

CRUISE REPORT (V34-07 & V34-08)

Ship Name: R/V VEMA

Cruise No. 34-07

Departure: August 30, 1977

From: Mahe , Seychelles

Arrival: September 29, 1977

At: Bombay, India

Days at Sea: 30

Days at Bombay: 3

Area of Operation: N.W. Indian Ocean including the N.W.
Indian Ridge, Owen Ridge, Indus Cone
and deep western Indian Margin

Participants: (All L-DGO unless otherwise specified)

Kolla, Venkatarathnam
Naini, Bhoopal
Cochran, James
Holland, Michael
Leyden, Robert
Mossman, Brian
O'Neill, Owen
Paisley-Smith, Van
Petersen, Robert
Prell, Warren

Qali, Ropate
Roth, Mark
Smith, Hector

Chief Scientist
~~Co-Chief Scientist~~ ~~GEO~~PHYSICIST
~~Co-Chief Scientist~~ ~~GEO~~PHYSICIST
Camera & Nephelometer
Geophysicist
E.T.
E.T.
Gravity
E.T.
Visiting Scientist-CLIMAP,
Brown, University
Core Bosun
Core Describer
Airgun

Ship Name: R/V VEMA

Cruise No. 34-08

Departure: ~~September~~^{OCTOBER} 2, 1977

From: Bombay, India

Arrival: October 29, 1977

At: Mahe, Seychelles

Days at Sea: 27

Days at Mahe:

Area of Operation: Indus Cone and Western Indian Margin

Participants: (All L-DGO)

Kolla, Venkatarathnam

Banuve, Malakai

Hobart, Michael

Holland, Michael

Mossman, Brian

Naini, Bhoopal

Ostrowski, Brian

Paisley-Smith, Van

Petersen, Robert

Qali, Ropate

Roth, Mark

Smith, Hector

Chief Scientist

Core O.S.

Heat Flow

Camera/Nephelometer

E.T.

Geophysicist

E.T.

Gravity

E.T.

Core Bosun

Core Describer

Airgun

The V34-07 Leg was in part supported by IDOE/NSF and in part by ONR. V34-08 Leg was supported by NSF.

Program Description

The objective of our two months investigations is to study the tectonic and sedimentary history of the Indus Cone, the Indian Margin and the Owen Ridge. Our studies were designed to map the magnetic anomaly pattern; to locate and trace fracture zones; to determine the crustal structure of the Arabian Sea; to map the sedimentary facies; to determine the bottom water activity, if any; to map the shallow and deep acoustic character of the seafloor and to study the paleomonsoon changes as reflected in sedimentation.

The following aspects of work have been carried out:

1. Magnetic and gravity surveys
2. Continuous seismic reflection profiling
3. 3.5 kHz and 12 kHz echosounding (12 kHz only on V34-07)
4. Deployment of short-range sonobuoys (32 stations)
5. Deployment of long-range sonobuoys (14 stations)
6. Coring (56 stations)
7. Camera and Nephelometry (19 stations)
8. Physical property measurement on some selected cores

Some Preliminary Findings

1. The anomalous basement high west of the Indian Margin discovered on earlier RC17-07 and 08 cruises, has been found to extend farther north into the proximal area of the Indus Cone.

2. Sonobuoy work has shown that on either side of the anomalous high the crust is typically oceanic. On the basement high itself, Moho is at a depth of more than 18 km.

3. Several magnetic anomalies, some of which look like the ones of seafloor spreading type, have been found.

4. Some of the fracture zones identified by Whitmarsh (1974) do not appear to exist.

5. The Indus Cone can be divided into two sedimentary basins separated by the anomalous basement high.

6. The sediment thickness decreases, as one would expect, in the distal compared to proximal areas of the cone. Basement topography imposed strong control on the above thickness pattern.

7. Our work has shown that models of deep-sea fan sedimentation based on the studies of small fans, are not valid for the Indus Cone in the following respects:

a. The turbidity current channels extend all the way to the Carlsberg Ridge and do not stop in the region of the 'supra' fan as required by previous models.

b. Massive sand beds are more common in the distal cone rather than at the 'supra' fan.

8. A preliminary 3.5 kHz echocharacter map for the Indus Cone has been prepared. From a comparison of the echocharacter and lithology in piston cores, we believe we can develop an

acoustic model for deep-sea fan sedimentation.

9. The turbidites appear to have been deposited from about Middle to Late Miocene. Below the Miocene strata, two reflectors have been observed. Between these and the basement, pelagic sediments of Eocene and Cretaceous ages were deposited.

10. Slumping seems to be a common process along the Indian Margin. In the deep margin off Bombay, a 'giant' slump has been found.

Except for the first 10 days of the first leg, the weather was fairly good. Most of the main aspects of the work we wished to do were carried out. One main problem we had was the continental breakdown of the hydro winch. With the experienced chief engineer onboard on the first leg, the winch used to be repaired in time. However, on the second leg, with a new chief engineer who did not apparently have experience on ships, we could not use the hydro winch once it broke (after three stations on the second leg).

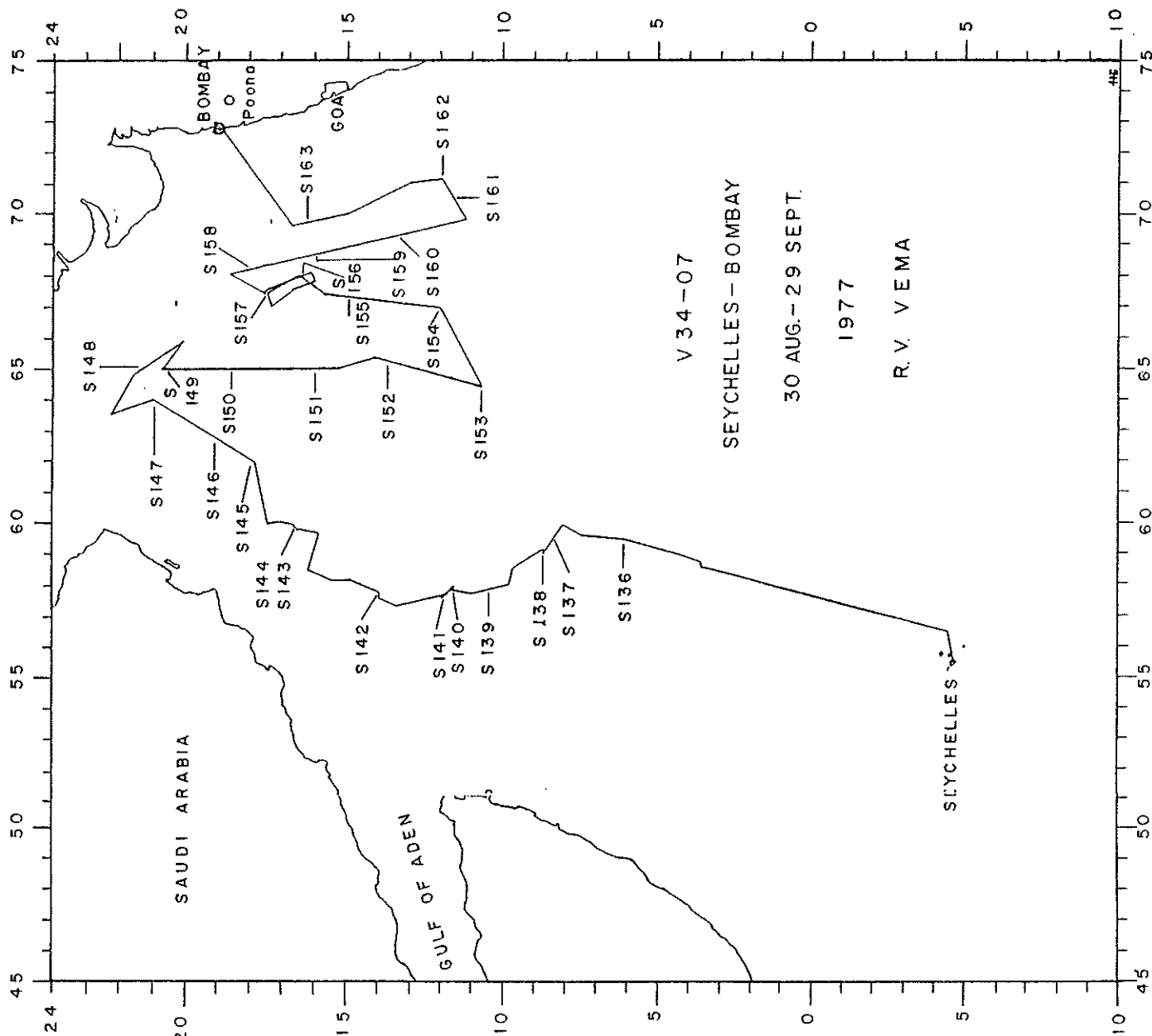
S136 3 SEPT C80
 S137 4 SEPT C81
 S138 4 SEPT C82
 S139 5 SEPT C83
 S140 5 SEPT C84
 S141 6 SEPT C85
 S142 7 SEPT C86
 S143 9 SEPT C87
 S144 9 SEPT C88
 S145 10 SEPT C89
 S146 10 SEPT C90
 S147 11 SEPT C91
 S148 12 SEPT C92
 S149 13 SEPT C93
 S150 14 SEPT C94
 S151 15 SEPT C95
 S152 16 SEPT C96
 S153 17 SEPT C97
 S154 18 SEPT C98
 S155 19 SEPT C99
 S156 21 SEPT C100
 S157 22 SEPT C101
 S158 22 SEPT C102
 S159 23 SEPT C103
 S160 24 SEPT C104
 S161 25 SEPT C105
 S162 25 SEPT C106
 S163 27 SEPT C107

 K31 N13

 K32 N14
 K33 N15
 K34 N16
 K35 N17
 K36A N18A

 K36 N18
 K37 N19
 K38 N20
 K39 N21
 K40 N22
 K41 N23
 K42 N24
 K43 N25
 K44 N26

SONOBUOYS 43-59
 LONG-RANGE SONOBUOYS 1-8



V 34-07
 SEYCHELLES-BOMBAY
 30 AUG.-29 SEPT.
 1977
 R. V. VEMA

S164 4 OCT C108
 S165 5 OCT C109
 S166 5 OCT C110
 S167 6 OCT C111
 S168 7 OCT C112
 S169 8 OCT C113
 S170 8 OCT C114
 S171 10 OCT C115
 S172 11 OCT C116
 S173 12 OCT C117
 S174 13 OCT C118
 S175 13 OCT C119
 S176 14 OCT C120
 S177 14 OCT C121
 S178 15 OCT C122
 S179 16 OCT C123
 S180 17 OCT C124
 S181 18 OCT C125
 S182 19 OCT C126
 S183 19 OCT C127
 S184 20 OCT C128
 S185 21 OCT C129
 S186 22 OCT C130
 S187 22 OCT
 S188 22 OCT C131
 S189 23 OCT C132
 S190 23 OCT C133
 S191 25 OCT C134
 S192 26 OCT C135

K 45 N 27
 K 46 N 28
 K 47 N 29

N 30

SONOBUOYS 60 - 74
 L.R.S.B.'S 10 - 15

