

PHOENIX

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SCRIPPS INSTITUTION OF OCEANOGRAPHY
UNIVERSITY OF CALIFORNIA, SAN DIEGO
LA JOLLA, CALIFORNIA 92093



CRUISE PROSPECTUS
R/V MELVILLE
JULY 1992 - SEPTEMBER 1992

Robert A. Knox

Robert A. Knox, Associate Director, SIO

PHOENIX EXPEDITION

R/V Melville

Leg 01

C. de Moustier, Scripps Institution
of Oceanography
Sea Beam 2000 Calibration Cruise
San Diego - Acapulco
7-16 July 1992

Calibration of Sea Beam 2000
including water gun profiling
along the west coast of Mexico

Leg 02

R. Batiza University of Hawaii at Manoa
H. P. Johnson University of Washington
Petrologic Temporal Variation Tests
Rockdrill Tests
Acapulco - Manzanillo
20 July - 16 August 1992

Dredging, magnetics, Sea Beam 2000
and Rockdrill tests at the
East Pacific Rise 9°30' - 13°21'N.

Leg 03

P. Lonsdale Scripps Institution of Oceanography
Guadalupe Island Cruise
Manzanillo - San Diego
18 August - 2 September 1992

Sea Beam 2000, magnetics, and
Single-channel seismic refraction
west of Guadalupe Island.

Underway Geophysical Data Collection

R/V *MELVILLE* (1992):

I.D.	Dates	Days	Chief Scientist(s)	Ports
Leg 1:	7 Jul -16 Jul	10	de Moustier	San Diego - Acapulco Sea Beam (w/SB Proc); Gravity (transit mode) Magnetometer (yes); Seismic profiler (yes)
Leg 2:	18 Jul - 14 Aug	31	Batiza UH/Johnson/UW	Acapulco - Manzanillo Sea Beam (transit mode); Gravity (transit mode) Magnetometer (yes); Seismic profiler (no)
Leg 3:	18 Aug-2 Sep	17	Lonsdale	Manzanillo - San Diego Sea Beam (w/SB Proc); Gravity (transit mode) Magnetometer (yes); Seismic profiler (yes)

Contact:

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**C. de Moustier, SIO
Sea Beam 2000 Calibration Cruise
San Diego to Acapulco
7 - 16 July 1992
Leg 01**

The Scripps Institution of Oceanography research vessel *Melville* returned to service in early 1992 after a major overhaul. A principal piece of new equipment is a Sea Beam 2000 multibeam echosounder, designed to produce greatly improved bathymetric maps of sea floor relief. The specifications of this new, untested echo-sounder include the ability to map a 15km -wide strip of 4500m - deep seafloor on a single pass, and to resolve steeper bottom slopes than has been possible with earlier multibeam echosounders, especially in deep water.

The first cruise of Phoenix Expedition is to check-out, adjust, and calibrate this Sea Beam 2000 system in waters off the west coast of Mexico. Sites in the Mexican Exclusive Economic Zone, namely Cedros Deep, the Rivera transform fault, and the Middle American Trench, are preferred because they include ideal areas of deep, steeply sloping (and flat) seafloor, fully meeting the requirements of our tests.

Part of the required test program for the Sea Beam includes simultaneous operation of a water gun profiler, to check how much acoustic interference occurs between the two systems.

We expect these test operations to incidentally yield scientifically useful data, especially on the patterns of bathymetric lineation, which provide evidence of the geologic history of the oceanic crust. To help interpret these patterns we will make magnetic measurements (with a towed magnetometer) during the echo-sounder tests, to see if bathymetric lineations match magnetic lineations.

Our planned schedule is departure from San Diego 7 July 1992. The cruise is scheduled for a 10 day period. The anticipated port of arrival is Acapulco. Transit from San Diego to Acapulco takes 5.5 days at 11 knots, leaving approximately 3.5 days (84 hours) to perform tests that do not advance the ship towards Acapulco.

As shown on the accompanying figure, areas identified along the ship's general route from San Diego to Acapulco satisfy the requirements of the tests, including deep, steeply sloping and flat, seafloor.

(1) a 2000 m deep basin off northern Baja California where acoustic alignment and initial roll bias tests can be conducted on the first day out.

(2) Cedros Deep, a 300 km long, 20 km wide depression with a flat mud floor at 4100-4500 m depth, with a steep landward side 15° (average slope between 2200 m and 4500 m). This site can be used to perform a full roll and pitch bias test, and to evaluate operational performance of the system (swath coverage, repeatability of soundings, noise measurements etc.). Up to 3 days can be devoted to these operations.

(3) Ulloa Deep is a 4200 m depression similar to Cedros Deep that can be used for further tests of the system as indicated in (2).

(4) Rivera Transform valley, a steep sided rocky rift valley, with a narrow floor going down to 5800 m with walls averaging 30° slopes between 3000 m and 5000 m. This is the deepest water to be encountered during the sea trials. Transit time from (3) to (4) is about 24 hours. This site can be used to evaluate deep water performance and verify system accuracy.

(5) Middle America Trench, offshore between Manzanillo and Acapulco, with a flat floor at 4400-5500 m depth, and a 15° landward slope between 2500 m and 5000 m.

We have obtained clearance through diplomatic channels to operate in Mexican jurisdictional waters.

Scientific personnel Leg 01:

1. Mr. Greg Adams, UCSD/SIO/STS, Programmer
2. Mr. Luis Delgado Argote, CICESE, Foreign Observer
3. Ms. Rubria Adriana Chaires Bricaire, Secretaria de Marina, Mexico, Foreign Observer
4. Mr. Agostino Calisi, Sea Beam Instruments, Customer Support
5. Mr. James Charters, UCSD/SIO/STS, Computer Technician
6. Mr. Dave Collins, Sea Beam Instruments, Software Engineer
7. Mr. Perry Crampton, UCSD/SIO/STS, Seismics Technician
8. Dr. Christian de Moustier, UCSD/SIO/MPL, Chief Scientist
9. Mr. Stephen Glow, Sea Beam Instruments, Systems Engineer
10. Mr. William Goodwin, Sea Beam Instruments, Customer Support
11. Mr. Earl Heckman, UCSD/SIO/STS, Hardware Technician
12. Mr. Juan Ignacio Gutierrez Jurado, Secretaria de Marina, Mexico, Foreign Observer
13. Dr. Peter Lonsdale, UCSD/SIO/MPL, Scientist
14. Dr. Jacqueline Mammerickx, UCSD/SIO/GRD, Scientist
15. Mr. Ramon Mendoza, CICESE, Foreign Observer
16. Mr. Ronald Moe, UCSD/SIO/STS, Computer Technician
17. Mr. Seth Mogk, UCSD/SIO/STS, Resident Technician
18. Ms. Claudia Ruiz, CICESE, Foreign Observer
19. Mrs. Elizabeth Shor, UCSD/SIO/Aquarium, Staff Volunteer
20. Dr. George Shor, UCSD/SIO/MPL, Professor, Emeritus
21. Mr. Jeffrey Skinner, UCSD/SIO/STS, Hardware Engineer
22. Mr. Stuart Smith, UCSD/SIO/STS, Data Processor
23. Mr. Arthur Staff, Sea Beam Instruments, Programmer

