JOIDES Executive Committee

30-31 January, 2002

University of California at Santa Cruz

Prepared by the JOIDES Office at http://joides.rsmas.miami.edu
RSMAS-MGG, 4600 Rickenbacker Causeway, Miami FL 33149, USA

FINAL VERSION

Includes documents distributed during the meeting

***JOIDES* EXECUTIVE COMMITTEE MEETING**

UNIVERSITY OF CALIFORNIA at SANTA CRUZ

30-31 JANUARY, 2002

MEETING AGENDA

WEDNESDAY	**30 JANUARY**	**9:00AM**

1. Welcome and Introduction p.4-5

1.1 Introduction of participants **p.4**	(Harrison)
1.2 Meeting logistics **p.5**	(Silver)

2. Approval of Agenda p.2 (Harrison)

3. Minutes and Matters Arising p.6

3.1 Approve Jun. 2001 EXCOM Minutes **p.6**	(Harrison/Urquhart)
3.1.1 EXCOM Motion 01-2-7 **p.6**	(Harrison)

4. Country and Consortium Reports (Read Only) p.7-24

4.1 ECOD **p.7**	(Von Knorring)
4.2 France	(Cannat)
4.3 Germany **p.9**	(Beiersdorf)
4.4 Japan **p.10**	(Tokuyama)
4.3 PacRim Consortium	(Powell)
4.6 The Peoples Republic of China **p.11**	(Shen)
4.7 United Kingdom **p.12**	(Falvey)
4.8 U.S.A **p.13**	(Malfait)

COFFEE BREAK 10:10 – 10:30

5. Management and Operations Reports p. 25-66

5.1 ODP Council Report **p.25**	(Malfait)
5.2 NSF Management Report **p.25**	(Malfait)
5.3 JOI	(Bohlen)
5.4 PEC VI **p.27**	(Harrison)
5.5 ODP Operations **p.32**	(Fox)
5.6 LDEO Borehole Research Group **p.57**	(Goldberg)
5.7 JOIDES	
5.7.1 JOIDES EXCOM Public Affairs Subcommittee **p.64**	(Orcutt/White)
5.7.2 Draft plan for phasing out JOIDES Science Advisory Structure (EXCOM Motion 00-2-3) **p.65**	(Becker)
5.7.3 JOIDES identity and JOIDES Journal post 2003	(Harrison/Becker)

LUNCH BREAK 12:00 – 1:15

6. Relationships with Other Organizations

6.1 ICDP	(Mutter et al.)
6.2 Industry	(Beiersdorf)

7. IODP Planning p.67

7.1 IWG	(Leinen/Harrison)
7.1.1 iSAS Staffing	(Harrison)
7.2 IPC **p.67**	(Kinoshita)
7.3 MEXT Report	(Miki)
7.4 JAMSTEC Report	(Miki/Yamakawa)
7.5 OD21 Report	(Kinoshita)
7.6 European initiative	(Falvey)
7.7 U.S. NSF plans	(Malfait)

COFFEE 3:00 – 3:30

8. SCICOM Report **p.68-78**

8.1 Achievements on Legs 196-199	(Becker)
8.2 Proposal activity/transfer **p.76**	(Urquhart)
8.3 SCICOM Legacy Report **p.78**	(Becker)

THURSDAY 31 JANUARY 9:00AM

9. FY 2003 Science Plan and Budget p.79

9.1 FY 2003 Science Plan **p.79**	(Becker)
9.2 FY 2003 Program Plan and Budget **p.84**	(Bohlen)
9.2.1 FY03 PP - Executive Summary **ES-1**	(Bohlen)
9.2.2 FY03 PP – Introduction **PP-1**	(Bohlen)
9.2.3 FY03 Program Plan **PP-50**	(Bohlen)
9.3 Phase out Plans – FY 04-07 **PP-95** and page XIV	
9.3.1 JOI **PP-114**	(Bohlen)
9.3.2 ODP **PP-96**	(Fox)
9.3.3 LDEO **PP-107**	(Goldberg)

COFFEE BREAK 10:10 – 10:30

10. Legacy Plans

10.1 JOI	(Bohlen)
10.2 JOIDES	(Becker)
10.3 ODP	(Fox)
10.4 LDEO	(Goldberg)

11. Future Meetings and Other Business

12.1 Granada, Spain, June 2002	(Von Knorring)
12.2 Future meetings	(Harrison)
12.3 IUGG	(Harrison)
12.4 Other business	

Appendix: Additions distributed during the meeting

JOIDES EXCOM –UNIVERSITY OF CALIFORNIA at SANTA CRUZ, 30-31 JANUARY 2002 PARTICIPANTS

Executive Committee – EXCOM

Chris Harrison (Chair)	Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA
Helmut Beiersdorf	Bundesanstalt fur Geowissenschaften Und Rohstoffe, Germany
Robert S. Detrick	Woods Hole Oceanographic Institution, USA
David Falvey	British Geological Survey, United Kingdom
Dennis V. Kent	Department of Geological Sciences, Rutgers University, USA
Mary von Knorring	Swedish Research Council
John Mutter	Lamont-Doherty Earth Observatory (LDEO), Columbia University, USA
Neil Opdyke	Department of Geological Sciences, University of Florida, USA
John Orcutt	Scripps Institution of Oceanography, University of California, San Diego, USA
Robert M. Owen	Dept of Geological Sciences, University of Michigan, USA
Trevor Powell	Australian Geological Survey Organization, Australia.
David Prior	College of Geosciences, Texas A&M University, USA
Eli Silver	Earth Sciences Department, University of California, USA
Paul Stoffa	Institute for Geophysics, University of Texas at Austin, USA
Hidekazu Tokuyama	Ocean Research Institute, University of Tokyo, Japan

Associate Member Observers

Mathilde Cannat	Laboratoire de Géosciences Marines, Universite Pierre at Marie Curie, Paris, France
Jianzhong Shen	Ministry of Science and Technology, Beijing, China

Liaisons

Keir Becker	Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA
Stephen Bohlen	Joint Oceanographic Institutions (JOI), Inc., USA
Jeff Fox	Ocean Drilling Program (ODP), Texas A&M University, USA
Dave Goldberg	Lamont-Doherty Earth Observatory (LDEO), Columbia University, USA
Bruce Malfait	National Science Foundation (NSF), USA

Guests

John Farrell	Joint Oceanographic Institutions (JOI), Inc., USA
Eldon Hayman	Joint Oceanographic Institutions (JOI), Inc., USA
Taneika Herman	Joint Oceanographic Institutions (JOI), Inc., USA
Hajimu Kinoshita	Japan Marine and Technology Center (JAMSTEC), Japan
Carol Kokinda	Joint Oceanographic Institutions (JOI), Inc., USA
Yoshiro Miki	Japan Marine and Technology Center (JAMSTEC), Japan
Nick Pisias	Oregon State University, Corvallis, USA
Kiyoshi Suyehiro	Japan Marine and Technology Center (JAMSTEC), Japan
Toshiya Uenoyama	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Kasey White	Joint Oceanographic Institutions (JOI), Inc., USA
Yasuo Yamada	Japan Marine and Technology Center (JAMSTEC), OD21, Japan
Minoru Yamakawa	Japan Marine and Technology Center (JAMSTEC), iSAS, Japan

Guests from JOI BOG

Raymond Bye	Florida State University, Tallahassee, USA
Timothy Cowles	Oregon State University, Corvallis, USA
David Farmer	Graduate School of Oceanography, University of Rhode Island, USA
Fred Grassle	Rutgers, The State University of New Jersey, USA
Neil Lundberg	Florida State University, Tallahassee, USA
Franklin Orr	Stanford University, California, USA
Barry C. Raleigh	SOEST, University of Hawaii at Manoa, Honolulu, USA

JOIDES Office

Elspeth Urquhart	International Liaison, RSMAS, University of Miami, USA
Aleksandra Janik	Science Coordinator, RSMAS, University of Miami, USA

1.2 Meeting logistics

MEETING LOCATION, DATES & TIMES
January 30 09:00 – 17:00
January 31 09:00 – 12:00
Santa Cruz Meeting Room (second floor of the hotel)
West Coast Santa Cruz Hotel
175 West Cliff Drive
Santa Cruz, CA 95060
PHONE: (831) 426-4330
FAX: (831) 427-2025
RES: (800) 325-4000
http://www.westcoasthotels.com/WHC/hotels/ShowHotel.asp?ID=48

LUNCHES
Lunch each day in The Twelve Winds Room

GROUND TRANSPORTATION
From San Francisco International Airport (SFO) or Santa Cruz Airport (SJC), there is only one transportation company: The Santa Cruz Airporter. The fee each way from SFO is $45.00 and from SJC is $35.00.
The pick up times at the airports are as follows:
From SFO: 08:00 every two hours until 22:00
From SJC: 09:00 every two hours until 23:00
It is recommended that you reserve by calling 800.497.4997 (toll free in the U.S.), or 831.423.1214 worldwide. There are many car rentals available at both airports, and parking at the hotel is free. If you were to taxi from SFO it would be over $100.00, and from SJC it is ~$80.00.

MEETING HOST
Dr. Eli Silver
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SOCIAL FUNCTIONS
January 29 Icebreaker 18:00 - 19:30 at Seymour Discovery Center
Hosted by Gary Griggs of The Institute of Marine Sciences and Thorne Lay of IGPP. Please be in the lobby of West Coast Santa Cruz Hotel at 17:45 for bus transportation to Seymour Discovery Center. Bus transportation will be provided back to the hotel at 19:30. If you would like to attend please RSVP to Eli Silver esilver@emerald.ucsc.edu and advise if you will bring a guest.

January 30 Dinner at University House on the UCSC Campus, 19:00 - 21:00
Hosted by JOI and campus provost and executive vice-chancellor John B. Simpson. Please be in the lobby of West Coast Santa Cruz Hotel at 18:30 for bus transportation to University House. Bus transportation will be provided back to the hotel at 21:00. A formal invitation will be sent to you, please RSVP at that time.

FIELD TRIP:
February 1
Viewing of coastal views and outcrops, culminating at an excellent local winery. If you are interested contact Eli Silver esilver@emerald.ucsc.edu

3.1 Approve June 2001 EXCOM Minutes

The minutes from the last EXCOM meeting in June 2001 in Oxford, UK are available at:

http://joides.rsmas.miami.edu/files/EXCOM_01_2.pdf

3.1.1 EXCOM Motion 01-2-7

EXCOM Motion 01-2-7: EXCOM advises SCICOM that the ODP JOIDES Science Advisory Structure will terminate in Sept. 2003. EXCOM recognizes that JOI may continue to require scientific advice during the ODP phase-out period through FY2007, and recommends that JOI seek advice, as appropriate, during this period from the IODP SAS to ensure a smooth transition from ODP to IODP.

Detrick moved, Falvey seconded; 15 in favor

Excerpts from "A Guide to the Ocean Drilling Program" JOIDES Journal, 1999:
http://joides.rsmas.miami.edu/files/guide2odp99.pdf :

"The new JOIDES Science Advisory Structure is headed by a Science Committee (SCICOM), the mandate of which focuses on the long-term science planning activities necessary to meet, and go beyond, the goals of the ODP Long Range Plan. this capacity, SCICOM prioritizes scientific and technological objectives based on input and advice from the Advisory Structure panels in order to optimize the scientific returns from drilling. An Operations Committee (OPCOM), created as a sub-committee of SCICOM, deals with operational issues, such as ship scheduling, technological development, and scientific measurements. OPCOM's responsibilities include providing SCICOM with drilling schedules based on SCICOM's proposal rankings, advising SCICOM on short-term logistical and technological implementations of highly ranked scientific programs, as well as longer term technological requirements for implementing the ODP Long Range Plan."

4.1 ECOD

The European Consortium for Ocean Drilling
Mary von Knorring

ECOD Country Report (1 July – 31 December 2001)

1. EMCO meetings

The 18th ECOD Management Committee (EMCO) meeting was held in Zürich, Switzerland, on September 29, 2001, partly as a joint meeting with the ECOD Scientific Committee (ESCO). The main issues discussed were consortium finances including sponsoring of meetings (ODP-Forum, IWG and EXCOM) which will be held in ECOD-countries during the first half of 2002. ECOD involvement in planning for an European participation in IODP was another main issue.

The 19th EMCO meeting will again be held together with ESCO in connection with the next European ODP-Forum in Tromsø, Norway in April 2002.

2. ECOD administration

The EMCO vice chair Menchu Comas has, during a part of the reporting period been acting as chair, while Mary von Knorring has been unable to fulfil her duties.

The ESCO office has, from the 1st of July, been hosted by the Netherlands. More about ECOD, EMCO and ESCO can be found at www.geo.vu.nl/~esco/

The ESF has nominated Martina Hildebrand as Scientific Secretary for ECOD. Joanne Dalton continues her work as administrative officer for EMCO, and has also assisted the ESCOD during their planning meetings for a new European consortium for IODP.
http://www.esf.org/esf_article.php?language=0&article=66&domain=3&activity=1

3. ECOD iSAS Representatives

Panel Delegate/Alternate:
SCICOM & iPC: Jeroen Kenter (The Netherlands) / Hans Christian Larsen (Denmark)
TEDCOM: Sigmund Stokka (Norway) / Sergio Persoglia (Italy)
(i)ESSEP: Helmut Weissert (Switzerland) / Nalan Koc (Norway)
(i)ISSEP: Rolf Birger Pedersen (Norway) / Luis Menezes Pinheiro (Portugal)
(i)PPSP: Juanjo Danobeita (Spain) / Birger Larsen (Denmark)
(i)SPP: Annakaisa Korja (Finland) / Luca Gaspeerini (Italy)
(i)SciMP: Leonardo Saniotti (Italy) / Eve Arnold (Sweden)

4. ECOD scientists sailing on ODP-legs June 2001 – June 2002

Leg 196: Nankai II; M B. Hansen (Denmark)
Leg 197: Hotspots; F. Tremolada (Italy), R. Bonaccorsi (Italy) and S. Lindblom (Sweden)
Leg 198: Shatsky Rise; co-chief I. Premoli-Siva (Italy); M. R. Petrizzo (Italy), S. Gylesjö (Sweden)
Leg 199: Paleogen Pacific; J. Backman (Sweden), I. Raffi (Italy)
Leg 200: H2O Observatory; M. Lustrino (Italy) and Student Trainee: I. Nielsen (Denmark)

5. ECOD scientists invited to sail during January – July 2002

Leg 201: Peru Biosphere; Patric Meister (Switzerland) and Nils Holm (Sweden)
Leg 202: SE Pacific Paleoceanography; Helga Flesche Kleiven (Norway), Fatima Abrantes (Portugal), Jose-Abel Flores (Spain)
Leg 203: Equatorial Pacific Ion; Paula Vanucchi (Italy)

6. ECOD Membership Status

Inquiries have been made in ECOD member states to attain funds for full membership fee to the present program. Unfortunately, no additional funding has been obtained. Thus ECOD will contribute with 99.5% of a full membership to ODP for the fiscal year 2002.

7. Activities towards IODP

All ECOD countries have agreed to a joint European submission of an European Commission application Ocean Research Drilling to form an European Research Area and for the funding of Mission Specific Platforms. An increasing number of ECOD member countries actively participate in European efforts towards the formation of a single European consortium for the IODP, and in planning for the administration of the European contribution to IODP SOC:s and POC:s. ECOD member countries are striving to take formal decisions on funding and funding levels of IODP participation during 2002.

8. Forthcoming meetings

The 4th European ODP Forum will be hosted by ECOD and held in Tromsø, Norway during 10-12 April 2002. Deadline for registration is 31 January and for abstract submission 15 February 2002. For information see: http://www.ibg.uit.no/geologi/konferanser/odpforum

In 2002 the ECOD will also host important administrative meetings. The recently formed ECORD interim Council will hold its second meeting in Stockholm, Sweden. The meeting of the International Working Group for IODP will be held in Stockholm, 4-5 June 2002. The meetings of EXCOM and ODP Council will be held in Granada, Spain during 25-27 June 2002.

4.3 Germany

ODP related research in Germany

On Leg 197 downhole magnetometer data were successfully collected with a new magnetometer. This magnetometer equipped with three fluxgate sensors and an innovative fiber optic sensor to record tool rotation, was developed by BGR and further improved by geophysicists of University of Göttingen with DFG grants within the DFG Priority Programme ODP/DSDP. Data acquired during Leg 197 were used to distinguish between sequences of basalt and volcaniclastic sediments.

Germany's approach to IODP

Discussions are continuing on Germany's participation in IODP. The President of DFG has written a letter to the Minister of Education and Science (BMBF), Dr. Bulmahn, in which he seeks support from the Ministry for joint BMBF-DFG sponsorship for Germany to join the new programme.

The Working Group Scientific Drilling of the DFG "Geokommission" was asked to prepare a document which will underpin a formal request to sponsor Germany's participation in IODP at the Senate of DFG.

The Wissenschaftsrat (Research Council) which advises the Government of FRG on scientific matters, has reviewed the project "AURORA BOREALIS" and the plans to build a research vessel with icebreaking and ocean drilling capabilities. The project was proposed by the European Polar Board. A report on this review is pending. The European approaches to a Third Leg of IODP were introduced to the review panel by H.B. The new vessel may become an important component of Europe's contribution to IODP.

Representatives of DFG and the German ODP community participated actively in all meetings held for the establishment of the European Consortium on Ocean Research Drilling (ECORD), namely meetings of the European Steering Committee on Ocean Drilling (ESCOD), which advises the European Funding Agencies on scientific ocean drilling, held August 7 and November 9 in Brussels and Paris respectively, and European Agencies Group Meeting (EAG) on November 22 2001, in Bonn.

Scientists from Germany are members of various working groups of the EC-funded Joint European Ocean Drilling Initiative (JEODI) aiming at establishing a Thematic Network, which will bring together the European member states involved in ocean drilling. Particular emphasis is put on the formation of the Third Leg of IODP using European-sponsored drilling capabilities and other infrastructure.

Colloquia

The German ODP community will be represented by approximately 10 scientists at the 4th European ODP forum in Tromso, Norway, to be held on 10-12 April 2002: http://www.ibg.uit.no/geologi/konferanser/odpforum/

For closer cooperation with the International Continental Drilling Program (ICDP) a joint meeting of DFG Priority Programmes ODP/DSDP and ICDP will be organized and held in Potsdam (Germany) on 7/8 June 2002. International participation is encouraged.

4.4 Japan

1. JOIDES Resolution Portcall

Following two portcalls were held at Daikoku pier, Yokohama.
1) July 4th for students and Japan ODP related persons.
2) August 30th for the citizens in Yokohama.

Japan ODP Office appreciates the supports of TAMU to accept two portcalls .

2. Panel meeting

SSEP and iSSEP joint meeting was held from Nov. 14th-16th ,2001 at JAMSTEC, Yokosuka.

3. Site Survey Cruise - 2002 schedule

1) Submersible survey in Indian Ocean using Shinaki 6500 (January).
2) DTV survey in the accretionary prism and the forearc basin off Kumano and Tokai using Natsushima (February).
3) Seismic, piston sampling, heat flow surveys in the accretionary prism and the forearc basin off Kumano using Tansei Maru (March)
4) Morphological and magnetic survey at Okinawa Trough by Wadatsumi deep tow backscattering system and 3 component magmetometer using R/V Hakuho Maru (June)
5) Submersible survey in the accretionary prism and the forearc basin off Kumano using Shinaki 6500(June)
6) Submersible survey in the forearc basin off Tokai using Shinaki 2000 (August)

JAMSTEC are going to make plans of several MCS/OBS surveys for the purpose of imaging of seismogenic at the trenches surrounding Japan.

4. ODP related symposium

Post cruise meeting of eastern Nankai OBS cruise performed by the framework of Japan-France collaborative project(December).

5. IODP related activity

International Workshop which was aimed in preparation for making IODP preliminary proposal of Nankai seismogenic zone was held on 10th 12th, August at ORI, Tokyo.

Launching ceremony of “Chikyu” was held on 18th January 2002, at Mitui Shipyard Company, Okayama.

4.6 The People's Republic of China

(January-December 2001)

China ODP

The year 2001 has seen enhanced activities in the Chinese ODP community. With an increase of national budget for basic research in the country, ODP and its related deep-sea studies have become increasingly attractive for Chinese geoscientists. This is manifested in their endeavor to scrutinize ODP cores from the South China Sea on the one hand, and in their enthusiasm in meeting the new IODP phase on the other.

Leg 184 Post-Cruise Studies

The post-cruise analyses of the South China Sea cores from ODP Leg 184 remain the focus of ODP activities in China. A wealth of paleo-data is being produced in various labs. For example, over ten thousand samples from Leg 184 cores were analyzed for isotopes, and about fifteen hundred samples for pollen. A collection of twelve papers was published in Science in China the leading natural science journal in the country, as a special issue in 2001 to show the preliminary results from Leg 184 studies. Early in May, 63 scientists from 8 countries met in Beijing to attend the ODP Leg 184 Post-Cruise Meeting with 44 oral and 38 poster presentations. This meeting was followed by the Asian Monsoon Symposium titled Asian Monsoons and Global Linkages on Milankovitch and Sub-Milankovitch Timescales at the same place. Leg 184 scientists and invited speakers delivered nineteen presentations, and a special issue of "Marine Geology" will be published on the basis of the symposium. Currently, the Chinese participants in Leg 184 post-cruise studies are preparing their reports for the next national review late January 2002 in Beijing.

National Scientific Committee

The National Scientific ODP Committee convened the Third National ODP Symposium of China (ODP-China III) on the campus of Tongji University, Shanghai, in mid May 2001, following the first one in 1996 and second in 1998. Nearly 120 participants from universities, research institutions and industrial organizations attended the meeting for scientific exchanges and discussions on the future plan of Chinese participation in IODP. Along with 37 oral and 33 poster presentations, six invited speakers from the US and Japan delivered lectures on latest progress in deep-sea studies or reports on forthcoming IODP.In September, an enlarged meeting of the Chinese ODP Scientific Committee was held in Beijing, with several organizations or institutions for the first time represented at the meeting. Members of the committee reviewed the three-year progress since its setting up and discussed the further development of deep-sea studies in China. The Committee decided to promote China's participation in IODP and to increase the related activities in China. The Secretariat is asked to prepare the new national program for IODP in China to be adopted early next year, and a list of Chinese representatives to iODP panels was approved. Besides, its Secretariat based at Tongji has produced three issues of "ODP-China Newsletter" in Chinese.

ODP Meetings in China

2001 is the first year when China hosted ODP meetings in its cities. In late March, the JOIDES Science Committee and Operations Committee Meetings were also held on the campus of the Tongji University. About 47 participants attended this meeting, and the Chairman of the Chinese ODP SciCom and the representative of the Shanghai Municipality warmly welcomed all the guests from the ODP communities at the banquet. The next ODP meeting was the Leg 184 Post-Cruise Meeting in Beijing as mentioned above. Now the Chinese hosts are looking forward to welcome the participants in SSP and iSSP meeting in February 2002 on the campus of the Beijing University. The Chinese community was quite active in ODP-related meetings in 2001, such as the 7th International Paleoceanographic Conference in Sapporo. Chinese scientists participate in IMAGES cruise and preparing its official joining to InterRidge. As recommended by ODP-China, Dr. SU Xin participated in ODP Leg 195 working on nannofossils and on Site 1202, the southern Okinawa Trough.

4.7 United Kingdom

1. ODP Special Topic Grants

The following ODP special topic grants have been awarded since the last EXCOM meeting:

-- Dr. Pamela Kempton, Controls on the compositional dynamics of the Emperor-Hawaii plume; combined isotope (Sr-Nd-Hf-Pb) and trace element study of plume structure.

-- Prof. I. Nick McCave, Linking evidence for current related hydrographic change in the Australo-Antarctic and SW Pacific Gateways with opening of Drake Passage in the early Miocene.

-- Dr Rachael James, Foraminiferal Zn/Ca: New insights as to the role of deep ocean circulation in glacial-interglacial climate change.

2. Rapid Research Grants

The Following have received rapid response grants since the last EXCOM meeting:

Chambers, L	University of Edinburgh
Wilson, M	University of Durham
White, R	Leicester University
Smart, C W	University of Plymouth
Clarke, L C	University of Wales
Roberts, A	University of Southampton

3. Post Doc-Funding

Two post-docs received special funding, Dr Heike Palike and Dr Steve Robinson

4. UK Forum

The annual UK ODP forum was held at the British Geological Survey, Keyworth, Nottingham on November 28 2001 and attracted around 60 ODP researchers from all parts of the UK. The following keynote talks were presented:

Dr. Godfrey Fitton, Drilling the Ontong Java Plateau, the worlds largest igneous province

Dr. Paul Pearson, Sea Surface temperatures in ancient greenhouse climates

Prof. Phil Weaver, Using ocean drilling to aid our understand of sedimentation on the continental margin

Dr. Chris MacLeod, Detachment faulting in the Atlantic

Mr Andy Kingdon, IODP the way forward

In addition over 14 posters on all aspects of the programme were displayed and presentations by recent UK participants and on forthcoming drilling proposals were made. The meeting proved a great success.

5. UK ODP newsletter

Newsletter 27 was published in September 2001 and distributed to the UK ODP community, UK earth science departments and international ODP offices.

6. IODP

In November 2001 the UK have committed to joining IODP in principle in the period 2003-2006 with a preliminary indicative total budget of up to £9 million (~€ 14.4 million) and the possibility of provision of facilities in kind and industrial co-operation, including free access to certain data. This followed detailed consultation and a written submission from the UK Earth and Marine science community and has been endorsed at the highest levels in NERC. The UK is committed to joining in co-operation with European partner countries. Work on the EU funded JEODI (Joint European Ocean Drilling Initiative) project for IODP planning is ongoing.

4.8. U.S.A.

Although the President's 2002 budget request to Congress identified only a 1% increase for NSF, Congress chose to appropriate funds at a higher level. The final 2002 agency budget that has been signed by the President provides an overall NSF increase (from the 2001 level) of 8.4%. Within the total budget ($4,788B), the Geosciences Directorate is identified to increase by $48.4M (or 8.6%). Divison (Earth, Atmospheric and Ocean) and Program budgets have not yet been identified, but will hopefully be better know by the time of the EXCOM meeting.

Personnel recruitment activities continue within the **Division of Ocean Sciences** following re-organization into 3 sections in the Fall of 2000. Dr. Jim Yoder from the University of Rhode Island joined the Division as its new Director in October. Don Heinrichs who was heading the Division and the **Marine Geosciences Section** (Marine Geology and Geophysics Program and the Ocean Drilling Program) departed NSF in November. Bruce Malfait has been identified as the acting Section Head while recruitment actions are completed to fill the position on a permanent basis. Within the **Ocean Drilling Program** a second program director position has been established and Paul Dauphin has been promoted to fill that position. Brad Clement (visiting scientist) from Florida International University continues with the primary ODP responsibility for NSF grants activity. A second visiting scientist/engineer position has been identified for the ODP Program. It is expected that this position will concentrate on IODP planning – specifically with respect to the acquisition of the non-riser drill ship. The position has been open for over year, but no qualified candidate has been located.

Focused NSF funding in support of ODP science is divided between the U.S. Science Support Program (USSSP) administered by JOI ($5.5M in FY 2001) and a separate unsolicited proposal/grant activity administered by NSF ($10.5M in FY 2001).

NSF/ODP supported field programs for calendar year 2002 include 1) a study of sediment drifts in the North Atlantic (Greg Mountain – LDEO as lead scientist); 2) a VSP experiment on hydrate ridge as part of Resolution drilling on leg 204 (Ingo Pecher and Ann Trehu as lead scientists); 3) additional heat flow studies in the Cocos Plate by Andrew Fisher (Santa Cruz) and others; 4) a study of gas hydrates in the Gulf of Mexico by Carolyn Ruppell (Georgia Tech) and others; and 5) and a return to the Corks in the Galapagos region by Becker (Miami) and Spiess (Scripps). NSF has also committed to funding Miriam Kastner (Scripps) and others for the Cork deployments as part of Leg 205. NSF/ODP also participates in support for the Margins program and in 2002 will support Brian Taylor and others for a US-Japan MCS/OBS study of the Marianna Arc and an MCS program under the direction of Dan Lizzeralde in the gulf of California.

NSF will continue to support field programs for research and data acquisition with a view toward the beginning of the IODP. Field programs in 2003 for which a funding commitment has already been made include: 1) a study of fluid flow in the Mariana arc by Patricia Fryer (Hawaii) and, 2) a study of the Kane megamullion by Morris Tivey (Woods Hole).

U.S. Science Support activities funded under NSF's cooperative agreement with JOI can be found in the following report.

U.S. Country Report (Part II, JOI/USSSP Activities 6/01 to 1/02)

U.S. Science Support Program (USSSP)

The annual "close-out" report for USSSP Year 16 (March 1, 2000 to February 28, 2001) was submitted to the U.S. National Science Foundation (NSF) in June 2001 and approved in July. The final Year 18 USSSP Program Plan will be submitted to NSF in February 2002 for the year beginning March 1, 2002. This will be the last year in which support is sought for a full year of ODP science operations. A "close-out" report for Year 17 will be submitted to NSF in Spring 2002. Because the timing and duration of USSSP are linked to ODP, wind-down of USSSP will begin in calendar 2003 and will conclude before February 28, 2006. USSSP operation beyond 2003 is necessary to accommodate post-cruise research and other activities, and to enable financial and programmatic closeout.

U.S. scientists are anticipating national participation in the future Integrated Ocean Drilling Program (IODP), and thus the creation of a successor program to USSSP. As such, the U.S. Science Advisory Committee (USSAC) is now actively considering how such a program can be structured and managed to provide support to U.S. scientists in the IODP. This activity involves defining a new U.S. Science Advisory Committee and a new support program covering all aspects of participation. This activity will continue to be a major agenda item in next two USSAC meetings (February 2002, Chapel Hill, North Carolina, and July 2002, San Francisco, California). Supplemental planning retreats are planned for Jan. 31-Feb. 1 and in mid June. USSAC intends to submit to NSF this Fall a white paper containing recommendations on a national program.

USSAC membership rotation

The following four people completed their three-year terms on USSAC on September 30, 2001: Drs. John Armentrout (Cascade Stratigraphics), Timothy Byrne (Univ. Conn.), Gregor Eberli (RSMAS), and Mike Underwood (Univ. Missouri). At their July meeting, USSAC considered a slate of 42 nominees (self and otherwise) for membership on USSAC and their recommendations were forwarded in August 2001 to the Nominations Committee of the JOI Board of Governors (BoG) for consideration and approval. The new BoG-approved members of USSAC, who began their three-year terms on October 1, 2001, are Drs. Nathan Bangs (UTIG), Earl Doyle (consultant, retired from Shell), Al Hine (Univ. South Florida), and Ellen Thomas (Wesleyan Univ.). Peggy Delaney (UCSC), whose membership term was extended by the BoG, will continue to serve as USSAC Chair until October 1, 2002.

U.S. planning for IODP

USSAC activities
In early 2001, USSAC began engaging the broader US community in planning national participation in IODP. Because the ISP reflects the goals of the international science community, USSAC developed a US companion document to complement the ISP. The purpose of this document is to establish the rationale for U.S. participation in the IODP. This document, titled, "Understanding our Planet through Ocean Drilling: A Report from the United States Science Advisory Committee" (UPOD), was published in September 2001. During the early summer, the need was identified for a concise, colorful brochure distilled from the UPOD document. As such, JOI contracted Geosciences Professional Services Inc. (Geo Prose) to develop a brochure titled, "United States Participation in the Integrated Ocean Drilling

Program." The brochure was designed for presentation in tandem with IODP's ISP and in September 2001, 5000 copies of the brochure were printed. Both the UPOD document and the affiliated brochure are available online at http://www.joi-odp.org/USSSP/UPOD.html. They are being distributed within the US and abroad.

US participation on the interim Science Advisory Structure
US nominations for membership on the panels and committees of the interim Scientific Advisory Structure (iSAS) were approved by the IWG in June 2001. Initially, the interim panels include a Planning Committee (analogous to the JOIDES SCICOM), two SSEPs, a SCIMP, and an SSP. Additional panels and committees (e.g. technical advisory panel and industrial liaison panel) are being considered. Each extant panel has 5 US members, therefore a total of 25 US scientists are currently serving on the iSAS panels. Alternate members are also being identified to ensure continuous U.S. participation. The new iSAS panels have been meeting in conjunction with the relevant JOIDES panels since August. The iSAS panels may begin to meet alone, if the affiliated JOIDES panels opts not to meet (such as during the iSSP meeting in February 2002 in Beijing). Travel support for U.S. participants in iSAS meetings is being provided by JOI/USSSP.

Additional IODP ISP's printed
In July 2001, 6,000 copies of the Initial Science Plan (ISP) "Earth, Oceans, and Life" for the Integrated Ocean Drilling Program (IODP) were printed by JOI. The costs were divided equally between JOI/USSSP and JAMSTEC. The U.S. copies are being distributed broadly within the U.S. The JAMSTEC copies are being distributed internationally by the iSAS office.

IODP folders produced
In September 2001, JOI/USSSP—working with Geo Prose—developed a special IODP folder to showcase and present the ISP and the US brochure. In October, JOI printed 2,500 copies of the sturdy but decorative folder. These have been offered at cost (US $2.98/each) to ODP and IODP partners for their use in promoting the IODP.

USSSP supports the efforts of the US iPC co-chair
Through a contract to the University of Michigan established in Summer 2001, JOI/USSSP is providing financial support (salary, travel, and other costs) to Dr. Theodore Moore, Jr. as co-chair of the IODP iPC to implement the mandate specified by the IWG from September 1, 2001 through September 30, 2003. During this period, Dr. Moore, and his Japanese iPC co-chair, Dr. Hajimu Kinoshita, will lead iPC planning activities. They will oversee the IODP iSAS, administer the evaluation of scientific ocean drilling proposals and help establish the IODP Science Advisory Structure that will initiate on October 1, 2003. Ms. Joanne Reuss will provide programmatic and administrative support to Dr. Moore, the iPC, and she will also assists the iSAS Office at JAMSTEC.

US contribution to the IWG Support Office
Since November 30, 1999, The IWG Support Office (IWGSO), co-located at JOI, has assisted the International Working Group (IWG) and its designates in their efforts to build a new post-2003 drilling program, the Integrated Ocean Drilling Program (IODP). The US, through the NSF, contributes half of the office's operating costs to JOI through the USSSP cooperative agreement. The other half comes from JAMSTEC, under the auspices of the STA. The IWGSO provides administrative, clerical, and financial support for planning activities and serves as a communication center for coordination among the U.S., Japan, and other potential IODP partners.

The IWGSO follows an annual work plan that is approved by NSF and STA/JAMSTEC. Among other activities, the IWGSO has: (a) published IODP promotional brochures in four languages; (b) assisted with the logistics (agenda book development and minute taking) at the IWG meetings in the US (Washington, DC) Japan (Tokyo and Kobe), the UK (Oxford), and Canada (Ottawa); (c) assisted with meeting planning and execution for IPSC and their working groups; (d) assisted with the logistics of the ISP review meeting; (e) promoted IODP at international science meetings; (f) produced and distributed visual and illustrative materials; and (g) developed a web page (www.iodp.org) and contact list.

Since the last IWG meeting in Ottawa, Canada, the Support Office has assisted with meeting coordination for the first iPC meeting in Portland and the Industry Liaison Working Group (ILWG) Forum for Industry-Academia Partnerships at the BP offices in the UK, wrote articles about the planning of IODP for the JOI/USSAC Newsletter, worked with ILWG to produce an industry companion document to the ISP for IODP, produced an IODP promotional pen, and redesigned the IODP web site. The IWGSO co-hosted exhibit booths at a reception co-hosted by JOI and the US House of Representatives Oceans Caucus at the Rayburn Office Building on Capitol Hill and the AGU fall meeting in San Francisco. IWGSO worked with the iSAS office to produce posters and informational fliers for the displays. At these meeting, IWGSO and iSAS staff handed out IODP and OD21 brochures, the *OD21 Newsletter*, the ISP for the IODP, the US companion document to the ISP, and other information. The Memorandum of Understanding between JOI and JAMSTEC for IWGSO to provide support services was extended to October 1, 2003 by NSF and MEXT at their June 2001 meeting.

The Office is fully staffed with representatives from the United States (Dr. John Farrell) and Japan (Dr. Izumi Sakamoto), an office coordinator (Ms. Betsy Fish), and other part-time staff for travel and logistics, contracts, purchasing, and technical needs. In April 2001 Ms. Betsy Fish replaced Ms. Jennifer Peterson as the IWGSO coordinator. For information or promotional materials, please contact Ms. Fish at iwgso@joiscience.org (202-232-3900 x262).

Workshop Proposals Funded

Dr. Timothy Bralower (University of North Carolina, Chapel Hill), "An International Conference on Cretaceous Climate-Ocean Dynamics", $28,000. Funds will be used to provide partial support for meeting costs and attendees travel to a workshop that will be held at The Nature Place in Florissant, CO on July13-18, 2002.

Site Augmentation Proposals Funded

Dr. Mitch Lyle (Boise State University), "Building IESX databases for shipboard use on ODP Leg 199: integrating digital seismic reflection data from site surveys with well logging and recovered sediment core," $23,497. Funding was used to prepare a digital high-resolution seismic reflection site survey package for use onboard the *JOIDES Resolution* during Leg 199. These data will be integrated with additional survey data as well as with coring and downhole logging results from this leg.

Dr. Richard Jarrard (Univ. of Utah), "Refinement of an LAS-based mineralogy technique for ODP Leg 199," $13,106. Funding was used to establish a calibration dataset to be applied to light-absorption spectrometry measurements made on dried sediment samples of ODP cores to determine their dominant clay mineralogy and other lithologic components. The field spectrometer was used during Leg 199 to make shipboard measurements of the recovered sediments.

Dr. Greg Moore (Univ. of Hawaii)," Participation in a Workshop to Develop an IODP Proposals for Riser Drilling of the Nankai Trough Seismogenic Zone," $24,000. Funding was provided to pay travel support for 10 U.S. participants at a planning meeting in Japan to develop a unified international proposal for riser drilling of the Nankai Trough Seismogenic Zone.

Post-Cruise Scientific Research Proposals

Thirty-five post-cruise scientific research proposals were approved for funding by JOI/USSSP from May 27, 2001 to January 15, 2002. These proposals were primarily from participants on ODP Legs 193, 194, 195, and 196.

The proposed USSSP research from Leg 193 is focused on understanding the physical properties, fluid flow, fluid-rock interactions, mineralogy, geochemistry, paleomagnetism and rock magnetic properties of hydrothermal deposits drilled in the Manus Basin near Papua New Guinea.

The research from Leg 194 seeks to understand the evolution of sediment and rock facies in a carbonate platform undergoing subsidence influenced by tectonic and eustatic processes. Seismic facies interpretation integrated with analyses of downhole logging and core samples will be used to model the evolution of the platform and adjacent basins to establish limits on the range of possible interpretations provided by biostratigraphic and faunal data.

The research from Leg 195 will investigate the geochemical, isotopic, biological, and physical properties of fluids and materials recovered from a non-accretionary Mariana convergent margin at South Chamorro Seamount and two other sites drilled during this cruise.

The research from Leg 196 will involve the interpretation of logging-while-drilling data in the context of other geophysical data sets and the drilling results from ODP Leg 190, which occupied sites in the same area. These studies will provide integrate studies of geophysical properties with studies of fluid flow, physical properties, geochemical parameters, and visualization of these parameters both along and across the Nankai Trough.

JOI/USSSP Internship Program

The JOI/USSSP internship program was inaugurated in 1998 with the educational purpose of introducing recent graduates from earth science programs to the career opportunities of science program management. During Year 17, JOI has employed two interns, who began their tenure in Summer 2001. Both work on JOI/USSSP internship projects, as well as assisting with other JOI/USSSP administrative duties. Mr. Micah Nicolo was graduated from Hobart William Smith College in May 2001 with a B.S. in Geoscience and a B.A. in Political Science. Ms. Christina Riesselman was graduated from University of Nebraska-Lincoln in May 2001 with a B.A. in both Geology and English. The terms of their internships have been extended through Summer 2002. In Fall 2002, both interns plan to attend graduate school in geology.

The interns are working on a variety of projects. For example, each is developing a series of downloadable scientific presentations for the USSSP web page. Mr. Nicolo’s project is based on specific areas of ODP research, such as gas hydrates, deep biosphere and rapid climate change. Ms.

Riesselman's project is based on talks given by speakers in the JOI/USSAC Distinguished Lecturer Series (DLS). These resources will be made available on the USSSP website for students, teachers and scientists to download and print for educational and other purposes.

In December 2001, JOI issued a call over the JOI/USSSP listserver for applications for next year's internship. This internship will begin in Summer 2002, to provide for some overlap with the current interns. The text of the email message follows:

Joint Oceanographic Institutions (JOI) is currently seeking qualified applicants for a one-year internship, beginning summer 2002, at the JOI Office in Washington, DC. The goal of the JOI/USSAC Internship Program is to introduce recent earth science graduates to science program management. This internship is ideally designed for graduates who seek experience with a scientific non-profit organization before continuing their education in graduate school or elsewhere. Interns will work full-time, dedicating half of their effort to specific scientific ocean drilling projects and the remainder to other tasks in support of the US Science Support Program (USSSP). For the term appointment, the intern will be a salaried JOI employee with full benefits. Specific start and end dates will be negotiated. Interested applicants must submit a cover letter, resume, and three references to the JOI Office by March 15, 2001. Interviews with finalists will be scheduled in late March/early April, and a decision will be made by mid-April.

JOI manages worldwide cooperative research programs, including the scientific Ocean Drilling Program (ODP) and the US Science Support Program (USSSP). ODP is an international partnership of scientists and research institutions organized to explore the evolution and structure of Earth. ODP provides researchers around the world access to a vast repository of geological and environmental information recorded far below the ocean surface in seafloor sediments and rocks. USSSP was designed to maximize the scientific output of the international Ocean Drilling Program by actively involving the possible cross section of the U.S. scientific community. This is accomplished by providing research funds and educational opportunities to U.S. scientists and students. For more information about JOI and the science programs it manages, please visit www.joiscience.org

If you have any questions about the JOI/USSSP internship, please contact Brecht Donoghue at bdonoghue@joiscience.org

Please send your application to:
Brecht Donoghue
Joint Oceanographic Institutions
1755 Massachusetts Avenue, NW
Suite 700
Washington, DC 20036

Schlanger Ocean Drilling Fellowship Program

At their July 2001 meeting, USSAC considered a record number (20) of shipboard and shorebased fellowship proposals. Two 1-year shorebased awards and two 1-year shipboard awards were granted, as follows:

Benjamin Cramer, Rutgers, The State University of New Jersey

"Evolution of a warm climate: Long-term paleoceanographic trends and short-term orbital forcing of climate in the late Paleocene-early Eocene" (shorebased, ODP/DSDP legs 22, 113, 143, 171B)

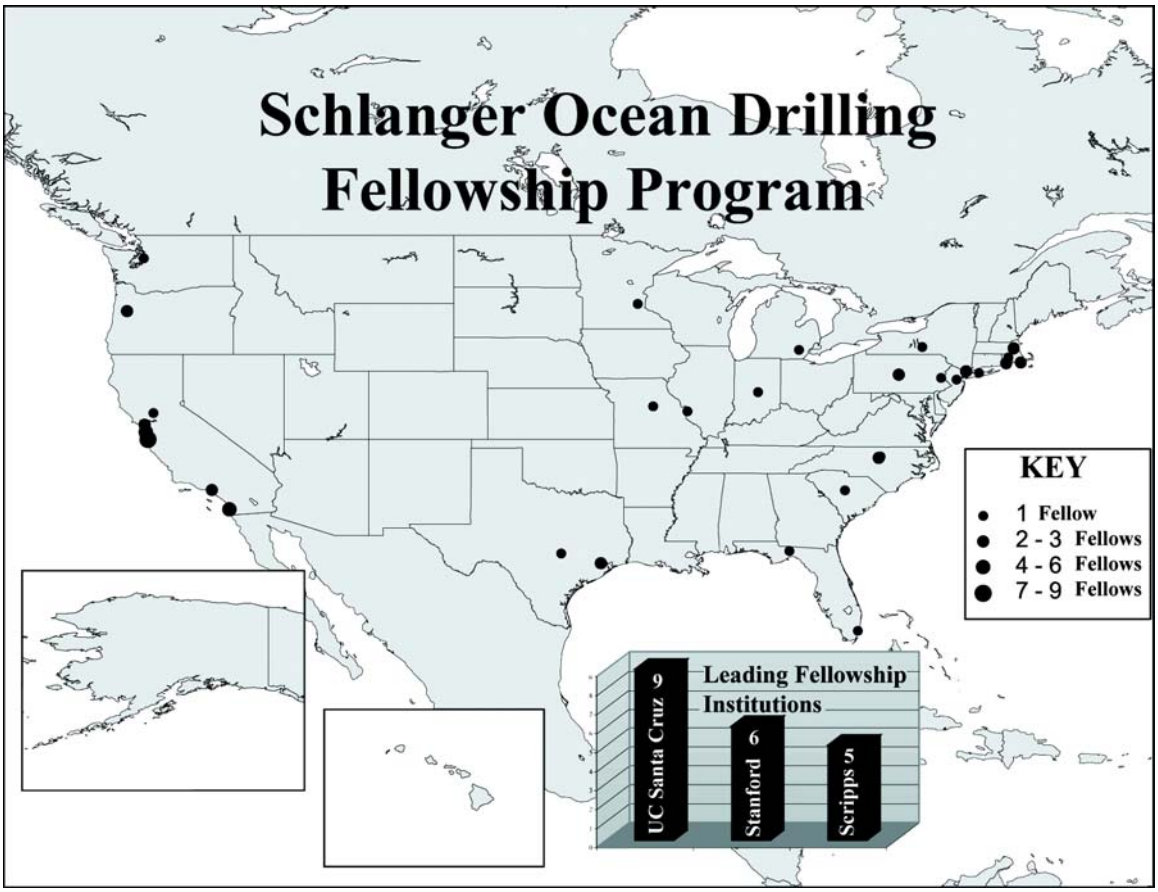
Maria Prokopenko, University of Southern California
"Fractionation of nitrogen isotopes during early diagenesis in the sediments of Peru Margin" (shipboard, ODP Leg 201)

Cara Santelli, MIT/WHOI Joint Program
"The role of microorganisms in alteration of basaltic glass in deep oceanic subsurface environments" (shipboard, ODP Leg 205)

Matthew Schmidt, University of California, Davis
"Temperature and hydrological changes in the Western Caribbean and the Tropical Pacific during the last 750 kyr" (shorebased, ODP legs 138 and 165)

Once again, twenty proposals were submitted for the November 15, 2001 shorebased fellowship deadline.

The following figure, created by JOI/USSSP intern Micah Nicolo, shows the distribution of institutions from which JOI/USSAC and Schlanger Ocean Drilling Fellows have been selected.



JOI/USSAC Distinguished Lecturers Series for 2001-02 and 2002-03

During the current academic year (2001-2002), the following DLS lecturers will give talks at the institutions listed below. Please note that most lecturers volunteer to give more than the "minimum" requested number of lecturers. The series continues to be popular and successful (from both sides of the lectern). We greatly appreciate the support and the time and effort expended by the lecturers and by the host institutions.

Dr. Robert Dunbar, Stanford University
Southern Ocean Impacts on Global Climate: Clues from the Antarctic Margin
Columbus State University, Columbus, GA
Duke University Marine Lab, Beaufort, NC
State University of New York, Albany, NY
Portland State University, Portland, OR – October 24, 2001
State University of New York , Stonybrook, NY

Dr. David Hodell, University of Florida
Late Pleistocene Evolution of the Ocean's Carbonate System: A Serendipitous Result from ODP Leg 177
WHOI, WHOI, MA
Northwestern University, Evanston, IL
University of California, Santa Barbara, CA - March 6, 2002
University of Nebraska, Lincoln, NE - March 8, 2002
Salem State University, Salem, MA

Dr. W. Steven Holbrook, University of Wyoming
Methane Hydrates: Boon or Bane?
Texas A&M University, College Station, TX - November 12, 2001
University of California, Santa Cruz, CA - February 5, 2002
University of Colorado, Boulder, CO
University of Miami, Miami, FL
Montana Tech, Butte, MT

Dr. John Mahoney, University of Hawaii
The Nature, Origin, and Fate of a Giant Oceanic Plateau: Ontong Java Plateau
Trinity University, San Antonio, TX - March 25, 2002
University of Texas at Arlington, Arlington, TX - March 27, 2002
College of Charleston, Charleston, SC - March 29, 2002
University of Wyoming, Laramie, WY - April 22, 2002
New Mexico State, Las Cruces, NM - April 24, 2002

Dr. Lisa Tauxe, University of California, San Diego
Hunting the Earth's Magnetic Field
Florida State University, Tallahassee, FL – February 28, 2002
Oberlin College, Oberlin, OH – April 2, 2002
Indiana University, Bloomington, IN – April 1, 2002
Colorado College, Colorado Springs, CO – March 28, 2002
Fort Lewis College, Durango, CO – March 29, 2002

Dr. Michael Underwood, University of Missouri
Subduction Zone Megathrusts: Why Stratigraphy and Sedimentology Matter
Johns Hopkins University, Baltimore, MD - February 18, 2002
Virginia Tech, Blackburg, VA - February 21, 2001
East Carolina University, Greenville, NC - February 22, 2001
University of Missouri, Rolla, MO - November 14, 2001
University of Iowa, Iowa City, IA - November 16, 2001
California State University, Fresno, CA - April 29-30, 2001

In addition, Drs. Robert Dunbar and Steven Holbrook have been asked to present their lectures at the US National Science Foundation in Spring 2002.

The lecturers for DLS talks in the 2002-2003 academic year have also been identified. JOI has printed a 2002-2003 DLS flyer which was made available at the American Geophysical Union meeting in San Francisco this December. The flyer will be widely distributed to academic institutions in January 2002.

2002-2003 JOI/USSAC Distinguished Lecturer Series

Listed below are the six lecturers, their home institutions, and their lecture titles for the 2002-03 series. Applications to host these lectures during the 2002-2003 academic year are due at JOI on April 5, 2002. JOI expects over 100 applications.

Dr. Barbara Bekins, US Geological Survey
The Subduction Squeegee

Dr. Gerald R. Dickens, Rice University
Extreme Climates and Frozen Methane: The Global Carbon Cycle with Gas Hydrate

Dr. Patricia Fryer, University of Hawaii
Windows on Subduction Zone Processes

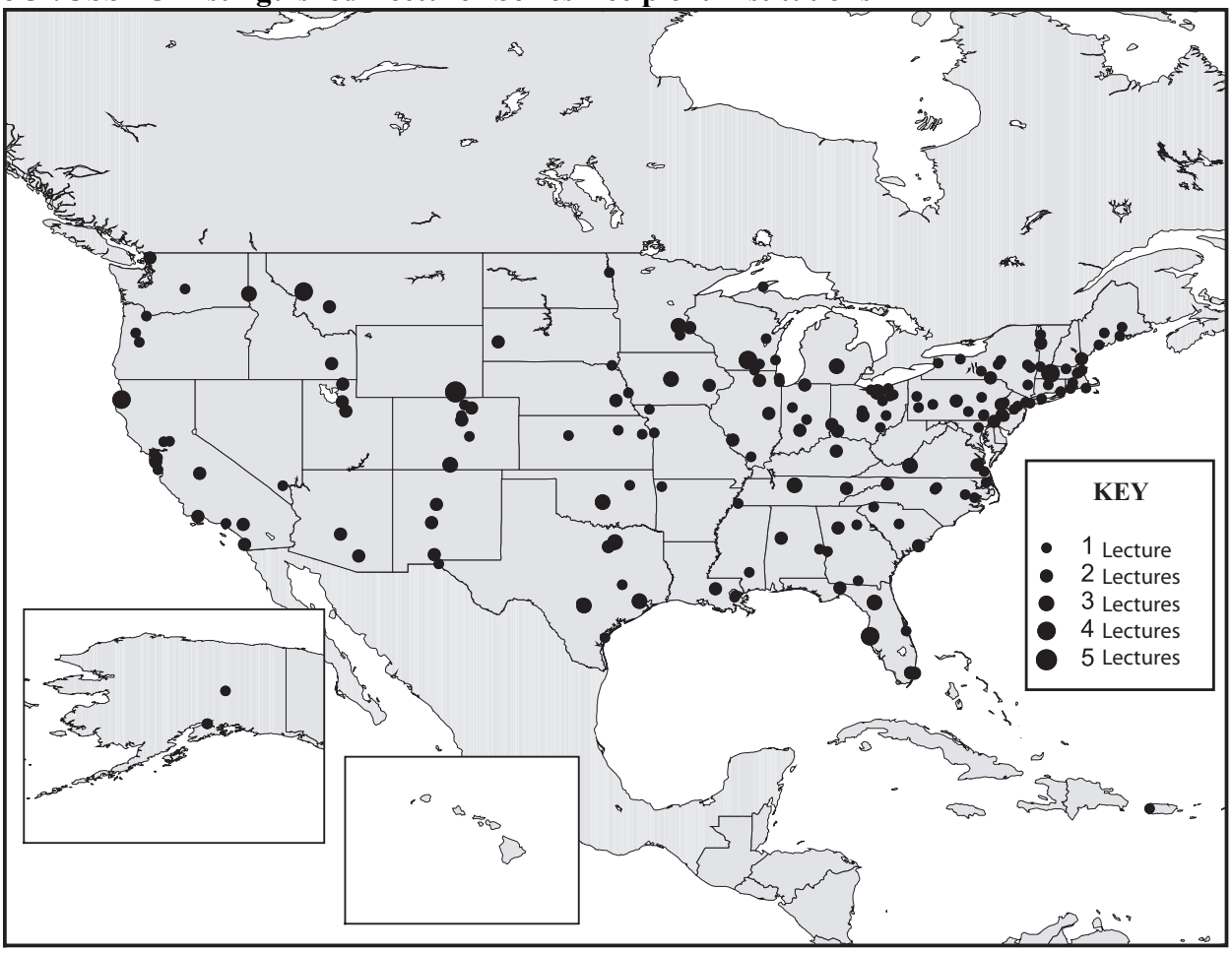
Dr. Alan Mix, Oregon State University
The Icy Poles or the Muggy Equator: What Drives Natural Climate Change?

Dr. Gregory Mountain, Lamont Doherty-Earth Observatory
The Ups and Downs of Determining Ancient Sea Level Change

Dr. David C. Smith, University of Rhode Island
Life in Marine Sediments: Probing the Limits of Earth's Deep Biosphere

In an attempt to assess the national impact of the DLS series, the JOI/USSSP intern Micah Nicolo mapped the distribution of US academic institutions that have received DLS lecturers since the program's inception in 1990.

JOI/USSAC Distinguished Lecturer Series Recipient Institutions



ODP Undergraduate Student Trainee Program

Jill Ann Gudding, an undergraduate at Michigan State University, participated as a Student Trainee on Leg 197 in July and August, 2001. Ms. Gudding was the third U.S. Trainee to participate in the program. During the leg, Ms. Gudding was mentored in igneous petrology by Dr. Clive Neal, University of Notre Dame, and by Dr. Randall Keller, Oregon State University. Ms. Gudding was graduated in Fall 2001, and hopes to continue her Leg 197 research in graduate school. Future trainee positions on upcoming Legs 203 and 205 were advertised in the fall 2001 issue of the *JOI/USSAC Newsletter*.

Educational and Curriculum Development

JOI has continued to distribute the *Blast from the Past* poster at conferences and in response to requests, mostly from educators. Following a panel evaluation in June 2001, this popular poster was also selected for inclusion in a curriculum program being produced by Carolina Biological Supply Company. The program, titled "Science and Technology Concepts for Middle School," is being developed by the National Science Resources Center, which is jointly operated by the National Academy of Sciences and the Smithsonian Institution. Carolina Biological Supply Company is printing copies of the poster for use with the curriculum packages.

With current supplies of *Gateways to Glaciation* running low, JOI/USSSP contracted with a vendor in August 2001 to duplicate an additional 15,000 copies of the educational CD-ROM. The new version of the CD contains a PDF copy of the *Gateways to Glaciation* Teacher's Manual, and the CDs are packages in CD sleeves rather than jewel cases making them easier to transport and mail. Printed on the new sleeve is the ODP logo, instructions for loading the CD-ROM and acknowledgement of both USSSP and NSF's contributions to the project. The CDs will continue to be distributed at scientific meetings, US port calls, and in response to requests.

Collaboration with AGI on Earth Science Week

In September 2001, five thousand *Gateways to Glaciation* CDs were provided to the American Geological Institute (AGI) for inclusion in Earth Science Week kits. These kits are being distributed by AGI as a primary component of their Earth Science Week (October 7-13, 2001) activities. Extra *Blast from the Past* posters and *ODP: Mountains to Monsoons* educational CDs remaining from Earth Science Week in 2000 were also included in the 2001 kits.

Partnership with the Carolina Biological Supply Company

In the summer and fall of 2001, JOI/USSSP began coordinating plans with Carolina Biological Supply Company ("Carolina") to develop an educational video that highlights the Ocean Drilling Program and several scientists involved with ODP. This video will complement existing Carolina videos that introduce middle and high school students to both scientific concepts and careers. Carolina staff will produce the video with advice and guidance from JOI. Specifically, Carolina will conduct and film 15-minute scientist interviews and edit them into a final product that runs approximately 45 minutes. JOI will coordinate interviews with willing scientists, supply information and editorial feedback, and provide existing film footage of the *JOIDES Resolution*.

Willing scientists serving on USSAC, many of whom are previous Distinguished Lecturers, will be interviewed in February 2002 when USSAC meets in Chapel Hill, NC, which is near Burlington, where Carolina is located. Arrangements will be made for a Carolina film crew to visit the *Resolution* at a port call if additional footage of the ship is necessary. The target port call would be in San Francisco in July 2002. The July 2002 USSAC meeting will take place at this same port call, which would provide Carolina with another opportunity to film interviews with scientists if necessary.

JOI/USSSP presence at national/international meetings

JOI/USSSP provided materials and support for scientific ocean drilling booths in the exhibit halls of three major scientific meetings in year 2001. These included the European Union of Geosciences (EUG) (Strasbourg, France, April 6-13, 2001), the International Conference on Paleoceanography (ICP) (Sapporo, Japan, September 16-22, 2001), and the fall meeting of the American Geophysical Union (AGU) (San Francisco, CA, December 10-14, 2001).

As is tradition, JOI/USSSP sponsored an annual "ODP Town Meeting" on December 11, 2001, during the fall AGU meeting. The town meeting, which attracted several hundred attendees, is an important event at AGU for it provides an ideal venue for exchanging information. At the meeting, updates are provided on the activities of the ODP and the plans, progress, and timelines for the development of the

various elements of the IODP. These event offers an opportunity for lively questions and answers. The gathering, emceed by JOI President Dr. Steve Bohlen, provided an opportunity to hear from Drs. Margaret Leinen on the planning process for IODP, from Dr. Larry Mayer on the initial Science Advisory Structure, and from Dr. Peggy Delaney, USSAC Chair, on U.S. participation in ODP and in IODP.

JOI/USSSP also plans to host a scientific ocean drilling booth at the spring American geophysical Union Meeting in Washington, DC, May 29-31, 2002.

JOI/USSAC Newsletter

A 24-page issue of the *JOI/USSAC Newsletter* was printed and distributed in November 2001. This issue included articles on the JOIDES Arctic drilling proposal, 533-Full2, magnetic artifacts in APC cores, a coral drilling workshop, site survey work around Hole 735B, the research of two Schlanger Ocean Drilling Fellows, as well as other USSSP, ODP and IODP activities. This issue and past ones can be viewed on-line at
http://www.joi-odp.org. The newsletter is distributed to nearly 2400 addresses in the U.S. and abroad.

JOI/USSSP listserver and website

A JOI/USSSP email list, launched in May 2000, continues to provide rapid communication primarily with the U.S. and non-U.S. scientific ocean drilling community. The email list is moderated at JOI to ensure that all the messages are relevant to USSSP, ODP, or other matters of scientific ocean drilling. Since its initiation, the number of list members has grown to about 1500. If you wish to be added to the list, or to distribute a message over the listserver, please send it, along with a brief explanation, to Andrea Johnson at: ajohnson@joiscience.org.
The USSSP component of the JOI website (http://www.joi-odp.org) continues to grow as an important means of providing information to the scientific ocean drilling community. Maintaining, updating, and upgrading the website continue as vital JOI/USSSP activities.

Promotion at U.S. ports of call of the *JOIDES Resolution*

Under the direction of JOI's Ms. Kasey White, JOI/USSSP is making plans for port call activities in San Francisco (July 2002) and San Diego (September 2002). JOI is currently working with local hosts to plan events at the port calls surrounding Leg 204.

Capitol Hill Event

On October 10, JOI joined with the bipartisan House Oceans Caucus to cosponsor a reception on Capitol Hill. The event featured displays on ODP research and IODP by Drs. Nick Pisias, Ken Miller, Steve D'Hondt, Robert Zierenberg, Susan Humphris, Peter Flemings, Jerry Dickens, and JOI staff. House Oceans Caucus Co-Chair Tom Allen (D-ME) welcomed attendees to the reception, and JOI President Dr. Steve Bohlen and Caucus Co-Chair Jim Greenwood (R-PA) spoke about the importance of ODP and ocean research to the nation. The reception, which was well attended by congressional staff and the scientific community, was the culmination of two days of visits to nearly 20 offices of key congressional members and committee staff on the importance of ocean drilling.

5. Management and Operations Reports

5.1 ODP Council Report

The ODP Council met on Saturday, 30 June following the EXCOM meeting in Oxford. The agenda included presentations by JOIDES and JOI on: 1) Scientific accomplishments and plans; 2) Program operations; 3) status of JOIDES membership; 4) Phase-down planning including scientific legacy documentation; and 5) Concluding remarks on the PEC-V report. NSF reported that it plans to support phase-down of ODP activity (2004-2007) without additional partner contributions. The Council also expressed some concern with delays in contributions to the ODP Legacy Activity. The ODP has been a long and highly successful program. Formally documenting this success and the Program's contributions should be a high priority for ODP scientists.

5.2 NSF Management Report

The FY 2002 ODP (1 October 2001 to 30 September 2002) Program Plan was approved at an initial funding level of $46,198,000. The Plan meets JOIDES requirements for science programs to be conducted in 2002, and NSF guidance with respect to budgeting fuel costs and continued planning for Arctic drilling. Following approval of the Plan, JOI identified approximately $1.3M in unobligated FY 2001 funds that primarily represent delayed spending for cork programs as part of the drilling off Costa Rica, and residual funds not required in 2001 for fuel. NSF has approved carrying forward these funds into FY 2002, with the remaining fuel funds to remain as a buffer against an unexpected rise in fuel prices above the budgeted $250/ton level. The resulting Program Plan is therefore presently approved at a level of $47,578,259.

Contributions by all ODP members are expected to be consistent with schedules identified in MOUs and previously reported, though the FY 2002 contribution level for the PACRIM consortium has not been resolved. Canada and Australia have committed to maintaining their 1/3 (full member) contribution levels, but the total PACRIM contribution has not been identified. NSF will provide approximately 65% of FY 2002 Program Costs.

The present funding approval from the National Science Board of NSF for the prime contract to JOI will terminate at the end of 2002. NSF has instructed ODP managers to prepare a multiyear Program Plan that will cover the final year of ODP drilling operations (2003) and phase-out of contractor activity (2004-2007). This plan will be presented to EXCOM at the Santa Cruz meeting. The formal version of this plan will be due at NSF in early March 2002, will be merit reviewed in the Spring and considered by the National Science Board in the Summer of 2002. It is expected that the contract phase-down plan will be consistent with the JOIDES recommendations and plans for termination of the ODP. NSF expects the plan to reflect the following considerations:

- Continuation of the strong scientific program which has characterized the ODP to date, with drilling and logging operations maximizing use of the JOIDES Resolution in 2003, but allowing sufficient time to meet all requirements (vessel and logging) for subcontract completion prior to the end of FY 2003. A provisional target budget of $45.3M has been identified for 2003 scientific drilling based on this plan. Initial out-

year budgets (2004-2007) have been identified based on JOIDES and contractor planning and will be subject to yearly re-negotiation. No international contributions for the 2004-2007 period are expected.

- An orderly termination and phase-down of operations, including completion of the legacy documentation identified by JOIDES.
- Continuation of good business practice in contract and program management that has characterized ODP to date.
- Continuation of operationally and environmentally safe procedures and practices.
- Preservation of ODP scientific and physical assets.
- Orderly phase-down of personnel assets.

To the extent possible it is expected that the responsibility for ODP scientific and physical assets will be transferred to appropriate IODP contractor organizations as required.

NSF and JOI have discussed the requirements for the next Performance Evaluation Committee and decided to schedule this activity in 2004. One objective of the review will be to examine status and progress of phase down activities.

5.4 PEC VI

1. Terms of Reference for Performance Evaluation (Revised Sept '87)

During the life of the Ocean Drilling Program JOI will periodically evaluate the performance of its subcontractors. This evaluation will be accomplished at 2-3 year interva1s by a committee of experts appointed by the President of JOI. The President will consult with NSF, the JOIDES EXCOM, PCOM, and others as appropriate in the formation of the evaluation committee. The Performance Evaluation Committee (PEC) will report to the President of JOI. Terms of Reference for the evaluation will embody the following general procedures and criteria:

1) The committee membership will consist of experts in the fields of engineering, management, and science to be chosen by the President of JOI in consultation with NSF, the JOI Board of Governors, JOIDES and others. The committee should be chaired by an eminent scientist who should be knowledgeable about ODP but not currently active in the program. Committee members should not be currently active in the program.

2) The committee will review and evaluate the performance of Texas A&M, Lamont-Doherty, and other subcontractors in accordance with a schedule to be developed by the chairman and approved by the President of JOI. JOI will provide for sufficient funds in the Performance Evaluation Committee budget to include the services of an executive secretary.

3) The committee will be briefed by the JOI Chairman of the Board of Governors and President in advance of any scheduled performance evaluation. Following completion of the evaluation and receipt of subcontractors comments and plans, the committee will debrief corporate members of JOI.

4) The committee will transmit in writing to the subcontractor being evaluated the scope and procedures of the evaluation together with any questionnaires or questions to be answered. Copies of such correspondence will be furnished to the President of JOI who will keep the Board of Governors informed.

5) The committee will conduct its evaluation at the headquarters site of the principal subcontractors. Sufficient time shall be allocated for a thorough review. The drillship also will be visited for evaluation when appropriate and convenient. If scheduling is impractical, interviews will be conducted with members of recent past crew and past scientific parties.

6) The committee will evaluate the principal items of performance, including accomplishment of scope of work in the contract, particularly with regard to achievement of scientific objectives; program plan management and adherence; personnel policies and personnel management; overall management effectiveness and efficiency, including cost consciousness; subcontract management; reports

and report management; public information, particularly in regard to scientific dissemination of data; liaison and relationships with JOIDES, JOI, NSF, and national and international scientific bodies; engineering maintenance, development, and application; attention to environmental conditions and adherence to environmental impact statements; safety procedures and safety record; staff morale, other items considered important by the committee.

7) After completion of each evaluation, the chairman of the committee will discuss the committee's findings with the senior official of the subcontractor and/or the subcontractor's staff, as is mutually agreed. This discussion and its content shall be communicated to the President of JOI who shall in turn inform the Board of Governors

8) Within two months of completion of site visits, the chairman of the committee will submit the performance evaluation report to the President of JOI who will discuss with and transmit the report to the subcontractors with a request for written comments, including plans for any action required.

9) The President of JOI, after receiving the subcontractors' comments and plans, will review the final report and implementing recommendations with the Board of Governors. The President will then transmit a copy of the report and implementation plans to NSF, the JOIDES EXCOM and PCOM. This should occur within two months after receipt of the report from the Performance Evaluation Committee. Those recommendations requiring consultation with EXCOM and NSF will be reviewed with these organizations prior to implementing action.

INTRODUCTION; MEMBERSHIP; TERMS OF REFERENCE; and ACTIVITIES

1. Introduction

It had been recognized that during the life of the Ocean Drilling Program, it was essential that JOI as the prime contractor should have a method for periodically evaluating the performance of its subcontractors. In its proposal to the National Science Foundation in July 1983, the Corporation set forth its intention to conduct a performance evaluation of Texas A&M University, the Science Operator, Lamont-Doherty Geological Observatory, the subcontractor, for logging services, and other subcontractors and program activities on a biannual basis. This process was scheduled to begin in the fall of 1985.

The president of JOI after consultation with the JOIDES Executive and P1anning Committees and other appropriate individuals, appointed the Performance Evaluation Committee and chose its chairman.

2. Membership

Dr. William Hay, Chairman
Dr. Joe S. Creager
Dr. Jean Francheteau
Dr. Karl Hinz
Dr. Myron Horn
Dr. John C. Maxwell (only available for College Station visit)
A.E.S. Mayer, Executive Secretary

3. Terms of Reference

3.1 Committee Operation -JOI laid down the following arrangements for the operation of the Committee: "The Committee will be briefed by the Chairman of the Board and other officers of JOI in advance of the beginning of the performance evaluation. Following the evaluation, the Committee will debrief officers and then Corporate members of JOI with the general guidelines provided by the Terms of Reference. The Committee will first develop and then transmit in writing to the subcontractors being evaluated the scope and procedures of the evaluation, together with any questionnaires or questions to be answered. The same information will be transmitted to the president of JOI. The Committee will conduct its evaluation at the principal headquarters sites of the subcontractors and will visit the drillship during its St. John's, Newfoundland port call in the later part of October 1985.

The Committee will interview co-chief scientists and/or members of the scientific party as appropriate of Legs 101 through 105, which will have been completed at the time of the performance evaluation, as well as members of JOIDES committees and panels.

After the completion of the evaluation, the chairman of the Committee will discuss the Committee's findings with the President of JOI and the senior officials of the subcontractors and/or the subcontractors' staff, as is mutually agreed.

Within one month of the evaluation, the chairman of the Committee will submit a draft of the evaluation report to the President of JOI. The President of JOI or his representative will discuss with and transmit the report to the subcontractors and will ask for written comments, including plans for any action required. After receiving the subcontractors' comments and plans, JOI will discuss the report with and transmit a copy of it to the Chairman of the EXCOM and PCOM and to the National Science Foundation.

The ultimate objective is to achieve a reliable and effective evaluation system that will best serve the scientific community, NSF and JOI. Committee members are encouraged to suggest to the President of JOI ways in which the process can be made more effective."

The Committee adhered to this operational plan.

3.2 Scope of the Evaluation -JOI stipulated that the evaluation should include an examination of the following program management elements:

3.2.1 Achievement of scientific objectives - The report of the Conference on Scientific Ocean Drilling November 1981 established the blueprint for ten years of scientific ocean drilling. It was the document upon which a peer review as conducted and program approval awarded by the National Science Board. It was recognized that at the time of the evaluation, only five of an anticipated sixty or more legs had been completed. Nevertheless, sufficient plans were in place which enabled the Committee to make some general observations with regard to the initial direction of the program and its consistency with COSOD objectives.

3.2.2 Program plan management and adherence – Each year, the principal subcontractors, TAMU and LDEO, provide JOI with a program plan for the following year which is based upon the scientific directions of JOIDES. Since two program plan years, FY 84 and 85, had been completed at the time of the evaluation and a program plan for FY 86 initiated, the Committee was asked to assess the subcontractors' success in meeting the plans' objectives.

3.2 .3 Budget preparation and adherence - Detailed subcontractor budgets, prepared as part of the development of annual program plans were available. The Committee was asked to review the budget preparation process, the budgets themselves, and the subcontractors' performance.

3.2.4 Personnel policies and management-The success of a major program undertaking rests to a major degree upon management' s ability to attract and hold capable individuals and to elicit a consistent, highly motivated attitude toward program execution. The Committee was asked to take a retrospective look at staffing, making a judgment on the subcontractors' success in developing the appropriate cadre and establishing an esprit de corps.

3.2.5 Engineering maintenance, development, application -The maintenance standards established by the subcontractors for all shipboard equipment, either directly or indirectly under their control, have a major bearing on the quality of scientific results achieved. The development of enhanced technical capability to obtain information heretofore beyond the capabilities of GLOMAR CHALLENGER, and the application of those developments to the service of science are essential ingredients of the COSOD report. The Committee was asked to assess these aspects of the program engineering effort and make judgments regarding engineering staff adequacy, organization and performance during the initial phases of the program.

3.2.6 Attention to environmental conditions -The field portion of the Ocean Drilling Program is an inherently dangerous undertaking in which lack of adequate preparation or carelessness in execution can have serious environmental consequences. The Committee was asked to assess the standard operating procedures for adequacy and assess subcontractors' adherence to these procedures and if possible make a judgment of contactor performance in the face of unforeseen developments.

3.2.7 Safety -Operations on board a drillship are inherently dangerous to personnel. The Committee was asked to attempt to review the safety procedures, adherence, and personnel training as well as the statistical measure of success in providing a safe environment.

3.2.8 Overall management effectiveness and efficiency -The Committee was asked to attempt to make a judgment of each of the subcontractor's success in this category in terms of the cost consciousness of personnel, the management of subcontracts, the timeliness of reports internal to the subcontractor, as well as to the prime contractor, the dissemination of public information about the program and the general orderliness with which the business affairs of the subcontractor are being carried out.

3.2.9 Relationships with JOIDES, JOI, NSF -Each of these bodies is an integral part of the total program management structure. The Committee was asked to assess the interrelationships with special attention to the fidelity of communications, working relationships and any perceptions that suggest remedial attention might be required.

3.2.10 Morale -The Committee was asked to make a judgment in each subcontractor organization as to morale, confidence in the future and the general outlook of individuals associated with the program.

History of how the PEC-V charge (aka mandate) was determined:

In brief, a draft mandate was developed in early 1998 by a group that included, among others, the incoming and outgoing EXCOM Chairs (Helmut Beiersdorf and Bob Detrick, respectively), and the interim Director of ODP at JOI (Nick Pisias). This PEC-V activity was discussed at the January 1998 meeting, and EXCOM endorsed the draft mandate at their June 1998 meeting. The JOI BoG approved the mandate at their June 1998 meeting.

From the June 1998 EXCOM Meeting

A draft charge was presented by Nick Pisias, JOI's interim Director of ODP, to EXCOM at their June 1998 meeting. The charge (embedded in the "5th ODP Performance Evaluation Committee Terms of Reference") was included in Tab 17 of the agenda book. Also included was background and the action sought of EXCOM. EXCOM was asked to review the charge and make recommendations to JOI BoG. Pisias said that the consensus at the January EXCOM meeting was not to conduct the standard PEC, but focus instead on how the Program is preparing for the future.

The 4-part charge was:

- The progress of the Program toward the achievement of the major scientific goals outlined in the ODP Long Range Plan, and the cost effectiveness and performance of JOI, and its major subcontractors, in achieving these goals.**

- The effectiveness of mechanisms in place for making budgetary decisions in the context of the scientific priorities of the Program and projected budgetary constraints, and the potential of current strategies for seeking additional avenues of funding for the Program.

- The operation of the new JOIDES advisory structure, including proposal evaluation and selection, short- and long-term planning, and provision of technical advice to JOI and its subcontractors.

- The progress of the present Program in preparing for a new scientific ocean drilling program beyond the year 2003.

From the June 1998 JOI Board of Governors meeting:

Agenda Item V: Approval of Terms of Reference for the Fifth Performance Evaluation Committee

Governors held a general discussion of the terms of reference and questioned, in detail, specific mechanisms for assessing the achievement of the major scientific goals of the ODP through the PEC V. In terms of the PEC membership, Leinen stressed the importance of individuals from outside of traditional academic circles, arguing that 50% participation from industry and other non-academic representatives would be making a "statement". Governors concluded their discussion with a general consensus that the terms of reference should be edited** by Moran so that the achievements of the ODP

are evaluated in light of the Program's Long Range Plan within the fiscal constraints imposed by the overall decline in the Program's budget, in real dollars.

****** NB: The Board approved the addition of this sentence to the first charge, "This progress should be evaluated within the context of the budgets available to the drilling program."

From the January 1999 EXCOM meeting:

8.2.1 Performance Evaluation Committee V
The members of the committee will be Earl Doyle, Hans Dürbaum, Ross Heath (Chair), Dan Karig, Tom Loutit, Nori Nasu, Amos Nur, and Karl Turekian. The committee will have its first meeting in Washington in February 1999, and completion of its study is expected in September 1999.

SCIENCE OPERATOR'S EXCOM REPORT

Review of Activities June 2001 through December 2001

Executive Overview

After carrying out a very demanding and challenging sequence of scientific drilling operations in the far western Pacific and Southern Ocean for more than three years, the JR concluded scientific ocean drilling in this sector of the global ocean with Leg 197 (Emperor Seamounts) and Leg 198 (Shatsky Rise). After transiting to Hawaii for the Leg 198/199 port call, the ship commenced working in the central eastern Pacific during Leg 199 (Paleogene Pacific).

These last three legs (Leg 197, 198, 199) were relatively routine because operational requirements utilized our standard drilling and coring tools. Each one of these legs encountered challenging drilling conditions (chert horizons on Leg 198 and 199 and extrusive lavas on Leg 197), but the scientific objectives of each leg were achieved. Legs 198 and 199 were scheduled during the typhoon season in the western Pacific but, fortunately, the typhoon tracks went south when the JR was working along the Emperor Seamounts and the typhoons tracked north when the JR was working on Shatsky. Less than 48 hours of drilling time was lost due to weather on these two legs combined.

The scientific program that has been scheduled for the next 12 months is not only scientifically exciting, but many of the legs require the utilization of technological enhancements, and/or demanding drilling installations that require a significant amount of extra drilling hardware. On Leg 201 (Peru Biosphere) the Program will deploy a newly designed and built radioisotope van to support the microbiological objectives of the leg. Also, ODP will carry out engineering tests of the Program's enhanced Pressure Core Sampler and a new percussion coring/pressure sampling system developed by the HYACE/HYACINTH consortium. These tools will be tested on Leg 201 in preparation for deployment on Leg 204 (Gas Hydrates) where these tools will be used to recover gas hydrates. On Legs 200 (H2O Observatory), 203 (Equatorial Pacific Ion), 205 (Costa Rica), and 206 (Fast Spreading Crust), long strings of casing will be required to stabilize the holes in order to achieve the scientific goals of the legs. In addition, on Leg 205 the Program will deploy CORKS and osmotic water samplers.

The Program's operational successes on Legs 197, 198 and 199 have been supplemented by the completion of a number of programmatic initiatives. With the addition of a radioisotope laboratory to the JR, the quality of the microbiology facilities are now first-rate and ready for Leg 201, a leg devoted solely to microbiological investigations. Moreover, a digital photographic system was successfully installed on board the JR in July 2001 for testing and is now fully functional. As well, the new Advanced Piston Core (APC) Methane Tool, a joint development with the Monterey Bay Aquarium Research Institute (MBARI), has been fully tested at sea and is now ready for deployment on Legs 201 and 204.

It is now less than two years until scientific drilling in support of ODP ceases. As such, at Texas A&M we are experiencing an increase in the rate of turnover of senior personnel (e.g. four engineers and one staff scientist have left in the last six months and another two staff scientist will leave in 2002). With effective management, this enhanced turnover has been accommodated so far without a significant loss of productivity. We remain confident that even in the face of enhanced turnover rates, we will maintain our excellent standard of science service delivery until the end of ODP.

Introduction

In an effort to codify relevant information and to streamline the summary of the Science Operator's activities, as much information as possible is presented in tabular form. These data are presented by functional department.

Science Services

Schedule of Science Operations for the *JOIDES Resolution*: August, 2001 – September, 2003

	Leg	Port (Origin)	Dates ¤	Total Days (port†/sea)	Days at Sea (transit/on site)	TAMU Contact	LDEO Contact
198	Shatsky Rise	Yokohama	28 August – 24 October '01	57 (5/52)	17/35	M. Malone	T. Williams
199	Paleogene Pacific	Honolulu	24 October – 17 December '01	54 (5/49)	13/36	C. Escutia	P. Gaillot, B. Rea
200	H2O Observatory	Honolulu	17 December – 28 January '02	42 (5/37)	9/28	G. Acton	Y. Sun
201	Peru Biosphere	San Diego	28 January – 1 April '02	63 (5/58)	23/35	J. Miller	G. Guerin
202	SE Paleoceanography	Valparaiso	1 April – 1 June '02	61 (5/56)	20/36	P. Blum	U. Ninnemann
203	Eq. Pac. ION	Balboa	1 June – 8 July '02	37 (5/32)	16/16	G. Acton	A. Buysch
204	Gas Hydrates*	San Francisco	8 July– 6 September '02	60 (5/55)	7/48	C. Richter	D. Goldberg, S. Barr
205	Costa Rica	San Diego	6 September – 6 November '02	61 (5/56)	11/45	A. Klaus	S. Saito
206	Fast Spreading Crust	Balboa	6 November – 5 January '03	60 (5/55)	6/49	TBN	F. Einaudi
	Transit	Balboa	5 January – 13 January '03	8 (2/6)	6/0	TBN	TBN
207	Demerara Rise	Barbados	13 January – 8 March '03	54 (3/51)	13/38	TBN	B. Rea
208	Walvis Ridge	Rio de Janeiro	8 March – 9 May '03	62 (5/57)	18/39	M. Malone	U. Ninnemann
209	MAR Peridotite	Rio de Janeiro	9 May – 10 July '03	62 (5/57)	17/40	J. Miller	G. Iturrino
210	Newfoundland Margin	Bermuda	10 July – 9 September '03	61 (5/56)	6/50	P. Blum	H. Delius
	Transit	St. John's	9 September – 21 September '03	12 (1/11)	11/0	TBN	TBN
	Demobilization‡	Galveston	21 September – 30 September '03	9 (9/0)	0/0	TBN	G. Myers

Notes:
¤ Start date reflects the first full day in port. This is the date of the ODP and ODL crossover meetings. The JR is expected to arrive late the preceeding day. Port call dates have been included in the dates which are listed.
† Although 5 day port calls are generally scheduled, the ship sails when ready.
* A mid-leg port call will occur for Leg 204.
‡ Demobilization assumes a seven day (+2 day port call) period tentatively scheduled for Galveston.

17 December 2001

Co-Chief Scientists and Cruise Staffing for Science Operations

Co-Chief Scientists for Legs 198-210:

	Leg	Co-Chief Scientists
198	Shatsky	T. Bralower I. Premoli Silva
199	Paleogene	M. Lyle P. Wilson
200	H_2O Observatory	R. Stephen J. Kasahara
201	Peru	S. D'Hondt B. Jorgensen
202	SE Paleoceanography	A. Mix R. Tiedemann
203	Eq. Pac. Ion	J. Orcutt A. Schultz
204	Gas Hydrates	A. Trehu G. Bohrmann
205	Costa Rica	J. Morris H. Villinger
206	Fast Spreading Crust	D. Wilson D. Teagle
207	Demerara Rise	J. Erbacher TBN
208	Walvis Ridge	J. Zachos D. Kroon
209	MAR Peridotite	E. Kikawa P. Kelemen
210	Newfoundland Margin	B. Tucholke TBN

Scientific Party Staffing:

Staffing through Leg 202 is completed and staffing for Legs 203 - 205 is in progress.

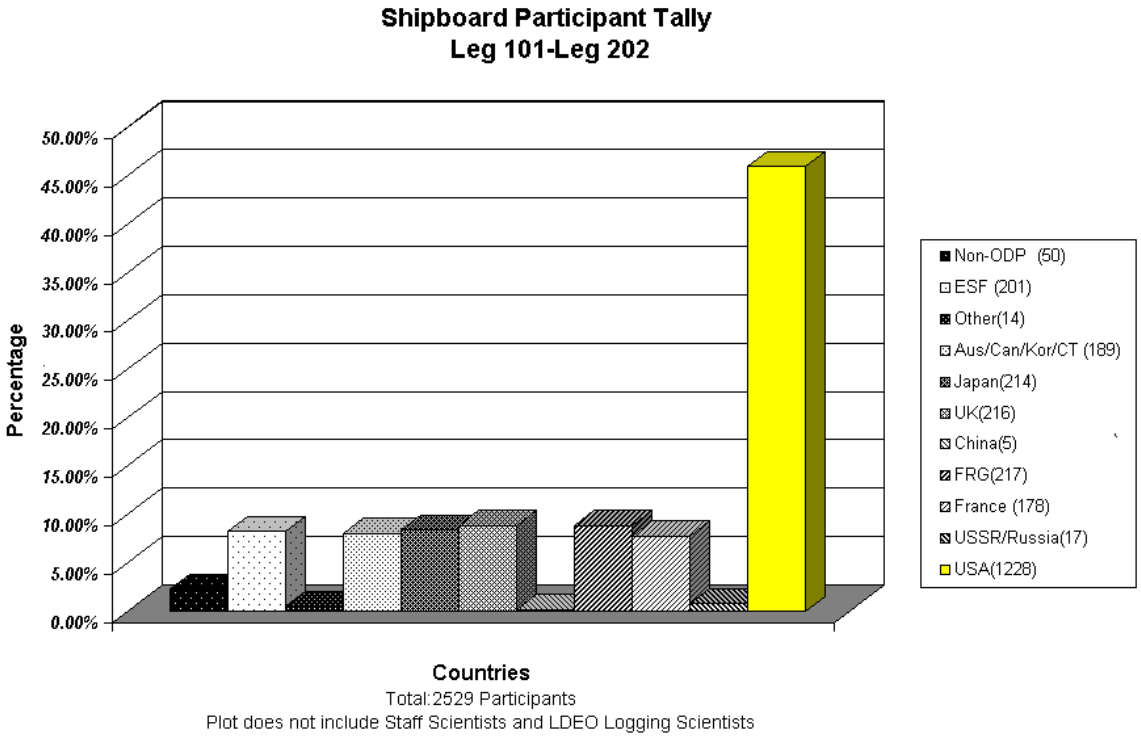
Tabulated below are the numbers of applications on file as of November 30, 2001.

Legs	Total Applicants	U.S. Applicants	U.S. Students	Non-U.S. Applicants	Non-U.S. Students
200	17	4	1	7	5
201	48	21	5	17	5
202	65	17	7	31	10
203	12	4	1	6	1
204	48	12	4	20	12
205	23	7	4	8	4

Leg 205 is the last leg in ODP concerned with implanting downhole instrument packages or CORKs, rather than coring. Legs 206-210 are focussed on more "traditional" ODP coring operations. This, coupled with the fact that they are the last legs scheduled for ODP, will likely stimulate community interest in sailing on *JOIDES Resolution*. Therefore, although the numbers of applications for berths on legs 206 and beyond is presently very small, we expect significant numbers of applications to be received early in 2002 as information about these cruises becomes more widely known.

Shipboard Participant Tally:

Please reference the table below for a compilation of all sailing participants since Leg 101 through Leg 202.



Ongoing Programmatic Enhancements

Digital Imaging:

A GeoTek system capable of imaging four core sections at each pass was purchased and installed on *JOIDES Resolution* at the beginning of Leg 198 (late FY01). This was a joint project between Science Services and the Information Services departments. ODP/TAMU received the digital imaging system from Geotek in mid July and had it installed at ODP/TAMU shortly thereafter. Technicians and photographers were trained to use the system and Information Services personnel focused on developing software to allow data flow from the initial scan to presentation over the ship's intranet.

The hardware and software were delivered to the ship and loaded during the Yokohama port call in late August. ODP technicians and MCS's assembled the track, installed the software, and rigged the system for testing. A fair amount of testing occurred during Leg 198 because the digital imaging system and associated hardware/software were used for the first time under "field

conditions". Nevertheless, the Leg 198 science party reported that they were very pleased with the system, using the images for discussion, display and presentation, and for constructing complex figures for publication. In particular, the images allow almost instant visual comparison of critical intervals between holes and among sites, something that was very important for that leg. Nearly 3,000 meters of core were scanned (by section) and all image files were provided over the ship's Intranet to scientists for viewing and manipulation. Throughout the leg, original bit map files were archived on tape while compressed files were provided to the scientists.

At the end of the leg, all original bit map files and compressed files were brought back to ODP. The bit map files were transferred to the ODP data librarian and the compressed files were placed on the worldwide Internet (under moratorium protection). No analytical capabilities through software were included in the original scanning system specifications and none were provided during the testing of the new system. The implementation during Leg 198 focused on scanning the core and archiving the digital image data. The same goals were set for Leg 199 and no changes were made to the imaging system for that leg.

The next phase of the project will focus on the use of the data in compressed format. The desire of the scientists is to be able to analyze the digital images using some sort of software tools. ODP is in the process of assessing and selecting such tools. One possibility is a software tool that will plot the red (R), green (G), and blue (B) color image values next to the scanned image itself. Another potential tool would allow scientists and technicians to plot Janus database variables alongside the plotted RGB values and the images. In either case, the attempt will be to provide some analytical capabilities on the JR in addition to the primary tasks of scanning and archiving the core sections. An ambitious timeline for this phase of the project has been set. The expectation is that analytical capabilities will be available on Leg 202.

Microbiology:

Leg 201 (February-April, 2002), which is focussed on deep biosphere studies along the Peru margin, is the first leg dedicated entirely to microbiological objectives. The sites selected have all been occupied and cored previously by ODP (on Legs 112 and 138) so the basic litho- and biostratigraphic relationships are already known. This has enabled us to reduce the shipboard activities in those areas to a minimum and to focus on geochemical and microbiological studies. This departure from more usual ODP activities is reflected in the make up of the shipboard science party which includes 15 geochemists and microbiologists, rather than the usual 3 or 4 representatives of these disciplines.

The use of radioisotopes on Leg 201 is a new development for ODP. A new van, built to UNOLS standards and specially equiped for radio isotope work is being installed on *JOIDES Resolution* during the San Diego port call (presently in progress) and will be used during Legs 201 and 204. The van will then be removed from the ship and stored for future use in IODP.

Summary of Leg Operation: Legs 196, 197, 198

	Leg 196 Nankai II 2 May – 1July '01 Keelung - Yokohama	Leg 197 Hawaii Hotspots 1 July – 27 August Yokohama - Yokohama	Leg 198 Shatsky Rise 27 August – 23 October '01 Guam – Keelung
Transit/Onsite (day)	6.6/46.7	15.6/37.3	16.9/37.3
Sites	2	4	8
Holes	4	5	16
Water Depth (m)	4801-4685	1321-2604	2398-3894
Deepest Penetr. (m)	1057	954	622
Cored Interval (m)	19	1481	3946
Tot. Recov. (m,%)	5 (26.6%)	752 (50.8%)	2914 (73.9%)
APC Recov. (m,%)	0	0	2543 (102.9%)
XCB Recov. (m,%)	0	0	190 (71.7%)
RCB Recov. (m,%)	5 (26.6%)	752 (50.8%)	180 (15.0%)
HYACE	0	0	0.2 (5.1%)

Review of Operations

Leg 196 (Nankai II):

- Leg 196 was the second cruise of a two-leg program in the Nankai Trough, a convergent margin accreting a thick section of clastic sediments. Part 1 (Leg 190) cored at sites along two transects to investigate the variability in deformational and hydrologic characteristics. Part 2 (Leg 196) conducted logging-while-drilling (LWD)/measurement-while-drilling (MWD) measurements and installed two long-term observatories.
- LWD/MWD measurements were successfully conducted at three sites.
  - Site 808I reached a record LWD/MWD depth of 1057.5 m.
- Two sites were instrumented with ACORK casing, packers, and well screens.
  - Hole 1173B was completed with an ACORK with 5 screens and 4 packers.
  - Hole 808I was completed with an ACORK with 6 screens and 2 packers
  - A record string of 20 in. casing (156 m) was installed with an underreamer and mud motor.

Leg 197 (Hawaii Hotspots):

- The objective was to penetrate 100-150 m of igneous basement at each of five sites along the Emperor seamount chain located in the Northwest Pacific to determine the paleolatitude and age of the seamount chain.
- Four sites and five holes were cored in water depths from 1321-2604 m.
- 1481 m of sediment and 752 m of basement were cored (50.8% recovery).
- All sites penetrated acoustic basement (1213 m of basement cored with 56.5% recovery).
- The average ROP in basement was 3.1 m/hr.

Leg 198 (Shatsky Rise):

- The objective was to address the causes and consequences of global "greenhouse" warm climate intervals in the Cretaceous and Paleogene and to determine whether the Shatsky Rise large igneous province formed at a divergent boundary or within a plate.
- Eight sites were cored water depths from 2398-3894.
- Record Shatsky Rise recovery: 2914 m of core was recovered (73.9% recovery).
- XCB center bits were effectively used to drill cherts so that APC coring could be continued below the cherts.

Review of Engineering Development Projects

The developmental engineering projects that ODP/TAMU is working on can be divided into two categories: surface equipment and downhole instruments. The first category includes Active Heave Compensation (AHC) and the Rig Instrumentation System (RIS), two pieces of equipment that were installed in the fall of 1999. These systems are functioning and continue to undergo refinements as they are incorporated into the daily drilling operations of the *JOIDES Resolution*. The other category consists of downhole tool development projects that are currently underway and include: Davis-Villinger Temperature Probe (DVTP), Memory Drilling Sensor Sub (DSS), APC Methane Tool (APCM), and the Pressure Core Sampler (PCS).

Active Heave Compensator (AHC) Operational Review

Weight-on-Bit Filter:

Because the AHC imparts significant dynamic forces to the derrick-mounted load cells, there are large variations in the weight-on-bit (WOB) indicator used by the driller. These large variations make it more difficult for the driller to effectively control the WOB due to excessive needle bounce. ODP and ODL have agreed to the design and fabrication strategy for the WOB filter. The electrical design is complete for the top drive transmitter and the drill floor receiver. The shipboard cabling has been run and all hardware purchased. The mechanical packaging and fabrication is in progress. The software code development and testing have been contracted to an outside engineering firm. The target date for the WOB filter installation is Leg 201.

AHC Simulator:

A Graduate Assistant Researcher (GAR), under direction of the ODP project engineer, has completed the software code for the drill string model, which is one component of the Simulator Model. Currently, the drill string model is being refined and calibrated with real data obtained during the MWD experiment on Leg 196. The next step to be undertaken is the software simulation of the hydraulic system. It is projected that this model of the dynamics of the drill string will be completed by June of 2002.

AHC Hydraulic Bundle Update:

Crew suggestions were received regarding strategic placement of valves at the ends of the AHC hydraulic hoses to contain spillage and facilitate inspection or replacement of the AHC hydraulic system. A plan was prepared for hose spill containment that emphasized the use of existing valves. Replacement hoses were delivered to the ship along with blind closures and bleeder valves, and new hose spacers will be delivered soon. During the Leg 199 port call, the AHC Control Valve jumper hoses were measured for spares. Two high-pressure ball valves will be added to facilitate drainage of the AHC Filter System during filter changes. Spare jumper hoses and the ball valves are scheduled for delivery at the Leg 201 port call.

Moreover, the hose bundle covers have become worn and new specifications have been prepared for lace-on, vinyl impregnated, nylon covers that provide wear resistance and spill containment. These old bundle covers will be replaced with covers made from improved material.

Rig Instrumentation System/Operational Review:

The Rig Instrumentation System (RIS) provides for real-time monitoring and electronic storage of drilling parameters and vessel motion. The RIS system is a PC-based data acquisition system with a master computer serving the Driller's Console and broadcasting these data to remote workstations in the ODP Operation Manager's office. The RIS system provides algorithms for tracking depth and calculating WOB and ROP.

During the Leg 196 port call, the RIS was set up for two-way communication with Anadrill's acquisition system for the MWD/LWD deployment during Leg 196. A WITS (Wellsite Information Transfer Specification) link was installed during the port call. The MWD system, which transmitted downhole torque and WOB information in real-time, was used to document the effects of the AHC system on the performance of the drilling bit. Data sharing and correlation between the RIS and Anadrill systems were critical to the evaluation process.

The microbiology goals of Leg 201 require that tracer material be continually pumped downhole when the mud pumps are on. To free up two technicians from 24-hr duty, the operation of the tracer pump is being automated by putting it under control of the RIS computer. The automatic system was installed and statistically tested during the Leg 199 port call. The installation for testing at port call was temporary. During the course of Leg 199, actual operation will be tested, and ODL will run a shipboard cable and a power conduit to the tracer pump for permanent installation. A cabinet to enclose the pump and a backup pump will be installed on Leg 200.

Downhole Measurement Technology

Davis-Villinger Temperature Probe (DVTP):

The purpose of this project is to incorporate the capability to make pore pressure measurements into the DVTP. The prototype DVTP with pressure (DVTPP) was developed by Pacific Geosciences Center in Canada and first deployed on Leg 190. Though the deployment confirmed the viability of the measurement, significant improvements were required to bring the tool up to operational status. The tool underwent a redesign to address corrosion and assembly issues. Additional hardware has been purchased to transform it from a retrofit kit into a unique tool. One redesigned DVTPP is targeted for deployment on Leg 201, and we plan to have two standard DVTPs and two DVTPPs operational for Leg 204.

Labview Software Interface for Downhole Tools:

The communication software for current ODP downhole tools was written for DOS operating systems. These programs are being converted to LabView for Windows to create a commonality in support software for all downhole measurement tools. The communication and analysis software for the DVTP tool has been rewritten in LabView and is operational on the ship. Work on the APCT tool and WSTP have commenced. The communication software will be integrated into the base LabView program so that it will have the same software front-end as the DVTP.

APC Methane Tool (Temperature, Pressure, Conductivity):

The APC Methane tool will monitor the effects of gas loss in cores from the time the core is cut until it reaches the deck by recording temperature, pressure, and conductivity in the core headspace with sensors mounted in the APC piston. The APC Methane tool is a joint development between ODP-TAMU and MBARI.

Following a successful Leg 195 test, MBARI upgraded the tool software to record the pressure channel. The prototype was then tested on a MBARI dive in early October. Additional software changes were implemented based on this test, and it was sent out on Leg 199 for sea trials where it performed flawlessly. The tool will be deployed on Leg 201 to establish baseline data for deployment on Leg 204.

Pressure Core Sampler (PCS):

The PCS is a free-fall deployed, hydraulically actuated, wireline retrievable pressure coring tool for retrieving core samples maintained at bottom-hole pressures. Modifications of the tool design are being made to improve drilling capabilities and extend performance, primarily in the rotary coring mode. The design work is focused on the cutter design for rotary coring and improved core recovery. Three types of prototype cutters have been ordered for testing. The major changes aimed at improving core recovery include extending the cutter farther ahead of the bit and increasing the inner diameter (ID) of the inner core barrel. Testing of the PCS modifications and cutters will take place at the Maurer Drilling Research Center in Houston. Sea trials of the new design are set for Leg 201. Three operational tools are to be deployed for Leg 204.

Jerry Dickens at Rice University will head up the gas sampling manifold design. Jerry sailed on Leg 164 and was instrumental in the evolution of the manifold that was used successfully during that leg.

Memory Drilling Sensor Sub (DSS):

The DSS will provide data from sensors packaged in its collar wall. These sensors measure weight on bit, torque on bit, annulus pressure, pipe pressure, and annulus temperature. The DSS will be an 8-1/4 in. OD memory sub with a 4-1/8 in. through-bore to allow for core retrieval. It will be positioned in the Bottom Hole Assembly (BHA) on top of the Outer Core Barrel. Phase I, the preliminary design, was delivered in February. Phase I included a detailed design layout, load and stress analysis, material specifications, expected sensor accuracy, and testing and calibration requirements. The purchase order for Phase II work and final design and prototype construction was started in December of 2001. The first sea trial with the DSS is scheduled to be Leg 206.

Fissler Water Sampler:

The Fissler Water Sampler is being upgraded by Joris Gieskes at Scripps. The upgrade is intended to improve upon the WSTP by controlling the pressure differential and rate of sample intake. The upgraded tool will be delivered to ODP in early January of 2002.

Temperature Tool Repair and Calibration:

ODP terminated the relationship with Blue Mountain Instruments for calibration and repair of the APC temperature (APCT) probe because of nonperformance. All APCT and WSTP hardware held by Blue Mountain was returned to ODP. The ODP Service Center is providing repair and calibration of the APCT electronics in-house. A set of precision resistors was purchased for calibrating the WSTP, DVTP, and APCT electronics.

Information Services

Status of Migration of Historical ODP Data into the Janus Database

The data migration projects (migrating old ODP data: legs 101-170 to the Janus database) continue to progress very well. The MST data migration project has been completed while the physical properties and chemistry data migration projects are underway. An update on data types follows.

(A) GRAPE, P-Wave, Magnetic Susceptibility, NGR and Color Reflectance data have been successfully migrated to the Janus database for all ODP Legs 101-170. This effort started in September 1998 and was completed in August 2001. Starting from ODP Leg 171 these data have been collected and loaded directly into the Janus database. All data in the Janus database are available on the web at:
http://www-odp.tamu.edu/database

(B) The migration of physical property data started in December 1999. It includes Moisture & Density, Thermal Conductivity, Compressional Wave Velocity, and Shear Strength. The expected completion data for this project is June 2002.

(C) The chemistry data migration project started in April 2001 and includes Carbonates, Interstitial Water, Gases, XRF chemical analyses and XRD mineralogical analyses. Completion of the project is targeted for February 2003.

Please see the information in the graphs below for details of the status of these three data migration projects. The graphs are available on the web at: http://www-odp.tamu.edu/database/migration.htm.

MST and Color Reflectance Data Migration:

Start Date: September 1998 Completed Completion Date: August 2001

Leg / Data	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
GRAPE	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x
P-Wave	x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	o	x	x	x	x	o	x	x	x
MagSus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x
NGR	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x	1				
Color Reflectance	x	x	x	o	x	x	x	o	o	x	x	x	o	x	x	o	x	2								

Leg / Data	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	127	126	125	124	123	122	121	120	119
GRAPE	x	x	o	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
P-Wave	x	x	o	x	o	x	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MagSus	x	x	o	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
NGR																										
Color Reflectance																										

Leg / Data	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101
GRAPE	o	x	x	x	x	x	x	x	x	o	x	x	o	x	x	x	o	x
P-Wave	o	x	x	x	x	x	x	o	x	o	x	o	o	o	o	o	o	o
MagSus	x	x	x	x	x	o	o	x	x	o	o	x	x	x	x	o	o	o
NGR																		1
Color Reflectance																		2

Legend:

x Migration to Janus database completed

o Data not acquired by ODP

1 NGR acquisition started Leg 150

2 Reflectance acquisition started Leg 154

Magsus Leg 104-130 in S1032

Completed = 210 = ## %

Remaining = 0 Oct. 3, 2001

Physical Properties Data Migration:

Start Date: December 1999 Current: October 2001 Target Completion Date: June 2002

Leg / Data	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Thermcon	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MAD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
PWS			x	x	x		x		x	x	x	x	x	x	x	x	x	x		x	x		o	x	x	x
Shear Str.		o	x	o	x		x	o	x	o	x	x	o		x	x	x	o	x		o		o	o	x	

Leg / Data	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	127	126	125	124	123	122	121	120	119
Thermcon	x	x	o	x	x	o	x	o	x	x	x	o	o	x	x	x	x	x	x	x	x	x	x	x	x	x
MAD	x		o	x	o	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
PWS	x		o	x	o	x	x	x	x	x	x	x	x	x	o	x	x	x	x	x	x	x	x	x	x	x
Shear Str.	x	o	o	o	o	o	x		x	x	x	x	x	x	o	x	x	o	x	x	x	x	x	x	x	x

Leg / Data	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101
Thermcon	x	x	x	x	x	x	x	x	x	x	x	x	o	x	x	x	o	x
MAD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x
PWS	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	o	x
Shear Str.	o	x	x	x	x	x	x	x	x	o	x	x	o	x	x	x	o	x

Legend:

x Migration to Janus database completed
o Data not acquired by ODP, or
bad files or no data found

Completed = 230 = 94 %
Remaining = 15

Oct.3, 2001

Chemistry Data Migration:

Start Date: April 2001 Current: October 2001 Target Completion Date: February 2003

Leg / Data	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145
Carbonates								o										o								
InterstitialW.								o										o					o	o		
Gases								o					o					o					o	o		
XRF		x	x	o	x	x	o	x	o	x	o	o	x	x	o	x	o	x	x	x	x	x	x	x	o	x
XRD													o										o		o	o

Leg / Data	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	127	126	125	124	123	122	121	120	119
Carbonates			o		o			o	o																	
InterstitialW.			o		o			o																		
Gases	o		o		o	o		o																		
XRF	x	x	x	x	x	x	x	x	x	x	x	o	o	o	x	o	x	x	x	x	x	x	o	x	x	x
XRD		o	o	o	o		1																			

Leg / Data	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101
Carbonates	x								x	o	x	x	o	x	x	x	o	x
InterstitialW.	o									o			o				o	
Gases	o							o		o			o			o	o	
XRF	x		x	x	x	x	o	x	o	x	o	o	x	o	o	o	o	o
XRD																		1

Legend:

x Migration to Janus database completed.

o Data not acquired by ODP or bad files.

1 Data in unreadable pro-350 format.

Completed = 54 = 22 %

Remaining = 192

Oct. 3, 2001

Mirror Sites

Web mirror sites that contain all the e-publication products of ODP have been operating successfully in Australia, the Federal Republic of Germany, and the United Kingdom. None of these sites mirror the Janus database. Additional mirror sites are not envisioned for the remainder of this program. The mirror sites are updated at the end of each week from the main site located at ODP/TAMU and supported by the Information Services Department at: ODP Science Operator:
http://www-odp.tamu.edu/isg (Texas A&M University).

Australian mirror site:
http://www.agso.gov.au/odp (Australian Geological Survey Organisation; site is functional and updated weekly).

Federal Republic of Germany mirror site:
http://odp.pangaea.de/ (Institute for Marine Environmental Sciences [MARUM] and Alfred Wegener Institute for Polar and Marine Research [AWI]; this site is functional and updated weekly).

United Kingdom mirror site:
http://owen.nhm.ac.uk/odp/ (The Natural History Museum, London; this site is functional and updated weekly).

Publication Services

ODP/TAMU Web Site

User Statistics:

The number of site visitors (defined as single computers accessing the site) and the number of pages (or files) accessed at the ODP/TAMU Web site increased by 384% and 543%, respectively, from the beginning of FY98 through the end of FY01. In FY01, there were 453,634 visitor sessions, which was an increase of 46% over the previous year. The German mirror site went online in June 2000. Available site statistics are listed in Table 2. At this time there are still no user data available from the mirror sites in Australia and the United Kingdom.

Table 1. Web User Statistics for ODP/TAMU Main Entry Points*

	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01
Total for ODP/TAMU site†	**48,562**	**38,038**	**43,777**	**48,762**	**52,448**	**48,537**	**43,989**	**50,371**	**55,994**	**57,756**	**52,000**	**55,628**
Totals for specific pages:												
ODP/TAMU home page	11,319	7,317	9,264	9,657	9,333	8,371	8,926	8,921	8,005	8,667	20,011	10,690
Publication Services**	1,617	1,313	1,548	1,470	1,654	1,621	1,752	1,761	1,816	1,857	1,723	2,008
Cruise information	1,467	1,139	1,543	1,468	1,406	1,195	1,112	1,082	1,186	1,213	1,494	1,632
Janus database	1,375	1,108	1,378	1,254	1,273	1,211	1,187	1,156	1,145	1,169	1,265	1,369
Sample request form	NA	257	269	234	253	259	302	315	254	299	323	324
Operations schedule	768	663	1,056	1,005	951	779	708	761	626	774	908	899
Science & Curation	628	563	570	621	608	555	582	551	485	552	614	657
Cruise participation	351	584	664	587	836	636	398	332	280	324	377	405
Site maps	491	400	450	475	467	426	444	452	423	487	589	594
JOIDES Resolution information	755	863	924	447	478	473	466	408	444	536	629	624
Search	967	853	932	898	926	908	873	740	789	824	777	961
Drilling Services	867	819	873	851	825	814	767	586	583	651	815	892
Life onboard *JOIDES Resolution*	504	863	583	805	697	922	609	487	612	675	929	815
Leg 195 photos							507					
Leg 196 photos							684	919	648	265	52	
Leg 197 photos									603	1,278	651	267
Leg 198 photos											1,122	1,515
Janus queries† (janusaxp.tamu.edu)	1,356	926	756	588	714	845	946	1,042	1,015	906	843	833

Notes: * = numbers represent unique-computer sessions that originate outside ODP/TAMU; each session may result in multiple page views and/or database requests; mirror sites are not included. † = Janus sessions are in addition to those given for the "ODP/TAMU site." ** = see "Volume Production" section for statistics on unique-computer sessions for each volume. NA = not available.

Table 2. Web User Statistics for German Mirror Site.

	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01
German mirror site* (odp.pangaea.de)	708	745	1,183	945	944	913	282	524	787	1,000	1,367	1,865

Note: * = German mirror site went online in Jun 2000. No data are available for mirror sites in Australia and the United Kingdom..

Volume Production

All *Proceedings of the Ocean Drilling Program* volumes are now produced in the "new format." Volumes are produced electronically and distributed in three formats. A printed booklet containing a table of contents to the entire volume and a summary chapter is accompanied by a CD-ROM, which contains all chapter material and core description information (*Initial Reports* only) in PDF format and selected tabular material in ASCII format. The volumes are also published on the ODP/TAMU Web site. Chapter material is presented in both HTML and PDF formats, core description information (*Initial Reports* only) in PDF format, and selected tabular material in ASCII format. The *Initial Reports* volume booklets and CD-ROMs are distributed one-year postcruise and the Web formats come out simultaneously or one month in advance of the booklet/CD-ROM formats. For the *Scientific Results* volumes, papers are processed and

published individually on the Web in order of acceptance. The booklet/CD-ROM package is produced and distributed after receipt of the revised leg synthesis paper, which is produced by the Co-chiefs, and is scheduled to be distributed four-years postcruise.

Initial Reports

From June 2001 through October 2001:

The following booklet/CD-ROM sets were distributed: 190 (July 2001); 191 (September 2001).

The following volumes were made available online: 190 (June 2001); 191 (September 2001).

From November 2001 through May 2002:

The following booklet/CD-ROM sets are expected to be distributed: 192 (November 2001); 193 (January 2002); 194 (March 2002); 195 (May 2002).

These volumes are also expected to be available online in HTML and PDF format during the same time period.

Scientific Results

From June 2001 through October 2001:

Publication of online volumes began for volumes: 174A (June 2001); 177 (June 2001); 178 (June 2001); 180 (July 2001).

The following booklet/CD-ROM sets were distributed: 174B (July 2001); 173 (August 2001); 172 (September 2001).

From November 2001 through May 2002:

Publication of chapters online will begin for volumes: 176, 179, 181, and 182. Chapters from other volumes will be published after manuscripts have been accepted and processed for publication.

The following booklet/CD-ROM sets are expected to be distributed: 175 (March 2002); 174A (April 2002); 179 (May 2002).

Publication of the booklet/CD-ROM sets for *Scientific Results* volumes 176, 177, and 178 are off schedule because the leg synthesis papers were submitted late.

ODP *Proceedings* Web Publication Statistics:

As of 30 October 2001, 32 *Initial Reports* volumes and 33 *Scientific Results* volumes were published in HTML and PDF formats on the ODP/TAMU Web site. Eight older volumes that were initially published only in PDF format are now also available in HTML format (*Scientific Results* volumes 162–168 and 169S). A total of 34,922 unique users accessed the *Proceedings* volumes between November 2000 and October 2001 (see Tables 3 and 4). This is an increase of 65% or 13,772 users, between the periods of November 1999–October 2000 and November 2000–October 2001. User statistics clearly indicate that all volumes are accessed every month and that usership did not decline over the two-year time period of November 1999–October 2001. *Initial Reports* volumes were accessed during 39% of the user sessions and *Scientific Results* volumes during 61% of the sessions.

A total of 13,618 unique users accessed the *Initial Reports* online volumes between November 2000 and October 2001 (see Table 3). This is an increase of 68%, or 5,489 users, over the previous year, and equates to an average of 906 unique users per month. An average of 36

unique users have accessed each *Initial Reports* online volume every month. The actual number of unique users per volume per month ranges between 1 and 326.

A total of 21,304 unique users accessed the *Scientific Results* online volumes between November 2000 and October 2001 (see Table 4). This is an increase of 64%, or 8283 users, over the previous year, and equates to an average of 1,430 unique users per month. An average of 62 unique users have accessed each *Scientific Results* online volume every month. The actual number of unique users per volume per month ranges between 10 and 217.

Leg-Related Postcruise Publications:

Table 5 reflects the number of ODP-related papers that are projected for, submitted to, in press, or published in *Scientific Results* volumes, books, and journals for Legs 160 through 190. The data on manuscripts for books and journals are based on the information ODP receives from the scientific participants from each leg. (There is no guarantee the counts are complete.)

Figure 1 shows the total number of submitted, in press, and published papers per leg. For Legs 101 through 159, only *Scientific Results* papers were tracked. Beginning with Leg 160, papers published in journals and books were also tracked. All legs through 175 have passed the four-years postcruise mark. Legs through 185 have passed the 28-months postcruise mark, which is the date when all SR, journal, and book submissions are due (185 deadline = 15 October 2001).

To date, seven new-format *Scientific Results* volumes have been completed (169–173 and 174B). As of October 2001, for these volumes 124 *Scientific Results* papers were published on the Web and 37 additional *Scientific Results* papers were in press. The total number of papers published on the Web has doubled since May 2001. Publication of the booklet/CD-ROM sets for the *Scientific Results* volumes 176, 177, and 178 is off schedule because the leg synthesis papers were submitted late.

The range of time over which postcruise research papers are published has expanded since the publication policy and format changes went into effect. The Appendix shows the number of papers published per month for Legs 169 through 185 and also includes the number of papers that were classified as "submitted" or "in press" as of October 2001 through Leg 189. Each graph illustrates the breakdown of papers by *Scientific Results* and journal/book categories. 288 papers have been published related to Legs 169 through 185. 12% (35 papers) were published by 28-months postcruise, 80% (230 papers) were published between 29-months postcruise and four-years postcruise, and 8% (23 papers) were published later than four-years postcruise. All of the publications that were published by 28-months postcruise (35 papers) were in journals or books (this equates to an average of 2 papers per leg). Thus, some scientific participants are taking advantage of the policy revisions that allow authors to publish papers shortly after the moratorium has ended. 74% of all the papers that have been published thus far after four-years postcruise were in journals or books (an average of 2 papers per leg). We expect this number will increase over time.

Leg-related Citation Lists:

Authors from Leg 160 and beyond are required to provide ODP/TAMU with copies of all citations from papers published in books or journals during the first 48 months postcruise.

ODP/TAMU posts these citations on the ODP Publications Web site (http://www-odp.tamu.edu/publications/, click on "Leg-Related Citations").

The Publication Services Department began collecting leg-related citations in January 1999. The citation lists now include 622 citations, of which 561 are submitted, in review, in press, or published papers and 115 are conference abstracts. Of the 561 papers, 176 have abstracts reproduced on the ODP/TAMU web site. (ODP requests abstract reprint permission from all publishers.) The numbers of citations listed per leg depend on whether authors notify ODP once their papers have been accepted for publication; whereas the availability of abstracts depends on whether publishers permit their reproduction.

We know the leg citation lists are not complete despite our efforts and those of the Staff Scientists to remind scientific party members of their publication obligations. The success of the leg-related citation lists is dependent upon authors submitting all published citations and a reprint of each publication to ODP, as outlined in the ODP Policy.

ODP Proceedings Distribution:

The Department has sold DSDP and ODP volumes for a cumulative revenue of $5,077.00 between June 2001 and October 2001. This revenue supports a portion of the cost budgeted for the printing and distribution of new volumes. The Department has continued to distribute free sets of volumes to academic institutions that do not already have accessible sets of DSDP and ODP volumes (institutions pay shipping costs). Between June 2001 and October 2001, three institutions (Tulane University, USA; Max-Planck Institute, Germany; INOCAR, Ecuador) were sent 356 ODP and 126 DSDP volumes. Total value for the books in these shipments equals $23,288.

Table 3. *Initial Reports* Web Publication User Statistics.*
Part A. November 2000 – October 2001.

Volume	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01	Web Publication Date
166†	50	50	39	38	48	44	46	44	43	34	50	55	1 Oct 1997
167†	36	33	30	30	37	32	36	38	56	76	49	36	13 Feb 1998
168†	29	28	21	34	18	20	31	47	36	48	37	36	23 Feb 1998
169†	33	32	30	38	25	27	31	47	44	53	73	59	17 Apr 1998
169S†	25	19	18	21	14	13	17	21	25	35	30	26	10 Apr 1998
170†	35	27	27	31	18	25	20	41	39	44	31	37	24 Apr 1998
171A†	34	22	25	24	17	28	24	33	22	41	28	31	26 Jun 1998
171B†	36	19	36	36	25	14	20	34	53	31	36	26	26 Jun 1998
172†	26	26	22	41	28	17	27	51	30	48	44	40	31 Jul 1998
173†	25	37	23	32	18	19	25	34	33	50	36	31	4 Sep 1998
174A†	39	23	26	28	33	40	31	41	32	58	45	39	31 Dec 1998
174B†	20	17	17	25	13	18	11	25	30	38	25	15	31 Dec 1998
174AX†	18	16	17	15	10	11	18	13	24	37	28	27	31 Dec 1998
174AXS**	18	12	14	14	15	28	24	29	24	29	23	326	28 Dec 1998
175†	51	41	44	45	34	32	52	53	66	67	28	42	9 Feb 1999
176**	28	22	25	21	20	13	20	21	31	44	15	32	30 Jun 1999
177**	32	31	27	33	35	22	66	67	72	54	76	53	28 May 1999
178**	29	35	39	36	47	23	28	64	59	95	38	77	31 Aug 1999

179**	39	14	20	18	19	39	60	69	64	66	47	60	23 Jul 1999
180**	49	29	35	41	38	28	40	56	70	46	29	36	4 Feb 2000
181**	38	41	30	21	21	17	30	44	64	41	18	42	12 May 2000
182**	41	27	29	32	13	26	24	35	46	74	36	56	26 May 2000
183**	32	28	35	31	26	23	51	35	60	61	35	37	9 Jun 2000
184**	38	28	29	27	32	37	51	98	74	56	44	101	12 Jun 2000
185**	58	33	33	42	42	46	45	73	54	56	60	60	19 Sep 2000
186**	61	46	33	43	24	47	62	53	63	55	37	28	28 Jul 2000
187**			58	60	30	25	24	32	24	29	20	15	9 Jan 2001
188**					88	97	56	47	55	58	35	53	5 Mar 2001
189**							145	125	98	85	66	71	2 May 2001
190**								46	88	94	152	106	29 Jun 2001
191**											92	81	3 Sep 2001
192**												14	16 Oct 2001

Notes: * = numbers represent unique-computer sessions that originated outside ODP/TAMU to the entry page of a volume; each session may result in multiple page views. Hits to mirror sites are not included. † = volumes in PDF format. ** = volumes in PDF and HTML formats.

Table 3. *Initial Reports* Web Publication User Statistics (continued).*
Part B. November 1999 – October 2000.

Volume	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00	Web Publication Date
166†	32	41	34	27	44	44	57	44	34	36	44	52	1 Oct 1997
167†	27	20	37	37	36	29	52	38	25	41	45	41	13 Feb 1998
168†	23	19	33	22	26	19	23	32	20	32	35	29	23 Feb 1998
169†	39	33	37	41	39	29	33	27	21	24	35	35	17 Apr 1998
169S†	14	19	25	32	18	16	17	24	20	23	23	26	10 Apr 1998
170†	20	25	27	25	21	23	33	37	28	29	28	34	24 Apr 1998
171A†	22	18	23	23	20	16	20	29	25	26	31	32	26 Jun 1998
171B†	31	20	31	31	31	24	1	30	24	31	1	26	26 Jun 1998
172†	18	19	36	29	26	26	25	25	23	36	43	37	31 Jul 1998
173†	22	19	29	16	18	22	25	31	23	23	31	33	4 Sep 1998
174A†	36	14	21	22	17	25	24	28	28	27	36	31	31 Dec 1998
174B†	17	20	16	16	12	13	18	20	17	16	26	22	31 Dec 1998
174AX†	20	11	25	16	12	14	19	22	17	17	28	32	31 Dec 1998
174AXS**	8	21	32	27	18	17	18	17	121	3	22	27	28 Dec 1998
175†	22	27	29	28	35	25	21	27	26	42	40	50	9 Feb 1999
176**	25	20	18	13	19	25	18	27	26	26	30	33	30 Jun 1999
177**	50	26	33	40	30	24	49	57	52	31	39	46	28 May 1999
178**	29	31	37	39	37	26	38	39	53	52	39	51	31 Aug 1999
179**	36	44	37	36	18	30	27	25	30	19	29	34	23 Jul 1999
180**				38	63	44	46	30	31	29	43	39	4 Feb 2000
181**							42	33	39	36	28	33	12 May 2000
182**							42	38	28	20	32	57	26 May 2000
183**								45	40	23	61	44	9 Jun 2000
184**								42	63	40	60	46	12 Jun 2000
185**											50	112	19 Sep 2000
186**									34	57	86	73	28 Jul 2000

Notes: * = numbers represent unique-computer sessions that originated outside ODP/TAMU to the entry page of a volume; each session may result in multiple page views. Hits to mirror sites are not included. † = volumes in PDF format. ** = volumes in PDF and HTML formats.

Table 4. *Scientific Results* Web Publication User Statistics.*
Part A. November 2000 – October 2001.

Volume	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01	Web Publication Date
150X†	59	51	61	49	85	59	43	76	76	84	48	122	7 Aug 1998
152†	98	69	92	70	77	66	98	140	69	106	52	74	8 Jul 1998
154†	84	64	58	74	78	72	92	84	405	98	42	106	1 Oct 1997
155†	72	65	81	104	88	104	80	90	72	86	59	88	15 May 1998
156†	71	60	59	50	76	74	55	63	81	62	66	80	21 Aug 1998
157†	70	62	94	69	92	69	75	65	107	95	65	73	14 Aug 1998
158†	80	52	51	56	73	45	54	51	61	80	41	54	15 May 1998
159†	92	72	63	75	95	49	59	65	66	76	45	70	31 Dec 1998
159T†	35	35	40	22	39	18	30	35	50	56	29	41	31 Dec 1998
160†	217	194	159	157	125	106	120	140	126	115	186	177	9 Nov 1998
161†	112	81	79	86	85	92	103	71	101	134	71	77	19 Mar 1999
162**	53	39	51	29	47	26	57	56	60	46	36	44	20 Aug 1999
163**	39	29	28	26	31	24	34	40	56	82	21	47	19 Sept 1999
164**	59	29	56	38	53	53	76	97	216	97	66	81	19 May 2000
165**	60	47	42	37	44	31	38	49	76	52	33	61	26 May 2000
166**	50	36	26	29	29	42	43	44	63	47	38	74	29 May 2000
167**	59	47	36	42	51	29	42	45	69	62	34	84	31 Jul 2000
168**	34	34	31	27	34	24	30	27	48	38	21	44	4 Aug 2000
169††	58	38	48	37	50	37	40	50	46	73	10	41	15 Apr 2000
169S**	35	20	29	21	29	24	22	25	28	23	26	28	8 Aug 2000
170††	81	34	46	32	35	27	35	31	48	63	68	69	20 Jun 2000
171A††	35	18	44	33	44	20	37	28	26	40	28	29	2 Aug 2000
171B††	45	30	44	60	46	49	55	77	63	63	41	44	4 Jul 2000
172††	37	38	42	41	35	41	45	46	54	58	39	57	1 Sep 2000
173††	31	40	42	33	39	40	71	46	40	82	57	55	2 Oct 2000
174A††	38	37	28	25	28	29	32	32	27	41	41	56	29 Sep 2000
174B††			32	29	27	25	39	29	30	38	19	38	5 Jan 2001
175††			109	90	114	112	145	82	110	97	52	112	10 Jan 2001
176††													In press
177††								30	104	61	55	56	28 Jun 2001
178††							72	118	144	111	75	146	29 May 2001
179††													In press
180††									101	140	78	78	16 Jul 2001

Notes: * = numbers represent unique-computer sessions that originated outside ODP/TAMU to the entry page of a volume; each session may result in multiple page views. Hits to mirror sites are not included. † = volumes in PDF format. ** = volumes in PDF and HTML formats. †† = volumes published chapter by chapter in the order of acceptance in PDF and HTML formats; date indicates when first paper was published.

Table 4. *Scientific Results* Web Publication User Statistics (continued).*
Part B. November 1999 – October 2000.

Volume	Nov 99	Dec 99	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00	Web Publication Date
150X†	58	42	63	61	63	57	53	58	40	62	60	64	7 Aug 1998
152†	98	65	75	87	76	64	78	65	47	58	84	102	8 Jul 1998
154†	93	65	82	78	78	80	116	67	46	58	72	78	1 Oct 1997
155†	86	72	101	80	103	66	73	87	53	69	70	100	15 May 1998
156†	59	46	64	55	70	53	49	59	46	55	74	64	21 Aug 1998
157†	98	70	80	79	75	64	62	60	46	45	52	80	14 Aug 1998
158†	66	65	68	65	77	52	71	56	43	50	56	66	15 May 1998
159†	96	73	82	65	62	46	70	64	44	53	74	79	31 Dec 1998
159T†	30	15	26	19	22	20	33	35	21	25	36	38	31 Dec 1998
160†	144	124	118	131	145	97	122	113	94	99	133	163	9 Nov 1998
161†	86	88	88	98	80	68	79	79	65	58	81	89	19 Mar 1999
162**	50	44	47	46	58	37	45	37	25	36	49	34	20 Aug 1999
163**	62	38	68	63	60	51	50	40	29	21	34	36	19 Sep 1999
164**							70	87	48	59	43	48	19 May 2000
165**							34	57	55	34	45	50	26 May 2000
166**							43	90	60	35	47	44	29 May 2000
167**									31	55	68	54	31 Jul 2000
168**										54	71	43	4 Aug 2000
169††						25	62	77	71	61	77	41	15 Apr 2000
169S**										50	46	34	8 Aug 2000
170††								30	41	52	75	64	20 Jun 2000
171A††										49	37	46	2 Aug 2000
171B††									53	72	55	39	4 Jul 2000
172††											84	40	1 Sep 2000
173††												34	2 Oct 2000
174A††											10	48	29 Sep 2000

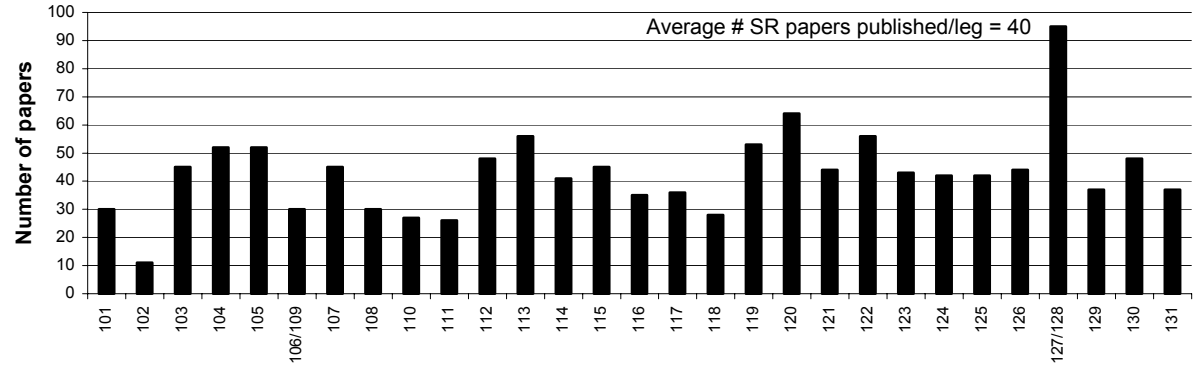
Notes: * = numbers represent unique-computer sessions that originated outside ODP/TAMU to the entry page of a volume; each session may result in multiple page views. Hits to mirror sites are not included. † = volumes in PDF format. ** = volumes in PDF and HTML formats. †† = volumes published chapter by chapter in the order of acceptance in PDF and HTML formats; date indicates when first paper was published.

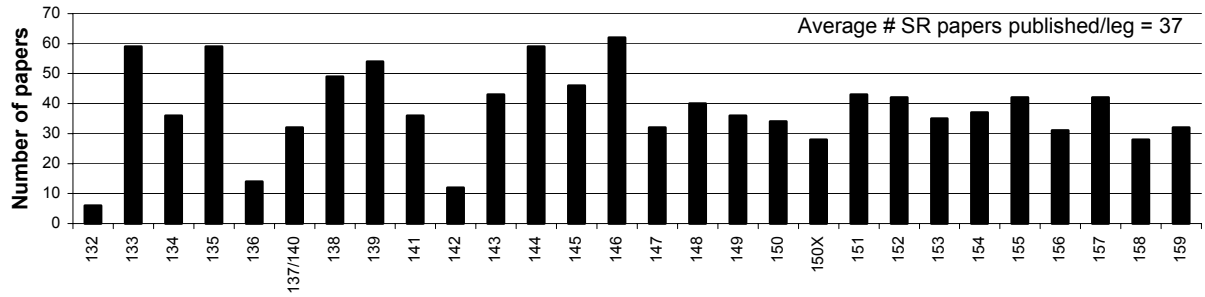
Table 5. Number of ODP-related papers projected, submitted, in press, and published in *Scientific Results* volumes and in books or journals.

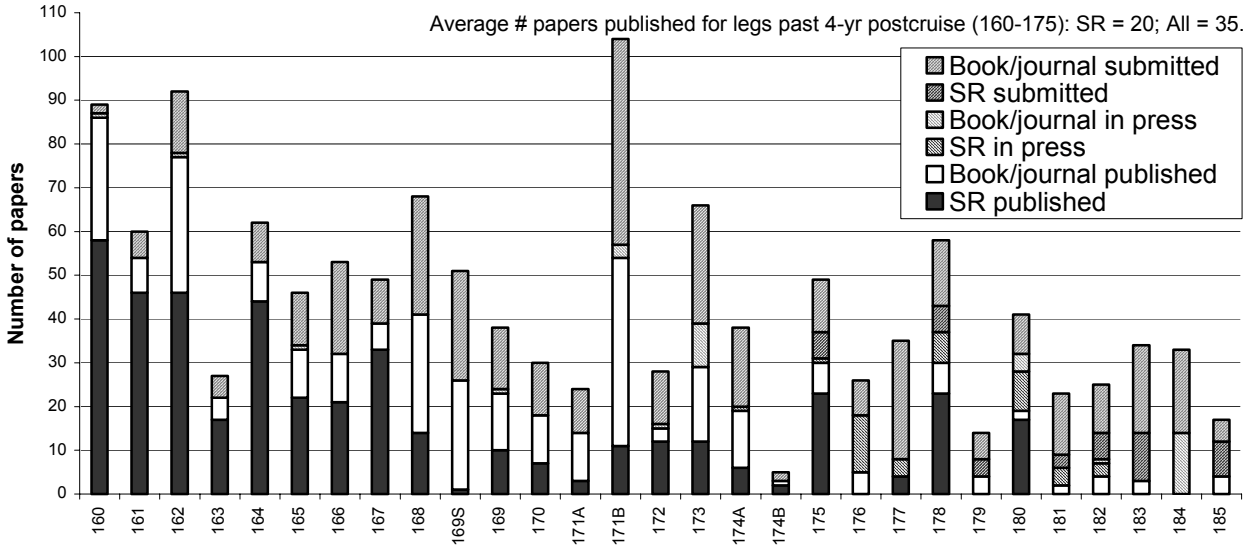
	SR Volume				Journal or Book			
Leg	Projected*	Submitted	In Press	Published	Projected*	Submitted†	In Press†	Published†
160	62			58	2		1	28
161	47			46	6		0	8
162	24			46	32		1	31
163	22			17	4		0	5
164	35			44	18		0	9
165	26			22	2		1	11
166	28			21	7		0	11
167	40			33	11		0	6
168	17			14	47		0	27
169S	0			1	28		0	25
169	14			10	29		1	12
170	6			7	15		0	12
171A	1			3	16		0	11
171B	15			11	43	1	3	41
172	8			12	36	8	1	3
173	8			12	19	0	10	16
174A	8		1	6	17	5	0	13
174B	1			2	5		0	1
175	14	6	1	23	24		0	7
176	17		13		20		0	5
177	7		4	4	44	20	0	1
178	8	6	17	17	44	1	0	5
179	15	4			8	1	0	4
180	15		9	17	25	2	4	1
181	21	3	4		25	5	0	2
182	13	6	3		37	5	1	3
183	15	11			25	18	0	3
184	23	0			34	6	14	0
185	9	8			29	1	0	2
186		17 Dec 01				0	0	0
187		13 May 02				0	0	0
188		15 Jul 02				0	0	0
189		23 Sep 02				1	0	1
190		18 Nov 02				2	0	1

Notes: Data updated in October 2001. * = estimated number of papers at second postcruise meeting. Submitted = number of papers received (and in peer review) or expected by December 2001. † = number of papers ODP has received from authors or has identified in journals. Dates in SR Volume submitted column indicate deadline when submissions are due (28-months postcruise).

Figure 1. Number of published and in press papers on record per leg.







Note: Data on papers submitted, in press, or published in books/journals is provided by authors and may not be complete or up-to-date.

AGI Database:

ODP/TAMU and JOI are in the process of reviewing the Web-based citation database that contains the ODP- and DSDP-related citations that exist in GeoRef. This database, which contains more than 18,000 citations, has been produced by AGI and will be formatted so that citations can be downloaded into common bibliographic software such as Endnote. AGI will update the database on a weekly basis from the master GeoRef database contents. The expected release date for the product is 2002. A report based on the citation data through 2001 (which ODP/TAMU will receive in February 2002) will be prepared in 2002 and disseminated with Science Operator reports for subsequent panel meetings.

Public Information

Port Call Activities:

At each of the last three port calls (Yokohama I Leg 196/197; Yokohama II Leg 197/198; Honolulu I Leg 198/199) there were activities designed to acquaint visitors with ODP. At Yokohama I, approximately 30 diplomatic representatives visited the ship and were given a presentation about ODP and the future of IODP. The visit was organized by JAMSTEC. At Yokohama II, approximately 460 people visited the ship with the majority being college and high school students. In addition, film crews from two major Japanese television stations collected footage of the ship and conducted interviews with leading Japanese scientists in the laboratories of the JR. These activities were also organized by JAMSTEC.

During the port call in Honolulu, approximately 60 students and faculty from SOEST/University of Hawaii toured the ship.

Public Information Requests:

During the last six months, ODP/TAMU has responded to 22 requests for scientists, news media, television producers, universities, K-12 schools, government administrators and publishers. The material distributed includes: slide sets, B-roll video tapes, ODP video Planet in Motion, and the Cretaceous-Tertiary Impact Poster.

5.6 LDEO

Executive Summary

Leg 197 Hotspots
Drilling at Detroit Seamount, located at the northern end of the NNW trending Emperor seamount chain of volcanoes (northwestern most Pacific Basin), was cored and logged to reveal the motion of the Hawaiian hotspot with respect to the Earth's spin axis. Basaltic sections are characterized by high electrical resistivity, low porosity, high density, and low natural gamma ray. FMS images can be used to distinguish pillow basalt and more massive units. The borehole magnetometer yielded data that suggest that the combined remanent and induced magnetic field has an inclination greater than 45 degrees in these basalt sequences. In addition to the standard ODP data, downhole magnetometer data were collected with the Göttingen magnetometer

Leg 198 Shatsky Rise
Characterization of the black shale interval near the base of the Aptian (Ocean Anoxic Event (OAE) 1a), one of the major objectives of the leg, appears as peaks in the natural gamma radiation logs at both sites. The FMS resistivity images at Hole 1207B reveal the form, thickness, and frequency of the chert horizons below 230 mbsf where low core recovery leaves many questions unanswered. Logs provide important data to develop better strategies for core recovery in alternating chalk-chert sequences.

Leg 199 Paleogene Pacific
Formation cyclicity appear clearly in density and porosity logs through the carbonate section. The high resolution 3rd-party MGT spectral gamma tool illustrates cyclicity in the carbonate sediment similar to that found in the core from visual observation and grape data. The log data, especially FMS images, identified a number of chert layers in the Eocene sequence, and show the Eocene-Oligocene boundary.

Active Heave Compensation /MWD Project
The post-cruise analysis of the Leg 196 Anadrill and rig-instrumentation data continued during the reporting period. Wavelet analysis was used to investigate the frequency of ship's heave and weight on bit as a function of time. Analysis was conducted on Leg 188 and 196 MWD downhole, heave, and surface weight on bit data. Results will be presented at upcoming JOIDES and AGU meetings.

Legacy Project
First drafts of the one-page technology summaries were delivered to the JOIDES Office. The summaries are being completed for the primary tool strings, third party certified tools, and software and support equipment.

Third-Party Tool Support
Two third-party tools (Dr. Johannes Stoll, PI) were cleared for deployment on Leg 197. ODP Logging Services accommodated these tools by supplying the necessary computer power, cable head connections and depth counting capabilities.

The Multi-Sensor Gamma Ray Tool (MGT) (D. Goldberg, PI), an ODP certified tool, was prepared and shipped to Yokohama for deployments on Legs 198, 199, and 202.

Development began in November 2000 to improve the third-party logging tool depth counting system aboard the *JOIDES Resolution*. The system will be installed on the ship during the Leg 201 portcall in San Diego.

Leg 201/204 deployments of the HYACINTH pressure core barrels are planned to be augmented using the drill string acceleration (DSA) tool which measures acceleration and pressure near the bit while coring.

Seismic Data Integration
A final report on the Joint BRG/SSDB IESX Pilot Study was prepared and sent to SciMP in October.

I. MANAGEMENT

ODP Logging Services sent the FY 01-Close-Out Report to JOI.

ODP Logging Services submitted the FY 03-07 Program Plan to JOI.

LMF at the University of Montpellier changed its name to LGHF- Laboratoire de Geophysique et Hydrodynamique en Forage.

Christine Lauer-Leredde replaced Philippe Pezard as chief scientist at LGHF.

ODP Logging Services personnel assisted with the staffing of the ODP booth at the fall AGU meeting in San Francisco.

II. STANDARD LOGGING OPERATIONS

Leg 197 Hotspots
Drilling at Detroit Seamount, located at the northern end of the NNW trending Emperor seamount chain of volcanoes (northwestern most Pacific Basin), was cored and logged to reveal the motion of the Hawaiian hotspot with respect to the Earth's spin axis. Site 1203 is located toward the central region of the summit area of Detroit Seamount.

Logging operations at Hole 1203A were extensive, including the collection of downhole natural gamma ray, density, porosity, electrical resistivity, and temperature data. Downhole magnetometer data were also collected with the Göttingen magnetometer in a third run. A fourth logging run was planned using the Göttingen Magnetic Susceptibility Tool, however just before deployment it appeared that this tool was not working and the run was canceled. Excellent data quality and repeatability were observed along the whole section during the three runs. Basaltic sections are characterized by high electrical resistivity (up to 10 Ohm.m), low porosity (< 0.5%), high density (up to 2.5 g/cm^3), and low natural gamma ray (< 20 API). In contrast, sediment and volcaniclastic units exhibit low resistivity, high porosity, and high natural gamma ray. FMS electrical images are of high quality and can be used to distinguish pillow basalt and more massive units. The borehole magnetometer, which employs three fluxgate sensors and an innovative fiber optic sensor to record tool rotation, yielded data that suggest that the combined remanent and induced magnetic field has an inclination greater than 45 degrees in these basalt sequences. A standard Schlumberger weight was added to the tool and tests indicate that its effect on the measurement accuracy appears to be low.

Leg 198 Shatsky Rise
Two holes were logged during Leg 198: Hole 1207B with standard tool strings as well as the Multisensor Gamma Tool (MGT) and the Geologic High-Resolution Magnetic Tool (GHMT), and Hole 1213B with the Triple Combo tool string. Both were RCB holes in low recovery chert-rich Cretaceous chalk and ooze.

Drilling and characterizing the black shale interval near the base of the Aptian (Ocean Anoxic Event (OAE) 1a) was one of the major objectives of the leg. It is clearly represented as peaks in the natural gamma radiation logs at both of the logged sites. Most of the gamma radiation comes from uranium adsorbed onto the organic matter, and potassium and thorium are also high,

indicating the presence of clay in the sediments. The gamma radiation peak at OAE 1a is much stronger than the other peaks in the log: other OAEs are either absent or are weaker than OAE 1a on the Shatsky Rise.

The FMS resistivity images at Hole 1207B reveal the form, thickness, and depths of the chert horizons that formed the bulk of the recovered core below 230 mbsf. Between 210-375 mbsf the chert layers occur on average every 83 cm and have an average thickness of 9 cm. The cherts typically appear as layers rather than nodules. Low core recovery in chalk-chert sequences has been the subject of much discussion, and the image logs from Hole 1207B provide important data to develop better strategies for core recovery in chalk-chert alternating sequences.

Synthetic seismograms were constructed from density and velocity data from both logs and core physical properties measurements. They enabled the core and logs to be correlated with the seismic section using IESX, and hence enabled ages to be assigned to the seismic reflectors.

Leg 199 Paleogene Pacific
Leg 199 operations are currently ongoing. To date, downhole logging operations have been carried out in Hole 1218A. The Triple Combo with the MGT was run, followed by the FMS-Sonic toolstring. Towards the end of the second pass on the final run the drill pipe was gradually withdrawn to a depth of 65mbsf thus providing an extra 20m of logged formation. In all 5 passes were made with no bridges encountered and the bottom of the hole was reached on all passes.

Resistivity logs picked out the major Eocene-Oligocene boundary towards the base of the hole, as noted similarly in the density and porosity logs. In the carbonate section of the formation cyclicity is picked out by the density and porosity logs. Initial viewing of the MGT results show low total counts, but the high resolution of the tool has picked out cyclicity in the carbonate similar to those found in the core from visual observation and grape data. The FMS data identified a number of chert layers in the Eocene sequence, showed the Eocene-Oligocene boundary and a cyclicity in the carbonate section. A combination of the sonic and density data will be used to produce a synthetic to assist in interpretation of the regional seismics.

III. SPECIALTY TOOLS AND ENGINEERING DEVELOPMENTS

Active Heave Compensation /MWD Project
The post-cruise analysis of the Leg 196 Anadrill and rig-instrumentation data continued during the reporting period. Wavelet analysis was used to investigate the frequency of ship's heave and weight on bit as a function of time. Analysis was conducted on Leg 188 and 196 MWD downhole, heave, and surface weight on bit data. Results will be presented at upcoming JOIDES and AGU meetings.

Legacy Project
Inventory and archiving of ODP Logging Services technical developments continued. A central location for all digital technical information has been established for all tools. This data server now provides the temporary warehousing location for drawings, schematics, source codes, user manuals, and data files. First drafts of the one-page technology summaries were delivered to the JOIDES Office. The summaries are being completed for the primary tool strings, certified third party tools, and software and support equipment. We expect to have all drafts completed by early December.

Third-Party Tool Support
Two third-party tools (Dr. Johannes Stoll, PI) were cleared for deployment on Leg 197. ODP Logging Services accommodated these tools by supplying the necessary computer power, cable head connections and depth counting capabilities. Prior to deployment, the tools were determined to be too light for safe deployment in ODP holes. The problem was corrected by adding sufficient amount of weight to each tool with the collective help from Schlumberger and Sedco technical personnel.

The Multi-Sensor Gamma Ray Tool (MGT) (D. Goldberg, PI), an ODP certified tool, was prepared and shipped to Yokohama for deployments on Legs 198, 199, and 202. The tool was deployed successfully to 351 mbsf in Hole 1207, on Leg 198, and to 245 mbsf in Hole 1218A on Leg 199. Results will be analyzed post-cruise.

Development began in November 2000 to improve the third-party logging tool depth counting system aboard the *JOIDES Resolution*. Assembly of the depth counter components is nearing completion with the printed circuit boards being fully populated and installed, and only the wiring remaining. It is anticipated that the system will be installed on the ship during the Leg 201 portcall in San Diego.

Leg 201/204 deployments of the HYACINTH pressure core barrels are planned to be augmented using the drill string acceleration (DSA) tool which measures acceleration and pressure near the bit while coring.

TAP Tool Replacement
Replacement efforts for the Temperature, Acceleration and Pressure (TAP) tool lost during Leg 195 were initiated. Anticipated total costs for the replacement are $17,115.

IV. SHIPBOARD LOG ANALYSIS

Seismic Data Integration
A final report on the Joint BRG/SSDB IESX Pilot Study was prepared and sent to SciMP in October.

V. SHOREBASED LOG ANALYSIS

ODP Conventional Date
The following holes were processed and prepared for inclusion in the database:
Leg 197 - Holes 1203A conventional log processing
Leg 198 - Hole 1207B processing of conventional and FMS data

FMS Processing
The following holes were processed and prepared for inclusion in the database:
Leg 195 - Hole 1201D FMS processing

LWD Processing
Leg 196 - Holes 1173B, 1173C, 808I RAB processing

Leg 193 - Production of final GIF images from RAB data
Leg 196 - Production of final GIF images from RAB data

Training and Visitors
Steve Bohlen (JOI) visited BRG on 7/18 to meet staff and discuss current and future ODP activities.

Peter Knoop (U. Michigan) visited LDEO-BRG July 12-18 for general operations and IESX training prior to his participation on Leg 199 as JOIDES Logging Scientist.

Philippe Gaillot (LMF - Montpellier) visited LDEO-BRG for IESX training prior to sailing on Leg 199 as ODP Logging Staff Scientist.

Anahita Tikku and Michael Gutner (LDEO) received IESX training at LDEO-BRG.

A two-day IESX course on synthetic seismograms was given at LDEO by GeoQuest. This class was attended by several members of the LDEO-BRG staff as well as Philippe Gaillot and Peter Knoop.

Aleksandra Janik (RSMAS) received GeoFrame training at LDEO-BRG (July 19).

E. Kikawa and U. Takaki (JAMSTEC) visited LDEO-BRG on 7/24 to discuss IODP activities.

Rob Pockalny (URI) visited LDEO/BRG on September 6 to work with FMS Leg 149 data.

Brice Rea (LUBR) completed a two-day course on GeoFrame Fundamentals at Schlumberger, Gatwick (June 4-5).

Ted Baker (LDEO-BRG) took a 3-day Macintosh OS X System Administrator's course at Apple Computer in New York City.

Brice Rea (LUBR) visited LDEO/BRG September 17-21 for training prior to sailing on Leg 199 as a Logging Trainee.

VI. DATABASE

The ODP Log Database has been updated through Leg 198 including Schlumberger original and processed data (conventional, geochemical, and FMS), specialty tools (borehole televiewer, multi-channel sonic, and temperature), borehole images, and sonic waveforms.

Historical Data Migration
All the ODP Well Log Proprietary data were transferred from 9-track tapes to 4-mm DAT tapes in 1993-1994. With the end of the program approaching, we are now planning to load the same data on a more permanent medium, i.e. CD-ROM. Tests were successfully conducted to ensure that the original format (LIS/DLIS) is not altered during the transfer from Unix to Mac to CD. The data (>600 tapes) were loaded on Unix in preparation for transfer to CD-ROM. More than 250 tapes have been converted from LIS to DLIS format to date. Each CD-ROM will include data from a specific leg, complete listings of the content of each file, and additional documentation aimed at helping the user to identify each file. This project is expected to be completed in the first half of 2002.

Post Cruise Distribution of Log Data
All log data CDs up to and including Leg 192 have been created and included with the Initial Reports publications. Leg 193 is being worked on for mid-January publication.

VII. PUBLICATIONS AND REPORTS

Barr, S.R., Revillon, S., Brewer, T.S., Harvey, P.K., and Tarney, J. Determining the inputs to the Mariana Subduction Factory: Results from integration of core and log data from ODP Site 801C. Leg 185, 2nd Postcruise Meeting, Torino, Italy, 10-16 June 2001.

Bartetzko, A., P. Pezard, D. Goldberg, Y.F. Sun, and K. Becker, 2001, Volcanic stratigraphy of DSDP/ODP Hole 395A: An interpretation using well-log data, *Marine Geophys. Res.,* 22-2, 111-127.

Becker, K., Bartetzko, A. and Davies, E.E., 2001. Leg 174B Synopsis: Revisiting Hole 395A for logging and long-term monitoring of off-axis hydrothermal processes in young oceanic crust, In: Becker, K., and Malone, M.J. (Eds.), Proc. ODP, Sci. Results, 174B, 1-12 [Online]. http://www-odp.tamu.edu/publications/174B_SR/VOLUME/SYNOPSIS/SR174BSY.PDF

Brewer, T.S., Harvey, P.K.H., Barr, S.R., Haggas, S.L. and Delius, H. Constructing the architecture of the volcanic layer from ODP boreholes, A core-log approach. Presented at the Joint Annual Meeting of the Geological Association and the Mineralogical Association of Canada, St John's, 23-31 May 2001.

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Saito, S., and D. Goldberg, 2001. Compaction and dewatering processes of the oceanic sediments in the Costa Rica and Barbados Subduction zone: estimates from in situ physical property measurements, *Earth and Plan. Sci. Lett.,* 191 (3-4), 283-293.

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S. R. Barr, T. S. Brewer, P. K. Harvey, H. Delius, and S. L. Haggas, Discrimination of petrophysical properties of volcanic rocks.

A. Bartetzko, H. Delius, and R. Pechnig, Effects of compositional and structural variations on log responses in igneous and metamorphic rocks I: mafic rocks.

H. Delius, T. S. Brewer, and P. K. Harvey, Evidence for structural and alteration changes in basaltic lava flows using variation in magnetic rock properties.

P. K. Harvey and T. S. Brewer, Neutron porosity measurements in basic and ultra-basic rocks: the significance of minor and trace elements.

S. L. Haggas, P. K. Harvey, and T. S. Brewer, Analysis of crystal-plastic fabrics from gabbroic ocean basement, using core and Formation MicroScanner data: A case study from ODP Hole 1105A.

G. J. Iturrino, D. Goldberg, H. Glassman, D. Patterson, Y-F. Sun, and S. Haggas, Shear-wave anisotropy from dipole shear logs in oceanic crustal environments.

R. Pechnig, H. Delius, and A. Bartetzko, Effects of compositional and structural variations on log responses in igneous and metamorphic rocks II: acid rocks.

5.7.1 JOIDES EXCOM Public Affairs Subcommittee – Activity Report

Distributed a press release on Leg 196 that was spearheaded by the University of Texas.

On October 10, JOI joined with the bipartisan House Oceans Caucus to cosponsor a reception on Capitol Hill. The event featured displays on ODP research and IODP by Nick Pisias, Ken Miller, Steve D'Hondt, Rob Zierenberg, Susan Humphris, Peter Flemings, Jerry Dickens, and JOI staff. House Oceans Caucus Co-Chair Tom Allen (D-ME) welcomed attendees to the reception, and JOI President Steve Bohlen and Caucus Co-Chair Jim Greenwood (R-PA) spoke about the importance of ODP and ocean research to the nation. The reception, which was well attended by congressional staff and the scientific community, was the culmination of two days of visits to nearly 20 offices of key congressional members and committee staff on the importance of ocean drilling.

Greatest Hits, Volume 2: At the request of the JOIDES Executive Committee, the JOI and JOIDES offices are preparing a sequel to *ODP's Greatest Hits*, which will contain highlights of ODP research. We have issued a call for articles to the international scientific community, and will synthesize these articles to illustrate the cumulative contributions of ODP. Once completed, these articles will be available on the web for a variety of uses, including communicating with policymakers, the public, and the press.

Worked with scientists on Leg 197 to produce an "Update from the *JOIDES Resolution*" with preliminary findings on hotspots. This handout was distributed to the media, international country representatives, and JOI/House Oceans Caucus reception attendees.

Wrote a press release on Leg 198 that resulted in articles in *Oceanspace, Science Daily*, and *BBC News* and additional press releases by the National Science Foundation and University of North Carolina.

Wrote article for JOI/USSAC newsletter on Public Affairs activities.

Redesigned public affairs/newsroom portions of www.oceandrilling.org and www-odp.tamu.edu to make more current and user-friendly. Continued to update websites with press releases, news stories on ODP, and upcoming events.

Provided ODP information for distribution at a congressional World Oceans Day event and Lamont Science Day.

Responded to requests for information and ODP material, including CDs, *Greatest Hits*, and "Blast from the Past" posters.

At the American Geophysical Union (AGU) 2001 fall meeting, we created a binder containing more than 200 ODP-related abstracts that was available in the press room and ODP booth. We distributed a press release on these abstracts, highlighting sessions of potential media interest.

At AGU, we distributed a press release on ODP Town Meeting, which lured many reporters to the event. Richard Kerr, *Science*; Alexandra Witze, *Dallas Morning News*; Randy Showstack, *EOS*; Kristina Bartlett, *Geotimes*, were among the journalists present.

Prepared presentation on ODP that provided background material on ODP and highlighted the areas of commonality between NEPTUNE and ODP for the NEPTUNE booth at AGU.

Wrote and distributed press release announcing award of DOE grant for methane hydrate characterization.

Prepared and distributed press release on Leg 199.

Upcoming Events
Plans are underway for port call activities in San Francisco and San Diego. We are currently working with local hosts to plan events at the port calls surrounding Leg 204.

JOI also spoken with House Oceans Caucus staff about cosponsoring another event, likely centered around World Oceans Day next summer.

5.7.2 Draft plan for phasing out JOIDES Science Advisory Structure

I. Relevant Motions

Excerpt from **EXCOM Motion 00-2-3**:
"…For review at the June 2001 EXCOM meeting:
SCICOM will develop a draft phase-out plan for the JOIDES Science Advisory Structure…"

SCICOM Motion 00-2-15: SCICOM proposes to EXCOM that all committees and panels of the JOIDES Science Advisory Structure remain extant through September 2003. Although the duties of these committees and panels may diminish greatly after September 2001, and some of them may not need to meet in person, the program will continue to require their advice on scientific prioritization (SCICOM, SSEPs), shipboard operations (OPCOM, PPSP, SSP), shipboard measurements (SciMP), and technical developments (TEDCOM). The maintenance of the JOIDES Science Advisory Structure through September 2003 will allow the greatest flexibility in the transition to the interim IODP science advisory structure (iSAS). We foresee that some or all of the JOIDES committees and panels may meet in tandem with their iSAS counterparts.

EXCOM Motion 01-1-7: EXCOM concurs with the SCICOM motion 00-2-15 concerning the terms of office of the current JOIDES advisory panels.

EXCOM Motion 01-2-7: EXCOM advises SCICOM that the ODP JOIDES Science Advisory Structure will terminate in Sept. 2003. EXCOM recognizes that JOI may continue to require scientific advice during the ODP phase-out Period through FY2007, and recommends that JOI seek advice, as appropriate, during this period from the IODP SAS to ensure a smooth transition from ODP to IODP.

II. Status Report, 31 December, 2001

A. Phase-in of iSAS panels

- iPC, iSSEPs, iSCIMP, iSSP formed in 2001
- iPC, iSSEPs, iSCIMP met in 2001 with JOIDES panels, iSSP to meet by itself Feb 2002
- iPPSP, iTAP, iILP mandates to be discussed at Jan 2002 IWG

B. Phase-out of JOIDES panels

- SSEPs and SSP had final meetings in 2001, unless compelling issues arise
- PPSP needs one more meeting in 2002 to complete safety review of FY03 programs, perhaps another meeting if issues arise; PPSP chair not a candidate to co-chair iPPSP
- TEDCOM requests at least one more meeting, presumably with iTAP
- SCIMP should have full workload and meeting schedule through 2003 (but see III.B.)
- SCICOM and EXCOM to meet through 2003 as needed

III. Potential issues

A. Does EXCOM Motion 01-2-7 apply to EXCOM itself?

Terms of Reference and Mandates in 1998 Guide to ODP define "JOIDES Science Advisory Structure" to encompass SCICOM and its advisory panels (p. 52), whereas "JOIDES Advisory Structure" also includes EXCOM and BCOM (p. 6). By these conventions, the wording of EXCOM Motion 01-2-7 could be interpreted not to include EXCOM.

B. Ongoing ODP data migration and archiving issues

At its December 2001 meeting, SCIMP advised that there are major ongoing issues related to ODP data migration and archiving, which (a) will extend well beyond 2003 and (b) could overwhelm SCIMP/iSCIMP during the transition between ODP and IODP. SCIMP is advising formation of a separate group to oversee these issues – a group which should not terminate at the formal end of ODP and therefore probably should be established as a joint JOIDES/iSAS group so that it can continue as a SAS group. In a sense, the SCIMP recommendation is to break out the IHP functions that were rolled into SCIMP when it was formed to replace the three service panels IHP, SMP, and DMP. This could be done on a temporary basis by forming a SCIMP working group or reestablishing an IHP-like panel – and this could be made permanent later if deemed appropriate when the IODP SAS is established in 2003. The mandate for SCICOM empowers it to create an advisory structure appropriate to the tasks at hand, and SCICOM will address the SCIMP recommendation at its March meeting with iPC. Does EXCOM have any procedural comments?

7. IODP Planning

7.2 IPC - interim Planning Committee

Minutes from the first iPC meeting in Portland, Oregon (August 29-30, 2001), are available at:

http://www.isas-office.jp/ipc.html

8. SCICOM Report

JOIDES SCIENCE COMMITTEE
27-30 August, 2001
Hosted by Oregon State University and JOI - Embassy Suites Hotel, Portland, OR
DRAFT MOTIONS AND CONSENSUS ACTIONS

SCICOM Consensus 01-02-01: SCICOM approves the meeting agenda.

SCICOM Motion 01-02-02: SCICOM approves the minutes of its March 2001 meeting in Shanghai.
Hay moved, Robertson seconded, 14 in favor, none opposed, 1 absent (Wiens)

SCICOM Motion 01-02-03: SCICOM approves the ESSEP recommendation to name Gilbert Camoin as the next ESSEP Chair.
Hay moved, D'Hondt seconded, 14 in favor, none opposed, 1 absent (Wiens)

SCICOM Consensus 01-02-04: In response to SCIMP Recommendation 01-1-4, SCICOM approves a small SCIMP working group to define the characteristics and requirements of a hard rock core description methodology. This working group should have approximately 6 members representing volcanic, magmatic, metamorphic and structural expertise, should be organized no later than the next SCIMP meeting, and should meet once at ODP-TAMU. The SCIMP co-chairs should be prepared to report on the working group findings at the next SCICOM meeting.

SCICOM Motion 01-02-05: SCICOM supports the intention of SCIMP Recommendation 01-1-8 and reaffirms that post-cruise research results are an important part of the legacy of ODP. SCICOM therefore expects all shipboard scientists and all scientists who work with data, samples, and results from ODP to provide ODP/TAMU with a list of all papers produced using those results and data, and a digital copy of those papers if it is possible. In addition, SCICOM encourages ODP/TAMU to develop a standard metadata form that can be submitted by ODP researchers, which would facilitate the tracking of the types and locations of available data.
Bloomer moved, Mayer seconded, 15 in favor, none opposed

SCICOM Motion 01-02-06: In recognition of the critical importance of technological advancements in support of science, SCICOM recommends that the "nominal" drilling leg contain up to 48 hours dedicated to engineering developments. In this context, "engineering developments" are defined as those that are critical to high priority scientific ocean drilling and that cannot be made operational without appropriate testing at sea.
The appropriate use of this time will be determined by OPCOM after consultation with TEDCOM, SCIMP, and the Operators and finally would be decided by SCICOM. Plans for use of this engineering time will be transmitted to the leg co-chiefs no later than pre-cruise meeting.
Mayer moved, Robertson seconded, 15 in favor, none opposed

SCICOM Consensus 01-02-07: SCICOM recognizes the importance of further development of the HYACE tools and endorses an ODP partnership for this development with the HYACINTH consortium.

SCICOM Motion 01-02-08: SCICOM accepts the Arctic DPG Report.

Hay moved, Coffin seconded, 13 in favor, none opposed, 2 absent (Wiens, Bloomer)

SCICOM Consensus 01-02-09 : SCICOM defines the pool of programs to be ranked for FY2003 to comprise all the full proposals included in the FY03 Drilling Prospectus.

SCICOM Consensus 01-02-10: SCICOM forwards the top 13 ranked drilling proposals to OPCOM for possible scheduling in FY2003.

SCICOM Motion 01-02-11: SCICOM forwards APL-19 "Nu'uanu Landslide" to OPCOM for consideration in the drilling schedule.

Wiens moved, Fryer seconded, 14 in favor, none opposed, 1 abstention (Rea)

SCICOM Motion 01-02-12:
SCICOM approves the following option presented by OPCOM for the FY03 operations schedule:

Leg	**Proposal**
Leg 206	An in-situ section of oceanic crust spread at superfast rate
Leg 207	Demerara Rise: equatorial Cretaceous and Paleogene paleoceanographic transect
Leg 208	Early Cenozoic extreme climates: the Walvis Ridge transect
Leg 209	Drilling mantle peridotite along the Mid-Atlantic Ridge from 14° to 16°N
Leg 210	Drilling the Newfoundland half of the Newfoundland-Iberia transect

Pisias moved, Robertson seconded, 15 in favor, none opposed

SCICOM Consensus 01-02-13: SCICOM forwards to iPC the 4 highly ranked proposals that require mission specific platforms as a SCICOM prioritization should funds become available to support mission specific platform drilling very early in IODP.

SCICOM Consensus 01-02-14: SCICOM endorses the OPCOM consensus to switch Legs 203 (Costa Rica) and 205 (Equatorial Pacific ION Observatory).

SCICOM Consensus 01-02-15: SCICOM accepts OPCOM Consensus 01-02-05 for scheduling APL 19 if the ship leaves port for Leg 200 one day early.

SCICOM Consensus 01-02-16: SCICOM accepts OPCOM Consensus 01-02-07 for provision of two berths during Leg 201 for engineering tests of HYACE tools, pending development of a formal ODP-HYACINTH partnership.

SCICOM Motion 01-02-17: SCICOM endorses SCIMP recommendations 01-1-5, 01-1-6 , 01-1-7, and 01-1-9.

Fisher moved, Mayer seconded, 15 in favor, none opposed

SCICOM Motion 01-02-18: SCICOM endorses the joint JOI/European initiative to set up a Lomonosov Ridge Project Management team.

Pisias moved, Rea seconded, 15 in favor, none opposed

SCICOM Consensus 01-02-19: SCICOM recognizes the scientific importance and quality of several proposals intended to achieve high priority objectives of ocean drilling using mission specific platforms. SCICOM enthusiastically supports drilling of these programs as part of a mission-specific platform component of IODP.

SCICOM Consensus 01-02-20: Alastair Robertson, Mike Coffin, Doug Wiens, and Bill Hay are all ending their terms on SCICOM after this meeting. It is appropriate that they have been here for this last scheduling meeting of ODP and the first meeting of iPC, as all of them have worked hard to promote the success of ocean drilling.

Bill has served the Program in a variety of roles, from his involvement with DSDP, as chair of the old SGPP Panel, to his long-standing interests in the sciences of DSDP/ODP, through his most recent service as SCICOM chair. The program has benefited tremendously from his thoughtful leadership, integrity and commitment.

Mike has helped to formulate one of the most important new initiatives that the program has pursued through his research on LIPS and his thoughtful leadership in defining appropriate strategies and tools for studying these fundamental earth features. His work as co-chair of the Scientific Planning Working Group (authors of the Initial Science Plan for IODP) has helped shape the future of the next phase of scientific ocean drilling.

Alastair has, like Bill, been involved with every incarnation of scientific ocean drilling, from DSDP, through the days of the Tectonics Panel, to his current service on SCICOM. His vast experience in field geology in all kinds of geological settings has provided an invaluable perspective in our discussions. In all of his roles, his boundless enthusiasm for good science and his fairness and care in evaluating and presenting proposals has benefited all of us.

Doug has brought to SCICOM (and to ISSEP before that) a breadth and depth of knowledge on the applications of geophysics to both solid earth and traditional geological problems. His thoughtful reviews and insights have helped many of us not so geophysically blessed to understand the intricacies and possibilities of using the drill ship to tackle important solid earth problems…and all this without ever having sailed (or even expressed a desire to sail) on the drillship!

Alastair, Mike and Doug,
With Bill, have cut quite a rug.
To get people like these
To work hard for free
Should make us all feel pretty smug**.**

SCICOM Consensus 01-02-21: SCICOM extends its heartfelt thanks to Neil Lundberg for his service to ODP as chair of the Science Steering and Evaluation Panel for Earth Environment. Neil's unfailing courtesy and thoughtful guidance to proponents, SSEPs and SCICOM have tremendously enriched the scientific returns of ODP cruises. SCICOM wishes Neil all the best as he moves on to the challenges of his next chairmanship.

SCICOM Consensus 01-02-22: SCICOM thanks Oregon State University and JOI for the wonderful meeting arrangements and for a great experience at the Bridgeport Brewery reception.

Proposals ranking – excerpts from the August 2001 SCICOM minutes

http://joides.rsmas.miami.edu/files/scicom_01_02.pdf

N. Preview 28 August proposal review and ranking procedures

Becker reviewed the JOIDES "Conflict of Interest Statement" and the "SCICOM Voting Procedures for the Global Scientific Ranking of Proposals" as approved by EXCOM in 1997 and 1998 and published on p. 59 of "A Guide to the Ocean Drilling Program." The latter describes a multi-step process including: (1) defining the pool of proposals to be ranked by either consensus proposed by chair or voting proposal by proposal, (2) procedures for the ranking by signed ballots, and (3) selection of ranked proposals to forward to OPCOM for possible scheduling, and (4) acceptance of an OPCOM-recommended schedule by simple-majority SCICOM vote.

Becker also reviewed the following two relevant SCICOM motions regarding the ship track and treatment of proposals outside the projected area of JR operations.

SCICOM Motion 99-2-10
SCICOM expresses concern about highly ranked proposals (those forwarded to OPCOM) that clearly lie outside the projected area of ship operations for several years yet receive a new global scientific ranking each year. Such proposals inevitably slip in rank because of the higher priority placed on those proposals with a geographic urgency to the schedule. SCICOM therefore adopts the following procedure:

1) Every proposal, regardless of its geographic location, will receive a global scientific ranking when first reviewed by SCICOM.
2) If OPCOM does not schedule a highly ranked proposal primarily because it lies outside the projected area of ship operations, SCICOM will not automatically re-rank that proposal the following year. When the possibility arises to schedule such a proposal, SCICOM may request the proponents to submit an update, in the form of either an addendum or revised proposal (not subjected to further external review, for consideration at the spring meeting of the SSEPs.

Humphris proposed, Klein seconded, 13 in favor, 2 absent (Coffin, Brown)

SCICOM Motion 99-2-23
SCICOM resolves that the JOIDES Resolution will operate in the Atlantic Ocean during at least part of 2002

Moore proposed, Holm seconded, 9 in favor, 1 opposed (Tamaki), 3 abstain (Brown, Robertson, Zachos, 2 absent (Bond, Coffin)

Becker noted that the first step in the ranking process - choosing the pool of proposals to be ranked - might pose some issues on the following day, given (a) the previous year's decision to defer directly to IODP a number of ranked JOIDES Resolution proposals not in the project area of FY03 operations, (b) the presence of some previously very highly ranked proposals in the FY03 prospectus, and (c) the presence of MSP programs from any geographic locations in the FY03 prospectus. With reference to previously highly ranked proposals, Becker drew attention to the words "will not automatically re-rank that proposal" in SCICOM Motion 99-2-10, and noted that they allow SCICOM to choose to include previously ranked proposals in the pool to be re-ranked when such proposals do lie in the likely area of ship operations.

Becker then mentioned the letter included in the briefing book from Canadian oil industry representatives offering financial contributions towards ODP drilling to recover a deep Cenozoic section on the Scotian Shelf. This letter was relevant to three programs included in the FY03 Prospectus, most directly to APL 17, but also to proposals 455 and 572. Becker asked the co-Chair of the Industry Liaison Working Group, K. Moran, if she cared to comment, acknowledging that she is a co-proponent on two of the three relevant proposals. Moran

commented generally, emphasizing that the concept of academia and industry working together on a scientific issues is an important thrust of IODP and could be of great mutual benefit in ODP.

Becker reviewed the SCICOM watchdog duties and asked the watchdogs to have their summary statements for the letters to proponents ready by the end of the meeting. SCICOM then discussed the details of ranking and possible mechanisms for choosing the pool of the proposals to be ranked considering the operations area limitations and MSP proposals included in the FY03 prospectus. Ludden said that MSP proposals should be globally evaluated [ranked] because some IODP funding for MSP may be available as soon as in 2003/2004. Bloomer said that SCICOM should do global ranking of all proposals, including very highly ranked programs from last year. Sarg supported that idea and said that science is most important and SCICOM should rank all proposals, so the next program [IODP] would have those rankings available. D'Hondt wondered about the proposals deferred to IODP after last years SCICOM.

Discussion and Ranking of Proposals

Becker started by reviewing the SCICOM Voting Procedures again and the issue of defining the pool of proposals to be ranked. He thanked Fisher for drawing his attention to the following sentence in the voting procedures: "A list of proposals that SCICOM wishes to be scheduled will then be determined from the ranked list, and will be forwarded to OPCOM." Becker pointed out that this allows for selection after a global scientific ranking of all proposals in the FY03 prospectus, so that limiting the pool of proposals to be ranked would not be required to address possible issues discussed the previous day. Consistent with the prescribed procedure, Becker proposed the following consensus which was adopted for defining the pool of proposals to be ranked:

SCICOM Consensus 01-02-09 : SCICOM defines the pool of programs to be ranked for FY2003 to comprise all the full proposals included in the FY03 Drilling Prospectus.

Becker then announced that the session would run as late as required that evening to finish the ranking in time for the OPCOM meeting the following morning. All proponents (actual SCICOM members or observers) were excluded from entire discussion and observers were asked to act strictly as observers, not to actively influence the ranking process.

O. Proposal presentations by watchdogs, each with brief comments by chairs of SSEPs, and, if appropriate, PPSP, followed by SCICOM discussion.

Following a suggestion from the SSEPs chairs, the order of proposal reviews was determined according to major themes of the Long-Range Plan. An average of approximately 30 minutes was spent on discussion of each proposal, but, consistent with Robert's Rules of Order, discussion on any given proposal was not concluded until all SCICOM members who wished to comment were allowed that right. The substance of each proposal review was summarized for proponents by SCICOM watchdogs in letters sent to the proponents by the SCICOM Chair after the meeting.

P. Ranking of proposals

After discussion of all proposals, SCICOM members ranked the 23 programs in the FY03 prospectus by signed ballots sealed and archived at the JOIDES Office. The ballots were tabulated immediately, with the following result:

August 2001 SCICOM Global Rankings

Rank		Proposal	Mean	S.D.	
1	**533**	**Lomonosov Ridge**	**2.53**	**2.80**	**MSP**
2	**525**	**MAR Peridotite**	**3.60**	**2.56**	
3	**559**	**Walvis Ridge**	**6.60**	**3.31**	
4	**522**	**Fast Spread Crust**	**7.53**	**5.82**	
5	**577**	**Demerara Rise**	**9.33**	**5.56**	
6	**519**	**S. Pac. Sea-Level**	**9.93**	**3.97**	**MSP**
7	**557**	**Storegga Slide**	**10.47**	**5.12**	
8	**564**	**New Jersey Shelf**	**10.93**	**4.88**	**MSP**
8	**594**	**Newf. Margin**	**10.93**	**6.43**	
10	**548**	**Chicxulub**	**11.00**	**5.21**	**MSP**
11	**575**	**G. of Aden**	**11.27**	**5.88**	
12	**539**	**Blake Hydrates**	**11.40**	**4.56**	
13	**455**	**Laurentide Ice Sheet**	**11.53**	**6.19**	
14	**572**	**N. Atl. Neogene**	**12.20**	**5.06**	
14	**547**	**Subsurface Biosphere**	**12.20**	**5.81**	
16	**512**	**MAR Core Complex**	**12.93**	**5.16**	
17	**561**	**Caribbean LIP**	**14.07**	**5.72**	
18	**584**	**TAG II**	**15.33**	**4.01**	
19	**589**	**GoM Overpressures**	**15.87**	**6.36**	
20	**573**	**Carbonate Mounds**	**16.67**	**6.70**	
21	**543**	**CORK Hole 642E**	**17.47**	**5.29**	
22	**581**	**GoM Coralgal Reefs**	**20.47**	**2.61**	**MSP**
23	**554**	**GoM Hydrates**	**21.47**	**1.55**	

The ranking process concluded with the following consensus choice of the subset of ranked proposals to be forwarded to OPCOM for scheduling.

SCICOM Consensus 01-02-10: SCICOM forwards the top 13 ranked drilling proposals to OPCOM for possible scheduling in FY2003.

Q. Discussion of APL's

The four APL's in the FY03 prospectus were reviewed following the procedures for review of full proposals. One of the APL's was recommended for possible scheduling:

SCICOM Motion 01-02-11: SCICOM forwards APL-19 "Nu'uanu Landslide" to OPCOM for consideration in the drilling schedule.

Wiens moved, Fryer seconded, 14 in favor, none opposed, 1 abstention (Rea)

R. Presentation of alternative schedules from OPCOM

Becker prefaced the presentation of alternative FY03 schedules by noting that OPCOM had applied the following criteria in drawing up possible schedules:

1) Maximize use of JR prior to demobilization
2) Demobilize JR in Galveston by 21 Sept 2003
3) 1) and 2) allow scheduling 5 normal-length JR legs
4) Honor SCICOM rankings to extent possible
5) Moderate weather constraints (hurricanes, high-lat winter) lead to scheduling low-latitude programs in winter/spring and any high-latitude programs in summer
6) Weather constraints consistent with rankings and not a serious factor in OPCOM recommendations

Becker then reported that 4 schedule options were being forwarded from OPCOM for SCICOM consideration. These honor the SCICOM rankings by each including the top 4 ranked JOIDES Resolution programs, and each includes a different North Atlantic program ranked below the top 4 as the final leg. This approach was motivated by the statistical closeness of rankings beyond the top 4 JOIDES Resolution programs, and the fact that the 5th ranked JOIDES Resolution program would suffer a modest transit penalty that could not be worked around owing to the firm demobilization date. Becker then presented the 4 options, noting that they are shown with an OPCOM-recommended switch of the Costa Rica program to Leg 205 that doesn't materially affect the FY2003 program and would be subject to SCICOM approval later in the meeting.

Option #1 with Storegga Slide Hydrates shortened leg

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	Walvis Ridge (559)
Leg 209	MAR Peridotites (525)
Leg 210	Storrega Slide Hydrates (557)
Disadvantage:	approx 15 days short→ curtailed Storegga program

Option #2 with Newfoundland Margin (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	Walvis Ridge (559)
Leg 209	MAR Peridotites (525)
Leg 210	Newfoundland Margin (594)

Option #3 with Blake Hydrates (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	MAR Peridotites (525)
Leg 209	Blake Hydrates (539)
Leg 210	Walvis Ridge (559)

(OPCOM noted that the Blake proponents had underestimated time requirements; a regular-length leg would not be long enough to achieve all stated objectives.)

Option #4 with LISO (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demarara Rise (577)
Leg 208	Walvis Ridge (559)
Leg 209	MAR Peridotites (525)
Leg 210	Laurentide Ice Sheet Outlets (455)

Before proceeding to a vote on these options, Becker asked first for a thorough discussion of the relative scientific merits of the 4 programs being considered for the final leg in the 4 possible schedule options. This discussion included consideration of the impact of the transit penalty on the Storrega Slide program as well as some comparative discussion of the two programs with gas hydrates objectives.

S. Vote on FY2003 schedule (non-conflicted SCICOM members)

After thorough discussion of the scientific merits of the 4 options above, Becker turned to the possible mechanism to make a selection among them. He reminded SCICOM that the Voting Procedures require only a simple majority for SCICOM to approve a suggested schedule. A straw vote was conducted, with each SCICOM member ranking the 4 options on paper ballots that were archived at the JOIDES Office, to assess whether any of the 4 options were favored by a simple majority of SCICOM members. The outcome was indeed that one option – Option #2 above, with the Newfoundland conjugate margin program - was clearly favored, and that schedule option was accepted with the following motion:

SCICOM Motion 01-02-12:
SCICOM approves the following option presented by OPCOM for the FY03 operations schedule:

Leg	**Proposal**
Leg 206	An in-situ section of oceanic crust spread at superfast rate
Leg 207	Demerara Rise: equatorial Cretaceous and Paleogene paleoceanographic transect
Leg 208	Early Cenozoic extreme climates: the Walvis Ridge transect
Leg 209	Drilling mantle peridotite along the Mid-Atlantic Ridge from 14° to 16°N
Leg 210	Drilling the Newfoundland half of the Newfoundland-Iberia transect

Pisias moved, Robertson seconded, 15 in favor, none opposed

SCICOM then reaffirmed its very strong scientific interest in the highly-ranked MSP programs, which could not be considered for ODP scheduling in addition to the approved FY03 JOIDES Resolution operations owing to limitations on ODP program resources.

SCICOM Consensus 01-02-13: SCICOM forwards to iPC the 4 highly ranked proposals that require mission specific platforms as a SCICOM prioritization should funds become available to support mission specific platform drilling very early in IODP.

8.2 Proposal activity/transfer

Disposition of the proposals in the JOIDES Office

Transferred to iSAS (64 proposals)

477-Full2	Takahashi	Okhotsk/Bering Plio-Pleistocene
478-Full4	Tokuyama	Eastern Nankai Subduction
482-Full3	Escutia	Wilkes Land Margin
489-Full3	Barrett	Ross Continental Shelf
491-Full3	Hinz	Cretaceous S. Atlantic Accretion
503-Full2	Jokat	Weddell Basin
505-Full3	Fryer	Mariana Convergent Margin
512-Full2	Blackman	Oceanic Core Complex
513-Full2	Opdyke	Scott Plateau Paleoceanography
514-Full4	Droxler	Maldives Sea Level
515-Full	Flood	Black + Marmara Seas Sediments
519-Full2	Camoin	South Pacific Sea Level
520-Full3	Ohara	Kyushu-Palau Ridge
521-Full5	Clift	Indus Fan
531-Pre2	Snow	Max Spreading Rate Core Complex
532-Full	Tucholke	Kane Megamullion
533-Full2	Backman	Arctic – Lomonosov Ridge
535-Full2	Dick	735B Deep
537-Full3	von Huene	Costa Rica Proto-Seismogenic Zone
539-Full2	Holbrook	Blake Ridge Gas Hydrates
541-Full	Anderson	Chilean Fjord Sediments
542-Pre	Mortimer	Hikurangi Plateau LIP (SW Pacific)
543-Full2	Harris	CORK in Hole 642E
545-Full2	Fisher	Juan de Fuca Flank Hydrogeology
547-Full3	Fisk	Oceanic Subsurface Biosphere
548-Full2	Morgan	Chixculub K-T Impact Crater
549-Full2	von Rad	Northern Arabian Sea Monsoon
550-Full	Bradshaw	Carbonate Clinoforms, NW Aust/.
551-Full	Gillis	Hess Deep Plutonic Crust
552-Full2	France-Lanord	Bengal Fan
553-Full	Hyndman	Cascadia Margin Hydrates
554-Full4	Kennicutt	Gulf of Mexico Hydrates
555-Full2	Kopf	Continental Collision, Crete
556-Pre	Wefer	Malvinas Confluence
557-Full2	Andreassen	Storegga Slide Gas Hydrates
560-Full	Taylor	Return to Woodlark Basin 1108
561-Full3	Duncan	Caribbean LIP
562-Full2	Norris	J Anomaly Ridge Transect
564-Full	Miller	New Jersey Shallow Shelf
565-Pre	Feary	Eucla Carbonate Platform
566-Full3	Ashi	Nankai Trough Gas Hydrates
567-Pre	Lyle	South Pacific Paleogene
568-Pre	Droxler	Northern Nicaragua Rise
569-Full	Goldberg	CO2 Sequestration

570-Full	Haymon	East Pacific Rise Crust
572-Full2	Channell	N. Atlantic Late Neogene
573-Full2	Henriet	Porcupine Basin Carbonate Mounds
575-Full3	deMenocal	Gulf of Aden African Climate
576-Pre2	Deville	S. Barbados Accretionary Prism
578-Pre	Hiscott	Marmara Sea Gateway
581-Full	Droxler	Late Pleistocence Coralgal Banks
584-Full	Rona	TAG II Hydrothermal
585-Full	Clift	Murray Ridge Deep Drilling
586-Full2	Rubenstone	Hawaiian Coral Reefs and Basalts
587-Pre	Nelson	Gulf of Mexico Mini-Basin
588-Pre	Gradstein	Arctic-Atlantic Cretaceous Gateway
589-Full2	Flemings	Gulf of Mexico Overpressures
590-Pre	Armentrout	Coop. JOIDES-Industry GoMex
591-Pre	Herzig	Conical/Desmos Hyd., PNG
592-Pre2	Andriessen	Shallow Water Dogger Bank
593-Pre	Flower	Gulf of Mex. Neogene Climate
595-Full	Clift	Indus Fan Riser + Non-Riser
596-Pre	Morrissey	Rockall-Hatton Cretaceous Hotspot
597-Pre	Jaeger	S. Alaska High-resolution Sediments

Waiting for permission to transfer (4 proposals)

455-Rev3	Piper	Laurentide Ice Sheet Outlets
574-Full	Fouquet	Rainbow Hydrothermal Field
579-Pre	Anderson	N Pacific Climate/ Anoxic Skan Bay
582-Pre	Fairbanks	Christmas Atoll Sea Level

Withdrawn or Now Inactive for 3-Year Rule (14 proposals)

~~467-Rev2~~	~~Droz~~	~~Western Med Sea Level~~
~~492-Full2~~	~~Lallemand~~	~~Taiwan Arc-Continent Collision~~
~~504-Full2~~	~~Driscoll~~	~~NARM Non-Volcanic Deep Hole~~
~~506~~	~~Stephen~~	~~ION Global Plan~~
~~516-Pre~~	~~Becker~~	~~CORKs in Holes 504B/896A~~
~~518-Pre~~	~~Reston~~	~~Galicia Bank S Reflector~~
~~524-Pre~~	~~Coffin~~	~~Oceanic Mesozoic Reference Sect.~~
~~526-Full~~	~~Castillo~~	~~Cretaceous Pacific Magmatic Expt.~~
~~527-Pre~~	~~Hinz~~	~~Peru-Chile Margin Deep Hole~~
~~528-Pre~~	~~Driscoll~~	~~Gulf of Aden Rifting~~
~~529-Pre~~	~~Wise~~	~~Dronning Maud Land Deep Hole~~
~~540-Pre~~	~~Chung~~	~~SPOT - S Part of Okinawa Trough~~
~~558-Pre2~~	~~Zitellini~~	~~SW Iberia, 1755 Lisbon Earthquake~~
~~563-Pre2~~	~~Smolka~~	~~EurAmerican Gateway~~

8.3. SCICOM Legacy Report

Achievements and Opportunities of Scientific Ocean Drilling

I. Dynamics of Earth's Environment

A. Earth's Changing Environment (editor L. Peterson)

- Rapid climate change (J. Kennett and L. Peterson)
- Exceptional Global Warmth and Climatic Transients Recorded in Oceanic Sediments (D. Kroon, R. D. Norris, and P. Wilson)
- Mikankovitch and Climate: the Orbital Code of Climate Change (R. Zahn)
- The role of ODP in understanding the causes and effects of global sea-level change (K. Miller)
- Biotic Effects of Abrupt Paleocene and Cretaceous Climate Events (T. J. Bralower, D. C. Kelly, R. M. Leckie)

B. Sediments, Fluids, and Bacteria as Agents of Change (editor H. Elderfield)

- Sedimentation processes on terrigenous continental margins (D. J. W. Piper and S. Migeon)
- The Dynamics and Significance of Fluids within the Seafloor (A. T. Fisher)
- The Evolution of an Idea: from Avoiding Gas Hydrates to Actively Drilling for Them (E. Suess)
- ODP Exploration of the Marine Subsurface Biosphere (S. D'Hondt, D. C. Smith, and A. J. Spivack)

II. Dynamics of Earth's Interior

A. Transfer of Heat and Material from Earth's Interior (editor, C. Mevel**)**

- Scanning Mantle and Core: a New ODP Challenge (K. Suyehiro)
- The Oceanic Lithosphere (J. Pearce)
- Altered Rocks and Seafloor Massive Sulfide Deposits: the Record of Hydrothermal Processes (S. Humphris)
- Subduction Factory Input and Output (T. Plank)
- Oceanic Plateaus: Magmas from When the World Worked Another Way (N. Arndt and D. Weis)

B. Lithosphere Deformation and Earthquake Processes (editor J. Tarduno)

- Investigations of rifted margins (H. C. Larsen)
- Convergent plate margins (C. Moore and E. Silver)

As of 7 January, 2002, all initial versions and about half of final versions received. Pdf files of the final versions are at ~~joides.rsmas.miami.edu/reports/AandO.html~~ **http://joides.rsmas.miami.edu/legacy**

9. FY2003 Science Plan and Budget

9.1 FY2003 Science Plan

Ocean Drilling Program Plans Final Year of Operations

In press, EOS, Transactions AGU, early 2002

The Ocean Drilling Program (ODP), widely hailed as perhaps the most successful example of international cooperation in all of geosciences, will formally terminate as of September 30, 2003 and recently planned the schedule for its final year of operations. ODP is a long-running international partnership of research institutions and geoscientists organized to explore the Earth's evolution and structure in subseafloor settings throughout the oceans. Since 1985, the ODP drillship JOIDES Resolution has been coring, logging, and installing long-term instrumentation beneath the seafloor in a wide range of settings to address compelling scientific themes set out most recently in the 1996 ODP Long-Range Plan (LRP). There remain many opportunities to participate in the final ODP legs. This article summarizes objectives of the newly schedule legs, and interested scientists may obtain further information at the Internet site of the Science Operator for the ODP drillship JOIDES Resolution, http://www-odp.tamu.edu. The article closes with a brief update on planning for a follow-on Integrated Ocean Drilling Program (IODP) beginning in late 2003.

The Joint Oceanographic Institutions, Inc. (JOI, Inc.; http://www.joi-odp.org) manages ODP under contract with the National Science Foundation. Scientific planning for ODP is coordinated by the advisory committees of the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES; http://joides.rsmas.miami.edu), which evaluate drilling proposals on an annual cycle in light of the objectives set out in the Long-Range Plan. At the late August meeting of the JOIDES Science and Operations Committees, plans were developed for the final five legs (206-210) of ODP in FY2003 (October 1, 2002 – September 30, 2003) based on competitive evaluation of 23 strong drilling proposals. A slight reordering was also approved for the legs previously scheduled for the end of FY2002, which were summarized in these transactions earlier this year (Hay and Becker, 2001). Table 1 presents a revised CY2002-2003 schedule, Figure 1 illustrates the general drilling locations, and principal objectives of the final five legs are briefly described below.

The programs scheduled for the final five ODP legs directly address principal themes of the ODP LRP. In addition, all five programs are strongly grounded in the activities of "program" or "detailed" planning groups (PPG's or DPG's) which were convened to refine planning for LRP objectives of particular interest.

- Two legs (206 and 209) address LRP themes relating to creation and structure of oceanic crust – themes which were further refined and prioritized by the recent Architecture of Oceanic Lithosphere PPG.
- Two legs (207 and 208) address LRP themes relating to understanding climate change, particularly on investigating extreme climate change episodes of the Cretaceous and/or Paleogene as developed by the recent Extreme Climates PPG.

- The final leg (210) will address LRP themes relating to continental rifting with a deep hole on the Newfoundland non-volcanic rift margin conjugate to the previously cored Iberia margin – bringing to some closure an ambitious multi-leg program put forth a decade ago by the North Atlantic Rifted Margins DPG.
- In addition, the deep holes planned for Legs 206 and 210 will begin to address a long-standing technical ambition of the LRP – to core deeper than 2 km below seafloor in a number of tectonic settings.

Leg 206: Oceanic Crust Spread at Superfast Rate, Guatemala Basin

Leg 206 represents the first part of a proposed two-leg program designed to penetrate a complete upper crustal section to gabbros, at a Guatemala Basin site in 15 Ma oceanic crust formed at the Pacific-Cocos boundary during a Miocene period of superfast spreading (~20 cm/yr). The first leg will be dedicated to coring the upper section and initiating a cased reentry hole that could be revisited by IODP as one of several possible pilot sites for an eventual complete crustal penetration. Leg 206 will focus on determining the depth to and nature of the dike/gabbro contact or transition zone, which is expected to be relatively shallow (1300-1800 mbsf) given the fast spreading rate – an expectation which is supported by analyses of site survey seismic data. The cores will allow investigation of a host of complementary topics, including: fluid flow in and alteration of oceanic crust; petrology and geochemistry of typical fast-spread oceanic crust; the relationship between seismic boundaries and observed lithologic contacts; paleomagnetic signature of oceanic crust (although the site was formed near the magnetic equator); and the extent of the deep crustal biosphere.

Leg 207: Equatorial Cretaceous/Paleogene Paleoceangraphic Transect at Demerara Rise

The best examples in the geologic record of rapid wholesale extinctions linked to massive perturbations of the global carbon cycle and extreme changes in Earth's climate come from the Cretaceous and Paleogene, e.g., oceanic anoxic events (OAE's) in the Cretaceous and the Paleogene, and the Late Paleocene Thermal Maximum (LPTM). However, the underlying causes and effects of these critical events in Earth history are poorly understood. Leg 207 will address these issues by coring a paleoceanographic depth transect on the Demerara Rise on the Surinam margin, where the sediments present an ideal target to investigate rapid climate change and mass extinctions in the Cretaceous and Paleogene. Specific objectives include high-resolution evaluation of (a) the history of multiple Cretaceous OAE's in an equatorial setting, (b) response of oceanic biotic communities across a range of paleodepths to extreme perturbations in global climate and carbon cycle, (c) key Paleogene events of biotic turnover and/or inferred climate extremes, particularly the LPTM and Eocene/Oligocene boundary, (d) short and long-term changes in greenhouse forcing and tropical sea surface temperature response, and (e) the role of the equatorial Atlantic gateway opening in controlling paleoceanographic circulation patterns, OAE's, and cross-equatorial heat transport into the North Atlantic.

Leg 208: Early Cenozoic Extreme Climate Transect at Walvis Ridge

The Walvis Ridge, located in the southern Atlantic Ocean, is an ideal location for obtaining sediments suitable for reconstructing early Cenozoic variations in the thermal and chemical characteristics of S. Atlantic deep and surface waters. The primary operational objective of Leg 208 is high-resolution coring along a depth transect targeting the upper Cretaceous and early

Cenozoic pelagic chalks and oozes on Walvis Ridge. The cores will be used to reconstruct in detail the paleoceanographic variations associated with several prominent episodes of early Cenozoic extreme climate change, including the Late Paleocene Thermal Maximum (LPTM), the Early Eocene Climate Optimum, and the Early Oligocene Glacial Maximum. A fundamental objective is to characterize variations in water mass chemistry and circulation at different depths on orbital time scales in transition across these extreme climate states. Several hypotheses will be tested including one that calls for a rapid dissociation of methane hydrates as the primary cause of the carbon isotope excursion across the LPTM.

Leg 209: Mantle Peridotites on the Mid-Atlantic Ridge, 14-16°N

Leg 209 will sample the upper mantle in a magma-starved portion of a slow spreading ridge, to test current hypotheses that mantle flow, or melt extraction, or both are focused in three dimensions toward the centers of ridge segments, especially at slow speading rates. The area of Mid-Atlantic Ridge to be cored on Leg 209 is an ideal region for this study, in that igneous crust is locally absent and the structure and composition of the mantle can be determined at sites over ~100 km along strike. The primary aim of drilling is to characterize the spatial variation of mantle deformation patterns, residual peridotite composition, melt migration features, and hydrothermal alteration along axis. Results should provide direct tests of current hypotheses for focused solid or liquid upwelling beneath ridge segments, specifically predictions for spatial variation of mantle lineation or the distribution of melt migration features. A secondary aim of the leg is to provide a "natural laboratory" to test geophysical imaging techniques in a region underlain mainly by partially serpentinized peridotites.

Leg 210: Newfoundland Margin, Non-Volcanic Rift Conjugate

Leg 210 builds on results of several prior ODP legs designed to investigate tectonic and magmatic processes of continental rifting on the North Atlantic margins. Prior drilling on the Iberian "non-volcanic" margin has documented extreme extension with little or no decompression melting of the asthenospheric mantle. Geophysical studies on the conjugate Newfoundland margin document significant cross-rift asymmetries in basement depth, amount of tectonic extension, and other deep structures. These observations raise fundamental questions about rifting of non-volcanic margins, including the cause and extent of mantle unroofing, the presence or absence of decompression melting, the origin of deep and crustal asymmetry between conjugates, the age-subsidence and strain partitioning history, and the relation of rift events to development of shallow water unconformities and the stratigraphic record. Leg 210 will investigate the composition and subsidence history of the stratigraphic sequence above basement and igneous/tectonic basement contact on the Newfoundland margin. The proposed drilling is in a position exactly conjugate to the Iberia Abyssal Plain drilling transect, with a primary objective being a single deep penetration through ~2200 m of sediment and ~100 of underlying basement.

Looking Forward to the Integrated Ocean Drilling Program Post 2003

As ODP nears its scheduled end, planning becomes more and more concrete for a follow-on Integrated Ocean Drilling Program (IODP; http://www.iodp.org). Ambitious scientific goals have been set out in the recently published IODP Initial Science Plan (ISP; available at http://www.iodp.org). The ISP builds on ODP results and the ODP LRP to set out drilling objectives which will require multiple platforms with a range of capabilities including but much

expanded beyond those of a ship like the ODP's JOIDES Resolution. ODP partners and funding agencies are now developing the principles and funding models to conduct such multi-platform drilling operations as a scientifically unified IODP partnership. An interim IODP Science Advisory Structure (iSAS) and Office (http://www.isas-office.jp) have been established, which are now accepting new IODP proposals and to which most of the unscheduled ODP proposals have now been forwarded (with proponents' permission).

The August ODP scheduling decisions were noteworthy for the strong showing of programs that require drilling platforms other than the JOIDES Resolution: Four of the top 10 ranked programs – including the Arctic drilling program ranked #1 for the second consecutive year - require "mission-specific platforms" of the type now being envisioned for IODP. Owing to limitations on ODP program resources, these programs could not be considered for ODP scheduling in addition to the FY03 JOIDES Resolution operations described above. Nevertheless, the rankings reaffirm the very strong scientific interest of the active ODP scientific community in the expanded capabilities represented by the developing IODP, and provide particular justification for the Joint European Ocean Drilling Initiative (JEODI, http://www.jeodi.org) to develop the capability to supply mission-specific platforms for IODP operations commencing in late 2003.

Acknowledgements
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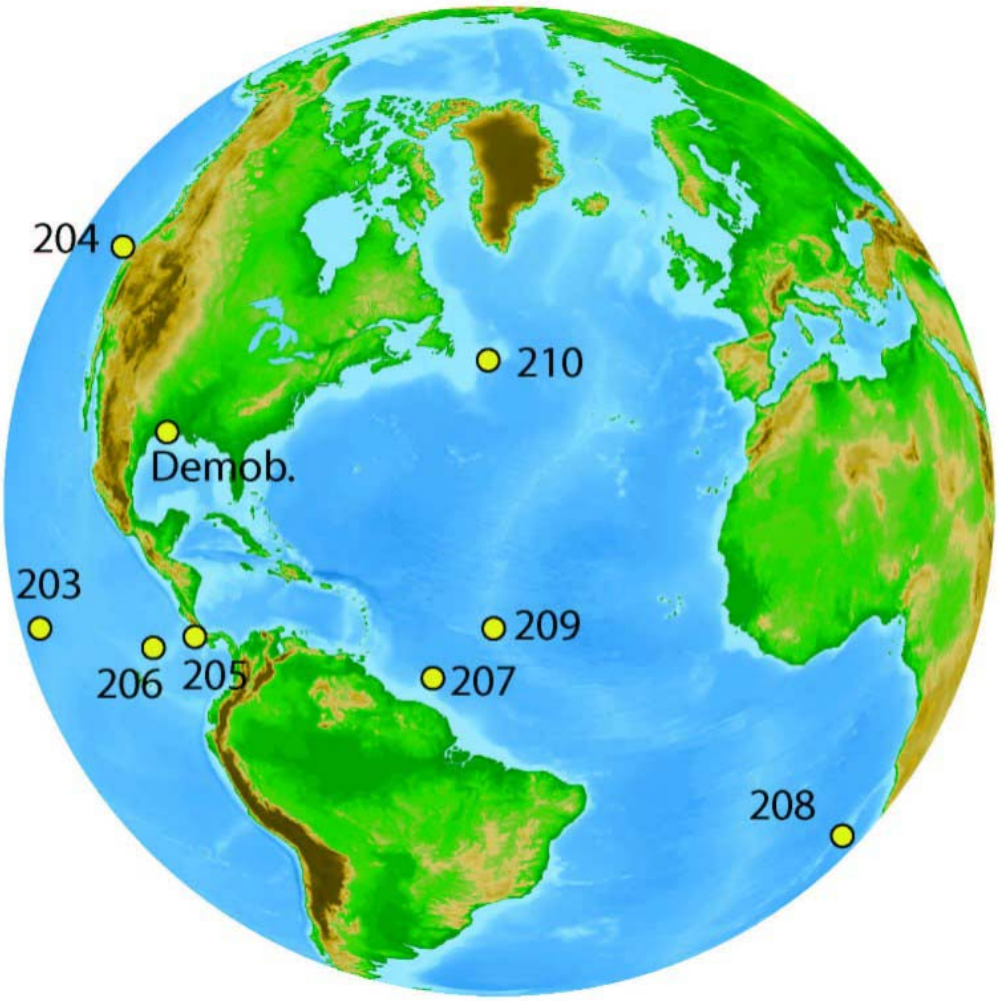
Author: Keir Becker, Chair, JOIDES Science Committee (kbecker@rsmas.miami.edu - Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, 4600 Rickenbacker Causeway, Miami, FL 33149 USA)

Reference:
Hay, W.W. and Becker, K., 2001, Ocean Drilling Program's research intensifies as end nears, Eos, Trans. AGU, 82, 201, 209.

Table 1. Programs scheduled for drilling by JOIDES Resolution from mid-2002 through 2003.

Leg	Project	Port (Origin)	Dates
203	Equatorial Pacific ION	Panama	June 1 – July 8, 2002
204	Oregon Margin Hydrates – Hydrate Ridge	San Francisco	July 8 – Sept 6, 2002
205	Costa Rica Subduction Factory and CORKs	San Diego	Sept 6 – Nov 6, 2002
206	Fast-spread Ocean Crust, Guatemala Basin	Panama	Nov 6, 2002 – Jan 5, 2003
Transit		Panama	Jan 5 – 13, 2003
207	Demerara Rise Cretaceous/Paleogene Paleoceanography	Barbados	Jan 13 – March 8, 2003
208	Walvis Ridge Early Cenozoic Extreme Climates	Rio de Janeiro	March 8 – May 9, 2003
209	Mid-Atlantic Ridge Peridotites	Rio de Janeiro	May 9 – July 10, 2003
210	Newfoundland Non-Volcanic Rift Margin	Bermuda	July 10 – Sept 9, 2003
Transit from St. Johns followed by demobilization in Galveston Sept 21-30, 2003			

Figure 1. General locations of ODP legs planned for mid-2002 through demobilization in late September, 2003.



FY 03-07

PROGRAM PLAN & PHASEOUT

for the

OCEAN DRILLING PROGRAM

January 10, 2002

ODP Program Plan FY2003-2007 Status

Section	Status
Executive Summary	Complete
Introduction:	
ODP Organization	Complete
Highlights of ODP History	In Progress
ODP Accomplishments FY97-01 (Themes based on ODP LRP):	
Science	Complete
Engineering & Technology	Complete
Management	In Progress
FY03 ODP Program Plan:	
Operations Schedule	Complete
ODP Leg Map	Complete
How JOIDES arrived at FY03 Plan/Schedule	Complete
FY 2003 (Legs 205-210) Drilling Leg Descriptions:	
Introductory Information and Leg Map	Complete
Cost center definitions for Leg Based Budgets	Complete
Leg Information (Title, Number, Proponents)	Complete
Figure: Leg Map w/ Drill Sites	Complete
Brief Description of Leg Science	Complete
Drilling Plans/ Table: Drill Site Locations	Complete
Logging Plans	Complete
Leg Based Budgets	Complete
Budget Overview	Complete
Budget Tables (FY01, 02, and 03, and FTEs)	Complete
FY04-07 ODP Phase Out Plan:	
Introduction	Complete
ODP-TAMU Phase Out Plan w/ Intro	Complete (Will be provided in its entirety in final Plan)
ODP-LDEO Phase Out Plan w/ Intro	Complete (Will be provided in its entirety in final Plan)
ODP-JOI/JOIDES/SSDB Phase Out Plan w/ Intro	Complete
Appendix A – TAMU Program Plan	Complete (Will be provided in final Program Plan)
Appendix B – LDEO Program Plan	Complete (Will be provided in final Program Plan)
Appendix C – JOI Program Plan	Complete (Will be provided in final Program Plan)

Executive Summary

Ocean Drilling Program Organization

The Ocean Drilling Program (ODP) is an international partnership of scientists and research institutions organized to explore Earth's history and structure as recorded in the ocean basins. ODP provides sediment and rock samples (cores), shipboard and shore-based facilities for the study of these samples, downhole geophysical and geochemical measurements (logging), and opportunities for special experiments to determine *in situ* conditions beneath the seafloor. ODP studies lead to a better understanding of plate tectonic processes, Earth's crustal structure and composition, environmental conditions in ancient oceans, and climate change.

ODP is funded by the US National Science Foundation (NSF) and by international partners, which currently include: the Australia/Canada/Chinese Taipei/Korea Consortium for Ocean Drilling, the European Science Foundation Consortium for Ocean Drilling (representing twelve countries), France, Germany, Japan, the United Kingdom, and the People's Republic of China. The ODP Council, representing all of these partners, provides a forum for consultation among the NSF and other national funding agencies.

Scientific advice for ODP is provided by the Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES), an international organization of advisory committees and panels. The scientific basis and justification for ODP is documented in the report on the Conference on Scientific Ocean Drilling (COSOD) held in November 1981. The COSOD report identified twelve major scientific themes around which JOIDES continues to develop specific drilling plans. The report of a second COSOD meeting (COSOD-II) held in July 1987 provides the framework for scientific ocean drilling through the 1990s. The ODP Long Range Plan (LRP), published by Joint Oceanographic Institutions, Inc. (JOI) in 1990, distills COSOD themes, JOIDES panel white papers, and other scientific and technical advice into a scientific and engineering road map through 2002. The latest ODP Long Range Plan, published in 1996, updates and extends the 1990 Long Range Plan to provide a vision into the twenty-first century.

Overall program management is provided by Joint Oceanographic Institutions (JOI). JOI contracts with Texas A&M Research Foundation (TAMRF) for business services and Texas A&M University (TAMU) to serve as Science Operator, and with Lamont-Doherty Earth Observatory (LDEO) to serve as Logging Operator and also to provide Site Survey Data Bank Services. The Science Operator is responsible for operation of the drillship *JOIDES Resolution* and associated activities of cruise staffing, logistics, engineering development and operations, shipboard laboratories, curation and distribution of core samples and data, and publication of scientific results. The Logging Operator is responsible for providing a full suite of geophysical and geochemical logging services, involving acquisition, processing and interpretation of logging measurements. The Site

Survey Data Bank prepares safety packages for pre-cruise review of designated sites, and supplies each shipboard scientific party with the geophysical data necessary to properly conduct scheduled drilling cruises. The Data Bank also assists scientists interested in writing/revising ODP proposals by providing information in regards to scientific problems of interest to the scientific ocean drilling community.

Coordination of the ODP Program Plan

Primary scientific programs are based on proposals submitted by the international science community to the JOIDES Office. The reviews and implementation of these program proposals are completed by various JOIDES advisory panels which make recommendations to the JOIDES Science Committee (SCICOM). From this input, SCICOM writes a science plan and submits it to JOI. JOI prepares the program plan from the science plan with budgetary input from subcontractors. The program plan is reviewed by EXCOM and forwarded by JOI to NSF for formal approval.

Highlights FY 01 to 02 (Legs 195-199)

Science Highlights

Seafloor Observatories and the Kuroshio Current

Leg 195 consisted of three science segments. The first segment was devoted to coring and setting a long-term geochemical observatory at the summit of South Chamorro Seamount, a serpentine mud volcano on the forearc of the Mariana subduction system. The observatory will provide information on biological and physical processes in subduction zones and nonaccretionary forearc regions.

The second segment was devoted to coring and casing a hole on the Philippine Sea abyssal seafloor and the installation of a broadband seismometer for a long-term subseafloor borehole observatory. The seismic observatory in the Philippine Sea is an important component of the International Ocean Network seismometer net. By filling a large gap in the global seismic station grid, the observatory will help increase the resolution of global tomographic studies, which have revolutionized our understanding of mantle dynamics and structure. Moreover, the observatory will allow more precise study of the seismic structure of the crust and upper mantle of the Philippine plate, as well as better resolution of earthquake locations and mechanisms in the northwest Pacific subduction zone.

On the third segment was located in the Okinawa Trough, one of the few locations in the Pacific where the seafloor under the Kuroshio Current lies above the carbonate compensation depth, allowing the calcareous microfossil record to be preserved, and the only location with a high sedimentation rate, allowing high-resolution studies. On this

segment an array of advanced piston corer/extended core barrel holes was cored under the Kuroshio Current. Drilling in Leg 195 was also designed to obtain a high-resolution sediment record to study global climate change, sea level fluctuation, local tectonic development, and terrestrial environmental changes in East Asia.

Observing Submarine Quakes Offshore Japan

Legs 190 and 196 formed a two-leg program to investigate the relationships of structure, fluid flow, and tectonics in the Nankai Trough subduction system off southwest Japan. Nankai Trough is the type example of a convergent margin accreting a thick section of clastic sediments, across which a transect of holes was cored during Leg 190.

During Leg 196, two sites previously cored during Legs 131 and 190 were investigated with logging-while-drilling (LWD) and installation of long-term advanced CORK (ACORK) hydrological observatories. The sites are near the toe of the Nankai accretionary prism, where initial deformation occurs and the plate boundary fault develops. Three LWD tools were deployed: Azimuthal Density Neutron, ISonic, and Resistivity-at-Bit (RAB). The RAB allowed scientists to collect 360 degree images of the formation, and provided clear and dramatic images of fault zones and borehole breakouts. The LWD data also provide important information on porosity that helps to define *in-situ* pressures that may contribute to fluid flow along fault zones.

The ACORKs installed in two holes will monitor pressures at multiple depths in the formation for many years, data which will help resolve the interrelationships of tectonic activity, fluid pressures, and possible fluid flow in the subduction system. Initial results from the ACORKs will be collected during a JAMSTEC ROV during summer of 2002.

Hotspots

Drilling in the Emperor Seamount trend, the oldest, deepest and most northerly of Hawaiian-built volcanoes, occurred during Leg 197 to test the hypothesis of southward motion of the Hawaiian hotspot. The principal drilling objective was to obtain cores from lava flows suitable for paleomagnetic, paleolatitude, and radiometric age determinations. Leg 197 set a record for drilling into submarine volcanic rock -- more than 1200 m of penetration at Detroit, Nintoku, and Koko Seamounts.

Early results using an advanced superconducting magnetometer on the ship show that the northern-most volcano, which erupted 76 million years ago, formed at a latitude of 35 degrees N while two younger volcanoes in the central and southern Emperor Seamounts formed at 27 degrees N and 22 degrees N. All clearly formed well north of the present location of Hawaii and tell us that the hotspot has moved south at an average rate of 30 to 50 kilometers per million years. This preliminary data suggest that the Emperor Seamounts record the rapid southward motion of the Hawaiian hotspot in the mantle,

requiring a major change in how we view this classic age-progressive volcanic lineament as a record of mantle convection and plate motions.

Another important science objective of the leg was to determine the geochemical variation of the volcanic products of the Hawaiian hotspot through time. The three ancient volcanoes drilled during Leg 197 give a detailed picture of the style and composition of hotspot volcanic activity long ago. Preliminary results show that these volcanoes behaved much like Hawaii in many ways -- they grew to a similar size, built up above sea level by a combination of quiet lava flows and pyroclastic eruptions, developed beaches, and then sank below sea level. The compositions of the lava flows are also similar to those at Hawaii, but differ in subtle ways that show important changes in the hotspot material or conditions of melting.

Warming in the Earth's Past

Leg 198 on Shatsky Rise examined the Late Paleocene Thermal Maximum, the origin of the long-term climatic transition into and out of "greenhouse" climate, and abrupt climatic events. Shatsky Rise, a medium-sized large igneous province in the west-central Pacific, contains sediments of Cretaceous and Paleogene age at relatively shallow burial depths on three prominent highs.

The cores show vivid signs of multiple bursts of warming in the Cretaceous Period that began almost instantaneously -- over a period of about one thousand years. These bursts may have been triggered by large volcanic eruptions that released greenhouse gases, mainly carbon dioxide. Because warming apparently decreased the ocean's oxygen-carrying capacity and caused the waters to become anoxic, vast reaches of the Pacific Ocean were devoid of oxygen for intervals of about a million years.

The Late Paleocene Thermal Maximum was recovered in 10 separate holes at four sites on the Southern High. Cores show that this 200,000-year warming event caused extinction of 30-50% of deep ocean life, while simultaneously allowing new species to evolve in the surface layer. Sediments from cores support previous studies that proposed that this event was triggered by a burst of methane from under the seafloor that depleted the deep ocean of oxygen and caused several degrees of warming of the Earth's atmosphere.

Sedimentary layers from Shatsky Rise show that the abnormally warm Cretaceous and Paleocene conditions gradually began to moderate about 50 million years ago, and a pulse of rapid cooling about 33 million years ago finally shut the door on the warm interval. This cooling pulse happened at the same time that glaciers began to cover Antarctica. The distinctive color change in the all of the Leg 198 records reflects a pronounced deepening in the CCD at or during the Eocene–Oligocene transition.

Eocene Warm Period

Leg 199 aimed to uncovered details about the warm Eocene period – how and why it began, maintained itself and ended. Cores were recovered from eight sites near the Eocene equator, which is north of the modern equator, about half way between Hawaii and Mexico due to the drift of the Earth's plates. These cores contain continuous records from this warm period that were not previously available.

Results of the on-board studies reveal a very different equatorial oceanographic world in the Eocene. During the Eocene, the equatorial circulation system was quite broad, but had very low plankton productivity. The ecology of the area was dominated by radiolarians, organisms that never regained this dominance after the end of the Eocene.

The transition from the Eocene to the Oligocene marks a change in oceanic ecology from siliceous organisms to an assemblage dominated by calcium carbonate-producing organisms. This shift also marks the beginning of an oceanic biological system where all the action is focused at the equator, in stark contrast to the broad and diffuse system that preceded it. This transition from warm to cool climates and diffuse to focused equatorial systems took place in less than 100,000 years - well within the time span that humans have been functioning on our planet.

Leg 199 will provide fundamental new information to help intercalibrate geologic time scales. Sediments recovered by Leg 199 are close to perfect for intercalibration because the materials themselves represented a continuous history with no gaps, the magnetic reversal history was clearly displayed, and the evolutionary history of both siliceous and calcareous organisms was available from the sediment. Furthermore, preliminary results demonstrate that even subtle changes in the equatorial sediments can be correlated over long distances of 500 miles or more, to the precision of foot-by-foot through the recovered section.

Other Highlights

ODP Legacy Project

Following motions from EXCOM and SCICOM in 2000 and 2001, the JOIDES Office, various JOIDES committees, JOI, TAMU, and BRG have been working to document several aspects of the ODP legacy. This legacy cannot be completely assessed until well after the final ODP operations in FY03, so this is but the beginning of a long-term effort. Specific legacy efforts that were initiated in 2000 and 2001 include the following, all slated for completion in 2002:

- SCICOM and the JOIDES Office organized a scientific legacy volume entitled *"Achievements and Opportunities of Scientific Ocean Drilling."* This includes 16 4- to

6-page contributions from leading ODP scientists, spanning the range of important themes of the ODP Long-Range Plan. Contributors fell behind the publication schedule originally envisioned, but this volume now appears to be on track for publication as a special issue of JOIDES Journal in winter-spring of 2002.

- In response to an EXCOM request, the JOIDES Office and JOI are working on an additional scientific legacy publication – a second volume of "*ODP Greatest Hits*" with brief abstracts and intended for a wider audience that the Achievements and Opportunities volume.
- TEDCOM has worked with the ODP Science and Wireline Operators to develop a series of summary tool sheets for wide distribution to document the technical legacy of ODP. Most of these should be ready for distribution in print and on the internet by early 2002. TEDCOM is also working with the operators in providing guidelines for the complete technical documentation (working drawings, instructions, etc) that the ODP operators are preparing for eventual transfer to IODP operators.
- *DSDP/ODP Bibliographic Database*: With the help of SCIMP and ODP scientists, ODP/TAMU and JOI are reviewing the web-based citation database that contains the ODP- and DSDP-related citations in the bibliographic database GeoRef. This database, which contains more than 18,000 citations, has been produced by American Geological Institute (AGI) and will be formatted so that citations can be downloaded into common bibliographic software such as Endnote® and ProCite®. AGI will update the database on a weekly basis from the master GeoRef database contents. The expected release date for the product is early 2002.
- SCIMP and the JOIDES Office are working with JOI and the ODP Operators on archiving issues related to ODP databases and cores. Issues related to the ODP databases are quite complex, and it is likely that SCIMP (or a recommended new JOIDES/iSAS working group) will have a continuing need to address them through and beyond the formal end of JOIDES in September, 2003.

Collaboration with the U.S. Department of Energy

The U.S. Department of Energy's National Energy Technology Laboratory has recently awarded nearly $1 million to JOI to characterize marine methane hydrate deposits during an upcoming research cruise of the ODP. Dr. Frank Rack is the principal investigator at JOI. The JOI proposal, "*In situ* Sampling and Characterization of Naturally Occurring Marine Methane Hydrates using the *D/V JOIDES Resolution*," will develop and test tools to both sample and characterize marine gas hydrates in an effort to better understand these deposits. These tools will be used to study hydrates and conduct tests onboard the *JOIDES Resolution* during ODP Leg 204, which will begin in July, 2002. Additional experiments and testing of tools will take place during ODP Leg 201, offshore Peru.

In preparation for Leg 201, DOE funding has been provided to accomplish upgrades to the ODP Pressure Coring System (PCS), the APC-methane tool, the Davis-Villinger Temperature Probe (DVTP), the design and fabrication of a PCS gas manifold in collaboration with Dr. Gerald Dickens of Rice University, the purchase of a FLIR infrared thermal imaging system (FLIR

SC2000), and thermography training has been provided to personnel who will operate the IR system during Leg 201. Additional activities are underway in preparation for deployments on Leg 204 in July.

Collaboration with HYACINTH partners on Gas Hydrates

ODP has negotiated a general cooperative agreement with European parties coordinated under the EC-funded HYACINTH project (the acronym for "Development of HYACE tools In New Tests on Hydrates, where HYACE is, in turn, a acronym for "Gas Hydrate Autoclave Coring Equipment System, see http://www.tu-berlin.de/fb10/MAT/hyace/welcome/hyace.htm that provides the opportunity to test pressure coring and measurement systems onboard the *JOIDES Resolution* during Legs 201 and 204. The agreement provides specific terms for the testing of the FUGRO Pressure (percussion) Corer (FPC), HYACE Rotary Corer (HRC), Logging Transfer Chamber (LTC), and GEOTEK LTC vertical logging system. These agreements outline the obligations and responsibilities of the parties, and the specific benefit to ODP (and IODP) as a result of this collaborative testing.

The FUGRO Pressure Corer and autoclave system will be deployed on Leg 201 for up to 24 hours of testing spread out over a period of 10 days to two weeks. Two FUGRO engineers will participate in this testing program onboard *JOIDES Resolution* offshore Peru. A HYACINTH partners meeting will take place in Clausthal, Germany during the week of January 14 to discuss a variety of issues related to the proposed deployments on Leg 204. Tim Francis (GEOTEK) the coordinator of the HYACINTH group will inform JOI and ODP/TAMU about the outcome of these discussions and further discussions will continue in preparation for Leg 204.

Arctic Drilling: Developing a Logistics & Operations Plan

JOIDES interest in scientific ocean drilling in the high Arctic remains keen, and planning efforts being conducted by representatives from both ODP and JEODI are now underway to mount a field program in 2004, to conduct the Lomonosov Ridge program, under the auspices of IODP and possibly by a European science operator.

At the June 2001 EXCOM meeting in Oxford, the following motion was passed:

EXCOM Motion 01-2-14: EXCOM recommends to IPC and IWG that the Arctic drilling proposal (JOIDES proposal 533 – Lomonosov Ridge) be given a high priority in the first year of IODP.

(Falvey moved, Stoffa seconded; 15 in favor)

Continuing in this vein, was the very strong showing of the Lomonosov proposal at the August SCICOM/OPCOM scheduling meeting, where it was ranked #1 for the second year in a row. This was significant because: (1) it demonstrates the importance of "Mission Specific Platform" (MSP) programs to the ODP Long Range Plan; (2) SCICOM forwarded this and three other highly ranked MSP proposals to the interim Planning Committee of the iSAS, for consideration

in IODP because these proposals could not be scheduled for implementation due to programmatic commitment to the *JOIDES Resolution* and because of limited resources; and (3) SCICOM passed a motion encouraging the development of an operational, logistical, and implementation plan for the Arctic program by endorsing "the joint JOI/European initiative to set up a Lomonosov Ridge Project Management team."

Consistent with the endorsements from SCICOM and EXCOM, JOI budgeted funds in the FY02 Program Plan to develop further the operational, logistics, and implementation plan for the Lomonosov Ridge proposal that the Arctic DPG has written as its final report (see http://joides.rsmas.miami.edu/panels/ARCT_DPG.html).

In light of the possibility that a Lomonosov field program might occur in 2004, as an IODP expedition, representatives from JOI and JEODI (Joint European Ocean Drilling Initiative, www.jeodi.org) initiated discussions on this possibility in August, at the SCICOM meeting. Deliberations focused on the creation of a project management team, and how to secure the services of a professional organization that was familiar with planning and conducting Arctic operations. Discussions continued into the fall and JOI and JEODI (specifically Workpackage II) personnel have continued to work towards this goal.

In support of this planning activity, the following events have occurred since October 2001:

1. In October 2001, JOI released a call for expressions of interest to all EXCOM members and to all ODP member offices to identify qualified vendors to develop an operations, logistics and implementation plan for the Lomonosov Ridge program.
2. One response, from the Swedish Polar Research Secretariat (SPRS, www.polar.se), was received by the submittal deadline of November 12, 2001.
3. In mid-November, and in consultation with JEODI representatives, JOI developed a Request For a Proposals (RFP).
4. On November 26, 2001, JOI received NSF approval to release a formal RFP to the SPRS on a single source basis.
5. The SPRS submitted a response to JOI on December 20, 2001.
6. By January 9, 2002, the response was favorably reviewed by JOI and JEODI representatives.
7. On January 11, 2002, JOI requested approval from NSF to establish a subcontract with the SPRS.

Integration of seismic, log, and core data via "IESX"

The IESX software system has now been integrated into ODP operations, specifically on the *JOIDES Resolution*, at the Site Survey Data Bank (SSDB), and at the ODP Logging Analysis centers, after a successful two-year pilot project. IESX enables ODP scientists to integrate and manipulate seismic survey data with log and core data on the drillship and at the SSDB. Use of IESX, a module of the Geoframe system software, was funded in FY01 plan as a pilot project. The software was used successfully on Leg 194, particularly for seismic interpretation and site

location, and IESX was also critical to the success of Leg 196. IESX software is available for use by the JOIDES community at the LDEO Site Survey Data Bank, BRG, and at each of the international log analysis centers. Further development and implementation of IESX will occur in FY03, consistent with the recommendations of the JOIDES Scientific Measurements Panel, and OPCOM. Greater capability in FY02 and FY03 will enable enhanced training for seagoing seismic integrators from the international scientific community, as well as better data loading and quality control on all digital seismic data received for scheduled legs. The Systems Administrator position which is being hired in FY02 will assist in IESX training, as well as maintaining Data Bank systems and assisting in the development of the online review systems.

JOIDES

As of January 1, 2001, the final rotation of the JOIDES Office occurred, moving from GEOMAR in Germany to the University of Miami. The year 2001 was notable not only for this rotation, but also for many stages in the transition from JOIDES planning for ODP to IODP planning by an interim Science Advisory Structure. Hence, JOIDES activities encompassed regular functions associated with ODP planning, transitional matters associated with IODP planning, and phase-down activities including developing the ODP legacy. These are summarized briefly below:

ODP Planning

- The final year of ODP operations was planned in late 2001 – the FY03 schedule described elsewhere in this program plan.
- Formal submissions of ODP proposals to the JOIDES Office declined considerably from the year 2000 – which was to be expected given that the evaluation process dictated that no proposals submitted after 2000 could be considered for ODP scheduling.
- JOIDES Journal continued to be published on a twice-annual basis, and will be published in that fashion through 2004.

ODP-IODP Transition

- The IODP Planning Subcommittee (IPSC, a special JOIDES committee chaired by Ted Moore) fulfilled its mandate in 2001 in fine fashion. IPSC accomplishments included:
    - Publication of the Initial Science Plan for IODP
    - Reports and activities by two IPSC working groups, Technical Advice (TAWG) and Industry Liaison (ILWG), showing the way for an expanded capacity and vision in IODP
    - Composing mandates and a timeline for establishment of an interim Science Advisory Structure (iSAS) for IODP
- The iSAS was largely staffed and began meeting in 2001, in coordination with corresponding JOIDES panels. At IWG request, iSAS was formed "as a joint working group representing JOIDES and OD21." Hence, the JOIDES Office coordinated the nomination process of iSAS members from ODP partners aside from Japan. In the latter half of 2001, initial meetings wer e held of the interim Planning Committee (iPC), interim

Science Steering and Evaluation Panels (iSSEPs) and interim Scientific Measurements Panel (iSCIMP).

- Once an iSAS Office was established at JAMSTEC, the JOIDES Office worked very closely with iSAS Office to schedule joint iSAS/JOIDES meetings and to transfer unscheduled ODP proposal files to the iSAS Office. JOIDES was unable to schedule many strong ODP proposals – one of the many important ODP legacies – and nearly all of the proponents of unscheduled ODP proposals enthusiastically agreed to transfer of their proposals to iSAS in 2001.
- As the need for iSAS panel meetings ramped up in 2001, the need for actual meetings of JOIDES panels is beginning to ramp down. Although all JOIDES panels met on a normal schedule in 2001 and will continue to exist through September 30, 2003, the need for a regular meeting schedule for some has diminished following the scheduling of the final year of ODP operations. It is likely that 2001 witnessed the final formal meetings of the JOIDES Site Survey Panel (SSP) and SSEPs, but EXCOM, SCICOM, TEDCOM, SCIMP, and PPSP will continue to meet as needed into 2002-2003.

FY03 Science Plan (Legs 205-210)

The following is a summary of the scientific objectives for FY03.

At the late August meeting of the JOIDES Science and Operations Committees, plans were developed for the final five unscheduled legs (206-210) of ODP in FY03 based on competitive evaluation of 23 externally reviewed proposals and 4 APL's. The scheduled programs directly address principal themes of the ODP LRP. In addition, all five programs are strongly grounded in the activities of PPG's or DPG's which were convened to refine planning for LRP objectives of particular interest.

- Two legs (206 and 209) address LRP themes relating to creation and structure of oceanic crust – themes which were further refined and prioritized by the recent Architecture of Oceanic Lithosphere PPG.
- Two legs (207 and 208) address LRP themes relating to understanding climate change, particularly on investigating extreme climate change episodes of the Cretaceous and/or Paleogene as developed by the recent Extreme Climates PPG.
- The final leg (210) will address LRP themes relating to continental rifting with a deep hole on the Newfoundland non-volcanic rift margin conjugate to the previously cored Iberia margin – bringing to some closure an ambitious multi-leg program put forth a decade ago by the North Atlantic Rifted Margins DPG.
- In addition, the deep holes planned for Legs 206 and 210 will begin to address a longstanding technical ambition of the LRP – to core deeper than 2 km below seafloor in a number of tectonic settings.

The strong showing of MSP programs – 4 in the top 10 rankings – is noteworthy. It demonstrates the great relevance of MSP science to the Long-Range Plan and is a strong endorsement of the inclusion of MSP operations in IODP. SCICOM recognized that MSP programs could not be considered for ODP scheduling. Nevertheless, SCICOM reaffirmed its

very strong scientific interest in the highly-ranked MSP programs with the following two consensus statements and a motion regarding furthering the planning effort for the Lomonsov Ridge program that was at the top of SCICOM rankings for the second year in a row:

SCICOM Consensus 01-02-13: SCICOM forwards to iPC the 4 highly ranked proposals require mission specific platforms as a SCICOM prioritization should funds become availa support mission specific platform drilling very early in IODP.

SCICOM Motion 01-02-18: SCICOM endorses the joint JOI/European initiative to set u Lomonosov Ridge Project Management team.

Pisias moved, Rea seconded, 15 in favor, none opposed

SCICOM Consensus 01-02-19: SCICOM recognizes the scientific importance and qualit several proposals intended to achieve high priority objectives of ocean drilling using missio specific platforms. SCICOM enthusiastically supports drilling of these programs as part o mission-specific platform component of IODP.

Leg 205: Equatorial Pacific ION

A cased, cemented hole will be drilled and fitted with a re-entry cone in the equatorial western Pacific to support a site selected by the International Ocean network (ION) and the Ocean Seismic Network (OSN) for long-term geophysical observatories. The installation will be done using wireline re-entry some time after the drillship leaves the site. The proposed drill site is on fast-spreading ocean lithosphere with an age of 10-12 Ma and is, potentially, a site for a reference hole. The site will, at minimum, include a broadband, triaxial borehole seismometer (e.g. Teledyne-BrownKS-54000-IRIS), a triaxial, high frequency seismometer, and a broadband hydrophone suspended in the water column near the SOFAR channel. The observatory will be attached to a buoy and satellite communications will return data daily to established data centers (SIO Data Collection Center and thence to the IRIS Data Management Center). The full data streams (high frequency channels in particular) will be retrieved annually when the buoy is serviced, possibly in conjunction with the extensive oceanographic TOGA-TAO arrays in the same area.

Leg 206: Oceanic Crust Spread at Superfast Rate, Guatemala Basin

This expedition represents the first part of a proposed two-leg program designed to penetrate a complete upper crustal section to gabbros, at a Guatemala Basin site in 15 Ma oceanic crust formed at the Pacific-Cocos boundary during a Miocene period of superfast spreading (~20 cm/yr). The first leg will be dedicated to coring the upper section and initiating a cased reentry hole that could be revisited by IODP as one of several possible pilot sites for an eventual complete crustal penetration. Leg 206 will focus on determining

the depth to and nature of the dike/gabbro contact or transition zone, which is expected to be relatively shallow (1300-1800 mbsf) given the fast spreading rate – an expectation which is supported by analyses of site survey seismic data. The cores will allow investigation of a host of complementary topics, including: fluid flow in and alteration of oceanic crust; petrology and geochemistry of typical fast-spread oceanic crust; the relationship between seismic boundaries and observed lithologic contacts; paleomagnetic signature of oceanic crust (although the site was formed near the magnetic equator); and the extent of the deep crustal biosphere.

Leg 207: Equatorial Cretaceous/Paleogene Paleoceangraphic Transect at Demerara Rise

The best examples in the geologic record of rapid wholesale extinctions linked to massive perturbations of the global carbon cycle and extreme changes in Earth's climate come from the Cretaceous and Paleogene, e.g., oceanic anoxic events (OAE's) in the Cretaceous and the Paleogene, and the Late Paleocene Thermal Maximum (LPTM). However, the underlying causes and effects of these critical events in Earth history are poorly understood. Leg 207 will address these issues by coring a paleoceanographic depth transect on the Demerara Rise on the Surinam margin, where the sediments present an ideal target to investigate rapid climate change and mass extinctions in the Cretaceous and Paleogene. Specific objectives include high-resolution evaluation of (a) the history of multiple Cretaceous OAE's in an equatorial setting, (b) response of oceanic biotic communities across a range of paleodepths to extreme perturbations in global climate and carbon cycle, (c) key Paleogene events of biotic turnover and/or inferred climate extremes, particularly the LPTM and Eocene/Oligocene boundary, (d) short and long-term changes in greenhouse forcing and tropical sea surface temperature response, and (e) the role of the equatorial Atlantic gateway opening in controlling paleoceanographic circulation patterns, OAE's, and cross-equatorial heat transport into the North Atlantic.

Leg 208: Early Cenozoic Extreme Climate Transect at Walvis Ridge

The Walvis Ridge, located in the southern Atlantic Ocean, is an ideal location for obtaining sediments suitable for reconstructing early Cenozoic variations in the thermal and chemical characteristics of S. Atlantic deep and surface waters. The primary operational objective of Leg 208 is high-resolution coring along a depth transect targeting the upper Cretaceous and early Cenozoic pelagic chalks and oozes on Walvis Ridge. The cores will be used to reconstruct in detail the paleoceanographic variations associated with several prominent episodes of early Cenozoic extreme climate change, including the Late Paleocene Thermal Maximum (LPTM), the Early Eocene Climate Optimum, and the Early Oligocene Glacial Maximum. A fundamental objective is to characterize variations in water mass chemistry and circulation at different depths on orbital time scales in transition across these extreme climate states. Several hypotheses will be tested including one that calls for a rapid dissociation of methane hydrates as the primary cause of the carbon isotope excursion across the LPTM.

Leg 209: Mantle Peridotites on the Mid-Atlantic Ridge, 14-16°N

Leg 209 will sample the upper mantle in a magma-starved portion of a slow spreading ridge, to test current hypotheses that mantle flow, or melt extraction, or both are focused in three dimensions toward the centers of ridge segments, especially at slow speading rates. The area of Mid-Atlantic Ridge to be cored on Leg 209 is an ideal region for this study, in that igneous crust is locally absent and the structure and composition of the mantle can be determined at sites over ~100 km along strike. The primary aim of drilling is to characterize the spatial variation of mantle deformation patterns, residual peridotite composition, melt migration features, and hydrothermal alteration along axis. Results should provide direct tests of current hypotheses for focused solid or liquid upwelling beneath ridge segments, specifically predictions for spatial variation of mantle lineation or the distribution of melt migration features. A secondary aim of the leg is to provide a "natural laboratory" to test geophysical imaging techniques in a region underlain mainly by partially serpentinized peridotites.

Leg 210: Newfoundland Margin, Non-Volcanic Rift Conjugate

Leg 210 builds on results of several prior ODP legs designed to investigate tectonic and magmatic processes of continental rifting on the North Atlantic margins. Prior drilling on the Iberian "non-volcanic" margin has documented extreme extension with little or no decompression melting of the asthenospheric mantle. Geophysical studies on the conjugate Newfoundland margin document significant cross-rift asymmetries in basement depth, amount of tectonic extension, and other deep structures. These observations raise fundamental questions about rifting of non-volcanic margins, including the cause and extent of mantle unroofing, the presence or absence of decompression melting, the origin of deep and crustal asymmetry between conjugates, the age-subsidence and strain partitioning history, and the relation of rift events to development of shallow water unconformities and the stratigraphic record. Leg 210 will investigate the composition and subsidence history of the stratigraphic sequence above basement and igneous/tectonic basement contact on the Newfoundland margin. The proposed drilling is in a position exactly conjugate to the Iberia Abyssal Plain drilling transect, with a primary objective being a single deep penetration through ~2200 m of sediment and ~100 of underlying basement.

Table ES-1: Ship Schedule for Legs 198-210 (FY 02 - FY 03)

	Leg	Port (Origin)◊	Dates €
198	Shatsky Rise	Yokohama	28 August – 24 October
199	Paleogene Pacific	Honolulu	24 October - 17 December
200	H2O Observatory	Honolulu	17 December – 28 January '02
201	Peru Biosphere	San Diego	28 January – 1 April
202	SE Paleoceanography	Valparaiso	1 April – 1 June
203	Eq. Pac. Ion	Balboa	1 June – 8 July
204	Gas Hydrates *	San Francisco	8 July – 6 September
205	Costa Rica	San Diego	6 September – 6 November
206	Fast Spreading Crust	Balboa	6 November – 5 January '03
	Transit	Balboa	5 January – 13 January
207	Demerara Rise	Barbados	13 January – 8 March
208	Walvis Ridge	Rio de Janeiro	8 March – 9 May
209	MAR Peridotite	Rio de Janeiro	9 May – 10 July
210	Newfoundland Margin	Bermuda	10 July – 9 September
	Transit	St. John's	9 September – 21 September
	Demobilization•	Galveston	21 September – 30 September

Notes:

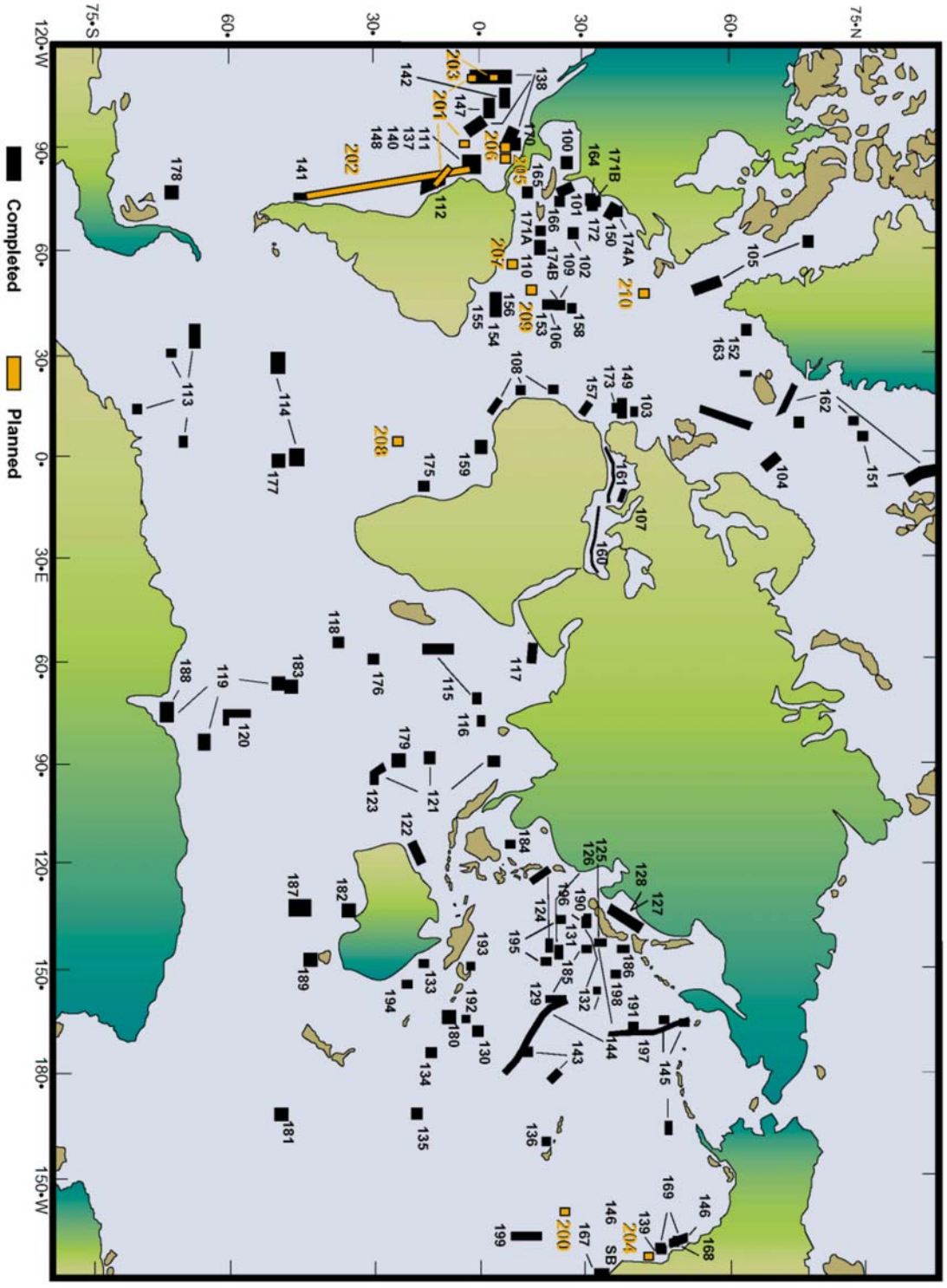
€ Start date reflects the first full day in port. This is the date of the ODP and ODL crossover meetings. The JR is expected to arrive late the proceeding day. Port call dates have been included in the dates which are listed.

◊ Although 5 day port calls are generally scheduled, the ship sails when ready.

* A mid-leg port call occurred for Leg 196 and may occur for Leg 204.

• Demobilization assumes a seven day (=2 day port call) period tentatively scheduled for Galveston, TX.

Figure ES-1: Drilling locations through Leg 210. FY2002 and 2003 locations are shown in bold.



FY04-FY07 ODP Phaseout

With the completion of science operations only 20 months away, JOI and its subcontractors have developed detailed plans that describe how the activities of ODP will be successfully concluded, equipment facilities maintained and stored, scientific information published, data and information archives developed, information, databases, equipment, etc. transferred to the appropriate entity(ies) in IODP, and so on. These plans are accompanied by staffing plans and budgets (Figure ES-2).

JOI will work with its subcontractors to ensure that all phase-out activities are carried out in the same professional manner in which scientific operations have been conducted since the beginning of the program, nearly 20 years ago. These activities will include demobilization of ship and shorebased facilities, stewardship of the program's legacy (data, samples, cores, equipment, engineering products, materials, publications, etc.) as it is maintained, documented, cataloged, and archived before being transferred to a successor entity or entities in the Integrated Ocean Drilling Program (IODP), and wind-down of the science advisory functions conducted by JOIDES through the JOIDES office at the University of Miami.

Specifically JOI will focus on the following activities:

- Work with major support subcontractors to conduct traditional and phase-out programmatic activities.
- Select and work with other subcontractors, as required, to meet programmatic objectives.
- Develop annual Program Plans in consultation with the NSF program officer and as approved by the NSF contracting officer that address, but are not limited to:
    - programmatic goals
    - scheduled activities and organization plans
    - budgets
    - review activities
    - recent scientific results and distribution of samples, data, and program publications
    - all other phase-out activities and responsibilities
- Maintain a policy manual which contains a clear and up-to-date summary of the policies and guidelines under which the Program is managed and operates.
- Evaluate the Program. Respond to the final Performance Evaluation (PEC VI); Host final Co-Chief review.
- Prepare and submit quarterly reports to NSF that summarize the ODP financial, operational, and phase-out activities.
- Conduct public affairs activities through FY03.
- Continue liaison responsibilities.
- Provide business and administrative support to JOIDES as its activities conclude. For example:
    - provide for final JOIDES publications, including the *JOIDES Journal*

    - support JOIDES efforts to document the scientific legacy of the ODP.

- Provide background and support to ensure a smooth transition to IODP
- Prepare the final ODP Report

As the Science Operator, Texas A&M University will focus on a few continuing services in addition to phaseout activities. These include:

- Curating and distributing cores and research samples from the four repositories.
- Managing, verifying, storing, and distributing ODP data.
- Publication of the Proceedings of the Ocean Drilling Program which consists of the Initial Reports and Scientific Results volumes.
- Continue administrative services, complete audits and inventory controls, support all financial and contractural aspects of ODP contract
- Ship demobilization, completion of post cruise reports, preventive maintenance and storage of equipment, preparation of legacy materials
- Drilling and coring equipment demobilization, completion of technical legacy documentation, documentation of coring system design improvements.
- Maintenance of data availability, continue migration of data to the Janus database, documentation of information legacy.

The LDEO Borehole Research Group and its subcontractors will focus on the completion of the demobilization of the equipment from the drillship as well as the demobilization of shore-based facilities. Other phaseout activities include:

- Maintenance of the ODP Log Database
- Maintenance of log analysis centers
- Processing and archiving of digital DSDP log data

Budget Overview

This Program Plan budget requests $45.3 M for FY03 (Table ES-2), the final year of ODP operations, to meet the high-priority needs identified by the JOIDES advisory structure. This plan also requests an additional $20.5M to implement a plan to phase out the ODP over a four-year span extending from FY04 through FY07.

FY03, the final year of science operations

Once the scientific needs have been identified, the budgeting process begins by determining the leg-based scientific and operational requirements, including the costs of ship operation, standard drilling and down-hole operations, logging science, and laboratory needs, among others. Most funds within the science and logging operational budgets have been allocated to, and apportioned within, leg-based budgets. Detailed budgets for Legs 205 through 210 are presented in the "Program Plan" section. Note that the a portion of Leg 205 is scheduled to occur in FY02, but that additional costs for this leg will be incurred in FY03, and are thus budgeted herein.

The second step in the budget process is assessing Program needs that are not directly affiliated with legs, such as services in science, technical support, operations, publications, information, management, administration, logging, JOIDES advisory, public affairs, and technical development projects. These funds, together with associated leg-based funds are incorporated into the department-based budgets.

The third step in the process, which maintains scientific and technical innovation in the Program, is allocation of $1,808K in the FY03 budget for high priority science and engineering needs. Expenditures against these needs are referred to as "special operating expenses" (SOEs). In addition, and in support of Legs 206 (Fast Spreading Crust) and 209 (MAR Peridotite), an additional $841K of cost savings was committed in FY02, for the purpose of ordering equipment that requires a long lead time to deliver. As such, total SOEs consumed in FY03 will total $2,649K.

For Leg 206, which is to be drilled on fast spreading crust, SOE expenses total $641K, including $299K of cost savings identified and committed in FY02. These funds will be used to purchase and ship additional drilling equipment (including bulk materials and liners), two under-reamers and mud motors, supplies, bits, reentry systems and casing, and to use logging specialty tools (WST, DLL). For Leg 207 (Demerara) SOE costs sum to $168K, and will be used to purchase and ship drilling equipment, supplies, and to use the MGT logging tool. Walvis Ridge coring (Leg 208) will require $201K of leg-specific costs to accommodate supplemental equipment and supplies as well as the GHMT and MGT logging tools. Activities on Leg 209 (MAR Peridotite) will include logging-while-drilling (LWD) and hammer drilling which necessitate SOEs of $1,087K, including $542K of FY02 cost savings committed in FY02 for long lead-time purchases. These costs will be used to purchase or rent and to ship bulk materials, liners, bits, hammer drill casing, 13 3/8" hangers, casing, hammers, LWD, and the services of a hammer drill engineer.

Finally, Leg 210 will require SOEs of $552K to purchase and ship RCB core bits, a reentry cone, hangers, casing (in three different diameters), and to rend jars, under-reamers, and mud motors.

The budget in FY03 is lower than in previous years, in part resulting from the termination of the ship's subcontract (which precludes the additional day rate payment normally made the last month of the fiscal year as an advance for the first month of operations in the new fiscal year), by continued identification of cost savings, despite growth in certain cost centers, such as umbrella coverage for the Marine Insurance Package as a result of the events beginning September 11, 2001, and by supplementing or cost-sharing program costs with external funds, such as from the DOE award. With regard to budget risk, management agreed that in FY03, as in the previous year, fuel will be budgeted at $250/metric ton rather than at the historical average of $200/MT used in FY01. In that year, the Program paid an average of $312/MT of fuel at the first four ports of call (Legs 193 through 196) and cost overruns were experienced. If the average cost of fuel exceeds $250/MT during FY03, NSF has indicated a willingness to consider a request for additional resources.

In an attempt to offset flat funding, the Program has sought resources from external sources, as in years past. In December 2001, JOI's proposal to the US Department of Energy solicitation on "Methane Hydrates" titled "*In-situ* sampling and characterization of naturally occurring marine methane hydrate using the *D/V JOIDES Resolution*," was funded at approximately $1,000K to support upgrades to downhole tools used by ODP for characterizing gas hydrates (e.g., Pressure Core Sampler (PCS), ODP memory tools), and new equipment that could be used for this purpose (e.g., G/GI seismic guns, infrared thermal imaging system, PCS gas manifold system, modifications to the FUGRO piezoprobe tool). These activities supported characterization efforts on ODP Legs 201 and 204. As in FY02, the Program will continue to realize ~$80K of cost savings through a Schlumberger/GeoQuest university software license program. ODP has not seen a substantive increase in funding from existing or new partners in more than nine years.

To continue the logistics and operational planning of the Arctic Lomonosov Ridge drilling project, and to ensure a seamless transition of this activity from ODP to IODP, JOI requests funds ($200K) to exercise the option to extend its subcontract with the Swedish Polar Research Secretariat to continue to provide planning services for a second and final year. The in-depth technical planning initiated in FY02 should continue, unabated, as the science operator is identified for this program, as contracts are drawn up to lease the ice breakers, and as the drilling vessel is identified and outfitted accordingly for coring, among other activities. ODP management will continue to work closely with JEODI representatives and other relevant parties, with the scientific proponents, with the Science Advisory structure of the incipient IODP, and with science and logging operators to develop a sound and comprehensive strategy for executing an Arctic expedition.

FY04, ODP phase-out

This 5-year Program Plan includes a phase-out plan by which JOI and its major subcontractors will efficiently conclude the activities of the ODP, archive and/or transfer its assets and legacy, and terminate all programmatic, contractual, and financial business. Expenses are affiliated with many activities, including demobilization of the *JOIDES Resolution* and related tasks, maintenance and continued use of the core repositories, archiving activities, conducting a preventative maintenance on the drill string, technical legacy documentation, coring system design improvements, scientific publications, log analysis centers, logging database archiving and distribution of data, processing/archiving of DSDP logging data, and administrative closeout.

Table ES-2 summarizes the FY03 budget request and compares it to the approved FY02 budgets. The table also shows the budgets for the four-year phase-out. The ODP budget is divided into three major categories: Science Operations (TAMU), Logging Services (LDEO), and Prime Contractor (JOI/JOIDES) Services budget includes the LDEO Borehole Research Group, international processing centers, and the subcontractor (Schlumberger Offshore Services). The Prime Contractor (JOI/JOIDES) includes program management at JOI, advisory services of the JOIDES Office, the ODP Site Survey Data Bank at LDEO, and miscellaneous costs such as printing and distributing the JOIDES Journal and providing Panel Chair Support.

Table ES-2: Budgets for FY 02 through FY 07 ($K)

TAMU	FY02	FY03	FY04	FY05	FY06	FY07	Total Phaseout Costs (FY04-FY07)
Science Services	4,227	4,020	2,297	210	-	-	2,507
Drilling Services	3,508	3,699	2,120	331	-	-	2,451
Information Services	2,412	2,369	1,188	204	-	-	1,392
Publications	1,645	1,619	1,842	1,673	1,538	1,404	6,457
Headquarters/ Administration	1,858	1,855	2,039	1,059	-	-	3,098
Ship Operations	24,863	23,838		-	-	-	-
TOTAL TAMU	**38,513**	**37,400***	**9,486**	**3,477**	**1,538**	**1,404**	**15,905**
LDEO	**5,168**	**5,427****	**1,190**	**429**	**235**	**234**	**2,088**
JOI/JOIDES	**2,517**	**2,473**	**1,379**	**499**	**343**	**290**	**2,511**
TOTAL ODP BUDGET	**46,198**	**45,300**	**12,055**	**4,405**	**2,116**	**1,928**	**20,504**

* TAMU's SOEs (totaling $2,277,388) are incorporated into their leg-based and departmental budgets. $841K of TAMU's leg related special operating expenses for FY03 activities were expensed in FY02 to purchase long lead time equipment.

**LDEO's SOEs (totaling $371,437 for FY03 operations) are outlined in more detail on page L-13 of the LDEO Program Plan, Appendix B.

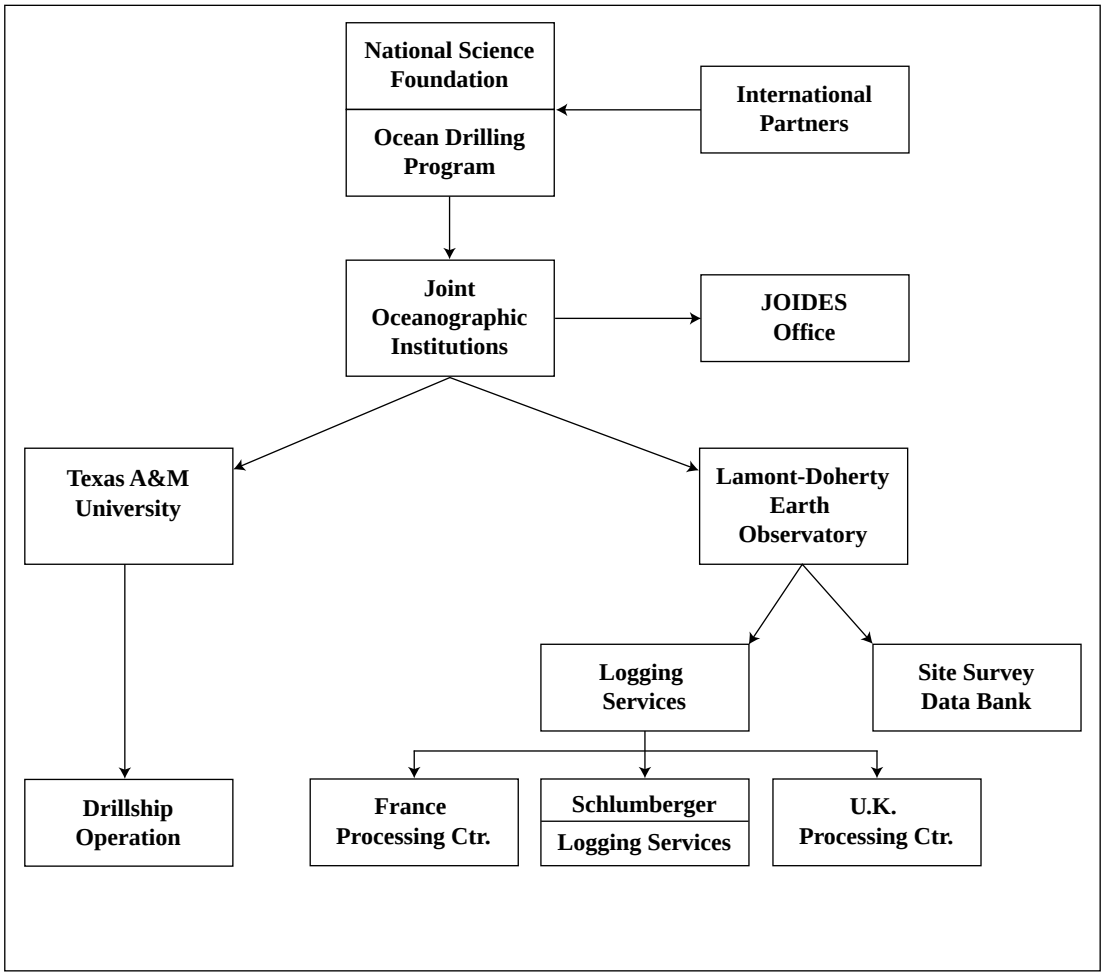
Ocean Drilling Program Organization

Organizational Framework

The Ocean Drilling Program (ODP) is funded by the US National Science Foundation (NSF) using commingled funds from the US and the international partners, that currently include the Australia-Canada-Chinese Taipei-Korea Consortium, the European Science Foundation Consortium for Ocean Drilling, Germany, Japan, the United Kingdom, the People's Republic of China and France. The ODP Council provides a forum for consultation between the NSF and the international funding agencies.

The technical management relationship for ODP consists of four basic components: the overall Program Manager, Joint Oceanographic Institutions (JOI); the scientific advisory structure, Joint Oceanographic Institutions for Deep Earth Sampling (JOIDES); the Science Operator Texas A&M University (TAMU); and the Logging Services Operator, Lamont-Doherty Earth Observatory (LDEO). The management relationships among these components are illustrated in Figure PP-1.

Figure PP-1: ODP Management Structure



In considering the organization of ODP, it is important to bear in mind that not only are the organizational components physically separated, but also that the program organization cuts across institutional lines. For example, LDEO houses parts of three different ODP organizational components (i.e., logging services, ODP Site Survey Data Bank and the TAMU-operated ODP East Coast Core Repository).

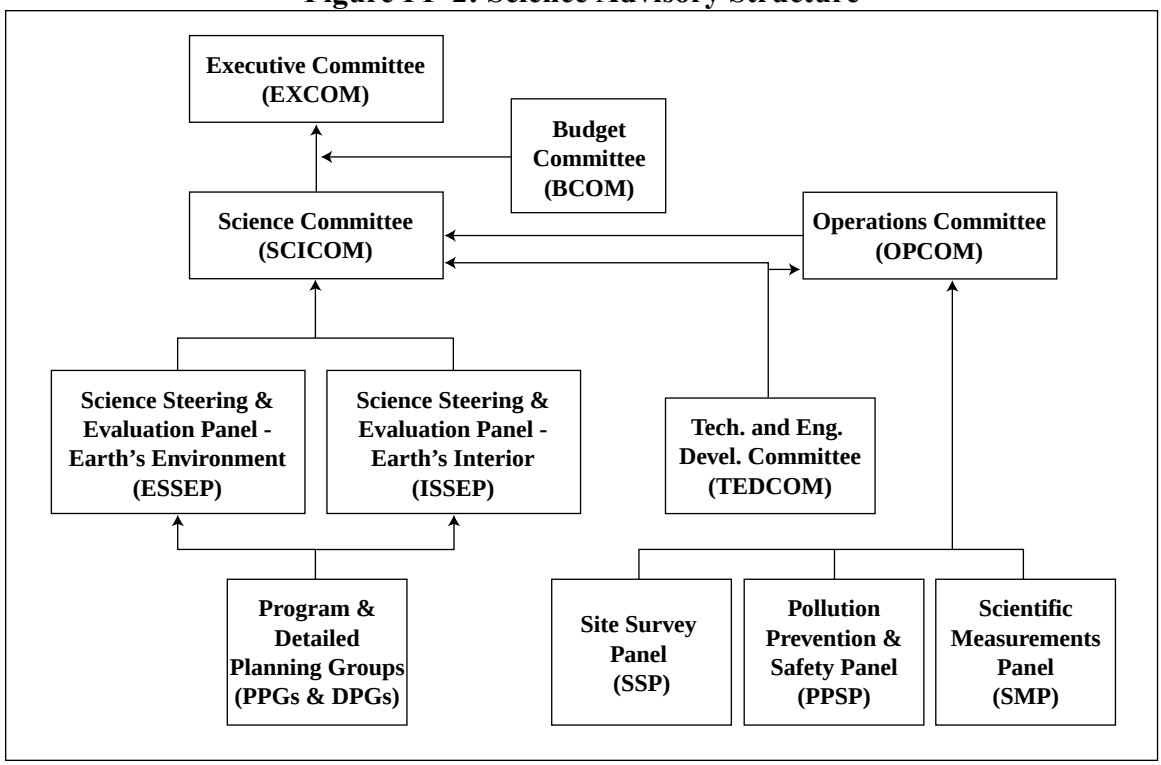
Program Manager

ODP is managed by JOI as the prime contractor to NSF. JOI is a consortium of fourteen major US oceanographic institutions (in legal terms, a not-for-profit corporation), which provides management support to large multi-institutional scientific research programs such as the ODP. JOI is located in Washington, DC. The FY03 staffing level is planned to be 19, of which approximately 7.50 Full Time Equivalents (FTE) will be directly charged to ODP, including one FTE offsite JOI employee who works as a liaison in the JOIDES Office. JOI provides scientific, contractual, management and fiscal links between NSF and the various operational and advisory components of ODP.

Scientific Advisory Structure

The scientific objectives of ODP are established by JOIDES panels, international groups of scientists drawn from the JOI institutions, other US institutions, and representatives of the non-US partners. JOIDES panels provide planning and program advice to JOI with regard to scientific goals and objectives, facilities, scientific personnel, and operating procedures. ODP national organizations appoint panel members, and over 200 scientists from the international geoscience community are represented on these panels (see Figure PP-2).

Figure PP-2: Science Advisory Structure



The JOIDES advisory structure and activities are coordinated by the SCICOM chair and the JOIDES Office. The JOIDES Office typically consists of four people (one of whom is the SCICOM Chair), and provides support for the JOIDES Executive and Science Committees and for the science advisory services structure. The office and the personnel rotate every two years between the U.S. and non-U.S. ODP members. Any U.S. institution, with the exception of the ODP subcontractors, Texas A&M University and Columbia University, is able to bid to host the JOIDES Office when the office rotates to the U.S. The JOIDES Office has been located at the University of Miami since January 2001.

Science Operator

Texas A&M University (TAMU), located in College Station, Texas, serves as Science Operator for ODP through a contract between JOI and the Texas A&M University, JOI also contracts with Texas A&M Research Foundation (TAMRF) for business services. As Science Operator, TAMU is responsible for implementing science and operations, including managing the operation of the *JOIDES Resolution* (owned and operated by Overseas Drilling, Ltd. [ODL]); engineering development and improvement of drilling technology; selecting scientists for the shipboard scientific parties; designing, furnishing, staffing and maintaining shipboard laboratories; curation and distribution of all core samples and core-related data; publishing scientific results; and working with JOI to provide public information about ODP. TAMU has facilities that serve as a repository for ODP cores from the Pacific and Indian Oceans. In addition, TAMU is responsible for core repositories at LDEO for Atlantic, Mediterranean, and Caribbean cores through Leg 150; at Bremen, Germany for Atlantic, Mediterranean and Caribbean cores from Leg 151

onward; and at Scripps Institution of Oceanography, which houses previously-collected DSDP cores from the Pacific and Indian Oceans. The general organization of the Science Operator is shown in Figure PP-3 and is detailed in Appendix A (TAMU section) of this Program Plan. The TAMU staff staffing level is planned to be 141.05 FTEs in FY03.

Logging Services

Lamont-Doherty Earth Observatory (LDEO), located in Palisades, New York, and affiliated with Columbia University, provides, through its Borehole Research Group, a full suite of geophysical and geochemical services which involve the acquisition, processing and presentation of *in situ* borehole logging measurements. LDEO is charged with providing state-of-the-art "oil industry" logging customized to the scientific needs of ODP, plus certain specialty logs. LDEO also provides interpretation and dissemination services to ODP scientists.

The organization of the ODP logging services operation is shown in Figure PP-4 and is detailed in Appendix B (LDEO section) of this Program Plan. A log analysis center operated by the Borehole Research Group at LDEO with additional processing centers in France, United Kingdom, Germany and Japan, has computer processing, log analysis and interpretation services for post-cruise use by ODP scientists. LDEO also contracts for basic oil-field type logging services from Schlumberger Offshore Services. The Logging Services staff is planned to be 17.21 FTEs in FY03.

ODP Site Survey Data Bank

The ODP Site Survey Data Bank, formerly the IPOD Data Bank, is located at LDEO. It has served the JOIDES community since 1985 by cataloging, collecting, and distributing site survey and other geophysical data to various panels and individuals associated with scientific ocean drilling. The Data Bank staff is planned to be 4 FTEs in FY03.

Figure PP-3: ODP Program Manager Organization

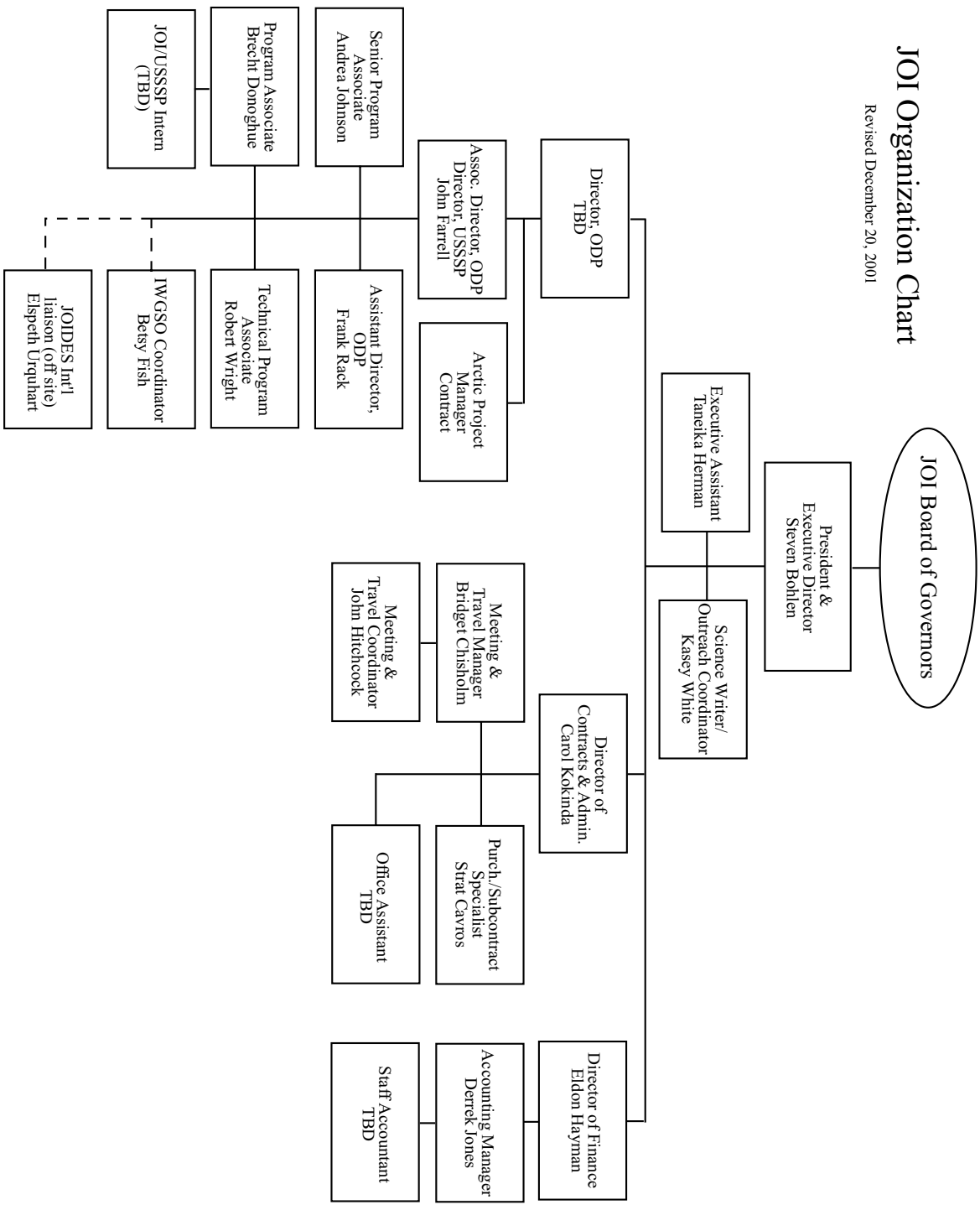
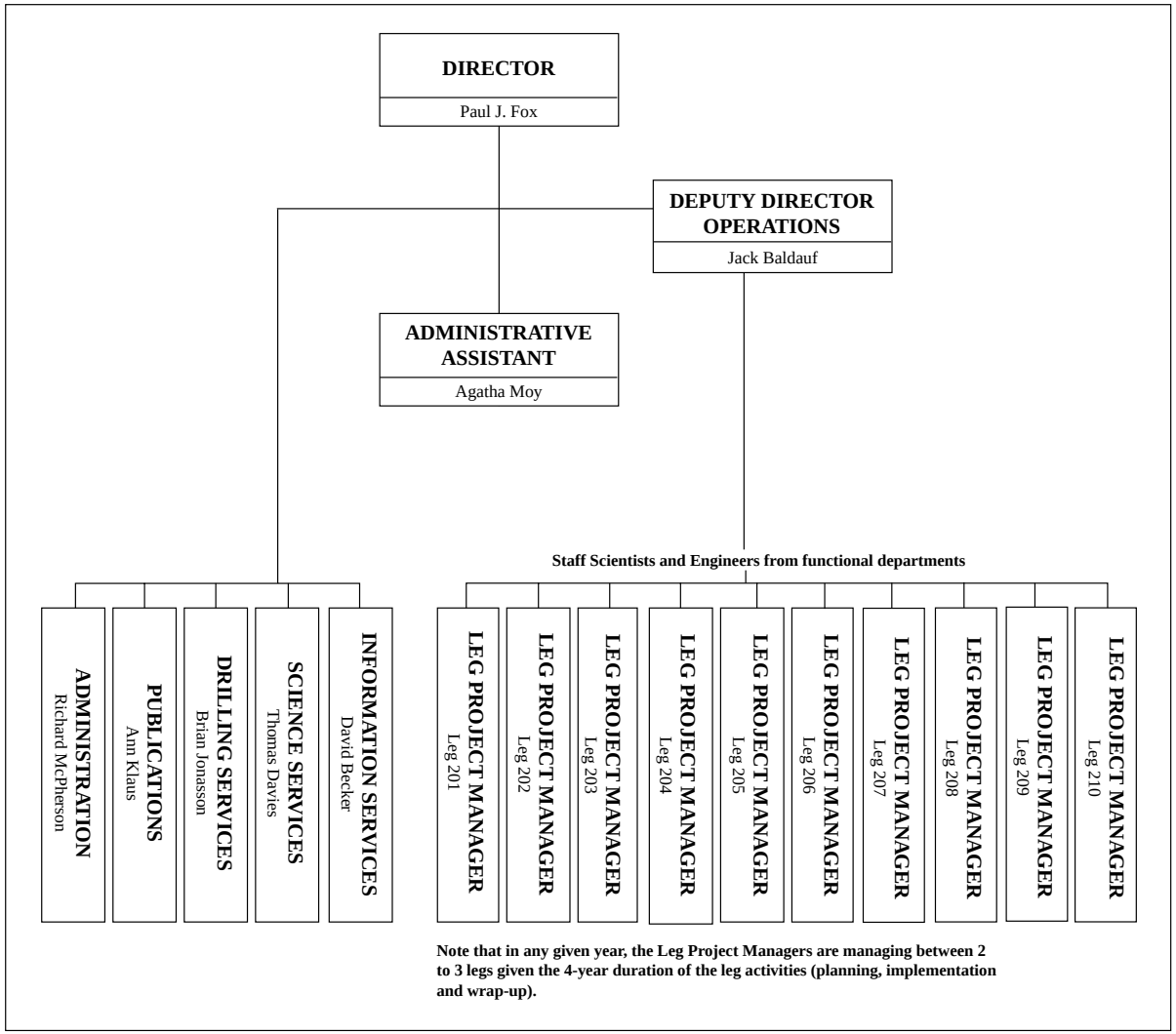
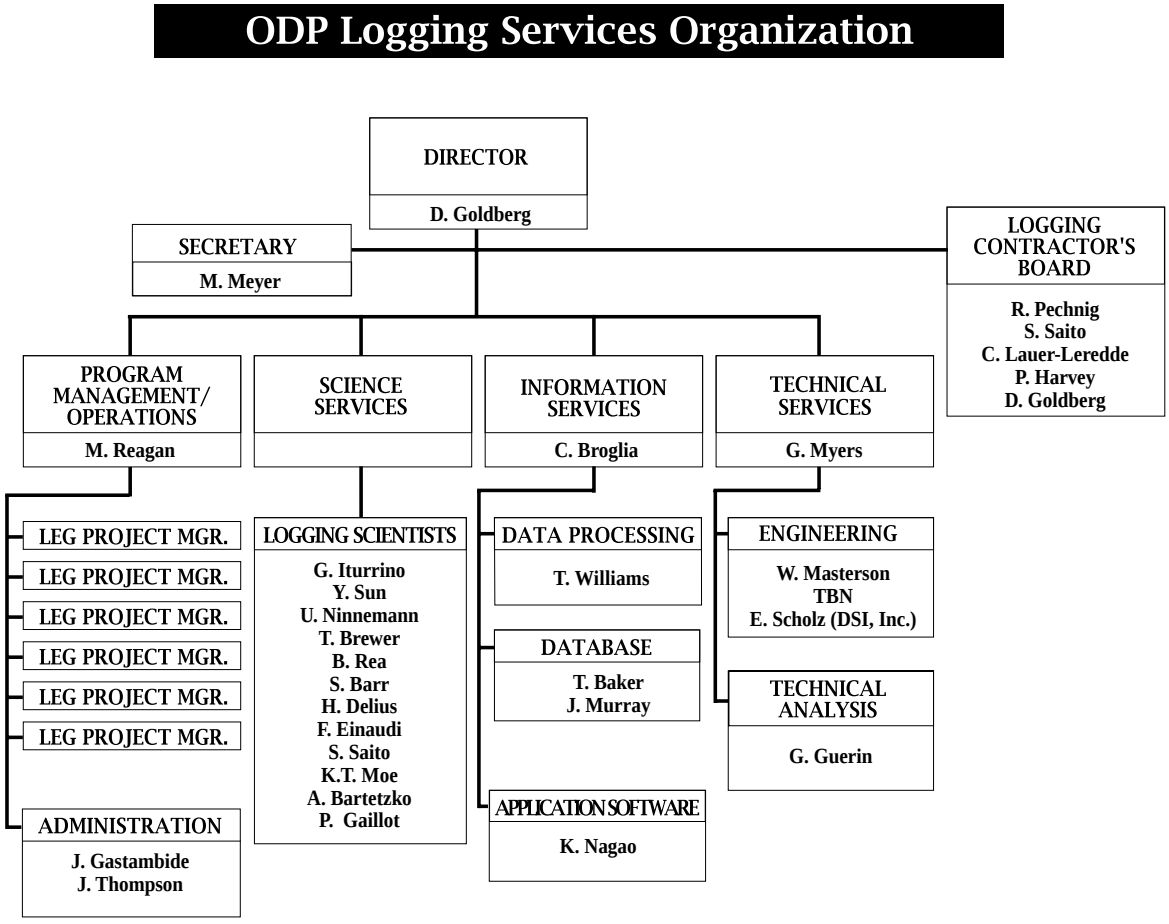


Figure PP-4: ODP Science Operator Organization*



*All business services are provided by the Texas A&M Research Foundation.

Figure PP-5: ODP Logging Services Organization



Highlights of ODP History

Will be provided by JOI – work in progress.

ODP Accomplishments (FY97-FY01)

Science Accomplishments

Introduction

Between June 1997 and October 2001, 27 highly successful scientific cruises were completed by the Ocean Drilling Program (ODP), contributing significantly to the understanding of systems and processes controlling our environment. The description of operations and scientific results for each of the cruise legs (ODP Legs 173 – 198) can be found in the "Initial Reports" and the "Scientific Results" of the *Proceedings of the Ocean Drilling Program.* It should be noted however that scientific analyses of ODP material is an ongoing process, samples being available to the scientific community for many years to come and the results of future analyses should not be underestimated. Publication of cruise data has undergone a dramatic change during the last five years and now, instead of the familiar pink and blue, somewhat unwieldy paper tomes the data are all available in electronic format on CD-Roms presented in much slimmer, book-shelf friendly packaging.

In 1996 the Ocean Drilling Program published a Long Range Plan (LRP) outlining the fundamental scientific objectives of the program, describing how the scene had been "set' by previous ODP studies, and planning the optimum strategies to consolidate and build on these latter achievements during the succeeding phases of drilling activity.

Dynamics of Earth's Environment

1.1 Understanding Earth's Changing Climate

Major targets of the ODP Long Range Plan include investigation of the role of greenhouse gases in climate change, specifically how the natural variations in atmospheric CO_2 and methane are linked to changes in oceanographic conditions, i.e. were episodes of global warming in the past due to changes in atmospheric composition or pole-ward heat transport by ocean currents? Emphasis has been placed on the recovery of longer cores, i.e. those sedimentary records that have a long enough history to withstand rigorous statistical analyses and identify previous major climate shifts, and on cores from sites with high sedimentation rates, which will enable extremely high-resolution studies.

The installation onboard the *JOIDES Resolution* of new technology, including the multisensor track system, has greatly increased the potential for rapid extraction of paleoclimatic data from rapidly accumulated sediments

African and Asian Monsoons

The dynamic interactions between the configuration of the continents, tectonic activity, ocean currents and atmospheric conditions with regard to exchange of energy and volatiles govern Earth's climate. A better understanding of these interactions through time is a major goal of the ODP and during the past five years two drilling cruises, Legs 175 and 184 have focused on monsoonal causes and effects in Africa and in Asia. Previous paleoceanographic monsoon-related ODP studies have been dominated by those on the Indian Monsoon, for example, Leg 117 on the Oman margin.

The climate of southern Africa is strongly influenced by the Benguela Current and ODP Leg 175 drilled a series of sites off Africa between the Congo and Cape Town in order to evaluate this relationship. Initial results showed a strong link between biological productivity in the Angola basin and monsoonal variations in northern Africa. The goal of ODP Leg 175 was to reconstruct the Late Neogene history of the Benguela current and the associated upwelling off Angola and Namibia between 5º and 32ºS. This is one of the greatest upwelling regions of the world – intermediate in size between the Peru and California upwelling systems. One of the major aims was to monitor the evolution of the Benguela current system and its relationship to the onset of Northern hemisphere and Antarctic glacial cycles. High sedimentation rates in the region offer the opportunity to develop very detailed paleoceanographic records. In addition, eastern boundary upwelling is strongly involved in modulation of the carbon cycle, and therefore in control of the partial pressure of CO_2 content of the atmosphere. Hence, in order to predict the effects of changes in productivity on the CO_2 content of the atmosphere, relations between circulation, nutrient transport, and the sedimentation of organic compounds and carbonate must be established for each region of high productivity. Understanding the role of the ocean in climate change through heat transport and control of carbon dioxide is critical in determining the mechanisms of climate change. The Benguela Current plays a key role in the heat transfer from South Atlantic to North Atlantic, which in turn dominates climate developments in the northern hemisphere in the late Neogene

Also a major component of both regional and global climate is the Asian monsoon system, phenomena addressed by drilling operations during Leg 184 in the South China Sea (SCS). An understanding of the evolution and variations of this system is a major objective for paleoclimatology studies. The SCS with its high sedimentation rates of carbonate-rich hemipelagic sediments offers a rare opportunity to study the variability of the East Asian monsoon in the Western Pacific region. Its location between East Asia and the "Maritime Continent" is ideal to document the paleoceanographic response to both winter and summer monsoons. An alternative theory to that of the high latitude ice sheets as the most significant phenomenon controlling monsoonal activity is that, both evolution of the Asian monsoon system and the Cenozoic global cooling are thought to be closely linked to the Himalayan-Tibetan orogen. The sediments of the SCS therefore offer a record of the erosion and weathering of tectonic orogens for future analyses as well as changes in global and regional climate.

Further to the north in the western Pacific drilling at Site 1202, during part of Leg 195, was designed to obtain a high-resolution sediment record under the Kuroshio Current to

study global climate change, sea level fluctuation, local tectonic development, and terrestrial environmental changes in East Asia over the past 2 m.y. The Okinawa Trough is one of the few locations in the Pacific where the seafloor under the Kuroshio Current lies above the carbonate compensation depth, allowing the calcareous microfossil record to be preserved, and it is the only location with a high sedimentation rate, allowing high-resolution studies. Although this cruise has only recently been completed preliminary examination of samples suggests a rapid depositional rate for sediments of at least 325 cm/k.y..

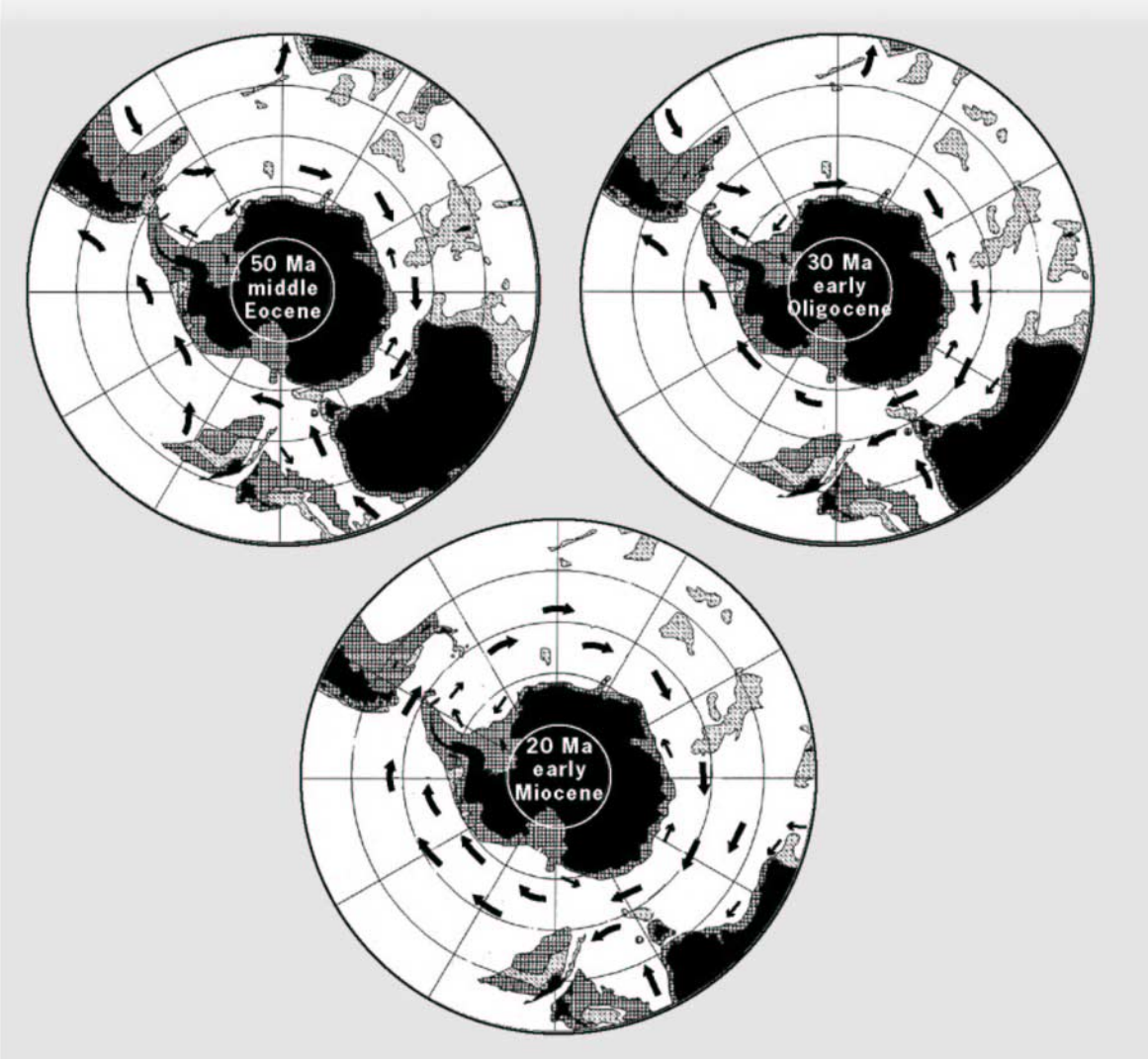
Cryosphere dynamics in the Southern Hemisphere

Over the last decade, paleoceanographers, climatologists, and geochemists have recognized that processes occurring in the Southern Ocean have played a vital role in defining Earth's climate, yet many questions remain about the region's paleoenvironmental evolution. The Antarctic ice sheets and the adjacent Southern Ocean act together to form the Antarctic ocean-cryosphere system. The development and evolution of the Antarctic ice sheet and sea-ice field have had a profound influence on global sea-level history, Earth's heat budget, atmospheric circulation, surface- and deep-water circulation, and the evolution of Antarctic biota. The Southern Ocean is one of the primary sites of intermediate-, deep-, and bottom-water formation. For example, Antarctic Bottom Water that mainly originates in the Weddell Sea region bathes almost two-thirds of the global ocean floor. The Southern Ocean represents the "junction box" of deep-water circulation where mixing occurs among water masses from all ocean basins. As one of the primary sites of deep- and intermediate-water mass formation, the geochemical and climatic fingerprint of Southern Ocean processes is transmitted throughout the world's deep oceans. Today the Antarctic continent is thermally and biogeographically isolated from the subtropics by the Antarctic Circumpolar Current (ACC), a ring of cold water that contains complex frontal features and upwelling/downwelling cells. In the Late Cretaceous, before the pathway of the ACC had evolved, Australia and Antarctica were still united, although rifts had developed as the slow separation and northward movement of Australia commenced.

During the drilling phase between 1998 – 2000 the ODP drilled several legs, based on a suite of linked proposals, to decipher the Cenozoic glacial history and paleoenvironments of Antarctica, by documenting the paleoenvironments for select periods during the Cenozoic and older times as Antarctica transformed from a temperate to polar setting. In East Antarctica the Gamburtsev Subglacial Highlands, possibly the nucleus of the earliest Antarctic glaciation, are included in the drainage basin of the “Amery Ice Shelf-Lambert Glacier” ice drainage system. The Lambert Glacier responds to fluctuations of the interior of the East Antarctic ice sheet that are then reflected in the sediments of Prydz Bay at the downstream end of this ice drainage system. A major objective of ODP Leg 188 was to determine the onset of widespread glaciation in East Antarctica, and its adjacent continental rise and to document a proximal continental rise record of Antarctic glacial and interglacial periods. Records recovered by this cruise are now being used for comparison with sites around Antarctica and with Northern Hemisphere ice sheets. The sites drilled provide records of the transition from East Antarctic preglacial to glacial conditions on the shelf, the variability of ice sheet extent, sediment source areas and

glaciomarine depositional processes during latest Neogene glacial-interglacial periods on the slope. These sediment cores recovered by Leg 188 in Prydz Bay also document the long-term lower to upper Miocene transition from a temperate climate to a cold climate glaciation together with super imposed short term glacier fluctuations since early Miocene time.

Figure PP-6:



Antarctica and surrounding continents in middle Eocene, early Oligocene and early Miocene times, showing the change from meridional to circum-Antarctic current circulation that brought about the thermal isolation of Antarctica (after Lawver et al., 1992; Shipboard Scientific Party, 1999). Leg 189 was in the plateau areas around Tasmania

Drilling on the Pacific western margin of the Antarctic Peninsula during Leg 178 also recovered records of Antarctica's Cenozoic glacial history by sampling sediments that have been transported at the base of grounded ice sheets to the Antarctic continental margin, deposited on the shelf and slope as progradational wedges, and deposited on the continental rise in drifts. The analyses of samples from Leg 178 hold the promise of significantly advancing our understanding of the vital role of the Antarctic ice sheet in global climate dynamics by providing an unprecedented high-resolution record of Antarctic continental climate over the past 6-10 Ma.

During earlier Cenozoic times, the Paleogene and early Neogene was a period marked by the establishment of the Antarctic cryosphere and the ACC. ODP Leg 177 recovered cores from a latitudinal and depth transect across the Antarctic Circumpolar Current to document the paleoceanographic and climatic history of the southern high latitudes in the Atlantic sector of the Southern Ocean, particularly those sediments deposited during Paleogene and early Neogene times. Expanded sections of late Neogene sediments, which will contribute to the resolution of the timing of subsequent Southern Hemisphere climatic events were also recovered during this cruise. The middle Eocene through early Miocene was a time period when there was a shift in Earth's climate from a warm- ("hothouse") to a cold-climate ("icehouse") mode, and included the buildup of ice on the Antarctic continent and major paleogeographic changes in the Southern Ocean. These changes included the gradual isolation of the Antarctic continent and the opening of the Drake Passage, one of the major ACC 'gateways'.

Cores recovered and analyzed by ODP Leg 189 indicate that the Tasmanian land bridge, at polar latitudes, completely blocked the eastern end of the widening Austral-Antarctic Gulf, during both the slow-spreading phase and the fast-spreading phase (starting at 43 Ma), until the late Eocene. The Drake Passage opened early in the Neogene, and the Tasmanian Seaway continued to open, strengthening and widening the Antarctic Circumpolar Current and strongly isolating Antarctica from warm-water influences from lower latitudes. At ~15 Ma, the East Antarctic cryosphere evolved into ice sheets comparable to those of present day. This intensified global cooling and thermohaline circulation. The "Icehouse" world had arrived. However, temperatures and current activity fluctuated, and dissolution and erosion varied over time. Along with global climate change associated with high latitude ice sheet expansion, this led to the massive aridity of Australia and an increase in dust abundance in some sequences after 5 Ma.

Today deep waters from the Southern Ocean enter the Pacific Basin through the Southwest Pacific gateways. Present knowledge of Southwest Pacific Ocean history, and in particular the development of the Antarctic Circum-Polar Current-Deep Western Boundary Current (ACC-DWBC) system, is extremely poor, although it is known that the Pacific DWBC is today one of the largest single contributors to the deep waters of the world's oceans. ODP Leg 181 was concerned with developing a better understanding of earth's changing climate through exploration of the Southwest Pacific gateways and therefore drilled seven holes in the eastern New Zealand region in order to attempt to reconstruct the stratigraphy, paleohydrography, and dynamics of the DWBC and related water masses. The circulation of cold, deep Antarctic Bottom Water is one of the

controlling factors in the earth's heat budget and, ultimately, climate. Currently, forty percent of the flux of cold bottom water entering the major ocean basins does so through the Southwest Pacific Ocean, as the thermohaline DWBC. The cold water in the DWBC is derived from dense waters sinking around Antarctica and entrainment and mixing of deep Atlantic and Indian Ocean waters by the wind driven Antarctic Circumpolar Current. Further study of the material collected on Leg 181 will lead to a better understanding of the history and evolution of the Pacific ACC-DWBC system and related oceanic fronts and to the important role they play in global ocean circulation. Core material recovered has provided the raw data needed to study a range of problems during the Neogene history of the Southern Ocean.

The study of the evolution of the Southern Ocean was also the focus of ODP Leg 182, which was devoted to the study of the Cenozoic cool-water carbonates of the Great Australian Bight. The cool water carbonates are different from tropical carbonates and are possible analogues of the vast shelf carbonates of the Paleozoic. The location of the Great Australian Bight, facing the evolving Southern Ocean throughout the Cenozoic, made this area a prime site to determine the timing of the Tasman Gateway opening and the subsequent paleoceanographic effects.

This region, Antarctica and the Southern Ocean, was identified as a high priority target for ODP drilling during this phase of operations because comparisons of sequences drilled on the Antarctic margin and the southern oceans will greatly improve our understanding of these momentous changes in Earth's history and some of the constraints on modern climates. If Australia had not broken away from Antarctica and moved northward, global climate may well have remained warm.

In the northern hemisphere the high Arctic regions represent a critical piece of the climate puzzle as the extent of sea and land ice in this area is thought to be a powerful source of climatic feedback, reflecting sunlight and insulating the cold polar atmosphere from oceanic heat. As yet the Arctic is poorly explored but during the past 5 years significant progress has been made both by seismic, cross-line imaging and in the logistical planning of an expedition to drill the Lomonosov Ridge at 87º N.

1.2 Causes and Effects of Sea-level Changes

The causes and effects of sea level change constitute a significant area of interest for the ODP as outlined in the Long Range Plan. Sea level and sea level changes have a major impact on climate and global oceanic circulation as discussed in the section above. Some of the most influential phenomena of this interactive system are the increases and decreases in ice volume in the high latitudes and the related eustatic sea level fluctuations. Measuring the magnitude of these eustatic sea level fluctuations has proved to be a difficult problem whose resolution is essential both for the establishment of an accurate eustatic sea-level curve for the Phanerozoic and for the accurate interpretation of sediment sequences on continental margins. Several attempts have been made to determine the amplitude of glacioeustatic fluctuations including passive margin sequence stratigraphy; modeling of sedimentary depositional regimes; calibration of the oxygen isotope curve;

and analysis of the depositional history of carbonate sediments on atolls. These analyses often agree on the timing of sea level changes but there are significant differences between estimates of the magnitude of these events.

North Atlantic

Sea-level fluctuations, as an important component of Earth's paleoenvironment, were the focus of the Leg 174A drilling on the New Jersey shelf and slope. The major goal of Leg 174A was to investigate the Oligocene Holocene history of sea-level change as part of a transect of holes from the slope (ODP Leg 150) to the coastal plain (150X and 174AX), which constitute the Mid-Atlantic Sea-level Transect. Sampling of the New Jersey shelf sedimentary succession resulted in characterization of four major unconformities thought to represent mid-Miocene to Pleistocene times, or intervals of falling sea level. Slope drilling recovered a thick Pleistocene section with excellent biostratigraphy at high resolution, which should provide for calibration of glacial-eustatic sea-level fluctuations over the last 2 million years. The chemistry of interstitial waters recovered from these sediments also indicates that salinity minima are consistent with alternate exposure of the shelf during the Pliocene-Pleistocene, followed by renewed flooding of seawater. On the slope, five well-defined alkalinity maxima and four HPO_4^{2-} maxima in interstitial-water profiles from the thick late Pleistocene succession can be attributed to variations in the amount or type of buried organic matter between glacial and interglacial intervals in the northern hemisphere.

Southern Oceans

Investigation of the southern hemisphere cryospheres in relation to sea level fluctuations has also been significant during this phase of ODP operations with several cruises to the region. The Cenozoic Era is unusual in its development of major ice sheets. Progressive cooling at high latitudes during the Cenozoic eventually formed major ice sheets, initially on Antarctica and later in the Northern Hemisphere. The Antarctic cryosphere today represents the largest accumulation of ice on Earth's surface and should it melt completely, sea level would rise by 50 to 60 m. This ice sheet is the most likely governor of rapid eustatic sea-level change. A major goal of ODP Leg 178 was to extract the Cenozoic glacial history of Antarctica from the sediments of its continental margin by drilling and coring drift deposits off the western side of the peninsula. During Leg 188 drilling across the Prydz Bay continental shelf, slope and rise provided new evidence of long and short-term variations in paleoenvironments extending from Holocene to Mesozoic times. In the early 1970s, a hypothesis was proposed that climatic cooling and an Antarctic cryosphere developed as the Antarctic Circumpolar Current progressively thermally isolated the Antarctic continent. This current resulted from the opening of the Tasmanian Gateway south of Tasmania during the Paleogene and the Drake Passage during the earliest Neogene. The five Leg 189 drill sites tested the above hypothesis and refined and extended it, greatly improving understanding of Southern Ocean evolution and its relation with Antarctic climatic development. The sites selected drilled on submerged continental blocks, extending as far as 600 km south of Tasmania. These blocks were at paleolatitudes of up to 70ºS and are in a relatively shallow region off Tasmania, in one of the few places where well-preserved and almost-complete marine Cenozoic carbonate-rich sequences can be drilled in present day latitudes of 40º- 50º S. The changes recorded in the cored

sequences clearly reflect evolution of a tightly integrated, and at times dynamically evolving, system involving the lithosphere, hydrosphere, atmosphere, cryosphere, and biosphere. These results essentially encapsulate the evolution during the Cenozoic of the Antarctic system from "Greenhouse" to "Icehouse" and indicate that the Tasmanian land bridge, at polar latitudes, completely blocked the eastern end of the widening Australo-Antarctic Gulf until the late Eocene.

South China Sea

The effects of changing sea levels in areas removed from immediate proximity to the ice sheets was one objective of ODP Leg 184 which investigated the timing and magnitude of sea level change in the South China Sea (SCS). Previous work suggests that during the last glacial maximum (LGM) a lower sea level greatly altered the configuration and area of the western Pacific marginal seas exposing a shelf area comparable in size to the Indian subcontinent. The SCS lost half of its surface area as a result of this shelf exposure, and this reduction in size must have profoundly influenced the thermodynamic role played by this area of the western Pacific. The central portion of the SCS is also thought to have experienced a considerable decline in the sea-surface temperature (SST) during the LGM. In the SCS region an important consequence of the contemporaneous glacial conditions was the intensified aridity in China. The summer monsoon is the main source of water vapor for rainfall in East China and changes in shelf emergence, SST decline, and land-sea heating patterns must have led to a reduction of vapor transport to southern Asia. The glacial reduction in water vapor transport helps to explain the intensification of aridity in the China hinterland as evidenced by the extensive distribution of loess deposits. Successful coring and recovery of sediments during Leg 184 has yielded a sequence of hemipelagic sediments that records the past 32 m.y. of environmental history of the South China Sea. For the first time in the lower latitude western Pacific, these cores provide a high-resolution continuous record of relatively carbonate-rich fine-grained sediments and a possibility of sea-land correlation of the upper Cenozoic stratigraphy for the region. The lithologies, microfossils, and physical properties of the hemipelagic sequence reveal significant trends, clear cyclicities, and abrupt changes that provide detailed records of environmental transformations, including provenance and volcanism.

Carbonate Platforms

Evidence of sea level changes, the timing, magnitude, and effects manifest on carbonate platforms was the goal of two quite different ODP legs (Legs 182 and 194) during the last five years. Sediments recovered in the Great Australian Bight (on a temperate carbonate platform off southern Australia) during Leg 182 record carbonate deposition in a middle- and high-latitude setting against the background of an evolving Southern Ocean and northward drift of the Australian continent. Carbonate platforms are large geologic structures composed of the remains of formerly living, calcium carbonate secreting organisms that can develop in environments ranging from tropical to temperate, and in locations that are free of siliceous sediment, to those with significant amount of sediment from land. Because these platforms are composed of biogenic remains sensitive to changes in environmental conditions such as sea level, wind or currents, nutrient content, and water temperature the study of carbonate platforms provides fundamental information regarding environmental change in a range of environments. One priority objective of Leg

182 was to record a sea-level history for this part of the Southern Ocean, as a component of the global latitudinal sea-level transect. In addition, an important objective was to determine how sea-level fluctuations controlled cool-water carbonate ramp deposition. One particularly interesting discovery on this leg was the identification of large-scale Bryozoan mounds, the first modern analogues for features that have only previously been described from onshore exposures, although from many parts of the geological record. Leg 182 recovered cores of these mounds and scientists are now developing a model of alternating mound growth and quiescent phases, with upwelling along the margin during sea-level lowstands contributing to mound growth, followed by cessation of mound growth and covering by mud during sea-level highstands. If this model is correct, it raises the interesting possibility of a global alternation in the location of reef/mound growth, with tropical reefs growing most strongly during interglacials, and bryozoan mounds developing during interglacial periods.

The establishment of an accurate Phanerozoic sea level curve and the interpretation of sediment sequences on continental margins depend on reliable estimates of the amplitude and timing of past eustatic sea level changes. These estimates can be calculated in tectonically stable environments by correlating seismic data with lithologic facies, biofacies (for paleowater depths), and chronostratigraphy. During Leg 194, a series of eight sites were drilled through Oligocene-Holocene mixed carbonate and siliciclastic sediments that record the depositional history and past sea level variations of the Marion Plateau, northeast Australia. As suggested above carbonate platforms and their slopes are sensitive indicators of sea level variations, as they predominantly record growth during sea-level highstands and shut down during sea level lowstands. Sampling these platforms records sea level change in a "dipstick" fashion. On the other hand, sediments on platform margins and slopes record sea level variations as alternations of shallowing and deepening sequences. Leg 194 drill sites were positioned to establish the magnitude of the middle Miocene Zones N12-N14 sea level fall (12.5-11.4 Ma) using both of these depositional systems. An important characteristic of the stratigraphic relationships investigated during Leg 194 is that the drill sites are located in an area without intervening structural elements. Thus, subsidence of the platform is likely to have affected all sites equally, enabling the true amplitude of the sea level fall to be determined. Results from Leg 194 have enabled an accurate estimate of the magnitude of middle Miocene sea-level fall, an important interval of the global sea level curve, together with providing potentially important information for constraining paleocurrents in the western south Pacific. Determining the timing, amplitudes, and causal mechanisms of sea-level variations, as well as their relation to the resulting stratigraphic record, continues to be a fundamental goal of ODP

Figure PP-7:

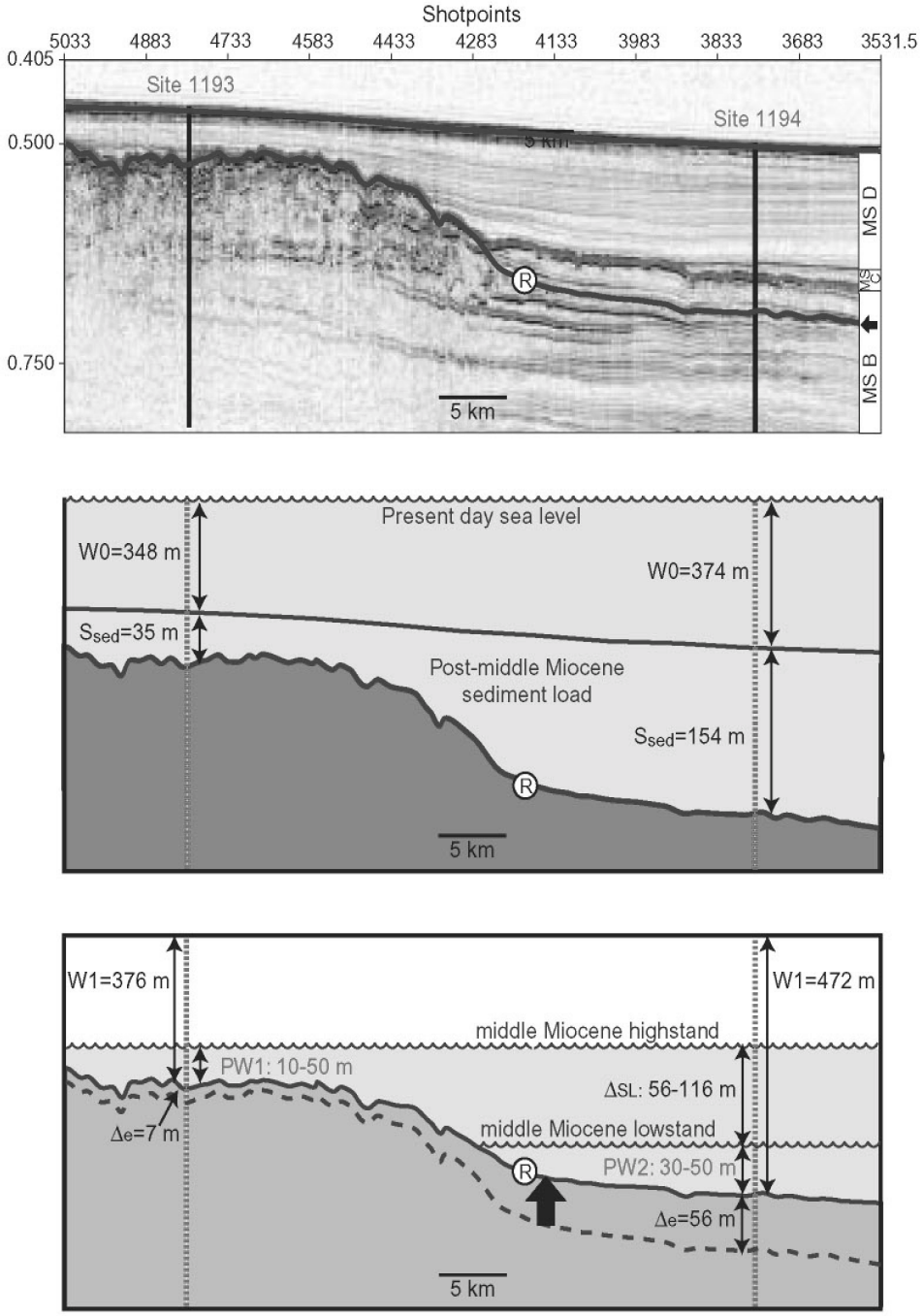


Diagram illustrating the calculation of the late middle Miocene eustatic sea level fall using Sites 1193 and 1194. (From Leg 194 Science Report, 2001: Sea Level Magnitudes Recorded by Continental Margin Sequences on the Marian Plateau, Northeast Australia)

1.3 Sediments, Fluids and Bacteria as Agents of Change

The ODP Long Range Plan theme of sediments, fluids and bacteria as agents of change has focused primarily on the carbon cycle, the formation, residence and degradation of gas hydrates, and the rates and fluxes of fluids within the lithosphere, together with associated bacterial activity.

The sites off the Angola/Namibia margin drilled during Leg 175 provided an excellent setting for natural experiments in sediment diagenesis that are important in the formation of economically important resources, such as petroleum and phosphate. It was also an excellent opportunity to study early diagenetic processes in environments with very high organic carbon and opal contents.

Considerable diagenetic activity was evident at all drill sites, but especially at those with high organic matter content. Gas contents in the hemipelagic sediments were high, and biogenic methane and carbon dioxide are roughly equally important at most sites. Interstitial water chemistry profiles at the margin of the major Namibian upwelling region indicated some of the most extreme conditions of sediment diagenesis ever recovered by DSDP or ODP. Maximum values of alkalinity and ammonium were observed, with sulfate being completely depleted within 5 meters below the sea floor (mbsf). A large portion of the excess alkalinity (over seawater values) is interpreted as the result of bacterial reduction of sulfate and replacement of this strong anion with bicarbonate, a product of abundant bacterial CO_2 production. Bacterial activity (down to at least 200 mbsf) is responsible for the extreme ammonium values. One of the more unexpected discoveries of Leg 175 was the presence of numerous dolomitic layers at several of the sites. Some were recovered in the cores; these and additional layers were identified from the logging data by their high velocity, resistivity and density. These layers probably formed as the result of the very high alkalinities at these sites. The widespread occurrence of dolomite layers in upper Neogene sediments bears on the interpretation of dolomites exposed on land, such as those in the Monterey Formation in California.

Bacterial activity was also evident in several sites drilled during Leg 180 in the extensional Woodlark Basin in the SW Pacific. Near-surface bacterial populations are similar to those at other sites with similar overlying water depths and near-surface organic carbon concentrations. Population numbers decrease rapidly with increasing depth. The activity of deep subsurface microbial populations is evident in the geochemical data. Pore-water sulfate concentrations are depleted in the uppermost sediments, below which methane concentrations increase rapidly as methanogenic bacteria gain a competitive advantage over sulfate-reducing bacteria for common organic substrates. Biological decomposition of organic matter is also evident from the accumulation of ammonia in pore waters. At Site 1108, methanogenesis was biological in origin in the uppermost sediments, with a dramatic increase in methane concentrations occurring below the depth of pore water sulfate depletion.

The Moresby detachment fault was the most spectacular tectonic structure encountered during Leg 180. The *JOIDES Resolution* drilled, an ~ 100-m-thick succession of

brecciated to mylonitic rocks above a basement of undeformed gabbro at a site where the fault plane crops out on the northern flank of the Moresby seamount. A fault gouge several meters thick, crops out on the seafloor and represents the most advanced stage of deformation, with evidence for fluid assisted alteration to produce secondary minerals such as serpentinite, chlorite, talc, calcite, ankerite and fibrous amphibole

One of the main objectives of Leg 182 was to determine the characteristics of fluid circulation within a carbonate platform adjacent to a vast inland karst with sluggish water circulation; and to understand the nature of early burial diagenesis (lithification and dolomitization) in a cold, seawater-dominated system. One of the surprising discoveries of Leg 182 was the presence of brine, with variable salinity, within and underlying seven drill sites. The salinity distribution at three different drill sites suggests that the top of the brine has a uniform depth below sea level and, therefore, cross cuts sequence boundaries. Although the origin of the brine has not yet been established, pore fluids in the Pleistocene portion of the sediments from the shallow water sites possess a Na+/Cl- ratio greater than that of seawater, suggesting that fluids in these sediments were involved in the dissolution of NaCl. It is likely that further post cruise study of the nature and distribution of this brine will shed light on lowstand shelf evaporative processes and the nature of fluid flow within cool-water carbonate margin sediments.

Because of high sedimentation rates and their location at the edge of a broad continental shelf, the shallow water sites initially contained a high concentration of organic material. High salinity fluid interacted with high organic carbon concentrations within the Pleistocene sediment wedge at the modern outer edge of the continental shelf to produce spectacularly high concentrations of methane and hydrogen sulfide gas. The relatively low iron concentration in these carbonate sediments means that the H_2S was not sequestered as iron sulfides and concentrations were able to reach high levels. The organic carbon to feed this bacterial sulfate reduction process was deposited when storms repeatedly removed organisms growing on the vast Great Australian Bight continental shelf and piled the material at the shelf edge. The high-salinity brine is presumed to have formed during times when sea level was low, and large evaporative lakes produced hypersaline fluids, which drained into underlying sediments. Unusual Na+/Cl– ratios greater than unity in brines within the thickest part of the Pleistocene shelf-edge wedge present the interesting possibility that they may reflect the formation of mixed methane and hydrogen sulfide clathrates (frozen gas) within the upper part of the succession. Although the relatively warm water temperatures and shallow depth would rule out the presence of pure methane clathrates, the addition of hydrogen sulfide places at least part of the Pleistocene sediment wedge within the H_2S/CH_4 clathrate stability zone. In contrast to the mineralogically stable environment predicted prior to drilling, the oxidation of organic matter at these sites caused accelerated diagenesis having an important influence on carbonate recrystallization, which is occurring at higher rates than previously thought possible for cool-water carbonates. The high hydrogen sulfide content resulted in decreased pH of pore fluids causing dissolution of the least stable carbonate minerals, and the increased alkalinity resulting from sulfate reduction created a thermodynamic regime favorable for the formation of dolomite. Although fluid flow through the margin was identified as a leg objective, there was little expectation prior to drilling that the results of fluid circulation

within the succession immediately underlying the outer shelf and upper slope would prove to be so dramatic.

Leg 193 drilled in the Eastern Manus Basin, SW Pacific, intersecting an actively forming base metal sulfide system. An assessment of the interplay between magmatic-derived fluids and seawater and the examination of fluid pathways with a view to the establishment of a comprehensive chemical and hydrological model for the system is expected from future shore-based studies using the material recovered. The initial perception is that despite pervasive alteration indicative of a long-lived hydrothermal system, the prenatal development of a massive sulfide deposit has been encountered, which, given continued maturation, could develop on the order of those exploited for centuries in ancient ore environments. Understanding of how such ore bodies were created in the past, by deciphering the interplay between igneous, structural, hydrothermal, and hydrologic processes in a close modern analog of such a setting, will improve the capability of future exploration geoscientists to recognize favorable signals of economic potential in ancient sequences. In addition to understanding the mineral deposit geology the differences noted here, in a convergent plate margin setting, between earlier ODP drilling in hydrothermally active sites hosted by mafic volcanic rocks and sediments located on divergent margins, for example Legs 158 (Mid-Atlantic Ridge) and Legs 139 and 169 (northeast Pacific) are profoundly important in understanding chemical and energy fluxes in the global ocean.

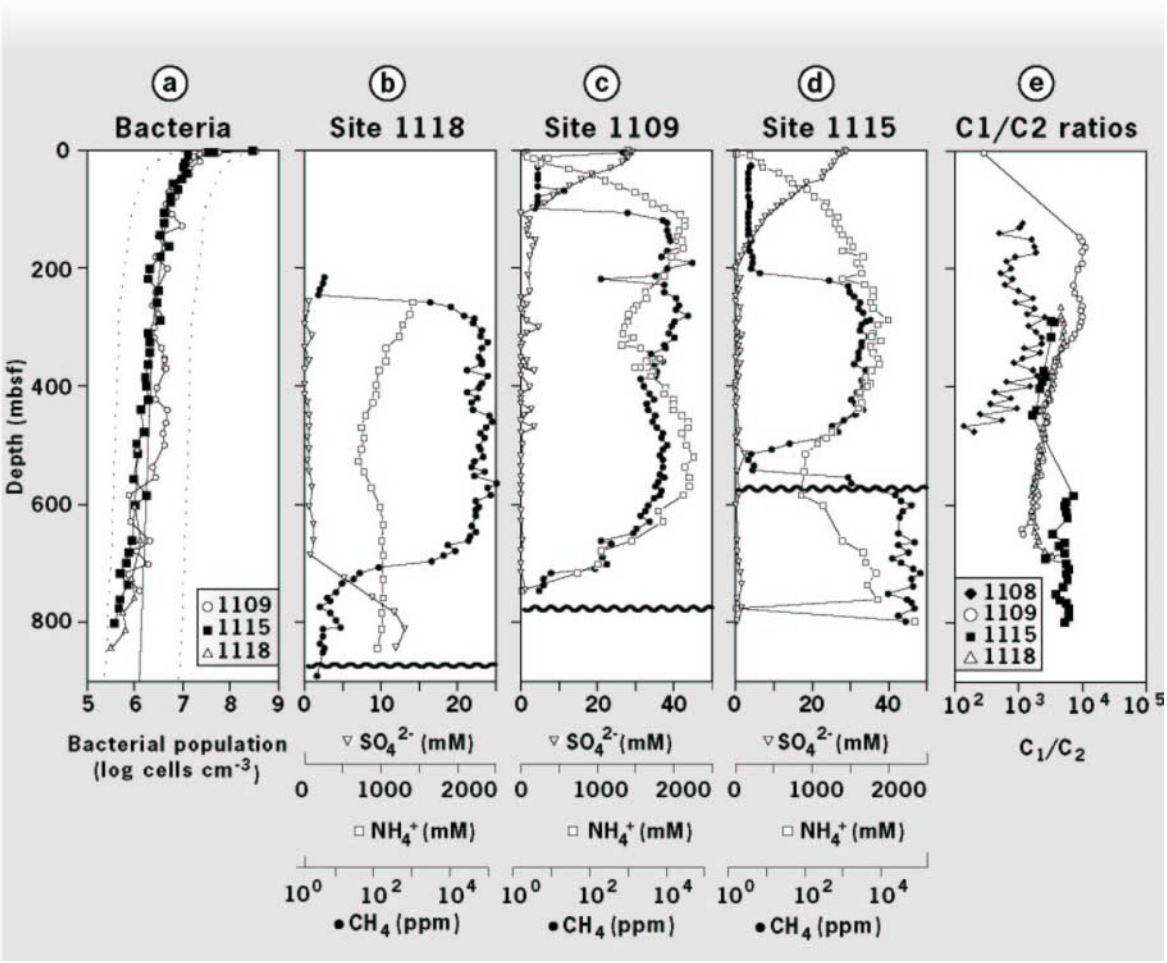
1.4 Earth's Deep Biosphere (ODP *Pilot Project*)

The discovery of Earth's deep microbial biosphere is recognized as one of the most outstanding breakthroughs in the geosciences and biological sciences. The extent of this biosphere is currently unknown, but we are becoming increasingly aware that microbial life has persisted in environments ranging from active hydrothermal systems on mid-ocean ridges to deep ocean sediments. Exploring the extent and effects of the sub seafloor biosphere was highlighted in the Long-Range Plan as a "Pilot Project." The past five years have seen the ODP effort develop from occasional pilot studies to a concentrated effort in a range of tectonic settings.

Depth profiles of the deep sub-seafloor biosphere were made during Leg 180 at Sites 1115 and 1118 in an extensional setting in the Woodlark Basin. Bacteria were present in all samples analyzed at the three northern sites drilled to >800 mbsf. Both dividing and divided cells were present to 842 mbsf, although there is an indication that numbers are decreasing more rapidly than current models predict, resulting in a sigmoidal depth distribution. Because bacteria play a dominant role in the degradation of organic matter, and consequently drive chemical changes and diagenesis in sediments, their deep subsurface activity is evident in geochemical data from these sites. Pore-water sulfate concentrations are depleted in the uppermost sediments, below which methane concentrations increase rapidly as methanogenic bacteria gain a competitive advantage over sulfate-reducing bacteria for common organic substrates. Biological decomposition of organic matter is also evident from the accumulation of ammonia in the pore waters.

The persistence of microbial life into indurated sedimentary rock adds to a steadily growing body of evidence for a more extensive biosphere than previously imagined.

Figure PP-8:



Biogeochemical profiles at Leg 180 sites: a. Total bacterial populations. The solid curve represents a general regression line of bacterial numbers vs. depth in deep-sea sediments (Parkes et al., 1994), with 95% upper and lower prediction limits shown by dashed curves. b–d. Sulfate, ammonia, and methane depth profiles. Wavy line depicts unconformity. e. Methane/ethane ratios.

Shipboard studies of the deep biosphere were initiated on Leg 185, in very old oceanic crust of the western Pacific. During Leg 185 ODP established a microbiology laboratory, carried out microbial contaminant tests, and established techniques for core handing of biological samples. Contaminant tests using perfluorocarbon and fluorescent microsphere tracers demonstrated that sediments cored with the APC showed less susceptibility to contamination than RCB coring. These tests, which demonstrate that biological

contamination can be assessed and surmounted, paved the way for establishing ODP as a new platform for microbiological studies.

Several glass samples from this leg and from other crustal sites show textural evidence for microbial alteration and invite the intriguing question of whether there is still microbiological activity in volcanic basement as old as 170 Ma.

Microbiological studies have been continued on subsequent legs and an additional new laboratory with radioactive specification was installed onboard the JOIDES Resolution in late 2001. Samples from a number of cruises drilled in a variety of geological settings have been taken to start culturing experiments in various media at both atmospheric and in situ pressure, and to begin shore based DNA extraction and community characterization.

Leg 187 sampled variably altered basalt and basaltic glass at the Australia-Antarctic Discordance to characterize the microbial diversity of the crustal biosphere. Rock and sediment samples collected during Leg 187 for microbial culturing and analyses range in age from 14 to 28 Ma, providing an opportunity to study temporal changes in microbial alteration. Enrichment cultures were prepared in the microbiology laboratory onboard JOIDES Resolution, and samples were also collected for post-cruise DNA analyses and high-pressure incubation studies. Complementary electron microscope studies will seek to characterize fossil and living microbes involved with biodegradation of basaltic glass and their habitats.

ODP Leg 190 included a concerted effort to assess the deep sedimentary biosphere on a transect of sites across the Nankai Trough accretionary prism. Preliminary results demonstrate that there is a large contrast among the various properties, including the lithologic and geochemical (including microbial activity) character of the incoming sedimentary sequences.

During Leg 191 sediment samples from Holes 1179B and 1179C were collected from old NW Pacific crust to characterize both the chemistry and microbial activity in this relatively low temperature (~10° –30° C) environment. Microbial activity will be inferred from incubation experiments and from shore-based lipid analysis. Whole-round cores were collected from different depths for incubation experiments and for detailed analyses of bacterial lipid changes with depth. As certain cell-membrane lipids are diagnostic of particular groups of bacteria, the lipid analyses may reveal the presence of different types of bacteria throughout the sedimentary column. Interstitial pore waters were collected for chemical analyses from the same approximate depths taken for lipids in order to relate the microbial communities to the geochemical sedimentary environment.

An additional contribution was made to ODP's "Deep Biosphere" Pilot Project by Leg 193, drilled in an active submarine hydrothermal system on the Pual Ridge in the Eastern Manus Basin. One of the goals was to delineate the extent to which microbial life flourishes in the subsurface of such a hydrothermal system. The nature, extent, and habitat controls of microbial activity in this environment were also carefully evaluated. Direct counting and biological tracer analyses indicate the presence of a biomass to >100m below

seafloor. Cultivation experiments indicate that the potential microbiological activity persists to much deeper and more harsh environments.

One of the objectives of ODP Leg 195, at Chamorro Seamount was to investigate microbial biological activity associated with serpentinite diapirism bringing subduction zone material from great depth. Pore fluid chemistry is highly unusual (pH ~12), and its effect on the microbial population was a particular focus. A new and exotic extremophile microbial community was encountered at 0-20 mbsf that is chemically manipulating its environment to suit its own needs.

The continued presence of bacterial populations at more than 800 mbsf is of fundamental significance. The persistence of microbial life into indurated sedimentary rock adds to a steadily growing body of evidence for a more extensive biosphere than previously imagined. Bacteria are know to grow at temperatures as high as ~120ºC. Indirect evidence for the existence of cells at temperatures approaching ~400º C. and at abyssal depths where pressures over 1000 atmospheres prevail. The bacterial biosphere in deep marine sediments may be conservatively equivalent to about 10% of the surface biosphere. The discovery of the deep bacterial biosphere has extended our perception of life from merely a surface phenomenon, and has profound implications for the biodiversity of our planet, fossil fuel formation, the origins of life on Earth, and the potential for life on other planets.

Dynamics of the Earth's Interior

2.1 Exploring the Transfer of Heat and Material to and from the Earth's Interior

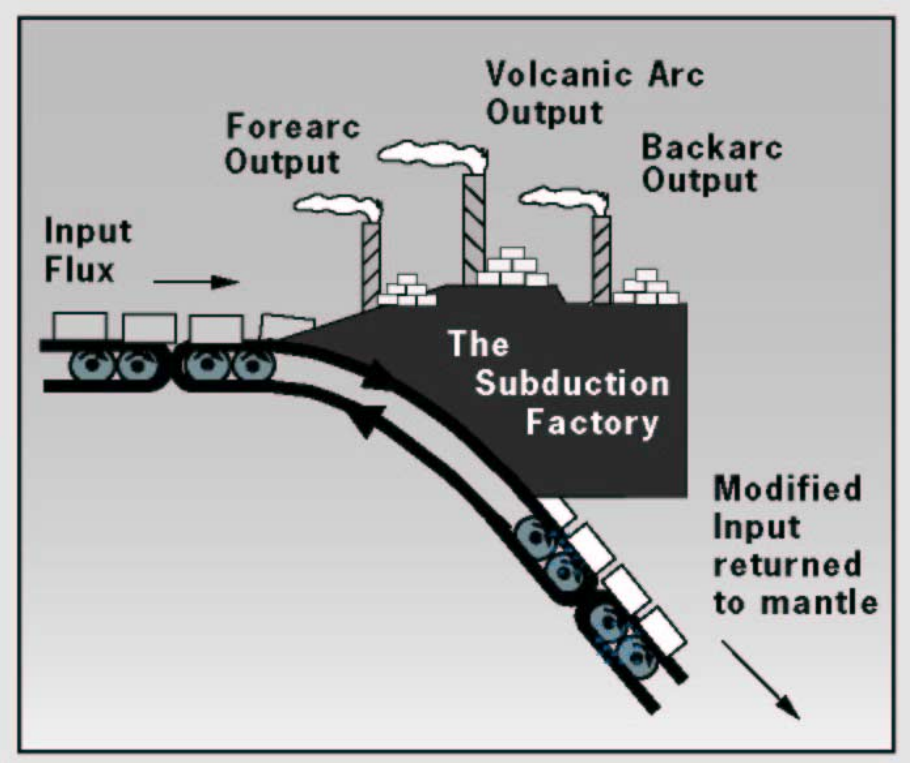
There are four sub-themes recognized in the Long Range Plan describing the interactions between the Earth's mantle and crust in diverse settings and by a variety of processes: mass balance and temporal variability at subduction zones; hydrothermal processes and sulfide mineralization; oceanic crust; and mantle dynamics

Mass Balance and Temporal Variability at Subduction Zones
The foci of drilling in the past five years has been in accordance with the ODP Long Range Plan and addresses the main topics concerned with quantifying mass balances at subduction zones together with the determination of the temporal variation in arc, forearc and backarc volcanic and tectonic activity.

Leg 185 of the Ocean Drilling Program cored two sites in Mesozoic crust in the Mariana-Izu Bonin region of the western Pacific to determine inputs into the western Pacific "Subduction Factory". The oldest ocean crust on Earth is subducting into the Izu-Mariana arc system, and in addition to providing geochemical data to input into the subduction equation, the two sites studied provide important constraints on the nature and history of Mesozoic ocean crust. The results bear directly on the problem of the forcing functions on the subduction factory output, and the volatile cycle through the factory. Forcing functions include convergence vectors, thickness of the upper plate; slab temperature and sediment transfer to depth. The Izu-Mariana margin was a particularly good area to examine these

functions because of the large geochemical signal along-strike in the volcanic arc. There are significant differences in Ba/Na observed in the basalts formed in the Izu-Bonin and the Marianas systems. Similarly Pb-isotope variations are strikingly different and probably controlled by the sediment input into the system. The volatile emissions (H_2O, CO_2, SO_2 and Cl) from arc volcanics derive from the basaltic portion of the downgoing plate and the subducted sediments, but this volatile input is virtually unknown for any convergent margin. Results from further study of samples taken on Leg 185 will demonstrate how alteration zones and carbonate veins are organized in ancient fast-spreading crust, and so enable the first estimates for volatiles in the upper oceanic crust and sediments near a subduction zone. It will then be possible to compare these estimates directly to volcanic and fore-arc volatile outputs. Both sites drilled on Leg 185 originated at spreading centers in the Southern Hemisphere and then migrated northwards, but at different times and durations. Thus, in addition to the "Subduction Factory experiment" scientists have an unparalleled opportunity to assess the equatorial sedimentation history of the Pacific Ocean since Mesozoic time, to place limits on the ages of the oldest magnetic anomalies in the ocean basins, and to study the nature of the "Jurassic Quiet Zone".

Figure PP-9:



The Subduction Factory (figure reproduced from JOIDES Journal, vol. 25(2), p. 14)

Fluid flow in accretionary prisms is one of the LRP objectives addressed during successful drilling along two transects across the Nankai Trough accretionary prism during Leg 190. Two reference sites at the seaward ends of the Muroto Transect (Site 1173) and the Ashizuri Transect (Site 1177) delineate the stratigraphic framework of the

accreting/subducting Shikoku Basin sedimentary section. A thick section of Miocene turbidites and smectite-rich mudstones are present within the subducting section at the Ashizuri site. The turbidites and mudstones are absent in the correlative section at the Muroto site, probably contributing to the difference in prism wedge taper between the two transects, while possibly controlling the seismic character of this active plate boundary. The décollement in both transects is localized along a stratigraphic unit (~5.9—7 Ma) within the lower Shikoku Basin. This horizon is correlative across both transects through its magnetic susceptibility. The broad low-chloride zone in the lower Shikoku Basin unit, first identified at Site 808, progressively decreases across the Muroto Transect. This landward-freshening trend is due to both enhanced diagenetic reaction and fluid flow.

Previous theories as to the tectonic evolution of the Muroto Transect have been dramatically changed as a result of this drilling operation. Accretion of a Miocene and Pliocene turbidite package forms the large thrust slice zone (LTSZ). This event is associated with a shift from a transverse sediment transport system that delivered coarse material from the arc to the trench to an axial transport system that delivers sediment down the trench axis from the east. Growth of the prism from the LTSZ to the toe of the slope (40 km) took place rapidly within the past 2 m.y.

The drilling and observatory installation program of Leg 195 at South Chamorro Seamount was designed to (1) examine the processes of mass transport and geochemical cycling in the subduction zones and forearcs of nonaccretionary convergent margins; (2) ascertain the spatial variability of slab-related fluids within the forearc environment as a means of tracing dehydration, decarbonation, and water/rock reactions in subduction and suprasubduction zone environments; (3) study the metamorphic and tectonic history of nonaccretionary forearc regions; (4) investigate the physical properties of the subduction zone as controls over dehydration reactions and seismicity; and (5) investigate biological activity associated with subduction zone material from great depth. The pore waters from Site 1200 revealed a deep-sourced fluid that is believed to be upwelling from the top of the subducting slab 25-30 km below the seafloor.

Hydrothermal Processes and Sulfide Mineralization

Ocean Drilling Program Leg 193 undertook an exploration of the lateral, vertical, and temporal variability of a seafloor hydrothermal system hosted by felsic volcanic rocks in a convergent plate margin setting. Three sites on the crest of Pual Ridge in the Eastern Manus Basin were proposed as primary targets, one each in an area of high-temperature venting (a black smoker chimney field), a field of lower temperature diffuse venting, and at a reference site that, although proximal to a high temperature venting area, showed no surficial evidence of hydrothermal activity. With the material recovered, the assessment of the interplay between magmatic-derived fluids and seawater is expected together with the examination of fluid pathways with an aim toward establishing a comprehensive chemical and hydrologic model for this system. The intensity, degree, and distribution of alteration facies and details regarding the abundance of clay minerals and anhydrite chronicled in the Leg 193 Initial Reports volume directly address these objectives. An actively forming base metal sulfide system has been intersected. However, poor core recovery in the sulfide-rich interval precludes adequate assessment of the dimension of such mineralization. Detailed

consideration of extensive downhole logging data, still being processed, will throw additional light on this issue. The Resistivity-at-Bit (RAB) tool was used for the first time in ODP to record total gamma-ray counts and electrical resistivity logs as well as resistivity images (like FMS images) in these difficult-to-recover hydrothermal vent rocks. Several temperature profiles were obtained during wireline operations using a high-T memory temperature probe. The profiles show an average steady increase in temperature with time and a thermal rebound of approximately 204º C over a seven-day period, reaching the highest bottom-hole temperatures (314ºC) ever recorded during ODP or DSDP. Initial perceptions are that despite the pervasive alteration indicative of a long-lived hydrothermal system, the prenatal development of a massive sulfide deposit has been glimpsed which, given continued maturation, could develop into a deposit on the order of those exploited for centuries in ancient ore environments. Additionally, development of a petrogenetic model for the volcanic rocks at Pual Ridge is being sought in order to evaluate the volcanic architecture of this edifice. By integrating the results of that research with the detailed descriptions recorded and the array of continuous records provided by the logging tools, it will be possible to make direct comparisons with not only other active seafloor hydrothermal areas, but with ancient ore deposition environments as well, thus improving understanding of these complex systems.

Oceanic Crust

One important mandate of the Long Range Plan concerns the determination of the composition and physical properties of the lower two-thirds of oceanic crust. The combined results of previous ODP drilling during Leg 118 and the more recently drilled Leg 176 make results from Hole 735B compelling. For the first time, a significant proportion of one of the major layers of the Earth's crust, the all but inaccessible Layer 3 in the ocean basins, has been sampled and examined. It is now possible to describe the architecture and outline the magmatic, structural, and metamorphic history of a block of the lower ocean crust that formed at this very slowly spreading ridge 11 Ma ago. In summary, the sequence of rocks observed in Hole 735B is unlike that found in well-studied ophiolites. A full on-land counterpart to these rocks has yet to be described. Still less does this sequence of rocks resemble a layered igneous intrusion. Hole 735B, therefore, provides a first assessment of synkinematic igneous differentiation in which the upper levels of the gabbroic crust were enriched in late differentiated melts through tectonic processes, rather than simple gravitationally-driven crystallization differentiation. Another major accomplishment for ODP was achieved when drilling during Leg 193 marked the first successful penetration into unsedimented back-arc crust. Subsequent analyses will provide much sought insight into the history of alteration of such mantle material.

Mantle Dynamics

Large Igneous provinces (LIPs) are representative of a special type of planetary volcanism found on the earth, Moon, Venus and Mars and the formation of LIPs is one of the processes selected for study in the ODP Long Range Plan. During the past five years two ODP cruises, Legs 183, 192, have been devoted to drilling these phenomena. LIPs represent large volumes of magma emplaced over relatively short time periods, such as is expected from decompression of upwelling, relatively hot or wet mantle. This process

explains hot spot magnetism at the Earth's surface and is conceptually described by various plume head and tail models applicable to the Earth's sublithospheric mantle. In such models, the plume head leads to oceanic plateaus and continental flood basalts, and the tail leads to volcanic chains known as hot spot tracks.

The Kerguelen Plateau-Broken Ridge LIP, the focus of Leg 183, is interpreted to represent voluminous Cretaceous volcanism associated with the arrival of the Kerguelen plume head below young Indian Ocean lithosphere. Subsequently, rapid northward movement of the Indian Plate over the plume stem formed the 5000-km-long, ~82 to 38 ma, hot spot track, known as Ninetyeast Ridge. At ~40 Ma the newly formed Southeast Indian Ridge (SEIR) intersected the plumes position. As the SEIR migrated northeast relative to the plume, hot spot magmatism became confined to the Antarctic plate. From ~40 Ma to the present, the Kerguelen Archipelago, Heard and MacDonald Islands, and a northwest-southeast-trending chain of submarine volcanoes between these islands were constructed on the northern and central sectors of the Kerguelen Plateau. Thus, an ~115 M.y. record of volcanism is attributed to the Kerguelen plume.

During Leg 183, igneous basement rock and sediment cores were obtained from five sites on the Kerguelen Plateau and two on Broken Ridge. Based on the recovery of basalt, other igneous rocks, and interbedded and overlying sediments, the age of the uppermost crust forming this large igneous province was found to decrease from south to north, possibly in steps (i.e., ~110 ma in the southern Kerguelen Plateau, ~85 to 95 Ma in the central Kerguelen Plateau, Broken Ridge, and Elan Bank, and ~35Ma in the northern Kerguelen Plateau). The submarine igneous basement of the Elan Bank and the northern Kerguelen Plateau had not been previously sampled.

Another important finding was that the growth rate of the LIP at five of seven basement sites was sufficient to form a subaerial landmass. This was most spectacularly revealed at central Kerguelen Plateau site 1138 by wood fragments in dark brown sediment overlying the subaerially erupted lava flows, a result consistent with the charcoal and wood fragments in sediments overlying igneous rocks at Site 750 in the southern Kerguelen Plateau. The terminal stage of volcanism forming the LIP included explosive eruptions of volatile-rich felsic magmas formed from cooling basaltic magmas that were trapped within the crust when the flux of basaltic magma from the mantle decreased.

Previous geochemical studies of basalt from the southern Kerguelen Plateau and eastern Broken Ridge had identified a component derived from continental crust, but the mechanism for incorporation of a continental component into the oceanic plateau was unconstrained. Possible processes range from recycling of continental material into a deep mantle plume to contamination of mantle-derived basaltic magma by fragments of continental crust isolated in the embryonic Indian Ocean crust during rifting of Gondwana. At Site 1137 on Elan Bank, ~26 m of a braided river conglomerate show the wide range of rock types that were subaerially exposed on Elan bank. Most notable are clasts of garnet-biotite gneiss, a rock type that is characteristic of continental crust, thereby showing that a continental fragment is present in this oceanic environment.

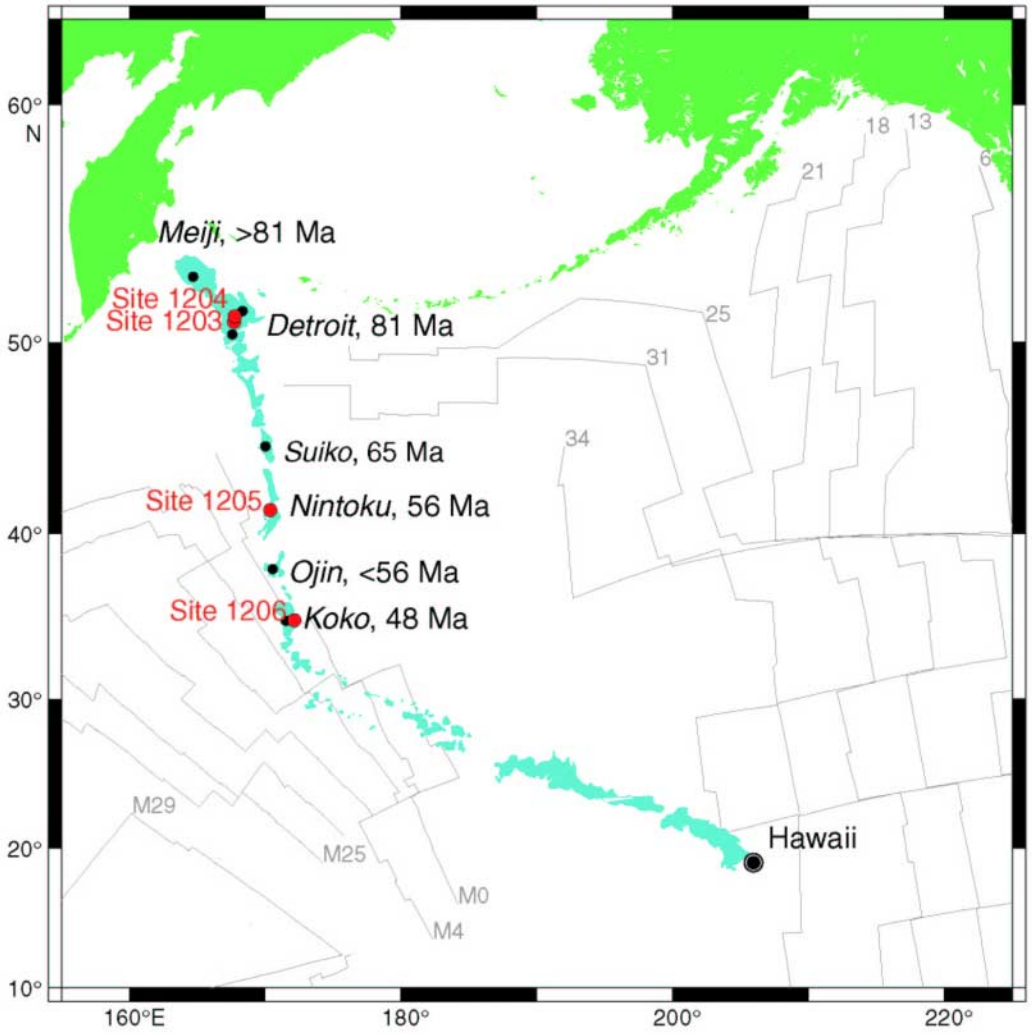
The Ontong Java Plateau with a surface area of 1.6 x 10^6 km^2 and a volume of 4-5 x 10^7 km^3, is the world's largest volcanic oceanic plateau, and may represent the largest magmatic event on Earth in the last 200 m.y. During ODP Leg 192 igneous basement and sediment cores were recovered in five widely separated sites in previously unsampled areas across the plateau. Primary objectives of the leg were to determine (1) the age and duration of emplacement of the plateau, (2) the compositional range of magmatism, and (3) the environment and style of eruption.

Emplacement of lavas at all four high-plateau sites was entirely submarine. The shallowest estimated Aptian water depth for basement is several hundred meters, at Site 1183 on the broad dome of the plateau. Together with previous evidence, results indicate that most of the Ontong Java Plateau formed well below sea level and was never aerially exposed, as was the LIP of the Kerguelen Plateau. The only evidence that a portion of the Ontong Java high plateau was ever at shallow depth is two thin intervals of Aptian vitric tuff above basement at Site 1183 and possibly a vitric tuff just above basement at DSDP Site 289. The mainly submarine emplacement of the plateau probably accounts for its apparently limited paleoenvironmental effects. However, ferruginous claystone layers above basement at Sites 1183 and 1187 provide evidence for at least local Aptian "dead zones." On a somewhat different theme Leg 187 undertook to trace the boundary between Indian and Pacific, ocean-scale mantle provinces across 10- to 30-m.y.-old seafloor of the southeast Indian Ocean between Australia and Antarctica and explored the nature of the geochemical and physiographic boundary between Pacific and Indian Ocean mantle along the Australian-Antarctic Discordance (AAD). The boundary has been located on young seafloor, where it is sharply defined and migrating to the west at ~40 mm/yr. Samples from Leg 187 will undergo extensive geochemical and isotopic analyses to refine the definition of the isotopic boundary and to improve our understanding of the nature and origin of the AAD, the mantle boundary, and the distinctive Indian Ocean mantle province.

ODP Leg 197 recently completed successful drilling in the northwestern Pacific in the northern part of the Hawaiian-Emperor seamount chain thus extending and complementing results from the earlier ODP Leg 145. Many ideas of where mantle plumes originate, how they interact with the convecting mantle, and how plates have moved in the past are founded on interpretations of the Hawaiian-Emperor hotspot track. One reason this volcanic lineament has attained this conceptual stature lies in its prominent bend at 43 Ma. The bend, which separates the westward-trending Hawaiian Islands from the northward-trending Emperor Seamounts has no equal among the Earth's hotspot tracks; it is the clearest physical manifestation of a change in plate motion in a fixed hotspot reference frame. Alternatively, the bend might primarily record differences in motion of the Hawaiian hotspot relative to the Pacific lithosphere. Basements sites were drilled in the Emperor Seamount trend during Leg 197 to test the latter hypothesis of southward motion of the Hawaiian hotspot. The principal drilling objective was to achieve moderate basement penetration at these sites to obtain cores from lava flows suitable for paleomagnetic paleolatitude and radiometric age determinations. Although shipboard analysis of paleolatitude vs. age for the Emperor Seamounts must yet be supported by shore-based paleomagnetic studies and radiometric age determinations, the currently

available data suggest that the Emperor Seamounts record the rapid southward motion of the Hawaiian hotspot in the mantle, requiring a major change in how this classic age-progressive volcanic lineament is viewed as a record of mantle convection and plate motions. Another important scientific objective of Leg 197 was to determine the geochemical variation of the volcanic products of the Hawaiian hotspot through time. Samples recovered during Leg 197, together with samples from previously studied sites of Leg 145, exhibit a range of compositions at Detroit Seamount that covers most of the variability seen in volcanoes of the island of Hawaii. The variability of trace element ratios (e.g., Ti/Zr) in basement samples provides hints that Leg 197 has recovered material from different source compositions. It remains for shore-based studies to evaluate and define these suspected source heterogeneities through the examination of additional trace elements and isotopic compositions.

Figure PP-10:



Location of Leg 197 sites and previous DSDP and ODP sites on the Emperor Seamounts (solid circles). (after Prell et al., 2001)

2.2 Investigating Deformation of the Lithosphere and Earthquake Processes

Subduction zones are characterized by the world's largest and potentially most catastrophic earthquakes. Moreover, these plate convergence zones return materials to the Earth's interior with chemical fluxes that may impact global geochemical budgets and influence climate. Subduction zones also are the location of the incipient stages of formation of convergent and collisional mountain belts

Rifted Margins
The rifting of continents and their eventual breakup are a fundamental geologic process. Unfortunately the deeper crustal rocks of most ocean margins are buried beneath thick layers of sediment or outpourings of lava that resulted from magmatism associated with continental breakup. An apparent exception to this generalization is the Atlantic margin of Iberia, most recently drilled by ODP during Leg 173. Seismic reflection profiles across this margin show titled fault blocks of basement rock beneath a thin sediment section. This situation offers the opportunity for detailed seismic imaging of the deep crust and sampling of the rocks by drilling. This was achieved on Leg 173, which sampled a complex array of ultramafic and mafic rocks that include samples of the mantle, thin oceanic crust, and metaplutonic rocks related to syn-rift magmatism. From comparing the results of Leg 173 with earlier drilling further north it is also clear that there are significant differences along the margin. Thus the results from Leg 173 lead to as many new questions as answers.

Active continental extension in the western Woodlark Basin, Papua New Guinea was explored during ODP Leg 180. The Woodlark Basin displays a continuum of active extensional processes along a propagating rift, varying from continental rifting to seafloor spreading. Seafloor magnetic anomalies indicate that during the last 6My the formerly contiguous, eastward extensions of the Papuan peninsula (the Woodlark and Pocklington Rises) were separated as a westward propagating spreading center opened the Woodlark Basin. Eleven sites were drilled including eight on the hanging wall of the northern margin of the active rift basin and two on the footwall. Data collected should permit detailed analyses of the uplift and subsidence history of the rift basin.

Convergent Margins
Geologic processes at convergent plate margins control geochemical cycling, seismicity, and deep biosphere activity within subduction zones. The study of input into a convergent plate margin by sampling the downgoing plate provides the geochemical reference necessary to learn what geochemical factors influence the production of suprasubduction zone crust and mantle in these environments. The study of the output in terms of magma and volatiles in volcanic arcs and backarc basin settings constrains processes at work deep in the subduction zone, but these studies are incomplete without an understanding of the throughput, the nature of geochemical cycling that takes place between the time the subducting plate enters the trench and the time it reaches the zone of magma genesis beneath the arc.

The target area of Leg 195, the Mariana convergent margin provided precisely the sort of environment needed to install a long-term geochemical observatory in that it is a location where natural processes bring materials from great depths directly to the surface from the deeper dècollement region. This zone is inaccessible directly with current or even foreseeable ocean drilling technologies. Leg 195 drilling at Site 1201 was also designed to provide more precise basement age constraints for models of backarc spreading in the Philippine Sea as well as high-quality sediment sections that could be used to reconstruct the history of microplate motion, climate change, eolian transport, and arc volcanism in the region.

Volcanic Oceanic Plateaus

Volcanic oceanic plateaus are formed by immense volumes of magma emplaced in pre-existing oceanic lithosphere or at spreading centers. Two ODP Legs 183, 192, have recently focused on these large igneous provinces (LIPs) and while the emplacement of the magma results in deformation of the lithosphere these legs are discussed more fully in section 2.1, "Exploring the Transfer of Heat and Material to and from the Earth's Interior".

3.1 Understanding natural climate variability and the causes of rapid climate change (ODP *Initiative I)*

The goal of this ODP Long Range Plan initiative is to take advantage of new analytical techniques and unique drilling capabilities, in cooperation with other international science initiatives in an effort to understand the causes and consequences of natural climate variability over shorter time scales, i.e. time scales more directly relevant to society. For example, what is the climatic impact of global warming, a phenomenon most likely contributed to by human activities? New technologies and a global perspective need to be applied in order to understand the processes of rapid climate change from the record preserved in marine sediments. These technologies include the shipboard laboratory's multisensor track and associated suite of instruments which enable automated, centimeter-scale measurements of numerous physical and magnetic properties, all contributing to the ultimate aim of producing a global snapshot of the state of the ocean-climate system at a given time.

During the last 5 years many of the ODP legs haves focused on the timing, magnitude, duration and effects of glacial/interglacial intervals.

A major goal of Leg 177 was to understand the role of the Southern Ocean in climate change on time scales ranging from millennia to tens of millions of years. Sediment cores recovered from Leg 177 will also be used to investigate cycles of the Plio-Pleistocene, and the long term evolution of the Antarctic glacial/interglacial cryosphere system during the Cenozoic. Seven sites along a north-south transect across the Antarctic Circumpolar current (ACC) were drilled and high sedimentation rates in each of these sites provides the opportunity to resolve climate variability on a millennial time scale. At one site (1090) high quality sediments were recovered which show excellent potential for high-resolution paleomagnetic reversal studies and biostratigraphical studies. Potential also exists for

developing an astronomically-tuned time scale using cyclic variations in lithologic parameters. The middle Eocene to early Miocene interval encountered at one particular site is particularly significant because it spans the time period associated with the development of ice-sheets on Antarctica, early production of cold surface and bottom waters in the Southern Ocean, together with paleogeographic changes, e.g. the opening of the Tasman Seaway and Drake Passage that led to the establishment of the ACC. These ODP cores will be used to extend marine-sediment-ice core correlations to the oldest ice cored at Lake Vostok, which is now ~450K yrs., and to study the interaction between the ocean and polar atmosphere and the Antarctic cryosphere. Correlation with comparable cores drilled by ODP on the North Atlantic drift deposits will aid in identifying the mechanism(s) linking climate in the polar regions of the Atlantic.

Leg 178 drilled on the western margin of the Antarctic Peninsula and obtained a record from part of the continent that is occupied by small ice masses that respond rapidly to climate change.

During Leg 188, a transect across the Prydz Bay continental shelf, slope, and rise provides new evidence of long- and short-term variations in paleoenvironments (i.e., depositional, glacial, and inferred climate) extending from Holocene to Mesozoic times. A shelf site (Site 1166) documents the earliest stages of East Antarctic glaciation from inferred temperate climates (i.e., with vegetation) to transitional environments of proximal glaciers to full glacial and interglacial conditions with intermittently grounded glaciers on the shelf. Samples from a site on the slope are latest Neogene sediments that attest to rapid deposition and the variability of onshore erosion areas and glaciomarine depositional settings in front of grounded ice sheets during glacial/interglacial periods. On the continental rise, the drilling record documents a long-term lower to upper Miocene transition from temperate to cold-climate glaciation, with superimposed short-term glacier fluctuations since early Miocene time. These sites document changing paleoenvironments, with long-period changes that may mark the transition from more temperate times of wet-based onshore glacier systems with fluvial outwash (i.e., before 13–14 Ma; middle Miocene) to cold times of dry-based systems with over deepened shelf and subglacial deposition (late Miocene and younger). The notable variability in ice rafted debris (IRD) concentrations since middle Miocene time suggests that the transition period switched repeatedly between the temperate and cold glacier systems. The short cyclic variations (at Milankovitch periodicities) recorded may track the persistent seaward/landward movements of onshore ice sheets and their internal ice streams. The glacier systems provided more terrigenous sediments during times of glacial advances and less terrigenous sediment during periods of glacial retreat or interglacials. Leg 188, together with previous ODP legs (e.g. Legs 119, 178) and future Antarctic continental margin drilling transects, can provide the hard-earned proximal geologic samples needed to link the histories of the Antarctic Ice Sheet and the distal ocean-current and climate systems.

Leg 182 drilled a closely spaced transect of sites through a sequence on the shelf-edge to upper slope in the Great Australian Bight that is distinguished by a spectacular succession of prograding clinoforms forming an unusually thick sediment wedge. These sediments were found to be of mostly Quaternary age and overlie a pronounced sequence boundary

representing a hiatus of up to 12 m.y. The Pleistocene thickness exceeds 550 m, indicating average accumulation rates of over 300 m/my through this time period. For shorter periods of time, accumulation rates exceeded 40 cm/ky, rivaling the fastest rates known in shallow-water tropical carbonate depositional systems.

The cores recovered from this slope wedge are bioturbated muds and very fine, sand-sized skeletal grains, with the unexpectedly high sedimentation rates representing episodes of organic growth followed by wave-driven erosion on the adjacent broad 'shaved' shelf. Seismic imagery, downhole logging, and mineralogic data suggest that the slope wedge drilled is packaged in cycles, most likely responding to astronomically-forced sea-level fluctuations.

In the western Pacific Leg 184, the first deep-sea drilling leg to visit the seas off China, was designed to recover sediment sections to study the climate changes on a variety of time scales, reconstructing the evolution and variability of the East Asian Monsoon during the late Cenozoic on millennial, orbital and tectonic time scales. This cruise also hoped to identify, and better understand the links among tectonic uplift, erosion and weathering, hemipelagic deposition and climate change, including the coevolution of the Asian monsoon and Neogene global cooling. Leg 184 recovered a sequence of hemipelagic sediments that records the past 32 m.y. of environmental history of the South China Sea (SCS). For the first time in the lower latitude western Pacific, these cores provide a high-resolution continuous record of relatively carbonate-rich fine-grained sediments and a possibility of sea-land correlation of the upper Cenozoic stratigraphy for the region.

The lithologies, microfossils, and physical properties of the hemipelagic sequence reveal significant trends, clear cyclicities, and abrupt changes that provide detailed records of environmental transformations, including provenance and volcanism. Relatively long cores with exceptionally high sedimentation representing relatively short time periods (e.g. ~ 500m for 1my from Site 1144), promise to provide a new set of constraints of the possible relationship between Tibetan Plateau uplift, monsoon evolution and global cooling. Such high-resolution material presents a rare opportunity for high-resolution paleoenvironmental studies at decadal scale. The site of recovery of this core (Site 1144), is located on a sediment drift where a nearby sediment core has yielded proxy records of monsoonal variations on millennial and centennial time scales. Another site, (Site 1146) also from the northern slope of SCS yielded a >600m long section of recovered core, representing a 19 m.y. record. This long-term record at orbital scale resolution (2 k.y.) will allow comparison of East Asian monsoon variability with orbital forcing, glacial forcing, and internal feedback within the climate system.

Excellent orbital-scale cyclicity and fine fluctuations in monsoonal climate are displayed in prominent variations in color reflectance, natural gamma radiation, magnetic susceptibility, and bulk density, particularly for the Pliocene-Pleistocene intervals.

The very recently completed ODP Leg 198 which drilled on the Shatsky Rise, northwestern Pacific, has recovered some extremely interesting high-resolution sections through the Jurassic – Pleistocene interval. The main objective of the leg was to study the

Late Paleocene Thermal Maximum and to monitor the oceanographic changes and biotic responses during "Greenhouse World" incursions/excursions. A particular highlight of this leg has been the recovery of a high-resolution, highly diatomaceous Upper Miocene to Recent section. This section has decimeter-scale lithologic cycles in eighteen of the cores showing significant changes in the relative percentages of diatoms and marked differences in the nature of carbonate preservation. Preliminary biostratigraphy suggests that the cycles have an obliquity periodicity (40 k.y.) but further investigation is required before this is attributed to dissolution due to shifts in depths of the lysocline, or variations in biosiliceous production. The phenomena may also be due to latitudinal shifts through time of the transition zone between the subtropical water mass and the subarctic water mass. Pending shore-based studies of the excellent material collected during this leg promise to greatly improve knowledge of long-term climatic transition into and out of "greenhouse" climate together with a better understanding of abrupt climatic events.

Study of these related features will help resolve the nature and timing of one of the most significant Cenozoic tectonic and climatic changes of the region.

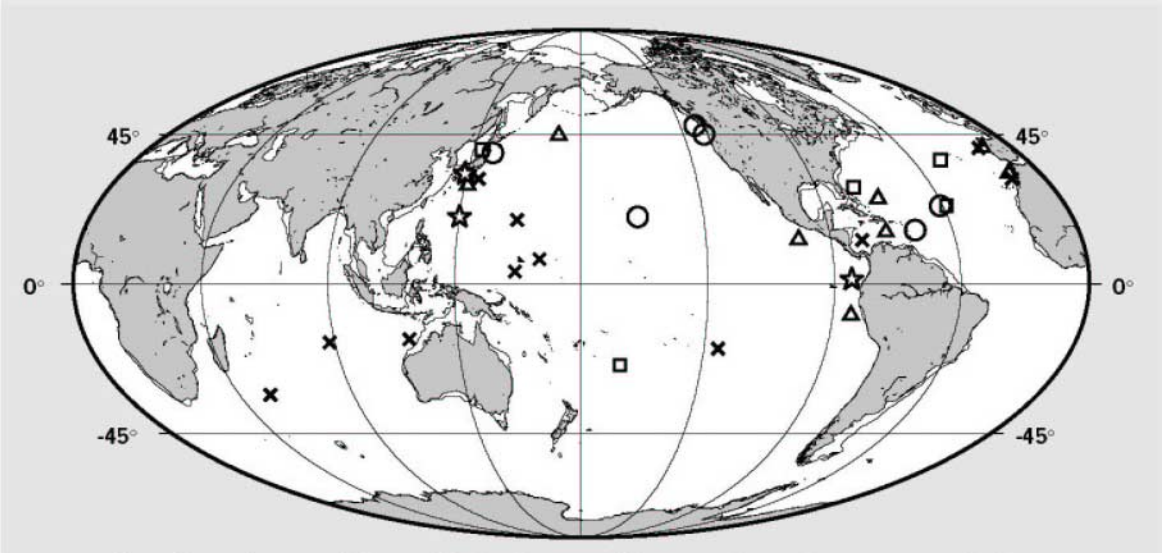
3.2 *In Situ* Monitoring of Geological Processes (ODP *Initiative II*)

The 1996 Ocean Drilling Program Long Range Plan emphasizes the potential of using seafloor boreholes as geophysical and geochemical observatories to provide both a clearer view of the Earth's structure and a means to monitor active earth processes. Post-drilling instrumentation of ODP boreholes has been taking place since 1989 and represents an expansion of ODP's original focus from mainly acquiring samples and downhole geophysical data while the ship is present, to making long-term observations or conducting active experiments in concert with other Earth Science programs.

Seismic Observatories

The Earth science and ODP communities have acknowledged the scientific importance of establishing long-term geophysical stations at deep ocean sites since the 1980's. A principal objective for deep-ocean borehole seismic stations is to understand the tectonic processes driving Earth's dynamic systems from a regional to global scale by imaging the Earth's interior with seismic waves. Unfortunately, few seismometers are located on the 71% of the Earth's surface covered by oceans, and the asymmetry and non-uniformity of seismic station distribution makes high-resolution imaging of some parts of the mantle and core nearly impossible. Long-term borehole and ocean-bottom broadband seismometers at even just a few deep-sea locations carefully selected to optimize imaging will greatly enhance our seismic imaging of the Earth's mantle and core utilizing the unpredictable natural earthquake source energy.

Figure PP-11:



□	Reentry holes used for past wireline reentry experiments or observatories
✖	Reentry holes presently suitable for wireline reentry experiments or observatories
Δ	older reentry holes lacking second casing string
O	Reentry holes presently in use or recently used as observatories
☆	Observatories intalled in 200/2001

The International Ocean Network (ION), an international consortium of geoscientists and oceanographers, has worked very closely with ODP to identify the highest-priority gaps in the global seismic observation network most appropriate for installation of deep-sea borehole seismic stations. Through the last 5 years the Ocean Drilling Program has made a concerted effort to drill the required holes in the Indian and western Pacific Oceans, and in some cases to install the actual seismic observatories. As described elsewhere in this document, this effort will continue in 2001-2002 at two sites in the eastern Pacific. Relevant efforts in the past five years include ODP Legs 179 (Ninetyeast Ridge), 186 (inner wall of Japan Trench), 191 (seaward side of Japan Trench), and 195 (Philippine Plate).

During operations to install the Ninety East Ridge Observatory (NERO), ODP Leg 179 drilled to a depth of 493 meters below the sea floor into basaltic basement in the eastern Indian Ocean. A re-entry cone and casing were installed to prepare the site as an eventual ocean-bottom observatory. The instrumentation will be installed at a later date (probably as a joint French-Japanese effort) and the site will then become part of the ION network of seafloor seismic observatories following the goal of cooperation with partner projects outlined in the Long Range Plan.

On the deep-sea terrace of the Japan Trench, two borehole geophysical observatories were installed during ODP Leg 186. Here a portion of the Pacific Plate is subducting at a fast rate beneath northern Japan causing major earthquakes along the trench. The two

observatories were located in sites of contrasting seismic characteristics relative to the seismogenic zone of the Japan Trench subduction system. One observatory is located above the seismically active zone and the other is within an aseismic zone. The systems started collecting data in September 1999 and will be serviced by a remotely operated vehicle at least once a year to recover continuous high sampling rate and wide dynamic range data. These stations have made invaluable additions to the existing geophysical network over the western Pacific. In addition, they are noteworthy as the first combined installations of state-of-the-art strain, tilt and seismic sensors for long-term operation in seafloor boreholes.

A high priority for ION has been to install a station beneath the deep seafloor of the northwest Pacific to gain a better understanding of regional earthquake patterns and to enhance tomographic images of the Earth's interior. This objective was fully achieved during Leg 191 with the drilling and casing of a borehole at a site in the northwest Pacific Ocean between Japan and Shatsky Rise and the installation of a broadband seismic observatory.

Similarly, Leg 195 cored and cased a hole on the Philippine Sea abyssal seafloor and installed a broadband seismic observatory in the middle of the Philippine Plate. Although this was successfully accomplished, the observatory will not be activated until the monitoring equipment is installed during an ROV visit in the fall of 2001 and the first data will be recovered when it is again revisited in 2002.

Hydrogeological Observatories

Fluid flow beneath the seafloor is widely acknowledged to be a key process in a variety of tectonic environments. Such fluid flow can characteristically occur as high temperature hydrothermal vents at and near spreading centers, as tectonically forced fluid expulsion where plates collide at subduction zones, as low-temperature hydrothermal circulation throughout much of the ocean basins, or as density-driven flow in continental margins and carbonate platforms.

Since its inception, ODP has been at the forefront of investigations of subsurface fluid flow, using coring, downhole measurements, and studies of pore-water chemistry. Starting in 1991, ODP added a new approach: the installation of long-term hydrogeological observatories called CORKs ("Circulation Obviation Retrofit Kits") in carefully selected reentry holes. The CORK seals the hole and cuts off the exchange of fluids between formation and ocean commonly observed in unsealed holes. The typical CORK is equipped with temperature, pressure and chemical sensors connected to a multiyear data logger to monitor conditions in the drill hole as they gradually return to the natural, predrilling state. After installation by ODP, CORK data are downloaded periodically utilizing manned or unmanned submersibles.

From 1991 through 1996, ODP installed 12 CORKs in the first three characteristic settings listed above. Since 1996, that effort has continued with two additional CORKs in 1997 and 2001 and the first installations of an entirely new design, the Advanced CORK, in 2001.

During Leg 174B, ODP emplaced a CORK in a classic DSDP crustal site, Hole 395A, to investigate low-temperature off-axis hydrothermal circulation on the flank of the Mid-Atlantic Ridge. Results from this installation strongly complement those obtained from 4 CORKs installed on the flank of the Juan De Fuca Ridge during Leg 168. Hole 395A was initially drilled in a sediment pond in 1975 and since then seawater had been flowing down the hole and formation, implying significant lateral fluid transport within the ocean crust. Data recovered from the CORK in 1998 and 2001, in combination with data collected from the Juan de Fuca CORKs, confirm the inference of very high lateral fluid fluxes in off-axis basement covered by sediments. These CORK results also indicate that the fluid flow is enabled by very high regional-scale permeabilities in ridge-flank crust, such that very low driving forces (i.e., pressure differentials) are required despite the huge overall fluxes.

In 2001, ODP installed a CORK and two newly-designed "Advanced CORKs" in western Pacific subduction settings. Recent studies of the processes occurring at subduction zones have established beyond doubt that fluids play a major role in the physical and chemical evolution of subduction zones and mountain belts. Understanding such processes was a general objective of coring on several legs in the western Pacific (185, 186, 190, 195 and 196) and the specific objective of observatories installed during Legs 195 and 196.

In 2000 and 2001, Legs 190 and 196 formed a two-leg program to investigate the relationships of structure, fluid flow, and tectonics in the Nankai Trough subduction system off southwest Japan. Nankai Trough is considered the type example of a convergent margin accreting a thick section of clastic sediments. Leg 190 focused on coring at several sites; Leg 196 then conducted logging-while-drilling measurements and installed Advanced CORKs at two sites near the toe of the accretionary prism where initial deformation occurs and the plate boundary fault first develops. The Advanced CORKs differ from original CORKs in having not just one seal at the seafloor, but multiple casing packers to separately isolate several zones within the formation, corresponding more exactly to natural structural and permeability stratification. Initial results from the Nankai ACORKs are planned to be collected using a JAMSTEC ROV in 2002.

In addition to the Philippine Sea seismic installation described above, a major objective of Leg 195 was coring and setting a long-term geochemical CORK observatory at the summit of South Chamorro Seamount. This site is located on a serpentine mud volcano on the forearc of the Mariana subduction system. The setting has unique potential to address processes of geochemical cycling in non-accretionary subduction, particularly the role of fluids from the subducted slab. The CORK instrumentation included a long-term in-situ fluid sampler as well as temperature and pressure sensors; the first data as well as an in-situ fluid sampler will be recovered from the observatory when it is revisited by an ROV in early 2003.

Also noteworthy in 2001 was the use of two existing ODP holes, 504B and 896A in the eastern equatorial Pacific, for yet another variant on the CORK experiment installed by

wireline reentry from a conventional oceanographic ship. (In this case, the Scripps Control Vehicle was used from the Scripps ship Roger Revelle.) The two holes are in comparable ridge-flank locations to the CORKs installed during Legs 168 and 174B, so the combined results will be very powerful in elucidating processes of ridge-flank circulation. In another vein, the successful wireline reentry use of the ODP reentry holes further validates the method planned for post-drilling installation of broadband seismometers for those holes mentioned above which are simply drilled and cased by the *JOIDES Resolution*.

3.3 Exploring the Deep Structure of Continental Margins and Oceanic Crust (ODP *Initiative III*)

Within this Long Range Plan initiative the Ocean Drilling Program has emphasized the goal of "penetrating hitherto inaccessible regions beneath the seafloor to explore the underlying processes that form continents, rifts, oceanic crust and economic resources". The scientific objectives and technological initiatives of Leg 176 represent a start towards meeting this challenge. Leg 176 was devoted to deepening ODP Hole 735B, located on a shallow wave cut terrace along the transverse ridge of the Atlantis II Fracture Zone in the Indian Ocean. This hole was initiated during Leg 118 and 500m of gabbro were recovered. Leg 176 deepened this hole by more than 1000m to a total depth of 1508m with excellent recovery. This represents the first recovery of a significant portion of one of the major layers of the Earth's crust. It is the second deepest hole ever drilled into oceanic crust and one of only five holes ever drilled to >1500m in the history of ODP. Analyses of this core are likely to result in a major breakthrough in understanding geologic processes occurring beneath ocean ridges.

Continental rifting, eventual breakup and the onset of sea floor spreading is one of the major recurring geological events on earth. The evolution of the tectonic and magmatic processes that are involved, however, tend to occur deeply below the surface in zones technically below the drilling depth capabilities of the ODP. The west Iberia margin presents an exception to this setting as seismic reflection profiles across the area provide images of tilted fault blocks and onshore, and offshore, there appears to be a paucity of signs of syn-rift magmatism. There is also a relatively thin sediment cover on the northern part of the margin. Therefore, not only are the basement rocks of the margin within the depth range of ODP drilling capabilities but the lack of magmatism means that it is possible to image seismically, and even sample, the basement rocks that have been tectonically rearranged by extensive low-angle and normal faulting at the time of rifting.

The main objective of Leg 173 was to investigate the mechanisms of thinning and break-up of the continental lithosphere and the early stages of oceanic crust formation.

As the west Iberia margin is an excellent example of a non-volcanic rifted margin, it has been the focus of numerous geological sampling and geophysical cruises to the area as well as DSDP 47B, ODP Legs 103, 149 and 173. Subsidiary objectives of Leg 173 included the characterization of the ocean-continent transition (OCT), constraining the tectono-metamorphic evolution of the continental and oceanic basement, determining the

extent of syn-rift magmatism, examining the nature of the oldest oceanic crust and investigating the early sedimentary history of the rifted margin.

In a completely different deep geological setting an actively forming base metal sulfide system has been intersected during drilling on Leg 193 in the Manus Basin, SW Pacific contributing to the Long Range Plan objective of understanding processes forming economic resources. Poor core recovery, however, in the sulfide-rich interval precludes adequate assessment of the dimension of such mineralization. Detailed consideration of extensive downhole logging data, still being processed, will throw additional light on this issue.

Engineering & Technological Accomplishments

Technological Enhancements

The success of ocean drilling for scientific purposes is measured by the recovery of core enabling scientists to read the record of our planet's history, and/or the utilization of the holes drilled to acquire data that is fundamental to our understanding of planetary processes. The recovery of good core in hostile geologic environments and the ability to emplace instruments and sensors into the sea floor are dependent on the timely and successful integration of new technologies into the Program's operations. Indeed, as the scientific requirements of the Program become more sophisticated, it is even more important that the Program continue to develop and incorporate new technological capabilities into operations, if the Program is to achieve many of its stated goals. The ambitious and visionary ODP five year science plan (1998-2002) identified a number of scientific goals involving the dynamics of the Earth's environment and interior that required significant advances in technology. This document recognized that, to achieve its vision for a new era of exploration, the Program had to develop the capability to emplace geophysical and geochemical observatories in the unique environment of seafloor boreholes, and to penetrate previously inaccessible regions beneath the seafloor. Moreover, the Program had to capitalize on new drilling, logging and analytical advances to enhance our understanding of the natural climate variability, the nature of in situ geologic properties and processes, and the character of the deep biosphere.

In the last five years, the Program has made significant progress by successfully incorporating a suite of new technologies that have allowed the Program to address a new generation of fundamental questions. A summary of the Program's achievement over the last five years is given below and serves as a robust testament of the Program's record of technological development.

Drilling Enhancements

Rig Instrumentation System
The Rig Instrumentation System (RIS) was installed during dry dock in 1999 and provides for real-time monitoring and electronic storage of drilling parameters and vessel

motion. The RIS is a PC-based data acquisition system with the master computer serving the driller's console and broadcasting the data to remote workstations in the ODP Operations Manager office, ODL Drilling Superintendent office, and Downhole Measurement Laboratory. The RIS provides algorithms for tracking depth and calculating WOB and rate-of-penetration (ROP) and is used routinely while drilling.

Instrumented load pins were also installed at the hook to directly measure the weight of the drill string. This enhancement provides a true hook load vs. the measurement from the hydraulic load cell mounted in the crown, which is also measuring the weight of the travelling blocks and heave compensator. The result is a better WOB calculation because the hook load measurement from the load pins is less affected by ship motion and heave compensator momentum.

Measurement-While-Drilling

During Leg 188 drilling data were acquired near the bit and transmitted to the surface through the mud column in real-time using Schlumberger/Anadrill's Measurement While Drilling (MWD) equipment. The MWD system was subsequently deployed in nearly 6000 m of water during Leg 196 in the Nankai Trough. Downhole data were transmitted to the surface at rates enabling two samples per meter depth resolution. The RIS system was also used successfully to simultaneously collect downhole measurement-while-drilling (MWD) and surface drilling data during Legs 188 and 196. The MWD real-time data (WOB and torque-on-bit) were transmitted to RIS via an RS422 link from the MWD/LWD data acquisition system. The communication was two-way as RIS transmitted rig data and ship motion data (heave, roll, and pitch) to the MWD/LWD data acquisition system. These co-registered surface and downhole drilling data are essential for evaluation of the active drillstring compensation system.

Active Heave Compensator System

The Active Heave Compensator (AHC) system has been operational since Leg 189 and has achieved the goal of significantly reducing the absolute drill pipe motion and stabilizing the drill string rpm and torque. Measurements made on Leg 189 showed that the total compensator efficiency when using AHC and Passive Heave Compensator (PHC) was 90-98% vs. 50-80% when only the PHC was used. With enhanced control of these parameters, drilling and coring operations with the extended core barrel (XCB) and rotary core barrel (RCB) coring systems have improved. Data analysis has shown that the AHC limits the absolute drill string motion relative to the seafloor to 4-6 in. This limited drill string motion has played a key role in the success of the HRRS and the ADCB systems, which require a low WOB variation with no lift off by the bit from the bottom of the hole. The variability in drill string rpm and torque has also been reduced in magnitude and frequency when the AHC is used, which will reduce bit failures and allow increased use of specialty diamond bits. Moreover, the marked reduction in drill string motion has made it possible to control the installation/landing of equipment in the hole (ACORKs, geophysical/ geochemical packages).

Shock Sub and Drilling Jar
Griffith Vector developed a shock sub and a drilling jar for use with the RCB and ADCB coring systems. The shock sub is placed above the outer core barrel to reduce the transfer of vertical motion to the bit. The shock sub is fully balanced and uses both pump-open force and applied weight-on-bit to normalize vertical motion propagated to the bit from surface induced drill string heave. The stroke of the shock sub is compatible with the +/- 3-in motion of the drill string during AHC operations. The drilling jars have a full 4.125-in inside diameter that allows coring operations to continue. The drilling jars are also used during deployment of the Schlumberger LWD tools.

Hard Rock Reentry System
The Hard Rock Reentry System (HRRS) system provides the ability to establish a cased reentry site on sloping, fractured, hard rock sites. The HRRS uses a downhole fluid hammer to advance the hole and casing simultaneously. The hydraulic hammer was tested on Leg 191. During the tests, the fluid hammer operated successfully in bare hard rock spuds at full flow rates of 400-450 gpm without damage. The dual-cam and flat-face underreamer bits worked as designed. The additional standpipe bracing that was added to the derrick at dry dock and a Vortex-type pulsation sub in the BHA were successful in eliminating the standpipe vibration experienced during Leg 179.

Leg 193 presented extreme operational and technical challenges, which included bare-rock spuds in rugged volcanic terrain and uncertain drilling conditions. It was decided to deploy the HRRS on Leg 193 as a contingency for achieving leg science objectives. A reentry cone was set, but the drilled holes were not stable enough to allow casing installation despite repeated drill pipe wiper trips and reaming. The HRRS was used as it was designed to install 31 m of 13-in casing into a bare, sloping, fractured, hard rock site on the seafloor. The fluid hammer operated flawlessly at an average penetration rate of 3.1 m/hr. The fluid hammer and jet sub were successful in keeping the hole clean. In a second hole, the development engineer and operations manager determined that the HRRS and Dril-Quip CADA casing running tool could be used outside of the design configuration in an underreaming mode to install 60 m of 13-in casing in a pre-drilled 14-in hole. An HRRS reentry funnel was free-fall deployed to provide reentry into the 13-in casing. The ability of the HRRS to install casing was critical in achieving the science objectives during Leg 193.

Advanced Diamond Core Barrel
The Advanced Diamond Core Barrel (ADCB) was developed as an alternate coring system to the RCB where higher recovery is required and when additional time is available to use the ADCB. The ADCB is a PQ mining-style, relatively thin-kerf diamond coring system. The ADCB uses 6-in drill collars and a 7-in diamond bit to cut a 44% larger core than the RCB. The ADCB has a 36% smaller borehole diameter and should have better core quality, faster penetration rate, and smoother borehole wall.

While much of the success of the ADCB depends upon the formation, bit type selection, and the ability to retain core once cut, the general trend is that recovery is several times better than with either the XCB or RCB. The overall recovery for the ADCB during Leg

193 (18.3%) was more than twice that of the RCB (8.5%) in spite of a damaged bit and the tool being operated outside of its recommended parameters. When operated at the recommended 35-150 gpm flow rates, the low profile core bit recovered a higher percentage of the very fractured material.

Downhole Technological Enhancements

Logging While Drilling

Logging While Drilling (LWD) technology was highlighted as a key advancement in the ODP Long Range Plan, it has proven to be invaluable to the science objectives of legs where core recovery was poor and hole conditions were extremely problematic, including Legs 156, 170, 171A, 174B, 188, 193, and 196. LWD equipment has been deployed in a wide range of water depths, bottom compositions and rock types. During LWD operations, the logging tools are located directly behind the drill bit and collect data as the hole is being drilled. This allows log data to be collected under less than ideal hole conditions. It also provides data in the upper section of the hole; something not possible with wireline logging due to the need for the drillstring to remain in the hole during wireline tool deployment. A wide range of LWD tools have been deployed including first generation commercial tools such as the compensated dual resistivity (CDR) and compensated density neutron (CDN) tools. Newer and increased capability tools have been added as they have become available to ODP. These tools included the measurement while drilling tool that telemeters data up the drill pipe in real time, the resistivity at bit (RAB) tool that creates a 360 degree resistivity image of the borehole, the azimuthal density neutron (ADN) tool which creates a 360 degree density image of the borehole and the integrated sonic tool.

Table PP-1: ODP Logging-While-Drilling Operations (FY 98-02)

Location	**Leg**	**LWD Logging**
NJ Shelf	174A	3 holes (CDN, CDR)
Prydz Bay	188	2 holes (CDR, MWD)
Manus Basin	193	2 holes (RAB)
Nankai Trough	196	3 holes (ISONIC, RAB, ADN, MWD)
Upcoming 2002:		
Gas Hydrates – Oregon Margin	204	RAB, ADN

Third-Party Tool Support

One of the mandates of ODP Logging Services is to provide support for 3rd-party tool developments. To this end, we have developed a multipurpose data acquisition system (3rd-party DAS) that has been installed in the Downhole Measurements Lab (DHML) to interface with a wide variety of logging tools and support equipment. This system offers numerous features including a standard computer platform from which to launch acquisition software, several power supplies, and a workspace in the acquisition area

devoted to 3rd -party equipment. The system is based on unique modular software for data telemetry, equipment triggering and switching for a variety of downhole devices. Each module has been written for a specific piece of equipment and can be run from any PC with the proper hardware installed. The system currently utilizes the Windows 98 operating system. Recent enhancements to 3rd -party tool support services include the design of a cablehead crossover that allows 3rd -party tools to connect to the Schlumberger cablehead via an inexpensive, modified off-the-shelf connector. The DAS has been used on numerous occasions including the Seismic-while-drilling experiment on Leg 179, multiple Multisensor Gamma Tool (MGT) deployments, and the Göttingen magnetometer deployment on Leg 197.

Temperature Pressure Acceleration (TAP)

A high-resolution (Temperature/Acceleration/Pressure) TAP tool was designed to routinely acquire borehole fluid temperature, pressure and tool string acceleration. This data is important for characterizing the borehole temperature gradient and monitoring the motion of the wireline. The TAP tool may be run in one of two modes: memory mode, where the tool is fastened to the bottom of a toolstring and data stored in the onboard memory; or, telemetry mode, where the tool is run alone and data is recorded in real-time by the data acquisition system developed by LDEO. Fast and slow response thermistors are mounted near the bottom of the tool to detect borehole fluid temperatures at two different rates. The fast-response detects small abrupt changes in temperature; the slow-response thermistor estimates the temperature gradient and thermal regimes more accurately. One pressure transducer is included to turn the tool on and off at specified depths when used in memory mode. A 3-axis accelerometer is also included to measure tool movement downhole, which is useful for deconvolving the effects of heave and fine tuning control of the wireline heave compensator (see below).

CB-Temperature Tool (CBTT)

During Leg 193 there were significant challenges in coring and logging under the expected high temperature conditions. In anticipation of these challenges ODP Logging Services developed the Core Barrel Temperature tool (CBTT). The tool is a modification of the existing DSA tool to measure borehole temperature while coring is underway. The scientific party successfully deployed the tool for the first time during this leg, quantifying the cooling of the borehole by pumping, and demonstrating that the borehole temperature was safe for logging tool deployment.

Drill String Acceleration Tool (DSA

The Core Barrel Drill String Acceleration tool (CB-DSA) was developed by ODP Logging Services to measure and record the drillbit acceleration and vibration signals while drilling. The DSA tool contains a single axis high-sensitivity accelerometer for heave measurements, a three-axial high-frequency accelerometer for drillbit vibrations and a high-resolution pressure sensor. For ease of deployment, the CB-DSA has been designed as a removable extension of the APC/XCB/RCB core barrels. Using standard threaded connections, the CB-DSA is attached to the top of a selected core barrel prior to

core barrel deployment. Except for the connection and disconnection of the CB-DSA, coring activities are not affected by the presence of the CB-DSA. Upon CB-DSA/core barrel retrieval, the CB-DSA is disconnected and the data downloaded to the LDEO data acquisition system for immediate analysis.

Wireline Heave Compensator

The wireline heave compensator (WHC) is an extremely important component in the ODP wireline logging program. Its primary role is to reduce wireline motion due to ship heave and prevent serious degradation of the data. The WHC consists of a large hydraulic ram with a wireline sheave on one end and supporting hydraulics and electronics designed to sense and compensate for the effect of heave. As the ship heaves with the billowing sea, a 3-axis accelerometer located near the ship's center of gravity measures the movement and transmits the data in real time to the controlling electronics and software. The WHC responds to the heave by adding or removing cable slack to decouple the movement of the ship from the desired movement of the toolstring. The WHC can adequately compensate to 50-90% vertical motion in seas of 6 meters or less.

CORK Borehole Completion

The CORK was designed for thermal and physical characterization of subsea hydrology over an open formation interval in a variety of hydrologic settings. CORKs are designed for long-term in situ monitoring of temperature and pressure as well as collecting borehole fluid samples through added tubing and valves. The CORK system was redesigned for Leg 195 for compatibility with the new reentry cone design, which had the transition joint removed. Additional design work was performed to reduce costs, improve reliability, and minimize failures.

ACORK Borehole Completion

The ACORK is a tool designed to isolate multiple zones in a borehole for independent zone investigation. ACORKs allow sub-seafloor biosphere studies in the context of their hydrological, chemical, microbiological, and thermal regimes, as well as hydrologic responses to seismic activity, tides, and barometric loading. Multiple holes could be used to determine lateral gradients and geological property variations. After the ACORK casing is installed, the hole may be deepened with coring or drilling operations. The ACORK casing can be sealed with a bridge plug at the bottom to allow installation and servicing of secondary instrument packages and sensor strings. Remotely operated vehicles (ROV) or submersibles can retrieve ACORK data for shore-based study.

To date, only two ACORKS have been deployed and both were deployed in the Nankai Trough, off Japan, during Leg 196. The deployment of the Hole 1173B ACORK was successful, emplacing five screens across five previously identified zones of interest that were isolated by four packers. The second ACORK was deployed in Hole 808I and was composed of six screens and two packers. During ACORK installation at Hole 808I, the underreamer failed, and the insertion of the ACORK stopped ~39.6 m above the landing point because of hole friction on the casing. After discussion, the drill string was released from the ACORK and the ACORK wellhead fell over, coming to rest on the seafloor. The 10-3/4 in casing and the umbilical appear to be intact and the position of the

wellhead gives an ROV or submersible access to the attached instruments. It is believed that the ACORK screens are close enough to the zones of interest that useful data may be collected in the future. Bottom camera surveys indicate that the access ports are positioned to allow data retrieval via submersibles.

Instrument Hanger Borehole Completion

The scientific community has various goals related to enhanced long-term downhole measurements and sampling in permanent boreholes. This includes temperature monitoring and fluid sampling over both the wellbore and in isolated zones. It also includes the installation of permanent seismic packages, which can include seismometers, strainmeters, and tiltmeters in the borehole (e.g., ION completions during Legs 186, 191, and 195). An instrument hanger will also be used on Leg 205 for completion with an osmotic sampler. A significant element of the completion is the third-party equipment supplied by the Principal Investigators, which includes both the downhole instrumentation and the associated seafloor data loggers and battery power supplies. A key objective of the completions design is to ensure access to the data loggers at the wellhead using oceanographic vessels equipped with submersibles. This allows frequent recovery of fluid samples and recorded data without using the *JOIDES Resolution*. The AHC plays a critical role in the installation of borehole completions as it isolates the completion string from the ship heave, thereby minimizing downhole equipment movements during landing in the wellhead and during cementing of seismic equipment in the borehole.

Deep Biosphere Technology

Tracer testing was conducted during Leg 185 to evaluate the level of contamination to core samples during the coring process. Two tracer methods were evaluated: fluorescent microspheres and perfluoromethylcyclohexane (PFC) solution. Small plastic bags (whirl-paks) with fluorescent microspheres were placed inside the core barrel above the core catchers. As the core is cut, the core breaks the bags and the fluorescent microspheres is released inside the core barrel. The PFC solution was injected at a concentration of 1 ppm downstream of the centrifugal charge pump and into the No. 2 (portside) triplex mud pump intake. Injection timing was coordinated with the driller to allow the scientists to start, stop, and change injection rates. The tests confirmed that the core contamination from the mud circulating in the hole is limited to the near surface of the cores, and does not impact microbiological sampling of the cores. Because Leg 201 required continuous PFC tracer injections, the tracer pump operation was automated to free up two technicians who otherwise would have been needed for 24-hr operation. Since the tracer injection rate is directly related to the mud pump flow rate, the tracer pump was connected to the Rig Instrumentation System computer via an RS232 communication link to automate the process. This was implemented during Leg 199.

APC Methane Tool

As a result of high interest in gas hydrate research, ODP and Monteray Bay Aquarium Research Institute (MBARI) jointly developed a methane sensor package to determine the methane content of the cores. MBARI developed the Temperature Pressure Conductivity (TPC) tool and successfully tested the tool on the seafloor with an ROV.

ODP collaborated with the MBARI principal investigators to add the sensor package to the ODP APC core barrel. The APC Methane (APCM) tool sensor package is installed at the top of the APC core barrel where it takes measurements of the core headspace. The temperature, pressure and conductivity measurements are recorded continuously during the APC run so that thermal changes can be quantified in gas-rich cores. The APCM tool was successfully run on Leg 195 to test its operational bounds (high pressure and vibration) as well as its data recording capability (three channels, no calibrations). It was successfully tested on Leg 199 with enhanced tool software (five channels including time stamp) and calibrations, and is scheduled for operational deployment on Leg 201.

Data Acquisition and/or Analytical Enhancements

Data Integration Software

The ability to integrate core, log, and seismic data is an essential component to the scientific themes of the ODP Long Range Plan. In light of this, ODP Logging Services has developed data integration software and has adapted commercial software for this purpose.

Splicer

Two programs, *Splicer* and *Sagan*, were developed as part of the Core-Log Integration Platform project. *Splicer* is a graphical and interactive program for depth-integrating (depth-shifting) multiple-hole core data for building composite sections and developing age models. The program uses an optimized cross-correlation routine for determining the best interhole depth correlation and splice positions. Multiple data types can be compared simultaneously in order to quickly determine the best correlation for all variables. Once the correct depth offset is determined it is applied to the entire core and the user proceeds iteratively core-by-core until all cores of all holes at a given site are optimally depth-correlated. The real time feedback provided by shipboard application of *Splicer* allows gaps in the recovered sequence to be identified in time to guide drilling for complete recovery of stratigraphic sequences. *Splicer* has been used routinely on the *JOIDES Resolution* to build continuous sediment records since Leg 151.

Sagan

The second program, *Sagan*, allows the composite sections output by *Splicer* to be mapped to their true stratigraphic depths, unifying core and log records and providing a crosscheck on the completeness of the composite section. *Sagan* generates a single metafile that defines a set of precise depth correlations between core and log datasets at any given site. This metafile provides the foundation for core-log data integration, as it establishes the unique mapping function linking the two independent depth scales. The program performs the core-log depth merging using physical parameters which are measured on both cores by logs (e.g. natural gamma, bulk density, porosity, magnetic susceptibility, sonic velocity). The program can manage up to 10 holes of core data, 5 data types, nearly an infinite number of cores and data points and up to 3 reference log curves. The resulting core-log timelines can be applied across equivalent mcd depths in different holes or just for individual cores. *Sagan* has been in regular use since Leg 189.

IESX

In FY 01, a pilot study was initiated by ODP Logging Sciences and the ODP Site Survey Databank to determine if the IESX software package could enhance ODP's capability for seismic-log integration and provide a mechanism for digital seismic data handling and archiving. IESX is a data integration package that allows the user to integrate seismic, log, and physical properties data. It is part of Schlumberger-GeoQuest's GeoFrame* software. IESX has proven to be especially effective in the integration of log and seismic data into a single coherent project and also provided the Site Survey Data Bank with a mechanism for handling and distributing digital seismic data while still maintaining its proprietary restrictions. Using software provided by ODP Logging Services, the output from IESX can be exported to personal computers for annotation and the preparation of figures. The core-log-seismic integration and data management capability within the IESX package has been incorporated into routine use by ODP Logging Services and Site Survey Databank personnel.

** GeoFrame has been used by the ODP downhole logging groups for several years to display and process ODP log data, particularly fluorescent microsphere images. Prior to the start of this pilot study, ODP Logging Services negotiated an arrangement with GeoQuest for the free use of this software. This type of arrangement is now available to other universities, allowing scientists to continue to use the software following the cruise.*

High Speed Satellite Data Transmission

The capability of routinely transmitting log data, images, text, and other digital data via satellite was added following a focused effort by ODP Logging Services and TAMU in 1998 to upgrade the data transmission capabilities of the *JOIDES Resolution*. Digital log data are now routinely transmitted via satellite to LDEO-BRG after the completion of logging operations at each hole. This allows shorebased log analysts to perform routine processing of the conventional logs and transmit the data back to the ship in ASCII format along with documentation of the processing performed. Fluorescent microspheres and specialty data processing are performed following the cruise.

Microbiology facility

One of the goals of the most recent ODP Long Range Plan is study of the deep biosphere, This requires the integration of microbiology into the disciplines supported by the shipboard laboratories. In January 1999, a portable laboratory for biosphere studies was fabricated and installed on *JOIDES Resolution* in Australia. This was used successfully on Leg 185, but was removed during dry dock to make space for the additional level added to the lab stack. Subsequently, space on the forecastle deck formerly used for the XRF and thin section making was converted for use as a microbiological laboratory. (The XRF was removed from the ship, and thin section making has been moved to the new space on the upper level of the lab stack.) The microbiology facility was completed with the installation of a number of items of equipment acquired by Woods Hole Oceanographic Institution under a separate grant from the NSF LExEn Program, and made available to ODP. These laboratory changes were accomplished during Leg 191. The new configuration places the microbiology laboratory adjacent to the chemistry

laboratory, and facilitates synergy between these two disciplines that have strongly overlapping interests.

The final phase of developing facilities for microbiological studies is the addition of a separate, portable laboratory van for radio isotope studies. The van will fit on top of the core tech. shop, adjacent to the driller's shack, and will be installed in January 2002.

ICP Analyzer
An inductively coupled plasma analyzer (ICP) donated by the U.S. Department of Energy was installed in the shipboard chemistry laboratory at the beginning of Leg 187 (late 1999). After some initial "teething troubles" this instrument has proved robust and performs analyses rapidly. Since the ICP provides rapid and accurate elemental analyses of both solids (minerals) and fluids, it effectively replaced the X-ray fluorescence analyzer (XRF) and the atomic absorption spectrometer. Removal of the XRF made space available for the microbiology laboratory.

Digital Imaging
A split-core track system (also referred to as the "archive MST") was installed in the core laboratory on *JOIDES Resolution* on Leg 179. The system originally included a digital line scan camera, Minolta spectrophotometer, and a Bartington point magnetic susceptibility meter. Although the spectrophotometer and and magnetic susceptibility applications are successful, the digital camera continued to be problematic. Accordingly, following a strong recommendation from JOIDES, in early FY01 the Program evaluated options for installing a core digital imaging capability separate from the split core MST. A GeoTek system capable of imaging four core sections at each pass was purchased and installed in late FY01. Early reports are that this system and the related system for managing and archiving the digital images are working well. (Routine wet-chemical photography of the cores continues both as back up for the digital system and for comparison purposes.)

Management Accomplishments

Will be provided by JOI – work in progress.

Program Summary

The operational phase of ODP began in January 1985 with the completion of the shakedown cruise (Leg 100) and acceptance of the *JOIDES Resolution.* As of January 2002, 99 operational cruises will have been completed (Legs 101-200) and Leg 201 will be underway. Table PP-1 summarizes the FY 02-03 schedule of the *JOIDES Resolution*; (Figure PP-12 shows the location of all ODP operations through Leg 210). Initial description of the cruises and scientific results can be found in the "Preliminary Reports" available on the World Wide Web (www-odp.tamu.edu/publications). For each leg, the Science Operator publishes detailed descriptions of the drilling results and scientific accomplishments in the "Initial Reports" (printed 10-12 months post-cruise) and the "Scientific Results" (printed 36 to 48 months post-cruise) volumes of the *Proceedings of the Ocean Drilling Program*.

The JOIDES Resolution has now drilled in the Atlantic, Pacific, Indian, and Southern Oceans, including high-latitude zones bordering East and West Antarctica and Greenland, and the Mediterranean, Caribbean, Weddell, Sulu, Celebes, Philippine, South China and Japan Seas, in search of answers to important scientific problems designated by JOIDES. As of Leg 197, the JOIDES Resolution has revisited, drilled and cored 1577 holes at 602 sites and retrieved 192,115 meters of cored material, and has logged 332 holes. As of Leg 199, 2468 shipboard scientists from around the world have participated in cruises. Scientists have taken over 1.9 million individual samples to their home institutions for further study.

Table PP-2: Ship Schedule for Legs 198-210 (FY 02 - FY 03)

	Leg	Port (Origin)◊	Dates €
198	Shatsky Rise	Yokohama	28 August – 24 October
199	Paleogene Pacific	Honolulu	24 October - 17 December
200	H2O Observatory	Honolulu	17 December – 28 January '02
201	Peru Biosphere	San Diego	28 January – 1 April
202	SE Paleoceanography	Valparaiso	1 April – 1 June
203	Eq. Pac. Ion	Balboa	1 June – 8 July
204	Gas Hydrates *	San Francisco	8 July – 6 September
205	Costa Rica	San Diego	6 September – 6 November
206	Fast Spreading Crust	Balboa	6 November – 5 January '03
	Transit	Balboa	5 January – 13 January
207	Demerara Rise	Barbados	13 January – 8 March
208	Walvis Ridge	Rio de Janeiro	8 March – 9 May
209	MAR Peridotite	Rio de Janeiro	9 May – 10 July
210	Newfoundland Margin	Bermuda	10 July – 9 September
	Transit	St. John's	9 September – 21 September
	Demobilization•	Galveston	21 September – 30 September

Notes:

€ Start date reflects the first full day in port. This is the date of the ODP and ODL crossover meetings. The JR is expected to arrive late the proceeding day. Port call dates have been included in the dates which are listed.

◊ Although 5 day port calls are generally scheduled, the ship sails when ready.

* A mid-leg port call occurred for Leg 196 and may occur for Leg 204.

• Demobilization assumes a seven day (=2 day port call) period tentatively scheduled for Galveston, TX.

FY 2003 Drilling Program Development

At its August 2001 meeting, SCICOM considered for the final year of ODP operations an FY2003 prospectus comprising 23 externally reviewed proposals and 4 APL's. The 23 full proposals included 10 which had been carried forward from the August 2000 meeting, and 13 forwarded since then by the SSEPs, as follows:

ODP Prospectus for FY2003
(MSP = Mission-Specific Platform)

A. Proposals Carried Over From FY2002 Prospectus and Ranking

1	533-Full2	Backman	Lomonosov Ridge, Arctic	MSP
3	525-Full	Keleman	MAR Peridotite	
6	455-Rev3	Piper	Laurentide Ice Sheet Outlets	
9	559-Full	Zachos	Walvis Ridge	
10	564-Full	Miller	New Jersey Shelf	MSP
11	539-Full2	Holbrook	Blake Gas Hydrates	
12	512-Full2	Blackman	Core Complex	
13	522-Full2	Wilson, D.	Fast Spreading Crust	
14	577-Full	Wilson, P.	Demerara Rise	
22	519-Full2	Camoin	Sea-Level Rise S. Pacific	MSP

B. Proposals Externally Reviewed After May/Nov 2000 SSEPs Meetings

561-Full2	Duncan	Caribbean LIP	
584-Full	Rona	TAG Hydrothermal II	
543-Full2	Harris	CORK Hole 642E	
547-Full3	Fisk	Oceanic Subsurface Biosphere	
548-Full2	Morgan	Chicxulub: K/T Impact	MSP
554-Full4	Kennicutt	Gulf of Mexico Gas Hydrates	
557-Full2	Andreassen	Storegga Slide Gas Hydrates	
572-Full2	Channell	N. Atl. Late Neogene; Distal LISO	
573-Full2	Henriet	Carbonate Mounds, Porcupine Basin	
575-Full3	deMenocal	Gulf of Aden African Climate	
581-Add	Droxler	Late Pleistocene Drowned Coralgal Reefs	MSP
589-Full2	Flemings	Gulf of Mexico Overpressures	
594-Full	Tucholke	Newfoundland Margin	

C. Ancillary Program Letters

APL-15	Tamaki	Gulf of Aden Basement	
APL-17	Piper	Sotian Margin Cenozoic	
APL-19	Garcia	Nu'uanu Landslide	(Leg 200)
APL-20	Ranero	Costa Rica Mud Volcanoes	(Leg 203)

The proposals were evaluated primarily in terms of their relevance to the objectives and priorities of the ODP Long-Range Plan (LRP), as well as the IODP Initial Science Plan since IODP is equivalent to Phase IV of the LRP. The SCICOM discussions and

evaluations were guided by the statement on conflict of interest and SCICOM voting procedures mandated by EXCOM in 1997 and 1998, both of which are set out in Appendix IV of the 1998-1999 special issue of JOIDES Journal entitled "A Guide to the Ocean Drilling Program." The rules for conflict of interest were applied to any guests or observers as well as actual panel members. The SCICOM voting procedures include four principal steps: (1) defining the pool of proposals to be ranked, then thoroughly discussing each one, (2) ranking by signed ballots, and (3) selection of ranked proposals to forward to OPCOM for possible scheduling, and (4) acceptance of an OPCOM-recommended schedule by simple-majority SCICOM vote. There is a final step - formal approval by EXCOM at its January 2002 meeting - so this report of the SCICOM-recommended FY03 schedule should be considered provisional pending EXCOM approval.

In defining the pool of proposals to be ranked, a number of potential issues and constraints were considered, including:

1) Geographic location, because JOIDES Resolution operations for FY2003 would be governed by (a) contractual requirements for demobilization in a US Gulf Coast port by Sept 30, 2003, and (b) the following 1999 SCICOM motion:

SCICOM Motion 99-2-23
SCICOM resolves that the JOIDES Resolution will operate in the Atlantic Ocean during at least part of 2002.

2) Platform considerations, in that 5 of the 23 proposals require mission-specific platforms (MSP) other than the JOIDES Resolution, but program funds could not be identified to support such MSP drilling in addition to a full JOIDES Resolution schedule.
3) Very high prior rankings for a few proposals, because a 1999 SCICOM motion (Motion 99-2-10) stated that SCICOM "will not automatically re-rank" (but may indeed elect to re-rank) such proposals in subsequent years.

In the end SCICOM decided by "consensus on recommendation of Chair" to rank all 23 externally reviewed proposals, including MSP proposals, purely in terms of global scientific objectives.

SCICOM Consensus 01-02-09 : SCICOM defines the pool of programs to be ranked for FY2003 to comprise all the full proposals included in the FY03 Drilling Prospectus.

Review of Full Proposals and Ranking Results

Proposals were reviewed in groups according to major themes of the LRP, in the order in which those themes are developed in the LRP. For each proposal, a primary SCICOM watchdog first summarized objectives and relevance to the LRP, and a second SCICOM watchdog made additional comments as appropriate. Then the SSEPs chairs (who earlier in the meeting had summarized the SSEPs' overall groupings for all the proposals in the prospectus) were asked to comment on the SSEPs review of the proposal under discussion. If there were safety concerns, the PPSP chair was asked to comment. Then the floor was

opened for general discussion by SCICOM members. An average of approximately 30 minutes was spent on discussion of each proposal, but, consistent with Robert's Rules of Order, discussion on any given proposal was not concluded until all SCICOM members who wished to comment were allowed that right.

After the review, SCICOM members voted by signed ballots to determine a global scientific ranking of all 23 proposals, with the following outcome:

August 2001 SCICOM Global Rankings

Rank	Proposal		Mean	S.D.	
1	533	Lomonosov Ridge	2.53	2.80	MSP
2	525	MAR Peridotite	3.60	2.56	
3	559	Walvis Ridge	6.60	3.31	
4	522	Fast Spread Crust	7.53	5.82	
5	577	Demerara Rise	9.33	5.56	
6	519	S. Pacific Sea-Level	9.93	3.97	MSP
7	557	Storegga Slide	10.47	5.12	
8	564	New Jersey Shelf	10.93	4.88	MSP
8	594	Newfoundland Margin	10.93	6.43	
10	548	Chicxulub	11.00	5.21	MSP
11	575	G. of Aden	11.27	5.88	
12	539	Blake Hydrates	11.40	4.56	
13	455	Laurentide Ice Sheet	11.53	6.19	
14	572	N. Atlantic Neogene	12.20	5.06	
14	547	Subsurface Biosphere	12.20	5.81	
16	512	MAR Core Complex	12.93	5.16	
17	561	Caribbean LIP	14.07	5.72	
18	584	TAG II	15.33	4.01	
19	589	GoM Overpressures	15.87	6.36	
20	573	Carbonate Mounds	16.67	6.70	
21	543	CORK Hole 642E	17.47	5.29	
22	581	Drowned Coralgal Reefs	20.47	2.61	MSP
23	554	GoM Hydrates	21.47	1.55	

(For intuitive reference regarding the significance of the standard deviations, consider a relatively evenly distributed, completely unclustered set of 15 rankings from 1 to 23 – e.g., rankings of 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 6, 12, and 18 for a hypothetical proposal among 23. Such an example distribution of rankings would yield an obvious mean of 12 with standard deviation of 6.78.)

After tabulation and presentation of the rankings, SCICOM decided by consensus to forward the top 13 ranked proposals to OPCOM for development of possible drilling schedules.

SCICOM Consensus 01-02-10: SCICOM forwards the top 13 ranked drilling proposals to OPCOM for possible scheduling in FY2003.

SCICOM then reviewed the 4 APL's in the FY2003 prospectus, and concluded that only one – APL 19 for the Giant Nu'uanu Landslide – deserved further consideration for possible scheduling:

SCICOM Motion 01-02-11: SCICOM forwards APL-19 "Nu'uanu Landslide" to OPCOM for consideration in the drilling schedule.

Wiens moved, Fryer seconded, 14 in favor, none opposed, 1 abstention (Rea)

Schedule Options from OPCOM

In developing alternative schedules for FY2003 JOIDES Resolution operations, OPCOM applied the following criteria:

1) Maximize use of JOIDES Resolution prior to demobilization in Galveston by 21 Sept 2003, which allowed scheduling 5 normal-length JOIDES Resolution legs.
2) Honor SCICOM rankings to the extent possible.
3) Moderate weather constraints (hurricanes, high-lat winter) require scheduling low-latitude programs in winter/spring and any high-latitude programs in summer – basically consistent with rankings and not a serious factor.

OPCOM actually forwarded the 4 schedule options below for SCICOM consideration. These honored the SCICOM rankings by each including the top 4 ranked JOIDES Resolution programs, and each also included a different North Atlantic program ranked below the top 4 as the final leg. This approach was motivated by the statistical closeness of rankings beyond the top 4 JOIDES Resolution programs, and the fact that scheduling the 5th ranked JOIDES Resolution program would entail a significant transit penalty on that leg that could not be worked around owing to the firm demobilization date. (Note that the 4 options are shown with an OPCOM-recommended switch of the Costa Rica program to Leg 205 that didn't materially affect the FY2003 program and was subsequently approved by SCICOM as described below.)

Option #1 with Storegga Slide Hydrates shortened leg

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	Walvis Ridge (559)
Leg 209	MAR Peridotites (525)
Leg 210	Storrega Slide Hydrates (557)
Disadvantage:	approx 15 days short → curtailed Storegga program

Option #2 with Newfoundland Margin (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	Walvis Ridge (559)

Leg 209	MAR Peridotites (525)
Leg 210	Newfoundland Margin (594)

Option #3 with Blake Hydrates (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demerara Rise (577)
Leg 208	MAR Peridotites (525)
Leg 209	Blake Hydrates (539)
Leg 210	Walvis Ridge (559)

(OPCOM noted that the Blake proponents had underestimated time requirements; a regular-length leg would not be long enough to achieve all stated objectives.)

Option #4 with Laurentide Ice Sheet Outlets (5 legs of normal length)

Leg 205	Costa Rica
Leg 206	Fast-Spread Ocean Crust (522)
Leg 207	Demarara Rise (577)
Leg 208	Walvis Ridge (559)
Leg 209	MAR Peridotites (525)
Leg 210	Laurentide Ice Sheet Outlets (455)

SCICOM Recommendation for FY2003 *JOIDES Resolution* Schedule

Before proceeding to a vote on the 4 schedule options, SCICOM engaged in a thorough discussion of the relative scientific merits of the 4 programs being considered for the final leg in the 4 possible schedule options. This discussion included assessment of the impact of the transit penalty on the Storegga Slide program as well as some comparative discussion of the two programs with gas hydrates objectives. The Chair reminded SCICOM that the voting procedures require only a simple majority for SCICOM to approve a suggested schedule. Therefore, SCICOM members decided to first rank the 4 options on individual paper ballots, in a nonbinding straw poll to assess whether there were a majority in favor of one of the options. The outcome was indeed that one option – that with the Newfoundland conjugate margin program - was clearly favored by a majority. SCICOM therefore accepted that scheduling option by unanimous motion:

SCICOM Motion 01-02-12:
SCICOM approves the following option presented by OPCOM for the FY03 operations schedule:

Leg	**Proposal**
Leg 206	An in-situ section of oceanic crust spread at superfast rate
Leg 207	Demerara Rise: equatorial Cretaceous and Paleogene paleoceanographic transect
Leg 208	Early Cenozoic extreme climates: the Walvis Ridge transect
Leg 209	Drilling mantle peridotite along the Mid-Atlantic Ridge from 14° to 16°N
Leg 210	Drilling the Newfoundland half of the Newfoundland-Iberia transect

Pisias moved, Robertson seconded, 15 in favor, none opposed

Each of these 5 programs has a very strong scientific basis in the Long-Range Plan, as well as in the reports of PPG's as follows:
Legs 206 and 209 - Architecture of Oceanic Lithosphere PPG,
Legs 207 and 208 - Extreme Climates PPG
Leg 210 – North Atlantic Rifted Margins DPG
In addition, the deep hole proposed for Leg 210 and the initial steps to establish a deep crustal hole on Leg 206 address the Long-Range Plan technological goal for establishing holes deeper than 2 km below seafloor.

Adjustments to FY2002 schedule

Shortly after approving the option above for the FY2003 JOIDES Resolution schedule, SCICOM endorsed OPCOM recommendations for two adjustments to the FY2002 schedule. First was a recommendation to switch the order of the Costa Rica Subduction Factory/CORK program originally scheduled as Leg 203 and the Equatorial Pacific ION program originally scheduled as Leg 205 within FY2003. This was motivated by the clear and compelling need for more time for preparations for the Costa Rica CORK program in light of the experience gained earlier in the summer during Leg 196 ACORK operations at Nankai Trough. The switch will have a minor effect (no more than 1-2 days) on overall transit times and some adjustments will be required for second-ship operations associated with Leg 204, but otherwise it was fully acceptable to all parties concerned.

SCICOM Consensus 01-02-14: SCICOM endorses the OPCOM consensus to switch Legs 203 (Costa Rica) and 205 (Equatorial Pacific ION Observatory).

The other adjustment to FY2002 operations concerned the possibility of scheduling 1.8 days requested for APL 19 (Giant Nu'uanu Landslide) on Leg 200. OPCOM recommended against formally adding time to Leg 200 for the APL, because it was apparent that the FY03 schedule options would require all available JOIDES Resolution time until demobilization, but to devote the necessary time on Leg 200 if the ship leaves port a day early before the leg. By consensus, SCICOM accepted the OPCOM recommendation:

SCICOM Consensus 01-02-15: SCICOM accepts OPCOM Consensus 01-02-05 for scheduling APL 19 if the ship leaves port for Leg 200 one day early.

What About the MSP Programs and Unscheduled Drillship Programs?

The strong showing of MSP programs – 4 in the top 10 rankings – is noteworthy. It demonstrates the great relevance of MSP science to the Long-Range Plan and is a strong endorsement of the inclusion of MSP operations in IODP. SCICOM recognized that MSP programs could not be considered for ODP scheduling in addition to the approved FY03 JOIDES Resolution operations owing to limitations on ODP program resources. Nevertheless, SCICOM reaffirmed its very strong scientific interest in the highly-ranked MSP programs with the following two consensus statements and a motion regarding

furthering the planning effort for the Lomonsov Ridge program that was at the top of SCICOM rankings for the second year in a row:

SCICOM Consensus 01-02-13: SCICOM forwards to iPC the 4 highly ranked proposals that require mission specific platforms as a SCICOM prioritization should funds become available to support mission specific platform drilling very early in IODP.

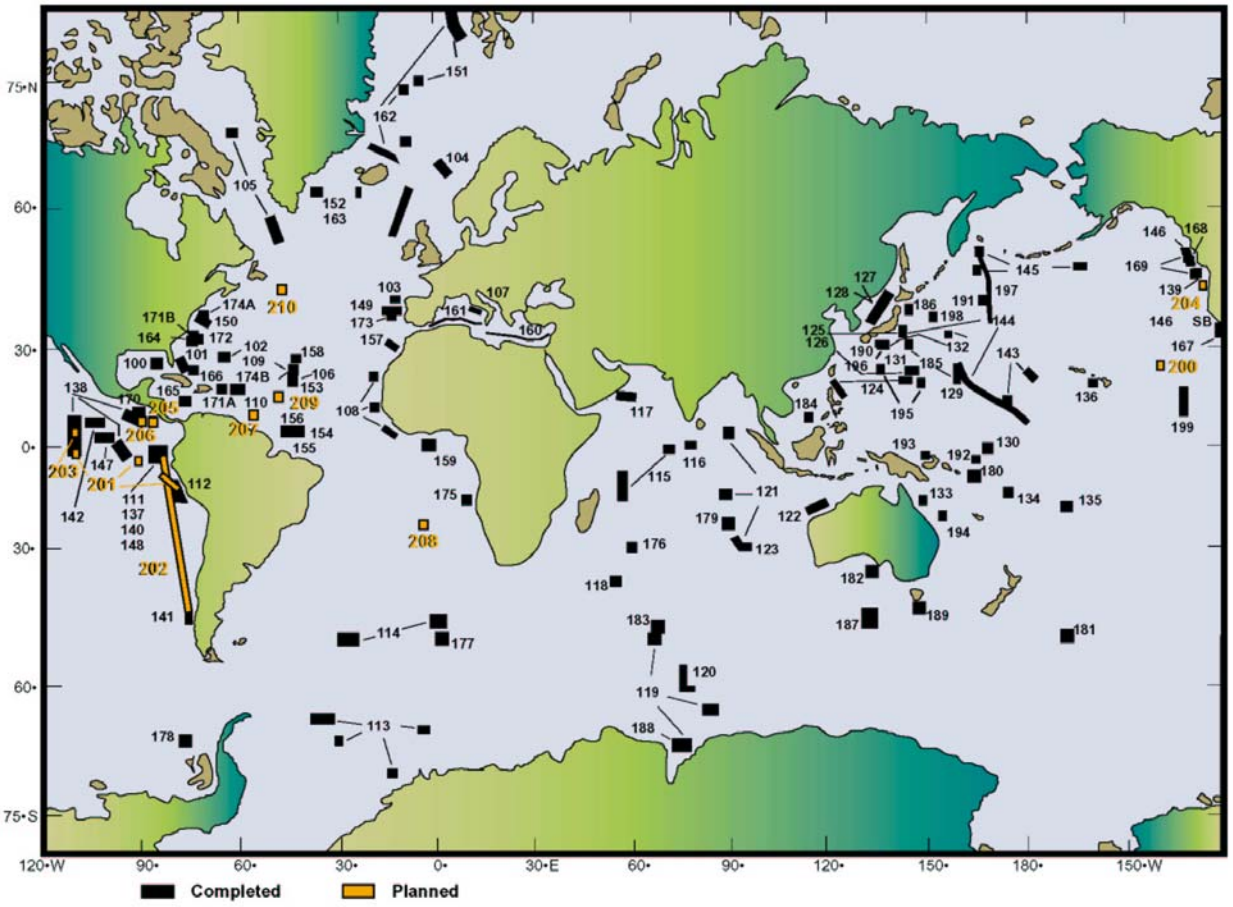
SCICOM Motion 01-02-18: SCICOM endorses the joint JOI/European initiative to set up a Lomonosov Ridge Project Management team.

Pisias moved, Rea seconded, 15 in favor, none opposed

SCICOM Consensus 01-02-19: SCICOM recognizes the scientific importance and quality of several proposals intended to achieve high priority objectives of ocean drilling using mission specific platforms. SCICOM enthusiastically supports drilling of these programs as part of a mission-specific platform component of IODP.

The IODP interim Planning Committee met during the same week, and iPC members observed the SCICOM process to arrive at the FY2003 schedule. The message from SCICOM regarding MSP programs was very well received at iPC. With proponents' permission, the great majority of ODP proposals (conventional or MSP) which were not scheduled by SCICOM have now been forwarded to the interim Science Advisory Structure for IODP planning.

Figure PP-12: FY 2003 Drilling Leg Locations (Legs 101-210)



Leg 205 carries over from FY 2002 into FY 2003. It was included in the FY 2002 Program Plan, and the information below is repeated for completeness

Leg 205	**Equatorial Pacific ION Observatory**
Proposal	**499-Rev**
Title	**Equatorial Pacific Site for the International Ocean Network**
Proponents	**J.A. Orcutt, A. Dziewonski, B. Romanowicz, F. Vernon**

A single site will be drilled in the equatorial Pacific to establish a borehole that will serve as a site for a future International Ocean Network (ION) and Ocean Seismic Network (OSN) observatory. The site (5°17.57'N, 110°4.58'W), which will be located in ~10-12 m.y. old lithosphere of Pacific Plate, was chosen to fill a large gap in seismic coverage in the region between Central America and the Pacific Islands. During Leg 205, the site will first be cored and then a second hole will be drilled, have a reentry cone set, and be cased into basement. The boreholes will penetrate through about 120 m of sediment and extend into the basement by about 100-150 m. Installation of the borehole instruments will be done using wireline reentry after Leg 205 has ended. Instrumentation will include a broadband triaxial borehole seismometer and a triaxial high-frequency seismometer, both of which will reside in basement portion of the borehole, and a broadband hydrophone, which will be suspended in the water column near the SOFAR channel. The observatory will be attached to a buoy that will provide power, data storage, and satellite communication capabilities, making it possible to return data daily to established data centers.

The observatory will be part of a global network that will resolve mantle and core structure, particularly anisotropy and lateral heterogeneities that may exist in these regions, and will aid in mapping the core-mantle boundary, a region that is probably the birth place of hotspots and the resting place of subducted slabs. The observatory will also improve the detection threshold for earthquakes occurring in the region. A secondary goal will be to recover and characterize the physical properties and geochemistry of an igneous basement section that was formed by super fast seafloor spreading (141 mm/yr full spreading rate).

Drilling Plan

The main purpose of Leg 205 is to establish a cased reentry hole into the oceanic crust at the drilling site, for subsequent emplacement of an Ocean Seismic Network broad-band seismometer by wireline reentry. The main technical requirements include installing well-cemented casing completely through about 115 m of sediments and into uppermost basement, with up to 100 m of open hole in basement below. This is envisioned as a relatively “standard” ODP reentry cone installation for basement penetration and will probably involve the routine procedures for establishing such a hole, as follows: pilot hole in sediments with jet-in test to determine depth of 16” casing, wash-in installation of 16” casing, installation and cementing of second casing string into basement, and finally coring into basement to total depth proposed as about 225 mbsf.

Table PP-3: Leg 205 Drill Site Locations

Site Name	Latitude (°N)	Longitude (°W)	Water Depth (m)	Total mbsf (m)
OSN-2	5°17.56'N	110°4.579'W	3860	226

Figure PP-13: Leg 205 Drill Site Locations

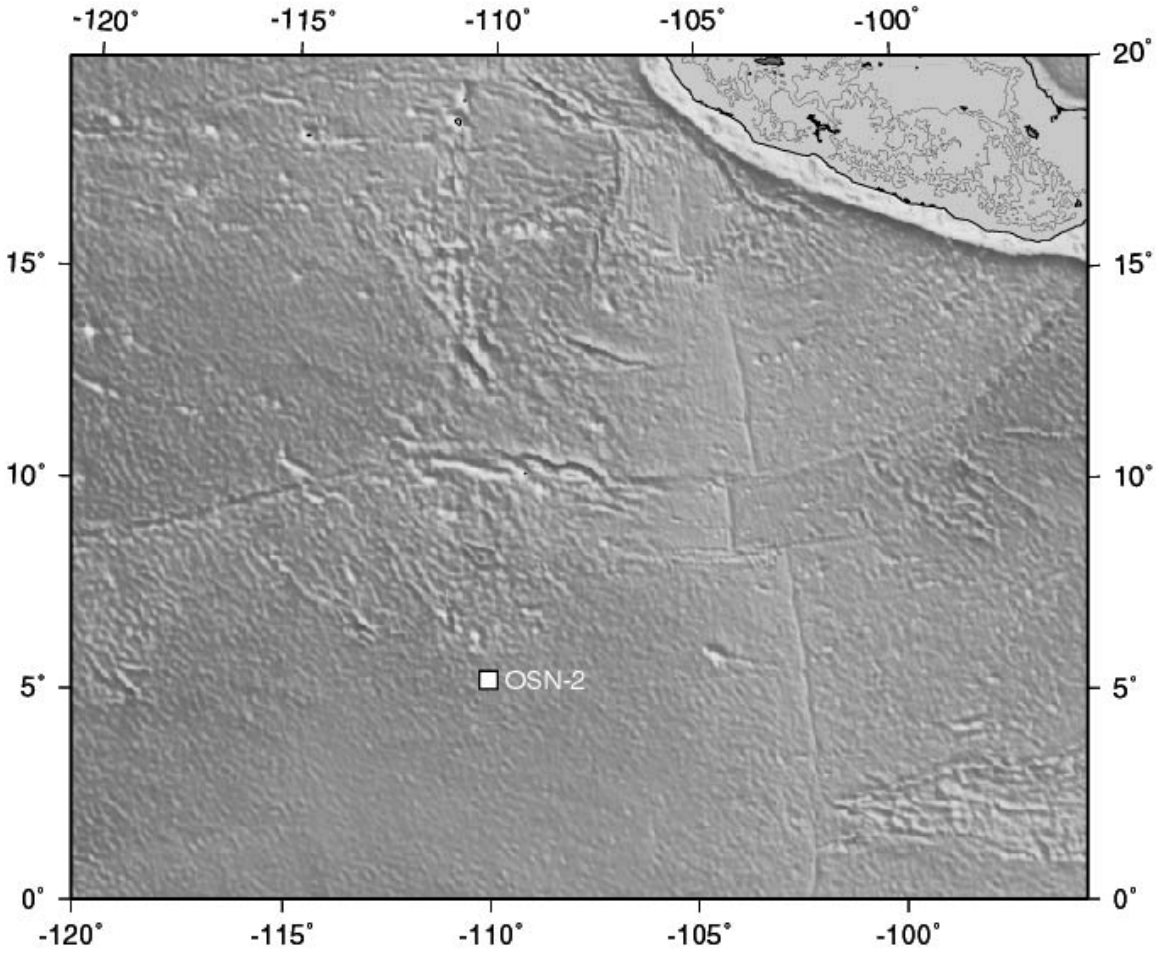


Table PP-4: Leg 205 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	280,332	20,274
3500	Travel	1,739	7,019
3533	Drilling Clearances		
3580	Travel to/from Port	1,042	2,500
3600	Training		
3750	Travel - ODL		
3760	Per Diem	46,307	2,005
4000	Supplies	1,229	3,861
4750	Fuel		
5070	Insurance	69,232	28,411
5261	Shipping	148	15,766
5370	Communications	3,662	
5373	Ship-to-Shore Communications	3,115	1,285
5550	Services	1,521	
5590	Computing Services	1,184	
5931	Equipment Rental		
5981	Other Expenses – ODL	107,249	
6820	Repairs & Maintenance		5,898
7040	Day Rates	28,335	379,420
7090	Port Calls		
8400	Equipment		1,838
	Logging Operations		41,482
	Sub Total	**$545,095**	**$509,759**
	Logging Deployment SOE		
	Grand Total	**$545,095**	**$509,759**

*Part of the ODP-TAMU Leg 205 budget was included in the ODP FY02 Program Plan.

Leg 206	Fast Spreading Crust
Proposal	522-Full2/Add
Title	An In Situ Section of Oceanic Crust Spread at Superfast Rate
Proponents	D.S. Wilson, J.D. Alt, R.S. Detrick

The primary goal of Leg 206 is to drill a complete upper crustal section, including volcanic rocks, sheeted dikes and into gabbros, in 15 Ma Guatemala Basin crust generated at a superfast (200 mm/yr) spreading ridge in the eastern Pacific. Because of the observed decrease in depth to magma chambers with increasing spreading rate, penetration of the dike-gabbro transition and into gabbros should be possible at depths as shallow as 1000-1500 m subbasement with present drilling capabilities.

Drilling Plans

Leg 206 is the first leg in a proposed two-leg program designed to penetrate a complete upper crustal section to the gabbro in 15 Ma oceanic crust at a site in Guatemala Basin generated on a superfast spreading ridge in the eastern Pacific Ocean. The first leg is dedicated to coring the upper section and initiating a single cased reentry hole in 3650 m water depth. One primary site will be cored, with a focus on determining the depth to and nature of the dike/gabbro (layer 2/3) contact or transition zone. The fast spreading rates (~200 mm/yr) at the location should result in this contact being relatively shallow (1300-1800 mbsf). In addition, the age of the lithosphere should result in lower temperatures with depth than was encountered at Site 504B, resulting in reduced thermal stresses during drilling. The rapid sedimentation at the site may have increased cementation and reduced fracturing, also producing more favorable drilling conditions. Other topics which may be investigated on Leg 206 include: fluid flow in and alteration of oceanic crust; petrology and geochemistry of typical oceanic crust; paleomagnetic signature of oceanic crust; the relationship between seismic boundaries and observed lithologic contacts; and further deep biosphere studies.

Hole A (pilot hole) will be APC/XCB cored in sediment to ~240 m plus 20 m of basement. Hole B will be drilled to 10 m above basement and RCB cored and logged to ~360 m. Hole C is dedicated to completing a single cased reentry hole. A reentry cone will be set with a 20 in conductor jetted-in, and 350 m of 16 in casing will be set and cemented. The hole will be cored and logged to 800 m, and 13-3/8 in casing will be set and cemented. If there is time remaining after this procedure, the hole will be cored and logged as deep as possible (ideally, to ~1540 mbsf). Potential operational problems may include unstable upper hole in fractured volcanic rock and opening a large hole to run long casing strings. The estimated cored interval is 250 m (with ~85% recovery) in sediments and 1320 m cored interval (with ~35% recovery) in basement. Heavy use of RCB core bits, mud, and under-reamers and mud motors is anticipated.

Leg 206 operations will be conducted from 6 November 2002 to 5 January 2003. Leg specific drilling/equipment costs (formerly listed in FY02 as “SOE Hardware”) are budgeted

at $316,789, which includes one reentry cone and casing. Rental costs are estimated at $121,260 for two under-reamers and mud motors. Total shipping cost for the leg of $118,767 and leg pool supply costs (formerly listed in FY02 as "Functional Hardware") of $26,828 are budgeted in the FY03 Program Plan. Note that bits, reentry cone, and casing inventory costs will occur in FY02. No unusual costs for shipboard science (laboratory) activities are anticipated.

Logging Plans

A complete logging program is planned to help achieve the main scientific objectives, which are to determine the lithostratigraphy and structure of the upper oceanic crust and to understand the magmatic and hydrothermal processes of crustal formation and alteration. The standard toolstrings and a check shot survey are planned. The DLL will be deployed to collect resistivity data in the highly resistive rocks expected for this leg. If funds become available, the UBI (borehole televiewer) may also be run.

As already seen in previous ODP holes in the upper oceanic crust, the standard geophysical logs provide detailed information about the physical structure of the upper crust: acoustic velocities, electrical resistivity and density measurements indicate, for example, the presence of highly porous and permeable intervals. The FMS provides high-resolution electrical images of the borehole wall allowing an accurate description of tectonic features, lithological boundaries, and the presence of fractures and faults and their spatial orientation. The magnetometer associated with the FMS provides measurements of the magnetic properties of the upper crust. The recording of temperature measurements is essential for investigation of the in situ hydrogeology at the site. The WST provides depth-travel time pairs for accurate core-seismic integration and for calibrating the sonic logs. If funds become available, the UBI should be run to provide images of the local faulting regime and stress field.

Table 5: Leg 206 Drill Site Locations

Site Name	Latitude (ºN)	Longitude (ºW)	Water Depth (m)	Total mbsf (m)
GUB03B	6°43.7'N	91°56.7'W	3650	1750
GUB01	7V55.5'N	90°32.6'W	3414	1790

Figure 14: Leg 206 Drill Site Locations

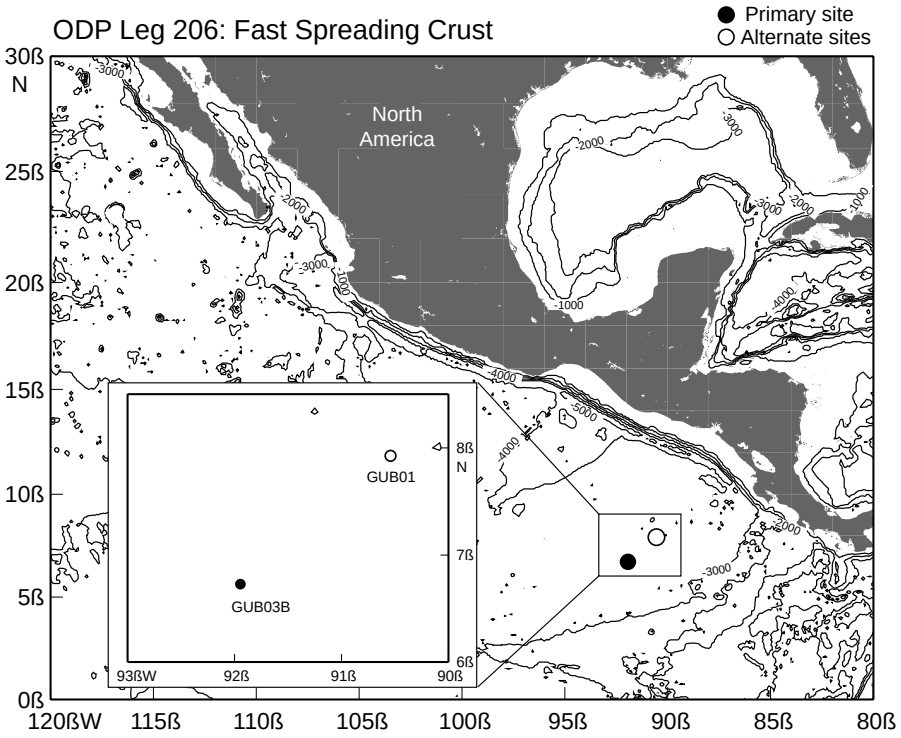


Table PP-6: Leg 206 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	485,037	37,316
3500	Travel	42,588	6,904
3533	Drilling Clearances		
3580	Travel to/from Port	27,427	5,000
3600	Training	5,000	
3750	Travel - ODL	205,532	
3760	Per Diem	71,658	1,973
4000	Supplies	100,377	3,797
4750	Fuel	343,795	
5070	Insurance	117,768	27,945
5261	Shipping	121,307	15,507
5370	Communications	7,160	
5373	Ship-to-Shore Communications	4,511	1,381
5550	Services	15,224	
5590	Computing Services	1,920	
5931	Equipment Rental	121,260	
5981	Other Expenses – ODL	173,918	
6820	Repairs & Maintenance	7,500	5,801
7040	Day Rates	3,177,235	373,200
7090	Port Calls	142,085	
8400	Equipment	1,500	1,808
	Logging Operations		47,900
	Sub Total	**$5,172,802**	**$528,533**
	Logging Deployment SOE		9,595
	Grand Total	**$5,172,802**	**$538,128**

Table PP-7: Leg 206T (Transit) Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	49,648	
3500	Travel	2,152	
3533	Drilling Clearances		
3580	Travel to/from Port	70,182	
3600	Training		
3750	Travel - ODL		
3760	Per Diem	9,472	
4000	Supplies	266	
4750	Fuel		
5070	Insurance	14,969	
5261	Shipping	1,872	
5370	Communications	408	
5373	Ship-to-Shore Communications	421	
5550	Services	329	
5590	Computing Services	256	
5931	Equipment Rental		
5981	Other Expenses – ODL	23,189	
6820	Repairs & Maintenance		
7040	Day Rates	414,715	
7090	Port Calls	81,635	
8400	Equipment		
	Logging Operations		
	Sub Total	**$669,514**	**$0**
	Logging Deployment SOE		
	Grand Total	**$669,514**	**$0**

Leg 207	**Demerara Rise**
Proposal	**577-Full/Add**
Title	**Demerara Rise: Equatorial Cretaceous and Paleogene Paleoceanographic Transect, Western Atlantic**
Proponents	**J. Erbacher, R.D. Norris, P.A. Wilson**

The best examples in the geologic record of rapid (1 ka to 1 Ma) wholesale extinctions linked to massive perturbations of the global carbon cycle and extreme changes in Earth's climate come from the Cretaceous and Paleogene (eg. oceanic anoxic events, or 'OAEs' and the late Paleocene Thermal Maximum, or 'LPTM'). However, little is known about the underlying causes and effects of these critical events in Earth history. To a significant extent, these gaps in our understanding arise because of a lack of modern high-resolution paleoceanographic records from ocean drill sites, particularly from the tropics which are so important to driving global ocean-atmospheric circulation. The Ocean Drilling Program provides a unique capability to access expanded sections of the in situ Cretaceous and Paleogene deep sea sediments that are required. These targets are priorities of the ODP Extreme Climates PPG and Long Range Plan.

ODP Leg 207 will drill a mid-Cretaceous and Paleogene palaeoceanographic transect on the Demerara Rise (Surinam margin, western Atlantic). The Demerara Rise represents an ideal drilling target for this purpose because the target sediments: (i) crop out on the sea floor, (ii) exist with good stratigraphic control in expanded unlithified sections, (iii) contain spectacularly well-preserved microfossils and (iv) were deposited within the core of the tropics in a proximal location to the equatorial Atlantic gateway.

Of the ten potential drill sites proposed, all are on the northern margin of Demerara Rise and four are primary objectives. The sites are located on a depth transect (present water depths ~1735-3320 m) along existing multi-channel seismic lines with stratigraphic control from DSDP Site-144 and industry well Demerara-A2-1. DSDP-144 was spot-cored towards the escarpment in a highly condensed section. Yet even here, Demerara Rise preserves a highly expanded (~150 m thick) sequence of dark clays and shales correlative to at least three Cretaceous OAEs plus a further 150 m-thick sequence of Upper Palaeocene to Lower Oligocene carbonate ooze. These sections thicken inboard and records of at least five OAEs (OAE-1b, -1c, -1d, -2 and -3) can probably be penetrated by transect drilling on the Demerara Rise with good potential for the LPTM and Eocene/Oligocene boundary. The proposed transect of Cretaceous and Palaeogene cores will be used to evaluate, at high resolution:

- The history of multiple Cretaeous OAEs in an equatorial setting and thereby test competing hypotheses for their causes and climatological effects (particularly in relation to rapid emission and draw-down of greenhouse gases).

- The detailed response of oceanic biotic communities across a range of paleowater depths to extreme perturbations in the geochemical carbon cycle and global climate.

- Short and long-term changes in greenhouse forcing and tropical sea surface temperature response.

- Key Palaeogene events of biotic turnover and/or inferred climate extremes, particularly the LPTM and the Eocene/Oligocene boundary.

- The role of equatorial Atlantic gateway opening in controlling paleoceanographic circulation patterns, OAEs and cross-equatorial ocean heat transport into the North Atlantic.

Drilling Plans

Leg 207 will drill a paleoceanographic transect on the Demerara Rise (Surinam margin, W Atlantic). Ten sites located on the northern margin of Demerara Rise are proposed, of which four are primary sites. Previous drilling on the Demerara Rise, including DSDP Leg 14, demonstrated that this area contains shallowly buried expanded sections of mid-Cretaceous and Paleogene sediments with well-preserved carbonate microfossils. This leg will drill a transect of sites on the north of the Demerara Rise that will sample Miocene to Aptian pelagic oozes, carbonaceous clays and shale, and chalk. The primary target is the sequence of Albian-Santonian black shales and clays, which outcrops at Site DR-8 and is present at burial depths of between 300 m and 650 m at sites DR-1 to DR-7. Water depths at the proposed sites range from 1735 m to 3320 m. The present operational plan calls for one site to be triple APC cored to refusal (~280 m) and not logged. The other three sites will be triple APC cored to refusal (~300 m), with one of the three holes deepened by XCB coring to refusal (~500 to 560 m). At two sites a fourth hole will be drilled to XCB refusal and RCB cored to 760 and 1020 m. The three deeper sites will be logged. The estimated cored interval is 4980 m with 3654 m recovery in sediments. No drilling problems or special tools have been identified.

Leg 207 operations will be conducted from 13 January to 8 March 2003. Expected high core recovery may result in above average consumption of supplies. Heavy use is possible for APC heat flow, DVTP, WST, and biological sampling tools. Leg specific drilling/equipment costs are budgeted at $80,633 with no rental costs. Total shipping costs of $45,800 and leg pool supply costs of $41,090 are budgeted in the FY03 Program Plan. No unusual costs for shipboard science (laboratory) activities are anticipated, though high usage of consumables can be expected because of the anticipated moderately high core recovery.

Logging Plans

This cruise plans to drill a four-site depth transect on the Demerara Rise to investigate Cretaceous and Paleogene global carbon cycle perturbations and extinction events (e.g. Cretaceous ocean anoxia and the late Paleogene Thermal Maximum).

Standard geophysical and FMS image logs will be able to accurately classify the different sedimentary deposits on the Demerara Rise. For example, the Albian-Santonian black shales and clays may be associated with high uranium concentrations, which will be indicated on the spectral gamma-ray logs. The Multisensor Gamma Tool (MGT) will be particularly useful for this purpose. In places these black shales are laminated, with occasional stringers

of limestone; these features may be visible on the FMS images. The density, porosity and sonic travel-time values within the black shales and claystones may also be markedly different from those within the limestones, chalks and oozes above. The Geological High-resolution Magnetic Tool (GHMT) is not recommended, although it was proposed, as the Demerara Rise is too close to the latitude at which magnetic polarity cannot be determined.

Table 8: Leg 207 Drill Site Locations

Site Name	Latitude (^{0}N)	Longitude (^{0}W)	Water Depth (m)	Total Mbsf (m)
DR-1b	8°57.7'N	54°7.0'W	1610	1060
DR-2	9°5.0'N	54°01.0'W	1895	1020
DR-3	9°08.0'N	53°58.0'W	2080	750
DR-3a	9°26.0'N	54°44.0'W	3215	760
DR-4b	9°20.5'N	54°06.2'W	2800	350
DR-4	9°24.0'N	54°07.0'W	3155	350
DR-5b	9°18.0'N	54°12.0'W	2340	560
DR-6	9°09.0'N	53°59.5'W	2118	800
DR-6a	9°07.3'N	54°35.5'W	2460	560
DR-6b	9°13.6'N	54°35.5'W	2410	540
DR-7b	9°03.0'N	54°19.0'W	1980	740
DR-8b	9°27.23'N	54°20.52'W	2950	280

Figure 15: Leg 207 Drill Site Locations

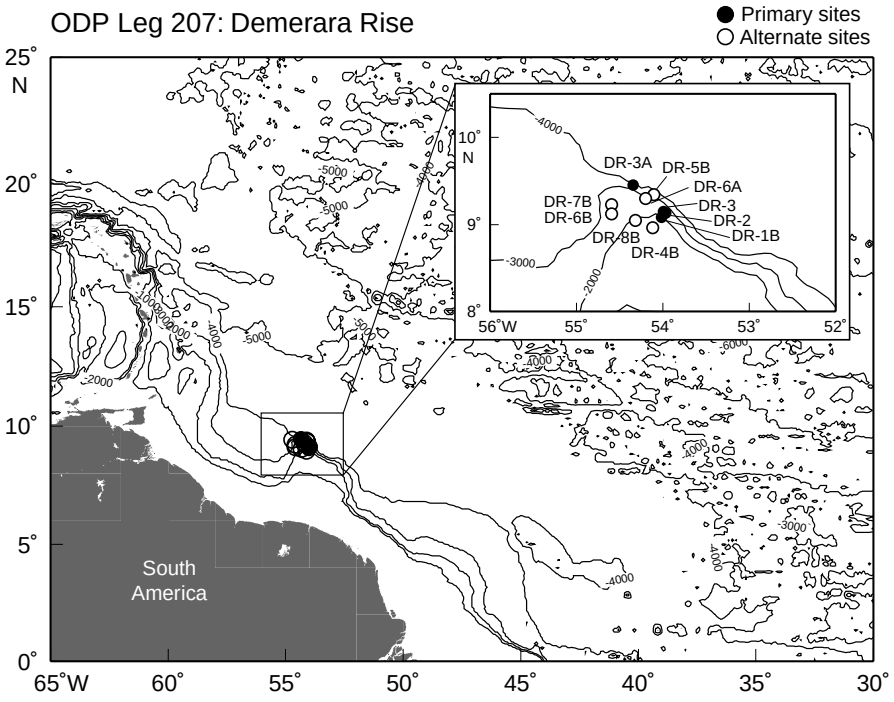


Table PP-9: Leg 207 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	433,653	33,376
3500	Travel	5,556	6,214
3533	Drilling Clearances		
3580	Travel to/from Port	28,241	5,000
3600	Training	5,000	
3750	Travel - ODL	190,871	
3760	Per Diem	64,554	1,775
4000	Supplies	145,822	3,418
4750	Fuel	343,795	
5070	Insurance	102,042	25,151
5261	Shipping	49,450	13,957
5370	Communications	4,316	
5373	Ship-to-Shore Communications	4,195	1,266
5550	Services	29,557	
5590	Computing Services	1,728	
5931	Equipment Rental		
5981	Other Expenses – ODL	156,526	
6820	Repairs & Maintenance	7,500	5,221
7040	Day Rates	2,886,757	335,880
7090	Port Calls	97,500	
8400	Equipment	1,500	1,627
	Logging Operations		40,504
	Sub Total	**$4,558,562**	**$473,389**
	Logging Deployment SOE		8,000
	Grand Total	**$4,558,562**	**$481,389**

Leg 208	**Walvis Ridge Transect**
Proposal	**559-Full/Add**
Title	**Early Cenozoic Extreme Climates: The Walvis Ridge Transect**
Proponents	**J. Zachos, R. Zahn, V. Spiess, N. Shackleton, D. Kroon, T. Herbert, G. Dickens**

The Walvis Ridge is an ideal location for obtaining sediments suitable for reconstructing early Cenozoic variations in the thermal and chemical characteristics of S. Atlantic deep and surface waters. During DSDP Leg 74, Paleogene and Neogene pelagic oozes and chalks with well preserved microfossils and excellent magnetics were recovered from several locations on Walvis Ridge. Subsequent investigations of the recovered sediments proved to be instrumental in defining the long term history of late Cretaceous and early Cenozoic oceans. However, because of poor recovery and drilling disturbances, many of the cores were rendered unsuitable for high resolution work.

In Leg 208 a multiple hole 5-6 site depth transect will be drilled, targeting the upper Cretaceous and early Cenozoic pelagic chalks and oozes on Walvis Ridge. The goal is to recover fully intact sequences of sediments deposited at water depths between 2500 and 4500 m. Advances in APC/XCB technology coupled with triple/double coring and higher resolution seismic reflection data should significantly enhance recovery rates of target intervals. The proposed sites will be used to reconstruct in detail the paleoceanographic variations associated with several prominent episodes of early Cenozoic extreme climate change including the Latest Paleocene Thermal Maximum (LPTM), the Early Eocene Climate Optimum (EECO), and the Early Oligocene Glacial Maximum (EOGM). A fundamental objective is to characterize variations in water mass chemistry and circulation at different depths on orbital time scales in transition across these extreme climate states. Testing of several hypotheses is intended during Leg 208, including one that calls for a rapid dissociation of methane hydrates as the primary cause of the carbon isotope excursion across the LPTM. This drilling transect will complement Leg 198, recently drilled in the western north Pacific (Shatsky Rise).

Drilling Plans

The primary objective of Leg 208 is to APC/XCB core five or six sites in a depth transect targeting the upper Cretaceous and early Cenozoic pelagic chalks and oozes on Walvis Ridge. The five primary sites have a maximum penetration of 280 to 400 m in sediments with a water depth of 2272 to 4762 m. Chert is a possible drilling problem, but no special tools have been identified. All sites will be logged with triple combination, FMS-Sonic, BHTV, and magnetic susceptibility tools. The estimated cored interval is 5240 m with 3402 m recovery in sediments.

Leg 208 operations will be conducted from 8 March 2003 to 9 May 2003. Leg specific drilling/equipment costs are budgeted at $54,649. Shipping cost to the leg of $74,500 and leg pool supply costs of $16,623 are budgeted in the FY03 Program Plan. No unusual costs

for shipboard science (laboratory) activities are anticipated, though high usage of consumables can be expected because of the anticipated moderately high core recovery.

Logging Plans

The current logging plan calls for standard tools plus GHMT (if tool is available) at six sites in order to characterize the sediments and sediment cyclicity through the drilled section. These sites penetrate between 300 and 400 mbsf. Density, porosity, velocity, natural gamma, and magnetic susceptibility should all show climate-related variability and cyclicity through the sediment section. The MGT will be deployed to record high-resolution gamma data and enhance core-log integration. Spliced core data and logs will improve the completeness of the section and orbital tuned chronologies, both important component of the science plan.

Table 10: Leg 208 Drill Site Locations

Site Name	Latitude (°S)	Longitude (°E)	Water depth (m)	Total mbsf (m)
WAL-7	19°38.75'S	9°02.8'E	2248	320
WAL-8a	28°31.96'S	2°50.73'E	2526	540
WAL-8b	28°37.88'S	2°50.73'E	2557	400
WAL-8c	28°47.73'S	02°54.82'E	2522	300
WAL-9	28°51.05'S	2°37.31'E	2983	400
WAL-10a	28°31.49'S	2°19.44'E	3800	340
WAL-10b	28°32.61'S	2°22.49'E	3708	400
WAL-10c	28°28.53'S	2°19.39'E	3827	400
WAL-10d	28°24.36'S	2°16.69'E	3951	400
WAL-11a	28°02.49'S	1°45.80'E	4428	215

Figure 16: Leg 208 Drill Site Locations

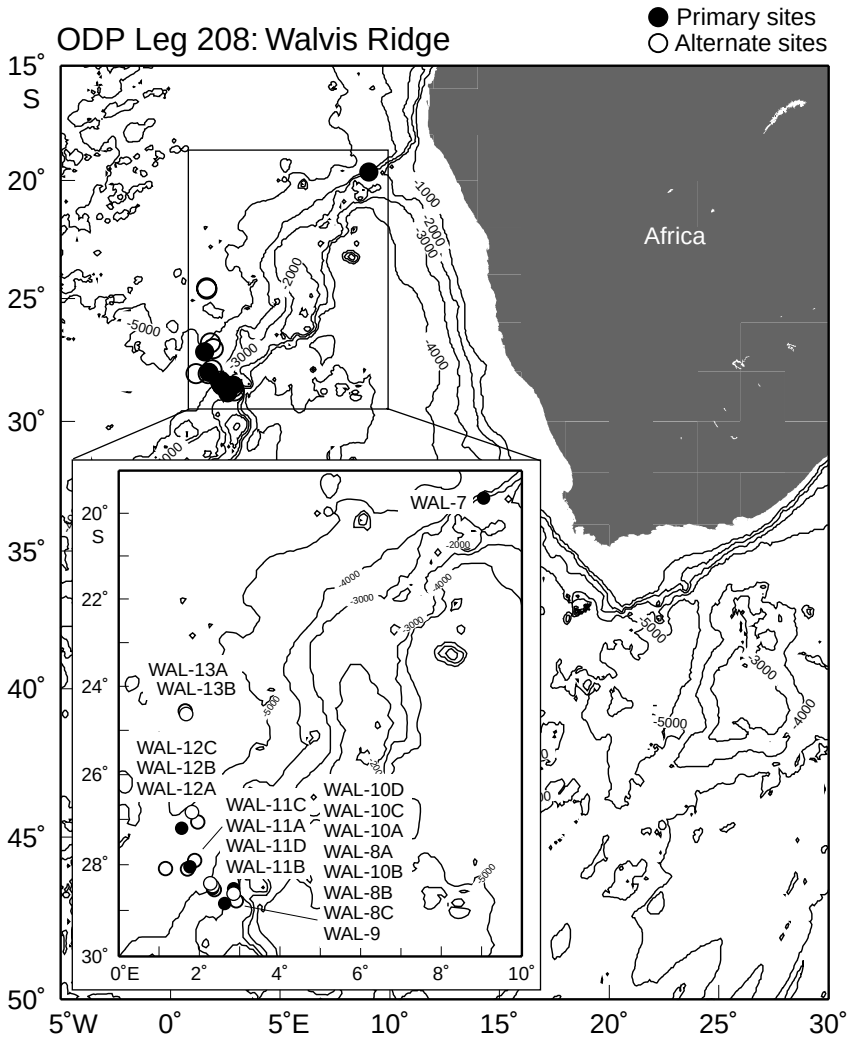


Table PP-11: Leg 208 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	474,641	34,556
3500	Travel	8,448	7,134
3533	Drilling Clearances		
3580	Travel to/from Port	95,084	5,000
3600	Training	3,000	
3750	Travel - ODL	228,905	
3760	Per Diem	74,026	2,038
4000	Supplies	130,509	3,924
4750	Fuel	343,795	
5070	Insurance	117,011	28,877
5261	Shipping	77,048	16,024
5370	Communications	7,262	
5373	Ship-to-Shore Communications	4,615	1,419
5550	Services	29,885	
5590	Computing Services	1,984	
5931	Equipment Rental		
5981	Other Expenses – ODL	179,715	
6820	Repairs & Maintenance	7,500	5,994
7040	Day Rates	3,297,373	385,640
7090	Port Calls	164,596	
8400	Equipment	1,500	1,868
	Logging Operations		44,133
	Sub Total	**$5,246,897**	**$536,609**
	Logging Deployment SOE		54,892
	Grand Total	**$5,246,897**	**$591,500**

Leg 209	**MAR Peridotite**
Proposal	**525-Full**
Title	**Proposal for Drilling Mantle Peridotite along the Mid-Atlantic Ridge from 14° to 16° N**
Proponents	**P. Keleman, J. Casey and M. Cannat**

Leg 209 will drill mantle peridotites along the Mid-Atlantic Ridge (MAR) from 14° to 16°N. This area was identified at the 1996 Workshop on Oceanic Lithosphere and Scientific Drilling into the 21st Century (OL Workshop) as the ideal region for drilling of a strike line of short holes to sample the upper mantle in a magma-starved portion of a slow spreading ridge. In this area, igneous crust is locally absent and the structure and composition of the mantle can be determined at sites over about 100 km along strike.

A central paradigm of RIDGE studies is the hypothesis that mantle flow, or melt extraction, or both, are focused in three dimensions toward the centers of magmatic ridge segments, at least at slow spreading ridges such as the MAR. This hypothesis has essentially reached the status of accepted theory, but it has never been subject to a direct test. A strike line of oriented mantle peridotite samples extending for a significant distance within such magmatic segments offers the possibility of directly testing this hypothesis. Continued dredging and submersible studies cannot provide the spatial information which is required to make such a test.

The primary aim of Leg 209 drilling is to characterize the spatial variation of mantle deformation patterns, residual peridotite composition, melt migration features, and hydrothermal alteration along axis. Hypotheses for focused solid or liquid upwelling beneath ridge segments make specific predictions regarding the spatial variation of mantle lineation or the distribution of melt migration features. These predictions will be directly tested by drilling. A secondary aim is to provide a natural laboratory to test geophysical imaging techniques in a region underlain mainly by partially serpentinized peridotites. If possible, it is important to develop a technique, or combination of techniques, which can distinguish partially serpentinized peridotite and plutonic gabbro in crust formed at oceanic spreading ridges.

Exposures of serpentinized peridotites form a significant part of the axial valley walls and rift mountains in the area. The OL Workshop report proposed an array of single-bit holes in these exposures. These were to be at approximately equivalent distances from the active rift, and at a variety of distances from the 15°20 Fracture Zone and an anomaly in basalt composition at about 14°N. In Leg 209 this strategy will be adopted, but modified to incorporate the following constraints: (a) all drill sites have been visited by submersible, and are underlain by lightly sedimented bedrock, (b) all drill sites are known to be underlain by peridotite or, in a few cases, gabbro, and (c) all drill sites have a slope angle of less than 5 degrees over several hundred thousand square meters.

Drilling Plans

Potential operational issues include the difficulty of penetrating loose rubble on the fracture surface and hole cleaning problems in unstable basement. To reduce the risk of encountering these problems, all proposed sites have been inspected by submersible and are known to be underlain by lightly sedimented bedrock and to have a slope angle of less than 5°.

The Hard Rock Reentry System system will be utilized to establish a cased reentry hole on unstable sloping surfaces. The HRRS will be used to set 22 m of 13-3/8 in casing at up to seven sites in 2850 to 3970 m water depth. RCB cores will be taken to 150 m penetration into basement and the holes will be logged. The estimated cored interval is 896 m with ~35% recovery in basement.

Leg 209 operations will be conducted from 9 May to 10 July 2003. Leg specific drilling/equipment costs are budgeted at $608,850, which includes RCB bits, hammer drill casing assemblies with 13-3/8 in hangers, and casing. Rental costs are $111,400 for hammer rentals and a hammer drill engineer. Total shipping cost to the leg of $74,008 are budgeted in the FY03 Program Plan. Note that bits, reentry cone, and casing inventory costs will occur in FY02. No unusual costs for shipboard science (laboratory) activities are anticipated. In fact expenditures for scientific consumables will be well below normal as we draw down shipboard inventory in anticipation of the conclusion of ODP operations.

Logging Plans

The primary aim of the leg is to characterize the spatial variation of mantle deformation patterns, residual peridotite composition, melt migration features and hydrothermal alteration. Central to these themes will be the use of borehole logging and downhole experiments to restore the orientation and stratigraphic position of recovered core, and relate in-situ physical properties in the drill holes to larger scale geophysical properties.

Standard logs, WST, LWD, and 3rd party magnetometer tools are critical for the location and orientation of core in zones of poor recovery and for building a complete physical model of the boreholes. LWD tools provide high-quality measurements from the seafloor to TD immediately after the hole is drilled. The Resistivity-at-Bit (RAB) tool will acquire azimuthal resistivity images of the borehole (similar to FMS images but of lower vertical resolution.) and total gamma-ray measurements.

Table 12: Leg 209 Drill Site Locations

Site Name	Latitude (^{o}N)	Longitude (^{o}W)	Water Depth (m)	Total mbsf (m)
MARN-1A	15°38.9'N	46°40.6'W	3970	102
MARN-2A	15°32.9'N	46°41.2'W	3900	102
MARN-3A	15°30.0'N	46°40.9'W	3440	102
MARS-1A	15°06.5'N	44°57.5'W	2900	102
MARS-2A	15°02.3'N	44°04.3'W	3600	102
MARS-3A	14°55.9'N	44°04.3'W	2850	102
MARS-4A	14°50.9'N	45°04.9'W	3000	102
MARN-1B	15°44.1'N	46°54.1'W	1680	102
MARN-2B	15°36.8'N	46°34.6'W	3600	102
MARS-1B	15°07.0'N	46°16/0'W	1650	102
MARS-2B	15°43.4'N	44°53.6'W	2075	102

Figure 17: Leg 209 Drill Site Locations

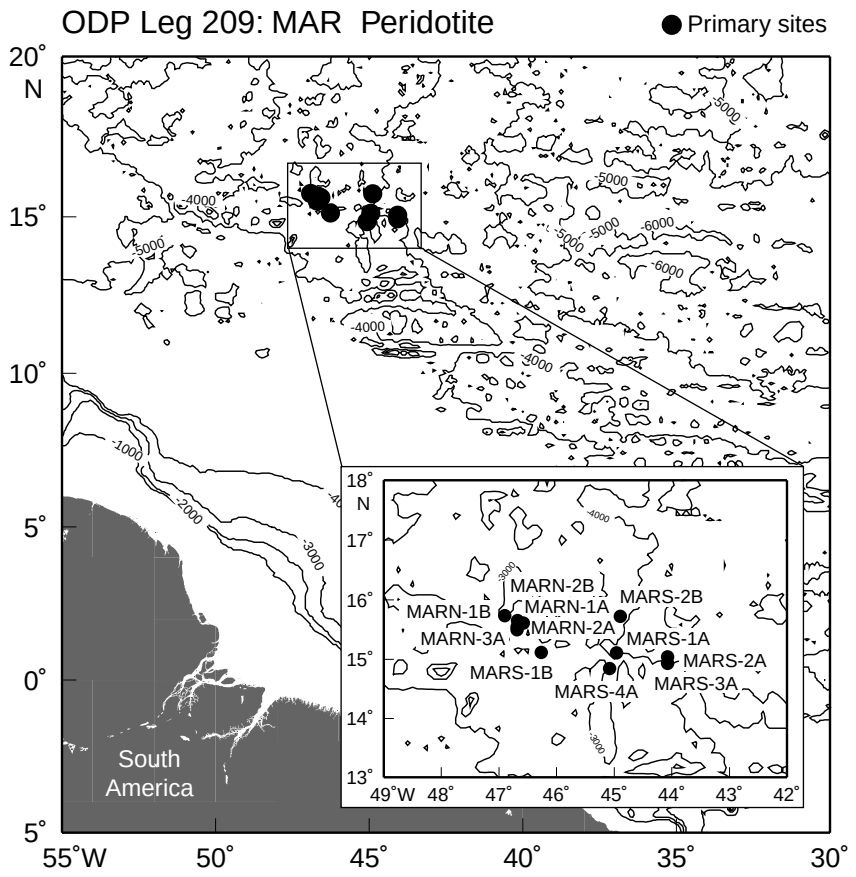


Table 13: Leg 209 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	507,315	35,325
3500	Travel	6,148	7,134
3533	Drilling Clearances		
3580	Travel to/from Port	105,941	5,000
3600	Training	1,000	
3750	Travel - ODL	233,290	
3760	Per Diem	74,026	2,038
4000	Supplies	95,220	3,924
4750	Fuel	343,795	
5070	Insurance	134,011	28,877
5261	Shipping	76,556	16,024
5370	Communications	7,262	
5373	Ship-to-Shore Communications	4,616	1,419
5550	Services	15,306	
5590	Computing Services	1,984	
5931	Equipment Rental	111,400	
5981	Other Expenses – ODL	179,715	
6820	Repairs & Maintenance	7,500	5,994
7040	Day Rates	3,344,100	385,640
7090	Port Calls	164,596	
8400	Equipment	1,500	1,868
	Logging Operations		38,660
	Sub Total	**$5,415,281**	**$531,904**
	Logging Deployment SOE		299,000
	Grand Total	**$5,415,281**	**$830,904**

Leg 210	Newfoundland Margin
Proposal	594-Full
Title	Drilling the Newfoundland Half of the Newfoundland-Iberia Transect: The First Conjugate Margin Drilling in a Non-Volcanic Rift
Proponents	B.E. Tucholke, N.W. Driscoll, W.S. Holbrook, J.R. Hopper, H.C. Larsen, K. Louden, T.A. Minshull, D.S. Sawyer, J.-C. Sibuet, S.P. Srivastava and R.B. Whitmarsh

The underlying premise of many empirical, analytical, and numerical models of continental rifting is that mantle melt supply and/or temperatures prior to and during extension govern structural architecture and magmatic construction in the rift. However, previous drilling on the Iberia margin has documented extreme extension with little or no decompression melting of the asthenospheric mantle, defying model predictions. The puzzles raised by Iberia drilling are compounded by observations from geophysical studies on the conjugate Newfoundland margin, which document significant cross-rift asymmetries in basement depth, amount of tectonic extension, and other deep structure. These results raise fundamental, overarching questions about rifting of non-volcanic margins, including the cause and extent of mantle unroofing, the presence or absence of decompression melting, the origin of the deep and crustal asymmetry between conjugates, the age-subsidence and strain-partitioning history, and the relation of rift events to development of shallow-water unconformities and the stratigraphic record. Three competing hypotheses have been proposed for development of the rift in which these questions are subsumed and which make specific predictions that will be tested by ocean drilling on the Newfoundland margin. The drilling proposed is in a position exactly conjugate to the Iberia Abyssal Plain drilling transect and is based on a detailed grid of MCS and OBS/H surveys completed during 2000. The single most productive and direct test of the hypotheses will be accomplished by a deep hole (up to ~2300 m) in the central Newfoundland Basin. Analysis and review of drilling results from that hole will define the optimum program for any further drilling along the Newfoundland-Iberia transect.

Drilling Plans

Leg 210 will study the composition and subsidence history of the stratigraphic sequence above basement and igneous/tectonic basement contact on the Newfoundland margin. The proposed drilling is in a position exactly conjugate to the Iberia abyssal plain drilling transect. The single reentry site is located in 4559 m water depth. A pilot hole will be APC/XCB cored to refusal at ~500 m, and a single bit RCB hole will be cored to 1500 m in sediment and logged. A reentry cone will be set with a 20 in conductor casing jetted-in and 16 in casing set and cemented at 800 m. A 10-3/4 in casing will be set and cemented at 1500 m. The hole will be RCB cored as deep as possible in the time remaining with a target of 2200 m in sediment with 100 m of basement penetration. The hole will be logged. The estimated cored interval in sediments is 2200 m (with ~60% recovery) and 100 m cored interval in basement (with ~35% recovery).

Operations on Leg 210 will be conducted from 10 July to 9 September 2003. Leg specific drilling/equipment costs are budgeted at $410,918, which includes the RCB core bits, one reentry cone, hangers, and 20-in/16 in/13-3/8 in casing. Rental costs are $111,800 for jars, under-reamers, and mud motors. Total shipping cost for the leg of $150,416 reflect the additional cost to ship casing, hangers, reentry cone, and under reamers to the leg. The leg pool supply costs are $48,297. All costs are budgeted in the FY03 Program Plan. Note that bits, reentry cone, and casing inventory costs will occur in FY02. No unusual costs for shipboard science (laboratory) activities are anticipated. In fact, expenditures for scientific consumables will be minimized since this is the last operational ODP leg and we will be drawing down shipboard inventory as much as possible.

Logging Plans

Achieving the goals detailed above requires detailed characterization of the composition, structure, and depositional history of the basement and overlying sedimentary sequences. The standard ODP toolstrings, along with check-shot WST will be deployed. Logging will be conducted in three stages correlating with each phase of hole deepening as the hole is drilled: Hole A - APC/XCB to ~ 500 m and log. Hole B - Drill/wash to 500 m, then RCB to 1300-1500 m and log, if stable continue to TD. If unstable, Hole C would be drilled with re-entry cone and casing set to 1300-1500 m, allowing a further 1000 m of coring and logging.

The standard APS and HLDS logs will generate porosity and bulk density data, required in conjunction with velocity data for correlating the lithostratigraphy to the seismic section. The DITE resistivity data will be valuable for identifying weathering and alteration horizons and the contact between crust or mantle and synrift basalt flows. The gamma ray measurement is a useful indicator of lithology, mineralogy, facies and depositional environment and provides valuable tie points for core-log integration. Spectral gamma-ray data will also be useful for cyclostratigraphy in the shallow Cenozoic sedimentary section where episodes of extreme climatic change are predicted. The high-resolution microresistivity images provided by the FMS will allow the mapping of fractures, faults, and foliations in basement necessary to constrain the tectonic evolution and emplacement history of basalt flows. The WST provides depth-travel time

Table PP-14: Leg 210 Drill Site Locations

Site Name	Latitude (^{o}N)	Longitude (^{o}W)	Water depth (m)	Total mbsf (m)
NNB01A	45°24.3'N	44°47.1'W	4559	2300
NNB01B	45°23.5'N	44°45.5'W	4563	2380
NNB01C	45°28.0'N	44°54.3'W	4412	2400
NNB02A	45°44.0'N	44°25.4'W	3580	1900
NNB03A	45°19.6'N	44°37.9'W	4553	1700
NNB04A	45°11.8'N	44°22.6'W	4624	185
NNB05A	45°06.2'N	44°11.8'W	4695	510
NNB06A	45°01.6'N	44°03.0'W	4735	755

Figure 18: Leg 210 Drill Site Locations

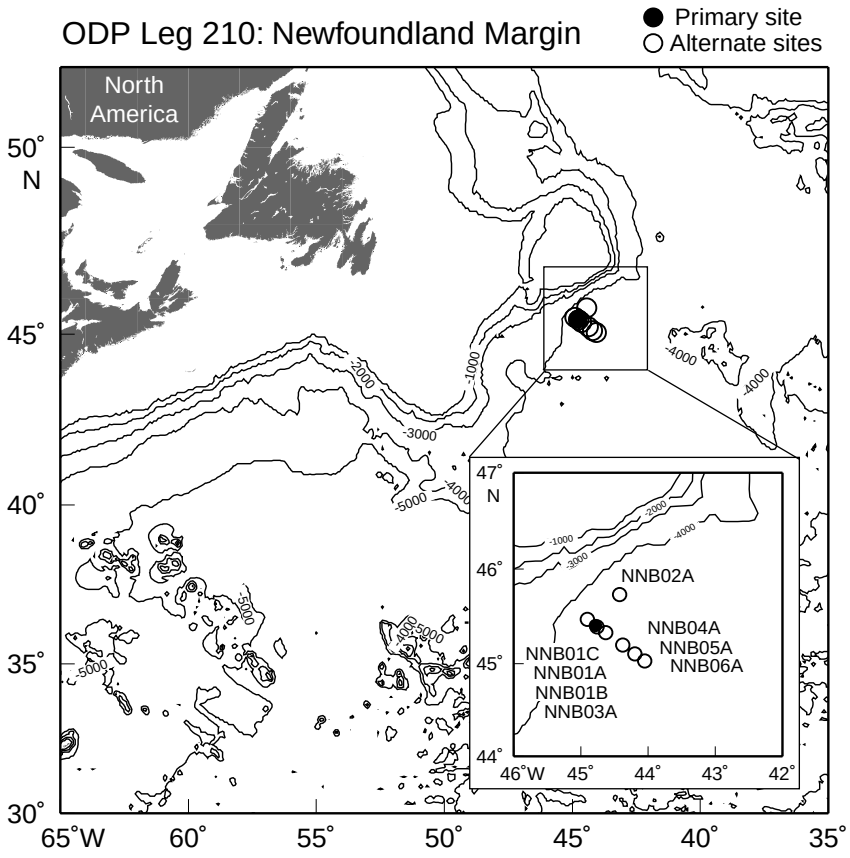


Table PP-15: Leg 210 Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	468,303	43,177
3500	Travel	6,072	7,019
3533	Drilling Clearances		
3580	Travel to/from Port	67,489	5,000
3600	Training	1,000	
3750	Travel - ODL	215,778	
3760	Per Diem	72,842	2,005
4000	Supplies	434,078	3,861
4750	Fuel	343,795	
5070	Insurance	159,640	28,411
5261	Shipping	154,241	15,766
5370	Communications	7,211	
5373	Ship-to-Shore Communications	4,563	1,400
5550	Services	15,265	
5590	Computing Services	3,782	
5931	Equipment Rental	66,800	
5981	Other Expenses – ODL	176,816	
6820	Repairs & Maintenance	1,500	5,898
7040	Day Rates	3,302,403	379,420
7090	Port Calls	118,038	
8400	Equipment	1,500	1,838
	Logging Operations		85,792
	Sub Total	**$5,621,116**	**$579,589**
	Logging Deployment SOE		
	Grand Total	**$5,621,116**	**$579,589**

Table PP-16: Leg 210-T Budget

Expense Category	Description	TAMU	LDEO
2000	Payroll/Salary	94,107	
3500	Travel	2,448	
3533	Drilling Clearances		
3580	Travel to/from Port	44,965	
3600	Training		
3750	Travel - ODL	169,640	
3760	Per Diem	14,826	
4000	Supplies	25,499	
4750	Fuel	112,500	
5070	Insurance	22,454	
5261	Shipping	48	
5370	Communications	862	
5373	Ship-to-Shore Communications	1,234	
5550	Services	493	
5590	Computing Services	384	
5931	Equipment Rental		
5981	Other Expenses – ODL	34,784	
6820	Repairs & Maintenance		
7040	Day Rates	638,238	
7090	Port Calls	62,265	
8400	Equipment		
	Logging Operations		
	Sub Total	**$1,224,747**	**$0**
	Logging Deployment SOE		
	Grand Total	**$1,224,747**	**$0**

Glossary of Expense Categories

TAMU

***Payroll*—**This category contains salary, fringe and sea pay directly associated with specific legs, along with pro rata amounts of the same items for employee efforts in support of leg activities.

***Travel*—**Travel in support of leg activities (e.g., postcruise travel), exclusive of port call travel, are contained in this expense category.

***Travel to/from Port Call*—**Funds in this category support travel to and from the ship at port calls for all seagoing personnel and other Program employees attending port call. All funds are leg-specific.

***Training*—**This category contains funds that support training of the shipboard staff and other Program employees who receive specific training (e.g., Labview, Novell, etc.) that supports shipboard activities. The costs are both leg-specific and pro rata.

***Travel*—**ODL funds are budgeted for rotation of the ODL, SOS and Catermar staff for each leg. The amounts depicted for each leg are leg-specific.

***Per Diem*—**This category reflects catering charges for 45 personnel per month based on the most recent averages of shipboard participants. This category does not include ODL, SOS or Catermar personnel, as they are accounted for in the day rate.

***Supplie*s—**In this category are leg-specific supplies (e.g., drilling supplies, laboratory supplies, core liners, etc.), safety equipment for the ship and personnel and departmental pro rata expenses associated with the annual cost of supporting the science plan at sea.

***Fuel*—**Fuel is budgeted for seven refuelings (8050 metric tons) at an average cost of $250 per metric ton. Each leg is budgeted at 1,150 metric tons.

***Insurance (Ship Ops-ODL/ODP)*—**Funds in these categories are to reimburse ODL for Hull & Machinery and Removal of Wreck coverage and the ODP/TAMRF Marine Package insurance (refer to Appendix III).

***Shipping*—**The majority of costs contained in this category are leg-specific costs and involve shipment of equipment and supplies to and from the ship. There is a small amount of funds associated with shipment/mailing of items in support of leg activities throughout the year.

***Communications*—**This expense is associated with shore-based cost incurred in support of leg activities. Some costs are leg-specific, while others are incurred in support of multiple legs.

***Ship-to-Shore Communications*—**Satellite and regular communications charges between the *JOIDES Resolution* and shore-based personnel are included in this category.

***Services*—**In this category are costs associated with temporary employees hired through companies/corporations, drill pipe maintenance, wireline severing charges, shipboard maintenance service calls, transfer fees, weather reports, and physical examinations for seagoing personnel.

***TAMU Computing Services*—**The pro rata cost associated with computing services reimbursed to TAMU in support of ship operations is included in this expense category.

***Equipment Rental*—**Rental of third party drilling equipment (e.g., underreamers, drilling jars, etc.) makes up this category.

***Other Expenses-ODL*—**In these expense categories (1806-01/1806-02) the annual payment of $1,000,000 to ODL (1806-01), the cost of medical evacuation (1806-02) and operation of the waste management system (1806-02) are covered by these funds.

***Repairs & Maintenance*—**Funds contained in this category are for repairing drilling, coring, operations, and laboratory equipment for the ship.

***Day Rates*—**Covers the cost of staffing the ship to include the sailing crew, drilling personnel, and catering personnel. It does not cover the cost of ODP/TAMU's crew or the scientists on board the ship. The day rate varies according to the mode of the ship which is generally operating, standby, or cruising. While it is a fixed rate per day, the day rate is adjusted for changes in the Consumer Price Index-Urban (CPI-U) and Employment Cost Index (ECI). When the cumulative change in the CPI-U and ECI (since the last increase) equals or exceeds 2%, the day rates will be adjusted by the percentage change. The adjustment takes effect at the beginning of the month following the increase and cannot occur more frequently than every six months.

***Port Calls*—**Locations have a definite effect on the cost of port calls which covers agents' expenses and freight associated with resupplying the ship. During each port call, cores and equipment are off-loaded from the previous cruise and supplies are loaded for the upcoming leg. ODL is reimbursed for port agent charges and the shipment of food and related supplies. Shipment of cores, drilling equipment, and laboratory supplies is arranged and paid by ODP/TAMU and paid for by ODP/ TAMRF. Similarly, ODP/TAMRF purchases all drilling equipment and laboratory supplies necessary for meeting the objectives of the leg. These costs are covered in other areas, not Ship Operations.

Equipment—Includes costs associated directly with equipment (computer, scientific, and drilling) intended solely for use on the ship over a period of time greater than one leg, equipment purchased for a specific leg and pro rata cost of shore-based equipment used partially to support leg activities.

LDEO

***Salary*—**Leg-based salaries include fringe and sea pay for logging scientists during the cruise. Salaries for pre- and post-cruise work are not included. Salaries for shorebased processing and other technical support are also not included.

***Travel to/from Port Call*—**Travel of sea-going personnel to and from the drillship. It does not cover portcall travel for technical or management personnel or the pre- and post-cruise travel associated with the cruise (e.g., pre-cruise meetings).

***Travel*—**Schlumberger funds are budgeted for rotation of the logging engineers for each cruise and for port call maintenance travel by Schlumberger technicians. Travel funds are also reflect prorated travel costs for the mechanic that is shared by ODL, TAMU, and the logging program.

***Per Diem*—**This category reflects prorated catering charges for the mechanic that is shared by ODL, TAMU, and the logging program.

***Supplies*—**The cost of replenishing supplies for the Downhole Measurements Lab and for upgrades/additions to the software for this lab.

***Insurance*—**Insurance for standard logging tools during below-the-keel deployments.

***Shipping*—**The costs for routine shipments to and from the ship.

***Ship-to-Shore Communications*—**The costs for phone and fax communication to the ship, as well as satellite transmission of data.

***Repairs and Maintenance*—**Upgrade, modifications, and repair of non-Schlumberger tools and data acquisition systems.

***Day Rates*—**Covers the costs associated with the leasing of standard tools and the associated engineering support services.

***Equipment*—**Prorated costs of computer, scientific, and engineering equipment for use on the ship over a period of time greater than one leg.

***Other Expenses — Logging*—**Covers computer service charges and indirect costs associated with leg operations.

Logging Operations — Covers computer service charges and indirect costs associated with leg operations.

Logging Deployment SOE —- Covers the leasing, shipping, and insurance expenses associated with the deployment of special tools.

Budget Overview

This Program Plan budget requests $45.3 M for FY03 (Table PP-17), the final year of ODP operations, to meet the high-priority needs identified by the JOIDES advisory structure. This plan also requests an additional $20.5M to implement a plan to phase out the ODP over a four-year span extending from FY04 through FY07.

FY03, the final year of science operations

Once the scientific needs have been identified, the budgeting process begins by determining the leg-based scientific and operational requirements, including the costs of ship operation, standard drilling and down-hole operations, logging science, and laboratory needs, among others. Most funds within the science and logging operational budgets have been allocated to, and apportioned within, leg-based budgets. Detailed budgets for Legs 205 through 210 are presented in the "Program Plan" section. Note that the a portion of Leg 205 is scheduled to occur in FY02, but that additional costs for this leg will be incurred in FY03, and are thus budgeted herein.

The second step in the budget process is assessing Program needs that are not directly affiliated with legs, such as services in science, technical support, operations, publications, information, management, administration, logging, JOIDES advisory, public affairs, and technical development projects. These funds, together with associated leg-based funds are incorporated into the department-based budgets.

The third step in the process, which maintains scientific and technical innovation in the Program, is allocation of $1,808K in the FY03 budget for high priority science and engineering needs. Expenditures against these needs are referred to as "special operating expenses" (SOEs). In addition, and in support of Legs 206 (Fast Spreading Crust) and 209 (MAR Peridotite), an additional $841K of cost savings was committed in FY02, for the purpose of ordering equipment that requires a long lead time to deliver. As such, total SOEs consumed in FY03 will total $2,649K.

For Leg 206, which is to be drilled on fast spreading crust, SOE expenses total $641K, including $299K of cost savings identified and committed in FY02. These funds will be used to purchase and ship additional drilling equipment (including bulk materials and liners), two under-reamers and mud motors, supplies, bits, reentry systems and casing, and to use logging specialty tools (WST, DLL). For Leg 207 (Demerara) SOE costs sum to $168K, and will be used to purchase and ship drilling equipment, supplies, and to use the MGT logging tool. Walvis Ridge coring (Leg 208) will require $201K of leg-specific costs to accommodate supplemental equipment and supplies as well as the GHMT and MGT logging tools. Activities on Leg 209 (MAR Peridotite) will include logging-while-drilling (LWD) and hammer drilling which necessitate SOEs of $1,087K, including $542K of FY02 cost savings committed in FY02 for long lead-time purchases. These costs will be used to purchase or rent and to ship bulk materials, liners, bits, hammer drill casing, 13 3/8" hangers, casing, hammers, LWD, and the services of a hammer drill engineer. Finally, Leg 210 will require SOEs of $552K to purchase and ship RCB core bits, a reentry cone, hangers, casing (in three different diameters), and to rend jars, under-reamers, and mud motors.

The budget in FY03 is lower than in previous years, in part resulting from the termination of the ship's subcontract (which precludes the additional day rate payment normally made the last month of the fiscal year as an advance for the first month of operations in the new fiscal year), by continued identification of cost savings, despite growth in certain cost centers, such umbrella coverage for the Marine Insurance Package as a result of the events beginning September 11, 2001, and by supplementing or cost-sharing program costs with external funds, such as from the DOE award. With regard to budget risk, management agreed that in FY03, as in the previous year, fuel will be budgeted at $250/metric ton rather than at the historical average of $200/MT used in FY01. In that year, the Program paid an average of $312/MT of fuel at the first four ports of call (Legs 193 through 196) and cost overruns were experienced. If the average cost of fuel exceeds $250/MT during FY03, NSF has indicated a willingness to consider a request for additional resources.

In an attempt to offset flat funding, the Program has sought resources from external sources, as in years past. In December 2001, JOI's proposal to the US Department of Energy solicitation on "Methane Hydrates" titled "*In-situ* sampling and characterization of naturally occurring marine methane hydrate using the *D/V JOIDES Resolution*," was funded at approximately $1,000K to support upgrades to downhole tools used by ODP for characterizing gas hydrates (e.g., Pressure Core Sampler (PCS), ODP memory tools), and new equipment that could be used for this purpose (e.g., G/GI seismic guns, infrared thermal imaging system, PCS gas manifold system, modifications to the FUGRO piezoprobe tool). These activities supported characterization efforts on ODP Legs 201 and 204. As in FY02, the Program will continue to realize ~$80K of cost savings through a Schlumberger/GeoQuest university software license program. ODP has not seen a substantive increase in funding from existing or new partners in more than nine years.

To continue the logistics and operational planning of the Arctic Lomonosov Ridge drilling project, and to ensure a seamless transition of this activity from ODP to IODP, JOI requests funds ($200K) to exercise the option to extend its subcontract with the Swedish Polar Research Secretariat to continue to provide planning services for a second and final year. The in-depth technical planning initiated in FY02 should continue, unabated, as the science operator is identified for this program, as contracts are drawn up to lease the ice breakers, and as the drilling vessel is identified and outfitted accordingly for coring, among other activities. ODP management will continue to work closely with JEODI representatives and other relevant parties, with the scientific proponents, with the Science Advisory structure of the incipient IODP, and with science and logging operators to develop a sound and comprehensive strategy for executing an Arctic expedition.

Table PP-18 lists the ODP FTE Comparisons for FY 01 - FY 03. Additional details are provided in the TAMU and LDEO appendices.

Table PP-17: Budgets for FY 01, FY 02, & FY 03 ($K)

TAMU	FY01	FY02	FY03
Science Services	4,374	4,227	4,020
Drilling Services	4,181	3,508	3,699
Information Services	2,500	2,412	2,369
Publications	1,776	1,645	1,619
Headquarters/Administration	1,920	1,858	1,855
Ship Operations	23,787	24,863	23,838
TOTAL TAMU	**38,538**	**38,513**	**37,400**
LDEO	**5,268**	**5,168**	**5,427**
JOI/JOIDES	**2,317**	**2,517**	**2,473**
GRAND TOTAL ODP BUDGET	**46,123**	**46,198**	**45,300**

Table PP-18: FTE Comparisons for FY 01 - FY 03

	FY01	FY02	FY03
TAMU			
Headquarters/Administration	27.20	24.80	24.80
Publications	25.00	23.00	22.00
Drilling and Engineering	19.50	19.50	19.50
Science Services	52.00	51.50	48.50
Information Services	26.25	26.25	26.25
Total	**149.95**	**145.05**	**141.05**
LDEO			
Borehole Research Group	11.58	12.58	12.58
NEB-LMF	2.45	1.58	1.58
University of Leicester	2.05	2.05	2.05
University of Aachen	.50	.50	.50
Ocean Research Institute	.50	.50	.50
Total	**17.08**	**17.21**	**17.21**
JOI/JOIDES			
JOI Direct	7.49	7.50	6.75
JOIDES Office (RSMAS)	2.75	2.75	2.75
ODP Data Bank	3.50	4.00	4.00
Total	**13.74**	**14.25**	**13.50**
Total	**180.77**	**176.51**	**171.76**

9.3 Phase out Plans - FY04-07

Introduction

With the completion of science operations only 20 months away, JOI and its subcontractors have developed detailed plans that describe how the activities of ODP will be successfully concluded, equipment facilities maintained and stored, scientific information published, data and information archives developed, information, databases, equipment, etc. transferred to the appropriate entity(ies) in IODP, and so on. These plans are accompanied by staffing plans and budgets outlined below.

JOI will work with its subcontractors to ensure that all phase-out activities are carried out in the same professional manner in which scientific operations have been conducted since the beginning of the program, nearly 20 years ago. These activities will include demobilization of ship and shorebased facilities, stewardship of the program's legacy (data, samples, cores, equipment, engineering products, materials, publications, etc.) as it is maintained, documented, cataloged, and archived before being transferred to a successor entity or entities in the Integrated Ocean Drilling Program (IODP), and wind-down of the science advisory functions conducted by JOIDES through the JOIDES office at the University of Miami.

Please, see also page XIV for "Phase out tasks" presentation by Pisias

D R A F T

OCEAN DRILLING PROGRAM

Science Operator

Texas A&M University

PHASEOUT
FY04 – FY07

CONTRACT 1-94

For Time Period

1 October 2003 to 30 September 2007

AMOUNT PROPOSED FY04-FY07: $15,904,705

Respectfully Submitted to:
Joint Oceanographic Institutions Inc.

Paul J. Fox
Director, Science Operations, ODP
Texas A&M University
College Station, TX

Introduction

Our FY04-07 Program Plan defines the ODP Science Operator phaseout strategy. Given the broad portfolio of science services which we deliver in support of ODP, the phaseout of science operations is a protracted process having a four-year duration. During the phaseout, the focus of ODP/TAMU's mission changes from one dominated by service delivery related to ship operations to one of stewardship of the Program's legacy. Indeed, some of our traditional services remain:

- Curating and distributing cores and research samples from the four repositories;
- Managing, verifying, storing and distributing ODP data;
- Publishing the *Proceedings of the Ocean Drilling Program*, consisting of the *Initial Reports* and *Scientific Results* volumes; and
- Providing cost-effective program management and administrative services including fiscal contracts, purchasing, budgeting, and inventory control (TAMRF responsibilities).

There are, however, major new responsibilities that are a direct consequence of the closing down of a program that will have successfully implemented 109 legs of scientific expeditions during its 19 years of seagoing operations. Given this rich history, ODP/TAMU has the additional responsibilities during phaseout to protect the legacy of ODP by:

- Cataloging, maintaining and archiving all equipment and records that could be utilized by IODP;
- Documenting and annotating designs of drilling and scientific equipment pertinent to IODP; and
- Creating a record of the analytical procedures used during the acquisition of data aboard the *JOIDES Resolution*.

The process by which we bring Science Operations to an end has been one of exploration for us for two reasons: the experience is new and we are without relevant historical models; and the boundary constraints that will affect the details of phaseout (i.e., the identity of the IODP operator(s); the timing of the start of IODP operations) are not yet known. In order to frame our phaseout process, we have adopted a number of important assumptions to aid us in our planning process.

- The last operational leg/cruise will conclude 9 September 2003.
- The current subcontract between the Joint Oceanographic Institutions Inc. and Texas A&M Research Foundation (JOI/TAMRF) will be extended through FY05, with negotiations for further extensions a potential.

- The USSSP agreement will be administered through CY05, at which time a new agreement with TAMRF will be negotiated.
- The current contract between TAMRF and Transocean Sedco Forex will terminate 30 September 2003 and JOI/NSF will approve a TAMRF/ODL no-cost extension for a maximum of two weeks in FY04, ensuring an orderly demobilization of the *JOIDES Resolution*.
- Except for Publication Services and administrative closeout, all other functions will be transferred to the new (i.e., IODP) science operator. The date of transfer is unknown, but for purposes of Phaseout planning, the conclusion of FY04 (30 September 2004) has been used.
- Publication of the *Proceedings of the Ocean Drilling Program* through Leg 210 will continue on the standard schedule: *Initial Reports* completed one year postcruise, *Scientific Results* completed four years postcruise, with publication costs based on an average volume size.
- The ODP Publications Web site contents will continue to be managed by the ODP/TAMU Publication Services Department until after the last *Scientific Results* paper and the ODP Cumulative Index have been published on the Web in late FY07. The ODP/TAMU Publications Web site will be transferred to the IODP program operator at the end of FY07.
- The responsibility for the distribution of the Deep Sea Drilling Project and Ocean Drilling Program publications will be transferred to the IODP program operator at the end of FY05. The cost associated with shipping the publications to the IODP operator are not included in this budget.
- The Publication Services Manager and Publications Specialist will be involved in the coordination of the shutdown of the department, working in conjunction with TAMRF.
- Fiscal forecasts, including payroll, are based on the FY02 Program Plan submission, escalated 3% per year and include regular compensation, program termination leave pay and vacation buyout.
- All four ODP/DSDP repositories will continue to operate at present staffing levels during FY04, with the responsibility for staffing and management of the repositories transferred to IODP by the start of FY05.
- Funding for scientific support by Staff Scientists for the *Proceedings of the Ocean Drilling Program, Initial Reports* and *Scientific Results* volumes will be provided by the Science Services Department in FY03. During FY04–FY07, after the Staff Scientist full-time positions have ended, the costs associated with these services will be covered by the Publication Services Department budget. Projected costs are based on time estimates that Staff Scientists spend 45–55% of their time working on postcruise publication tasks.
- Computer hardware/software equipment, support, and maintenance will all be provided by the Information Services Department through FY03. Publication Services will cover the costs of new computer equipment for FY04–FY07 and the costs of computer support staff and equipment maintenance for FY05–FY07.

- Funds for program termination leave and vacation buyout for staff leaving at the end of a fiscal year are included in the next year's request.

FY04 will be a busy year for ODP as the responsibilities of the Science Operator for the Program focus on the orderly phaseout of a majority of the tasks presently shouldered by Science Services, Drilling Services and Information Services. It will be a year of significant change in staffing levels; the year starts with a compliment of 117 (113.3 FTEs) staff on hand to handle phaseout activities and this number will decline over the year to 35 at the start of FY05. During this time of transition, Science Services will be devoted to two major phaseout tasks: the inventory, refurbishment and storage of scientific equipment, and the complete documentation of our scientific activities relating to installation, operation and use of ODP scientific equipment, as well as maintenance of our cruise staffing database. In addition, curatorial responsibilities and post-leg activities leading to the production of the *Proceeding* volumes will continue to be delivered. In Drilling Services, the focus will be on the demobilization of drilling and coring equipment removed from the *JOIDES Resolution*. Moreover, there will be a major effort on documentation of all the Program's technical developments. This is a major task and the goal will be to catalog tool systems and important technical innovations, review the scientific benefits, explain tool operations and important functions, consolidate design drawings and specifications, provide a history of technical development, and explain operational parameters, performance and limitations. During FY04, the tasks for Information Services will be to create a complete archive that documents all software relevant to ODP, continue the migration of old ODP data to the Janus database, maintain the Janus database with all Janus data available on the Web, continue to provide computer system and network support at ODP/TAMU and remote repositories, and, at the end of FY04, hand the ODP database off to the new IODP operator and archive the ODP data with NGDC. By the end of FY04, the phaseout tasks of these three Departments will be completed and the legacies of Science Services, Drilling Services and Information Services will be ready to transfer to the IODP.

The tasks and responsibilities for Publication Services in FY04 are similar to a "normal" year of operations, as this Department's deliverables remain essentially the same. Administrative Services will also have a busy year with all the activities associated with the closeout of the subcontract for the *JOIDES Resolution*, enhanced personnel requirements related to staff turnover and reductions, and the preparation of a thorough equipment inventory.

In FY05, the focus for the Science Operator will be on the continued delivery of our publication products, the *Initial Reports* and *Scientific Results,* and the wrap-up of all the major administrative tasks associated with phaseout. After the first five months in FY05, Administrative Service staff will be gone and only the Publication Services Department will remain. The ODP/TAMU staffing requirements at the beginning of FY05 are 35 FTEs, but by the end of the year all of the administrative services staff have departed and the staffing level of Publications has been reduced to 12. Two computer support positions from Information Services will be shifted to Publication Services in FY05 to provide necessary computer support needed for the Publications Department.

By FY06 and through FY07, the Publication Services Department will be the sole department remaining at ODP/TAMU. The central goal of this department will be the continued publications of the *Scientific Results* volumes. However, additional duties such as equipment inventory, shipping and receiving, complete budget management and development of a yearly program plan will be handled by Publication Services. Because the last *Scientific Results* volume and the Cumulative Index will not be completed until the end of FY07, funds for vacation carryover and two months salary for the staff that are needed to wrap up the work extend into FY08. The staffing for the Publication Services Department declines through FY04-07 as the workloads on tasks decrease; at the start of FY04, Publication Services has 20 staff and at the end of FY07 there are only six staff left.

The staff at ODP/TAMU is proud of the outstanding contributions that they have made to ODP over almost two decades and it is with great sadness that we bid farewell to ODP. Although the FY04-07 period will be challenging for us, we will bring the same exemplary level of service to the Program's phaseout that we have brought to the Program's 109 scientific expeditions.

FY04-07 Budget Outline
General Overview

FY04 begins the phaseout of activities associated with the Ocean Drilling Program (ODP) and participation of Texas A&M University (TAMU) as the Science Operator and Texas A&M Research Foundation as the business and compliance agent. Total resources involve a request for $9,486,378 in FY04, $3,477,116 in FY05, $1,537,629 in FY06 and $1,403,582 in FY07. Following demobilization of the *JOIDES Resolution* at the end of FY03 staffing of the Program decreases to zero with the publication of the scientific results from Leg 210. The specific details of each department's activities and staff reductions are contained in the Department overview that follows and in more detail within the cost center explanations.

Salary and Fringe—Total salary and fringe, along with the full-time equivalents supported at the beginning of each fiscal are shown below. Besides normal compensation, each cost center contains the estimated cost of program termination leave and vacation buyout for employees as their positions are eliminated.

Fiscal Year	Total Salary and Fringe	Employees*
04	$7,139,845	117
05	2,645,415	35
06	1,005,640	12
07	699,516	9
08**	138,997	0

* Reflects total number of employees at the beginning of the fiscal year.

** Involves compensation (i.e., program termination leave and vacation buyout) for employees that completed publication's effort in FY07.

COST CENTER DETAIL

1805 Science Services—In FY04 the department's base budget decreased by 44% from FY03, reflecting the reduction of personnel following the completion of ODP seagoing operations in FY03. All personnel costs, including program termination leave and vacation buyout for staff terminating in FY04, are included in the base budget. (Program

termination leave and vacation buyout for staff terminating on September 30, 2004, including repository and curatorial staff are budgeted in FY05.) Costs for science support (cost center 1805–01) decline steadily through FY04 as tasks are completed and the remaining staff scientists terminate. Similarly, costs for technical support (cost center 1805-12) diminish rapidly over the first six months of FY04, with the last personnel, the laboratory officers and Supervisor of Technical Support, terminating at the end of March 2004, as demobilization and related tasks are completed. Repository operations will, however, continue at a normal level in FY04, with the focus on moratorium sampling and completing the core wrapping project by the end of the year. We assume that at the end of FY04 responsibility for the continued operation of the repositories will be transferred to IODP responsibility.

The phaseout in FY04 exposes the department to some risks, the repositories are now staffed at the minimum level necessary to provide reliable service to the community, and no provision is made for major maintenance or upgrades of ODP-owned physical plant (e.g., replacement of a refrigeration unit) at any of the repositories. Finally, the continuing volatility in utilities costs at both the East Coast Repository and the West Coast Repository, remains a cause for concern.

1803 Drilling Services—In FY04, the preventative maintenance program will be done on the drill pipe and drill collars to preserve the drill string. This includes inspection of each joint (including the tubes, box, and pin); recutting of the box and pin, if required; and internal and external coating of the joint. In addition, Temporary Import Bonds (TIB) will have to be filed on the imported drill string, on a yearly basis up to a maximum of three years. A significant duty will need to be paid on the ODP owned Japanese drill pipe if it is still in the USA after three years.

Funds have also been budgeted for 9.0 full-time equivalents (FTE) from DSD and 2.0 Core Techs from Transocean Sedco Forex (TSF) to work in the controlled warehouse space breaking-out, preserving, inventorying, and crating coring and drilling equipment and consumables for future use by other NSF scientific coring programs. This includes the salary for the two TSF Core Techs for the month of October, and the rental of a breakout skid, forklift, and stevedore crew.

The majority of the DSD phaseout budget is for staff payroll to accomplish: Drilling and Coring Equipment Demobilization (37.4 % of FTE effort), DSD Technical Legacy Documentation (37.2% of FTE effort), and Coring System Design Improvements (25.4% of FTE effort). DSD staffing reductions will occur in a stepped approach as each of the above tasks is completed. The initial staff reduction of two FTEs will occur at the end of October 2003 when all of the drilling equipment has been moved for disposal and long-term storage from the controlled warehouse space at the demobilization port to College Station. As demobilization and storage ends, staffing is expected to reduce again in December 2003 (2 FTEs) and March 2004 (4 FTEs).

The ramp down that does occur in March 2004 assumes that the key operational manuals and documentation will be completed. It has been estimated that all tasks will be completed by the end of December 2004. The FY04 budget also includes program termination leave and vacation buyout of staff that leave as tasks are completed.

***1809 Information Services*—**For FY04, it is anticipated that the Information Services Department will require 14 FTE at the beginning of the year and 12.0 FTE at the end of the fiscal year. Primary expenditures will take place in salaries, software licenses, and computer software and hardware maintenance contracts. All other expected expenditures are related to normal administrative functions of a Department. Two members of the department will be transferred to the Publications Services Department at the end of FY04 to support that department's computer automation needs through FY07.

***1802 Publication Services*—**The overall budget for the Publication Services Department in FY04 increased by 11%, or $174,589, compared to FY03 Program Plan. Because of the nature of the work that falls under the Publication Services Department, tasks handled by the department will only decline slightly in FY04 (one Preliminary Report, six *Initial Reports*, and five *Scientific Results* volumes will be published). The decreases in the cost categoreies Supplies, Software, Shipping, and Communications in FY04 are the result of a slight decrease in workloads related to the end of the Program and the related decrease in staff (from 22 full-time equivalents in FY03 to 19 FTEs in FY04). The decrease in Service costs is due to the production of fewer CD-ROMs in FY04 (15 vs. 13). Payroll funds, which include an average 3% increase over FY03 salaries for all eligible employees, cover 20 employees during the first half of FY04 and 19 employees during the second half of the fiscal year. Travel and Training costs are significanly higher than in FY03 because costs were cut by 74% and 81%, respectively, to meet the FY03 budget target. Recruiting increased by the standard 3% inflation factor. Volume subcontract costs are lower than in FY03 because one more volume was printed that year. The cost increase in this category stems from the initiation of the Cumulative Index Project in FY04 and revenue projections from volume sales are $1,000 lower in FY04. Maintenance costs are higher than in FY03 because copier maintenance contracts are expected to increase by 10% in FY04. Equipment costs increase 100% from FY03 because equipment was budgeted under the Information Services Department in FY03. Increased Library costs will cover the purchase of updated reference books in FY04.

During FY05–FY07, the Department will coordinate the peer-review process for the *Scientific Results* volumes; produce the *Scientific Results* volumes; manage and produce leg citation lists and associated citation reports; produce a cumulative index; and handle daily management of budgetary tasks. The Department will take on staff and tasks traditionally handled by other departments in support of ODP publications (e.g., computer technician work to support department systems, and Staff Scientists' Editorial Review Board duties). As the sole department left at ODP/TAMU, additional duties such as shipping and receiving, complete budget management and development of the Program Plan, equipment inventory, and personnel supervision will be handled by Publication Services. In FY07 the Department will be involved in phaseout activities (e.g., legacy documentation, completing final projects, and closing down offices).

In FY05, the overall budget for the Publication Services Department decreased by 7%, or $119,029, compared to FY04. Decreases occur in all categories except Payroll and Maintenance and Repair. The cost reductions seen in most cost categories are a reflection of the decreases in the number of publications processed and generated in FY05 (papers from 15 legs in peer review, papers from 18 legs in production, and six *Scientific Results* volumes published). Payroll costs support 18 to 17 employees (vs. 20 to 19 in FY04) and

include an average of 3% increase over FY04 salaries for all eligible employees. Maintenance and Repair costs increased because costs for maintenance contracts on software and hardware for department servers and computer systems will be transferred from the Information Services Department to the Publication Services Department in FY05.

In FY06 the overall budget for the Publication Services Department decreased by 8%, or $135,509, compared to FY05 Program Plan. Decreases were seen in all categories except Travel, Services, Subcontracts, and Maintenance and Repair. The cost reductions seen in most cost categories are a reflection of the decreases in the number of publications processed and generated in FY06 (papers from nine legs in peer review and papers from 12 legs in production). Payroll costs support 12 to 11 employees (vs. 18 to 17 in FY05) and include an average of 3% increase over FY05 salaries for all eligible employees. The increase in Services costs is due to the production of one extra *Scientific Results* volume in FY06 (one extra CD-ROM and three extra Editorial Review Board payments). Subcontracts costs are higher than in FY05 because seven *Scientific Results* volumes will be published in FY06 (vs. six in FY05) and revenue is not included to offset subcontract expenses as in past years because volumes will be transferred to IODP at the end of FY05. The increase in Maintenance and Repair costs is a reflection of the 3% annual inflation rate.

In FY07 the overall budget for the Publication Services Department decreased by 9%, or $164,857, compared to FY06 Program Plan. Decreases were seen in all categories except Subcontracts. The reductions seen in most cost categories are a reflection of the decreases in the number of publications processed and generated during the last year of ODP's phaseout period (papers from three legs in peer review, papers from 5 legs in production, and five *Scientific Results* volumes published). Payroll costs support 9 to 6 employees (vs. 12 to 11 in FY06) and include an average of 3% increase over FY06 salaries for all eligible employees. The total subcontracts budget is $225,422 higher than in FY06. Volume subcontract costs are $70,149 less than in FY06 because five *Scientific Results* volumes are scheduled to be published in FY07 (vs. seven in FY06). The total increase is due to the costs associated with printing and distributing the Cumulative Index.

1801-01 Administration/Headquarters—At the beginning of FY04 funds are provided for payroll and support activities associated with 24.8 FTEs (2.2 in Headquarters and 22.6 in Administration) or 28 actual employees. The numbers of personnel are reduced to 18.8 FTEs (22 actual employees) by year's end. In the first month of FY05 a further reduction of 5.5 FTEs (six actual employees) occurs, with all of Administrative and Headquarters personnel completing their assignments by the end of February 2005 (FY05). At that point, support for all remaining ODP/TAMU personnel will be transferred to either the main TAMRF on-campus office (i.e., business and compliance issues) or the College of Geosciences at TAMU (i.e., human resources activities). With the exception of the Maintenance and Repair Expense category in FY04, where items that would normally be replaced will require maintenance/repair, all other expense categories are decreased from the amount requested in the preceding fiscal year in accordance with a similar decrease in activity.

FTE COMPARISON FY04 – FY05 – FY06 – FY07 *

TAMU/TAMRF	FY04	FY05	FY06	FY07
Headquarters/Administrative Services	24.8	17	--	--
Publication Services	20	18	12	9
Drilling Services	19.5	--	--	--
Science Services	35	--	--	--
Information Services	14	--	--	--
Total	**113.3**	**35**	**12**	**9**

* Totals reflect FTEs at the beginning of the fiscal year.

FY04 – FY07 BUDGET SUMMARY

Account	Description	FY04 Program Plan Budget	FY05 Program Plan Budget	FY06 Program Plan Budget	FY07 Program Plan Budget
418050-01	Science Services	$ 679,136	$ 98,791	$ -	$ -
418050-06	East Coast Repository	233,794	21,815	-	-
418050-07	West Coast Repository	149,973	23,833	-	-
418050-08	Gulf Coast Repository	145,351	26,491	-	-
418050-09	Curatorial Section	130,364	39,554	-	-
418050-10	Bremen Core Repository	27,500	-	-	-
418050-11	Bremen Core Repository - ODP	4,000	-	-	-
418050-12	Technical Support	927,386	-	-	-
	Subtotals	**2,297,504**	**210,484**	**-**	**-**
418030-01	Drilling Services - Office	196,155	54,221	-	-
418030-02	Drilling Operations Team	1,055,676	113,402	-	-
418030-03	Development Engineering Team	430,349	134,374	-	-
418030-04	Material Services Team	437,581	28,916	-	-
	Subtotals	**2,119,761**	**330,913**	**-**	**-**
418090-01	Information Services	1,188,387	203,922	-	-
	Subtotals	**1,188,387**	**203,922**	**-**	**-**
418020-01	Publications Services	1,841,947	1,673,226	1,537,629	1,403,582
	Subtotals	**1,841,947**	**1,673,226**	**1,537,629**	**1,403,582**
418010-01	Administration/Headquarters	2,038,779	1,058,571	-	-
	Subtotals	**2,038,779**	**1,058,571**	**-**	**-**
	TOTAL	**$ 9,486,378**	**$ 3,477,116**	**$ 1,537,629**	**$ 1,403,582**

ODP Logging Services
FY 04-07 Program Plan

During the period FY 04 – 07 activities at LDEO-BRG and its subcontractors will focus on the completion of demobilization of the equipment from the drillship as well as the demobilization of shorebased facilities. One of the main achievements of the Ocean Drilling Program has been to make an unprecedented amount of data readily available and easily analyzed. A limited number of activities proposed during the phase out period will be continued in order to insure ongoing access to software and data. A summary of the required tasks is given below.

General Operations

During FY 04 and early FY 05, the emphasis will be on management of ship and shore lab demobilization activities and phasing out/downsizing of subcontracts. In the out years, efforts will focus on preparation of the final report.

Demobilization of the logging facilities on the *JOIDES Resolution* will take place in September 2003. The technical staff at LDEO-BRG will be involved in equipment inventory, storage, and transfer after demobilization of the *JOIDES Resolution* through FY 04. Funds are also budgeted for the completion and finalization of documentation related to downhole tools (including machine drawings, schematics, operations manuals, software, and performance reports) and the maintenance/refurbishment of equipment as appropriate. Demobilization activities also include the inventory, service and storage (or disposal) of computer equipment and other property at each of the ODP Logging Services offices. FY 07 demobilization costs are associated with the inventory and transfer of those items required for FY 04-07 operations.

Publication of the last *ODP Initial Reports* Data CD will occur on or before 9/30/04. Based on the current schedule of CD production, there will be six CDs to be produced during this time period. Logging Staff Scientists at LDEO-BRG and its subcontractors will retain partial support after their final cruise. Salary support for sea-going logging scientists is budgeted for the completion of post-cruise activities and attendance at the first post-cruise meetings, as well as the travel funds to attend these meetings. All cruise-related activities are expected to be completed by the end of FY 04. This will allow time to complete contractual requirements, log processing and database archiving, and leg summary reports. Logging Staff Scientists will not be retained beyond FY 04 for work related to the *ODP Scientific Results* volumes.

Based on historical experience, six months of support of the data processing group will be required to complete the IR data plots and the six remaining data CDs. One month is needed to complete the log processing and data archiving for the final ODP leg.

Other Activities

The activities listed below are included in the FY 04-07 Program Plan budget. Project-specific budgets are also provided.

Database Archiving/Distribution
The Ocean Drilling Program has collected and archived an unprecedented amount of log data that is readily accessible to the scientific community. Maintenance of the ODP Log Database will continue through FY 07. Staff and hardware necessary for this activity will remain at LDEO-BRG. A limited personnel and computer services budget is required to provide services associated with insuring the integrity of the data and security of the database, monitoring database performance and utilization, distributing data not available online, and assisting users with data handling and usage questions. Data access and handling issues related to the site survey seismic data must also be maintained as the drilling community continues to improve its use of and access to digital seismic data for drilling-related planning as well as post-cruise science. This function will continue to be jointly supported by LDEO-BRG and the LDEO-SSDB.

Log Analysis Centers
Having the means to integrate core, log, and seismic data is a critical function associated with ODP scientific research. The GeoFrame/IESX data processing and interpretation package provides this capability at the five shore-based facilities, among several other University-based locations, that are affiliated with ODP logging services: Columbia University (USA), University of Leicester (UK), University of Aachen (Germany), University of Montpellier (France), and University of Tokyo (Japan). Usage of these systems is stead at all five locations, both prior to and after ODP legs.

Log analysis centers will be maintained through FY 07 in order to provide access to processing, interpretation, and core-log-seismic integration capabilities. Borehole image log interpretation, in particular, requires this specialized software to take full advantage of the data. One month per year of personnel time at each center is budgeted for a log analyst/technical support. An additional month is budgeted at LDEO to provide oversight of all the centers. Funds are budgeted at each center to cover the cost of GeoFrame/IESX maintenance.

DSDP Processing/Archiving
Processing and archiving of digital DSDP log data will occur in FY 04. The majority of these data are only available in LIS format, which requires specialized software to read and process, limiting its usefulness and accessibility in its present form by the scientific community. Translation to ASCII format will also allow DSDP data to be merged with the ODP log database and interpreted using more common software packages.

A total of 91 holes were logged during DSDP, of which 83 are available digitally. Approximately five months of effort are required to process these data, with an additional one month required for data archiving. Following processing, data will be available

online in ASCII format, which will make it compatible with the ODP log database and substantially the global coverage of these digital data sets.

Budget Justification

Actual/projected costs from FY 00-01 were used as the basis for all budgets.

Personnel
The table below outlines the distribution of personnel support at LDEO for the completion of required tasks in FY 04:

FY 04 LDEO man months	Months	FTE
Administration/Management	31.25	2.60
Ship and shore lab demobilization	23.75	1.98
Post-cruise processing/publication	14.25	1.19
Database archiving/distribution	4.00	0.33
Log analysis center	3.00	0.25
DSDP reprocessing/archiving	6.00	0.50
	82.25	**6.85**

Personnel support in the out years decreases significantly with the completion of the post-cruise processing/publication and DSDP reprocessing/archiving tasks and the near-completion of the shorebased lab demobilization. Total LDEO support is projected to be 25 months in FY 05, 11.5 months in FY 06, and 11.25 months in FY 07. Unspent vacation pay has been included, prorated over the four years of the phase out.

Permanent Equipment
No additional permanent equipment purchases are budgeted for the phase out.

Materials and Supplies
Costs in this category include shipping, engineering, and general office supplies.

Travel
Travel expenses include trips to JOI and TAMU, as well as meetings associated with final subcontract issues. In addition, funds are budgeted to cover the first post-cruise meetings still remaining in FY 04.

Communications and Shipping
Communication costs include phone and fax to and from JOI, TAMU, JOIDES, subcontractors, and vendors. Shipping costs are associated with sending equipment back from subcontractors and delivering all necessary equipment to JOI, NSF, or other locations as directed.

Other Costs
CD-ROM publication expenses include charges for mastering, duplication, and packaging for inclusion in the *ODP Initial Reports* volumes and are based on estimates provided by current vendors. The final six CD-ROMs will be completed during FY 04.

Computer Service
Repair, upgrade, and backup of Sun Microsystems hardware and software will be covered under the LDEO network subscription and is projected to be $9,588 for FY 04. This rate is based on the number and types of workstations needed for phase-out operations at BRG.

Indirect Costs
Indirect costs (53%) are assessed on all charges except LDEO Computer Services.

Laboratoire de Géophysique et Hydrodynamique en Forage (LGHF), France
The FY 04 budget includes funds for the completion of leg-based activities (e.g., editing of Initial Reports), assisting with the preparation of the final report, and activities related to the closing-out of this subcontract.

Funds are also provided in the LGHF budget for the maintenance of a log analysis center. The budget will cover one month of salary support and funds for the maintenance of the GeoFrame/IESX software.

University of Leicester, United Kingdom
The FY 04 budget includes funds for the completion of leg-based activities (e.g., editing of Initial Reports), assisting with the preparation of the final report, and activities related to the closing-out of this subcontract.

Funds are also provided in the LUBR budget for the maintenance of a log analysis center. The budget will cover one month of salary support and funds for the maintenance of the GeoFrame/IESX software.

University of Aachen, Germany
The FY 04 budget includes funds for the completion of leg-based activities (e.g., editing of Initial Reports), assisting with the preparation of the final report, and activities related to the closing-out of this subcontract.

Funds are also provided for the maintenance of a log analysis center. The budget will cover one month of salary support and funds for the maintenance of the GeoFrame/IESX software.

Ocean Research Institute, Japan
The FY 04 budget includes funds for the completion of leg-based activities (e.g., editing of Initial Reports), assisting with the preparation of the final report, and activities related to the closing-out of this subcontract.

Funds are also provided for the maintenance of a log analysis center. The budget will cover one month of salary support and funds for the maintenance of the GeoFrame/IESX software.

Downhole Systems, Inc.
LDEO subcontracts with Downhole Systems, Inc. for technical service. DSI personnel will assist with tool documentation and refurbishment activities during FY 04.

FY 04-07 SUMMARY

		FY 04	FY 05	FY 06	FY 07
A.	PERSONNEL (LDEO)	$451,209	$182,103	$88,224	$86,473
B.	FRINGE BENEFITS	$118,495	$48,314	$23,644	$23,348
	TOTAL SALARIES AND FRINGE	**$569,705**	**$230,418**	**$111,868**	**$109,820**
C.	PERMANENT EQUIPMENT	$0	$0	$0	$0
D.	MATERIALS AND SUPPLIES	$9,700	$2,000	$1,000	$1,000
E.	TRAVEL	$22,000	$6,000	$2,000	$2,000
F.	COMMUNICATIONS AND SHIPPING	$33,300	$8,300	$4,800	$5,300
G.	TOTAL OTHER COSTS	$14,089	$631	$631	$631
H.	COMPUTER SERVICES	$9,588	$6,392	$6,392	$6,392
	LDEO DIRECT COSTS TOTAL	**$658,382**	**$253,741**	**$126,691**	**$125,143**
	(MODIFIED DIRECT COSTS)	$648,794	$247,349	$120,299	$118,751
I.	LDEO INDIRECT COSTS @ 53%	$343,861	$131,095	$63,758	$62,938
	LDEO BASE BUDGET TOTAL	**$1,002,242**	**$384,835**	**$190,450**	**$188,081**
J.	SCHLUMBERGER	$0	$0	$0	$0
K.	OTHER SUBCONTRACTS				
	LGHF	$61,186	$11,504	$11,813	$12,133
	UNIVERSITY OF LEICSTER	$61,322	$12,661	$13,024	$13,401
	UNIVERSITY OF AACHEN	$23,795	$9,516	$9,776	$10,047
	OCEAN RESEARCH INSTITUTE	$24,458	$10,171	$10,434	$10,707
	DOWNHOLE SYSTEMS, INC.	$16,800	$0	$0	$0
	TOTAL	**$1,189,803**	**$428,687**	**$235,496**	**$234,369**

JOI's role in ODP phase-out, a four-year plan

Introduction

As the ODP Program Office and the prime contractor to NSF for the international ODP, JOI Inc. will have the principal responsibility for overseeing programmatic, contractual, and fiscal phase-out of the ODP during the period FY04 to 07.

JOI will work with its subcontractors to ensure that all phase-out activities are carried out in the same professional manner in which scientific operations have been conducted since the beginning of the program, nearly 20 years ago. These activities will include demobilization of ship and shorebased facilities, stewardship of the program's legacy (data, samples, cores, equipment, engineering products, materials, publications, etc.) as it is maintained, documented, cataloged, and archived before being transferred to a successor entity or entities in the Integrated Ocean Drilling Program (IODP), and wind-down of the science advisory functions conducted by JOIDES through the JOIDES office at the University of Miami.

Assumptions

• The current contract between NSF and JOI will be extended beyond FY03 for a period sufficient to conclude all phase-out activities. Agreements between JOI and its subcontractors will similarly be extended.

• Major subcontracts, such as those associated with the operation of the ODP's drillship, *JOIDES Resolution*, and the logging operations on that ship, will end in FY03, although short-term no-cost extensions may occur.

• JOIDES and the JOIDES Office will conclude activities in FY03 and the subaward to the University of Miami will be closed. Documents and data will be transferred to JOI and publication and distribution by JOI of a final issue of the *JOIDES Journal* is scheduled to occur in FY04.

• The ODP Site Survey Data Bank will conclude activities in FY04 and the subaward will be closed.

• Fiscal forecasts, including payroll, are based on the figures in the FY02 Program Plan, and are escalated 5% annually. Vacation buy out, cost of living adjustments, merit pay, and termination leave pay are incorporated. JOI will negotiate a new lease, or an extension, through December 31, 2007.

• Program property, documents, publications, and electronic data maintained by JOI will be transferred to a successor entity by the end of FY04.

• NSF audits of ODP will be conducted in FY04 and in FY07.

• The final technical and financial report will be submitted by JOI to NSF in FY07.

General Operations

JOI will continue to manage the Program under the terms and conditions of the NSF ODP contract (OCE 93-9308410), in accordance with this phase-out plan, and consistent with subsequent annual program plans until the ODP contract has been completed. JOI staff will continue to be responsible for the overall management, planning, data dissemination, and reporting of ODP.

Specifically, JOI will continue to:

a. Work with major support subcontractors to conduct traditional and phase-out programmatic activities.
b. Select and work with other subcontractors, as required, to meet programmatic objectives.
c. Develop annual Program Plans in consultation with the NSF program officer and as approved by the NSF contracting officer that address, but are not limited to:
i. programmatic goals
ii. scheduled activities and organization plans
iii. budgets
iv. review activities
v. recent scientific results and distribution of samples, data, and program publications
vi. all other phase-out activities and responsibilities
d. Maintain a policy manual which contains a clear and up-to-date summary of the policies and guidelines under which the Program is managed and operates.
e. Evaluate the Program. See conduct of Performance Evaluation under "Other Activities," below.
f. Prepare and submit quarterly reports to NSF that summarize the ODP financial, operational, and phase-out activities.
g. Conduct public affairs activities through the first quarter of FY04.
h. Continue liaison responsibilities.
i. Provide business and administrative support to JOIDES as its activities conclude. For example:
i. provide for final JOIDES publications, including the *JOIDES Journal*
ii. support JOIDES efforts to document the scientific legacy of the ODP.

Other Activities

In addition to conducting general management operations, JOI will also carry out the following tasks and activities.

Performance Evaluation

During the life of the ODP, JOI is contractually required by NSF to periodically evaluate the management of the Program and the performance of its subcontractors. This evaluation will be accomplished at 2-3 year intervals by a committee of experts appointed by the president of JOI. The president will consult with NSF, the JOIDES EXCOM, SCICOM, and others as appropriate in the formation of the evaluation committee. The Performance Evaluation Committee (PEC) will report to the JOI Board of Governors through the president of JOI. JOI will report the findings of the PEC, along with their response, to NSF.

The last PEC, the fifth since the beginning of the Program, was held in 1999. The results were formally transmitted to NSF in 2000. PEC-IV is scheduled to occur in 2004. The Terms of Reference and the membership of the committee will be established by early 2003. Based on past performance, JOI requests funds to support the travel of PEC-IV members for site visits and for meetings and for administrative and clerical support.

Co-Chief Review

In 2004, JOI will host a final co-chief review meeting. The purpose of this review is to retrospectively examine how ODP has performed in meeting the scientific objectives of the drilling legs since the last co-chief review, held in April 2001. All facets of ODP will be discussed, including: Scientific Advice (JOIDES); Science Operations (TAMU), Logging Operations (LDEO), Site Survey Data Bank (LDEO), management (JOI), and any other relevant aspects. A report from the review will be prepared by JOI, and forward to NSF and other appropriate parties. To support this activity, JOI seeks funds for travel, meeting and logistics costs, and for administrative support.

Arctic Ocean Drilling Expedition Planning

At the recommendation of SCICOM and EXCOM, and with NSF approval, JOI has entered into an agreement with the Swedish Polar Research Secretariat (SPRS) to develop an operations, logistics, and implementation plan for a scientific ocean drilling expedition to the Arctic's Lomonosov Ridge (JOIDES proposal 533). Implementation of such a plan is envisioned to occur under the auspices of the IODP. To ensure adequate planning and a smooth transition from ODP to IODP, planning will need to begin in 2002, given a proposed field program scheduled for August-September 2004. JOI and its major subcontractors will not have responsibility for implementing such a program. Instead, and as of January 2002, it is envisioned that a European entity will assume such a responsibility. As such, JOI will work closely with representatives from JEODI (Joint European Ocean Drilling Initiative), who will ultimately inherit the operational plan, and who may implement it within IODP. Over the next two years, representatives from JOI will work with representatives from the SPRS and JEODI to oversee the development, and possibly the implementation, of a plan to conduct scientific ocean drilling in the high Arctic.

ODP-to-IODP Hand-Off Meeting of International Program Offices

We envision the need for a meeting of representatives from ODP Program Offices and from IODP Program Offices, in late 2003 or early 2004. The purpose of such a meeting would be to transmit information before a critical mass of personnel have departed, taking with them corporate experience and knowledge. Ted Moore, the US iPC co-chair, strongly endorsed this idea. Such a meeting would be analogous to the "International Program Office Meeting" that JOI hosted in September 1999. At that gathering, over 20 representatives from the US, the European Consortium for Ocean Drilling (ECOD), Japan, Germany, Australia, the UK, China, Canada, and Chinese Taipei convened to exchange information on a wide variety of topics, ranging from staffing of scientific parties to publication of post-

cruise results; ways to communication among program offices; how to effectively disseminate information, especially via the internet; sharing methods for involving a broader cross-section of scientists in scientific ocean drilling, and discussing techniques for improving and coordinating educational and outreach activities on an international level. The expense of this activity to ODP would be minimal since the travel costs will be borne by the member countries. To facilitate such a meeting, JOI would be willing to work with an IODP entity.

Final ODP report

To close the ODP contract, JOI will submit a final technical and financial report to NSF after all activities of the Program have been concluded, and after all audits have been conducted and closed. The structure and the specific contents of the report are being developed and they will be approved by the NSF.

Budget Justification for JOI/ODP and JOIDES, FY04 to FY07

The Washington Office budget is presented in Table 1.

JOI salaries and benefits: The budgets for FY03 through FY07 are based on FY02 salary levels with an annual 5% increase (which is designed to cover cost of living adjustments, merit increases, vacation buy out, and termination leave pay). The estimated JOI benefit rate is 31%. See Table 2 for current staffing levels. Note that in FY02 the salary and benefit lines included the expense for an Arctic Project manager. After the FY02 Program Plan was approved, JOI, with NSF endorsement, decided to contract this service rather than to hire an manager at JOI. As such, these and support funds, such as in travel, were moved into the contractual services line item after the fiscal year began.

Other Direct Costs (Materials, Services, Supplies, Communication/Shipping and ODC, and Contractual Services): These budget figures are predicated on past experience and are adjusted in light of phase-out activities. Contractual services may include the hiring of temporary help.

Public Affairs: Activities will conclude in FY04, and will require funds for printing and distributing documents, shipping, materials, supplies, communication, and other expenses.

Travel: The budget includes support for JOI personnel travel to subcontractors, geoscience meetings, and planning meetings.

JOI General & Administrative Costs: The NSF-approved provisional rate of 30% was used to calculate G&A. G&A is charged on all direct costs and on the first $100,000 of all subcontracts JOI administers. As the G&A base decreases during the phase-out period, it may be necessary to increase this rate, subject to NSF approval.

Co-Chief Review in 2004: As described in the text, this activity is will require funds to cover the cost of travel for co-chiefs and other representatives, as well as meeting expenses. A budget of $40,000 is requested.

Performance Evaluation Committee in 2004: As described in the text, this activity will require funds to cover the cost of travel for PEC members and for administrative and clerical support. A budget of $60,000 is requested.

ODP Site Survey Data Bank: The Data Bank is located at Lamont-Doherty Earth Observatory and is managed by Mr. Daniel Quoidbach. The Data Bank is currently managing site survey data packages for the remaining 11 Legs of ODP, and is preparing to archive survey data for all drilled ODP Sites. Data packages for these Legs will be prepared for SSP and PPSP review, and for use onboard the drill ship. The Data Bank is also supporting iSAS. In FY 2004 the primary tasks of the Data Bank will be the duplication of data to be archived at NGDC and the completion of a final data inventory that will be passed, along with the survey data, to IODP. In FY04, the staff will be reduced to the Data Bank Manager and the Database Assistant.

JOIDES: Given the time span between the conclusion of the final ODP drilling legs in FY03 and the printing of preliminary results in the *JOIDES Journal*, funds are requested to print and distribute one final issue of the JOIDES Journal in FY04.

Table 1: JOI/JOIDES Program Plan budgets for FY02 through FY07

JOI Wash. Office	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	Total*
Salary & Benefits	837,389	692,566	477,847	262,593	164,825	130,203	1,035,467
Materials, Serv., Suppl.	42,312	44,000	35,000	15,000	8,000	5,000	63,000
Comm. & Shipping	36,000	36,000	35,000	15,000	10,000	12,000	72,000
Travel	88,000	109,401	70,000	15,000	15,000	10,000	110,000
Other Direct Costs	35,000	40,000	35,000	15,000	10,000	10,000	70,000
Contractual Services	40,000	250,000	35,000	15,000	10,000	10,000	70,000
Public Affairs	15,000	50,000	5,000	-	-	-	5,000
Co-Chief Review	-	-	40,000	-	-	-	40,000
PEC Activities	-	-	60,000	-	-	-	60,000
JOIG&A (indirect)	457,710	464,690	330,854	161,278	125,347	113,161	730,640
Total JOI	1,551,411	1,686,657	1,123,701	498,871	343,172	290,364	2,256,107
JOIDES Office	488,193	327,000	-	-	-	-	-
JOIDES Publication	20,000	15,000	10,000	-	-	-	10,000
ODP Data Bank	445,722	432,013	245,054	-	-	-	245,054
Panel Chair Support	12,000	12,000	-	-	-	-	-
Total JOIDES	965,915	786,013	255,054	-	-	-	255,054
Grand Total	2,517,326	2,472,670	1,378,755	498,871	343,172	290,364	2,511,161

*Total is for phase-out years FY04 through FY07, inclusive

Table 2: JOI Office personnel percent labor direct charged to ODP

Employee/Title	**'02***	**'03**	**'04**	**'05**	**'06**	**'07**
Dr. Steven Bohlen, President	50	50	25	20	15	10
Dr. Nicklas Pisias, Interim Director, ODP	85	85	50	30	30	15
Dr. John Farrell, Assoc. Program Director	45	45	30	20	0	0
Ms. Carol Kokinda, Contracts & Admin. Director	35	35	40	30	15	20
Dr. Frank Rack, Assist. Program Director	50	50	30	0	0	0
Dr. Elspeth Urquhart, JOIDES Intl' Liaison	100	25	0	0	0	0
Ms. Andrea Johnson, Sr. Program Associate	50	50	25	0	0	0
Ms. Brecht Donoghue, Program Associate	70	70	100	50	25	25
Mr. Robert Wright, Tech. Program Assoc.	50	50	50	20	15	15
Ms. Katherine White, Sci. Writer/Outreach Coord.	85	85	25	0	0	0
Ms. Bridget Chisholm, Manager, Travel	30	30	40	20	0	0
Ms. Taneika Herman, Assist. to the President	50	50	25	20	15	10
Mr. Efstratios Cavros, Contracts Specialist	25	25	20	0	0	0
Mr. John Hitchcock, Travel Coordinator	25	25	0	0	0	0
Total Full Time Equivalent	**7.50**	**6.75**	**4.60**	**2.10**	**1.15**	**0.95**

* An Arctic Project Manager position was included in the original FY02 Program Plan, but is removed here, as this activity was initiated in FY02 as a subcontract, and thus not a JOI employee.

Appendix: Additions to the Agenda Book distributed during the meeting
EXCOM Santa Cruz
30-31 January 2002

4.5 PacRim Consortium Report

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USA

PACRIM GROUP REPORT TO EXCOM

The membership contribution situation of the PACRIM group has not changed greatly since the last EXCOM meeting in June 2001, at which it was agreed that we could continue as full members in FY2001/2. Now, Canada is struggling to fund its 1/3 share for the year because of the depreciation of the Canadian dollar. On the other hand, Australia has obtained extra funds since the last EXCOM meeting, and can fully fund its 1/3 share. Therefore, for the present fiscal year, PACRIM contributions should continue at the rate: Canada hopefully 1/3, Australia 1/3, Chinese Taipei 1/12, Korea 1/12. All the countries are wrestling with the question of IODP membership as alluded to below.

Australia:

Australia will contribute at the 1/3 level in FY2001/2. Unfortunately, Australia has not identified a suitable funding mechanism to enable it to join IODP. Although this may change, the omens are not particularly good. Furthermore, we have fundamental difficulties with the structure of IODP, as our interests are overwhelmingly in the *JOIDES Resolution* successor. At this moment, the main emphasis in the marine geoscience community is on bringing our research fleet up to world standard, and on developing stronger research groups of marine geoscientists in the universities. Only by doing this, will we have the basic scientific strength to address global scientific problems that need IODP drilling to solve them.

Canada:

With the drop in exchange rates and government priorities focussed on security, Canada can currently only commit to providing Can $1.26M (currently around US$780k) for its ODP membership contribution for US Fiscal 2001/2. Efforts to bring its contribution up to a full one third in US funds are continuing but cannot be guaranteed at this time.

With regard to IODP, Canada has established a consortium of industry, universities and government agencies that is developing a proposal for full membership. After a competitive review of Letters of Intent, the group, lead by the Atlantic Canada Petroleum Institute (ACPI), has now been invited to make a full proposal to a new Canadian Foundation for Innovation (CFI) fund specifically created to support international scientific collaboration. The proposal will be

submitted on February 4, 2002 with the result expected in May or June of 2002. Canada is continuing to be an active member of the IWG for IODP."

Chinese Taipei:

The Taiwanese ODP Consortium leadership has changed recently, with Chao-Shing Lee taking over as the Chairman and Min-Teh Chen as the new Director of the Secretariat. The Taiwan geoscience community is relatively small, but the interesting geological topics are very diverse. For example, we are not only promoting Taiwan's continuation in IODP, we have also a group of people pushing for the ICDP (International Continental Drilling Program) to drill a 7 km deep-hole on Taiwan, where the Ms=7.6 Chi-Chi earthquake occurred in 1999. Some scientists are listed in both IODP and ICDP. Under this kind of structure, the best strategy for Taiwan to continue with the IODP may be to maintain approximately its present financial contribution, but to become more active in science contribution (writing more IODP proposals).

In order to make this happen, we are working to
1. Combine with the IMAGES group (this has started),
2. Propose workshops so that IODP-related proposals will be integrated,
3. Work hard to promote IODP to the National Science Council, and
4. Work through Asia-Pacific Economic Cooperation (APEC) activities to promote our IODP partnerships in Asia.

Korea:

Korea will maintain a 1/12 membership for the present fiscal year. At present, Korea ODP Council members are discussing whether Korea should join in IODP. If the membership contribution is much higher than the present level, Korea should look for other countries to make a consortium. If a suitable consortium cannot be built, Korea is not able to continue in IODP.

Dr Trevor Powell
Australian ODP Council

7.1 IWG Report

Report of the IWG meeting, Kobe, Japan. 16-17 January 2002 (plus some later developments).

Presented by Christopher Harrison

Much discussion centered around the European plans for IODP involvement. The European countries have stated that if they can find the funds, they wish to become an IODP Lead Agency, which implies that they will contribute equally with Japan and US to the costs of the program (my estimate is that this will eventually be about $151M in 2002 dollars). They would operate the Mission Specific Platforms, which would be expected to cost in the region of $10M per year plus Science Operation costs. Part of the cost of being a Lead Agency will be born by the European Commission. The European countries have formed a new consortium called the European Consortium for Ocean Research Drilling (ECORD). ECORD structure is shown next.

ECORD Council	Representatives of all European funding authorities/agencies supporting national IODP-related programs.
ECORD Science & Operations Committee	Science and Operations sub-panels (memberships nominated by funding authorities); plus a Science Office (to be designated) at a European institution.
Designated European Management Agency	An executive managing agency for European participation in IODP; set up under authority of the ECORD Council (interim DFG)
European Science Operator	The operational arm of the Designated European Management Agency (currently JEODI)

Canada is still planning on becoming a member ($5M US, inflated) and has applied to the Canadian Foundation for Innovation (CFI) International Access Fund. A full proposal is being submitted by 4 February 2002. The collaborative role of industry is very important, through the Atlantic Canada Petroleum Institute (ACPI).

China wishes to be involved with IODP but does not know at what level. It currently is represented on the iSAS committees.

South Korea and Chinese Taipei sent observers to the IWG meeting, indicating a strong interest in participating in some way in IODP. They have since requested observer status on iSAS committees.

Delivered-To: harrison@mail.rsmas.miami.edu
From: "LEECS" <leecs@mail.ntou.edu.tw>
To: "Han Hyun-Chul" <han@kigam.re.kr>
Subject: Request to send an observer for the interim IODP panels
Date: Wed, 23 Jan 2002 02:07:24 +0800

Dear Prof. Harrison

It was nice to meet you in Kobe. As we have indicated in the iWG meeting that Korean and Taiwanese scientists are currently promoting to our own government for a continuation with the IODP. Our initial contribution for finance may be not so big, however, our ambition to make a big scientific contribution. Therefore, we are interesting and will work together to promote an Asian IODP consortium (AIC). In order to fellow up the progress of IODP, we would like to ask a permission to send an "observer" to all interim committee panels. This will be a big help for the success of AIC. Many thanks and look forward to communicating with you.
Chao-Shing Lee.

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Japan's commitment to IODP was solidified by the launch of Chikyu ("Earth" or "Globe") on 18 January 2002, a splendid ceremony attended by IWG members and observers, as well as representatives from other organizations. The ceremony was performed by Her Imperial Highness Princess Sayako, who also graced the post launch reception with her presence.

Because it appears likely that MSP drilling will occur in FY 2004, the IWG was asked to make an exception to the rule that iPC would not rank proposals. The iSAS office was asked to inform the scientific community that MSP proposals may be drilled in 2004 and that proposals should be submitted or updated by 1 April 2002.

IODP COUNCIL

Tasks and Responsibilities:

- **Forum for the exchange of views among government agencies providing financial support for the Program.**
- **Reviews IODP accomplishments, status, and plans**
- **Reviews resource requirements and plans**
- **Makes recommendations, as appropriate, on planning and operation of IODP**
- **Receives audit, fiscal and management reports**

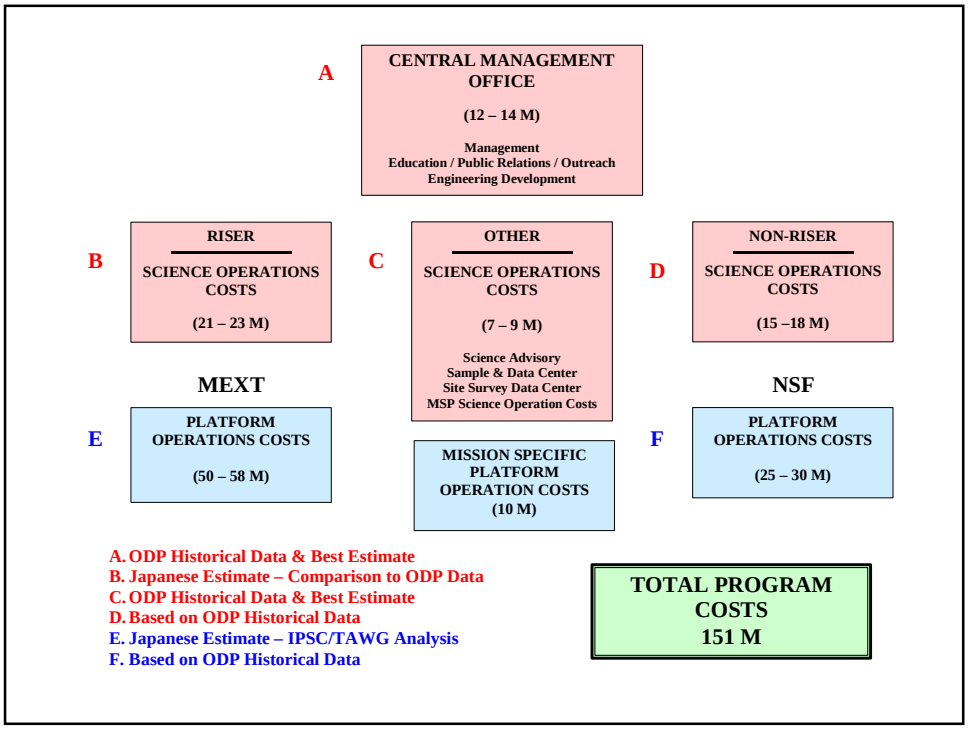
Structure:

- **Meetings: annually**
- **Members: all member countries. Each country has one representative**
- **Chairperson: rotate among lead agencies every year**

SAS EXECUTIVE AUTHORITY

Tasks and Responsibilities

- Formulate scientific and policy recommendations (e.g. IODP membership policy)
- Conduct IODP planning
- Reviews and approves IODP Program plan and budget recommended by the Science (Planning) Committee and prepared by the CMO.
- Evaluate and assess Program accomplishments with regard to established goals and objectives
- Establish subcommittees as needed to accomplish objectives of the Program and approve terms of reference for each subcommittee
  - Establish a Science Committee (Planning Committee)
- Promote support for IODP in appropriate fora
- Report to the IODP Council as appropriate and requested
- Scientific promotion of Program – Expansion of membership



IWG agreed to add two new panels to the interim Science Advisory Structure, a Technical Advice Panel and an Industrial Liaison Panel.

Interim Industrial Liaison Panel (iILP)- MANDATE—Final Draft

1 General Purpose:

To facilitate ongoing communication and cooperative scientific activities between IODP and selected industries, with the goal of benefiting IODP science and technology and maximizing economic benefits from sharing resources, such as drilling of sites for shared scientific and technical goals, development of joint drilling/sampling technologies, and the development of improved downhole measurement/observatory capabilities. Industrial sectors of interest include oil & gas companies (offshore deepwater technology, petroleum geology, and engineering), mining (understanding potential economic targets), microbiology (development of new enzymes, etc.), insurance industry (climate predictions) and research and development organizations in these fields.

2 Mandate.

The iILP will:

1. Develop effective personal links between academic and industry scientists with mutual research and technical/engineering interests.
2. Identify barriers to industry participation in IODP and recommend solutions for overcoming these barriers.
3. Develop mechanisms for sharing industry data/expertise/resources with IODP scientist**s,** and for making IODP results of maximum use to industry;\.
4. Act as the liaison group for IODP to industry and selected industry associations, and promote IODP educational and outreach activities within selected industry professional organizations.
5. Assist with the identification of scientists and engineers from industry to serve on panels, committees and working groups of IODP.

6. Define industrial priority research within the IODP context and advocate industry participation in IODP research and technical development.
7. Assist iPC in the establishment of interim Detailed Planning Groups for complex multiple platform, multiple-leg programs, and/or interim Program Planning Groups as needed.

3 Meetings

In order to ensure strong links to the scientific goals of the IODP, the iILP should meet jointly with the iSSEPs at least once per year. A second annual iILP meeting may be held separately or in conjunction with meetings of professional societies.

4 Membership.

ILP will be composed of 15 people representing as many IWG member nations as possible to maintain reasonable size and balance of expertise and research interests, with an ideal goal of about two thirds of the members from industry and one third from academia. Nominations will be solicited from the.JOIDES and OD21 science advisory structure, industry colleagues, and national ODP offices. iPC will be responsible for approving iILP members. In consultation with the iILP Chair, the iPC Co-Chairs will recommend candidates for membership as needed. Academic iILP members should have experience in scientific ocean drilling, and scientific expertise related to industry interests or be actively involved in academic/industrial collaborations.

5 Chair

The iILP Chair is appointed by iPC

interim Technology Advice Panel (iTAP) Mandate – Final Draft

1 General Purpose:

The interim Technology Advice Panel (iTAP) is responsible for advising the iPC and through the iPC, the IWG on those matters related to the technological developments needed to meet the scientific objectives outlined in the Initial Science Plan (ISP) of IODP.

2 Mandate: The iTAP provides advice and service to IODP through the iPC by identifying long-term (2-5 year lead time) technical needs required to meet the scientific objectives of the IODP ISP, and by recommending how these needs might be met. Such needs and advice may include:

1 Recommendations on performance requirements for specific technological needs.

2 The assessment of whether these needs can be most optimally met through the use of "Commercial off-the-shelf" technology or whether R&D within IODP will be required.

3 Recommendation to the iPC concerning the appropriate mode for pursuing such R&D, (i.e., through IODP development, university or industry development, or joint ventures).

4 Advice and recommendations to the iPC on the process and procedures for RFP development and evaluation in support of technical design and innovation.

5 Regular review of the progress made by the science community and iSAS in planning for the technological needs of the IODP

3 Meetings:

The iTAP should meet twice per year, or as required and approved by the iPC co-chairs. These meetings can be held in conjunction with the iSciMP so that joint sessions may be held as required.

4 Membership:

The iTAP should be made up of fifteen to eighteen members, with a nominal term of an individual on the panel being three years. Each IWG member may name one representative to the iTAP. All other members of the iTAP will be selected based on the expertise needed on the panel. Nominations for these additional members will be made to, and approved by, the iPC. Members of iTAP should be specialists who can provide expert advice in the fields of marine operations on a variety of platforms, down-hole logging and instrumentation, drilling technology (including mining technology and drilling under extreme conditions), geotechnics and other disciplines as needs are identified. In order to meet the need for added breadth of expertise and the receipt of technical advice in a timely manner, the iTAP may recommend to the iPC the establishment of Working Groups to address specific technological issues.

5 Liaisons: In order to assure that iTAP members are fully appraised of the scientific objectives of the IODP as well as the progress of the scientific programs, the Chairs of the iPC or their designates will brief the iTAP at least once per year on the status of the science program. In addition, liaisons from the operators, the Industrial Liaison Panel, the Data Centers and other cooperating scientific programs should be invited to attend iTAP meetings regularly. The iTAP Chair should attend iSSEPs meeting as a liaison.

6 Chair. The iTAP Chair is appointed by iPC.

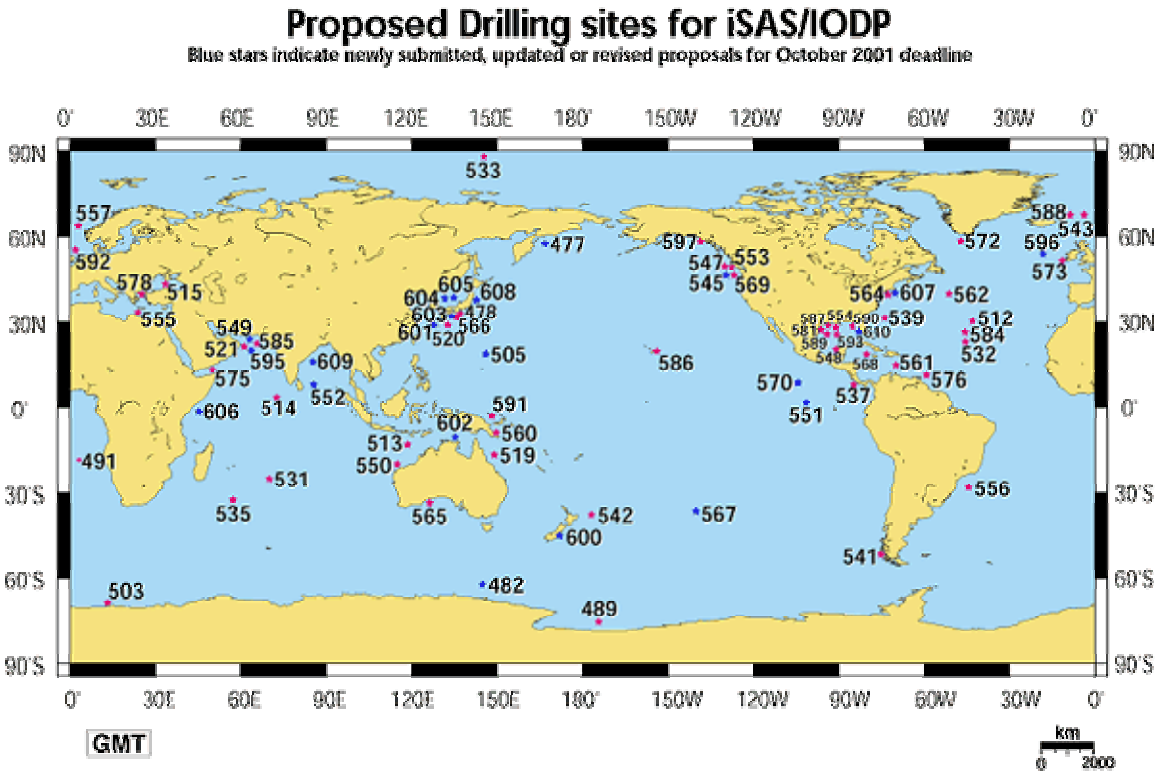
7.4 JAMSTEC Report - iSAS Proposals Status

Active Proposals for iSAS/IODP as of 28th January 2002

Proposal	Lead Proponent	Short Title
477-Full2*	Takahashi	Okhotsk/Bering Plio-Pleistocene
478-Full4	Tokuyama	Eastern Nankai Subduction
482-Full3*	Escutia	Wilkes Land Margin
489-Full3	Barrett	Ross Continental Shelf
491-Full3	Hinz	Cretaceous S. Atlantic Accretion
503-Full2	Jokat	Weddell Basin
505-Full3*	Fryer	Mariana Convergent Margin
512-Full2	Blackman	Oceanic Core Complex
513-Full2	Opdyke	Scott Plateau Paleoceanography
514-Full3	Droxler	Maldives Sea Level
515-Full	Flood	Black + Marmara Seas Sediments
519-Full2	Camoin	South Pacific Sea Level
520-Full3	Ohara	Kyushu-Palau Ridge
521-Full5	Clift	Indus Fan
531-Pre2	Snow	Max Spreading Rate Core Complex
532-Full	Tucholke	Kane Megamullion
533-Full2	Backman	Arctic - Lomonosov Ridge
535-Full2	Dick	735B Deep
537-Full3	von Huene	Drilling Proto-Seismogenic Zone
539-Full2	Holbrook	Blake Ridge Gas Hydrates
541-Full	Anderson	Chilean Fjord Sediments
542-Pre	Mortimer	Hikurangi Plateau LIP (SW Pacific)
543-Full2	Harris	CORK in Hole 642E
545-Full2*	Fisher	Juan de Fuca Flank Hydrogeology
547-Full3	Fisk	Oceanic subsurface biosphere (OSB)
548-Full2	Morgan	Chixculub K-T Impact Crater
549-Full2*	von Rad	Northern Arabian Sea Monsoon
550-Full	Bradshaw	Carbonate Clinoforms, NW Aust/.
551-Full*	Gillis	Hess Deep Plutonic Crust
552-Full3*	France-Lanord	Bengal Fan
553-Full	Hyndman	Cascadia Margin Hydrates
554-Full4	Kennicutt	Gulf of Mexico Hydrates
555-Full2	Kopf	Continental Collision, Crete
556-Pre	Wefer	Malvinas Confluence

557-Full2	Andreassen	Storegga Slide Gas Hydrates
560-Full	Taylor	Return to Woodlark Basin 1108
561-Full3	Duncan	Caribbean Large Igneous Province
562-Full2	Norris	J Anomaly Ridge Transect
564-Full	Miller	New Jersey Shallow Shelf
565-Pre	Feary	Eucla Carbonate Platform
566-Full3	Ashi	Nankai Trough Gas Hydrates
567-Full*	Lyle	South Pacific Paleogene
568-Pre	Droxler	Northern Nicaragua Rise
569-Full	Goldberg	CO2 Sequestration
570-Full*	Haymon	East Pacific Rise Crust
572-Full2	Channell	Late Neogene-Quaternary Climate Records
573-Full2	Henriet	Porcupine Basin Carbonate Mounds
574-Full	Fouquet	Rainbow hydrothermal field Mid Atlantic ridge
575-Full3	deMenocal	Gulf of Aden African Climate
576-Pre2	Deville	S. Barbados Accretionary Prism
578-Pre	Hiscott	Marmara Sea Gateway
579-Pre	Anderson	Pacific climate variability - Skan Bay
581-Full	Droxler	Late Pleistocence Coralgal Banks
584-Full	Rona	TAG II Hydrothermal
585-Full	Clift	Murray Ridge Deep Drilling
586-Full2	Rubenstone	Hawaiian Coral Reefs and Basalts
587-Pre	Nelson	Gulf of Mexico Mini-Basin
588-Pre	Gradstein	Arctic-Atlantic Cretaceous Gateway
589-Full2	Flemings	Gulf of Mexico Overpressures
590-Pre	Armentrout	Coop. JOIDES-Industry GoMex
591-Pre	Herzig	Conical/Desmos Hyd., PNG
592-Pre2	Andriessen	Shallow Water Dogger Bank
593-Pre	Flower	Gulf of Mex. Neogene Climate
595-Full*	Clift	Indus Fan Riser + Non-Riser
596-Pre*	Morrissey	Rockall-Hatton Cretaceous Hotspot
597-Pre	Jaeger	S. Alaska High-resolution Sediments
600-Pre*	Fulthorpe	Canterbury Basin
601-Pre*	Takai	Iheya Ridge
602-Pre*	Edgar	Tropical Epeiric Seas
603-Pre*	Kimura	Nankai Trough
604-Pre*	Lee	Ulleung Basin
605-Pre*	Tada	Asian monsoon
606-Pre*	Nishi	Mesozoic Greenhouse

607-Pre*	Dugan	New Jersey Slope
608-Pre*	Hasegawa	NW Pacific/ Cretaceous Greenhouse
609-Pre*	Spiess	Himalaya-Bengal system
610-Full*	Mallinson	W Florida Margin



Science Operator Introduction

Traditional Responsibilities of the Science Operator:

- Curating and distributing cores and research samples from the four repositories;
- Managing, verifying, storing and distributing ODP data;
- Publishing the *Proceedings of the Ocean Drilling Program*, consisting of the *Initial Reports* and *Scientific Results* volumes; and

New Responsibilities Associated with phase-out

- Cataloging, maintaining and archiving all equipment and records that could be utilized by IODP;
- Documenting and annotating designs of drilling and scientific equipment pertinent to IODP; and
- Creating a record of the analytical procedures used during the acquisition of data aboard the *JOIDES Resolution*.

Assumptions of Phase-out

- The last operational leg/cruise will conclude 9 September 2003.
- Except for Publication Services and administrative closeout, all other functions will be transferred to the new CMO at the conclusion of FY04 (30 September 2004) has been used.
- Publication of the *Proceedings of the Ocean Drilling Program* through Leg 210 will continue on the standard schedule: *Initial Reports* completed one year postcruise, *Scientific Results* completed four years postcruise, with publication costs based on an average volume size.
- The ODP Publications Web site contents will continue to be managed by the ODP/TAMU Publication Services Department until after the last *Scientific Results* paper and the ODP Cumulative Index have been published on the Web in late FY07. The ODP/TAMU Publications Web site will be transferred to the IODP at the end of FY07.
- The responsibility for the distribution of the Deep Sea Drilling Project and Ocean Drilling Program publications will be transferred to the IODP at the end of FY05.
- All four ODP/DSDP repositories will continue to operate at present staffing levels during FY04, with the responsibility for staffing and management of the repositories transferred to IODP by the start of FY05.
- Computer hardware/software equipment, support, and maintenance will all be provided by the Information Services Department through FY03. Publication Services will cover IS costs afterwards

FY04-07 Budget Outline
Science Operator

FTE COMPARISON FY04 – FY05 – FY06 – FY07 *

TAMU/TAMRF	FY04	FY05	FY06	FY07
Headquarters/Administrative Services	24.8	17	--	--
Publication Services	20	18	12	9
Drilling Services	19.5	--	--	--
Science Services	35	--	--	--
Information Services	14	--	--	--
Total	**113.3**	**35**	**12**	**9**

* Totals reflect FTEs at the beginning of the fiscal year.

Budget Summary FY04-FY07 ($k)

	FY04	FY05	FY06	FY07	
Science Operations	$9,486	$3,477	$1,538	$1,404	**$15,905**
BRG	$1,190	$429	$235	$234	**$2,088**
JOI/JOIDES	$1,379	$499	$343	$290	**$2,511**
TOTAL	**$12,055**	**$4,405**	**$2,116**	**$1,928**	**$20,504**

Science Services Department FY04

GOALS

- **COMPLETION OF POST CRUISE REPORTS**
- **DEMOBILIZATION**
- **PREPARATION OF LEGACY MATERIALS**
- **REPOSITORY ACTIVITIES**

TASKS

- Complete post-leg activities leading to production of the final *Initial Reports* volumes.
- Complete documentation and analysis of the cruise staffing database.
- Complete inventory, refurbishment and placing into storage of scientific equipment removed from the *JOIDES Resolution*.
- Complete documentation relating to the installation, operation and use of the scientific equipment.
- Maintain operation of the four core repositories; including sampling, curation and archiving until responsibility is transferred elsewhere.

Drilling Services Department

GOALS

- **Department will protect the drilling and coring equipment assets of ODP and prepare documentation on recommended coring tool improvements.**
- **Drilling and Coring Equipment Demobilization**
    - Establish procedures to inventory, preserve, and store all coring and drilling equipment removed from the *JOIDES Resolution.*
    - Develop a preventative maintenance program for the drill string and drill collars removed from the *JOIDES Resolution*.
- **Technical Legacy Documentation**
- **Coring System Design Improvement**

Information Services Department

GOALS

- **Documenting the ODP ISD Legacy**
- **Complete Data Migration**
- **Provide for Data Availability**
- **Daily Computer Systems and Network Support**
- **Digital Image Archive**

Publication Services Department

GOALS

During FY04–FY07, the central tasks for the Department will be the coordination of the peer-review process for the *Scientific Results* volumes (189–209, 196–210, 202–210, and 208–210, respectively, each fiscal year); production of the *Scientific Results* volumes (187–192, 193–198, 199–205, and 206–210, respectively, each fiscal year); management and production of leg citation lists and associated citation reports; development of a cumulative index; and daily management of budgetary tasks.

FY05–FY07

Tasks	FY04	FY05	FY06	FY07
Hole Summary and Preliminary Report preparation and publication	210; Task ends 11/04			
Initial Reports volume production and publication	206, 207, 208, 209, 210	210; Task ends 11/05		
Scientific Results peer review; receive, distribute, and track leg-related papers published in journals and books*	Papers from 21 legs (189–209)	Papers from 15 legs (196–210)	Papers from 9 legs (202–210)	Papers from 3 legs (208–210); Task sends 3/07
Scientific Results manuscript production and publication on Web (approximately 15 papers per leg)	Papers from 21 legs (187–207)	Papers from 18 legs (193–210)	Papers from 12 legs (198–210)	Papers from 5 legs (206–210); Task ends 8/07
Scientific Results CD/booklet production and publication	187, 188, 189, 190, 191, 192	193, 194, 195, 196, 197, 198	199, 200, 201, 202, 203, 204, 205	206, 207, 208, 209, 210; Task ends 9/07
Citation reports production				
Subcontractor liaison duties				
Budget preparation and management; property inventory				
ODP and DSDP volume distribution (store and distribute; transfer to IODP)			Only distribution of new publications	
ODP/TAMU Web site management (Science Operator and Publications)	Transfer of ODP/TAMU Web site	Only support of ODP/TAMU Publications Web site		
Volume archive and file transfer				
Cumulative Index Project				

Graphics support (design work, overheads, posters, etc.)				
Production of legacy documentation				
Closing of department (personnel, equipment, etc.)				

* = volume of work associated with this task depends on when participants submit papers after a cruise.

ODP LOGGING SERVICES

GOALS

- Orderly phase-down of activities, including budgeting, personnel, asset management, data dissemination, and contracts
- Completion of ship and shore lab demobilization
- Completion legacy documents
- Completion of post-cruise processing
- Publication of remaining *ODP Initial Reports* Data CDs
- Maintenance of ODP Log Database and data distribution services
- Maintenance of ODP Log Analysis Centers
- Processing and archiving of DSDP log data
- Completion of reporting requirements