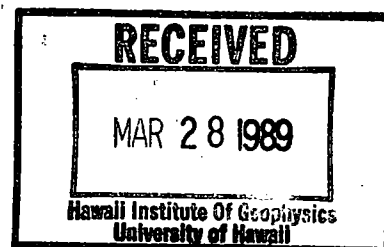


**JOIDES TECTONICS PANEL MEETING  
HANNOVER, F.R.G., FEBRUARY 27-MARCH 1, 1989**

**DRAFT MINUTES**



89-147

**Present**

**Panel Members:**

Ian Dalziel, Chairman, U.S.A.  
Roger Buck, U.S.A.  
Dan Davis, U.S.A.  
David Engebretson, U.S.A.  
Karl Hinz, F.R.G.  
Hans-Christian Larsen, Denmark  
Yujiro Ogawa, Japan  
Robin Riddihough, Canada  
Jacques Bourgois, France  
Graham Westbrook, U.K.

**Guest/Observer:**

Michael Etheridge, Australia

**Liaison:**

Olav Eldholm, Norway (PCOM)

**Preliminaries**

Chairman Dalziel welcomed new TEC Panel member Hans-Christian Larsen (Denmark) and Guest/Observer Mike Etheridge (Australia).

Karl Hinz, F.R.G., welcomed the TEC Panel to West Germany.

President Kürsten of Bundesanstalt für Geowissenschaften und Rohstoffe welcomed the TEC Panel to B.G.R.

**Minutes**

The draft minutes of the meeting in Palisades, N.Y., October 1988 were approved.

## **Reports**

Olav Eldholm (PCOM) reported on the Annual Meeting and recent PCOM activities.

## **Proposals**

### 1. WPAC, CEPAC and TEC Panel priorities therein.

#### A. Northern Cascadia subduction zone off Vancouver Island (317/E)

**Presentation:** R. Riddihough presented the proposal

**Discussion:** This centered on the seismicity part of the proposal. Doubts were expressed that the heat-flow temperature model would be good enough to constrain the extent of the "brittle" zone at its deeper end. How does faulting at a higher structural level in the wedge relate to the thrust faulting along the Benioff zone?

It seems to the Panel that there is a paradox with regard to the BSR and gas hydrates. If the latter seal off gases deeper in the structural pile, then how could upwards fluid flow proceed?

Deductions from velocity/porosity and BSR stability/heat flow lead to presumption of pervasive fluid loss and the widespread existence of a non-porous BSR. Can you have both? There appears to the Panel to be a conspicuous lack of knowledge of the whole problem (see B below).

**Decisions:**

1. TEC Panel requests PCOM to establish a Detailed Planning Group (perhaps a modification of the Fluid Processes in Accretionary Prisms Working Group chaired by Graham Westbrook):

Recognizing that the investigation of processes at convergent margins is one of the top five themes identified by TEC Panel, also recognizing that accretionary wedges are an important component of these margins, and noting the general guidelines laid out in the draft of the TEC Panel Long-Range Planning Document, the Panel requests that PCOM establish a Detailed Planning Group to evaluate proposals, clarify objectives, and coordinate drilling plans within a realistic framework for the accretionary wedges of Nankai, Cascadia (Vancouver Island and Oregon) and Barbados.

Appropriate connections with other interested panels (e.g., LITH Panel and SGP Panel) should be made.

2. The Report to proponents of Proposal 317/E should indicate that it does address high priority objectives of the TEC Panel, but:

- Doubts were raised as to the validity of the modeling for the inner (i.e., deeper) boundary of the zone of interplate brittle thrusting.
- There may be some contradictions between the existence of a BSR and bulk fluid expulsion.

- Lateral variability shown in single channel seismic data, SeaMarc data etc. requires a high quality MCS survey before final site selection.
- The proposal needs to be assessed alongside Nankai, Oregon and Barbados accretionary wedge proposals.

#### B. Gas Hydrates in WPAC Drilling (316/E)

Following general discussion it was decided that TEC Panel believes this to be an important problem that should be addressed as early as possible. It is obviously going to come up again and again. If possible it should be tackled as Nankai, but could be done anywhere in an accretionary wedge situation.

#### C. Chile Margin Triple Junction (318/E)

Presentation: G. Westbrook presented the proposal in the light of recently acquired *Gloria* data from the region.

Discussion: This ranged over all aspects of the proposal from plate kinematics to variation in deformational front morphology.

Decisions: The proposal addresses high-priority objectives of the TEC Panel although final site selection is viewed as premature given the preliminary state of processing of the MCS data. The Panel looks forward to revisions based on further processing, and its final endorsement of 1 or 2 legs will depend on this refinement. Meantime a few points need to be conveyed to the proponents:

- A site well to the north of the Darwin Fracture Zone would provide an otherwise missing calibration of the thermal history of the margin before the influence of ridge crest approach was felt.
- Can good biostratigraphic control be expected?
- Most precise available poles of rotation should be used to refine the plate kinematics, triple junction and fracture zone migration history, and plate interaction history.
- Better graphics, including block diagrams, would help reviewers assess the final proposal.

#### D. Cross Seamount, Hawaiian Swell (307/E)

The mixed goals of this proposal diminished its appeal to TEC Panel. None of the objectives were judged to be achievable in a satisfactory way. The proposal does have secondary interest to TEC Panel if judged to be of high priority to another panel.

#### E. Seamounts of Line Islands chain (308/E)

As a possible 70-120 Ma hot-spot trace this feature has considerable potential value for the high-priority theme of plate kinematics. The tectonic situation is, however, judged to be a rather complex one subject to a possible major "overprint" event. Hence it was not deemed to satisfactorily address high-priority thematic objectives.

## F. Old Pacific (306/E, 285, 287, 267/E)

**Presentation:** D. Engebretson gave a brief overview of the "Old Pacific" problem. He noted that in his opinion it is of major global significance both in terms of plate kinematic history and paleoenvironment.

**Discussion:** TEC Panel agreed that this overall program of study of pre-Cretaceous Pacific crust, sedimentary environment and magnetic anomaly time-scale is of very high priority.

**Decision:** The TEC Panel view with regard to prioritization should be conveyed to all proponents so that a consensus can be sought as to the best drilling program to address the theme.

## G. Priorities

Because the member from France had to leave early, the Chairman decided to hold a vote on TEC Panel's views of outstanding WPAC and CEPAC tectonic objectives. Each member was given 3 top priority, 3 mid priority and 3 low priority votes. Result:

	<u>Priorities*</u>			<u>Points Total*</u>
	<u>Top</u>	<u>Mid</u>	<u>Low</u>	
1. Chile Rise (1 leg)	10	0	0	30
2. Pre-Cretaceous History	8	0	2	26
3. Cascadia (1 leg)	4	5	1	23
4. Nankai (2nd leg)	3	6	1	22
5. Hawaii Flexure	4	2	4	20
6. Chile (2nd leg)	0	9	1	19
7. Bering Sea	0	5	5	15
8. North Pacific (Detroit seamount, etc.)	1	1	8	13
9. Cascadia (2nd leg)	0	2	8	12

\*10 Voting

\*\*1st priority = 3 pts.; 2nd priority = 2 pts.; 3rd priority = 1 pt.

## 2. Other Proposals

### A. Continental Margin Sediment Instability (59/A)

**Presentation:** D. Davis presented the proposal for the investigation of turbidite sequences off NW Africa.

**Discussion:** The proposal was not judged to be of high thematic interest by TEC Panel (although there was some interest because of suppressed magnetic anomalies that may be in the Jurassic quiet zone. Some concern was expressed about lack of knowledge of the role of deep currents.

**Decision:** Refer to other panels - principally OHP and SGP.

B. Arctic Ocean (305/F)

Presentation: K. Hinz presented the proposal.

Discussion: The feeling of TEC Panel is that there is need for considerably more work before drilling for tectonic targets is undertaken in the Arctic Ocean. The most important tectonic theme involves primary exploration drilling for kinematic history - for example discovering the age of the Canada Basin and Alpha Ridge crust. Much of the drilling proposed could not be undertaken by *JOIDES Resolution* anyway, and other targets may be achievable elsewhere - for example slow spreading ridge processes. The main interest lies in the paleoenvironment.

Decision: TEC Panel does not endorse drilling in the Arctic Ocean for tectonic targets at the present time. More specific comments are to be sent to the proponents.

C. Dipping Reflector Sequences and their "Sedimentary Equivalents" (310/A; 311/A)

Presentation: The proposals were presented by H.-C. Larsen.

Discussion: There was extensive discussion about oceanward dipping reflector sequences and their relationship to onshore magmatic provinces related to supercontinental break-up. It was generally agreed that these are manifestations of extremely important tectonic processes related to the evolution of rifted continental margins. There is an important opportunity to combine work that must be done at sea with work that can be done on land. The North Atlantic region with all its detailed petrologic/geochemical work on land is one important place to study these phenomena.

Decision: TEC Panel rates this theme very highly but believes that more work needs to be done to optimize the drilling targets in the North Atlantic region, and indeed on volcanic margins in general. The Panel wishes to encourage the proponents to interact with other groups known to have additional data relevant to the problem and come up with an optimum plan. TEC Panel is willing to recommend a Detailed Planning Group in this area of study to PCOM if future developments indicate that this would be a fruitful step.

The proposal to investigate sedimentary basins adjacent to volcanic margins (311/A) does not, however, convincingly demonstrate that a mappable stratigraphic relationship exists in this particular region between the main volcanic body and the sediments. Demonstration of such a relationship by high-quality seismic data must be regarded as a prerequisite to any panel endorsement of incorporating marginal basins into transects across volcanic margin/dipping reflector sequences.

D. The Equatorial Atlantic (313/A)

While not addressing directly the highest priority themes of TEC Panel, the proposal is aimed at an area of important interface between tectonics and ocean history. TEC Panel feels that it is important to develop quantitative predictive models of the plate kinematics, based on the most accurate poles of rotation available, before drill sites can be optimized.

E. Reykjanes Ridge (312/A)

This was not judged by TEC Panel to be a mature proposal; rather it suggests that certain TEC Panel and LITH Panel goals can be addressed by drilling on the Reykjanes Ridge.

F. Gulf of California (275/E)

The area clearly has considerable potential for high-priority thematic proposals to understand the evolution of transtensional environments. TEC Panel does not believe, however, that appeal to orthogonal rifting models is appropriate, and feels that the proponents should reconsider their proposal in the light of more recent (i.e., post-1982) models of the stretching and rifting of continental crust. In other words, TEC Panel feels that the region has major potential for drilling important tectonic targets that is not realized in the current proposal.

**Panel Membership and Liaisons**

**NOMINATIONS FOR TEC PANEL MEMBERSHIP**

1. The following candidates were nominated for membership of the Tectonics Panel to replace Dr. David Howell and Dr. Peter Vogt.

Eldridge Moores, UC, Davis  
Greg Moore, HIG  
David Clague, USGS, Menlo Park  
Tanya Atwater, UC, Santa Barbara  
Robert Duncan, Oregon State University  
Dale Sawyer, Rice University  
Lee Royden, MIT  
Richard Gordon, Northwestern University

2. The following were nominated as TEC Panel Liaisons:

LITH Panel, Roger Buck\*  
SGPP Panel, Graham Westbrook

\*Willing to serve from fall 1989.

**Next Meeting**

The next TEC Panel meeting will be held the week of September 25, 1989 in Honolulu, Hawaii subject to the approval of PCOM.

**Acknowledgements**

TEC Panel members acknowledged with thanks the hospitality of President Kürsten and Dr. Karl Hinz of BGR, their colleagues, and associates at Prakla-Seismos.