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

## CRUISE No. 88

11th October to 9th November, 1993

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
# THE 88TH OCEANOGRAPHIC CRUISE OF
# O.R.V. SAGAR KANYA

( 11 October to 9 November, 1993 )

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## C O N T E N T S

## 2. CRUISE SUMMARY

The 88th cruise of O.R.V. SAGAR KANYA was organised during 11 October to 9 November, 1993, in the Bay of Bengal, for studies on thermal structures along Madras - Port Blair section under TOGA Project, internal waves off Andaman Sea and cyclogenesis processes in the Bay of Bengal region. Physical oceanographic, surface meteorological and upper air data were collected. Altogether, 116 CTD observations (including time series for 3 days) and 10 Hydrocast observations were carried out during the cruise. Besides, the scientists from National Institute of Oceanography, scientists from India Meteorological Department, Indian Institute of Tropical Meteorology and Andhra University, also participated in the cruise. The cruise started from Mormugao Harbour and ended at the same harbour.

## 3. PARTICIPANTS

(a) Scientific Component :

| | |
|---|---|
| M.S.S. Sarma | - Chief Scientist |
| R. Vaithiyanathan | National Institute of Oceanography |
| Alvarinho J. Luis | |
| Shailesh M. Pednekar | |
| Balaji P. Lambata | |
| A. Surya Chandra Rao | |
| B. Subramanyam | |
| R.C. Gupta | India Meteorological Department |
| D. Joardar | |
| K. Nayak | |
| M.G. Yadav | |
| M.V. Guhan | |
| H.R. Mahajan | |
| P. Sitaramayya | Indian Instt. of Tropical Meteorology. |
| Jane Mitra | Andhra University |
| S. Santosh | |
| C. Ravi | Shipboard Trainees |
| M. Subramaniam | |

(b) Ship's Complement :

| | | |
|---|---|---|
| Capt. K. Thankavelu | - | Master |
| Gurucharanjit Singh | - | Chief Officer |
| Voleyty Sivaram | - | Second Officer |
| T.N.V.V. Rao | - | Third Officer |
| L.U. D'Souza | - | Radio Officer |
| R. Venkataraman | - | Purser |
| Dr. A.N. Pillai | - | Medical Officer |
| K. Balachandra Nayar | - | Chief Engineer |
| K.B. Kunhimon | - | Second Engineer |
| Sukanta Dutta | - | Third Engineer |
| A. Muthukrishnan | - | Fourth Engineer |
| V.P.P. Nair | - | Electrical Officer |
| Ram Nath Sharma | - | Electrical Officer |
| Morris Fernandes | - | Catering Officer |
| C. Verrapandian | - | Asst. Catering Officer |

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## 4. OBJECTIVES AND CRUISE PLAN

The objectives were : (a) To collect temperature and salinity data (for the Indian TOGA Programme) along Madras - Port Blair Shipping Route; (b) to carry out time series observations for studies on internal waves off Andaman Sea; (c) to collect sea truth data for validation of satellite data; and (d) to collect data for cyclogenesis studies and to display data transmitting drifting buoy under National Remote Sensing Programme.

During the cruise, it was planned to collect temperature and salinity data upto 1000 m depth at stations separated by half degree (30 miles apart), upto 86°E longitude and by one degree (60 miles apart) along Madras - Port Blair shipping route. Time series observations at hourly intervals, were planned off Andaman Sea for 3 days and temperature-salinity data upto 500 m depth in the northern Bay of Bengal. It was also planned to collect surface meteorological data at 3-hourly intervals at standard synoptic hours and upper air data at 00 Z and 12 Z along the cruise track.

## 5. CRUISE DETAILS

O.R.V. SAGAR KANYA sailed from Mormugao Harbour at 1800 hrs., on 11 October, 1993 with 18 scientists and technical personnel

from various organisations.

Using SEABIRD CTD System, temperature and salinity data were collected in the study area from 116 stations (including time series observations). Hydrocast was operated at 10 stations. Surface meteorological data were collected at all these stations.

The scientists from IMD collected surface meteorological data at 3-hourly intervals at standard synoptic hours and upper air data through Radio Sonde ascents daily at 00 Z and 12 Z. The number of observations during the cruise were as follows :

| | | |
|---|---|---|
| CTD observations | : | 116 |
| Hydrocast | : | 10 |
| Upper air data | : | 53 |
| Surface meteorological observations at 3-hourly intervals | : | 200 |
| Surface meteorological observations at 1-hourly intervals ( 3 days time series) | : | 72 |

After successful completion of the cruise programme, the ship arrived at Mormugao Port on 9 November, 1993.

## 6. PRELIMINARY RESULTS

The weather was fairly good, except in the northern Bay of Bengal. In the northern Bay of Bengal, off Andaman Islands, the weather was slightly disturbed due to the low pressure area created near Andaman region. Sea surface temperature varied between 28.5° to 30.5°C. Northeasterly wind was prevailing in the observed area and speed ranged between 0.5 to 12 m/s and average wind speed was around 5.0 m/s. Off Madras and Andaman region, warm waters ( > 29°C) were observed. Mixed layer was well developed along Madras - Port Blair Section. Down-sloping of isotherm in the subsurface layers (subsurface sinking) was seen near 88°E. In the Madras - Port Blair Section, below 200 m depth, the heat content decreased in between 88 - 86°E latitudes and an increasing trend towards Port Blair region.

## 7. ACKNOWLEDGEMENT

The Chief Scientist and other members of the scientific team are thankful to the Master, Officers and crew, for their cooperation during the cruise. The Chief Scientist also wishes to thank the participants for the successful completion of the cruise.

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TABLE I

CTD Station Details

| S.No. | Station No. | Latitude °N | Longitude °E | Date | Time (IST) |
|---|---|---|---|---|---|
| 1 | SK8801 | 12 59.4 | 81 00.0 | 17.10.93 | 1130 |
| 2 | SK8802 | 12 56.7 | 81 30.1 | 17.10.93 | 1545 |
| 3 | SK8803 | 12 52.2 | 81 59.4 | 17.10.93 | 2020 |
| 4 | SK8804 | 12 47.8 | 82 29.6 | 18.10.93 | 0045 |
| 5 | SK8805 | 12 43.1 | 82 59.7 | 18.10.93 | 0500 |
| 6 | SK8806 | 12 39.3 | 83 29.3 | 18.10.93 | 0945 |
| 7 | SK8807 | 12 34.9 | 83 59.9 | 18.10.93 | 1400 |
| 8 | SK8808 | 12 30.7 | 84 29.8 | 18.10.93 | 1830 |
| 9 | SK8809 | 12 27.1 | 84 59.8 | 18.10.93 | 2210 |
| 10 | SK8810 | 12 22.8 | 85 29.7 | 19.10.93 | 0210 |
| 11 | SK8811 | 12 19.6 | 85 59.8 | 19.10.93 | 0635 |
| 12 | SK8812 | 12 11.1 | 86 59.5 | 19.10.93 | 1455 |
| 13 | SK8813 | 12 03.0 | 87 59.7 | 19.10.93 | 2235 |
| 14 | SK8814 | 11 54.5 | 89 00.0 | 20.10.93 | 0555 |
| 15 | SK8815 | 11 45.9 | 89 59.9 | 20.10.93 | 1300 |
| 16 | SK8816 | 11 37.9 | 91 00.0 | 20.10.93 | 2020 |
| 17 | SK8817 | 11 29.8 | 91 59.6 | 21.10.93 | 0310 |
| 18 | SK8818 | 09 59.9 | 91 59.9 | 21.10.93 | 1715 |
| 19 | SK8819 | 09 59.6 | 92 59.8 | 22.10.93 | 0023 |
| 20 | SK8820 | 09 59.8 | 93 59.9 | 22.10.93 | 0703 |
| 21 | SK8821 | 11 00.1 | 94 00.0 | 22.10.93 | 1425 |

TABLE 1 (Contd.) ORV SAGAR KANYA
Cruise 88

CTD Station Details

| S.No. | Station No. | Latitude °N | Longitude °E | Date | Time |
|---|---|---|---|---|---|
| 22 | SK8822 | 11 59.9 | 94 00.7 | 22.10.93 | 2120 |
| 23 | SK8823 | 14 29.6 | 92 00.7 | 26.10.93 | 1932 |
| 24 | SK8824 | 14 30.0 | 91 00.0 | 27.10.93 | 0225 |
| 25 | SK8825 | 14 30.2 | 90 00.1 | 27.10.93 | 0919 |
| 26 | SK8826 | 14 29.7 | 88 59.9 | 27.10.93 | 1550 |
| 27 | SK8827 | 14 29.2 | 87 59.9 | 27.10.93 | 2215 |
| 28 | SK8828 | 15 00.0 | 88 00.0 | 28.10.93 | 0330 |
| 29 | SK8829 | 15 30.3 | 87 59.9 | 28.10.93 | 0632 |
| 30 | SK8830 | 15 29.6 | 88 29.6 | 28.10.93 | 1034 |
| 31 | SK8831 | 15 29.9 | 88 59.9 | 28.10.93 | 1500 |
| 32 | SK8832 | 15 29.2 | 89 29.9 | 28.10.93 | 1902 |
| 33 | SK8833 | 15 29.8 | 89 59.8 | 28.10.93 | 2253 |
| 34 | SK8834 | 15 30.0 | 90 29.8 | 29.10.93 | 0250 |
| 35 | SK8835 | 15 30.0 | 91 00.0 | 29.10.93 | 0635 |
| 36 | SK8836 | 15 29.9 | 91 29.9 | 29.10.93 | 1020 |
| 37 | SK8837 | 15 29.9 | 92 00.0 | 29.10.93 | 1404 |
| 38 | SK8838 | 15 59.6 | 92 00.0 | 29.10.93 | 1725 |
| 39 | SK8839 | 16 29.6 | 92 00.0 | 29.10.93 | 2100 |
| 40 | SK8840 | 16 30.0 | 91 30.0 | 30.10.93 | 2350 |
| 41 | SK8841 | 16 30.0 | 91 00.0 | 30.10.93 | 0333 |
| 42 | SK8842 | 16 30.0 | 89 59.9 | 30.10.93 | 0945 |
| 43 | SK8843 | 16 29.9 | 89 29.8 | 30.10.93 | 1300 |

TABLE II

ORV SAGAR KANYA
Cruise 88

HYDROCAST STATION DETAILS

| S.No. | Station No. | Latitude °N | Longitude °E | Date | Time |
|---|---|---|---|---|---|
| 44 | SK8844 | 16 30.0 | 88 30.3 | 30.10.93 | 1635 |
| 45 | SK8845 | 17 00.5 | 87 59.5 | 31.10.93 | 0320 |
| 46 | SK8846 | 17 29.9 | 88 29.9 | 31.10.93 | 0920 |
| 47 | SK8847 | 17 30.0 | 89 30.0 | 31.10.93 | 1615 |
| 48 | SK8848 | 17 30.0 | 90 29.7 | 31.10.93 | 2325 |
| 49 | SK8849 | 17 29.7 | 91 29.9 | 01.11.93 | 0700 |
| 50 | SK8850 | 18 29.1 | 91 29.7 | 01.11.93 | 1435 |
| 51 | SK8851 | 18 30.0 | 90 30.0 | 01.11.93 | 2105 |
| 52 | SK8852 | 18 29.7 | 89 29.9 | 02.11.93 | 0345 |
| 53 | SK8853 | 18 29.7 | 88 30.1 | 02.11.93 | 1030 |

At Location 10 00.59 °N, 91 30.08°E MET OCEAN BUOY Deployed on 21.10.93 at 1345 hrs IST.

Time Series of CTD data collected at location 13 00.0 °N, 94 00.0°E from 0500 hrs of 23.10.93 to 0500 hrs of 26.10.93.