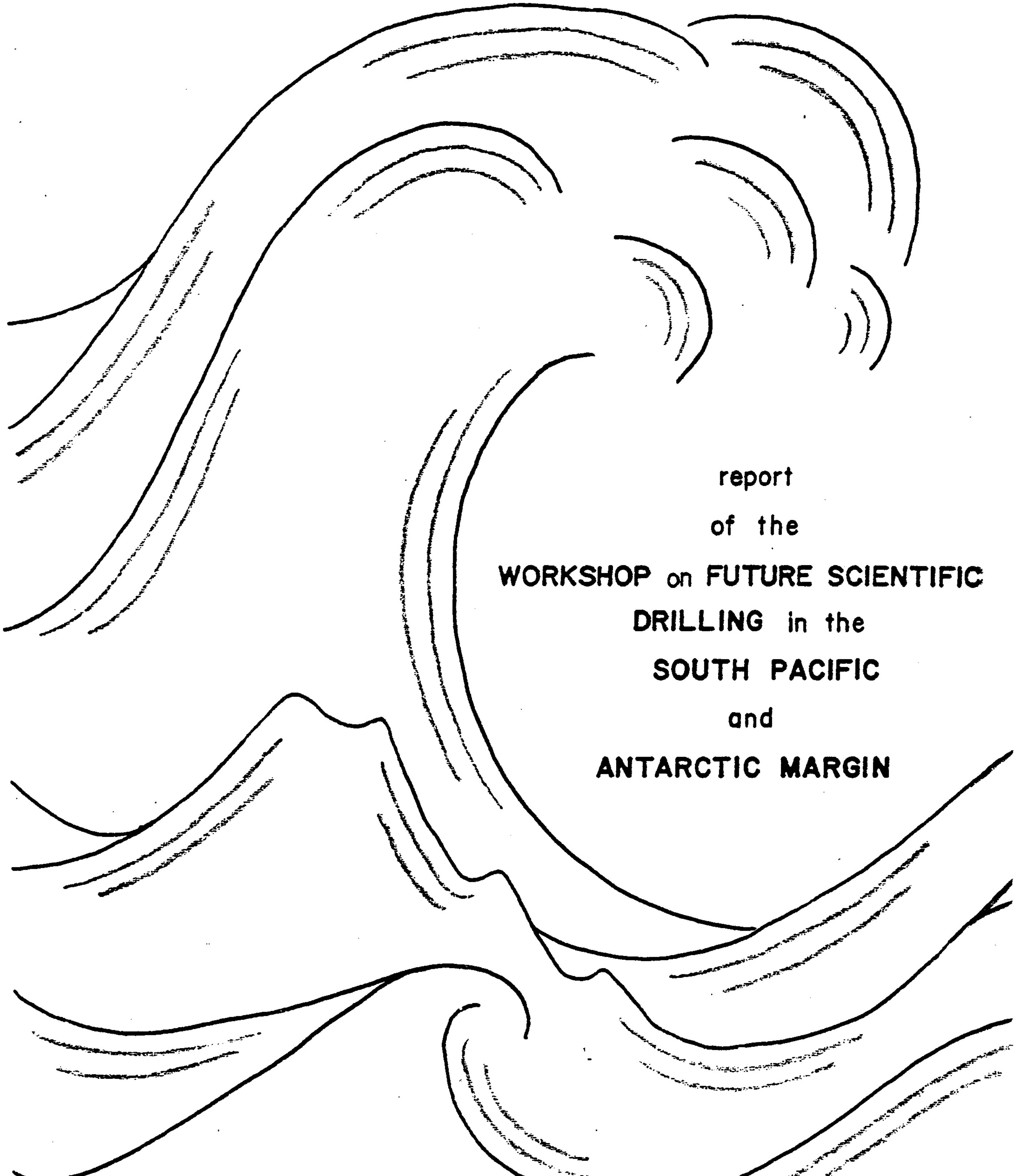
APRIL 20-22, 1986

UNIVERSITY OF FLORIDA

GAINESVILLE, FL



report

of the

WORKSHOP on FUTURE SCIENTIFIC DRILLING in the SOUTH PACIFIC and ANTARCTIC MARGIN

Sponsored by:

JOINT OCEANOGRAPHIC INSTITUTIONS, INC.

TABLE OF CONTENTS

F. Hotspots, Seamounts, and Ocean Islands
   1. French Polynesian Hotspots (AIC-1 through AIC-3)
   2. French Polynesian Volcanic Lineaments (MI-1 through MI-3, T-1, NT-1, NT-2)
   3. Louisville Ridge (LR-1 through LR-3)

G. Fracture Zones
   1. Eltanin Fracture Zone
   2. Sala y Gomez Ridge (SG-1 through SG-3)

H. Ridge Axis
   1. Small Scale Geoid Height Anomalies (GHA-1)

I. Plate Tectonic History
   1. Old Pacific Crust in the SW Pacific (OP-1, OP-2)

III. SEDIMENTS AND OCEAN HISTORY WORKING GROUP

A. Major Scientific Themes for Future Drilling in the SE Indian Ocean, South Pacific, and Antarctic Margin

B. Drilling Proposals
   1. Western Ross Sea (WRS-1 through WRS-7)
   2. Continental Rise West of Graham Land, Antarctic Peninsula (AP-1, AP-2)
   3. Pacific-Antarctic Continental Margin (BS-1, BS-2, BS-3)
   4. Antarctic Peninsula, Pacific Margin (AP-3, AP-4, see II-D, 6)
   5. Amundsen Sea Shelf (AS-1)
   6. Neogene Paleoceanography and Biostratigraphy
   7. East Pacific Rise Transect (EPRT-1 through EPRT-4)
   8. Cretaceous/Tertiary - East Pacific Rise Transect (KTEPRT)
   9. Hydrothermal Processes
   10. Rate Limiting Processes in Reef Growth: Oceanic Islands
   11. Bransfield Strait (BR-1)

IV. PREVIOUSLY SUBMITTED PROPOSALS FOR THE SOUTHEASTERN INDIAN OCEAN, SOUTH PACIFIC, AND ANTARCTIC MARGIN

A. Site Proposals from the Bureau of Mineral Resources and Australian Universities (Crook, Falvy, and Peckham, eds., 1984)
   1. Lord Howe Rise (LHR-1, LHR-2)
   2. Queensland Plateau Margin (QP-1A, QP-2A)
   3. Northern Queensland Trough (QT-1A)
   4. Western Coral Sea Basin (CSB-1, CSB-2)
   5. Tasman Basin (TB-1)
   6. Goodenough Basin (GB-1)
   7. Western Solomon Sea Basin (WSS-1 through WSS-4)
   8. Rennell Island Ridge and Basin (RIR-1, RIR-2)
   9. Western New Britain Trench (NBT-1 through NBT-5)
   10. Western Tasman Sea (TS-1, TS-2, TS-3)
   11. Central Great Barrier Reef Slope (GBR-1 through GBR-5)

12. Australian-Antarctic Discordance (AAD-1 through AAD-3)
13. Diamantina Zone, Australian-Antarctic Depression (AAD-4)
14. Cenduna Plateau (AAD-5, AAD-6)

B. Other previously submitted proposals for the Southeastern Indian Ocean, South Pacific, and Antarctic Margin

1. Adelie Land Margin (AM-1, AM-2, AM-3)
2. Axial Bounty Trough (A-1, B-1)
3. Southeast Pacific (SEP-1, SEP-2, SEP-3)
4. South Tasman Rise (STR-1, STR-2, STR-3)
5. Otway Basin (OT-1 through OT-4)
6. Indispensable Basin (IB-1,IB-2)
7. Mborokua Basin (MB-1)
8. Buka Basin (BB-1 through BB-3)
9. Shortland Basin (SB-1, SB-2)
10. Southern New Hebrides Arc (BAT-1 through BAT-5)
11. Central New Hebrides Arc (IAB-1 through IAB-3, DEZ-1 through DEZ-6)
12. Mussau Trench (MuT-1)
13. Manus Trench (MaT-2A, MaT-2B)
14. Mussau Island Arc (MIA-1)
15. Manus Forearc (MF-2, MF-1C)
16. Wilkes Land Margin (WL-1 through WL-3)

REPORT OF THE JOINT OCEANOGRAPHIC INSTITUTIONS, INC. SPONSORED WORKSHOP ON FUTURE SCIENTIFIC DRILLING IN THE SOUTH PACIFIC AND ANTARCTIC MARGIN

I. INTRODUCTION.

A. Introductory Statement.

No major region of the world ocean has been so sparsely drilled as the South Pacific. Previous drilling in the South Pacific, including the Antarctic margin, by the DSDP-IPOD program was confined to the low latitudes, western margins, and southeastern margin near the Antarctic Peninsula. Due to the remoteness of much of the South Pacific, our knowledge of its sedimentary history, paleoceanography, and lithospheric characteristics in vast regions is based solely on a sparse record from piston cores and rock dredges. Additional ocean drilling in the South Pacific is needed if an adequate global representation of drill sites is to be obtained for evaluation of temporal changes in global characteristics and dynamics of climatic, oceanographic, sedimentologic, tectonic, and lithospheric systems.

B. Background of the Workshop.

To provide the U.S. scientific community with an opportunity to express their interest in future drilling in the South Pacific, a workshop was funded by the Joint Oceanographic Institutions, Inc. under contract JPO 9-86 to P. F. Ciesielski. An announcement of the workshop was published in Geotimes, and Nature, and advertised through a mass mailing to approximately 200 individuals to encourage participation. The workshop was held at the University of Florida on April 20, 21, and 22, 1986. A list of participants is provided in Table 1.

The purpose of this workshop was to bring together a diverse group of geophysicists and geologists to collect, discuss, and synthesize ideas and proposals for future drilling in the South Pacific region. This report discusses major scientific problems which may be addressed by future drilling in the South Pacific region and presents specific drilling proposals related to these scientific themes. The contents of this report reflect the contributions made by those scientists participating in the workshop or those who submitted proposals to the workshop. The report makes no pretense that the scientific themes and site proposals presented herein cover all possible problems which may be addressed by South Pacific drilling.

C. Organization of the Report.

The contributions of this report largely represent scientific objectives and site proposals for the South Pacific, including the Antarctic margin. We have included, however, proposals for the Southeast Indian Ocean region south of Australia because: 1) present drilling plans in the Indian Ocean are outside this region, 2) there are fundamental scientific problems in this region which are of critical importance to South Pacific objectives, and 3) evaluation of the potential drilling objectives of the area is essential to logistical planning of the of the route of exit of the JOIDES Resolution from the Indian Ocean.

Participants of the workshop divided into two thematic groups to discuss potential South Pacific drilling objectives and to develope site proposals. Section II of the report presents the results of the Lithosphere/Tectonics Working Group. Preceeding the site proposals of this section is an overview of tectonic and lithosphere problems. The results of the Sediment and Ocean History Working Group are presented in Section III. This section is divided into two parts, the first being a discussion of major scientific themes which may be addressed in the South Pacific region, and the second comprising site proposals for specific or general areas.

Section IV includes other site proposals for the SE Indian Ocean and South Pacific which were written or submitted prior to the workshop. Many of these proposals have already been formally submitted and have been, or are being, reviewed by ODP panels. Some of these proposals are currently being revised or updated for resubmission. We include them here to provide in this single volume a fairly comprehensive compendium of site proposals for this region to assist ODP thematic and regional panels and others in developing future drilling plans.

Many of the proposed sites in this report have multiple objectives which are of interest to two or more of the ODP thematic panels. Table 2 provides a handy reference for the major thematic scientific objectives of each proposed site. Maps following this table illustrate the locations of these sites.

Paul F. Ciesielski
Convener

Antarc- [illegible]
South [illegible]
and Antarctic
Margin Workshop

TABLE 1

WORKSHOP PARTICIPANTS

South Pacific and Antarctic Margin Workshop
April 20-22, 1986
University Centre Hotel, Gainesville, FL

1. Dr. John B. Anderson
   Department of Geology and Geophysics
   Rice University
   P.O. Box 1892
   Houston, Texas 77251

2. Dr. Peter F. Barker
   Department of Geological Sciences
   University of Birmingham
   Birmingham, B15 2TT
   England

3. Dr. Brian D. Bornhold
   Pacific Geoscience Centre
   Institute of Ocean Sciences
   P.O. Box 6000
   Sidney, British Columbia VBL 4B2
   Canada

4. Dr. Lloyd Burckle
   Lamont-Doherty Geological Observatory
   Palisades, New York 10964

5. Dr. Steven Cande
   Lamont-Doherty Geological Observatory
   Palisades, New York 10964

6. Dr. James E. T. Channell
   Department of Geology
   University of Florida
   Gainesville, Florida 32611

7. Dr. Paul F. Ciesielski
   Department of Geology
   University of Florida
   Gainesville, Florida 32611

8. Dr. Brent Constantz
   Earth Sciences Board
   University of California, Santa Cruz
   Santa Cruz, California 95064

9. Dr. William Coulbourn
   Hawaii Institute of Geophysics
   University of Hawaii at Manoa
   2525 Correa Road
   Honolulu, Hawaii 96822

10. Dr. Kathleen Crane
Lamont-Doherty Geological Observatory
Palisades, New York 10964

11. Dr. Ian W. D. Dalziel
Institute for Geophysics
University of Texas at Austin
4920 IH 35 North
Austin, Texas 78751

12. Dr. Henry Dick
Department of Geology and Geophysics
Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543

13. Dr. Dean Dunn
Department of Geology
University of Southern Mississippi
Southern Station Box 5044
Hattiesburg, Mississippi 39406-5044

14. Dr. Stephen Eittreim
U. S. Geological Survey M.S. 999
345 Middlefield Road
Menlo Park, California 94025

15. Dr. David Elliot
Institute for Polar Studies
103 Mendenhall
Ohio State University
Columbus, Ohio 43210

16. Dr. David Epp
Office of Naval Research
ONR Detachment, Code 425GG
NSTL, Mississippi 39529

17. Dr. Robert Goll
Geoscience Department
Continental Shelf Institute - SINTEF
Haakon Magnussongt. 1B
P.O. Box 4883
N-7001 Trondheim,
Norway

18. Dr. D. Graham Jenkins
Department of Earth Sciences
Open University
Milton Keynes MK7 6AA
England

19. Dr. Thomas Kellogg
Institute for Quaternary Studies
University of Maine
Orono, Maine 04469

20. Dr. James Kennett
    Graduate School of Oceanography
    University of Rhode Island
    Narragansett Bay Campus
    Kingston, Rhode Island 02881

21. Dr. Dennis Kent
    Lamont-Doherty Geological Observatory
    Palisades, New York 10964

22. Dr. Loren W. Kroenke
    Hawaii Institute of Geophysics
    University of Hawaii at Manoa
    2525 Correa Road
    Honolulu, Hawaii 96822

23. Dr. Yves Lancelot
    Dept. de Geologie Dynamique
    Universite Pierre et Marie Curie
    5, Place Jussieu
    75230 Paris Cedex 05
    France

24. Dr. Hsin Yi Ling
    Department of Geology
    Northern Illinois University
    DeKalb, Illinois 60115

25. Dr. Peter Lonsdale
    Scripps Institution of Oceanography
    La Jolla, California 92093

26. Dr. Mitchell Lyle
    College of Oceanography
    Oregon State University
    Corvallis, Oregon 97331

27. Dr. Stanley Margolis
    Department of Geology
    University of California, Davis
    Davis, California 95616

28. Dr. Jacqueline Mammerickx
    Geological Research Division A-020
    Scripps Institution of Oceanography
    La Jolla, California 92093

29. Dr. Michael Marlow
    U. S. Geological Survey M.S. 999
    345 Middlefield Road
    Menlo Park, California 94025

30. Dr. Judith McKenzie
    Department of Geology
    University of Florida
    Gainesville, Florida 32611

31. Dr. Ralph Moberly
    Hawaii Institute of Geophysics
    University of Hawaii at Manoa
    2525 Correa Road
    Honolulu, Hawaii 96822

32. Dr. Samuel Mukasa
    Department of Geology
    University of Florida
    Gainesville, Florida 32611

33. Mr. David Naar
    Geological Research Division A-020
    Scripps Institution of Oceanography
    La Jolla, California 92093

34. Dr. Emile A. Okal
    Department of Geological Sciences
    Northwestern University
    Evanston, Illinois 60201

35. Dr. Neil Opdyke
    Department of Geology
    University of Florida
    Gainesville, Florida 32611

36. Dr. Robert Owen
    University of Michigan
    2455 Hayward Drive
    Ann Arbor, Michigan 48109

37. Dr. Nath S. Parate
    111 Old Hickory Blvd., E-170
    Nashville, Tennessee 37221

38. Dr. Michael Perfit
    Department of Geology
    University of Florida
    Gainesville, Florida 32611

39. Dr. Hans Schrader
    National Science Foundation
    OCE 606
    1800 G Street NW
    Washington, DC 20550

40. Dr. Kensaku Tamaki
    Ocean Research Institute
    University of Tokyo
    1-15-1 Minamidai, Nakano
    Tokyo 164,
    Japan

41. Dr. Dietz Warnke
    Department of Geological Science
    California State University
    Hayward, California 94542

42. Dr. Joel Watkins
    Department of Oceanography
    Texas A & M University
    College Station, Texas 77843

43. Dr. Peter Webb
    Department of Geology
    Ohio State University
    Columbus, Ohio 43210

44. Mr. William White
    College of Oceanography
    Oregon State University
    Corvallis, Oregon 97331

45. Dr. Doug Williams
    Department of Geology
    University of South Carolina
    Columbia, South Carolina 29208

46. Dr. Sherwood Wise, Jr.
    Department of Geology
    Florida State University
    Tallahassee, Florida 32306

TABLE 2

Site Objectives

SITE		LITHO.	TEC.	SOH
II. Lithosphere/Tectonics Working Group				
MT-1	Micronesian Trench	X	X	X
MT-1A	"	X	X	X
MT-2	"	X	X	X
MT-2A	"	X	X	X
AB-1	Peru-Chile Trench		X	
AB-2	"		X	
AB-3	"	X		X
AB-4	"		X	
AB-5	"		X	
AB-6	"		X	X
AB-7	Arica Bight-Nazca Ridge			X
CTJ-1	Chile Margin Triple Junction		X	
CTJ-2	"		X	
CTJ-3	"	X		
BR-1	Bransfield Strait	X	X	X
AP-1	Antarctic Peninsula		X	X
AP-2	"		X	X
AP-3	"		X	X
AP-4	"		X	X
WB-1	Woodlark Basin, Ghizo Ridge		X	X
WB-2	New Gecrgia Group, Blanche Channel		X	X
WB-3	Eastern Woodlark Basin		X	X
MF-1A	Manus Forearc	X	X	X
MF-1B	"	X	X	X
SS-1	South Shetland Islands Region	X	X	X
SS-2	"	X	X	X
MP-1	Manihiki Western Plateau	X	X	X
MP-2	Manihiki North Plateau	X	X	X
MP-3	Manihiki High Plateau	X	X	X
OJ-1	North Ontong-Java Plateau	X	X	X
OJ-1A	"	X	X	X
OJ-2	Central Ontong-Java Plateau	X	X	X
OJ-3	Southern Cntong-Java Plateau	X	X	
OJ-3A	"	X	X	
OJ-4	"	X	X	
OJ-5	Malaita Anticlinorium	X	X	
OJ-6	"	X	X	
AIC-1	Austral Island Chain	X	X	X
AIC-2	"	X	X	X
AIC-3	"	X	X	X
MI-1	Marquesas Islands	X	X	
MI-2	"	X	X	
MI-3	"	X	X	
T-1	SE flank of Tahiti	X		
NT-1	Northern Tuamotu Island	X	X	
NT-2	"	X	X	

LR-1	Louisville Ridge	X	X	X
LR-2	"	X	X	X
LR-3	"	X	X	X
SGH-1	Small scale geoid height anomalies	X	X	X
SG-1	Sala y Gomez Ridge	X	X	
SG-2	"	X	X	
SG-3	"	X	X	
OP-1	Old Pacific Crust		X	X
OP-2	"		X	X

<u>III. Sediments and Ocean History Working Group</u>

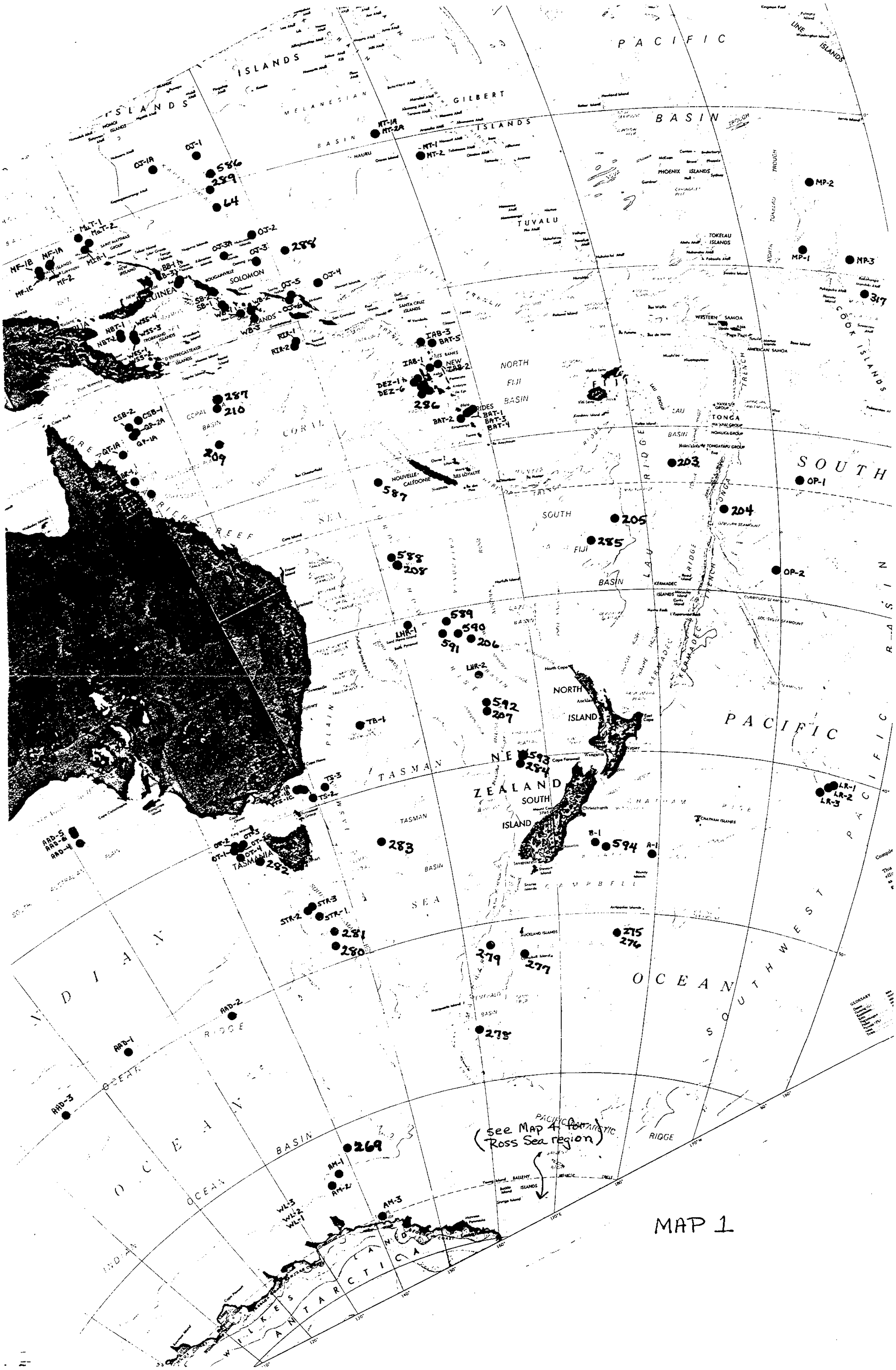
WRS-1	Western Ross Sea		X	X
WRS-1A	"		X	X
WRS-2	"		X	X
WRS-2A	"		X	X
WRS-3	"		X	X
WRS-3A	"		X	X
WRS-4	"			X
WRS-4A	"			X
WRS-5	"		X	X
WRS-5A	"		X	X
WRS-6	"		X	X
WRS-6A	"		X	X
WRS-7	"			X
AP-1	Antarctic Peninsula		X	X
AP-2	"		X	X
AP-3	"		X	X
AP-4	"		X	X
BS-1	Bellingshausen Sea			X
BS-2	"			X
BS-3	"			X
AS-1	Amundsen Sea			X
EPRT-1	East Pacific Rise Transect			X
EPRT-1A	"			X
EPRT-2	"			X
EPRT-2A	"			X
EPRT-3	"			X
EPRT-4	"			X
KTPR/EPRT-5	Cretaceous-Tertiary, SE Pacific Rise			X

<u>IV. Previously Submitted Proposals</u>

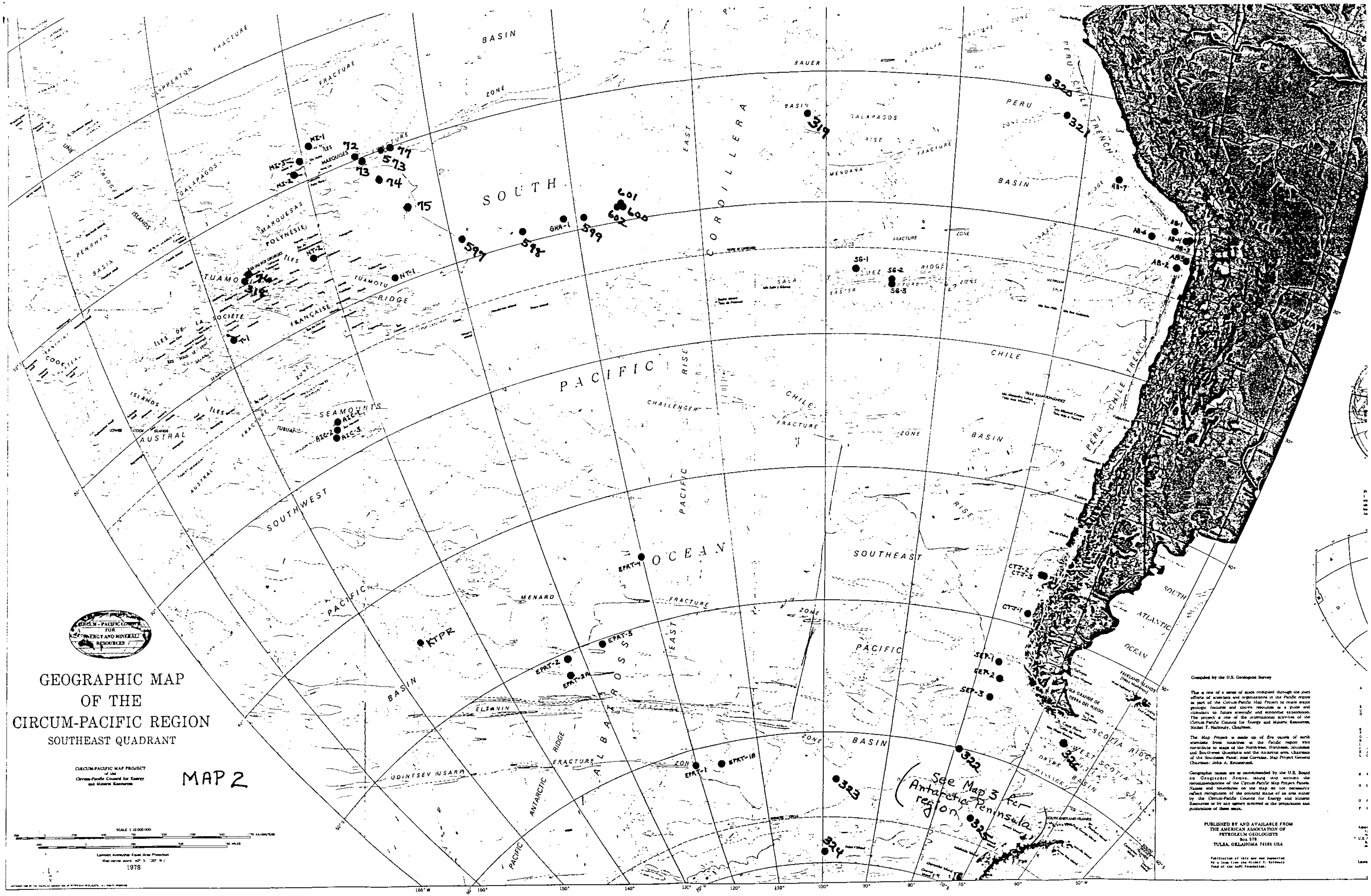
LHR-1	Lord Howe Rise		X	X
LHR-2	"		X	X
QP-1A	Queensland Plateau Margin	X		X
QP-2A	"	X	X	X
QT-1A	"		X	X
CSB-1	Coral Sea Basin	X	X	X
CSB-2	"	X	X	X
TB-1	Tasman Basin	X		
GB-1	Goodenough Basin	X	X	

WSS-1	West Solomon Sea Basin	X	X	X
WSS-2	"	X	X	X
WSS-3	"	X	X	X
WSS-4	"	X	X	
RIR-1	Rennell Island Ridge		X	X
RIR-2	"		X	X
NBT-1	Western New Britain Trench		X	X
NBT-2	"		X	X
NBT-3	"		X	X
NBT-4	"		X	X
NBT-5	"		X	X
TS-1A	Western Tasman Sea		X	X
TS-1B	"		X	X
TS-1C	"		X	X
TS-2	"	X	(X)	X
TS-3	"		X	X
GBR-1A	Great Barrier Reef Slope			X
GBR-1B	"			X
GBR-2	"			X
GBR-3	"			X
GBR-4	"			X
GBR-5	"			X
AM-1	Adelie Land Margin		X	X
AM-2	"		X	X
AM-3	"		X	X
AAD-1	Aust.-Ant. Discordance	X		
AAD-2	"	X		
AAD-3	"	X		
A-1	Axial Bounty Trough	X	X	X
B-1	"	X	X	X
SEP-1	Southeast Pacific			X
SEP-2	"			X
SEP-3	"			X
STR-1	South Tasman Rise		X	X
STR-2	"		X	X
STR-3	"		X	X
AAD-4	Diamantina Zone	X	X	X
AAD-5	Cenduna Plateau	X	X	X
AAD-6	"	X	X	X
OT-1	Otway Basin	X	X	X
OT-2	"	X	X	X
OT-2A	"	X	X	X
OT-3	"	X	X	X
OT-4	"	X	X	X
WL-1	Wilkes Land Margin		X	X
WL-2	"		X	X
WL-3	"		X	X
IB-1	Indispensable Basin		X	X
IB-2	"		X	X
MB-1	Mborokua Basin		X	X
BB-1	Buka Basin		X	X
BB-2	"		X	X
BB-3	"		X	X

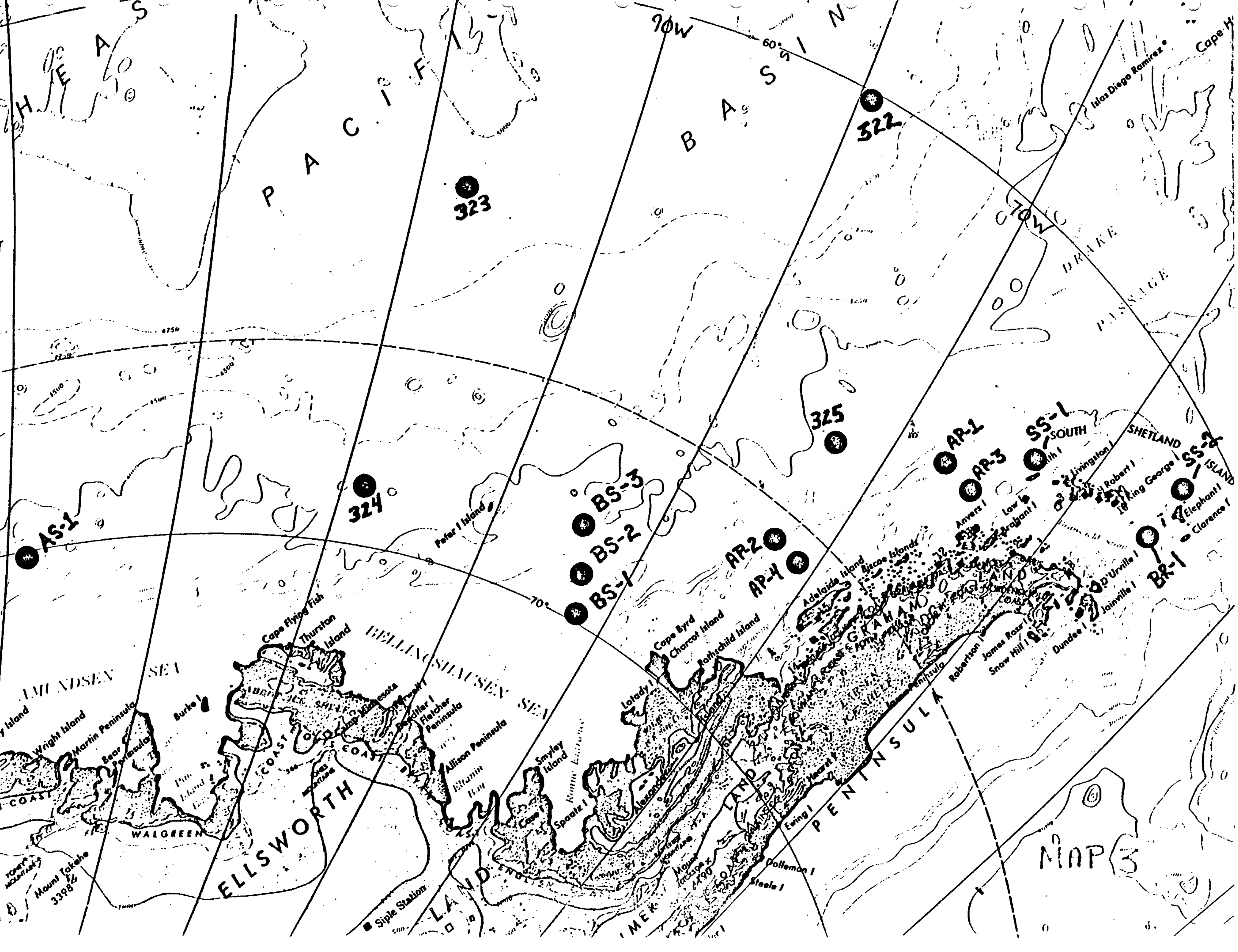
SB-1	Shortland Basin		X	X
SB-2	"		X	X
BAT-1	Southern New Hebrides Arc		X	X
BAT-2	"		X	X
BAT-3	"	X	X	X
BAT-4	"	X	X	X
BAT-5	"	X	X	X
IAB-1	Central New Hebrides Arc		X	X
IAB-2	"		X	X
IAB-3	"		X	X
DEZ-1	"		X	X
DEZ-2	"		X	X
DEZ-3	"		X	
DEZ-4	"		X	X
DEZ-5	"		X	X
DEZ-6	"		X	X
MuT-1	Mussau Trench	X	X	X
MaT-2A	Manus Trench	X	X	X
MaT-2B	"	X	X	X
MIA-1	Mussau Island Arc	X	X	
MF-2	Manus Forearc	X	X	X
MF-1C	"	X	X	X

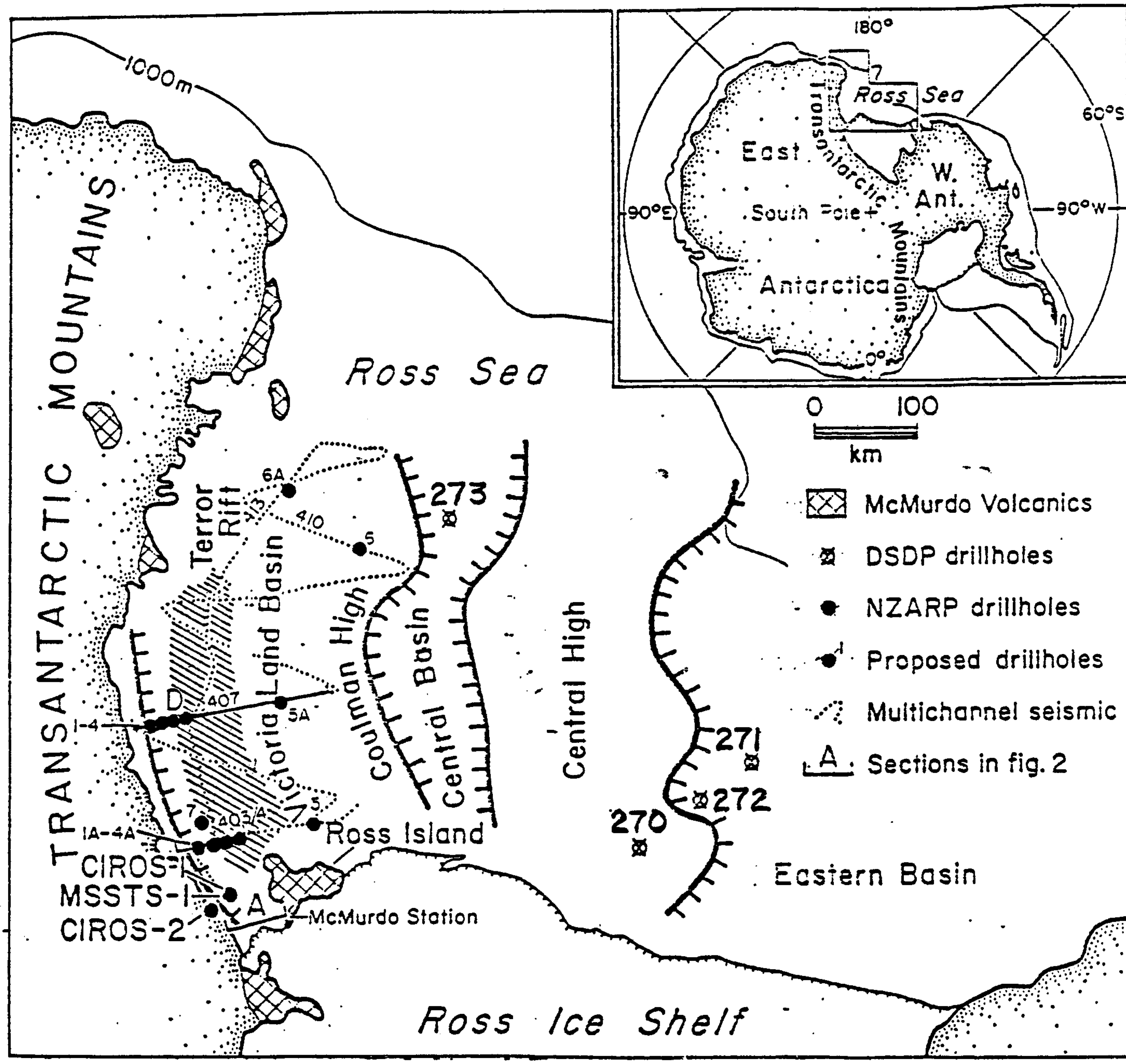

(see Map 4 for Antarctic Ross Sea region)
INDIAN OCEAN
TASMAN SEA
NEW ZEALAND
NORTH ISLAND
SOUTH ISLAND
SOUTHWEST PACIFIC OCEAN
PACIFIC BASIN
SOLOMON ISLANDS
GILBERT ISLANDS
TUVALU
FIJI
TONGA
WESTERN SAMOA
AMERICAN SAMOA
COOK ISLANDS
TOKELAU ISLANDS
PHOENIX ISLANDS
LINE ISLANDS
WILKES LAND
ANTARCTICA

MAP 1



GEOGRAPHIC MAP
OF THE
CIRCUM-PACIFIC REGION
SOUTHEAST QUADRANT
CIRCUM-PACIFIC MAP PROJECT
of the
Circum-Pacific Council for Energy
and Mineral Resources
MAP 2
SCALE 1:10 000 000
Lambert Azimuthal Equal Area Projection
1978
FOR
RESOURCES
Compiled by the U.S. Geological Survey
This is one of a series of maps compiled through the joint efforts of scientists and organizations in the Pacific region as part of the Circum-Pacific Map Project to relate major geologic features and known resources as a guide and stimulant to future scientific and economic exploration. The project is one of the international activities of the Circum-Pacific Council for Energy and Mineral Resources, Michel T. Halbouty, Chairman.
The Map Project is made up of five panels of earth scientists from countries in the Pacific region who contribute to maps of the Northwest, Northeast, Southeast and Southwest Quadrants and the Antarctic area. Chairman of the Southeast Panel: José Corvalán. Map Project General Chairman: John A. Reinemund.
Geographic names are as recommended by the U.S. Board on Geographic Names, taking into account the recommendations of the Circum-Pacific Map Project Panels. Names and boundaries on the map do not necessarily reflect recognition of the political status of an area either by the Circum-Pacific Council for Energy and Mineral Resources or by any agency involved in the preparation and publication of these maps.
PUBLISHED BY AND AVAILABLE FROM
THE AMERICAN ASSOCIATION OF
PETROLEUM GEOLOGISTS
Box 979
TULSA, OKLAHOMA 74101 USA
See Map 3 for Antarctic Peninsula region
SOUTH PACIFIC OCEAN
SOUTHWEST PACIFIC BASIN
SOUTHEAST PACIFIC BASIN
SOUTH ATLANTIC OCEAN
EAST PACIFIC RISE
ALBATROSS CORDILLERA
PACIFIC ANTARCTIC RIDGE
CHILE RISE
GALAPAGOS RISE
PERU BASIN
CHILE BASIN
PERU-CHILE TRENCH
BAUER BASIN
MENDANA FRACTURE ZONE
CHALLENGER FRACTURE ZONE
MENARD FRACTURE ZONE
ELTANIN FRACTURE ZONE
UDINTSEV (USARP) FRACTURE ZONE
CLIPPERTON FRACTURE ZONE
MARQUESAS FRACTURE ZONE
GALAPAGOS FRACTURE ZONE
EASTER FRACTURE ZONE
TUAMOTU RIDGE
PENRHYN BASIN
LINE ISLANDS
COOK ISLANDS
AUSTRAL SEAMOUNTS
ILES MARQUISES
ILES TUAMOTU
ILES DE LA SOCIETE
POLYNESIE FRANÇAISE
SCOTIA RIDGE
DRAKE PASSAGE
WEST SCOTIA BASIN
FALKLAND ISLANDS
ISLA GRANDE DE TIERRA DEL FUEGO
MZ-1
MZ-2
MZ-3
72
73
74
75
77
573
NT-1
NT-2
T-1
316
AIC-1
AIC-2
AIC-3
597
598
599
600
601
602
GHR-1
319
320
321
SG-1
SG-2
SG-3
AB-1
AB-2
AB-3
AB-4
AB-5
AB-6
AB-7
CTJ-1
CTJ-2
CTJ-3
SEP-1
SEP-2
SEP-3
EPAT-1
EPAT-1A
EPAT-2
EPAT-2A
EPAT-3
EPAT-4
KTPR
322
323
324
325
326


MAP 3
PACIFIC BASIN
DRAKE PASSAGE
BELLINGSHAUSEN SEA
AMUNDSEN SEA
ELLSWORTH LAND
GRAHAM LAND
PENINSULA
SOUTH SHETLAND ISLAND
322
323
324
325
AS-1
BS-1
BS-2
BS-3
AP-1
AP-2
AP-3
AP-4
SS-1
SS-2
BR-1
70W
90W
60°
70°
Islas Diego Ramirez
Cape H
Peter I Island
Adelaide Island
Biscoe Islands
Anvers I
Low I
Brabant I
Livingston I
Robert I
King George I
Elephant I
Clarence I
D'Urville I
Joinville I
Dundee I
James Ross I
Snow Hill I
Robertson I
Cape Byrd
Charcot Island
Rothschild Island
Latady I
Smyley Island
Spaatz I
Alexander Island
Allison Peninsula
Fletcher Peninsula
Cape Flying Fish
Thurston Island
Burke I
Martin Peninsula
Bear Peninsula
Wright Island
Mount Takahe 3398
WALGREEN
Siple Station
Ewing I
Dolleman I
Steele I
Mount Jackson 4190



The Ross Sea region, showing sedimentary basins, and planned drillsites.

II. TECTONICS AND LITHOSPHERE WORKING GROUP

A. Overview

1. Scientific Problems of Active and Passive Margins

A variety of topics of interest were identified in the South Pacific-Antarctic Margin region. Here they are grouped into tectonic problems, problems of volcanism and plate margins, and passive margin histories.

Ridge-trench collision is a process that is observed at a limited number of localities, most of which occur in the South Pacific (see Ridge-Trench Overview, Section II, D-3). Such collisions are likely to have occurred many times in the geologic record, particularly along convergent plate margins of long standing, though few appear to have been recognized. The Tertiary ridge-trench collisions off the Antarctic Peninsula and the present collision of the Chile triple junction provide a unique opportunity to examine in detail the interplay of tectonic erosion, thermal effects associated with collision and subduction of the ridge, volcanism, and metamorphism in the forearc. The Antarctic Peninsula and the Chile triple junction form a complementary pair of ridge-trench collisions differing principally in that very slow subduction has continued south of the triple junction after collision.

Farther north at the Arica Bight, the forearc region is characterized by sediment starvation and a change in convergence vectors. Unlike most forearc regions in which sediment supply is sufficient to build an apron out onto and over the trench, thus obscuring the details of accretion and subduction budgets, uplift rates etc., in the Arica Bight it is possible to distinguish the biogenic and clastic contents of the basin fills on the oceanic plate, slope, and shelf. This permits discrimination of the sediment in the deformed forearc. Furthermore, the change in orientation of the trench at the Arica Bight allows investigation of the role of oceanic lithosphere structures in determining the evolution of structures and basins in the forearc terrain. (See Forearc and Tectonics Overview, Section II, D-1).

Volcanism associated with active plate margins can be studied in many parts of the world, but within the South Pacific-Antarctic Margin region there exist some anomalous situations that merit investigation. One of the other sites of ridge-trench collision is the young Woodlark Basin where the spreading center is being subducted beneath the Solomon Islands. Dredging has recovered dacitic rocks adjacent to, but outside, the trench and on the subducting slab. Another anomalous region is the forearc terrain of the Manus basin which is interpreted to include wide-spread lava flows of uncertain origin. Finally, dredging of the backarc basin of the very young Bransfield Strait has recovered fresh andesites from volcanic centers in the middle of the basin. Investigation of this young marginal basin would address questions of the roles and influences of subduction, subcontinental mantle, and suboceanic mantle on the composition of magmas generated during the transition from continental to oceanic rifting.

The study of passive margins in this region has two foci, one dealing with conjugate margins and the other with tectonism and glaciation. The orthogonal spreading between Antarctica and Australia provides an uncomplicated and ideal setting within which to study and compare the evolution of opposing margins, though the Antarctic margin history during the late Cenozoic differs due to the effects of glaciation. However, what sets these conjugate margins apart is their association with the Antarctic-Australia discordance which is inferred to be of long standing, possibly well into pre-breakup time, and the possibility of testing the models of passive margin evolution and theoretical models of rifting and subsidence.

In contrast to the Antarctic conjugate margin is that in the western Ross Sea. This is a rifted margin in which the rifts run parallel to the Transantarctic Mountain range and nearly perpendicular to the continental margin. Rift development appears to have a temporal association with uplift of the Transantarctic Mountains which are likely to have played an important role as ice centers or as a range blocking and deflecting ice. Investigation of the Victoria Land basin in the western Ross Sea will yield data on the Mesozoic and Cenozoic history of the continent, the subsidence of the Ross Sea embayment and associated uplift of the Transantarctic Mountains, and the pattern of glacial events that may well have been initiated in the early Cenozoic.

2. Drilling Proposals for Passive Margins

Within the South Pacific-Antarctic Margin region passive margins are located in the Ross Sea and Wilkes Land sectors of Antarctica, the southern and eastern margins of Australia, the Lord Howe Rise, New Zealand and the Campbell Plateau. The objectives for passive margin drilling include: timing of breakup, depositional environments associated with rifting and subsequent foundering of the margin; subsidence history; the dating of erosional episodes, establishment of oceanic circulation patterns, etc.

a. ROSS SEA. The Ross Sea sector of Antarctica encompasses a region of thin crust (20-30 km) in abrupt juxtaposition with the Transantarctic Mountains (approximately 40 km thick crust). Major sedimentary basins are oriented approximately north-south, and are parallel and to the east of this crustal boundary. These sedimentary basins contain sequences that may be as old as Jurassic and may be floored by pre-breakup strata of the Beacon Supergroup (the Gondwana sequence of Antarctica). The sequences also contain a record of the history of glaciation. Drilling a series of sites in the Victoria Land Basin will provide information on the rifting of Antarctica associated with Gondwanaland breakup, a (?) late Jurassic to late Tertiary history of sedimentary basin filling which cannot be obtained from any outcrop geology except near the tip of the Antarctic Peninsula, important paleobiogeographic and paleoceanographic data bearing on the evolution of seaways during the Cretaceous and Tertiary, information on the uplift of the transcontinental Transantarctic Mountains during the same time interval, and finally a record of glacial events including possible relations between ice volume and global sea level changes in the Cenozoic.

b. WILKES LAND MARGIN AND THE CONJUGATE AUSTRALIAN MARGIN. The conjugate margins of Australia and Antarctica afford an opportunity to examine many aspects of "classical" passive margin evolution. On the Wilkes Land margin a pre-breakup sequence overlain by syn-rift and post-rift sequences are clearly recognized in seismic records. The ages of these sequences, and their interpretation, are matters of debate and in part reflect differences of opinion about the age of the oldest anomaly. Drilling a series of sites off the Wilkes Land margin will establish the age of the oldest sea floor, the nature of the basement and overlying unconformities on the continental rise and slope, yield data on the evolving seaways between Antarctica and Australia, and provide much needed information on ice buildup and fluctuations in a region dominated by the East Antarctic ice sheet but unaffected by the Transantarctic Mountains and its Cenozoic uplift. In addition comparable data, except for that pertaining to glaciation, would be acquired on the opposing margin. However, the apparently simple orthogonal spreading also affords the opportunity to test models of passive margin stratigraphy, such as breakup and rift-onset unconformities, and theoretical models of extension and subsidence.

c. AUSTRALIAN SITES. Drilling objectives for the Ceduna Platform, Otway Basin, and South Tasman Rise all have features in common. They are concerned with the rifting of Australia from Antarctica, the depositional environment, regional seismic unconformities, subsidence histories and so on. Some sites, on or adjacent to the Ceduna Platform, will complement those of the Wilkes Land margin, as discussed above. The Lord Howe Rise documents separation of New Zealand from Australia and includes the usual passive margin objectives. Oceanic circulation pattern changes may record major oceanographic changes attendant on Australia-Antarctica separation. The objectives for the sites off Queensland are very similar, although including much more detailed investigation of rift-fill sequences, volcanism, tectonism across a passive margin, and the nature of the crust-ocean boundary.

3. Lithosphere Objectives and Proposals

a. OCEANIC PLATEAUS. The Southern Pacific region contains a number of anomalous oceanic "plateau" regions where the crust has been determined to be from 30 to 40 km thick. A few scanty samples of basaltic lavas have the major element characteristics of MORB, but the isotopic characteristics of "hotspot" or "plume" basalts typical of regions such as the Iceland or the Galapagos Islands. The volume of excess volcanism represented by these plateau regions, however, is vastly greater than the possible modern analogues such as Iceland. The resistance of the Ontong-Java Plateau to subduction has strongly influenced late Oligocene and late Miocene plate reorganizations and appears to be producing an even broader scale reorganization. If such plateaus, then, cannot be subducted, they must eventually be accreted to the continents and may play a significant role in the formation of continental crust.

Drilling on the oceanic plateaus during DSDP was motivated primarily by paleontologic and paleoenvironmental concerns, with basement rarely penetrated. A number of sites have now been proposed to: 1) properly constrain the ages of both the Manihiki and Ontong-Java Plateaus, 2) to obtain fresh basement samples in sufficient quantity to properly evaluate the nature and chemical diversity of the plateau lavas to properly compare these regions to possible modern analogues such as Iceland, 3) learn the nature, timing, extent, and course of volcanism, 4) determine the timing of edge deformation along the Ontong-Java Plateau, and 5) obtain sufficient basement penetration to answer questions regarding the oceanic or continental affinities of these plateaus.

b. HOTSPOTS, SEAMOUNTS, AND OCEAN ISLANDS. A striking feature of the Pacific is the number of seamounts and islands occurring throughout the basin. Although many occur as isolated volcanos, many are arranged in long linear chains which Wilson (1963) and Morgan (1971, 1972) propose reflect plate movement over a volcanic hotspot source fixed in an underlying mantle reference frame. Among the many such chains in the Pacific, the Louisville Ridge and the French Polynesian "Hotspot" chains were felt to warrant high priority for ocean drilling. A particular emphasis for this drilling would be to locate sites both on the flanks of the volcanic edifices of individual islands, to sample as complete a record of their geochemical evolution as possible where individual units were thin, and between individual volcanos to determine what age differences exist with formation of the underlying ocean crust.

Lying in a region roughly the size of western Europe, the six subparallel Polynesian hotspot chains sample the underlying mantle on a much denser scale than anywhere else on earth. Those lineaments with accessible volcanic rocks show similar rates of age progression from southeast to northwest, and have trace and isotopic compositions covering nearly the entire worldwide range, with tremendous variations between the different chains. For example, the evolution of isotopic ratios in the Marquesas from the main shield-building to post-erosional series is the inverse of that observed in Hawaii. In the Austral chain, different groups of islands have strongly differing Pb and Sr signatures precluding simple mixing with the lithosphere. Important differences between the southern and northern groups may reflect differences in the degree of thermal thinning of the lithosphere. The Polynesian chains may represent the only natural laboratory where wide variations exist in the initial conditions such as the composition of mantle sources, the amount of upwelling material, and the thermal properties of the overriding plate. Thus, they represent a key opportunity to study the spatial as well as temporal variability of mantle hotspots as well as the influence of different lithospheric structure on the evolution of hotspot magmas.

The Louisville Ridge is a curvilinear chain of seamounts and guyots recording 65 Ma of hotspot activity beneath the Pacific Plate. The chain is not actually coincident with the trace of the

Eltanin Fracture Zone system, as it appears in some maps, but crosses it at a low angle with the youngest seamount located not far from the Pacific-Antarctic Ridge at 50 S, 139 W (Lonsdale, in press). The oldest surviving volcano in the chain, Osborn Seamount, is currently being subducted at the Tonga Trench. The ridge is subparallel to the Emperor and Hawaiian seamount chains, suggesting that they formed contemporaneously. Both the aximuth of the chains and age progressions, to the extent that they are known, agree well with the lineaments predicted for Pacific Plate motions over fixed hotspots. A unique difference between the chains, however, is the smaller size and the absence of a local bathymetric depressions around individual volcanos of the Louisville chain. This difference is most simply explained by formation of the Louisville volcanos near the axis of the Pacific-Antarctic Ridge, where in the absence of a thick lithosphere they were isostatically compensated with deep underlying crustal roots. The Hawaiian and Emperor chains, in contrast, formed on old thick lithosphere which resulted in the formation of high volcanic edifices locally elastically supported by the lithosphere; bending due to this elastic moment produced the local negative gravity anomaly and bathymetric moat around the islands.

Drilling in the Louisville Ridge then provides a unique opportunity to test the Hawaiian model for hotspot volcanism and to see if the unusual progression from a main tholeiitic constructional phase with "plume"-like geochemical characteristics to a late alkalic phase with more "MORB"-like isotopic and trace element geochemistry is unique. To do this we need to obtain sufficient drill core to determine the magmatic evolution of a single major volcano in the chain to see if it repeats the Hawaiian progression, or the more typical pattern found in other ocean islands. In particular, such drilling will provide a unique opportunity to examine the geochemical evolution of a long-lived Hawaiian-like chain which formed in the absence of a thick lithosphere.

c. FRACTURE ZONES. The fast-slipping transforms of the East Pacific Rise and the Pacific-Antarctic Ridge represent an extreme case for the development of oceanic fracture zones. The only examples of large age offset active transforms comparable to those in the Indian and Atlantic Oceans, however, are the 300-400 km offset fracture zones of the Eltanin system in the far South Pacific. They are the only extant examples of the features responsible for the longest crustal structures on earth: the great Pacific fracture zones (Murray, Molokai, Clarion, etc.), which are no longer connected to active transforms. The latter are structurally, geomorphologically, and probably petrologically quite different from slow-slipping Atlantic and Indian Ocean fracture zones. The Udintsev, Tharp, and Heezen transform faults of the Eltanin system represent extreme disruptions of the general smooth relief of the Pacific-Antarctic Ridge with a 5000-6000 meter fault trough and high-flanking transverse ridges shoaling at 500-600 meters.

The principle objectives of drilling at the Eltanin system would be to determine the crustal composition and stratigraphy of the fracture zone valley, and to obtain a deep crustal section comparable to those planned for SW Indian Ridge fracture zone drilling in 1987. Representing the extreme end-member for the physiographic/morphotectonic development of oceanic fracture zones, detailed study of this fracture zone system is critical to understanding the evolution of transform plate boundaries.

The Sala y Gomez Ridge appears to be a fracture zone in the process of transformation into either a leaky fracture zone or an impending spreading center. The Ridge runs east from the Easter Island microplate to a cluster of guyots near the end of the Nazca Ridge. Volvanism along the ridge, however, does not fit the age sequence expected if it were a hotspot trace, leading to the leakiy fracture zone interpretation. Drilling on this ridge should enable discrimination between the different hypotheses for its origin and permit the detailed evlauation of what may be an important but transient tectonic phenomenon.

d. OCEAN RIDGES. Recent analysis of Seasat altimetry data has revealed the existence of surprisingly regular lineated gravity rolls over the younger portions of several of the faster moving plates in the Pacific. These rolls consist of subparallel gravity highs and lows, with a wave length of 150-200 km, aligned in the direction of the present absolute plate motion but at an angle to the spreading direction. The nature of these rolls has become at once a key question for those trying to understand the nature of shallow mantle circulation and crustal development. The key issues include determining to what extent the "gravity rolls" reflect shallow crustal structures as opposed to dynamic phenomenon in the shallow underlying mantle. Obviously a systematic drilling program, particularly in the gravity lows between rolls, to obtain comparable crustal sections would greatly and uniquely aid in determining their origin. The lineated gravity rolls are best and most clearly developed in the south central Pacific which would be the ideal area for a drilling program designed to study them.

B. PASSIVE MARGIN PROPOSALS

Most of the passive margin proposals listed below were previously submitted to ODP (2-10). ODP Site Proposal Summary Forms for these sites may be found in Section IV. Summary forms for the new proposal for drilling in the western Ross Sea are in Section III, B-1.

Passive margin proposals are as follows:

1. Western Ross Sea (WRS-1 through WRS-7)
2. Wilkes Land Margin (WL-1 through WL-3)
3. Adelie Land Margin (AM-1 through AM-3)
4. Otway Basin (OT-1 through OT-4)
5. South Tasman Rise (STR-1 through STR-3)
6. Western Tasman Sea (TS-1 through TS-3)
7. Lord Howe Rise (LHR-1, LHR-2)
8. Queensland Plateau (QP-1, QP-2)
9. Axial Bounty Trough (A-1, B-1)
10. Ceduna Plateau (AAD-5, AAD-6)
11. Goodenough Basin (GB-1)
12. Great Barrier Reef Slope (GBR-1 through GBR-5)

C. YOUNG SUBDUCTION ZONES

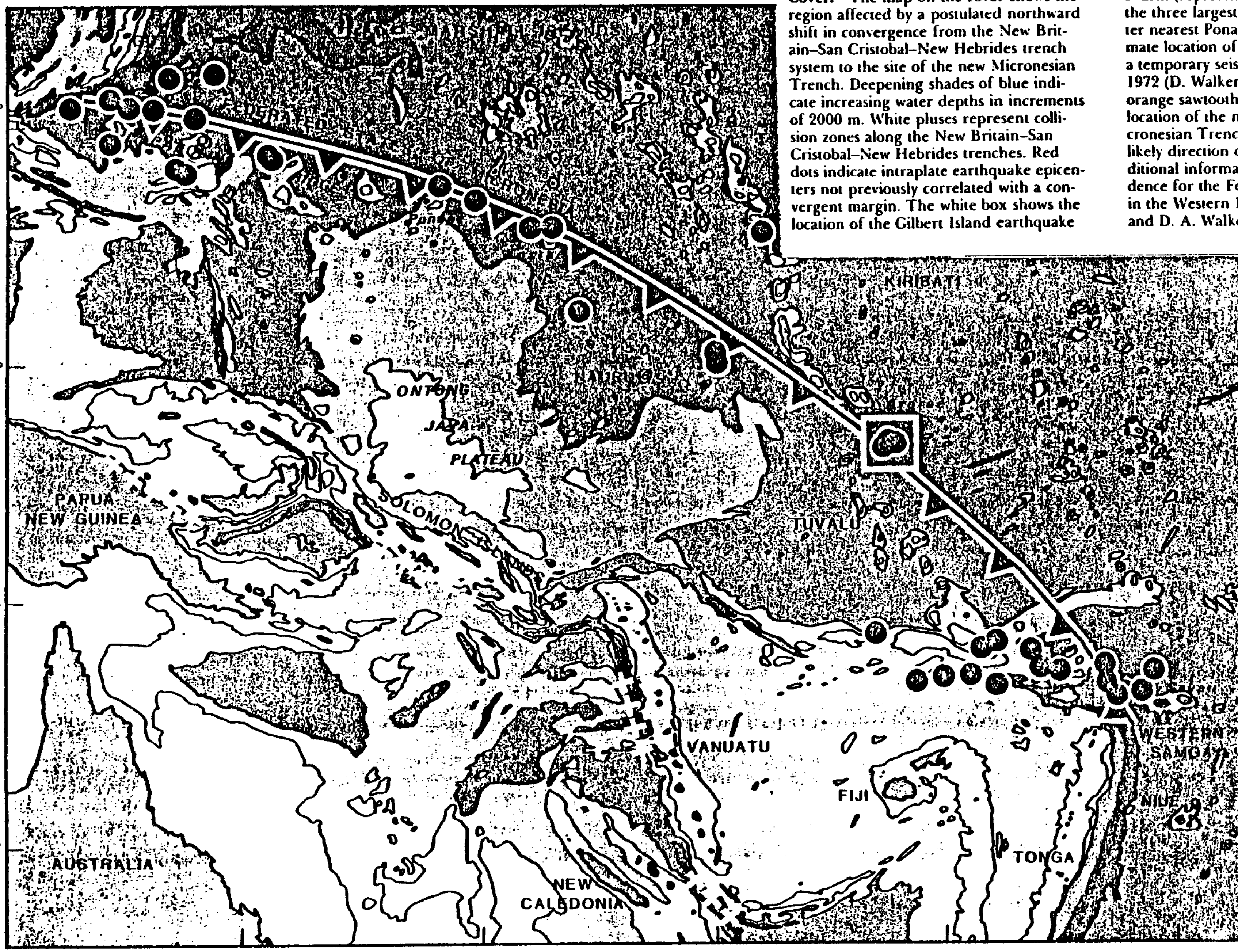
1. The Micronesian Trench (MT-1 through MT-2a)

THE MICRONESIAN TRENCH.

L.W. Kroenke, Hawaii Institute of Geophysics, University of Hawaii at Manoa; E. Okal, Northwestern University.

Stretching across the Western Pacific from the Mariana to the Tonga Trench, along the northern margin of the Ontong-Java and across the Nauru Basin, a line of seismicity may indicate the formation of a new subduction zone: the Micronesian Trench (Fig. 1). This new subduction zone is also evidenced by deformational structures suggestive of incipient trench-arc morphology.

Although there may be other young subduction zones, the Micronesian Trench represents the earliest stages in the development of a convergent margin. Drilling into and across this incipient feature (Fig. 2) should provide information on processes involving 1) the development of the lowest grades of subduction-related metamorphism; 2) the initiation of forearc diapirism; 3) the early incorporation of sediments in a subduction melange, and 4) the initiation of dewatering and the presence of abnormal fluid pressures.



Cover. The map on the cover shows the region affected by a postulated northward shift in convergence from the New Britain–San Cristobal–New Hebrides trench system to the site of the new Micronesian Trench. Deepening shades of blue indicate increasing water depths in increments of 2000 m. White pluses represent collision zones along the New Britain–San Cristobal–New Hebrides trenches. Red dots indicate intraplate earthquake epicenters not previously correlated with a convergent margin. The white box shows the location of the Gilbert Island earthquake swarm (represented by the epicenters for the three largest teleseisms). The epicenter nearest Ponape denotes the approximate location of earthquakes recorded by a temporary seismic station on Ponape in 1972 (D. Walker, unpublished data). The orange sawtooth line shows the postulated location of the new subduction zone (Micronesian Trench); teeth point in the most likely direction of underthrusting. For additional information, see the article "Evidence for the Formation of a New Trench in the Western Pacific," by L. W. Kroenke and D. A. Walker, p. 145.

FIGURE 1.

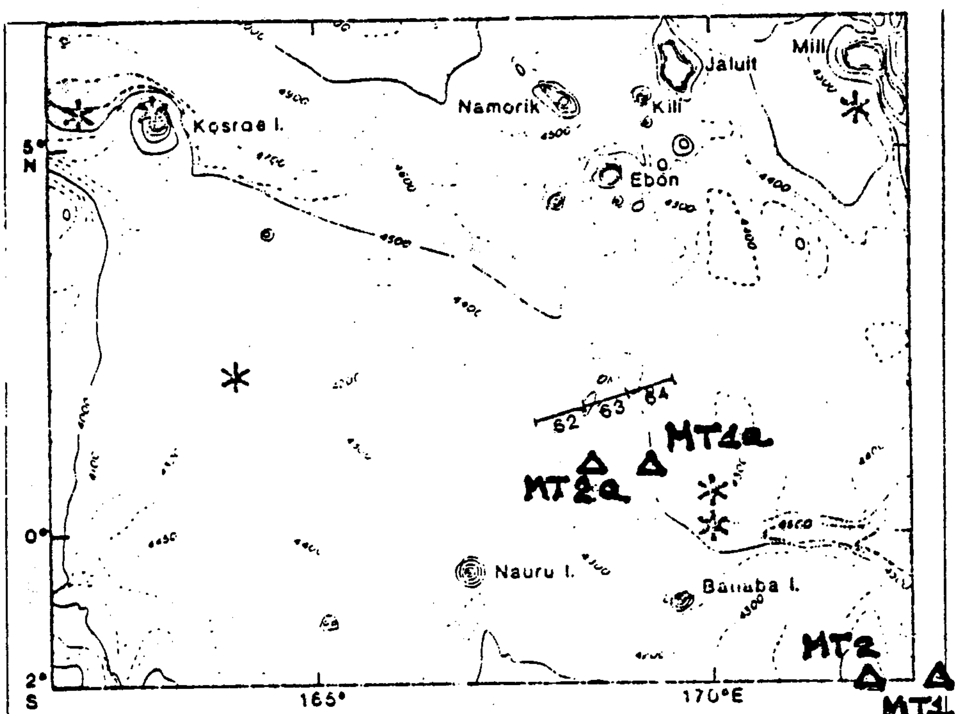


Fig. **2.** Bathymetry of the Nauru Basin [after *Mammerickx and Smith*, 1985]. The contour interval (solid lines) is 500 m. Intermediate contours (dashed lines) indicate locations of elevated and depressed areas north and south, respectively, of the convergent boundaries believed to be structurally controlled by the formation of the new Micronesian Trench. Also shown are the location of the Deep Sea Drilling Project (DSDP) Leg 1 reflection profile line, earthquake epicenters (asterisks) from the cover figure, and the probable location of the new Micronesian Trench (shaded areas).

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MT-1
Micronesian Trench: tow of inner trench wall

General Area: Nauru Basin, SW Pacific
Position: ~ 02°00'S, 172°45'E
Alternate Site: MT-1a
~ 01°00'N, 169°15'E

General Objective:
Drill into the tow of the inner trench wall to study the early incorporation of sediment in the subduction melange

Thematic Panel interest: TECP, LITHP, SOHP
Regional Panel interest: CEPAC, WPAC

Specific Objectives:

To investigate processes involved in the earliest stages of subduction including sediment deformation and imprinting of structural fabric, initiation of dewatering processes and presence of abnormal fluid pressures; and development of the lowest grades of subduction-related metamorphism

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: DSDP, LDGO, HIG, and SIO-SCS profiles

Other data: 3.5 kHz and other bathymetric data, earthquake seismic data

Site Specific Survey Data:

Seismic profiles: Additional site survey data required, particularly Sea Marc II, Watergun SCS, and Sonobuoy seismic refraction/OBS

Other Data:

Operational Considerations:

Water Depth: (m) ~ 4500 Sed. Thickness: (m) ~ 600 Tot. penetration: (m) ~ 700

HPC ___ Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: pelagic ooze/chalk/limestone/basalt/greenschist/serpentinite

Weather conditions/window: Equatorial

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Downhole measurements - seismic, logging, heat flow

Proponent: L. W. Kroenke
Address & phone number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MT-1a
Micronesian Trench: tow of inner trench wall

General Area: Nauru Basin, SW Pacific
Position: ∿ 01°00'N, 169°15'E
Alternate Site: MT-1
∿ 02°00'S, 172°45'E

General Objective:
Drill into the tow of the inner trench wall to study the early incorporation of sedi[illegible] in the subduction melange

Thematic Panel interest: TECP, LITHP, SOHP
Regional Panel interest: CEPAC, WPAC

Specific Objectives:

To investigate processes involved in the earliest stages of subduction including sediment deformation and imprinting of structural fabric, initiation of dewatering processes and presence of abnormal fluid pressures; and development of the lowest grades of subduction-related metamorphism

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: DSDP, LDGO, HIG, and SIO-SCS profiles

Other data: 3.5 kHz and other bathymetric data, earthquake seismic data

Site Specific Survey Data:

Seismic profiles: Additional site survey data required, particularly Sea Marc II, Watergun SCS, and Sonobuoy seismic refraction/OBS

Other Data:

Operational Considerations:

Water Depth: (m) ∿ 4500 Sed. Thickness: (m) ∿ 600 Tot. penetration: (m) ∿ 700

HPC ___ Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: pelagic ooze/chalk/limestone/basalt/greenschist/serpentinite

Weather conditions/window: Equatorial

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Downhole measurements - seismic, logging, heat flow

Proponent: L. W. Kroenke
Address & phone number:
Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site:
MT-2
Micronesian Trench: Incipient Forearc

General Area: Nauru Basin, SW Pacific
Position: ~ 02°00'S, 172°00'E
Alternate Site: MT-2a
~ 01°00'N, 168°30'E

General Objective:

Drill into incipient forearc to study the early stages of formation of the forearc structural high

Thematic Panel interest: TECP, LITHP, SOHP
Regional Panel interest: CEPAC, WPAC

Specific Objectives:

To investigate processes accompanying the initial phases of uplift deformation and intrusion of the forearc including development of the sedimentary structural fabric; early stages of basement metamorphism; and emplacement of forearc diapiric structures

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: DSDP, LDGO, HIG, and SIO-SCS profiles

Other data: 3.5 kHz and other bathymetric data, earthquake seismic data

Site Specific Survey Data:
Seismic profiles: Additional site survey data required, particularly Sea Marc II, Watergun SCS, and Sonobuoy seismic retraction/OBS

Other Data:

Operational Considerations:

Water Depth: (m) ~ 4000 Sed. Thickness: (m) ~ 600 Tot. penetration: (m) ~ 700

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: pelagic ooze/chalk/limestone/basalt/greenschist/serpentinite

Weather conditions/window: Equatorial

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Downhole measurements - seismic, logging, heat flow

Proponent: L. W. Kroenke
Address & phone number: Hawaii Instute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MT-2a
Micronesian Trench: Incipient Forearc

General Area: Nauru Basin, SW Pacific
Position: ∿ 01°00'N, 168°30'E
Alternate Site: MT-2
∿ 02°00'S, 172°00'E

General Objective:
Drill into incipient forearc to study the early stages of formation of the forearc structural high

Thematic Panel interest: TECP, LITHP, SOHP
Regional Panel interest: CEPAC, WPAC

Specific Objectives:
To investigate processes accompanying the initial phases of uplift deformation and intrusion of the forearc including development of the sedimentary structural fabric; early stages of basement metamorphism; and emplacement of forearc diapiric structures

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: DSDP, LDGO, HIG, and SIO-SCS profiles

Other data: 3.5 kHz and other bathymetric data, earthquake seismic data

Site Specific Survey Data:
Seismic profiles: Additional site survey data required, particularly Sea Marc II, Watergun SCS, and Sonobuoy seismic refraction/OBS

Other Data:

Operational Considerations:

Water Depth: (m) ∿ 4000 Sed. Thickness: (m) ∿ 600 Tot. penetration: (m) ∿ 700

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: pelagic ooze/chalk/limestone/basalt/greenschist/serpentinite

Weather conditions/window: equatorial

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Downhole measurements - seismic, logging, heat flow

Proponent: L. W. Kroenke
Address & phone number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

D. FOREARC TECTONICS AND PETROLOGY

1. Overview (R. Moberly)

2. The Peru-Chile Forearc at the Arica Bight (W. Coulbourn)

3. Ridge-Trench Collision Overview (S. Cande)

4. Southern Chile Margin (S. Cande)

5. Bransfield Strait (P. Barker)

6. Antarctic Peninsula, Pacific Margin (P. Barker)

7. Woodlark Basin-Solomon Islands Triple Junction
   (M. Perfit and M. Marlow)

8. Other Forearc Proposals
   a. Manus Forearc (M. Marlow)
   b. South Shetland Islands (I. Dalziel)

D. Forearc Section

1. OVERVIEW: FOREARC TECTONICS AND PETROLOGY DISCUSSED AT WORKSHOP (to be supplemented by individual contributions by Coulbourn, Cande, Barker, Perfit, and Marlow).

R. Moberly, Hawaii Institute of Geophysics, University of Hawaii at Manoa.

Each major kind of ocean margin is found somewhere around the rim of the Pacific Ocean: active convergent, active transform, and passive. Of these, however, convergent margins are the most typical kind of Pacific margin. The Eastern Pacific primarily shows the convergence of oceanic and continental lithospheric plates. The Western Pacific has a festoon of island arcs along the convergence from the Aleutians south to New Zealand. Drilling objectives amid the rim of the South Pacific have been presented at this workshop.

The eastern South Pacific margin is the type Andean margin. Small lengths of ocean-continent convergence and subduction exist at North Island of New Zealand, Sunda, Alaska, Washington and Oregon, Middle America, and Makran, but the largest and seemingly most varied sort of active convergent continental margin lies west of South America. The climate controlled supply of detrital sediment at the recent history of the interception of active-spreading and aseismic ridges with the trench varies markedly along the South American margin. These factors, and perhaps others, control the variation in the style of basin evolution, accretion, and vertical deformation in the forearcs west of South America. Colombia and Ecuador, and southernmost Chile, have accreted oceanic crust, but east of the Nazca plate are Peru and Northern Chile with no evidence for the accretion of such terranes, but in fact strong evidence for the tectonic erosion -- by subduction -- of the western edge of the continental crust. One ODP leg has been assigned to this hithertofore undrilled margin, to investigate the mature forearc basins and shelf-edge phosphorites and anoxic sediments off Central Peru north of the Nazca Ridge. A last-minute attempt by one of the proponents of Peru drilling to include sites off northern Peru may fail for lack of time for complete review and approval.

Convergence of the Carnegie Ridge into the Ecuador Trench and the Nazca Ridge in to the Peru Trench are excellent examples of the subduction of aseismic ridges leading to deformation in the trench and forearc, but structural problems there do not seem to call for the drill -- at least so far. Off northern Peru theories about two of the principal convergence processes do not seem testable by the drill, namely (1) the massive seaward gliding of forearc basin-fill along large scale bedding plane faults mapped in the subsurfaces of coastal oilfields and in outcrop on land, and (2) the tectonic erosion of continental crust in the place, where of all of the world's subduction zones, and old igneous and metamorphic complex lies closest to a trench. And some segments of the Andean margin are no better and no worse than several other margins or places to investigate convergent processes by drilling. Most such drilling to date has been plagued by near-uniformity of sediment facies on both sides of the trench, making difficult the interpretation of accretion and subduction budgets, uplift rates, early histories, and so on. Two places off South America, however, appear to be unique among the world's forearcs.

The Arica Bight of southernmost Peru-nothernmost Chile has an exceptionally low contribution of terrestrial detritus. Unlike virtually any other convergent margin, both the foraminiferal and mineralogical contents of the oceanic plate, upper slope, and shelf differ sufficiently to allow early discrimination of provenance of the sediment in the deformed lower forearc, overcoming the difficulty mentioned that has plagued interpretations of other margins drilled during DSDP. A change in strike of the trench at the bight allows an answer to the question of whether or not the orientation and size of faulted structures of the oceanic lithosphere controls structures on the landward side of the trench. The low rate of sedimentation will allow an examination of the nature of the edge of the continental crust and the inner edge of accretion under the middle of the forearc basins.

Although not specifically of tectonic interest, the Arica Bight also has the oldest oceanic crust (Eocene) off South America, and the Nazca and Iquique Ridges rise above the calcite compensation depth, and should provide tephrachronology and biostratigraphic information in this region of the Peru or Humboldt Current. The inshore edge of the current should have left a record of its most recent fluctuations in the sediment of the upper slope and shelf edge.

The trench-ridge-trench triple junction off southern Chile has had alternating episodes of ridge-crest and transform entering the trench. Structures of the forearc as well as vertical movements along the margin seem to be controlled by this alternating passage of the ridge-crest and transform segments. They may also control alternating periods of tectonic erosion or truncation of the continental crust with periods of accretion. Structures of the forearc south of the South Chile Ridge presumably are nascent, born after the triple junction migrated northward and caused tectonic erosion of the old forearc structures. By drilling, the new subsurface structures and basin-fill south of the ridge can be compared with the margin structures to the north (acting as a reference), to constrain our ideas of the early history of forearc deformation and drilling.

Although our interest is mainly tectonic, the trench and adjacent sediments over and near the ridge crest where it enters the trench would show accelerated diagenesis from hydrothermal circulation and temperature-controlled mineralogy resulting from the ridge crest's heat. There are, of course, locations in the northern hemisphere where sediment blankets a ridge crest, and diagenetic studies off Chile have to be considered merely as targets of opportunity and an adjunct to the prime tectonic purposes of drilling at the Chile triple junction.

The South Pacific has two other places proposed for drilling when ridge crests enter trenchs. One has abnormal metamorphic rocks and the other has abnormally placed volcanic rocks. The Antarctic Peninsula is the first example. Its singular feature is the interception of the Hero and Shackleton fracture zones with the trench. Smith and Elephant Islands lie inshore and in line with these fracture zones. Blueschist metemorphism shows a place today where material that had recently been subducted 10 or more km is now being lifted above sea level.

Spreading exists today in the Woodland Basin, a very young basin southwest of the Solomon Islands. Its spreading ridge enters the trench southwest of the Solomons. There the unique feature is the present day volcanism adjacent to the southeast of the triple junction but outside the trench. A few dredgings augment land-sampling to show the dacitic nature of the volcanism, but the position and timing of the onset of volcanism relative to the complex tectonic and petrologic history of the Solomon Islands can be solved only by drilling.

The Manus Basin is the fastest spreading backarc basin known. Recently obtained seismic profiles show unexpected rock masses in the lower sections of its northern forearc. Presumably these are lava flows. Drilling should resolve new ideas about the petrology and structures of the earliest stages of forearc evolution.

(Other interesting combinations of petrology and tectonics in the Bransfield Straits and at the collision zone between the Ontong-Java Plateau and the Solomon Arc were presented by other drilling proponents at this workshop.)

2. A PROPOSAL FOR DRILLING ON THE PERU-CHILE FOREARC AT THE ARICA BIGHT.

W. Coulbourn, Hawaii Institute of Geophysics, University of Hawaii at Manoa.

INTRODUCTION.

The evolution of convergent margin structures and the relation of those structures to plate convergence are variable and only vaguely known. Efforts to sharpen our image of these processes have led to drilling on several active margins of the North Pacific Basin and will be addressed shortly on the Peruvian margin north of Arica during ODP Leg 112. Despite this history of investigation and progress in understanding the geological dynamics of convergent margins in general, there are several unanswered aspects of the general problem that can best be addressed by drilling on the forearc offshore of Arica, near the border of Peru and Chile.

OBJECTIVES UNIQUE TO THIS AREA.

1. <u>Contrast of Sedimentary Facies across the Trench Axis-Tectonic Mixing.</u>

Uniformity of sedimentary facies across convergent plate boundaries (trenches) has limited the success of drilling expeditions to the Nankai, Aleutian, and Middle America Trenches. Glacial sediments blanket both flanks of the Aleutian Trench, olive gray-green hemipelagic muds comprise the sedimentary section in the Nankai region and blanket a section of pelagic carbonates accumulated on the Cocos Plate. The red-brown clays of the NW Pacific Plate are nondiagnostic when mixed with slope sediments of the Japan Trench. In contrast, at Arica mid-Eocene subtropical planktonic foraminifera accumulated on the sea floor beneath South Pacific Central Water are now tectonically juxtaposed to sediment accumulating beneath the nutrient rich, cold waters of the Peru-Chile current. The contrast in planktonic foraminiferal assemblages is also mirrored in the assemblages of benthic foraminifera. The sediments are color-coded -- white pelagic carbonates of the Nazca Plate section contrast with olive-green hemipelagic muds of the lower slope landward toward the structural high. Turbidites ponded in the trench axis separate these two facies. Because the contrasts in microfossil assemblages, color, and mineralogy are so clear, tectonic mixing within the forearc and lower slope -- if it occurs at all -- would be easily recognizable.

2. <u>Structural Contrasts across the Change in Strike-Subduction Dynamics.</u>

The change of strike of the Peru-Chile Trench at Arica produces a contrast in geometry of plate convergence from oblique offshore of Peru to normal offshore of Chile. The reflection of such a difference in geometry on the structures and sediment dynamics of the landward slope is more easily addressed here than elsewhere. Superimposed on this effect is the contrast in deformation style of the Nazca Plate from a series of normal faults and down-stepped blocks offshore of Peru to horst and graben offshore of Chile. Also specific to this one area is the chance to examine the relation of forearc structures to the change in onshore geology, as revealed in the difference between lithotectonic units exposed in southern Peru and northern Chile.

3. <u>Sediment Starvation - Ease of Access to Subduction Complex.</u>

Seaward of the first tier of slope basins, the blanket of hemipelagic slope sediment appears to thin rapidly seaward. Because the slope cover is relatively thin, access to the subduction complex beneath should be easier here than along other convergent margins and most other segments of this Andean margin. Likewise, but higher on the slope, drilling to buried continental rock should be relatively easy, providing an assessment of both the nature and extent of continental rock on the seaward portion of the forearc.

4. <u>Other Active Margin Problems.</u>

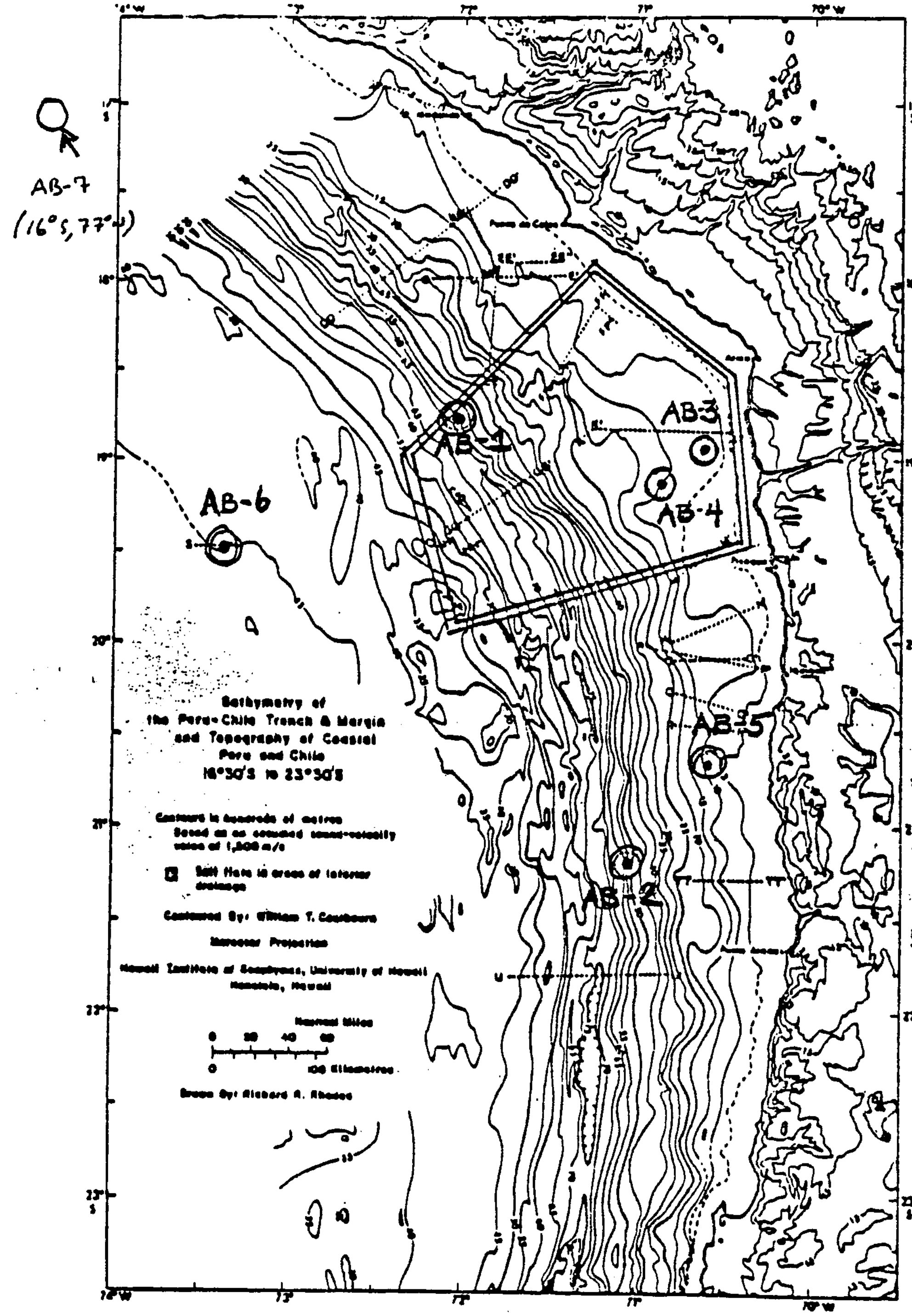
Problems pursued and remaining unanswered from drilling efforts on other margins can also be addressed or re-examined on the forearc at Arica. Estimates of uplift or subsidence can be deduced from benthic foraminiferal assemblages, consolidation studies may produce estimates of overburden removal, and collection of pore waters will provide clues to the composition of fluids circulating within the subduction complex.

5. <u>Paleoenvironmental Goals.</u>

The Peru-Chile margin lies beneath nutrient-rich, cool, upwelling waters of the northward flowing Peru-Chile Current. These highly productive surface waters are linked to a band of organic rich muds accumulating at several hundred meters depth, landward of the upper slope or forearc basins. Expansion or contraction of the breadth of these deposits holds the record of fluctuations in the intensity of the Peru-Chile Current. Leg 112 drilling will attempt to recover this record offshore of central Peru; a certain result of that drilling will be the desire to establish the regional extent of that pattern.

PROPOSED SITES.

Drilling strategy would follow previous expeditions to active margins in that a reference hole in the trench and a transect of slope sites is proposed (Fig. 1). Offshore of Arica, however, the series of slope holes must be drilled at offsets along strike if the goals of comparing and contrasting slope sediment and structures off of Peru and Chile are to be met. Holes would be located seaward of the structural high down to the trench axis (2000 to 8000 m water depth) and would penetrate 400 m to 800 m of slope sediment before reaching deeper objectives within the subduction complex. HPC holes would be required for the samples of organic carbon-rich sediments of the uppermost slope.



Area of proposed work in Arica Bight. Base from Coulbourn (1981).

PERU-CHILE TRENCH

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-1

General Area: Peru-Chile Trench, Arica Bight
Position: 18°45'S, 72°05'W
Alternate Site:

General Objective:
Forearc evolution

Thematic Panel interest: TECP
Regional Panel interest: CEPAC

Specific Objectives:

Sediment provenance along obliquely convergent tectonic grain (compare with AB-2); sedimentary fabric; sediment consolidation

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: KK 1973-74 Nazca Plate Project profile network

Other data: Gravity, heat flow, magnetics

Site Specific Survey Data: Equivalent of DD-DD' at 6000 m
Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 6000 Sed. Thickness: (m) > 1000 Tot. penetration: (m) 200

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: olive-gray hemipelagic mud

Weather conditions/window: always excellent

Territorial jurisdiction: Peru and Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Petrofabric specialist on board

Proponent: W. Coulbourn
Address & phone number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-8489

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-2	General Objective: Forearc evolution
General Area: Peru-Chile Trench, Arica Bight Position: $21^{o}15'S$, $71^{o}08'W$ Alternate Site:	Thematic Panel interest: TECP Regional Panel interest: CEPAC

Specific Objectives:

Sediment provenance and consolidation along a trench segment parallel to tectonic grain (compare with AB-1); sedimentary fabric and sediment consolidation in lower slope

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: KK 1973-74 Nazca Plate Project single channel profiles

Other data: Gravity, heat flow

Site Specific Survey Data: QQ-QQ' (Tu)
Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 6000 Sed. Thickness: (m) > 1000 Tot. penetration: (m) 200

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: olive-gray hemipelagic mud with tectonized Cenozoic carbonates

Weather conditions/window: always excellent

Territorial jurisdiction: Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Petrofabric specialist on board

Proponent: W. Coulbourn Address & phone number: Hawaii Institute of Geophysics 2525 Correa Road Honolulu, HI 96822 (808) 948-8489	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-3

General Objective: Forearc evolution and paleocirculation

General Area: Peru-Chile Trench, Arica Bight
Position: 19°00'S, 70°40'W
Alternate Site:

Thematic Panel interest: TECP, SOHP
Regional Panel interest: CEPAC

Specific Objectives:

Upwelling history (Peru-Chile current), tephrachronology, and delineation of edge of continental crust
1) structural differences within basins
2) form of continental edge

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: KK 1973-74 Nazca Plate Project Profile

Other data: Gravity, magnetics, heat flow

Site Specific Survey Data: L-L'
Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 1350 Sed. Thickness: (m) 1200 Tot. penetration: (m) 1250

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: biogenic and trapped terrigenous sediments overlying edge of continental igneous or metamorphic basements
Weather conditions/window: always excellent

Territorial jurisdiction: Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. Coulbourn
Address & phone number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-8489

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-4 General Area: Peru-Chile Trench, Arica Bight Position: 19°10'S, 70°50'W Alternate Site:	General Objective: Forearc evolution Thematic Panel interest: TECP Regional Panel interest: CEPAC

Specific Objectives:

Vertical motion and onset of deformation in the Arica Basin .

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: KK 1973-74 Nazca Plate Project

Other data: Gravity, magnetics, heat flow

Site Specific Survey Data: L-L'

Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 1500 Sed. Thickness: (m) 1500+ Tot. penetration: (m) 800

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: biogenic and trapped terrigenous sediments overlying th landward flank of a structural high; reflectors display progressive deformation with increasing subbotton depth

Weather conditions/window: always excellent

Territorial jurisdiction: Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. Coulbourn Address & phone number: Hawaii Institute of Geophysics 2525 Correa Road Honolulu, HI 96822 (808) 948-8489	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-5	General Objective: Forearc evolution
General Area: Chile Trench Position: 20°35'S, 70°35'W Alternate Site:	Thematic Panel interest: TECP Regional Panel interest: CEPAC

Specific Objectives:

Displacement, pore water chemistry and pressure and their relation to olistostrome formation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: KK 1973-74 Nazca Plate Project profile

Other data: Gravity, magnetics, heat flow

Site Specific Survey Data: (to be furnished later)

Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 1200 Sed. Thickness: (m) > 1000 Tot. penetration: (m) 00

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: olive-gray hemipelagic slope muds

Weather conditions/window: always excellent

Territorial jurisdiction: Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. Coulbourn Address & phone number: Hawaii Institute of Geophysics 2525 Correa Road Honolulu, HI 96822 (808) 948-8489	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AB-6

General Area: Peru-Chile Trench, Arica Bight
Position: 19°30'S, 73°30'W
Alternate Site:

General Objective:

Forearc evolution (oceanic plate reference section), Paleogene biostratigraphy

Thematic Panel interest: TECP, SOHP
Regional Panel interest: CEPAC

Specific Objectives:

Oceanic reference site; Eocene to Miocene carbonate chalk beneath red-brown clay; oldest magnetic lineations on Nasca Plate

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: KK 1973-74

Other data: Gravity, heat flow, magnetics

Site Specific Survey Data: S-S'

Seismic profiles:

Other Data: Free-fall and piston cores

Operational Considerations:

Water Depth: (m) 4500 Sed. Thickness: (m) 200 Tot. penetration: (m) Sediment and basement requirement 300 ?

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: clay/chalk/basalt

Weather conditions/window: always excellent

Territorial jurisdiction: Peru-Chile

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. Coulbourn
Address & phone number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-8489

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

.roposed Site: AB-7

General Objective: Cenozoic biostratigraphy, tephrachronology

-eneral Area: Arica Bight - Nazca Ridge
osition: 16°S, 77°W
Alternate Site:

Thematic Panel interest: SOHP
Regional Panel interest: CEPAC

pecific Objectives:

Obtain biostratigraphies and tephra record of Eastern South Pacific Basin (ridge is above CCD). Lower section was in gyre distant from land and presumably is this. Upper section increasingly close to coastal upwelling and tephra. Possible petrographic interest in a seismic-ridge basement.

ackground Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:
Seismic profiles: HIG, OSU

Other data: Gravity

Site Specific Survey Data:
Seismic profiles: HIG and OSU (to be provided)

Other Data: Piston cores

perational Considerations:

Water Depth: (m) 2800 Sed. Thickness: (m) 400 Tot. penetration: (m) 400 m plus basement requirement

HPC x Double HPC ** Rotary Drill x Single Bit x Reentry ___

ature of sediments/rock anticipated: carbonate and siliceous ooze over chalk over basalt

Weather conditions/window: always excellent

erritorial jurisdiction: Peru

Other:

** If biostratigraphers desire, upper section can be sampled twice with hydraulic piston core

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. Moberly
ddress & phone
number: Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-8765

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

3. RIDGE-TRENCH COLLISION OVERVIEW.
S. Cande, Lamont-Doherty Geological Observatory.

The geologic history of the circum-Pacific region is punctuated by collisions between active spreading ridges and trenches. Ridge-trench collisions have been documented for the active margins of Japan, the Aleutian Arc, North America, South America, and the Antarctic Peninsula. These collisions generally are characterized by a triple junction migrating along an active margin leaving behind a trail of geologic evidence. Based on the geologic record, it has been proposed that ridge-trench collisions have a major impact on the arc-trench system including uplift followed by subsidence of the margin, a hiatus in arc magmatism, increased levels of metamorphism in the forearc, near trench plutonism and volcanism, and tectonic erosion of the landward trench slope.

Ridge-trench collisions may provide an answer to one of the fundamental questions of forearc tectonics. It is now recognized that the Peru-Chile continental margin fluctuates between periods of sedimentary accretion interrupted by episodes of tectonic erosion. During periods of tectonic erosion, continental basement itself can be eroded, leading to truncation of the continental margin. Recent studies of the effect of ridge-trench collisions off southern Chile and the Antarctic Peninsula indicate that ridge collisions are a very effective mechanism for removing the accretionary prism and may be the cause of the episodes of continental margin truncation.

There are three places in the South Pacific where ridge-trench collisions can be studied. In each place the conditions are unique and provide the opportunity for studying different aspects of ridge-trench interactions. Off southern Chile an active ridge is currently passing beneath the landward trench slope. North of the collision there is rapid convergence between the Nazca Plate and South America. South of the collision zone, corresponding to the time after the collision, convergence continues, although at a much slower rate, between the Antarctic and South American Plates. Along the Antarctic Peninsula there have been a series of collisions during the Cenozoic between the Alute-Antarctic Ridge and the trench, culminating in a collision 4 m.y. ago south of the South Shetland trench. In this area, convergence ceases after the collision. In the Woodlark Basin, a spreading water in a young, backarc basin has started to be subducted beneath the Solomon Islands. This case is different from the two examples in the southeast Pacific because it involves a young backarc basin and is probably more typical of earlier ridge collision events in the western Pacific.

4. SOUTHERN CHILE MARGIN DRILL SITES.

S. Cande, Lamont-Doherty Geological Observatory.

The southern Chile margin triple junction is an ideal place to study the effects of ridge crest subduction. Because of the geometry of the ridge segments along the Chile Rise, in a distance of only a few hundred kilometers it is possible to study what happens before, during, and after a ridge-trench collision. North of the triple junction, we predict that ridge collisions will recur in 3 and 1 m.y. In the collision zone a section of the Chile Rise is in the process of being subducted. South of the triple junction, ridge-trench collisions took place at 3, 6, and 10 m.y. ago.

The ridge collision greatly affects the landward trench slope. As the triple junction is approached from the north, the landward slope narrows and steepens. This apparently reflects the tectonic erosion of the accretionary prism and perhaps the truncation of the continental margin. South of the triple junction, the landward slope rapidly widens as the accretionary prism is rebuilt.

We propose a series of drill sites with the following objectives: 1) document the history of uplift and subsidence of the landward trench slope accompanying a ridge collision event, and 2) document the extent of erosion of the landward trench slope during ridge collision.

To achieve these objectives will require drilling along three transects of the margin as follows (Fig. 1).

1) We propose a transect of the margin near 50° S in the zone where the collision took place 10 m.y. ago. This transect has the highest priority since the margin has undergone the entire cycle of uplift and subsidence. A hole drilled on a major mid-slope basin will define the history of uplift as well as the effects of the passage of the ridge on the basin sediments. A hole drilled on the lower trench slope will focus on processes involved in the rebuilding of the accretionary prism.

2) We propose a second transect across the collision zone. These holes will determine the level to which the landward trench slope has been eroded and may reveal whether the continental basement has been truncated.

3) We propose a third transect should be located north of the triple junction in the zone corresponding to 3 m.y. before the collision. Drilling here would establish the nature of the accretionary complex and provide a reference section for studying the effects of the collision on the other two transects.

Suggested Priorities for Drilling (Fig. 2).

Highest Priority.

1. Sites along profile 10. Drilling along this line would probably reveal the most complete picture of the effects of a ridge-trench collision.

2. Sites along profile B-B´ in the collision zone. This is the most active region, with the deepest levels of erosion and the highest thermal gradients.

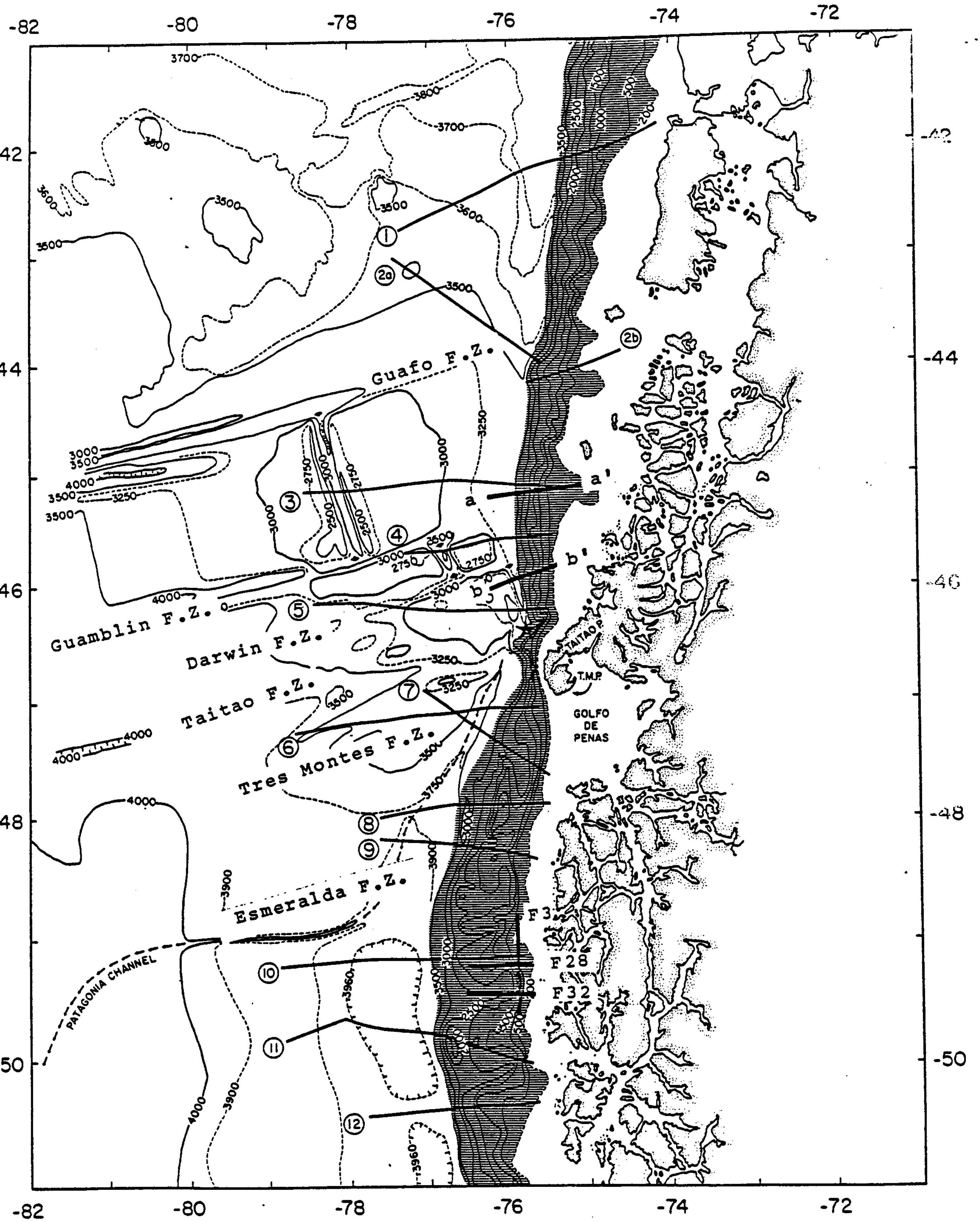


Figure 2. Bathymetric map of Southern Chile Trench. Inner trench wall is shaded.

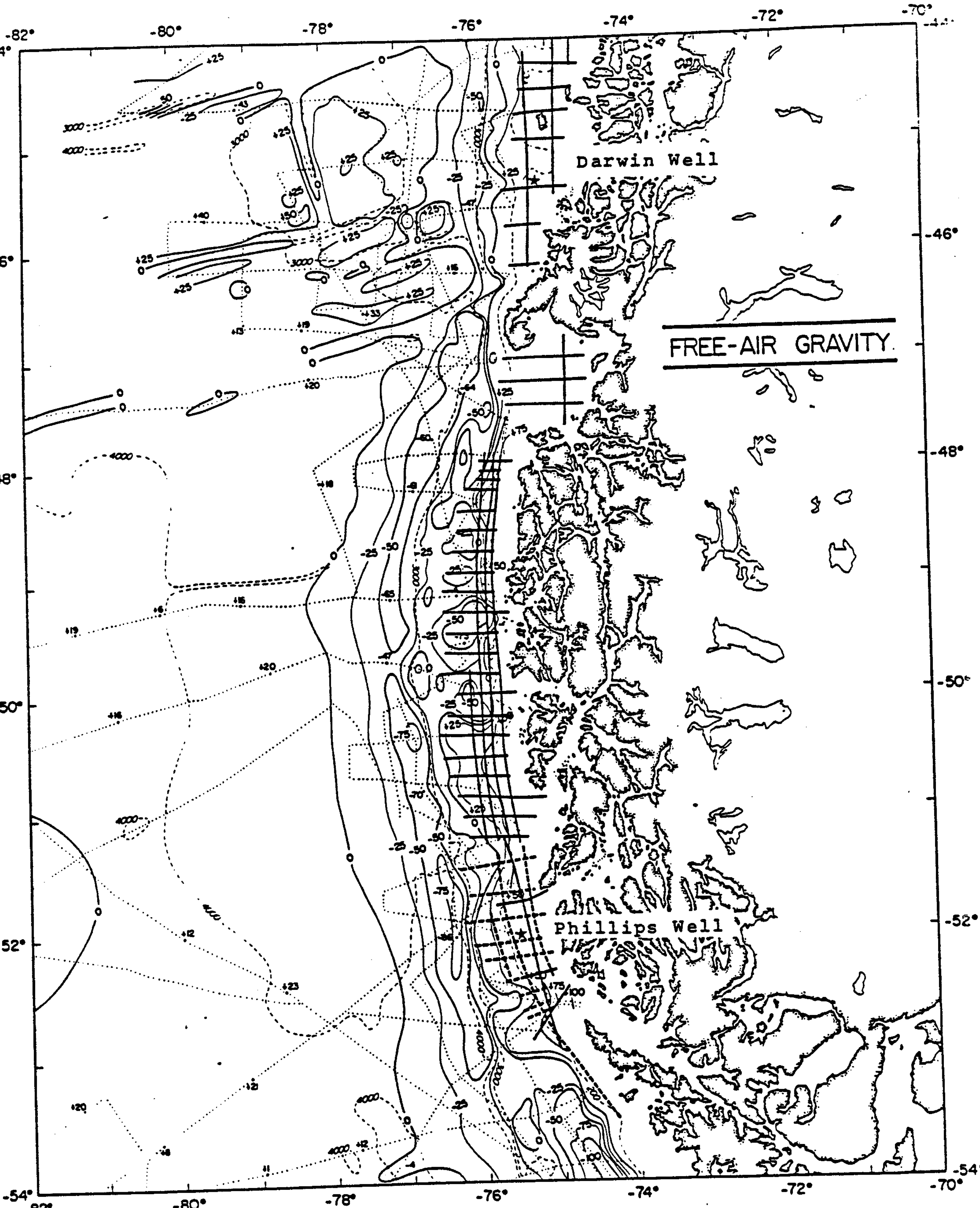


Figure 3. Location of ENAP MCS lines and wells near triple junction.

Proposed Site: TRENCH INNER WALL AND UPPER SLOPE BASIN SOUTH OF THE TRIPLE JUNCTION CTJ-1 General Area: Chile Triple Junction Position: 49°S, 76°W Alternate Site:	General Objective: DETERMINE EFFECTS OF THE NEOGENE RIDGE COLLISIONS ON THE TRENCH INNER WALL Thematic Panel interest: Tectonics Regional Panel interest: Eastern and Central Pacific

Specific Objectives:

1) Determine amount of uplift and subsidence that has occurred along the mid and upper slope.
2) Determine nature of acoustic basement.
3) Determine the stratigraphy and thermal history of the sediments in the Madre de Dios Basin

Background Information:

Regional Data:

Seismic profiles: Conrad Leg 21-07, ENAP

Other data: Conrad magnetics, gravity

Site Survey Data - Conducted by:

Date:

Main results:

Operational Considerations

Water Depth: (m) 1500m   Sed. Thickness: (m) 500-1000m   Total penetration: (m) 500-1000m

HPC ____   Double HPC ____   Rotary Drill __X__   Single Bit __X__   Reentry ____

Nature of sediments/rock anticipated: Claystone, siltstone

Weather conditions/window: Austral Summer

Territorial jurisdiction: Chile

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Steve Cande Lamont-Doherty Geological Observatory Palisades, NY 10964	Date submitted to JOIDES Office: July 18, 1984

Proposed Site: TRENCH SLOPE IN THE COLLISION ZONE
CTJ-2

General Area: Chile Margin Triple Junction
Position: 46°S, 76°W
Alternate Site:

General Objective: Characterize the ridge-trench interaction in the collision zone.

Thematic Panel interest: Tectonics
Regional Panel interest: Central and Eastern Pacific

Specific Objectives:

1) Determine extent and nature of the accretionary prism.
2) Determine level of erosion of the trench inner wall.
3) Determine effect of high thermal gradients.
4) Determine mechanism by which trench inner wall is eroded.

Background Information:

Regional Data:

Seismic profiles: Conrad Leg 23-04

Other data: Conrad Magnetics, gravity

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) 2000m   Sed. Thickness: (m) ?   Total penetration: (m) 300m/hole

HPC ____   Double HPC ____   Rotary Drill X   Single Bit X   Reentry ____

Nature of sediments/rock anticipated: Accretionary prism.

Weather conditions/window: Austral Summer

Territorial jurisdiction: Chile

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
Steve Cande
Lamont-Doherty Geological Observatory
Palisades, NY 10964

Date submitted to JOIDES Office:
July 18, 1984

Proposed Site: RIFT VALLEY FLOOR
CTJ-3

General Area: Chile Margin Triple Junction
Position: 46°S, 76°W
Alternate Site:

General Objective: Drill into Zero age crust

Thematic Panel interest: Lithosphere
Regional Panel interest: Central and Eastern Pacific

Specific Objectives:

Drill into a magma chamber?

Background Information:
Regional Data:
Seismic profiles: Conrad Leg 23-04

Other data: Conrad magnetics and gravity

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) 3000m Sed. Thickness: (m) 200m Total penetration: (m) ?

HPC ____ Double HPC ____ Rotary Drill X Single Bit ____ Reentry X

Nature of sediments/rock anticipated: Turbidites over basalt

Weather conditions/window: Austral Summer

Territorial jurisdiction: Chile

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
Steve Cande
Lamont-Doherty Geological Observatory
Palisades, NY 10964

Date submitted to JOIDES Office:
July 18, 1984

5. BRANSFIELD STRAIT: LITHOSPHERE/TECTONIC DRILLING OBJECTIVES.
P. Barker, University of Birmingham, U.K.

The Bransfield Strait is a newly opened basin which separates the South Shetland Islands from the Antarctic Peninsula. Active rifting has produced a basin some 40 km wide and 2000 km deep. Within the basin, fresh andesites have been dredged from volcanic centers in the middle of the basin, which is otherwise sediment-filled. An off-axis site, drilled well into basement, would allow the following questions to be addressed:

1. Changes in composition and volcanic processes during the transition from continental to oceanic rifting,
2. Extent of influence of subduction along the South Shetland Trench to the northwest on the composition of the mantle beneath the region,
3. Relative contributions of subcontinental and suboceanic mantle to volcanism and temporal changes in these contributions,
4. Sediment-magma interaction (i.e., assimilation of magma by sediment), and
5. Hydrothermal flux from a backarc spreading center (which may be largely captured by the sediment).

Bransfield Strait, Site BR-1 on map 3.

6. ANTARCTIC PENINSULA, PACIFIC MARGIN DRILLING PROPOSAL.
P. Barker, University of Birmingham, U.K.

Along the Pacific margin of the Antarctic Peninsula (Fig. 1), a series of collisions have taken place between ridge crest sections of the Antarctic-Aluk (Phoenix, Drake) plate boundary and a trench. The earliest collision took place in the southwest about 50 Ma age and the most recent occurred off Smith I 4 Ma ago. Before collision, subduction geometry was very simple: subduction and spreading directions were parallel. After collision, subduction stopped, so that the record of subduction and collision is unusually well-preserved. Collision was "passive", in the sense that the newly opposed ridge flank and forearc had no relative motion after collision - both were part of the Antarctic plate.

Farther to the northeast, spreading stopped (4 Ma ago, the time of the final collision) before the spreading centres had reached the trench. Trench topography is preserved and continued roll-back of the hinge of the sinking slab is thought to have caused the current backarc extension in Bransfield Strait.

Little is known of the effects of ridge crest-trench collisions on the overriding plate, because the world is short of recent, well-defined examples. Yet collisions will have occurred at some time or other along most long-lived active margins. Among the effects hypothesised are:

(a) tectonic erosion of the accretionary prism;

(b) uplift as the more buoyant oceanic lithosphere near the ridge crest is subducted and/or as the base of the overriding plate is heated;

(c) regional thermal metamorphism of the surviving forearc, from the latter cause also; and

(d) changes in volcanism due to a reduction in the amount of water being subducted, and an increase in the direct supply of heat.

In 1985 (Discovery cruise 154) the Birmingham/BAS group carried out a survey of the younger collision zones (16, 14, 6.5, and 4 Ma) which included DMCS, gravity, magnetic, shallow (shelf) sidescan profiling, and dredging. A WHOI team made heat flow measurements. These data are not yet completely processed: for example, the DMCS processing (April 1986) has reached brute stack. However, it is already apparent that the sediments on the ocean floor and on the shelf together provide the opportunity of examining the uplift history.

The sidescan survey of the shelf (mostly in the 14 Ma collision zone) was a piggy-back operation, along ship tracks located on tectonic considerations. Nevertheless, it allowed us to map several different types of surface fabric which have been related to glacial processes. John Anderson (Rice) agreed to test our ideas during his recent coring cruise aboard USCGS Glacier. Together with the reflection profiles, the sidescan records suggest that the outer shelf high is a wedge of glacial till bulldozed to the outer shelf by grounded shelf ice during a glacial maximum. It is over 400 m thick in places, above a prominent unconformity. Since the last glacial maximum, the wedge has been scarred by drifting icebergs, and a thin layer of glacial marine sediments (thicker inshore) has been deposited.

Despite the steepness of the continental slope, it appears progradational, and the subdued nature of magnetic anomalies offshore (off the 16 Ma and 14 Ma collision zones) suggests that shelf-derived sediment was able to overstep the advancing ridge crest. DSDP Hole 325 off the 16 Ma collision zone, though only spot-cored, suggests a hiatus in the supply of terrigenous sediment between 15 and 8 Ma, after the collision. We take this to imply uplift of the outer shelf by heating from below, and subsequent cooling. However, to separate this effect from any fluctuations in the glacial state of the Antarctic Peninsula, it would be necessary to find the extent of the hiatus in two different age provinces. The model should be tested additionally by drilling a short hole through the glacial wedge on the shelf, also in each collision age province. This would check the extent of the sub-wedge unconformity (reflecting uplift of the outer shelf) against its oceanic equivalent. In addition to showing the uplift history (to constrain a thermomechanical model), these holes would also test hypotheses of the glacial history of West Antarctica. Was the wedge produced entirely by glacial processes? Entirely during the last glacial maximum? Mostly by a Pliocene glacial advance greater than any since? Or as we suspect, was it produced over a large number of glaciations, successively more severe, on a margin that has been subsiding gently meanwhile? Interbedded glacial marine and till sequences should allow the outer shelf wedge to be dated and reveal the history of glaciation along the Antarctic Peninsula.

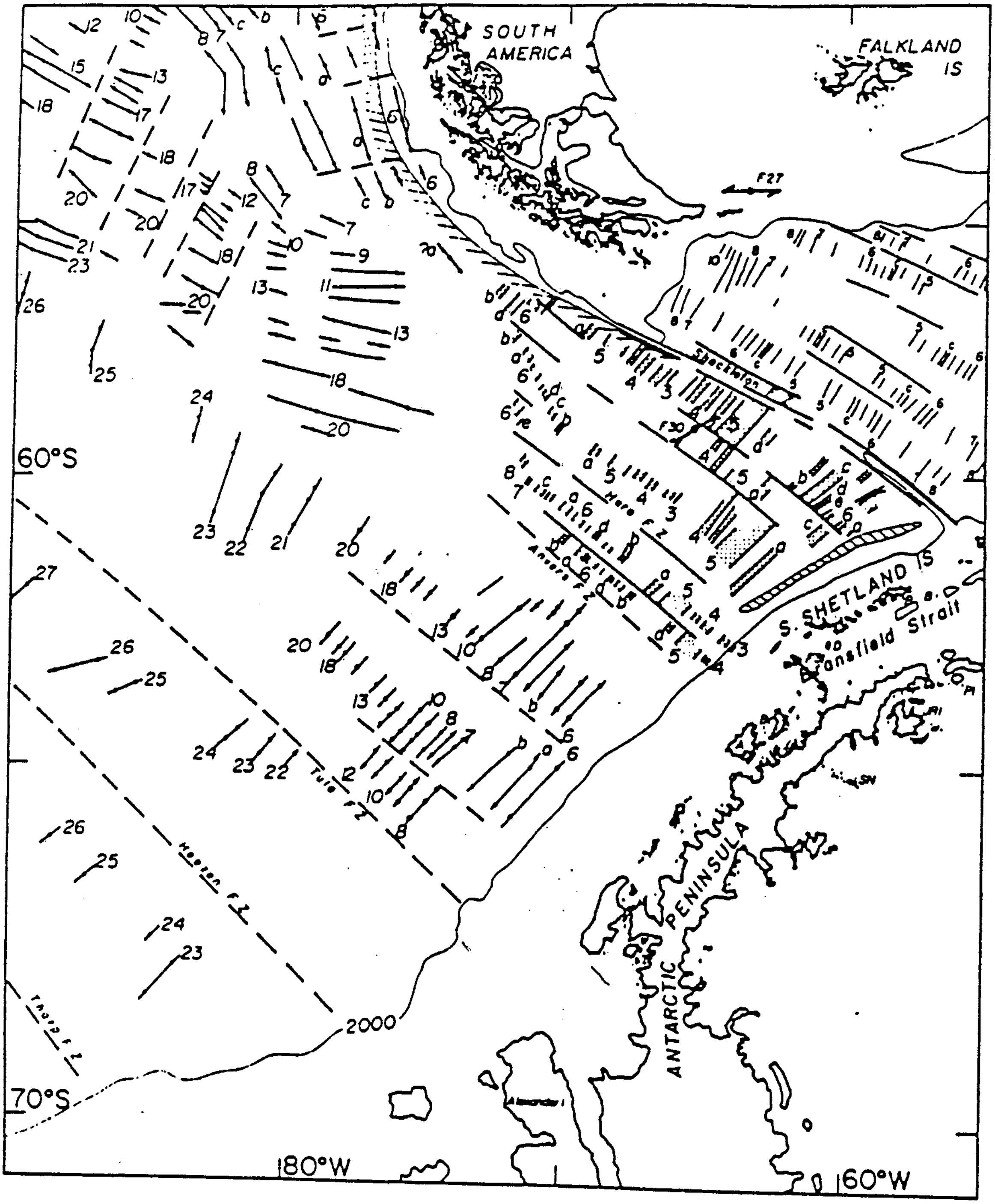
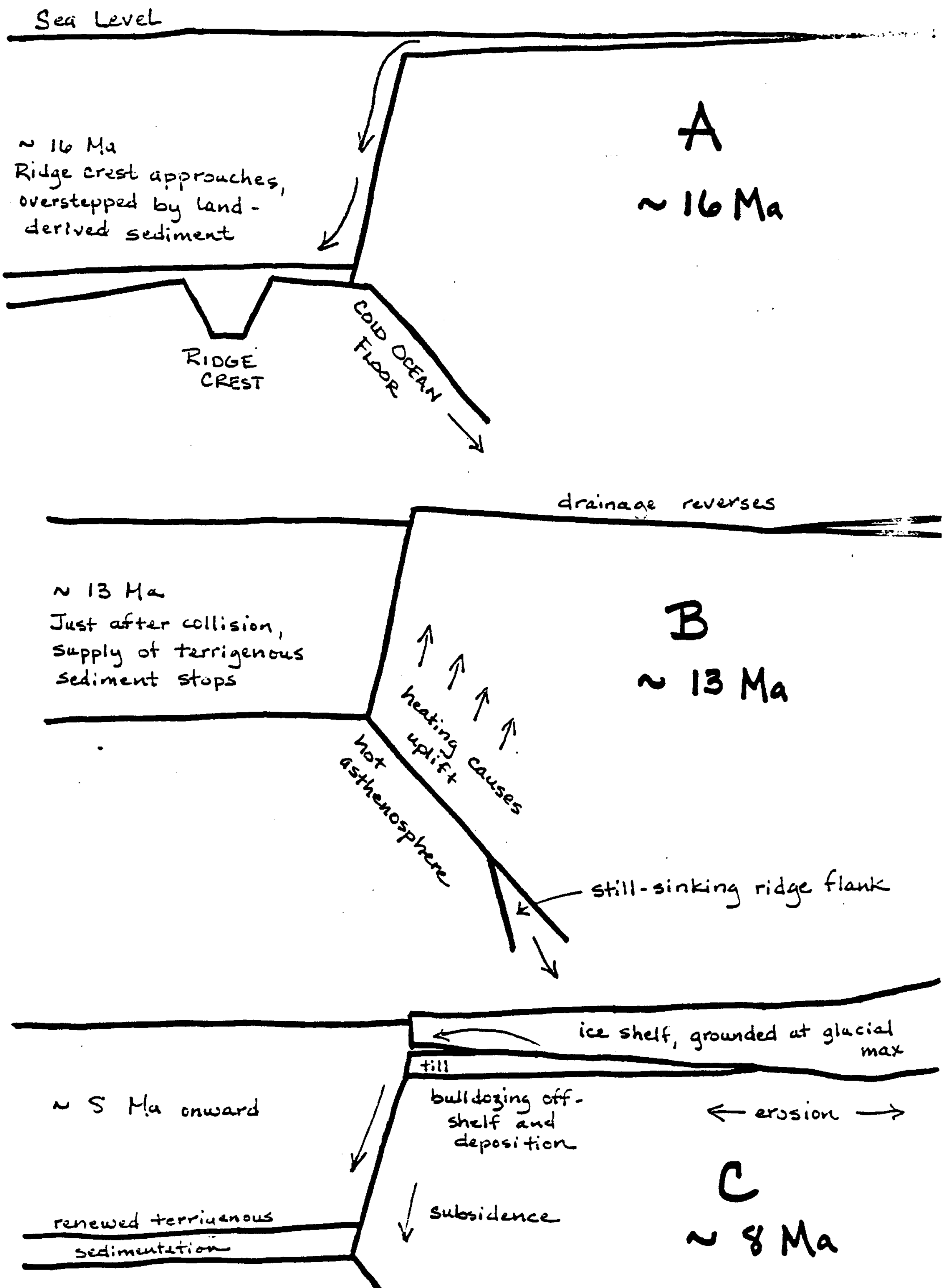


Figure 1. Magnetic anomalies off Antarctic Peninsula (from Barker, 1982) showing ridge crest-trench collisions becoming younger northeastward, from 50 Ma ago off Alexander I to only 4 Ma ago (anomaly 3) off Brabant I.

Fig. 2. Crude model of Antarctic Peninsula sedimentation at 14 Ma collision zone.



ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AP-1 (see also AP-2, AP-3, AP-4) General Area: Antarctic Peninsula Position: 64°S, 67°W Alternate Site:	General Objective: 1) Ridge crest-trench collision processes at 14 Ma collision 2) Peninsula glacial history and sedimentation Thematic Panel interest: TECP, SOHP Regional Panel interest: SOP

Specific Objectives:

1) To date hiatus in terrigenous sedimentation caused by collision-related uplift of the outer shelf
2) To study the relationship between shelf and continental rise sedimentation during glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, *Discovery* cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz and 12 kHz, heat flow

Site Specific Survey Data:

Seismic profiles: UK, to be undertaken 1987-8

Other Data:

Operational Considerations:

Water Depth: (m) 3400 Sed. Thickness: (m) 1000 Tot. penetration: (m) 550

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: terrigenous silt/clay (silica-rich)

Weather conditions/window: December-April (inclusive)

Territorial jurisdiction: Antarctic Treaty applies

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker Address & phone number: Geology Department Birmingham University Birmingham B15 2TT, England	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AP-2

(see also AP-1, AP-3, AP-4)

General Area: Antarctic Peninsula
Position: 67°S, 73°W
Alternate Site:

General Objective:

1) RC-T collision processes at 18 Ma collision
2) Peninsula glacial history and sedimentation

Thematic Panel interest: TECP, SOHP
Regional Panel interest: SOP

Specific Objectives:

1) To date hiatus in terrigenous sdeimentation caused by collision-related uplift of the outer shelf
2) To study the relationship between shelf and continental rise sedimentation during glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, *Discovery* cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz and 12 kHz

Site Specific Survey Data:

Seismic profiles: To be undertaken 1987-8

Other Data: Sidescan?

Operational Considerations:

Water Depth: (m) 3700   Sed. Thickness: (m) 1200   Tot. penetration: (m) 600

HPC x   Double HPC ___   Rotary Drill x   Single Bit x   Reentry ___

Nature of sediments/rock anticipated: terrigenous silt/clay

Weather conditions/window: December-April

Territorial jurisdiction: Antarctic Treaty applies

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AP-3

General Area: Antarctic Peninsula
Position: 64°S, 65°W
Alternate Site:

General Objective:

1) RC-T collision processes at 14 Ma collision
2) Peninsula glacial history from glacial till wedge

Thematic Panel interest: TECP, SOHP
Regional Panel interest: SOP

Specific Objectives:

1) To date an unconformity on the outer shelf attributed to uplift related to RC-T collision
2) Sample a 400 m thick till on the outer shelf to describe the history of Peninsula glaciation

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: UK, Discovery cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz, sidescan
USCGC Glacier data and cores

Site Specific Survey Data:
Seismic profiles: UK 1987-8 season

Other Data: US 1986-7 season

Operational Considerations:

Water Depth: (m) 450 Sed. Thickness: (m) 2000 Tot. penetration: (m) 500

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: glacial till/interbedded diatom-rich glacial marine

Weather conditions/window: December-March

Territorial jurisdiction: Antarctic Treaty

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AP-4

General Area: Antarctic Peninsula
Position: 67°S, 71°W
Alternate Site:

General Objective:
1) RC-T collision process at 18 Ma collision zone
2) Peninsula glacial history from glacial till wedge

Thematic Panel interest: TECP, SOHP
Regional Panel interest: SOP

Specific Objectives:
1) Date unconformity on outer shelf attributed to uplift related to RC-T collision
2) Sample a 400 m thick till on outer shelf to describe history of Peninsula glaciation

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: UK, *Discovery* cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, sidescan
USCGC *Glacier* data and cores

Site Specific Survey Data:
Seismic profiles: UK 1987-8 season

Other Data: Possible US 1986-7 season

Operational Considerations:
Water Depth: (m) 450 Sed. Thickness: (m) 2000 Tot. penetration: (m) 500
HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____
Nature of sediments/rock anticipated: glacial till/interbedded diatom-rich glacial marine
Weather conditions/window: December-March
Territorial jurisdiction: Antarctic Treaty
Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

7. PROPOSAL FOR WOODLARK BASIN-SOLOMON ISLANDS TRIPLE JUNCTION: RIDGE SUBDUCTION AT AN ARC.

M. Perfit, University of Florida; M. Marlow, U. S. Geological Survey.

RATIONALE

The Woodlark Basin-Solomon Islands region is a tectonically unique locality where an active ridge (Woodlark Spreading Center) has been and is being subducted beneath an active island arc (New Georgia Group). Previous geophysical and sampling studies have provided a model of ridge subduction in the region and a framework for future investigations of the complex tectonic and magmatic processes that occur at ridge-trench-transform triple junctions. This triple junction is particularly instructive because the Woodlark Spreading Center is a typical MOR-type (not affected by hot spots, nonbackarc) and the arc is relatively young (not complicated by multiple thermal-magmatic events) and oceanic in nature (not complicated by continental crustal processes).

Although rock dredging suggested that there is an interplay between MORB magma genesis and arc volcanism at the triple junction, the temporal and spacial relationships are unclear. Additionally, dredging in the forearc primarily recovered talus from the arc rather than bedrock, so the effects of ridge subduction on arc crust are still unknown. We propose three sites that would provide critical information regarding the fate of young ridges and oceanic crust at subduction zones and their consequences in the development of island arcs. One site (WB-1) is located on the flank of the subducting ridge within the sediment covered triangular region between Ghizo Ridge-Simbo Transform and the trench. Site WB-2 is in the forearc region above the zone of ridge subduction just west of the active submarine volcano Kavachi. The third site WB-3 is just seaward of the trench on older ocean crust about to be subducted.

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WB-1
Woodlark Basin (Ghizo Ridge)

General Area: N. Woodlark Basin
Position: 156°43'15"E, 08°30'15"S
Alternate Site:

General Objective:
Tectonic and magmatic effects of spreading center subduction

Thematic Panel interest: TCP, SOHP
Regional Panel interest: WPAC

Specific Objectives:
To determine the nature and age of crust formed at the complex ridge-transform-trench triple junction. The site is located on the north flank of the subduction ridge in a region of thick sediment cover. Samples of sedimentary rocks will provide information on history of the fore-arc and nature of material being subducted. Crustal samples will give first detailed information on volcanic rocks of unusual chemical composition erupted at triple junction.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: 1982 Kana Keoki CCOP/SOPAC Cruise: 10 N-S single channel seismic reflection profiles across Woodlark Basin and New Georgia forearc; 7 intersecting seismic lines

Other data: Gravity, heat flow, magnetics, bathymetry, core samples, dredge samples USGS multichannel seismic lines nearby (1982, 1984)

Site Specific Survey Data:

Seismic profiles: 5 single channel seismic reflection profiles with 5 intersecting lines

Other Data: Detailed SeaMarc investigation by H.I.G. (B. Taylor)
Magnetics, gravity, 2 dredges on ridge are on Kana Keoki seamount to east

Operational Considerations:

Water Depth: (m) 3000 Sed. Thickness: (m) ~ 500 Tot. penetration: (m) 500 +

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry possibly in basement

Nature of sediments/rock anticipated: clay-rich sediments with mixtures are arc-derived detritus and ash overlying basaltic basement

Weather conditions/window: Cyclone season Feb-May

Territorial jurisdiction: Solomon Islands

Other: Note that this proposal is an extension of those proposed by J. G. Vedder and T. R. Brans (JOIDES Ref 191/D) for the Solomon Arc and intra-arc basin

Special Requirements (staffing, instrumentation, etc.):

Proponents: Michael R. Perfit
Address & phone number: Dept. of Geology
University of Florida
Gainesville, FL 32611
(904) 392-2128
M. Marlow, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WB-2

New Georgia Group (Solomon Islands)
Forearc (Blanche Channel)

General Area: Solomon Islands
Position: 157°36'45"E, 08°34'45" S
Alternate Site:

General Objective:

Tectonic and magmatic effects of spreading center subduction

Thematic Panel interest: TCP, SOHP
Regional Panel interest: WPAC

Specific Objectives:

To determine the uplift and subsidence history or the New Georgia forearc as related to the subduction of the Woodlark spreading center. Drilling data will provide sedimentary/ash stratigraphy with which we can determine the paleobathymetry, thermal history, and episodes of volcanism. Vertical tectonics and forearc volcanism are well documented, but timing and magnitude are poorly constrained. Important to compare with USGS data on Vella Ridge to NW.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles:

Other data:

as in WB-1

Site Specific Survey Data: 1982 CCOP/SOPAC Kana Keoki cruise

Seismic profiles: 3 crossing single channel seismic reflector profiles

Other Data: Detailed heat flow measurements across channel, gravity, one piston core, 2 dredges on Kavachi seamount to East

Operational Considerations:

Water Depth: (m) 1010 Sed. Thickness: (m) > 1000 Tot. penetration: (m) 1000 +

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: silty clay with high proportion of volcanogenic detritu

Weather conditions/window: Feb-May cyclone season

Territorial jurisdiction: Solomon Islands

Other: This proposal complements Site SB-1 proposed by J.G. Vedder and T.R. Brans to study the tectonic history of Vella Ridge NW of the islands

Special Requirements (staffing, instrumentation, etc.):

Proponent: Michael R. Perfit &
Address & phone Michael Marlow
number:

(see WB-1)

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WB-3 East Woodlark Basin General Area: Solomon Islands Position: 157°28'30"E, 08°59'S Alternate Site:	General Objective: Tectonic and magmatic development of the Woodlark Basin Thematic Panel interest: TCP, SOHP Regional Panel interest: WPAC

Specific Objectives:

To sample material from the Solomon Islands forearc slope and trench on older oceanic crust formed at the Woodlark spreading center. This area is the extension of Ghizo Ridge which is comprised of a submarine dacitic volcano on its eastern end. It is not known if the oceanic basement here is arc-like or typical MORB. Sediments may be derived from submarine eruptions to the west. Sediments overlying basement will provide information on age of oceanic crust and timing of volcanism in the arc (ash layers).

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: } as in WB-1

Other data: } as in WB-1

Site Specific Survey Data: 1982 CCOP/SOPAC Kana Keoki cruise and 1985 HIG Sea Marc study (B. Taylor)

Seismic profiles: 3 crossing single channel relfection profiles

Other Data: One dredge and one core nearby, Sea Marc survey, gravity, heat flow profile nearby, dredge and core on Kana Keoki seamount to west

Operational Considerations:

Water Depth: (m) 3700 Sed. Thickness: (m) ~ 200 Tot. penetration: (m) 200 +

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry possible in basement

Nature of sediments/rock anticipated: turbidites, silty clay and hyaloclastics overlying basaltic (?) basement

Weather conditions/window: Feb-May cyclone season

Territorial jurisdiction: Solomon Islands

Other: This proposal is an extension of those proposed by J.G. Vedder and T.R. Brans (JOIDES Ref. 191/0)

Special Requirements (staffing, instrumentation, etc.):

Proponent: Michael R. Perfit & Michael Marlow Address & phone number: (see WB-1)	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

8a. MANUS FOREARC TECTONICS.

M. S. Marlow, U. S. Geological Survey; M. Perfit, University of Florida.

BACKGROUND

Multichannel seismic reflection and magnetic profiles collected in the forearc north of Manus Island (Bismarck Sea) revealed more than 8000 km of magnetic, highly reflective, and flat-lying layers, layers thought to be outpourings of lava. The "lava flows" occupy the broad, relatively flat regions of the forearc, and their thickness and age are unknown. The layers are buried by 100-400 meters of hemipelagic (?) sediment. The sources of the flows are also unknown; they may be related to volcanic outpourings along the Manus volcanic arc to the south. Alternatively, the flows may be part of a failed system related to the formation of the backarc Manus Basin south of Manus Island. However, these flows extend across the Manus forearc, and are, therefore, in the wrong position geometrically to be related to backarc spreading.

SITE MF. 1A

Location: 01°28.9´S, 146°14.3´E. Water depth: 1840 m. Sediment thickness 100-200 m. Suspected lava flows beneath sediment cover. Objectives are to sample and date possible extensive lava flows in the Manus forearc and possible relate the flows to the opening of Manus Basin. Also, to sample and date the overlying 100 to 200 m of hemipelagic (?) sediment for the history of sedimentation in the forearc, including ash chronology, ocean circulation, etc.

SITE MF 1B

Location: 01°45.9´S, 146°09.3´E. Water depth: 1500 m. Sediment thickness 100-200 m. This alternate site has the same objectives as site MF 1A with the additional possibility that older, deformed sedimentary deposits of the Manus forearc may be reached beneath the lava flows. However, we cannot accurately estimate the total depth because the thickness of the overlying flows is unknown. Seismic reflection data suggest that the deformed section may be 500 to 1000 m below the sea floor. The deformed section is folded and ruptured by thrust faults, and seismological studies confirm the existence of thrust events that may be associated with southward dipping faults in the Manus forearc. Secondary objectives of this site are the age, origin, and time of deformation of the offscrapped (?) sediment pile beneath the lava flows and the history of the Manus volcanic arc and forearc.

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MF1A General Area : Manus Forearc (Bismarck Archipelago) General Area: Position: 1°28.9S'; 146°14.3'E Alternative Site: MF1B	General Objective: Origin and age of the Manus forearc - extinct subduction zone and overlying lava flows possibly related to failed backarc spreading in a forearc setting. Thematic Panel interests: LithP, SOHP, TECP Regional Panel interests: WPRP

Specific Objectives:

- Nature and age of extensive lava flows in Manus forearc that may be related to the opening of Manus Basin.
- Nature and age of offscraped sediment pile in extinct Manus forearc convergence zone (beneath lava flows).
- History of Manus forearc, arc, and Manus Basin.

Background Information:

Regional Data:

Seismic profiles: Intersection of USGS L784SP Line 424 (24-channel) and BMR (Australia) Line 05/48; CCOP/SOPAC & BMR profiles nearby.

Other data: USGS Gravity and magnetic data; BMR magnetic data

Site Survey Data - Conducted by: Could be conducted by BMR onboard the R/V Rig Seismic

Date:

Main results:

Operational Considerations

Water Depth: (m) 1840 Sed. Thickness: (m) 100-200 Total penetration: (m) 200-500

HPC______ Double HPC ______ Rotary Drill _X__ Single Bit _X__ Reentry ______

Nature of sediments/rock anticipated: 100-200 meters of pelagic ooze overlying lava flows - may be sediment beneath lave flows (both unknown thicknesses)

Weather conditions/window: Best weather December-January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

NONE

Proponents: Date submitted to JOIDES Office:

Michael S. Marlow
Pacific Marine Geology - MS999
US Geological Survey
345 Middlefield Road
MENLO PARK CAL 94025 USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
CANBERRA ACT 2601 Australia

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MF1B General Area: Manus Forearc (Bismarck Archipelago) Position: 1°45.9'S; 146°09.3'E Alternative Site: MF1A	General Objective: Origin and age of the Manus forearc - extinct subduction zone and overlying lava flows possibly related to failed backarc spreading in a forearc setting. Thematic Panel interests: LithP, SOHP, TECP Regional Panel interests: WPRP

Specific Objectives:

- Nature and age of extensive lava flows in Manus forearc that may be related to the opening of Manus Basin.
- Nature and age of offscraped sediment pile in extinct Manus forearc convergence zone (beneath lava flows).
- History of Manus forearc, arc, and Manus Basin.

Background Information:

Regional Data:

Seismic profiles: Intersection of USGS L784 SP Line 424 (24-channel) and BMR Australia Line 05/41; SOPAC-BMR Lines nearby.

Other data: USGS gravity and magnetic data; BMR magnetic and earthquake data

Site Survey Data - Conducted by: Could be conducted by BMR onboard the R/V Rig Seismic

Date:

Main results:

Operational Considerations

Water Depth: (m) 1500 Sed. Thickness: (m) 100-200 Total penetration: (m) 200-500

HPC ______ Double HPC ______ Rotary Drill __X__ Single Bit __X__ Reentry ______

Nature of sediments/rock anticipated: 100-200 meters of pelagic ooze overlying lava flows - may be sediment beneath lava flows (both unknown thicknesses)

Weather conditions/window: Best weather : December-January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

NONE

Proponents: Date submitted to JOIDES Office:

Michael S. Marlow
Pacific Marine Geology MS999
US Geological Survey
345 Middlefield Road
MENLO PARK CALIF 94025 USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
CANBERRA ACT 2601

8b. CONVERGENT MARGINS OF DRAKE PASSAGE; A PRELIMINARY PROPOSAL.
Ian W. D. Dalziel, Institute for Geophysics, University of Texas at Austin.

The continental margins of Drake Passage may present unique opportunities for studying convergent margins and orogenic processes if new geophysical studies, that are the subject of a pending proposal, are undertaken in time for consideration in a southeastern Pacific Ocean leg of JOIDES Resolution. This note is intended only to point out the potential of the area. The new data are definitely required before a "mature" proposal could be formulated.

There are two aspects worthy of consideration (apart from others such as ridge crest-trench "collision" pointed out by others such as Cande and Barker). First, it should be noted that the two sides of Drake Passage represent different stages in the evolution of a cordilleran mountain range. In the southern Andes a backarc basin like that presently active off the Antarctic Peninsula (Bransfield Strait) was uplifted and destroyed in the mid-Cretaceous indicating tectonic uplift of the southern Andes. Thus, the potential exists for contributing by drilling to an understanding of cordilleran orogenic processes in a situation far simpler than that of the North American cordillera, and far more accessible than that encountered elsewhere in the Andes. Accessible, for example, is the passive continental margin of a backarc basin, prior to inversion to form a cordillera, for comparison with the passive margin of a continent bordering an Atlantic-type ocean basin. Also accessible are sediments reflecting the infilling of a very young backarc basin with a high thermal gradient representative of Andean regional metamorphism, and the basement of a backarc basin initiated within continental crust.

Second, the Drake Passage area offers opportunities for drilling metamorphic complexes that represent products of "underplating" in subduction zones. The Diego Ramirez Islands off Cape Horn, the Elephant Island Group, and Smith Island in the South Shetland Islands (map 3) all contain comparatively high P/T metamorphic mineral assemblages involving MORB volcanics and pelagic sedimentary rocks. These islands are uniquely located at fracture zone-convergent margin intersections (both ends of the Shackleton fracture zone and the southern end of the Hero fracture zone). While the mechanisms of subduction and uplift are yet to be understood, the geotectonic setting is unique and may offer an important opportunity for understanding the evolution and uplift of the deep-seated parts of a subduction complex.

South Shetland Islands: Sites SS-1, SS-2 (map 3), formal site proposal pending.

E. MID-PLATE VOLCANISM

1. Manihiki Plateau (MP-1, MP-2, MP-3)
2. Ontcng-Java and Manihiki Plateaus (OJ-1 through OJ-6)
3. Nauru Basin

1. PROPOSED DRILLING ON THE MANIHIKI PLATEAU.

W.M. White, R.A. Duncan and M.R. Fisk, College of Oceanography, Oregon State University; L. Kroenke, Hawaii Institute of Geophysics, University of Hawaii at Manoa.

The Manihiki Plateau is a region of anomalously elevated, and apparently thick, crust (Hussong et al., 1979) in the Central Pacific, north and east of Samoa. Some debate exists as to the origin of this and the Ontong-Java Plateau to the west. Basalt recovered at the base of Hole 289, on the Ontong-Java Plateau, is petrologically similar to MORB. However, both this basalt and basalt collected from the island of Malaita in the Solomons, where part of the Ontong-Java Plateau is exposed by obduction which began 10 Ma ago, have isotopic compositions similar to those of OIB rather that MORB. The Ontong-Java Plateau is of lower Cretaceous age. On Malaita, however, later alkalic volcanics of upper Cretaceous to Eocene age are exposed and include a pipe-like intrusion of alnoite dated at 34 Ma. The alnoite bears many similarities to kimberlite, including the presence of upper mantle xenoliths (Nixon and Boyd, 1979) and is the only oceanic occurrence of such rocks. The alnoite and its xenoliths also have isotopic compositions similar to those of oceanic islands. Thus, the Ontong-Java Plateau and underlying lithosphere are chemically distinct from normal oceanic crust and lithosphere.

Additional evidence for chemically anomalous mantle in this region comes from studies of Samoa. Like Hawaii, Samoa has two main phases of volcanism: shield and post-erosional. Whereas, Hawaiian post-erosional volcanics have isotopic compositions that become more MORB-like, indicating increased involvement of normal depleted upper mantle, Samoan post-erosional volcanics do not. In fact, there is not evidence for the involvement of depleted mantle in Samoan volcanism. It has been speculated that the region of anomalous mantle that apparently underlies the Ontong-Java Plateau extends to Samoa. The Manihiki Plateau may also be underlain by such mantle.

A single drill hole on the Manihiki Plateau penetrated about 30 m of basalt at about 900 m subbottom. The basalts are highly vesicular, suggesting shallow, and possibly subareal, eruption. K-Ar dates range from 92 to 106 Ma, but volcanogenic sediments above the basalt imply a minimum basement age of 107 Ma and the 106 Ma date may be a minimum due to alteration. The basalts appear to be normal mid-ocean ridge tholeiites and do not show significant incompatible element enrichment. However, ranges from +3.5 to +7.8, indicating an oceanic island affinity. Most likely, the Manihiki Plateau formed as a large on-ridge hotspot platform, similar to Iceland and the Galapagos.

Additional drill sites have been proposed on the Ontong-Java Plateau. Additional sites on the Manihiki are also desirable and we hope some or all of the following could be achieved.

(a) Tighter constraints on the age of formation of the Plateau, Hole 317 provided only minimum ages. The Plateau formed during the Cretaceous Quiet Periods, so age is not well constrained by magnetics.

(b) Obtain fresher samples than those obtained by drilling and dredging so far. Some geochemical parameters (alkali concentrations, Sr and Pb isotopes) are subject to disturbance by alteration. These parameters are particularly important in dating and determining the tectonic environment of formation. The vesicular nature of basalts recovered from Hole 317 makes them particularly susceptible to alteration. A drill site in a deeper area might recover less vesicular, and hence fresher, rocks.

(c) Obtain a wider variety of compositions than those obtained thus far. The Galapagos, for example, show an extreme range of compositions, some of which are indistinguishable from MORB. What is the range in the Manihiki? Do alkalic rocks occur? Are there rocks with chemical similarities to the Ontong-Java Plateau alnoite?

(d) The above could determine the origin of the Manihiki, and together with additional data from the Ontong-Java, constrain early Cretaceous plate reconstructions.

(e) The above will also allow assessment of the nature and extent of chemically "anomalous" lithosphere in the Pacific, which in turn will constrain models on mantle evolution.

(f) Finally, the Ontong-Java Plateau has apparently resisted subduction. If thick oceanic plateaus cannot be subducted, they must be accreted to continents and, hence, may play a major role in the growth of continents.

We propose three additional sites on the Manihiki Plateau, an additional site on the High Plateau, and one on the Western Plateau, e.g., near 8^{o}S, 166^{o}W (MP-1), and one on the North Plateau, e.g., 5^{o}S, 165^{o}W (MP-2). These sites will complement Site 317 and provide tighter constraints on the origin of the Plateau.

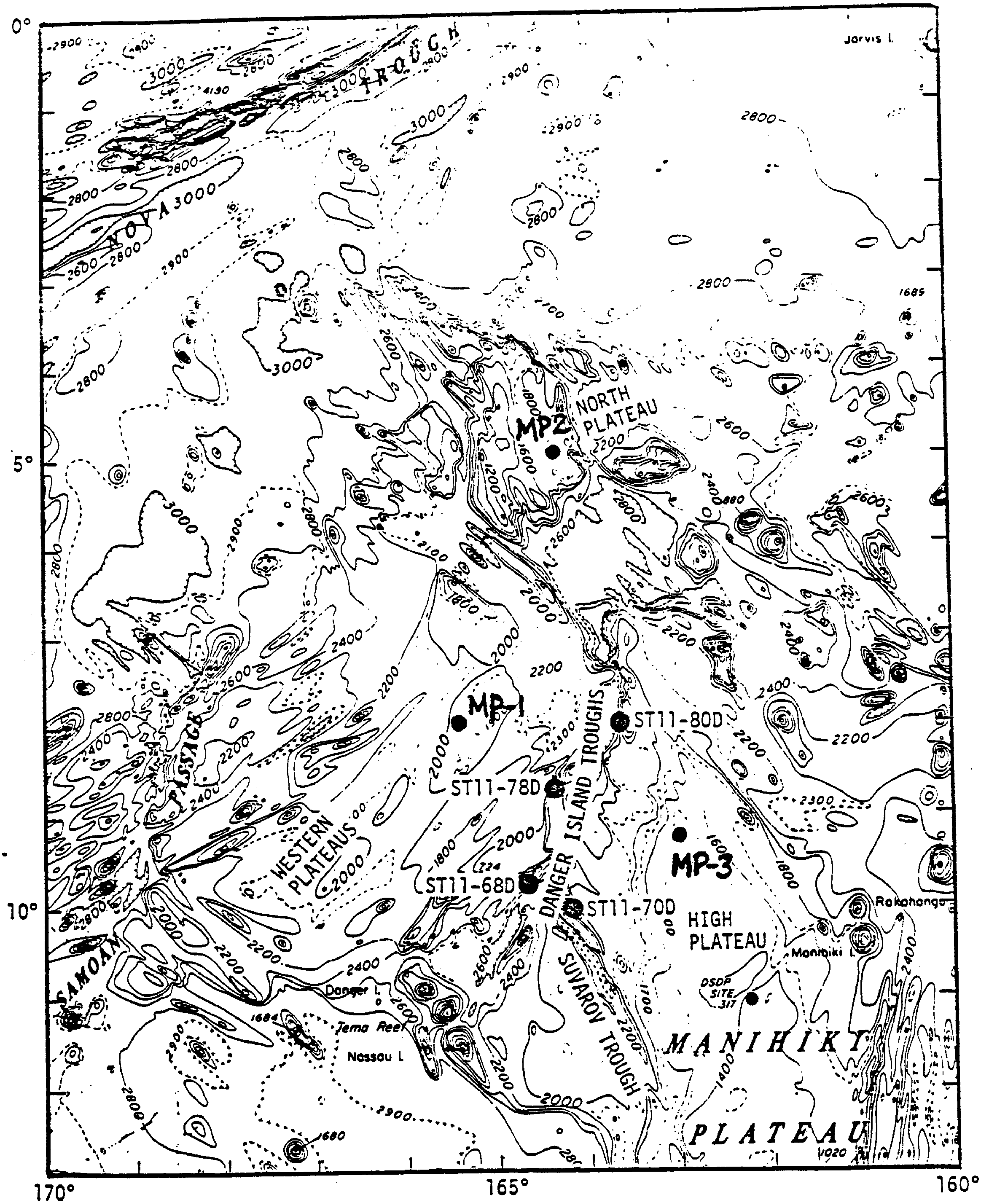


Figure 1. *Bathymetric chart of the Manihiki Plateau (from Winterer et al., 1974), contour interval, 200 meters.*

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MP-1

General Area: Manihiki Western Plateau

Position: 08°S, 166°W

Alternate Site:

General Objective:

Basement age, nature, origin, paleogeography

Thematic Panel interest: LITHP, SOHP, TECP

Regional Panel interest: CEPAC

Specific Objectives:

Basement age, chemistry, affinities, nature of mantle source, latitude of formation, tectonic reconstruction

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: single channel seismic exists

Other data:

Site Specific Survey Data:

Seismic profiles:

Other Data:

Operational Considerations:

Water Depth: (m) ~ 2000 Sed. Thickness: (m) ~ 900 Tot. penetration: (m) 1200

HPC x Double HPC ____ Rotary Drill x Single Bit ____ Reentry x

Nature of sediments/rock anticipated: carbonate/chert/ooze/basalt

Weather conditions/window: year-round

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. M. White

Address & phone number: College of Oceanography
Oregon State University
Corvallis, OR 97331
(503) 754-2296

FOR OFFICE USE:

Date received:

Classification no.:

Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MP-2 General Area: Manihiki North Plateau Position: 05°S, 165°W Alternate Site:	General Objective: Basement age, nature, origin, paleogeography Thematic Panel interest: LITHP, SOHP, TECP Regional Panel interest: CEPAC

Specific Objectives:

Basement age, chemistry, affinities, nature of mantle source, latitude of formation, tectonic reconstruction

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: single channel seismic exists

Other data:

Site Specific Survey Data:

Seismic profiles:

Other Data:

Operational Considerations:

Water Depth: (m) ~ 2000 Sed. Thickness: (m) ~ 900 Tot. penetration: (m) 1200

HPC x Double HPC ____ Rotary Drill x Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: carbonate/chert/ooze/basalt

Weather conditions/window: year-round

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. M. White Address & phone number: College of Oceanography Oregon State University Corvallis, OR 97331 (503) 754-2296	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MP-3	General Objective: Copper mineralization, nature, origin, age of basement paleogeography
General Area: Manihiki High Plateau Position: 09.1°S, 163.2°W Alternate Site:	Thematic Panel interest: LITHP, SOHP, TECP Regional Panel interest: CEPAC

Specific Objectives:

Basement age, chemistry, affinities, nature of mantle source, latitude of formation, tectonic reconstruction

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: single channel seismic exists

Other data:

Site Specific Survey Data:

Seismic profiles: swath mapping planned

Other Data:

Operational Considerations:

Water Depth: (m) 1500 Sed. Thickness: (m) ∿ 900 Tot. penetration: (m) 1200

HPC x Double HPC ____ Rotary Drill x Single Bit ____ Reentry x

Nature of sediments/rock anticipated: carbonate/chert/ooze/basalt

Weather conditions/window: year-round

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: W. M. White Address & phone number: College of Oceanography Oregon State University Corvallis, OR 97331 (503) 754-2246	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

2. ONTONG-JAVA AND MANIHIKI PLATEAUS.

L.W. Kroenke, W. Coulbourn, R. Moberly, Hawaii Institute of Geophysics, University of Hawaii at Manoa; W. White, Oregon State University.

The South Pacific includes a variety of anomalous tectonic and petrologic regimes which may be of profound importance in plate reorganization and formation of the continental crust. The resistance of the Ontong-Java Plateau to subduction has strongly influenced late Oligocene and late Miocene plate reorganization and appears to be producing an even broader scale reorganization and incipient trench formation at present. If such plateaus cannot be subducted, they must eventually be accreted to the continental mass and hence may play an important role in the formation of continental crust. Thus their origin, geochemical signature, sedimentary history, and style of deformation are of extreme importance in the formation and evolution of continents.

The original reasons for drilling oceanic plateaus during the Deep Sea Drilling Project were primarily paleontological and paleoenvironmental in nature: to study the sedimentary record above the CCD. The objectives, however, were never fully attained because of poor recovery, presence of lacunae, and the frequent inability to reach basement. The sparse data available from the basement are of limited utility because of minimal penetration and, in one instance, the highly altered nature of the basalts that were encountered. The focus here is on tectonic, geochemical, and petrological problems, with the secondary goal of answering some remaining paleontological and paleoenvironmental questions. As conceived, this drilling program would comprise a coordinated attack on the problems of the geochemistry, petrology, and mantle sources; possible diachronism or age progression; the paleoenvironment and early sedimentation history of the plateau; and the tectonics of collision.

Paleontological and weakly constrained K-Ar dates from sites 289 and 317 indicate both the Ontong-Java and Manihiki Plateaus were forming approximately 110-100 Ma. Basement basalts from these plateaus show petrological similarities to MORB but Nd isotopic compositions indicate a "hot spot" type mantle source. Seismic refraction investigations suggest the crust of Ontong-Java is greater than 44 Km thick and predict the crust of Manihiki to be greater than 30 Km. Seasat data indicate both plateaus are in isostatic equilibrium. These observations suggest that the plateaus formed along or near spreading ridges influenced by hot spots. Nevertheless, the thickness of the crust is greater, and the volume of excess volcanism vastly greater, than possible modern analogues such as Iceland. Drilling sites are proposed for the Ontong-Java and Manihiki Plateaus that have the following specific objectives: 1) constrain ages, direction of crustal aging, and hence, spreading ridge geometry, 2) obtain fresh basement samples in sufficient quantity to allow more extensive geochemical study and enable comparison between plateaus and with possible modern analogues such as Iceland, 3) learn the nature, timing, extent, and course of mid Tertiary volcanism on the Ontong-Java Plateau, 4) determine timing of Ontong-Java Plateau edge deformation, and 5) above all, obtain sufficient basement penetration to answer questions regarding the oceanic or continental affinities of these plateaus.

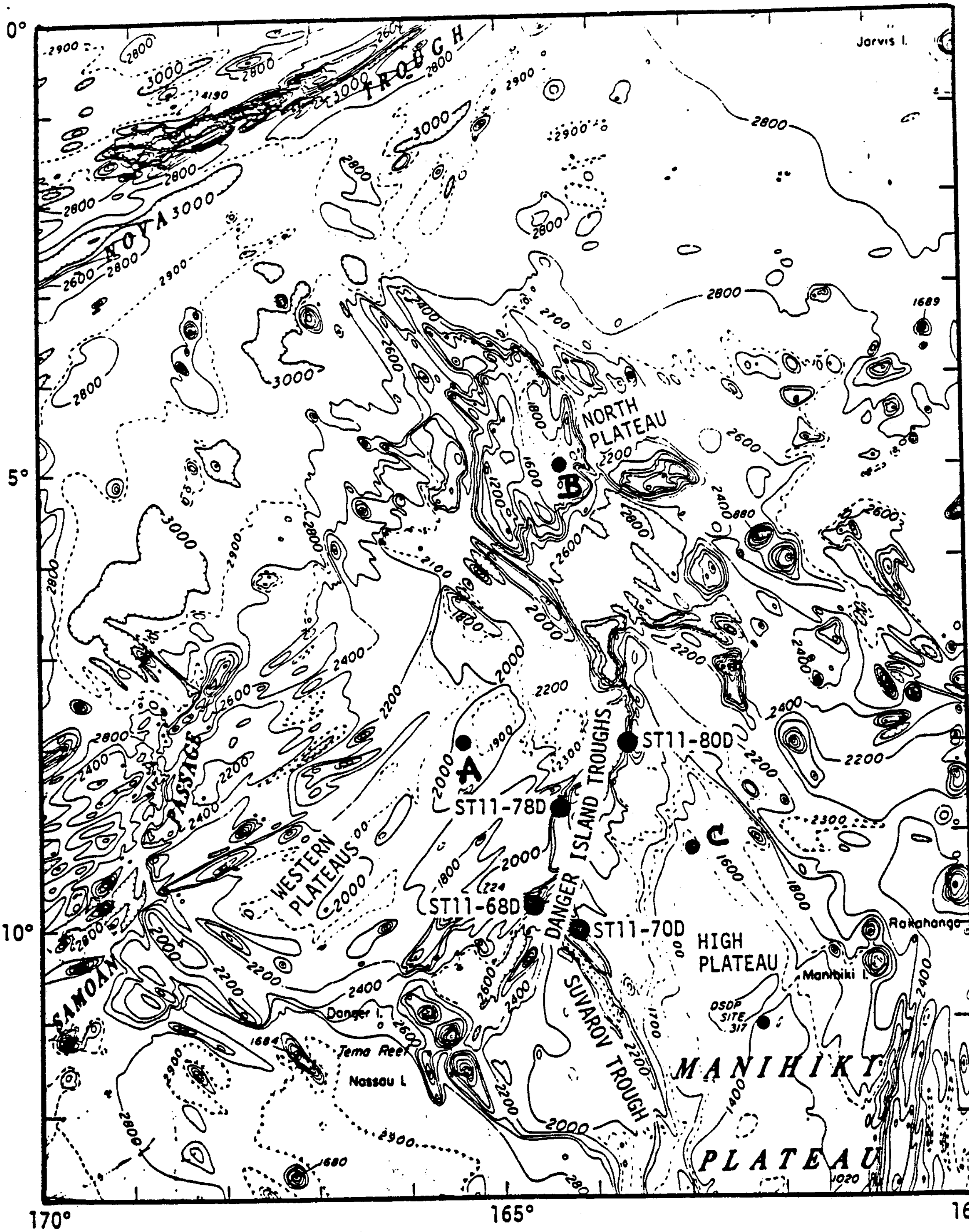


Figure 1. *Bathymetric chart of the Manihiki Plateau (from Winterer et al., 1974), contour interval, 200 meters.*

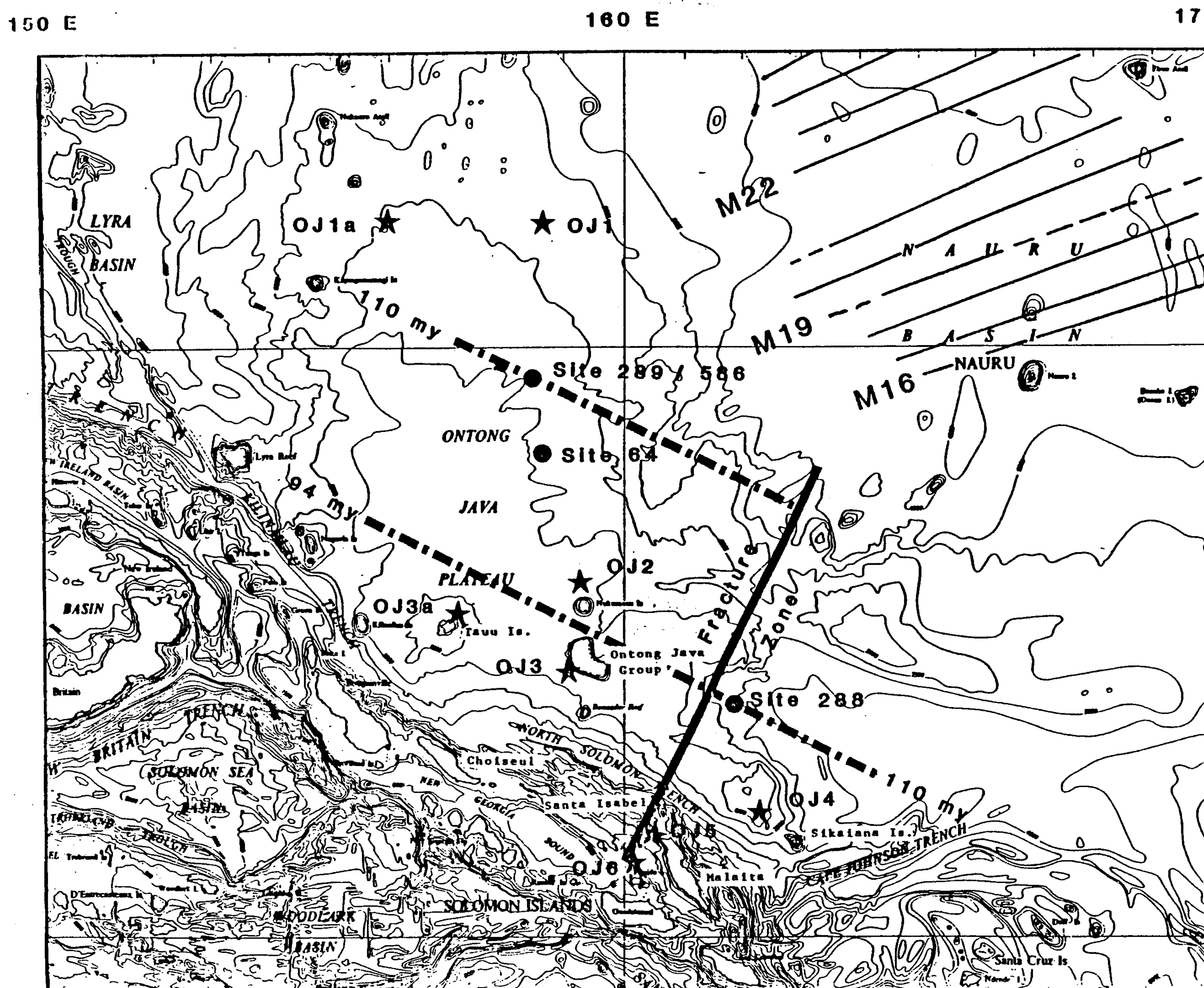


Figure 2. Location of proposed Ontong Java drilling sites in relation to previous DSDP sites, postulated fracture zone, hypothetical isochrons, and charted Mesozoic magnetic lineations.

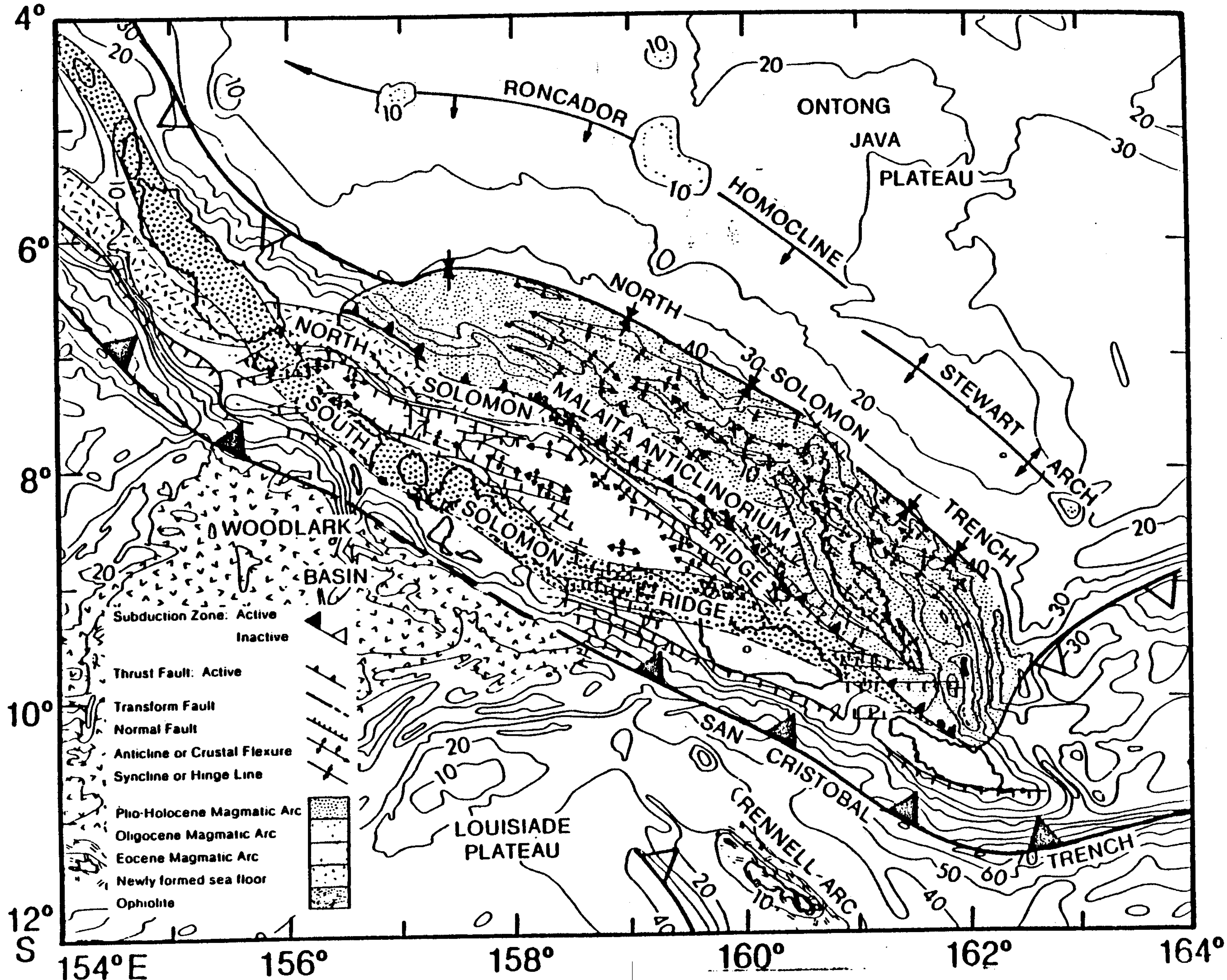


Figure 3. Tectonic elements along the southern margin of the Ontong Java Plateau. Southern margin of the Plateau (Malaita Anticlinorium) is actively overthrusting the Oligocene North Solomon Arc (North Solomon Ridge).

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-1
LAT 2°06'N Long 158°48'E

General Area: Northern Ontong Java Plateau
Position:
Alternate Site: OJ-1A

General Objective:
Basement nature, origin, paleogeography, and paleoenvironment

Thematic Panel interest: LITHP/SOHP/TECP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives:
Basement age, chemistry, affinities, nature of mantle source(s), and latitude of formation. Upper Jurassic-Lower Cretaceous carbonate sequence for paleo-environment/ paleomagnetic investigations.

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Petroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:
Seismic profiles: DSDP airgun/watergun SCS

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) ~2675 Sed. Thickness: (m) ~1400 Tot. penetration: (m) ~1600

HPC x Double HPC ____ Rotary Drill x Single Bit ____ Reentry x

Nature of sediments/rock anticipated: ooze, chalk, limestone, chert, basalt.

Weather conditions/window: Equatorial/year-round

Territorial jurisdiction: International water

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
Loren W. Kroenke
Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

Alternate: John Mahoney
(808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-1A
LAT 2°08'N Long 156°00'E

General Area: Northern Ontong Java Plateau
Position: NE of Kapingamarangi Island
Alternate Site: OJ-1

General Objective:
Basement nature, origin, paleogeography, and paleoenvironment

Thematic Panel interest: LITHP/SOHP/TECP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives:
Basement age, chemistry, affinities, possible mantle source(s), and latitude of formation, Upper Jurassic-Lower Cretaceous carbonate sequence for paleo-environment/ paleomagnetic investigations.

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Petroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:
Seismic profiles: DSDP airgun/watergun SCS

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) ~2475 Sed. Thickness: (m) ~1400 Tot. penetration: (m) ~1600

HPC x Double HPC ____ Rotary Drill x Single Bit ____ Reentry x

Nature of sediments/rock anticipated: ooze, chalk, limestone, chert, basalt.

Weather conditions/window: Equatorial/year-round

Territorial jurisdiction: International water

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
Loren W. Kroenke
Hawaii Institute of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

Alternate: John Mahoney
(808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-2

LAT 3°56'S LONG 159°13.5'E

General Area: Central Ontong Java Plateau
Position: North of Nukumanu Island
Alternate Site: --

General Objective:
Basement nature; origin; sediment paleoenvironment; record of tectonism and tectonovolcanism

Thematic Panel interest: LITHP/SOHP/TECP
Regional Panel interest: SEPAC/WPAC/SOP

Specific Objectives:

Basement age and composition; Middle to Late Cretaceous sections for paleoenvironment analysis; sedimentary structures and tephra chronology

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Petroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:
Seismic profiles: HIG airgun SCS

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 1860 m Sed. Thickness: (m) ~ 1000 Tot. penetration: (m) ~1100

HPC X Double HPC ___ Rotary Drill X Single Bit X Reentry ___

Nature of sediments/rock anticipated: ooze, chalk, limestone, chert, basalt

Weather conditions/window: Equatorial/year-round

Territorial jurisdiction: Papua New Guinea EEZ

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
Loren W. Kroenke
Hawaii Inst. of Geophysics
2525 Correa Road
Honolulu, HI 96822
(808) 948-7845

Alternate: John Mahoney
(808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-3 LAT 5°24'S LONG 159°01E **General Area:** Southern Ontong Java Plateau **Position:** South of Ontong Java Atoll **Alternate Site:** OJ-3A	**General Objective:** Tectonovolcanism; nature and timing **Thematic Panel interest:** LITHP/TECP **Regional Panel interest:** CEPAC/WPAC/SOP

Specific Objectives:

Determine petrologic geochemical character of late stage eruptive rocks, possible nature/evolution of mantle source, and timing of volcanism relative to regional tectonics.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Petroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:

Seismic profiles: HIG sparker/airgun SCS

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 1840 Sed. Thickness: (m) ~500 Tot. penetration: (m) ~600

HPC ___ Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: ooze, ashy chalk, limestone, basalt sills/flows

Weather conditions/window: Equatorial/year-round

Territorial jurisdiction:

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: **Address & phone number:** Loren W. Kroenke Hawaii Institute of Geophysics 2525 Correa Road Honolulu, HI 96822 (808) 948-7845 Alternate: John Mahoney (808) 948-8705	**FOR OFFICE USE:** Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-3A

LAT 4°24'S LONG 157°03'E

General Area: Southern Ontong Java Plateau
Position: North of Tauu Island
Alternate Site: OJ-3

General Objective:

Tectonovolcanism; nature and timing

Thematic Panel interest: TECP/LITHP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives:

Determine petrologic geochemical character of late stage eruptive rocks, possible nature/evolution of mantle source, and timing of volcanism relative to regional tectonics.

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Peltroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data: HIG sparker/airgun SCS
Seismic profiles:

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 1360 Sed. Thickness: (m) 300 Tot. penetration: (m) 900

HPC ____ Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: ooze, ashy chalk/limestone, basalt sills/flows

Weather conditions/window: Equatorial/Year-round

Territorial jurisdiction: Papua New Guinea EEZ

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone
number:
Loren W. Kroenke
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822
(808) 948-7845
Alternate:
John Mahoney (808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-4

LAT 7°48'S LONG 162°19'E

General Area: Southern Ontong Java Plateau
Position: NW of Sikaiana Island
Alternate Site:

General Objective:
Tectonovolcanism; nature and timing

Thematic Panel interest: TECP/LITHP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives:

Determine petrologic geochemical character of late stage eruptive rocks, possible nature/evolution of mantle source, and timing of volcanism relative to regional tectonics.

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Peltroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data: HIG sparker/airgun SCS
Seismic profiles:

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 1120 Sed. Thickness: (m) ~500 Tot. penetration: (m) ~700

HPC ____ Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: ooze, ashy chalk/limestone, basalt sills/flows

Weather conditions/window: Equatorial/Year-round

Territorial jurisdiction: Solomon Island EEZ

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
Loren W. Kroenke
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822
(808) 948-7845

Alternate: John Mahoney (808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ-5

LAT 8°13'S LONG 160°28'E

General Area: Malaita Anticlinorium
Position: West of Malaita
Alternate Site:

General Objective:
Timing of subduction/tectonics of collision, origin of basement

Thematic Panel interest: TECP/LITHP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives: Determine timing of Solomon Island Arc volcanism and obduction of Ontong Java plateau crust by investigating island arc and tectonovolcanic tephra stratigraphy, sedimentary structure, and tectonic induced reworking of sediment. Nature and geochemistry of basement compared with that of Maliata and OJ-1 and OJ-2.

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Peltroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:
Seismic profiles: USGS MCS (R/V S.P. LEE)

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 900 Sed. Thickness: (m) 900 Tot. penetration: (m) 1000

HPC ____ Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: ooze, ooze, chalk, limestone, chert, basalt.

Weather conditions/window: Equatorial/Year-round

Territorial jurisdiction: Solomon Islands

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
Loren W. Kroenke
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822
(808) 948-7845
Alternate: John Mahoney (808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: OJ- 6

LAT 8°42'S LONG 160°08'E

General Area: Malaita Anticlinorium
Position: East of Santa Isabel
Alternate Site:

General Objective:
Tectonics of collision

Thematic Panel interest: TECP/LITHP
Regional Panel interest: CEPAC/WPAC/SOP

Specific Objectives:

Investigate details of structural, metamorphic, ore-forming, and fluid overpressuring procedures associated with active obduction, timing of obduction, and tephra-stratigraphy.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: HIG airgun/watergun/sparker SCS; DSDP airgun/watergun SCS; USGS and Peltroleum Co. MCS

Other data: 3.5 kHz, refraction measurements, piston cores, magnetics and gravity.

Site Specific Survey Data:

Seismic profiles: USGS MCS (R/V S.P. LEE)

Other Data: Additional data required to include watergun SCS, 3.5 kHz, SeaMARC II, piston coring, rock dredges (site survey proposal being submitted by HIG).

Operational Considerations:

Water Depth: (m) 150 m   Sed. Thickness: (m) 300   Tot. penetration: (m) 800-1300

HPC ____ Double HPC ____ Rotary Drill x Single Bit ____ Reentry x

Nature of sediments/rock anticipated: arc sediments, chalk/limestone basalt, arc basement.

Weather conditions/window: Equatorial/Year-round

Territorial jurisdiction: Solomon Island waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:

Loren W. Kroenke
Hawaii Institute of Geophysics
University of Hawaii
2525 Correa Road
Honolulu, Hawaii 96822
(808) 948-7845

Alternate: John Mahoney (808) 948-8705

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

3. NAURU BASIN.

Y. Lancelot, Universite Pierre et Marie Curie, France.

Deep Sea Drilling in what is believed to be the oldest part of the Pacific (and of the world ocean) has uncovered exceptional volcanic activity of early Cretaceous age in most of the deep basins of the west-central part of that ocean.

This activity has not only produced an unusual number of large volcanos on much of the western part of the Pacific Plate, but is also responsible for the emplacement of deep water basaltic sheet flows and intrusives that may cover large areas of the western Pacific (greater than 3 x 10^5 Km^2. These have been observed in the Central Pacific Basin as well as in the Nauru Basin. In the latter, drilling has determined that the duration of the volcanic event extended at least from the early Aprian through the early late Cretaceous. Several phases of volcanism are probably involved, the major one having occurred during Aptian-Albian time.

This activity is almost certainly of an intraplate nature since magnetic and other data (age-depth relations in particular) preclude a Cretaceous age for most of the deeper basins. The true age and actual depth of the oceanic crust however remain unknown for these basins.

The Nauru Basin is characterized by a set of well-defined magnetic anomalies of the M series. The age of the crust in that basin is inferred to range from early Cretaceous in the south to late (and possibly middle) Jurassic toward the north. At the DSDP drill site there is no doubt that the volcanic event post-dates the formation of the underlying oceanic crust. The time of the initiation of the intraplate volcanic activity, however, remains unknown since the drill did not penetrate through the entire volcanic complex.

The main unanswered questions remain as follows:

1) What is the age and nature of the oldest oceanic crust in the Pacific?

2) What is the time span of the Cretaceous volcanic event(s)? Has there been continuous activity following the formation of the oceanic crust?

3) What is the areal extent of the volcanic layer?

4) What is the tectonic setting of this event and how did it produce such different fractures as large volcanos and very extensive sheet flows? (Ancillary questions, of obviously extreme importance for the study of global paleoenvironment during the Jurassic are not discussed here since they are included in present proposals from JOIDES panels).

Some of the questions above can be answered by geophysical surveys. In particular studying the geometry of the volcanic layers should answer questions 3 and 4. Only drilling, however, will address the specific questions about the history of the volcanism.

Geophysical surveys which are in preparation both in France and in the U.S. at this time (multichannel seismics) are aimed at resolving questions 3 and 4. They should also provide the basis for the selection of drill sites addressing questions 1 and 2.

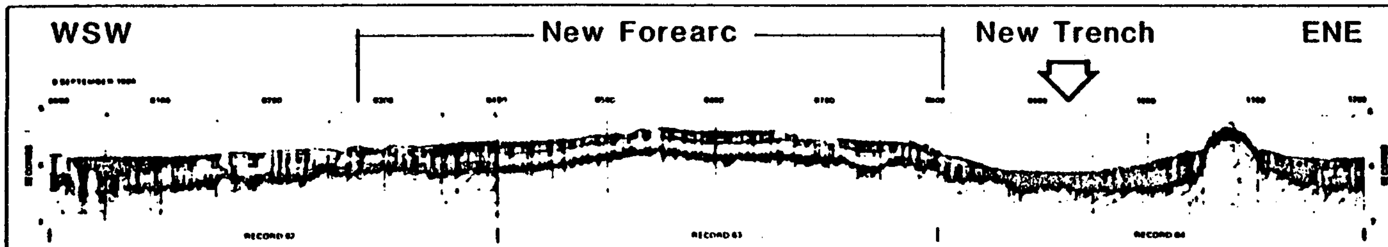


Fig. 1 DSDP Leg 7 reflection profile in the Nauru Basin [*Kroenke et al.*, 1971], showing the surface expression of the postulated Micronesian Trench. The profile location is shown in Figure 2. Vertical exaggeration is approximately 12 to 1.

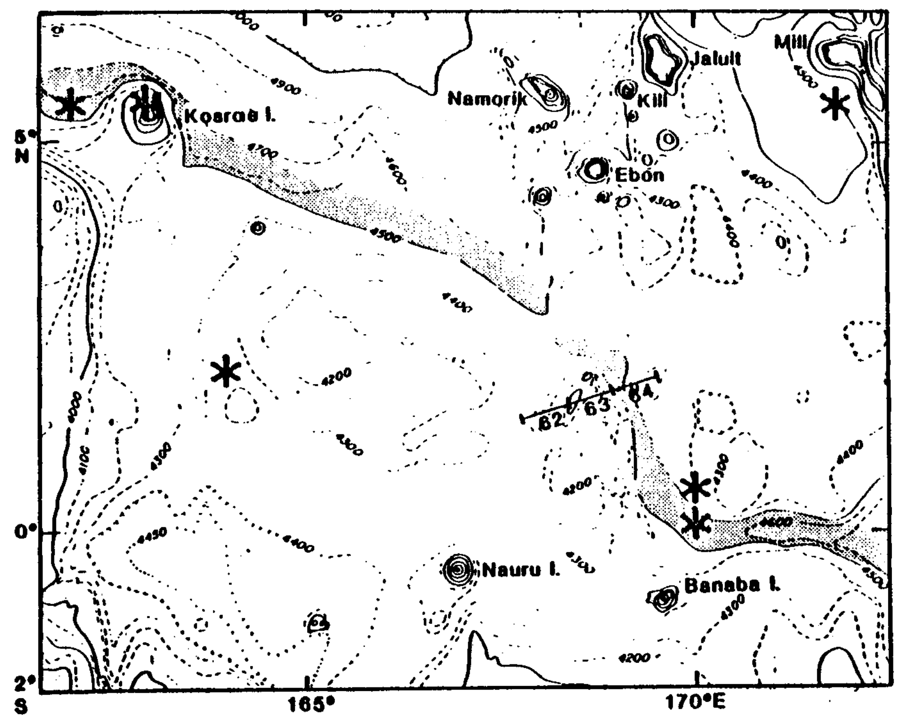


Fig. 2 Bathymetry of the Nauru Basin [after *Mammerickx and Smith*, 1985]. The contour interval (solid lines) is 500 m. Intermediate contours (dashed lines) indicate locations of elevated and depressed areas north and south, respectively, of the convergent boundaries believed to be structurally controlled by the formation of the new Micronesian Trench. Also shown are the location of the Deep Sea Drilling Project (DSDP) Leg 1 reflection profile line, earthquake epicenters (asterisks) from the cover figure, and the probable location of the new Micronesian Trench (shaded areas).

F. HOTSPOTS, SEAMOUNTS, AND OCEAN ISLANDS

1. French Polynesian Hotspots, Austral Island Chain (AIC-1, AIC-2, AIC-3)

2. French Polynesian Volcanic Lineaments (MT-1, MT-2, MT-3, T-1, NT-1, NT-2)

3. Louisville Ridge

1. FRENCH POLYNESIA HOTSPOTS.

E.A. Okal, Northwestern University; W. White, Oregon State University; Y. Lancelot, Universite Pierre et Marie Curie, France.

While the general progression of volcanism with age along island chains such as Hawaii is reasonably well understood, the actual succession in volcanic processes during the formation of an individual island or group of islands is still obscure, notably in the evolution of their geochemical signature. In addition, little is presently known about the time span involved in the initial growth and formation of a volcanic edifice, in the cessation of activity, and in the total duration of recurrent and post-erosional volcanism.

Most volcanic ages presently available for oceanic islands have been derived from subareal samples, and therefore are related to the later stages of this activity. However, it is necessary to obtain a precise understanding of the time constraints involved in the early growth of islands and seamounts, in order to successfully use the age of island chains as a kinematic constraint on plate motions. The four island chains of French Polynesia-Marquesas, Tuamotu, Society and Australs, are among those offering the most complex scatter of ages, geochemical signatures, and thermo-mechanical effects on the lithosphere. For example, the evolution of isotopic ratios in the Marquesas from the main shield-building to the post-erosional series is inverse of that observed in Hawaii; in the Austral chain, different groups of islands (Tubuai-Rurutu versus Rapa-Macdonald) have strongly differing Pb and Sr signatures precluding simple mixing with the lithosphere; as determined by studies of plate flexure, the thermal thinning under the southern group (Rapa-Macdonald) is also considerably more important than under the northern group (Tubuai-Rurutu).

The Polynesian chains may represent the only natural laboratory where wide variations exist in the initial conditions such as the composition of mantle sources, the amount (flow) of material upwelling, and the thermal properties of the overriding plate, resulting in the observed variety of volcanic products.

As opposed to land sampling and dredging, drilling into seamount edifices will provide the only way of sampling the complete record of the formation of a volcanic edifice. This could be achieved by drilling a series of holes into the flanks of seamounts, where the thickness of volcanic layers is small enough that several of them can be penetrated by the drill. Another major advantage of this approach is that coring of alternations of volcanogenic layers and sediments should provide the best way to establish a reasonably accurate chronology for the volcanic events. Therefore, drill sites should be arranged in transects; sites immediately near the base of seamounts have a chance to sample the succession of most of the major rock types produced by the volcano, whereas sites farther away will have the best chance to obtain a detailed chronology of the successive events involved in the building of the edifice.

Drilling provides the only means of sampling the Tuamotu chain, which consists of coral atolls and guyots. Sampling the northern Tuamotu chain would allow the establishment of its geochemical signature and provide constraints on the age progression in the chain. This, in turn, allows testing of the hypothesis that this chain was formed on ridge and is the trace of the present Easter-Sala y Gomez hotspot.

Austral Island Chain, Sites AIC-1, AIC-2, AIC-3 on map 2.

2. TEMPORAL AND PETROCHEMICAL EVOLUTION OF FRENCH POLYNESIAN VOLCANIC LINEAMENTS.

R.A. Duncan, W.M. White, M.R. Fisk, Oregon State University; E. A. Okal, Northwestern University.

INTRODUCTION

The phenomenon of intraplate, or hotspot, volcanism is nowhere better represented than in French Polynesia, in the south-central Pacific Ocean basin. In this region, roughly the size of Western Europe, subparallel volcanic lineaments related to at least six disticnt hotspots (McDonald, Rarotonga, Societies, Pitcairn, Marquesas, and Easter) have been described. Those lineaments for which volcanic rocks are accessible show similar rates of age progression from south-east to northwest centers. Through the erupted magmas, these volcanos sample the underlying mantle on a much denser scale than anywhere else on earth.

The trace and isotopic compositions of volcanic rocks from these volcanos exhibit nearly the complete range seen worldwide, and tremendous variations occur from hotspot to hotspot and even within individual islands. This region is the very best to test several current ideas about the scale of mantle geochemical heterogeneities, the geochemical structure of hotspots, and the source of melts contributing to oceanic islands and lithosphere.

In this proposal we briefly describe several drilling sites which are part of a program designed to recover volcanic rocks for specific petrochemical objectives. Broadly, these objectives are: test hypotheses concerning the nature of the Tuamotu chains; determine the variability of mantle plume composition on a long time scale; test hypotheses about plume dynamics and plume-asthensphere interaction; test the universality of the Hawaiian volcanic evolution pattern; and determine the nature and extent of anomalous lithosphere in the west central Pacific.

PROPOSED DRILLING PROGRAM

1. Marquesas Islands Transect. The Marquesas Islands (Fig. 1) are a relatively short hotspot lineament which are age-progressive from 6 to 7 Ma in the northwest to 1.3 Ma in the south-east, although several researchers contend that the hotspot was active earlier and "switched on" again in latest Miocene time. Recent geochronological and geochemical work on several of these islands has revealed an evolution and sequence from tholeiitic to alkalic basalts, similar to that seen in the Hawaiian Islands. The two magma types are dramatically distinct and, unlike the Hawaiian example, the tholeiitic melts appear to have a large component of lower lithosphere or MORB, whereas the alkalic basalts are more "plume-like". One intriguing model put forward is that the hotspot itself is chemically zoned, with a plume-dominated outer torus and a center of entrained MORB material.

We can test this idea in the Marquesas area by drilling a three-hole transect perpendicular to the islands trend (Fig. 1). Volcanic ridges at the edges of the trend should have sampled the outer, "plume-like", region of the hotspot, while those at the center should be more MORB-like in isotopic composition. A cruise to investigate the Marquesas swell by SEABEAM, gravity, magnetics, and dredging has been proposed to NSF by M. McNutt, J. Natland, and R. Duncan, and could provide site surveys in 1987.

2. The Society Islands. Do tholeiites form the shield of Tahiti? Tholeiitic melts are important in the evolution of oceanic volcanos because they represent large degrees of melting of the mantle and are thus a truer reflection of the source composition. As yet, no tholeiitic compositions have been found in the Society Islands which exhibit some of the most extreme isotopic compositions among oceanic rocks. We propose that a site be drilled on the southeast flank of the island of Tahiti (Fig. 2) with the objective of recovering tholeiitic shield lavas for geochemical characterization. Alkalic basalts overlie tholeiites in the Hawaiian, Marquesas, and Samoan Island chains, and it is most likely that tholeiites would be found in Tahiti by drilling at the mid-flank position. This region has had considerable SEABEAM coverage by the *Charcot* during surveys of submarine volcanic and seismic activity around the present position of the Society Islands hotspot.

3. The Tuamotu Archipelago. The Tuamotu archipelago consists of two island-seamount chains which sit atop a broad swell. The islands consist only of coral atolls and no basalts have been recovered from them. Redeposited coral from DSDP Hole 318 at the western end of the archipelago has been paleontologically dated at about 52 Ma. $^{40}Ar/^{39}Ar$ dating of rocks dredged from the western end yielded ages of 47 and 42 Ma. One of the Tuamotu chains (the northern one) was apparently formed by an on- or near-ridge hotspot, quite possibly the Easter-Sala y Gomez hotspot. According to Okal and Cazenave, the Easter hotspot was approximately ridge-centered until 25 Ma when a ridge jump left it on the Nazca plate side. The southern Tuamotu chain lines up with the atolls of Oeno, Henderson, and Ducie; Crough seamount, which may still be active, could be the youngest member of this chain. The Line Islands, further to the west, have a complex volcanic history and at least two hotspots appear to be required for their formation. One of these hotspots could be Easter-Sala y Gomez.

Drilling in the Tuamotus would help accomplish these objectives: (a) through dating and paleomagnetic studies, test the hypotheses as to the origin of these chains and their relation to the Easter hotspot and the Line Islands, (b) constrain Cenozoic spreading histories of the East Pacific Rise and its ancestors, (c) through isotopic and chemical analyses, evaluate relationships of the Tuamotus to Easter Island and the Line Islands, and examine the constancy of mantle plume composition through time, and (d) study chemical changes in volcanism as a hotspot changes from ridge-centered to off-ridge.

There is considerable flexibility in where the drill sites should be located. We propose one drill site at the southeast end of the chain, near 135°W, 19°S (A in Fig. 3), near or southeast of Reao atoll. This will allow us to sample volcanism at the time of the proposed ridge jump. A second site should be located in the center of the northwestern portion of the chain; we suggest near the atolls of Fongatau and Fakahina, 140°W, 16°S (B in Fig. 3).

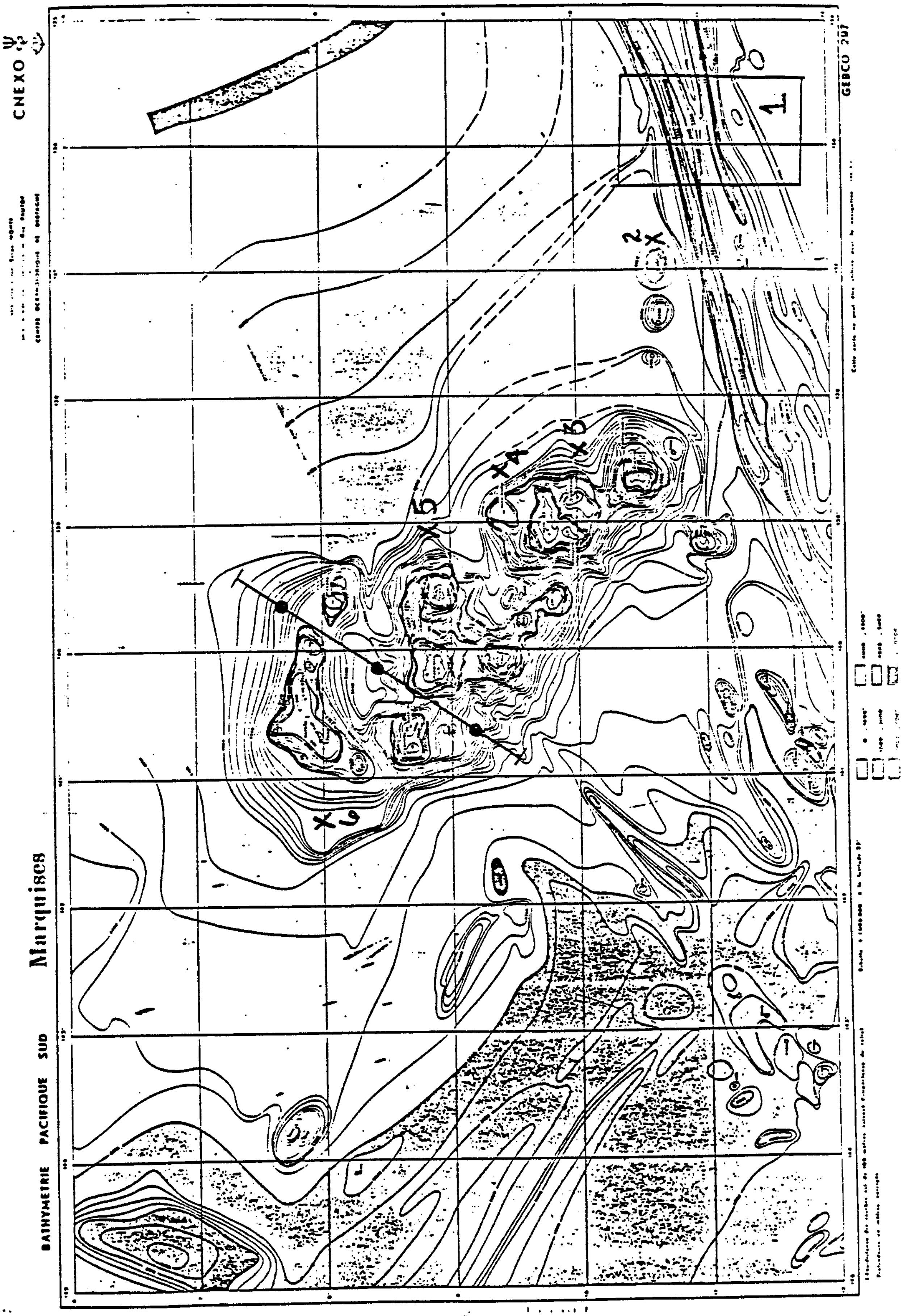


Fig. 1

Fig. 2

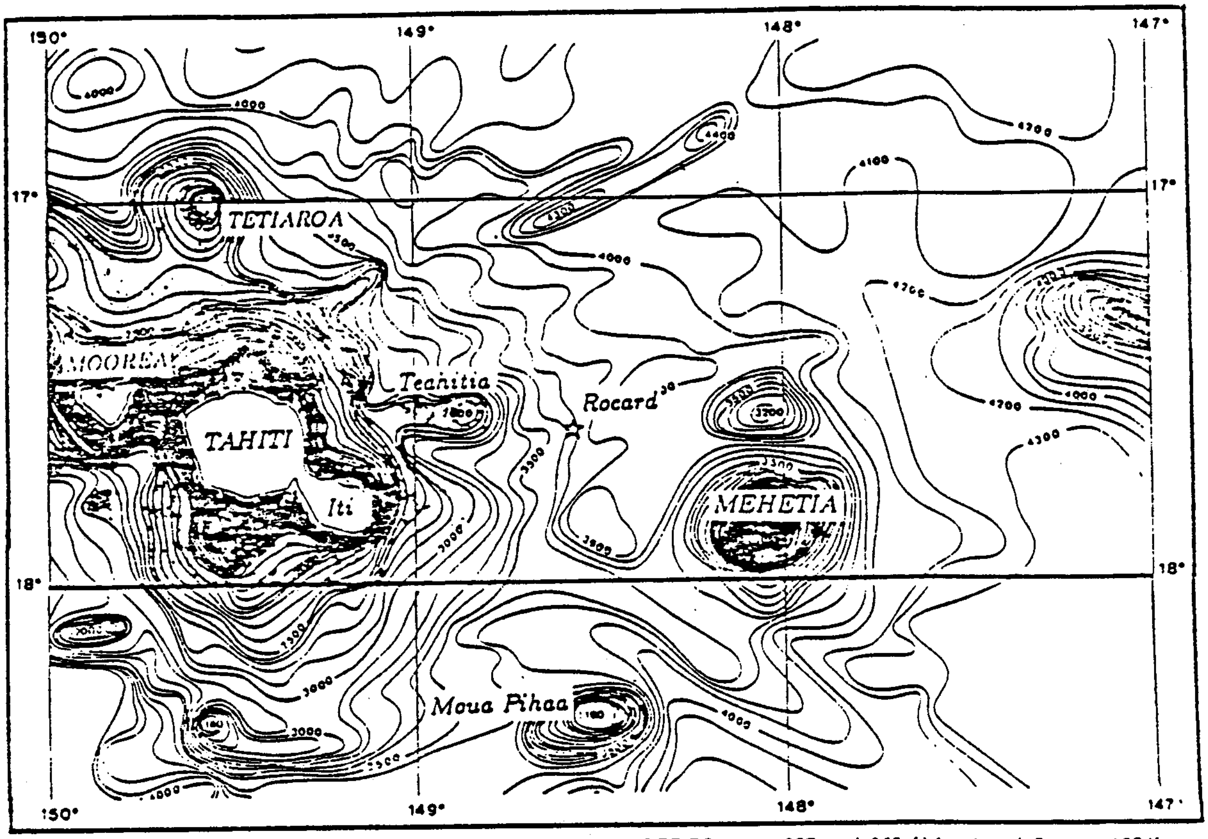


Fig. 2. Bathymetry of the Tahiti-Mehetia area, adapted from GEBCO maps 327 and 358 [*Monti and Pautot*, 1974]. Note that Moua Pihaa and Teahitia seamounts were charted prior to their activity but that Rocard seamount was identified only later (open star). The crater identified by the French Navy survey southeast of Mehetia is shown as a white star.

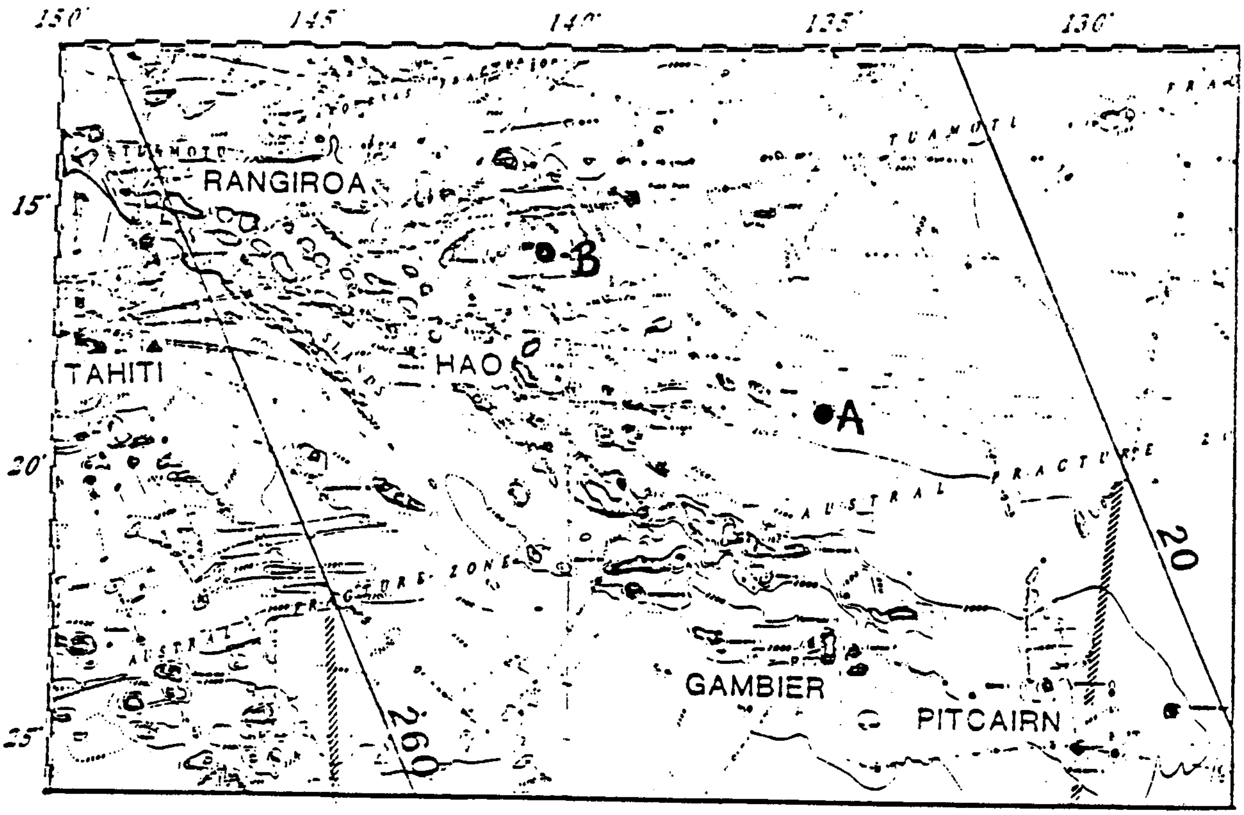

150°
145°
140°
135°
130°
15°
20°
25°
RANGIROA
TAHITI
HAO
B
A
GAMBIER
PITCAIRN
AUSTRAL
FRACTURE ZONE
260
20

Fig. 3

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MI-1
Marquesas Islands

General Area: North of Clark Reef
Position: 07.6°S, 139.6°W
Alternate Site:

General Objective:

Petrology and geochemistry of basement; chemical variations across Marquesas hotspots

Thematic Panel interest: LITHP, TECP
Regional Panel interest: CEPAC

Specific Objectives:

Petrology and geochemistry of basalt on flank of Marquesas hotspot swell; examine petrological and geochemical variation across swell to test models of mantle plume dynamics and plume-lithosphere interaction

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:
Seismic profiles:

Other data:

Site Specific Survey Data:
Seismic profiles:

Other Data:

Geophysical cruise to the region is pending funding

Operational Considerations:

Water Depth: (m) 3600 Sed. Thickness: (m) < 100 Tot. penetration: (m) 400

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: reef debris/volcanogenic sedimentation/basalt

Weather conditions/window:

Territorial jurisdiction: French Polynesia

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan
Address & phone number: College of Oceanography
Oregon State University
Corvallis, OR 97331
(503) 754-2296

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

roposed Site: MI-2 Marquesas Islands eneral Area: West of Ua Pou osition: 09.2°S, 140.6°W lternate Site:	General Objective: Petrology and geochemistry of basement; chemical variations across Marquesas Thematic Panel interest: LITHP, TECP Regional Panel interest: CEPAC

pecific Objectives:

Petrology and geochemistry of basalt on flank of Marquesas hotspot swell; examine petrological and geochemical variations across hotspot swell; examine petrological and geochemical variations across swell to test models of plume dynamics

ackground Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles:

Other data:

Site Specific Survey Data:

Seismic profiles:

Other Data:

Geophysical cruise to region is pending funding

perational Considerations:

Water Depth: (m) 3300 Sed. Thickness: (m) < 100 Tot. penetration: (m) 400

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated:

Weather conditions/window:

Territorial jurisdiction: French Polynesia

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan Address & phone number: College of Oceanography Oregon State University Corvallis, OR 97331 (503) 754-2296	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: MI-3 Marquesas Islands General Area: North of Nuku Hiva Position: 08.3°S, 140.15°W Alternate Site:	General Objective: Petrology and geochemistry of basement; chemical variations across Marquesas hotspot Thematic Panel interest: LITHP, TECP Regional Panel interest: CEPAC

Specific Objectives:

Petrology and geochemistry of basalt in center of Marquesas hotspot swell; examine petrological and geochemical variations across swell to test models of plume dynamics and plume-lithosphere interaction

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles:

Other data:

Site Specific Survey Data:

Seismic profiles:

Other Data:

Geophysical cruise to the region is pending funding

Operational Considerations:

Water Depth: (m) ~ 3500 Sed. Thickness: (m) < 100 Tot. penetration: (m) 400

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: reef debris/carbonate/volcanogenic sediment/basalt

Weather conditions/window:

Territorial jurisdiction: French Polynesia

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan Address & phone number: College of Oceanography Oregon State University Corvallis, OR 97331 (503) 754-2296	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals

Proposed Site: T-1 Southeast Flank of Tahiti General Area: French Polynesia Position: $18^{\circ}S$, $148.7^{\circ}W$ Alternate Site: other flank areas of Tahiti	General Objective: Nature and geochemistry of early stages of Society Islands Thematic Panel interest: LITHP Regional Panel interest: CEPAC

Specific Objectives:

Obtain basement samples to determine petrology and geochemistry to earliest phases of Tahitian volcanism, in coordination with fieldwork on island and dredging of upper slope

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles:

Other data:

Site Specific Survey Data:

Seismic profiles:

Other Data:

Operational Considerations:

Water Depth: (m) 3500 Sed. Thickness: (m) < 100 Tot. penetration: (m) 300

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: volcanogenic/carbonate sediment/basalt basement

Weather conditions/window: year-round

Territorial jurisdiction: France

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan Address & phone number: College of Oceanography, Oregon State University, Corvallis, OR 97331 (503) 754-2296 Alternate: W. M. White	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: NT-1
Northern Tuamotu Island

General Area: SE of Reao
Position: 19.5°S, 135°W
Alternate Site:

General Objective:
Petrology and geochemistry of basement; reef, paleontological and subsidence history

Thematic Panel interest: LITHP, TECP
Regional Panel interest: CEPAC

Specific Objectives:
Geochemical and petrological features of hotspot volcanism at the time of a ridge jump transition from on-ridge to off-ridge volcanism; age of basement; tectonic reconstruction

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles:

Other data:

Site Specific Survey Data: Swath mapping/MCS needed
Seismic profiles:

Other Data:

Operational Considerations:

Water Depth: (m) 3000 Sed. Thickness: (m) 400 Tot. penetration: (m) 300

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: reef/reef debris/carbonate/volcanogenic/basalt

Weather conditions/window: year-round

Territorial jurisdiction: French Polynesia

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan
Address & phone number: College of Oceanography
Oregon State University
Corvallis, OR 97331
(503) 754-2296

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: NT-2
Northern Tuamotu Island

General Area: NW of Fangatau
Position: 15.6°S, 141.0°W
Alternate Site:

General Objective:
Petrology and geochemistry of basement of Tuamotu plateau and island edifice; Reef, paleontological and subsidence history

Thematic Panel interest: LITHP, TECP
Regional Panel interest: CEPAC

Specific Objectives:

Age of volcanism, petrology and geochemistry of Tuamotu chain; comparison to Easter hotspot and line islands; reef and subsidence history

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles:

Other data:

Site Specific Survey Data: Swath mapping/MCS needed
Seismic profiles:

Other Data:

Operational Considerations:

Water Depth: (m) 1500 Sed. Thickness: (m) < 100 Tot. penetration: (m) 300

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: reef debris/carbonate/volcanogenic/basalt

Weather conditions/window: year-round

Territorial jurisdiction: French Polynesia

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: R. A. Duncan
Address & phone number: College of Oceanography
Oregon State University
Corvallis, OR 97331
(503) 754-2296

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

3a. LOUISVILLE "RIDGE".

P. Lonsdale, Scripps Institution of Oceanography.

Louisville "Ridge" is actually a chain of seamounts and guyots that records 65 Ma of activity of a hotspot beneath the Pacific Plate. The hotspot is presently located near a young seamount with a 500 m never-emergent peak at 50°S, 139°W; it has created at least 40 islands, now submerged as guyots of which the oldest surviving example is the 65 Ma Osbourn Guyot, in the process of being subducted at Tonga Trench. The older part of the guyot chain is built on Cretaceous (?) crust of poorly understood tectonic evolution, and is a significant barrier to the northward flow of Pacific Bottom Water into the tropical Pacific.

Primary objectives of drilling are to understand the volcanic evolution of a typical member of this chain, to clarify the shallow water and submergence history of guyots, and to determine the composition, provenance and sedimentary processes of the apron of a reefless (i.e., non-coralline) guyot. Coring would also collect a section of late Paleogene to recent calcareous sediment with a predictably increasing depth of deposition, help determine the age and evolution of the basement, and contribute to the history of bottom water circulation. These objectives are best met by a transect of three sites into the summit and both flanks of an Oligocene guyot near the middle of the chain, and just downstream of Valerie Passage (between Louisville Ridge and Chatham Ridge).

Sites LR-1, LR-2, LR-3 on map 1. Formal site proposals pending.

3b. PROPOSED DRILLING ON THE LOUISVILLE RIDGE.
S. E. Humphris, Woods Hole Oceanographic Institution.

One of the most striking features of the topography of the Pacific Ocean sea floor is the large number of seamounts and islands that occur throughout the basin. Many occur as isolated volcanos; however, a number of them are arranged in long, linear chains. Wilson (1963) and Morgan (1971, 1972) proposed that these intraplate seamount and island chains represent a series of volcanos formed by plate movement over a hotspot that is fixed in the mantle; hence, these lineations provide a record of plate motion. Much of the work on these chains has therefore focused on determining the history of motion of the Pacific plate with respect to hotspots (e.g., Jarrard and Calgue, 1977; Duncan, 1981) and has emphasized the North and Mid-Pacific seamount chains - for instance, the Hawaiian Islands - Emperor Seamount chain (e.g., McDougall, 1964, 1979; Clague and Jarrard, 1973) and the Line Islands (e.g., Davis et al, 1980; Saito and Ozima, 1976).

The Louisville Ridge is a prominent, curvilinear, discontinuous feature in the S.W. Pacific Ocean (Fig. 1). It extends from the Pacific-Antarctic Rise, in the vicinity of the Eltanin Fracture Zone System, in a NNW direction to the Kermadec-Tonga Trench, which it intersects at about 26°S. Although this volcanic chain is not well documented, the limited amount of bathymetric data indicates that it is composed of a series of seamounts, many of which stand more than 3000 m above the surrounding sea floor; in fact, several of the summits are less than 1000 m below the sea surface. The density of volcanos appears to be greatest at the northern end of the Ridge, where a linear, closely-spaced series can be defined. South of about 42°S, however, the Ridge continues as a number of isolated seamounts and it is not clear whether, or where, it actually intersects the Pacific-Antarctic Rise.

The Louisville Ridge is subparallel to the Emperor Seamounts, suggesting that these two features may be contemporaneous (the Emperor Seamounts were formed between 100 my and 42 my ago). This is supported by two lines of evidence. Three volcanos have recently been dated (shown in Fig. 1) and yield ages between 45.5 and 53.3 my (Duncan and Clague, 1985). Osborne Seamount, the most northerly seamount in the chain, was dated at 30-36 my by K-Ar dating (Ozima et al, 1970). However, this age can only be considered as a minimum estimate because of alteration effects. In addition, the azimuth of the chain and the ages agree well with the lineament predicted from the Pacific Plate motions over a fixed hotspot (Duncan and Clague, 1985). Hence, on the basis of the sparse, currently available data, the Louisville Ridge might represent a major structural feature created at a hotspot that has been active over a long period of time. It therefore provides the opportunity not only to further investigate Pacific Plate motion, but also to examine the nature and evolution of the Ridge from both a structural and geochemical standpoint.

The proposed strategy for a drilling program on the Louisville Ridge would be to complete a series of sites on the summits of four or five seamounts spaced along the entire length of the Ridge.

In addition, and of equal importance, would be a series of sites between the seamounts into the adjacent sea floor.

The objectives of the proposed drilling would be:

1) to determine the age relationships both between volcanos along the Louisville Ridge, and with the adjacent sea floor;

2) to characterize the nature of the magmas erupted along the Louisville Ridge on different seamounts, and to determine variations in composition within and between individual seamounts; and

3) to produce a comprehensive interpretation of the origin, and magmatic and tectonic histories of the Louisville Ridge.

This information will be of significance with respect to broader questions such as:

1) What is the origin of the Louisville Ridge? Is it the trace of a ridge-centered hotspot, or the trace of an off-ridge mantle plume?

2) What is the age progression along the chain, if any? Are the rocks of similar age to the adjacent sea floor? Can rock ages be related to sea floor spreading rates?

3) Are there any geochemical variations in the rock types found along the chain? Are they all derived from the same mantle source?

4) Is there any evolution of the magma within an individual volcano as seen, for instance, in the Hawaiian chain? Does volcanism continue for long after the plate has passed the hotspot? Is there renewed volcanic activity from a different mantle source?

5) How does this South Pacific feature compare with other linear volcanic chains, particularly those in the North Pacific?

REFERENCES

Clague, D.A. and R.D. Jarrard. 1973. Tertiary Pacific plate motion deduced from the Hawaiian-Emperor chain. Geol. Soc. Amer. Bull., v.84:1135-1154.

Davis, G.T., J.J. Naughton and J.A. Philpotts. 1980. Petrology, geochemistry, and ages of Line Islands basaltic rocks, central Pacific Ocean. Trans. Am. Geophys. Un., v.61:1144.

Duncan, R.A. 1981. Hot spots in the southern oceans - an absolute frame of reference for motion of the Gondwana continents. Tectonophysics, v.74:29-42.

Duncan, R.A. and D.A. Clague. 1985. Pacific plate motion recorded by linear volcanic chains. In: Nairn, A.E.M., F.G. Stehli, and S. Uyeda (eds): The Ocean Basins and Margins, v.7A. The Pacific Ocean. Plenum Press, N.Y. Ch.3:89-121.

Jarrard, R.D. and D.A. Clague. 1977. Implications of Pacific Island and seamount ages for the origin of volcanic chains. Rev. Geophys. Space Phys., v.15:57-76.

McDougall, I. 1964. Potassium-argon ages from lavas of the Hawaiian Islands. Geol. Soc. Am. Bull., v.75:107-128.

McDougall, I. 1979. Age of shield-building volcanism of Kauai and linear migration of volcanism in the Hawaiian Island Chain. Earth Planet. Sci. Letts., v.46:31-42.

Morgan, W.J. 1971. Convection plumes in the lower mantle. Nature, v.230:42-43.

Morgan, W.J. 1972. Deep mantle convection: plumes and plate motions. Am. Assoc. Petrol. Geol. Bull., v.56:203-213.

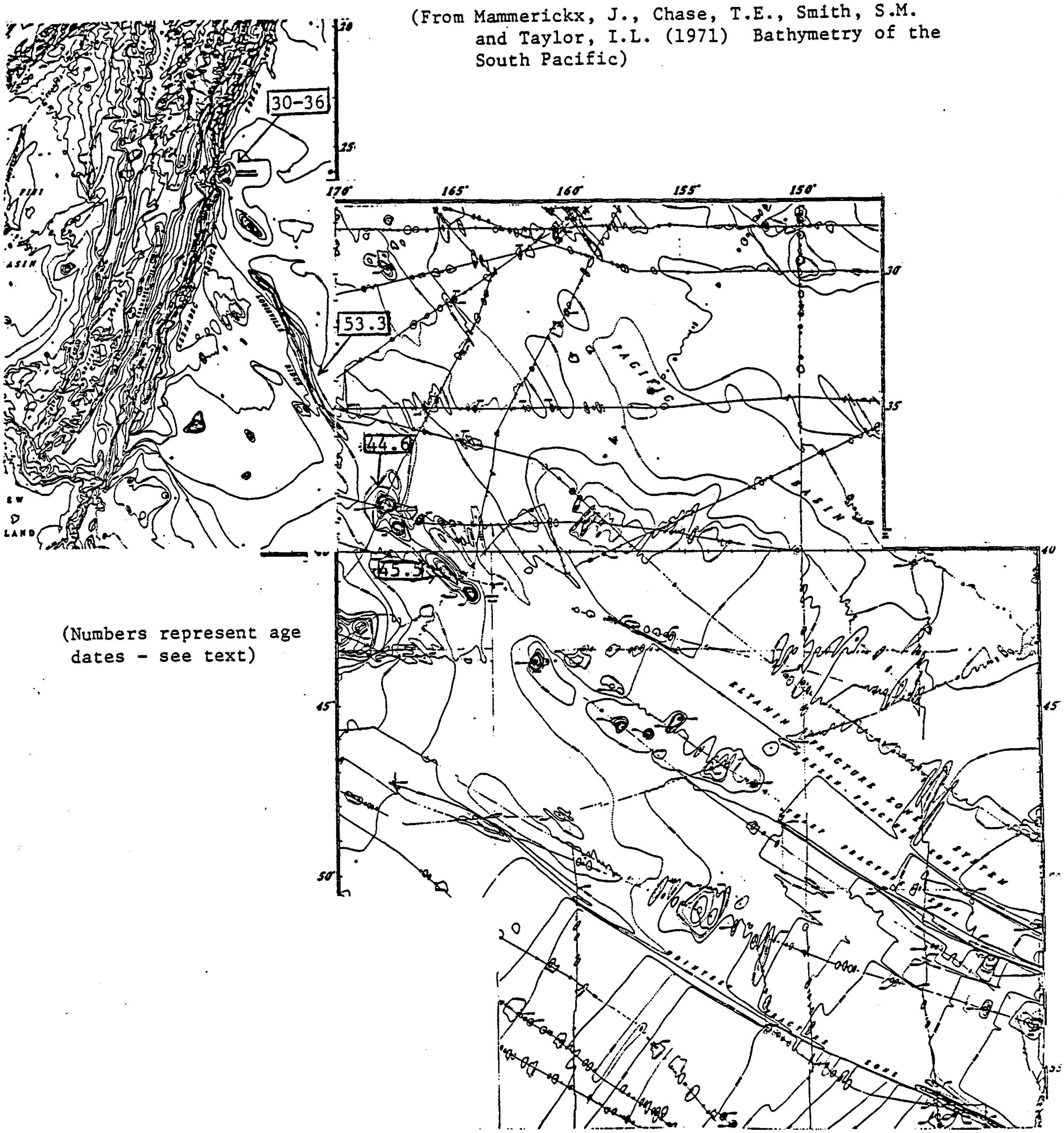
Ozima, M., I. Kaneoka and S. Aramaki. 1970. K-Ar ages of submarine basalts dredged from seamounts in the western Pacific area and discussion of oceanic crust. Earth Planet. Sci. Letts., v.8:237-249.

Saito, K. and M. Ozima. 1976. ^{40}Ar-^{39}Ar ages of submarine rocks from the Line Islands: implications on the origin of the Line Islands. Am. Geophys. Un., Geophys. Mon., v.19:369-374.

Wilson, J.T. 1963. A possible origin of the Hawaiian Islands. Can. J. Phys., v.41:863-870.

Figure 1. Bathymetry of the Louisville Ridge

(From Mammerickx, J., Chase, T.E., Smith, S.M. and Taylor, I.L. (1971) Bathymetry of the South Pacific)



(Numbers represent age dates - see text)

G. FRACTURE ZONES

1. Eltanin Fracture Zone
2. Sala y Gomez Ridge (SG-1, SG-2, SG-3)

1. ELTANIN FRACTURE ZONE.

P. Lonsdale, Scripps Institution of Oceanography.

The 300-400 km long Udintsev, Tharp and Heezen transform faults are extreme interruptions of the generally smooth relief of the Pacific-Antarctic Ridge. They each have a fault trough 5500-6000 m deep (approximately 3 km deeper than the surrounding ridge flank), and one or two high transverse ridges (alonside the fault trough) with crests that have been wave (?) truncated at 500-600 m, and were almost certainly emergent as long, narrow islands during parts of the Pleistocene. All three transforms have persisted since the initiation of Pacific-Antarctic spreading at approximately 80 Ma, and have left long fracture zone trails between Campbell Plateau/Chatham Rise and the Antarctic margin.

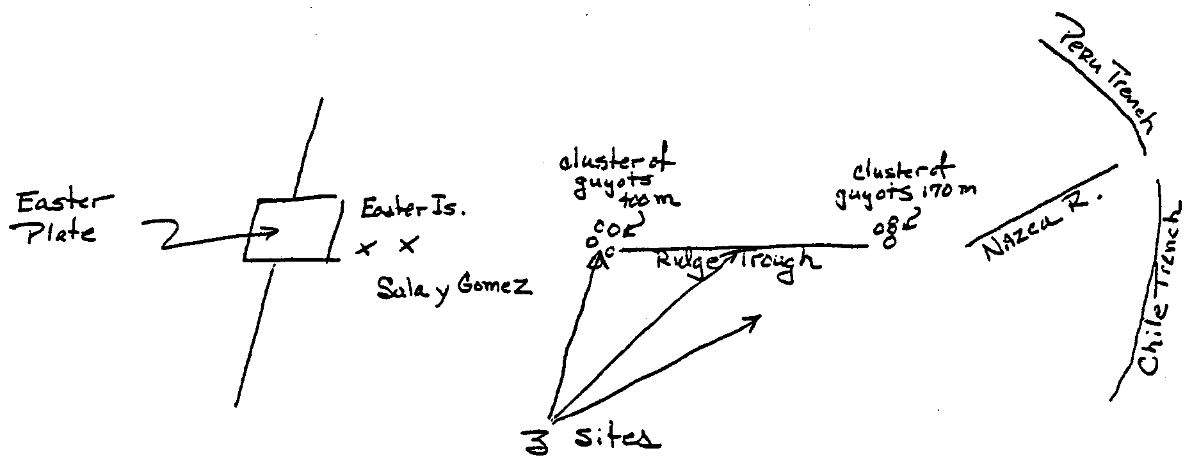
The significance of these admittedly remote transform faults is that they are the only extant examples of features responsible for the great Pacific fracture zones, the longest crustal structures on earth. Understanding the geology of Pacific fracture zones requires study of the transforms that are actively creating them. The classic North Pacific examples (Murray, Molokai, Clarion, etc.) are no longer connected to an active transform, but the Eltanin system (whose fracture zones appear structurally identical to those in the North Pacific) is still active, with comparable lateral offsets and slip rates. Pacific fracture zones (and transform faults) are structurally, geomorphologically, and (probably) petrologically quite different from slow-slipping Atlantic and Indian Ocean fracture zones that have already been targeted for drilling.

The specific objectives of three proposed drill sites would be (1) to ascertain crustal composition and stratigraphy of the transform valley floors where the igneous crust (beneath approximately 100-200 m of ponded sediment) is expected to be very thin. Only drilling can test the several explanations for why these fault troughs are so deep; (2) to determine the composition of the rapidly uplifting (2 mm/yr) transverse ridges that are the salient features of these transforms. Soviet dredging has recovered mafic schists and serpentinized peridotites from the faulted side of Heezen transverse ridge (whose crests have caps of shallow water limestone). Drilling would determine crustal thickness (probably very small) and extent of upper-mantle serpentinization, critical data for constraining models based on magnetic and gravity interpretation for the origin of the ridges. It would also recover an upper mantle section for comparison with those at slow-slipping transforms, and for characterization of the mantle of a huge oceanic area with no other known peridotite outcrop for 4000 km; and (3) to test models that explain how structures of the aseismic fracture zone evolve from those of the transform domain. Existing Seabeam data suggests that the (thin?) crust of the transform valley floor is buried and invested with new flows and dikes as it passes a spreading center intersection, creating a double thickness of crust with two different sources, in a band 5-20 km wide that evolves by subsequent crustal flexure into a fracture zone ridge. A judiciously sited drill site could expect to recover young lavas overlying a 10 Ma sedimentary section and 10 Ma basalt, if this model is valid.

2. SALA Y GOMEZ RIDGE.

K. Crane, Lamont-Doherty Geological Observatory; J. Mammerickx, Scripps Instutition of Oceanography.

The Sala y Gomez Ridge is a fracture zone in process of transformation into either a leaky fracture zone or an impending spreading center. 1) Arguments for a leaky transform FZ are the occurrence of volcanism along the ridge in an age sequence that does not fit the hotspot model. 2) Arguments for an impending spreading center are an underlying depth anomaly and a tectonic setting identical to the one preceding the opening of the Cocos-Nazca spreading ridge 25 Ma. The Sala y Gomez Ridge bisects the two branches of the Peru-Chile Trench. Trench pull may be part of the triggering mechanism.



Testing of this hypothesis would include preliminary site surveys and dredging of the guyots clusters as well as the intervening Ridge.

We propose to drill the transverse ridge to see whether or not distinct metamorphic assemblages yield clues to the earlier ridge formation: 1) mechanically built up (thrust faults) with reverse metamorphic signatures, 2) diapiric welling of mantle sources, 3) constructional volcanism, and 4) vertically uplifted sections as documented by limestone age dating.

The question of early provenance can only be assured by drilling the transverse ridge and not the trough. However, the style of recent activity may be best studied by a contrasting trough drill site, to test for recent volcanism, extrusion and intrusion, magma type, and to document vertical motion by sediment stratigraphy.

Site SG-1, SG-2, SG-3, Sala y Gomez Ridge. Formal site proposal pending.

H. RIDGE AXIS

1. Small scale geoid height anomalies (GHA-1)

1. THE INVESTIGATION OF SMALL-SCALE GEOID HEIGHT ANOMALIES IN THE SOUTH PACIFIC OCEAN: EVIDENCE FOR FROZEN TOPOGRAPHY GENERATED BY MAGMA DIAPIRISM ON THE EPR.

K. Crane, Lamont-Doherty Geological Observatory; H. Dick, Woods Hole Oceanographic Institution.

INTRODUCTION

Analysis of Seasat altimetry data has shown the existence of lineated gravity patterns over the younger portions of several of the faster moving oceanic plates (Haxby and Weissel, 1985). The patterns consist of subparallel gravity highs and lows which are aligned in the direction of present absolute plate motion (Fig. 1). The predominant wave lengths observed are between 150 and 200 km and the maximum peak to trough amplitudes observed are 20 mgals. Preliminary results of measurements of gravity and bathymetry on the recent cruise RC26-08 have confirmed the existence of this pattern in the east Central Pacific where they are well developed.

One of the best understood characteristics of the lithosphere plates is the increase in their flexural rigidity with age (Watts and Steckler, 1980; McNutt, 1984). If stresses produced by small scale convection result in topography when the lithosphere is young and its flexural rigidity is low, this topography can later be partially supported by older lithosphere which has a higher rigidity even if the pattern of convection has changed. This will give rise to frozen lineated topography and a corresponding pattern of gravity anomalies. Simple calculations show that the wave length range of 150 to 200 km can be efficiently "frozen in" by the growing elastic lithosphere.

The question of what causes these linear gravity patterns to be developed in some areas and not in others is crucial to understanding the mechanism which they form.

With the viewpoint that linear short wave length gravity anomalies are formed on plates when they are young and then frozen in, different areas can be studied to determine what characteristics of an area lead to the preservation of these features. For example, since the areas where the patterns seem to reflect present day motion are on fast moving plates, we should investigate older areas of the ocean basins which reflect fast plate motion in non-present directions. In general, the relationship between the amplitude and wave length of these patterns and plate speed will be studied. The fact that the gravity patterns are not symmetric about present day mid-ocean ridges (Haxby and Weissel, 1985) also must be studied. One possible mechanism for the asymmetric development of lineated features is that the upwelling associated with the larger scale of mantle flow may not be centered under the ridge. The absolute plate motions on each side of ridges will be considered along with data indicating other important asymmetries across ridges. Jim Cochran (1985) has compiled detailed data on the near ridge subsidence curves for large segments of the ridges which are associated with linear gravity patterns.

Finally, work will be done to consider how possible along ridge thermal variations may correlate with the development of these features. Andrews et al. have noted the correlation between geoid highs and the development of linear gravity patterns. Geoid highs may indicate higher average mantle temperatures under those ridge segments. Higher mantle temperatures could mean lower viscosity and this will lead to earlier development of vigorous small scale convection. In the light of the present model, this would mean that the convective stresses would be well developed while the elastic lithosphere was still young and thin and so the associated topography would be more efficiently frozen in.

Similar wave lengths in the rise axis topography (100-180 km) have been detected on the axis of several medium to fast spreading rate ridges. Where data are available, these harmonically spaced highs are correlated with large hydro-thermal regions 10 to 20 km in length.

Although off-axial topographic data are scarce, some seamount chains have been discovered which extend from these hydrothermal rise axis highs into the older parts of the Pacific Plate. They also correspond directly to observed Seasat anomalies.

The degree of stability (spatial and temporal evolution) of hydrothermal regions may be answered by observing both the generation of small seamount chains and the establishment of the short wave length geoid height anomalies.

If indeed this is the case, then we should be able to use the geoid to predict the location of fossilized hydrothermal regions (hence polymetallic sulfides). In addition, the variation of source magmas and their evolution may be tied to the same processes which cause "punctiform" hydrothermal activity (presumably a surface manifestation of a deep-seated source).

If diapiric processes are responsible for the upwelling of localized magma bodies then there should be a thickening of basalt along sections of the rise axis above the diapirs. How they are frozen into the plates and transported off through time may be an interaction between magma movement along the rise axis and the shear imparted on a secondary convection system by a plate moving at some angle away from the rise axis.

We propose to test these hypotheses by a combination of detailed geophysical, geological site surveys, and drilling on and off of a small wave length geoid height anomaly in the South Pacific (19°S, 121°W) as this is where they are best expressed. Drilling should address the questions of: 1) origins and concentrations of polymetallic sulfides, 2) magma source variation through time, 3) magnetic intensity varia-tions through time, and 4) relationship between axial magma processes and their fossilized end members.

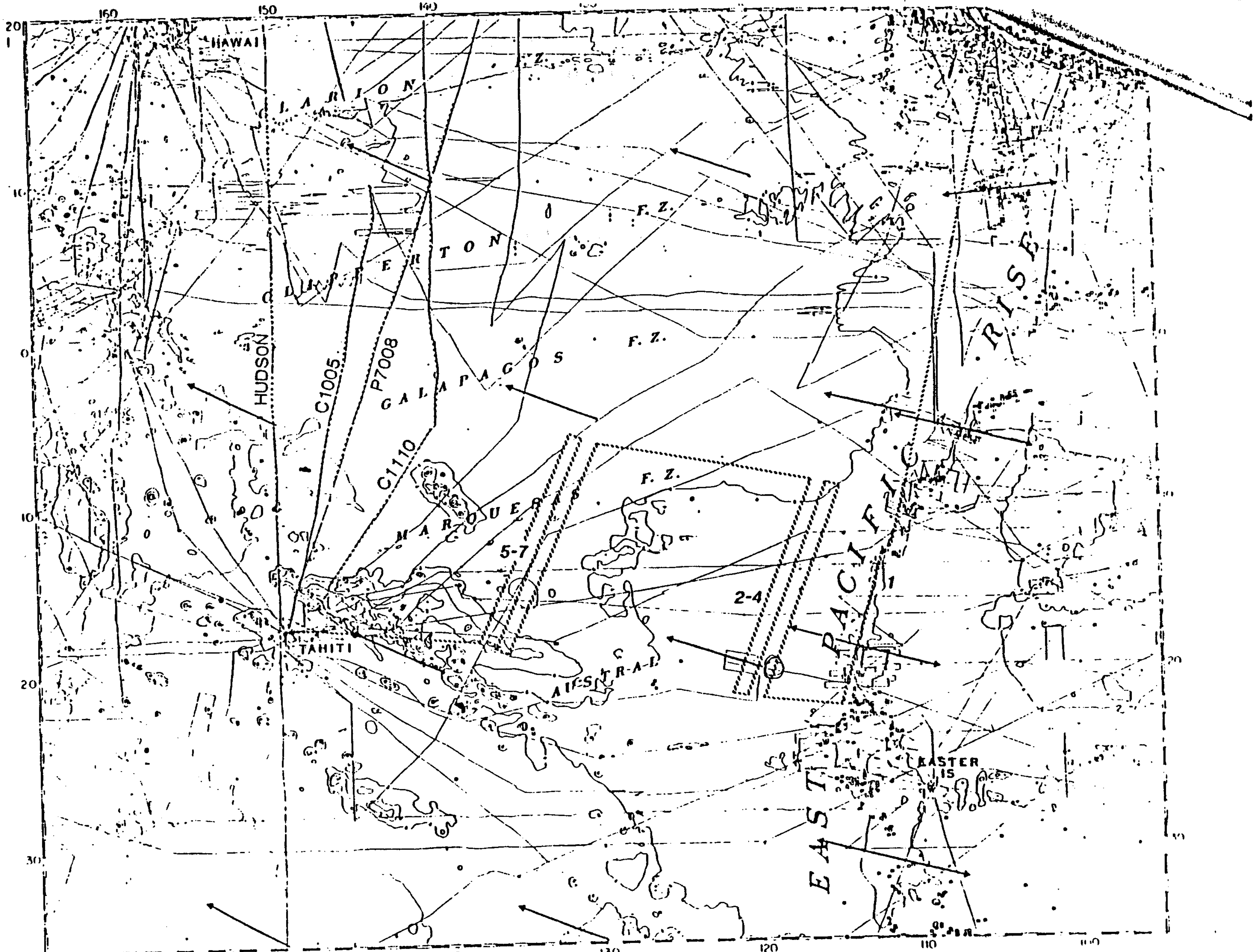


Figure 1. EXISTING SHIIPTRACKS WITH BOTH GRAVITY & BATHYMETRY
.... RC26-08 SHIPTRACK

I. PLATE TECTONIC HISTORY

1. Old Pacific Crust (OP-1, OP-2)

1. OLD PACIFIC CRUST IN THE SOUTHWEST PACIFIC.

J. Mammerickx, Scripps Institution of Oceanography; S. Cande, Lamont-Doherty Geological Observatory.

The quest for oldest Pacific crust has been one of the enduring goals of the drilling program. While all the efforts have been concentrated until now in the northwest Pacific, an argument can be made that oldest Jurassic Crust might exist in the southwest Pacific. It would be found west of a topographic lineament connecting the eastern edge of Campbell Plateau to the eastern edge of the Manihiki Plateau, along 165°W.

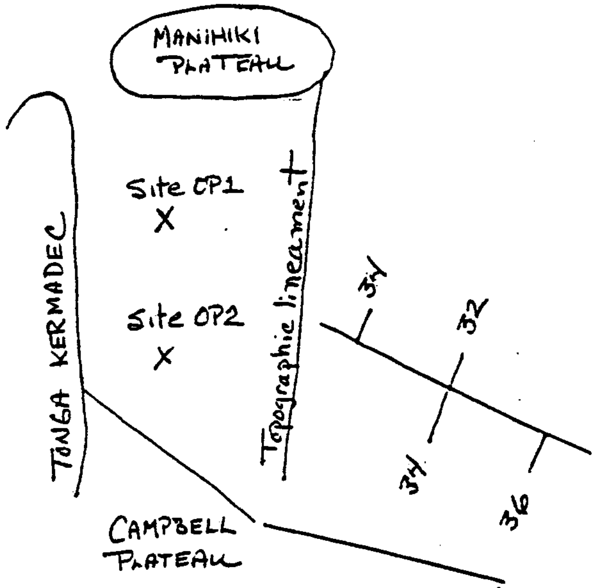


FIG. 1

Plate reconstruction models of the Central Pacific show the plate configuration 165 Ma before the present to be as on Fig. 2. The Pacific-Phoenix ridge died ∿105 Ma at the Manihiki Plateau. A large segment of abandoned Phoenix plate is now located south of the Manihiki Plateau and between the Tonga-Kermadec Trench and the 165°W topographic lineament.

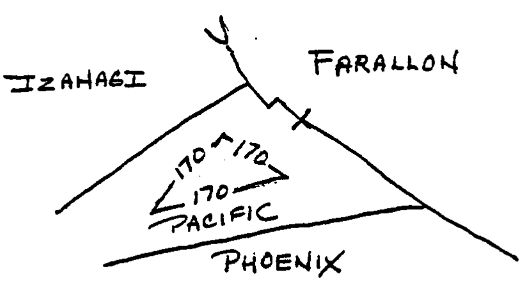


FIG. 2

Two sites drilled several degrees apart as on Fig. 1 would recognize an age gradient. Two earlier drilling sites have only collected fish teeth and debris; the stratigraphy of these sites is not very refined. Nevertheless, the importance of the problem justifies the drilling plan.

III. SEDIMENTS AND OCEAN HISTORY WORKING GROUP

Major Scientific Themes for South Pacific, SE Indian Ocean, and Antarctic Margin Drilling

1. Tectonic Influences on the Development of Inter-intra Basin Oceanic Teleconnective Passageways in the Pacific-Antarctic Sector
2. Antarctic Glacial History
3. Paleocirculation in the Pacific-Antarctic Sector
4. Development of the Antarctic Circumpolar Current
5. Development of the Biosiliceous Province
6. Sediment Dynamics of the Antarctic Margin
7. Deep Basin Sediment Dynamics and Geochemical Cycling
8. Paleobiogeography/Biostratigraphy/Evolutionary Processes
9. Sea Level Processes in the Pacific-Antarctic Sector
10. Hydrothermal Processes in the Pacific-Antarctic Sector

THEME 1. Tectonic Influences.

The tectonic evolution of the Pacific Antarctic Sector (PAS) has had profound effects on the history of sedimentation and paleoceanographic processes both in the Southern Ocean and global ocean system. Outlined below are some of the outstanding major tectonic events identified as exerting major influence on the development of oceanic passageways in the PAS and the overall glacial history of the Antarctic region.

- Cretaceous continental rifting history between Australia-Antarctica
- Cretaceous tectonics between West and East Antarctica
- Completion of Tasman Rise/Antarctic separation in the Paleogene
- Opening of the Drake Passage in the early Neogene
- Opening of the Samoan Passage
- Louisville Ridge development and consequences for Kermadec Trench western boundary current
- Fracture zone development along the SE Indian Ridge and Pacific-Antarctic Ridge
- Subsidence history and bathymetric development of deep basins of the PAS

By no means is the above listing meant to be inclusive of all tectonic events of importance to sediment and ocean history objectives in the Pacific-Antarctic Sector. The unique history of the PAS and high latitude connections with the Indian Ocean south of Australia and the Atlantic through the Drake Passage makes drilling in the PAS of critical importance to the scientific community. PAS drilling is also important to determining the ice-controlled elimination of the hypothetical East-West Antarctic seaway. In all of the tectonic events influencing PAS, it is important to distinguish between: 1) shallow connections allowing limited surface exchange of water, often created by early subsidence and initial continental separation which allowed planktic populations to mix; and, 2) the deep water connections which result from lateral or vertical tectonic motions permitting fundamental changes in major oceanic circulation and thermohaline processes.

We should recognize that such changes put extra demands on us. We forget that the present ocean has not always been as it is today when we attempt to reconstruct paleoceanographic processes. For example, it is not enough to examine the (late Eocene?) onset of Antarctic Bottom Water (AABW) formation in the South Atlantic and assume that because AABW is now a circum-Antarctic water mass that its early history was the same in once separated basins. The answers apply also to the South Pacific. The two oceans were not then connected and could have been as different in their bottom water histories as the North Atlantic and North Pacific are now.

The same problems and opportunities occur at other levels. The South Pacific is the best place to study Antarctic Circumpolar Current (ACC) and Polar Front (PF) behavior through the Neogene. It is not constricted as in the Drake Passage, Kerguelen-Broken Ridge or Australia-Antarctic region, and has no dominant east-west topography like the last. Thus, the ACC becomes slower, and north-south migrations of the PF are relatively unconfined by bathymetry, allowing better resolution and making continuous sedimentation more likely.

To examine these variations, a suite of sites should use tectonics in another way: the Pacific-Antarctic Ridge provides the chance of locating an excellent north-south transect on the same flank anomaly isochron, provides consistent and predictable paleo-depths, and provides a predictable carbonate sequence.

The reverse of this situation is that some studies are made more difficult: there are no broad aseismic plateaus, for example, to provide the slump-free dipstick samplers so useful in the South Atlantic. Again, there is a limit to how far back the Humboldt Current can be studied: the oceanic evidence has been subducted, and the American margin is unstable. Experimental design in such circumstances has to be carefully thought out.

THEME 2. Antarctic Glacial History.

Answering many remaining questions regarding the Cenozoic glacial, paleoceanographic, and climatic history of the Earth is contingent upon additional drilling in southern high latitudes where so little drilling has been done to date. Recognizing this fact, ODP has made a major commitment of four drilling legs (113, 114, 118, 119) to the Southern Ocean regions of the Atlantic and Indian Oceans. While drilling in these regions will help solve, or partially solve, many remaining questions, drilling of the Southern Ocean sectors of the southeast Indian Ocean and Pacific is essential to interpretation of the paleoenvironmental history and influence of the Antarctic region for these reasons: 1) regional differences in the glacial history, 2) differences in the apparent stability of East and West Antarctic Ice Sheets, and 3) partial or complete separation of Southern Ocean basins during the Paleogene.

Some of the problems which may be addressed by drilling in the South Pacifc and southeast Indian Ocean are outlined below. Sites are proposed following the thematic discussion which are specific to some of these problems. Additional site proposals are needed, but await further evaluation of existing geophysical data or require new survey. Problems regarding Antarctic glacial history which may be addressed by drilling in this region are:

- the timing and nature of various stages of Antarctic glacial development ("alpine-stage", "ice sheet stage", "sea level ice sheet-shelf stage"),
- the Alpine glacial record of the Antarctic Peninsula,
- the timing of the first sea level glacial discharge,
- West vs East Antarctic glacial history,
- the vegetation history of Antarctica from palynomorphs deposited in major glacial drainage basins,
- the temporal and geographic distribution of glacial ice-rafted detritus on the Antarctic margin and adjacent basins,
- the relationship between circum-Pacific volcanic episodes and Antarctic glacial history,
- the degree of West Antarctic Ice Sheet instability and its record of fluctuations,
- the speed, timing, and nature of rapid deglacial events, particularly in the West Antarctic region which may be susceptible to rapid "green-house effect" destruction,
- the relationship of West Antarctic glacial history to northern hemisphere glacial fluctuations and sea level fluctuations induced by northern hemisphere ice growth,
- the influence of southeast Pacific paleoceanography on Patagonia glaciation, and
- Neogene glacial responses to insolation changes induced by changes in orbital parameters.

THEME 3. Paleocirculation in the Pacific-Antarctic Sector.

The intimate relationship between tectonic and paleoceanographic developments in PAS make drilling in PAS imperative to understand better paleocirculation questions involving:

- Circumantarctic circulation
- Subtropical gyral circulation
- Evolution of Antarctic convergence/divergence system
- Evolution of subtropical convergence
- Evolution of latitudinal thermal gradients
- Bottom water sources and circulation
- Paleocirculation relationships with glacial and climatic evolution

Circum-Antarctic circulation

The evolution of the Tasmanian seaway, in particular the history of the grabens and their unique role in Pacific and Indian ocean connections, needs to be established. Shallow sites on the seaway and deeper water sites east and west of the seaway should be drilled. The justification for the drilling is that the establishment of the Tasmanian seaway was one of the most important circulatory events in the Cenozoic and played a major role in the development of the circum-Antarctic flow of both shallow and later deep waters. A major climatic effect was the decoupling of the subtropical gyre in the SW Pacific away from the Antarctic continent, and major changes in the thermal gradients. Very little information has been obtained from previous DSDP drilling due to site location and spotty recovery prior to the development of the hydraulic piston core (HPC). Thus, there is insufficient data from Leg 29 sites.

Subantarctic circulation

As the circum-Antarctic circulation became established, the Antarctic and Subantarctic water masses spread northward and the Subtropical gyre was displaced northward in the entire South Pacific. This had major paleoclimatic effects as warm waters were increasingly decoupled from the Antarctic continent, and contributed to the refrigeration of the continent. The history of these events is not well established, but existing data suggest initial decoupling at the Eocene/Oligocene boundary. It is possible that the southern arm of the gyre was displaced rapidly northward because of the obstruction caused by the New Zealand landmass. This may have occurred in the early Neogene and the process resulted in major cooling in the mid-high latitudes. The changes in the circulation can be examined in a north-south traverse in the central South Pacific in relatively shallow depths on the flanks of the East Pacific Rise.

Evolution of Antarctic Convergence/Divergence system

A series of sites in a north-south traverse are required to trace the development of the Antarctic convergence/divergence system in the Cenozoic. It can be inferred that the incipient stage of this system was represented only by a temperature contrast in surface waters. This in turn would have been followed by the formation of a well-developed thermal front, later followed by the strengthening in vertical structure with weak upwelling, and thence to an increasingly strong system of upwelling and downwelling.

Such a traverse of sites would provide the materials necessary to trace the northward expansion of these fronts as the Antarctic water mass expanded, and the expansion of the zone of upwelling between the Antarctic Divergence and Convergence. This evolution is tied to the northward expansion of the biogenic siliceous regime and the northward movement of the siliceous/carbonate facies boundary at the north of this system.

Evolution of Subtropical Convergence

The present day Subtropical Convergence is a major oceanographic front separating Subantarctic from cool subtropical (temperate) water masses. Upwelling associated with the Subtropical Convergence increases biogenic productivity. The Subtropical Convergence represents a major biogeographic barrier within the oceanic plankton. In the SW Pacific, the convergence occurs at 45°S.

Drilling at DSDP Site 594 indicates that the Subtropical Convergence began to form during the middle Miocene based on the separation of latitudinal assemblages which suggest the presence of separate water masses.

This evolution needs to be examined in the central South Pacific away from areas affected by topography such as the Chatham Rise, where the Subtropical Convergence seems to be topographically fixed. In the central South Pacific region, global climates should have controlled the latitudinal position of the Subtropical Convergence. It needs to be determined if the northward latitudinal movement of the subtropical gyre is intimately related to the origin and evolution of the Subtropical Convergence. The north-south traverse of sites for study of the evolution of the subtropical gyral systems will also provide the needed data for examination of the convergence evolution.

Evolution of latitudinal thermal gradients

The north-south traverse of sites in the central south Pacific will also provide vital data to examine the evolution of the surface water thermal gradients at middle and high latitudes from the Antarctic mass to the central part of the South Pacific gyre. Previous work has shown that the surface water thermal gradients began to increase in the early Oligocene. During the Miocene, the tropical to polar temperature gradient has approximately doubled. The increased temperature gradient at middle and high latitude resulted from the high latitudes and partitioning of the warm and cool waters as the surface water masses became established.

Bottom water sources and circulation

The South Pacific sector has been a major source of bottom water, particularly the Ross Sea sector and pre-glacial embayments in West Antarctica -- both of which are likely long-term areas of bottom water formation. This area is important to study especially when the South Pacific was isolated from the South Indian and Atlantic sectors prior to the opening of the Tasman seaway and the Drake Passage in the Paleogene, early Miocene, and perhaps later.

Partitioning of this cell of bottom water was at that time separate from Indian and Atlantic Oceans, with potential communication only at low latitudes. There must have been important factors in the partitioning of dissolved elements and gases with respect to geochemical cycles in each basin.

-What were the potential sources and sinks in PAS?

-What can we learn about the flow paths and conduits from the South Pacific to the North Pacific in the Paleogene, and between the high latitude systems?

Paleocirculation relations with glacial and climatic evolution

-What are the relationships between the steps in development of Antarctic glaciation and paleocirculation and climatic evolution in the South Pacific, Antarctic margin area?

-What are the temporal relationships between high and middle latitude heat transfer, and water mass developments in each circum-Antarctic Southern Ocean sector, and how do these correlate with changing degrees of Antarctic glaciation?

THEME 4. Development of the Antarctic Circumpolar Current (ACC).

The development of the ACC during the latest Oligocene thermally isolated the Antarctic continent by the decoupling of warm subtropical gyres from the cold subpolar gyres. The result of this action was the growth of Antarctic ice sheets and an accompanying increase in the extent of circum-Antarctic sea ice. Our rudimentary knowledge of the history of the ACC is based largely on a few sites from aseismic ridges or rises which are from regions of atypical ACC flow because these bathymetric highs and the Coriolis force impart significant northward deviations to the dominant eastward flow of the ACC. Additional sites are needed in regions where the ACC is relatively uninfluenced by bottom topography.

The eastern South Pacific would appear to be an exceptionally good location to drill a sequence of sites which would offer a history of ACC development uninfluenced by bottom topography. We propose a north-south transect of sites in this region, the East Pacific Rise Transect, to obtain a record of ACC development (EPRT-1 through EPRT-4). Problems which are related to the development of the ACC and may be addressed by study of these holes include:

- the relationship between the development of the ACC and Antarctic glacial history,
- variations in ACC intensity through time, and
- the role of the ACC in: 1) growth of the biosiliceous province, 2) formation of distinct global latitudinal belts of planktic biogeography, 3) establishing permanent latitudinal planktic diversity gradients between low and high latitudes, and 4) intensifying latitudinal thermal gradients.

THEME 5. Development of the Biosiliceous Province

The modern day biosiliceous province surrounds Antarctica in an 800 to 2000 km wide zone largely between the Antarctic Divergence and the Antarctic Convergence (Polar Front). Large scale upwelling and the resultant high biosiliceous productivity in this zone has produced the single largest silica sink in the global oceans. Development of the biosiliceous province has had major consequences upon the late Paleogene and Neogene global silica budget, and has influenced the evolution and biogeographic distribution of planktic organisms.

The initiation of widespread biosiliceous productivity in the Southern Ocean and its northward expansion was linked to a number of factors, including: the glacial development of Antarctica and the progressive cooling of Antarctic surface waters, the development of the Circumpolar Current, and the formation of the strong upwelling systems associated with the Antarctic Convergence and Antarctic Divergence or their precursors. Our present fragmentary knowledge of the development of the biosiliceous province is inadequate because it is based on a relatively few sites with generally poor recovery and wide latitudinal spacing. It is also a composite record based upon sites which are from the southeast Indian Ocean, southwest Pacific, and southwest Atlantic. Many of the existing sites are on bathymetric highs where localized upwelling may give an unrepresentative picture of the true developpment of the biosiliceous province.

Since the initial stages of the formation of the biosiliceous province predates the development of deep water passages linking circum-Antarctica basins, adequate drilling is needed in the Pacific, Indian Ocean, and Atlantic sectors to interpret its history. To interpret the history of the biosiliceous province in the Pacific sector we have proposed a north-south traverse of sites, refered to as the East Pacific Rise Transect.

THEME 6. High Latitude Sedimentation.

1. Sedimentation on high latitude continental margins.

Glacial marine sediments are widespread, both in time and space, and occupy key stratigraphic positions within the late Precambrian and Paleozoic. Geologists faced with interpreting these deposits are confronted by a paucity of sequence and facies models from modern high latitude settings. Proper paleogeography is contingent upon proper interpretation of these deposits. Sites drilled in select portions of the Antarctic continental margin will provide valuable information about glacial marine sedimentation in different glacial maritime settings.

2. Transport of terrigenous sediments across the Antarctic continental shelf and onto the deep sea floor.

Proper paleoclimatic and paleoceanogrpahic interpretation of the Antarctic deep sea sedimentary record is complicated by the fact that these sediments are polycompositional. Terrigenous material is a primary component of abyssal sediments situated within a hundred kilometers of the margin. Factors which regulate the supply and dispersal of fine-grained sediments are poorly understood, but it is reasonable to assume that the quantity and character of sediments shed from the continental shelf has varied significantly between glacial and interglacial episodes, and therefore, provide a record of these events. At least one transect of sites extending from the continental shelf to the abyssal plain is needed to examine the relationship between sedimentation on the study shelf and that on the deep sea floor.

3. Erosional history of the Antarctic continental shelf.

The Antarctic continental shelf presently averages 500 m in depth, and in places, is over a kilometer deep. Its great depth is a result of the combined effects of glacial erosion and isostasy. Lowering of the shelf by these processes has probably had a profound influence on sedimentation on the shelf, and on oceanographic processes (i.e., the formation of Antarctic Bottom Water is influenced by wind forcing and the residence time of shelf waters versus brine production, and these processes will vary as shelf depth varies). Sites drilled in key areas of the continental shelf and rise will provide a record of shelf erosion in the form of sea floor unconformities (confined to the shelf) and sedimentation gravity flow aprons which are the downslope products of this erosion. It is assumed that erosion of the shelf occurred at different times in different regions (i.e., the East Antarctic shelf, the West Antarctic shelf, and the Antarctic Peninsula shelf).

4. Origin and development of deep sea fans.

A major problem in Antarctic marine sedimentation involves the origin and development of deep sea fans given the great depth of the continental shelf and polar glacial setting (no fluvial discharge). The mechanisms by which these fans are supplied with sediment are most likely tied to glacial conditions on the continent. Sites drilled on the continental rise and abyssal floor during DSDP Leg 35 provide a record of deep sea fan development since the glacial maritime setting was established on the adjacent margin. Sites on the adjacent shelf would provide a record of associated glacial, eustatic, and isostatic events which can be related to fan evolution in high latitude settings.

5. History of biogenic silica sedimentation in Antarctic marginal basins.

One of the most surprising discoveries made during coring programs on the Antarctic continental shelf has been the widespread distribution of biogenic siliceous muds and oozes there. Recently derived radiocarbon and Pb_{210} analyses of these sediments has shown that they were deposited at rates of 0.5 to 3.0 mm/yr. Therefore, shelf basins are presently important sinks for biogenic silica. A key question concerns the duration of this mode of deposition, and hence, the role of Antarctic shelf basins in Antarctic, as well as global, geochemical cycles. Sites drilled in the western Ross Sea and in shelf basins on the continental shelf off the George V-Adelie Coast and off the Antarctic Peninsula will provide a record of biogenic silica deposition in these regions.

THEME 7. Deep Basin Sediment Dynamics and Geochemical Cycling.

The case for drilling in the Pacific-Antarctic sector is best stated by the fact that this region provides a unique location to document Mesozoic and Paleogene sediment in the basin of which we know little or nothing. Even if a west-east Antarctic connection existed at this time, we need to know about sediment accumulation in the Southern Pacific basins, since they were part of the largest ocean basin of the Earth.

We have only limited knowledge of the distribution of hiatuses in the Southern Oceans, and drilling in this region is necessary to complete the record of hiatus distributions in the Southern Pacific gyre, and also to relate hiatus distributions to global circulation and to basin-basin accumulation patterns.

Drilling in this sector is necessary to complete the regional record of biosiliceous sediment and circum-Antarctic fractionation. Data on stable isotopic fractionation may provide some information related to the timing of denudation of the Antarctic continent.

In order to obtain an undistorted record of the occurrence and distribution of ice-rafted debris in this region, it is necessary to drill deep basin sediments. This data may be used to compare the deep ocean and the continental margin records of glaciation, in terms of their timing and duration.

THEME 8. Paleobiogeography, Biostratigraphy, Evolutionary Processes.

Some of the major objectives under this theme which may be addressed by South Pacific drilling are:

- Improved biostratigraphic resolution for the entire Cenozoic for all major microfossil groups using continuous hydraulic piston coring to provide a chronologic framework for the historical aspects of sedimentological and tectonic processes.

- Determination of the degree of longitudinal and latitudinal diachroneity (if any) of stratigraphically important index species.

- Examination of the interrelationship between the faunal and floral histories of the Antarctic, Subantarctic, and Transition water masses.

- Intercalibration of pelagic biostratigraphy, tephrochronology, paleomagnetic stratigraphy, and stable isotope chronology with special emphasis on the Neogene.

- Comparison of the above marine record with the marine record exposed on the Antarctic continent. Development of biostratigraphic control in shelf facies as well as in the pelagic realm.

- Documentation of the terrestrial vegetation history of the Antarctic continent with special reference to accumulation of organic matter in continental margin sediments.

- Study of the decline of Mesozoic and Paleogene provincialism as a result of the disruption of surface current barriers and the increase in climatically-induced Neogene provincialism in the Antarctic.

- Comparison of the impact of catastrophic biotic turnover events in both high and low latitude regions.

- Collection of sections that will facilitate the study of the evolution of individual lineages throughout their entire biogeographical distribution.

- Investigatation of the development of bipolarity or pseudobipolarity. This is best done in the Pacific sector of the Antarctic because it is best suited for comparison with the North Pacific.

- Study of the role of the Southern Ocean as a reservoir of "conservation" assemblages of species that periodically serve as a source to replenish low latitudes with new genetic stocks.

- Study of the impact of major fluctuations in the ice budget on the Antarctic marine biota.

Biogeography/Evolutionary Processes (P. Webb)

The major long-standing objective of biostratigraphers is to develop reliable and precise chronologic frameworks with high resolution that can be used for the historical interpretation of geologic processes. Previous DSDP drilling in the Antarctic has provided a foundation for realizing this goal in high southern latitudes. Unfortunately however, previous sites were selected to obtain answers to problems not compatible with biostratigraphic objectives, and many of these sites were discontinuously cored in hiatus-condensed sections. Poor microfossil preservation and disturbed assemblages are other problems inherent in some of these DSDP Antarctic sites.

Accomplishing our objectives in the Antarctic is a particularly vexing problem, because the region in a broad sense is currently occupied by three distinctive pelagic distribution provinces: the Transition, Subantarctic, and Antarctic Domains. The development and origination of these provinces is presently unknown, but the Pacific sector of the Antarctic is a particularly good region to investigate these problems. A north-south traverse of drill sites along the flanks of the Pacific-Antarctic Ridge-East Pacific Rise, where oozes accumulate above the red clays of the neighboring abyssal plains, would provide the necessary sections.

Additionally, the present Antarctic region has undergone a profound plate tectonic history which has influenced east-west provincialism. The Indian Ocean sector of the Antarctic was isolated from the Pacific sector during the Cretaceous. As Australia gradually separated from Antarctica, this isolation and associated provincialism declined. The impact of this complex history on diachroneity of index species must be investigated.

Another problem that must be addressed is the broad span of time that must be considered and the range of resolution requirements. The large interest in late Neogene geological processes require maximum possible chronologic control. Alternatively, very little is known about Paleogene-Cretaceous biostratigraphy of the diverse high southern latitude regions, and we must select sites that will give us our first look at old sediments of this age.

Last, we must develop biostratigraphic control in regions of diverse facies, from the open ocean north of the Polar Front, to regions of continental shelf and slope that are strongly influenced by ongoing glacial processes.

In order to meet all these objectives, we need sections that are characterized by minimal reworking and without extensive hiatuses. HPC and XCB drilling will reduce drilling disturbance to our acceptable level. Moreover, we will integrate biostratigraphic data with tephrochronologic, paleomagnetic stratigraphy, and stable isotope data to establish a chronology with state-of-the-art resolution.

One of the most important accomplishments of ocean drilling for evolutionary studies is collection of long-undistrubed sections in diverse localities for the comparison of the histories of microfossils in space as well as in time. These sections provide a basis for the study of evolution at all taxonomic levels from individual lineages up to entire biotas. Drilling of such sections

THEME 9. Sea Level Processes in the Pacific-Antarctic Sector. (Wise and Anderson)

Sea Level History of the Australian and Antarctic Passive Margin.

1. The Vail, et al. coastal onlap/offlap ("sea level") curve: validation/calibration on non-Atlantic passive margins.

The "Vail curve" was based primarily on seismic records from circum-North Atlantic passive margins. These margins may have been affected by synchronous tectonic events associated with the opening of the Atlantic, thus independent verification of the onlap/offlap pattern is needed from non-Atlantic passive margins. The Australian and Antarctic margins are logical candidates. Major eustatic sea level drops are manifested along slopes and rises by the development of submarine canyons, major disconformities, and Vail Type I submarine fans, all of which have been recognized by deep sea drilling on other margins. Around the North Atlantic margin, such features have been detected in the Aptian, at the lower-middle Eocene boundary, in the mid Oligocene, and the Tortonian. Finer scale sea level fluctuations have been revealed by slope/shelf drilling. The transect approach (shelf to abyssal plain) has been the most effective method for documenting these events, and for providing data by which they can be modeled.

2a. Responses to sea level changes: comparison of conjugate margins (glaciated vs. non-glaciated plus isostatic effects from ice loading).

Drilling along the conjugate margins of Australia (Otway Basin) and Antarctica (George V coast) should reveal similar eustatic sea level histories until the onset of glaciation, after which the George V coast should behave differently as a result of the isostatic effects of ice loading. The shallow marine Mesozoic-Cenozoic sequences along the George V coast (now drillable at 600 m water depth) should provide a detailed sea level record for comparison with that off Australia, therby allowing insight into the glacial isostatic history of the Antarctic margin.

2b. Responses to sea level changes: comparison of carbonate bank/reef vs. siliciclastic margins.

Results of Leg 93 and 95 suggest that the response of carbonate bank/reef complexes to sea level fluctuations is opposite that of siliciclastic margins. Testing of this model in a non-Atlantic setting could be carried out best along Australian margins.

2c. Responses to sea level changes: major disconformities related (?) to sea level low stands, including the "T" disconformity off the George V coast.

The "T" disconformity off the George V coast may be related to sea level (i.e., the Danian 63 Ma event, which is well dated along the DSDP Leg 93/95 New Jersey Transect). A similar regional disconformity has eroded Maestrictian-Danian sediments across the Falkland Plateau, for which Wise, Gombos, and Muza (1985) have suggested an alternate hypothesis for origin, that of regional erosion related to possible circulation changes through shallow seaways across the Antarctic Peninsula or across Antarctica itself. Drilling the "T" disconformity off the George V coast might solve this problem as to the nature and cause of this widespread early Tertiary regional erosion.

THEME 10. Hydrothermal Processes in the South Pacific Ocean. (Robert M. Owen and Mitchell W. Lyle)

BACKGROUND: DSDP Leg 92 (1983) investigated the history of hydrothermal activity along the western flank of the East Pacific Rise at about 20°S. It was initially assumed that any observed variations in the intensity of hydrothermal activity (recorded as vari-variations in the mass accumulation rate [MAR] of the hydrothermal component of the sediments) would be correlated with changes in the spreading rate. Two key findings of this cruise were: 1) there have been at least four episodes during the past 30 m.y. in which the intensity of hydrothermal activity was 5-25 times greater than present day levels; and 2) these episodes of intensified hydrothermal flux do not correspond to times of increased spreading rate, but instead are more closely related to large scale tectonic events, such as ridge jumps, or to circum-Pacific volcanic events.

MAJOR CONSIDERATIONS AND OBJECTIVES

1. Why conduct further studies in the South Pacific?

Present knowledge indicates the Southeast Pacific region is the optimum location for such studies because:

- hydrothermal materials represent a large and easily identified fraction of the sediments;
- the paleo-distribution of hydrothermal effluents has been roughly similar to the present day pattern for at least the past 30-50 m.y.;
- it will be possible to obtain better resolution of the magnitude, duration, and timing of known hydrothermal episodes;
- the region includes both the physiographic features and the requisite sedimentary record to further clarify the link between tectonism and hydrothermal activity.

2. Specific goals:

Studies resulting from Leg 92 suggest the hypothesis that there is a direct link between hydrothermal episodes and large scale plate reorganizations. Future drilling/coring operations should be aimed at testing this hypothesis. Specific goals include:

- identifying previously unknown hydrothermal episodes;
- determining the relationship between hydrothermal episodes and local ridge jumps; periods of general reorganization; periods of circum-Pacific volcanic events;
- determining if the hydrothermal episodes which are related to ridge jumps are associated with changes at the fossil ridge or the new ridge.

SIGNIFICANCE/IMPLICATIONS

Sea floor hydrothermal activity involves significant chemical exchanges between sea water and basalt which can exert a controlling influence on sea water chemistry. Episodes of anomalously high hydrothermal activity may have been particularly significant in influencing the evolution of sea water composition (e.g., Ca/Mg ratios), the deposition of economic levels of mineral depostis, the composition of carbonate sediments and the position of the carbonate compensation depth (CCD), and may be related to past climatic variations (via CO_2 evolution). Moreover, any hydrospheric or atmospheric changes resulting from hydrothermal pulses must be manifestations of changes in the lithosphere, because it is the "plumbing" of the lithosphere (degree of fracturing, spacing of convection cells, etc.) that ultimately controls the extent of sea water-basalt interaction.

Further drilling/coring operations aimed at investigating hydrothermal episodes should also contribute to our knowledge concerning sediment deposition, paleocirculation, productivity variations, the heat budget, and sea level variations.

DRILLING PROPOSALS

1. Western Ross Sea (Barrett, et al.)
2. Continental Rise, Antarctic Peninsula (Warnke)
3. Pacific-Antarctic Continental Margin (Anderson)
4. Amundsen Sea (Kellogg)
5. Ross and Amundsen Seas (Burckle)
6. East Pacific Rise Transect (Ciesielski, et al.)
7. South Pacific Ocean (Owen)
8. Oceanic Islands (Constantz)

1. A PROPOSAL FOR DRILLING IN THE WESTERN ROSS SEA, ANTARCTICA.

P. J. Barrett, Victoria University of Wellington, New Zealand; A. K. Cooper, U. S. Geological Survey; P. N. Webb, Ohio State University; F. J. Davey, Department of Scientific and Industrial Research, Wellington, New Zealand.

Drilling in the western Ross Sea should give information on the Mesozoic and younger history of Antarctic rifting (between East and West Antarctica) and Antarctic glaciation. We propose a transect of drill holes that would sample the Mesozoic (?) and Cenozoic sedimentary section in the Victoria Land Basin as well as underlying Mesozoic and older basement rocks. Our priorities would be: 1) to penetrate to basement and date the time of initial rifting, 2) to obtain a continuous core of Antarctic glaciation, and 3) to penetrate a glacial delta to determine how these features form in the glacial environment.

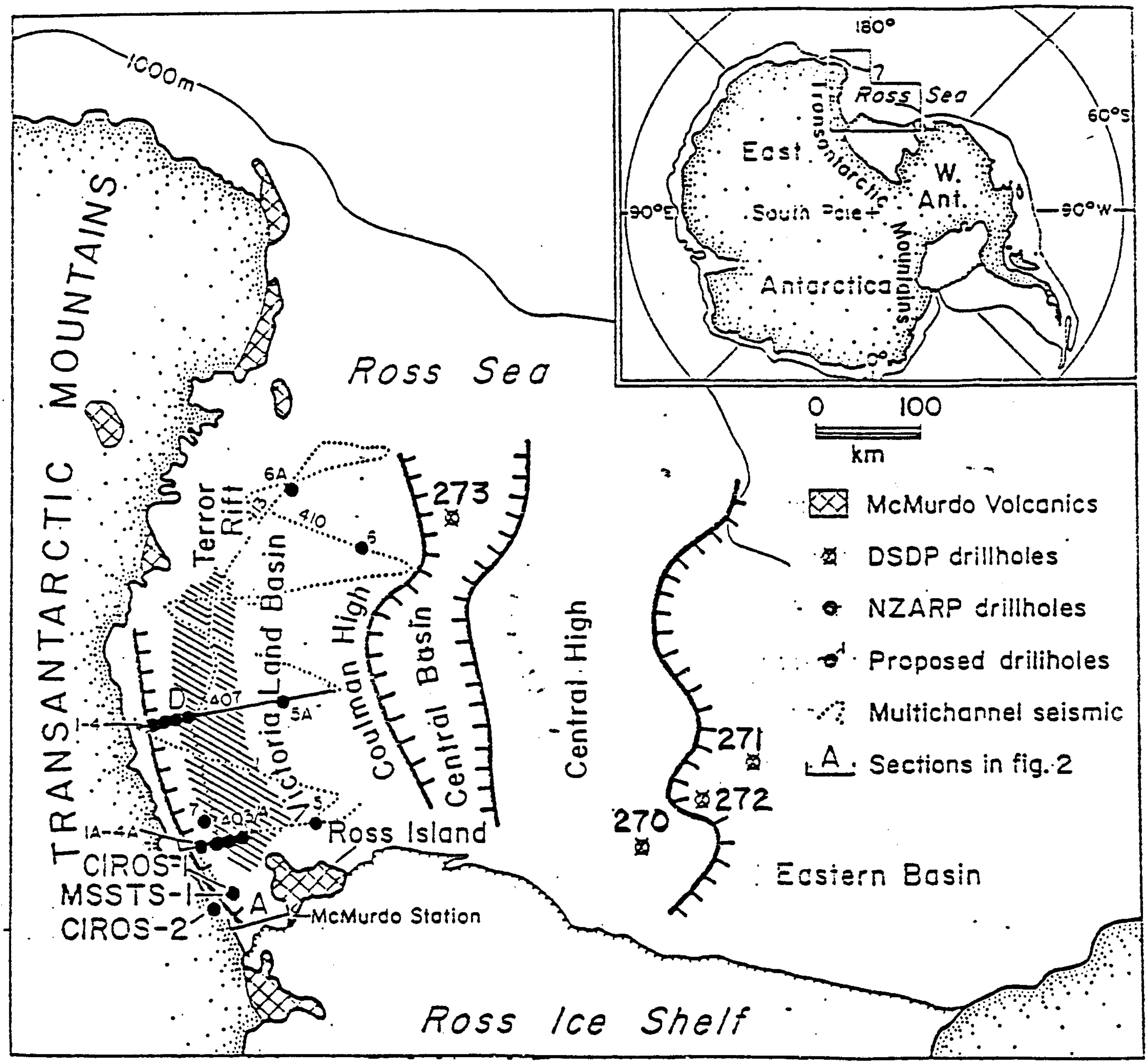


Figure 1. The Ross Sea region, showing sedimentary basins, and planned drillsites.

SITE	LAT. S.	LONG. E.	WATER DEPTH	DEPTH OF HOLE	UNITS TO BE PENETRATED	PRIORITY
WRS-1	75.9314	163.7462	740 m	1400 m	V3, V5, basement?	1
WRS-1A	76.9939	163.7126	220 m	1200 m	V4, V5, basement?	
WRS-2	75.9273	164.1396	700 m	1500 m	V1, V3, V4	5
WRS-2A	77.0163	164.5009	375 m	1500 m	V1, V3, V4	
WRS-3	75.9449	164.5022	710 m	900 m	V1, V2, V3	6
WRS-3A	77.0253	165.3751	710 m	1100 m	V1, V2, V3	
WRS-4	75.9634	164.8717	880 m	1500 m	V1, V2, V3 (top)	
WRS-4A	77.0252	166.2016	880 m	1700 m	V1, V2, V3 (top)	2
WRS-5	77.0953	169.3454	920 m	1500 m	V2, V3, V4, basement	3
WRS-5A	76.0132	169.6087	400 m	1800 m	V2, V3, V4, basement	
WRS-6	74.7590	171.8498	500 m	1600 m	V1-V4, basement	4
WRS-6A	74.1267	169.7579	530 m	1600 m	V1-V4, basement	
WRS-7	?	?	550 m	600 m	V1 (delta)	7

Table 2. Summary of basic data for proposed drillholes and alternative (A) sites for the Western Ross Sea (WRS)

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-1

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-1A

General Objective:
Date rifting and obtain early climatic history by sampling older strata in VLB.
Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:

Core through lower part of Unit V3 and upper part of Unit V5 to determine age and lithology of each. Both are basin-wide units and Unit V5 can only be sampled here or at WRS-1A.

Background Information:
Regional Data:
Seismic profiles: MCS 407 (SP430) (Figs. 4 and 6)

Other data: Gravity, magnetics.

Site Survey Data - Conducted by: S. P. Lee.
Date: February, 1984.
Main results:

Operational Considerations

Water Depth: (m) 740 m Sed. Thickness: (m) 3000 m Total penetration: (m) 1400 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: ~50 m of Unit V1, 200 m of Unit V3, 1150 m of Unit V5. ?Paleogene-Cretaceous shallow marine or terrestrial clastics below 50m.
Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM

(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-1A

General Area: Ross Sea, Antarctica

Position: See Table 2

Alternate Site: WRS-1

General Objective: Date rifting and obtain early climatic history by sampling older strata in VLB

Thematic Panel interest: TECP SOHP

Regional Panel interest: SOP

Specific Objectives:

Core through lower part of Unit V4 and upper part of Unit V5 to determine age and lithology of each. Both are basin-wide units and can only be sampled here or at WRS-1.

Background Information:

Regional Data:

Seismic profiles: MCS 403 (SP380) (Figs. 4, 7)

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee.

Date: February, 1984

Main results:

Operational Considerations

Water Depth: (m) 220 m   Sed. Thickness: (m) 1800 m   Total penetration: (m) 1200 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ____

Nature of sediments/rock anticipated: 200 m of Unit V4 followed by 1000 m of Unit V5, ?Paleogene-Cretaceous shallow marine or terrestrial clastics.

Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International.

Other: Ice Breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office: April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-2

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-2A

General Objective:
Date rifting and obtain early climatic history by sampling older strata in VLB

Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:

Obtain continuous core through Neogene-Paleogene

Background Information:
Regional Data:
Seismic profiles: MCS 407 (SP 600) (Figs. 4 and 6).

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984
Main results:

Operational Considerations

Water Depth: (m) 700 m Sed. Thickness: (m) 7500 m Total penetration: (m) 1500

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: 50 m of Unit V1, 1350 m of Unit V3, and 100 m of Unit V4.

Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International

Other: Ice breaker support

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:
B. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM

(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-2A

General Objective: Date rifting and obtain early climatic history by sampling older strata in VLB

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-2

Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:

Obtain continuous core through Paleogene and ?Cretaceous

Background Information:

Regional Data:
Seismic profiles: MCS 403 (SP 810) (Figs. 4 and 7)

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984
Main results:

Operational Considerations

Water Depth: (m) 375 Sed. Thickness: (m) 9500 Total penetration: (m) 1500

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: 100 m of Unit V1, 1300 m of Unit V3, 100 m of Unit V4.

Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International

Other: Ice breaker support

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office: April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-3

General Objective: Cenozoic pre-glacial and glacial history

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-3A

Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:

Obtain continuous core through Paleogene and Neogene

Background Information:
Regional Data:
Seismic profiles: MCS 407 (SP 830) (Figs. 4 and 6)

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee
Date: February 1984
Main results:

Operational Considerations

Water Depth: (m) 710 Sed. Thickness: (m) 10500 Total penetration: (m) 900

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ____

Nature of sediments/rock anticipated: 100 m of Unit V1, 750 m of Unit V2, 50 m of Unit V3

Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International

Other: Ice breaker support

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:

April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-3A

General Objective: Cenozoic pre-glacial and glacial history

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-3

Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:
Obtain continous core through Paleogene and Neogene

Background Information:
Regional Data:
Seismic profiles: MCS 403 (SP 1260) (Figs. 4 and 7)
Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984
Main results:

Operational Considerations

Water Depth: (m) 710 Sed. Thickness: (m) 13800 Total penetration: (m) 1100

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: 400 m of Unit V1, 400 m of Unit V2, 300 m of Unit V3

Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International

Other: Ice breaker support

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging

Proponents:
P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-4

General Objective: Cenozoic glacial history

General Area: Ross Sea, Antarctica
Position: see Table 2
Alternate Site: WRS-4A

Thematic Panel interest: SOPH
Regional Panel interest: SOP

Specific Objectives:

Obtain continuous core through thickest development of Neogene marine glacial Units V1 and V2, and into top of Paleogene? preglacial Unit V3.

Background Information:

Regional Data:

Seismic profiles: MCS 407 (SP 1070) (Figs, 4 and 6)

Other data: Gravity, magnetics.

Site Survey Data - Conducted by: S. P. Lee

Date: February, 1984

Main results:

Operational Considerations

Water Depth: (m) 880 Sed. Thickness: (m) 12 km Total penetration: (m) 1500 m

HPC _____ Double HPC _____ Rotary Drill _____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: Marine glacial sequence to 1200 m, shallow marine carbonate or clastics below. Units V1, V2, and V3.

Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Webb
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office: April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-4A

General Objective: Cenozoic glacial history

General Area: Ross Sea, Antarctica
Position: See Table 2
Alternate Site: WRS-4

Thematic Panel interest: SOHP
Regional Panel interest: SOP

Specific Objectives:

Open continuous core through thickest development of marine glacial Unites V1 and V2 (Neogene, glacial), and into the top of Unit V3 (Paleogene, ?preglacial).

Background Information:
Regional Data:
Seismic profiles: MCS 403 (SP 1760) (Figs. 4 and 7)
Other data: Gravity, magnetics.
Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984
Main results:

Operational Considerations

Water Depth: (m) 880 m Sed. Thickness: (m) 12 km Total penetration: (m) 1700 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: Marine glacial sequence to 1500 m, shallow marine carbonate or clastics below. Units V1, V2 and V3.
Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International.

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:
P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-5

General Area: Ross Sea, Antarctica.
Position: See Table 2
Alternate Site: WRS-5A

General Objective: Core Units V2-V4 near volcanic center to calibrate Southern Ocean biostratigraphy and into basement to sample possible early rift-related rocks.
Thematic Panel interest: SOHP TECP
Regional Panel interest: SOP

Specific Objectives:

Core continuously from seafloor to Basement in sequence with abundant volcanic debris for radiometric dating. Sample Basement which may contain Mesozoic sills or volcanics related to rifting.

Background Information:
Regional Data:
Seismic profiles: MCS 404 (SP 1360) (Figs. 4 and 8)

Other data: Gravity, magnetics.

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984.
Main results:

Operational Considerations

Water Depth: (m) 920 m Sed. Thickness: (m) 1400 m Total penetration: (m) 1500 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit x Reentry ?

Nature of sediments/rock anticipated: Marine glacial to 100 m, remainder shallow marine clastics. Basaltic material throughout. Basement may include sills or volcanics. Units V2, V3, V4.
Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International.

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:

April 1986

ODP SITE PROPOSAL SUMMARY FORM

(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-5A

General Area: Ross Sea, Antarctica.
Position: See Table 2.
Alternate Site: WRS-5

General Objective: Core Units V2-V4 near volcanic center to calibrate Southern Ocean biostratigraphy and into basement to sample possible early rift-related rocks.
Thematic Panel interest: SOHP, TECP
Regional Panel interest: SOP

Specific Objectives:

Core continuously from seafloor to top Basement in sequence with abundant volcanic debris for radiometric dating. Sample Basement which may contain Mesozoic sills or volcanics related to rifting.

Background Information:

Regional Data:
Seismic profiles: MCS 407 (SP 3670) (Figs. 4 and 8).

Other data: Gravity, magnetics.

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984.
Main results:

Operational Considerations

Water Depth: (m) 400 m   Sed. Thickness: (m) 1700 m   Total penetration: (m) 1800 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: Marine glacial sequence with abundant basaltic debris and possibly occasional flows. Basement may include sills or volcanic (Units V2, V3, and V4)

Weather conditions/window: Mid-January/Mid-February (due to sea ice)

Territorial jurisdiction: International

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:

April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-6

General Area: Ross Sea, Antarctica.
Position: See Table 2.
Alternate Site: WRS-6A

General Objective:
Cenozoic glacial history. Age of first rifting.

Thematic Panel interest: TECP SOPH
Regional Panel interest: SOP

Specific Objectives:

-Obtain record of glacial events back into the Early Cenozoic (and possibly Cretaceous) on the Coulman High - to compare with those recorded in center of VLB (WRS-4A), and show which are regional and which are local.
-Date sediment in half-graben to constrain timing of rifting.
-Sample basement.

Background Information:

Regional Data:
Seismic profiles: MCS 410 (SP 920) (Figs. 5 and 9)

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee
Date: February, 1984
Main results:

Operational Considerations

Water Depth: (m) 500 m Sed. Thickness: (m) 1500 m Total penetration: (m) 1600 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ?

Nature of sediments/rock anticipated: Marine glacial to 400 m (Units V1 and V2), pre-glacial clastics to 1500 m (Units V3 and V4), and basement (V7).
Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International.

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM

(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-6A

General Area: Ross Sea, Antarctica
Position: See Table 2.
Alternate Site: WRS-6

General Objective:
Cenozoic glacial history. Age of first rifting.

Thematic Panel interest: TECP SOHP
Regional Panel interest: SOP

Specific Objectives:

-obtain record of glacial events back into the Early Cenozoic (and possibly Cretaceous) on the Coulman High to compare with those recorded in center of VLB (WRS-1A), and show which are regional and which are local.

-date sediment in half-graben to constrain timing of rifting.

-sample basement.

Background Information:

Regional Data:

Seismic profiles: MCS 413 (SP 1080) (Fig. 5 and 9)

Other data: Gravity, magnetics

Site Survey Data - Conducted by: S. P. Lee

Date: February, 1984

Main results:

Operational Considerations

Water Depth: (m) 530 m Sed. Thickness: (m) 1500 m Total penetration: (m) 1600 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit __x__ Reentry __?__

Nature of sediments/rock anticipated: Marine glacials to 400 m, preglacial clastics to 1500 m, and basement · Units V1-V4 and V7.

Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponent:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:
April 1986

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: WRS-7

General Area: Ross Sea, Antarctica.
Position: See Table 2
Alternate Site:

General Objective:
Understand formation of submarine deltaic bodies.

Thematic Panel interest: SOHP
Regional Panel interest: SOP

Specific Objectives:

Core through ?Late Quaternary 'delta' off Granite Harbour to determine its age and mode of formation.

Background Information:
Regional Data:
Seismic profiles: Single channel (Fig. 10)
Other data: Gravity, magnetics.

Site Survey Data - Conducted by: USCGC Glacier
Date: 1980
Main results:

Operational Considerations

Water Depth: (m) 550 m   Sed. Thickness: (m)   Total penetration: (m) 600 m

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit X Reentry ____

Nature of sediments/rock anticipated: Quaternary marine glacials.

Weather conditions/window: Mid-January/Mid-February (due to sea ice).

Territorial jurisdiction: International.

Other: Ice breaker support.

Special requirements (Staffing, instrumentation, etc.)

Staffing: Micropaleontology (diatoms, forams, palynology), Sedimentology, Petrology, Organic geochemistry, Paleomagnetics, Logging.

Proponents:

P. Barrett
A. Cooper
P. Webb
F. Davey

Date submitted to JOIDES Office:

April 1986

2. PRELIMINARY PROPOSAL FOR TWO SITES ON THE CONTINENTAL RISE WEST OF GRAHAM LAND, ANTARCTIC PENINSULA.

D. A. Warnke, California State University.

INTRODUCTION

Two sites are proposed west of Graham Land at a depth between 3000 and 4000 m (Sites AP-1, AP-2). These sites are the same as those proposed by Prof. Peter Barker of the University of Birmingham. Although Barker's objectives are mainly tectonic, these sites are also of great interest from a sedimentological, glacial-historical, and paleocirculation point of view. Most of these themes have already been addressed by Dr. John Anderson of Rice University for his proposed shelf sites and the transect of sites seaward of the Bellingshausen Sea. For this reason, only a brief synopsis of his views is necessary in order to underline the sedimentological importance of the proposed sites.

THE SETTING

The glacial drainage regime of the Antarctic Peninsula according to Anderson is divided into three systems, namely (1) a valley-glacial system in the northern peninsula, dominated at present by tidewater glaciers, (2) the Palmer Land Ice Cap which drains via the George VI Ice Shelf into Marguerite Bay, and (3) the West Antarctic Ice Shelf which, however, has only minor drainage to the west. These three systems may have originated at different times and probably reacted differently to sea level and climatic changes. Two shelf sites have been proposed by Drs. Anderson and Barker off Graham Land-Marguerite Bay. These sites will hopefully shed light on the initiation and development of the first two above-mentioned systems.

SITE OBJECTIVES

The proposed sites on the sea floor (west of the shelf sites proposed by Barker and Anderson) fulfill some of the same requirements, as for the proposed shelf sites, namely the development of a better understanding of sediment dynamics, particularly with respect to the delivery systems linking the continental shelf to the deep sea floor. The proposed sites have received sedimentary components not only in the form of mass-wasting products, ice rafting, and similar processes, but also receive biogenic components. The proposed sites should provide insight into the interaction between these various processes and their dependence on climato-genetic causes.

In addition, the proposed sites are of interest from a paleobio-geographic and geochemical point of view because they should light on the evolution of biogeographic (siliceous) provinces at these latitudes, and should contain organic-geochemical signals of the denudation of the Antarctic region. Finally, the proposed sites are two of the very few located in "deep" water relatively close to continental sources, yet seaward of the continental slope that are of specific interest from a sediment ocean history (in addition to a tectonic) point of view. Therefore, because these sites are of great common interest, and supply one of the linkages between the shelf and distal deep sea basins, they should be given careful consideration in planning objectives for the proposed legs.

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals

Proposed Site: AP-1 (see also AP-2, AP-3, AP-4)	General Objective: 1) Ridge crest-trench collision processes at 14 Ma collision 2) Peninsula glacial history and sedimentation
General Area: Antarctic Peninsula Position: 64°S, 67°W Alternate Site:	Thematic Panel interest: TECP, SOHP Regional Panel interest: SOP

Specific Objectives:

1) To date hiatus in terrigenous sedimentation caused by collision-related uplift of the outer shelf
2) To study the relationship between shelf and continental rise sedimentation during glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, *Discovery* cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz and 12 kHz, heat flow

Site Specific Survey Data:

Seismic profiles: UK, to be undertaken 1987-8

Other Data:

Operational Considerations:

Water Depth: (m) 3400 Sed. Thickness: (m) 1000 Tot. penetration: (m) 550

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: terrigenous silt/clay (silica-rich)

Weather conditions/window: December-April (inclusive)

Territorial jurisdiction: Antarctic Treaty applies

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker Address & phone number: Geology Department Birmingham University Birmingham B15 2TT, England	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

Submit 6 copies of mature proposals, 3 copies of preliminary proposals

Proposed Site: AP-2

(see also AP-1, AP-3, AP-4)

General Area: Antarctic Peninsula

Position: 67°S, 73°W

Alternate Site:

General Objective:

1) RC-T collision processes at 18 Ma collision
2) Peninsula glacial history and sedimentation

Thematic Panel interest: TECP, SOHP

Regional Panel interest: SOP

Specific Objectives:

1) To date hiatus in terrigenous sdeimentation caused by collision-related uplift of the outer shelf
2) To study the relationship between shelf and continental rise sedimentation during glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, Discovery cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz and 12 kHz

Site Specific Survey Data:

Seismic profiles: To be undertaken 1987-8

Other Data: Sidescan?

Operational Considerations:

Water Depth: (m) 3700 Sed. Thickness: (m) 1200 Tot. penetration: (m) 600

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: terrigenous silt/clay

Weather conditions/window: December-April

Territorial jurisdiction: Antarctic Treaty applies

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

3. PRELIMINARY PROPOSAL FOR ODP DRILLING THE PACIFIC-ANTARCTIC CONTINENTAL MARGIN.

J.B. Anderson, Rice University.

The series of sites outlined in this proposal are aimed at the following thematic objectives:

1. Investigating the evolution of the West Antarctic Ice Sheet, Palmer Land Ice Cap and valley glaciers of the northern Antarctic Peninsular region.
2. Developing a better understanding of sediment dynamics on the continental margin, particularly the manner in which glacial, climatic and oceanographic process, which leave a profound record on the shelf, are manifested in the deep sea sedimentary record.
3. Obtaining stratigraphic sequences that can be incorporated into glacial marine sedimentation models for interpreting ancient rock sequences.
4. An examination of the erosional history of the Antarctic continental shelf.
5. An examination of the origin and development of Antarctic deep sea fans and development of models for interpreting their paleoclimate paleoglacial record.

GLACIAL HISTORY

The glacial drainage regime of the Antarctic Peninsula is divided into three distinct systems:

1. A valley glacial regime in the northern peninsula with a modern glacial maritime setting that is dominated by tidewater glaciers;
2. The Palmer Land Ice Cap which drains northward into the George VI Ice Shelf which in turn flows into Marguerite Bay;
3. The West Antarctic Ice Sheet which drains mainly into the Ross and Ronne-Filchner Ice Shelves, but has minor drainage outlets into the Bellingshausen Sea and Amundsen Sea.

These three glacial systems probably originated at different times and responded in a different manner to climatic and eustatic events. A series of sites located along the continental shelf and adjacent to these three drainage systems is needed to study their histories. Two shelf sites off Graham Land and Marguerite Bay have already been proposed by Dr. Peter Barker of Birmingham University (AP-3, AP-4). A third shelf site is needed on the Bellingshausen continental shelf edge to investigate West Antarctica's glacial record (BS-1). This site should provide a more complete Plio-Pleistocene record than is available in the Ross Sea where large ice streams have eroded the upper few hundred meters of sediment from the shelf (Hayes and Frakes, 1973). Other areas of the West Antarctic margin are ice covered and therefore unacceptable.

CONTINENTAL MARGIN SEDIMENTATION AND SHELF EROSION

The proposed shelf site (BS-1), coupled with a second site (BS-2) from the adjacent slope in an intercanyon area and DSDP Leg 35 sites will provide a means with which to examine the manner in which glacial, eustatic, and erosional events on the shelf are manifested in the deep sea sedimentary record. Until now, no attempt has been made at examining shelf-slope-abyssal sedimentary processes by drilling a complete margin transect. Consequently, the relationships between glacial transport (including ice-rafting, marine current transport, and sediment gravity flow processes) to paleoclimatic and paleoceanography events is still poorly known. Proper interpre-tation of deep sea sediments situated within the terrigenous sedi-ment belt is contigent upon developing a better understanding of these processes. For example, the flux of fine-grained terrigenous sediments to the deep sea floor probably varies considerably as glacial conditions shift from polar to temperate.

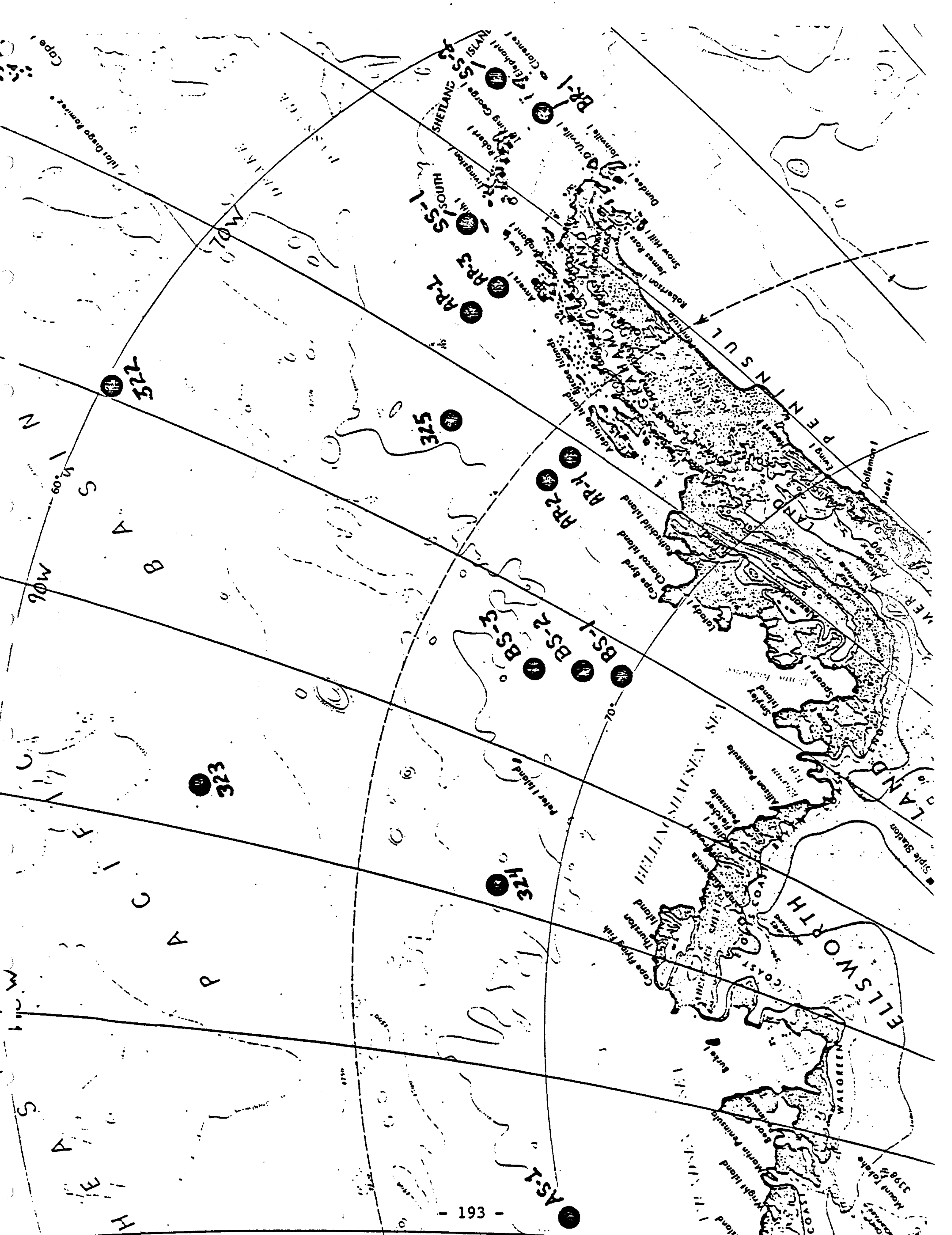
Sediment gravity flow deposits will surely comprise a significant portion of slope sequences, but since these are the products of mass wasting on the shelf, their stratigraphic distribution is of prime interest in establishing the glacial erosional history of the shelf.

DEEP SEA FAN DEVELOPMENT

The sites drilled on the Bellinghausen continental rise during Leg 35 (Sites 324 and 325) penetrated quartz-rich turbidite sands in the basal, Late Miocene section. Tucholke et al (1975) suggest that these are part of the Charcot Deep Sea Fan. The high quartz content and high degree of sorting in these sands indicates that they were subjected to fluvial and/or coastal processes before being transported down slope. The Charcot Fan appears to have become inactive for virtually all of the Pliocene to late Pleistocene time when diatomaceous muds and oozes were deposited. These sediments contain the earliest record of ice-rafting in the region. Anderson (1985) has suggested that starvation of the Charcot Fan at this time could have resulted from glacial erosion of the continental shelf and subsequent isolation of area canyons.

During the late Pleistocene, canyons and valleys of the Bellingshausen margin were filled with poorly sorted, arkosic, and lithic sands and gravels with abundant glacial surface features. Our petrographic analyses of these sands indicated that individual canyons were supplied with sediment from relatively restricted drainage basins. Just how these sediments were transported across the shelf is problematic amidst the rationale for the proposal of Site BS-3. An advance of the ice sheet to the shelf edge is a likely explanation. The proposed sites, plus those sites proposed by Barker and DSDP Leg 35 sites, would provide a transect of sites from which sediment transport to fans and the paleoclimatic significance of fan deposition can be examined.

A formal proposal of sites BS-1, BS-2, and BS-3 is pending. See Map 3.



SOUTH SHETLAND ISLANDS
PENINSULA
ELLSWORTH LAND
BELLINGSHAUSEN SEA
PACIFIC BASIN
Clarence I
Elephant I
King George I
Robert I
Livingston I
Joinville I
D'Urville I
Dundee I
Snow Hill I
James Ross I
Robertson I
Anvers I
Brabant I
Adelaide Island
Biscoe Islands
Alexander I
Rothschild Island
Charcot Island
Cape Byrd
Latady I
Spaatz I
Smyley Island
Peter I Island
Allison Peninsula
Fletcher Peninsula
Thurston Island
Cape Flying Fish
Burke I
Bear Peninsula
Martin Peninsula
Wright Island
Siple Station
Mount Takahe
Dolleman I
Steele I
Ewing I
Islas Diego Ramirez
70°
70°W
80°W
90°W
BR-1
SS-1
SS-2
AR-1
AR-2
AR-3
AR-4
BS-1
BS-2
BS-3
AS-1
322
323
324
325

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: AP-3

General Area: Antarctic Peninsula
Position: 64°S, 65°W
Alternate Site:

General Objective:

1) RC-T collision processes at 14 Ma collision
2) Peninsula glacial history from glacial till wedge

Thematic Panel interest: TECP, SOHP
Regional Panel interest: SOP

Specific Objectives:

1) To date an unconformity on the outer shelf attributed to uplift related to RC-T collision
2) Sample a 400 m thick till on the outer shelf to describe the history of Peninsula glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, Discovery cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, 3.5 kHz, sidescan
USCGC Glacier data and cores

Site Specific Survey Data:

Seismic profiles: UK 1987-8 season

Other Data: US 1986-7 season

Operational Considerations:

Water Depth: (m) 450 Sed. Thickness: (m) 2000 Tot. penetration: (m) 500

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: glacial till/interbedded diatom-rich glacial marine

Weather conditions/window: December-March

Territorial jurisdiction: Antarctic Treaty

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM

Submit 6 copies of mature proposals, 3 copies of preliminary proposals.

Proposed Site: AP-4

General Area: Antarctic Peninsula
Position: 67°S, 71°W
Alternate Site:

General Objective:

1) RC-T collision process at 18 Ma collision zone
2) Peninsula glacial history from glacial till wedge

Thematic Panel interest: TECP, SOHP
Regional Panel interest: SOP

Specific Objectives:

1) Date unconformity on outer shelf attributed to uplift related to RC-T collision
2) Sample a 400 m thick till on outer shelf to describe history of Peninsula glaciation

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: UK, *Discovery* cruise 154, 24-fold DMCS
Eltanin single channel seismics

Other data: Magnetics, gravity, sidescan
USCGC *Glacier* data and cores

Site Specific Survey Data:

Seismic profiles: UK 1987-8 season

Other Data: Possible US 1986-7 season

Operational Considerations:

Water Depth: (m) 450 Sed. Thickness: (m) 2000 Tot. penetration: (m) 500

HPC x Double HPC ___ Rotary Drill x Single Bit x Reentry ___

Nature of sediments/rock anticipated: glacial till/interbedded diatom-rich glacial marine

Weather conditions/window: December-March

Territorial jurisdiction: Antarctic Treaty

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Barker
Address & phone number: Geology Department
Birmingham University
Birmingham B15 2TT,
England

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

4. PROPOSED DRILLING SITES IN THE SOUTH PACIFIC.

T. B. Kellogg, Institute for Quaternary Studies, University of Maine.

1. We lack a high-resolution Neogene biostratigraphy (especially for marine diatoms), as shown by a number of recent studies. This limitation results in part from apparent species diachrony, and from regional climate- and environment-related variations in species distributions on either side of the Antarctic Convergence. Unfortunately, available JOIDES drill cores on Antarctic continental shelves fail to provide sedimentary sequences that can be studies to fill this need, because of widespread erosional events, hiatuses, and sediment reworking (probably caused by grounded ice). The solution to this problem could be provided by drilling at sites north of the continental shelf margin, at locations deep enough to exceed all possible former grounded ice advances but shallow enough to avoid erosion by AABW flow and turbidite deposition. Prime drilling sites could include seamounts and ridges such as the de Gerlache Seamounts or Amundsen Ridges (see Vanney and Johnson, 1976, Fig. 3). Ideally, drilling would be done using a transect of sites extending from north of the Antarctic Convergence southward to the continental margin.

2. The second major objective proposed for drilling is the continental shelf and margin in the Amundsen Sea. This area is almost completely unknown because of the normal heavy ice cover that persists year round. Nevertheless, <u>Glacier</u> succeeded in collecting cores at 20 sites in a transect from the continental shelf margin south to Pine Island Glacier in January of 1985. Bathymetric information collected at that time shows that south of 72°S the shelf has a rugged surface with numerous deep (glacial scoured?) troughs and intervening ridges. Shelf topography north of 72°S is much smoother. Single channel seismic data we collected on this cruise show that ridges are nearly sediment-free but that troughs contain relatively thick sediment. The troughs probably extend northward across the continental shelf to the margin, buried beneath thick sediments, but this hypothesis is untested because ice cover in this area was generally too thick to permit deployment of the seismic gear. Sediments collected on the outer shelf were all hard or overcompacted glacial marine sediments and/or diamictons, thus limiting penetration to a maximum of about 2.5 meters. Further south in the troughs, silty mud was found. Penetration here was much greater (up to 5.5 m) but the seismic data indicate we only sampled the surface of a thick deposit. Drilling in the troughs would permit us to sample the entire column of sediment above bedrock, thus providing the potential for dating this material (and, presumably the timing of the most recent episode of deposition on the shelf). In addition, continued coring at these sites would provide information on the bedrock, and thus on the geologic history of the region. Drilling on the northern part of the shelf would

provide material to test our hypothesis concerning the former extent and timing of glacial advances to the continental shelf margin, while giving additional information on bedrock geology. We would like to see a transect of perhaps 3 cores on the shelf.

I conclude by pointing out that these objectives complement a set of three objectives provided for ODP drilling by Dr. Lloyd Burckle.

Site AS-1, Amundsen Sea (see Map 3), formal site proposal pending.

5. NEOGENE PALEOCEANOGRAPHY AND BIOSTRATIGRAPHY.

L. H. Burckle, Lamont-Doherty Geological Observatory.

1. A series of sites beginning at approximately 50°S and running from there along 123°W to approximately 60°S. The purpose of these sites would be to pick up Quaternary and late Neogene fluctuations in the position of both the Subantarctic Front and the Polar Front. A similar set could be obtained for the southwest Pacific. However, it is important that the series begin far enough north (say around 50°S) so that it can pick up the Subantarctic Front also.

2. As an appendix to No. 1, the series of north-south sites could be extended to at least 65°S along a line beginning at 50°S, 123°W and ending at about 65°S, 135°W. The purpose of this extension would be to test the integrity of high latitude zonal markers for the late Neogene. According to our data, species diachrony makes it difficult to set up a single zonal scheme for the Southern Ocean. Because so much of our interpretation of high southern latitude paleoclimate and paleoceanography is dependent upon a high resolution biostratigraphy, I feel it is important that we devote some effort toward establishing these stratigraphies.

3. Drilling along the continental margin, particularly off the Ross and the Amundsen Seas. My objectives are the late Neogene floras, but I am sure others will also have Paleogene objectives. I have been working on Denton's and Prentice's material from the Dry Vallys. These are glacial tills and glacial marine sediments. The tills are middle to late Pliocene in age while the glacial marine appears to be late Miocene-early Pliocene in age. If the glacial tills are correlative with the paleoceanographic/paleoclimate events which I see in the surrounding Southern Ocean then they were likely deposited between 2.4-2.0 myBP. A series of sites along the continental margin would permit us to pick up reworked glacially derived floras (possibly correlative with tills on the continent) and, hopefully, interbedded, in place, floras which could be used to date the emplacement of the glacial marine sediments. A necessary adjunct to this study would be the definition of a high latitude zonation for the late Neogene as outlined under No. 2.

6. EAST PACIFIC RISE TRANSECT.

P. F. Ciesielski, University of Florida; D. Dunn, University of Southern Mississippi; J. P. Kennett, University of Rhode Island; R. Goll, Geoscience Dept., Continental Shelf Institute, Norway; and L. Burckle, Lamont-Doherty Geological Observatory.

It was the consensus of the Sediments and Ocean History Working Group that many of the scientific themes discussed in the beginning of Section III could be best addressed by drilling of a north-south transect of sites in the southeast Pacific. Such a transect would be located on the flanks of the East Pacific Rise between ~30°S to ~61.5°S. The location of this transect offers the advantage of providing a paleoenvironmental record for the Pacific sector in a region where bottom topography has not significantly influenced the position of oceanographic fronts and upwelling.

The following preliminary site proposals are possible components of the southern portion of the north-south transect between 61° and 45°S. At the time of this writing, sufficient geophysical data was not available to extend the transect northward to approximately 30°S.

If suitable geophysical lines are available, we intend to submit a formal proposal for a north-south transect with the following characteristics:

1. a north-south transect of 7 sites at 5° latitude spacing between ~61° and 30°S. These sites would be located on the ~25 m.y. isochron, and
2. a north-south transect of 4 sites at 10° latitude spacing between ~60° and 30°S. These sites would be located on 35 to 45 m.y. old crust.

Sites on 35-45 m.y. old crust will provide a record of the older paleoenvironmental record and should contain carbonate (needed for isotopic studies) through the Paleogene-early Neogene. The wider spacing (10° of latitude) of these sites should be sufficient because of less rapid paleoenvironmental change during this time period. The second transect of sites at 5° latitudinal spacing is located on younger and shallower crust to provide a better opportunity to recover a Neogene record with carbonate. The closer spacing of these sites is needed because of the more rapid Neogene increase in latitudinal thermal gradients.

Existing geophysical tracks may be sufficient for a formal proposal for the 30° to 60°S transect. We will submit a formal proposal which is most in keeping with the above strategy. Additional geophysical survey work is needed to develop site proposals for the transect which best address the scientific themes discussed previously.

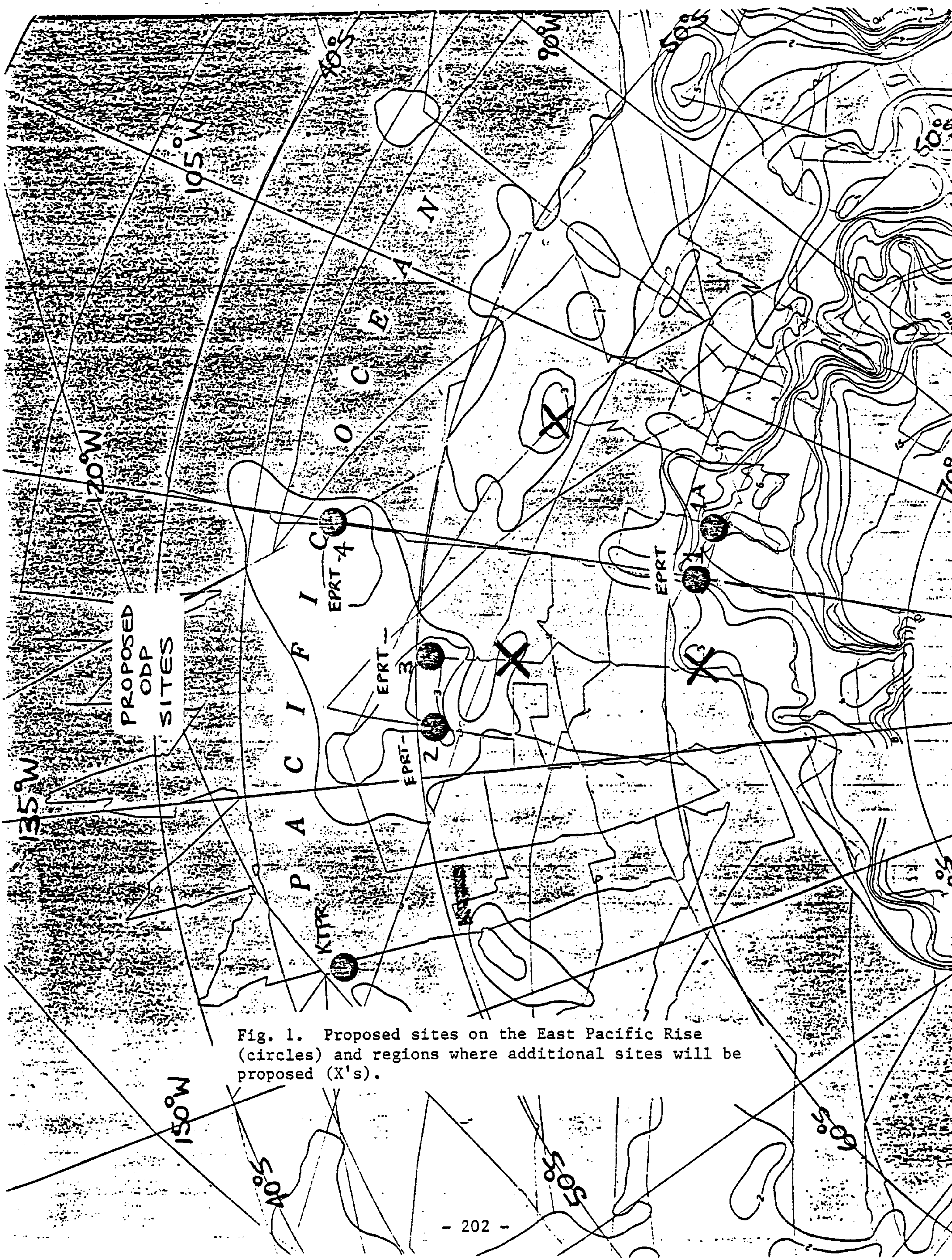


Fig. 1. Proposed sites on the East Pacific Rise (circles) and regions where additional sites will be proposed (X's).

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: EPRT-1 East Pacific Rise Transect General Area: E. of Udintsev Fracture Zone Position: 61°18'S, 120°14'W Alternate Site: EPRT-1A	General Objective: Sedimentologic, biogeographic, glacial, and paleoceanographic history of the Pacific Sector of the Southern Ocean Thematic Panel interest: SOHP Regional Panel interest: SOP

Specific Objectives: 1.) Antarctic glacial history, 2) development of Antarctic circumpolar circulation, 3) evolution of latitudinal thermal gradients, 4) bottom water history and circulation, 5) evolution of the Antarctic Divergence, 6) high latitude biogeographic, biostratigraphic and evolutionary processes, 7) development of the biosiliceous province, 8) paleocirculation relationships with glacial and climatic evolution.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20, 21, 22, 25, and 43.

Other data:

Site Specific Survey Data:

Seismic profiles: Eltanin 22, 0900Z 27 Dec 1965

Other Data: Anomaly 21, middle Eocene

Operational Considerations:

Water Depth: (m) ~ 4758 Sed. Thickness: (m) ~ 600 Tot. penetration: (m) ~ 600

HPC ____ Double HPC x Rotary Drill x Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: Eocene-Oligocene mixed biosiliceous/calcareous sediment, Miocene-muddy biosiliceous with some carbonate, Pliocene-Recent muddy biosiliceous ooze

Weather conditions/window: Sea ice, icebergs, rough seas/ Jan-Feb.

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: P. F. Ciesielski Address & phone number: Dept. of Geology University of Florida Gainesville, FL 32611 (904) 392-2231	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

D. Dunn, Geology, University of Southern Mississippi, Hattiesburg, Miss.

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site:
EPRT-1A
East Pacific Rise Transect

General Area: E. of Udintsev Fracture Zone
Position: 61°26'S, 116°22'W
Alternate Site:

General Objective:
Sedimentologic, biogeographic, glacial, and paleoceanographic history of the Pacific Sector of the Southern Ocean

Thematic Panel interest: SOHP
Regional Panel interest: SOP

Specific Objectives: 1) Antarctic glacial history, 2) development of Antarctic circumpolar circulation, 3) evolution of latitudinal thermal gradients, 4) bottom water history and circulation, 5) evolution of the Antarctic Divergence, 6) high latitude biogeographic, biostratigraphic and evolutionary processes, 7) development of the biosiliceous province, and 8) paleocirculation relationships with glacial and climatic evolution.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20,21 22,25, and 43.

Other data:

Site Specific Survey Data:

Seismic profiles: Eltanin 22, 2145Z 28 Dec 1965

Other Data: Anomaly 24, Early Eocene or possibly older.

Operational Considerations:

Water Depth: (m) 4850 Sed. Thickness: (m) ~ 700 Tot. penetration: (m) ~ 700

HPC ____ Double HPC x Rotary Drill x Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: Eocene-Oligocene mixed biosiliceous/calcareous sediment. Miocene-muddy biosiliceous with some carbonate, Pliocene-Recent muddy biosiliceous ooze

Weather conditions/window: Sea ice, icebergs, rough seas / Jan-Feb.

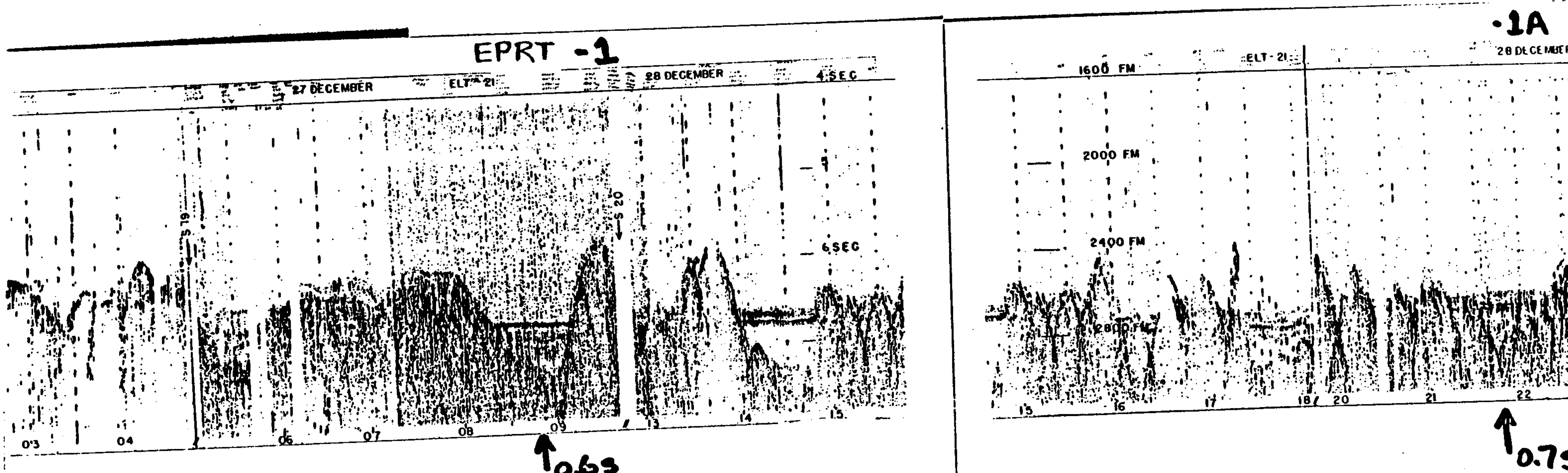
Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
see EPRT-1

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:


EPRT -1
27 DECEMBER
ELT 21
28 DECEMBER
4 SEC
6 SEC
6LS
S 20
03
04
06
07
08
09
13
14
15
0.65
-1A
28 DECEMBER
ELT-21
1600 FM
2000 FM
2400 FM
2800 FM
15
16
17
18
20
21
22
0.75

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: EPRT-2 East Pacific Rise Transect General Area: Position: 50°26'S, 131°47'W Alternate Site: EPRT-2A	General Objective: Sedimentologic, biogeographic, glacial, and paleoceanographic history of the Pacific Sector of the Southern Ocean Thematic Panel interest: SOHP Regional Panel interest: SOP

Specific Objectives: 1) Antarctic glacial history, 2) development of Antarctic circumpolar circulation, 3) evolution of latitudinal thermal gradients, 4) bottom water history and circulation, 5) high latitude biogeographic, biostratigraphic and evolutionary processes, 6) development of the biosiliceous province, 7) paleocirculation relationships with glacial and climatic evolution, 8) history of the Antarctic Convergence (Polar Front)

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20, 21, 22,25, and 43.

Other data:

Site Specific Survey Data:
Seismic profiles: Eltanin 43, 1500Z 15 May 1970

Other Data: Anomaly 12, early Oligocene

Operational Considerations:

Water Depth: (m) 4750 Sed. Thickness: (m) ∿ 350 Tot. penetration: (m) ∿ 350

HPC ___ Double HPC x Rotary Drill x Single Bit ___ Reentry ___

Nature of sediments/rock anticipated: Oligocene-Miocene: calcareous-siliceous ooze, Pliocene-Recent: siliceous ooze

Weather conditions/window: icebergs throughout year, rough seas, best conditions Nov.-Feb. although drilling possible most months.

Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: Address & phone number: see EPRT-1	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: EPRT-2A
East Pacific Rise Transect

General Area:
Position: 51°42'S, 132°12'W
Alternate Site:

General Objective:
Sedimentologic, biogeographic, glacial, and paleoceanographic history of the Pacific Sector of the Southern Ocean

Thematic Panel interest: SOHP
Regional Panel interest: SOP

Specific Objectives: 1) Antarctic glacial history, 2) development of Antarctic circumpolar circulation, 3) evolution of latitudinal thermal gradients, 4) bottom water history and circulation, 5) high latitude biogeographic, biostratigraphic and evolutionary processes, 6) development of the biosiliceous province, 7) paleocirculation relationships with glacial and climatic evolution, 8) history of the Antarctic Convergence (Polar Front)

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: Regional single channel seismic lines by *Eltanin* cruises 20, 21, 22, 25, and 43.

Other data:

Site Specific Survey Data:
Seismic profiles: *Eltanin* 43, 2200Z 15 May 1970

Other Data: near Anomaly 12, early Oligocene

Operational Considerations:

Water Depth: (m) 4300 Sed. Thickness: (m) ∿ 450 Tot. penetration: (m) ∿ 450

HPC ___ Double HPC x Rotary Drill x Single Bit ___ Reentry ___

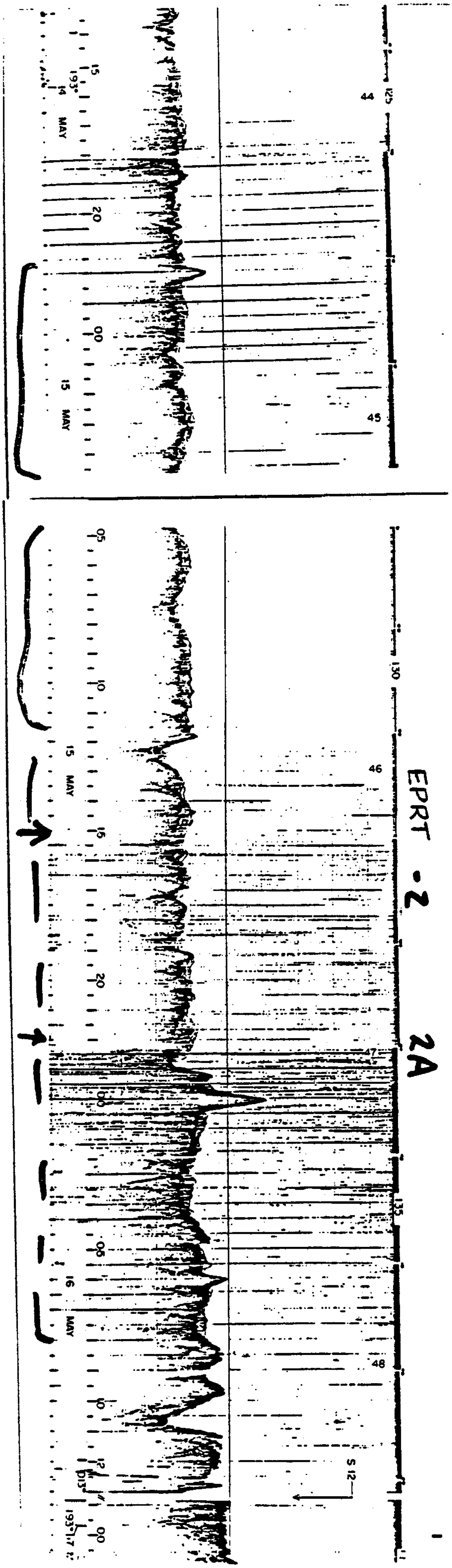
Nature of sediments/rock anticipated: Oligocene-Miocene: calcareous-siliceous ooze, Pliocene-Recent: siliceous ooze
Weather conditions/window: icebergs throughout year, rough seas, best conditions Nov.-Feb. although drilling possible most months
Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
see EPRT-1

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:


EPRT -2
2A
14 MAY
15 MAY
16 MAY
125
130
135
44
45
46
47
48
S 12

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: EPRT-3
East Pacific Rise Transect

General Area: W. flank EPR north of Eltanin FZ
Position: 50°32'S, 127°25'W
Alternate Site:

General Objective:
Sedimentologic, biogeographic, glacial, and paleoceanographic history of the Pacific Sector of the Southern Ocean

Thematic Panel interest: SOHP
Regional Panel interest: SOP

Specific Objectives: 1) Antarctic glacial history, 2) development of Antarctic circumpolar circulation, 3) evolution of latitudinal thermal gradients, 4) bottom water history and circulation 5) high latitude biogeographic, biostratigraphic and evolutionary processes, 6) development of the biosiliceous province, 7) paleocirculation relationships with glacial and climatic evolution 8) history of Antarctic Convergence (Polar Front)

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20, 21, 22, 25, and 43.

Other data:

Site Specific Survey Data:
Seismic profiles: Eltanin 25, 0000Z 27 Oct 1966

Other Data: Anomaly 5, late middle Miocene or early late Miocene

Operational Considerations:

Water Depth: (m) 4026 Sed. Thickness: (m) ~ 400 Tot. penetration: (m) ~ 400

HPC ____ Double HPC x Rotary Drill x Single Bit ____ Reentry ____

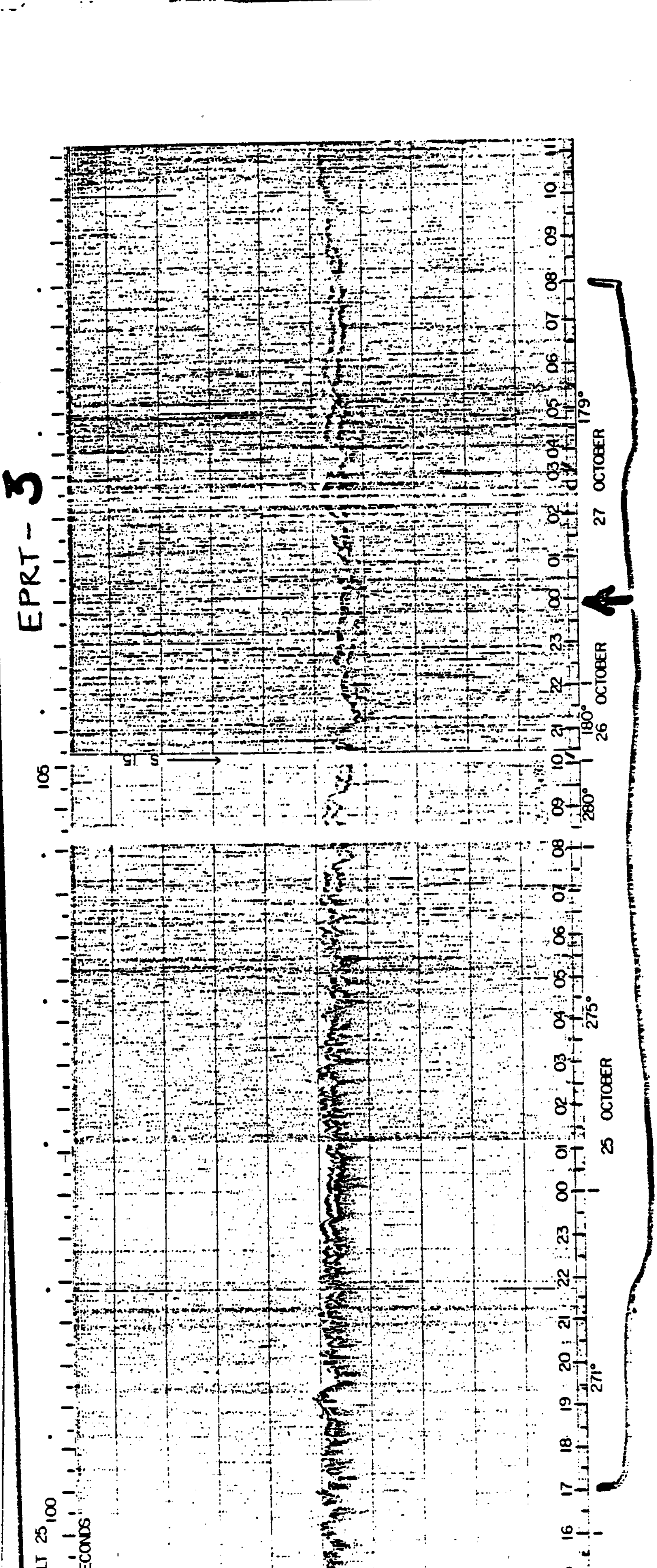
Nature of sediments/rock anticipated: Miocene: mixed calcareous and siliceous ooze, Pliocene-Recent: siliceous ooze
Weather conditions/window: icebergs throughout year, rough seas, best conditions Nov.-Feb. although drilling possible most months
Territorial jurisdiction: International waters

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
see EPRT-1

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:


EPRT-3
ELT 25
100
105
SECONDS
271°
275°
280°
180°
179°
25 OCTOBER
26 OCTOBER
27 OCTOBER

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: EPRT-4 East Pacific Rise Transect	General Objective: Sedimentologic, biogeographic, and paleoceanographic history of the southeast Pacific
General Area: W. flank of EPR, north of Menard FZ	
Position: 45°S, 120°10'W	Thematic Panel interest: SOHP
Alternate Site:	Regional Panel interest: SOP

Specific Objectives: 1) Development of Antarctic circumpolar circulation, 2) evolution of latitudinal thermal gradients, 3) development of vertical water mass gradients, 4) temperate/high latitude biogeographic, biostratigraphic, and evolutionary relationships, 5) development of the biosiliceous province, 6) paleocirculation relationships with glacial and climatic evolution, 7) subtropical gyre evolution, 8) benthic circulation history.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20, 21, 22, 25, and 43.

Other data:

Site Specific Survey Data:

Seismic profiles: Eltanin 21, 1600Z 17 Dec 1965

Other Data: Anomaly 5B to 5C
A site to the west on Anomaly 6A crust is preferred, however, there are no present geophysical lines in this area.

Operational Considerations:

Water Depth: (m) 3813 Sed. Thickness: (m) ~ 200 Tot. penetration: (m) ~ 200

HPC ____ Double HPC x Rotary Drill ____ Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: Miocene: mostly calcareous ooze with some siliceous ooze; Pliocene-Recent: mixed siliceous and calcareous ooze

Weather conditions/window: rough seas

Territorial jurisdiction: International waters

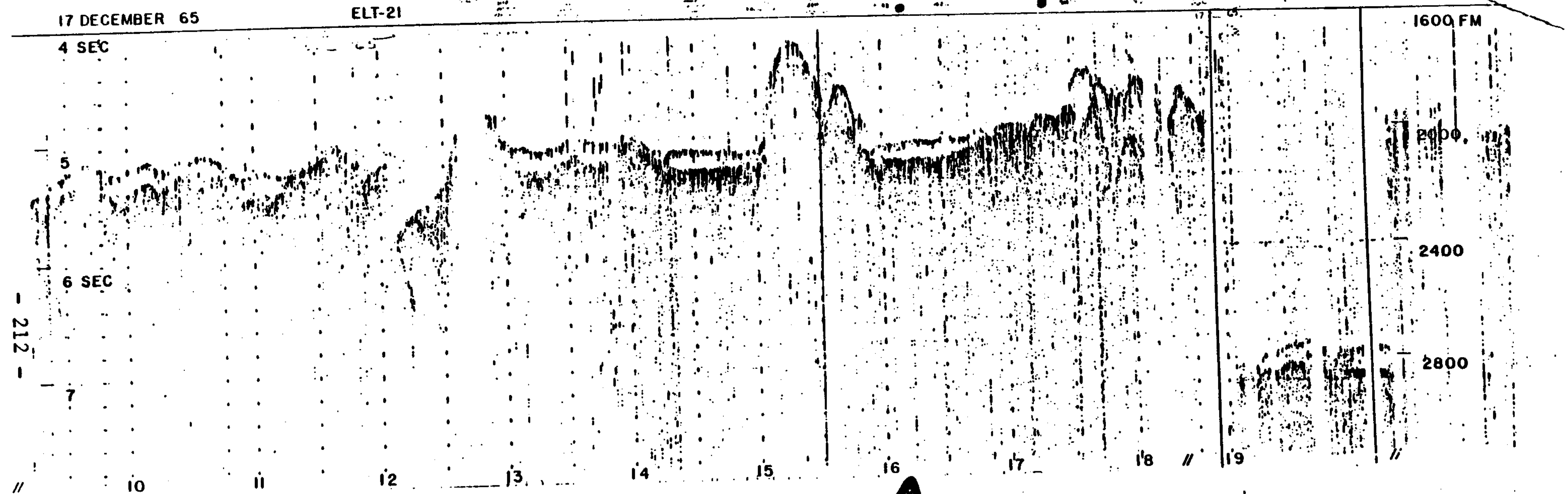
Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: Address & phone number: see EPRT-1	FOR OFFICE USE: Date received: Classification no.: Panel allocation:

E21

EPRT - 4



17 DECEMBER 65
ELT-21
17 DECEMBER 65
1600 FM
2000
2400
2800
4 SEC
5
6 SEC
7
10
11
12
13
14
15
16
17
18
19

ODP SITE PROPOSAL SUMMARY FORM

(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site:

KTPR/EPRT-5
Cretaceous/Tertiary section-East Pacific Rise Transect

General Area: W. of EPR, near Menard FZ

Position: $44^{\circ}37'S$, $146^{\circ}40'W$

Alternate Site:

General Objective:

Sedimentologic, biogeographic, and paleoceanographic history of the southeast Pacific

Thematic Panel interest: SOHP

Regional Panel interest: SOP

Specific Objectives: 1) Development of Antarctic circumpolar circulation, 2) evolution of latitudinal thermal gradients, 3) temperate/high latitude biogeographic, biostratigraphic, and evolutionary relationships, 4) development of the biosiliceous province, 5) paleocirculation relationships with glacial and climatic evolution, 6) subtropical gyre evolution, 7) benthic circulation history, 8) investigate catastrophic biotic turnover events in the southern high latitudes associated with K/T boundary.

Background Information (indicate status of data as outlined in the Guidelines):

Regional Geophysical Data:

Seismic profiles: Regional single channel seismic lines by Eltanin cruises 20, 21, 22, 25, and 43.

Other data:

Site Specific Survey Data:

Seismic profiles: Eltanin 20, 1345Z 26 Sept 1965

Other Data: Anomaly 31 to 32A ?

Operational Considerations:

Water Depth: (m) 4670 Sed. Thickness: (m) ∿ 400 Tot. penetration: (m) ∿ 400

HPC ___ Double HPC x Rotary Drill x Single Bit ___ Reentry ___

Nature of sediments/rock anticipated: Late Cretaceous-Paleogene carbonates; Neogene: mixed calcareous and siliceous oozes

Weather conditions/window: rough seas most of the year

Territorial jurisdiction: International waters

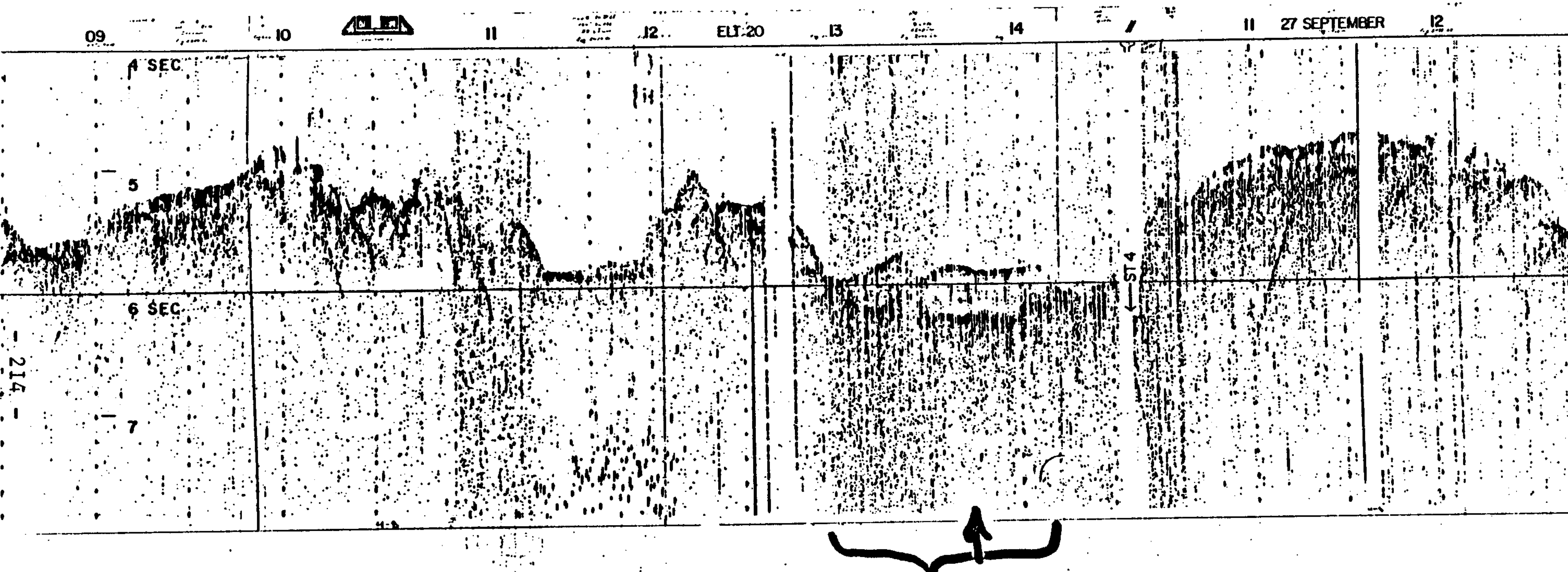
Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent:
Address & phone number:
see EPRT-1

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:

KTPR



7. INFORMAL PROPOSAL FOR FUTURE DRILLING/CORING OPERATIONS IN THE SOUTH PACIFIC OCEAN.

R. M. Owen, University of Michigan.

BACKGROUND

DSDP Leg 92 was the last cruise of the Glomar Challenger in the South Pacific Ocean and was devoted largely to an investigation of sea floor hydrothermal processes. A major objective of this cruise was to document the Neogene history of hydrothermal sedimentation along the western flank of the East Pacific Rise (EPR) (Fig. 1). Prior to the cruise it was assumed that any observed variations in the intensity of hydrothermal activity (recorded as variations in the mass accumulation rate [MAR] of Mn and other elements in the hydrothermal component of the sediments) would be correlated with changes in the spreading rate. Our findings did not support this assumption. Instead, we found that at certain times during the past 30 m.y. the intensity of sea floor hydrothermal activity has been as much as 5-25 times greater than present day levels, and that episodes of greatest hydrothermal flux do not correspond to times of increased spreading rate but are more closely related to times of large scale ridge reorganizations. Detailed analysis of Sites 597 and 598 indicate there were four periods of anomalously high hydrothermal activity between 28-6 Ma (Fig. 2). These four episodes were identified by comparing observed Mn MAR's with those predicted from a model of particle distribution from a hydrothermal source on the EPR (Lyle et al., 1986). As shown in Fig. 2, each of these episodes is more closely associated with some large scale tectonic event (ridge jumps, circum-Pacific volcanic episodes) rather than with periods of increased spreading rate. The hydrothermal pulses shown between 6-0 Ma in Fig. 2 are based on estimates taken from additional Mn analysis of sediments from Site 598 (R. Owen and D. Ruhlin, unpublished data). Site 598 sediments include a complete record of sedimentation in this region for the period 16-0 Ma. The existence of the three hydrothermal episodes shown for this period in Fig. 2 is also supported by MAR data for Fe and several REE's (Ruhlin and Owen, 1986).

SCIENTIFIC PROBLEM, IMPLICATIONS, AND SUGGESTIONS FOR FUTURE DRILLING/ CORING IN THE SOUTHEAST PACIFIC.

Sea floor hydrothermal activity is now recognized as a pervasive marine process involving significant chemical exchanges between sea water and basalt which exert a controlling influence on sea water chemistry. Periods of anomalously high hydrothermal activity may have been particularly significant in influencing the evolution of sea water composition and, depending on their magnitude and duration, may be related to other known coeval oceanic and climatic variations (Wilkinson et al., 1985; Owen and Rea, 1985). Moreover, any hydrospheric or atmospheric changes resulting from hydrothermal pulses must be linked to changes in the lithosphere, because it is the "plumbing" of the lithosphere (degree and depth of fracturing, spacing of convection cells) that ultimately controls the extent of sea water-basalt interaction.

Future drilling/coring operations in the Southeast Pacific should be aimed at clarifying this link: we need to refine our present concept of the relationship between hydrothermal activity and tectonism. The Leg 92 studies have shown that our first-order assumption concerning this link (i.e., hydrothermal activity is proportional to spreading rate) is too simplistic. However, these studies also suggest the hypothesis that there is a direct relationship between hydrothermal activity and large scale plate reorganizations. Future drilling/coring sites should be selected with the objective of testing this hypothesis. Numerous tectonic events such as ridge jumps and volcanic episodes have been documented for the Southeast Pacific, although with varying degrees of resolution. Any sediments and basalt recovered at future drilling/coring sites should record a time span which brackets these events. Beyond this obvious consideration, there are three reasons why future drilling/coring sites should be located as close as possible to the probable sources of hydrothermal effluents:

1. The geochemical modeling method used to identify hydrothermal pulses in the Leg 92 studies assumes a log-normal decay in the distribution of hydrothermal particles with distance from the injection point. Thus, the ability of this method to identify anomalies in the mass accumulation rate of hydrothermal components falls off rapidly for sediments deposited beyond about 400 km from the injection point;
2. This will enable us to better resolve the magnitude, duration, and timing of the anomalies that have already been identified in the Leg 92 studies; and,
3. It is not clear from the data now available whether those hydrothermal pulses which appear to be related to ridge jumps are associated with changes at the fossil ridge or the new ridge. Located drilling/coring sites near both the old and new ridge should clarify this.

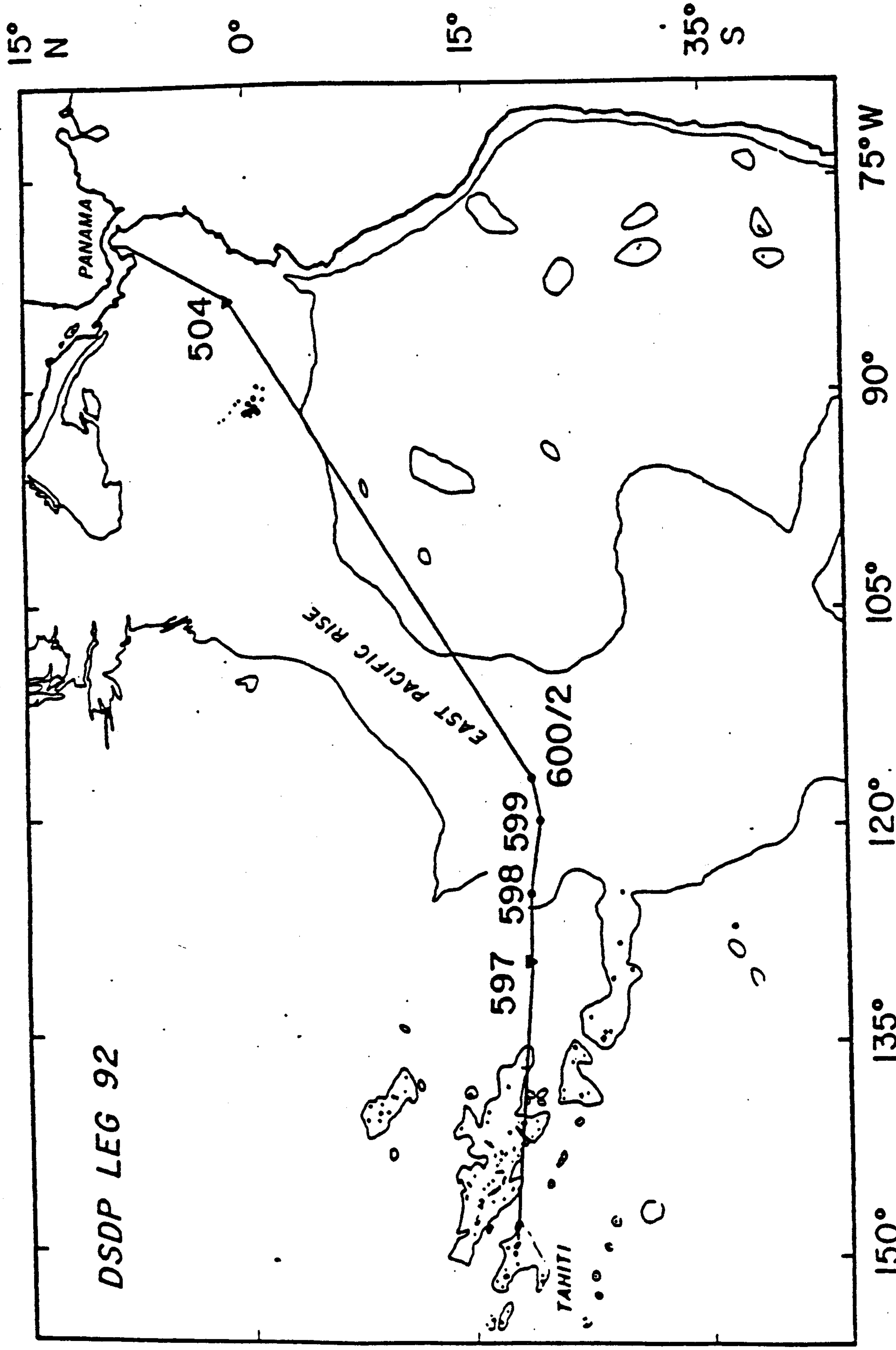
REFERENCES

Lyle, M., R.M. Owen and M. Leinen, 1986. History of Hydrothermal Sedimentation at the East Pacific Rise, 19°S. In: Initial Reports of the Deep SEa Drilling Project (M. Leinen and D. K. Rea, eds.), vol. 92, U.S. Government Printing Office, Washington, D.C., (in press).

Owen, R. M. and D. K. Rea, 1985. Seafloor hydrothermal activity links climate to tectonics: the Eocene carbon dioxide greenhouse. Science, vol. 227, p.166-169.

Ruhlin, D. E. and R. M. Owen, 1986. The rare earth element geochemistry of hydrothermal sediments from the East Pacific Rise: an examination of a seawater scavenging mechanism. Geochim. Cosmochim. Acta, vol. 50 (in press).

Wilkinson, B. H., R. M. Owen and A. R. Carroll, 1985. Submarine hydrothermal weathering, global eustacy, and carbonate polymorphism in Phanerozoic marine oolites. Jour. Sed. Petrol., vol. 55, p.171-183.


DSDP LEG 92
PANAMA
504
EAST PACIFIC RISE
600/2
599
598
597
TAHITI
15° N
0°
15°
35° S
75°W
90°
105°
120°
135°
150°

of rapid vertical reef growth may be instantaneous in geological time, depending on their frequency and duration, they may nevertheless dominate reef facies in the stratigraphic column. Several examples exist of vertical coral reef growth rates (dated with carbon-14) that exceed 10 m/1000 years; these reefs have in common a distinctive community structure dominated by competitively superior framework building corals. This geological data appears to correlate well with current ecological disturbance models. Reefs whose vertical growth potentials are kept in check by relative sea level are here characterized as being disturbed at intermediate to high levels. In contrast, reefs whose vertical growth potentials about match rapid relative sea level rise are here characterized as having low levels of disturbance. Under low levels of disturbance competitively superior (rapid framework building) species dominate the reef. Moreover, if level of disturbance may control reef framework development, it follows that ecological perturbation is one rate limiting factor of vertical reef growth in times of rapid sea level rise. Many examples exist where rapid sea level rise has surpassed the vertical framework building capability of corals on a reef and the reef has drown.

In summary, two rate limiting processes of vertical coral reef growth are hypothesized. One would operate when net rate of eustatic sea level rise is small; this growth style is controlled by subsidence of the oceanic island. The other would operate when rate of eustatic sea level rise is high and is limited by the growth potential of dominant framework building corals. Horizontal reef growth may be relatively great when rate or eustatic sea level is small, except, on oceanic islands because of lateral limitations on the antecedent topography. While subsidence controlled reef growth may operate during long intervals of geologic time, during short intervals of rapid sea level rise, vertical reef growth, limited only by reef growth potential and global eustatic sea level, may become disproportionately over-represented in the stratigraphic column. Rapid reef growth is proposed to be porous, have a distinctive community structure, and have low amounts of early diagenetic cements. Slow reef growth is proposed to be relatively nonporous, have a distinctive community structure, and have high amounts of early diagenetic cement. This project proposes to recognize times of rapid versus slow reef growth in atoll cores for comparison with relative sea level changes and tectonic history. Information about evolutionary and biogeographic events, and paleoceanographic circumstances on the atoll could be correlated with already existing information from adjacent regions.

*** ODP SITE PROPOSAL SUMMARY FORM ***

Proposed Site: W 10
Basin off King George Island, Bransfield Strait, Antarctica

General area: South Shetlands
Position: 62 17.2'S 57 29.8'W
Alternate Site: nearby

General Objective: Thermal interaction between basin sediments and back-arc volcanism, Quaternary climate and paleo-oceanography
Thematic Panel interest: SOHP TEC
Regional Panel interest: SOP

Specific Objectives:

Development and history of back-arc basin; nature of submarine volcanic intrusions; hydrothermal interaction and fluid advection at heavily sedimented ridge crest segment; early stages of hydrothermal petroleum formation from end-member type siliceous biogenous material; conditions of formation of calcium carbonate hexahydrate as polar climate indicator; very high resolution Quaternary climatic and paleoceanographic record;

Background Information
Regional Geophysical Data:
Seismic profiles: single channel seismic lines (Marine Geophysics Kiel and British Antarctic Survey), high resolution 3.5 kHz lines;
Other data: magnetics (BAS), gravity cores, pore water chemistry, dredges and water column radiochemistry and trace elements;
Site Specific Survey Data:
Seismic profiles: single channel seismic lines ANT 10, 6, 9a, 9c (Marine Geophysics, U. Kiel; 3.5 kHz survey (OSU/Kiel/AWI, map and profiles attached); W 10 on profile 231;
Other data: Bathymetry (OSU/Kiel/AWI), heat flow (AWI, pending), dredges & cores (OSU/Kiel/AWI) see map;

Operational Considerations:

Water Depth:(m) 1985; Sed.thickness:(m) 400-600; Total penetr:(m) 500;
HPC ; Double HPC X ; Rotary Drill X ; Single Bit X ; Reentry ;
Nature of sediments/rocks anticipated: Unconsolidated turbidites interbedded with sparse "pelagic" units, basement volcanic sills and/or volcanoclastics, hydrothermal petroleum, elevated temperatures and fluid advection;
Weather conditions/window: Ice-free November-March;
Territorial jurisdiction: None
Other: Site close to Polish research station ARCTOWSKY, King George Island; premier back-up site because guaranteed ice-free during Leg 113, ideally drilled during beginning of leg;

Special Requirements: (staffing, instrumentation, etc.):
Pore water chemistry, pressure core barrel, gases, organic geochemistry, igneous petrology (back-arc volcanics), siliceous microfossils, sedimentology;

Proponents:

E. Suess, OSU
College of Oceanography,
Corvallis, OR 97331, (503) 754-2296

FOR OFFICE USE:
Date received
Panel allocation:
Classification no:
Panel allocation:

IV. PREVIOUSLY SUBMITTED SITE PROPOSALS FOR THE SOUTH PACIFIC AND SOUTHEAST INDIAN OCEAN (SOUTH OF AUSTRALIA).

A. Pacific Site Prcposal from the Bureau of Mineral Resources and Australian Universities (Cook, Falvey, and Packman, eds., 1984)

1. Lord Howe Rise (LHR-1, LHR-2)
2. Queensland Plateau Margin (QP-1A, QP-2A)
3. Northern Queensland Trcugh (QT-1A)
4. Western Coral Sea Basin (CSB-1, CSB-2)
5. Tasman Basin (TB-1)
6. Goodenough Basin (GB-1)
7. Western Solomon Sea (WSS-1 through WSS-4)
8. Rennell Island Ridge and Basin (RIR-1, RIR-2)
9. Western New Britain Trench (NBT-1 through NBT-5)
10. Western Tasman Sea (TS-1 through TS-3)
11. Central Great Barrier Reef (GBR-1 through GBR-5)
12. Australian-Antarctic Discordance (AAD-1 through AAD-3)
13. Diamantina Zone, Australian-Antarctic Depression (AAD-4)
14. Ceduna Plateau (AAD-5, AAD-6)

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: LHR1, LORD HOWE RISE
(Figs 19, 23)

General Area: Western Lord Howe Rise, Tasman Sea
Position: 161°E, 30°30'S
Alternate Site:

General Objective:
- Nature of rift basin fill, basement type, tectonic development

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives:

- Pre-rift history and basement origins
- Nature of rift-fill and subsidence
- Post-breakup subsidence history
- Oceanic circulation following breakup of Australia and Antarctica

Background Information:
Regional Data:
Seismic profiles: BGR 'SONNE' (SO-007) Line 16
'SONNE' Line 12 (to be investigated by BMR 'Rig Seismic' and BGR 'SONNE' in 1985).
Other data:

Site Survey Data - Conducted by:
Date: Could possibly be carried out by BMR 'Rig Seismic'
Main results:

Operational Considerations

Water Depth: (m) 1650 Sed. Thickness: (m) (?) Total penetration: (m) 1500

HPC 250 Double HPC ____ Rotary Drill 1250 Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: 700m Cainozoic ooze; 500m Mesozoic rift-fill of uncertain origin; (?) Palaeozoic 'basement'
Weather conditions/window: Fair (summer months)

Territorial jurisdiction: Australian

Other: Minor risk of stratigraphic entrapment of hydrocarbons

Special requirements (Staffing, instrumentation, etc.)

Proponent: J B Willcox
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: LHR2, LORD HOWE RISE (Figs. 19,22) General Area: Eastern flank Lord Howe Rise, Tasman Sea Position: 165°E, 34°S Alternate Site:	General Objective: . Study ancient continental margin Thematic Panel interest: SOHP, TECP Regional Panel interest: WP-RP

Specific Objectives:

- Study progradational wedges on margin of Australian/Antarctic supercontinent
- Tectonic development of (active) margin
- Age of New Caledonia Basin
- Subsidence history

Background Information:

Regional Data:

Seismic profiles: BGR 'SONNE' (SO-007) Line 1A

Other data: Company data

Site Survey Data - Conducted by:
Date: Could possibly be carried out by BMR 'Rig Seismic'
Main results:

Operational Considerations

Water Depth: (m) 2850 Sed. Thickness: (m) (?) Total penetration: (m) up to 2000m

HPC 250 Double HPC ____ Rotary Drill 1750 Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: 700m Cainozoic ooze; 1200+m of Mesozoic coastal-marine facies; Palaeozoic basement

Weather conditions/window: Fair (summer months)

Territorial jurisdiction: Australian

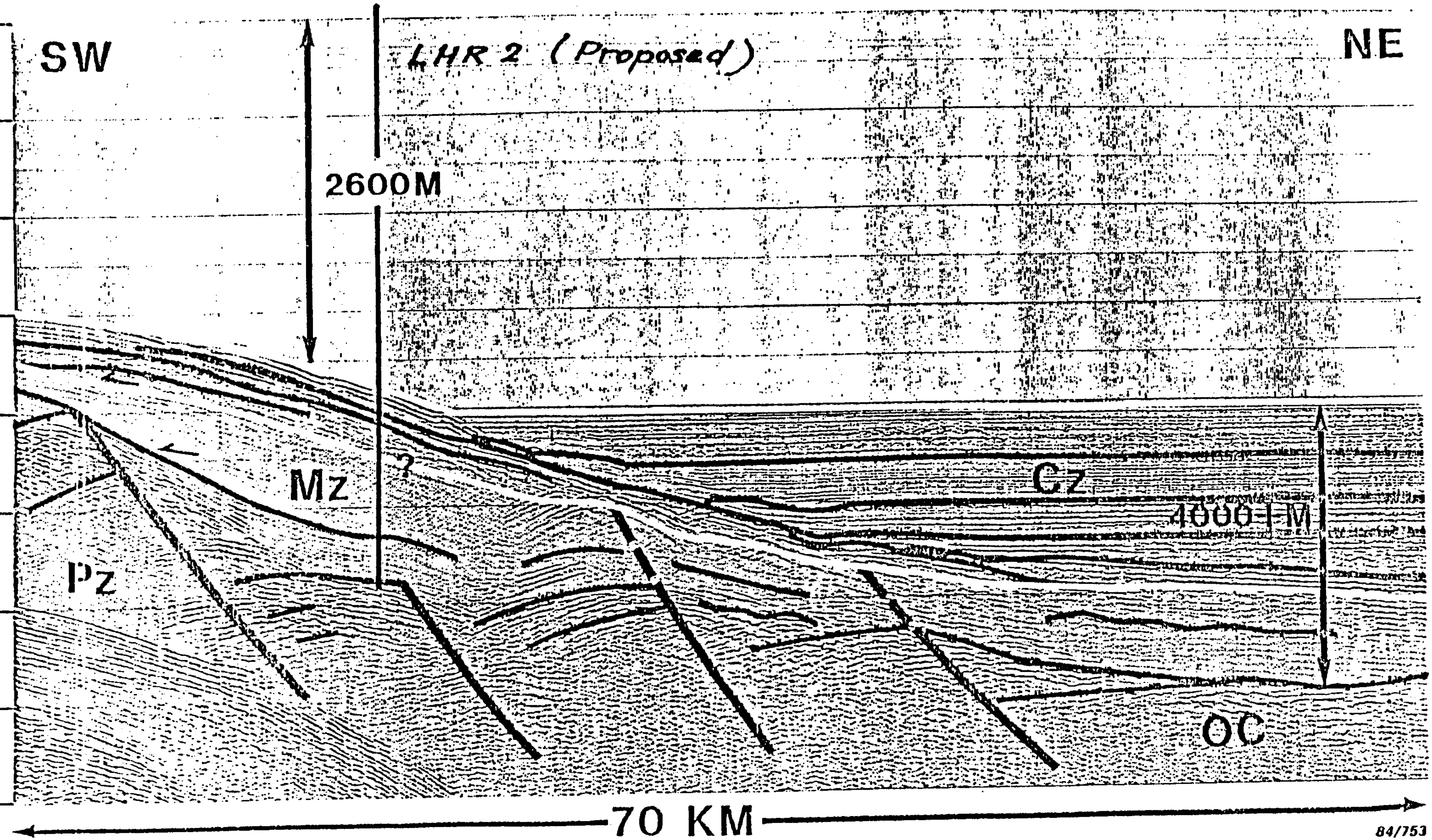
Other: Progradational unit is open updip and does not present a safety risk; however, rollover above Palaeozoic fault-blocks should be avoided.

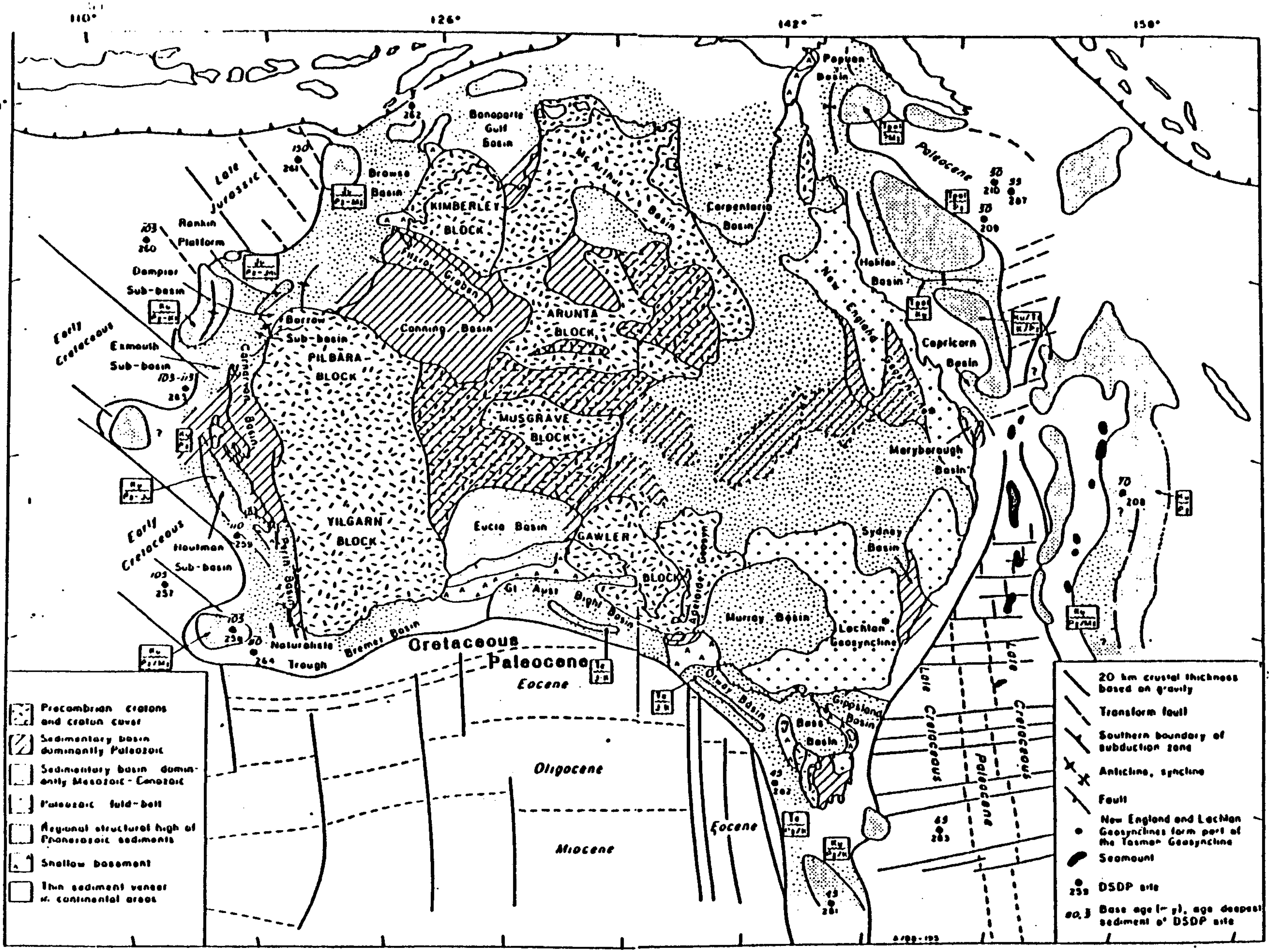
Special requirements (Staffing, instrumentation, etc.)

Proponent: J B Willcox
Bureau of Mineral Resources
G P O Box 378

Date submitted to JOIDES Office:

NEW CALEDONIA BASIN FLANK (LINE 1 A)





Australian Passive Margins (After Willcox, 1982)

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: QP1A, QUEENSLAND PLATEAU MARGIN (Figs. 46, 47A & B)

General Area: Western Coral Sea
Position: 13°37'S, 147°23'E
Alternate Site: (QB1B) 14°8.9S, 146°39.3'E

General Objective: Early rifting history of passive continental margins

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives: Determine:

- Age, nature and depositional environment of primary rift-fill sediments in half grabens adjacent to Coral Sea Basin.
- Nature of the rotated continental basement block.
- Uplift subsidence history of the margin.
- Relative proportion of syn- and pre-rift sediments to post-rift sediments
- Response of sedimentation to fluctuations in sea levels during submergence of plateau.

Background Information:

Regional Data:

Seismic profiles: BMR (1970) 6-fold, Shell (1973/74) 24-fold, BGR/BMR Sonne (1978/80) 24-fold, GSI Group Shoot (1979) 48-fold presently confidential.

Other data: A considerable amount of gravity and magnetic data; some shallow and crustal refraction profiles; some dredging and coring around margins of

Site Survey Data - Conducted by: Queensland Plateau

Date: Site located using Sonne data; line SO-16-04 SP3984 (Alternate line

Main results: SO-16-07 SP3155)
Thin sheet of Early Oligocene and younger ooze overlying onlapping Eocene bioclastics. These overlie Paleocene-Late Cretaceous paralic and shallow shelf clastics, possibly with fluvio-deltaics at base, which onlap ?Paleozoic basement.

Operational Considerations

Water Depth: (m) 2333(1920) Sed. Thickness: (m)1479 (1082) Total penetration: (m) 1600 (1500)

HPC 500 Double HPC ____ Rotary Drill Yes Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: Top - pelagic ooze; Middle - pelagic ooze and terrigenous detritus; Base - sands and shales (?continental)

Weather conditions/window: Fair all year except for possible cyclones in January and February. Heaviest swell June-August.

Territorial jurisdiction: Australian

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: P A Symonds
Bureau of Mineral Resources

Date submitted to JOIDES Office:

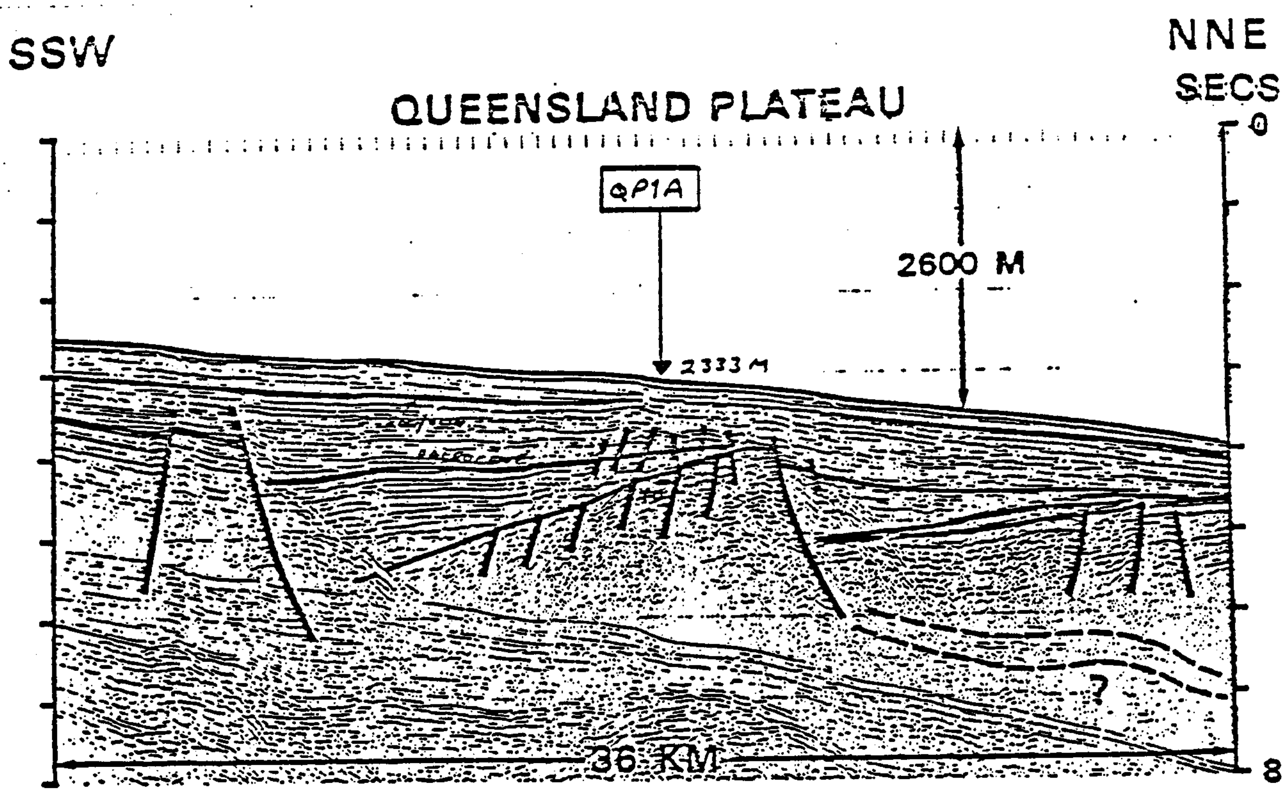


Fig. 47A. SONNE LINE 16-04

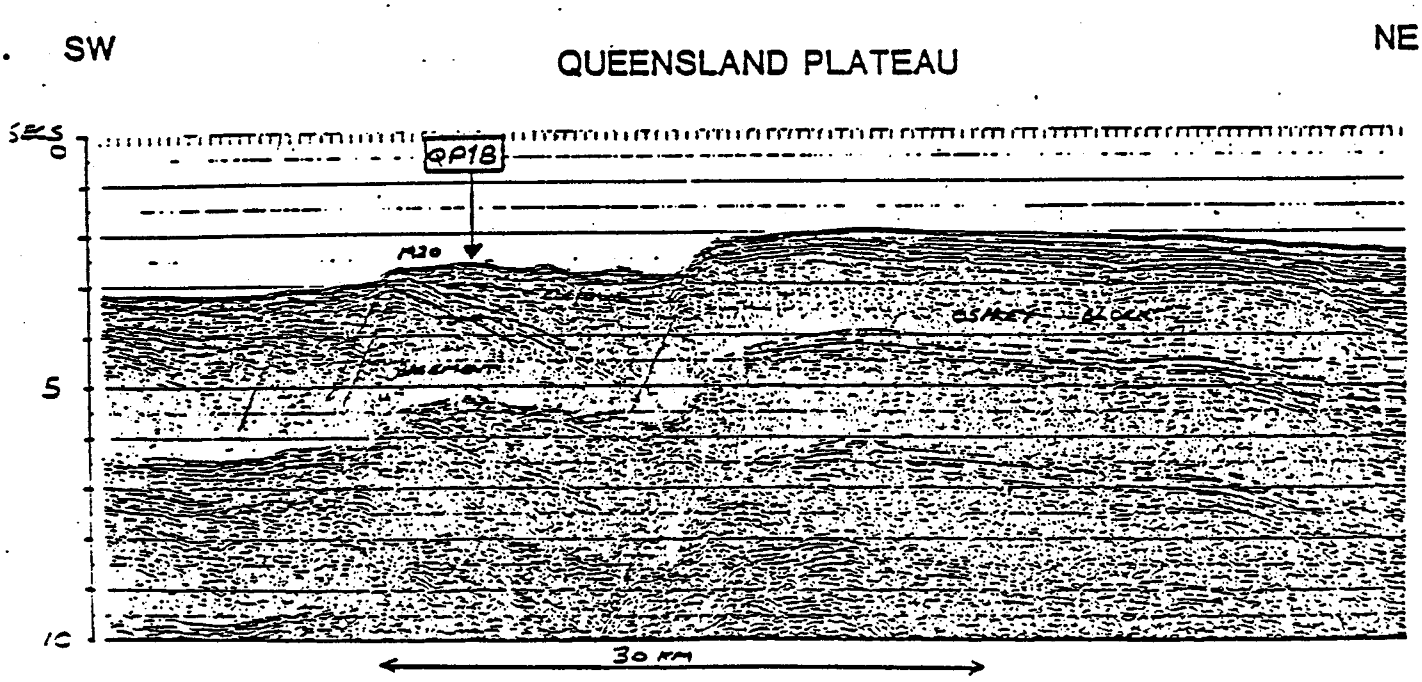


Fig. 47B. SONNE LINE 16-07

ODP SITE PROPOSAL SUMMARY FORM

oposed Site: QP2A, QUEENSLAND PLATEAU MARGIN
(Figs. 46, 48)

eneral Area: Western Coral Sea
osition: 13°24'S, 147°32.5'E
lternate Site: (QP2B)
13°29.2'S, 147°28.8'E

General Objective:
Early rifting history of passive continental margins. Rift phase volcan[illegible]
History of ocean circulation.
Thematic Panel interest: LITHP, SOHP, TECP
Regional Panel interest: WP-RP

pecific Objectives: Determine:

- Age, nature and depositional environment of oldest sediments in the Coral Sea Basin at the ocean/continent boundary.
- Age nature of the outer basement high. Does it have a volcanic origin?
- Subsidence history of the outermost part of the continental margin.
- History of ocean circulation.
- Response of sedimentation to fluctuations in sea level during submergence of Queensland Plateau.

Background Information:
Regional Data:
Seismic profiles: BMR (1970) 6-fold; BGR/BMR Sonne (1978/80) 24-fold

Other data: A considerable amount of gravity and magnetic data; some shallow and crustal refraction profiles; some dredging and coring around marings of Queensland Plat.
Site Survey Data - Conducted by: Site located using Sonne data; line SO-16-04 SP3380 (alternate SP3620)
Date:
Main results: Onlapping Early Oligocene and younger ooze overlying onlapping Eocene ooze and terrigenous detritus. These overlie Paleocene and older marine clastics which onlap outer high basement.

Operational Considerations
Water Depth: (m) 3548 (2933) Sed. Thickness: (m) 1117 (932) Total penetration: (m) 1300 (1200)

HPC Yes to refusal Double HPC ____ Rotary Drill Yes Single Bit ____ Reentry ? drilling into volcanics

Nature of sediments/rock anticipated: Top - pelagic ooze; Middle - pelagic ooze and terrigenous detritus; Base - sands, shales and basalt (volcanogenic sediments)
Weather conditions/window: Fair all year; possible cyclones in January and February; heaviest swell June-August.

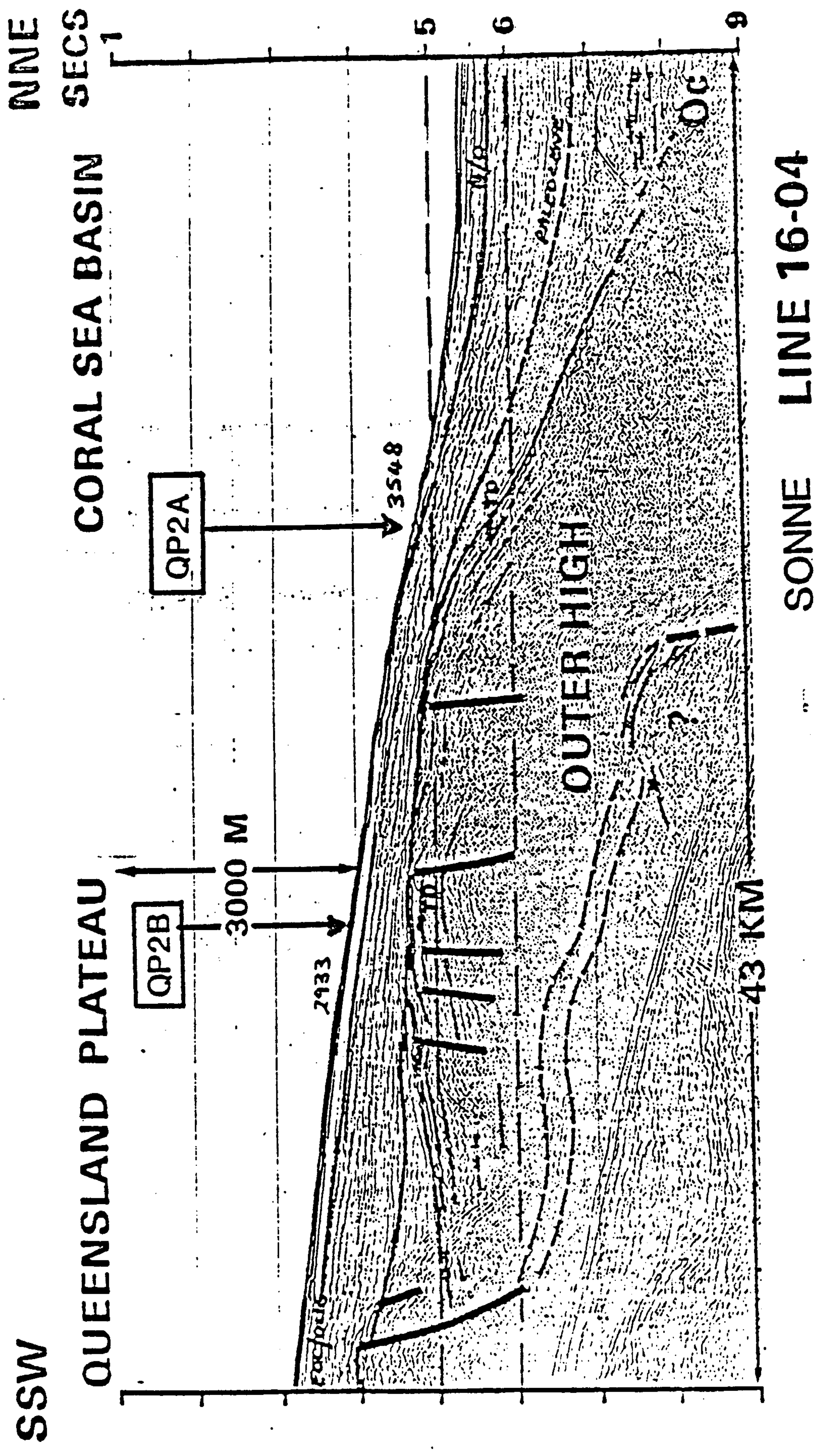
Territorial jurisdiction: Australian

Other:

pecial requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

oponent: P A Symonds
Bureau of Mineral Resources
G P O Box 378
[illegible] A C T 2601


SSW
QUEENSLAND PLATEAU
CORAL SEA BASIN
NNE
SECS
QP2B
QP2A
3000 M
3000 M
2933
3548
OUTER HIGH
43 KM
5
6
9
SONNE LINE 16-04

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: QT1A NORTHERN QUEENSLAND TROUGH
(Figs. 46, 49, 50)

General Area: Western Coral Sea
Position: 14°19.2'S, 146°8'E
Alternate Site: (QT1B)
14°18'S, 145°42'E

General Objective:
Early rifting history of passive continental margins.
History of ocean circulation.

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives: Determine:

- Age, nature and depositional environment of primary rift-fill sediments.
- Response of sedimentation to fluctuations in sea level.
- The nature of basement.
- The burial history of the Trough.
- History of ocean circulation.
- Nature of sedimentary and organic diagenesis.

Background Information:

Regional Data:

Seismic profiles: BMR (1970) 6-fold; Shell (1973/74) 24-fold; BGR/BMR Sonne (1978 and 1980) 24-fold, GSI Group Shoot (1979) 48-fold (confidential)

Other data: A considerable amount of gravity and magnetic data; some shallow and crustal refraction profiles; some dredging and coring around the marings of Queesland Plateau.

Site Survey Data - Conducted by: Site located using Sonne data; line SO-16-08 SP850 (Alternate line SO-16-08 SP60)

Date:

Main results: Blanket of Early Oligocene and younger ooze and turbidites overlying onlapping Eocene ooze and terrigenous detritus. These overly trough fill alluvial and submarine fan deposits of Paleocene and older age.

Operational Considerations

Water Depth: (m) 2745 (2595) Sed. Thickness: (m) 2014 (1393) Total penetration: (m) 2200 (1600)

HPC Yes to refusal Double HPC ____ Rotary Drill Yes Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: Top - pelagic ooze and terrigenous detritus. Middle - sands and shales, restricted shallow marine; Bottom - conglomerates, sands and shales, mainly alluvial and fluvial deposits at base.

Weather conditions/window:
Fair all year except for possible cyclones in January and February.

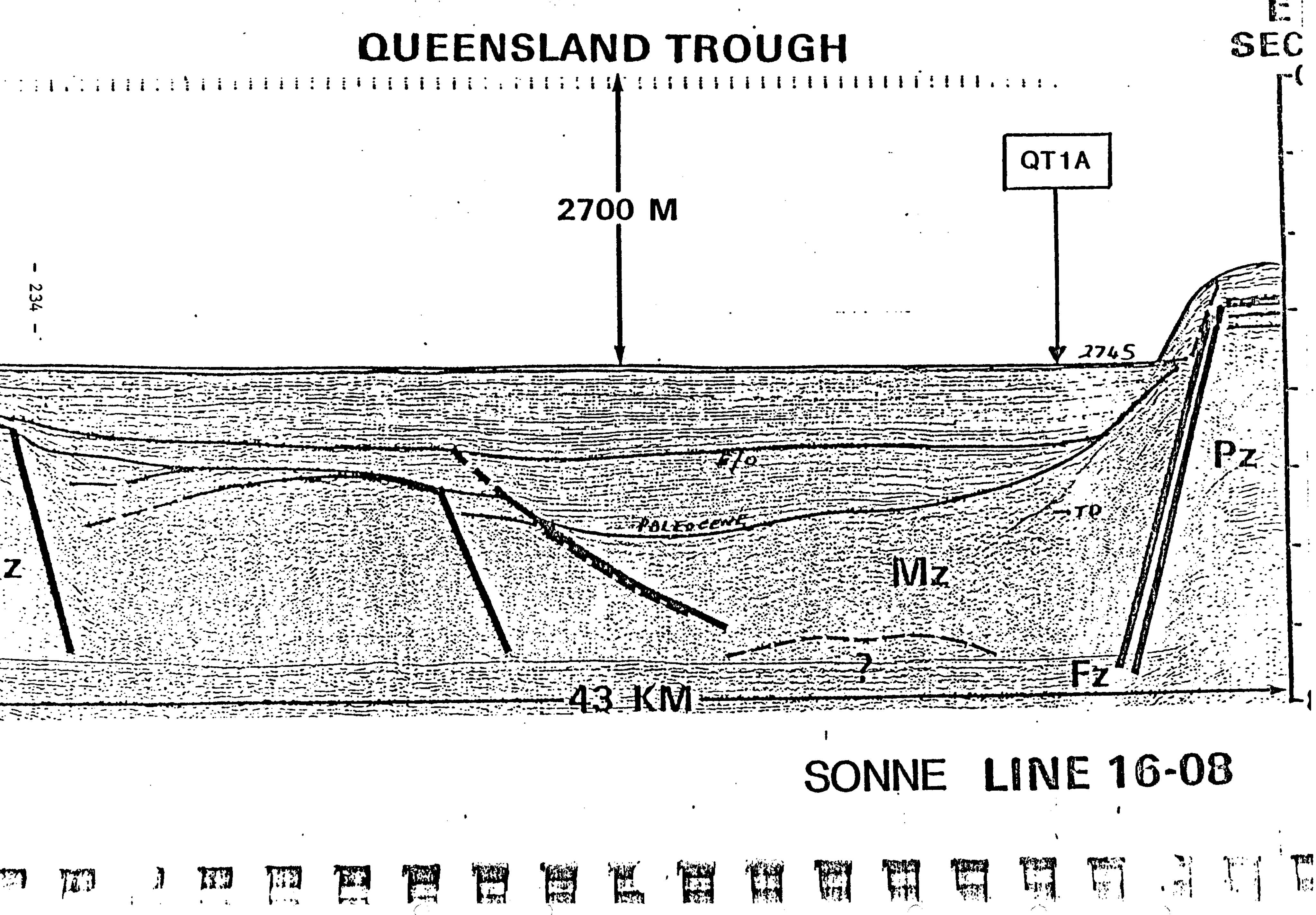
Territorial jurisdiction: Inside Australian 200 nautical limit.

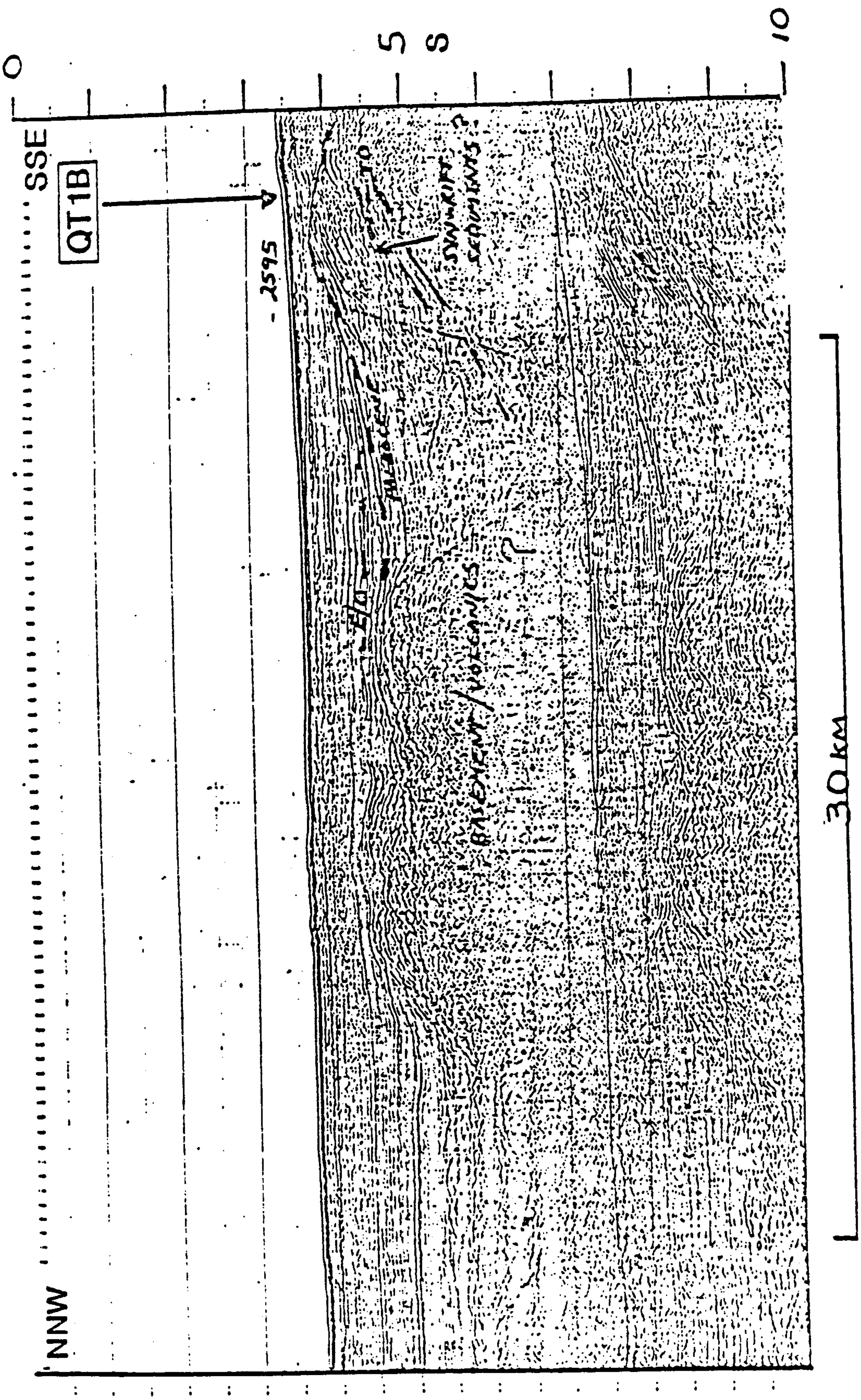
Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: P A Symonds
Bureau of Mineral Resources
G P O Box 378

Date submitted to JOIDES Office:


QUEENSLAND TROUGH
E
SEC
QT1A
2700 M
2745
Pz
Mz
Fz
TD
PALEOCENE
?
Z
43 KM
SONNE LINE 16-08



Sonne Line 16-09, northern Queensland Trough.

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: CSB1 & 2 WESTERN CORAL SEA BASIN (Figs. 46, 51, 52)

General Area: Western Co-al Sea
Position: CSB1 - 12°49'S, 147°57.5'E
~~**Alternate Site:**~~ CSB2 - 13°4'S, 147°10.5'E

General Objective:
Origin and evolution of oceanic crust
Response of deep sea sedimentation to fluctuations in sea level
History of ocean circulation
Thematic Panel interest: LITHP, SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives: Determine:

- Any major variation in the nature of oceanic basement between these two sites and DSDP 287 to the east in an effort to explain the westward reduction in amplitude of magnetic lineation pattern.
- Nature of the oldest sediments.
- Date and tie major seismic sequence boundaries from site to site and attempt to relate them to paleobathymetric conditions on the surrounding continental margins.

Background Information:
Regional Data:
Seismic profiles: BMR (1970) 6-fold; BGR/BMR Sonne (1978/80) 24-fold
Other data: A considerable amount of gravity and magnetic data; some shallow and crustal refraction profiles; some dredging and coring around margins of Queensland Plateau.
Site Survey Data - Conducted by: Sites located using Sonne data - CSB1, Line SO-16-04,
Date: SP1800; CSB2, Line SO-7-29, SP5260
Main results: Substantial thickness of Early Oligocene and younger ooze, abyssal clay and turbidites onlapping Eocene and Paleocene ooze and terrigenous detritus. Oceanic basement.

Operational Considerations

Water Depth: (m) 4118; 3938 Sed. Thickness: (m) 1933; 1834 Total penetration: (m) 2200; 2100

HPC Yes to refusal Double HPC ____ Rotary Drill Yes Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: Top - silt and clay (turbidites) and ooze; Middle - chalk and clay; Base - clay, chalk and basalt.
Weather conditions/window: Fair all year; possible cyclones in January and February; heaviest swell June-August.
Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: P A Symonds
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601

Date submitted to JOIDES Office:

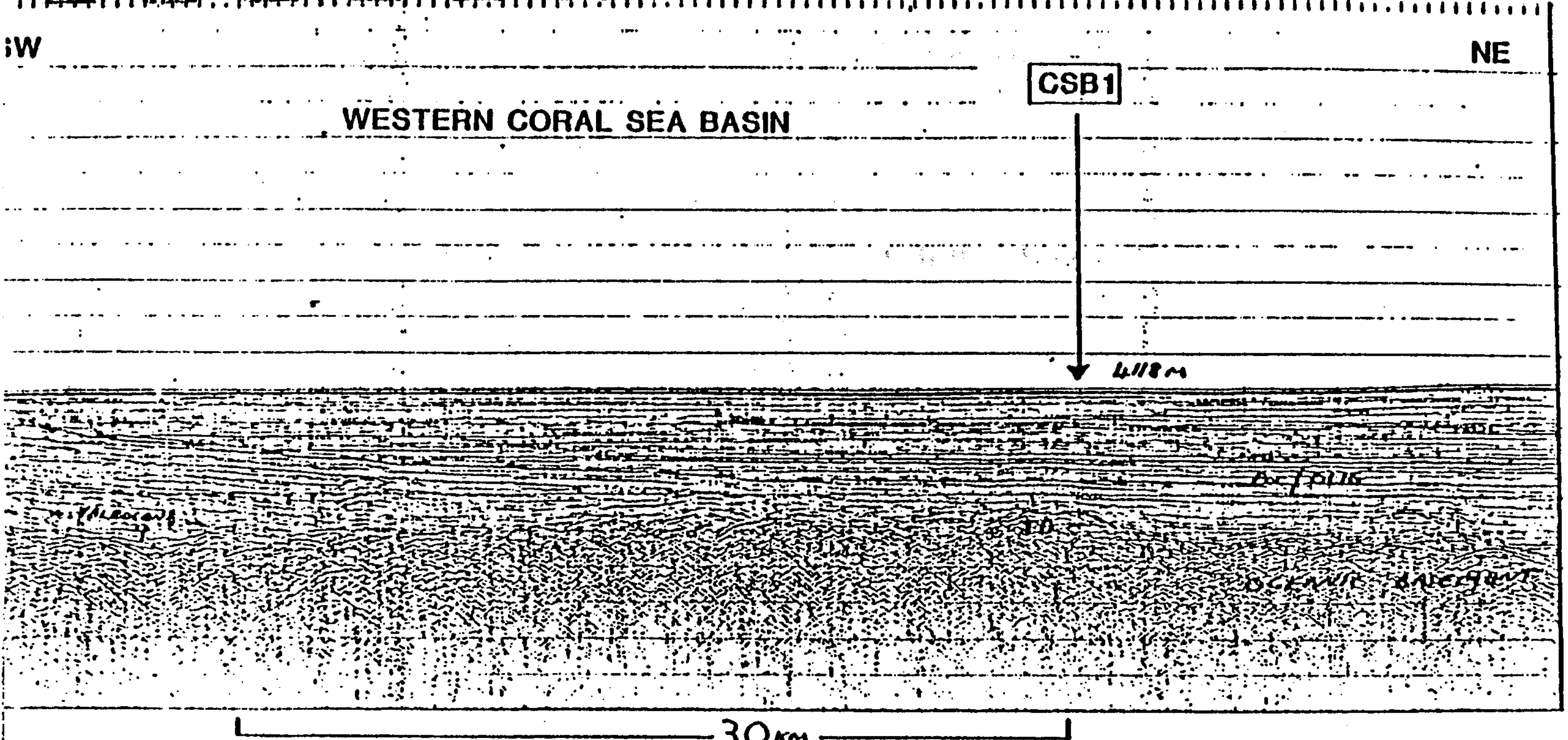
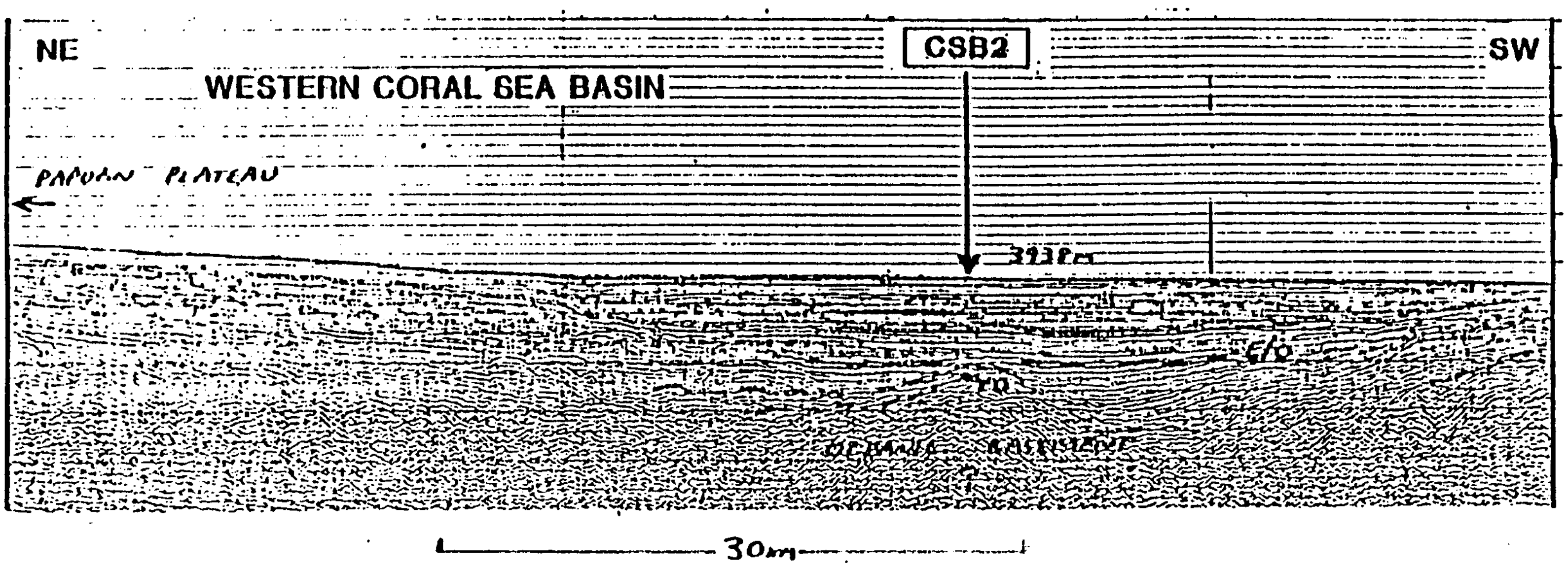
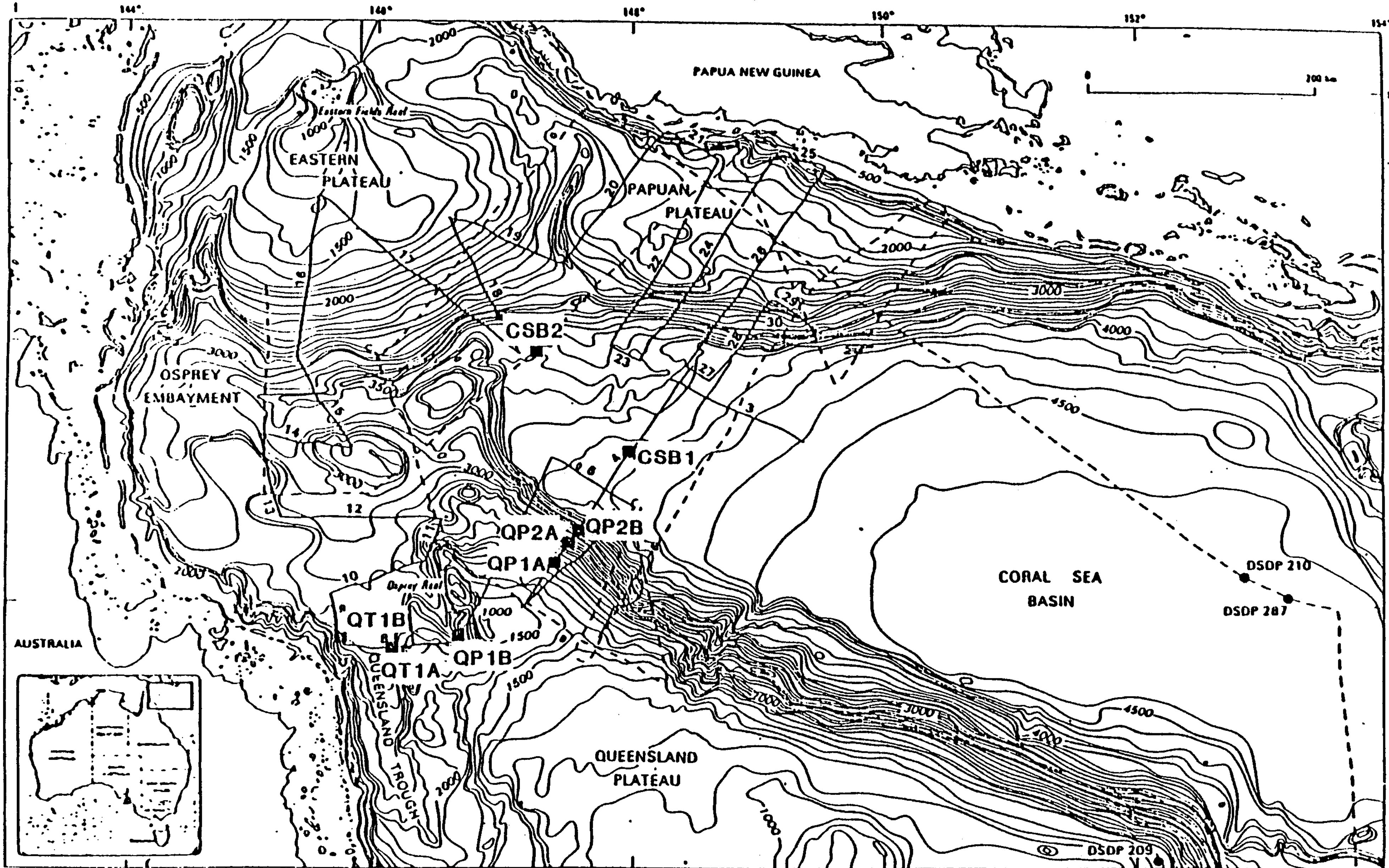


Fig. 51A. SONNE Line 16-04.



SONNE Line 07-29.



Bathymetry of the western Coral Sea. Shows Sonne 1978 seismic lines by broken line and 1980/81 data by a continuous line. DSDP sites 209, 210, 287 and proposed ODP sites also shown (After Symonds et al., 1984)

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: TB1 & 2, TASMAN BASIN (Figs. 54-57)

General Area: Tasman Sea
Position: 36°10.78'S, 155°12.83'E
Alternate Site: 36°06.74'S, 155°23.33'E

General Objective:
To investigate structure, and magmatic and hydrothermal plumbing at an extinct spreading ridge

Thematic Panel interest: LITHP
Regional Panel interest: WP-RP

Specific Objectives:

- Study extinct ridge hydrothermal system for (a) mineral zonation in crust and sedimentary cover (b) evidence of continued activity after volcanism ceased (c) mineralisation
- Study extinct ridge magma system for (a) chemical variation in late volcanics (b) compare age of youngest volcanics with age of ridge as determined by magnetic anomalies
- Structure of extinct spreading ridge, dimensions and nature of basaltic crust, feeder dykes, and high-level magma chamber.

Background Information:
Regional Data:
Seismic profiles: BMR profile 14.068. 7021-7022 and Eltanin Cruise 47A

Other data: Considerable amount of gravity and magnetic data has been collected on the BMR and Eltanin lines; some sonobuoy refraction profiles

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) (i) 5205 (ii) 3850   Sed. Thickness: (m) (i) 350-400 (ii) zero   Total penetration: (m) (i) 850 (ii) 500

HPC (i) 350-400 ~~(ii)~~ Nil   Double HPC ____   Rotary Drill Yes   Single Bit Yes   Reentry ____

Nature of sediments/rock anticipated: Pelagic ooze above basalt, possible encrustation

Weather conditions/window: Relatively rough seas likely; best months December-March (Austr. summer)

Territorial jurisdiction: Beyond Australian 200 nautical mile EEZ (not yet declared)

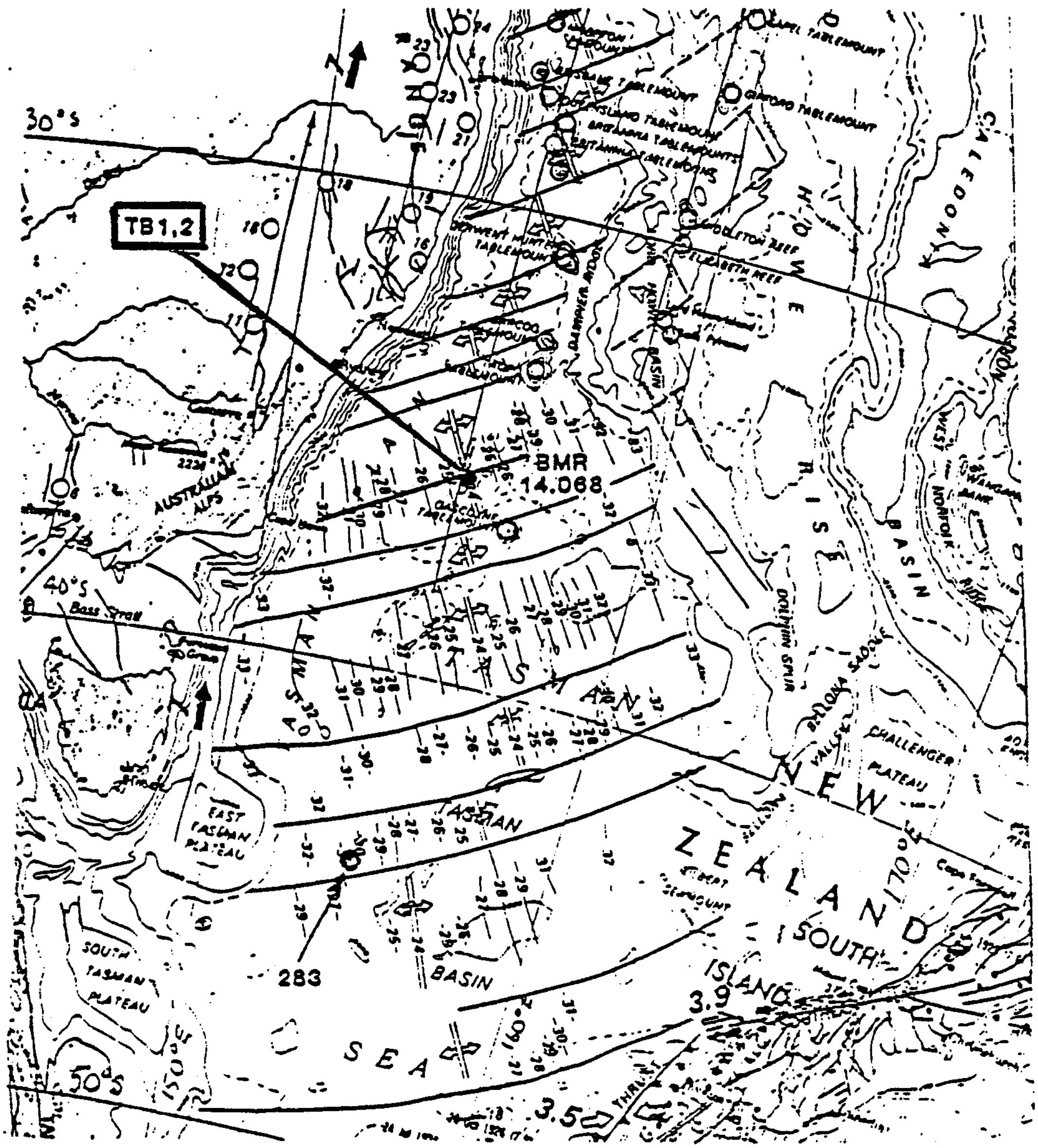
Other:

Special requirements (Staffing, instrumentation, etc.)

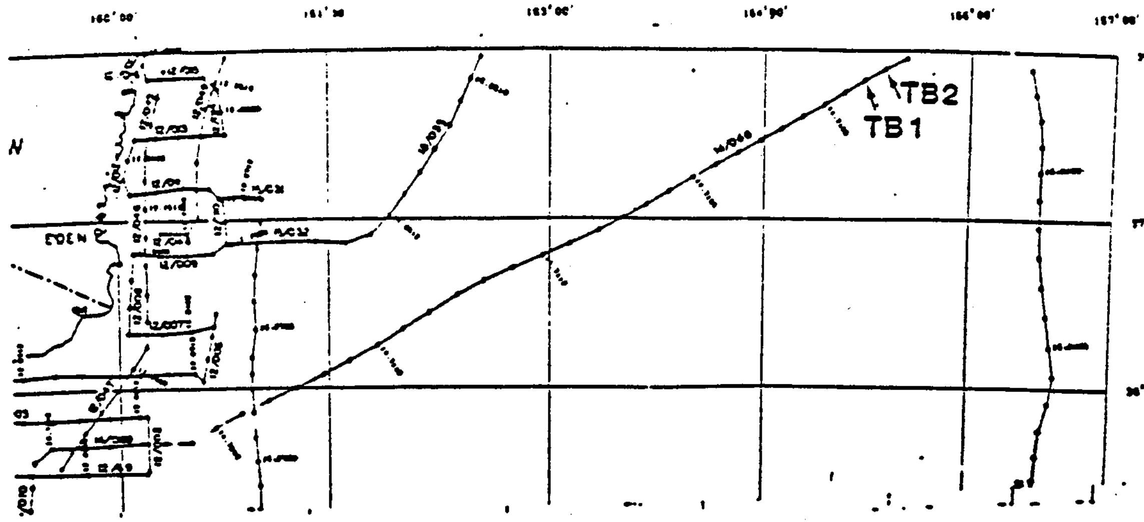
TB2 requires bare-rock spud-in

Proponent: H L Davies & P A Symonds
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

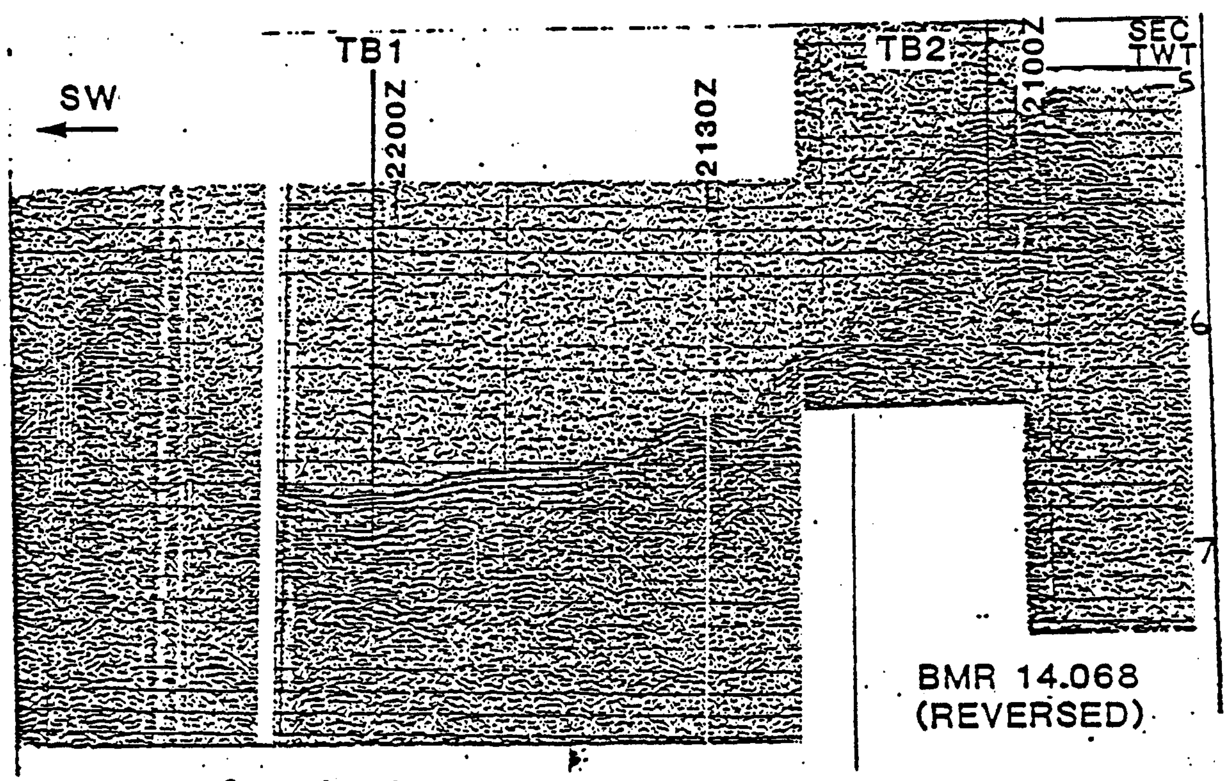
Date submitted to JOIDES Office:



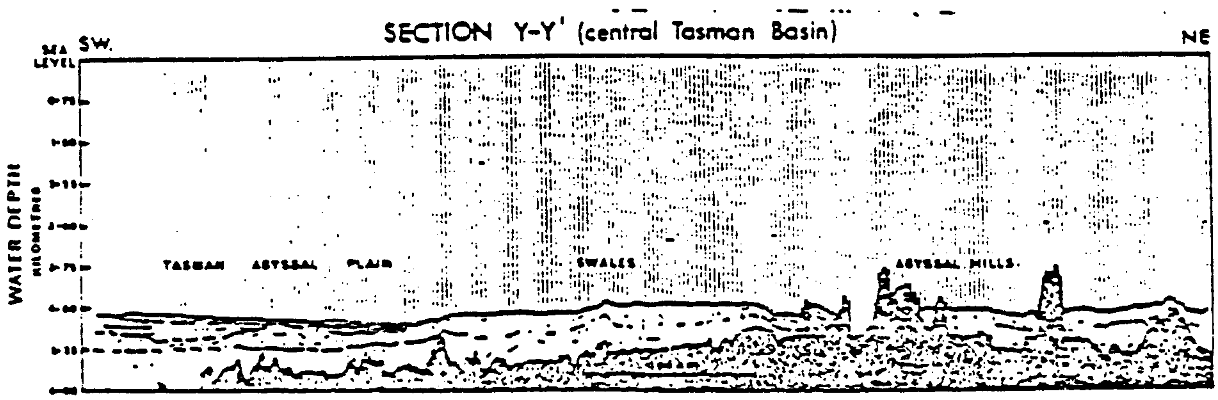
Magnetic lineations and site location in Tasman Basin, (copied from Plate Tectonic map of the Circum-Pacific Region, SW Quadrant).



Ship track BMR 14.068 (from Cameron & Pinchin, 1974). Shows proposed ODP sites TB1 and TB2.



Central rift and adjacent scarps, Tasman extinct spreading ridge, BMR line 14/068, ship speed 8.5kt. Location on Fig. 55



Line drawing interpretation of BMR 14/068 by Symonds (1973). Location on Figs. 54 and 55.

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: GB1, GOODENOUGH BASIN (Western Woodlark Rift) (Figs. 58-61) General Area: Southeastern Papua New Guinea Position: 9°55'S, 150°30'E approx. Alternate Site:	General Objective: To study an active marine rift system Thematic Panel interest: LITHP, SOHP, TECP Regional Panel interest: WP-RP

Specific Objectives:

- Nature and depositional environment of primary rift-fill phase of passive margin development in a modern analogue
- Nature of rift-floor volcanism, and associated hydrothermal activity
- Nature of rifted/extended continental crust in the vicinity of an ocean/continent boundary

Background Information:

Regional Data:

Seismic profiles: BMR profile 5/008 sub-parallel to rift axis

Other data: Magnetics and gravity on same line and regional gravity and also magnetic data, particularly onshore.

Site Survey Data - Conducted by:

Date:

Main results:

Operational Considerations

Water Depth: (m) 1200-1300 Sed. Thickness: (m) 800 Total penetration: (m) 900

HPC 800 Double HPC ____ Rotary Drill 100 Single Bit Yes Reentry ____

Nature of sediments/rock anticipated: Basal coarse clastics overlain by fine marine sediments, volcanics interfingering throughout

Weather conditions/window: All year OK, November-March seas calmest

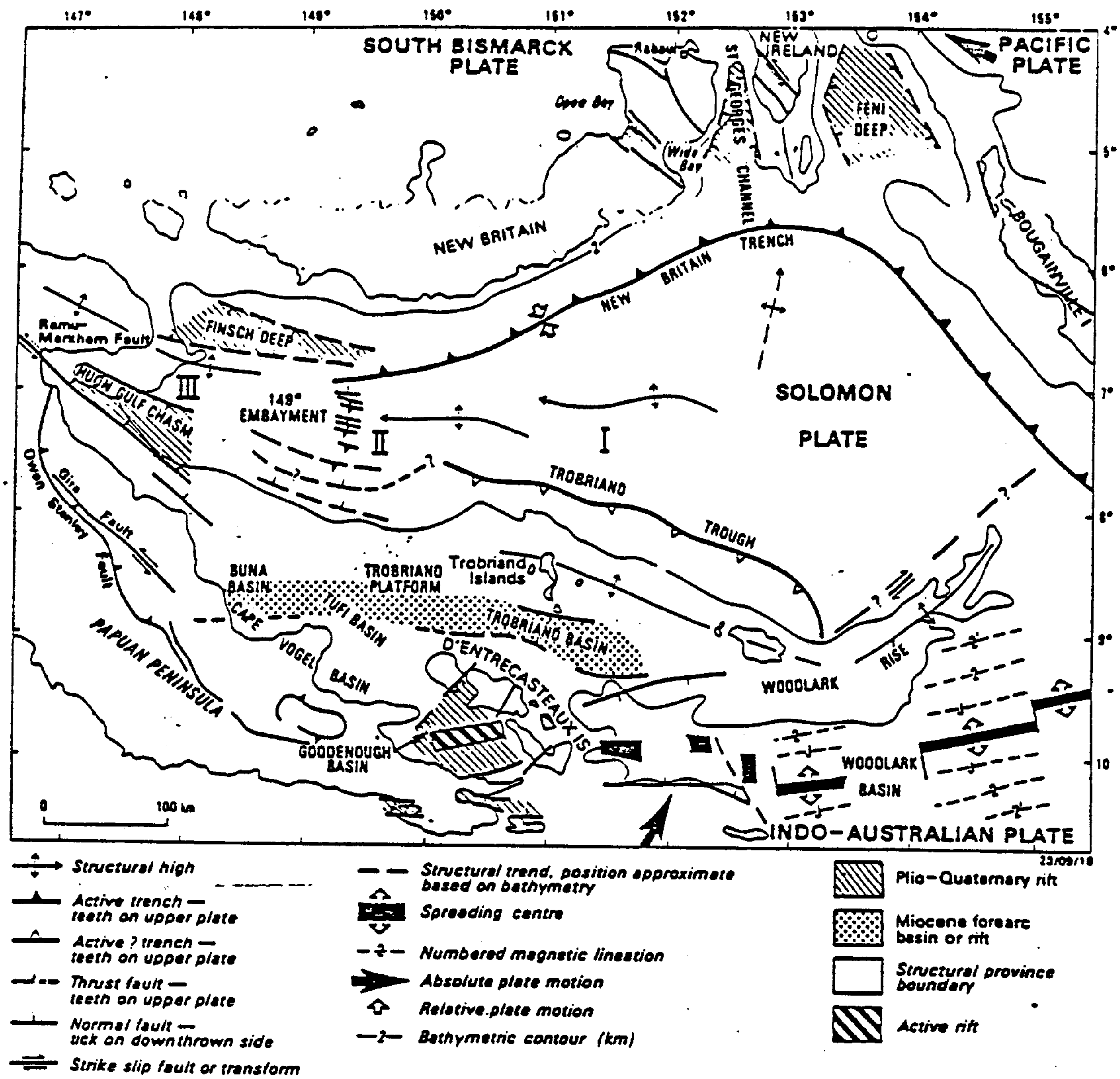
Territorial jurisdiction: PNG

Other:

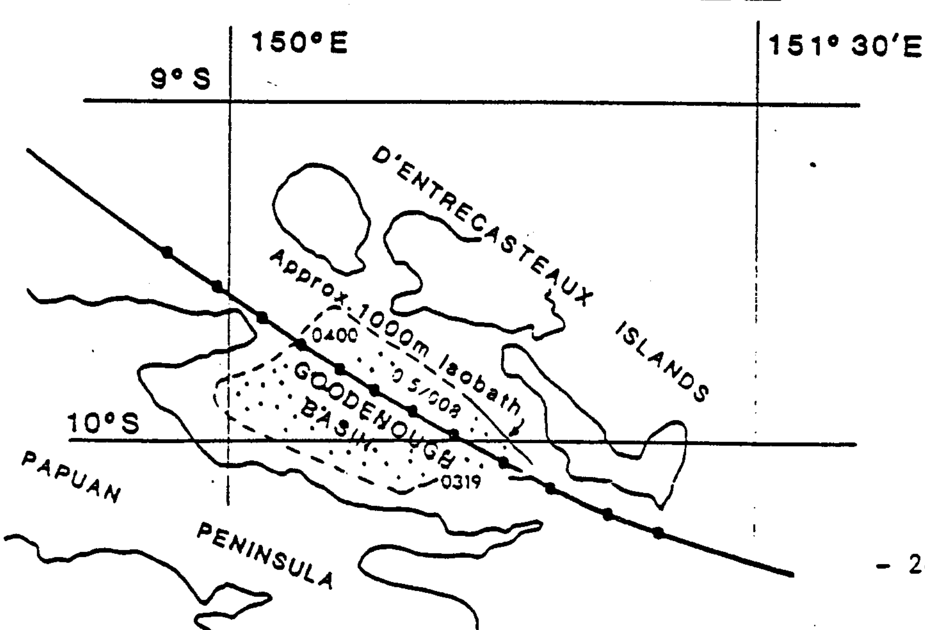
Special requirements (Staffing, instrumentation, etc.)

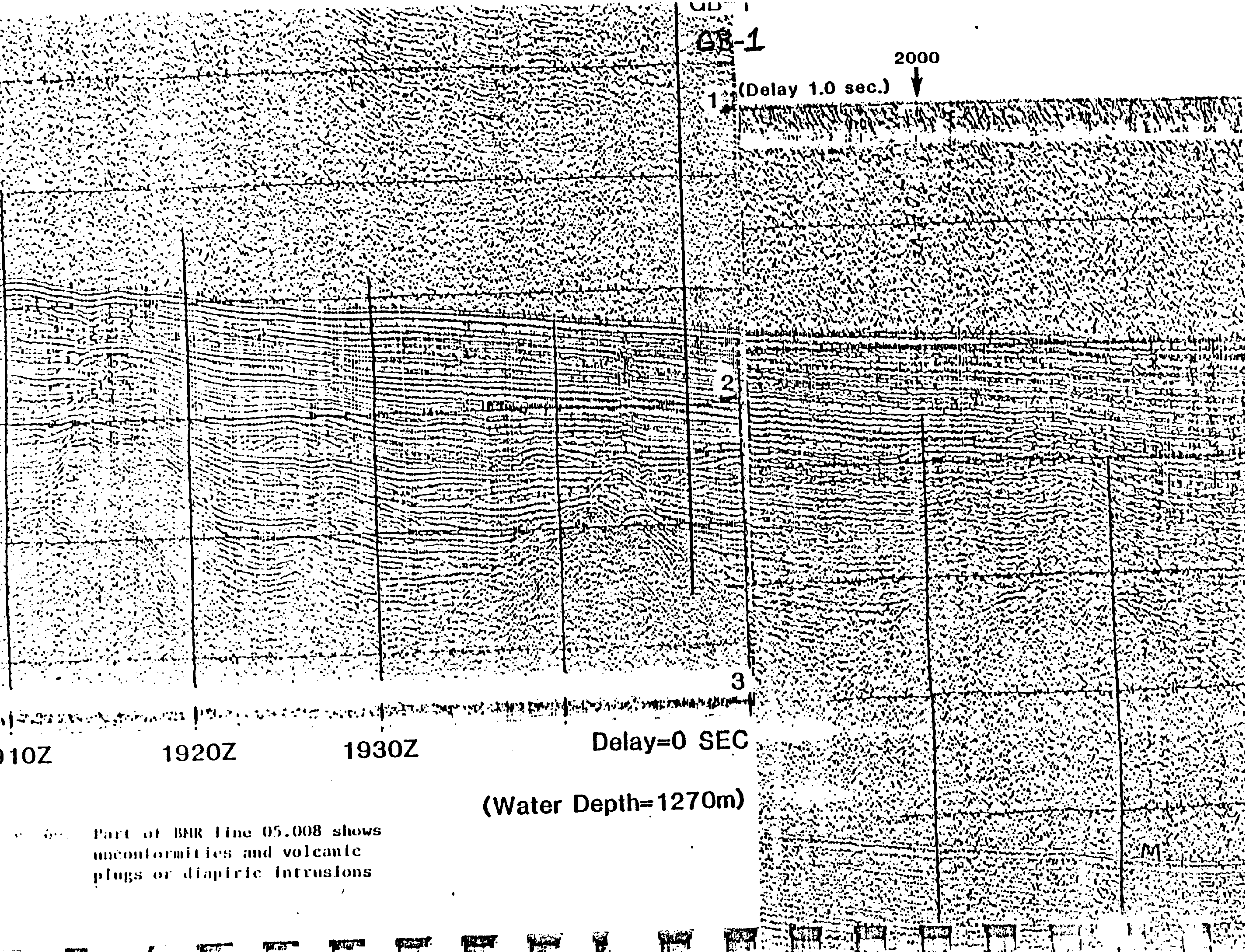
Proponent: H L Davies & P A Symonds
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office:



2 Structural interpretation map of the Solomon Sea region. (After Davies et al., 1984)





Part of BMR line 05.008 shows unconformities and volcanic plugs or diapiric intrusions

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: WSS 1, 2 & 3, WESTERN SOLOMON SEA (Figs. 62-64)

General Area: Solomon Sea Basin
Position: (1) 7°32'S, 149°55'E
Alternate Site: (2) 7°28.5'S, 149°54.5'E
(3) 7°17'S, 149°53.5'E

General Objective:
Deformation history of oceanic lithosphere caught between opposed convergent margins

Thematic Panel interest: LITHP, TECP, (SOH
Regional Panel interest: WP-RP

Specific Objectives:

Determine timing and magnitude of fault movements by correlation of sedimentary cover on separate fault blocks (in conjunction with site WSS4)

Background Information:
Regional Data:
Seismic profiles: Natsushima Line 29 (Fig. 63)

Other data: BMR and Natsushima lines in vicinity

Site Survey Data - Conducted by: To be done
Date:
Main results:

Operational Considerations

Water Depth: (m) 4650-5100 Sed. Thickness: (m) 270-325 Total penetration: (m) 325 max.

HPC Yes Double HPC _____ Rotary Drill No Single Bit _____ Reentry _____

Nature of sediments/rock anticipated: pelagic muds

Weather conditions/window: December-January very calm

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Keith A W Crook

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: WSS4, WESTERN SOLOMON SEA (Figs. 62-64)

General Area: Solomon Sea Basin
Position: 7°09'S, 149°53'E
Alternate Site:

General Objective: Deformation history of oceanic lithosphere caught between opposed convergent margins

Thematic Panel interest: LITHP, TECP
Regional Panel interest: WP-RP

Specific Objectives:

- Measure the physical properties and behaviour of lithosphere as it responds to contemporary subduction.
- Determine age of Solomon Sea Basin crust.
- Determine timing and magnitude of fault movements, in conjunction with sites WSS1-3.

Background Information:
Regional Data:
Seismic profiles: Natsushima Line 29 (Fig. 63)

Other data: BMR and Natsushima lines in vicinity

Site Survey Data - Conducted by: To be done
Date:
Main results:

Operational Considerations

Water Depth: (m) 5700 Sed. Thickness: (m) 200 Total penetration: (m) 400

HPC Yes Double HPC ____ Rotary Drill Yes Single Bit Yes Reentry ____

Nature of sediments/rock anticipated: Pelagic muds over basalt basement; drill ca.200m into basement

Weather conditions/window: December-January very calm.

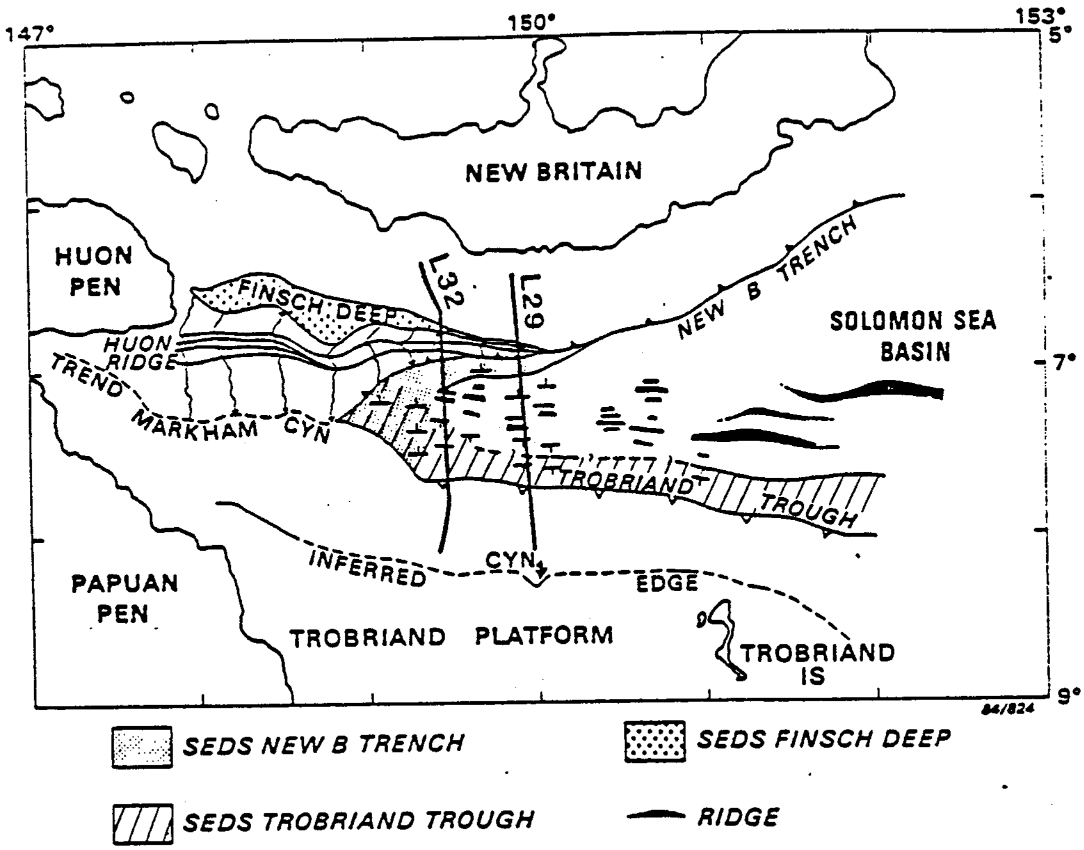
Territorial jurisdiction: Papua New Guinea

Other:

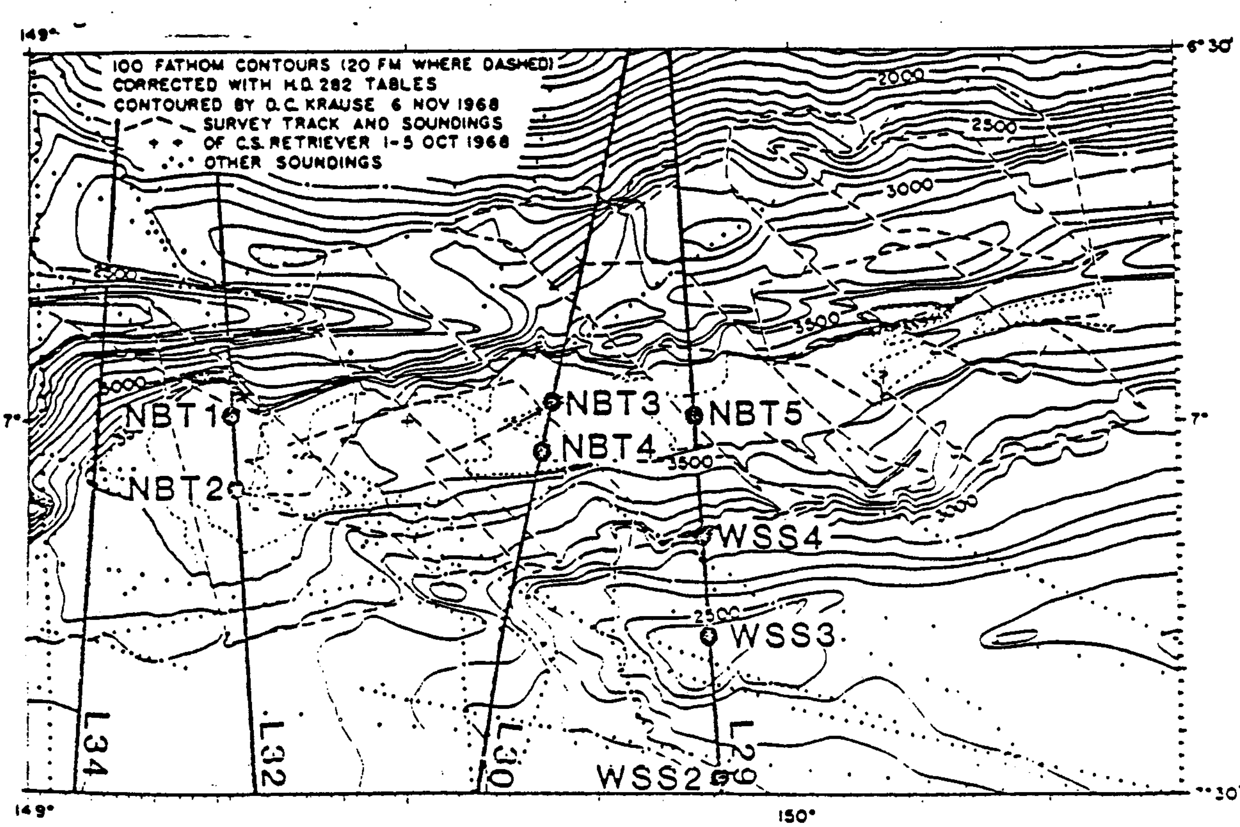
Special requirements (Staffing, instrumentation, etc.)

Down hole seismometer, strain gauges and other relevant tectonophysical instrumentation.

Proponent: Keith A W Crook Date submitted to JOIDES Office:



Structural features, western Solomon Sea showing locations of Natushima lines L29 and L32



Detailed bathymetry of the western New Britain Trench.
(after Krause et al., 1970, showing Natsushima seismic lines and proposed drill sites WSS3-WSS5)

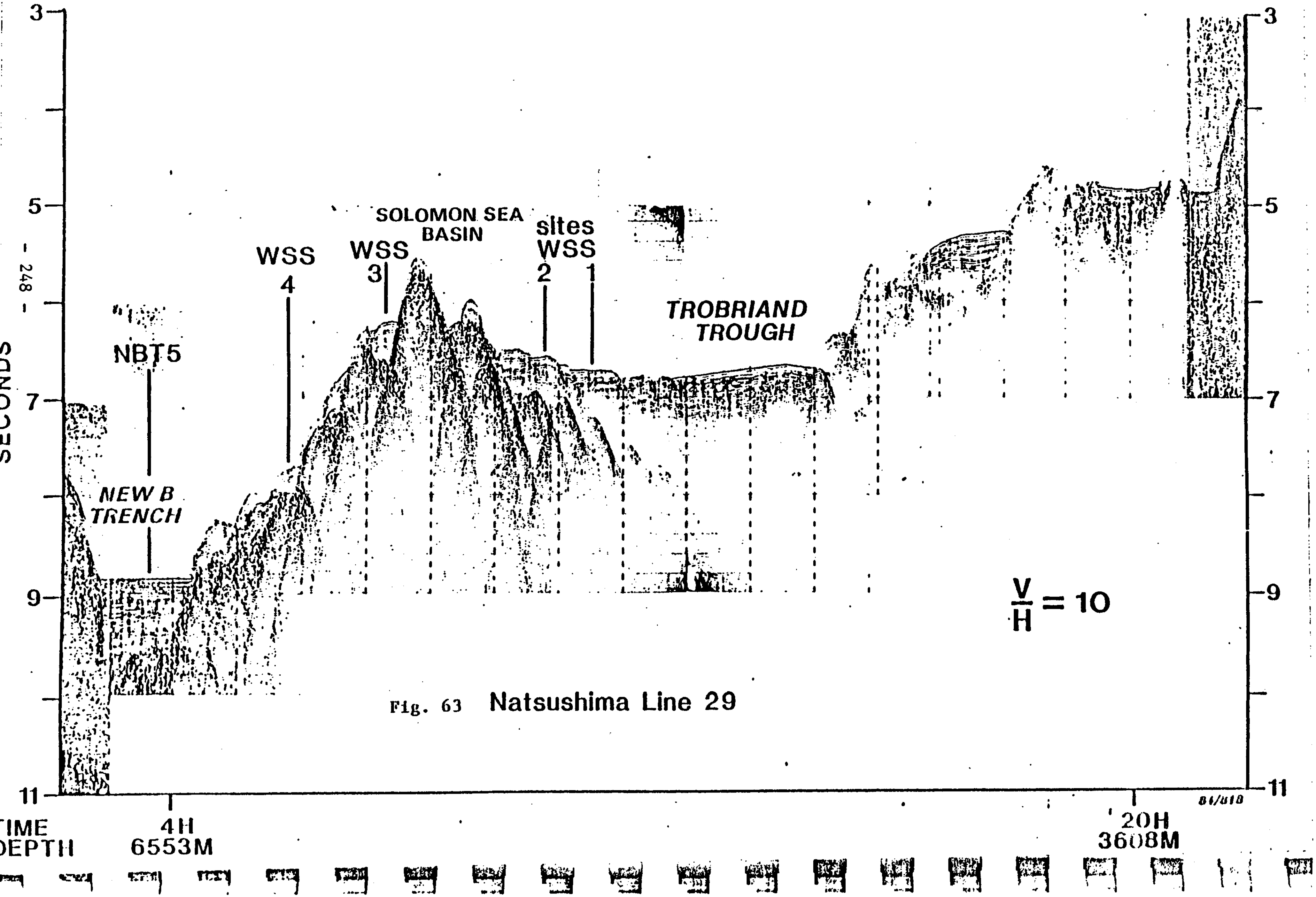


Fig. 63 Natsushima Line 29

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: RIR1, RENNELL ISLAND RIDGE (Figs. 68-71)	**General Objective:** Post-subduction history of an extinct oceanic island arc.
General Area: Eastern Coral Sea **Position:** 12°17'38"S, 159°35'00"E **Alternate Site:** on line BC, Fig. 68	**Thematic Panel interest:** SOHP, TECP **Regional Panel interest:** WP-RP

Specific Objectives:

- Post-subduction subsidence and thermal history.
- Age and nature of post-subduction sediments
- Age and nature of syn-subduction, fore-arc materials
- Dating of regional tectonic events

Background Information:

Regional Data:

Seismic profiles: Line $A\text{-}A_1\text{-}A^L A_1'$, Daniel *et al.*, (1978) (Figs. 68,69,71)

Other data: See Fig. 68

Site Survey Data - Conducted by: To be done

Date:

Main results:

Operational Considerations

Water Depth: (m) 1425 Sed. Thickness: (m) 300 Total penetration: (m) 400

HPC Yes Double HPC ____ Rotary Drill Yes Single Bit Yes Reentry ____

Nature of sediments/rock anticipated: Pelagics over ?shelf carbonates over volcaniclastic basement

Weather conditions/window: Summer cyclones

Territorial jurisdiction: Solomon Islands

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Keith A W Crook

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: RIR2, RENNELL BASIN (Fig. 68-71)

General Area: E. Coral Sea
Position: 12°31'45"S, 159°14'07"E
Alternate Site: On lines BCDE, Fig. 68

General Objective: Post-subduction history of an extinct oceanic island arc.

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives:

- Post-subduction subsidence and thermal history.
- Age and nature of post-subduction sediments.
- Age and nature of syn-subduction trench and incoming plate sediments.
- Dating cessation of subduction.
- Dating of regional tectonic events.

Background Information:

Regional Data:
Seismic profiles: Line A-A, Daniel *et al.* (1978) (Figs. 68, 69, 71)

Other data: See Fig. 68

Site Survey Data - Conducted by: To be done
Date:
Main results:

Operational Considerations

Water Depth: (m) 3650 Sed. Thickness: (m) 1500+ Total penetration: (m) >1500 (to basement)

HPC Yes Double HPC ? Rotary Drill Yes Single Bit ____ Reentry Probably

Nature of sediments/rock anticipated: Pelagics over ?distal volcaniclastics over ocean floor basalt basement.

Weather conditions/window: Summer cyclones.

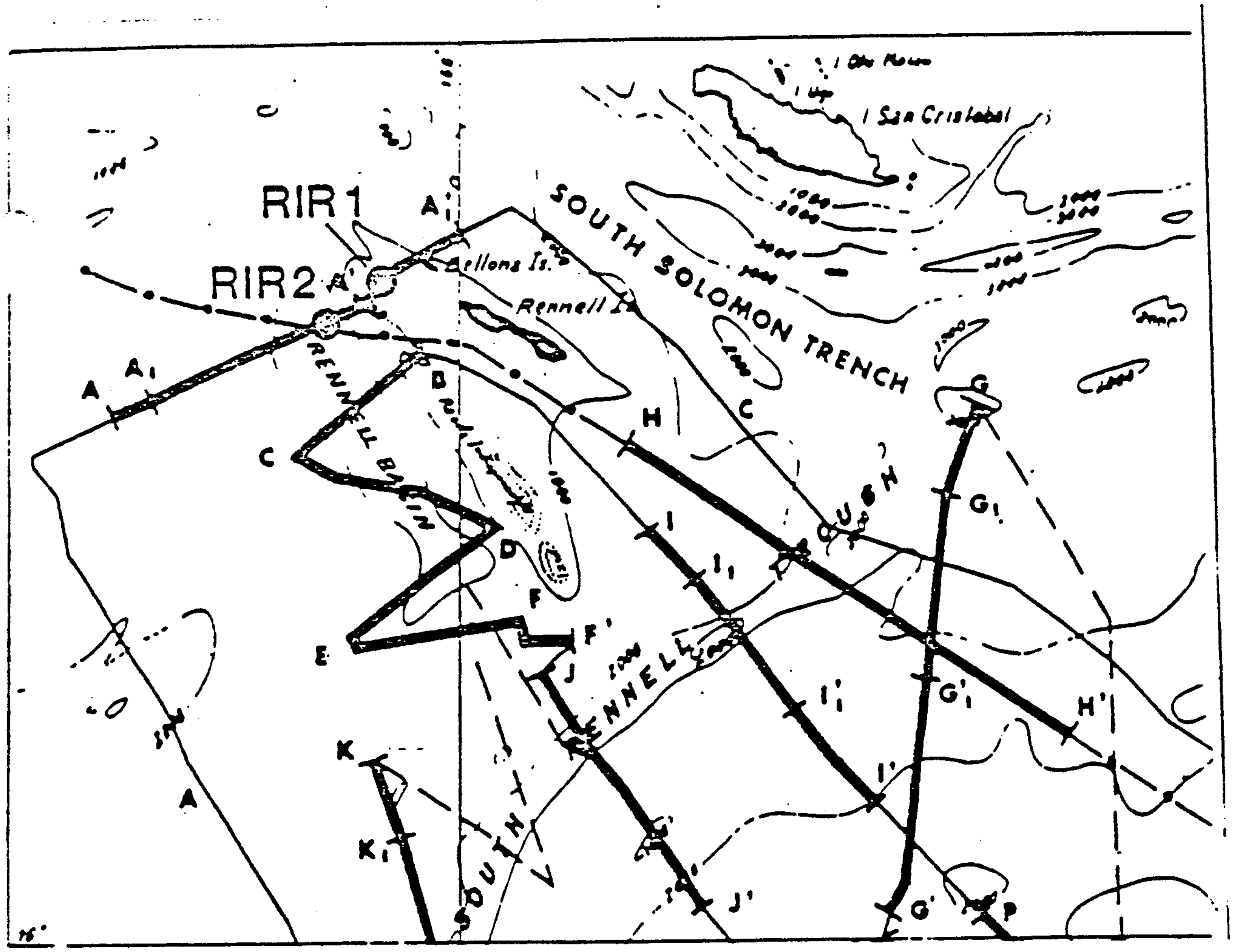
Territorial jurisdiction: Solomon Islands

Other:

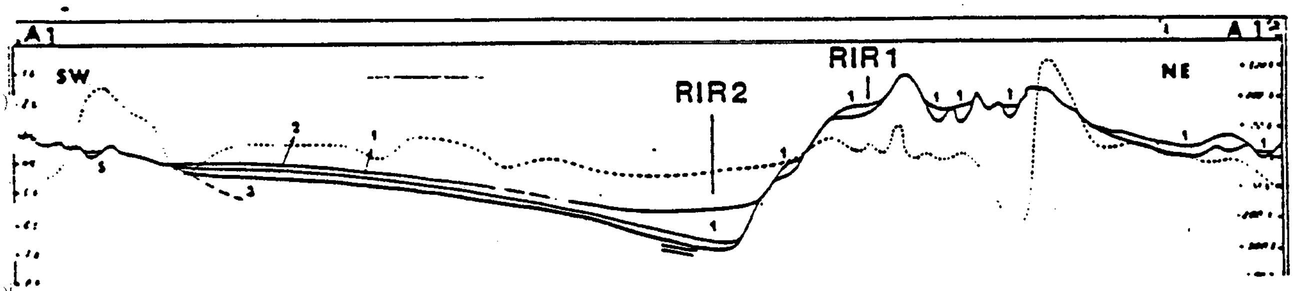
Special requirements (Staffing, instrumentation, etc.)

Proponent: Keith A W Crook

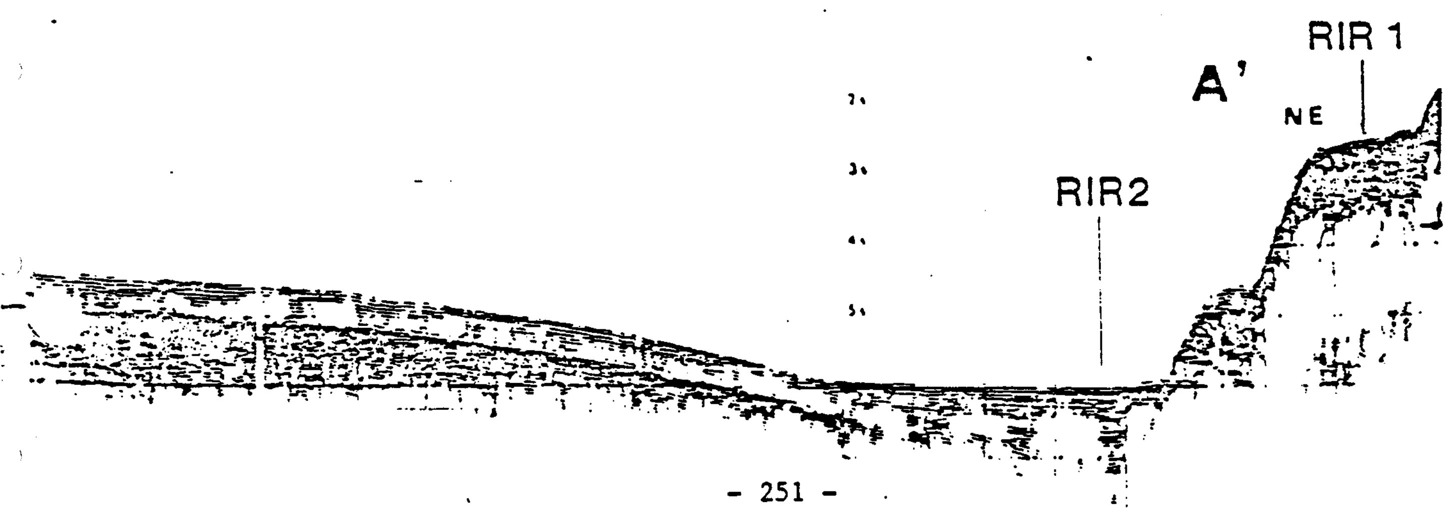
Date submitted to JOIDES Office:



Locality map, sites RIR1 & 2 (from Daniel et al., 1978)



Sedimentary units 1-3 on line A1-A1' (Fig. 68) showing sites RIR1 & 2 (after Daniel et al., 1978)



ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: NBT1, WESTERN NEW BRITAIN TRENCH (Figs. 82, 83)

General Area: Western Solomon Sea
Position: $6^{\circ}59$'S, $149^{\circ}16$'E
Alternate Site:

General Objective:
Establish facies models for non-fan turbidites.

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WR-RP

Specific Objectives:

- Establish vertical facies succession through a non-fan turbidite sequence.
- Examine diagenetic changes with depth in volcanic lithic detritus.
- Determine age range of sequence (probably Quaternary).

Background Information:

Regional Data:
Seismic profiles: Natsushima Line 32 (migrated multichannel) (Figs. 83, 84)

Other data: Adjacent BMR 6-channel line, presently unprocessed.

Site Survey Data - Conducted by: To be done. SeaMARC-II swath mapping and
Date: deep-tow high resolution seismic surveys desirable.
Main results:

Operational Considerations

Water Depth: (m) 6400 Sed. Thickness: (m) 1000 Total penetration: (m) 1000

HPC Yes to refusal Double HPC ____ Rotary Drill Yes Single Bit ____ Reentry ? drill to basement

Nature of sediments/rock anticipated: Lithic conglomerate, sandstone and mudstone.

Weather conditions/window: Very calm December-January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Keith A W Crook

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: NBT2-5, WESTERN NEW BRITAIN TRENCH (Figs. 82,84; 63, p.104)

General Area: Western Solomon Sea
Position: 2: 7°05.5'S, 149°16.5'E
Alternate Site: 3: 6°58.5'S, 149°41.3'E
4: 7°02'S,149°40.6'E; 5: 6°59S,149°62.4'E

General Objective:
Establish facies models for non-fan turbidites.

Thematic Panel interest: SOHP, TECP
Regional Panel interest: WP-RP

Specific Objectives:

- Establish non-fan turbidite facies characteristics in relation to depositional/ erosional morphology in diverse parts of the area.
- Establish cross-current and down-current variability of morphologically related facies.

Background Information:
Regional Data:
Seismic profiles: Natsushima Lines L29,30 (single channel) and Line 32 (multichannel) (Figs. 82, 84, 63)
Other data: Line 34 (Fig. 82); BMR 6-channel Line, presently unprocessed.

Site Survey Data - Conducted by: To be done. SeaMARC-II swath mapping and deep-tow high resolution seismic surveys desirable.
Date:
Main results:

Operational Considerations

Water Depth: (m) 2: 6400 5: 6637 3: 6575 4: 6583 Sed. Thickness: (m) >500 Total penetration: (m) 100

HPC Yes to refusal Double HPC ____ Rotary Drill No Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: Lithic sands (?gravels) and muds

Weather conditions/window: very calm, December-January

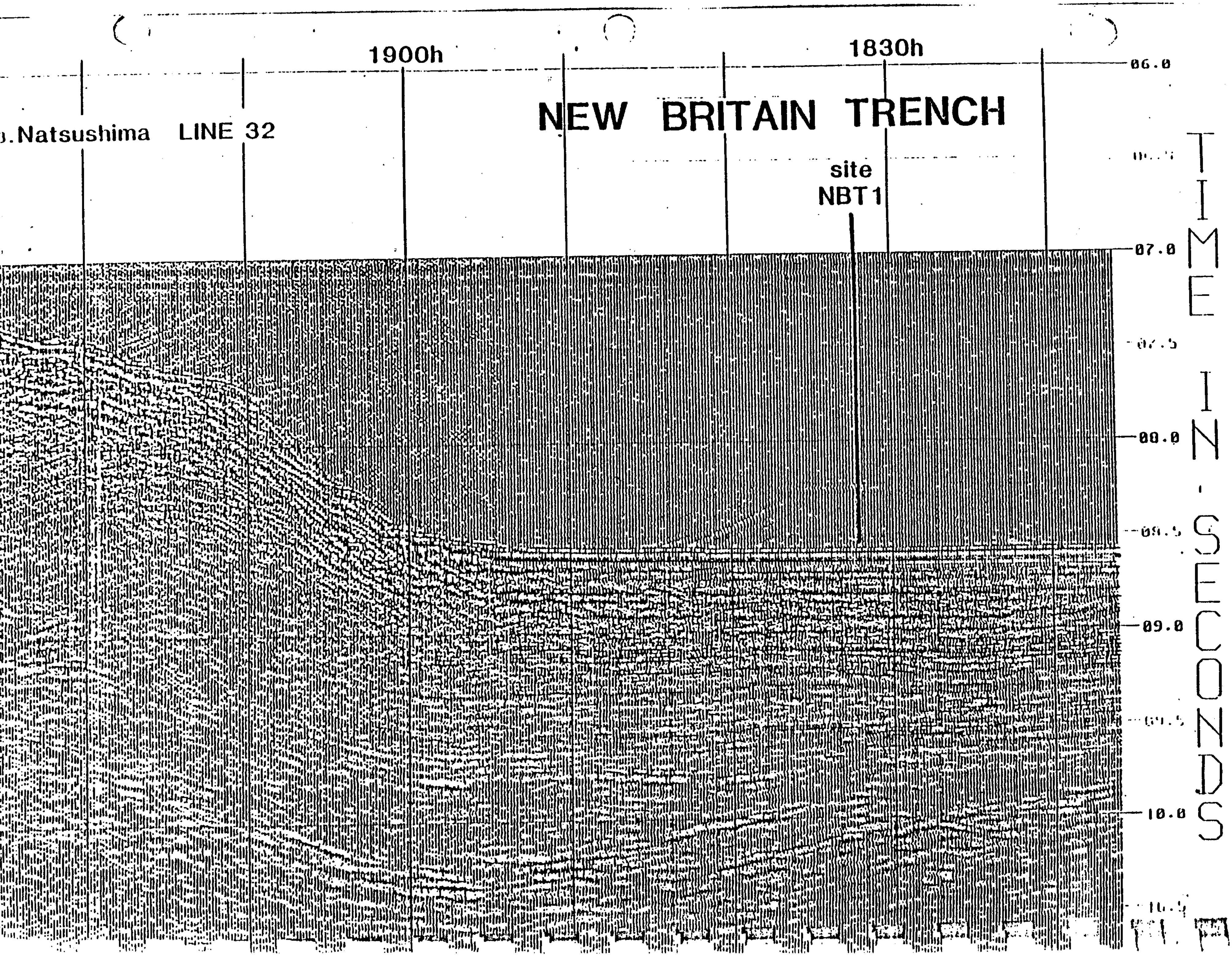
Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Keith A W Crook

Date submitted to JOIDES Office:



NEW BRITAIN TRENCH
.Natsushima
LINE 32
1900h
1830h
site
NBT1
06.0
07.0
08.0
09.0
10.0
TIME IN SECONDS

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: TS1A, TS1B, TS1C WESTERN MARGIN TASMAN SEA (Figs. 87, 88)

General Area: Tasman Sea
Position: 38°39'S, 148°47'E
Alternate Site: 38°43'S, 149°05'E
38°48'S, 149°22'E

General Objective:

Subsidence and sedimentation history of a failed-rift

Thematic Panel interest: SOHP, TECP
Regional Panel interest: IO-RP, SO-RP, WP-RP

Specific Objectives:

- When and at what rate does subsidence occur?
- How was this east-west rift affected by the north-south spreading which dissected it?
- What is the sedimentology and diagenetic history of proximal ('canyon fill') turbidites consisting of aragonitic and calcitic debris interbedded with terrigenous sediments?

Background Information:

Regional Data:
Seismic profiles: SHELL N434 (multichannel seismic line - see Fig. 88)

Other data: BMR multichannel seismic lines shown on Fig. 87

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) A: 2550 B: 3075 C: 3075

Sed. Thickness: (m) ≈3000

Total penetration: (m) 0.6 sec(TW 0.6 0.8

HPC No | Double HPC No | Rotary Drill Yes | Single Bit No | Reentry Yes

Nature of sediments/rock anticipated: Marl and calcarenite overlying carbonaceous mudstone, volcaniclastic sandstone.

Weather conditions/window: Anytime.

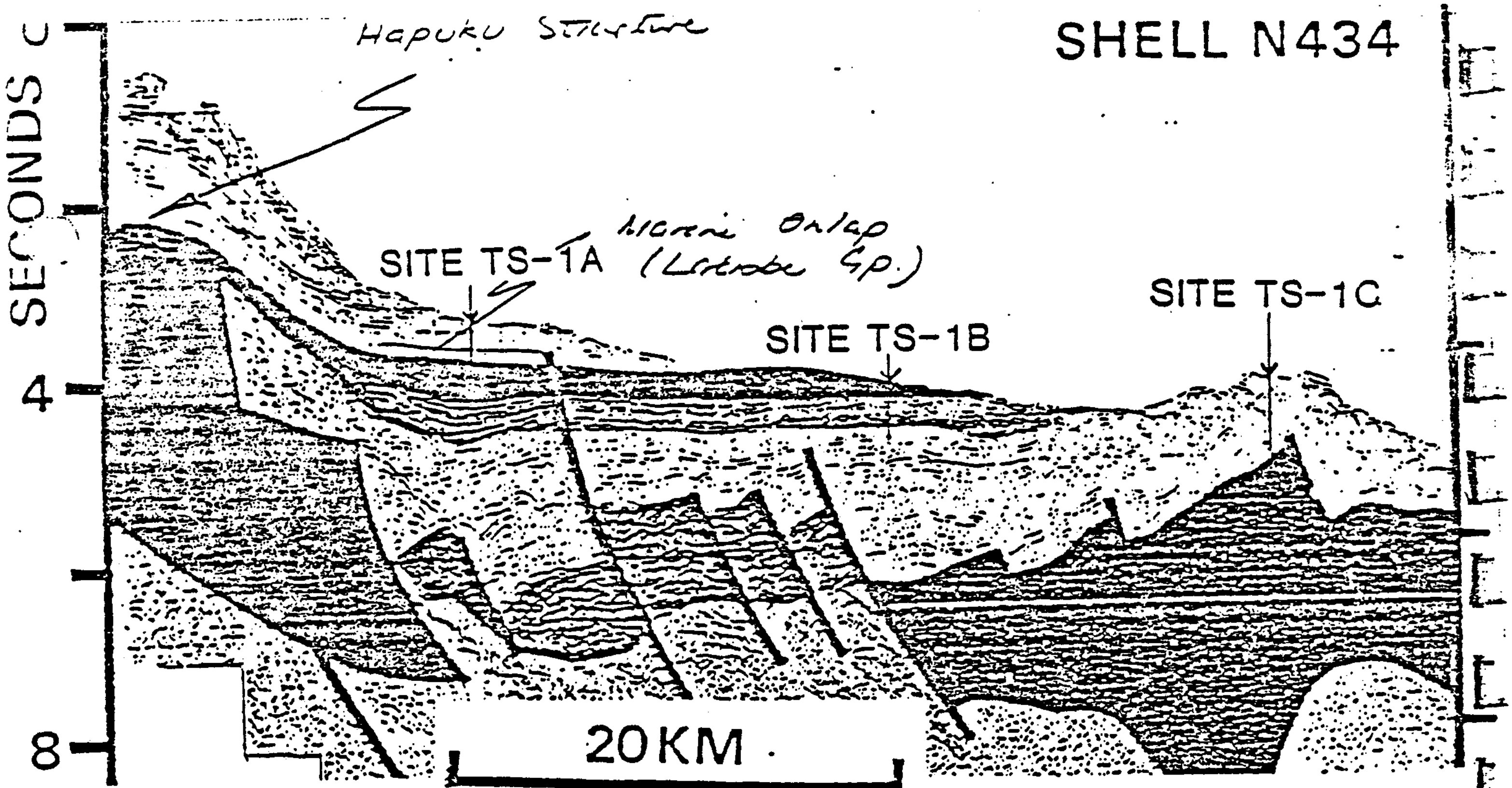
Territorial jurisdiction: Australia

Other:

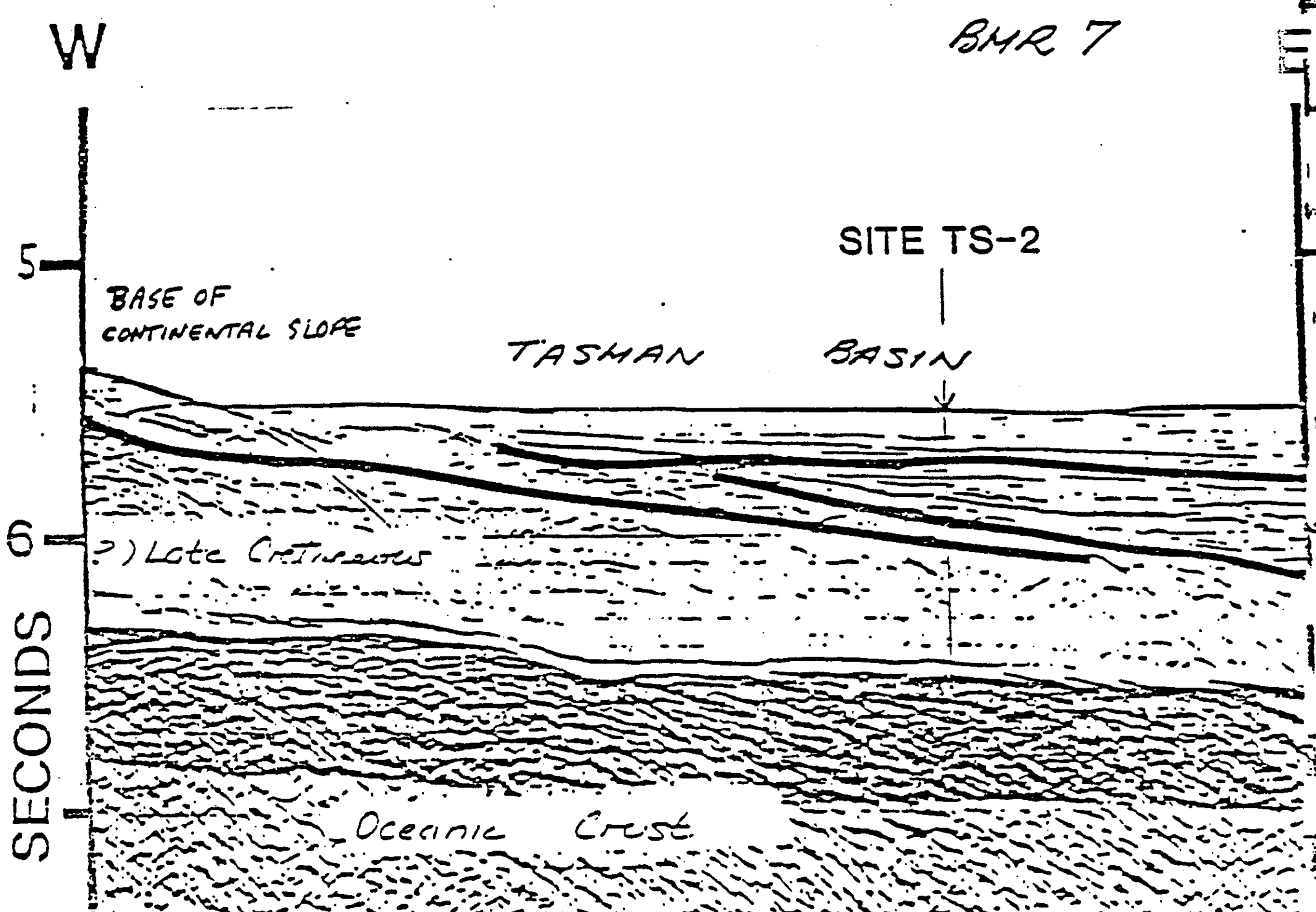
Special requirements (Staffing, instrumentation, etc.)

Proponent: J B Keene & G H Packham
Ocean Science Institute
University of Sydney
SYDNEY N S W 2006

Date submitted to JOIDES Office:



Location of proposed sites TS-1A, B and C on multichannel seismic line.
(See Figure 3 for position of line).



*****ODP SITE PROPOSAL SUMMARY FORM*****

Proposed Site: GBR1A, 1B, GBR2
CENTRAL GREAT BARRIER REEF SLOPE
(Figs. 90, 92, 93)

General Area: Western Coral Sea

Position: 1: 16°39.2'S, 146°16.5'E
2: 16°38.2'S, 146°18.5'E

Alternate Site: GBR1B
17°33.8'S, 146°43.2'E

General Objective: Response of marine sedimentation to fluctuations in sea level. History of ocean circulation.

Thematic Panel interest: SOHP

Regional Panel interest: WP-RP

Specific Objectives: Address general objectives by examining the nature of tropical carbonate/epiclastic dominated passive margin.

Site GBR1A (GBR1B)

- Nature of fore-reef talus associated with submerged shelf edge barrier reef.
- Nature of any low sea level deposits interfingering with reef rocks.
- Nature of reef sediments

Site GBR2

- Nature and basinward extent of carbonate sequences
- Nature and depositional environment of prograding sequences-low sea level shelf edge delta?

Background Information:

Regional Data:

Seismic profiles: BMR (1970) 6-fold sparker; Gulf (1973) 24-fold Aquapulse; Shell (1974) 24-fold airgun; BMR (1982) 12-fold high resolution sparker.

Other data: A considerable amount of gravity and magnetic data seaward of reef; aeromagnetics throughout reef. Boomer profiles and vibroseising throughout central GBR

Site Survey Data - Conducted by: Sites located using BMR high resolution sparker data

Date: GBR1A - line 41/63 - 41.248.237; GBR1B - line 41/22 - 41.206.0606

Main results: GBR2 - line 41/63 - 41.248.2330;
Submerged shelf edge reef facies; seaward carbonate sequence which is laterally continuous with reef; underlain by complex sigmoid-oblique and sigmoid progradational facies.

Operational Considerations

Water Depth: (m) GBR1A - 99 (105) GBR2 -315 Sed. Thickness: (m) > 3000 Total penetration: (m) 1: 500-600 2: 600-800

HPC Yes 500m Double HPC ____ Rotary Drill ____ Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: Upper - thin outer shelf carbonates; 200-200m reef rock; Lower - interbedded shelf carbonates and siliciclastic sediments.

Weather conditions/window: Possible cyclones in January-February; heaviest swell June to August. Generally fair weather.

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: P A Symonds & P J Davies
Bureau of Mineral Resources
G.P.O. Box 378

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: GBR3, 4, 5, CENTRAL GREAT BARRIER REEF SLOPE (Figs. 90, 94, 95)

General Area:
Position:
3: 17°30.9'S, 146°51.2'E
4: 17°30.2'S, 146°28'E
5: 17°37.2'S, 146°57.2'E

Alternate Site:

General Objective:
. Response of marine sedimentation to fluctuations in sea level.
. History of ocean circulation.

Thematic Panel interest: SOHP
Regional Panel interest: WP-RP

Specific Objectives: Address general objectives by examining slope facies adjacent to tropical carbonate/epiclastic depositional system.

Site GBR3:
. Nature and depositional environment of prograding sequence and underlying erosional remnant.

Site GBR4:
. Nature and depositional environment of lower slope facies. How are they affected by sea level changes?

Site GBR5:
. Nature and depositional environment of upper submarine fan system. Levee bank deposits or intercanyon high?

Background Information:
Regional Data:
Seismic profiles: BMR (1970) 6-fold sparker; Gulf (1973) 24-fold Aquapulse; Shell (1974) 24-fold airgun; BMR (1982) 12-fold high resolution sparker; (GSI (1979) 24-fold airgun in Queensland Trough - Confid.)

Other data: Considerable amount of gravity and magnetic data off shelf; aeromagnetics over shelf. Boomer profiles and vibroseising throughout shelf area of central GBR.

Site Survey Data - Conducted by: Sites located using BMR high resolution sparker data.
Date: GBR3 - line 41/22-41.206.0435; GBR4 - line 41/22-41.206.0412;
GBR4 - line 41/21-41.206.0156.
Main results: Upper slope ?low sea level progradational facies; lower slope-distal part of prograding facies, submarine fan deposition - levee bank deposits, channel fill, intercanyon highs.

Operational Considerations

Water Depth: (m) 3: 430, 4: 863, 5: 600

Sed. Thickness: (m) 2000-3000

Total penetration: (m) 700-800 all sites

HPC Yes to refusal Double HPC ____ Rotary Drill Yes Single Bit Yes Reentry ____

Nature of sediments/rock anticipated: GBR3 - thin carbonates, epiclastics (fluvio-deltaic); GBR4 - submarine fan and debris flow deposits; GBR5 - upper fan, channel fill and levee deposits.

Weather conditions/window: Generally fair; possible cyclones January-February; heaviest swell June to August

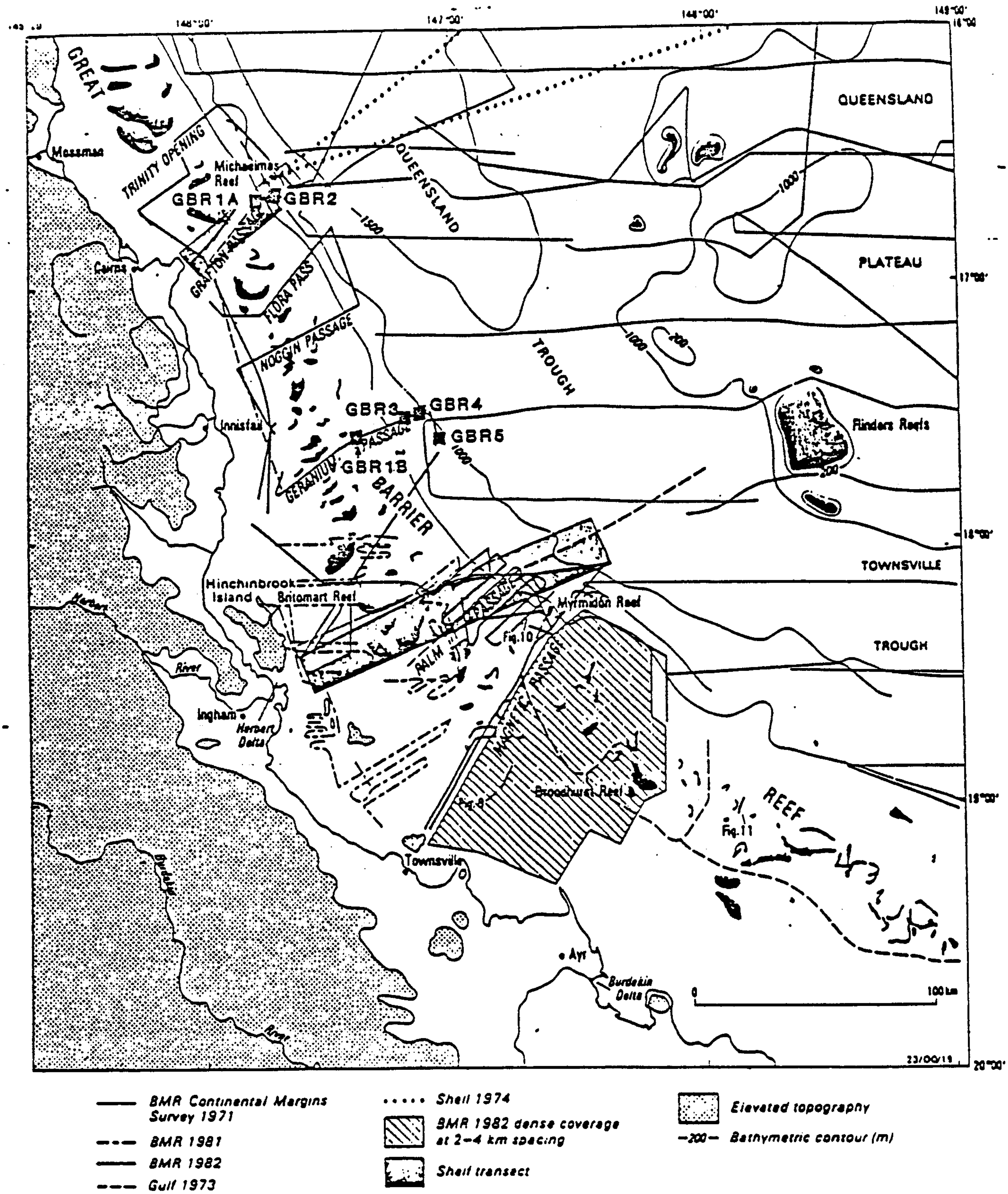
Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: P A Symonds & P J Davies
Bureau of Mineral Resources
G P O Box 378

Date submitted to JOIDES Office:



Distribution of seismic lines in the central Great Barrier Reef region. The positions of the Grafton Passage and Palm Passage shelf transects are also shown. The reefs are shown in black.

(After Symonds et al., 1983)

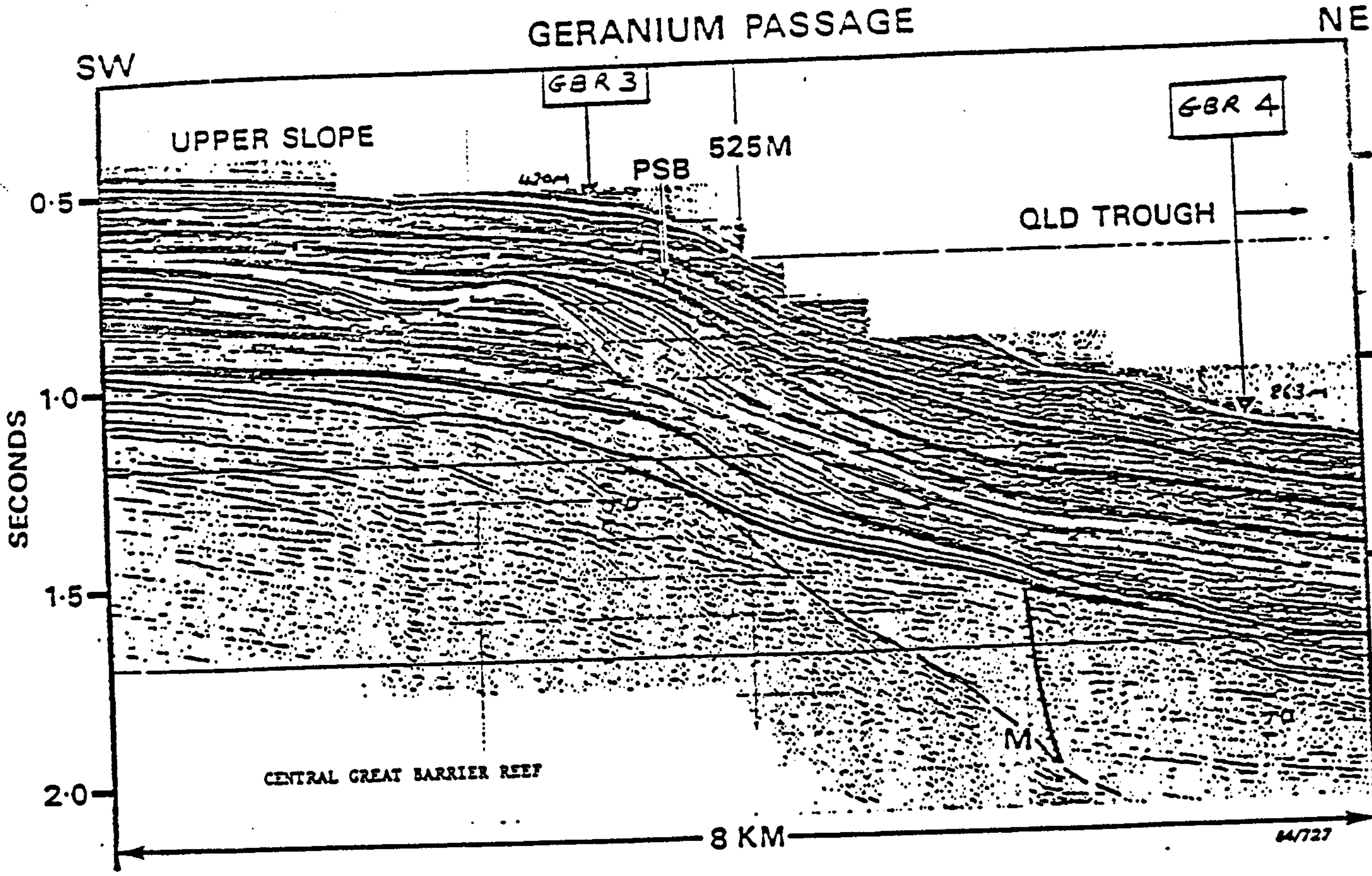
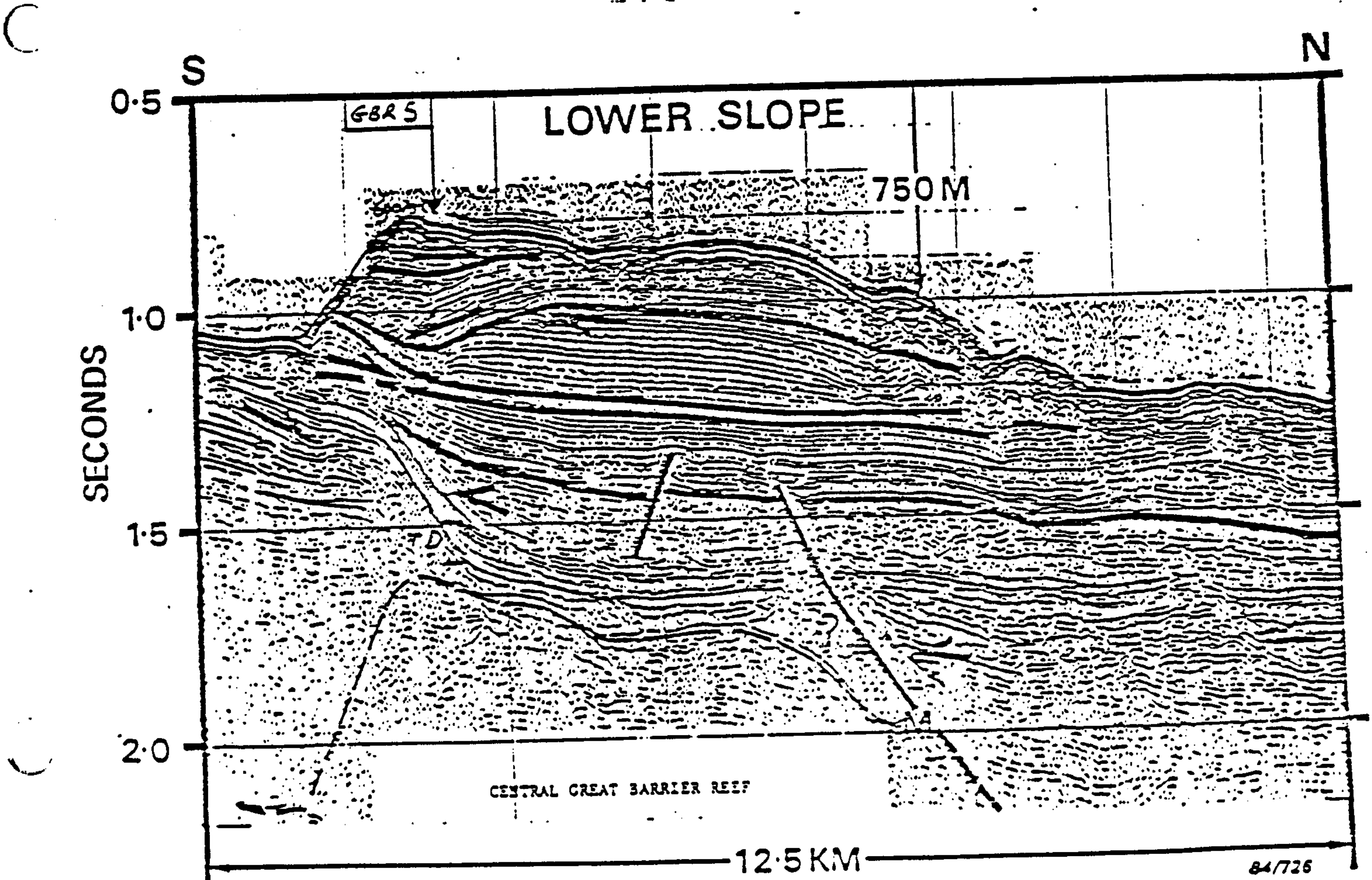


Fig. 94. BMR Sparker Line 41/22



BMR Sparker Line 41/21

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: AAD1-3 AUSTRALIAN-ANTARCTIC DISCORDANCE, ZONE B (Fig.-52)

General Area: Southeast Indian Ridge
Position: 49°02'S, 124°00'E
Alternate Site: 50°25'S, 135°05'E (Zone A)
49°55'S, 115°22'E (Zone C)

General Objective: Basalt magnetisation and chemistry in region of anomalous lithosphere

Thematic Panel interest: LITHP
Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

Basalt magnetisation and chemistry related to magnetic anomaly amplitude

Background Information:

Regional Data:

Seismic profiles: LDGO Vema 3301 and 3302 (dredge sites 3, 7, 10 of Anderson et al., 1980, JGR 85, p.3887)

Other data:

Site Survey Data - Conducted by:

Date:

Main results:

Operational Considerations

Water Depth: (m) 2180 Sed. Thickness: (m) 100 Total penetration: (m) several hundred

HPC ____ Double HPC ____ Rotary Drill Yes ____ Single Bit ____ Reentry probably required

Nature of sediments/rock anticipated: Thin surface sediment over oceanic layer 2A sequence

Weather conditions/window: Extremely rough/Austral summer (December-January)

Territorial jurisdiction:

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: J J Veevers and J C Branson **Date submitted to JOIDES Office:**

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: AAD4, DIAMANTINA ZONE, AUSTRALIAN-ANTARCTIC DEPRESSION (Figs. 52, 53)

General Area: Great Australian Bight
Position: 130°45'E, 35°55'S
Alternate Site:

General Objective: Age, magnetisation and chemistry of region of anomalous lithosphere of Australian-Antarctic Depression

Thematic Panel interest: LITHP, SOHP, TECP
Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

- Determine age of oldest oceanic crust (nothing older than 50Ma found by DSDP in this presumably Late Cretaceous ocean)
- Basalt magnetisation and chemistry of oldest very slowly spreading edge of oceanic crust
- Processes of ocean margin volcanism
- Paleoceanographic record of proto-Southern Ocean

Background Information:
Regional Data:
Seismic profiles: BMR 16/136 (Fig. 53)

Other data:

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) 5250 Sed. Thickness: (m) a site with 100m could be found Total penetration: (m) several hundred m into layer 2

HPC ____ Double HPC Yes Rotary Drill Yes Single Bit ____ Reentry probably required

Nature of sediments/rock anticipated: Thin Cz carbonate and detritus, Late Cretaceous detritus, over basalt
Weather conditions/window: Heavy swell: Austral summer (December-January)

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: J J Veevers and J C Branson **Date submitted to JOIDES Office:**

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: AAD5 & AAD6, CEDUNA PLATEAU (Figs. 30-32)

General Area: Australian-Antarctic Depression Great Australian Bight

Position: 35°00'S, 130°45'E: Site AAD5

Alternate Site: 35°15'S, 130°45'E: Site AAD6 (These sites are complementary)

General Objective:
Constitution and history of northern part of A-A Depression, by drilling two sites through pre- and post-breakup sequences

Thematic Panel interest: LITHP, SOHP, TECP

Regional Panel interest: OR-RP, SO-RP

Specific Objectives:

- Palaeo-heatflow of basement and overlying Cretaceous section of principal depocentre of northern part of A-A Depression
- History of rifted margin adjacent to very slowly spreading MOR
- To avoid penetrating hydrocarbon traps by choice of sites after detailed site survey (see Cook et al., 1981, 10A, p.104)
- Stratigraphic record of transition from 'restricted' nascent ocean to 'open' ocean.

Background Information:

Regional Data:

Seismic profiles: BMR 16/136 (Figs. 31, 32)

Other data:

Site Survey Data - Conducted by: Yet to be done

Date:

Main results:

Operational Considerations

Water Depth: (m) 5- 2250, 6- 3000 | Sed. Thickness: (m) 5000, 1800 | Total penetration: (m) 1500, 1800

HPC ____ Double HPC Yes Rotary Drill Yes Single Bit ____ Reentry Yes

Nature of sediments/rock anticipated: 5: paralic to deep marine detrital sediment
6: non-marine detrital sediment on Precambrian

Weather conditions/window: Heavy swell: Austral summer (December-January)

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Blow-out prevention; safe sites to be pinointed from a narrower grid of processed seismic lines (see proposal 10A of Cook et al., 1981, p.104)

Proponent: J J Veevers and J C Branson **Date submitted to JOIDES Office:**

B. Other previcusly submitted proposals for the Southeastern Indian Ocean, South Pacific, and Antarctic Margin

1. Adelie Land Margin (AM-1 through AM-3)
2. Axial Bounty Trough (A-1, B-1)
3. Southeast Pacific (SEP-1 through SEP-3)
4. South Tasman Rise (STR-1 through STR-3)
5. Otway Basin (OT-1 through OT-4)
6. Indispensable Basin (IB-1, IB-2)
7. Mborokua Basin (MB-1)
8. Buka Basin (BB-1 through BB-3)
9. Shortland Basin (SB-1, SB-2)
10. Southern New Hebrides Arc (BAT-1 through BAT-5)
11. Central New Hebrides Arc (IAB-1 through IAB-3, DEZ-1 through DEZ-6)
12. Mussau Trench (MuT-1)
13. Manus Trench (MaT-2A, MaT-2B)
14. Massau Island Arc (MIA-1)
15. Manus Forearc (MF-2, MF-1C)
16. Wilkes Land Margin (WL-1 through WL-3)

ODP SITE PROPOSAL SUMMARY FORM

Proposed site: AM 1 General Area: Lower Antarctic Continental Rise Position: 62°45'S and 138° E Alternate Site: AM 1 bis	General Objective: Adélie Margin Ages and processes of the early opening between Australia and Antarctica Thematic Panel interest:SOHP, TECP Regional Panel interest:SOP

Specific Objectives:

Determine the nature and age of a subbottom high interpreted as a volcanic and volcano-clastic ridge related to the early opening between Australia and Antarctica. Determine the importance of hiatus with the thin overlying hemipelagic sediments.

Background Information:

Regional Data:

Seismic profiles: Line ATC 101, SP 3950

Other data: Eltanin lines 50-53

Site Survey Data - Conducted by: Institut Français du Pétrole (CEPM)
Date: 1982
Main results: ___

Operational Considerations:

Water Depth: (m) 3700   Sed. Thickness: (m) 3500   Total penetration: (m) 500/600

HPC____   Double HPC____   Rotary Drill X   Single Bit X   Reentry____

Nature of sediments/rock anticipated: 300 m of distal turbidites (cf DSDP 269)
200 m of volcanoclastic sediments

Weather conditions/window: Potential icebergs - Fair weather Jan. Feb.

Territorial juridiction: Antarctic treaty jurisdiction

Other:

Special requirements (Staffing,instrumentation,etc.)

Proponent:
J. WANNESSON et al.

Date submitted to JOIDES Office:
10.7.1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed site: AM 1 bis

General Objective: Adélie Margin
Age and processes of the early opening between Australia and Antarctica

General Area: Lower Antarctic Continental Rise
Position: 62°45' S and 138° E
Alternate Site: AM 1

Thematic Panel interest: SOHP, TECP
Regional Panel interest: SOP

Specific Objectives:

Determine the nature and age of a subbottom high interpreted as a volcano-clastic ridge related to the early opening between Australia and Antarctica. Alternate site of AM 1 in an area of clearly northward dipping reflectors with very thin pelagic cover.

Background Information:

Regional Data:
Seismic profiles: Line ATC 101, SP 3675

Other data: Eltanin lines 50-53

Site Survey Data - Conducted by: Institut Français du Pétrole (CEPM)
Date: 1982
Main results:

Operational Considerations:

Water Depth: (m) 3800 Sed. Thickness: (m) 4000 Total penetration: (m) 500/600

HPC____ Double HPC____ Rotary Drill X Single Bit X Reentry____

Nature of sediments/rock anticipated: 100 m of distal turbidites (cf DSDP 269)
300-400 m of volcanoclastic sediments

Weather conditions/window: Potential icebergs. Fair weather Jan. Feb.

Territorial juridiction: Antarctic Treaty Jurisdiction

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
J. WANNESSON et al.

Date submitted to JOIDES Office:
10.7.1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed site: AM 2	General Objective: Adélie Margin Sedimentary and tectonic evolution of the Antarctic margin facing South Australia
General Area: Lower Antarctic Continental Rise Position: 63°20' S and 136°40' E Alternate Site:	Thematic Panel interest: SOHP, TECP Regional Panel interest: SOP

Specific Objectives:

Determine the nature and age of the main sedimentary sequences of the Antarctic margin facing south Australia. Paléoenvironment of the Antarctic Margin building. Determine the initiation of antarctic glaciation.

Background Information:

Regional Data:

Seismic profiles: Line ATC 101, SP 5810

Other data:

Site Survey Data - Conducted by: Institut Français du Pétrole (CEPM)

Date: 1982

Main results:

Operational Considerations:

Water Depth: (m) 3980 Sed. Thickness: (m) 2200 Total penetration: (m) 1100

HPC____ Double HPC____ Rotary Drill X Single Bit ? Reentry____

Nature of sediments/rock anticipated: 800 m of distal turbidites, 200 m of pelagic calcareous oozes and marls, 100 m of volcanoclastic sediments.

Weather conditions/window: Potential icebergs - Fair weather Jan. Feb.

Territorial juridiction: Antarctic Treaty Jurisdiction

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: J. WANNESSON et al.	Date submitted to JOIDES Office: 10.7.1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed site: AM 3

General Area: Antarctic Continental Shelf
Position: 66°30' S and 141°30' E
Alternate Site:

General Objective: Adélie Margin
Sedimentary and tectonic evolution of the Antarctic margin facing South Australia.

Thematic Panel interest: SHOP, TECP
Regional Panel interest: SOP

Specific Objectives:

Determine nature and age of the pre-Neogene sequence on the Upper Antarctic continental margin. Comparison of facies and paleoenvironment with lower continental rise sequence (site AM 2).

Background Information:

Regional Data:
Seismic profiles: Line ATC 105, SP 5010

Other data:

Site Survey Data - Conducted by: Institut Français du Pétrole (CEPM)
Date: 1982
Main results:

Operational Considerations:

Water Depth: (m) 230 Sed. Thickness: (m) 550 Total penetration: (m) 550

HPC____ Double HPC____ Rotary Drill X Single Bit X Reentry____

Nature of sediments/rock anticipated: 500 m of clastic subcontinental deposits

Weather conditions/window: Many icebergs - Fair weather Jan. Feb.

Territorial juridiction: Antarctic Treaty Jurisdiction

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
J. WANNESSON et al.

Date submitted to JOIDES Office:
10.7.1985

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: A1
Axial Bounty Trough

General Area:
Position: 46.22°S, 179.3°E
Alternate Site: (A2) 46.23°S, 174.42°E

General Objective: To date and establish the nature of two widespread horizons interpreted as Oligocene and Paleocene age. To date the nearby East-West compressional feature.
Thematic Panel interest: Lithosphere Panel
Regional Panel interest: W. Pacific Panel

Specific Objectives:
(1) Sample horizons interpreted as Oligocene-Miocene Unconformity and Paleocene to determine origin, composition and age.
(2) Sample and establish the sedimentary history particularly the finely laminated Early Oligocene to Recent sequence characteristic of alternating glacial-inter glacial sedimentation.
(3) Date the nearby East-West compressional feature.
(4) Date Volcanogenic deposits for correlation with Bounty Trough rifting stages.

Background Information:
Regional Data:
Seismic profiles: Tangaroa BT83Ø3 2100 Day 276

Other data: Gravity & magnetics from above cruise. See also track charts.

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) 3300 Sed. Thickness: (m) 1600m Total penetration: (m) 1150

HPC _____ Double HPC _____ Rotary Drill _____ Single Bit _____ Reentry _____

Nature of sediments/rock anticipated: hemipelagic/pelagic carbonates. Some volcanoclastics.

Weather conditions/window:

Territorial jurisdiction: NZ EEZ

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: B.W. Davy
Geophysics Division
D.S.I.R.
N.Z.

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 5 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: B1

General Objective: To date rotated (late Cretaceous?) horizon and hence Trough formation. Date and identify widespread horizons.

General Area: Bounty Trough
Position: 45°28'S, 173°51'E
Alternate Site: (B2) 45°14'S 175°53'E

Thematic Panel interest: Lithosphere
Regional Panel interest: W. Pacific

Specific Objectives:

(1) Date the horizon rotated by basement block faulting.
(2) Sample and establish the sedimentary history particularly the nature of the horizons interpreted as the Oligocene-Miocene Unconformity and Paleocene horizon.
(3) Date Volcanogenic deposits for correlation with stages of Bounty Trough rifting.

Background Information:
Regional Data:
Seismic profiles: Mobil 72-11 at 1340. (Fred H. Moore) (3 fold stack)
Other data: See track chart.

Site Survey Data - Conducted by:
Date:
Main results:

Operational Considerations

Water Depth: (m) 1500m Sed. Thickness: (m) 1460 Total penetration: (m) 1500

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: hemipelagic/pelagic carbonates, some volcanoclastics greywacke/schist basement

Weather conditions/window:

Territorial jurisdiction: NZ EEZ

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: B.W. Davy
Geophysics Division
D.S.I.R.
N.Z.

Date submitted to JOIDES Office:

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: site 1 (SEP-1)

General Area: south-east Pacific
Position: 53°00'S 77°35'W
Alternate Site:

General Objective:
continuously core with HPC
200 meters of section

Thematic Panel interest: ocean sediment
Regional Panel interest:
Antarctic - Pacific

Specific Objectives:

Recover a complete late Neogene section

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: RC17-14 20 Jan. 1975 0500Z (see Fig. 2)
GC 35 25 Feb. 1974 2030Z

Other data: LDGO piston core, RC15-65 (see Appendix 1)

Site Specific Survey Data:
Seismic profiles: (see Fig. 3)

Other Data:

Operational Considerations:

Water Depth: (m) ~ 4,000m Sed. Thickness: (m) ~ 600 Tot. penetration: (m) 200+

HPC ____ Double HPC ✓ Rotary Drill ____ Single Bit ____ Reentry ____

Nature of sediments/rock anticipated: unconsolidated , easily cored

Weather conditions/window: Austral summer

Territorial jurisdiction: International

Other:

Special Requirements (staffing, instrumentation, etc.):

Proponent: J. D. Hays
Address & phone number: New Core Lab.
L.D.G.O. of COlumbia U.
Palisades, N.Y.10964
(914) 359-2900 ext" 403

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:
ODP reference 153/E

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: site 2 (SEP-2)

General Area: South-east Pacific
Position: 54°20'S 76°50'W
Alternate Site:

General Objective:
continuously core with HPC 200 meters of section

Thematic Panel interest: ocean sediment
Regional Panel interest: Antarctic-Pacific

Specific Objectives: Recover a complete Late Neogene sequence to sample high southern latitude fossil floras and faunas to place their paleoecological and evolutionary development in a global context

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: RC18-02 30 March,1975 0600Z (see Fig. 2)

Other data: LDGO piston core V18-68 (see Appendix 1)

Site Specific Survey Data:
Seismic profiles: (see Fig. 4)

Other Data:

Operational Considerations:

Water Depth: (m) ~ 3800 Sed. Thickness: (m) ~ 500 Tot. penetration: (m) 200 +

HPC ✓ Double HPC ✓ Rotary Drill ____ Single Bit ____ Reentry ____
if time permits
Nature of sediments/rock anticipated: unconsolidated , easily cored

Weather conditions/window: Austal summer

Territorial jurisdiction: International

Other:

Special Requirements (staffing, instrumentation, etc.):
an enthusiastic and determined chief scientist

Proponent: J. D. Hays
Address & phone number: New Core Lab
L.D.G.O. of COlumbia
Palisades, New York 10964

(914) 359-2900 Ext; 403

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:
ODP reference 153/E

ODP SITE PROPOSAL SUMMARY FORM
(Submit 6 copies of mature proposals, 3 copies of preliminary proposals)

Proposed Site: site 3 (SEP-8)

General Area: south-east Pacific
Position: 55°50'S 77°15'W
Alternate Site:

General Objective:
continuously core with HPC
200 meters of section

Thematic Panel interest: ocean sediment
Regional Panel interest:
Antarctic - Pacific

Specific Objectives: Recover a complete Late Neogene sequence to sample high southern latitude fossil floras and faunas to place their paleo-ecological and evolutionary development in a global context

Background Information (indicate status of data as outlined in the Guidelines):
Regional Geophysical Data:
Seismic profiles: see Fig. 2

Other data: L.D.G.O. piston core, RC12 232 (see Appendix 1)

Site Specific Survey Data:
Seismic profiles: RC12-3 Dec. 1968 (0000 Z hours)
sheet 1570 (see Fig. 5)

Other Data:

Operational Considerations:

Water Depth: (m) 4296 Sed. Thickness: (m) 400 Tot. penetration: (m) 200+

HPC ____ Double HPC ____ Rotary Drill ____ Single Bit ____ Reentry ____
if time permits

Nature of sediments/rock anticipated: unconsolidated - easily cored (see Appendix 1)

Weather conditions/window: Austral summer

Territorial jurisdiction: International

Other:

Special Requirements (staffing, instrumentation, etc.):
Biostratigraphers should include those familiar with high latitude siliceous faunas

Proponent: J. D. Hays
Address & phone number: LDGO of COlumbia U.
Palisades, N.Y. 10964
(914) 359-2900 Ext: 403

FOR OFFICE USE:
Date received:
Classification no.:
Panel allocation:
ODP reference 153/E

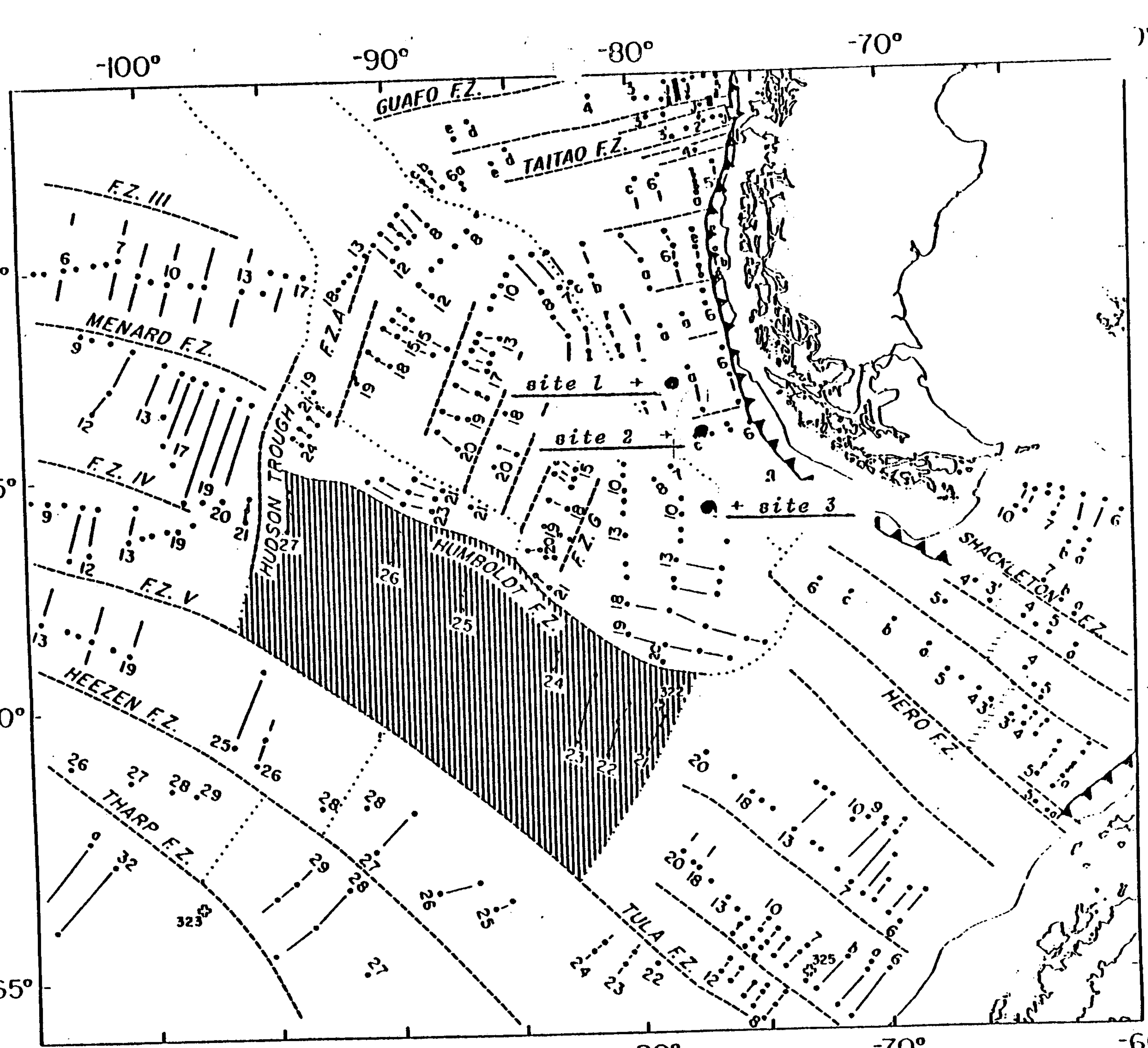


Figure 1
Location of proposed drill sites, showing their relationship to crustal anomalies

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: STR - 1

General Area: South Tasman Rise
Position: 46° 46' S, 146° 49' E
Alternate Site: --

General Objective: Timing of Australian - Antarctic fragmentation, and paleo-environment at high latitude during this period

Thematic Panel interest: TECP, SOHP
Regional Panel interest: IOP, SOP

Specific Objectives:

- to determine accurate timing of the Australian - Antarctic fragmentation;
- to study litho- and biostratigraphy and depositional environment of Paleogene and Mesozoic sediments at high latitudes;
- to determine age and nature of an important abrasional event which bevelled continental basement blocks in the region;
- to identify age and nature of regional pre-Oligocene seismic unconformities.

Background Information: Geoscientific results of SONNE cruise SO-36, BMR Continental Margin Survey
Regional Data:
Seismic profiles: MCS line SO-36-56, SP 2270

Other data: Results of DSDP Sites 280, 281, 282, 269, 270-274

Site Survey Data - Conducted by: SONNE cruise SO-36 conducted by BGR
Date: March - April 1985
Main results:

Operational Considerations

Water Depth: (m) 1765 Sed. Thickness: (m) 1500 Total penetration: (m) 1550

HPC x Double HPC ___ Rotary Drill ___ Single Bit ___ Reentry x

Nature of sediments/rock anticipated: 300 m Neogene pelagic sediments, 1200 m Paleog. and Mesozoic shales, sandst., siltstone, conglomer.-equivalents of Otway Group, Eastern View Formation and Sherbrook Group of SE-Australia
Weather conditions/window: Moderate

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Staffing: Sedimentology, Paleontology, Palynology, Organic geochemistry, Igneous petrology
Logging

Proponent: K. Hinz, H. Dostmann

Date submitted to JOIDES Office: 23rd July 19..

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: STR - 2

General Area: South Tasman Rise
Position: 46° 14' S, 146° 02, 5' E
Alternate Site: STR - 1

General Objective: Timing of Australian - Antarctic fragmentation, and paleo-environment at high latitude during this period

Thematic Panel interest: TECP, SOHP
Regional Panel interest: IOP, SOP

Specific Objectives:

- to determine accurate timing of the Australian - Antarctic fragmentation;
- to study litho- and biostratigraphy and depositional environment of Paleogene and Mesozoic sediments at high latitudes;
- to determine age and nature of an important abrasional event which bevelled continental basement blocks in the region;
- to identify age and nature of regional pre-Oligocene seismic unconformities.

Background Information: Geoscientific results of SONNE cruise SO-36, BMR Continental Margin Survey
Regional Data:
Seismic profiles: SO-36-61/SP 2670 and SO-36-50/SP2350

Other data: Results of DSDP Sites 280, 281, 282, 269, 270-274

Site Survey Data - Conducted by: BGR
Date: March - April 1985
Main results:

Operational Considerations

Water Depth: (m) 2440 Sed. Thickness: (m) > 1800 Total penetration: (m) 1800

HPC x Double HPC ___ Rotary Drill ___ Single Bit ___ Reentry x

Nature of sediments/rock anticipated: 400 m Neogene pelagic sedim., 1400 m Paleogene and Mesozoic shales, sst, siltst., conglom.-equivalents of Otway Group, Eastern View Form. and Sherbrook Group of SE-Australia
Weather conditions/window: Moderate

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Staffing: Sedimentology, Paleontology, Palynology, Organic geochemistry, Igneous petrology Logging

Proponent: K. Hinz, H. Dostmann

Date submitted to JOIDES Office: 23rd July 19..

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: STR - 3

General Area: South Tasman Rise
Position: 45° 58.5' S, 146° 27' E
Alternate Site: -

General Objective: Timing of Australian - Antarctic fragmentation, and paleo-environment at high latitude during this period

Thematic Panel interest: TECP, SOHP
Regional Panel interest: IOP, SOP

Specific Objectives:

- to determine accurate timing of the Australian - Antarctic fragmentation;
- to study litho- and biostratigraphy and depositional environment of Paleogene and Mesozoic sediments at high latitudes;
- to determine age and nature of an important abrasional event which bevelled continental basement blocks in the region;
- to identify age and nature of regional pre-Oligocene seismic unconformities.

Background Information: Geoscientific results of SONNE cruise SO-36, BMR Continental Margin Survey

Regional Data:
Seismic profiles: SO-36-61/SP 1850

Other data: Results of DSDP Sites 280, 281, 282, 259, 270-274

Site Survey Data - Conducted by: SONNE cruise SO-36 conducted by BGR
Date: March - April 1985
Main results:

Operational Considerations

Water Depth: (m) 1910 Sed. Thickness: (m) 1300 Total penetration: (m) 1300

HPC x Double HPC ___ Rotary Drill ___ Single Bit ___ Reentry x

Nature of sediments/rock anticipated: 150 m Neogene pelagic, 1150 Paleogene and Mesozoic shales, sandst., siltstone, conglom.

Weather conditions/window: Moderate

Territorial jurisdiction: Australia

Other:

Special requirements (Staffing, instrumentation, etc.)

Staffing: Sedimentology, Paleontology, Palynology, Organic geochemistry, Igneous petrology Logging

Proponent: K. Hinz, H. Oostmann

Date submitted to JOIDES Office: 23rd July 19..

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: OT1 OTWAY BASIN
(Figs. 1, 2, 6, 18) BMR 40-24: SP520
NW Tasmania Australia

General Area: Otway Basin Continental margin
Position: 40°48.5'S, 141°50.2'E
Alternate Site:

General Objective: Continental margin development during two-stage breakup of Australia/Antarctica

Thematic Panel interest: LITHP, SOHP, TECP
Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

- Test basement age and nature (continental or oceanic) in a magnetic quiet zone on outermost high block
- Investigate nature, age and paleowater depths of overlying sediments
- Monitor the biofacies changes in a new ocean in high paleolatitudes
- Provide an important local record of presumably worldwide sea-level changes in the Cretaceous and Tertiary

Background Information:

Regional Data:

Seismic profiles: BMR 1982 multichannel radiopositioned; Shell Petrel 1973 & BMR 1985 multichannel satellite positioned.

Other data: BMR 1970-72 (6-fold) satellite positioned

Site Survey Data - Conducted by: BMR

Date: May 1982

Main results: Thin Cainozoic pelagic cover and Tertiary and Late Cretaceous sequences over ?Pz basement.

Operational Considerations

Water Depth: (m) 4130 **Sed. Thickness: (m)** 970 **Total penetration: (m)** 1000

HPC Yes **Double HPC** ____ **Rotary Drill** Yes **Single Bit** Yes **Reentry** No

Nature of sediments/rock anticipated: 40 m Neogene ooze; 330m Paleogene shallow marine sediments; 600 m Cretaceous non-marine and marine clastics; 30 m Pz basement

Weather conditions/window: Exposed westerly

Territorial jurisdiction: Australia, Tasmania Adjacent Area

Other: Drilling time estimated as 11 days

Special requirements (Staffing, instrumentation, etc.)

Wireline logs

Proponent: J.B. Willcox, J.C. Branson & N.F. Exon
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office:

6 December 1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: OT2, OTWAY BASIN
(Figs. 1, 3, 6)
BMR 40-23 : SP 1080

General Area: Otway Basin continental margin
Position: 40°30.4'S, 142°01.2'E
Alternate Site: OT2A

General Objective: Continental margin development during two-stage breakup of Australia/Antarctica

Thematic Panel interest: LITHP, SOHP, TECP
Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

- Test nature and age (Cretaceous or basement) of high block away from margin
- Investigate nature of sedimentary sequence
- Provide data for palaeo-environment models
- Study Austral Cretaceous and Paleogene fossil faunas
- Provide an important local record of presumably world-wide sea-level changes in the Cretaceous and Tertiary

Background Information:
Regional Data:
Seismic profiles: BMR 1982 multichannel, radio positioned; Shell Petrel 1973 & BMR 1985 multichannel satellite positioning
Other data: BMR 1971 (6-fold), satellite positioned

Site Survey Data - Conducted by: BMR
Date: May 1982
Main results: Seaward tapered edge of a shallow basin; sequences can be traced into adjacent areas

Operational Considerations

Water Depth: (m) 3907 **Sed. Thickness: (m)** 1000 **Total penetration: (m)** 1000

HPC Yes **Double HPC** ____ **Rotary Drill** Yes **Single Bit** Yes **Reentry** No

Nature of sediments/rock anticipated: 200 m Neogene ooze; 360 m Paleogene shallow marine clastics; 340 m Late Cretaceous shallow marine clastic sediments; 100 m E. Cretaceous non-marine clastics.
Weather conditions/window: exposed, westerly weather

Territorial jurisdiction: Australia, Tasmania Adjacent Area

Other: Drilling time estimated as 11 days

Special requirements (Staffing, instrumentation, etc.)

Wireline logs

Proponent: J.B. Willcox, J.C. Branson & N.F. Exon
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office: 6 December 1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: OT2A, OTWAY BASIN (Figs. 1,3,6,18) BMR 40-24:SP 1080

General Area: NW Tasmania, Australia Otway Basin continental margin

Position: $40^{\circ}44.4'S$, $142^{\circ}17.2'E$

Alternate Site:

General Objective: Continental margin development during two-stage breakup of Australia/Antarctica

Thematic Panel interest: LITHP, SOHP, TECP

Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

- Test nature and age (Cretaceous or basement) of high block away from margin
- Investigate nature of sedimentary sequence
- Provide data for paleo-environment models
- Study Austral Cretaceous and Paleogene fossil faunas
- Provide an important local record of presumably world-wide sea-level changes in the Cretaceous and Tertiary.

Background Information:

Regional Data:

Seismic profiles: BMR 1982 multichannel, radiopositioned
Shell 1973 & BMR 1985 multichannel, satellite positioned

Other data: BMR 1971 (6-fold), satellite positioned

Site Survey Data - Conducted by: BMR

Date: May 1982

Main results: Seaward tapered edge of a shallow basin; sequences can be traced into adjacent areas.

Operational Considerations

Water Depth: (m) 3974 **Sed. Thickness: (m)** 1100 **Total penetration: (m)** 1100

HPC Yes **Double HPC** ____ **Rotary Drill** Yes **Single Bit** Yes **Reentry** No

Nature of sediments/rock anticipated: 220 m Neogene ooze; 530 m Paleogene shallow marine clastics; 290 m Late Cret. shallow marine clastics; 60 m E. Cret non-marine clastics.

Weather conditions/window: Exposed westerly weather.

Territorial jurisdiction: Australia; Tasmania adjacent area

Other: Drilling time estimated as 11 days

Special requirements (Staffing, instrumentation, etc.)

Wireline logs

Proponent: J.B. Willcox, J.C. Branson & N.F. Exon
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office: 6 December 1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: OT3, OTWAY BASIN
(Figs. 1, 4, 6, 18) BMR 40-24:
SP 1700

General Area: NW Tasmania, Australia
Position: 40°40.0'S, 142°46.0'E
Alternate Site:

General Objective: Continental margin development during two-stage breakup of Australia/Antarctica

Thematic Panel interest: SOHP, TECP
Regional Panel interest: IO-RP, SO-RP

Specific Objectives:

- Study changes in sediment type and date unconformities in prograding Late Cretaceous and Paleogene sequences. Why so little sinking over such a long period?
- Obtain detailed biostratigraphic data for use in world-wide correlation of Cretaceous and Paleogene sea-level changes and establishment of high-latitude plankton-biogeographic record.

Background Information:

Regional Data:

Seismic profiles: BMR 1982 multichannel , radiopositioned, Shell Petrel 1973 & BMR 1985 multichannel, satellite positioned

Other data: BMR 1971-73 (6-fold) satellite positioned

Site Survey Data - Conducted by: BMR

Date: May 1982

Main results: Older sequences open to the seafloor which present no hydrocarbon trap ris

Operational Considerations

Water Depth: (m) 3226 **Sed. Thickness: (m)** 1000 **Total penetration: (m)** 1000

HPC Yes **Double HPC** ____ **Rotary Drill** Yes **Single Bit** Yes **Reentry** No

Nat e of sediments/rock anticipated: 100 m Neogene ooze; 120 m Eocene shelf clastics; 240 m E. Eocene shelf clastics; 330 m Paleocene shelf clastics; 220 m L. Cret shelf clasti

Weather conditions/window: High swell, open to westerly gales

Territorial jurisdiction: Australia, Tasmania Adjacent Area

Other: Drilling time estimated as 10 days.

Special requirements (Staffing, instrumentation, etc.)

Wireline logs

Proponent: J.B. Willcox, J.C. Branson, N.F. Exon
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office: 6 December 1985

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: OT4, OTWAY BASIN (Figs. 1, 5, 6)
Eltanin 47 : Day 110, 1555

General Area: W. Tasmania, Australia
Abyssal plain off Otway Basin

Position: 41°26.9'S, 142°01.9'E

Alternate Site:

General Objective: Dating and nature of Australian/Antarctic two-stage rifting and breakup.

Thematic Panel interest: LITHP, SOHP, TECP

Regional Panel interest: IORP, SORP

Specific Objectives:

1. Nature and age of presumed oldest oceanic crust in the region
2. Environments of deposition of overlying sediments-bathyal or shallow marine?
3. Detailed high-latitude biogeographic record of Cretaceous and Paleogene sequences

Background Information:

Regional Data:

Seismic profiles: Eltanin Legs 47 & 55

Other data:

Site Survey Data - Conducted by: Lamont-Doherty Eltanin Leg 47.

Date: 1971

Main results: The continental rise ends in a flat, sedimented area of depressed oceanic basement of possible Early Cretaceous age about 100 km wide on which this site is located.

Operational Considerations

Water Depth: (m) 4750 **Sed. Thickness: (m)** 730 **Total penetration: (m)** 800

HPC Yes **Double HPC** ___ **Rotary Drill** Yes **Single Bit** Yes **Reentry** No

Nature of sediments/rock anticipated: 180 m Cainozoic ooze, 100 m Late Cretaceous marine clastics, 450 m Early Cretaceous marine or non-marine clastics, 70 m ?oceanic basement

Weather conditions/window: Exposed westerly weather

Territorial jurisdiction: Australia; Tasmania adjacent area

Other: Drilling time estimated as 11 days

Special requirements (Staffing, instrumentation, etc.) Wireline logs.

Proponent: J.B. Willcox, J.C. Branson &
N.F. Exon
Bureau of Mineral Resources
G P O Box 378
CANBERRA A C T 2601
Australia

Date submitted to JOIDES Office: 6 December 1985

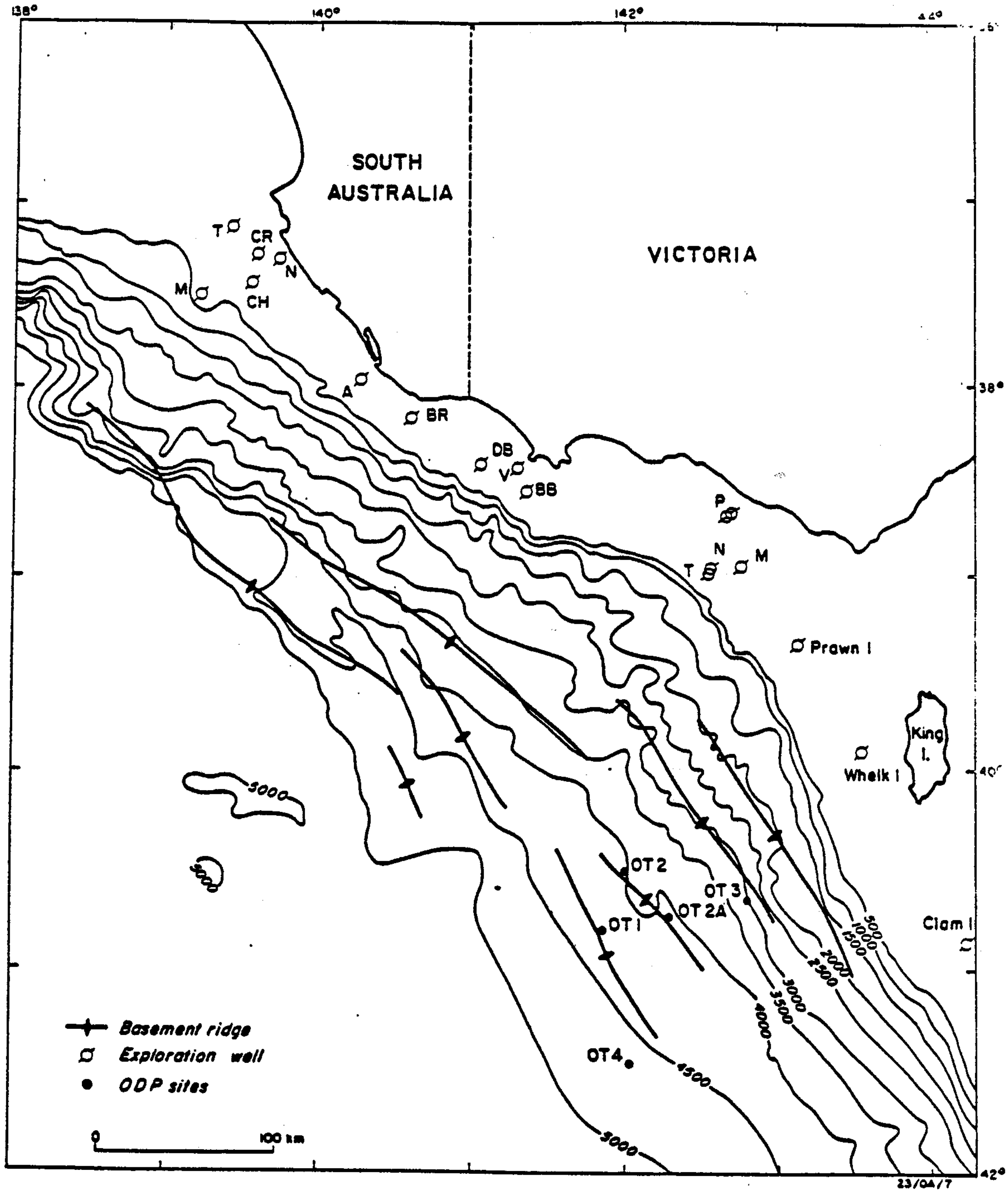


Figure 1. Bathymetry of Otway Basin showing basement ridges and proposed ODP sites.

15

Proposed Site: IB-1
(Indispensable Basin)

General Area: Solomon Islands
Position: 160°44.8'E, 9°17.5'S
Alternate Site:

General Objective: (1) Ontong Java Plateau approach and collision history and (2) subduction-polarity reversal history.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Cores from sedimentary and basement rocks will give sedimentation history during time of plateau collision and arc reversal. Increasing terrigenous content, provenance and age of sediment, ash chronology, depositional environment (depth, rate) should show timing of approach and collision of the Ontong Java Plateau, and effects of the collision process.

Background Information:

Regional Data:

Seismic profiles: Crossing multichannel and high resolution seismic lines.

Other data: Bathymetry, 3.5 KHz, gravity, magnetic

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1982

Main results: Sedimentary sequences suggest a late Miocene and younger history of possible uplift and subaerial erosion, followed by subsidence and basin filling. Basin history and form are due to Ontong Java collision, and subsequent, persistent, gentle convergence between the Pacific plate and the Solomon Islands.

Operational Considerations

Water Depth: (m) 1400 Sed. Thickness: (m) 800-1000 Total penetration: (m) 1200

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to well-lithified sedimentary rocks, carbonates, and volcanic rocks from top to bottom of hole.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Solomon Islands.

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:

ODP reference 191/D

Rev. 0284

Proposed Site: IB-2
(Indispensable Basin)

General Area: Solomon Islands
Position: $160^{\circ}25.2'E$, $8^{\circ}18.8'S$
Alternate Site:

General Objective: (1) Ontong Java Plateau approach and collision history and (2) subduction-polarity reversal history.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: To sample sequences on top of Ramos Ridge to give approach history of the Ontong Java Plateau toward the Solomons Arc, and to give uplift history of the ridge. Approach history may be deduced by changes in terrigenous input into the carbonate rocks. The uplift history should be given by paleobathymetry. Because arc reversal history may be preserved in ash layers, tephrochronology will be attempted.

Background Information:
Regional Data:
Seismic profiles: Crossing multichannel and high resolution seismic lines.

Other data: Bathymetry, 3.5 KHz, gravity, magnetic

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1982
Main results: Seismic data show uplifted, faulted sedimentary strata over the top of a submarine ridge (Ramos Ridge). Uplift occurred in late Miocene and later time during the Ontong Java collision with the northeastern Solomons Arc.

Operational Considerations

Water Depth: (m) 540 Sed. Thickness: (m) 700 Total penetration: (m) 1000

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Hemipelagic terrigenous sequence, pelagic and hemipelagic carbonates, and basalt from top to bottom, respectively.
Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Solomon Islands.

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:
ODP reference 191/D

Rev. 02S4

Proposed Site: MB-1
(Mborokua basin)

General Area: Solomon Islands
Position: 158°26.7'E, 9°00.4'S
Alternate Site:

General Objective: Development history of southwestern Solomons Arc; arc-reversal history.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Mborokua basin, which lies west of Guadalcanal, is a small tilted forearc basin on the Pliocene and Quaternary (post-arc reversal) Solomons Arc. Sampling of the sediments within the basin will aid in revealing the development history of this new arc, by determining age, subsidence history, and ash chronology.

Background Information:
Regional Data:
Seismic profiles: Converging multichannel seismic lines give dip control.

Other data: Bathymetry, gravity, magnetics

Site Survey Data - Conducted by: U.S. Geological Survey and Western Geophysical
Date: 1982 and 1973 respectively.
Main results: As much as 1 km of sedimentary strata are present in a small forearc basin, Mborokua basin. Strata in the basin show increasing amounts of northward tilting with depth.

Operational Considerations

Water Depth: (m) 1310 Sed. Thickness: (m) 1000 Total penetration: (m) 1200

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to lithified hemipelagic sedimentary rocks and volcanic rocks.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Solomon Islands

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:

ODP reference 191/D

Rev. 0284

·oposed Site: BB-1 (Buka basin)

General Objective: Arc-reversal chronology and processes.

eneral Area: West of Bougainville, Papua
Position: New Guinea
Alternate Site: 153°50.8'E, 5°19.2'S

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Site is selected to sample rocks on top of probable pre-late Miocene arc to determine the age of the arc, the timing of volcanic shutdown and the subsequent subsidence history of the arc. Cored rocks also should give timing of arc reversal.

Background Information:

Regional Data:

Seismic profiles: Single multichannel crossing line; numerous other single-channel lines in region, but presently not obtained. These may provide necessary crossing line.

Other data: Bathymetry, high-resolution seismic, gravity, magnetic.

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1984

Main results: Submarine ridge probably is a subsided, pre-late Miocene volcanic arc overlain by carbonates and Pliocene to Quaternary hemipelagic and pelagic strata.

perational Considerations

Water Depth: (m) 2000 Sed. Thickness: (m) 1000 Total penetration: (m) 1200

'PC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Hemipelagic and pelagic strata, carbonates, and volcanics from top to bottom.

Weather conditions/window: Cyclone season is February through May.

erritorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

Date submitted to JOIDES Office:

ohn G. Vedder
.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
15-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

CDP reference 191/D

Rev. 028

Proposed Site: BB-2 (Buka basin)

General Area: West of Bougainville, Papua
Position: New Guinea
Alternate Site: 153°53.3'E, 5°05.0'S

General Objective: Arc-reversal chronology and processes.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Site is selected to sample the old arc, proximal forearc apron and overlying, undeformed strata to give arc shutdown and subsidence history. Ash layers in upper sediments may also provide data on time of inception of the new arc.

Background Information:

Regional Data:

Seismic profiles: Crossing multichannel lines; numerous other single-channel lines in region, but presently not obtained. These may provide necessary crossing line.

Other data: Bathymetry, high-resolution seismic, gravity, magnetic.

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1984

Main results: Flank of pre-late Miocene arc is underlain by probable late-Miocene and older proximal forearc apron, and by probable late Miocene and younger basin-fill strata deposited over the subsided, old arc.

Operational Considerations

Water Depth: (m) 3600 Sed. Thickness: (m) 1200 Total penetration: (m) 1400

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to well lithified hemipelagic to clastic rocks overlying volcanics.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:

ODP reference 191/D

Rev. 0284

Proposed Site: BB-3 (Buka basin)

General Objective: Arc-reversal chronology and processes.

General Area: West of Bougainville, Papua
Position: New Guinea
Alternate Site: $154^{\circ}11.0'E$, $4^{\circ}49.8'S$

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Site is designed to sample sedimentary rocks derived from both the old and new arcs, thus giving the timing of arc development and the duration of subsidence and uplift.

Background Information:
Regional Data:
Seismic profiles: Single multichannel crossing line; numerous other single-channel lines in region, but presently not obtained. These may provide necessary crossing line.
Other data: Bathymetry, high-resolution seismic, gravity, magnetic.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: Seaward-dipping strata on flank of ridge are likely uplifted, distal forearc-apron rocks derived from pre-late Miocene arc. These rocks are overlain by undeformed younger strata.

Operational Considerations

Water Depth: (m) 2900 Sed. Thickness: (m) 1200 Total penetration: (m) 1400

HPC _____ Double HPC _____ Rotary Drill x Single Bit x Reentry _____

Nature of sediments/rock anticipated: Pelagic, hemipelagic, and clastic rocks overlying volcanics.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:

CDP reference 191/D

Rev. 02S4

Proposed Site: SB-1
(Shortland basin)

General Objective: Tectonic effects of spreading-center subduction.

General Area: Solomon Islands
Position: 156°08.8'E, 7°28.5'S
Alternate Site:

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: To determine the uplift, subsidence, and thermal history of Vella Ridge and compare with the timing of Woodlark spreading center subduction. Pronounced Quaternary vertical tectonics are documented for the ridge, and may be related to spreading center subduction. Drilling data will allow determination of uplift/subsidence history through sedimentary rock types and history, diagenesis paleobathymetry, and depositional environment. Data should also give timing and thermal history, thus allowing a comparison of tectonic and thermal effects with timing of spreading center subduction.

Background Information:

Regional Data:

Seismic profiles: Four converging multichannel lines give dip control.

Other data: High-resolution, bathymetric, gravity, magnetic, and refraction data.

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1982 and 1984

Main results: Northward dipping section exposed at seafloor. Seismic reflection and dredge data indicate a Quaternary history of uplift from 1600 m to subaerial, followed by subsidence to 700 m. These vertical motions may be related to subduction of the Woodlark spreading center.

Operational Considerations

Water Depth: (m) 560 Sed. Thickness: (m) 2000+ Total penetration: (m) 1200

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to consolidated clastic sedimentary rocks; probably carbonates at or near seafloor.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Solomon Islands.

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

John G. Vedder
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:
ODP [illegible] 1985

Rev. 0284

n-oposed Site: SB-2
(Shortland Basin)

:neral Area: Solomon Islands
I ısition: 156°04.1'E, 7°15.4'S
Alternate Site:

General Objective: Development history of an intra-arc basin; relation to Ontong Java Plateau collision and arc reversal.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: On seismic reflection data, sedimentary sequences show a clear relation to uplift and subsidence of the north and south basin flanks. Drilling here will give data on timing of uplift/subsidence events, on sediment source terrains, and on ash chronology. All of these data sets can in turn be related to the history of arc development on both the north and south flanks of the basin.

E_ckground Information:

Regional Data:

Seismic profiles: Intersecting multichannel seismic lines.

Other data: Gravity, magnetic, high-resolution seismic reflection, bathymetry, refraction.

ite Survey Data - Conducted by: U.S. Geological Survey
Date: 1982 and 1984
Main results: Seismic sequences in intra-arc basin are related to development of north and south arcs.

^erational Considerations

Water Depth: (m) 1260 Sed. Thickness: (m) 2200 Total penetration: (m) 1400

'C ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to moderately consolidated clastic sequence.

:ather conditions/window: Cyclone season is February through May.

.erritorial jurisdiction: Solomon Islands.

.her:

.pecial requirements (Staffing, instrumentation, etc.)

Proponent:
ohn G. Vedder
.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
15-856-7025

Terry R. Bruns
U.S. Geological Survey
345 Middlefield Road
Menlo Park, CA 94025
415-856-7106

Date submitted to JOIDES Office:
ODP reference 191/D

Rev. 0284

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: BAT 1 / BAT 2 **General Area:** Southern New Hebrides arc **Position:** 168° 52' E, 17° 57'5 S **Alternate Site:** 168° 39,5 , 18° 16' S	**General Objective:** Investigate the evolution of the back arc troughs and of a young magmatic arc **Thematic Panel interest:** SOHP TECP **Regional Panel interest:** WPAC

Specific Objectives: This site is outside of both the back arc tensional zone and the arc-ridge collision zone, thus it will provide a reference on the development of the southern New Hebrides arc away from back-arc and arc / ridge collision zone.

Background Information:

Regional Data:

Seismic profiles: Crossing single channel seismic lines

Other data: Unprocessed 12 channels seismic lines, bathymetric, gravity, seismic refraction and magnetic data

Site Survey Data - Conducted by: ORSTOM / IFP

Date: 1972-1982

Main results: The arc is covered by a tilted stratified sedimentary sequence. This include an angular unconformity probably outlined by an an erosional surface

Operational Considerations

Water Depth: (m) 1000 m   Sed. Thickness: (m) 1300 m   Total penetration: (m) 1500 m

HPC ____   Double HPC ____   Rotary Drill X   Single Bit X   Reentry ____

Nature of sediments/rock anticipated: Semi consolidated rocks and volcaniclastic rocks

Weather conditions/window: Cyclone season is December trough April

Territorial jurisdiction: VANUATU

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:
J. Recy   J. Daniel   M. Monzier
ORSTOM
BPA 5
Noumea New Caledonia

Date submitted to JOIDES Office:

H.G. Greene   M.A. Fisher
USGS
345 Middlefield Road
Menlo Park, CA 94025

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: BAT 3 General Area: Southern New Hebrides arc Position: 169° 05'5 E , 17° 54 S Alternate Site:	General Objective: Investigate the back arc processes Thematic Panel interest: LITHP SOHP TECP Regional Panel interest: WPAC

Specific Objectives: Drilling this site will help to determine when extension began. This will be correlated with Arc / Ridge collision time and magmatic pulses of the arc.

Background Information:

Regional Data:

Seismic profiles: Crossing single channel seismic lines

Other data: Unprocessed 12 channels seismic lines, bathymetric, gravity and magnetic data.

Site Survey Data - Conducted by: ORSTOM / IFP

Date: 1972-1982

Main results: Seismic profile displays an angular unconformity between old arc slope sediments down dropped in the trough and more recent sedimentary deposits.

Operational Considerations

Water Depth: (m) 2100 m • Sed. Thickness: (m) 1500 m Total penetration: (m) 1500 m

HPC _____ Double HPC _____ Rotary Drill X Single Bit X Reentry _____

Nature of sediments/rock anticipated: Semi consolidated rocks and volcaniclastic rocks

Weather conditions/window: Cyclone season is December trough April

Territorial jurisdiction: VANUATU.

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent: Date submitted to JOIDES Office:

J. Recy M. Monzier P. Maillet Jean-Yves Collot M.A. Fisher
ORSTOM USGS
BPA 5 345 Middlefield Road

Proposed Site: BAT 4

General Objective: Investigation of the back-arc processes

General Area: Southern New Hebrides arc
Position: 169° 20, 5 E, 17° 49' 8 S
Alternate Site:

Thematic Panel interest: LITHP SOHP TECP
Regional Panel interest: WPAC

Specific Objectives: Drilling the central part of the seismically active back-arc will show the chemical composition and age of volcanic rocks that were injected into the troughs during the initial stage of formation of new oceanic crust. The age of the sedimentary section associated with the volcanic rock will help date the onset of back-arc extension.

Background Information:
Regional Data:
Seismic profiles: Crossing single channel seismic lines

Other data: Unprocessed 12 channel seismic line, bathymetric, gravity, magnetic and seismic refraction data

Site Survey Data - Conducted by: ORSTOM/IFP
Date: 1972 - 1982
Main results: Seismic lines show weak, disrupted reflections from rocks within the trough that contrast with the well layered deposits covering the seafloor on both sides of the trough. Magnetic anomalies measured over the trough suggest the presence of igneous rocks.

Operational Considerations

Water Depth: (m) 2600 m Sed. Thickness: (m) ? Total penetration: (m) 500 - 1500 m

HPC ____ Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: Volcaniclastics rocks, lava flows and volcanic sills.

Weather conditions/window: Cyclone season is December through April

Territorial jurisdiction: VANUATU

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

Date submitted to JOIDES Office:

P. Maillet M. Monzier J. Recy
ORSTOM
BP A5

H.G. Greene M.A. Fisher
U.S.G.S.
345 Middlefield Road

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: BAT 5	General Objective: Investigation of the back arc process
General Area: Southern New Hebrides arc Position: 167° 57' E, 13° 15' S Alternate Site:	Thematic Panel interest: LITHP SOHP TECP Regional Panel interest: WPAC

Specific Objectives: This site is located within a back-arc trough of the Arc/Ridge collision zone. Drilling at this site will provide information about the stage of formation of new oceanic crust and about the timing of the back arc extension. The stage of formation and timing for the troughs north and south of the collision zone can be compared.

Background Information:

Regional Data:

Seismic profiles: Crossing single channel seismic line.

Other data: Unprocessed 12 channel seismic line, bathymetric, and magnetic data.

Site Survey Data - Conducted by: ORSTOM/IFP

Date: 1972-1982

Main results: Well developed trough contains many weak, incoherent reflectors as well as a possible lava flow. The trough is flanked by well stratified sedimentary sequences laying on the arc slope and on the North Fiji basin crust

Operational Considerations

Water Depth: (m) 2550 m Sed. Thickness: (m) ? Total penetration: (m) 500 to 1500 m

HPC _____ Double HPC _____ Rotary Drill X Single Bit X Reentry _____

Nature of sediments/rock anticipated: Volcaniclastic rocks, lava flows and volcanic sills

Weather conditions/window: Cyclone season is December through April

Territorial jurisdiction: VANUATU

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

Date submitted to JOIDES Office:

J. Recy P. Maillet M. Monzier M.A. Fisher H.G. Greene

ORSTOM
BP A5

U.S.G.S.

Proposed Site: IAB-1

General Area: Central New Hebrides arc
Position: 167°35.0'E, 14°47.5'S
Alternate Site: 167°43.1'E, 14°44.0'S

General Objective: 1) Investigate the evolution of an intra-arc basin, and the magmatic arc near the arc-ridge collision, and 2) the subduction-polarity reversal.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: To determine whether the age of a major unconformity within the North Aoba basin correlates with the time of arc-ridge collision, showing perhaps how collision modifies the evolution of an intra-arc basin. The chemistry of volcanic ashes may show how magmatic-arc processes are modified by collision and help to determine when and whether subduction polarity flipped.

Background Information:

Regional Data:

Seismic profiles: Crossing multichannel and high-resolution lines.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1982

Main results: Thick basin fill includes a major unconformity that marks the onset of major basin subsidence.

Operational Considerations

Water Depth: (m) 3075 Sed. Thickness: (m) 1000 Total penetration: (m) 1000

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Semi-consolidated sedimentary rocks.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office.

Proponent:
H. Gary Greene, USGS, Menlo Park, 94025, 415-856-7049
Michael Fisher, USGS, Menlo Park, 94025, 415-856-7108
J.N. Carney, British Geol. Survey, London, England
David A. Flavey, BMR, Canberra, Australia
A. Macfarlane, British Geol.S. London, England

Rev. C

Proposed Site: IAB-2

General Area: Central New Hebrides arc
Position: 167°55.0'E, 14°38.3S
Alternate Site:

General Objective: Investigate 1) the evolution of an intra-arc basin and the magmatic arc near the arc-ridge collision, 2) the subduction-polarity reversal.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Drilling at this site would sample the deep fill in the Aoba basin to give a composite stratigraphic section (with data from site IAB-1) that straddles chronologically the arc-ridge collision and possible flip in subduction polarity. Basin history and evolution of the magmatic arc during this time of unsteady geologic environment can be studied.

Background Information:

Regional Data:

Seismic profiles: A multichannel and a high-resolution seismic line.

Other data: Bathymetric, gravity and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey

Date: 1982

Main results: Deep-basin strata rise to shallow depth in the eastern flank of the North Aoba basin.

Operational Considerations

Water Depth: (m) 2600 Sed. Thickness: (m) 1000 Total penetration: (m) 1000

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Semi-consolidated sedimentary rocks

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:

Michael Fisher
USGS
Menlo Park, 94025
415-856-7108

H. Gary Greene
USGS
Menlo Park, 94025
415-856-7049

David A. Flavey
BMR
Canberra, Australia

J.N. Carney
British Geol. Surv.
London, England

A. Macfarlane
British Geol. Su
London, England

oposed Site: IAB-3

eneral Area: Central New Hebrides arc
osition: 167°04.7'E, 12°51.6'S
lternate Site:

General Objective: Investigate 1) the evolution of an intra-arc basin and the magmatic arc away from the collision of arc and ridge, and 2) the subduction-polarity reversal.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

ecific Objectives: This site is outside of the arc-ridge collision zone, so it will provide a eference for holes drilled within the collision zone. Basin development and magmatic arc volution within and outside of the collision zone can be compared.

ackground Information:
Regional Data:
Seismic profiles: Crossing multichannel and high-resolution seismic lines.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: Thick basin fill includes an unconformity that may correlate with the one in the North Aoba basin.

Operational Considerations

Water Depth: (m) 1900 Sed. Thickness: (m) 1500 Total penetration: (m) 1500

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Semi-consolidated sedimentary rocks.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
H. Gary Greene, USGS, Menlo Park, 94025
Michael Fisher, USGS, Menlo Park, 94025
David A. Falvey, BMR, Canberra, Australia
J.N. Carney, British Geol. Surv., London, England
A. Macfarlane, British Geol. Sur, London, England

Rev. 02

Proposed Site: DEZ-1

General Area: Central New Hebrides arc
Position: 166°21.7'E, 15°19.2'S
Alternate Site:

General Objective: Investigate the processes involved in arc-ridge collision.

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: To drill through the lowermost accretionary wedge where the north ridge of the DEZ is subducting. Drilling data will show the amount of material stripped from the ridge, the effect of ridge composition on the type of slope structures formed, and the approximate time when arc-ridge collision began.

Background Information:
Regional Data:
Seismic profiles: Crossing multichannel and high-resolution seismic lines

Other data: Bathymetric, gravity, and magnetic data

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: The top of the north ridge of the DEZ can be traced beneath the lower slope, showing that this ridge is being subducted.

Operational Considerations

Water Depth: (m) 2130 Sed. Thickness: (m) 950 Total penetration: (m) 1300

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Unconsolidated to semi-consolidated sedimentary rocks and possibly volcanic rocks at the bottom of the hole.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Proponent:

Date submitted to JOIDES Office:

Michael Fisher
USGS
Menlo Park, 94025
415-856-7108

Jean-Yves Collot
ORSTOM
Noumea
New Caledonia

H. Gary Greene
USGS
Menlo Park, 94025
415-856-7049

Jacques Recy
ORSTOM
Noumea
New Caledonia

J.N. Carney
British Geol. Survey
London, England

Proposed Site: DEZ-2

General Objective: Investigate processes involved in arc-ridge collision

General Area: Central New Hebrides arc
Position: 166°40.5'E, 16°01'S
Alternate Site:

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Drill through a shallow, parallel-bedded sequence to determine the time when possible obduction occurred. Drilling into rocks would show whether rocks in the Bougainville spur are obducted oceanic crust or deformed ridge rocks. This information will help us understand what type of accretion or deformation accompanies arc-ridge collision.

Background Information:
Regional Data:
Seismic profiles: Crossing multichannel and high-resolution seismic lines.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: The Bougainville spur might be composed of obducting oceanic crust, rocks of the south ridge of the DEZ, or island arc rocks.

Operational Considerations

Water Depth: (m) 1100 Sed. Thickness: (m) 700 Total penetration: (m) 300

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: semi-consolidated and consolidated rock.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
Jean-Yves Collot
ORSTOM
Noumea
New Caledonia

Michael Fisher
USGS
Menlo Park, 94025
415-856-7108

Jacques Recy
ORSTOM
Noumea
New Caledonia

H. Gary Greene
USGS
Menlo Park, 94025
4.5-856-7049

J.N. Carney
British Geol. Survey
London, England

Proposed Site: DEZ-3

General Objective: Investigate the processes involved in arc-ridge collision

General Area: Central New Hebrides arc
Position: 166°21.7'E, 15°19.2'S
6
Alternate Site:

Thematic Panel interest: TCHP
Regional Panel interest: WPAC

Specific Objectives: To drill through rocks at the base of the slope where the south ridge of the DEZ is subducting. These rocks may be obducting oceanic crust or ridge rocks, or they may be deformed arc rocks. This information will help show the style of deformation or accretion that accompanies arc-ridge collision.

Background Information:
Regional Data:
Seismic profiles: Crossing multichannel and high-resolution seismic lines.

Other data: Bathymetric, gravity and magnetic data

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1982 and 1984
Main results: Oceanic rocks rise from abyssal depth toward the arc, suggesting that these rocks may be obducting.

Operational Considerations

Water Depth: (m) 3890 Sed. Thickness: (m) 850 Total penetration: (m) 1000 m

HPC ____ Double HPC ____ Rotary Drill _x_ Single Bit _x_ Reentry ____

Nature of sediments/rock anticipated:

Weather conditions/window: Cyclone season February through May

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
Michael Fisher, USGS, Menlo Park, 94025, 415-856-7108
Jean-Yves Collot, ORSTOM, Noumea, New Caledonia
H. Gary Greene, USGS, Menlo Park, 94025, 415-856-7049
Jacques Recy, ORSTOM, Noumea, New Caledonia
J.N. Carney, British Geol. Surve, London, England

Proposed Site: DEZ-4

General Objective: Investigate processes involved in arc-ridge collision

General Area: Central New Hebrides arc
Position: 166°35.5'E, 15°42.1'S
Alternate Site:

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Drill through lower slope rocks between the ridges of the DEZ, where the lower slope is blanketed by a trenchward prograding fan. The age of the oldest rocks in the fan will give the time when major deformation associated with arc-ridge collision began. Drilling data will also support sediment provenance studies by showing the type of debris shed from the arc to the Central d'Entreasteaux Basin. This provenance data will be used to help date the time of collision.

Background Information:
Regional Data:
Seismic profiles: Crossing multichannel and high-resolution seismic lines.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1982, 1984
Main results: Lower trench slope is made up of a submarine fan the progrades trenchward and is only mildly deformed by thrust faults.

Operational Considerations

Water Depth: (m) 3000 Sed. Thickness: (m) 1400 Total penetration: (m) 1500

HPC _____ Double HPC _____ Rotary Drill x Single Bit x Reentry _____

Nature of sediments/rock anticipated: Semiconsolidated sedimentary rocks

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
H. Gary Greene, USGS, Menlo Park, 94025, 415-856-7049
Michael Fisher, USGS, Menlo Park, 94025, 415-856-7108
Jean-Yves Collot, ORSTOM, Noumea, New Caledonia
Jacques Recy, ORSTOM, Noumea, New Caledonia
J.N. Carney, British Geol. Survey, London, England

Proposed Site: DEZ-5

General Area: Central New Hebrides arc
Position: 166°30.2'E, 15°52.6'S
Alternate Site:

General Objective: Investigate processes involved in arc-ridge collision

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Drilling here will help determine what effect ridge composition has on the style of deformation that occurs in collision zones, whether south-ridge rocks have been obducted onto the arc's slope, and what type of sediment would be derived from the south ridge. Sediment provenance studies may help determine when the arc and ridge came close together.

Background Information:
Regional Data:
Seismic profiles: A multichannel and a high-resolution seismic line across the site.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: The south ridge of the DEZ is covered by 300-400 m of sedimentary rock that overlie ridge rock that are poorly reflective.

Operational Considerations

Water Depth: (m) 3600 Sed. Thickness: (m) 400 Total penetration: (m) 600

HPC ____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: Semi-consolidated sedimentary rocks and volcanic(?) and volcaniclastic rocks.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
Michael Fisher, USGS, Menlo Park, 94025, 415-856-7108
H. Gary Greene, USGS, Menlo Park, 94025, 415-856-7049
Jean-Yves Collot, ORSTOM, Noumea, New Caledonia
Jacques Recy, ORSTOM, Noumea, New Caledonia
J.N. Carney, British Geol. Survey, London, England

Proposed Site: DEZ-6

General Objective: Investigate processes involved in arc-ridge collision

General Area: Central New Hebrides arc
Position: $165^{\circ}57.5'E$, $15^{\circ}32.1'S$
Alternate Site:

Thematic Panel interest: TCHP, SOHP
Regional Panel interest: WPAC

Specific Objectives: Drill through fill in the Central d'Entrecasteaux Basin to determine when the basin and the arc first came close together. Other sites will show the types of sediment derived from the DEZ and arc to allow separation of arc-derived component.

Background Information:
Regional Data:
Seismic profiles: A multichannel and a high-resolution seismic line.

Other data: Bathymetric, gravity, and magnetic data.

Site Survey Data - Conducted by: U.S. Geological Survey
Date: 1984
Main results: The d'Entrecasteaux Basin is filled with about 1 km of sediment that overlies presumed MORB basement.

Operational Considerations

Water Depth: (m) 3400 Sed. Thickness: (m) 950 Total penetration: (m) 1000

HPC ____ Double HPC ____ Rotary Drill __x__ Single Bit __x__ Reentry ____

Nature of sediments/rock anticipated: Semi-consolidated rocks and probable MORB at bottom.

Weather conditions/window: Cyclone season is February through May.

Territorial jurisdiction: Vanuatu.

Other:

Special requirements (Staffing, instrumentation, etc.)

Date submitted to JOIDES Office:

Proponent:
Michael Fisher
USGS
Menlo Park, 94025
415- 856-7108

Jean-Yves Collot
ORSTOM
Noumea
New Caledonia

H. Gary Greene
USGS
Menlo Park, 94025
415-856-7049

Jacques Recy
ORSTOM
Noumea
New Caledonia

J.N. Carney
British Geol. Survey
London, England

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MT1 = MuT-1 herein

General Area: Mussau Trench
Position: 0°23.3'S 149°19.4'E
Alternative Site:

General Objective: Origin and age of the accretionary complex along convergence zone between the Mussau Ridge and Trench.

Thematic Panel interests: LithP, SoHP, TECP
Regional Panel interests: WPRP

Specific Objectives: Nature and age of deformed sediment at juncture of Mussau Ridge and Trench - offscraped East Caroline Basin sediment? Test the hypothesis of Recent convergence between the Caroline and Pacific plates during the last one million years. Test a possible decollement separating upper deformed and offscraped sediment from a lower, undeformed section that may be totally subducting.

Background Information:
Regional Data:
Seismic profiles: USGS Cruise L7845P Line 410 (24-channel and single channel)

Other data: USGS bathymetry, gravity, and magnetic data.

Site Survey Data - Conducted by: Could be conducted by Bureau of Mineral Resources (Australia) onboard the R/V Rig Seismic
Date:
Main results:

Operational Considerations

Water Depth: (m) 6530 Sed. Thickness: (m) > 1000 Total penetration: (m) 800?

HPC X Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: About 800 m of deformed sedimentary section over a possible decollement zone (thrust fault?)
Weather conditions/window: Best weather December-January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

Proponents:

Michael S Marlow
Pacific Marine Geology MS999
US Geological Survey
345 Middlefield Road
MENLO PARK CAL 94025 USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
CANBERRA ACT 2601

Date submitted to JOIDES Office:
ODP reference 184/D

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MT2A = MaT-2A herein General Area: Manus Trench Position: $0^{\circ}54.2'S$, $149^{\circ}48.5'E$ Alternative Site: MT 2B	General Objective: Origin and age of the accretionary complex along the eastern Manus Trench Thematic Panel interests: LithP, soHP, TECP Regional Panel interests: WPRP

Specific Objectives: Nature and age of deformed sediment along the inner (landward) wall of the eastern Manus Trench (East of the Mussau-Manus Trenches juncture). Test the hypothesis of Recent convergence between the North Bismarck and Pacific plates (and existence of the Bismarck plate). Test for possible decollement separating upper, deformed and offscraped sediment from a lower, undeformed subducting section.

Background Information:

Regional Data:

Seismic profiles: USGS Cruise L784SP Line 409 (24-channel and single channel). Austradec Line 317 (12-channel), CCOP/SOPAC, and BMR lines nearby.

Other data: USGS and BMR bathymetry, gravity and magnetic data.

Site Survey Data - Conducted by: Could be conducted by BMR (Australia) onboard the
Date: R/V Rig Seismic.
Main results:

Operational Considerations

Water Depth: (m) 6075 Sed. Thickness: (m) >1500 Total penetration: (m) 1250'

HPC X Double HPC ___ Rotary Drill X Single Bit X Reentry ___

Nature of sediments/rock anticipated: About 1250 m of deformed sedimentary section over a possible decollement zone.

Weather conditions/window: Best weather December-January.

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

Proponents:

Michael S Marlow
Pacific Marine Geology MS 999
US Geological Survey
345 Middlefield Road
MENLO PARK CAL. 94025 USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
CANBERRA ACT 2601 Australia

Date submitted to JOIDES Office:
ODP reference 184/7

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MT2B = MaT-2B herein General Area: Manus Trench Position: 0°52.3'S, 149°48.2'E Alternative Site: MT 2	General Objective: Origin and age of the accretionary complex along the eastern Manus Trench Thematic Panel interests: LithP, SOHP, TECP Regional Panel interests: WPRP

Specific Objectives: Nature and age of deformed sediment along the inner (landward) wall of the eastern Manus Trench (East of the Mussau-Manus Trenches juncture). Test the hypothesis of Recent convergence between the North Bismarck and Pacific plates (and existence of the Bismarck plate). Test for possible decollement separating upper, deformed and offscraped sediment from a lower, undeformed subducting section.

Background Information:

Regional Data:

Seismic profiles: USGS Cruise L784SP Line 409 (24-channel and single channel). Austradec Line 317 (12-channel), CCOP/SOPAC, and BMR lines nearby.

Other data: USGS and BMR bathymetry, gravity and magnetic data.

Site Survey Data - Conducted by: Could be conducted by BMR (Australia) onboard the

Date: R/V Rig Seismic.

Main results:

Operational Considerations

Water Depth: (m) 6337 Sed. Thickness: (m) 1500 Total penetration: (m) 1000?

HPC X Double HPC ____ Rotary Drill X Single Bit X Reentry ____

Nature of sediments/rock anticipated: About 1000 m of deformed sedimentary section over a possible decollement zone.

Weather conditions/window: Best weather December-January.

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

Proponents: Date submitted to JOIDES Office: ODP reference 184/D

Michael S Marlow
Pacific Marine Geology MS 999
US Geological Survey
345 Middlefield Road
MENLO PARK CAL. 94025 USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
CANBERRA ACT 2601 Australia

Proposed Site: MIA-1

General Area: Mussau Island arc-1 (Bismarck Archipelago)

Position: 1° 12.6'S 149° 26.1'E

Alternative Site:

General Objective: Origin and age of volcanic crust beneath island arc around Mussau Island. Test for hydrothermal circulation from suspected magma chamber beneath Mussau Island.

Thematic Panel interests: LithP, TECP

Regional Panel interests: WPRP

Specific Objectives: Nature and age of volcanic basement rocks beneath the island arc around Mussau Island. Test and sample possible hydrothermal metallic deposits and fluids associated wi venting and circulation from suspected magma chamber beneath Mussau Island. History of northwestern end of Mussau-Bougainville Island arc near Mussau Island.

ackground Information:

Regional Data:

Seismic profiles: At intersection of USGS L784SPLine 413 (24-channel) and Austradec Line 317 (12-channel). CCOP/SOPAC and BMR Lines nearby.

Other data: USGS gravity and magnetic data; BMR gravity, magnetic, bathymetry, and earthquake data.

Site Survey Data - Conducted by: Could be conducted by BMR onboard the R/V Rig Seismic

Date:

Main results:

erational Considerations

ater Depth: (m) 1010 Sed. Thickness: (m) 150-200 Total penetration: (m) 250-300?

PC ______ Double HPC ______ Rotary Drill x Single Bit x Reentry ______

ture of sediments/rock anticipated: 150 to 200 meters of volcaniclastic sediment overlying volcanic basement of the arc.

ather conditions/window: Best weather: December - January

rritorial jurisdiction: Papua New Guinea

her:

ecial requirements (Staffing, instrumentation, etc)

own hole logging and water sampling to test for hydrothermal circulation.

oponents:

Michael S. Marlow
Pacific Marine Geology MS 999
U.S. Geological Survey
345 Middlefield Road
Menlo Park, Calif. 94025
USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
Canberra ACT 2601
Australia

Date submitted to JOIDES Office: Sup. to ODP reference 184/D

Proposed Site: MF 2

General Area: Manus forearc (Bismarck Archipelago)
Position: 1° 07.8'S, 147° 02.4'E
Alternative Site:

General Objective: Origin and age of the Manus forearc-extinct subduction zone and overlying lava flows possibly related to failed backarc spreading in a forearc setting.
Thematic Panel interests: LithP, SOHP, TECP
Regional Panel interests: WPRP

Specific Objectives:

- Nature and age of extensive lava flows in Manus forearc that may be related to the opening of Manus Basin
- Nature and age of offscraped sediment pile in extinct Manus forearc convergence zone (beneath lava flows)
- History of Manus forearc, arc, and Manus Basin

Background Information:

Regional Data:

Seismic profiles: On USGS L784SP Line 422 (24-channel) near BMR Line 05/44; CCOP/SOPAC and BMR Lines nearby.

Other data: USGS gravity and magnetic data; BMR magnetic and earthquake data

Site Survey Data - Conducted by: Could be conducted by BMR onboard the R/V Rig Seismic

Date:

Main results:

Operational Considerations

Water Depth: (m) 2160 Sed. Thickness: (m) 300-400 Total penetration: (m) 50

HPC x Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: 300 to 400 meters of pelagic/hemipelagic sediment overlyi lava flows-may be sediment beneath lava flows (both unknown thicknesses)

Weather conditions/window: Best weather: December — January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

Proponents:

Date submitted to JOIDES Office:
Sup. to ODP reference 184/D

Michael S. Marlow
Pacific Marine Geology MS 999
U.S. Geological Survey
345 Middlefield Road
Menlo Park, Cal. 94025
USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
Canberra ACT 2601
Australia

ODP SITE PROPOSAL SUMMARY FORM

Proposed Site: MF 1C General Area: Manus forearc (Bismarck Archipelago) Position: 1° 39.2'S, 146° 11.5'E Alternative Site: MF 1A, 1B	General Objective: Origin and age of the Manus forearc-extinct subduction zone and overlying lava flows possibly related to failed backarc spreading in a forearc setting. Thematic Panel interests: LithP, SOHP, TECP Regional Panel interests: WPRP

Specific Objectives:

- Nature and age of extensive lava flows in Manus forearc that may be related to the opening of Manus Basin
- Nature and age of offscraped sediment pile in extinct Manus forearc convergence zone (beneath lava flows)
- History of Manus forearc, arc, and Manus Basin

Background Information:

Regional Data:

Seismic profiles: On USGS L784SP Line 424 (24-channel) near BMR Lines 05/40 and 05/41; CCOP/SOPAC and other BMR Lines nearby.

Other data: USGS gravity and magnetic data; BMR magnetic and earthquake data

Site Survey Data - Conducted by: Could be conducted by BMR onboard the R/V Rig Seismic

Date:

Main results:

Operational Considerations

Water Depth: (m) 1610   Sed. Thickness: (m) 150-200   Total penetration: (m)200

HPC____ Double HPC ____ Rotary Drill x Single Bit x Reentry ____

Nature of sediments/rock anticipated: 150 to 200 meters of pelagic/hemipelagic sediment overl lava flows-may be sediment beneath lava flows (both unknown thickness)

Weather conditions/window: Best weather: December - January

Territorial jurisdiction: Papua New Guinea

Other:

Special requirements (Staffing, instrumentation, etc)

None

Proponents:

Date submitted to JOIDES Office: Sup. to ODP reference 184/D

Michael S. Marlow
Pacific Marine Geology MS 999
U.S. Geological Survey
345 Middlefield Road
Menlo Park, Cal. 94025
USA

and

Neville Exon
Bureau of Mineral Resources
GPO Box 378
Canberra ACT 2601
Australia

3/5/86

PRELIMINARY OCEAN DRILLING PROGRAM PROPOSAL FOR DRILLING ON THE WILKES LAND MARGIN, ANTARCTICA

INTRODUCTION

On the eastern Wilkes Land margin of Antarctica, near Dumont d'Urville, a window through the sea ice occurs each January through March, due to particular weather and oceanographic conditions (Fig. 1). Sometimes referred to as the Adelie Land margin or the Dumont d'Urville Sea, it is one of the few locales on the East Antarctic margin where cruises can be planned on the continental shelf and even close to the coast and be reasonably assured of access. Hence a number of marine geophysical and geological surveys have been carried out in this region including early ELTANIN work and more recent surveys by the French (IFP), Japanese (JNOC), and the US (USGS) (Wannesson et al, 1985a; Tsumuraya et al, 1985; Eittreim and Cooper, 1984).

On the basis of these surveys and subsequent interpretations of the seismic data, some important scientific questions, and some differences of interpretation, have arisen. These questions could be highly illuminated, and differences of interpretation resolved, by deep drilling. The structure and seismic stratigraphy across the continent-ocean boundary (COB) is well displayed on this margin, which split apart from Australia in the mid-Cretaceous (96 Ma according to Veevers, in press). A deep marginal basin exists between well-defined oceanic crust on the north and a seaward-thinning wedge of continental crust on the south. The nature of the floor of this marginal basin is in dispute. Wannesson et al (1985a) place the COB on the south side of this marginal basin and consider the basin to be floored by oceanic crust. Eittreim and Smith (in press) place the COB on the north side and consider the basin to be floored by extremely thinned continental crust on the basis of parallel-bedded, block-faulted strata which are continuous with continental basement to the south. Two key unconformities occur in the seismic records which relate the stratigraphic sequences to times before, during or after rifting and the age of these unconformities is crucial to tectonic interpretations. A third very prominent unconformity, seen in all the seismic data in this region, occurs at shallower levels, in the postrift section, and its relationship to postrift events such as the growth of the Antarctic ice cap, and/or the Tertiary dips in sea level, is

Letters.

Veevers, J. (in press), The conjugate continental margins of Antarctica (Wilkes Land) and Australia, *in*, S. Eittreim, A. Cooper, M. Hampton and F. Davey, eds., Antarctic continental margin studies: offshore Wilkes Land and the western Ross Sea: Circum-Pacific Council for Energy and Mineral Resources Earth Science Series.

Vail, P. R., R. M. Mitchum and S. Thompson, III, 1977, Seismic stratigraphy and global changes of sea level, part 3: relative changes of sea level from coastal onlap, *in* Seismic Stratigraphy—applications to hydrocarbon exploration: AAPG Memoir 26, p. 63-81.

Wannesson, J., M. Pelras, B. Petitperrin, M. Perret, and J. Segoufin, 1985a, A geophysical transect of the Adelie margin, East Antarctica: Marine and Petroleum Geology, v. 2, p. 192-201.

Wannesson, J, M. Pelras, B. Petitperrin, M. Perret, J. Segoufin, 1985b, Proposal for oceanic drilling on the Adélie Land margin (East Antarctica): Ocean Drilling Program Proposal.

Watts, A. B. and J. Thorne, 1984, Tectonics, global changes in sea level and their relationships to stratigraphic sequences at the US Atlantic continental margin: Marine and Petroleum Geology, v. 1, p. 319-339.