

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

CRUISE No. 93

28th June to 16th July, 1994



**National Institute of Oceanography
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REPORT ON THE
93RD OCEANOGRAPHIC CRUISE OF
O.R.V. SAGAR KANYA

(28th June to 16th July, 1994)

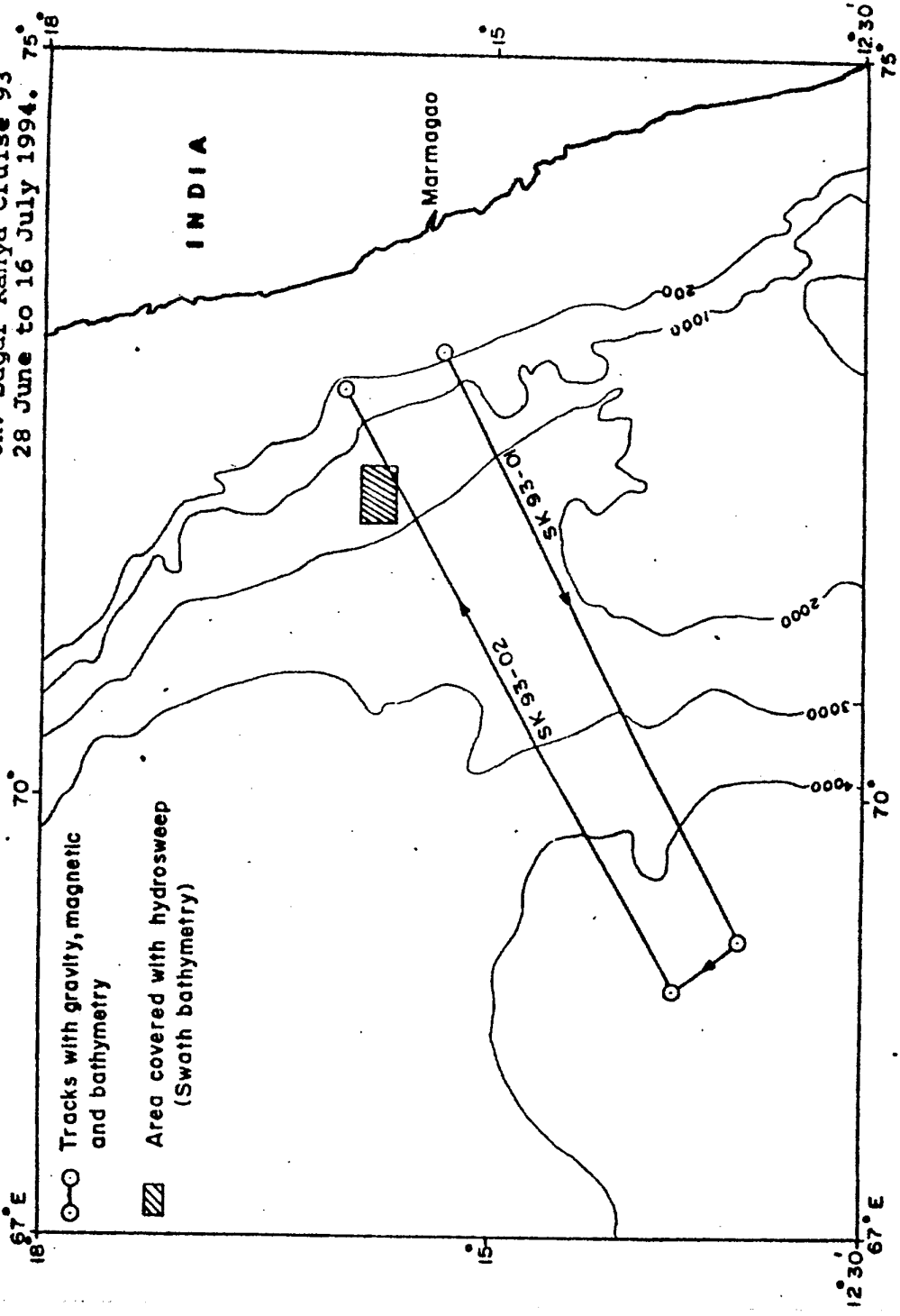
REPORT ON THE 93RD OCEANOGRAPHIC CRUISE OF

O.R.V. SAGAR KANYA

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ORV Sagar Kanya Cruise 93
28 June to 16 July 1994. 75°18'



○—○ Tracks with gravity, magnetic
and bathymetry

▨ Area covered with hydrosweep
(Swath bathymetry)

INDIA

Marmagao

SK 93-02

SK 93-01

18°

15°

12°30'

70°

70°

67°E

75°18'

2. CRUISE SUMMARY

The ship sailed from Mormugao harbour on 28.6.1994 towards the east central Arabian Sea with 15 participants, but came back to Mormugao on 4.7.1994 for urgent repair of machineries. After repairs, the ship once again sailed on 9.7.1994.

The objective of this cruise was to acquire underway;
(i) gravity, magnetic and bathymetric data along regional profiles and (ii) swath bathymetric data over some selected bathymetric features in the southern Laxmi Basin area. About 983 lkm of gravity, magnetic and bathymetric data and about 899 lkm of swath bathymetric data were collected during the cruise.

At the end of the cruise, the ship returned to Mormugao harbour on 16.7.1994.

3. PARTICIPANTS

(a) Scientific Component :

G.C. Bhattacharya)	- Chief Scientist
)	
L.V. Subba Raju)	
)	
A.K. Chaubey)	
)	
G.P.S. Murty)	Geological Oceanography
)	
K. Srinivas)	Division, N.I.O., Goa.
)	
G.H. Ranade))	
)	
V. Khedekar)	
)	
K.M. Sivakolundu)	
)	
M.M. Subrahmanyam	-	Shipboard Trainee
	-	
M.U. Gheewala	-	Engineer from CMC, Bombay
	-	
Joji Abraham)	
)	
Jojoy Abraham)	M.Sc. (Tech.) Marine Geophysics
)	students from the Cochin Univer-
V.B. Biju)	sity of Science and Technology,
)	
V.B. Binu)	Cochin.
)	
Tony George)	

(b) Ship's Complement :

Capt. A.K. Basu Choudhary	- Master
Ashim P. Majumdar	- Chief Officer
Samar Kumar Peto	- Second Officer
Anshuman Bajpai	- Second Officer
Kamal Kumar Datta	- Chief Eng. Officer
Samar Kumar Pal	- Second Eng. Officer
Sukanta Dutta	- Third Eng. Officer
T.J. Tojan	- Radio Officer
M.F.M. Luis	- Electrical Officer
Anwar A.S. Mistry	- Electrical Officer
C.G. Pinto	- Purser
V.A. Fernandes	- Catering Officer
Dr. Dinesh Kumar Tyagi	- Medical Officer

4. INTRODUCTION

4.1 General

A recent geophysical study for the first time has indicated that part of the Laxmi Basin in the Arabian Sea (i.e. areas east of the Laxmi Ridge, approximately between 19°- 16°N) is underlain by an 84-65 my old oceanic crust. For this area, the following characteristic geophysical signatures were detected :

i) a short wavelength free-air gravity low associated with the inferred extinct spreading center; and

ii) presence of fairly well correlatable NNW trending magnetic anomalies representing a two-limbed sea-floor spreading sequence over the entire area.

To investigate the possible southward extension of this crust, additional gravity, magnetic and bathymetric data were planned to be collected during this cruise.

In addition to this, it was also planned to carry out swath bathymetric investigation of an isolated positive bathymetric feature identified during an earlier cruise.

Due to extremely rough sea condition, time lost due to port call for repair of ship's machineries and malfunctioning of some scientific equipments, only partial objectives of the cruise could be fulfilled.

From the Cochin University of Science and Technology, five M.Sc.(Tech.), Marine Geophysics students participated in the cruise. Apart from helping in data acquisition tasks, they also used this occasion to get acquainted with the equipment and methodology of a marine geophysical investigation on board.

4.2 Quantum of Work

During the cruise the following data were collected :

a) Underway Geophysical Data :

Bathymetric	:	983 lkm
Gravimetric	:	983 lkm
Magnetic	:	983 lkm
Hydrosweep	:	899 lkm

4.3 Itinerary

LEG 1	28.6.94	07:00	IST	Departure	Mormugao
	3.7.94	09:30	IST	Arrival	Mormugao outer anchorage

From 04.7.94 (10:00 IST) to 09.7.94 (17:06 IST) the vessel remained alongside berth at Mormugao for repairing the ship's machinery.

LEG 2	09.7.94	17:06	IST	Departure	Mormugao
	14.7.94	08:00	IST	Arrival	Mormugao outer anchorage

From 14.7.94 (08:00 IST) to 16.7.94 (about 16:00 IST) the vessel remained in the outer anchorage due to non-availability of berth/port permission.

	16.7.94	18:00	IST	Arrival	Mormugao berth
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5. ACQUISITION OF SURVEY DATA

5.1 Navigation : The positions during the survey were obtained by using a MAGNAVOX series 5000 Integrated Navigation System (INS) using a Global Positioning System (GPS, Model MX4400) receiver as primary navigation aid. The survey lines were shot in a "total distance" mode with 250 m as shot point interval. The raw navigation and other underway geophysical data were recorded on magnetic tape at every shot point.

5.2 Echosounding : During the cruise, the bathymetric data were obtained by using a deep-sea echosounder (M/s. Honeywell Elac). The data were recorded in analog form on a 25.5 cm wide electrostatic paper.

5.3 Gravimetry : The gravity data were collected using a marine gravimeter (Bodenseewerk, Model KSS-30). Parabola and ball calibration tests were carried out prior to commencement of the cruise. A new dot matrix printer was successfully interfaced with the gravimeter during the cruise.

5.4 Magnetics : Earth's total magnetic field intensity values were recorded along the tracks using a Geometrics Proton Precession Magnetometer (Model G801/3). The sensor was towed about 250 m aft of the vessel. The data were recorded in analog form on a strip chart recorder.

5.5 Swath bathymetry : The swath bathymetry data were collected using a multibeam hydrosweep system (Krupp Atlas Elektronik, Germany).

5.6 Other pertinent information :

a) To all the bathymetric data collected during the cruise, 5.0 m should be added as transducer correction. As the EMG-2 unit of the Deep-sea echosounder was not working and therefore digital depth data could not be recorded in the tape.

b) Gravimeter still reading for the cruise

Date : 28.06.1994

Location : Mormugao harbour between berth Nos. 5 & 6

(15° 24.762'N, 73°47.822'E)

Gravimeter reading : -2204.90 mgal (sensor level)

Absolute gravity value at jetty level

1) berth No. 5 : 978358.84 mgal

2) berth No. 6 : 978358.00 mgal

c) Throughout the cruise, the gravimeter did not function properly (in particular while the vessel was underway). Therefore, the gravity measurements during the cruise were of poor quality.

d) The BCD output as received from the magnetometer and recorded in the INS tapes were observed to be erratic at times. Since the analog magnetic record was found to be correct, magnetic data recorded in the INS tapes need to be checked and corrected as per the analog records.

Magnetic data is noisy from about 1500 GMT of JDay 183 (2.7.1994) onwards.

6. ACKNOWLEDGEMENTS

The Chief Scientist and all the members of the scientific team would like to express their sincere thanks to the Department of Ocean Development (DOD), Government of India, for providing O.R.V. SAGAR KANYA to carry out the investigation. They also thank Captain A.K. Basu Choudhary, officers and crew members of O.R.V. SAGAR KANYA (Cruise 93) for their co-operation during the cruise.

ANNEXURE - I

ORV Sagar Kanya
Cruise 93

Lines along which gravity magnetic and bathymetric (GMB) data were acquired.

Line Id	SHOT POINT	Date DDMMYY(JDAY)	GMT	Lat (N) DD MM SS.S	Long (E) DD MM SS.S
<u>Line No. SK 93-01</u>					
B.O.L.	21	280694(179)	13:09	15 20 50.4	72 50 32.0
E.O.L.	2000	010794(182)	05:02	13 12 43.2	69 00 17.6
<u>Line No. SK 93-02</u>					
B.O.L.	56	010794(182)	11:45	13 46 49.2	68 40 48.6
E.O.L.	2010	020794(183)	18:23	15 58 54.0	72 42 25.2