IODP-MI Operations Task Force

British Geological Survey
Edinburgh, Scotland
June 29-30, 2005

Operations Task Force members (for June 2005 meeting)

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Keir Becker	Rosenstiel School of Marine & Atmospheric Science, U of Miami, USA
Mike Coffin	Ocean Research Institute, University of Tokyo, Japan
Dan Evans	ECORD Science Operator (ESO), British Geol Survey, UK
Jun Fukotomi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
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Shin'ichi Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Hans Christian	Larsen IODP Management International, Inc., Sapporo, Japan
Frank Rack	JOI Alliance, Joint Oceanographic Institutions, Inc., USA
Mary Reagan	JOI Alliance, Lamont Doherty Earth Observatory, USA
Alister Skinner	ECORD Science Operator (ESO), British Geol Survey, UK

Observers/liaisons

Earl Doyle	Consultant (SSP)
Nobu Eguchi	IODP Management International, Inc., Sapporo, Japan
Susan Humphris	Woods Hole Oceanographic Institution, USA (SPPOC liaison)
Barry Katz	Energy Technology Company, ChevronTexaco, USA (EPSP liaison)
Kenji Kimura	Ministry of Education, Culture, Sports, Science, and Technology, Japan
Catherine Mevel	ECORD Management Agency, Institut de Physique du Globe de Paris, France
Barry Zelt	IODP Management International, Inc., Sapporo, Japan

Operations Task Force (OTF) Meeting Report

1) Welcome, Introductions, and Review of meeting agenda

The meeting was called to order by the chair at 09:00 on June 29, 2005. Dan Evans, meeting host, welcomed all attendees, reviewed the meeting logistics and presented a safety briefing on how to evacuate the building. Following this logistics and safety briefing, self introductions were made by all attendees. The chair then provided a short overview of the agenda for the next two days.

2) Funding agency updates

Short updates on the status of facilities (vessels) were given by the MEXT and EMA representatives. The non-riser drilling vessel (replacement for the *JOIDES Resolution*) is expected to be available in last quarter of FY07 (Jul-Sept, 2007) while international IODP operations for the Chikyu are expected to start in September 2007.

MSP operations for the Tahiti expedition were delayed as the expected ship contractor for the drilling platform pulled out of the bidding process. ESO and SeaCore are pursuing other platform options and are still planning to finish Tahiti ship-based operations by end of November. Catherine Mevel told the Operations Task Force (OTF) that since the Tahiti expedition is more expensive than first thought, ECORD has agreed to move POC funds earmarked for FY06 into FY05 to help defray expenses. This will not leave enough funds (POCs) to implement New Jersey in FY06. ECORD is working on getting additional funds for FY06 (New Jersey).

3) FY05/06 Operator issues

JOI Alliance (USIO)

Jack Baldauf updated the OTF on several USIO issues including the removal of Monterey Bay Observatory expedition from the schedule and the subsequent revisions to operations resulting from this change. Baldauf also noted that the Cascadia prospectus was being amended and being resubmitted for Canadian clearance. The request by Expedition 301 proponents (via Andy Fisher) for additional cementing operations at Expedition 301 boreholes during or at the end of the Cascadia expedition is still being evaluated by the USIO. Initial estimates by the USIO indicate that the cementing program is more complex than previously thought and would take more time than the 1-2 days suggested by the Expedition 301 proponents. The USIO will update the OTF within a few weeks as to the likelihood of this cementing operation.

Finally, Baldauf informed the OTF about potential gas hydrate work with India, China, and others following the end of Phase I operations. This work may impact demobilization.

CDEX

Jun Fukutomi and Shin'ichi Kuramoto updated the OTF on the status of *Chikyu* operations. *Chikyu* is scheduled for delivery to JAMSTEC on July 29th, 2005. Shakedown and training cruises will begin with acceptance tests and inspections from Aug 2005-May 2006, full crew training from June 2006- August

2006 and drilling exercises at Shimokita (riserless and riser) from September 2006-August 2007. International operations will begin in September 2007

The CDEX representatives told the OTF that the 3-D site survey for NanTroSEIZE will occur in ~Feb-March 2006. Negotiations are currently underway with potential 3-D seismic contractors.

ESO

Tahiti Operations

Ali Skinner updated the Operations Task Force on issues associated with Tahiti science, operations and outreach.

ESO held discussions with local officials from a range of departments aided by the local office of The French Institute for Research and Development. This has resulted in receipt of all necessary permissions to drill the planned sites. It remains for the vessel to get clearance from France to undertake scientific research in French waters. This must be carried out by the flag nation state of the selected vessel.

Ship tenders were issued Jan 2005; opened 5 March 2005. Three ships offered; one of which was not fully tender-compliant but within budget. Visits to the non-compliant ship were cancelled four times for various reasons by ship contractor. A preferred contractor was nominated on 20 May after additional funds were brought forward by ECORD Council to allow negotiation with a tender-compliant vessel. However, the ship manager took on another contract for ROV opportunities in the North Sea. ESO/SeaCore are conducting further investigations for the vessels (other previously tender compliant vessels not available in preferred operational window).

Outreach for the high visibility Tahiti operation includes brochures in English, German, French, and Japanese; film operations with French and German organizations, local events on Tahiti and a press conference in Paris after the expedition.

New Jersey Operations

A gas hazard analysis was conducted and a report distributed to EPSP (EPSP will do its final review at its December meeting). ESO will start clearance procedures and put a notice in the European Journal to alert contractors.

ECORD is seeking additional funding for POCs to cover the 90-day program. The Lead Agencies will make a response in November. SOCs in the FY06 Annual Program Plan have been approved by SPPOC/BoG. ESO is looking at LWD as a way to examine hole stability issues and save money on casing. It was noted by OTF members that a proposal for holes off Martha's Vineyard has been sent by SSEPs for external review. If this program is ultimately forwarded to SPC (and highly ranked) it could be combined with New Jersey for a savings on mob/demob costs.

Efficient use of MSPs

The current method for developing MSP operations is inefficient and expensive in this buoyant market.

Considerable savings can be gained by conducting back-to-back expeditions and taking advantages of opportunities when ships are in a proposal region. However, this approach requires a larger pool of 'ready' MSP expeditions at OTF.

ACTION ITEM: CHAIR---- to ask SPPOC/SPC look at other ways of ranking to ensure there are sufficient MSP projects at OTF.

4) Scheduling FY07/08 Operations

USIO Operations

Assessment Procedures

The following proposals were evaluated by the USIO and presented to the Operations Task Force for discussion and possible scheduling:

Proposal	**Proposal version or information used for assessment**
477 Okhotsk/Bering	(Full 4 – 1 Oct 03)
482 Wilkes	(Full 3 – 1 Oct 03)
545 Juan de Fuca	(Full 3 +1 Apr 03/letter)
553 Cascadia	(Full 2/Add 3 – 17 Aug 03)
589 GOM	(Full 3 – 1 Apr 02)
595 Indus	(Add 3 - 28 Dec 04)
600 Canterbury	(Full – 16 Sep 03)
603A/B NanTroSEIZE	(per scoping group)
621 Monterey Bay	(prospectus)
626 Equatorial Pacific	(Full 2 – 1 Apr 04)

Additionally, several of the proposals were examined in a modified format including:

477 Okhotsk/Bering	(combined + separate)
545 Juan de Fuca	(w/o ex301 + cementing)
553 Cascadia	(w/o ex311)
589 GOM	(w/o ex308)
603A/B NanTroSEIZE	(per scoping group)
621 Monterey Bay	(w/o APL/2nd hydro-hole)

For each proposal, the USIO presented the same assessment criteria (see below) in order for the OTF to easily compare and evaluate the relative strengths/weaknesses of each proposal. This assessment criteria also provides IODP-MI and the SAS with a reliable marker when assessing science and operational

accomplishments from the time the initial proposal is submitted to SAS for assessment and ranking, to OTF scheduling, to IO implementation, to the actual recovered record and subsequent scientific manuscripts.

USIO evaluation criteria included the following:

- Science objectives.
- Operational strategy –Primary/alternate sites (based on proposal or modifications described above)
- Operational risks
- Environmental constraints
- Limitations/assessment
- Special considerations
- Expedition costs*

*Expedition costs are considered confidential for the purposes of this public report and are not presented in this report.

The details of each proposal assessment are presented in the tables below.

477 -- Bering and Okhotsk

Science Objectives	To assess the history and dynamics of: • The global conveyer belt, and water column structure • Climate and surface ocean conditions since the earliest Pliocene • The origin and intensity of North Pacific intermediate water and possibly deeper water mass formation • Continental glaciation, river discharges and sea-ice formation and linkages • Ocean/climate processes that occur in the more sensitive marginal sea environment • Ocean/climate of the Bering Strait gateway region and the effect on North Pacific and global conditions		
Operational Strategy	Bering Sea	Primary Sites	APC to refusal (200 mbsf) SHR-3A and UMK – 4B APC/XCB to 700 mbsf w/ std. logs GAT-3A, GAT-4A, BOW-12A, BOW- 14A
		Alternate Sites	APC to refusal (200 mbsf) SHR-1A and UMK – 3A
	Sea of Okhostk	Primary Sites	APC to refusal (200 mbsf) ARS-1A, COP-2C, KAM-2A, PGR-1A, SAK-2A, KST-1A APC/XCB to 700 mbsf w/ std. logs ARS-2A
		Alternate Sites	APC to refusal (200 mbsf) COP-2B APC/XCB to 700 mbsf w/ std. logs ARS-3A, ARS-4A
Time estimate	On site 62 days (54/8) Transit 23 days (10/13) Port 5 days Estimated Total 90 days		
Operational Risks	None		
Environmental Constraints	Weather window (summer), Ice, ice-bergs, typhoons		
Limitations/Assumptions	Poor quality navigation, accuracy of site locations		
Special Considerations	Weather Observer Russian Clearance Emergency Evacuation		

482 -- Wilkes Land

Science Objectives	Long term record of Antarctic glaciation and its relationship between paleoclimate and paleoceanography • Obtain the nature and timing of the Cenozoic onset of grounded ice • Obtain high-resolution late Neogene-Quaternary glacial/interglacial record • Assess the main controls on sediment transport in the Antarctic environment • Constrain the timing and nature of changes in glacial and paleoceanography	
Operational Strategy	Primary Sites	WLSHE-7A Timing of glacial onset APC/RCB + LWD to 510m, Std. Log, WST WLRIS -1A High resolution record of glacial events /paleoceanography APC/XCB/RCB to 1000m, Std. Log, WST WLRIS-2A High resolution record of glacial events /paleoceanography APC/XCB/RCB to 1000m, Std. Log, WST
Time Estimate	On site (coring/logging) Transit (port/sites) Port Estimated Total	39 days (34/5) 14 days (13/1) 5 days 58 days
Operational Risks	• Hole stability • Core recovery	
Environmental Constraints	• Limited weather window (February) • Ice, ice-bergs • Shallow water (600 m)	
Limitations/Assumptions	• Availability of LWD tools (not included)	
Special Considerations	• Weather/ice observer, • Antarctic treaty • Emergency evacuation strategy, • Marine mammals (WST)	

545 -- Juan de Fuca

<table>
<tr><td>Science Objectives</td><td colspan="2">• Evaluate along-strike versus across-strike fluid flow with multi-year cross-hole testing
• Determine geophysical, hydrogeologic significance of seismic acoustic anomalies
• Quantify physical, chemical, biological state of upper oceanic crust
• Evaluate nature of “sediment-sealed” hydrothermal circulation
• Long-term chemical sampling for natural recovery and variability, microbiological incubation/sampling at depth</td></tr>
<tr><td>Operational Strategy</td><td colspan="2">Network of four boreholes - 1026B, 1027C, SR-1, SR-2
Replaced 1026B Cork, Added U1301A/B ACORKs
1027C CORK not replaced
Seal effectiveness uncertain for U1301B

Penetration of 600 m of permeable basement
Penetrated 108 and 320 mbsf

Conduct single-hole and cross-hole experiments
Packer experiments completed in U1301 A/B
Hydrogeologic, microbiological, geochemical, and seismic experiments at a range of spatial and temporal scales
Note: 3 CORKS-II to be installed</td></tr>
<tr><td></td><td>Hole 1027C</td><td>Remove CORK, deepen hole from 635 to 675 mbsf, log, install CORK-II w/ osmo Sampler/thermistor string</td></tr>
<tr><td></td><td>Holes 1301A/B</td><td>Reenter Hole 1301B and cement cone</td></tr>
<tr><td></td><td>SR-2A/-2B</td><td>RCB to t.d., install reentry cone, casing, VSP, logging, CORK-IIs, OsmoSamplers</td></tr>
<tr><td>Time Estimate</td><td colspan="2">On site 60 days (55/5)
Transit 3 days (2/1)
Port 5 days
Estimated Total 68 days</td></tr>
<tr><td>Operational Risks</td><td colspan="2">• Hole Stability</td></tr>
<tr><td>Environmental Constraints</td><td colspan="2">• Weather window (summer)</td></tr>
<tr><td>Limitations/Assumptions</td><td colspan="2">• CORK-II designs
• Microbiology requirements</td></tr>
<tr><td>Special Considerations</td><td colspan="2">• Canadian clearance required
• Sailing ACORK Engineer
• Cementing Plan
• Marine Mammals (VSP)</td></tr>
</table>

553 – Cascadia

Science Objectives	• Test gas hydrate formation models and constrain model parameters • Determine the origin and mode of formation for the hydrate gases • Determine the source of the fluids carrying the gases sequestered in the gas hydrates • Complete microbiology/molecular biology experiments to help determine over what depth range biogenic methane is produced, • Determine what microbes are associated with the gas hydrates, which microbes directly take up methane, which microbes are responsible for other anaerobic processes within the gas hydrate environment • Determine whether any groups of microbes associated with anaerobic methane oxidation can be cultured in the lab
Operational Strategy	Drill to 200 – 600 mbsf (hole dependent), VSP, Deploy temp. sensor CAS-01B, -2C, -3b, -5D, -6A APC/XCB to 500 – 600 mbsf (hole dependent), APCT, DVTPP, MWD CAS-4B, -7A PCS, CORKs CAS-01B (2), -7A *Note: 2 ACORKS to be installed*
Time Estimate	On site 67 days (55/5) Transit 3 days (2/1) Port 5 days Estimated Total 75 days
Operational Risks	• Hydrates, H2S • Hole Stability
Environmental Constraints	• Weather window (summer)
Limitations/Assumptions	• ACORK design not well defined • Cross hole testing not well defined • Microbiology undefined
Special Considerations	• Canadian clearance required • Sailing ACORK Engineer • Marine Mammals (VSP) • Modular Formation Dynamics tester (MDT) – formation pressure and in situ fluid sampler, larger diameter pipe • Reconcile with Expedition 311 adjustments

589 -- Gulf of Mexico

Science Objectives	Drill End Members: • Normally Pressured (Brazos Trinity) • Reference section • Characterize Core, Pressure, Stress, Logs Consolidation, Petrophysical Response • Overpressured (Ursa) • Characterize spatial variation in rock properties, temperature, pressure, chemistry • Characterize Pressure/Stress in overpressure • Test Flow-Focusing Model • CORKs for long term monitoring	
Operational Strategy	Expedition 308 (modified proposal)	• Brazos Trinity Sites and uppermost 300-600 m section of URSA site (above Blue sand interval) • Complete 85% of the science Establish reference properties Test of flow focus model by mapping spatial variations Determine in-situ slope stability Establish stratigraphic model for turbidite systems • Not achieved on Exp 308 In-situ pressure in the Blue Unit Pressure monitoring in the Blue Unit Long term monitoring of pressure in the Blue Unit
	Follow-up Strategy (remaining objectives after Exp 308)	• Penetrate the Blue zone at 3 sites in the URSA Basin • Install 2 ACORK
Time Estimate	On site Transit Port Estimated Total	27 days (55/5) 2 days (2/1) 5 days 34 days
Operational Risks	• Shallow water flow • Gas (?)	
Environmental Constraints	• Weather window • Loop currents	
Limitations/Assumptions	• ACORK design not well defined • Need to define platform and operational strategy for penetration into the Blue Unit prior to scheduling	
Special Considerations	• URS-2B block will be developed by Shell • URS locations in vicinity of MARS platform and cables and pipelines	

595 -- Indus Fan

Science Objectives	Document age, source and volume of sediments in the Indus Fan to better constrain: • Rates of deposition and exhumation, and sediment provenance through time (age & source) • Evolution of India-Asia collision and Himalayan and Tibetan topography (age & source; volume would be helpful) • Relation of Himalayan and Tibetan topography to regional and global climate change (age, source & volume) Understanding the relation between Himalayan and Tibetan topography and climate change • Constrain timing of monsoon initiation and intensification • Determine whether the monsoon increases or decreases Himalayan erosion?
Operational Strategy	Riserless element consists of five holes at site MU-1B • Triple APC/XCB to 350 mbsf • Drill/RCB w/MBR to 700 mbsf, log • Set reentry cone, RCB to 1535 mbsf, log
Time Estimate	On site 27 days (55/5) Transit 2 days (2/1) Port 5 days Estimated Total 41 days
Operational Risks	• Hole Stability
Environmental Constraints	• Weather window (non-summer)
Limitations/Assumptions	• None
Special Considerations	• Clearance Pakistan • Core ownership

600 -- Canterbury Basin

Science Objectives	Sea-level history in a siliciclastic setting • Rates of tectonic subsidence and uplift • Sediment supply, Isostasy, and Compaction Subsidence histories and estimation of eustatic amplitudes • Regional distribution of the Marshall Paraconformity and investigate its origin • Constrain the early erosion history of the Southern Alps by dating the progradational units, to determine sedimentation rates, and linking sediments to onshore source areas
Operational Strategy	APC/XCB to 500 mbsf • All sites RCB 500 – t.d. • CB-01A – 650 mbsf • CB-02A – 730 mbsf • CB-03A – 1200 mbsf • CB-04A – 1825 mbsf • CB-05A – 1765 mbsf Log w/ triple combo, FMS – Sonic, VSP • All sites
Time Estimate	On site 57 days (46/11) Transit 3 days (2/1) Port 5 days Estimated Total 65 days
Operational Risks	• Shallow Water Guidelines (82, 103, 123, 337, 383 m) • Core recovery (sands) • Currents (28-80 cm/s) • Shallow gas
Environmental Constraints	• Weather window (minimum wave heights – Jan-Feb)
Limitations/Assumptions	• Hazard survey completed? • MSP may be required for shallowest sites
Special Considerations	• New Zealand Clearance • Marine Mammals (VSP)

603 – NanTroSEIZE

Science Objectives		
Operational Strategy	NT1-01	• APC/XCB/RCB to 470 m +100 m basement (2 holes), Logs, VSP, packer tests • LWD to 570 mbsf
	NT1-06 *(alternate for NT1-02; now preferred)*	• APC/XCB/RCB to 990 m +100 m basement (2 holes), Logs, VSP, packer tests • LWD to 1090 mbsf
	NT1-03	• APC/XCB to 550 mbsf, APCT, DVTPP, logs, VSP, packer tests • LWD to 550 mbsf
	NTS-01	• APC/XCB/RCB to 1000 mbsf (2 holes), APCT, DVTPP, Logs, VSP, packer tests • LWD to 1000 mbsf
	NT2-04	• APC/XCB/RCB to 1300 mbsf (2 holes),APCT, DVTPP, VSP, logs, packer tests • LWD to 1300 mbsf
Time Estimate	On site Transit Port Estimated Total	79 days (67/12) 3 days (2/1) 5 days 87 days
Operational Risks	• Upper basement hole conditions for LWD	
Environmental Constraints	• Weather window (minimum wave heights – Jan-Feb) • Currents (5nmi/hr)	
Limitations/Assumptions	• CORK specifics need to be defined (not included) • CHDT and DST not defined • Single bit holes may not achieve targets	
Special Considerations	• None	

621 -- Monterey Bay

Science Objectives	Engineering only	
Operational Strategy	MBTS-03A	• APC/XCB to 350 mbsf, APC, DVTP, PCS, Std. logs • Install casing and low-profile reentry structure, screens and umbilical • LWD to 350 mbsf
	MBTS-05A	• APC/XCB to 350 mbsf, APC, DVTP, PCS, Std. logs • Install casing and low-profile reentry structure • LWD to 350 mbsf
Time Estimate	On site Transit Port Estimated Total	30 days (25/5) 6 days (5/1) 5 days 41 days
Operational Risks	• None	
Environmental Constraints	• Weather window (summer/early autumn)	
Limitations/Assumptions	• CORK specifics need to be defined • Program may be modified to include Slim CORK (APL-not included)	
Special Considerations	• Clearance (Marine Sanctuary) • Borehole liability • Environmental Impact Statement	

626 -- Equatorial Pacific

Science Objectives	• Resolve crucial questions concerning
	  o paleo-productivity
	  o astronomical calibration of the geological time scale for the Cenozoic
	  o temperature and nutrient profiles and gradients
	  o changes of the CCD
	• Obtain the best carbonate preserved record in the Pacific from the Eocene to Miocene
	• Investigate how where and when paleo-productivty changed
	• Integrate seismic and sediments to develop a basin scale model of oceanic circulation
	• Uses age slice approach on paleo-equator to obtain shallow burial

Operational Strategy	All 8 sites – PEAT-1B to -8B • Triple APC w/ XCB to basement (<355 mbsf) • Logging w/ triple combo and FMS Sonics • APCT measurements
Time Estimate	On site 61 days (53/8) Transit 20 days (14/6) Port 5 days Estimated Total 86 days
Operational Risks	• None
Environmental Constraints	• None

Limitations/Assumptions	• Two site survey proposals
	  o NERC Survey approved
	  o NSF survey pending

Special Considerations	• 5 m APC cores near chert layers • New sites to be selected following site survey results

Summary of Proposal Assessment for Riserless Operations

Clearance Issues:

Bering Sea	**Russia/**USA
Canterbury	New Zealand
Cascadia	USA
Equatorial Pacific	None
GOM	USA/**Lease Blocks**
Indus	**Pakistan**
Juan de Fuca	Canada
Monterey	USA, **Marine Sanctuary**
NanTroSEIZE	Japan
Sea Of Okhotsk	**Russia**
Wilkes	Antarctic Treaty

BOLD = Clearance issues

Shallow Water

0-75 m

- Operations will not be conducted

76-300 m **(Canterbury)**

- Coring will be terminated if
  - Heave comp stroke exceeds 1.0 m
  - Wind > 35 kts or roll >3 degrees
  - Deteriorating weather, sea state
  - Floating ice present

301-650 m **(Canterbury, Wilkes)**

- Coring will be terminated if
  - Heave comp stroke exceeds 2.0 m
  - Wind > 50 kts or roll >5 degrees
  - Deteriorating weather, sea state
  - Floating ice present

651+

- No restrictions

Environmental Constraints

- Ice - **Bering Sea, Wilkes**
- Hurricanes/typhoons - **GoM, NanTroSEIZE, Okhotsk**
- Monsoons - **Indus**
- Currents - **GoM, NanTroSEiZE**
- Hydrocarbons – **O&B Sea, GoM, Indus**
- Weather Windows – **All** except Equatorial Pacific.

Weather Windows

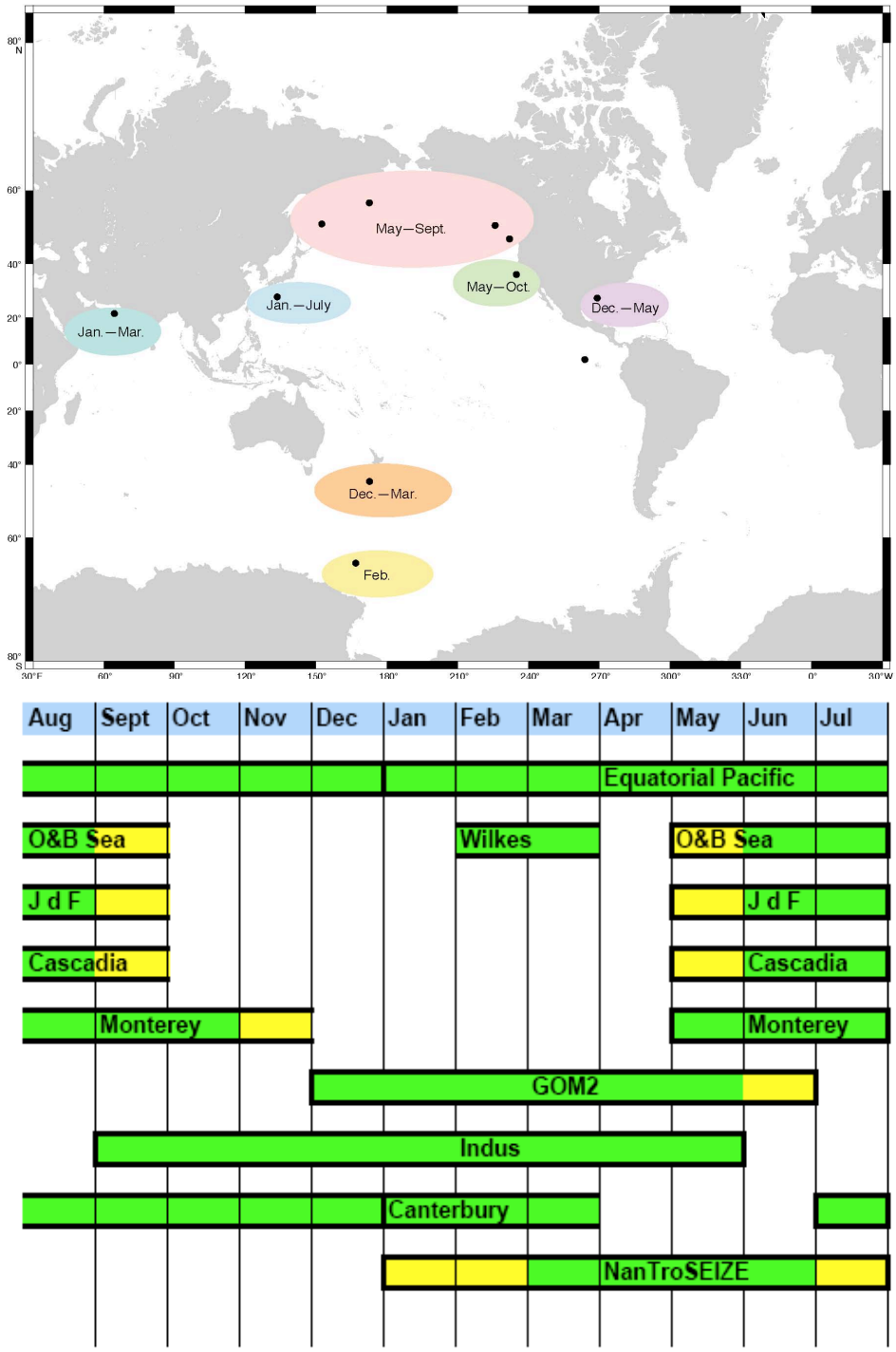

Figure 1: *Weather windows associated with the riserless operations considered for scheduling by the Operations Task Force.*

Estimated Days (w/o Transit)

Below are the estimated days of transit between programs for the riserless operations under consideration by the OTF.

477 Okhotsk/Bering	(80 days/46 days)
482 Wilkes	(45)
545 Juan de Fuca	(66)
553 Cascadia	(73)
589 GOM	(32)
595 Indus	(39)
600 Canterbury	(63)
603A/B NanTroSEIZE	(85)
621 Monterey Bay	(41)
626 Equatorial Pacific	(72)

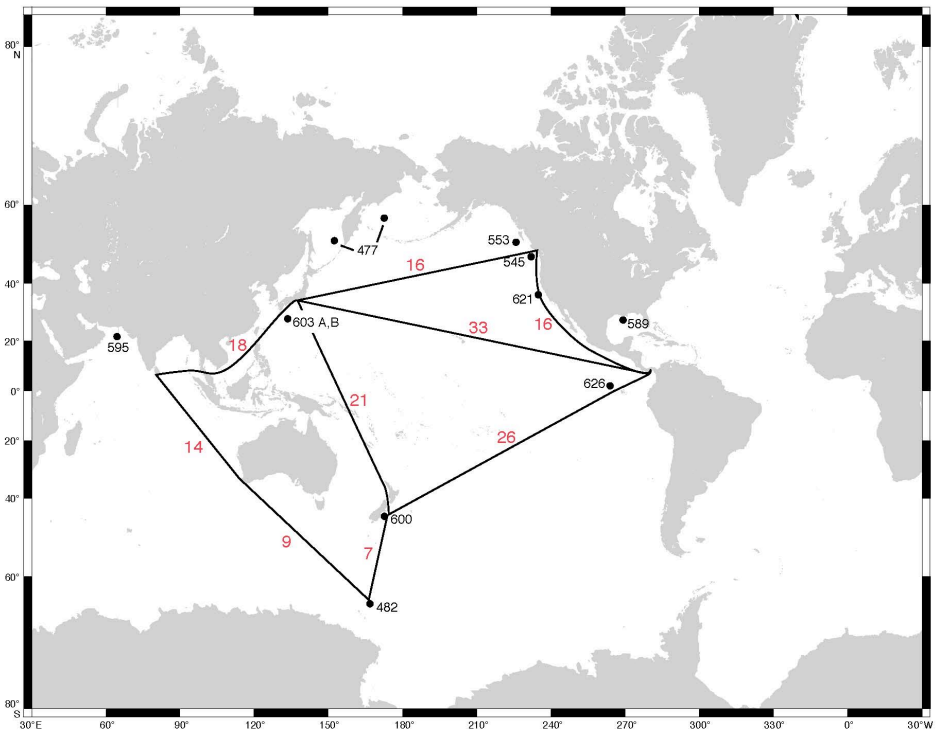

Figure 2: *Estimated transits and port calls based upon probable transit scenarios for riserless operations under consideration by the OTF.*

Scheduling Options for Riserless Drilling

The USIO presented several scenarios for availability of the new riserless vessel

- **Feb 2008:** A shakedown cruise would begin around Oct 2007 (beginning of FY08). Following this shakedown cruise(s), the vessel would become available for international operations
- **Oct 2007**: If no shakedown necessary or not utilized, the vessel would be available around the start of FY08.
- **Late spring 2007**: If full funding and conversion not possible, then vessel could be out of the yard much earlier, perhaps as early as mid FY07

Thus three models were developed by the Operations Task Force for the start of riserless vessel operations:

- Mid FY07
- FY07/FY08 boundary
- February 2008 (~mid FY08)

The following points were considered by the OTF in addition to the potential starting times:

- Try to schedule a simple first expedition for the new riserless drilling vessel
- Determine whether there should be a commitment to the Southern Ocean
- Determine whether there should be a commitment to Indus/Murray Ridge given the transit time involved
- All proposals residing with OTF are of equal "rank", i.e., priority
- Utilize shakedown cruise to move ship to initial operating location
- Some NanTroSEIZE riserless operations can be conducted by riser and/or riserless vessels

Combining the different times for the onset of operations, the additional considerations mentioned directly above and the environmental constraints, transits, and operations described in the previous sections, an initial set of proposed operations were presented to OTF members for discussion and refinement (**Figure 3 below**). Weather windows are a major constraint for all proposals in consideration except the Equatorial Pacific.

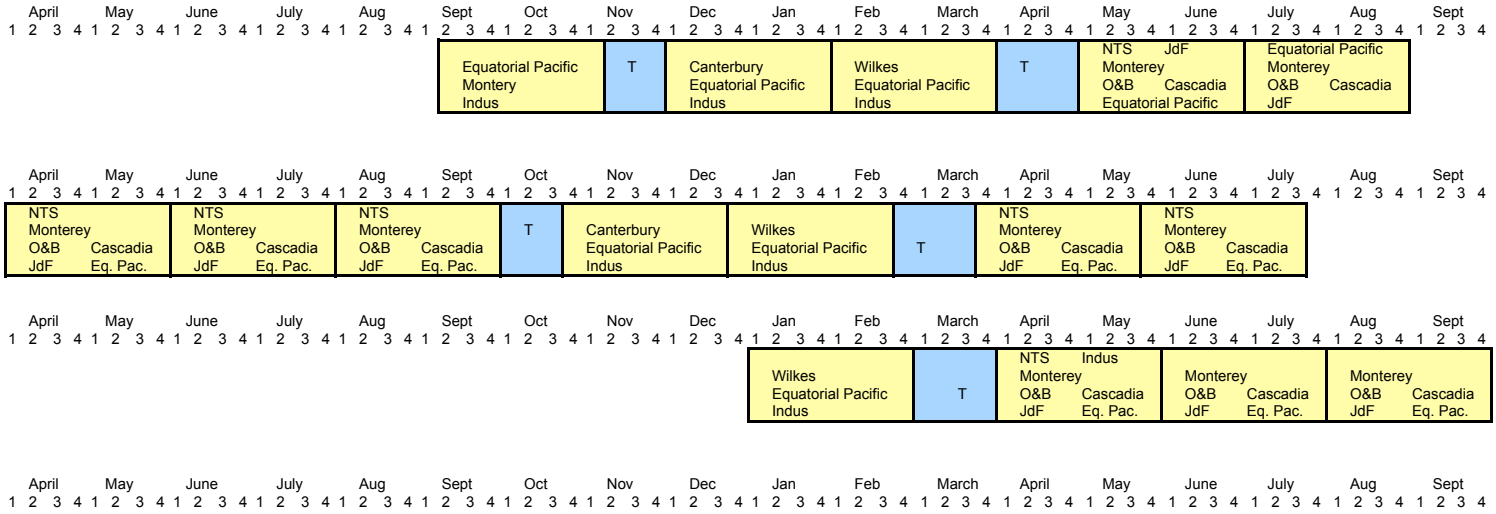

Figure 3: *Initial scheduling scenarios for riserless operations.*

Each of the expedition "blocks" of time in **Figure 3** contains multiple expeditions and refers to the expeditions that could possibly be implemented during that time frame. Also, "Indus" refers to only Murray Ridge (as recommended by SPC).

The initial discussion by the OTF members involved the "Southern Ocean" vs. "non-Southern Ocean" option. The commitment towards one of these two options quickly narrows down the possible scheduling scenarios for any of the three starting points. As this is a major science decision that will drive most of the scheduling process, the OTF members decided to present SPC with both options for each starting time frame.

The Bering Sea/ Sea of Okotsk expeditions were not presented for implementation during this meeting. Just prior to the OTF meeting, the Environmental Protection and Safety Panel met in Edinburgh and discussed the status of this proposal. The panel deferred a decision on many of the proposed sites because of concerns about navigation and true position of sites. EPSP summarized *"The dataset presented was, in general, not satisfactory for a meaningful safety assessment by the panel. It was noted, however, that significant new data will not become available in the foreseeable future (i.e., the necessary site survey programs have not been proposed or scheduled). As noted in the summary above* ***many of the sites could not be approved as proposed nor could they be relocated by EPSP with the available data****. It was suggested that seismic data could be acquired prior to drilling by the drillship for the necessary safety assessment and that a real-time evaluation would need to be made".*

Based upon this lack of information and no EPSP approval for of many of the high priority sites, the OTF did not feel it could put the Bering Sea/ Sea of Okotsk expeditions into any of the developed options.

"Southern Ocean" options

All the Southern Ocean options have significant transit. The OTF recognized this issue and suggested that some of the transit could be utilized for shakedown operations (although not an ideal situation while going to the high southern latitudes). However, if the two Southern Ocean expeditions are going to be conducted in the near future (i.e., 2-3 years), significant transit is the only option as there are no other expeditions nearby.

Below are OTF options developed from the initial set of options set forth in Figure 3. They are presented graphically in Figure 4 (below).

Timeline starting in September FY07:

Equatorial Pacific or Indus (Murray Ridge)
Canterbury
Wilkes
Monterey
Juan de Fuca

This scenario (Models 1a, 1b in Figure 4) has relatively "simple" expeditions to start if Equatorial. Pacific or Indus (Murray Ridge) proposals are selected to begin operations. These two expeditions are problematic, however, as initial expeditions. The Equatorial Pacific Transect still needs a site survey to locate drill sites.

If this site survey does not occur soon the expedition IO would not have sufficient lead time to properly plan this expedition. The Indus (Murray Ridge) expedition may require significant transit (depending on mobilization shipyard). The OTF felt that Monterey was too complex to start new riserless operations. The OTF needs to get more information from the Equatorial Pacific site survey proponents before further recommending Equatorial Pacific or Indus (Murray Ridge) and thus both are left as options at this point.

Canterbury and Wilkes would be the next two operations in this scenario. Following these two Southern Ocean Expeditions, the OTF referred to the SPPOC's consensus that deemed Monterey as a high priority expedition that needed to be implemented as soon as possible. There was some discussion of implementing this expedition as an MSP operation but the OTF decided keep this as a riserless (USIO) operation (SEE MSP scheduling BELOW for more details). Implementation of Monterey by the USIO in the time slot proposed here would allow sufficient time for clearances and long-term operational planning. The OTF included the remaining Juan de Fuca operations at the end of this scenario as it felt the need to follow through with a programmatic commitment to finish the operations started on Expedition 301.

Timeline starting in April FY07:

NanTroSEIZE, Equatorial Pacific (alt: *Superfast*, Deep Biosphere)
Juan de Fuca
Canterbury
Wilkes
Monterey
Cascadia

This scenario is problematic if started in April in that (as described above) the Equatorial Pacific may not be ready in time to implement this early and NanTroSEIZE, Juan de Fuca and Wilkes are not in good weather windows. However, moving the start of operations to June/July 2007 puts many of the proposed operations into better weather windows (see Models 5a, 5b in Figure 4 below). The lead off expedition would still be Equatorial Pacific (if ready) or NanTroSEIZE. However, NanTroSEIZE is still not in an ideal window. This scenario depends heavily on Equatorial Pacific being viable this early. An additional scenario is to place additional Superfast operations or Deep Biosphere (if SPC forwards it in March 06 to OTF) at the beginning of mid-year FY07 operations. This latter option is not presented in Figure 4 below but could be considered after the March 06 SPC ranking meeting.

Compared to the September 2007 scenario, Cascadia is a new addition. As with Juan de Fuca, the OTF felt that it is important to commit program resources to finishing these operations.

Timeline starting in FY08:

Wilkes
Canterbury (partial)
Equatorial Pacific
Juan de Fuca
Monterey

If operations start in FY08 (See Model 3 in Figure 4 below), it would require Wilkes to be the leadoff expedition. This is not an ideal starting expedition because of the remote location and the significant transit penalty associated with the operations (however, the latter is true for all Southern Ocean options). Canterbury operations are also hampered by a poor weather window but this, in part, could be ameliorated by conducting some of the shallower Canterbury sites with a later MSP operation. Transit/weather considerations place Equatorial Pacific operations next in the order of operations, followed by commitments to finish Juan de Fuca and Monterey (the latter, though, not being in an ideal weather window).

"Non-Southern Ocean" options:

Timeline starting in September FY07:

Monterey (or Indus)
Equatorial Pacific
NanTroSIEZE
Juan de Fuca
Cascadia (light)
Monterey (if Indus first)

The above options (Model 2 in Figure 4 below) address many of the high-priority options for the program as identified by SPPOC (e.g., Monterey) and finish several high priority proposals (Juan de Fuca, Cascadia) that the program has started. However, Juan de Fuca is not in an optimal weather window and Cascadia may not be a full expedition (depending on operations finished on previous Cascadia operations). Monterey is a complex operation and it would be best not to start new riserless operations with this expedition. It would be possible to start with Indus (Murray Ridge) and put Monterey at the end.

For timeline starting in mid FY07:

The OTF could not develop feasible non-Southern Ocean scenarios for this time frame as not enough expeditions were available because of weather windows (or lack thereof).

For timeline starting in FY08:

Equatorial Pacific or Indus
NanTroSEIZE
Juan de Fuca
Monterey

This scheduling scenario (Models 4a, 4b in Figure 4 below) begins with relatively simple operations (Equatorial Pacific or Indus) recognizing the same caveats previously discussed with these two operations (e.g., lack of site surveys for the Equatorial Pacific and long initial transit for Indus). The NanTroSEIZE riserless operations address high priority science and fill a prime weather window (If this scenario is chosen, the NanTroSEIZE project scoping group would need to better define operations designated for the USIO and those for CDEX). Juan de Fuca finishes an operational commitment to that program and the scheduling of Monterey addresses the concerns of the community about the need to establish observatory test sites. All operations are in prime weather windows in this scenario.

Figure 4 (below) shows in graphical form the scheduling scenarios developed by the Operations Tasks force for both the Southern Ocean and Non-Southern ocean options.

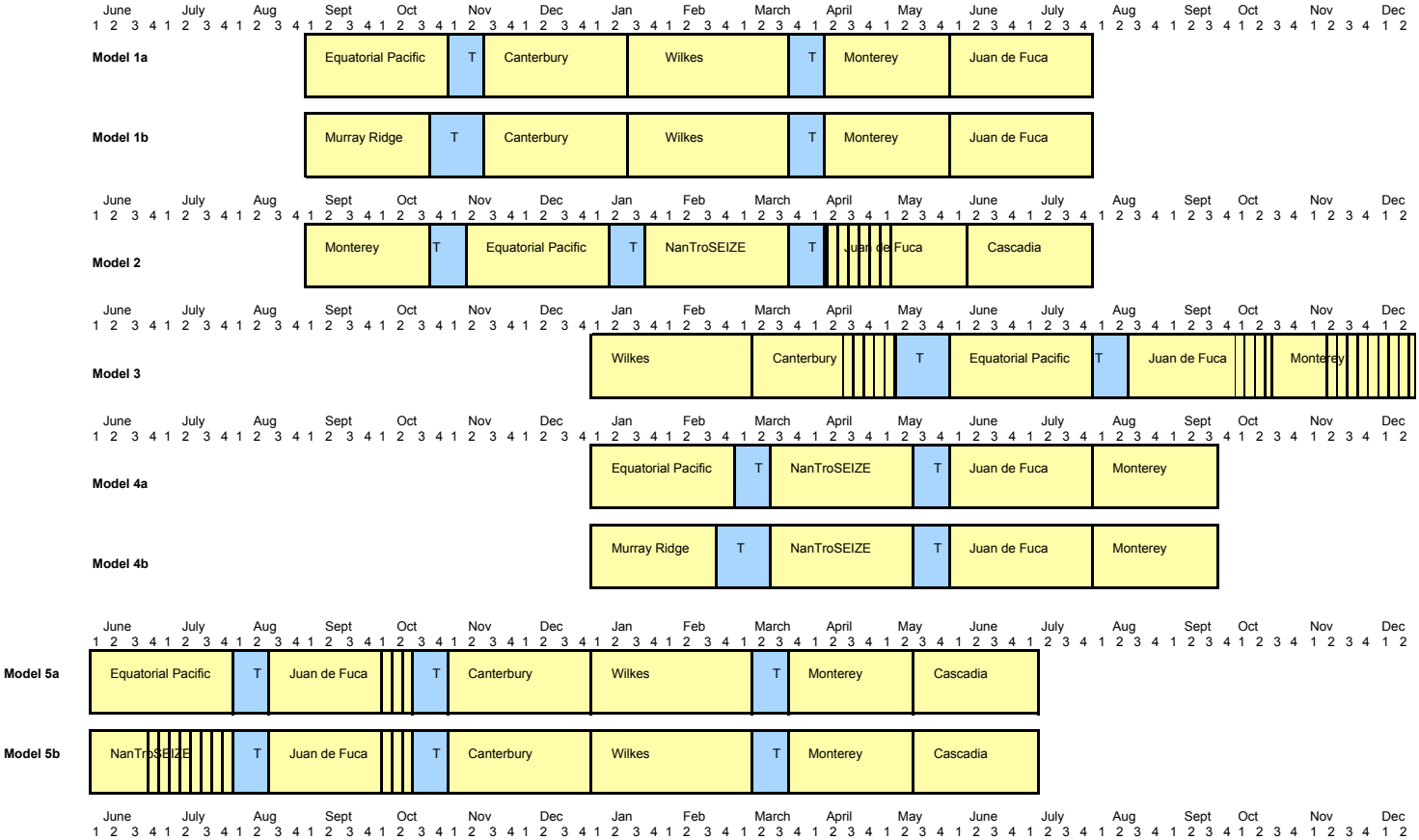

Figure 4: *Southern Ocean and Non-Southern ocean options developed by the Operations Task force for three different possible starting scenarios for riserless operations*

Notes to Figure 4:

a) Availability of the riserless vessel will be finalized early next year. Given this, adjustments to the start date of weeks to months may eliminate specific models, or require significant modification to proposed models.
b) Operational requirements need to be finalized for the following programs; Monterey, Juan de Fuca, Cascadia, and NanTroSEIZE. The estimated operating days will be adjusted once these requirements are finalized.
c) Costing of the models will be completed once the operational requirements for Monterey, Juan de Fuca, Cascadia, and NanTroSEIZE are finalized.
d) Permitting for Monterey will need to commence this summer
e) A hazard assessment will need to commence for Murray Ridge this summer.
f) Clearance/permission will need to commence for Murray Ridge this Autumn
g) A site survey is required for the equatorial Pacific program to determine specific site locations. It is unclear when this cruise will be completed. This could jeopardize the equatorial Pacific program, if scheduled early.

h) It is critical that the vessel operations occur in the Wilkes region during February. All models containing this program will be adjusted to target this weather window.

Model 1a

1. ~33 transit days and ~239 operating days (includes on site and between site transits).
2. A site survey for the equatorial Pacific is required.
3. The operational requirements for Monterey and Juan de Fuca need to be finalized

Model 1b

1. ~40 transit days and ~232 operating days (includes on site and between site transits).
2. A hazard assessment is required for the Murray Ridge program.
3. The proposed Murray Ridge site is located both in a lease block and in the territorial waters of Pakistan. The clearance process will take significant time, but should not commence until a firm commitment is made to implement this program.
4. The operational requirements for Monterey and Juan de Fuca need to be finalized

Model 2

1. ~43 transit days and ~235 operating days (includes on site and between site transits).
2. The operational requirements for Monterey, NanTroSEIZE, Juan de Fuca, and Cascadia need to be finalized.
3. A site survey for the equatorial Pacific is required.
4. Juan de Fuca is an operationally complex expedition. Multiple CORK installations, packer testing, VSP logging, and remedial cementing operations (previously not undertaken) are all planned. As such, we need to err more on the conservative side with regards to weather and sea state. June through August are by far the best months to be operating in that area. May and September are marginal. Operations should not be attempted prior to May.
5. Monterey is a moderately complex program. It is preferable to start with more simple operations.

Model 3

1. ~32 transit days (not including in the estimate is the transit to Wellington) and ~239 operating days (includes on site and between site transits).
2. Canterbury Basin is not a complex expedition; however, the sites are located in shallow water ranging from 82-383 meters. It is predominantly an APC/XCB expedition, however, there is some deep RCB coring (target 1825 mbsf). The shallow water operations could be jeopardized by erratic winds and freak waves which rise to the moderate frequency April through October. Tidal effects are moderate throughout the year and this too can cause problems with shallow water operations. Wind velocities and wave heights rise to the moderate level April through June. Shallow water operations should be avoided during the months of April through October.
3. Juan de Fuca is an operationally complex expedition. Multiple CORK installations, packer testing, VSP logging, and remedial cementing operations (previously not undertaken) are all planned. As such, we need to err more on the conservative side with regards to weather and sea state. June through August are by far the best months to be operating in that area. May and September are marginal. Operations should not be attempted after September.
4. Monterey is another complex operation again calling for reentry cone/casing systems installed in shallow water. The reentry cones are specially designed "trawl proof" structures that have never been deployed before by ODP/IODP. Operations within the marine sanctuary also call for operational discretion. In December there is a moderate chance for freak waves which would not bode well if they occurred during a sensitive time in the operation. The best months for this operation are July, August, and September by far with June and October marginal but acceptable. November and December should be avoided.
5. The operational requirements for Monterey and Juan de Fuca need to be finalized.

Model 4a - ~33 transit days and ~190 operating days (includes on site and between site transits).

1. A site survey for the equatorial Pacific is required.
2. The operational requirements for Monterey, NanTroSEIZE, and Juan de Fuca need to be finalized

Model 4b - ~36 transit days and ~183 operating days (includes on site and between site transits).

1. The operational requirements for Monterey, NanTroSEIZE, and Juan de Fuca need to be finalized
2. A hazard assessment is required for the Murray Ridge.
3. The proposed Murray Ridge site is located both in a lease block and in the territorial waters of Pakistan. The clearance process will take significant time, but should not commence until a firm commitment is made to implement this program.

Model 5a

1. ~45 transit days and ~284 operating days (includes on site and between site transits).
2. Juan de Fuca is an operationally complex expedition. Multiple CORK installations, packer testing, VSP logging, and remedial cementing operations (previously not undertaken) are all planned. As such, we need to err more on the conservative side with regards to weather and sea state. June through August are by far the best months to be operating in that area. May and September are marginal. Operations should not be attempted after September.
3. A site survey for the equatorial Pacific is required.
4. The operational requirements for Monterey, Cascadia and Juan de Fuca need to be finalized

Model 5b

1. ~45 transit days and ~296 operating days (includes on site and between site transits).
2. Typhoons can occur in the Nankai area from May through December. The risk increases significantly in late June and July, for the remainder of the summer. As such, the NanTroSEIZE program occurs during the wrong weather window.
3. The operational requirements for Monterey, NanTroSEIZE, Cascadia and Juan de Fuca need to be finalized

Chikyu Operations for FY07/FY08

The OTF heard from CDEX representatives about the status of *Chikyu* operations. The vessel is being delivered to JAMSTEC at the end of July 2005 and is scheduled to begin international IODP operations in September of 2007. CDEX representatives described training riser and riserless training operations for the Chikyu over the next two years (Shimokita).

The OTF consensus is for FY07/08 *Chikyu* operations to begin with the NanTroSEIZE "Stage1" riserless scenario set forth by the NanTroSEIZE Project Scoping Group (see appendices-*NOTE to OTF members—appendices will consist of agenda book plus pertinent ppt presentations…these appendices will appear in the final version of the report*). These "Stage 1" sites are all riserless drilling efforts and require a relative minimum of "special" operations beyond coring, logging, and casing to maintain stable hole conditions in thick sand.

CDEX (and the USIO) will work with the NanTroSEIZE Project Scoping Group in August to determine a more definitive schedule of operations. This schedule of operations will be available for SPC to consider prior to its fall meeting. The Project Scoping Group will also suggest scenarios to divide up operations between CDEX and the USIO should SPC approve a scheduling scenario for the USIO that has NanTroSEIZE operations.

Mission Specific Operations for FY07/08

The OTF evaluated the operations currently residing with the Task Force and determined the following to be potential MSP operations for FY07:

New Jersey
Great Barrier Reef
Monterey
Canterbury

New Jersey is currently scheduled for FY06 operations. If it does not occur in FY06 it would be the prime candidate for FY07 MSP operations.

The Great Barrier Reef (part of the South Pacific Sea Level proposal) suffers from a lack of site survey data and unknown permitting issues. Without site survey data and the beginning of subsequent permitting/clearance processes it is impossible to move forward with the program at this time.

Action Item*: The OTF chair to contact Great Barrier Reef proponents to determine status of site survey*

The Canterbury program is a potential MSP operation. However, ESO considers the *JOIDES Resolution* (or its replacement) to be the ideal platform for this operation. Depending on the riserless scenario chosen by SPC (e.g., Model 3 in Figure 4), there could be some portions of Canterbury that would not be drilled by the USIO due to weather constraints and these could possibly be addressed by an MSP program.

Given the high priority that the community has placed on establishing an observatory test site, the OTF discussed the possibility of conducting Monterey as an MSP operation in order to get it started more quickly. After much discussion of the issues the OTF determined that (1) the timing of funding and tendering for operations relative to the time needed for environmental clearances is not compatible with the ECORD/MSP funding process and (2) relations between the USIO and the Monterey Bay Marine Sanctuary are very good at this time and restarting the process with an MSP operator (with an unknown vessel) could be detrimental to the permitting process. Thus the OTF felt that this operation is best conducted by the USIO if it is to proceed in a timely manner.

Given the lack of MSP operations at this point the OTF did not put forward an MSP operation for FY07 (unless New Jersey is delayed). The OTF will await the March 2006 SPC rankings to determine if viable MSP are ranked and sent to the Task Force and then evaluate FY07 MSP operations again at that time.

5) Other Business

What does SPPOC want to know?

SPPOC approves the Annual Program Plan each year and it has not been clear to this point what information that panel needs to fully evaluate the science and operational program. Thus, the OTF Chair asked the SPPOC observer for input on this issue. A number of suggestions were given, including

List of proposals sitting at OTF for scheduling and how each fits into the Initial Science Plan.

- The process by which the schedule was developed, the reasons for inclusion or exclusion of proposals from the scheduling considerations, and the rationale for the schedule being put forward.
- A clear statement from SPC that they have reviewed the schedule and believe that what has been scheduled either meets, or goes a way to meeting, the scientific objectives of the proposal.
- Include abstracts of the proposals under consideration in the Agenda Book so there is no need for discussion of the science of each proposal.

Action Item: *The OTF chair will work with SPPOC and SPC to insure that the appropriate level of information is provided to both panels so that they have enough information to make informed decisions.*

What does OTF need to know to perform its tasks?

The OTF Chair asked OTF members for questions and suggestions. A recommendation was made for each IO to provide similar breadth and depth of information on parameters relevant to the OTF recommendation and decision-making processes. As the OTF, in some cases, must choose among various platforms for specific holes and expeditions, full knowledge of relevant parameters is essential for the OTF to conduct its business.

Action Item: *The OTF chair will work with the IOs to insure that the appropriate level of information is provided to the OTF so that it has enough information to make informed decisions.*

6) Next meeting date and location

The OTF will generally meet three times a year. The main scheduling meeting will be in the May-June timeframe each year. Additional short (1/2 day) OTF meetings will be held the day before each SPC meeting to deal with specific/timely issues for which SPC may need input or wish to comment on. Thus the next meeting will be on Oct 23rd in Kyoto, Japan, one day before the start of the SPC meeting.