TR-049

UNIVERSITY OF RHODE ISLAND · KINGSTON, R. I.
Narragansett Marine Laboratory Graduate School of Oceanography

TR-049
KRAUSE

CRUISE REPORT
CRUISE TR - 49
22 April - 10 June 1968
R/V TRIDENT

A 50-day cruise was made in the North Atlantic Ocean from 22 April to 10 May 1968. The operations involved geological and geochemical studies.

Leg 1 22 April - 16 May 1968, Narragansett, Rhode Island to St. George, Bermuda (25 days) - 16-19 May 1968 - St. George, Bermuda

Leg 2 19 May - 10 June 1968, St. George, Bermuda to St. George, Bermuda (23 days)

Scientific Party

Dr. Dale C. Krause (URI) Scientific Leader, Geology - Leg 1

Bonnie A. McGregor (URI) Scientific Leader, Geology - All Legs

Peter Betzer (URI) Geochemistry - Leg 2

George Steele (URI) Geology - All Legs

Christine Trmal (URI) Geology - All Legs

Arthur Buddington (URI) Oceanographic Specialist - All Legs

Timothy Kennard (URI) Oceanographic Specialist - All Legs

Ship Personnel

B. Collinson, Master

C. Sawyer, Chief Mate

D. Hlousek, 2nd Mate

O. Palardy, Bosn.

H. Martin, Able Bodied Seaman

J. Fratus, Able Bodied Seaman

J. Stohlberg, Jr., Able Bodied Seaman

L. Gabrault, Able Bodied Seaman

G. Robb, Ordinary Seaman

A. Gomes, Ordinary Seaman

J. Stowell, Ordinary Seaman

P. Neves, Cook

F. Flores, Messman

J. Evans, Radio Officer

J. Symonds, Chief Engineer

D. Symonds, 1st Ass't Engineer

G. Williams, 2nd Ass't Engineer

G. Alves, Oiler

H. Ellsworth, Oiler

R. Price, Oiler

W. Fenton, Oiler

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Geology

Soundings and magnetic readings were obtained routinely with, respectively, a metric Alpine PESR coupled to an Edo echo sounder and a Varian shipborn magnetometer. A sub-bottom profiler system (a Bolt Associates Pneumatic Acoustic Repeater with a General Oceanics "garden hose" hydrophone and a Raytheon PFR Recorder) was used in various study areas. Sediment cores were taken with a 150 lb. gravity corer, and rock samples were taken with a chain-bag dredge. Bottom photographs were taken in areas where dredge hauls were made.

A sub-bottom profile was made between 40°N, 69°W and 38°07'N, 67°30'W down Hydrographer Canyon. This was part of a preliminary study for a later R/V Trident cruise.

A general survey of the Corner Seamounts area 36°35'-34°N and 52° - 47°W was conducted using echo sounder, magnetometer, and seismic profiler. Three seismic profiler lines were conducted from 36°N, 52°W to 36°N, 47°W, from 36°40'N, 48°W to 34°N, 48°W and from 36°40'N, 50°W to 34°N, 50°W. The objective of these lines was to determine the thickness of sediments, the type of sedimentation, and the degree of distortion. Maximum sediment penetration was approximately 600 m. Bedrock was reached in areas near the seamounts. Seven seamounts were surveyed in detail with the echo sounder and magnetometer, to determine shape and general trends. Three of the seamounts were found to be guyots, with the tops at about 1100 m. Minimum depths recorded were as follows: 1160 m on seamount at 35°15'N 48°10'W, 975 m at 34°39.5'N 49°51'W, and 635 m at 35°30'N 51°59'W. The seamount at 34°39.5'N, 49°51'W has a terrace around it at 1300 m. The magnetics in this area are of interest, because the seamounts have very small magnetic anomalies, approximately 300 γ. One of the objectives is to determine the cause of this anomaly size.

Core, dredge, and camera stations were made on four seamounts. The seamounts were covered with carbonaceous sand, gravel, and living and dead coral. Two rock samples were obtained.

The objective of this study is to determine the origin and history of the sea floor in the Corner Seamounts area.

Seven days of the cruise were devoted to a reconnaissance survey northeast of B. McGregor's survey area (Corner Seamounts area). The object of the survey was to closely examine the westernmost end of the West Azores fracture zone studied previously on cruises TR-21 and TR-28 (TR-28 studied the easternmost end). The survey consisted of six north-south lines of roughly 10 mile spacing between 35°30' - 38°00'N lat. and 45°20' - 46°25'W long. along with other cross lines. The data recorded consists of precision echo soundings, total field magnetics (Varian proton magnetometer) and seismic profiles (air gun). The speed during the seismic profiling ranged from 6-8 knots. Where possible, seismic profiling was done with three 10 cubic inch Bolt air guns. Solenoids, however, gave considerable trouble and the last section of the survey was run with a single air gun with an 18 cubic inch chamber built aboard ship. The profiler data was recorded on a dry paper Raytheon PFR recorder.

Preliminary analysis of the data reveals that east-west structure does exist in accordance with the existence of the West Azores fracture zone. However, these structures in places are terminated abruptly by other structures which may accord with B.C. Heezen's fracture zones.

DREDGE STATIONS

Station	Sample	Latitude	Longitude	Date	Depth (m)
1	D-1	35°10'N	48°10'W	5/4/68	1400
	Samples recovered - Coral and globigerina ooze from side of seamount				
1	D-2	35°10'N	48°10'W	5/4/68	1175-1350
	Samples recovered - Coral, crinoids, blocks of globigerina ooze from top of seamount (flat topped)				
2	D-1	34°39.5'N	49°51'W	5/29/68	1365-1410
	Samples recovered - Two orange fan corals from side of seamount				
3	D-1	34°08'N	51°46'W	6/1/68	2500-2700
	Samples recovered - Carbonaceous sand with clay, buff color with shell fragments, and a cobble from side of seamount				
4	D-1	35°30'N	51°59'W	6/4/68	750-950
	Samples recovered - Corals, echinoderm, pelecypods, brittle stars and basalt cobble from top of seamount				

CORE STATIONS

Station	Sample	Latitude	Longitude	Date	Depth (m)
2	C-1	34°39.5'N	49°51'W	5/29/68	1275
	Samples recovered - Calcareous sand and coral fragments - no penetration - terrace on side of seamount				
2	C-2	34°39.5'N	49°51'W	5/29/68	1300
	Samples recovered - A little calcareous sand, no penetration - side of seamount				
3	C-1	34°08'N	51°46'W	6/1/68	1970
	Samples recovered - Tan globigerina ooze - sand and silt 13 cm long - top of seamount				
4	C-1	35°30'N	51°58'W	6/4/68	1090
	Samples recovered - Small amount calcareous sand.- top of seamount				

CAMERA STATIONS

1	Cam 1	35°10'N	48°10'W	5/5/68	1165
	Top of seamount				
2	Cam 1	34°39.5'N	49°51'W	5/29/68	1200-1680
	Side of seamount				
4	Cam 1	35°30'N	51°59'W	6/4/68	910
	Top of seamount				

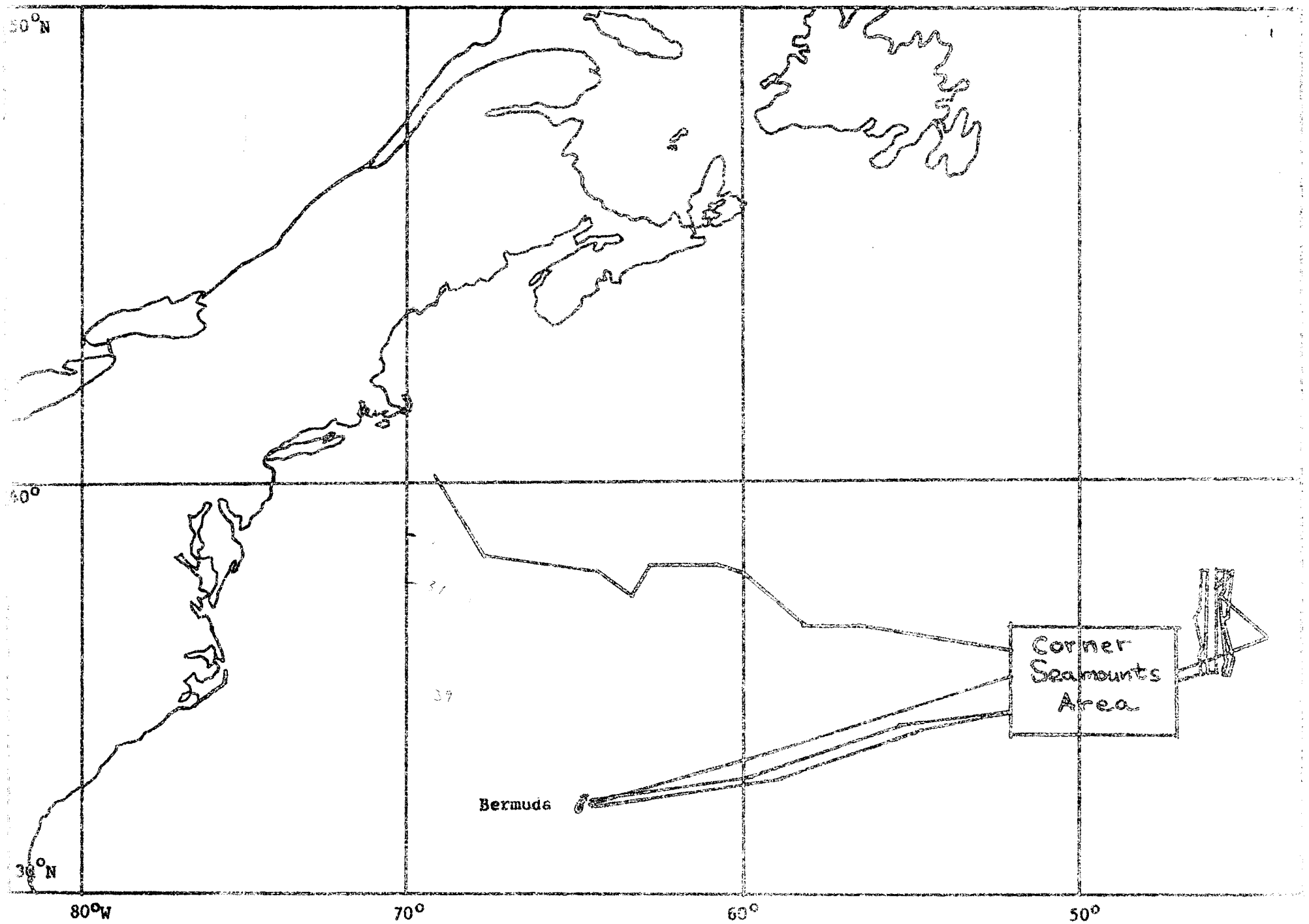
Geochemistry

Thirty-eight hydrostations were occupied between Bermuda and Bermuda (Leg 2) on Trident cruise TR-49. Thirty liter Niskin samples were taken in surface and deep water in an effort to assess variations in particulate iron levels with depth. Water collected in the 30 liter Niskin bottles was filtered through 90 mm, 0.45μ , millipore filters. Iron analyses will be carried out in the laboratory by atomic absorption spectroscopy. In additon to isolating particulate matter larger than 0.45μ diameter, salinity and temperature measurements were collected at each shallow (0-300 meters) station and salinity and oxygen data at each deep (600-5000 meters) station. Station coordinates as well as the depths at which water samples were taken follow:

STATION #	SAMPLE DEPTHS (meters)	COORDINATES
1	0-25-50-75-100-300	32°16.5'N 64°25'W
2	0-25-50-52-75-100	32°27'N 63°17'W
3	300-600-1000-4000	32°29.5'N 63°14.6'W
4	0-25-50-75-100-300	32°40'N 60°24'W
5	0-25-50-75-95-103	33°03'N 58°33'W
6	300-600	33°27.5'N 56°48'W
7	300-600-1000-2000-3000-4000	34°07'N 54°55'W
8	0-25-27-50-75-100	34°09'N 53°05.5'W
9	0-25-50-75-100-300	34°33'N 50°52.5'W
10	600-1000-2000-3000-4000-5000	35°09'N 49°32.5'W

STATION #	SAMPLE DEPTHS (meters)	COORDINATES
11	0-25-50-75-77-100	34°48'N 48°43'W
12	0-25-50-75-100-300	34°40'N 48°20'W
13	600-1000-2000-3000-3002-3500	34°30'N 47°26.5'W
14	0-0-50-50-100-100	34°02.9'N 47°43'W
15	600-998-1000-2000-3000-4000	34°33'N 50°35'W
16	0-2-25-50-75-100	34°26.8'N 50°30.5'W
17	0-25-50-75-100-300	34°14'N 51°54'W
18	0-25-50-75-100-300	34°41'N 51°38.5'W
19	300-600-900-1200-1500-1800	34°17'N 51°42'W
20	0-25-48-50-75-100	35°53.1'N 51°46.1'W
21	600-1000-2000-3000-4000-5000	35°05'N 51°48'W
22	600-1200-2200-3200-4200-5000	35°07'N 50°40'W
23	0-25-50-75-100-300	35°35'N 51°52'W
24	0-25-50-75-100-300	35°23'N 51°10.5'W
25	600-1000-2000-3000-4000-5000	35°28'N 52°18'W
26	0-24-25-50-75-100	35°02'N 53°09'W
27	0-10-20-30-40-50	34°40.5'N 55°12.5'W
28	50-60-70-80-90-100	34°40.5'N 55°12.5'W

STATION #	SAMPLE DEPTHS (meters)	COORDINATES
29	600-1000-2000-3000-3998	33°58'N 57°47'W
30	600-1000-2000-3000-3998-4000	33°49'N 58°34'W
31	0-25-50-75-100-300	33°32'N 59°50'W
32	600-602-1000-2000-3000-4000	32°58'N 61°27'W
33	0-25-50-75-99-100	32°58'N 61°27'W
34	0-25-50-75-100-300	32°41'N 62°46'W
35	600-1000-2000-2002-3000-4000	32°41'W 62°46'W
36	300-600-1000-2000-3000-4000	32°26'N 64°03'W
37	0-25-50-75-100-300	32°26'N 64°03'W
38	0-25-50-75-100-300	32°18'N 64°00'W



Track Chart for Trident Cruise #49

515
520
525
530
535