JOIDES TECTONICS PANEL MEETING
Palisades, New York
5-7 October 1988

Executive Summary

The meeting was divided into two main parts — Long-Range Planning and WPAC/CEPAC drilling. Input to the TECP Long-Range Plan will be submitted for the Chairman to put together the next draft as soon as possible.

WPAC drilling proposals were discussed. The Panel's principal recommendations concern Nankai Trough drilling. Namely:

- Sufficient time needs to be taken to carry out a drilling program commensurate with the recommendations of the Working Group on fluid flow at convergent margins chaired by Graham Westbrook.
- Additional surface studies should precede final site selection.
- Pore pressure and permeability measurements are essential.
- Site NKT10 should be drilled to basement to obtain a complete picture of fluid flow at the toe of the prism.

The Panel's highest priority themes for CEPAC drilling were reviewed with presentations on the Hawaiian moat experiment and the Chile Rise triple junction. TECP is satisfied that sufficient progress is being made toward mature proposals in these two themes but retains reservations about both at the present time. Proponents were encouraged to supply the Panel with further information at the earliest possible opportunity. The Chile Rise triple junction will probably need two legs to satisfactorily address the problem. TECP believes that a proposal for the Vancouver Island margin and at least preliminary results of Nankai Trough drilling need to be in before final recommendations can be made for Cascadia convergent margin drilling. TECP was impressed by the new data bases available for the North Pacific and Bering Sea and urges PCOM not to drop drilling in that region from the CEPAC program. Highly significant tectonic themes identified in the Panel's long-range plan can be addressed there.

Finally TECP recognizes the need to draw to the attention of proponents of tectonic drilling that it foresees having to make hard choices regarding thematic programs in the CEPAC region during the next year.

Next Meeting: Europe (F.R.G. or France) tentatively during the week February 27 to March 3, 1989, or else the following week.

DRAFT MINUTES

JOIDES TECTONICS PANEL MEETING
Palisades, New York
5-7 October 1988

Members Present:

I. Dalziel (U. Texas at Austin), Chairman
J. Behrman (F.R.G.)
J. Bourgois (France)
R. Buck (L-DGO)
D. Davis (SUNY, Stony Brook)
D. Engebretson (W. Washington U.)
K. Hsu (E.T.H.)
Y. Ogawa (Japan)
S. Srivastava (Canada)
T. Watts (L-DGO)
G. Westbrook (U.K.)

In Attendance:

L. Kroenke (CEPAC)
G. Moore (CEPAC)
P. Vogt (N.R.L.)

Absent:

K. Hinz (F.R.G.)

Agenda

Five principal topics were discussed at the meeting:

Long-range planning
WPAC drilling
CEPAC drilling
Nominations for WPAC co-chiefs and new US panel members
Next meeting

Long-range planning

There was extensive discussion of the TECP Long-range planning document as commented upon by PCOM. It was understood that further work was required to move the document ahead from being closer to a White Paper to being closer to a long-range plan. Some initial drafting was undertaken towards this end, but pressing WPAC and CEPAC matters

limited time spent on long-range planning to approximately one half of the three-day meeting. It was agreed that writing assignments should be in the Chairman's hands by October14.

WPAC Drilling

Nankai Trough (Proposal 314/D)

TECP had an extensive discussion of this proposal to study fluid flow and mechanical response across an accretionary prism. The discussion was carried out in the light of a report by Graham Westbrook of the deliberations of the Working Group on fluid flow at convergent margins. The Panel agreed that any drilling of the Nankai accretionary prism should be carried out in a manner commensurate with the recommendations of that Working Group. Accordingly, the following recommendations were agreed to:

1. Drilling should be planned and carried out in the light of detailed surface studies. Every effort should be made to coordinate the up-coming submersible studies with the proposed drilling program.
2. Pore pressure and permeability measurements are essential. The drilling should not be undertaken unless the appropriate instruments are available and working. Sufficient time must be devoted to acquiring the data needed to understand the fluid flow and mechanical response to deformation within the prism.
3. Time should be taken to drill the proposed Site NKT10 to basement in order to obtain a complete picture of fluid flow at the toe of the prism.
4. Drilling should be concentrated at the toe of the Nankai prism. Time needed to drill NKT10 to basement should, if necessary, be obtained by drilling fewer holes at up-slope sites.

A meeting of the Chairman, Graham Westbrook, and Shiri Srivastava with Chairman Paul Worthington and the Downhole Measurements Panel indicated that the necessary tools for Nankai drilling will indeed be on line, but confirmed TECP's concern that the time available in the current plan for downhole measurements is inadequate. TECP reiterates its belief that the

Nankai accretionary prism experiment needs to be done properly, and that means taking the necessary time for essential measurements.

Electrical Conductivity Structure of the Eastern Margin of the Japan Sea (Proposal 302/F)

While believing that electrical conductivity measurements such as those proposed can indeed contribute to understanding the deep structure of the lithosphere, TECP was concerned that the proposed experiment was of necessity confined to one point. This is in contrast to the array of instruments used in the recent conductivity traverse successfully carried out across the Vancouver Island convergent margin. Thus the Panel is reluctant to recommend that 55 hours of *JOIDES Resolution* time be assigned to this experiment.

Island Arc to Back Arc Basin Transition (Proposal 155/F)

TECP found this proposal of considerable tectonic interest (as it had done before, i.e., in March 1988). The goals fit into TECP's long-range plans for monitoring of tectonic activity at ODP sites and for local tectonic experiments using seismometers and stress observations. The Panel was disappointed, however, that the proponents had not followed-up on its earlier request for an assessment of the improvement in resolution of earthquake hypocenters that can be expected from the instrumentation. Thus TECP supports the proposal with reservations.

Zenisu Ridge (Proposal 163)

The proposal addresses a high priority tectonic theme, namely processes at convergent margins and specifically ophiolite obduction. The Panel did not, however, find the likely outcome of successful drilling in terms of the timing of the onset of deformation to be of sufficient interest to support this proposal strongly.

Scientific Drilling in the South China Sea (Revised Proposal 194/D)

TECP has a long-term thematic interest in South China Sea drilling from the point of view of the development of rifted margins of a small marginal ocean basin. The Panel wishes to encourage the Chinese Committee to acquire more seismic data to develop a mature proposal. The present proposal, however, does not make clear how drilling at the proposed

sites could indeed discriminate between different models of rifted margin formation. The Panel suggests that a more mature proposal be presented at a later date.

Lau Basin (Site LG6) 266/D

TECP wishes to go on record as supporting the drilling of a fore-arc site such as the proposed Site LG6 as part of the Lau Basin program. The scientific goal of such drilling being to relate in as far as possible the history of back-arc development with the history of arc volcanism. This is a major problem as back-arc basins in several parts of the world (e.g., Bransfield trough) develop independent of active arc volcanism. Hence the tectonic mechanisms are unclear. The site would also contribute to knowledge of the fore-arc basement and to understanding of the tectonic history of the Lau fore-arc.

Zero-offset Vertical Seismic Profiling at Bonin Sites Bon-1 and Bon-2 (Proposal 309F)

TECP strongly supports this proposal but urges the use of the highest resolution energy source giving the penetration needed. The Panel does not believe this will be achieved with the 1000 cu. in. source proposed.

CEPAC Drilling

TECP concentrated its attention on its highest priority themes for CEPAC, namely the Hawaiian lithospheric flexure, Chile Rise-Chile Trench ridge crest subduction processes, and the convergent processes at the Cascadia margin. It also reviewed the "Augmentations" furnished by David Scholl for the North Pacific and Bering Sea ,judged to be of pressing significance in the light of PCOM's directive to CEPAC to eliminate those areas due to lack of strong thematic interest.

Hawaiian Flexure (Revised Proposal 3/E)

Tony Watts provided an update on the proponents view of planning for this experiment in the light of the widespread concern that satisfactory age control could not be achieved, He presented magneto-stratigraphic data that had been received only the previous day from the University of Rhode Island. TECP regarded the new data as very encouraging despite the

absence of declinations and susceptibility measurements that left some room for additional concerns that should be eliminated later. The available data indicate that satisfactory magneto-stratigraphic control should be obtainable at least back to the Olduvai event. While the cores studied do not allow assessment of the "datability" of older strata in the region, and there is still lingering doubt as to whether the time-dependence of lithospheric flexure can indeed be determined from drilling , TECP had no hesitation in continuing to support this theme highly for CEPAC drilling at the present time. The primary goals are increasingly mature, and the secondary and tertiary goals regarding rim volcanicity and mass-wasting(particularly the former) strengthen the overall plan. Nonetheless the proponents were encouraged to develop a model for the flexure of the lithosphere using the MCS data and assumed deposition rates for consideration by the Panel at its next meeting.

Chile Rise Triple Junction

Steve Cande reviewed the results of his recent cruise for the Panel. This included "brute stacks" of the MCS data. The Panel was impressed by the data even in its present rough form, and feels confident that a mature proposal will emerge. The preliminary proposal distributed at the meeting concentrated on the immediate effects of ridge crest subduction, including subduction erosion and ridge crest volcanism in the toe of the accretionary wedge. There was significant feeling on the Panel that a mature proposal should also address the recovery of the margin after ridge crest subduction, the state of stress in the upper plate both before and after this phenemenon, and possibly ophiolite obduction on the Taitao Ridge, The latter is more problematical, however, and should perhaps be addressed as part of a related terrestrial study. It would be unfortunate not to take full advantage of any ODP drilling by thoroughly investigating the adjacent region on land. It is known ,for example, that there are young ophiolites emplaced on land along the coast at the triple junction, that there is anomalous near trench magmatism, and that there is increased deformation resulting in increased height of the mountains to the south of the collision zone. It is felt by TECP that a complete job of investigating the important phenemenon of ridge crest-trench collision at this unique locality is

likely to need two full drilling legs.It also needs to be borne in mind that significant transit time is going to be needed from any other CEPAC site to reach 47 degrees south along the Chile margin.

Cascadia Convergent Margin (Revised Proposal 233/E)

TECP found this an encouraging proposal although the actual number of holes may need to be reduced. A mature proposal will need to await the planned seismic and side-scan sonar surveys. The Panel noted with interest the letter sent by Dr Hyndman to Robin Riddihough concerning the well-studied Vancouver Island portion of the margin. A mature proposal will be studied with interest, and a final drilling plan will also need to be viewed in the light of the results from the Nankai accretionary prism..It should be borne in mind here that TECP believes that this latter program is going to need two full legs of drilling, and a final program has yet to be determined by PCOM.

North Pacific and Bering Sea "Augmentations" (Proposals 231/E, 182/E, and 225/E)

TECP is impressed by the new data base and the potential for addressing several themes judged to be of major importance in its emerging Long Range Plan, The Panel recalled that the original proposals for drilling in this region contained little, if any, tectonic interest. The Panel supports the suggestion of a small group being set up to develop a detailed plan to address both tectonic and ocean history goals in this region. The TECP Chairman is to discuss the matter with the other appropriate panel chaimen.

Conclusion.

TECP continues to support the proposals for drilling its highest priority themes for CEPAC, namely Hawaiian flexure, Chile Rise triple junction, and Cascadia margin. In addition the Panel believes that further consideration should be given to the North Pacific and Bering Sea areas from a tectonic perspective, TECP recognizes, however, that it will very likely be forced into making some hard choices in the not-too-far-distant future. The Panel needs to make it clear to proponents that the development of thoroughly mature proposals is now an urgent necessity. Identification of the above themes as being of the highest TECP

interest for CEPAC does not mean that one or more will not have to be dropped and left to compete at a later date with other proposals from the world"s oceans as a whole.

Nominations for Co-Chief and Panel Membership

The Panel was made aware that nominations for Co-chief Scientist on up-coming WPAC legs and for US Panel member to replace Peter Vogt and David Howell should be submitted as soon as possible.

Next Meeting

Europ (F.R.G. or France) during the week of February 27 to March 3, 1989, or else the following week.