DEPLOYMENT / RETRIEVAL OF DATA BUOY

SK298, CRUISE REPORT

(10 to 29 September 2012)

Report No. : NIOT/OOS/CR-058/2012/09

OCEAN OBSERVATION SYSTEMS
NATIONAL INSTITUTE OF OCEAN TECHNOLOGY
(MINISTRY OF EARTH SCIENCES, GOVT. OF INDIA)
PALLIKARANAI, CHENNAI – 600 100

ACKNOWLEDGEMENT

We express our sincere gratitude to our beloved Director Dr. M. Atmanand, NIOT for providing us the opportunity as well as the necessary facilities to carry out our expedition.

We are very grateful to Director, NCAOR, Dr. S. Rajan and Mr. M. M. Subramaniam for providing the ship ORV Sagar Kanya at the required time, for the successful completion of cruise.

Our sincere thanks to Captain, Ship officers and crew of ORV Sagar Kanya for their valuable cooperation throughout the cruise and for the help and support extended us to complete the task.

We express our sincere thanks to our Group Head Dr. R.Venkatesan, Ocean Observation Systems, NIOT for his constant guidance, encouragement and support during the course of this cruise.

We are also thankful to OOS team for helping us at various stages for successful completion of the cruise.

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CHAPTER 1

OBJECTIVE OF THE CRUISE

The main objective of the SK298 cruise is:

- Retrieve service and redeploy OMNI buoys deployed in Bay of Bengal
- Deployment of Tsunami buoy in TB 08 location
- Deployment of Met buoy in BD 04 location

The other objectives include:

- Performance observations of INSAT MSS communications.

Plan of the SAGAR KANYA CRUISE TEAM

Buoy ID /Type	Latitude(N)	Longitude(E)	Depth(m)	Remarks
BD11_old	14° 12' 00"	82° 54' 00"	**3300**	**RETRIEVAL**
FOAS TB(2 Nos)	13° 06'00"	80° 40' 00"	**-**	**Deployment & Retrieval**
BD11	13° 30' 00"	84° 00' 00"	**3300**	**DEPLOYMENT**
BD10	16° 30' 00"	88° 00' 00"	**2600**	**SERVICE**
TB08	12° 30' 00"	85° 30' 00"	**3285**	**RETRIEVAL**
TB08_A	12° 32' 14"	85° 28' 00"	**3285**	**RETRIEVAL**
TB06	14° 39' 59"	89° 29' 00"	**2832**	**Surface Buoy Swap**
BD04	14° 12' 00"	82° 54' 00"	**3300**	**DEPLOYMENT**
BD13	11° 00' 00"	86° 30' 00"	**3400**	**SERVICE**
BD14	08° 10' 00"	85° 30' 00"	**3703**	**DEPLOYMENT**

Achievements of the Sagar Kanya Cruise Team

Buoy ID /Type	Latitude(N)	Longitude(E)	Depth(m)	Remarks
BD11_old	14° 12' 00"	82° 54' 00"	**3300**	**RETRIEVAL**
FOAS TB(2 Nos)	13° 06'00"	80° 40' 00"	**-**	**Deployment & Retrieval**
BD11	13° 30' 00"	84° 00' 00"	**3300**	**DEPLOYMENT**
TB08	12° 30' 00"	85° 30' 00"	**3285**	**RETRIEVAL**
TB08_A	12° 32' 14"	85° 28' 00"	**3285**	**RETRIEVAL**
BD04	14° 12' 00"	82° 54' 00"	**3300**	**DEPLOYMENT**
BD13	11° 00' 00"	86° 30' 00"	**3400**	**SERVICE**
BD14	08° 10' 00"	85° 30' 00"	**3703**	**DEPLOYMENT**

CHAPTER 2

CRUISE TEAM

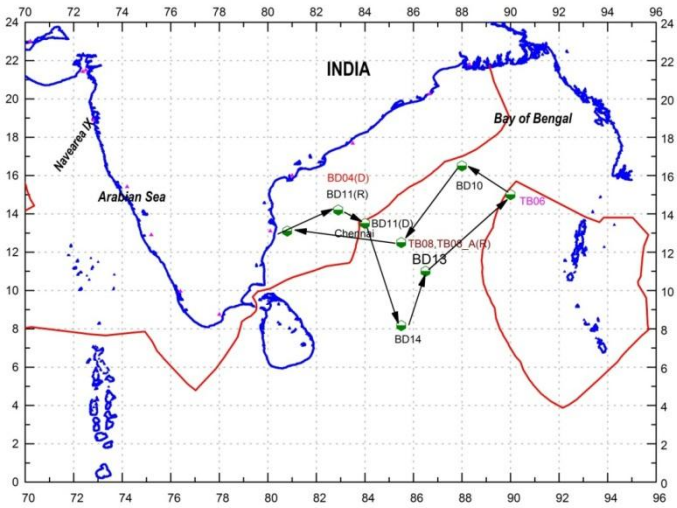
S. No.	Name	Organization	Rank
1.	SUNDARJESURAJ SEBASTIAN	NIOT - OOS	Chief Scientist
2.	KALIYAPERUMAL PALANISAMY	NIOT – OOS	Deputy Chief Scientist
3.	KESAVAKUMAR BALAKRISHNAN	NIOT – OOS	Scientist - B
4.	GNANADHAS THASIAN	NIOT – OOS	Project Sci.Assistant
5.	SARAVANAN JAYAVELU	M/s.Eurotech Systems	Field Engineer
6.	SIVARAJ VASUDEVAN	M/s.Eurotech Systems	Field Engineer
7.	SRINIVASAN RADHAKRISHNAN	Ms/Norinco	Field Engineer
8.	INGE DAHL SAETERENG	M/s.Fugro Oceanor	Field Engineer
9.	VENKATESAN SELVARAJ	M/s.Elektronik Lab	Deployment Assistant
10.	ASWIN KUMAR SELLAPPAN	M/s.Elektronik Lab	Deployment Assistant
11.	SAKTHIVEL DEVARAJ	M/s.Elektronik Lab	Deployment Assistant
12.	KIRUBAKARAN NARAYANASAMY	M/s.Elektronik Lab	Deployment Assistant
13.	CHANDRU ELANGOVAN	M/s.Elektronik Lab	Deployment Assistant
14.	SATHISH THUYAMANI	M/s.Elektronik Lab	Deployment Assistant
15.	DHAMODHARAN KUPPAN	M/s.Elektronik Lab	Deployment Assistant
16.	PRADEEP KUMAR WELLINGTON JESUCHRISIANT	M/s.Elektronik Lab	Deployment Assistant

CHAPTER 3

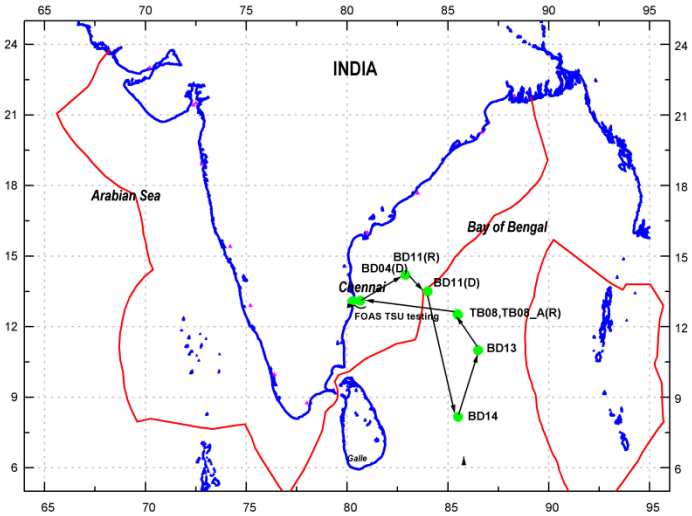
Cruise track

Name of the Vessel	**ORV SAGAR KANYA**
Cruise operation	**18 days**
Cruise commencing from	**10th September 2012 to 28th September 2012 (tentative)**
NIOT Operation	**Buoy (Tsunami & OMNI) Maintenance Operations (Retrieval & Deployment)**
Additional Operation	**Nil**
Ocean Region	**Bay of Bengal**
Port of Embarkation & Disembarkation	**Chennai to Chennai**
Total Distance	**1800 nm**

Proposed Cruise track



Performed cruise track



CHAPTER 4

Details of Day by Day Activities

Dairy of events

Diary of events	
10-09-2012	
3.30 pm	All the persons including Scientists and sea men Signed on board ORV sagar kanya
5:00 pm	The work started with material arrangement. The materials were re-arranged as per the work plan
7:00 pm	Inmarsat antenna was fixed for establishing communication with shore station
8:00 pm	Arrangement of buoys and fixing of capstan winch started
10:00 pm	The vessel started sailing towards the location of first FOAS Tsunami buoy deployment
11-09-2012	
5:45 am	Bathymetry survey with multibeam echosounder started
7:00 am	The buoy electronics were started for test transmission
10:00 am	Cleaning of BPR (SDSM)unit 1 started
10:30	Testing of The BPR(SDSM) unit 1 started
11:30	Requested data from shore station for buoy transmission
11:45 am	Buoy assembly started
2:00 pm	Buoy mooring components assembly in progress
5:00 pm	Buoy loaded in the deep sea winch
5:45 pm	Buoy deployed
6:20 pm	Dead weight dropped
6:30 pm	BPR dead weight brought in position
7:00 pm	BPR assembly in progress
7:30 pm	BPR fixtures assembly in progress
8:00 pm	Acoustic release testing in progress
9:30 pm	Assembly of floats
10:15 pm	BPR dropping started by using deep sea winch
11:15pm	Connection could not be established between buoy and BPR
11:30 pm	BPR deployment started
12:00 am	BPR deployment completed
12-09-2012	
8:00 am	Assembly of 2nd buoy started
10:00 am	Assembly of surface acoustic modem and connection
11:00 am	Second BPR was brought in position
11:30 am	Cleaning of BPR in progress
1:00 pm	Testing communication between buoy and BPR
3:00 pm	Troubleshooting the problem in communication
4:00 pm	Assembly of sinker weight with BPR
4:45 pm	Connection of yellow floats with the BPR system
5:30 pm	BPR PP rope payout in progress and 1 yellow float was missing
6:15 pm	The end of PP rope connected with the green floats and operation completed
7:00 pm	Assembly of old BPR started

13-09-2012	
7:15 am	BPR float assembly in progress
8:15 am	Assembled BPR system taken through deep sea winch for deployment
9:00 am	BPR deployment completed with fixing of green floats at the end
11:00 am	Went to old location to check the status of BPR and buoy
12:00 pm	There was good acoustic communication between the buoy and the BPR
2:00 pm	Started to the second BPR location
2:30 pm	Provided instructions to the watch keeping boats
4:00 pm	Started to BD 11 location for retrieval
5:00 pm	The sensors and other accessories stocks were checked and arranged
14-09-2012	
7:00 am	Benthos release – deck unit assembled and transducer lowered
7:30 am	Release command provided
9:00 am	Searching of floats started
11:45 am	Green floats spotted
12:15 pm	Vessel moved towards the floats
1:30 pm	Boats lowered to access the floats
2:10 pm	Yellow floats were accessed by the boat persons
3:00 pm	The boats Out board motor had problem and persons cannot start the engine
4:45 pm	The ropes were started rolling in with the winch
6:30 pm	Buoy approached near the vessel
7:30 pm	BD 11 Buoy was on board – Observation Rainfall sensor was missing , wind sensor, PSP were damaged.
15-09-2012	
7:00 am	BD 11 buoy and its components were segregated.
8:30 am	Buoy arrangement in progress
9:45 am	Assembly of BD 04 idas omni buoy started
10:30 am	Mooring components were arranged near the buoy
11:15 am	Buoy moved to position
12:30 pm	Buoy deployed
1:36 pm	Pay out of mooring line in progress
2:00 pm	Deployment completed
3:25 pm	Final cleaning of BD 11 buoy in progress
4:50 pm	Connection of components in progress
6:00 pm	Testing of individual sensors and buoy started
16-09-2012	
6:00 am	Buoy testing in progress
9:00 am	Buoy final assembly in progress
10:30 am	Connection and providing cable tie for all the sensors
11:40 am	Testing of benthos release function
1:00 pm	Moving adcp to correct position for deployment
2:30 pm	Buoy lifted with deep sea winch
3:00 pm	Buoy dropped
4:15 pm	Connection of CT sensors and pay out of induction cable in progress
5:45 pm	Sinker weight dropped
6:00 pm	BD 11 buoy deployment completed
17-09-2012	
9:00 am	Service of buoy retrieved from BD 11 position for BD 14 deployment
11:00 am	Service of ADCP started

12:00 pm	Removal of sensor arm in progress
12:30 pm	Testing of individual sensors
1:00 pm	Assembly of buoy started
3:00 pm	Testing of sensors retrieved from BD 11 location started
6:00 pm	Water found in one of the CT sensor
18-09-2012	
8:00 am	Arranging all the CT sensors
10:00 am	Connection of CT sensor wires
12:pm	CTD checking process started
2:00 pm	CTD lowered and tested
3:00 pm	Connection of sensors with the CPU in progress
3:30 pm	Testing of buoy with CPU
4:00 pm	Insat MSS terminal was checked with mechanical team for fixing with buoy
5:00 pm	Planning of a fixture clamp for MSS
6:00 pm	Machining of clamps started
6:30 pm	Cutting of clamps
7:00 pm	Searching for different location for MSS terminal for continuous data transmission
8:00 pm	Connection of MSS
9:00 pm	Repairing the connections of MSS terminal
19-09-2012	
6:30 am	Connection of floats for BD 14 buoy
7:45 am	Marking of NIOT details on Benthos release and floats
9:00 am	Started arranging all the CT sensors
11:00 am	Connection of ADCP
12:00 pm	Moving ADCP to required position and buoy dropped
1:00 pm	Rope pay out in progress
2:00 pm	Anchor dropped
3:00 pm	Insat modem position changed and checked for data
4:00 pm	Tried for programming the ACTF board with the given hex code
5:00 pm	The programming could not be done since the provided hex code was a boot loading file
20-09-2012	
9:00 am	The retrieved CT sensors were brought to lab
11:00 am	Data downloading started from the CT sensors
12:00 pm	ADCP was connected with the system and checked for data
21-09-2012	
7:00 am	BD 13 Retreival operation started
8:00 am	Trying to release the benthos
11:00 am	Searching for the floats
11:30 pm	Again provided release command and waited for floats
2:30 pm	Searching in progress for yellow floats
4:00 pm	Yellow float was not visible
5:40 pm	Buoy was taken on board
6:50 pm	Yellow float was retrieved in burst condition
8:00 pm	Buoy hull cleaning in progress
22-09-2012	
7:00 am	Buoy dismantling in progress
10:00 am	Eppley sensor and mast cable was changed
10:30 am	ADCP was connected with the system by connecting it in RS 232 port

11:30 am	ADCP was not functioning and the lid was changed which was found to work
12:15 pm	Induction cable was checked for damage
2:30 pm	DVS was checked for functionality
3:15 pm	Humidity sensor was changed with the new one
4:00 pm	The ARGO battery was changed
5:00 pm	The CT sensors were tested
6:00 pm	The sensors were connected to the induction mooring and the system was checked
7:00 pm	The lid connections were made and the system was tried to put in continuous testing mode
9:30 pm	The humidity sensor given error value
23-09-2012	
7:00 am	ADCP was again not functioning
9:00 am	The retrieved ADCP was found to have the PCB board burnt
11:00 am	Spare ADCP lid was changed
12:00 pm	The connector was changed and the functionality was checked with the system
2:00 pm	The connection of eppley and the humidity sensor was checked
4:00 pm	The buoy wiring was completely checked
5:00 pm	The humidity and the radiation sensor was found to perform good
7:00 pm	ADCP lid was changed and testing started
8:00 pm	The pins of the ADCP was checked and cleaned again
10:00 pm	Waiting for ADCP data through buoy
11:00 pm	ADCP value seems good
24-09-2012	
7:00 am	The floats were arranged
8:30 am	Mooring connections were in progress
9:00 am	Buoy was moved to required location
10:00 am	ADCP was moved with trolley for deployment
10:45 am	Buoy was lifted for deployment
11:00 am	Payout of ropes in progress
11:45 am	Connection of 500 meter CT
12:15 pm	Payout of ropes in progress
12:40 pm	Anchor dropped
2:30 pm	Started connection of old ADCP
4:00 pm	The Tsunami buoy TB 08 was brought in position for deployment.
5:00 pm	The assembly of buoy started
5:30 pm	Connections made between buoy and system and checked
7:00 pm	The damaged bolt was removed between buoy and tsunami pipe
25-09-2012	
8:00 am	The buoy was moved to required location
10:00 am	The mooring components were arranged
11:00 am	The buoy was hooked in crane for deployment
11:30 am	Buoy dropped in water
12:30 pm	Rope payout in progress
1:30 pm	The electrical system of the ship was not working
2:00 pm	The rope was tied near the A frame and electrical power awaited
3:00 pm	Started lowering the dead weight
5:00 pm	Sonardyne BPR assembly was started
7:30 pm	BPR started lowering
9:00 pm	Communication checked by lowering the modem

9:45 pm	Communication was not established since the BPR was communicating with the buoy
10:30 pm	BPR Lowering in progress
11:00 pm	BPR released
11:20 pm	Conformance from shore station awaited
11:40 pm	IXSEA release heaving up started
12:30 pm	IXSEA retrieved on board
26-09-2012	
7:00 am	Deck unit for releasing the BPR was assembled
8:00 am	BPR Release command provided
8:45 am	The slant range of the BPR was continuously checked
9:30 am	BPR searching started
11:00 am	The ship was moved around the released position
12:00 pm	Searching in progress for BPR
2:00 pm	Ships watch circle for BPR was increases and searched again
5:00 pm	Still the BPR was not found
6:30 pm	Ship started towards TB 08A Location to check the Battery voltage
7:30 pm	The BPR was pinged and the vessel started towards the ennore location
27-09-2012	
7:00 am	The materials were arranged
8:00 am	Boat position was changed and covered
10:00 am	The materials packing was in progress
10:30 am	Inmarsat field modem was removed
12:00 pm	Vessel sailing towards ennore location for fugro BPR retreival
2:00 pm	Material packing in progress
4:00 pm	PP and nylon ropes were wounded in bobbins
6:00 pm	Sailing in progress
28-09-2012	
7:30 am	Reached Fugro SDSM unit 2 location
7:50 am	Release command provided
8:30 am	Yellow floats seen
9:15 am	Boats lowered
10:00 am	SDSM lifted on board
10:30 am	Pay in of ropes in progress
11:15 am	Reached first location of FOAS Tsunami buoy and SDSM
11:40 am	Yellow floats were seen and were retrieved with the watch keeping boats
12:00 pm	SDSM unit retrieved
12:30 pm	The FOAS buoy was hooked for retrieval
1:00 pm	Buoy retrieved and vessel started sailing towards Chennai port
End of Cruise	

CHAPTER 5

PERFORMANCE OF EQUIPMENT ONBOARD

- **Oil Well Crane (12 T)(Port Side):**

During the cruise we used the Oil Well Crane for material handling and the performance was found good.

- **2T Cranes at Starboard Side:**

For all the buoy retrieval and deployment operations we made use of 2T cranes fixed at Starboard side and aft end. The performance of the cranes was found satisfactorily.

- **Sub – Bottom Profiler:**

For the purpose of finding the depth, we used Sub – Bottom profiler, performance of which was found satisfactorily.

- **CTD Winch:**

To deploy the BPR, we used CTD winch. Even though the depth indicator is malfunctioning, it served the purpose of controlled lowering and heaving of BPR.

- **Deep Sea Winch:**

It was used for deployment and retrieval operations and the performance was found satisfactorily.

- **Dynamic Positioning System:**

For all the Tsunami buoy deployments we extensively used Dynamic Positioning System, the performance of which was found good.

- **A – Frame:**

The performance of the A – Frame was found good.

CHAPTER 6

DIFFICULTIES FACED ONBOARD

- CTD Winch depth indicator

  During the deployment of Bottom Pressure Recorder for Tsunami buoy systems, it is essential to have

  accurate depth reading. But the depth indicator attached with CTD winch, given wrong value which

  forced us to look for alternatives.

- Sudden stoppage of Deep Sea Winch

  Two times during the deployment of surface buoy, deep sea winch stopped when the buoy was

  hanging. After repairing of Winch we continued our operations.

- Vessel Blackout Happened once while performing the anchor deployment operation.
- Fresh water hydro pore pumping system was not performing satisfactorily.
- Sufficient medicines are not available on board.