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CRUISE REPORT

Ship Name: R/V VEMA

Cruise No: 33-07

Departure: May 16 from Djibouti, TFAI
Date Port

Arrival: June 12 at Colombo, Sri Lanka
Date Port

Days at Sea: 27

Days Foreign Port: 3

No. of days in arrival port

Area of Operation: Gulf of Aden-Arabian Sea

Program Description:

Rock dredging of the Sheba Axis for the purpose of geochemical and petrological studies - A test for the possible presence of a mantle plume upwelling beneath the Afar and outward flow along the Sheba Ridge.

Participants: (All L-DGO unless otherwise specified)

P.L. Cunningham	Master	S. Prakash	Cook
A. Sala	2nd Officer	R. Baleikasayu	M/M
W. Walters	3rd Officer	S. Bisnath	M/M
R. Johnson	Radio Officer	H. Giddy	Coring Bosun
W. Richards	Bosun	L. Tanner	Coring O.S.
R. Qali	O.S.	J-G. Schilling	Ch. Scientist (URI)
P. Nasilasila	O.S.	P. Howard	Scientific O.S. (URI)
E. B-Smith	O.S.	R. Kingsley	Scientific O.S. (URI)
R. McGill	O.S.	M. Bergeron	Scientific O.S. (URI)
A. Crouse	O.S.	M. Sundvik	Scientific O.S.
J. Coffill	Ch. Eng.	A. Rock	Scientific O.S.
S. Bingham	2nd Eng.	D. Holland	Scientific O.S.
A. Wong	3rd Eng.	D. Quick	Scientific O.S.
D. Keizer	Oiler	J. Powell	Scientific O.S.
J. Hull	Ch. Steward	V. Paisley-Smith	Scientific O.S.

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

(See over)

Breakdown of Operations:

Total Cruise (4095 n.m)	645 hrs	-
Seismic profiling	320 hrs	50%
Magnetics	330 hrs	51%
PDR (3.5 and 12 KHz)	633 hrs	98%
Gravity	645 hrs	100%
Dredging stations (38)	171 hrs	26%

Acknowledgements:

We thank Dr. M. Talwani, Lamont-Doherty Geological Observatory and Captain P.L. Cunningham and his Crew of R/V Vema, for their cooperation in making this cruise possible and a success. This work was supported in part by NSF Grant OCE 76-01577 to J.G. Schilling, Graduate School of Oceanography, University of Rhode Island.

(See over - Table of
dredging record)

TABLE 1 DREDGING RECORD - GULF OF ADEN

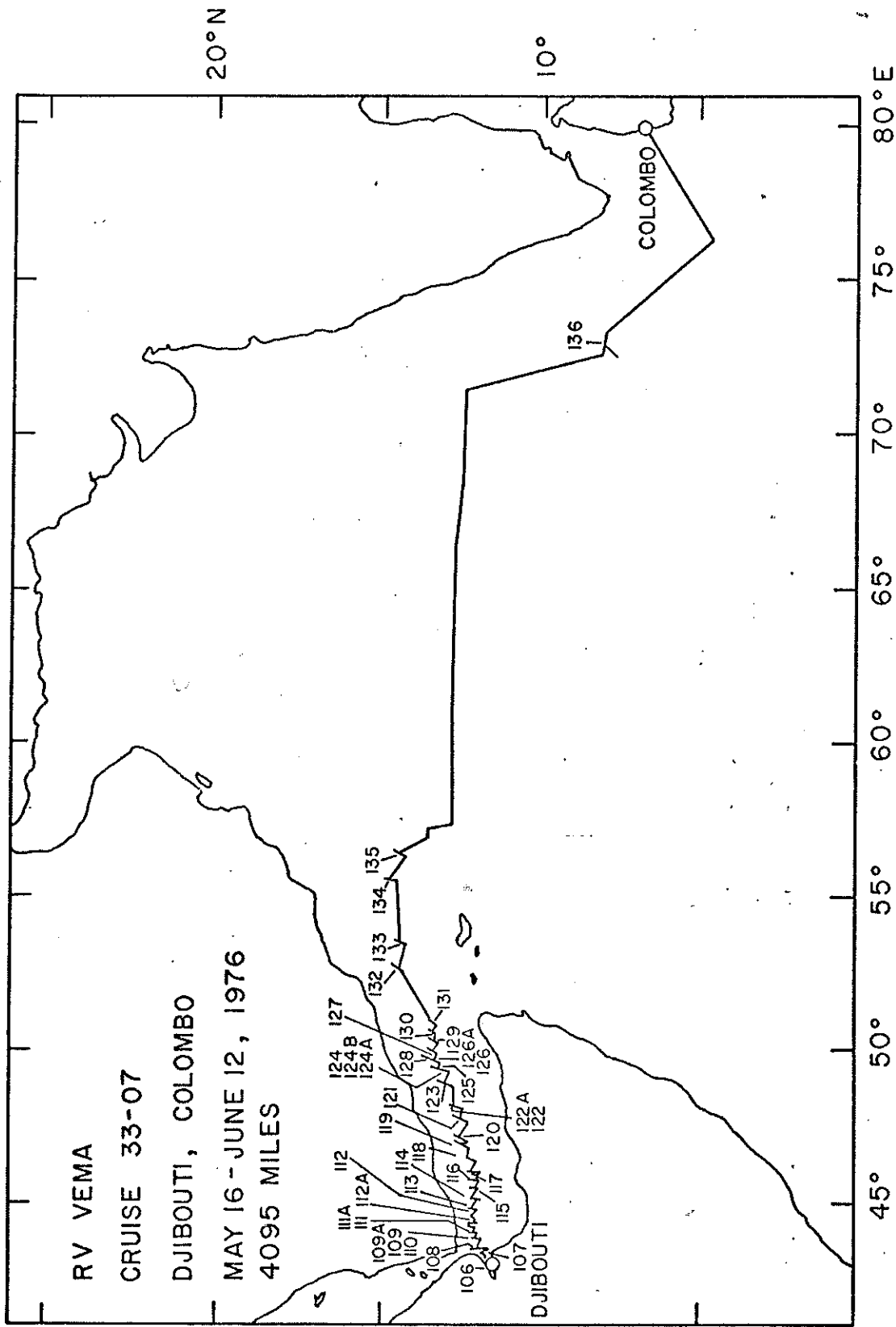
Station	Dredge	Location	Depth(m)	Feature	Recovery	Weight(Kg)
106	40D	11°43.2'N 42°54.7'E	695- 630	Tadjura Deep-volcano on south slope Gulf of Tadjura. Line 1.	Pebbles of basalts, one highly glassy. Corals and organic rich mud-some clay stones.	10?
107	41D	11°56.2'N 43°24.5'E	1130- 770	Upper, north wall of Tadjura Trough. Line 3.	Unconsolidated mud, 1. 5 small fragments of pillow rinds, some glassy; 5 pieces of pillow interior, vesicular. 2. 2 pieces of pumice.	0.5
108	42D	11°56.3'N 43°41.4'E	1465-1320	Lower, south wall of Tadjura Trough-Line 4.	Fairly fresh pillow and fragments of pillow with some glass; consolidated marl with glass attached.	~400
109	43D	12°04' N 43°56' E	1225-1005	Small peak in bottom of Tadjura Trough-Gulf of Aden.	Unconsolidated sediment	
110	44D	12°05' N 43°56' E	1225-1025	South side of central volcano on bottom of Tadjura Trough. Line 5.	Fresh glassy pillow and crust-feldsparphyric.	90
111	45D	12°06.5'N 44°07.5'E	1150- 915	Bottom of Tadjura Trough. Line 6.	Unconsolidated sediment.	
112	46D	12°03.5'N 44°42.8'E	1315-1250	Bottom of Tadjura Trough. Line 7 to 8.	Relatively fresh pillow basalt fragments with some glass.	11
113	47D	12°04' N 44°50' E	1260-1170	South side of central volcano on bottom of Tadjura Trough. Line 8.	1. Very fresh glassy-dark brown crust-pillow basalt fragments. 2. Older-highly altered-yellowish basalt pillow.	270

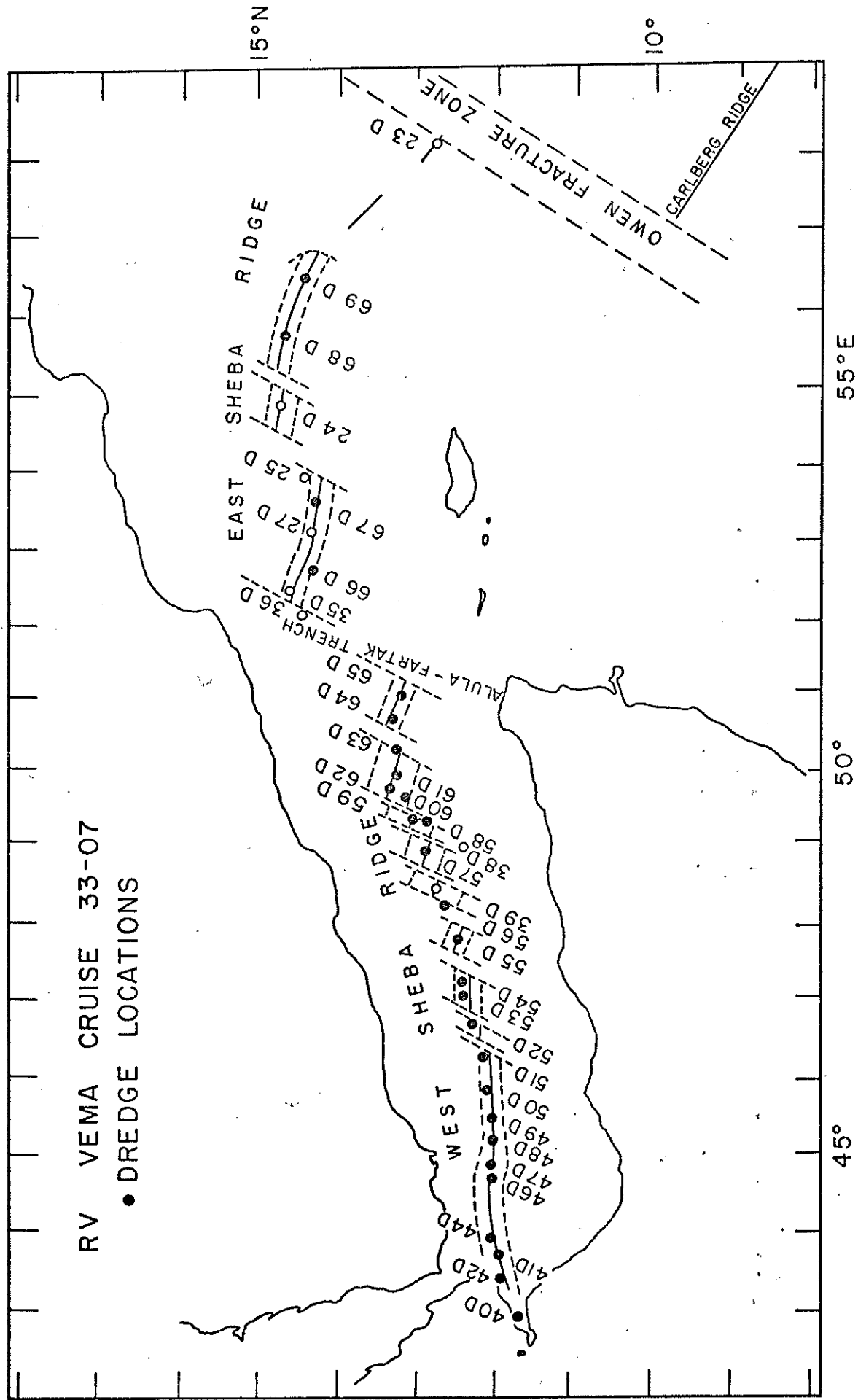
Station	Dredge	Location	Depth(m)	Feature	Recovery	Weight(kg)
114	48D	12°02.6'N 45°12.4'E	1070- 970	South side of central volcano on bottom of Tadjura Trough. Line 9.	1. Fresh glassy-dark brown crust-pillow basalt fragments. 2. Relatively fresh glassy-yellowish to dark brown crust-pillow basalt fragments associated with some indurated sediment. 3. Older, altered-yellowish basalt fragments.	240
115	49D	12°02.5'N 45°30.5'E	1040- 550	South side of axis volcano forming ridge East Tadjura Trough Line 10.	Highly vesicular basalt, some glassy crust-some greenish & reddish scoriaceous alteration product of fulmerole activity-probably near vent. One more massive contains nodule of feldspar.	?
116	50D	12°06.1'N 45°51.2'E	1460-1300	Lower, north wall of East Tadjura Trough Line 11.	1. Blocky vesicular basalt-and one pillow with glass. 2. Older, fist size, brown-yellowish palagonite with some glass-pillow basalt fragments; thick mud; one coral.	?
117	51D	12°09.3'N 46°17.3'E	1890-1755	South side of central volcano in East Tadjura Trough. Line 12.	Fresh glassy pillow basalt, some brown crust-unconsolidated sediment, siliceous sponges.	210
118	52D	12°16.2'N 46°42.5'E	1930-1830	Rift bottom of west Sheba Ridge. Line 13	2 pillow basalt fragments with slightly palagonitized glass; and massive rock and glass fragments.	14
119	53D	12°25.3'N 47°06' E	2120-2050	Central volcano on rift bottom of West Sheba Ridge. Line 14	Fresh pillow basalt fragments 2 pillows, abundant glass chips some crust preserved. Unconsolidated mud.	47

Station	Dredge	Location	Depth(m)	Feature	Recovery	Weight (Kg)
120	54D	12°25.3'N 47°14.8'E	1700-1590	Top of central horst-like ridge axis, west Sheba Ridge. Line 15.	1. Two large, fresh, glassy, aphyric pillow basalt-slightly palagonitized 2. Abundant fresh highly glassy, plagioclase-cpx porphyritic pillow basalt fragments, with fresh crust. Some pieces of interlayering of glass with indurated sediments.	230
121	55D	12°28.4'N 47°50.4'E	2635-2450	Bottom north wall of rift, west Sheba Ridge. Line 16.	Extremely fresh glassy pillow basalt fragment with crust. Some reapy structures. One large 1m x .8m pillow-museum piece (~400Kg)-abundant thick mud.	106 + ~400
122	56D	12°38.9'N 48°16.3'E	2230-2065	Bottom north wall of rift, west Sheba Ridge. Line 17.	One large and few smaller feldsparphyric pillow basalts with some glass preserved. Mud.	~130
123	57D	12°53.8'N 48°59.4'E	2290-2085	South side of rift bottom, west Sheba Ridge. Line 18.	Relatively fresh glassy, feldsparphyric pillow basalts with crust slightly palagonitized.	36
124	58D	12°53.7'N 49°21.3'E	1740-1535	Small peak south-west of west Sheba Ridge axis. Line 19A	1. Consolidated dark grey mud with mammillary, bubble like forms. Some greenish stains-probably of fumarole or hot-spring origin. 2. One small piece of plagioclase-porphyritic basalt, diabasic with 1mm thick glass layer.	65 .3
125	59D	13°02.3'N 49°23.6'E	2880-2615	South side of volcano-on west Sheba Ridge axis near small fracture zone. Line 19C.	One fresh glassy, feldsparphyric pillow basalt with contorted forms.	18

Station	Dredge	Location	Depth(m)	Feature	Recovery	Weight(Kg)
126	60D	13°09.4'N 49°41.6'E	1740-1500	South flank mountains of west Sheba Ridge. Line 20.	Relatively fresh pillow basalt fragments-no glass preserved-few pieces of manganese crust with botryoidal surface. Probably >1x10 ⁶ my.	137
127	61D	13°15.8'N 49°58.4'E	2780-2525	South side of central volcano on bottom of rift of west Sheba Ridge. Line 21.	1. Light gray glassy basalts with stalagmites and crust. 2. Older pillow basalt weathered brown-no glass. 3. Tabular massive basalt of Type 1 or 2?	162
128	62D	13°21.7'N 49°48.3'E	3035-2910	Bottom north wall of rift, west Sheba Ridge. Line 20B	1. Fresh <u>glassy</u> , slightly feldsparphyric pillow basalt with contorted forms. 2. One diabase weathered outside-fresh inside. 3. Older palagonitized pillow basalt with some manganese rinds. 4. Some manganese crust.	63
129	63D	13°17.3'N 50°19.4'E	3255-3020	Bottom north wall of rift, west Sheba Ridge. Line 22.	One large massive basalt block. One large glassy pillow basalt and fragments. Some small fragments appear serpentinized or chlorotized including glass! One egg-like pillow basalt without glass.	173
130	64D	13°20.2'N 50°41.5'E	3440-3110	Bottom north wall of rift, west Sheba Ridge. Line 23.	1. One large, older pillow basalt with striations, dark brown palagonite and patches of manganese coating. 2. Abundant very fresh highly glassy pillow basalt fragments and slabs. Glass up to 5 cm thick. Some mud.	223

Station	Dredge	Location	Depth(m)	Feature	Recovery	Weight(Kg)
131	65D	13°12.8'N 51°01.2'E	3275-3035	South side of central volcano, bottom of rift, west Sheba Ridge. Adjacent to Alula-Fartak F. Zone. Line 24.	1. Fresh glassy pillow basalt fragments, one larger feldsparphyric glassy pillow. 2. Older slightly feldsparphyric pillow basalt fragments with some glass and dark brown palagonite crust remaining. One large and 2 small glassy, palagonitized pillow basalt-with crust and 1.5mm thick manganese crust. Crustal fragments.	72
132	66D	14°23.5'N 52°41' E (estimated)	1740-1680	Southside of volcano near poorly defined ridge axis-East Sheba Ridge. Line 25	One large and 2 small glassy, palagonitized pillow basalt-with crust and 1.5mm thick manganese crust. Crustal fragments.	68
133	67D	14°22.1'N 53°34.8'E	3390-3145	Top of central volcano bottom of rift East Sheba Ridge Line 26.	Pillow basalt fragments-two large one. Highly feldsparphyric some glass-also egg shape small pillows with some crust and glass preserved. One large pillow fragment with some glass and manganese stain-few smaller partly glassy fragments.	250
134	68D	14°44.4'N 55°42.7'E	2835-2490	Bottom north wall of rift, East Sheba Ridge. Line 27.	One large pillow fragment with some glass and manganese stain-few smaller partly glassy fragments.	40
135	69D	14°27.9'N 56°25.3'E	3565-3420	South side of central volcano, bottom of rift, East Sheba Ridge. Line 28.	Fresh glassy pillow basalt with some crust remaining.	160
136	70D	8°04.3'N 72°55.3'E	2010-1520	East wall of Laccadive-Maldive Ridge. (north of 8°N channel)	Indurated sediment, conglomerate and sandstone with thick botryoidal manganese crust-conglomerate may contain some volcanic fragments. Also altered chloritized block with onion skin weathering surface. Smaller clay fragment may be highly altered gabbros with clay pseudo-feldspar crystal. Ferro-magnesian mineral better preserved.	81





o Complementary dredge station from RV Vema 33-06