

J-G

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Received 28 April 1975

UNIVERSITY OF RHODE ISLAND
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Graduate School of Oceanography • Narragansett Bay Campus

CRUISE REPORT

R/V TRIDENT

TR 164

J-G

SCHEDULE

8 March 1975	Guayaquil, Ecuador
1 April 1975	Guayaquil, Ecuador

REGION OF INVESTIGATION AND PURPOSE

Rock dredging along the Galapagos Spreading Center, east and west of the Galapagos Islands (see chart attached), for the purpose of laboratory petrological, geochemical and geological studies.

SCIENTIFIC PARTY

J-G. Schilling	URI	Chief Scientist	Switzerland
M. Bergeron	URI	Student	USA
W. White	URI	Student	USA
G. Beaulieu	URI	Student	USA
R. Evans	URI	Chemist	USA
R. Kingsley	URI	Geologist	USA
M. Zajac	URI	Geologist	USA
L. Bedingfield	MIT	Student	USA
E. Kumin	Wellesley	Student	USA
A. Buddington	URI	Technician	USA
P. Hendershot	URI	Technician	USA
G. Soriano	INOCAR Ecuador	Observer	Ecuador
M. Valencia	INOCAR Ecuador	Chemist	Ecuador
B. Beate	Politecnica Quito, Ec.	Student	Ecuador

SHIP COMPANY

C. Vanderhoop, Master	J. Braconnier, Ordinary Seaman
R. Reusswig, Chief Mate	J. Symonds, Chief Engineer
J. Seeley, Second Mate	T. Surette, First Engineer
A. Carter, Radio Officer	T. Ziegler, Second Engineer
H. Martin, Bos'n.	J. Muscatelli, Oiler
E. Carroll, AB Seaman	A. Rose, Oiler
P. Babbett, AB Seaman	J. Cormier, Oiler
R. Johnson, AB Seaman	P. Neves, Steward
D. Nelson, Ordinary Seaman	W. Theagene, Second Cook

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OPERATIONS AND PRELIMINARY RESULTS

1. A total of 27 dredge stations were occupied with a total recovery of 5107 kg. of fresh to semi-fresh basaltic rocks. Sample location and description are given in Table 1 and Figure 1.
2. Each dredge station was accompanied by short (~25n.m) seismic, bathymetric and total magnetic-intensity field profiles perpendicular to the ridge to locate dredging sites. The same data recording was obtained during transit lines, except that no magnetic recording was obtained after March 18 due to a permanent breakdown of the magnetometer recording system.
3. Water surface temperature measurements at two hour intervals were obtained by the Ecuadorian scientists, as required by INOCAR. Continuous recording of the water surface temperature was also obtained for a cross check.
4. Forty-eight hours were spent steaming to and out of the Galapagos Islands, to obtain clearance at San Christobal, and for an eight-hour visit at Santa Cruz.

The hourly breakdown of operations is:

	Hours	%*	Approx. n. miles
Dredging	134	22	--
Magnetic profiling	146	24	1200
Sub-bottom profiling (CEPS, 3.5KZ)	364	61	3000
Bathymetric profiling	407	68	3250

*Relative to 25 days total

ACKNOWLEDGEMENTS

We thank Raul TOLDEO Echeverria, Captain de Corbeta U.N., Director del Instituto Oceanographic de la Armada, for authorizing R/V TRIDENT to work in Ecuadorian Territorial Waters around the Galapagos Islands, and for providing generous assistance in port in Guayaquil. We also thank Alferez de Fragata, Ingeniero Guillermo Soriano, INOCAR, Dr. Manuel Valencia, INOCAR, and Mr. Bernardo Beate, Escuela Politecnica Nacional, Quito, for their valuable assistance during the cruise. The assistance of Captain C. Vanderhoop and his crew as well as Chief Engineer J. Symonds is also greatly acknowledged.

This work was supported by the National Science Foundation Grant DES 72-01705.

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TABLE 1: TR164 ROCK DREDGING STATIONS

Station	Location	Depth(m)	Feature	Recovery	Weight(kg)
1D	00 44.2'N 87° 28.9'W	2160-2200	EGSC-Line 1 crest-S side ridge	Fresh pillow basalts-aphyric-some glass-some Mn-coating 3-5mm thick	365
2D	00 43.1'N 87° 51.8'W	2100-2130	EGSC-Line 2 Top of ridge crest	Few, fresh glassy pillow basalt frag- ments	6
3D	00 43.7'N 88° 14.1'W	1967-2020	EGSC-Line 3 Top ridge crest	Abundant, fresh glassy pillow basalts and crusts-Aphyric-few dispersed vesti- cles-few samples with Mn<1mm.	303
4D	00 44.8'N 88° 35.8'W	1850-1910	EGSC-Line 4 S side ridge crest	Abundant, fresh glassy pillow basalts	729
5D	00 46.9'N 88° 53.7'W	1760-1790	EGSC-Line 5 Top ridge crest	Exceptionally fresh, glassy crusts and slabs of basalt lava tubes-ropy flow struct. pressure ridges and stalagmites	23
6D	00 50.6'N 89° 35.3'W	1780-1810	EGSC-Line 6 N side ridge crest	1 large pillow basalt and fragments- Fresh-glassy with palagonite crust preserved. Few samples with Mn-film	97
7D	00 51.5'N 89° 59.4'W	1700-1720	EGSC-Line 7 Top ridge crest	1. Very fresh glassy crusts-surpris- ingly vesicular and bubbly. 2. Tuffa- ceous material (or altered scoria?)- traces sediment.	22
8D	00 54.7'N 90° 22.9'W	1660-1700	EGSC-Line 8 S side ridge crest	Two small pillow fragments-one small crust and a few basalt pebbles (semi- fresh).	1

Station	Location	Depth(m)	Feature	Recovery	Weight(kg)
9D	0° 55.9'N 90° 30.2'W	1540-1570	EGSC-Line 9 Top ridge crest	One large fresh, glassy vesicular pillow basalt and fragments. One fresh crust-aphyric.	89
10D	2° 01.1'N 91° 48.5'W	1920-1970	WGSC-Line 11 Ridge crest w/ opened V cen- tral valley (rift!) N wall of valley.	Two fist-size pillow fragments-semi-fresh-one angular massive basalt cobble and 3-4 small pebbles.	1
11D	2° 05.1'N 92° 14.6'W	1800-1830	WGSC-Line 12 Top ridge crest	Glassy, pillow fragments w/ some crust preserved-one crust slab.	16
12D	2° 15.2'N 92° 41.1'W	1955-2010	WGSC-Line 13 Top ridge crest	1. Fist-size glassy pillows. 2. Glassy pillow fragments(10cm.). 3. Large pillow basalt with Mn-encrustation-no glass. 4. Fresh massive b. flow-blocky. 1 & 4 w/ plagioclase phenocrysts (mm size).	252
13D	2° 25'N 93° 20.6'W	2340-2420	WGSC-Line 14 Ridge w/ rift- Bottom N. wall	Small pillow basalt fragments w/ some glass preserved & crust-hydrothermal stains.	94
14D	2° 28.3'N 93° 45.5'W	2110-2315	WGSC-Line 15 Ridge crest subdued and hilly tophill	Fresh, glassy pillow basalts-some crust preserved w/ glass	207
15D	2° 31'N 94° 03.8'W	2400-2440	WGSC-Line 16 Ridge crest subdued & hilly. Crest center.	1. Abundant semi-fresh pillow basalts & fragments-feldsparphyric-some glass & hydrothermal stains 2. Few fragments very fresh & glassy(1.2cm thick) w/ extr. fresh olivine & feldspar phenocrysts.	176

Station	Location	Depth(m)	Feature	Recovery	Weight(kg)
16D	2° 33.7'N 94° 26.8'W	2360-2400	WGSC-Line 17 Ridge crest subdued & hilly	Abundant, fresh, glassy pillow basalts & fragments (1-75cm long) one plate-some hydrothermal stains & thin Mn-coating	563
17D	2° 34.3'N 94° 52.2'W	2500-2600	WGSC-Line 18 Hilly subdued ridge center	Glassy pillow basalts & fragments- some crusts, and massive basalts semi-fresh	353
18D	2° 17.3'N 96° 10.7'W	2800-2930	WGSC-Line 19 Hilly subdued ridge with broad central depression (rift!)-bottom valley	1. Large, fresh, glassy pillow basalt feldsparphyric 2. Aphyric pillow b. fragments. Type 1 w/ crust preserved. Type 2. Hydrothermal stains-older	340
19D	2° 07.4'N 97° 11.6'W	3300-3375	WGSC-Line 21 Ridge w/ broad rift. Central hill rift bot- tom	Fresh, feldsparphyric, glassy pillow basalts & crusts w/ palagonite crust- dark brown-preserved.	162
20D	2° 14.3'N 97° 51.5'W	3100-3300	WGSC-Line 22 Hilly subdued ridge w/ broad rift- central hill rift bottom	Contorted & ropy pillow basalts en- crusted with very fresh glass with feldspar phenocrysts-unusual structures	386
21D	2° 18.5'N 98° 32.4'W	2620-2700	WGSC-Line 23 Hilly subdued ridge-broad hilltop	One large pillow (0.5m) and frag- ments w/ some glass preserved & Mn- encrustation 3.4mm thick. Two small glassy basalt pillows 5mm thick glass & 3-4mm thick Mn-encrustation	197

Station	Location	Depth(m)	Feature	Recovery	Weight(kg)
22D	2° 17.8'N 99° 33.4'W	3130-3300	WGSC-Line 24 subdued ridge w/ rift-bottom N wall.	Few pieces of glass with dark brown palagonite encrustation-very fresh- glass feldsparphyric-1 thicker piece (5cm)-otherwise mostly 3mm thick.	0.3
23D	2° 17.5'N 92° 53.8'W	2080-2150	WGSC-Line 25 Ridge crest bottom small grabben.	1. Very fresh, glassy pillow basalts with ropy structures-crust preserved 2. Older pillow basalts w/ some glass.	331
24D	1° 57.3'N 91° 23.7'W	1650-1700	WGSC-Line 27' Ridge crest S side crest.	Small glassy, fresh pillow basalt fragments and one crust very fresh- abundant glass debris	10
25D	1° 56.8'N 91° 10.8'W	1955-2020	WGSC-Line 28 Ridge crest- w/ small valley bot- tom & N side wall.	Small pillow basalts & fragments, 3 crusts 1. w/ Mn coating (<1mm) & dark brown palagonite 2. glassy large rognon type w/ pipe vesicles	41
26D	1° 54'N 90° 57'W	1960-2090	WGSC-Line 28' Hilly ridge crest-N wall large hill	Pillow basalt fragments & crusts. Possibly two types 1. fresh and glassy 2. w/ dark brown palagonite crust and Mn coating-few massive lava blocks	271
27D	1° 03.8'N 90° 48.3'W	1830-1880	GSC-segment within offset GFZ-ridge crest S side	Few pillow basalts & 2 large crust slabs (10 cm thick) w/ Mn-coating beneath & some dark palagonite encrustation.	72
EGSC WGSC GFZ	East Galapagos Spreading Center West Galapagos Spreading Center Galapagos Fracture Zone		TOTAL		5,107

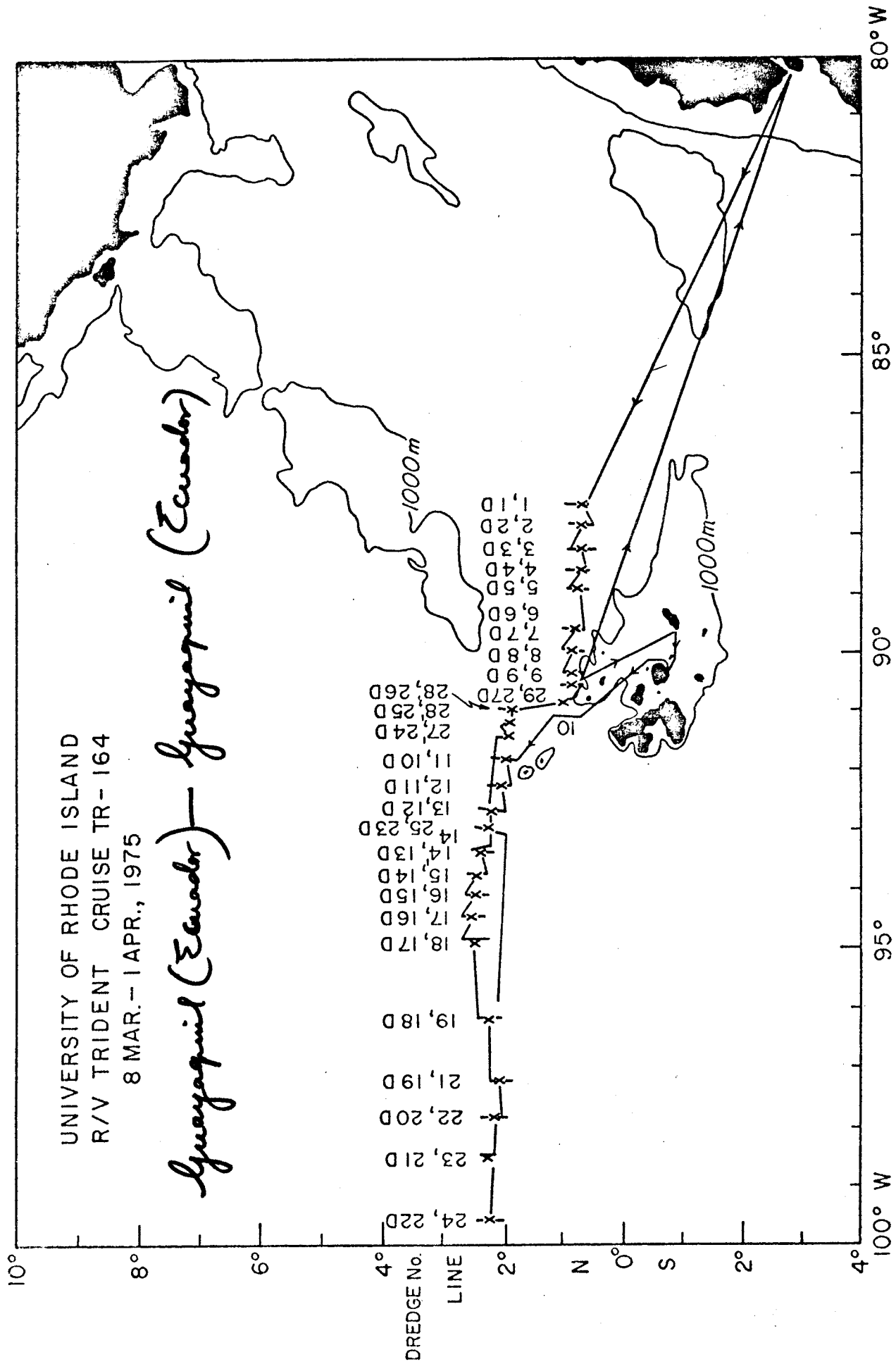


Fig. 1. Ship tracks and location of Dredge Stations (x)