Shatsky) to conduct a reduced CRISP-A at this time.

Shatsky

Shatsky has been a consistently highly ranked program (as have the others). However, this program provides the most science in terms of operational days of the three options examined in detail by OTF (~46 days vs. 26-28 days for Superfast [Option 1B] and CRISP A [Option 1D]). On face value, this simple breakdown of operational time would suggest that Shatsky (given the equal rankings of the three programs) was a better option at this point and that perhaps it would be more prudent to dedicate full expeditions to Superfast and CRISP at a later date.

In addition, this expedition also focuses on an aspect of the ISP (LIPs) that has not yet been addressed. The hard rock/geodynamics aspects of this expedition would also nicely complement the climate/paleo work previously done in Shatsky area drilling.

A final aspect in favor of a full Shatsky Rise expedition over a reduced Superfast or CRISP-A in FY09 is that these two latter programs are in operational areas that most likely will be in the transit path of the *JOIDES Resolution* (potentially several times) over the next few years. There is good potential for Atlantic and Pacific-based non-IODP operations in FY10/11. Thus the likelihood of the vessel moving back and forth between Atlantic and the Pacific is high. CRISP and Superfast, with excellent, year-around, weather windows, are ideally situated to take advantage of such transits associated with these non-IODP operations.

In sum, there are positive elements to each of the three programs proposed for the fourth slot in the six-expedition schedule that OTF developed for the *JOIDES Resolution*. Each has justifiable reasons to be included in the schedule. In the end, though, OTF members felt that the operational constraints (long transits resulting in reduced operational time at CRISP and Superfast), the thematic LIPS aspect to Shatsky, and the uncertainty of the long-term aspects of CRISP make Shatsky the most viable of the three programs given the boundary conditions imposed.

Thus, in early October 2008, OTF formally adopted the following schedule for the *JOIDES Resolution* when it enters IODP operation in March 2009:

Pacific Equatorial Age Transect (PEAT) I, PEAT II /Juan de Fuca cementing, Bering Sea, Shatsky Rise, Canterbury Basin, and Wilkes Land

This schedule has the following advantages:

- Completes numerous previously scheduled highly-ranked programs
- Maintains commitment to the Juan de Fuca program
- Completes two polar programs
- Completes both the Neogene and Paleogene portion of the PEAT transects.
- Addresses at least one ISP not previously attempted in IODP (LIPS---Shatsky)
- Relatively easy to implement in a short time frame, as 5 of 6 programs have been essentially planned
- Relatively easy start for *JOIDES Resolution*: Previously OTF recommended starting with PEAT or similar "non-complex" program. A related point here is that having 1.5 expeditions related to PEAT at the start of JR IODP operations provides an added contingency for addressing technical and operational issues associated with this first program out of the shipyard (should they arise)
- And last, but not least, it fits the budget.

Based upon the OTF recommendation, the USIO incorporated the above schedule into the Annual Program Plan they submitted to IODP-MI.

2.2 *Chikyu* Schedule Modifications

In early October, CDEX informed OTF that *Chikyu's* return date to IODP operations would be the beginning of May 2009 instead of March 2009. Issues related to the availability of a floating crane and repair-work personnel associated with the thruster gear replacement forced this delay.

Unfortunately, CDEX could not simply move the ~180 days of scheduled operations (See **Figure OTF-1**; above) forward by two months. The scheduled operations (Mar-Aug 2009) had spanned two Japanese fiscal years (~1 Month in JPFY H20 which ends March 31, 2009 and ~5 months in JPFY H21 which begins April 1, 2009). The new operational period would be entirely in JPFY H21. As Japanese platform operating funds cannot be carried forward across fiscal years, the net effect was that only ~150 days could be allocated to upcoming operations (i.e., a loss of ~30 days of time previously allocated to JPFY H20). These new operations would run from ~May through Sept 2009.

Based upon this information, the OTF chair asked the NanTroSEIZE Project Management Team (PMT) to discuss the effects of this loss of thirty days to the scheduled NanTroSEIZE FY09 operations and re-prioritize operations as necessary. Once OTF had the PMT recommendations, they could examine and discuss these recommendations and determine the most appropriate IODP operations for Chikyu for this upcoming period of operations.

The NanTroSEIZE Project Management Team (PMT) discussed the effects of this loss of thirty days and examined the priority of operations. The PMT discussed numerous options. In the end, for scientific and logistical reasons, they agreed that it was best to keep as much of the previously scheduled operations in place as possible, including the riser and riserless observatory preparations and at least one input site. In sum, the PMT recommended to keep the Subduction Input expedition intact (~40 days duration) and reduce the Riser/Riserless observatory expedition to 110 days (from 140 days). The major change would be a shallower Total Depth (TD) for the riser observatory (NT2-11).

Below are specific recommendations by the PMT:

Expedition 319:

- Riser Observatory Site- NT2-11

The PMT proposed a change in the TD at site NT2-11 from 2200 mbsf to 1600 mbsf. This change basically means stopping after the 13 3/8" casing set point and suspending the well (deleting the 9 5/8" casing drilling completely). Drilling, LWD logging, downhole measurements, wireline logging, and short intervals of coring (~60-100 m of core) are all still planned, as is standard cuttings analyses. The new TD will still penetrate entirely through the basin fill sediments and reach the accretionary prism sediments, which was a main goal at this site. See **APPENDIX E** for details regarding the PMT rationale for this change in TD.

- Riserless Observatory Site- NT2-01J

Operations for this portion of the expedition (casing operations for a riserless observatory to be installed at a future date) were preserved as previously planned.

-Expedition Logistics

The current plan is for Expedition 319 to extend from ~May 10 through August 31 without any port call, but that is provisional and subject to change. Site contingencies will continue to be refined through the pre-expedition meeting. The Expedition length will be about 110 days.

- Chief Scientists and Staffing Plan

The first ~25 days of Expedition 319 will be taken up by top-hole drilling and setting of the conductor casing and 20-inch casing. The PMT recommended that these operations be done without a standard on-board scientific party. The Chief Project Scientists (Kinoshita/Tobin) would act as on-board scientific representatives during this portion of the expedition. The remainder of the expedition (~90 days) would be carried out with four co-Chiefs and two scientific parties, on a staggered rotation. CDEX agreed that, for national balance, 1 JP, 2 US, and 1 EU co-chief is appropriate. This is a reduction from the previously planned six co-chief model.

The PMT and CDEX also agreed to a staffing model for the science party that includes two groups serving approximately ~45 day stints, with a crossover staggered by several days to insure continuity.

Long-term objectives for NT2-11:
Right now, the PMT consensus is to complete the 1600 mbsf penetration at the riser site. If a reason arises to consider deepening it for the observatory at a future stage, that would only be considered by the PMT after the results of this drilling stage are in hand. The working hypothesis is that this new TD (1600 mbsf) will be deep enough for the NT2-11 observatory plans. That hypothesis would be evaluated after the operations are completed. Additional drilling operations at NT2-11 (if deemed necessary) would obviously need to be prioritized by the PMT against all other NanTroSEIZE and by OTF for both NanTroSEIZE and non-NanTroSEIZE *Chikyu* operations.

Expedition 322
No substantial change to the original expedition plan is foreseen. Mike Underwood and Sanny Saito are still the Co-Chief Scientists. The expedition is ~40 days in duration, which is enough time to complete operations at NT1-07. Contingencies have been developed and agreed upon. A port call is tentatively scheduled between 319 and 322.

OTF Recommendations for *Chikyu* FY2009 Operations:
Given the schedule changes resulting from the shipyard repair work, the fast approaching time for the start of operations, the need to finalize an FY09 APP (FY09 was already underway during this discussion) and the retention of the main science objectives for NanTroSEIZE, the OTF chair put forth a recommendation to the Task Force members that OTF accept these PMT-developed operational plans for *Chikyu* FY09 operations.

Based upon input from OTF members, there was a consensus to move forward with the operations proposed by the PMT. Specifically, the operations consist of the following two expeditions:

---Riser/Riserless Observatory-1
May - August, 2009 Length ~110 days
---Subduction Inputs
Sept – early October 2009 Length ~40 days

IODP-MI incorporated this operational plan into the FY2009 Annual Program Plan and notified SAS panel chairs.

2.3 MSP operations

No major changes have occurred to the MSP operational plan for FY2009. Contractual discussions regarding the drilling and platform contract for New Jersey are making progress (albeit slowly). The Onshore Science Party for New Jersey has been provisionally set for 6 November 2009.

3.0 Summary Schedules

Figure OTF-5 shown below summarizes the current OTF approved schedule that was included in the final FY2009 Annual Program Plan.

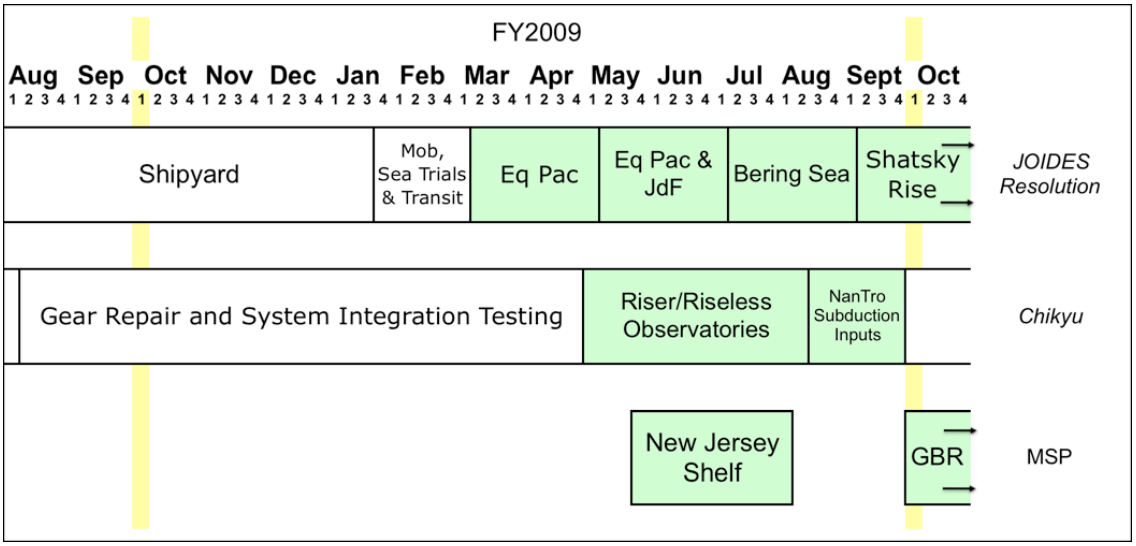


Figure OTF-5 *The OTF recommended schedule that was forwarded to IODP-MI for inclusion in the FY2009 IODP Annual Program Plan. Note that the Canterbury and Wilkes Land expeditions (directly following Shatsky Rise) are approved for the first two expeditions in FY10. Other FY2010 expeditions will be determined once formal budget guidance is provided by the Lead Agencies Exact start/stop times for MSP operations are still subject to final tender negotiations.*

Appendix A - Letter from Bob Gagosian re: *JOIDES RESOLUTION*

15 September 2008

SODV Update – Revised Schedule -- A letter from Ocean Leadership

A number of important activities have occurred recently concerning the Integrated Ocean Drilling Program. This message is intended to bring you up to date. Last week the leadership of the US Implementing Organization (USIO) and the SODV Conversion Management Team (CMT) for the U.S. drilling vessel met to evaluate progress toward delivery of the ship and assess efforts to reduce costs to maximize service delivery on the JOIDES Resolution (JR) for the four planned expeditions in FY 09.

As you know from previous communications, the target date for the JR's departure from Singapore has been October 11. Sailing on this date would have allowed for transit to Wellington, NZ to begin the Canterbury Basin expedition as scheduled. During this transit, a robust readiness assessment and testing of science systems had been planned. Throughout the conversion, both the USIO leadership and the CMT have been closely monitoring progress toward completion of the ship, keeping an anxious eye on key milestones and the progress of terminating over 60,000 electrical connections from over 230 km of new cable that has been installed on the ship. At this time, the vessel refit is about 95% complete. A month ago our assessment was that delivery of the ship by October 11 was possible even though all schedule contingency had been consumed. On August 28, the shipyard and ship owner concluded that the ship was not ready for a key milestone scheduled for last week; the inclining test. This conclusion, along with continued under performance of the shipyard in completing electrical terminations, indicated that further delay in delivery had become inevitable.

The CMT evaluated the potential impact of many complications in delivering the ship. Among these, the team evaluated slow progress on electrical terminations by the shipyard, and the potential difficulties they faced in adding additional personnel to the ship conversion. The team also considered the potential for unforeseen delays such as those that might arise from improper electrical terminations, problems discovered during initial sea trials, possible time consuming adjustments to major systems after sea trials, and potential conflicts with both the USIO and the shipyard personnel needing access to the same spaces as final tasks are completed.

With a clearer, though not guaranteed, picture of the end game, the CMT was encouraged to target a return to service that could be met with a high degree of confidence, even in light of the foreseen and unforeseen problems that might unfold. With this conservative perspective, the USIO has indicated that the ship will sail from Singapore by the end of January 2009.

The implications of this date are being evaluated now, but a likely outcome is that the Canterbury Basin and Wilkes Land expeditions will not occur as scheduled. Information concerning the ships schedule will be forthcoming from the Operations Task Force of IODP-MI.

We recognize that a significant adjustment to the ship's schedule less than two months from the anticipated return to service causes a number of complications for many in the science community, not to mention widespread disappointment. We understand that the schedules of expedition participants – their commitments to family, colleagues and the institutions for which they work - must be planned well in advance and are not easily changed on short notice. It is with such complexities in mind that the January delivery date was derived.

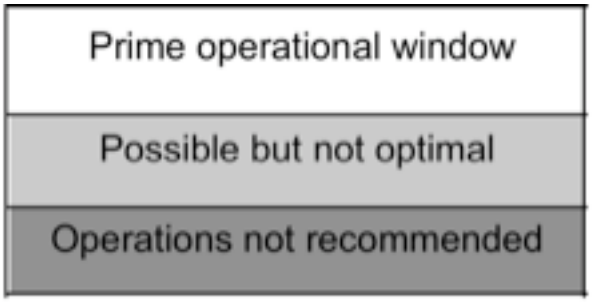
Though recent events are very disappointing to all of us, we remain focused on the outcome – a vastly improved drilling ship that meets the community's needs for scientific ocean drilling today and well into the future. We shall keep you informed as events unfold.

Bob Gagosian

APPENDIX B: Environmental Constraints for OTF programs.

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Weather Comments
PACIFIC OCEAN												
						Asian Monsoon						June-Oct is Typhoon season; Peak typhoon prob is 30-40% Aug-Sept.
								Bering Sea				Summer window; Fog can be a problem during summer months.
		Canterbury										All primary sites have shallow water drilling limitations (<1 m and <2 m heave)
Costa Rica Mud Mounds												Hurricanes don't normally threaten (3 in last 50 years)
Costa Rica Seismogenesis Project												Hurricanes don't normally threaten (3 in last 50 years)
								Juan de Fuca				Highest probability for fog is June through Sept (10-16%).
						Mariana						Highest prob for trop cyclones is summer-early fall (23-32%). July is start of peak season
					Okinawa							The Kuroshio Current is a constant in this region; Typhoons June-Oct (not high % but avoid)
Pacific Equatorial Age Transect												
						Shatsky Rise Origin						Typhoon season May through Dec.; peak Aug.-Oct., Frequency low; Leg 198 Aug-Oct
	S. Pacific Gyre											SPG-1 and SPG-2: Cyclone prob 5-8% (Jan through March), 1-5% (Dec & April). SPG-11, 12, 10 and -9: Down time likely with high waves throughout year. Cyclones rare. Bergs and fog possible at southern sites. Freak waves possible in winter.
								S. Alaska				Ship icing (Oct-May). Fog GT/=10% Feb. Freak waves.
Superfast Spreading Crust												Visibility is usually excellent year round.
			Wilkes Land									Sea Ice is the major issue; sea ice clears in mid to late January and returns late February to mid-March
ATLANTIC OCEAN												
MO							Mediterranean Outflow					
							Mid Atlantic Microbio					Hurricane season from June to Nov.
								Newfoundland				Hurricanes infrequent-later summer early fall.

Appendix B: *Matrix showing the environmental operational risk associated with each proposal at OTF. Information on wave heights, typhoons, hurricanes, currents, visibility, ice, etc were used to constrain the weather window. The type of proposed operations was also factored in to the summary matrix (e.g., CORK installation is much less tolerant than shallow penetration coring). Matrix color key is shown below.*



Appendix C: OTF Scheduling Protocols

1) Period(s) of Operation. Primarily dependent on available commercial work

2) Area(s) of Operation: Dependent heavily on location of commercial work. In addition, SPC has a consensus item on the table for a preference for Pacific operations in FY10, if logistically possible.

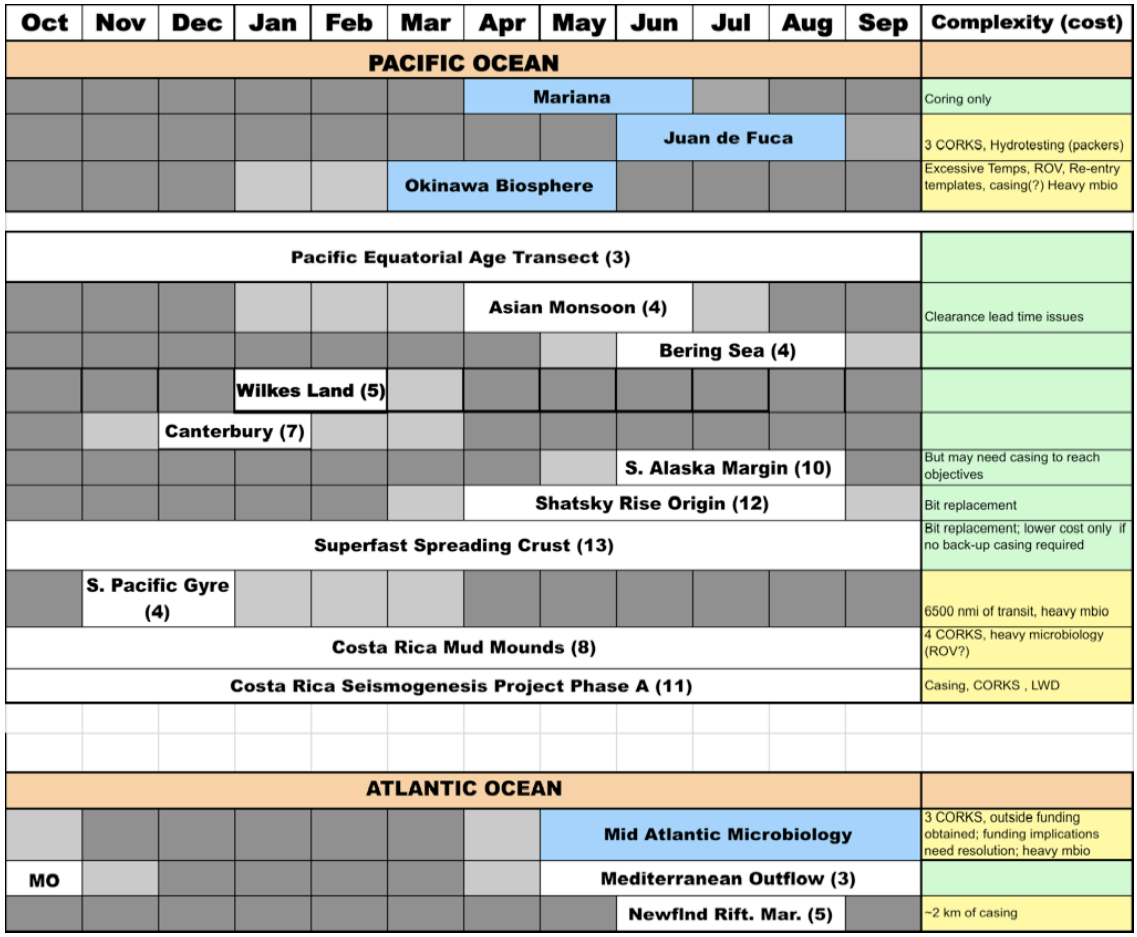
3) Weather Window(s): If in a poor weather window (as defined by Protocol 1), some operations will be eliminated immediately even if they are Tier 1 programs, in an optimal transit path, cost efficient, etc. The risk of significant downtime is simply too great for some operations in certain time frames.

4) Tier 1 Designation: If the 8-month IODP block (as defined in protocol 1) contains Tier 1 programs in appropriate locations and good weather windows (as defined in Protocols 2 and 3), OTF should develop options that maximize the completion of these operations.

5) Tier 2 Ranking Order: Within the 8-month window, insert Tier 2 programs according to viability with Tier 1 operational areas. If two Tier 2 operations are equally viable and compete for the same time block, then global ranking order should be utilized. Clearly, there are issues with respect to utilizing global rankings as programs at OTF come from many SPC ranking sessions. But they probably can be utilized as first-order guides.

6) Cost: Cost is obviously an important factor. The Lead Agencies have already indicated that FY2010 funding levels will be similar to that of FY2009. Thus operations with significant extra costs (CORK infrastructure, ROV usage, significant casing needs, etc) may not be implementable if we try to conduct four expeditions in FY2010.

Appendix D: Prioritized matrix of operational windows for OTF programs



Environmental risk matrix determined as described in Appendix B but prioritized with additional information regarding (1) proposal Tier status (2) Tier 2 Ranking order from SPC global ranking session – in parentheses and (3) costs. Key below. Note that Tier 1 proposal ranking is not included as it is expected that these programs remain at OTF until they are implemented.

COLOR KEY
Low cost
High-cost implications
Tier 1 Prime operational Window
Tier 2 Prime operational Window
Possible but not optimal
Operations not recommended

Appendix E: PMT rationale for shallower total depth at NT2-11.

NT2-11 Site for Expedition 319

Harold Tobin and Masa Kinoshita
(for the NanTroSEIZE PMT members)
Nov 13, 2008

1600 mbsf TD option and justification

The figure below shows the NT2-11 site, with the EPSP-approved 3.5 km maximum total depth. The principal objective of drilling at this site is to provide access to the subsurface to install a borehole observatory system in the hanging wall of the seismogenic plate boundary fault system.

Once EPSP approval was in hand, the PMT actually recommended drilling to a "maximum" planned depth of 2500 mbsf at our June 2008 PMT meeting. The justification for this depth was that it represents a compromise between drilling deeply to get to sufficiently indurated rock to permit high-quality strainmeter and seismometer coupling, on the one hand, and a reasonable drilling duration and likelihood of success on the other. Additionally, available casing for FY09 limited it to 2500 mbsf.

The observatory team recognized from the outset that the differences in induration over the interval from ~1500 mbsf to 2500 mbsf might be incremental (or in fact might even degrade with depth). Hence, the PMT agreed that it might be possible to decide to shorten the TD target at a later date. In fact, the PMT noted specifically that the interval around 1600 mbsf (3700 m total on the figure) was a package with weak internal reflectivity, and might represent a homogeneous, little-fractured fine-grained mudstone interval analogous to one drilled at Site C0002, and that this could in fact be a superior location for strainmeter/seismometer installation, relative to deeper targets with reflectivity more suggestive of sandy turbiditic interbeds.

Subsequently, at the observatory planning meeting in August, it was determined that even if the borehole were cased to 2500 mbsf, the projected temperature-depth profile (see figure) meant that any broadband seismometer installation would need to be done at ~1600 mbsf or shallower to protect the sensitive electronics from thermal stress, at least given presently available technology.

The net outcome of all these considerations is that the 1600 mbsf TD now planned for NT2-11 operations on Expedition 319 requires no substantial de-scoping of the major objectives – we simply plan to install the observatory components somewhat shallower than originally planned – but still within the depth range that was considered and approved by the PMT in June. We do lose the ability to collect samples and logs from the deeper interval of landward-dipping reflectors between ~1700 and 2500 mbsf, but no specific target intervals have been identified in this zone. All the justifications for Site NT2-11 provided to the OTF in June, 2008 still hold under this reduced depth target. The potential risk is that the formation will prove to be too soft and compliant for the instrument packages. The logging, VSP, and other downhole data we collect will address

this question. Should it be unsuitable, then the PMT will have to evaluate whether deepening to the originally-planned TD in a future stage would be advantageous.

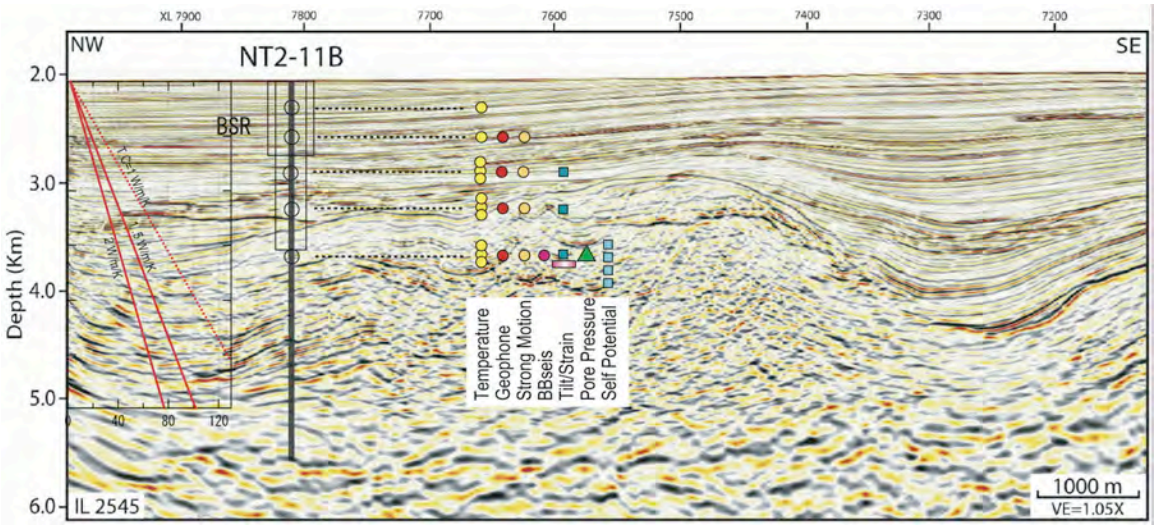


Figure: The NT2-11B site on Inline 2545, the EPSP-approved 3.5 km maximum penetration (solid line), and a casing plan that includes the 20" casing to 700 mbsf and the 13 3/8" casing to 1600 mbsf. Planned observatory elements are shown schematically. Inset shows the projected temperature profile at this location, based on regional studies and the C0002 heat flow data. Final observatory installation (in a later year) would include a ~100 meter rat-hole drilled out just below the cased interval for parts of the instrument package and access to formation pore pressure.