

*CRUISE REPORT*  
*SK - 250*



*22<sup>nd</sup> September, 2008 to 8<sup>th</sup> October, 2008*  
*ONBOARD ORV SAGAR KANYA*

*NATIONAL CENTRE FOR ANTARCTIC & OCEAN RESEARCH*  
*HEADLAND SADA, VASCO-DA-GAMA GOA- 403804, INDIA*

# ORV SAGAR KANYA

## CRUISE SK – 250

**Departure**    Marmugao    ⇒    22/9/2008    ⇒    17.00 hrs.  
**Arrival**        Chennai        ⇒    8/10/2008    ⇒    5.30 hrs.

### **Objectives:**

- 1)    Multibeam bathymetric surveys using SB 3012 in Arabian Sea under MoES project “Comprehensive Topographic Survey in Indian EEZ”. This is the fourth cruise under this project onboard Sagar Kanya after SK-218, SK-247 and SK-249.
- 2)    Sediment Sampling (Gravity Core) at selected sites under above project.
- 3)    Other underway data collection like Sub-bottom profiling, ADCP, Single Beam Echosounding and AWS.
- 4)    Surface Met observations at synoptic hours.
- 5)    Water Sampling (surface) in the ships track in Arabian Sea under IWIN Programme of DST/NIO/PRL.
- 6)    Testing of DO sensor of newly calibrated PCTD (collection of water samples and estimation of DO by Winkler Method).

### **PARTICIPANTS :**

- |    |                        |                 |                     |
|----|------------------------|-----------------|---------------------|
| 1) | Shri M. M. Subramaniam | NCAOR           | Chief Scientist     |
| 2) | Dr. M. V. Ramesh       | NCAOR           | Dy. Chief Scientist |
| 3) | Shri K. Madhusudan     | Norinco (AMC)   |                     |
| 4) | Shri N. Dhanasekaran   | “               |                     |
| 5) | Shri J. Viswanathan    | “               |                     |
| 6) | Shri K. Arulwakar      | “               |                     |
| 7) | Shri M. Passuram       | “               |                     |
| 8) | Shri Dipesh Kumar      | Shipboard Asst. |                     |
| 9) | Shri Sameer Shaikh     | “               |                     |

Sr. Nos. 1,2 and 9 joined the vessel at Mormugao on 22/9/2008 and others are continuing from previous cruise.

**22/9/2008**

Vessel sailed from Mormugao as sheduled at 17.00 hrs. ADCP, AWS & Single Beam Echosounding commenced.

**23/9/2008**

11.00 hrs ⇒ Multibeam System started after vessel entered into deeper waters.  
0558 UTC ; 13°10'45"N ; 73° 37'4"E ; Depth : 657 m.  
Vessel heading towards the patchline which could not be covered in previous cruise SK-249 ; SB 3012.

SB 3012 Watch keeping scheduled as follows :-

08.00 – 12.00 hrs : M.M. Subramaniam  
Dipesh Kumar  
Vishwanathan

12.00 – 0400 hrs : K. Madhusudan  
Sameer Shaikh  
Arul Chelvam

04.00 – 08.00 hrs : M. V. Ramesh  
Dhansekharan  
Parsuram

PM3 & PM4 (propulsion motors) were not functional in previous cruise. PM3 was made operational during the last port-call. However after sailing yesterday evening (22/9/2008) PM3 gave problem (current fluctuation) and stopped. Vessel was on PM1 & PM2 only and was getting around 7.5 knots speed. Today at 1100 hrs, PM3 was started and getting speed about 8.5 knots. However, PM3 was put off ater observing vibrations in the evening. Now, getting speed about 8 knots. Now running on two PMs only (PM1 & PM2).

**24/9/2008**

0015 hrs ⇒ IST (1345 UTC) reached the BOL patchline.  
1846 UTC, 11°24'22"N ; 73°29'29"E ; Depth 2125m (BOL);  
2146 UTC, 10°54'53"N ; 73°30'00"E ; Depth : 1937m (EOL).

Vessel proceeding to SK-250 Survey Area.

Surface Met observations & collection of water samples for IWIN programme are in progress since sailing out.

1630 hrs => Boat drill conducted. All Scientists took part.

1830 hrs => Reached station (just prior BOL - 01)

1850 hrs => Gravity coring commenced (SK 250/GC 01)  
09° 02' 29"N ; 73° 58' 47"E ; Depth : 2640 m

1943 hrs => Corer touch down

2030 hrs => Corer on deck ; Recovery : 5.11 m

2100 hrs => Idronaut CTD with PCTD lowered upto 1000 m  
9° 02' 31"N ; 73° 59' 01"E ; Depth : 2640 m

2200 hrs => CTD operation completed, water samples collected at surface 5m,  
10m, 25m, 50m, 75m, 100m, 200m, 300m, 500m & 1000m.

For above 11 water samples – DO estimation to be done tomorrow titration unit  
developed some problem)

2215 hrs => SVP operation commenced (SK-250/SVP 01)  
09° 02' 29"N ; 73° 58' 98"E ; lowered upto 1500 m

2330 hrs => SVP operation completed. Data downloaded file no. 91.

### **25/9/2008**

0005 hrs => (BOL 01) => 09° 00'N; 73° 59'59"E ; Hdg :180.2° ;  
Speed : 7.4 knots ; CBD (≈ 2656m)

0943 hrs => (EOL 01) => 07° 45'32"N ; 74° 00"E, Hdg : 189° ; Depth : 2773 m

Gravity coring : 0950 hrs started : 74° 00'E ; 7° 45'28"E  
Depth : 2773 m. Completed at 1130 hrs.  
Recovery: 4.42 m

1210 hrs => BOL 02 07° 44'15"N; 74° 02' 59" E  
Hdg : 809° ; Speed : 6.7 knots ; Depth : 2772m

2135 hrs => (EOL 02) => 09° 00' 04" N : 74° 02' 59" E  
Hdg : 359 ; Speed 7.6 knots, Depth : 2716 m

2204 => (BOL 03 ) => 09° 00'00"N; 74° 06"E  
Hdg : 187° ; Speed : 8 knots ; Depth : 2728 m.

**26/9/2008**

0710 hrs ⇒ (EOL 03) ⇒ 07° 44' 18"N ; 74° 05' 59"E  
Hdg : 183.4° ; Speed : 7.9 knots ; Depth : 2772 m

SVP operation no. 2 ⇒ Commenced at 0720 hrs (1500 m)  
completed at 0840 hrs

0914 hrs ⇒ (BOL 04) ⇒ 07° 44' 21"N ; 74° 09' 01"E  
Hdg : 357.6° ; Speed : 7.2 knots ; Depth : 2776 m

1842 hrs ⇒ (EOL 04) ⇒ 09° 00' 02"N ; 74° 08' 59"E  
Hdg : 0.8° ; Speed : 7 knots ; Depth : 2745 m

SVP operation 3 ⇒ 1900 hrs : 09° 00' 15"N ; 74° 08' 39"E

2000 hrs ⇒ SVP on deck.

2045 hrs ⇒ (BOL 05) ⇒ 09° 00' 09"N ; 74° 12' 00"E ; Hdg : 184.9° ;  
Speed : 7.3 knots ; Depth : 2743 m

**27/9/2008**

0617 hrs IST ⇒ (EOL 05) ⇒ 07° 44' 54"N ; 74° 12' 00"E  
Hdg : 182.8° ; Speed : 7.5 knots ; Depth : 2779 m

0647 hrs IST ⇒ (BOL 06) ⇒ 07° 45' 13"N ; 74° 15' 02"E  
Hdg : 353° ; Speed : 7.4 knots ; Depth : 2776 m

1100 hrs IST ⇒ Safety Committee Meeting with Captain & other Officers.

1621 hrs IST ⇒ (EOL 06) ⇒ 09° 00' 007"N ; 74° 15' 00"E  
Hdg : 359.7° ; Speed : 7.6 knots ; Depth : 2746 m

1654 hrs IST ⇒ (BOL - 07) ⇒ 09° 00' 04"N ; 74° 17' 59 "E  
Hdg : 173.6° ; Speed : 7.6 knots ; Depths : 2744 m

**28/9/2008**

0200 hrs ⇒ (EOL - 07) ⇒ 07° 46' 28"N ; 74° 18"E  
Hdg 180.4° ; Speed 6.5 knots ; Depth : 2774 m

0225 – 0335 hrs ⇒ SVP No. 4 operation. Data file no. 97

0630 hrs ⇒ (BOL – 08) ⇒ 07°46'02"N ; 74°21"E ; Hdg : 259.3 ° ;  
Sped : 7.6 knots ; Depth : 2772m

At 0805 UTC (1335 IST) Nav. data input to Hydrostar stopped. At 0827 UTC the problem noticed and also observed Helmsman terminal hung.

1452 IST 0922 UTC – Hydrostar restarted.

1530 IST – 1000 UTC – Helmsman Display restarted.

SVP operation no. 5 1516 IST - 1630 IST ⇒ (74° 20'50"E ; 09° 00'57"N)

Then vessel proceeded (after setting right Hydrostar / Helmsman and SVP operation) southward to 0800 UTC position to re-occupy (about 4 NM distance).

1800 hrs re-occupied line 08 at 0800 UTC position i.e. 08°57'1"N ; 74° 20' 59"E and completed.

1848 hrs ⇒ (BOL – 9) ⇒ 08° 59'59"N ; 74° 23'59"E ; Hdg :172.6 ; Speed : 7.7 knots; Depth : 2740 m.

On receiving DGPS signal subscription (temporary) Master tried DP in Automode and observed not holding position. It is learnt that DGPS was not fully enabled, the subscription could not be activated.

### **29/9/2008**

0425 IST ⇒ (EOL – 9) ⇒ 07° 46' 15" N ; 74° 23 59 " E  
Hdg : 184.4° ; Speed : 6.7 knots ; Depth : 2771 m.

0456 IST ⇒ (BOL - 10) ⇒ 07° 46'43" N ; 74° 26'59"E  
Hdg 3.4° ; Speed : 8.3 knots ; Depth : 2773 m

1336 IST ⇒ (EOL –10) ⇒ 08°59' 54"N ; 74°26' 59"E  
Hdg : 1.1° ; Speed : 8.3 knots ; Depth : 2737 m

1411 hrs ⇒ (BOL –11) ⇒ 09° 00'04"N ; 74°30'00" E  
Hdg : 1786° ; Speed : 7.0 knots ; Depth : 2746 m

**30/9/2008**

0007 IST  $\Rightarrow$  (EOL - 11)  $\Rightarrow$  07° 47' 10"N ; 74° 29' 59"E  
Hdg : 256.5° ; Speed : 0.8 ; Depth : 2772 m

SVP (no. 6) at 0015 IST  $\Rightarrow$  07° 47' 15"N ; 74° 29' 58"E Depth : 2776 m

0206 IST  $\Rightarrow$  (BOL -12)  $\Rightarrow$  07° 48' 08"N ; 74° 33' 01"E  
Hdg : 354.2 ; Speed : 8.0 knots ; Depth 2775 m

1045 IST  $\Rightarrow$  (EOL - 12)  $\Rightarrow$  09° 00' 00"N ; 74° 33' 00"E  
Hdg : 355° ; Speed : 8.5 knots ; Depth : 2746 m

SVP (no. 7) at 1117 IST - 30/9/2008

1255 IST  $\Rightarrow$  (BOL -13)  $\Rightarrow$  09° 00' 00"N ; 74° 36' 00"E  
Hdg : 182.2° ; Speed : 5.8 knots ; Depth : 2746 m

2209 IST  $\Rightarrow$  (EOL -13)  $\Rightarrow$  07° 48' 00"N ; 74° 36' 00"E  
Hdg : 182.3° ; Speed : 5.2 knots ; Dpeth : 2774 m

2230 IST Vessel stopped and DP testing done by Master again. Not satisfactory.

2327 IST  $\Rightarrow$  (BOL -14)  $\Rightarrow$  07° 48' 40"N ; 74° 38' 59"E  
Hdg : 2.2° ; Speed : 8.3 knots ; Depth : 2771m

**1/10/2008**

0745 IST  $\Rightarrow$  (EOL -14)  $\Rightarrow$  08° 59' 59"N ; 74° 39' 00"E  
Hdg : 356.1° ; Speed 8 knots ; Depth : 2727m

0819 IST  $\Rightarrow$  (BOL -15)  $\Rightarrow$  09° 00' 00"N ; 74° 42' 00"E  
Hdg : 188.4° ; Speed : 7.5 knots ; Depth : 2728m

1500 IST : Hydrostar hung when the line is progress. Restored the system and re-occupied the line.

1900 IST (EOL 15) : 07° 50' 31"N ; 74° 42' 32"E Depth : 2777m

1920 IST SVP operation (no. 8) 7° 48' 35"N ; 74° 41' 55"E

2111 IST  $\Rightarrow$  (BOL -16)  $\Rightarrow$  7° 49' 20"N ; 74° 45' 00"E  
Depth : 2778 m

**2/10/2008**

0557 IST  $\Rightarrow$  (EOL -16)  $\Rightarrow$  09°00'01"N ; 74°45'00"E; Depth : 2729 m

0630 IST SVP operation (no.9) 09°00'0"N ; 74°48"E

When the line no. 17 commenced, the system hung and restarted re-occupied the (BOL 17) at 0324 IST ; 09°00'00"N ; 74°47'57"E; Depth : 2733m.

1704 IST  $\Rightarrow$  (EOL -17)  $\Rightarrow$  07°49'27"N ; 74°48'00"E Depth : 2779m

1730 hrs IST : Vessel stopped for DP testing . Not satisfactory in Automode.

1835 hrs IST  $\Rightarrow$  BOL - 18)  $\Rightarrow$  07°49'34"N ; 74°49'54"E ; Depth 2779m

**3/10/2008**

When the line no. 18 was in progress, at 0150 hrs, the SB 3012 Hydrostar online hung. About 8 NM before EOL-18. Restarted Hydrostar and not getting online. Receiver terminal showing error messages. Decided to carry out core station meanwhile.

Core station : SK - 250/GC 03 : 03330 hrs ; 8°59'2"N ; 74°51.0"E.

No sample recovered. One more coring operation done at the same location, yet there is no sample probably due to hard bottom.

On no improvement in Hydrostar, called up Mr. Mandar (ASB system) and Mr. Abhishek (NCAOR) and sought advice. However, no improvement. Tried till 0745 hrs and keeping in view the ETA Chennai schedule decided to proceed towards south (without multibeam survey on the last scheduled line-19). Due to this new problem in Hydrostar, we could not survey the line no. 19 and the 8 NM end part of line no.18.

Reached SK - 250/GC 04 at 1630 hrs 7°52'9"N ; 74°51.3"E ; Depth : 2775M  
Recovery : 5.29m

Aft CTD winch was tested by Master/Chief Engineer and observed to be satisfactorarily functional.

1850 hrs IST : Heading towards Chennai.



*4/10/2008 & 5/10/2008*

Vessel sailing towards Chennai

*6/10/2008*

Multibeam system restarted and came online. Vessel sailing towards Chennai.

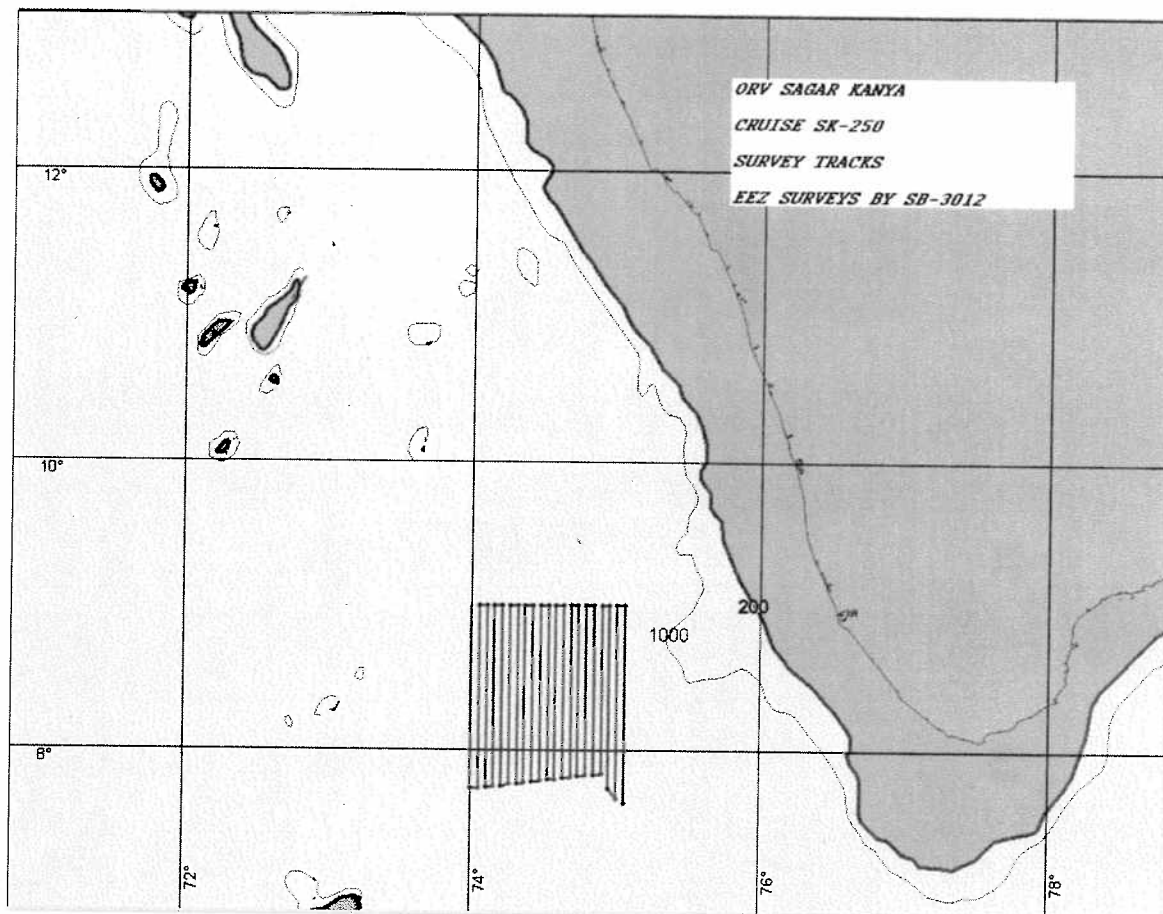
*8/10/2008*

Reached Chennai and berthed at 0530 hrs (8/10/2008)

**Enclosures:**

1. Survey Track of SK-250
2. Surface Met data (Synoptic hours)
3. IWIN sample collection details.

] SK-250 Survey Track



MULTIBEAM DATA SK-250

		B.O.L				E.O.L			
LINE NO.	DATE	TIME	LAT(N)	LONG(E)	LINE NO.	DATE	TIME	LAT(N)	LONG(E)
SK-249 PATCH LIN	24-09-2008	18:46	11°24'22"	73°29'29"	START	24-09-2008	21:46	10°59'53"	73°30'00"
SK-250/01	25-09-2008	00:05	09°00'00"	73°59'59"	SK-250/01	25-09-2008	09:43	07°45'32"	74°00'00"
SK-250/02	25-09-2008	12:10	07°44'15"	74°02'59"	SK-250/02	25-09-2008	21:35	09°00'04"	74°02'59"
SK-250/03	25-09-2008	22:04	09°00'00"	74°06'00"	SK-250/03	26-09-2008	07:10	07°44'18"	74°05'59"
SK-250/04	26-09-2008	09:14	07°44'21"	74°09'01"	SK-250/04	26-09-2008	18:42	09°00'02"	74°08'59"
SK-250/05	26-09-2008	20:45	09°00'09"	74°12'00"	SK-250/05	27-09-2008	06:17	07°44'54"	74°12'00"
SK-250/06	27-09-2008	06:47	07°45'13"	74°15'02"	SK-250/06	27-09-2008	16:21	09°00'07"	74°15'00"
SK-250/07	27-09-2008	16:54	09°00'04"	74°11'59"	SK-250/07	28-09-2008	02:00	07°46'28"	74°18'00"
SK-250/08	28-09-2008	06:30	07°46'02"	74°21'00"	SK-250/08	28-09-2008	18:00	08°57'10"	74°20'59"
SK-250/09	28-09-2008	18:48	08°59'59"	74°23'59"	SK-250/09	29-09-2008	04:25	07°46'15"	74°23'59"
SK-250/10	29-09-2008	04:56	07°46'43"	74°26'59"	SK-250/10	29-09-2008	13:36	08°59'54"	74°26'59"
SK-250/11	29-09-2008	14:11	09°00'04"	74°30'00"	SK-250/11	30-09-2008	00:07	07°47'10"	74°29'59"
SK-250/12	30-09-2008	02:06	07°48'08"	74°33'01"	SK-250/12	30-09-2008	10:45	09°00'00"	74°33'00"
SK-250/13	30-09-2008	12:55	09°00'00"	74°36'00"	SK-250/13	30-09-2008	22:09	07°48'00"	74°36'00"
SK-250/14	30-09-2008	23:27	07°48'40"	74°38'59"	SK-250/14	01-10-2008	07:45	08°59'59"	74°39'00"
SK-250/15	01-10-2008	08:19	09°00'00"	74°42'00"	SK-250/15	01-10-2008	13:30	07°50'31"	74°50'32"
SK-250/16	01-10-2008	09:50	07°49'20"	74°45'00"	SK-250/16	02-10-2008	00:27	09°00'01"	74°45'00"
SK-250/17	02-10-2008	03:00	08°59'14"	74°59'14"					

### SK-250 DO-1(Dissolved Oxygen)

Location:- Lat-09° 02.31'N and Long-73° 59.01'

Depth: 2640 m

Sr.No.	Depth (mts)	Initial Reading (m)	Final Reading (m)	value(FR - IR)	Average(m)	Dissolved Oxygen (ml / l)
1	surface	0.00	3.98	3.98	3.96	4.1006
		3.98	7.92	3.94		
2	5	0.00	3.61	3.61	3.62	3.7485
		3.61	7.24	3.63		
3	10	1.50	5.76	4.26	4.235	4.3854
		0	4.21	4.21		
4	25	0	3.75	3.75	3.765	3.8987
		3.75	7.53	3.78		
5	50	0	1.44	1.44	1.47	1.5222
		1.44	2.94	1.50		
6	75	1.76	3.02	1.26	1.255	1.2996
		3.02	4.27	1.25		
7	100	0	0.92	0.92	0.88	0.9112
		0.92	1.76	0.84		
8	200	1.78	2.56	0.78	0.80	0.8284
		2.56	3.38	0.82		
9	300	0	0.91	0.91	0.89	0.9216
		0.91	1.78	0.87		
10	500	0	0.84	0.84	0.845	0.875
		0	0.85	0.85		
11	1000	0	1.25	1.25	1.265	1.3099
		0	1.28	1.28		

D.O.(Dissolved Oxygen) =  $113.792 \times 0.0091 \times \text{Burette Reading}$

=  $1.0355072 \times \text{Burette Reading}$

= (mg/l)

**National programme On isotope Fingerprinting of waters of india ( IWIN )**

NAME OF THE VESSEL		Cruise No.: SK-250,251-Leg=1,2		Duration :		Name Of Incharge:	
		22-09-2008	to	07-10-2008			
Name Of The Field Sample Collector:		Dipesh T.		23-10-2008	to	10-11-2008	
		Sameer S.					
<b>Surface WATER Sample Collection Details</b>							
Sr. No	Date&Time Of Collection	Sampling Depth (m)	Position	Volume Of Sample Collected	NIO-Goa's Sample Code	IWIN Sample Code	
	DD-MM-YY hh:mm	(m)	Latitude(N) Longitude(E)	Salinity	Salinity	Isotope	
1	23-09-2008 00:00	Surface	14°42.58' 73°37.62'				SK-250 -1
2	23-09-2008 06:00	Surface	13°54.13' 73°38.75'				SK-250 -2
3	23-09-2008 09:00	Surface	13°30.24' 73°36.95'				SK-250 -3
4	23-09-2008 12:00	Surface	13°06.29' 73°37.34'				SK-250 -4
5	23-09-2008 15:00	Surface	12°40.27' 73°37.90'				SK-250 -5
6	23-09-2008 18:00	Surface	12°15.60' 73°38.50'				SK-250 -6
7	23-09-2008 21:00	Surface	11°49.98' 73°35.96'				SK-250 -7
8	24-09-2008 00:00	Surface	11°26.18' 73°30.33'				SK-250 -8
9	24-09-2008 03:00	Surface	11°02.44' 73°30.00'				SK-250 -9
10	24-09-2008 06:00	Surface	10°38.21' 73°37.35'				SK-250 -10
11	24-09-2008 09:00	Surface	10°14.89' 73°46.24'				SK-250 -11
12	24-09-2008 12:00	Surface	09°52.13' 73°52.21'				SK-250 -12
13	24-09-2008 15:00	Surface	09°29.53' 73°55.49'				SK-250 -13
14	24-09-2008 18:00	Surface	09°04.99' 73°58.74'				SK-250 -14
15	25-09-2008 03:00	Surface	08°36.08' 74°00.00'				SK-250 -15
16	25-09-2008 09:00	Surface	07°50.01' 74°00.00'				SK-250 -16
17	25-09-2008 12:00	Surface	07°46.11' 74°02.99'				SK-250 -17
18	26-09-2008 08:40	Surface	07°43.97' 74°05.76'				SK-250 -18
19	26-09-2008 19:00	Surface	09°00.02' 74°08.64'				SK-250 -19
20	27-09-2008 10:30	Surface	08°15.00' 74°14.99'				SK-250 -20
21	28-09-2008 03:00	Surface	07°44.06' 74°18.01'				SK-250 -21
22	28-09-2008 09:00	Surface	08°21.15' 74°20.99'				SK-250 -22
23	29-09-2008 09:00	Surface	08°20.76' 74°26.99'				SK-250 -23
24	30-09-2008 09:00	Surface	08°44.44' 74°32.99'				SK-250 -24
25	01-10-2008 01:00	Surface	08°39.54' 74°41.99'				SK-250 -25
26	02-10-2008 09:20	Surface	08°52.60' 74°47.99'				SK-250 -26
27	03-10-2008 15:00	Surface	08°03.25' 74°50.99'				SK-250 -27
28	03-10-2008 21:00	Surface	07°42.74' 75°03.81'				SK-250 -28
29	04-10-2008 09:00	Surface	07°03.02' 76°40.23'				SK-250 -29
30	04-10-2008 12:00	Surface	06°53.33' 77°05.40'				SK-250 -30
31	04-10-2008 15:00	Surface	06°42.73' 77°31.56'				SK-250 -31
32	04-10-2008 21:00	Surface	06°24.06' 78°17.85'				SK-250 -32
33	05-10-2008 09:00	Surface	05°45.63' 79°51.36'				SK-250 -33
34	05-10-2008 18:00	Surface	05°46.33' 81°09.12'				SK-250 -34
35	05-10-2008 23:45	Surface	06°20.50' 81°55.74'				SK-250 -35
36	06-10-2008 09:00	Surface	07°44.33' 82°16.17'				SK-250 -36
37	06-10-2008 12:00	Surface	08°10.40' 82°12.40'				SK-250 -37
38	06-10-2008 18:00	Surface	10°26.91' 81°21.15'				SK-250 -38

39	07-10-2008	09:00	Surface	10°48.81'	81°12.38'					SK-250 -39
40	07-10-2008	12:00	Surface	11°11.05'	81°03.72'					SK-250 -40
41	07-10-2008	15:00	Surface	11°54.07'	80°47.50'					SK-250 -41
42	14-10-2008	02:00	Surface	12°39.97'	83°59.69'					SK-251-1 -42
43	14-10-2008	11:15	Surface	12°33.59'	84°48.95'					SK-251-1 -43
44	14-10-2008	17:45	Surface	12°31.31'	85°14.88'					SK-251-1 -44
45	15-10-2008	00:00	Surface	12°25.63'	86°00.27'					SK-251-1 -45
46	15-10-2008	10:00	Surface	12°21.01'	86°59.95'					SK-251-1 -46
47	15-10-2008	23:40	Surface	12°13.20'	87°59.62'					SK-251-1 -47
48	16-10-2008	09:45	Surface	12°06.04'	88°59.96'					SK-251-1 -48
49	17-10-2008	09:20	Surface	11°54.44'	89°55.56'					SK-251-1 -49
50	18-10-2008	09:00	Surface	12°59.30'	89°58.31'					SK-251-1 -50
51	18-10-2008	19:35	Surface	14°00.36'	90°00.18'					SK-251-1 -51
52	19-10-2008	05:00	Surface	14°56.80'	89°59.69'					SK-251-1 -52
53	20-10-2008	09:30	Surface	16°42.72'	88°55.35'					SK-251-1 -53
54	20-10-2008	16:00	Surface	16°58.14'	88°45.45'					SK-251-1 -54
55	21-10-2008	09:00	Surface	18°47.50'	87°34.30'					SK-251-1 -55
56	24-10-2008	06:45	Surface	20°17.76'	87°51.50'					SK-251-2 -56
57	27-10-2008	18:40	Surface	19°23.55'	87°19.98'					SK-251-2 -57
58	06-12-2008	19:30	Surface	01°00.00'	65°00.00'					SK-251-2 -58
59	07-12-2008	03:00	Surface	02°00.00'	65°00.11'					SK-251-2 -59
60	07-12-2008	14:45	Surface	03°00.00'	65°00.00'					SK-251-2 -60
61	07-12-2008	23:00	Surface	04°00.00'	65°00.00'					SK-251-2 -61
62	08-12-2008	11:15	Surface	05°00.00'	65°00.00'					SK-251-2 -62
63	08-12-2008	18:50	Surface	06°00.00'	65°00.00'					SK-251-2 -63
64	09-12-2008	07:10	Surface	07°00.00'	65°00.00'					SK-251-2 -64
65	09-12-2008	16:00	Surface	08°00.00'	65°00.00'					SK-251-2 -65
66	10-12-2008	03:30	Surface	09°00.00'	65°00.00'					SK-251-2 -66
67	10-12-2008	13:00	Surface	10°00.00'	65°00.00'					SK-251-2 -67
68	10-12-2008	21:00	Surface	10°08.51'	65°21.13'					SK-251-2 -68
69	11-12-2008	09:00	Surface	11°09.60'	66°47.92'					SK-251-2 -69
70	11-12-2008	15:00	Surface	11°40.86'	67°38.97'					SK-251-2 -70

SAGAR KANYA (SK-250)  
SURFACE MET DATA

SN	DATE	TIME	CRUISE	LAT.	LONG.	SST	ATM
1	22/09/08	21:00	SK-250	15°06.66'N	073°38.30'E	28°c	1012.5mb
2	23/09/08	00:00	SK-250	14°42.58'N	073°37.62'E	28°c	1013.5mb
3	23/09/08	03:00	SK-250	14°18.33'N	073°38.49'E	28°c	1011.5mb
4	23/09/08	06:00	SK-250	13°54.13'N	073°38.75'E	27.5°c	1012.5mb
5	23/09/08	09:00	SK-250	13°30.24'N	073°36.95'E	28°c	1013.5mb
6	23/09/08	12:00	SK-250	13°06.29'N	073°37.34'E	28.5°c	1011.5mb
7	23/09/08	15:00	SK-250	12°40.27'N	073°37.90'E	28.5°c	1088.5mb
9	23/09/08	18:00	SK-250	12°15.60'N	073°38.50'E	29°c	1009.5mb
10	23/09/08	21:00	SK-250	11°49.98'N	073°35.96'E	28.5°c	1012.5mb
11	24/09/08	00:00	SK-250	11°26.18'N	073°30.33'E	28.5°c	1013.5mb
12	24/09/08	03:00	SK-250	11°02.44'N	073°30.00'E	28.5°c	1011.5mb
13	24/09/08	06:00	SK-250	10°38.21'N	073°37.35'E	28.5°c	1012.5mb
14	24/09/08	09:00	SK-250	10°14.89'N	073°46.24'E	28.5°c	1013.5mb
15	24/09/08	12:00	SK-250	09°52.13'N	073°52.21'E	29°c	1010.5mb
16	24/09/08	15:00	SK-250	09°29.53'N	073°55.49'E	30°c	1008.5mb
17	24/09/08	18:00	SK-250	09°04.99'N	073°58.74'E	29.5°c	1010.5mb
18	24/09/08	21:00	SK-250	09°02.30'N	073°59.00'E	29.5°c	1012.5mb
19	25/09/08	00:00	SK-250	09°74.00'N	074°00.00'E	29.5°c	1012.5mb
20	25/09/08	03:00	SK-250	08°36.08'N	074°00.00'E	29°c	1010.5mb
21	25/09/08	06:00	SK-250	08°14.21'N	074°00.00'E	29°c	1012.5mb
22	25/09/08	09:00	SK-250	07°50.01'N	074°00.00'E	29°c	1014.5mb
23	25/09/08	12:00	SK-250	07°46.11'N	074°02.99'E	29°c	1012.5mb
24	25/09/08	15:00	SK-250	08°07.16'N	074°02.94'E	29.5°c	1011.5mb
25	25/09/08	18:00	SK-250	08°31.31'N	074°02.90'E	29.5°c	1012.5mb
26	25/09/08	21:00	SK-250	08°54.73'N	074°02.99'E	29°c	1014.5mb
27	26/09/08	00:00	SK-250	08°44.00'N	074°06.00'E	29°c	1014.5mb
28	26/09/08	03:00	SK-250	08°18.49'N	074°06.00'E	28.5°c	1013.5mb
29	26/09/08	06:00	SK-250	07°53.92'N	074°06.00'E	28.5°c	1014.5mb
30	26/09/08	09:00	SK-250	07°44.05'N	074°06.02'E	29°c	1013.5mb
31	26/09/08	12:00	SK-250	08°06.02'N	074°08.90'E	29.5°c	1012.5mb
32	26/09/08	15:00	SK-250	08°29.65'N	074°08.99'E	29.5°c	1013.5mb
33	26/09/08	18:00	SK-250	08°54.58'N	074°08.99'E	29°c	1011.5mb
34	26/09/08	21:00	SK-250	08°57.12'N	074°12.00'E	28.5°c	1011.5mb
35	27/09/08	00:00	SK-250	08°34.50'N	074°12.00'E	28.5°c	1010.5mb
36	27/09/08	03:00	SK-250	08°11.46'N	074°12.00'E	28.5°c	1011.5mb
37	27/09/08	06:00	SK-250	07°47.00'N	074°12.00'E	28.5°c	1012.5mb
38	27/09/08	09:00	SK-250	08°04.52'N	074°14.99'E	28.5°c	1014.5mb
39	27/09/08	12:00	SK-250	08°25.11'N	074°14.90'E	28.5°c	1013.5mb

40	27/09/08	15.00	SK-250	08°49.95'N	074°14.99'E	29°c	1011.5mb
41	27/09/08	18.00	SK-250	08°51.54'N	074°18.00'E	28°c	1010.5mb
42	27/09/08	21.00	SK-250	08°27.81'N	074°18.00'E	28.5°c	1012.5mb
43	28/09/08	00:00	SK-250	08°03.63'N	074°18.00'E	28.5°c	1010.5mb
44	28/09/08	03:00	SK-250	07°44.96'N	074°18.01'E	28.5°c	1011.5mb
45	28/09/08	06.00	SK-250	07°57.50'N	074°20.92'E	28.5°c	1013.5mb
46	28/09/08	09.00	SK-250	08°21.15'N	074°20.99'E	28.5°c	1014.5mb
47	28/09/08	12.00	SK-250	08°45.76'N	074°20.99'E	28.5°c	1013.5mb
48	28/09/08	15.00	SK-250	09°00.88'N	074°20.83'E	28°c	1012.5mb
49	28/09/08	18.00	SK-250	08°57.71'N	074°20.99'E	28.5°c	1011.5mb
50	28/09/08	21.00	SK-250	08°44.28'N	074°24.00'E	28.5°c	1012.5mb
51	29/09/08	00:00	SK-250	08°19.75'N	074°24.00'E	28.5°	1013.5mb
52	29/09/08	03:00	SK-250	07°54.53'N	074°24.00'E	28.5°c	1012.5mb
53	29/09/08	06.00	SK-250	07°55.70'N	074°26.90'E	28.5°c	1013.5mb
54	29/09/08	09.00	SK-250	08°20.67'N	074°26.99'E	28.5°c	1014.5mb
55	29/09/08	12.00	SK-250	08°46.00'N	074°26.90'E	28.5°c	1013.5mb
56	29/09/08	15.00	SK-250	08°53.74'N	074°30.00'E	29°c	1011.5mb
57	29/09/08	18.00	SK-250	08°31.30'N	074°30.00'E	28.5°c	1009.5mb
58	29/09/08	21.00	SK-250	08°09.15'N	074°30.00'E	28.5°c	1011.5mb
59	30/09/08	00:00	SK-250	07°47.21'N	074°29.94'E	28.5°c	1012.5mb
60	30/09/08	03:00	SK-250	07°55.53'N	074°32.99'E	28.5°c	1011.5mb
61	30/09/08	06.00	SK-250	08°20.10'N	074°32.90'E	28.5°c	1012.5mb
62	30/09/08	09.00	SK-250	08°44.44'N	074°32.99'E	28.5°c	1013.5mb
63	30/09/08	12.00	SK-250	08°00.13'N	074°36.20'E	29°c	1014.5mb
64	30/09/08	15.00	SK-250	08°43.52'N	074°36.00'E	29.5°c	1012.5mb
65	30/09/08	18.00	SK-250	08°20.20'N	074°36.00'E	28.5°c	1011.5mb
66	30/09/08	21.00	SK-250	07°57.56'N	074°36.00'E	28.5°c	1010.5mb
67	01/10/08	00:00	SK-250	07°53.86'N	074°38.99'E	28.5°c	1012.5mb
68	01/10/08	03:00	SK-250	08°90.49'N	074°38.99'E	28.5°c	1011.5mb
69	01/10/08	06.00	SK-250	08°45.00'N	074°38.90'E	28.5°c	1012.5mb
70	01/10/08	09.00	SK-250				
71	01/10/08	12.00	SK-250	08°31.73'N	074°42.00'E	29°c	1010.5mb
72	01/10/08	15.00	SK-250				
73	01/10/08	18.00	SK-250	07°58.33'N	074°42.00'E	28.5°c	1010.5mb
74	01/10/08	21.00	SK-250	07°48.66'N	074°59.60'E	28°c	1012.5mb
75	02/10/08	00:00	SK-250	08°12.11'N	074°44.99'E	28°c	1011.5mb
76	02/10/08	03:00	SK-250	08°36.15'N	074°44.99'E	28°c	1010.5mb
78	02/10/08	06.00	SK-250	09°00.00'N	074°45.00'E	28°c	1011.5mb
79	02/10/08	09.00	SK-250	08°54.80'N	074°45.00'E	28.5°c	1012.5mb
80	02/10/08	12.00	SK-250	08°31.15'N	074°48.00'E	28.5°c	1011.5mb
81	02/10/08	15.00	SK-250	08°07.07'N	074°47.99'E	28.5°c	1010.5mb
82	02/10/08	18.00	SK-250	07°49.09'N	074°49.99'E	28.5°c	1011.5mb
83	02/10/08	21.00	SK-250	08°12.80'N	074°50.90'E	28°c	1010.5mb
84	03/10/08	00:00	SK-250	08°38.60'N	074°50.99'E	28°c	1010.5mb
85	03/10/08	03:00	SK-250	08°58.98'N	074°50.90'E	28.5°c	1011.5mb



86	03/10/08	06.00	SK-250	08°59.20'N	074°51.00'E	28.5°c	1012.5mb
87	03/10/08	09.00	SK-250	08°50.55'N	074°51.00'E	29°c	1013.5mb
88	03/10/08	12.00	SK-250	08°26.80'N	074°50.90'E	29.5°c	1011.5mb
89	03/10/08	15.00	SK-250	08°03.25'N	074°50.99'E	29.5°c	1010.5mb
90	03/10/08	18.00	SK-250	07°53.00'N	074°51.30'E	29°c	1009.5mb
91	03/10/08	21.00	SK-250	07°42.74'N	075°03.81'E	29°c	1011.5mb
92	04/10/08	00:00	SK-250	07°33.15'N	075°27.25'E	28.5°c	1012.5mb
93	04/10/08	03:00	SK-250	07°21.30'N	075°57.50'E	28.5°c	1010.5mb
94	04/10/08	06.00	SK-250	07°13.00'N	076°16.30'E	28.5°c	1012.5mb
95	04/10/08	09.00	SK-250	07°03.02'N	076°40.23'E	29°c	1013.5mb
96	04/10/08	12.00	SK-250	06°53.33'N	077°05.40'E	29°c	1011.5mb
97	04/10/08	15.00	SK-250	06°42.73'N	077°31.56'E	29.5°c	1010.5mb
98	04/10/08	18.00	SK-250	06°34.14'N	077°54.81'E	29°c	1009.5mb
99	04/10/08	21.00	SK-250	06°24.04'N	078°17.85'E	29°c	1010.5mb
100	05/10/08	00:00	SK-250	06°13.80'N	078°39.78'E	29°c	1011.5mb
101	05/10/08	03:00	SK-250	06°04.16'N	079°04.03'E	29°c	1012.5mb
102	05/10/08	06.00	SK-250	05°58.10'N	079°19.80'E	29°c	1013.5mb
103	05/10/08	09.00	SK-250	05°45.63'N	079°51.36'E	29°c	1014.5mb
104	05/10/08	12.00	SK-250	05°41.96'N	080°17.51'E	29°c	1013.5mb
105	05/10/08	15.00	SK-250	05°42.50'N	080°43.40'E	29°c	1012.5mb
106	05/10/08	18.00	SK-250	05°46.33'N	080°09.12'E	29°c	1010.5mb
107	05/10/08	21.00	SK-250	06°00.50'N	081°35.60'E	29°c	1011.5mb
108	06/10/08	00:00	SK-250	06°21.60'N	081°56.83'E	29°c	1010.5mb
109	06/10/08	03:00	SK-250	06°51.50'N	081°10.10'E	29°c	1012.5mb
110	06/10/08	06.00	SK-250	07°17.80'N	082°16.10'E	29°c	1013.5mb
111	06/10/08	09.00	SK-250	07°44.33'N	082°16.17'E	29.5°c	1014.5mb
112	06/10/08	12.00	SK-250	08°10.40'N	082°12.40'E	29.5°c	1013.5mb
113	06/10/08	15.00	SK-250	08°33.24'N	02103.70'E	29.5°c	1012.5mb
114	06/10/08	18.00	SK-250	08°56.92'N	081°55.90'E	29°c	1011.5mb
115	06/10/08	21.00	SK-250	09°18.90'N	081°46.40'E	29°c	1012.5mb
116	07/10/08	00:00	SK-250	09°40.70'N	081°37.40'E	29°c	1010.5mb
117	07/10/08	03:00	SK-250	10°09.07'N	081°29.67'E	29°c	1011.5mb
118	07/10/08	06.00	SK-250	10°26.90'N	081°20.50'E	29°c	1012.5mb
119	07/10/08	09.00	SK-250	10°48.81'N	081°12.38'E	29°c	1014.5mb
120	07/10/08	12.00	SK-250	11°11.05'N	081°03.72'E	29°c	1013.5mb
121	07/10/08	15.00	SK-250	11°31.91'N	080°55.81'E	29°c	1011.5mb
123	07/10/08	18.00	SK-250	11°54.07'N	080°47.50'E	29°c	1011.5mb
124	07/10/08	21.00	SK-250	12°17.00'N	080°38.10'E	29°c	1012.5mb
125	08/10/08	00:00	SK-250	12°38.08'N	080°30.16'E	29°c	1011.5mb