

**JOIDES TECTONICS PANEL
FALL 1996 MEETING
Sultan Quaboos University, Oman,
19-21st October, 1996
Executive Summary**

Attendees:

TECP Members: Juichiro Ashi: Uni. Tokyo, Ulrich Bleil: Uni. Bremen, Kevin Brown: Scripps Institution, Tim Byrne: Uni. Connecticut, Steve Hurst: Duke Uni., Garry Karner: Lamont Doherty, Juan Lorenzo: Louisiana State Uni., Alain Mauffret: Villefrance-sur-Mer, Dieter Mueller: Uni. Sydney, Alastair Robertson: Uni. Edinburgh, Jacob Skogseid: Uni. Oslo, Joann Stock: CalTech

Liasons: Tom Shipley: PCOM, Carl Richter: TAMU, Phillipe Pezard: WLS, Dave Falvey: JOI

Host: Samir Hanna

1. Ranking of proposals

Rank	Proposal	points	Stdv
1	447 Woodlark	2.67	1.87
2	431 WPac Seism	2.75	1.76
3	451 Tonga	3.42	1.68
4	450 Taiwan	3.64	2.25
5	445 Nankai	5.27	2.61
6	472 Izu	6.17	1.80
7	457 Kerguelen	6.33	2.19
8	DCS	7.67	2.50
9	485 Aus-Ant Gateway	7.92	2.23
10	441 SW Pac Gateway	9.08	1.56
11	79 Somali	10.08	1.24

2. Recommendations

After discussion TECP adopted the following recommendations. Further details of the number of the issues are given in the minutes below.

2.1. Janus "structure" initiative

TECP recommends to PCOM that PCOM recommends to JOI Inc. direct ODP/TAMU to ensure that the integration of structural (and related sedimentary) data is fully completed within JANUS phase II, or equivalent.

Note: TECP believes that it is essential that PCOM and JOI allocate the resources to complete the image-based core description portion of the JANUS project in the most timely and efficient manner, with completion in a year as the goal.

The sedimentary, hard rock, and structural geology community is agreed upon the type of core description software and hardware needed for shipboard description. We desperately await the implementation of the system that will make the job of the majority of shipboard scientists easier

and more efficient. It will greatly improve the description, archiving, and distribution of core description data, and deserves the highest priority, bar none.

2.2. Proposed engineering legs

2.2.1 Deep hole

TECP recommends to PCOM that PCOM recommends to JOI Inc. direct ODP/TAMU to exclude Somali Basin as a candidate for a deep hole, as it has no scientific merit. Alternate of scientific interest to TECP are Nankai upslope site and Woodlark basin.

Notes:

TECP believes ODP/TAMU engineers are being overly conservative in seeking to drill a simple, stable, passive margin setting such as Somali Basin. This environment is not an effective test of high priority drilling sites over the next few years. Other sites are well characterized and fulfill realistic needs for future deep drilling. These include

- a. Nankai; upslope site in sediments at 2-3 km water depth in seismically well imaged area where active faults could be avoided. This site could serve as a future reference hole for seismogenic related drilling (OD 21 priority).
- b. Woodlark; deep hole at 2-3 km water depth in rift basin sediments, a priority for present Woodlark proposal but not included owing to time constraints. Well imaged: a realistic drilling test.

Other possibilities could include Iberia Margin (S' reflector), Venezuela basin, Angola basin.

2.2.2. DCS

While supporting the concept of a DCS engineering leg, TECP believes that alternate to 735B may well fit the science drilling plan better, i.e., Bonin Ridge and Vanuatu.

Notes: TECP recognizes 735B has merits but JR may leave this area previously. TECP recognizes the drill site should be very well characterized and therefore suggests the following alternates in previously drilled areas.

- a. Bonin Ridge Site 809; Data include good seismics and swath mapping (former engineering test site).
- b. Vanuatu Leg 134 Oba basin flank near previously drilled sites includes volcanics and volcanoclastics (good weather avoiding site clearances).

3. Interim Panel planning membership

TECP members selected for corporate memory and scientific balance:

Kevin Brown, Garry Karner, Dietmar Mueller, An Yin

Alternate: Alain Mauffret

4. Drilling plan

TECP proposes the following drilling plan for next 3 or more year that gels high thematic objectives with PCOMs theme objectives, as follows:

4.1. Deformation partitioning within the lithosphere due to extension

- active low angle, e.g., Woodlark
- conjugate margins, e.g., Newfoundland/Iberia, Great Australia Bight/Antarctic, NE Atlantic (volcanic rifted margins), Gulf of Aden
- Transforms, e.g., Tasman fracture zone, Vema/Romanche

- Ocean crust, e.g., W Atlantic, Angola basin, Angola abyssal plain

4.2. Deformation partitioning, fluid flow, and exhumation during lithosphere convergence

- deformation and fluid flow, e.g., Nankai, Barbados, Cascadia, Costa Rica
- Collisional processes, e.g., Taiwan, Timor, E Mediterranean
- arc evolution, e.g., Tonga, Okinawa trough, S China Sea
- fluid flow/mass balance, e.g., Izu-Mariana, Costa Rica
- Tectonic erosion, e.g., Peru-Chile, Tonga, Japan Trench

4.3. Earthquake mechanisms

- monitoring seismicity using global seismic network and downhole geophysical observatories, e.g., west Pacific seismic network and related downhole measurements

5. Program planning groups

TECP proposes the following program planning groups, aimed to progress new initiatives:

- downhole measurements and observatories
- conjugate margins
- seismogenic segmentation (convergent margins)

6. Thanks

Alastair Robertson concluded the meeting by thanking all TECP members for their wonderful input and commitments to the panel's activities. On behalf of the panel members, Garry Karner expressed their gratitude to Alastair Robertson for his work as a very effective TECP chairman and his contribution in directing the meetings and organizing and executing related field trips.

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Liaisons: Tom Shipley: PCOM, Carl Richter: TAMU, Phillippe Pezard: WLS, Dave Falvey: JOI

Host: Samir Hanna

1. Introduction

Alastair Robertson began by welcoming the panel to this, the last TECP meeting, as presently constituted. On behalf of TECP he thanked profusely Dr. Samir Hanna for all his assistance with organizing the meeting and related activities at Sultan Quaboos University, and with helping to lead the very successful field excursion.

2. Minutes

The prior minutes were endorsed without further discussion.

It was noted that the agenda was very full largely owing to the very large number of new and revised tectonics related drilling proposals and letters of intend.

3. Liaison reports

3.1. JOI

Dave Falvey outlined the organizational changes at ODP that would soon be introduced. TECP and LITHP would essentially be combined within a new panel, with a Science Committee above and a limited number of short life planning groups below. U.S. members of the Science Committee would no longer be drawn exclusively from JOI Institutions. The new cycle of planning meetings would facilitate operations. The overall objective is to make the program more accountable and responsive to the funding agencies through the ODP counsel. During a brief discussion it was noted that the revised panel structure did not differ greatly from that suggested by TECP at its spring meeting. The changes were largely driven by the funding agencies; the present 4 panel structure was not necessarily flawed, but needed streamlining to be more accountable.

3.2. PCOM

Tom Shipley (PCOM) expanded on the reorganization. Accountability was a prerequisite for requests for greatly increased expenditure (i.e., OD21) in the new Science Committee. Detailed planning groups would be multidisciplinary, specific, short-lived and few in number to cut costs. Mail reviews would play an important role. An interim panel would meet once in the new year to select mature proposals for mail review. TECP was asked to select 4 members to form this committee.

TECP should clearly state its priorities in the form of an outline drilling plan for the next 3 years. In the discussion concern was expressed that tectonic-related science should be well represented in the new panel structure, considering the strong and growing grass roots interest in tectonics drilling.

Concern was expressed that the mail review system be carefully set up and returns sensibly interpreted.

A rogue review could potentially destroy an excellent drilling program resulting from years of work and major expenditure.

3.3.LITHP report

Alastair Robertson, in the absence of LITHP liaison Jian Lin, who was at sea, presented the LITHP ranking of proposals. LITHP had ranked DCS engineering leg ahead of all normal proposals. They had ranked ION to include Seismic networks in the W Pacific and 90 deg E Ridge. The latter was therefore added to the prospectus.

3.4. TAMU report

3.4.1. ODP REORGANIZATION

The ODP Director, Jeff Fox, has initiated organizational changes in order to address budgetary constraints of a continuing flat budget, and accommodate JOI-mandated project management of legs and other activities. The changes should furthermore streamline ODP activities, eliminate redundancies, and improve services to the community.

3.4.2. ODP/TAMU BUDGET

ODP has responded to the EXCOM/JOI request to present for FY97 a bare-bone base budget, along with special operation expense items (SOEs), as approved by BCOM/PCOM.

FY95	\$36,494,984	(Total)
FY96	\$37,717,503	(Total)
FY97	\$34,832,449	(Base)
	\$ 2,823,223	(SOE)
	\$37,655,672	(Total)

FY97 budgeted SOEs are: Leg 173 reentry hardware, Leg 174B: CORK Hole 395A, DCS Phase III and initial Phase IV, hammer drill system, Janus I: complete, Janus II projects, data migration, WWW publication, split-core MST, procure core image capture system, sampling parties, semiannual report, Solaris operations system upgrades, XRF crystals.

3.4.3. ODP PUBLICATIONS

The first decisive policy change of major implication was implemented by JOI in May 1996: in order to fulfill the publication requirement, shipboard participants must publish in a recognized international journal OR in the SR volume (starting with leg 160). All IR data will be electronically published starting with Leg 169, and printing of the IR will cease with Leg 175. For the SR, the printed volume will be limited to 500 pages for legs 152 to 168 and CD viewable versions will be available which may include data sets if provided by the author. Starting with Leg 169, no more SR hard copy will be printed and the CD material will be viewable, downloadable and printable. JOI is now forming a Publications Steering Committee (PSC) to provide advisory input to the Publications Department during the shift to electronic publication. The shift to all-electronic publishing (176IR; 169SR) will proceed only if JOI receives recommendations from the PSC and endorsement by the JOIDES scientific community.

3.4.4. ORACLE DATABASE PROJECT (JANUS)

Deployment of the final delivery version of the Oracle database is scheduled for Leg 171B (January/February, 1997). Testing and acceptance is scheduled for Leg 172 (February/March, 1997). Warranty support is from mid April to mid July 1997.

Components to be completed within Phase I: Corelog, Operations, Curation, Sampling (UG1) MST, Logging (UG2a), Paleontology, paleomag, color reflectance (UG2b), Physical Properties (UG3), Chemistry (UG4a)

Components probably not completed within Phase I: Core description (replacement of VCD, HARVI), Core photos, Thin sections and smear slides, Underway geophysics, tensor tool

Phase II refers to proposed developments which cannot be accomplished within Phase I, and for which two SOE items are scheduled within FY97 budget.

3.5. SGPP

Tim Bryne summarized the results of the Fall 1996 meeting that was held in Nancy, October 3-5.

3.6. WLS report

Philippe Pezard reported on recent results and developments from the logging program.

4. Recent Scientific results

Leg 167 (California Margin) investigated the evolution of oceanographic conditions in the north Pacific Ocean to document changes in flow of the California Current system and associated changes in coastal upwelling. The 13 sites are organized into three transects across the California Current and one coastal transect extending from northern Baja California to the California/Oregon border. Observed high sedimentation rates (30-200 m/m.y.) make it possible to study climate variability at submillennial scales at most sites. High organic carbon burial helps to preserve paleoproductivity indices. The productivity events that were observed along the California margin are different in timing than those in either the subarctic or equatorial Pacific. Regional oceanographic circulation patterns seem to last for millions of years, suggesting that stable climate patterns exist or that climate responds strongly to tectonic changes in boundary conditions.

Leg 168 (Juan de Fuca hydrothermal) drilled a transect on the eastern flank of the Juan de Fuca Ridge, extending from about 20 km east of the ridge crest, where turbidite sediments begin to continuously blanket the 0.8 Ma igneous crust, to about 100 km from the crest, where the crust is 3.6 Ma in age. The main objective was to determine the thermophysical characteristics of hydrothermal circulation in the upper oceanic crust in off-axis settings as influenced by crustal topography, sediment cover, and permeability; The hydrothermal transition transect documented changes in basement fluid temperature and compositions, the physics of fluid flow, and the alteration of the crustal rocks. Two corks were successfully installed at Sites 1024 and 1025. Basalts illustrate progressive changes in alteration intensity related to increasing basement temperature from Site 1023 to 1024 to 1025. Higher basement temperatures and coarser grain sizes produce larger degrees of hydrothermal alteration. No alteration effects were observed that have occurred at temperatures much higher than those prevailing today. Composition of pore water shows clear indications of reaction and diffusion in the sediment section. Outermost site (1025) shows advection.

Leg 169S (Saanich Inlet) was a 2-day, 2-site leg to obtain an ultra-high-resolution record of Holocene climate, oceanography, marine productivity, ecology, and terrestrial vegetation. Upper

15 m at both sites were dark gray, gassy, highly disturbed sediment. The laminated sequence extends below that to 55 mbsf (1033) and 80 mbsf (1034). Varve thicknesses up to 1.5 cm and long intervals of uninterrupted laminations will enable very detailed investigations.

Leg169 (Sedimented ridges) investigated the mechanism of formation of massive sulfide deposits at sedimented ridges, the tectonics of sedimented rifts and controls on fluid flow, and the sedimentation history and diagenesis at sedimented rifts. Two CORKs were successfully replaced. Site 1035 (8 holes with <225 mbsf penetration) in the Bent Hill area was drilled to obtain a 3-dimensional image of a massive sulfide deposit. Drilling has created at least two new vigorous hydrothermal vents at Holes 1035F and 1035H. Site 1036 in the Dead Dog hydrothermal mound drilled three shallow holes (<50 mbsf) 9 m west of an active anhydrite chimney.

5. Reviews of New and Revised Proposals and Letters of Intent

The chair summarized the normal procedure for review and noted that the JOIDES office had asked that several "late" proposals, LOI's and technical requests also be considered. As in the past care was taken to ensure that proponents left the meeting room during discussion of their individual proposal(s).

79-Add: W Somali Basin

Tectonic objectives need to be placed into the proper scientific framework. Currently there is insufficient seismic data coverage over the proposed drilling region and the drilling sites remain undefined. It is unconvincing that only one hole can uniquely constrain the proposed kinematic models. Clarification is needed as to why stress measurements in addition to those available on land are needed and whether it is essential to drill into oceanic crust in order to obtain reliable values of stress. If the kinematic history is solved with new magnetic, gravity and seismic data collected by a pre-site survey then the need to drill to basement for the purpose of discerning between existing kinematic models can be removed.

Ratings: A6, B1.2, B2.1, C3, D2, E2, E3, E6, E8, F4

355: Add2 Peru Gas Hydrates

TECP thanks the proponents for their letter remind us of the proposals possible contributions to the drilling program. The basic tectonic questions in the proposal remain of considerable interest to us. TECP note, however, that no further data are presented and encourages the proponents to consider how to best study the along strike variations in the unconformities and facies architecture in this margin as these will best address questions surrounding the effect of the ridge impingent and associated forearc erosional processes. Along strike seismic data should be presented with interpretations of the evolving unconformities that are placed in the context of the local tectonic and global eustatic impacts on the associated sequence boundaries.

426-Rev 2 Mantle reservoirs and mantle migration associated with Australian-Antarctic rifting

TECP considers this proposal to be very clear and straightforward, well designed to constrain the location of the isotopic boundary between Pacific MORB and Indian MORB going back in time. The drilling plan is well thought out, but the proposal does not sufficiently discuss what the proponents will do with the data, once they are collected, in order to answer the tectonic questions they have posed. We can envision that the data might be used in modeling of large-scale mantle flow patterns, etc., but the proposal does not describe the details of what the

proponents expect to do in this regard. We consider this to be a very important aspect of the tectonic outcome of the proposed work and we feel that this proposal would benefit greatly from a more detailed mention of the planned follow-up in terms of modeling. Perhaps the proponents could contact someone who can help them with such modeling (e.g., Geoff Davies, Michael Gurnis, Jason Phipps-Morgan).

Any revision of this proposal should contain the following information:

- 1) The final geochemical results of the dredged samples from 1996 (those listed as "ND", or "not determined" in the present version of the proposal. These are essential in order to completely support the model that the proponents wish to test.
- 2) The proponents need to demonstrate that they will be able to do sufficient geochemical analyses on board ship, within a few hours, in order to make decisions on where to drill next. They recognize in their proposal that such capability needs to be demonstrated before the proposal can be approved.
- 3) The proponents should prepare a detailed magnetic anomaly map of the study region. This is because smaller scale ridge jumps, if present, could affect the distance between the ridge and the anomaly boundary at fracture zones. This would lead to problems with the interpretation scheme proposed for the geometry of the isotopic boundary (Figure 10 of the proposal).
- 4) The proponents should consider whether the isotopic characteristics of either Indian MORB or Pacific MORB might have evolved with time, over the timescale being considered here (tens of Ma) and if so, how this will affect their drilling strategy and/or their interpretations. For example, is it possible that the present strong difference between Indian Ocean MORB and Pacific MORB is less obvious going back in time? If so, this would have very interesting implications for the cause of the anomaly and its tectonic evolution through time, and it would also affect our ability to locate it on older seafloor.

Ratings: A3, B1.1, B2.1, C1, D1-2, E4, F3

431 Rev Add3: W. Pacific Geophysical Network

This proposal meets the scientific objectives of ION and is highly relevant to TECP objectives. We ask the proponents to present to TECP all processed data as soon as they become available. This includes the results of on-land testing of their instruments as well as their site-survey results.

Ratings: A1, B1.1, B2.1, C1, D3, E0, F2

441-Add1: Southwest Pacific Gateway: Palaeohydrography of the deep Pacific source

This proposal is highly directed toward OHP and SGPP themes. A part of the objectives, however, concerns about TECP interests. The site SWPAC-8A deepened by 50 m is placed for obtaining the accurate age of the regional unconformity, which provides the post-Late Miocene sedimentary and deformation history. TECP has encouraged the proponents to discuss about tectonic aspects in this region. For example, the Spring 1995 TECP comment addressed the collaboration with tectonic geologists. Tectonic aspects, however, are still unclear in this proposal. A distribution map of unconformity and models showing plate kinematics should be presented.

445-Add 4: Nankai

TECP considers this proposal highly relevant to both the long range plan and the TECP interests of TECP. The results of the modeling provide both interesting additional constraints and further questions that can only be addressed by drilling. The proposal is now at the stage where it is

fully mature and ready for drilling. TECP is particularly keen on the concept of testing the hypothesis that the along strike variation in the taper of the wedge, general internal wedge architecture and decollement reflective character etc, are linked to differences in the fluid pressure and stress conditions on the basal decollement. It is considerably beneficial that such variations occur in the same wedge so that many extraneous factors can be avoided and the underlying principals studied in a relatively simple environment. Naturally, prospects for the second leg involving the emplacement of corks etc, will be necessarily predicated on the success and results of the first leg. We expect the geochemical aspects of the study would then have to be addressed quantitatively and in more detail when further data are available. We expect the successor panel to TECP will be most interested in any future result from drilling Nankai.

Ratings: A1 B1.1 B2.1 C1 D1 E0 F1

447-Rev 3: Active continental extension in the western Woodlark basin

This is a mature proposal that deals with a major theme of both the LRP & TECP, that of defining and constraining the deformational history of a low-angle, active, normal fault. It remains one of the highest ranked TECP proposals. The panel was interested to learn of the local seismic network proposal in lieu of its recommendations from the Spring '96 panel. Further, the panel was happy to see progress on the MCS processing and noted the 1A classification from SSP. Despite its high ranking, the panel remains concerned about the activeness of the low-angle normal fault even though the Moresby Seamount region may be in an area of general continental extension. The main concern of the Spring panel was the demonstration that the normal fault was indeed active. While arguments presented in the proposal generally supported this issue (e.g., increasing dip of deeper syn-rift packages across the hangingwall block), the panel is requesting:

- 1) a structure contour map of the fault surface,
- 2) 3.5kHz records over the bathymetric escarpments,
- 3) reprocessing of the critical seismic sections to optimize imaging of the fault surface and the sediment packages,
- 4) a seismic stratigraphic study of the region to help identify alternate/higher priority drill sites,
- 5) depth conversion of critical seismic sections.

It is the panel's view that the imaged low-angle fault has been periodically active and it is not clear what part of the cycle the fault is presently in. Further, since the degree of rotation of the syn-rift sediments is a proxy for the amount of extension, then maximum basin development has occurred further to the west (EW9510-1371) and is possibly a better drilling target. This assessment can only be made with the cooperation of the proponents in finalizing the processing and interpretation of the seismic data. The panel will look forward to the eventual results of the NSF proposal.

Ratings: A1, B1.1, B2.1, C1, D1, E0, F1

448-Rev2: Ontong Java

This proposal seeks to address several tectonic aspects of LIP formation including emplacement deformation, vertical tectonics, post-emplacement collision and rifting, and paleomagnetic aspects such as the dating of M0. To accomplish these objectives the proponents need additional survey data to determine appropriate sites that fulfill the tectonic aspects as well as petrologic aspects of the program. Until more survey data is collected the Ontong Java plateau project is primarily in exploration mode and will have difficulty defining exact sites that can address testable tectonic hypotheses. We recommend continued consideration of tectonic aspects of LIP

emplacement and evolution in the refinement of drilling site selection based on new information, both site survey and onshore mapping and analyses

Ratings: A3, B1.2, B2.1, C2, D1, E0, F5

450 Add-2: Taiwan

TECP considers this to be a highly relevant proposal. The three dimensional transgressive nature of the Taiwan collision belt offers considerable opportunities for studying the evolving kinematic and sedimentological changes that occur during an arc continent collision. The sites dealing with the sedimentological, structural and hydrogeologic processes occurring along the back thrust of the system should be adequately constrained by the present drilling strategy and will greatly add to our understanding of the arc continental collision process. TECP strongly encourages the proponents to present and make use of the additional constraints that should be provided by the newly acquired MCS data.

Although most of the legs objective would be met even without drilling TECP-3, TECP is also very interested in the hypothesis of the offshore extension of the active syn-collisional "normal fault systems" that have been identified onland. The GPS and field based studies suggest that these are currently unroofing the metamorphic interior of the accreting material to the west of the longitudinal trough. Mechanisms of syncollisional tectonic extension and unroofing of deep material (up to blueschist in some collisional systems) in collisional provinces are still the object of considerable debate in the scientific community. We appear to have the opportunity to test this hypothesis and to study the structural and hydrogeologic processes associated with the possible southward propagation of the external fault system into the developing wedge. The aqueous geochemical signature of any fluids escaping along such faults should have deep seated origins and be closer to their pristine state in this submerged region of the wedge which is away from the topographical generated ground water flow of the emergent mountain belt. TECP would like the proponents to present all the relevant gravity, seabeam, side scan and magnetic data, that we believe does exist, to support the contention that the extensional zone extends through TC-3. If necessary, the proponents should also consider moving TC-3 further north to improve the chances that they encounter the extensional system, as this represents a fundamentally new type of tectonic processes for ODP drilling.

Ratings: A1, B1.1, B2.1, C1, D1, E0, F1

451-Add2: Ocean drilling in the Tonga forearc: subduction geodynamics, arc evolution and deformation processes at non-accretion

This is mature proposal well formulated and documented. The new site survey data go a long way to address TECP's concerns about the tectonic objectives, especially the role of the Louisville Ridge. TECP noted that the revised proposal is simplified and focuses more on testable hypotheses. However, the objectives are clearly intermingled and the whole drill results will need to be taken together when addressing individual hypotheses. TECP feels that although it is still not clear how each and every hypothesis will be effectively tested by drilling, this is a very exciting drill program that is bound to lead to very interesting results. The land-based community will also be interested, even if the actual drilling of the ophiolitic forearc is not possible (barerock).. However, the proponents can hope to obtain a complete section of the Tonga margin from the forearc and upper slope by drilling and by the dredged samples already obtained in the lower slope between 4.5 km and 9 km.

Ratings: A 3, B 1.1, B 2. 1, C 1, D 1 E 0, F 3.

452- Add2: Antarctic Peninsula

Ratings: A5- Not relevant to thematic objectives.

457-Rev4: Kerguelen Plateau

As written, this proposal has few tectonic objectives. The proponents should clearly delineate the possible results from each drilling site that may shed light on the complicated tectonics of the Kerguelen plateau. From emplacement deformation, syn and post emplacement vertical tectonics, post-emplacement rifting and possible collisional events, the tectonic history of Kerguelen is complex and will directly affect the interpretation and analysis of petrologic and other data from drilling. We strongly recommend that the proponents continue to consider these tectonic aspects in the selection of drill sites and clarify the expected structural and tectonic hypotheses to be tested at each drilling site.

Ratings: A3, B1.1, B2.1, D1, E0, F4

463-Add2: Shatsky Rise

The main aspect of this proposal of interest to the Tectonics Panel is the relationship of the volcanic activity to plate reconstruction and/or ridge jumping. We strongly support the efforts of the proponents to address these questions and recommend continued consideration of these aspects in the selection and refinement of the positions and targets of the proposed drilling sites.

Ratings: A3, B1.1, B2.1, C1, D2, E0, F5

Proposal 466-Rev: "Investigation of linearly magnetized rifted crust and the evolution of high extension/slow spreading continental margins: A proposal for drilling in the Great Australian Bight region by the Ocean Drilling Program"

The problem of investigating the behavior of highly extended continental crust/and or young oceanic crust during the transition from rifting to drifting is of high relevance to both TECP and the LRP (conjugate margin studies). Consequently, the panel welcomed this revised proposal dealing with the zone of enigmatic crust in the Great Australian Bight that is characterized by linear magnetic anomalies and related tilt-blocks.

The panel felt that this revised proposal, without the unnecessary distractions associated with metamorphic core complexes, represented an effective and straightforward statement about studying the nature of faulted, linearly magnetized, crust. However, in the data presented and "Reconstructions and spreading history" discussions, it is not clear that the continent-ocean boundary (COB) has been adequately defined spatially. That is, what is the nature of the crust to the north of the presumed COB? What is the origin of the gravity highs that bound the various crustal zones (given that they are as persistent as the magnetic anomalies along strike)?

The panel agrees with the proponents that the crustal fabric (as defined from GEOSAT gravity and ASGO seismic mapping) parallels the opening direction of the Perth basin. Thus, is the crust to the north of the presumed COB oceanic crust produced by ultra-slow spreading from M10 onwards? If so, then it is hardly surprising that the differences between the shiptrack azimuth and the spreading direction would result in magnetic anomalies that are difficult to correlate. The panel believes that the proposal is immature in its present form and recommends the following revisions:

- 1) The issue of linear magnetic anomalies and continental crust. Given the observed distribution of tilted blocks, how much of the magnetic anomaly is topographically imparted?
- 2) The issue of possible oceanic crust to the north of the proposed COB. Is the existence of this oceanic crust consistent with the plate tectonic reconstructions for the Indo-Australian, Antarctica, and Pacific plates for the appropriate time interval?
- 3) Augmenting drilling locations/targets. It would seem imperative that the crustal type to the north of the presumed COB be tested. Thus the complete drilling transect needs to define the crustal type and timing of deformation/formation in each zone.
- 4) Fundamental importance of the proposal. As presented, the proposal does not portray the project in anything more than solving a local problem. That is, what is the advance in our knowledge of lithospheric processes if drilling does in fact determine whether these enigmatic crustal zones south of Australia are oceanic or continental? Clearly it will help define the rifting events affecting the southern Australia and this plate reconstructions between Australia and Antarctica, but is this truly fundamental? The proponents need to give careful consideration as to why this crustal type issue is truly a fundamental problem that can only be addressed by ODP drilling. Perhaps it might be useful to recast this problem along the lines of the mechanical behavior of highly extended continental crust and/or young oceanic crust during the transition from extension to spreading.

Ratings: A1, B1.2, B2.1, C2, E8, F2

467-Rev: Sand rich versus mud rich turbidite systems at intermediate latitude

The main target of this proposal is to compare a mud rich turbidite system (i. e. Rhone deep sea fan) and a sand rich system (i. e., Var fan). At the difference of the Mississippi and Amazon fans the Mediterranean fans have been affected by the glacio-eustatism. These fans were supplied by the rivers (Rhone and Var.) draining the Alps massif. The Mediterranean Sea is a closed system and a balance between the erosion of the Alps and the sedimentation in the basin can be established. The ODP drilling in the Indus fan gave several information on the Himalayas mountain building and in this way some tectonic information on the Alps could be obtained. The Mediterranean basin was opened by a rotation of the Corsica-Sardinia block during the early Miocene. During the extension two types of margin have been identified: one in the Gulf of Lion where the present Rhone fan is located is large whereas an abrupt and narrow margin bounds the Côte d'Azur area. These two types of margin are separated by a major transfer fault. The tectonic architecture has a large influence on the construction of the Mediterranean fans during the Pliocene and Quaternary times. The Rhone deep sea fan is distributed in several lobes on a large area whereas the Var fan is vertically stacked close to the slope off Nice. Moreover, the steepness of the slope allow the formation of turbiditic currents in the abyssal plain although the present time is characterized by a high stand level. In addition the steepness of the slope is accentuated by a reactivation by compression. The relationship between the formation of fans and the previous extension is interesting for a tectonic point of view. However, this proposal is mainly OHP oriented and the tectonic aspects cannot be developed because the eventual tectonic targets are too deep to be reached with the present capabilities of drilling of the Joides Resolution.

Ratings: A3, F4

469-Add: The Argo Abyssal Plain: A Proposal to Drill Reflecting Interfaces within Oceanic Crust

TECP is encouraged that the proponents have collected more geophysical data for their proposed study area. We will be interested in seeing the revised proposal that appears to be forthcoming for Jan. 1997.

Ratings: no new ratings because the proposal is the same one as last time.

472-Add: Crustal Fluxes and Mass Balances at the Mariana-Izu Margin

This addendum addresses comments made by the panels in the spring of 1996; primarily concerns raised by SGPP with some overlap with TECP. Specific questions raised by TECP related to the heterogeneity of oceanic crust and the likelihood that just one hole in the crust 100s of kilometers from the trench will better constrain the mass balance equation. The proponents have done an excellent job of simplifying what is known and not known about the mass balance equation (e. g., Table 1) and provide a clear explanation of the rationale for deepening ODP 801.

In essence, an ODP workshop in May, 1996, concluded that: (1) there has been no penetration of Pacific crust anywhere beyond about 100 m and (2) approximately 300-400 m of crust needs to be drilled in order to document the alternation zone. Deeping of 801 is most logical because: (1) the crust has already been penetrated and they know that it is normal crust (2) it's the most direct route; Site 452 requires drilling through 100's m (>500) of Cret. flows and sills already sampled (Leg 129) before reaching oceanic crust. In addition, Site 452 appears to be very similar to all other PB sites so it's not clear that anything new will be obtained with this extra drilling.

TECP is still concerned, however, with the problem of how representative the results from 801 will be and, therefore, with the ultimate goal of "balancing" the fluid budget across the margin.

Ratings: A1, B11, B21, C1, D1, E0, F1

476-Add2: The Hudson Apron Submarine Slope Stability Transport

The proponents have made an excellent effort at addressing questions raised by TECP and the panel is, overall, more supportive of the proposed pilot study than the previous proposals. In any future revisions or addendums, however, the panel would also like to ask that the proponents include the results any side-scan surveys of their proposed sites.

At the same time, the panel is still concerned that objectives outlined in the addendum will not address the fundamental mechanic or dynamic aspects of slope failure. As the Panel expressed in their last review, the difficulty of locating a site that will fail in the near future is almost impossible to overcome.

479-Rev: Massive sulfide mineralization in felsic volcanics of the eastern Manus back-arc basin, Western Pacific

The tectonic framework of the Manus back-arc basin interests the Tectonic Panel. This basin formed by small spreading centers separated by large transform faults. The eastern Manus basin is a pull apart basin formed in a felsic volcanic environment whereas the crust presents Morb affinity in the small basins opened by oceanic crust accretion. The evolution from pull part basin to oceanic accretion can be applied to others areas (i. e. California Gulf). however, the tectonic aspect of the Manus basin is not the main topics of this proposal that is focused on the mineralization in felsic volcanic environment. If the proponents will expand the tectonic aspects the TecP will be interested. As others panels we recommend to form a working group to build an integrated proposal that will include the tectonic framework. The Japanese results from a diving submersible survey should be also included in the final proposal.

Ratings: A 3, B 1.1, B 2. 1, C 1, D 1 E 0, F 3.

481-Add: Red Sea Deeps

Tectonic process during the early stages of oceanization after continental break-up has been considered as an important theme of TECP interests. The proponents planed a transect drilling including four sites oblique to the rift axis in the original proposal, and TECP claimed the obliquity of the transect. This addendum addresses the re-oriented the transect perpendicular to the rift axis and additional site survey plan of high resolution MCS. The proposal should be well presented by using of these new MCS and/or reprocessed MCS profiles, especially for crustal structures. The proponents also show a structural lineament map around the proposed sites (RS-1B, RS-2 and RS 3B) for understanding the formation of the pull apart basin, although a lineament map of the northern Red Sea is shown in Figure 14 in the original proposal.

Ratings: A3, B1.2, B2.1, C2, D1, E8, F5

485-Rev: Southern Gateway-Australia/Antarctic

Two tectonic sites are proposed to drill the west South Tasman Rise marginal ridge. Transforms are of great interest to the panel. However, the transform history is probably more complex than so far presented and if would be better served with a separate proposal. Therefore we do not recommend a major alteration to the current proposal in order to include the transform tectonics component.

This drilling proposal already contains a highly interesting tectonic component, namely the influence of plate kinematics on palaeoceanography. For this reason we suggest that the proponents consider whether drill a site on oceanic crust (perhaps off the SE corner of the South Tasman Rise), could further kinematic movements in the region. The latest available magnetic anomaly map should be included in this new assessment. A future version of this proposal should contain a more refined plate kinematic reconstruction and its relation to climate.

Certain local aspects of the complexity of this transform remain to be addressed in any future proposal. It is unclear from the data shown whether there is sufficient sedimentary cover to conduct a useful subsidence analysis. The possible degree of flexural coupling with oceanic crust across the transform is not noted. The western South Tasman Rise terrain experienced shearing both on its western and eastern edges. Therefore, the intracontinental transform stage may consist of two episodes directed from two directions. Gabbro along the transform margin could derive not only from the transform margin but also from underplating from the rifted direction or even from early intracontinental shearing. The significance of underplating should be incorporated into testable geodynamic models. As in the previous Leg 159 to a continental transform margin, a series of drilling sites along the length of the margin will be necessary.

We encourage communication with the South Australian Bight drilling proponents (Stagg et al., AGSO) to address common tectonic objectives.

Ratings: A6, B1.2 (too brief), B.2.1 (for tectonics although the transform component is questionable), C3, D1, E4 (refined kinematic evolutionary sequence based on new published marine magnetic anomaly interpretations of Exxon, Royer and Hill Mar. Geophys. Res. (1996), F5, but could become F3 were this proposal substantially revised.

491-Add: Drilling of Defined Oceanic Crustal Categories to a Better Understanding of Cyclic Crustal Accretion

We will look forward to seeing the revised proposal which the proponents indicate they will submit at the end of the year. The general problem being addressed is of interest to TECP, but the specifics of this study need to be more clearly formulated. TECP requests the proponents to take into account our comments from Spring 1996, which are not repeated here. We remind the proponents that the revised proposal must clearly lay out the hypotheses being tested and must specify how the measurements they will make, in-situ or on the cores, will then allow them to resolve among these hypotheses. This proposal definitely has the potential to be of strong interest to TECP but the approach to the problem may need to be multidisciplinary in nature. We recommend that the proponents consider including a discussion of any petrological or geochemical tests which will aid them in resolving their hypotheses, as well as of possible unwanted effects of proximity to the influence of the Tristan da Cunha hotspot. TECP also suggests that the proponents clearly explain why this is the best area to address this question. Can any constraints be obtained from existing drilling results and seismic data elsewhere on earth?

Because of ODP's increased interest and possibility in deep drilling, the proponents may also wish to consider some scenarios involving deeper penetration of basement at their proposed sites.

Ratings: No new ratings as this is the same proposal as last time.

494-Rev: "Rifting processes of the passive continental margin and tectonic evolution of the south China Sea"

The panel was happy to see the marked improvement of this revised proposal, both in terms of the presentation of corroborating evidence to support arguments and the overall structure and philosophy of the proposal compared with the earlier submission. However, it is the panel's view that the proponents remain overly ambitious in their suite of objectives. Perhaps more problematic is that many of the objectives tend to be only of local significance. At the heart of the proposal is the need to use the drill ship to define the type and age of crust across the south China Sea. The onus is on the proponents to develop and defend the fundamental nature of this work. For example, how will knowing the details of the age of formation of the south China Sea really help us understand better rift processes? Why do we need to know in detail the sedimentation processes operative across passive continental margins? Further, how can the proponents "test the validity of existing thermo-mechanical models of rifting"? No quantitative predictions were presented in the proposal that highlight the differences between the many models proposed in the literature for margin development nor was it clear how drilling could be used to unambiguously test between these models. It was equally unclear if the proponents had access to lithospheric deformation computer codes. The proponents also need to place their proposed drilling sites into a regional seismic and geologic framework. In particular, it is difficult to assess the regional importance of the various unconformities mentioned in the proposal from the reflection seismics presented.

The panel recognizes, however, that first-order geological problems do exist in the south China Sea region. For example and as actually mentioned by the proponents on page 3, a particularly interesting problem deals with the tectonic mechanisms responsible for the initiation of the south China Sea - plate rollback along the Palawan trench or continental escape of Indo-China along the Red River fault in response to the Indian sub-continent collision with Asia. The panel recommends that the proponents seriously consider this theme in collaboration with, for example, French researchers who have been working actively on aspects of this same problem (e.g., Anne Briaux, Observatoire midi-Pyrenees GRGS, Toulouse; Paul Tapponnier, Institut de Physique du Globe, Paris). During the proposal revision, the proponents should keep in mind that they need to test a hypothesis that itself has a number of first-order predictions that can be compared with observations/results obtained by ODP drilling.

Ratings: A6, B1.2, C3, F4.

495-Rev: Rifting and the isolation of microcontinents: Tectono-magmatic evolution of Seychelles and associated continental fragments in the Western Indian Ocean.

Since last version this revision has taken onboard several of the comments made by TECP in the sense that the objectives are rewritten to be more model testing. However, 1) the drilling strategy and major drilling targets are not changed and do not tell how the revised objectives are to be addressed; 2) based on the relatively large amount of seismic data available the proponents have not been able to identify even the generalized structure of the microcontinent, including identifying the grabens that are suggested to be filled with either sediments or volcanics, and thus would allow the ultimate test according to proposal; 3) the suggested tectono-magmatic models are as such not evaluated, and it is TECP's view that none of these models have to apply. Several panel members noticed that there are other microcontinents around the world that are characterized by rift propagation in clear non-plume settings (not mentioned by the proponents); 4) the plate tectonic consequences of a large microcontinent are not properly discussed. TECP think it is unrealistic to spend two drilling legs only to define the extent of the microcontinent, and cannot see how the prime tectonic component of the proposal can be achieved with the proposed drilling. The fact that aeromagnetic data apparently worked well for the definition of the Farquhar group may indicate that such data could be used also to limit Greater Seychelles. TECP thinks more work needs to be carried out. However, before embarking on this the proponents need to realise that they have not yet convinced TECP that they are actually tackling a problem of global importance (i.e. rifting of microcontinents as opposed to large continents) and that even if this is a global problem how they would actually solve it by drilling in the Seychelles. The study of a regional problem in the Indian ocean is not in itself an adequate reason for drilling.

Ratings: A6; B1.2; B2.1; C3; D1; E8; F3

496: "Formation of volcanic rifted margins and oceanic plateaus: A proposal to test mantle plume versus non-mantle plume hypotheses by drilling the Cuvier Margin and Wallaby Plateau off Western Australia"

This new proposal intends to test between a plume and non-plume hypothesis for the formation of large volcanic constructs on newly formed oceanic crust along the northwest Australian margin. With the evidence presented, the panel was not convinced that: 1) A plume model was particularly convincing for reasons outlined below, and 2) drilling could really help to resolve between the models presented. First, while the Zenith Seamount and Wallaby Plateau may well parallel the proposed hotspot trend, a hotspot hypothesis completely ignores the equally important Joey Rise adjacent to the northwest edge of the Exmouth Plateau and the areally extensive Roo Rise. Second and as reported by the proponents, "there are no convincing plume related . . . basalts sampled in dredges from the Western Australian rifted margin, either from the 155 Ma Argo margin or from the 130 Ma Cuvier and Gascoyne margins". Third, the reported regional uplift of the Bernier Platform, in the absence of any supporting reflection seismic lines, is better explained as the footwall (i.e., rift flank) uplift in response to Tithonian-Valanginian extension along the margin. These points, coupled with the fact that the Cuvier ocean crust immediately after breakup is of standard thickness, suggested to the panel that the plume hypothesis is not tenable without significantly more corroborating evidence.

In contrast, the panel felt that studying the processes that lead to large volcanic constructions on oceanic crust, especially those adjacent to major fracture zones, is important. However, without the plume hypothesis, this proposal does not present a testable hypothesis using the drilling tool to investigate what these processes might be. Even though the

Wallaby Plateau showed evidence for continental contamination, this was not a characteristic of the Joey Rise suggesting that the continental component within these northwestern Australian oceanic plateaus is, in general, minimal. The panel would welcome a revised drilling proposal to test between various non-plume hypotheses for the development of oceanic plateaus.

Ratings: A2, B1.2, B2.1, C1, D1, F3

497: Ryukyu Forearc Tectonics and Paleooceanography

This proposal is relevant to TECP's thematic objectives. There has been a long-standing interest in the question what causes bends in volcanic arcs. However, the proposal requires major improvement with respect to:

- 1) Defining a problem of global interest
- 2) Clearly outlining hypotheses to be tested by drilling
- 3) Relevance to the Long Range Plan
- 4) Broadening of the proposal by involving the international community
(e.g. French, US scientists)
- 5) Is the location of the Ryukyu arc the most appropriate one to test the particular hypotheses to be tested?

The proponents will be sent an example of a successful proposal (e.g. Nankai) to aid improving the structure of theirs.

Ratings: A2, B1.3, B2.1, C3, D1, E8, F4

499: Equatorial Pacific Site for the International Ocean Network

This proposal meets the scientific objectives of ION. The site selected in the equatorial Pacific ocean fills a critical gap in the global seismic network. The proponents should report on further progress in testing the equipment and installation of instrument packages in deep sea boreholes. TECP would like to see the location of the selected site in the context of regional geological and tectonic framework, i.e. plate boundaries, magnetic lineations, and gravity anomalies. We suggest the proponents may consider carrying out an OBS survey of the selected area to demonstrate the suitability of the site mainly in order to characterize the site in terms of noise level. We ask the proponents to outline their strategy for long term power supply and data retrieval at their station.

Ratings: A2, B1.1, B2.1, C1, D3, E?, F1

501: Geochemical and Environmental Consequences of Cretaceous LIP Formation in the Western Pacific

The study of the Cretaceous LIP is very fundamental for the dynamics of the Earth's mantle and environmental impact regarded as the theme addressed in the Long Range Plan (LRP). This proposal focuses on both the mid-Cretaceous igneous complex and the Ontong Java Plateau. The former has two conflicting models for explaining the emplacement. TECP recognizes that the emplacement of the igneous complex and the drilling of the Jurassic basement is important for understanding of the Pacific Plate evolution. The latter is the target to know the uplift and subsidence of the plateau and the timing of the volcanic activity. It is also partly relevant to the TECP theme. However, the tectonic objectives remain unclear. TECP encourages the proponents to discuss about tectonic aspects for the formation of the igneous complex.

Questions:

1. According to the magnetic anomaly map (Fig. 2), SNB-1A is located in or south of the M17. The schematic illustrations, however, show that the Jurassic oceanic crust exists in the SNB-1A. A detail map for the magnetic anomalies is needed.
2. Where is the EMB-3 in Fig. 2?

Ratings: A3, B1.1, B2.1, C2, D1, F4

504: Understanding the processes that shape passive margins during the transition from continental rifting to seafloor spreading: the Newfoundland Basin.

This proposal is considered of high thematic relevance to TECP and the planned drilling seem to be ideally located with respect to ODP's stated interest of conjugate margin drilling. TECP looks, however, forwards to see the new data that is mentioned in the proposal or a reprocessing of existing data, which hopefully will allow a better definition of "basement" across the margin. From the existing data it seems that fairly thick units of apparent sedimentary strata exists in the half-graben terrain beneath the "U" reflector, which theoretically indicates substantially more upper crustal extensional deformation than can be inferred from the presented interpretation (e.g. fig. 6). Although it is realized that drill-hole information from the syn-rift sequence may require even deeper holes than presently proposed, it is clear that such information will enable a better assessment of the temporal rift development and the strain partitioning or focusing on the margin.

In terms of ODP's general aim on hypothesis-testing drilling TECP would like to see data constrained quantitative models for the basin uplift/subsidence history related to the one or the other suggested alternative for the origin of basement across the margin. It is difficult to envisage that "U" is a near sealevel erosional surface formed during an episode of ultra-slow seafloor spreading and associated formation of thin oceanic crust. It is, on the other hand, also questionable whether a simple shear model may manage to keep an almost 300 km wide rift zone near sealevel during most of the rifting episode. If so there has to be a close correlation between the amount of predictable mantle lithosphere thinning and the amount of post-rift tectonic subsidence observed. It is requested that such calculations are included in the proposal, as it is believed that this will enable a more precise drilling strategy and maybe aid a redefinition of "U" as a diachronous feature, which as such not is directly related to breakup. The Iberian Margin Leg 173 will in part address the same questions that are outlined in this proposal, and TECP encourage the proponents to include in a revised version of the proposal the new results from the Iberian Margin.

Rankings: A1; B1.2; B2.1; C2; D2; E8; F2

505: Mariana convergent margin mass balance

While still at an early stage of development the studies along the Mariana system should provide substantial benefits with regards isolating hydrogeologic and chemical input from the oceanic basement during accretion and are in tune with the long range plan. This basement fluid component is a fundamental part of all convergent margins and this proposal will address very important processes in an end member system. TECP encourages the proponent to make full use of the data from the upcoming cruises to isolate the coupling between forearc structure, heat flow and hydrogeologic systems along this margin. Concern was expressed, however, over the apparent misconception of the proponents that this system will not be dominated by both heterogeneous and transient flow patterns. The proponents make an issue of the contention that these are not important, but are probably incorrect in doing so. Shore based hydrogeologic studies have always shown that heterogeneity is a fundamental component of fracture flow systems and must be treated with respect (particularly given the mix of mantle diapirs and fracture systems in the Mariana forearc). Why do the proponents think the Marina forearc system would be any different to those previously studied fractured systems? Transient fault

valving mechanisms were also first developed for hardrock fracture flow environments (ie. the various Sibson models) similar to those in this forearc. TECP would be greatly surprised if such mechanisms were not operating particularly given the likelihood for chemical precipitates in fractures at depth. Why do the proponents think there will be little significant transience? Even the eruptions and rate of fluid flow through the diapirs will probably be linked to earthquake related stress/strain pulses in the forearc region.

TECP would also expect the geochemical signature of fluids moving up the faults in the forearc will be different to those moving up the mantle diapirs given the different chemical environments they will encounter along the way. How will the proponent separate the effects of the different flow paths? The proponents also need to make it clear that it will be possible to extract fluids from fault rocks in regions outside of the serpentinite diapirs. Why the alteration products can be studied, it would be difficult to squeeze pristine water from fractured basalt.

Ratings: A1, B1.2, B2.1, C2, D1, E8, F2

506: Global siting plan of borehole geophysical observatories by International Ocean Network

This proposal presents the scientific goals, the global siting plan and the implementation plan for in situ geophysical observatories in the world oceans. It is highly relevant to TECP thematic objectives and to the Long Range Plan. TECP is highly supportive of the general concepts as well as of the two prime objectives of this proposal: 1) Global seismic tomography and 2) monitoring processes in tectonically active areas, including hazards originating the oceanic environment.

506 Add: Ninety East Ridge Observatory (NERO)

NERO meets the scientific objectives of ION. The site selected in the south central Indian ocean fills a critical gap in the global seismic network. It will also enable the investigation of specific geodynamic problems of the Indian plate. This proposal is relevant to TECP thematic objectives. All necessary technology including broadband seismometers, their installation and retrieval from boreholes have been successfully tested, and should not cause any future problems.

Ratings: A2, B1.1, B2.1, C1, D1, E0, F1

507: TAG II: Evolution of a Volcanic-hosted Hydrothermal System on a Slow spreading Ocean Ridge

This proposal addresses the temporal and spatial development of an entire hydrothermal system by drilling the active zone, where ODP Leg 158 failed to drill the center, and the relict zone in the TAG hydrothermal field. The drilling of the TAG field will provide the example for the evolution of the hydrothermal system hosted in mafic volcanic rocks at the slow-spreading ridge. The proponents address the interplay with magmatic and tectonic processes through time. Tectonic aspects, however, are unclear in this proposal. TECP would like the proponents to explain what the relationship between magmatic and tectonic processes is.

Ratings: A5, F4

Okinawa Trough

This proposal, while very preliminary, would address several themes of interest to TECP. The Okinawa Trough may be an excellent place to study the initiation of a back-arc basin and to constrain various aspects of the evolution of such a system in terms of heat flow, crustal composition and structure. We encourage the proponents to outline specific hypotheses

regarding tectonic processes relevant to this area, and clearly indicate how these hypotheses will be constrained by the measurements to be done in the drill holes and/or on the cores recovered from drilling. For instance, it is unclear how drilling will be able to identify the existence of spreading-related magnetic anomalies given the lack of such identified anomalies on the numerous ship tracks in the area.

The international composition of the proponent group is a very positive aspect of this proposal. The proponents may also wish to review the details of a proposal which has been submitted for study of the Ryuku forearc (#497) to see to what extent the two proposals might be able to be coordinated in terms of processes linking the two regions.

Ratings: A6, B1.2, B2.1, C2, D1, E3, E4, E8, F3

Letters of Intent

LOI 69: CORK 174B

As presented, fully approved by Tectonics Panel.

Ratings: A1, F1, B1.1, B2, C1, D1, E0, F1

LOI 70: Hydraulic piston coring to deepwater site investigation

TECP encourages the proposed collaboration with industry. However it is essential that a scientific rationale is developed for the proposed leg. We encourage the proponent to submit a full proposal, including clearly outlined scientific objectives.

LOI 71: Southeast Indian Ocean hotspots

Drilling a previously unknown linear chain of seamounts may contribute deciphering the history and relationships between various hotspots in the central Indian Ocean and to improve on the regional plate tectonics. The extremely limited data base available is as yet inadequate, however, to address these objectives and substantial site survey (including dredging) is needed before submitting a proposal.

Ratings: A3, F4

LOI 72: RAB and ISONIC LWD tool engineering test

This proposal is of high relevance to TECP. The RAB/ISONIC tool would be instrumental to better image structures both in MOR basalts as well as in accretionary prisms. We encourage the proponents to submit a complete proposal. However, there was doubt as to how useful the ISONIC tool would be for unconsolidated sediments. Which are the lowest sonic velocities for which the tool would work?

LOI (no number): Geologic evolution of a back-arc basin by drilling the South China Sea and the Bashi Strait

Many of the objectives of this letter of intent are clearly related to the mandates of the Ocean History Panel (e.g., the paleoceanographic problems listed on page 6) and it is therefore not appropriate for TECP to comment on these aspects. With respect to the TECP objectives, the panel understands the archipelago model and recognizes the desire by the proponents to test the model in an active or "actualistic" setting. If the archipelago model applies universally, however, the panel is not convinced that it can be tested with the program outlined in the Letter of Intent.

12. Drilling plan

TECP proposes the following drilling plan for next 3 or more year that gels high thematic objectives with PCOMs theme objectives, as follows:

12.1. Deformation partitioning within the lithosphere due to extension

- active low angle, e.g., Woodlark
- conjugate margins, e.g., Newfoundland/Iberia, Great Australia Bight/Antarctic, NE Atlantic (volcanic rifted margins), Gulf of Aden
- Transforms, e.g., Tasman fracture zone, Vema/Romanche
- Ocean crust, e.g., W Atlantic, Angola basin, Angola abyssal plain

12.2. Deformation partitioning, fluid flow, and exhumation during lithosphere convergence

- deformation and fluid flow, e.g., Nankai, Barbados, Cascadia, Costa Rica
- Collisional processes, e.g., Taiwan, Timor, E Mediterranean
- arc evolution, e.g., Tonga, Okinawa trough, S China Sea
- fluid flow/mass balance, e.g., Izu-Mariana, Costa Rica
- Tectonic erosion, e.g., Peru-Chile, Tonga, Japan Trench

12.3. Earthquake mechanisms

- monitoring seismicity using global seismic network and downhole geophysical observatories, e.g., west Pacific seismic network and related downhole measurements

13. Program planning groups

TECP proposes the following program planning groups, aimed to progress new initiatives:

- downhole measurements and observatories
- conjugate margins
- seismogenic segmentation (convergent margins)

14. Thanks

Alastair Robertson concluded the meeting by thanking all TECP members for their wonderful input and commitments to the panel's activities. On behalf of the panel members, Gary Karner expressed their gratitude to Alastair Robertson for his work as a very effective TECP chairman and his contribution in directing the meetings and organizing and executing related field trips.