CRUISE REPORT
SHIP UTILIZATION DATA

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REV. 5/76

SHIP NAME R/V ROBERT D. CONRAD	OPERATING INST. Lamont-Doherty Geological Observatory	
CRUISE (LEG) NO. 21-01	DATES 9/8/77 - 10/1/77	
AREA OF OPERATIONS: New York Bight, North America Basin and Bermuda Rise	PORT CALLS: PLACE: St. George's, Bermuda	DATES: 9/29 - 10/1/77
DAYS AT SEA 21	DAYS IN PORT 3	

PARTICIPATING PERSONNEL

CODE	NAME	TITLE	AFFILIATION
1.	C. Windisch	Chief Scientist	Lamont-Doherty
2.	W. Robinson	E. Eng. MCS	"
3.	C. Gutierrez	E. T. MCS	"
4.	R. Rottier	" "	"
5.	A. Engvik	E. T.	"

PRIMARY PROJECTS (those which govern the principal operations, area and movements of the ship)

PROJECT TITLE AND PRINCIPAL INVESTIGATOR	SPONSORING ACTIVITY	GRANT OR CONTRACT NUMBER	PARTICIPATING PERSONNEL (AS CODED ABOVE)
Marine Geophysics Talwani et al.	onr	N00014-75-C-0210	All

ANCILLARY PROJECTS (which are accomplished on a not-to-interfere basis and contribute to the overall effectiveness of the cruise)

PROJECT TITLE AND PRINCIPAL INVESTIGATOR	SPONSORING ACTIVITY	GRANT OR CONTRACT NUMBER	PARTICIPATING PERSONNEL (AS CODED ABOVE)

SIGNATURE Charles C. Windisch DATE Jan 17, 1978
CHIEF SCIENTIST

(Continue personnel and project listings on reverse if additional space needed)

ATTACH PAGE SIZE CRUISE TRACK

COST ALLOCATION DATA

DAYS CHARGED	AGENCY OR ACTIVITY CHARGED	GRANT OR CONTRACT NO.
24	ONR	N00014-75-C-0210

SIGNATURE S. Hayes DATE 11 Jan. 78
Institution Official

Lamont-Doherty Geological Observatory | *Palisades, N.Y. 10964*
of Columbia University

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CRUISE REPORT

Ship Name: ROBERT D. CONRAD Cruise No: 21-01

Departure: 8 Sept. 1977 (Date) from Piermont, N.Y. (Port)

Arrival: 28 Sept. 1977 (Date) at St. George's, Bermuda (Port)

Days at Sea: 20 Days Foreign Port: 4
No. of days in arrival port

Area of Operation:

New York Bight, North America Basin and Bermuda Rise

Program Description:

See next page

Participants: (All L-DGO unless otherwise specified)

C. Windisch	Chief Scientist
W. Robinson	E. Eng. MCS
C. Gutierrez	E.T. MCS
R. Rottier	E.T. Mcs
A. Engvik	E.T.
D. Hutchinson	E.T.
B. Ostrowski	E.T.
W. Robertson	E.T.
D. Medlicott	Comp. Tech
R. Crimmins	Mech. Tech.
M. Iltzsche	Mech. Tech.
J. Sindt	Mech. Tech. MCS

All inquiries regarding cruise should be made to the chief scientist.

Program Description: ROBERT D. CONRAD 21-01

RC21-01 departed Piermont, N.Y. on Sept. 8, 1977 and arrived in Bermuda on Sept. 28. The primary objective of this cruise was to run a series of multichannel seismic (MCS) lines on the continental shelf, on the upper and lower continental rise and in the Hatteras abyssal plain in an effort to compare MCS and sonobuoy methods fro determining sediment velocities in areas acoustically typical of the major physiographic provinces along the eastern seaboard. The MCS crossings on the shelf were planned to cross the COST B-2 well from which borehole velocity logs are available to serve as a primary source of correlative velocity information. MCS lines in the deeper provinces crossed various of the DSDP sites which, while lacking borehole velocities, had basic information about sediment types and velocities determined from core samples. The remainder of the leg was planned to carry tentative correlations of the Horizon A family of reflectors as well as Horizon β from the New York Bight area to the DSDP sites 105 and 106 and then southward to the IPOD MCS line. At that point we would attempt to carry MCS coverage eastward across DSDP site 387 and as far into the Bermuda rise as time would permit.

We completed approximately three crossings of COST B-2 using different seismic array configurations in an effort to evaluate velocity resolution as a function of detector spacing.

A short run was also completed on the shelf using 50 m detector spacing and firing two air guns spaced at 25 m apart. The air guns were fired alternately on a five second schedule. The resulting record spacing should be 12.5 m, after processing, or one fourth our standard spacing. Some difficulty was experienced in synchronizing the shooting schedule with the recording equipment because at least 2.5 seconds are lost to functional operations in the DFS IV before recording can actually begin. The result was that we were able to record a 5.0 sec data window on the odd shots and only 1.0 second on the even shots. In future experiments the instrument cycles will have to be adjusted quite carefully to insure equal recording length on both odd and even numbered shots. Recording windows much longer than 3 seconds per shot are unlikely, if not impossible.

The remainder of the track was covered more or less as planned with all critical MCS lines being spiked with sonobuoys as required. MCS operations were suspended for technical reasons before reaching DSDP site 387, but the line was completed with single-channel methods which were adequate to satisfy scientific objectives.

We completed approximately 900 n.m. of MCS coverage. This amount was considerably smaller than anticipated due to numerous technical difficulties with the seismic streamer which began with incorrect ballasting and increased with numerous and unavoidable encounters with fishing equipment anchored near the

edge of the continental shelf. Some nine active sections and two stretch sections were repaired or replaced. Total losses included two depth control units and an entire tail buoy assembly including radio beacon and flasher.

Ship operations went quite well considering the shake-down status of the leg. A single power failure was handled very smoothly by the Captain without hazard to the streamer. The Captain and Senior Officers are knowledgeable and sensitive to the problems of MCS work. The remainder of the crew will benefit from experience over the next few months. The ship itself remains difficult to handle during streamer recovery operations in any kind of sea. We would benefit from some kind of tunnel-thruster or active rudder which would allow lateral movement of the stern independent of forward (or reverse) motion. Future MCS work in the southern ocean promises intersting challenges to both crew and scientist in this respect.

It would appear that most of the scientific objectives of the leg were satisfied. MCS monitor records in deep water were quite promising. The shallow water data cannot be estimated without preliminary data processing but sample data tapes returned to the lab for evaluation indicate the recording system was still in proper alignment and working well at the end of the MCS run. The 364 reels of recorded seismic tapes have already been returned to the lab for processing.

(understanding?) that the winch would be worked on by Machine Shop people during the ship layup. Apparently the winch was not touched during this period, and the operator is now trying to catch up. I suspect it will be in good order for the Barbados-Rio leg.

The new Loran C received mixed reviews. Reception at night and in many near-continent areas was poor. This may have been due to poor antenna location or to natural causes. The Captain tended to blame the instrument but I suspect he was disappointed in not getting a more familiar and expensive system without the automatic position computing. When reception was good, the Captain and officers alike seemed to enjoy the computational abilities of the Micro Loran though they complained it was too slow (not that they could compute the position any faster). Antenna position should be improved before final judgment is made. The Loran C positions do not agree with Sat Nav fixes which is not a new problem but one which will need to be resolved if Loran is going to be used to interpolate between satellite fixes.

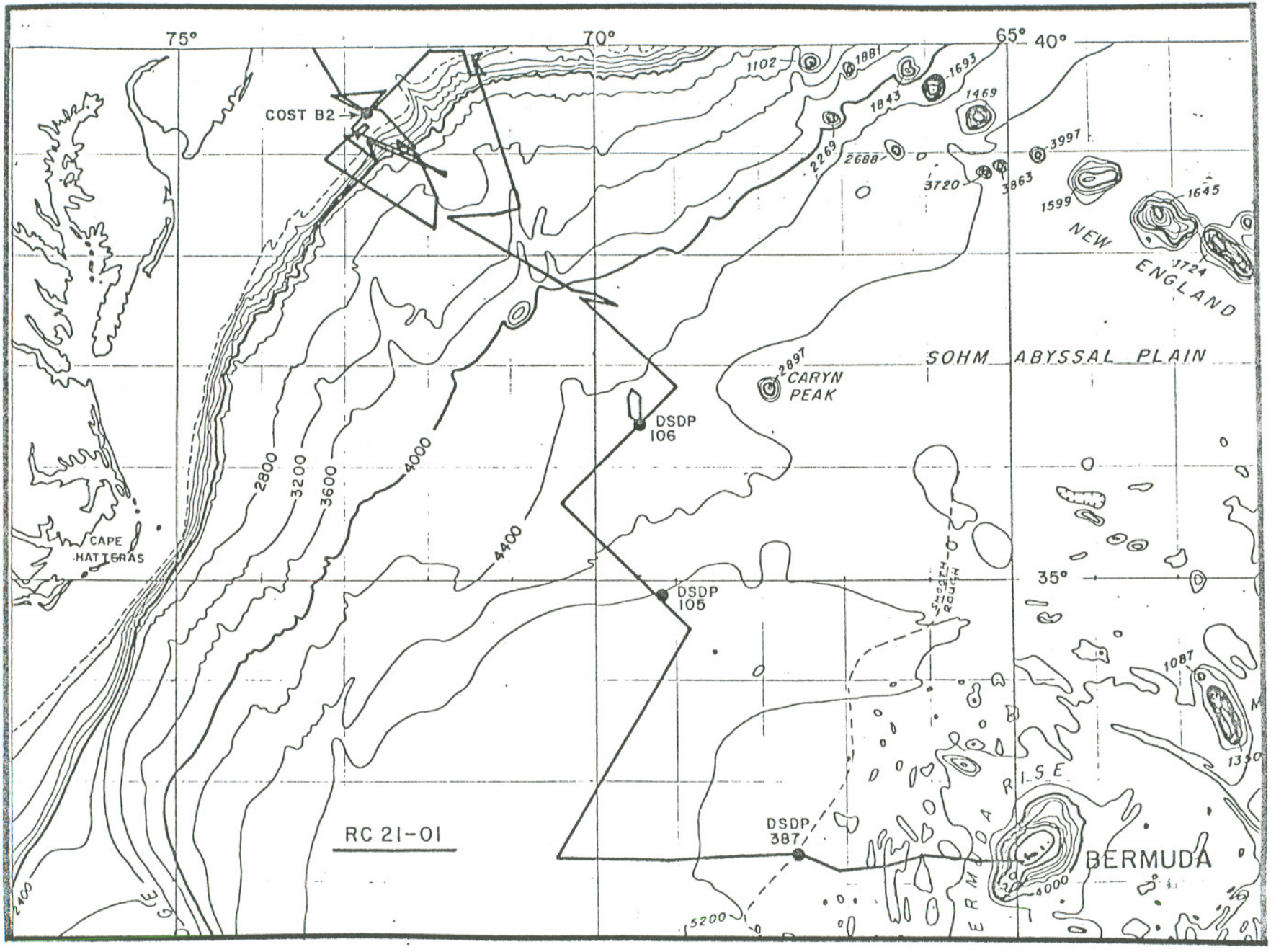
It would be premature and unfair to judge the new scientific crew on the basis of a three-week shake-down leg. There are no obvious problems yet and perhaps one or two outstanding people.

The ship's computer system was down for the entire cruise with unspecified malaise. A factory representative in Bermuda indicated that the major problem was in broken and/or intermittent connections in the cables between the various subassemblies. Computer shock-mounts are much too soft and tend to resonance with low frequency vibrations of the ship's screw. Vibrations from the engines and compressors do not carry into the computer room to any serious degree. Therefore changing to stiffer computer mountings should not sacrifice mechanical isolation from known mechanical disturbances in the engine room area.

The Sperry Doppler sonar log did not work properly during the entire leg. Although speed and distance logs are usually taken for granted, it is very inconvenient to work efficiently without them. The Sperry people were to repair the Doppler log in Bermuda.

The fuel tank hatch covers in the magazine leaked flooding the magazine with several inches of diesel oil. Five cases (some counted eight) of computer tape were destroyed. The magazine was unloaded, pumped out, cleaned, and the hatches retightened. The hatches are a recent modification to the ship. I question the wisdom of locating them in the magazine.

CONRAD's core winch looks to be in rather poor shape. I gather that the winch operator let things slide with the hope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70°
65°
40°
35°
COST B2
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1469
1843
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2688
3720
3863
3997
1599
1645
1724
NEW ENGLAND
SOHM ABYSSAL PLAIN
2897
CARYN PEAK
DSDP 106
DSDP 105
DSDP 387
2800
3200
3600
4000
4400
5200
CAPE HATTERAS
HATTERAS OUTER RIDGE
BERMUDA RISE
1087
1330
4000
BERMUDA
RC 21-01