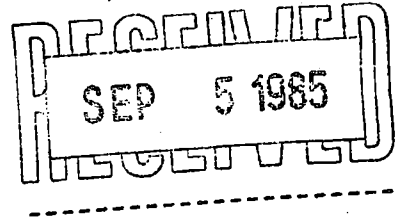


85/777



DRAFT MINUTES OF THE

SEDIMENTS AND OCEAN HISTORY PANEL

(meeting at Lamont-Doherty Geological  
Observatory, July 25-26, 1985)

PRESENT

- M. Arthur
- P. Meyers
- Y. Lancelot
- M. Sarnthein
- E. Suess
- W. Hay
- W. Ruddiman
- J. Kennett (SOP)
- S. Gartner (PCOM Liaison)
- G. Brass (NSF)
- A. Palmer (ODP)

Executive Summary

SOHP Minutes

(July 25/26, 1985; LDGO)

- I. SOHP endorses 2 legs for southern ocean in Indian Ocean Program:
  - 1) Pryda Bay and Southern Kerguelan  
(Sites: 4 in Prydz Bay & K7, K12, K5, K10, K11)
  - 2) Northern Kerguelan  
(Sites: KHP-1, KHP-3, KHP-5A, S8B)
- II. a) SOHP recommends that HPC Sites proposed by J. Hays off Chile be retained as backup sites, but that they have lower priority than Weddell sea program.  
b) SOHP reiterates that W7 (or W8), W6, and W10 be completed at end of Weddell Sea program (as previously proposed), but that W10 (Bransfield Straits) be considered as first site if any ice problems.
- III. SOHP recommends that a deep hole (ca. 2500 m) be drilled on or near anomaly M25 in the Somali Basin (for reasons detailed in minutes) as our favorite "Chinese Menu" alternative. More specific location to follow.
- IV. Deep Stratigraphic Tests proposal will be revised and submitted as formal proposal. Emphase 6 deep holes: 1) Somali Basin; 2) Exmouth-Argo; 3) Bering Sea; 4) Venezuelan Basin; 5) Hole 603B; 6) Moroccan Basin
- V. Man, Milankovitch, Mountains, Monsoon proposal: a) 3 Sites in upwelling transect to ~~Duina~~ Ridge; b) 1 site on Somali basin margin; c) 1 to 2 sites on distal Indus Cone. (follows basic plan of Prell and IOP)
- VI. See other comments within on Red Sea, 90°E-Ridge, and possible Chagos/<sup>Owlen</sup>Laccadive/Mascarene transect.
- VII. Next meeting Jan. 6,7 in La Jolla.

7/25/85

1.) PCOM Summary - Gartner

- a) Possible USSR membership in IPOD. UK is on indefinite hold, ESF still short.
- b) ODP now under Facilities Section of NSF (Toye)
- c) only two bare-rock bases will be built (limited funds) and EPR drilling will probably be scrapped this go-round (Hole 504B will replace)
- d) new positioning system (GPS) on Resolution
- e) wireline packer not available for Barbados leg (lack of funds)
- f) Indian Ocean plus Atlantic-Subantarctic allocated 18 months by PCOM at present

2.) ODP Report-Palmer

- a) Amanda provided a cogent summary of Legs 101, 102, & 103, and a progress report on Leg 104. Drilling rates faster than anticipated!

3.) Southern Oceans Program - Kennett

- a) Two Kerguelen legs deemed necessary. Problem of crew change in Kerguelen is presently unresolved but advisable as opposed to steaming back and forth to Reunion Island with Resolution.
- b) Prydz Bay - more multichannel seismic data expected, and single-channel and core material before making final selection of sites.

(1) 4 Sites proposed: 3 on shelf, 1 on rise

- shelf series should recover Mesozoic/Cenozoic Strata and will give history of polar ice growth, continental, and paleo-oceanography

- deepwater site will mainly show history of glacial sedimentation not obtainable on shelf because of ice-erosion.

- The shelf sites may be only locations which will show older Antarctic history

- projected hole depths on the order of 500 to 750 meters across the sequence of dipping reflectors. Three sites necessary to obtain younger to older sequence.

(2) Drilling dates: November may be too soon for entry into Southern high latitudes, mid-December is when weather moderates.

(3) Combine Prydz Bay sites with S. Kerguelen sites to compose one leg.

3.) Southern Oceans Program - Kennett (Continued)

c) Kerguelen - general: only place where S-N transect of Antarctic water masses can be obtained. Depth transect and latitudinal - transect will provide records of paleoceanography, tectonic history, and history of Kerguelen Plateau.

d) Southern Kerguelen - seismic data not yet generated, or not yet fully processed

(1) SOP proposes at least 4 sites: K-11, K-5, K-7, K-12 - a depth transect from 1 to 2.5 km water

-multiple sites needed to complete record, because of many unconformities

-total Cenozoic record may be impossible because of hiatuses

e) Northern Kerguelen - better data

(1) 6 Sites: K 1, K 2, K 3A, K 4A, K 5A, S8

f) Next meeting of SOP will work on firming up sites Kerguelen/Prydz Bay legs. This will be in September. New seismic and core data from 1985-86 cruises of French ships will be worked into overall objectives before firm site selections can be made. Basement objectives also need to be considered.

g) SOP priorities: East Antarctic Margin, Kerguelen Plateau, Sub-Antarctic Traverse

h) Kennett comments also on Hays proposal: 3 HPC sites off southern Chile, another sub-Antarctic transect, late Neogene record, 4 km water depth, 200m penetration. Conceptually good, but may delay Weddell Sea startup. If so, then logistics may make it impossible.

4.) SOHP comments on Hays proposal (see 3 g for Kennett's comments)

SOHP favors adding W10 to the Weddell Sea Leg if time becomes available, rather than substituting the HPC sites proposed by Hays. If sufficient time exists to do W10 and the 3 HPC sites, then SOHP encourages incorporation of the southern Chile sites. Scientifically, the Hays proposal is good, and SOHP endorses it, but must consider it as a series of backup sites. There is little known about the region and such sites should be drilled eventually.

SOHP priorities on Weddell Sea sites, based on new seismic lines, is:

W7 (or W8), W6, W10 - after other Weddell Sea sites on margin and in basin, as previously reported to R. Larson and PCOM in separate document.

5.) Kerguelen Plateau Legs

Sites cannot really be prioritized yet, not until new data come in, but for water-mass histories they should include locations at depths of 900-1000m, 2000-2500m, and a deepwater site. Logging should be done, even at cost of time lost to drilling. A latitudinal transect is important, also, for water-mass and current histories. This should extend from 41-42°S to Antarctic margin. Our preliminary recommendations are shown below.

N. Kerguelan

<u>Ranking</u>	<u>Possible sites:</u>	<u>Objective</u>	<u>Penetration in Meters</u>	<u>Time (drilling &amp; logging)</u>
1A	S8B	Deepwater-Neog. History		6 days
1	KHP3	Eocene -- Cretaceous (Base- ment)	1500M	21
1	KHP1	Neogene	900+	12
2	KHP5A	Recent -- Eocene	1200	18
				57
				12 Transit

S. Kerguelan

<u>Ranking</u>	<u>Possible sites:</u>	<u>Objective</u>	<u>Meters</u>	<u>Time</u>
2	K5*	Deepwater, early Cen.	700	8 days
1	K12	Neogene		14
1	paired K7	Eocene -- Cretaceous (base- ment)	1000	
2	K11	Neogene deepwater	500	8
2	K10	latitudinal transit-Neogene	750	18 9 (drilling & loggin
1	Prydz Bay 1-4			17-19 (includes transit)

\*K5 position might be moved to west to be in shallower water, but at same latitude (Better Neogene & pre-Neogene record obtainable this way.)  
-1500 to 2000 m.

Prydz Bay sites, as a package, are of highest priority. Site survey data needed for all locations, regardless of priority, and new rankings may result. Primary SOHP interest is toward tracing history of surface water movement. Secondary interests are histories of deep water masses and of unconformities. Ultimate site rankings are likely to reflect these objectives.

6.) Deep Hole Proposal: Sarg/Arthur

- A) General concept is very well-received. A good introduction is needed, as well as some support in areas. Addition of oblique seismic logging and full logging suggested. Bill Hay will be responsible for adding items and sending them to Rick Sarg. All panel members will give their ideas to Hay before the end of the LDGO meeting. The general proposal will be attached to one for the Somali Basin, which in turn is a good match for the Exmouth Plateau-Argo site.
- B) a) Somali Basin site - questions to resolve through deep drilling (local)
- (1) rifting of Madagascar and separation from Africa
  - (2) oldest "Tethyan" crust
  - (3) ammonite evolution (Mesozoic) - gateways
  - (4) site of accumulation of sediment lost from Africa during Cretaceous rifting-uplift
  - (5) salt basin and volumes of salt (Jurassic)
  - (6) climatic evolution of east Africa and timing of east African uplift (Neogene)
  - (7) premonsoonal climates of Indian Ocean region
  - (8) black shale events of Cretaceous and Jurassic
- b) Global Objectives
- (1) east-west tilt of Africa during rifting and opening of S. Atlantic ocean and interaction with Vail onlap-offlap curve (comparison with Australia which has different freeboard but roughly the same latitude)
  - (2) mid-latitude (equatorial) long-term climate record
  - (3) reference section for Indus cone-tectonics vs sea level effects on sediment supply
- c) requirements
- (1) on crustal age M25
  - (2) off evaporites (on edge of evaporite strata to enable dating)
  - (3) in sediment thickness of no more than about 2500 m and water depth no more than 4500 m.
  - (4) oblique seismic and complete logging.
  - (5) case deeply to improve likelihood of reaching basement
- d) Information for Somali deep hole proposal (DST-1) will be prepared by Arthur and transmitted to Sarg.

6.) Deep Hole Proposal: Sarg/Arthur

- B) e) Site 603 justification will be prepared by Meyers (DST-6)
- f) Lancelot will also provide a location and justification for a Pacific deep hole to Sarg. Such a location has been described much earlier for the southwest Pacific (DST-3)
- g) Shatsky Rise appears not suitable because of chert thicknesses. Best location in northwest Pacific may be Bering Sea, which will yield old Pacific crust and sediments. Arthur will prepare Bering Sea justification. (DST-4). Should contact D. Scholl for more information.
- h) Venezuela Basin is an important location which should be included in the DST Program. Hay will prepare justification (DST-5).

Final result: Holes reordered, Cape Basin, Mediterranean, and Shatsky Rise locations were dropped as being regionally important, but not part of global objectives. Venezuela Basin added as important to Deep stratigraphic Test (DST) Program.

- 6.) j) Exmouth Plateau has tentatively been selected because of better availability of data. A location on the Scott Plateau may actually be preferable because of better stratigraphic resolution and better carbonate preservation, but cannot be selected until better data become available. At present, sites EP5 and AAP1A appear best locations. SOHP recommends site surveys be done on the Scott Plateau and site selections be reconsidered later.

7.) Need for sand recovery is still needed. It will be very important to deep holes!

8.) Man, Mountains, Milankovith, and Monsoons -----M<sup>4</sup>

- a) Possible sites: 5 total (6 if time allows)  
Somali Basin margin - Neogene record of east Africa (Man)

outer Indus - Cone (Mountains)

3 sites transect under Somali upwelling and onto Owen Ridge (Monsoon/Milank.)

- b) Objectives:

Cone site - record of tectonic uplift and continental erosion in Himalayas. Econd up-cone site if time allows.

Somali Basin site - record of east African climate

Transect across Somalia Upwelling - record of monsoonal upwelling

- c) Specific site selections are best done by the Indian Ocean Panel with advice from Prell.

9.) Red Sea Proposals - reviewed by Hay

SOHP would like to see double HPC and continuous coring for paleoceanographic and geochemical stories. Existing proposals are mostly ocean crustal in nature, and sediment records must be considered.

10.) 90° East Ridge Proposal - Sarnthein, reviewer

SOHP would like sediments to be drilled on the sides of the Ridge. Sites farther to the north, under the Equatorial high-productivity zone (10°S), might give a better paleoceanographic record, but problems exist in sediment resolution. This location seems to have mostly lithologic and tectonic objectives.

11.) Mascarene - Chagos - Laccadive Ridge Proposals - reviewed by Lancelot

- a) Very attractive to SOHP because of low-latitude N-S range, which will contain well-preserved record of paleoproductivity and sediment accumulation through the Paleogene, and into the Cretaceous
- b) Three sites suggested on Mascarene Ridge drilled to basement (800-900m), in a depth transect (different water masses) and in N-S transect Neogene & Paleogene)
- c) Depths: 1500, 3000, 4000m water  
Two sites on Chagos-Laccadive Ridge, to provide N-S transect

Summary - SOHP finds locations suggested in Mascarene-Chagos-Laccadive Proposals much more promising than those in 90° East proposals.

12.) Western Pacific ---

- a) Specific proposals not discussed, but SOHP reiterates its strong interests in Great Barrier Reef region (northeast Australia)
- b) Philosophy --
  - (1) Broad objectives, rather than local, specialized problems should be the focus
  - (2) Marginal seas can be very interesting, if they contain special records of ocean-wide conditions (i.e. - sample only upper water masses and hence have simpler records of water chemistry of the entire Pacific).
  - (3) Marginal seas may contain good, high-resolution records of continental climate.
  - (4) Sediment subduction and destruction is an important problem.

13.) Next meeting must be prior to January 21-22 PCOM meeting. Planned date will be January 6 & 7, in La Jolla.