

Oceanographic Data of the 45th Japanese Antarctic Research Expedition from December 2003 to March 2004

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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 45th Japanese Antarctic Research Expedition (JARE-45) during the austral summer of 2003/2004. The tidal observations were carried out by the winter party of JARE-44 from February 2003 to January 2004.

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 51 stations and the results are given Table 1.

(2) Monitoring of marine pollution

Surface water sampling for monitoring of marine pollution were made at 15 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 124 stations (XCTD: 102 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), (d) and (h) 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 (i), (j) and (k) were analyzed with the method in Hydrographic and Oceanographic Department (2005).

- (a) Practical salinity: Conductive salinometer
(Guidline Autosal salinometer model 8400B).
- (b) pH: Glass electrode method
(Horiba digital pH meter F-16).
- (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) Ammonium: Indophenol blue method
(Shimadzu Model UV-1600 Spectrophotometer).
- (i) Petroleum oil: N-hexane extraction-fluorophotometric analysis.
- (j) Cadmium (Cd): Solvent extraction-atomic absorption spectrophotometry.
- (k) Mercury (Hg): Cold vapor atomic absorption spectrophotometry.

The results of items (a) to (h) are given in Tables 1 and 4. The results of items (i) to (k) 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. 21853) was deployed at 46°04.6'S, 110°08.6'E on December 6, 2003. The second one (ID No. 21880) was deployed at 55°27.6'S, 109°22.7'E on December 8, 2003. The third one (ID No. 21847) was deployed at 59°10.9'S, 103°40.5'E on December 9, 2003. Three drifters were being in operation until September 30, 2004. The trajectories are shown in Fig. 8.

(7) Current observation with LADCP

LADCP (RD Instruments Co. 300kHz WH-ADCP) observations were carried out at 15 stations and the results are given in Fig. 9. The current data observed in st.14 and st.15 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 2003 to January 2004 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-44, 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.

Acknowledgments

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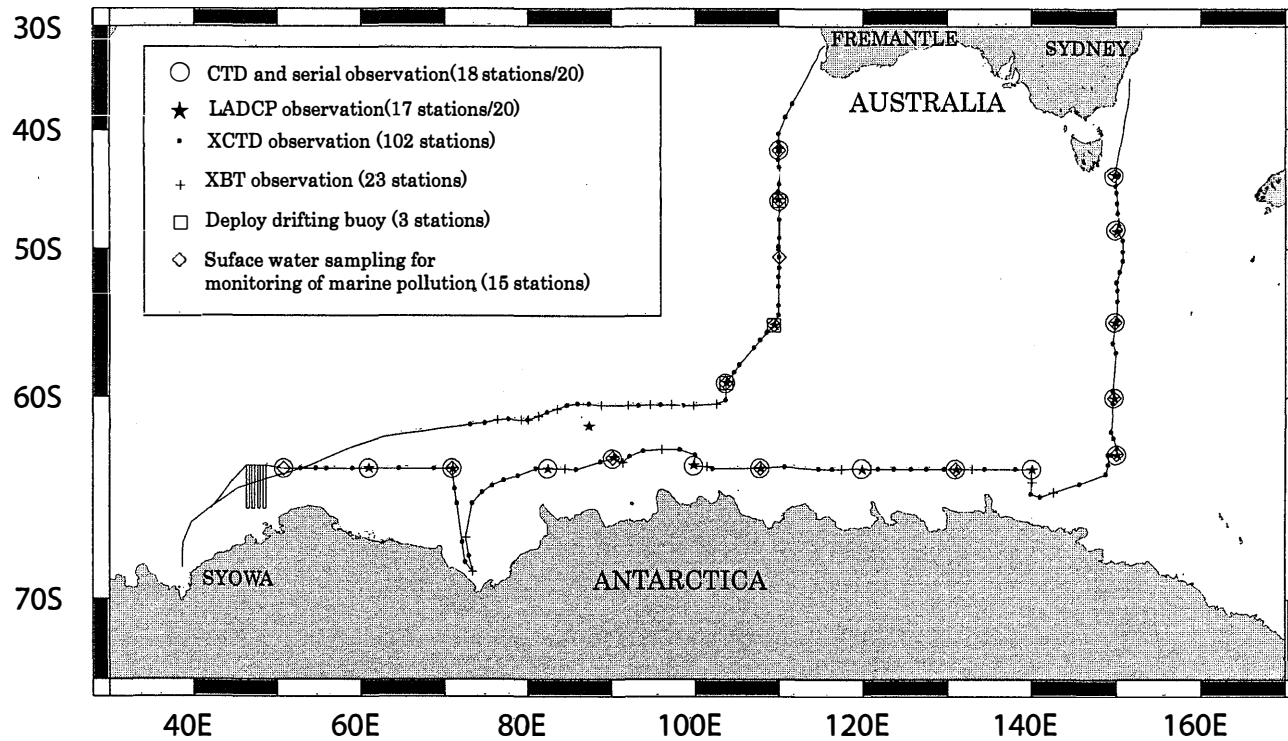


Fig. 1. The track of the icebreaker "Shirase" and the site of oceanographic stations.

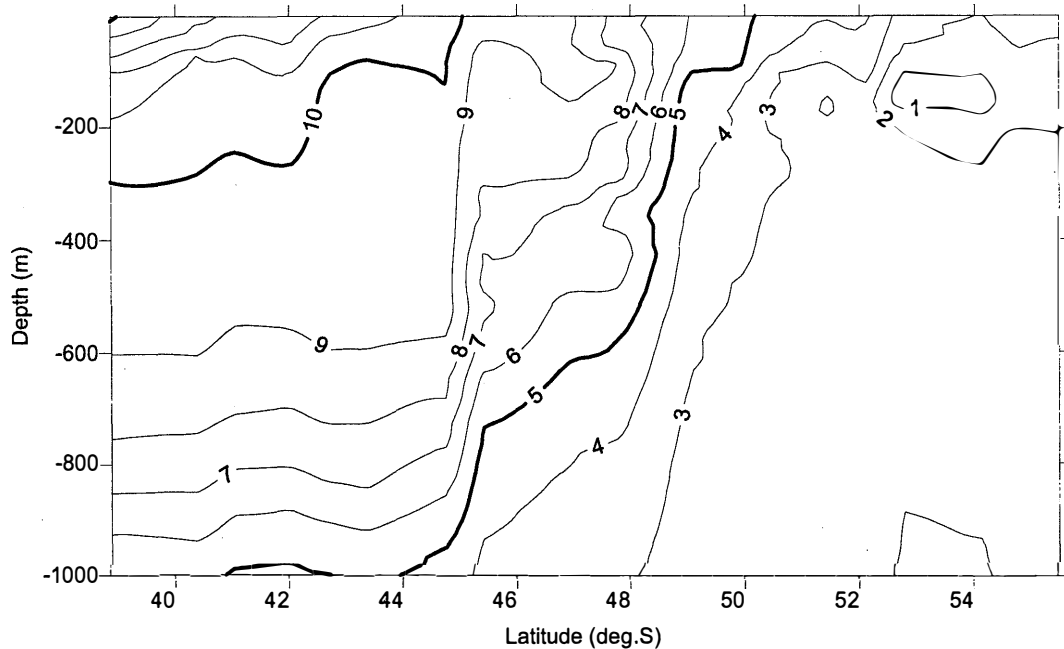


Fig. 2. Vertical profile of water temperature ($^{\circ}\text{C}$) observed with XCTD along 110°E .

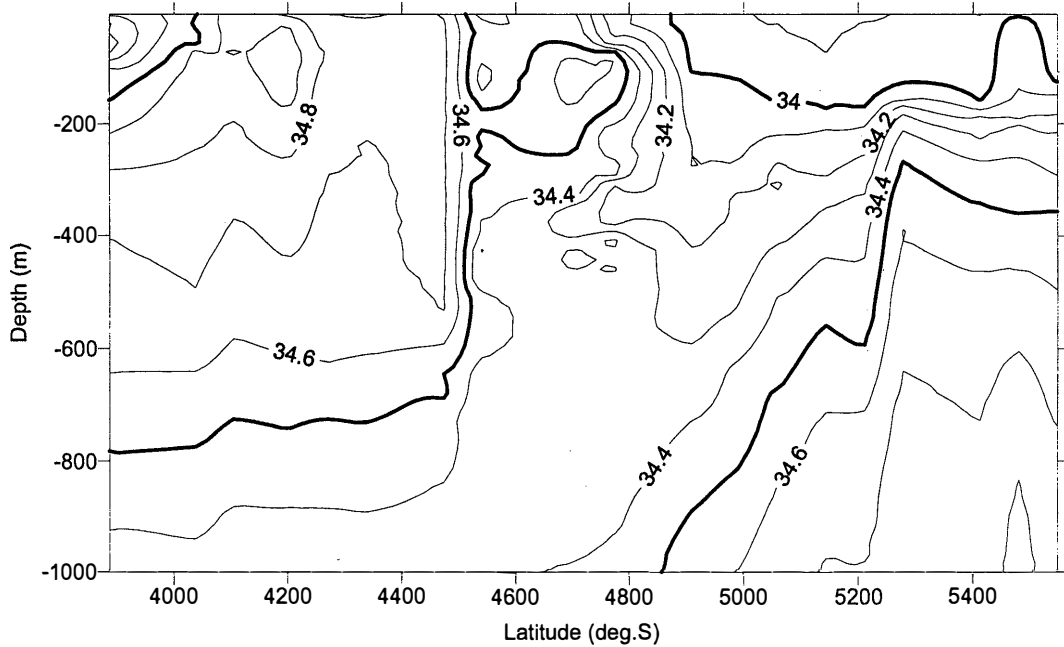


Fig. 3. Vertical profile of water salinity observed with XCTD along 110°E .

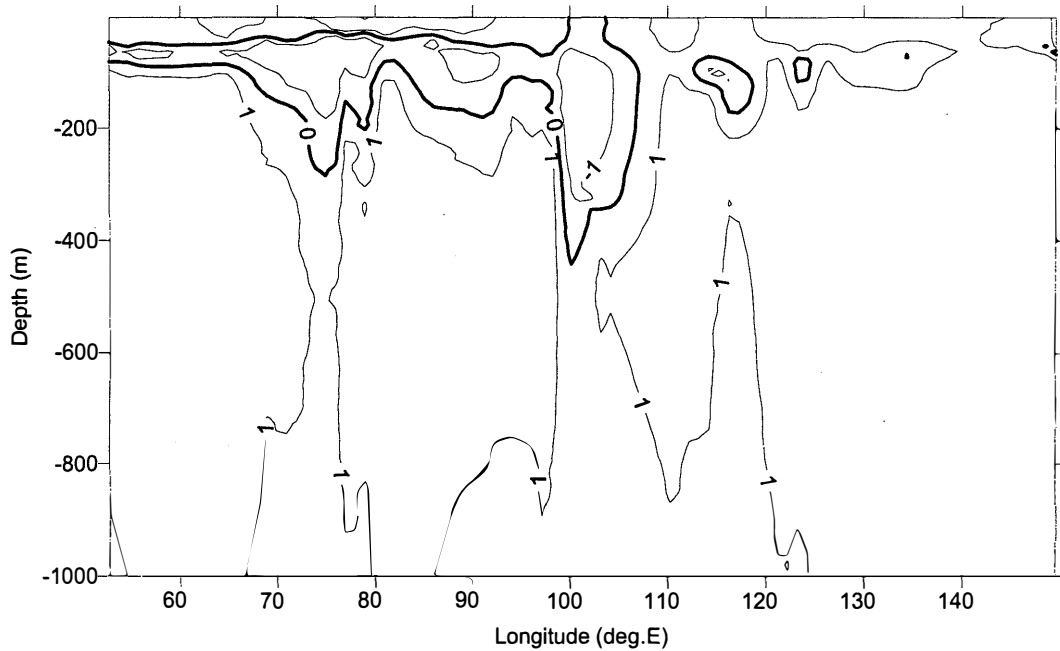


Fig. 4. Vertical profile of water temperature ($^{\circ}\text{C}$) observed with XCTD along 64°S .

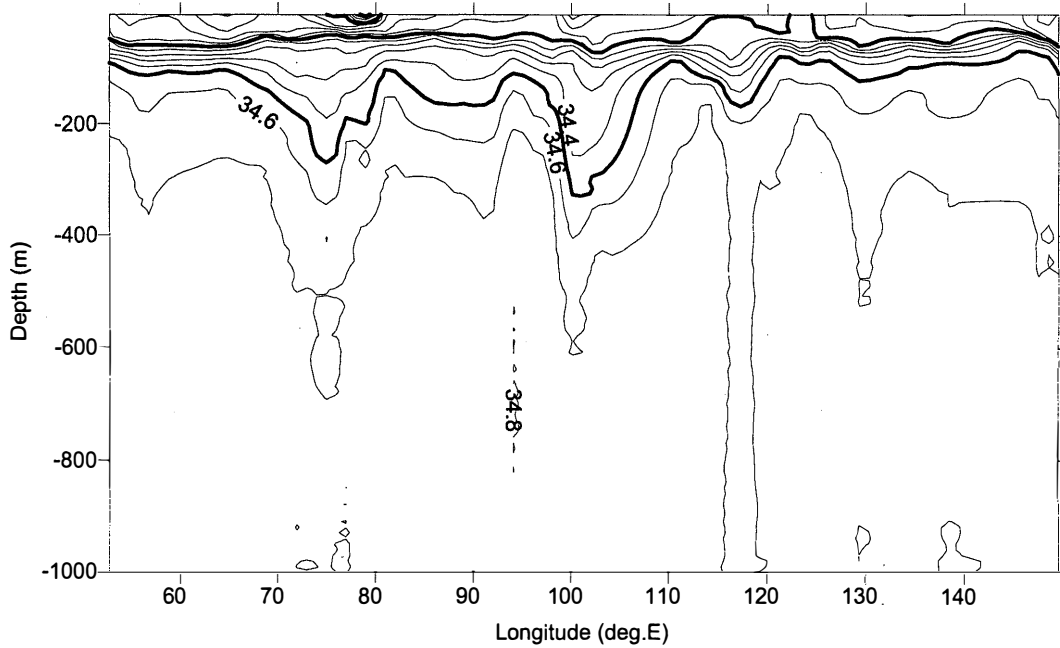


Fig. 5. Vertical profile of water salinity observed with XCTD along 64°S .

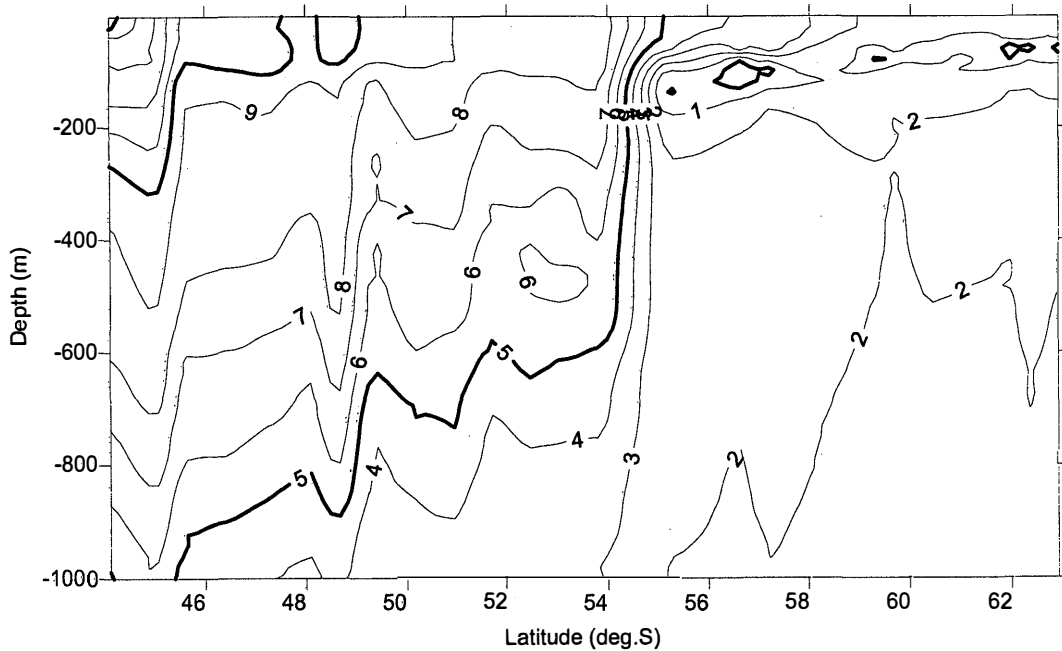


Fig. 6. Vertical profile of water temperature (°C) observed with XCTD along 150°E.

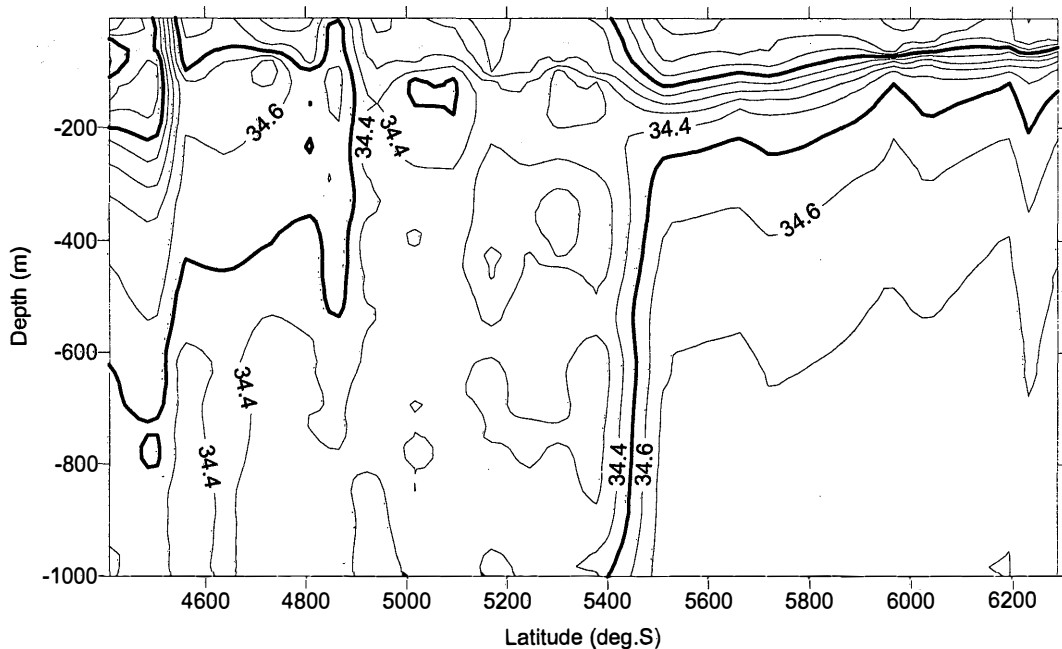


Fig. 7. Vertical profile of water salinity observed with XCTD along 150°E.

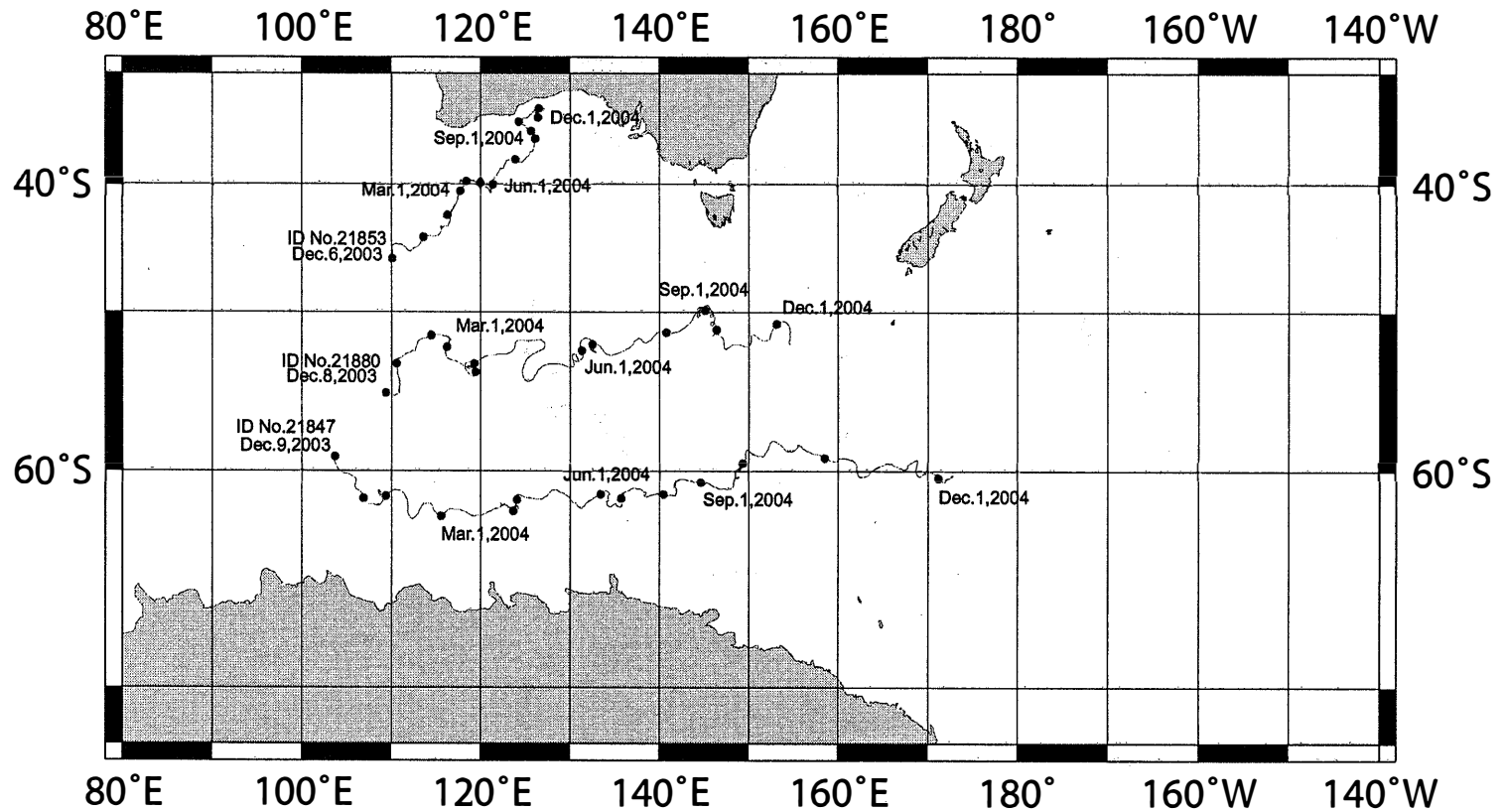


Fig. 8. Trajectories of three surface drifting buoys. Solid circles denote the deployment location and the location on the first day of every month.

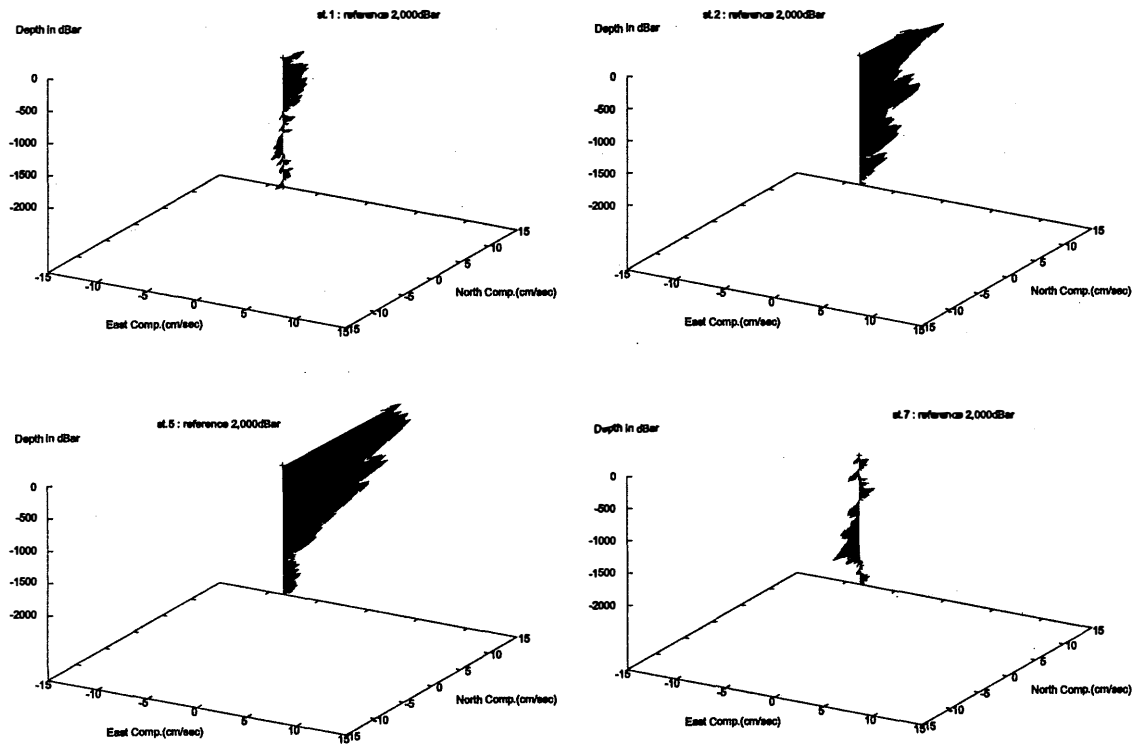


Fig. 9. Vertical profile of current observed with LADCP.

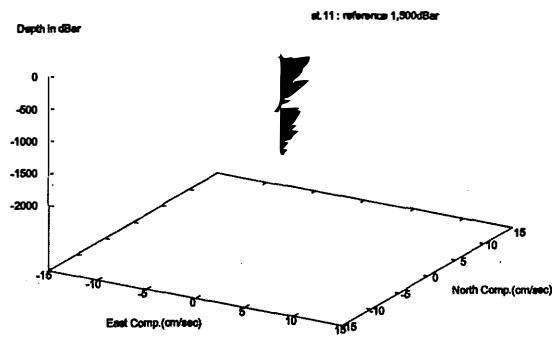
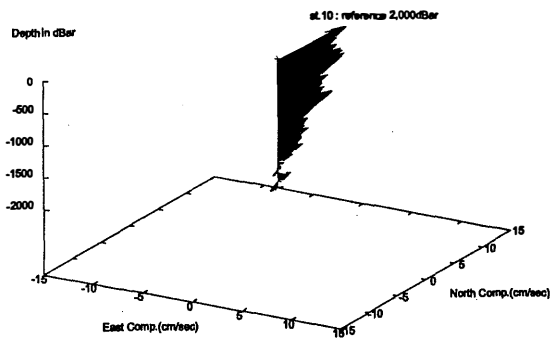
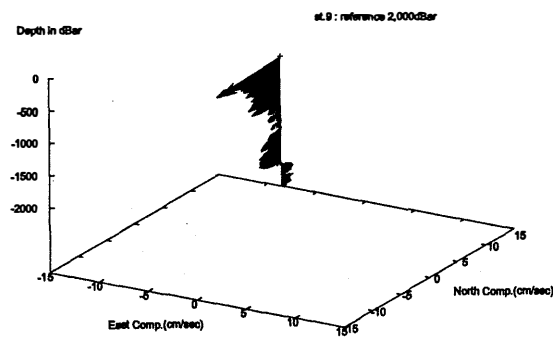
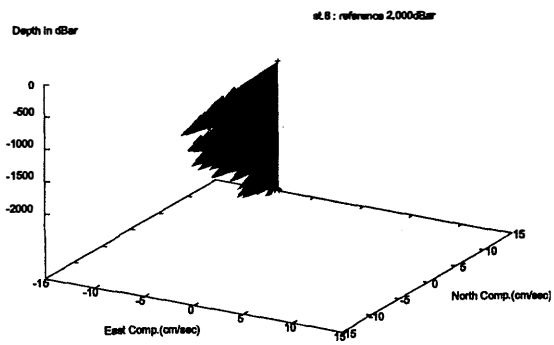


Fig. 9 (continued).

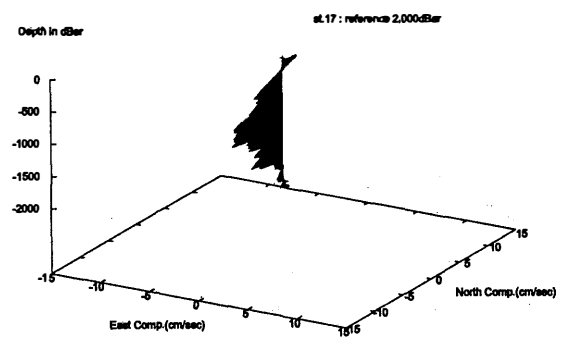
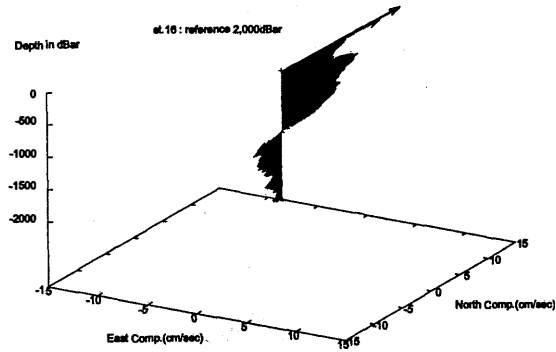
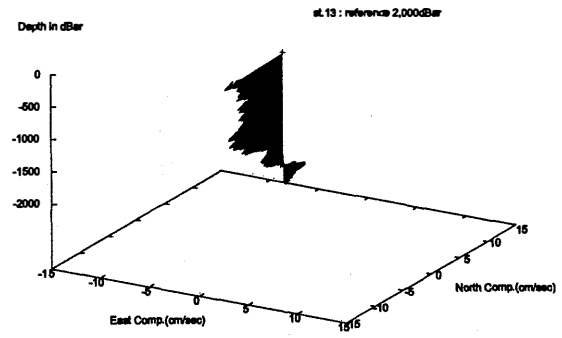
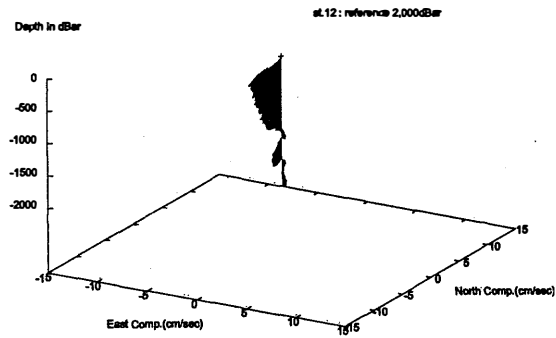


Fig. 9 (continued).

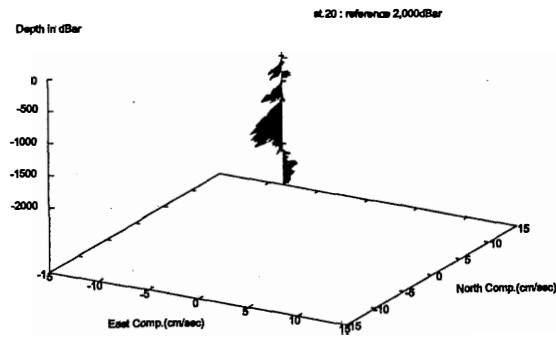
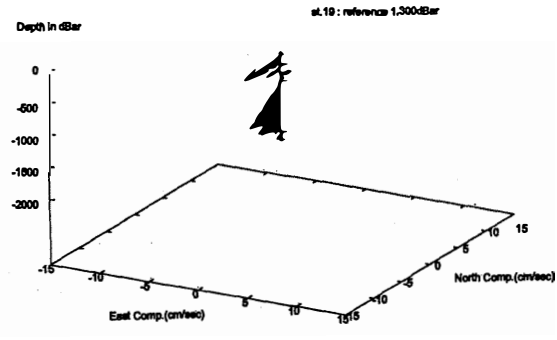
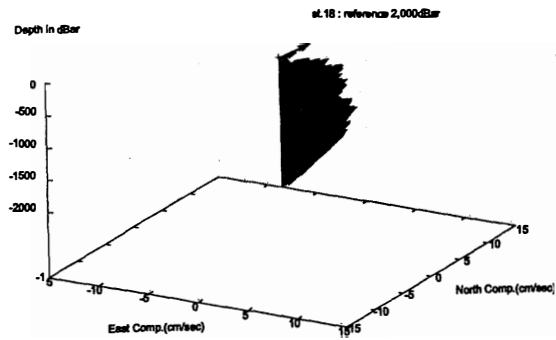


Fig. 9 (continued).

Table 1. Data of surface water observations and on board the icebreaker "Shirase" in 2003-2004.

Date	Time	Position		Station N.o.	Air Temp.	Water Temp.	Salinity	pH	DO2	PO4-P	SiO3-Si	NO2-N	NO3-N	NH4-N
		Lat.	Long.											
(UT)					°C						(μ mol/l)			
2003														
Dec.	5 1205	41-03.8 S	109-59.9 E		13.5	—	34.861	—	—	0.87	—	0.21	8	0.0
	5 0605	41-51.4	110-00.7	St.1	12.8	12.6	34.930	8.18	279	0.79	-2	0.19	9	0.0
	6 0200	45-23.5	110-00.0		11.3	9.0	34.417	7.96	—	0.98	-5	0.34	14	-0.1
	6 0601	46-09.7	110-01.4	St.2	11.7	9.6	34.620	8.00	296	0.89	-3	0.26	12	-0.1
	7 0200	49-48.8	110-00.1		7.7	—	33.945	8.10	324	1.55	1	0.23	23	0.5
	7 0703	50-35.8	110-04.3	St.3	5.8	4.4	33.922	8.12	334	1.50	-2	0.32	23	0.3
	8 0200	54-46.5	109-59.2		3.8	2.1	33.959	8.13	349	1.86	15	0.46	29	-6.0
	8 0718	55-27.6	109-22.7	St.4	4.7	—	—	—	353	1.75	15	0.36	28	-1.7
	9 0604	59-10.9	103-40.5	St.5	1.9	—	33.952	—	369	2.02	36	0.30	31	-0.1
	9 0200	58-32.0	104-38.7		1.6	—	33.899	—	359	1.96	31	0.29	29	-0.1
	10 0200	60-29.9	98-33.3		0.6	-0.3	33.975	—	352	1.98	46	0.19	30	1.0
	10 0800	60-29.6	95-54.4		2.1	—	—	—	364	1.99	41	0.25	30	0.8
	11 0300	60-25.0	87-23.2		1.3	-0.5	33.804	8.15	368	2.90	36	0.25	29	0.1
	11 0612	60-26.1	85-58.3		1.1	—	33.810	—	361	2.01	53	0.25	31	0.0
	12 0409	61-20.8	79-56.9		0.3	-0.7	33.931	8.14	365	1.92	42	0.25	30	0.1
	12 1200	61-23.0	76-19.0		0.4	-0.5	33.825	8.13	364	1.98	37	0.29	30	0.2
		Arrived at the ice edge of SYOWA station												
2004														
Feb.	23 0450	63-59.5	50-49.8	St.6	-0.6	-1.3	33.901	8.16	348	2.20	56	0.40	31	0.7
	23 1300	63-59.8	52-46.9		-1.2	-0.9	33.961	8.14	351	2.09	53	0.45	31	0.6
	24 0400	64-00.0	59-02.3		0.0	0.5	33.841	8.14	353	1.92	44	0.37	29	0.8
	24 0850	64-00.0	60-56.5	St.7	-0.9	0.5	33.847	8.15	352	1.91	43	0.32	29	1.0
	25 0400	63-59.5	68-44.4		0.3	0.6	33.742	8.14	348	1.87	43	0.32	28	0.7
	25 0855	63-59.1	70-58.6	St.8	1.0	0.6	33.752	8.13	346	1.89	42	0.29	28	0.8
	26 0300	67-33.7	72-09.9		-3.6	-1.1	33.638	8.30	363	0.94	19	0.21	18	0.2
	26 1100	68-50.2	73-22.1		-10.0	-1.1	32.919	8.51	397	0.32	24	0.11	5	0.0
	27 0312	65-44.8 S	73-17.6 E		-1.7	0.1	32.979	8.31	360	1.07	19	0.05	17	0.1
	27 1103	64-50.8	75-40.2		-0.4	0.6	33.507	8.21	350	1.45	17	0.16	22	0.8
	28 0300	64-00.0	80-57.4		0.6	1.3	33.697	8.22	346	1.39	4	0.31	24	1.0
	28 0803	64-00.8	82-23.7	St.9	1.1	1.4	33.676	8.22	347	1.46	8	0.30	24	1.1
	29 0200	63-39.1	88-41.0		0.3	0.9	33.944	8.24	345	1.52	21	0.32	23	1.3
	29 0309	63-27.3	90-12.8	St.10	1.0	2.6	33.962	8.21	340	1.58	19	0.23	25	1.3
Mar.	1 0200	63-03.1	93-47.1		-0.6	0.4	33.966	8.19	347	1.71	29	0.26	26	0.3
	1 1000	63-00.4	96-02.8		-1.9	0.6	33.990	8.18	355	1.75	39	0.25	27	0.1
	2 0200	63-16.1	100-02.1		-2.7	-0.4	33.788	8.14	353	2.06	57	0.24	31	1.2
	2 0655	63-50.6	99-51.0	St.11	-0.6	-0.4	33.963	8.12	350	2.07	56	0.24	30	0.5
	3 0720	63-57.5	107-46.3	St.12	-0.6	-0.4	34.065	8.12	346	2.00	55	0.34	30	0.8
	3 1700	63-52.9	110-42.9		0.6	—	—	—	—	-0.05	3	0.31	0	—
	4 0100	64-00.0	114-41.2		-0.7	-0.2	34.086	8.14	346	2.03	52	0.21	30	0.4
	5 0452	63-56.7	119-55.4	St.13	1.8	1.7	34.045	8.13	340	1.90	43	0.32	29	0.6
	5 1600	63-59.8	121-48.4		1.2	—	—	—	—	-0.02	3	0.10	0	—
	6 0000	63-59.8	123-41.7		1.0	1.1	34.029	8.13	335	1.94	37	0.26	29	0.0
	7 0522	64-00.1	131-06.3	St.14	-0.9	0.9	33.967	8.09	337	1.97	35	0.29	30	0.5
	7 2300	64-00.1	138-06.6		-1.0	—	—	—	—	0.01	3	0.09	0	—
	8 0348	63-59.3	140-01.1	St.15	-0.8	0.8	33.930	8.13	339	1.92	27	0.30	29	0.8
	8 1100	64-39.5	140-00.0		-1.9	0.6	33.909	8.13	336	1.88	27	0.28	29	0.6
	10 2152	63-12.4	150-06.0	St.16	1.3	2.3	33.771	8.16	341	1.63	26	0.31	29	0.9
	11 2152	60-01.8	149-49.9	St.17	2.1	2.8	33.785	8.12	339	1.91	11	0.25	28	1.4
	13 0305	57-14.8	150-01.9		3.0	3.6	33.819	8.13	324	1.71	-5	0.30	26	0.4
	14 0311	55-15.8	149-56.4	St.18	5.2	6.2	33.771	8.14	320	1.54	-6	0.34	25	0.7
	15 0500	51-42.9 S	150-26.2 E		6.1	8.0	34.102	8.19	297	1.36	-4	0.30	20	0.2
	15 2156	48-29.0	149-57.9	St.19	9.7	11.5	34.621	8.19	279	0.84	-6	0.31	11	0.2
	16 2153	44-05.6	149-46.4	St.20	13.5	16.3	35.405	8.26	257	0.20	-6	0.19	0	0.0

Table 2. XCTD observation data.

station	JA45001		JA45002		JA45003		JA45004		JA45005		JA45006		JA45007		JA45008	
date	2003/12/4		2003/12/4		2003/12/4		2003/12/4		2003/12/5		2003/12/5		2003/12/5		2003/12/5	
time(UT)	10:00		13:00		16:00		23:00		2:00		11:00		14:00		17:00	
latitude	37-38.1S		38-15.2S		38-51.9S		40-22.6S		41-03.8S		41-59.0S		42-40.3S		43-19.8S	
longitude	111-34.8E		111-10.6E		110-45.8E		110-00.0E		109-59.9E		110-00.3E		110-00.0E		110-00.5E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	16.8	35.49	15.4	35.01	15.3	35.18	13.6	35.01	12.8	34.82	12.9	34.72	12.0	34.69	11.4	34.66
10	16.2	35.51	14.6	35.17	14.6	35.18	13.6	35.03	12.7	34.84	12.9	34.86	11.8	34.72	11.4	34.71
20	15.9	35.52	14.4	35.21	14.7	35.31	12.9	34.98	12.1	34.84	12.5	34.90	11.5	34.74	11.1	34.73
30	15.8	35.53	14.2	35.23	14.4	35.31	12.8	34.99	12.1	34.85	12.3	34.92	11.1	34.74	10.8	34.74
50	14.8	35.45	13.7	35.33	13.8	35.36	12.8	35.03	11.6	34.86	12.1	34.93	10.9	34.75	10.8	34.74
75	13.5	35.34	13.1	35.29	13.0	35.29	10.9	34.88	11.1	34.91	11.8	34.97	10.2	34.80	10.1	34.73
100	13.1	35.29	12.3	35.17	12.1	35.12	10.8	34.89	10.7	34.89	11.2	34.97	10.0	34.78	9.7	34.71
125	12.5	35.18	11.9	35.10	11.7	35.05	10.5	34.85	10.5	34.84	10.9	34.94	9.9	34.75	9.6	34.71
150	12.2	35.13	11.5	35.03	11.5	35.02	10.4	34.84	10.3	34.82	10.9	34.95	9.8	34.74	9.6	34.70
200	11.4	35.01	11.0	34.93	10.9	34.92	10.2	34.83	10.1	34.80	10.5	34.87	9.7	34.72	9.6	34.71
250	10.7	34.89	10.6	34.88	10.5	34.86	10.1	34.80	10.0	34.77	10.2	34.82	9.6	34.72	9.5	34.70
300	10.2	34.80	10.3	34.83	10.0	34.76	10.0	34.78	9.8	34.74	9.8	34.76	9.5	34.70	9.5	34.70
400	9.6	34.71	9.6	34.72	9.6	34.71	9.7	34.74	9.4	34.68	9.5	34.72	9.4	34.68	9.4	34.69
500	9.2	34.65	9.4	34.68	9.3	34.66	9.4	34.70	9.2	34.65	9.2	34.67	9.3	34.67	9.4	34.68
600	8.9	34.62	9.1	34.64	9.0	34.63	9.0	34.64	8.8	34.59	8.8	34.61	9.0	34.62	8.9	34.61
700	8.3	34.55	8.6	34.58	8.3	34.55	8.3	34.55	8.1	34.52	8.0	34.53	8.3	34.53	8.2	34.53
800	7.1	34.47	7.6	34.49	7.7	34.49	7.5	34.48	7.1	34.45	7.1	34.47	7.4	34.46	7.4	34.46
900	6.0	34.40	6.3	34.43	6.2	34.41	6.4	34.42	5.9	34.38	5.8	34.40	6.0	34.39	6.2	34.39
1000	4.9	34.37	5.1	34.37	5.1	34.35	5.3	34.38	4.8	34.33	4.8	34.35	5.0	34.33	5.2	34.33

station	JA45009		JA45010		JA45011		JA45012		JA45013		JA45014		JA45015		JA45016	
date	2003/12/5		2003/12/6		2003/12/6		2003/12/6		2003/12/6		2003/12/7		2003/12/7		2003/12/7	
time(UT)	23:00		2:00		14:00		17:00		23:00		2:00		7:03		11:00	
latitude	44-44.8S		45-23.5S		46-59.4S		47-41.4S		49-07.8S		49-48.8S		50-35.8S		51-24.7S	
longitude	110-00.5E		110-00.0E		110-00.0E		110-00.3E		110-00.0E		110-00.0E		110-04.3E		110-02.0E	
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	10.7	34.68	9.3	34.33	9.1	34.42	7.8	34.12	5.9	33.93	5.5	33.91	4.6	33.85	4.1	33.83
10	10.7	34.70	9.3	34.37	9.1	34.44	7.8	34.16	5.9	33.96	5.4	33.94	4.4	33.88	3.9	33.87
20	10.7	34.71	9.3	34.46	9.1	34.46	7.8	34.17	5.9	33.96	5.4	33.94	4.3	33.90	3.9	33.88
30	10.6	34.71	9.2	34.47	9.1	34.46	7.8	34.18	5.9	33.97	5.4	33.94	4.3	33.91	3.9	33.89
50	10.2	34.72	9.0	34.44	9.0	34.48	7.5	34.21	5.8	33.97	5.3	33.95	4.2	33.90	3.7	33.89
75	10.1	34.72	8.7	34.40	9.0	34.55	9.0	34.59	5.6	33.97	5.4	33.96	3.8	33.93	3.5	33.90
100	10.1	34.72	8.5	34.37	9.4	34.66	9.1	34.61	5.3	33.98	5.2	33.98	3.0	33.95	2.5	33.94
125	10.0	34.72	8.4	34.36	9.2	34.63	8.9	34.58	4.5	34.04	4.2	34.01	3.0	33.98	2.1	33.98
150	9.7	34.71	8.5	34.44	9.0	34.62	8.7	34.55	4.3	34.04	4.1	34.03	2.7	33.99	2.0	33.99
200	9.5	34.72	8.6	34.51	8.6	34.56	8.0	34.42	4.2	34.07	4.0	34.06	2.6	34.03	2.3	34.08
250	9.4	34.71	8.3	34.47	8.3	34.51	7.6	34.39	4.2	34.10	3.7	34.08	3.0	34.14	2.5	34.15
300	9.4	34.71	8.0	34.42	7.9	34.46	6.7	34.21	4.0	34.12	3.9	34.18	3.2	34.22	2.2	34.21
400	9.4	34.71	7.5	34.37	6.5	34.29	7.2	34.45	3.6	34.19	3.4	34.23	2.6	34.27	2.4	34.35
500	9.4	34.70	7.0	34.38	5.9	34.34	5.9	34.36	3.3	34.25	3.0	34.28	2.7	34.39	2.5	34.46
600	8.7	34.59	6.5	34.42	5.2	34.35	5.0	34.32	3.0	34.30	3.0	34.37	2.7	34.45	2.4	34.53
700	7.7	34.47	5.4	34.33	4.5	34.34	4.3	34.32	2.8	34.37	2.8	34.43	2.6	34.53	2.4	34.60
800	6.6	34.43	4.7	34.31	4.0	34.35	3.8	34.35	2.7	34.44	2.6	34.49	2.5	34.57	2.3	34.64
900	5.5	34.37	4.2	34.33	3.4	34.37	3.5	34.38	2.6	34.51	2.6	34.54	2.4	34.62	2.3	34.68
1000	4.6	34.34	3.8	34.37	3.2	34.43	3.2	34.42	2.6	34.56	2.5	34.60	2.5	34.66	2.3	34.71

station date	JA45017 2003/12/7	JA45018 2003/12/7	JA45019 2003/12/7	JA45020 2003/12/8	JA45021 2003/12/8	JA45022 2003/12/8	JA45023 2003/12/8	JA45024 2003/12/8								
time(UT)	14:00	17:00	23:00	2:00	7:18	11:00	14:00	17:00								
latitude	52-05.4S	52-45.4S	54-06.8S	54-46.5S	55-27.6S	55-56.7S	56-28.7S	56-59.0S								
longitude	110-00.0E	110-00.0E	109-59.4E	109-59.2E	109-22.7E	108-36.2E	107-47.8E	107-01.0E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	4.3	33.85	2.6	33.91	2.0	33.89	2.5	33.98	2.6	33.91	1.6	33.89	1.6	33.89	1.6	33.89
10	4.1	33.90	2.6	33.92	2.0	33.92	2.4	34.01	2.6	33.93	1.6	33.92	1.6	33.91	1.6	33.92
20	4.0	33.91	2.4	33.93	2.0	33.93	2.2	34.04	2.2	33.94	1.4	33.92	1.6	33.92	1.6	33.94
30	4.0	33.91	2.4	33.93	1.9	33.93	2.2	34.06	2.1	33.95	1.2	33.93	1.6	33.94	1.6	33.94
50	3.9	33.92	2.0	33.93	1.7	33.94	2.1	34.07	1.9	33.96	1.0	33.93	1.4	33.95	1.5	33.94
75	3.8	33.92	1.8	33.94	1.5	33.94	1.9	34.09	1.6	33.96	0.6	33.94	1.1	33.95	1.3	33.95
100	3.6	33.93	1.0	33.97	1.1	33.93	1.8	34.09	1.3	33.97	0.5	33.94	1.1	33.95	1.2	33.95
125	3.0	33.95	0.6	33.99	0.8	33.95	1.5	34.10	1.0	33.99	0.0	33.96	0.9	33.95	1.0	33.96
150	2.3	33.96	0.3	34.06	0.6	33.97	1.5	34.10	1.1	34.09	-0.1	34.03	0.7	33.98	0.8	33.97
200	2.7	34.08	1.9	34.37	1.7	34.26	2.1	34.31	1.9	34.23	1.8	34.42	1.2	34.19	0.7	34.11
250	2.8	34.18	2.1	34.47	1.9	34.37	2.4	34.40	2.2	34.35	2.0	34.51	2.0	34.34	2.1	34.35
300	2.8	34.26	2.3	34.53	2.1	34.45	2.3	34.45	2.1	34.41	2.0	34.55	2.1	34.42	2.2	34.42
400	2.8	34.38	2.2	34.60	2.2	34.55	2.4	34.56	2.4	34.54	2.1	34.63	2.2	34.54	2.3	34.51
500	2.5	34.43	2.2	34.66	2.2	34.62	2.4	34.64	2.4	34.61	2.1	34.67	2.3	34.60	2.2	34.58
600	2.3	34.50	2.1	34.69	2.2	34.66	2.4	34.69	2.3	34.65	2.0	34.71	2.2	34.65	2.2	34.64
700	2.4	34.58	2.1	34.73	2.2	34.69	2.3	34.75	2.2	34.69	2.0	34.73	2.2	34.68	2.2	34.69
800	2.3	34.65	2.1	34.74	2.1	34.71	2.3	34.79	2.2	34.72	1.9	34.74	2.1	34.71	2.1	34.70
900	2.3	34.67	2.0	34.75	2.0	34.73	2.2	34.82	2.1	34.72	1.9	34.76	2.1	34.73	2.0	34.72
1000	2.3	34.71	1.9	34.75	2.0	34.74	2.1	34.84	2.1	34.74	1.8	34.77	2.0	34.74	2.0	34.73

station date	JA45025 2003/12/8	JA45026 2003/12/9	JA45027 2003/12/9	JA45028 2003/12/10	JA45029 2003/12/10	JA45030 2003/12/10	JA45031 2003/12/11	JA45032 2003/12/11								
time(UT)	23:00	2:00	14:00	2:00	8:00	14:00	3:00	6:12								
latitude	58-01.9S	58-32.0S	60-13.0S	60-29.9S	60-29.6S	60-30.1S	60-25.0S	60-26.1S								
longitude	105-20.0E	104-38.7E	103-39.0E	098-33.3E	095-54.4E	093-16.6E	087-23.2E	085-58.3E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	0.6	33.91	0.5	33.81	0.0	33.91	-0.3	33.91	0.3	33.90	-0.2	33.59	-0.1	33.79	-0.6	33.81
10	0.6	33.91	0.5	33.83	0.0	33.92	-0.3	33.94	0.2	33.91	-0.3	33.60	-0.1	33.79	-0.6	33.82
20	0.6	33.92	0.5	33.84	0.0	33.93	-0.3	33.95	0.2	33.92	-0.4	33.63	-0.1	33.80	-0.6	33.83
30	0.6	33.92	0.5	33.85	0.0	33.94	-0.4	33.97	0.1	33.92	-0.7	33.66	-0.2	33.82	-0.9	33.84
50	0.3	33.94	0.3	33.86	-0.3	33.95	-0.9	34.02	0.0	33.94	-1.1	33.79	-0.3	33.88	-1.4	33.98
75	0.0	33.95	0.0	33.90	-0.5	33.99	-1.1	34.06	-0.2	33.95	-1.2	33.91	-0.7	33.96	-1.2	34.20
100	0.0	33.96	0.0	33.90	-0.4	34.09	-0.8	34.24	-0.2	33.96	-1.1	34.08	-0.6	34.05	-0.5	34.32
125	-0.2	33.97	-0.2	33.94	1.0	34.31	0.2	34.41	-0.2	34.10	-0.6	34.21	-0.4	34.18	0.6	34.49
150	0.0	34.06	0.0	34.06	1.7	34.45	0.9	34.50	0.3	34.21	0.2	34.35	0.2	34.33	1.2	34.53
200	1.6	34.38	1.3	34.34	2.0	34.56	1.4	34.58	1.5	34.44	1.1	34.48	1.4	34.48	1.6	34.62
250	2.0	34.48	1.9	34.49	2.0	34.59	1.6	34.63	1.6	34.51	1.8	34.60	1.7	34.56	1.8	34.67
300	2.1	34.54	2.0	34.55	2.0	34.63	1.6	34.64	1.7	34.58	1.7	34.63	1.8	34.63	1.8	34.70
400	2.1	34.61	2.0	34.60	1.9	34.67	1.7	34.68	1.9	34.66	1.9	34.68	2.0	34.70	1.8	34.72
500	2.1	34.67	2.1	34.65	1.8	34.70	1.7	34.70	2.0	34.70	1.9	34.70	1.9	34.71	1.7	34.74
600	2.1	34.71	2.0	34.67	1.8	34.72	1.6	34.72	1.9	34.73	1.8	34.73	1.8	34.74	1.6	34.71
700	2.0	34.72	1.9	34.68	1.8	34.73	1.6	34.72	1.9	34.74	1.7	34.73	1.8	34.76	1.5	34.73
800	2.0	34.73	1.9	34.68	1.7	34.74	1.5	34.72	1.8	34.75	1.6	34.73	1.7	34.76	1.4	34.74
900	1.9	34.74	1.9	34.68	1.6	34.74	1.4	34.72	1.7	34.75	1.6	34.74	1.6	34.76	1.2	34.72
1000	1.8	34.74	1.8	34.68	1.5	34.74	1.3	34.71	1.6	34.75	1.5	34.74	1.5	34.75	1.2	34.74

station date	JA45033	JA45034	JA45035	JA45036	JA45037	JA45038	JA45039	JA45040								
time(UT)	9:00	15:00	4:09	9:00	15:00	18:10	13:00	17:00								
latitude	60-30.6S	60-56.5S	61-20.8S	61-20.6S	61-31.7S	61-37.5S	63-59.8S	64-00.0S								
longitude	084-44.9E	082-20.2E	079-56.9E	077-43.1E	074-43.9E	073-03.3E	052-46.9E	054-37.4E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	-0.6	33.83	-0.4	33.79	-0.4	33.90	-0.4	33.81	-0.1	33.81	-0.1	33.74	0.6	33.85	1.0	33.69
10	-0.6	33.84	-0.4	33.80	-0.5	33.92	-0.4	33.82	-0.1	33.82	-0.1	33.78	0.6	33.88	1.0	33.75
20	-0.7	33.86	-0.5	33.84	-0.5	33.93	-0.5	33.81	-0.1	33.82	-0.1	33.79	0.6	33.90	0.9	33.79
30	-1.0	33.88	-0.7	33.87	-0.6	33.94	-0.8	33.82	-0.4	33.82	-0.3	33.78	0.6	33.90	0.9	33.82
50	-1.5	34.02	-0.8	33.90	-0.9	33.96	-1.2	33.85	-1.3	33.90	-0.8	33.82	0.1	33.94	0.7	33.85
75	-1.0	34.17	-1.3	34.00	-1.2	34.11	-1.5	34.04	-1.3	34.03	-1.6	33.95	-0.8	34.28	-0.4	34.25
100	0.2	34.37	0.0	34.34	-0.3	34.26	-0.3	34.21	0.0	34.28	-1.6	33.98	1.1	34.55	0.7	34.47
125	0.8	34.45	0.7	34.46	1.1	34.44	1.3	34.42	1.6	34.49	-0.7	34.13	1.3	34.60	1.2	34.56
150	0.9	34.46	1.4	34.57	1.6	34.52	1.7	34.49	1.8	34.53	1.0	34.38	1.4	34.65	1.6	34.62
200	1.5	34.56	1.8	34.66	1.9	34.59	1.9	34.54	1.8	34.56	1.8	34.52	1.3	34.67	1.6	34.66
250	1.9	34.64	1.9	34.69	2.0	34.64	2.0	34.59	2.0	34.61	1.9	34.57	1.6	34.72	1.7	34.70
300	1.9	34.68	1.9	34.71	2.0	34.67	2.0	34.63	2.0	34.64	2.0	34.61	1.6	34.73	1.7	34.72
400	1.9	34.72	1.9	34.72	2.0	34.70	2.1	34.66	2.0	34.68	2.0	34.67	1.5	34.74	1.6	34.74
500	1.9	34.74	1.8	34.73	2.0	34.73	2.0	34.70	2.0	34.71	2.1	34.71	1.4	34.76	1.6	34.77
600	1.8	34.75	1.7	34.74	1.9	34.74	2.0	34.72	1.9	34.73	2.0	34.73	1.3	34.76	1.5	34.78
700	1.8	34.76	1.7	34.74	1.9	34.75	1.9	34.74	1.9	34.73	2.0	34.74	1.2	34.76	1.4	34.78
800	1.7	34.77	1.6	34.74	1.8	34.76	1.9	34.75	1.8	34.73	1.9	34.76	1.1	34.76	1.2	34.78
900	1.6	34.76	1.5	34.73	1.7	34.77	1.8	34.76	1.7	34.75	1.8	34.77	1.0	34.76	1.1	34.78
1000	1.5	34.76	1.4	34.74	1.6	34.77	1.7	34.75	1.6	34.74	1.7	34.77	0.9	34.75	1.0	34.77

station date	JA45041	JA45042	JA45043	JA45044	JA45045	JA45046	JA45047	JA45048								
time(UT)	20:00	4:00	20:00	4:00	16:00	19:00	3:00	7:00								
latitude	64-00.4S	64-00.0S	64-00.1S	63-59.5S	65-02.0S	65-43.9S	67-33.7S	68-27.1S								
longitude	055-53.8E	059-02.3E	064-35.5E	068-44.4E	071-12.8E	071-27.9E	072-09.9E	072-30.3E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	1.0	33.76	0.8	33.78	1.2	33.55	1.0	33.72	0.9	33.75	0.9	33.64	-0.4	33.58	0.6	33.66
10	1.0	33.79	0.8	33.81	1.2	33.62	1.0	33.73	0.9	33.77	0.9	33.65	-0.4	33.61	0.6	33.67
20	1.0	33.81	0.8	33.83	1.1	33.66	1.0	33.74	0.9	33.78	0.9	33.75	-0.5	33.71	0.6	33.70
30	0.9	33.81	0.8	33.84	1.1	33.68	1.0	33.75	0.9	33.79	0.8	33.76	-1.5	34.37	0.2	34.17
50	0.3	33.88	0.7	33.85	0.9	33.77	-1.1	34.09	-0.8	34.03	-1.5	34.20	-1.5	34.41	-1.2	34.33
75	-1.1	34.15	-0.9	34.19	-0.8	34.17	-1.3	34.26	-1.5	34.22	-1.5	34.30	-1.5	34.44	-1.7	34.37
100	0.8	34.44	0.6	34.46	0.9	34.48	-0.7	34.36	-1.2	34.28	-1.4	34.33	-1.8	34.45	-1.8	34.39
125	1.4	34.53	1.4	34.57	1.6	34.59	-0.3	34.46	-0.9	34.33	-1.4	34.35	-1.7	34.45	-1.8	34.40
150	1.5	34.57	1.5	34.61	1.7	34.62	0.1	34.53	-0.1	34.43	-1.3	34.38	-1.8	34.46	-1.8	34.41
200	1.6	34.61	1.6	34.65	1.8	34.66	0.7	34.62	0.8	34.57	-1.0	34.42	-1.8	34.46	-1.8	34.43
250	1.7	34.65	1.7	34.68	1.8	34.70	1.0	34.68	0.8	34.60	-0.3	34.50	-1.8	34.46	-1.9	34.44
300	1.7	34.68	1.7	34.70	1.8	34.72	1.1	34.70	1.0	34.65	0.2	34.58	-1.8	34.48	-1.9	34.46
400	1.7	34.72	1.6	34.73	1.8	34.75	1.2	34.72	1.2	34.68	0.6	34.66	-1.8	34.51	-1.9	34.48
500	1.6	34.72	1.6	34.75	1.7	34.76	1.3	34.75	1.2	34.71	0.6	34.67	-1.8	34.53	-1.9	34.50
600	1.5	34.74	1.6	34.76	1.6	34.78	1.1	34.75	1.2	34.71	0.8	34.71	-1.8	34.56	-1.8	34.53
700	1.4	34.75	1.4	34.76	1.5	34.78	1.0	34.76	1.1	34.72	0.8	34.71	-	-	-1.8	34.55
800	1.3	34.75	1.4	34.76	1.4	34.80	1.0	34.76	1.0	34.71	0.6	34.71	-	-	-	-
900	1.2	34.74	1.2	34.76	1.3	34.80	0.9	34.77	0.9	34.71	0.6	34.71	-	-	-	-
1000	1.1	34.74	1.2	34.76	1.2	34.79	0.8	34.77	0.8	34.71	0.5	34.70	-	-	-	-

station date	JA45049	JA45050	JA45051	JA45052	JA45053	JA45054	JA45055	JA45056								
time(UT)	15:00	3:12	7:00	11:03	15:00	19:00	3:00	18:00								
latitude	68-10.0S	65-44.8S	65-12.8S	64 - 50.8S	64 - 36.4S	64 - 22.2S	64 - 00.0S	64 - 03.2S								
longitude	072-53.8E	073-17.6E	074-29.0E	075 - 40.2E	077 - 09.9E	078 - 50.8E	080 - 57.4E	085 - 47.6E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	0.2	33.31	0.5	32.91	0.8	33.25	1.1	33.43	1.6	33.47	0.7	32.76	1.7	33.68	1.2	33.79
10	0.2	33.33	0.5	32.92	0.8	33.25	1.3	33.54	1.6	33.51	1.2	33.12	1.7	33.69	1.2	33.80
20	-0.4	34.08	0.6	32.96	1.2	33.52	1.3	33.59	1.6	33.54	1.7	33.59	1.7	33.74	1.2	33.81
30	-1.3	34.31	-0.4	33.65	0.1	33.72	-0.5	33.76	1.0	33.64	0.2	33.66	1.4	33.77	1.2	33.83
50	-1.5	34.38	-1.6	34.14	-1.4	34.09	-1.5	34.13	-1.2	34.07	-1.4	34.10	-0.6	34.04	-1.1	34.24
75	-1.7	34.41	-1.7	34.24	-1.6	34.26	-1.5	34.24	-1.2	34.19	-1.6	34.23	-0.2	34.32	-0.7	34.37
100	-1.8	34.42	-1.7	34.27	-1.4	34.30	-1.2	34.28	-0.8	34.28	-1.4	34.30	0.7	34.48	-0.7	34.41
125	-1.8	34.43	-1.7	34.30	-1.5	34.33	-1.4	34.31	-0.2	34.37	-0.5	34.40	1.3	34.55	-0.4	34.44
150	-1.8	34.44	-1.7	34.30	-1.5	34.35	-1.4	34.33	-0.1	34.42	-0.8	34.41	1.6	34.60	-0.1	34.48
200	-1.8	34.45	-1.6	34.32	-1.6	34.38	-0.5	34.42	0.6	34.53	-0.1	34.51	1.7	34.64	0.5	34.57
250	-1.9	34.46	-1.4	34.37	-0.5	34.47	-0.4	34.47	1.3	34.61	0.9	34.61	1.6	34.66	1.4	34.67
300	-1.9	34.46	-0.7	34.44	0.2	34.57	0.2	34.56	1.4	34.65	0.8	34.65	1.7	34.70	1.6	34.71
400	-1.9	34.48	-0.2	34.54	0.5	34.64	0.2	34.59	1.5	34.68	1.2	34.70	1.8	34.73	1.6	34.72
500	-1.8	34.51	0.3	34.63	0.9	34.70	1.0	34.70	1.5	34.71	1.3	34.72	1.7	34.75	1.5	34.73
600	-1.8	34.52	0.7	34.65	0.9	34.71	0.8	34.69	1.4	34.71	1.2	34.74	1.7	34.77	1.4	34.74
700	-1.8	34.55	0.7	34.65	0.9	34.72	0.8	34.71	1.4	34.72	1.1	34.74	1.6	34.76	1.3	34.74
800	-1.2	24.69	-	-	0.8	34.73	0.8	34.71	1.2	34.71	1.0	34.74	1.5	34.77	1.2	34.73
900	-0.5	24.70	-	-	0.8	34.73	0.6	34.70	1.1	34.70	0.9	34.72	1.4	34.76	1.1	34.74
1000	0.0	24.64	-	-	0.7	34.72	0.6	34.70	1.0	34.70	0.8	34.73	1.4	34.77	1.0	34.74

station date	JA45057	JA45058	JA45059	JA45060	JA45061	JA45062	JA45063	JA45064								
time(UT)	2:00	18:00	2:00	18:00	2:00	17:00	17:00	1:00								
latitude	63-39.1S	63-21.9S	63-03.1S	63-00.0S	63-16.1S	63-59.3S	63-52.9S	64-00.0S								
longitude	088-41.0E	092-13.1E	093-47.1E	098-11.4E	100-02.1E	102-06.9E	110-42.9E	114-41.2E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	1.2	33.87	1.0	33.87	0.8	33.82	0.6	33.94	0.0	33.62	-0.2	33.78	1.4	33.78	0.7	33.97
10	1.2	33.89	1.0	33.88	0.8	33.88	0.6	33.94	0.0	33.70	-0.2	33.80	1.4	33.84	0.7	34.01
20	1.2	33.91	1.0	33.91	0.8	33.94	0.6	33.96	0.0	33.74	-0.1	33.84	1.4	33.90	0.7	34.04
30	1.1	33.93	0.9	33.93	0.8	33.95	0.7	33.96	0.0	33.79	-0.1	33.87	1.3	33.93	0.7	34.05
50	0.0	34.07	0.6	34.00	0.0	34.07	0.4	33.99	-0.2	33.98	0.0	33.89	1.3	33.98	0.7	34.07
75	-1.1	34.34	-1.2	34.29	-0.5	34.36	-0.2	34.16	-1.7	34.26	-1.1	34.04	0.9	34.41	-0.1	34.17
100	-1.0	34.37	-1.0	34.37	-0.3	34.43	-0.5	34.34	-1.7	34.31	-1.6	34.20	1.1	34.57	-1.2	34.32
125	-0.9	34.40	-0.5	34.45	0.4	34.57	0.0	34.45	-1.7	34.33	-1.7	34.27	1.3	34.63	0.3	34.55
150	-0.5	34.45	-0.2	34.49	0.6	34.61	0.0	34.48	-1.7	34.35	-1.6	34.30	1.4	34.65	0.9	34.65
200	0.2	34.54	0.3	34.58	1.0	34.68	0.6	34.58	-1.7	34.36	-1.6	34.35	1.5	34.68	1.2	34.70
250	0.7	34.61	0.8	34.64	1.3	34.74	1.0	34.64	-1.5	34.39	-1.3	34.41	1.5	34.70	1.4	34.72
300	1.2	34.68	1.1	34.69	1.3	34.75	1.2	34.68	-0.9	34.47	-0.5	34.51	1.5	34.72	1.3	34.74
400	1.3	34.71	1.2	34.71	1.3	34.78	1.4	34.72	-0.3	34.59	0.5	34.66	1.4	34.73	1.2	34.74
500	1.3	34.72	1.2	34.72	1.2	34.79	1.3	34.72	0.4	34.68	1.0	34.71	1.3	34.74	1.1	34.74
600	1.2	34.73	1.1	34.72	1.1	34.79	1.2	34.73	0.3	34.69	0.8	34.71	1.2	34.74	1.0	34.74
700	1.1	34.73	1.1	34.72	1.0	34.80	1.2	34.72	0.4	34.70	0.7	34.71	1.1	34.75	1.0	34.74
800	1.0	34.73	1.0	34.72	0.9	34.80	1.0	34.71	0.4	34.72	0.6	34.71	1.1	34.74	0.7	34.72
900	0.9	34.72	0.9	34.72	0.8	34.80	0.9	34.71	0.3	34.72	0.6	34.71	1.0	34.74	0.6	34.72
1000	0.9	34.73	0.8	34.71	0.7	34.79	0.8	34.71	0.2	34.71	0.4	34.70	0.9	34.74	0.5	34.72

station	JA45065	JA45066	JA45067	JA45068	JA45069	JA45070	JA45071	JA45072								
date	2004/3/4	2004/3/5	2004/3/6	2004/3/6	2004/3/6	2004/3/7	2004/3/7	2004/3/7								
time(UT)	5:00	16:00	0:00	8:00	16:00	0:00	15:00	23:00								
latitude	63-59.9S	63-59.8S	63-59.8S	64-00.1S	64-01.2S	64-00.0S	63-59.9S	64-00.1S								
longitude	116-18.8E	121-48.4E	123-41.7E	125-42.1E	125-42.1E	129-41.3E	134-27.3E	138-06.6E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	0.5	33.99	1.8	33.98	1.5	34.06	1.9	33.89	1.7	33.85	1.6	33.90	1.3	33.78	1.3	33.84
10	0.5	34.01	1.8	33.98	1.5	34.07	1.9	33.89	1.7	33.86	1.6	33.90	1.2	33.83	1.3	33.87
20	0.5	34.03	1.8	33.99	1.5	34.08	1.9	33.90	1.7	33.87	1.6	33.91	1.2	33.86	1.3	33.89
30	0.5	34.04	1.8	33.98	1.5	34.08	1.8	33.90	1.7	33.88	1.6	33.91	1.2	33.89	1.3	33.90
50	0.5	34.05	1.1	34.10	1.4	34.08	1.1	34.03	1.7	33.89	1.3	33.96	0.9	33.99	1.1	33.96
75	0.3	34.06	1.0	34.51	0.0	34.38	0.8	34.46	0.5	34.37	0.2	34.27	0.0	34.38	1.0	34.34
100	-0.6	34.21	1.3	34.58	-0.3	34.52	1.2	34.55	1.1	34.49	0.7	34.43	0.5	34.49	1.7	34.54
125	-0.9	34.34	1.5	34.62	0.1	34.59	1.4	34.60	1.4	34.56	0.8	34.48	0.7	34.56	1.7	34.56
150	-0.6	34.43	1.5	34.64	0.8	34.67	1.6	34.64	1.5	34.59	1.1	34.54	1.2	34.61	1.6	34.59
200	0.7	34.61	1.6	34.68	1.1	34.71	1.7	34.69	1.7	34.64	1.4	34.60	1.5	34.67	1.4	34.60
250	1.1	34.68	1.6	34.70	1.2	34.74	1.7	34.72	1.7	34.67	1.6	34.66	1.6	34.69	1.8	34.67
300	1.1	34.69	1.6	34.71	1.4	34.77	1.7	34.73	1.7	34.69	1.6	34.67	1.6	34.71	1.8	34.69
400	0.9	34.69	1.6	34.73	1.5	34.79	1.7	34.76	1.7	34.72	1.6	34.68	1.4	34.72	1.8	34.71
500	0.7	34.69	1.5	34.73	1.3	34.77	1.6	34.77	1.7	34.74	1.5	34.70	1.5	34.75	1.7	34.73
600	0.6	34.69	1.5	34.74	1.2	34.78	1.6	34.77	1.6	34.75	1.4	34.70	1.4	34.76	1.6	34.73
700	0.5	34.69	1.3	34.72	1.2	34.79	1.5	34.77	1.5	34.76	1.3	34.70	1.3	34.75	1.6	34.73
800	0.4	34.69	1.2	34.74	1.1	34.78	1.4	34.76	1.4	34.77	1.2	34.70	1.2	34.76	1.5	34.71
900	0.3	34.69	1.1	34.72	1.0	34.78	1.3	34.76	1.3	34.75	1.1	34.70	1.1	34.76	1.4	34.70
1000	0.2	34.68	1.0	34.72	0.9	34.77	1.2	34.75	1.3	34.75	1.0	34.70	1.0	34.76	1.3	34.68

station	JA45073	JA45074	JA45075	JA45076	JA45077	JA45078	JA45079	JA45080								
date	2004/3/8	2004/3/8	2004/3/9	2004/3/9	2004/3/10	2004/3/10	2004/3/10	2004/3/11								
time(UT)	15:00	23:00	14:00	22:53	2:00	5:00	8:00	5:09								
latitude	65-14.7S	65-23.4S	64-45.9S	64-14.1S	63-45.1S	63-13.9S	63-13.6S	62-53.6S								
longitude	140-00.0E	141-03.2E	145-41.9E	148-46.7E	149-05.3E	149-05.8E	149-28.7E	150-05.8E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	0.0	33.92	-1.0	33.69	0.9	33.82	0.7	33.66	0.8	33.74	1.4	33.83	1.1	33.78	1.1	33.78
10	0.0	33.96	-1.0	33.74	0.9	33.82	0.7	33.68	0.8	33.76	1.5	33.84	1.1	33.79	1.1	33.79
20	0.0	34.00	-1.0	33.79	0.9	33.83	0.7	33.71	0.8	33.78	1.4	33.84	1.1	33.80	1.1	33.80
30	0.0	34.00	-0.8	33.87	0.9	33.83	0.7	33.72	0.8	33.78	1.4	33.84	1.1	33.79	1.1	33.79
50	0.0	34.02	-0.7	33.97	0.4	34.39	0.6	33.77	0.8	33.79	1.4	33.85	1.0	33.80	1.0	33.80
75	-1.3	34.31	-1.6	34.30	1.5	34.53	1.3	34.48	0.8	34.49	0.4	34.37	0.3	34.26	0.3	34.26
100	-1.5	34.39	-1.6	34.33	1.1	34.51	1.7	34.57	1.6	34.59	1.6	34.55	1.6	34.43	1.6	34.43
125	-1.3	34.43	-1.5	34.35	1.7	34.61	1.7	34.59	1.7	34.63	1.8	34.60	1.8	34.48	1.8	34.48
150	-1.2	34.44	-1.4	34.38	1.7	34.63	1.7	34.61	1.8	34.66	1.9	34.63	2.0	34.53	2.0	34.53
200	-0.8	34.50	-1.2	34.43	1.7	34.65	1.8	34.65	1.8	34.69	1.9	34.66	2.1	34.59	2.1	34.59
250	-0.5	34.54	-0.7	34.49	1.7	34.68	1.9	34.69	1.8	34.71	2.0	34.71	2.1	34.62	2.1	34.62
300	-0.1	34.59	-0.4	34.53	1.7	34.69	1.8	34.68	1.8	34.74	2.0	34.72	2.1	34.65	2.1	34.65
400	0.3	34.66	0.1	34.61	1.7	34.71	1.8	34.73	1.8	34.76	1.9	34.75	2.1	34.68	2.1	34.68
500	0.5	34.70	0.2	34.64	1.6	34.73	1.7	34.73	1.8	34.79	1.8	34.77	2.0	34.71	2.0	34.71
600	0.5	34.71	0.3	34.67	1.6	34.74	1.7	34.74	1.7	34.80	1.8	34.78	2.0	34.74	2.0	34.74
700	0.4	34.71	0.3	34.68	1.4	34.74	1.6	34.76	1.7	34.81	1.7	34.79	1.9	34.75	1.9	34.75
800	0.4	34.71	0.2	34.68	1.4	34.75	1.5	34.75	1.6	34.81	1.7	34.80	1.8	34.76	1.8	34.76
900	0.3	34.72	0.1	34.67	1.3	34.74	1.5	34.76	1.5	34.81	1.6	34.79				
1000	0.3	34.72	0.2	34.68	1.1	34.73	1.4	34.76	1.4	34.81	1.5	34.81				

station date	JA45081	JA45082	JA45083	JA45084	JA45085	JA45086	JA45087	JA45088								
time(UT)	8:50	11:00	20:00	5:00	8:00	3:05	8:00	14:00								
latitude	62-18.0S	61-56.9S	60-19.2S	59-37.7S	59-22.6S	57-14.8S	56-36.7S	55-10.6S								
longitude	149-41.3E	149-26.6E	149-39.9E	149-38.9E	149-05.1E	150-01.9E	149-38.3E	150-02.6E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	1.5	33.69	1.4	33.81	1.5	33.72	1.4	33.56	1.6	33.73	3.8	33.77	3.9	33.70	4.9	33.61
10	1.5	33.70	1.4	33.82	1.5	33.73	1.4	33.65	1.6	33.74	3.8	33.78	3.9	33.73	4.9	33.66
20	1.5	33.71	1.4	33.83	1.5	33.73	1.4	33.70	1.6	33.75	3.8	33.80	3.9	33.74	4.8	33.69
30	1.5	33.71	1.4	33.82	1.5	33.73	1.4	33.73	1.6	33.74	3.8	33.79	3.9	33.76	4.8	33.72
50	1.4	33.72	1.3	33.83	1.4	33.74	1.4	33.74	1.6	33.75	3.8	33.80	3.8	33.77	4.8	33.73
75	0.2	34.13	-0.1	34.20	0.2	34.21	0.0	34.03	-0.7	34.10	3.4	33.72	0.6	33.83	3.1	33.77
100	1.7	34.35	1.4	34.41	1.5	34.39	1.4	34.42	1.1	34.35	-0.2	33.95	-0.9	34.00	0.9	33.86
125	1.9	34.39	1.9	34.52	1.8	34.44	1.9	34.51	1.7	34.44	0.7	34.14	-0.3	34.14	0.0	33.97
150	2.1	34.44	2.0	34.54	1.9	34.47	1.9	34.53	1.9	34.49	1.8	34.33	0.8	34.30	0.0	34.16
200	2.2	34.49	2.0	34.59	2.1	34.52	2.0	34.59	1.8	34.53	2.2	34.43	1.9	34.45	1.5	34.40
250	2.2	34.53	2.1	34.64	2.1	34.57	2.1	34.63	2.0	34.58	2.2	34.51	2.2	34.55	2.0	34.50
300	2.2	34.57	2.1	34.67	2.1	34.59	2.0	34.64	2.1	34.63	2.3	34.53	2.2	34.58	2.1	34.56
400	2.1	34.63	2.0	34.71	2.1	34.66	2.0	34.68	2.0	34.67	2.3	34.61	2.2	34.63	2.1	34.62
500	2.1	34.66	2.0	34.73	2.0	34.68	1.9	34.71	2.0	34.70	2.2	34.65	2.1	34.67	2.2	34.67
600	2.0	34.68	1.9	34.76	2.0	34.70	1.9	34.73	2.0	34.71	2.2	34.68	2.1	34.71	2.1	34.70
700	2.0	34.70	1.9	34.78	1.9	34.72	1.8	34.73	1.9	34.74	2.1	34.71	2.0	34.73	2.2	34.74
800	1.9	34.71	1.8	34.78	1.9	34.74	1.8	34.75	1.8	34.74	2.1	34.73	2.0	34.75	2.1	34.74
900	1.9	34.72	1.8	34.81	1.8	34.74	1.7	34.75	1.8	34.74	2.0	34.74	1.9	34.76	2.1	34.76
1000	1.8	34.73	1.7	34.81	1.7	34.74	1.6	34.74	1.7	34.74	2.0	34.76	1.9	34.77	2.0	34.76

station date	JA45089	JA45090	JA45091	JA45092	JA45093	JA45094	JA45095	JA45096								
time(UT)	20:00	23:00	2:00	5:00	8:00	11:00	14:00	20:00								
latitude	53-49.6S	53-04.0S	52-24.8S	51-42.9S	50-58.2S	50-10.5S	49-19.9S	48-35.5S								
longitude	150-10.7E	150-12.1E	150-03.0E	150-26.2E	150-47.8E	150-47.2E	150-47.3E	150-05.7E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity		
0	8.7	34.04	8.4	34.14	8.5	34.14	8.1	34.04	9.0	34.09	9.7	34.20	9.6	34.16	10.8	34.49
10	8.6	34.11	8.4	34.15	8.5	34.15	8.1	34.06	9.0	34.18	9.7	34.25	9.6	34.19	10.8	34.55
20	8.6	34.13	8.4	34.16	8.5	34.15	8.1	34.06	9.0	34.20	9.7	34.26	9.6	34.21	10.8	34.56
30	8.6	34.15	8.4	34.17	8.5	34.17	8.1	34.06	9.0	34.21	9.7	34.26	9.6	34.21	10.8	34.56
50	8.6	34.15	8.4	34.17	8.5	34.17	8.1	34.07	9.0	34.23	9.7	34.28	9.6	34.22	10.8	34.57
75	8.6	34.17	8.4	34.18	8.5	34.17	8.1	34.08	9.0	34.27	9.7	34.28	9.4	34.27	10.7	34.58
100	8.6	34.17	8.2	34.48	8.5	34.18	8.1	34.09	8.7	34.46	8.7	34.41	8.4	34.30	9.4	34.66
125	8.1	34.44	7.9	34.45	7.2	34.28	7.3	34.32	8.5	34.52	8.7	34.54	7.8	34.35	9.2	34.65
150	7.9	34.42	7.7	34.43	7.2	34.32	7.1	34.32	8.3	34.52	8.5	34.51	7.8	34.39	9.1	34.64
200	7.7	34.40	7.5	34.41	7.3	34.37	7.0	34.33	8.1	34.47	8.1	34.47	7.3	34.34	8.9	34.61
250	7.3	34.34	6.9	34.33	7.0	34.33	6.5	34.28	7.8	34.43	7.9	34.43	6.8	34.29	8.9	34.61
300	6.7	34.27	6.1	34.22	6.4	34.25	6.1	34.23	7.4	34.39	7.4	34.36	6.9	34.39	8.8	34.61
400	5.9	34.22	5.6	34.18	5.9	34.23	5.6	34.22	6.9	34.34	6.6	34.27	6.0	34.31	8.7	34.58
500	5.8	34.30	6.1	34.38	6.0	34.35	5.3	34.26	6.5	34.34	6.7	34.36	5.6	34.36	8.4	34.55
600	4.8	34.23	5.3	34.34	5.4	34.35	4.9	34.31	5.6	34.31	6.0	34.35	5.1	34.38	7.7	34.46
700	4.2	34.25	4.5	34.32	4.6	34.32	4.0	34.30	5.1	34.32	5.0	34.29	4.2	34.36	6.9	34.41
800	3.7	34.27	3.9	34.32	3.8	34.29	3.7	34.32	4.5	34.32	4.4	34.30	3.9	34.39	6.2	34.40
900	3.4	34.32	3.4	34.34	3.4	34.35	3.4	34.37	4.0	34.34	4.0	34.33	3.4	34.45	4.9	34.34
1000			3.2	34.39	3.1	34.40	3.1	34.41	3.6	34.37	3.6	34.36	3.2	34.48	4.2	34.33

station	JA45097	JA45098	JA45099	JA45100	JA45101	JA45102								
date	2004/3/16	2004/3/16	2004/3/16	2004/3/16	2004/3/16	2004/3/16								
time(UT)	2:00	5:00	8:00	11:00	14:00	20:00								
latitude	48-05.4S	47-15.7S	46-26.0S	45-34.8S	45-00.0S	44-06.3S								
longitude	150-21.0E	150-15.8E	150-10.0E	150-04.3E	150-01.3E	150-02.4E								
depth	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity	temp	salinity
0	9.7	34.26	10.2	34.25	10.9	34.40	10.7	34.29	13.1	34.98	15.5	35.29		
10	9.7	34.30	10.2	34.29	10.9	34.45	10.7	34.36	13.1	35.02	15.5	35.31		
20	9.7	34.32	10.2	34.31	10.9	34.46	10.7	34.38	13.1	35.03	15.3	35.28		
30	9.7	34.33	10.2	34.32	10.9	34.47	10.7	34.39	13.1	35.04	14.9	35.19		
50	9.7	34.34	10.2	34.34	10.9	34.49	10.7	34.41	12.9	34.99	13.7	34.97		
75	9.7	34.35	11.0	34.70	10.6	34.56	10.2	34.42	13.1	35.08	13.2	34.89		
100	9.9	34.52	10.2	34.80	9.9	34.70	9.7	34.49	12.8	35.15	12.9	34.90		
125	8.7	34.51	9.5	34.70	9.3	34.67	9.1	34.62	12.4	35.16	12.5	35.02		
150	8.2	34.50	9.3	34.67	9.0	34.65	9.0	34.62	12.0	35.13	12.1	35.13		
200	8.2	34.50	8.9	34.60	8.8	34.62	8.9	34.61	11.7	35.07	11.2	34.98		
250	8.1	34.50	8.8	34.58	8.6	34.60	8.8	34.59	10.9	34.93	10.3	34.84		
300	8.3	34.57	8.7	34.57	8.5	34.57	8.7	34.57	10.3	34.83	9.7	34.74		
400	7.5	34.44	8.3	34.51	8.4	34.56	8.4	34.53	9.5	34.71	8.9	34.62		
500	7.2	34.44	7.6	34.42	7.7	34.47	7.9	34.45	9.2	34.64	8.6	34.57		
600	6.3	34.37	6.7	34.33	7.0	34.42	7.1	34.37	8.7	34.57	8.2	34.53		
700	5.7	34.39	6.2	34.36	6.5	34.45	6.6	34.37	8.3	34.56	7.3	34.48		
800	5.1	34.39	5.4	34.34	5.9	34.45	5.9	34.36	7.6	34.52	6.5	34.45		
900	4.3	34.38	4.7	34.31	5.0	34.43	5.2	34.33	6.7	34.46	5.8	34.44		
1000	3.8	34.39	4.0	34.32	4.3	34.41	4.5	34.37	5.9	34.44	4.9	34.40		

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
JA450001B	20031209	1700	60-26.3S	102-31.7E	-0.3 1.7	-0.3 1.7	-0.3 1.7	-0.4 1.6	-0.7 1.6	-0.9 1.6	-1.0	-0.3	0.9	1.5	1.7	1.5	1.7	1.7	1.8	27	0.8
JA450002B	20031209	2302	60-30.0S	099-50.3E	-0.5 1.8	-0.5 1.7	-0.5 1.7	-0.6 1.7	-0.6 1.6	-1.1 1.5	-0.5	0.2	0.9	1.4	1.6	1.6	1.7	1.8	1.7	52	0.7
JA450003B	20031210	0500	60-29.0S	097-13.4E	-0.4 1.7	-0.5 1.6	-0.6 1.6	-0.7 1.6	-0.9 1.6	-1.3 1.5	-1.4	-0.3	0.7	1.1	1.6	1.7	1.6	1.7	1.8	40	1.9
JA450004B	20031210	1100	60-28.7S	094-38.5E	-0.4 1.9	-0.5 1.9	-0.3 1.8	-0.2 1.8	-0.4 1.8	-0.5 1.8	-0.5	0.2	1.4	1.8	1.9	1.9	1.9	1.9	1.9	28	1.9
JA450005B	20031210	1700	60-30.1S	092-00.1E	-0.2 2.0	-0.3 1.9	-0.7 1.9	-0.5 1.9	-0.3 1.8	-1.0 1.7	-1.0	-0.5	-0.1	1.2	1.8	1.8	1.9	2.0	1.9	41	-0.4
JA450006B	20031210	2400	60-30.0S	088-46.5E	0.1 1.9	0.1 1.8	0.0 1.8	-0.2 1.8	-0.6 1.8	-0.7 1.7	-0.6	0.2	1.0	1.6	1.9	1.9	1.9	1.9	1.9	83	1.4
JA450007B	20031211	1200	60-45.4S	083-30.6E	-0.6 1.7	-0.6 1.7	-0.6 1.7	-0.7 1.6	-0.9 1.6	-1.2 1.5	-0.5	0.8	1.5	1.8	1.8	1.9	1.9	1.8	1.8	73	0.0
JA450008B	20031211	1800	61-09.5S	081-15.6E	-0.5 1.9	-0.5 1.9	-0.6 1.9	-0.9 1.9	-1.1 1.8	-1.0 1.8	-0.4	0.8	1.4	1.9	2.0	2.0	2.0	2.0	2.0	60	-0.1
JA450009B	20031212	0000	61-22.5S	079-57.4E	-0.4 2.0	-0.4 2.0	-0.5 1.9	-0.8 1.9	-1.0 1.9	-1.4 1.8	-0.7	1.0	1.4	1.8	2.0	2.0	2.0	2.0	2.0	79	-0.1
JA450010B	20031212	0600	61-22.1S	079-08.6E	-0.4 2.0	-0.4 2.0	-0.7 2.0	-0.9 2.0	-1.3 2.0	-1.7 1.9	-0.1	1.1	1.8	2.0	2.1	2.1	2.1	2.1	2.1	74	0.0
JA450011B	20031212	1159	61-23.0S	076-19.0E	-0.1 2.0	-0.2 2.0	-0.5 2.0	-0.8 2.0	-1.6 2.0	-1.8 2.0	-1.2	1.0	1.5	1.9	2.0	2.0	2.0	2.1	2.1	84	0.4
JA450012B	20040226	1100	68-50.2S	073-22.1E	-0.1 -1.9	-0.2 -2.0	0.1 -2.0	0.2 -1.9	1.1 -1.9	1.1 -1.9	0.3	-0.3	-1.1	-1.7	-1.9	-1.9	-1.9	-1.9	-1.9	30	-10.0
JA450013B	20040226	1106	68-50.5S	073-23.2E	-0.3 -2.0	-0.1 -2.0	0.0 -2.0	0.6 -2.0	1.1 -1.9	1.1 -1.9	0.5	-0.6	-1.1	-1.8	-1.9	-1.9	-2.0	-2.0	-2.0	27	-10.0
JA450014B	20040226	1900	67-21.5S	072-32.2E	-0.6 -1.9	-0.5 -1.9	-0.7	-1.3	-1.6	-1.7	-1.8	-1.8	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	19	-4.3
JA450015B	20040228	1500	63-59.5S	084-27.4E	1.4 1.6	1.4 1.6	1.3 1.5	0.6 1.5	-1.3 1.5	-0.7 1.4	0.5	0.1	0.6	1.6	1.8	1.8	1.7	1.7	1.6	56	0.9

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		
JA450016B	20040229	1400	63-29.7S	091-20.1E	1.2 1.3	1.2 1.3	1.1 1.2	1.1 1.2	0.5 1.2	-0.9 1.1	-0.4	0.2	0.5	0.9	1.1	1.3	1.3	1.3	37	-0.4
JA450017B	20040301	1000	63-00.4S	096-02.8E	0.9 1.3	0.8 1.3	0.8 1.2	0.8 1.2	0.2 1.1	-0.7 1.0	-0.2	0.1	0.5	1.1	1.3	1.4	1.4	1.4	47	-1.9
JA450018B	20040302	1400	63-53.9S	101-23.1E	-0.2 0.6	-0.2 0.6	-0.2 0.6	-0.2 0.6	0.0 0.6	-1.5 0.5	-1.7	-1.8	-1.8	-1.8	-1.6	-1.0	-1.0	-0.4	53	-0.3
JA450019B	20040304	0900	64-00.2S	117-25.9E	0.4 1.3	0.4 1.2	0.4 1.2	0.4 1.2	0.4 1.1	-1.5 1.1	-1.7	-1.2	-0.2	1.1	1.1	1.4	1.5	1.4	63	0.4
JA450020B	20040305	1200	64-00.0S	120-54.2E	1.6 1.5	1.7 1.5	1.6 1.5	1.6 1.4	1.3 1.3	-0.7 1.3	-1.7	-1.6	-0.5	0.9	1.5	1.6	1.6	1.6	49	1.4
JA450021B	20040307	1200	64-00.0S	132-54.7E	1.5 1.5	1.5 1.5	1.5 1.5	1.5 1.4	1.4 1.2	-0.3 1.2	-0.2	-0.4	0.0	0.5	1.2	1.2	1.5	1.6	49	-2.1
JA450022B	20040308	1100	64-39.5S	140-00.0E	0.1 1.0	0.1 1.0	0.1 1.1	0.1 1.0	0.1 1.0	-1.3 0.9	-1.5	-1.4	-1.3	-1.0	-0.4	0.0	0.6	0.9	52	-1.9

Table 4. Serial and CTD observation data.

station 01

Beginning of cast

Date	: December 05, 2003	Time(UT)	: 0600	Wind direction	: SSW
Time(UT)	: 0605	Weather	: bc	Velocity	: 10 (kn)
Latitude	: 41-51.4S	Air Temperature (dry)	: 12.8 (degC)	Wave	: 3
Longitude	: 110-00.7E	Humidity	: 78 (%)	Swell	: 3
Depth	: 4,377 (m)	Atmospheric Pressure	: 1019.6 (hPa)	Visibility	: 20 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	12.6	34.930	8.18	279	0.79	0	0.19	9	0.0	10	12.653	34.919
(50)	-	34.826	-	299	0.75	0	0.17	9	0.2	20	12.162	34.891
(75)	-	34.899	-	284	0.78	0	0.36	9	0.2	30	11.679	34.834
101	10.566	34.882	8.16	280	0.80	0	0.18	10	0.0	50	11.671	34.989
125	10.466	34.872	8.15	280	0.82	0	0.01	11	0.2	75	10.997	34.946
152	10.418	34.869	8.16	278	0.83	0	0.00	11	0.0	100	10.645	34.891
200	10.185	34.832	8.16	283	0.88	0	0.01	12	0.0	125	10.486	34.875
252	10.002	34.801	8.14	281	0.94	0	0.00	12	0.7	150	10.412	34.868
300	9.948	34.791	8.14	280	0.95	0	0.00	13	0.4	200	10.183	34.831
402	9.592	34.731	8.13	271	1.10	0	0.00	15	0.4	250	10.014	34.802
(500)	-	-	-	271	1.18	0	0.00	16	0.3	300	9.930	34.786
607	8.909	34.626	8.11	259	1.32	2	0.00	19	0.1	400	9.566	34.724
708	8.229	34.551	8.11	244	1.53	5	0.00	22	0.2	500	9.289	34.681
805	7.156	34.468	8.07	225	1.81	11	0.00	26	0.1	600	8.868	34.617
906	6.052	34.407	8.07	220	2.05	19	0.00	30	0.2	700	8.224	34.545
1009	4.923	34.350	8.07	228	2.21	26	0.00	32	0.2	800	7.248	34.464
(1250)	-	-	7.92	-	2.49	48	0.00	36	0.1	1000	4.966	34.347
1504	2.987	34.510	8.02	188	2.64	70	0.00	38	0.5	1200	3.750	34.355
2002	2.528	34.684	8.00	184	2.54	92	0.00	36	0.1	1500	2.977	34.500
2499	2.155	34.743	8.02	200	2.35	94	0.00	34	0.3	2000	2.521	34.674
2994	1.692	34.749	8.03	-	2.33	107	0.00	34	0.4	2500	2.156	34.738
(3500)	-	-	-	221	2.39	123	0.00	35	0.3	3000	1.666	34.741
3993	0.878	34.712	7.99	229	2.42	135	0.00	35	0.4	3500	1.187	34.721

ITS-90 : International Temperature Scale of 1990.

PSS78 : Practical Salinity Scale of 1978.

() : The dbar value in parentheses is an approximate depth.

station 02

Beginning of cast

Date	: December 06, 2003	Time(UT)	: 0600	Wind direction	: WSW
Time(UT)	: 0601	Weather	: c	Velocity	: 21 (kn)
Latitude	: 46-09.7S	Air Temperature (dry)	: 11.7 (degC)	Wave	: 4
Longitude	: 110-01.4E	Humidity	: 89 (%)	Swell	: 4
Depth	: 3,648 (m)	Atmospheric Pressure	: 1011.4 (hPa)	Visibility	: 7 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	9.6	34.620	8.00	296	0.89	0	0.26	12	0.0	10	9.926	34.585
52	9.523	34.589	8.01	296	0.98	0	0.29	13	0.0	20	9.940	34.587
77	9.562	34.600	8.03	293	0.98	0	0.29	13	0.2	30	9.928	34.603
101	9.571	34.605	8.04	298	0.97	0	0.32	13	0.0	50	9.704	34.644
123	9.644	34.638	8.04	293	0.98	0	0.33	13	0.0	75	9.642	34.643
152	9.630	34.663	8.06	294	1.00	0	0.29	14	0.0	100	9.714	34.668
205	9.538	34.693	8.05	282	1.01	0	0.03	14	0.0	125	9.766	34.698
255	9.150	34.629	8.05	280	1.08	0	0.02	15	0.0	150	9.823	34.731
308	8.976	34.606	8.05	277	1.15	1	0.02	17	0.2	200	9.700	34.727
405	8.831	34.612	8.05	266	1.22	1	0.03	18	0.1	250	9.371	34.670
505	8.166	34.539	8.04	237	1.46	6	0.01	22	0.1	300	9.337	34.681
606	7.123	34.464	8.03	227	1.71	10	0.00	25	0.0	400	8.350	34.496
705	6.025	34.389	8.00	218	1.89	15	0.00	28	0.0	500	7.701	34.414
808	5.246	34.350	8.00	225	2.05	20	0.00	30	0.0	600	7.331	34.465
906	4.393	34.320	7.99	228	2.16	26	0.00	32	0.0	700	6.341	34.400
1005	3.931	34.340	8.01	220	2.28	34	0.00	34	0.0	800	5.255	34.353
1256	2.984	34.413	7.99	201	2.45	54	0.01	36	0.0	1000	3.922	34.336
1506	2.735	-	7.99	189	2.49	68	0.00	36	0.0	1200	3.278	34.407
2002	2.382	-	7.97	201	2.27	78	0.00	33	0.0	1500	2.694	34.532
2498	2.017	34.755	7.98	-	2.19	89	0.02	32	0.0	2000	2.385	34.700
2997	1.495	34.741	8.00	214	2.23	109	0.00	33	0.0	2500	2.035	34.752
3285	1.331	34.733	7.94	217	2.27	115	0.00	33	0.0	3000	1.495	34.738

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

station 05

Beginning of cast

Date	: December 09, 2003	Time(UT)	: 0600	Wind direction	: N
Time(UT)	: 0603	Weather	: bc	Velocity	: 9 (kn)
Latitude	: 59-09.5S	Air Temperature (dry)	: 1.9 (degC)	Wave	: 3
Longitude	: 103-32.4E	Humidity	: 80 (%)	Swell	: 3
Depth	: 4,510 (m)	Atmospheric Pressure	: 993.2 (hPa)	Visibility	: 15 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	-	33.952	-	369	2.02	36	0.30	31	-	10	0.327	33.924
51	-0.002	33.928	8.15	361	2.00	37	0.27	30	-	20	0.193	33.924
73	-0.444	33.952	8.17	354	2.04	39	0.25	30	-	30	0.165	33.923
100	-0.722	33.977	8.15	354	2.10	44	0.23	31	-	50	-0.086	33.946
125	-0.287	34.113	8.11	311	2.26	52	0.19	33	-	75	-0.470	33.951
151	1.280	-	8.07	236	2.48	63	0.07	36	-	100	-0.533	33.963
200	1.867	34.506	8.06	194	2.54	75	0.05	37	-	125	-0.513	34.044
252	1.914	34.577	8.05	192	2.53	80	0.05	37	-	150	0.628	34.276
301	1.945	34.612	8.05	186	2.51	82	0.09	37	-	200	1.732	34.507
405	1.934	34.666	8.06	187	2.44	86	0.07	36	-	250	1.904	34.578
504	1.872	34.698	8.05	193	2.37	87	0.03	34	-	300	1.908	34.616
605	1.860	34.724	8.06	197	2.30	89	0.04	33	-	400	1.929	34.669
704	1.815	34.733	8.08	200	2.29	90	0.06	33	-	500	1.862	34.697
800	1.714	34.736	8.05	204	2.27	93	0.03	33	-	600	1.819	34.716
903	1.657	34.744	8.06	207	2.25	94	0.04	33	-	700	1.775	34.728
1003	1.575	34.744	8.08	210	2.25	101	0.05	33	-	800	1.725	34.738
1254	1.328	34.737	8.07	212	2.29	103	0.05	33	-	1000	1.576	34.742
1501	1.123	34.727	8.06	216	2.31	110	0.04	33	-	1200	1.406	34.739
2002	0.721	34.705	8.07	224	2.41	123	0.05	34	-	1500	1.145	34.729
2496	0.421	34.691	8.04	227	2.40	129	0.02	35	-	2000	0.730	34.705
2997	0.196	34.678	8.05	233	2.38	135	0.04	35	-	2500	0.400	34.690
3499	0.044	34.676	8.03	239	2.37	134	0.03	35	-	3000	0.181	34.682
3996	-0.030	34.673	8.03	242	2.33	134	0.04	34	-	3500	0.042	34.676
										4000	-0.033	34.672

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

station 06

Beginning of cast

Date	: February 23, 2004	Time(UT)	: 0500	Wind direction	: WSW
Time(UT)	: 0505	Weather	: c	Velocity	: 5 (kn)
Latitude	: 63-59.2S	Air Temperature (dry)	: -0.6 (degC)	Wave	: 3
Longitude	: 50-49.9E	Humidity	: 76 (%)	Swell	: 1
Depth	: 4,334 (m)	Atmospheric Pressure	: 985.9 (hPa)	Visibility	: -- (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	-1.3	33.901	8.16	348	2.20	56	0.40	31	0.7	10	0.523	33.905
55	-0.815	-	-	-	-	-	-	-	-	20	0.518	33.906
78	-0.761	-	-	-	-	-	-	-	-	30	0.518	33.906
104	0.740	-	-	-	-	-	-	-	-	50	0.521	33.903
129	1.320	-	-	-	-	-	-	-	-	75	-0.832	34.240
154	0.998	-	-	-	-	-	-	-	-	100	-0.215	34.446
204	1.476	-	-	-	-	-	-	-	-	125	0.744	34.573
254	1.552	-	-	-	-	-	-	-	-	150	1.357	34.649
304	1.530	-	-	-	-	-	-	-	-	200	1.535	34.691
403	1.493	-	-	-	-	-	-	-	-	250	1.562	34.704
505	1.425	-	-	-	-	-	-	-	-	300	1.514	34.712
606	1.329	-	-	-	-	-	-	-	-	400	1.421	34.723
707	1.236	-	-	-	-	-	-	-	-	500	1.349	34.726
806	1.136	-	-	-	-	-	-	-	-	600	1.255	34.726
906	1.027	-	-	-	-	-	-	-	-	700	1.169	34.726
1007	0.907	-	-	-	-	-	-	-	-	800	1.081	34.725
1256	0.629	-	-	-	-	-	-	-	-	1000	0.773	34.701
1505	0.521	-	-	-	-	-	-	-	-	1200	0.697	34.707
2007	0.240	-	-	-	-	-	-	-	-	1500	0.487	34.694
2504	-0.026	-	-	-	-	-	-	-	-	2000	0.140	34.669
3001	-0.164	-	-	-	-	-	-	-	-	2500	-0.038	34.663
3501	-0.229	-	-	-	-	-	-	-	-	3000	-0.174	34.660
4000	-0.282	-	-	-	-	-	-	-	-	3500	-0.230	34.661
										4000	-0.281	34.656

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

station 07

Beginning of cast

Date : February 24, 2004 Time(UT) : 0900 Wind direction : E
 Time(UT) : 0902 Weather : c Velocity : 19 (kn)
 Latitude : 64-00.5S Air Temperature (dry) : -0.9 (degC) Wave : 4
 Longitude : 60-57.1E Humidity : 59 (%) Swell : 3
 Depth : 4,352 (m) Atmospheric Pressure : 985.7 (hPa) Visibility : 40 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.5	33.847	8.15	352	1.91	43	0.32	29	1.0	10	0.959	33.821
53	0.980	33.817	8.14	353	1.87	42	0.27	29	1.0	20	0.942	33.819
80	-1.348	34.094	8.14	332	2.18	55	0.12	32	1.0	30	0.939	33.818
104	-0.059	34.319	8.05	264	2.44	74	0.22	35	0.8	50	0.930	33.813
129	1.293	34.521	7.99	250	2.58	87	0.10	37	0.9	75	-1.282	34.056
156	1.532	34.573	7.98	196	2.59	90	0.00	37	0.7	100	-0.473	34.250
205	1.714	34.624	7.98	192	2.55	93	0.00	37	0.6	125	1.367	34.529
254	1.749	34.652	7.96	190	2.51	94	0.01	36	0.6	150	1.608	34.587
305	1.759	34.673	7.98	191	2.48	94	0.00	36	0.9	200	1.756	34.638
406	1.739	34.702	7.98	196	2.41	95	0.00	35	0.8	250	1.813	34.672
508	1.705	34.718	8.00	201	2.37	96	0.00	34	0.8	300	1.903	34.694
607	1.653	34.732	8.00	206	2.34	97	0.00	34	0.8	400	1.789	34.708
706	1.580	34.738	8.01	208	2.31	99	0.00	33	0.8	500	1.725	34.722
808	1.447	34.735	8.01	-	2.33	102	0.00	33	0.8	600	1.639	34.733
907	1.400	34.740	8.02	211	2.31	104	0.00	33	0.7	700	1.580	34.739
1009	1.314	34.737	8.02	215	2.31	106	0.00	33	0.8	800	1.482	34.738
1257	1.081	34.728	8.01	217	2.33	113	0.00	34	0.8	1000	1.308	34.736
1509	0.852	34.714	8.00	220	2.42	121	0.00	34	0.9	1200	1.136	34.730
2005	0.520	34.695	8.00	221	2.44	131	0.00	35	1.0	1500	0.853	34.714
2504	0.288	34.685	7.98	228	2.48	138	0.00	36	0.9	2000	0.521	34.693
3001	0.113	34.675	7.98	235	2.48	141	0.00	35	0.8	2500	0.293	34.682
3498	-0.037	34.669	7.96	242	2.47	142	0.00	35	1.0	3000	0.111	34.675
3998	-0.168	34.663	7.97	249	2.46	145	0.00	35	0.9	3500	-0.037	34.666
										4000	-0.168	34.661

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

station 08

Beginning of cast

Date	: February 05, 2004	Time(UT)	: 0900	Wind direction	: ESE
Time(UT)	: 0859	Weather	: c	Velocity	: 13 (kn)
Latitude	: 63-59.1S	Air Temperature (dry)	: 1.0 (degC)	Wave	: 3
Longitude	: 70-58.7E	Humidity	: 81 (%)	Swell	: 1
Depth	: 3,503 (m)	Atmospheric Pressure	: 988.5 (hPa)	Visibility	: 40 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.6	33.752	8.13	346	1.89	42	0.29	28	0.8	10	1.083	33.736
54	-1.182	34.083	8.08	335	2.10	57	0.10	30	0.8	20	1.071	33.733
79	-1.609	34.200	8.05	299	2.29	65	0.17	33	0.7	30	1.070	33.733
105	-1.241	34.270	8.02	284	2.34	69	0.14	34	0.1	50	-0.631	33.963
130	-0.545	34.382	7.99	268	2.35	74	0.16	34	0.3	75	-1.602	34.197
156	0.070	34.482	7.98	250	2.37	81	0.00	34	0.3	100	-1.401	34.247
205	1.003	34.612	7.97	215	2.40	88	0.00	35	0.3	125	-1.002	34.324
258	1.128	34.653	7.96	212	2.38	92	0.00	34	0.4	150	-0.220	34.467
311	1.146	34.670	7.97	214	2.36	93	0.00	34	0.5	200	1.463	34.650
406	1.285	34.706	7.98	210	2.32	97	0.00	33	0.4	250	1.158	34.645
508	1.213	34.712	7.98	213	2.32	100	0.00	33	0.3	300	0.954	34.646
610	1.123	34.714	7.98	215	2.31	103	0.00	33	0.2	400	0.888	34.663
707	1.027	34.713	7.98	-	2.31	106	0.00	33	0.4	500	0.854	34.673
806	0.953	34.711	7.97	216	2.33	109	0.00	33	0.4	600	0.852	34.686
907	0.943	34.717	7.98	217	2.38	113	0.00	33	0.3	700	0.982	34.706
1007	0.838	34.712	7.97	219	2.33	116	0.00	34	0.5	800	0.892	34.707
1257	0.590	34.699	7.96	220	2.38	120	0.00	34	0.4	1000	0.817	34.708
1506	0.441	34.692	7.97	224	2.40	126	0.00	34	0.7	1200	0.650	34.698
2003	0.220	34.682	7.96	227	2.42	135	0.00	35	0.9	1500	0.447	34.690
2502	0.055	34.676	7.95	235	2.43	135	0.00	35	0.3	2000	0.223	34.682
3000	-0.066	34.673	7.96	242	2.40	135	0.00	35	0.6	2500	0.053	34.675
3403	-0.194	34.667	7.93	240	2.41	135	0.00	35	0.5	3000	-0.065	34.670

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

station 09

Beginning of cast

Date	: February 28, 2004	Time(UT)	: 0800	Wind direction	: NNE
Time(UT)	: 0804	Weather	: s	Velocity	: 5 (kn)
Latitude	: 64-00.8S	Air Temperature (dry)	: 1.1 (degC)	Wave	: 2
Longitude	: 82-23.7E	Humidity	: 98 (%)	Swell	: 1
Depth	: 3,698 (m)	Atmospheric Pressure	: 983.4 (hPa)	Visibility	: 5 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.4	33.676	8.22	347	1.46	8	0.30	24	1.1	10	1.767	33.669
49	-0.586	-	8.14	337	2.16	39	0.18	30	-	20	1.718	33.666
75	-0.795	34.183	8.06	291	2.42	63	0.15	34	1.2	30	1.537	33.706
100	0.666	-	7.98	225	2.57	78	-	37	0.7	50	-0.750	33.968
126	1.417	34.523	7.96	196	2.64	85	0.05	38	0.9	75	-0.678	34.218
150	1.670	34.582	7.95	189	2.62	89	0.00	38	0.8	100	-0.280	34.328
200	1.842	34.639	7.96	185	2.56	91	0.00	37	1.0	125	0.195	34.420
251	1.895	-	7.96	187	2.52	92	0.00	37	0.7	150	0.188	34.444
299	1.388	34.638	7.99	203	2.48	92	0.00	36	1.0	200	1.240	34.578
401	1.799	34.717	7.99	198	2.40	94	0.00	35	0.6	250	1.302	34.616
499	1.706	34.729	8.01	200	2.38	97	0.00	35	0.3	300	1.766	34.693
601	1.407	34.713	8.02	211	2.35	97	0.00	34	0.5	400	1.385	34.676
701	1.579	34.746	8.02	209	2.31	99	0.00	34	0.3	500	1.441	34.704
800	1.493	34.748	8.02	211	2.30	101	0.00	34	0.5	600	1.323	34.708
901	1.365	34.742	8.02	212	2.31	105	0.00	34	0.8	700	1.310	34.717
1000	1.277	34.740	8.02	213	2.32	108	0.00	34	0.5	800	1.434	34.743
1250	0.991	34.722	8.00	215	2.39	116	0.00	35	0.8	1000	1.242	34.735
1504	0.784	34.714	8.00	220	2.41	123	0.00	35	0.4	1200	1.063	34.726
2001	0.439	34.693	8.00	221	2.47	134	0.00	36	0.5	1500	0.784	34.711
2499	0.198	34.681	7.99	230	2.49	137	0.00	36	0.5	2000	0.445	34.689
3001	0.045	34.676	7.99	235	2.46	136	0.00	36	0.4	2500	0.200	34.678
3500	-0.074	34.673	7.98	242	2.45	139	0.00	36	0.7	3000	0.046	34.672
3603	-0.109	34.671	7.98	243	2.46	141	0.00	35	0.7	3500	-0.075	34.667

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

station 10

Beginning of cast

Date	: February 29, 2004	Time(UT)	: 0700	Wind direction	: E
Time(UT)	: 0703	Weather	: c	Velocity	: 3 (kn)
Latitude	: 63-27.3S	Air Temperature (dry)	: 1.0 (degC)	Wave	: 2
Longitude	: 90-12.8E	Humidity	: 70 (%)	Swell	: 1
Depth	: 3,844 (m)	Atmospheric Pressure	: 984.2 (hPa)	Visibility	: -- (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	2.6	33.962	-	340	1.58	19	0.23	25	0.0	10	1.246	33.961
50	-1.050	34.217	8.09	309	2.36	65	0.41	32	-	20	1.186	33.975
75	-1.205	34.326	8.06	294	2.33	71	0.22	33	0.9	30	0.519	34.021
102	-0.989	34.386	8.06	284	2.33	73	0.20	34	0.0	50	-1.150	34.318
125	-0.612	34.424	8.05	271	2.35	76	0.11	34	0.1	75	-0.438	34.423
151	0.045	34.496	8.03	250	2.39	82	0.19	35	0.0	100	-0.757	34.433
200	0.646	34.582	8.02	228	2.40	87	0.11	35	0.2	125	-0.246	34.479
250	1.125	34.649	8.00	214	2.38	92	0.10	35	0.0	150	0.237	34.543
300	1.291	34.685	8.01	210	2.40	94	0.04	35	0.0	200	0.883	34.631
400	1.268	34.707	8.02	210	2.33	98	0.03	34	0.1	250	1.233	34.683
500	1.266	34.721	8.03	212	2.34	102	0.09	34	0.0	300	1.313	34.702
(600)	-	-	7.86	-	2.35	104	0.02	35	0.0	400	1.267	34.725
701	1.115	34.723	8.02	213	2.34	108	0.04	35	0.0	500	1.242	34.734
801	1.047	34.721	8.02	213	2.33	111	0.05	34	0.1	600	1.178	34.733
900	0.974	34.722	8.02	215	2.34	114	0.00	34	0.0	700	1.106	34.736
1002	0.884	34.716	8.02	216	2.33	116	0.00	34	0.2	800	1.036	34.735
1250	0.690	34.706	8.01	218	2.36	123	0.00	34	0.0	1000	0.872	34.726
1500	0.510	34.697	8.01	221	2.38	128	0.00	35	0.1	1200	0.701	34.716
2000	0.229	34.684	8.00	228	2.45	132	0.00	36	0.5	1500	0.482	34.705
2499	0.051	34.678	8.00	235	2.55	134	0.00	38	0.1	2000	0.210	34.692
3001	-0.073	34.672	7.99	241	2.45	132	0.00	36	0.2	2500	0.039	34.685
3499	-0.124	34.668	7.99	243	2.38	131	0.00	35	0.1	3000	-0.079	34.680
3701	-0.139	34.669	7.98	244	2.37	132	0.00	35	0.2	3500	-0.125	34.676

ITS-90 : International Temperature Scale of 1990.
PSS78 : Practical Salinity Scale of 1978.
() : The dbar value in parentheses is an approximate depth.

station 11

Beginning of cast

Date : March 02, 2004
 Time(UT) : 0656
 Latitude : 63-50.6S
 Longitude : 99-51.0E
 Depth : 1,900 (m)

Time(UT) : 0700
 Weather : c
 Air Temperature (dry) : -0.6 (degC)
 Humidity : 74 (%)
 Atmospheric Pressure : 993.5 (hPa)

Wind direction : W
 Velocity : 15 (kn)
 Wave : 3
 Swell : 1
 Visibility : 30 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	-0.4	33.963	8.12	350	2.07	56	0.24	30	0.5	10	-0.117	33.950
52	-0.116	33.968	8.11	347	2.06	57	0.22	30	0.9	20	-0.118	33.949
75	-0.929	34.152	8.09	329	2.17	62	0.18	31	0.7	30	-0.123	33.949
101	-1.781	34.312	8.08	321	2.25	67	0.10	33	-	50	0.010	33.987
126	-1.824	34.324	8.08	324	2.25	67	0.08	33	-	75	-1.154	34.197
151	-1.824	34.332	8.08	324	2.25	67	0.03	33	-	100	-1.722	34.296
201	-1.771	34.352	8.08	323	2.27	68	0.02	33	-	125	-1.814	34.322
251	-1.754	34.365	8.07	326	2.26	67	0.01	33	-	150	-1.829	34.328
300	-1.678	34.393	8.07	324	2.26	69	0.01	33	-	200	-1.805	34.345
399	-1.338	34.455	8.06	308	2.30	74	0.01	33	-	250	-1.647	34.375
501	0.163	34.610	8.02	247	2.36	94	0.00	34	-	300	-1.509	34.408
602	0.611	34.675	8.00	226	2.38	106	0.00	34	-	400	-0.862	34.491
701	0.713	34.698	8.00	219	2.41	116	0.00	34	-	500	0.306	34.633
801	0.508	34.687	8.01	224	2.45	120	0.00	35	-	600	0.631	34.676
900	0.457	34.688	8.00	223	2.44	123	0.00	35	-	700	0.789	34.709
1003	0.386	34.688	8.00	224	2.47	126	0.04	35	-	800	0.494	34.690
1253	0.193	34.681	8.00	228	2.45	131	0.01	35	-	1000	0.385	34.690
1500	0.013	34.674	8.00	234	2.45	131	0.00	35	-	1200	0.236	34.688
1700	-0.100	34.669	7.99	238	2.42	130	0.01	35	-	1500	0.020	34.677

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

station 12

Beginning of cast

Date : March 03, 2004
 Time(UT) : 0719
 Latitude : 63-57.4S
 Longitude : 107-46.4E
 Depth : 4,312 (m)

Time(UT) : 0700
 Weather : s
 Air Temperature (dry) : -0.4 (degC)
 Humidity : 94 (%)
 Atmospheric Pressure : 983.1 (hPa)

Wind direction : ENE
 Velocity : 30 (kn)
 Wave : 4
 Swell : 3
 Visibility : 2 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	-0.4	34.065	8.12	346	2.00	55	0.34	30	0.8	10	0.758	34.143
50	0.028	34.044	8.10	349	2.06	57	0.47	30	1.1	20	0.755	34.143
75	-0.124	34.127	8.09	334	2.04	58	0.22	30	0.9	30	0.780	34.144
103	-1.368	34.282	8.06	306	2.17	66	0.37	32	0.5	50	0.790	34.145
125	-1.593	34.309	8.05	306	2.19	68	0.13	33	0.3	75	-0.292	34.158
152	-0.382	34.478	8.02	263	2.25	78	0.28	34	-	100	-1.549	34.319
203	0.798	34.612	7.99	222	2.28	86	0.08	34	0.1	125	-0.898	34.418
253	1.189	34.672	7.98	211	2.26	91	0.06	34	0.2	150	0.413	34.600
301	1.428	34.717	7.98	205	2.25	93	0.07	34	0.1	200	1.278	34.692
403	1.413	34.727	7.99	206	2.23	96	0.06	33	0.1	250	1.354	34.712
503	1.341	34.730	8.00	210	2.22	99	0.06	33	0.1	300	1.412	34.727
605	1.247	34.730	8.00	211	2.23	103	0.19	33	0.0	400	1.395	34.740
703	1.172	34.727	7.99	214	2.22	105	0.05	33	0.1	500	1.333	34.741
807	1.079	34.723	7.99	216	2.28	109	0.21	34	0.2	600	1.256	34.740
907	1.007	34.720	8.00	217	2.24	110	0.00	33	0.2	700	1.185	34.739
1009	0.923	34.717	8.00	218	2.24	113	0.00	33	0.2	800	1.087	34.733
1256	0.695	34.704	7.99	-	2.27	119	0.10	34	0.3	1000	0.906	34.722
1504	0.484	34.694	7.99	226	2.29	123	0.01	34	0.4	1200	0.729	34.715
2001	0.157	34.680	7.99	235	2.29	126	0.00	34	0.5	1500	0.488	34.701
2496	-0.050	34.672	7.97	240	2.29	124	0.12	34	0.3	2000	0.156	34.683
2990	-0.145	34.667	7.98	247	2.27	117	0.00	33	0.3	2500	-0.052	34.677
3287	-0.179	34.666	7.96	249	1.11	60	0.04	16	0.3	3000	-0.145	34.673

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

station 13

Beginning of cast

Date : March 05, 2004
 Time(UT) : 0452
 Latitude : 63-56.7S
 Longitude : 119-55.4E
 Depth : 3,601 (m)

Time(UT) : 0500
 Weather : c
 Air Temperature (dry) : 1.8 (degC)
 Humidity : 78 (%)
 Atmospheric Pressure : 957.2 (hPa)

Wind direction : E
 Velocity : 7 (kn)
 Wave : 3
 Swell : 3
 Visibility : 30 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	1.7	34.045	8.13	340	1.90	43	0.32	29	0.6	10	1.616	34.025
53	0.720	34.116	8.11	326	2.07	52	0.29	31	1.1	20	1.563	34.028
78	-1.319	34.275	8.08	315	2.25	65	0.24	33	1.0	30	1.539	34.029
106	-1.334	34.331	8.07	307	2.28	68	0.18	34	0.9	50	1.328	34.015
128	-0.601	34.417	8.04	280	2.32	75	0.15	34	0.9	75	-1.121	34.338
153	0.670	34.557	8.00	226	2.42	85	0.21	36	0.7	100	-0.783	34.417
203	1.259	34.647	7.99	207	2.42	92	0.08	36	0.8	125	0.367	34.538
252	1.495	34.693	7.99	203	2.38	95	0.11	35	0.9	150	0.811	34.594
305	1.558	34.712	8.00	200	2.35	97	0.07	35	0.8	200	1.383	34.677
407	1.523	34.725	8.01	203	2.33	100	0.05	34	0.8	250	1.503	34.708
506	1.460	34.733	8.01	206	2.32	103	0.09	34	0.7	300	1.510	34.718
606	1.363	34.733	8.02	208	2.33	106	0.10	34	0.7	400	1.403	34.722
706	1.265	34.731	8.01	211	2.33	110	0.08	34	0.8	500	1.365	34.729
805	1.187	34.729	8.01	211	2.32	113	0.03	34	0.4	600	1.150	34.717
907	1.044	34.721	8.01	215	2.33	115	0.02	34	0.4	700	1.249	34.737
1004	0.967	34.717	8.01	219	2.34	118	0.08	34	0.6	800	1.133	34.729
1253	0.732	34.705	8.01	219	2.36	125	0.02	34	0.4	1000	0.946	34.722
1504	0.507	34.696	8.01	224	2.38	129	0.01	35	0.7	1200	0.754	34.710
2004	0.210	34.684	8.00	229	2.40	137	0.02	35	0.7	1500	0.539	34.696
2507	-0.024	34.674	8.00	238	2.40	136	0.02	35	0.5	2000	0.217	34.689
3006	-0.196	34.671	7.99	248	2.38	133	0.02	35	0.5	2500	-0.018	34.676
3505	-0.392	34.645	7.98	259	2.36	117	0.02	34	0.4	3000	-0.198	34.667
										3500	-0.391	34.648

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

station 14

Beginning of cast

Date	: March 07, 2004	Time(UT)	: 0600	Wind direction	: E
Time(UT)	: 0522	Weather	: b	Velocity	: 7 (kn)
Latitude	: 64-00.1S	Air Temperature (dry)	: 1.8 (degC)	Wave	: 3
Longitude	: 131-06.3E	Humidity	: 80 (%)	Swell	: 3
Depth	: 2,990 (m)	Atmospheric Pressure	: 975.1 (hPa)	Visibility	: 40 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.9	33.967	8.09	337	1.97	35	0.29	30	0.5	10	0.864	33.980
52	0.914	33.989	8.07	338	2.02	38	0.27	30	0.7	20	0.862	33.980
81	-1.040	34.321	8.02	306	2.30	63	0.25	34	0.1	30	0.866	33.982
106	-0.949	-	8.01	293	2.32	67	0.17	34	0.2	50	0.868	34.004
129	-0.930	34.408	8.01	294	2.31	68	0.06	34	0.4	75	-1.254	34.262
155	-0.376	34.473	7.99	272	2.34	73	0.08	35	0.0	100	-1.128	34.388
205	-0.233	34.515	7.99	265	2.33	76	0.04	34	0.1	125	-0.653	34.436
255	0.881	34.624	7.96	226	2.35	85	0.05	35	0.2	150	-0.151	34.498
306	0.924	34.640	7.96	223	2.35	86	0.06	35	0.3	200	0.424	34.580
405	1.007	34.673	7.97	222	2.31	90	0.00	34	0.4	250	0.784	34.626
508	1.115	34.697	7.98	220	2.30	94	0.05	34	0.4	300	1.023	34.670
608	1.016	34.698	7.97	220	2.30	98	0.00	34	0.3	400	1.108	34.694
705	0.916	34.697	7.97	222	2.31	101	0.02	34	0.3	500	1.067	34.705
805	0.885	-	-	-	-	-	-	-	-	600	1.197	34.726
907	0.788	34.697	7.97	222	2.31	108	0.00	34	0.5	700	0.999	34.714
1008	0.786	34.704	7.97	222	2.33	114	0.02	34	0.5	800	0.880	34.707
1254	0.478	34.686	7.97	228	2.34	117	0.00	35	0.3	1000	0.737	34.705
1506	0.244	34.678	7.96	235	2.36	122	0.00	35	1.0	1200	0.547	34.698
2005	0.021	34.675	7.96	236	2.37	127	0.02	35	0.7	1500	0.288	34.688
2501	-0.200	34.667	7.94	245	2.36	126	0.00	35	0.6	2000	0.006	34.679
2902	-0.386	34.652	7.95	-	2.34	112	0.00	34	0.5	2500	-0.200	34.670

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

station 15

Beginning of cast

Date : March 08, 2004
 Time(UT) : 0348
 Latitude : 63-59.3S
 Longitude : 140-01.1E
 Depth : 3,718 (m)

Time(UT) : 0400
 Weather : b
 Air Temperature (dry) : -0.8 (degC)
 Humidity : 62 (%)
 Atmospheric Pressure : 982.4 (hPa)

Wind direction : WSW
 Velocity : 6 (kn)
 Wave : 2
 Swell : 3
 Visibility : 40 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	0.8	33.930	8.13	339	1.92	27	0.30	29	0.8	10	0.980	33.929
52	0.972	33.915	8.11	338	1.91	27	0.28	29	1.0	20	0.980	33.931
78	0.161	-	8.02	264	2.36	64	0.29	35	0.6	30	0.983	33.931
101	0.920	34.500	7.97	-	2.49	75	0.38	37	0.1	50	0.983	33.928
127	0.641	-	7.99	232	2.41	75	0.15	36	0.2	75	-0.033	34.377
154	0.632	-	7.99	235	2.40	76	0.05	36	0.0	100	0.855	34.496
203	1.242	34.607	7.98	210	2.38	82	0.03	36	0.2	125	0.843	34.545
253	1.302	34.634	7.97	208	2.38	84	0.06	35	0.1	150	1.038	34.567
306	1.387	34.660	7.98	206	2.34	86	0.01	35	0.2	200	1.154	34.616
403	1.399	34.685	7.99	208	2.31	88	0.02	34	0.1	250	1.267	34.646
505	1.496	34.712	7.99	206	2.29	91	0.05	34	0.1	300	1.405	34.672
605	1.477	34.724	8.00	208	2.26	94	0.04	34	0.1	400	1.419	34.700
703	1.427	34.727	7.99	211	2.25	96	0.02	34	0.0	500	1.511	34.725
805	1.278	34.721	8.00	213	2.26	98	0.02	33	0.2	600	1.452	34.733
904	1.225	34.723	8.00	213	2.26	101	0.01	34	0.2	700	1.418	34.737
1004	1.127	34.721	8.01	215	2.33	105	0.02	34	0.3	800	1.362	34.740
1254	0.959	34.715	8.00	216	2.29	111	0.00	34	0.3	1000	1.160	34.728
1503	0.779	34.707	7.99	218	2.32	117	0.02	34	0.2	1200	1.011	34.722
2004	0.399	34.689	7.98	226	2.35	126	0.01	35	0.4	1500	0.757	34.710
2504	0.147	34.679	7.98	232	2.36	127	0.02	35	0.2	2000	0.396	34.693
3005	-0.059	34.672	7.98	241	2.35	127	0.01	35	0.2	2500	0.149	34.684
3503	-0.358	34.652	7.96	256	2.34	107	0.04	34	0.3	3000	-0.053	34.674
3604	-0.485	34.640	7.96	262	2.30	102	0.05	34	0.2	3500	-0.360	34.652

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

station 16

Beginning of cast

Date	: March 10, 2004	Time(UT)	: 2200	Wind direction	: NW
Time(UT)	: 2152	Weather	: s	Velocity	: 31 (kn)
Latitude	: 60-01.4S	Air Temperature (dry)	: 1.3 (degC)	Wave	: 4
Longitude	: 149-49.9E	Humidity	: 93 (%)	Swell	: 3
Depth	: 3,844 (m)	Atmospheric Pressure	: 962.6 (hPa)	Visibility	: 3 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	2.3	33.771	-	341	1.63	26	0.31	29	0.9	10	0.865	33.784
56	0.016	-	8.05	299	1.99	45	0.18	33	1.0	20	0.867	33.783
79	1.406	34.458	7.94	207	2.24	71	0.44	38	0.3	30	0.867	33.785
109	1.919	34.556	7.77	184	2.24	78	0.05	38	0.3	50	0.842	33.794
131	1.912	34.568	7.92	185	2.18	79	0.03	38	0.3	75	0.250	34.313
162	1.938	34.597	7.94	182	2.23	81	0.01	37	0.3	100	1.552	34.517
216	1.975	34.637	7.78	186	2.31	83	0.02	37	0.3	125	1.781	34.565
257	1.950	-	7.79	187	2.27	84	0.00	36	0.3	150	1.872	34.593
307	1.949	34.667	7.95	190	2.21	85	0.00	36	0.3	200	1.953	34.629
411	1.939	34.697	7.97	195	2.13	86	0.00	35	0.4	250	1.946	34.649
514	1.889	34.726	7.98	198	2.05	87	0.00	34	0.3	300	1.941	34.667
610	1.828	34.726	7.98	202	2.02	89	0.00	34	0.4	400	1.911	34.697
707	1.771	34.733	7.99	205	1.97	91	0.00	34	0.4	500	1.878	34.716
811	1.697	34.739	7.99	208	1.95	93	0.00	34	0.4	600	1.824	34.730
911	1.627	34.742	7.99	210	1.92	95	0.00	34	0.4	700	1.771	34.739
1009	1.549	34.741	8.00	214	2.03	98	0.00	33	0.2	800	1.707	34.742
1257	1.344	34.736	7.99	216	2.07	105	0.00	34	0.5	1000	1.548	34.743
1505	1.138	-	8.00	220	2.28	112	0.00	34	0.5	1200	1.383	34.741
1995	0.748	34.708	7.99	225	2.15	124	0.00	35	0.6	1500	1.141	34.731

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

station 17

Beginning of cast

Date	: March 11, 2004	Time(UT)	: 2200	Wind direction	: WNW
Time(UT)	: 2204	Weather	: b	Velocity	: 37 (kn)
Latitude	: 60-01.8S	Air Temperature (dry)	: 2.1 (degC)	Wave	: 4
Longitude	: 149-49.9E	Humidity	: 82 (%)	Swell	: 6
Depth	: 3,272 (m)	Atmospheric Pressure	: 971.2 (hPa)	Visibility	: 30 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	2.8	33.785	-	339	1.91	11	0.25	28	1.4	10	1.313	33.760
47	1.289	33.751	8.13	339	1.93	9	0.24	27	1.6	20	1.311	33.760
76	-0.841	34.163	8.04	299	2.48	54	0.14	34	1.5	30	1.326	33.759
101	1.583	34.488	7.94	194	2.68	73	0.25	38	0.4	50	1.324	33.761
129	1.873	34.558	7.94	185	2.66	78	0.01	38	0.5	75	-0.452	34.098
152	1.852	34.579	7.94	183	2.66	79	0.01	37	0.5	100	1.386	34.419
203	1.919	34.615	7.95	184	2.62	82	0.00	37	1.6	125	1.828	34.498
249	1.946	34.646	7.94	185	2.53	83	0.00	36	1.4	150	1.994	34.540
311	1.984	34.669	7.96	187	2.50	84	0.00	35	0.6	200	1.647	34.547
406	1.941	34.689	7.97	190	2.47	85	0.00	35	0.4	250	2.042	34.622
509	1.919	34.712	7.99	198	2.37	86	0.00	34	0.5	300	2.036	34.644
604	1.850	34.723	7.99	204	2.37	87	0.00	34	0.5	400	1.953	34.678
704	1.787	-	-	-	-	-	-	-	-	500	1.964	34.713
804	1.722	-	-	-	-	-	-	-	-	600	1.900	34.728
904	1.664	34.741	8.00	216	2.32	93	0.00	33	0.4	700	1.816	34.734
1004	1.579	34.743	8.01	211	2.29	96	0.00	33	0.6	800	1.762	34.742
1253	1.384	34.738	8.00	211	2.30	102	0.00	33	0.6	1000	1.605	34.747
1506	1.179	34.729	8.00	215	2.30	109	0.00	34	0.6	1200	1.455	34.743
1989	0.776	34.711	7.99	221	2.37	122	0.00	34	0.6	1500	1.178	34.733

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

station 18

Beginning of cast

Date	: March 14, 2004	Time(UT)	: 0300	Wind direction	: W
Time(UT)	: 0305	Weather	: b	Velocity	: 41 (kn)
Latitude	: 55-15.8S	Air Temperature (dry)	: 5.2 (degC)	Wave	: 4
Longitude	: 149-56.4E	Humidity	: 84 (%)	Swell	: 6
Depth	: 3,880 (m)	Atmospheric Pressure	: 993.1 (hPa)	Visibility	: 7 (km)

Water Sampling bu Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	6.2	33.771	-	320	1.54	0	0.34	25	0.7	10	4.858	33.758
46	4.672	33.757	8.14	322	1.53	0	0.32	25	1.0	20	4.848	33.759
77	2.752	-	8.13	335	1.86	0	0.31	27	1.5	30	4.837	33.757
100	1.114	33.871	8.12	338	2.16	7	0.25	28	2.3	50	4.835	33.757
129	-0.075	-	8.08	331	2.33	23	0.24	30	2.5	75	4.745	33.759
151	-0.220	34.119	-	298	2.39	41	0.24	33	1.8	100	2.546	33.821
204	0.932	-	7.97	234	2.56	63	0.37	37	0.7	125	1.250	33.877
255	1.891	34.500	7.93	189	2.58	73	0.06	38	0.4	150	0.390	33.974
303	2.090	34.564	7.92	182	2.54	76	0.03	37	0.4	200	0.179	34.192
406	2.125	34.622	7.94	183	2.47	79	0.03	36	0.4	250	1.662	34.417
505	2.115	34.646	7.95	185	2.46	80	0.04	36	0.4	300	2.012	34.495
604	2.089	34.672	7.96	191	2.39	81	0.01	35	0.4	400	2.169	34.580
706	2.082	34.701	7.95	193	2.33	82	0.01	34	0.4	500	2.151	34.619
805	2.068	34.715	7.97	201	2.28	83	0.01	34	0.4	600	2.100	34.650
909	2.045	-	-	-	-	-	-	-	-	700	2.126	34.687
1005	2.011	34.733	7.99	203	2.26	85	0.00	33	0.3	800	2.088	34.708
1252	1.838	34.744	7.98	206	2.24	90	0.00	33	0.5	1000	1.961	34.728
1500	1.661	34.744	7.99	211	2.25	96	0.00	33	0.4	1200	1.891	34.747
1995	1.246	34.731	7.99	217	2.30	108	0.01	34	0.7	1500	1.669	34.749

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

station 19

Beginning of cast

Date : MArch 15, 2004
 Time(UT) : 2156
 Latitude : 48-29.0S
 Longitude : 149-57.9E
 Depth : 1,514 (m)

Time(UT) : 2200
 Weather : c
 Air Temperature (dry) : 9.7 (degC)
 Humidity : 79 (%)
 Atmospheric Pressure : 1007.1 (hPa)

Wind direction : W
 Velocity : 28 (kn)
 Wave : 4
 Swell : 6
 Visibility : 15 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	11.5	34.621	-	279	0.84	0	0.31	11	0.2	10	10.647	34.581
50	10.822	34.619	8.20	281	0.82	0	0.28	10	0.2	20	10.650	34.580
75	10.821	34.617	8.20	279	0.82	0	0.30	11	0.3	30	10.649	34.579
100	10.425	-	8.18	273	0.93	0	0.24	13	0.2	50	10.650	34.579
127	9.359	34.680	8.14	268	1.11	0	0.07	16	0.2	75	10.654	34.578
151	9.156	34.659	8.14	274	1.13	0	0.07	16	0.2	100	10.651	34.579
203	8.919	34.624	8.15	277	1.13	0	0.08	16	0.0	125	10.378	34.615
255	8.831	34.612	8.14	280	1.12	0	0.07	16	0.1	150	9.171	34.665
307	8.815	34.613	8.15	282	1.12	0	0.06	16	0.0	200	8.939	34.630
406	8.638	34.584	8.14	279	1.18	0	0.06	17	0.1	250	8.841	34.617
505	8.461	34.559	8.14	280	1.22	0	0.05	17	0.1	300	8.808	34.614
604	7.903	34.478	8.12	270	1.37	0	0.05	20	0.2	400	8.631	34.590
704	7.041	34.411	8.08	242	1.67	6	0.02	25	0.3	500	8.171	34.518
804	6.305	34.394	8.03	228	1.88	12	0.02	28	0.2	600	7.846	34.478
906	5.313	34.347	8.01	227	2.05	19	0.01	30	0.1	700	7.081	34.414
1002	4.574	34.333	8.00	226	2.17	26	0.02	32	0.1	800	6.317	34.388
1229	3.385	34.378	7.96	207	2.40	46	0.04	35	0.0	1000	4.609	34.330
1295	3.127	34.415	7.94	202	2.44	53	0.01	36	0.1	1200	3.419	34.373

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

station 20

Beginning of cast

Date	: March 16, 2004	Time(UT)	: 2200	Wind direction	: WSW
Time(UT)	: 2153	Weather	: c	Velocity	: 13 (kn)
Latitude	: 44-05.6S	Air Temperature (dry)	: 13.5 (degC)	Wave	: 3
Longitude	: 149-46.4E	Humidity	: 73 (%)	Swell	: 3
Depth	: 2,616 (m)	Atmospheric Pressure	: 1015.5 (hPa)	Visibility	: 30 (km)

Water Sampling by Niskin bottles										Observed by CTD		
Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)	pH	DO2	PO4-P	SiO3-Si (μ mol/l)	NO2-N	NO3-N	NH4-N	Pressure (dBar)	Temperature (ITS-90)	Salinity (PSS78)
0	16.3	35.405	-	257	0.20	0	0.19	0	0.0	10	15.890	35.415
50	15.401	35.341	8.26	257	0.22	0	0.24	1	0.1	20	15.823	35.406
75	14.356	-	8.21	242	0.50	0	0.19	6	0.0	30	15.759	35.403
102	13.875	35.167	8.20	237	0.57	0	0.09	7	0.0	50	14.158	35.171
125	13.349	-	8.19	236	0.65	0	0.11	8	0.1	75	13.572	35.229
150	12.849	35.196	8.16	225	0.79	0	0.07	11	0.0	100	12.995	35.202
201	12.108	35.153	8.17	240	0.80	0	0.08	11	0.1	125	12.634	35.197
252	11.453	35.063	8.15	247	0.85	0	0.02	12	0.0	150	12.295	35.169
300	10.653	34.915	8.14	247	0.98	0	0.02	14	0.1	200	11.853	35.123
404	9.599	34.745	8.12	246	1.16	0	0.01	17	0.1	250	11.361	35.049
503	8.538	34.577	8.12	261	1.29	0	0.00	19	0.0	300	10.616	34.917
605	8.346	34.599	8.07	219	1.56	4	0.00	23	0.0	400	9.430	34.713
703	7.520	34.525	8.05	209	1.75	9	0.00	26	0.1	500	8.767	34.615
804	6.762	34.487	8.01	206	1.90	16	0.00	28	0.1	600	8.300	34.591
903	5.865	34.452	7.99	200	2.07	26	0.00	31	0.0	700	7.574	34.537
1004	5.134	34.443	7.98	196	2.20	36	0.00	32	0.0	800	6.735	34.491
1252	3.857	34.484	7.95	182	2.44	62	0.00	35	0.1	1000	4.978	34.441
1502	2.975	34.556	7.93	177	2.52	81	0.00	37	0.3	1200	3.955	34.475
2000	2.325	34.678	7.95	188	2.40	90	0.00	35	0.5	1500	3.003	34.554
2495	1.857	34.729	7.96	198	2.33	103	0.00	34	0.3	2000	2.305	34.689

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

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

Station No.	Date	Time		Position		Air Temp.	Water Temp.	Petroleum Oil	Cadmium	Mercury
		UT	LMT	Latitude	Longitude	(°C)		(μg/l)		
	2003									
1	12/5	0605	1305	41-51.4S	110-00.7 E	12.8	12.6	0.13	0.015	0.0268
2	6	0601	1301	46-09.7S	110-01.4 E	8.6	9.6	0.08	0.054	0.0036
3	7	0703	1403	50-35.8S	110-04.3E	5.8	5.4	0.07	0.071	0.0110
4	8	0718	1505	55-27.6S	109-22.7E	4.7	3.5	0.09	0.085	0.0063
5	9	0604	1306	59-10.9S	103-40.5E	1.9	0.1	0.05	0.073	0.0039
	2004									
6	2/23	0450	0750	63-59.5S	50-49.8E	-0.6	-1.3	0.10	0.083	0.0275
8	25	0855	1255	63-59.1S	70-58.6E	1.0	0.6	0.07	0.062	0.0098
10	29	0309	1309	63-27.3S	90-12.8E	1.0	2.6	0.05	0.046	0.0056
12	3/3	0720	1420	63-57.5S	107-46.3E	-0.6	-0.4	0.05	0.077	0.0030
14	7	0522	1300	64-00.1S	131-06.3E	-0.9	0.9	<0.05	0.071	0.0038
16	10	2152	0752	63-12.4S	150-06.0E	1.3	2.3	0.10	0.064	0.0025
17	11	2152	0752	60-01.8S	149-49.9E	2.1	2.8	0.09	0.060	0.0020
18	14	0311	1311	55-15.8S	149-56.4E	5.2	6.2	0.06	0.035	0.0044
19	15	2156	0756	48-29.0S	149-57.9E	9.7	11.5	0.07	0.019	0.0033
20	16	2153	0753	44-05.6S	149-46.4E	13.5	16.3	<0.05	0.007	0.0019

The concentration of petroleum oil is expressed in the chrysene equivalents.

Table 6. Hourly tidal observation at Syowa Station from February 2003 to January 2004 (time is LMT(UT+3 hours)).

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : FEB. 1. - FEB. 28, 2003
 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	263	269	277	288	300	304	298	282	255	225	195	170	158	159	177	204	233	261	283	293	294	285	269	258	5997	250	6250	250
2	253	254	264	279	293	307	307	297	276	248	214	186	167	162	173	195	223	248	274	288	289	281	270	256	6003	250	6247	250
3	244	242	248	264	282	296	303	299	285	263	232	200	178	167	172	189	214	239	259	274	282	276	261	249	5916	247	6151	246
4	235	228	230	242	262	279	291	294	289	271	246	220	196	181	179	190	209	233	255	270	276	274	260	244	5851	244	6085	243
5	234	223	217	226	244	264	279	287	285	277	260	236	214	199	192	196	211	230	250	263	270	269	258	242	5823	243	6051	242
6	228	218	211	212	225	243	259	271	275	270	260	241	224	212	207	207	217	232	249	262	270	269	261	247	5768	240	6002	240
7	233	221	212	210	217	232	246	258	265	266	263	251	236	229	224	224	230	243	257	267	273	274	268	254	5853	244	6095	244
8	242	230	218	213	214	223	234	242	250	255	253	249	242	238	237	239	243	251	259	268	273	271	266	260	5868	245	6116	245
9	248	235	226	217	213	218	222	229	237	238	242	240	238	239	243	247	253	258	264	272	273	274	268	262	5856	244	6108	244
10	252	241	232	222	217	214	214	215	218	219	225	227	231	237	244	254	259	265	268	271	273	271	265	259	5792	241	6045	242
11	253	247	239	230	224	218	212	207	204	203	207	214	221	232	246	258	269	277	281	282	282	278	274	268	5824	243	6090	244
12	266	263	256	250	244	236	224	213	206	201	197	202	214	229	246	266	280	291	295	296	292	284	278	274	5999	250	6271	251
13	272	271	269	266	262	252	238	221	205	193	185	186	197	211	233	256	276	292	296	296	291	280	272	266	5985	249	6250	250
14	265	266	268	270	266	260	246	223	201	182	168	161	168	183	208	235	261	279	290	292	286	274	263	255	5768	240	6022	241
15	253	257	264	270	274	272	260	236	211	185	163	150	148	161	186	214	245	268	282	288	284	271	259	246	5646	235	5890	236
16	244	249	259	272	282	288	280	261	235	204	173	154	146	151	174	204	234	263	281	288	286	275	261	247	5710	238	5953	238
17	243	247	261	278	293	307	312	300	278	246	214	189	175	176	189	217	249	280	300	311	310	300	283	265	6221	259	6475	259
18	254	251	259	277	296	312	319	314	297	270	234	202	177	162	168	190	216	241	264	281	282	272	255	238	6029	251	6252	250
19	223	215	218	235	259	283	300	305	300	283	256	228	201	184	184	195	219	244	265	280	288	280	264	245	5953	248	6179	247
20	227	213	210	222	244	270	291	304	309	303	284	259	236	216	208	212	228	248	268	281	285	281	267	245	6109	255	6334	253
21	225	207	196	198	215	235	255	275	286	287	280	266	247	230	221	220	228	244	262	272	276	274	262	240	5900	246	6120	245
22	220	203	186	179	186	201	219	235	250	258	260	254	245	238	233	231	237	248	262	270	274	275	266	250	5677	237	5930	237
23	234	216	200	190	185	191	205	215	227	240	248	252	252	252	255	256	262	268	276	283	285	284	277	267	5820	243	6073	243
24	253	237	222	211	202	199	199	203	209	218	227	236	243	253	264	270	277	280	284	287	288	284	278	271	5894	246	6155	246
25	262	251	240	229	217	211	202	193	191	195	196	205	219	232	248	265	274	279	282	284	281	276	271	266	5769	240	6030	241
26	262	258	253	244	238	228	212	198	186	180	177	185	199	214	236	259	276	287	291	289	285	278	272	269	5775	241	6042	242
27	268	268	270	271	267	258	243	225	205	191	181	181	189	209	234	258	283	299	305	303	294	285	275	268	6028	251	6297	252
28	269	274	278	284	286	282	269	246	220	198	180	172	174	189	214	240	268	287	294	294	285	273	259	252	5987	249	6238	250
MONTHLY MEAN																							245.3		cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : MAR . 1 , - MAR . 31 , 2003
 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	252	257	270	282	291	291	284	265	237	210	186	169	168	180	202	232	258	280	295	297	288	274	257	248	5970	249	6215	249
2	245	253	268	284	298	307	305	290	266	234	208	185	175	181	198	225	253	276	292	295	286	269	250	236	6079	253	6308	252
3	229	231	246	267	284	298	304	294	274	245	216	189	172	172	184	209	236	258	273	281	273	255	234	218	5839	243	6046	242
4	206	206	218	242	264	282	294	292	276	254	228	200	181	175	184	205	230	255	272	280	274	258	237	219	5730	239	5935	237
5	205	200	208	228	253	277	292	297	290	273	248	226	207	195	200	216	238	261	278	286	283	267	245	225	5896	246	6104	244
6	207	198	201	217	240	265	282	292	290	279	259	237	220	208	206	218	236	256	273	282	279	268	247	223	5880	245	6087	243
7	207	195	191	202	222	244	265	278	280	278	264	245	230	222	218	227	243	261	277	287	286	277	259	237	5894	246	6113	245
8	219	207	203	208	224	247	268	282	289	291	283	271	259	256	251	257	272	286	300	307	307	299	284	261	6330	264	6572	263
9	242	228	217	218	228	241	257	272	279	281	279	273	264	260	261	265	274	287	296	304	305	296	284	268	6378	266	6628	265
10	250	237	226	221	224	235	245	256	263	267	268	267	265	264	269	274	280	289	297	301	299	294	283	271	6345	264	6599	264
11	254	241	232	225	224	227	231	237	242	246	253	253	255	263	270	278	285	292	295	299	297	290	281	272	6241	260	6499	260
12	257	247	239	231	228	225	224	222	223	227	232	236	242	254	266	278	290	297	298	300	297	288	280	273	6155	256	6419	257
13	264	256	254	247	241	235	225	219	213	211	211	217	229	243	259	276	290	299	302	300	293	284	273	267	6108	255	6371	255
14	263	260	257	257	253	246	233	219	206	197	191	195	207	226	249	273	293	306	311	309	302	293	283	279	6108	255	6386	255
15	278	281	287	291	290	285	269	249	231	213	200	199	207	224	249	277	299	314	320	319	307	294	280	273	6435	268	6706	268
16	272	277	288	298	304	302	290	272	244	219	200	192	196	210	236	266	292	310	320	318	305	287	269	260	6426	268	6684	267
17	259	266	280	299	313	319	314	296	267	237	212	193	189	199	223	252	280	305	316	316	306	285	265	250	6439	268	6683	267
18	244	253	272	293	316	331	332	322	295	264	233	206	194	197	214	241	270	294	308	311	297	275	252	232	6446	269	6665	267
19	220	223	239	265	294	318	331	330	314	285	254	227	207	201	211	234	259	281	296	301	291	268	240	216	6303	263	6502	260
20	199	194	209	234	264	293	317	326	321	306	280	252	231	220	223	241	263	283	297	304	295	273	245	220	6288	262	6485	259
21	197	183	187	205	233	263	288	307	314	308	290	270	251	239	237	248	267	287	301	306	302	285	257	230	6254	261	6459	258
22	205	186	180	188	209	235	262	281	295	298	290	278	266	256	249	254	268	283	293	300	297	283	260	234	6149	256	6382	255
23	210	191	176	174	188	207	227	249	262	272	277	274	268	267	265	266	277	289	298	305	304	292	277	256	6069	253	6303	252
24	233	213	198	189	189	198	210	226	237	249	259	263	266	272	277	283	289	299	306	312	312	304	291	279	6153	256	6415	257
25	262	245	233	221	216	215	219	222	228	238	247	257	266	276	287	298	304	310	317	319	316	311	304	294	6405	267	6687	267
26	282	273	266	258	248	243	237	230	230	232	236	246	259	272	288	305	314	319	322	318	312	306	299	293	6586	274	6874	275
27	288	286	280	275	272	259	248	236	222	216	217	222	233	252	271	291	305	311	310	306	297	288	281	275	6441	268	6715	269
28	274	278	281	282	281	274	259	241	223	208	202	203	213	231	253	276	294	305	304	298	288	274	264	261	6267	261	6532	261
29	264	273	283	294	299	297	286	268	246	226	213	208	214	231	254	277	297	311	312	304	289	274	258	252	6428	268	6684	267
30	257	267	282	298	308	311	303	286	260	236	218	207	208	222	243	265	287	301	303	297	280	258	240	231	6367	265	6597	264
31	231	244	260	280	298	305	302	289	264	238	219	201	196	207	227	252	272	289	293	288	273	249	231	218	6124	255	6339	254
MONTHLY MEAN																							258.8		cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : APR. 1, - APR. 30, 2003
 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	215	227	249	273	298	314	318	314	296	270	250	232	225	229	247	271	291	306	313	308	290	266	241	224	6467	269	6684	267
2	217	222	241	267	292	313	322	318	305	284	259	240	227	226	241	262	280	299	307	302	289	263	235	218	6427	268	6632	265
3	206	205	222	248	275	299	313	317	308	291	269	248	233	230	238	255	274	289	298	295	280	255	228	204	6278	262	6466	259
4	188	184	194	217	245	269	288	298	296	284	268	250	238	234	237	252	271	286	294	293	282	260	232	208	6069	253	6258	250
5	189	180	186	201	228	254	273	286	290	283	270	256	247	240	242	254	270	286	296	298	289	269	245	224	6055	252	6259	250
6	204	192	193	204	226	251	271	287	296	295	290	281	273	271	273	278	293	307	314	317	311	295	274	250	6445	269	6673	267
7	229	216	211	215	229	245	266	278	287	292	292	284	278	277	279	283	293	302	310	311	306	293	275	253	6503	271	6736	269
8	233	218	211	210	216	229	243	254	263	269	273	273	272	276	278	283	292	301	306	305	299	288	275	256	6322	263	6559	262
9	236	224	216	212	211	218	224	232	242	247	254	259	263	269	279	284	290	298	301	301	298	286	276	266	6184	258	6435	257
10	251	238	233	224	222	222	223	224	228	232	240	248	255	267	279	287	295	302	303	300	294	287	278	270	6203	258	6468	259
11	265	257	252	250	245	238	235	231	230	233	241	251	262	279	296	310	319	324	324	321	315	304	299	297	6578	274	6876	275
12	298	300	298	296	289	280	264	249	238	228	228	234	244	259	279	294	307	310	308	298	288	273	264	263	6587	274	6852	274
13	265	270	279	283	284	279	264	246	231	218	212	218	228	247	271	290	303	313	310	301	281	265	254	249	6359	265	6612	264
14	252	262	278	291	297	295	284	261	237	216	203	195	204	225	247	270	291	300	298	288	267	245	229	224	6159	257	6386	255
15	228	244	264	287	304	312	305	286	260	232	211	199	201	216	239	264	287	300	300	289	269	244	225	213	6176	257	6393	256
16	217	235	264	295	321	338	344	334	310	283	257	237	231	240	259	278	298	311	314	303	278	248	221	202	6620	276	6814	273
17	195	205	232	265	295	325	339	337	326	302	278	258	247	251	266	287	309	324	328	321	299	267	237	210	6702	279	6897	276
18	196	201	224	254	287	319	343	354	350	335	314	295	278	273	279	295	313	324	328	321	301	268	232	201	6884	287	7061	282
19	177	168	176	199	231	261	288	307	313	311	300	285	271	266	268	280	300	313	320	321	307	283	256	226	6427	268	6631	265
20	204	189	188	208	233	261	292	312	326	333	330	324	315	307	306	313	326	340	344	342	332	312	283	251	6968	290	7193	288
21	224	203	187	186	196	213	232	248	265	277	278	280	281	279	281	284	292	304	313	316	310	298	281	257	6284	262	6521	261
22	237	221	205	200	203	214	230	244	261	272	285	295	301	309	311	312	318	323	327	331	326	315	303	289	6631	276	6909	276
23	272	258	243	234	226	223	227	231	237	246	258	267	275	288	295	301	305	308	310	312	306	300	294	287	6500	271	6778	271
24	278	269	263	256	244	237	232	227	228	230	238	250	260	274	289	297	301	302	300	297	291	286	281	277	6409	267	6685	267
25	277	277	276	273	268	258	247	239	230	227	229	239	250	266	281	292	300	299	294	288	275	268	264	262	6378	266	6644	266
26	266	274	279	283	282	275	262	247	233	223	221	227	237	252	268	282	289	289	281	268	255	242	234	234	6202	258	6444	258
27	242	251	264	276	279	277	266	248	231	217	211	215	222	239	258	271	284	286	277	266	249	233	222	223	6004	250	6235	249
28	231	243	261	280	291	294	289	277	257	239	230	227	233	248	264	281	291	294	289	275	252	232	217	213	6209	259	6428	257
29	219	236	257	278	297	303	302	290	272	253	236	229	231	242	260	275	286	291	287	271	249	226	208	200	6197	258	6401	256
30	204	220	243	267	289	303	303	294	280	258	239	229	224	231	249	263	276	282	275	260	238	210	189	175	6001	250	6175	247
																							MONTHLY MEAN		265.6 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00' 28"S
 LONGITUDE : 39°34' 13"E
 DURATION : MAY 1, - MAY 31, 2003
 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	174	187	209	236	261	279	290	285	274	255	240	226	217	225	240	256	269	278	275	264	240	211	189	171	5750	240	5917	237
2	167	174	194	225	252	275	290	295	285	274	258	246	238	239	251	265	279	287	287	275	252	224	197	176	5907	246	6072	243
3	165	166	182	208	234	258	278	286	283	273	261	250	243	240	248	264	277	287	288	282	261	234	209	185	5862	244	6029	241
4	167	166	174	197	223	249	271	284	286	283	273	266	260	257	264	276	291	302	305	302	286	263	237	214	6094	254	6291	252
5	197	188	192	209	230	255	278	293	301	302	298	293	288	287	289	297	308	319	323	320	306	288	265	238	6561	273	6782	271
6	221	207	204	213	227	246	265	279	287	295	294	290	290	289	289	295	304	314	318	317	308	293	271	248	6561	273	6789	272
7	227	212	204	204	211	225	240	253	266	275	278	279	285	286	288	292	300	305	308	308	303	290	275	259	6375	266	6613	265
8	239	224	217	210	211	220	228	236	249	257	265	272	278	282	288	290	293	297	299	297	293	284	274	262	6263	261	6513	261
9	250	240	232	226	220	221	225	230	235	245	254	267	274	284	295	298	301	305	304	301	297	291	285	279	6357	265	6630	265
10	273	267	261	255	249	241	238	235	234	241	248	259	272	284	294	303	304	301	296	291	282	274	270	269	6439	268	6709	268
11	271	272	272	270	265	256	246	235	230	229	237	247	261	278	293	302	305	305	295	287	276	266	263	265	6424	268	6698	268
12	274	285	293	298	297	290	276	261	248	239	240	249	261	280	300	313	319	317	308	295	277	264	260	263	6705	279	6979	279
13	274	291	307	323	328	324	313	292	269	254	245	243	254	268	285	298	304	299	288	268	242	223	213	210	6614	276	6839	274
14	224	247	271	295	313	319	313	294	275	254	239	235	240	253	268	283	292	291	279	257	231	203	184	180	6241	260	6433	257
15	192	212	243	276	303	321	328	319	300	282	264	253	255	262	279	291	300	301	290	265	236	204	176	159	6312	263	6472	259
16	161	177	206	240	272	298	315	317	306	290	273	259	255	259	273	288	298	303	297	281	249	216	185	159	6176	257	6325	253
17	150	157	179	214	246	279	304	317	318	312	298	285	279	278	288	300	313	318	316	302	277	243	207	178	6358	265	6516	261
18	158	152	162	188	219	248	274	293	302	303	295	285	279	276	280	293	305	310	311	304	286	255	225	196	6199	258	6367	255
19	168	153	153	165	189	214	239	261	275	283	283	282	281	274	277	287	297	309	315	313	302	283	258	230	6089	254	6296	252
20	206	189	177	181	196	211	236	253	271	285	290	295	295	295	296	298	307	317	322	324	319	306	289	266	6420	268	6665	267
21	245	225	210	203	205	212	225	239	249	261	271	278	283	285	284	281	285	288	291	293	286	281	270	256	6203	258	6442	258
22	239	223	209	199	191	193	198	204	215	226	237	246	255	260	262	263	264	263	264	268	266	262	257	252	5713	238	5950	238
23	245	237	231	222	213	207	206	205	207	214	223	234	244	251	256	256	255	253	246	245	239	238	237	236	5599	233	5836	233
24	237	237	233	232	225	218	211	203	203	208	217	226	234	244	253	257	257	252	243	237	230	225	229	231	5542	231	5782	231
25	241	243	251	259	261	247	243	241	230	224	240	253	255	265	279	286	284	283	273	261	247	241	238	239	6081	253	6326	253
26	245	257	264	271	273	272	261	249	237	231	226	231	239	248	259	266	264	260	248	234	220	208	204	208	5875	245	6095	244
27	220	234	251	267	274	275	271	258	244	235	227	229	239	247	259	264	266	259	248	230	212	196	190	190	5785	241	5988	240
28	203	222	246	264	283	289	291	282	272	261	257	259	268	277	291	299	305	300	287	268	245	226	212	207	6310	263	6526	261
29	216	232	254	274	291	302	304	293	282	269	256	252	252	259	269	277	282	280	268	249	224	197	180	174	6134	256	6314	253
30	180	197	222	249	273	291	303	302	294	285	275	269	269	277	291	301	310	308	301	285	259	233	211	196	6380	266	6576	263
31	196	208	227	255	282	304	320	323	318	308	296	290	284	288	297	309	316	318	311	295	269	242	215	194	6665	278	6853	274
MONTHLY MEAN																							258.1		cm			

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : JUN#1, - JUNE30, 2003
 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	188	194	209	235	261	284	301	311	311	302	294	287	281	282	290	300	309	313	310	298	277	247	219	196	6493	271	6676	267		
2	183	181	190	212	238	261	282	296	300	295	288	283	278	276	281	290	299	304	306	296	277	251	225	198	6286	262	6466	259		
3	180	175	177	191	216	238	260	277	288	287	286	285	280	276	278	287	297	303	305	301	288	266	241	214	6196	258	6391	256		
4	195	180	179	186	201	221	244	260	272	280	281	281	277	274	275	279	287	296	299	300	290	275	256	231	6116	255	6327	253		
5	211	196	186	187	195	212	230	245	261	271	276	281	283	281	278	283	289	292	299	300	297	287	274	255	6167	257	6406	256		
6	239	226	213	206	208	217	231	243	256	267	277	285	286	286	286	284	284	286	289	290	286	283	274	262	6265	261	6516	261		
7	251	239	228	221	216	217	224	231	242	254	266	276	281	284	284	284	282	279	281	281	279	278	277	274	6228	260	6497	260		
8	269	264	258	250	243	236	234	238	240	246	257	270	278	282	284	283	281	273	268	265	263	264	265	267	6276	262	6551	262		
9	275	278	277	276	268	259	253	247	245	245	253	265	274	282	285	283	277	268	256	246	240	237	239	248	6276	262	6538	262		
10	282	272	283	288	286	279	267	256	249	246	249	257	264	276	281	281	278	265	252	236	223	216	216	227	6212	259	6458	258		
11	246	267	288	304	310	310	302	289	276	269	268	268	280	290	295	300	295	281	282	241	218	205	198	202	6462	269	6682	267		
12	219	244	270	294	311	319	316	302	292	277	269	268	274	283	292	297	294	283	262	238	208	183	167	165	6327	264	6505	260		
13	178	202	231	261	286	304	312	308	297	284	273	269	272	280	289	296	297	293	276	253	221	193	167	156	6196	258	6359	254		
14	162	180	209	240	271	300	320	323	323	313	302	296	295	299	310	322	325	324	314	294	263	229	200	175	6584	274	6751	270		
15	167	173	192	223	253	282	309	323	325	318	310	304	296	299	305	316	322	327	320	304	279	248	216	184	6593	275	6758	270		
16	165	162	172	197	225	253	281	300	310	312	307	299	293	293	299	307	318	324	325	320	301	273	244	214	6493	271	6679	267		
17	186	172	172	185	208	231	257	278	294	301	301	298	292	287	288	294	307	316	321	323	310	290	266	239	6418	267	6631	265		
18	214	198	188	190	204	224	242	261	282	289	294	293	289	282	281	283	290	297	308	312	303	295	279	256	6352	265	6587	263		
19	235	217	203	198	202	214	232	246	264	273	280	283	280	277	270	266	273	276	286	292	293	292	281	269	6200	258	6453	258		
20	253	237	220	216	212	220	228	237	251	264	269	276	273	273	267	260	257	258	265	270	275	270	270	265	6084	254	6342	254		
21	257	245	236	229	223	224	225	230	236	246	255	259	262	262	258	252	247	243	243	247	252	253	254	257	5896	246	6155	246		
22	259	254	258	253	255	252	251	252	262	269	276	286	291	293	292	293	287	277	274	276	272	273	270	275	6500	271	6766	271		
23	280	282	286	285	284	280	275	274	274	274	278	283	288	286	285	284	276	266	256	249	244	247	247	251	6534	272	6801	272		
24	267	273	283	289	292	292	290	281	284	285	284	291	293	294	298	295	286	275	264	252	244	239	239	246	6634	276	6892	276		
25	257	268	286	297	303	305	305	298	290	286	287	287	289	295	295	294	288	274	260	245	227	218	214	217	6584	274	6813	273		
26	229	244	262	277	291	295	296	291	285	277	274	272	277	285	287	288	285	273	261	241	220	206	195	192	6300	263	6504	260		
27	204	217	237	258	276	291	291	289	285	274	267	267	268	273	279	283	281	273	259	239	215	196	177	175	6072	253	6250	250		
28	178	196	222	244	266	283	292	295	290	281	273	271	271	276	285	288	292	287	276	258	231	209	186	175	6125	255	6304	252		
29	179	189	210	236	261	281	297	301	300	292	285	280	277	281	288	296	301	299	292	276	249	222	196	178	6265	261	6437	257		
30	172	176	195	217	244	270	287	295	298	290	282	277	271	271	279	289	296	298	295	283	261	232	205	184	6165	257	6336	253		
MONTHLY MEAN																													262.9 cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JULY 1, - JULY 31, 2003
 UNIT : CENTIMETRE

The zero of the tide gauge: 500cm below the bench m

Date	Time																							(24H)		Σ		
	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	
1	171	170	185	206	232	260	281	296	301	298	293	288	282	280	286	295	306	310	311	304	285	256	228	204	6327	264		
2	185	176	179	197	219	247	267	284	297	297	295	287	280	277	278	285	294	304	309	305	292	272	244	216	6286	262		
3	194	180	174	183	202	223	244	263	277	278	278	272	263	254	253	260	266	274	283	284	277	264	241	217	5905	246		
4	194	175	165	166	179	195	215	235	249	258	261	258	254	250	245	246	253	262	275	278	280	276	262	243	5674	236		
5	227	208	198	193	193	209	222	237	252	261	270	271	263	259	252	246	245	253	260	266	270	272	265	254	5845	244		
6	243	229	216	208	204	209	220	231	242	250	257	260	257	252	241	235	230	226	233	237	242	244	244	243	5651	235		
7	239	232	224	213	210	206	205	215	222	229	238	239	240	238	229	223	213	205	204	207	211	219	226	234	5323	222		
8	241	245	248	248	245	242	240	242	244	251	257	263	265	264	260	249	238	231	219	213	214	217	226	237	5798	242		
9	254	264	272	280	280	278	271	267	266	265	267	272	273	271	269	259	244	228	212	198	189	185	188	200	5950	248		
10	217	237	257	271	281	283	278	275	269	268	270	272	277	283	281	281	269	252	236	216	199	188	182	190	6030	251		
11	210	231	257	285	303	315	321	318	310	307	305	307	312	314	319	321	317	305	287	261	236	218	203	201	6761	282		
12	215	233	262	292	320	336	344	347	338	326	319	314	311	315	317	319	315	306	287	262	230	199	177	162	6845	285		
13	162	176	202	232	264	289	306	314	311	302	293	287	285	290	300	307	311	310	301	283	252	218	186	167	6347	264		
14	158	164	181	208	241	271	295	308	310	306	297	288	283	286	294	306	315	320	318	305	281	248	215	186	6384	266		
15	166	163	174	196	223	253	277	294	301	300	293	283	276	271	277	290	304	311	317	315	295	270	240	210	6298	262		
16	186	172	173	189	213	238	260	279	291	293	287	279	271	262	263	274	287	302	313	315	309	293	266	240	6255	261		
17	216	200	196	203	220	243	265	284	298	303	303	297	285	276	271	275	287	300	314	321	318	311	293	271	6550	273		
18	250	232	221	221	229	245	264	278	292	300	300	296	287	277	269	269	273	284	297	305	308	306	295	279	6577	274		
19	263	245	236	233	239	249	264	279	290	294	294	288	277	268	258	252	253	262	273	282	288	291	287	277	6440	268		
20	269	259	249	244	246	254	259	272	280	286	288	283	273	263	253	245	243	239	248	258	262	266	267	261	6266	261		
21	260	255	249	246	249	253	259	265	271	276	278	277	269	257	250	239	234	229	228	237	240	245	249	251	6067	253		
22	252	257	257	255	257	261	262	266	270	272	274	276	271	263	256	248	238	231	229	229	228	232	237	241	6061	253		
23	249	255	263	273	277	281	285	285	285	289	292	290	291	288	282	276	269	260	252	248	244	245	247	254	6477	270		
24	267	278	290	305	312	318	321	321	319	315	313	314	310	307	303	295	282	273	259	247	236	227	220	224	6853	286		
25	236	244	260	276	287	296	296	295	290	283	280	280	275	275	274	269	263	252	236	220	205	192	182	180	6147	256		
26	192	210	226	250	265	278	287	285	280	278	271	266	270	272	275	273	273	264	250	231	210	193	181	177	5956	248		
27	185	201	223	247	270	286	294	297	293	286	279	274	274	277	284	286	289	284	272	252	228	203	186	174	6145	256		
28	175	191	212	240	266	289	302	309	306	298	291	285	283	284	295	302	307	305	298	283	253	225	199	181	6380	266		
29	175	182	202	228	256	283	298	307	306	298	288	277	269	272	282	290	298	301	298	285	260	227	194	172	6245	260		
30	159	158	168	193	221	247	266	278	281	276	268	253	246	241	246	264	275	282	286	283	263	239	207	178	5775	241		
31	157	156	164	181	207	238	263	283	289	287	281	273	263	263	272	284	297	312	321	326	313	293	262	229	6213	259		
																							MONTHLY MEAN		257.8	cm		

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : AUG. 1, - AUG. 31, 2003
 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	204	187	184	197	217	241	261	279	287	289	282	273	256	255	258	263	283	301	314	321	320	308	287	259	6325	264	6565	263
2	240	219	207	212	227	247	264	279	289	290	284	271	259	243	239	240	247	262	277	287	293	289	277	259	6199	258	6437	257
3	237	223	215	212	219	235	253	269	277	281	281	269	257	245	236	232	236	248	265	276	290	295	290	277	6118	255	6387	255
4	269	256	245	241	242	250	260	272	279	282	283	271	256	243	228	219	214	219	228	240	249	259	260	262	6027	251	6285	251
5	259	252	246	242	240	241	250	260	264	266	267	258	248	235	220	209	203	195	203	209	216	226	237	245	5690	237	5940	238
6	250	256	258	260	261	259	263	265	267	267	266	262	255	244	231	219	207	195	189	189	192	197	205	218	5671	236	5902	236
7	231	246	258	268	275	279	281	283	283	288	286	284	284	280	272	265	252	238	223	213	207	204	205	215	6117	255	6351	254
8	234	253	271	293	302	310	312	308	307	303	299	296	296	292	288	280	271	253	232	213	194	181	175	178	6339	264	6533	261
9	194	210	237	263	286	297	301	299	293	290	282	279	280	283	284	282	279	266	248	226	199	179	163	161	6081	253	6251	250
10	170	190	214	245	270	290	301	301	294	282	277	272	270	275	283	287	287	282	268	248	220	186	161	151	6023	251	6175	247
11	152	163	188	218	251	275	294	300	294	283	274	268	266	275	287	299	308	312	304	287	262	225	194	174	6150	256	6313	253
12	163	168	188	215	244	268	288	298	292	284	273	256	252	259	269	283	296	307	307	294	274	242	210	182	6112	255	6281	251
13	168	167	180	206	234	261	282	298	297	289	278	266	256	255	267	286	308	321	330	327	312	286	252	223	6349	265	6547	262
14	198	189	190	206	227	252	270	282	284	272	258	241	228	220	224	240	259	279	291	298	291	273	245	221	5938	247	6137	245
15	198	184	184	194	215	240	259	273	277	272	257	242	227	217	217	228	247	268	285	295	295	283	265	241	5863	244	6084	243
16	222	206	203	211	227	246	266	277	282	281	267	251	235	223	220	223	240	258	276	290	293	291	278	259	6023	251	6268	251
17	246	233	225	229	242	257	271	284	288	285	276	258	243	229	220	218	225	240	256	269	274	275	270	256	6068	253	6313	253
18	245	233	229	233	238	249	262	274	278	277	268	250	233	222	209	204	204	216	228	241	250	254	253	245	5795	241	6034	241
19	240	235	231	233	237	247	255	261	266	265	257	247	233	217	209	204	198	203	214	224	232	233	241	239	5619	234	5860	234
20	240	240	246	252	255	263	272	276	283	282	277	268	257	247	238	233	223	222	224	228	233	236	237	241	5975	249	6221	249
21	246	253	260	272	281	283	286	292	288	287	284	280	270	264	255	248	238	234	230	224	230	227	227	233	6191	258	6434	257
22	243	258	267	284	292	305	306	303	302	301	299	290	284	282	275	266	258	249	237	232	222	213	215	217	6399	267	6607	264
23	228	242	259	273	282	297	300	300	294	289	285	276	274	275	272	268	263	255	241	227	212	202	194	197	6200	258	6408	256
24	208	221	243	265	282	296	300	299	293	286	280	274	273	274	275	277	273	262	250	229	210	195	180	178	6119	255	6305	252
25	186	205	227	251	273	289	299	300	292	281	272	267	264	270	274	281	284	278	267	246	219	193	172	162	6048	252	6211	248
26	164	178	199	228	253	275	282	285	277	264	252	244	241	248	259	271	279	279	268	253	224	193	167	149	5731	239	5877	235
27	146	154	178	206	233	258	273	275	268	258	244	233	227	235	249	267	283	292	291	280	258	225	194	175	5701	238	5866	235
28	164	167	188	217	246	275	292	299	297	285	270	255	246	248	263	284	305	318	327	323	302	273	242	213	6301	263	6498	260
29	198	192	201	225	251	275	294	302	298	283	264	249	232	229	238	257	280	301	312	316	306	283	255	226	6267	261	6470	259
30	203	191	194	210	236	259	278	286	284	273	255	233	217	208	211	228	252	276	296	308	309	298	274	251	6030	251	6260	250
31	231	214	211	223	238	261	279	286	288	278	259	234	212	200	192	199	218	245	265	282	291	288	276	258	5927	247	6170	247
MONTHLY MEAN																									251.9 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : SEP. 1. - SEP. 30, 2003
 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	243	229	221	229	239	256	274	281	281	277	263	241	221	206	194	196	207	227	248	265	280	289	287	282	5936	247	6209	248
2	272	265	260	263	270	285	299	305	307	304	293	272	253	238	221	211	214	223	236	253	264	276	282	285	6350	265	6634	265
3	285	284	283	289	294	300	309	316	314	311	306	289	272	256	240	227	221	219	224	232	241	251	260	267	6489	270	6763	271
4	274	281	289	292	298	303	307	309	309	304	300	289	277	263	253	241	228	219	215	214	213	215	224	232	6346	264	6592	264
5	246	260	274	288	296	301	303	304	300	296	292	285	279	271	263	258	245	229	218	207	199	195	196	205	6208	259	6433	257
6	225	242	261	281	295	304	304	301	295	290	286	282	279	276	276	273	265	251	236	217	200	186	178	180	6182	258	6378	255
7	196	215	241	264	285	295	294	294	284	273	268	261	262	269	273	276	275	267	249	226	206	181	166	166	5986	249	6158	246
8	172	192	219	244	271	288	295	290	281	265	259	254	256	262	274	287	293	290	280	258	232	202	180	169	6011	250	6181	247
9	170	186	207	236	259	280	289	283	270	256	239	229	229	239	255	270	285	288	284	270	243	211	184	169	5829	243	5995	240
10	166	173	197	224	253	276	290	289	278	264	251	235	234	245	266	289	310	319	325	315	295	266	238	217	6212	259	6419	257
11	207	207	225	254	276	301	312	309	299	280	261	243	232	237	255	277	299	318	325	321	306	276	248	222	6489	270	6697	268
12	207	206	217	236	260	281	295	297	285	267	245	223	213	211	224	249	271	293	309	312	303	280	257	234	6173	257	6390	256
13	217	210	219	235	257	276	288	290	282	265	240	220	204	195	203	224	249	272	289	298	296	282	260	239	6008	250	6232	249
14	224	215	218	233	251	271	286	286	282	266	241	220	203	192	194	209	231	255	273	286	290	282	268	252	5928	247	6168	247
15	240	234	236	245	260	279	291	295	292	281	262	238	221	211	209	217	236	257	279	291	302	299	289	279	6240	260	6512	260
16	272	267	269	274	285	299	307	308	304	293	276	253	233	221	214	216	226	242	256	271	281	282	279	272	6399	267	6665	267
17	266	264	266	270	279	290	296	302	295	286	272	251	232	217	208	206	209	217	230	239	246	248	249	251	6089	254	6339	254
18	250	253	259	267	275	283	290	291	285	277	269	255	238	227	219	212	210	215	218	224	229	232	238	242	5960	248	6205	248
19	245	254	263	272	282	289	293	294	289	284	279	265	252	245	238	230	226	223	220	222	224	224	229	238	6080	253	6328	253
20	248	259	272	283	293	296	296	295	290	282	276	265	258	251	250	243	237	229	224	216	212	209	209	219	6112	255	6344	254
21	232	246	264	280	293	300	301	296	290	282	276	269	266	265	267	265	260	253	239	226	213	203	200	202	6189	258	6406	256
22	217	234	257	276	291	301	302	294	285	279	270	263	264	267	273	272	270	260	247	226	209	192	182	184	6112	255	6286	251
23	195	216	240	263	282	293	294	288	273	261	251	243	246	256	265	273	279	275	259	239	214	188	172	170	5933	247	6108	244
24	175	196	221	247	272	286	289	281	266	251	237	228	229	238	256	274	284	287	279	258	232	201	178	165	5829	243	5993	240
25	164	180	205	232	254	274	281	273	256	236	220	210	208	221	244	267	287	301	299	286	260	230	201	181	5772	241	5947	238
26	175	183	206	233	255	275	283	279	260	237	216	199	193	203	226	253	278	300	309	305	284	255	228	205	5837	243	6028	241
27	191	193	208	233	257	275	286	280	263	239	214	190	177	179	196	228	256	279	302	307	298	276	249	226	5803	242	6014	241
28	210	204	213	233	254	273	283	282	269	245	217	191	173	167	178	205	234	266	289	304	307	297	276	258	5828	243	6070	243
29	243	232	236	252	271	290	300	300	288	269	241	211	190	176	176	193	216	247	273	291	302	299	287	276	6057	252	6320	253
30	263	254	254	262	277	292	299	302	294	276	251	223	199	178	171	176	190	213	234	253	270	276	275	270	5952	248	6219	249
MONTHLY MEAN																							253.2		cm			

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : OCT. 1. - OCT. 31, 2003
 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	267	264	263	269	280	293	302	303	297	285	267	239	217	199	184	179	183	195	211	224	239	248	254	259	5921	247	6180	247		
2	260	264	268	272	281	290	295	298	293	285	273	253	235	221	207	197	192	192	199	206	215	224	233	242	5894	246	6143	246		
3	249	261	272	276	285	290	292	293	290	284	272	260	250	238	230	219	207	202	198	195	196	199	206	217	5880	245	6111	244		
4	232	248	263	277	285	288	288	285	283	278	269	266	263	256	254	250	239	228	219	208	200	197	199	209	5981	249	6205	248		
5	225	243	264	281	294	298	295	288	282	274	267	268	268	271	274	275	271	259	242	224	209	194	190	196	6153	256	6362	254		
6	209	228	250	272	287	290	287	276	264	254	245	244	249	257	268	276	277	269	256	234	212	194	183	181	5959	248	6151	246		
7	192	212	236	259	275	282	280	268	251	237	225	222	228	243	258	272	281	281	269	249	226	201	184	179	5810	242	5995	240		
8	185	201	224	248	269	279	276	265	247	227	214	208	212	231	252	273	290	296	291	275	251	225	202	191	5831	243	6025	241		
9	193	205	227	249	269	282	280	266	247	226	207	196	198	218	215	240	265	286	301	302	294	272	249	226	5905	246	6114	245		
10	209	215	237	259	277	287	289	276	254	230	208	190	185	199	224	251	277	295	302	298	283	259	237	218	5959	248	6171	247		
11	212	218	233	255	277	286	290	280	260	235	210	191	182	189	214	241	267	291	304	305	295	275	254	237	5999	250	6226	249		
12	227	229	241	259	279	293	293	285	269	242	214	193	178	180	198	223	252	275	293	299	295	281	264	250	6011	250	6250	250		
13	239	236	245	262	279	290	294	287	271	248	220	195	179	175	182	203	229	253	272	282	284	275	260	250	5908	246	6151	246		
14	243	236	244	256	272	285	290	284	269	248	223	196	179	168	169	184	206	225	243	257	261	257	249	240	5684	237	5921	237		
15	237	235	238	247	261	273	279	275	264	249	225	201	183	173	172	181	196	216	234	247	256	260	257	253	5611	234	5863	235		
16	252	254	255	264	275	286	290	289	283	268	248	228	210	198	193	196	205	216	230	241	249	255	258	256	5896	246	6153	246		
17	256	263	264	271	282	288	292	290	282	273	256	239	221	209	201	201	204	207	218	226	231	239	244	251	5906	246	6163	247		
18	257	265	274	281	287	297	296	292	288	277	267	256	241	233	228	224	219	218	221	226	227	230	240	248	6090	254	6347	254		
19	256	272	282	290	297	302	300	294	291	283	273	266	258	252	248	246	236	230	226	221	214	215	223	230	6205	259	6449	258		
20	244	259	273	284	292	294	290	282	276	265	258	254	252	252	254	253	247	235	226	216	205	199	203	212	6023	251	6249	250		
21	226	245	264	280	291	294	290	281	270	259	253	254	255	264	274	279	276	269	253	236	221	208	204	209	6155	256	6378	255		
22	223	241	261	279	292	295	283	272	258	243	232	232	241	252	268	279	282	276	263	241	218	200	189	189	6010	250	6213	249		
23	202	221	243	264	280	286	279	261	242	225	211	209	219	238	262	284	298	302	292	272	245	221	202	194	5950	248	6153	246		
24	203	219	242	265	280	288	279	262	238	211	193	188	194	216	245	274	297	310	310	294	269	245	222	205	5949	248	6155	246		
25	207	223	242	262	280	287	280	262	234	204	180	165	167	185	215	249	279	300	310	306	286	262	238	220	5841	243	6053	242		
26	212	218	236	255	270	280	276	259	248	199	165	143	135	147	175	208	241	270	291	299	290	271	255	237	5560	232	5784	231		
27	224	227	241	258	274	286	283	270	246	213	178	154	137	134	155	184	215	247	276	290	293	285	271	259	5601	233	5850	234		
28	249	246	254	271	287	297	296	288	270	239	205	175	152	141	146	166	192	222	248	268	281	282	277	270	5720	238	5985	239		
29	265	260	265	278	291	301	303	299	285	262	233	205	176	158	153	159	177	196	218	236	251	261	263	262	5757	240	6018	241		
30	262	259	260	268	280	290	293	290	284	268	245	220	194	177	165	162	168	177	191	205	220	232	241	247	5598	233	5851	234		
31	253	258	261	265	271	279	281	281	276	266	253	235	217	203	191	181	179	179	182	192	200	207	220	231	5559	232	5800	232		
MONTHLY MEAN																											245.1		cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : NOV. 1. - NOV. 30, 2003
 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	241	250	258	263	266	273	273	270	268	263	256	247	239	234	223	215	208	203	198	198	198	203	213	225	5686	237	5922	237
2	236	250	262	268	270	272	270	265	260	254	253	251	250	250	246	244	237	226	218	209	203	203	208	218	5822	243	6056	242
3	234	249	263	274	278	277	269	258	252	246	243	243	251	256	261	265	261	249	237	224	210	203	205	211	5917	247	6141	246
4	225	244	259	270	275	273	261	248	237	228	223	228	239	254	266	275	279	272	260	244	226	215	210	214	5922	247	6148	246
5	227	241	260	274	281	278	265	250	233	219	212	215	226	244	263	278	286	286	277	260	242	225	215	216	5973	249	6197	248
6	225	240	257	269	279	279	265	246	226	207	197	198	206	226	252	272	288	294	290	276	259	239	224	222	5935	247	6163	247
7	228	242	259	273	283	283	271	251	226	206	192	183	190	213	238	263	283	295	295	286	270	250	235	227	5941	248	6170	247
8	229	240	258	272	282	284	274	253	229	204	181	169	175	191	217	246	269	287	293	289	275	259	244	235	5854	244	6087	243
9	233	242	257	273	285	289	280	262	237	210	185	168	167	180	204	234	259	279	291	293	285	270	257	245	5882	245	6124	245
10	241	248	260	275	288	292	288	272	247	219	193	173	163	171	191	217	245	268	284	292	288	276	266	256	5911	246	6163	247
11	252	253	264	279	291	298	295	283	262	235	207	182	171	170	182	207	235	256	273	287	288	281	274	265	5987	249	6247	250
12	260	261	269	281	292	298	299	289	270	245	217	192	172	167	174	191	215	238	256	269	279	277	270	266	5944	248	6208	248
13	265	263	267	277	286	297	299	290	277	258	228	205	186	174	176	188	203	222	240	255	265	271	267	265	5922	247	6186	247
14	265	265	269	277	287	294	297	292	284	266	244	221	203	190	188	190	201	216	231	245	253	261	263	264	5966	249	6233	249
15	267	270	271	275	285	290	291	289	283	270	254	237	221	209	203	201	206	216	228	240	248	259	269	273	6056	252	6335	253
16	279	285	289	293	297	301	301	300	296	288	276	266	250	241	234	230	227	228	233	239	245	254	263	271	6385	266	6663	267
17	279	284	291	293	295	296	293	289	284	275	267	260	251	247	239	233	229	225	220	220	222	227	236	248	6201	258	6458	258
18	257	264	274	279	279	276	270	264	257	253	249	249	250	251	253	247	242	235	224	217	212	214	220	230	5964	249	6208	248
19	244	257	268	274	274	270	260	248	239	231	229	232	241	250	258	262	260	251	237	224	214	208	210	219	5859	244	6091	244
20	233	248	263	270	273	269	254	238	225	214	211	217	230	248	265	278	283	275	264	248	229	219	213	217	5883	245	6113	245
21	230	246	262	273	276	268	251	231	209	193	188	190	206	231	256	279	293	295	287	270	249	234	222	221	5859	244	6088	244
22	230	244	261	272	276	271	252	225	201	177	163	163	179	205	237	269	295	307	308	298	280	261	245	239	5857	244	6116	245
23	245	256	270	283	289	286	270	245	215	183	161	151	158	183	215	251	285	308	318	315	303	287	270	258	6005	250	6264	251
24	259	270	282	294	303	302	289	266	233	198	170	150	146	163	191	225	262	290	311	321	317	307	293	281	6123	255	6399	256
25	276	280	292	302	311	315	305	286	257	218	183	155	137	138	155	183	215	245	270	286	293	290	280	272	5944	248	6209	248
26	265	266	275	286	297	305	302	288	267	233	199	168	145	135	141	159	186	214	240	264	277	282	283	280	5757	240	6033	241
27	276	275	280	291	304	317	311	298	286	273	243	215	188	170	166	172	187	206	228	249	265	277	281	281	6040	252	6319	253
28	279	279	279	285	294	306	308	307	303	285	263	239	217	197	182	180	184	195	211	227	239	254	262	266	6039	252	6309	252
29	270	271	270	271	276	284	288	288	286	279	267	250	234	217	205	197	194	197	205	215	226	238	250	259	5936	247	6199	248
30	263	267	267	266	267	269	269	272	274	270	266	260	252	243	235	226	217	215	214	217	223	231	241	250	5973	249	6230	249
MONTHLY MEAN																							248.0		cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : DEC . 1 , - DEC . 31 , 2003
 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	257	263	266	262	261	260	255	255	255	252	256	256	254	254	253	247	242	234	229	226	227	229	236	245	5972	249	6226	249
2	254	261	266	267	263	258	251	244	242	239	240	247	251	257	263	266	262	256	248	238	232	235	237	243	6018	251	6273	251
3	255	262	268	269	266	257	246	231	225	219	220	226	236	249	260	269	270	266	258	248	241	236	234	240	5951	248	6201	248
4	250	259	267	268	266	257	240	224	211	201	199	206	218	235	251	268	277	276	269	259	250	243	237	240	5869	245	6118	245
5	249	258	266	270	268	259	245	225	207	193	187	188	202	222	243	264	277	283	281	271	260	251	242	241	5850	244	6099	244
6	249	257	265	273	272	266	250	229	207	187	174	175	187	209	234	259	277	291	293	287	278	267	257	255	5896	246	6154	246
7	258	269	279	286	287	283	268	245	221	197	181	174	181	201	223	251	275	289	298	298	288	277	269	261	6057	252	6318	253
8	261	270	282	289	294	292	280	257	231	206	182	168	169	185	207	234	260	280	291	294	287	281	271	263	6031	251	6294	252
9	263	267	277	288	295	295	285	268	244	214	189	170	164	172	191	220	248	270	286	295	292	284	275	268	6019	251	6284	251
10	264	264	274	288	293	294	290	274	251	223	195	172	163	164	175	201	228	250	270	282	286	280	271	268	5919	247	6180	247
11	261	261	271	281	288	295	293	280	263	237	206	182	167	162	168	186	209	233	252	268	278	275	270	267	5851	244	6114	245
12	263	261	263	274	284	287	290	283	268	245	218	189	169	160	159	170	187	211	229	246	258	262	259	257	5691	237	5946	238
13	255	252	254	261	269	279	280	278	269	253	231	205	186	171	166	173	185	201	221	237	250	259	259	257	5651	235	5908	236
14	257	255	254	258	266	272	273	276	270	259	242	222	205	189	181	179	187	199	212	228	239	249	256	256	5682	237	5940	238
15	258	259	255	256	261	265	268	268	267	263	253	238	226	215	205	200	200	207	214	226	235	243	254	257	5793	241	6051	242
16	258	259	257	255	257	256	257	258	258	257	255	247	241	232	225	220	216	213	218	222	229	237	246	254	5827	243	6084	243
17	257	259	259	254	248	247	244	242	240	241	243	242	243	245	244	238	235	228	224	222	224	229	234	240	5780	241	6028	241
18	248	252	251	250	244	233	223	218	213	213	219	226	238	248	254	257	257	250	242	236	232	232	238	244	5716	238	5966	239
19	250	257	260	257	249	238	222	208	199	197	201	211	227	246	263	275	281	278	268	260	251	245	244	251	5838	243	6095	244
20	258	266	267	266	262	248	230	210	192	184	183	188	208	232	257	280	295	300	295	285	275	265	258	261	5963	248	6228	249
21	265	271	278	278	272	260	239	212	187	167	155	159	175	197	227	259	284	296	300	297	286	274	264	260	5859	244	6123	245
22	264	271	278	282	280	271	250	223	193	164	142	134	145	167	197	232	264	289	305	307	302	291	279	272	5802	242	6077	243
23	275	282	290	297	300	295	281	255	223	188	155	138	134	145	172	205	239	270	293	304	304	297	287	279	5907	246	6182	247
24	275	278	287	296	303	305	295	277	249	212	175	145	131	131	146	172	204	235	262	280	286	286	279	269	5779	241	6043	242
25	264	262	271	283	294	300	299	288	268	237	201	169	144	133	139	157	183	213	240	263	276	282	280	275	5720	238	5987	239
26	267	261	267	279	292	303	308	305	294	271	242	210	183	165	158	166	183	205	227	250	265	271	274	269	5913	246	6173	247
27	260	254	251	257	270	280	289	292	286	274	253	227	202	180	168	167	176	192	210	227	242	254	256	254	5720	238	5969	239
28	249	241	236	233	243	255	264	270	274	268	255	239	222	204	190	185	184	195	206	219	231	243	248	246	5597	233	5840	234
29	243	238	230	226	228	234	241	248	252	255	253	246	238	227	217	212	212	215	221	231	241	250	255	259	5668	236	5925	237
30	257	253	248	241	237	239	238	243	251	254	256	255	251	248	246	240	237	237	237	243	248	253	258	260	5931	247	6191	248
31	261	257	250	246	240	232	229	230	233	236	238	241	246	249	252	253	252	252	250	252	255	257	259	263	5933	247	6197	248
MONTHLY MEAN																							243.6		cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JAN . 1 , - JAN . 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	264	263	256	251	244	234	224	217	214	216	220	225	233	244	255	265	270	270	271	270	273	272	270	276	5997	250	6277	251																						
2	281	277	275	272	265	255	242	230	223	220	219	225	234	246	259	272	280	283	280	277	274	268	264	266	6188	258	6456	258																						
3	268	268	268	267	259	248	234	220	206	197	195	198	208	224	244	264	279	286	289	288	282	276	274	275	6017	251	6295	252																						
4	278	281	284	283	278	268	252	235	216	202	193	194	202	217	238	260	280	290	295	293	289	281	272	271	6152	256	6424	257																						
5	272	278	280	281	281	274	257	238	215	194	178	174	181	194	216	244	267	281	292	294	289	281	274	269	6004	250	6273	251																						
6	269	274	282	284	286	283	270	248	222	199	177	165	166	179	203	230	255	276	291	297	293	287	277	271	5981	249	6251	250																						
7	271	274	282	292	296	295	286	267	240	214	189	171	165	173	194	219	246	272	288	298	298	290	281	275	6074	253	6344	254																						
8	270	272	279	291	298	301	296	280	255	227	197	174	162	160	175	201	226	252	272	286	289	282	274	267	5983	249	6245	250																						
9	282	280	267	278	289	297	298	287	266	238	210	183	165	159	166	189	216	240	264	282	288	285	279	271	5937	247	6202	248																						
10	265	261	266	276	288	300	304	297	283	263	234	204	183	173	172	187	208	232	255	273	284	285	279	272	6044	252	6309	252																						
11	265	260	258	265	279	291	299	298	290	275	250	224	201	185	179	186	201	222	242	259	272	275	272	265	6013	251	6271	251																						
12	258	251	246	249	261	273	283	287	287	278	261	240	217	201	193	191	200	216	233	247	262	268	268	262	5930	247	6185	247																						
13	255	246	239	237	240	252	262	268	273	271	264	248	232	220	206	203	207	216	230	242	254	262	264	260	5852	244	6104	244																						
14	252	245	237	230	230	236	243	251	257	262	262	256	249	240	231	227	226	227	236	247	257	262	266	264	5891	245	6148	246																						
15	257	250	241	230	225	223	226	230	238	243	250	255	255	253	252	249	247	246	247	252	259	262	262	263	5915	246	6177	247																						
16	262	255	244	234	226	216	211	211	214	220	228	237	248	255	262	266	268	266	267	266	267	268	267	267	5922	247	6189	248																						
17	268	261	254	247	235	223	213	203	202	205	211	225	245	264	282	296	308	313	309	308	305	304	305	305	6288	262	6597	264																						
18	308	311	303	293	281	265	243	226	213	202	200	207	220	243	266	287	303	311	312	308	301	295	288	286	6472	270	6758	270																						
19	286	285	287	281	272	261	236	211	190	174	163	164	178	201	230	262	288	305	315	315	309	301	292	289	6094	254	6384	255																						
20	290	293	297	298	298	289	270	243	214	185	164	156	160	177	204	239	271	295	312	319	314	304	293	289	6173	257	6461	258																						
21	288	291	299	305	309	307	294	270	239	205	175	155	149	158	178	211	245	273	295	308	307	301	290	279	6131	255	6408	256																						
22	276	280	290	303	313	319	315	297	271	239	202	172	155	155	170	196	225	257	283	298	303	298	287	274	6180	258	6439	258																						
23	266	266	274	289	303	314	317	310	290	260	226	194	170	160	165	185	211	240	267	286	294	292	281	268	6127	255	6385	255																						
24	259	251	255	271	287	302	311	311	301	282	252	220	192	176	174	184	205	230	252	271	282	282	273	262	6083	253	6332	253																						
25	249	238	237	246	262	283	296	302	303	290	269	242	217	199	189	193	206	226	247	264	275	278	270	257	6037	252	6282	251																						
26	245	231	225	227	237	255	271	280	286	282	267	248	228	210	199	199	208	220	236	252	262	265	260	248	5842	243	6078	243																						
27	235	223	212	207	213	227	240	253	260	261	257	245	231	218	208	208	212	220	234	246	255	259	254	246	5624	234	5858	234																						
28	234	221	211	204	202	210	222	233	240	245	246	243	236	230	227	225	229	236	246	254	262	263	262	255	5636	235	5880	235																						
29	244	234	223	214	209	211	218	223	230	237	239	241	242	241	243	249	252	257	263	268	273	274	269	266	5819	242	6076	243																						
30	258	245	236	228	222	216	216	215	217	221	224	225	228	235	243	249	256	260	263	268	269	265	262	257	5778	241	6030	241																						
31	251	244	236	228	221	212	205	201	197	196	199	201	208	219	230	245	256	263	267	269	271	267	263	261	5612	234	5869	235																						
																							MONTHLY MEAN		249.7 cm																									

Table 7. Harmonic constants at Syowa Station.

SYOWA STATION			(3) MEAN SEA LEVEL	
(1) POSITION			SO	253.4 CM
LAT	69	0 28S		
LONG	39	34 13E		
(2) EPOCH & DURATION OF ANALYSIS			(4) SPECIAL REMARKS	
EPOCH	2003	2 1	Obsr. -Pre. MAX	37.2 CM
CENTRAL DATE	2003	8 2	Obsr. -Pre. S.D.	9.9 CM
DURATION IN DAYS	365 DAYS			
MISSING HOUR	0 HOURS			
ERROR	0			

HARMONIC CONSTANTS							
	H(CM)	K(DEG)	G(DEG)		H(CM)	K(DEG)	G(DEG)
SA	8.71	64.04	64.06	M2	24.97	233.11	168.46
SSA	1.75	53.77	53.81	MKS2	0.11	257.83	193.23
MM	0.70	352.74	353.01	LAM2	0.22	210.06	145.65
MSF	1.45	295.95	296.46	L2	1.10	183.52	119.14
MF	1.81	180.52	181.07	T2	1.33	242.57	178.41
2Q1	0.91	358.22	325.08	S2	20.06	251.25	187.11
SIG1	1.05	0.89	327.78	R2	0.30	268.23	204.11
Q1	6.01	12.65	339.78	K2	5.75	249.80	185.70
RH01	1.02	21.63	348.79	MSN2	0.13	134.32	70.45
O1	24.39	25.22	352.62	KJ2	0.41	111.54	47.71
MP1	0.28	50.02	17.47	2SM2	0.19	194.60	130.97
M1	0.86	33.96	1.64	M03	0.09	268.90	171.65
CH11	0.37	17.98	345.69	M3	0.26	14.37	277.40
P11	0.35	13.17	341.06	S03	0.05	64.48	327.74
P1	7.59	34.02	1.93	MK3	0.04	332.64	235.95
S1	0.33	125.29	93.22	SK3	0.40	89.14	352.95
K1	22.27	34.68	2.63	MN4	0.27	186.86	57.29
PS11	0.23	341.36	309.33	M4	0.45	250.16	120.87
PH11	0.25	35.71	3.70	SN4	0.05	285.81	156.75
THE1	0.16	18.13	346.32	MS4	0.20	321.24	192.45
J1	1.10	35.12	3.34	MK4	0.06	350.44	221.69
S01	0.24	2.42	330.88	S4	0.05	333.29	205.01
001	0.42	28.33	356.83	SK4	0.04	350.82	222.58
0Q2	0.03	208.10	142.63	2MN6	0.07	257.26	63.04
MNS2	0.02	58.27	352.84	M6	0.14	304.30	110.36
2N2	0.56	197.17	131.98	MSN6	0.06	29.53	195.82
MU2	0.55	179.03	113.87	2MS6	0.39	46.85	213.41
N2	4.74	224.16	159.23	2MK6	0.12	43.77	210.37
NU2	0.76	233.23	168.34	2SM6	0.11	123.10	290.17
OP2	0.12	102.35	37.66	MSK6	0.08	130.67	297.78