

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

CRUISE No. 34

16th July to 8th August, 1987



**National Institute of Oceanography
Dona Paula-403 004, Goa
INDIA**

NATIONAL INSTITUTE OF OCEANOGRAPHY
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Dona Paula, Goa-403 004

REPORT ON
34TH OCEANOGRAPHIC CRUISE OF
O.R.V. SAGAR KANYA

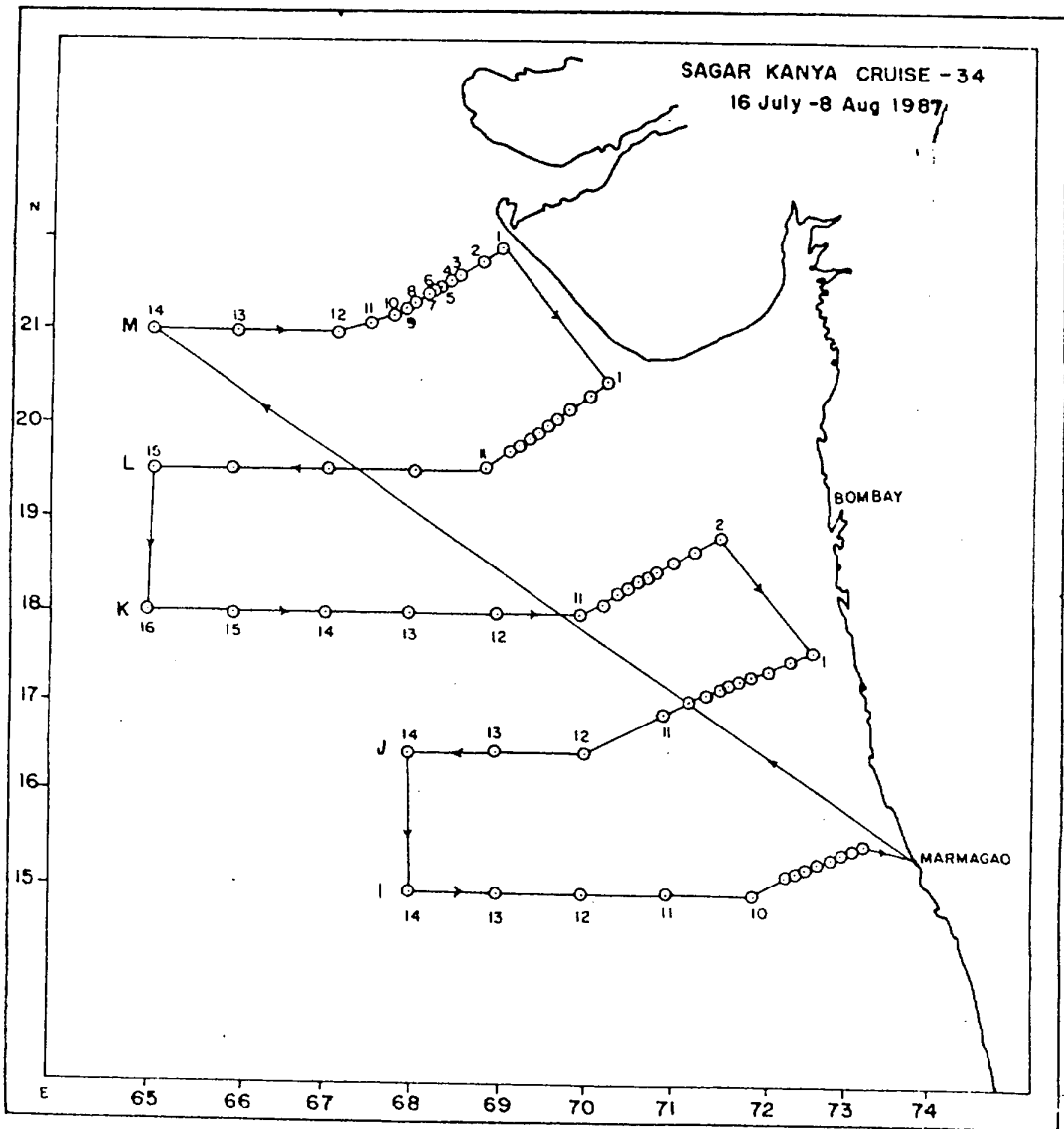
(16th July to 8th August, 1987)

REPORT ON THE 34TH OCEANOGRAPHIC CRUISE OF
O.R.V. SAGAR KANYA

C O N T E N T S

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2. SUMMARY

The cruise left Mormugao Harbour on 16 July, 1987. The area covered was between 15°N and 21°N, 74°E to 65°E (Fig.1).

The track was planned as a series of 5 parallel transects. The deep stations were 1° apart. The shallow stations were between 10 to 30 kms apart. Physical, chemical and biological oceanographic data were collected from all stations as shown in Annex-1. IMD personnel launched a minimum of 2 balloons per day in accordance with their schedule. 3 hourly data on wind speed, direction and cloud cover was also collected. A near-bottom water sampler designed and fabricated at NIO was successfully deployed. ONGC representative on board collected tar samples in co-ordination with zooplankton hauls and grab samples at all shallow stations. The cruise returned to Mormugao harbour on the 8th August, 1987.

3. PARTICIPANTS

(a) Scientific component

A. Pant	...	Chief Scientist
J. Royan	Y	Biological Oceanography Division, NIO.
S.R.S. Nair	*	
S. Raghukumar	X	
S. Shetye	Y	Physical Oceanography Division, NIO.
A. Gouveia	*	
K. Santhanam	*	
A. Almeida	X	
S.W.A. Naqvi	Y	Chemical Oceanography Division, NIO
P.V. Narvekar	*	
R. Nagarajan	*	
R. Noronha	*	
H. Dalvi	*	
M.D. Rajgopal	X	
Ananthakrishnan		Instrumentation Division, NIO
CMC - 1 Berth		
IMD - 5 Berths		
ONGC - 1 Berth		

Ship's complement

b) Ship's complement

Capt. Amrit Rai Parti	...	Master
Gurdeep Singh	...	Chief Officer
Cleartone Carneiro	...	Second Officer
Rajesh Kumar Sakhuja	...	Third Officer
Moorad Ali Knot	...	Third Officer
Vasant Narsing Kale	...	Chief Radio Officer
Jagdishwar Rao Sangam	...	Radio Officer
Naresh Kanyalal Jumani	...	Medical Officer
Dipak Kumar Basu	...	Chief Engineer
R.V. Balakrishnan Nair	...	Second Engineer
Neville John D'Sousa	...	Third Engineer
Chandrashekar Tulairam D.	...	Fourth Engineer
Sivadas Ravi	...	Fifth Engineer
Rajendra Prasad Yadav	...	Electrical Officer
Mohan Awardi	...	Electrical Officer
Aboo Md. Tarique	...	Purser
Amaranti D. Carneiro	...	Catering Officer

4. Objectives

1. Study of the Arabian Sea as part of the Indian Exploitable Economic Zone during the SW Monsoon.
 - a) Physical Oceanography
 - i. circulation of the water, geostrophic flows using temperature salinity data
 - ii. presence and extent of undercurrents at the shelf break and identification of water masses
 - b) Chemical Oceanography
 - 1) Nutrient studies; Phosphate, Nitrate, Nitrite and Silicate.
 - ii) Oxygen deficit
 - iii) Near-Bottom nitrite and dissolved oxygen
 - iv) Chemistry of surface microlayer (weather permitting)
 - c) Biological Oceanography
 - i) Chlorophyll a distribution & primary production
 - ii) Secondary production : species and biomass
 - iii) Fungal components of plankton
 - iv) Biology of surface microlayer (weather permitting)
2. Tar pollution studies in benthic sediments and the water column by Oil & Natural Gas Commission personnel.
3. Weather data and upper air investigations by India Meteorology Department personnel.

5. Preliminary results

Temperature-salinity profiling was done at all stations using deep and shallow hydrographic casts with Nansen 1.7 l reversing bottles and with protected and unprotected thermometers. Further processing of this data is in progress. Evidence for the occurrence and northward dissipation of an undercurrent is being examined.

Chemical analyses were carried out at all stations for dissolved oxygen and nutrients (nitrate, nitrite, phosphate and silicate). A near-bottom water sampler designed and fabricated at NIO was successfully deployed to collect water samples from 1 m off the seafloor at depths less than 450 m. The results indicate an offshore intensification of the reducing conditions along the two southern transects, which probably provides indirect evidence for the presence of a counter current off the continental shelf.

Chlorophyll a distributions were patchy with respect to latitude and longitude and there was a sub-surface maximum in chlorophyll. In general these values are higher in the SW monsoons than during the NE monsoon, and values range from 0.1 $\mu\text{g/l}$ to 1.87 $\mu\text{g/l}$. Zooplankton biomass ranges from 2 to 22 ml per haul.

Work on thraustochytrid protists, fungi and bacteria was carried out at 25 stations at depths of 0 and 25 m. Isolation and enumeration of thraustochytrids using (a) pine pollen baiting method and (b) surface plating method were done. Direct bacterial counts using epifluorescence microscopy were also done.

Surface microlayer investigations have revealed that microflagellate concentrations in this layer are 20x higher (most probable number) than at the 2 m depth. Nitrite-N values are much higher than those from the 1 m depth and the same is true for phosphate-P, Nitrite-N ranges from 0.01 μ mole/l to 0.41 μ mole per litre and phosphate-P from 0.06 to 0.56 μ mole/litre in this microlayer.

A total of 40 stations were occupied for hydrocarbon and tar ball pollution studies by ONGC personnel. Morning and afternoon balloon ascensions were carried out in addition to 3 hourly wind speed, direction, wet and dry bulb reading and cloud cover.

6. LOSS REPORT

One messenger was lost.

7. ACKNOWLEDGEMENTS

We thank the officers and crew of ORV Sagar Kanya for their help during the cruise.

ORV Sagar Kanya
Cruise 34

SUMMARY OF OBSERVATION

Annex - 1

Stn.	Date	Long. E	Lat.	Depth	Ship stop Time From To	Shallow casts	deep casts	Produc- tivity casts & Micro- biology	Grab	Vert- ical hauls	Hori- zontal hauls	Remark	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
I-1	8.8.87	73°18'.01	15°31'.12	60	0409	0530	4	-	1	1	-	-	
I-2	8.8.87	73°07'.28	15°31'.12	88	0145	0245	1	-	1	1	1	1	
I-3	8.8.87	73°00'.87	15°25'.13	110	0000	0110	1	-	1	1	-	-	
I-4	7.8.87	72°57'.01	15°23'.23	140	2200	2300	1	-	1	1	-	-	
I-5	7.8.87	72°50'.69	15°21'.59	258	1750	1950	1	-	1	1	-	-	
I-6	7.8.87	72°46'.05	15°18'.27	744	1540	1640	1	1	-	-	1	1	
I-7	7.8.87	72°40'.95	15°16'.23	993	1300	1440	1	1	-	-	-	-	
I-8	7.8.87	72°32'.98	15°12'.02	1420	0900	1100	1	2	1	-	1	1	
I-9	7.8.87	72°23'.46	15°08'.26	1770	0515	0715	1	1	-	-	1	1	
I-10	6.8.87	72°00'.00	15°00'.09	2050	2230	0230	1	1	3	-	1	1	
I-11	6.8.87	71°00'.10	14°59'.84	2614	1100	1600	1	2	3	-	1	1	
I-12	6.8.87	69°59'.96	14°59'.84	3450	0040	0540	1	1	3	-	1	1	
I-13	5.8.87	69°00'.03	15°00'.32	3858	1340	1900	1	1	3	-	1	1	
I-14	5.8.87	67°59'.96	14°59'.90	3925	0130	0730	1	2	2	-	1	1	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
J-1	1-8-87	72°40'.18	17°36'.07	41	1430	1530	1	-	1	1	-	-	-
J-2	1-8-87	72°23'.78	17°30'.11	83	1819	2000	1	-	2	1	1	1	1
J-3	1-8-87	72°07'.91	17°24'.02	97	1000	1130	1	-	1	1	-	-	-
J-4	2-8-87	71°57'.02	17°19'.98	92	0125	0215	1	-	-	1	-	-	-
J-5	2-8-87	71°52'.99	17°18'.01	97	0315	0415	1	-	1	1	1	1	1
J-6	2-8-87	71°47'.86	17°15'.99	197	0535	0630	1	-	-	1	-	-	-
J-7	2-8-87	71°42'.08	17°13'.92	660	0540	0730	1	1	1	-	-	-	-
J-8	2-8-87	71°36'.55	17°13'.08	935	1150	1300	1	1	-	-	-	-	-
J-9	2-8-87	71°26'.00	17°08'.98	1550	1520	1820	1	1	1	1	1	1	1
J-10	2-8-87	71°11'.69	17°02'.97	2050	1950	2300	1	1	1	2	1	1	1
J-11	3-8-87	70°55'.13	16°55'.89	2665	0100	0600	1	1	2	-	1	1	1
J-12	3-8-87	69°59'.91	16°29'.94	3620	1245	1745	1	1	1	2	1	1	1
J-13	4-8-87	69°00'.00	16°30'.08	3650	0030	0530	1	1	1	2	1	1	1
J-14	4-8-87	67°59'.84	16°29'.99	3026	1210	1710	1	1	1	2	1	1	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
K-2	1-8-87	71°40'.10	18°55'.15	74	0320	0430	1	-	2	1	1	1	1
K-3	31-7-87	71°15'.73	18°41'.96	82	2230	2400	1	-	1	1	-	-	-
K-4	31-7-87	71°01'.85	18°33'.98	87	1930	2030	1	-	-	1	-	-	-
K-5	31-7-87	70°46'.01	18°26'.89	90	1510	1630	1	-	1	1	1	1	1
K-6	31-7-87	70°37'.01	18°21'.01	97	1200	1330	1	-	-	1	-	-	-
K-7	31-7-87	70°32'.11	18°18'.71	370	0900	1100	1	1	1	1	-	-	-
K-8	31-7-87	70°25'.93	18°15'.55	787	0530	0730	1	1	-	-	-	-	-
K-9	31-7-87	70°22'.07	18°13'.15	1525	0230	0430	1	1	-	-	1	1	1
K-10	30-7-87	70°11'.90	18°07'.92	2312	2130	0130	1	1	2	-	1	1	1
K-11	30-7-87	69°59'.83	17°59'.19	2700	1210	1710	1	1	2	-	1	1	1
K-12	30-7-87	68°59'.78	17°59'.85	3364	0000	0630	2	2	2	-	1	1	1
K-13	29-7-87	67°59'.92	18°00'.41	3420	1100	1700	1	1	2	-	1	1	1
K-14	28-7-87	69°59'.69	17°59'.85	3425	2330	0430	1	1	2	-	1	1	1
K-15	28-7-87	66°00'.00	17°59'.76	3260	1325	1825	1	1	2	-	1	1	1
K-16	28-7-87	64°59'.78	17°59'.95	3420	0115	0600	1	1	2	-	1	1	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
L-1	23-7-87	70°16'.12	20°28'.69	60	1348	1500	1	-	1	1	-	-	-
L-2	23-7-87	70°01'.69	20°19'.93	81	1745	1845	1	-	2	1	1	1	1
L-3	23-7-87	69°47'.99	20°10'.93	84	2230	2330	1	-	1	1	-	-	-
L-4	24-7-87	69°38'.93	20°04'.98	83	0207	0300	1	-	-	1	-	-	-
L-5	24-7-87	69°33'.94	20°00'.98	95	0404	0500	1	-	1	1	1	1	1
L-6	24-7-87	69°30'.50	19°58'.20	170	0725	0925	1	-	1	1	-	-	-
L-7	24-7-87	69°24'.95	19°56'.07	300	1045	1200	1	1	-	1	-	-	-
L-8	24-7-87	69°21'.82	19°52'.57	620	1338	1500	1	1	-	-	-	-	-
L-9	24-7-87	69°16'.23	19°50'.10	1036	1710	1910	1	1	2	-	1	1	1
L-10	24-7-87	69°05'.94	19°42'.87	2080	2230	0130	1	1	2	-	1	1	1
L-11	25-7-87	68°53'.22	19°33'.00	2640	0430	1000	1	1	2	-	1	1	1
L-12	25-7-87	69°59'.94	19°30'.37	3200	1900	0100	1	1	2	-	1	1	1
L-13	26-7-87	66°59'.13	19°30'.26	3066	0815	1300	1	1	2	-	1	1	1
L-14	26-7-87	66°59'.94	19°30'.15	2800	2200	0500	1	1	2	-	1	1	1
L-15	27-7-87	64°55'.87	19°29'.98	3100	1030	1530	1	1	2	-	1	1	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
M-1	22-7-87	69°02'.24	21°22'.44	40	2210	2310	1	-	1	1	-	-	-
M-2	22-7-87	68°47'.96	21°44'.19	60	1810	2010	1	-	2	1	1	1	1
M-3	22-7-87	68°32'.92	21°34'.46	50	1335	1440	1	-	1	1	-	-	-
M-4	22-7-87	68°24'.15	21°31'.00	100	1110	1200	1	-	-	1	-	-	-
M-5	22-7-87	68°18'.05	21°28'.26	120	0745	0845	1	-	1	1	1	1	1
M-6	22-7-87	68°12'.96	21°25'.76	160	0330	0630	1	-	1	1	-	-	-
M-7	22-7-87	68°08'.12	21°23'.21	230	0117	0215	1	-	-	1	-	-	-
M-8	21-7-87	68°08'.85	21°20'.03	320	2200	2300	1	1	-	1	-	-	-
M-9	21-7-87	67°58'.01	21°16'.93	1376	1900	2100	1	1	1	2	1	1	1
M-10	21-7-87	67°47'.03	21°12'.71	1950	1115	1600	1	1	2	2	1	1	1
M-11	21-7-87	67°30'.19	21°06'.55	2200	0600	1100	1	1	2	-	1	1	1
M-12	20-7-87	66°59'.94	20°59'.85	2300	2050	0150	1	1	2	-	1	1	1
M-13	20-7-87	65°59'.50	20°59'.07	2500	0430	0930	1	1	2	-	1	1	1
M-14	19-7-87	64°59'.80	20°59'.95	3000	1500	2000	1	1	2	-	1	1	1