# DEPLOYMENT/ MAINTENANCE OF DATA BUOYS IN BAY OF BENGAL SEA

ORV SAGAR KANYA SK-206

June 30 to July 10, 2004

Chennai to Chennai

**NATIONAL DATA BUOY PROGRAMME**
**NATIONAL INSTITUTE OF OCEAN TECHNOLOGY**
**CHENNAI**

CONTENTS

## 1. CRUISE SUMMARY

The ORV Sagarkanya cruise SK-206 was taken up to service and maintain the data buoys in Bay Of Bengal Sea. The Dolphin Data Buoy at Ennore was recovered and re-deployed at the same location after servicing. A special Data Buoy was deployed off Ennore to collect systematic time series ambient Noise. Four new Moorings with data buoys are deployed at DS5, DS3, MB11 and DS4 locations.

## 2. OBJECTIVES OF THE CRUISE

***The main objectives of the cruise are:***

- Deployment of 4 deep water buoys at DS5, DS3, MB11 and DS3 location.
- Deployment of two shallow water buoys at Ennore.
- Search for MB10 data buoy.
- Search and recovery of the DS3 and MB11 data buoys.

## 3. LIST OF PARTICIPANTS

*NIOT, Chennai*

1. Mr. Tata Sudhakar — Chief Scientist
2. Mr. V. Gowthaman
3. Mr. G. Senthil kumar
4. Mr. D. Sivakumar
5. Mr. G. Venkatesan
6. Mr. M. Athiyaman
7. Mr. P. Ramesh
8. Mr. S. Ramji
9. Mr. Thirunavukkarasu
10. Mr. G. Raghuraman
11. Mr. G. Velu

*M/s. Cherry Soft Technologies, Chennai*

1. Mr. D. Mohan

*SEAMEN CHARTED FROM M/s. SEAPOL LOGISTICS, CHENNAI*

1. Mr. D. kalyana Sundaram
2. Mr. Thomas Antony jeneffer
3. Mr. Iruthayraj seelan
4. Mr. Krishnan Vivekandhan

*NCAOR, Goa*

1. Mr. M. M. Subramaniam
2. Mr. Ganesh Chandvale
3. Mr. Rambir Singh Dhiman
4. Mr. Abhishek Tyagi

## 4. DIARY OF EVENTS

| Date | Time | Event |
|---|---|---|
| 30-06-04 | 1.30 Hrs | Scientist Boarded the ship. |
| | 14.00-17.30 Hrs | Loading of the materials |
| | 20.00 Hrs | Ship sailed out from Chennai. |
| 01.07.04 | 6.00 – 8.00 HRS | Recovery of the Sw6 data buoy at Ennore. |
| | 08.30 Hrs | Sailed towards DS5 location |
| | | Assembling and testing of DS5 data buoy. |
| 02.07.04 | 06.30-8.30 Hrs | Deployed DS5 data buoy at N 13.99102 and E 83.27161 at 3267m of water depth. |
| | | Ship sailed towards MB10 location. |
| 3.07.04 | 5.00 – 8.00 Hrs | Search for MB10 data Buoy |
| | | DS3 data Buoy is assembled and tested |
| 04-07-2004 | | DS3 Mooring prepared. |
| 05-07-2004 | 05.00 – 07.00 Hrs | Search for DS3 data buoy. |
| | 07.00 – 08.31 Hrs | Deployment of new buoy |

| | | |
|---|---|---|
| | 8.35 - 11.30 Hrs | Search for DS3 buoy as per Coast Guard provide location. |
| | 12.00 Hrs | Proceeding towards Mb11 location. |
| 06-07-2004 | 14.30 Hrs | Reached MB11 location. |
| | 14.30 – 18.00 Hrs | Searched for MB11 data buoy. |
| | 18.00 – 19. 24 Hrs | Deployed New Buoy at MB11. |
| | 19.45 Hrs | Proceeding towards DS4 location |
| 07-07-2004 | 18.00 Hrs | Reached DS4 location. |
| | 18.00 – 19.20 Hrs | Deployment of Ds4 data Buoy. |
| | 20.00 Hrs | Proceeding towards SW6 location. |
| 08.07.04 | | Sailing towards Ennore |
| | | Preparation of SW6 buoy |
| | | Preparation and testing of NRB buoy. |
| 10.07.04 | 13.30 Hrs | Reached Sw6 location |
| | 14.40 Hrs | Deployed SW6 dolphin buoy |
| | 15.15 Hrs | Deployed Noise measuring buoy |
| | 17.00 Hrs | Anchored Off Chennai. |

## 5. PREPARATION OF DATA BUOYS

Six data buoys along with mooring systems were loaded on board ORV Sagar Kanya. The data Buoys were assembled and tested before the deployment.

### 5.1 SETTING UP OF FIELD STATION

A field station was set up on board the ship in wet lab on the star board side of the main deck, to communicate with the buoy while testing the assembly and to receive initial set of data from the buoy and for communicating with NIOT.

### 5.2 BUOY CONFIGURATION

*The Data Buoy*

The data buoy used in deep-water buoy is of discus shaped hull and a keel weight mounted under the hull. The deep-water buoy has a diameter of 2.8 meters and a total height of 5.85 meters weighing about 950 Kg, when assembled with its mast and keel. The sensors are fixed at a height of 3 meters from the water surface. The central cylinder of the buoy contains all electronic modules, power package and the wave sensor. The buoy is equipped with a mast to support the meteorological sensors and Inmarsat antenna. Four solar panels are mounted top the buoy to charge the lead acid batteries. The buoys are also fitted with a ventilation system to prevent any hydrogen gas accumulation inside the cylinder.

## 5.3 SENSOR DETAILS

The details of sensors mounted on the buoys deployed are shown in the table below

| Sensor | Make | Range | Accuracy | Resolution | Sampling duration /frequency |
|---|---|---|---|---|---|
| Air pressure | Vaisala | 800 – 1100 hPa | ± 0.1 hPa | 0.01 hPa | Only one sample |
| Air temperature | Omega Eng. | 10 – 50°C | ± 0.1°C | 0.01°C | 15 min, 1/sec |
| Wind* (speed, direction) | Lambrecht | 0 – 60 $ms^{-1}$, 0 – 360° | ± 1.5% FS, ± 3.6° | 0.07 $ms^{-1}$, 0.1° | 15 min, 1/sec |
| Water temperature** | NE Sensortec | -5 – 45°C | ± 0.1°C | 0.01°C | 15 min, 1/sec |
| Conductivity** | NE Sensortec / Falmouth | 2 – 77 m mho $cm^{-1}$ | ± 0.06 m mho $cm^{-1}$ | 0.01 m mho $cm^{-1}$ | 15 min, 1/sec |
| Surface current** (speed, dirn) | NE Sensortec/ Falmouth | 0 – 6 $ms^{-1}$, 0 – 360° | ± 3% FS, ± 2° | 0.005 $ms^{-1}$, 0.36° | 15 min, 2/sec |
| Wave Parameters | Seatex | ± 20m, 0 – 360° | ± 10 cm, ± 5° | 1 cm, < 0.1° | 34 min, 2/sec |
| Relative Humidity (on few buoys) | Rotronix | 0-100% | +/-1% | 1% | 10 min./sec |

## 6. OPERATIONS

### 6.1 Recovery of SW6 Data Buoy.

SW6 data buoy was recovered from Off Ennore on 01. 07.04 at 08.00 hrs

### 6.2 Deployment Of Ds5

A deep water Met ocean data buoy was deployed at DS5 location on 2.7.04

Position N 13° 59.43
E 083° 16.32

Depth 3267 m

### 6.2 DEPLOYMENT OF DS3 BUOY

A deep water Met ocean data buoy was deployed at DS3 location on 5.7.04

Position N 12° 9.91
E 090° 47.78

Depth 3156 m

### 6.3 DEPLOYMENT OF MB11 Data BUOY

A deep water Met ocean data buoy was deployed at Mb11 location on 6.7.04

Position N 15° 02.00
E 093° 35.11

Depth 2840 m

### 6.4 DEPLOYMENT OF DS4 BUOY

A deep water Met ocean data buoy was deployed at DS4 location on 7.7.04

Position N 18° 21.72
E 087° 33.59

Depth 2355 m

### 6.5 DEPLOYMENT OF SW6 AND NOISE MEASURING BUOY.

Two data buoys are deployed at off Ennore at a depth of 24 m to collect met ocean and Ambient Noise of the sea on 10.7.04

### 6.6 SEARCH FOR MB10 BUOY

Search was carried out for missing data buoy at Mb10 location on 3.7.04

## 7. PERFORMANCE OF EQUIPMENTS ON BOARD SAGARKANYA

The following equipments were used during the cruise and their performance is indicated below.

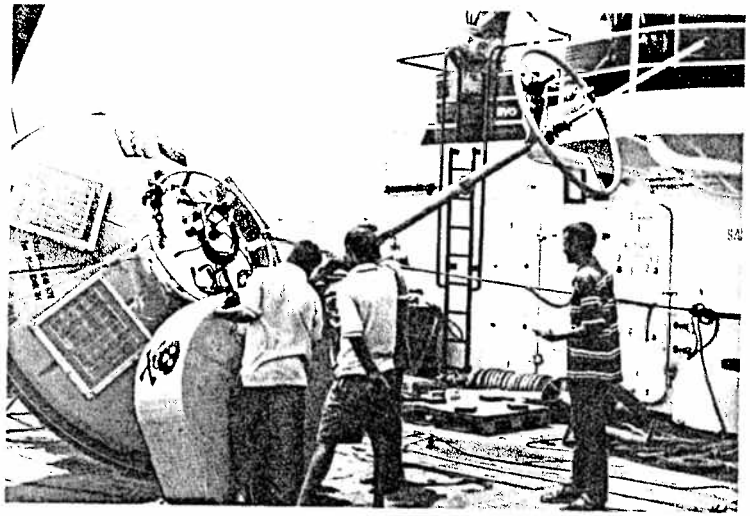
1. ATLAS cranes in the mid ship and in the aft were used for deployment, retrieval and anchor dropping and their performance was satisfactory. There was oil leak from both the cranes.
2. Deep-sea winch with aluminum drum was used for laying the mooring ropes, it worked satisfactorily.
3. Deep sea and shallow water echo sounders were worked satisfactorily.
4. The general air conditioning in the ship was poor needs to be attended. Fans in some of the living cabins and recreation room need repair.
5. Auto Sal was used and working satisfactorily.
6. Main deck needs patchwork.
7. Washing machine for the Scientists has broke down frequently.
8. Fresh water supply was interrupted for two days.
9. Air-conditioner problem was rectified in the Starboard Wetlab during the cruise. There was water leakage inside the Starboard wet lab due to condensation.

## 8. ACKNOWLEDGEMENTS

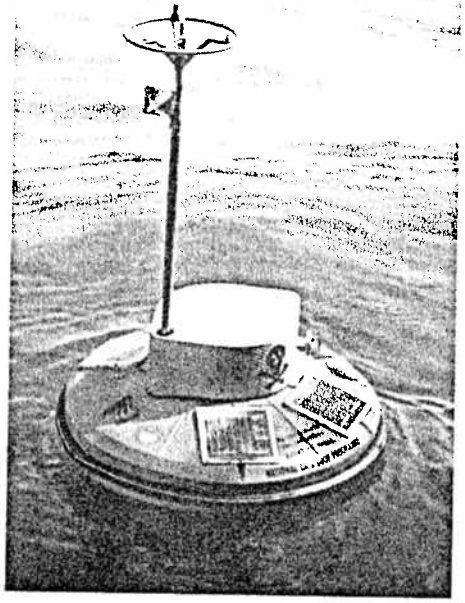
We thank the Department of Ocean Development, New Delhi, for providing ship time on ORV Sagar Kanya. We express our sincere thanks to Dr. Pandey, Director, NCAOR and Dr. M. Sudhakar, Group Director, NCAOR, for coordinating the cruise. Our sincere thanks to Captain, officers and the crew of ORV Sagar Kanya for their cooperation throughout the cruise and their sincere effort in helping us to complete the task.

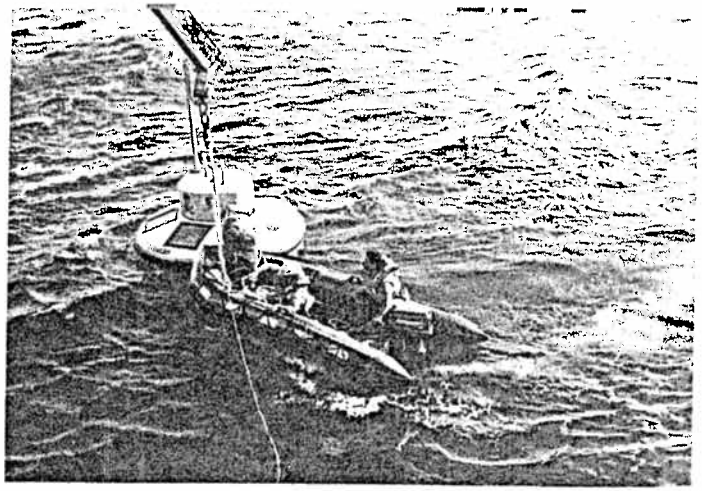
We express our sincere thanks to Dr. S. Kathiroli, Director-in-charge, NIOT for entrusting this task. We are also thankful to all NDBP colleagues at NIOT for helping us at various stages for the successful completion of the cruise.

NRB BUOY



NRB BUOY GETTING READY
FOR DEPLOYMENT





DATA BUOY RETRIEVAL

CRUISE PARTICIPANTS