

DRAFT MINUTES OF THE SEDIMENTS AND OCEAN HISTORY PANEL MEETING

Scripps Institution of Oceanography

La Jolla, California

May 7, 8, and 9, 1984

Attending

M. Arthur (Chairman)
R. Embley
J. Hay
J.-P. Herbin (for Y. Lancelot)
L. Mayer
P. Meyers
K. Sang
R. Stein (for M. Samthein)
N. Shackleton
Y. Takayanagi
L. Tauxe
H. Schrader (PCOM Liaison)
L. Gamboa (Ex Officio, TAMU-ODP)

Absent (with apologies)

B. D'Argenio
W. Ruddiman
E. Suess

Guests

H. Zimmerman (NSF)
J. Van Hinte (ESF)

CONTENTS OF MINUTES AND ITEMS FOR PCOM ATTENTION

(*PCOM Action Item or SOHP Recommendation)

1. Speeding up dissemination of minutes
2. Connection to minutes of March 19-20
3. Agenda items
4. Summary of PCOM meeting (March 21-23)
 - A. Drilling objectives and schedule
 - B. Norwegian Sea drilling
 - C. HPC-Barbados Site
- * 4B, 4C 5. TAMU Report
6. NSF Report
7. PCOM Report
 - A. Summary
 - B. Working Groups
- * 7B
- * 8 8. Shipboard sampling
- * 9 9. Core orientation
- * 10 10. Baffin Bay/Labrador Sea objectives
- * 11 11. Mediterranean Sea drilling
- * 12 12. North Atlantic-Newfoundland Basin Proposal
(see also #25)
13. Proposal handling
- * 14 14. Moroccan deep hole
- * 15 15. Request clarification of Sedco capabilities
for deep drilling
- * 16 16. Riser objective-Mediterranean deep hole
- * 17 17. Prioritization of proposed NW African
drilling sites
18. E. Atlantic drilling (Herbin proposal)
19. PCOM update
20. Drilling times Baffin Bay-Labrador Sea

21. Return to #18
22. Future themes (deferred discussion to later in meeting)
23. Madeira Abyssal Plain proposal
- * 24 24. Other objectives-N. Africa/Equat. Atlantic
- * 25 25. Replacement for 30-day "bare rock drilling" leg
- * 26 26. Peru margin drilling and Paleo-upwelling program (PUP)
27. Report of ESF
- * 28 28. Bahamas drilling
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- * 30 30. Suggested drilling areas (locations) for #29
- * 31 31. Priority SOHP objectives for next 3-4 years
32. French proposals
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Meeting begun 8:50 AM.

1. Celerity of minutes - members encouraged to help speed dissemination of minutes by providing packaged information.
2. Connection to minutes of previous meeting: p. 11, Eq. 10 is 3°S of Ceara Rise.
3. Agenda - Old business, then package objectives. Sweeping objectives don't fly well with PCOM. Specific objectives focused on 1 to 3 sites/regions are needed.
4. Summary of PCOM meeting (3/21-23/84) - H. Schrader

A. ODP initial drilling program reviewed (see letter from Author of 2 April, Appendix 1).

B. Norwegian Sea difficulties; paleoenvironmental factors need to be developed. Thiede has been queried and was invited to the meeting, but has not responded. Evidently, Thiede has presented paleoenvironmental arguments (HPC) to the Atlantic panel. Hay commented that no decent fossil section has been obtained from the Norwegian Sea. More seismic information seems needed to pick good sites to study paleoenvironment. Schrader suggested forming a small working group to generate suggestions: Backman, Bjorkøllund, Thiede, Hinz, Montadert. This might be a "high latitude W.G." to combine Labrador Sea and Norwegian Sea to exist for these two legs only.

A copy of the minutes for the Norwegian Sea W.G. meeting of 7 March 1984 was read. The W.G. suggested 1 or 2 deep holes to basement on the Vøring Plateau. Priority 1, 1370 m/water, 450 m sed., 800 m of basement, 40 days drilling. Priority 2 has high latitude paleoenvironmental objectives. Within present time restrictions it doesn't seem likely that separate holes with paleoenvironmental objectives could be drilled. Both were said (by Thiede) to meet basement objectives as well.

With these notes in mind, formation of a new W.G. seems pointless.

SOHP should state that the planned leg seems unlikely to satisfy all of the unanswered paleoenvironmental questions, e.g. history of deep-water formation, benthic foram history, high latitude biostratigraphy, etc.

Further discussion was tabled until Thiede contacted (see p. 13).

C. Shackleton asked about double HPC sampling at shallowest Barbados Leg sites (LAF 2 or 6?) to obtain a good, continuous section. Do this until hiatuses appear.

5. Texas A&M Report - L. Gamboa

-No bare-rock drilling on MAR Leg (#3). December Gulf of Mexico shake-down cruise is planned.

-The SOHP strongly suggests DeSoto Canyon for shake-down cruise sites.

-In the absence of bare-rock drilling capability, the MAR objectives are lost for the time being, leaving an additional 30 days of possible drilling time in the initial program.

6. NSF Report - H. Zimmerman

U.S. science building via funded syntheses. FY 84 and 85 are not cut. International funding is not secure. Only FRG is firm in 1984 and 85. Budgetary problems, if they arise, will be from international concerns. Start-up date looks good as 1 Jan. 1985; no further savings would come from changing this. The core repository problem is still a major, unresolved issue.

7. PCOM Report - H. Schrader

A. Mediterranean Leg has much concern. PCOM feels SOHP may be stressing Quaternary objectives too much. PCOM feels current membership is well-balanced -- no new members are needed. Prospects of establishing new working groups (Geochemistry, Paleomag., Stratigraphy, etc.) needs much lobbying to succeed. In ODP, W.G.s are meant to be short-lived and for a specific need or leg. These SOHP suggestions fared poorly.

B. Science Operator should convene a panel of paleomag. people to solve equipment problems on board ship (Levy, Tauxe, Kent, Bannerjee/King, etc.) and sampling problems. Organic geochemistry problems will probably be handled by members of present panels or by a small group of specialists working for the Science Operator.

8. Shipboard Sampling

Hay asked about consideration of homogenized sampling for micropaleontology, physical properties, etc. DSDP-style sampling has spread such samples out in hard-to-correlate spacing. On-board sampling procedure needs to be reviewed.

9. Core Orientation

Tauxe asked (again) about core orientation problem. Gamboa said TAMU is working on it. The SOHP again emphasizes that this system should be operational for the first ODP Leg.

10. Baffin Bay/Labrador Sea - Larry Mayer

Two sites suggested (BB1 and BB3) in southern Baffin Bay. Should record past 25 my at BB1; BB3 has shallow cover and may

reach Eocene/Oligocene. Site survey needed for BB3 (and perhaps BB1 if it is relocated westward to thinner sediments and pinchouts). BB1 may have iceberg problems, but BB3 seems o.k. in summer months.

Total number of sites in combined proposal is now 4: LA5, BB1, BB2, LA2. Alternate proposal omits Baffin Bay and has 4 sites: LA 2, 5, 3, 6. There is now a moratorium on drilling in western Baffin Bay, so no sites may be available this year regardless of results of surveys.

N.B.-Priority of LA sites has been modified. The Labrador Sea W.G. listed 5, 2, 3, 6, 4, 7, and 8 as decreasing order of priority. SOHP gave 3, 5, and 6 first priority and 2, 4, 7, and 8 second priority at the March meeting. Newest proposal has gone back to original listing. Arguments for Site 2 are 1) Hudson Straits paleocirculation and 2) monitors cold Arctic Flow.

Attractive feature of Baffin Bay is Paleogene history of Arctic flow. SOHP suggests reentry cones be considered for 1000 m and deeper holes. Gamboa will help calculate more realistic drilling times. Slight the Neogene to obtain better Paleogene sections, and consider consolidating the Baffin Bay objectives into 1 site. BB3 is first priority, Paleogene objectives. BB1 is probably too deep. 1500 m with reentry, 15 days. Alternate should be similar to BB3 (BB1 and BB2 not good).

In Labrador Sea, priorities decided at March SOHP meeting should be preserved with addition of Paleogene objectives at LA6. Order is 6, 5, 3, 2.

Overall priorities:

- First Priority: 1. BB3, reentry to 1500 m, Paleogene paleo-environments (pre-mid-Miocene)
2. LA6, N. Atlantic-Labrador Sea connection, drill continuously into Paleogene
3. LA5
- Second Priority: 4. LA3
5. LA2

(See new proposal from Labrador Sea W.G.)

11. Mediterranean Sea

Should the Mediterranean be made an overall second priority relative to the Northeastern Atlantic? Yes. The Mediterranean will probably be drilled for political reasons. The panel reviewed objectives outlined in a note from R. Thunell. Site 132 seems to be the most important Mediterranean site for stratigraphic reasons. The SOHP feels that the proposed NW Africa legs have more important scientific objectives.

12. North Atlantic

Newfoundland Basin Proposal-U.K. group has hypothesis joining Galicia Bank with Flemish Cap. They propose single basement hole (2400 m). A drill string capable of going deeper than the Challenger could be needed. Meanwhile, a deep hole should be attempted to test the capability of existing combination of the string and ship. However, Newfoundland Basin may not be the place. This proposal seems to be a regional problem without broad application. The SOHP defers consideration to Tectonics and Atlantic panels (after report from Sarg).

13. Proposal Handling

Arthur will send proposals to panel member best qualified to evaluate it. This person will present it (acting as on-panel advocate) to the panel. Selected parts of each proposal may be distributed to all members if appropriate. This will allow uniform consideration of proposals and eliminate need to xerox copies for entire panel.

14. Deep Hole (see Item 12). First Priority [No riser]

Overall Key to Paleooceanographic Evolution of Early N. Atlantic

Propose a basement hole to Jurassic strata off Morocco. Purposes: 1) Test deep drilling capability; 2) investigate N. Atlantic early opening; and 3) continuous Mesozoic/Cenozoic record. Description: Moroccan Basin Deep Hole. The total penetration may be as great as 2500 m. Location of the hole can be discussed with D. Hayes to achieve best crustal objectives as well.

A. Early rift sequence (nature of continent-ocean transition; presalt?, age of initiation of rifting, seaward extent, age, and composition of evaporites, seawater paleochemistry, paleoenvironment/climatology of young, low-latitude ocean).

B. Early drift sequence (nature of unconformity, stratigraphy/composition of Triassic/Jurassic sections, seismic sequence calibration and comparison to margin sequences (this is the classic type locality of Vail et al. coastal onlap curve)). This margin is conjugate to N. American margin. Jurassic CCD and Cong (black shales). Jurassic paleomagnetism (removes outcrop tectonic effects). Cretaceous black shales revisited; deep burial sediment diagenesis due to thermal effects.

C. Logging (velocity structure)

D. Crustal structure (instrumented hole)

E. Heat flow (thermal gradients on a passive margin)

F. Chance to HPC red-clay sediments from Cenozoic to

Cretaceous (fish teeth paleoproductivity, long-term eolian and geochemical fluxes, glacial/interglacial eolian cycles?).

15. Ask L. Garrison (TAMU) to evaluate feasibility of deep hole (#14).

16. Mediterranean Deep Hole - *Epicritic Dome* [Riser Objective]

A. Main objective - penetration and recovery of "Messinian" evaporites:

1) evaporite depositional models (onlap?) verification subaqueous (basinal) vs sabkha,

2) age, duration, and accumulation rate (chemical effect on seawater),

3) facies sequence-relative proportions of soluble salts to geochemical fractionation,

4) paleoceanography of Mediterranean water masses prior to Messinian, and relationship between Mediterranean circulation and global paleoceanography, including deep-water circulation, and

5) organic matter-oil source potential, and

6) late Miocene phosphorites.

B. Presalt:

1) Tripoli deposits - estuarine circulation?,

2) Indian-Atlantic preMessinian connection, and

3) origin of Mediterranean basins - deep or shallow? and paleodepth of presalt basins.

This hole clearly requires riser capability! Drilling should be done in thick salt with good presalt sediments beneath them. A relatively deep basinal location is called for.

17. Western North Atlantic - Sarnthein et al./Ruddiman et al.
Proposals

Priorities assigned at March SOHP meeting:

MAU 5 and 6	1st priority	upwelling history
MAU 4	1st priority	dust inputs
EQ 3-6 and SLR 1	1st priority	deep circulation
EQ 9	1st priority	N & S hemisphere interaction

These are based upon stated objectives in proposals and do not include more ancient objectives.

MAU 5	250 m to e. Miocene	2.5 d
MAU 6	300 m to m. Miocene	3.0 d
MAU 4	300 m to Miocene	2.5 d
SLR 1	500 m to l. Miocene	4.5 d
EQ 9	180 m to l. Miocene	2.0 d
EQ 3	400 m to Oligocene	4.5 d
EQ 4	150 m to l. Miocene	2.0 d
EQ 5	150 m to o. Miocene	2.0 d
EQ 6	125 m to l. Miocene	2.0 d
	transit	8.0 d
	logging	4.0 d
	Total	37.0 d

The SOHP then considered possible additional objectives as follows.

18. Herbin Proposal for E. Atlantic drilling

Mesozoic black shales - reoccupy 135 (Med. junction) and 138 (ridge flank). These were spot-cored with poor recovery. Also, do a site like 369.

Area between 12° N and 12° S is not sampled along African margin. Herbin proposes to fill this Mesozoic knowledge gap. This will determine when African-Brazilian connection foundered, as well as relate deposition of black shales in North and South Atlantic Oceans. His top site is in 3200 m water depth off the Ghana-Ivory Coast border (100 miles?). A more reasonable site is off the Liberia-Ivory Coast border in 4400 m water. This site is closer to the Sierra Leone Rise. It represents the N-S connection, black shales, and an equatorial paleoenvironment.

19. Update from Honnorez, PCOM Chairman - Schrader

A. Bare-rock capabilities will be delayed, so MAR/Kane leg time is not available for other uses in summer of 1985.

B. Canadian proposal has problems with sediment depth calculations. Depths may be greater, hence drilling times will be longer. Difference may be as much as 300 m.

C. Sedco 471 looks good-space is good and ship is in good shape. Will come with 10 km string. Prospects for deep drilling are good.

20. Return to Baffin Bay-Labrador Sea Proposal (and 19C)

Question - how were seismic velocities obtained and converted to depths? Mayer responded that they were based on sonobuoy information. He will check depth calculations.

21. Return to Herbin's proposal (African Margin).

The problems are 1) lack of good seismic data, hence we don't know what is there, and 2) great depth, hence almost one leg to drill one hole. This proposal has good scientific merit, but cannot be accommodated in present schedule. A long-term objective of interest to SOHP.

22. Hay - Future theme "History of Water Masses in the Atlantic" will be discussed later.

23. Turbidite Proposal (Weaver and Kidd) to Embley for digestion. Location is Madeira Abyssal Plain.

Turbidites (redepositional events from continental margin) are used as indicators of sea-level changes in Pleistocene. Madeira A.P. is free of complications present in other areas, e.g. fans, rivers, etc. Major questions remain about the feasibility of dating these events, and choice of location (better location may be one having an abundant supply of sediment). The objectives of this proposal might be met by GPC (Giant Piston Core) or by combining this proposal into the Moroccan deep hole (#14).

24. Deeper objectives in North African/Equatorial Atlantic legs.

1) Mesozoic black shales - need sites on ridge flank, basin high, and continental rise or slope to evaluate turbiditic events *in situ* deposition in one basin.

2) Sites above the CCD to give Paleogene paleoenvironmental information. Possibilities: Sites similar to 138, MAU 4 (368), 366, SLR 1, 135 (?), a relocated EQ 9 (more to Maestrichtian crust to obtain K/T boundary).

-Site in Senegal Basin will probably give best productivity record, located on Albian crust.

-Cape Verde Basin Site (MAU 11) (20 N, 28 W) HPC-XCB, late Albian crust, 450 m penetration, eolian flux (minimize hemipelagics) over long-term, and black shales on ridge flank or crest.

-Equatorial Site (MAU 12) (0 or MAU 11 transect) on Maestrichtian crust, 400 m penetration tie to eolian fluxes, Paleogene biostratigraphy, K/T boundary.

-Consider deepening MAU 6 from 300 m to 800 m to investigate turbidite events (see #23). Embley, Sang, and Mayer will look over Leg 47 sites to see whether MAU 6 is appropriate for this.

-Another possibility is MAU 1, 2600 m water depth, black shales can be reached at 800 m. This site probably would not help the eolian objectives of Sarnthein (hemipelagic complications). The arguments for this site are weak, however, and seem to rest mostly on the black shales.

Mayer/Embley will correspond with Weaver and Kidd to give them a chance to respond to SOHP's reservations (see #23). No priority will be assigned until they respond.

Arthur and Shackleton will work out Northwest Africa package. Two legs proposed - Morocco deep hole and MAU/EQ combination. None of the EQ sites will be deepened as outlined in #14.

25. Should SOHP propose a substitute for the MAR/Kane leg? Bahamas sites could be augmented. New Jersey Transect (Miller/Mountain proposal for Site 1A) could be completed. K-9 site (Ruddiman) off Labrador could be done. It is probably not wise to propose a whole leg which might compete with the Northwest Africa legs. Consideration could be given to additional sites in the Norwegian Sea (e. g. Jan Mayen Ridge). The SOHP would rather push for at least 2 NW Africa legs.

12. (Continued). Sang reported on Newfoundland Basin proposal. Its objectives are 1) stratigraphy/sedimentation of section and 2) age of crust. Primary site is near Flemish Cap. Sediment depth (pre-Barremian) is probably about 2800 m. Basement is thought to be continental. Secondary site is on oceanic crust, seaward of primary location. SOHP considers this of low interest and defers this proposal to Tectonic and Atlantic panels.

26. Peru Margin and Paleo-upwelling Program (PUP)

Tectonics panel is very interested, yet SOHP interests remain to be stressed. This is a great chance to study the history of upwelling recorded in sediments. Best location would be in the upwelling core (about 11°S), in very shallow water (100 to 200 m). The new ship evidently can do this. Five holes, 3 N-S and 3 E-W, in a cross array would give a history of fluctuations in upwelling intensity and latitudinal and offshore shifts in upwelling centers. Obtainable record probably extends well into the Miocene. The sedimentary record offshore Peru is very complicated. Site locations must await further site surveys. In principle, the SOHP ranks this as a first priority objective which could be achieved with about 10 days operation time in transit to Southern Ocean.

Objectives are to determine long-term upwelling history, changes during glacial/interglacial cycles, O₂ minimum history,

etc. Five sites would be a minimum, because of sediment accumulation rate variability and slumping and lateral variability, to achieve these objectives. Further SOHP interest would be to revisit Site 532 region off Namibia and to sample monsoonal upwelling off Arabia. A group of SOHP members will consider fuller objectives of upwelling zone drilling. (Paleo Upwelling Program - PUP). Santa Barbara Basin should be included because its sediment record is excellent.

PUE

1. NW Africa margin
2. Peru slope
3. California borderland (Santa Barbara Basin)
4. Panama Basin (HPC Site 504)-high resolution paleomagnetics
5. Benguela Current (Site 532 plus others)
6. Monsoonal upwelling history (Arabian margin)
7. EQ 9 (Atlantic equatorial productivity)
8. Site 502 (equatorial Pacific productivity)
9. Guaymas Basin (longer record, higher resolution)
10. W. Australia upwelling
11. Kerguelan (high latitude, circumpolar current productivity)
12. Oyashio-Kuroshio current (check to see if HPC'd already Leg 87)

M. Miocene to Quaternary records should be obtained in each area.

Objectives

1. productivity changes (upwelling intensity, current shifts)
2. O_2 minimum zone fluctuations (intensity and thickness)
3. Core burial rates (and preservational changes)
4. diagenesis in Core-rich sediments: phosphorite, dolomite, organic matter
5. downslope redeposition of Core-rich sediments (Peru)

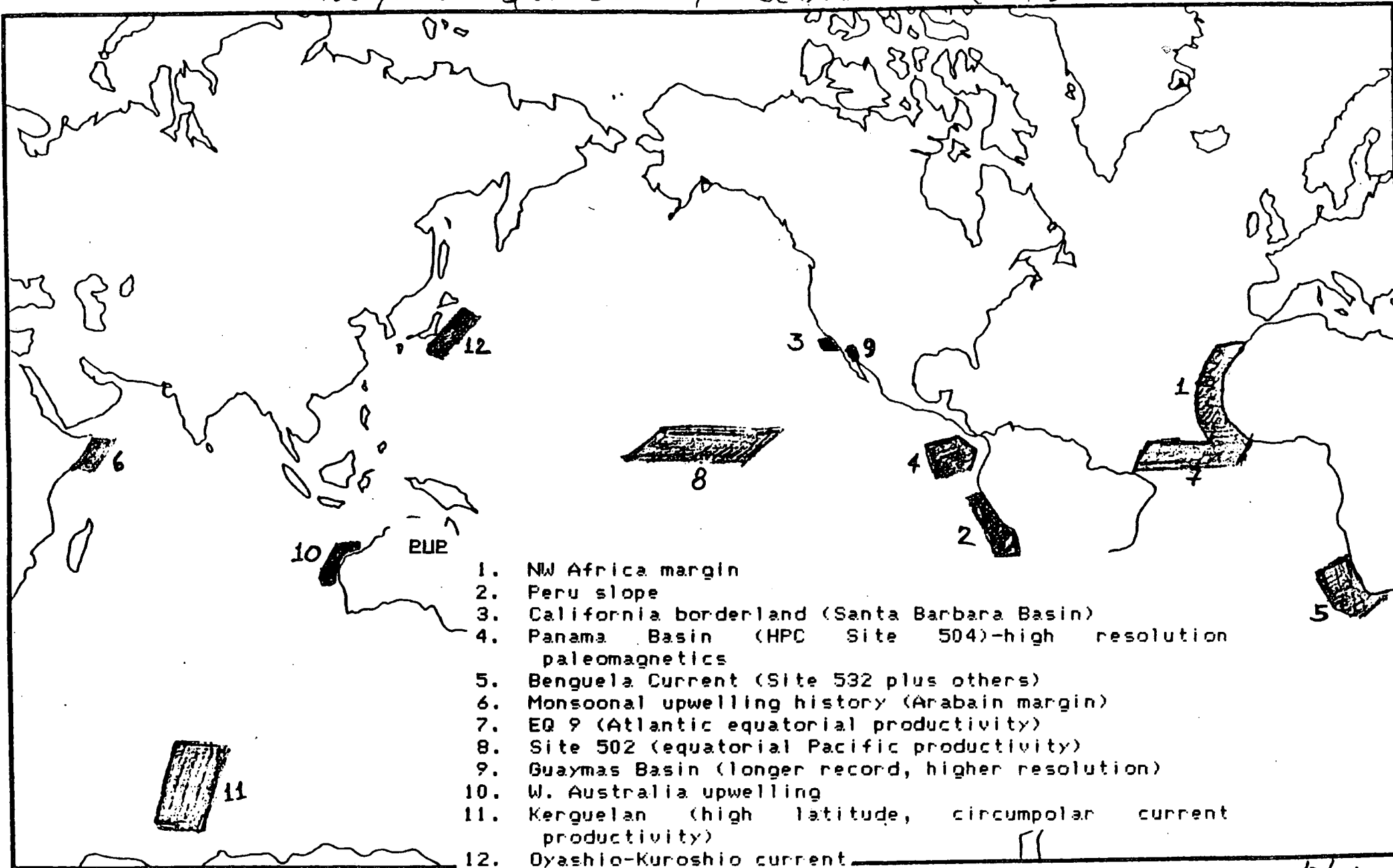
This is a SOHP first priority program.

27. Report of European Consortium - Jan van Hinte

European Science Foundation (18 countries) is nucleus of activity. They created an ESF-ODP Working Group (Switzerland, Italy, Sweden, Norway, and The Netherlands). An *ad hoc* Science Committee (5 people) of this W.G. nominates panel members. After May 4 and 5 meeting, the committee is no longer *ad hoc*. Other interested countries at this meeting were Greece, Spain, Denmark, Finland, and Belgium. Financing is a problem. So far, 40%, or \$1.07 million, of their share has been promised. Australia is being considered for invitation to join the European group. Greece is also likely to join, as is Spain.

4. Revisited. Thiede is not available for comment on Norwegian sea proposal until the Atlantic Panel meeting in Miami, May 14, 1984.

NEOGENE - QUATERNARY SEQUENCES (PUP)



1. NW Africa margin
2. Peru slope
3. California borderland (Santa Barbara Basin)
4. Panama Basin (HPC Site 504)-high resolution paleomagnetics
5. Benguela Current (Site 532 plus others)
6. Monsoonal upwelling history (Arabain margin)
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12. Oyashio-Kuroshio current

SOHP

"PALEO-UPWELLING PROGRAM"
FOR ODP

5/9/84

28. Bahamas Drilling (Exuma Sound Site)

Response from Schlager to SOHP considerations (see SOHP minutes of Mar. 84) presents arguments to retain Exuma Sound, Florida Strait sites. These overall Bahama region sites are quite complicated. These two sites give the best ties to currently understood areas. SOHP should find out where they plan a leeward site (assignment to Sang). Schlager should have defended proposal at earlier SOHP meeting. The SOHP now understands arguments of Schlager et al. However, would still recommend concentrating on one area for drilling. If Exuma Sound sites are so good, why not do windward and leeward slope.

29. Themes for future SDHP focus:

1. Global oceanic sediment and geochemical budgets - oceanic geochemical cycles through time
2. Upwelling histories - Cong production and burial of nutrients
3. Interocean connections and history of water masses and water-mass exchanges (circulation and chemistry, latitudinal vs meridional circulation)
4. Controls on physical stratigraphy
5. Evolution of the oceanic biosphere
6. Burial diagenesis (emphasize deep burial)
7. Ocean-continent interactions

What are the major unknowns?

- 1) Oldest margin sediment?
- 2) Mass of marine evaporites and rapidity of precipitation?
- 3) Changes in accumulation rate of pelagic sediments?*
- 4) Geochemical pulses over long terms* (Mesozoic, Cenozoic)
- 5) Details of late Neogene-Quaternary budgets of Cong, CaCO_3 [1 + 3]
- 6) Volcanic episodicity?
- 7) Controls on terrigenous sediment inputs to the oceans [1 + 4] (shelf-basin fractionation, CaCO_3)
- 8) Properties of deep-water masses over time
- 9) Causes of major biotic extinctions
- 10) Biotic radiation episodes
- 11) History of hydrothermal input
- 12) Magnetostratigraphy - high resolution* in mid-Miocene and Jurassic/Cretaceous
- 13) Earth magnetic-field models testing, N-S hemisphere high resolution for polarity transition
- 14) Paleoceanographic significance of seismic reflectors

N.B.-Fans will not be overlooked, although better ways to investigate them are needed. Past studies have not used correct approach in not getting stratigraphic reference section to tie into overall fan geometry. Fan studies are needed to estimate volumes and rates of continental erosion and rates of continental rise construction. One or two carefully picked sites to connect seismic lines might work better than the multi-hole, descriptive approach used to date.

- 15) Need more information about rates of fan buildup-buildout through time in general.
- 16) Role of fans in sediment budgets, temporal distribution, rates of development? (single-hole approach)
- 17) Sediment accumulation in abyssal plains? (red clays)
- 18) Provincialism in marine planktonic groups?
- 19) Development and intensity of monsoonal circulation?
- 20) Timing, magnitude, and causes of Cenozoic glaciation?
- 21) History of response to orbital forcing through time?

(usefulness to calibrate time scales and seafloor spreading rates)

22) The "oldest" paleoceans (the elusive Jurassic!).

*Test XCB in cherty pelagic carbonate sequence. Is recovery improved?

30. Suggested locations to investigate unknowns in #29 (by item number) [riser drilling = *]

- 1) Moroccan deep hole
Madagascar (possible diapirs) and date Gondwana separation, deep hole > 2.5 km
Maud Rise - Agulhas
Exmouth Plateau*
- 2) Mediterranean Sea* - Messinian evaporites
Sao Paulo Plateau - Cretaceous S. Atlantic
Red Sea*
Moroccan deep hole
- 3) No single area seems adequate, instead look at: Arctic Ocean Abyssal red clay environments through time (Atlantic and Pacific)
Equatorial Paleogene sequences
Cretaceous Paleogene - SW Pacific
Circum-Antarctic
Bering Sea - trapped tropical Pacific Cretaceous crust?
- 4) See 3).
- 5) PUP area list
- 6) Pacific seamount province
Ceara Rise
General problem (active margins)
- 7) Sunda Shelf*
Bahamas
Upper Continental Rise locations world-wide
Circum-Antarctic
- 8) Arctic Sea
Ceara Rise Transect
Maud Rise Transect
90° East Ridge Transect
Kerguelan Transect
Ontong-Java Transect
Mariana Ridge ("gatemouths")
Norwegian Sea
Weddell Sea
Labrador Sea
Unconformities and drift deposits in general

- 9) All over locations of opportunity
- 10) All over locations of opportunity
High latitude-low latitude transitional sequence
Low-latitude Paleogene
- 11) Abyssal red clay sites - long-term averaging/integration
(all basins)
- 12) Northwest Africa (Neogene)
Mediterranean (e.g. 132) (Neogene/Quaternary)
- 13) Cover the earth (sed. rates > cm/1000 y), all ages but
focus on Neogene for a start. "Each reversal is dif-
ferent" (L. Tauxe, 1984)
Kerguelan
90° East Ridge
Maud Rise
Ceara Rise
Arctic
Labrador Sea
- 14) See 8) and others (Moroccan deep hole, NW Africa, N-S
Atlantic junction)
Core unconformities (to determine dissolution vs
erosion, Exxon vs high resolution)
- 15) See many above
- 16) Big fans
Bengal
Indus
Amazon
Mississippi
Laurentian
Astoria
Paleofans (603, Orange River, Limpopo)
- 17) All over
- 18) Regional locations and opportunities
- 19) Somali Coast
Mozambique
- 20) Circum-Antarctic
Kerguelan
Labrador
Argentine Basin
Arctic
Maud-Agulhas
- 21) Equatorial Paleogene - most critical
Equatorial late Cretaceous

- 22) Bering Sea (?)
Moroccan deep hole
Pacific (?)

31. What are the highest priorities for the next 3-4 years? These depend somewhat upon fixed times (high latitude objectives) in the projected drilling schedule. These presently include July-Oct. 1985 (N. Atlantic), Jan.-April 1987 (Weddell Sea), and Jan. 1988 (Kerguelan).

Priorities of SOHP Interests:

- 1st - Northwest Africa Leg
- 1st - Labrador/Baffin Bay Leg
- 1st - Moroccan deep hole (closely following NW Africa) (1.2)
- 1st - Peru slope/trench transect (1.2)
- 1st - Weddell Sea-Maud Rise
- 1st - 504B
- 1st - Somali Margin-monsoonal history (Hay will draw up prospectus)
- 1st - Kerguelan
- 1st - 90° East Ridge
- 2nd - Mediterranean Sea (without riser capability)
- 2nd - Norwegian Sea (possibly include Jan Mayen Ridge)
- 2nd - Bahamas
- 2nd - Ceara Rise
- 2nd - Newfoundland Basin
- 2nd - Barbados
- 2nd - Madeira Abyssal Plain
- 2nd - N-S Equatorial Cretaceous connection
- 2nd - Red Sea (withouth riser capability)
- 2nd - Agulhas A. P.
- 2nd - Exmouth Plateau
- 2nd - Bengal Fan

Pacific sites are deferred to Carmel meeting because drilling will not be done there for 4 or 5 years, but they need to be considered soon to provide time for surveys and planning.

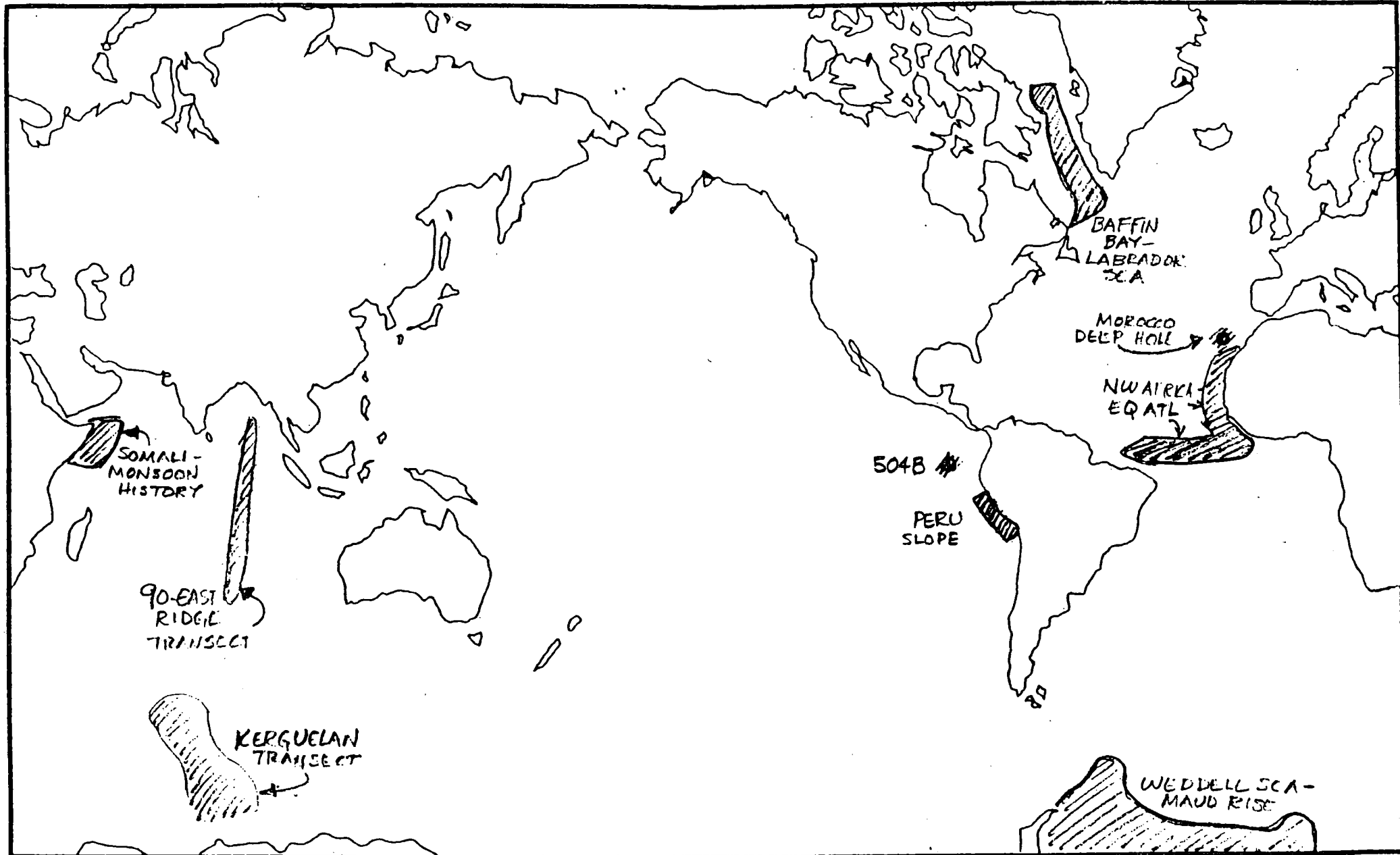
32. Arthur will ask Lancelot for more copies of the French plans for future drilling for distribution to SOHP members. Those who lack copies are Hay, Mayer, Shackleton (others?).

33. Next meeting, November, 1984 immediately after GSA, in Carmel, CA. Tentative dates will be Nov. 12, 13, and 14. Hay will be the host. Field trip to Monterey Fm. and redeposited sediment facies will precede on weekend.

34. Following meeting will be coordinated with the Kiel Geological meeting. It will be held Feb. 21, 22, and 23 in Italy. D'Argenio will host. A weekend field trip will be arranged (Feb. 24 and 25).

Meeting adjourned 11:30 Wednesday.

SUMMARY OF SOHP FIRST PRIORITY TARGETS*, JAN. '85 - JAN '89



* 5/9/84

Assuming Shiptack N. ATL ('85)
S. OCEAN ('87)

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 Graduate School of Oceanography, Narragansett Bay Campus

April 2, 1984

Dear

I have just returned from the PCOM which met in Washington, DC on March 21-23, 1984 in order to formulate short and long term plans for the rapidly evolving ODP. All of the first day was taken up with reports from thematic and regional panel chairmen who described initial meetings of the newly formed panels including ours. A large number of drilling proposals in various states of maturity were also discussed. The PCOM opened the discussion of the initial drilling program on the second day by first discussing the question of how long to spend drilling in the North Atlantic and eastern Pacific before heading south for the Weddell Sea. Since the start date of drilling has been moved back three months to January 1, 1985, this discussion centered on the options of cutting three months out of the existing Atlantic schedule in order to arrive at the Weddell Sea in January 1987 or to add nine months to Atlantic drilling and arrive at the Weddell Sea in January 1988. The consensus of the PCOM is that the paleoenvironmental and tectonic problems in the Antarctic and Indian Oceans are so overwhelming that we should go there as soon as possible. Because of the way ODP was sold to the community and funding agencies, PCOM felt that we should utilize our new high latitude capabilities and test bare rock drilling equipment as soon as possible in the program. This was balanced against the need to placate various European and North American scientists who have great interest in the North Atlantic and whose countries are paying for the bulk of the program (called "National Lollypops" colloquially in PCOM).

The following initial drilling program was then worked out with much discussion and input from other panel chairmen and agreed to by resolution.

ODP INITIAL DRILLING PROGRAM

1985 Jan	Bahamas, 55 days	
Feb		-Miami
Mar	Barbados, 55 days	
Apr		-Port of Spain
May	Mid-Atl Ridge/Kane, 40 days	
June		-Dublin
July	Norwegian Sea, 60 days	
Aug		-Reykjavik
Sept	Labrador Sea, 60 days	
Oct		-Gibraltar
Nov	Mediterranean ?	
Dec		

1986 Jan ??
 Feb Northwest Africa ? (but with no decision as to what objectives)
 Mar
 Apr Mid-Atl Ridge/Kane ?
 May
 June Barbados ?
 July
 Aug 504B
 Sept
 Oct Peru Trench
 Nov Chile triple junction
 Dec
 1987 Jan Weddell Sea
 Feb
 Mar Weddell Sea
 Apr

This schedule was agreed on 14 to 1 with the following reservations. The first five legs are relatively firm, except that PCOM wants a rejustification of the Norwegian Sea objectives (primarily to drill "dipping reflectors" at present) at their next meeting which must include input from the SOHP on paleoenvironmental objectives. Bare rock drilling will be tested on the third leg at the Mid-Atlantic Ridge. The schedule is tied to the sequential weather windows in the Norwegian and Labrador Seas. We actually hope to drill Baffin Bay in the northern Labrador Sea. PCOM was very receptive to our prioritization and I emphasized this objective. However, it's not clear that site surveys will be obtained in time or that potential safety problems will be resolved. The last two legs in the Weddell Sea are also considered firm. The interior North Atlantic/Mediterranean legs are flexible and the Mediterranean was felt by PCOM to have the poorest justification at this time. The ship will go down the west coast of South America, but at least one of the listed legs may be swapped for bare rock drilling on the fast-spreading Nazca/Pacific plate boundary (East Pacific Rise).

PCOM nominated leg proponents and potential co-chiefs for the first five legs. They are listed below.

<u>Leg Proponents</u>	<u>Primary</u>	<u>Secondary</u>
Bahamas	W. Schlager	H. Mullins
Barbados	G. Westbrook	A. Mascle
Mid-Atl Ridge/Kane	M. Purdy	J. Karson
Norwegian Sea	O. Eldholm	J. Mutter
Labrador Sea	F. Gradstein	S. Srivastava

<u>Leg</u>	<u>Potential co-chiefs</u>
Bahamas	J. Austin*, W. Schlager*, H. Mullins, R. Sheridan, B. Pusser, D. Meischner
Barbados	G. Westbrook*, R. Speed*, C. Moore, A. Mascle, Biju-Duval
MARK	M. Purdy, M. Salisbury, J. Cann, T. Francis, W. Bryan, T. Juteau
Norwegian Sea	O. Eldholm, J. Mutter, J. Thiede, K. Hinz
Labrador Sea	S. Srivastava, K. Miller, C. Keen, M. Arthur

* first refusal designates

The PCOM then considered long range plans in a much more general way. They believe that a 10-year drilling program should consist of two 5-year world circuits, with the first 5 years emphasizing high latitude drilling and the last 5 years utilizing riser capability at lower latitudes. The most likely outline of the first 5-year circuit is as follows.

Jan 85 North Atlantic	}	North Atlantic
July 85 Norwegian Sea		
Jan 86 Northwest Africa	}	Southeast Pacific
July 86 Barbados		
Jan 87 Weddell Sea	}	Southern Oceans
July 87 Red Sea		
Jan 88 Kerguelen Plateau	}	Indian Ocean
July 88 Banda Sea		
Jan 89 West Pacific arcs	}	Western Pacific
July 89 Aleutians		
Jan 90 West Central Pacific	}	Eastern Pacific
July 90 Juan de Fuca		
Jan 91 Eastern Pacific	}	

It would also be possible to do the 87-91 schedule in roughly the opposite order, but generally people want to go to the Indian Ocean as soon as possible. Either way we would be in the northwest Pacific in mid-1989.

Our job at the next SOHP meeting will be to further consider our objectives for the next five years, perhaps condensing our first priority objectives to a few important areas. PCOM seems more receptive, at present, to a narrowly focused set of targets rather than the Sherwin-Williams "cover-the-earth" policy. We must also carefully consider our needs for riser drilling (including any improvements in technological capability), and to identify both areas and types of site surveys required. I have made the request for a meeting in La Jolla, May 7-9. You should be hearing about this soon.

PCOM did not seem too sympathetic with our suggestions for more panel members or for the "Specialty Working Groups" for geochemistry and paleomag. that we proposed at the end of our last meeting. However, I will continue to push Jose Honnorez on this (and Roger Larson too).

As you can see, neither the Yucatan proposal or any Gulf of Mexico drilling fared well at this meeting. I raised our objections to Yucatan and others agreed, although I'm afraid that Eric Rosenkrantz won't be happy after the work that he put into the proposal. It's possible that the Florida slope holes might be drilled during the shakedown cruise of the 471, but this is not at all certain. The Bahamas received much discussion and we were asked to meld our objectives with those decided by the Atlantic Regional Panel. I have supplied L. Montadert (ARP Chairman) with a copy of our proposal. Y. Lancelot (SOHP) will act as our liaison to that panel.

We should really tighten up the NW Africa proposal objectives and intercalate the "best" of Bill Ruddiman's (et al.) Equatorial Atlantic proposal. We will have to fight hard for SOHP objectives; I hope that with the flexible schedule we will be able to justify 2 NW-Africa legs. We may have to sell short some the high-resolution Plio-Quat. work to feature some high-res. objectives for Paleogene and even Cretaceous.

The Mediterranean pot-pourri was not deemed very exciting in view of other

potential objectives. If we're to save anything here it will have to be carefully justified. One common statement made by individual PCOM members was "Why drill it if it crops out on land!?" This objection applies to several potential holes. The redrill of Site 132 for high-resolution bio-magneto strata in Plio-Quat. was the only site that met with enthusiasm. Are we willing to delegate Med. objectives to second priority in order to concentrate on NW Africa-Equatorial Atlantic story?

Thanks for your efforts at the SOHP meeting. We were well received by PCOM but have a long way to go. Minutes of our meeting to follow. See you sooner than we'd all like, I'm sure.

With best regards,

Michael A. Arthur
Chairman, SOHP

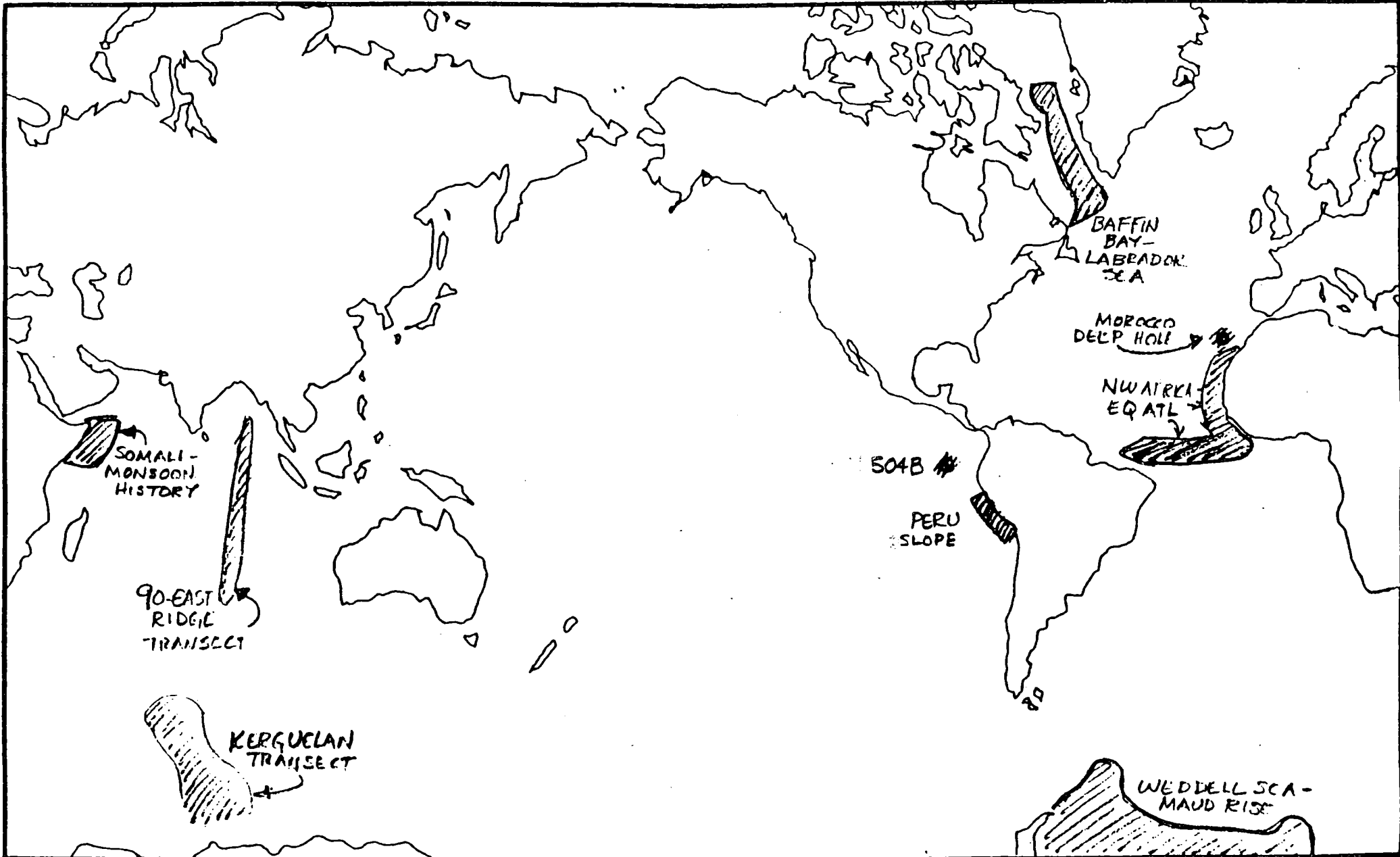
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"Handy Reference Guide"

to SOHP Future Objectives and Priorities for ODP

5/9/84

SUMMARY OF SOHP FIRST PRIORITY TARGETS*, JAN. 85 - JAN '89



* 5/9/84

Assuming Shiptack. N ATL ('85)
S OCEAN ('87)

31. What are the highest priorities for the next 3-4 years? These depend somewhat upon fixed times (high latitude objectives) in the projected drilling schedule. These presently include July-Oct. 1985 (N. Atlantic), Jan.-April 1987 (Weddell Sea), and Jan. 1988 (Kerguelan).

Priorities of SOHP Interests:

- 1st - Northwest Africa Leg
- 1st - Labrador/Baffin Bay Leg
- 1st - Moroccan deep hole (closely following NW Africa) (1.2)
- 1st - Peru slope/trench transect (1.2)
- 1st - Weddell Sea-Maud Rise
- 1st - 504B
- 1st - Somali Margin-monsoonal history (Hay will draw up prospectus)
- 1st - Kerguelan
- 1st - 90° East Ridge
- 2nd - Mediterranean Sea (without riser capability)
- 2nd - Norwegian Sea (possibly include Jan Mayen Ridge)
- 2nd - Bahamas
- 2nd - Ceara Rise
- 2nd - Newfoundland Basin
- 2nd - Barbados
- 2nd - Madeira Abyssal Plain
- 2nd - N-S Equatorial Cretaceous connection
- 2nd - Red Sea (withouth riser capability)
- 2nd - Agulhas A. P.
- 2nd - Exmouth Plateau
- 2nd - Bengal Fan

Pacific sites are deferred to Carmel meeting because drilling will not be done there for 4 or 5 years, but they need to be considered soon to provide time for surveys and planning.

Themes for future SOHP focus:

1. Global oceanic sediment and geochemical budgets - oceanic geochemical cycles through time
2. Upwelling histories - Cong production and burial of nutrients
3. Inter-ocean connections and history of water masses and water-mass exchanges (circulation and chemistry, latitudinal vs meridional circulation)
4. Controls on physical stratigraphy
5. Evolution of the oceanic biosphere
6. Burial diagenesis (emphasize deep burial)
7. Ocean-continent interactions

What are the major unknowns?

- 1) Oldest margin sediment?
- 2) Mass of marine evaporites and rapidity of precipitation?
- 3) Changes in accumulation rate of pelagic sediments?*
- 4) Geochemical pulses over long terms* (Mesozoic, Cenozoic)
- 5) Details of late Neogene-Quaternary budgets of Cong, CaCO₃ [1 + 3]
- 6) Volcanic episodicity?
- 7) Controls on terrigenous sediment inputs to the oceans [1 + 4] (shelf-basin fractionation, CaCO₃)
- 8) Properties of deep-water masses over time
- 9) Causes of major biotic extinctions
- 10) Biotic radiation episodes
- 11) History of hydrothermal input
- 12) Magnetobiostratigraphy - high resolution* in mid-Miocene and Jurassic/Cretaceous
- 13) Earth magnetic-field models testing, N-S hemisphere high resolution for polarity transition
- 14) Paleoceanographic significance of seismic reflectors

L.B.-Fans will not be overlooked, although better ways to investigate them are needed. Past studies have not used correct approach in not getting stratigraphic reference section to tie into overall fan geometry. Fan studies are needed to estimate volumes and rates of continental erosion and rates of continental rise construction. One or two carefully picked sites to connect seismic lines might work better than the multi-hole, descriptive approach used to date.

- 15) Need more information about rates of fan buildup-buildout through time in general.
- 16) Role of fans in sediment budgets, temporal distribution, rates of development? (single-hole approach)
- 17) Sediment accumulation in abyssal plains? (red clays)
- 18) Provincialism in marine planktonic groups?
- 19) Development and intensity of monsoonal circulation?
- 20) Timing, magnitude, and causes of Cenozoic glaciation?
- 21) History of response to orbital forcing through time? (usefulness to calibrate time scales and seafloor spreading rates)
- 22) The "oldest" paleoceans (the elusive Jurassic?).

*Test XCB in cherty pelagic carbonate sequence. Is recovery improved?

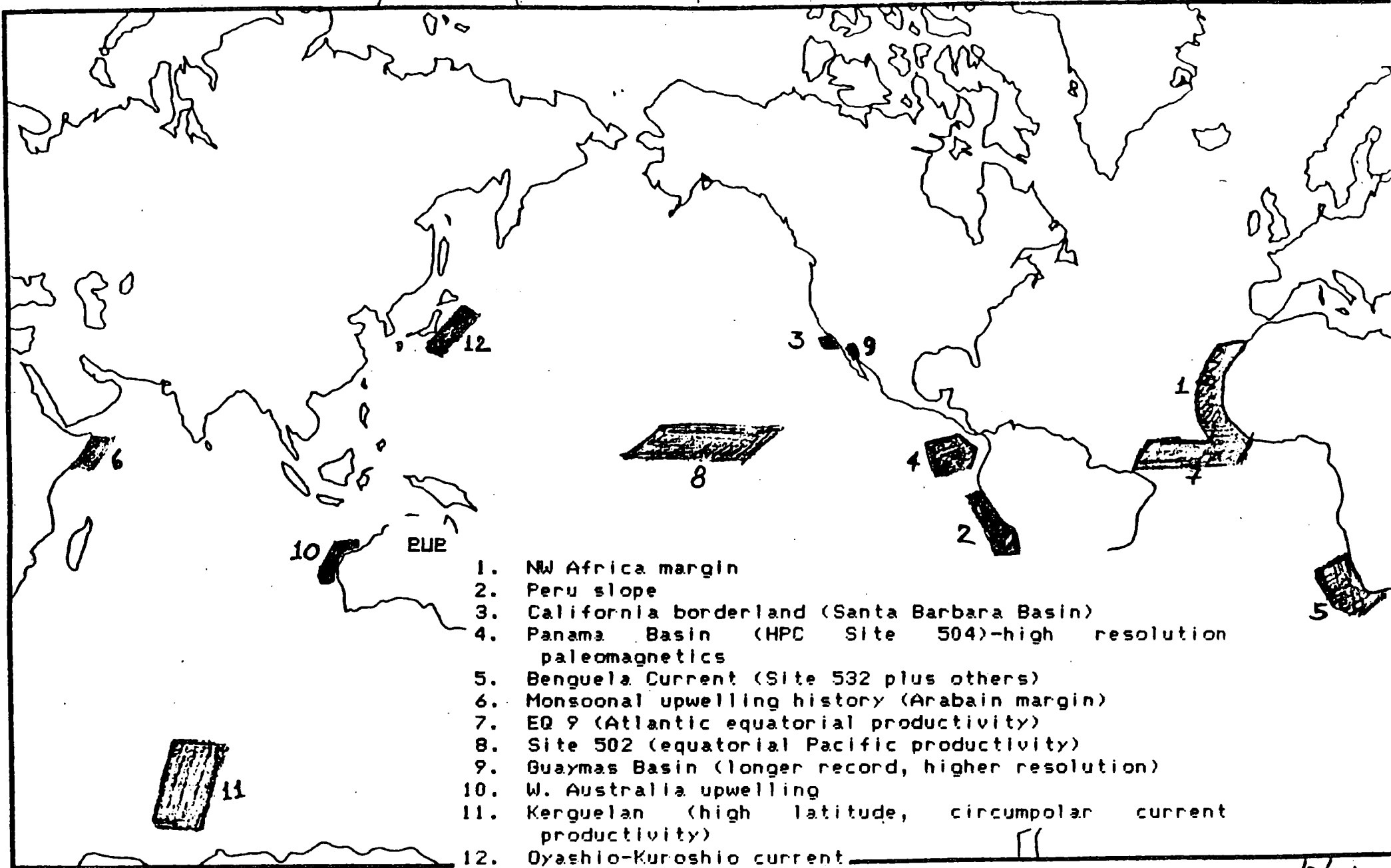
number) (riser drilling = *)

areas in which to attack
Major themes

- 1) Moroccan deep hole
Madagascar (possible diapirs) and date Gondwana
separation, deep hole > 2.5 km
Maud Rise - Agulhas
Exmouth Plateau*
- 2) Mediterranean Sea* - Messinian evaporites
Sao Paulo Plateau - Cretaceous S. Atlantic
Red Sea*
Moroccan deep hole
- 3) No single area seems adequate, instead look at: Arctic
Ocean Abyssal red clay environments through time
(Atlantic and Pacific)
Equatorial Paleogene sequences
Cretaceous Paleogene - SW Pacific
Circum-Antarctic
Bering Sea - trapped tropical Pacific Cretaceous crust?
- 4) See 3).
- 5) FUP area list
- 6) Pacific seamount province
Ceara Rise
General problem (active margins)
- 7) Sunda Shelf*
Bahamas
Upper Continental Rise locations world-wide
Circum-Antarctic
- 8) Arctic Sea
Ceara Rise Transect
Maud Rise Transect
90° East Ridge Transect
Kerguelan Transect
Ontong-Java Transect
Mariana Ridge ("gatemouths")
Norwegian Sea
Weddell Sea
Labrador Sea
Unconformities and drift deposits in general
- 9) All over locations of opportunity
- 10) All over locations of opportunity
High latitude-low latitude transitional sequence
Low-latitude Paleogene
- 11) Abyssal red clay sites - long-term averaging/integration
(all basins)
- 12) Northwest Africa (Neogene)
Mediterranean (e.g. 132) (Neogene/Quaternary)
(over)

- 13) Cover the earth (sed. rates > cm/1000 y), all ages but focus on Neogene for a start. "Each reversal is different" (L. Tauxe, 1984)
 - Kerguelan
 - 90° East Ridge
 - Maud Rise
 - Deana Rise
 - Arctic
 - Labrador Sea
- 14) See 8) and others (Moroccan deep hole, NW Africa, N-S Atlantic junction)
 - Core unconformities (to determine dissolution vs erosion, Exxon vs high resolution)
- 15) See many above
- 16) Big fans
 - Bengal
 - Indus
 - Amazon
 - Mississippi
 - Laurentian
 - Astoria
 - Paleofans (603, Orange River, Limpopo)
- 17) All over
- 18) Regional locations and opportunities
- 19) Somali Coast
 - Mozambique
- 20) Circum-Antarctic
 - Kerguelan
 - Labrador
 - Argentine Basin
 - Arctic
 - Maud-Agulhas
- 21) Equatorial Paleogene - most critical
 - Equatorial late Cretaceous
- 22) Bering Sea (?)
 - Moroccan deep hole
 - Pacific (?)

NEOGENE - QUATERNARY SEQUENCES (PUP)



1. NW Africa margin
2. Peru slope
3. California borderland (Santa Barbara Basin)
4. Panama Basin (HPC Site 504)-high resolution paleomagnetics
5. Benguela Current (Site 532 plus others)
6. Monsoonal upwelling history (Arabain margin)
7. EQ 9 (Atlantic equatorial productivity)
8. Site 502 (equatorial Pacific productivity)
9. Guaymas Basin (longer record, higher resolution)
10. W. Australia upwelling
11. Kerguelan (high latitude, circumpolar current productivity)
12. Oyashio-Kuroshio current

SOHP "PALEO-UPWELLING PROGRAM"
FOR ODP

5/9/84

ELP

1. NW Africa margin
2. Peru slope
3. California borderland (Santa Barbara Basin)
4. Panama Basin (HPC Site 504)-high resolution paleomagnetism
5. Benguela Current (Site 532 plus others)
6. Monsoonal upwelling history (Arabian margin)
7. EQ 9 (Atlantic equatorial productivity)
8. Site 502 (equatorial Pacific productivity)
9. Guaymas Basin (longer record, higher resolution)
10. W. Australia upwelling
11. Kerguelan (high latitude, circumpolar current productivity)
12. Oyashio-Kuroshio current (check to see if HPC'd already Leg 87)

M. Miocene to Quaternary records should be obtained in each area.

Objectives

1. productivity changes (upwelling intensity, current shifts)
2. O₂ minimum zone fluctuations (intensity and thickness)
3. Core burial rates (and preservational changes)
4. diagenesis in Core-rich sediments: phosphorite, dolomite, organic matter
5. downslope redeposition of Core-rich sediments (Peru)

This is a SOHP first priority program.

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The following is an Addendum to the Minutes of the SOHP of May 7-9, 1984 concerning proposed Labrador Sea/Baffin Bay Drilling

The information was provided by Larry Mayer and Luiz Gamboa at the request of M. Arthur

Labrador Sea and Baffin Bay:

A summary of the revised Labrador Sea/Baffin Bay proposal was presented by L. Mayer. Unfortunately none of the panel members had received a copy of the proposal before the meeting.

There was much discussion of the proposed drilling schedule. It was concluded that a drilling schedule based on the DSDP nomograms may be too optimistic -- especially when drilling a deep hole that may contain sands and glacial material. It was also suggested that a 1350 m hole probably should have a re-entry cone. A re-entry cone would permit re-occupation of the site should an iceberg necessitate the moving vessel. Schrader expressed the concern of PCOM about uncertainties in the travel time/depth conversions for the Lab Sea/Baffin Bay sites. These are relatively deep holes on a logistically difficult leg. Uncertainties of 200-300 meters could jeopardize the viability of a site. PCOM would like the depth conversions documented - letter should be sent to Schrader & Honnorez. Malpas should be prepared to reply at the next PCOM meeting.

Based on these considerations the Panel recommends that:

Baffin Bay sites be re-entry sites.

2. TAMU should use data provided in proposal and carefully evaluate drilling times and the need for re-entry cones. They will report back to Lab Sea W.G. and SOHP. (see attached letter from Gamboa).

Given these timing considerations, the SOHP believes that there will probably be time for only one Baffin Bay site. The Panel ranks the Paleogene objectives as the highest priority and therefore recommends that BB-3 (or a site in the vicinity) be the primary site.

The Panel was made aware of the logistical difficulties in providing a site survey for BB-3 (see discussion later) and of the fact that permission had not yet been granted to drill in this area.

Rick Sarg (Exxon), who has done considerable work in the Flemish Cap region, believes that the basement reflection at BB-3 is a Paleocene volcanic event. The Panel recommends that Rick be sent the crossing lines for the site and he will provide a second interpretation.

The Panel recognizes site LA-5 as the highest priority Labrador Sea site and recommends it be a re-entry site drilled to basement (if time permits). TAMU will provide realistic drilling time estimate.

Given time for one more site, the Panel evaluated the other Labrador Sea sites. Site LA-2 was ranked as a second priority site because of concern that the paleo-temperature signal from this site would show minimal fluctuations (always cold) and because of the restricted regional and temporal significance of the site.

A strong interest was expressed in tying Labrador Sea seismic stratigraphy to that of the North Atlantic and the relative merits of site LA-3 and LA-6 for this purpose were discussed. LA-3 appears to have a well developed seismic stratigraphy but as a drift deposit the section may be anomalous. LA-6, located on a transparent wedge between the drift and the mid-ocean channel is probably more representative of pelagic deposition (and probably has higher % CaCO₃ than Site 112) but shows a 'non-standard' seismic section.

The general preference was for LA-6 but Ken Miller will examine existing seismic syntheses to see if a better site can be selected. This site should have a good pelagic section and correlatable seismic stratigraphy. Ken will present his findings to the Labrador Sea Working Group for evaluation. The SOHP recommends that this site be drilled to basement and therefore recover Paleogene sediments.

The recommended drilling program consists of:

1st Priority	Site BB-3 Site LA-5 Site LA-6/3
2nd Priority	Site BB-1 Site LA-2

The SOHP realizes the logistical problems associated with Baffin Bay drilling and that weather, safety considerations, or lack of permission may prevent drilling of Baffin Bay sites. If no Baffin Bay drilling is permitted the SOHP recommends the four-site drilling program originally proposed by the Labrador Sea Working Group (modified to fit the time constraints to be provided by TAMU). If drilling is possible in Baffin Bay, but permission denied for BB-3, the Panel recommends drilling a site as far west along the BE 74-51 line as safety considerations allow.

Baffin Bay Site Survey:

A meeting was held with Herman Zimmerman of NSF to discuss the problems associated with conducting a Baffin Bay Site Survey. The following points were made:

1. Canada is paying the entire cost of the Labrador Sea site survey (34 days of C.S.S. Hudson; a non JOI site survey).
2. Canada is making a significant contribution of shiptime towards the Kane Fracture Zone site survey (a survey that is being requested by JOI - 18 days of C.S.S. Hudson minus a \$90,000 contribution towards ship costs by JOI).
3. The possibility of Baffin Bay sites has only recently arisen, long after the Canadian ships have been scheduled.
4. A hydrographic vessel, C.S.S. Baffin, will be in the vicinity of Site BB-3 in October of 1985, but Baffin is not equipped to do seismic work.
5. It may be possible to free up several days of Baffin to conduct a site survey but, no funds are available to pay for the airlifting of the equipment and personnel necessary for the site survey to the vessel.

Dr. Zimmerman was asked if JOI could cover the cost (\$50,000) associated with this transfer of equipment and personnel. He informed me he will bring this up with the appropriate people in Washington and get back to us as soon as possible.