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CRUISE REPORT

ORV SAGAR KANYA

Cruise No. 122

(8-18 April, 1997)

राष्ट्रीय समुद्र विज्ञान
संस्थान
NATIONAL INSTITUTE
OF
OCEANOGRAPHY

ORV SAGAR KANYA

Cruise No. 122

(8-18 April, 1997)

NATIONAL INSTITUTE OF OCEANOGRAPHY

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REPORT ON THE 122ND OCEANOGRAPHIC CRUISE OF O.R.V. SAGAR KANYA

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Cruise Track
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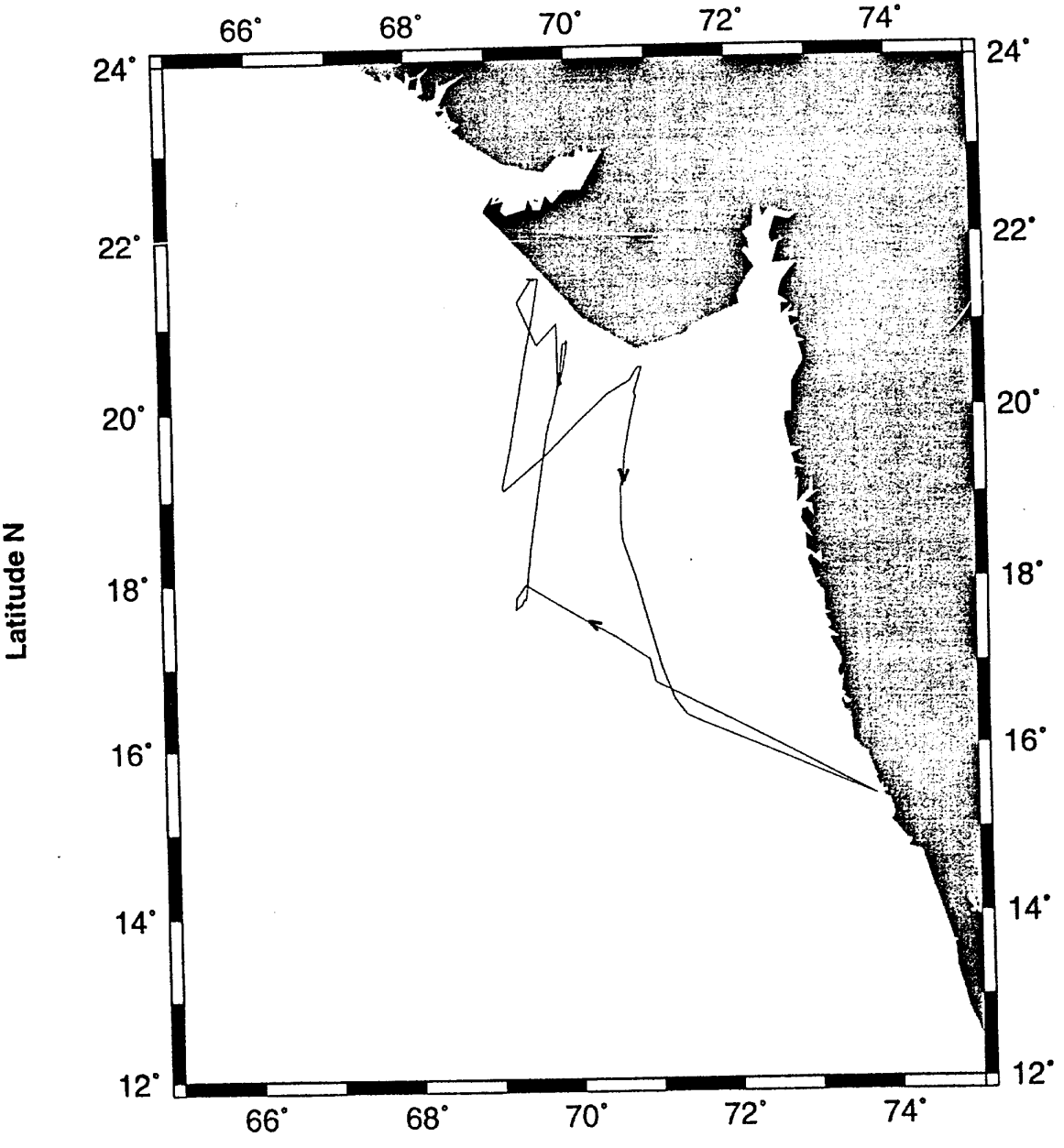

2.CRUISE SUMMARY

The cruise was a part of the validation campaign of the ocean colour sensor MOS, on board the Indian Remote Sensing Satellite, (IRS-P3). Cruise participants were drawn from the Space Applications Center (Ahmedabad), Physical Research laboratory (Ahmedabad) and Fishery Survey of India (Goa), besides NIO.

Scientific work consisted of radiation measurements using LICOR spectroradiometer upto the euphotic zone, measurements of absorption spectra using AC-9 meter, chlorophyll and suspended sediments observations, measurments of atmospheric optical depth and aerosol size distribution and surface met observations along the path numbers 91 and 92 of IRS-P3. The area of operation was south of Saurashtra coast in Arabian Sea.

The ship left Mormugao on April 8, 1997 with 15 scientists on board. The sea was slightly rough with white caps appearing occasionally. Sky was partly cloudy throughout the cruise. In all, 15 Ocean Colour stations, 59 stations for atmospheric parameters and 65 seatruth observations for surface meteorological parameters were covered during the cruise. The cruise ended on April 18, 1997 at Mormugao harbour.

3. PARTICIPANTS

3.1 Scientific component

P.V. Sathe R. Vaithiyanathan E.P. Ramarao J.M. Parvez J.I. Goes Jolly Kurian Namita Jadhav T. Suresh G. Chandivale	)	Chief Scientist NIO, Goa
Vijay Mangar	—	Ministry of Fisheries, (Mauritius)
R.M. Dwivedi Mini Raman A.K. Mathur	—	SAC, Ahmedabad
Y.B. Acharya	—	PRL, Ahmedabad
S.K. Naik	—	FSI, Goa
Shellak Davis P. Premchandran Nair P.B. Abdul Nazar	—	Norinco, Goa

3.2 Ship's complement

Captain W.T. Pereira	—	Master
Sam Abraham	—	Chief Officer
N.S. Bajwa	—	3rd Officer
Shenavas Khan M.	—	Chief Engineer
V. Singh		2nd Engineer
Sreedharan P.	—	Electrical Officer
G.S. Nagarcenkar	—	Radio Officer
James Jose	—	Medical Officer
R.G.S. D'Silva	—	Purser
L.M.F. Rodrigues	—	Catering Officer

4. INTRODUCTION

The cruise was a part of a special campaign for validation of the ocean colour sensor MOS, (Modular Optoelectronic Scanner) on board the Indian Remote Sensing Satellite, (IRS) P3, launched on March 21, 1996. The objective of the cruise was to collect synchronous seatruth with respect to satellite passes and also to increase the data base required for development/refinement of existing algorithms to retrieve chlorophyll, suspended sediments, and other micro-constituents of the sea. The first three cruises under the programme were organized earlier in February, April and December 1996 respectively.

During the meeting of IRS P-3 validation committee held at NIO on March 4, 1997, it was decided to use both Sagar Kanya and Sagar Sampada during the current mission to cover more number of satellite passes. Accordingly, it was decided that Sagar Kanya will cover path numbers 91 and 92 while Sagar Sampada will cover path numbers 96 and 97 for synchronous seatruth collection.

The cruise was multi-disciplinary enlisting participation from optical oceanographers, biologists and space physicists, besides personnel from ocean remote sensing.

5. CRUISE DETAILS

The cruise was planned to collect synchronous seatruth for ocean colour sensor MOS on board Indian satellite IRS P-3 and to increase the data base for development/refinement of retrieval algorithms for biological parameters. Simultaneous measurements of radiation upwelling from the sea and quality of seawater in terms of its various constituents that alter the spectral character of incoming radiation are required for this purpose. The cruise was planned to collect such data at the various locations in the sea along satellite passes. Path numbers 91 and 92 of IRS P-3 were planned to be covered.

The ship sailed from Mormugao on April 8, 1997 AT 1700 hrs with 15 scientists and 3 technicians from NORINCO on board. The ship proceeded to cover the track along path number 91 in northern Arabian sea south of Saurashtra coast. The first station was a dry-run of equipments on the location 16°46'N and 71°18'E on April 9, 1997 between 1100 to 1430 hrs. Collection of seatruth data for AVHRR validation including surface meteorological parameters also began on April 9 at 1200 hrs and it continued every 3 hours all along the cruise track. Annexure 1 gives station locations and schedule for these observations. Instruments operated for the purpose were bucket thermometer, PRT, Thermosalinograph, wave recorder, anemometer, wind vane, psychrometer and automatic weather station fabricated by NIO. Automatic weather station requires dedicated PC on board. Since we had only 2 PCs and they were required for several purposes, continuous data collection was not possible.

Radiation measurements consisted of the following parameters:

1. Transparency of water: Secchi disk was used to establish total attenuation.
2. Reflectance: Upwelling and downwelling light at various depths was measured in the range from 350 to 850 nm using LICOR underwater radiometer manufactured by MS LICOR, USA.
3. Inherent optical properties (IOP): AC-9 meter (WETLABS) was used to measure absorption and beam attenuation at 9 wave lengths viz, 412, 440, 488, 510, 555, 630, 650, 676 & 715 nm.

At all locations where ocean colour measurements were made, simultaneous biological observations were taken. These included chlorophyll pigment concentration profile, primary production at different depths and total suspended sediments. SST, surface met observations and wave characteristics were also supplemented at every ocean colour station. The locations and schedule of ocean colour stations are given in annexure 2.

Atmospheric measurements consisted of studies on aerosol concentration disrtibution and optical depths of atmosphere. They began on April 9, at 1000 hrs. The locations and schedule of stations for atmospheric measurements are given in annexure 3. Following instruments were used for the purpose.

1. Sunphotometer: It consists of an interference filter and a photodiode with suitable electronics to convert incident flux into electrical voltage. It measures optical depth in six wavelengths, viz, 399, 497, 667, 848, 950 and 1051 nm. The bandwidth of interference filter is approximately 10 nm. Observations were made every half an hour during clear sky conditions. The equipment is indegenously manufactured by the Physical Research Laboratory, Ahmedabad.
2. Quartz Crystal Microbalance (QCM) Cascade Impactor: This is used for the measurement of mass concentration and size distribution of fine particles suspended in air in the range of 0.5 to 25 microns. It consists of 10 impactor stages which are arranged in a cascade with jets that segregate the larger aerosol particles. Observations were made 4 times a day. The instrument is manufactured by M/S California Measurments Inc. USA.
3. Normal Incidence Pyrheliometer: It is used to measure total solar radiation and also in one colour wavelength band (red). Observations are made synchronous with sunphotometer. The instrument is supplied by M/S Eppley laboratories, USA.

Weather was fine throughout the cruise and all instruments functioned well. The cruise came to an end on 18th April at Mormugao.

6. SUGGESTIONS

Shortage of PCs was strongly felt during the cruise since every other instrument requires a dedicated PC. Besides, PCs are required for onboard downloading of data and other computations. It is suggested that 5 PCs may be procured for Sagar Kanya and kept on board for use during the cruises.

7. ACKNOWLEDGEMENTS

The cruise participants are thankful to Department of Ocean Development for making Sagar Kanya available for the validation exercise. Thanks are also due to Master of the vessel and his crew for making this cruise a big success.

ANNEXURE 1

Station locations and schedule for surface met.observations

Sr No	Date 1997	Time hrs	Latitude (N)	Longitude (E)
01	09/04	1430	16:47	71:00
02	09/04	1730	17:04	70:56
03	09/04	2030	17:19	70:32
04	09/04	2330	17:30	70:12
05	10/04	0530	17:58	69:24
06	10/04	0830	17:48	69.17
07	10/04	1100	17:40	69.16
08	10/04	1430	17:44	69:21
09	10/04	1600	17:48	69:33
10	10/04	1730	17:47	69:24
11	10/04	2030	18:04	69:26
12	10/04	2330	18:24	69:28
13	11/04	0530	19:22	69:37
14	11/04	0830	19:43	69:41
15	11/04	1050	19:53	69:43
16	11/04	1130	19:53	69:44
17	11/04	1430	20:14	69:49
18	11/04	1540	20:18	69:50
19	11/04	1730	20:17	69:51
20	11/04	2030	20:18	69:53
21	11/04	2330	20:21	69:51
22	12/04	0530	20:46	69:54
23	12/04	0830	20:46	69:56
24	12/04	0940	20:48	69:57
25	12/04	1130	20:47	69:57
26	12/04	1430	20:29	69:54
28	12/04	2030	21:00	69:49
29	12/04	2330	20:45	69:34
30	13/04	0530	21:15	69:20
31	13/04	0900	21:31	69:31
32	13/04	1130	21:30	69:33
33	13/04	1430	21:31	69:28
34	13/04	1555	21:31	69:34
35	13/04	1730	21:31	69:36
36	13/04	2030	21:05	69:31
37	13/04	2330	20:37	69:25
38	14/04	0530	19:33	69:13
39	14/04	0830	19:10	69:08
40	14/04	0945	19:06	69:07
41	14/04	1130	19:04	69:08
42	14/04	1430	19:07	69:16

.....continued

Sr No	Date 1997	Time hrs	Latitude (N)	Longitude (E)
43	14/04	1730	19:28	69:39
44	14/04	2030	19:51	70:04
45	14/04	2330	20:11	70:27
46	15/04	0530	20:20	70:44
47	15/04	0830	20:29	70:50
48	15/04	0945	20:29	70:52
49	15/04	1130	20:29	70:53
50	15/04	1430	20:15	70:48
51	15/04	1545	20:11	70:47
52	15/04	1730	20:09	70:48
53	15/04	2030	19:53	70:44
54	15/04	2330	19:29	70:39
55	16/04	0530	19:07	70:38
56	16/04	0830	19:12	70:37
57	16/04	1130	19:06	70:36
58	16/04	1430	18:57	70:36
59	16/04	1730	18:42	70:36
60	16/04	2030	18:28	70:37
61	16/04	2330	18:02	70:47
62	17/04	0530	16:58	71:05
63	17/04	0830	16:35	71:14
64	17/04	1100	16:23	71:23
65	17/04	1430	16:18	71;33

ANNEXURE 2

Station locations and schedule for ocean colour observations

Sr No	Date 1997	Time hrs	Latitude (N)	Longitude (E)
1	09/04	1205	16:46	71:18
2	10/04	1120	17:04	69:15
3	10/04	1600	17:46	69:24
4	11/04	1210	19:53	69:43
5	11/04	1340	20:17	69:51
6	12/04	1105	20:45	69:56
7	12/04	1615	20:16	69:48
8	13/04	1100	21:30	69:31
9	13/04	1600	21:31	69:33
10	14/04	1155	19:05	69:07
11	15/04	1100	20:29	70:52
12	15/04	1540	20:10	70:46
13	16/04	1100	19:06	70:36
14	16/04	1610	18:43	70:34
15	17/04	1100	16:23	71:22

Annexure 3

Station locations and schedule-atmospheric observations

Sr No	Date 1997	Time hrs	Latitude Deg N	Longitude Deg E
01	09/04	0730	16:30	71:49
02	09/04	0945	16:43	71:27
03	09/04	1115	16:49	71:18
04	09/04	1527	16:52	71:12
05	09/04	1715	17:03	70:58
06	09/04	1800	17:07	70:52
07	09/04	1940	17:16	70:40
08	10/04	0740	17:54	69:19
09	10/04	1027	17:40	69:16
10	10/04	1201	17:40	69:17
11	10/04	1511	17:48	69:23
12	10/04	1559	17:49	69:23
13	10/04	1605	17:49	69:23
14	10/04	1637	17:49	69:23
15	10/04	1700	17:49	69:23
16	10/04	1942	17:55	69:26
17	11/04	0836	19:42	69:41
18	11/04	0935	19:48	69:42
19	11/04	1132	19:53	69:44
20	11/04	1523	20:18	69:49
21	11/04	1555	20:17	69:59
22	11/04	1637	20:18	69:59
23	12/04	0800	20:45	69:55
24	12/04	1000	20:45	69:55
25	12/04	1123	20:47	69:57
26	12/04	1530	20:16	69:48
27	12/04	1600	20:17	69:49
28	12/04	1635	20:17	69:49
29	13/04	0735	21:26	69:28
30	13/04	1135	21:32	69:34
31	13/04	1505	21:31	69:33
32	13/04	1554	21:31	69:33
33	13/04	1720	21:31	69:33
34	13/04	1930	21:17	69:35
35	14/04	0728	19:20	69:10
36	14/04	0806	19:14	69:09
37	14/04	1044	19:14	69:09
38	14/04	1130	19:04	69:08
39	14/04	1515	19:31	69:23
40	14/04	1632	19:22	69:33
41	14/04	1720	19:29	69:41

.....continued

Sr No	Date 1997	Time hrs	Latitude Deg N	Longitude Deg E
42	14/04	1920	19:13	69:23
43	15/04	0730	20:30	70:50
44	15/04	1115	20:29	70:53
45	15/04	1511	20:11	70:47
46	15/04	1608	20:10	70:46
47	15/04	1636	20:10	70:46
48	15/04	1930	20:02	70:47
49	16/04	0715	19:07	70:39
50	16/04	0805	19:12	70:37
51	16/04	0904	19:08	70:36
52	16/04	1107	19:06	70:37
53	16/04	1519	18:48	70:35
54	16/04	1930	18:38	70:04
55	17/04	0720	16:43	71:10
56	17/04	0810	16:36	71:12
57	17/04	0917	16:28	71:20
58	17/04	1021	16:23	71:23
59	17/04	1601	16:13	71:45