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CRUISE REPORT



राष्ट्रीय समुद्र विज्ञान
संस्थान

**NATIONAL INSTITUTE
OF
OCEANOGRAPHY**

RV SAGAR KANYA
CRUISE SK 246
(13/5/08 – 06/06/08)

NATIONAL INSTITUTE OF OCEANOGRAPHY
(Council of Scientific and Industrial Research)
Dona Paula, Goa – 403 004

REPORT ON THE 246th CRUISE OF ORV SAGAR KANYA

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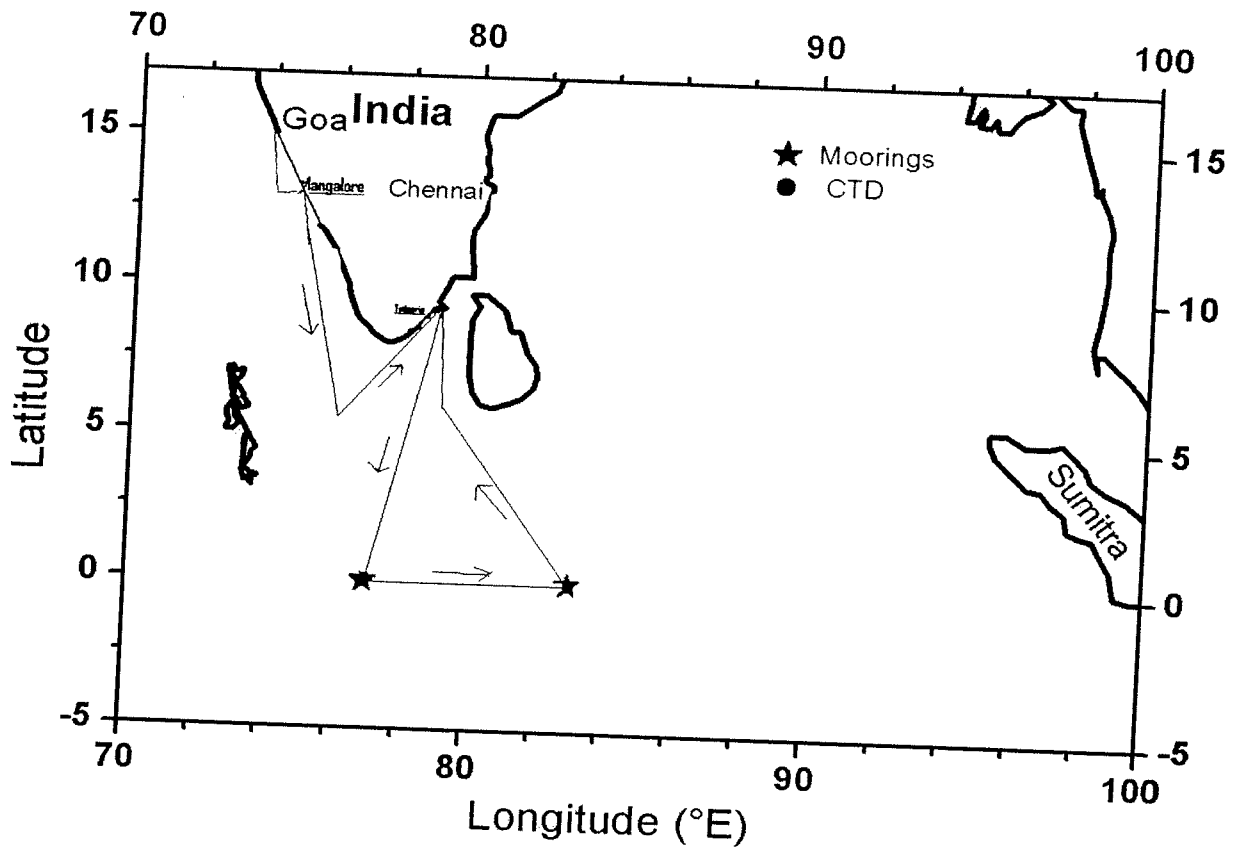
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1. SUMMARY

The participants including 14 Goa University students (GUS) boarded the vessel ORV *Sagar Kanya* at 1300 hrs on 13/5/08. Loading of mooring equipment was completed. At 1400 hrs Ship sailed out and kept at outer anchorage. Ship sailed out from Marmugao outer harbour at 0015 hrs 15/5/08. Meeting was held with GUS and scientists, Norinco & seamen. The vessel had arrived Mangalore Port at 2200 hrs. Bunkering was completed at 0600 hrs 16/5/08. Finally the ship sailed out from Mangalore port at 1600hrs. GUS have taken 2 hourly observations of met data from 1200 hrs on 17/5/08. Around 2130 hrs on 18/5/08 the ship was diverted towards Tuticorin. This was informed by the Captain and CEO. SCI told them that R.O Engineer would be joining at Tuticorin.. The vessel was berthed at Tuticorin port around 1200 hrs on 20/5/08. The Ship came back to outer anchorage of Tuticorin port after the trail run for 12 hrs on 22/5/08. The Multi-beam was operational. Propulsion motor was working. R.O. engineer said that the plant was working and he sailed with us. The ship sailed out at 1015 hrs towards the first mooring station, i.e., Equator, 77E. The Captain informed me R.O. plant was not repaired and not working. Water rationed again from the very next day. Chief Scientist was informed that the ship would be diverted to either Male or Colombo for taking fresh water after completing 77E mooring station. The retrieval operation started at 0448 hrs on 25 May 2008 and the first buoy was sighted in the radar and got VHF signal at 0500 hrs. It was successfully completed at 1845 hrs. Sea was very calm and very transparent surface. The CTD was operated up to 1800 m at 00°00'11.31"N, 077°01'9.1"E. After completing CTD station the ship sailed towards 83°E. It was heavily rained throughout the day. The vessel has reached Equator, 83E at 1900 hrs on 29/5/08. The retrieval of mooring started at 0430 hrs and successfully completed at 1625 hrs on 30/5/08. The Ship was moved around 20 nm farther away from the mooring position, Equator, 83° E towards east because of westward drift of about 2 knts and started redeployment of mooring at this location at 0700 hrs on 01/6/08. The deployment was successfully completed at 1425hrs. Later on the ship sailed out towards 00°, 93°E at 1530hrs. However, on 02/06/08, at 1500 hrs the ship was diverted to Tuticorin because of shortage of fresh water. The vessel reached Tuticorin Port on 6 June 2008 and all the cruise participants disembarked at this port because it was difficult and risky to do the mooring operations during monsoon period at the Equator. The cruise ended there. Total 14 ARGO drifter buoys were deployed along the track at different locations.

As a part of training program for GUS, we demonstrated Echosounder, bucket thermometer. Many samples were collected at Algal bloom at 06°29.92'N, 077°14.62-65'E and video the patch and taken still shots by GUS. They visited Chemistry and Geophysics labs. They have seen the Auto-analyser and sub-bottom profiler. The function of AUTOSAL was explained to them. MPN was operated with four nets and lowered up to 200 m for GUS. They collected samples. We explained about portable CTD and RCMS to them.

2. CRUISE TRACK



3. INTRODUCTION

The cruise SK-246 was the seventh of the series since 2000 for undertaking the equatorial current meter mooring operations under the Ocean Observing System (OOS) program of the Ministry of Earth Science. The cruise was organized for servicing and maintenance of the three existing current meter moorings at 77°E, 83°E and 93°E along the Equator, which were deployed during 31 August – 3 October 2006. However, we could complete 77°E and 83°E moorings only. All the participants including Goa University students boarded the vessel at Mormugao port on 13 May 2008.

4. ITINERARY

Departure	:	Marmugao Port	---	13 May 2008
Arrival	:	Tuticorin Port	---	6 June 2008

5. CRUISE PARTICIPANTS

1. Scientific component

1. Ayyagari Suryanarayana	Chief Scientist (NIO, Goa)
2. Malladi Surya Subrahmanya Sarma	
3. Rompicherla Jagannatha krishnama charyulu Goa	National Institute of Oceanography,
4. Almeida Anselm Michae	-do-
5. Sardar Areef Abdu	-do-
6. Sadashiv Tarachand Khalap	-do-
7. Medikonda Anil Kumar	-do-
8. Yerraguntla Steeven Paul	-do-
9. Raikar Dattaram Anil	-do-
	Dept. of Marine Sciences, Goa University
10. Naik Richita Sudhakar	-do-
11. Nair Abhilash Ashokan	-do-
12. Noronha Cheryl Arcanjela	-do-
13. Gaonkar Vaman Vithoba	-do-
14. Rodrigues Ethel Savia	-do-
15. Kumbhar Jyoti Vasant	-do-
16. D'Mello Joshua Rosario	-do-
17. Naik Puja Kamu	-do-
18. Shirodkar Sinthia Tulshidas	-do-
19. Nagoji Sidhesh satish	-do-
20. Paropkari Renu Anil	-do-
21. Araujo Jesly	-do-
22. Kavlekar Sanit Laxman	-do-
23. Vadakkemanappurathu Chandrasekharan Sarathchandran	Marine Sciences, GU NORINCO
24. Tachezhath Baiju	-do-
25. Rajak Mohamed Ismail	-do-
26. Parshuram Durgappa Madar	-do-
27. Thangaraj Ramesh	-do-
28. Chauhan Rahul Kumar Mohan	-do-
29. Patel Sunilkumar Amruttal	National Centre for Antarctic and Ocean Research
30. Chavan Sandipkumar Kirtan	-do-
31. Bamaniamanish Virchand	-do-

2. Ship's Complement

1. Capt. Rajesh Kumar	Master
2. Moorad Ali Khot	Ch.Off
3. Sushil Verma	2 nd off
4. Piyush Kumar	Med.off
5. Constancio Monteiro	Rad.off
6. Pritish Ranjan Bandyopadhyay	Ch.Engr
7. Jibanando Sarkar	2 nd Engr
8. Tanmay Gupta	3 th Engr
9. Gunna Ramakrishna Rao	4 th Engr
10. Lal Chandra Maurya	El.off
11. Francis S Lobo	CTO
12. Kannan Kumar	Asst.CTO

6. OBJECTIVES

1. Retrieval and redeployment of three deep-sea current meter moorings along the equator
2. Deployment of 12 drifting buoys
3. Surface met observations
4. According to O.M. from NCAOR, dt.16/05/08, training to Goa University students

7. WORK ACCOMPLISHED

The cruise participants started from NIO at 0800 hrs to board ORV Sagar Kanya and boarded the ship along with 14 GU students (GUS) at 1300 hrs on 13/5/08. At 1400 hrs Ship sailed out and kept at outer anchorage.

The ship sailed out from Marmugao outer harbour at 0015 hrs on 15/05/08. The ship with 4 generators (one was just repaired) proceeded towards Mangalore for bunkering. A meeting was held with GUS and scientists, Norinco & seamen. As a part of training, Echosounder was shown and explained to GUS. The ship had arrived Mangalore outer anchorage at 2000 hrs and came alongside at 2200 hrs. Bunkering was completed at 0600 hrs on 16/05/08. We were waiting for water and Cadets to be joined to the ship here. Everything was completed by 1500 hrs. Finally the ship sailed out from Mangalore port at 1600hrs. Initially ship speed was 11 knots. It was heading towards Equator, 77E. At 0800 hrs on 17/05/08 the ship speed was 8.8 knts. Demonstrated bucket thermometer to GUS at 0930 hrs. During that time the bucket thermometer rope got snapped in the sea while operating it and lost in the sea. After some time the ship was stopped for testing AT & BT. At 1000 hrs, had a meeting with GUS and explained them what are the observations are to be carried out by them and allotted work for them. GUS started taking 2 hourly observations of met data from 1200 hrs onwards. RJK gave one lecture to GUS at 2000 hrs.

Around 2130 hrs on 18/05/08 ship was diverted towards Tuticorin. This was informed by the Captain and CEO. Explained about drifters to GUS. The ship was stopped at 1430 hrs for GUS to take samples from Algal bloom at 06°29.92'N, 077°14.62-65'E. Many samples were collected and video the patch and taken still shots by GUS. The samples were kept in the cold storage. At 1000 hrs GUS visited Chemistry and Geophysics labs. They have seen the Auto-analyser and sub-bottom profiler.

The vessel was berthed at Tuticorin port around 1200 hrs on 20/05/08. The ship went for trail run of R.O for 12 hours in the deep sea at 1700 hrs on 21/5/08 and came back to anchorage on 22/5/08 morning. Multibeam was made operational. P.Motor was working. The ship sailed out at 1015 hrs towards the first mooring station, i.e., Equator, 77E. GUS had started again taking met observations from 1200 hrs. One microscope was provided to them to analyse the bloom sample.

On 23/5/08, the function of AUTOSAL was explained to GUS. MPN was operated with four nets at 03°57.68'N, 077°41.56'E and lowered up to 200m at 1615 hrs to demonstrate to GUS. MPN brought back to deck at 1730 hrs. GUS collected samples and preserved after injecting the formalin in to the samples. The Acoustic Release (AR) was tested by lowering up to 100 m at 1750 hrs. AR brought back to deck at 1800 hrs.

[Team: A. Suryanarayana, M.S.S. Sarma, R.J.K.Charyulu, Anselm Almedi, S. Khalap and Areef Sardar]

7.1 Servicing of the current meter mooring at Equator, 77°E

a) Recovery of the current meter mooring at 77°E

The ship was stopped at the 77°E mooring location at 0330 hrs on 25/5/08. At 0440 hrs the acoustic release was released. The first buoy was sighted in the radar and got VHF signal at

0500 hrs. Light beacon flash was not working and it got damaged. The second buoy was sighted at 0517 hrs. The retrieval operation started at 0645 hrs and it was successfully completed at

1845 hrs. The sea was very calm and very transparent surface. The GUS boys had helped us during the operation and Girls gave moral support.

Tables 7.1.1 to 7.1.4 represent the mooring system information, the design of the recovery operations and the status of ADCP and RCMs after retrieval of mooring at 77°E.

On 26/5/08, explained about portable CTD and RCMS to GUS. The CTD was lowered up to 1800 m only because of limitation of depth range for bio spherical (PAR) sensor at 00°00'11.31"N, 077°01'9.1"E at 1145 hrs. It was brought to the deck at 1315 hrs. Preparations were made for the deployment on 27/5/08.

b) Deployment of the current meter mooring at 77°E

On 27/5/08, started deployment of RCMs at Equator, 77°E at 0700 hrs. ADCP buoy was in the water at 0715 hrs. Initially so many problems for deployment because of no winds and but drift was about 4.0 knts. The AT & BT were used to control the drift. In the last moment AT & BT were failed. The ship was drifting with 3kts per hour. Finally, the anchor was dropped at 00°00' 28.15"N, 077°00' 53.64"E (00°00.484'N, 077°00.88'E) at the depth of 4749 m at 1655 hrs. Triangular positions were taken to get the correct anchor drop position.

Tables 7.1.5 to 7.1.7 represent the mooring system information, design of deployment, status of ADCP and RCMs before deployment of mooring at 77°E and checklist of Acoustic Releases respectively.

7.2 Servicing the current meter mooring at Equator, 83°E

a) Recovery of the current meter mooring at 83°E

The ship reached Equator, 83°E at 1900 hrs on 29/5/08. It was heavily raining throughout the day. We were checking the range before releasing the acoustic release at 0430 hr on 30/05/08 but the range was not shown because of any response from the beacon. It was tried two or three times and directly gave the release command. Still we got any response from Acoustic Release. However, the buoy was popped up with in 5 min. This is the peculiar problem as mentioned by Mr. Areef in this area that we are facing from the beginning of the mooring project (from the year 2000 onwards). First buoy was sited at 0500 hrs and the second buoy at 0530 hrs. The ship started approaching the first buoy to hook it at 0600 hrs. Even though the sea was calm and good weather, it took two and half hours to hook the first buoy. Fishing net was entangled the ADCP buoy. Rotor was lost for the 1st RCM. However, we successfully completed the retrieval of mooring at 1625 hrs.

Tables 7.2.1 to 7.2.4 show the mooring system information, the design of the recovery operations and the status of ADCP and RCMs after retrieval of mooring at 83°E.

CTD was operated up to 1800 m at 00°03' 17.80"S, 083°02'57.57"E from 1015hrs to 1215hrs on 31/5/08.

b) Deployment of the current meter mooring at 83°E

Started deployment of mooring at 083°19'E at 0700 hrs on 01/06/08. ADCP buoy was in the water at 0725 hrs. We have seen two fishing vessels with deep sea nets near to our ship and immediately stopped the deployment. Waited for half-an-hour but the vessels did not move from their position. We moved out from that place for about one mile towards west and started again deployment at 0830 hrs. Deployment was successfully completed at 1425hrs. The Anchor drop Position: 00°00'22.35"N, 083°12'36.27"E, and depth: 4555 m.

Tables 7.2.5 to 7.2.7 show the mooring system information, design of deployment, status of ADCP and RCMs before deployment of mooring at 83°E and checklist of Acoustic Releases respectively

The ship sailed towards third mooring position, i.e., Equator, 93°E at 1530hrs. AUTOSAL was demonstrated to GUS. Meanwhile the ship was diverted towards Tuticorin because of acute shortage of freshwater onboard. We could not complete the third mooring (93°E) operations. GUS submitted their work reports. A loss report of Bucket thermometer was submitted to the Captain.

The arrangements were made for our sign off at Tuticorin. The Met Observations were continued up to 2200 hrs on 4 June 2008. We started packing of instruments and the vessel berthed alongside at Tuticorin and the cruise ended at 1000 hrs on 6 June 2008.

7.3 Deployment of surface drifters

(Sub-team: Mr. Anselm Almeida)

Table 7.3 provides the details of surface drifters deployed at the pre-determined locations during the cruise.

7.4 Surface meteorological measurements

(Sub-team: GU students, A. Suryanarayana)

Surface meteorological parameters of Sea Surface Temperature (SST), barometric pressure (corrected to mean sea level), dry bulb and wet bulb temperature, and navigation information were collected at two hourly interval from 17 May 2008. The wind sensors fitted to onboard AWS were not working during the cruise period.

7.5 CTD operations

(Sub-team: MSS Sarma, Anselm Almeida and A. Suryanarayana)

Portable Sea-bird CTD was operated at two stations, at Equator, 77E and Equator, 83E.

The details of the observations are given below Table (CTD Stations):

CTD Stations

St n N o.	Date 2008	Lat	Longitude	Stn Dept h (m)	SS T °C	Depth CTD lowere d
1	26/5/08	00° 00.179'N	077°01.162'E	4750		1800
2	31/5/08	00° 03.296'S	083°02.96'E	4550		1800

8. CONCLUSIONS

The cruise SK-246 with initial hick ups was successful with all scientific operations, except one mooring at 93E, completed.

9. RECOMMENDATIONS

Deep-sea echo-sounder and R.O. plant may be kept for proper usage during deep-sea and long term cruises.

10. ACKNOWLEDGEMENTS

The Chief Scientist and his team are thankful to the Master, Chief Officer and other officers who were on duty during the stations, Engineers and crew for providing excellent services and cooperation for all the operations. The Chief Scientist is thankful to all participants for their cooperation and coordination for all the operations during the cruise that has made the cruise SK-246 a success. The engineers from NORINCO extended services during all the operations. The participants including chief scientist are thankful to the Radio Officer for patiently handling the incoming and outgoing e-mails.

The chief scientist and his team are thankful to Dr. S.R.Shetye, Director, NIO and to the Secretary and Chairman, MOES, Govt. of India, Dr. Rasik Ravindra, Director, NCAOR, Vasco, Goa and Dr. M.Sudhakar, Group Director, OSSG, NCAOR, Vasco for allotting the ship time for the time-specific mooring operations and Mr. M.M. Subramaniam, NCAOR for making all the necessary arrangements and cruise related logistics support.

The Chief Catering Officer and his associates onboard ORV Sagar Kanya has served variety of dishes to the satisfaction of the participants.

Table 7.1.1

NATIONAL INSTITUTE OF OCEANOGRAPHY; GOA-INDIA
(Ocean Observing System Programme MOD)

CRUISE NO: 246

RECOVERY DATE: 25.05.2008

Mooring I.D.: EQCM #3.4R

MOORING SYSTEM INFORMATION

RECOVERY

Captain	Rajesh Kumar
Chief Scientist	A. Suryanarayana
First Mate	Moorad Ali Khot
Mooring Master	Sadashiv T Khalap
Scientific Hands	Sarma, Charyulu, Areef, Almieda
Winch operations	Parshuman, Ismail, Baiju (Norinco)
Crew Hands (NCAOR)	Chavan, Manish, Rahul, Sunil
Weather Condition	Sea state 0
Mooring Design	Vijayan Fernando
Water Depth	4757 m
Release Model	MORS/Oceano AR 661 B2S
Interrogation Code	(#790) – 3AA5 (#610) – 3AA3
Release Code	(#790) – 3AA6 (#610) – 3AA4
Mooring Top, Description	Low drag float with ADCP 75khz-LR
Radio Frequency	Channel 63
Strobe Flash	Benthos
Release Armed	Areef Sardar – New Batteries
Slant Range	4705 m
ANCHOR DROP	00°00.190'N
	077°00.90'E
RDI ADCP 75khz – LR	416 m
RCM 7 – 2 Nos.	449 m & 501 m
RCM 8 – 3 Nos.	804 m, 1007 m & 1993 m
RCM 11 – 1 No.	4021 m

Table No.7.1.2

AR 661 B2S – DDL RELEASE TURNAROUND CHECKLIST

1) AR 661 B2S – DDL S/N 611
INT-RANGE CODE 3A41 RELEASE CODE 3A42 FREQUENCY 12.0 KHz

2) AR 661 B2S – DDL S/N 790
INT-RANGE CODE 3A45 RELEASE CODE 3A46 FREQUENCY 12.0 KHz

- Step 1 -RECOVERY
Inspect exterior and clean with fresh water. OK
- Step 2 -REPLACE BATTERIES

	<u>#611</u>	<u>#790</u>
Old Battery voltage	8.32 v	<u>8.66 v</u>
New Battery voltage (LR20)	<u>9.56 v</u>	<u>9.68 v</u>
New Battery voltage (6LR61)	9.44 v	9.41 v
- Step 3 -Inspect/clean O-rings and grooves.
Very lightly grease O-rings and metal face seal. OK
- Step 4 -Close housing, purge with nitrogen. OK
- Step 5 -Tighten all bolts. OK
- Step 6 -SYSTEM TEST
 - Release command OK
 - Acknowledgement pulse OK
 - Release after 3 seconds OK
 - Execution pulse OK
 - Interrogate/ranging command OK
 - Single transpond OK
- Step 7 -RE-ARMING
 - Insert release ring and fit locking shaft OK

Interrogation after deployment from both the acoustic releases OK

Comments: RELEASE # 611 & # 790 CONNECTED IN PARALLEL.

Deployment Date: 27/05/2008 Cruise: SK-246

Station: EQCM- 3.5 (77 deg) Multibeam Echosounder : 4750 Meters

Anchor Drop : 000 00 28 .15 Anchor drop time : 16:52 hrs
077 00 53. 64

Triangulation :

First Position : 000 00 33.47 Time : 17:40 hrs
076 59 39.15 Slant Range : 5365 meters

Second Position : -000 02 08.24 Time : 18:42 hrs
077 00 04.51 Slant Range : 6916 meters

Submersible Recovery Strobe & Recovery Transmitter

a) Novatech radio transmitter cum strobe (Duo) :

Model No: RF-700C6
Serial No.: WO3-118
Frequency: 160.72500 Mhz
Channel: 62 (C)

Deployment Tests:

1. Deck test : OK
2. Pre-deployment tests : OK
3. Battery status : OK
4. Submergence signal after anchor drop : OK

Organisation: *National Institute of Oceanography, Dona Paula, Goa. India.*

Name: Areef A. Sardar

Signatures: _____

Deployment Date: 27/05/2008

Cruise: **ORV - SK-246**

Station : **EQCM- 3.5 (77 deg)**

Table 7.1.3 Retrieval of Equatorial Mooring at 77°E RCM (25/05/08)

	Depth of instrument (meters)	Type of instrument	Instrument sr. No.	DSU sr. No.	No of records in DSU	Remarks
I	415	76.8 kHz ADCP	5789			Recorded 27/9/06 – 25/05/08
II	449	RCM-7	12759	15092	65520	Top rotor lost
III	501	RCM-7	12645	15091	65520	Ok
IV	804	RCM-7	12744	15099	65520	Ok
V	1007	RCM-8	12748	15086	65520	Ok
VI	1993	RCM-8	12757	15083	11331	Water leaked through conductivity cell
VII	4021	RCM-11	82	15095	65520	Ok

Table 7.1.4
 CRUISE NO. SK 246

NATIONAL INSTITUTE OF OCEANOGRAPHY, GOA.
 (Ocean Observing System, MOD)

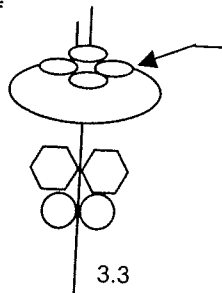
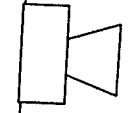
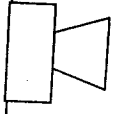


Mooring System Information

Mooring ID: EQCM - 3.4
 Deployment

Anchor Drop:
 0°00 .19' N
 77°01 .15' E

Recovered Date: 25/5/2008
 Deployment Date: 27.09.06
 Recovered Date: 25.09.06
 Prev. deployment: 18.10.04

sea state:

m.a.b	m.b.s	Mooring Diagram	Mooring Description	Remarks	Recovery Time out
					IST
4341	416		Lowdrag ADCP Float CH (63) Benthos flasher 1.5m Chain 1/2" Chain Triple Mclane (3 x 3) Dual Benthos	<i>RDI LR 75kHz</i> ID# 5789 9 nos 1 set	7:40
		3.3	20 m Nylon / WR		
4308	449		current meter #1 ID# 759-RCM7		8:14
		3.3	50m wire rope		
4256	501		current meter #2 ID# 645-RCM7		8:55
		3.2 3.4	200m wire rope 100m wire rope	do	9:10 9:32
3953	804		current meter #3 ID # 744-RCM8		10:10
		3.4	200M Wire rope		10:30
			0.3m Chain	Jib boom failure	
3750	1007		current meter #4 ID # 748-RCM8		11:00
			0.5m Chain		
		3.4	400m wire rope	winch breakdown 40 mins	11:15
		3.1	500m wire rope		12:20



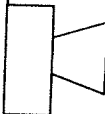
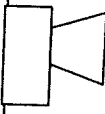


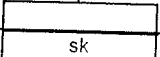
				50m wire swivel .5m 1/2" Lchain		13:15
				Mclane G6600-3 (3x4)		13:55
				17" Benthos 4 nos		
			3.4	20m nylon rope		14:20
2764	1993			0.4m Chain current meter #5 ID #757-RCM 8		14:50
			3.4	25m wire		15:00
			3.3	500m wire rope		15:30
			3.3	500m wire rope		16:00
			3.4	500m wire rope		16:35
			3.4	500m wire rope		16:55
736	4021			0.5m Chain current meter #6 ID # 82-RCM11		17:10
			3.2	200m wire rope		17:50
			3.3	100m wire rope		17:58
			3.4	200m wire rope		18:05
			3.3	100 wire		18:18
			3.2	50 wire		18:22
			3.4	50 wire	<i>Insert at end</i>	
				1m chain Triple Mc. Lane (3x3) Glass floats		
c 25	4732		3.2	1m chain 1/2"		18:45
				MORS release # 610 and #790- 1.5M u 1/2" CHAIN new shackles	R-3A49, IR3A40 RC-4b69, IR-4b60 old - 2.1	
			3.4			
			3.2	1m n1/2 "		
			3.3	20m nylon		
depth	4757					
			sk			
				Rly wheel Anchor 1400 Kg.		

Table 7.1.5

NATIONAL INSTITUTE OF OCEANOGRAPHY, GOA.
(Ocean Observing System, MOD)

CRUISE NO: SK 246

Mooring System Information

Mooring ID: EQCM - 3.5
Deployment

Anchor Drop:

00 00 28.15 N
77 00 53.64 E

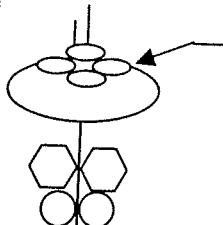

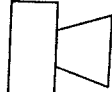

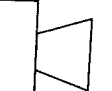
Deployment Date:

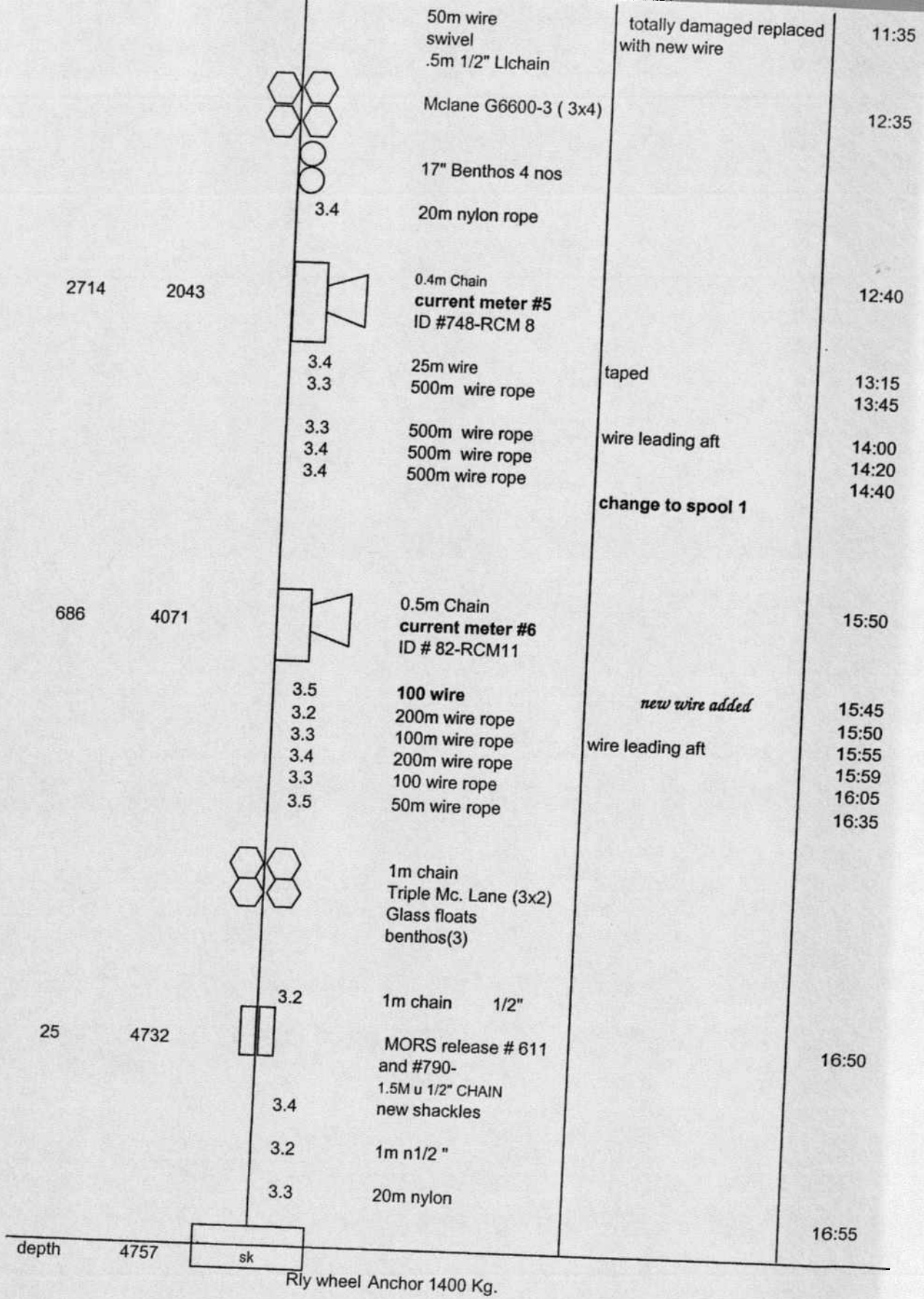
27.05.08

Recovered Date:

25.05.08

sea state:

m.a.b	m.b.s	Mooring Diagram	Mooring Description	Remarks	Deployment Time out
					IST
4291	466		SBE 39 Lowdrag ADCP Float CH (63) Novatech combo duo 1.5m Chain 1/2" Chain Triple Mclane (3 x 3) Dual Benthos	ID# 4334 <i>RDI LR 75kHz</i> ID# 5742	7:15
		3.3	20 m Nylon / WR	9 nos 1 set	
4258	499		current meter #1 ID# 759-RCM7	Base rubber damaged	7:20
		3.3	50m wire rope		7:50
4206	551		current meter #2 ID# 645-RCM7		8:00
		3.2 3.4	100m wire rope 200m wire rope	wire over buoy respooled wire to check change to spool 1	8:15
3903	854		current meter #3 ID # 757-RCM8		10:20
		3.5	200M Wire rope	new	
3696	1061		0.3m Chain current meter #4 ID # 744-RCM8		10:35
		3.5	0.5m Chain 500m wire rope	new	10:40
		3.1	400m wire rope		11:03



50m wire swivel .5m 1/2" Lchain	totally damaged replaced with new wire	11:35
Mclane G6600-3 (3x4)		12:35
17" Benthos 4 nos		
20m nylon rope		
0.4m Chain current meter #5 ID #748-RCM 8		12:40
25m wire	taped	13:15
500m wire rope		13:45
500m wire rope	wire leading aft	14:00
500m wire rope		14:20
500m wire rope	change to spool 1	14:40
0.5m Chain current meter #6 ID # 82-RCM11		15:50
100 wire	<i>new wire added</i>	15:45
200m wire rope	wire leading aft	15:50
100m wire rope		15:55
200m wire rope		15:59
100 wire rope		16:05
50m wire rope		16:35
1m chain Triple Mc. Lane (3x2) Glass floats benthos(3)		
1m chain 1/2"		
MORS release # 611 and #790- 1.5M u 1/2" CHAIN new shackles		16:50
1m n1/2 "		
20m nylon		
sk		16:55

Rly wheel Anchor 1400 Kg.

Table 7.1.6

NATIONAL INSTITUTE OF OCEANOGRAPHY; GOA-INDIA
(Ocean Observing System Programme MOD)

CRUISE NO: 246

DEPLOYMENT DATE: 27.05.2008

MOORING SYSTEM INFORMATION

Mooring I.D.: EQCM #3.5R

DEPLOYMENT	
Captain	Rajesh Kumar
Chief Scientist	A. Suryanarayana
First Mate	Moorad Ali Khot
Mooring Master	Sadashiv T Khalap
Scientific Hands	Sarma, Charyulu, Areef, Almieda
Winch operations	Parshuman, Ismail, Baiju (Norinco)
Crew Hands (NCAOR)	Chavan, Manish, Rahul, Sunil
Weather Condition	Sea state 0
Mooring Design	sadashiv Khalap
Water Depth	4750 m
Release Model	MORS/Oceano AR 661 B2S
Interrogation Code	(#611) – 3A41(#790) – 3AA5
Release Code	(#611) – 3A42 (#790) – 3AA6
Mooring Top, Description	Low drag float with ADCP 75khz-LR
Radio Frequency	Channel 63
Strobe Flash	Benthos
Release Armed	Areef Sardar – New Batteries
Slant Range	4705 m
ANCHOR DROP	00°00'28.15"N 077°00'53.64"E
RDI ADCP 75khz – LR	466 m
RCM 7 – 2 Nos.	499 m & 551 m
RCM 8 – 3 Nos.	854 m, 1057 m & 2043 m
RCM 11 – 1 No.	4071 m

Table 7.1.7 Deployment of mooring at 77°E on 27/5/08

Location from top	Depth of RCM	RCM type	Sr. No	DSU Sr. No.	Initial No of records in DSU
R.float	416	ADCP	5742		
I	449	RCM-7	12759	15888 E	0
II	501	RCM-7	12645	15891 E	0
III	804	RCM-7	12744	14318	0
IV	1007	RCM-8	12748	13813	0
V	1997	RCM-8	12757	13579	0
VI	4021	RCM-11	82	13817	0

Table 7.2.1

NATIONAL INSTITUTE OF OCEANOGRAPHY; GOA-INDIA
(Ocean Observing System Programme MOD)

CRUISE NO: 246

RECOVERY DATE: 30.05.2008

Mooring I.D.: EQCM #2.5R

MOORING SYSTEM INFORMATION

RECOVERY

Captain	Rajesh Kumar
Chief Scientist	A. Suryanarayana
First Mate	Moorad Ali Khot
Mooring Master	Sadashiv T Khalap
Scientific Hands	Sarma, Charyulu, Areef, Almieda
Winch operations	Parshuman, Ismail, Baiju (Norinco)
Crew Hands (NCAOR)	Chavan, Manish, Rahul, Sunil
Weather Condition	Sea state 0
Mooring Design	Vijayan Fernando
Water Depth	4350 m
Release Model	MORS/Oceano AR 661 B2S
Interrogation Code	(#789) – 3AA3 (#722) – 4B60
Release Code	(#789) – 3AA4 (#722) – 4B69
Mooring Top, Description	Orange Ellipsoid float with ADCP 300khz
Radio Frequency	Novatech Combo, Channel 62 160.725Mhz
Strobe Flash	Benthos
Release Armed	Areef Sardar – New Batteries
Slant Range	not responded

ANCHOR DROP

00°03.09'S
083°00.74'E

RDI ADCP 300khz – 2 nos. – 82 m up – looking & 112 m down looking	
RCM 7 – 1 No.	314 m
RCM 8 – 3 Nos.	517 m, 1019 m
RCM 11 – 2 Nos.	1991m & 4014 m
Micro CAT – 1 no. – 124 m	

Table 7.2.2 Retrieval of mooring at 00°, 83°E on 30/05/08

	Depth of instrument (meters)	Type of instrument	Instrument sr. No.	DSU sr. No.	No of records in DSU	Remarks
I	82	300 kHz ADCP (up look)	3593			Recorded 21/9/06 – 24/04/08
II	112	300 kHz ADCP (down look)	3594			Recorded 20/9/06- 26/5/08
III	124	Microcat	2121			Ok
IV	315	RCM-7	12725	15088	65520	Rotor lost
V	517	RCM-7	12726	15097	65520	Ok
VI	1019	RCM-7	12734	15093	65520	Ok
VII	1991	RCM-11	21	15082	65520	Ok
VIII	4014	RCM-11	68	15090	65520	Ok

Submersible Recovery Strobe & Recovery Transmitter

a) Novatech radio transmitter cum strobe (Duo) :

Model No: RF-700C6, Serial No.: SO8-037
Frequency: 160.72500 Mhz, Channel: 62 (C)

b) Benthos radio transmitter :

Model No: 204-RT, Serial No.: 056
Frequency: 160.785 Mhz, Channel: 63

Deployment tests:

- | | |
|---|----|
| 1. Deck test : | OK |
| 2. Pre-deployment tests : | OK |
| 3. Battery status : | OK |
| 4. Submergence signal after anchor drop : | OK |

Organisation: *National Institute of Oceanography, Dona Paula, Goa. India.*

Name: Areef A. Sardar

Signatures: _____

Deployment Date: 01/06/2008

Cruise: ORV - SK-246

Station : EQCM- 2.6(83 deg)

Table 7.2.4

NATIONAL INSTITUTE OF OCEANOGRAPHY, GOA.
(Ocean Observing System, MOD)

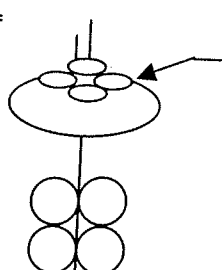
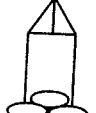




CRUISE NO: SK-246

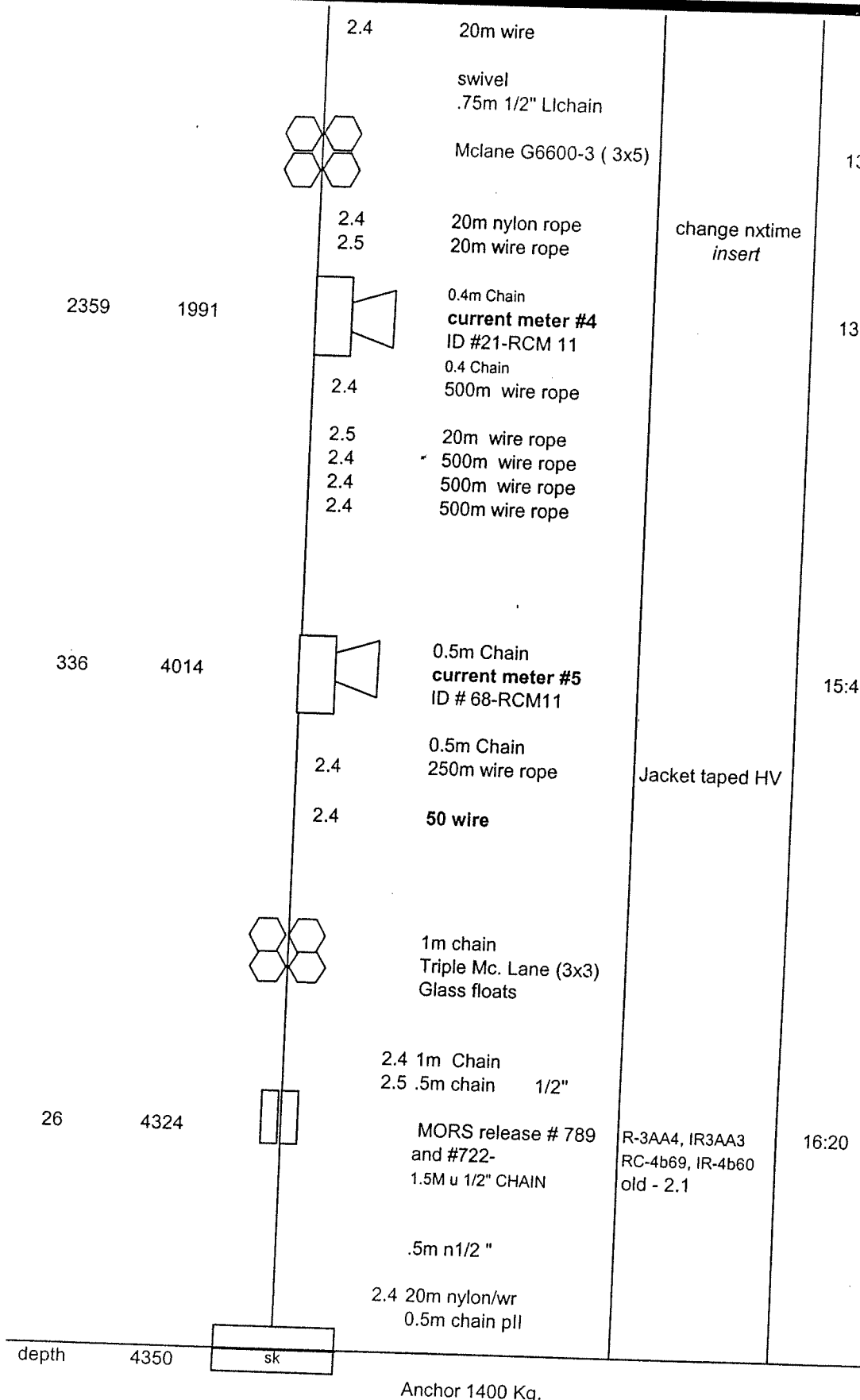
Mooring System Information

Mooring ID: EQCM - 2.5
Recovery

Anchor Drop:
0°03 .09' S
83°00 .74' E

Recovery Date: 30.05.08
Deployment Date: 21.09.06

m.a.b	m.b.s	Mooring Diagram	Mooring Description	Remarks	Recovery Time out
					IST
4268	82		Lowdrag ADCP Float CH 160.725(62) Novatech combo 2m Chain 1/2" Chain Dual Benthos(7x2) Glass floats	<i>RDI 300 kHz</i> ID# 3593 2.5chain	8:35
			2m chain 20 m Nylon / WR	Tao/2.4 wr	
			.5m chain		
4238	112		300 Khz ADCP ID# 2121		8:46
4226	124		Microcat 100m wire rope		9:03
		2.4	100m wire rope		
4036	314		current meter #1 ID# 725-RCM7		9:30
		2.4	0.3m Chain 200m wire rope	capstan	
3833	517		current meter #2 ID # 726-RCM8		10:05
		2.5	0.3m Chain 250M Wire rope 250M Wire rope		
3331	1019		current meter #3 ID # 734-RCM8		11:05
		2.1	0.5m Chain		
		2.4	400m wire rope		
		2.4	500m wire rope		
		2.4			



Anchor 1400 Kg.