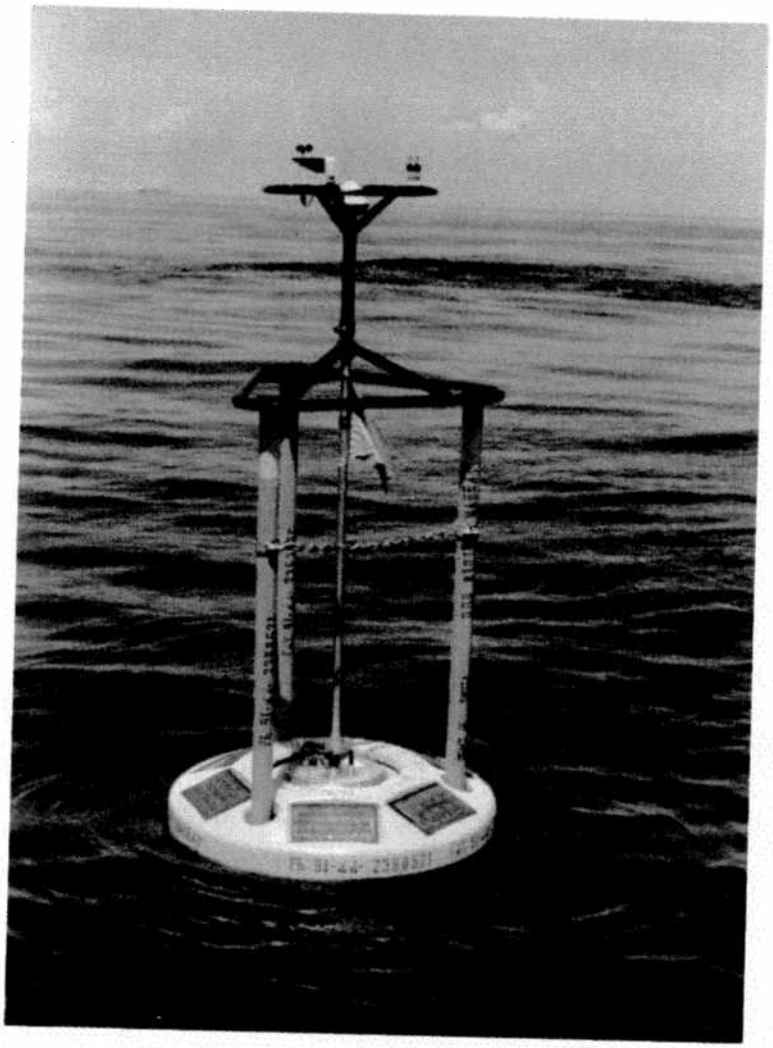
SERVICING AND DEPLOYMENT OF DATA BUOYS IN BAY OF BENGAL

CRUISE REPORT

ORV SAGARKANYA
SK - 144 B



7th May to 17th May 1999

CHENNAI TO CHENNAI

NATIONAL DATA BUOY PROGRAMME
NATIONAL INSTITUTE OF OCEAN TECHNOLOGY
CHENNAI

ORV SAGAR KANYA CRUISE REPORT
(SK – 144 B)

1. CRUISE SUMMARY

The Sagar Kanya cruise 144 b was undertaken to service the existing data buoys in the East Coast and to deploy drifting buoys.

Ship sailed off chennai port at 1200 hrs. on 7th May '99 and returned back to chennai at 08.00 hrs on 17th May 1999. During the cruise, a new buoy was deployed at DS4 to the existing mooring and four drifting buoys were deployed in Bay of Bengal.

2. LIST OF PARTICIPANTS

1.	Mr. Tata Sudhakar	Chief Scientist NIOT, Chennai
2.	Mr. D. Sivakumar	NIOT, Chennai
3.	Mr. V. Gowthaman	NIOT, Chennai
4.	Mr. G. Senthilkumar	NIOT, Chennai
5.	Mr. Torgeir Jenson	Oceanor, Norway
6.	Mr. Inge Saetereng	Oceanor, Norway
7.	Mr. A. M. Almeida	NIO, Goa
8.	Mr. Sudeesh Kurian	Norinco
9.	Mr. Jagadeesh S.Negali	Norinco
10.	Mr. Razak Mohd Ismail	Norinco
11.	Mr. N. Rajendran	Field Assistant
12.	Mr. V. Kathavarayan	Field Assistant
13.	Mr. S. K.Devaraj	Field Assistant

Ship's Complement

S.No.	Name	Rank / Rating
1.	Capt. N. Sreekumar	Master
2.	P. G. Prakash	C/O
3.	D. Bhattacharjee	2/O
4.	Dhrub Singh	NWKO
5.	Mohd. I. A. Walge	J/O
6.	S. Srinath	R/O
7.	Dr. H.V. Subrahmanyam	M/O
8.	R. G. S. D'Silva	P/O
9.	Arnab Ghosal	CEO
10.	Gaurav Agarwal	2EO
11.	H. K. Jain	3EO
12.	M. N. Murlidharan	3EO
13.	Kuldeep Sengar	TME

14.	A. R. D'Cruz	EL/O
15.	T. P. Gairola	EL/O
16.	M. F. Rodrigues	Catrg.O
17.	Robert Luis	Asst.Catrg.O
18.	H. Dourado	ERPO-I
19.	C.A. Fernandes	ERPO-I
20.	J. P. Goes	Electrician
21.	K. J. Kapadia	P.O.(M)
22.	Madan Singh	P.O.(M)
23.	M. G. Kharva	Dk/Serang
24.	S. A. R.Mhaskar	DTC
25.	S. Chatterjee	SHM
26.	P. S. Jagadeesan	,,
27.	Gulla Gurumurthy	,,
28.	Shakti Singh	,,
29.	R. Jamruddin	,,
30.	M. M. Kunhi	,,
31.	G. Raj	,,
32.	Jag Charan	,,
33.	B. S. Talwadia	DUH
34.	Mohd Yusuf Moideen	Crew Cook
35.	N. K. Patel	Er.Serang
36.	V. G. Tambe	D/Greaser
37.	S.C. Changra	,,
38.	S. Bhowmick	,,
39.	Abdul K. A. K. Adkar	Err.II
40.	R. A. Keni	Tr.Err.II
41.	V. F. Sequeira	Ch.Cook&Bkr
42.	Simon D'Souza	2nd Cook
43.	S. Vasupalli	Tr.Cook
44.	A. F. Vaz	G.S.
45.	C. Braganza	,,
46.	Manuel D'Souza	,,
47.	A. S. M. Gonsalves	,,
48.	Avelino Fernandes	,,
49.	I. C. Countinho	,,
50.	Emelian Pereira	,,
51.	Caetano Travasso	Laundryman
52.	Shaik Abdul Gafoor	Uty.Stwd.
53.	N. M. Patel	Uty.Hand
54.	K. T. Rao	Uty.Hand
55.	Luquman P.B.	Tr.Err.II

NIOT team at shore station, Chennai.

1. **Mr. K. Premkumar**
2. **Mr. M. Ravichandran**
3. **Mr. R. Vaithaynathan**
4. **Mr. S. Ramasundaram**
5. **Mr. R. Venkatasen**

3. OBJECTIVES OF THE CRUISE

Main objectives of the cruise are:

- Servicing of data buoys (DS3, DS4, DS5 and SW6)
- Deployment of four drifting buoys.
- Retrieval of DS4 (old) buoy along with Mooring.

4. CRUISE SCHEDULE

DAY	TIME (HRS)	EVENT
7th May 1999	08.00	Deployment of SW6 at Chennai port.
7th May 1999	12.00	Sailing from chennai port
9th May 1999		DS3 Operation
9th and 10th May 1999		Deployment of four Drifting buoys
11th May 1999	16.00 – 18.30	DS4 (Old)
12th & 13th May 1999	0800 – 08.30 hrs.	DS4 (new) location – Retrieval and deployment of Wavescan buoy
15th May 1999	08.00 - 1600	DS5
17th May 1999	08.00	Returned t o Chennai.

5. Preparation of Data Buoys

As per program one Wavescan and one Seawatch buoy tested at NIOT and loaded on board Sagar Kanya at Chennai port. The Seawatch buoy was to be installed at Chennai port (SW6). The new Gemini craft and Out board motor was assembled and tested before Chennai port operation The buoys are painted with anti-fouling paint and fitted with zinc anodes against corrosion.

Setting up field station

A field station was setup on board Sagar Kanya for communicating with buoys during the testing and also to receive the data from moored buoys after deployment. The Inmarsat antenna was installed on balloon deck and the modem in wet lab in the starboard side.

Buoy Configuration:

The Wavescan buoy is a discuss shaped hull with a diameter of 2.76 m and a height of 6.15 Mts. from keel to mast. The weight of the buoy is 994kg when fully assembled. The buoy is equipped with meteorological sensors, GPS and Inmarsat antennas. The buoy has wave sensor inside the aluminum cylinder and the current meter is at the instrumentation protection frame. The buoy is powered by internal batteries, which are charged by four solar panels.

The Seawatch buoy is a vertically stabilised buoy, mounted on a transparent frame surrounding the central buoyancy. It has a height 8.2 Mts. and diameter of 1.75 Mts. with total weight of 604 kg. The meteorological sensors are fitted on mast ring along with Inmarsat antenna. The buoy uses same antenna for GPS position and for Inmarsat communication. The wave sensor is installed in the center stainless steel cylinder and current meter is installed along with the green sensors at the bottom portion of the mast. The buoy is powered by internal batteries, which are powered by 6 solar panels. The buoy also has lithium batteries as backup.

Both buoys communicate with shore station using Inmarsat satellites. All the buoys fitted with a radar reflector and beacon light for collision avoidance. The t lamp has daylight switch to make it glow only during the dark period.

Sensors details:

SL. NO.	PARAMETERS	RANGE	MODEL / MAKE
1.	Wave height and direction	± 20m, 0-360°	MRU-6/ SEATEX
2.	Wind speed and direction	0-60 m/Sec., 0-360°	1453S2 / Lambrecht
3.	Air Pressure	800 - 1100hPa	PTB – 200 A/ Vaisala
4.	Air Temperature	10 - 50°C	Omega Eng. ON-905-55036
5.	Current Speed and direction	0 – 300 Cm/Sec., 0-360°	NE Sensortec UCM-60
6.	Water Temperature	–5°C to 45°C	NE Sensortec UCM-60
7.	Conductivity	2 – 77 m mho/Cm	NE Sensortec UCM-60

6. DATA BUOYS SERVICING AND DEPLOYMENT

Chennai (SW6)

Data buoy at Chennai was recovered from the location and a float was installed on 12.4.99. During the present cruise, a Seawatch buoy was installed at this location. The new Gemini Craft and OBM were used to tow the buoy from the inner harbour on 7.5.99. The operation started at 08.00 hrs and completed by 11.30 hrs. Due to high current in that region the installation of buoy has taken longer time. After completion of the operation, ship sailed from Chennai harbor at 12.00hrs on 7.5.99 towards DS3 location

Off Chennai (DS3)

Ship reached DS3 location and 08.00hrs in 10.5.99. It was found that all the sensors and electronic modules inside the cylinder are missing. Attempts made to retrieve the empty hull and mooring has failed due to rough sea conditions. Extra zinc and safety link was added to the buoy using Gemini Craft.

Off Paradip DS4 (Old)

It was planned to lift the remaining components (hull and mooring) of the buoy system which has been damaged in March'98 and could not be retrieved during the last cruise in June'98 due to the rough weather prevailed at that time. Preparation was made on deck by installing extra pulleys to transfer the mooring line to capstan. Ship reached buoy location at 16.30hrs on 11.5.99 and found that the buoy was missing. After 2 hours of search, we have abandoned the intended operation as any further search will be futile in open sea and not to waste the ship time.

DS4 (New)

Ship reached DS4 (New) location at 08.00hrs on 12.5.99 and found that the critical buoy system have been found lost as in case of DS3. Except solar panel all the sensors and electronic modules inside the cylinder are missing. A new Wavescan buoy was deployed at the same location after retrieving the empty hull.

Off Machilipatnam (DS5)

Ship reached DS5 location on 15.5.99 AT 08.00hrs. It was found that the remaining components (hull and mooring) of the buoy was missing Search was conducted till 16.00hrs. As any further search will be a futile exercise in open sea we have sailed back to Chennai.

7. Validation of Buoy data

In order to validate the Buoy data, we have calibrated each sensor onboard to ensure the reliability of the data.

Air and Water temperature

The temperature was checked using the standard temperature probe. If any difference is noticed, the correction factor was applied at shore-station.

Wind Speed and Direction

The wind speed sensor is checked by fixing the sensor with tape to show zero wind. Also, a standard new anemometer was fixed near to the wind speed sensor and compared the two outputs. The wind wane was also fixed with tape keeping the north, south, east and west direction.

Air-Pressure

The Air pressure sensor was checked with a standard air pressure sensor and also compared with barometer fitted on the ship.

Water current and Direction

The water current and direction is measured with UCM-60. The standard calibration procedure is given by manufacture was followed. The instrument is re-calibrated before every deployment.

Conductivity (Salinity)

The conductivity probe was tested with standard resistor fixed around the conductivity cell. For different resistor, the output value of the conductivity was noted.

Wave

The wave data is measured by the MRU-6. This instrument was calibrated and tested by the manufacturer. Field-testing carried out against the software supplied by the equipment manufacturer.

8. Deployment of Drifting Buoys

As part of the ongoing Drifting Buoy Programme under the Ocean Observing System funded by the DOD, NIO has been deploying several SVP-B and FGGE type buoys using ships of opportunity in the Arabian Sea, Bay of Bengal and the North Indian Ocean.

The drifting buoys deployed during this cruise are of the SVP-B type manufactured by Technoccan. The buoy consists of a spherical hull measuring 40 cms in diameter and a Holey sock at a depth of 15m to ensure that the buoys followed surface currents rather than the winds. The batteries and electronics are enclosed in the hull along with the barometric pressure sensor, submergence and SST sensor. All this data along with the battery level are transmitted every 90 sees via the Argos PTT to the NOAA satellite and then collected by the receiving station at Toulouse, France and from there sent to NIO via e-mail and CD-ROMs.

The buoys were deployed during the sailing from the locations of the Data Buoys DS3 to DS4 at one-degree interval. The ship track is shifted by 1 degree to the East to deploy in favorable current regime.

After boarding the vessel, all the four buoys were switched ON and NIO was informed to confirm the Data reception via ARGOS. Also, confirmatory checks were carried out using the Multi-meter to ensure that they were transmitting well on land.

The ship speed was reduced to 5 knots and the buoys are deployed form the stern of the ship.

Sl..No.	Date	Time	Buoy ID	Location
1.	09.05.99	18.20IST	06381	N 13 01 E 87 01'3
2.	10.05.99	02.25IST	11086	N 14 00 E 87 38E
3.	10.05.99	10.50 IST	11353	N 15 00 E 88 18'E
4.	10.05.99	19.15 IST	06382	N 16 00 E 89 00'E

9. PERFORMANCE OF EQUIPMENT ON BOARD SAGAR KANYA

The following equipment was used during the cruise and their performance is indicated below.

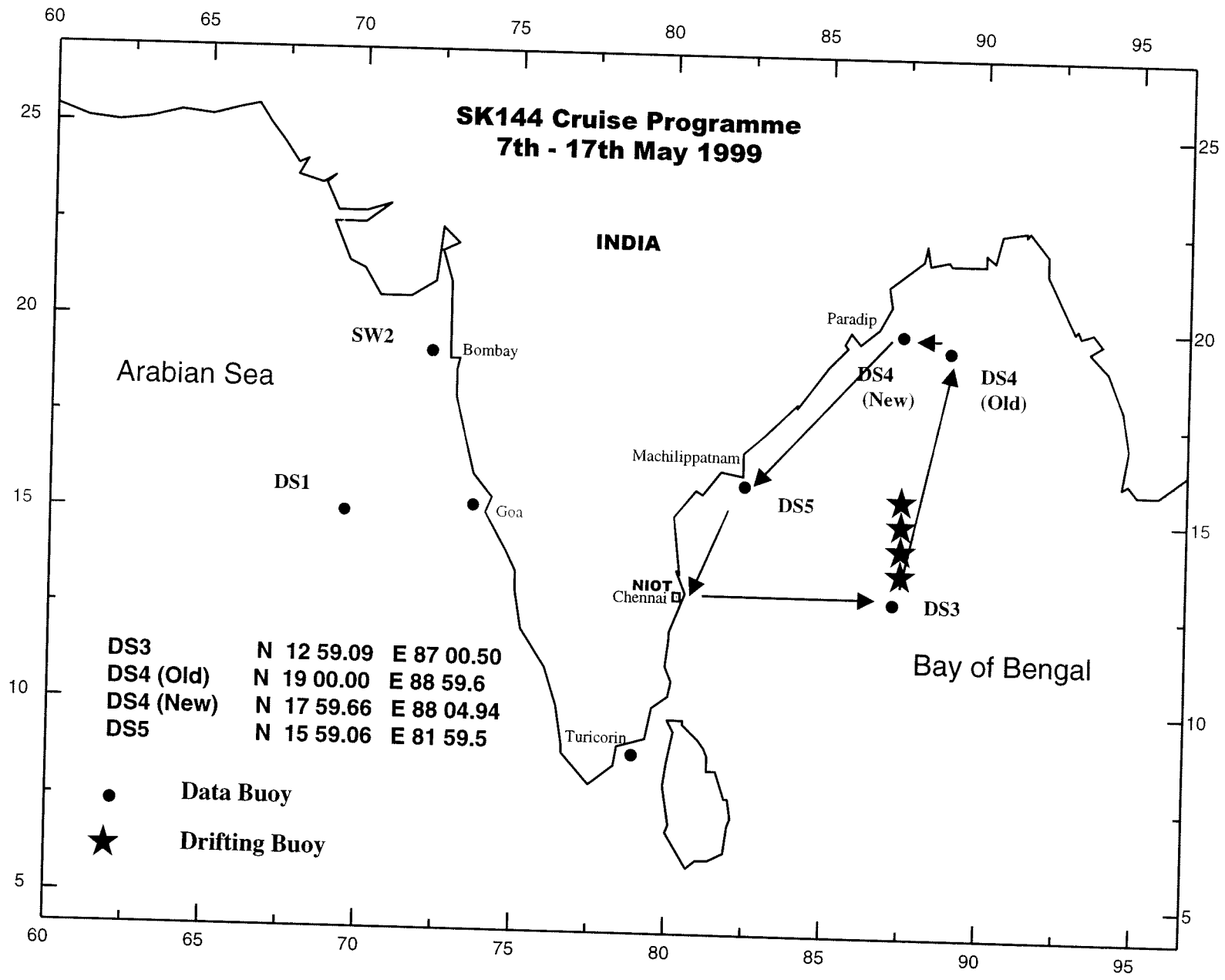
1. Deck equipment: Deep Sea winch, Atlas cranes, Jib boom, NMF crane etc. Worked satisfactorily.
2. Deep sea Echo sounder and INS was used during the cruise and are working satisfactorily.

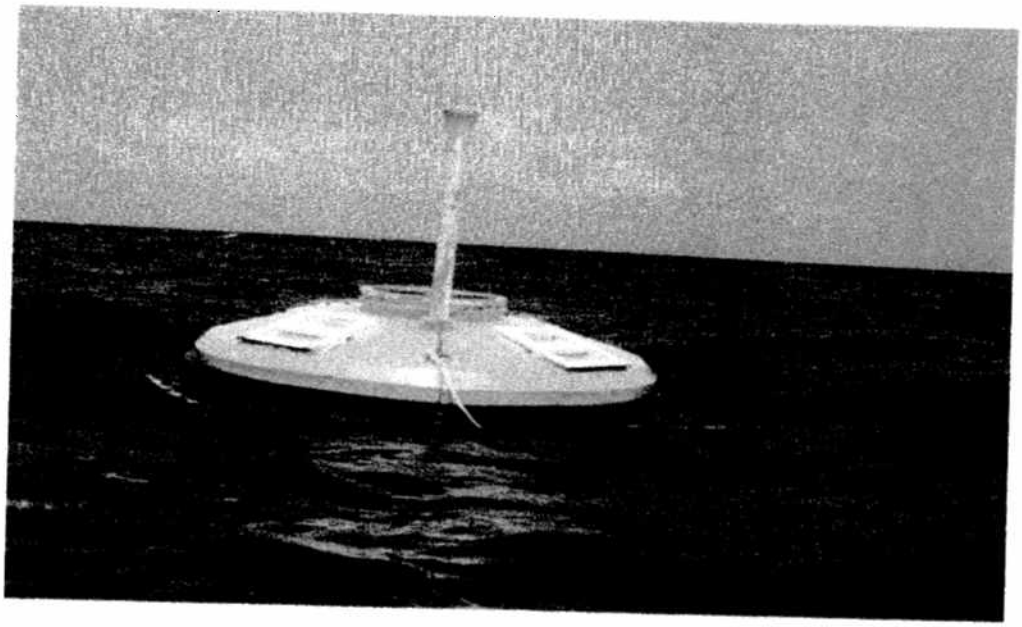
10. ACKNOWLEGEMENT

We thank the Department of Ocean Development, New Delhi for providing ship time on ORV Sagar Kanya. We express our thanks to Dr.Pandey, Director, Antarctic Study Center and Dr.M.Sudhakar, Programme Manager, Sagar Kanya Ship Cell for co-ordinating the cruise. Our sincere thanks to Capt.N. Seekumar, the officers and crew of ORV Sagar Kanya for their cooperation throughout the

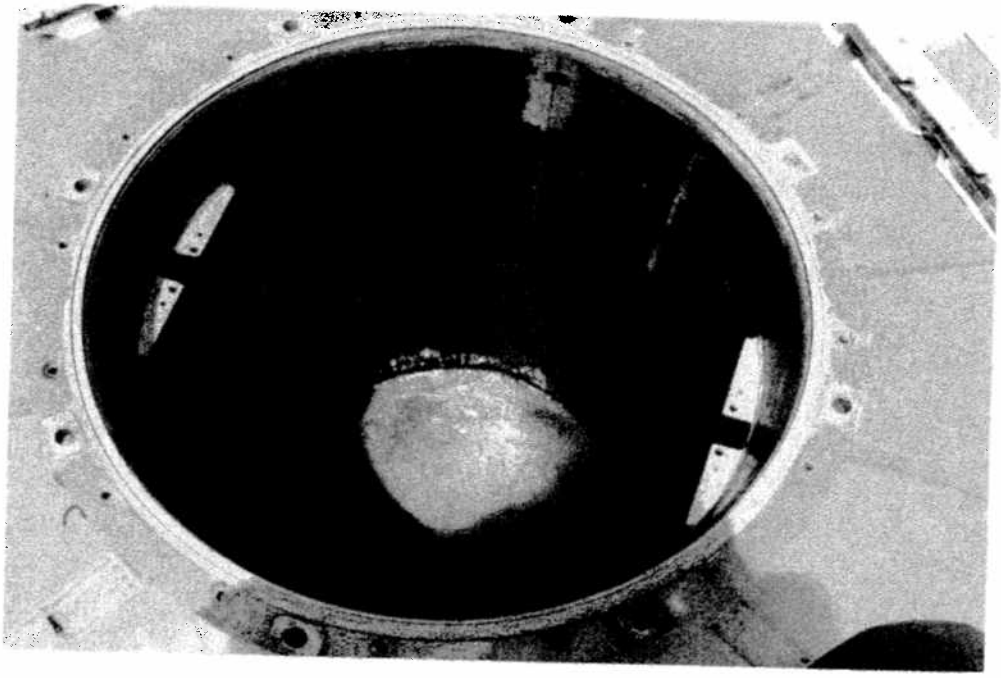
cruise and their sincere effort in helping us to complete task even in unfavorable weather conditions. We are also thankful to NORINCO staff for their cooperation during deck operations.

We express our sincere thanks to Prof. M. Ravindran, Director, National Institute of Ocean Technology for entrusting the task expressed above. We are also thankful to my NDBP colleagues for helping us at various stages to the successful completion of the cruise.

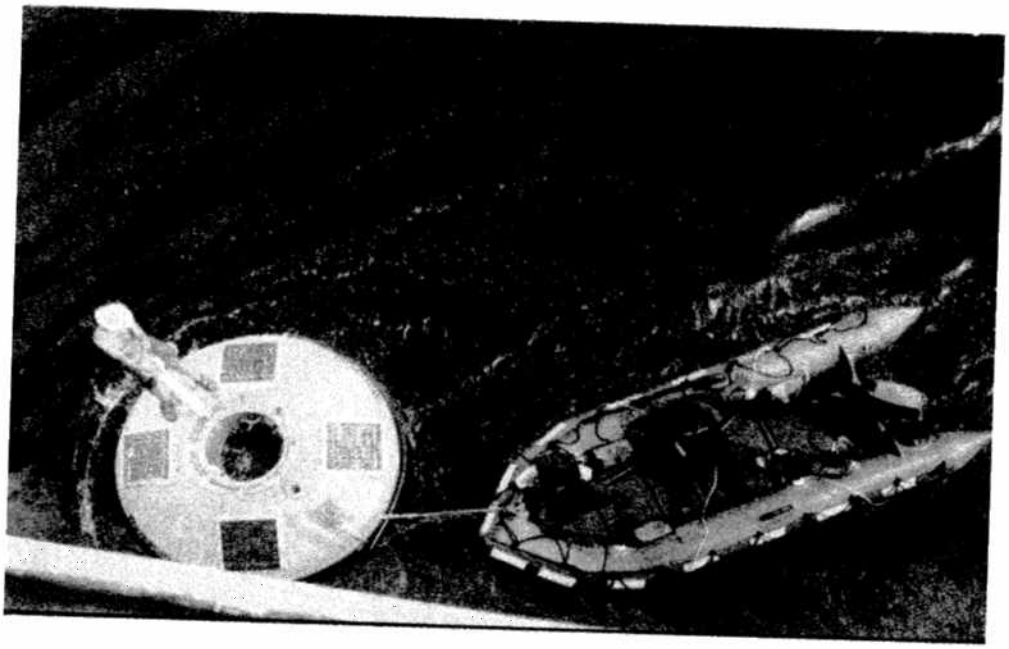

SK144 Cruise Programme
7th - 17th May 1999
INDIA
Arabian Sea
Bay of Bengal
SW2
Bombay
DS1
Goa
Paradip
DS4
(New)
DS4
(Old)
Machilippatnam
DS5
NIOT
Chennai
DS3
Turicorin
DS3 N 12 59.09 E 87 00.50
DS4 (Old) N 19 00.00 E 88 59.6
DS4 (New) N 17 59.66 E 88 04.94
DS5 N 15 59.06 E 81 59.5
Data Buoy
Drifting Buoy
60
65
70
75
80
85
90
95
25
20
15
10
5



Status of Damaged Buoy at DS3 Location



Preparation of Data Buoy for Deployment



Buoy Retrieval at DS4 Location