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DRAFT MINUTES OF THE SEDIMENTS AND OCEAN HISTORY PANEL MEETING

Graduate School of Oceanography
University of Rhode Island
March 19 and 20, 1984

Attending

M. Arthur (Chairman)
B. D'Argenio
R. Embley
Y. Lancelot
P. Meyers
W. Ruddiman
R. Sarg
M. Sarnthein
N. Shackleton
E. Suess
L. Tauxe
H. Schrader (PCOM Liaison)
A. Wright Meyer (Ex Officio, TAMU)

Guests

K. Miller (LDGO; Lab. Sea W.G.)
A. Aksu (Lab. Sea W.G.; for L. Mayer)
R. Thunell (USC; Med. W.G.)
J. Kennett (URI; South. Oceans W.G.)

Absent (with apology)

W. Hay
Y. Takayanagi
L. Mayer

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4E	E. Bahamas
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ITEM 1: Introductions, Presentation and Discussion of Agenda

A) The Chairman convened the meeting at 8:30 AM, March 19, 1984 in the Challenger Room of the GSO Pell Library. The panel members introduced themselves and briefly summarized their areas of expertise and interests.

B) Because it was our first meeting, M. Arthur noted the full agenda and the need to consider a variety of important issues during the meeting. W. Ruddiman asked to add discussion of "sampling policy" to the agenda and L. Tauxe brought up the issue of "oriented piston cores." Discussion was deferred to the second day with consideration of lab design, etc. The SOHP members were also asked to consider the broad panel mandate for later discussion, particularly the need to focus on a few specific and important problems rather than a wish-list of objectives.

C) There was not NSF representative in attendance so M. Arthur mentioned that a drilling vessel had been decided upon (SEDCO-BP 471); he also noted that some funds were available from NSF-ODP to hold workshops on particular problems of interest to ODP (column in EOS).

ITEM 2: TAMU-ODP Report

A) A. Wright Meyer briefly presented information on the SEDCO-471, including a summary of its capabilities and comparison to the *Glomar Challenger*. A riser capability is planned for ZOCOM. Y. Lancelot mentioned that the same limitations applied to drillstring length (about 27,000 ft.) on SEDCO as to *Challenger*, the basic parameter being the strength of the drillstring, not the hoisting power of the rig. L. Tauxe asked about the possibility of special coatings (e.g. Zn) or an aluminum drillstring to eliminate the "rust" problem in future paleomagnetic studies of ODP cores. She also suggested that a larger diameter drillstring and U-channel sampling might alleviate the problem.

PCOM action item (also TAMU)

Recommendation: The SOHP feels that drillstring composition and diameter is an important issue and *urges* PCOM and TAMU to consider alternatives so that the "rust" contamination problem can be alleviated.

B) A. Wright Meyer went on to describe plans for a 4-story scientific lab housing forward of the derrick.

H. Schrader emphasized that a 4-story design is essential to maximize available space. L. Tauxe suggested that the flow of cores through the system should be altered if the drillstring design remains the same. That is that whole-core spinning will be useless so bringing cores through the mag. lab. first is unnecessary. U-channel sampling after the cores are opened would be best. H. Schrader suggested that if there are strong concerns about shipboard plans they should be sent immediately to TAMU and

PCOM Chairman (end of April deadline).

PCOM Action Item

C) A. Wright Meyer stated that, as planned, the first new ODP site would be Site 625 on Leg 101. W. Ruddiman alluded to a "sense of history" and moved that the first leg be 97 and the first site be 625. The motion carried 8 to 2.

D) W. Ruddiman asked about the bare rock drilling technology. Y. Lancelot described two different concepts being examined, but stated that the technology would probably not be available during the first few legs.

ITEM 3: PCOM Report

H. Schrader pointed out the importance for any panel making recommendations to PCOM to make every effort to prioritize and document recommendations. He called attention to the COSOD report and pertinent subjects there.

He also mentioned that the SOHP should not take the concept of the first four legs as "cast in concrete" too seriously. He emphasized that future plans should not be influenced by whether or not site surveys could be completed in time. There's still a lot of flexibility in planning early legs. He noted that drilling proposals should be sent directly to the PCOM Chairman.

H. Schrader also noted that the Weddell Sea Leg might be deferred for another year and therefore that the ship might have another year in Atlantic or E. Pacific. The first leg will likely be in the Gulf of Mexico with first priority to the Yucatan Basin.

ITEM 4: Consideration of Drilling Proposed for First 3-4 Legs of ODP

A) Gulf of Mexico-Florida Slope

1) J. Kennett reviewed the objectives of Florida Slope (near DeSoto Canyon) holes proposed by himself and Ted Moore. He emphasized that there are no adequate sites in the Gulf of Mexico region that adequately concentrate on Cenozoic stratigraphy-paleoclimatology and no others proposed.

The objectives (see Figs. 4A-1-4) would be to obtain high quality HPC cores at 2 sites of about 600-700 m penetration each to examine: a) Quaternary meltwater spikes on deglaciation (note Orca Basin failure), b) Cenozoic carbonate biostratigraphy/paleoclimatology in region with strong continental influence, and c) seismic stratigraphy-major reflectors and sediment packages and relationship to sea level.

Y. Lancelot emphasized the "global" nature of the drilling, and during discussion these other rationales were brought up: a) that preservation (barring diagenesis) should be exceptional, and b) that this site is complementary to N.J. transect sites. Carbonate deposition on a passive margin complementary to some proposed Bahamas drilling, and c) models of global eustacy will depend on this type of drilling -- in the best surveyed (seismically) area in the world. No further site surveys are needed.

SOHP recom. to PCOM

2) Will await discussion of other areas before doing prioritization of objectives overall (see Table 4A-1), but the panel attached high importance to Florida Slope drilling. Could it be done during "shakedown" cruise?

3) SOHP also considered original Gulf of Mexico-Florida Straits Sites proposed by Buffler after his Leg 77 experiences. The panel felt that a site on Line SF-11 (see Buffler proposal) could possibly reach Lower Cretaceous_Jurassic sedimentary objectives not yet reached in the Gulf region. Early evolution of Gulf of Mexico sedimentary environments would be of high interest to SOHP.

SOHP recom. to PCOM

We recommend further consideration of SF-11 of similar site by PCOM. Perhaps more site survey data is required to Safety Panel consideration, and there is the additional proviso that the site is in Cuban waters.

SOHP recom. to PCOM

The following are suggested as candidates for co-chief scientist in the event of a Gulf of Mexico Leg: R. Buffler (UT), T. Moore (EXXON), R. Sheridan (Delaware).

Site Surveys required
E. of DeSoto Canyon
additional sites proposed by
OPP

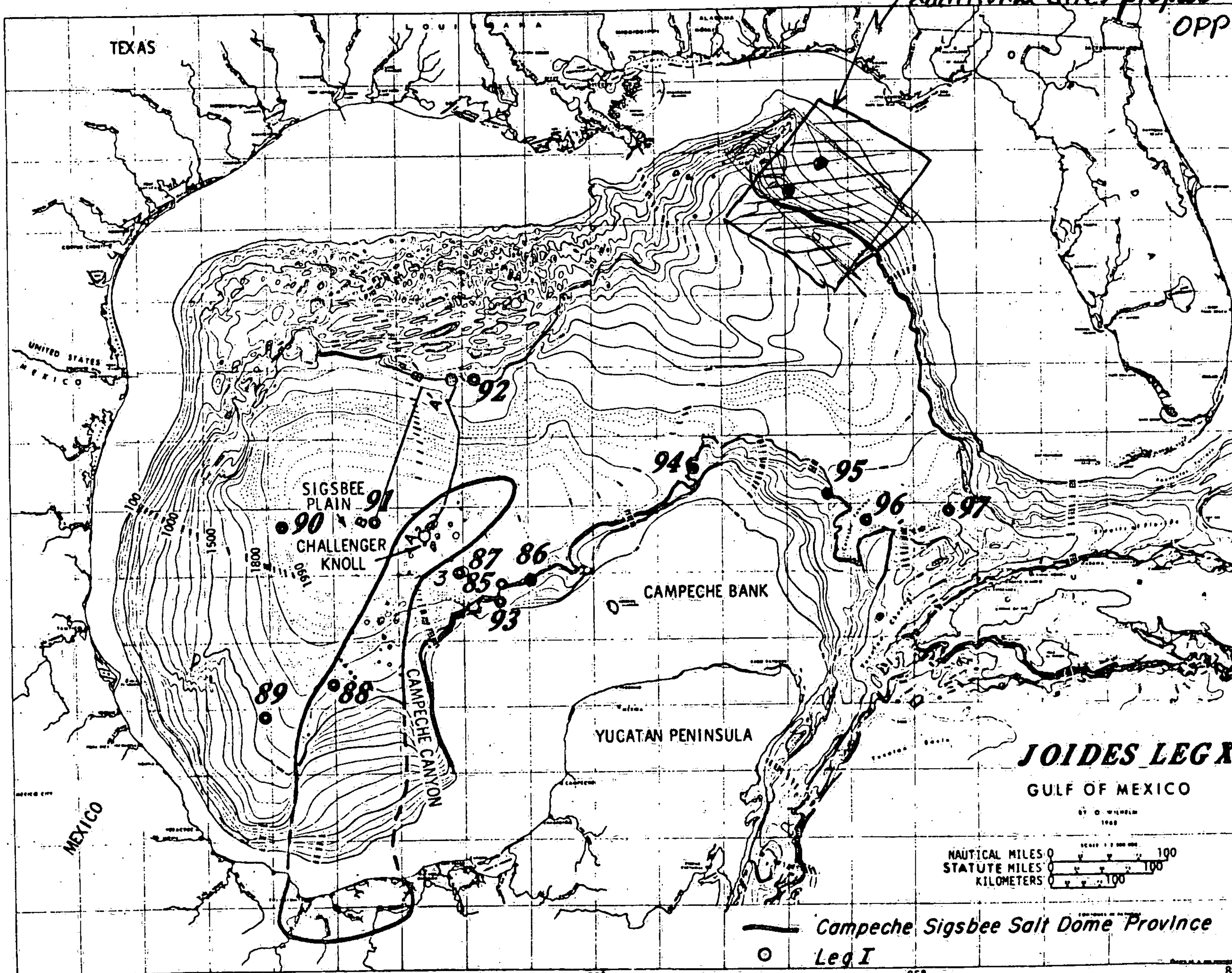


Figure 4A-1

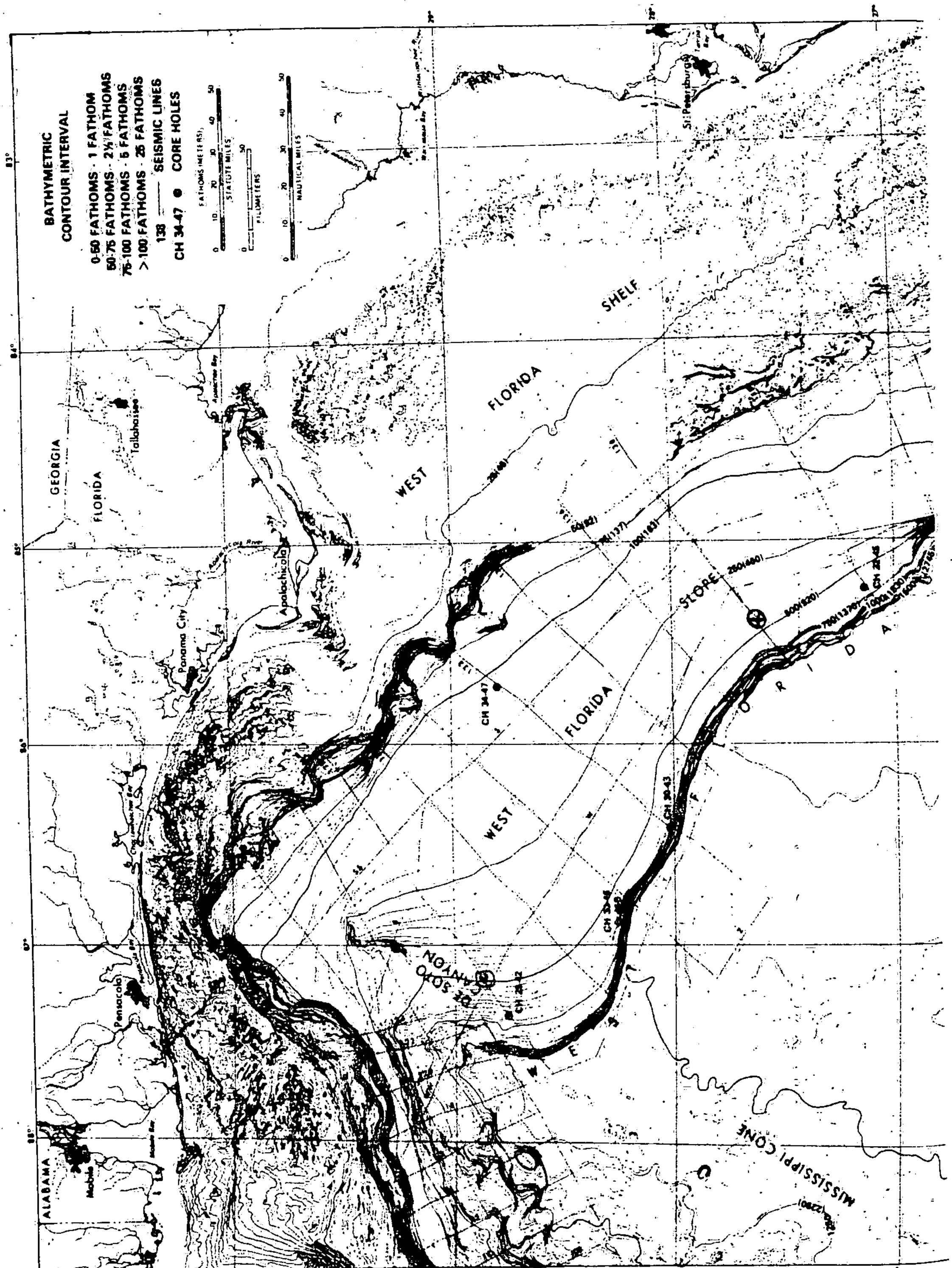

BATHYMETRIC
CONTOUR INTERVAL
0-50 FATHOMS - 1 FATHOM
50-75 FATHOMS - 2½ FATHOMS
75-100 FATHOMS - 5 FATHOMS
>100 FATHOMS - 25 FATHOMS
138 SEISMIC LINES
CH 34-47 CORE HOLES
ALABAMA
GEORGIA
FLORIDA
Mobile
Pensacola
Tallahassee
Panama City
Apalachicola
St. Petersburg
WEST FLORIDA SHELF
WEST FLORIDA SLOPE
DE SOTO CANYON
MISSISSIPPI CONE
CH 34-47
CH 28-42
CH 30-43
CH 22-45
W E S T F L O R I D A

Figure 4A-2

DSDP/IPOD SITE PROPOSAL

SITE: Florida 1
POSITION: 28°50'N; 87°10'W
GENERAL AREA: Close to DeSoto Canyon, n.e. Gulf of Mexico on West Florida Slope.

GENERAL OBJECTIVE: Neogene to Late Oligocene biostratigraphy and paleoclimatology of Gulf of Mexico.

PANEL INTEREST: O.P.P.

OBJECTIVES: To obtain a high-quality continuous pelagic sequence through the entire Neogene in the Gulf of Mexico. This objective has not been met yet in the Gulf despite DSDP 5 legs in the area.

BACKGROUND INFORMATION:
Regional Data:
Seismic Profiles: Seismic Profile Line 126 of Michum, 1978, p. 199 (AAPG Studies in Geology, No. 7).
Other Data:

Site Survey Data: Conducted by: Require east-west and north-south crossing detailed digital single channel seismic lines over proposed site location, to establish final site location.
Date:
Main Results:

OPERATIONAL CONSIDERATIONS:
Water Depth (m) ~920 m Sediment Thickness (m): 1.5 seconds Total Time on Site (days) ~4 days
Single Bit -- Re-entry Total Penetration (m): 550 m
Double HPC & XCB
Nature of Sediments Anticipated: Foram Nanno Ooze

Weather Conditions: Good
Jurisdiction: U.S.A.
Other:

SCIENTIFIC REQUIREMENTS: Staffing Special Analyses

Shipboard:

Shoreboard:

Shorebased:

STATUS OF PROPOSAL

Liaison Officer or Proponent	Panel(s) Endorsement	PCOM Endorsement	Safety Review
J. Kennett and T. Moore for O.P.P.	O.P.P.		Expect no safety problems in this part of sediment column.

B) Yucatan: The SOHP discussed the information given in proposals by Buffler and Rosenkrantz which were distributed earlier to all members. No proponents for the drilling were present.

M. Arthur noted that to obtain real basement age of oldest basement and to recover oldest sedimentary horizons (possibly Jurassic) would require over 2 km of penetration, clearly too much for first drilling under new program. A. Wright Meyer showed a seismic line discussed at the Caribbean Working Group meeting which illustrated the possibility that CAR 7 (YB-1) Site would be located near crest of a "fossil" spreading center. Dating the age of that crust would only constrain latest age of formation of the Yucatan Basin, not necessarily the timing of initiation of rifting.

The seismic character of the sedimentary sequence suggests that the majority of the sequence to be recovered consists of turbidites (ponded, subparallel reflectors, onlap "basement high"), which would not be of high priority interest to the SOHP.

SOHP recom. Low Priority

Because of the above-mentioned problems, the SOHP felt that the Yucatan Drilling is of second priority or lower interest and, as proposed would probably attack problems of only regional nature.

C) Mississippi Fan Drilling

1) A. Wright Meyer, who was on DSDP Leg 96, reviewed the accomplishments of drilling on the Mississippi Fan for the benefit of new SOHP panel members (cf. JOIDES Journal and Prelim. Rept.).

She addressed the reasons for returning to the Fan for further drilling, which are outlined in Appendix II (letter from Bouma/Coleman to TECPAN Chairman). These are basically to: a) drill channels on upper fan which were originally refused by JOIDES Safety Panel, b) drill several sites at midfan-lower fan juncture to examine patterns/timing/causes of channel jumping, and c) drill a Quaternary reference section for biostratigraphy, seismic horizons, etc. to trace into fan complex.

2) There was concern expressed by R. Embley that drilling of a so-called reference section on the adjacent abyssal plain would not accomplish the objectives because of the difficulty of tracing seismic facies into the fan. He suggested that such a section should be drilled on the fan but away from Late Pleistocene channels.

.P recom. to PCOM

3) Prioritization was deferred until end of discussion. The SOHP considered John King's letter, forwarded by J. Honnorez, concerning paleomagnetic objectives in the Gulf of Mexico. The concensus was that his basic recommendations were good, but the SOHP would not consider designing or prioritizing specific sites for those objectives. The recommendation of SOHP to PCOM is that objectives might be satisfied at other sites

Figure 4A-3

FIG. 3—Seismic profile line 126, reflection time section (see Fig. 1 for location). Marked change in sedimentary regime occurs at horizon F, with strong downlap of younger beds. Channel on right of core hole 29-42 is part of ancestral DeSoto Canyon system (see Figs. 17, 18).

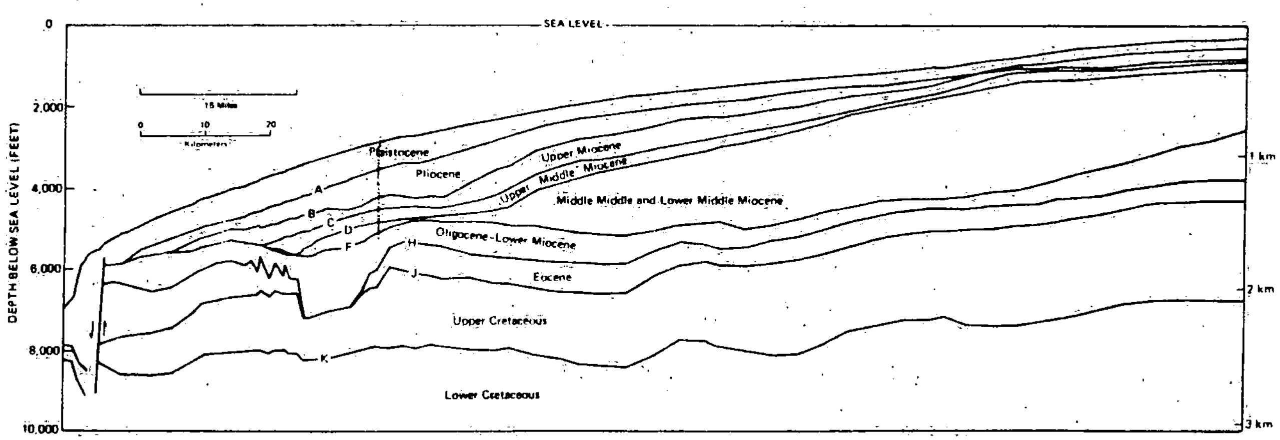


FIG. 4—Seismic profile line 126 converted to depth scale in feet and kilometers. Vertical exaggeration is about 20:1

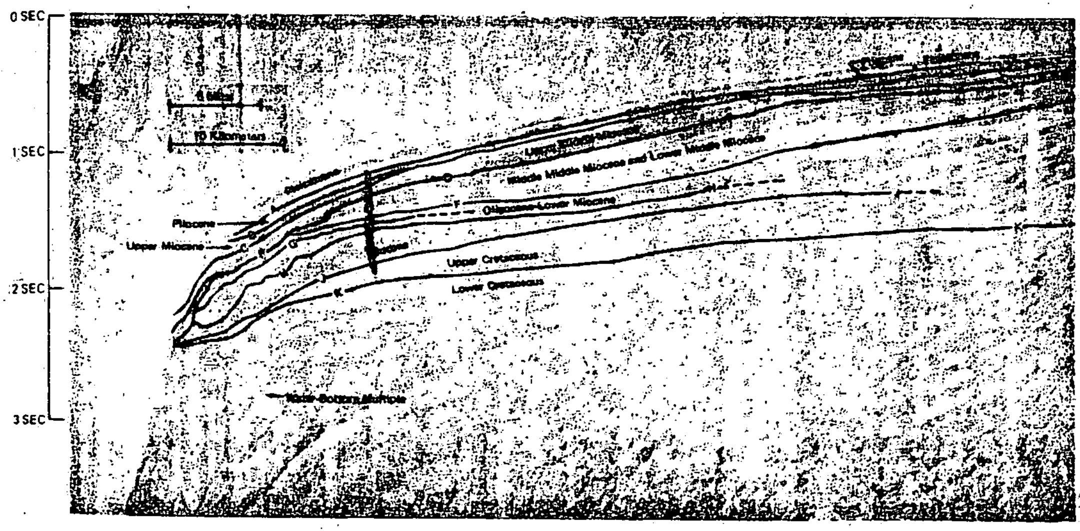


FIG. 8—Seismic profile line 138, reflection ‚ime section (see Fig. 1 for location).

Figure 4A-4

DSDP/IPOD SITE PROPOSAL

SITE: Florida 2 POSITION: 27°40'N; 85°25'W GENERAL AREA: West Florida Shelf, n.e. Gulf of Mexico.	GENERAL OBJECTIVE: Late Cretaceous to Oligocene biostratigraphy and paleoceanography of Gulf of Mexico. PANEL INTEREST: O.P.P.

OBJECTIVES: To obtain a good quality Paleogene and late Cretaceous pelagic record for the Gulf of Mexico. In order to penetrate to this age material about half the section will be of Neogene age. The site has been chosen for its relatively thin Neogene cover underlain by a potentially continuous or near continuous Paleogene and Cretaceous section.

BACKGROUND INFORMATION:

Regional Data:

Seismic Profiles: Seismic Profile Line 138 of Michum, 1978, p. 205 (AAPG Studies in Geology, No. 7).

Other Data:

Site Survey Data: Conducted by: Require ene-wsw and wnw-ese crossing detailed digital single channel seismic lines over proposed site lication; to establish final site location.

Date:

Main Results:

OPERATIONAL CONSIDERATIONS:

Water Depth (m) ~900 m Sediment Thickness (m): >1.5 secs. Total Time on Site (days) ~ 6 days

Single Bit -- Re-entry Total Penetration (m): 800 m

Double HPC & XCB

Nature of Sediments Anticipated: Foram Nanno Ooze

Weather Conditions: Good

Jurisdiction: U.S.A.

Other:

SCIENTIFIC REQUIREMENTS: Staffing Special Analyses

Shipboard:

Shoreboard:

Shorebased:

STATUS OF PROPOSAL

Liaison Officer or Proponent	Panel(s) Endorsement	PCOM Endorsement	Safety Review
J. Kennett & T. Moore for O.P.P.	O.P.P.		A careful grid is needed around the site to establish if there are any safety problems.

Leg 2: "Bahamas" (interface with Florida Slope Sites) (overall priority 1)

-General understanding of carbonate platform sedimentation and response to sea level - need for initial coherent program to look at one carbonate bank system; emphasize off-bank production-resedimentation.

-Combine best parts of Schlager et al. with Ravenne and LeQuelloc

Eleuthera Fan - Little Bahama Bank E: Slope

*Sites X-Z -Fan - 3 sites - HPC/XCB 2 @ 300m to exam. fan facies composition, volume; 1 @ 600m to base of fan complex

(X) -Slope - 1 site - HPC @200m - windward slope (downslope or off-bank transport and comparison to transect on NE LBB) [Abaco]

Sites T-V -Little Bahama Bank Transect - 2-3 sites - HPC/XCB @ 200-300m penetration (downslope/off-bank sedim., arag. dissol., sea level)

Site W -NE Providence Channel - 1 site - (near old 98) 600m penetration (to examine platform sedimentation problem, good Paleog.-U.K. pelagic sequence)

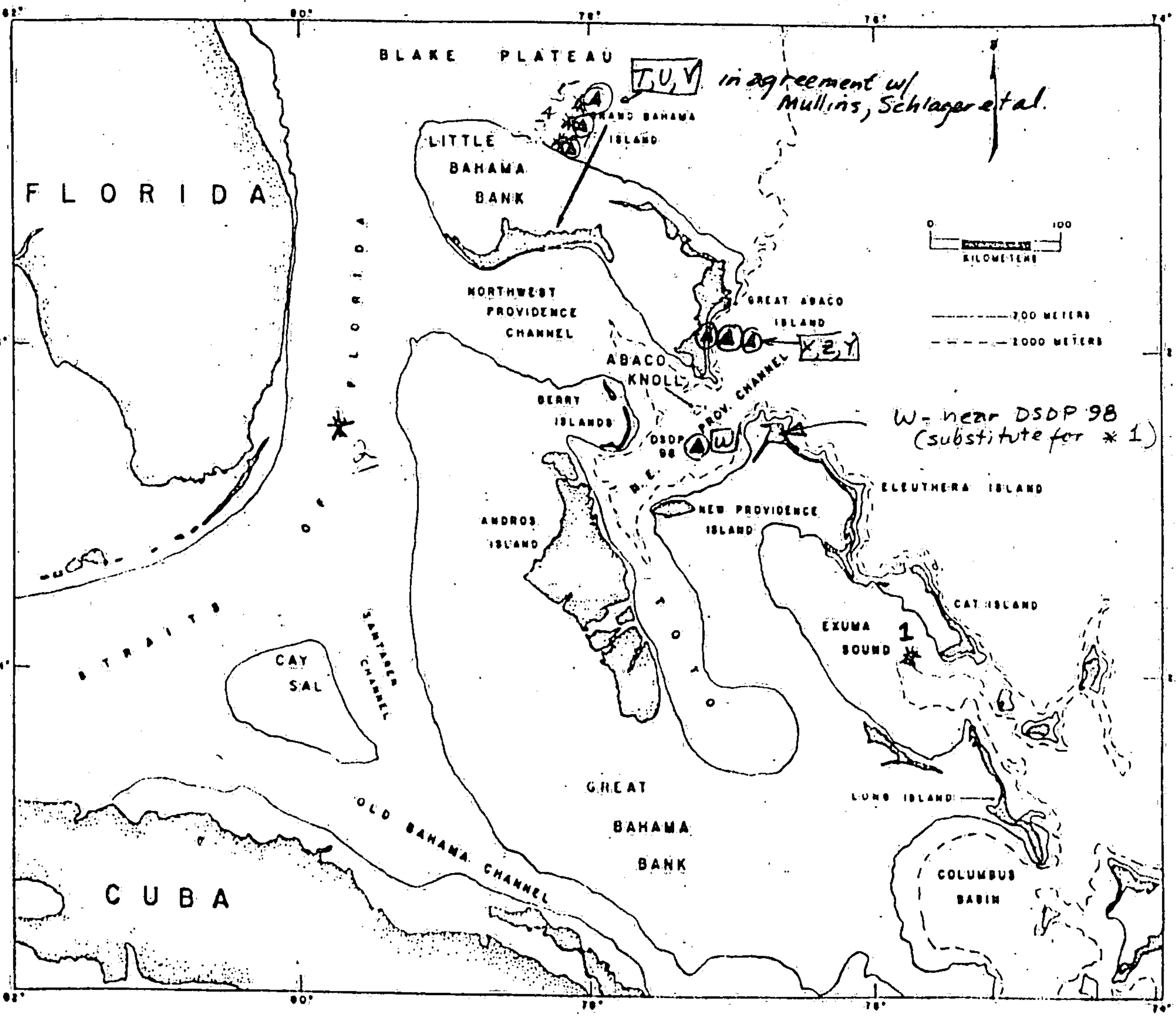
* designation of SOHP, see Fig. 1

TABLE 4E-1: ESTIMATED DRILLING TIME (assuming double HPC/XCB)

(may be problem with slope sites; early lithification)

Priority	Site	Water Depth	Penetration	Objective	Drilling Time
1	X	ca. 3500 m	200 m	Abaco slope sequence (windward slope)	5 days
1	Y	ca. 4500 m	600 m	Distal carbonate fan (Neogene history)	10
2	Z	ca. 4000 m	200 m	Sediment "cone" at mouth of channel	5
1	W	ca. 3500 m	600 m (+)	(near DSDP 98-segmentation history & pelagic canyon fill)	11
1	T	500 m	200 m +	Little Bahamas slope sequence - Upper	5
1	U	1000 m	200 m +	Middle	5
2	V	1100 m	200 m +	Lower	5
				subtotal	46 days

(not including transit)

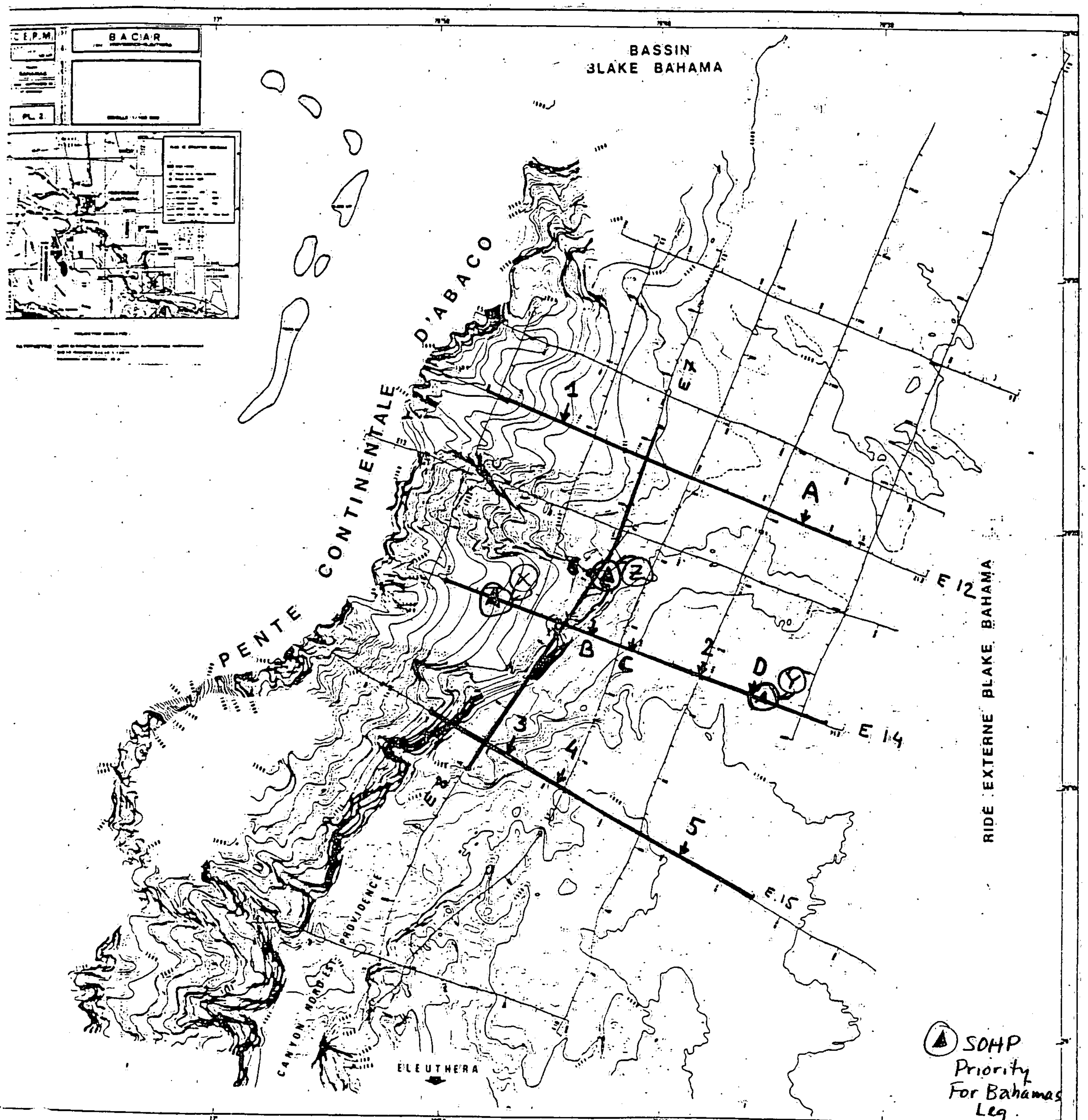


Index map of Northwestern Bahama platform (TOTO – Tongue of the Ocean).

Fig. 4E-1 Index map of northwestern Bahama Platform showing relationship of shallow-water banks and deep-water basins. Also shown are general locations of proposed Deep-Sea Drilling Sites (#'s 1-5).

* Proposed by Mullins, Schlager et al

(A) Priority Sites for SOHP (includes several Eleuthera Fan Sites proposed by Ravenne & LeQuelloc)



INDEX MAP FOR ELEUTHERA FAN SEISMIC LINES AND PROPOSED DRILLSITES (SEE LINES ON FIGS. 3,4)

Fig. 4E-2 (From Ravenne and LeQuelloc)


Fig. 3.
← PROPOSED DRILL SITE
0 5 10 KM
deep basin sequence
"shelf" sequence
basement
0
1.0
2.0
3.0
4.0
5.0
6.0
SECONDS (2-WAY TIME)

Fig. 5A-3

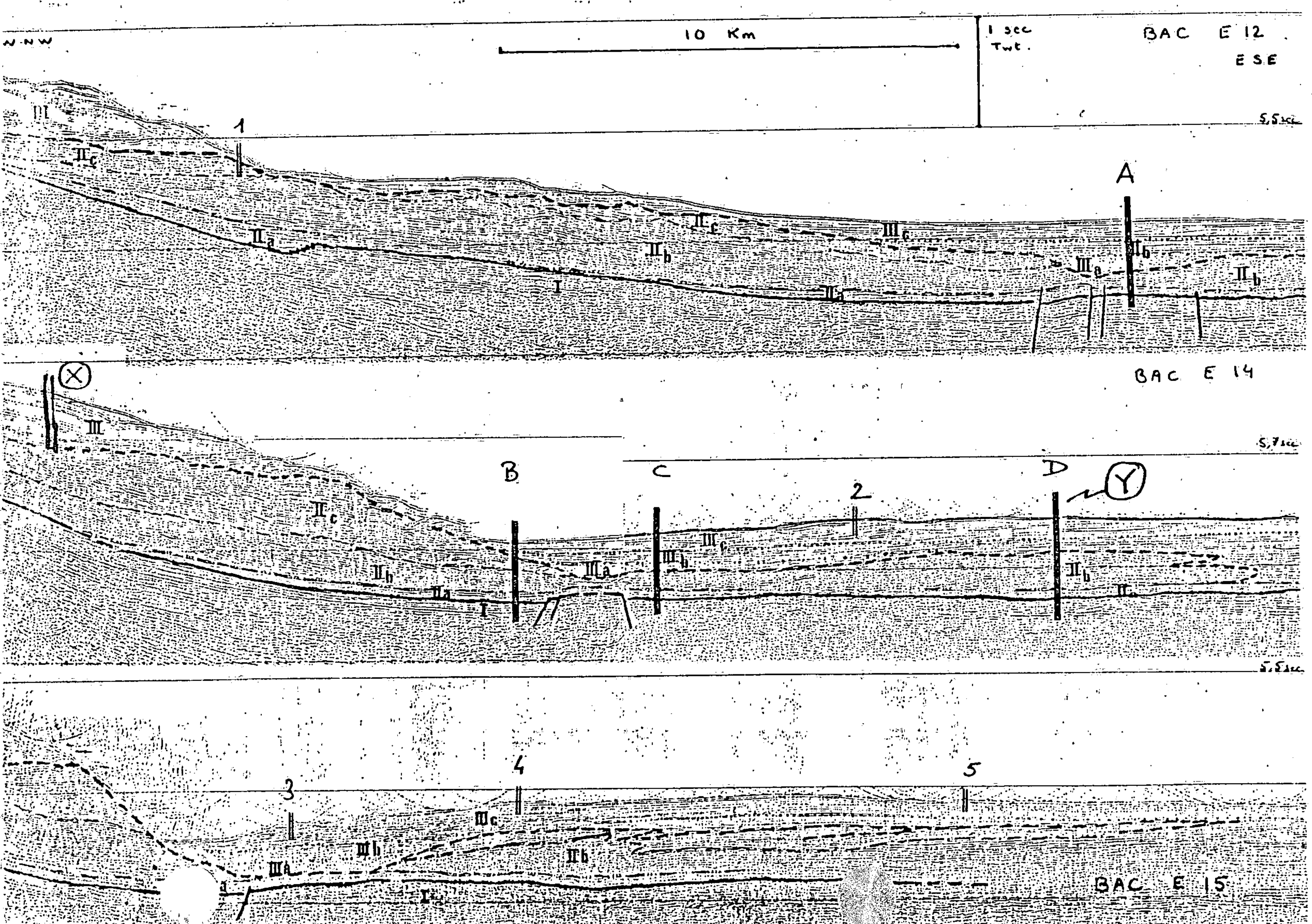


Fig. 4E-3

- MULTICHANNEL LINES
(RAVENNE AND LEQUELLEC)

Note: SOHP sites X and Y

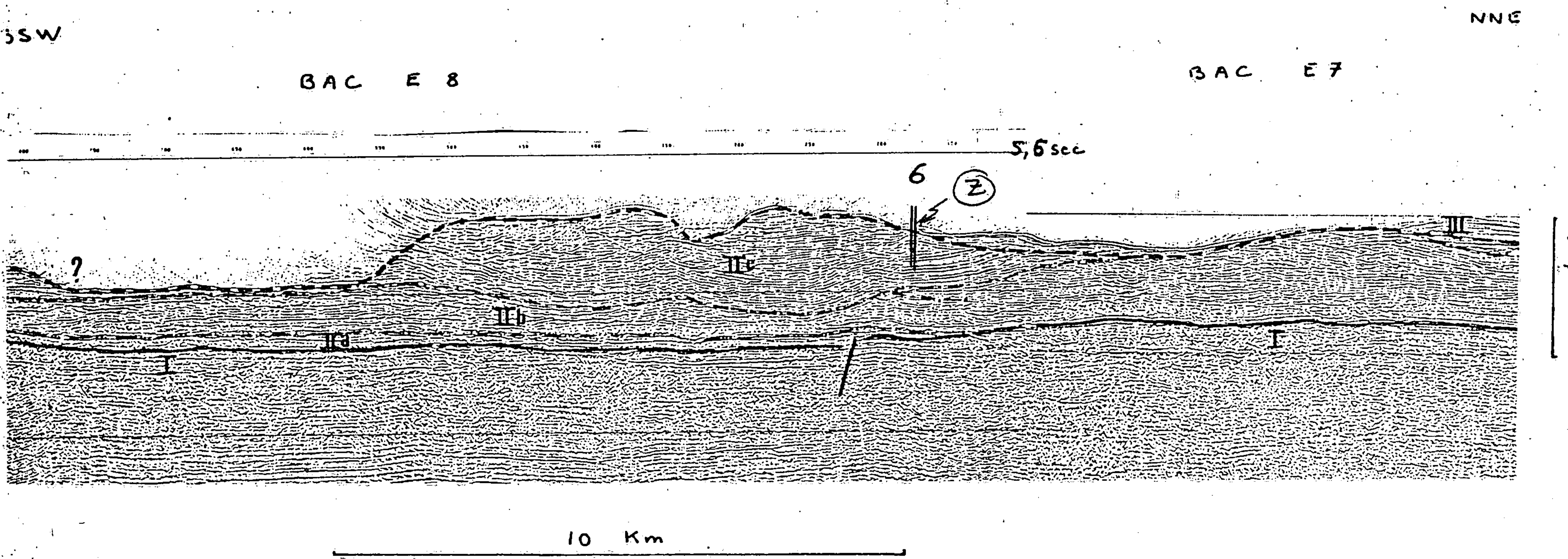


Fig. 4E-4

Table 5A-1

LABRADOR SEA DRILLING

Recommendations of SOHP

FIRST PRIORITY SITES

-Baffin Bay (OPP and SOHP Recommendation - See preliminary Petro Canada proposal)
Urge more data - FIRST PRIORITY OBJECTIVES: Arctic-Atlantic H_2O mass exchange
warm high-latitude climate
Late K-Paleog. record

-3 Gloria Drift - 1010m; Neog.: Paleog. paleoenvironment; crustal age.

-5 Paleog./Neog. paleoenvironment, 1480m (reentry)

-6 Neogene paleoenvironment (U. Mioc.) 250m HPC/XCB

SECOND PRIORITY SITES

-2 Neogene paleoenvironment (~700m penet., possible 1100m) - bsmt. too deep

-CHARCOT (K-9) (Ruddiman proponent) W. N. Atlantic, 44°N-40°W (HPC/XCB)

-Davis Strait (AKSU proponent) (HPC-Rotary) (alternate to Baffin site)
Origin of Davis Strait; Arctic-Atlantic H_2O mass exchange

Table 5A-2

BAFFIN BAY SITE (proposed)

(on basis of information supplied by A. C. Grant)

Penetration: ca. 1100m

Objectives: a) Arctic-N. Atlantic connection and water mass exchange, Late Cretaceous - Recent

b) Warm, high-latitude paleoclimates in Late Creatceous-Paleogene

Location: Site is 1200 km north of Labrador Sea Site 5

Drilling Time: 100m penetration and logging estimated 11 days (3 days steaming time each way); Total 17 days

Proposed Program

	Drilling	Steaming
Site 5	25 days	
Site 3	9 days	9 days (St. Johns)
Site 6	3 days	
Baffin	11 days	6 days
subtotal	48 days	
		15 days
TOTAL	63 days	

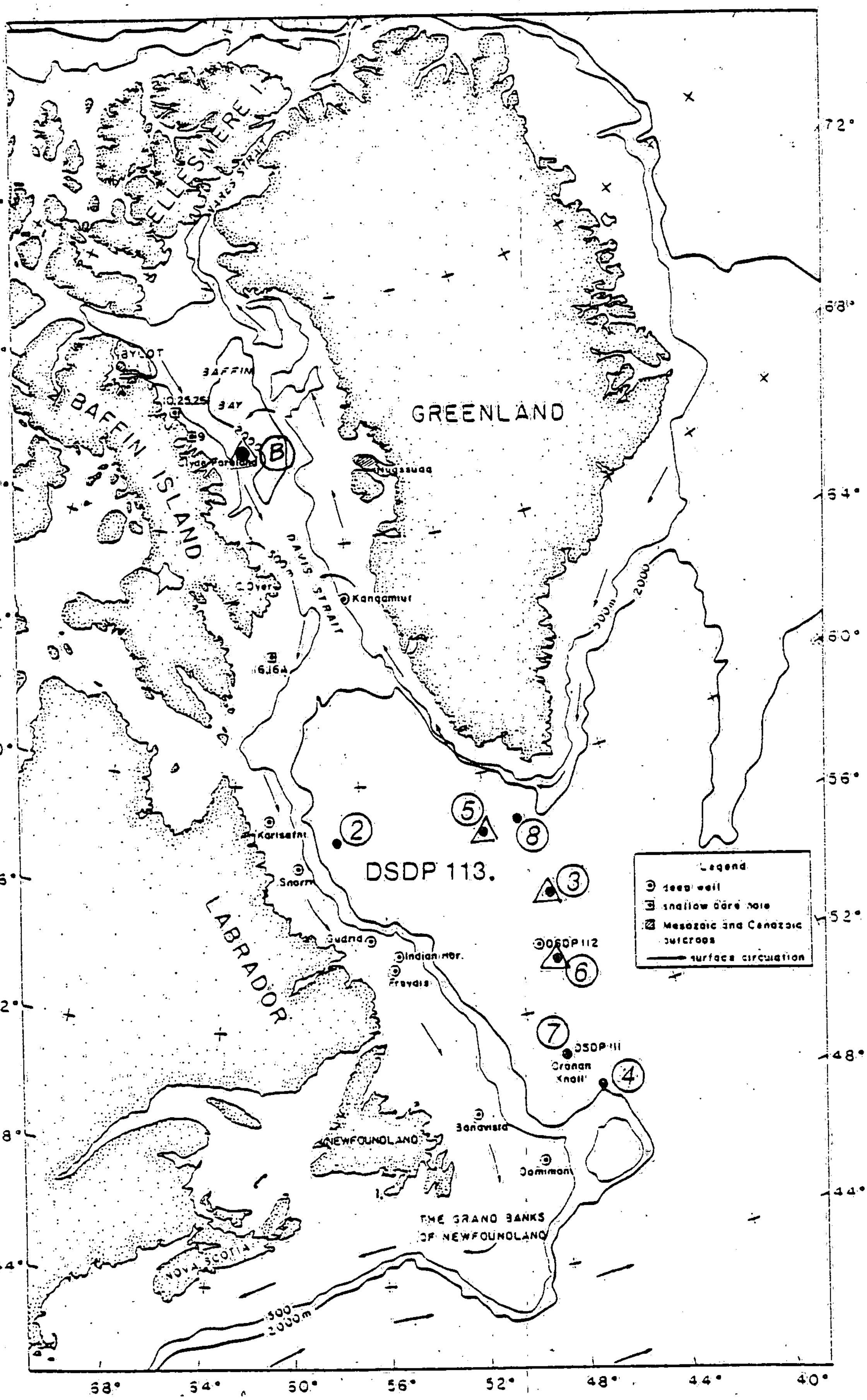
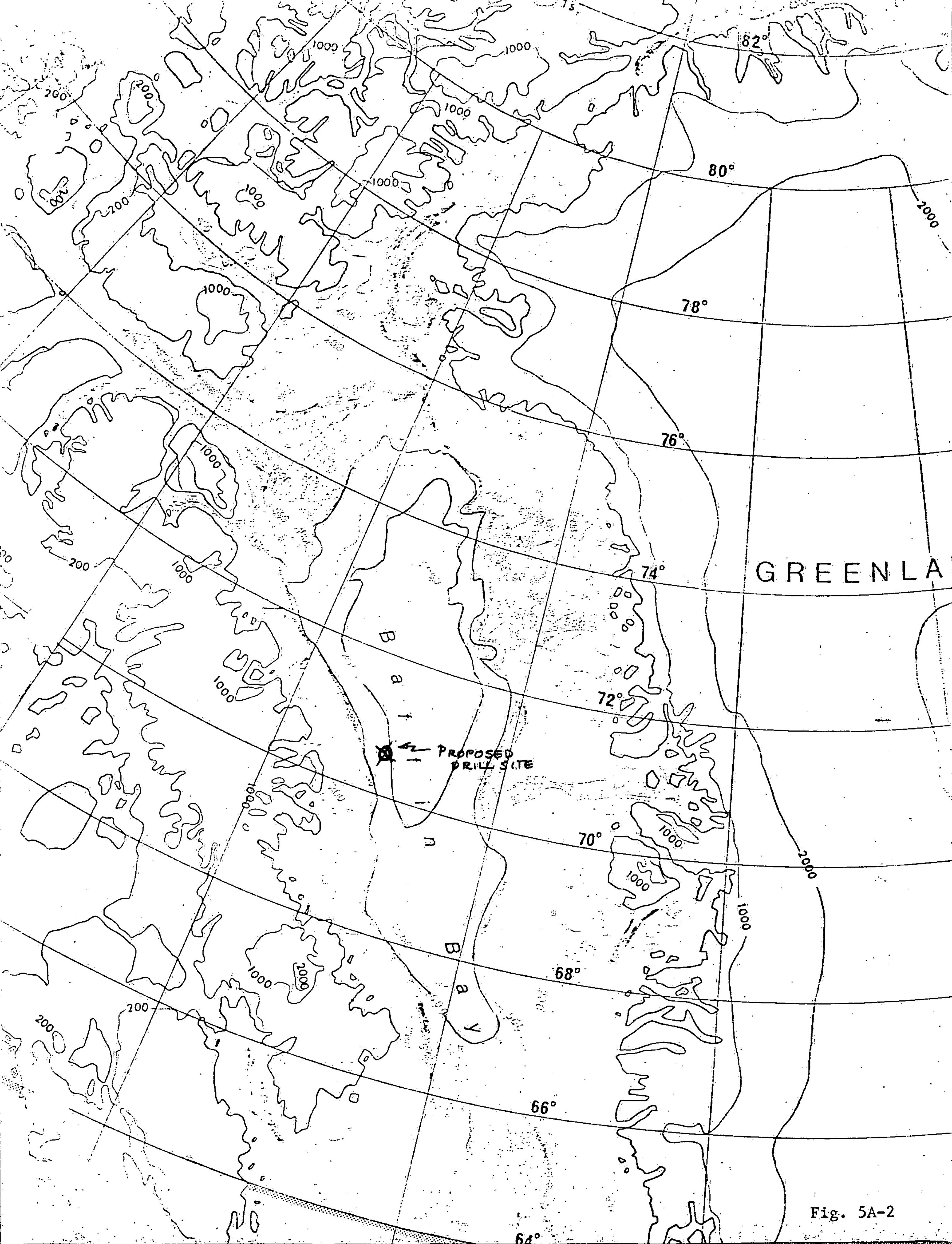


Fig. 5A-1 Location of proposed Labrador ODP Sites.

▲ Priority SOHP Sites (Recommended)



GREENLA
B a f f i n B a y
PROPOSED DRILL SITE
82°
80°
78°
76°
74°
72°
70°
68°
66°
64°
1000
2000
200

Fig. 5A-2

already proposed.

D) The SOHP, after discussing various points in detail, designed a "Leg 1" program, as outlined below. The drilling has <u>overall priority</u> 2, but ranks above the proposed Yucatan drilling.

<u>Leg 1: "Gulf of Mexico" (overall priority 2)</u>

Site
<u>Priority</u>

1   1 site - S.E. Gulf of Mexico
L.K.-Juras. Strat./Sed. objectives
1500+ m, near Line SF-11 (Buffler proponent)

2   2 sites - Florida Slope - "land/sea interaction"
HPC/XCB Sites, 500-600 m ea. (Kennett/Moore proponents-AAPG Mem.)
Cenozoic "carbonate platform" pelagics
sea level changes - seismic stratigraphy

3   4 sites - Mississipi Fan (Bouma/Coleman proponents)
1-2 HPC/XCB (MF-3,4) Upper Fan Channels, mass-wasting
1-2 HPC/XCB mid-fan to lower fan transition (about 200 m ea.)
1 HPC/XCB Abyssal Palin reference section

Yucatan Basin - in principle CAR 7 (YB-1) is acceptable, but SOHP felt objectives might not be reasonable; Priority 4.

****

E. Bahamas: The SOHP examined the rather large and diverse amount of science to be accomplished with Bahamas drilling. Y. Lancelot suggested that more realistic goals and more detailed knowledge might be achieved by combining objectives and drilling in one area of the Bahamas.

SOHP recom. to PCOM

Our proposed program is rated Priority 1 and shown below. Proposed co-chiefs are: W. Schlager, H. Mullins, R. Sheridan, and/or Ravenne (Fr.) See Table 4E and Figs. 4E1-3 that follow for site locations and depths, estimated drilling times, etc.

F) Barbados: The SOHP considered the proposed Barbados Transect (minutes of Carib. W.G.). We have not detailed recommendations of our own. The proposed objectives are important.

E. Suess expressed concern that the pore water geochemistry and flow rate monitoring program receive adequate attention from qualified individuals, emphasizing the importance of potential scientific returns from such a program.

<u>ITEM 5A</u>: Labrador Sea

A) A. Aksu (Dalhousie) and K. Miller (LDGO) presented the drilling program proposed by the Labrador Sea Working Group (proposal revised 3/9/84 and transmitted by J. Malpas). They emphasized the paleoceanographic-paleoclimatic orientation of the drilling with the additional ojbective at one proposed site to determine the ocean crustal age (suspected anomaly 24) within a part of the Labrador Sea.

The primary sites and their order of priority according to the Labrador Sea Working Group are (see Fig. 5A-1):

Site 5 Eastern Labrador Basin - Onset of glaciation and Neogene climatic history; mid-Tertiary paleoceanography; spreading history and ocean crust.

Site 2 Western Labrador Basin - Neogene climatic history, Labrador Current.

Site 3 Gloria Drift - R3/R4, mid-Tertiary high latitude paleoceanography, framework with Site 5.

Site 6 Southeast of DSDP 112 - Neogene isotope stratigraphy and climatic history; complete Oligocene.

Site 4 (Alternate), Flemish Cap, Oligocene - Recent sedimentation and history of the Western Boundary Undercurrent.

Site 7 (Alternate), Orphan Knoll - objectives as Site 2 and synrift Jurassic sedimentation.

Site 8 (Alternate), Eirik Ridge, objectives similar to Site 5, but Paleogene much condensed.

The SOHP discussed and prioritized the proposed sites, as shown in Table 5A-1 and Fig. 5A-1.

Labrador Sea drilling is a SOHP <u>First Priority</u>; we would, however, urge drilling of at least one site in Baffin Bay as <u>highest priority</u> for seasons shown in Tables 5A-1 and 5A-2. Preliminary information was supplied by A. C. Grant, Figs. 5A-2 through 4.

ITEM 5B: New Jersey Drilling

Ken Miller also presented a justification of returning to the New Jersey transect which was partly drilled during Legs 93 and 95 of DSDP. The details are included as Appendix I.

SOHP recom. to PCOM

The SOHP sympathized with the objectives of drilling one further site. We recommend that, if possible, this site be picked up during transit to or from the Labrador Sea. However, we rank the site as Second Priority with respect to any of our first priority Labrador Sea Sites.

ITEM 5C-1: Northwest Africa

M. Sarnthein outlined the objectives of proposed sites for NW African margin drilling as detailed in the proposal submitted to JOIDES PCOM (March, 1984). The site locations are shown in Fig. 5C-1 (which can be compared with map of modern upwelling/wind directions in Fig. 5C-1-2). Table 5C1-1 lists the sites, locations, objectives and prioritization according to the proposers. A number of questions of a scientific nature were entertained.

The total estimated drilling and transit time for the first-priority program as described was 54.5 d. Y. Lancelot asked if this included logging. M. Sarnthein replied that it did not. Because of this and the fact that all sites were to be double HPC, M. Arthur and several others suggested that the estimated time might be unrealistic.

The importance of the late Neogene-Quaternary objectives was obvious to many SOHP mambers, but several emphasized the need to further prioritize sites and objectives. Further discussion was deferred until after the presentation of an Equatorial Atlantic program by W. Ruddiman which overlaps the NW African work in part.

Table 5C-1 ODP-LEG 6 PROPOSED SITES (SARNTHEIN ET AL, 1984)

Site	Priority (According to Sarnthein et. al.)	Coordinates	Water Depth (m)	Nearest land mass (n.mi.)	Location	Maximum Penetration (m)	Drilling Time (days)	Primary Objectives
SLR 1	2A	9°58,9'N 19°15,3'W	4300	220 (Guinea-Bissau)	North slope of Sierra Leone Rise	500 to base Miocene	4,5 d	Bottom-water circulation between southern and northern East Atlantic; Trade wind history
MAU-1	2B	18°13,8'N 17°55,0'W	2680	103 (Mauritania)	E Cape Verde Rise	350 (800) to Paleogene/ Neogene (to Cenomanian)	3,5 (7)d	Coastal upwelling; proximal eolian dust supply (Cretaceous black shales
MAU-4	1	18°4,5'N 21°1,5'W	3050	130 (Cape Verde Islands)	Cape Verde Rise (close to Site 368)	300 to Miocene basalt	2,5 d	Deepwater paleoceanography; Circulation history of Saharan Air Layer
MAU-7	1	18°38'N 25°16'W	3900	120 (Cape Verde Islands)	Northern spur of Cape Verde Islands	400 to base Miocene	3,5 d	Warm subtropical water mass; Long distance dust transport; Deepwater paleoceanography. Volcanis C. Verde Islands.
MAU-5	1	21°20'N 20°45'W	3960	220 (Mauritania)	Outer Rise W of Cape Blanc (close to Site 140)	250 to Early Miocene	2,5 d	Reference location for non-upwelling conditions in outer Canary Current Eolian-sand lenses.
MAU-6	1	20°56,5'N 18°40,0'N	2662	93 (Cape Blanc)	Upper Rise W of Cape Blanc	300 to Middle Miocene	3,0 d	Persistent Upwelling Cel Trade wind history; Fluvial sediment supply from Central Sahara

Site	Priority	Coordinates	Water Depth (m)	Nearest land mass (n.mi.)	Location	Maximum Penetration (m)	Drilling Time (days)	Primary Objectives
139-R	2A	23°31, 14'N	3047	100 (ex.Spanish Sahara)	Outer rise off ex-Spanish Sahara	450 to early Middle Miocene	4,0 d	Reference position for non-upwelling location in Canary Current; Trade wind history; Contour current.
135-R	1	35°20, 8'N 10°25, 45'W	4150	180 (Morocco)	Structural high south of Horseshoe A.P.	350 to Paleogene/ Neogene (650 to Aptian)	3,0 d (5,5 d)	Closure of Tethyan-Atlantic seaways, Development of eastern boundary current; (Cretaceou black shales)
GC-1	1	35°54'N 8°17'W	2100	90 (Portugal)	Continental slope W off Straits of Gibraltar	500 to basement	4,5 d	Tethyan-Atlantic seaways; Mediterranean outflow.
GC-2	3	35°48'N 7°20'W	1100	120 (Morocco/ Spain)	Continental slope W off Straits of Gibraltar	500 to basement	(4,5 d)	Tethyan-Atlantic seaways; Mediterranean outflow. Messinian event.
GC-4	1	36°54, 30'N 7°39,00'W	720	25 (Portugal)	Plateau south of Portugal	200 to basement below major unconformity	2,5 d	Faro sediment drift Mediterranean outfl Messinian event.
GC-5	1	36°52,60'N 7°39,00'W	540	28 (Portugal)	Plateau south of Portugal	550 to major unconformity	4,5 d	(twin site to GC-4 and 6)

Site	Priority	Coordinates	Water Depth (m)	Nearest land mass (n.mi.)	Location	Maximum Penetration (m)	Drilling Time (days)	Primary Objectives
GC-6	1	36°48,70'N 7°39,00'W	600	32 (Portugal)	Pleateau south of Portugal	600 to major unconformity	5,5 d	(twin site to GC-4 and 5)

total drilling time:	43.5 d	(54 d)
time for positioning:	1 d	
total travel time (2400 n.mi.)	10 d	
(without site AS-10)		
	54.5 d	(65 d)

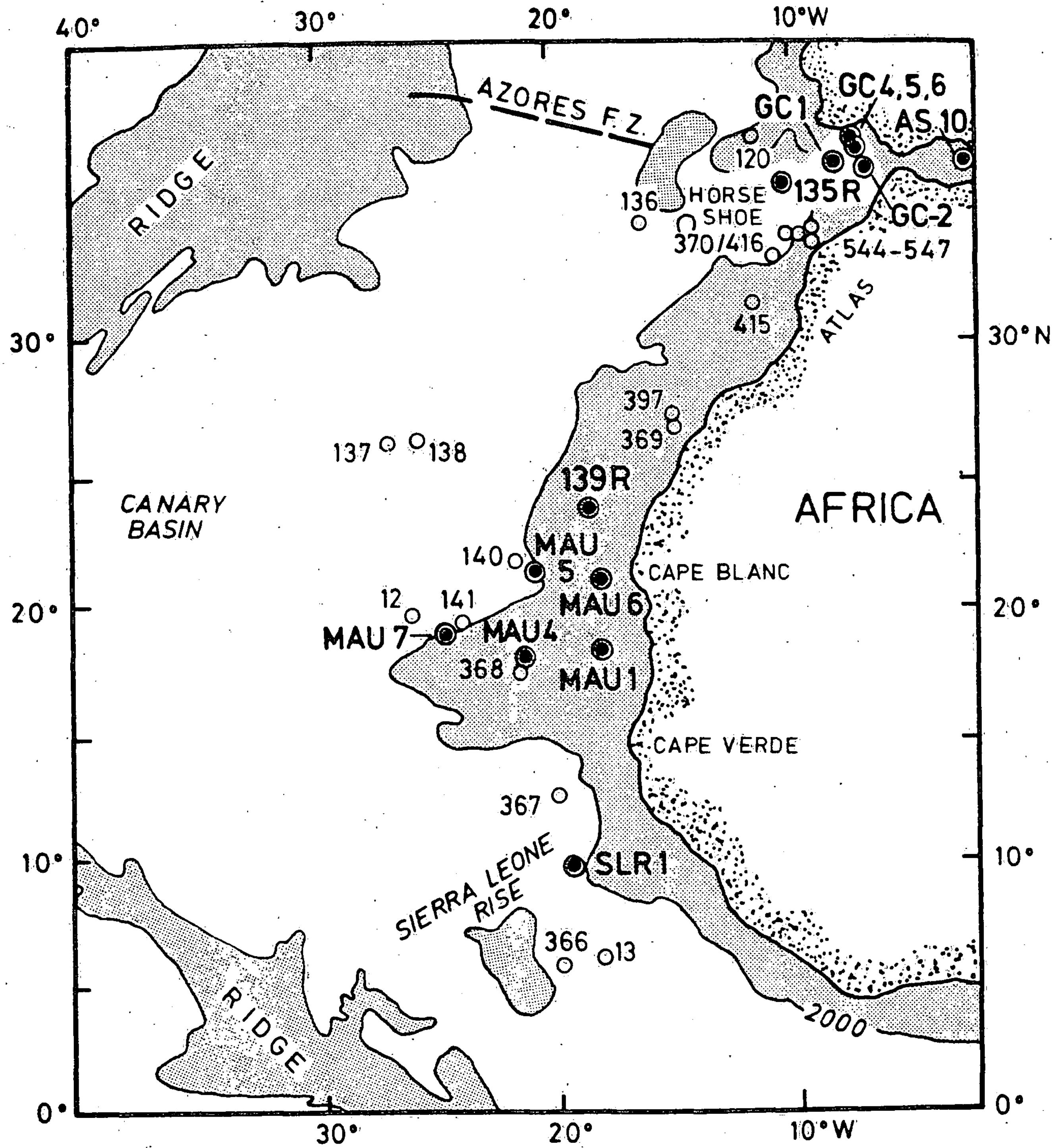


Fig. 5C1-1 LOCATION OF ALL EXISTING DSDP/IPOD SITES AND PROPOSED DRILLING SITES

○ OLDER DSDP SITES

◉ CANDIDATE SITES OF THIS PROPOSAL (SARNTHEIN, ET AL, 1984)

ITEM 5C-2: Equatorial Atlantic

W. Ruddiman outlined objectives for an Equatorial Atlantic drilling transect which was recently submitted to PCOM (Ruddiman et al., March, 1984). The theme of the drilling emphasized primarily Neogene and Quaternary climatic and sedimentary records related to Milankovitch forcing and the differential signals in northern and southern hemishpere in the equatorial region. This included monitoring eolian fluxes from Africa (aridity vs. wind strength), as well as surface water response (equatorial divergence).

The proposed sites are shown in Fig. 5C-2 and outlined in Table 5C-2-1.

The importance of the equatorial work is to examine long records, well back into the Neogene (and even Paleogene) before ice was so important as part of the forcing-coupling mechanism, in order to evaluate the relative importance of orbital forcing in short-term paleoclimate/paleoceanographic variations.

The SOHP rated the objectives high and noted the overlaps with and important links to proposed NW African drilling, as well as the potential importance to compare oceanic responses to orbital variations in equatorial regions with those recently obtained from high latitudes.

Table 5C-2

LOCATIONS OF PROPOSED SITES AND DRILLING OBJECTIVES (Ruddiman, et al.)

SITE	LAT.	LONG.	DEPTH		AGE/DEPTH*	MAIN OBJECTIVES
Eq-1	25° 10'N (at German core M12392-1)	16° 51'W	2573m	NW Afr.	Late Miocene/ 350m.	Surface-water response and eolian
Eq-2	18° 26'N (at L-DGO core V30-49)	21° 05'W	3093m	NW Afr.	Eocene/ 1250m.	Surface-water response and eolian
Eq-3	05° 46'N (at DSDP site 366)	19° 51'W	2870m	1	Oligocene/ 400m.	Bottom-water response and eolian
Eq-4	04° 30'N	21° 30'W	3500m	1	Late Miocene/ 150m.	Bottom-water response
Eq-5	04° 20'N (at WHOI core 36GGC)	20° 13'W	4300m	1	Late Miocene/ 150m.	Bottom-water response
Eq-6	02° 30'N (at WHOI core 29GGC)	19° 45'W	5100m	1	Late Miocene/ 125m.	Bottom-water response
-7	01° 21'S (at L-DGO core RC24-7)	11° 55'W	3899	1	Late Miocene/ 150m.	Surface-water response
Eq-8	05° 02'S (at L-DGO core RC24-16)	10° 12'W	3530m	1	Late Miocene/ 200m.	Surface water response and eolian
Eq-9	00° 12'S (at L-DGO core V30-40)	23° 09'W	3706m	1	Late Miocene/ 180m.	Surface-water response and eolian
Eq-10	03° 33'S (at L-DGO core V25-56)	35° 14'W	3512m	2	Mid. Miocene/ 450m.	Surface-water response
ALTERNATE SITES (Depending on cruise tracks at ends of leg)						
Eq-11A	19° 52'N (at L-DGO core V25-59)	19° 55'W	3409m		Late Miocene/ 250m.	Surface-water response and eolian
Eq-12A	10° 04'S (at L-DGO core V22-174)	12° 49'W	2630m		Late Miocene/ 250m.	Surface-water response
Eq-13A	05° 25'W (at L-DGO core RC24-27)	00° 22'W	3791m		Late Miocene/ 175m.	Surface-water response and eolian
Eq-14A	04° 55'N (at WHOI core 38GGC)	20° 30'W	2900m		Oligocene/ 300m.	Bottom-water response and eolian

*All sites will be double-cored with the HPC (generally to 150-200m.) and then single-cored with the XCB to the deepest objective.

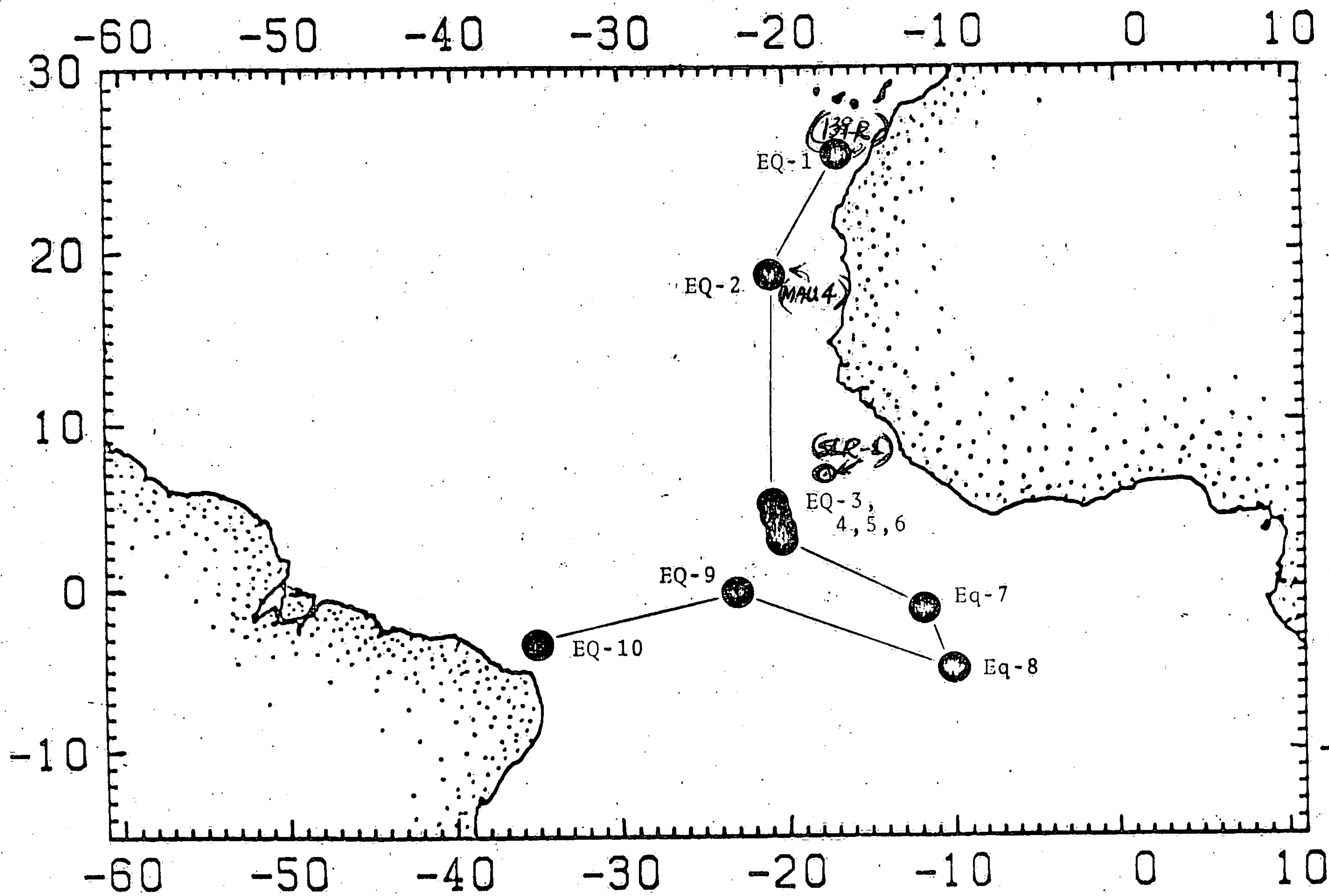
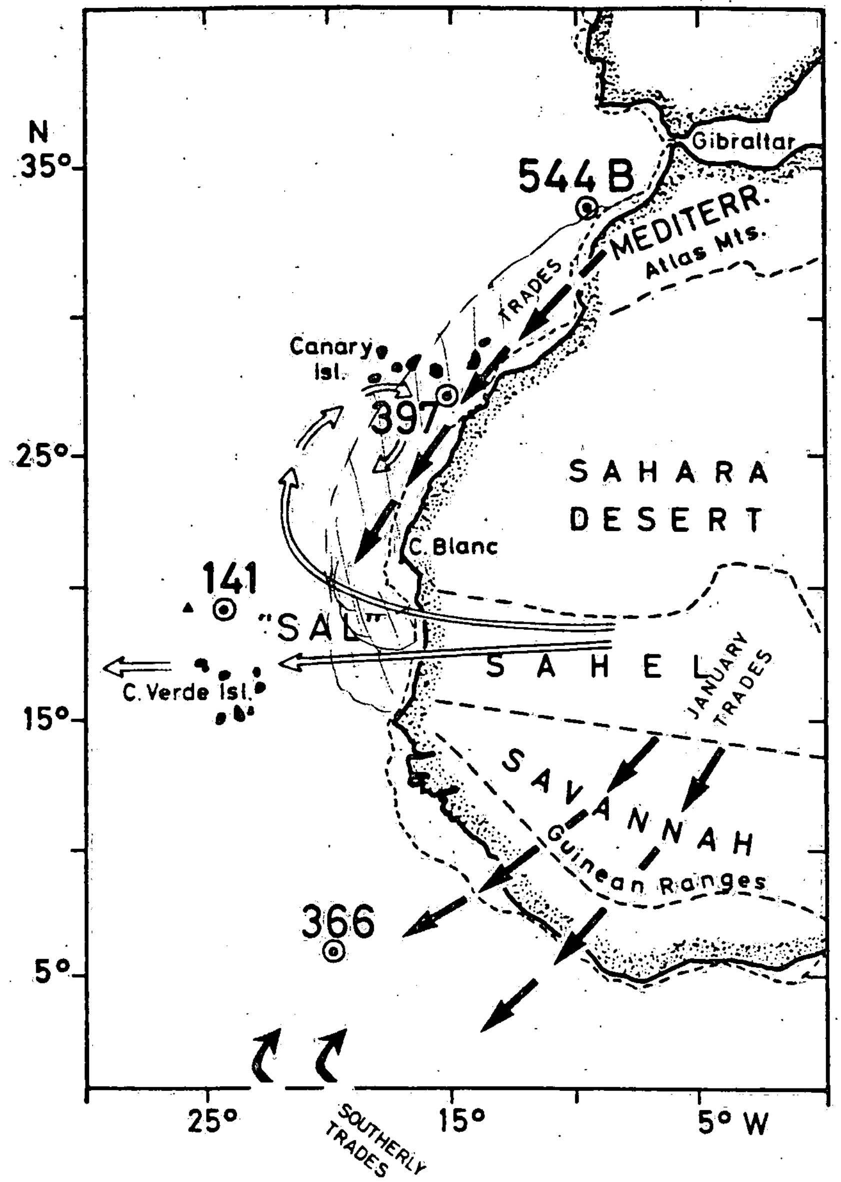


Fig. 5C-2-1 . **Location of core sites for equatorial Atlantic paleoenvironmental drilling during the ODP phase of the deep-sea drilling project** (from proposal of Ruddiman et al, 1984)



Upwelling

Fig. 5C1-2 : Major climatic zones and flow patterns and directions of dust supply by different wind systems. Open arrows: zonal winds of Saharan Air Layer (SAL). Solid arrows: meridional (surface-) trade winds.

N. Shackleton suggested that the most important objective is to have an HPC transect on the Sierra Leone Rise. The location is particularly important as a monitor of deep-water mass exchange, including incursions of AABW into the E.N. Atlantic Basin during the Cenozoic, fluctuations in rates of $CaCO_3$ production and dissolution.

R. Embley considered that some of the upwelling and dust transport holes might be combined to minimize drilling and transit time, although this would not give optimum information recording to M. Sarnthein.

SOHP recom. to PCOM

The SOHP then prioritized the sites off NW Africa, outlined by Sarnthein and others, and in the Atlantic equatorial region as proposed by Ruddiman and others.

The Atlantic Equatorial-NW African drilling program is <u>Number 1 Priority</u> to SOHP and ranks equally with Labrador Sea and Southern Ocean drilling programs and above the Bahamas drilling. The prioritization of sites is as follows (refer to Tables 5C-1-1 and 5C-2-1 and Figs. 5C-1-1 and 5C-2-1 for details of objectives, location, etc.):

<u>Priority</u>

1 (1) MAU 5, 6 (NW African upwelling history)

1 (2) MAU 4 (NW African wind intensity, aeolian dust, and history of land climate)

1 (3) EQ 3-6 and SLR-1 (Sierra Leone Rise Transect; dissolution/deep-water mass circulation)

1 (4) EQ 9 (MOR, southern/northern hemisphere interaction equat. divergence)

2 (5) EQ 7, 8 (Equat. Atlantic divergence) and EQ 10 (Ceara Rise)

2 (6) MAU 1, 7 (NW African dust)

2 (7) EQ 1 and 139R (non-upwelling reference site)

3 (8) Gulf of Cadiz Sites (Mediterranean outflow; Faro-drift).

The SOHP also will consider other NW African margin objectives (Mesozoic, black shales, etc.) at the next meeting. Consensus was that at least 2 legs of exciting science could be formulated in this region.

<u>ITEM</u> 5D: Mediterranean Sea Objectives

A) SOHP considered priority objectives for a possible Mediterranean drilling program with respect to the Mediterranean Working Group recommendations. R. Thunell (USC) summarized the

Mediterranean Working Group as follows:

The newly organized Mediterranean Working Group (J. Mascle, Chairman) met for the first time in Paris on Jan. 23-24, 1984 in order to identify and evaluate potential deep sea drilling objectives for the new Ocean Drilling Program. They were working under the assumption that two drilling legs will be scheduled for the Mediterranean in late 1985 and early 1986. A second meeting of this working group is planned for May 10-11, at which time formal proposals will be presented for each of the drilling objectives. The following is a brief summary of their preliminary recommendations and priorities (see Fig. 5D-1). (Priority rankings and objectives are according to Med. Pan.; see Table 5D-1 for SOHP prioritization.)

I. Priority One

A) Tyrrhenian Sea Transect: The objectives of the proposed drilling in the Tyrrhenian Sea are both structural-tectonic and stratigraphic-paleoenvironmental in nature. The structural-tectonic aim is to resolve the timing and evolution of oceanization in the back arc basin. This will be accomplished by determining the lithology and age of basal sediments (pre-Messinian) on a series of tilted blocks in the western portion of the basin. If possible, the nature of the basement will also be determined.

The stratigraphic objectives include establishing a Pliocene/Pleistocene deep sea type-section (biostratigraphy, paleomagnetic stratigraphy, isotope stratigraphy and tephrochronology) that will allow for better correlation between land-based stratotypes in the circum-Mediterranean region and the open ocean record. In particular, Mediterranean biostratigraphic datums need to be directly calibrated to a paleomagnetic stratigraphy. An HPC site on the Tyrrhenian Rise in the vicinity of Site 132 should provide a complete Plio/Pleistocene sequence of approximately 200 m in length. This site will also provide a continuous paleoclimatic record for the last 5 million years.

A total of 4 holes is probably needed to meet all of the Tyrrhenian Sea objectives.

B) Western Mediterranean Ridge Transect: A proposed transect of 4 HPC sites and 1 deep drilling site, extending from the Ionian basin, across the western sector of the Mediterranean Ridge to the Hellenic Trench (Ionian Trough section) also received top priority from the working group. The scientific objectives would again be both tectonic and paleoenvironmental-paleoceanographic.

An examination of the age and lithology of the 4 HPC sequences (from the base of the ridge to its crest) will yield information on the accretionary nature of the Mediterranean Ridge. The approach proposed here would be similar to that employed for the Barbados Ridge Experiment (Leg 78A).

The primary paleoenvironmental problem to be addressed with this transect of 4 HPC sections concerns the periodic development of anoxic conditions during the Pliocene-Pleistocene. Specifically, what has been the frequency and timing of sapropel formation during the last 5 million years? How has the bathymetric distribution of sapropels changed through time? How has the mechanism of sapropel formation changed through time?

In addition, tephrochronologic studies of these HPC sites will provide an excellent opportunity for documenting the explosive volcanic history of this region.

II. Priority Two

A) Alboran Sea: A single HPC hole is proposed for the Alboran Sea in order to recover a continuous Pliocene-Pleistocene pelagic sequence for paleoenvironmental objectives. At present very little is known about the sedimentary history of this westernmost Mediterranean basin. Only one site (Site 121) has been previously drilled in the Alboran Sea and it contains a very incomplete record. As will be discussed later, the proposed Alboran Sea site will serve as the western end of an E-W transect of sites that will be used to study changes in paleoceanographic gradients within the Mediterranean through time (Pliocene-Pleistocene). The location of this site will also make it useful for examining the history of water exchange between the Atlantic and the Mediterranean.

B) Malta Scarp-Ionian Basin Transect: A transect of 4 holes has been proposed for the region extending from the edge of the Sicilian platform into the deep Ionian Basin. The primary objective of this transect will be to reconstruct the Mesozoic and Tertiary history of this region of the central Mediterranean. An HPC hole on the Sicilian platform will provide a Pliocene-Pleistocene record of flow patterns (i.e. possible current reversals) between the eastern and western basins. A hole at the base of the Malta Scarp will permit the recovery of pre-Messinian sediments because of a pinchout of the evaporites. With the exception of Site 375 on the Florence Rise, all previous drilling in the eastern Mediterranean has failed to recover pre-Messinian sediments. In addition to its obvious paleoenvironmental importance, such a sequence may also aid in determining when the faulting occurred that created the Malta Scarp.

In addition, this set of sites, when combined with the proposed traverse across the western Mediterranean Ridge, will represent a transect from a passive margin to an active margin within a limited geographic area.

C) Florence Rise-Erathosthene Seamount: A site will be selected on either the Florence Rise or the Erathosthene Seamount for the primary purpose of recovering pre-Messinian sediments. Drilling on the Erathosthene Seamount had previously been approved for Leg 42A, but was eliminated because of time constraints. A 100 m thick Pliocene-Pleistocene sequence can be recovered with hydraulic piston coring from the upper flanks of the seamount. Pinchout of the evaporites at the base of the seamount will allow pre=Messinian sediments to be drilled beneath the Pliocene-Pleistocene veneer.

If the Florence Rise is selected instead of the Erathosthene Seamount, it has been proposed that Site 375 be redrilled. At this location it is reasonable to expect recovery of a sequence at least back through the Oligocene.

A site on either the Erathosthene Seamount or the Florence Rise would serve as the eastern end of a proposed E-W transect designed to study Pliocene-Pleistocene paleoceanographic gradients (see next section).

D) East-West Paleoceanographic Transect: One of the primary paleoenvironmental objectives for future drilling in the Mediterranean should be to evaluate how east-west oceanographic gradients have developed and changed during the last five million years. For example, when was the present lagoonal-like circulation established? Has the formation and export of Mediterranean Intermediate Water changed through time, and what impact may this have had on Atlantic circulation (i.e. NADW production)? What effect did the initiation of Northern Hemisphere glaciation have on circulation in the Mediterranean, and how have subsequent glacio-eustatic sea level fluctuations modified inter-basin communication within the Mediterranean (i.e. sapropel formation)?

In order to answer these and other paleoceanographic questions, it will be necessary to examine an east-west trending transect of hydraulically piston cored Pliocene-Pleistocene sequences. This can be accomplished by utilizing a series of sites already targeted for other drilling objectives. In particular, this east-west transect would incorporate the previously proposed Alboran Sea site, at least one of the Tyrrhenian Basin sites, the Sicilian Platform site, a Mediterranean Ridge site, and either the Florence Rise or Erathosthene Seamount site.

E) Rhone Deep Sea Fan: A proposal was made to study the sedimentary evolution of the Rhone Fan, with the intention of using it as a model for deep sea fan development. This objective would require a minimum of 6 HPC sites and one deep drilling hole. The deep hole would be used primarily to provide stratigraphic control for the developmental history of the fan. The HPC holes would be positioned so as to sample the various lithofacies (chaotic, bedded, transparent) characteristic of the inner, mid and outer fan.

III. Priority Three

A) S.E. Mediterranean Ridge-Hellenic Trench Transect:

A transect of 4-5 HPC holes starting in the Levantine Basin and crossing the Mediterranean Ridge to the Hellenic Tranch has been proposed in order to study the tectonic processes responsible for the formation of this portion of the ridge (i.e. accretion from frontal and back thrusting). These objectives are similar to those being proposed for the Western Mediterranean Ridge Transect (see section I.B.)

IV. Supplementary Suggestions

Several additional suggestions were made for potential targets in the Mediterranean, however, these proposals were very preliminary and require substantial development before their merit can be adequately evaluated. These suggestions include drilling in the Aegean Sea in order to study the development of a young back-arc basin (the Cretan Sea). It was also suggested that holes be drilled in the Ligurain and Valencia Basins to study the nature of the crust and the tectonic evolution of each basin.

B) The SOHP considered and prioritized the sites, as presented by R. Thunell as shown in Table 5D-1. We believe that on the basis of information supplied the Mediterranean Ridge transects would be answering perhaps regional problems; Barbados and other drilling better attach the problems of accretion, forearc sedimentation, etc. Therefore, we ranked these programs and the Tyrrhenian Sea transect (which could be done at Galicia as well) as lower priority with the exception of the sites shown in Table 5D-1.

On the whole the SOHP would rank a NW African program higher than the Mediterranean drilling proposed so far.

TABLE 5D-1: Mediterranean Sea Drilling (SOHP Recomm.-Priority)

Priority 1

1) Reoccupy Site 132 (about 2500 m water depth)
Tyrrhenian Sea - 200 m HPC Plio-Pleist.
Biomagnetostrat., stable isot., W. Med. record

2) Erathosthene Seamount (about 1500 m water depth)
HPC-rotary (about 1000 m)
Pre-Messinian strat.-gateway, preservation of signal, biotic evolution-exchange

3) Malta Escarpment (about 1000 m water depth)
Rotary, 1500 m penet. - older Tethyan sequence

Priority 2

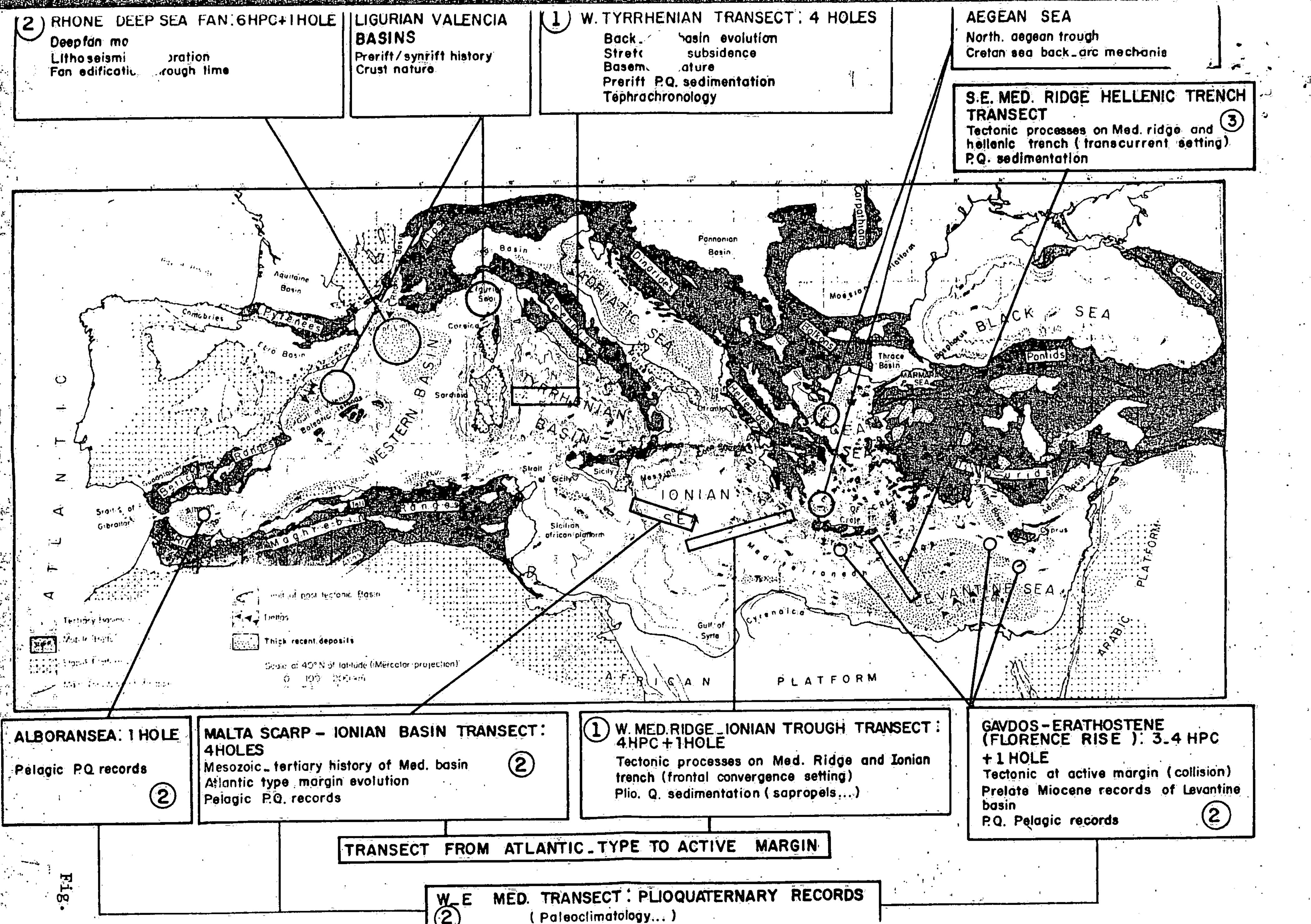
4) Sapropel Transect - HPC/XCB
   a) Ionian Basin - deep basin sapropels (about 3500 m water depth) 400 m penetration, Plio-Quat.
   b) Mediterranean Ridge or Florence Rise (about 1500 m water depth) (e.g. DSDP Site 125) "shallow" sapropels, Plio-Quat.
   c) Sicilian Platform (about 500 m water depth) benthic foram record, about 250 m penetration, Plio-Quat.

Priority 3

5) Rhone Fan Transect
No detailed plan, but excellent survey data.

Unprioritized

6) Alboran Sea - Basinal site; high sed. rates; Atlantic-Med. water-mass exchange. Need better survey data; possibility of Messinian non-evap. section.



2 RHONE DEEP SEA FAN: 6HPC+1HOLE
Deepfan mo
Litho seismi   oration
Fan edificatic   rough time
LIGURIAN VALENCIA BASINS
Prerift/synrift history
Crust nature
1 W. TYRRHENIAN TRANSECT: 4 HOLES
Back.   basin evolution
Stret   subsidence
Basem   ature
Prerift P.Q. sedimentation
Tephrachronology
AEGEAN SEA
North. aegean trough
Cretan sea back_arc mechanis
S.E. MED. RIDGE HELLENIC TRENCH TRANSECT 3
Tectonic processes on Med. ridge and hellenic trench (transcurrent setting)
P.Q. sedimentation
ATLANTIC
Aquitaine Basin
Cantabries
Pyrenees
Ebro Basin
Alps
Ligurian Sea
Corsica
Sardinia
Balearic Islands
WESTERN BASIN
TYRRHENIAN BASIN
Apennines
ADRIATIC SEA
Dinarides
Pannonian Basin
Carpathians
Moesian Platform
Balkans
Thrace Basin
MARMARA SEA
BLACK SEA
Bosphorus
Pontids
Caucasus
Hellenides
Strait of Otranto
AEGEAN SEA
Taurids
Crete
Cyprus
Adana Basin
LEVANTINE SEA
Mediterranean Ridge
IONIAN SEA
Messina
Sicily
Strait of Sicily
Sicilian african platform
Gulf of Syrte
Cyrenaica
Betic
Guadalquivir
Ranges
Strait of Gibraltar
Alboran
Rif
Maghrebides
AFRICAN PLATFORM
ARABIC PLATFORM
Limit of post tectonic Basin
Deltas
Thick recent deposits
Tertiary basins
Mobile Belts
Scale at 40° N of latitude (Mercator projection)
ALBORANSEA: 1 HOLE
Pelagic P.Q records
2
MALTA SCARP – IONIAN BASIN TRANSECT: 4HOLES
Mesozoic_tertiary history of Med. basin
Atlantic type margin evolution
Pelagic P.Q. records
2
1 W. MED.RIDGE_IONIAN TROUGH TRANSECT: 4HPC+1HOLE
Tectonic processes on Med. Ridge and Ionian trench (frontal convergence setting)
Plio. Q. sedimentation (sapropels...)
GAVDOS-ERATHOSTENE (FLORENCE RISE): 3_4 HPC +1 HOLE
Tectonic at active margin (collision)
Prelate Miocene records of Levantine basin
P.Q. Pelagic records
2
TRANSECT FROM ATLANTIC_TYPE TO ACTIVE MARGIN
W_E MED. TRANSECT: PLIOQUATERNARY RECORDS
(Paleoclimatology...)
2

Fig. 5D-1

ITEM 5E: Southern Ocean Transect

Jim Kennett summarized the proposals for ODP drilling in the Southern Ocean as formulated by the Southern Ocean Panel.

-Proposal for 2 legs during one austral summer with numerous alternate sites in case of ice problems in Weddell Sea. Would like to have long (i.e. 70 day) legs approved.

-Would like to have ship in southern Indian Ocean (e.g. Kerguelan) for next austral summer.

-The highest priority objectives for the drilling are those of paleoenviroment of Late Cretaceous and Paleogene in the circum-Antarctic. The keys to an understanding of global paleoceanography and the relationship betwen sea level changes and the oxygen isotopic record lie here.

The general consensus of the SOHP is that Southern Ocean drilling is one of our first priority programs. In principle, we support the objectives outlined by SOP, but we hesitate to prioritize individual sites until more site survey data are available. However, we would rank the Maud Rise and Caird Margin sites as priority 1 (see Table 5E-1 and Fig. 5E-1).

The SOHP also emphasizes that the first Southern Ocean drilling should be completed early in the program (preferably austral summer of 1986-87) so that results can be evaluated in light of needs for further investigations.

Table 5E-1

PROPOSED SOUTHERN OCEAN DRILLING SITES

Weddell Sites (W)

I-Priority	Water depth (m)	Drilling thickness (m)	time
W1 Maud Rise	3000	500	3½
W2 " "	3500	500	4
W4 Caird Margin	3040	900	6
" " (possible additional site)	3000	400	(3¼)
W5 Weddell Basin	4950	1000	9¼
W6 S. Orkney Plateau	3500	500	4
W7 " "	2100	500	3
W8 " "	700	500	2
			32 days

II-Priority			
W3 Astrid Ridge	2000	700	4
W10 Bransfield Basin	2000	600	3½
W11 Southeast Drake Passage	3600	900	6
			13½ days

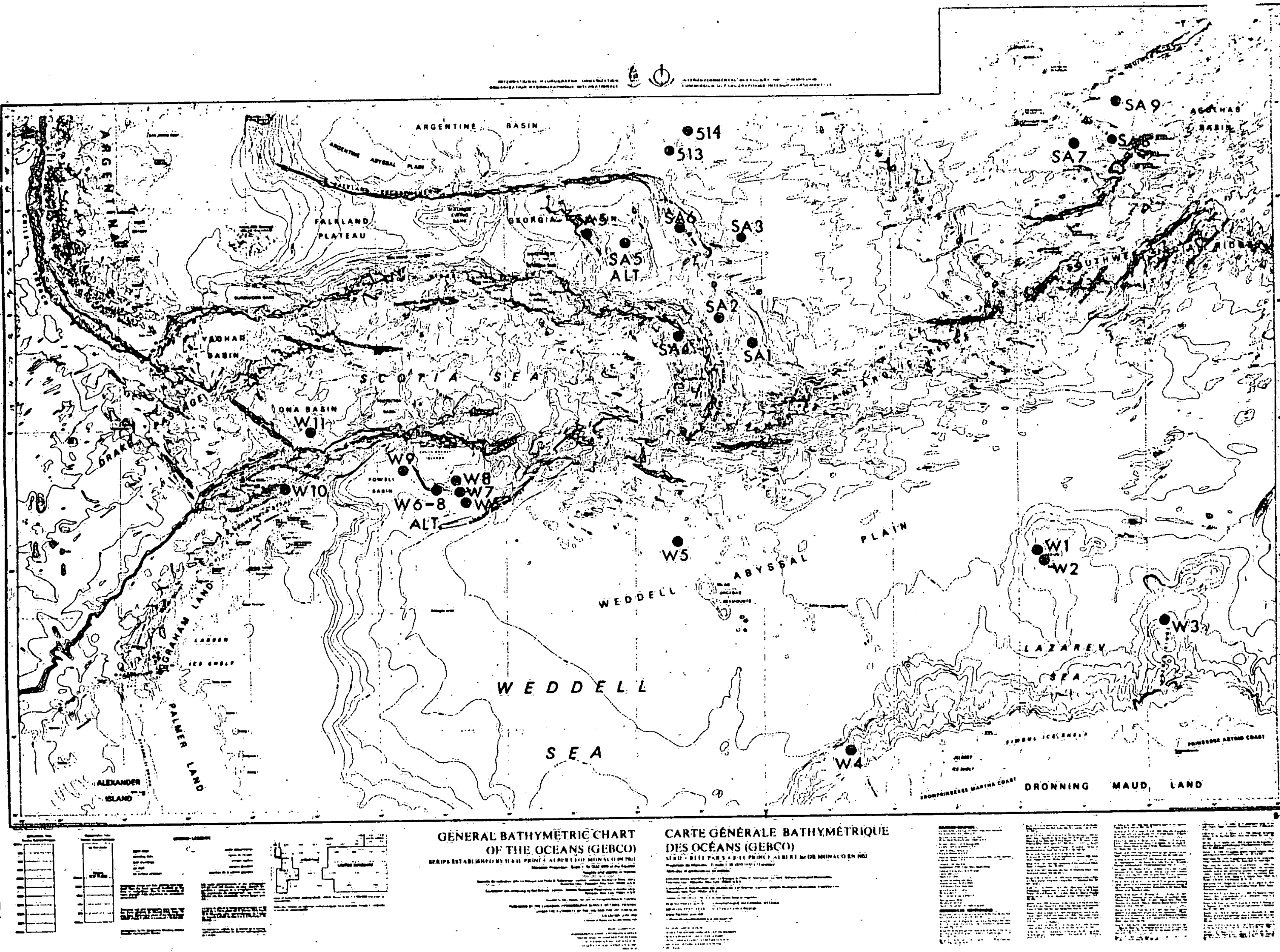
Total for southern sites 45½ days

Subantarctic Sites (SA)

I-Priority			
SA1 N-S transect	4700	500	4½
SA2 " "	4100	700	6
SA3 " "	4300	500	4½
SA4 S. Sandwich Forearc	2700	600	4
SA6 Islas Orcadas Rise	3000	500	3½
SA8 Meteor Rise	2500	500	3½
			26 days

II-Priority			
SA5 Northeast Georgia Rise	2000	800	4½
SA7 Late Eocene African Flank	4300	500	4½
SA9 Agulhas Basin	4400	500	4½
			13½ days

Total for northern sites 39½ days



SA 9
514
513
SA7
SA6
SA3
SA5
SA5 ALT
SA2
SA4
SA1
W11
W9
W8
W7
W6-8 ALT
W10
W5
W1
W2
W3
W4
ARGENTINE BASIN
FALKLAND PLATEAU
SCOTIA SEA
WEDDELL ABYSSAL PLAIN
WEDDELL SEA
LAZAREV SEA
DRONNING MAUD LAND
ALEXANDER ISLAND
PALMER LAND
GRAHAM LAND
GENERAL BATHYMETRIC CHART OF THE OCEANS (GEBCO)
CARTE GÉNÉRALE BATHYMÉTRIQUE DES OCÉANS (GEBCO)

Fig. 5E-1

ITEM 6: Sediments and Ocean History Panel: Mandate

The SOHP, which by now was running out of time to consider longer-term objectives at this meeting, concerned itself briefly with its mandate and with organizing a "holistic" but coherent program for future drilling.

The Chairman noted the broad interdisciplinary composition of the panel and the spectrum of ocean problems with which we would deal. The mandate, as established by PCOM and EXCOM is as follows:

"The Sediments and Ocean History Panel is concerned with investigations of marine stratigraphy, marine sedimentology and paleoceanography. Areas specifically include:

a) Stratigraphy including the subdivision, correlation and dating of marine sediments. Examples are: refinement of magnetostratigraphy, radiometric dating, chemostratigrapy, biostratigraphy, tephrochonology, and seismic stratigraphy.

b) Processes of formation of marine sediments, diagenesis, organic and inorganic sedimentary geochemistry and global mass balancing of oceanic sediments.

c) Long-term history and driving mechanisms of the oceanic atmosphere and biosphere. Central to this theme are relations among plate tectonics and ocean paleocirculation, sedimentation patterns, global paleoclimates, glacial and ice-sheet evolution, sea level change and its effects on marine sedimentation and evolution of marine life."

The panel members agreed that our unifying program theme was to "understand oceanic response and imprints on the sedimentary record to forcing functions at various time scales." This would include the imprints of orbital cycles and insolation changes as well as the longer-term tectonic/volcanic/sea level changes.

A high priority of the panel is to obtain high-latitude sediment records (e.g. Labrador Sea and Southern Ocean) because little is known of the climate evolution of these areas and because their impact on global ocean circulation and climate may be profound.

W. Ruddiman, N. Shackleton, and M. Arthur each emphasized the important and exciting results that could be derived from high resolution studies. We are only now begining to appreciate the richness and variability of the sedimentary high frequency record. Although the last two years of DSDP-HPC drilling focused, in part, on high resolution records for the Pliocene-Quaternary, we believe that continuation of such drilling in certain areas will result in major jumps in our knowledge of climatic changes and oceanic and sedimentary response.

In particular, we see the <u>land-sea interaction</u>, <u>history of</u>

upwelling, and deep-water mass circulation and chemistry as major problems to be examined. Coherent drilling programs with Neogene-Quaternary targets off the NW African margin into the Equatorial Atlantic and off Peru-Chile are major emphases and high priority for the panel. Problems to be attacked that have not been examined previously included:

1) Variations in wind strength, direction and aeolian flux from adjacent continents as the result of high frequency and longer term climate changes. The dust flux (and detailed study of various components) will also monitor climate changes (e.g. desertification) on adjacent land masses.

2) Changes in upwelling intensity, productivity and sedimentary organic contents and geochemistry as a function of long-term climate deterioration and high frequency climate fluctuations.

3) Changes in deep-water mass structure and chemistry in response to climate changes. Requires depth transects for chemical gradients and intermediate as well as deep-water masses.

4) Record of intensity of monsoonal upwelling with climate change (i.e. Arabian Margin).

N. Shackleton also emphasized that longer records of Milankovitch cycles, perhaps extending into the Jurassic, would allow us to construct and "tune" a high-resolution stratigraphy and time-scale such as that being done for the Quaternary by the SPECMAP group.

Other important outcomes of obtaining high resolution records would be to study interrelationships of variations in ice volume, wind-driven upwelling intensity and aeolian flux in both hemispheres, and monsoonal influence. An understanding of the global carbon cycle and CO_2 -climate variations (forcing vs. response) through high resolution $\delta^{13}C$ records from planktic and benthic foraminifers could also be obtained.

Another SOHP objective is to examine temporal changes in the dominance of certain types of sedimentary processes, for example the incidence in time and space of active deep-sea fan sedimentation, hiatuses, mass wasting, and fluctuations in the CCD. Specific drilling targets should be identified to optomize drilling time and make use of available seismic data to map sedimentary parameters on a regional scale.

The SOHP agreed that there was not sufficient time at this meting to properly formulate a coherent and well-justified set of regional and site-specific proposals to satisfy our major objectives. Further lenghty discussion was proposed for the next meeting.

ITEM 7: Riser Drilling

Sufficient time was not available to adequately consider this topic. Several panel members expressed concern that present riser capabilities (i.e. 2000 m limitation) might not be sufficient for some important objectives, such as drilling through evaporites in Mediterranean or Red Sea. Discussion was tabled until the next meeting.

ITEM 8: Working Groups and Other Concerns

Those members still present near the end of the meeting discussed other problems of interest to SOHP:

A) Geochemistry Working Group: M. Arthur and P. Meyers posed the problem of who would be concerned with sampling and sample distribution, new instrumentation and monitoring of shipboard geochemical analysis programs, and staffing for organic geochemistry (and inorganic) in the absence of an Organic Geochemistry Panel. Those assembled agreed that a small "Working Group" affiliated with our panel might serve as a consulting body for such problems. E. Suess expressed his concern about the need to have someone follow the shipborad porewater sampling and geochemistry program.

M. Arthur suggested forming a six-member group with an ODP staff scientist to interface with them as a proposal to PCOM. Names of people suggested are:

Phil Meyers
Berndt Simoneit
Ted van Vleet
J. Rüllkötter
C. Summerhayes or J. Herbin
Erwin Suess
Joris Gleskes
Harry Elderfield or Michael Bender

B) Paleomagnetics Working Group: L. Tauxe suggested that such a group might also be useful to advise ODP in shipboard instrumentation, measurement, and sample-core handling policy, as well as to function as an ad-hoc advisory group on magneto-biostratigraphy. L. Tauxe and N. Shackleton proposed the following as composing the recommended Working Group:

Lisa Tauxe
John King
Jan Backman
and 1 ocean crust-type geomag. person
Nick Shackleton
Dennis Kent

SOHP would like PCOM to advise on these two proposed working groups.

C) Panel Membership: The panel members considered the composition of the SOHP and concluded that the addition of two more members might be advisable in the sense of adequate coverage of disciplines. The SOHP keenly feels the lack of a biostratigrapher. Although one of our members (Y. Takayanagi) is an excellent biostratigrapher, he has been consistently unable to attend our meetings. The SOHP suggests Ken Miller (LDGO) as a possible additional member (with Mark Leckie, U. Colorado as second choice). We also feel that addition of a scientist interested in deep-sea fan sedimentation would be of importance, particularly because the issue of fan drilling continues to appear. William Normark (USGS, Menlo Park) was agreed upon as the SOHP recommendation with Dorrik Stow (Edinburgh) as second choice. The SOHP realizes that larger size might be detrimental, but we would like to give adequate consideration to the above mentioned subject areas.

D) Shipboard Equipment: The SOHP considered the list of proposed equipment/instrumentation for science aboard the SEDCO 471. We felt that the list as very adequate, with one exception: L. Tauxe suggested purchase of a Susceptibility Bridge for onboard use, pointing out its utility in providing a continuous record (proxy) of carbonate content (insoluble residue) downcore via susceptibility measurements. We recommend purchase of this item to the Science Operator (TAMU).

E) Oriented Cores: L. Tauxe emphasized the importance of core orientation of HPC cores for paleomagnetic and other studies.

> The SOHP urges and unanimously recommends that ODP engineers design and perfect a core orientation device for the beginning of ODP drilling.

Larger diameter cores and U-channel sampling would also enhance success of paleomagnetic studies.

ITEM 2: Next Panel Meeting

The panel members agreed that a second meeting should be held as soon as possible, preferably several weeks before the next (May) PCOM meeting. Because of scheduling conflicts, the members agreed that May 7-9 at DSDP, La Jolla would be best in terms of maximum attendance. Several SOHP members would be there for DSDP co-chiefs meetings anyway (Meyers, Ruddiman).

The meeting was adjourned at 5:20 PM, March 29, 1984.

NEW JERSEY SITE 1A

Kenneth G. Miller and G.S. Mountain
Lamont-Doherty Geological Observatory

Although drilling was successful on the New Jersey Transect (DSDP Legs 93 & 95), time limitations only allowed drilling of lower slope and rise locations (rise: Sites 604, 605, & 613; lower slope: Site 612). The major scientific goal of the transect was to test the depositional model of Vail et al. (1977); unfortunately, a major unconformity representing Oligocene to middle Miocene time at the sites drilled prevents evaluation of the Vail model for perhaps the most critical time interval. Controversy surrounds the Oligocene series on the New Jersey margin (cf. Vail et al., 1977; Olsson et al. 1980; Poag, 1980, in press; Miller and Mountain, in press). We believe that drilling Site NJ1A between the COST B-3 well and Site 612 (USGS Line 25, approximately shotpoint 2930; Figs. 1,2) will help to resolve the timing of late Eocene through Miocene unconformities on the margin, which can then be compared with the Vail depositional model.

Based upon comparisons of the rock stratigraphic record at the COST B-3 well and Site 612 with the seismic stratigraphic record (Line 25; Figs. 1,2), it appears that the most conformable Oligocene section will be recovered between the B-3 and the ASP 14 borehole at shotpoint ca. 2930. This proposed location for Site NJ-1A is slightly downdip of the original placement of proposed Site NJ-1 at shotpoint 2900; however, operational, safety, and scientific goals are identical to the approved Site NJ-1 (original documentation enclosed). Drilling at Site 612 recovered lowermost Oligocene sediments (ca. 36 Ma) immediately below a major unconformity (Fig. 3); drilling at COST B-2 and B-3 wells recovered middle Oligocene sediments (ca. 30.5 Ma) immediately above a similar unconformity (Fig. 3). The event which caused this erosion is believed to be the major offlap event of the middle Oligocene of Vail et al. (1977). At present, we can only state that the event which caused this erosion occurred between 30 and 36 Ma. This uncertainty is compounded by poor biostratigraphic resolution in the COST wells. In order to resolve the timing of this event on the U.S. Atlantic margin and to establish its relationship with the Vail model, a cored site with a more complete Oligocene sequence is needed. We believe that NJ-1A meets these requirements.

NJ-1A will also provide an opportunity to recover a more complete Miocene record (COST B-3 set casing in the Miocene, while Site 612 drilled near the pinchout of Miocene strata; Fig. 1). In addition, assuming that we drill until encountering middle Eocene sediments, we will be able to evaluate the importance of an unconformity associated with the middle/upper Eocene boundary at Site 612 (Fig. 3). The proposed drilling will establish the chronostratigraphic framework for the upper slope, which is critical to evaluation of the Vail depositional model.

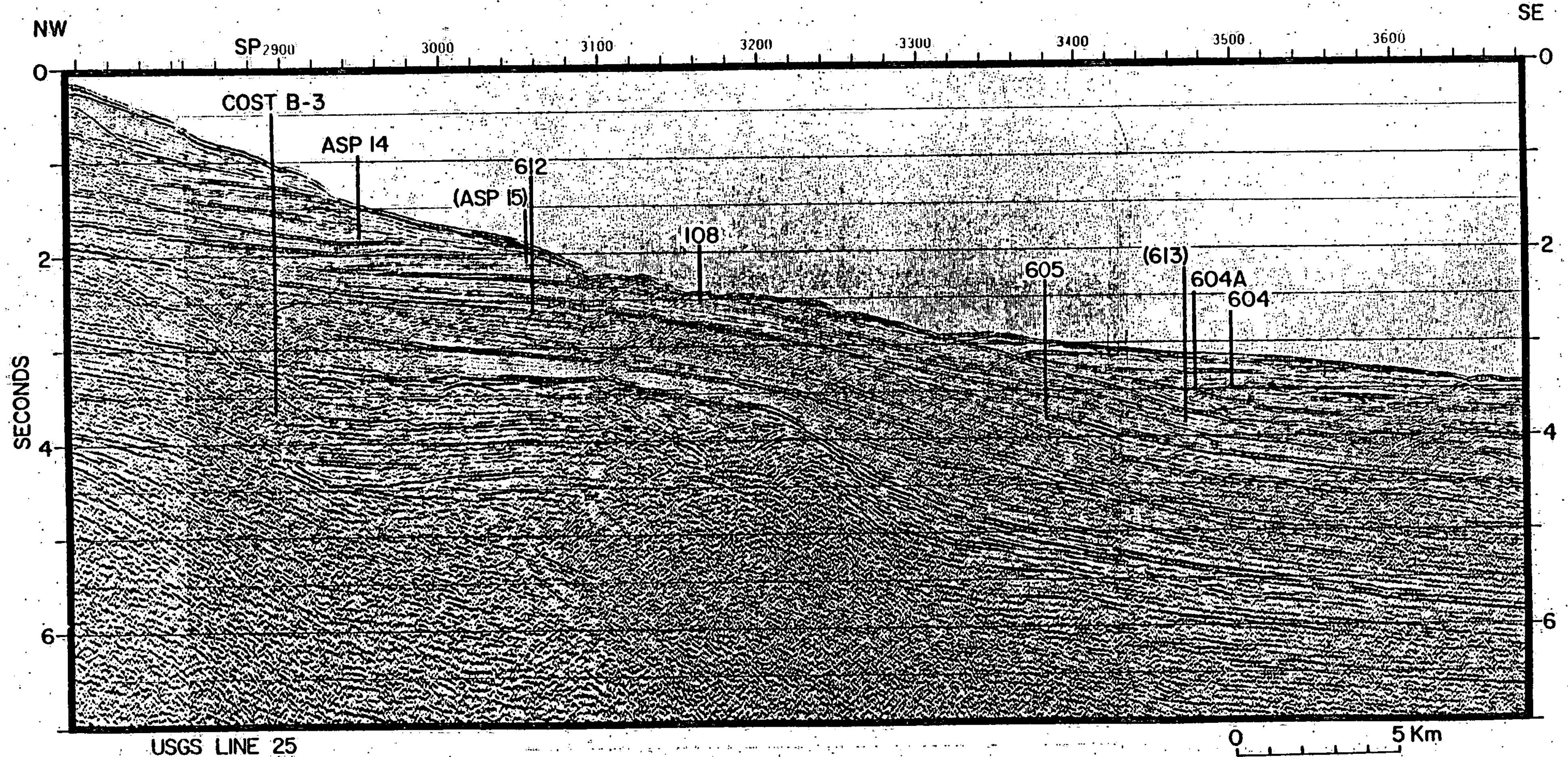


Fig. 1 MCS Line 25, New Jersey margin. Proposed Site NJ-1A located between COST B-3 well and ASP 14 (shotpoint 2930)

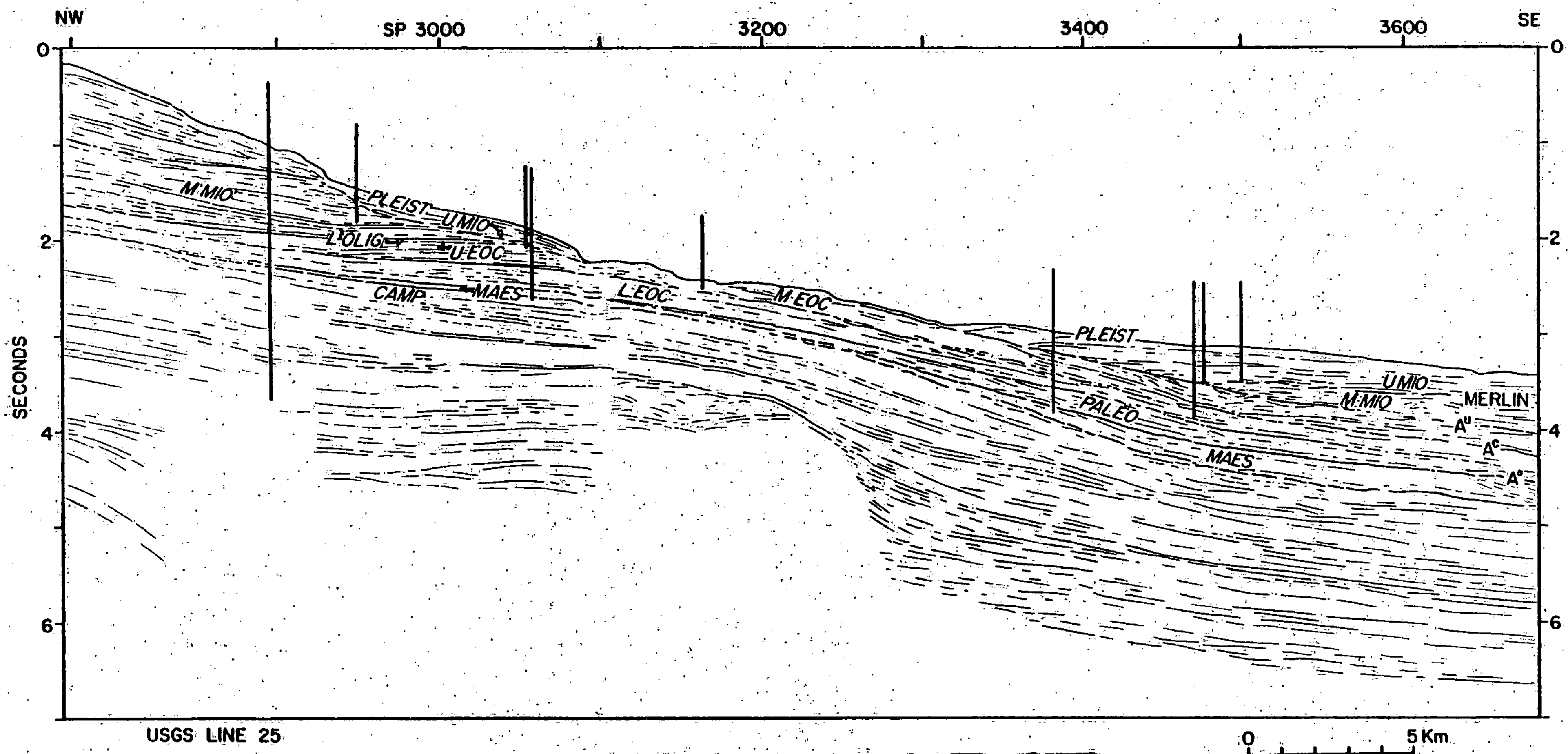


Fig. 2 Line drawing interpretation of Figure 1.

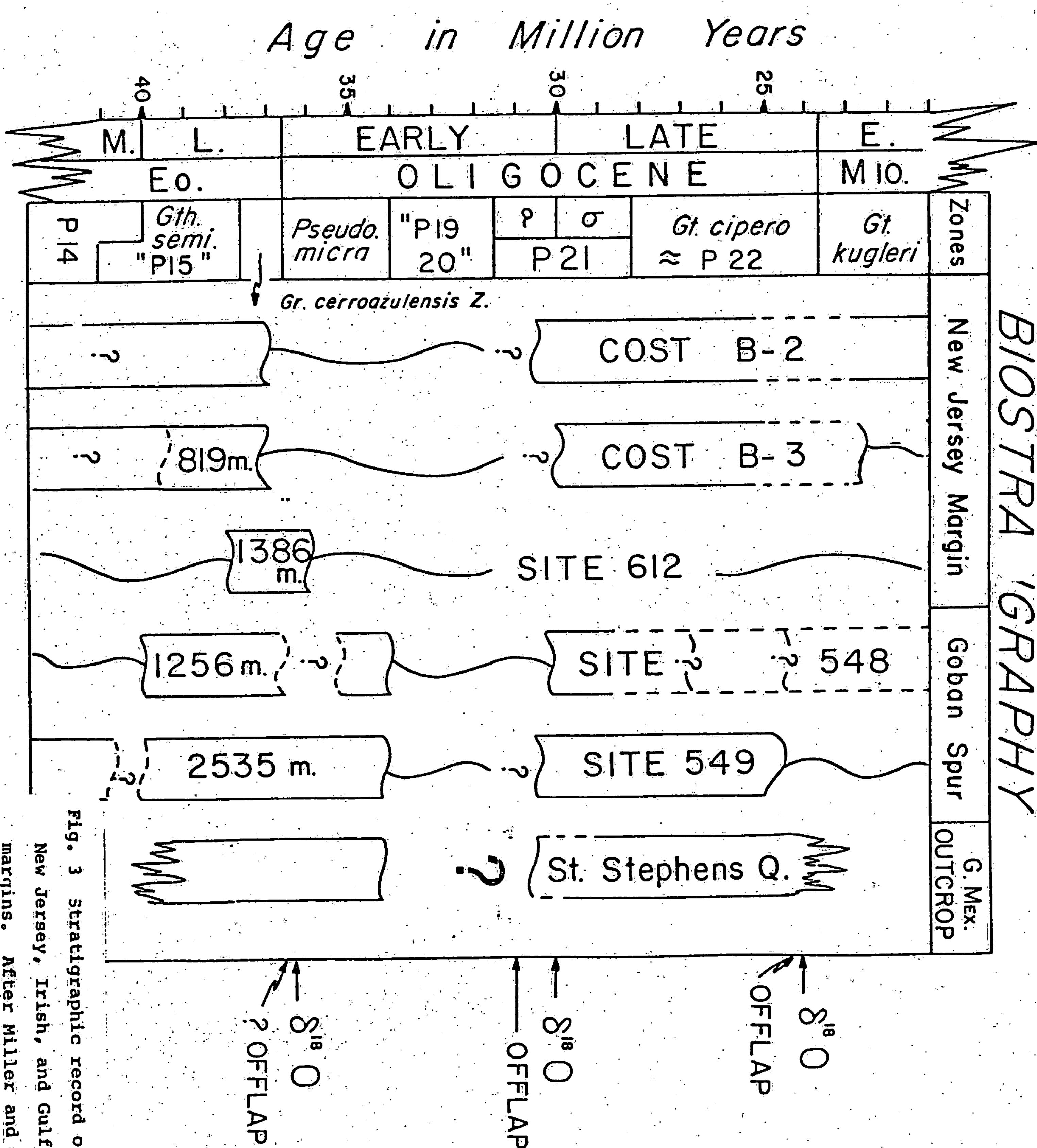


Fig. 3 Stratigraphic record of the New Jersey, Irish, and Gulf of Mexico margins. After Miller and Mountain,

Site: N.J.-1 - Approximately on strike with COST B-3

Location Description: On CDP Line 25 (Shot Point #2900) - Figures 6,7.

Coordinates: 38°50.9'N; 72°51.3'W

Water Depth: 827m

Penetration: ~800m

Expected Stratigraphic Section:

Pleistocene

Pliocene

Miocene (U, M, L)

Oligocene

Eocene (TD in upper Eocene at ~800 m penetration)

Comments:

This hole will continuously sample the Upper Tertiary interval that was drilled in the COST B-3 well. The first sample in the B-3 well (350m subbottom) was of middle Miocene age, but site N.J.-1 will sample the overlying upper Miocene, Pliocene, and Pleistocene, as well, and will provide a tie with the ASP 14 core hole. It will continuously core the radiolarian rich Miocene and Oligocene strata that were sampled at B-3 and should provide a better record of calcareous microfossils, by which the radiolarian record can be more accurately calibrated (see Poag, 1980). Continuous coring through the Oligocene is especially critical in testing the sea level concepts of Vail and others (1977) because preliminary data (Poag, 1980, 1981) show the greatest discrepancy in this interval.

Operational Considerations:

Shipboard paleontology will be required to identify the top of the Eocene to which point the site will be abandoned.

CHECK SHEET
JOIDES SAFETY REVIEW

Leg. 82 Site No. NJ-1 Lat. 38°50.9'N Long. 72°51.3W

Water Depth (m) 827 Dist. from Land (n.mi.) 76 Jurisdiction USA

General location or geomorphic province Upper continental slope seaward of New Jersey

Upon what geophysical and/or geological data was this site selection made?

Seismic lines USGS lines 25 (SP#2900); supporting BGR lines 204, 218, 219 and USHS line 34

Piston cores

DSDP holes

Other COST B-3; ASP 14

Proposed total penetration (m) 850 Probable thickness of sediments 10-12 km

From previous DSDP drilling in this area, list all hydrocarbon occurrences of greater than background levels, give nature of show, age and depth of rock:

DSDP hole 108 was drilled 18 km to the southeast (see Fig. 6B) in 1845 m of water. It cored 209 m below the sea floor recovering middle Eocene gray siliceous chalf. No analyses for hydrocarbon were made.

From available information, list all commercial drilling in this area that produced or yielded significant shows; give depths and ages of hydrocarbon bearing deposits:

The COST B-3 well was drilled 10 km to the northeast; single gas show was encountered at 4801 m in (Amato and Simonis, 1979, p. 112) gaseous sandstone 2 m thick.

Is there any indication of gas hydrates at this location?

NONE

Is there any reason to expect any hydrocarbon accumulation at this site? Please comment.

None. The upper 8200 ft. (2500 m) of theCOST B-3 drill on strike with this hole and 10 km to the northeast is thermally immature. Geochemcial data indicate that thermal maturation of kerogen is low. Algal rich-organic matter int the Tertiary above 5000 ft (1524 m) could generated biogenic methane; Smith (1980) reports $C_1 - C_4$ concentrations of 4328 - 15,037 ppm in cutting above 500 feet.

What is your proposed drilling program?

Continuously core until encountering the Late Eocene. Follow with Hydraulic Piston Core to point of refusal.

What is your proposed logging program?

Assuming outside support can be found, use Schumberger or equivalent well logg tool combination (gamma ray, sonic and caliper, temperature, formation densit neutron induction and lateral log). Heat flow and geotechnical studies of equipment available.

What "special" precautions will be taken during drilling?

Continuous coring, continuous shipboard organic-carbon content measurement or CNH analyzer, determinations of gaseous hydrocarbons by gas chromatography an pyrolysis studies.

What abandonment procedures do you plan to follow? (see Safety Manual, Sec. VIII

Cement plug

Summary: what do you consider to be the major risks in drilling at this site?

No major ones. Possibly some biogenic methane in the youngest sediments.

Please answer each question as carefully as possible, using extra pages if need
The information you provide here will be an important factor in the Safety Revi

APPENDIX II

MEMORANDUM

TO: Dr. Jeremy Leggett, Chairman
Tectonics Panel ODP

FROM: Arnold H. Bouma and James M. Coleman

SUBJECT: Suggested sites in Gulf of Mexico for ODP

DATE: January 3, 1984

The very successful, but technically difficult, drilling on the Mississippi Fan during Leg 96 solved a number of important questions concerning a large deep sea fan in a passive margin setting. The passing through of a large amount of coarse material across the upper and middle fan, with only insignificant amounts of lateral spillover of such material, was an eye opener. The sites drilled in the central channel (Sites 621 and 622) and in the levee-overbank deposits (Sites 617-620) basically provided answers to the understanding of that part of the system. Deeper holes will be necessary to check the validity of the model in underlying fan lobes but likely are technically impossible at this time.

The potential presence of coarser lag material in the upper fan channel is a serious scientific question and Sites MF-3 and MF-4 should have been drilled. However, the Safety Panels did not allow such based on expected gas. The issue may be brought up again because no gas of significance was encountered at any fan site.

The drilling results clearly provided a model for this type of a deep sea fan although a number of other key questions could not be accommodated because of lack of time. One and likely difficult to answer problem relates to the change in channel characteristics going from a migratory channel on the midfan to a jumping channel on the lower fan. We know that the sinuous channel on the midfan becomes less sinuous and smaller in a downfan direction. At Sites 623 and 624 we think we proved that the channel frequently jumped position and that any channel course served only for a relatively short time. The area where such a change in channel character occurs likely moves back and forth with an overall progradational tendency. Therefore to find sites to study this issue may be difficult. However, a number of sites in and across the channel in the mid fan-lower fan area might provide most of the answers and simultaneously gives the characteristics of the processes that operated between the Site 621 area and the Site 623 area.

The most puzzling is the lower fan where we did not drill Site MF-13, because of time constraints. As a consequence we only drilled in the proximal area of the depositional lobes and consequently did not address those lobes properly. That "short cut" was a very serious omission.

From the point of view of local or regional slope instability Site 616 has to be expanded. The so-called Walter-Massingill slump can now be considered a superposed stack of slides. Because such mass-moved bodies are very common on many fans a more detailed drilling program is warranted. To understand the influence of the processes that produced such extremely fast accumulation rates, additional drilling is required before the origination point and transport mechanisms can be properly identified. Simultaneously, this aspect of the proposed drillling provides the needed information for an improved study on seismic facies characterization.

Site MF-14 on the abyssal plain, an alternate site of the Leg 96 program, was suggested by Buffler and Bryant. It is located in international waters and will serve an excellent stratigraphic purpose to ground truth the seismic stratigraphy of the central Gulf of Mexico. To date we use the incrementally cored DSDP sites in the western Gulf. The main problems of such correlations are the abnormal locations of the sites for such purposes and proper correlation across diapiric fields.

It is assumed that little or no time will be available for site surveys. Sufficient seismic coverage is available to produce a more in-depth scientific proposal together with a complete package for the Safety Panels. It is also assumed that little or no engineering research will be conducted to improve the coring devices that were used on the D.V. GLOMAR CHALLENGER. Therefore it is imperative that a logging program accompanies the drilling because low core recovery below 60-100 m sub-bottom depth should be expected.

In summary it can be stated that the drilling during Leg 96 provided us with the main elements of the fan model. A selected number of additional sites would supply the needed information to answer some of the very critical sedimentologic-biostratigraphic-seismic facies issues:

Lower lower fan: a total of three - four sites, one about 450 m deep and the others less than 200 m, would provide the main characteristics of the depositional lobes and the biostratigraphical identifications of the Ericson-Wollin Zone X (carbonate debris flow). This group of sites should receive the highest priority.

Lower middle fan - upper lower fan: A set of sites identical to the series Sites 617, 620, 621, 622 would solve the major problem of the channel-levee complex that dominates fan construction, specifically the change in character from migratory to jumping.

Lower upper fan: drill former Sites MF-3 and 4 to obtain the significance of the processes that moved so much coarse material downfan. However, we don't know how the channel filled. An upfan thinning lag deposit is anticipated.

Middle fan area in the Walker-Massingill slump to analyze the significance of mass movement by sliding and slumping and the distance over which such bodies may move.

Former Site MF-14 in the abyssal plain to obtain a good stratigraphic section to serve as ground truth for seismic stratigraphic correlations.

for AHBouma
A. H. Bouma

JMC
J. M. Coleman

AHB/JMC:se
cc: Dr. J. Honnorez
Members Tectonics Panel