

Atlantic Regional Panel Final Minutes: Executive Summary
April 2-3, 1987
Woods Hole Oceanographic Institution, Woods Hole, MA

The ARP had several drilling proposals on its agenda for review, but most of the members felt that it would be appropriate to spend time first on a group consideration of the members' regional/thematic interests in order to develop a viable context for the future consideration of such proposals. Each member was then asked to summarize his personal perspectives on important "Atlantic" problems and the best place(s) to consider their study/solution. The group then summarized and grouped these opinions under a number of major "Atlantic" topics. What follows probably constitutes the ARP's first (only?) attempt at outlining a "white paper".

Topics:

I. Continental Break-Up

- A. Sequences of tectonic events (including the effects of episodes of vertical tectonism and the evolution of sedimentary sequences), e.g.'s various (conjugate and non-conjugate) passive continental margins: Galicia (tectonics) and Cape Basin (sediments).
- B. Mechanisms of continental crust deformation and extension during rifting, e.g. Galicia.
- C. Development, evolution and re-integration of (continental) microplates, e.g. Rockall-Hatton-Greenland.
- D. Magmatic events and their evolution (pre-, syn- and post-separation), e.g.'s selected (sediment-starved) margin features: J-Anomaly Ridge and Madeira-Tore Rise.
- E. Identifying asymmetries in crustal structure across conjugate passive continental margins, e.g. Galicia-Newfoundland.
- F. Ocean-continent boundary structure and evolution, e.g.'s a variety of passive margins of different age and structure: particularly Galicia-Newfoundland.
- G. Sheared continental margins, e.g. Gulf of Guinea.

II. Evolution of Oceanic Lithosphere

- A. Slow-spreading ridges, including their deformation, hydrogeology and the history of magma chambers, e.g. Kane FZ/MARK area.
- B. Transform-ridge discontinuities, e.g.'s large-offset equatorial Atlantic FZ's.
- C. Cretaceous-Cenozoic intraplate volcanism, e.g. Venezuelan Basin.
- D. Paired aseismic ridges, e.g. Walvis Ridge/Rio Grande Rise.
- E. Emplacement of ultramafics into oceanic crust, e.g. MARK area (Site 670).
- F. Processes of aging in old oceanic crust; comparisons with ophiolites, e.g. Blake-Bahama Basin in vicinity of Blake Spur magnetic anomaly.
- G. Seaward-dipping wedges*, e.g.'s Rockall-Hatton, SE Greenland. *ARP felt that this feature could have been listed under Topic I. as well.

III. Convergence and Collision

- A. Continent-continent, e.g. Hellenic arc/Mediterranean.
- B. Accretionary tectonics on thickly-sedimented oceanic lithosphere with normal convergence, e.g. Barbados.
- C. Strike-slip convergent margins, e.g. North Scotia Ridge [continent-ocean], Azores-Gibraltar Ridge [ocean-ocean].
- D. Fore-arc basin evolution, e.g. Barbados.

IV. Paleooceanography

- A. Gateways

--opening, e.g.'s from south to north: Agulhas FZ, Walvis Ridge/Rio Grande Rise, equatorial shear zone, Iceland-Faeroes Ridge, Davis Strait and others.

--closing, e.g.'s eastern Mediterranean, western Caribbean.

B. Circulation patterns.

1. History of deep circulation, e.g.'s eastern vs. western basins; northern vs. southern basins.

2. Upwelling, e.g.'s northwest Africa, southwest Africa.

C. Black shales.

1. Pelagic vs. terrestrial signals, e.g. Madeira-Tore Rise.

2. Distribution in space and time.

D. Deep Stratigraphic Tests and standard reference sections, e.g.'s every major Atlantic depocenter.

E. Initiation of glaciation--Arctic vs. Antarctic.

V. Eustatic Sea Levels Through Time

A. Timing and magnitude of eustatic sea level events, e.g.'s eastern U.S. and Canada, Cape Basin.

B. Controls on the sedimentary record: shelf/slope/rise/abyssal plain continuum, e.g.'s transects of various margins.

VI. Catastrophes

A. Impacts, e.g. Montaignais structure, Scotian shelf off Nova Scotia.

Consideration of Drilling Proposals

Following this (very productive) summary of its drilling interests, ARP moved on to a discussion of the four proposals submitted for its consideration. Three came directly out of the recent JOI-USSAC Black Shales Workshop convened by P. Meyers and M. Arthur: 254/A, pt. 1 (Tucholke), 254/A, pt. 2 (Parrish) and 255/A (Zimmerman/Herbin). The fourth (264/A) was submitted by Jansa and Pe.-Piper of Canada, and regards an interpreted impact structure discovered on the Scotian Shelf south of Nova Scotia. Motions regarding these proposals are summarized below. All statements were voted on by the panel, and all votes were unanimous.

I. 254/A, pt. 1 (Tucholke)

"ARP has discussed the black shale letter proposal by Tucholke and the panel plans to take concepts encompassed by this document into consideration during the development of a future Atlantic drilling program. ARP encourages the continued development of this broad statement of concepts into a more mature drilling proposal, incorporating the recommendations of the JOI-USSAC Black Shales Workshop and in conjunction with other researchers interested in the study of "black shales" in the Atlantic. The development of such a proposal, with supporting seismic reflection records necessary for the display of suitable drilling targets, will be welcomed by ARP."

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"ARP encourages Tucholke and Parrish to revise and update their respective proposals, in particular consolidating the two into one, focusing on the space/time distribution of "black shales" in the eastern North Atlantic off Africa. In order to create a mature drilling proposal, objectives stated in the JOI-USSAC Black Shales Workshop should be incorporated, as should newer and better seismic data."

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"ARP considers the Zimmerman/Herbin proposal an interesting target for black shale history and South Atlantic-Central Atlantic connections, but not relevant for understanding the evolution of sheared margins. ARP suggests that the proponents incorporate this proposal in a more comprehensive one targeting the Mesozoic black shale history in the equatorial Atlantic. As part of this proposal, better seismic lines in support of assigned drilling targets are necessary."

IV. 264/A (Jansa/Pe.-Piper)

"ARP is particularly pleased to see the proposal by Jansa/Pe.-Piper, which represents a novel and innovative new use of the Ocean Drilling Program. We view the proposal as reasonably mature, but still somewhat lacking in high resolution seismic reflection data. ARP strongly endorses continued utilization of industry seismic data and the acquisition of new seismic and geochemical data to support the contention that the Montaignais feature is an impact structure. ARP also endorses the presentation of this proposal as an example of a new type of ocean drilling initiative at COSOD-II."

Other Business

Summary of ARP-endorsed workshop activities:

1. South Atlantic Workshop: funded by JOI-USSAC and scheduled for April 6-8, 1987, at Woods Hole Oceanographic Institution. Convener: J. Austin. All preparations complete.
2. Caribbean Workshop: funded by JOI-USSAC and scheduled for November 17-21, 1987, in Jamaica (Discovery Bay). Convener: B. Speed. Austin will request that ARP hold its next meeting in Jamaica immediately following the workshop in late November.
3. Mediterranean Workshop: to be held in Europe (perhaps Greece) in October, 1988. Conveners: J. Mascle, with A. Maldonado (Spain) and Makris (Greece).
4. Central Atlantic Workshop: proposal not yet written, but Tucholke/Klitgord will either write it themselves or get someone to do it. ARP felt that this workshop should be held no later than late spring-early summer, 1988.

Panel Rotation

1. After next meeting, K. Klitgord plans to rotate off. Suggested replacements were J. Karson (Duke), J. Fox (U.R.I.) and H. Dick (W.H.O.I.).

Next Meeting

1. If the Jamaica meeting site and November, 1987, timing are deemed unsuitable by PCOM, Austin will request Copenhagen, Denmark as an alternate. Time: mid-late March, 1988. H.-C. Larsen agreed to host that meeting.

Atlantic Regional Panel Final Minutes

On April 2 and 3, 1987, the Atlantic Regional Panel met at Woods Hole Oceanographic Institution, Woods Hole, MA. Brian E. Tucholke was our host. Attendance at the meeting was as follows:

ARP Members:

J. Austin, chairman
D. Sawyer
B. Tucholke
R. Speed
K. Klitgord (LITHP Liaison)
P. Meyers (SOHP Liaison)
C. Hemleben
J. Mascle
H. Okada
H. C. Larsen
F. Gradstein (alt. for L. Jansa)
D. Smythe (alt. for R. Whitmarsh)

Liaison:

J. P. Cadet, PCOM

Guests:

E. Taylor, ODP (Leg 108/Leg 110)
B. Bryan, WHOI (Leg 109)
H. Dick, WHOI

Day 1: April 2, morning

PCOM Report: Cadet

Summary of Hawaii (January 1987) Meeting

1. General administration

--Russian membership delayed by U.S.(NSC) reservations on transfer of technology aboard the drill ship. Resultant problems with budget (which included Russian contribution) may cause all planned drilling enhancements (i.e., drilling supplies, e.g. pipe, bits; development of riser drilling technology, maintenance of SEDCO crew levels) to be postponed/cancelled.

--Establishment of Budget Committee (BCOM) means standardization of PCOM meeting times.

--Panel membership (ARP): Sawyer replaces Mutter. Keen will probably replace Jansa next year.

--Panel meetings (U. von Rad motion): never less than once, but not more than twice without special permission. "Inactive" panels (e.g. ARP) should continue to meet at full

strength, though. The ARP policy of developing a workshop schedule was endorsed by PCOM.

2. COSOD-II - Strasbourg, July, 1987

--Invitations are not yet "in the mail." There are nearly 450 applications from the U.S. for 150 spots. Considerably less pressure from France, Japan and other international partners.

--White paper preparation is going well. All technical (TAMU, IFREMER and DMP) and scientific (five thematic) papers should be complete by May 15.

--One of the most important topics will be consideration of a multi-platform ODP. White paper by IFREMER.

--Conference proceedings to be published in dedicated issue of Tectonophysics, and a special report.

--For ARP, one of the most important objectives for the long-term is to have a lot of targets ready well in advance. Those ARP members attending COSOD-II should begin to talk this up, perhaps using the forthcoming South Atlantic workshop document.

3. Technology Improvements

--Drilling through alternating hard and soft layers. (see PANCHM Meeting Report, below)

--Navidrill testing (Leg 114, Subantarctic South Atlantic)

--Pressure Core Barrel

--Improving packer systems (trouble during Leg 110)

--High-temperature drilling (e.g. along the EPR)

--Drilling through fractured rocks

--Developing a coring motor for bare-rock drilling

--Further guide base development (Leg 118, SWIR)

4. Sampling Strategy

--General concerns expressed with both shipboard and post-cruise sampling

--PCOM felt that both plans should be defined well in advance

--PCOM also asserted that shipboard sampling for non-shipboard investigators should be minimized, unless approved prior to drilling legs

Discussion of Indian Ocean Program

1. While discussing Leg 123 (Argo Abyssal Plain), ARP briefly discussed the issue/importance of "reference" holes. What petrology/ geochemistry needs to be done? It was noted that a meeting of TEDCOM will be held in late April-early May to address the

related questions of fly-in re-entry, riser drilling, etc. in preparation for COSOD-II. K. Klitgord will attend for ARP.

2. Indian Ocean problems: insufficient site surveys (and a continuous and perhaps in part consequent reorientation of drilling perspectives); strong weather constraints; politics (e.g., Red Sea).

Discussion of WPAC Program

1. Four core programs: Bonins, Japan Sea, Nankai Trough and Sulu/South China Sea. A total of 9 drilling legs. Back-ups are Great Barrier Reef, Vanuatu and Lau Basin, for a total of 13 legs. A cohesive program, largely the result of good liaison between the WPAC Panel and thematic groups.

2. For now, the PCOM is keeping a three-year limit on drilling in the Pacific. But the issues of WPAC/CEPAC balance, amount of time to be spent on the EPR, etc. are unresolved.

3. There should be a strong COSOD-II influence on this program.

PANCHM II Report: Austin

1. The Panel Chairmen (PANCHM) met for the second time just prior to the January PCOM Meeting in Hawaii.

2. The PANCHM agreed that the advisory system is working as well as can be expected, with the exception of PCOM liaisons. Improvements over the past year have included joint thematic-regional panel meetings and more effective panel-to-panel liaisons.

3. As requested by the PCOM, PANCHM made recommendations concerning the high-priority engineering goals of ODP. These included drilling and effective recovery through young, fractured rocks and alternating hard (i.e., chert) and soft formations. (Note: A complete list of these recommendations will form part of the PCOM minutes for the Hawaii meeting. See the JOIDES Journal.)

LITHP Liaison Report: Klitgord

1. LITHP is writing a white paper summarizing their perspectives right now. ARP eagerly awaits this document.

a. R. Detrick/J. Malpas putting this report together.

b. Six major ideas, inc. nature and interaction of oceanic spreading centers and transforms, aging of the oceanic lithosphere, the relationships of convergent margins and back-arc basins, geochemical mass balances and testing the ophiolite model for the formation of oceanic crust.

2. J. Mutter, ex-ARP member now on the LITHP, a strong spokesperson for ARP perspectives.

3. Kim's report led to a discussion of ARP's response to LITHP's statement of thematic objectives. Most felt that an ARP white paper was also necessary, perhaps a written response incorporating the results of the workshops which ARP has already endorsed (see Day 2).

SOHP Liaison Report: Meyers

1. SOHP has had little PCOM liaison, a persistent problem.
2. Major themes at present:
 - a. "Deep Stratigraphic Tests" (DST's): Fans, Somali Basin, Argo abyssal plain: Deep-penetration, rotary-coring with good recovery.
 - b. "Paleo-upwelling and Productivity" (PUP): HPC/XCB coring, multiple holes and very high stratigraphic resolution. Many regions of interest.
 - c. "High-Latitude Paleoceanography": Concentration on the Cretaceous and Neogene.
3. However, a white paper is not at present in the works. ARP urged Meyers to convey to SOHP its desire for such a comprehensive document as a future aid to planning.

Leg 109 Report: Bryan (Note: I summarize the co-chief's recommendations to ARP based upon his cruise experiences, not the leg itself. For such summaries, refer to the Preliminary Report and the JOIDES Journal.)

1. All engineering problems encountered on this leg can be solved, given sufficient time and money.
2. Unsupported bare-rock spud-ins on young oceanic crust are successful enough to warrant rethinking of the use of large, complex guide bases for work on mid-ocean ridges.
3. Coneless re-entry (Site 670) made possible by employing downpipe TV camera near drill-bit.
4. However, core recovery in these environments is still a major problem, as are hole stability and consequent sticking of the drill-string. Rubble appears to be both a natural product of the geologic environment and a result of drilling disturbance and downhole contamination.
5. Eight days of standard logging at Site 395 a complete success.
6. Recommendations:
 - a. Drilling jars must be stronger.
 - b. Design smaller, simpler guide bases, and use direct spud-in where feasible to save time and money.
 - c. Drill and occupy "zero-age" holes continuously and then leave for good, rather than waiting years to reoccupy a site in a tectonically active environment, where continuing hole stability is a real problem.

Science Operator's Report: Taylor

1. Leg 114 left the Falklands 2.5 days ahead of schedule because no fuel tanker arrived. The drill ship will refuel at sea.

2. Leg 115 co-chiefs: B. Duncan and J. Backman.
3. Leg 116 co-chiefs: D. Stow and J. Cochran.
4. Leg 117 co-chiefs: W. Prell and N. Niitsuma.
5. Leg 118 co-chiefs: P. Robinson and D. von Herzen.
6. In-house publications: Part A's: Legs 101/102 are out, 103 is in press, 104 is in review. Manuscripts for part B volumes are often late, and sample delivery is part of the problem.
7. Technological developments:
 - a. Leg 113 tested lockable flapper valve, which allows logging through XCB/HPC BHA without dropping the bit.
 - b. Leg 114 will test the Navidrill, which already works on land, where the weight on the drill bit is constant. This device should improve recovery in fractured basalt and alternating hard and soft formations.
 - c. Additional development of packers and pore-fluid samplers.

Leg 108 Report: Taylor (Note: As with Leg 109, refer to Preliminary Report and JOIDES Journal for a scientific summary of this leg. I concentrate only on this leg's scientific and technological recommendations for ARP. Jack Baldauf was invited as the staff scientist for this leg, but he could not attend.)

1. Technological developments:
 - a. Used "side entry sub" for the first time, in order to trip pipe without pulling the logging string. Unfortunately, logging tools failed.
 - b. In order to correlate complete stratigraphic sequences sampled by HPC, the shipboard party made both whole round magnetic susceptibility and compressional wave velocity measurements.
2. Scientific accomplishments:
 - a. Biostratigraphic resolution better than 60,000 yrs. in sections less than 2.8 m.y. old. Detailed enough to look at climatic vs. oceanographic forcing functions on upwelling and wind circulation/eolian sediment input in the eastern equatorial Atlantic.
 - b. Evidence for polar glaciations as a forcing function at ca. 2.8 m.y. B.P.
 - c. Slumps along flank of Romanche FZ at 1.9 m.y. B.P. may be related to periodic seismicity. Recognized both lithologically and biostratigraphically.
3. Recommendations:
 - a. HPC recovery ca. 98%, but much lower in sandy turbidite sections. Improvements are necessary here.

b. Used a small reentry cone, hinged so that it could be wrapped around and dropped down the drill string, for "fly-in" re-entry using a drill-string TV camera. These cones required little storage space, and should be used where re-entry is desirable in soft formations and time is short.

Leg 110 Report: Taylor (see note for Leg 108)

1. Technological developments:

a. Downhole logging objectives almost completely unsuccessful.

1.) Drill-in packer tested at two sites (671/675), pumped to pressure, and either never inflated at all or never seated. Completely ruptured when it came to the surface. (Perhaps it became partially inflated on the way down?)

2.) There was no "side-entry sub" made of the right alloy for the geologic conditions available on the ship. Consequently, hole stabilization prior to logging was a problem (e.g. only 20 m. was logged at Site 672).

b. Site 641 did not encounter overpressure at the depth of the seismically observed decollement, and previously observed overpressure may have been created by "charging" the formation with drilling fluids (ref. DSDP Leg 78A). Plans are now being made to sense overpressure ahead of the HPC.

The input of the Cornell University physical properties workshop will also be made available for planning future convergent margin drilling.

2. Scientific accomplishments:

a. East to west transect (Sites 671-676) across the Barbados forearc, with Site 672 as a reference section seaward of the seismically observed accretionary zone.

b. Drilled to and through the decollement (Site 671): scaly fabric, anomalous geochemistry (low chlorine, high methane), repeated and overturned stratigraphic sections, porosity discontinuities, temperature anomalies (also at Site 672).

c. Evidence for subduction-related deformation/diagenesis at Site 672 a surprise.

Day 1, April 2, afternoon; Day 2, April 3, morning

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2. Caribbean Workshop: funded by JOI-USSAC and scheduled for November 17-21, 1987, in Jamaica (Discovery Bay). Convener: B. Speed. A discussion of this upcoming workshop produced the following points:

a. How will the workshop results be transmitted to ARP? Several members wanted to reestablish the Caribbean Working Group for this purpose, with a tenure lasting until completion of the next Atlantic drilling cycle. However, this motion was defeated by a vote of 7 opposed, 2 in favor, 1 abstention. Instead, ARP voted to nominate a subset of itself, consisting of Speed, Hemleben and Klitgord, for this purpose. Vote: 5 in favor, 3 opposed, 3 abstentions. Furthermore, Austin will request that ARP hold its next meeting in Jamaica immediately following the workshop in late November

b. Speed has requested UNESCO funding for Caribbean geologists (ca. 12 invited) to attend the workshop, but that support is uncertain.

3. Mediterranean Workshop: to be held in Europe (perhaps Greece) in October, 1988. Conveners: J. Mascle, with A. Maldonado (Spain) and Makris (Greece). ARP established another informal subset of itself, consisting of Mascle, Hemleben and Speed, to maintain communication between the Mediterranean workshop as it develops and ARP (Austin).

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