

**Oceanographic Data of the 46th Japanese Antarctic Research Expedition
from December 2004 to March 2005**

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The result of oceanographic observations on board the icebreaker “Shirase” and tidal observations at Syowa Station, Antarctica are presented in this report. The oceanographic observations were carried out by the summer party of the 46th Japanese Antarctic Research Expedition (JARE-46) during the austral summer of 2004/2005. The tidal observations were carried out by the winter party of JARE-45 from February 2004 to January 2005.

1. Oceanographic observations

The track of the icebreaker “Shirase” and the sites of oceanographic stations are shown in Fig. 1. Surface water samplings were carried out using a plastic bucket of 10-ℓ capacity. XCTD (Expendable Conductivity, Temperature and Depth profiler), XBT (Expendable Bathy-Thermograph), CTD (Conductivity, Temperature and Depth profiling system) and serial observations were made in the Southern Ocean. Three surface drifting buoys were deployed and LADCP (Lowered Acoustic Current Profiler) observations were made at three sites in the Antarctic Circumpolar Current region. These observation were carried out in the Southern Ocean from Fremantle to Antarctica and on the way back to Sydney, and each observation and analytical method are summarized below.

(1) Surface water sampling

Surface water sampling were carried out at 30 stations and the results are given Table 1.

(2) Monitoring of marine pollution

Surface water sampling for monitoring of marine pollution were made at 14 stations. Items and method of analysis are given in the following section of (5).

(3) XCTD and XBT observations

XCTD and XBT observations were carried out at 95 stations (XCTD: 73 stations, XBT: 22 stations). The result are listed in Table 2 and Table 3 . The vertical profiles of water temperature and salinity are shown in Fig. 2 to Fig. 7.

(4) CTD and serial observations

CTD (Falmouth Scientific Inc. TRITON ICTD) and serial observations with Rosette sampler (2.5 -ℓ Niskin sampler × 22) were carried out 18 stations. The result including chemical analysis of sampled water and measured value of temperature and salinity with CTD at each standard depth together with meteorological data are given in Table 4.

(5) Chemical analysis of sampled water

Chemical analysis of seawater sampled with a bucket (10 -ℓ) for surface observation or Niskin bottles (2.5 -ℓ) for serial observation was made according to the following methods. The item (a) was calculated from conductivity using the 1987 practical salinity scales (UNESCO, 1981). The items (b) and (d) were carried out with the method described by Strickland and Parsons (1972). The item (c) was analyzed by the winker method as modified by Carpenter (1965) for more precision. The item (e) was analyzed with the method in Motomizu and Korechika (1988). The items (f) and (g) were analyzed with the method in Andersson (1979). The items (h), (i) and (j) were analyzed with the method in Hydrographic and Oceanographic Department (2005).

- (a) Practical salinity: Conductive salinometer
(Guidline Autosol salinometer model 8400B).
- (b) pH: Glass electrode method (Horiba digital pH meter F-24).
- (c) Dissolved oxygen: Carpenter method
(Sensoren Instrument System dissolved oxygen analyzer).
- (d) Phosphate: Molybdenum blue method
(BRAN+LUEBBE model traacs 800 auto analyzer).
- (e) Silicate: Molybdenum blue method
(BRAN+LUEBBE model traacs 800 auto analyzer).
- (f) Nitrite: Naphthylethylenediamine method
(BRAN+LUEBBE model Traacs 800 auto analyzer).
- (g) Nitrate: Cadmium (Cd)-copper (Cu) reduction column,
Naphthylethylenediamine method
(BRAN+LUEBBE model Traacs 800 auto analyzer).
- (h) Petroleum oil: N-hexane extraction-fluorophotometric analysis.
- (i) Cadmium (Cd): Solvent extraction-atomic absorption spectrophotometry.
- (j) Mercury (Hg): Cold vapor atomic absorption spectrophotometry.

The results of items (a) to (g) are given in Tables 1 and 4. The results of items (h) to (j) are given in Table 5.

(6) Current observation with three surface drifters

Each surface drifter comprises from a spherical buoy of 35 cm in diameter with a drogue of 1 m in diameter, 7 m in length and 15 m in depth (TOYOCOM Co. Model 2ANZ-1388). Signal transmitted from the drifter are sent to CLS (Data Processing Center in CNES) via NOAA satellites, and the CLS distributes drifter's positions and surface water temperature observed by the drifter to the drifter's owners. The first buoy (ID No. 49834) was deployed at 45°45.8'S, 110°11.6'E on December 6, 2004. It continued transmitting data until December 17, 2004. The second one (ID No. 21869) was deployed at 55°54.7'S, 109°35.6'E on December 8, 2004. It continued transmitting data until March 27, 2005. The third one (ID No. 29362) was deployed at 64°00.8'S, 111°35.1'E on March 8, 2005. It continued transmitting data until April 16 2005. The trajectories are shown in Fig. 8.

(7) Current observation with LADCP

LADCP (RD Instruments Co. 300 kHz WH-ADCP) observations were carried out at 12 stations and the results are given in Fig. 9. The current data observed in st.14 and st.16 were excepted, because the compass mounted on LADCP has large error of direction with an accuracy of about 5 degrees or more where horizontal magnetic intensity is below 3000 nT (Kikuchi *et al.*, 2004).

2. Tidal observations at Syowa Station

Tidal observations have been continued at Syowa Station since 1965. The tide gauge (QWP-8-303D, Meisei Denki Co.) was installed on the sea bottom, about 15 m water depth, Nisi-no-ura Cove, East Ongle Island by the JARE-36 member on February 2, 1995, and has been continuing observation. The result obtained from February 2004 to January 2005 are described in this report. The methodology of tidal observations is followed Odamaki *et al.* (1991). In this system, the relative water pressure compensated for atmospheric pressure is measured with a quartz oscillator. The range 0-50 m and its precision is 0.01 m. The data sampled once per 2 s are averaged over 30 s on hard disk of recording PC. The gauge was maintained by a member of the winter party of JARE-45, through the year. Hourly sea level was recorded on the hour. Daily and monthly mean sea levels were calculated from the hourly data. The results are given Table 6. The least squares method was employed to the harmonic analysis for one year. The harmonic constants, characteristics of the tide and other details are given Table 7.

On the zero level of the tide gauge:

Every summer, the zero level of the tide gauge has been routinely checked. And, since February 1, 2001, the level of 500 cm below the bench mark No. 1040 was adopted as the reference of the tide levels.

3. Current observation near Syowa Station

Ocean current observations were carried out for 8 days from December 22, 2004 to December 29, 2004 at 68°59.9'S, 39°37.9'E in the coastal fast ice in Ongul Strait near Syowa Station, with an Acoustic Doppler Current Profiler (WH-ADCP, RD Instruments Co.), 6 m below the sea surface. The results are given in Fig. 10. The harmonic constants, characteristics of the tide and other details are given in Table 8.

Outline of the observation is as follows.

Apparatus name	Workhorse Sentinel ADCP Self-Contained 300 kHz
Observation term	8 days
Observation start time	December 22, 2004 13:00 (LMT (UT+3 hours))
Observation start time	December 29, 2004 08:00 (LMT(UT+3 hours))
Transducer depth	2.0 m
Ping per ensemble	240 pings
Sampling interval	10.0 min
Observation layer interval	4.0 m

Total number of observation layers	32 layers
First bin range	5.96 m
Last bin range	121.96 m
Maximum observed layer	111.53 m
Magnetic variation	-49.0 deg.

Acknowledgments

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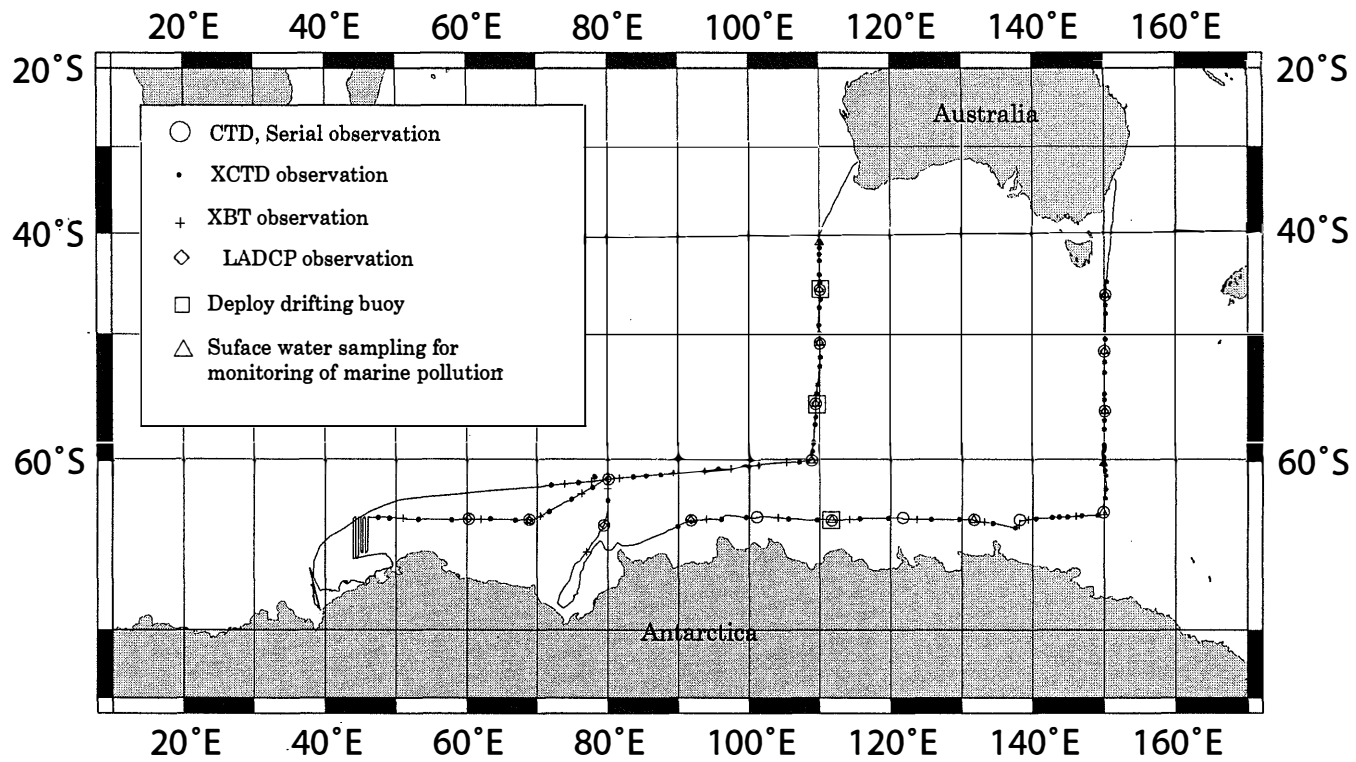


Fig. 1. The track of the icebreaker "Shirase" and the site of oceanographic stations.

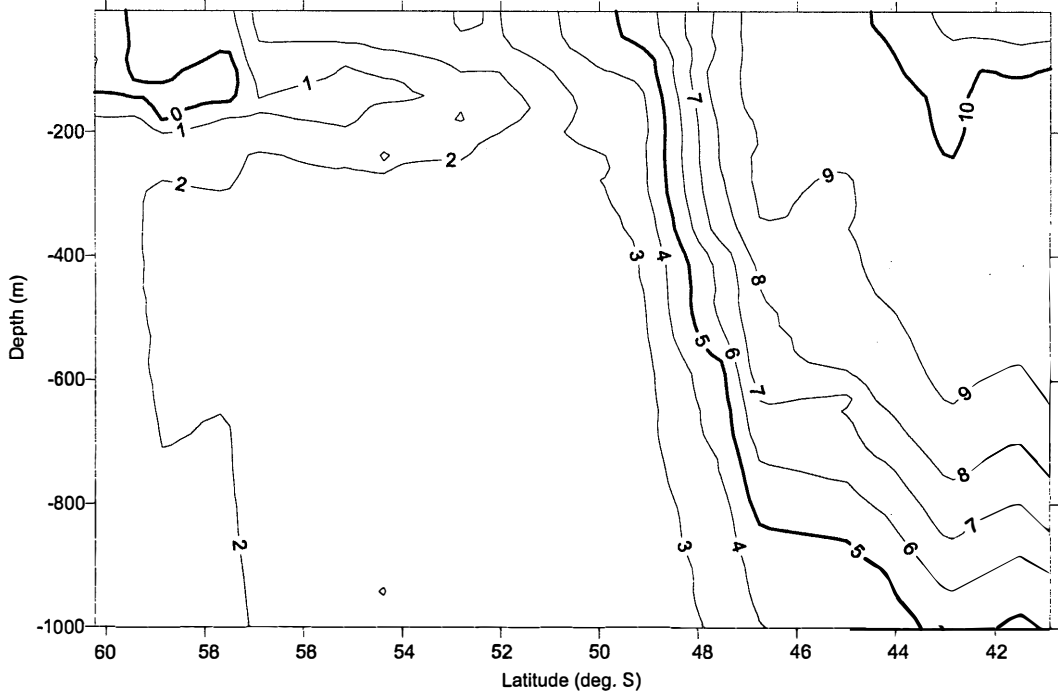


Fig. 2. Vertical profile of water temperature (°C) observed with XCTD along 110°E.

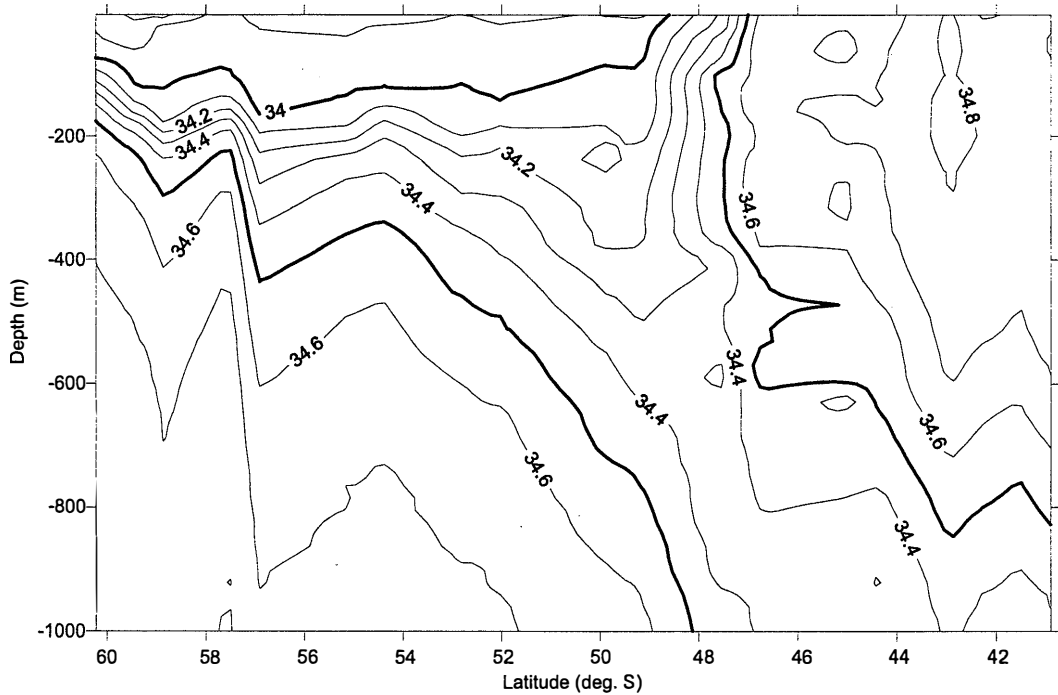


Fig. 3. Vertical profile of water salinity observed with XCTD along 110°E.

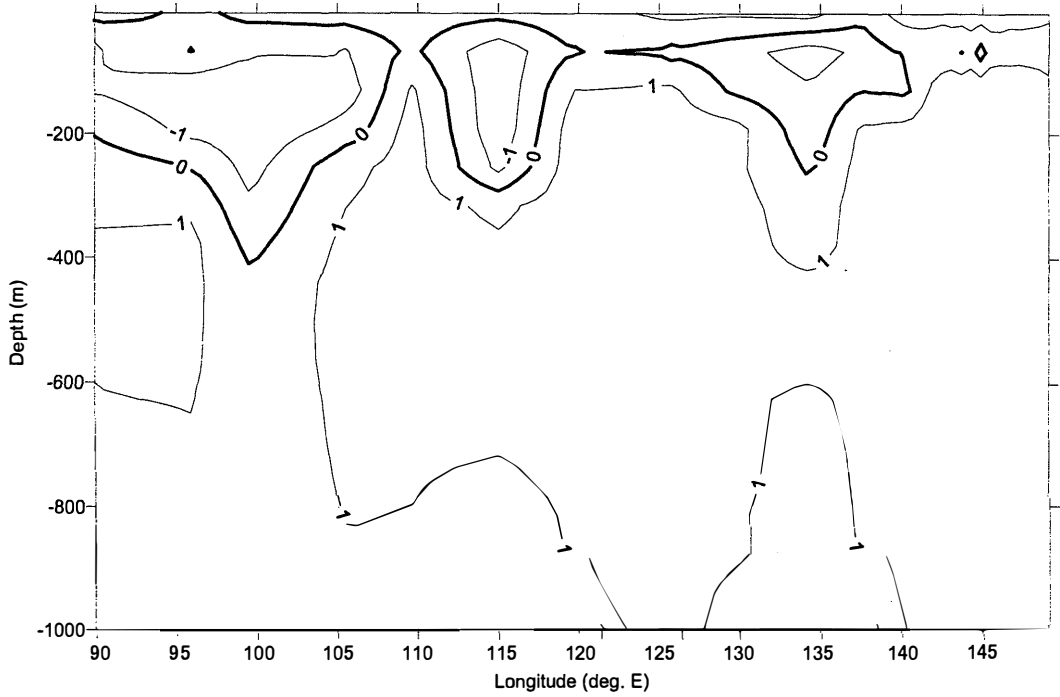


Fig. 4. Vertical profile of water temperature ($^{\circ}\text{C}$) observed with XCTD along 64°S .

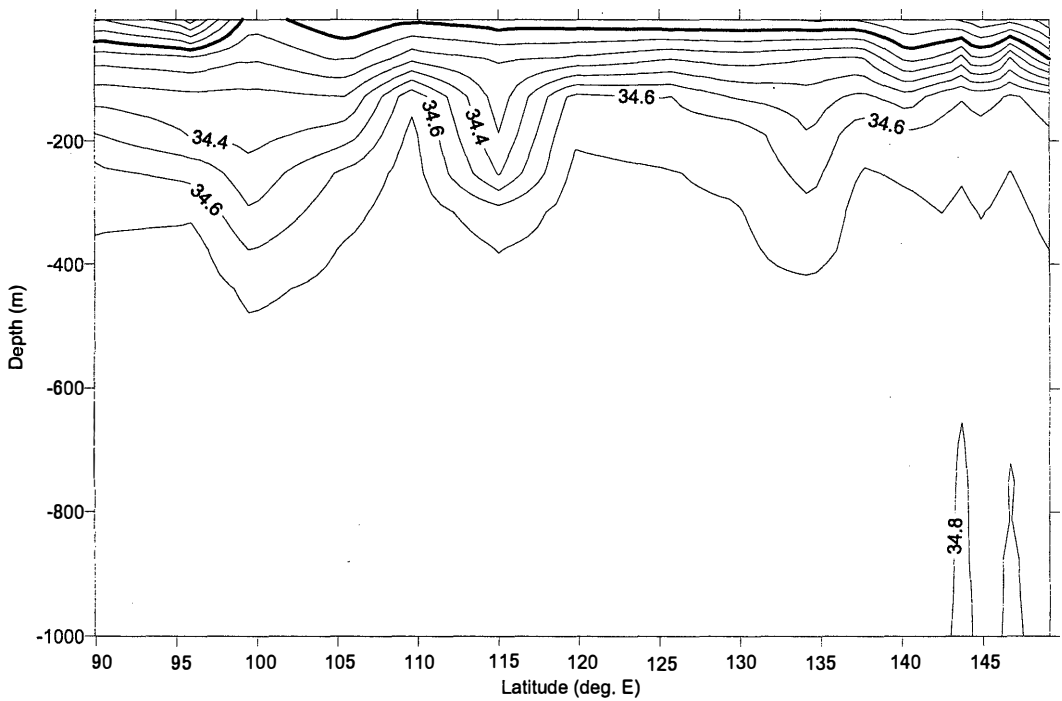


Fig. 5. Vertical profile of water salinity observed with XCTD along 64°S .

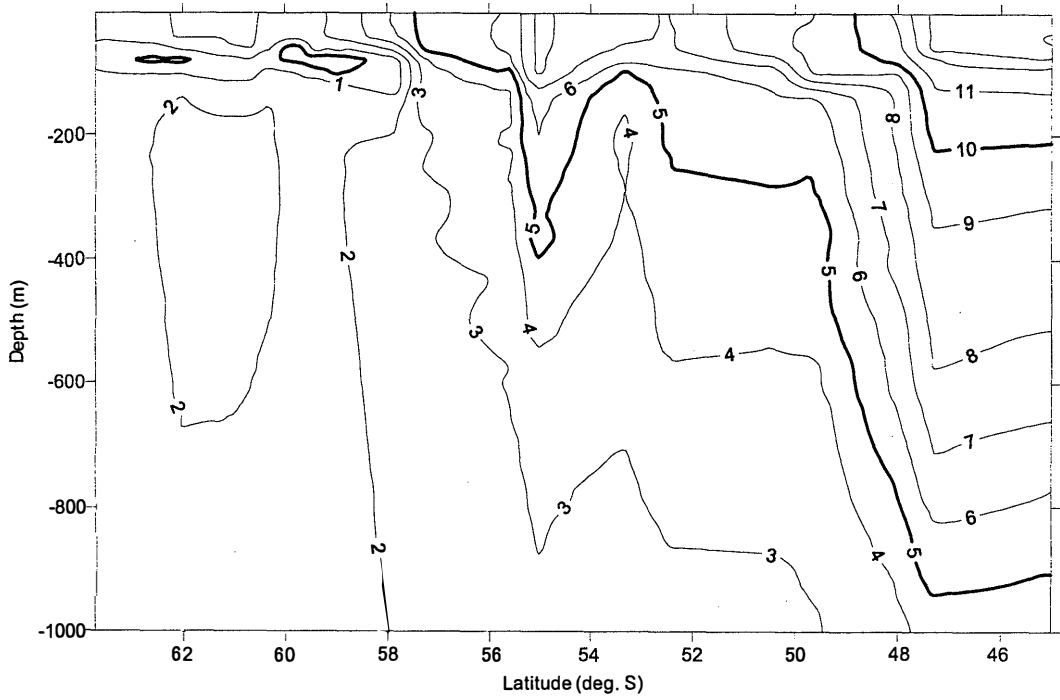


Fig. 6. Vertical profile of water temperature ($^{\circ}\text{C}$) observed with XCTD along 150°E .

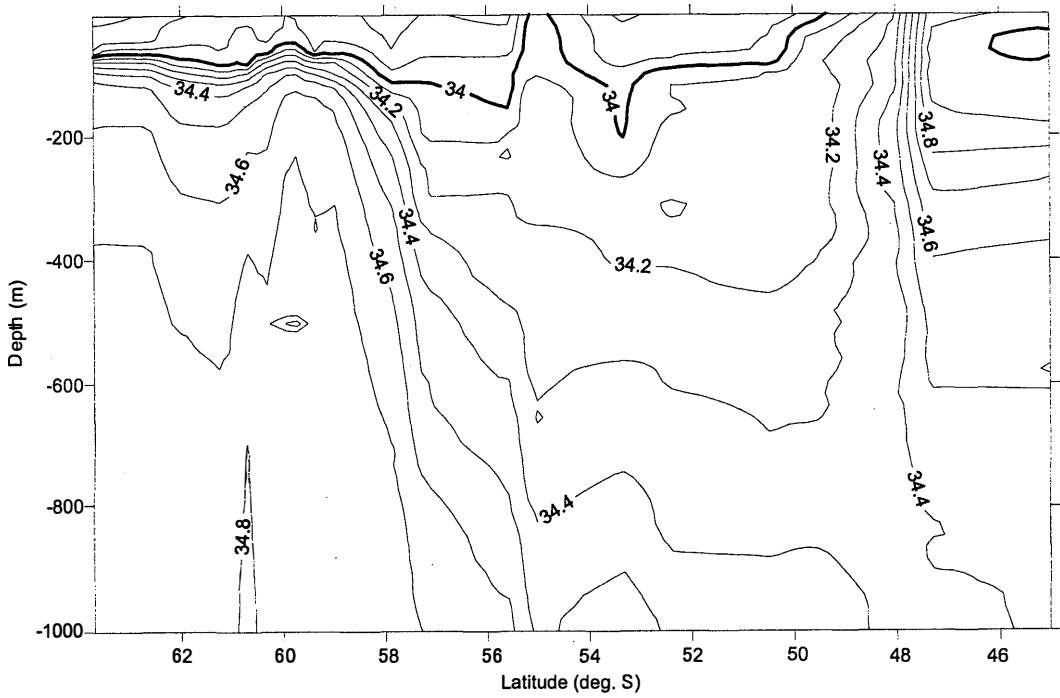


Fig. 7. Vertical profile of water salinity observed with XCTD along 150°E .

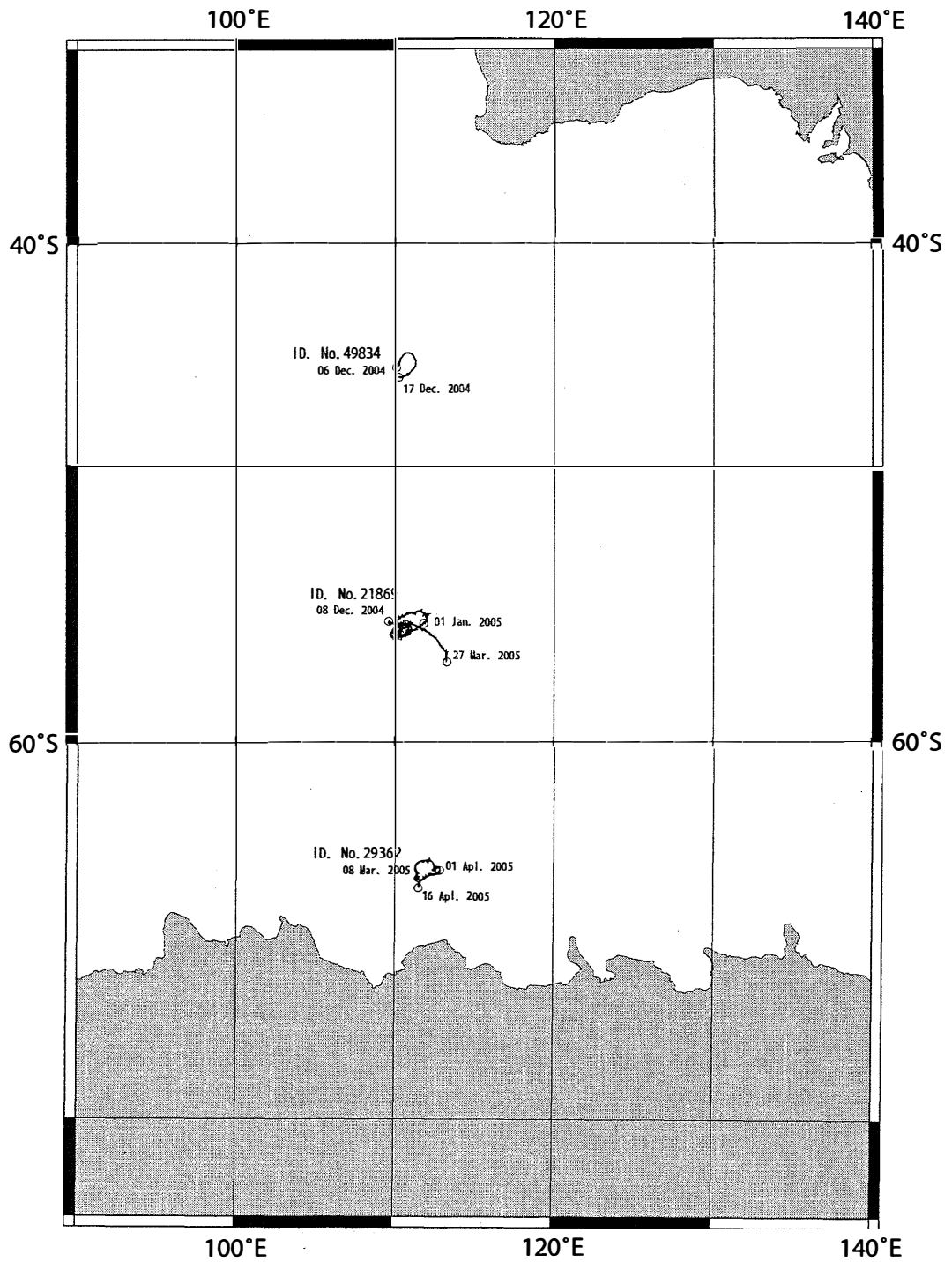


Fig. 8. Trajectories of three surface drifting buoys. Solid circles denote the deployment location and the location on the first day of every month.

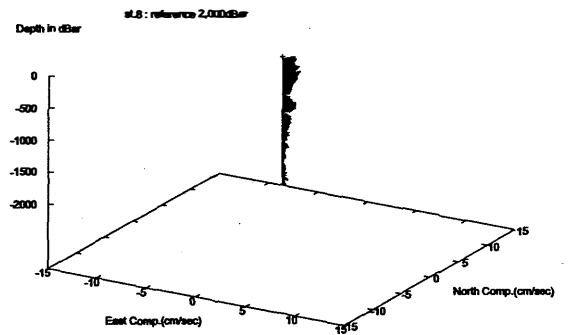
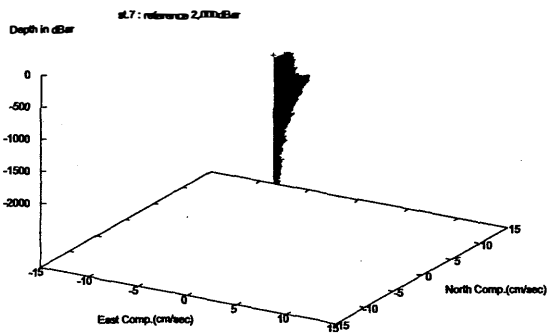
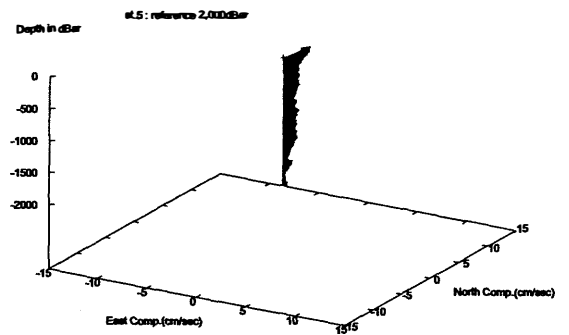
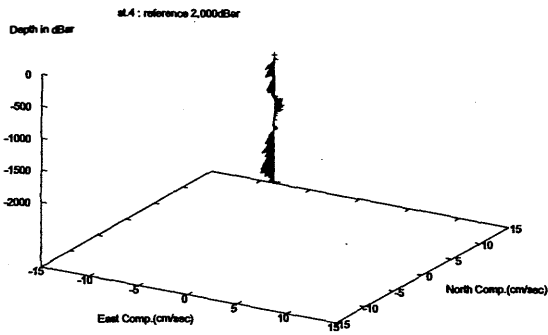
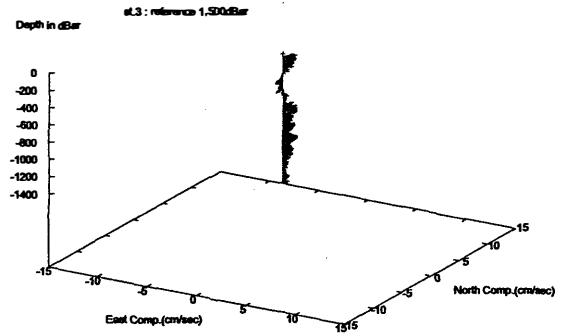
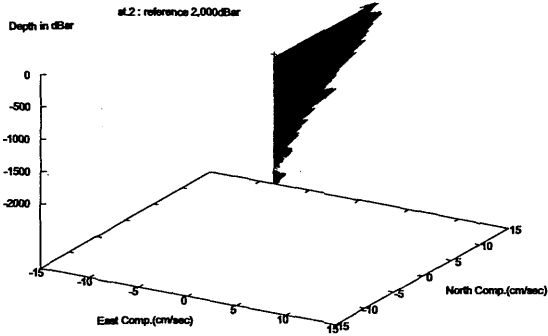


Fig. 9. Vertical profile of current observed with LADCP.

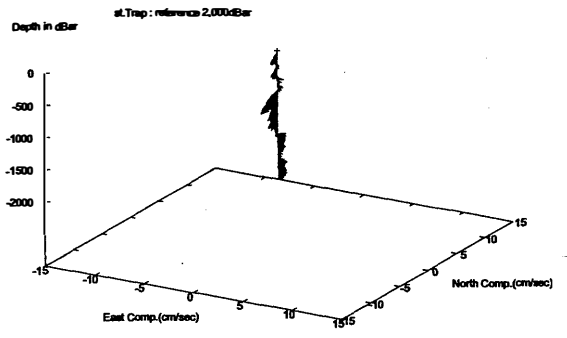
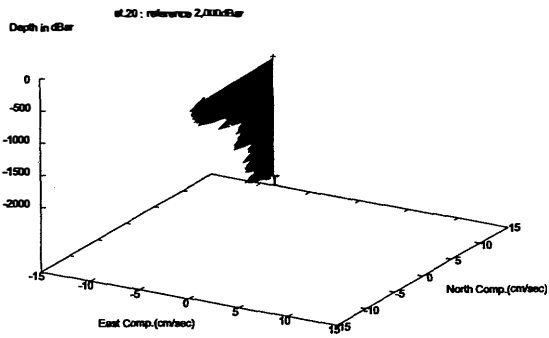
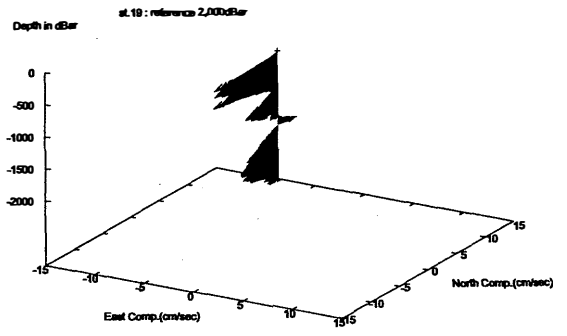
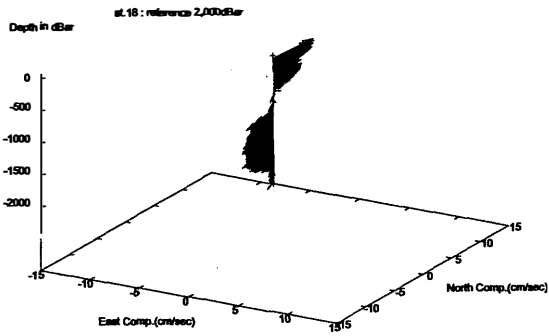
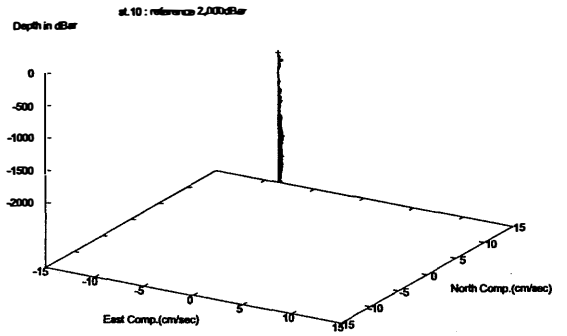
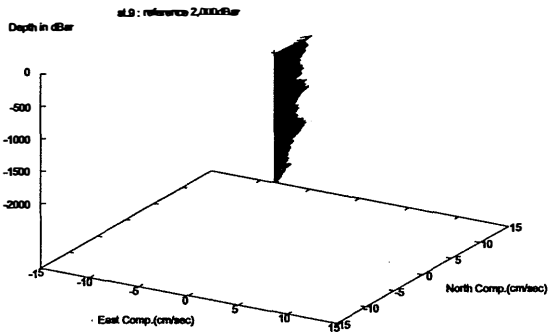


Fig. 9 (continued).

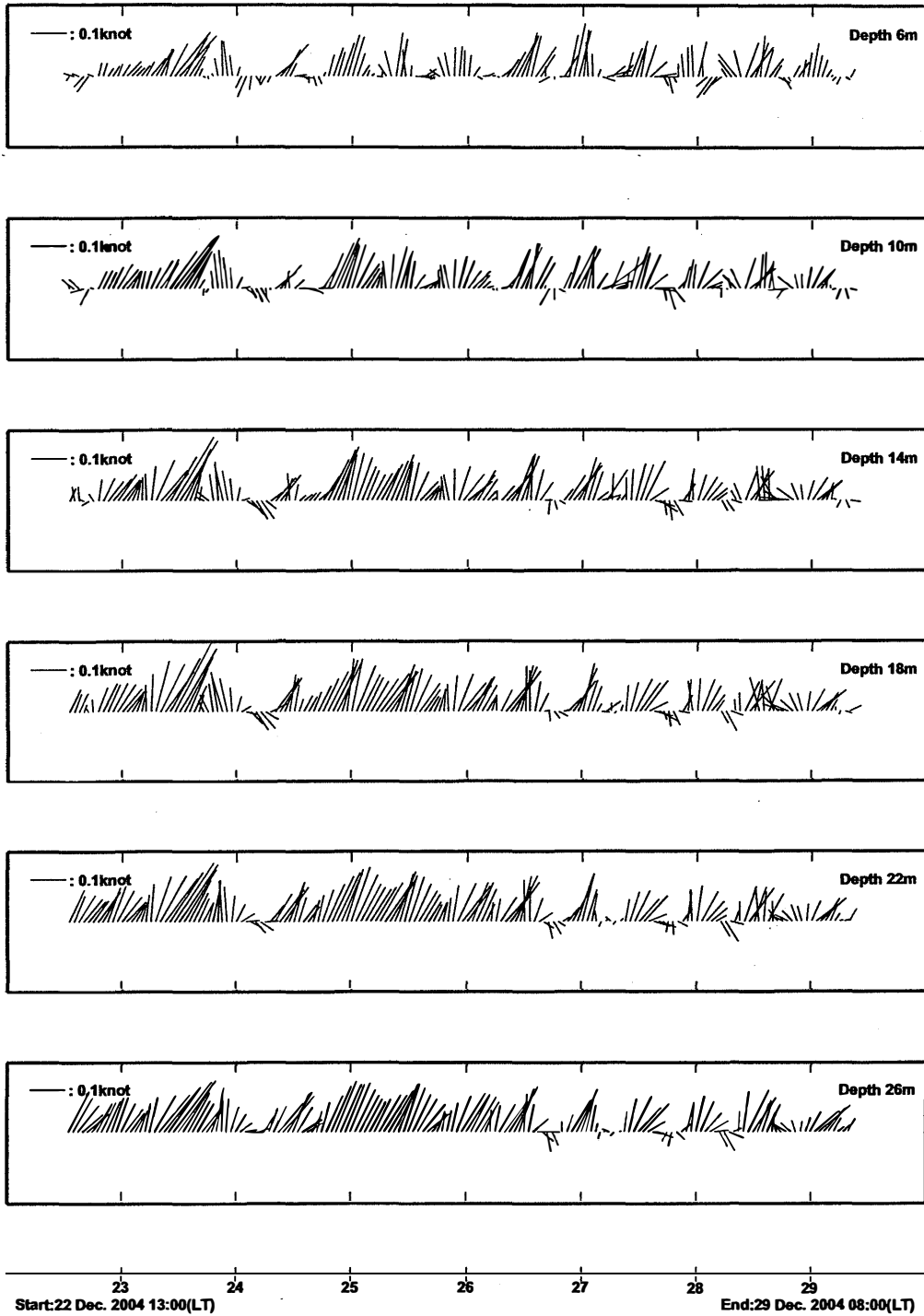
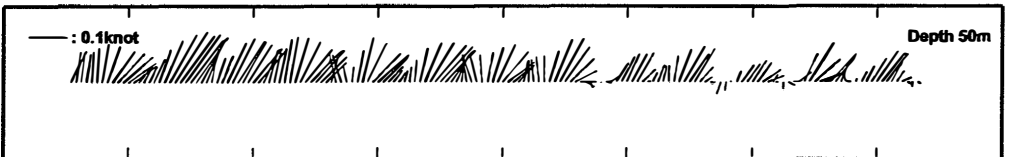
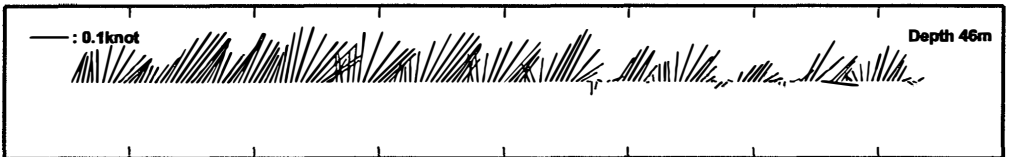
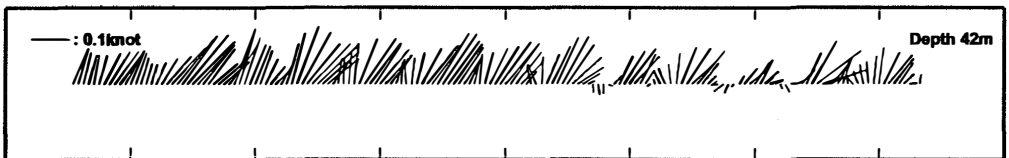
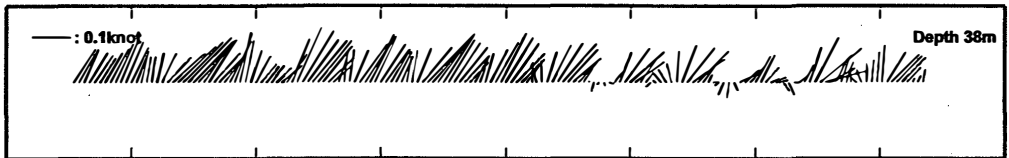


Fig. 10. The result of the current observation near Syowa Station.



23 24 25 26 27 28 29
Start:22 Dec. 2004 13:00(LT) End:29 Dec. 2004 08:00(LT)

Fig. 10 (continued).

Table 1. Data of surface water observations and on board the icebreaker "Shirase" in 2004-2005.

Date	Time	Position		Air Temp	Water Temp	Salinity	pH	Dissolved oxygen	Phosphate	Silicate	Nitrite	Nitrate	
		(UT)	Lat.										Long.
2004													
Left Fremantle													
Dec.	5	6:00	40-57.1S	109-58.3E	12.7	15.3	34.802	8.15	282.7	0.75	0.7	0.56	6.85
	6	2:16	45-02.5S	110-01.6E	12.0	9.8	34.577	8.19	290.5	0.68	0.0	0.59	11.67
	7	2:13	49-56.1S	110-00.9E	8.0	5.2	33.973	8.17	330.8	1.41	0.0	0.83	21.29
	8	2:10	55-06.5S	109-32.9E	4.4	2.8	33.915	8.12	343.4	1.70	15.5	0.64	26.29
	9	2:10	59-23.2S	108-56.9E	3.4	0.6	33.880	8.10	362.2	1.76	33.1	0.64	27.67
	10	2:14	60-25.0S	101-18.6E	0.1	-0.2	34.026	8.12	360.4	1.76	46.3	0.32	27.78
	10	9:19	60-41.5S	97-24.7E	0.1	0.2	34.074	8.13	358.8	1.79	50.0	0.25	27.67
	11	2:10	60-59.2S	89-18.4E	0.5	0.8	33.898	8.16	355.2	1.67	27.0	0.24	26.50
	11	10:21	61-10.3S	85-24.3E	0.2	-0.2	33.988	8.18	368.2	1.70	49.4	0.27	25.61
	12	2:09	61-31.7S	77-40.7E	0.9	0.2	33.760	8.30	375.1	1.40	32.5	0.25	23.61
	12	10:09	61-42.6S	73-51.9E	1.5	0.3	33.750	8.27	371.1	1.63	37.7	0.18	24.62
Arrived at the ice edge of SYOWA station													
2005													
Left at the ice edge of SYOWA station													
Feb.	25	13:10	63-54.2S	49-07.7E	2.0	1.6	33.856	8.10	348.0	1.85	49.7	0.31	27.09
	26	5:13	64-00.5S	57-49.9E	3.5	1.6	33.799	7.91	344.3	1.88	47.2	0.31	27.58
	27	4:08	64-01.4S	66-51.1E	0.6	1.0	33.770	8.08	346.3	1.86	48.5	0.22	27.50
	28	3:08	62-44.5S	74-49.2E	0.1	1.4	33.846	8.20	346.7	1.74	26.0	0.25	24.81
	28	11:04	61-56.0S	77-48.5E	0.0	1.8	33.777	8.12	343.3	1.72	27.0	0.21	25.39
Mar.	2	11:04	65-15.6S	78-08.0E	0.0	1.1	33.621	8.07	351.6	1.78	41.4	0.21	26.81
	6	2:03	64-25.4S	89-55.4E	-0.3	0.6	33.971	8.00	349.6	1.81	50.5	0.18	26.87
	7	2:06	63-52.1S	99-35.4E	-0.1	0.5	34.112	7.99	350.4	1.93	52.9	0.21	28.15
	8	1:05	64-00.9S	109-36.5E	-4.4	0.5	34.125	8.03	343.5	1.99	56.5	0.26	29.14
	9	0:04	63-53.5S	119-36.0E	-4.2	0.8	34.041	8.04	345.7	1.93	51.6	0.19	28.25
	10	0:08	63-59.5S	129-38.4E	-2.0	1.2	33.967	8.04	341.9	1.88	40.9	0.28	28.00
	10	23:04	64-28.9S	137-28.9E	-0.1	0.7	33.995	8.04	345.5	1.98	45.4	0.31	28.66
	11	23:06	63-51.7S	142-40.1E	0.9	1.5	33.906	8.05	343.8	1.78	28.2	0.28	27.55
	12	7:06	63-49.5S	144-51.9E	1.8	1.8	33.919	8.06	348.2	1.77	26.0	0.28	27.24
	12	22:04	63-41.9S	149-04.3E	1.7	1.8	33.857	8.05	350.8	1.79	25.7	0.29	27.06
	14	3:00	60-15.8S	149-57.6E	2.7	2.3	33.903	—	342.2	1.80	16.7	0.25	27.21
	14	23:05	57-11.5S	149-58.0E	6.0	5.9	33.883	8.07	315.5	1.58	3.6	0.25	24.21
	15	23:05	52-27.5S	150-00.0E	7.3	7.3	33.898	8.07	307.8	1.51	1.5	0.27	21.40
	16	23:07	47-16.6S	150-10.9E	9.9	13.4	34.951	8.13	270.8	0.41	0.0	0.21	3.44
Arrived Sydney													

Table 2. XCTD observation data.

station	JA46001		JA46002		JA46003		JA46004		JA46005		JA46006		JA46007		JA46008	
date	2004/12/05		2004/12/05		2004/12/05		2004/12/05		2004/12/05		2004/12/06		2004/12/06		2004/12/06	
time(UT)	07:58		11:00		13:57		16:55		22:59		02:16		13:56		16:57	
latitude	40-54.2S		41-32.4S		42-13.5S		42-55.3S		44-20.9S		45-02.5S		46-43.0S		47-34.0S	
longitude	110-01.9E		109-59.9E		109-59.8E		110-00.9E		109-59.9E		110-01.6E		110-07.5E		110-00.9E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	11.5	34.77	11.7	34.72	11.3	34.66	11.3	34.81	10.1	34.61	9.7	34.61	9.7	34.62	8.2	34.20
10	11.5	34.78	11.6	34.73	11.3	34.71	11.3	34.82	10.1	34.63	9.7	34.61	9.7	34.65	8.2	34.22
20	11.4	34.79	11.5	34.74	11.2	34.72	11.2	34.82	10.1	34.65	9.6	34.61	9.7	34.66	8.2	34.22
30	11.3	34.80	11.4	34.75	11.1	34.74	11.1	34.82	10.1	34.65	9.6	34.60	9.7	34.67	8.2	34.25
50	11.0	34.81	11.2	34.75	11.0	34.74	11.0	34.82	9.9	34.69	9.1	34.55	9.7	34.68	8.2	34.36
75	10.6	34.79	10.5	34.76	10.5	34.77	10.9	34.82	9.8	34.68	9.1	34.56	9.7	34.67	8.1	34.36
100	9.8	34.77	10.3	34.79	9.9	34.77	10.6	34.81	9.7	34.70	9.4	34.66	9.4	34.62	8.7	34.55
125	9.8	34.77	9.8	34.75	9.8	34.77	10.4	34.83	9.7	34.70	9.5	34.69	9.5	34.69	8.5	34.52
150	9.8	34.77	9.9	34.78	9.8	34.77	10.2	34.84	9.6	34.70	9.6	34.73	9.5	34.69	8.4	34.51
200	9.8	34.79	9.8	34.77	9.8	34.79	10.1	34.83	9.6	34.70	9.6	34.72	9.1	34.63	8.1	34.46
250	9.7	34.78	9.7	34.76	9.7	34.77	10.0	34.81	9.6	34.69	9.1	34.64	9.2	34.66	8.0	34.49
300	9.7	34.77	9.7	34.74	9.6	34.74	9.9	34.80	9.5	34.69	8.8	34.59	9.2	34.68	7.8	34.48
400	9.6	34.76	9.5	34.72	9.6	34.74	9.8	34.78	9.3	34.66	8.7	34.59	8.6	34.57	6.3	34.31
500	9.5	34.75	9.3	34.69	9.5	34.73	9.5	34.74	8.8	34.57	8.6	34.59	7.9	34.48	6.0	34.39
600	9.2	34.70	8.8	34.63	9.0	34.65	9.2	34.70	8.4	34.53	7.8	34.50	7.5	34.53	4.6	34.28
700	8.5	34.60	8.0	34.54	8.3	34.57	8.6	34.62	7.4	34.46	6.6	34.44	6.4	34.45	4.2	34.33
800	7.5	34.52	7.0	34.46	7.3	34.50	7.6	34.54	6.1	34.37	5.6	34.39	5.4	34.40	3.6	34.33
900	6.2	34.44	5.8	34.40	6.1	34.42	6.5	34.46	5.0	34.31	4.6	34.36	4.5	34.38	3.3	34.38
1000	5.1	34.39	4.8	34.36	5.1	34.37	5.4	34.42	4.3	34.31	4.1	34.37	4.0	34.39	3.1	34.44

station	JA46009		JA46010		JA46011		JA46012		JA46013		JA46014		JA46015		JA46016	
date	2004/12/06		2004/12/07		2004/12/07		2004/12/07		2004/12/07		2004/12/08		2004/12/08		2004/12/08	
time(UT)	22:55		02:14		13:55		16:56		22:56		02:11		13:55		16:52	
latitude	49-10.6S		49-56.1S		52-01.6S		52-48.5S		54-24.0S		55-06.5S		56-55.1S		57-32.3S	
longitude	109-55.3E		110-00.9E		110-04.9E		109-56.0E		109-40.9E		109-32.9E		109-28.1E		109-23.0E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	5.4	33.85	4.8	33.89	3.0	33.86	3.1	33.90	2.4	33.80	2.5	33.87	2.3	33.81	0.7	33.94
10	5.4	33.92	4.8	33.91	3.0	33.90	3.1	33.92	2.4	33.90	2.4	33.88	2.3	33.87	0.6	33.96
20	5.4	33.94	4.7	33.93	3.0	33.91	3.1	33.92	2.3	33.91	2.4	33.89	2.3	33.89	0.6	33.97
30	5.4	33.96	4.7	33.94	3.0	33.92	3.1	33.93	2.3	33.92	2.4	33.90	2.2	33.90	0.5	33.97
50	5.3	33.97	4.7	33.95	2.9	33.93	2.9	33.94	2.3	33.93	2.3	33.91	2.1	33.92	0.2	33.98
75	4.4	33.99	4.4	33.99	2.6	33.94	2.2	33.95	1.7	33.96	1.2	33.93	1.9	33.92	-0.1	34.00
100	4.3	34.02	4.0	34.03	2.0	33.97	2.0	33.98	1.3	33.99	0.9	33.97	1.5	33.94	-0.6	34.00
125	3.9	33.99	3.7	34.03	1.8	33.99	1.4	34.01	0.8	34.00	0.9	34.00	1.1	33.95	-0.5	34.07
150	3.7	34.00	3.4	34.04	1.5	34.02	1.0	34.01	1.0	34.12	0.8	34.02	0.9	33.96	-0.2	34.18
200	3.6	34.07	3.5	34.11	2.0	34.14	1.5	34.10	1.6	34.29	1.1	34.16	1.5	34.11	1.6	34.47
250	3.6	34.13	2.8	34.07	2.0	34.20	2.1	34.24	1.9	34.39	1.9	34.37	2.2	34.26	1.9	34.56
300	3.6	34.18	2.9	34.16	2.3	34.31	2.2	34.31	2.1	34.46	2.1	34.44	2.2	34.35	2.0	34.63
400	3.0	34.21	2.8	34.25	2.2	34.41	2.4	34.45	2.2	34.57	2.2	34.54	2.3	34.46	2.1	34.69
500	2.8	34.29	2.8	34.36	2.3	34.51	2.3	34.53	2.2	34.62	2.2	34.61	2.4	34.54	2.0	34.73
600	2.6	34.38	2.7	34.44	2.2	34.57	2.4	34.60	2.2	34.66	2.2	34.66	2.3	34.60	2.1	34.77
700	2.6	34.46	2.5	34.49	2.3	34.63	2.3	34.64	2.2	34.69	2.1	34.69	2.3	34.64	2.0	34.78
800	2.5	34.53	2.5	34.56	2.2	34.67	2.3	34.67	2.1	34.72	2.1	34.70	2.2	34.67	1.9	34.79
900	2.5	34.58	2.4	34.61	2.2	34.69	2.2	34.71	2.0	34.73	2.1	34.73	2.2	34.70	1.9	34.80
1000	2.4	34.63	2.4	34.64	2.2	34.71	2.1	34.73	2.0	34.75	2.0	34.73	2.1	34.72	1.8	34.81

station	JA46017		JA46018		JA46019		JA46020		JA46021		JA46022		JA46023		JA46024	
date	2004/12/08		2004/12/09		2004/12/09		2004/12/10		2004/12/10		2004/12/11		2004/12/11		2004/12/11	
time(UT)	23:01		02:09		13:01		04:56		12:59		05:57		10:20		13:54	
latitude	58-49.6S		59-23.2S		60-13.6S		60-30.4S		60-41.3S		61-04.3S		61-10.3S		61-25.2S	
longitude	109-07.7E		108-56.9E		107-02.9E		099-27.2E		095-35.8E		087-26.8E		085-24.3E		083-28.3E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	0.8	33.69	0.2	33.75	-0.4	33.82	-0.3	33.92	-0.2	33.99	-0.1	33.91	-0.3	33.91	-0.1	33.79
10	0.8	33.90	0.2	33.80	-0.4	33.86	-0.3	34.00	-0.2	34.03	-0.1	33.95	-0.8	33.92	-0.1	33.85
20	0.8	33.93	0.1	33.82	-0.5	33.89	-0.3	34.02	-0.2	34.05	-0.2	33.96	-1.1	33.98	-0.1	33.88
30	0.8	33.94	0.1	33.84	-0.5	33.89	-0.3	34.03	-0.2	34.07	-0.5	34.00	-1.3	34.07	-0.2	33.88
50	0.8	33.94	0.1	33.86	-0.5	33.92	-0.4	34.04	-0.4	34.08	-0.6	34.02	-1.0	34.22	-0.8	33.94
75	0.6	33.96	0.3	33.94	-1.1	34.02	-0.6	34.11	-0.8	34.16	-0.9	34.06	0.0	34.39	-1.1	34.07
100	0.1	33.99	0.2	33.96	-1.0	34.13	-0.9	34.14	-0.8	34.23	-1.2	34.21	1.0	34.56	-0.2	34.25
125	0.0	34.00	0.0	34.00	-0.3	34.28	-0.2	34.29	-0.4	34.35	-0.6	34.32	1.3	34.60	0.4	34.35
150	-0.1	34.02	0.1	34.12	0.4	34.41	1.0	34.43	0.8	34.52	0.0	34.43	1.7	34.65	1.2	34.47
200	0.9	34.23	1.6	34.42	1.3	34.56	1.8	34.57	1.2	34.61	0.8	34.55	1.5	34.66	1.7	34.57
250	1.9	34.43	1.9	34.53	1.5	34.62	2.0	34.64	1.4	34.68	1.3	34.64	1.6	34.71	1.9	34.63
300	2.0	34.50	2.0	34.60	1.5	34.64	2.0	34.67	1.6	34.72	1.4	34.66	1.8	34.74	1.9	34.65
400	2.1	34.59	2.0	34.65	1.6	34.70	1.9	34.71	1.7	34.76	1.6	34.72	1.7	34.77	1.9	34.70
500	2.1	34.63	2.0	34.70	1.7	34.73	1.9	34.74	1.7	34.78	1.5	34.74	1.6	34.77	1.9	34.73
600	2.1	34.68	2.0	34.73	1.6	34.74	1.8	34.76	1.7	34.81	1.4	34.74	1.5	34.77	1.8	34.75
700	2.0	34.70	1.9	34.76	1.6	34.76	1.7	34.77	1.5	34.81	1.3	34.75	1.3	34.77	1.8	34.76
800	2.0	34.72	1.9	34.77	1.5	34.76	1.6	34.76	1.4	34.81	1.2	34.76	1.2	34.78	1.7	34.76
900	1.9	34.74	1.8	34.77	1.4	34.76	1.5	34.77	1.3	34.82	1.1	34.76	1.1	34.78	1.6	34.77
1000	1.8	34.75	1.7	34.78	1.4	34.77	1.4	34.77	1.2	34.82	1.0	34.76	1.1	34.80	1.5	34.78

station	JA46025		JA46026		JA46027		JA46028		JA46029		JA46030		JA46031		JA46032	
date	2004/12/12		2004/12/12		2005/02/25		2005/02/25		2005/02/25		2005/02/26		2005/02/26		2005/02/27	
time(UT)	05:54		14:03		09:25		13:08		20:53		05:11		20:01		04:06	
latitude	61-36.7S		61-47.7S		63-57.2S		63-54.2S		64-00.0S		64-00.5S		63-57.9S		64-01.4S	
longitude	075-51.3E		071-59.4E		047-31.0E		049-07.7E		053-11.9E		057-49.9E		063-21.8E		066-51.1E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	0.1	33.65	-0.3	33.57	1.5	33.94	1.4	33.69	1.2	33.74	1.3	33.65	0.8	33.74	0.8	33.80
10	-0.1	33.70	-0.6	33.63	1.5	33.95	1.4	33.77	1.2	33.77	1.3	33.73	0.8	33.74	0.8	33.81
20	-0.4	33.74	-0.8	33.69	1.5	33.95	1.4	33.81	1.2	33.80	1.2	33.75	0.7	33.77	0.8	33.84
30	-0.4	33.77	-0.9	33.71	-0.7	34.03	1.4	33.82	1.2	33.82	1.2	33.77	-1.1	34.10	0.7	33.84
50	-1.6	33.93	-1.6	33.86	-0.8	34.35	-0.5	34.00	0.5	33.85	-1.3	34.01	-1.0	34.28	-0.1	33.97
75	-1.6	34.04	-1.4	34.07	0.5	34.55	-1.0	34.23	-0.9	34.27	-0.3	34.25	-0.7	34.42	-1.4	34.36
100	-0.7	34.19	0.2	34.33	1.3	34.66	0.9	34.48	1.0	34.51	1.0	34.46	-0.6	34.47	-0.4	34.52
125	1.3	34.46	1.1	34.49	1.3	34.68	1.4	34.56	1.4	34.58	1.6	34.56	0.3	34.59	0.9	34.68
150	1.6	34.51	1.7	34.57	1.4	34.70	1.5	34.60	1.5	34.62	1.7	34.59	1.3	34.68	1.2	34.74
200	1.8	34.58	1.8	34.63	1.4	34.74	1.6	34.65	1.6	34.67	1.8	34.63	1.4	34.71	1.0	34.73
250	1.9	34.64	1.9	34.67	1.4	34.76	1.6	34.69	1.7	34.70	1.8	34.65	1.5	34.73	1.3	34.79
300	1.9	34.67	1.9	34.68	1.4	34.76	1.6	34.70	1.7	34.72	1.8	34.68	1.5	34.74	1.5	34.83
400	2.0	34.71	1.9	34.74	1.4	34.78	1.6	34.72	1.6	34.75	1.7	34.71	1.3	34.75	1.4	34.84
500	2.0	34.75	1.9	34.77	1.3	34.79	1.5	34.74	1.5	34.76	1.6	34.72	1.3	34.75	1.3	34.85
600	1.9	34.77	1.9	34.79	1.2	34.79	1.4	34.75	1.4	34.77	1.6	34.73	1.3	34.77	1.2	34.85
700	1.9	34.79	1.8	34.81	1.0	34.79	1.3	34.74	1.3	34.77	1.5	34.74	1.2	34.77	1.1	34.84
800	1.8	34.79	1.7	34.83	0.9	34.78	1.2	34.74	1.2	34.78	1.4	34.75	1.1	34.77	1.1	34.84
900	1.7	34.80	1.6	34.83	0.8	34.77	1.0	34.73	1.1	34.77	1.4	34.75	1.0	34.77	0.9	34.84
1000	1.7	34.81	1.5	34.83			0.9	34.73	1.0	34.77	1.3	34.75	0.9	34.78	0.9	34.83

station date	JA46033		JA46034		JA46035		JA46036		JA46037		JA46038		JA46039		JA46040	
time(UT)	2005/02/27		2005/02/28		2005/02/28		2005/03/01		2005/03/02		2005/03/06		2005/03/06		2005/03/07	
latitude	63-29.3S		62-44.5S		61-56.0S		62-48.1S		65-15.6S		64-25.4S		64-00.0S		63-52.1S	
longitude	071-40.8E		074-49.2E		077-48.5E		079-58.8E		078-08.0E		089-55.4E		096-02.2E		099-35.4E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	0.9	33.57	1.2	33.78	1.3	33.66	1.2	33.65	0.6	33.53	0.4	33.79	-0.4	33.45	0.3	34.04
10	0.9	33.62	1.2	33.80	1.3	33.69	1.0	33.71	0.5	33.60	0.4	33.84	-0.4	33.51	0.3	34.08
20	0.9	33.66	1.2	33.81	1.3	33.72	1.0	33.74	0.5	33.67	0.3	33.88	0.2	33.83	0.3	34.08
30	0.9	33.66	1.2	33.82	1.3	33.73	1.0	33.77	0.3	33.77	0.3	33.91	0.4	33.96	0.2	34.10
50	-0.8	33.95	1.2	33.83	1.3	33.74	0.9	33.78	-1.1	34.06	0.2	33.94	0.4	34.09	-0.2	34.14
75	-0.9	34.23	-0.6	34.21	-0.4	33.85	-1.2	34.02	-1.5	34.22	-1.3	34.24	-0.2	34.14	-1.6	34.24
100	1.1	34.49	0.8	34.43	-1.5	33.99	-0.1	34.22	-1.5	34.28	-1.4	34.32	-1.6	34.28	-1.7	34.28
125	1.4	34.56	1.5	34.54	-0.8	34.10	1.2	34.39	-1.4	34.33	-1.2	34.36	-1.8	34.33	-1.8	34.32
150	1.5	34.59	1.7	34.59	0.7	34.32	1.6	34.47	-1.3	34.37	-0.8	34.41	-1.7	34.35	-1.8	34.34
200	1.7	34.63	1.9	34.65	1.7	34.48	1.8	34.54	-0.9	34.43	-0.1	34.52	-1.0	34.43	-1.7	34.38
250	1.6	34.64	1.9	34.68	1.9	34.54	1.9	34.58	-0.5	34.49	0.7	34.64	-0.2	34.56	-1.3	34.43
300	1.5	34.66	1.9	34.70	2.0	34.58	1.9	34.60	-0.2	34.55	0.8	34.67	0.6	34.66	-0.9	34.51
400	1.7	34.70	1.9	34.73	2.0	34.65	2.0	34.66	0.4	34.63	1.1	34.73	1.2	34.75	-0.2	34.62
500	1.6	34.71	1.9	34.75	2.0	34.69	2.0	34.69	0.8	34.69	1.1	34.73	1.1	34.75	0.4	34.71
600	1.5	34.71	1.8	34.77	2.0	34.71	1.9	34.71	0.9	34.72	1.1	34.74	1.1	34.75	0.5	34.73
700	1.4	34.71	1.8	34.78	2.0	34.73	1.9	34.72	0.9	34.73	0.9	34.73	0.9	34.76	0.5	34.73
800	1.3	34.70	1.7	34.78	1.9	34.75	1.8	34.74	0.8	34.73	0.9	34.74	0.8	34.75	0.4	34.75
900	1.2	34.71	1.6	34.78	1.9	34.76	1.7	34.73	0.8	34.74	0.8	34.73	0.7	34.76	0.3	34.75
1000	1.1	34.70	1.5	34.78	1.8	34.76	1.6	34.75	0.7	34.74	0.7	34.73	0.6	34.75	0.1	34.74

station date	JA46041		JA46042		JA46043		JA46044		JA46045		JA46046		JA46047		JA46048	
time(UT)	2005/03/07		2005/03/08		2005/03/08		2005/03/09		2005/03/09		2005/03/10		2005/03/10		2005/03/10	
latitude	63-56.6S		64-00.9S		63-57.8S		63-53.5S		63-58.9S		63-59.5S		64-12.7S		64-28.9S	
longitude	105-34.0E		109-36.5E		115-00.3E		119-36.0E		125-42.6E		129-38.4E		134-22.0E		137-28.9E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	0.5	33.89	0.5	33.97	0.3	33.92	0.6	33.91	1.2	33.88	1.1	33.89	1.4	33.88	0.3	33.86
10	0.5	33.91	0.5	33.98	0.3	33.95	0.6	33.94	1.2	33.92	1.1	33.90	1.4	33.88	0.3	33.91
20	0.4	33.93	0.5	34.02	0.3	33.97	0.6	33.96	1.2	33.93	1.1	33.92	0.5	33.98	0.3	33.94
30	0.4	33.94	0.5	34.02	0.3	33.97	0.6	33.98	1.2	33.94	1.1	33.93	-0.7	34.07	0.2	33.95
50	0.1	33.95	0.5	34.04	-1.3	34.12	0.6	33.99	1.2	33.94	0.5	34.02	-1.5	34.25	-0.4	34.14
75	-1.5	34.15	0.0	34.42	-1.8	34.21	-0.5	34.40	-0.1	34.38	-0.8	34.33	-1.6	34.32	-0.6	34.38
100	-1.7	34.24	0.5	34.58	-1.8	34.22	0.2	34.51	0.8	34.53	-0.8	34.39	-1.5	34.36	-0.9	34.42
125	-1.6	34.30	1.1	34.67	-1.8	34.24	1.0	34.63	1.3	34.60	-0.2	34.48	-1.0	34.42	0.0	34.52
150	-1.4	34.34	1.3	34.70	-1.8	34.26	1.3	34.67	1.4	34.62	0.1	34.54	-0.4	34.49	0.6	34.59
200	-0.6	34.46	1.4	34.73	-1.7	34.31	1.5	34.70	1.6	34.67	1.5	34.68	-0.5	34.52	1.2	34.67
250	0.7	34.62	1.4	34.74	-1.3	34.38	1.5	34.72	1.6	34.71	1.2	34.67	-0.2	34.57	1.3	34.70
300	1.0	34.67	1.4	34.75	0.6	34.62	1.5	34.73	1.7	34.71	1.3	34.69	0.3	34.61	1.4	34.72
400	1.3	34.71	1.3	34.76	1.3	34.72	1.4	34.74	1.6	34.73	1.3	34.72	0.6	34.67	1.4	34.75
500	1.3	34.74	1.3	34.77	1.3	34.74	1.4	34.75	1.6	34.75	1.3	34.73	1.3	34.74	1.4	34.77
600	1.2	34.73	1.2	34.77	1.0	34.73	1.3	34.74	1.5	34.76	1.2	34.74	0.9	34.71	1.2	34.77
700	1.1	34.73	1.1	34.77	1.1	34.75	1.2	34.75	1.4	34.76	1.2	34.75	0.7	34.70	1.1	34.77
800	1.1	34.74	1.0	34.77	0.7	34.72	1.1	34.74	1.3	34.77	1.1	34.74	0.7	34.72	1.0	34.77
900	0.9	34.72	0.9	34.77	0.6	34.73	1.0	34.74	1.2	34.76	1.1	34.75	0.8	34.72	1.0	34.77
1000	0.8	34.73	0.8	34.77	0.6	34.73	0.9	34.73	1.1	34.76	0.9	34.74			0.9	34.77

station	JA46049		JA46050		JA46051		JA46052		JA46053		JA46054		JA46055		JA46056	
date	2005/03/11		2005/03/11		2005/03/12		2005/03/12		2005/03/12		2005/03/12		2005/03/13		2005/03/13	
time(UT)	14:54		23:05		02:52		07:06		13:52		22:03		10:53		13:52	
latitude	63-55.8S		63-51.7S		63-50.2S		63-49.5S		63-45.2S		63-41.9S		62-37.9S		62-03.9S	
longitude	140-24.2E		142-40.1E		143-40.8E		144-51.9E		146-47.8E		149-04.3E		150-04.1E		150-12.5E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	1.5	33.77	1.3	33.81	1.5	33.77	1.5	33.72	1.3	33.75	1.2	33.62	1.7	33.70	2.1	33.74
10	1.5	33.80	1.3	33.84	1.4	33.82	1.5	33.74	1.3	33.77	1.2	33.68	1.7	33.72	2.1	33.84
20	1.5	33.82	1.2	33.86	1.4	33.86	1.4	33.76	1.2	33.78	1.2	33.70	1.7	33.75	2.1	33.86
30	1.5	33.83	1.2	33.87	1.4	33.87	1.4	33.78	1.2	33.80	1.2	33.73	1.7	33.75	2.1	33.87
50	1.5	33.86	1.2	33.89	1.4	33.90	1.4	33.81	1.2	33.81	1.1	33.76	1.6	33.78	2.1	33.88
75	-0.6	34.20	0.1	34.27	0.4	34.35	-0.3	34.20	0.9	34.45	-0.1	34.18	-0.4	34.17	-0.4	34.02
100	0.1	34.39	1.3	34.49	1.4	34.52	1.3	34.48	1.6	34.55	1.2	34.45	1.0	34.41	0.9	34.26
125	-0.5	34.41	1.9	34.57	1.8	34.59	1.9	34.57	1.9	34.62	1.6	34.56	1.6	34.51	1.9	34.42
150	0.5	34.53	1.9	34.60	1.8	34.61	2.0	34.60	1.9	34.64	1.7	34.59	1.8	34.56	2.1	34.46
200	1.4	34.64	1.9	34.64	1.9	34.66	2.0	34.64	2.0	34.67	1.8	34.62	2.0	34.61	2.1	34.52
250	1.6	34.69	2.0	34.67	1.9	34.69	2.0	34.67	2.0	34.69	1.6	34.62	2.0	34.65	2.2	34.57
300	1.7	34.71	1.9	34.69	1.9	34.71	2.0	34.69	2.0	34.72	1.8	34.66	2.0	34.67	2.2	34.60
400	1.7	34.73	2.0	34.72	1.9	34.75	1.9	34.72	1.9	34.75	1.9	34.71	2.0	34.71	2.1	34.65
500	1.6	34.74	1.9	34.75	1.8	34.78	1.9	34.74	1.9	34.77	1.8	34.72	1.9	34.73	2.1	34.69
600	1.6	34.75	1.8	34.77	1.7	34.79	1.8	34.75	1.8	34.79	1.8	34.74	1.9	34.75	2.0	34.72
700	1.5	34.75	1.8	34.78	1.7	34.80	1.8	34.77	1.7	34.80	1.7	34.74	1.8	34.76	2.0	34.74
800	1.4	34.76	1.7	34.78	1.6	34.81	1.7	34.78	1.6	34.80	1.7	34.76	1.7	34.78	1.9	34.75
900	1.3	34.76	1.6	34.78	1.5	34.82	1.6	34.78	1.6	34.81	1.6	34.76	1.7	34.78	1.8	34.76
1000	1.2	34.75	1.5	34.78	1.4	34.83	1.5	34.77	1.5	34.81	1.5	34.77	1.6	34.78	1.8	34.77

station	JA46057		JA46058		JA46059		JA46060		JA46061		JA46062		JA46063		JA46064	
date	2005/03/13		2005/03/13		2005/03/14		2005/03/14		2005/03/14		2005/03/14		2005/03/14		2005/03/14	
time(UT)	19:53		22:51		02:22		07:58		10:51		13:51		19:57		23:04	
latitude	61-07.6S		60-41.6S		60-20.8S		59-48.8S		59-22.9S		58-59.5S		57-51.6S		57-11.5S	
longitude	150-07.3E		150-05.5E		149-50.8E		149-55.2E		150-00.0E		150-01.5E		149-59.1E		149-58.0E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	2.0	33.84	2.1	33.84	1.9	33.86	1.8	33.91	1.9	33.84	2.2	33.85	4.1	33.74	5.6	33.80
10	2.0	33.87	2.1	33.88	1.9	33.86	1.8	33.91	1.9	33.85	2.2	33.86	4.1	33.75	5.6	33.82
20	2.0	33.88	2.1	33.91	1.9	33.87	1.8	33.91	1.9	33.86	2.2	33.88	4.1	33.76	5.5	33.84
30	2.0	33.89	2.1	33.93	1.9	33.88	1.8	33.92	1.8	33.88	2.2	33.88	4.1	33.77	5.5	33.84
50	2.0	33.89	2.1	33.93	1.9	33.89	0.3	34.03	1.8	33.89	2.1	33.89	3.5	33.84	5.5	33.85
75	1.6	33.90	1.8	33.95	-0.2	34.15	-0.5	34.31	-1.0	34.15	-0.7	34.17	0.6	33.85	4.6	33.91
100	0.0	34.14	0.2	34.23	1.5	34.42	1.0	34.53	0.4	34.41	-0.3	34.30	0.5	33.93	3.5	33.97
125	1.6	34.38	1.8	34.46	1.9	34.50	1.6	34.61	1.7	34.58	1.4	34.52	0.6	34.08	3.6	34.02
150	1.8	34.44	1.9	34.50	2.0	34.53	1.8	34.65	1.9	34.61	1.8	34.60	1.4	34.21	3.7	34.07
200	2.1	34.52	2.1	34.58	2.0	34.57	1.9	34.69	2.0	34.66	1.9	34.65	1.9	34.34	3.0	34.09
250	2.2	34.56	2.2	34.62	2.1	34.61	1.9	34.71	2.0	34.66	2.0	34.67	2.2	34.42	3.1	34.17
300	2.2	34.60	2.1	34.65	2.1	34.64	1.9	34.74	2.0	34.68	2.0	34.70	2.2	34.48	2.7	34.20
400	2.1	34.65	2.1	34.70	2.1	34.69	1.9	34.76	2.0	34.72	1.9	34.73	2.3	34.56	2.9	34.35
500	2.1	34.68	2.1	34.74	2.0	34.71	1.8	34.78	1.9	34.74	1.9	34.74	2.3	34.62	2.7	34.44
600	2.1	34.71	2.0	34.78	1.9	34.73	1.8	34.79	1.8	34.75	1.8	34.76	2.2	34.67	2.6	34.50
700	2.0	34.73	1.9	34.80	1.9	34.74	1.8	34.77	1.8	34.77	1.8	34.78	2.2	34.71	2.4	34.54
800	1.9	34.74	1.9	34.81	1.8	34.75	1.7	34.77	1.7	34.77	1.7	34.78	2.2	34.72	2.4	34.63
900	1.9	34.75	1.8	34.82	1.7	34.75	1.6	34.77	1.6	34.77	1.6	34.79	2.1	34.74	2.4	34.66
1000	1.8	34.75	1.7	34.84	1.7	34.75	1.5	34.77	1.5	34.77	1.5	34.79	2.1	34.75	2.3	34.69

station	JA46065		JA46066		JA46067		JA46068		JA46069		JA46070		JA46071		JA46072	
date	2005/03/15		2005/03/15		2005/03/15		2005/03/15		2005/03/16		2005/03/16		2005/03/16		2005/03/16	
time(UT)	10:49		13:25		19:52		23:04		10:52		13:55		19:53		23:06	
latitude	55-34.9S		55-05.3S		53-20.8S		52-27.5S		50-26.3S		49-38.0S		48-05.0S		47-16.6S	
longitude	150-00.0E		149-59.9E		150-00.0E		150-00.0E		150-05.9E		150-08.0E		150-09.4E		150-10.9E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	6.1	33.75	8.2	34.04	7.2	33.76	7.0	33.82	8.9	33.76	9.0	33.93	11.1	34.23	13.3	34.87
10	6.1	33.78	8.2	34.05	7.2	33.79	7.0	33.83	8.8	33.86	9.0	33.96	11.1	34.29	13.3	34.88
20	6.1	33.80	8.2	34.06	7.2	33.81	7.0	33.85	8.8	33.89	9.0	33.98	11.0	34.31	13.3	34.90
30	6.1	33.82	8.2	34.07	7.2	33.82	7.0	33.86	8.8	33.90	9.2	34.10	10.7	34.31	13.3	34.90
50	6.1	33.84	8.2	34.08	7.1	33.83	6.9	33.86	8.8	33.91	9.2	34.14	10.6	34.32	13.2	34.93
75	5.9	33.94	8.2	34.08	6.6	33.83	6.9	33.87	8.3	33.91	9.4	34.19	10.2	34.34	12.0	34.88
100	4.6	33.98	8.2	34.09	4.7	33.95	5.6	34.08	6.4	34.13	9.2	34.17	8.8	34.34	11.5	34.99
125	4.0	33.96	6.8	34.20	4.3	33.98	5.5	34.10	6.0	34.14	6.6	34.11	7.9	34.33	11.0	34.94
150	3.9	34.00	6.5	34.21	4.0	33.99	5.3	34.09	5.8	34.13	5.8	34.13	8.0	34.41	10.6	34.91
200	4.4	34.13	6.1	34.19	3.8	33.99	5.3	34.14	5.6	34.16	5.4	34.13	8.0	34.45	10.3	34.86
250	4.0	34.14	5.5	34.16	3.9	34.07	5.0	34.14	5.4	34.16	5.0	34.13	7.8	34.44	9.7	34.76
300	3.9	34.21	5.2	34.16	4.0	34.13	4.5	34.11	4.8	34.12	5.0	34.17	7.5	34.40	9.3	34.69
400	3.4	34.25	5.0	34.24	3.7	34.19	4.5	34.19	4.2	34.12	4.6	34.19	7.2	34.38	8.7	34.60
500	3.3	34.34	4.3	34.25	3.4	34.25	4.3	34.26	4.2	34.22	4.5	34.29	6.4	34.33	8.3	34.54
600	3.0	34.41	3.8	34.28	3.3	34.34	3.9	34.30	3.7	34.26	3.8	34.29	6.1	34.38	7.9	34.52
700	2.8	34.45	3.4	34.32	3.1	34.39	3.7	34.36	3.4	34.31	3.4	34.32	5.5	34.37	7.1	34.47
800	2.6	34.51	3.1	34.38	2.8	34.45	3.2	34.38	3.1	34.35	3.2	34.37	4.8	34.35	6.3	34.42
900	2.5	34.57	3.0	34.44	2.6	34.50	2.9	34.42	2.9	34.40	3.1	34.42	4.1	34.35	5.6	34.41
1000	2.5	34.63	2.8	34.48	2.5	34.57	2.8	34.49	2.8	34.46	2.9	34.48	3.6	34.36	4.5	34.35

station	JA46073	
date	2005/03/17	
time(UT)	11:54	
latitude	45-01.3S	
longitude	150-19.1E	
depth	temp	salinity
0	13.9	34.91
10	13.9	34.92
20	13.9	34.93
30	14.0	35.02
50	14.0	35.08
75	13.6	35.06
100	11.4	34.93
125	11.2	35.00
150	10.8	34.94
200	10.2	34.85
250	9.5	34.73
300	9.1	34.66
400	8.5	34.57
500	8.1	34.53
600	7.5	34.51
700	6.6	34.45
800	5.8	34.43
900	5.1	34.42
1000	4.3	34.43

Table 3. XBT observation data.

NUMBER	DATE UT	TIME	POSITION		TEMPERATURE (degC)														S.L. (m)	AIR TEMP. (degC)	
					DEPTH (m)																
			LAT.	LONG.	0 500	10 550	20 600	30 650	50 700	75 750	100	125	150	200	250	300	350	400			450
JA460001B	2004/12/09	16:53	60-13.7S	105-15.6E	0.0 2.0	0.0 1.9	0.0 1.9	-0.1 1.9	-0.2 1.8	-0.5 1.8	-1.0	-1.0	-0.9	1.2	1.8	1.9	1.9	2.0	2.0	63	1.3
JA460002B	2004/12/10	01:12	60-25.0S	101-18.6E	-0.4 1.7	-0.5 1.7	-0.5 1.7	-0.5 1.6	-0.6 1.5	-0.6 1.5	-1.0	-0.5	0.2	1.0	1.5	1.6	1.7	1.8	1.7	87	0.2
JA460003B	2004/12/10	09:18	60-41.5S	097-24.7E	-0.2 1.7	-0.2 1.7	-0.2 1.6	-0.4 1.6	-0.4 1.5	-0.9 1.5	-0.6	0.4	1.0	1.4	1.5	1.7	1.7	1.7	1.6	69	0.1
JA460004B	2004/12/10	16:55	60-47.0S	093-41.5E	-0.2 1.8	-0.2 1.7	-0.2 1.7	-0.3 1.8	-0.4 1.7	-0.5 1.7	-1.0	-0.4	-0.1	0.9	1.3	1.5	1.6	1.7	1.7	73	-0.2
JA460005B	2004/12/11	02:09	60-59.2S	089-18.4E	0.5 1.9	0.5 1.9	0.5 1.4	0.5 1.5	0.4 1.5	-0.3 1.5	-0.5	-0.2	0.3	1.4	1.9	1.9	1.8	1.9	2.0	65	0.5
JA460006B	2004/12/11	17:57	61-18.9S	081-37.3E	-0.1 1.9	-0.1 1.8	-0.1 1.8	-0.4 1.7	-0.9 1.8	-1.3 1.7	-0.8	0.6	1.0	1.7	1.9	1.9	1.9	1.9	1.9	21	-0.4
JA460007B	2004/12/12	02:08	61-31.7S	077-40.7E	-0.1 2.1	-0.3 2.0	-0.4 1.9	-0.5 2.0	-1.5 1.9	-1.5 2.0	-1.5	-0.9	0.5	1.4	1.9	2.0	2.0	2.0	2.0	26	0.9
JA460008B	2004/12/12	10:08	61-42.6S	073-51.9E	-0.3 2.0	-0.4 2.0	-0.8 2.0	-0.9 1.9	-1.6 1.9	-1.6 1.9	-0.3	0.8	1.6	1.8	1.9	2.0	2.0	2.0	2.0	46	1.5
JA460009B	2004/12/12	17:58	61-52.6S	070-02.8E	-0.6 1.9	-0.7 1.9	-0.8 1.9	-0.8 1.9	-1.4 1.9	-1.5 1.9	-0.9	1.2	1.5	1.8	1.9	2.0	2.0	2.0	2.0	45	0.3
JA460010B	2005/02/25	16:58	63-54.9S	051-01.2E	1.1 1.4	1.1 1.4	1.1 1.4	1.1 1.3	1.0 1.3	-0.9 1.2	0.9	1.0	1.5	1.6	1.6	1.7	1.7	1.5	1.5	52	2.0
JA460011B	2005/02/26	16:59	63-59.0S	062-02.2E	0.8 1.6	0.8 1.6	0.8 1.5	0.8 1.5	0.0 1.4	0.0 1.4	1.2	1.5	1.7	1.8	1.7	1.7	1.7	1.7	1.6	44	2.0
JA460012B	2005/02/27	15:52	63-46.6S	070-27.0E	0.9 1.4	0.9 -	0.9 -	-	-	-1.2 1.3	-0.9	0.4	1.2	1.5	1.4	1.6	1.6	1.5	1.5	-	0.0
JA460013B	2005/02/28	06:52	62-21.0S	076-16.1E	1.1 2.0	1.1 2.0	1.1 2.0	1.1 2.0	1.1 1.9	-1.1 1.9	-0.4	1.2	1.6	1.8	2.0	2.0	2.0	2.0	2.0	60	0.2
JA460014B	2005/03/01	14:52	62-01.2S	079-58.0E	1.1 1.9	1.0 2.0	1.0 1.9	0.9 1.8	0.6 1.8	-0.9 1.8	-0.5	0.9	1.3	1.8	1.9	1.9	2.0	2.0	2.0	41	1.4
JA460015B	2005/03/02	14:55	65-55.6S	077- 0.4E	-0.8 0.6	-0.5 0.8	-0.5 1.0	-1.3 1.1	-1.7 1.2	-1.8 1.2	-1.8	-1.8	-1.7	-1.8	-1.7	-1.6	-0.9	-0.1	0.2	24	-0.8

NUMBER	DATE	TIME	POSITION		TEMPERATURE (degC)														S.L.	AIR	
					DEPTH (m)																
			LAT.	LONG.	0	10	20	30	50	75	100	125	150	200	250	300	350	400			450
JA460016B	2005/03/06	13:54	63-59.2S	093-58.6E	0.3	0.3	0.3	0.2	0.3	-0.7	-1.4	-1.7	-1.5	-1.1	-0.5	0.0	0.4	0.5	0.8	57	0.5
					0.9	0.9	0.8	0.8	0.8	0.7											
JA460017B	2005/03/07	13:51	63-51.3S	104-05.6E	0.6	0.6	0.6	0.5	0.4	-1.0	-1.4	-1.4	-0.8	-0.4	0.6	0.8	1.3	1.4	1.3	46	-1.1
					1.2	1.2	1.2	1.1	1.1	1.1											
JA460018B	2005/03/08	12:52	63-59.1S	114-12.1E	0.3	0.3	0.3	0.3	0.3	-1.3	-1.7	-1.6	-1.2	0.4	0.8	1.1	1.0	1.0	1.1	60	-5.5
					1.1	1.1	1.0	0.9	0.8	0.8											
JA460019B	2005/03/09	11:52	63-58.6S	123-44.1E	1.1	1.1	1.1	1.0	1.0	-1.0	-0.5	0.4	0.9	1.4	1.5	1.5	1.4	1.4	1.5	60	-1.6
					1.4	1.4	1.2	1.2	1.3	1.2											
JA460020B	2005/03/10	11:55	64-07.8S	133-12.8E	1.3	1.3	1.3	1.3	0.7	-1.3	-1.6	-1.6	-1.5	-1.3	-1.2	-1.2	0.2	1.2	1.3	45	-4.9
					1.3	1.3	1.2	1.2	0.9	0.8											
JA460021B	2005/03/11	10:53	63-59.7S	139-20.7E	1.6	1.5	1.5	1.5	0.3	-0.8	-0.6	-0.6	-0.2	1.1	0.8	1.4	1.4	1.4	1.4	42	0.9
					1.5	1.4	1.4	1.4	1.3	1.3											
JA460022B	2005/03/12	10:51	63-46.2S	145-58.4E	1.4	1.3	1.3	1.2	1.2	0.2	1.7	1.9	2.0	2.0	1.9	2.0	1.9	1.9	2.0	52	2.0
					1.9	1.9	1.9	1.8	1.8	1.7											

Table 4. Serial and CTD observation data.

station : 02

Beginning of cast

Date : December 06, 2004
 Time(UT) : 0552
 Latitude : 45-46.9S
 Longitude : 110-01.3E
 Depth : 3,762 (m)

Time(UT) : 0600
 Weather : r
 Air Temperature (dry) : 11.4 (degC)
 Humidity : 87 (%)
 Atmospheric Pressure : 1007.1 (hPa)

Wind direction : NW
 Velocity : 29 (kn)
 Wave : 4
 Swell : NNW/4
 Visibility : 7 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate	Nitrite (μ mol/l)	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	8.9	34.357	8.25	301.6	0.81	0.0	0.36	13.90	-	10	8.582	34.346
54	9.155	-	8.21	306.8	0.77	0.0	0.22	12.39	-	20	8.564	34.341
81	8.761	-	8.21	296.7	0.90	1.2	0.28	13.91	-	30	8.521	34.337
106	8.500	34.483	8.20	295.3	0.92	1.6	0.31	14.47	-	50	8.362	34.313
131	8.409	-	8.22	300.6	0.93	1.8	0.31	15.01	-	75	8.299	34.368
156	8.416	-	8.20	292.3	0.97	2.4	0.30	18.06	-	100	8.898	34.513
207	8.176	34.461	8.19	290.5	0.99	3.2	0.05	17.07	-	125	8.581	34.488
260	7.782	34.396	8.16	295.8	1.07	3.4	0.05	17.62	-	150	8.423	34.466
310	7.570	34.377	8.16	289.4	1.15	4.4	0.03	18.38	-	200	8.326	34.469
409	6.706	34.276	8.09	294.6	1.27	5.7	0.02	20.91	-	250	8.046	34.437
510	6.821	34.398	8.07	245.2	1.50	12.2	0.01	24.03	-	300	7.794	34.398
611	5.751	-	8.07	246.8	1.66	16.7	0.01	27.24	-	400	7.306	34.364
711	4.875	34.304	8.05	242.1	1.82	22.8	0.01	29.15	-	500	6.922	34.366
810	4.261	34.299	8.03	232.9	2.03	28.9	0.00	30.19	-	600	6.250	34.362
910	3.807	34.320	8.00	226.5	1.97	36.6	0.00	31.68	-	700	5.043	34.275
1011	3.513	34.352	7.98	221.7	-	-	-	-	-	800	4.412	34.280
1281	2.976	34.484	7.98	198.7	-	-	-	-	-	1000	3.530	34.333
1514	2.690	34.573	8.00	192.7	2.16	71.1	0.00	33.88	-	1200	2.986	34.407
2009	2.351	34.709	8.02	220.2	1.99	79.2	0.00	31.49	-	1500	2.699	34.561
2502	1.913	-	8.02	224.9	1.93	92.3	0.00	30.96	-	2000	2.366	34.704
2846	1.512	-	7.99	224.7	2.02	106.0	0.00	31.57	-	2500	1.921	34.744

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 03

Beginning of cast

Date : December 07, 2004
 Time(UT) : 0558
 Latitude : 50-46.5S
 Longitude : 110-01.0E
 Depth : 3,300 (m)

Time(UT) : 0600
 Weather : r
 Air Temperature (dry) : 7.0 (degC)
 Humidity : 91 (%)
 Atmospheric Pressure : 999.2 (hPa)

Wind direction : NNW
 Velocity : 30 (kn)
 Wave : 4
 Swell : W/4
 Visibility : 3 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	4.5	33.969	8.20	339.5	1.47	0.0	0.50	22.55	-	10	3.829	33.955
55.2	3.921	33.944	8.23	339.3	1.48	0.0	0.44	22.24	-	20	3.821	33.956
78.0	3.134	33.963	8.21	337.4	1.70	1.2	0.56	23.94	-	30	3.802	33.956
107.9	2.665	33.972	8.20	335.9	1.78	8.5	0.42	24.93	-	50	3.682	33.962
130.5	2.466	33.978	8.19	324.2	1.81	12.0	0.45	25.79	-	75	3.244	33.969
156.1	2.209	33.983	8.18	344.7	1.85	15.1	0.39	26.55	-	100	2.836	33.983
207.4	2.296	-	8.14	308.3	2.01	23.8	0.27	28.71	-	125	2.628	33.977
258.1	2.216	34.110	8.10	279.8	2.11	31.8	0.23	30.59	-	150	2.369	33.982
308.5	2.307	34.186	8.08	254.1	2.18	39.1	0.14	32.08	-	200	2.084	34.013
407.4	2.387	34.310	8.03	223.5	2.30	52.1	0.18	33.88	-	250	2.059	34.058
509.1	2.386	34.401	8.02	205.0	2.39	61.3	0.20	34.70	-	300	1.715	34.086
607.9	2.399	34.479	8.01	193.6	2.39	68.5	0.19	34.93	-	400	2.421	34.272
707.9	2.387	34.541	8.00	188.5	2.36	72.5	0.21	33.90	-	500	2.374	34.376
809.0	2.368	34.595	8.01	189.4	2.31	75.4	0.21	33.56	-	600	2.347	34.466
907.2	2.334	34.634	8.01	190.0	2.28	76.9	0.01	33.09	-	700	2.388	34.542
1008.5	2.288	34.666	8.02	192.4	2.23	78.6	0.06	32.44	-	800	2.374	34.596
1255.5	2.159	34.725	8.04	201.7	2.10	81.6	0.01	30.73	-	1000	2.270	34.667
1505.8	2.011	34.742	8.07	208.5	2.08	84.8	0.01	30.55	-	1200	2.143	34.709
1977.7	1.524	34.736	8.05	214.7	2.10	97.8	0.00	31.05	-	1500	1.994	34.746

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 04

Beginning of cast

Date : December 08, 2004
 Time(UT) : 0555
 Latitude : 55-52.2S
 Longitude : 09-28.5E
 Depth : 3,895 (m)

Time(UT) : 0600
 Weather : b
 Air Temperature (dry) : 4.3 (degC)
 Humidity : 79 (%)
 Atmospheric Pressure : 1006.8 (hPa)

Wind direction : NNW
 Velocity : 14 (kn)
 Wave : 4
 Swell : NW/4
 Visibility : 20 (km)

Water Sampling by Niskin bottles											Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium		Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	2.3	33.969	8.14	347.5	1.79	20.4	0.39	27.51	-		10	1.878	33.931
55	1.740	33.934	8.15	348.5	1.78	20.1	0.24	27.50	-		20	1.831	33.933
77	1.347	-	8.16	349.2	1.87	21.1	0.23	27.71	-		30	1.774	33.933
105	0.702	33.963	8.16	348.8	1.94	25.8	0.22	28.54	-		50	1.710	33.934
128	0.498	33.965	8.16	337.0	1.95	27.0	0.13	28.60	-		75	1.657	33.935
154	0.348	33.972	8.15	359.5	1.96	28.3	0.07	29.12	-		100	0.820	33.946
204	1.104	-	8.07	286.3	2.16	42.1	0.00	32.32	-		125	0.612	33.963
257	1.940	-	7.99	211.8	2.38	61.9	0.00	35.59	-		150	0.357	33.977
306	2.103	34.446	7.98	194.7	2.39	67.9	0.00	35.86	-		200	1.354	34.203
407	2.204	34.536	7.98	185.6	2.38	73.9	0.00	35.75	-		250	1.927	34.361
505	2.218	34.603	7.98	182.3	2.33	77.4	0.00	34.60	-		300	2.048	34.426
607	2.145	34.645	8.00	184.1	2.29	80.5	0.00	34.21	-		400	2.181	34.521
706	2.145	34.680	8.00	187.6	2.23	81.2	0.00	33.53	-		500	2.241	34.594
805	2.089	34.705	8.02	193.0	2.18	83.2	0.00	32.62	-		600	2.202	34.638
905	2.040	34.719	8.03	195.3	2.14	84.0	0.00	32.04	-		700	2.145	34.673
1005	1.961	34.731	8.03	199.3	2.14	86.3	0.00	31.99	-		800	2.099	34.697
1259	1.800	34.744	8.03	203.6	2.10	91.0	0.00	31.30	-		1000	1.981	34.725
1506	1.576	34.744	8.04	207.6	2.10	98.2	0.00	31.27	-		1200	1.849	34.739
2003	1.153	34.726	8.03	214.0	2.16	110.8	0.00	32.03	-		1500	1.577	34.741
2501	0.735	34.708	8.03	221.0	2.23	123.1	0.00	32.84	-		2000	1.145	34.721
2998	0.391	34.688	8.00	229.8	2.23	131.8	0.00	33.16	-		2500	0.732	34.699
3488	0.172	34.679	8.00	236.3	2.25	136.9	0.00	33.18	-		3000	0.392	34.681
3794	0.113	34.675	7.99	237.4	-	-	-	-	-		3500	0.165	34.672

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 05

Beginning of cast

Date	: December 09, 2004	Time(UT)	: 0600	Wind direction	: NNE
Time(UT)	: 0557	Weather	: f	Velocity	: 10 (kn)
Latitude	: 60-03.7S	Air Temperature (dry)	: 1.8 (degC)	Wave	: 3
Longitude	: 108-51.4E	Humidity	: 87 (%)	Swell	: WNW/3
Depth	: 4,334 (m)	Atmospheric Pressure	: 1008.3 (hPa)	Visibility	: 0.3 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.5	33.944	8.15	364.5	1.82	38.5	0.37	28.30	-	10	-0.286	33.898
52	-0.590	33.901	8.18	366.6	1.79	38.5	0.24	27.96	-	20	-0.363	33.898
80	-0.916	33.936	8.17	364.6	1.85	40.7	0.23	28.55	-	30	-0.380	33.900
101	-1.135	33.977	8.17	354.1	1.93	43.8	0.22	29.33	-	50	-0.406	33.901
128	-0.972	34.093	8.14	312.8	2.06	51.0	0.13	31.36	-	75	-0.657	33.917
155	-0.498	34.184	8.10	303.2	2.11	56.6	0.07	32.53	-	100	-1.170	33.983
204	1.236	34.469	8.01	212.7	2.28	74.3	0.00	34.82	-	125	-0.934	34.116
255	1.710	34.569	7.99	192.5	2.30	81.0	0.00	34.44	-	150	-0.001	34.288
305	1.794	34.615	8.01	189.1	2.29	83.9	0.00	34.43	-	200	1.402	34.518
404	1.818	34.670	8.03	193.5	2.22	86.9	0.00	33.44	-	250	1.601	34.583
505	1.813	34.698	8.03	196.1	2.16	89.2	0.00	32.94	-	300	1.799	34.634
604	1.822	34.720	8.04	197.2	2.14	90.7	0.00	32.34	-	400	1.803	34.677
705	1.761	34.732	8.05	200.7	2.14	92.7	0.00	31.95	-	500	1.748	34.696
806	1.640	34.734	8.06	203.4	2.13	95.8	0.00	31.81	-	600	1.726	34.716
906	1.563	34.736	8.07	207.3	2.12	98.5	0.00	31.62	-	700	1.726	34.731
1005	1.456	34.735	8.06	208.8	2.13	101.3	0.00	31.78	-	800	1.664	34.737
1253	1.262	34.731	8.06	210.7	2.15	108.8	0.00	31.81	-	1000	1.474	34.736
1503	1.061	34.723	8.06	212.5	2.18	115.7	0.00	32.36	-	1200	1.324	34.735
2004	0.672	34.701	8.04	220.0	2.22	126.3	0.00	32.87	-	1500	1.052	34.723
2503	0.360	-	8.04	226.8	2.26	134.8	0.00	33.52	-	2000	0.695	34.702
3003	0.148	-	8.03	234.9	2.26	138.4	0.00	33.21	-	2500	0.364	34.684
3502	0.008	34.673	8.02	241.1	2.27	139.0	0.00	33.19	-	3000	0.148	34.676
4002	-0.057	-	8.01	244.5	2.27	140.3	0.00	33.22	-	3500	0.008	34.671
										4000	-0.058	34.664

ITS-90 : International Temperature Scale of 1990.
PSS78 : Practical Salinity Scale of 1978.

station : 07

Beginning of cast

Date : February 26, 2005
 Time(UT) : 1002
 Latitude : 63-57.6S
 Longitude : 060-16.2E
 Depth : 4,415 (m)

Time(UT) : 1000
 Weather : bc
 Air Temperature (dry) : 2.1 (degC)
 Humidity : 75 (%)
 Atmospheric Pressure : 990.1 (hPa)

Wind direction : W
 Velocity : 230(kn)
 Wave : 4
 Swell : NNW/4
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.7	33.871	8.06	342.1	1.87	45.6	0.28	27.97	-	10	1.443	33.786
53	-0.118	33.922	8.06	344.2	1.98	48.4	0.15	28.36	-	20	1.435	33.787
79	-1.131	-	8.03	319.3	2.11	56.9	0.08	30.36	-	30	1.436	33.787
103	0.008	34.290	7.97	270.9	2.25	67.5	0.06	32.18	-	50	0.948	33.884
126	1.142	-	7.91	211.9	2.42	80.1	0.11	34.88	-	75	-0.937	34.157
152	1.460	34.542	7.90	197.8	2.44	84.0	0.08	35.33	-	100	0.761	34.433
205	1.736	34.614	7.90	187.9	2.41	87.0	0.00	35.20	-	125	1.352	34.519
259	1.756	34.643	7.91	187.5	2.36	89.2	0.00	34.53	-	150	1.551	34.562
308	1.752	34.666	7.91	187.7	2.36	90.0	0.00	33.96	-	200	1.673	34.607
410	1.743	-	-	-	-	-	-	-	-	250	1.749	34.642
505	1.700	34.716	7.94	201.1	2.23	91.7	0.00	32.25	-	300	1.757	34.665
607	1.663	34.728	7.94	203.0	2.20	92.6	0.00	32.10	-	400	1.729	34.694
710	1.606	34.737	7.94	206.9	2.17	93.8	0.00	31.85	-	500	1.716	34.713
808	1.511	34.737	7.94	209.4	2.18	96.2	0.00	31.76	-	600	1.634	34.720
908	1.437	34.738	7.94	213.4	2.17	97.8	0.00	31.72	-	700	1.608	34.728
1007	1.321	-	7.95	213.5	2.17	101.1	0.00	31.54	-	800	1.473	34.728
1260	1.057	-	7.94	216.6	2.22	108.0	0.00	32.24	-	1000	1.293	34.727
1506	0.835	-	-	-	-	-	-	-	-	1200	1.110	34.719
2004	0.480	34.693	7.92	223.4	2.31	125.3	0.00	33.78	-	1500	0.815	34.706
2495	0.226	34.680	7.91	229.7	2.33	132.2	0.00	33.60	-	2000	0.481	34.688
2596	0.185	34.679	7.91	232.1	2.33	133.0	0.00	33.42	-	2500	0.225	34.675

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 08

Beginning of cast

Date : February 27, 2005
 Time(UT) : 0851
 Latitude : 64-00.2S
 Longitude : 068-53.4E
 Depth : 3,483 (m)

Time(UT) : 0900
 Weather : c
 Air Temperature (dry) : 0.1(degC)
 Humidity : 80 (%)
 Atmospheric Pressure : 994.1 (hPa)

Wind direction : N
 Velocity : 10 (kn)
 Wave : 3
 Swell : NNW/3
 Visibility : 20 (km)

Water Sampling by Niskin bottles											Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium		Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.0	33.767	8.13	343.7	1.86	50.2	0.22	27.56	-		10	0.743	33.750
55	-0.976	34.127	8.11	313.6	2.05	58.4	0.08	29.83	-		20	0.726	33.748
81	1.041	-	7.99	213.6	2.35	81.6	0.09	33.63	-		30	0.710	33.751
107	1.474	34.592	7.98	195.3	2.37	87.5	0.05	34.53	-		50	-1.332	34.142
130	1.621	34.632	7.97	190.2	2.35	89.3	0.00	33.92	-		75	-1.579	34.205
156	1.639	-	7.98	189.8	2.33	89.9	0.00	33.81	-		100	-1.463	34.253
207	1.708	-	7.98	191.0	2.26	90.7	0.00	32.80	-		125	-0.780	34.338
260	1.723	34.713	7.99	194.0	2.24	91.2	0.00	32.27	-		150	0.018	34.462
308	1.630	34.716	8.00	196.2	2.22	92.5	0.00	32.15	-		200	0.627	34.551
408	1.521	34.725	8.01	195.0	2.20	94.7	0.00	31.48	-		250	1.219	34.632
512	1.434	34.733	8.03	205.5	2.16	97.9	0.00	31.66	-		300	1.260	34.653
607	1.361	34.736	8.03	208.4	2.17	99.7	0.00	31.36	-		400	1.260	34.670
706	1.193	-	8.02	210.9	2.17	103.3	0.00	31.58	-		500	1.231	34.714
806	1.042	-	8.02	212.5	2.19	107.1	0.00	31.86	-		600	1.067	34.687
906	0.927	-	8.02	214.5	2.21	109.9	0.00	32.15	-		700	0.897	34.696
1007	0.835	-	8.00	215.2	2.22	113.0	0.00	32.11	-		800	0.852	34.689
1259	0.635	-	8.00	217.0	2.28	120.8	0.03	33.09	-		1000	0.755	34.669
1504	0.455	-	7.99	220.3	2.30	126.0	0.02	33.26	-		1200	0.590	34.685
2005	0.168	-	7.99	228.9	2.29	129.5	0.00	33.04	-		1500	0.430	34.655
2499	-0.011	-	7.98	233.8	2.30	136.9	0.02	33.46	-		2000	0.158	34.625
2998	-0.138	-	7.97	241.9	2.30	132.7	0.00	33.06	-		2500	-0.002	34.652
3300	-0.233	-	7.97	245.2	2.30	146.0	0.02	33.12	-		3000	-0.138	34.644

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 09

Beginning of cast

Date : March 02, 2005
 Time(UT) : 0248
 Latitude : 64-20.3S
 Longitude : 079-29.0E
 Depth : 3,646 (m)

Time(UT) : 0300
 Weather : bc
 Air Temperature (dry) : 1.0 (degC)
 Humidity : 77 (%)
 Atmospheric Pressure : 993.6 (hPa)

Wind direction : W
 Velocity : 8 (kn)
 Wave : 2
 Swell : WNW/1
 Visibility : 30 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.1	33.688	8.10	347.6	1.66	34.1	0.24	26.08	-	10	0.725	33.688
52	-1.124	34.113	8.03	311.6	2.12	60.0	0.11	30.58	-	20	0.544	33.756
79	-1.033	34.225	7.99	289.0	2.19	67.0	0.13	31.81	-	30	0.254	33.839
104	-0.678	-	-	-	-	-	-	-	-	50	-1.074	34.140
128	-0.237	34.393	7.96	254.5	2.27	76.0	0.02	33.20	-	75	-0.897	34.267
153	0.128	-	7.96	241.8	2.29	79.8	0.00	33.43	-	100	-0.469	34.356
200	0.921	34.570	7.92	215.6	2.31	86.3	0.00	34.02	-	125	-0.025	34.432
251	1.200	34.628	7.92	207.3	2.29	89.2	0.00	33.62	-	150	0.460	34.502
300	1.418	34.672	7.92	200.7	2.29	91.5	0.00	33.37	-	200	0.993	34.587
400	1.578	34.714	7.93	200.7	2.22	93.6	0.00	32.68	-	250	1.343	34.655
506	1.489	34.723	7.95	203.8	2.21	95.7	0.00	32.64	-	300	1.425	34.677
602	1.395	34.728	7.94	207.2	-	-	-	-	-	400	1.384	34.696
702	1.299	34.727	7.94	209.4	2.19	100.6	0.00	31.98	-	500	1.436	34.716
802	1.177	34.723	7.94	211.5	2.20	103.5	0.00	32.11	-	600	1.387	34.726
902	1.098	34.723	7.95	214.1	2.22	106.7	0.00	32.06	-	700	1.257	34.720
1000	1.006	34.720	7.94	212.9	2.23	110.3	0.00	32.29	-	800	1.206	34.725
1255	0.782	34.711	7.95	216.8	2.26	117.9	0.00	33.02	-	1000	1.014	34.720
1503	0.573	34.699	7.92	217.4	2.30	124.6	0.00	33.51	-	1200	0.832	34.711
2002	0.292	34.683	7.91	224.1	2.33	131.3	0.00	33.60	-	1500	0.593	34.697
2503	0.081	34.676	7.90	231.3	2.33	135.5	0.00	33.59	-	2000	0.299	34.679
3001	-0.050	34.671	7.89	238.3	2.30	133.8	0.00	33.57	-	2500	0.084	34.675
3506	-0.157	34.667	7.87	242.7	2.32	133.6	0.00	33.45	-	3000	-0.047	34.665
										3500	-0.155	34.659

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 10

Beginning of cast

Date : March 06, 2005
 Time(UT) : 0654
 Latitude : 64-00.8S
 Longitude : 091-47.9E
 Depth : 3,413 (m)

Time(UT) : 0700
 Weather : s
 Air Temperature (dry) : 0.1 (degC)
 Humidity : 91 (%)
 Atmospheric Pressure : 996.4 (hPa)

Wind direction : NNE
 Velocity : 16 (kn)
 Wave : 2
 Swell : NE/1
 Visibility : 10 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.6	33.935	8.02	350.3	1.85	53.9	0.18	27.49	-	10	0.248	33.928
53	-0.629	34.082	8.02	342.1	1.96	58.5	0.11	29.01	-	20	0.217	33.930
78	-1.484	34.213	8.00	327.3	2.10	64.5	0.10	30.78	-	30	0.190	33.936
103	-1.732	-	7.97	320.7	2.14	66.3	0.07	31.48	-	50	-0.933	34.141
128	-1.756	34.286	7.97	320.6	2.16	66.3	0.04	31.75	-	75	-1.542	34.226
153	-1.762	34.298	7.97	320.9	2.14	66.3	0.04	31.85	-	100	-1.736	34.274
203	-1.700	34.320	7.95	318.4	2.16	67.1	0.00	32.00	-	125	-1.751	34.287
254	-1.461	34.377	7.96	312.4	2.17	70.4	0.00	32.00	-	150	-1.760	34.298
304	-0.579	34.479	7.91	271.1	2.23	80.6	0.00	32.68	-	200	-1.700	34.326
408	0.644	34.640	7.89	230.9	2.25	93.8	0.00	33.06	-	250	-1.276	34.385
504	1.125	34.710	7.89	212.1	2.22	101.2	0.00	32.84	-	300	-0.544	34.485
607	1.037	34.715	7.88	211.1	2.24	106.3	0.00	32.89	-	400	0.661	34.660
703	0.970	34.715	7.88	212.9	2.24	110.0	0.00	32.99	-	500	1.028	34.708
805	0.889	34.713	7.87	214.2	2.26	113.3	0.00	33.13	-	600	1.033	34.722
904	0.778	34.708	7.87	216.9	2.26	116.4	0.00	33.24	-	700	0.966	34.720
1005	0.686	34.705	7.87	217.0	2.29	119.4	0.00	33.39	-	800	0.879	34.715
1254	0.455	34.692	7.85	224.6	2.28	123.3	0.00	33.63	-	1000	0.708	34.709
1503	0.280	34.687	7.85	227.1	2.32	128.5	0.00	33.94	-	1200	0.499	34.697
2002	0.030	34.677	7.84	234.4	2.32	130.1	0.00	33.92	-	1500	0.281	34.686
2499	-0.097	34.673	7.84	240.1	2.31	132.1	0.00	33.70	-	2000	0.035	34.679
2998	-0.169	34.668	7.82	244.6	2.30	129.0	0.00	33.60	-	2500	-0.105	34.670
3302	-0.223	34.663	7.81	246.3	2.33	133.5	0.03	33.79	-	3000	-0.176	34.665

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 11

Beginning of cast

Date : March 07, 2005
 Time(UT) : 0644
 Latitude : 63-50.5S
 Longitude : 101-09.7E
 Depth : 1,278 (m)

Time(UT) : 0700
 Weather : c
 Air Temperature (dry) : 0.6 (degC)
 Humidity : 85 (%)
 Atmospheric Pressure : 998.9 (hPa)

Wind direction : NE
 Velocity : 8 (kn)
 Wave : 2
 Swell : NNE/1
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.5	33.975	8.02	355.2	1.86	55.7	0.21	28.22	-	10	0.062	33.973
52	-0.171	33.992	8.02	351.9	1.91	56.8	0.18	28.67	-	20	0.027	33.972
78	-1.139	34.143	8.01	338.8	2.02	62.2	0.14	30.04	-	30	0.010	33.973
102	-1.712	34.237	7.98	327.5	2.12	66.7	0.16	31.39	-	50	-0.042	33.989
127	-1.720	34.291	7.97	317.3	2.16	66.9	0.18	32.13	-	75	-1.026	34.153
152	-1.751	34.306	7.97	316.7	2.16	66.8	0.06	32.07	-	100	-1.718	34.256
203	-1.654	34.330	7.95	314.6	2.16	67.4	0.01	32.11	-	125	-1.726	34.295
251	-1.238	34.396	7.93	299.2	2.19	72.3	0.01	32.43	-	150	-1.747	34.306
302	-0.964	34.451	7.92	288.7	2.20	75.8	0.00	32.69	-	200	-1.692	34.324
402	-0.051	34.586	7.90	252.4	2.23	90.1	0.00	32.91	-	250	-1.280	34.395
501	0.476	34.661	7.91	229.8	2.24	101.8	0.00	33.07	-	300	-0.813	34.476
602	0.487	34.673	7.88	226.5	2.25	107.6	0.00	33.25	-	400	0.003	34.601
702	0.405	34.676	7.89	226.9	2.27	113.6	0.05	33.48	-	500	0.509	34.672
803	0.333	34.678	7.89	225.9	2.29	118.4	0.00	33.63	-	600	0.476	34.681
903	0.252	34.677	7.86	226.9	2.28	121.5	0.00	33.72	-	700	0.382	34.680
1002	0.174	34.676	7.85	228.5	2.30	124.6	0.02	33.77	-	800	0.329	34.683
1203	-0.004	34.670	7.86	231.4	2.33	130.0	0.03	33.99	-	1000	0.165	34.680
										1200	-0.006	34.673

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 12

Beginning of cast

Date : March 08, 2005
 Time(UT) : 0546
 Latitude : 64-01.1S
 Longitude : 110-40.7E
 Depth : 2,886 (m)

Time(UT) : 0600
 Weather : bc
 Air Temperature (dry) : -4.9 (degC)
 Humidity : 66 (%)
 Atmospheric Pressure : 1003.8 (hPa)

Wind direction : E
 Velocity : 17 (kn)
 Wave : 3
 Swell : ESE/1
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.6	34.084	8.03	342.6	1.97	58.8	0.22	28.86	-	10	0.387	34.087
54	0.433	34.102	8.03	337.7	1.96	60.5	0.21	29.17	-	20	0.382	34.089
79	0.386	34.526	7.95	241.5	2.26	84.7	0.19	32.92	-	30	0.369	34.091
103	0.879	34.626	7.91	215.7	2.32	90.4	0.08	33.80	-	50	0.363	34.092
127	1.172	34.673	7.90	205.4	2.30	93.7	0.02	33.85	-	75	-0.548	34.417
154	1.322	34.696	7.90	202.6	2.31	94.9	0.03	33.64	-	100	0.573	34.593
204	1.389	34.713	7.90	204.6	2.29	96.3	0.01	33.48	-	125	0.987	34.668
255	1.368	34.721	7.90	202.6	2.28	98.1	0.01	33.45	-	150	1.171	34.699
305	1.328	34.723	7.90	203.8	2.27	99.5	0.01	33.25	-	200	1.302	34.721
404	1.236	34.723	7.89	207.8	2.27	102.2	0.05	33.35	-	250	1.320	34.729
505	1.126	34.721	7.90	210.2	2.27	105.2	0.00	33.29	-	300	1.310	34.735
606	1.013	34.716	7.89	211.6	2.27	108.2	0.04	33.25	-	400	1.222	34.735
704	0.867	-	7.89	218.0	2.30	110.3	0.03	33.54	-	500	1.117	34.730
803	0.754	34.701	7.89	217.8	2.30	113.2	0.00	33.48	-	600	0.988	34.723
904	0.622	34.694	7.89	220.7	2.30	116.1	0.02	33.69	-	700	0.858	34.714
1003	0.509	34.688	7.88	222.3	2.32	117.3	0.01	33.74	-	800	0.764	34.710
1251	0.302	34.679	7.87	228.3	2.34	121.4	0.01	33.94	-	1000	0.534	34.695
1499	0.154	34.676	7.87	229.5	2.34	125.1	0.02	34.28	-	1200	0.338	34.683
1701	0.079	34.676	7.85	232.7	2.34	127.0	0.01	34.02	-	1500	0.157	34.680

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 13

Beginning of cast

Date : March 09, 2005
 Time(UT) : 0446
 Latitude : 63-53.2S
 Longitude : 121-44.7E
 Depth : 3,802 (m)

Time(UT) : 0500
 Weather : c
 Air Temperature (dry) : 2.0 (degC)
 Humidity : 69 (%)
 Atmospheric Pressure : 997.8 (hPa)

Wind direction : ENE
 Velocity : 20 (kn)
 Wave : 4
 Swell : ESE/1
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.1	33.956	8.05	341.3	1.92	42.9	0.26	27.89	-	10	1.174	33.966
53	1.191	33.985	8.04	340.5	1.91	46.0	0.20	28.07	-	20	1.177	33.963
78	-0.600	34.313	8.00	307.6	2.15	67.3	0.06	31.09	-	30	1.179	33.965
102	0.131	34.491	7.95	250.4	2.32	80.4	0.22	33.13	-	50	1.181	33.964
128	1.019	34.613	7.90	213.0	2.36	87.8	0.00	33.88	-	75	-0.282	34.372
153	1.271	34.650	7.89	202.2	2.34	89.7	0.00	34.00	-	100	0.477	34.553
204	1.460	34.686	7.88	198.0	2.31	91.8	0.00	33.75	-	125	1.332	34.671
255	1.559	34.710	7.88	197.0	2.32	93.9	0.00	33.51	-	150	1.529	34.696
307	1.499	34.715	7.89	198.9	2.31	95.0	0.00	33.06	-	200	1.566	34.715
404	1.478	34.726	7.90	202.5	2.27	96.9	0.00	32.81	-	250	1.571	34.727
506	1.409	34.732	7.91	204.8	2.25	99.5	0.00	32.61	-	300	1.541	34.734
603	1.351	34.733	7.88	207.5	2.26	102.3	0.00	32.63	-	400	1.479	34.742
704	1.267	34.732	7.90	208.7	2.24	105.0	0.00	32.59	-	500	1.427	34.744
806	1.185	34.730	7.90	210.4	2.25	107.8	0.00	32.59	-	600	1.348	34.744
904	1.086	34.725	7.89	213.1	2.28	110.5	0.00	32.71	-	700	1.255	34.740
1003	1.021	34.723	7.89	213.2	2.27	113.1	0.00	32.77	-	800	1.180	34.738
1254	0.813	-	7.88	216.6	2.33	118.9	0.02	33.37	-	1000	1.019	34.730
1503	0.586	34.698	7.87	222.2	2.32	123.1	0.00	33.51	-	1200	0.850	34.719
2001	0.227	34.682	7.86	229.1	2.34	128.6	0.00	33.77	-	1500	0.567	34.699
2500	0.026	34.676	7.85	236.0	2.35	131.5	0.00	33.70	-	2000	0.216	34.680
3000	-0.097	34.672	7.83	241.7	2.34	131.8	0.00	33.80	-	2500	-0.003	34.671
3499	-0.218	34.663	7.81	246.3	2.32	130.5	0.00	33.54	-	3000	-0.095	34.668
3699	-0.311	34.653	7.82	252.0	2.32	125.3	0.00	33.40	-	3500	-0.218	34.659

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 14

Beginning of cast

Date : March 10, 2005
 Time(UT) : 0445
 Latitude : 64-00.0S
 Longitude : 131-42.3E
 Depth : 3,108 (m)

Time(UT) : 0500
 Weather : s
 Air Temperature (dry) : 1.7 (degC)
 Humidity : 88 (%)
 Atmospheric Pressure : 980.8 (hPa)

Wind direction : E
 Velocity : 20 (kn)
 Wave : 3
 Swell : ENE/1
 Visibility : 10 (km)

Water Sampling by Niskin bottles											Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium		Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.2	33.951	8.03	342.9	1.89	42.3	0.31	28.26	-		10	0.962	33.954
53	0.921	33.957	8.03	341.2	1.90	43.2	0.26	28.33	-		20	0.961	33.955
78	-0.992	34.227	7.99	327.0	2.12	61.0	0.17	31.40	-		30	0.966	33.954
105	-1.212	34.322	7.97	311.6	2.19	68.0	0.15	32.52	-		50	-0.438	34.167
130	-0.988	34.388	7.96	294.4	2.24	72.7	0.07	32.99	-		75	-1.110	34.297
157	-0.433	34.465	7.93	269.6	2.29	77.8	0.07	33.74	-		100	-1.092	34.351
205	0.257	34.553	7.91	244.4	2.26	83.4	0.00	33.70	-		125	-0.678	34.452
258	0.929	34.640	7.91	217.9	2.26	88.9	0.00	33.53	-		150	-0.346	34.501
307	1.186	34.679	7.89	210.3	2.23	91.6	0.00	33.39	-		200	0.224	34.578
405	1.257	34.702	7.90	210.1	2.23	94.7	0.00	33.11	-		250	0.827	34.640
506	1.205	34.715	7.91	212.0	2.20	99.7	0.00	32.92	-		300	1.058	34.675
606	1.144	34.716	7.90	212.3	2.20	102.4	0.00	32.77	-		400	1.258	34.716
708	1.085	34.722	7.91	212.8	2.23	107.2	0.00	32.81	-		500	1.217	34.721
805	1.065	34.723	7.91	214.9	2.23	109.7	0.00	32.94	-		600	1.103	34.722
906	0.996	34.719	7.88	213.4	2.24	112.0	0.00	33.07	-		700	0.990	34.717
1005	0.814	34.709	7.90	217.1	2.24	115.3	0.00	33.35	-		800	0.870	34.710
1255	0.550	34.695	7.88	222.4	2.28	121.1	0.00	33.86	-		1000	0.750	34.709
1504	0.364	34.691	7.87	225.3	2.30	130.3	0.00	33.91	-		1200	0.586	34.698
2000	0.080	34.675	7.85	234.7	2.30	129.0	0.01	34.05	-		1500	0.404	34.695
2498	-0.076	34.675	7.85	238.3	2.29	134.6	0.00	34.06	-		2000	0.111	34.681
2997	-0.236	34.661	7.83	248.2	2.29	115.4	0.00	33.54	-		2500	-0.055	34.675
											3000	-0.237	34.661

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 15

Beginning of cast

Date : March 11, 2005
 Time(UT) : 0345
 Latitude : 63-59.3S
 Longitude : 138-09.3E
 Depth : 3,587 (m)

Time(UT) : 0400
 Weather : s
 Air Temperature (dry) : 1.3 (degC)
 Humidity : 90 (%)
 Atmospheric Pressure : 975.6 (hPa)

Wind direction : NNE
 Velocity : 10 (kn)
 Wave : 3
 Swell : NNW/3
 Visibility : 10 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.4	33.931	8.05	341.6	1.87	37.8	0.29	27.72	-	10	1.107	33.940
53	-0.597	34.211	8.02	340.5	2.06	46.0	0.19	29.51	-	20	1.088	33.941
79	-1.145	34.262	7.99	317.4	2.22	67.3	0.21	32.05	-	30	1.030	33.947
104	-1.169	34.345	7.96	304.3	2.25	80.4	0.24	32.81	-	50	0.939	33.960
129	-0.898	34.400	7.95	290.8	2.26	87.8	0.01	33.21	-	75	-0.978	34.266
154	0.232	34.521	7.90	243.0	2.31	89.7	0.00	33.98	-	100	-1.167	34.330
204	0.751	34.593	7.88	224.5	2.32	91.8	0.00	34.04	-	125	-0.534	34.419
255	1.476	34.680	7.88	-	2.29	93.9	0.01	33.61	-	150	-0.214	34.478
305	1.259	34.674	7.87	207.0	2.28	95.0	0.00	33.55	-	200	0.767	34.593
405	1.432	34.708	7.88	204.5	2.25	96.9	0.00	33.08	-	250	0.743	34.607
506	1.376	34.715	7.90	206.9	2.24	99.5	0.01	32.88	-	300	0.985	34.646
606	1.304	34.720	7.89	209.6	2.22	102.3	0.00	32.63	-	400	1.363	34.706
705	1.304	34.728	7.90	210.9	2.22	105.0	0.00	32.53	-	500	1.331	34.715
806	1.162	34.722	7.89	212.0	2.23	107.8	0.00	32.82	-	600	1.320	34.724
906	1.071	34.717	7.88	-	2.25	110.5	0.00	32.93	-	700	1.299	34.730
1007	0.989	34.715	7.88	217.6	2.24	113.1	0.00	32.91	-	800	1.243	34.733
1256	0.878	34.718	7.87	220.5	2.28	118.9	0.00	33.31	-	1000	1.037	34.722
1505	0.638	34.701	7.87	220.3	2.31	123.1	0.00	33.51	-	1200	0.824	34.711
2005	0.282	34.685	7.84	227.4	2.32	128.6	0.00	33.80	-	1500	0.631	34.701
2502	0.089	34.678	7.84	233.8	2.31	131.5	0.00	33.93	-	2000	0.296	34.684
3002	-0.084	34.671	7.83	240.1	2.30	131.8	0.00	33.78	-	2500	0.087	34.676
3502	-0.289	34.657	7.81	250.4	2.30	130.5	0.01	33.63	-	3000	-0.082	34.670
										3500	-0.290	34.654

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 16

Beginning of cast

Date : March 13, 2005
 Time(UT) : 0247
 Latitude : 63-31.2S
 Longitude : 149-50.0E
 Depth : 3,761 (m)

Time(UT) : 0300
 Weather : c
 Air Temperature (dry) : 2.0 (degC)
 Humidity : 78 (%)
 Atmospheric Pressure : 983.5 (hPa)

Wind direction : NW
 Velocity : 8 (kn)
 Wave : 3
 Swell : WNW/3
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate ($\mu\text{mol/l}$)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.4	33.806	8.06	351.8	1.82	25.7	0.29	27.36	-	10	1.095	33.804
55	-0.036	33.989	8.02	341.1	2.19	41.1	0.21	29.65	-	20	1.087	33.803
79	0.417	34.367	7.94	255.0	2.42	69.9	0.34	34.35	-	30	1.083	33.803
103	1.516	34.538	7.87	194.1	2.51	80.5	0.08	36.48	-	50	1.033	33.812
132	1.903	34.590	7.85	182.1	2.48	83.0	0.00	36.35	-	75	-0.172	34.268
153	1.886	34.607	7.84	183.1	2.46	84.1	0.00	35.93	-	100	1.401	34.511
203	1.884	34.629	7.84	185.4	2.43	85.4	0.00	35.66	-	125	1.601	34.539
258	1.942	34.661	7.86	184.5	2.39	86.8	0.00	34.95	-	150	1.864	34.592
307	1.883	34.672	7.86	186.9	2.37	87.3	0.00	34.52	-	200	1.896	34.628
407	1.917	34.702	7.87	191.7	2.29	88.2	0.00	33.77	-	250	1.950	34.659
506	1.847	34.714	7.88	195.7	2.27	90.2	0.00	33.24	-	300	1.959	34.682
608	1.795	34.726	7.88	200.1	2.23	91.7	0.00	32.92	-	400	1.873	34.702
708	1.722	34.732	7.88	204.0	2.23	93.6	0.00	32.54	-	500	1.832	34.718
806	1.638	34.736	7.88	205.1	2.24	95.6	0.00	32.58	-	600	1.802	34.734
906	1.576	34.738	7.90	207.4	2.21	97.9	0.00	32.51	-	700	1.755	34.742
1005	1.502	34.740	7.89	209.7	2.20	100.7	0.00	32.26	-	800	1.673	34.743
1256	1.282	34.734	7.89	213.5	2.23	106.7	0.00	32.65	-	1000	1.483	34.742
1506	1.074	34.724	7.87	216.3	2.29	113.3	0.01	32.86	-	1200	1.317	34.738
2005	0.686	34.705	7.86	221.5	2.30	125.0	0.00	33.61	-	1500	1.092	34.727
2504	0.324	34.685	7.84	230.2	2.33	129.8	0.00	33.87	-	2000	0.683	34.705
3003	0.140	34.680	7.84	236.0	2.32	131.4	0.00	33.73	-	2500	0.323	34.687
3497	-0.036	34.673	7.81	242.5	2.30	130.3	0.00	33.64	-	3000	0.139	34.681
3705	-0.119	34.669	7.81	245.8	2.32	126.5	0.01	33.69	-	3500	-0.035	34.672

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 18

Beginning of cast

Date : March 15, 2005 Time(UT) : 0300 Wind direction : N
 Time(UT) : 0253 Weather : r Velocity : 25 (kn)
 Latitude : 56-25.5S Air Temperture (dry) : 5.7 (degC) Wave : 4
 Longitude : 150-03.2E Humidity : 93 (%) Swell : NNW/6
 Depth : 3,612 (m) Atmospheric Pressire : 988.5 (hPa) Visibility : 10 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	5.0	33.758	8.07	320.7	1.58	1.4	0.25	23.91	-	10	4.744	33.750
51	4.946	33.746	8.07	321.0	1.56	1.2	0.23	23.76	-	20	4.744	33.753
77	4.008	-	8.05	328.6	1.68	1.8	0.23	24.38	-	30	4.055	33.806
99	1.038	33.835	8.03	345.4	2.12	13.0	0.28	28.03	-	50	1.785	33.866
130	0.814	33.885	8.00	333.0	2.07	20.7	0.11	30.05	-	75	1.477	33.875
152	0.811	33.943	7.99	322.2	2.13	26.2	0.11	30.97	-	100	1.339	33.904
204	0.835	34.048	7.93	302.4	2.25	37.5	0.00	33.01	-	125	1.597	34.005
255	2.114	34.264	7.88	231.1	2.42	52.4	0.00	35.45	-	150	1.874	34.077
311	2.197	34.356	7.84	207.6	2.49	60.4	0.00	36.34	-	200	2.229	34.219
407	2.310	34.462	7.83	188.3	2.53	70.3	0.00	36.98	-	250	2.484	34.308
506	2.493	34.535	7.84	186.7	2.46	72.2	0.00	35.76	-	300	2.475	34.377
605	2.367	34.575	7.83	183.5	2.45	76.6	0.00	35.97	-	400	2.474	34.471
706	2.330	34.625	7.83	187.9	2.37	79.2	0.00	34.92	-	500	2.478	34.553
806	2.189	34.652	7.83	188.6	2.36	82.1	0.00	34.82	-	600	2.340	34.598
905	2.099	34.681	7.82	191.4	2.33	84.8	0.00	34.37	-	700	2.362	34.636
1004	2.118	34.709	7.84	197.6	2.25	84.9	0.00	33.17	-	800	2.264	34.670
1260	1.974	34.737	7.87	206.2	2.21	89.6	0.00	32.29	-	1000	2.173	34.719
1504	1.751	34.733	7.88	211.4	2.22	94.9	-	-	-	1200	1.999	34.736
1994	1.292	-	7.86	217.9	2.25	108.1	0.00	32.91	-	1500	1.770	34.750
2294	1.099	34.724	7.87	218.7	2.27	117.4	0.00	33.11	-	2000	1.290	34.736

ITS-90 : International Temperature Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

station : 19

Beginning of cast

Date	: March 16, 2005	Time(UT)	: 0300	Wind direction	: WSW
Time(UT)	: 0252	Weather	: bc	Velocity	: 16 (kn)
Latitude	: 51-28.9S	Air Temperature (dry)	: 9.2 (degC)	Wave	: 4
Longitude	: 149-57.1E	Humidity	: 77 (%)	Swell	: NW/3
Depth	: 4,227 (m)	Atmospheric Pressure	: 1009.1 (hPa)	Visibility	: 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	8.7	34.014	8.07	298.3	1.35	1.7	0.24	19.36	-	10	8.497	34.006
55	8.464	34.008	8.08	299.3	1.36	1.7	0.21	19.36	-	20	8.468	34.006
78	8.398	34.014	8.07	298.7	1.37	1.8	0.28	19.50	-	30	8.366	34.003
105	6.909	34.227	8.05	299.4	1.42	4.8	0.83	18.93	-	50	8.341	34.004
132	6.712	34.218	8.03	298.0	1.44	5.4	0.31	20.57	-	75	7.375	34.174
156	6.616	34.219	8.02	297.3	1.44	5.6	0.07	20.90	-	100	6.807	34.227
206	6.468	34.233	8.03	294.7	1.47	5.9	0.01	21.32	-	125	6.666	34.239
256	6.108	34.202	8.01	292.1	1.53	7.1	0.00	22.01	-	150	6.592	34.245
306	5.825	34.187	8.01	288.6	1.59	8.2	0.00	23.34	-	200	6.189	34.203
408	5.472	34.214	7.98	271.2	1.74	12.4	0.00	25.50	-	250	5.787	34.177
507	4.998	34.224	7.95	258.6	1.88	17.0	0.00	27.99	-	300	5.473	34.162
603	4.620	34.275	7.93	239.5	2.03	24.0	0.00	29.74	-	400	4.994	34.158
708	3.812	34.248	7.90	241.2	2.14	30.0	0.00	31.35	-	500	4.879	34.232
809	3.651	34.317	7.87	224.0	2.25	39.0	0.00	32.94	-	600	4.622	34.280
909	3.254	34.337	7.85	217.0	2.34	46.2	0.00	33.89	-	700	4.071	34.288
1019	3.184	34.420	7.82	197.9	2.39	57.6	0.00	34.53	-	800	3.523	34.303
1258	2.726	34.517	7.81	188.6	2.44	70.2	0.00	35.34	-	1000	3.073	34.385
1507	2.494	-	-	-	-	-	-	-	-	1200	2.786	34.498
2003	2.186	-	-	-	-	-	-	-	-	1500	2.503	34.615
2499	1.770	34.745	7.85	208.7	2.19	100.4	0.00	32.02	-	2000	2.185	34.726
2999	1.302	34.728	7.84	215.2	2.25	116.3	0.00	32.80	-	2500	1.771	34.743
3500	1.043	34.715	7.82	218.8	2.28	125.0	0.00	32.90	-	3000	1.296	34.727
										3500	1.043	34.714

ITS-90 : International Temperature Scale of 1990.
PSS78 : Practical Salinity Scale of 1978.

station : 20

Beginning of cast

Date : March 17, 2005
 Time(UT) : 0254
 Latitude : 46-19.7S
 Longitude : 150-09.2E
 Depth : 4,373 (m)

Time(UT) : 0300
 Weather : bc
 Air Temperature (dry) : 11.1 (degC)
 Humidity : 76 (%)
 Atmospheric Pressure : 1021.6 (hPa)

Wind direction : ESE
 Velocity : 5 (kn)
 Wave : 2
 Swell : SW/3
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	13.4	34.988	8.15	274.6	0.42	0.0	0.18	3.50	-	10	13.194	34.868
52	13.194	34.948	8.15	270.2	0.43	0.0	0.19	3.41	-	20	13.187	34.871
76	13.091	34.956	8.14	270.0	0.44	0.0	0.22	3.88	-	30	13.194	34.878
102	12.047	34.972	8.09	255.6	0.72	1.1	0.01	9.21	-	50	13.208	34.934
126	11.063	34.969	8.06	253.1	0.86	2.2	0.00	11.98	-	75	13.077	34.951
152	10.703	34.947	8.06	254.6	0.91	2.7	0.01	12.59	-	100	12.456	34.964
*200	-	-	-	260.3	1.02	3.0	0.00	14.02	-	125	11.548	35.060
254	9.549	34.760	8.03	261.5	1.07	3.3	0.00	14.86	-	150	10.710	34.899
*300	-	-	-	268.0	1.10	3.2	0.00	15.23	-	200	10.165	34.863
404	8.868	34.636	8.04	276.6	1.09	3.1	0.00	15.37	-	250	9.626	34.766
504	8.468	34.568	8.03	277.5	1.18	3.6	0.00	16.48	-	300	9.311	34.712
603	8.126	34.520	8.00	263.5	1.31	5.4	0.00	18.71	-	400	8.871	34.637
704	7.664	34.493	7.95	232.7	1.55	10.2	0.00	22.54	-	500	8.460	34.572
805	7.137	34.483	7.92	214.0	1.74	15.6	0.00	25.39	-	600	8.123	34.528
902	6.517	34.458	7.90	206.1	1.87	21.1	0.00	27.17	-	700	7.668	34.496
1007	5.694	34.433	7.88	201.3	2.02	29.4	0.00	29.68	-	800	7.011	34.446
1258	3.996	34.425	7.85	194.7	2.28	52.2	0.01	33.15	-	1000	5.552	34.410
1504	3.157	34.505	7.81	179.0	2.44	73.1	0.00	34.75	-	1200	4.324	34.416
2002	2.413	34.654	7.79	178.8	2.37	91.2	0.00	34.16	-	1500	3.188	34.495
2501	2.056	34.724	7.80	193.7	2.26	96.9	0.00	32.92	-	2000	2.409	34.652
3002	1.686	34.733	7.81	202.8	2.28	108.6	0.00	32.63	-	2500	2.063	34.719
3501	1.316	34.726	7.80	209.4	2.27	118.0	0.00	33.00	-	3000	1.688	34.730
4000	1.069	34.715	7.81	213.4	2.30	126.6	0.00	33.02	-	3500	1.322	34.721
										4000	1.069	34.711

ITS-90 : International Temperature Scale of 1990.

PSS78 : Practical Salinity Scale of 1978.

"*" of the Pressure column is a predetermined layer.

station : St.Trap

Beginning of cast

Date : March 1, 2005
 Time(UT) : 06:25
 Latitude : 61-21.4S
 Longitude : 80-03.5E
 Depth :

Time(UT) : 06:00
 Weather : bc
 Air Temperture (dry) : 0.9 (degC)
 Humidity : 87 (%)
 Atmospheric Pressire : 976.7 (hPa)

Wind direction : NNW
 Velocity : 15 (kn)
 Wave : 3
 Swell : WNW/1
 Visibility : 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	Dissolved oxygen	Phosphate	Silicate (μ mol/l)	Nitrite	Nitrate	Ammonium	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.0	-	-	341.4	1.79	26.3	0.22	26.11	-	10	1.185	33.838
11	1.218	-	-	340.7	1.75	26.4	0.22	26.02	-	20	1.162	33.839
22	1.210	-	-	341.3	1.76	26.5	0.21	26.00	-	30	1.168	33.840
32	1.166	-	-	341.7	1.77	26.4	0.21	25.89	-	50	1.159	33.842
54	1.171	-	-	341.5	1.77	26.5	0.21	25.79	-	75	-1.310	34.038
79	-1.307	-	-	313.7	2.19	52.1	0.17	30.75	-	100	-0.516	34.177
103	-0.520	-	-	278.4	2.28	58.5	0.22	32.98	-	125	0.497	34.322
127	0.547	-	-	237.7	2.39	66.9	0.04	34.53	-	150	1.285	34.434
153	1.348	-	-	205.4	2.46	74.8	0.01	35.56	-	200	1.786	34.538
202	1.795	-	-	185.6	2.48	81.2	0.01	35.81	-	250	1.935	34.592
251	1.928	-	-	179.7	2.45	83.0	0.00	35.75	-	300	1.984	34.627
301	1.983	34.615	-	178.0	2.41	84.7	0.00	35.07	-	400	2.015	34.672
402	2.015	34.663	-	182.2	2.35	85.7	0.00	34.28	-	500	1.994	34.701
505	2.002	34.696	-	186.7	2.30	86.8	0.00	33.42	-	600	1.960	34.720
603	1.967	34.717	-	192.3	2.21	87.1	0.00	32.34	-	700	1.904	34.735
805	1.827	34.743	-	200.8	2.16	89.4	0.00	31.48	-	800	1.823	34.745
1003	1.678	34.749	-	206.1	2.13	92.3	0.00	31.11	-	1000	1.666	34.750
1252	1.436	34.746	-	210.5	2.14	99.2	0.00	31.07	-	1200	1.493	34.748
1502	1.187	34.753	-	213.4	2.19	106.7	0.00	31.50	-	1500	1.178	34.732
1749	0.967	34.722	-	213.7	2.23	115.6	0.00	31.91	-	2000	0.752	34.706
2002	0.762	34.709	-	216.4	2.23	122.2	0.00	32.33	-	2500	0.458	34.689
2250	0.593	34.701	-	219.4	2.27	127.5	0.00	32.65	-			
2489	0.477	34.695	-	220.2	2.29	135.9	0.00	33.07	-			

ITS-90 : International Temperture Scale of 1990.
 PSS78 : Practical Salinity Scale of 1978.

Table 5. Petroleum oil, cadmium and mercury concentration in the surface water.

Station No.	Date	Time	Position		Air Temp	Water Temp	Petroleum oil	Cadmium	Mercury	
	(UT)		Latitude	Longitude	(°C)		($\mu\text{g/L}$)			
	2004									
1	Dec.	5	8:00	40-57.1S	109-58.3E	13.3	15.3	<0.05	<0.003	0.0033
2		6	8:00	45-46.8S	110-01.6E	11.0	8.9	0.05	0.004	0.0025
3		7	7:40	50-46.5S	110-01.0E	6.8	4.5	<0.05	0.004	0.0042
4		8	7:40	55-52.2S	109-28.5E	4.2	2.3	0.07	0.021	0.0046
5		9	7:30	60-03.7S	108-51.4E	1.3	0.5	0.10	0.025	0.0048
	2005									
8	Feb.	27	10:00	64-00.2S	68-53.4E	0.2	1.0	<0.05	0.018	0.0036
10	Mar.	6	7:40	64-00.8S	91-47.8E	0.1	0.6	0.06	0.016	0.0028
12		8	6:40	64-01.1S	111-40.7E	-4.9	0.6	0.05	0.055	0.0040
14		10	5:40	64-00.0S	131-42.3E	-2.4	1.2	<0.05	0.044	0.0033
16		13	3:20	63-31.2S	149-50.0E	2.0	1.4	0.06	0.039	0.0021
17		14	3:00	60-15.8S	149-57.6E	2.7	2.3	0.10	0.032	0.0023
18		15	3:40	56-27.7S	150-05.7E	5.9	5.0	<0.05	0.008	0.0033
19		16	3:30	51-28.6S	149-59.1E	8.3	8.7	<0.05	0.006	0.0011
20		17	3:20	46-19.7S	150-09.2E	11.1	13.4	<0.05	<0.003	0.0013

Table 6. Hourly tidal observation at Syowa Station from February 2004 to January 2005 (time is LMT(UT+3 hours)).

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : FEB. 1, - FEB. 29, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	258	254	251	246	239	232	222	210	202	196	194	196	205	217	234	253	267	276	282	283	281	276	271	268	5812	242	6079	243
2	266	265	265	260	256	251	237	222	209	199	192	193	203	217	238	262	283	297	306	310	305	299	294	290	6119	255	6410	256
3	290	295	295	293	293	288	271	251	228	210	195	189	194	209	228	255	277	292	303	305	297	288	279	269	6293	262	6559	262
4	265	269	272	274	276	272	258	238	214	189	168	158	158	172	195	220	248	269	282	288	285	274	264	255	5762	240	6015	241
5	253	258	265	272	279	281	273	252	228	199	174	156	149	159	181	206	235	259	276	285	283	273	261	250	5707	238	5952	238
6	246	249	258	272	284	289	287	273	249	220	191	167	155	157	173	199	229	255	275	285	284	277	263	251	5786	241	6030	241
7	243	242	253	268	282	295	297	287	269	240	207	182	161	156	167	188	216	242	263	278	279	269	256	242	5781	241	6012	240
8	231	227	231	245	264	280	289	286	273	250	222	192	170	158	162	179	206	230	253	271	274	266	254	239	5651	235	5877	235
9	227	219	221	234	253	274	289	295	290	275	250	223	199	183	179	189	210	232	254	269	276	274	260	243	5815	242	6045	242
10	230	215	210	220	236	255	273	284	288	282	265	241	217	202	194	196	207	229	246	261	269	267	256	239	5783	241	6006	240
11	224	208	198	198	211	229	246	262	271	273	268	253	235	222	212	213	222	235	251	265	271	270	263	245	5745	239	5973	239
12	228	214	202	193	197	211	225	238	252	259	260	255	247	239	233	234	239	245	257	269	275	273	268	255	5766	240	6005	240
13	239	223	210	199	192	197	207	218	226	237	245	247	248	249	250	250	255	259	265	273	276	274	269	261	5768	240	6016	241
14	248	235	221	208	198	193	196	199	202	215	223	231	241	251	259	267	272	277	278	280	282	279	275	267	5795	241	6053	242
15	257	248	237	224	213	201	193	185	183	187	192	203	218	233	252	269	284	289	293	296	293	293	287	282	5811	242	6091	244
16	280	278	271	264	251	241	226	210	199	196	195	202	217	234	256	280	297	307	308	305	297	288	281	275	6159	257	6431	257
17	272	271	271	268	261	249	231	206	184	167	155	154	163	181	212	241	267	287	296	295	290	279	269	267	5735	239	6003	240
18	268	271	282	289	291	287	273	250	226	201	181	171	173	189	215	244	273	296	308	310	301	288	273	263	6123	255	6386	255
19	263	269	279	290	298	301	292	270	242	208	179	160	153	163	186	215	247	274	293	300	294	281	263	252	5972	249	6220	249
20	249	252	266	284	300	307	306	292	266	233	198	172	157	158	173	200	231	259	280	289	284	268	250	235	5905	246	6130	245
21	225	225	239	258	277	295	302	295	277	248	213	184	163	154	162	186	214	239	259	270	267	253	233	215	5650	235	5850	234
22	201	196	204	227	249	271	287	288	279	258	230	202	178	163	167	186	211	235	254	268	267	255	236	217	5528	230	5745	230
23	200	191	194	212	238	264	284	292	293	280	259	236	214	199	200	211	232	256	273	287	288	276	256	236	5871	245	6088	244
24	217	202	197	208	230	254	274	285	292	287	271	254	236	222	217	225	241	258	275	287	288	280	262	241	6001	250	6222	249
25	221	205	196	200	214	235	256	270	277	279	271	256	243	235	232	235	247	262	277	286	288	281	266	247	5980	249	6208	248
26	228	212	201	198	204	221	238	250	260	263	262	255	245	243	241	245	255	266	277	287	289	283	274	257	5952	248	6190	248
27	238	225	215	209	211	220	230	241	248	254	256	254	250	250	254	261	269	277	287	294	295	290	282	267	6076	253	6328	253
28	252	239	229	222	219	223	227	232	238	242	245	250	252	257	265	275	285	294	302	307	308	304	297	288	6251	260	6528	261
29	277	265	258	249	243	241	236	234	235	236	237	238	245	253	263	276	288	295	300	301	299	291	284	277	6320	263	6592	264
																							MONTHLY MEAN		245.6 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : MAR. 1. - MAR. 31, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	272	263	257	255	250	245	238	233	227	224	225	228	236	249	267	284	301	310	315	315	312	303	295	290	6394	266	6679	267
2	285	281	280	277	272	266	255	241	229	221	215	217	228	243	265	286	305	317	323	325	318	310	300	296	6555	273	6847	274
3	292	291	295	298	296	291	279	260	242	227	215	213	220	235	256	282	302	317	325	322	313	301	290	282	6644	277	6924	277
4	280	284	289	295	300	295	282	263	238	214	198	189	191	207	228	255	279	298	306	305	296	281	267	258	6298	262	6552	262
5	254	260	271	284	294	297	289	270	245	218	196	180	180	193	216	245	270	293	307	308	299	283	267	257	6176	257	6428	257
6	252	258	275	292	308	319	317	301	278	250	219	200	191	196	216	242	270	293	307	311	300	282	265	249	6391	266	6629	265
7	238	242	256	276	299	312	317	310	286	257	227	200	182	180	195	219	246	270	287	294	283	268	248	227	6119	255	6334	253
8	215	216	230	253	282	307	323	324	314	292	263	239	219	212	223	244	269	293	311	316	312	293	268	247	6465	269	6694	268
9	229	219	226	248	274	298	318	327	322	307	282	254	231	216	218	234	253	273	291	298	293	276	252	228	6367	265	6574	263
10	207	192	192	208	234	260	284	302	308	303	290	269	252	241	238	248	268	287	304	313	311	299	277	250	6337	264	6565	263
11	228	211	202	207	227	251	275	294	306	310	303	291	279	267	261	267	276	291	303	309	308	297	278	254	6495	271	6725	269
12	230	210	195	191	202	220	237	256	272	282	286	283	279	276	273	276	284	294	307	312	311	306	291	271	6344	264	6592	264
13	248	230	217	206	208	218	230	244	258	270	283	288	291	296	304	307	313	321	331	334	331	323	311	295	6657	277	6933	277
14	276	259	244	230	221	218	219	219	227	234	243	253	261	271	285	295	303	311	317	320	319	313	304	297	6439	268	6723	269
15	284	273	262	250	241	232	223	217	213	214	218	228	241	254	274	293	304	309	315	313	307	300	292	286	6343	264	6624	265
16	281	276	273	268	262	249	233	219	205	196	195	201	215	234	257	280	298	307	310	305	297	289	279	275	6204	259	6480	259
17	276	278	282	283	282	274	256	235	214	197	188	187	197	218	245	272	295	310	314	309	298	285	273	270	6238	260	6508	260
18	270	279	291	300	305	303	289	266	240	215	197	187	190	206	232	259	282	301	307	300	286	269	251	244	6269	261	6515	261
19	246	254	268	286	299	303	295	275	247	217	194	176	172	183	206	236	259	279	288	282	268	248	226	216	5923	247	6138	246
20	215	227	248	270	293	307	307	296	272	244	217	194	186	195	213	242	267	286	298	294	280	256	231	215	6053	252	6261	250
21	208	213	235	261	283	305	313	307	291	265	237	214	199	200	216	239	263	281	293	293	278	253	228	208	6083	253	6279	251
22	196	198	216	241	273	297	313	316	305	286	262	238	222	219	228	249	271	291	302	303	293	270	244	221	6254	261	6472	259
23	205	202	214	238	268	292	312	322	319	305	285	265	249	242	246	262	283	302	315	316	306	287	260	236	6531	272	6749	270
24	218	207	211	231	257	282	303	316	318	307	293	278	263	256	267	285	302	313	316	308	288	264	239	6578	274	6796	272	
25	218	204	203	213	234	256	277	290	297	298	289	277	270	261	261	270	283	296	308	310	304	289	267	243	6418	267	6640	266
26	222	208	203	207	219	240	257	272	279	282	280	273	266	266	269	275	285	298	306	309	303	294	273	250	6336	264	6569	263
27	233	217	208	208	215	227	241	253	261	267	270	267	265	269	274	282	293	302	309	312	311	302	289	273	6348	265	6605	264
28	257	243	236	234	235	241	247	257	261	267	271	273	276	281	289	296	306	314	321	322	318	312	300	287	6644	277	6917	277
29	273	264	256	251	250	250	252	255	258	260	268	273	279	289	302	313	320	327	330	329	324	313	303	293	6832	285	7114	285
30	282	273	267	261	257	251	245	242	236	235	241	246	255	268	281	295	306	313	314	313	304	295	286	280	6546	273	6820	273
31	274	272	272	270	266	260	252	243	232	226	228	233	243	258	278	295	310	318	318	314	306	297	286	281	6532	272	6811	272
																							MONTHLY MEAN		265.9 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00' 28"S
 LONGITUDE : 39° 34' 13"E
 DURATION : APR. 1 , - APR. 30 , 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	279	283	285	287	285	280	266	249	230	216	208	210	218	238	259	278	293	303	303	296	283	269	257	253	6328	264	6582	263
2	254	260	271	279	284	280	267	250	226	205	196	191	199	218	238	263	283	293	296	290	275	258	245	238	6059	252	6301	252
3	242	253	271	287	299	302	292	274	251	226	206	198	202	218	241	266	287	302	305	294	276	254	234	224	6204	259	6428	257
4	224	237	257	280	297	307	305	289	262	233	210	191	188	200	222	247	268	283	290	281	262	237	214	199	5983	249	6179	247
5	196	209	234	260	287	307	315	308	286	260	237	216	208	218	237	261	285	305	313	305	286	259	231	212	6235	260	6438	258
6	203	210	235	265	296	326	341	341	329	306	277	255	240	237	250	273	294	314	321	318	302	274	247	221	6675	278	6880	275
7	205	204	223	251	283	314	338	351	348	332	312	292	273	264	269	285	301	314	321	317	298	270	236	205	6806	284	6988	280
8	182	169	174	194	221	252	278	295	302	296	285	269	252	242	245	257	272	287	295	294	283	259	227	197	6027	251	6201	248
9	174	155	150	164	185	212	240	260	274	283	280	274	267	262	265	272	287	302	311	312	305	288	264	238	6024	251	6237	249
10	213	192	180	184	195	213	235	256	272	286	293	293	295	296	298	303	314	324	332	333	328	315	298	277	6525	272	6778	271
11	253	235	222	213	213	222	232	243	257	270	281	287	296	303	308	313	318	323	327	327	320	311	298	282	6654	277	6919	277
12	265	249	235	223	214	211	210	212	216	224	235	246	257	271	283	291	296	299	301	303	298	290	283	273	6185	258	6451	258
13	266	259	250	243	233	224	217	211	207	210	216	229	242	259	279	291	297	301	299	295	290	282	276	273	6149	256	6421	257
14	272	274	271	271	264	251	237	224	211	204	206	214	228	248	268	285	297	300	295	288	280	269	263	262	6182	258	6447	258
15	265	274	282	286	285	279	263	245	227	213	208	210	223	243	266	287	300	305	300	288	274	260	249	249	6281	262	6539	262
16	258	271	286	300	310	307	295	275	254	233	222	218	227	244	266	286	300	308	304	288	270	251	238	231	6442	268	6679	267
17	237	255	273	293	307	310	304	288	263	238	222	214	212	228	248	266	280	288	284	268	244	222	201	191	6136	256	6334	253
18	198	216	240	265	286	299	300	288	268	245	224	212	211	221	238	258	276	286	285	272	249	222	201	187	5947	248	6135	245
19	188	203	228	257	283	302	309	304	290	270	249	235	229	234	251	268	285	295	297	283	261	232	207	188	6148	256	6329	253
20	181	189	212	241	268	290	306	306	296	279	261	244	235	236	248	265	282	289	290	282	257	228	202	177	6064	253	6228	249
21	164	169	185	211	242	266	285	295	290	276	263	249	239	239	245	262	279	290	293	288	269	244	214	189	5946	248	6121	245
22	175	171	183	204	233	260	278	290	295	287	276	268	260	258	263	277	294	307	311	306	294	267	241	218	6218	259	6428	257
23	198	190	194	210	234	259	279	293	300	299	292	284	278	274	280	288	299	313	316	312	300	279	253	227	6451	269	6661	266
24	210	197	192	203	219	236	256	269	276	280	278	276	271	270	275	278	290	301	305	305	295	278	256	233	6249	260	6464	259
25	215	201	193	196	206	220	237	249	258	266	268	266	266	271	275	279	289	296	302	304	296	283	268	249	6153	256	6386	255
26	233	219	209	210	212	221	232	241	250	258	266	272	272	278	286	292	297	304	307	307	300	291	278	263	6298	262	6549	262
27	251	237	229	225	223	225	227	234	240	244	252	260	267	275	283	290	295	299	302	300	293	283	273	264	6271	261	6526	261
28	255	248	243	237	230	229	228	225	224	231	237	245	255	266	277	285	291	293	289	286	278	270	263	258	6143	256	6399	256
29	256	254	251	248	244	237	229	220	216	215	220	229	241	257	271	282	290	287	284	277	267	256	250	249	6030	251	6283	251
30	253	258	261	263	262	254	241	227	217	211	210	219	230	248	265	279	286	285	279	271	255	244	238	237	5993	250	6239	250
																							MONTHLY MEAN		259.5 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : MAY 1, - MAY 31, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN		
1	246	255	268	277	279	275	263	245	228	216	209	212	225	242	258	273	284	286	275	261	243	225	216	215	5976	249	6202	248		
2	226	243	263	281	290	292	283	264	242	224	213	212	219	234	254	270	281	283	274	256	232	211	196	192	5935	247	6137	245		
3	202	221	247	274	293	305	303	286	266	243	224	217	218	231	252	267	279	284	276	256	229	202	181	169	5925	247	6101	244		
4	176	197	226	258	288	307	316	310	293	271	252	238	236	246	263	278	290	296	289	271	242	210	182	163	6098	254	6260	250		
5	162	174	202	237	272	299	316	320	310	295	276	259	251	255	266	282	294	298	295	282	251	217	182	160	6155	256	6301	252		
6	146	147	168	199	232	266	289	300	302	292	277	265	256	252	263	278	292	300	300	291	266	236	202	173	5992	250	6148	246		
7	154	146	156	181	210	243	273	293	305	304	301	297	289	284	289	301	315	323	326	321	301	275	244	212	6343	264	6529	261		
8	186	169	165	176	197	222	250	270	286	296	296	297	295	291	290	299	310	319	324	322	310	290	262	236	6358	265	6567	263		
9	209	187	175	177	183	200	220	237	253	269	276	281	287	285	288	292	299	307	313	314	306	296	278	256	6188	258	6423	257		
10	235	217	199	192	193	194	207	224	233	247	262	270	278	286	288	290	294	297	301	303	299	295	285	271	6160	257	6421	256		
11	261	247	234	222	212	209	209	215	223	231	245	255	267	277	283	287	286	286	284	281	279	274	271	271	6125	255	6392	257		
12	267	260	254	248	237	230	223	218	218	221	229	244	255	267	276	283	283	278	274	269	262	261	260	261	6078	253	6344	254		
13	266	270	270	269	263	253	241	231	224	222	227	238	250	265	277	284	286	280	271	261	250	243	242	246	6129	255	6385	255		
14	256	265	273	278	277	269	254	240	228	219	217	223	234	247	260	268	271	265	252	240	223	211	208	212	5890	245	6112	244		
15	222	237	252	266	270	270	259	244	228	217	211	216	223	237	251	261	267	262	251	232	212	197	189	190	5664	236	5869	235		
16	205	223	243	264	278	282	278	266	250	237	227	229	235	246	260	271	275	271	260	242	222	202	190	188	5844	244	6043	242		
17	199	220	244	267	288	301	303	295	281	267	256	251	254	267	279	290	296	293	285	265	240	215	198	187	6241	260	6435	257		
18	194	210	233	261	284	301	310	305	295	283	269	263	263	271	283	296	303	302	296	276	251	225	201	187	6362	265	6549	262		
19	187	201	226	251	275	296	311	312	306	295	284	279	276	280	292	305	314	318	312	296	273	246	221	200	6556	273	6750	270		
20	194	200	217	243	269	293	310	317	313	306	298	288	283	283	294	305	317	320	317	305	282	253	229	206	6642	277	6835	273		
21	193	195	208	229	256	282	300	310	313	309	301	297	292	291	299	310	321	327	327	319	300	274	250	226	6729	280	6938	278		
22	209	203	210	226	249	272	290	304	312	311	305	302	298	295	301	308	315	326	329	322	307	284	257	232	6767	282	6988	280		
23	215	202	201	210	227	246	268	280	291	298	296	296	292	292	291	297	307	314	317	313	303	285	262	238	6541	273	6762	270		
24	221	206	199	205	215	229	246	260	272	283	282	284	284	283	286	288	296	301	308	305	298	287	270	252	6360	265	6595	264		
25	235	219	210	210	214	223	236	249	260	270	272	276	278	281	284	285	287	290	293	290	281	272	256	256	6279	262	6521	261		
26	242	231	218	211	211	216	221	232	241	251	259	267	273	275	277	280	280	280	283	282	277	271	268	259	6105	254	6355	254		
27	250	244	235	229	224	220	223	226	231	240	247	258	264	272	276	276	274	275	274	269	266	264	262	261	6060	253	6323	253		
28	263	262	256	253	250	246	244	245	250	260	270	282	294	306	315	317	317	315	306	300	294	286	286	289	6706	279	6997	280		
29	291	296	298	298	295	285	274	263	257	255	257	265	277	287	293	296	291	282	270	259	246	239	239	245	6558	273	6815	273		
30	257	269	280	290	289	282	271	255	246	239	238	245	255	266	277	281	277	268	252	237	220	209	205	212	6120	255	6349	254		
31	229	249	270	290	301	300	294	283	270	263	259	263	274	287	304	309	311	304	290	269	248	229	221	224	6541	273	6780	271		
MONTHLY MEAN																													260.0 cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JUNE 1, - JUNE 30, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN	
1	239	260	284	309	329	336	334	324	308	293	284	280	285	293	305	312	310	302	283	256	227	201	183	178	6713	280	6903	276	
2	191	211	239	273	301	320	328	325	311	297	284	276	277	284	293	303	306	300	287	262	230	197	173	158	6424	268	6584	263	
3	160	177	204	238	273	299	319	324	320	310	299	290	286	291	303	311	316	318	308	287	255	221	187	162	6457	269	6609	264	
4	152	157	175	204	239	269	293	308	313	307	299	291	283	286	293	303	312	315	311	295	270	237	202	171	6284	262	6434	257	
5	150	144	152	175	203	233	259	286	298	300	301	297	292	289	294	306	318	321	325	320	302	278	246	215	6301	263	6493	260	
6	192	176	172	184	205	230	257	280	298	307	310	311	304	300	299	304	312	321	324	321	311	294	267	235	6514	271	6723	269	
7	208	185	171	169	175	189	210	230	248	260	270	274	273	272	271	271	279	287	296	302	298	293	280	263	5974	249	6219	249	
8	245	225	211	202	201	210	223	239	257	272	283	294	298	297	296	295	296	299	306	312	312	311	304	294	6479	270	6758	270	
9	280	266	252	236	230	226	228	234	246	254	265	273	275	278	273	267	263	257	259	260	264	265	264	264	6178	257	6438	258	
10	261	254	248	238	228	224	220	223	229	235	246	254	258	263	264	270	271	269	258	243	222	204	190	180	183	5903	246	6098	244
11	195	213	236	257	277	288	289	286	282	269	266	268	275	282	286	286	278	266	245	223	205	189	184	184	6109	255	6298	252	
12	256	260	262	261	256	252	244	238	237	241	246	255	262	265	266	263	256	250	238	230	225	227	230	233	5954	248	6199	248	
13	246	256	262	265	264	260	253	243	236	236	235	242	248	254	255	254	247	237	224	210	197	195	199	204	5722	238	5942	238	
14	220	237	249	259	267	270	266	258	252	245	248	255	262	269	276	276	270	257	247	230	214	203	201	203	5934	247	6150	246	
15	216	230	249	265	277	282	278	274	265	255	253	253	255	264	270	271	269	258	243	222	204	190	180	183	5903	246	6098	244	
16	195	213	236	257	277	288	289	286	282	269	266	268	275	282	286	286	278	266	245	223	205	189	184	184	6109	255	6298	252	
17	190	205	227	250	273	289	297	297	294	285	279	276	275	283	290	297	299	292	282	263	237	214	193	185	6272	261	6459	258	
18	187	202	222	246	270	291	304	307	305	299	291	286	286	290	297	304	307	305	296	278	253	227	201	182	6435	268	6613	265	
19	178	183	202	223	250	272	287	294	297	289	279	276	270	271	278	288	295	294	290	277	255	231	205	183	6166	257	6341	254	
20	176	178	192	214	238	264	283	297	303	297	290	287	281	281	286	296	305	308	307	298	277	251	223	200	6330	264	6513	261	
21	183	176	181	199	220	246	266	280	289	289	284	283	276	274	279	286	296	304	305	302	288	266	241	217	6228	260	6426	257	
22	197	190	188	202	221	245	267	281	294	297	296	294	289	283	285	293	298	304	311	310	298	284	259	234	6419	267	6635	265	
23	216	199	191	199	211	228	246	263	275	281	280	278	274	268	265	266	271	281	285	285	280	271	250	228	6089	254	6336	253	
24	210	194	183	184	189	203	218	231	247	255	259	261	256	252	251	252	258	266	274	280	283	283	272	257	5816	242	6063	243	
25	246	233	224	222	224	231	242	254	265	272	280	282	278	274	272	270	270	275	282	290	291	300	298	287	6364	265	6645	266	
26	281	273	263	254	253	257	259	269	276	283	292	296	294	290	287	280	274	267	269	270	273	276	278	278	6587	274	6864	275	
27	277	272	268	263	257	255	256	258	263	269	277	282	285	283	281	272	263	256	253	250	248	253	258	266	6360	265	6634	265	
28	274	276	278	279	274	270	266	265	266	269	275	279	285	286	282	275	266	252	244	234	229	230	233	246	6330	264	6590	264	
29	260	271	283	289	291	290	284	276	273	270	272	275	279	283	279	274	265	248	233	218	206	199	203	212	6231	260	6461	258	
30	230	251	273	288	295	299	295	287	280	273	271	272	277	279	281	280	269	251	234	213	190	179	174	180	6121	255	6319	253	
30	198	219	248	274	295	306	309	304	298	290	285	286	290	294	300	299	296	283	263	239	211	190	173	170	6321	263	6321	253	
																							MONTHLY MEAN		259.6 cm				

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JULY 1, - JULY 31, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	183	204	230	261	289	307	318	319	313	302	291	291	288	290	298	302	300	292	276	250	219	185	160	146	6313	263	6461	258
2	147	163	187	222	256	283	304	314	314	306	299	291	290	291	301	306	312	308	299	278	246	211	177	154	6256	261	6399	256
3	142	145	164	192	224	260	286	302	316	312	306	303	298	301	315	326	333	341	342	329	304	271	239	206	6557	273	6740	270
4	183	175	182	202	227	260	286	306	320	323	318	312	303	295	299	310	322	332	335	335	318	292	262	229	6726	280	6927	277
5	200	184	178	187	207	233	257	279	295	300	299	292	282	275	272	279	291	303	312	317	311	297	274	244	6367	265	6587	263
6	220	200	185	184	200	217	240	259	278	286	290	284	278	270	262	260	270	284	296	306	310	305	290	271	6245	260	6495	260
7	251	228	211	206	212	219	236	251	267	274	281	284	271	266	257	249	248	260	273	284	293	291	291	280	6179	257	6445	258
8	266	257	239	230	230	234	244	256	265	274	279	276	273	262	253	247	239	241	252	261	265	273	274	274	6164	257	6435	257
9	271	263	258	253	249	252	255	263	270	275	282	281	274	267	259	247	237	232	233	238	242	246	252	256	6156	257	6416	257
10	260	259	257	256	257	256	254	256	262	262	264	265	262	258	250	238	230	220	214	214	214	220	222	228	5876	245	6113	245
11	237	243	247	252	255	255	252	251	253	254	256	260	259	255	250	246	236	222	217	212	208	211	214	220	5763	240	5996	240
12	234	249	260	271	279	285	284	284	283	283	283	281	281	281	274	268	259	245	231	216	207	201	198	200	6135	256	6348	254
13	213	226	243	258	268	277	279	277	274	268	269	268	266	269	270	268	261	251	238	221	205	192	186	185	5931	247	6125	245
14	194	208	230	249	267	279	285	287	283	276	274	272	273	277	281	282	278	269	256	241	218	201	192	189	6061	253	6255	250
15	195	208	230	253	276	297	303	307	306	295	288	286	283	288	291	295	291	287	276	254	230	208	190	181	6317	263	6501	260
16	184	196	217	242	264	286	298	303	303	294	288	285	280	286	293	299	303	300	290	274	250	224	202	185	6344	264	6525	261
17	181	191	209	234	256	283	297	305	306	300	291	285	282	284	292	301	308	309	307	293	269	243	215	192	6430	268	6612	264
18	182	184	197	223	249	272	291	302	303	300	293	283	274	275	282	294	303	307	310	300	281	256	225	199	6385	266	6573	263
19	187	183	191	211	237	263	282	298	303	296	291	280	273	268	276	284	299	310	316	312	297	274	247	218	6395	266	6593	264
20	197	187	189	200	220	245	266	281	291	287	281	275	264	260	262	272	283	298	310	308	301	288	263	235	6262	261	6478	259
21	216	203	199	207	225	243	264	281	292	292	288	277	267	257	255	257	270	281	293	300	293	286	266	244	6254	261	6478	259
22	224	207	201	202	212	231	248	263	276	280	279	266	255	249	238	240	247	259	273	281	288	284	278	261	6042	252	6316	253
23	243	231	222	217	226	240	253	270	280	287	288	277	268	257	248	244	248	255	268	280	287	292	291	285	6256	261	6531	261
24	274	268	261	255	256	265	276	288	294	301	305	296	284	275	262	252	248	249	258	264	271	279	282	281	6542	273	6822	273
25	280	277	270	267	266	272	276	283	292	294	295	292	287	272	261	252	240	235	237	240	249	257	261	271	6424	268	6703	268
26	279	282	284	287	284	285	286	289	291	291	291	289	284	275	262	251	234	222	218	214	211	220	225	239	6290	262	6546	262
27	256	270	278	291	296	296	299	298	297	296	295	291	287	282	275	262	250	234	218	204	198	193	197	210	6272	261	6496	260
28	224	245	267	282	296	301	301	300	296	290	291	287	283	266	283	273	262	243	223	208	187	173	172	177	6149	256	6338	254
29	190	212	241	268	289	304	309	308	304	294	290	287	282	287	286	280	275	263	243	220	194	168	155	151	6100	254	6258	250
30	158	176	204	233	266	286	297	304	301	291	285	278	277	280	287	291	291	286	272	246	215	185	159	142	6010	250	6151	246
31	141	154	179	209	245	272	294	303	306	293	285	277	273	276	287	300	306	308	301	282	249	215	181	155	6090	254	6233	249
MONTHLY MEAN																							259.8		cm			

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : AUG. 1. - AUG. 31. 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN		
1	144	146	165	191	224	252	278	298	297	290	277	267	261	265	273	288	304	310	315	305	281	250	214	184	6077	253	6239	250		
2	162	154	163	183	213	242	267	285	288	283	270	260	248	242	250	266	283	299	309	309	295	272	242	210	5994	250	6180	247		
3	186	170	171	186	207	234	256	273	280	280	266	250	237	229	230	241	263	280	294	304	303	287	265	238	5928	247	6141	246		
4	213	194	186	194	210	230	251	264	271	273	264	247	231	221	212	215	233	254	269	281	287	280	267	245	5788	241	6012	240		
5	224	209	199	201	213	229	245	261	268	269	261	244	232	218	204	205	215	228	245	263	273	273	266	256	5702	238	5948	238		
6	247	235	226	225	234	247	262	274	280	286	276	264	247	234	220	215	216	224	238	253	261	267	267	263	5958	248	6215	249		
7	257	250	244	245	245	254	265	270	278	279	273	266	247	230	220	208	203	206	212	223	230	233	240	240	5817	242	6058	242		
8	241	239	242	244	248	255	262	269	274	274	268	266	254	240	233	222	210	208	210	217	219	223	224	232	5774	241	6012	240		
9	239	243	251	255	263	268	272	272	276	277	270	267	256	248	240	231	219	215	212	208	209	206	206	212	5812	242	6032	241		
10	221	231	240	250	262	269	270	273	272	269	266	261	255	251	246	239	232	222	214	208	203	198	199	202	5753	240	5968	239		
11	215	229	248	264	280	292	300	299	299	295	292	291	288	286	286	283	281	271	259	247	231	223	218	218	6393	266	6620	265		
12	228	242	258	280	297	311	316	317	312	305	295	294	292	292	292	295	292	285	272	256	235	220	210	206	6600	275	6810	272		
13	211	226	250	273	296	312	320	322	319	310	303	298	297	300	303	306	305	297	286	271	245	221	203	193	6667	278	6861	274		
14	194	207	229	251	277	297	306	309	303	294	285	276	272	278	282	293	297	295	286	270	245	217	192	178	6331	264	6507	260		
15	176	184	204	227	251	274	288	292	284	275	263	252	248	252	262	274	285	293	288	274	250	222	194	173	5982	249	6148	246		
16	166	170	188	213	241	265	284	289	288	278	267	254	249	252	264	279	296	306	308	299	278	251	221	196	6100	254	6284	251		
17	183	186	197	220	247	277	293	305	304	294	280	270	261	257	270	291	309	324	330	328	316	289	260	234	6523	272	6738	270		
18	215	208	213	231	255	279	297	307	309	299	282	266	251	241	246	256	278	296	305	311	304	283	257	231	6420	268	6631	265		
19	210	196	194	207	231	251	271	282	286	278	262	244	228	217	220	230	246	268	286	298	299	292	270	245	6011	250	6240	250		
20	230	212	208	216	231	253	270	282	286	279	266	249	228	216	211	215	229	252	271	283	295	291	281	266	6020	251	6267	251		
21	248	236	227	230	239	255	270	277	282	277	263	245	222	208	196	193	202	216	233	248	260	267	263	255	5812	242	6057	242		
22	245	238	232	232	237	247	262	272	273	272	263	246	227	210	197	187	188	193	208	222	232	244	249	252	5626	234	5878	235		
23	250	249	249	251	253	260	269	273	276	275	268	256	239	225	211	198	191	190	196	203	215	222	232	241	5690	237	5941	238		
24	252	254	261	270	276	282	288	293	295	295	289	283	272	261	251	238	229	218	215	213	216	220	232	243	6145	256	6405	256		
25	260	276	293	309	316	324	327	329	332	320	319	310	300	296	291	280	265	248	236	224	214	208	205	218	6697	279	6931	277		
26	234	248	274	291	309	317	317	317	310	299	295	289	286	284	284	277	265	250	233	212	193	181	172	174	6311	263	6502	260		
27	191	211	237	267	290	306	313	308	302	293	286	283	282	286	294	294	294	286	267	245	217	197	178	172	6298	262	6476	259		
28	179	201	229	260	287	308	315	315	308	294	285	275	275	283	294	304	309	304	293	270	241	207	182	168	6384	266	6552	262		
29	168	180	208	239	270	296	309	315	306	291	278	270	265	274	292	307	321	331	324	308	281	246	215	192	6486	270	6667	267		
30	181	186	204	233	261	287	303	306	295	278	260	243	235	239	256	277	296	311	313	307	286	250	217	193	6217	259	6389	256		
31	172	170	185	206	232	257	277	281	275	260	241	219	208	209	222	247	274	294	306	308	296	271	242	213	5863	244	6057	242		
MONTHLY MEAN																											254.3		cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : SEP. 1, - SEP. 30, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040.

Date	Time																							(24H)		(25H)				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN		
1	194	184	191	213	238	259	277	284	277	266	244	221	205	198	206	229	256	279	295	306	307	289	263	238	5918	247	6137	245		
2	219	204	206	220	240	259	276	283	279	266	245	221	200	190	188	203	227	251	272	288	291	282	267	250	5825	243	6056	242		
3	231	221	219	226	245	264	277	287	281	271	254	231	208	192	187	194	212	236	254	270	280	278	270	260	5846	244	6096	244		
4	250	243	242	249	262	277	293	300	299	292	276	252	232	218	208	205	218	233	247	263	271	274	272	265	6138	256	6395	256		
5	257	258	257	258	269	281	292	298	294	289	276	256	237	224	211	205	209	215	226	238	248	254	254	252	6057	252	6310	252		
6	253	254	259	266	272	281	290	297	294	288	278	262	247	235	227	217	215	219	219	229	236	237	240	242	6054	252	6301	252		
7	248	259	266	277	285	292	301	302	301	299	290	280	266	258	249	240	235	231	231	230	230	230	231	237	6267	261	6514	261		
8	247	256	270	281	289	297	302	301	299	294	286	277	271	260	254	251	242	234	230	225	220	214	214	219	6231	260	6459	258		
9	229	242	257	273	286	293	297	294	290	283	277	269	264	262	263	261	256	250	240	229	219	208	205	210	6156	257	6374	255		
10	218	236	259	276	296	306	310	308	300	291	285	277	277	278	280	283	279	270	258	243	227	209	199	199	6363	265	6570	263		
11	207	226	249	269	289	303	305	302	294	284	273	269	267	274	281	286	289	284	271	252	230	209	192	189	6295	262	6489	260		
12	194	210	233	257	281	296	300	297	288	273	263	256	255	263	277	288	295	296	289	271	245	220	198	188	6230	260	6418	257		
13	188	200	224	250	275	291	299	293	280	265	250	239	234	244	261	280	294	303	298	283	257	228	203	185	6123	255	6303	252		
14	180	192	212	235	261	281	289	286	272	253	234	220	213	219	239	262	280	292	295	285	262	233	203	181	5877	245	6049	242		
15	171	175	193	217	244	266	276	274	263	243	222	203	195	195	217	243	267	287	300	298	282	257	229	205	5722	238	5913	237		
16	192	191	202	223	248	269	279	280	270	248	229	206	191	189	204	226	254	278	296	303	295	276	251	225	5824	243	6032	241		
17	208	202	205	221	246	265	273	276	266	245	220	195	172	167	172	189	217	244	265	282	281	271	252	235	5567	232	5786	231		
18	219	208	211	223	244	262	272	276	270	254	227	203	182	170	171	184	204	231	253	273	283	283	275	262	5637	235	5887	235		
19	250	243	243	250	265	281	293	295	292	280	257	232	211	194	186	191	204	222	243	263	275	283	282	274	6009	250	6278	251		
20	269	267	265	270	281	290	299	301	294	283	263	236	216	197	184	179	178	189	203	214	232	239	244	246	5839	243	6088	244		
21	249	254	259	261	270	280	286	288	283	276	268	249	229	213	202	192	186	188	193	201	212	221	230	242	5732	239	5981	239		
22	249	261	275	282	291	298	299	301	295	292	282	269	258	245	236	224	215	204	202	197	198	203	210	223	6010	250	6226	249		
23	239	254	274	288	299	304	305	304	298	294	284	280	274	266	263	258	246	234	219	202	194	192	190	200	6160	257	6377	255		
24	217	239	261	282	295	300	299	293	282	275	268	264	266	266	268	268	262	248	232	211	192	176	170	175	6009	250	6200	248		
25	191	212	239	267	287	301	298	292	280	269	261	259	264	264	274	286	294	296	290	275	253	227	205	190	186	6193	258	6391	256	
26	198	219	246	273	294	308	311	300	287	270	258	256	259	273	294	308	319	319	309	288	259	227	203	194	6469	270	6664	267		
27	195	209	231	259	282	296	296	285	264	245	226	216	216	230	253	275	293	301	298	279	251	219	192	175	5982	249	6150	246		
28	169	180	202	226	250	265	270	261	241	218	196	183	179	195	221	249	275	293	298	291	271	242	214	193	5579	232	5764	231		
29	186	191	207	230	255	268	274	266	247	219	196	177	166	175	201	229	255	279	294	291	279	257	232	210	5585	233	5783	231		
30	198	199	212	233	256	270	279	271	254	228	204	180	165	169	187	214	243	269	286	295	290	273	253	235	5660	236	5660	226		
MONTHLY MEAN																													249.1 cm	

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : OCT . 1 , - OCT . 31 , 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	222	217	226	244	264	279	284	280	268	245	214	189	172	163	172	194	222	246	266	280	281	270	256	243	5698	237	5928	237
2	230	226	231	244	260	277	281	279	269	247	220	194	175	164	167	180	201	226	247	261	266	264	255	246	5609	234	5849	234
3	240	238	240	248	267	280	286	285	276	259	233	211	190	178	175	184	197	219	235	249	258	259	256	250	5713	238	5960	238
4	247	249	252	259	272	284	291	292	286	272	255	233	212	201	196	197	204	218	231	242	251	253	253	253	5902	246	6154	246
5	253	255	261	269	280	288	293	293	289	278	260	243	225	212	208	205	204	208	216	222	225	229	235	236	5885	245	6125	245
6	240	249	258	267	274	282	285	281	278	269	256	245	232	223	217	212	210	212	214	214	216	218	224	232	5805	242	6043	242
7	238	251	262	273	283	287	289	286	281	271	264	256	246	238	234	230	226	220	215	211	207	207	211	217	5899	246	6126	245
8	228	241	257	270	261	285	285	279	271	265	256	251	248	245	247	245	242	233	227	217	208	202	202	211	5894	246	6117	245
9	223	240	258	273	284	291	289	278	270	261	252	249	252	256	264	266	263	258	241	228	213	205	201	206	6017	251	6228	249
10	211	228	249	265	261	283	281	271	257	245	234	231	235	245	258	264	266	261	248	231	210	191	181	182	5807	242	5998	240
11	191	209	232	255	271	277	273	263	247	231	220	219	224	239	258	274	284	285	277	257	234	211	198	193	5820	243	6020	241
12	201	218	242	263	281	287	285	269	249	231	214	207	215	231	254	276	293	300	296	277	253	226	204	195	5967	249	6163	247
13	196	212	232	255	275	284	282	268	245	222	202	190	193	209	237	263	289	303	306	295	272	246	222	207	5904	246	6107	244
14	203	214	232	254	275	284	284	268	245	217	193	177	174	186	213	246	275	296	310	308	291	270	247	225	5885	245	6102	244
15	217	221	235	256	276	287	286	274	252	220	195	173	160	165	187	217	248	277	298	304	299	283	263	245	5837	243	6070	243
16	232	232	243	260	276	287	290	281	260	232	201	173	156	153	164	193	226	255	280	298	301	294	283	271	5841	243	6101	244
17	260	257	266	279	297	310	312	305	290	266	233	205	184	172	177	193	218	244	269	289	299	301	294	289	6207	259	6487	259
18	280	278	281	291	304	314	319	315	302	282	254	224	198	182	175	180	197	214	235	253	268	272	277	276	6169	257	6444	258
19	274	273	276	282	292	301	304	300	294	278	255	230	206	188	177	173	178	186	202	217	228	240	251	257	5862	244	6126	245
20	264	271	276	284	294	302	305	304	302	293	277	261	245	230	218	209	204	205	210	217	225	236	248	259	6138	256	6407	256
21	270	283	292	299	305	311	308	306	303	297	286	277	268	258	246	237	228	216	210	206	205	207	217	229	6262	261	6505	260
22	244	259	275	285	291	292	290	283	280	275	273	273	271	269	268	265	256	242	232	221	210	207	214	226	6201	258	6438	258
23	241	262	281	297	304	306	299	292	283	275	272	274	279	288	294	302	301	285	267	248	231	219	207	222	6527	272	6764	271
24	237	258	279	296	305	305	295	280	266	254	248	248	259	274	288	301	304	297	284	262	241	225	216	215	6437	268	6664	267
25	227	246	266	283	296	297	284	266	246	228	217	218	230	249	272	291	301	303	294	273	249	227	214	208	6187	258	6404	256
26	217	232	251	270	285	288	276	256	236	215	201	201	211	234	260	285	304	313	309	296	272	250	233	222	6116	255	6341	254
27	225	238	257	274	288	292	281	260	235	209	189	180	184	204	234	262	288	305	310	303	286	265	245	234	6046	252	6278	251
28	232	244	262	278	293	298	291	273	246	219	194	177	175	190	216	248	274	298	307	309	295	279	262	247	6104	254	6347	254
29	242	247	262	279	294	301	294	280	254	225	199	177	168	175	198	228	257	281	296	304	297	284	270	257	6071	253	6322	253
30	251	252	263	278	291	300	294	282	260	229	199	177	161	162	176	201	230	251	270	282	279	272	265	255	5879	245	6127	245
31	249	250	259	273	289	299	298	287	270	244	215	192	173	167	176	195	217	240	259	274	281	275	269	265	5915	246	6177	247
																							MONTHLY MEAN		249.5 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : NOV. 1, - NOV. 30, 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN
1	262	261	267	281	292	303	306	298	285	263	238	214	196	185	187	199	214	236	256	268	277	280	276	272	6115	255	6388	256
2	273	276	279	288	302	309	312	311	300	283	261	239	221	212	208	212	224	240	254	266	275	280	283	283	6391	266	6675	267
3	284	286	291	297	304	310	312	309	299	286	266	247	228	215	209	207	211	219	226	236	243	249	254	257	6243	260	6503	260
4	260	265	270	275	283	287	288	284	278	268	256	244	229	218	214	209	209	211	216	220	227	233	238	247	5927	247	6182	247
5	254	263	272	278	284	286	285	284	276	271	261	253	247	240	232	230	225	223	222	221	222	227	233	240	6027	251	6278	251
6	250	261	271	278	282	284	276	273	268	259	252	250	245	244	242	240	235	227	219	213	211	209	214	225	5928	247	6164	247
7	236	248	260	269	271	270	264	255	246	238	237	235	238	245	251	252	250	243	233	222	213	209	209	218	5811	242	6042	242
8	231	246	259	270	274	271	262	249	236	227	224	225	234	247	258	268	269	263	249	235	218	208	205	208	5835	243	6055	242
9	220	236	252	264	268	263	253	234	218	202	197	200	210	232	251	265	277	275	265	247	227	213	203	206	5676	237	5893	236
10	217	231	248	263	272	269	251	232	210	189	180	182	193	217	243	270	288	294	288	273	254	234	221	217	5733	239	5957	238
11	223	239	258	270	276	276	261	239	211	185	169	166	175	199	228	261	285	300	304	294	274	254	237	228	5812	242	6042	242
12	230	242	258	270	282	281	267	245	216	182	158	146	147	167	196	230	264	287	298	298	283	269	252	238	5703	238	5938	238
13	235	244	257	271	280	284	275	255	225	190	161	141	134	144	170	203	237	268	288	296	295	284	271	260	5667	236	5921	237
14	253	256	268	280	291	297	291	273	246	213	179	153	135	136	151	178	211	241	268	288	294	292	288	280	5760	240	6036	241
15	276	275	283	297	309	317	316	306	284	253	222	192	169	157	161	177	200	227	252	272	287	292	292	291	6108	255	6395	256
16	287	286	292	303	313	321	326	319	304	283	252	226	202	182	175	182	195	212	233	252	267	280	285	289	6266	261	6557	262
17	291	290	290	296	305	315	316	311	305	289	265	244	220	199	186	182	186	194	207	222	236	251	262	267	6127	255	6401	256
18	274	282	282	284	288	296	297	297	295	288	277	265	249	235	223	212	207	207	212	219	227	240	251	261	6167	257	6439	258
19	272	280	282	282	283	285	285	283	282	278	274	270	260	252	244	235	225	218	211	212	214	221	231	241	6120	255	6373	255
20	252	264	271	272	271	269	263	259	258	257	257	261	262	264	265	262	253	242	233	227	223	223	229	240	6076	253	6327	253
21	251	262	272	275	271	264	255	243	239	235	237	245	254	263	274	278	275	266	257	246	235	229	232	239	6097	254	6347	254
22	249	261	271	276	274	268	253	236	226	219	218	225	239	255	271	283	289	284	273	260	246	238	233	237	6083	253	6327	253
23	248	259	269	274	275	265	247	229	210	195	191	198	211	232	255	273	286	287	279	269	256	241	236	237	5921	247	6166	247
24	245	258	271	277	279	274	254	233	210	191	181	185	197	219	245	270	289	297	296	287	272	259	248	246	5983	249	6237	249
25	254	261	274	284	284	280	264	238	214	191	174	169	179	200	226	253	278	291	298	294	283	270	258	254	5971	249	6227	249
26	256	267	280	290	295	292	278	257	230	203	181	170	171	187	213	239	266	284	295	296	287	275	266	257	6035	251	6292	252
27	257	265	276	287	293	296	286	265	239	211	185	169	164	174	198	225	252	274	290	298	296	287	278	269	6033	251	6301	252
28	268	271	280	291	300	302	295	279	256	224	197	176	162	167	181	204	230	255	271	283	285	281	272	267	5998	250	6262	250
29	264	263	270	282	292	297	294	282	261	235	206	183	167	163	172	191	216	239	258	272	278	277	271	269	5901	246	6166	247
30	265	262	269	281	289	297	297	289	273	250	223	199	181	172	173	187	207	227	247	261	270	275	271	268	5932	247	5932	237
																							MONTHLY MEAN		249.2 cm			

STATION : SYOWA STATION
 LATITUDE : 89°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : DEC . 1 . - DEC . 31 . 2004
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24H)		(25H)			
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN	
1	270	267	271	280	288	297	302	295	284	266	245	223	202	193	189	195	210	228	246	259	272	277	279	280	6119	255	6399	256	
2	280	279	281	285	294	301	304	303	296	282	267	246	228	215	208	209	217	229	243	254	264	273	276	275	6310	263	6590	264	
3	280	280	280	282	287	294	294	295	290	282	270	254	240	230	219	217	221	226	234	245	254	262	267	272	6274	261	6547	262	
4	273	276	275	274	278	280	280	281	279	273	266	258	247	239	233	226	223	224	228	233	240	249	256	262	6151	256	6418	257	
5	267	271	274	272	268	269	265	262	262	258	255	253	250	246	244	239	235	232	228	227	230	236	241	248	6032	251	6287	251	
6	255	260	263	261	258	251	243	238	234	234	233	236	244	247	249	252	247	240	235	231	227	230	234	240	5845	244	6096	244	
7	251	258	263	262	257	248	238	227	221	217	220	227	240	254	266	272	274	270	260	250	243	242	243	249	5950	248	6207	248	
8	257	266	273	271	267	258	240	223	211	202	202	210	227	247	265	282	290	280	269	258	247	244	249	249	6025	251	6283	251	
9	258	265	272	273	269	258	239	215	193	180	175	181	198	221	247	273	292	297	293	285	271	256	249	249	5906	246	6162	246	
10	256	263	270	275	272	261	240	213	186	163	150	150	163	189	221	253	277	296	300	294	285	270	258	254	5756	240	6013	241	
11	257	265	275	282	283	275	256	228	198	168	146	138	142	164	195	229	262	289	302	307	303	293	279	273	5809	242	6083	243	
12	274	278	288	298	300	296	285	260	226	192	164	140	133	147	171	201	236	267	290	303	306	302	291	284	5933	247	6212	248	
13	280	282	292	302	308	311	301	283	254	218	184	153	135	136	150	174	205	236	262	282	292	293	287	280	5899	246	6173	247	
14	274	274	284	292	301	307	305	293	272	241	207	177	149	137	140	154	180	206	234	255	271	279	280	276	5788	241	6059	242	
15	271	270	272	281	293	301	305	302	291	271	241	212	185	164	157	162	173	194	217	237	255	266	269	272	5859	244	6129	245	
16	269	262	260	264	274	285	290	292	290	279	261	238	212	193	180	174	176	188	204	222	236	249	256	258	5813	242	6072	243	
17	259	255	249	248	251	258	267	274	276	271	264	252	236	219	206	199	196	198	208	218	230	243	252	256	5783	241	6041	242	
18	258	255	250	245	243	244	248	253	259	262	261	259	251	244	236	225	220	218	220	225	231	241	247	253	5845	244	6102	244	
19	257	255	251	243	238	234	231	232	236	241	245	248	252	254	252	249	243	239	235	234	237	242	244	251	5843	243	6100	244	
20	258	255	253	249	238	229	221	215	214	218	225	232	241	251	257	261	260	257	254	249	249	248	250	253	5837	243	6097	244	
21	260	261	261	256	249	238	223	214	207	204	210	216	229	244	259	272	276	276	275	269	263	260	259	261	5940	248	6206	248	
22	266	267	268	265	257	244	228	211	200	190	187	196	209	225	241	259	272	277	276	269	264	259	256	257	5841	243	6109	244	
23	260	266	268	267	262	251	235	216	197	182	177	179	190	209	231	254	274	284	290	287	279	272	267	266	5861	244	6129	245	
24	268	272	278	278	275	268	251	230	207	186	174	170	178	197	221	246	269	287	293	294	292	283	273	272	5961	248	6237	249	
25	276	279	288	292	291	285	269	248	223	197	177	166	168	182	204	230	255	275	288	289	286	281	269	265	5981	249	6247	250	
26	266	271	279	287	291	289	280	262	236	207	184	170	163	173	193	219	248	273	280	276	277	292	271	292	5979	249	6224	249	
27	246	277	287	296	320	313	296	278	276	244	205	175	175	193	188	212	240	265	282	296	299	298	288	282	6231	260	6509	260	
28	278	286	287	298	312	308	313	300	274	246	220	195	180	179	176	201	228	243	267	286	291	286	282	279	6214	259	6482	259	
29	268	265	270	282	293	299	302	299	280	256	229	202	183	177	178	188	212	238	253	273	283	281	273	267	6049	252	6312	252	
30	263	257	257	267	278	288	294	291	279	263	237	213	192	180	180	190	209	228	249	266	278	282	280	277	5999	250	6271	251	
31	272	266	267	270	279	292	298	300	297	285	266	244	225	210	203	205	218	233	248	266	280	285	283	280	6271	261	6560	262	
MONTHLY MEAN																										248.8		cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JAN. 1. - JAN. 31, 2005
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench mark No. 1040

Date	Time																							(24h)		(25h)						
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	MEAN	SUM	MEAN				
1	276	270	267	266	272	283	289	293	294	288	275	259	241	226	217	216	220	231	246	259	272	278	279	277	6292	262	6564	263				
2	272	266	259	255	258	263	270	275	277	277	270	259	249	236	227	221	224	228	236	247	257	262	267	268	6124	255	6387	255				
3	263	257	252	246	244	246	249	254	259	262	264	262	258	254	250	245	243	244	249	255	261	265	271	275	6126	255	6397	256				
4	271	264	259	253	245	240	238	238	240	246	250	254	256	258	260	259	257	254	253	255	257	260	263	263	6090	254	6352	254				
5	262	259	252	243	234	226	216	210	211	213	219	229	241	253	263	268	272	270	265	265	263	264	263	266	5926	247	6194	248				
6	267	266	262	255	243	229	215	204	199	194	199	209	227	243	261	277	286	287	287	283	276	273	270	270	5981	249	6254	250				
7	272	273	271	264	255	241	220	203	188	176	175	183	200	222	247	274	291	300	302	299	293	285	281	281	5995	250	6277	251				
8	282	285	286	283	278	264	243	219	193	173	163	161	174	197	225	259	286	302	310	312	304	295	286	282	6060	253	6343	254				
9	283	287	290	294	291	281	262	233	202	175	152	141	145	163	191	225	258	285	303	310	308	299	291	283	5951	248	6233	249				
10	283	286	293	299	302	300	285	262	231	195	164	142	132	142	164	193	229	260	285	300	303	299	288	279	5913	246	6186	247				
11	274	276	283	295	304	307	301	284	256	220	185	154	134	132	144	170	201	233	261	281	291	289	281	271	5828	243	6090	244				
12	262	259	266	280	292	303	306	298	280	250	216	181	154	142	142	157	183	210	238	260	276	277	270	260	5762	240	6014	241				
13	251	242	244	255	271	287	295	297	290	270	244	211	181	161	154	158	173	197	221	242	255	260	256	247	5664	236	5898	236				
14	235	224	221	226	242	259	271	282	283	276	258	233	210	188	174	176	182	197	220	235	249	257	254	246	5596	233	5833	233				
15	236	225	216	213	220	236	252	263	271	274	267	252	235	218	206	202	206	212	229	243	253	261	260	251	5699	237	5940	238				
16	241	230	216	208	209	217	228	239	251	257	257	252	244	236	227	221	222	226	238	248	256	261	263	259	5705	238	5954	238				
17	248	236	226	216	208	210	216	223	232	239	246	247	246	243	243	244	244	247	253	259	264	267	266	263	5766	241	6043	242				
18	257	248	237	226	217	212	212	213	218	224	228	233	240	244	249	256	260	263	265	268	271	272	269	267	5850	244	6115	245				
19	265	255	246	238	228	219	211	205	203	205	209	215	223	235	249	261	271	276	279	279	280	279	277	275	5883	245	6157	246				
20	274	269	263	257	249	238	226	213	203	199	196	200	209	222	239	255	270	279	284	284	282	277	274	270	5930	247	6201	248				
21	270	270	269	265	259	249	235	219	204	192	185	184	193	207	226	247	266	280	286	286	282	279	273	269	5896	246	6165	247				
22	269	268	269	272	268	260	247	230	210	192	179	177	179	196	217	240	261	280	289	290	287	279	273	267	5897	246	6163	247				
23	266	269	273	278	278	274	261	242	220	198	179	169	169	181	204	228	253	274	287	291	289	282	272	266	5903	246	6169	247				
24	266	267	275	283	287	277	260	236	210	186	169	166	173	193	218	246	269	285	292	292	284	274	267	267	5958	248	6219	249				
25	262	266	273	282	293	297	290	276	252	223	196	173	163	167	183	208	235	261	279	288	291	282	269	260	5968	249	6223	249				
26	255	255	264	275	288	297	295	285	265	237	209	183	167	166	175	198	226	251	271	284	288	280	269	258	5940	248	6189	248				
27	249	246	253	265	280	294	298	292	278	254	225	197	176	170	174	191	217	242	261	278	283	278	267	254	5922	247	6167	247				
28	245	237	239	251	267	283	293	293	286	266	239	213	187	174	174	185	205	228	249	265	274	270	258	245	5823	243	6057	242				
29	234	225	222	231	245	263	277	282	281	272	249	224	203	186	180	190	205	226	246	260	270	270	259	248	5745	239	5979	239				
30	234	222	219	222	233	252	265	276	282	277	263	243	227	214	202	206	219	233	251	264	272	274	265	252	5869	245	6107	244				
31	238	224	216	213	221	235	249	260	269	272	265	253	239	230	221	219	226	237	252	265	271	275	269	258	5875	245	6121	245				
MONTHLY MEAN																													245.9		cm	

Table 7. Harmonic constants at Syowa Station.

(1)POSITION		(3)MEAN SEA LEVEL	
LAT.	69-00-28S	S_0	254.0 cm
LONG.	39-34-13E		
(2)EPOCH & DURATION OF ANALYSIS		(4)MEAN SEA LEVEL	
EPOCH	2004/02/01	Obser.-Pre. Max	39.0 cm
CENTRAL DATE	2004/08/02	Obser.-Pre. S.D.	9.5 cm

	H(cm)	κ (deg)		H(cm)	κ (deg)
<i>SA</i>	7.32	64.51	M_2	24.95	232.90
<i>SSA</i>	2.00	67.96	MKS_2	0.14	257.11
<i>MM</i>	2.49	257.10	LAM_2	0.24	213.38
<i>MSF</i>	1.54	210.28	L_2	0.64	183.90
<i>MF</i>	3.55	205.72	T_2	1.24	240.00
$2Q_1$	0.95	352.03	S_2	20.12	251.24
SIG_1	1.04	358.24	R_2	0.24	264.22
Q_1	6.06	13.54	K_2	5.80	249.66
RHO_1	1.03	13.37	MSN_2	0.20	106.97
O_1	24.47	25.18	KJ_2	0.46	106.57
MP_1	0.23	74.76	$2SM_2$	0.23	186.65
M_1	0.47	11.92	MO_3	0.10	247.40
CHI_1	0.36	2.04	M_3	0.24	11.82
PI_1	0.47	30.16	SO_3	0.04	42.43
P_1	7.22	32.85	MK_3	0.06	2.21
S_1	0.35	129.28	SK_3	0.35	87.68
K_1	22.19	34.89	MN_4	0.24	186.84
PSI_1	0.12	299.85	M_4	0.42	251.12
PHI_1	0.18	42.77	SN_4	0.06	297.54
THE_1	0.22	37.50	MS_4	0.20	331.46
J_1	1.13	26.54	MK_4	0.04	327.25
SO_1	0.24	23.88	S_4	0.07	338.22
OO_1	0.37	14.84	SK_4	0.04	329.21
OQ_2	0.06	201.27	$2MN_6$	0.05	242.13
MNS_2	0.05	17.94	M_6	0.15	294.94
$2N_2$	0.53	215.13	MSN_6	0.11	19.05
MU_2	0.52	177.24	$2MS_6$	0.33	39.83
N_2	4.76	228.36	$2MK_6$	0.11	41.64
NU_2	0.77	235.01	$2SM_6$	0.13	122.85
OP_2	0.14	66.33	MSK_6	0.09	94.95

Table 8. Harmonic analysis of tidal stream for 6 days near Syowa Station.

		M_2	S_2	K_2	K_1	O_1	P_1	M_4	MS_4	constant
Depth : 06m										
North comp.	$V(cm/sec)$	1.196	3.149	0.860	0.255	0.217	0.084	0.292	0.195	2.068
	$\kappa(deg.)$	287.3	323.1	323.1	126.7	270.3	126.7	301.6	213.5	
East comp.	$V(cm/sec)$	0.346	0.869	0.237	0.144	0.553	0.048	0.500	0.227	0.796
	$\kappa(deg.)$	65.9	309.6	309.6	144.1	198.5	144.1	186.1	301.4	
Main Dir 357.6	$V(cm/sec)$	1.206	3.111	0.849	0.249	0.211	0.082	0.301	0.195	2.033
	$\kappa(deg.)$	286.8	323.2	323.2	126.3	276.2	126.3	305.2	210.7	
Depth : 10m										
North comp.	$V(cm/sec)$	1.197	2.497	0.682	0.328	0.283	0.108	0.258	0.487	2.592
	$\kappa(deg.)$	312.9	327.6	327.6	127.4	345.7	127.4	338.9	170.1	
East comp.	$V(cm/sec)$	0.499	0.752	0.205	0.464	0.472	0.154	0.658	0.267	1.280
	$\kappa(deg.)$	54.7	313.1	313.1	71.5	256.7	71.5	220.9	18.8	
Main Dir 5.0	$V(cm/sec)$	1.184	2.551	0.696	0.351	0.285	0.116	0.236	0.465	2.693
	$\kappa(deg.)$	314.9	327.2	327.2	121.9	337.5	121.9	326.5	168.7	
Depth : 14m										
North comp.	$V(cm/sec)$	1.541	2.001	0.546	0.581	0.479	0.192	0.090	0.203	3.112
	$\kappa(deg.)$	313.2	341.0	341.0	126.6	336.7	126.6	170.0	172.3	
East comp.	$V(cm/sec)$	0.381	0.933	0.255	0.731	0.597	0.242	0.359	0.141	1.408
	$\kappa(deg.)$	72.3	299.8	299.8	70.4	266.1	70.4	229.1	88.8	
Main Dir 23.2	$V(cm/sec)$	1.350	2.129	0.581	0.735	0.564	0.243	0.197	0.201	3.415
	$\kappa(deg.)$	318.8	334.5	334.5	107.6	313.5	107.6	208.1	156.4	
Depth : 18m										
North comp.	$V(cm/sec)$	1.692	1.765	0.482	0.683	0.723	0.226	0.072	0.220	3.480
	$\kappa(deg.)$	322.2	340.8	340.8	121.9	316.2	121.9	110.6	183.6	
East comp.	$V(cm/sec)$	0.235	0.906	0.247	0.641	0.488	0.212	0.159	0.260	1.557
	$\kappa(deg.)$	106.6	307.7	307.7	81.8	264.3	81.8	256.1	138.5	
Main Dir 18.2	$V(cm/sec)$	1.548	1.920	0.524	0.813	0.790	0.269	0.039	0.272	3.792
	$\kappa(deg.)$	323.8	336.2	336.2	112.8	307.5	112.8	156.6	171.4	
Depth : 22m										
North comp.	$V(cm/sec)$	1.759	2.023	0.552	0.714	0.799	0.236	0.177	0.195	3.632
	$\kappa(deg.)$	310.8	352.3	352.3	131.1	335.0	131.1	132.4	247.9	
East comp.	$V(cm/sec)$	0.169	0.599	0.163	0.493	0.416	0.163	0.139	0.156	1.842
	$\kappa(deg.)$	352.5	324.6	324.6	109.4	300.9	109.4	229.1	130.1	
Main Dir 16.0	$V(cm/sec)$	1.726	2.092	0.571	0.814	0.866	0.269	0.170	0.172	3.999
	$\kappa(deg.)$	311.8	350.2	350.2	127.6	330.7	127.6	145.4	235.1	

		M_2	S_2	K_2	K_1	O_1	P_1^c	M_4	MS_4	constant
Depth : 26m										
North comp.	$V(cm/sec)$	1.811	2.356	0.643	0.620	0.622	0.205	0.201	0.245	3.588
	$\kappa(deg.)$	298.2	357.4	357.4	138.3	351.2	138.3	123.3	251.8	
East comp.	$V(cm/sec)$	0.444	0.703	0.192	0.584	0.524	0.193	0.215	0.057	2.035
	$\kappa(deg.)$	329.5	12.3	12.3	131.0	308.0	131.0	236.9	114.7	
Main Dir 21.6	$V(cm/sec)$	1.825	2.441	0.666	0.790	0.731	0.262	0.172	0.213	4.085
	$\kappa(deg.)$	300.8	358.9	358.9	136.3	340.8	136.3	148.4	248.0	
Depth : 30m										
North comp.	$V(cm/sec)$	1.572	1.917	0.523	0.427	0.279	0.141	0.322	0.200	3.612
	$\kappa(deg.)$	303.2	352.8	352.8	137.8	18.9	137.8	144.8	280.0	
East comp.	$V(cm/sec)$	0.679	0.975	0.266	0.631	0.517	0.209	0.349	0.157	2.110
	$\kappa(deg.)$	321.2	17.4	17.4	134.1	302.6	134.1	234.6	343.8	
Main Dir 34.7	$V(cm/sec)$	1.664	2.094	0.572	0.710	0.414	0.235	0.331	0.219	4.170
	$\kappa(deg.)$	307.4	359.2	359.2	135.9	335.2	135.9	181.7	301.5	
Depth : 34m										
North comp.	$V(cm/sec)$	1.329	1.802	0.492	0.402	0.310	0.133	0.275	0.169	3.594
	$\kappa(deg.)$	302.7	352.1	352.1	158.5	53.9	158.5	146.1	279.6	
East comp.	$V(cm/sec)$	0.971	1.041	0.284	0.644	0.541	0.213	0.451	0.249	2.173
	$\kappa(deg.)$	328.2	16.1	16.1	135.2	299.7	135.2	244.1	2.3	
Main Dir 44.4	$V(cm/sec)$	1.590	1.975	0.539	0.723	0.352	0.239	0.348	0.224	4.089
	$\kappa(deg.)$	313.3	0.7	0.7	144.3	334.9	144.3	210.0	330.0	
Depth : 38m										
North comp.	$V(cm/sec)$	1.272	1.552	0.424	0.505	0.463	0.167	0.302	0.411	3.551
	$\kappa(deg.)$	303.6	354.7	354.7	172.0	35.3	172.0	103.2	235.4	
East comp.	$V(cm/sec)$	1.066	1.324	0.362	0.630	0.548	0.209	0.461	0.312	2.253
	$\kappa(deg.)$	326.7	11.5	11.5	143.6	303.2	143.6	241.9	16.5	
Main Dir 48.1	$V(cm/sec)$	1.610	2.001	0.546	0.782	0.503	0.259	0.233	0.173	4.0495
	$\kappa(deg.)$	314.7	2.9	2.9	155.4	341.1	155.4	207.0	292.5	
Depth : 42m										
North comp.	$V(cm/sec)$	1.230	1.381	0.377	0.501	0.343	0.166	0.141	0.245	3.642
	$\kappa(deg.)$	311.1	343.5	343.5	161.2	26.5	161.2	143.9	219.7	
East comp.	$V(cm/sec)$	1.154	1.320	0.360	0.561	0.377	0.186	0.252	0.155	2.192
	$\kappa(deg.)$	342.8	1.8	1.8	154.2	307.5	154.2	238.4	17.5	
Main Dir 45.4	$V(cm/sec)$	1.621	1.886	0.515	0.750	0.393	0.248	0.198	0.081	4.118
	$\kappa(deg.)$	326.5	352.5	352.5	157.5	344.5	157.5	208.6	250.6	

		M_2	S_2	K_2	K_1	O_1	P_1	M_4	MS_4	constant
Depth : 26m										
North comp.	$V(cm/sec)$	1.275	0.895	0.244	0.561	0.407	0.186	0.170	0.313	3.641
	$\kappa(deg.)$	313.9	325.9	325.9	139.2	347.8	139.2	119.1	227.1	
East comp.	$V(cm/sec)$	1.125	1.483	0.405	0.374	0.167	0.124	0.123	0.073	2.070
	$\kappa(deg.)$	7.9	340.8	340.8	149.0	284.8	149.0	170.4	4.4	
Main Dir 43.6	$V(cm/sec)$	1.515	1.658	0.453	0.662	0.362	0.219	0.188	0.193	4.064
	$\kappa(deg.)$	338.4	335.1	335.1	143.0	331.3	143.0	139.7	237.3	
Depth : 30m										
North comp.	$V(cm/sec)$	1.359	0.658	0.180	0.544	0.367	0.180	0.008	0.315	3.288
	$\kappa(deg.)$	309.3	7.7	7.7	147.2	356.4	147.2	49.2	222.4	
East comp.	$V(cm/sec)$	0.944	1.469	0.401	0.214	0.089	0.071	0.053	0.054	1.744
	$\kappa(deg.)$	29.3	329.1	329.1	133.9	157.1	133.9	147.8	38.6	
Main Dir 34.1	$V(cm/sec)$	1.324	1.295	0.354	0.568	0.258	0.188	0.030	0.231	3.700
	$\kappa(deg.)$	332.5	344.3	344.3	144.4	0.1	144.4	135.1	222.9	