JOIDES Tectonics Panel Meeting - Spring 1994

Date: March 10 - 12, 1994

Place: Royal Waikoloan Resort, Hawaii

Chair: Alastair Robertson

Host: Greg Moore

1. Attendees:

Panel Members	Liaisons and Guests
Agar, Sue	Taylor, Brian (PCOM)
Ashi, Juichiro	Underwood, Mike (SGPP)
Brown, Kevin	Clift, Peter (ODP-TAMU)
Hurst, Steve	Pezard, Phillipe (ODP-LDEO)
Lagabrielle, Yves	Schmitt, Karen (JOIDES)
Lin, Jian	
Moore, Greg	
Robertson, Alastair	
Skogseid, Jakob	
Steckler, Michael	
Symonds, Phil	
Ten Brink, Uri	
Von Huene, Roland	
Yin, An	

2. Panel Recommendations to PCOM

TECP Recommendation 1: Shipboard Structural Science

Recommendation 1.1 Shipboard Structural Science

TECP recommends to PCOM that PCOM recommend to JOI Inc. that ODP-TAMU be directed to immediately implement the collection and archiving of structural data on the *JOIDES Resolution* and that it should be made a responsibility of the Co-chiefs and the TAMU staff scientist to ensure that these data are collected whenever features of structural interest are noted by the shipboard scientists.

Explanatory Notes:

TECP remains very concerned that structural data are still not being routinely recorded at sea. Important data undoubtedly are being lost. TECP will present standardized log sheets, one for "soft rocks" and one for "hard rocks" for routine use to SMP and IHP for review at their next meetings.

Recommendation 1.2 Shipboard Structural Geologist Staffing

TECP recommends to PCOM that PCOM recommend to JOI Inc. that ODP-TAMU be directed to ensure that a minimum of two shipboard scientists with structural capabilities are included on every leg that was globally ranked as a proposal within the top-four by TECP.

Explanatory Notes:

TECP notes that there is still a need for advertisement, both within the US and within international partner countries, for additional shipboard structural geologists. TECP will

endeavor to to attract applications from structural geologists (e.g. advertisement in GSA Structural Geology and Tectonics Newsletter).

Recommendation 1.3 Publication of Structural Data

TECP recommends to PCOM that PCOM recommend to JOI Inc. that ODP-TAMU be directed to ensure that all structural data collected on a leg be routinely published in both the Initial Reports and Scientific Results volumes. Specifically, TECP recommends that the structural logs for Leg 153 be published with their respective volumes.

Explanatory Notes:

TECP is very concerned that structural data already recorded are not being published in the cruise reports on a routine basis. These are unique primary data, for example, of essential use in core-log integration.

Recommendation 1.4 Salvage of Recorded Structural Data

TECP recommends to PCOM that PCOM recommend to JOI Inc. that ODP-TAMU be directed to ensure that TAMU devise a means for collating and formally archiving structural data, initially to be made available in a written format as an ODP Technical Note.

Explanatory Notes:

TECP is concerned that ODP structural data previously collected are seriously in danger of being dispersed and lost. Inexpensive means of salvaging these data could include employing a graduate student for a limited period, or a former staff scientist part-time, under direction of a TAMU staff scientist. To maximize data salvage it will be necessary to contact past Co-chiefs of relevant legs and, in some cases, individual former shipboard structural geologists. Once collated and archived, TECP recommends that the structural data be retained in a generally accessible format (e.g. accessible by computer).

TECP Recommendation 2: Computing

A. TECP recommends that PCOM endorse TECP's establishment of a liaison between TECP and SMP and IHP to facilitate communication on the issue of structural data collection, processing, archiving and salvage.

B. TECP recommends that PCOM endorse TECP's establishment of a Tectonics Panel Working Group on Structural Measurements with the mandate to: (a) review computing requirements for structural data collection, processing, archiving and salvage, and (b) to communicate these requirements to SMP, IHP, and the Computer RFP Evaluation Committee.

Explanatory Notes:

TECP is concerned that new computer systems should be able to handle structural data effectively. To facilitate this, a working group under Steve Hurst was formally set up to review and make recommendations to TECP. TECP has also appointed Joann Stock to be a liaison to IHP to facilitate interaction.

Plans for significant upgrading of the shipboard computer hardware and software present an opportunity to correct past deficiencies and adopt new methods to make the scientist's job of collecting and analyzing data significantly easier. These improvements will come only if the shipboard scientists are actively involved in the specification, development and testing of the new data handling system. We suggest that a formal program be established to include representation from the ODP scientific community in the development and evolution of the new system.

The details of what exactly should be in the basic database should be done in consultation with experienced shipboard scientists. There is now a large reservoir of experience and opinion on

what should be included. A formal method for distilling these requirements into the database specifications should be provided. We suggest using the Tectonics Panel Working Group on Structural Measurements as a clearinghouse for the structural related specifications. The Tectonics Panel Working Group on Structural Measurements had the following general suggestions in addition:

- The ODP database should have a nucleus of recommended measurement and description that are the minimum expected for the features observed in the core (this is already implemented to some extent for non-structural data, but clearly deficient in structural data).
- The database should be flexible enough to add fields for numeric and textual data at the discretion of the shipboard party. These added fields should be fully integrated with the rest of the database.
- Graphic items such as scanned photos and drawings should be fully integrated into the database and on equal standing with other data items (fields). These graphics should be scalable (i.e. show items for the whole hole or any part of a core). The graphics should be able to be displayed with overlays and adjacent additional data (such as core photos with overlain structural drawings, adjacent to physical props. measurements).
- The database and extraction program(s) should be portable. The shipboard scientist should be able to bring a runtime version of the extraction program(s) and the leg database to his home base.

It is essential that the database programs be tested during development and implementation. Scientists with data from a variety of former ODP legs should be asked to use the program intensively to enter and extract data in simulated conditions as soon as practicable. Before shipboard use the system should undergo intensive testing, perhaps at a workshop meeting where real core is described, entered into the system, archived and extracted.

We emphasize that the new system should not be restricted by the need to be totally compatible with previous ODP databases. The previous databases are clearly insufficient to serve the needs of the scientists, especially structural geologists.

We recommend that a prime goal of the database system be to ease the means of entering a variety of shipboard data. Currently, a great deal more time may be spent entering data into the computer than is used to describe the core itself. Methods such as automatic scanning of core, portable measurement devices with automatic computer entry and handwriting recognition systems should be considered.

TECP Recommendation 3: Equipment Development

TECP recommends to PCOM the following engineering development priorities:

a. recovery of fluids and gases (i.e. Pressure Core Sampler)

b. recording stress and strain in formation (e.g. Borehole Televiewer, Orientation Tool, Lateral Stress Tool, P/S Wave Tool,)

Explanatory Notes:

TECP notes with concern the current financial constraints on engineering and tool development. If continued, this will place serious constraints on highly-ranked TECP objectives. TECP continues to endorse its previous prioritization (with removal of the PPCS).

To facilitate communication, TECP has appointed Kevin Brown to liaison to SMP, Steve Hurst to TEDCOM, while Sue Agar remains as liaison to DMP.

TECP Recommendation 4: Equipment Deployment

TECP recommends to PCOM that PCOM recommend to JOI Inc. that ODP-TAMU be directed to generate without delay a comprehensive guidebook dealing with capabilities and limitations of equipment (onboard and downhole) to be available primarily to Co-Chiefs to assist planning of legs and science operations at sea.

Explanatory Notes:

TECP is concerned that written information on capabilities of downhole instruments is not available, e.g. in a handbook for Co-chiefs to assist with planning of legs and shipboard science. TECP suggests to ODP-TAMU that this item be discussed and an implementation plan be created at the annual Co-chief's Review Meeting.

TECP looks forward to interaction with IHP on these aspects.

3. Global Ranking (Spring meeting) / Prospectus Ranking (Fall meeting)

Rank	Number	Short Title	Score	Std.Dev.	"Hero"
1.	447	Continental Extension in W. Woodlark Basin	18.73	3.4	Phil Symonds
2.	400-Add	Mass Balance of the Costa Rica Accretionary Wedge	17.33	4.5	Kevin Brown
3.	450	Taiwan Arc-Continent Collision	15.87	5	Greg Moore
4.	NARM-Add3	Iberia II	14.71	6.2	Roland Von Huene
5.	442	Rift Initiation in Backarc Basins: N. Mariana	14.13	5.9	Uri Ten Brink
6.	340	Tectonic Climatic Oceanic Change, N. Australian Margin	13.64	6.9	Carlo Doglioni
7.	NARM-Add2	East Greenland	12.47	6.2	
8.	333	Evolution of Pull-Apart Basin, Cayman Trough	12.36	6.5	
9.	445	Deformation and Fluid Flow in Nankai Trough	12.29	5.7	
10.	438	Test of Reflecting Interfaces in Oceanic Crust	12.00	5.3	
11.	31	Lower-Plate Continental margin A399	11.60	6.1	
12.	28	Japan Trench Downhole Observatory Off Sanriku	11.07	6	
13.	437	Lau-Havre-Taupo Rift to Drift	11.00	4.7	
14.	NARM-Add	Newfoundland Basin	10.87	5.9	

15.	432	Galicia Deep Hole S-Reflector	10.80	5.9	
16.	30	Erosion, Mass and Fluid Flux, Returned to the Mantle	9.93	5.6	
17.	446	Ocean Drilling in the Tonga Forearc	9.87	5.7	
18.	24	Cascadia Margin II	9.07	6	
19.	431-Add	Western Pacific Seismic Network	8.13	5.2	
20.	29	Evolution of the Hawaiian Hot Spot	7.93	5.9	
21.	21	Early Stages of Crustal Creation in the Western Pacific	7.13	4.7	
22.	443	Faults, Crustal Heterogeneity & Hydrology at 504B/896A	6.33	5.4	

4. Future Meeting Dates

Dates	Place	Host/Contact
Oct. 20 - 22, 1994	Cyprus	Xenophontos/Robertson
Spring 1995	San Luis Obispo, California	Underwood

5. TECP Liaisons for 1994

Panel Member	Liaison to:
Greg Moore	SGPP
Jian Lin	LITHP
Kevin Brown	SMP
Joann Stock	IHP
Sue Agar	DMP
Steve Hurst	TEDCOM

No other membership actions required.

A. Liaison Reports at the TECP Meeting

1. PCOM

Taylor reviewed the evolution of the FY95 Science Plan adopted by PCOM at the December 1993 annual meeting. He reported on the budget priorities that PCOM had recommended for the FY95 budget process and discussed the agenda items for the upcoming PCOM meeting.

2. ODP-TAMU

TAMU Science Operator Report (Peter Clift)

The diamond coring system (DCS) is presently being prepared for land testing at Midland, Texas. The testing will not focus on the drilling technology but on the secondary heave compensator. This has a new software system involving "fuzzy logic" and will be tested using real wave data from the JOIDES Resolution. This testing is dependent on the success of testing on models and on the resolution of contractual problems with the operating company in Midland, *Partech*. Further engineering developments include improvements in the pressure core sampler in the region of the seal in preparation for upcoming legs, such as 156 and 164.

The computing group at ODP/TAMU are aiming to complete and sign a contract for the database upgrade in April this year. Development is due to last until 1997. Testing of Rocky, the hardrock description program was done on Leg 153. It is yet to achieve operational quality and will now be modified for further testing. Etch-a-sketch, which is the next generation sediment description and barrel sheet program will be demonstrated at the SMP meeting and is intended to be tested at sea soon. The role of structural measurements in the database must be considered as a priority item by TECP. The standardization of ODP structural data collection is now a principle item of concern. The recent inclusion of "structural geologist" as a regular position has helped in strengthening structural geology within the program but TECP's input as to what measurements need to be taken and in what form is essential. The aim is to produce a structural data program to allow the direct input of data into the database.

Staffing is complete up to Leg 158 and future staffing for Legs 159-162 will begin in April.

Leg 151, which had little tectonic component, successfully documented the history of glaciation and deep water flow through the Fram Strait into the Greenland Basin. Plio-Pleistocene calcareous fauna were recovered but in older sediments these have been dissolved away. A siliceous fauna, suggesting high productivity, has been found in the middle to upper Miocene in the Fram Strait and in the upper Eocene to Oligocene on the Greenland margin. North Atlantic Deep Water is dated from the Late Miocene. Intense glaciation starts at 2.5 Ma but is first recorded on the Iceland Plateau at 6.5 Ma.

Leg 152 was a big tectonic success as it completed a transect across the dipping reflectors off SE Greenland. Site 917 penetrated almost 800m of basalt into steeply dipping volcaniclastic shale under a major normal fault. The basalts were all erupted subaerially within magnetic Chron 24r. Early spreading rates are inferred to be more rapid than subsequently. Uplift of the Greenland margin is inferred to occur in the late Oligocene, possibly due to a ridge push effect.

Leg 153 cored 200m of serpentinized peridotite at Site 920, the deepest such hole in the ocean basins. Shallower coring in gabbros penetrated up to 80 m into basement. Plastic and brittle deformation is recorded in these rocks and documents rapid unroofing close to the rift valley. Melt veins in equilibrium with the peridotite represents an important find.

Leg 154 has succeeded in drilling high recovery, deep penetration holes into the pelagic cover of the Ceara Rise. At Site 925 none of the expected Miocene hiatuses were recognized, thus providing a continuous lower Eocene to Recent record with a diverse calcareous fauna throughout. Increasing sedimentation rates and flux from Amazon since the Plio-Pleistocene.

3. LITHP

MARK Review - Leg 153

Cannat reviewed the TECP objectives addressed on the MARK leg and reviewed the preliminary scientific results. She reported that Hole 920 was characterized by high temperature deformation (near solidus). A 200 m section of mantle was brought up and the distribution of shear zones indicated that the deformation was very localized. In addition, at 920 it was possible to see the multiple generations of gabbro injected at the end of the asthenospheric deformation. These gabbros were emplaced during the uplift as repeated injections of melt. Cannat explained that it would now be possible to look at the sequence of this injection process.

Cannat outlined the operational difficulties that were encountered during drilling at 920. Hole 920B was drilling well at 120 mbsf so they had pulled out of to put down the HRB. However, after this the HRB became unstable on the hole due to washout around and below the HRB. Hole 920D drilled well to 100 - 120 m when it also became unstable and collapsed. She concluded that at this site the HRB was not the main problem, internal hole stability caused the difficulties.

At Site 921 hole instability also made deep drilling unfeasible, again it was not problems with the HRB that were as problematical as the tectonism of the fault zone. Cannat explained that the gabbros recovered at this site were similar in composition to the 735B gabbros and different from the Hess Deep recovery.

4. DMP

Downhole Measurements Panel Report (Sue Agar)

The DMP meeting in Santa Fe was held jointly with LITHP with a main objective to discuss downhole measurements for TAG drilling. Of the possible drilling scenarios discussed it was considered most likely that vigorous downflow of cold seawater into the hole would occur, in which case the normal logging suite could be used but clearly some of planned measurements would not be achieved. If the holes are not cooled then the Schlumberger HEL tools ($60k) or memory tools would be needed. There are still problems with a high temperature cable for high temperature tools. This cable is currently being independently developed and if successful the company will approach ODP to see if they are interested in purchasing it.

The future of the DMT borehole televiewer was to be decided after Leg 152 but as it was not used during this Leg there is no change in the status of this tool. The cost per leg of running the BTV is $14k. DMP is taking action to ensure that there is a reliable tool available for recording borehole breakouts. A second version of the LAST (lateral stress) tool is being developed, involving a solid device (as opposed to a cylinder) with an inflatable packer. This tool still needs calibration. The core scriber and tensor tool are operational. The sonic core monitor, essential for core-log integration, is being developed over the next 1 to 3 years. The French temperature tool has been successful on Leg 148, 140 and 139 and is planned for use on TAG. The CSMA resistivity tool is designed to be used at temperatures up to 350°C and can measure borehole temperature and fluid conductivity. This tool requires funds on land high temperature tests.

The borehole research group outlined tools it is currently considering for development and sought feedback from the panels for prioritization. Does TECP see a use for the Dipole sonic imager tool? There are problems with the data interpretation for this tool at the moment. There is a modular formation dynamics tool and an improved geochemical tool from Schlumberger (both requiring "top hats" for deployment. The GHMT magnetic susceptibility tool is free until Leg 160. After this, the costs of the tool will be incurred. This tool could be included as part of the standard logging suite. The BRG will be sending representatives to meetings. Preliminary versions of tool brochures for geochemical tool and the neutron porosity tool have been prepared.

LWD (logging while drilling) was support by DMP for Barbados. DMP noted that the Sedimented Ridges II and Mediterranean Ridges legs would involve similar logging needs to Barbados and TAG and that panels and proponents should note the high costs involved. No special operating expenses for tool development have been included in the FY94 budget so any tool development will require proponents to acquire external funds. DMP recognized that the procedures for third party tool development could be off-putting for proponents. P. Lysne is preparing a JOIDES Journal article outlining these procedures.

5. BRG

BRG Report (Philippe Pezard; IMT, Marseilles, France)

Following a 1992 RFP concerning downhole measurements activities, the ODP "wireline services" structure was formaly reorganized in October 1993 (FY94). Still headed at Lamont-Doherty, this activity now receives support in the areas of ship staffing, scientific support and data processing, of two groups located within Leicester University in the UK, and the Institut Méditerranéen de Technologie in Marseilles, France. While the activity of the former is primarily concerned with the processing of geochemical and sonic data, that of the latter is centered ón electrical FMS images and magnetic data.

With a downhole measurement program now stabilized in terms of data reliability for "standard" measurements (geophysical and geochemical strings, FMS images), an effort appears to be needed to assist the ODP community in the use and translation of downhole measurements into geological facts. As for other thematic panels, the presence of a BRG liaison to at least a TECP meeting a year is intended to contribute to respond to this need.

Panel members are invited to seek support from the BRG representative, both during and in between meetings, to answer questions concerning downhole measurements or specifics of logging programs.

Recent results and new methods

Beside Leg 153 (MARK area), where logging was not allowed due to hole instabilities, the recording of downhole measurements has been highly sucessful over the past 12 months. High quality logging data and borehole images were recorded in sediments at 4 sites during both Leg 150 (New Jersey margin) and 151 (NAAG I), and at least at two sites (at the time of the meeting) during Leg 154 (Cerea Rise).

FMS images recorded during Leg 149 (NARM/Iberia) in foliated basement were reported as defective in the Part A volume. Initially unreported sofware modifications related to the use of the MAXIS computer (for which it was the first leg) were responsible for image scrambles. The 149 images will be reprocessed and available for analysis in the near future.

The mapping of fractures imaged with the FMS at Site 894 (Leg 147 at Hess Deep) over a 35-m-long interval indicate a 35 degrees clockwise rotation of the paleomagnetic vector over the past million year. This implies a presently unexplaned rotation of the horst within which most of the holes of Leg 147 were sited.

Data recorded during Leg 152 (NARM/SE Greenland) and Leg 148 (Hole 504B and 896A) were presented to the panel.

Leg 152 - Site 917 penetrated almost 800 m of subaerial basalt, and logs were recorded over a 350-m-long interval in Hole 917A. The geophysical data (Figure 1) show in a continuous manner the succession of individual flows found to be electrically resistive and acoustically fast at the base, whereas more conductive and slower near the top. Such signatures are similar to those observed in Hole 642E on the Vöring plateau, and is associated with alteration that developed between eruptions in the upper part of the flows. This m-scale structure is reproduced in FMS images, which also picture numerous structural and textural features.

The primary magmatic signal appears to be preserved in the natural gamma ray (GR) profile, which mostly respond to potassium content. While the tholeeites at the base of the sequence have a generally low potassium content and natural radioactivity, the dacite and more picritic lava located above are more radioactive. The remarkable linearity of the GR profile accross a 60-m-thick massive flow (Unit LU2) is unexplained at this stage.

The calipers of the FMS show a-N030°-oriented hole elongation over the logged interval. Whether this direction is associated with the flexure of the continental margin has not been investigated at this stage. This orientation is however coherent with the plate motion direction in this part of the North Atlantic.

Leg 148 - The quality of logging data collected both in Hole 504B and 896A was certainly the most positive element of the cruise. In particular, excellent acoustic (P- and S-wave), electrical resistivity, magnetic data (with the German BGR tool) and FMS images (Figure 2) were obtained throughout basement in each hole. The calipers and inclinometry section of the FMS provided a continuous description of hole size, shape and direction.

While calipers show a substancially enlarged borehole in the extrusive upper 700 m of basement (Figure 3), the newly recorded directional data will be essential in a reappraisal of borehole breakouts and induced fractures for stress in Hole 504B from existing BHTV and newly recorded FMS images.

The electrical resistivity data from the dual laterolog provide a continuous description of fracture distribution versus depth at m-scale. Near the base of the hole, high concentration of fractures appear to be associated with the presence of borehole breakouts (Figure 4) oriented at right-angle to those detected from BHTV images in the upper part of the dikes. Whereas theses breakouts originate in locally reduced effective stresses due to modified pore pressure in the fractures, or in relation to thermal stresses ("thermo-fracs") associated with drilling and borehole fluid circulation is not known at this stage.

At cm-scale, the geometry and aperture of individual fractures and fault zones imaged with the FMS will be determined in the near future from newly established image analysis workstation at L-DEO, IMT in Marseille or Leicester University. The use of these borehole surface image-analysis workstations are open to the ODP community for analysis of old or newly recorded images.

6. TEDCOM

TEDCOM Liaison Report (Greg Moore)

At its Fall meeting TEDCOM discussed the status of DCS development. The land field test of DCS was scheduled for October, but problems with the computer simulations seemed likely to preclude actually carrying out the tests until some later date.

Other reports were made on the status of the Diamond Retractable Bit, vibra-percussion corer, hard rock core orientation, and pressure core sampler. A discussion of deep drilling technology was focused on the likelihood that the Alboran deep site would be drilled in 1994/5.

At its Spring meeting, TEDCOM again addressed the status of DCS. ODP/TAMU engineers reported that computer simulations and mechanical model tests should be completed in June, and land tests will be scheduled for summer of 1994. TEDCOM does not want land tests scheduled until the simulation and model tests are completed.

In a joint meeting with SGPP, TEDCOM discussed the status of PCB, which needs only minor modifications to be operational.

The problem of inadequate site surveys for MARK and Hess Deep were discussed and ideas were presented for improving site characterization prior to drilling operations in this type of environment.

A list of on-going engineering projects was presented. This list is available for TECP members to use for prioritizing future engineering development.

7. SGPP

Underwood reported on the SGPP White Paper revision noting that budget situation would make focusing an important problem for all of the panels. SGPP had decided to focus on the themes of: (1) sea level and facies architecture, (2) fluid flow and geochemical fluxes, (3) base of the biosphere (nutrient fluxes/cycles, carbon geodynamics and deep microbiology.

Discussion of the SGPP global ranking was held for discussion until after TECP ranking.

Underwood discussed the 2003-1998 period in the context of the three themes; studies to address the SGPP themes would not include time periods beyond the Neogene. Emphasis was also given to priorities that would have an attraction for funding agencies in addition to being of thematic interest. Robertson asked TECP to consider this issue of societal relevance and be prepared for discussion on the topic after the review of proposals.

B. Proposal Reviews

Robertson explained the process that the panel would use to review proposals and highlight those with TECP interest for the global ranking process.

NARM-Add3, Basement sampling of the ocean-continent transition west of Iberia: sequel to Leg 149 studies of a non-volcanic margin

A1, B1.2, B2.1, C2, D1, E5, E8, F2

This proposal builds on the results and interpretations arising from Leg 149 over the non-volcanic, west Iberia continental margin. It presents a strategy to complete the NARM-DPG objectives in this area and thus characterise basement on a transect of holes across the ocean/continent transition zone (OCT), at the same time as addressing new questions raised by the drilling, The proposal also includes drilling a pilot hole at GAL-1 (an old NARM-DPG site that was not scheduled for Leg 149 because of time constraints) to determine the nature of the enigmatic terrane overlyind the S' reflector imaged on the northwest slope of Galicia Bank. This was proposed to test the possibility of drilling a detachment fault or the crust/mantle boundary on a subsequent leg. As mentioned by the proponents, the proposal presents a preliminary drilling program, and presumably a more mature proposal will be submitted following further analysis of the results of Leg 149.

Leg 149 confirmed the continental nature of the inboard end of the drilling transect, and revealed a much wider expanse of peridotite (upper mantle) within the outer part of the OCT than the original proponents expected. It also produced some unexpected and as yet poorly understood results, which highlight the complex nature of the OCT. The application of a simple shear model, as presented in this proposal, or a combination simple/pure shear model, to explain the lithospheric extension across the west Iberia margin predicts the possibility of a complex arrangement of basement highs within the OCT, and points to the need for detailed consideration of such models prior to drilling. It reinforces TECP's appeal for the presentation of balanced cross sections, no matter how schematic, within proposals as although they can be very subjective they are a very useful aid to proponents in thinking about the extensional history and processes that have operated, and thus the arrangement of rock types that can be expected within the area to be drilled. For example, using such models to explain the west Iberia OCT would predict that the basement highs could consists of a wide variety of possibilities ranging from peridotite (exposed upper continental mantle), underplated material, lower continental crust, upper continental crust, pre-rift sedimentary rocks, and syn-rift sedimentary rocks, as well as combinations of some of the above separated by a detachment. In the model contained in the proposal a later stage of faulting following on from detachment faulting, is invoked to break up the extended terrane into the fault blocks observed in the west Iberia OCT. However, a detachment model could also be envisaged

in which this was unnecessary, as a detachment fault rooted in the upper mantle could be overlain by rotated, upper plate fault blocks containing all of the basement elements described above without recourse to a later episode of significant structuring.

The above discussion serves to illustrate that there are probably a variety of tectonic models that can be used to explain the results of Leg 149. TECP feels that this points to the need for a period of reflection on the results and implications of the leg, before new, testable drilling proposals can be brought to maturity. TECP would like to see the proponents discuss the issue of what further drilling in this area will tell us beyond the main outcome of Leg 149, that the OCT is a complicated extended zone in which upper mantle has been exposed. Although TECP sees the logic in the drilling strategy proposed, it considers that there is considerable risk in proceeding with further drilling in this area prior to the development of more firmly based models. Further processing of seismic data in the area using the interactive, pre-stack migration techniques employed by Tim Reston should result in better imaging of the basement blocks and improved understanding of the Leg 149 sites and their place within the OCT. This will help in the development of more realistic models for testing on any future leg.

TECP feels that the results of Leg 149 require re-modelling of the potential field data on the transect to better constrain the limits of the peridotite and the metamorphosed mafic igneoes rocks (gabbro) of Site 900. There was considerable mis-match between observed and modelled magnetic anomaly in the pre-drill interpretation and this may be pointing to a complication in the OCT that can now be understood following Leg 149.

There are some ambiguities and inconsistencies in the proposal as is stands at the moment:

1. In the strategy section mention is commonly made of the location of the OCT between various sites. The original idea of Leg 149 was not so much locate the ocean-continent boundary but to characterise the OCT.

2. In the extensional model contained within the proposal the ocean-continent boundary would lie at the junction of the oceanic crust and the exposed continental upper mantle represented by the peridotites. If the peridotites were shown to represent oceanic upper mantle then of course the ocean-continent boundary could be some distance to the east. The start of the OCT must lie at the inner edge of identified oceanic crust,

TECP still rates characterisation of the OCT on the west Iberia margin as a high priority objective, and believes that drilling in this area should be completed following a period of reflection on the results of Leg 149 and a reconsideration of what can be tested and achieved by drilling at this location.

354 rev-2, Wefer et al.

A5, B1.1, B2.1, C1, D1

The proposal is not directed towards tectonic thematics. A deep hole on the Walvis Ridge could, however, reveal information on the subsidence history of this originally sub-aerial plume-related structure, and thus show "the entire" history of the current system in the region.

355-Rev3, Geophysical Estimates of gas hydrate quantities: A calibration through ODP drilling

A3, B1.2, B2.1, C1, D5, E8, F3

TECP recognized that this proposal was intended primarily for SGPP review but noted that there were several aspects that were of direct interest to TECP. Specifically, investigations proposed to examine the impact of the burial and uplift history of sediments on the formation of gas hydrates could provide a valuable way to use gas hydrates as a tool for constraining active tectonic processes. From this perspective, the proposal needs to include more information on existing

constraints on the structural framework, for example, have the locations of basin-controlling faults been identified? What are the existing constraints on the burial and uplift histories? How do the results of the fluid flow modeling relate to forearc structures? A higher ranking by TECP would need more detail on the broader tectonic history and present-day framework to examine possible hypotheses that link the generation of gas hydrates to the tectonic history. Some of the main aims of the proposal rely on the success of fluid sampling tools and retaining samples under pressure. The proponents would need to ensure that they could achieve these sampling objectives, given some of the difficulties encountered with fluid sampling in the past. Even though the Peru location is well-justified as one possible site for this study it would help to explain why Cascadia or the Chile Triple junction are not better alternative locations, given the studies that have already been undertaken in these areas.

367-Rev, Great Australian Bight: Evolution of a Cenozoic cool-water carbonate continental margin

A5, B1.1, B2.1, C2, D1, F4

This well formulated and presented proposal addresses the evolution of the world's largest cool-water carbonate shelf - southern Australian continental margin - and examines its response to oceanographic and biotic change. The proposal also seeks to use the carbonate sediments to understand global sealevel fluctuations, physical and chemical paleo-ocean dynamics, biotic evolution, hydrology and diagenesis, The proponents also suggest that some of sites could be used to deduce the subsidence history in and around the Southwest Ceduna Accommodation Zone - a major structural compartment boundary within the southern Australian margin rift system - as a basis for understanding accommodation zone movements. While this is of general tectonic interest it is not an important TECP thematic objective.

TECP recognises that if a tectonically oriented proposal such as outlined in letter of intent L31 (Lower-plate continental margin off southern Australia) progresses to maturity, then some of the sites oulined in this current proposal may be relevant to understanding the subsidence history of the inboard part of the margin.

Another consideration for this proposal that may have tectonic implications is that the Southern Ocean appears to be associated with anomalous mantle which is interpreted o be responsible for enigmatic features such as the Australia-Antaractic Discordance. It is possible that this anomaly could have affected the tectonic subsidence regime along the southern Australian margin, and therefore distorted the influence of global sealevel fluctuations on the carbonate sediments.

The proposal focusses on OHP and SGPP themes, and is not relevant to the priority thematic objectives of TECP.

384-Rev3

A2, B1.2, B2.1, C3, D1, E8, F2

In the present group of drilling proposals before the ODP panels, proposal 384 could be a contender if it were formulated more precisely. TECP interest is confined to proposed site A-1 because of its potential to define the path of the Caribbean plate and refine the Pacific basin plate history. Despite 2 revisions and extensive new geophysical data the present proposal does not adequately define the drill target. A 1500 m depth hole in these water depths is at high risk of not being completed because of the increasing drilling problems with depth. This means that the geophysics supporting the drilling must be of good quality. A-1 is located in an area of confused reflections and the target depth is not certain.

The following suggestions are offered from the TECP to improve this proposal. First the C03 seismic line must be carefully migrated so that the reflections at the site are in proper position and clearly defined. If B" is clearly imaged, then a precise depth estimate with stated limits of

uncertainty must be made. This estimate should make use of the site 153 depth and velocity information which is then extended downward with information from the closest refraction station (not semblance stacking velocities). The hole stability history of 153 and its implications for A-1 should be indicated. If the hole is then clearly drillable in half a leg, the dense network of seismic lines around the proposed sites A-1 and 153 should be used for construction of contour maps in depth showing the A"B"and sub B" horizons. Variability of thickness relative to the ridge would greatly support the safety and site survey aspects. This is the type of data set required to support a proposal which which would stand any chance at all of being drilled.

In the present group of drilling proposals before the ODP panels, proposal 384 could be a contender if it were formulated more precisely. The TECP interest is confined to proposed site A-1 because of its potential to define the path of the Caribbean plate and refine the Pacific basin plate history. Despite 2 revisions and extensive new geophysical data the present proposal does not adequately define the drill target. A 1500 m depth a hole in these water depths is at high risk of not being completed because of the increasing drilling problems with depth. This means that the geophysics supporting the drilling must be of good quality. The following suggestions are offered from the TECP. First the C03 seismic line must be carefully migrated so that the reflections at the site are in proper position and clearly defined. If B" is clearly imaged, then a precise depth estimate with limits of uncertainty must be made. This estimate should make use of the site 153 depth and velocity information which is then extended downward with information from the closest refraction station (not semblance stacking velocities). Indicate also the hole stability history of 153 and the implications for A-1. If the hole is then drillable in half a leg the dense network of seismic lines around the proposed sites A-1 and 153 should be used for construction of contour maps in depth showing the A"B"and sub B" horizons. This is the type of data set required to support a proposal which would stand any chance at all of being drilled.

386-Add2, M. Lyle et al.

A3, , , , , , F4

Although this proposal addresses primarily OHP objectives, the proposed basement penetration at Site CA-4 remains of strong interest to TECP. TECP is also interested in the general issue of translation, rotation, and titling of the California margin and its relation to continental tectonics of the California. TECP wish to emphasize that it is important to retain the basement penetration at Site CA-4 as a part of the California margin drilling strategy. We also continue to encourage stress measurement at CA-4.

To better address the Tectonic aspects of this drilling program, we encourage the proponents to consider possible collaboration with researchers who are interested in tectonics of this region. Possible candidates include, but not limited to, Dr. Paul Stoddard of the Northeastern Illinois University and Dr. Doug Wilson of UC, Santa Barbara.

400-Add2, Costa Rica

A1, B1.1, B2.1, C1, D1, , F1

This proposal remains a very high priority of the TECP as it presents exellent oppertunity to test the proposed crustal flux objectives with an additional important component concerned with the fluid flux distribution in the wedge. The following improvements, however, should be made in terms of the clarity and detail of the proposed scientific objectives.

First, the pannel was very keen to see the proponents make full use of the new Alvin and existing 3 D seismic data sets to put the proposed sites in a detailed structural and hydrogeologic context. In particular, detailed structural maps should show the main structual elements (for example, out-sequance thrusts, deformation front, the western termination of the seismically resolvable slope cover sequance, and the fluid vents) in the context of the drill sites. Structural contour maps

should be presented to delineate the 3D nature dipping internal structures that are an important drilling target at CR 3. Any changes in the lateral nature and extent of the negative polarity anomaly associated with the basal decollement zone at the toe of the wedge should also be brought out in the context of the positioning of site CR 2. At a secondary level it should also be possible to define the lateral extent of the the ramps associated with the underplated sediments and the general distribution of the duplexes. The plan of study for the CORK site should also be tightened up with a clear detailed plan that addresses what and how data is to be collected (i.e instruments to be deployed) and further details of any follow up program that will use the CORK for permeability tests etc.

The pannel also felt that emphasis should remain on: a) Determining the position and nature of the backstop (i.e. CR4) since this is important to the total material flux balance and, b) fully coodinating this study with studies of the along arc geochemical variations in the volcanoes.

1) We need to see the sites placed in the context of the 3D data

2) Need to bing in more form the onland volcanoes

3) Back stop needs to be better dileneated

4) Corkes we need to see a more detailed plan

408-Add2, Droxler et al.

A5, , , , ,

The Caribbean played an important role in the exchange of water masses between the low latitudes of the North Atlantic and Pacific oceans. The Caribbean evolution comprises a succession of opening and closure of small basin and barriers which modulated exchanges of water masses.

From a tectonic point of view, it is of high interest to describe better the temporal succession of current distribution in order to understand the role of Neogene tectonic activity on ocean circulation. This proposal has local tectonic interests but also has implication for a more global scale. It may help increase our understanding of how tectonic processes have consequences on global water masses circulation, and thus on global climate changes.

This addendum to proposals 408-rev, 415-rev, and 434 is an attempt to gather in a comprehensive Neogene drilling package several objectives which have been partially described in other proposals. This package includes a series of drilling targets designed specifically to answer questions about the location and the strength of ocean currents in the Caribbean during the Neogene. It addresses problems of major interest for OHP, but several questions that are discussed could be also of interest for the Tectonic Panel.

Four sites NR 1/2, NR 4, SSF 1 and S1 are located along a transect parallel to the Western Boundary Current. This surface current comprises the Caribbean current, the Loop current and the Gulf Stream. It could play a major role in inter-hemisphere exchanges from the South to the North Atlantic Ocean.

This proposal also addresses the question of variations through time of the water column stratification at intermediate water depths. Two depth transects are proposed that include up-current location relative to the Northern Nicaragua Rise (NR 9, NR 8/S 5, S 6, S 3, S 7, S 4) and down-current location relative to the Northern Nicaragua Rise (NR 7, S 2).

NR 1/2, NR 4, NR 9, SSF 1, BC 1 are ready to drill in the near future

(high resolution single channel and multi-channel lines and piston cores are available). S 2, NR 7, NR 8/S 5, S 6 and S 8 need site surveys. Proposal for site survey will be submitted this year to NSF. A cruise from GEOMAR is scheduled for the end of 1995.

Time estimates given by the authors do not seem unreasonable (total between 60 days to 68 days). Some sites should be eliminated if necessary.

TECP Review

This proposal could help better understand how tectonic processes have consequences on global water masses circulation, and thus on Earth global climate changes.

To have better TECP support, this proposal needs first to develop the types of links between the foundering of the megabank and the regional tectonics in the Caribbean. Why and how do these events relate to motion along the northern Caribbean boundary ? Which type of tectonics is responsible for the relative motion between the pieces of the foundered bank : extensional only, strike-slip, a combination of two? They should also mention that interest in Sites S1 and NR7 can be to try to document vertical motion related to the opening of the Cayman Trough. The second question concerns the plate kinematic reconstruction used in the proposal. The proponents do not discuss the validity of the reconstruction that they refer to in this proposal. Is the reconstruction used the only one avalaible?

415-Add2, H. Sigurdsson et al.

A5, , , , , , F4

In this Addendum, the proponents of the three Carribbean ODP proposals (#415-Rev, #408 Rev, and #434) propose to coordinate their programs into two drilling scenarios: 1) single-leg drilling to achieve primarily the paleoceanographic and Cretaceous/Tertiary boundary objectives; or 2) two-leg drilling to achieve additional lithospheric objectives of studying large Carribbean igneous province, as well as the same paleoceanographic and K/T boundary objectives as in the single-leg scenario.

Although TECP has a general interest in the problems of large igneous province and K/T boundary, neither of the proposed drilling scenarios will address the primary TECP priorities. We encourage the proponents of 415-Add2 and 408-Add2 to continue coordination of their drilling programs in the Carribbean.

421-rev, Vasiliev

A5, B1.3, B2.1, C3, D1, E2, E3, E4, E8, F4

The proposal does not address high priority tectonic themes. Processes in subduction zones however, have high priority to the panel, and existing data, e.g. from dredging, are important in the evaluation of tectonic models. Both from a geological and a technical point of view a detailed geophysical investigation will be needed before any drill site can be located. The panel stress that the proposal could become a higher priority topic if ver much more data is added, and thus, can place the proposed sites in the frame of a testable tectonic setting.

Because the observations of high SiO_2 content igneous rocks, as described in the proposal, are observed also other places in the oceanic domain, the panel recommend the proponent to make contact with the panel chair who can suggest contact with other groups working in the area, or with related topics.

431-Add, Western Pacific Seismic Network

A2, , B2.1, C1, D3, E1, E3, E4, E8, F3

TECP is highly supportive of the long-term objectives of the suggested work, which involves installation of two submarine broadband seismic stations as part of the Western Pacific Seismic network. The addition of data from these stations to the data from onland networks will help elucidate some topics that are TECP objectives, including structure of the Philippine Sea plate and

underlying mantle; structure of the western Pacific plate and underlying mantle; seismological images of the subducted plates and how they interact with the 670 km discontinuity; and mantle flow related to the creation of the western Pacific marginal seas.

The sites suggested (NW Pacific site at approximately 42 N, 160 E and site in the Philippine Sea) constitute two of the eight listed as priority sites in the OSN/ISN document (Aug. 1993). This is clearly a strength of the proposal, because it demonstrates a consensus, among the international seismological community, of the importance of these particular sites.

The OSN/ION planning document also proposes a 3-phase implementation of ocean bottom seismometers: pilot experiments, prototype stations, and establishment of the ION after the year 2000. Under this scenario, the drilling proposed here would contribue to phase 2 of this program. However, TECP is concerned that Phase 1 has not progressed far enough that planning of Phase 2 can commence. In particular, it must be demonstrated that the installation of seismometers within a drill hole, rather than just on the seafloor (OBS), is warranted at these sites. Although TECP recognizes the great benefits to be realized from the installation of permanent seismic stations in oceanic regions, it is not clear from this proposal (nor from the OSN/IOS document, Appendix 2) that downhole installations at these two sites will be superior to seafloor installations. We urge the proponents to specifically discuss this point, in light of the sediment thicknesses and lithologies at the two proposed sites and any available test data from other areas.

Two other questions of technical feasibility arise. First, the present instrument still has rather high noise levels at frequencies < 0.1 Hz. Better signal-to-noise ratios are needed; we understand that progress should be made in this direction as developmental work continues. Second, TECP recommends that shorter-term OBS studies should be made at the sites prior to any decision to drill them. This would ensure that the sites have no unexpected site effects that might make them undesirable locations for a network station, regardless of whether seafloor or downhole installation is used.

The OSN/ION planning document (1993) recognizes the need for studies to understand how the depth of burial of the sensor affects the recorded data. Presumably such studies could be conducted in TECP thus suggests that the proponents provide some rationale for the depth of basement penetration chosen (50 m) and continue to monitor this aspect of the drilling request as more data on this point become available.

TECP also notes, for the record, that there are several tectonic objectives that could be addressed in holes in these two locations, prior to the installation of borehole seismometers. For example, characterization of basement fractures, borehole breakouts (if present), or the stress state, would be highly desirable in both of the proposed drill hole locations, and would augment the presently sparse datasets on the Pacific and Philippine plates.

B2.1 Location is appropriate, both for the specific scientific objectives mentioned in the proposal and for the general needs of the global seismological community as expressed in the OSN/ION document of Aug., 1993.

E1. Needs abstract

E3. Survey coverage map - not shown. (Surveys not done yet for hole WP-2)

E4. Regional geological setting--needs more work and needs to be more thoroughly included in the objectives

E8. See review comments

435-Rev, Crustal fluxes into the mantle at convergent margins: A. The Nicaraguan margin

A. 3, B1.1, B2.1, C. 2, D. 1, E. 2, 3, 5, F. 2

This proposal addresses the flux of crustal material subducted at a relatively simple convergent margin. The margin has a distinct petrochemistry that is known from extensive sampling of the Central American volcanic arc. ODP samples will provide critical data on the sedimentary and oceanic crustal components being input to the system for comparison with known output from the active volcanoes.

This is the first part of a revision of a proposal that was first ranked by TECP in 1993. At that time, TECP agreed that the determination of the mass balance in accretionary prisms is of fundamental tectonic significance and that the Nicaraguan convergent margin is probably among the best places to carry out such an experiment. The proposal was still immature last year, lacking adequate geophysical data and geologic characterization of the margin. The proposal was assigned a "3".

This revision addresses some questions raised in the initial review. For instance, the UT seismic line across the Nicaraguan margin has been reprocessed. However, because no new geophysical data have been collected, the region remains insufficiently characterized -- a site survey is needed before this proposal can be considered to be mature. If the forearc region is to be drilled, excellent structural maps and cross-sections are necessary. TECP would like to see more information on Central American land geology, especially the history of volcanism and the chemical evolution of the volcanoes through time.

TECP suggests a strategy of drilling the seaward reference site to determine whether or not there is a geochemical signal off Nicaragua. If not, the landward sites are not necessary. A large amount of site survey data would not be necessary to locate a seaward site.

435-Rev2, Crustal fluxes into the mantle at convergent margins: B. The Mariana-Izu margin

A3, B1.2, B2.1, C2, D1, E8, F3

As with 435-Rev, this is a revision of part of 435 and deals with the flux of crustal material subducted at a convergent margin. This proposal is complementary to 435-Rev; it deals with the Mariana-Izu region in the western Pacific.

TECP believes that this revision still contains major deficiencies. The choice of ODP Site 801C is poor, because no Jurassic crust has been subducted in the Izu-Mariana region. A site closer to the Mariana Trench would be better. TECP has reservations about the validity of determining the bulk chemical composition from a single oceanic crustal reference site, given the known heterogeneity of oceanic crust (e.g., hydrothermal alteration, etc.). TECP suggests that geochemical modeling be undertaken using the existing data from the Izu-Bonin and Mariana arc and forearc sites to predict the linkage between subducting crust and the output observed in the arc/forearc. Thermal modeling would also be helpful to constrain the overall fluid circulation regime.

TECP finds the present proposal to be of limited thematic interest because it addresses only the topic of geochemical fluxes.

This revision contains examples of seismic reflection lines shot over the proposed drilling area; the sites are adequately characterized.

436, Neogene Sequence Stratigraphy Northern Campeche Bank

A5, , , , , , F4

The main objectives of this proposal are to test the validity of sequence stratigraphic models and study the local geological processes which control depositional geometries. There are no objectives related to the TECP mandate.

437, Lau-Havre-Taupo: Convergent margin spreading to rifting transect

A1, B1.2, B2.1, C2, D1, E3, E5, E6, F3

This is an immature proposal to drill a series of holes along the strike of the Lau-Havre-Taupo backarc rift system. The series of holes, primarily drilled along the axis of the system, will date the propagation of the rifting southward and document the sedimentary and volcanic fill of the rift. The proposal is still preliminary, in that, while a general approach to the drilling is outlined, specific locations for the sites are not identified. Due to the lack of seismic data showing the settings of sites within the rift structure, a complete evaluation of the probability of acheive the objectives is not yet possible. However, the scientific problem is of great interest to TECP and the strategy seems promising. We encourage the proponents in their plans to convene a working group to prepare a full proposal.

One problem, identified by the proponents, with the current drilling plans is the amount of drilling. The proposal envisions eight 1000-1500 m deep holes to acheive its objectives, including 500 m of basement drilling at each site. The proposal solicites the advice of the panels on how to revise the plans. We discussed two possibilities. If the proponents to maintain the same focus, then we recommend that the drilling be reduced to one leg. Since there is relatively little along-strike variability in the Havre Trough, justification/reduction of the number of sites is required. TECP noted that there is already a mature proposal investigating backarc rift propagation in the Izu-Bonin region. Thus, if this proposal is to move forward it would have to make a strong case as to why this would be the best region to investigate this important process. Advantages of this region include the absence of multiple seamounts on the downgoing plate.

An alternative, which represents the strong preference of TECP, is to concentrate the proposed drilling on the Taupo rift zone and the transition from backarc to continental rifting (Sites LHT 5-7). We consider this to be a high priority objective that can be addressed in one leg in a limited area, and one that is not addressed by other proposals. There is also opportunity for coordinating onshore-offshore scientific investigations, to the benefit of both. We suggest improved contact with the New Zealand geological community (e.g. paleomagnetists).

438, A drilling test of the Origin of Reflecting Interfaces in Oceanic Crust

A2, B1.1/1.2, B2.1/2.2, C2, D3/D2, , E, F3

Variations in reflectivity of the oceanic crust and the nature of internal crustal reflectors are of strong interest to TECP. Although this proposal addresses these themes, it is currently inadequate in both its presentation of the observational data leading to the problem and in its presentation of two alternative models to be tested by drilling.

First, we question the proponents' assertion that there is, indeed, a uniform variation of reflectivity with spreading rate. The seismic sections shown for comparison in the proposal differ in terms of data processing and data quality and therefore are difficult to use as support of this difference in reflectivity. The proponents should consider data from other regions, such as the Argo Abyssal plain, where faster-spreading crust is characterized by both a strong reflection Moho and by numerous low-angle reflecting horizons.

In the presentation of two alternative hypotheses to test, the hypothesis regarding structural control (faults or shear zones) is clearly presented whereas the alternative model seems poorly supported. If the reflectivity is related to a characteristic tuning thickness of magmatic layering, which in turn depends on finite strain, one might expect to be able to model the depths (for various spreading rates) at which this value of finite strain is expected, and perhaps expect to find the maximum reflectivity at different depths as a function of spreading rate. This would not necessarily correspond to the proponents' stated observations, which seem to be bimodal: that is, slow=reflective, fast=transparent.

Another question that needs to be addressed with this model is that the reflectors are not ubiquitous in the crust; they are visible over vertical spacings much greater than the expected tuning distance, so if a magmatic origin must be invoked, then it is widely vertically spaced or very heterogeneous in width so that not all reflectors are being imaged. All of the flow models that might give rise to different strain fields predict a rather homogeneous and smoothly varying pattern. Also, there is no explanation, under this model, for the variable dips of the observed reflectors.

The proponents argue that the site chosen is the only one of these reflectors within marginal reach of the drill ship. From its appearance on the seismic line, bounding a basement high, it seems quite likely to be a fault. If clearer data processing, or newer data acquisition, shows that it is very likely to be a fault, then this is not a good location to test this model. Thus, even if this site is drilled, it would be unlikely to resolve the identity of the deeper, subhorizontal reflectors.

TECP also questions the conclusion that this is the best site to drill in order to test this hypothesis. Since newer data acquired with better technology is showing crustal reflectors in more regimes, we feel that it might be better to pose this as a general challenge to the ODP community to identify the best site to address what is, in fact, a very important question concerning the structure and deformation of the oceanic lithosphere.

C2. Needs more supporting work, data from other regions, and a critical re-evaluation of the hypotheses presented. As the PIs recognize, they need to establish with the highest possible

D3/D2. Technology under development; for the site chosen,the proposed work is at the limits of current capability because of the 5400 m water depth, 1400 m sediment thickness, and the need for 500 m of basement penetration.

E1. Abstract - complete

E2. Site Location Map - complete

E3. Survey coverage Map -

E4. Regional geological setting - better resolution of faults and 3-D structure in the area would be desirable

E5. Balanced cross sections - better resolution of faults needed

E6. Site Summary forms - present

E7. Reference list - incomplete; need to look at more areas

F3 Proposal is of Low Priority, but could become High Priority

439, Mass budget of hot spots: deep apron drilling at the Marquesas

A1 , B1.3, B2.2, C1, 0, E8, F3

The proposed investigation is to drill through a deep part of the Marquesas volcanic apron. The information obtained from the drilling in conjunction with the existing seismic data will be used to establish the volcanic stratigraphy, which will be in turn used to evaluate (1) mass balance associated with the development of the Marquesas hot-spot track, (2) isotopic evolution of the hot-spot volcanism, and (3) spatial and temporal development of the apron as a function of volcanic loading during the propagation of the hot-spot tract. Although the result of the proposed work will enhance the knowledge of the stratigraphic evolution of the hot-spot system, the TECP considers that the proposal could be relevant only if the hypothesis is substantially revised to emphasize on the problems of lithospheric flexure and post-loading thermal relaxation. In addition, the hypotheses and questions to be addressed are at present poorly formulated. Specific comments are summarized as follows:

1. Mass budget: the "paradox' on the relation between the volume of the hot-spot volcanoes (Vv) and that of the archipelagic apron (Va), i.e., 5Vv=Va. is ill-defined. From the volcanological point of view, there is no need why Vv=Va has to be true. Data from one drill hole cannot differentiate various eruption/mass wasting mechanisms that produced the apron.

2. Diffusion model: The hypothesized diffusion process for mass wasting associated with the hot-spot evolution may not be appropriate. First, landslides along flanks of the volcanic centers are commonly generated during volcanic eruption and /or earthquakes. Thus, mass wasting may not be a purely gravity-driven processes and the amount of transported mass do not have to follow the linear relationship to the slope angle. In fact, the size of landslides is inversely proportional to the run-off angles: the lower angles the larger landslides. In addition, ejected air-fall volcanic materials should not follow the simple diffusion relation, as it has nothing to do with the surface gradient.

440, Investigating the nature and consequences of hydrothermal circulation in oceanic crust: Drilling on the eastern flank of the Juan de Fuca ridge

A4, B1.1, B2.1, C2, 0, E2, F4

This is a well designed experiment that will investigate three representative hydrothermal systems in a relatively well understood tectonic setting. The result will provide new insights into the fundamental physics on the relationship among fluid flow, alteration, thermal structure, and heat flow during the evolution of the oceanic crust. The proposed research could be relevant to the thematic interests of the TECP with certain revisions. In particular, we would like to see more input and consideration into the implications of the result for deformational processes in general. Additionally, we urge the proponents to consider the structural complexities that may cause the abrupt change in thermal regimes between the sediment-free section and the sediment-covered section away from the ridge. Proponents might raise the TECP rating of the proposal by discussing the nature of fracture-controlled permeability in the sediments and the basement, and their relation to the evolution of basement structures. The results from this study could provide a valuable control section for other deformed upper oceanic-crust section.

The assumption of the impermeable base for the permeable basaltic layer needs to be evaluated by both numerical modeling, which tests the sensitivity of the assumption, and further detailed seismic studies. Some panel members suggest that assuming an uniform permeability for the basaltic layer below the sedimentary layer may be over simplistic. This assumption itself should be tested during the drilling, i.e., to make the test as part of the operation. Understanding the permeability distribution will help differentiate the effect of the sedimentary layer from the inhomogeneous distribution of permeability in the basaltic layer below.

E2: locations of the figures are poorly indicated

E3: poor map symbols

441, R.M. Carter et al.

A5, , , , , F4

This proposal addresses primarily thematic objectives of OHP. Although this proposal, as it stands, addresses few TECP objectives, we recognize that this part of the Southwest Pacific is of great tectonic interest. We thus would like to encourage the proponents of the present proposal to collaborate with tectonic geologists and to explore, to the extent possible, any tectonic aspects of drilling in this region.

442, Rift initiation in the northern Mariana Trough

A1, , , , , F2

This is a mature proposal that clearly poses tectonic questions: The general problem is that of rift initiation and propagation in a back-arc setting. The Mariana Trough has been considered a type-example of arc/back-arc system. From previous studies in the area it appears that seafloor spreading turns into amagmatic deeps which are eastward dipping half-grabens possibly over a westward dipping detachment. Farther north a point-source volcanism becomes again important and finally the very tip of the rift is being uplifted along a single eastward-dipping fault. The axis of rifting progressively approaches the axis of the arc. The two axes merge at the northern part of the section displaying point-source volcanism and along the uplifted tip.

A DSDP leg (60) was devoted to studying the general features of the system at the widest portion of the arc. Other ODP legs focused on other aspects of arc and backarc geology (Legs 126,127,128, 135). In particular, sites 790, 791 drilled into the Sumisu backarc rift and came with interesting results regarding the development of tectonic styles of rifting and volcanism with rifting. Unlike the northern edge of the Mariana Trough, the Sumisu rift has been relatively stable and opening contemporenously along a large section. This proposal does not fully address the new aspects of rift initiation to be found in this site.

Site survey for this area is good with dense grid of old seismic data, wide-swath bathymetry, dredging, and planned diving. However, High resolution single or multi-channel seismic data (using sleeve guns or GI guns) are needed to improve site location and determination of hole depths. The sites extend from north to south and represent the temporal development of a propagating rift from organized spreading toward the tip. Some in the panel questioned the location of Site A. Site A is aimed at recording the timing of motion along the Hiyoshi fault. It was unclear how a site 15 km from the fault scarp with flat stratigraphic layering is going to tell about rates of movement on the fault. The recovered sediments are also expected to record sedimentary history indicating regional uplift. How, if the area is still more than 1000 m b.s.l. They are also expected to record turbidites and slump deposits from the fault. However, some of the seamounts (like fukutoku) are much closer and other sources are also possible.

Finally, TECP would like to see some structural hypotheses for rift propagation. TECP recommends adding proponents with structural background to the proposal.

443, Oceanic faults, crustal heterogeneity and ridge flank hydrogeology and alteration: Deepening of ODP Holes 504B and 896A (Alt and Bekker)

A1, B1.3, B2.1, C4, D5, E8, F2

TECP has an interest in this proposal and, in principle, supports the objective to penetrate an oceanic fault and a footwall section. The panel has some reservations about the current version of the proposal. First, given the history of drilling at Hole 504B and the low recovery levels the panel questions whether the returns from future drilling would be worth the investment of a drilling leg. What is the condition of the hole and the chances of acquiring comprehensive logging data? The predicted drilling scenario for 896A may be optimistic, given that it has taken 7 legs to achieve the present depths of Hole 504B. TECP strongly recommends that a structural geologist be involved in this proposal to develop hypotheses for the structural geometries that could be tested by drilling. At present the proposal presents a great deal of back ground information and comments on related studies in ophiolites, but it needs to focus on the structural problems specific to Holes 504B and 896A. In addition, the proponents should examine possible models for coupled fluid flow and deformation, relating these to hypothesized structural geometries and patterns of alteration. The proponents need to state clearly the rationale for problems that will be addressed by logging, core data and permeability measurements. For tectonic objectives the proposal is still at an immature stage but, TECP encourages the proponents to consider the suggested revisions and pursue their objectives.

444, History for Glacial-induced Sea-level fluctuations from siliciclastic shelf and slope records of the Western Pacific, Joban Margin, off Northeast Japan

A5, , , , , , F3

The main objectives of this proposal are to reveal the timing of sea-level fluctuations in mid-latitude Pacific Ocean and investigate the relationship between sea-level change and siliciclastic sedimentary architecture. These objectives are not within the TECP mandate. TECP, however, is interested in sedimentary basin evolution in a convergent margin. Significance of tectonic process to sedimentation should be discussed more, although this proposal noted the limited tectonic effects in the area.

445, Nankai

A1, B1.2, B2.1(?), C1, D1, F2

This proposal could become a high priority of the TECP as it presents an exellent opportunity to test the 3D cou and physical process with the fluid flux distribution in this type of accretionary wedge. Important evolutionary however, could be made in this proposal to advance and focus its objectives on some of the potentially exciting properties of this system. Having brought up the prospects for significant along strike variations in the slope of possible relation to the nature of the decollement (i.e. physical, seismic and hydrogeologic properties) this excit not developed on sufficiently. As one example, it would be extremely informative if the already existing and fai reflection data resources could be use to related (preferably in a quantitative manner) the laterally changing nat anomalies and distribution of the -ve polatity/+ ve polarity boundary (if indeed there is a simple boudary) to th structural changes in the wedge. The objectives could then be viewed in the broader context of heterogenaity in system,thus, substantially advancing the potential scientific gains over those of the previous leg. Note, question concerning the need for proper hydrogeologic (numerical) models to be built up for this region (that use the ph to help constrain obvectives and provide a testable hydrogeologic model.

446, Ocean drilling in the Tonga forearc: a test...

A2, B1.2, B2.1, C.1, D.2HRG, E. , F. 3

Although this proposal addresses a topic important to the Tectonics Panel, origin of ophiolites and the initiation of subduction, the testable hypothesis is primarily petrological and geochemical in nature. Tectonic aspects such as state of stress, subduction erosion, and forearc deformation are clearly secondary and without clear description of how the proposed drilling program will constrain or shed light on these problems. In addition, the proposal to drill boninitic lavas and the gabbro section does not have a clearly defined rationale. Why drill another lower crustal section to compare to Hess Deep, 735B, and MARK without a clear and important tectonic and structural framework for the section?

On the primary objective, the panel had questions about the accuracy of the dating methods and whether they can actually constrain the age of lava emplacement well enough to give a clear answer to whether the whole forearc developed synchronously. Also two points per transect doesn't seem to provide much constraint on the petrology, geochemistry and age of wide zone.

Additional site survey work needs to be done, specifically, several holes are on single seismic lines and need to be placed in a better 3-D context by getting at least crossing lines.

447, Active continental extension in the western Woodlark Basin

A1, B1.1, B2.1, C2, D1, , F1

TECP was very pleased to see this long awaited proposal that addresses important TECP themes related to lithospheric extension, continental breakup and the nature of low-angle faulting in the western Woodlark Basin. This area may be the only place on Earth where all the various

extensional deformation elements are present in an area which extends laterally from active continental rifting on the Papuan Peninsula and is associated islands, to active seafloor spreading in the western Woodlark Basin. This setting provides a unique situation for studying the mechanics of extension, detachment faulting and the formation of metamorphic core complexes in that the structures are active and thus their physical properties are quantifiable.

The proposal presents a transect of three sites across the area, which is considered to form a single drilling leg and represents the minimum drilling program to achieve the objectives. These sites test the interpretation that the Moresby Seamount is a metamorphic core complex associated with a detachmen fault, or a tilt block associated with a low-angle normal fault; characterise and monitor the insitu properties of the fault by drilling through it and installing a CORKed geochemical string and seismometer;

determine differences in in situ properies between the low-angle fault and similar inactive pre-existing structures; and deduce the vertical motion history of the upper and lower plates of the ?detachment system.

The proposal is succinct and generally well presented. However, TECP believes that there are some aspects of the proposal that require further attention by the proponents:

1. The sites do not appear to well imaged seismically. We realise that only preliminary stacked sections are presented and that futher processing is underway, but have some apprehension about the level of improvement that will be obtained, particularly in terms of multiple removal.

2. Site ACE-3 is only based on single channel seismic.

3. Non of the sites appear to be located on intersecting seismic lines according to the seismic track charts presented.

4. TECP has real doubts about the penetration depths of the sites as shown on the site summary forms. A preliminary check using low estimated velocities indicates that Sites ACE-1 and 2 could be several hundred meters deeper than shown on the site seismic sections, and ACE-3 could be substantially shallower.

5. Other comments made during the course of the review suggested the need for a hydrologist proponent to help with the development of the fault fluid aspects of the study; the use of a submersible or ROV to examine the low-angle fault where it is exposed at the seafloor, as well as to check the possibilty of active venting around the fault;

This proposal examines high priority TECP thematic objectives in an active tectonic environment.

448, Assessing the origins, age and post-emplacement history of the Ontong Java Plateau...

A. 3, B1.2, B2.1, C.1, D.1, E. , F. 4

Portions of this proposal address topics of importance to the Tectonics Panel, namely the effects of the collision on the southern margin and the rotational and translational history of the plateau. The first of these is not clearly addressed in the proposal and could be developed further although it would probably entail additional or changed drill sites. If drilling the rift-dipping reflectors becomes feasible the panel would also be interested in that aspect.

As noted by the authors of the proposal, significant additional site survey work remains. Additional dating and possibly drilling on islands would be preferable as pre-ocean drilling preparation to better constrain the tectonic goals.

449, Evolution of restricted Mesozoic Weddell Basin (Antarctic margin)

A3, , , , , F4

This proposal is aimed at providing a continuous Late Jurassic and Early Cretaceous record of the widespread anoxic "black shale" environment. Corollary benefits, according to the proposal would be dating of seaward dipping reflector sequence underlying the sediments and to obtain the early sedimentary record to help constrain the sequence and timing of breakup and dispersal of Gondwana. These later objectives are of interest to TECP, however, the proponents underestimate the depth of hole (1.5-2 sec) necessary to penetrate into the seaward dipping reflectors. In addition, although this proposal is an extension of Leg 113 the data presented in a way that makes it difficult to evaluate the site locations.

450, Taiwan arc-continent collision: forearc basin closure and orogenic history

A1, B1.2, B2.1, C2, D1, E3, E5, E8, F2

This proposal attacks high priority TECP objectives related to collisional systems in the area south of Taiwan. In this region there is a northward progression from subduction at the Manilla Trench, through the early stages of collision, to significant development of a fold and thrust belt around Taiwan. The proposal focusses on the backside of the accretionary wedge in order to examine the closure of what was once a forearc basin - the N. Luzon Trough. The main objectives of the proposal concern the structural geometry and kinematics during the collisional closure of the forearc basin, teconic processes duringearly collision, sedimentological processes associated with collision, and global plate kinematics.

Six sites are proposed distributed along the strike of the progressively deformed forearc basin; a seventh site is located east of the Luzon Arc aimed at collecting a continuous undeformed section that preserves a record of the Taiwan collision, and paleomagnetic data to constrain the Cenozoic movement of the Philippine Sea plate.

The proposal is reasonably well formulated in terms of objectives and scientific rationale but is lacking detail in supporting information. Such information is often critical to being able to solve the problems in collisional systems as it can provide the evidence for the timing and style of deformation at some distance from the study area, and sets the scene for the features being investigated. TECP felt that the following aspects of the proposal could be improved:

1. Although the proposal refers to numerous, relevant onland studies that contribute significantly to understanding of the collision, none of this work is summarised in the proposal.

2. The scientific outcomes that will be obtained from drilling each site are not clearly outlined. How will a small sample of sediment and its record of deformation allow us to solve the major problems associated with collisional systems?

3. There is no map showing the seismic data distribution. In particular are the sites placed o intersecting seismic lines?

4. The seismic data used to illustrate the sites is all single channel data,although is of good quality. However, deeper penetration multichannel data may be required to place the sites in their correct tectonic context. TECP notes that a multichannel survey and associated OBS work is planned for mid 1995.

TECP has considerable interest in this proposal as it examines important thematic questions in a very well represented collisional system.

451, The Tonga Ridge Longitudinal Island Arc Transect (SW Pacific Ocean)

A.3, B1.2, B2.1, C.1, D.1, E., F.4

Portions of this proposal address topics of importance to the Tectonics Panel, effects of subduction of aseismic ridges and subsidence and uplift of arc terranes. However these problems are not clearly developed in this proposal and may lie within the LITHP mandate. Although

unlikely to become a high priority of the Tectonics Panel, these aspects of the proposal should receive some additional attention. It could be increased if specific hypothesis capable of being tested by drilling can be posed.

452, Antarctic Peninsula Pacific Margin: Antarctic Glacial History and Causes of Sea-Level Change

A5, , , , , , F3

This proposal is mainly of concern to SGPP and/or OHP, because the main objectives are related to the Antarctic continental climate change over 8-10 Ma, Cenozoic glacial history and global sea-level change. The proposal, however, also includes the study about the vertical motion history associated with ridge crest collision, which should be discussed in TECP. Seismic stratigraphy provides a preliminary result of thermal/tectonic uplift and subsidence history. How degree do the proposed drillings improve this result? No additional sites to reveal lateral variations of uplift and subsidence history? More discussion in this point needs to be presented.

453, Fisk et al.

A3, B1.2, B2.1, C2;, D5, E8, F3

The proposal partly address priority tectonic themes and TECP rregards this as an unusually interesting area. However, the panel recommends a rewriting of the proposal focussing on the ridge-trench-backarc aspects, only. Before the proposal is resubmitted a complete evaluation of the formation of the Bransfield Strait would have to be made, including an evolutionary model with balanced cross- sections (the panel noticed it to be very unlikely, or even impossible, that a ~60 km wide basin structure has been affected with 60 km extension). This can independently be comparred with the changing stress regimes and convergence rates etc. and the proponents can make up their own mind on how stretching and slowing down of spreading are interacting.

The proposed drill sites are the most important parts in the proposal. These have to be argued for in details related to the tectonic, or other aspects, the proponents wants to address. This may include reprocessing and migration of the seismic data, and conversion from time sections to depth sections displaied in true scale (H=V). This would probably help resolving the nature of the fault blocks and the nature of the apparent "sub-basement" reflectors.

The technical feasibility may be questioned due to probability of large amounts of dropstones in the Neogene sequence.

LOI 15, Fracassi

A5, , , , , , F4

The tectonic panel appreciate the interest expressed in the letter, but can not see that any main ODP objectives can be solved by drilling in this region.

LOI 16, Palaeogeographic drilling south of Australia: global impact of a maturing mid-latitude ocean.

A5, , , , , , F4

This letter of intent outlines a palaeooceanographic drilling proposal for the Southern Ocean. It has no direct relevance to TECP thematic objectives, although with coordination could result in some drilling sites that support a tectonically oriented proposal for the development of the southern Australian continental margin and ocean/continent transition.

LOI 17, Internal anatomy of two hydrothermally-active volcanoes

A4, B1.1, , C1, D0, , F4

The TECP considers that the proposed subject is irrelevant to its thematic interests, although important results could be derived from this study regarding hydrothermal alteration and fluid circulation in three dimension.

LOI 18, A. Mix

A5, , , , , ,

Of no relevance to TECP

LOI 19, Hydrothermalism and metallogenesis in the Red Sea (Sichler, B.)

A1, , , , , ,

TECP strongly supports a drilling Leg in the Red Sea. Both the topics addressed in this letter are of interest to TECP. If a proposal is to be submitted the panel encourages the proponents to include all available site survey data. Given the existing proposal submitted by E. Bonnatti to study petrological and tectonic problems in the Red Sea the panel suggests that the proponents consider combining forces with Bonatti to develop a drilling Leg with integrated objectives.

LOI 21 Early stages of crustal creation in the western Pacific.

A2, , , , , F3

This letter of intent addresses two problems that can examined by drilling in the Sikoku Basin area of the northwest Pacific - 1. The tectonomagmatic setting of bononitic magamatism associatd with the creation of the Palau-Kyushu Ridge. 2. The effect of the mantle wedge overlying subducted Pacific Lithosphere on the composition of the magnasa of the Parece Vela-Shikoku Basins. Although largely a LITHP-type proposal as presented, drilling in this unique region to determine the age and nature of basement has the potential to answer important Pacific plate kinematic questions such as the pre-Hawaii/Emperor "bend change" plate configuration in the western Pacific.

LOI 22, Laurentide Ice Sheet

A5, B0, , C0, D1, E0, F4

This letter of intent presents a plan formulated to sample Laurentian Channel and Hudson Strait sediments for paleoclimatic purposes. This drilling is not of interest to TECP.

D1- except for shallow sites

LOI 23, Kerguelan Plateau and Broken Ridge

A.3, , , , , ,

A. 3 Portions relevant to Tectonics Panel. However, the Ontong-Java proposal is more mature and seems to have objectives closer to possible tectonics importance because of the collision of the Ontong-Java with a subduction zone.

LOI 24, Carson et al.

A2, , , , , ,

The TECP rating would have been higher with a stronger tectonic component.

LOI 25, Drilling the Shatsky Rise

,,,,,,

The project outlined in this letter of intent is categorized as "A3", that is, portions of the project would be relevant to TECP, but an interdisciplinary approach would be required. It is unlikely that this type of study would ever become a high priority for TECP.

LOI 26, Evolution of a Late Cretaceous-Cenozoic Seaway: Multiple Drilling objectives, SE Gulf of Mexico/Southern Straits of Florida, by Buffler et al.

,,,,,,

This LOI is more than a letter of intent but can be considered as a part of a proposal. The authors refer to existing set of transects being proposed througout the Caribbean/Gulf of Mexico/Bahamas regions. The proponents ask whether there is interest in these sites by the different Panels.

Beside clear objectives relevant to OHP priorities, the sites have a number of objectives of interest for the TECP :

- detailed timing of tectonic events in the evolution of the Caribbean/N. Am plate boundary.

- Sedimentary record of arc collision/obduction and thrusting. Significance of olistostrome and turbidites as manifestation of compressional events at an arc-continent boundary.

- Study the problem of subsidence of fore-arc region in response to collision.

- Better understanding of the causes of the breaking up the cretaceous megabank.

- Short-term and long-term influence of plate tectonics on deep and shallow water circulations in the oceans.

LOI 27, Integration of slopes & basins in Rhone & Var turbidites

A5,,,,,,F3

The main objective of this proposal is to reveal the relationship between gravity sedimentation and sea-level change. Tectonics in the proposed area is very interesting for TECP, but discussion about tectonic significance of fan evolution is not clear. The role of salt layer deformation to sedimentary process is also indistinct. More description is needed. The proposal objectives are not within TECP mandate for the present.

LOI 28, Japan Trench Downhole

A1,,,,,,F3

This could form the basis for a highly significant proposal in view of the downhole observatories relevance to seismic risk assessment, improvement of the imaging the deeper structure of the plate boundary, and the interesting geodetic component. Tectonic pannel doubts were raised, however, about basing a leg so exclusively on, as yet, unproven technology. In addition, in its current form it is too narrowly focused in its scientific scope. In particular, considerable work needs to be done to expand the proposal in terms of other types of multidisiplinary study to further justify the siting the holes . One possibility would be to widen the scientific proponent group and bring in further objectives that will advance our understanding of the structure, hydrogeology, strain distribution, and tectonic history of this fast convergent rate margin.

LOI 29, Evolution of the Hawaiian Hot Spot

A2, , , , , ,

A. 2 The Tectonics panel is interested in the evolution of the mantle over time and clarifying the ages along the Emperor-Hawaii seamount chain to more closely define the timing and nature of the mantle hot-spot.

LOI 30

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TECP encourages the proponents to submit a complete proposal to study the Peru forearc. There are currently no proposals that address the important tectonic problem of tectonic erosion. TECP would expect to see testable hypotheses presented. How will drilling demonstrate tectonic erosion? Integrated structural studies will be needed to evaluate tectonic processes. TECP does not believe that evidence for subsidence alone necessarily implies tectonic erosion.

LOI 31, Lower-plate continental margin

A1, B1.2, B2.1, C2, 0, E5, F3

This is a potentially excellent project that would provide new information for the formation of passive continental margins. The TECP is very excited abut the proposed work and considers that the southern Australian continental margin contains many key features that would allow testing the detachment-fault models. The TECP is also interested in potential contribution of the proposed work to the better understanding of the rifting history of the Gondwanaland. One of the important implications of this study is that it may provide clues on why core-complex-like structures in any of the ancient passive continental margins (i.e., the Cordillera, Appalachian, Asia, etc.) are so difficult to be recognized or preserved. Although we encourage the submittal of a formal proposal, we would like the proponents to consider the following aspects during your writing.

First, an important aspect of testing the detachment-fault model is to establish the tectonic-denudation history of the footwall. Thermochronology and age relationship between faulting and sedimentation should be considered to be important components in the formal proposal. This will allow the proponents to differentiate the mylonitic rocks formed during the detachment faulting from those that are unrelated to the rifting. Second, the time-section based on seismic reflection profiles should be converted into detailed balanced cross-sections. Kinematic evolution derived from these sections should be discussed, so that the testing by the drilling will be specific and well defined.

C. Watchdog Reports

1. Back arc basins and forearc domains (Yves Lagabrielle)

A large number of new proposals and Letters of Intent relate to problems of back-arc spreading and arc-forearc geology. All of these, except one (453), concern the West Pacific region, with clear concentration around the Lau basin.

A total of 7 new proposals and 3 LOI are directly relevant to objectives that concern tectonics of forearcs, arcs and back-arcs. Two revised proposals also concern the same topics.

Most of these proposals propose very good science. The study of active arc systems is clearly becoming a high priority for different scientific teams around the world. In addition, most of the proposals are of high priority for both the TECP and LITHP.

Most of the proposals seek to obtain 3-dimensional information on these tectonic systems as well as evolution through times. For this reason, the proposals often refer to transects of holes designed to constrain dynamic models, such as rift propagation, spreading axis propagation and progressive splitting of arcs. Some proposals also focus on problems of the origin and nature of forearc crust and to construction of early arc volcanic provinces.

The areas of concern in these proposals are both active plate boundaries and older domains, now inactive, but which may help better understanding present-day processes.

- The "old" regions are north of the Kyushu-Palau Ridge, is the target of LOI 21, and the complex oceanic system formed by the Tasman, the New Caledonia, the South Fiji and the Norfolk basins (targets of LOI 20).

- The active systems which are proposed for drilling are :

  - the north of the Mariana trough (442: study of rift and back-arc spreading propagation),

  - the tip of the Woodlark spreading axis (447: study of continental extension and transition to oceanic spreading, and LOI 17, drilling into active volcanoes),

  - the Lau-Havre system has 3 different proposals focusing on 3 different problems ; (1) processes of oceanic spreading in the back-arc basin (437), (2) north-south evolution of arc activity with time (451) and (3) the nature and origin of the forearc region (446).

One other new proposal concerns the Ontong-Java plateau whose post emplacement evolution has had considerable influence on the geodynamics of the SW Pacific region (448).

Revised proposals concern the general problem of input and output at convergent margin without accretionary complex (435-Rev2), and the origin of silicic rocks in the forearc (421-Rev).

Among the new proposals, proposal 453 (Fisk et al.) concerns the geology of arc and back-arc regions, north of the Antarctica peninsula. This multiple objective proposal addresses problems of global tectonics of magma genesis and also of paleoceanography.

448. Assessing the origins, age and post-emplacement history of the Ontong Java plateau through basement drilling. (Kroenke and others)

This is a two leg program with the aim of drilling the basement. The proponents point out that sampling of the basement was not yet done and that only the surface has been scratched.

This proposal is of interest for us because a plateau has effects on subduction patterns and may cause major changes in plate motions. For this reason, studying the post-emplacement history of the Ontong-Java plateau is very important and must be considered as a priority by our panel. Ontong Java plateau is folded and its southern boundary is an arch (Roncador homocline). Its southern boundary now corresponds to the inactive Solomon Trench. The collision of the plateau with the trench has led to reverse polarity of the subduction in this region.

A site of interest for the panel is OJ5 which has tectonic objectives.

Most of the sites need additional surveys and are not ready to drill.

To fit better with TECP priorities we could suggest drilling site closer to Malaita Island where thrust faults and compressive tectonics are well documented.

447. Active continental extension in the western Woodlark basin (Taylor and others.)

This is a totally tectonic-oriented proposal. The 3 sites include objectives of high priority for TECP. This proposals shows two main interests:

I. Regional interest. The question is how oceanic spreading in the Woodlark basin passes into continental stretching in the Papuan Peninsula.

II. General interest. It is to test a model of asymmetric rifting of the crust. It is specifically interesting to test whether the inferred detachment fault evolves from high angle to low angle and to test the mode of emplacement of a metamorphic core complex.

The Woodlark basin ridge is actively separating the Woodlark and Pocklington rises since 5 ma. Further west, extension is accommodated by continental rifting. Dredges on the Moresby seamount recovered material similar to the adjacent metamorphic core complex on the d'Entrecasteaux Islands.

According to the proponents, drilling is essential to test the interpretation that Moresby Seamount is a lower plate metamorphic core complex. A transect of sites is proposed and two different models of faulting are proposed with two different geometries.

442 The magmatic and tectonic evolution of rift initiation in back-arc basins : drilling in the northern Mariana trough. (Stern et al.)

This proposal addresses problems that are also discussed in other new proposals, especially 447 (Taylor et al.) and 437 (Parson et al.).

The problem concerns the way in which continental, or arc crust is stretched before oceanic spreading. The proponents emphasize that they want to compare their results to results obtained from rifting of felsic continental crust.

The TECP is mainly concerned with 3 objectives that are:

- style of initial rifting of arcs,

- timing of rifting and evolution with time,

- modes of propagation of rifting and then of spreading into a new region.

The remaining objectives are of interest for LITHP.

This proposal has also interest for on-land geologists since rifting of pre-existing arcs has been evoked in reconstructions of the tectonic evolution of ancient domains (cf CRO, California).

This proposal refers to previous ODP or DSDP legs : 126 (Sumisu Rift, rifting in the Bonin arc); 127, 128 in the Sea of Japan; 135 in the Lau Basin, 60 which tends to show (by opposition to Leg 135) that spreading of new crust in the back arc basin as dominant with respect to crustal stretching.

Mariana trough is spreading at a half rate of 1.5-2.2 cm/yr. The spreading regime passes progressively into amagmatic deeps (with gabbros and peridotites exposed) and then to grabens and volcanoes. The main question is to know how far to the north does crust formed by seafloor spreading extend.

The proposed strategy is to drill 5 sites along strike. All of them have clear tectonic objectives.

Site A : to study the W. Iyoshi Fault, the border fault of a half graben in an active tectonic region.

Site B : to study the tectonics and sedimentation in an asymmetrical graben in the northern continuation of the Volcanic-Tectonic Zone.

Site C : to drill in an inactive basin of the VTZ flanked by active volcanoes (S. Nikko basin).

Site D : to drill an inactive basin now away from the active zone formed by extension in the Northern Mariana Trough.

Site E : to study the volcanic-sedimentary sequence in an active half graben. In contrast to the other basins the floor deepens to the east.

451 The Tonga Ridge longitudinal Island Arc transect. (Tappin et al.)

The major interest of this proposal is that it develops the idea that arc construction is a 3 dimensional process. The drilling sites are designed to test a model where the volcanic arc is older to the north and younger to the south. The idea is that the rifting of the Lau-Tonga pre-existing ridge was followed by spreading propagation from the north to the south.

The Tonga ridge is not a simple feature and includes, from E to W: an inactive ridge, the Tofua trough and the active arc -- the Tofua arc.

They propose to drill 6 sites from the North to the South with objectives which are of interest to 3 panels TECP, LITHP and SGPP.

The integration of the results of these sites will help to reconstruct the tectonic history of an arc-back arc basin boundary in 3D and through time.

446 Ocean Drilling in the Tonga forearc. A test of models for the origin of supra-subduction ophiolites, early arc volcanism, subduction initiation and subduction erosion/accretion. (MacLeod and Bloomer.)

This is a preliminary proposal that addresses problems of high priority to TECP such as the structural evolution of forearc domains and more generally the history of subduction zones. However, most of the objectives are relevant to LITHP.

The proposal is based on the idea that the forearc crust originated not only as trapped oceanic crust but also incorporated products derived from subduction magmatism. The scientific objectives are to test the model developed from ODP Leg 135 in the Lau-Tonga region. Site 841 in the forearc appears to have an Eocene basement made up of silicic volcanic products which are part of a subaerial island-arc. This volcano subsided as a consequence of extension and erosion (the same conclusions were proposed from the results of a tectonic and petrological study of cores from Site 786 Leg 125 in the Bonin forearc).

This proposal is not ready to drill and requires additional information. 5 holes are proposed to be drilled, including about 500 m of sediments and 100 to 400 m of basement.

LOI 21. Early stages of crustal creation in the western Pacific. (Arculus.)

Arculus points out that the boninite volcanism could be older than the change in Pacific plate motion which caused the initiation of subduction at the boundary of the newly formed Philippine Sea plate and the creation of the Palau-Kyushu Ridge. He shows that the pre-Eocene basement has not been sampled yet by drilling and thinks that this could be possible in the Amami Plateau along an E-W transect north of the Kyushu-Palau Ridge.

The first objective is very similar to that developed in proposal 446, that is to constrain better processes of crustal formation at the early stages of volcanic arcs. The second objective is to test the chemical variations along strike of the arc. It is of secondary priority for TECP, except objective 2B which is to evaluate the tectonic control of alkalic magmatism that accompanies the initial rifting of an arc.

A transect from the Parece Vela basin (southern equivalent of the Shikoku basin) to the Shikoku basin is proposed, making a sort of complementary cross-transect with respect to DSDP Leg 58-59 transect.

437 Lau-Havre-Taupo: Convergent margin, spreading to rifting transect. (Parson and others.)

This is an "immature" drilling proposal which looks more like a letter of intent. The aim is to study a geological evolution through time from the attenuation of continental or arc crust (rifting process) to the spreading and the accretion of new oceanic crust.

This proposal addresses problems of equivalent interest for both LITHP and TECP.

The Lau-Havre-Taupo back-arc basin is shown as a modern example of where propagating oceanic spreading is succeeding to propagating rifting.

They propose to drill 7 sites along strike of the back-arc basin. Sites 6 and 7 have specific tectonic objectives as they are located at the tip of the oceanic axis, on "super" rifted continental crust. Other sites also have tectonic objectives specifically to determine the tectonic evolution of the rift and the history and processes of propagation.

421-Rev. Investigation of section age and formation conditions of the acidic volcanic layers in the ocean slope of the volcano Trench.

This proposal also relates to the general topic of forearc settings as it concerns the study of acidic rocks discovered in the volcano trench (at the Junction between the Mariana and Izu-Bonin trenches). The objectives are mostly petrological and geochemical objectives but the problem which is debated is close to the question arising from the Arculus proposal.

(Note that this proposal relates the occurrence of limestones and cherts of Early to Late Cretaceous age on the western side of the trench. This confirms old ages found farther south in similar position in the Mariana trench.)

435-Rev2 (Plank et al.)

This revised proposal also concerns the domain of forearc. They propose to drill 2 sites in the incoming plate in front of the Bonin forearc.

One of the objectives is to determine the fluid fluxes lost from the subducting plate to the fore-arc.

453 Bransfield Strait, Antarctica: marginal basin formation, timing of rift volcanism, mantle geochemistry, and Antarctic glaciation. (Fisk et al.)

This new proposal does not concern the W Pacific domain but also addresses questions of rifting and back arc spreading.

The study area is the Bransfield Strait located at the extreme north of the Antarctica Peninsula. The strait corresponds to a back arc basin that opened behind the now inactive South Shetland Islands Arc.

The objectives concern geodynamics, tectonic and paleoceanography.

Here again the problem of intra-arc rifting and further oceanic spreading are addressed.

They propose to drill 10 holes. About 5 holes have clear tectonic objectives.

LOI 17 (Binns and Scott.)

This LOI must be cited here although it concerns mostly LITHP objectives.

It is designed to drill into two active volcanoes and hydrothermal systems located along active spreading axis of the Manus and the Woodlark basins.

Drilling in the Woodlark basin could be joined with the tectonic proposal of Taylor et al.

LOI 20. Drill the major dilational basins of the SW Pacific. (Ewart and others.)

This letter of intent is of high interest for scientists concerned by the geodynamics and plate kinematics of the SW Pacific region.

Since the Cretaceous, the boundary between the Indo-Australian and the Pacific plates has been migrating to the east and has been changing drastically especially with the creation of island-arcs

and related basins. The proponents focus on the older features of the SW Pacific region, such as the Tasman basin, the New Caledonia Basin, the South Fiji basin and the Norfolk basin.

They propose to drill 8 holes, 2 holes in each basin with the major aim to sample basement.

They have 3 objectives.

1. Determine the basement age and help constrain the spreading history of the basins.

2. Evaluate mantle affinities and determine an Indian or a Pacific isotopic signature.

3. Investigate regional geochemical affinities (arc versus MORB).

2. Watchdog report - Translation settings (Uri Ten Brink)

Current and active proposals

Leg 165 in Vema fracture zone:

Jan.-Feb. 1996: Engineering leg to test the improved Diamond Coring System (DCS) for enhanced core recovery. Drilling on the median ridge through thin sediment cover into thick limestone.

Equatorial Atlantic Transform (346)

Leg 160. Goal is to constrain the structure and evolution of ocean-continent transform boundary, particularly its deformational history, vertical movements and their effects on the sedimentary record. 3 holes are proposed on the marginal ridge south of Ivory Coast.

California margin and southern California borderland-(386/422 and 386-add)

On 1995 prospectus. Although it is geared toward ocean history goals, it has the potential to contribute to our understanding of the California margin by dating the Neogene stratigraphy. 14 drill sites are proposed from northern Baja to Mendocino.

Other active proposals:

333-Cayman trough - Needs site survey. MCS proposal recently turned down. Will be resubmitted in May.

376- Vema F.Z. -(last proposed July 1992) - some objectives may be fulfilled in Leg 165

In general, there is still a great need for new proposals describing different aspects of translational settings, including the following settings:

1. oceanic transforms

2. Ocean-continent boundaries (Agulhas F.Z.)

3. Compressional transform margins (e.g., California borderland)