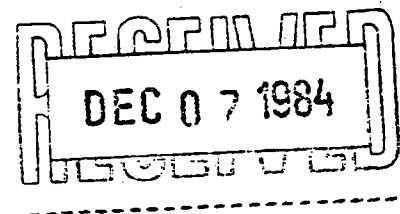


DRAFT



MINUTES

ATLANTIC REGIONAL PANEL

Grenoble (France) 11-13 September 1984

Members present:

Dr. Austin  
Eldholm  
Garrison (ODP representative)  
Honnorez (PCOM Chairman)  
Jansa  
Kidd  
Klitgord  
Mascle (Mediterranean WG Chairman)  
Montadert (Chairman)  
Mutter  
Schlager  
Speed (Caribbean WG Chairman)  
Thiede  
Tucholke

Guests:

Boillot G.  
Rehaut J.P.  
Winterer J.

Lou Garrison (TAMU) reviewed the present status of the Project. Conversion began and leg 101 departure is still scheduled for the 1st January. The cost of conversion is more important than scheduled but this is without consequence on the project (9,9 M\$ → 14 M\$). There are 85 people now at Tamu, for a final number of 130-140. R. Kidd was nominated Manager of Science Operations. Shipboard staffing is under way.

Leg 101: J. Austin, W. Schlager  
 Leg 102: J. Schlee, M. Salisbury.  
 Leg 103: G. Boillot  
 Leg 104: Invited O. Eldholm, J. Thiede

Marine technicians are trained on the new instruments and manuals are prepared. There will be about 10 marine technicians on each leg. Some countries can request insurance for pollution risks: there is a 200 M\$ insurance, above, it is covered by US Government.

L. Garrison requested recommendation for one extra site for leg 102.

J. HONOREZ (PCOM Chairman) made the following comments and requests:  
 The panel must look at the membership attendance,  
 The panel has not to be worried by logistics,  
 France gave official approval for participating to ODP  
 Not too many guests must be invited to meetings,  
 The panel must propose a list of co-chiefs,  
 The panel must establish priorities for the three legs still opened.

#### Leg 101 - BAHAMAS

W. Schlager: All necessary profiles have been processed, and the proposed sites went successfully through the safety panel. However new lines show that target (transition from deep water sediments to shallow platform carbonates) is deeper than expected: 1250 m on the Florida Shelf and 1350 m in the Exuma Sound. Reentry is necessary which implies 16,5 days for F.S site and 20 days for E.S. Also two reentry holes would suppress the other targets. Therefore reentry for the E.S. is not scheduled. Nevertheless everything obtained on the deep E.S. site is new and interesting, also a single bit hole is proposed even for 5 days of drilling only.

Jansa remarks than technical problem are possible in a first leg, and that potential targets may be even deeper than expected. After further discussion on the best drilling strategy, the following motion was proposed:

Motion I: The ARP endorse the priorities for leg 101 as set forth by the prospective co-chiefs, namely:

Priority 1: Little Bahama Bank - slope transect

- |   |          |
|---|----------|
| 1. Site 9A ( 600 m T.D., base of slope) | 3 days   |
| 2. Site 8A (mid-slope, ~300 m, HPC)     | 1,5 days |
| 3. Site 7A (upper slope, ~300 m, HPC)   | 1,5 days |

Priority 2: Straits of Florida - deep hole (reentry)

- |   |   |
|---|---|
| 1. Site 1 (~ 1250 m, +50 m penetration beneath "target" horizon T.D. ~1300 M) | 16,5 days including standard logging + VSP (0,5 days) |
|---|---|

Priority 3: Exuma Sound - slope transect

- |  |          |
|--|----------|
| 1. Site 11A (upper slope, ~300 m, HPC) | 1,5 days |
| 2. Site 11B (mid slope, ~300 m, HPC)   | 1,5 days |

Priority 4: Exuma sound - deep hole (no reentry)

- |   |         |
|---|---------|
| 1. Site 12 (A-D) ( 1350 m, + 50 m penetration beneath "target" horizon TD 1400 m) | 14 days |
|---|---------|

Total: 39,5 days  
Transit: 6,5 days

Motion II: In the case of site 1C in the straits of Florida, and following the thinking of the co-chiefs, the ARP recommends the following strategy:

- A. If the seismic facies transition is as predicted (from deep to shallow-water carbonates, presumably coincident with the observed increase in interval velocities) approx. 50 m of additional penetration, with the hole left in condition suitable for subsequent reentry at some future date.
- B. If the "target" depth is reached, and proves to be a "surprise" (e.g. a continuation of deep-water carbonates), the co-chiefs will seek permission to deepen the hole; but with the restrictions that time will be left to complete the Exuma Sound slope transect, as indicated.

Motion III: The ARP will leave to the co-chiefs the ultimate decision of drilling either a single-bit Exuma Sound deep hole to bit destruction, or of drilling a third hole (e.g. site 12D) as part of the slope transect. This decision will depend upon time remaining at the end of drilling sites 11A and 11B.

Motion moved by Klitgord  
seconded by Jansa  
Vote unanimous

## LEG 103 GALICIA MARGIN

G. Boillot, invited as co-chief on this leg presented the different sites which were defined and which were successfully presented at the safety panel

	Water depth	Proposed penetration	Time days	Priority
1b	5200	950	11	1
	5200	850	10	3
2a	5200	300	6	1 or 2
2b	5200	300	6	2 or 1
2c	5200	800	10	3
3b	5100	400	7	1 or 2
	4900	300	6	2 or 1
4a	4700	1000	11	1
4b	4500	1300	13	3
4c	3700	600	7	2
4d	3200	700	7	3
4e	3300	700	7	3

G. Boillot suggested 2 possible sequences for drilling

Sequence 1: 2a or 2b, 3a or 3b, 4a, 1a / 2b or 2a

Sequence 2: 4a, 3a or 3b, 2a or 2b, 1a / 4c

42 days: 35 days / 6-7 days

After a discussion the panel recommended the following drilling plan:

1. Drilling the "Lherzolite ridge" at the boundary between oceanic and continental crusts is the first priority. 2 holes, should be drilled with a 50 m penetration in the "basement".
2. Site 4 should be the second priority. 4a will be drilled first, then 4b', located slightly to the West of 4b to shorten the hole, will be drilled until the top of the layers penetrated at 4a.
3. Site 3 is the third priority.
4. Drilling for the oceanic crust is the last priority.

## NORVEGIAN SEA

APP discussed a letter from D. Warnke to J. Thiede in which alterations of the Norwegian Sea drilling were proposed, ARP shared D. Warnke's concern that only part of the Norwegian Sea paleoenvironment could be addressed by the proposed drilling on the Vöring Plateau, but it was felt that the priorities for drilling the dipping reflectors and the Cenozoic sediment sections on the Vöring Plateau were sound and should not be changed. However, ARP felt strongly that problems of North Polar deep Seas (Bering Sea, Arctic Ocean, Norwegian-Groenland Sea, Baffin Bay) were presently not optimally covered by existing ODP working groups and panels. Therefore ARP will propose the establishment of a North Polar Seas WG or panel to PCOM to facilitate long term planning. ARP considered the unsolved tectonic and paleoenvironmental problems of the North Polar Seas to be scientifically very important that the establishment of a new WG or even Panel is warranted.

## NW AFRICA

J. Winterer presented his July 1984 proposal whose objective is to study in detail the timing of opening of the central Atlantic.

Two ways are possible:

Direct: with a very deep hole implying a major effort (D. Hayes et al., proposal)

Indirect: On the margins, looking for events related to the opening.

He recalls the complex history of rifting:

1. Triassic
2. Callovian?
3. Lower Cretaceous?

Klitgord remarked that there must be an effect of the Atlantic transform and of shearing of N. Africa. J. Winterer proposed drilling MAZ 8 (800 m penetration) and deepening and logging of 547.

Tucholke asked for what new will drilling MAZ 8 bring.

J. Winterer: date of drowning and especially rate of subsidence

Tucholke commented that there will be problems for good datations in shallow carbonate, which Winterer agreed on.

Then the "deep hole" option was discussed.

Winterer shows new data from Meteor 67 cruise. A new paleomagnetic reversals scale for the Jurassic show no more quiet zone. There are as much reversals as in the Cenozoic (5 to 10 reversals per stage in the Middle Jurassic).

Anomaly S1 could be at the Continent-Ocean boundary. Site 416 is still a good location with the target at 2,5 sec i.e. = 3 km.

Schlager asked if a 3 km penetration is possible in open hole for safety and engineering reasons? For the future this point must be carefully examined.

MAZ 8 and 547 would require 15 days and the "deep hole" 2 legs.

R. Kidd provided an update on the proposal for drilling in the Madera Abyssal Plain. ARP had recommended that the draft proposal be combined with another from the Netherlands (ESF) and a mature "Weaver et al." proposal was now under considerations. He noted that MAP-1 the abyssal plain site is not only aimed at investigating turbidite periodicities. It will date the origin of the abyssal plain and a new pelagic reference hole and seismic stratigraphy for the eastern North Atlantic. It has a number of secondary geochemical and geotechnical objectives based on its value as a reference section. ARP recommended in May 84 that MAP-1 (without SR-1) be inserted in the NW Africa (Cenozoic) leg along with sites from the Ruddiman et al. and Sarthein et al. proposals. SOHP also discussed the draft proposal in May. They had questions on the feasibility of dating the pelagic intervals at depth on the distal location and on the need for drilling rather than gravity piston coring. SOHP decided to assign no priorities until these questions were answered by the proponents.

ARP discussion in Grenoble also revolved around stratigraphic resolution in the pelagic interbeds. Some members thought the establishment of the reference pelagic section with logging of greater importance than the turbidite story. Kidd responded that Weaver et al., have now investigated many more long piston cores in similar detail. All sustain their hypothesis on turbidite frequency. Correlations core to core are excellent and link through core logging to high frequency seismic profiles. Cored sequences in more proximal locations are incomplete: the turbidites have erosive bases. Improvement in penetration and recovery are only possible with the HPC and the deep seismic and lithologic stratigraphy is also a major objective. Because of the global significance of the Mazagan proposal, Kidd suggested some ARP discussion of whether a second NW Africa leg with deeper objectives was needed.

#### MEDITERRANEAN SEA

J. Mascle gave a brief review of the May and July Med WG meetings. Following the recommendations of PCOM the Med WG decided in July to focus a leg on the Tyrrhenian sea. There is still a desire to compete for one other leg with the Ionian proposals. New written proposal for the Ionian should be ready during the fall.

J.P. Rehault, one of the Tyrrhenian proponents, is given a general presentation of the main geological and geophysical characteristics of this back arc basin. Special emphasis with respect to the collision to the East (Apennines chains) and to the South (Sicily). The different candidate sites were then reviewed.

Questions arise about Site 5 and the existence of a real oceanic crust. Honorez mentions that a penetration of 100-200 meters into the volcanic layer should be considered. Site 373 on the lower slope of a neighbouring seamount has penetrated tholeite which shows a typical geochemistry of oceanic crust. Kidd

recommended that a strong argument for Site 5 should be to drill the contact between the sedimentary cover and the crust. The proponents and the Med WG are requested to look for criteria to used for demonstrating that there is oceanic crust there. Discussion is then hold on the different supposed (and superposed) rifting phases. Many comments concern the rather weak quality of the profiles shown. Schlager comments on the necessity to obtain not only site surveys but also regional profiles in order to better define the regional framework of the surveys.

Masclé indicates that there are two different requests of multichannel surveys in the Tyrrhenian sea, which are now almost decided. One could be devoted to regional profiles, the second to detailed site surveys. The surveys are going to be conducted during the first week, of 1985 using the IFP multichannel system.

Finally the ARP considers drilling in the Tyrrhenian Sea a conceptually and scientifically interesting approach investigating the rifting and subsidence history of a young ocean basin and the history of tectonic interactions of the African Eurasian plates. However, the sites as proposed suffer from a lack of adequate geophysical characterization (specifically - high resolution multi-channel site specific surveys and regional MCS lines). It will be necessary to have this MCS information and carefully located sites before ARP can fully evaluate and approve a drilling leg in the Tyrrhenian Sea.

#### CARIBBEAN

B. Speed presented the recommendations of the last meeting of the Caribbean WG (5 sept. 1984).

3 legs are proposed with the following priorities:

1. - Caribbean basin

Car 4 in the Venezuela basins with anomalous crust will test the Pacific origin of the Caribbean plate. It is a long hole with 700 m of drilling under  $\beta$ .

Car 5 in the Colombia basin will allow to drill a complete sedimentary section above basement.

2. - Lesser Antilles Transect includes sites from the Southern Barbados ridge until the Aves ridge.

3. - Yucatan basin.

The panel recommended the following priorities for leg 109

- 1 - LAF 1, 2, 3
- 2 - LAF 4, 5
- 3 - LAF 6.

PROPOSALS FOR REMAINING PROGRAM BEFORE WEDDELL SEA

1 - ARP considered four candidate legs to be prioritized for legs 111 to 113

- . Venezuela - Colombia basins
- . Lesser Antilles Transect  
Both were recommended by the Caribbean W.G (report 19.08.1984)
- . Yucatan
- . Eastern Atlantic Mesozoic History and Paleo-oceanography

It includes: Winterer et al., deepening and logging 547 + MAZ8  
Weaver et al., MAP-1 to basement with logging  
SOHP panel's deeper objectives sites including Mesozoic  
black shales.

2 - First there was consideration of whether the L.A. Transect was our first priority for the remaining legs.

3 - ARP decided to discuss its overall long-term objectives first. Klitgord made a presentation of tectonic reconstructions suggesting where a number of deep "2 km plus" penetration sites might be located to solve fundamental problems on the opening and early history of the Atlantic.

Among these, sites in the Venezuela, Colombian and Yucatan basins are deemed more important to our overall strategy. The suggestion was made that, despite the fact most of the "2 km plus" sites being necessarily targets for the second phase of Atlantic drilling, we should drill one of the three Caribbean basins as a first priority in this phase. At present, Yucatan appears the best prepared target basin, and ARP are already agreed on one 2600 m hole there as its primary remaining objective.

4 - Mutter and Schlager argued that from a purely scientific point of view a single site leg on the Moroccan margin was more important as a first deep site. After much discussion, all agreed that this was not feasible in the present phase, since the site selection could not be ready neither could the technology for over 3 km penetration.

5 - Kidd and Austin argued that in the perceived long-term Atlantic strategy the E. Atlantic deeper stratigraphy was more important than a second Barbados drilling transect closely following a Barbados leg. Austin suggested that the objectives of a second Barbados leg would benefit from a time interval after leg 109. Speed argued that such objectives are already well defined problems.

6 - Speed presented the reasoning that the Lesser Antilles Transect addressed specific problems independent of leg 109 and that the two legs could answer fundamental problems on the overall development of forearc early in the program. Tucholke concurred, stating that the Lesser Antilles was presently more attractive science than Eastern Atlantic (Mesozoic) since the program objectives are so well defined.



7 - At a vote:

1. single site leg in the Yucatan basin became ARP'S first choice for the undesignated (111-113) legs (vote 8 for - 4 against).
2. Eastern Atlantic Mesozoic versus Lesser Antilles Transect for the second choice resulted in a split vote (6 for - 6 against).

8 - Further discussion resulted only in ARP recommending that both legs are high priorities, ARP could not separate them to provide PCOM with second and third choices.

The following recommendations was put on:

The Atlantic Regional Panel strongly recommends that there must be a start, during the early phase of ODP, in a Caribbean drilling program aimed towards understanding the Cretaceous and older evolution of the region. The Caribbean Basin served as the important Seaway connection from the Atlantic to Pacific at least since the Late Jurassic, with this seaway being a narrow constriction during the Late Jurassic and Early Cretaceous. The tectonic evolution of this area has led to a superposition of geologic structures, and thus its characterization as a complex tectonic region. Separation of this tectonic evolution into some of its major component parts does make it possible to develop a drilling strategy requiring only a few drill holes that would permit major advances in understanding the superimposed tectonic events. Any further delays in establishing a drilling program will allow significant amounts of geophysical data to lay fallow, since most present attempts at understanding the regional geology awaiting drill hole data to start Caribbean research in some progressive direction.

The drilling strategy recommended by ARP is to drill a deep hole ( 2000 m of sedimentary rock) in the Caribbean to obtain a continuous temporally extensive sedimentary record of the Caribbean basin and the history of the Atlantic-Pacific equatorial seaway connection. The site should be on an old piece of crust generated at the mid-Carib spreading center. The late Jurassic to late Cretaceous mid-Carib spreading center is required by North American-South American-African plate reconstruction positions during this period. Subsequent tectonic evolution of the area has displaced or destroyed much of this old Carib crust, but the ARP considers the Yucatan Basin to be viable location for such crust and its overlying sediment record of Caribbean sedimentary history. The location of our primary site in the Yucatan Basin is YB2a in a basement low east of a basement ridge, and a secondary site at YB2c on the west side of this same ridge, as displayed on seismic line CAR-72 in the Rosenkrantz and Martin proposal. Although a few H.F. measurements suggest this crust is young (53 Ma), careful analysis of sediment accumulation rates in the context of available source areas, as well as tectonic models, suggest that the crust is 100 Ma in age.

Potential deep sites in the Venezuela Basin (in vicinity of site CAR 3) and Colombian Basin are being reviewed by the Caribbean Working Group.

**OTHER SITES FOR LEG 102**

ARP discussed the W Poag's proposal for completing the New Jersey Transect.  
ARP recommended NJ6 as in excellent back up site for leg 102.

**PANEL LIAISON**

The following motion was put on:

ARP are deeply concerned of the lack of attendance of Thematic Panel representatives at our meetings. Only a single liason member has attended one of our 3 ARP meetings. Our last day discussion in Grenoble clearly suffered from lack of SOHP and Tectonic Panel input to our prioritization of the remain program.

We suggest that PCOM request Thematic Panel chairmen to appoint on the last day of their meetings, member who can be certain to attend the next scheduled Regional Panel meeting appropriate to the drilling program. We consider their liaison role on the Regional Panels more important than specific expertise. This would provide additional flexibility in choosing liaison members.

ARP registred that J. Winterer (S10) has been rotated off PCOM and that he cannot act any longer as ARP's liaison to PCOM. In lieu that ARP will need a replacement for PCOM liaison and that ARP has no expertise in ocean crust petrology, it is suggested that PCOM could nominate J. Honorez as new Liaison ARP-PCOM.

**NEXT MEETING**

26 to 28 March  
3 location were proposed

Austin  
Barbados  
Spain (if. requested by PCOM before the Galicia leg)

Contact will be taken with the PCOM Chairman.

## ANNEX

The following generalized tectonic history of the region was provided by K. Klitgord as a framework for the committee's discussion of how to develop a rational drilling program with some promise of success.

At present there are two, of at least three or four tectonic phases that can be identified. A Late Jurassic (= Tithonian) to Late Cretaceous (=Campanian) extensional phase between the South American and North American plates produced a mid Carib spreading center connected by a large transform fault to the Atlantic spreading center and linked to the Pacific spreading center system. Evidence for this phase is primarily from plate tectonic reconstructions of the Central and South Atlantic spreading systems and the North American, South American and African plate paleopositions. There have been small modifications in published plate reconstructions but they all require a mid-Carib spreading system during the early tectonic evolution. The other well identified tectonic phase is the Neogene (or earlier) to Present phase of eastward Caribbean plate motion, with a Cayman spreading center-transform fault system, Lesser Antilles subduction zone, and a South American shear-compressive zone around the plate boundaries. Beyond these two phases, the various models for Caribbean tectonic evolution propose other tectonic activity superimposed on and following the Carib spreading center phase, and preceding or contemporaneous to the Cayman-spreading center-Less Antilles subduction phase. Many of the other proposed events can be explained by the motion of a block of Pacific plate into the Caribbean region causing consumption of Carib Crust at either a northward propagating subduction zone or at a subduction zone in the location of the present Greater Antilles. This motion of Pacific plate into the Caribbean and other models, such as the Eocene back arc spreading model recently postulated based on heat-flow, can be evaluated in the context of major plate reconstructions, as to locations of potential drill sites to test various models.

A mid Carib spreading center would have produced oceanic (?) crust with an overlying sediment layer that would be oldest near its South American and North American plate rifted margins. This oldest crust and sediment column should be a primary Caribbean drilling target but location of such crust is difficult. Most workers in the Gulf of Mexico agree that its tectonic activity ended near the end of the Jurassic, with Yucatan plate in place (although a variety of models for Yucatan plate motions to this point exist). The Chortis block was west of its present location and Pindell and Dewey (1982) and other authors have moved it back along the Bartlett Fault to a location South of the Yucatan plate; there have been suggestions that it was further west in the Pacific. The southeast edge of Yucatan is one plausible location of a Carib rifted margin and the Southeast edge of Chortis might also be one. There is evidence of a Late Jurassic rifted passive margin in the Eastern Cordillera and just west of Lake Maracaibo of northwest South America. Later tectonic activity may

have displaced this old Carib crust or destroyed it.

Reconstruction of the Caribbean plate location prior to start of its present eastward motion phase, provides one means of partially evaluating possible old crust location. Moving the Caribbean plate, including Chortis, back westward along the direction of the Barthelet Fault has been part of most evolution models but the amount of movement still needs to be determined; an excellent drilling program objective. Prior to the eastern motion of the Caribbean plate and formation of the Cayman spreading transform system, it is most likely that the Yucatan Basin was part of the Colombian Basin. Regardless of how one interprets the origin of the Yucatan Basin, it is important to note that the Cayman spreading system probably has isolated it from the complex Neogene and perhaps Paleogene tectonic evolution, making it a potential site for old Carib crust unaffected by the tertiary Caribbean tectonics to the South and East. A comparison between the extent of the mid-Carib spreading system at its terminus near the end of the Cretaceous (anomaly 33 time) as predicted by plate reconstructions with the Caribbean geometry predicted by Pindell and Dewey (1982) at about the beginning of the Neogene suggests that the Venezuela Basin may be the eastern Flank and the Colombia - Yucatan Basin the western Flank of the mid Carib spreading system. Crust in the eastern part of the Venezuela Basin (but west of Aves Ridge) potentially represents old Carib crust that was once near the South American Late Jurassic rifted margin. CAR 3 site region is a possibility sites near Beata Ridge should be near the abandoned spreading center and have a crustal age of Late Cretaceous.

The model of Pacific crust moving into the Caribbean must be evaluated in the framework of major plate paleopositions and Atlantic spreading center configurations. With the Gulf of Mexico formed by the end of the Jurassic, the plate reconstructions show that here is no reasonable way for a subduction zone system south of the Carib spreading system to migrate northward or for Pacific plate to push the Carib plate northward into a subduction zone until a reasonably wide ocean has developed, say by mid Cretaceous.

Space constraints on the width of this Carib ocean do put some reasonable constraints on a Pacific plate model to account for timing of Greater Antilles subduction. Compression along the Atlantic - Carib transform zone is an alternative to an invading Pacific plate model to account for Greater Antilles subduction time the appears to initiate from west to east and then to die out from west to east. Even assuming that a Pacific plate invasion did occur, pushing the Carib plate ahead of it and turning old Carib rift margins into transform margins, the Yucatan Basin would represent one of more likely sites of non-subducted Carib crust, displaced far to the north of its original location. The model of the Greater Antilles representing a subduction zone that has migrated northward from south of the Carib spreading system implies there probably is not old Carib crust left. Thus, this simplistic tectonic picture of the Caribbean evolution does help to put many tectonic models into perspective and permit some rational choice of potential drill sites.