

DRAFT

TECP MEETING MINUTES, DAVIS CA MARCH 1993

SUMMARY

1. TECP GLOBAL RANKINGS

Rank	Score/15	Name	"Hero"
1	11.6	323 Rev Alboran deep hole (AL-1)	Mike Steckler
2	10.85	NARM Non-volcanic Iberian	Phil Symonds
2	10.85	346-Rev 3 African Equatorial Transform	Alastair Robertson
4	10.2	330Rev Mediterranean I (shallow)	Roland Von Huene/Tim Reston
5	7.3	340Rev. N. Australia Margin	
6	7.2	400 Costa Rica/Middle Amer. Trench	
7.	6.6	NARM Volcanic Leg 2	
8.	5.4	265 W. Woodlark Basin	
8	5.4	334 Rev 2 Galicia margin S' reflector	
10	5.1	330 Rev Mediterranean 2 (deep)	
11	4.8	NARM Non-volcanic-Newfoundland	
12	4.7	333-Rev Cayman Trough	
13	4.2	Red Sea Generic	
13	4.2	323 Rev 2 Alboran(the rest)	

2. DEEP DRILLING PRIORITIES

1. Iberian deep hole (IAP 1)
2. Alboran deep hole (AL 1)
3. Galicia S' hole (334 Rev 2)
4. NARM Newfoundland deep hole (NB4A)

3. TECP PRIORITIES FOR LARGE BUDGET ITEM

Top Priority:

Pore fluid sampling--an immediate problem, as is needed for upcoming legs.

Deep drilling--TECP notes that many highest priority tectonic objectives are compromised because of lack of deep drilling capabilities. Therefore, TECP believes that the funding of these studies should be made available as soon as possible. TECP urges that information from the RFO should be evaluated as soon as possible, and if feasible, that the studies be funded on a priority basis.

Of Interest

Computers

DCS

Not of TECP concern

Ice Boat

4 . COMMENTS ON DÜRBAUM REPORT

1. White Paper: TECP has commenced a revision of its White Paper, with plans for a draft revision to be completed in time for discussion at the Fall meeting (see item below).

2. Role of Thematic Panels. TECP remains concerned about the great breadth of its mandate, the overall quality of proposals addressing tectonic themes, the difficulty of addressing tectonic themes, and the amount of ship time devoted to drilling to resolve tectonic problems. The Tectonics White Paper envisioned a total of 48 tectonic legs over 12 years, or an average of 3 per year. So far, this has not happened. TECP has appointed watchdogs over thematic areas, but sees the need to add "heroes" to assist proponents of highly-ranked individual proposals to bring their programs to fruition.

3. Overlapping themes. TECP is well aware of the overlapping nature and agreed that such overlapping interests would become part of our regular watchdog reports, as appropriate. TECP considers that its joint meeting with LITHP in Fall 1991 was highly successful, and led to the recognition of a large number of overlapping LITHP-TECP interests. TECP and SGPP are planning a joint meeting for Fall, 1993.

4. SSP, PPSP. TECP notes that SSP has more than once agreed with TECP in the past about the need for better characterization of proposed drill sites. TECP's interest here is in maximization of the scientific return, general as well as tectonic, in any planned new drilling.

5. Panel and Shipboard party membership. TECP, concerned about the breadth of its mandate, endorses the idea that all membership nominations, non-US as well as U.S., be made with an eye towards covering TECP's broad responsibilities.

7. PCOM. Although it is aware of the current workload on thematic Panel Chairs, TECP endorses the idea of greater thematic input to long-term decision making by PCOM. Regular attendance by Panel Chairs at part of each PCOM meeting possibly is a way to accomplish this objective.

8. Handling of drilling proposals. On the plus side this proposal would force the drilling community to look around the globe rather than concentrate on a flood of proposals in a given geographic area. On the minus side, this idea would diminish the proposal-driven nature of the program, and increase outsider suspicion of ODP as a closed community. TECP opines that on balance the negatives outweigh the positives.

TECP proposes that PCOM consider institution of a "pre-proposal" process. These would be short, but unlike "letters of intent", they would be ranked as to quality of science. This process might give ODP a better idea of good science in the pipeline than does the "letter of intent", and it might reduce the effort and delays in bringing a high-quality proposal to fruition.

DRAFT MINUTES
TECTONICS PANEL MEETING
DAVIS, CA. MARCH 22-24, 1993

Present: **Panel Members:** Susan Agar, Northwestern
Steve Cande, UC San Diego
Carlo Doglioni, Italy
Yves Lagabriele, France
Greg Moore, U. Hawaii
Eldridge Moores, Chair
Yujiro Ogawa, Japan
Tim Reston (alternate for Roland von Huene,
Germany)
Alastair Robertson, UK
Michael Steckler, Lamont-Doherty
Philip Symonds, Australia-Canada
Uri Ten Brink, Woods Hole
Mark Zoback, Stanford

Liaisons: Mathilde Cannat-LITHP
Robert Musgrave, ODP-TAMU
Karen Schmitt, JOIDES-U. Washington
Brian Taylor, PCOM
Michael Underwood, SGPP

Apologies: Jeff Karson, Duke

I. Welcome and Introductions

Moores welcomed everyone to the meeting, and it began with a round of self-introductions.

II. Liaison Reports

PCOM: Brian Taylor outlined the deliberations that led to the setting of the schedule for 1994. The Alboran proposal was plagued by a drilling time estimate more than 50% too short. Proponents have been charged to revise the proposal and break it into do-able legs. In the future TAMU will provide drilling time estimates for the items in the Prospectus. Mediterranean ridge was judged not ready. Three site-survey cruises are in progress or planned. MARK was scheduled. Equatorial Atlantic transform, NARM Non-volcanic II, and NARM Volcanic II competed with Barbados for one spot. The hi-priority TECP objectives at the Vema Transform will be drilled on the engineering leg.

TECP needs to become more proactive, as other panels have, and appoint "heroes" or liaisons to proponents of high-ranked proposals, to help shepherd them to fruition. In addition, the panel might add a summary overview or abstract to high-priority programs to emphasize what we want done.

Mark Zoback expressed concern about NARM and its progress. Taylor responded that NARM volcanic was probably in good shape, but that there was concern about NARM

non-volcanic drilling. PCOM was reluctant to commit to several very deep sites at once. TECP might want to make clear its deep-drilling priorities (see agenda item X below). Phil Symonds questioned why a program was included in the prospectus if there were concerns about its viability. Taylor responded that PCOM tries to leave things open as long as possible.

Taylor outlined the main tasks of this meeting--make Global Rankings, look at issues that impact budget (see item below), and comment on Dürbaum report. The expected budget next year is \$45M, in contrast to this year's \$47M, assuming Australia-Canada continues in the program.

Three RFP(RFQ)'s have been issued: Deep drilling, in situ pore fluid sampling, and computer upgrade.

ODP-TAMU Bob Musgrave summarized the recent and current ship operations. On Leg 145, they employed a successful strategy of drilling over an APC, which alleviated the overpull problem and enabled considerable extension of APC depth. On Leg 146 they found considerable H₂S at one site, "CORKed" two holes (889, 892), and accomplished the first successful packer experiment in an accretionary wedge. At 892, the BSR corresponded to a drop in velocity corresponding to free gas. The base of the BSR is at a height above that predicted for pure water/methane, requiring the addition of salt. On leg 147 (Hess Deep) they recovered closely interlayered dunite and troctolite, suggesting that they were very close to the "Lithologic "Moho. On leg 148, they extended the depth of Hole 504B another approximately 200 m, before hitting a fault zone in which they lost part of a fish. Another hole (896) was begun with an eye towards two-hole experiments. At TAMU there has been a large staff turnover, the number of staff scientists decreased to 4, and there are efforts to build it back up to 7. There is a new instrument--an anisotropy meter.

JOIDES - U. WASHINGTON Karen Schmitt outlined the organization of the new JOIDES office.

DMP Sue Agar reported from the recent meeting that input from TECP had been requested to help DMP assess the short and long-term needs of the scientific community so that funds could be appropriated. DMP had addressed concerns raised by TECP regarding high temperature tool testing, explaining the corrosion problems encountered during testing in Tuscany and plans to examine the fluids to see if they are representative of fluids in oceanic hydrothermal systems. High temperature tools had passed onshore tests conducted prior to returning to 504B. Difficulties in testing high temperature tools arose because available onshore sites are either not hot enough or time/access to them cannot be obtained. Some HEL (Hostile Environment) tools are now certified to 260°, but others are limited to 166°. Peter Lysne is the watchdog for the Adara Temperature tool.

TECP has raised questions regarding whether or not the CORK would 'pop' if over-pressured zones were encountered. Tom Pettigrew indicated that the CORK could ideally sustain pressures up to 2000 psi., although the maximum working pressure currently is estimated at 1,500 psi. With minor modification, the CORK could sustain differential pressures of 5,000 psi. I short summary including a discussion of possible failure during CORK is now available from Tom Pettigrew. Any developments of the CORK need to be driven by scientific interest. There is only moderate engineering support available from ODP. Further discussions of the CORK are planned for the next meeting.

Although DMP is not strictly responsible for the PCS, its status was discussed. Some redesign is underway to improve hydrostatic pressure retention. There is still no way to remove the core under pressure. Problems for development are lack of funds and continuity

in scientists wishing to follow through with the development. If TECP wishes to see continued use of the PCS, then the need for testing and development needs to be stated. An update on the FMS showed that the tool fails about 1 in 20-30 times. It failed in the Hess Deep (Leg 147) as a result of the telemetry failure. Extender arms on the FMS also become lodged. Joris Gieskes is now the 'watchdog for the WSTP. Obtaining representative fluid samples remains a problem. A sampler 'sub-panel' has revised the sample RFP intending to make the package as strong as possible to PCOM. Steve Hickman has been assigned as the 'watchdog' for the Lateral Stress Tool.

DMP had also raised the issue of tool calibration, pointing out that some of the Schlumberger logs don't provide the data as advertised, and that some are not calibrated in formations other than those encountered in oil field applications. DMP is trying to make moves for all tools to be calibrated to national standards. The reliability of neutron porosity logs was also raised, as the tool moves away from the borehole wall, and corrections cannot be constrained. The tool is not well-calibrated for ocean crust lithologies. DMP has requested input from TECP as to how closely porosity needs to be measured. The development of computer facilities includes a plan for a dedicated workstation for simultaneous display of core and log data, but data integration will include all data related to a borehole, not just core and log data. Log data for Leg 139 (Sedimented Ridges) is now available on CD ROMs. Comments are requested on this prototype issue. DMP resolved to have watchdogs for particular tools to ensure continuity in development and information handling. There will also be more follow-up after tools are run on the ship to assess feasibility and development directions. DMP welcomes input from shipboard scientists via thematic panels. DMP requested input from TECP regarding priorities for development of cross-well seismic technology and downhole radar.

Mark Zoback commented about our expression at the October 1991 (Nicosia) meeting about the need for an integrated strategy on WSTP, and asked whether it was being done. See Agenda Item IX below

LITHP Mathilde Cannat reported on the recent meeting. LITHP is in the process of revising its White Paper, which expresses its priorities for 1993-1998. The Panel has noted the need for development of a corporate memory about the performance of various downhole tools in hard rock holes, and the need for Co-Chiefs to attend a TEDCOM meeting prior to issuance of a prospectus.

LITHP's white paper is organized around the following themes:

<u>Ocean Lithosphere</u>	<u>Large Igneous Provinces</u>	<u>Convergent Margins</u>
Hydrothermal processes*®	Mantle plumes and continental breakup®	Arc initiation®
Offset drilling*®	Timing of LIP's (Ontong-Java, Kerguelen)®	Back-arc propagation and magma forces, W.Pacific®
Deepholes--504B-type®		Subduction mass-balance experiments®

* Legs drilled or scheduled

(TECP notes that the themes marked with ® above are ones that integrally involve structural/tectonic processes).

SGPP Mike Underwood discussed the recent joint meeting with OHP. They received two very different summaries of the results of Leg 146. SGPP has interest in shallow-water drilling, and has ranked a return to the shallow New Jersey sites as # 2 in their global rankings.

OHP TECP has no liaison at present. Alastair Robertson agreed to keep track of OHP deliberations and to bring any development of interest to TECP's attention

TEDCOM Greg Moore has agreed to serve as TECP's liaison to TEDCOM.

III. WPAC Active Margins and Marginal Basins Workshop

Brian Taylor distributed a two-page summary of the recent workshop (attachment A). Consensus emerged for proposals on drilling forearcs (both accretionary and non-accretionary), geochemical reference sites, and arc-continent collision zones, with emphasis on 4-D mass balance, fluid flow, and mechanics. An AGU volume will be published in the near future. During discussion, Mark Zoback among others commented on the need for coordination of oceanic and continental drilling. Zoback mentioned the forthcoming COSOD-like meeting in Potsdam for continental drilling at all scales and all places, including ocean-continent margins. Proposals for tectonic drilling need to have a careful focus on specific questions to be answered by drilling.

IV. Review of New Drilling Proposals

Spreading Centers and Associated Phenomena

333-Rev. Evolution of pull-apart basin, Cayman Trough, 333-Rev. Evolution of pull-apart basin, Cayman Trough, by B. Mercier de Lepinay, et al.

This proposal outlines a program to examine and test models for the initiation of rifting, opening of a pull-apart basin, and shearing along translational margins. Although the proposal objectives are of high priority to TECP, the present drill plan is unlikely to address any of the principal objectives adequately.

The recent additional survey data could strengthen this proposal, but it was difficult to assess the drill sites without seeing the interpretations and quality of the aeromagnetic data, multichannel seismic data, and SeaBeam bathymetry. Furthermore, geological maps of the onshore geology would help to place objectives for basement drilling in context. The CAY 1 site looks as though the basement could first be examined by dredging. If *in-situ* stresses remain as a major objective of the proposal, then a more detailed explanation is needed of the significance of the borehole data and how they will be evaluated. The drill sites are probably too far away from the transform to provide meaningful results in relation to transform motion, and the local structural influences have not been assessed. Detailed structural maps and, to the extent possible, cross-sections need to be presented to provide better constraints and justifications for the drill sites. There is also potential for comparing paleostress conditions with *in-situ* measurements, but this was not discussed. Sediment maps need to be constructed to assess the quality of the stratigraphic record and influences from point sources on structural highs. TECP suggested that complementary sites at the west end of the Cayman Trough should also be considered.

In revising this proposal, the proponents need to ensure that the objectives are more focused and can be realistically achieved from the proposed boreholes. They should also consider whether they have sufficient structural expertise in their group to address their objectives. TECP felt that additional and well-justified drill sites would be needed for the detailed structural objectives, and that the number of sites should not be reduced to accommodate a possible link with the Nicaraguan Rise proposal. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

Rating: 4.

424-Rev. Proposal to "cork" hole 395 A., by K. Becker and E. Davis.

Hole 395A has been sucking water for 17 years. This proposal is for hydrogeologic objectives, but does not address tectonic objectives. TECP finds some of the arguments against our previous criticisms to be incomprehensible. If the hole has been sucking water for 17 years, will it take as long to re-equilibrate after "CORKing" it? TECP is also concerned that no mention of lithology or of possible structural control of the permeability and the hydrothermal circulation system is made. In summary, the proposal does not appear to address tectonic objectives.

Rating: 3

426 Mantle reservoirs/migration, Australia-Antarctic rifting, by D. Christie, et al.

This proposal addresses the evolution with time of the boundary between the quite distinct mantle domains of the Indian and Pacific Oceans. As such it addresses the processes of sub-lithospheric convective flow, a topic within the mandate of TECP. Furthermore, the possibility that this mantle domain boundary is related to the Australian-Antarctic discordance, a region of anomalous bathymetry, morphology, and structure, makes this proposal of considerable interest to TECP.

TECP notes, however, a number of deficiencies with the current proposal. The principal question that is unanswered is whether studies of the incompatible, immobile, element ratios as proposed onboard could not be successfully applied to samples obtained by dredging in order to map out the mantle domains without drilling. There was also doubt about the ability to obtain satisfactory elemental ratios in real-time on board, given the low concentration of niobium.

TECP also notes that the proposal is deficient in terms of site survey data, in particular to define and document suitable locations for the secondary objectives with well-defined tectonic goals. The locations of the sites to be drilled in slow-spreading crust need to be chosen carefully to address problems of dating and possible amagmatic extension processes. TECP emphasizes also its desire for three-dimensional characterization of the proposed sites wherever possible. Detailed structural maps and true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

TECP reiterates that it is most interested in studies in this region and in addressing these topics, and it looks forward to receiving a revised proposal addressing the above-mentioned problems. For further information contact Jeff Karson or Yves Lagabrielle, TECP's Watchdogs for mid-oceanic ridges.

Box checked: 4.

428 The Quaternary igneous seafloor and hydrothermal sulfide deposits...South Tyrrhenian..., by C. Savelli, et al,

This is a proposal investigate back-arc spreading in the Tyrrhenian sea and the formation of sulfide deposits in such settings by drilling in one of two deeps, the Marsili deep, and a seamount, Palinuro volcano. Although there is potentially much of interest to the Tectonics Panel in this region, the current proposal does little to address such tectonic

objectives. There is a question whether the objectives as outlined could not be achieved by dredging. There needs to be much firmer integration of concepts derived from earlier ODP drilling in backarc basins, particularly in the western Pacific. To achieve support of the Tectonics Panel, the proponents need to revise their proposal to emphasize the role of tectonics in the development of this back arc basin in particular in relation to the development of back arc basins in general. In other words, the proponents need to justify drilling in this region in terms of the global questions to be answered.

TECP also notes that the proposal is deficient in terms of site survey data, in particular to define and document suitable locations for objectives with well-defined tectonic goals. The locations of the sites to be drilled need to be chosen carefully to address problems of tectonics in spreading and in the development of sulfide deposits. TECP emphasizes also its desire for three-dimensional characterization of the proposed sites wherever possible. Detailed structural maps and accurate true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated. The proponents should consider adding to their team an appropriate number of structural/tectonic experts. For further information, contact Yujiro Ogawa, TECP's watchdog for back arc basins, or E. M. Moores, Chair.

Rating: 3

431 Western Pacific Seismic Network..., by K. Suyehiro et al.

TECP strongly supports and encourages the development and implementation of the global seismic network. However, PCOM has requested a phased implementation plan for the ISN. Until that plan is received later this year, we wish to reserve judgment on where drillhole seismometers ... to be continued.

SR-Rev. Sedimented Ridges II, by J. M. Franklin and R. A. Zierenberg

This proposal presents a revised drilling strategy for the second leg of the Sedimented Ridges Detailed Planning Group (SRDPG) based on the results of the very successful Leg 139. The focus of the second leg is on the formation of massive sulfide deposits, the fine-scale hydrology of hydrothermal vent fields, and the formation of oceanic crust under sedimented covered ridges. To meet these objectives it is proposed that suites of holes be drilled at three sites--two in Middle Valley of the northern Juan de Fuca Ridge, in the vicinity of Leg 139 Sites 856 and 858, and one in Escanaba Trough of the southern Gorda Ridge. Three of the holes around Site 856 are planned to reach basement (400-600 mbsf), as are two in the Escanaba Trough (approx. 600 mbsf).

TECP interest in this proposal relates to the general theme of divergent oceanic plate margins, the structural evolution of mid-ocean ridge axes, and ridge-axis discontinuities. TECP considers that sedimented ridges can be good places to examine such questions because fundamental basement structures are often reflected in the sediment fill, which is readily imaged on seismic data. TECP is very interested in several of the sites proposed in Middle Valley and Escanaba Trough particularly the deep sites to basement, and those that may intersect significant structures. TECP recognizes that the proposed sites have been positioned to confront SGPP and LITHP objectives, and are therefore not optimally placed to meet TECP's interests; however there is a good possibility that significant tectonic information could be obtained, and therefore the proposal has a strong secondary interest to TECP. Given this interest, and the fact that many significant structural features were seen in the sediments during Leg 130 Middle Valley drilling, TECP recommends that structural expertise should be included within the shipboard party on any future drilling on sedimented ridges.

Rating: 3.

Convergent and collisional environments

419-Rev, Convergence of oceanic lithosphere...Azores-Gibraltar plate boundary, by R. Sartori et al

This proposal addresses the emplacement of ophiolites in a transpressional environment. Although this is of high thematic interest, this proposal has several deficiencies. The present plate boundary is diffuse and poorly defined. The present proposal does not address the neotectonics of the area. The uplift of Gorrige Bank predates the present Europe-Africa collision. The proponents need to define the regional seismic stratigraphy and identify specific hypotheses to be tested with the drill. The proponents are referred to ODP drilling on broken Ridge in the Indian Ocean for an example of the approach we suggest. They should also contact the French and British groups working in the area to obtain more regional seismic data to define sequences and extrapolate dates obtained in drilling on Leg 150 south toward the Gorrige Bank area. We recommend contacting Yves Lagabrielle (France) and Robert Whitmarsh(U.K.). TECP emphasizes also its desire for three-dimensional characterization of the proposed drill sites wherever possible. Detailed structural maps and accurate true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

Rating: 4.

340-Rev Neogene/Quaternary collisional tectonism and foreland basin development...northern Australia margin, by P. A. Symonds, et al..

This is a very tectonically oriented proposal that addresses a global tectonics problem, namely the origin of foreland basins. The generally accepted concept of foreland basin development is that they result from subsidence in response to lithostatic load on the continental crust occasioned by overthrusting. This proposal proposes to test this model in one of the few if not the only region(s) where foreland basins are in the process of development, which is also an area where the topographic relief appears to be too little to explain the high subsidence rates. Drilling will enable to quantify subsidence rates and relate them to the forward propagation of the accretionary wedge in a rarely accessible geologic setting. In addition, the proposed drilling might provide new information on fluid circulation in foreland settings, a question of importance to a number of tectonic and economic geological issues.

TECP is concerned whether the proposal should be split in to two separate proposals, one in the Timor-Aru area, and another in the Moresby trough.

The proponents acknowledge that the proposal is immature, and that new site surveys are in progress or planned. TECP looks forward to a revised proposal or proposals incorporating these new data. TECP emphasizes also its desire for three-dimensional characterization of the proposed drill sites wherever possible. Detailed structural maps and accurate true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

Rating: 4.

Transform margin

422-Rev Drilling in the Santa Monica basin, California, by L. D. Stott and R. C. Thunnell.

This is a "cutting edge" OHP proposal to study the Plio-Quaternary evolution of the California boundary current in well-documented basins off southern California. Piston coring in the past has been unable to penetrate the Holocene cap. One site should penetrate basement to test the existence of Franciscan basement. Other than that regional question, there are no significant tectonic objectives.

Rating: 1.

Ocean history, sediments, etc.

253 Add Paleoceanographic controls...organic carbon-rich strata...ancestral Pacific, by W. V. Sliter, et al.

TECP has a strong interest in the third objective discussed in the cover letter to this proposal, I.E., the age and history of basalt volcanism in the development of the Shatsky Rise. However, since specific sites are not presented or discussed, we are not able to rank the proposal at this time. TECP emphasizes also its desire for three-dimensional characterization of proposed drill sites wherever possible. Detailed structural maps and accurate true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

337 A Tests of Exxon sea-level curve, New Zealand

This is an interesting region, in that the sequence stratigraphy is out of sync with sea level change. Thus the stratigraphy may be tectonically driven. We look forward to receiving the new proposal, especially if it addresses adequately the tectonic aspects of the sea-level problem.

No rating.

347 Rev Late Cenozoic, south-equatorial Atlantic, by G. Wefer.

This proposal is primarily a paleoceanographic study that could be of interest to TECP. Most sites are proposed to drill 200 m of a 220-250 m. thick sedimentary section. We recommend using XCB coring to penetrate basement, in order to date oceanic basement in a region where magnetic anomalies are not developed.

Rating 1, with a possibility of 3 if basement is penetrated.

367 Add Sedimentation history, southern Australia, by N. P. James

This proposal is concerned with Quaternary carbonate margin sedimentary processes and has no identified tectonics objectives.

Rating: 1.

372 Add. Cenozoic evolution, N. Atlantic, by R. Zahn =.

This is a paleoceanographic proposal to drill two APC holes in 200 m. sediment in a section of approximately 250 m. total depth. We recommend that hole NAMD-02 use XCB coring to penetrate basement in order to constrain its age and composition.

Rating: 1 or 3 if basement penetration is included.'

408 Rev. Segmentation of the carbonate megabank covering the Northern Nicaraguan Rise..by A. W. Droxler.

This proposal examines the development of carbonate platforms and current circulation systems in the northern Nicaraguan Rise area, in response to segmentation and foundering of a "megabank" that is thought to have extended throughout the area. The segmentation of the "megabank" is postulated to have occurred as a result of tectonic activity along the Caribbean/North American plate boundary, and in particular, plate boundary reorganization in the Cayman Trough to the north of the Rise. This proposal is linked to proposal 333-Rev--Tectonic and magmatic evolution of a pull-apart basin, in the tectonic objectives of which TECP has expressed considerable interest.

Although Proposal 408-Rev advocates substantial tectonic and structural control on the development of the carbonate banks of the Northern Nicaraguan Rise, it does not attempt to address any high-priority TECP thematic objectives, except via its link with proposal 333 Rev. As expressed in the proposal, any tectonic/structural objectives appear to be of regional, rather than global significance. TECP also expressed doubts about the significance of structural control on the segmentation of the original "megabank". Clearly there is faulting associated with sequence A, that is thought to represent the megabank, but much of it appears to be of relatively small displacement, wrench-type structures, and in many cases appears to have been active following "segmentation" of the megabank. Some of the structures may well have controlled later bank development; however, much of the relief that has resulted in the various channels and basins associated with the Northern Nicaraguan Rise may have been formed by various bank growth phases throughout the Miocene. Thus the relationship between bank "segmentation" gateway formation and tectonism could be much less direct than inferred in the proposal. The drilling proposed may well answer important questions concerning carbonate bank development in the region, but it does not deal with high-priority TECP objectives.

Rating: 2.

412-Add The Bahamas transect, by G. P. Eberli et al.

This is an interesting proposal addressing sea level and fluid flow objectives in Miocene and younger passive margin. Its location was chosen partially because of the lack of tectonic activity during this period

Rating: 1.

423-Rev. Gas hydrate--Blake Ridge and Carolina rise, by C. K. Paull.

This proposal presents well-constrained sites with clearly identified objectives to examine the nature of gas hydrates in three contrasting passive margin settings. Although the proponents identify previous sites of gas hydrate sampling, it would be useful to know more about the results from these legs and how they might complement or contribute to the objectives of this proposal. The need for a new site needs to be justified. As stated previously, the general objectives are outside the mandate of this panel, but they incorporate aspects of related interest to TECP. The proposed CFD sites provide an

excelling opportunity to examine the impact of gas hydrates on failure mechanisms in sediments, as well as the interaction of fluid flow and deformation in shallow sedimentary sections. TECP has some concern regarding the use of the PCS, which has not performed well to date. TECP urges that if drilling proceeds, that structural geologists are included as shipboard scientists.

Rating: 3.

427. High-resolution sequence stratigraphy and sea-level history, south Florida, by A. C. Hine.

This proposal proposes to drill a transect of holes across a progradational set of carbonate sequences of Quaternary age of the southern margin of the Florida platform. It was judged to not be of significant interest to TECP.

Rating: 1.

429. Atlantic-Mediterranean gateway.

This proposal is not within the TECP mandate.

Rating: 1.

430 Subantarctic southeast Atlantic transect, by D. A. Hodell

There are no tectonics objectives in the proposal as written. However, if one or more of the sites could be moved into the Agulhas Basin, i.e. to the east of the Meteor rise, then they might be able to address tectonic objectives concerning the evolution of the Agulhas basin.

Rating: 1 (but could be three if tectonic issues in the Agulhas Basin were tackled).

Letter of Intent

K. J. Hsü, Mediterranean Ridge and a new theory of mountain building

This letter of intent proposes a radical new theory of mountain building that, among other things, proposes that the Mediterranean Ridge is a volcanic arc. This idea seems to contradict the conventional wisdom that it is an accretionary prism. Still, Hsü has a proven record of being right in the face of conventional wisdom to the contrary. TECP encourages him to get together with the proponents of Mediterranean Ridge drilling, and incorporate tests for his ideas into Phase 2 of that project.

V. JOIDES Advisory Structure Review Committee Report (Dürbaum report)

TECP discussed the eight principal recommendations of the Dürbaum committee, and has the following comments:

1. Workshops/COSOD's/White Papers

TECP has reviewed its White Paper and believes that, though complete, it needs sharper focus, particularly in view of the need to become more proactive and focus on the possible end of the program in 1998. TECP has commenced a revision of its White Paper, with plans for a draft revision to be completed in time for discussion at the Fall meeting (see item XII below). The recently published workshop on margins research will be used as a resource document in this revision.

2. Role of Thematic Panels

TECP remains concerned about the great breadth of its mandate, the overall quality of proposals addressing tectonic themes, the difficulty of addressing tectonic themes, and the amount of ship time devoted to drilling to resolve tectonic problems. The Tectonics White Paper envisioned a total of 48 tectonic legs over 12 years, or an average of 3 per year. So far, this has not happened. TECP has appointed watchdogs over thematic areas, but sees the need to add "heroes" to assist proponents of highly-ranked individual proposals to bring their programs to fruition.

3. Overlapping themes.

TECP is well aware of the overlapping nature of many of its themes with other JOIDES panels, and groups outside of JOIDES. At the Fall, 1992 meeting, TECP discussed this issue and agreed that such overlapping interests would become part of our regular watchdog reports, as appropriate. TECP considers that its joint meeting with LITHP in Fall 1991 was highly successful, and led to the recognition of a large number of overlapping LITHP-TECP interests. TECP and SGPP are planning a joint meeting for Fall, 1993.

4. SSP, PPSP

TECP notes that SSP has more than once agreed with TECP in the past about the need for better characterization of proposed drill sites. TECP's interest here is in maximization of the scientific return, general as well as tectonic, in any planned new drilling.

5. Panel and Shipboard party membership

TECP, concerned about the breadth of its mandate, endorses the idea that all membership nominations, non-US as well as U.S., be made with an eye towards covering TECP's broad responsibilities.

6. New JOIDES Office

No Comment.

7. PCOM

Although it is aware of the current workload on thematic Panel Chairs, TECP endorses the idea of greater thematic input to long-term decision making by PCOM. Regular attendance by Panel Chairs at part of each PCOM meeting possibly is a way to accomplish this objective.

8. Handling of drilling proposals

TECP understands that this proposal would result in PCOM determination of the ship's track two years ahead of time. There are good and bad aspects to this idea. On the plus side is that it would force the drilling community to look around the globe rather than concentrate on a flood of proposals in a given geographic area. On the negative side is the tendency for this idea to diminish the proposal-driven nature of the program, to increase outsider suspicion of ODP as a closed community. TECP opines that on balance the negatives outweigh the positives.

TECP proposes that PCOM consider institution of a "pre-proposal" process. These would be short, but unlike "letters of intent", they would be ranked as to quality of science. This process might give ODP a better idea of good science in the pipeline than does the "letter of intent", and it might reduce the effort and delays in bringing a high-quality proposal to fruition.

VI. Watchdog Reports

1. Transform Margins--Alastair Robertson

General Comment: The following transform-related proposals are current in **decreasing** priority:

1. Proposal 346-Rev 3. Ivory Coast-Ghana transform margin. This proposal remains a high thematic priority for TECP. A new revised proposal incorporating new data is expected. Alastair Robertson is a "hero" for this proposal.

2. 333-Rev Evolution of pull-apart basin, Cayman trough. This proposal addresses a high thematic priority to study transform rifting leading to small ocean basin development, but it needs considerable revision. Uri Ten Brink is "hero" for this proposal.

3. 386-Rev 2. California margin drilling. Although this proposal mainly involves OHP themes, TECP sees some opportunity to study transform-related northwest translation and/or tectonic rotations. The probable combination of this proposal will 422-Rev Santa Monica Basin may reduce the existing tectonic component.

4. 401. Evolution of a Jurassic Seaway, SE Gulf of Mexico. This proposal would study transform rifting of a small ocean basin, but the proposed sites are very deep and there is no prospect for resubmission.

5.079-Rev. Tethys and birth of the Indian Ocean. This is a possible transform-margin setting, but the proposed site objectives are deep and not well constrained. There is no resubmission in prospect.

Specific comment on Ivory Coast-Ghana Transform margin. For two years TECP has rated this proposal a mature high priority objective. One year ago, TECP was informed that results from new MCS and submersible work would be integrated into a revised proposal, and TECP identified a number of specific deficiencies. No revised proposal was available at the Sept. 1992 Grenada meeting, however. As watchdog, A. Robertson wrote after the meeting to lead proponent J. Mascle with the suggestion that the proponent base be enlarged to aid in revision, and he specifically suggested Dr. R. A. Scrutton (Edinburgh). J. Mascle replied, agreeing to this suggestion, he and Roger Scrutton have indeed been in contact. After PCOM's decision in December not to include this proposal in the FY 1994 drilling, E. Moores wrote to Mascle reiterating the need for an increased proponent base and revision of the proposal. J. Mascle responded, again agreeing, but noting problems with staff availability.

TECP wishes to re-emphasize its interest in this proposal, and suggests the following individuals who possibly could help with revision : Caroline Ruppel (Woods Hole), Jian-Lin (Woods Hole), Paul Mann (U. Texas - Austin), Juan Lorenzo (Louisiana State University). It was also suggested that John Mutter (PCOM) might be willing to comment on revised proposals while not himself becoming a proponent. Alastair Robertson will supply the above names and their addresses to Jean Mascle.

2. Plate history, sea level change, magnetic questions--Steve Cande.

Several proposals address important plate kinematic issues, although in most cases it will require some modification of the drilling plan to obtain the most relevant plate kinematic information.

The sites discussed in Proposal 333--Cayman trough directly address questions of 1) the age of the initiation of rifting; 2) the age of the oldest anomaly; and 3) the age of a major change in plate motion during the Oligo-Miocene in the Cayman trough. These sites will provide valuable information constraining the tectonic evolution of the trough. In addition to these sites, TECP encourages the proponents to consider adding a site on the conjugate western flank of the Cayman trough to check for possible asymmetries in the rate of opening.

Two sites were discussed in Proposal 426-Mantle Reservoirs, on anomaly 30 on the southern margin of Australia. Although designed to investigate the position of the Pacific-Indian isotopic boundary during the early opening of Australia-Antarctica, these sites would also confirm the age of the oldest anomalies south of Australia. Considering the uncertainties in the identification of the oldest anomalies south of Australia, TECP is very interested in these sites. TECP would also like to encourage other proposals that more directly address the early spreading history of Australia-Antarctica.

The sites described in Proposal 347 Rev. Late Cenozoic Paleooceanography, south Equatorial Atlantic, could provide important constraints on the age of oceanic basement in an area where there are no magnetic anomalies if the sites were cored the entire way to basement. At present, several of the sites are terminated about 20 m above basement. TECP strongly encourages deepening of these holes.

Drilling to basement at several sites on the Shatsky Rise, as proposed in Proposal 258 Add. Paleooceanographic Controls on the Deposition., is of high interest to TECP. These holes will provide important constraints on the age and rate of formation of the rise.

3. Rifted margins--Phil Symonds

1. Present Status:

There are 10 proposals that fall readily within this theme that were listed as active as 1 January, 1993. One other proposal --396 (received by JOIDES Office on 11 Feb., 1991) was examined by the NARM-DPG, but was not incorporated into its drilling transects, and should still have been listed as active. Thus there are currently 11 active proposals concerned with rifted margins and rifting of continental lithosphere, and either of these have been rated by TECP as 4 or above. Proposal 079-Rev--Tethys and the birth of the Indian Ocean--was included within this watchdog category in the report from the Fall 1992 meeting, but has now been removed as its objectives are more appropriate to other TECP watchdog themes (Transform Margins). At the last TECP meeting there 16 proposals (excluding 079-Rev) and including 395, which was not mentioned in the last watchdog report) related to the rifted margins theme.

By January, 1994, two of the presently active proposals (265-Add and 363) will become inactive, unless revised proposals are received.

TECP's assessment of the currently active proposals are summarized as follows:

265/265 Add Woodlark Basin (Scott)--highly ranked by TECP
333-Rev Cayman Trough (Mercier de Lepinay)--TECP very interested, but needs re-

assessment of major objectives.

- 363 Grand Banks/Iberia plume volcanism (Tucholke)--not included in NARM-DPG because of secondary interest as it stands.
- 392 Labrador Sea volcanism (Larsen)--Considered by NARM-DPG--addresses high priority objectives with deficiencies. Immature at moment.
- 394-Pre and syn-volcanic extensional basins (Kiorboe)--considered by NARM-DPG--addresses high priority objectives, but immature. A more mature revised proposal could be of interest.
- 395 Compression on volcanic margin (Boldreel) Considered by NARM-DPG--doesn't address rifting process or high priority thematic objectives, and appears to be only of local/regional interest.
- 397 N. Atlantic multiple rifting (Gudlaugsson)--addresses high priority objectives but with deficiencies. Interesting complexities with respect to magmatism and rifting.
- NARM-DPG transects--highly rated by TECP, and ranked very high in global and prospectus rankings during 1991/92/93 (various transects ranked 2, 7, and 11, at this meeting). The first stage of drilling related to these proposals has just commenced on Leg 149-Iberian margin.
- 396 Hotspot model for volcanic margins (Anderson)--of secondary interest to TECP as presented, and immature.
- 086-Rev2 Red Sea drilling (Bonatti)--addresses high priority TECP rifted margin objectives in a region of great interest, but immature at moment.
- 334-Rev2 Galicia S reflector (Boillot)--addresses high priority TECP non-volcanic margin objectives. Update of 334-Rev that was considered by NARM-DPG and objectives were partly included in Iberian margin drilling recommended within the NARM-DPG report as site GAL 1. The objectives of GAL 1 are to drill into the top of the "enigmatic terrane" lying above the S' reflector, which is proposed to be equivalent to the aerially extensive S reflector thought to be related to a major detachment fault. This proposal was included within the voting for TECP priorities for FY 1994 drilling and ranked eighth out of ten. It ranked eighth in the global rankings conducted at this meeting. It is considered mature and drillable at the moment.

It had been expected that a new proposal examining the continent/ocean transition and margin development off southern Australia would be available for review at this meeting. Unfortunately this proposal was not forthcoming, but proponents are encouraged to submit it in time for review at the next (Fall) meeting. TECP considers that this area may be a good one in which to attack specific global objectives related to the development of rifted margins and ocean/continent transition zones, within the drilling capabilities of current JOIDES RESOLUTION technology.

2. Scheduled rifted margin drilling:

NARM-DPG drilling is about to commence with Leg 149, which will examine basement in the ocean/continent transition of a non-volcanic rifted margin on the Iberia Abyssal Plain. Leg 152, which will take place later this year on the East Greenland margin, is the first leg of NARM-DPG's volcanic margin drilling. No NARM drilling has been scheduled for 1994, mainly because PCOM decided to await the drilling results of Legs 149 and 152 before allocating further drilling legs to the NARM-DPG transects. Thus the next possibility for rifted margin drilling will occur in 1995.

3. Future priorities:

The following discussion of priorities takes into account the possibility that ODP will not necessarily continue beyond its current funding episode, which runs out in 1998.

- a). NARM-DPG: TECP considers that it is necessary to complete NARM drilling to the

extent that is required to meet the top-priority objectives. As noted in the NARM-DPG report, because volcanic rifted margins appear to be relative symmetric, it is not an immediate priority to drill both conjugate margin pairs. However, this is not the case for the non-volcanic margins, where priority drilling is required on both conjugate pairs in order to understand the tectonic processes responsible for the asymmetric form that they commonly display. Given this, high priority NARM drilling is:

- (1) Complete Iberian margin drilling, including deep syn-rift site IAP-1.
- (2) Commence Newfoundland margin drilling with deep site NB-4A or equivalent. Further priority drilling may be required on Newfoundland margin, depending on results of NB-4A.
- (3) Complete East Greenland margin 63° N volcanic margin drilling.

At least three legs required--perhaps two in 1995 and one in 1996. Clearly further drilling on the NARM transects will depend on the results of Legs 149 and 152, and the above priority drilling. TECP understands that new seismic data sets will be collected on the Newfoundland side of the non-volcanic transect in an attempt to define better drilling sites. TECP looks forward to seeing the revised sites based on these new data, in the very near future, so that it can review its priorities for NARM drilling.

TECP emphasizes also its desire for three-dimensional characterization of the proposed drill sites wherever possible. Detailed structural maps and accurate true-scale cross-sections (balanced to the extent possible) need to be presented to provide better constraints and justifications for the drill sites. The specific objectives and hypothesis-testing questions for each drill site should be clearly stated.

b) Other 'old' rifted margins: There are several other regions, other than the North Atlantic, where it may be possible to answer some of the important global questions related to rifted margin development, as outlined in COSOD-II, TECP White Paper, and the NARM -DPG report, such as the South Atlantic (no currently active proposals), the Australian region, particularly the southern Australian margin (proposal being developed), and the Antarctic margin (generally thick post-breakup section and relatively hostile environment make it less attractive). A conjugate margin drilling strategy will probably not be possible in any of these regions. Although such an approach is the preferred method of studying non-volcanic rifted margins, it can be limiting in terms of targeting specific rift-related problems in the best and most readily drillable locations. This is because the inherent asymmetric development of such margins usually results in one side of a conjugate pair having a substantial thickness of post-breakup, sag-phase sedimentation, and thus important rift-related features are commonly beyond drillable depth.

Following priority NARM drilling, an approach could be adopted in which globally significant rifted margin objectives are examined by drilling specific features in locations where they are well characterized by seismic and other geophysical data, and the scientific objectives are not compromised by the limitations of current drilling technology. One such location may well be the southern Australian margin, and because of this TECP included a generic southern Australian margin drilling leg within its list of proposals for global ranking. If such a proposal was reviewed and supported at the 1993 Fall meeting, it is likely that it would be brought to maturity and be ready for drilling by 1996/7.

c) "Young" rifted margins: TECP is keen to see such margins drilled and currently has two proposals before it, that were highly rated during review. The Woodlark Basin proposal (265-Add) is expected to be substantially revised in the near future, following the recent Lamont-Doherty seismic cruise in the area, and the forthcoming Hawaii MR-1 cruise. These data sets should allow good sites to be selected in the area, to examine a rifted margin in the process of formation. It seems likely that this proposal could be ready for

drilling by 1996/7. The Red Sea proposal (086-Rev) is very immature and requires substantial modification. However, it is clear that significant rifted margin objectives could be examined by drilling in this area where conjugate margins are separated by a narrow segment of "new" ocean floor. This proposal requires new data acquisition before it can be brought to maturity, but it could probably be ready for drilling by 1997/8.

TECP considers that the combination of drilling on old and new margins should result in a new understanding of the rifting process, and the way continents break apart, and it should provide new insights into the nature of the enigmatic features commonly imaged on seismic data over rifted continental margins. Such an approach will probably require at least 5 to 6 legs of priority drilling (following Legs 149 and 152). Given that the next episode of rifted margin drilling cannot take place until 1995 at the earliest, time is fast running out to achieve substantial drilling-induced breakthroughs in our understanding of rifted continental margin development, during the currently funded period of ocean drilling (to 1998).

4. Mid-ocean ridges--Jeff Karson

In the absence of Karson, Moores gave a brief summary of current proposals in this category. They include, in no particular order: 1. 376--Vema Fracture zone, part of which is being drilled in FY-1994; 2. 426--Mantle reservoirs; 3. 300-Rev--Return to Site 735-B; 4. 407--Mid Atlantic Ridge at 15°20' N, 5. 425 Mid Atlantic Ridge at 15°37' N, 6. 420 Evolution of oceanic crust. TECP potentially is interested in all of these proposals, but in all the objectives of possible tectonic interest are not yet fully developed.

TECP reiterates its eagerness to support proposals to drill old oceanic crust, as well as of active processes along spreading centers. To be supportable, however, these proposals must attempt to place these holes in the context both of regional and local tectonic settings. In addition TECP expects careful attention to the origin and significance of relatively fine-scale structures expected on the scale of the drill cores and holes. Extensional tectonics in well-studied settings clearly show a marked diversity of structures ranging from simple to exceedingly complex. The orientations of oceanic crustal structures formed at spreading centers, therefore, cannot be assumed. Proposals that integrate the geometry and kinematics of various deformation structures in the framework of testable hypotheses are most likely to receive strong TECP support.

Despite the obvious importance of mechanical extension to the creation and evolution of oceanic lithosphere, proposals reaching the TECP still generally are deficient in attention to the processes and structures related to extension. TECP regards a proposal simply for drilling a deep hole into, say, gabbro or serpentized peridotite as weak because the orientation of the hole and any structures in it or in the drill core may not be constrained. Thus these structures cannot be adequately used to evaluate models of sea floor spreading.

5. Marginal Basins--Yujiro Ogawa

A. Significance: Marginal basins or seas, also known as back-arc basins (though not all marginal basins are back-arc basins) are a key to understanding not only regional tectonics, but also processes extending as deep within the Earth as the core-mantle boundary. Understanding the causes and processes of marginal basin formation can enhance our basic understanding the kinematics and dynamics of plate tectonics. Mantle flow or convection may originate as huge plumes from the core-mantle interface, as suggested recently by deep tomographic studies (Fukao et al, 1992, JGR?).

Despite their relatively small areas and concentration in the western Pacific, back arc

basins still possess very important significance for understanding mantle flow, because of their origin by mantle diapiric rise or other large-scale arc or continental rifting. Understanding the mechanism of initiation and cessation of opening of back arc basins can contribute not only to the constraint on plate tectonic processes, but also bears upon post-plate tectonic science.

B. Current state of knowledge in the western Pacific: This is well-summarized in the forthcoming report of the Monterey meeting, chaired by Brian Taylor (see above and Attachment A). Note worthy is the crustal structure of the Sea of Japan, which consists of two basins--the Japan basin to the north and the Yamato basin to the south. They have been analyzed critically by Tamaki et al (1992;ODP Scientific Results volume 127/128(A)), Jolivet & Tamaki (1992, *ibid*). The Japan basin is floored entirely by oceanic crust of normal thickness, whereas the Yamato basin crust is fairly thick. Analysis of data from OBS networks, as well as magnetic lineaments, suggests that the Yamato basin is underlain by thinned upper continental (granitic) crust. The Japan basin formed by westward propagation of an oceanic rift into the Yamato basin between 30(?) and 20 Ma (Suyehiro, 1992, *ibid*, and Hirata 1992, *ibid*). Several blocks of continental crust remain scattered within the Japan Sea (Tamaki, 1992, *ibid*).

C. Current proposals are few: 411--Caribbean basalt province, 415--Caribbean ocean history and K/T Boundary; 428--Tyrrhenian sea, and 431--Western Pacific Seismic network. Proposal 431 is special for emphasizing the seismic network, but it should be preceded by an evaluation of the success of the seismic network in the Sea of Japan. The other proposals are mostly related to magmatism and sulfide deposition. Basaltic magmatism is of interest to TECP because of its relationship to the ophiolite problem. This is a profound problem of great interest to TECP, and we need further clarification of the relationship between basaltic composition and tectonic setting, such as mid-oceanic, back-arc basin, other marginal basin, forearc, or island arc.

TECP considers back-arc basin problems to be significant global problems. Proponents of drilling in these regions are urged to cast their proposals in terms of their potential contribution to an understanding of the global problem, not just the local or regional one.

6. Convergent margins (normal subduction)--Greg Moore

Only a few proposals are currently active. 414--Barbados has been scheduled as Leg 156. 400--Costa Rica is a hydrogeology/initial deformation program that is mature. An Alvin dive/heatflow program has been funded for 1994. These new data will augment existing 3-D seismic and SeaBeam data. The other currently active proposals, 421--Volcanic rocks of the volcano arc and 419--Azores-Gibraltar plate boundary, are still immature.

Future proposals are expected to address issues of fluid flow and mechanisms of deformation within accretionary prisms of the western Pacific. Lack of accretion/subduction erosion might be addressed off Peru and in the western Pacific.

7. Convergent margins (collisional)--Carlo Doglioni

There are mainly four proposals related to "collisional" tectonic settings: 330--Mediterranean Ridge, 323--Alboran Sea, 340 Rev--North Australia Margin, and 369--Sardinia. In various ways they all focus on globally interesting tectonic problems, such as progressive change from ocean-continent to continent-continent convergence (330, 340); post-collisional extension of an earlier collisional belt (323) or compression of an earlier extensional basin (364). Also proposal 340 particularly addresses the origin of foredeep

basins which are among the most debated and economically significant tectonic features.

Other still-active proposals (e.g. 383 Aegean Sea) are also of interest to this panel. TECP reiterates its interest in broader links, where possible, between drilling proposals and on-land geology. TECP also would like to see major attention to such questions as the relationship between propagation of thrust faults and foredeep development (both trenches and foreland basins), in terms of subsidence rates, clastic input, and the relationship between thrust complexes and the composition and thickness of the lithospheres involved.

8. Stress and mid-plate deformation--Mark Zoback

Determination of stress in boreholes requires a paradoxical combination of conditions--rocks that are lithified, but which are not too strong to withstand the applied stresses. As drill holes are essentially vertical, the stress of concern is the maximum horizontal stress. The maximum horizontal stress increases fastest with depth in areas of compressional deformation, and slowest in areas of extensional deformation, (such as mid-oceanic ridges). Thus stress measurement opportunities require an optimum combination of depth, tectonic regime, and rock strength.

The following proposals or scheduled drilling legs have potential for obtaining stress orientation data:

Legs on Prospectus:

149--Iberia: deep (≈ 1 km) holes in sediment
152--NARM volcanic rifted margin (E. Greenland)--possible but hard to predict because of high strength of basalts.

Next Year?

NARM volcanic 2 (see comment above for Leg 152)
Alboran (Hole AL-1)

New (Possibility of being drilled is unknown)

333-Rev--Cayman trough: possible but holes are poorly sited to address questions related to frictional strength of transform faults.
SR-Rev--Escanaba trough (Gorda Ridge): deeply sedimented ridge valley.
419-Rev--Azores-Gibraltar: two ≈ 1 km deep holes in sediments are proposed.

Promising recent results include breakout data on cores obtained on Legs 125 and 126 near the Bonin Arc that look quite interesting.

9 Paleostress and deformation mechanisms--Sue Agar

At least 13 active proposals and 6 of the forthcoming scheduled legs include potential for studies of deformation mechanisms and paleostresses. These include opportunities for studies in contrasting sections of the lower oceanic crust (Leg 153--MARK; 300 Rev--Return to 735B; 425--MAR 15°37' N) and the upper oceanic crust (Leg 157--Vema Fracture Zone; Leg 158--TAG; 086 Rev 2--Red Sea; 420--Evolution of Ocean Crust; SR-Rev--Sedimented Ridges); convergent margins and accretionary prisms (Leg 156--N. Barbados Ridge; 400--Middle America Trench, Costa Rica; 323--Alboran Margin; 330--Mediterranean Ridge; 419--Azores-Gibraltar margin); passive margins (Leg 152--E. Greenland volcanic rifted margin; Leg 149--Iberia Abyssal Plain; 334 Rev 2--Galicia S'

reflector; 423 Rev--Gas Hydrates; and pull apart basins and transform margins (333-Cayman Trough, 346--Ivory Coast-Ghana transform margin).

Although many of these proposals hint at the potential for structural studies of core, few provide sufficient detail to demonstrate how such studies could be used to solve the tectonic problems outlined. Some of the proposals could be strengthened by including discussions of possible drilling scenarios and a realistic assessment of the results that would be obtained. Many of the proposals lack a discussion of the chronological relations that can be constrained by structural studies. Where *in-situ* stress measurements are being considered, the potential for constraining stress and strain paths by examining paleostresses and kinematic indicators has been ignored. Studies of fluid flow and deformation have received considerable attention in accretionary prism studies, but in ocean crust proposals the link between hydrothermal flow and the deformation of the oceanic crust has not been well-addressed. Both Leg 158--TAG and the SR-Rev--Sedimented Ridges proposal, for example, need to include structural geologists. Given the comparatively small numbers of structural geologists who have participated in ODP legs or have been active proponents, the shortcomings outlined above are understandable. TECP also wishes to emphasize the need for careful attention to core orientation. It should also be noted that even where deformed rocks are unlikely to be encountered, that structural geologists can provide shipboard expertise to document fabrics and relate them to physical property measurements, logging, and seismic velocities.

10. Updated list of TECP Watchdogs

1. Transform Margins: Alastair Robertson/Uri Ten Brink
2. Plate history, sea level change, magnetic questions: Steve Cande/Joann Stock(?)
3. Rifted margins: Phil Symonds/Mike Steckler
4. Mid-oceanic systems: rifts--Jeff Karson; Yves Lagabriele--ridge-transform questions:
5. Marginal and back-arc basins: Yujiro Ogawa
6. Convergent margins (normal subduction): Greg Moore/Roland Von Huene
7. Convergent margins (collisional): Carlo Doglioni
8. Stress and mid-plate deformation: Mark Zoback
9. Paleostress and deformation mechanisms: Sue Agar

VII. Global Rankings

Voting procedure: TECP followed the procedure agreed upon at the December, 1991 Panel Chairs' meeting. A total of 32 drilling legs were identified from the Watchdog Reports and the "Active" ODP Proposal list which were achievable in the next 4 or 5 years. Each Panel Member voted for 15 in ranked order, with each person's top choice receiving 10 points, #2 9, etc. Proponents were identified on their respective proposals. Voting was by paper ballot, with it agreed in advance that proponents could not vote on their own proposals. The total number of points for each drilling leg were totaled and normalized by the total permitted to vote. TECP members also volunteered to serve as "Heroes" to the top four ranked proposed legs, in order to assist them in bringing their proposals to a drillable state. Rankings, scores and "heroes" are as follows:

Rank	Score/15	Name	"Hero"
1	11.6	323 Rev Alboran deep hole (AL-1)	Mike Steckler
2	10.85	NARM Non-volcanic Iberian	Phil Symonds
2	10.85	346-Rev 3 African Equatorial Transform	Alastair Robertson
4	10.2	330Rev Mediterranean I (shallow)	Roland Von Huene/Tim Reston

5	7.3	340Rev. N. Australia Margin
6	7.2	400 Costa Rica/Middle Amer. Trench
7.	6.6	NARM Volcanic Leg 2
8.	5.4	265 W. Woodlark Basin
8	5.4	334 Rev 2 Galicia margin S' reflector
10	5.1	330 Rev Mediterranean 2 (deep)
11	4.8	NARM Non-volcanic- Newfoundland
12	4.7	333-Rev Cayman Trough
13	4.2	Red Sea Generic
13	4.2	323 Rev 2 Alboran (the rest)

VIII TECP priorities for large budget items.

Top Priority:

Pore fluid sampling--an immediate problem, as is needed for upcoming legs.

Deep drilling--TECP notes that many highest priority tectonic objectives are compromised because of lack of deep drilling capabilities. Therefore, TECP believes that the funding of these studies should be made available as soon as possible. TECP urges that information from the RFO should be evaluated as soon as possible, and if feasible, that the studies be funded on a priority basis.

Of Interest

Computers
DCS

Not of TECP concern

Ice Boat

IX. TECP priorities for deep drilling

As noted above (item VII) TECP is very interested in deep drilling. Four possible deep drilling objectives are included in TECP's 1993 Global Rankings. TECP's priorities for deep drilling, however are as follows:

1. Iberian deep hole (IAP 1) 2550 m.
2. Alboran deep hole (AL 1) 2.5-3 + km.
3. Galicia S' hole (334 Rev 2) 1.8 km.
4. NARM Newfoundland
deep hole (NB4A) ≈ 2500 m

TECP is interested to see that the Iberian drilling is finished, in that it has been started, and there remains some uncertainty as to the "conjugateness" with the Newfoundland site. IAP 1 thus is TECP's recommendation for ODP to begin its experience with deep drilling targets. TECP remains interested in the Galicia S reflector (as opposed to the S'), but there is no current proposal and the target remains very deep and

still apparently beyond the range of existing technology (? but possible with a slim-riser system?).

X. TECP priorities for downhole tool deployment and development

Priority

1. FMS
LAST
2. HI-Temperature tools
Magnetometer

Need encouragement:

Borehole seismics--need to modify for size of hole
Downhole radar

Of secondary interest

WSTP
CORK

Not of high priority

PCS--It's not working

XI. TECP statement on core orientation

A. Core Orientation: Responsibilities of Shipboard Paleomagnetists

Core orientation with respect to the earth's magnetic field is a major contribution to the success of a leg which may be made by the shipboard paleomagnetists. TECP recommends the following core orientation duties be incorporated as part of the "job description" for shipboard paleomagnetists.

1. Direct Orientation of APC cores by the Tensor or multishot tools.

In cooperation with the assigned marine laboratory specialist, the shipboard paleomagnetists will determine the azimuth of oriented APC cores, disseminate this information to the shipboard scientific party, and record it in an archivable form (e.g., Excel spreadsheet, 4D form - see motion on archiving of core orientation).

2. Hard Rock Orientation.

The paleomagnetists will work in conjunction with petrologists and/or sedimentologists and structural geologists, and with the assigned marine specialist and engineering staff, to record the orientation of hard rock pieces determined by the Tensor/sonic core monitor/scribe orientation technique. The paleomagnetists will be responsible for the dissemination and archiving of the orientation data.

3. Orientation by Remanence.

Where practical, the paleomagnetists should determine the orientation of core or

integral pieces of core with respect to the viscous remanence, by means of stepwise demagnetization of archive-half sections and/or discrete working-half specimens. Where the viscous remanence cannot be isolated, the paleomagnetists may choose to determine the orientation with respect to the characteristic remanence, providing the relation between the paleofield reference frame and the modern geographic frame is independently known. Paleomagnetists should keep in mind that a near-vertical component acquired during coring often obscures the viscous remanence, and may also overprint the characteristic remanence. If this coring-related overprint is successfully removed by alternative demagnetization of field-free storage techniques, the paleomagnetists should supply orientation information at the second post-cruise meeting.

B. Archiving of Core Orientation Information

APC core orientation by the Tensor or multishot tools, and piece orientation by the hard-rock-orientation technique, are currently not formally recorded or archived. TECP recommends that this information be considered as prime data, and archived (by the shipboard paleomagnetists and/or the relevant marine specialist) as such. A 4D data entry form, or similar spreadsheet structure, should be developed for this purpose.

Core/piece orientation with respect to the viscous or characteristic remanence should also be recorded by the shipboard paleomagnetists in an archived form (as a dedicated 4D application, or alternatively as an element of the "Structural Geology Spreadsheet" currently under consideration as a database element). The record should include information about the type of remanence being isolated, its relation to current geographic north, and the demagnetization technique and intervals used to isolate the remanence.

C. Core Orientation Using FMS and BHTV Logs

An automated (Macintosh-based) core orientation system is available to orient planar structures (bedding, faults, fractures, veins) with FMS and BHTV logs. This system was successfully used to orient about 4 km of continuous core from the KTB pilot hole in Germany. TECP recommends that when good-quality FMS data and relatively continuous core are available, the core should be oriented on board so that this information is available to scientists taking oriented samples or referring to structural information both during the leg and post-cruise. This procedure should be carried out jointly by the shipboard loggers, structural geologists, sedimentologists and petrologists, and should be incorporated into the "job description" of each group.

XII. White Paper Revision

TECP discussed the question of the revision of the White Paper. It was agreed that the preliminary working outline would be as follows:

I. General Preamble

Technical development
Structural processes in general

Each person will write a portion or comment of preamble for his/her section to be merged with the rest.

II. Sections

	Writer(s)
Convergent settings: Active Margins	Greg Moore/Roland Von Huene
Collisional processes	Carlo Doglioni

Divergent settings	Rifted margins Marginal basins Mid-Oceanic Ridges	Phil Symonds/Mike Steckler Yujiro Ogawa Rifts--Jeff Karson Transforms--Yves Lagabriele
Translational settings--transforms		Alastair Robertson/Uri Ten Brink
Plate Kinematics		Steve Cande/Joann Stock
Intraplate deformation		?
Plate dynamics		Mark Zoback
Plate history, magnetics, etc.		Steve Cande
Paleo-stress, deformation mechanisms		Sue Agar

Each section to include:

State of knowledge
 Current status of drilling progress
 Opportunities achievable for drilling through 1998
 Opportunities beyond 1998
 Suggested drilling strategy, technical developments, locations and achievable results (will tabulate all together in final write-up)
 Map keyed to themes

"Brainstorm" list of items to include, as appropriate:

Structural processes: stress and strain, deformation paths, chronology
Vertical motion--uplift and subsidence
Fluid in deforming crust
Age dating of sediments and basement
Comparison--tectonic and magmatic processes
Creation--oceanic lithosphere
Subduction
Passive-rifts, etc.
Mass balance
Ductile structures--fabrics, kinematic indicators, geometry
Temperature and thermal history
Sediment-tectonic interaction
Response to deforming lithosphere
Fabric in rock
Composition
Age
Geochemical and physical properties
Shows complexity--all factors point to solution to tectonic problems
Dating deformation--relative chronology, absolute age.
Rate of deformation
Scale problem
Microfabric, core--correlation with other cores
Regions, plates, plate margins, orogenic belts, etc.
Integration and synthesis:
Site surveys, drilling, seismics, other geophysics, dredging, on-land geology
3-D presentation (characterization)
Hypothesis testing--quantitative vs. qualitative
Experimental Rock deformation--application to interpretation of core, deduction of rheologic properties from microstructures

Appendices: 1. Suggestions on how to translate tectonic objectives into shipboard

- scientists' assigned duties
2. Tectonics guide for shipboard scientists. How to distinguish drilling disturbances from real primary structural features.

Writing plan:

1. Each person to write assigned section, send to Eldridge Moores as e-mail or Word 4(Macintosh) disk by **July 15, 1993**
2. Moores to collate, combine into single document for review at Fall Meeting.
3. Sections should be shorter and more focused than equivalent sections in current White Paper.
4. Prepare two versions--shorter one to publish, and longer one for Panel and to send to proponents

XIII Nominations for Chair (alphabetical order)

names will be presented at PCOM when the candidates have been able to confirm their ability to serve as chair if chosen

XIV. Next Meeting

Tentative: September 18-21, Corner Brook Newfoundland, to include a joint meeting with SGPP.

XV. Meeting Adjourned: 11:00 A.M. PST, Wednesday March 24, 1993.

XVI--TECP E-mail addresses

Agar, Sue	agar@earth.nwu.edu
Cande, Steve	cande@gauss.ucsd.edu
Cannat, Mathilde	mac@ccr.jussieu.fr
Dogliani, Carlo	connection to be made soon
Karson, Jeff	?
Larsen, Hans-Christian	?
Lagabrielle, Yves	connection to be made soon
Moore, Greg	moore@soest.hawaii.edu
Moores, Eldridge	moores@geology.ucdavis.edu
Musgrave, Bob	musgrave@nelson.tamu.edu (until May 1)
Ogawa, Yujiro	yogawa@arsia.geo.tsukuba.ac.jp
Robertson, Alastair	coming
Schmitt, Karen	joides@ocean.washington.edu
Steckler, Mike	steckler@lamont.lggo.columbia.edu
Stock, Joann	jstock@seismo.gps.caltech.edu
Symonds, Phil	p_symonds@frend.bmr.gov.au (perhaps in future: psymonds@bmr.gov.au)
Taylor, Brian	taylor@elepaio.soest.hawaii.edu
Ten Brink, Uri	tenbrink@nobska.er.usgs.gov
Underwood, Mike	coming
Von Huene, Roland	coming
/Tim Reston	