

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

**CRUISE No. 33**

**15th June to 13th July, 1987**



**National Institute of Oceanography  
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REPORT ON  
33RD OCEANOGRAPHIC CHUISE OF  
O.R.V. SAGAR KANYA

(15th June to 13th July, 1987).

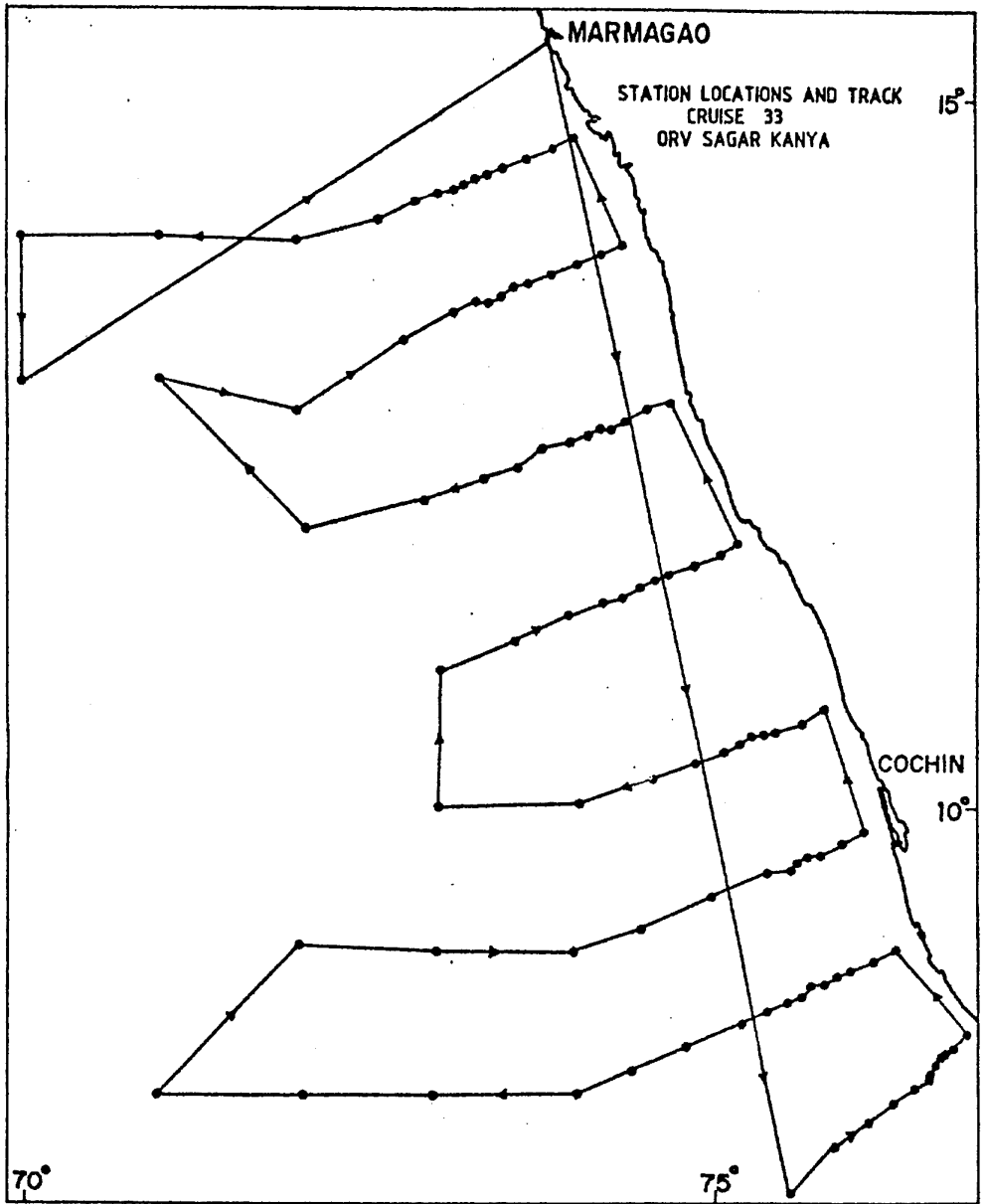
REPORT ON THE 33RD OCEANOGRAPHIC CRUISE OF

O.R.V. SAGAR KANYA

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1. CRUISE TRACK AND STATIONS



### 1. CRUISE SUMMARY

ORV Sagar Kanya sailed from Mormugao harbour on the 15th of June 1987 and returned to the port on 13th July, 1987. The area of operation during the cruise was off the southern portion of the west coast of India. Observations were made to study the biological, chemical and physical oceanography of the coastal region during the southwest monsoon. In addition surface meteorological observations and radio sonde ascents were conducted. Altogether 4973 lkm were logged during the ~~cruise~~ cruise and 103 oceanographic stations were worked on. Salinity and temperature measurements using Nansen casts were carried out at all the stations. Concentrations of Phosphate, Silicate, Nitrate, Oxygen, Nitrite and Ammonia were determined at 68 stations. Microbiological, primary productivity, zooplankton, benthic and detritus studies were carried out at 31, 29, 42, 31 and 28 stations respectively.

2. PARTICIPANTS

a) Scientific component

Satish R. Shetye	-	Chief Scientist
S.C. Shenoi	Y	
Danddar Sundar	X	Physical Oceanography Division
Michael Selvam	X	Division, NIO.
A. Rajendran	Y	
M. DileepKumar	X	Chemical Oceanography
P.V. Shirodkar	X	Division, NIO.
Blasco Fernandes	X	
K. Somasundar	X	
S. Upadh	X	
S. Upadhyay	X	
M. Madhu Pratap	Y	
C.T. Achuthankutty	X	Biological Oceanography
P.A. Loka Bharathi	X	Division, NIO.
Lata Raghukumar	X	
Krishnakumari Warriar	X	
Z.A. Ansari	X	
Sumitra Vijayaraghavan	X	
M.R. Nayak	Y	Marine Instrumentation &
George Vithayathil	X	Computer Division, NIO.
Asol Lal	Y	
S.K. Dey	X	India Meteorological
P.N. Machnurkar	X	Department
K. Gupta	X	
S.S. Rao	X	

b) Ship's complement

Capt. A.R. Parti	- Captain
D.K. Basu	- Chief Engineer
Gurdeep Singh	- Chief Officer
P. Singh	- Second Officer
R.K. Sakuja	- Third Officer

#### 4. OBJECTIVES OF THE CRUISE

The objectives behind each component of the oceanographic data collection programme are described below.

##### 4.1 Biological Oceanography

The Biological Oceanographic studies had the following sub-components.

a) Microbiology : The main objective was to study the vertical and horizontal distribution of Microbial Biomass in the coastal region. The following Microbial flora are to be estimated and isolated for physiological studies in the water column upto the depth of 100 m : (1) total Heterotrophic Bacteria; (2) total Propagules of Lower Fungi; (3) total Propagules of Higher Fungi. The other objectives of the microbiological studies are: (1) estimation of Oligotrophic Bacteria in the coastal region; (2) screening of sediments for phages of Sulfate Reducing Bacteria, (3) screening of Phytoplankton for fungal pathogens; (4) screening of shells from sediments for the presence of shell boring fungi.

b) Phytoplankton Productivity: The aim here is to assess the primary production at different depths in the coastal region during the monsoon using the C-14 method.

c) Detritus : The objective is to determine the quantity



of suspended detritus and to evaluate its role in the food chain. d) Zooplankton

d) Zooplankton : Vertical samples from the epipelagic zone were collected with a WP net to estimate the standing stock and secondary production. Samples indicate high biomass zones along the coastal belt probably associated with upwelling and phytoplankton bloom. These samples will also be used to study the neritic - distant - oceanic association of zooplankton. Microstructure of the upper layer will be studied from the data collected using neuston and bongo net tows.

e) Benthic studies : The object here was to collect data on faunal changes effected by seasonal variation and to estimate the potential of demersal fisheries in the region. However, due to malfunctioning of the deep-sea winch, only samples from the shallow stations were taken

#### 4.2 Chemical Oceanography

The aim of chemical oceanographic studies was to measure variables such as Oxygen, Nitrate, Nitrite, Ammonia, Silicate and Phosphate using Nansen cast samples. The data would be used to study the vertical distribution of these variables and to infer about the water mass characteristics and circulation of the region.

#### 4.3 Physical Oceanography

The primary objectives of the physical oceanographic studies was to collect data on temperature and salinity. Nanseen casts were used for the purpose. These data would then be used in dynamic computations and in water mass analysis to infer the circulation pattern of the region. Because the spatial scale of coastal processes in the direction normal to the coast is small, of the order of 50 km. stations were spaced at a distance of about 15 km over the shelf and the slope region. This is required to permit resolution of the features like the coastal undercurrent.

#### 5. CRUISE DETAILS

Station locations and the type of data collected at each of the stations is listed in the Annex. The code used in the table given there is as follows:

- ST : Salinity and temperature at standard depths using Nansean cast.
- CM : Determination of concentration of Phosphate, Silicate, Nitrate, Oxygen, Nitrite and Ammonia at standard depths.
- MB : Microbiology
- PP : Primary Productivity
- ZP : Zooplankton
- BT : Benthic studies
- DT : Detritus

Besides the data summarized in the Annex, India Meteorological Department carried out 214 weather observations and conducted 49 radio sonde ascents.

#### 6. SYNOPSIS OF OBSERVATIONS

The data collected during the cruise provide a comprehensive look at the large scale coastal oceanography of the region during the southwest monsoon. A preliminary analysis of the temperature and salinity data suggests the presence of a coastal surface current moving towards the equator and an undercurrent moving northward. Upwelling was most pronounced near the southern tip of the coast and decreased northward. This decrease in the intensity of upwelling is reflected in the nutrient distribution and in the biological activity of the region.

#### 7. PERFORMANCE ANALYSIS

No major breakdown of equipment occurred.

#### 8. LOSSES/DAMAGES

Apart from two messengers, no loss of equipment occurred during the cruise.

9. ACKNOWLEDGEMENTS

The Chief Scientist and other participants of the cruise express their gratitude to the Captain, his officers and the crew for the excellent co-operation extended throughout the cruise.

Table 1

Sl No	Station Number	Location		ST	CM	MB	PP	ZP	BT	DT	
		lat	long								
1	33A13	07	19.22	75	34.41	*	*	*	*	*	*
2	33A12	07	37.60	75	52.65	*					
3	33A11	07	47.63	76	06.80	*					
4	33A10	07	55.72	76	17.47	*		*	*		*
5	33A09	08	01.42	76	25.69	*	*				
6	33A08	08	05.05	76	26.59	*					
7	33A07	08	08.48	76	32.71	*					
8	33A06X	08	11.40	76	34.00	*					
9	33A06	08	13.11	76	35.50	*					
10	33A05X	08	14.75	76	38.13	*					
11	33A05	08	16.03	76	40.08	*	*	*	*		*
12	33A04	08	19.39	76	43.65	*					
13	33A02	08	24.96	76	49.83	*	*	*	*	*	
14	33B02	08	59.55	76	18.53	*	*	*	*	*	
15	33B04	08	54.81	76	07.75	*	*	*	*		*
16	33B06	08	50.78	75	58.07	*					
17	33B07	08	48.92	75	52.83	*	*				
18	33B08	08	47.17	75	48.23	*					
19	33B09	08	44.52	75	41.67	*			*		
20	33B10	08	41.54	75	37.76	*	*	*	*	*	*
21	33B11	08	34.81	75	25.49	*					
22	33B13	08	29.39	75	11.77	*	*	*	*		*
23	33B14	08	19.85	74	47.16	*	*				
24	33B15	08	10.00	74	23.00	*	*				
25	33B16	07	59.82	73	59.78	*	*	*	*		*
26	33B17	08	00.05	72	56.75	*	*	*	*		
27	33B18	08	00.16	71	59.91	*	*	*	*		*
28	33B19	07	58.92	70	59.32	*	*	*	*		
29	33C01	09	49.98	76	05.03	*	*	*	*	*	*
30	33C03	09	45.86	75	54.87	*	*	*	*	*	*
31	33C05	09	41.10	75	45.94	*	*	*	*	*	*
32	33C06	09	39.67	75	40.34	*					
33	33C07	09	38.00	75	36.00	*	*			*	
34	33C08	09	35.46	75	32.26	*					
35	33C10	09	33.21	75	22.14	*	*	*			
36	33C12	09	24.02	74	58.25	*	*	*	*		*
37	33C13	09	10.67	74	27.27	*	*				
38	33C14	09	00.32	73	59.21	*	*	*	*		
39	33C15	08	59.75	72	59.24	*	*	*	*	*	*
40	33C16	09	03.04	71	58.72	*	*	*	*	*	*
41	33D13	09	59.59	72	59.53	*	*	*	*	*	*
42	33D12	10	01.61	73	59.93	*	*	*	*	*	*
43	33D11	10	13.04	74	34.35	*	*				
44	33D10	10	20.24	74	51.19	*	*	*	*		
45	33D09	10	24.01	75	02.16	*	*				
46	33D08	10	27.76	75	09.83	*		*			
47	33D07	10	30.12	75	14.92	*	*	*	*		*
48	33D06	10	31.61	75	19.74	*				*	
49	33D05	10	33.33	75	25.19	*					
50	33D04	10	37.49	75	36.07	*	*				

Table 1 (cont.)

Sl No	Station Number	Location		ST	CM	MB	PP	ZP	BT	DT
		lat	long							
51	33D03	10	37.49	75	36.07	*	*			
52	33D01	10	42.99	75	45.57	*	*	*	*	
53	33E14	10	58.88	73	00.54	*	*	*	*	*
54	33E13	11	11.82	73	33.46	*	*			*
55	33E12	11	22.05	73	55.76	*	*	*	*	*
56	33E11	11	27.23	74	11.35	*				
57	33E10	11	30.48	74	20.17	*	*	*		
58	33E09	11	34.28	74	27.23	*				
59	33E08	11	35.73	74	33.57	*	*			
60	33E07	11	37.95	74	39.04	*				*
61	33E05	11	43.23	74	50.96	*	*	*	*	*
62	33E03	11	46.66	75	01.83	*	*			*
63	33E01	11	50.86	75	09.05	*	*	*	*	*
64	33F01	12	49.71	74	39.58	*	*	*	*	*
65	33F03	12	47.00	74	30.00	*	*	*	*	*
66	33F05	12	41.84	74	19.94	*	*	*	*	*
67	33F06	12	39.05	74	13.93	*	*	*	*	*
68	33F07	12	39.08	74	08.64	*	*	*	*	*
69	33F08	12	35.69	74	05.00	*	*	*	*	*
70	33F09	12	32.66	73	55.55	*	*	*	*	*
71	33F10	12	30.58	73	44.16	*	*	*	*	*
72	33F11	12	24.33	73	34.46	*	*	*	*	*
73	33F12	12	17.84	73	18.84	*	*	*	*	*
74	33F13	12	09.89	72	54.18	*	*	*	*	*
75	33F14	11	59.48	72	04.06	*	*	*	*	*
76	33G14	13	00.85	70	59.82	*	*	*	*	*
77	33G13	12	45.93	71	59.65	*	*	*	*	*
78	33G12	13	18.48	72	46.35	*	*	*	*	*
79	33G11	13	23.20	72	56.94	*	*	*	*	*
80	33G10	13	27.94	73	06.69	*	*	*	*	*
81	33G09	13	32.35	73	16.51	*	*	*	*	*
82	33G08	13	31.63	73	21.16	*	*	*	*	*
83	33G07	13	35.00	73	26.98	*	*	*	*	*
84	33G06	13	38.28	73	31.91	*	*	*	*	*
85	33G05	13	40.31	73	38.11	*	*	*	*	*
86	33G04	13	43.66	73	47.81	*	*	*	*	*
87	33G03	13	48.92	73	59.67	*	*	*	*	*
88	33G02	13	53.08	74	09.91	*	*	*	*	*
89	33G01	13	56.97	74	19.93	*	*	*	*	*
90	33H01	14	42.79	73	59.65	*	*	*	*	*
91	33H02	14	37.95	73	49.32	*	*	*	*	*
92	33H03	14	34.27	73	38.36	*	*	*	*	*
93	33H04	14	29.90	73	27.90	*	*	*	*	*
94	33H05	14	27.69	73	22.25	*	*	*	*	*
95	33H06	14	25.91	73	15.91	*	*	*	*	*
96	33H07	14	24.08	73	10.82	*	*	*	*	*
97	33H08	14	20.60	73	05.98	*	*	*	*	*
98	33H09	14	18.82	72	59.65	*	*	*	*	*
99	33H10	14	15.90	72	49.81	*	*	*	*	*
100	33H11	14	08.91	72	34.05	*	*	*	*	*

Table 1 (cont )

Sl No	Station Number	Location		ST	CH	MB	PP	ZP	BT	DT
		lat	long							
101	33H12	13 59.98	71 59.44	*	*			*		
101	33H13	14 00.50	71 00.00	*	*			*		
102	33H14	14 00.51	70 00.17	*	*	*				
103	33G15	12 59.37	70 00.10	*	*	*				