

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

**CRUISE No. 43**

**2nd August to 14th September, 1988**



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

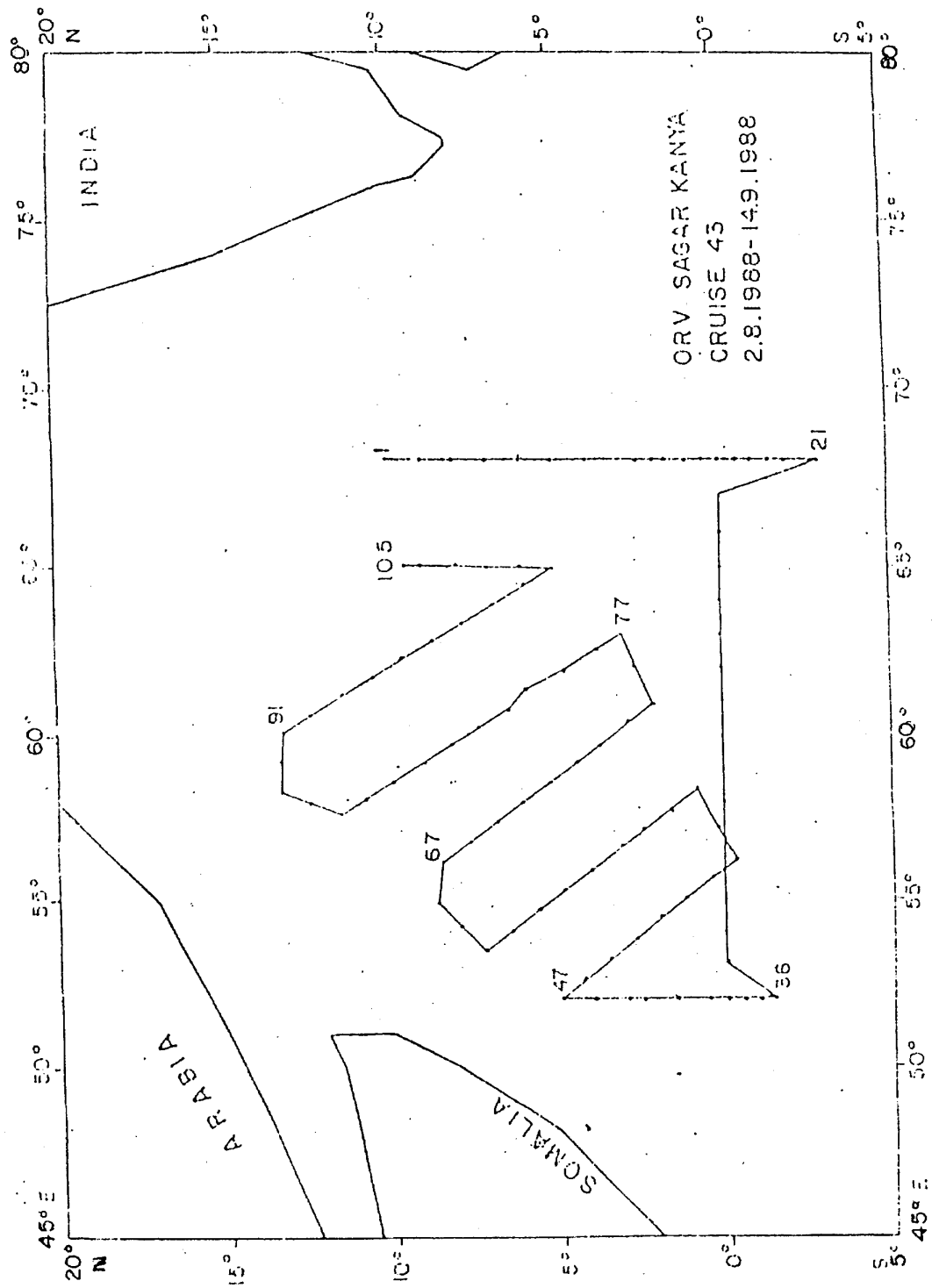
NATIONAL INSTITUTE OF OCEANOGRAPHY  
(Council of Scientific & Industrial Research)  
Dona Paula, Goa - 403 004

REPORT ON  
43RD OCEANOGRAPHIC CRUISE OF  
ORV SAGAR KANYA

(2 August to 14 September, 1988)

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## 2. Cruise Summary

Cruise 43 of ORV Sagar Kanya was organised as a part of the Joint Indo-USSR Collaborative programme in the Arabian Sea for the study of the monsoon dynamics from 2nd August to 14th September 1988. Data on Physical Oceanographic, Surface and Upper air Meteorology were collected during the cruise. All physical oceanographic data were processed on board. A total of 105 oceanographic stations were occupied. Besides scientists from the National Institute of Oceanography, scientists from India Meteorological Department, Department of Naval Oceanography and Meteorology, Indian Institute of Tropical Meteorology and three Soviet scientists have participated in the cruise.

## 3. Participants

### (a) Scientific Component:

D.P. Rao	Chief Scientist
N. Bahulayan	Deputy Chief Scientist
V. Ramesh Babu	Physical Oceanography Div.
V.V. Gopalakrishna	- do -
Y.V.B. Sarma	- do -
M.S.S. Sarma	- do -
G. Nampoothiri	- do -
M.T. Babu	- do -

P.V. Chodankar	- do -
P.N. Vinayachandran	- do -
N.Y. Apte	India Meteorological Dept.
B.B. Das	- do -
P.S. Venkataraman	- do -
S.K. Dey	- do -
P.M. Machnurkar	- do -
P. Seetharamaiah	Indian Institute of Tropical Meteorology, Pune
Lt. Cdr. D. Kumar	Naval Oceanography and Meteorology, New Delhi.
N.V. Dani	CMC Engineer.
D.A. Iosifovich	USSR Scientist
B.K. Pavlovich	- do -
T.V. Petrovich	- do -

**(b) Ship's Complement:**

G.W. Vendegucht	Master
C. Carneiro	Chief Officer
M.A. Khot	2 nd Officer
R.S. Sakhuja	3 rd Officer
R.V. Lad	Chief Engineer Officer
Arun Ajamani	2 nd E.O
T. Dasgupta	5 th E.O
A. Dutta Choudhary	5 th E.O

Om Prakash Bharadwaj	Electrical Officer
B.K. Vashista	- do -
S.D. Warkey	Chief Radio Officer
Jairaj Nair	Radio Officer
S. Gokulnath	Medical Officer
R. Fernandes	Catering Officer
A. Rodriques	Asst. Catering Officer
R.D.S. D'Silva	Purser

#### 4. Objectives and Cruise Plan

To study the monsoon dynamics of the Arabian Sea with special reference to

1. Distribution of Oceanographic Properties such as temperature, salinity and mass,
2. Geostrophic Circulation and Mass Transport,
3. Heat Content and Heat Transport by Vertical and Lateral Advective Processes in the upper layer of the ocean,
4. Flux Transfer across Ocean-Atmosphere interface and in the upper atmosphere.

The present cruise has been organised as a part of the joint Indo-USSR collaborative programme for the study of dynamics of the southwest monsoon. The western and equatorial Indian Ocean, which is subjected to rapid and vigorous response to the monsoon winds has been selected for the work. Stations were planned at 60 nm interval. It was intended to repeat the observations thrice during various stages of the monsoon, viz.,

1. The Pre-Monsoon Period April-May,
2. During the peak of the monsoon June-July and
3. During the withdrawal phase of August-Sept.  
the Monsoon.

The first two cruises of 45 days each were carried out



1. Surface meteorological observation at three hour interval
2. Radiosonde observations at 00 Z and 12 Z
3. Omegasonde at 0500 Z
4. STD/ Hydrocast upto 1000 m depth along the track at 60 nm interval for temperature and salinity at discrete depths.
5. Current measurements along  $68^{\circ}$  E from  $3^{\circ}$  N to  $3^{\circ}$  S and between  $3^{\circ}$  N  $1^{\circ}$  30' S along  $52^{\circ}$  E at 30 nm apart.
6. Wave recording at some selected stations.

The stations locations are shown in the cruise track

#### Equipment Used:

Self recording T.S.K salinity - temperature - depth profiler, model 4 was used for obtaining temperature and salinity with depth along tracks 1,2 and 3 upto station 49 upto about 1200 m . The STD was discontinued after station 49 as salinity cell developed some defect, probably due to leakage of sea water into the cell. Hydrocast was operated afterwards upto 1500 m for obtaining the above data at discrete depths. Temperature was measured with reversing bottles and conductivity of sea water was measured on Guildline autosal model 8400 A. Later salinity was computed using UNESCO's Practical Salinity Scale.

Surface meteorological observations viz wind speed,

by the Soviet Research Ship Akademik Korolev from March 18th to May 3rd and May 5th to June 14th of 1988. The third cruise was planned on board ORV Sagar Kanya from August 2nd to September 14th, 1988. The cruise track is shown in Fig. 1.

During the cruise it was proposed to collect oceanographic data on temperature and salinity in the upper 1000 m, which is considered to be more responsive to the wind system together with 3 hourly surface meteorological data and upper air data at 0000 Z and 1200 Z. The vessel sailed a total distance of 12,800 lkm.

5. **Cruise details:**

ORV Sagar Kanya sailed from Mormugao harbour at 1630 hrs (IST) on 2 nd August 1988 with 21 scientists from various organisations like NIO., IMD., IITM., Directorate of Naval Oceanography and Meteorology and CMC. Three Soviet scientists; one from Hydrometeorological Centre and two from the State Oceanographic Institute were deputed by the USSR government to participate in the cruise.

A meeting of all the scientists was held onboard at 1100 IST on 3.8.1988. The chief scientist briefed the plan of work and after that various working schedules were discussed for carrying out the observations on physical oceanography, meteorology and data processing.

The following observations were carried out.

direction, wet bulb, dry bulb and sea surface temperatures were recorded on HP 9845 B data logger. The upper air data on atmospheric pressure, air temperature and dew point temperature were obtained on Radiosonde equipment. Upper winds were obtained using Vaisala Omega system.

Current measurements were carried out by suspending acoustic current meter (Simrad UCM -30 ) upto a depth 500 m and the data were recorded on a cassette and later read on the Osborne computer.

Total observations carried out:

STD/Hydrocast stations	105
Radiosonde	72
Omegasonde	20
Current measurements	23

#### 6. Synopsis of observations and data collected:

The sea was very quite nearer to the equatorial regions and was rough as the vessel moved northwards. The winds were also calm and variable in the equatorial region and reached upto 30 - 35 Knots in the Western Arabian Sea and remained steady from the southwesterly direction. The sea surface temperature varied between 30.2 and 25.3<sup>o</sup> C.

The following are the preliminary results of the study.

1. Cooling is more towards East during August than during

May - June. (RV Akademik Korolev )

2. The anticyclonic gyre observed during May - June (Korolev cruise) has weakend and more localised small scale eddies were observed.
3. Heat content in the upper layer decreased during August - September compared to that during May - June.

The data are being analysed for further detailed study.

7. **Losses/Damages:**

There was no loss of equipment during the cruise.

8. **Acknowledgement:**

The chief scientist thanks the master, officers and the crew of ORV Sagar Kanya, the participating scientists for their cooperation in organising the cruise successfully.

## SUMMARY OF OBSERVATIONS

SHIP : ORV SAGAR KANYA  
 AREA : ARABIAN SEA  
 CRUISE NUMBER : 43

Sl.No.	Stn.No.	Date	Time (GMT)		Position		Depth (m)	STD	W.R	Observations	
			From	To	Latitude	Longitude				Surf. Met	Others
1	1	5.8.88	0710-0920	09 53.0'N	68 02.0'E	4465	Yes	Yes	Yes	Yes	Deep Station
2	2	5.8.88	1743-1344	08 57.8'N	68 00.3'E	4528	Yes	Yes	Yes	Yes	-
3	3	6.8.88	0230-0310	08 00.2'N	68 00.0'E	4617	Yes	Yes	Yes	Yes	-
4	4	6.8.88	1003-1045	07 00.0'N	68 00.0'E	4457	Yes	Yes	Yes	Yes	-
5	5	6.8.88	1840-1934	05 53.8'N	68 00.0'E	3125	Yes	Yes	Yes	Yes	-
6	6	7.8.88	0319-0315	05 00.0'N	68 00.0'E	3515	Yes	Yes	Yes	Yes	-
7	7	7.8.88	1155-1250	04 00.0'N	68 00.0'E	3429	Yes	Yes	Yes	Yes	-
8	8	7.8.88	2000-2205	03 00.0'N	68 00.0'E	3102	Yes	Yes	Yes	Yes	-
9	9	8.8.88	0220-0415	02 30.0'N	68 00.0'E	4050	Yes	Yes	Yes	Yes	-
10	10	8.8.88	0753-0934	02 00.0'N	68 00.0'E	3071	Yes	Yes	Yes	Yes	-
11	11	8.8.88	1235-1425	01 36.6'H	67 59.3'E	3738	Yes	Yes	Yes	Yes	-
12	12	8.8.88	1350-2025	01 00.0'N	68 00.0'E	4241	Yes	Yes	Yes	Yes	-
13	13	9.8.88	0005-0150	00 30.0'N	68 00.0'E	3376	Yes	Yes	Yes	Yes	-
14	14	9.8.88	0530-0756	00 00.0'	68 00.0'E	3254	Yes	Yes	Yes	Yes	-
15	15	9.8.88	1119-1253	00 30.0'S	68 00.0'E	3780	Yes	Yes	Yes	Yes	-
16	16	9.8.88	1718-1906	01 00.0'S	68 00.0'E	3255	Yes	Yes	Yes	Yes	-
17	17	9.8.88	2305-0030	01 30.0'S	68 00.0'E	2692	Yes	Yes	Yes	Yes	-
18	18	10.8.88	0430-0607	02 00.0'S	68 00.0'E	3805	Yes	Yes	Yes	Yes	-
19	19	10.8.88	0937-1122	02 30.0'S	68 00.0'E	3938	Yes	Yes	Yes	Yes	-
20	20	10.8.88	1543-1755	03 00.0'S	68 00.0'E	2499	Yes	Yes	Yes	Yes	-
21	21	11.8.88	1222-1323	00 01.0'S	67 00.0'E	3040	Yes	Yes	Yes	Yes	-
22	22	11.8.88	1930-2100	00 00.1'S	66 00.0'E	2974	Yes	Yes	Yes	Yes	-
23	23	12.8.88	0437-0530	00 00.3'S	65 00.0'E	3760	Yes	Yes	Yes	Yes	-
24	24	12.8.88	1146-1359	00 01.1'S	64 00.5'E	4250	Yes	Yes	Yes	Yes	-
25	25	12.8.88	1957-2110	00 00.1'S	63 00.0'E	4300	Yes	Yes	Yes	Yes	-
26	26	13.8.88	0422-0310	00 00.1'S	62 00.0'E	4766	Yes	Yes	Yes	Yes	-
27	27	13.8.88	1037-1315	00 00.2'S	61 00.0'E	4410	Yes	Yes	Yes	Yes	-
28	28	13.8.88	1833-1940	00 00.0'	60 00.0'E	4521	Yes	Yes	Yes	Yes	-
29	29	14.8.88	0100-0307	00 00.3'S	59 03.0'E	4629	Yes	-	Yes	Yes	-
30	30	14.8.88	0852-0942	00 00.5'S	58 00.0'E	4704	Yes	-	Yes	Yes	-

STATEMENT OF OBSERVATIONS

AREA : ARABIAN SEA

SHIP : ORV SAGAR KANYA  
 CRUISE NUMBER : 43

Sl.No.	Stn.No.	Date	Time (GMT)		Position		Depth (m)	STD/ Hydrocast	W.R	Surf. Met	Others
			From	To	Latitude	Longitude					
31	14.8.83	1618-1713	00 00.5'S	56 56.0'E	4579	Yes	-	Yes	-	-	
32	14.8.83	2238-2237	00 00.5'S	57 58.7'E	3450	Yes	-	Yes	-	-	
33	15.8.83	0605-0706	00 00.4'N	55 00.0'E	4433	Yes	Yes	Yes	-	-	
34	15.8.83	1457-1557	00 00.1'N	54 00.0'E	4908	Yes	-	Yes	-	-	
35	15.8.83	0417-0528	00 00.9'S	53 00.1'E	5037	Yes	-	Yes	-	-	
36	15.8.83	2210-0013	01 29.1'S	52 00.0'E	5085	Yes	-	Yes	-	-	
37	17.8.83	0358-0540	01 00.2'S	52 00.0'E	5073	Yes	Yes	Yes	-	-	
38	17.8.83	0905-1045	00 31.7'S	51 59.0'E	5069	Yes	-	Yes	-	-	
39	17.8.83	1454-1756	00 00.8'S	52 00.0'E	5072	Yes	Yes	Yes	-	-	
40	17.8.83	2151-2312	00 29.8'N	51 59.8'E	5074	Yes	-	Yes	-	UCM (500 m)	
41	18.8.83	0310-0442	01 00.0'N	51 59.0'E	5082	Yes	-	Yes	-	UCM (500 m)	
42	18.8.83	0632-0951	01 30.0'N	52 00.0'E	5080	Yes	-	Yes	-	UCM (500 m)	
43	18.8.83	1255-1435	01 54.0'N	51 59.0'E	5058	Yes	-	Yes	-	UCM (500 m)	
44	18.8.83	1835-2010	02 30.0'N	52 00.0'E	5032	Yes	Yes	Yes	-	-	
45	18.8.83	2344-0125	02 59.0'N	52 00.0'E	4844	Yes	-	Yes	-	-	
46	19.8.83	0923-1022	04 00.0'N	52 00.0'E	5075	Yes	-	Yes	-	-	
47	19.8.83	2435-2130	04 43.5'N	52 00.0'E	5066	Yes	-	Yes	-	-	
48	20.8.83	0433-0713	04 13.8'N	52 35.8'E	5072	Yes	-	Yes	-	-	
49	20.8.83	1230-1317	03 26.6'N	53 12.0'E	5094	Yes	-	Yes	-	-	
50	20.8.83	1850-2100	02 39.5'N	53 49.8'E	5000	Yes	-	Yes	-	-	
51	21.8.83	0300-0400	01 56.6'N	54 28.0'E	4930	Yes	Yes	Yes	-	-	
52	21.8.83	1234-1538	01 10.5'N	55 04.5'E	4800	Yes	-	Yes	-	-	
53	22.8.83	0033-0230	00 20.2'N	55 42.9'E	4500	Yes	-	Yes	-	-	
54	22.8.83	1223-1530	00 21.8'S	56 16.4'E	4600	Yes	-	Yes	-	-	
55	23.8.83	0040-0302	00 08.7'W	57 14.7'E	4700	Yes	-	Yes	-	-	
56	23.8.83	1140-1300	00 47.1'N	53 21.6'E	4500	Yes	-	Yes	-	-	
57	23.8.83	1943-2151	01 35.3'N	57 45.5'E	4500	Yes	Yes	Yes	-	-	
58	24.8.83	0511-0651	02 22.0'N	57 08.0'E	4500	Yes	-	Yes	-	-	
59	24.8.83	1232-1400	03 02.0'N	56 42.0'E	4300	Yes	-	Yes	-	-	
60	24.8.83	2354-0133	04 00.3'N	55 53.5'E	4300	Yes	-	Yes	-	-	

Observations

SUMMARY OF OBSERVATIONS

SHIP : ORV SAGAR KANVA AREA : ARABIAN SEA  
 CRUISE NUMBER : 43

Sl.No.	Stn.No.	Date	Time (GMT) From - To	Position		Depth (m)	STD/ Hydrocast	V.R	Surf. Met	Others	Observations
				Latitude	Longitude						
91		5-9-88	2343-0120	13 10.0'N	60 02.0'E	4300	Yes	Yes	Yes	-	
92		6-9-88	0835-0959	12 19.0'N	60 35.0'E	4300	Yes	-	Yes	-	
93		6-9-88	1805-1936	11 24.0'N	61 10.0'E	4400	Yes	-	Yes	-	
94		7-9-88	0400-0524	10 27.0'N	61 40.0'E	4400	Yes	Yes	Yes	-	
95		7-9-88	1203-1322	09 35.1'N	62 15.0'E	4500	Yes	-	Yes	-	
96		7-9-88	2028-2200	08 40.0'N	62 50.0'E	4550	Yes	Yes	Yes	-	
97		8-9-88	0601-0731	07 45.0'N	63 20.0'E	4190	Yes	-	Yes	-	
98		8-9-88	1508-1645	06 50.0'N	63 53.0'E	3850	Yes	-	Yes	-	
99		8-9-88	2333-0109	05 55.0'N	64 27.0'E	4050	Yes	-	Yes	-	
100		9-9-88	0823-0952	04 59.8'N	64 59.8'E	4000	Yes	Yes	Yes	-	
101		9-9-88	1736-1955	06 00.0'N	65 00.0'E	4450	Yes	-	Yes	-	
102		10-9-88	0350-0530	07 00.0'N	65 00.0'E	4600	Yes	-	Yes	-	
103		10-9-88	1203-1326	07 54.1'N	65 00.8'E	4300	Yes	-	Yes	-	
104		10-9-88	2326-0100	09 00.0'N	65 00.0'E	4150	Yes	-	Yes	-	
105		11-9-88	0509-0547	09 28.3'N	65 01.6'E	4400	Yes	-	Yes	-	