

**Draft Minutes
Sediments and Ocean History Panel**

United States Geological Survey
Palo Alto, California
March 9, 10 and 11, 1987

Members present:

L. Mayer (Canada), Chairman	W. Normark (USGS)
M. Arthur (URI)	I. Premoli Silva (ESF)
A. Droxler (Rice U.)	I. Saito (Japan)
R. Garrison (UCSC)	R. Sarg (Exxon)
W. Hay (U. of Colorado)	A. Schaaf (France)
P. Meyers (U. of Michigan)	N. Shackleton (England)
R. Stein (Germany)	

In attendance:

J. Barron (USGS)	N. Pisiias (PCOM) - Days 2 & 3
J. Ingle (WPAC)	W. Sliter (CEPAC)
R. Jarrard (LDGO - logging)	E. Taylor (TAMU)
M. Wiedicke (JOIDES office)	

Absent:

M. Goldhaber (USGS)
R. Embley (NOAA)
L. Tauxe (SIO)

1. Opening Remarks and Approval of Previous Minutes:

- 1.1 The meeting began at 8:45 after a 15 minute wait for a PCOM liaison to appear. When it was confirmed that there was no PCOM liaison in town, the meeting was called to order and new members (R. Stein) and liaisons (Sliter) were introduced.
- 1.2 Minutes of 20 - 21 October meeting were accepted.
- 1.3 At this point, the Chairman related his limited understanding of the PCOM liaison situation - Gartner in Texas having only received his tickets that morning - Kastner in La Jolla having classes to teach and expecting Gartner to attend. The SOHP is greatly distressed by the failure of a PCOM liaison to appear. With PCOM - Panel communication so critical, it is outrageous to conduct a meeting with no PCOM representation. Clearly a formal mechanism of assigning a PCOM liaison to a meeting is in order.

2. Liaison Reports:

2.1 PCOM Report (M. Wiedicke)

In the absence of a PCOM representative, M. Wiedicke kindly agreed to review the results of the January PCOM meeting. In particular, he reviewed those legs of most interest to SOHP:

- 1 - Indian Ocean scheduling decisions:
 - a - Red Sea, Makran dropped
 - b - SWIR leg delayed to allow time for guide-base construction
 - c - 2 legs scheduled for Argo/Exmouth
- 2 - Leg 114 - dropped requirement to pick up W-7
 - prioritized sites as SA2, SA3, SA8, SA5 and required Navidrill testing
- 3 - Leg 115 - Carbonate Saturation Profile and Mascarene Plateau added
 - Co-Chiefs - Duncan and Bachmann
 - Site Surveys underway
- 4 - Leg 117 - All in order
 - Co-Chiefs - Prell and Niitsuma
- 5 - Leg 118/119 - Prydz Bay in jeopardy due to lack of survey data
 - Kerguelen Working Group meeting next week

The SOHP reiterates its strong support for the Prydz Bay sites and urges PCOM to do all in its power to see that the appropriate site survey data is processed and made available.

- 6 - Exmouth/Argo - 2 legs scheduled
 - PCOM requests input from SOHP as to priorities for drilling
- 7 - WPAC - four core programs (Banda-Sulu; Bonin 1; Japan Sea; Nankai) and a nine leg program established
- 8 - CEPAC - SOHP must provide input to CEPAC and respond to CEPAC first prospectus
- 9 - PCOM - will meet regularly in April, August and December

10 - Panels should meet only twice per year unless more meetings are requested by PCOM

The SOHP (and especially the Chairman) applauds the two meeting per year directive (with flexibility) and will seek to generate a long-term regular meeting schedule (See below).

2.2 TAMU Report (E. Taylor)

- Report on 112 - extremely successful - most exciting result the discovery of brines. B. Garrison confirmed success of leg from SOHP point of view.
- Leg 113 - Maud Rise results look good. Orkney Plateau transect suffered from lack of carbonate.
- Leg 114 - Three primary sites - SA2, SA3, SA8. New Co-Chief: Kristoferson with Ciesielski. Navidrill tests.
- A brief outline of Indian Ocean schedule, co-chiefs and TAMU representatives was presented.

2.3 Logging Report (R. Jarrard)

A report on the current status of wireline logging was presented as well as some recent results particularly relevant to SOHP interests (i.e. determination of Milankovitch cycles).

The availability of log data was questioned and R. Jarrard responded that paper, binary and card image data is available from LDGO 1 year post cruise. LDGO will also make available log analysis software.

The SOHP has been and continues to be extremely supportive of logging efforts. In addition to those items discussed we would also like to see:

- 1 - downhole susceptibility measurements
- 2 - presentation of log data on barrel sheets (this information will be passed on to IHP)
- 3 - increased effort to log upper 100 m of section (through the pipe or alternative methods).

3. SOHP Engineering Priorities:

The SOHP short term engineering priorities previously established were reviewed and opened for discussion:

- 1 - complete recovery in
 - a - sandy sediments

- b - gassy sediments
- c - mixed lithologies (i.e. chert problem)
- 2 - pressure core barrel
- 3 - high temperature sampling
- 4 - continuous core color logging

In light of the successful and exciting wireline logging results, the need for equivalent capabilities on cores was pointed out. In particular, the SOHP recommends that efforts be directed to improving or developing a suite of laboratory tools that can provide continuous measurements of:

1. density, porosity (GRAPE)
2. sonic velocity, attenuation (p-wave logger)
3. susceptibility
4. natural gamma-ray
5. resistivity
6. color (i.e. Chase photographic system or Holman et al digital scanner)
7. texture, grain size, mineralogy (i.e. U. of Colorado laser scanner)

SOHP also recommends that any continuous core data collected also be presented on the barrel sheets. We realize that the barrel sheets may become unwieldy and that perhaps other means of presentation (i.e. microfiche) may become necessary but we believe that it is incumbent upon the project to present data in the most useful format possible.

Based on the discussion, SOHP now ranks its short term engineering priorities as:

- 1 - continuous core recovery (sands, gas, mixed lithologies)
- 2 - continuous core logging
- 3 - pressure core barrel
- 4 - high temperature sampling

Our long term priorities remain:

- 1 - ability to drill deep (2500-3000 m) stable holes
- 2 - ability to drill through salt

Andre Droxler will represent SOHP at the May TEDCOM meeting in College Station.

4. Sampling Strategy:

The request from PCOM to respond to Biju-Duval's letter prompted a discussion of sampling philosophy and strategy. While the exact nature of the request was not perfectly clear, the SOHP offers the following recommendations:

General Statement on Thematic Sampling:

By their nature, the problems represented under the SOHP mandate represent, for the most part, questions of global significance. Thus, there is a good chance of recovering material important to SOHP themes on almost every leg. Despite this fact, we are uncomfortable with the idea of providing a generalized set of sampling guidelines that would be carried from one leg to another for the fear that such guidelines would be blindly followed without proper regard for the specific problems to be addressed at a particular site. Instead we suggest that in the course of proposal and program review, each thematic panel take special note of sampling and staffing needs and make specific recommendations on a leg by leg basis.

Two areas of specific concern - Geochemistry and Physical Properties - where whole-round samples are often necessary were raised:

The SOHP appreciates the need for whole-round sampling for certain measurements but is not satisfied with the present policy of routine whole core sampling. We recommend that:

1 - the best solution to sampling that needs whole-round sections is a dedicated extra hole.

2 - where dedicated extra cores are not possible, we suggest:

a - the need for whole-round sampling be demonstrated and justified on a hole by hole basis. To monitor these requests as well as to make recommendations with regard to sampling and staffing, we recommend the establishment of two small working groups - a geochemistry working group under the auspices of SOHP and a physical property working group under the auspices of DMP. The policy for these working groups would be established by the parent panel and PCOM. The working groups could make their decisions by mail or phone and thus require no meetings. For the geochemistry working group we propose the following members:

Kay Emeis (TAMU)
Keith Kvenvolden (USGS)
Phil Meyers (U. of Michigan,
SOHP)
Martin Goldhaber (USGS-SOHP)
Joris Geiskes (SIO)
W. Dean (USGS)

Recommendations on sampling strategy:

In addition SOHP makes the following general recommendations on sampling strategy:

- 1 - More flexibility needs to be given to co-chiefs and scientific party
- 2 - Coordinated sampling and sample-sharing is essential. Shore-based investigators should attempt to incorporate shipboard scientific party in their requests whenever possible.
- 3 - The shipboard scientific party must retain highest priority in terms of sample requests. 'Manifest sample requests' encourage coordinated sampling programs but should be approved only when there is not considerable overlap with shipboard scientific party interests and with the expressed consent of the shipboard scientific party.
- 4 - Approved sample requests should be processed in a timely manner.
- 5 - The review of sampling requests should include the option of deferring some sampling to the core repository.

5. New Panel Proposal:

Keith Kvenvolden made a brief presentation regarding the establishment of a new panel on diagenesis and lithification.

The SOHP defers all such decisions to PCOM but recommends that many of the concerns raised can be addressed by the small working group proposed above.

6. Letter from G. Jenkins:

The letter from Graham Jenkins (UK) criticizing SOHP's handling of microfossil problems (Appendix A) was discussed and found inappropriate. The Chairman's response (Appendix A) was endorsed.

7. PANCHM Meeting:

L. Mayer reported on the annual PANCHM meeting in Hawaii. Key issues raised were:

- 1 - Effectiveness of liaison structure - working better between panels, still major problem with PCOM liaisons (as evident at this meeting)
- 2 - Panels will strive for regular meeting schedules
- 3 - General agreement among panels with regard to engineering priorities - Panel Chairman will provide supplemental information to TEDCOM
- 4 - COSOD II - general concern over lack of openness of COSOD II and early preclusive of many topics -

The SOHP shares these concerns. A glaring example is the apparent lack of any venue at COSOD II to discuss problems of sedimentary processes and deep sea fans.

- 5 - Circumnavigation - concern over the inability to do necessary science because of constraints to move on to next region -

The SOHP shares these concerns and urges PCOM and COSOD II to re-evaluate the circumnavigation philosophy and permit the time necessary to complete the best science.

8. Sediment Classification Scheme:

The SOHP has been asked to review the final modifications by von Rad and TAMU to the sediment classification scheme. In as much as SOHP has not received revisions from either von Rad or TAMU, no action can be taken.

10 March 1987 - N. Pisiias arrives as PCOM liaison.

A discussion of the problems with PCOM liaison ensued with the hope that the PCOM Chairman could find some means of resolving the issue.

9. Regional Panel Reports:

9.1 INDIAN OCEAN (B. Hay)

The results of the IOP meeting were presented. In as much as this meeting predated the PCOM meeting, many of the IOP suggestions were superceded by PCOM actions. The SOHP then turned its attention to outstanding Indian Ocean issues:

Leg 115 - Carbonate Saturation Profile:

The SOHP is delighted to see this program included in Leg 115. After reviewing the suggested sites, we make the following comments:

1 - The primary objective of the saturation profile is a depth transect of 4 HPC sites. We support the co-chief's suggestion that three of the sites be located somewhat shallower and recommend that -

- a - the 4600 m site be located at 4000 m
- b - the 3800 m site be located at 3200 m
- c - the 3000 m site be located at 2700 m

d - the 1600 m site remain at 1600 m
This saves approximately 27 hours of drilling time.

Andre Droxler has obtained new seismic data in Maldives that indicates viable targets at MLD-2 and MLD-1. Piston cores in the vicinity of MLD-2 show strong cyclic variations in aragonite and carbonate content that appear to reflect glacial/interglacial changes. Based on this new evidence, the SOHP recommends that the 27 hours saved by shoaling the carbonate saturation sites be allocated to coring at MLD-2.

Thus the SOHP makes the following recommendations for the Carbonate Saturation Profile part of Leg 115:

- 1 - Within the time constraints already established for the Carbonate Saturation Profile program, we recommend a core program consisting of:
 - a - the four carbonate saturation sites at shallower depths
 - b - Site MLD-2

- 2 - If further time is available we recommend (in order of priority):
 - a - MLD-1
 - b - HPC at MP-1

VOTE: 10 in favor, 2 opposed.

Rationale:

The 4 carbonate saturation sites are necessary to address the critical questions of the history of ocean chemistry, climate and deep-water circulation. Site MLD-2 has the potential of providing insight into the origin of the aragonite signal (i.e. is it a dissolution or platform input signal). Piston cores in the vicinity of MLD-1 show no aragonite signal but an HPC may address the question of platform drowning. We rank the HPC at MP-1 lowest priority because at this time we have no idea whether there is any sediment there or what its state is. We understand that by retaining an HPC at MP-1 as a priority, we create a difficult logistical problem (it will be drilled way before the carbonate saturation sites). We do this so as not to preclude the option (should the co-chiefs find themselves ahead of schedule) but emphasize its relative ranking and the fact that

we would rather not see an HPC at MP-1 at the expense of MLD-2.

Exmouth/Argo:

Given the directive of one leg at EXMOUTH and one leg at ARGO, the SOHP re-evaluated its priorities for drilling in the region.

The SOHP views the Exmouth/Argo package as the first series of sites that directly meet many of the objectives of our Deep Stratigraphic Test concept. This concept, a series of globally distributed deep stratigraphic test holes aimed at addressing questions of seal level history, sediment supply, passive margin subsidence, margin/basin fractionation, and black shale formation, has been and continues to be a primary objective of the SOHP. To meet these objectives, the SOHP suggests a series of sites that will result in near complete recovery of Triassic syn-rift to Quaternary sediments on this region.

Our highest priority site has been EP-5 on top of the Exmouth Plateau but discussions between our watchdog and the site proponents have convinced us that safety problems for this site are unsurmountable.

The SOHP thus recommends the following sites in order of priority for an Exmouth Plateau leg.

		WD	PEN
1. EP-7	As outlined in von Rad proposal but with re-entry	1365m	990m
2. EP-10A	As outlined in von Rad proposal	2050m	980m
3. EP-2A	As outlined in von Rad proposal to basement	4050m	800m
4. EP-6	To 1200m with re-entry?	1250m	1200m
5. EP-9B	As proposed	3320m	600m

Rationale:

The Exmouth Plateau provides a unique opportunity to look at the evolution of a starved sediment margin in a region that has an excellent seismic data base and complementary industry data.

EP-7 - is primary site on Exmouth Plateau. It should provide a Neogene to Upper Jurassic section suitable for sea level

studies, Cretaceous to Cenozoic paleoceanography and sedimentation history and differential studies. To assure success at this critical site, we recommend it be a re-entry site.

- EP-10A - provides the best opportunity to sample Triassic pre- and syn-rift sediments, the breakup unconformity and to look at young ocean development.
- EP-2A - provides the opportunity to sample transitional crust near ocean-continent boundary. We choose EP-2A above EP-2B so as to sample Triassic syn-rift fill.
- EP-6 - provides a complement to EP-7 from other side of Plateau. Suggest extension to approximately 1200 m subbottom. Re-entry cone if necessary but not critical.
- EP-9B - complements EP-10A for post Neocomian to Quaternary history of margin.

A full logging program is required for each of these sites.

The SOHP vote for a five site Exmouth program (not leg) with above prioritization: UNANIMOUS.

Argo:

The SOHP reviewed the proposals for Argo Abyssal Plain drilling and does not modify its original statement that most of the SOHP's objectives as well as the objectives of the 'geochemical reference section' can be met at one carefully drilled site - AAP-1B.

While careful review of drilling times necessary for these programs is essential, the SOHP recommends a two leg program consisting of Sites EP-7, EP-10A, EP-2A, EP-6, EP-9B and AAP-1B (not prioritized).

INDIAN OCEAN LEG CO-CHIEF RECOMMENDATIONS:

The SOHP recommends the following people as Co-chiefs for relevant Indian Ocean legs:

S. Kerguelen: H. Thierstein, J. Anderson

Exmouth: von Rad
Argo: Gradstein, Buffler
Broken Ridge: B. Haq

9.2 WPAC (J. Ingle):

J. Ingle presented a summary of the WPAC Panel's meeting in Tokyo. The program is falling into place and almost all sites have some potential paleoceanographic interest. The WPAC Panel is working with an 11 leg program consisting of (not presented as legs): (in order of priority)

1. Banda-Sulu-South China Seas basins
2. Bonin I
3. Lau Basin
4. Vanuatu
5. Japan Sea
6. Nankai Trough
7. Great Barrier Reef
8. Sunda
9. Bonin II
10. Nankai geotechnical "mini-leg"
11. South China Sea margin
12. Zenisu Ridge

The PCOM selected four programs as 'core programs': Banda-Sulu-S. China Sea; Bonin I; Japan Sea and Nankai.

The SOHP is incredulous over the absence of the Great Barrier Reef program from the list of core programs. It has been and remains as our highest priority program in WPAC. The proposed program represents an opportunity to drill in a unique depositional setting where the interplay of subsidence, sea level, sediment supply and the resulting facies patterns/seismic stratigraphy can be examined on a mixed carbonate-siliclastic margin and on an adjacent isolated shallow carbonate plateau at the same latitude.

There are no explanations of why it was dropped in the PCOM minutes. How can a panel respond if the rationale behind decisions is not presented?

When the Panel calmed down, discussion of WPAC issues continued.

GREAT BARRIER REEF:

T. Saito (WPAC liaison at last meeting) presented WPAC's discussion of the Jansa et al. lead-zinc ore deposition proposal. It appears that the

sites proposed (The MVT sites) are not compatible with the high priority sites proposed by SOHP: (NEA-1 - 5, 8, 9, 12) except for NEA-12.

The SOHP supports the concept of testing the GBR as an analogy to the Mississippi Valley mineralization province but feels that the MVT sites are not well enough documented to warrant the relocation or deletion of the NEA sites. Of particular concern to SOHP is the apparent weakness of the analogy between GBR and the Mississippi Valley ores which are thought to originate from a black shale source. In addition, the Mississippi Valley's continental heat flow gradients are probably much higher than those at the GBR.

Therefore, the SOHP encourages the program to be conducted at the existing sites, but cannot justify relocation of the sites based on the available information.

The Chairman has spoken to P. Davies, GBR proponent. Davies says that there should be no problem with permission to drill in the National Park for shallow sites and that deep site will be located outside of Park bounds. All drilling time estimates have been recalculated using TAMU's latest guidelines. We will ask Davies to officially transmit this information to PCOM and TAMU.

SOUTH CHINA SEA:

T. Ingle presented a recently revised proposal for a transect of sites across the South China Sea Margin (Hayes). The present WPAC core S. China Sea program (Banda-Sulu-South China Ses) calls for 1 - 2 basin sites that will sample no older than Oligocene-Miocene. These sites will address problems of:

- 1 - date of opening
- 2 - paleoceanographic effects of cessation of Indian/Pacific interchange
- 3 - evolution of deep water circulation patterns
- 4 - enhanced climatic record
- 5 - history of siliclastic-oxic basin

but only for the post-Oligocene.

The margin transect proposal would provide a complete sedimentary history of the basin in

addition to sampling oceanic and transitional crust. With industry data, a basin history from the strand line to the deep basin will be possible. In addition, the transect should provide insight into intermediate water mass history. Finally the SCS margin transect allows comparison of an oxic siliclastic basin with a series of WPAC basins with very different sediment input: Great Barrier (Coral Sea) - mixed siliclastic-oxic; Sulu Sea - carbonate-anoxic; and Japan Sea - silted anoxic-oxic-mixed siliclastic and siliceous bioclastic).

Based on these conclusions, the SOHP supports the SCS margin transect program. Our overall ranking of WPAC-SOHP programs is:

1. Great Barrier Reef
2. Japan Sea
3. South China Sea Basin
4. Sulu Sea
5. South China Sea Margin Transect

VOTE: 12 for, 1 against.

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9.3 CEPAC:

The third day of the SOHP meeting was devoted entirely to discussions of CEPAC objectives and priorities. The discussion began with a review of SOHP's previously (and hastily) established themes for CEPAC drilling:

- 1 - PALEOSECS (high-to-low-latitude and depth transects)
- 2 - Old Pacific Crust
- 3 - Atolls and Guyots
- 4 - Episodicity of Volcanism
- 5 - Fans and Sedimentary Processes
- 6 - Fluid Circulation (hydrothermal processes, etc.)

It was apparent that some of these themes -- especially the top priority PALEOSECS theme -- were too broad and unfocussed to provide useful direction to the CEPAC Panel. A rather free-form discussion ensued with numerous Pacific-specific problems outlined. These included:

- silica uptake and deposition in the N. Pacific
- CCD history of the N. Pacific
- Gateways: Bering Sea, Atlantic and Indian Ocean connections
- organic matter - upwelling history

- evolution of biota in Pacific and relationship to in-place high latitude fauna
- low latitude temperature and bottom water history
- Eastern boundary currents and relationship to terrestrial climate

In order to focus our discussion, Bill Sliter was asked to present the CEPAC Panel's preliminary packages and ranking. We would respond to this, note any important gaps and oversights and then use this as a guide to formulate more focussed themes.

The CEPAC preliminary prospectus consisted of:

	CEPAC Rank
1) Juan de Fuca (232 E)	3
2) N. Pacific Gyre (199E)	2
3) Pacific Guyots (203E)	1
4) Ontong Java Plateau (222E)	2
5) EPR (76E)	3
6) Bering Sea (195E)	5
7) Shatsky (253E)	2
8) Marshalls (202E)	1
9) Old Pacific (262E)	4
10) Oregon Accretionary Prism (233E)	8
11) N P Magnetic Quiet Zone (231E)	2
12) Ontong Java Transect (142E)	2
13) Hawaii Moat (31E)	6
14) Vancouver Island (237E)	0

Those of direct SOHP interest are:

- 1) N. Pacific Gyre
- 2) Ontong Java Plateau
- 3) Bering Sea
- 4) Shatsky
- 5) Marshalls
- 6) Old Pacific

Of some interest are:

- 7) Pacific Guyots
- 8) Juan de Fuca
- 9) Oregon Accretionary Prism

The programs of interest to SOHP and included on the CEPAC program were discussed:

1. N. Pacific Gyre (199E)
 - evolution of siliceous sedimentation in N. Pacific

- relationship to Antarctic glaciation (global silica budget)
- Cenozoic history of aeolian sedimentation
- paleoenvironment of N. Pacific - Milankovitch cycles over Neogene interval of global cooling
- evolution/paleobiology of subarctic gyre species

The SOHP wonders if many of these questions can be addresses in Bering Sea. In many cases, sites further North would better address objectives (i.e. Sounder Ridge). Could any of these objectives be combined with NP MQZ program?

2. O. J. Plateau (depth transect) (142E)

- vertical oceanic gradients and their linkage to climate parameters, bottom and intermediate water properties
- high-resolution stratigraphic records across intervals of fundamental paleoceanographic change (global hiatuses)
- nature and role of carbonate dissolution - CO₂ budgets
- nature of deep-sea seismic signal and relationship to sea level signal
- correlation with margin transects (basin-shelf fractionation) and global network of equatorial depth transects (basin-basin fractionation)

The SOHP strongly supports this program though they would like to see the proposal better documented. This program is very complementary to Eq Pacific Paleoenvironment program (221E) - see below.

3. Bering Sea (182E, 195E)

- one of few sites available for Cretaceous-Paleogene high northern latitude pelagic record
- water mass exchanges with Arctic Ocean through time
- areal extent of Cretaceous black shales
- nature of Cretaceous-Paleogene high latitude climate
- evolution of faunal assemblages - radiation of species

The SOHP supports these programs and has listed the Sounder Ridge as one of its highest priority Deep Stratigraphic Test sites. Our only concern is uncertainty of basement ages in region.

4. Shatsky

- anoxic history in low latitude ocean basin

- history of productivity, upwelling, volcanism
- paleodepth of low oxygen water masses
- paleomag studies, spreading rates, plate evolution
- transitional ocean (early Jurassic) - major climate change

The SOHP strongly supports this program. Problem is technical one. Must be able to drill through mixed lithologies to address objectives.

5. Marshalls and Pacific Guyots:

- Eocene-Cretaceous (?) reefs
- volcanic history
- subsidence patterns and sea level history
- why atoll vs guyot
- plate motions

The Panel believes that atoll and guyot drilling can be extremely important to SOHP objectives, particularly in terms of establishing sea level histories, in establishing continuous paleoclimatic record (pre Neogene) from low latitude (must be pieced together), examining diagenesis as a function of sea level fluctuations, volcanic episodicity and early Cretaceous to Recent shallow water biota. To address these problems, we urge that the sites drilled be:

- continuous pelagic sequences
- above CCD
- not too deeply buried

Examples: Harrie, Sylvania, Horizon, Ogasawara

6. Old Pacific Crust (261E)

- age and nature of Mid Cretaceous volcanic crust
- age and paleoenvironment of underlying (Jurassic-E. Cretaceous) sediment
- calibration of Mesozoic magnetic lineation correlation

This program offers the only opportunity to look at an open ocean record for the Cretaceous and thus is of extreme importance to the SOHP. The success of this program depends on site surveys that show windows through the volcanic event and a drillstring capable of withstanding severe conditions imposed by the program.

The following gaps in the CEPAC program were identified

and discussed:

- 1 Equatorial Pacific Late Paleoenvironments (221E)
 - focuses on equatorial current system and relationship to thermocline
 - examines several time scales - Milankovitch cycles and Neogene events
 - addresses questions of dissolution vs erosion vs productivity and relevance to global hiatuses, Isthmus or Panama closing
 - excellent complement to Peru Margin studies and O.J. Plateau transect (deep and intermediate water story)

Strong SOHP support for this program.

- 2 Ogasawara Plateau (260D)
 - comparisons between guyot and seamount development
 - development stages of reefal communities (Jurassic? - Cretaceous)
 - diagenesis studies
 - Paleogene carbonate sequences

General support but some questions of appropriateness of sites - section is thin.

- 3 Peru Margin - B. Garrison suggested a return to Peru Margin - problems to be addressed include:
 - upwelling history - longer than thought-land evidence shows Oligocene/Eocene events
 - Milankovitch/phosphorite cycles
 - brine story - implications for diagenesis

SOHP very enthused about Leg 112 results and not opposed to further drilling but feels that it is necessary for Leg 112 results to have public dissemination and for land studies to develop further before more serious consideration.

- 4 Gulf of California (257E)
 - Cenozoic sediments and diagenesis with respect to heat flows

Guaymus Basin already examined (Site 498). Regional studies are necessary before further drilling. Problem might be better examined at Juan de Fuca Ridge.

- 5 California Margin Transects
 - history of California Current system
 - timing of onset of diatom deposition
 - development of seasonality
 - response of current system to N. hemisphere

- glaciation
- hiatus development
- improved paleomag and tephrachronology

Can be combined with tectonic (248E) and Navy Fan proposals. Potentially serious problems with paleomag. General support but needs careful identification of useful sites.

6 South Pacific

- South Pacific is important in terms of high latitude paleoceanography and as comparison to N. Pacific high latitude sites. We encourage proposals especially for pre-Neogene sections (Louisville Ridge?)

7 N.E. Pacific upwelling (247E)

- high latitude reference biostratigraphic studies
- paleoceanography of California Current
- N. Pacific bottom water history
- long term hydrothermal history
- history of aeolian sediments and hemipelagic deposition
- age, composition, history of seamount chains

This program is certainly relevant to SOHP interests but needs to be better focused and developed to demonstrate feasibility of fulfilling objectives.

8 Fans and Sedimentary Processes

- find modern analogs to important ancient deposits
- test models for fan development
- relationship of turbidite deposition to tectonic and sea level history

SOHP is generally supportive of efforts to see problems of fans addressed. Some technical difficulties exist and some debate among proponents about which fan is best to drill. A careful drilling strategy must be developed.

Based on these discussions, SOHP ranked all discussed programs:

Rank	Votes	Theme
1	12	Equatorial Pacific
2	11	Bering Sea

3	10	Old Pacific
4	9	Ontong Java Plateau (Transect)
5	8	Shatsky Rise
6	7	Navy Fan
7	5	N. Pacific Gyre
8	4	Gulf of California (diagenesis)
	4	Oregon upwelling
10	3	Marshalls (atolls)
	3	California margin transect
	3	Ogasawara (seamount)
	3	Louisville Ridge (SW Pacific)
14	2	Pacific guyots
	2	Peru margin (oceanography)
16	1	Juan de Fuca (sedimented ridge)
	1	Oregon accretionary prism
	1	S. Pacific

And established a set of CEPAC-specific themes to guide future CEPAC planning (in order of priority)

1. Pacific Neogene Paleoenvironment:

High resolution surface and bottom water Neogene history of the Pacific and its relationship to paleoclimate, sea level, and tectonic events -

Example programs: - Eq Pacific Paleoenvironments (221E); O.J. Depth Transect (142E)

2. Mesozoic-Paleogene Pacific Paleoceanography:

Evolution of late Mesozoic through Paleogene paleoclimates in high and low latitudes -

Example programs: - Souder Ridge-Unmak Plateau (195E, 182E); Atolls (some N. Pacific Gyre sites)

3. Old Pacific Crust:

A look at Cretaceous open ocean

Example program: - Mariana/Nauru Basin (261E)

4. Anoxic events:

Time stratigraphy, distribution and significance of oceanic carbon in low latitude open ocean settings. Correlation with other Cretaceous anoxic events, role of black shales in global carbon cycles; importance of carbon preservation vs productivity; effect of volcanism and role of bathymetry and climate in developing upwelling.

Example program: - Shatsky Rise (253E)

5. Atolls and Guyots:

Drowning history, sea level and subsidence curves; continuous pre-Neogene paleoclimatic record from

low latitudes; early Cretaceous to Recent shallow water biota; diagenesis as function of seal level history and volcanic episodicity.

Example program: - (Ogasawara (260D), Marshalls, Pacific Guyots, 202E, 203E)

6. Fans and Sedimentary Processes:

Modern analogs to ancient deposits; test models for fan development; relationship of turbidite deposition to tectonic and sea level history.

Example programs: - Navy Fan (250E), Zodiak Fan (241E), Monterey Fan

The rationale for this ranking can be found in the discussions of individual programs. The SOHP emphasizes that these are its highest ranked themes for CEPAC drilling and that we would like to see each of these issues addressed in the Pacific. We are very concerned about the time constraints placed on the Pacific program and ask PCOM to seriously consider the time allotted to Pacific drilling.

10. Rotations and Liaisons:

Bill Hay, Lisa Tauxe and Mike Arthur are scheduled to rotate off.

R. Stein has replaced M. Sarnthein for this meeting and may become the regular German member.

The Panel thanks Lisa, Bill, Mike A. and Mike S. for their efforts. We have enjoyed their presence and have greatly benefitted from their wisdom.

The following names were suggested as replacements:

Paleomag: Jim Channel, Dennis Kent, Bob Karlin, John King

Paleoceanographers: Wolf Berger, John Barron, Bob Thunnell, Ken Miller

Geochemists: Walt Dean, Simon Brassell

The Chairman has asked the members rotating off to continue full participation until PCOM has officially replaced them.

Liaisons:

Mike Arthur will go to Evanston, Ill. CEPAC meeting in place of Tsuni Saito.

Phil Meyers will serve as both SOP and ARP liaison at the WHOI South Atlantic meeting.

11. Meeting Schedule:

The SOHP will try to meet regularly each year in mid-September and the end of February/early March.

Our next meeting will be in the 29 August - 4 September time period.

First choice for location: Tokyo
Second choice: Milan