

EXECUTIVE SUMMARY  
INDIAN OCEAN PANEL MEETING  
Strasbourg (France), 4-8 July 1986

1. IOP noted with disappointment the absence of liaison members of the Lithosphere and Tectonics Panels at this most critical meeting.
2. IOP considered the status of recent and planned Indian Ocean site surveys, reviewed new and revised drilling proposals and finally discussed a two-option drilling program for the first six legs in the Indian Ocean :

Leg 115	SWIR-FZ	SWIR-FZ
Leg 116	Red Sea	Intraplate Def.-N 90ER
Leg 117	Neogene	Makran/Carb.Sat./Masc.
Leg 118	Makran/Carb.Sat./Masc.	Neogene
Leg 119	Kerguelen North	Kerguelen North
Leg 120	Kerguelen South	Kerguelen South

SWIR-FZ : Site survey funded (October 1986). IOP concur with SSP requirements and also urge that a camera survey be run in the selected fracture zone.

Red Sea : IOP strongly supports the Red Sea program. The Bannock Deep will not be surveyed, this reduces the Red Sea program by at least one site.

Intraplate Deformation - N 90ER : Site survey funded and almost completed.

Neogene : Site survey completed ; no major changes.

Makran : Main objectives can be addressed by a minimum of 4 to 5 sites (20 days). Processed MCS data will not be available prior to drilling.

Carbonate Saturated Profile : Depth transect of 4 sites north from Seychelles-Mascarene Plateau (12 days).

Mascarene Plateau : no changes in proposed sites (16 days).

Kerguelen North : no changes in proposed sites.

Kerguelen South : Site survey completed. Final revisions of the Kerguelen South program will be made by the French and Australians and discussed by the IOP-SOP Kerguelen Working Group.

3. Leg 118 in the first option (including Red Sea) and 117 in the second option is a combination of shorter programs : Makran (20 days), Carbonate Saturated Profile (12 days), Mascarene Plateau (16 days). Only two of these programs can be undertaken. The priorities have been defined by IOP : 1st Carbonate Saturated Profile (23 points), 2nd Mascarene Plateau (21 points), 3rd Makran (13 points).
- Leg 119 should start as early as possible (~ December 1, 1987) to allow maximum drilling time on the Kerguelen-Gaussberg Ridge. \*\* IOP strongly recommends that PCOM schedule the crew change between Leg 119 and 120 at Kerguelen rather than

Mauritius. Such action will save two weeks of critical drilling time in the short good weather window of this remote region \*\*.

5. IOP strongly supports the Intraplate Deformation, 90ER, Broken Ridge, Exmouth Plateau and Argo Abyssal Plain programs as previously scheduled and recommends as first alternative plan, if the Red Sea is not drilled, an extension of the Argo Abyssal Plain program. The Otway Basin Passive Margin is the next alternate if scheduled programs cannot be drilled.
6. IOP membership changes have been proposed to PCOM. Liaison members from IOP to other panels will be appointed, according to geographical proximity and expertise : R. Duncan for LITHP in Corvallis, W. Prell for SOHP in Ann Arbor.
7. IOP proposes R. Schlich, D. Falvey and W. Prell as their representatives at the IOP-SOP Kerguelen Workshop (October, 1986).
8. Nominees for co-chief scientists for Indian Ocean Legs are included in the minutes.
10. Next meeting between Nov. 1 and Dec. 15, in Miami or College Station.



LET'S FLY TO THE INDIAN OCEAN PANEL !

MINUTES OF THE INDIAN OCEAN PANEL MEETING

4-8 July 1986

Strasbourg, France

Members Present :

Dr. J. Backman  
Dr. J. Cochran  
Dr. J. Curray (7,8 July)  
Dr. R. Duncan, secretary  
Dr. D. Falvey  
Dr. F. Gradstein  
Dr. W. Prell  
Dr. U. von Rad  
Dr. R. Schlich, chairman  
Dr. J. Segawa (4,5,6 July)  
Dr. R. White (7,8 July)

Attending Guests :

Dr. G. Brass, NSF  
Dr. W. Hay, SOHP  
Dr. R. Larson, PCOM (4,7 July)  
Dr. A. Mauffret, SSP  
Dr. L. Mayer, SOHP (4,5 July)

Absent :

Dr. J. Sclater  
Dr. J. Leggett, TECP  
Dr. C. Langmuir, LITHP

The IOP opened its meeting on July 4 with a warm welcome by the chairman and host, Dr. Roland Schlich. A special welcome was extended to Dr. Jan Backman, representing the ESF membership, and to Dr. Bob White, returning to represent the United Kingdom.

The IOP noted with extreme disappointment the absence of liaison members of the Lithosphere and Tectonics Panels at this most critical meeting. We have lacked the important input of information from these thematic panels. This subject arose later during discussion of ODP panel membership.

The agenda for our meeting comprised :

1. General information, local logistics ;
2. Minutes of the IOP Meeting at San Francisco (12-14 December 1985) ;
3. PCOM Meeting at La Jolla (20-24 January 1986) ;
4. Thematic Panel Reports
  - . Tectonic Panel (Miami, 19-21 February and Seattle 5-6 June 1986)
  - . Lithosphere Panel (Seattle, 10-11 April 1986)
  - . Sediments and Ocean History Panel (La Jolla, 6-7 January and Boulder, 21-22 April 1986) ;

5. Site Survey Panel Report and status of recent and planned Indian Ocean site surveys ;
6. Panel Chairmen Meeting at Coryallis (3-4 April 1986) ;
7. Indian Ocean Panel Membership ;
8. Indian Ocean Panel Liason Members ;
9. PCOM Meeting at Lamont (28-30 May 1986) ;
10. Review of new and revised drilling proposals ;
11. Indian Ocean Drilling Program ;
12. Drilling Plan for leg 115 to 118 ;
13. Indian Ocean co-chief scientists for leg 115 to 118 ;
14. Ad'hoc IOP-SQP working group for Kerguelen I and Kerguelen II drilling plan.

The minutes of the 12-14 December, 1985 meeting were adopted.

Roger Larson remarked on the concise and effective executive summaries on Indian Ocean drilling legs produced by us for PCOM at our last meeting.

#### REPORTS FROM PCOM AND PANEL MEETINGS

##### Planning Committee

Roger Larson reviewed the conclusions of two PCOM meetings held since the last IOP meeting :

1. In January, 1986 meeting three Indian Ocean drilling programs (SWIR, 90ER and Red Sea) were in jeopardy because of site survey problems. Site surveys for SWIR and 90ER will be done. The Red Sea is still a sensitive political issue. The French and Germans have not been able to complete site surveys. The Saudis are developing a policy on ODP drilling in their waters but this is not expected until August or later. PCOM still supports the Red Sea drilling plan but has devised an alternative plan should the political situation fail to improve. The dual schedules will be considered again at the August PCOM meeting.

2. PCOM reviewed the panel structure and performance and decided to keep the present order of thematic and regional panels, with the following direction : that the 3 thematic panels define the global themes of drilling ; that the regional panels then construct a plan to meet those objectives in their regions,

with possible critique and revision of the themes ; that drilling programs be returned to the thematic panels for review and consensus. We discussed this new strategy and agreed that it potentially produced greater interaction between the panels than currently existed and could insure that programs that passed the final consensus would not be dismissed by PCOM without sound scientific, safety, or logistical reasons. It was noted that several programs endorsed by IOP in its last report to PCOM (Mascarene Fossil Ridge, Mascarene Plateau and Otway Basin) were not adequately discussed in the PCOM minutes.

3. Summarizing the May, 1986 PCOM meeting R. Larson noted that ESF has joined the ODP, bringing the total number of participating countries to 17. This has provided a sound financial base for the program. The USSR seems very interested but a very high level of approval is needed within that country and some positive action is expected in early 1987. Australia is currently negotiating with Canada at the ministerial level for a shared membership. The ODP budget for FY87 will be around \$ 35 million. Strengthening of engineering development and ODP publications are high priorities. COSOD II will be hosted by the ESF in Strasbourg during 6-10 July, 1987. Long-range goals of ODP after 1991 will be the subject of this meeting to be planned by a steering committee chaired by X. Le Pichon.

4. On the subject of panel membership, PCOM policy now is that individuals may serve on one panel and liaison members will not be voting members of panels. L. Mayer noted his objections in a letter to R. Larson.

5. Current operations were reviewed for Legs 107, 108 and 109. Of special interest was Leg 109 drilling into a serpentinite body within the MAR rift valley. The drill spudded in and cut well for 40 m, then was removed. Re-entry was achieved using only the drill-string TV camera and ship positioning and another 50 m were drilled.

6. R. Larson presented the two PCOM drilling schedules for the Indian Ocean up through Leg 120 (the second Kerguelen program). The prime option included Red Sea drilling, along with SWIR, Neogene, and Makran programs before the Kerguelen legs ; the second option substitutes Intraplate Deformation and Northern 90ER drilling for the Red Sea and reverses the order of Neogene and Makran drilling. PCOM has created a 6 member Kerguelen working group, composed of 3 IOP and 3 SOP members, to discuss and present a consensus drilling plan for the 2 Kerguelen legs.

### Tectonics Panel

No representative from the TECP attended so we had only the minutes from their last meeting. We noted their recommendations that if the Red Sea is not drilled, then the Makran should be, if SWIR is not drilled then an alternative Central Indian Ridge Fracture Zone (proposal 223/B) should be. The IOP again emphasized the importance of liaison member attendance at panel meetings.

### Lithosphere Panel

No representative from the LITHP attended so again we has to rely on the minutes of their last meeting. We noted that LITHP recommends the SWIR leg now that the site survey will occur ; the 90ER is a high priority ; the Kerguelen Plateau basement sites must be drilled into basement ; the LITHP strongly supports the Red Sea Program. If the Red Sea is not drilled, LITHP suggests that the ship leave the Indian Ocean early for Western Pacific sites.

In response to this last comment, IOP is totally opposed to the *Resolution* leaving the Indian Ocean early regardless of the Red Sea decision.

### Sediment and Ocean History Panel

Fortunately we has two representatives of the SOHP to present their latest recommendations on the Indian Ocean drilling program. W. Hay first reviewed the global themes of the SOHP. The April, 1986 meeting strongly endorsed the Kerguelen program. A deep, full recovery hole to basement in the Somali Basin was the next priority in the Indian Ocean. It was recognized that there did not appear to be adequate site survey information in the area of interest, and 1<sup>1/2</sup>-2 legs would be necessary under optimum conditions. If the deep stratigraphic hole could not be drilled in the Somali Basin then extra time should be added to the Argo Abyssal Plain drilling for full recovery and deepening of that hole. After the deep stratigraphic hole the highest SOHP priority is the Neogene II (Carbonate Saturation Profile) program. These paleoceanographic objectives are best met on a depth transect off the northern Mascarene Plateau. The 90ER transect does not meet SOHP objectives because sites are too deep (i.e. poor carbonate preservation), the slope are too steep, and HPC was not proposed for all sites.

Southern Oceans Panel

No liaison member attended but we had some written information from L. Leclaire. Our interaction with this panel focuses entirely on the second Kerguelen Leg which will be the job of the Kerguelen Working Group noted above.

We then discussed the logistical problem of crew change at Kerguelen using the *Marion Dufresne*. F. Gradstein and U. von Rad proposed a motion, carried unanimously, that :

\*\* The IOP strongly recommends that PCOM schedule the crew change between leg 119 and 120 at Kerguelen rather than Mauritius. Such action will save two weeks of critical drilling time in the short good weather window of this remote region \*\*

SITE SURVEY PANEL REPORT AND STATUS OF RECENT AND PLANNED INDIAN OCEAN SITE SURVEYS

A. Mauffret presented the comments and recommendations of the SSP from their last meeting at Sidney B.C. (22-25 April 1986). He noted that some efforts were being made to improve the underway geophysics data on *Resolution* but that these were constrained by the ship's noise.

Specific IOP program recommendations were :

115 SWIR - The H. Dick site survey has been funded and will occur October, 1986. The SSP has requested deep towed 3.5 Khz pinger for better definition of ponded sediment, and piston cores for geotechnical information.

116 Red Sea - C.A. Williams on *Darwin* is scheduled to complete site surveys for a few specific sites but permission to do this work has been denied by the Saudis. Only the site in Sudanese water (Sudan delta) could be surveyed now, reported R. White. These sites may alternatively be surveyed by Makris.

117 Neogene I - W. Prell has completed site survey work and will submit additional information to the ODP data bank for SSP. Additional work by *Darwin* and *Marion Dufresne* on the Indus Fan will be completed early 1987.

118 Makran - *Darwin* cruise scheduled for November-December, 1986 by R. White. Shallow drilling objectives may not need more than SCS. According to A. Mauffret SSP cannot, however, assure safety or good geological control without processed MCS. Alternative Western Indian Ocean programs have been discussed :

- . Mascarene Fossil Ridge - no longer scheduled.
- . Somali Basin - needs site survey, including good velocity determination, sediment thickness, and piston core for geotechnical properties. This appears unlikely.
- . Neogene II (Carbonate Saturation Profile) - some site survey data in hand, additional required can be obtained by *Darwin* (March, 1987) cruise. All are shallow, HPC holes, with one single bit core to basement on the Seychelles-Mascarene Plateau.
- . Mascarene Plateau - site surveys grids will be done by the *Darwin* (March, 1987), including SCS, 3.5 Khz, gravity and magnetics. Basement definition and sediment thickness are required, slumping and steep slopes to be avoided.

119, 120 Kerguelen North and South - two French cruises have been completed : Schlich (Jan., 1986) and Leclair (Feb. 1986). The new MCS records (4500 km) will be processed and will provide several crossings of existing BMR lines for final site selection. The French and Australians will meet in Strasbourg in August for this purpose.

Prydz Bay MCS lines have not been processed and are not likely to be in the near future as Southern Kerguelen lines have higher priority with BMR. A previously planned Japanese cruise to this area in late 1986 is now uncertain.

121 Intraplate Deformation and N90ER - J. Curray has just returned from surveying the northernmost (90ER-1) site. J. Weissel is currently doing surveys in the Intraplate Deformation area, and J. Sclater will finish this and survey the central 90ER sites.

122 Broken Ridge - J. Weissel will survey the Broken Ridge sites and the southern 90ER site. All work for legs 121 and 122 will be completed by September, 1986.

123 Argo Basin and Exmouth Plateau - site survey data are very satisfactory and await final processing.

D. Falvey reviewed the status of Otway Basin rifted margin sites. PCOM had instructed that previous sites lay too close to a transform fault so an MCS line further west was processed by BMR. A scheduled cruise (BMR) in Jan-Feb, 1987 could conduct additional site surveys if required.



### PANEL CHAIRMEN MEETING

R. Schlich presented the minutes of the 3-4 April Panel Chairmen meeting in Corvallis. The most important points for us were the conclusion that better communication between panels is necessary, specifically in the liaison system. The chairmen felt that PCOM decision-making was sometimes obscure, with unsatisfactory reasoning given for elimination of programs. Also requests for new members to panels were sometimes ignored. The 3-step process for panel evaluation of programs to be sent to PCOM was applauded.

### INDIAN OCEAN PANEL MEMBERSHIP

R. Schlich informed us of PCOM policy to have one-third rotation of panel membership each year, with individuals serving 3-year terms. In 1986 L. Tauxe, F. Gradstein (C), R. Herb (ESF), will have resigned. To comply with the rule a fourth member should be rotated in 1986. Replacements are J. Ludden (C), and A. Bossellini, J. Backman, alt. (ESF). Nominees for the remaining vacancies will be forwarded to PCOM.

Liaison members from IOP to other panels will be appointed by R. Schlich, determined by geographical proximity to the meeting and expertise. R. Duncan will attend the July LITHP meeting in Corvallis and W. Prell will attend the SOHP meeting in Ann Arbor.

### KERGUELEN WORKING GROUP MEMBERSHIP

The IOP proposes that their representatives be R. Schlich, D. Falyey and W. Prell. The workshop will meet sometime following the August PCOM meeting, probably October. IOP suggests San Diego or Hawaii.

### REVIEW OF NEW AND REVISED DRILLING PROPOSALS

1. Transform Fault Zone drilling. Proposal 223/B from J. Natland and R. Fisher to drill a fracture zone on the Central Indian Ridge was submitted as a backup to the SWIR program. Now that the site survey for SWIR is to be done the CIR program should not be considered further. Proposal 208/B by J. Natland et al. to

drill Oligocene crust to investigate petrochemical discontinuities was deemed premature, lacking adequate detail about present triple junction geochemical variability.

SWIR - We reviewed the H. Dick et al. site survey and drilling proposals (89/B revised) and make the following recommendations. Leave the seismic experiment out of the drilling program owing to time limitations and lack of second ship, but leave a re-entry cone at the deep mantle hole for a subsequent experiment which we agree is important. We expect that basalt rubble in the floor of the fracture zone will be the greatest obstacle to successful drilling. We concur with SSP that 3.5 Khz pinger be towed near the bottom to increase resolution in the sediment ponds and that piston cores be taken. We also urge that a camera survey be run in the selected fracture zone to determine the distribution of rubble, clean hard-rock surface, and sediments on the floor. We feel that this program is highly imaginative but also has high risk, so site surveys should be designated to reduce this risk as much as possible. We request that IOP chairman be informed of the results of the site survey as soon as possible.

2. Red Sea and Gulf of Aden. The difficulty of *Darwin* in obtaining permission from the Saudis means that only the Sudan delta site could be surveyed. This reduces the Red Sea program by at least one site (Bannock Deep, for which existing site survey data are inadequate). J. Cochran will contact Makris who has previously raised the possibility of Red Sea site surveys on *Meteor* in Jan, 1987. The M. Richardson and M. Arthur proposal (215/B) formalizes the paleoenvironmental sites. The R. Girdler (134/B) and P. Simpson (219/B) proposals for basement drilling in the Gulf of Aden were thought to be poorly sited, requiring drilling through very thick sections (2-3 km) with the sole purpose of checking a basement age. Such an objective could be combined with the Hominid ash layer stratigraphy objective if existing seismic lines showed a much thinner section. We feel the ash stratigraphy is the more important objective and should be the main objective in locating this site.

3. Somali Basin Deep Hole. We reviewed the rationale for SOHP deep stratigraphic holes (211/B) and looked at all existing MCS records of the Somali Basin, including unpublished section at IPGS. None were deemed adequate.

We fully endorse the importance of the Somali Basin deep hole objectives but also recognize the present problems in lack of site survey work and magnitude of drilling time required. We urge SOHP to develop the drilling rationale for incorporation in the COSOD II document and to encourage proponents to design and carry out the necessary geophysical and geological surveys for drilling.

4. Carbonate Saturation Profile (Neogene II). The L. Peterson and W. Prell proposal (97/B, 226/B) to examine Neogene productivity and circulation via a depth transect of 4 sites north from the Seychelles-Mascarene Plateau. All sites would be double HPC and the shallowest drilled to basement. We believe this is the optimum place to perform this experiment (the 90ER does not satisfy the requirements of depth range and shallow slopes). This program of 12 days could be combined with either Makran or Mascarene Plateau to form a complete leg.
5. Mascarene Plateau. No changes in 3 proposed sites ; awaiting site survey in March, 1987 by Baxter on *Darwin*.
6. Makran. The Nov-Dec 1986 Darwin site survey by R. White will conduct a land-sea refraction experiment, MCS lines, high-resolution seismic reflection profiles and collect piston cores. Existing SCS data show that gas hydrates are common in the upper 500 m of sediment, with a strong bottom simulating reflector at the underlying free-gas contact : this produces a strong safety constraint. Proposed drilling does not exceed 400 m. There is also evidence of localized shale diapirism and slumping. The Leggett & White proposal (55/B) could be shortened to a minimum of 4 or 5 sites which address the main objectives of drilling through the hypothesised thrust faults, determining pore pressures in the dewatered section, and investigating the processes of uplift and sedimentation. Based on W. Prell's calculations for the time required for double HPC holes for the Neogene proposal, the holes could be cored more quickly than allowed for in the original proposal, reducing the operation to about half a leg (20 days).
7. Neogene I. W. Prell suggested reducing the Indus Fan drilling from two sites to one and using the time gained to deepen one or two of the Owen Ridge holes. The Gulf of Aden hominid ash layer site is still planned as part of this program.

8. Exmouth Plateau. Proposal 121/B was revised by U. von Rad according to Safety Panel concerns with two previous sites near gas fields. The present program includes EP2, EP7, EP9B, EP10A, and AAP-1B.

9. Argo Abyssal Plain extension. F. Gradstein reviewed new proposal 240/B for a stratigraphic hole to basement on Jurassic crust in the Argo Abyssal Plain. The prime objective will be recovery of a Thethyan stratigraphic section. Recovery has been notoriously poor in previous Mesozoic drilling, so siting near AAP-1B will provide "double-coring" to improve recovery for high resolution paleoenvironment and stratigraphy. This site (AAP-2) is located on the Jurassic anomaly M25 and on a clear, processed MCS line, allowing age calibration of the magnetostratigraphic timescale for this period. It is also proposed that a vertical seismic profile (VSP) experiment be conducted at this site to identify stratigraphic reflectors. Finally, the two holes allow evaluation of microfossil distribution in 3-D in a quantitative sense (water depth : 5000 m ; hole depth : 1000 m ; drilling time estimation :  $9 + 1/2$  day transit = 9.5 days).

10. Kerguelen. Final revisions of the Kerguelen South program will be made by the French-Australian meeting at Strasbourg in August, using the processed BMR data and crossing lines from the Jan, 1986 French cruise (R. Schlich). New dredging and piston cores (L. Leclaire) provide additional information. The Kerguelen Working Group should produce a prognosis for each site and site-specific objectives.

11. Otway Basin Passive Margin. Informal advice was received in early 1986 from PCOM that the proposal for drilling on the Otway Passive Margin submitted by Willcox et al. (197/B) and reviewed and recommended by IOP at its meeting in San Francisco (12-14 December, 1985) was considered to be too close to the West Tasmania Transform. New seismic data were presented to IOP for consideration (BMR line 48.043 - along  $140^{\circ}$ E). This fully processed and migrated multichannel section extends from an open-file continental shelf exploration well to the continent/ocean boundary and shows that an essentially complete pre-breakup and post-breakup Cretaceous section crops-out or is close to the seafloor on the lower continental slope, within practical drilling depth. Volcanics are

largely absent. An extensive dredging (with possible add-on site survey) program is firmly scheduled for January, 1987. IOP considers this an excellent and well prepared passive margin proposal and strongly recommends this program as a first alternate during the 1988 Indian Ocean drilling if scheduled programs cannot be drilled or as a scheduled program during a later period, if the Southern Pacific and/or Antarctica is being drilled after the SW and NE Pacific drilling program.

INDIAN OCEAN DRILLING PROGRAM

We have discussed the two drilling plan options received from PCOM with regard to scientific objectives, specific site drilling times, and logistics. We make the following recommendations on the two plans :

The Red Sea Option (Table I)

	Transit Time	Est. Drill Times	Available Time	Schedule Total	Port Time
113 Weddell Sea Falklands	24	44	41	65	5
114 SubAntarctic Mauritius	24	?	32	56	5
115 SWIRFZ Djibouti	14	33	33	47	5
116 Red Sea Mina Qaboos	11	39	39	50	5
117 Neogene Pkg. Karachi	5	40	39	45	5
* 118 Makran/Carb.Sat./Masc. Mauritius	10	32	34	42	5
119 No. Kerguelen Mauritius	14	35	47	61	5
120 So. Kerguelen Fremantle	21	35	39	60	5

\* Shortened Makran program or Carbonate Saturation Profile or Mascarene Plateau, with drilling times of 20, 12, 16 days, respectively.

The Intraplate/N90ER Option (Table 2)

	Transit Time	Est. Drill Times	Available Time	Schedule Total	Port Time
113 Weddell Sea Falklands	24	44	41	65	5
114 SubAntarctic Mauritius	24	?	32	56	5
115 SWIRFZ Colombo	9	33	38	42	5
116 Intraplate/N90E Karachi	14	36	36	50	5
* 117 Makran/Carb.Sat./Masc. Mina Qaboos	2	40	42	42	5
118 Neogene Pkg. Mauritius	10	45	34	50	5
119 No. Kerguelen Mauritius	14	35	47	61	5
120 So. Kerguelen Fremantle	21	35	39	60	5

\* Shortened Makran program or Carbonate Saturation Profile or Mascarene Plateau, with drilling times of 20, 12, 16 days, respectively.

The leg numbered 118 in the Red Sea Option (Table 1) and 117 in the second option (Table 2) is a combination of shorter programs. We calculate that there are 32 days for operations in the Red Sea plan and 40 days in the second plan for this leg, and consequently only two of the proposed programs can be undertaken.

We have voted on the priority of these programs in constructing a drilling leg :

- first priority : Carbonate Saturation Profile (23 points)
- second priority : Mascarene Plateau (21 points)
- third priority : Makran (13 points).

Leg 119 should start as early as possible (December 1, 1987) to allow maximum drilling time on the Kerguelen-Gaussberg Ridge.

NOMINATIONS FOR CO-CHIEF SCIENTISTS FOR INDIAN OCEAN LEGS

	U.S.	non-U.S.
115 SWIR	R.von Herzen; H.Dick; J. Natland	R.Robinson(Can.); J.Malpas(Can.); K.Bostrom(ESF).
116 Red Sea	J. Cochran; E. Bonatti	H.Bäcker(D); P.Guennoc(F); G.Pautot(F).
117 Neogene	W.Prell; J.Cochran	N.Kenyon(UK); R.Kidd(UK).
118 Makran/Carb.Sat./Masc. . Makran		J.Leggett(UK); R.White(UK); R.Hesse(Can.).
. Carb.Sat.	L.Peterson; W.Curray	H.Thirstein(ESF); A.Baxter(UK).
. Mascarene	R.Duncan; R.Fisher	A.Baxter(UK).
119/120 Kerguelen(N&S)	W.Berggren; R.Wise	R.Schlich(F); D.Falvey(Aust.); K.Perch-Nielsen(ESF); L.Leclaire(F); H.Schrader(ESF).
121 Broken R/S 90ER	J.Sclater; J.Weissel; R.Duncan	J.Pierce(Can.); R.Herb(ESF);
122 Intraplate/N 90ER	J.Weissel; J.Curray	J.Pierce(Can.); R.Scrutton(UK); R.Herb(ESF).
123 Exmouth/Argo	J.Mutter; R.Larson	U.von Rad(D); N.Exon(Aust.); F.Gradstein(Can.); P.Williamson(Aust.).

NEXT IOP MEETING

The next meeting will be sometime between Nov 1 and Dec 15, in Miami or College Station. A representative of the Downhole Measurements Panel should attend this meeting.

**INSTITUT DE PHYSIQUE DU GLOBE DE STRASBOURG**

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

INSTITUT NATIONAL D'ASTRONOMIE ET DE GÉOPHYSIQUE

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July 15, 1986

Dr. Roger L. LARSON  
University of Rhode Island  
Graduate School of Oceanography  
JOIDES Office  
Narragansett, R.I. 02882-1197  
U.S.A.

Dear Roger,

I am sorry you could not attend all the sessions of our last Indian Ocean Panel Meeting. I am also sorry for the Saturday evening session and the Sunday excursion. Next time I hope you will do better !

Enclosed are the minutes of the meeting. They have been posted to the panel members for approval. I shall distribute the final version as soon as possible.

I am preparing a note concerning the IOP membership rotation scheme. Four members should rotate in 1986. I have already F. Gradstein, R. Herb and L. Tauxe who have resigned. None of the other members who attended the Strasbourg meeting are willing to leave the panel before 1987. I don't know about J. Sclater who was absent. May I suggest we stay with the three above mentioned changes, leaving to J. Sclater the decision whether he remains or resigns. F. Gradstein and R. Herb have been replaced, the remaining vacancy(ies) should be filled by PCOM at its next meeting. I would like to have your input before finalizing the complete three year rotation scheme.

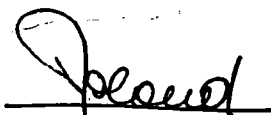
As proposed in our minutes, liaison members from IOP to other panels should be chosen according to geographical proximity and expertise. R. Duncan should be appointed for the next LITHP meeting in Corvallis and W. Prell for the next SOHP meeting in Ann Arbor. Please let me know the place and time for the next TECP meeting.

The IOP-SOP Kerguelen Workshop should meet in October. I suggest sometime between 20 and 31 October, 1986 to allow a maximum time for processing the french MCS South Kerguelen data. San Diego and Hawaii have been proposed. Hawaii is really far from Europe. We need a place with good working facilities : Dave and I, and probably the Prydz Bay people, will have miles of seismic sections. What are the dates proposed by the SOP members ?



The next IOP meeting should be after the Kerguelen Workshop and before December, 15. Taking into account the IOP member commitments (members present on July 8 afternoon), I found only one possibility : 20-22 November. Other solutions are : 13-15 November (with B. Hay absent) or 4-6 December (with D. Falvey absent on 4 and 5). The meeting could be in Miami or College Station. Please let me know your decision as soon as possible. I think we should have someone from the Downhole Measurements Panel at our next meeting.

Best regards,

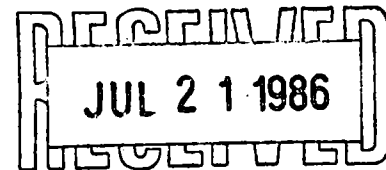
  
R. SCHLICH

c.c. IOP members

MINUTES OF THE INDIAN OCEAN PANEL MEETING

4-8 July 1986

Strasbourg, France



Members Present :

Dr. J. Backman  
Dr. J. Cochran  
Dr. J. Curray (7,8 July)  
Dr. R. Duncan, secretary  
Dr. D. Falvey  
Dr. F. Gradstein  
Dr. W. Prell  
Dr. U. von Rad  
Dr. R. Schlich, chairman  
Dr. J. Segawa (4,5,6 July)  
Dr. R. White (7,8 July)

Attending Guests :

Dr. G. Brass, NSF  
Dr. W. Hay, SOHP  
Dr. R. Larson, PCOM (4,7 July)  
Dr. A. Mauffret, SSP  
Dr. L. Mayer, SOHP (4,5 July)

Absent :

Dr. J. Sclater  
Dr. J. Leggett, TECP  
Dr. C. Langmuir, LITHP

The IOP opened its meeting on July 4 with a warm welcome by the chairman and host, Dr. Roland Schlich. A special welcome was extended to Dr. Jan Backman, representing the ESF membership, and to Dr. Bob White, returning to represent the United Kingdom.

The IOP noted with extreme disappointment the absence of liaison members of the Lithosphere and Tectonics Panels at this most critical meeting. We have lacked the important input of information from these thematic panels. This subject arose later during discussion of ODP panel membership.

The agenda for our meeting comprised :

1. General information, local logistics ;
2. Minutes of the IOP Meeting at San Francisco (12-14 December 1985) ;
3. PCOM Meeting at La Jolla (20-24 January 1986) ;
4. Thematic Panel Reports
  - . Tectonic Panel (Miami, 19-21 February and Seattle 5-6 June 1986)
  - . Lithosphere Panel (Seattle, 10-11 April 1986)
  - . Sediments and Ocean History Panel (La Jolla, 6-7 January and Boulder, 21-22 April 1986) ;

5. Site Survey Panel Report and status of recent and planned Indian Ocean site surveys ;
6. Panel Chairmen Meeting at Corvallis (3-4 April 1986) ;
7. Indian Ocean Panel Membership ;
8. Indian Ocean Panel Liason Members ;
9. PCOM Meeting at Lamont (28-30 May 1986) ;
10. Review of new and revised drilling proposals ;
11. Indian Ocean Drilling Program ;
12. Drilling Plan for leg 115 to 118 ;
13. Indian Ocean co-chief scientists for leg 115 to 118 ;
14. Ad'hoc IOP-SOP working group for Kerguelen I and Kerguelen II drilling plan.

The minutes of the 12-14 December, 1985 meeting were adopted.

Roger Larson remarked on the concise and effective executive summaries on Indian Ocean drilling legs produced by us for PCOM at our last meeting.

#### REPORTS FROM PCOM AND PANEL MEETINGS

##### Planning Committee

Roger Larson reviewed the conclusions of two PCOM meetings held since the last IOP meeting :

1. In January, 1986 meeting three Indian Ocean drilling programs (SWIR, 90ER and Red Sea) were in jeopardy because of site survey problems. Site surveys for SWIR and 90ER will be done. The Red Sea is still a sensitive political issue. The French and Germans have not been able to complete site surveys. The Saudis are developing a policy on ODP drilling in their waters but this is not expected until August or later. PCOM still supports the Red Sea drilling plan but has devised an alternative plan should the political situation fail to improve. The dual schedules will be considered again at the August PCOM meeting.

2. PCOM reviewed the panel structure and performance and decided to keep the present order of thematic and regional panels, with the following direction : that the 3 thematic panels define the global themes of drilling ; that the regional panels then construct a plan to meet those objectives in their regions,

with possible critique and revision of the themes ; that drilling programs be returned to the thematic panels for review and consensus. We discussed this new strategy and agreed that it potentially produced greater interaction between the panels than currently existed and could insure that programs that passed the final consensus would not be dismissed by PCOM without sound scientific, safety, or logistical reasons. It was noted that several programs endorsed by IOP in its last report to PCOM (Mascarene Fossil Ridge, Mascarene Plateau and Otway Basin) were not adequately discussed in the PCOM minutes.

3. Summarizing the May, 1986 PCOM meeting R. Larson noted that ESF has joined the ODP, bringing the total number of participating countries to 17. This has provided a sound financial base for the program. The USSR seems very interested but a very high level of approval is needed within that country and some positive action is expected in early 1987. Australia is currently negotiating with Canada at the ministerial level for a shared membership. The ODP budget for FY87 will be around \$ 35 million. Strengthening of engineering development and ODP publications are high priorities. COSOD II will be hosted by the ESF in Strasbourg during 6-10 July, 1987. Long-range goals of ODP after 1991 will be the subject of this meeting to be planned by a steering committee chaired by X. Le Pichon.

4. On the subject of panel membership, PCOM policy now is that individuals may serve on one panel and liaison members will not be voting members of panels. L. Mayer noted his objections in a letter to R. Larson.

5. Current operations were reviewed for Legs 107, 108 and 109. Of special interest was Leg 109 drilling into a serpentinite body within the MAR rift valley. The drill spudded in and cut well for 40 m, then was removed. Re-entry was achieved using only the drill-string TV camera and ship positioning and another 50 m were drilled.

6. R. Larson presented the two PCOM drilling schedules for the Indian Ocean up through Leg 120 (the second Kerguelen program). The prime option included Red Sea drilling, along with SWIR, Neogene, and Makran programs before the Kerguelen legs ; the second option substitutes Intraplate Deformation and Northern 90ER drilling for the Red Sea and reverses the order of Neogene and Makran drilling. PCOM has created a 6 member Kerguelen working group, composed of 3 IOP and 3 SOP members, to discuss and present a consensus drilling plan for the 2 Kerguelen legs.

### Tectonics Panel

No representative from the TECP attended so we had only the minutes from their last meeting. We noted their recommendations that if the Red Sea is not drilled, then the Makran should be, if SWIR is not drilled then an alternative Central Indian Ridge Fracture Zone (proposal 223/B) should be. The IOP again emphasized the importance of liaison member attendance at panel meetings.

### Lithosphere Panel

No representative from the LITHP attended so again we has to rely on the minutes of their last meeting. We noted that LITHP recommends the SWIR leg now that the site survey will occur ; the 90ER is a high priority ; the Kerguelen Plateau basement sites must be drilled into basement ; the LITHP strongly supports the Red Sea Program. If the Red Sea is not drilled, LITHP suggests that the ship leave the Indian Ocean early for Western Pacific sites.

In response to this last comment, IOP is totally opposed to the *Resolution* leaving the Indian Ocean early regardless of the Red Sea decision.

### Sediment and Ocean History Panel

Fortunately we has two representatives of the SOHP to present their latest recommendations on the Indian Ocean drilling program. W. Hay first reviewed the global themes of the SOHP. The April, 1986 meeting strongly endorsed the Kerguelen program. A deep, full recovery hole to basement in the Somali Basin was the next priority in the Indian Ocean. It was recognized that there did not appear to be adequate site survey information in the area of interest, and 1<sup>1/2</sup>-2 legs would be necessary under optimum conditions. If the deep stratigraphic hole could not be drilled in the Somali Basin then extra time should be added to the Argo Abyssal Plain drilling for full recovery and deepening of that hole. After the deep stratigraphic hole the highest SOHP priority is the Neogene II (Carbonate Saturation Profile) program. These paleoceanographic objectives are best met on a depth transect off the northern Mascarene Plateau. The 90ER transect does not meet SOHP objectives because sites are too deep (i.e. poor carbonate presevation), the slope are too steep, and HPC was not proposed for all sites.

### Southern Oceans Panel

No liaison member attended but we had some written information from L. Leclaire. Our interaction with this panel focuses entirely on the second Kerguelen Leg which will be the job of the Kerguelen Working Group noted above.

We then discussed the logistical problem of crew change at Kerguelen using the *Marion Dufresne*. F. Gradstein and U. von Rad proposed a motion, carried unanimously, that :

\*\* The IOP strongly recommends that PCOM schedule the crew change between leg 119 and 120 at Kerguelen rather than Mauritius. Such action will save two weeks of critical drilling time in the short good weather window of this remote region \*\*

### SITE SURVEY PANEL REPORT AND STATUS OF RECENT AND PLANNED INDIAN OCEAN SITE SURVEYS

A. Mauffret presented the comments and recommendations of the SSP from their last meeting at Sidney B.C. (22-25 April 1986). He noted that some efforts were being made to improve the underway geophysics data on *Resolution* but that these were constrained by the ship's noise.

Specific IOP program recommendations were :

115 SWIR - The H. Dick site survey has been funded and will occur October, 1986. The SSP has requested deep towed 3.5 Khz pinger for better definition of ponded sediment, and piston cores for geotechnical information.

116 Red Sea - C.A. Williams on *Darwin* is scheduled to complete site surveys for a few specific sites but permission to do this work has been denied by the Saudis. Only the site in Sudanese water (Sudan delta) could be surveyed now, reported R. White. These sites may alternatively be surveyed by Makris.

117 Neogene I - W. Prell has completed site survey work and will submit additional information to the ODP data bank for SSP. Additional work by *Darwin* and *Marion Dufresne* on the Indus Fan will be completed early 1987.

118 Makran - *Darwin* cruise scheduled for November-December, 1986 by R. White. Shallow drilling objectives may not need more than SCS. According to A. Mauffret SSP cannot, however, assure safety or good geological control without processed MCS. Alternative Western Indian Ocean programs have been discussed :

- Mascarene Fossil Ridge - no longer scheduled.
- Somali Basin - needs site survey, including good velocity determination, sediment thickness, and piston core for geotechnical properties. This appears unlikely.
- Neogene II (Carbonate Saturation Profile) - some site survey data in hand, additional required can be obtained by *Darwin* (March, 1987) cruise. All are shallow, HPC holes, with one single bit core to basement on the Seychelles-Mascarene Plateau.
- Mascarene Plateau - site surveys grids will be done by the *Darwin* (March, 1987), including SCS, 3.5 Khz, gravity and magnetics. Basement definition and sediment thickness are required, slumping and steep slopes to be avoided.

119, 120 Kerguelen North and South - two French cruises have been completed : Schlich (Jan., 1986) and Leclair (Feb. 1986). The new MCS records (4500 km) will be processed and will provide several crossings of existing BMR lines for final site selection. The French and Australians will meet in Strasbourg in August for this purpose.

Prydz Bay MCS lines have not been processed and are not likely to be in the near future as Southern Kerguelen lines have higher priority with BMR. A previously planned Japanese cruise to this area in late 1986 is now uncertain.

121 Intraplate Deformation and N90ER - J. Curray has just returned from surveying the northernmost (90ER-1) site. J. Weissel is currently doing surveys in the Intraplate Deformation area, and J. Sclater will finish this and survey the central 90ER sites.

122 Broken Ridge - J. Weissel will survey the Broken Ridge sites and the southern 90ER site. All work for legs 121 and 122 will be completed by September, 1986.

123 Argo Basin and Exmouth Plateau - site survey data are very satisfactory and await final processing.

D. Falvey reviewed the status of Otway Basin rifted margin sites. PCOM had instructed that previous sites lay too close to a transform fault so an MCS line further west was processed by BMR. A scheduled cruise (BMR) in Jan-Feb, 1987 could conduct additional site surveys if required.

### PANEL CHAIRMEN MEETING

R. Schlich presented the minutes of the 3-4 April Panel Chairmen meeting in Corvallis. The most important points for us were the conclusion that better communication between panels is necessary, specifically in the liaison system. The chairmen felt that PCOM decision-making was sometimes obscure, with unsatisfactory reasoning given for elimination of programs. Also requests for new members to panels were sometimes ignored. The 3-step process for panel evaluation of programs to be sent to PCOM was applauded.

### INDIAN OCEAN PANEL MEMBERSHIP

R. Schlich informed us of PCOM policy to have one-third rotation of panel membership each year, with individuals serving 3-year terms. In 1986 L. Tauxe, F. Gradstein (C), R. Herb (ESF), will have resigned. To comply with the rule a fourth member should be rotated in 1986. Replacements are J. Ludden (C), and A. Bossellini, J. Backman, alt. (ESF). Nominees for the remaining vacancies will be forwarded to PCOM.

Liaison members from IOP to other panels will be appointed by R. Schlich, determined by geographical proximity to the meeting and expertise. R. Duncan will attend the July LITHP meeting in Corvallis and W. Prell will attend the SOHP meeting in Ann Arbor.

### KERGUELEN WORKING GROUP MEMBERSHIP

The IOP proposes that their representatives be R. Schlich, D. Falvey and W. Prell. The workshop will meet sometime following the August PCOM meeting, probably October. IOP suggests San Diego or Hawaii.

### REVIEW OF NEW AND REVISED DRILLING PROPOSALS

1. Transform Fault Zone drilling. Proposal 223/B from J. Natland and R. Fisher to drill a fracture zone on the Central Indian Ridge was submitted as a backup to the SWIR program. Now that the site survey for SWIR is to be done the CIR program should not be considered further. Proposal 208/B by J. Natland et al. to



drill Oligocene crust to investigate petrochemical discontinuities was deemed premature, lacking adequate detail about present triple junction geochemical variability.

SWIR - We reviewed the H. Dick et al. site survey and drilling proposals (89/B revised) and make the following recommendations. Leave the seismic experiment out of the drilling program owing to time limitations and lack of second ship, but leave a re-entry cone at the deep mantle hole for a subsequent experiment which we agree is important. We expect that basalt rubble in the floor of the fracture zone will be the greatest obstacle to successful drilling. We concur with SSP that 3.5 KHz pinger be towed near the bottom to increase resolution in the sediment ponds and that piston cores be taken. We also urge that a camera survey be run in the selected fracture zone to determine the distribution of rubble, clean hard-rock surface, and sediments on the floor. We feel that this program is highly imaginative but also has high risk, so site surveys should be designated to reduce this risk as much as possible. We request that IOP chairman be informed of the results of the site survey as soon as possible.

2. Red Sea and Gulf of Aden. The difficulty of *Darwin* in obtaining permission from the Saudis means that only the Sudan delta site could be surveyed. This reduces the Red Sea program by at least one site (Bannock Deep, for which existing site survey data are inadequate). J. Cochran will contact Makris who has previously raised the possibility of Red Sea site surveys on *Meteor* in Jan, 1987. The M. Richardson and M. Arthur proposal (215/B) formalizes the paleoenvironmental sites. The R. Girdler (134/B) and P. Simpson (219/B) proposals for basement drilling in the Gulf of Aden were thought to be poorly sited, requiring drilling through very thick sections (2-3 km) with the sole purpose of checking a basement age. Such an objective could be combined with the Hominid ash layer stratigraphy objective if existing seismic lines showed a much thinner section. We feel the ash stratigraphy is the more important objective and should be the main objective in locating this site.

3. Somali Basin Deep Hole. We reviewed the rationale for SOHP deep stratigraphic holes (211/B) and looked at all existing MCS records of the Somali Basin, including unpublished section at IPGS. None were deemed adequate.

We fully endorse the importance of the Somali Basin deep hole objectives but also recognize the present problems in lack of site survey work and magnitude of drilling time required. We urge SOHP to develop the drilling rationale for incorporation in the COSOD II document and to encourage proponents to design and carry out the necessary geophysical and geological surveys for drilling.

4. Carbonate Saturation Profile (Neogene II). The L. Peterson and W. Prell proposal (97/B, 226/B) to examine Neogene productivity and circulation via a depth transect of 4 sites north from the Seychelles-Mascarene Plateau. All sites would be double HPC and the shallowest drilled to basement. We believe this is the optimum place to perform this experiment (the 90ER does not satisfy the requirements of depth range and shallow slopes). This program of 12 days could be combined with either Makran or Mascarene Plateau to form a complete leg.

5. Mascarene Plateau. No changes in 3 proposed sites ; awaiting site survey in March, 1987 by Baxter on *Darwin*.

6. Makran. The Nov-Dec 1986 Darwin site survey by R. White will conduct a land-sea refraction experiment, MCS lines, high-resolution seismic reflection profiles and collect piston cores. Existing SCS data show that gas hydrates are common in the upper 500 m of sediment, with a strong bottom simulating reflector at the underlying free-gas contact : this produces a strong safety constraint. Proposed drilling does not exceed 400 m. There is also evidence of localized shale diapirism and slumping. The Leggett & White proposal (55/B) could be shortened to a minimum of 4 or 5 sites which address the main objectives of drilling through the hypothesised thrust faults, determining pore pressures in the dewatered section, and investigating the processes of uplift and sedimentation. Based on W. Prell's calculations for the time required for double HPC holes for the Neogene proposal, the holes could be cored more quickly than allowed for in the original proposal, reducing the operation to about half a leg (20 days).

7. Neogene I. W. Prell suggested reducing the Indus Fan drilling from two sites to one and using the time gained to deepen one or two of the Owen Ridge holes. The Gulf of Aden hominid ash layer site is still planned as part of this program.

8. Exmouth Plateau. Proposal 121/B was revised by U. von Rad according to Safety Panel concerns with two previous sites near gas fields. The present program includes EP2, EP7, EP9B, EP10A, and AAP-1B.

9. Argo Abyssal Plain extension. F. Gradstein reviewed new proposal 240/B for a stratigraphic hole to basement on Jurassic crust in the Argo Abyssal Plain. The prime objective will be recovery of a Thethyan stratigraphic section. Recovery has been notoriously poor in previous Mesozoic drilling, so siting near AAP-1B will provide "double-coring" to improve recovery for high resolution paleoenvironment and stratigraphy. This site (AAP-2) is located on the Jurassic anomaly M25 and on a clear, processed MCS line, allowing age calibration of the magnetostratigraphic timescale for this period. It is also proposed that a vertical seismic profile (VSP) experiment be conducted at this site to identify stratigraphic reflectors. Finally, the two holes allow evaluation of microfossil distribution in 3-D in a quantitative sense (water depth : 5000 m ; hole depth : 1000 m ; drilling time estimation :  $9 + 1/2$  day transit = 9.5 days).

10. Kerguelen. Final revisions of the Kerguelen South program will be made by the French-Australian meeting at Strasbourg in August, using the processed BMR data and crossing lines from the Jan, 1986 French cruise (R. Schlich). New dredging and piston cores (L. Leclaire) provide additional information. The Kerguelen Working Group should produce a prognosis for each site and site-specific objectives.

11. Otway Basin Passive Margin. Informal advice was received in early 1986 from PCOM that the proposal for drilling on the Otway Passive Margin submitted by Willcox et al. (197/B) and reviewed and recommended by IOP at its meeting in San Francisco (12-14 December, 1985) was considered to be too close to the West Tasmania Transform. New seismic data were presented to IOP for consideration (BMR line 48.043 - along  $140^{\circ}$ E). This fully processed and migrated multichannel section extends from an open-file continental shelf exploration well to the continent/ocean boundary and shows that an essentially complete pre-breakup and post-breakup Cretaceous section crops-out or is close to the seafloor on the lower continental slope, within practical drilling depth. Volcanics are

largely absent. An extensive dredging (with possible add-on site survey) program is firmly scheduled for January, 1987. IOP considers this an excellent and well prepared passive margin proposal and strongly recommends this program as a first alternate during the 1988 Indian Ocean drilling if scheduled programs cannot be drilled or as a scheduled program during a later period, if the Southern Pacific and/or Antarctica is being drilled after the SW and NE Pacific drilling program.

INDIAN OCEAN DRILLING PROGRAM

We have discussed the two drilling plan options received from PCOM with regard to scientific objectives, specific site drilling times, and logistics. We make the following recommendations on the two plans :

The Red Sea Option (Table I)

	Transit Time	Est. Drill Times	Available Time	Schedule Total	Port Time
113 Weddell Sea Falklands	24	44	41	65	5
114 SubAntarctic Mauritius	24	?	32	56	5
115 SWIRFZ Djibouti	14	33	33	47	5
116 Red Sea Mina Qaboos	11	39	39	50	5
117 Neogene Pkg. Karachi	5	40	39	45	5
* 118 Makran/Carb.Sat./Masc. Mauritius	10	32	34	42	5
119 No. Kerguelen Mauritius	14	35	47	61	5
120 So. Kerguelen Fremantle	21	35	39	60	5

\* Shortened Makran program or Carbonate Saturation Profile or Mascarene Plateau, with drilling times of 20, 12, 16 days, respectively.

The Intraplate/N90ER Option (Table 2)

	Transit Time	Est. Drill Times	Available Time	Schedule Total	Port Time
113 Weddell Sea Falklands	24	44	41	65	5
114 SubAntarctic Mauritius	24	?	32	56	5
115 SWIRFZ Colombo	9	33	38	42	5
116 Intraplate/N90E Karachi	14	36	36	50	5
* 117 Makran/Carb.Sat./Masc. Mina Qaboos	2	40	42	42	5
118 Neogene Pkg. Mauritius	10	45	34	50	5
119 No. Kerguelen Mauritius	14	35	47	61	5
120 So. Kerguelen Fremantle	21	35	39	60	5

\* Shortened Makran program or Carbonate Saturation Profile or Mascarene Plateau, with drilling times of 20, 12, 16 days, respectively.

The leg numbered 118 in the Red Sea Option (Table 1) and 117 in the second option (Table 2) is a combination of shorter programs. We calculate that there are 32 days for operations in the Red Sea plan and 40 days in the second plan for this leg, and consequently only two of the proposed programs can be undertaken.

We have voted on the priority of these programs in constructing a drilling leg :

- first priority : Carbonate Saturation Profile (23 points)
- second priority : Mascarene Plateau (21 points)
- third priority : Makran (13 points).

Leg 119 should start as early as possible (December 1, 1987) to allow maximum drilling time on the Kerguelen-Gaussberg Ridge.

NOMINATIONS FOR CO-CHIEF SCIENTISTS FOR INDIAN OCEAN LEGS

	U.S.	non-U.S.
115 SWIR	R.von Herzen; H.Dick; J. Natland	R.Robinson(Can.); J.Malpas(Can.); K.Bostrom(ESF).
116 Red Sea	J. Cochran; E. Bonatti	H.Bäcker(D); P.Guennoc(F); G.Pautot(F).
117 Neogene	W.Prell; J.Cochran	N.Kenyon(UK); R.Kidd(UK).
118 Makran/Carb.Sat./Masc. . Makran		J.Leggett(UK); R.White(UK); R.Hesse(Can.).
. Carb.Sat.	L.Peterson; W.Curray	H.Thirstein(ESF); A.Baxter(UK).
. Mascarene	R.Duncan; R.Fisher	A.Baxter(UK).
119/120 Kerguelen(N&S)	W.Berggren; R.Wise	R.Schlich(F); D.Falvey(Aust.); K.Perch-Nielsen(ESF); L.Leclaire(F); H.Schrader(ESF).
121 Broken R/S 90ER	J.Sclater; J.Weissel; R.Duncan	J.Pierce(Can.); R.Herb(ESF);
122 Intraplate/N 90ER	J.Weissel; J.Curray	J.Pierce(Can.); R.Scrutton(UK); R.Herb(ESF).
123 Exmouth/Argo	J.Mutter; R.Larson	U.von Rad(D); N.Exon(Aust.); F.Gradstein(Can.); P.Williamson(Aust.).

NEXT IOP MEETING

The next meeting will be sometime between Nov 1 and Dec 15, in Miami or College Station. A representative of the Downhole Measurements Panel should attend this meeting.