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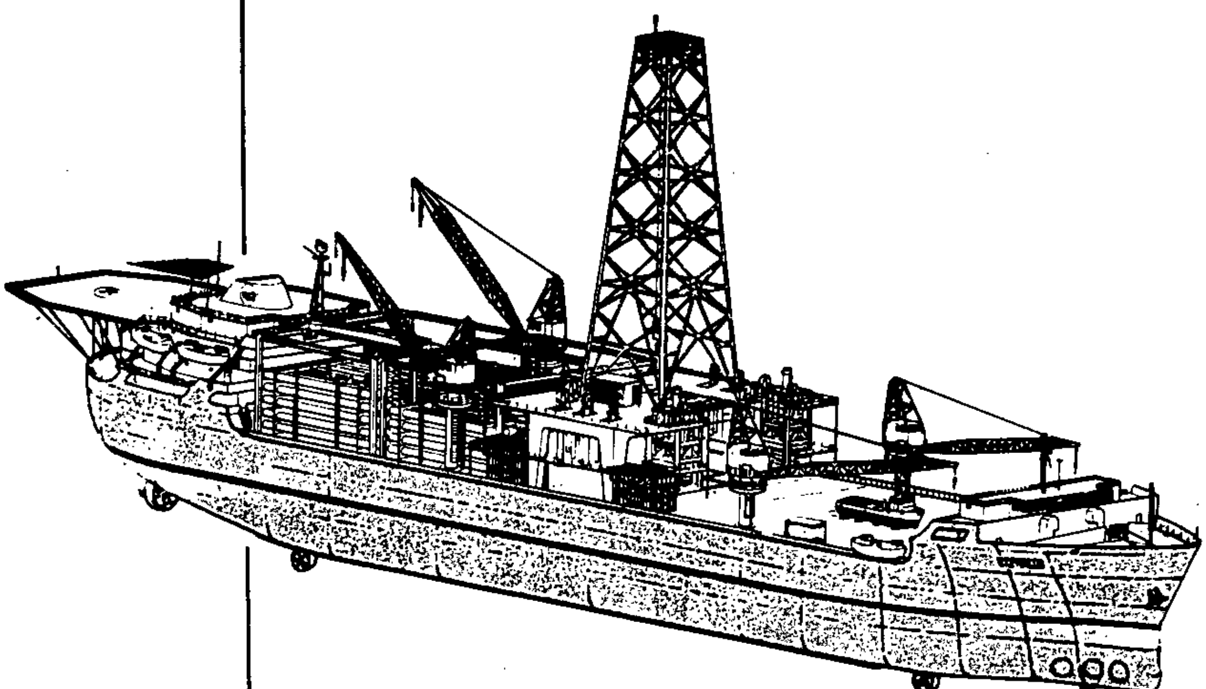

Glomar Explorer

Cover: Artist's conception of the converted *Glomar Explorer,* the proposed drilling platform for the Advanced Ocean Drilling Program. Illustration and data shown below provided by Lockheed Missiles & Space Company.

TABLE 1
PRINCIPAL CHARACTERISTICS

A.B.S. CLASSIFICATION	+ A1 Ⓔ AMS MOBILE OFF-SHORE DRILLING UNIT, UN-LIMITED OCEAN SERVICE, ICE CLASS 'C'
CONSTRUCTION	WELDED STEEL, A.B.S. LONGITUDINALLY FRAMED
LENGTH, OVERALL	619'-4"
BREADTH MOLDED	115'-8-½"
MOON POOL SIZE	41'-8" × 47'-8"
HEIGHT TO DERRICK TOP	258'-10"ABL (APPROX.)
DISPLACEMENT AT SUMMER LOADLINE	57,074 L.T. (APPROX.)
LIGHTSHIP DISPLACEMENT	23,000 LT. (APPROX.)
OPERATING DISPLACEMENT (EST.)	44,422 L.T. W/O RISER AND BOP
OPERATING DRAFT (EST.)	30'2"
SERVICE SPEED (EST.)	9 TO 11 KNOTS
PROPELLERS	TWO, 15-FOOT DIA., 6600 HP EACH
TUNNEL THRUSTERS	3 FWD AND 2 AFT (ORIG.) 2150 HP EACH
RETRACTABLE, AZIMUTHING THRUSTERS	1 FWD AND 2 AFT (NEW) 2150 HP EACH
ENDURANCE	200 DAYS (BASED ON ESTIMATED FUEL RATE AND CAPACITY) 200-300 DAYS (BASED ON REEFER AND DRY STORES CAPACITY)
NUMBER OF BERTHS	42 FWD AND 108 AFT

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TENTATIVE *GLOMAR CHALLENGER* SCHEDULE, LEGS 89-96[1]

Leg	Departs	Departure Date	Total Days	Days Oper.	Days Steaming	Terminates at	Arrival Date	Port Days	Re-entry	Objective
89	Yokohama	11 Oct 82	50	31	19	Noumea, New Caledonia	30 Nov 82	3	Yes	Old Pacific
90	Noumea	03 Dec 82	39	28	11	Wellington, New Zealand	11 Jan 83	5	No	SW Pacific
91	Wellington	16 Jan 83	36	23	13	Papeete, Tahiti (Dateline)	20 Feb 83	3	Yes	Tonga Trench
92	Papeete	23 Feb 83	55	33	22	Balboa, Panama	19 Apr 83	5	Yes	Hydrogeology
93	Balboa	24 Apr 83	56	46	10	Norfolk, USA	19 Jun 83	5	No	ENA 3
94	Norfolk	24 Jun 83	59	36	23	St. John, Newfoundland	22 Aug 83	5	No	NE Atlantic Paleo
95	St. John	27 Aug 83	29	20	9	Ft. Lauderdale, USA	25 Sep 83	2	No	New Jersey Transect
96	Ft. Lauderdale	27 Sep 83	39	35	4	Galveston, USA	05 Nov 83	12	No	Mississippi Fan
							Demob.			

[1]Compiled 19 October 1982. This schedule was compiled after the **JOIDES Journal** had gone to press. Leg number/objective for legs 91-96 may differ from journal text in this and previous issues.

SHIPBOARD SCIENTIFIC PARTIES

Leg 87A

H. Kagami	Co-chief scientist	Japan - Ocean Research Institute
D. Karig	Co-chief scientist	USA - Cornell University
W. Coulbourn	DSDP representative/ sedimentologist	USA - Scripps. Inst. of Oceanography
J. Charvet	Sedimentologist	France-Universitė D'Orleans
N. Lundberg	Sedimentologist	USA - University of Calif., Santa Cruz
A. Smith	Sedimentologist	UK - University of London
C. Stein	Sedimentologist	USA - Sandia Laboratories
A. Taira	Sedimentologist	Japan - Koichi University
M. Lagoe	Paleontologist (foraminifers)	USA - Atlantic Richfield Co.
T. Lang	Paleontologist (nannofossils)	USA - Florida State University
G. Lombari	Paleontologist (radiolarians)	USA - University of Rhode Island
C. Bray	Physical properties specialist	USA - Cornell University
H. Kinoshita	Physical properties specialist	Japan - Chiba University
T. Machihara	Organic geochemist	Japan - Japan National Oil Corporation
P. Mukhopadhyay	Organic geochemist	FRG - Inst. of Oil and Organic Geochemistry

Leg 87B

H. Kagami	Co-chief scientist	Japan - Ocean Research Institute
D. Karig	Co-chief scientist	USA - Cornell University
W. Coulbourn	DSDP representative/ sedimentologist	USA - Scripps. Inst. of Oceanography
J.P. Cadet	Sedimentologist	France - Universite' D'Orleans
K. Fujioka	Sedimentologist	Japan - Ocean Research Institute
J. Leggett	Sedimentologist	UK - Imperial College of Science and Technology
R. Matsumoto	Sedimentologist	Japan - Geological Institute
C. Stein	Sedimentologist	USA - Sandia Laboratories
F. Akiba	Sedimentologist	Japan - Japan Petroleum Exploration Company, Ltd.
M. Lagoe	Paleontologist (foraminifers)	USA - Atlantic Richfield Co.
T. Lang	Paleontologist (nannofossils)	USA - Florida State University
G. Lombari	Paleontologist (radiolarians)	USA - University of Rhode Island
C. Bray	Physical properties specialist	USA - Cornell University
N. Niitsuma	Physical properites specialist	Japan - Shizuoka University

Leg 88

F. Duennebier	Co-chief scientist	USA - Hawaii Institute of Geophysics
R. Stephens	Co-chief scientist	USA - Woods Hole Oceanographic Institution
F. Avedic	Seismologist	France - Centre Oceanologique de Bretagne
G. Pascal	Seismologist	France - Universite' de Bretagne Occidentale
A. Inderbitzen	Physical properties specialist	USA - National Science Foundation

Leg 89

R. Moberly	Co-chief scientist	USA - Hawaii Institute of Geophysics
S. Schlanger	Co-chief scientist	USA - Northwestern University
M. Baltuck	DSDP representative/ sedimentologist	USA - Scripps. Inst. of Oceanography
W. Dean	Sedimentologist	USA - U.S. Geological Survey
J. Haggerty	Sedimentologist	USA - University of Tulsa
J. Whitman	Sedimentologist	USA - Scripps. Inst. of Oceanography
P. Floyd	Igneous petrologist	UK - University of Keele
R. Schaefer	Organic geochemist	FRG - Institute for Petroleum and Organic Geochemistry
J. Bergen	Paleontologist (nannofossils)	USA - Florida State University
A. Schaaf	Paleontologist (radiolarians)	France - Institut de Geologie
I. Premoli-Silva	Paleontologist (foraminifers)	Italy - Instituto di Paleontologia
W. Sliter	Paleontologist (foraminifers)	USA - U.S. Geological Survey
N. Fujii	Physical properties specialist	Japan - Kobe University
J. Ogg	Paleomagnetist	USA - University of Wyoming

GLOMAR CHALLENGER OPERATIONS

CRUISE SUMMARIES

Leg 85 — Equatorial Pacific Paleoenvironment[1]

Leg 85 began 10 March at Los Angeles, California, and ended 2 May 1982 at Honolulu, Hawaii.

General Setting and Objectives

Leg 85 was designed as a stratigraphic/paleoenvironmental transect employing hydraulic piston coring (and rotary drilling) to recover undisturbed, tropical Cenozoic sections for research on:

1. High-resolution bio-, magneto-, seismic-, carbonate, and stable-isotope stratigraphy;
2. Oceanographic and biological (evolutionary) changes associated with the Eocene-Oligocene boundary;
3. Termination of Atlantic-Pacific circulation across the Central American isthmus and the evolution of modern Pacific circulation;
4. The low-latitude response to Miocene Antarctic glaciation and to Pliocene glaciation of the northern hemisphere;
5. The origin of the fine-scale cyclicity in Pacific sediments of Oligocene to Quaternary age; and
6. Carbonate and silica diagenesis in thick biogenic sections.

To address these objectives, the Ocean Paleoenvironment Panel of JOIDES had identified 11 possible target sites in the central and eastern equatorial Pacific. Scheduling constraints for Leg 85, however, forced the panel to limit the program to Sites 571 to 575.

In addition to the primary objectives, secondary objectives were to be addressed. Considerable excitement surrounded the paleomagnetic program. The newly-developed HPC azimuthal-orientation capability, essential for determining the magnetostratigraphy at low latitudes, could make it possible to derive Neogene (to HPC refusal) apparent polar-wandering paths for the Pacific plate if the magnetic intensity of the sediments proved sufficiently strong.

Another secondary objective involved the detailed examination of the relationships between paleoceanographic changes and the acoustic and physical properties of the sediments.

A final secondary objective originated in a proposal by the JOIDES Hydrogeology Working Group to conduct *in situ* heat flow measurements and pore-water collection in a region of unusually low heat flow at Site 571. The purpose of these downhole experiments was to verify advection of sediment pore-waters.

In a broad sense, the interplay of three fundamental factors has shaped the depositional history of the central and eastern equatorial Pacific. These are the tectonism of the spreading sea floor, biological productivity in the overlying waters, and changes in oceanographic conditions, both on the surface and near the sea floor. A brief review of this interplay is given here, based primarily on van Andel and others (1975).

At present, the dominant tectonic feature of the region is the East Pacific Rise, which generates new crust at rates of 8 to 20 cm/yr, and which serves as a boundary to four major plates, the Pacific, North American, Cocos, and Nazca Plates (Fig. 2). Of these plates, the first is of greatest concern to this report since all leg 85 sites lie on it. In very simple terms, during the last 50 m.y., new Pacific crust has been continuously moving (and rotating) northwestward, spreading away from the East Pacific Rise and subsiding from an initial depth of about 3000 m. This motion had two crucial results. It continuously altered the relationship between the stationary equatorial high-productivity belt and its depositional expression on the sea floor (Fig. 1). And, the subsidence with age and cooling of the spreading crust brought about an increasing exposure of solution-susceptible calcium carbonate to deeper, more corrosive waters below or near the lysocline.

Superimposed on this evolving tectonic framework is biological productivity. Upwelling associated with the equatorial current system creates one of the Earth's most fertile planktonic belts along the equator, especially in the eastern Pacific. This belt, dominated by carbonate and silica production by planktonic foraminifera, calcareous nannofossils, diatoms, and radio-

[1]Abridged from a preliminary Leg 85 report prepared by Larry Mayer, Fritz Theyer (Co-Chief Scientists), John A. Barron, Dean A. Dunn, Tim Handyside, Scott Hills, Ian Jarvis, Catherine A. Nigrini, Niklas G. Pisias, Annick Pujos, Tsunemasa Saito, Paul Stout, Ellen Thomas, Norbert Weinreich, and Roy H. Wilkins.

larians, is regionally and temporarily variable in width. Today it is roughly 3-4° wide and has its maximum expression slightly offset to the north of the equator. If these present-day relationships between surface waters and productivity have remained roughly constant during the Cenozoic, a more or less lens-shaped body of dominantly biogenic calcareous-siliceous sediments should have accumulated, with its apex offset to the north. This sedimentary bulge should be dominated by calcareous sediments along its crest and be increasingly more siliceous towards its northern and southern flanks. Seismic profiling, piston coring, and previous DSDP drilling confirm this, and demonstrate the rotation and northward displacement with time of the sedimentary bulge (Fig. 1).

The product of this simple tectonic-productivity model of the equatorial region is altered by changes in oceanograhic conditions. The latter affect primarily solution of calcium carbonate or may, in the form of thermohaline currents, physically remove and mix sections of the depositional record. Solution of biogenic silica appears occur throughout the water column, but calcium carbonate is responsive to changes in the deeper waters as expressed in bathymetric changes of the CCD and the lysocline. The numerous submarine outcrops of Tertiary sediments and the widespread hiatuses in the equatorial Pacific testify to the effectiveness of bottom water erosion throughout the Cenozoic.

DRILLING RESULTS

Site 571

At Site 571 we failed to recover downhole heat flow data, *in situ* pore waters, and correlative sediments due to technical difficulties. The 711-cm long mudline core contained predominantly calcareous Quaternary oozes with a 16 m/m.y. sedimentation rate and a mass accumulation rate of about 1.0 gm/cm^2/m.y. The core is heavily bioturbated, and shows distinct cyclic color changes. All major microfossil groups are abundantly represented and, with some exceptions, well preserved. Calcareous nannofossils and planktonic foraminifers generally dominate, although radiolarians and diatoms are never less than 1%, and usually more. The calcium carbonate content of the sediments varies cyclically, generally between 70 and 85%. These carbonate fluctuations are matched by variations in abundance of the nannofossil flora and are expressed in GRAPE downcore

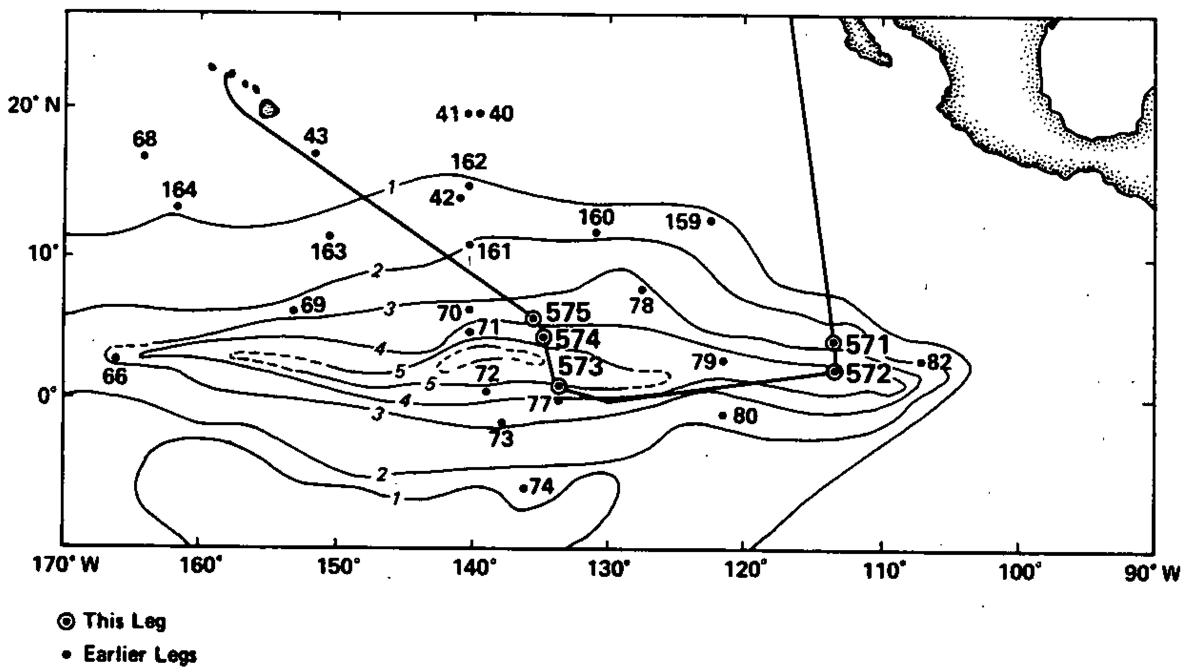


Figure 1. Track and locations of sites drilled on Leg 85 in relation to sediment thickness (contours in tenths of seconds of two-way travel time), and previous DSDP holes drilled on Legs 5, 8, 9 and 16.

density cycles, low density corresponding to low carbonate. The coherence of these data allows identification of Pleistocene carbonate events B11 to B3 (Hays et al., 1969). This is corroborated by the extrapolated age of the bottom of Core 1 (about 0.46 Ma) and by the fact that the topmost 40 cm appear to have been lost during coring. Physical properties and initial geochemical data are also compatible with published results for similar biogenous oozes. The magnetization of the sediments is stable, of normal direction, and of typical intensity; it was acquired at the core-site latitude.

Site 572

Located at the eastern edge of the equatorial high productivity zone (Fig 1), Site 572 is a few miles from Site 81 (DSDP Leg 9) at which only the uppermost and lowermost few meters of the section were recovered. At Site 572 we drilled five holes resulting in the continuous hydraulic piston coring of the upper 170 m and the nearly continuous coring of the rotary-drilled bottom 310 m of the section, to a terminal depth of 485.5 m. Basement was encountered at 479.5 m sub-bottom and the last core of the site recovered 43 cm of basalt.

The 479.5-m sedimentary section consists of laminated and burrow-mottled siliceous-calcareous oozes to siliceous-nannofossil oozes grading to siliceous-nannofossil chalks. These have been placed in a single lithologic unit. Cyclic variations in sediment color are seen throughout the section, and the dominant colors have been used to divide the section into four subunits. These subdivisions are arbitrary; sediment color does not appear to be directly related to texture or microfossil composition. The subunits may, however, be recognized in all five holes, and can be correlated with the "oceanic formations" defined for Site 81. The transition from oozes to chalks occurs between 293.5 and 367.5 m sub-bottom. Throughout, and especially in the chalky section, burrows of *Chondrites, Planolites,* and *Zoophycus* occur. The lowermost samples of the recovered sequence show indications of hydrothermal activity (Fig. 4). The entire section is characterized by cyclic alterations between high (80-90%) and low (45-65%) carbonate intervals. Many of these variations may be tied into established equatorial carbonate stratigraphies (Fig. 6).

Biostratigraphic data show that a continuous sequence from upper Pleistocene (0.22 Ma) through the lowermost middle Miocene (~ 15 Ma) was sampled. Holocene and uppermost Pleistocene sediments were not recovered (probably lost in the coring process) since the youngest sediment cored is older than the 220,000 years B.P. The Pliocene/Pleistocene boundary is found approximately 24 m sub-bottom, and the Miocene/Pliocene boundary about 116 m sub-bottom (Fig. 4).

All of the major microfossil groups are represented at Site 572. Siliceous microfossils occur in common to high abundances throughout the section whereas the abundance of calcareous microfossils varies with time as a function of carbonate dissolution. Calcareous microfossils are abundant and well preserved throughout the Pliocene and Pleistocene. A sharp break in preservation occurs at approximately 150 m sub-bottom (upper part of the late Miocene, ~ 6 Ma). From this level down to the lowermost part of the section (150-435 m, middle Miocene), calcareous microfossils are represented by solution resistant forms only, with particularly high dissolution indices at approximately 6.1 Ma and 10.8 Ma. Well preserved assemblages reappear in the deepest three cores in the section (436-464.5 m – middle Miocene; 14-15 Ma). Radiolaria are well preserved throughout the section whereas diatoms show good preservation above 365 meters sub-bottom (13.3 Ma) and generally poor to moderate preservation below that level. High percentages of the diatoms *Thallassionema nitzschiodes* and *Thalassiothrix longissima,* which are thought to indicate upwelling, dominate the intervals between 4.0 and 7.8 Ma (62-226 m) and 10.0 and 12.2 Ma (225-322 m). These intervals are periods of high sedimentation rate and correlate with the intervals of severe carbonate dissolution.

Sedimentation rates at Site 572 are variable, and, in some intervals, remarkably high (Fig. 6). The rate from about 12-15 Ma averages approximately 63 m/m.y. After 12 Ma the rate decreases to 13 m/m.y. and remains low until abut 7 Ma when it increases to about 50 m/m.y. This high sedimentation rate continues into the lower Pliocene (4.5 Ma) where it decreases to approximately 16 m/m.y. Some parts of the lower Pliocene may have sedimentation rates as high as 70 m/m.y. The uppermost material recovered (lower Pliocene and lower Pleistocene) has a sedimentation rate of 13 m/m.y.

An inverse relationship exists between percent carbonate and sedimentation rate implying dilution of carbonate during periods of high sedimentation rate. Comparison of carbonate and non-carbonate accumulation rates reveals that when accumulation rates shift from low to high, the carbonate rate increases by a factor of five. The three intervals of relatively high accumulation of non-carbonate (mainly biogenous silica) rate increases by a factor of

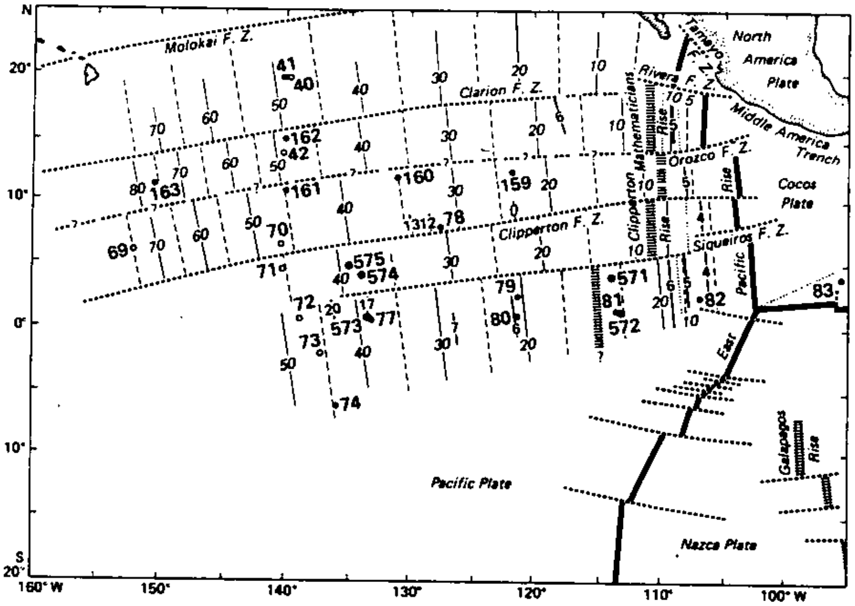


Figure 2. Tectonic and basement isochron chart of the central equatorial Pacific, from van Andel et al. (1975). Heavy line is present ridge crest; broad striped zone is extinct ridge crest; heavy dashed lines are fracture zones. Thin lines numbered 10 through 70 are basement isochrons. Heavier lines numbered 4, 5, 6, 17 and 20 are magnetic anomalies after Herron (1972). Approximate boundary of crust generated from present and extinct ridge system is shown by dotted line.

five. The three intervals of relatively high accumulation of non-carbonate material can be tentatively correlated with: the passage of the site under the equator (4-7 Ma); an equatorial Pacific-wide interval of very high biogenic silica accumulation (12-13 Ma); and a time of more localized maxima in silica accumulation (14-15 Ma). The maximum in carbonate accumulation rates at 14-15 Ma is consistent with previously established trends for the equatorial Pacific. Although the initial analysis of the sedimentation rate curves implies continuous sedimentation, the data may also be interpreted to show three short hiatuses (120 m, 360 m, and 425 m sub-bottom).

The sediments have extremely low NRM intensities (Fig. 5). Contributing to the problem of low intensities is the apparent acquisition of viscous components of magnetization in samples from the Brunhes normal epoch and the overprinting of primary information by chemical alterations. A ten-fold increase in intensity is found in the bottom 100 m of the section (middle Miocene). There the measured NRM inclinations indicate paleo-latitudes higher than the site's latitude, consistent with its northward motion (Fig. 3).

Shipboard pore-water analyses indicate similarities in the trends of calcium ion concentrations and alkalinity, especially between 230 and 350 m sub-bottom, suggesting that both are influenced by calcite saturation equilibria. An increase in alkalinity at 140-220 m coincides with the occurrence of an H_2S odor, an increase in the abundance of pyrite, high sedimentation rates, and numerous diatom-rich layers. These observations suggest rapid deposition of organic-rich material and depletion of oxygenated interstitial waters by microbial combustion.

Seismic velocity measurements yield almost invariable data downsection (ranging from 1.52 to 1.56 km/sec) to about 360 m; acoustic impedance is thus dominated by the substantial variations in saturated bulk density (1.2-1.6 gm/cm^3). Saturated bulk density variations correlate with changes in percent calcium carbonate: high carbonate sediments are dominated by dense, closely packed calcareous nannofossils (high saturated bulk density), and low carbonate sediments by less dense, loosely packed, biogenic silica (low saturated bulk density) (Fig. 5). Grain density variations support this conclusion. Formation factor and thermal conductivity show a maximum at 140-150 m sub-bottom, correlating with a porosity minimum and a carbonate maximum. Deeper than about 400 m all physical properties except gain density change abruptly. The increase in saturated bulk density and sonic velocity without a concurrent increase in grain density or carbonate content indicate a diagenetic effect. The seismic section at Site 572 is highly stratified throughout. This is consistent with the cyclic variations in saturated bulk density.

Site 573

Site 573 is located over a basement trough covered by acoustically well-stratified sediments reaching 0.62 seconds in thickness. In contrast, Site 77 (DSDP Leg 9) in the immediate vicinity was drilled on a basement flank over a 0.51 seconds thick sediment cover of comparable stratification.

The oldest sediment cored was uppermost Eocene limestone (Hole 573B, 528 m), below which 1 m of basalt was cored, showing a baked sediment interface and glassy rinds. Five lithostratigraphic units were recognized in the sedimentary section (Fig. 4). These can be subdivided on the basis of color and grouped so as to correlate with the three oceanic formations established at Site 77. Most notable among the lithostratigraphic subdivisions are 1) an uppermost Eocene biogenic limestone sub-unit (528-520.6 m); 2) a brown unit that contains metalliferous claystone and foraminifer-nannofossil chalk (528-520 m), which correlates with uppermost Eocene at its base, is virtually barren of fossils in its dark brown center, and contains lowermost Oligocene at its top; 3) a calcareous ooze/chalk unit (520-45.1 m); and 4) a siliceous calcareous ooze unit (45.1-0 m). Above the brown unit we observed turbidite layers (from centimeters to about a meter in thickness) of volcanic glass and ash intercalated with the pelagic sediments. The upper part of the section (0-180 m) is characterized by high amplitude cyclic carbonate fluctuations, while the lower part of the section (180-520 m) shows relatively constant, high carbonate values with lower amplitude fluctuations (Fig. 5).

Planktonic foraminifera, calcareous nannofossils, radiolaria, and diatoms are, with exceptions, well represented in the cored sediments allowing recognition and correlation of nearly all Eocene to Quaternary biozonal and stratigraphic boundaries (Fig. 4). This makes the section a valuable reference for the equatorial Pacific, even though the Eocene/Oligocene boundary could not be located unequivocably. The latter boundary either falls within the barren mid-portion of the metalliferous unit (528-514 m sub-bottom) or it coincides with a hiatus. The lower/upper Oligocene boundary falls in Core 573B-34 (ca. 456 m). The Oligocene/Miocene boundary occurs at about 334 m (573B-21) followed up-section by the lower/middle Miocene boundary at 246 m (573B-12); the middle/upper Miocene boundary at approximately 176 m (573B-4); and the top of the Miocene at about 80 m sub-bottom depth (573-10). The Pliocene/Pleistocene boundary is at ca. 25 m sub-bottom

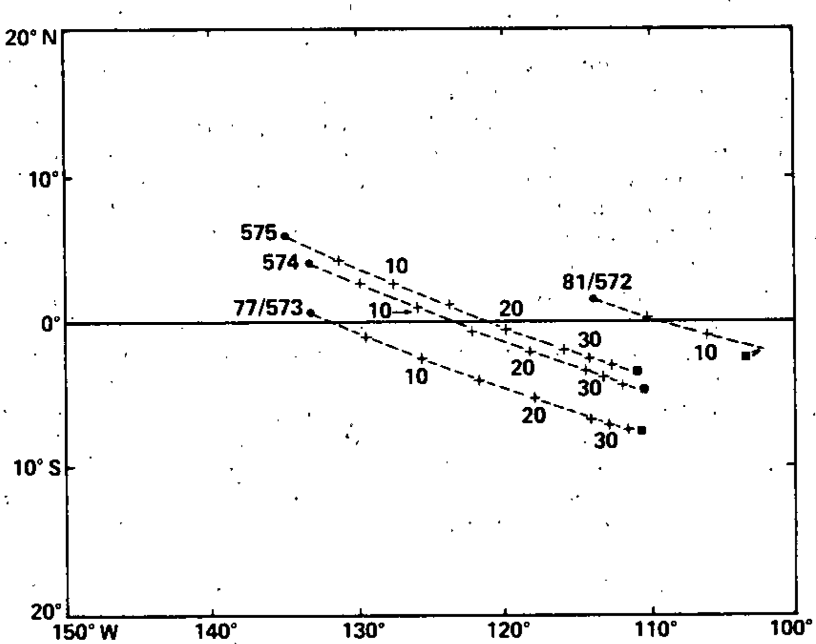


Figure 3. Migration tracks of Sites 572 through 575. Rates and rotation interpolated from the model developed by van Andel et al. (1975). Dots represent present, squares initial positions. At Site 575 drilling stopped at 22 Ma.

in Core 4 of Hole 573 and Core 3 of Hole 573A.

Biostratigraphic evidence points to the presence of at least three hiatuses or intervals of drastically slower rates of sedimentation in the cored sequence. Most prominent is the interval bracketed by foraminiferal zones P16 (uppermost Eocene) and P18 (basal Oligocene) and nannofossil subzones CP 15b (Eocene) and CP16b (Oligocene). This interval contains the Eocene/Oligocene boundary as generally accepted. Thus, the absence of Zone P17 (foraminifera) can either be explained by postulating a hiatus, or by assuming that the metalliferous claystone of Core 573B-42 (520.5 to 528 m) represents a greatly slowed-down depositonal record of latest Eocene-earliest Oligocene time. It is not inconceivable that the metalliferous layer is the remnant of a normal biogenic ooze from which hydrothermal activity has removed all microfossils by solution. Two other brief hiatuses occur, one in the topmost Oligocene (573B, Core 22 or 21) and the other in the lower upper Miocene. At nearby Site 77 correlative gaps were found in that record.

Benthic foraminifera occur throughout the section but are generally rare. The assemblages contain mainly long-ranging, Eocene to Recent genera. Species fluctuate in their relative abundances but the assemblages are remarkably stable in terms of overall "character". Rare Eocene marker fossils were found in the upper Eocene sediments of 573B-42-4, 144 to 147 cm.

Overall sediment accumulation rates at Site 573 are relatively constant, varying generally between 16 and 12 m/m.y. (Fig. 6). A peak of 30 m/m.y. occurs between 5.5 and 6 Ma and a low of about 10 m/m.y. between 15 and 21 Ma. In some instances, the accumulation rate changes correlate with breaks in the lithology and with changes in the NRM paleomagnetic intensities. Thus, the silica-rich sediments between about 160 and 200 m approximate an interval of rapid deposition, whereas a brown sedimentary unit between 260 and 360 m is roughly equivalent to a time of slower accumulation. In other parts of the record such a relationship between lithology and depositional rates does not seem to apply. compaction has a marked effect on sedimentation rate estimates, as demonstrated by mass accumulation rate calculations. Although the intervals between 25 and 30 Ma and 1.3 to 3.5 Ma show equal rates of sedimentation (about 13 m/m.y.), the Oligocene chalks–which are considerably denser–have a mass accumulation rate greater by a factor of two than the Pliocene/Pleistocene sediments. These estimates also show that the Oligocene was a time of generally high mass accumulation at Site 573.

Physical properties studies show a constancy of the grain densities data which hover near values of pure carbonate throughout most of the site's section. This implies that most of the bulk density of these sediments is controlled by water content or porosity (Fig. 5). Corroboration of this is given by the formation factor, another porosity-sensitive parameter. The seismic section is characterized by alternations of highly stratified and more transparent zones throughout the section; the more acoustically stratified sections correlate with high amplitude, high frequency fluctuations in saturated bulk density (and calcium carbonate) whereas the more transparent zones correlate with intervals of lower amplitude, longer wavelength changes. Several distinct individual reflectors appear to correlate with major shifts in the density curve.

Shipboard paleomagnetic results indicate that low NRM intensities characterize the bulk of the analyzed samples (Fig. 5). With the exception of the initial 50 m, a portion between 260 and 360 m, and the bottom 20 m of Hole 573B (where intensities on the order of 10^{-6} gauss and above were measured), the majority of samples fall within, or barely above, the noise level of the shipboard magnetometer. Consequently, they must await shore-based analyses if, indeed, they are usable at all. However, the changes in intensity seem to broadly coincide with color changes and fluctuations in sedimentation rates. In the upper 50 m of Site 573 a preliminary Gauss to Matuyama stratigraphy can be recognized, subject to refinement by demagnetization and proper orientation of individual cores. A tentative paleolatitude calculation, based on the mean NRM inclination of 22 specimens from 573B-14 to 24, yields a paleolatitude of 7.7°. This is somewhat higher than postulated for a comparable Oligocene-Miocene interval at Site 77. Considering the preliminary nature of the shipboard analyses, however, it appears entirely satisfactory.

Shipboard geochemical analysis suggests diagenetic activity within the sediments of the site. Magnesium, calcium, and alkalinity show nearly linear trends in the upper 100 m, with significant concavity in their curves below this level. The concavity is interpreted as due to production or consumption of these species, whereas the linear trends in the upper part of the section would indicate diffusional transport and exchange with sea water.

Site 574

Site 574 is the second of a three-site north-

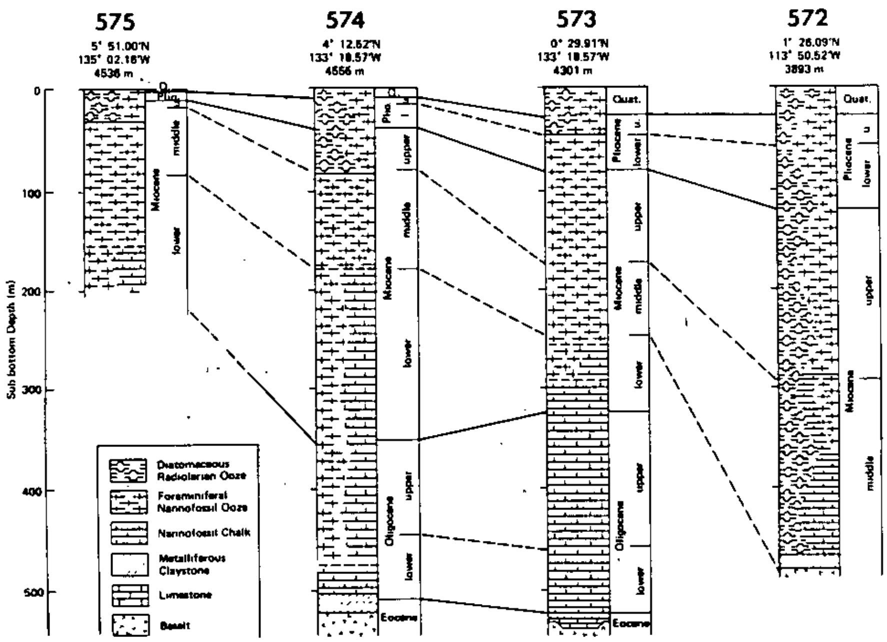


Figure 4. Lithologic columns and stratigraphy of Sites 572 through 575. The stratigraphic boundaries are drawn according to the time scale made up by the shipboard party and defined by foraminiferal, nannofossil, radiolarian diatom datum levels.

south transect across the equatorial high productivity zone. Its position (near the crest of the equatorial sediment bulge) was selected to provide a sedimentary record of the migration of this site across the equator as well as to permit recovery of the Eocene/Oligocene boundary. The section at Site 574 is divided into three lithologic units based primarily on sediment compostion. (Fig. 4):

Unit I: Cyclic siliceous calcareous ooze unit (0-83.8 m; upper Miocene-Quaternary)

This unit is characteized by cyclic variations in the relative abundances of siliceous and calcareous microfossils ranging from siliceous nannofossil to calcareous siliceous oozes. The unit is subdivided into three sub-units distinguished primarily by color: 1) an upper brown cyclic ooze sub-unit, 2) a green-gray ooze sub-unit, 3) a lower cyclic brown ooze sub-unit.

Unit II: Calcareous ooze/chalk unit (83.8-502.5 m; lower Oligocene-upper Miocene)

A predominantly calcareous unit, which has a range from siliceous nannofossil to nannofossil oozes and chalks. Two sub-units are recognized on the basis of color, a green-white ooze/chalk sub-unit (83.8-470.2) and a yellow-white ooze/chalk sub-unit (470.2-502.5 m). A gradual ooze to chalk transition occurs between about 185 and 480 m sub-bottom.

Unit III: Metalliferous calcareous unit (502.5-520.0 m; upper Eocene-lower Oligocene)

A yellow brown siliceous nannofossil chalk with common iron/manganese oxides. This unit directly overlies basaltic basement.

The percent carbonate curve at Site 574 is similar to that at Site 573 (Fig. 5). The upper (late Miocene-Quaternary) 85 m part of the section is an interval of high amplitude, high frequency carbonate fluctuations. From Eocene to middle Miocene the curve shows high carbonate percentages with little variation.

The major microfossil groups are generally represented providing a fairly complete uppermost Eocene to Quaternary section. Siliceous microfossils are abundant and well preserved in most of the section. There is, however, a decline in diatom abundance and preservation in the upper Oligocene, the upper part of the lower Oligocene, and near the Eocene/Oligocene boundary. Planktonic foraminiferal abundances fluctuate and provide good stratigraphic control only in the lower middle Miocene. Calcareous nannofossils are common to abundant throughout the section. Both the foraminifera and the nannofossils reveal at least three zones of reworked Oligocene microfossils in the middle Miocene interval.

Several events of stratigraphic significance are recorded. The planktonic foraminifera reveal the "*Globorotalia fohsi* lineage" and the *Orbulina* datum. The transition from the uppermost Eocene to the lowermost Oligocene is remarkably complete. The transition occurs in the metalliferous unit (502.5-520.0 m) directly above basement, but its precise location varies with the differing criteria of each microfossil group.

Nonetheless, the apparently continuous sequence offers a unique opportunity to study the Eocene/Oligocene boundary. The Oligocene/Miocene boundary occurs in Hole 574C, Core 17, Section 3 (ca. 350 m) and the Miocene/Pliocene boundary occurs in Hole 474, Core 5, Section 4 at approximately 40 m sub-bottom. The diatom stratigraphy suggest hiatuses in the lower Pleistocene (0.8-1.5 Ma) and the lower upper Miocene (9.1-10.8 Ma) whereas the sedimentation rate curves indicate these to be times of decreased sedimentation. Detailed studies are necessary to resolve this discrepancy.

Sedimentation rates at Site 574 are moderate; Oligocene rates average 10 m/m.y. increasing to 31 m/m.y. in the early Miocene (15-20 Ma) (Fig. 6). There is a short interval of low sedimentation rates (13.4-15.6 Ma) followed by a middle Miocene interval (12-13.4) of relatively high (∿ 40 m/m.y.) rates. After the middle Miocene maximum sedimentation rates decrease sharply (< 10 m/m.y.) and, except for a short interval of increased rates (∿ 20 m/m.y.) between 5 and 6.2 Ma, remain low into the youngest sediments recovered. In contrast to Sites 572 and 573, the sedimentation rate and calcium carbonate curves at Site 574 show a positive correlation. Carbonate and non-carbonate accumulation rates continue to exhibit a linear relationship, but the regression has a much lower slope than at Sites 573 and 572.. These data suggest that sediment accumulation is more strongly dominated by carbonate sedimentation than at the previous Leg 85 sites.

Paleomagnetic studies at Site 574 were once again hampered by extremely low NRM intensities in much of the section, but, despite these problems, the shipboard program produced interesting results. In the cyclic calcareous-siliceous unit, NRM intensities are an order of magnitude higher than in the rest of the section (except for the metalliferous sediments) (Fig. 5). Polarity reversals can be identified but not specific reversals. The detailed magnetic stratigraphy as well as polar wandering path calculations will have to await shore-based studies. In the region of high NRM intensities (∿ 0-80 m) there is an extremely good correlation between carbonate content and NRM intensity, with low carbonate corresponding to high intensity. Below 80 m sub-bottom where carbonate content is high and shows little variation, the NRM intensities decrease and appear to vary as a function of sedimentation rate (higher intensity with lower sedimentation rate). The NRM intensities once again increase in the metalliferous sediments at the base of the section.

Shipboard analyses of interstitial waters reveal linear trends for alkalinity, calcium, and magnesium in the upper 150 meters. Departures from linearity in this interval may be a function of changes in diffusion coefficients which are suggested by variations in formation factor. Deeper in the section, variations in alkalinity, calcium, and magnesium are influenced by sedimentation rate, depth of burial, and compositional changes, and are probably indicative of diagenetic processes. High alkalinity values are associated with high sedimentation rate and sulphate reduction; low alkalinity occurs where calcium is at a minimum, indicating possible calcite precipitation and coinciding with an increase in the amount of chalk. Most intriguing are the changes in the geochemical parameters associated with the metalliferous sediments at the base of the section. A full understanding of these changes as well as all the geochemical relationships requires detailed shore-based studies.

Physical property measurements (gravimetric, sonic velocity, thermal conductivity and electrical resistivity) show an upper zone of large-amplitude wavelength variations (0-90 m) followed by an interval of fairly consistent values (90-220 m), the mean of which is offset from that of the upper interval (Fig. 5). Below about 220 m there is another major shift in mean values that appears to be associated with the beginning of chalk formation. Unlike the previous sites, saturated bulk and grain densities in the lowermost part of Site 574 (420-510 m) decrease (porosity increases). This unexpected result is associated with the abundance of siliceous microfossils in this interval.

The seismic section of Site 574 is characterized by numerous closely-spaced reflectors that vary in strength and character downsection. Variations in sonic velocity are minimal until about 380 m sub-bottom as has been typical of Leg 85 sediments; impedance contrasts are thus a function of changes in just the saturated bulk density above that level. The reflection pattern of cyclic density changes in the upper 80 m of the section. Below this level several individual reflectors can be correlated to shifts in saturated bulk density values, but these reflectors may also be interference composites. Acoustic basement correlates with a zone of rapid velocity and density excursions (deeper than 400 m) and probably does not represent basalt.

Site 575

Located just south of the Clipperton Fracture zone, Site 575 (Fig. 1) completes the three-site latitudinal transect of Leg 85 along approximately 133°W across the equatorial sedimentary "bulge." Lack of time disallowed completion of drilling to basement. Nevertheless, the site's paleoenvironmental and stratigraphic goals were exceedingly well served by three HPC holes, which penetrated 196.3 m into the subbottom and ended in lowermost Miocene. A combined total of 374.47 m (of these, the upper 120 m overlap) of sediments was recovered, mostly undisturbed. The early to middle Miocene history (12 to 22 Ma) of the section records a highly productive environment dominated by the equatorial belt, whereas its higher part testifies to the site's tectonic emergence from under this belt and its migration to the north. Shipboard analyses of the cored material allow the following observations:

1. We distinguish two sedimentary units, an upper Miocene to Quaternary siliceous calcareous cyclic unit (Unit I, 0-30 m subbottom) at top, and a lower to middle Miocene calcareous ooze/chalk unit (Unit II, 30-196.3 m) at bottom (Fig. 4). Unit I is characterized by cyclic alternations in carbonate content whereas Unit II has relatively constant, high (94%) carbonate values down to the middle part of the lower Miocene where there is a slight decrease of the mean carbonate percentage (86%) (Fig. 6). Sub-units, based primarily on color, can be distinguished in both. Centimeter thick sandy to pebbly turbidites are intercalated throughout the section. These are primarily composed of allochthonous foraminifera and volcanic debris.

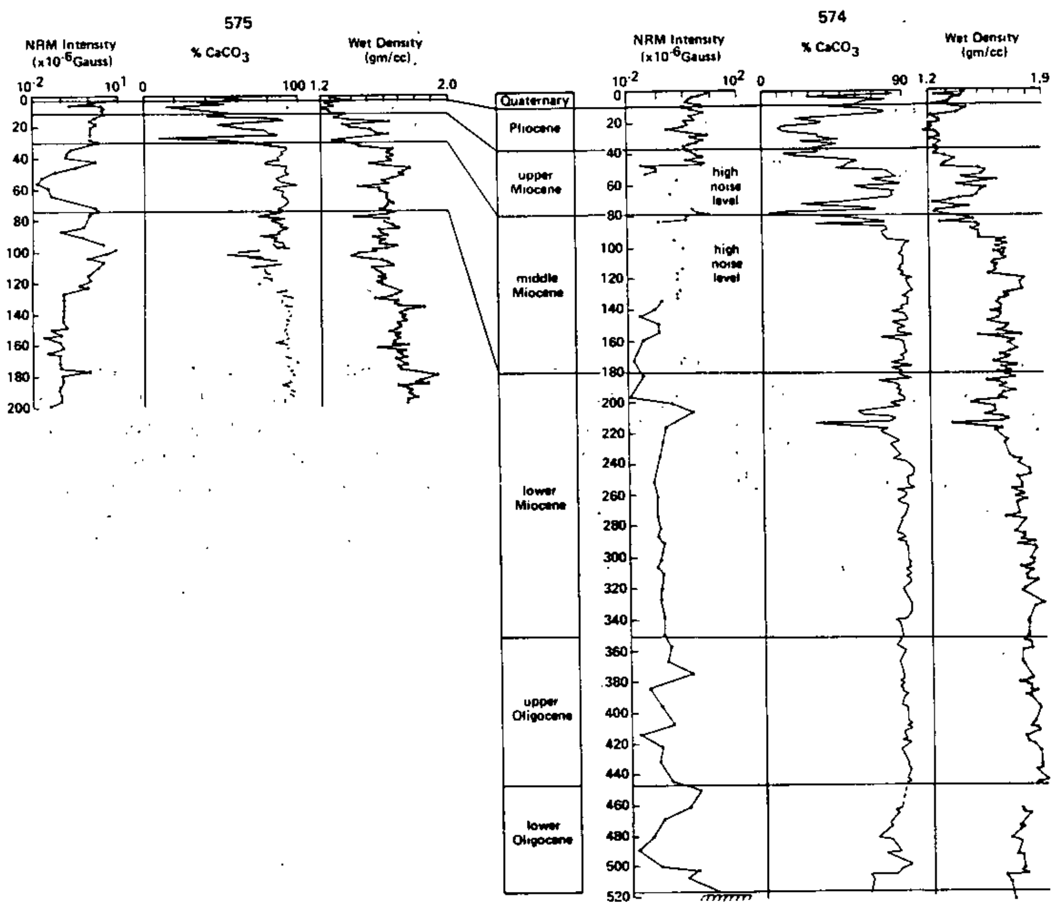


Figure 5. NRM intensity, percent calcium carbonate and saturated bulk density in the sediments at Sites 572 through 575.

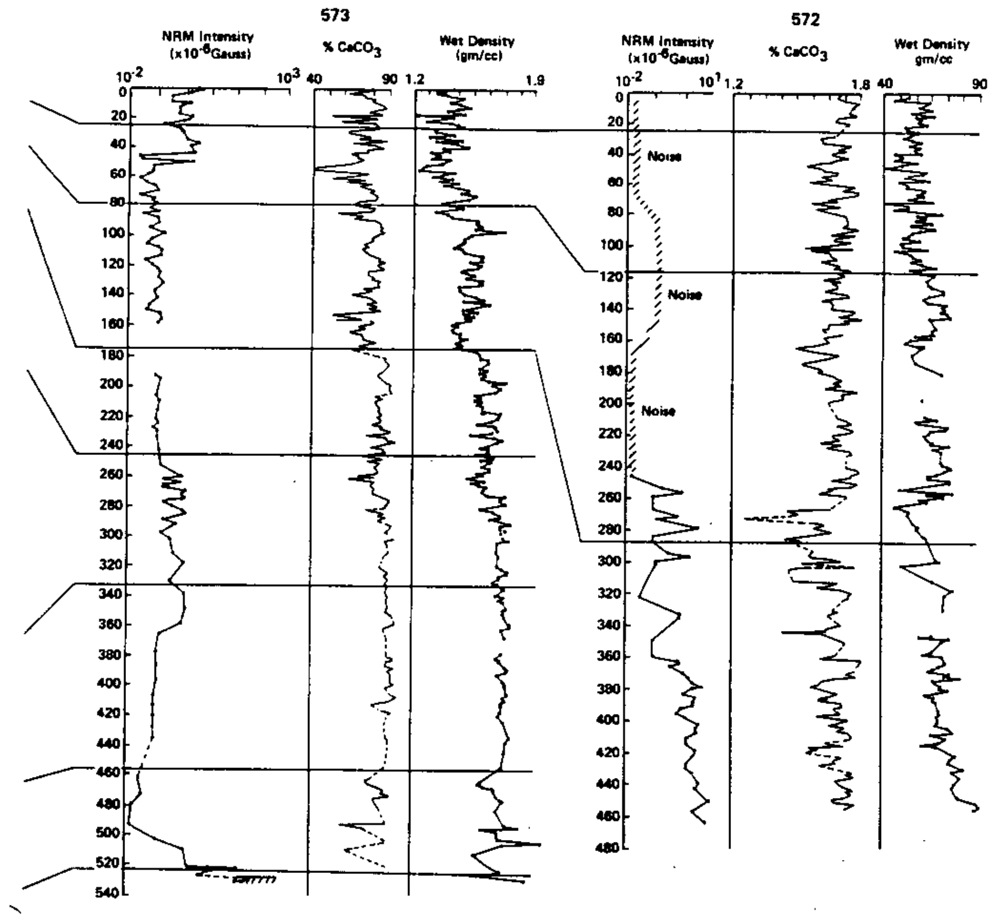


Figure 5 (cont'd.)

2. Except for one hiatus at 10.5 to 12 Ma, a complete lowest Miocene (beginning at about 22 Ma) to upper Pleistocene sequence was recovered (Fig. 4). all major microfossils occur throughout, although preservation of calcareous skeletons is poor to almost nil in the topmost siliceous calcareous cyclic Unit I. Calcareous dissolution is evident in the uppermost unit and compounded by microfossil reworking and the extreme stratigraphic compression of the section, obscuring recognition of some biozonal boundaries in these upper Neogene sediments. In contrast, the expanded character of Unit II, and the excellent preservation of microfossils (except for a very brief interval from 102-108 m sub-bottom), make it one of the most complete lower Neogene sequences available from the equatorial Pacific.
3. Foraminifera in the sandy to pebbly turbidites seem to indicate a grading down-section, with coarser grains lower in the record. Planktonic foraminifera in some of these layers are considerably older than those of the *in situ* sediments, whereas benthic foraminifera testify to the shallower origin of the sediments forming the layers.
4. Sediment accumulation rates confirm the lithostratigraphic subdivision (Fig. 6). Moderate and variable rates of 14-20 m/m.y. characterize the siliceous nannofossil oozes of Unit II, and very low but virtually constant rates of 4 m/m.y. the siliceous/calcareous Unit I. The small fluctuations in rates in the lower unit are not necessarily correlative to the sub-units; the maximum rate of 20 mm/m.y. prevails between about 22 and 19.5 Ma, and a brief interval between 16.5 and 14.5 Ma accumulated at the minimum rate of 14 m/m.y.
5. A prominent hiatus or period of extreme reduction in sedimentation rate is found between about 9.5 and 12.5 Ma. Shore-based paleontological research will clarify the na-

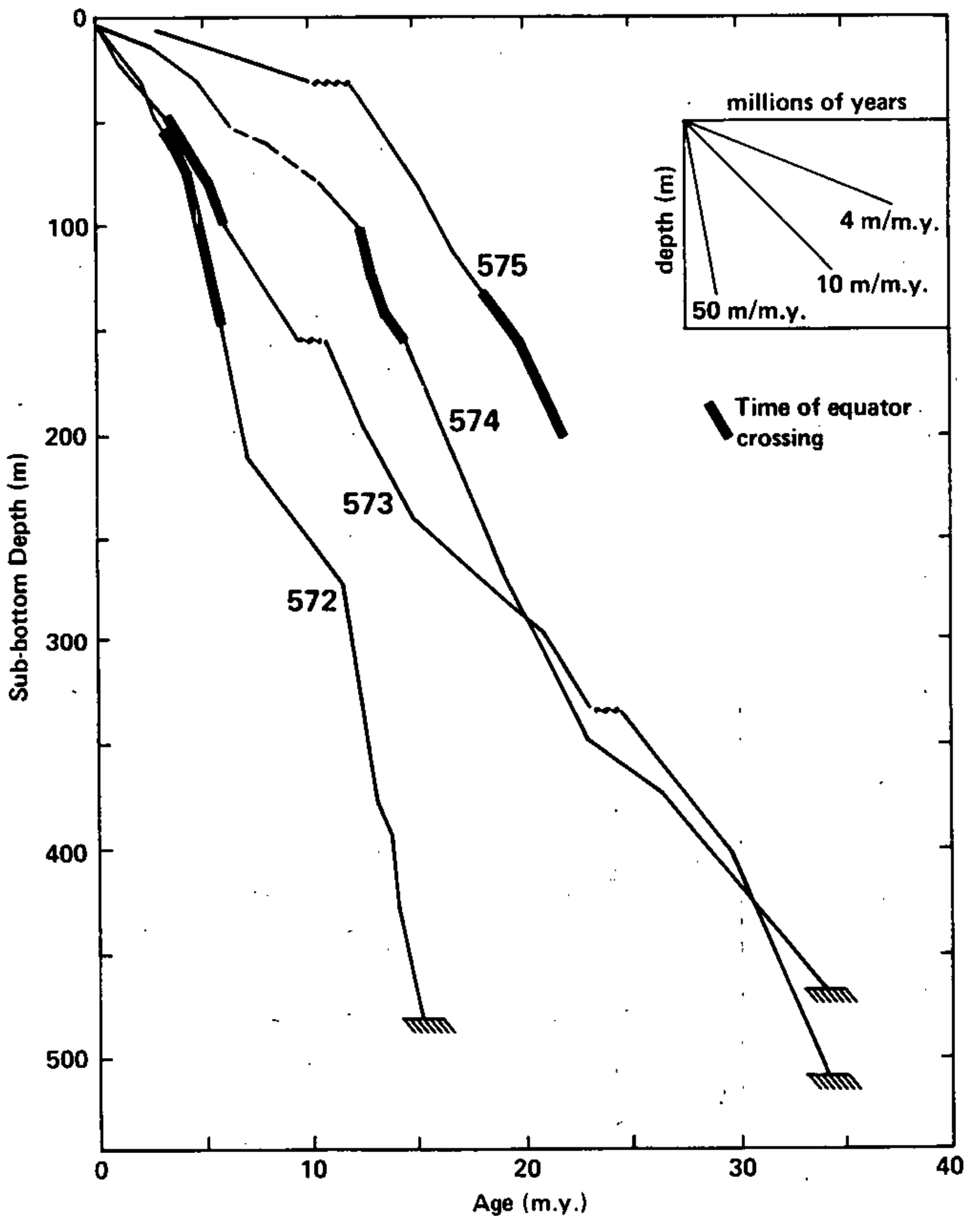


Figure 6. Sediment accumulation rates at Sites 572 through 575.

ture of this event.

6. NRM intensity trends correlate both with sedimentation rates and sediment color (Fig. 5). Consistently high values, on the order of 10^{-6} gauss or above, are typical for the sediments of Unit I and for most of the browner intervals of Unit II.
7. Physical properties show strong gradients over the topmost 30-40 m, followed by scatter about a constant mean in the subsequent 40-130 m sub-bottom, where a shift towards a new mean ensues (Fig. 5). The data appear to closely reflect lithology, particularly carbonate content. The compressional acoustic velocity appears to have greater fluctuations in amplitude than at previous sites. In addition, some of its spikes were produced by samples from the turbidites interspersed in the column. The seismic section (upper 200 m) consists of a zone of strong, closely-spaced reflections. The upper, seismically stratified zone correlates extremely well with the interval of large amplitude, short wavelength fluctuations in saturated bulk density as has been the case for most of Leg 85 sites.

8. Inorganic geochemistry pore-water trends are comparable to those of the earlier sites, although the gradients are more compressed and possibly indicative of reactions deeper in the section. the hiatus at 10.5-12 Ma is supported by the geochemical evidence.

Finally, in concert with the multiple evidence for erosion in the seismic records around the site, and the proximity to a prominent seamount, the turbidites (with basalt pebbles, volcanic glass, and allochthonous foraminifera) throughout the section tell a story of discrete erosional, redepositional, and possibly volcanic events punctuating the last 20 m.y. of the region's geological history.

CONCLUSIONS

The primary results broadly support the existing tectonic-oceanographic model of central equatorial sedimentation (van Andel et al., 1975). The conclusions are our first and preliminary impressions.

The distribution of sites on Leg 85 permits the evaluation of many of the major influences on the deposition of pelagic sediments. This implies that, except for the thin metalliferous layers (of hydrothermal origin), at the base of each section the major compositional changes in the recovered sediments are the result of shifts in the relative abundances of the biogenic

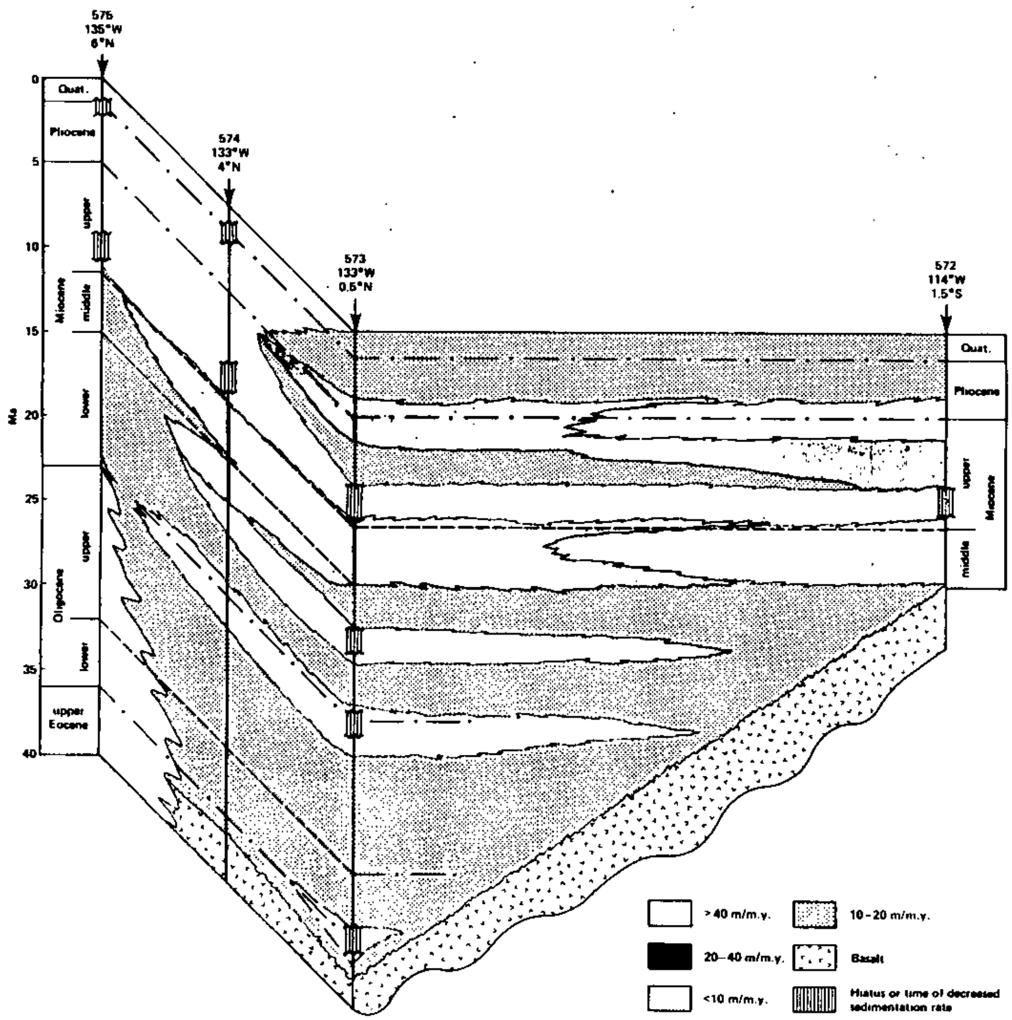
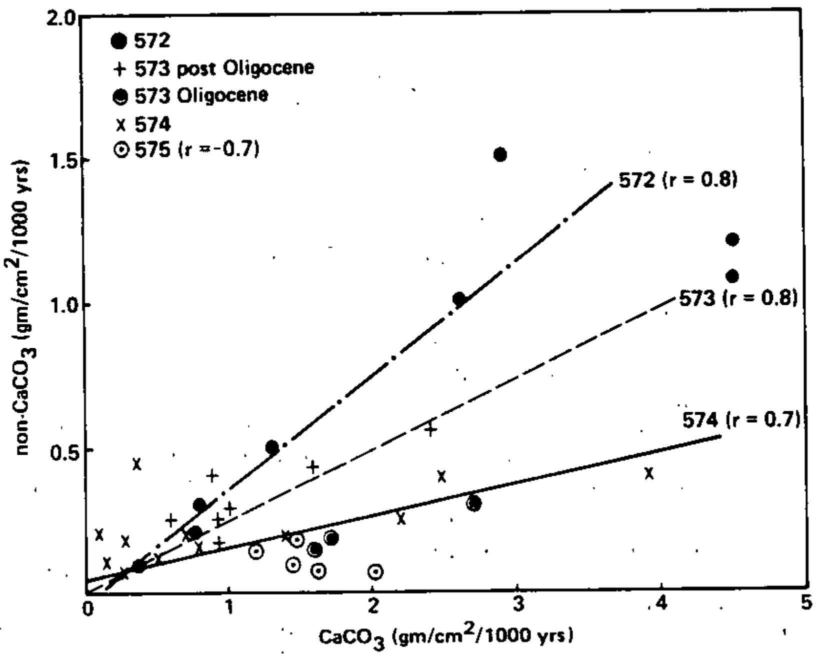


Figure 7. Schematic representation of the depositional history at Sites 572 through 575. High rates typify the eastern region during the middle Miocene to earliest Pliocene, corresponding with high siliceous productivity dominated by diatoms. Rates decrease toward the west and northward from the equator. Pre-middle Miocene rates are more uniform and correspond with dominantly calcareous sediments.



Units = $gm/cm^2/1000$ yrs

Figure 8. Mass accumulation rates of carbonate and non-carbonate sediment fractions. Points that fall off the regression line for Site 572 occur at the extremely high siliceous deposition in the late Miocene and at the highest rate of calcium carbonate sedimentation just above basement. The pre-Miocene data of Site 573 are not included in the regression calculation. Note that these data points fall on the regression line for Site 574.

siliceous or calcareous components.

All of the Leg 85 sites have migrated from relatively shallow (~ 3000 m) depths in the eastern Pacific, south of the equator, to deeper (4000-4600 m), more western locations at, or north of the equator (Fig. 3). In the course of this migration, these sites have passed under or into the latitudinal and longitudinal gradients of the equatorial high productivity zone and have been exposed to increasing carbonate dissolution with depth. Superimposed on these influences, temporal variations (15 to 16 m.y. for Site 572, 38 to 40 m.y. for Sites 573-575) – in productivity, dissolution, and erosion – have played a major role.

Of the factors effecting the Leg 85 drill sites, the most striking is the strong east-west productivity gradient. At Site 572 (114°W) sedimentation and accumulation rates are extremely high (often > 50 m/m.y.; Fig. 6). The sedimentation rate curve at Site 573 (ca. 2100 km to the west) has the same shape as that at Site 572, but shows attentuated rates (except for 0-5 Ma) (Fig. 7). While depth and latitude also influence the differences between Sites 572 and 573, analyses of the carbonate and non-carbonate accumulation rates, the foraminiferal dissolution index, and qualitative evaluation of diatom and benthic foraminiferal species distribution support a strong east-west productivity gradient during the mid-Miocene to early Pliocene. This gradient is dominated by the production of siliceous microfossils (mostly diatoms) in the east; the lithologic and stratigraphic variation from east to west is a response to this gradient (Figs. 4 and 5).

The increasing influence of silica productivity in the east is shown by a comparison of the carbonate and non-carbonate accumulation rates. For all the Leg 85 sites it is probably valid to assume that the non-carbonate component consists mainly of biogenic silica. There is consistent association of diatom species indicative of upwelling with times of increased non-carbonate accumulation. For Site 572, a plot of carbonate vs. non-carbonate rates shows a linear relationship with a positive slope (Fig. 8). At Site 573 a comparison of the post-Oligocene carbonate and non-carbonate accumulation rates reveals a similar positive relationship but with a depressed slope (Fig. 8), implying that the non-carbonate component decreases in importance.

The influence of the productivity gradient is particularly noticeable when comparing the sedimentation rate, accumulation rate, carbonate content, and dissolution index curves of Sites 572 and 573. At Site 573, the carbonate and non-carbonate accumulation rates and carbonate contents track nicely: high carbonate values are associated with high accumulation rates (productivity) and better preservation. At Site 572, however, the same relationships are found during periods of relatively lower accumulation rates only; times of high accumulation are associated with enhanced dissolution and decreased carbonate content. A possible explanation for this involves the magnitude of non-carbonate accumulation at each site. The highest non-carbonate rate at Site 573 is about 0.5 $gm/cm^2/1000$ yr whereas the maximum value at Site 572 is almost three times that amount. We suggest that when a certain non-carbonate accumulation rate (productivity) threshold is reached, the abundant organic matter produces steep dissolution gradients and enhanced dissolution. We see evidence for this phenomenon at Site 572 only, but the implications for paleoceanographic modeling are intriguing.

Though less pronounced than the east-west gradient, a latitudinal change in depositional environment is also apparent between Sites 573, 574 and 575 (Fig. 7). The northward decrease in sedimentation rates away from the equator from Site 573 to 575 is shown in the uppermost section (representing approximately the upper Miocene, Pliocene, and Quaternary) of the sedimentation rate plot (Fig. 6). Between Sites 573 and 574 this gradient is even more pronounced in the early Miocene, despite the proximity of these two sites. This early Miocene gradient is consistent with van Andel et al.'s (1975) compilation of equatorial Pacific sedimentation patterns.

The trend in relationship between carbonate and non-carbonate accumulation rates between Sites 572 and 573 continues northward. At Site 574 a positive, linear relationship is seen but its slope is about half that of the post-Oligocene at Site 573, and equal to that of the Oligocene at Site 573 (Fig. 8). The implication is one of decreasing influence of biogenic silica (productivity?) and the increasing dominance of carbonate. Finally, the regression of carbonate versus non-carbonate accumulation rates for Site 575 shows a negative correlation (Fig. 8) indicating that carbonate and non-carbonate accumulation are no longer responding in parallel.

The general trend of a northward decrease in accumulation is complicated by the timing of the passage of each site beneath the equatorial high productivity zone. Sites 572 and 573 have only recently crossed the equator and are still under the area of relatively high productivity (Figs. 6 and 7). Site 574 shows a middle Miocene peak in sedimentation that corresponds to its equator crossing and Site 575 shows its sedimentation rate maximum in the lower Miocene when it crossed the equator (Fig. 6). The combination of the north-south productivity gradient and the equatorial passage produces the dominant features of the lithology and stratigraphy of Sites 573-575 (Figs. 4 and 5).

Superimposed upon these factors are temporal variations in productivity, dissolution and deep-sea erosion. While detailed, quantitative studies are necessary to sort out these factors, some general statements can be made. First, and most impressive is a major shift in the nature of carbonate deposition at the middle-late Miocene boundary at Site 573, 574 and 575. Generally speaking, material deposited after the middle Miocene has large amplitude, short wave-length fluctuations between high and low carbonate content whereas material older than late Miocene has a relatively constant high carbonate content. Associated with this shift from carbonate-silica cycles to high carbonate sediments are significant changes in the physical and magnetic properties of the sediment (Fig. 5). The shift from a carbonate to a carbonate-siliceous regime at the middle/late Miocene boundary has been attributed to worldwide cooling and a change from an Atlantic to a Pacific sink for silica (Keller and Barron, in press).

A second prominent feature is the occurrence of hiatuses or intervals of greatly reduced sedimentation, which are synchronous at the Leg 85 sites (Fig. 7). The first interval, expressed as a hiatus at Site 573, but as greatly reduced depositional rates at Site 574, is correlative with the Eocene/Oligocene boundary. This hiatus has been associated with the separation of Antarctica from Australia and enhanced bottom water circulation resulting from Antarctic glaciation (Kennett et al., 1975).

Some of the biostratigraphic data suggest a second and third hiatus or period of reduced sedimentation at the Oligocene/Miocene boundary and in the middle part of the lower Miocene. More detailed analyses will be necessary to substantiate them. Finally, there is strong evidence for a hiatus (or time of reduced sedimentation) in the early late Miocene (ca. 9.2 to 11 Ma) at Sites 573, 574, and 575, and possibly at Site 572. Hiatuses at this time are widespread in the oceans (Keller and Barron, in press). In this context, it should be empha-

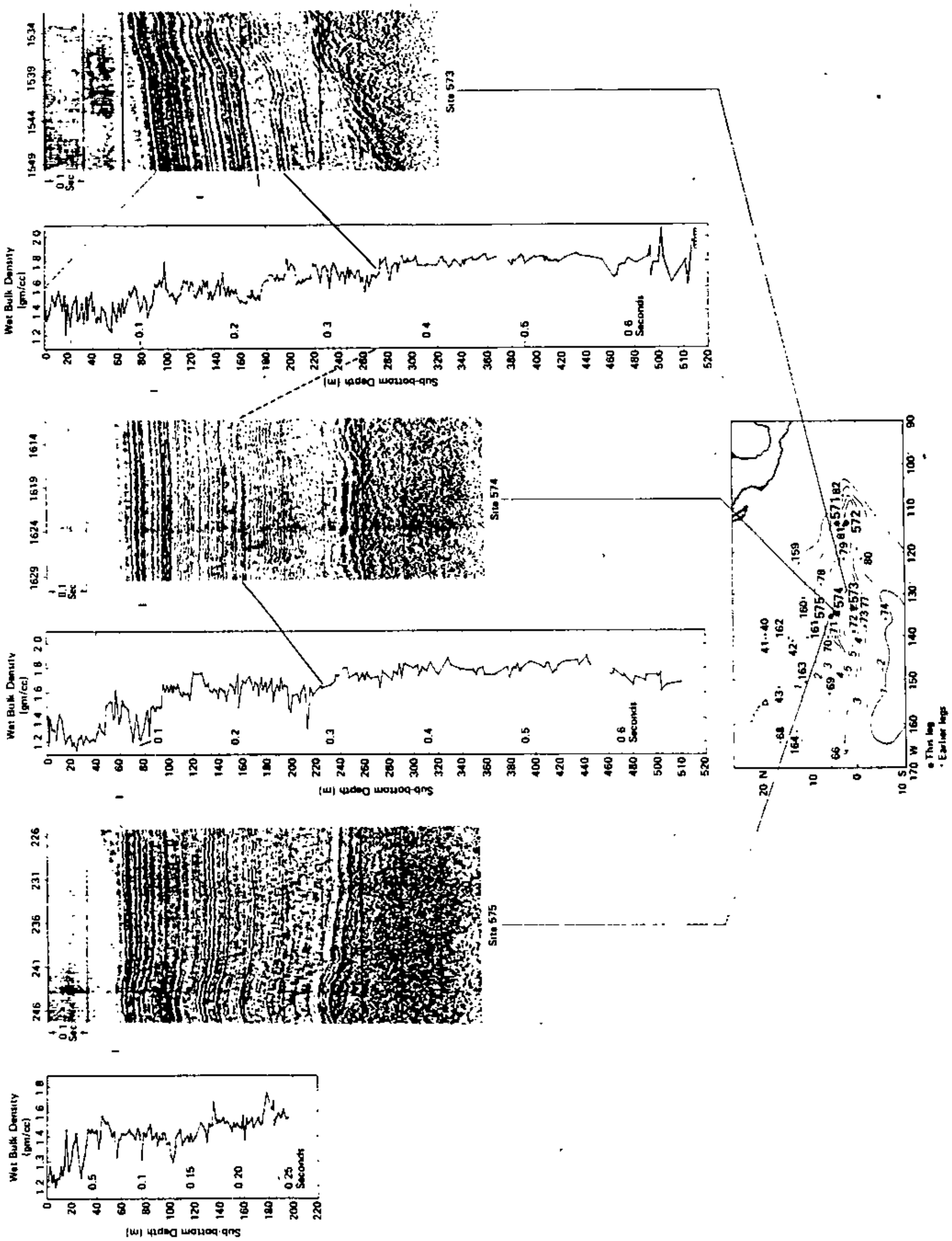


Figure 9. Seismic correlation at Sites 573, 574 and 575. The seismic profiles are preliminary, processed, digitally recorded water gun records collected by R/V *Thomas Washington* on expedition Ariadne I. The base of the cyclic unit (seismic unit I) corresponds to the middle/late Miocene boundary.

sized that a hiatus and a zone of greatly reduced sedimentation convey the same message. Both are indications of significant oceanwide events–they only vary in degree.

A particularly intriguing result of Leg 85 is the possibility of acoustically identifying the middle/late Miocene shift in depositional regime and seismically tracing this boundary over much of the central equatorial Pacific. Our preliminary analysis indicates that the distinct shift in the carbonate content (and saturated bulk density) at the middle/late Miocene boundary is associated with a distinct change in reflector pattern (Fig. 9). If seismic modeling proves these tentative correlations to be true, the implications for paleoceanographic studies are tremendous.

REFERENCES

Anderson, R.N. and Sclater, J.G., 1972. Topography and evolution of the East Pacific Rise between 5°S and 20°. *Earth and Planet. Sci. Lett.*, 14, 433-441.

Arrhenius, G.O., 1952. Sediment cores from the East Pacific. Swedish Deep-Sea Exped. Rept. 1947-48, 5, Pt. 3, 189-201.

Bramlette, M.N., 1961. Pelagic sediments, *Oceanography*, Washington, D.C., Am. Assoc. Adv. Sci., 345-366.

Berger, W.H., 1973. Cenozoic sedimentation in the eastern tropical Pacific. *GSA Bull.*, 84, 1941-1954.

Hays, J.D., Saito, T., Opdyke, N.D. and Burckle, L.H., 1969. Pliocene-Pleistocene sediments of the equatorial Pacific: their paleomagnetic, biostratigraphic and climatic record. *G.S.A. Bull.*, 80, 1481-1514.

Hays, J.D. et al., 1972. An interpretation of the geologic history of the eastern equatorial Pacific from the drilling results of the *Glomar Challenger*, Leg 9. *In* Hays, J.D. (ed.) *Init. Repts. DSDP*, v. 9: Washington (U.S. Govt. Printing Office), 909-931.

Herron, E.M., 1972. Sea floor spreading and the Cenozoic history of the east-central Pacific. *Geol. Soc. Amer. Bull.*, 83, 1671-1692.

Keller, G. and Barron, J.A., in press. Paleoceanographic implications of Miocene deep sea hiatuses. *Geol. Soc. Amer. Bull.*

Kennett, J.P. and others, 1975. Cenozoic paleoceanography in the southwest Pacific Ocean, Antarctic glaciation, and the development of the circum-Antarctic current. *Init. Repts. DSDP*, v. 29: Washington (U.S. Govt. Printing Office), 1155-1169.

Riedel, W.R. and Funnell, B.M., 1964. Tertiary sediment cores and microfossils from the Pacific Ocean floor. *Geol. Soc. London Quart. Jour.*, 120, 305-368.

Sclater, J.G., Anderson, R.N. and Bell, M.L., 1971. Elevation of ridges and evolution of the central eastern Pacific. *J. Geophys. Res.*, 76, 7888-7915.

van Andel, Tj. H., Heath, G.R. and Moore, T.C., Jr., 1975. Cenozoic history and paleoceanography of the central equatorial Pacific Ocean. *GSA Memoir* 143.

Winterer, E.L., 1973. Sedimentary facies and plate tectonics of the equatorial Pacific. *Am. Assoc. Pet. Geologists Bull.*, 57, 265-282.

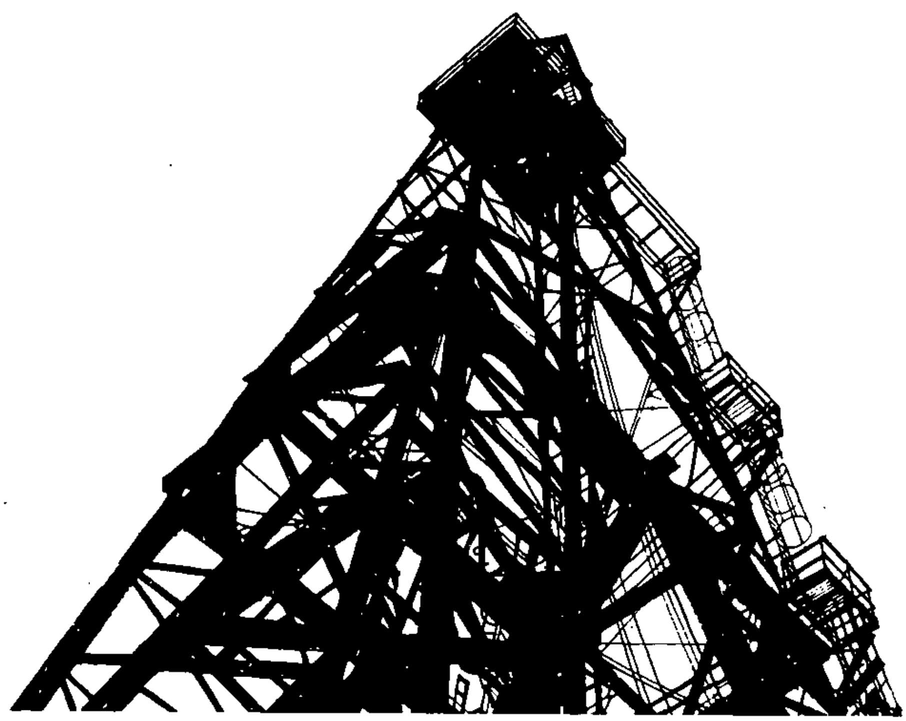


TABLE 1

LEG 85 CORING SUMMARY

Site	No. of Holes	Water Depth (Corrected Meters)	Operations	No. of Received Cores	Maximum Penetration (Meters)	Cored Sub-Bottom Range (Meters)	Est. Age of Oldest Seds (MA)	Nature of Basement
571	1	3962	HPC Heat Flow/ Pore Water	1	7.1	571 0-7.1	0.46	
572	5	3893	Double HPC Rotary Core*	76	486.0	572 0-19.0 572A 0-154.0 *572B 154.0-172.1 572C 0-169.5 572D* 151.0486.0	14-15	BASALT
573	3	4301	Double HPC Rotary core* Heat Flow/ Pore Water	68	529.0	573 0-158.6 573A 0-53.2 573B* 138.5-529.0	38-39	BASALT
574	4	4561	Double HPC Rotary core*	92	532.5	574 0-206.5 574A 0-180.2 574B* 185.0-204.0 574C* 194.5-532.5	38-39	BASALT
575	4	4536	Double HPC	60	196.3	575 0-98.6 575A 93.8-196.8 575B 0-99.8 575C 0-15.8	22	

Leg 86 — NW Pacific Paleoenvironment

The primary objective of Leg 86 (Fig. 1) was to recover a north-south profile of late Neogene sections across the Kuroshio current system, from subtropical to subarctic waters, in order to unravel the pre-glacial and Quaternary paleoceanographic history of this system, and to determine whether the Miocene onset of biosiliceous sedimentation was synchronous or diachronous in this region. Secondary objectives included HPC sampling of the Cretaceous-Tertiary boundary on Shatsky Rise, recovery of a "type" red clay section for paleogeochemical and geotechnical studies, determination of the thickness and character of sediments at the site of the proposed DARPA downhole seismometer experiment (Leg 88) to allow design of casing strings, and recovery of a late Quaternary section on the Japanese margin.

The primary objective was largely achieved, although time constraints prevented rotary coring beyond the HPC-sampled sections at Sites 579 and 580, as well as any HPC sampling at Site 581 or planned double HPC sampling of the sections at Sites 578, 579 and 580. The abundance and preservation of the siliceous microfossils improves from Site 578 to Sites 579 and 580. The latter two sections should meet the primary paleoceanographic goals of the N-S section, although the breaks between cores will limit the amount of frequency-domain work that can be done.

The time constraints mentioned earlier also led to elimination of the Japanese margin site. Otherwise, the secondary objectives were achieved.

Three factors combined to force the cutbacks in our scientific program:

1. Greatly reduced trip speeds with the HPC caused by the undersized bore of the pipe delivered in Long Beach. Because the tight fit made the core barrel "float," with the resultant risk of snarling of the sand line, coring times were almost 50% greater than estimated in the cruise schedule.

2. Slower-than-expected speeds underway, due to weather, unpredictable currents, and, perhaps, marine growth on the hull.

3. Failure to allow for loss of 1 day when crossing the International Date Line from east to west.

The site-by-site results are summarized in the following section. Figure 2 shows the south to north increase in accumulation rates from the relatively unproductive central water mass to the productive subarctic region.

The onset of siliceous sedimentation increases in age from south (late Miocene at Site 578) to north (middle Miocene at Site 581). Even more spectacular is an abrupt decrease in sedimentation rate from 24 to 14 m/m.y. at 2.75 m.y. in Site 578, versus 23 to 4.6 m/m.y. at 6.5 m.y. in Site 581. In both cases, the boundary is marked by a downhole change from reduced gray-green pyritic to oxidized yellow-brown biosiliceous clay.

The Cretaceous-Tertiary boundary was cored three times at Site 577 on Shatsky Rise. All three boundaries are undeformed, well centered in 1.5 m core sections, and appear visually identical. There is no color change or evidence of a discontinuity at the boundary. Preliminary evaluations of the nannofossils and foraminifers suggest that the section is expanded relative to Gubbio, which may contain a brief hiatus.

Sites 578, 579 and 580 each recovered more than 60 volcanic ash beds. These beds produce the numerous near-surface reflectors seen in 3.5 kHz reflection records. They also will allow the development of a detailed tephrachronology for the northwest Pacific.

The paleomagnetic data from Sites 578 and 580 are of superior quality. They provide a detailed chronology for the Plio-Pleistocene sections, and may yield insight to the behavior of the earth's magnetic field during reversals. At Site 579, rough weather led to a major reduction in core quality. As now configured, the HPC cannot tolerate heaving of the ship, which has a "concertina" effect on the cores; expanded ("flow-in") intervals alternate with apparently undisturbed (but likely compressed) intervals. Such deformation severely degrades the magnetic properties of the sediment.

A new core-nose temperature probe was deployed for the first time on Leg 86. This miniaturized microprocessor-based tool fits into a cavity in the wall of the core cutter. After some initial teething problems, it worked well mechanically. It appears to be measuring something well. Because of temperature reversals (up to 3.5°C) downcore, and a significant (3.5°C) temperature discrepancy relative to the conventional probe, there is some question as to whether the instrument is actually detecting the *in situ* temperature of the sediments. Further shore-based work is needed to resolve this question.

Site 576

Site 576 lies about 300 km east of Shatsky Rise in a region where the surface "transparent" acoustic layer is laterally very uniform. Six VEMA-36 piston cores around the site confirm this uniformity, with less than 6 percent variation in Pleistocene deposition rates over 10,000 square km. Site 576 was designed to recover the "transparent" section for studies of eolian and authigenic deposition through the Cenozoic, and also for geotechnical studies of a "type" pelagic (red) clay.

The site met all of its objectives. The "transparent" acoustic layer was completely cored three times, with essentially full recovery. The cores from one of the holes were left unopened and stored vertically for shore-based geotechnical studies.

The section cored consists of three units (Fig. 3), with the top one subdividable into two subunits:

Subunit I-1: 0 to 28 m (contact gradational over several meters).

Yellowish brown to brown pelagic clay of Pliocene and Quaternary age (based on paleomagnetics). Sedimentation rate decreases from 10 m/m.y. in the Brunhes to less than 3 m/m.y. at the base of the Matuyama. Based on earlier studies and the abundance of silt-sized quartz, we infer that this unit is largely of eolian origin.

Subunit I-2: 28 to 55 m.

Dark brown "slick" pelagic clay, zeolitic in part. This material is extremely homogeneous, very fine grained, and manganese-rich. If deposition has been continuous, the average sedimentation rate decreased from about 2 m/m.y. during the late Neogene to 0.2 m/m.y. (uncorrected for compaction) during the late Cre-

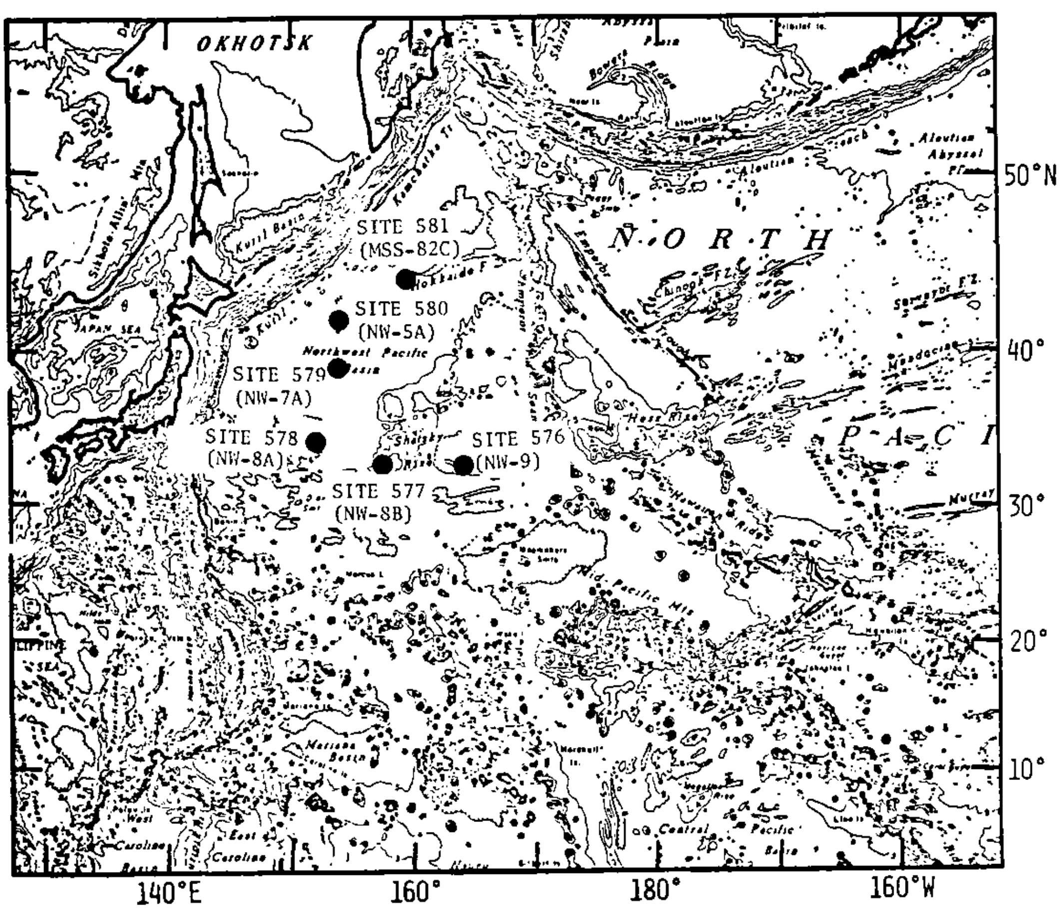


Figure 1. Location of sites drilled on DSDP Leg 86.

taceous. Further studies of ichthyoliths are required to constrain these rates. Mineralogical and chemical analyses on shore will characterize this unit more adequately. By analogy with similar-looking North and South Pacific pelagic clays, we suspect that it contains a large authigenic component.

Unit II: 55 to 76 m.

Interbedded dark brown pelagic clay similar to Subunit I-2 and pale brown nannofossil ooze of Campanian to early Maestrichtian age. Several of the carbonate layers are graded, with sharp erosional basal contacts. These are turbidites. Others may be pelagic. The absence of microfossils younger than Maestrichtian age, and the results of earlier DSDP drilling in this region suggest that the components of the carbonate and clay layers are essentially contemporaneous. Whether the carbonate reflects enhanced biogenic deposition due to higher productivity (at the lower latitude of the site 70 m.y. ago) or to fluctuations in the CCD, or both, is unclear.

Unit III: 76 m.

Only one small glassy chert chip and a few small fragments of off-white porcellanite were recovered from this unit, which forms the prominent reflector at the base of the "transparent" layer in the northwest Pacific.

Progressive consolidation of the pelagic clays of Units I and II yielded striking profiles of physical properties. Both the shear-wave velocity and vane shear strength increased with depth (from 6 to 127 m/sec and less than 20 to more than 1000 g/cm^2, respectively) without regard to the lithologic change from Subunit I-1 to I-2. LL44-GPC3 at 30°N, 158°W showed similar trends. Shore-based studies of the unopened cores from Hole 576A should significantly enhance our understanding of the geotechnical properties of pelagic "red" clays and the way in which they evolve over geologic time.

Site 577

Site 577 on Shatsky Rise recovered an unusually good late Cenozoic sequence, a Paleogene sequence, and an undisturbed record of the Cretaceous/Tertiary boundary. The late Cenozoic and Paleogene sequences were recovered in two holes while the Cretaceous/Tertiary boundary was recovered in three holes. A paleomagnetic reversal record was determined for the Neogene but since the magnetization of much of the sediment did not exceed the noise level of the shipboard magnetometer, detailed magnetostratigraphy must await shore-lab analysis. All the sediments are predominately calcareous nannofossil oozes (Fig. 3), but they can be subdivided into three units:

Unit I (0-55 m) is a white to light gray nannofossil ooze. It is divided into two subunits based upon a downcore decrease in the percentage of foraminifers, radiolarians and diatoms. The lower unit carries only a few percent foraminifers and traces of radiolarians and diatoms. The base of subunit two is an unconformity in which late Miocene sediment rests unconformably on top of middle Eocene sediment.

Unit II (55-112 m) is a white to pale brown calcareous nannofossil ooze of Paleocene and Eocene age. This unit is characterized by high percentages (60-90%) of coccoliths. It is further subdivided into two subunits with the upper one being pale brown in color and the lower one characterized by alternating white and pale brown colors.

Unit III (112-123 m) is a white calcareous nannofossil ooze of lowermost Paleocene and uppermost Cretaceous age. It occurs in the lower twenty meters of the hole. Penetration was stopped by a hard layer, presumably chert.

Sediment accumulation rates were highest in the late Cenozoic (12-13 m/m.y.) and markedly less below the unconformity (0.4-1.9 m/m.y.). Measurements of both physical properties and heat flow seemed to "sense" the late Miocene-middle Eocene unconformity at approximately 60 meters. There is a sudden increase in bulk density just below this boundary as well as a rapid increase in compressional wave velocity (1.48 km/s to 1.53 km/s). The heat flow data show a linear increase with depth to the unconformity at which point there is an apparent temperature reversal. The cause of this phenomenon has not yet been identified.

Site 578

Hole 578 recovered an unexpectedly thick section of late Neogene biosiliceous clays (Fig. 3). Siliceous microfossils are well preserved in the late Quaternary and Mio-Pliocene portion of the section. The paleomagnetic stratigraphy is exceptional. All events except the Gilsa and "X" back to the middle of Epoch 5 can be identified from the shipboard NRM inclinations.

The upper 76 meters of biosiliceous clay (0-2.4 m.y.) is anoxic (gray and olive gray in color) with many pyrite-cemented layers. From 76 to 125 meters (2.4 to 9-9.5 m.y.), the clays are oxidized (yellow-brown and brown in color) with rare ferromanganese nodules.

These two units contain 72 clearly visible ash layers, 24 of which are more than 5 cm thick (the thickest is 17 cm, or 27 cm if adjoining the 17 and 10 cm white and green ash beds formed from a single eruption).

From 125 to 176 meters (9-9.5 to 70 m.y.), the pelagic clay is "slick," predominantly dark to very dark brown, and very homogeneous. At its base, the clay is very stiff, with a shear strength approaching 2 kg/cm^2 (the 9.5 m core at a depth of 170 m penetrated only a little over 4 m). Drilling was stopped by chert at 176.8 meters. Silicified foraminifers immediately above the chert are late Campanian to Maestrichtian in age (about 70 m.y.).

Sedimentation rates drop from almost 50 m/m.y. at the surface to about 25 m/m.y. from 1 to 2.4 m.y. ago, where they decrease abruptly to 15 m/m.y. and then gradually to about 8 m/m.y. at the base of the fossiliferous section. If deposition was continuous, the pelagic clays accumulated at less than 1 m/m.y. from about 10 to 70 m.y. ago.

The rapid late Pliocene-Pleistocene rates were

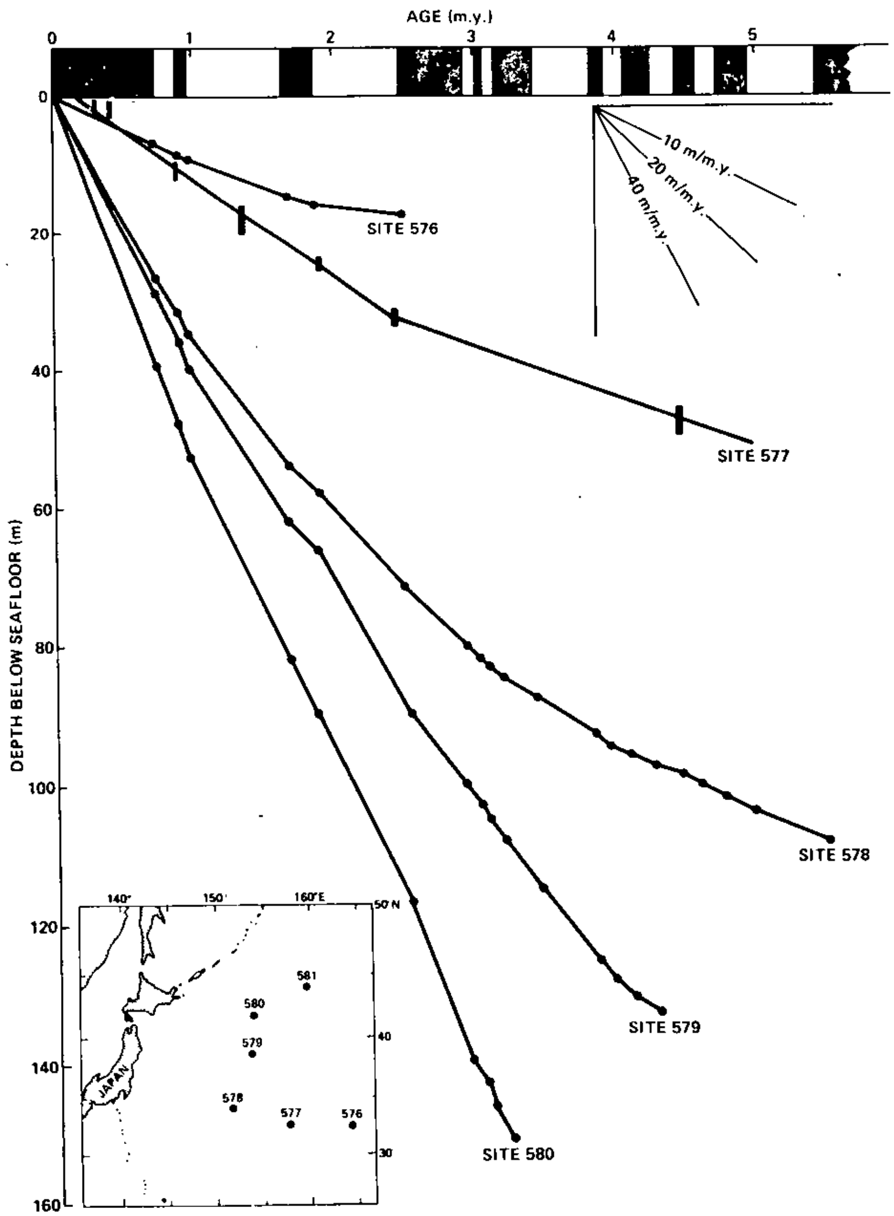


Figure 2. Plot of geomagnetic time scale versus sub-bottom depth in meters showing sedimentation rates at Site 576 and 578-580. Ages for Site 577 are based on biostratigraphic events, due to weak magnetization of carbonate-rich samples. Inset map in bottom left hand corner shows locations of DSDP Leg 86 sites.

LEG 86

Hole	Dates (1982)	Latitude	Longitude	Water Depth*	Penetration	No. Of Cores	Meters Cored	Per Cent of Recovered	Recovery
576	May 16-18	32°21.36'N	164°16.54'E	6217 m	69.2 m	8	69.2	68.52	99
576A	May 18-19	32°21.38'N	164°16.52'E	6217	65.7	7	65.7	66.20	101
576B	May 19-20	32°21.37'N	164°16.52'E	6217	74.8	9	74.8	74.07	99
577	May 23	32°26.51'N	157°43.40'E	2675	118.8	13	118.8	111.07	93
577A	May 24	32°26.53'N	157°43.39'E	2675	123.4	13	123.4	110.64	90
577B	May 25	32°26.48'N	157°43.39'E	2675	113.9	1	9.5	9.63	101
578	May 27-30	33°55.56'N	151°37.74'E	6010	176.8	20	167.8	165.02	98
579	June 1	38°37.68'N	153°50.17'E	5736.6	17.9	2	17.9	16.90	94
579A	June 2-4	38°37.61'N	153°50.28'E	5736.6	149.5	15	135.5	115.87	86
580	June 6-8	41°37.47'N	153°58.58'E	5375	155.3	17	155.3	140.74	91
581	June 10-13	43°55.62'N	159°47.76'E	5476	352.5	19	172.0	77.59	45
						124	1109.9	956.25	86

*Water depth at sea level.

unexpected. Further work is required to determine whether a change in provenance or transport was responsible for the 70% rate increase 2.4 m.y. ago. The new core-nose heat flow unit yielded data on 7 out of 8 deployments. The temperature gradients are linear above 75 and below 85 meters, but there is an unexplained temperature reversal of 1°C between these two depths (which spans the accumulation rate change mentioned above).

Site 579

Site 579 recovered a thick late Neogene biosiliceous clay (Fig. 3). Siliceous microfossils (diatoms and radiolarians) are abundant and well preserved throughout much of the section which is late Miocene to Quaternary in age. Even though degraded by core disturbance, an interpretable and complete magnetic stratigraphy can be identified back to the middle of the Gilbert Reversed Epoch (early Pliocene).

Except for ash layers, the sediments are relaively uniform in color being gray, dark gray, olive gray and greenish gray. Although burrow mottles are abundant, the sediment lacks any depositional sedimentary structures. Based upon these data, the entire sedimentary section recovered at 579 is placed into one single pelagic unit. However, based upon changes in biogenic and inorganic sediment components, three subunits can be recognized:

The upper subunit (0-58 m) is siliceous clay of Pleistocene age with 15-30% quartz. Twenty-even ash layers and eighty-three thin, stiff, dark grayish green pyritic layers occur in this subunit. The middle subunit (58-103 m) is a clayey siliceous ooze of late Pliocene to early Pleistocene age containing from 5 to 15% quartz. Twenty-four ash layers and 126 thin, indurated grayish green pyritic layers were recovered. The lowermost subunit (103-149 m) of late Miocene to late Pliocene age contains from 3 to 25% quartz. Ash layers (10) are less abundant, and there are 116 of the well-indurated dark grayish green pyritic layers.

Sedimentation rates gradually decrease downcore. In the late Pleistocene, the average rate was approximately 42 m/m.y. This declines to 34 m/m.y. in the early Pleistocene and 25 m/m.y. for the late Pliocene. During the early Pliocene and late Miocene, rates averaged less than 20 m/m.y.

Marginal weather precluded a full heat flow program; measurements were not possible until Core 9. However, 7 successful measurements were made between Cores 9-15. In this interval (approximately 100-150 meters depth), the temperatures show a linear increase with depth.

Site 580

At Site 580, we recovered a thick sequence of Pleistocene and late Pliocene sediments (Fig. 3). Siliceous microfossils (diatoms and radiolarians) are generally abundant and moderately to well preserved. An excellent magnetic reversal record can be identified back to the middle of the Gauss Normal Epoch.

Except for the numerous ash layers and the indurated darkish green layers, the sediments are remarkably uniform in color being gray, olive gray and dark gray. The entire sedimentary sequence recovered at Site 580 again is placed in one pelagic unit. However, based upon changes in biosiliceous components and fine-grained carbonate, five subunits are recognized.

Subunit IA extends from 0 to 60 meters and is predominately a biosiliceous clay of late Pleistocene age, characterized by up to 25% fine-grained carbonate material. Subunit IC (70-117 m), of late Pliocene and early Pleistocene age, is similar lithologically to subunit IA. Subunit ID (117-136 m), of late Pliocene age, is a diatom ooze containing up to 60% diatoms. Subunit IE (136-156 m), of early late Pliocene age, is again similar to subunit 1A.

Sedimentation rates are unusually high for the Pleistocene and late Pliocene, averaging 55 meters/m.y. However, at approximately 2.5 m.y.B.P., there is an abrupt decrease in the rate to approximately 13 m/m.y.

The heat flow system operated normally. The temperature profile shows an almost linear increase with depth.

Site 581

Because of the limited time available and the need to drill to basement to allow Leg 88 to plan their casing program, HPC sampling of the upper part of the sediment section at Site 581 was deferred until Leg 88. Apart from a mudline core, we did not sample the interval above 181.5 meters.

From 0 to 223.6 meters, the cored section is reduced (gray and green) late Miocene to earliest Pliocene biosiliceous clay and ooze (Fig. 3), similar to but less ashy and pyritic than the sections at Sites 579 and 580. Presumably, the uncored section is similar, but with more ash and pyritic layers toward the surface.

From 223.6 to 244.8 meters, the sediment is oxidized (yellow-brown) latest middle Miocene to late Miocene biosiliceous clay, which accumulated at about one sixth the rate of the overlying sediments.

From 244.8 to 276.5 meters, the sediment is "slick," fine-grained pelagic clay of presumed middle Miocene age, which grades downcore from brown to very dark brown in color. From 276.5 to 344 meters, we recovered nothing but chert fragments, even though the drilling rate suggests that most of the section is soft sediment (?clay). The chert ranges from off-white to bright reds and yellows and dark brown in color. Most of it looks like silicified dark brown pelagic clay. Diatoms from a small vug in a fragment near the top of the sequence are middle Miocene in age.

The hole was terminated after drilling from 344 to 352.5 meters in medium gray aphyric basalt containing calcite and iron oxide-lined fractures and alteration rinds. Because no soft sediment was recovered below 276.5 meters, we have no idea of the age of the basalt. If this is primary oceanic crust, it should be about 115 m.y. old (between Mesozoic magnetic anomolies M-3 and M-4).

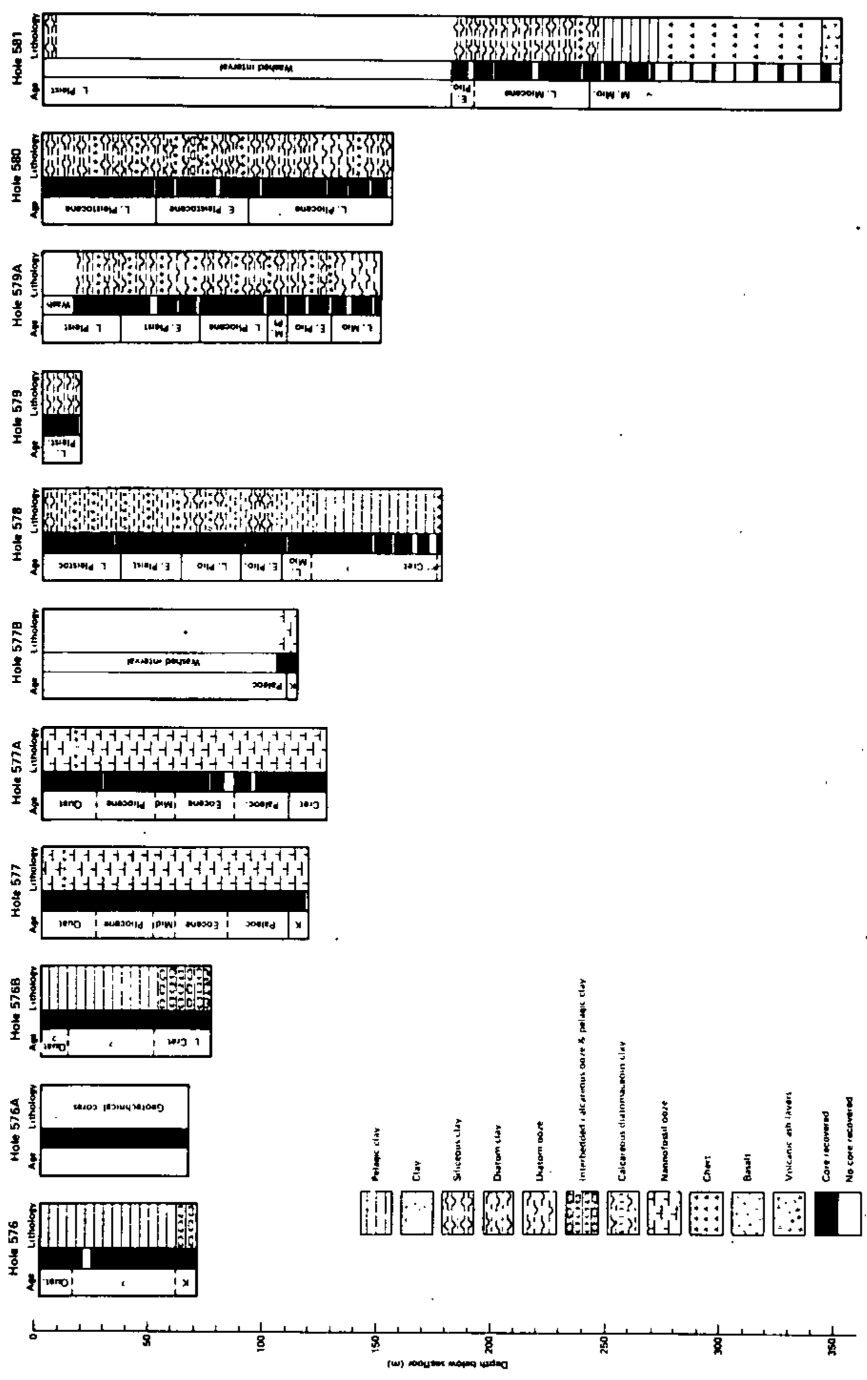


Figure 3. Age, core recovery, and lithostratigraphy of sediments and rock drilled on DSDP Leg 86. Age boundaries are tentative, and will be refined by detailed shore-based paleontological and paleomagnetic studies. Positions of volcanic ash layers shown in lithologic columns are schematic only.

PLANNED *CHALLENGER* DRILLING

Leg 90 — Southwest Pacific Paleoenvironment

Noumea, New Caledonia to Wellington, New Zealand, 39 days (operation and steaming). Co-chief scientists: James P. Kennett and C. von der Borch.

Neogene Paleoceanography, Equatorial to Subantarctic Latitudes

Drilling Objectives

The primary objective of DSDP Leg 90 is to obtain a traverse of high quality Neogene (23 Ma to present day) cores between equatorial and northern subantarctic water masses in the southwest Pacific. Six sites are to be strategically placed latitudinally (Fig. 1) to obtain paleoceanographic records for a number of distinct water masses and to maximize our ability for correlation across the wide latitudes between equatorial and subpolar regions. All sites are to be located at water depths of about 1000 to 2000 m in areas of known rich calcareous biogenic sequences. Previous rotary drilling in the region during DSDP legs 21 and 29 have demonstrated that the southwest Pacific is optimal for the study of relatively uncomplicated and continuously deposited carbonate sequences of Neogene age (see Fig. 2) between the equator and the subantarctic region. Unlike nearly all other oceanic regions, shallow-water platforms extend latitudinally over vast distances providing an opportunity for drilling into oceanic pelagic sequences at shallow depths. These include the Ontong-Java Plateau on the equator; the Lord Howe Rise; the Challenger Plateau west of New Zealand and the Chatham Rise east of New

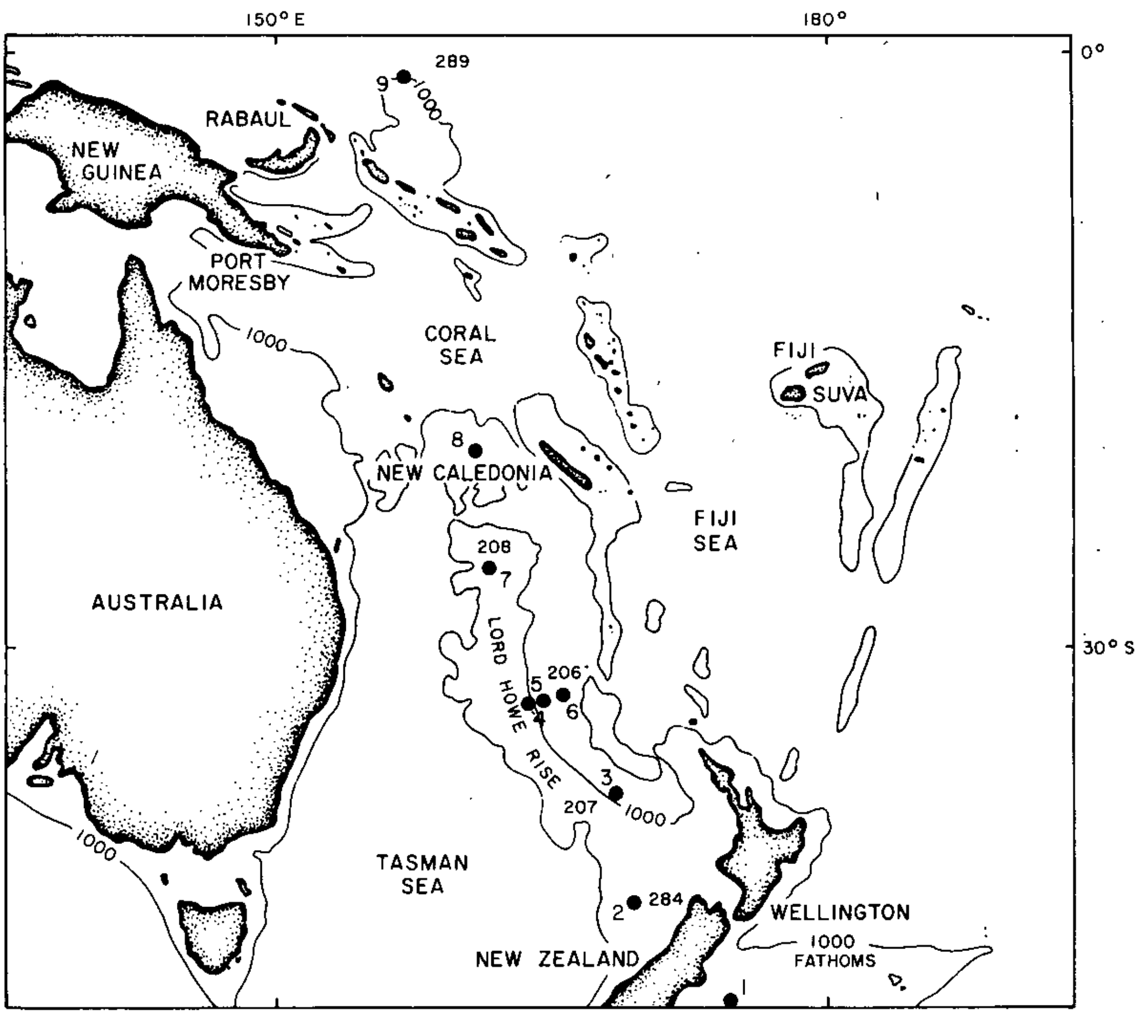


Figure 1. Location of sites to be drilled in the southwest Pacific during DSDP Leg 90.

Zealand. The shallow location of the planned sites will provide sections containing abundant, well preserved microfossil assemblages for quantitative paleontological and stable isotopic studies.

It is planned that Site 9 (= DSDP Site 289) will be cored during Leg 89, but that its study will be conducted by the Leg 90 scientific team as a part of the north-south traverse.

The slope of the Lord Howe Rise also offers a good opportunity to collect a traverse of sites at different water depths for paleoceanographic studies within the water column. Sites 4 and 6 are to be located on the Lord Howe Rise to the west of DSDP Site 206 (Fig. 1). Site 4 will be located near the crest of the Lord Howe Rise at 1416 m; Site 6 will be located at 2291 m on the slope of the rise. These two sites when studied in conjunction with DSDP Site 206 (water depth 3,196 m) will provide a traverse through the water column.

Two hydraulic piston cores will be obtained at each site to assure collection of complete sections. Since it is expected that Neogene sediments older than the late Miocene will be too compacted for efficient use of the HPC, these will be continuously cored using conventional rotary drilling. At most sites coring will be terminated in the late Oligocene, which is expected to coincide in several locations with a regional Oligocene unconformity (see Fig. 2). Several sites may be drilled into older sediments where appropriate and if the primary Neogene goals are met. Three previously drilled classical sites will be reoccupied to obtain high-quality Neogene sequences (DSDP Sites 289; 208; and 284). A reoccupation close to Site 207 is a low priority contingency site.

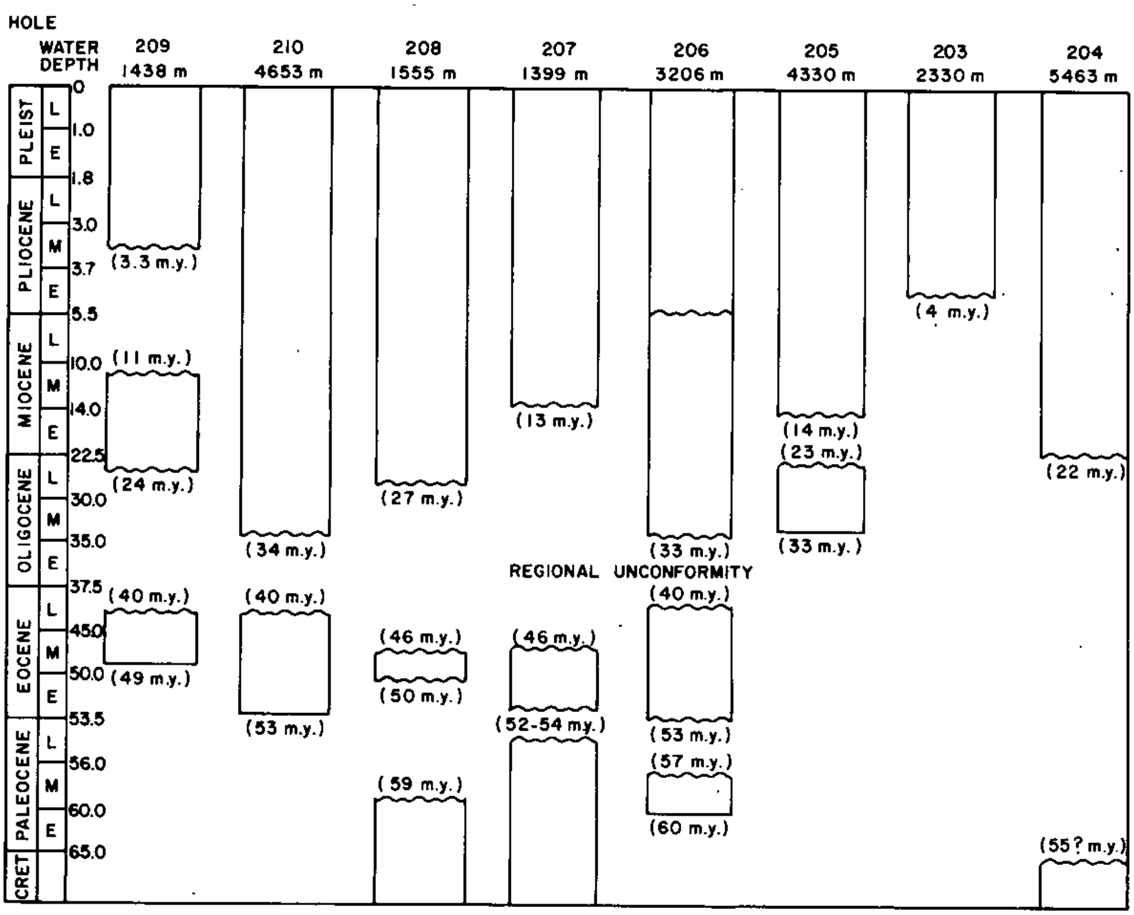


Figure 2. Ages of sediments cored during DSDP Leg 21. Note the continuity of most Neogene sequences and the disruption of Paleogene sediments by unconformities including the regional unconformity centered in the Oligocene.

Site	Coordinates	Water Depth	Location	Estimated Maximum Penetration	Primary Objectives
SW9 (= Site 289)	00°29.92'S 158°30.69'E	2224 m	Ontong-Java Plateau	To limit of HPC. 200 m (Late Miocene to Recent)	Equatorial, high resolution, carbonate sequence. Integrate radiolarian biostratigraphy
SW8	21°09'S 161°20'E	1100 m	South of Landsdown Bank; northern tip of Lord Howe Rise	600 m. To base of Neogene	Section at margin of tropics to link equatorial and warm sequences.
SW7 (= Site 208)	26°06'S 161°13'E	1545 m	Northern Lord Howe Rise	500 m. To Neogene-Paleogene Unconformity	Warm subtropical classical sequence.
SW4	30°41.20'S 163°38.65'E	1416 m	Central Lord Howe Rise	500+ m. To Paleogene/Neogene unconformity.	Transitional water mass. Shallow site for depth transect.
SW6	30°38.86'S 164°23.89'E	2291 m	Central Lord Howe Rise	650 m. Drill to first distinct reflector	Intermediate depth for depth transect.
SW3 (= Site 207)	35°52'S 165°30'E	1050 m	Southern Lord Howe Rise	To limit of HPC 200 m	(Secondary, contingency site) Neogene section in north temperate water mass.
SW2 (= Site 284)	40°30'S 167°50'E	1078 m	Challenger Plateau	500 to 600 m. To first distinct reflector or slightly deeper.	Temperate (cool subtropical) water mass.
SW1	45°30'S 174°55'E	1400 m	South of Chatham Rise on edge of Bounty Trough	500-600 m.	Northern Subantarctic site Tephrochronology.

Scientific Objectives

The southwest Pacific expedition is one of three major paleo-environmentally centered investigatons in the Pacific Ocean centered around hydraulic piston coring. A major thrust of this paleoenvironmental program is to integrate the paleoceanographic-biostratigraphic record in the southwest Pacific with the other two primary areas of investigation: the eastern equatorial Pacific and the northwest Pacific. This should provide an integrated paleoceanographic history of the Pacific basin during the Late Cenozoic and earlier. The high resolution cores to be collected from the southwest Pacific will provide material for the following investigations:

Scientific Objectives

1. Neogene paleoclimatic history of the southwest Pacific.
2. History of fluctuations of tropical, subtropical, transitional, temperate and subantarctic surface waters during the Neogene.
3. High resolution Neogene biostratigraphy and integration with stable isotopic (oxygen and carbon) stratigraphy and magnetostratigraphy. Detailed cross-latitudinal correlations.
4. History of vertical water-mass changes in the southwest Pacific employing oxygen isotopes and benthonic foraminiferal traces of deep water masses. Comparison with the record in the south Atlantic.
5. Study of evolutionary models in high resolution cores (e.g., gradualism; punctuated equilibria). Also modes of extinction of planktonic microfossil species.
6. Diagenetic history of carbonate oozes.
7. Studies of physical properties of sediments including relationships with seismic data.
8. Tephrochronology in sites close to New Zealand.

(James P. Kennett, July 1982)

Leg 95-B — Mississippi Fan

The following text prepared by Arnold Bouma, Co-Chief Scientist — Leg 95-B, summarizes a recent COMFAN (Committee on Deepsea Fans) meeting. Because of its applicability to Leg 95-B, it is included in this section of the JOIDES Journal.

A meeting of international experts on ancient and modern deepsea fans was hosted by Gulf Research & Development Company in Pittsburgh, Pennsylvania in September. Recent findings and concepts were discussed with emphasis on comparing ancient and modern fans, scale effects, and future drilling on fans including Leg 95-B on the Mississippi Fan.

The willingness to put aside published models and sequence analysis resulted in the awareness that ancient and modern fans may have many characteristics in common, heretofore not considered. Specifically, recent findings with GLORIA, SEABEAM, and deep-towed instruments, together with new approaches in the studies of ancient deepsea fans, made such advances possible.

The outer fan segment, especially those belonging to large and giant fans, seems to be the major sand-collecting area. Little is understood about the system by which coarser material bypasses the mid fan area. Little detailed observations exist on the modern morphology of small feeder channels and depositional lobes or sheet sands in the outer fan. Drilling in these areas, particularly DSDP Leg 95-B may ascertain the reality of this outer fan sand deposition. However, we feel there is a similarity with ancient fans in that small packages of layers (Mutti's compensation cycles) can often be correlated laterally even though this is not possible with individual layers.

The mid fan on large fan areas may be typified by sinuosity of its major constructive channel based on side-scan and SEABEAM studies. It is known, however, that fluvial channels in very arid climates exhibit extreme channel migration and meandering, even though river discharge is highly episodic. Whether or not the "meanders" indicate migration comparable to fluvial systems is also unknown. A well-designed site survey and drilling experiment should help to shed light on those questions.

Many deepsea fans contain large and small, acoustically transparent or chaotic patches interpreted as slumps and/or debris flow deposits. Surface irregularities may either result from coalescence of smaller events and/or from protruding sides of "undisturbed" allochthones floating in the matrix.

Slumping is now considered a major cause for the forming of submarine canyons on passive margins. Initiation may result from earthquakes, growth fault activity, and possibly rapid changes in sea level exposing rather unconsolidated material. Retrogressive slumping often results in the formation of a canyon. The Old Mississippi Canyon was cut and nearly filled in the short period from 25,000 to 20,000 yrs. B.P. Its volume equals about 9% of the Mississippi Fan. This implies that the upper fan channel and its levees, and possibly each major fan lobe, can be formed in a very short time geologically, followed by a longer period of relative quiescense. Drilling on the Mississippi Fan may encountmaterial that can be correlated with shelf sediment data released by industry.

The results from the COMFAN meeting will be published early in 1983 in a special issue of GEO-MARINE LETTERS with short descriptions of about 13 modern and 11 ancient fans, all presented in the same format to facilitate comparison.

SITE SUMMARIES

Leg 87–Nankai Trough and Japan Trench

Co-chief scientists: Hideo Kagami and Daniel Karig

Site 582 (NK-1C)

Latitude: 31°47.5'N
Longitude: 133°54.8'E
Water Depth: 4882 meters
Penetration: 749.4 meters

Site 582 was drilled as a reference site in undeformed sediments of the Nankai Trough for comparison with the next site (NK-2C) to be drilled on the inner trench slope. After several mechanical problems, Hole 582B penetrated approximately 560 meters of trench fill overlying early Quaternary and late Pliocene hemipelagic sediments correlative with the Shikoku Basin section. The approximate age at the base of the trench fill is 1.1 m.y. The trench fill consists of both turbiditic and hemipelagic intervals. Coarse sand turbidites decreased in frequency with depth but no overall downward fining of the sands was observed. A thick coarse sand with transported pumice clasts appeared at 300 meters. These sands were poorly recovered but were clearly marked by drilling characteristics and correlated closely with reflectors on reference seismic profiles. Sand was apparently also responsible for the failure of the bit release thus preventing logging of the hole.

Sedimentation rates in the trench fill are poorly controlled due to the paucity of microfossils but are slower than expected, averaging 440 meters/m.y. and possibly decreasing to half this value during the late Quaternary. Subduction rates calculated from the sedimentation rates and trench geometry are near 1.5 cm/yr. The heat-flow decreases from 2.43 HFU to 1.48 HFU with depth. No structures were observed in the turbidites but small healed normal faults and dewatering veins are seen in the hemipelagic sediments below 600 meters.

Site 583 (NK-2C)

Holes 583, 583E, 583F, and 583G
Latitude: 31°50.1'N
Longitude: 133°51.4'E
Water Depth: 4634 m
Total Depth: 450 m

Hole 583A
Latitude: 31°50.13'N
Longitude: 133°51.26'E
Water Depth: 4618 m
Total Depth: 54 m

Hole 583D
Latitude: 31°49.76'N
Longitude: 133°51.54'E
Water Depth: 4749 m (approx.)
Total Depth: 326.6 m

Eight holes were drilled at Site 583 (NK-2C) on the lowest structural step of the inner slope of the Nankai Trough before Typhoon Bess ushered us from the area. Holes 583, 583A, 583B, and 583C were hydraulically piston cored, the rest were rotary cored. These holes failed to accomplish the primary scientific objective, which was to penetrate and characterize the seismically-defined thrust zone along which the terrace was uplifted. Combined Holes 583B, C, and D achieved shallow penetration of the fault for hydrocarbon monitoring. In Hole 583D, we cut two splays of the fault near 60 m and 170 m, but core recovery was poor. Core quality precluded determination of gradients in physical properties in the vicinity of the faults. Dips averaging 45° above 50 m and between 20° and 35° below that depth, combined with the reference seismic profile, indicate that this hole penetrated a hanging-wall anticline above a bedding-plane step-thrust. Porosity gradients in all holes were effectively identical to that at reference Site 582, implying that little or no dewatering accompanied deformation. However, shear strengths at equivalent depths appear to be higher at Site 583. Extensive heat-flow measurements at Site 583 showed a value of 1.59 HFU, which was significantly lower than anticipated and similar to the 1.51 HFU value at Site 582.

Site 584 (J13A)

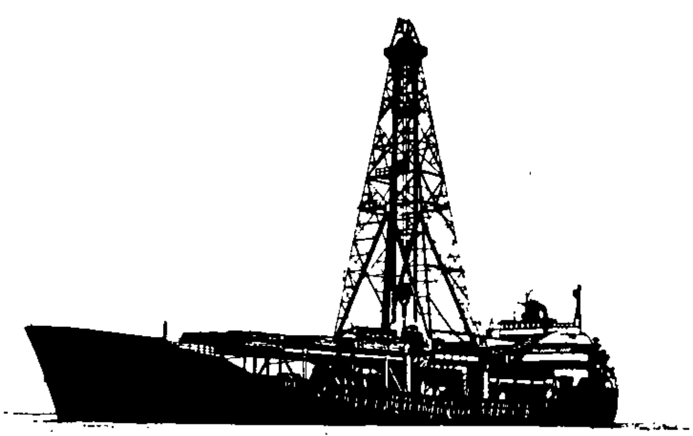
Hole 584
Latitude: 40°28.0'N
Longitude: 143°56.1'E
Water Depth: 4114 m
Total Depth: 941.0 m

Hole 584A
Latitude: 40°28.0'N
Longitude: 143°57.6'E
Water Depth: 4115 m
Total Depth: 901.5 m

Hole 584B
Latitude: 40°28.0'N
Longitude: 143°57.6'E
Water Depth: 4142 m
Total Depth: 954.0 m

The holes were drilled at site survey target J13A on the midslope terrace of the landward slope of the Japan Trench off northeast Honshu. The objectives of the site were to obtain the history of vertical crustal movement in the area and to delineate its mechanics. Hole 584 suddenly was bridged and terminated. At 941.0 m sub-bottom a major shear zone was probably intersected. Hole 584A was spot cored for correlation with Hole 584 and was planned to penetrate deeper, but was blocked at 901.5 m sub-bottom. Hole 584B was planned to penetrate as deep as possible in the short time remaining but was also terminated by drilling difficulties. A similar lithologic sequence was cored in all three holes.

The uppermost 4 m are Pleistocene mud, underlain without a visible lithologic contact by soft lower Pliocene diatomaceous mud and mudstone, consolidating near 88 m sub-bottom. A third unit (231 m to 537 m sub-bottom) is also a diatomaceous mudstone, but is distinguished by fine sand and silt beds, seaward dripping strata, and markedly higher induration. The Pliocene/Miocene boundary occurs within this unit, near 564 m sub-bottom, but no lithologic contrast marks it. Varicolored bioturbated mudstone with a much reduced diatom content constitutes unit 4 and the remaining 841 m drilled at Hole 584. The lower portion is noteworthy for its paisley appearance and pervasive network of dewatering veinlets. Healed fractures begin in core 27 of Hole 584 and become more numerous down-section. Most offsets are normal, but abundant reverse faults also occur. The high angle dips observed in the cored interval are disharmonic to the nearly horizontal seismic reflectors. The three holes drilled at Site 584 establish that stratigraphic horizons repeat with perhaps a few hundred meters offset along major faults or shear zones. Apparently the larger faults are related to landward dipping structures of the basement. Using reference seismic lines and measurements on dip and strike of the microfaults, we have confirmed that vertical crustal movement has been occurring along previously-established zones of weakness since the late Pliocene.



DEEP SEA DRILLING PROJECT

INFORMATION HANDLING GROUP

Background

The DSDP data bank is a dynamic library of information. As the Project has expanded so have the areas of responsibility of the DSDP Information Handling Group (IHG). Not only has the volume of data multiplied, but the kinds of data and information handled have also increased. The development of tools and technology onboard *Glomar Challenger* has required development of new software to integrate the resulting data in a harmonious fashion with the existing data files. The Information Handling Group also works actively with greater efficiency and reliability. We have three primary goals in this work: (1) to preserve the data collected by DSDP operations for future use; (2) to make data readily available to qualified scientists upon request; and (3) to provide advice and assistance by means of computer reduction and display of data to contributors to the Initial Reports.

Data Availability

The DSDP Sample Distribution Policy restricts the release of scientific data gathered aboard *Glomar Challenger* to those immediate members of the respective shipboard scientific party for a 12-month period following completion of the cruise. This policy excludes the Preliminary Report on underway data, containing track charts and data indexes; these data have immediate unlimited distribution. DSDP may require reimbursement for expenses if a data request costs more than $50.

Table DSDP-1 summarizes and categorizes the data. With the exception of the seismic data, which are available only on microfilm or hardcopy, all data are stored (and are available) on magnetic tape and microfilm. Investigators can also obtain copies of the original data (shipboard forms) on microfilm, or they can view them at DSDP headquarters at Scripps Institution of Oceanography or at Lamont-Doherty Geological Observatory.

Much progress has occurred this year in bringing the data bases for visual core descriptions, smear slide descriptions, and paleontology up to date. Table DSDP-1 indicates the current status of each.

The hard rock minor- and major-chemical analyses files continue to be modified and updated as more data is published and coded. The hard rock paleomagnetics data base is now available upon request for those legs specified in Table DSDP-2.

Logging data were collected on selected legs. These data are available on magnetic tape or analog strip charts for Legs 60, 61, 63-65, 67, 68, 70-76, and 78; analog records are only available for Legs 66 and 69; magnetic tapes are available for selected sites from Legs 46, 48, 50, 51, 52, and 57.

Update on Shipboard Computer

DSDP purchased a Hewlett-Packard 1000 system for use onboard *Glomar Challenger.* The computer will improve data collection and data collection and data handling activities at sea, as well as ensure drilling safety. Initially the shipboard scientists will use the computer to: (1) acquire and process gas chromatography data; and (2) direct digital collection of seismic data. Future plans for the computer include data collection and processing in the core lab and curatorial inventory of shipboard sampling. Shipboard operations for the system will be shared by the marine technicians and the electronics staff.

The computer was installed during the ship's September drydock in Yokohama. DSDP Programmer Tom Birtley sailed on Leg 89 to oversee the computer's operation.

Data Handling and Retrieval Tools

The computer-generated Keyword Index was updated this spring (it is updated every six months). The index retrieves information related to completed and current research on DSDP core material. These data help in preventing duplication of research.

The special reference files (Sitesummary, Guide, Ageprofile, and Coredepth, see Table DSDP-2) are used independently and in coordination with other files in (a) multi-step searches, and (b) generation of standard files with assigned ages (from Ageprofile) and/or sub-bottom depths (from Coredepth).

The Sitesummary file contains key data for each hole including drilling statistics, site location, age of sediments, presence of basement sediment and hard rock descriptions. The file is continually updated from data reported in DSDP *Initial Reports, Hole Summaries,* and *Initial Core Descriptions.*

The guide (to DSDP cores) also summarizes data published in the Initial Reports (Legs 1-34)[1], but in a different format than in the Sitesummary file. It comprises thirty categories of data which summarize the characteristics of each core. The Guides are available on microfiche and magnetic tape. All of these files can be accessed by DATAWINDOW-DSDP's principal program for the retrieval and display of data.

DATAWINDOW transfers data between tape and disk storage, updates tapes, corrects records, and monitors the tape status within a tape series (storage unit for our data base files). Access is accomplished through independent, easily modifiable data dictionaries which the program references in both its interactive and batch modes of operation. Individual requests can easily be constructed using DATAWINDOW's versatile search commands. Through DATAWINDOW, investigators can search the data bases by leg(s), site(s), ocean area(s), and age(s), in addition (or linked) to specific elements stored in each data base.

Areas of Support and Endeavor

Advanced Engineering Studies

The DSDP programming staff continues to provide the engineering group with mathematical and computer support for advanced engineering data collection (shipboard), reduction, and analysis.

We encourage researchers to use all these extensive data systems described above. Address your requests for information or data to:

Information Handling Group
Deep Sea Drilling Project, A-031
Scripps Institution of Oceanography
La Jolla, CA 92093
Tel: (714) 452-3526

(Nancy Freelander, DSDP Information Handling Group, September 1982)

CORE REPOSITORIES

Samples from DSDP Legs 1-81 are available to investigators for study to result in published papers. We encourage investigators who desire samples to first obtain a statement of the NSF/DSDP sample distribution policy and a sample request form from the DSDP Curator. (A statement of the sample distribution policy also appears in the Initial Reports and in the Initial Core Descriptions.) We ask that requests for samples be as specific as possible. Requestors should specify the hole, core, section, interval in centimeters measured from the top of each section, and sample volume in cubic centimeters. Refer to the graphic core descriptions in the Initial Reports and/or the Initial Core Descriptions for core details.

Samples for publication of results elsewhere than in the Initial Reports cannot be distributed until one year after the completion of a cruise or two months after publication of the Initial Core Descriptions for the cruise, whichever occurs sooner. Beginning with Leg 76, the Initial Core Descriptions will be available only in microfiche. This change in production format does not affect the sample distribution policy.

The DSDP Curator can approve many standard requests in his own office, but requests for material of particularly high interest (e.g., certain hydraulic piston cores, key stratigraphic boundaries) or for large volumes of material must be forwarded by the Curator to the NSF Sample Distribution Panel for review.

Cores from the Atlantic and Antarctic oceans and the Mediterranean and Black seas (Legs 1-4, 10-15, 28, 29, 35-53, and 71-82) are at the East Coast Repository at the Lamont-Doherty Geological Observatory. Cores from the Pacific and Indian oceans and the Red Sea (Legs 5-9, 16-27, 30-34, 54-70, 83, and 84) are at the West Coast Repository at the Scripps Institution of Oceanography. The thin sections and smear slides from a particular cruise are stored at the same repository as the cores from that cruise. Photographs of all cores and prime data and publications from all legs are kept at each repository. Frozen samples (collected specifically for organic geochemical analyses), interstitial water samples, and gas samples from all DSDP legs are kept at the West Coast Repository. Interested scientists may view the cores, core photographs, or other associated data at either repository by making arrangements in advance with the Curator.

Please address your questions or sample requests to:

The Curator
Deep Sea Drilling Project, A-031
Scripps Institution of Oceanography
University of California, San Diego
La Jolla, California 92093
Tel. (714) 452-3528

(Amy B. Altman, DSDP Assistant Curator, 10 September 1982)

[1]DSDP is no longer encoding data for the Guides.

TABLE DSDP 1

DEEP SEA DRILLING PROJECT– DATA BASE STATUS
Physical Properties, Quantitative and Analytical Core Data

DATA FILE	LEGS	COMMENTS
Carbon-carbonate (shore lab)	1-79	No data for Legs 46, 72
Grain-size (sand-silt-clay) (shore lab)	1-76	No data for Leg 16. Legs 64 & 65 not yet available
G.R.A.P.E. (gamma ray attenuation porosity evaluator) (shipboard measurements, processed and edited onshore)	1-74	No data collected on Leg 46. Leg 45 GRAPE is not complete.
Hard Rock Major-Element Chemical Analyses prime and onshore labs)	13-19, 22-30, 32-39, 41, 42A, 43, 45-46, 49, 51-55, 58-65.	No data for legs: 1-12, 20-21, 31, 40, 43, 47-48, 50, 56-57. Includes igneous and metamorphic rock and sediment composed of volcanic material.
Hard Rock Minor-Element Chemical Analyses (prime and onshore labs)	13-19, 22-26, 28-34, 36-39, 41-42A, 43, 45-46, 49, 51-55, 58-65.	No data for Legs: 1-12, 20-21, 27, 35, 40, 43, 47-48, 50, 56. Same set of data source as major-element file.
Hard Rock Paleomagnetics	14-16, 19, 23, 25-29, 32-34, 37-38, 41-43, 45-46, 49, 51-55, 58-66, 70.	No data for Legs: 1-13, 17-18, 20-22, 24, 30-31, 35-36, 39, 40, 47-48, 50, 56-57.
Sonic Velocity (shipboard, Hamilton Frame)	3-86	
Water Content (shipboard lab)	1-83	No data for Leg 41
Long-core Spinner Magnetometer Sediment Paleomagnetics	68, 70, 71, 72, 75	From hydraulic piston cores. This is a CLOSED data base due to rust contamination of cores and sediment disturbance.

TABLE DSDP 1 (continued)

DEEP SEA DRILLING PROJECT – DATA BASE STATUS
Physical Properties, Qualitative and Analytical Core Data

DATA FILE	LEGS	COMMENTS
Discrete Sample Magnetics, sediment	71-73, 75	From hydraulic piston cores.
Alternating Field Demagnetization	72, 73, 79	From hydraulic piston cores.
	Lithological and Stratigraphic Core Data	
Paleontology (onshore labs)	1-44	From Initial Reports. Includes 10,000 species from 24 bug groups.
SCREEN	1-44	Output from JOIDESSCREEN. Computer-generated lithological classification includes basic composition data, average density, and age of layer.
Smear Slide Descriptions	1-81*	Shipboard observations.* Legs 45-81 are available only in raw data format.
Thin Sections	49 only	Legs 37, 45, 46, 51-55, 57-64 keypunched.
Visual Core Descriptions	1-59	Shipboard observations.

TABLE DSDP-2
DEEP SEA DRILLING PROJECT – DATA BASE STATUS
Underway Data

DATA FILE	LEGS	COMMENTS
Bathymetry	7-9, 13-56, 61-80	
	7-9, 12-80	
	3-80	
	1-80	Seismic data available only in hardcopy or microfilm
Merged format files (MDG77)	1-80	
SPECIAL REFERENCE FILES		
Sitesummary	1-85	Hole oriented. Regularly updated.
DSDP/Guide	1-34	Core,oriented. Microfiche or tape.
Ageprofile	1-86	Hole, core, section. From biostratigraphy.
Coredepth	1-86	Hole-core. Primary reference tool.
AIDS TO RESEARCH		
Datawindow		Search & retrieval program, data base maintenance.
Mudpak		Plotting program, handles multiple parameters.
Maps		DSDP Affiliated Scientists & Institutions searchable.
DASI/Inquiry		
Keyword Index-Search		Constructed from bibliography and sample request files – microfiche.
Sample Records		Point data inventory
Data Data		Series of informal specific memoranda containing detailed descriptions of procedures and capabilities of the IHG.

JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

REPORT FROM JOI, INC.

Explorer Scientific Laboratories

The NSF has asked JOI to produce a detailed layout of scientific laboratories aboard *Explorer* including lists of furniture and equipment to be installed. Capt. Robertson Dinsmore of Woods Hole Oceanographic Institution has been retained to lead the effort. He is assisted by Gerald Schiff of the architectural firm of Ambramovitz, Harris, Kingsland and supporting staff. Directing the technical staff is a steering group comprised of Dr. Jose Honnorez, Chairman; Dr. Stephan Gartner, Texas A&M University; Dr. Michael Rhodes, University of Massachusetts; Dr. Matthew Salisbury, Scripps Institution of Oceanography; Dr. William Hahn, University of Rhode Island. The staff members spent several days in discussions at DSDP/SIO and have interviewed more than 30 scientists with shipboard laboratory experience representative of the scientific disciplines associated with core examination and study. Based on these discussions, an *Explorer* laboratory layout was developed. It was presented to the Steering Group on September 9, 1982 and to NSF and Lockheed on September 15, 1982. Comments and suggestions were integrated with a second design iteration, which was presented to the PCOM during their October 6-8 meeting at L-DGO. The final layout will be submitted to the Steering Committee for review and approval in late October. The task is scheduled for completion with the November delivery of drawings to the AODP Interface Working Group.

Site Surveys

The JOI Site Survey Planning Committee met at L-DGO June 17-18, 1982 to evaluate proposals received for conduct of Mississippi Fan Survey. Two academic and two industrial respondents made verbal presentations to the specially convened review group who had previously scored the written proposals. The process resulted in a recommendation that JOI award the contract to L-DGO, Dr. Alexander Shor, Principal Investigator.

The SSPC recommend that JOI receive proposals for the Peru-Chile and N.W. Africa surveys advertised earlier and to seek sufficient funds to complete both field programs. Implementation of both recommendations was begun.

JOI Office Moves

Leaving its infamous quarters in Watergate, the JOI staff took up residence July 23, 1982 in the Joseph Henry Building of the National Academy of Sciences. The new address is:

2100 Pennsylvania Avenue, NW
Room 316
Washington, DC 20037

Phone: (202) 331-9438
Cable: JOIINC

JOIDES scientists visiting Washington are cordially invited to make use of the office where telephones and limited secretarial assistance are available.

JOI has also joined the OMNET telemail network and for the Washington office correspondence should be addressed J. Clotworthy. The JOIDES office at the University of Miami should be addressed J. Honnorez.

IPOD SITE-SURVEY DATA BANK

The IPOD Site-Survey Data Bank at Lamont-Doherty Geological Observatory has recently (May-August 1982) received the following data.

- A publication, "Multichannel Seismic Reflection Data Across Nankai Trough," from Ocean Research Institute, University of Tokyo.
- Microfilm of processes single-channel seismic data from IPOD site survey KK 810626 (Mesozoic Pacific, Leg 89), from T. Shipley, Scripps Institution of Oceanography.
- Digital underway geophysics (bathymetry, magnetics) merged with navigation, for IPOD site survey ARIA 1 (Equatorial Pacific, Leg 85), from Scripps Institution of Oceanography.
- Revised digital data for IPOD Mid-America Trench site surveys IDA GREEN 24-3 and 24-4, from P. Ganey, UTMSI.

FOCUS

LETTER FROM THE PLANNING COMMITTEE CHAIRMAN

Since I inherited from Jerry Winterer the Chairmanship of the PCOM and JOIDES office, I have not yet been able to take the ship's bearings. This is my first occasion to look back at our work during the past four months and to share my impressions with you. We faced so many assignments and "crises" that we merely kept trying to meet the next deadline. Within the first four months of my tenure I attended two PCOM meetings, one EXCOM meeting, and 3 meetings of the *Explorer* laboratory steering group. In the meantime, I attended two post-cruise meetings at DSDP. This is to say that the job of PCOM Chairman is not boring (I am even enjoying it). But it also means that the Planning Committee needs all the help it can get from the scientific community.

We live in exciting times because while JOIDES is planning the last seven legs of the *Glomar Challenger,* we must simultaneously phase-in the Advanced Ocean Drilling Project (AODP) and phase-out the Deep Sea Drilling Project (DSDP). Consequently, three new PCOM ad-hoc subcommittees were created: the subcommittee on the future advisory structure of AODP, the subcommittee on the scientific and technical requirements (and their funding) in preparation for and during the initial years of AODP, and the steering group for the *Glomar Explorer* laboratory layout and instrumentation. Of course, we are basing our work on the Conference on Scientific Ocean Drilling (COSOD) report and the scientific narrative for an 8-year drilling program drafted by Jerry Winterer on the basis of the panels' white papers. Both documents are wonderful tools and mines of information. But PCOM and its various subcommittees need the collaboration of the community as represented by the existing JOIDES panels and working groups which are your only permanent representatives until they are replaced by the new advisory structure.

As you probably know, the conversion of the *Glomar Explorer* to the AODP drilling platform has proceeded to the point where detailed plans are available; the estimated conversion and operating costs have been checked and verified by NOAA with the assistance of the Maritime Administration; the layout of the laboratory and office areas on the *Explorer* is going through its final reiteration; new engineering and technological developments including drilling technology and downhole instrumentation such as bare rock spudding, hot rock drilling and high-temperature logging tools have already been identified; and we are now in the process of computing the cost of US science both on board the *Explorer* and on shore. We anticipate that the new drilling program will be more international in scope, and negotiations between the National Science Foundation and potential partners are now underway. We welcome Canada on board and look forward to the participation of other countries in the AODP.

We need to secure spin-off funds to support science and engineering development during the hiatus and during the initial one to two years of *Explorer* drilling. This is necessary to ensure that we will be ready to make effective use of the *Explorer* at the time it is launched in the fall of 1985; these high front-end costs would then decline to a lower steady state level after the initial years of drilling. The following projects must be protected through identification as line items within the budget to ensure that they will be available when needed: a) site surveys and regional syntheses; b) engineering (drilling) development; and c) downhole instrumentation development.

We need your talents, experience and creativity to help us organize and establish a solid but imaginative AODP. The future meetings of the various JOIDES panels and working groups will be extremely important for AODP. In addition to their usual chores dealing with the ongoing legs, the panels and working groups should start focusing on AODP, and mainly on how the existing panels and working groups could be improved to play an active role in advising the AODP.

Shipboard Organic Geochemistry Guide/Handbook

Prepared by the JOIDES Advisory Panel on Organic Geochemistry, Berndt R. T. Simoneit, Chairman.

Copies available from:

Science Operations
Deep Sea Drilling Project, A-031
Scripps Institution of Oceanography
La Jolla, CA 92093
Tel: (714) 452-3503

APPROVED JOIDES COMMITTEE AND PANEL MEETINGS

	COMMITTEE / PANEL	Feb 1982	Mar 1982	Apr 1982	May 1982	Jun 1982	Jul 1982	Aug 1982	Sep 1982	Oct 1982	Nov 1982	Dec 1982	Jan 1983
	Executive Committee (EXCOM)				21-22 Wash., DC				1-2 Kyoto, Japan		10-11 UT-Austin		
	Planning Committee (PCOM)	23-26 Miami					7-9 Fujinomiya, Japan			6-8 L-DGO			25-28 San. Fran.
SUBJECT / AREA	Ocean Crust Panel (OCP)												
	Ocean Margin (Active) Panel (AMP)		4-5 SIO										
	Ocean Margin (Passive) Panel (PMP)					9-11 L-DGO							
	Ocean Paleoenvironment Panel (OPP)					8-9 L-DGO							
DISCIPLINE	Inorganic Geochemistry Panel (IGP)							17 MIT					
	Organic Geochemistry Panel (OGP)		28-30 Oregon										
	Sedimentary Petrology & Physical Properties Panel (SP^4)										8-9 DSDP		
	Stratigraphic Correlations Panel (SCP)												
OPERATIONS	Downhole Measurements Panel (DMP)												
	Industrial Liaison Panel (ILP)												
	Information Handling Panel (IHP)	4-5 SIO											
	Pollution Prevention & Safety Panel (PPSP)		11-12 SIO										
	Site Surveying Panel (SSP)												
	Ad hoc Panel	18-19 SIO OPP *ad hoc*											20-21 SIO
	Working Group							*17 HWG MIT*					

JOIDES COMMITTEE AND PANEL REPORTS

The following items have been extracted from the minutes of recent JOIDES committee and panel meetings.

EXECUTIVE COMMITTEE

William A. Nierenberg, Chairman

The Executive Committee met 21-22 May 1982 at the National Academy of Sciences, Washington, D.C.

National Science Foundation Report

Allen Shinn reported for the National Science Foundation. Having reported to the JOI Board of Governors (U.S. members of EXCOM) and IPOD (non-U.S. members of EXCOM) the preceding day, he presented only a summary report to the Executive Committee.

I. 1982-83 Membership

NSF has concluded agreements with France, Germany, Japan, and the United Kingdom for the FY 1982-83 *Challenger* drilling program.

II. Post-1983 Planning

A. Funding

The NSF Office of Scientific Ocean Drilling has moved ahead with option "3" of the alternative drilling plans–that of converting *Explorer* for riserless scientific ocean drilling. The Foundation has recommended the *"Explorer* option" to the National Science Board, and the NSB has resolved to promote an extended scientific ocean drilling, approved the establishment of the Advanced Ocean Drilling Program, and endorsed the acquisition and conversion of *Explorer.* NSF is now seeking administration approval for "reprogramming" of $9 million for the 1983 *Challenger* work ($3 million) and *Explorer* planning ($6 million) through discussions with the Office of Management and Budget.

The program has been mentioned only peripherally in congressional hearings, but so far it has not encountered difficulties. The analysis of conversion and operations costs will be a major factor in OMB's decision, but prospects for the program are excellent once the administration approves. Shinn is relatively optimistic that such support will be forthcoming.

In reviewing the program (AODP), NSF has considered scientific benefits, cost of conversion and operations and degree of international interest and participation.

With regard to international participation, 15 countries were represented at the IPOD meeting–some participants stayed on to observe at the Executive Committee meeting. The IPOD meeting was planned to provide potential members an opportunity to discuss the program, rather than to extrract explicit statements of position. Nonetheless, Canada (M. Keene, representative) has expressed a readiness to make a commitment to at least the planning phase of the program.

DSDP Site Map Updated

Topography of the Oceans with Deep Sea Drilling Project sites now available through Leg 82. To request map contact:

Barbara J. Long
Information Handling Group
Deep Sea Drilling Project, A-031
Scripps Institution of Oceanography
La Jolla, California 92093
Tel: (714) 452-3506

Sediment Paleomagnetism Data Now Available

The sediment paleomagnetism data base contains shipboard paleomagnetic measurements taken by the discrete-sample spinner magnetometer, the alternating-field demagnetizer and the long-core spinner magnetometer. The file is restricted to paleomagnetic measurements of cores recovered by the hydraulic piston corer. The long-core spinner-magnetometer sediment-paleomagnetism file is complete with measurements from DSDP Legs 68, 70-72 and 75. Discrete-sample spinner magnetometer sediment-paleomagnetism data are available for DSDP Legs 71-73 and 75.

Address requests for these data to:

Donna Hawkins
Information Handling Group
Deep Sea Drilling Project, A-031
Scripps Institution of Oceanography
La Jolla, California 92093
Tel: (714) 452-3526

B. EXCOM Discussion/Consensus

The Executive Committee discussion centered mostly on ways to (a) maintain the momentum developed in encouraging new membership and (b) express concrete support for the program.

a. With regard to new membership, the *ad hoc* membership committee presented the concepts of "candidate membership" and "full membership," the latter as either single-membership or consortia.

And the NSF will continue this summer and fall (1982) to conduct discussions with interested governments.

The EXCOM also recommended that observers from potential new member countries continue to be invited to the Planning and Executive Committee meetings. Specific coordination and invitation is left to the judgement of the PCOM and EXCOM chairmen.

b. To demonstrate a formal and concrete support of the Advanced Ocean Drilling Program, the following motion was adopted:

The Executive Committee instructs its chairman to send the Director of NSF a letter endorsing the COSOD recommendation in support of the long-term scientific ocean drilling program.

Deep Sea Drilling Project Report

M. Peterson reported for the Deep Sea Drilling Project.

I. Challenger Operations

Recent *Challenger* drilling has produced some very interesting results.

The **Leg 83** party extended Hole 504B to over a kilometer into oceanic crust, and sampled a mineral stockwork in the lowermost part of layer 2A. The shipboard team, despite two drill string failures, left the hole clean. Some proponents believe it can be deepened perhaps to layer 3, and return to that site is a possibility the Planning Committee may consider at its next meeting. Recovery during Leg 83, however, was very low, and DSDP would hope to find a solution before returning to the hole. Broken and ground-up pieces of basalt in the bottom of the hole which interfere with bit rotation are primarily responsible for the low recovery.

Leg 84, drilled in the Middle America Trench off Central America sampled the west-facing side of an ancient underthrusted active margin tectonized more than 70 million years ago. Recovery of massive "snow bank" gas hydrates is another significant result. Leg 84, however, came close to being aborted owing to difficulties in receiving permission from Guatemalan authorities to drill in Guatemalan-claimed waters.

The **Leg 85** team recovered 2.2 km of Neogene sequences that provide a high resolution record of oceanographic climates in the Equatorial Pacific. The heat-flow experiment planned at Site EQ-1B was unsuccessful; proponents may want to return to that site at some later date.

Leg 86 just began at the time of the Executive Committee meeting drilling the first site in red clay (NW-9) and successfully coring (HPC) the Cretaceous/Tertiary boundary on the Shatsky Rise at the second site.

Following Leg 86 *Challenger* will put into Yokohama then conduct a two-part leg (87A, 87B) off Japan. 87A in the Nankai Trough will study tectonic subsidence and subduction mechanisms and evolution of the Japanese margin. The ship will return to Yokohama to pick up the Leg 87B scientific team to study the history and seaward extent of the Oyashio landmass and paleo-oceanography of the Kuroshio current by drilling in the Japan Trench.

II. Program Plans (FY 1982 and 1983)

A. Fiscal 1982

NSF has approved the 1982 program plan for DSDP operations at the level of $22,234,027. This sum must cover costs, in addition to routine DSDP operations, for additional drill string (550 joints), logging on Legs 87 and 89, and salaries for the ship's weathermen.

(The project will take delivery of 450 replacement drill string joints 15 September and 100 additional joints 25 September. Drill string will be loaded at the Yokohama port stop immediately before Leg 89.)

B. Fiscal 1983

NSF has recommended a target of $22.35 million for the DSDP FY 1983 budget. The NSF-targeted budget is expressedly geared to a phase-down period calling a significant reduction of engineering efforts, reduction of purchasing new gear, spare parts, inventories, and overall reduced spending.

Peterson commented, however, that engineering development must continue if any future drilling program is to attain immediate success. Testing tools and systems from *Challenger* is the only realistic way to ensure ongoing development in preparation for the post-1983 program.

Higher anticipated logging costs within the reduced budget impose further problems. DSDP is pleased with Schlumberger, its current logging contractor. Reports from shipboard parties have also been extremely good and DSDP has, and hopes in the future, to preserve a reasonable logging contract with Schlumberger. Through the cooperative research effort between the Project and Schlumberger, DSDP has been able to acquire the services of Schlumberger at a reasonable cost. Nonetheless, DSDP estimates logging costs may increase by 50 per cent in 1983 and estimates that about $950 thousand would be needed to log three legs in the FY 1983 program.

DSDP will ask for the Planning Committee's guidance on priorities for logging operations and means to keep drilling technology ahead of drilling operations.

III. Drill String Failure

A recent drill string failure and drill pipe loss has created serious budget and planning problems.

During Leg 84, new drill pipe parted beneath the *Challenger's* hull resulting in the loss of about 5.4 km of pipe and $1.4 million in pipe and logging tools. DSDP thus had only about 12,670 meters of pipe remaining, of which only 8,255 meters is strictly usable–an insufficient amount of pipe to drill most targets. DSDP has since ordered an additional 550 joints (5200 m) of which it will take delivery in Yokohama, just prior to Leg 89. Funds to acquire the pipe must come from the Project's FY 1982 budget.

Tests have confirmed that the pipe parted as a result of a manufacturing flaw–an inclusion in the pipe, but have also shown that the pipe was harder (i.e. more brittle) than standard pipe.

Upon receipt of the replacement string (previously owned new string) in Los Angeles, DSDP had all pipe inspected to ensure that all fell within the specifications for hardness. This new factor nonetheless poses problems as it demonstrated the need for a different and more extensive type of inspection.

The Project thus must institute the policy of *inspection of all new pipe* before it will accept delivery from the manufacturer.

In conjunction with the report, Peterson noted that drill strings lost on previous legs have been a result of different failure.

Leg	Amount (ft)	Cause
4	15,000	Failure of bail (on traveling block) to engage.
36	12,000	Rough weather. Stem broke at neck of horn.
48	16,000	Failure of pup-joint connecting drill string to hydraulic motor.
84	18,000	Tensional fatigue

In response to a query, Peterson noted that drill string inspection for pipe used in marine, especially deep sea, operations is far beyond commercial inspection for land wells. In the case of drilling on land, lost pipe can simply be retrieved from the hole so extensive, expensive inspections are neither necessary nor cost effective.

IV. EXCOM Discussion

A. Permission to Drill

Members of the Executive Committee expressed concern over problems in securing permission to drill in non-U.S. claimed waters. J. Knauss pointed out that *six months* is now the accepted lead time to secure such permission.

Although final drilling plans do not evolve until closer to the cruise, negotiations could be opened earlier, and general options presented. DSDP might consider routinely sending a person to the appropriate governments well in advance of drilling. Little is lost if *Challenger* does not go into the territorial waters proposed; a great deal is lost if drilling is aborted at the last minutes owing to political difficulties.

B. Logging

In response to a query, M. Peterson noted that DSDP has conducted no formal study with regard to comparing logging subcontractors, but all involved agree the Schlumberger is providing much superior service than the previous subcontractor. "The success of the recent logging operation is beyond what we ever dreamed."

H. Durbaum stressed the importance of continued logging and reiterated the need to ensure that a logging specialist is on board *Challenger* during the appropriate legs. At one time, the suggestion was made to train a member of the shipboard party to ensure this capability.

Winterer noted, however, that it is not easy to recruit scientists from other fields with the depth of understanding necessary to allow them to double as logging specialists.

C. FY 83 Budget-Phase Down

J. Knauss questioned whether the additional amount added to the FY 1983 budget would alleviate the numerous budget constraints and problems reported to the Planning Committee (PCOM minutes of 23 of February 1982). Peterson indicated that, inasmuch as the increased amount covered primarily purchase of new drill string, it did not alleviate the budget problems discussed during the planning committee meeting.

In response to another question, Peterson said that DSDP is starting to work on phase-down planning and a means to ensure continuity in certain functions. Probably two years will be needed to completely close-out the Deep Sea Drilling Project, but phase-out planning would of course depend upon the management structure and contractors of the future program.

A. Shinn commented that NSF had budgeted $7.6 million to cover phase-out period, but if a new group responds to NSF's RFP for Science Operations contractor it would need to specify plan (and costs) to interface with DSDP.

Planning Committee Report

E. Winterer reported for the Planning Committee.

I. Membership – All Panels

A. Recommended Membership Changes

The EXCOM adopted a resolution that *all changes to the JOIDES Panel membership as set forth in the minutes of the Planning Committee's meeting of 23-26 February 1982, Item 360-XVI, be approved.*

B. Future Panel Organization and Membership

The Planning Committee also noted that for the first time in recent history panels were attempting to increase their membership. The PCOM, recognizing that decisions regarding direction of the future program and shift toward long-term planning would bear strongly upon the organization of the advisory structure, postponed its discussion until its July meeting. At that time the PCOM plans to review the overall advisory structure and develop guidelines for each panel.

It will also review more specific items including:

- disposition of the Hydrogeology Working Group – whether or not to raise the HWG to panel level, maintain it as a working group, or ensure adequate coverage of hydrogeology within existing panels.
- consider making the Stratigraphic Correlations Panel a Working Group to the Ocean Paleoenvironment Panel with which it has strong areas of overlap.

C. Executive Committee Discussion

The Executive Committee discussed panel structure in the context of future management. Members noted that some regional studies tended to receive less attention within the subject panel structure. Suggestions included (a) creation of a regional panel which would specifically advocate regional studies, cross cutting those advocated by subject panels or perhaps (b) the creation of a "marginal-sea panel."

The EXCOM instructed the Planning Committee to recommend an advisory panel structure that would be appropriate to the future objectives of the scientific program.

II. Items From Panel Reports

Fairly detailed reports from the JOIDES Panels and Working Groups are contained in the PCOM minutes of 23-26 February 1982. Winterer thus reported only on certain items of special interest.

A. Research and Development Group

Some panels and panel members have become concerned that development technology is not moving ahead fast enough to keep ahead of drilling objectives – especially in the area of bare-rock and high-temperature drilling. The problem has in the past been addressed by DSDP where tool design is closely tied to scientific and drilling operations. Some panels now recommend that a new, independent organization be created to develop tools and systems.

Although the PCOM did not endorse the plan at its last meeting, it discussed the problem and recognized it as perhaps part of a broader concern – that of how to integrate (and ensure funding) of all the aspects of the scientific program (engineering development, geophysical surveys, pre-cruise planning, post-cruise study).

Executive Committee Discussion - Engineering Developments. The Executive Committee discussed the problem of future technology with great interest. Problems include (a) securing immediate funding to ensure continuity is maintained and drilling is not compromised owing to lagging technological developments, (b) encouraging and tapping incentive among researchers and various institutions and (c) coordinating and managing the effort. Members noted that several categories of tool development exist which might be handled in different ways: small tools, especially downhole instruments such as the Barnes-Uyeda pore-water/heat-flow instrument and the von Herzen heat probe are best developed by individuals (at the institutional level); major developments incurring large costs, cooperative efforts should be developed by a special engineering team (either connected to DSDP or by an independent group). But major-tool development must be closely coordinated with ship's operations to ensure compatible systems. Such tools fall in the domain of mechanical engineering and must be tied closely with the drilling systems.

Possibly a technological advisory structure–one paralleling the science advisory is needed to address questions of technological developments. (One possibility would be the establishment of a drilling technology "planning group.")

B. Sedimentary Petrology Technical Manual

The Sedimentary Petrology and Information Handling panels strongly recommend publication of the Sedimentary Petrology Technical Manual. DSDP has agreed to talk to M. Loughridge (National Geophysical and Solar Terrestrial Data Center) about publishing the manual in NGSTD format. Budget constraints make its printing difficult for DSDP at this time, but the NGSTD has offered to print the manual provided it can cover costs by selling it.

C. Bare-Rock Hot Rock, Hydrogeology, and Downhole Experiments

The Inorganic Geochemistry Panel has shifted its focus from geochemistry of interstitial water to solid phase geochemistry–chemical exchange between seawater and high- and low-temperature basalt and seawater and sediment.

The Inorganic Geochemistry and Ocean Crust panels and Hydrogeology Working Group strongly endorse developing tools and systems to spud in on rock overlain by a thin sediment cover (bare-rock drilling), and to drill into sequences with temperatures in excess of 300°C (hot-rock drilling).

The Downhole Measurements Panel further encourages development of a wire-line re-entry system, and the expansion of programs to leave instrument packages in the hole to monitor changes over longer periods of time.

D. Information Handling/Data, and Reference Centers

The Information Handling Panel emphasizes the importance of completing and maintaining the DSDP data base. It urged NSF/DSDP to ensure that sufficient funds, space, and personnel are made available to maintain all data base and further urged that the information and curatorial efforts be maintained at full strength during any proposed drilling hiatus.

The Information and Stratigraphic Correlations panels supported Riedel's and Saunders' continued work on developing microfossil reference centers.

The Information Handling Panel supports the work being done by the CNEXO group in France and cites the excellent brochure recently published by that group. It hopes that CNEXO will continue to provide support for that Group.

The Information Handling Panel also urged DSDP to acquire an onshore sister system to the shipboard mini-computer. DSDP, however, reported that although it had originally planned to purchase a sister system it had insufficient funds to do so within the present budget constraints.

E. Organic Geochemistry

The Organic Geochemistry Guide, prepared by the Organic Geochemistry Panel, is now available from B. Simoneit (OGP Chairman) or Matt Salisbury at DSDP.

Organic geochemists have also noted an increased interest among microbiologists interested in studying the distribution of live organisms in marine sediments. (DSDP had, in fact, begun preliminary planning to develop an aseptic core barrel in response to this new interest.)

Although the PCOM did not support creation of a microbiology panel, it noted this development with interest and suggested that a means might be found to incorporate the subject into pre-existing panels.

J. Debyser, at the present meeting, suggested that a microbiologist be added to the Organic Geochemistry Panel.

F. Dedicated Samples

Several panels and PCOM members noted the increased interest in and the value of double or triple coring intervals for comparative studies. Comparable cores for organic geochemistry, inorganic geochemistry and physical property measurements at certain sites would be particularly useful.

The problem, however, is that triple coring sections with the hydraulic piston corer is very time consuming—and as was the case of Leg 85 when the shipboard party had no time left to sample the important Eocene/Oligocene boundary, could compromise prime scientific objectives.

The EXCOM urged care in planning a balanced program.

G. Site Survey Work

The site surveys for the remainder of the 1982-83 *Challenger* program are in reasonably good shape. Site-survey work is now keeping ahead of the drilling.

Leg 88—DARPA. The DARPA site has been moved nearer to Japan to an area of pre-existing site-survey data. Its location is a compromise between DARPA and OPP proponents allowing the DARPA drilling to take place at a site where ocean paleoenvironment objectives can also be realized.

Leg 89—Oldest Pacific. A joint HIG-SIO survey has located a site in the Western Pacific where "windows" in the Cretaceous sill complex will—with luck—allow sampling the sediments of the "Mesozoic superocean" down to basement.

Leg 90—Southwest Pacific Paleoenvironments. The survey for this leg has been completed for some time; no additional data are required.

Leg 91—Hydrogeology. The **Washington,** at the time of the PCOM meeting, was conducting an SIO-URI survey along the East Pacific Rise to locate sites for the drilling to test hydrothermal models. Although some problems have arisen concerning the survey work, site-selection for Leg 91 will now move ahead.

Leg 92—Mississippi Fan. The GLORIA work provided from a recent IOS-USGS survey of the Mississippi fan has provided excellent maps. JOI has also distributed RFP for additional site-survey.

The site-survey data on hand are adequate for Leg 93 (ENA-3), Leg 94 (northeast Atlantic) and the three Leg 95 alternatives.

III. *Challenger* Drilling Program

E. Winterer briefly outlined the present and planned Challenger *drilling program.*

Although the heat-flow experiment at EQ-1B did not work, the hydraulic piston coring during Leg 85 to study Cenozoic environments in the equatorial pacific was highly successful.

Leg 86 operations are underway at the first site (NW-9). The drilling sampled the red clay sequence in the northwest Pacific.

Leg 87 along the Japanese margin is divided into two parts: 87A will drill the Nankai Trough to study subsidence and subduction processes along the Japanese margin, with particular attention being paid to comparing physical properties (porosity, pore-pressure, sonic velocity) in increasingly deformed sediments along the slope. The second part will continue the work begun on Legs 56 and 57 to study the history and seaward extent of the Oyashio landmass.

The Safety Panel has approved the Leg 87 sites (some with qualifications). The excellent profiler records provided by JAPEX clearly delineate subduction zones and thrust faults along the Japanese margins. These superior records have allowed proponents to target (and secure safety approval for) sites which should produce extremely interesting results.

The Leg 88, leaving from Hakodate, will emplace the DARPA downhole seismometer, and conduct a series of related experiments. The Ocean Paleoenvironment Panel and DARPA have now agreed upon a site which is suitable both for the DARPA experiment and for paleoenvironment studies (Neogene climatic changes). (The pilot hole for the DARPA experiment in the northwest Pacific will be drilled during Leg 86.)

In conjunction with the DARPA leg the PCOM and DSDP have expressed some concern about the deep-water limits of the drill string. The previous DARPA test was done during Leg 78A in "flat calm" conditions. Considering the limited amount of drill string available the weather could be a serious factor in the success of Leg 88.

The Leg 88 hole will not be logged inasmuch as drilling will penetrate into competent rock just deep enough to emplant the seismic system.

Leg 89 is planned to sample the presumed oldest sediments in the Pacific Ocean. Profiler records show 500-600 meters of pre-Campanian sediments over an acoustic basement at a site in the Mariana Basin. This suggests a high possibility of reaching the Cretaceous and Jurassic deposits deposited in the Mesozoic super-ocean. The Leg 89 team will also hydraulic piston core one site on the Ontong-Java Plateau in fulfillment of a Leg 90 objective. (The Leg 90 team will describe the cores and work up the results.)

The Leg 89 sites will be logged.

Leg 90, the third leg, in the Ocean Paleoenvironment program will extend the study of Neogene climatic history into the tropical and subantarctic (Neogene) water masses. Much of the drilling will be in relatively shallow water along the Lord Howe Rise; all sites have passed safety review.

Leg 91, on the East Pacific Rise, will comprise four sites in successively younger crust to study hydrothermal circulation and heat flow as a function of age of crust. A recent survey conducted by SIO and URI has provided seismic, Seabeam, and heat-flow data in the area. Specific sites have yet to be determined.

IV. SCIENCE NARRATIVE

A. Presentation/Background

E. Winterer submitted the PCOM's 8-year science narrative noting that the Executive Committee took a "preliminary look" at it during its December meeting in San Francisco. At that time, the EXCOM instructed the Planning Committee to move ahead with its preparation but to construct an 8-year proposal, free of any platform constraints. The earlier version comprised a five-year proposal supposing use of *Glomar Challenger.* Owing to the collapse of the Ocean Margin Drilling Program shortly before the EXCOM meeting, the *Explorer* had become available as a platform. The EXCOM instructed Winterer to modify the "proposal" accordingly.

At the February 1982 meeting, the Planning Committee suggested changes which Winterer subsequently incorporated. Thus, the 8-year Science Narrative, originally conceived as the scientific part of the *Challenger* proposal has evolved through changing political climates. Certain vestigial elements of the proposal remain in the language, but nonetheless the document as now presented embodies the major scientific objectives defined by the JOIDES panels.

B. EXCOM Discussion

During discussion, the Executive Committee emphasized that the proposed drilling plans set forth in the science narrative are *"not set in concrete."*

Some members expressed serious concern that non-U.S. agencies and/or potential new members would, on the basis of the document, view the scientific planning as completed, and thus be less interested in supporting the program. The sections containing the leg by leg tracks in particular give the impression that the program planning is a *"fait accompli."*

Other members noted that a working document was nonetheless necessary to focus planning; all agree that the document will be periodically updated as planning moved ahead.

In order to alleviate possibilities of misunderstanding, W. Nierenberg appointed J. Debyser, C. Helsley and E. Winterer to write a preface to appear in the front of the Science Narrative clearly stating that (a) the "narrative" is a *preliminary working document* setting forth guidelines to define a broad framework on which to build the program," (b) the ship's tracks are exemplary, demonstrating only that the targeted science can be addressed, and (c) that the specific objectives and actual ship's schedule will evolve as new ideas are brought forth. The EXCOM would not expect the working document to receive a wide, formal distribution, but rather be distributed on "need to know" basis.

After discussion and following the preparation and acceptance of the "Draft Preface," the following motion was adopted:

The Executive Committee thanks the Planning Committee for its efforts and accepts the "8-year Science Narrative" as a working document to provide guidelines for planning the future scientific drilling.

Conference on Scientific Ocean Drilling (COSOD)

R. Larson, Chairman of the Conference on Scientific Ocean Drilling, arrived mid-morning to present the members of the Executive Committee with the newly printed COSOD Report. He summarized the conference and the report as follows.

REPORT-SUMMARY

The conference report is divided into two major sections comprising

1. Summary of the Conference on Scientific Ocean Drilling, containing general recommendations from the Steering Committee, discussion of the scientific top priorities and summaries of the Working Group position papers.
2. Working Group position papers which are organized according to five major topics.

- Origin and Evolution of the Oceanic Crust
- Tectonic Evolution of Continental Margins and Oceanic Crust
- Origin and Evolution of Marine Sedimentary Sequences
- Causes of Long-Term Changes in the Atmosphere, Oceans, Cryosphere, Biosphere, and Magnetic Field
- Tools, Techniques and Associated Studies.

Larson summarized the general recommendations of the Steering Committee appearing in summary section B-1 to B-4 of the COSOD report for the Executive Committee

- A long-term program (of at least 10 years) of world-wide drilling is essential in the earth sciences. The *Explorer*, because of its longer potential life and extended capabilities is the preferred vessel for the future long-term program. The *Explorer's* availability is, in part, dependent upon a favorable analysis of conversion and operating costs, but the vessel would almost certainly be operated without a riser and blow-out prevention system for several years.
- A future drilling program must be a part of a larger scientific program in which geophysical surveys and studies, sample analyses and other investigations are identified. Support is needed to ensure that activities which require long lead times are completed before drilling begins as well as to support scientific studies of materials after each cruise.
- Scientific ocean drilling provides means through which to integrate marine and continental geology.
- International cooperation should be expanded; the cooperation among scientists of many nations has "pollinated" and stimulated scientific thinking, and continued efforts to expand membership will surely be fruitful.
- The Conference chose *Explorer* as the vessel to address post-1983 drilling, recognizing that costs of building a new vessel would be too high and thus the choice was between *Glomar Challenger* and *Explorer*. It deemed *Explorer* preferable because (a) its increased living and laboratory facilities would permit an increased number of scientists to participate (and thereby allowing increased IPOD membership), (b) of its greater stability owing to greater displacement which would allow drilling in more adverse weather condition, (c) it may be ice-strengthened to allow high-latitude drilling, (d) a longer drill string could be carried and deployed to drill targets in deepest water, (e) its capacity to accommodate a riser system at some later date.

  Disadvantages to *Explorer* are that the ship is too large to pass through the Panama Canal and that ports and drydocking facilities are relatively few.

R. Larson also presented the COSOD report in conjunction with NSF's presentation to the National Science Board last March; the Board appeared to receive the report very favorably.

Discussion

In response to a query from J. Knauss, Larson added that well over 50 per cent of the top priority objectives identified by COSOD require some facet of *Explorer* capability not available on *Challenger*. The ocean-crust objective to drill to layer 3 requires the longer drill string available on *Explorer*. Although many ocean paleoenvironment objectives may be realized with the hydraulic piston corer, high-latitude work, requiring *Explorer* is a first order OPP objective. Hydrothermal work requires numerous shipboard scientists and specialized laboratory failities, available only on *Explorer*. In addition, many questions about the active and passive margins must be answered with deep or nearshore drilling requiring well control capabilities.

The EXCOM also discussed ways to effectively coordinate and integrate results of ocean drilling with continental geology. It suggested that JOIDES might find a means to more actively push liaison with continental geologists. One way to do this is by each EXCOM member stimulating interest within his own institution or country. In some countries, e.g., France, the marine geological and continental geological communities are already one and the same – thus ensuring that the scientific results are closely related.

Larson suggested that scientific ocean drilling serves as a focus for geological sciences. The drill sites are modern laboratories in which investigators can observe the processes which have been going on over the past 200 million years.

Consensus

J. Knauss, speaking for the Executive Committee, thanked Larson for the excellent and truly impressive performance of the COSOD Steering Committee and Conference attendees in organizing and developing a cohesive, unified conference and in producing the handsome COSOD report within only six months – a record in itself.

Resolution: *The Executive Committee accepts the report of the Conference on Scientific Ocean Drilling and thanks R. Larson, members of the COSOD steering committee, and Working Groups for their efforts on behalf of the ocean drilling community.*

Advanced Ocean Drilling Program – Management Plan

I. PROPOSED PLANS

In viewing the greatly expanded concept of the Advanced Ocean Drilling Program, the Executive Committee considered ways to effectively manage such a program. In its discussion the EXCOM presumes a world-wide, long-term (perhaps 10-year) scientific program involving many countries and one using the *Explorer* as the drilling platform.

A. NSF Proposed AODP Management Plan (Three Prime Contractors)

NSF proposed a plan at the JOI Board of Governors meeting (25-26 March 1982) showing a structure wherein NSF contracted directly with three separate prime contractors:

The Science Planning Contractor provides scientific advice and guidance.

The Science Operations Contractor manages the logistics of the scientific drilling program.

The Systems Integration Contractor is the ship's operator and drilling contractor.

NSF favors this configuration as it allows NSF to communicate directly with each decision-making body which NSF views as critical in a program of such magnitude. Further, as *Explorer* would be owned by NSF, the Foundation believes direct access to the ship and drilling contractor is necessary to expedite all matters concerning ship's repair and operations.

B. Nierenberg Model (Single-Prime Contractor)

In a letter to the Executive Committee (of 9 April 1982), W. Nierenberg proposed a simpler plan in which NSF contracts (using co-mingled U.S. and non-U.S. funds) with but a single Prime Contractor (JOI) which subcontracts the science operator, which in turn subcontracts the ship/drilling operator. (The Prime Contractor would also support the JOIDES office with co-mingled funds and subcontract U.S. site surveys, and U.S. science in support of the program.)

C. JOI Board of Governors Plan (Single Prime Contractor and IPOD Council)

J. Baker, Chairman, JOI Board of Governors, presented a modified model developed at the JOI BOG meeting (20 May). The Board of Governors had addressed questions of (a) providing a mechanism to ensure direct access between the non-U.S. participants and the National Science Foundation and (b) reviewing the present JOIDES (EXCOM, PCOM, PANEL) advisory structure. Acting upon a suggestion made by W. Nierenberg, the JOI Board of Governors recommended the creation of an IPOD (oversight) council comprising all non-U.S. members which would link directly to NSF.

II. DISCUSSION

The Executive Committee discussed various ramifications of the management plans at length. Most discussion focused around three aspects of future planning and management plan.

- What sort of advisory structure is appropriate? Is the current Executive Committee-Planning Committee system suited to a long-term *Explorer* program? Is the current panel organization (major *subject* panels) the most suitable?
- How can we best ensure that the non-U.S. partners are adequately represented in the overall program at the management level?
- How can we ensure an effective management structure which is responsive first and foremost to the *scientific goals* of the program?

During discussion A. Maxwell outlined the advisory structure created for the OMD program which comprised a Scientific Advisory Committee including representatives from each participating oil company and JOI Institution, plus three members at large. To "pre-digest" items and expediently handle certain matters between meetings, the SAC formed a 6-person Executive Committee of the SAC. Various regional Planning Advisory committees provided direction to the SAC. The system seemed to work well – particularly in the context of a joint industry/university/government agency program.

Several members of the JOIDES Executive Committee, noted that whereas the definition of responsibilities of the current JOIDES Plan-

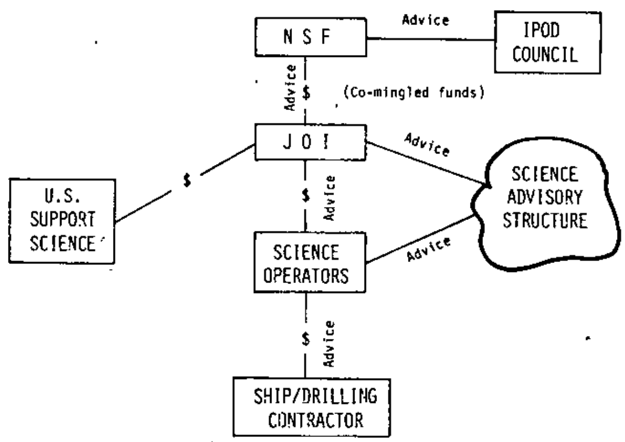


Figure 1. EXCOM

ning and Executive committees is not always clear and distinct, the system has worked effectively in the past. The particular strength of the system is in the incorporation of two major aspects of the program: definition of scientific goals and developing a means to accomplish them through the Planning Committee, and integration of political and institutional policies through the Executive Committee. The system allows for the scientific planning to benefit from direct institutional involvement and support.

With regard to management structure, most members of the Executive Committee expressed doubts about any management structure which would not place control of the ship's operation directly in the hands of the science operator.

Resolution: *The Executive Committee has reviewed a number of possible management structures. It concluded that*

1. *a committee structure should be established in a manner similar to the present Executive and Planning committees. Membership on these committees is to be related to the financial contribution of individual countries.*
2. *Further, the Executive Committee asks the Planning Committee to recommend an advisory-panel structure that would be appropriate to the future objectives of the drilling program;*
3. *It advises that a council consisting of representatives of each contributing non-U.S. member be established for the future program; and*
4. *Recommends and urges JOI, Inc. to seek and obtain contractual control of the Science Operations Group and through them the Ship's Operator.*

Owing to the complexity of the motion and the international character of item 4, the EXCOM accepted J. Debyser's request to split the motion into its four component parts. Items 1, 2 and 3 were adopted.

Owing to the internal (U.S.) aspects of the motion (part four) urging JOI to seek contractual control of the Science Operations and through them, ship's operations, the non-U.S. members suggested that this part of motion be tabled so that it could first be addressed by the JOI Board of Governors.

Resolution: *The Executive Committee tables action on part 4 of the motion on the floor.*

Member-Country Reports

Representatives from the non-U.S. member institutions reported on activities within their respective countries and institutions. All member countries are actively engaged in IPOD-related work; cruise participation, site surveys, sample analyses. Representatives also expressed strong support for a continued scientific ocean drilling program.

Representatives also supported the concept of an IPOD (oversight) committee.

I. MEMBER-COUNTRY COMMENTS

A. France

J. Debyser reported on recent French IPOD activity.

Laboratory Research – French scientists in Universities, CNEXO, and industry are actively conducting IPOD-related research. Money has been made available from the Centre National de la Ocean Recherche INRS so that samples from cruises on which French scientists participate are quickly studied and data made available for future planning.

Site Surveys– The French did not conduct a great number of site-surveys this past year, but in conjunction with other geophysical work, they have completed a post-leg survey on the Goban Spur, refraction and heat-flow surveys along the East Pacific Rise and done some work in the Clarion-Clipperton Fracture zones, near the Blake-Bahama escarpment, and on the Barbados ridge.

Recent events include a French Geological Society Conference held in Lille addressing the topic Oceans and Paleo-oceans. Sixteen papers given at the Conference were related to studies of DSDP/IPOD materials. The French community, especially with the support of J. Aubouin, views ocean drilling as the natural extension of continental geology; continental geologists and marine geologists are, in fact, one and the same community.

The French data handling offices are being partially transferred to BNDO.

Diving activity (mini-submersible) is increasing. The French have recently completed dives (a) along 13°N (East Pacific Rise) in the area of active hydrothermal vents, (b) in the Bay of Biscay where they were able to study the shelf slope, and (c) on the Gorringe Bank 160 miles southwest of Portugal where the mini-submersible *(Cyana)* was able to sample a section providing considerable information about the crust, slope, and continental margin. They have also recently organized a joint diving venture with the Germans off Morocco which will take place in September 1982.

J. Debyser reiterated that a strong support exists in his country for the international ocean drilling program. The French intend to be FULL PARTICIPANTS IN COMING YEARS. The cooperation and participation of an international team of scientists has created an ongoing scientific seminar– unique within both scientific and political arena. Many new things are "just starting to boil in this scientific stew pot." Debyser "cannot conceive of progress in the geological sciences without ocean drilling and the French are prepared to stay involved for another 10 years, if possible.".

B. Japan

N. Nasu reported that Japanese scientists strongly support IPOD activities and *Glomar Challenger* operations. Japanese scientists have benefited from participation on board ship and have produced excellent results. The community is extremely pleased that *Challenger* will be drilling the Nankai Trough and Japan Trench during Leg 87 to resolve questions of the origin and history of the Japanese margin.

The Japanese scientists are also surprised and excited by the excellent multichannel profiler records of the Nankai Trough kindly supplied by JAPEX. (The records were supplied gratis in response to requests of Japanese scientists. Their purchase would probably have cost about $0.5 million.)

Japan is planning to acquire a 460-ton vessel equipped with a 6-channel seismic system next year. The vessel will be available to conduct pre-drilling geophysical surveys.

The internal Japanese IPOD structure comprises two principal groups: (a) the Council of the Ministry of Education, Science and Culture and (b) the Research Liaison Committee. The Council prepares and promotes budgetary plans: the Research Liaison Committee, comprising 120 members, implements the plans and coordinates pre-drilling survey work. A "high feeling" for the IPOD work exists in Japan and the Japanese IPOD community is enthusiastic and highly cooperative. They all "eat rice from the same bowl."

G. Germany

Germany has contributed its dues for the FY 1982 program. The Geoscience Commission has been considering a further contribution; the German scientific community strongly supports ocean drilling. The IPOD membership dues are provided in equal parts by the Ministry of Research and Technology (BMFT) and the Deutsche Forschungsgemeinschaft (DFG). In addition the DFG supports DSDP-related research with 2 m DM, and DFG and GMFT support ship's time for regional geophysical/ geological surveys which may lead to DSDP drilling proposals.

Germany will soon engage in a joint diving program with the French on the Mazagan plateau.

With regard to site surveys, the *Sonne* conducted a Seabeam and seismic survey in the equatorial Pacific (Leg 85), and is doing regional surveys in the southeastern part of the south China Sea.

The Weddell Sea geophysical work containing detailed interpretations will be published in June 1982.

Durbaum stressed the need for more cooperation on technological matters; there should be found some mechanism to get German scientists involved in the technological research.

Durbaum also suggested that perhaps a German scientist could be included in the Hydrogeology Working Group.

D. United Kingdom

J. Bowman reported that interest, contribution, and commitment to the drilling program remains high within the United Kingdom. Twelve U.K. scientists have sailed recently on nine DSDP legs. The legs of greatest interest to U.K. scientists were those on the Goban Spur and Rockall Bank. The impact of the program, however, goes far beyond cruise participation; the Institute of Oceanographic Sciences alone has conducted four site surveys (Rockall Bank, Middle Atlantic, Gulf of Mexico and King's Trough); some of the surveys have included GLORIA work.

In this context, Bowman urged earliest possible forward planning. Requests for ship time in the U.K. require 18-month lead times. The U.K. could contribute more (in geophysical surveys) if targets were identified well in advance of drilling. Survey planners simply need more time.

Membership in JOIDES Panels has provided an important link between U.K. scientists and the world ocean drilling community – a cooperation which the U.K. scientists appreciate, and from which they have benefited.

Discussions concerning post-1983 planning have begun in the U.K. and Bowman noted the discussions in Washington, both in the NSF-sponsored IPOD meetings and at the Executive Committee meeting have been very useful.

The "open house" aboard *Glomar Challenger* in Southampton following Leg 80 was extensively covered by the press and stimulated considerable interest among U.K. scientists, and industrialists. Bowman thanked DSDP and others who made the "open house" possible. It was a great help in exposing the scientific community and government agencies, as well as laymen, to the ocean drilling program.

The NERC Quarterly, Volume 2, no. 11 (July 1981), also featured *Glomar Challenger* on its cover and a large feature story about the Deep Sea Drilling Project.

Joides Membership

I. JOIDES MEMBERSHIP COMMITTEE REPORT

The Executive Committee during its August 1981 meeting in Hannover formed a committee comprising A. Shinn (Chairman), J. Debyser, H. Durbaum and one U.S. member (subsequently named Art Maxwell) to consider questions involving ways to encourage new JOIDES membership and establish guidelines on how to bring new members into the existing partnership. The Executive Committee reviewed and expressed some reservation about a *draft* plan for increasing membership presented at its 2-3 December 1981 meeting. The plan favored by NSF at that time involved various levels of membership (full membership, ⅔ membership, ⅓ membership, etc., with corresponding reduced privilege).

The *ad hoc* committee has since met to revise and refine the plan which it presented at the current meeting.

B. Ad Hoc Membership Committee Report

A. Shinn (Chairman Membership Committee) distributed copies of the membership committee report which appears as Appendix 6.

In order for *Explorer* to replace *Glomar Challenger* as the drilling platform, expanded support from non-U.S. members is requisite. (The *Explorer,* of course, could accommodate a much larger scientific party making increased membership possible.)

The Membership Committee addressed ways to develop a structure wherein nations with lesser financial resources and ability to contribute (financially) could participate, yet present members and those which could afford full memberhip would continue, or join, at full membership cost.

The committee found, however, that schemes to establish different levels of membership (with different levels of privilege) while keeping current members involved at full levels were unworkable. The range of contribution requested – from full membership to 1/6 membership would create an overly complex system and could not be employed without loss of current membership. NSF also concluded that making a separate contractual agreement with each member of a consortium joining as a full partner (Plan C, Item 203-II, 2-3 December minutes) would also be too complex and pose legal and contractual problems.

The *ad hoc* membership panel thus recommended that regular JOIDES membeship comprise either of two catgories of full membership:

- *single-member full membership,* as is the type of membership held by the present non-U.S. members.
- *consortia as full members.* In this case a memorandum of understanding would be between

the NSF and a single body representing the consortium. Division of contribution, responsibility, and privilege is decided internally among the nations forming the consortium.

In addition, the Committee, recognizing the need to stimulate interest and involve potential new partners in the *planning phases* of the Advanced Drilling Program (i.e., during the two-year drilling hiatus), recommended establishing a new type of membership: *candidate membership.*

For a negotiated sum, Candidate Members would participate with full voting rights on the Planning and Executive Committees (and on other JOIDES panels in the same manner that non-U.S. members now participate). Candidate membership would begin in 1984 and would extend *only* during the pre-drilling phase. When drilling began, candidate members would have to choose either to terminate their JOIDES association or to join as a *regular full member* (either as a single-country or as a part of a consortium) and pay full membership dues. Only regular members qualify for shipboard participation, and Candidate Membership is only open to countries not currently members of JOIDES.

Resolution: *The Executive Committee accepts and endorses the conclusions of the report (of 21 May 1982) of the Membership Committee, and recommends that NSF move forward to secure new members.*

Implicit in the motion is that the Executive Committee endorses

- *single-level full membership.* A full member may be either a single country or a consortium comprising several countries.
- *candidate membership* which extends for about 2 years (beginning in 1984 and extending for the period of the pre-planning phase–drilling hiatus).
- no specific candidate membership fee is implied; that remains to be negotiated between the candidate member and NSF and must be acceptable to the current JOIDES partners.

II. ADMISSION OF THE INSTITUTE OF GEOPHYSICS AT THE UNIVERSITY OF TEXAS

The University of Texas has been a member of the Joint Oceanographic Institutions Board of Governors for many years and its representative has, in fact, usually sat as a guest at the JOIDES Executive Committee meetings. The newly founded Institute for Geophysics at The University of Texas now asks that it be granted formal membership status in JOIDES so that it may contribute in a full capacity.

Resolution: *The Executive Committee recommends to the JOI Board of Governors that the Institute for Geophysics of the University of Texas at Austin be admitted to JOIDES.*

"Ownership" of DSDP-Drilled Holes

I. DISCUSSION PAPER

Acting upon a query from the Downhole Measurements Panel, the Executive Committee first considered the question of who controls use of the DSDP-drilled holes at its meeting in Hannover in August 1981. J. Knauss subsequently prepared a paper for further EXCOM discussion. Knauss reviewed the problem at the present meeting. With the capability to re-enter a DSDP-drilled hole by a wireline system deployable from a variety of oceanographic vessels, the question arises whether or not JOIDES has proprietary rights to control access to the holes. Most important is ensuring that the holes are used in a responsible way.

Knauss noted that the draft convention of the Law of the Sea *does not* give sovereignty over areas of the seabed at which marine scientific research is conducted. A "safety zone" (not exceeding 500 meters) is, however, a generally accepted maritime concept which JOIDES could perhaps invoke.

Coastal States have jurisdiction into the sea off their shores, but the boundaries of this jurisdiction are not yet precisely defined. Use of the holes drilled near-shore on the continental shelf would probably fall under the jurisdiction of the adjacent state. The International Seabed Authority has no jurisdictional authority over the *conduct* of marine scientific research seaward of the coastal states' jurisdiction. JOIDES then cannot legally control use of the holes in the open sea; it could perhaps influence use of the holes near-shore through the authority enjoyed by the coastal states.

Knauss suggested that JOIDES might best look toward developing informal agreements among the international scientific community which would then be endorsed by the International Union of Geodesy and Geophysicists.

II. EXCOM CONSENSUS

The Executive Committee generally agreed that it was unwise to pose the question of ownership of the JOIDES-drilled holes to governmental agencies. The problem to be addressed was rather one of *coordinating* the use of the holes internally within the international marine geological and geophysical community. JOIDES could perhaps establish a mechanism to internally coordinate the responsible use of the holes.

Future Meetings

The Executive Committee will next meet

1-2 September 1982
Kyoto, Japan
Noriyuki Nasu–Coordinator

(The JOI Board of Governors will meet on *31 August 1982.)*

PLANNING COMMITTEE

Jose Honnorez, Chairman

The Planning Committee met 7-9 July 1982 at the Institute for International Mineral Resources Development, Fujinomiya, Japan.

National Science Foundation Report

I. MacGregor reported for the National Science Foundation.

I. National Science Board Endorsement of AODP

The Foundation made a formal presentation to the National Science Board on 18 March 1982 which resulted in a resolution in support of the Advanced Ocean Drilling Program. The resolution indicated support by:

1) acknowledging that a long-term program of ocean drilling is an essential component of basic research in the earth and ocean sciences;
2) approved the establishment of an office of Scientific Ocean Drilling in the Foundation; and
3) authorized the Director to seek resources leading to conversion of the *Explorer*. (The NSB resolution is Appendix 1 of the May 1982 EXCOM meeting minutes.)

Very strong support exists within the NSB and NSF to seek funds for the Advanced Ocean Drilling Program (approximately $6 million for engineering/design and $3 million for science related expenditures).

II. IPOD Membership

Increased membership in IPOD is an NSF goal. NSF hopes that non-U.S. participation in AODP will generate about $17 million; six participants at $3 million each are required to achieve the target goal.

Level of interest and organization varies among potential member countries. Canada, Australia and Australia/New Zealand consortium have a high level of interest and are well mobilized at the scientific and political levels. NSF is curently negotiating with Canada to participate in the planning phase of AODP for $200 K/yr.

Countries which are interested but not well organized in their efforts to participate are: Finland, Sweden, Norway, Denmark, Netherlands, Switzerland and Italy.

Countries showing some interest but not likely to participate in the near future are: Brazil, Mexico, Spain, India, China and Saudi Arabia representing several Arab states.

MacGregor noted that an important decision regarding IPOD membership was made by EXCOM–that only one class of membership (i.e., full membership) will exist. Another form of membership may exist during the planning phase only (e.g., membership for $200 K to participate in JOIDES panels with full voting privilege). After the planning phase, all members will contribute at the full rate.

E. Winterer requested informal support from NSF and from PCOM to promote IPOD/AODP participation while attending scientific meetings abroad. I. MacGregor indicated that NSF would welcome the help of PCOM in promoting IPOD membership and in explaining the science, cost and openness of the program.

III. EXPLORER CONVERSION

A. Background

The *Explorer* conversion is now in the planning stage. The Interface Working Group has defined the laboratory space. E. Winterer displayed working drawings from Lockheed of planned space utilization on *Explorer*. Using visual graphics, Winterer presented PCOM a general overview of *Explorer* space arrangements and traced the pathway of cores from work deck to storage.

Various Planning Committee members expressed concern that more input from the scientific (user) community is needed to ensure that *Explorer* space is efficiently utilized, living quarters are comfortable, and laboratory design is the best possible. PCOM noted that now (while in the planning phase) is the time to influence the conversion plan. MacGregor advised PCOM that NSF has contracted a team headed by R. Dinsmore (advisor to Woods Hole Oceanographic Institution on marine operations) to provide Lockheed with input from the scientific community. Dinsmore and J. Schiff, an architect experienced in laboratory design, will contact the PCOM chairman and various panel members for advice. PCOM members and others are urged to send comments regarding *Explorer* conversion to Dinsmore. Dinsmore and Schiff will report to J. Honnorez, chairman of the Steering Committee to oversee *Explorer* conversion.

B. Conversion and Operating Costs

Conversion of *Explorer* to the AODP platform is estimated to cost $69.6 million ± 12%. Already, there has been a 3% increase.

NSF hopes to secure the funds during the first two years of AODP; an alternate plan is to amortize $20 million of the total cost over twenty years.

MacGregor presented a detailed budget illustrating the cost breakdown for *Explorer* conversion and a comparison of operating costs for *Explorer* and *Challenger.*

R. Moberly, J. Aubouin and others were skeptical about the figures given for the relative operating costs of *Challenger* and *Explorer;* MacGregor indicated that the amounts were based on hard data and not susceptible to much error.

Discussion following the NSF presentation of the budget breakdown centered on the lack of funds for science during the *Explorer* conversion.

Resolution: *After reviewing the proposed NSF budget for the AODP the JOIDES Planning Committee expresses its concern at the level of scientific funding during the initial two year start-up period. The Committee believes that the budget is grossly inadequate and does not support site surveys, regional studies and engineering developments in the spirit of COSOD and the views of the scientific community in general. This committee recommends that steps be taken to resolve this problem by obtaining realistic support for the scientific aspect of the future drilling program.*

IV. REQUEST FOR INFORMATION

A. Engineering

NSF needs information from PCOM regarding engineering/development problems and new equipment requirements so that NSF/DSDP discussions can proceed. (MacGregor met privately with Y. Lancelot of DSDP to discuss this matter, and engineering and new equipment topics were later prioritized by PCOM – see "Post 1983 Planning, IIB").

B. Logging

NSF also requires more information on logging and downhole experiments. The chapter in the 8-year scientific plan is inadequate. MacGregor suggested that JOIDES may want to set up an advisory group for downhole logging. J. Heirtzler indicated that R. von Herzen (chairman Downhole Measurements Panel) would like to participate. Discussion among PCOM members led to the following resolution directed to the Downhole Measurements Panel:

Charge to Downhole Measurements Panel: *The JOIDES eight year science narrative defines a significant expansion in a future drilling program for downhole logging, measurements and experiments. PCOM requests the DMP to define the future needs for these activities, particularly with respect to their management, equipment development and deployment, and funding levels.*

JOIDES Committee, Panel and Working Group Reports

I. EXECUTIVE COMMITTEE

E. Winterer reported on the last EXCOM meeting 21-22 May 1982 in Washington, D.C. Several non-U.S. participants of the IPOD meeting stayed on as observers of the EXCOM meeting. Winterer summarized the meeting as follows:

On behalf of the Executive Committee, a letter was sent by the EXCOM chairman to the Director of NSF formally endorsing the COSOD recommendation in support of the long-term scientific ocean drilling program (the letter appears as Appendix 2 of the EXCOM minutes).

Panel membership ambiguities were cleared up by an EXCOM resolution accepting all changes in JOIDES panel membership as set forth in PCOM minutes of 23-26 February 1982, item 360-XVI.

PCOM was instructed to recommend an advisory panel structure that would be appropriate to the future objectives of the scientific program. The recommended panel structure should be capable of addressing regional problems which, at present, tend to receive less attention within the subject panel structure (see Post 1983 Planning, I. Future Advisory

Structure, p. 22).

The "8-year Science Narrative" was accepted as a working document to provide guidelines for planning the future scientific drilling. The document was accepted by EXCOM after discussion which resulted in the inclusion of a preface (Appendix 3 in EXCOM minutes) clearly stating that (a) the narrative is a preliminary document, (b) the ship tracks are exemplary and subject to change, and (c) the specific objectives and actual ship tracks will evolve as new ideas are brought forth.

The EXCOM expressed positive reaction to the COSOD report, presented and summarized by R. Larson (COSOD Chairman). EXCOM was concerned that the continental geology community have input during planning, so that ocean drilling results could be effectively coordinated and integrated with continental geology.

Several AODP management plans were reviewed. EXCOM favors the JOI/BOG plan in which NSF, with advice from an IPOD (oversight) council, contracts JOI to seek contractual control of the Science Operations, and through them, ship operations. The proposed management plan was generally unacceptable to the non-U.S. PCOM members and resulted in considerable discussion detailed in a later section (Future advisory structure).

II. ACTIVE MARGIN PANEL

J. Creager reported for the AMP which met at SIO 4-5 March 1982. No membership changes.

III. SAFETY PANEL

E. Winterer reported for the Panel. The Panel met to discuss the proposed Japanese sites for Legs 86 and 87. Only minor changes and site rejections were recommended.

The next review will focus on the Mississippi fan.

IV. DOWNHOLE MEASUREMENTS PANEL

W. Bryant, PCOM liaison, reported the results of the DMP meeting, 25-26 May 1982. Copies of the minutes of that meeting, including a summary of well-log data for Legs 80-84, were made available to PCOM members.

12 of 23 holes drilled on Legs 80-84 were logged.

Of 11 holes not logged for various reasons, 5 were not logged because of co-chief scientists decisions. DMP requests that PCOM provide some guidance in this matter.

Logging statistics should be considered for publication in an official document; Y. Lancelot (DSDP) will explore this matter.

I. MacGregor informed PCOM that NSF is trying to arrange with Schlumberger for the logging of all holes on Legs 89-93.

V. ORGANIC GEOCHEMISTRY PANEL

PCOM considered the election of PCOM liaison to the OGP. E. Winterer nominated H. Schrader as PCOM liaison, seconded by W. Bryant. J. Honnorez will ask Schrader to act as OGP liaison.

VI. OCEAN PALEOENVIRONMENT PANEL

J. Kennett reported:

The redrilling of site 289 is planned to be carried out at the end of Leg 89. Scientifically this site forms part of the southwest Pacific latitudinal traverse and will be studied by the Leg 90 scientific team. However, Leg 89 scientists will be given the opportunity of also working up the material on shore.

The North Atlantic sites were discussed at length and 6 sites were identified as high priority. OPP selected the New Jersey Transect as Leg 95.

A problem exists in obtaining accurate core orientation data and in interpreting these data. J. Honnorez will discuss the problem with the co-chief scientists on Leg 85 and then discuss the matter with DSDP.

VII. STRATIGRAPHIC CORRELATIONS PANEL

J. Kennett reported that OPP made a unanimous resolution to make SCP a working group of OPP. Discussions are needed between the SCP and the Planning Committee representative (J. Kennett) concerning responsibility of required tasks before this is considered.

VIII. PASSIVE MARGIN PANEL

PMP met jointly with OPP and was in agreement with the choice of the New Jersey transect for Leg 95.

The Panel decided that Leg 92 should concentrate on the Mississippi fan.

The Panel wishes to maintain itself during the coming year with no membership changes.

PMP requests a meeting after the Leg 92 site survey, late December or early January.

Challenger Pacific Program

I. LEG 88 – NORTHWEST PACIFIC BASIN (DARPA LEG)

Two holes are planned at the same site. DARPA (Defense Advanced Research Projects Agency) will emplace a borehole seismometer in one of the holes to be drilled into basement. An HIG seismometer, with temperature and tilt recorders, will be deployed in the second hole. Cores will not be taken and logging is not planned for this Leg.

The Navy vessel *De Steiguer* will take part in the experiment.

In response to a question by J. Heirtzler, Y. Lancelot answered that an initial report will be published for Leg 88.

II. LEG 89 – EAST MARIANA BASIN

Ralph Moberly reported that staffing is nearly complete for Leg 89. An exact location is chosen where the site survey data showed a gap in the deep reflectors. Logging is expected to be especially interesting on this leg because of the variety of rock types, including old altered basement and the Jurassic and Cretaceous sequence. Site 462 will be deepened if time permits.

A request by Moberly to spot-core until the Mesozoic led to the following resolution:

In consideration of the deep objectives of hole MZP-6 (Leg 89) PCOM recommends that the co-chief scientists be allowed to spot-core the Cenozoic sequence to the Paleocene, with the option of continuous coring in the upper part of the sequence at a later time, if time permits.

III. LEG 90 – SOUTHWEST PACIFIC

J. Kennett summarized the objective of Leg 90, to obtain a traverse of 9 Neogene sites between equatorial and northern subantarctic water masses in the southwest Pacific. (See Planned *Challenger* Drilling, Leg 90.)

Since the Miami PCOM meeting (23-26 Feb. 1982), all profile data for Leg 90 have been received.

Staffing is still in progress.

Safety Panel is currently reviewing sites.

DSDP will check if any arrangements should be made with New Zealand (some holes are near N.Z. territorial waters).

Logging: J. Kennett informed PCOM that logging is not planned for Leg 90. J. Cann noted that OPP is reluctant to log any holes. E. Winterer noted that logging in young pelagic sequences may not be cost effective. PCOM agreed that logging will not be done on Leg 90, after Kennett informed the Panel that 2 sites would be lost if 2 or 3 holes were to be logged.

IV. LEG 91 – HYDROGEOLOGY

Objective is to study open and closed hydrothermal systems in crust that spread rapidly; the proposed area is between 15° to 20°S west of the East Pacific Rise.

Site survey data are completed and under evaluation.

R. von Herzen (via J. Heirtzler) submitted a memo to PCOM suggesting alternate sites if survey data are inadequate.

PCOM discussion resulted in a decision to go ahead with staffing, etc. on the assumption that the objectives of Leg 91 will not change, even if the site survey data are inadequate. J. Honnorez will instruct the Hydrogeology Working Group to consider alternate sites if necessary.

M. Leinen (URI) has accepted the co-chief scientist position.

Logging is essential to the scientific objectives of Leg 91 and will be performed.

Challenger Atlantic Program

I. LEG 92 – MISSISSIPPI FAN/ORCA BASIN

W. Bryant reported on the status of Leg 92.

Primary objective is to study the 3-dimensional anatomy of a major fan.

Sites will be chosen as soon as site survey data are available; HPC will be used at 10 or 11 sites.

A. Bouma (Gulf) and J. Coleman (LSU) have agreed to be co-chief scientists.

Authorization from the Dept. of the Interior to drill the area should be requested now, before specific sites are chosen.

II. Leg 93 – ENA-3

E. Winterer reported that J. Ewing and others are being considered as co-chief scientists for Leg 93. If J. Ewing accepts, then a sedimentologist/stratigrapher should fill the other position.

Y. Lancelot indicated that timing may be a problem on this Leg, based on 1800-2000 m penetration and anticipated rate of penetration. Leg 93 could be 61 days (Ft. Lauderdale to St. Johns, Newfoundland).

III. Leg 94 Northeast Atlantic

J. Kennett reported on Leg 94.

Objective is to document the response of ocean circulation to changing boundary conditions during the Neogene.

A series of 5 sites has been proposed by OPP in the North Atlantic to study changing surface-water gradients including the highest (up to 12°C) glacial interglacial surface water temperature oscillation. All sites (37°N to 50°N) are east of the Mid Atlantic Ridge.

It is estimated that 55 days (17 transit and 38 drilling) are required.

W. Ruddiman (L-DGO) has accepted the co-chief scientist position; R. Kidd (U.K.) is under consideration. J. Aubouin suggested that H. Chamley (France) be contacted to fill the co-chief scientist position.

R. Moberly suggested that at least 2 holes should be logged.

DSDP Report

I. LEG 85 – EQUATORIAL PACIFIC

5 sites were drilled and a new record in core recovery (2.2 km) was set.

Preservation of laminations in the cores was excellent.

Only problem on Leg 85 was with the core orientation device. The problem resulted partly from the design of the tool, but mainly from its improper rigging by the drilling crew rather than by a responsible technician.

II. LEG 86

Cretaceous/Tertiary boundary was penetrated twice with piston cores.

Co-chief scientists reported that the geotechnical objectives were achieved.

Site NW-3 was not drilled because of lack of time.

Y. Lancelot requested guidance from PCOM regarding the drilling of NW-3.

III. LEGS 87-89

Leg 87A – *Challenger* on site after being blown off site by unexpected weather. The down-hole assembly was lost but the drill string is otherwise intact.

Additional objectives for these legs are:

1) drill NW-3 (not drilled on Leg 86)

2) test fly-in reentry system (18 hrs. required)

PCOM discussion: K. Kobayashi reviewed the importance of NW-3. Leg 87 has a schedule fuller than most legs: Leg 88 has contingency time built into it; Leg 89 unsuitable for NW-3 because of steaming time and interests of scientific party. Consensus: Try to drill NW-3 at end of Leg 88 and do fly-in reentry experiment on Leg 89.

J. Honnorez called for a vote on the priority of using Leg 88 contingency time, if available:

Drilling Hole NW-3 is the first priority and the fly-in reentry experiment is the second priority.

IV. DSDP BUDGET

A budget of $22.4 million has been finalized, allowing DSDP to be funded at approximately the same level as last year.

Shipboard equipment will not be upgraded.

Engineering will be confined to current projects with no new developments except for conceptual projects.

V. LOGGING

The budget allows for a full logging program in FY1983 (Legs 90-95). Discussions with Schlumberger are underway. Lancelot requested a mandate from PCOM to negotiate a flexible and long-term contract with Schlumberger.

Resolutions:

PCOM recommends that Yves Lancelot, Chief Scientist DSDP, negotiate a flexible and long-term contract for logging services with Schlumberger.

PCOM recommends logging priorities on Legs 89-95 according to the following table:

Leg	Objective	Logging Priority
89	Old Pacific paleoenvironment	1st
90	SW Pacific paleoenvironment	2nd
91	Hydrogeology	1st
92	Mississippi Fan	1st
93	ENA-3 (NW Atlantic)	1st
94	NE Atlantic paleoenvironments	2nd?
95	New Jersey Transect (?)	2nd?

VI. PUBLICATIONS

Russ Merrill is now Associate Chief Scientist at DSDP and charged with increasing the publication rate of the Initial Reports volume.

Volumes 64, 65, 67-70 are scheduled to be in press by the end of the fiscal year.

Sedimentary Petrology and Physical Properties (SP^4) manual is a second order priority because of lack of staff at DSDP. An outside publisher is being sought.

VII. ENGINEERING

Y. Lancelot reported on engineering/development tasks relating to FY 1983.

Drill string design: a computer assisted study is underway to determine the location and magnitude of stresses within a drill string under a variety of operating conditions. Programming still to be done for the DARPA leg 88.

A prototype wire-line reentry system will be tested on the *Challenger.* Approximately 18 hours ship time are required. FY 1983 funding level = $20K.

Small diameter heat-flow measurement device of R. von Herzen. The design is being adjusted to improve accuracy. FY 1983 = $20K.

Improved core recovery through controlled circulation for the corer and extended core barrel. FY 1983 = $70K.

Drill bit and core cutter testing and development. Legs 89 and 93. FY1983 = $10K.

Advanced piston corer development.

Operational engineering. FY 1983 = $10K.

VIII. SHIPBOARD ENGINEERING

The shipboard computer will be installed at Yokahama; Leg 89 will be the first leg to use the onboard computer.

The replacement drill string will also be delivered at Yokahama.

IX. DSDP STAFFING

Russ Merrill joined DSDP as Associate Chief Scientist; Audry Wright as Staff Scientist.

Leg 95 Alternatives

J. Honnorez requested that PCOM decide on the drilling site for Leg 95. The Planning Committee should assume that no time will be lost on preceding Legs or while in port. E. Winterer reminded the Panel that *Challenger* must be delivered "clean" to a U.S. port on 9 October 1983, and that approximately 12 days (prior to 9 October) are required to strip the ship.

Four ship track options were considered, shown in Table 2.

Each option was discussed at length. Options A and C-1 were considered unrealistic, mainly because of the lack of time required to meet the drilling objectives.

Discussion of the feasibility of including a N.E. Paleoenvironment Leg (Circumsahara, Morroco Leg) led to the following resolution:

The Planning Committee recommends that the Circumshara (Morroco) transect not be considered as an option for Leg 95; this recommendation is based on considerations of cost-effectiveness and logistics, and not on the scientific merit of the transect.

J. Honnorez called for a vote to decide between options B and C-2. The results were as follows:

For Option B	Vote: 7 for
For Option C-2	Vote: 4 for
Abstain	*0*

E. Winterer suggested that the Leg 95 options should be re-examined at the Next PCOM meeting (October, L-DGO), when more information on Legs 92 and 94 will be available.

AMP, OPP and PMP chairmen will be asked to prioritize the objectives for the relevant Legs, and will be informed of the number of drill days available.

Phase-Down Guidelines for *Challenger* Program

J. Honnorez requested tht Y. Lancelot (Chief Scientist, DSDP) identify major DSDP tasks.

I. PUBLICATION OF *CHALLENGER* RESULTS

Approximately 26-28 months are required to complete Initial Reports volumes after completion of last leg (= April 1986).

Resolution: *Essential to the task of completing the* Challenger *project is to maintain the present level of effort in publishing the Initial Report volumes and other DSDP publications for a period of 30 months after drilling.*

II. DATA BASE

Data processing (encoding, etc.) and dissemination in response to user requests is expected to continue at present level for at least 30 months after drilling, then decrease to a "steady state" level.

Resolution: *Recognizing that data processing and dissemination are long-term tasks and will continue into the indefinite future, PCOM recommends that the present DSDP staff continue these functions for at least 30 months after* Challenger *drilling.*

III. A. CORE CURATING AND SAMPLE DISTRIBUTION

1500-2000 samples/month are curated and distributed.

This level of requests is expected to continue for 2-3 years after drilling.

TABLE 2

LEG	START	DRILL/TRANSIT DAYS	END	PORT DAYS	THEME
OPTION A					
92	Balboa 27 Mar	18/15	Balboa 18 Apr	5	504B
93	Balboa 23 Apr	35/10	Ft. Laud. 7 Jun	5	Mississippi Fan
94	Ft. Laud. 12 Jun	51/9	St. Johns 11 Aug	5	ENA-3
95	St. Johns 16 Aug	36/22	Norfolk 9 Oct		NE Atlantic Paleoenvironment
OPTION B					
92	Balboa 27 Mar	35/10	Ft. Laud. 11 May	5	Mississippi Fan
93	Ft. Laud. 16 May	51/9	St. Johns 15 July	5	ENA-3
94	St. Johns 20 Jul	36/22	New York 12 Sep	5	NE Atlantic Paleoenvironment
95	New York 17 Sep	16/2	Norfolk 9 Oct		New Jersey Transect
OPTION C-1					
94	St. Johns 20 Jul	36/23	San Juan 13 Sep		SE Atlantic Paleoenvironment
95	San Juan 18 Sep	8/9	Ft. Laud. 9 Oct.		Barbados
OPTION C-2					
92	Balboa 27 Mar	12/11	Norfolk 23 Apr	5	Barbados
93	Norfolk 28 Apr	51/7	St. Johns 25 Jun	5	ENA-3
94	St. Johns 30 Jun	36/26	Ft. Laud. 27 Aug	5	NE Atlantic Paleoenvironment
95	Ft. Laud. 1 Sep	35/3	Galveston 9 Oct		Mississippi Fan

Resolution: *While recognizing that the* Challenger *cores will provide an invaluable asset for the indefinite future, PCOM recommends to NSF that curatorial activities continue at the present level for a period of five years beyond drilling.*

B. Distribution of Archive Material

Y. Lancelot informed PCOM that some cores are depleted and archive material is occasionally distributed, after approval from the NSF "Sample Panel."

E. Winterer felt that distribution of archive material should be terminated.

PCOM decided to invite W. Riedel (Curator of cores, DSDP) to the next PCOM meeting for clarification of this matter.

Resolution: *PCOM advised DSDP and the Curator of Cores not to disseminate archive material until a decision regarding this matter is made at the next PCOM meeting.*

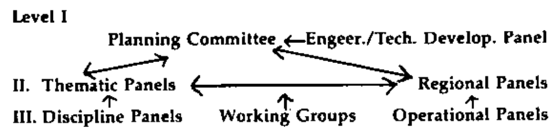
Post 1983 Planning

I. FUTURE ADVISORY STRUCTURE

A. Science Advisory Structure

Committee members discussed at length the present science advisory structure, and a variety of modifications to the present structure. A consensus developed, based on the following and other considerations:

- The present science advisory structure has worked well and changes should be made only if an improvement to the existing structure is to be realized.
- Subject (= thematic) panels and regional panels are both needed. Thematic panels should be permanent, whereas regional panels should be transient, meet with variable frequency, and reflect the region of ship operations.
- An Executive Committee should remain as part of the advisory structure, to maintain a separation between scientific and other (political, etc.) considerations.
- The advisory structure should reflect the 12 main scientific themes as identified in the COSOD document, and must also provide a means of recognizing and addressing science which may not fit into the 12 themes.
- A two-tier science advisory structure is desirable. The diagram illustrated below reflects the general view of PCOM on the future science advisory structure.



Continued discussion of the proposed advisory structure resulted in a decision to appoint a subcommittee of PCOM to refine the above diagram and present PCOM with two or three alternative advisory structures at the next PCOM meeting.

J. Honnorez appointed the subcommittee which consists of the following PCOM members:

H. Beiersdorf
D. Hayes
R. Moberly
E. Winterer
J. Honnorez (Chairman)

B. JOI/JOIDES/NSF/Science Operator Relationship

Evaluation by PCOM of the Executive Committee's endorsement of a management plan which interposes JOI between NSF and the Science Operators (figure p. 27, EXCOM minutes, 21-22 May 1982) resulted in general disagreement with the EXCOM management plan.

J. Aubouin noted that JOI, unlike JOIDES, is a purely U.S. entity. France and other non-U.S. AODP members would be concerned about fair representation under the EXCOM management plan.

PCOM was in general agreement that: JOI was necessary to represent the program in contractual agreement; and that the EXCOM endorsed management plan did not adequately reflect non-U.S. interests.

The following resolutions resulted:

PCOM believes that interposition of JOI between NSF and the science operator, and between JOIDES and the science operator in the overall structure of AODP is inappropriate. Filtering by JOI at this level would, in the view of PCOM, compromise the fully international nature of the project and the efficient flow of advice from scientists to operator.

The Planning Committee views the need to retain scientific control over ship operations as essential. It therefore recommends that whatever future operational structure is established, the ship operations be a subcontract of the scientific operations contract.

TABLE 3

	Location	Weather	Site Survey	Regional Synthesis	Engeer. Tech. Dev.	Panel/Working Groups	Primary Panel
ATLANTIC	Barbados	—	Yes?	Yes	+	AMP-TECT	AMP
	N.W. Africa	—	Report	"	OK	PMP-OPP-TECT-SED-HIST	PMP-OPP
	New Jersey	N. Summer	Yes	"	OK	PMP-HIST-SED	PMP
	Nenez Columbia	—	Yes?	"	OK	PMP-REG.W.G.	PMP
	Norwegian Sea	N. Summer	Yes	"	OK	OPP-PMP-HIST-TECT	OPP
	Mid. Atl. Ridge	?	No	"	+++	OCP-TECT	OCP
	Weddell Sea	S. Summer	?	"	OK	OPP-PMP-HIST-SED	OPP
	Scotia Sea	S. Summer	?	"	OK	OPP-AMP-HIST-TECT-SED?	AMP
PACIFIC	Hole 504B	—	Yes	"	+	OCP-ICP	OCP
	Peru Chile Trench	—	RFP Out.	"	?	AMP-OPP-TECT-SED	AMP
	Japan Sea	N. Summer	No	"	OK	AMP-TECT	AMP
	Bearing Sea/ Gulf of Alaska	N. Summer	No	"	OK	OPP-HIST	OPP
	EPR Crust	—	No	"	+++	OCP-TECT	OCP

C. Engineering/Technology Advisory Structure

During discussion of an engineering and technology advisory structure, the following issues were raised:

- Engineering and development are generally the first to suffer in any budget cuts.
- COSOD objectives cannot be met without engineering and technological developments.
- Development of new engineering and technology must begin soon if the AODP is to begin shipboard operations in 1986.

Resolution: *To ensure the availability of new engineering and technological developments necessary to achieve the scientific objectives of AODP as identified in the COSOD document PCOM designates the establishment of an Engineering and Technological Developments Panel.*

Resolution: *The Planning Committee hereby establishes a Working Group to advise PCOM on membership and guidelines for the newly established Engineering and Technological Developments Panel.*

PCOM recommended that the Working Group consist of the following four persons:

Max Newson
Stan Serocki
Roy Hyndman (Pac. Geoscience Center, CAN)
Alfred Jageler (AMOCO, Tulsa)

C. Hocott and R. von Herzen were mentioned as alternatives.

D. COSOD-Type Advisory Structure

A general consensus exists among PCOM members that a COSOD-type meeting should be held at approximately 3-year intervals, to incorporate the views of the scientific community as a whole into the AODP advisory structure.

II. IMPLEMENTATION OF 8-YEAR PLAN

A. Science Planning

Discussing leading to a tentative and incomplete list of AODP drilling objectives considered the following:

- It is unknown at this time whether the AODP platform will depart from an Atlantic or Pacific port.
- The *Explorer* is unable to traverse the Panama Canal.
- The ship will most likely traverse the world two times within an 8-year period.
- *Explorer* has the capability to remain on site for extended time periods, and has the capacity to accommodate a large (multi-objective?) scientific party.
- Scientific objectives not accomplished during the *Challenger* program will be incorporated into the AODP program.
- Approximately 18 months lead time is required between receipt of a proposal and actual drilling.
- J. Aubouin objected to the selection of potential drilling sites at this time, and prefers that site selection wait the establishment of the new AODP management and advisory structure.

Resolution: *In order to start efficient planning for the post-1983 drilling program, in terms of site surveys, requisite engineering and technical developments, logistics, and weather, the Planning Committee has considered areas and purposes in the Atlantic, Pacific and Antartic Oceans listed in the COSOD report and JOIDES 8-year Program Plan. We recommend to the EXCOM that an initial year or two of drilling include both (A) work in areas for the purposes shown in Table 3, and (B) certain additional regional work not yet identified, so that the areas in Table 3 may be connected by a ship/s track that is reasonable in terms of scientific balance, weather and logistics. Proposal of a specific initial ship track will await advice from participants in future drilling and a decision as to whether the ship will start from an Atlantic or a Pacific port.*

B. Engineering Planning

Y. Lancelot mentioned some engineering developments which relate to the post-1983 program but which require substantial lead time. This discussion among PCOM members resulted in Table 4 and the relevant resolutions:

The Planning committee, having considered proposals for engineering developments related directly to the Challenger *drilling program, moves that the developments be prioritized as follows: (see Table 4).*

The Planning Committee recognizes that in order to ensure the success of drilling with Explorer *certain engineering developments need to be undertaken now and these developments as listed in Table 4. We urge the Executive Committee and the National Science Foundation to fund these developments as soon as possible. We draw the attention of EXCOM and NSF to the deep-sea engineering expertise existant at DSDP.*

TABLE 4

PCOM Priority List for 1983 and Post-1983 Engineering Development

(A) = Highest Priority (C) = Lowest Priority

Subject	1983	Post-1983
Drill string characteristics	A	A
Wire-line reentry	A	A
Heat-flow measurement	A	—
Controlled circulation	A	A
Drill bit and core cutter testing and development	A	—
Hard rock spud	—	A
Advanced piston corer (very long stroke)	C	A
Engineering maintenance	A	—
Cutting shoe instrumentation	—	A
Hi-Temperature drilling (600°C max.?)*	—	A
Stradle packer	—	B
Core orientation	A	—
Directional drilling	—	C
HPC disturbance reduction	A	—
Large diameter drill string	—	A
Slim-line riser/concentric string	—	B
High-speed drilling (improve recovery rate)	—	A
Reverse circulation	—	A
Aseptic core barrel	—	C
Down-hole measurements while drilling	—	C

**Ocean Crust Panel will determine temperature maximum*

C. Site Survey Planning

PCOM requires information on the status of site survey and regional synthesis so that site survey planning can proceed.

D. Hayes (PCOM liaison to the Site Survey Panel) will contact J. Jones (SSP Chairman) regarding status of site survey data. J. Honnorez will then contact D. Hayes in two weeks.

J. Honnorez will ask L. Dorman to remain as chairman of JOI Site Survey Panel until F. Duennebier returns from Leg 85.

Closing Remarks

The next Planning Committee meeting will be held at Lamont-Doherty Geological Observatory, 6-8 October 1982.

DOWNHOLE MEASUREMENTS PANEL

Richard P. von Herzen, Chairman

The Downhole Measurements Panel met 25-26 May 1982 at Lamont-Doherty Geological Observatory. An abridged version of the minutes of that meeting follows.

Review of Measurements over past year.

About half the holes (12 of 23) drilled on Legs 80 through 84 were logged. Some logging equipment (e.g., long-spacing velocity tool) was lost on Leg 84. It was noted that gabbros on Leg 82 and clathrates on Leg 84 gave very clear log responses. Overall, both quantity and quality of logs have improved compared to previous years. It was recognized that PCOM continues to recommend that all deep holes be logged if possible, with some discretion left to co-chief scientists.

The DSDP downhole temperature/water sampling tool was the only other tool used during Legs 79 through 82. On Leg 84, a pressure sensor capability was tested with this tool (results still under evaluation), and over pressures were apparently measured in the formation; the pressure core barrel was also successfully used. An HPC temperature sensor is being tested on Leg 86.

An extensive suite of measurements was on Leg 83 (Site 504B). Temperature measurements showed the continuing drawdown of seawater into this hole, although at a reduced rate (about 25%) from Legs 69/70. A large increase in resistivity coincides with an increased fraction of sheeted dikes with depth. Borehole packer tests indicated a relatively low permeability of about 10^{-4} darcys over the deepest 750 m of this hole, compared with .04 darcys over the upper few hundred m. Cross-correlations of the logs, use of full-wave sonic logs, and detection of shear waves have given useful new information on *in-situ* rock properties. The borehole televiewer gave detailed views of hole ellipticity that may be related to rock structure and/or stress, but fracturing often was obscured by ship's heave.

Review of plans for upcoming year

Legs 85 and 86 will have no logging due to financial constraints and the nature of operations (primarily HPC in sediments). Logging is planned for Leg 87 (Japan margin) and Leg 89 (S. West Pacific), but not on Leg 88 (DARPA, seismic). New contract negotiations with Schlumberger for logging must begin soon, with a higher rate anticipated post-Leg 89. *It was recommended* that a representative of the Panel be involved as an observer in the contract negotiations for logging, now planned after the Leg 86/87 port call. The importance of logging for Leg 91 (hydrogeology) was emphasized.

The DARPA equipment will be similar to that of Leg 78B, and recording will be attempted for 45 days before recovery of the data by another ship. Data from the DARPA experiment will be available to interested investigators, according to the normal DSDP-JOIDES procedures. The HIG seismometer will be deployed in a nearby hole for a similar recording duration. Deployment limitations may result from the lack of a suitable crane to replace the logging cable used during the HIG experiment, so that the HIG instrument may be deployed only after the DARPA operations close to the end of Leg 88.

Long-term developments

Contract arrangements with a logging company in the future, such as testing new tools and facilities in deep-sea drill holes, acquiring tools and/or expertise for an in-house logging program by DSDP, etc. were discussed. A problem with testing new tools is that DSDP holes are considered high risk for logging.

Planning of future measurements of physical properties in coordination with downhole measurements.

The Panel recommends continuing the active liaison with SP4. A draft proposal was introduced from LDGO to develop, coordinate, and analyze future downhole measurements and physical properties. The Panel generally recognizes the need for early development of tools for such measurements, and *encourages* the early funding of such developments for the *Explorer* program. It may be desirable to separate the research and development functions from the coordination of measurements. An improved mechanism for rapid integration of new developments with drilling operations may be needed, based on the *Challenger* experience.

Future legs emphasizing logging and downhole measurements

Beyond the DARPA/seismic experiments on Leg 88, the Panel discussed possibilities of legs or mini-legs on which logging/downhole measurements would be scientifically rewarding. These are listed in order of priorities expressed by the Panel:

1) *Site 504B.* The expectations of results from an oblique seismic experiment in this deep hole, proposed by Stephen, make this a high priority site. Additional borehole packer experiments, and sampling for water chemistry equilibrated with dikes in the deeper part, would enhance the expected return. Approximately 10 days-2 weeks on site would be desirable for these programs, which the *Panel recommends* be done.

2) The possibility for doing more at Sites 417 and 418 in the Atlantic was discussed by Von Herzen and Salisbury. Hole 417D contains a broken bottom hole assembly that might be fished out, and 418 may have a logging cable and tool that could be pushed to the bottom of the hole. Additional logging and downhole measurements would be useful over the basement rock sections of these sites on relatively old crust (~110My). *The Panel recommends* that the accessibility of these holes be determined with a few days of *Challenger* time during an early Atlantic leg, to determine the possibility for such measurements.

3) Additional logging and packer permeability experiments would be useful at site 395A.

For future standard logging, *the Panel recommended* the priorities according to the following tables:

Leg Objective	Logging Priority	Comments
Old Pacific paleoenvironment	1	Deep hole
SW Pacific paleoenvironment	2	Mainly HPC
Hydrogeology	1	At least 1 deep basement penetration
Mississippi fan	2	Only 1 deep hole?
ENA-3 (NW Atlantic)	1	Deep hole, good seismic stratigraphy
NE Atlantic paeleoenvironments	2	Mainly HPC
Morrocco	2(?)	Desirable to log 547B
New Jersey transect	1	cf. physical props./ stratigraphy
Caribbean (Barbados)	1	Subduction margin

New Technology and Instrumentation Developments

1) A new temperature recorder for the hydraulic piston core has recently been constructed and is being tested on Leg 86. It is contained within a small pressurized space in a specially-constructed cutting shoe, and could also be used to record other parameters downhole.

2) The JOI-sponsored Logging-While-Drilling (LWD) workshop, which some Panel members attended, was discussed. It was noted that: a) to date it has mainly been a relatively expensive industry development to improve drilling efficiency (e.g. pore pressure measureents), and to monitor for blowout hazards in real time, (b) the data transmission rate is relatively low (e.g., mud pulses), (c) limited types of tools are used, (d) present systems do not permit coring.

Recognizing the high costs of drilling and the relatively slow penetration rates because of the coring requirement or basement rock drilling, the Panel feels that LWD on an Advanced Ocean Drilling Program (e.g., *Explorer*) could be very cost effective. Every hole could be logged for at least some parameters with no additional ship time. *The Panel recommends* that a serious effort be made to develop LWD in advance of such a program.

3) The need for logging and downhole measurements in high temperature environments was discussed. The normal maximum temperature is 180°C, and many tools for 260°C have been developed, although their reliability under field conditions may need improvement. The Panel believes that there is a strong demand from industry for high temperature capabilities in deep holes and geothermal settings, and that we should be prepared to adapt and use such tools as they become available, but should probably not attempt a separate development of such capabilities.

4) Additional capabilities for geotechnical and permeability measurements should continue to be encouraged. *In-situ* permeability in sediments may be obtainable from the DSDP temperature/pressure/pore water sampler tool, and some capability should be developed to mea-

sure permeability on cores (e.g., falling-head tests) for comparison.

5) *Wireline re-entry of holes* was discussed at some length, as several proponents of this development were present. Duennebier indicated that computer simulation of a typical system showed overdamping, with response time of about 5 min. at the end of the wire to a lateral vessel displacement. Salisbury discussed a new DSDP azimuth re-entry tool to be tried with wireline re-entry probably on Leg 87, although only limited time is available. *The Panel supports* this test. Renard described a test design under construction in France, which incorporates a small winch and electronics unit emplaced in the re-entry cone. Stephen discussed a re-entry design which has been proposed but not funded by NSF.

The questions of ownership and coordinated use of existing holes for re-entry are still outstanding. The Planning and Executive Committees *are urged* to resolve these issues, even on an interim basis, as soon as possible. *The Panel considers* the development of wireline re-entry capability to be high priority, especially for a scientific program during any drilling hiatus.

ORGANIC GEOCHEMISTRY PANEL

Bernd R.T. Simoneit, Chairman

The Organic Geochemistry Panel last met 28-30 April 1982 at Timberline Lodge, Government Camp, Oregon.

Sample Distribution:

The requests for samples from Legs 72-82 have been declining and also the U.S. participation has been decreasing in relation to the international contingent.

Sampling for Legs 81 and 82 is in progress and Leg 83 is in preparation.

Frozen Sample Inventory:

Ample inventory is available. Some individual requests are also being filled for inorganic-organic analyses. A minor fire occurred on March 17, 1982 in the frozen core locker at SIO repository. The fire extinguishing chemical ($NH_4H_2PO_4$) should not present a contamination problem for organic geochemistry. Our thanks to W. Mills for keeping us informed.

OGP reiterates the need to maintain the OG samples in a frozen state in order not to compromise the content of labile (unstable) organic compounds.

The *OGP recommends* that another effort should be made to stimulate shore based research on the frozen OG collection. After extensive discussion it was decided to prepare a one page announcement to serve as a hand-out at meetings and to be published in EOS and possibly other news journals. G. Erdman offered to review it for good PR prose.

Simoneit will maintain an inventory list with allied background information and will interact with potential investigators.

Response to 75-532 sampling: Received four written requests and three verbal. Proposed studies include:

R. Oremland – methanogenic bacterial activity vs. depth.

R. Morris – organic geochemistry (lipids, humic acids, also mineralogy).

P. Meyers – geolipid chemistry (light/dark zones).

E. Suess – dolomitization in organic rich sediments.

Verbal

S. Brassell/G. Eglinton – ketones and other lipid indicators (light/dark zones).

E. Degens – C/N, amino acids, sugars and phenols (terrig. vs. marine).

K. Peters – Rock-Eval pyrolysis for petroleum generating potential.

Sampling 75-532: Meyers and Simoneit are setting up a sampling protocol and matrix for the first round of studies. The investigators will be encouraged to submit a paper on the results within one year to be considered for collective publication in a reviewed journal. The Initial Report Vol. 75 and these subsequent papers should then stimulate further scientific interest.

Return of unused frozen OG samples: *OGP recommends* that frozen OG samples may be returned to the repository by investigators if they cannot schedule their analysis. The curator should return them to the OG frozen collection in the bags and reinventory them as daughter samples for future allocation.

Shipboard OG Guide/Handbook: Final version edited by Meyers, Kvenvolden and Simoneit, typed, printed and distributed to DSDP, OGP and JOIDES Office. OGP approved and thanks all contributors. Simoneit will distribute a copy to each participating organic geochemist onboard for Legs 89-95.

***Glomar Challenger* laboratory upgrade:** a) Capillary gas chromatography – for future drilling in hydrothermal or catagenetic zones the GC resolution should be improved. Capillary GC can be utilized to resolve olefinic hydrocarbons and also analyze other ephemeral gases (eg. H_2S, CO_2). Meyers, Whelan and Simoneit will evaluate such a system, eg. can the Hewlett-Packard GC onboard be converted to capillary mode on one channel and keep the present packed column system on the other? If the conversion can be made without jeopardizing routine gas monitoring, the subcommittee will make recommendations.

b) Gas stripping apparatus–Degens will inquire whether the KFA (Julich) group could contribute such a system to the *Glomar Challenger.*

c) HP-1000 computer system–Simoneit will continue to interact with DSDP (Woodbury and Birtley) to implement the automated system. The UCLA program does not integrate and is not satisfactory for DSDP purposes. Donation of a program from another source should be pursued further, as well as the in house effort.

Interlaboratory checks: Various discrepancies among data from various laboratories became evident during Leg 64 and this problem was discussed. In view of the impending drilling hiatus no official recommendations were made, as it was assumed that most of the discrepancies would be addressed by the investigators involved.

NSF funding of shore-based research: NSF has no designated fund for shore-based DSDP research; non-routine research not for the Initial Reports of DSDP is funded after peer review and competition with all other non DSDP research. Such proposals should be addressed to NSF Marine Geology or Chemistry.

Degens commented that the West German Research Council sets aside the equivalent funds spent for drilling ($1,000,000) to cover research proposals (2-3 year periods) dealing with the DSDP sample collection. This ensures that adequate research is carried out on these unique and costly samples.

Glomar Explorer will tackle problem oriented drilling and not survey drilling. A group of experts will collaborate throughout a project to the final report stage and it is envisaged to have block funding for that research.

Staffing for future legs: Based on the drilling schedules issued at the PCOM meeting (Feb. 82) the *OGP recommends* the following candidates as shipboard organic geochemists:

Leg 89	Edward S. VanVleet	Univ. South Florida
Leg 90	Martin Wiesner	Univ. Hamburg, Ger.
Leg 91	Veto Ittekkot	Univ. Hamburg, Ger.
Leg 92	Rainer G. Schaefer	KFA, Julich, Ger.
	and Martha E. Tarafa	WHOI, Woods Hole, MA
Leg 93	Robert Cunningham, Jr.	Exxon, USA
Leg 94	Philip A. Meyers	Univ. Michigan
Leg 95	open	

The dossiers of these candidates are being forwarded to DSDP (Y. Lancelot) as they are received by the panel.

New candidates: The following have expressed interest to participate as organic geochemists onboard: R. P. Philp, CSIRO, Australia; E. A. Romankevich, S. V. Liutsarev, V.A. Konov, Inst. Oceanology, USSR Acad. Sciences, Moscow; M. V. Ivanov and M. B. Weinstein, Inst. Biochem. and Physiol., USSR Acad. Sciences, Pushchino; E. M. Galimov, Inst. Geochem. and Anal. Chem., USSR Acad. Sciences, Moscow.

Reports of liaison members to other panels: Summerhayes for OPP, urged further HPC to be frozen for OG and organic geochemist participation on Legs 89 and 90. Kvenvolden for AMP, found this liaison to be a poor interface, especially with regards to gas hydrates which KK will pursue as proponent. Hunt for PMP, attended some interesting meetings, but OG had no influence on site selection, thus not a beneficial liaison. Simoneit for PCOM, presented brief summary of drilling schedules with options, proposal strategies and COSOD results. *OGP recommends* liaison to AMP and PMP be dropped and liaison with OPP, IGP and PPSP be encouraged.

Progress reports: a) The following organic geochemists participated onboard: Leg 71 – H. von der Dick; Leg 75–S. Brassel, A.Y. Huc, P.A. Meyers; Leg 76–L. A. Barnard, E. M. Keenan, K. A. Kvenvolden, J. W. Patton; Leg 77–L. B. Magoon, III, J. W. Patton; Leg 78–G. E. Claypool; Leg 79–J. Rulikotter, V. T. Vuchev; Leg 80–R. Cunningham, Jr., D. Waples; Leg 81 – A. J. Kaltenback; Leg 84 – K. A. Kvenvolden, T. MacDonald; and Leg 85 – T. Handyside. The panel extends its thanks and appreciation.

b) Leg 75–Meyers and Brassell: Lithology of Sites 530 and 532 many turbidites with alternating sequences of black/light periodic anoxic events changing gradually or with sharp boundaries. Organic matter in rich zones is about half of terrigenous and half of marine origin (good plant wax signature). Site 530 has high TOC to 230 m subbottom, representing the development of the present upwelling. During the Cretaceous the organic matter is more marine (type I-II kerogen), with paleodepth of 2300 m (no $CaCO_3$).

c) Leg 76 and 84–Kvenvolden: Presence of gas hydrates was demonstrated. The bottom simulating reflector (BSR) is a physical reflector at the base of a gas hydrate, however, not all BSR are hydrates. BSR cut across bedding reflectors. Best hydrates recovered at 84-570-27, where the CH_4/H_2O = 133:1 (pure hydrate is 170:1) for about 3-4 m. The ^{13}C of the CH_4 versus CO_2 is 60°/oo, indicating the CH_4 is derived from CO_2. Hydrate water salinity approaches 0°/oo, and the salinity decreases in interstitial water on approaching a hydrate zone. The density log is low in a hydrate zone. The major questions to be addressed in future drilling are: What goes on below the BSR? Is there extensive thermogenic gas? This could possibly be addressed on Leg 95 with Kvenvolden as proponent.

d) Leg 76 – Summerhayes: Blake Bahama Site 534 has high TOC throughout Cretaceous and not in narrow anoxic events. Black shales were "concentrated" by carbonate removal during sedimentation below the CCD.

e) Leg 77 – Summerhayes; gulf of Mexico Sites 539 and 540 contain marine organic matter, reflecting higher productivity than in the Atlantic and also sea-level fluctuations.

Publications: Symposium (1977) volume, Baker, ed., was to be published in Organic Geochemistry – no progress. Baker and Louda (1980) Organic Geochemistry: Highlights in the Deep Sea Drilling Project, in *Advances in Organic Geochemistry 1979*, A. Douglas and J. Maxwell, eds., Pergamon Press, Oxford, pp. 295-319. Kvenvolden (1981) Organic Geochemistry in the Deep Sea Drilling Project, SEPM Special Publication No. 32, pp. 228-249. Simoneit, Meyers and Summerhayes (1981) Synthesis of organic geochemical results from DSDP Leg 63, in Yeats, Haq, *et. al., Init. Repts. of DSDP*, Vol. 63, pp. 943-948. Simoneit, Summerhayes and Meyers (1982) Synthesis of organic geochemical results from DSDP Leg 64, in Curray, Moore, *et al., Init. Repts. of DSDP*, Vol. 64, in press. Syntheses for DSDP Legs 71, 76 and 77 are planned.

The panel or some of its members propose to write overview reviews of major geological problem areas where organic geochemistry has made contributions (eg., Cretaceous black shales, Black sea, terrestrial influence on hemipelagic sedimentary organic matter, etc.) during the possible post-1983 drilling hiatus.

Miscellaneous Points: Still need oldest black shales (eg. Leg 50) for paleoenvironmental analyses on the organic matter in such oceanic sediments.

Organic/inorganic interactions in black shale and hydrothermal systems as first examined in the Red Sea, i.e. the hydrothermal mobilization of metals after preconcentration in sedimentary basins by organic detritus. Other areas that should be considered are the Gulf of Aden (NE Indian Ocean) and the Gulf of California (these have high primary productivity, TOC and metals with concommittant high heat flow and basin formation).

Systematic HPC examination of the Quaternary-Miocene in order to couple climatology, organic matter degradation and upswelling. *OGP recommends* such a plan for Leg 95 as given in "Rationale for Leg 95".

Extinction events (eg. Cretaceous/Tertiary boundary) should have an organic matter signature. For example the light energy response of biota should be disrupted by the event and eventually return to normal, but this disruption should leave a different pigment signature behind in the sediments. Such boundaries should be amply sampled for detailed organic detritus analysis.

Hydrothermal alteration of organic matter is being studied in the Gulf of California (Guaymas Basin). The pyrolysis products generated at depth (cf. Leg 64) are brought to the seabed by diffusion through the sediments and by hydrothermal fluid circulation along faults. More work is needed on this process there and elsewhere.

Panel membership: Dr. J. Gordon Erdman resigned from the OGP after many years of service, the panel extends its sincere gratitude and best wishes. OGP also wishes to again thank Dr. K. Kvenvolden for his service as chairman and Drs. G. Eglinton, B. Tissot and D. Welte for their contributions as panel members. *OGP recommends* the next panel meeting to be held April/May 1983 in La Jolla, CA.

Rationale for Leg 95

Introduction

With the advent of HPC device it has been possible to obtain undisturbed Neogene sediment sections of the upper 200-300 m. It has been successfully used to study paleoenvironmental problems for instance on Leg 75 (Angola Basin) and Leg 64 (Guaymas Basin). In addition, it is currently being applied for Neogene paleoenvironmental reconstruction of the Pacific Ocean (Leg 85, 86, 90).

We propose to use the HPC to extend these Neogene studies to the continental margin of NW Africa (Leg 95). Previous investigations in that area by DSDP provide only an incomplete record of Neogene events in a region where we anticipate pronounced fluctuations in productivity as a response to the development of upwelling currents, which in turn are related to paleoclimatic events in the Mid-to Late Miocene (e.g. onset of extensive Antarctic glaciation

Table 1. Major questions of organic geochemistry in relation to DSDP/IPOD and to geographic areas of interest.

Topics and Areas[1]	DSDP/IPOD Leg[2]
1) Thermal history of basins and active hydrothermal systems:	
a) Hydrothermal effects on organic matter – East Pacific Rise versus Guaymas Basin, also Costa Rica Rift	83,84,91
b) Pacific basins – Japan Trench, Nauru Basin, Bering Sea	87,88
c) Metal-organic interactions (Arabian Sea, Gulf of California, Red Sea)	—
2) Organic Facies:	
I) Production of organic matter in divergent zones:	
a) Pacific – equatorial transect	85
b) Antarctic – circumpolar current, resultant productivity, erosion and redeposition (high latitude drilling)	—
c) Bering Sea – N. latitude basin (high latitude drilling)	87
II) Oxygen minima on continental margins and associated upwelling:	
a) Western North America (eg., off California)	—
b) South America (eg., off Peru)	—
c) Monsoonal changes (productivity) (Arabian Sea and Somalia current)	—
III) Lower organic matter sediments:	
a) Organic geochemistry of carbonate reef complexes (Atlantic versus Pacific and Indian Oceans)	—
b) Abyssal red clays	86
3) Geological events:	
I) Black shales:	
a) Jurassic (possibly older?) – N. Atlantic Ocean	92, 94, 95
b) Recent to lower Tertiary couple with HPC where possible – California Borderland, Mediterranean, Black Sea, Cariaco Trench, Gulf of California Basins, Orca and Pigmy Basins, Sea of Marmara	—
c) Cretaceous (especially mid-Cretaceous) – Western North and South Atlantic Ocean, Indian Ocean, Pacific Ocean (eg., Shatsky, Hess, Lord Howe Rises, Manihiki Plateau, etc.)	89, 90, 92, 94, 95
II) "Catastrophies" and peculiar events (eg. Cretaceous/Tertiary boundary)	—
4) Gas hydrates:	
a) Regional distribution	—
b) Stability	—
5) The terrestrial component – Fans and eolian deposition:	
a) River influx of terrestrial detritus to deltas and fans – Astoria (temperate conifer vegetation), Mississippi fan (temperate vegetation), Amazon, Niger and Mahakam (all tropical vegetation)	87, 92
b) Eolian Fallout – from Africa in NE Atlantic, from SW America in mid-eastern Pacific	85
c) Continental margin – rise transect to examine terrestrial runoff (between fan systems)	—

[1]Listed in order of long-range importance (1 = highest).

[2]DSDP/IPOD 1981-1983 program will provide some preliminary samples on legs indicated.

about 15 million years ago), as well as during the past 3 million years (closing of the Atlantic from the Pacific and bipolar glaciation).

Objectives

(1) Timing the beginning of upswelling and associated high productivity in relation to similar events recognized off SW Africa (Leg 75) and off California (Leg 63);

(2) Fluctuations in productivity caused by climatic change over the past 10-15 million years;

(3) Influx of terrigenous organic and inorganic material in relation to arid vs. humid climatic conditions in the hinterland (with special reference to the record of desertification and top soil erosion);

(4) Interpretation of Neogene studies with previous geologic information of the area to refine our understanding of paleoenvironmental signals;

(5) Outline the extent of ongoing microbial activities with depth and study its effect on the organic matter present;

(6) Taking a latitudinal transect from Cape Verde and Cape Blanc Areas (where upswelling is at present very intense) north to the Moroccan Coast (where climate is currently humid and upwelling is less intense). In the past, the Moroccan region may have been more productive as evidenced by large scale phosphorite deposition on the shelf and upper continental slope, which would imply major geographic shifts in the centers of upwelling with time.

(7) The area under consideration lends itself to multidisciplinary studies by sedimentologists (dust storms; fans; top soil, turbidites), organic geochemists, (marine vs. terrestrial organic matter supply, microbial diagenesis; paleoproductivity), inorganic geochemists (history of phosphorite deposition; mineral facies; metal-organic interactions), biostratigraphers (paleoenvironment as recognized through benthic and surface dwelling organisms), and isotope geochemists (examination of stable isotope fluctuations detailing water temperature, history and documentation of ^{13}C isotope shifts).

In short, a multifacetted program on biological productivity, paleoclimatology, paleocirculation and diagenesis is defined. No shortage of potential applicants is envisioned in view of the excellent pre-site surveys carried out in the past decade, in particular by France (Orgon expedition), Germany (Meteor expeditions), Great Britain (phosphorite investigations) and the USA (CUEA upwelling experiment).

Recipients of DSDP Samples and Data

Remember to send five reprints of any paper you have published using data or samples collected by or in conjunction with the Deep Sea Drilling Project to the DSDP Curator.

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Major- and Minor-Element Analyses

Major- and Minor-Element Analyses for igneous rocks are now available as listings or for computer searches. Both shipboard and shore laboratory data are included for DSDP Legs 13-62 and Legs 63-65. For information contact:

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Now Available
Geological map of the Indian Ocean

The Geologic Map of the Indian Ocean was produced by B. C. Heezen, R. P. Lynde, Jr., and D. J. Fornari to accompany the book, *Indian Ocean Geology and Biostratigraphy* (1977). The colored map shows the location of DSDP sites along with:

- a generalized stratigraphic column for each site
- age of oceanic basement
- bathymetry
- fracture and earthquake zones
- biostratigraphy
- magnetic stratigraphy

DSDP has a limited number of these maps available at no cost. Contact:

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