

CRUISE REPORT

ORV SAGAR KANYA

Cruise No. 105

16 August to 14 September, 1995



राष्ट्रीय समुद्र विज्ञान
संस्थान

NATIONAL INSTITUTE
OF
OCEANOGRAPHY

ORV SAGAR KANYA

Cruise No. 105

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NATIONAL INSTITUTE OF OCEANOGRAPHY

(Council of Scientific and Industrial Research)

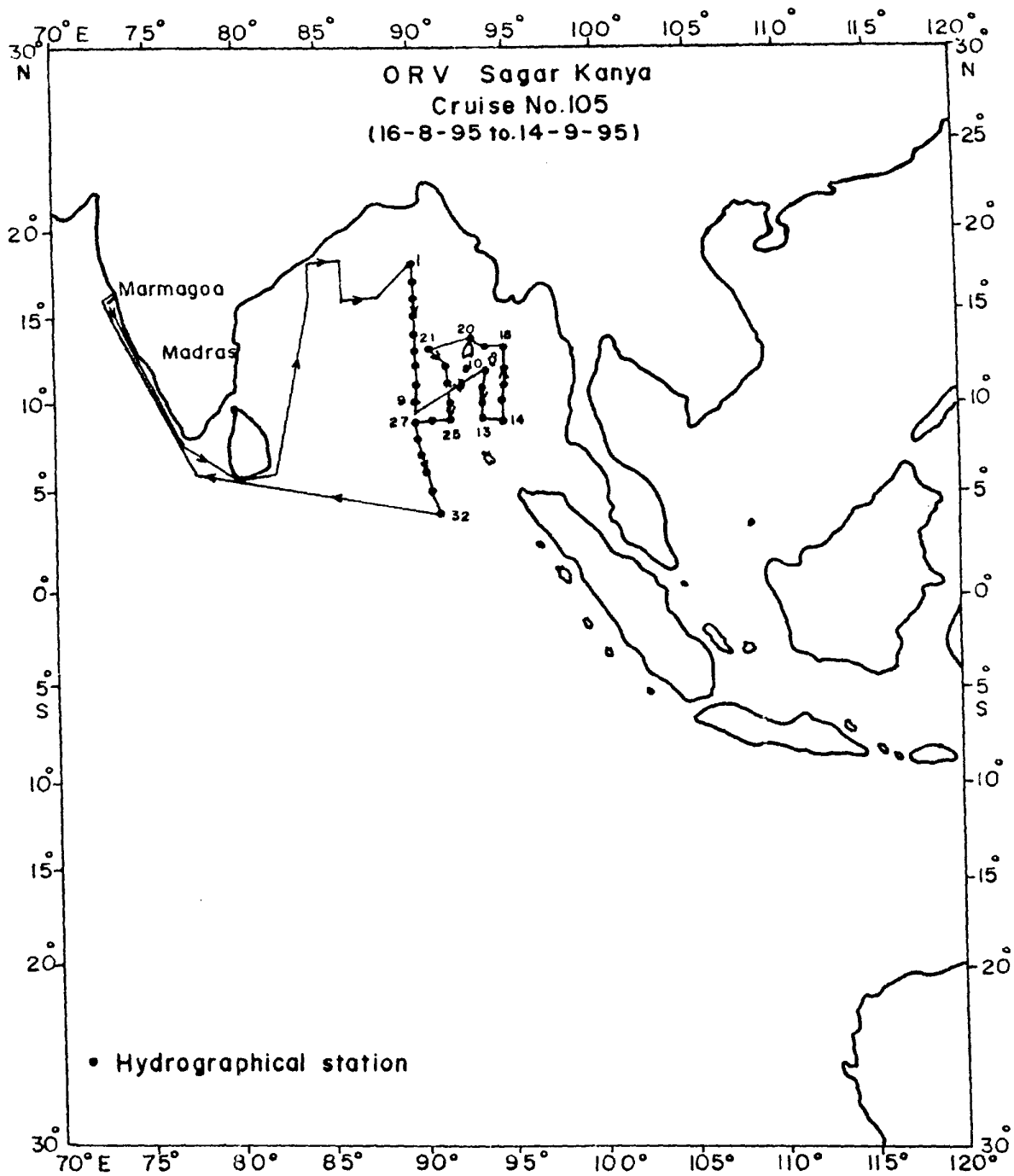
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**REPORT ON THE 105TH OCEANOGRAPHIC CRUISE OF O.R.V.
SAGAR KANYA**

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Cruise Track

2. CRUISE SUMMARY

The observational area for the cruise was in the Bay of Bengal and the Andaman Sea. The main objective of this cruise was to estimate the zonal volume transport across one of the World Ocean Circulation Experiment (WOCE)'s designated sections (IR5) i.e., along 90°E in the Bay of Bengal during summer monsoon. Three shorter sections along 92°, 94° & 95°E longitudes were covered around Andaman Islands between 9° and 13°N latitudes for assessing the cyclone heat potential and topographical influence on the seasonal flow dynamics. Thirty two hydrographical stations were occupied and CTD (Conductivity-Temperature-Depth) probe was operated to obtain depth profiles of temperature and salinity in the water column. Surface and upper air (radio-sonde) observations were also made to facilitate the studies on cyclogenesis in the atmosphere over the northwestern Bay of Bengal wherein the summer monsoon depressions prevail during the season. The atmospheric sounding data obtained at synoptic hours were reported on near real time basis to the India Meteorological Department for their application in the Department's operational weather forecasts. The ship sailed from Mormugao on 16 August 1995 and returned to the same port on 14 September 1995 at the end of the cruise.

3. PARTICIPANTS

3.1 Scientific Component

V. Ramesh Babu, <i>Chief Scientist</i>	) —	(Goa to Andamans)
Y.V.B. Sarma, <i>Chief Scientist</i>	) —	(Andamans to Goa)
G. Nampoothiri)	
S. Pednekar)	
J. Patnaik	) —	NIO,Goa.
M.N. Subrahmaniam)	
S.A. Mold)	
N.G. Deshpande)	
S.R. Kulkarni	) —	India Meteorological
G.N. Naguesh	)	Department
S.K. Dey)	
Lt.Cdr Anil Kumar	) —	Indian Navy
B. Biju)	

3.2 Ship's Complement

Capt. C. Pal	)	Master
M.S. Pangtey	)	Chief Officer
H.C. Medha	)	Addl. Chief Officer
M. Thangaman!	)	Navigating Officer
A.K. Tiwari	)	-do-
V.C. Chandran	)	Radio Officer
S. Murthy	)	Medical Officer
R. Saldanha	)	Purser
S. Gangopadhyay	)	Chief Engineer
P.K. Mitra	)	2nd Engineer
R.P. Ghosh	)	3rd Engineer
M.N. Muraleedharan	)	-do-
D. Singh	)	4th Engineer
K.P. Mishra	)	5th Engineer
K. Pandey	)	Electrical Officer
P.J. Valsan	)	-do-
R.M. Fernandes	)	Catering Officer

4. OBJECTIVES AND CRUISE PLAN

The cruise was planned to achieve the following objectives:

- (i) To estimate the zonal volume transport across WOCE section IR5 in the Bay of Bengal during summer monsoon.
- (ii) To evaluate the seasonal circulation patterns and cyclone heat potential around Andaman Islands
- (iii) To study cyclogenesis in the atmosphere over the north-western Bay of Bengal during summer monsoon.

The cruise started from Mormugao on 16 August 1995 and ended at the same port on 14 September, 1995. The cruise was originally planned for a period of 43 days. However, it was shortened by about 15 days in order to reach Mormugao earlier due to some anticipated changes in the subsequent ship's programme. Hence the hydrographical observations were carried out upto 4°N along WOCE IR5 section instead of original planned coverage of upto 8°S.

5. CRUISE DETAILS

Thirty-two hydrographic stations were occupied, 15 along WOCE IR5 section; 5 each along three shorter sections (92°, 94° and 95° E); and 2 along 91°E at 13°N & 9°N. Surface meteorological observations on wind speed & direction, atmospheric pressure and air temperature (dry and wet bulb) were recorded at 3-hourly synoptic interval from 17 August. The visual observations on clouds, sea state and visibility conditions were also recorded. Radio-sonde (RS) ascents involving measurements of temperature and humidity - height profiles in the marine atmospheric column were made twice a day at 0530 and 1730 hrs IST. Before arriving at first hydrographical station in the northern Bay of Bengal, the ship had followed some zig-zag tracks north of 15°N in order to get maximum spatial coverage for RS ascents over the northwestern Bay of Bengal. The hydrological observations consisting mainly C/STD casts to obtain temperature and salinity profiles in the water column started on 24 August at station 1 (18°N; 90°E) and continued upto 11°N along 90°E; i.e. upto station 9. However, before commencement of hydrographical observations at the next station (10°N; 90°E), the ship was diverted to the nearest Indian Port i.e. Port Blair for facilitating the disembarkation of the Chief Scientist (V. Ramesh Babu) in view of sudden demise of his father. The ship had a brief port call at Port Blair for less than 24 hours during 29-30 August to disembark Shri Ramesh Babu. Shri Y.V.B. Sarma took over as Chief Scientist for the rest of the cruise. The ship left Port Blair on 30 August and the scientific observations were recommenced in the Andaman Sea from station No. 10 along 94°E. The meridional transects along 94°, 95° and 92°E upto station 25(9°N, 92°E) were completed by 5 September, 1995. From this station, the ship had sailed westward along 9°E to join back the WOCE leg IR5 at station 27 (9°N, 90°E). On way to station 32 further southward along WOCE section, a TOGA drifting buoy with identification (ID) No. 09080 was deployed at 08°03' N and 90°04' E on 6 September 1995 around 1125 hrs IST. The last CTD station # 32 (4°N, 91°12'E) was occupied during the night of 7 September and the ship sailed back to Goa. Another TOGA drifting buoy (ID No. 09081) was deployed on the way back to Goa when the ship reached the position of 5°N & 82°E. Surface meteorological observations were continued by the IMD participants till 13 September. Finally, the cruise ended on 14 September 1995 at

Mormugao port. The CTD data were processed on board the ship using Sea Bird's software provided with CTD system.

6. PRELIMINARY RESULTS

Upper oceanic mixed layer was well developed with a thickness of about 75m all along WOCE IR5 section except between 7° and 10°N where the thermocline had conspicuously risen up by 45 m, indicating the presence of an intensive cyclonic gyre. The mixed layer temperature was somewhat higher in the northern part of the section. Further, the thermocline was sharp in the south.

The salinity structure showed a stronger dilution in the surface layers of the northern part of the WOCE section wherein the halocline was quite strong. The topography of halocline was similar to that of thermocline, but a broader isolated high saline pocket (35.2 PSS) was observed around 100 m depth in association with shallowing of thermocline between 7° and 10°N as mentioned earlier. A gradual decrease of salinity in the mixed layer towards south was seen upto 8°N. The density (σ_t) structure was, in general, similar to the thermal structure except in the north of 14°N where it had more resemblance of the haline structure in the upper 50 m layer.

The east-west thermohaline variations in the upper 100m water column along 9°N and 13°N south and north of the Andaman Islands showed marked fall in salinity towards east by about 0.6 PSS and this had resulted in formation of lighter waters towards east. The preliminary results of the sea surface dynamic topography with respect to 1000db further indicated strong meso-scale eddy activity in the region east of the Andaman Islands in comparison to that in the west of the Islands.

7. WEATHER

The weather during the cruise was, in general, varied from fair conditions to those of rainy and overcast sky. Rough sea conditions with height of waves reaching upto 3 meters in association with strong winds (20 knots) prevailed especially during the last week of August.

8. SUGGESTION

The CTD software files that were loaded in the IBM PC for CTD data acquisition/processing were virus infected and had to reload the entire software again. It is therefore suggested that the PC may not be used for other general purposes like word processing by different users. If necessary, another IBM PC for general purpose may be installed at an ideal location in the ship.

9. ACKNOWLEDGEMENTS

The Chief Scientist and other participants acknowledge, with thanks, the cooperation given by the ship's officers and crew during the cruise.

TABLE 1 : DETAILS OF HYDROGRAPHIC STATIONS

CTD. Stn. No.	Date	Time	Latitude	Longitude	Sonic Depth	CTD Sampling Depth (m)
01	24-8-95	1600-1815	18°00'	90°00'	2050	1800
02	25-8-95	0020-0215	17°00'	90°00'	2300	2100
03	25-8-95	0900-1145	16°00'	90°00'	2500	2275
04	25-8-95	1905-2200	15°00'	90°00'	2700	2400
05	26-8-95	0500-0700	14°00'	90°00'	2800	2500
06	26-8-95	1345-1725	13°00'	90°00'	2800	2500
07	27-8-95	0020-0240	12°00'	90°00'	3000	2500
08	27-8-95	0955-1215	11°00'	90°00'	3200	2530
09	27-8-95	2020-2330	10°00'	90°00'	3300	2820
10	30-8-95	2310-0030	12°00'	94°00'	1900	1500
11	31-8-95	0800-0920	11°00'	94°00'	1900	1500
12	31-8-95	1625-1805	10°00'	94°00'	1400	1100
13	1-9-95	0045-0105	9°00'	94°00'	3900	1500
14	1-9-95	0740-0900	9°00'	95°00'	2200	1500
15	1-9-95	1510-1615	10°00'	95°00'	1700	1500
16	1-9-95	2210-2330	11°00'	95°00'	3300	1500
17	2-9-95	0505-0635	12°00'	95°00'	2100	1510
18	2-9-95	1215-1258	13°00'	95°00'	2100	1510
19	2-9-95	2000-2120	13°00'	94°00'	1350	1150
20	3-9-95	1335-1435	13°00'	92°00'	1900	1600
21	3-9-95	2135-2300	13°00'	91°00'	3000	1500
22	4-9-95	0725-0819	12°00'	92°00'	1200	1050
23	4-9-95	1450-1534	11°00'	92°00'	950	900
24	4-9-95	2210-2330	10°00'	92°00'	1800	1500
25	5-9-95	0540-0703	9°00'	92°00'	2400	1500
26	5-9-95	1405-1525	9°00'	91°00'	3500	1500
27	5-9-95	2245-0105	9°00'	90°00'	3000	1500
28	6-9-95	0845-1045	8°00'	90°00'	3200	2500
29	6-9-95	1800-2014	7°00'	90°18'	2900	2500
30	7-9-95	0245-0455	6°00'	90°36'	2500	2479
31	7-9-95	1135-1325	5°00'	90°54'	2900	2508
32	7-9-95	2020-2230	4°00'	91°12'	3400	2620