MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

Lamont-Doherty Geological Observatory
Palisades, New York

6-7 October 1988

EXECUTIVE SUMMARY

1. Panel recommended that the Geoprops Probe be tested during Leg 126. If necessary, IP to be withdrawn to make time for this.
[Rec: 88/16]

2. Panel was unable to develop a 20-day logging programme at Nankai (Leg 129) sites NKT 1 and NKT 2 which satisfies the scientific objectives of the leg.

3. Panel recommended that the downhole-measurement programme needed to address properly the scientific objectives of the scheduled Leg 129 is 31.3 days. Serious data shortfalls will occur if this effort is reduced.
[Rec: 88/17]

4. Panel recommended that Nankai should be addressed through two separate legs. The first leg should comprise a single site at NKT 2 with adequate time being allowed for hole conditioning and two-stage logging. The second leg should comprise two/three additional sites to investigate horizontal gradients.
[Rec: 88/18]

5. Panel recommended with reluctance an abridged 20-day programme of downhole measurements for Nankai Leg 129, if it should be decided to drill only one Nankai leg. Considerable difficulty was experienced in formulating this recommendation, since the mis-match between the scientific objectives and the dedicated resources was unacceptably large. Panel felt very strongly that this 20-day programme is not adequate to address the scientific objectives of the accretionary prism study and offers it with reluctance. Panel wished to have the word "reluctance" fully emphasized.
[Rec: 88/19]

6. Panel will closely monitor the development of those tools scheduled for Nankai which are not yet field proven. These account for about 30% of the technically realistic downhole-measurement programme as per Recommendation 88/17. Should any of these tools fail to come up to expectations, alternatives will be proposed.

7. Panel reiterated its earlier position that VSP should be run only in response to scientific needs: zero offset VSP should not be a standard operation on board ship. Minimum tool acquisition for ODP use is three separate three-component VSP tools for adequate back-up. LDGO Borehole Geophysics Research Group would be the logical tool operator for tool maintenance, deployment and data archiving.

8. Four nominations were made for panel membership:

Roger Morin	(USGS)
Joris Gieskes	(Scripps)
Peter Lysne	(Sandia)
Mark Hutchinson	(Conoco)

9. Panel recommended that a two-day meeting of previous JOIDES logging scientists and contractor representativies be convened, with JOI support, to evaluate and pool experience of shipboard logging practices and to formulate recommentations for improvement. Target date early 1989. Co-convenors to be Wilkens and Worthington.

[Rec: 88/20]

10. Panel concurred that the digital borehole televiewer is DMP's highest priority new acquisition. Panel encourages earliest possible purchase.

11. Panel to meet next at University of Hawaii, Honolulu on 16-18 January 1989. Roy Wilkens to host the meeting.

[Rec: 88/21]

Paul F Worthington
26 October 1988

MEETING OF JOIDES DOWNHOLE MEASUREMENTS PANEL

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6 - 7 October 1988

MINUTES

Present

Chairman:	P F Worthington (UK)
Members:	S Bell (Canada) B Carson (USA) E Howell (USA) D Karig (USA) H Kinoshita (Japan) A Kristensen (ESF) J-P Pozzi (France) C Sondergeld (USA) R Traeger (USA) H Villinger (FRG) R Wilkens (USA)
Liaisons:	R Anderson (LDGO) K Becker (LITHP) X Golovchenko (LDGO) R Jarrard (LDGO) M Langseth (PCOM) T Pettigrew (ODP/TAMU)
Guests:	G Moore * (TECP) I Hill (Leg 129 Co-Chief)
Apologies	G Olhoeft (USA) R Stephen (USA)
Absent	R Porter (USA)

* attendance for agenda item 5 only

1. Welcome and Introductory Remarks

The meeting was called to order at 8.50 am. The Chairman welcomed DMP Members, Liaisons and Guests, especially the Co-Chief of Leg 129 (I Hill) and the ODP/TAMU representative (T Pettigrew).

Review of Agenda and Revisions

The Chairman explained that much of the meeting was to be dedicated to Agenda Item 5, the development of a programme of downhole measurements for Nankai. PCOM had not accepted DMP Recommendation 88/14 to refer this matter to a specialist working group, requiring instead that the entire panel reconsider the issue at this meeting. Consequently, much ongoing business has had to be deferred to the next DMP meeting in January 1989.

The usual Logging Contractor's report would be encompassed within the tour of LDGO facilities (Item 7).

Item 11, other business, to include:
(i) Meeting of JOIDES logging scientists:
(ii) Report on French wireline re-entry system (NADIA):
(iii) Acquisition of digital borehole televiewer:
(iv) Date of next meeting.

Subject to these modifications, the pre-circulated agenda was adopted as a working document for the meeting.

2. Minutes of Previous DMP Meeting, Texas A 8 M University, June 9 - 10, 1988

Modifications:

(i) p 5, para 1, lines 11/12

To read:
"Only the choice of 504B would have been worse from the standpoint of risk to a scientifically valuable hole."

(ii) p 5, para 2, line 1

To read:
"Hole 418A should not be put at risk if at all possible: DMP strongly supports the development of wireline re-entry technology."

(iii) p 18, Leg 126 - Bonin

Delete line 5: "(up to 600^{o}C)."

With these modifications the minutes were adopted: the Chairman signed the master copy for ODP records.

Matters Arising

The principal matter arising concerns the liaison between DMP and the Continental Deep Drilling Programme (KTB) of FRG. Dr Hanel of KTB, who attended the previous DMP meeting, has communicated the following:

(i) KTB Project Management and Heads of the R & D Programme are very pleased to establish cooperation between DMP of ODP and the Rock Physics, Logging and Log Interpretation Working Group (ARGE 4) of KTB.

(ii) Dr H Villinger is the DMP representative on ARGE 4.

(iii) Prof H Burkhardt is proposed as the ARGE 4 representative on DMP: an alternative may be nominated when appropriate.

(iv) The ARGE 4 representative will only participate in DMP meetings if there are topics of interest to KTB.

(v) The DMP meeting in autumn 1989 and the subsequent joint DMP/ARGE 4 workshop are invited to take place at the KTB well site. Details should now be arranged with KTB Project Management.

Date of autumn 1989 DMP meeting to be around mid-September: H Villinger to arrange with Dr Hanel.

[ACTION : VILLINGER]

3. PCOM Report

Langseth reported on the PCOM meeting held on 23 -25 August 1988 and specifically reviewed PCOM response to DMP recommendations 88/9 - 88/15 formulated at the last DMP meeting.

Rec. No.	Description	PCOM Response
88/9	Shipboard Measurements Panel (SMP) and DMP reciprocal liaison be established	Accepted
88/10	Diamond coring system (DCS) be designed to permit logging	Approved LDGO/TAMU joint study of DCS with respect to slimholing tools and/or widening hole
88/11	Cost analysis be made of DCS and necessary slimholing of logging tools	
88/12	KTB staff be invited to give presentation on programme to PCOM & EXCOM	KTB representative to be invited to next PCOM meeting

88/13	Drill AAP1B first during Leg 123	Accepted
88/14	Working Group be convened to plan downhole measurements for Nankai	Not Accepted
88/15	Standard logging suite be run at SUL 4 during leg 124	Accepted

Other points reported by Langseth were:

(1) PCOM approved two-stage logging of holes deeper than 750m for a 6 - 8 month trial period.

(2) The Engineering Test Leg has been extended by two days to allow more time for testing drilling techniques in alternating hard and soft layers, eg cherts.

(3) PCOM is concerned about rising insurance costs for logging tools and will investigate formulating a policy on tool fishing.

(4) Long-range planning document (10 years) is to be produced. DMP will probably be asked for further inputs. EXCOM is looking for ODP "spin-offs" to include in the plan.

(5) Terms of reference for the new panel structure were developed at the last PCOM meeting. The new mandates for DMP and SMP are attached as Annexure 1.

4. WPAC Legs 124 -128

Jarrard reviewed the current logging programme.

Leg 124: Sulu and Celebes Seas

Site	Penetration	Comments	Logs
CS-1	1050	Celebes Sea stratigraphy	standard, BHTV
SS-3	1350	Sulu Sea stratigraphy	standard, BHTV
SS-5	400	Sulu Sea anoxia	standard (poss. only 2 strings)

Recent changes:

1) Sites renumbered but virtually unchanged from last DMP, despite subsequent debates.

2) Co-chiefs added BHTV originally recommended by DMP but dropped by WPAC because of time constraints; stress even more important than we anticipated.

3) PCOM and Co-chiefs accept DMP recomm. 88/15 to log SS-5 (formerly SULU-4); but entire site will be dropped if not enough time to do CS-1 and SS-3 thoroughly.

4) If too much time for CS-1 and SS-3 but not enough time for all three sites, co-chiefs want option of adding VSP and/or hydrofrac. (not recommended by DMP).

Panel queried usefulness of stress magnitudes from hydrofrac. in small plates and observed that zero-offset VSP might not provide additional useful information.

Leg 124E: Engineering Test Leg

Most plans unchanged: dedicated hole for logging, wireline heave compensator tests and improvement, test conversion from 3 to 2 standard strings, test wireline packer, evaluate using SES to cool hot holes.

Recent changes:

1) PCOM lengthened leg by 2 days (logging time not affected).

2) FMS will not be tested; tool development going well but better to use January for further land testing and training Schlumberger engineers.

3) Wireline packer tests slightly behind schedule but still probably okay for 124E.

Leg 125: Bonin/Mariana

Site	Penetration	Comments	Logs
MAR-3A	700	serp. diapir summit	standard, wireline packer, BHTV
MAR-3B	700	serp. diapir flank	standard, wireline packer
BON-6	1100	Bonin out-arc high	standard, BHTV, packer, mag/susc.
BON-7	500	diapir?	standard, wireline packer

Recent changes:

1) Confirmation that FMS will not be available

Leg 126: Bonin

Site	Penetration	Comments	Logs
BON-1	1050	active rift	standard, FMS, wireline packer, I.P.
BON-2	1200	rift-flank horst	standard,FMS,mag/susc, wireline packer
BON-5A	950	forearc	standard, FMS
BON-5B	950	forearc	standard, FMS

Recent changes:

1) BON-1 may be a very hot hole, too hot to log much even with SES cooling.

2) Still haven't found an I.P. tool for BON-1.

3) WPAC rejected DMP recommendation of wireline packer at BON-5A and BON-5B.

No I.P. tool identified as yet. ARCO tool has been made available but this will not resolve clay effects. Need a tool that is digital, reliable and sensitive. If no I.P. tool can be found, other options for investigating sulphur are GLT if hole is not too hot and SP log which responded in 504B.

Nankai Co-chief wishes to see Geoprops Probe tested before Leg 129. A five hour deployment of Geoprops Probe is possible during Leg 126.

DMP Recommendation 88/16

"Geoprops Probe be tested during Leg 126. If necessary, IP to be withdrawn to make time for this."

Legs 127 and 128: Japan Sea

Site	Penetration	Comments	Logs
127			
J1d	380	rifting history	standard,FMS,mag/susc.
J1e	880	rifting history	standard, FMS, BHTV, mag/susc.
J3a	730	obduction	standard, FMS, BHTV, mag/susc, hydrofrac
J1b	800	rifting history	standard, FMS, BHTV, mag/susc,hydrofrac,VSP
128			
J1b	return		geoelectrical, oblique seismic, seismometer
J2a	1390	metal. in failed rift	standard, FMS, VSP, packer, IP?
JS-2	600	paleoceanography	standard, FMS

Recent changes:

1) At J2a, DMP and WPAC had VSP and packer, but Tamaki WPAC prospectus had neither.

2) WPAC did not follow DMP recommendation to move J1b hydrofrac. from overcrowded Leg 127 to 128.

3) Renewed WPAC interest in mag/susc at J1d (an old DMP recommendation dropped by DMP in earlier compromise with WPAC).

5. Leg 129 - Nankai

The Chairman outlined the Panel's brief from PCOM, i.e. to develop a 20-day programme of logging and downhole experiments for the Nankai Leg 129 and to identify the additional scientific objectives that could be addressed if additional logging time would be available at some future date.

Karig described the principal scientific objectives of the Nankai Leg as an improved understanding of the mechanisms that govern mass- and fluid-flow at active plate margins. This objective is addressed through studies of gradients of fluid-flow, stress, structural and geochemical characteristics within the sediment and

fluid continuum that an accretionary prism provides. Detailed in-situ studies are required to understand the permeable sand-rich accretionary prism at Nankai which is likely to be markedly heterogenous.

Karig outlined some principal messages from the recent ODP Working Group on Accretionary Complexes:

(i) Study fewer prisms thoroughly rather than many superficially:

(ii) Dedicate two to three legs per prism, with time for appraisal and development between legs where appropriate:

(iii) undertake a technologically intensive programme at and away from the toe to study gradients in physico-chemical characteristics:

(iv) Very intensive pre-drilling surveys are required.

Leg 129 comprises two proposed sites:

NKT 2 - Deep hole (1300m) through the toe of the prism, decollement, plate boundary, and into sediments and perhaps oceanic crust beneath.

NKT 1 - Shallower hole (900m) away from the toe to characterize sediments before they are incorporated into the prism.

Panel noted that this drilling programme seems insufficient in the light of the messages from the Working Group on Accretionary Complexes.

The scientific objectives require an adequate data coverage of permeability, pore pressure and temperature, pore fluid chemistry, stress, velocity and rock chemistry.

After six hours' discussion, which partly included TECP Chairman and members, DMP was unable to develop a 20-day logging programme at NKT 1 and NKT 2 which satisfied the scientific objectives of the leg. A downhole-measurement programme which does address these scientific objectives would take 31.3 days. The trimming of this technically realistic programme to 20 days could not be done without omitting measurements essential to the study. As one panel member put it, "It is like trying to decide which of your children to shoot". A downhole-measurement programme of 31.3 days would be too long for a single Nankai leg and should be incorporated within a two-leg scheme. This would alleviate the severe pressure of time and allow provision to be made for adequate hole conditioning and two-stage logging.

DMP Recommendation 88/17

"The downhole-measurement programme needed to address properly the scientific objectives of the scheduled Leg 129 is 31.3 days. This programme is as follows:

Leg 129: Nankai Realistic Programme (31.3 days)

NKT-2 Pilot Hole to about 400m

# days	
1.0	8 LAST, 4 WSTP @ 30M, 6 geoprops
1.0	standard logging
0.3	FMS
0.2	dual laterolog
0.3	multichannel sonic (shear source)
2.8	

NKT-2 Main Hole (XCB then rotary to 1300m, with reentry cone and casing)

# days	
3.8	30 geoprops (if O.K.)
1.0	trip to release bit and insert rotatable packer
1.3	standard logging
0.3	FMS
0.4	hole conditioning
0.4	BHTV
0.3	dual laterolog
0.4	multichannel sonic (shear source)
1.0	4 packer
0.4	hole conditioning
1.9	6 wireline packer plus fluid tests
1.2	VSP
1.5	offset seismic experiment
1.0	trip to change to straddle packer
1.0	4 packer
2.5	deploy temperature string
18.4	

NKT-1 (XCB to 900m)

# days	
2.5	8 LAST, 4 WSTP + 18 geoprops (or 10 geoprops + 4 wireline packer)
1.6	wash hole for logging, or extra time for 2-stage logging
1.4	standard logging
0.4	FMS
0.4	BHTV
0.5	multichannel sonic (shear source)
0.3	sual laterolog
1.0	VSP
1.0	minicone and pipe trip for packer
1.0	4 packer
10.1	

Serious data shortfalls will occur if this effort is reduced."

DMP Recommendation 88/18

"Nankai should be addressed through two separate legs. The first leg should comprise a single site at NKT 2 with adequate time being allowed for hole conditioning and two-stage logging. The second leg should comprise two/three additional sites to investigate horizontal gradients."

DMP Recommendation 88/19

"If it is decided to drill only one Nankai leg, and to allow only 20 days for downhole measurements, the following programme should be adopted at NKT 1 and NKT 2:

Leg 129: Nankai Abridged Programme (20.7 days)

NKT-2 Pilot Hole to about 400m

# days	
0.5	8 LAST, 4 WSTP @ 30M, 2 geoprops
1.0	standard logging
0.3	FMS
0.3	multichannel sonic (shear source)
2.1	

NKT-2 Main Hole (XCB then rotary to 1300m, with reentry cone and casing)

# days	
2.3	18 geoprops (if O.K.)
1.0	trip to release bit and insert rotatable packer
1.3	standard logging
0.3	FMS
0.4	hole conditioning
0.4	BHTV
0.4	multichannel sonic (shear source)
1.0	4 packer
1.4	4 wireline packer plus fluid tests
0.4	hole conditioning
1.2	VSP
1.0	trip to change to straddle packer
1.0	4 packer
2.0	deploy temperature string
14.1	

NKT-1 (XCB to 900m)

# days	
1.8	8 LAST, 4 WSTP + 12 geoprops (or 6 wireline packer)
1.4	standard logging
0.4	FMS
0.4	BHTV
0.5	multichannel sonic (shear source)
4.5	

Panel feels very strongly that this programme is not adequate to address the scientific objectives of the accretionary prism study and offers it with reluctance."

DMP will closely monitor the development of those tools scheduled for Nankai which are not yet field proven. These account for about 30% of the technically realistic downhole-measurement programme as per Recommendation 88/17. Should any of these tools fail to come up to expectations, alternatives will be proposed.
[ACTION; KARIG/HOWELL]

6. WPAC Legs 130 et seq

Jarrard reported that a leg structure had not yet been firmed up. The DMP recommendations essentially remained unchanged from January 1988. The DMP recommendation of June 1988, that the logging programme at the geochemical reference sites be similar to that at site AAP1B of Leg 123, still stands. Summary sheets are attached as Annexure II. Panel will review as soon as leg structure is established.

7. Tour of LDGO Facilities

As part of an overview of LDGO activity Anderson presented an update on logging performance since last DMP.

Leg 120:

Two holes logged, one lost to Bottom Hole Assembly plugged by flapper valve (prevented open hole logging) and poor hole conditions that threatened drillstring (prevented through-pipe logging). One hole lost to death of Lamar Hayes. Only one string (SS) run in each hole because of weather (80 knot winds, 40 ft seas) and tool problems (Lithodensity tool failed downhole). 753 of possible 812m logged.

Leg 121:

Three holes logged, one lost to medical emergency. 1280m of a possible 1468m logged successfully. Poor hole conditions, bridges and time caused two holes to be logged with only two strings. Seiemic Stratigraphy Tool lost because of broken centralizer. Fished successfully using minicone and drillstring overshot. Borehole televiewer run successfully in northern 90 east ridge site.

Leg 122:

Six holes logged, none lost. However, 1000m of loggable hole lost to bridging of sands (not clay swelling problem). When side-entry sub was finally allowed to be used, it worked spectacularly allowing 1425m of open hole to be logged. An additional 681m were logged through pipe using the Geochemical Logging Tool. Lithodensity Tool lost onto sea floor when weakpoint pulled off at rig floor during recovery of BHA: fishing unsuccessful. Hydraulic bit release failed at final hole.

Leg 123:

Hole 765 now proceeding in basement, cased with 932m of 11-3/4 in pipe. Deepest cased hole into oceanic crust. Terrible hole conditions for logging of pilot hole. Using SES (finally), following logs acquired:

0-181 mbsf (inside pipe) - Seisstrat. + Lithodensity
181-420 (open hole) - SS + LD
420-525 (inside pipe) - Natural Gamma Spectroscopy (NGT)
525-640 (open) - SS
640-660 (inside pipe) - NGT
660-742 (open hole) - SS

Turbidite sequence Aptian to Miocene shown by repeated fining upward sequences. Neutron and density logs correlate with carbonate profiles from core, then used to detect base of turbidites, especially in poorly recovered lower Miocene. Plan to run Geochemical Logging Tool through casing. Test of open hole vs through casing lost on this leg. Hydrofracture and borehole televiewer still in plan.

8. Vertical Seismic Profiling

Becker recounted a recent USSAC meeting at which a policy on VSP was sought. An earlier JOI-USSAC workshop on VSP had recommended:

(i) VSP should become an integral part of ODP science;

(ii) zero-offset VSP should be done at all ODP sites;

(iii) offset VSP should be done for specialized applications;

(iv) tool improvements are needed;

(v) a U.S. national VSP laboratory should be established.

USSAC did not accept (v), instead preferring integration with the JOIDES structure. USSAC sought guidance from DMP on items (i)-(iii) and in respect of USSAC responding to item (iv) by providing money for tool acquisition by LDGO or an appropriate subcontractor.

Panel noted that there is already a single component VSP tool on board ship. Three component tools would provide significantly improved data but processing to extract the extra information may be expensive and difficult. Anderson commented that three similar tools are needed for regular use in order to provide back-up and allow for breakdowns.

DMP Response

(1) VSP should be run only in response to scientific needs: zero offset VSP should not be a standard operation on board ship.

(This re-affirms earlier DMP position)

(2) Minimum tool acquisition for ODP use is three separate three-component VSP tools for adequate back-up.

(3) If such a three-component facility is provided, LDGO Borehole Geophysics Research Group is the logical tool operator for tool maintenance, deployment and data archiving.

(4) Availabilty of three separate three-component tools would simplify the logistics of offset VSP planning.

(5) Adequate funding is needed for tool acquisition, operation and data archiving.

(6) With these tools there is potential for considerable financial loss in terms of lost tools and lost hole.

(7) Rough cost estimates are at least $200,000 for the three tools and $50,000 per year for operation. Replacement of lost tools would be additional.

9. Monitoring of Third Party Tools

Deferred to next meeting.

10. Panel Membership

Four panel members are due to rotate off DMP: E Howell, G Olhoeft, R Stephen and R Traeger. The following are nominated for panel membership:

Roger Morin (USGS)
Joris Gieskes (Scripps)
Peter Lysne (Sandia)
Mark Hutchinson (Conoco)

E Howell has agreed to remain as a panel member for the time being so that he can monitor the development of the wireline packer and work with the Chairman in providing input to the workshop on geochemical logging, etc, planned for 1989. Both of these activities are DMP action items.

11. Other Business

(i) Meeting of JOIDES Logging Scientists

Wilkens reviewed the logging status quo on board ship on the basis of his experience as a logging scientist on Leg 122. He perceived several difficulties:

(1) conflicts of interest between TAMU and LDGO (eg mud programme vs use of SES):

(2) inadequate tool maintenance by Schlumberger due to remoteness from base:

(3) lack of communication between parties:

(4) telemetry and software problems:

(5) time allotted for logging is based on optimum conditions which never exist; have to beg for more time on board; could be solved by adding 15% to all logging time estimates.

Problems such as these could be addressed through a meeting of JOIDES logging scientists and contractor representatives (TAMU, LDGO, Schlumberger, SEDCO).

DMP Recommendation 88/20

"A two-day meeting of previous JOIDES logging scientists and contractor representatives be convened, with JOI support, to evaluate and pool experience of shipboard logging practices and to formulate recommendations for improvement. Target date early 1989. Co-convenors to be Wilkens and Worthington."

LDGO are asked to prepare a detailed record of logging contractor performance as an input to the meeting.

(ii) Wireline Re-entry of DSDP Hole 396B

Pozzi reported that in July 1988 IFREMER (Institut Francais de Recherche pour l'Exploitation de la Mer) carried out the first wireline re-entry of a borehole on the deep sea floor using the NADIA (Navette de Diagraphie) system at DSDP Site 396B near the mid-Atlantic Ridge and the Kane Fracture Zone. Water depth was 4455m. The project was called CAMPAGNE FARE (Faisabilite Re-entree). The NADIA system is a cone shaped aluminium frame emplaced on the re-entry cone by the deep sea submersible NAUTILE. NAUTILE also provides the hydraulic power and electric control signals to run the winch on NADIA which lowers logging tools into the borehole. Five logging runs were made:

(i) A Water sampler (outside diameter 100mm) was lowered to 173m into the hole which was cased to 170m;

(ii) a temperature probe (outside diameter 200mm) was lowered to 203m;

(iii) the water sampler was run again to a depth of 303m (130m into open hole in basalt);

(iv) a dummy probe (outside diameter 150mm) was lowered to 303m;

(v) the temperature probe was run a second time to 303m.

The total hole depth was originally 405m and it appears that the hole has filled in about 100m (all depths are quoted to plus or minus 5m) The temperature measurements indicate that bottom water is still flowing into the hole twelve years after drilling. Wireline re-entry is an exciting new technology development that will enable use of deep sea boreholes for geoscience experiments after the drillship leaves.

(iii) Acquisition of Digital Borehole Televiewer

Villinger raised the question of the purchase of a digital BHTV from WBK, Bochum, if JOI was agreeable. There appeared to be some doubt in JOI that the digital BHTV was seen as a high priority by DMP. Could the situation be clarified?

The Chairman referred to the previous DMP minutes which showed that the digital BHTV, originally scheduled for purchase in September 1989, had been deferred in the BCOM-approved budget until FY 92. The FY 90 budget makes no provision whatsoever for new tools. Quoting from the previous DMP minutes:

"A major item of concern is the deferral of the digital BHTV to FY 92... especially....in view of emphasis on stress measurements both by COSOD II and by DMP itself. In the light of its identified priorities, DMP notes that the LDGO budget status fails

to make provision for adequate downhole-measurement support for the characterization of lithospheric stress on a global scale. The early acquisition of a digital televiewer would partly alleviate this shortfall."

Chairman reiterated that this view remained unchanged. With the FY 89 acquisitions now committed, the digital BHTV remains the highest priority acquisition.

DMP Consensus

The digital borehole televiewer is DMP's highest priority new acquisition. Panel encourages earliest possible purchase.

(iv) Date of next DMP Meeting

Three days are required because of deferral of so many items due to the Nankai problem. Panel accepted a gracious invitation from Roy Wilkens to meet in Hawaii, it being Panel policy to meet in JOIDES institutions as far as possible.

DMP Recommendation 88/21

"DMP to meet next at the University of Hawaii, Honolulu, on 16-18 January 1989."

Close of Meeting

The Chairman thanked Members, Liaisons and Guests for their kind hospitality and Dr R N Anderson for his gracious hosting. The meeting closed at 3.00 pm on Friday, 7th October 1988.

Paul F Worthington
26 October 1988

7.4 Downhole Measurements Panel: Mandate

7.4.1. The general purpose of the Downhole Measurements Panel is to advise JOIDES on methods and techniques for determining the physical state, chemical composition, and dynamic processes in ocean crust and its sediment cover from downhole measurements and experiments. Areas of responsibility include: routine logging (including industry standard and special tools widely used in ODP); routine data processing and interpretation; new and adapted logging tools, techniques, and data processing; downhole experiments and data acquisition (including downhole recording).

7.4.2 The Downhole Measurements Panel is mandated to:

(a) Report to and advise PCOM on logging and downhole measurement programs of ODP.

(b) Advise on and recommend to the ODP Wireline Service Contractor the required logging facilities.

(c) Advise PCOM on the scientific desirability, technical feasibility of proposed programs

(d) Advise the Science Operator on scheduling and operational requirements of proposed programs.

(e) Monitor progress reports, results, tools and techniques from U.S. and international downhole instrumentation development groups.

(f) Solicit and expedite new logging capabilities and experiments.

(g) Evaluate new technology and recommend future measurement directions.

7.4.3. Membership consists of a well-balanced representation, and approximately half being logging and other downhole technologists and half having scientific backgrounds and interests. The Wireline Services Operator and Science Operator of ODP shall each be represented by non-voting members on the Panel.

7.5 Shipboard Measurements Panel

The Shipboard Measurements Panel is concerned with the inventory, operation, and condition of scientific instrumentation on board the JOIDES RESOLUTION and data handling for on board measurements.

7.5.1 The objectives of the panel are:

(a) To provide expert advice and make recommendations to the Planning Committee regarding the inventory and utilization of scientific equipment on the drillship.

(b) To represent the interests of the ODP user community with respect to the scientific equipment on the RESOLUTION.

(c) To direct, via PCOM, panel activities toward acquiring and maintaining the best possible shipboard scientific capability within the constraints of the ODP budget.

7.5.2 Scope. The panel is concerned with general types of instrumentation and issues:

(a) Underway geophysical equipment

(b) Equipment for handling core samples

(c) Physical properties, paleomagnetics and geotechnical measurements

(d) Petrological, mineralogical, sedimentological, organic and inorganic geochemistry analysis and equipment for performing these measurements such as microscopes.

(e) Computers managing data from shipboard equipment (in consultation, if necessary, with the Information Handling Panel).

(f) Utilization of laboratory space on the RESOLUTION.

7.5.3 Membership. The panel will consist of members from U.S. institutions and from non-U.S.JOIDES members countries. Representation from all non-U.S members should be maintained, if possible. The number of members should not exceed 15 and these should be appointed so as to represent the range of disciplines within the scope of the panel's activities.

Ideally, a majority of those serving on the panel should have participated on a cruise of the RESOLUTION.

7.5.4 Liaison. The SMP must maintain continuing liaison with the Planning Committee, the Science Operations of ODP/TAMU (in consultation with ODP/TAMU marine technicians and engineers), the Information Handling Panel, and the Downhole Measurements Panel. Ex-officio liaison representatives of these panels and organizations should attend each meeting.

7.5.5 Scheduling. As the SMP will normally not deal with time-critical issues, two meetings per year should suffice. Meetings at ODP/TAMU in College Station at regular intervals is recommended and occasional meetings that include a visit to the RESOLUTION would be valuable.

Geochemical Reference Sites

General

This program, tentatively scheduled by PCOM as one leg, has not been considered yet by DMP. Sites are still uncertain but are likely to include one site with 200m basalt penetration and at least one with 50m basalt penetration. The program focus is on geochemistry of crust entering trenches, for study of the effect of slab composition on arc geochemistry. However, the program also encompasses the primary thematic objective of DMP: comparison of crustal alteration (e.g. permeability, fracture filling, magnetic properties) and physical properties (e.g. velocity structure) between old and young crust and between fast and slow spreading crustal origins. DSDP and ODP have already undertaken extensive downhole measurements of old slow (418A), young slow (395A), and young fast (504B) crust. This leg and Leg 123 will study the missing crustal type: old crust generated at a fast spreading rate. At the other sites, DMP has recommended the full armada of downhole experiments. As leg plans are refined, objectives beyond the reference site objectives are certain to be added to this leg.

Standard logging

Goals:

1) continuous geochemistry of sediments and basalt (continuous, representative geochemical records of much larger volumes than feasible from core analyses are essential for elements such as potassium, less so for isotopic ratios);
2) mineralogy, particularly amounts of alteration minerals;
3) upper crustal physical properties (P-wave and S-wave velocity, attenuation, density, porosity);
4) modern fluid flow (if any) from logs of temperature and calculated thermal conductivity.

FMS and/or Televiewer

Goals:

1) high resolution in sediments (FMS better);
2) structural dip (if any) of lowest sediments, for near-ridge crustal tilting (FMS better);
3) stress direction (Televiewer better);
4) basalt core orientation, for paleomagnetic studies of plate motion and for studies of crustal velocity anisotropy (Televiewer better);
4) imaging of fracturing (filled and open), flow morphology, and flow alteration.

Wireline packer/packer

Goals:

1) permeability, pore pressure, and fluid chemistry of old oceanic crust;
2) hydrofrac for stress measurement (BON8 is on flexural swell immediately seaward of the first(?) extensional breaking of crust entering the trench).

Magnetometer/susceptibility

Goals:

1) magnetic properties (e.g. magnetic alteration, relative importance of induced, remanent, and viscous magnetizations) of old crust generated at

fast spreading rate;
2) complexity of the magnetic record in an environment of well developed magnetic anomalies (e.g. thickness of magnetic units, presence of reversals, variations in remanent inclination).

Dual laterolog
Goals:
1) large-scale porosity structure;
2) relative amounts of vertical and horizontal fractures.

Vertical seismic profile
Goals:
1) large-scale velocity structure of the upper crust;
2) detection of seismic horizons below the bottom of the hole;
3) potential for later offset seismic experiments, for crustal structure and anisotropy.

Long-term experiments?

NE Australia Margin

Standard logging

Goals:

1) seismic stratigraphy (essential to the primary cruise objective of testing the Vail hypothesis);
2) mineralogy, for paleoclimate and paleoceanography;
3) fluid flow (uranium, temperature, and thermal conductivity logs);
4) high-resolution intersite correlation, in spite of lateral variation of sedimentary facies.

Comments:

1) whether sonic logging will yield an accurate depth/seismic link depends on extent of diagenetically caused lateral heterogeneity;
2) very shallow water results in very fast logging times;
3) sites changed somewhat since 8/87 DMP, and further site revision is likely; 12/87 SOHP and WPAC plans differ in sites, water depths, and penetrations, and WPAC plan used here;
4) 5 sites are less than 400m.

DMP/WPAC compromise: both panels recommend standard logging of all sites, including those less than 400m. SOHP did not recommend logging of two shallow sites.

FMS

Goals:

1) sedimentary facies (all sites);
2) high resolution (all sites);
3) imaging of type of porosity (all sites, especially reef carbonates).

Dual laterolog

Goal: characterization of vugular reef porosity, with log penetration deeper and more representative than standard logs.

Comments: DMP previously had inadequate information on the extent of reef carbonates in the sites. Instead of pervasive reef carbonates, they are confined to part of NEA10 and the bottoms of NEA6 and NEA8.

DMP/WPAC compromise: DMP recommended dual laterolog at NEA1,2,3,4,&5, but WPAC did not. Should DMP withdraw their recommendation?

Vertical Seismic Profile

Goal: seismic stratigraphy, for more reliable seismic/depth tie than is obtainable from standard logs.

Comment: another deep site may be added to drilling plans.

DMP/WPAC compromise: DMP recommended VSP at NEA5 (900m penetration), but WPAC did not. Check shots at several sites are another alternative.

Wireline packer

Goals: pore fluid sampling, for carbonate diagenesis, aquifer hydrodynamics, and possible Mississippi Valley Type mineralization.

Comments: conventional interstitial water sampling may be impossible in some lithologies because of core disturbance, and some lithologies may not pack off well enough for wireline packer.

DMP/WPAC compromise: not recommended yet by DMP or WPAC, but DMP was unaware of fluid-flow objective and WPAC is now considering wireline packer. DMP may need more information concerning sites at which wireline packer is scientifically most useful.

Vanuatu

This leg has serious time constraints, even with a modest logging program. If DMP feels strongly about a substantial logging program, they probably should endorse the WPAC view that one leg is not long enough for Vanuatu.

Standard logging

Goals:

1) continuous geochemistry, for composition of accretionary prisms (DEZ-2 and DEZ-4) and seamount (DEZ-5), for arc geochemical changes vs. time caused by arc polarity reversal (IAB-2a) or collision (IAB-1a and IAB-2a);
2) continuous mineralogy, for same purposes as #1;
3) seismic stratigraphy, for site/seismic match in accretionary prism (DEZ-2 and DEZ-4) and for identification of depths in sites IAB-1a and IAB-2a of seismic unconformities;
4) hydrology of accretionary prism (DEZ-2 and DEZ-4) from temperature log and log-based thermal conductivity;
5) porosity of sediments at DEZ-5, for decompaction and subsidence.

DMP/WPAC compromise: both DMP and WPAC recommended standard logging at all sites; DEZ-1 (ridge reference site) is only 300 m penetration (200 m sediments and 100 m basement) and goal is merely determination of rock type so that its components can be identified in the accretionary prism. Although logs would help the goal, cores might suffice.

FMS

Goals:

1) structural dip, folding, fracturing, foliation, and brecciation in the accretionary prism (DEZ-2 and DEZ-4);
2) changes in structural dip in the intra-arc basin caused by collision (IAB-1a and IAB-2a) or arc polarity reversal (IAB-2a);
3) stress direction from breakouts at all sites (possibly not enough overburden at DEZ-1), but particularly in accretionary prism;
4) sedimentary facies (slumps at prism sites DEZ-2 and DEZ-4; slumps and turbidites vs. airfall for volcanogenic sediments at IAB-1a and IAB-2a?).

Comments: FMS applications at reference sites DEZ-1 and DEZ-5 are probably not critical enough to cruise objectives to justify tool use.

Televiewer

Goals: same as FMS goals 1-3, plus flow imaging at DEZ-1, DEZ-2, and DEZ-5.

Comments: 360 degree image is more complete than FMS, but FMS handles wider range of borehole sizes and is faster.

DMP/WPAC compromise: DMP recommended televiewer for bottom portion of prism sites DEZ-2 and DEZ-4, but WPAC recommended televiewer at all sites (before they knew about FMS).

Packer/Wireline Packer

Goal: hydrology (permeability, pore pressure, water chemistry) of ~~accretionary~~ prisms undergoing collision (DEZ-2 and DEZ-4).

Comments:

1) hydrology of accretionary prisms is a DMP priority, but it is only a minor priority of this leg. The focus of this leg is collision-related deformation. However, can this deformation be analyzed without addressing

fluid flow, if recent studies are correct in indicating that pore pressure affects deformation style even in "simple" ~~accretionary~~ prisms?
2) packer would require a reentry cone, but WPAC has not specified whether one is planned at DEZ-2 or DEZ-4.

DMP/WPAC compromise: DMP recommended both packer and wireline packer at DEZ-2 and DEZ-4, with pressure meter (DMP should explain) at DEZ-2. WPAC did not recommend any hydrology experiments because of time problems.

Geoprops Probe

Goal: mechanical properties of accretionary prism sites DEZ-2 and DEZ-4.

Comments:

1) WPAC did not specify which holes are XCB holes;
2) plenty of time for tool development before this leg.

DMP/WPAC compromise: not previously considered by either panel for this leg.

Standard logging

Goals:

1) continuous geochemistry and mineralogy of sediments and basement (all sites), for temporal and lateral variation in arc and back-arc basin geochemistry and for accumulation rates of hydrothermal metals;
2) seismic stratigraphy of LG3, particularly for identification in core and dating of seismic unconformity "A" (a marker of initial rifting);
3) porosity, for decompaction and vertical tectonics of LG3 (other sites have similar goal but paleodepth resolution of the benthic forams will be less than the porosity correction);
4) temperature and thermal conductivity, for modern fluid flow.

Comments: Two sites are less than 400 m penetration: LG2 (350m incl. 50m basement) and either LG1 (220m incl. 120m basement) or LG7 (200m incl. 50m basement). Final decision on logging these sites should depend on tests of quality of through-pipe geochemical logs.

FMS

Goals:

1) structural dip variations (all sites, particularly forearc site LG3), for timing of rift-related tectonic activity;
2) basement fracturing.

Comments: stress direction not included, because stress pattern can be inferred and because penetrations may be too shallow for breakouts.

Televiewer

Goals: same as FMS, plus basement imaging.

Comments: short holes, large proportion of basement, and combinability of televiewer with magnetometer and susceptometer may make televiewer/mag more productive than FMS for these sites.

DMP/WPAC compromise: DMP recommended televiewer at all sites, but WPAC recommended only standard logging.

Magnetometer/susceptibility

Goal: magnetic properties of arc volcanics and of seafloor formed by back-arc spreading (e.g. are the poorly developed magnetic anomalies of back-arc crust due to greater structural complexity, more diffuse volcanism causing mixed polarity, or more alteration of magnetic minerals, in comparison to "normal" crust?).

DMP/WPAC compromise: DMP recommended magnetometer and susceptibility logging at all sites, but WPAC recommended none.

Wireline packer/packer

Goals: (1) pore water chemistry, for study of modern hydrothermal activity in a region (LG1 or LG7, LG2) with high accumulation rates of hydrothermal metals; (2) permeability of young backarc crust (LG1 or LG7).

DMP/WPAC compromise: DMP recommended wireline packer at all sites, but WPAC recommended none. Compromise could be to use the tool only on the two sites (LG1 or LG7, LG2) where hydrothermal activity is known and a cruise objective. Neither panel considered packer use yet.