

**Report on Oceanographic Cruise of
O. R. V. Sagar Kanya**

CRUISE No. 89

10th December, 1993 to 21st January, 1994



National Institute of Oceanography

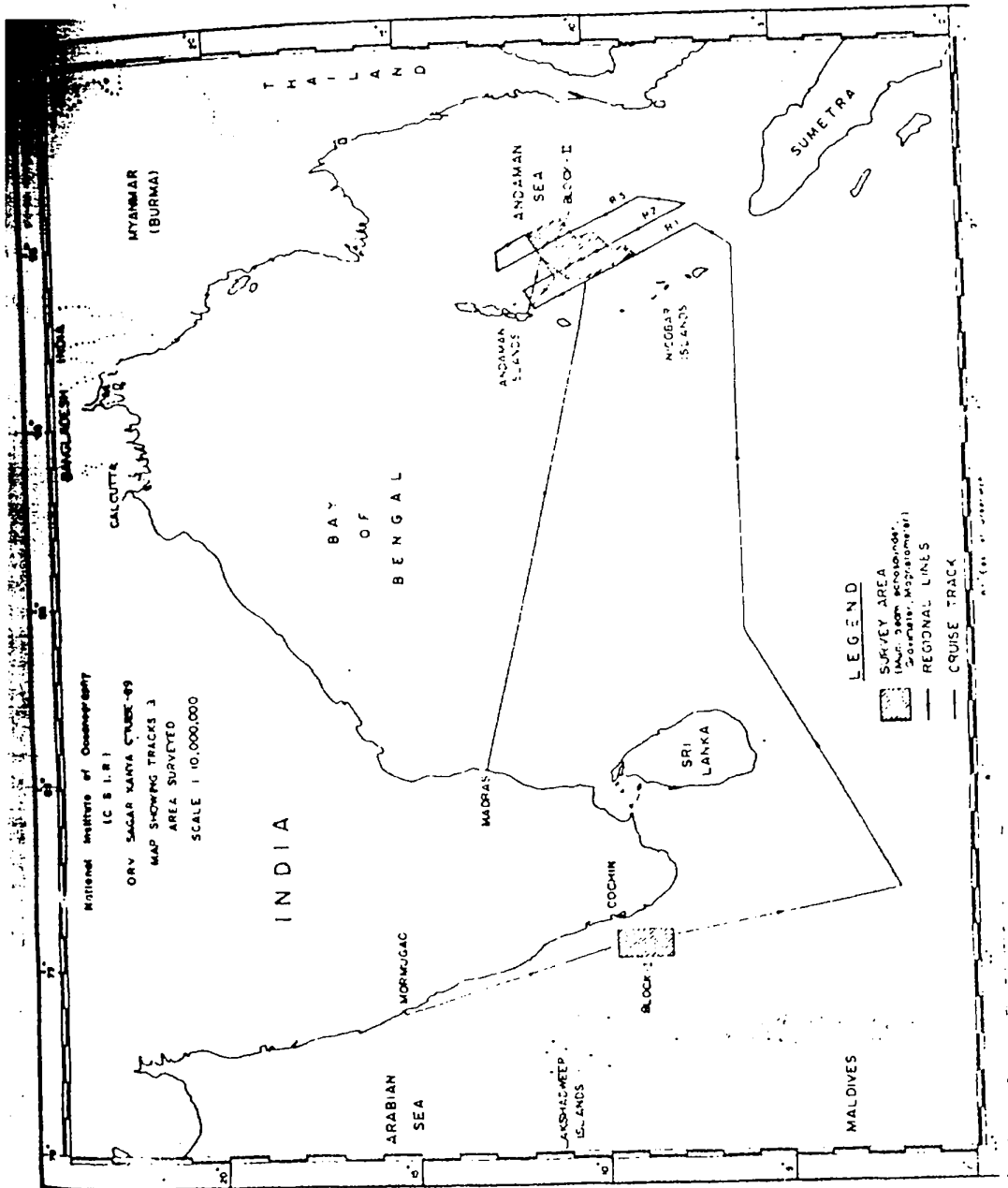
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REPORT ON
89th OCEANOGRAPHIC CRUISE OF
O.R.V. SAGAR KANYA

(10 Dec. 1993 to 21 Jan. 1994)



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2. CRUISE SUMMARY

The cruise was conducted to study the structure and tectonics of the Andaman Sea and the hydrothermal activity in the Andaman Sea. The occurrence of phosphorites on the bank off Quilon was studied. The studies included multibeam bathymetry, magnetos, gravity and sediment sampling. The cruise started from Cochin Harbour on 14.12.1993 and ended at Madras Port on 21.1.94.

In shallow depths off Quilon, gravity corer was operated. Core samples measuring 15 cm and 425 cm were collected during the first two operations, while calcareous shells were collected during the third operation.

In the Andaman Sea, three regional and 39 closely-spaced tracks were surveyed covering three ridge segments of the Back Arc. The surveys resulted in nearly 100% bottom coverage of an area of about 29, 540 sq;km. The multibeam bathymetric, magnetic and gravimetric data, have been processed and their profiles for corresponding tracks were plotted. Isobath map of the area, was also plotted.

3. PARTICIPANTS

Scientific Component :

Ch. Madhusudana Rao	- Chief Scientist
L.V. Subba Raju	- Dy. Chief Scientist
P.S. Rao	
T. Ramprasad	
K.A. Kamesh Raju	National Institute of Oceanography, Goa.
S. Afzalpurkar	
G.P. Naik	
T. Sudhakar	
G. Walker	
G. Senthil Kumar	
M. Thamban	
G. Chandwale	- Shipboard Trainee
M.M. Subramaniam	- Shipboard Trainee
T. Malwankar	- CMC Engineer

Ship's Complement :

Capt. K. Thankavelu	- Master
Gurucharanjit Singh	- Chief Officer
S.K. Peto	- Second Officer
L.K. Goel	- Second Officer
L.U. D'Souza	- Radio Officer
R. Venkataraman	- Purser
G.M. Siddiquie	- Medical Officer
S.K. Behal	- Chief Engineer
K.B. Kunhimon	- Second Engineer
Sukanta Dutta	- Third Engineer
A. Muthukrishnan	- Fourth Engineer
Thomas John	- Fifth Engineer
P.P. Nair	- Electrical Officer
Rammath Sharma	- Electrical Officer
Morris Fernandes	- Catering Officer
Veerapandian	- Asst. Catering Officer

4. INTRODUCTION

Recently, greater attention has been paid to study the structure and tectonics of the back arc basins for the recent evolution and occurrence of metalliferous sulphides. Andaman Sea forms an important region to study the same in its back arc basin. Therefore, a cruise was undertaken to carry out these studies in the region with multibeam bathymetry, magnetics, gravity and sediment sampling. It was also decided to test the performance of the storage winch at deeper depths on the way to the survey area.

5. OBJECTIVES

- 1) To study the structure and tectonics of the Andaman Sea and the hydrothermal activity in the Andaman basin; and
- 2) To study the occurrence of phosphorites on the bank off Nilon.

6. ITINERARY :

10.12.93	:	Boarding on the vessel
14.12.93	:	Departure from Mormugao Port
02.01.94	:	Arrival Port Blair Harbour.
06.01.94	:	Departure Port Blair Harbour
21.01.94	:	Arrival Madras Port

7. POSITION FIXING

Position fixing was done by the Integrated Navigation System (INS) with the input from the Global Positioning System (GPS).

8. SEDIMENT SAMPLING

During the cruise, sediment sampling was intended to be carried out with gravity corer and Van Veen grab, off Quilon and in the Andaman Sea. It was also planned to collect one core at deeper waters (more than 4000 m) on the way to the Andaman Sea to test the winch. However, at this station, about 4330 m winch wire was lost with the corer and no further sampling could be carried out.

In shallow depths off Quilon (Block I, Fig. 1), gravity corer was operated thrice. Core samples measuring 15 cm and 5 cm were collected during the first two operations while calcareous shells were recovered during the third operation. Cores were described and subsampled for detailed studies. Surveys (Multibeam Echosounder, Gravimeter and Magnetometer) along 5 tracks have been conducted in addition to sampling.

9. SURVEYS IN THE ANDAMAN SEA

Three regional (R1, R2 & R3) and 39 closely-spaced lines (Block II, Fig. 1), were surveyed covering the three ridge segments of the Back Arc Basin with Multibeam Echosounder,

magnetometer and gravimeter. The surveys resulted in nearly 100% track coverage of an area of about 29,540 sq.km. However, the magnetic data was not collected along some tracks due to malfunctioning of the towing cable and sensor of the magnetometer.

The multibeam bathymetric, magnetic and gravimetric data have been processed and their profiles for the corresponding tracks were plotted. Isobath map of the survey area was also prepared.

10. PRELIMINARY FINDINGS

a) Multibeam bathymetry : The survey area represents a very complex morphotectonic regime. The overall morphology varied from very smooth nearly flat area corresponding to the northeastern segment of the ridge to a highly complex and rugged one representing the middle and southwestern segments. The transition from very smooth northeastern segment to the rugged middle is marked by the turning of the contours resembling a ridge transverse intersection. Several seamounts with sharp peaks and steep slopes ranging from 500 to 2000 m high dot the zone corresponding to the middle and southwestern segments of the ridge. The bathymetry of the northeastern end of line R4 represents the Cook Seamount Group followed by a very smooth seafloor at the depth of 3000 m. A valley-like feature of about 30 km wide and 500 m deep was noticed in the central portion of the flat

ographic region. The northwestern end of line R3 passes very close to the Invisible Bank and the region is marked by sharp seamounts with highs ranging from 500 to 2000 m. The topography of the southeastern end of line R2 area is rugged with seamounts of about 1000-2000 m highs representing the Sewell Seamount Group.

b) Magnetics and Gravity : The magnetic signatures in the Back Arc region varied significantly. The northeastern segment of the ridge having a flat-bottomed valley has shown a very broad magnetic low of about 60 nT; whereas, the middle segment has shown an intermediate amplitude of about 150 nT. Further, southwestern side over the middle and southwestern segments of the ridge, high amplitude anomalies ranging from 300 to 700 nT are recorded probably representing a younger seafloor. The seafloor having low amplitude anomalies are characterised by smooth topography while the higher ones have the very rugged topography. The region having intermediate amplitude anomalies is characterised by a topography which is not as rugged as that of higher amplitude anomalies.

The northwestern extension of the line R2 shows the gravity, magnetic and bathymetric expression of West Andaman Fault. The valley-like feature in the northeastern segment of the ridge was presumed to be active spreading centre by Curray, et al., (1979). However, no recognizable seafloor spreading magnetic anomalies

observed in the present investigations corresponding to this feature.

The free-air gravity followed the bottom topography in the survey area, except at the northwestern end of line R2 where a prominent gravity low of about -175 mgal was observed reflecting probably a subduction zone.

11. RECOMMENDATIONS

- 1) The present P.C. in the chart & drawing room should be repaired / replaced by a new one.
- 2) Two HP plotters attached to HP 1000 general purpose computer are not working. They have to be repaired immediately.
- 3) Though the INS computer and general purpose computer, more than ten years old, 800 BPI tape drives are still used. Data recording which are more tape consuming and the data tapes are not compatible to be read on other systems. Hence, tape drives of both the computers may be upgraded to dual density drives (800/1600 BPI).
- 4) In view of the forthcoming inhouse facility for hydrographic data processing, which has CTD drives (155 MB) for storing data, it is suggested to supplement the Hydromap system on SAGAR KANYA with a CTD DRIVE. This facility will reduce

heavy consumption of magnetic tapes for carrying the data to
as well as ease storage of the data.

5) Frequent water leakage and bad condition of flooring are
observed in the multipurpose lab. They should be rectified
urgently.

12. ACKNOWLEDGEMENTS

I wish to thank all my colleagues and the Captain and his
crew, for their support and cooperation in the successful com-
pletion of this cruise.
