TR-174

LEDBETTER
TR-174

UNIVERSITY OF RHODE ISLAND
KINGSTON · R. I. 02881

Graduate School of Oceanography · Narragansett Bay Campus

CRUISE REPORT

R/V TRIDENT CRUISE 174

Schedule
Departed Lisbon, Portugal — 0930 GMT October 24, 1975
Arrived St. George, Bermuda — 1100 GMT November 16, 1975
Days at sea: 24

Region Investigated
North Atlantic Ocean

Benefitting Grants
ONR-N00014-76-C-0226 (G.R. Heath and T.C. Moore, Jr. G.S.O./U.R.I.)
NSF-IDOE-750-04-215 (H. Stommel, Woods Hole Oceanographic Institution)
NSF-IDO-75-22133 (Jorn Thiede - Oregon State University)

Scientific Personnel

Mr. Michael Ledbetter	Chief Scientist — U.R.I.
Dr. George Seaver	Research Scientist — M.I.T./W.H.O.I.
Mr. Theodore Bentinnen	Marine Technician — U.R.I.
Mr. Stephen Imms	Marine Technician — U.R.I.
Mr. Roger Roussell	Assistant — U.R.I.
Ms. Nancy Penrose	Assistant — O.S.U.
Mr. Ralph Moore	Research Assistant — O.S.U.

Ship Personnel

H. Bennett	Master
J. Seeley	Chief Mate
J. Frank	Second Mate
A. Carter	Radio Officer
H. Martin	Boatswain
J. Hall	Able Bodied Seaman
H. Bickford	" " "
W. Wise	" " "
J. Murray	Ordinary Seaman
L. Martin	" "
P. News	Steward
E. Carroll	Second Cook
J. Symonds	Chief Engineer
F. Nelson	Third Engineer
J. Walter	" "
J. O'Toole	Oiler
T. Hennessey	"
C. Hall	"

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Purposes of the Investigations:

A) Gilliss Seamount Coring (Heath & Moore)

The purpose of this cruise was to investigate the sedimentary record of areal and temporal changes in bottom current velocities around the Gillis Seamount. Over forty gravity cores were to be taken in a closely spaced grid around the drape of sediment cover on the seamount and the adjacent abyssal plain in order to study the physical properties of the sediment as a function of changing bottom current conditions.

B) XBT-Profile (Stommell)

The XBT-profile was to be taken along constant latitude (39^{o} 30'N) at a spacing of approximately 16 km and along the cruise track into Bermuda. The purpose was to locate large cyclonic eddies.

C) Iberian Basin Coring (Ledbetter, Thiede - O.S.U.)

A gap in the southern edge of the Iberian Basin allows bottom currents to flow south out of the basin. Cores across this gap will be used to trace the history of bottom water flowing out of the basin.

Summary of Results:

A) Gilliss Seamount Coring

Forty seven gravity cores were recovered from fifty stations around the Gilliss Seamount. Spacing between cores was increased with distance from the seamount because the largest affect on bottom currents due to the presence of the seamount is expected to occur nearest the seamount. Two previously identified deposits attributed to bottom current deposition on the eastern and western flanks of the seamount were more heavily cored and initial on-board inspection suggests some differences between the two deposits. The core coverage is adequate to discern areal differences due to shifting patterns of deposition related to changing climatic effects. The core length was not as great in some areas as anticipated, but in most cases the record should be long enough to sample both glacial and interglacial epochs in order to understand the role of climate on bottom current history in this region. (See Table 1-B).

B) XBT-Profile

384 XBTs were taken along a profile on latitude $39^{o}30'$N from 12^{o} to 54^{o}W and from $39^{o}30'$N, $55^{o}00'$W to Bermuda with a spacing of approximately 17 km. Five cyclonic eddies were discovered and an attempt was made to maintain constant course and speed in order to compute the surface velocity of the eddy by the offset from the designated course as determined by satellite navigation. Two of the eddies were encountered during storms and complete information is not available due to failure of the XBT system in the rough seas (see Table 2). Bucket thermometer readings of the surface water were collected at each XBT station.

C) Iberian Basin Coring

Eight piston cores and accompanying trigger cores were raised in the southern Iberian Basin in the gap connecting the Tagus Basin (Table 1A). The spacing of the cores allows good coverage both areally and in water depth to determine fluctuations in bottom water flowing south through the gap.

D) 3300 nautical miles of Bathymetry were taken using the 12kHz bathymetry profiler and the 3.5 kHz profiler.

Table 1

Coring Stations TR-174

A) Iberian Basin

Core No-Type	Length - Ft.	Lat.	Long.	Water Depth -m
1-PC	16.3	38°57.4'N	10°55.4'W	2945
2-PC	10.5	38°57.3'N	11°14.1'W	3150
3-PC	29.8	38°54.9'N	11°28.0'W	3680
4-PC	27.3	38°49.0'N	11°48.2'W	4310
5-PC	16.3	38°57.0'N	12°12.6'W	4430
6-PC	27.7	39°14.7'N	12°18.0'W	3840
7-PC	18.0	39°23.8'N	12°22.3'W	3675
8-PC	11.8	39°37.0'N	12°19.6'W	2860

B) Gilliss Seamount

1-G	4.0	35°48.8'N	58°20.9'W	5170
2-G	4.1	35°47.3'N	58°27.7'W	5070
3-G	BAG	35°47.2'N	58°29.6'W	4880
5-G	BAG	35°41.8'N	58°32.7'W	4670
6b-G	2.1	35°42.1'N	58°30.2'W	4810
7-G	7.0	35°41.4'N	58°28.2'W	5160
8-G	6.5	35°41.7'N	58°28.0'W	5160
9b-G	6.0	35°38.2'N	58°24.2'W	5000
11-G	0.5	35°37.5'N	58°29.3'W	5170
12-G	9.0	35°36.5'N	58°30.7'W	4920
13-G	6.5	35°35.7'N	58°31.4'W	4400
16-g	8.5	35°29.2'N	58°44.0'W	5160
17-g	6.5	35°27.7'N	58°49.5'W	5160
18-g	2.0	35°30.5'N	58°53.5'W	5160
19-g	9.0	35°38.3'N	58°41.3'W	4400
20-g	10.0	35°39.2'N	58°42.0'W	4600
21-g	9.0	35°39.9'N	58°40.5'W	4750
22-g	6.5	35°39.5'N	58°44.2'W	4850
23-g	8.0	35°41.7'N	58°44.5'W	4950
24b-g	BAG	35°45.6'N	58°52.2'W	5190
25-g	10.0	35°48.2'N	58°22.1'W	5100
26-g	10.0	35°45.2'N	58°40.9'W	5130
27-g	10.0	35°43.5'N	58°39.7'W	4710
28b-g	10.5	35°39.5'N	58°39.4'W	4550
29-g	3.0	35°42.1'N	58°36.1'W	4550
30-g	4.0	35°40.3'N	58°32.5'W	4650
31-g	10.0	35°49.0'N	58°37.7'W	5150
32a-g	0.8	35°49.0'N	58°36.7'W	5150
32b-g	6.0	35°50.0'N	58°37.3'W	5170
33-g	3.5	35°51.5'N	58°34.3'W	5160
34b-g	3.5	35°54.3'N	58°33.4'W	5160
35-g	10.0	35°47.1'N	58°29.8'W	4980
36-g	9.5	35°43.2'N	58°31.9'W	4640
37-g	7.0	35°43.8'N	58°30.1'W	4650
38-g	4.0	35°37.0'N	58°29.9'W	5090
39-g	10.0	35°30.7'N	58°36.0'W	4350

PC = Piston Core G = 4.5" PVC Gravity Core g = 2.5" Gravity Core.

Core No-Type	Length-Ft.	Lat.	Long.	Water Depth-m
40-g	10.0	35°31.2'N	58°33.8'W	4800
41-g	8.5	35°29.9'N	58°33.7'W	5200
42-g	10.0	35°29.3'N	58°32.5'W	5150
43-g	1.5	35°23.7'N	58°29.4'W	5200
44-g	9.0	35°22.8'N	58°36.7'W	5175
45-g	10.0	35°19.8'N	58°45.5'W	5040
46-g	3.0	35°24.4'N	58°44.3'W	5180
47-g	11.0	35°25.7'N	58°42.6'W	5170
48-g	9.5	35°30.2'N	58°38.7'W	4365
49a-g	0.1	35°29.8'N	58°41.6'W	4325
50-g	11.0	35°38.7'N	58°37.7'W	4150

PC = Piston Core G = 4.5"PVC Gravity Core g = 2.5"Gravity Core

Table 2

Eddy Summary

Eddy Number	Diameter(km)	Location		Isotherm	Vert. Displ.
		Lat.	Long.		
1	120km	39°31'N	26°06'W	10°	200m
2	150km	39°29'N	45°04'W	15°	280m
3	225km (Storm)	39°38'N	50°56'W	15°	490m
4	West side only (Storm)	39°44'N	53°54'W	15°	330m(min)
5	283km	36°48'N	57°50'W	15°	450m

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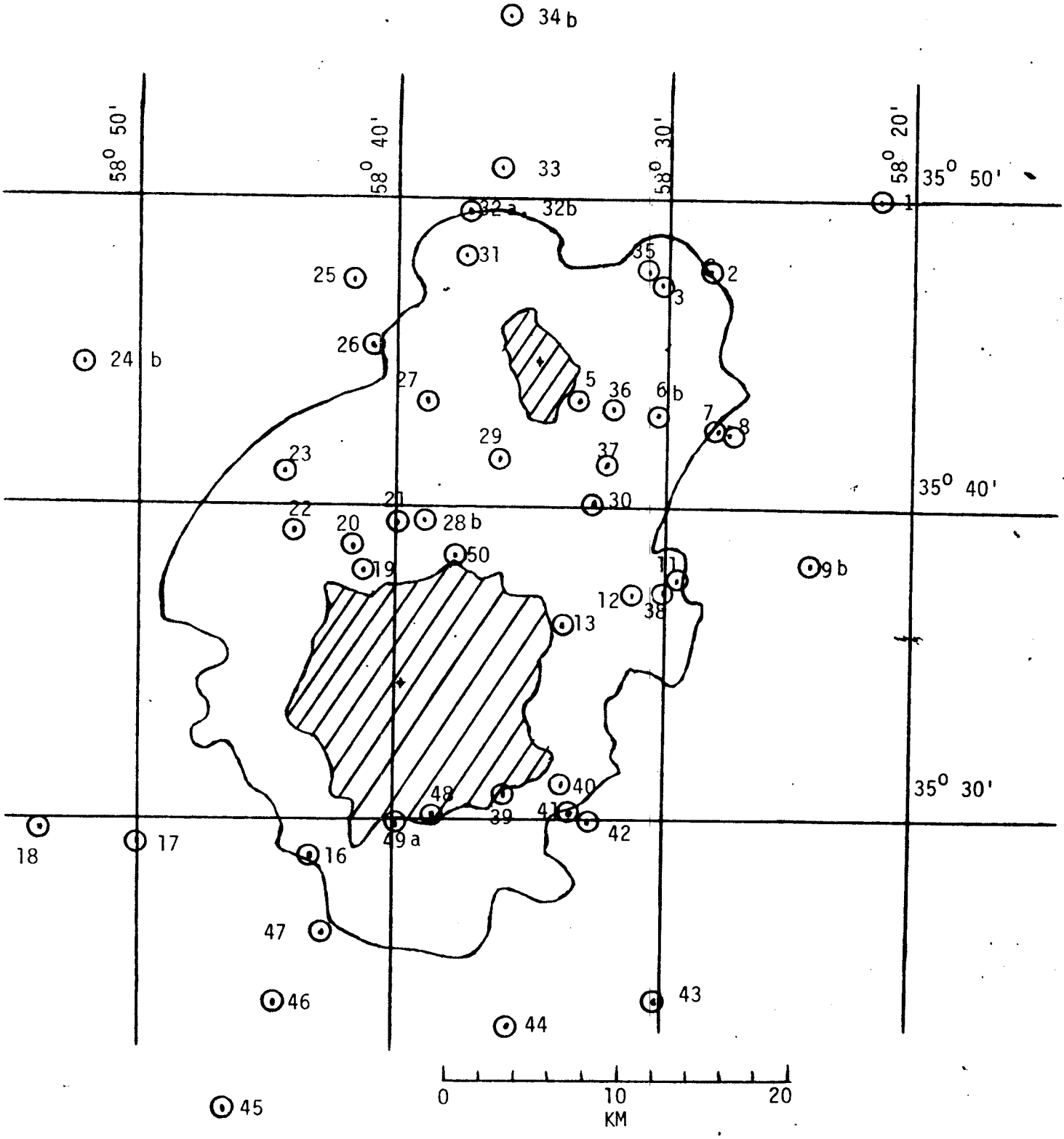
CHART #1

GILLISS SEAMOUNT

GRAVITY CORE STATIONS



///// = SEDIMENT FREE AREA (2200 fm isobath)

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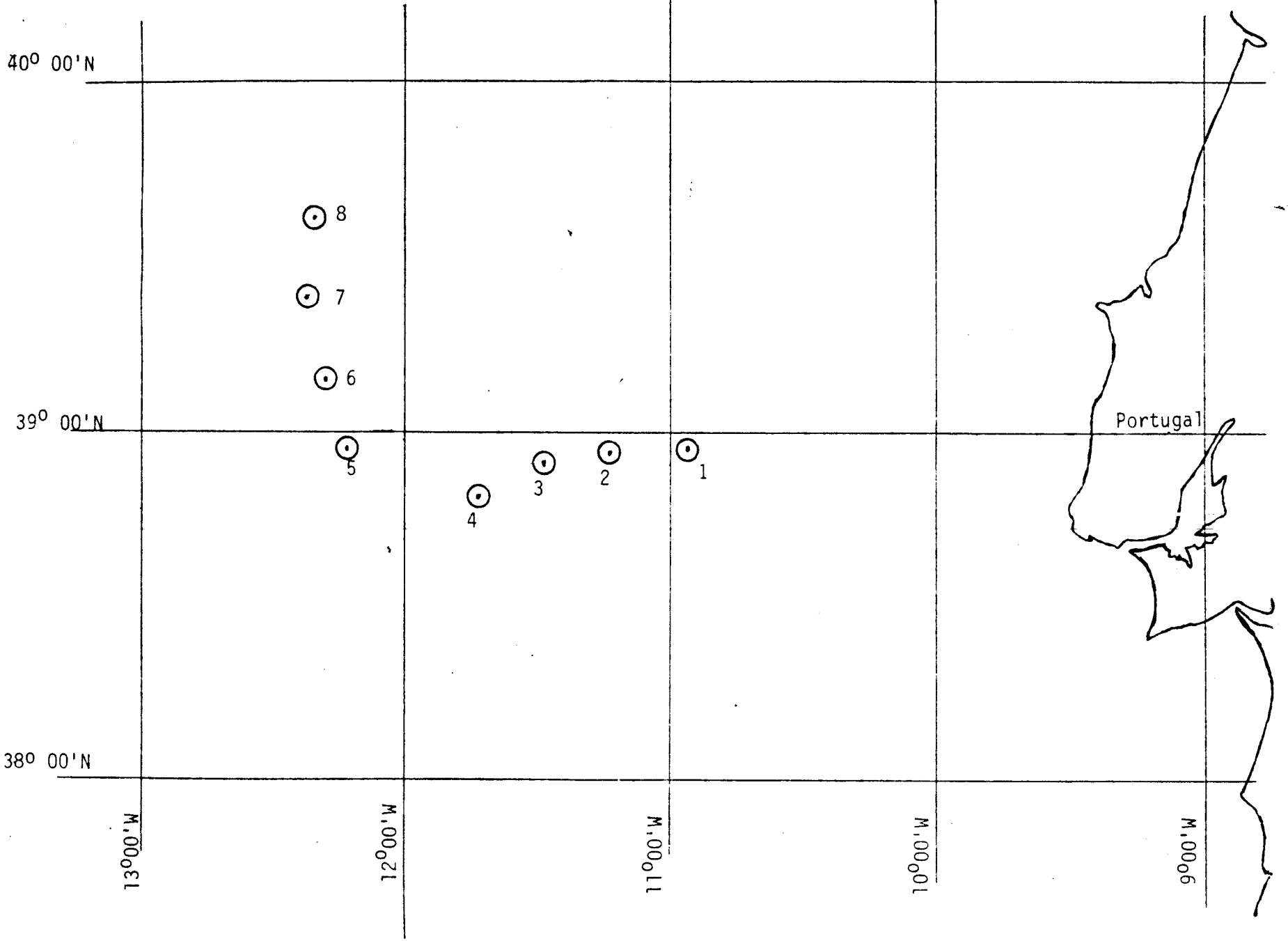
CHART #2
IBERIAN BASIN
TR-174 PISTON CORE STATIONS



R/V TRIDENT CRUISE TRACK

CHART # 3

CRUISE TRACK TR-174

24 Oct - 16 Nov 1975