

Oceanographic Data of the 41st Japanese Antarctic Research Expedition from November 1999 to March 2000

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The results 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 41st Japanese Antarctic Research Expedition (JARE-41) during the austral summer of 1999/2000. The tidal observations were carried out by the winter party of JARE-40 from February 1999 to January 2000.

1. Oceanographic observations

The track of the icebreaker "Shirase" and the sites of oceanographic stations are shown in Fig. 1. Surface water was sampled during the cruise using a plastic bucket of 10 liter capacity. XBT (expendable bathythermograph), XCTD (expendable CTD) and serial observations were taken in the Southern Ocean.

Three surface drifting buoys and five XCP (expendable current profiler) were deployed in the Antarctic Circumpolar Current.

(1) Surface water sampling

Surface water was sampled one or two times a day at 16 stations for chemical analysis. The results are given in Table 1.

(2) Monitoring of marine pollution

Surface water was sampled at 9 stations in the Southern Ocean for monitoring of marine pollution. Items and methods of analyses are given in the following section of (6).

(3) XBT observations

XBT observations were carried out at 40 stations in the Southern Ocean from Fremantle to Antarctica and back to Sydney. The results are listed in Table 2.

(4) XCTD observations

XCTD observations were carried out at 52 stations along the same route as XBT observations. The results are listed in Table 3. Salinity is not calibrated.

Vertical sections of water temperature with XBT and XCTD observations are shown in Figs. 2 to 5.

(5) Serial observations

Serial observations with Rosette sampler, equipped with twenty three Niskin bottles of 2.5 liter capacity and CTD (Conductivity, Temperature and Depth profiling system : Falmouth Scientific FSI TRITON ICTD) were carried out at 6 stations. The results of the observations and meteorological data are given in Table 4 .

(6) Chemical analysis of sampled water

Chemical analysis of seawater collected with a bucket or the Niskin bottle was done by the use of the following methods. Item (a) was calculated from conductivity using the 1978 practical salinity scale (UNESCO, 1981). Item (b), (d) and (h) were carried out with the methods described by Strickland and Parsons (1972). Item (c) was analyzed by the Winkler method as modified by Carpenter (1965) for more precision. Item (e) was analyzed with the method in Motomizu and Korechika (1988). Item (f) and (g) was analyzed with the method in Bergamin *et al.* (1978), Andersson (1979) and Gine *et al.* (1980). Item (i), (j) and (k) were analyzed with the method in Hydrographic Department (1995).

- (a) Practical salinity: Conductive salinometer (Guildline Autosal salinometer model 8400B).
- (b) pH: Glass electrode method (Horiba digital pH meter F-16).
- (c) Dissolved oxygen: Carpenter method (Hirama model ART-3 DO-1).
- (d) Phosphate-P: Molybdenum blue method (BRAN+LUEBBE model traacs 800 auto analyzer).
- (e) Silicate-Si: Molybdenum yellow method (BRAN+LUEBBE model traacs 800 auto analyzer).
- (f) Nitrite-N: Naphthylethylenediamine method (BRAN+LUEBBE model traacs 800 auto analyzer).
- (g) Nitrate-N: Cadmium (Cd) - copper (Cu) reduction column, Naphthylethylenediamine method (BRAN+LUEBBE model traacs 800 auto analyzer).
- (h) Ammonium-N: 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 analytical items (a) to (h) are given in Tables 1 and 3. The results of analytical items (i) to (k) are given in Table 4.

(7) Current observation with surface drifting buoys

Each surface drifting buoy is a spherical buoy of 35 cm diameter, from which hangs a drogue of 1m diameter, 8 m length (c-2340, TOYOCOM Co.). Buoy data from each drift

buoy were transmitted to the data processing center through the NOAA satellite, and the Argos system offered buoy position and surface water temperature to each user.

The first surface drifting buoy was deployed at 59°44' S, 109°52' E on December 9, 1999. The second was deployed at 59°40' S, 150°03' E on March 13, 1999. The third was deployed at 56°36' S, 150°03' E on March 14, 1999. The trajectories are shown in Fig. 6.

(8) Vertical current observations with XCP

XCP (Sippican Inc. U.S.A.) observations were carried out at the following four stations.

December 7, 1999	05:15 (UT)	50°27' S, 109°58' E
December 9, 1999	07:36 (UT)	59°43' S, 109°57' E
March 13, 2000	03:13 (UT)	59°40' S, 149°59' E
March 15, 2000	02:54 (UT)	52°18' S, 149°59' E

The results are given in Fig. 7.

2. Tidal observations

(1) Tidal observations at Syowa Station

Tidal observations at Syowa Station have been carried out since 1965. The tide gauge (QWP-8-303D, Meisei Denki Co.) set on the sea bottom about 15 m below the sea surface at Nisi-no-ura Cove. Methodology of tidal observations is described by Odamaki *et al.* (1991). In this system, the relative water pressure compensated for atmospheric pressure is measured with a quartz oscillator. The range of the sensor is 0-50 m and its precision is 0.01% to full scale, *i.e.* 0.005 m. The data sampled 5 times per second are averaged over one minute and record on solid IC memory every 10 min. The gauge was maintained by Mr. T. Nakanisi, a member of the winter party of JARE-40, 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 in Table 5.

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The authors also express their thanks to Captain S. Shigehara, the officers and crew of the icebreaker "Shirase".

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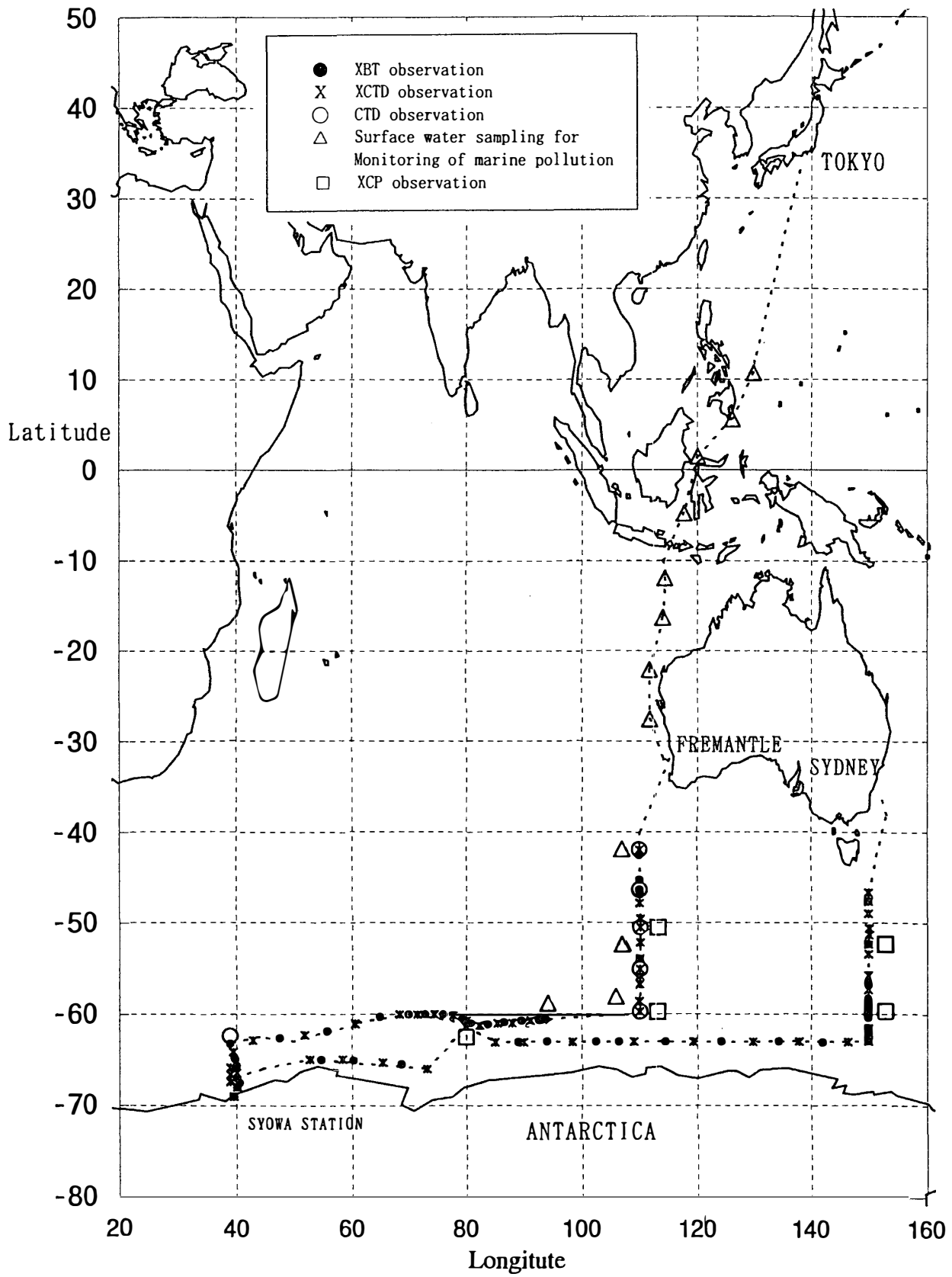


Fig. 1. The track of the icebreaker "Shirase" and the site of oceanographic station.

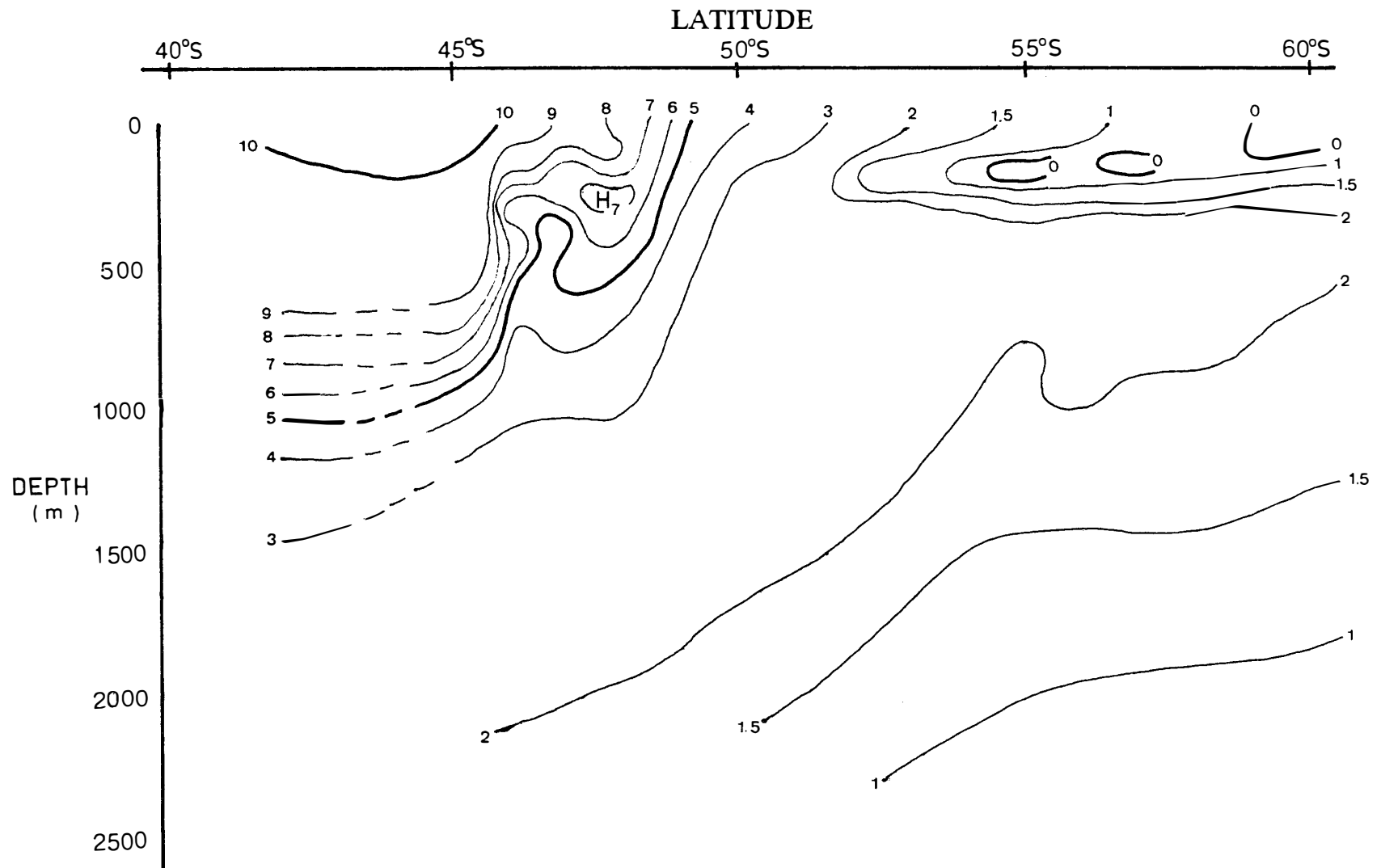


Fig. 2. Vertical profile of water temperature ($^{\circ}\text{C}$) observed with XBT and XCTD along 110°E .

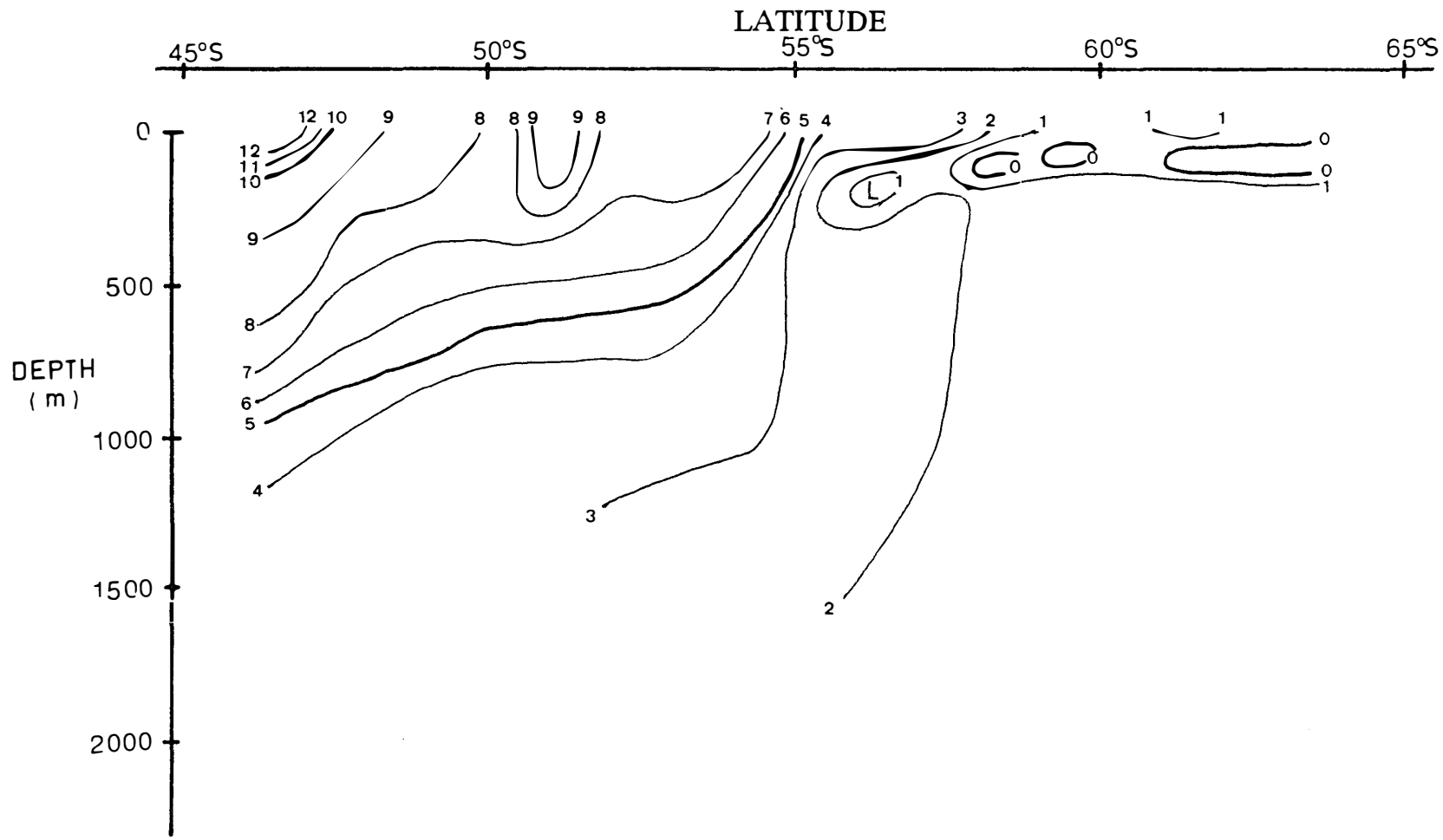


Fig. 3. Vertical profile of water temperature (°C) observed with XBT and XCTD along 150°E.

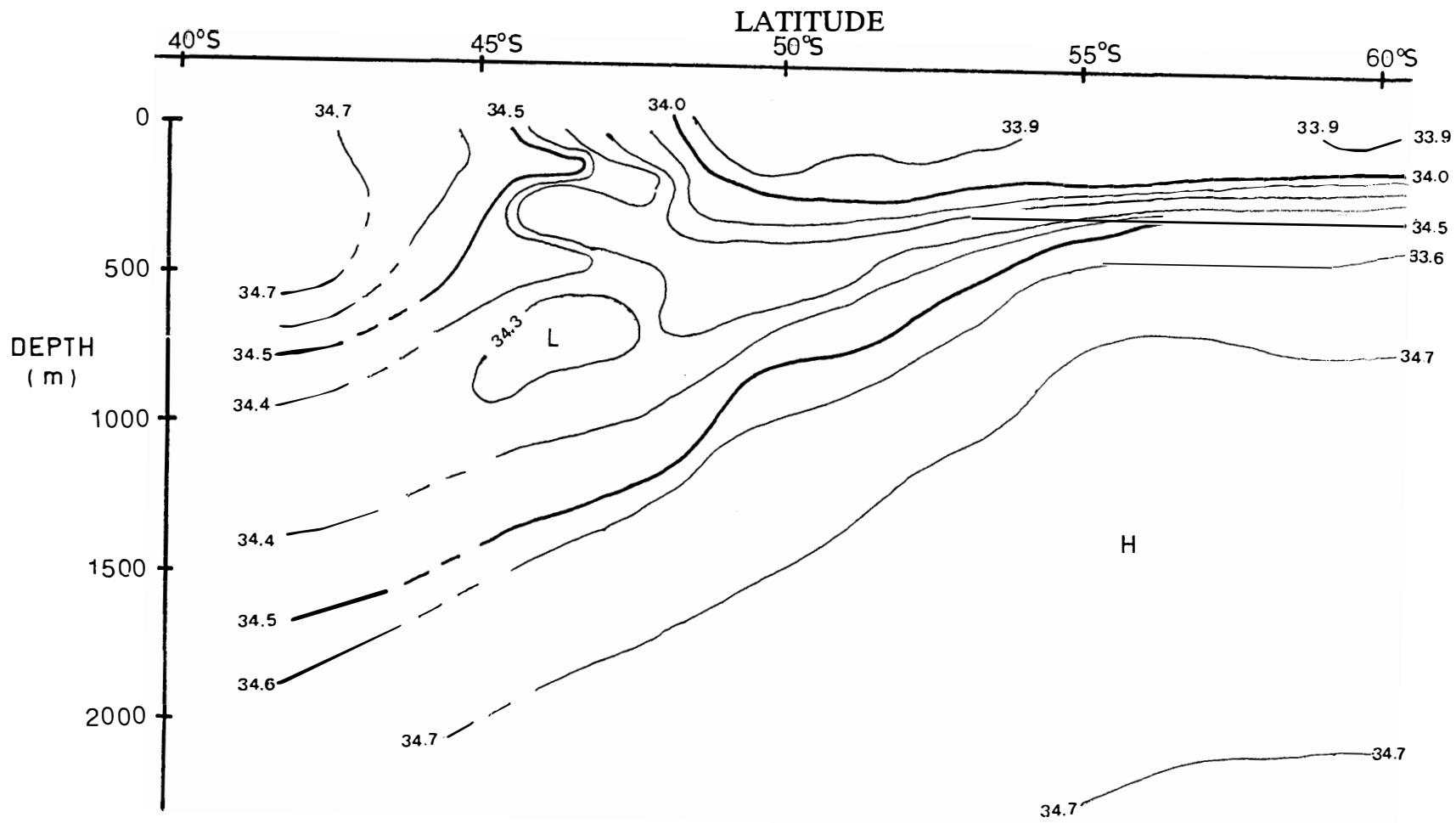


Fig. 4. Vertical profile of salinity (PSU) observed with XCTD along 110°E.

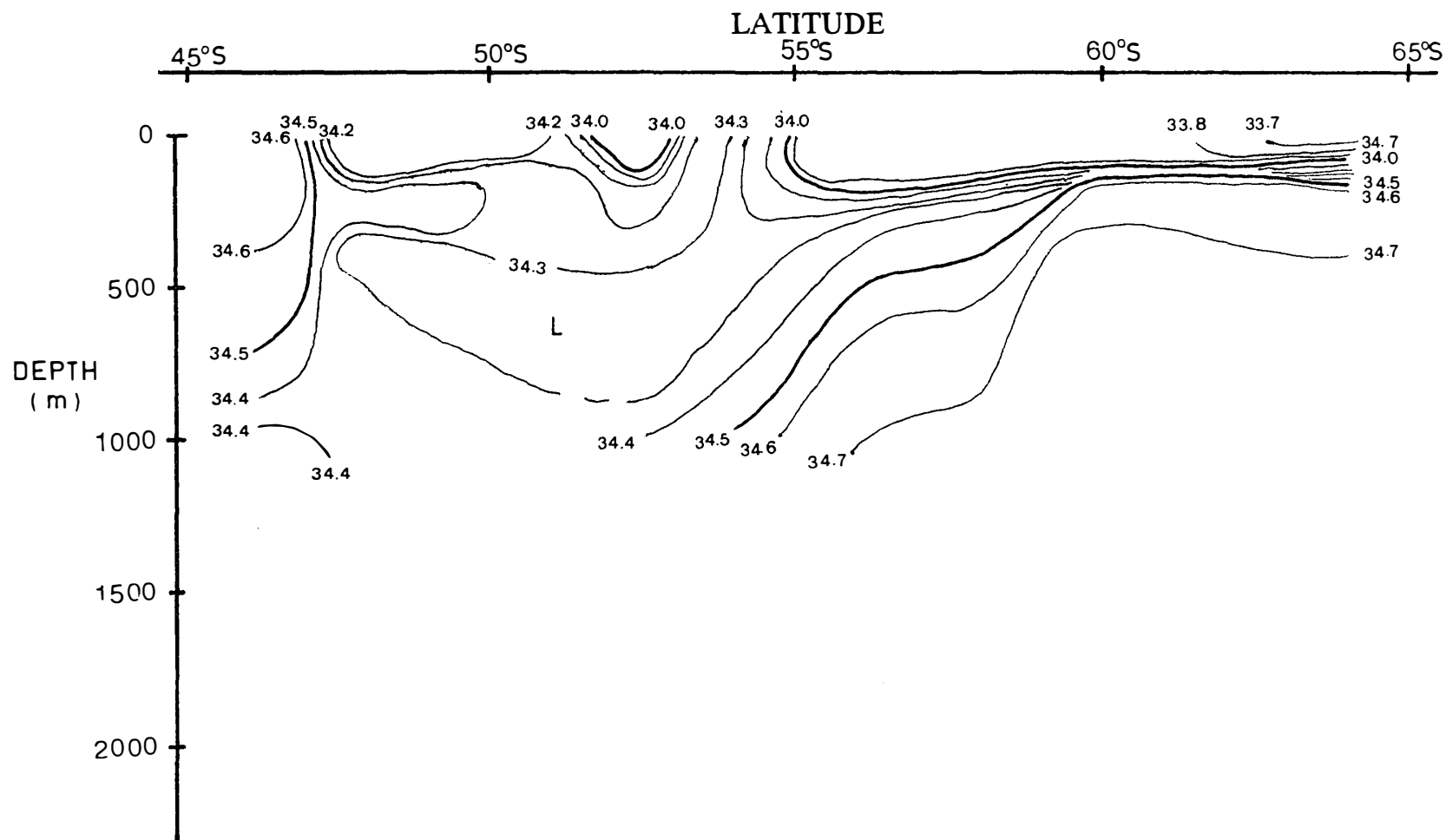


Fig. 5. Vertical profile of salinity (PSU) observed with XCTD along 150°E.

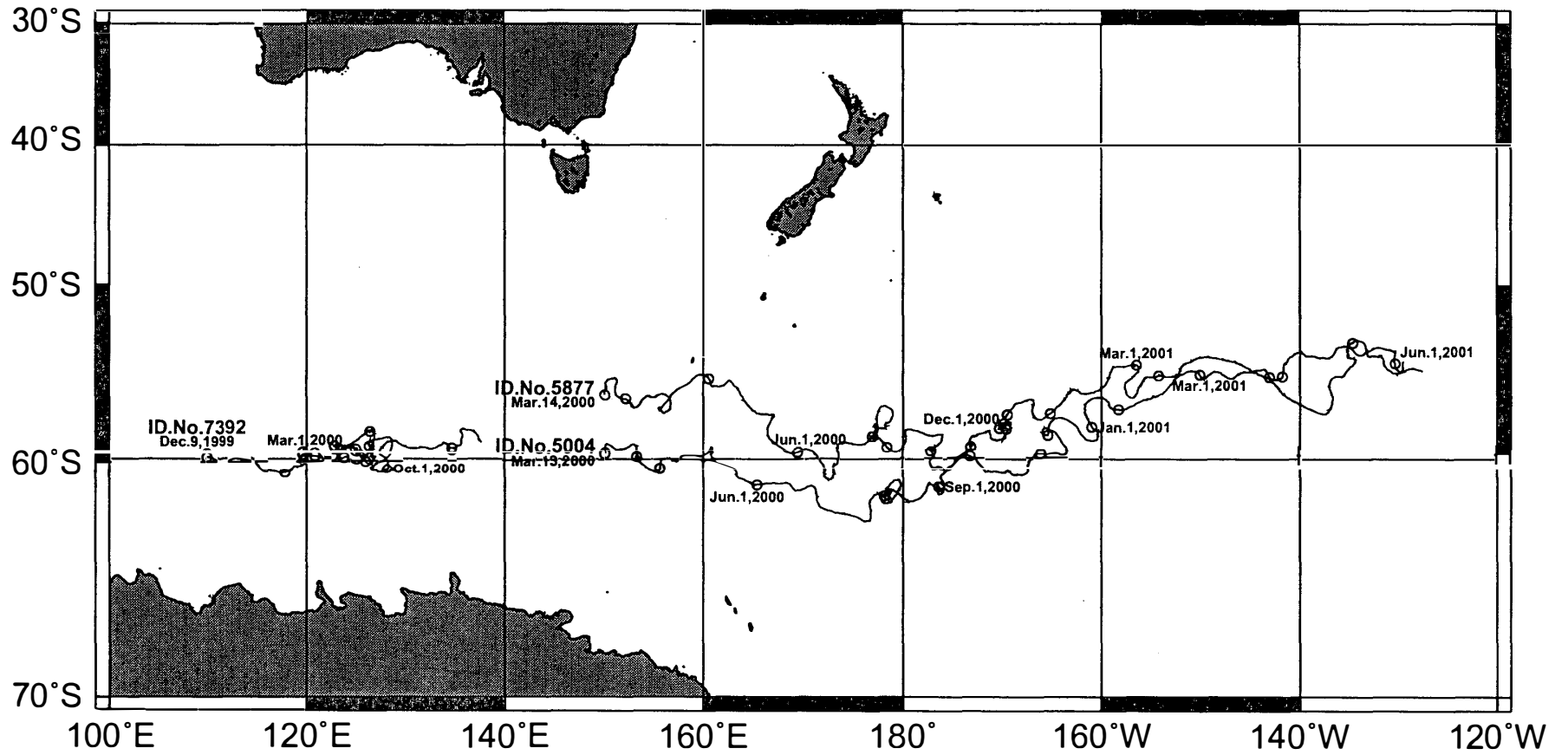


Fig. 6. Trajectory of surface drifting buoy.

41XCP001
 1999. 12. 7
 0515 (UT)
 LAT. 50-27.0S
 LONG. 109-57.7E

41XCP002
 1999. 12. 9
 0736 (UT)
 LAT. 59-42.7S
 LONG. 109-56.9E

41XCP003
 2000. 3. 13
 0313 (UT)
 LAT. 59-39.6S
 LONG. 149-59.1E

41XCP004
 2000. 3. 15
 0254 (UT)
 LAT. 52-18.0S
 LONG. 149-59.0E

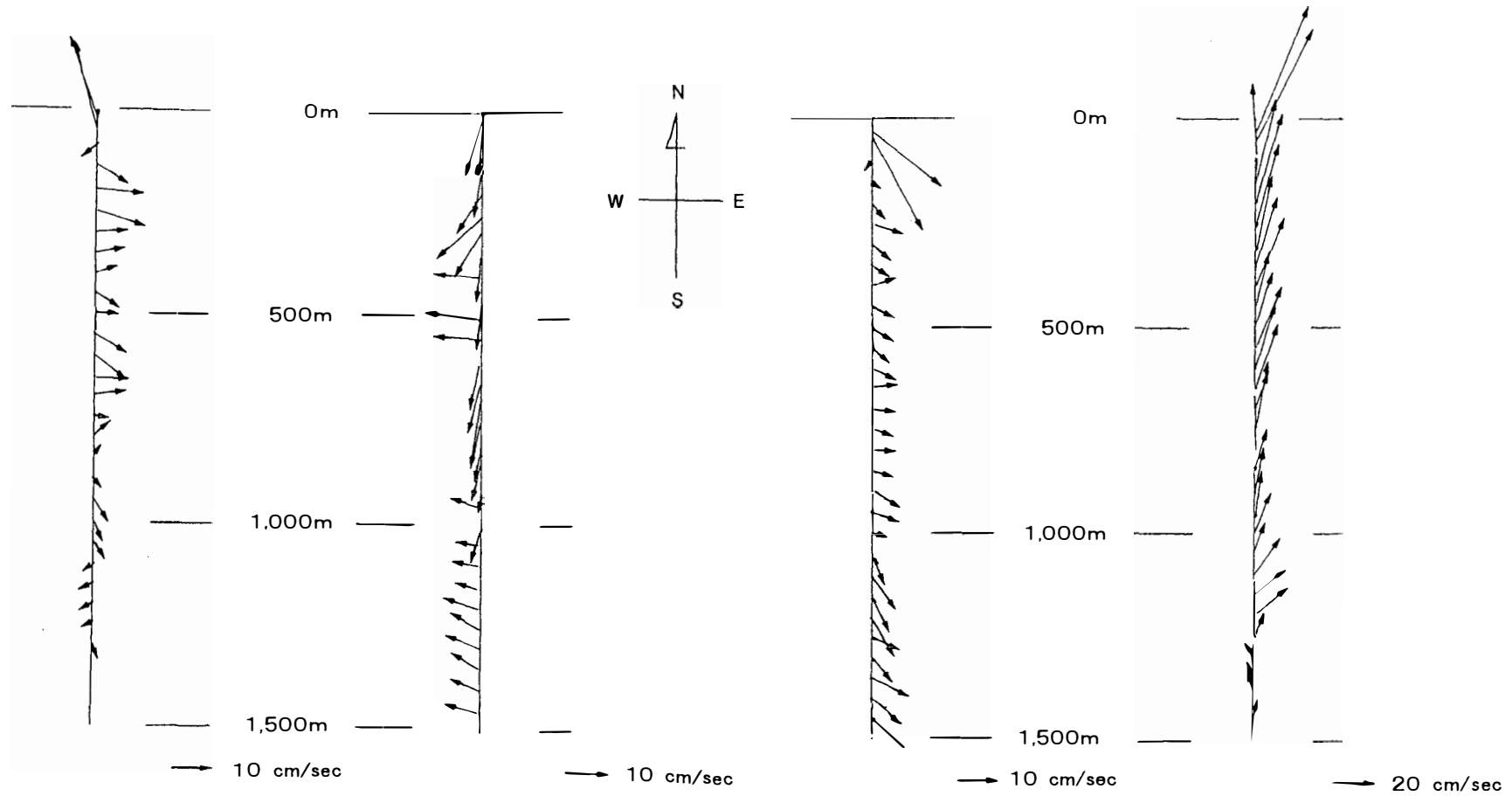


Fig. 7. Vertical profiles of current relative to the deepest layer measure with XCP.

Table 1. Data of surface water observation on board the icebreaker "Shirase" in 1999-2000.

ST.No.	Date Y/M/D	Time (UT)	Position		Temp.(°C)		Salinity	DO (μ mol/l)	pH	PO4-P (μ mol/l)	SiO3-Si (μ mol/l)	NO2-N (μ mol/l)	NO3-N (μ mol/l)	NH4-N (μ mol/l)
			Lat.	Long.	Air	Water								
1	1999/11/16	22:50	20-32.3N	132-51.5E	27.2	27.1	34.503	210	8.20	--	--	--	--	--
2	1999/11/17	6:50	18-39.3N	132-01.9E	28.2	28.8	34.463	200	8.15	--	--	--	--	0.2
3	1999/11/17	22:58	14-59.1N	130-25.5E	27.2	28.9	34.105	210	8.08	0	1	0	0	0.5
4	1999/11/18	7:00	13-05.2N	129-35.5E	27.8	29.8	34.242	202	8.05	0.1	2	0	0	0.1
5	1999/11/23	6:55	13-37.3S	114-48.3E	29.8	30.2	34.273	204	7.89	0	2	0	0	0.1
6	1999/11/23	22:56	17-17.4S	114-08.4E	26.6	27.7	34.722	211	7.90	0.1	2	0	0	0.2
7	1999/11/24	23:10	22-57.7S	113-04.5E	24.8	25.7	34.864	213	8.20	0.1	3	0	0	0.6
8	1999/11/25	22:55	27-42.1S	113-14.1E	22.7	23.0	33.572	224	8.21	0.1	2	0	0	0.5
9	1999/12/4	0:00	35-48.7S	112-53.1E	17.8	17.5	33.777	251	8.16	0.1	2	0	0	--
10	1999/12/5	7:00	42-03.1S	109-59.9E	13.2	12.1	34.721	--	8.14	0.5	2	0.2	10	0.3
St.1	1999/12/6	6:02	46-20.6S	110-00.4E	11.7	9.6	34.356	297	8.06	1.1	2	0.3	15	0.5
St.2	1999/12/7	6:02	50-31.1S	109-58.0E	5.2	4.3	33.901	339	8.05	1.2	3	0.3	24	0.2
St.3	1999/12/8	6:04	55-03.8S	109-58.2E	3.3	1.5	33.957	354	8.03	1.7	28	0.3	29	0.5
St.4	1999/12/9	6:11	59-44.1S	109-52.6E	1.6	0.2	33.097	368	8.13	1.6	33	0.3	32	0.5
11	1999/12/16	9:00	62-15.2S	51-50.5E	0.6	-1.0	33.764	373	8.09	1.7	44	0.3	28	--
St.5	1999/12/17	6:05	62-20.7S	38-58.8E	0.6	-1.3	33.865	368	8.09	1.4	53	0.2	29	0.5

Table 2. XBT observation data. "S.L" indicates surface layer depth in meters.

NUMBER	DATE TIME UT	POSITION		TEMPERATURE (°C)																S. L. (M)	AIR TEMP. (°C)		
		LAT.	LONG.	DEPTH (M)																			
				0	10	20	30	50	75	100	125	150	200	250	300	350	400	450					
				500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400					
				1500	1600	1700	1800																
SP99001	99-12-05 03.9	42-37S	110-00E	11.6	11.6	11.6	11.6	11.3	10.2	10.1	10.0	10.0	9.9	9.9	9.9	9.9	9.8	9.7	66	11.2			
				9.5	9.3	9.1	8.8	8.4	7.9	-	-	-	-	-	-	-	-	-	-				
SP99002	99-12-05 15.8	45-17S	110-00E	10.5	10.5	10.5	10.5	10.5	10.5	10.1	9.9	9.9	9.9	9.9	9.8	9.8	9.8	9.7	80	11.6			
				9.3	9.3	8.9	8.4	8.1	7.4	-	-	-	-	-	-	-	-	-	-				
SP99003	99-12-05 21.3	46-20S	110-02E	9.0	9.0	9.0	9.0	8.9	8.9	8.5	8.2	7.7	6.8	6.8	5.1	5.5	6.7	6.2	90	10.8			
				5.6	5.0	4.3	4.1	3.9	3.4	-	-	-	-	-	-	-	-	-	-				
SP99004	99-12-06 03.8	46-54S	110-05E	8.4	8.4	8.4	8.4	8.4	8.4	6.8	7.3	6.7	6.2	6.7	6.4	5.3	4.9	5.3	82	8.8			
				5.1	4.8	4.6	4.5	4.2	4.0	-	-	-	-	-	-	-	-	-	-				
SP99005	99-12-10 15.7	60-32S	93-49E	-0.3	-0.3	-0.3	-0.3	-0.3	-0.4	-0.5	-0.9	-0.2	1.6	1.9	2.1	2.2	2.3	2.2	112	-0.1			
				2.3	2.0	2.0	2.0	2.0	1.9	1.9	1.8	1.8	1.8	1.7	1.6	-	-	-	-				
SP99006	99-12-10 19.7	60-36S	92-34E	-0.7	-0.8	-0.7	-0.8	-0.8	-0.9	-0.9	-0.2	1.9	1.7	1.6	1.7	1.8	1.8	1.8	73	0.1			
				1.8	1.9	1.8	1.7	1.7	1.7	1.7	1.6	1.5	1.5	1.5	-	-	-	-	-				
SP99007	99-12-11 03.8	60-43S	89-38E	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.1	-0.4	1.5	1.7	1.9	1.9	1.8	1.7	1.7	87	0.5			
				1.7	1.9	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	-	-				
SP99008	99-12-11 13.3	60-53S	86-36E	-1.0	-1.1	-1.0	-0.9	-0.9	-1.5	-1.1	-0.5	-0.1	0.6	1.1	1.3	1.3	1.4	1.4	79	-0.8			
				1.3	1.3	1.4	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.0	-	-	-	-				
SP99009	99-12-11 20.7	61-06S	83-49E	-1.0	-1.1	-1.1	-1.1	-1.1	1.0	1.0	2.1	1.9	2.3	2.2	2.1	2.3	2.1	2.1	68	-0.1			
				2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.6	1.5	1.5	1.4	1.2	-	-				
SP99010	99-12-12 04.7	61-01S	80-53E	-0.9	-1.0	-1.0	-1.0	-1.3	0.3	1.4	1.6	1.8	1.9	2.0	2.0	2.0	2.0	2.0	54	-0.8			
				1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.4	1.3	1.2	-				
				1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
SP99011	99-12-12 14.3	61-04S	80-00E	-1.4	-1.4	-1.5	-1.4	-1.4	-1.6	-1.1	0.1	0.7	1.8	1.9	1.9	2.0	2.0	2.0	73	-1.0			
				2.0	2.0	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	-	-	-	-	-				
SP99012	99-12-13 05.7	60-28S	79-19E	-0.9	-0.9	-1.0	-1.0	-1.2	-1.1	0.0	1.0	1.4	1.8	2.0	2.0	2.0	2.0	2.0	67	0.0			
				2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.6	1.5	-	-				

SP99013	99-12-13	14.0	60-01S	75-52E	-1.2	-1.3	-1.3	-1.3	-1.3	-1.2	-0.7	0.2	0.8	1.5	1.8	1.9	1.9	1.9	1.9	72	-0.1
					1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.3		
					1.2	-	-	-													
SP99014	99-12-13	21.8	60-02S	72-44E	-1.2	-1.2	-1.3	-1.3	-1.3	-1.5	-1.0	0.1	1.2	2.5	2.5	2.4	2.7	2.6	2.5	97	0.2
					2.3	2.8	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.9	-	-		
SP99015	99-12-14	05.8	60-02S	69-46E	-1.1	-1.2	-1.2	-1.2	-1.2	-1.3	-1.2	-0.4	1.0	1.9	2.1	2.2	2.2	2.2	2.1	85	0.3
					2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.8	1.7	-		
SP99016	99-12-14	17.9	60-16S	64-47E	-1.1	-1.1	-1.1	-1.1	-1.2	-1.6	-1.6	-0.4	0.8	1.7	1.9	1.9	2.0	2.0	2.0	68	0.4
					2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5	-		
SP99017	99-12-15	11.0	61-46S	55-40E	-1.4	-1.5	-1.5	-1.4	-1.5	-1.7	-0.6	0.4	1.3	1.6	1.8	1.8	1.8	1.8	1.7	63	-0.3
					1.7	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.3	1.2	-	-		
SP99018	99-12-16	03.0	62-38S	47-32E	-1.3	-1.3	-1.3	-1.4	-1.4	-1.7	-1.2	0.2	1.3	1.6	1.7	1.7	1.7	1.7	1.7	61	-0.8
					1.6	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.2	1.1	-	-	-	-		
SP99019	99-12-17	03.9	63-12S	39-00E	-1.6	-1.7	-1.7	-1.7	-1.8	-1.5	0.1	1.2	1.5	1.4	1.5	1.5	1.4	1.4	1.3	68	-0.3
					1.3	1.2	1.1	1.1	1.0	0.9	-	-	-	-	-	-	-	-	-		
SP99020	99-12-17	11.7	64-54S	39-49E	-1.4	-1.4	-1.7	-1.7	-1.8	-0.3	1.1	1.3	1.5	1.5	1.5	1.5	1.4	1.4	1.4	65	-2.0
					1.3	1.2	1.2	1.1	1.1	1.0	-	-	-	-	-	-	-	-	-		
SP99021	99-12-17	15.8	65-39S	40-06E	-1.8	-1.8	-1.8	-1.8	-1.8	-1.3	1.1	1.2	1.5	1.5	1.5	1.5	1.5	1.4	1.4	72	-3.0
					1.3	1.2	1.2	1.1	1.1	1.0	-	-	-	-	-	-	-	-	-		
SP99022	99-12-18	00.0	67-02S	40-11E	-1.7	-1.7	-1.8	-1.8	-1.8	-1.6	-0.1	1.1	1.4	1.4	1.4	1.4	1.4	1.4	1.3	72	-1.5
					1.2	1.2	1.1	1.1	1.0	0.9	-	-	-	-	-	-	-	-	-		
SP99023	00-02-24	01.0	65-02S	54-42E	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.8	-0.1	0.2	-0.4	0.0	0.1	0.5	0.6	0.7	98	-3.3
					0.6	0.7	0.7	0.7	0.7	0.6	-	-	-	-	-	-	-	-	-		
SP99024	00-02-24	10.8	65-03S	60-17E	-0.5	-0.6	-0.6	-0.6	-0.5	-0.2	0.9	1.3	1.6	1.7	1.7	1.7	1.7	1.7	1.7	72	-2.2
					1.6	1.6	1.6	1.5	1.5	1.4	-	-	-	-	-	-	-	-	-		
SP99025	00-02-24	23.8	65-32S	68-39E	-0.4	-0.5	-0.5	-0.5	-1.7	-1.8	-1.8	-0.9	-0.4	0.1	0.4	0.5	0.6	0.6	0.6	32	-3.3
					0.6	0.6	0.7	0.6	0.6	0.5	-	-	-	-	-	-	-	-	-		
SP99026	00-03-03	04.9	62-59S	89-12E	-0.1	-0.1	-0.1	-0.1	-1.4	-1.3	-1.2	-0.9	-0.5	0.4	1.0	1.1	1.2	1.3	1.3	34	1.9
					1.4	1.4	1.3	1.2	1.2	1.2	-	-	-	-	-	-	-	-	-		
SP99027	00-03-04	04.9	63-01S	94-11E	0.1	0.1	0.0	0.1	0.0	-1.3	-1.7	-1.6	-1.6	-0.7	0.3	1.2	1.3	1.3	1.3	52	0.8
					1.2	1.2	1.2	1.2	1.1	1.0	-	-	-	-	-	-	-	-	-		

SP99028	00-03-05	04.9	63-00S	102-30E	0.2 1.8	0.2 1.8	0.2 1.7	0.2 1.9	0.4 1.9	-0.6 1.9	-0.5 -	-0.2 -	1.1 -	2.0 -	1.9 -	1.8 -	1.8 -	1.8 -	1.8 -	52	0.1
SP99029	00-03-06	40.9	63-00S	106-31E	-0.0 1.4	-0.0 1.4	-0.0 1.4	-0.0 1.4	-0.0 1.4	-0.7 1.3	0.4 -	0.4 -	1.2 -	1.2 -	1.4 -	1.3 -	1.5 -	1.5 -	1.5 -	62	-0.5
SP99030	00-03-07	03.8	63-00S	114-25E	0.3 1.5	0.3 1.5	0.3 1.5	0.3 1.4	-0.1 1.4	-0.1 1.4	0.4 -	0.8 -	1.0 -	1.3 -	1.6 -	1.6 -	1.6 -	1.6 -	1.6 -	48	2.6
SP99031	00-03-08	02.8	62-59S	124-13E	0.6 1.8	0.5 1.7	0.5 1.7	0.5 1.7	-0.6 1.6	0.7 1.6	1.4 -	1.5 -	1.8 -	1.9 -	1.9 -	1.9 -	1.8 -	1.8 -	1.8 -	33	0.7
SP99032	00-03-09	02.8	63-00S	134-21E	0.9 1.9	0.9 1.9	0.8 1.9	0.9 1.9	0.9 1.8	0.9 1.8	-0.3 -	0.6 -	1.6 -	1.8 -	1.9 -	1.9 -	1.9 -	1.9 -	1.9 -	78	-2.1
SP99033	00-03-10	01.8	63-01S	142-07E	0.6 1.8	0.6 1.8	0.6 1.8	0.6 1.8	0.5 1.7	-0.5 1.7	0.2 -	1.1 -	1.6 -	1.8 -	1.9 -	1.9 -	1.9 -	1.9 -	1.9 -	70	-0.5
SP99034	00-03-11	17.6	63-00S	150-00E	0.3 1.8 1.2	0.3 1.8 -	0.4 1.8 -	0.6 1.8 -	0.4 1.8 -	-1.0 1.8 -	-0.3 1.7 -	1.1 1.7 -	1.6 1.6 -	1.9 1.6 -	1.9 1.6 -	1.9 1.5 -	1.9 1.4 -	1.9 1.3 -	1.9 1.3 -	58	2.0
SP99035	00-03-12	18.1	59-39S	149-58E	0.4 1.9	0.4 1.8	0.4 1.8	0.4 1.8	0.4 1.7	0.3 1.7	1.1 -	1.6 -	1.8 -	1.9 -	1.9 -	2.0 -	1.9 -	2.0 -	1.9 -	73	2.1
SP99036	00-03-13	00.9	58-53S	149-59E	0.6 1.9	0.6 1.9	0.6 1.8	0.6 1.8	0.6 1.8	0.2 -	0.7 -	1.3 -	1.3 -	1.7 -	1.9 -	2.0 -	1.9 -	1.9 -	1.9 -	61	3.2
SP99037	00-03-13	05.0	58-17S	150-00E	1.8 1.8	1.8 1.8	1.8 1.8	1.8 1.7	1.8 1.7	1.4 1.7	-0.2 -	1.2 -	1.7 -	1.8 -	1.9 -	1.9 -	1.9 -	1.8 -	1.9 -	70	4.2
SP99038	00-03-13	18.1	56-35S	150-00E	3.3 2.3 1.9	3.3 2.3 1.8	3.2 2.3 1.7	3.2 2.3 1.6	3.1 2.4	3.1 2.3	3.0 2.3	2.5 2.3	1.1 2.2	1.3 2.2	1.9 2.2	2.1 2.1	2.2 2.1	2.2 2.0	2.3 2.0	105	5.0
SP99039	00-03-14	18.4	52-18S	150-00E	6.9 5.7 3.0	6.9 5.4 2.7	6.9 4.9 2.8	6.8 4.9 2.6	6.8 4.6	6.8 4.0	6.7 3.9	6.7 4.0	7.8 3.5	6.9 3.3	6.6 3.7	6.1 3.3	6.4 3.0	6.1 2.6	5.8 2.6	134	10.5
SP99040	00-03-15	18.1	47-39S	150-01E	9.4 7.3	9.4 7.1	9.4 6.9	9.4 6.4	9.3 5.9	9.2 5.5	9.1 5.3	8.7 4.8	8.1 4.5	8.1 4.3	7.9 -	7.8 -	7.7 -	7.6 -	7.4 -	126	12.3

Table 3. XCTD observation data.

station	JA41001	JA41002	JA41003	JA41004	JA41005	JA41006	JA41007	JA41008								
date	1999/12/5	1999/12/6	1999/12/7	1999/12/7	1999/12/7	1999/12/8	1999/12/8	1999/12/8								
time(UT)	7:00	17:00	0:48	6:00	17:00	1:00	6:12	12:48								
latitude	42-04S	47-49S	49-33S	50-31S	52-11S	53-58S	55-04S	55-51S								
longitude	110-00E	110-01E	109-59E	109-58E	109-59E	109-59E	110-00E	110-00E								
depth	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity						
0	11.4	34.65	8.4	34.09	4.9	33.85	4.0	33.87	3.0	33.85	1.5	33.86	1.5	33.93	1.5	33.91
10	11.8	34.67	7.9	34.12	4.7	33.86	3.9	33.88	2.8	33.86	1.7	33.88	1.2	33.94	1.3	33.93
20	11.7	34.69	7.9	34.13	4.7	33.87	3.9	33.89	2.8	33.86	1.7	33.90	1.2	33.95	1.3	33.94
30	11.7	34.69	7.9	34.14	4.7	33.87	3.9	33.90	2.8	33.87	1.7	33.91	1.2	33.95	1.3	33.96
50	10.3	34.72	7.9	34.15	4.7	33.88	3.9	33.91	2.8	33.88	1.7	33.92	1.2	33.96	1.3	33.96
75	10.0	34.71	8.0	34.17	4.6	33.88	3.9	33.91	2.8	33.87	1.7	33.92	1.1	33.96	1.3	33.96
100	9.9	34.70	8.2	34.36	3.8	33.88	3.6	33.91	2.4	33.89	1.2	33.92	0.4	34.00	1.1	33.97
125	9.9	34.70	8.2	34.43	3.6	33.91	2.6	33.95	1.5	33.91	0.5	33.96	0.1	34.02	0.8	34.07
150	9.8	34.70	7.9	34.39	3.3	33.89	2.6	33.96	1.4	33.94	0.4	33.97	-0.1	34.05	1.0	34.13
200	9.8	34.71	6.9	34.24	3.0	33.94	2.5	33.99	1.7	34.05	1.4	34.15	1.0	34.27	1.8	34.31
250	9.7	34.69	7.1	34.31	3.3	34.06	2.5	34.04	2.1	34.18	1.9	34.30	1.8	34.47	2.1	34.42
300	9.7	34.70	6.4	34.23	3.4	34.16	3.0	34.15	2.2	34.27	2.0	34.37	1.9	34.55	2.2	34.48
400	9.8	34.72	6.2	34.29	3.1	34.22	2.8	34.23	2.2	34.37	2.1	34.49	2.0	34.63	2.2	34.57
500	9.7	34.72	5.6	34.33	2.7	34.28	2.6	34.33	2.3	34.47	2.1	34.56	2.1	34.68	2.2	34.63
600	-	-	4.8	34.32	2.6	34.38	2.6	34.42	2.3	34.51	2.2	34.61	2.0	34.70	2.2	34.68
700	-	-	4.1	34.30	2.6	34.46	2.4	34.48	2.2	34.58	2.2	34.65	2.0	34.72	2.1	34.70
800	-	-	3.7	34.34	2.5	34.51	2.5	34.56	2.2	34.61	2.1	34.67	1.9	34.74	2.0	34.73
900	-	-	3.4	34.38	2.4	34.57	-	-	2.2	34.64	2.1	34.69	1.9	34.75	2.0	34.75
1000	-	-	3.1	34.41	2.4	34.61	-	-	2.2	34.66	2.0	34.71	1.8	34.77	2.0	34.76

station	JA41009	JA41010	JA41011	JA41012	JA41013	JA41014	JA41015	JA41016								
date	1999/12/8	1999/12/9	1999/12/9	1999/12/11	1999/12/11	1999/12/11	1999/12/12	1999/12/12								
time	16:48	0:48	6:06	2:48	8:42	17:48	1:42	9:36								
latitude	56-44S	58-35S	59-44S	60-35S	60-41S	60-56S	60-58S	61-13S								
longitude	109-56E	109-51E	109-53E	93-14E	91-08E	88-03E	85-22E	82-21E								
depth	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity						
0	1.1	33.94	1.1	33.90	0.2	33.85	-0.5	33.85	0.0	33.86	1.0	33.87	-1.0	33.84	0.0	33.85
10	0.6	33.95	0.7	33.92	-0.2	33.86	-0.6	33.86	-0.4	33.87	-0.7	33.88	-1.3	33.85	-0.6	33.86
20	0.6	33.97	0.7	33.94	-0.2	33.87	-0.6	33.87	-0.4	33.88	-0.7	33.89	-1.3	33.87	-0.6	33.87
30	0.6	33.97	0.7	33.95	-0.1	33.88	-0.6	33.87	-0.4	33.88	-0.7	33.90	-1.3	33.87	-0.6	33.87
50	0.6	33.98	0.7	33.95	0.1	33.94	-0.6	33.88	-0.4	33.89	-0.5	33.99	-1.4	33.87	-0.5	33.93
75	0.6	33.98	0.7	33.95	-0.2	33.99	-1.0	33.98	-0.4	33.88	-0.6	34.06	-1.5	34.23	0.3	34.27
100	0.5	33.99	0.7	33.95	-0.2	34.01	-0.5	34.11	-0.9	34.01	-0.3	34.17	-1.2	34.30	1.0	34.43
125	-0.1	34.04	0.3	33.99	0.6	34.21	0.2	34.23	-0.7	34.10	0.6	34.33	-1.0	34.35	1.5	34.50
150	0.1	34.15	0.7	34.12	1.3	34.35	1.0	34.35	0.4	34.28	1.5	34.47	-0.5	34.43	1.6	34.53
200	1.6	34.41	1.9	34.37	1.8	34.50	1.6	34.47	1.4	34.46	1.6	34.55	0.5	34.55	1.8	34.59
250	1.9	34.51	2.0	34.46	1.9	34.57	1.8	34.55	1.5	34.53	1.9	34.62	0.6	34.57	1.9	34.63
300	2.0	34.56	2.1	34.52	1.9	34.61	1.9	34.60	1.8	34.60	1.9	34.65	1.0	34.64	2.0	34.65
400	2.0	34.64	2.1	34.60	2.0	34.67	1.9	34.65	1.8	34.65	1.9	34.70	1.3	34.69	2.0	34.69
500	2.1	34.69	2.1	34.65	2.0	34.71	1.8	34.69	1.8	34.69	1.7	34.72	1.3	34.71	1.9	34.72
600	2.0	34.70	2.1	34.68	2.0	34.65	1.8	34.70	1.8	34.71	1.7	34.73	1.3	34.72	1.9	34.73
700	2.0	34.72	2.1	34.71	2.0	34.66	1.8	34.73	1.7	34.72	1.7	34.75	1.3	34.73	1.8	34.74
800	2.0	34.73	2.0	34.73	1.9	34.67	1.7	34.73	1.7	34.74	1.6	34.76	1.2	34.72	1.7	34.75
900	1.9	34.75	1.9	34.74	1.9	34.71	1.6	34.74	1.6	34.74	1.5	34.75	1.1	34.73	1.7	34.74
1000	1.8	34.76	1.9	34.75	1.8	34.73	-	-	-	-	1.4	34.75	1.0	34.72	1.5	34.75

station	JA41017	JA41018	JA41019	JA41020	JA41021	JA41022	JA41023	JA41024
date	1999/12/12	1999/12/13	1999/12/13	1999/12/14	1999/12/14	1999/12/14	1999/12/15	1999/12/16
time(UT)	18:42	9:30	18:48	2:54	10:48	18:48	10:42	3:42
latitude	60-41S	61-21S	60-04S	60-01S	60-02S	60-02S	61-01S	62-15S
longitude	80-00E	80-02E	77-41E	74-20E	71-16E	68-14E	60-29E	51-51E
depth	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity
0	-0.8 33.63	-0.7 33.65	-0.5 33.52	-0.9 33.61	-0.3 33.64	-0.5 33.63	-0.8 33.46	-1.0 33.78
10	-1.3 33.64	-1.4 33.66	-1.2 33.56	-1.2 33.61	-1.0 33.65	-0.8 33.64	-1.3 33.47	-1.4 33.78
20	-1.3 33.66	-1.4 33.67	-1.2 33.58	-1.2 33.62	-1.0 33.66	-0.8 33.64	-1.3 33.48	-1.4 33.79
30	-1.3 33.67	-1.4 33.67	-1.2 33.60	-1.2 33.62	-1.0 33.67	-0.8 33.65	-1.3 33.49	-1.4 33.79
50	-1.6 33.88	-1.6 33.74	-1.3 33.66	-1.2 33.62	-1.0 33.67	-0.8 33.65	-1.5 33.52	-1.4 33.79
75	-1.0 34.11	-1.4 34.02	-1.1 34.07	-1.3 34.00	-1.5 33.75	-1.2 33.71	-1.5 33.89	-1.7 33.94
100	0.1 34.26	-0.1 34.22	0.0 34.28	-0.4 34.19	-1.7 33.88	-0.8 33.89	-1.3 33.99	-1.8 33.99
125	0.9 34.38	0.9 34.34	1.1 34.43	0.5 34.34	-1.0 33.98	-0.4 33.94	0.7 34.29	-0.5 34.18
150	1.5 34.48	1.4 34.42	1.5 34.49	1.4 34.46	0.6 34.19	0.2 34.05	1.5 34.44	1.1 34.43
200	1.8 34.56	1.8 34.50	1.8 34.57	1.9 34.57	1.8 34.40	1.7 34.35	1.8 34.53	1.6 34.55
250	1.9 34.60	1.9 34.58	1.9 34.60	2.0 34.61	2.0 34.47	2.0 34.44	1.9 34.58	1.7 34.61
300	2.0 34.65	2.0 34.61	2.0 34.64	2.0 34.63	2.0 34.53	2.0 34.49	1.9 34.61	1.8 34.66
400	2.0 34.68	2.0 34.67	2.0 34.69	2.0 34.68	2.1 34.61	2.2 34.57	2.0 34.67	1.8 34.70
500	2.0 34.71	2.0 34.71	2.0 34.72	2.0 34.72	2.1 34.66	2.1 34.63	2.0 34.70	1.7 34.72
600	1.9 34.73	1.9 34.73	2.0 34.74	2.0 34.73	2.1 34.69	2.1 34.66	1.9 34.69	1.7 34.73
700	1.9 34.75	1.9 34.74	1.9 34.75	1.9 34.75	2.1 34.72	2.1 34.69	1.8 34.70	1.6 34.75
800	1.8 34.76	1.8 34.75	1.8 34.76	1.9 34.76	2.0 34.74	2.0 34.72	1.8 34.74	1.5 34.76
900	1.7 34.76	1.7 34.76	1.8 34.77	1.8 34.76	1.9 34.75	2.0 34.73	1.7 34.75	1.4 34.75
1000	1.7 34.76	1.7 34.76	1.7 34.77	1.7 34.76	1.9 34.75	1.9 34.74	1.6 34.74	1.3 34.74

station	JA41025	JA41026	JA41027	JA41028	JA41029	JA41030	JA41031	JA41032
date	1999/12/16	1999/12/17	1999/12/18	2000/2/17	2000/2/17	2000/2/18	2000/2/18	2000/2/24
time	20:48	16:54	4:48	14:12	18:42	9:18	12:48	4:54
latitude	62-52S	64-08S	66-23S	67-16S	66-36S	66-36S	65-51S	64-59S
longitude	42-55E	39-27E	40-08E	39-04E	38-56E	38-58E	38-58E	52-43E
depth	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity	temp. salinity
0	-0.6 33.84	-1.6 33.87	-1.0 34.10	0.2 33.90	0.2 33.58	0.2 33.75	0.9 33.82	0.0 34.09
10	-1.4 33.85	-1.6 33.96	-1.7 34.16	0.0 33.93	-0.5 33.60	-0.5 33.74	0.5 33.85	-0.4 34.11
20	-1.4 33.88	-1.6 33.96	-1.8 34.19	0.0 33.95	-0.5 33.62	-0.5 33.75	0.5 33.86	-0.4 34.11
30	-1.4 33.89	-1.6 33.98	-1.8 34.22	0.0 33.97	-0.7 33.79	-1.6 34.13	0.5 33.87	-0.4 34.11
50	-1.5 33.93	-1.8 34.16	-1.8 34.25	-1.8 34.27	-1.8 34.24	-1.8 34.26	-1.6 34.27	-0.4 34.11
75	-1.7 34.16	-1.8 34.20	-1.7 34.36	-1.8 34.33	-1.8 34.30	-1.8 34.29	0.5 34.56	-0.4 34.11
100	-1.3 34.24	-1.8 34.23	-0.6 34.45	-1.8 34.36	-1.8 34.34	-1.9 34.32	1.0 34.63	-0.5 34.12
125	0.9 34.49	0.5 34.51	0.9 34.62	-1.6 34.42	-1.8 34.35	-1.8 34.34	1.2 34.65	-1.6 34.33
150	1.2 34.53	1.1 34.59	1.2 34.65	-1.0 34.51	-1.6 34.39	-1.8 34.38	1.3 34.68	-1.5 34.41
200	1.4 34.63	1.3 34.66	1.5 34.69	0.4 34.67	0.6 34.63	-1.1 34.48	1.4 34.71	-1.2 34.46
250	1.5 34.67	1.5 34.69	1.5 34.70	0.8 34.72	1.5 34.73	1.3 34.70	1.4 34.73	-0.9 34.50
300	1.6 34.70	1.5 34.71	1.5 34.71	1.1 34.76	1.5 34.75	1.5 34.74	1.4 34.73	-0.6 34.54
400	1.5 34.72	1.4 34.73	1.4 34.72	1.3 34.79	1.4 34.76	1.4 34.75	1.4 34.75	-0.1 34.63
500	1.4 34.74	1.3 34.73	1.3 34.73	1.0 34.77	1.3 34.77	1.3 34.77	1.3 34.75	-0.2 34.65
600	1.3 34.75	1.2 34.74	1.2 34.72	1.0 34.77	1.2 34.77	1.2 34.77	1.2 34.75	0.4 34.69
700	1.2 34.76	1.0 34.74	- -	0.9 34.78	1.1 34.76	1.1 34.77	1.0 34.74	0.4 34.71
800	1.0 34.74	0.9 34.74	- -	0.8 34.76	1.0 34.76	1.0 34.77	0.9 34.74	0.3 34.70
900	0.9 34.75	0.8 34.73	- -	0.7 34.76	0.9 34.76	0.9 34.76	0.8 34.74	- -
1000	0.8 34.74	- -	- -	0.6 34.76	0.8 34.75	0.8 34.76	0.7 34.72	- -

station	JA41033		JA41034		JA41035		JA41036		JA41037		JA41038		JA41039		JA41040	
date	2000/2/24		2000/2/25		2000/2/25		2000/3/1		2000/3/3		2000/3/4		2000/3/5		2000/3/7	
time(UT)	16:48		3:48		15:54		4:48		1:48		1:36		1:48		0:48	
latitude	65-02S		65-19S		65-59S		61-20S		63-00S		63-01S		62-59S		63-00S	
longitude	58-25E		65-22E		73-06E		80-00E		85-04E		90-00E		98-25E		108-58E	
depth	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity
0	0.0	33.91	-0.3	33.94	0.2	33.60	1.3	33.61	0.3	33.27	0.4	33.85	0.8	33.96	0.2	33.77
10	-0.4	33.92	-0.7	33.97	-0.5	33.62	1.0	33.61	-0.1	33.28	-0.1	33.86	0.1	33.96	-0.1	33.79
20	-0.4	33.94	-0.8	34.00	-0.5	33.62	1.0	33.61	-0.1	33.30	-0.1	33.87	0.1	33.98	-0.1	33.80
30	-0.5	33.99	-0.7	34.01	-0.9	33.82	1.0	33.61	-0.1	33.31	-0.1	33.88	0.0	33.97	-0.1	33.80
50	-0.4	34.02	-0.8	34.06	-1.7	34.20	-1.2	33.94	-1.4	33.95	-1.0	34.17	0.0	33.99	-0.4	34.02
75	-0.6	34.07	-1.5	34.39	-1.8	34.23	-0.3	34.15	-1.5	34.10	-1.1	34.36	-0.8	34.28	-0.5	34.33
100	-0.3	34.49	-1.4	34.47	-1.7	34.25	0.7	34.32	-1.3	34.19	-0.5	34.45	-0.4	34.42	-0.3	34.45
125	0.4	34.57	-0.5	34.54	-1.5	34.31	1.3	34.42	-1.1	34.26	-0.2	34.50	0.3	34.54	-0.1	34.51
150	0.6	34.60	-0.3	34.57	-1.2	34.36	1.7	34.49	-1.0	34.32	0.5	34.59	0.7	34.60	0.4	34.57
200	1.0	34.66	0.7	34.66	-0.5	34.46	1.9	34.57	-0.4	34.38	1.0	34.66	1.1	34.66	1.0	34.65
250	1.2	34.70	0.8	34.68	-0.4	34.50	2.0	34.60	0.3	34.46	1.3	34.69	1.2	34.69	1.3	34.69
300	1.4	34.73	0.8	34.71	-0.4	34.53	2.0	34.63	0.6	34.51	1.3	34.72	1.2	34.70	1.4	34.71
400	1.3	34.74	0.9	34.72	0.2	34.60	2.0	34.69	0.9	34.58	1.4	34.74	1.2	34.71	1.5	34.74
500	1.3	34.76	0.9	34.72	0.6	34.65	2.0	34.72	1.0	34.61	1.3	34.75	1.2	34.72	1.4	34.74
600	1.3	34.76	0.8	34.73	0.6	34.66	2.0	34.69	1.3	34.59	1.3	34.71	1.1	34.72	1.4	34.70
700	1.2	34.76	0.7	34.73	0.6	34.67	2.0	34.69	1.0	34.50	1.2	34.74	1.0	34.73	1.3	34.65
800	1.1	34.76	0.7	34.73	0.6	34.68	1.9	34.66	1.1	34.56	1.1	34.75	1.0	34.73	1.3	34.62
900	1.0	34.76	0.6	34.72	0.6	34.68	1.9	34.66	1.1	34.60	1.0	34.73	0.8	34.71	1.2	34.65
1000	0.9	34.75	0.5	34.72	0.5	34.68	1.7	34.70	1.0	34.62	0.9	34.74	0.8	34.71	1.1	34.68

station	JA41041		JA41042		JA41043		JA41044		JA41045		JA41046		JA41047		JA41048	
date	2000/3/7		2000/3/8		2000/3/9		2000/3/10		2000/3/12		2000/3/13		2000/3/13		2000/3/14	
time	23:48		23:48		22:48		23:00		4:48		3:18		21:36		2:54	
latitude	63-00S		63-00S		63-00S		63-00S		63-00S		59-39S		57-18S		56-35S	
longitude	119-18E		129-47E		137-55E		146-30E		150-00E		149-59E		150-00E		150-00E	
depth	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity	temp.	salinity
0	0.6	33.71	1.4	33.78	0.5	33.90	0.5	33.74	0.6	33.64	0.8	33.81	3.3	33.82	3.5	33.79
10	0.4	33.73	1.1	33.78	0.3	33.90	0.2	33.74	0.3	33.65	0.4	33.81	3.0	33.82	3.2	33.81
20	0.4	33.74	1.1	33.80	0.3	33.90	0.2	33.75	0.3	33.65	0.4	33.83	3.0	33.83	3.2	33.83
30	0.4	33.76	1.1	33.79	0.3	33.91	0.2	33.75	0.3	33.67	0.4	33.83	3.0	33.83	3.2	33.84
50	-0.2	33.98	1.1	33.80	0.3	33.91	0.3	33.80	0.2	33.67	0.4	33.84	3.0	33.85	3.1	33.85
75	-0.5	34.29	-0.5	34.03	0.3	33.91	0.4	33.84	-1.2	34.13	-0.1	34.01	2.9	33.86	3.0	33.86
100	0.0	34.42	0.4	34.23	0.5	34.27	0.4	34.27	0.1	34.34	1.0	34.50	1.7	33.87	2.9	33.87
125	0.9	34.55	1.4	34.39	1.3	34.41	0.9	34.41	1.3	34.51	1.4	34.58	1.1	33.96	2.5	33.87
150	1.3	34.62	1.7	34.44	1.7	34.49	1.5	34.51	1.8	34.57	1.6	34.61	2.0	34.15	0.8	33.94
200	1.5	34.66	1.9	34.52	1.8	34.57	1.8	34.59	1.9	34.61	1.9	34.65	2.3	34.29	1.9	34.28
250	1.6	34.69	2.0	34.58	1.9	34.60	2.0	34.64	1.9	34.65	1.9	34.69	2.3	34.35	2.0	34.36
300	1.6	34.70	2.0	34.62	1.9	34.64	1.9	34.65	1.9	34.66	1.9	34.71	2.2	34.39	2.1	34.40
400	1.5	34.72	2.0	34.67	1.9	34.68	1.9	34.68	1.9	34.69	1.9	34.74	2.2	34.49	2.2	34.50
500	1.5	34.72	2.0	34.69	1.9	34.70	1.8	34.70	1.9	34.71	1.9	34.76	2.2	34.56	2.2	34.57
600	1.4	34.68	2.0	34.70	1.8	34.71	1.8	34.71	1.8	34.72	1.8	34.76	2.2	34.61	2.3	34.61
700	1.4	34.65	1.9	34.72	1.7	34.72	1.7	34.71	1.8	34.73	1.7	34.77	2.2	34.66	2.3	34.64
800	1.3	34.64	1.8	34.73	1.7	34.72	1.7	34.72	1.7	34.73	1.7	34.77	2.2	34.69	2.2	34.67
900	1.2	34.67	1.8	34.73	1.6	34.73	1.6	34.73	1.6	34.73	1.6	34.78	2.1	34.71	2.2	34.69
1000	1.1	34.68	1.7	34.73	1.5	34.72	1.5	34.73	1.5	34.74	1.5	34.78	2.1	34.73	-	-

station	JA41049	JA41050	JA41051	JA41052
date	2000/3/15	2000/3/15	2000/3/16	2000/3/16
time	2:12	21:18	2:54	9:48
latitude	52-18S	48-53S	47-39S	46-41S
longitude	150-00E	150-00E	150-00E	150-00E
depth	temp. salinity	temp. salinity	temp. salinity	temp. salinity
0	7.2 33.88	8.7 34.06	9.8 34.13	12.5 34.45
10	6.7 33.90	8.3 34.07	9.3 34.14	11.7 34.47
20	6.7 33.91	8.3 34.07	9.3 34.15	11.7 34.47
30	6.7 33.92	8.3 34.08	9.3 34.15	12.0 34.59
50	6.7 33.92	8.3 34.09	9.2 34.14	12.2 34.65
75	6.7 33.92	8.3 34.10	9.1 34.13	11.6 34.77
100	6.7 33.92	8.0 34.14	9.1 34.16	10.5 34.66
125	6.7 33.94	8.4 34.46	8.1 34.22	10.4 34.73
150	7.0 34.17	8.6 34.50	8.0 34.35	9.9 34.67
200	6.9 34.24	8.3 34.44	8.2 34.42	9.5 34.65
250	6.5 34.18	8.0 34.40	7.9 34.38	9.5 34.66
300	6.7 34.26	7.9 34.40	7.7 34.35	9.2 34.63
400	6.2 34.29	7.0 34.27	7.0 34.29	8.7 34.58
500	5.6 34.29	6.3 34.26	6.9 34.35	8.4 34.55
600	4.7 34.26	5.7 34.30	6.3 34.38	8.0 34.54
700	4.0 34.26	5.4 34.38	5.5 34.34	7.2 34.49
800	3.5 34.28	4.7 34.36	4.8 34.31	6.3 34.46
900	3.3 34.33	3.7 34.31	4.2 34.32	5.1 34.37
1000	3.3 34.40	3.5 34.36	3.7 34.32	4.8 34.42

Table 4. Serial observation data.

Station 410001

Meteorological observation

Date : December 06, 1999
 Time(UT) : 06 :0 0
 Latitude 46-20.6S
 Longitude 110-00.4E
 Depth : 3600 m

Weather Time(UT) : 06 :0 0
 Weather : bc.
 Air Temperature(dry) : 10.8 °C
 Humidity : -
 Atmospheric Pressure 1037 hPa

Wind Direction : WNW
 Velocity : 2m/s
 Wave : WNW/3
 Swell : -
 Visibility : 7km

Observed										Interpolated				
Depth (m)	T (°C)	S	pH	DO2	PO4-P	SIO3-Si	NO2-N	NO3-N	NH4-N	Depth (m)	T (°C)	S	σt	ΔD
				(μ mol/l)										
0	9.600	34.356	8.06	297	1.10	2	0.30	15	0.5	0	9.600	34.356	26.540	0.000
19	7.588	34.020	8.07	320	1.20	1	0.30	18	--	10	8.167	34.118	26.580	0.015
30	7.561	34.016	8.07	318	1.30	1	0.30	18	--	20	7.586	34.019	26.590	0.030
50	7.511	34.018	8.07	318	1.20	1	0.30	18	--	30	7.561	34.016	26.590	0.044
75	7.508	34.023	8.06	323	1.20	1	0.30	17	--	50	7.511	34.018	26.600	0.073
100	6.293	34.017	8.05	321	1.40	5	0.20	21	--	75	7.508	34.023	26.600	0.110
125	5.964	34.033	8.04	317	1.40	7	0.30	21	--	100	6.293	34.017	26.760	0.144
152	5.999	34.071	8.03	312	1.40	7	0.40	21	--	125	5.964	34.033	26.820	0.177
203	6.694	34.257	8.01	283	1.40	8	---	22	0.4	150	5.991	34.068	26.840	0.208
253	4.899	34.019	8.01	329	1.50	9	0.30	24	0.6	200	6.684	34.246	26.890	0.269
306	4.992	---	---	---	---	---	---	---	---	250	4.924	34.020	26.930	0.328
405	5.765	34.263	7.97	329	1.60	15	0.00	27	0.3	300	4.957	---	---	---
503	5.331	---	---	---	---	---	---	---	---	400	5.750	---	---	---
605	4.104	34.257	7.91	254	1.90	26	0.00	32	0.4	500	5.358	---	---	---
708	3.641	34.274	7.90	243	1.90	32	0.00	34	0.4	600	4.135	34.664	27.530	---
808	3.294	34.298	7.89	225	2.00	39	0.00	35	0.4	700	3.671	34.272	27.260	---
907	3.087	34.354	7.89	221	2.10	47	0.00	36	0.4	800	3.314	34.295	27.320	---
1006	2.855	34.393	7.88	205	2.10	54	0.00	36	0.4	1000	2.862	34.390	27.430	---
1258	2.673	34.543	7.88	188	2.00	67	0.00	36	0.6	1200	2.711	34.507	27.540	---
1509	2.502	34.648	7.89	185	2.00	74	0.00	35	0.4	1500	2.508	34.644	27.670	---
2008	2.225	---	---	---	---	---	---	---	---	2000	2.232	---	---	---
2502	1.709	34.750	7.91	216	1.80	95	0.00	33	0.5	2500	1.711	34.941	27.970	---
2591	1.610	---	---	---	---	---	---	---	---					
2604	1.607	34.744	7.93	211	1.80	98	0.00	33	0.3					

Station 410002

Meteorological observation

Date : December 07, 1999
 Time(UT) : 06 :0 0
 Latitude 50-31.1S
 Longitude: 109-58.0E
 Depth : 3300 m

Weather Time(UT) : 06 :0 0
 Weather : bc.
 Air Temperature(dry) : 4.20 °C
 Humidity : -
 Atmospheric Pressure : 1058 hPa

Wind Direction WSW
 Velocity : 2m/s
 Wave : WSW/4
 Swell : -
 Visibility : 7km

Observed										Interpolated				
Depth (m)	T (°C)	S	pH	DO2	PO4-P	SIO3-Si	NO2-N	NO3-N	NH4-N	Depth (m)	T (°C)	S	σt	ΔD
				(μ mol/l)										
0	4.300	33.901	8.05	339	1.20	3	0.30	24	0.2	0	4.300	33.901	26.900	0.000
19	3.894	33.895	8.05	341	1.30	3	0.20	24	0.3	10	4.014	33.896	26.930	0.011
31	3.883	33.897	8.05	338	1.30	3	0.30	24	0.3	20	3.893	33.895	26.940	0.023
51	3.874	33.897	8.04	340	1.30	3	0.20	24	0.2	30	3.883	33.897	26.940	0.034
75	3.857	33.896	8.03	338	1.20	4	0.20	24	0.4	50	3.874	33.897	26.940	0.056
100	3.747	33.900	8.02	338	1.30	4	0.20	24	0.5	75	3.857	33.896	26.950	0.085
125	2.907	33.939	7.98	326	1.50	15	0.20	27	--	100	3.747	33.900	26.960	0.113
152	2.587	---	---	---	---	--	---	--	--	125	2.907	33.939	27.070	0.139
204	2.878	34.014	7.96	305	1.60	20	0.10	29	0.2	150	2.611	---	---	---
256	2.845	34.067	7.93	291	1.60	24	0.10	31	0.3	200	2.873	---	---	---
304	2.687	34.109	7.92	277	1.70	29	0.00	32	0.2	250	2.857	34.062	27.170	---
406	2.746	34.226	7.89	242	1.90	40	0.00	35	0.5	300	2.693	34.105	27.220	---
507	2.576	34.317	7.87	222	2.00	52	0.00	37	0.4	400	2.743	34.220	27.310	---
604	2.526	34.403	7.86	201	2.00	61	0.00	38	0.3	500	2.582	34.311	27.390	---
704	2.450	---	---	---	---	--	---	--	--	600	2.529	34.399	27.470	---
807	2.434	34.542	7.86	191	2.00	73	0.00	37	0.5	700	2.452	---	---	---
908	2.393	34.590	7.86	192	2.00	76	0.00	37	0.2	800	2.436	---	---	---
1010	2.371	34.638	7.87	187	1.90	78	0.00	36	0.3	1000	2.376	34.633	27.670	---
1259	2.218	34.500	7.87	190	2.00	70	0.00	37	0.5	1200	2.255	34.543	27.610	---
1509	2.059	34.735	7.90	204	1.80	86	0.10	34	0.3	1500	2.065	34.720	27.760	---
2009	1.632	---	---	---	---	--	---	--	--	2000	1.640	---	---	---
2509	1.105	34.728	7.90	218	1.80	116	0.00	34	0.3	2500	1.114	---	---	---
3010	0.719	---	---	---	---	--	---	--	--	3000	0.725	---	---	---
3174	0.680	34.706	7.90	229	2.00	133	0.10	35	0.5					

Station 410003

Meteorological observation

Date : December 08, 1999
 Time(UT) : 06 :0 0
 Latitude 55-03.8S
 Longitude 109-59.2E
 Depth : 3818 m

Weather Time(UT) : 06 :0 0
 Weather : bc.
 Air Temperature(dry) : 2.20 °C
 Humidity :
 Atmospheric Pressure : 1012 hPa

Wind Direction WNW
 Velocity : 2m/s
 Wave : WNW/3
 Swell :
 Visibility : 7km

Observed										Interpolated				
Depth (m)	T (°C)	S	pH	DO2	PO4-P	SIO3-Si	NO2-N	NO3-N	NH4-N	Depth (m)	T (°C)	S	σt	ΔD
				(μ mol/l)										
0	1.500	33.957	8.03	354	1.70	28	0.30	29	0.5	0	1.500	33.957	27.200	0.000
20	1.149	33.957	8.02	359	1.60	27	0.30	29	0.4	10	1.259	33.957	27.210	0.009
30	1.150	33.963	8.02	356	1.60	27	0.30	29	0.4	20	1.149	33.957	27.220	0.017
51	1.147	33.965	8.01	354	1.60	27	0.30	29	0.5	30	1.150	33.963	27.220	0.026
78	1.091	33.971	8.00	356	1.60	27	0.30	30	0.4	50	1.147	33.965	27.230	0.043
101	0.461	33.986	7.98	349	1.70	32	0.20	31	0.5	75	1.103	33.970	27.230	0.064
127	0.311	34.023	7.96	340	1.70	37	0.20	32	0.5	100	0.480	33.985	27.280	0.085
152	0.942	34.126	7.93	291	1.90	43	0.10	34	0.4	125	0.323	34.016	27.320	0.104
202	2.029	34.339	7.88	216	2.10	59	0.00	37	0.4	150	0.895	34.118	27.370	0.123
252	2.177	34.424	7.87	204	2.10	66	0.00	38	0.5	200	2.004	34.331	27.460	0.157
304	2.164	34.477	7.87	189	2.10	70	0.00	38	0.8	250	2.171	34.422	27.520	0.188
404	2.121	34.580	7.88	184	2.10	77	0.00	37	0.9	300	2.166	34.473	27.560	0.216
505	2.097	---	---	---	---	--	---	--	--	400	2.122	34.576	27.640	0.268
605	2.075	34.674	7.89	192	1.90	82	0.00	36	0.8	500	2.098	---	---	---
706	2.036	34.706	7.89	190	1.90	84	0.00	35	0.9	600	2.076	---	---	---
806	1.959	34.719	7.90	202	1.90	85	0.00	35	0.7	700	2.039	34.705	27.750	---
910	1.905	34.570	7.89	192	2.00	76	0.00	37	0.7	800	1.963	34.718	27.770	---
1025	1.854	---	---	---	---	--	---	--	--	1000	1.869	---	---	---
1341	1.626	---	---	---	---	--	---	--	--	1200	1.728	---	---	---
1611	1.430	34.787	7.89	228	1.80	101	0.00	34	0.6	1500	1.511	---	---	---
2108	0.973	34.720	7.88	229	1.90	114	0.00	34	0.7	2000	1.071	---	---	---
2607	0.580	---	---	---	---	--	---	--	--	2500	0.659	---	---	---
2711	0.507	34.698	7.86	219	2.00	127	0.00	36	0.8					

Station 410004

Meteorological observation

Date : December 10, 1999
 Time(UT) : 06 : 00
 Latitude 59-44.1S
 Longitude: 109-52.6E
 Depth : 4429 m

Weather Time(UT) : 06 :00
 Weather : bc.
 Air Temperature(dry) : 8.0 °C
 Humidity : -
 Atmospheric Pressure : 873 hPa

Wind Direction : W
 Velocity : 1m/s
 Wave : W/2
 Swell : -
 Visibility : 7km

Depth (m)	Observed									Interpolated				
	T (°C)	S	pH	DO2	PO4-P	SiO3-Si	NO2-N	NO3-N	NH4-N	Depth (m)	T (°C)	S	σt	ΔD
	(μ mol/l)													
0	0.200	33.097	8.13	368	1.60	33	0.30	32	0.5	0	0.200	33.097	26.580	0.000
31	0.188	33.865	8.12	365	1.60	31	0.30	32	0.4	10	0.195	33.427	26.850	0.013
51	0.187	33.955	8.12	362	1.60	31	0.30	32	0.5	20	0.192	33.694	27.060	0.024
77	0.152	33.954	8.12	360	1.60	31	0.30	32	0.5	30	0.188	33.856	27.200	0.034
101	-0.201	33.980	8.10	357	1.70	36	0.20	33	0.4	50	0.187	33.955	27.270	0.051
127	0.018	34.071	8.06	322	1.80	44	0.20	35	0.5	75	0.156	33.954	27.280	0.071
154	1.197	34.318	7.96	241	2.00	62	0.00	39	0.5	100	-0.192	33.979	27.310	0.091
202	1.750	34.465	7.93	202	2.10	71	0.00	40	0.4	125	-0.026	34.061	27.370	0.109
254	1.935	34.527	7.92	193	2.10	75	0.10	40	0.5	150	1.088	34.293	27.490	0.125
304	1.989	34.581	7.93	187	2.00	77	0.00	39	0.5	200	1.741	34.462	27.580	0.154
403	1.993	34.638	7.93	190	2.00	81	0.00	39	0.5	250	1.928	34.523	27.620	0.179
504	1.971	34.678	7.94	197	1.90	83	0.00	38	0.5	300	1.988	34.577	27.660	0.203
605	1.975	34.712	7.95	197	1.90	84	0.00	37	0.4	400	1.993	34.637	27.700	0.247
705	1.898	34.719	7.95	200	1.80	85	0.00	37	0.6	500	1.972	34.677	27.740	0.287
806	1.851	34.737	7.96	201	1.90	87	0.00	36	0.4	600	1.975	34.711	27.760	0.325
905	1.786	34.741	7.96	209	1.80	88	0.10	36	0.5	700	1.901	34.718	27.780	0.362
1005	1.726	34.314	7.93	247	2.00	--	0.00	39	0.5	800	1.855	34.736	27.790	0.398
1257	1.517	34.744	7.96	213	1.80	97	0.00	35	0.4	1000	1.729	34.336	27.480	0.497
1563	1.291	---	---	---	---	---	---	--	--	1200	1.564	34.391	27.540	0.621
2232	0.888	---	---	---	---	---	---	--	--	1500	1.334	---	---	---
2777	0.522	34.697	7.93	231	1.90	124	0.00	37	0.5	2000	1.028	---	---	---
3276	0.257	34.685	7.93	235	1.90	128	0.00	37	0.5	2500	0.708	---	---	---
3776	0.093	34.680	7.92	240	1.90	131	0.00	38	0.3	3000	0.392	34.690	27.860	---

Station 410005

Meteorological observation

Date : December 17, 1999
 Time(UT) : 06 :0 0
 Latitude 62-20.7S
 Longitude: 38-58.8E
 Depth : 5121 m

Weather Time(UT) : 06 :0 0
 Weather : rs.
 Air Temperature(dry) : 510.0 °C
 Humidity : -
 Atmospheric Pressure : 832 hPa

Wind Direction : E
 Velocity : 0m/s
 Wave : nil
 Swell : -
 Visibility : 7km

Depth (m)	T (°C)	S	pH	Observed						Interpolated				
				DO2	PO4-P	SiO3-Si	NO2-N	NO3-N	NH4-N	Depth (m)	T (°C)	S	σ_t	ΔD
0	-1.300	33.865	8.09	368	1.40	53	0.20	29	0.5	0	-1.300	33.865	27.260	---
1004	0.732	34.699	7.91	221	1.90	116	0.00	36	0.5	1200	0.590	34.695	27.850	---
1255	0.556	34.693	7.91	220	1.90	122	0.00	36	0.5	1500	0.431	34.685	27.850	---
1505	0.429	34.685	7.90	221	1.90	125	0.00	36	0.6	2000	0.216	34.676	27.850	---
2008	0.213	34.676	7.89	231	1.90	130	0.10	36	0.6	2500	0.042	34.667	27.860	---
2511	0.039	34.667	7.87	244	1.90	131	0.00	36	0.6	3000	-0.087	34.662	27.860	---
3012	-0.090	34.662	7.87	247	1.90	132	0.00	36	--	3500	-0.179	34.659	27.860	---
3515	-0.181	34.659	7.87	254	1.90	131	0.00	36	0.5					
3952	-0.234	34.657	7.86	255	1.90	132	0.00	36	0.6					

Table 5. Hourly tidal observation at Syowa Station from February 1999 to January 2000
(time is LMT(UT+3 hours).

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : FEB. 1, - FEB. 28, 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	223	225	237	254	269	279	277	267	244	212	179	151	138	136	149	175	201	229	247	259	259	246	232	217	5305	221	5512	220	
2	207	205	213	230	246	262	269	263	249	223	191	160	141	131	140	159	184	209	232	245	246	243	227	211	5086	212	5285	211	
3	199	192	197	211	232	248	258	261	254	236	208	184	158	146	147	158	179	206	226	242	249	244	231	216	5082	212	5286	211	
4	204	192	189	200	217	236	248	256	255	244	225	201	180	162	160	168	183	206	223	239	248	243	234	220	5133	214	5341	214	
5	208	195	190	193	210	222	235	244	245	241	229	212	193	180	174	176	186	205	220	236	243	244	237	223	5141	214	5352	214	
6	211	198	190	186	193	208	221	230	236	237	232	222	206	195	190	189	195	210	221	233	241	242	237	228	5151	215	5365	215	
7	214	204	194	188	190	198	207	214	223	224	223	221	213	207	206	207	209	218	227	233	239	244	240	230	5173	216	5397	216	
8	224	212	205	195	193	194	197	202	207	212	212	211	210	209	210	212	214	217	221	228	231	234	227	221	5098	212	5312	212	
9	214	208	201	194	186	185	180	179	184	185	188	193	195	201	207	212	216	221	224	225	226	226	223	221	4894	204	5114	205	
10	220	213	209	205	198	191	187	182	179	178	179	184	191	203	215	224	234	236	238	238	234	230	229	225	5022	209	5247	210	
11	225	225	220	219	214	206	196	183	174	169	166	170	183	198	213	229	242	247	249	245	239	233	230	226	5101	213	5330	213	
12	229	230	231	232	228	221	208	189	174	160	154	156	164	181	203	223	241	249	252	248	239	228	220	219	5079	212	5300	212	
13	221	224	231	235	234	229	216	194	174	154	142	139	147	163	187	212	236	250	257	253	244	230	221	213	5006	209	5219	209	
14	213	221	231	241	244	244	233	213	186	162	143	134	133	148	171	200	226	247	258	257	245	231	215	207	5003	208	5209	208	
15	206	211	226	240	251	257	251	230	205	175	146	127	122	133	155	184	214	238	255	257	248	231	215	203	4980	208	5179	207	
16	199	203	219	237	255	266	266	250	228	201	170	146	134	136	151	179	208	232	251	258	252	237	225	209	5112	213	5311	212	
17	199	199	212	232	252	269	277	270	251	226	193	163	145	139	147	172	201	225	247	258	256	243	222	203	5201	217	5394	216	
18	193	183	189	208	232	251	264	269	258	237	208	180	154	148	150	167	190	213	235	245	247	237	217	196	5071	211	5253	210	
19	182	169	168	180	205	231	246	255	256	244	222	199	175	157	154	163	179	203	222	237	242	235	217	198	4939	206	5119	205	
20	180	162	154	162	180	201	223	236	242	240	228	209	189	175	168	172	189	207	222	236	241	236	225	208	4885	204	5075	203	
21	190	174	163	162	165	187	205	217	227	233	231	220	209	196	190	189	198	210	222	235	240	238	233	216	4950	206	5150	206	
22	200	184	171	161	161	174	186	199	212	220	224	223	216	213	212	210	213	220	230	239	243	244	238	225	5018	209	5230	209	
23	212	199	185	173	166	166	170	176	185	194	200	205	206	212	215	219	222	227	231	237	239	238	234	229	4940	206	5160	206	
24	220	211	200	191	181	175	170	171	175	181	186	197	207	217	232	244	251	255	260	262	263	260	257	255	5221	218	5473	219	
25	252	248	246	238	227	217	210	194	187	184	184	188	201	214	231	246	256	263	264	262	256	248	241	237	5494	229	5731	229	
26	237	236	235	233	226	217	199	180	165	153	148	152	159	178	201	220	239	249	250	245	237	227	217	213	5016	209	5233	209	
27	217	219	225	232	233	227	212	188	169	149	140	135	144	160	186	213	236	250	259	256	246	234	224	217	4971	207	5194	208	
28	223	229	241	253	258	259	244	220	201	170	151	139	141	153	178	204	229	245	257	256	245	231	217	207	5151	215	5361	214	
1	210																												
MONTHLY MEAN																							211.6		cm				

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : MAR . 1 , - MAR . 31 , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	210	213	228	244	256	263	257	241	220	189	162	143	138	147	168	194	221	241	254	256	244	228	210	196	5123	213	5317	213		
2	194	198	215	235	253	266	270	260	239	211	183	159	145	148	168	193	220	243	258	264	257	239	218	204	5240	218	5432	217		
3	192	195	209	229	252	270	279	277	254	230	205	181	163	160	174	195	218	241	256	262	257	241	219	203	5362	223	5552	222		
4	190	185	194	213	240	262	273	279	270	249	225	203	180	172	179	196	216	238	254	260	257	243	219	201	5398	225	5585	223		
5	187	179	181	202	224	250	269	278	281	275	254	233	211	197	200	212	230	251	266	273	261	249	229	211	5603	233	5799	232		
6	196	183	182	195	212	235	253	265	270	267	252	235	212	197	196	203	218	238	252	263	265	256	238	219	5502	229	5706	228		
7	204	188	183	187	199	218	237	250	258	259	249	236	225	214	212	215	227	243	256	263	265	261	247	229	5525	230	5738	230		
8	213	197	189	188	195	209	223	237	243	248	246	236	226	215	213	221	228	237	247	256	256	252	241	228	5444	227	5656	226		
9	212	197	189	182	184	192	203	212	218	223	226	223	217	216	219	221	225	233	239	244	244	241	234	225	5219	217	5430	217		
10	211	196	190	186	180	183	188	194	197	202	208	212	215	219	227	231	237	242	247	250	251	246	243	239	5194	216	5423	217		
11	229	219	214	210	203	200	199	195	194	201	204	210	217	227	235	244	253	256	255	256	253	248	244	242	5408	225	5644	226		
12	236	230	229	225	222	215	207	200	189	188	192	199	211	222	237	251	259	263	263	259	251	244	240	237	5469	228	5700	228		
13	231	234	236	235	231	224	212	196	183	176	172	175	186	204	223	242	256	262	261	256	244	234	225	222	5320	222	5545	222		
14	225	230	235	241	242	234	215	203	187	175	167	163	172	188	211	234	252	262	263	257	244	230	218	213	5261	219	5476	219		
15	215	224	234	244	251	249	237	220	202	179	164	150	156	172	198	225	248	261	265	258	243	225	211	204	5235	218	5441	218		
16	206	217	232	246	260	265	258	237	212	185	160	147	143	157	179	208	234	253	259	256	242	219	199	187	5161	215	5346	214		
17	185	194	215	237	258	270	270	256	234	208	181	159	150	154	173	200	229	250	262	261	245	221	198	180	5190	216	5364	215		
18	174	178	198	224	248	270	278	275	255	229	202	172	157	159	172	195	222	244	258	260	247	224	200	177	5218	217	5379	215		
19	161	162	176	202	231	257	274	277	268	247	222	195	175	166	173	192	220	243	251	256	248	227	200	177	5200	217	5356	214		
20	156	147	154	175	204	233	254	267	267	258	239	216	195	184	185	197	217	237	251	256	254	237	211	185	5179	216	5344	214		
21	165	147	147	158	180	208	233	251	259	258	247	232	217	206	203	210	226	243	258	263	262	249	229	206	5257	219	5441	218		
22	184	166	159	162	175	195	215	232	242	245	244	236	227	230	223	230	239	252	264	271	270	262	246	226	5395	225	5599	224		
23	204	184	171	165	169	181	198	212	223	233	241	239	236	237	236	239	246	255	262	271	270	265	255	240	5432	226	5655	226		
24	223	208	195	184	182	186	194	204	212	213	221	224	236	243	254	259	265	268	273	275	273	266	257	250	5565	232	5806	232		
25	241	228	218	209	199	193	191	188	190	194	202	210	216	228	240	248	251	254	257	254	253	245	241	239	5389	225	5622	225		
26	233	230	225	219	211	204	190	180	176	174	177	185	196	212	227	243	251	256	255	250	241	236	228	227	5226	218	5453	218		
27	227	230	235	233	228	220	207	191	178	169	167	172	183	201	220	237	251	257	257	250	240	230	217	217	5217	217	5439	218		
28	222	227	238	245	250	246	234	217	199	182	174	173	179	197	216	241	256	265	264	256	244	229	212	210	5376	224	5592	224		
29	216	224	238	255	264	265	257	240	214	194	179	170	174	190	212	234	253	264	266	257	244	225	207	203	5445	227	5650	226		
30	205	216	236	254	269	277	275	260	237	212	193	179	177	191	212	236	255	268	274	266	246	225	207	194	5564	232	5761	230		
31	197	204	226	249	270	282	285	276	254	230	208	189	183	192	212	234	255	273	276	271	254	230	211	193	5654	236	5841	234		
1	187																													
MONTHLY MEAN																											222.8		cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : APR. 1, - APR. 30, 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	187	190	211	237	263	283	291	287	276	253	229	212	202	204	217	241	260	277	287	283	267	242	213	192	5804	242	5981	239	
2	177	175	190	213	238	258	271	275	264	242	221	202	184	181	192	211	232	248	258	275	262	240	212	190	5411	225	5585	223	
3	174	169	178	197	220	244	260	269	264	249	233	215	200	195	202	218	238	253	266	266	257	237	210	188	5402	225	5573	223	
4	171	162	164	179	203	229	248	262	263	257	244	226	212	206	206	217	233	251	262	265	259	241	217	194	5371	224	5549	222	
5	178	167	165	175	193	216	239	252	258	260	250	239	228	221	219	225	241	255	267	273	266	254	235	212	5488	229	5683	227	
6	195	180	174	178	189	210	226	241	247	250	250	243	235	231	231	235	244	254	265	268	266	256	239	220	5527	230	5729	229	
7	202	186	179	176	183	195	211	225	234	239	242	239	236	236	239	242	246	255	263	267	264	256	244	230	5489	229	5702	228	
8	213	202	193	189	189	196	203	212	219	226	232	235	236	240	245	247	249	254	258	260	258	251	244	234	234	5485	229	5707	228
9	222	213	206	199	197	196	198	202	205	210	218	225	232	241	247	254	258	259	261	260	257	250	244	240	5494	229	5729	229	
10	235	227	224	220	216	212	209	205	201	202	208	214	225	244	257	266	271	273	271	266	261	250	246	244	5647	235	5890	236	
11	243	244	243	241	236	228	219	208	197	194	197	204	217	233	248	262	270	272	266	258	248	237	232	232	5629	235	5864	235	
12	235	243	249	254	255	248	236	219	203	190	185	188	198	217	237	254	266	267	262	248	234	219	209	207	5523	230	5735	229	
13	212	224	240	248	253	252	241	220	198	179	169	167	177	193	216	239	253	260	257	244	225	207	191	190	5255	219	5451	218	
14	196	209	230	249	261	265	258	237	214	191	172	162	169	184	206	231	249	257	257	245	221	198	181	184	5226	218	5412	216	
15	186	200	223	248	270	282	284	273	253	229	208	193	191	201	219	242	259	276	278	265	244	216	194	178	5612	234	5789	232	
16	177	191	216	247	277	300	310	308	292	266	244	223	212	216	232	251	269	284	284	275	253	222	191	170	5910	246	6069	243	
17	159	160	182	211	241	268	286	293	285	267	244	225	212	207	217	237	253	265	274	267	247	219	186	159	5564	232	5705	228	
18	141	137	148	176	209	237	259	272	273	264	248	233	222	212	221	224	249	262	269	268	255	231	199	169	5378	224	5524	221	
19	146	130	134	151	177	205	231	250	260	261	251	241	232	221	224	231	245	258	268	270	262	244	218	189	5299	221	5463	219	
20	164	146	139	147	163	187	212	233	248	260	262	260	257	256	258	264	275	288	300	303	298	286	269	244	5719	238	5940	238	
21	221	204	189	185	188	203	216	231	241	253	258	257	258	258	256	260	263	273	279	281	279	272	259	243	5827	243	6051	242	
22	224	212	197	186	186	189	194	206	212	222	232	238	243	248	255	259	262	266	269	272	272	265	259	250	5618	234	5859	234	
23	241	234	223	214	208	204	203	205	208	213	224	236	244	256	266	273	275	276	275	273	268	264	259	257	5799	242	6053	242	
24	254	250	250	244	237	228	219	212	209	209	211	219	231	242	254	264	266	264	259	251	244	236	233	232	5718	238	5953	238	
25	235	239	242	245	241	232	220	207	197	190	188	196	205	220	237	247	253	254	244	236	222	216	211	210	5387	224	5602	224	
26	215	221	234	239	241	238	224	209	194	182	177	181	191	204	223	238	247	244	242	228	211	197	188	187	5155	215	5355	214	
27	200	212	228	245	253	256	250	236	219	205	197	195	204	219	239	257	268	271	266	251	232	212	197	184	5496	229	5690	228	
28	194	207	226	246	260	269	266	255	237	221	207	201	205	217	237	254	267	270	268	253	233	210	192	181	5576	232	5764	231	
29	188	202	224	247	267	281	281	275	253	237	216	207	206	215	235	251	264	272	271	256	235	209	186	172	5650	235	5821	233	
30	171	182	206	232	255	273	279	277	264	245	228	214	211	216	233	250	267	276	274	266	243	215	185	167	5629	235	5792	232	
1	163																												
																							MONTHLY MEAN		230.7 cm				

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : MAY . 1 . - MAY . 31 , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	163	166	189	216	243	262	277	277	266	250	233	218	208	209	219	239	255	265	267	257	238	212	183	161	5473	228	5620	225		
2	147	148	160	186	214	237	255	264	260	245	231	217	207	207	215	231	252	265	274	273	259	237	212	188	5384	224	5542	222		
3	158	149	156	177	202	225	246	258	260	253	244	230	223	222	227	243	256	269	274	270	255	232	205	178	5412	226	5573	223		
4	161	150	152	166	189	213	237	252	259	261	255	243	239	237	239	248	261	274	283	279	273	255	231	209	5566	232	5755	230		
5	189	179	173	182	197	214	235	252	261	266	263	255	249	244	244	249	255	266	272	272	266	250	232	212	5677	237	5871	235		
6	194	179	168	170	179	192	209	223	231	240	243	241	236	234	234	234	239	245	251	252	249	239	225	209	5316	222	5508	220		
7	192	179	170	170	172	179	195	205	215	227	235	236	239	243	243	244	246	249	253	254	253	246	240	229	5314	221	5531	221		
8	217	208	198	194	191	194	201	209	215	227	238	245	250	257	262	260	264	263	262	262	260	255	250	244	5626	234	5863	235		
9	237	230	224	219	212	208	207	202	204	213	219	230	241	249	256	259	261	258	253	250	244	239	238	235	5588	233	5827	233		
10	239	238	237	234	225	218	212	203	198	199	204	216	229	240	250	257	258	252	244	238	228	220	217	225	5481	228	5713	229		
11	232	242	248	253	253	246	234	222	212	205	207	214	227	243	256	265	267	263	251	238	222	211	208	212	5631	235	5855	234		
12	224	239	253	269	273	269	262	242	224	214	208	211	222	239	255	268	276	272	261	240	212	195	186	186	5700	238	5898	236		
13	198	215	236	257	271	275	272	260	241	221	208	203	212	225	240	255	263	262	252	231	202	179	164	160	5502	229	5673	227		
14	171	191	217	244	268	280	281	269	250	230	212	204	207	215	235	250	263	265	256	236	207	179	154	140	5424	226	5571	223		
15	147	164	191	224	253	272	284	282	267	249	231	219	213	217	228	250	260	266	260	243	214	179	152	129	5394	225	5517	221		
16	123	134	157	188	221	247	268	275	274	262	246	231	223	227	243	259	275	284	283	277	251	222	193	165	5528	230	5679	227		
17	151	154	170	200	230	258	284	302	306	301	287	275	265	261	265	280	289	297	301	292	265	238	211	177	6059	252	6215	249		
18	156	141	143	160	183	211	238	255	266	270	265	258	253	246	247	258	273	282	289	289	277	257	230	203	5650	235	5826	233		
19	176	157	149	159	173	197	220	237	254	260	262	261	254	251	247	248	258	267	275	278	272	257	238	213	5563	232	5757	230		
20	194	173	160	156	173	187	205	220	235	244	249	252	252	240	237	237	242	247	255	260	257	251	243	225	5394	225	5605	224		
21	211	196	183	176	173	178	189	203	214	226	237	243	249	251	251	251	251	254	256	261	258	256	251	242	5460	228	5693	228		
22	233	223	213	207	197	194	197	201	207	216	224	234	240	244	248	249	246	247	250	252	257	254	252	247	5532	231	5770	231		
23	238	235	233	231	228	225	222	225	229	235	244	252	262	268	273	277	273	262	255	246	238	231	232	231	5845	244	6080	243		
24	235	240	243	241	236	231	219	212	208	206	210	217	223	233	243	244	243	236	222	212	203	193	191	196	5337	222	5542	222		
25	205	214	223	230	232	231	220	211	205	199	199	205	216	227	236	244	245	241	228	214	202	193	187	190	5197	217	5399	216		
26	202	217	234	248	256	244	238	227	216	208	213	217	226	236	245	253	255	251	241	223	203	186	176	177	5392	225	5578	223		
27	186	203	221	238	253	258	255	244	228	215	209	206	213	221	235	244	247	244	237	217	196	178	160	158	5266	219	5435	217		
28	169	186	208	232	253	264	267	261	247	232	219	213	217	224	231	238	244	246	243	225	200	176	154	145	5294	221	5439	218		
29	145	160	183	209	231	247	254	250	243	227	213	209	206	215	228	244	252	257	250	235	211	185	162	147	5163	215	5309	212		
30	146	157	178	205	232	253	266	268	260	250	237	226	224	225	238	252	262	266	264	251	226	201	175	154	5416	226	5568	223		
31	152	156	172	198	221	249	266	273	271	262	249	240	234	236	244	257	271	278	277	271	247	220	195	171	5610	234	5772	231		
1	162																													
MONTHLY MEAN																											228.8		cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : JUNE . 1. - JUNE . 30 , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	162	157	167	190	217	240	259	273	275	268	261	249	241	240	244	255	269	279	281	279	263	237	210	188	5704	238	5875	235																						
2	171	163	168	185	207	229	249	265	281	279	273	266	257	250	253	263	276	282	287	284	273	254	230	203	5848	244	6030	241																						
3	182	169	169	180	196	217	240	257	268	272	269	264	256	249	248	250	262	272	278	279	274	261	239	217	5768	240	5969	239																						
4	201	183	179	180	189	208	226	242	255	266	270	267	262	254	247	238	240	242	251	258	259	253	250	228	5648	235	5869	235																						
5	221	205	187	182	184	193	212	230	245	259	262	259	254	246	240	234	236	237	244	249	247	242	235	223	5526	230	5738	230																						
6	212	199	190	180	180	186	194	203	213	223	234	244	244	244	239	238	237	239	242	243	240	239	233	5340	223	5566	223																							
7	226	219	213	205	201	199	200	203	211	218	227	238	247	248	248	248	244	243	242	244	246	247	244	244	5505	229	5743	230																						
8	238	231	225	219	211	207	205	209	219	224	232	244	252	256	259	248	236	226	212	205	196	195	199	204	5352	223	5564	223																						
9	212	222	227	228	227	223	212	204	200	197	202	210	221	230	234	237	226	213	204	190	175	171	171	178	5014	209	5206	208																						
10	192	209	222	234	235	233	225	213	204	196	195	203	210	221	233	238	232	223	209	188	181	170	162	167	4995	208	5177	207																						
11	182	199	219	240	252	257	254	254	243	230	224	231	239	249	258	267	267	255	239	212	187	169	153	155	5435	226	5607	224																						
12	172	189	215	244	269	281	282	277	263	249	242	236	239	247	260	267	268	263	249	222	194	166	145	135	5574	232	5726	229																						
13	152	163	189	220	249	272	283	283	277	263	253	241	242	248	258	269	278	276	266	245	216	185	156	137	5621	234	5754	230																						
14	133	146	169	198	234	261	280	290	288	277	265	256	252	252	265	277	286	288	286	270	241	210	176	151	5751	240	5888	236																						
15	137	134	152	176	205	234	259	265	267	262	254	257	244	243	247	262	267	277	280	271	251	222	187	159	5512	230	5648	226																						
16	136	123	129	145	168	193	218	239	244	246	243	236	225	221	220	232	241	250	260	258	245	227	199	169	5067	211	5224	209																						
17	157	126	123	132	151	175	198	217	233	240	239	239	232	225	220	227	238	248	259	260	255	244	226	202	5066	211	5245	210																						
18	179	161	147	147	158	170	189	209	223	230	234	234	231	222	217	215	218	228	239	244	244	240	227	213	5019	209	5217	209																						
19	198	181	168	162	162	171	182	205	215	225	232	234	232	226	224	218	214	221	227	233	237	237	233	221	5058	211	5274	211																						
20	216	206	194	190	185	184	192	201	208	219	230	233	233	229	228	220	218	213	216	223	223	221	223	219	5124	214	5346	214																						
21	222	218	212	207	201	198	197	202	211	214	224	228	237												2771	115	2771	111																						
22																																																		
23				233	233	231	224	219	220	214	218	226	230	232	233	235	228	214	206	193	181	177	177	182	4506	188	4697	188																						
24	191	203	220	232	239	243	237	228	222	216	216	223	229												2899	121	2899	116																						
25																																																		
26														240	249	250	251	246	231	213	190	168	150	143	2331	97	2482	99																						
27	151	166	189	212	236	250	257	253	246	234	224	221	220	229	238	250	249	247	240	221	194	171	150	138	5186	216	5332	213																						
28	146	153	176	200	225	246	257	258	253	241	233	223	221	226	235	248	254	255	252	236	210	194	161	147	5250	219	5389	216																						
29	139	142	163	188	215	241	256	261	259	249	237	230	223	226	233	246	259	263	264	249	225	201	172	150	5291	220	5430	217																						
30	139	137	152	177	201	225	246	257	262	251	244	235	228	228	236	247	262	277	277	269	255	228	201	175	5409	225	5575	223																						
1	166																																																	
																							MONTHLY MEAN		196.6 cm																									

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE : 39°34'13"E
 DURATION : JULY . 1, - JULY . 31 , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	166	148	154	171	197	223	246	263	270	267	260	250	244	243	245	255	268	280	292	286	276	257	234	212	5707	238	5901	236		
2	194	183	179	189	212	243	260	274	287	284	277	265	255	244	245	250	259	272	284	282	277	266	241	218	5940	248	6139	246		
3	199	183	179	181	196	216	235	253	269	274	273	267	255	247	244	245	249	262	275	279	279	269	255	236	5820	243	6038	242		
4	218	205	193	187	196	212	223	238	252	260	264	260	253	245	240	232	234	243	247	257	260	254	248	238	5659	236	5889	236		
5	230	208	195	192	188	197	211	222	235	245	254	253	251	244	238	227	226	227	232	240	247	249	251	249	5511	230	5753	230		
6	242	236	231	221	218	211	215	222	232	241	247	259	255	249	243	233	222	221	217	221	225	227	231	236	5555	231	5788	232		
7	233	234	230	227	222	224	220	221	228	236	240	249	249	244	243	237	225	211	209	208	204	212	212	222	5440	227	5675	227		
8	235	241	244	240	240	241	237	236	236	237	240	246	247	250	244	237	228	212	203	193	183	181	187	197	5435	226	5646	226		
9	211	229	244	252	257	257	252	246	237	234	232	235	240	244	244	239	230	217	200	180	164	157	155	160	5316	222	5493	220		
10	177	199	218	238	253	261	256	252	241	235	232	232	237	239	244	244	238	223	208	187	165	143	130	134	5186	216	5333	213		
11	147	171	193	221	242	257	265	260	251	242	237	235	238	243	249	254	258	249	227	207	179	151	130	122	5228	218	5358	214		
12	130	147	172	202	231	250	263	267	257	244	237	231	231	234	244	252	258	257	245	223	194	162	130	116	5177	216	5289	212		
13	112	124	144	173	204	230	248	257	257	248	237	227	224	224	237	252	261	266	263	246	224	191	158	136	5143	214	5263	211		
14	120	120	139	161	194	221	244	261	265	256	251	241													2473	103	2473	99		
15																														
16																														
17			151	154	167	186	202	223	235	239	234	225	218	209	199	199	207	217	229	237	246	243	227	210	4657	194	4851	194		
18	194	178	165	163	167	180	197	215	226	228	231	223	216	210	200	192	197	204	214	225	232	233	226	220	4936	206	5143	206		
19	207	197	188	183	189	196	208	218	228	233	235	237	232	222	216	211	207	204	214	223	231	230	229	231	5169	215	5396	216		
20	227	216	212	212	210	210	214	223	230	234	237	237	229	224	213	208	199	193	196	200	199	205	208	206	5142	214	5350	214		
21	208	213	211	212	213	211	212	215	220	221	225	225	223	222	214	210	199	188	188	189	186	188	190	192	4975	207	5173	207		
22	198	208	207	212	217	214	212	214	215	218	219	219	215	213	206	202	195	185	178	173	171	173	178	178	4861	203	5054	202		
23	193	204	214	229	235	240	242	242	244	242	245	246	248	253	254	253	247	234	219	208	192	183	177	173	5417	226	5600	224		
24	183	199	216	234	246	252	253	254	250	228	232	233	236	243	244	244	244	236	222	207	188	175	169	171	5359	223	5540	222		
25	181	193	218	238	257	264	264	266	257	252	248	243	244	253	259	259	258	262	241	231	207	187	171	173	5626	234	5813	233		
26	187	202	229	250	281	292	300	300	289	284	275	272	271	273	281	287	290	289	278	257	247	223	204	180	6241	260	6417	257		
27	176	197	218	248	269	282	290	283	270	261	245	241	244	257	268	276	278	289	279	265	235	210	180	166	5927	247	6088	244		
28	161	168	189	212	242	262	276	283	277	263	254	239	234	238	250	261	272	279	275	261	242	211	183	160	5692	237	5843	234		
29	151	153	167	191	216	247	264	272	273	261	245	231	223	226	230	247	262	271	273	273	256	230	199	174	5535	231	5695	228		
30	160	147	158	181	202	234	253	269	272	264	255	239	228	222	226	241	258	272	279	277	270	248	213	187	5555	231	5723	229		
31	168	151	151	165	185	214	233	249	255	249	241	226	212	200	195	210	224	236	252	256	247	236	210	187	5152	215	5324	213		
1	172																													
MONTHLY MEAN																											206.8 cm			

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : AUG . 1 . - AUG . 31 . , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(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	172	156	142	149	166	187	207	223	233	232	229	209	198	187	179	185	196	215	228	239	238	233	217	192	4726	197	4922	197																				
2	177	160	150	152	159	178	196	214	224	224	220	214	200	188	179	176	180	198	212	225	231	233	224	212	4778	199	4992	200																				
3	196	181	171	172	178	189	197	213	223	225	221	212	205	196	183	179	177	183	193	205	215	222	225	217	5024	209	5244	210																				
4	214	206	203	197	196	207	217	228	236	238	241	232	223	211	198	186	180	181	188	194	204	208	217	219	4899	204	5097	204																				
5	220	223	218	215	220	220	224	226	228	230	231	229	223	212	199	188	178	167	163	170	169	175	180	191	4700	196	4878	195																				
6	198	206	212	215	220	223	220	221	220	219	221	218	218	213	204	193	179	170	161	152	147	150	154	166	4993	208	5166	207																				
7	178	193	213	224	234	240	237	238	233	229	231	232	231	233	231	225	220	201	186	171	157	149	150	157	5295	221	5453	218																				
8	173	190	214	236	250	260	262	257	255	245	242	241	244	247	245	248	242	230	214	191	168	152	144	145	5664	236	5814	233																				
9	158	180	206	235	256	273	280	278	272	261	257	254	255	263	267	275	274	268	250	226	199	176	155	146	5659	236	5802	232																				
10	150	171	192	220	247	269	279	280	274	263	250	244	243	251	263	272	277	270	250	221	190	161	145	5618	234	5764	231																					
11	143	150	174	201	232	256	273	277	272	259	245	236	229	237	248	268	277	285	282	271	248	212	185	158	5425	226	5567	223																				
12	146	147	168	195	214	244	262	272	266	251	238	224	212	214	225	243	258	271	274	272	252	224	192	161	5025	209	5181	207																				
13	142	137	146	164	190	212	235	244	245	236	221	206	194	189	194	212	231	247	255	263	252	233	201	176	5408	225	5612	224																				
14	156	146	147	163	187	214	236	249	254	248	241	222	212	209	208	225	248	261	275	284	283	268	246	226	5297	221	5485	219																				
15	204	187	183	190	207	229	245	257	261	259	242	226	212	196	187	190	205	219	234	244	245	242	225	208	4975	207	5187	207																				
16	188	174	169	168	184	199	219	230	238	237	229	214	199	191	181	180	186	204	219	232	239	238	235	222	5431	226	5667	227																				
17	212	204	199	197	207	221	235	246	253	254	250	243	226	211	206	201	201	211	227	239	248	252	245	243	5505	229	5730	229																				
18	236	230	227	227	226	239	244	253	258	260	256	245	232	224	212	206	202	203	212	214	222	224	228	225	5230	218	5438	218																				
19	225	225	224	226	226	233	237	242	245	244	244	238	229	220	210	204	195	192	189	191	194	196	198	203	5064	211	5266	211																				
20	208	211	213	223	225	228	231	230	235	235	233	227	224	218	214	206	202	192	185	184	183	182	183	192	5317	222	5517	221																				
21	202	212	222	233	240	244	247	244	244	244	239	239	237	236	233	232	222	213	204	191	187	180	183	189	5255	219	5426	217																				
22	200	211	227	238	249	254	254	254	246	242	239	232	231	231	234	230	223	213	200	190	176	166	156	159	4930	205	5076	203																				
23	171	184	202	222	234	244	244	239	230	219	215	212	210	216	224	226	228	219	204	190	169	149	139	140	5175	216	5331	213																				
24	146	166	190	209	233	245	248	240	233	220	213	212	213	217	227	232	240	233	220	204	179	156	137	129	4942	206	5078	203																				
25	136	151	173	200	227	242	247	245	238	222	210	202	201	212	225	240	250	253	244	228	204	177	155	140	5022	209	5168	207																				
26	146	155	179	206	236	255	265	270	261	244	229	220	216	224	243	255	270	277	275	259	239	206	178	154	5462	228	5605	224																				
27	143	152	171	194	222	244	260	260	250	238	219	203	196	198	215	236	250	265	269	265	245	217	186	162	5260	219	5409	216																				
28	149	148	161	182	212	236	253	259	254	239	219	200	187	186	196	216	237	253	264	264	254	230	200	176	5175	216	5331	213																				
29	156	146	150	172	194	216	234	242	240	227	206	184	169	163	166	188	208	227	244	252	249	234	205	180	4852	202	5018	201																				
30	166	150	147	156	174	197	215	227	228	221	205	184	165	156	153	175	192	221	242	259	268	262	244	223	4830	201	5037	201																				
31	207	194	185	191	203	220	235	243	246	238	221	199	180	167	156	160	174	191	211	228	240	238	232	222	4981	208	5185	207																				
1	204																																															
MONTHLY MEAN																																															214.5 cm	

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : SEP . 1 . - SEP . 30 . 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(25H)																							
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2	234	229	227	227	229	239	246	255	254	255	248	234	217	203	190	179	175	182	186	199	209	220	227	230	5294	221	5526	221																						
3	232	234	237	242	243	247	254	254	258	258	249	241	230	216	205	192	183	179	177	177	184	189	194	206	5281	220	5495	220																						
4	214	223	231	239	244	246	249	251	248	247	246	239	234	229	219	214	204	190	180	178	175	178	179	187	5244	219	5449	218																						
5	205	219	237	247	258	261	261	257	252	248	243	243	239	238	237	230	221	210	191	176	163	149	149	157	5291	220	5458	218																						
6	167	186	206	222	238	244	245	241	232	220	218	216	218	221	225	226	221	215	198	178	156	140	126	129	4888	204	5029	201																						
7	141	161	186	211	230	244	247	241	229	219	211	209	213	222	231	241	245	242	225	205	179	157	136	130	4955	206	5098	204																						
8	143	156	179	202	228	248	250	247	232	220	207	197	200	210	228	240	251	254	246	227	206	171	147	134	5023	209	5155	206																						
9	132	147	171	197	225	244	255	251	240	219	209	195	191	204	220	241	257	266	260	252	232	196	168	151	5123	213	5263	211																						
10	140	147	169	196	215	236	247	249	235	216	198	180	173	175	192	214	234	246	252	245	228	200	168	148	4903	204	5035	201																						
11	132	131	147	168	198	214	226	233	216	199	178	162	149	147	159	182	204	229	240	241	232	211	182	156	4536	189	4678	187																						
12	142	135	141	162	183	206	219	227	219	200	182	164	147	140	148	171	195	217	233	241	240	228	206	186	4532	189	4702	188																						
13	170	158	164	175	199	221	233	240	238	224	206	184	168	161	162	175	191	215	236	244	248	240	222	206	4880	203	5071	203																						
14	191	181	185	189	204	226	237	243	241	231	212	191	175	159	159	163	179	200	217	231	238	236	227	216	4931	205	5135	205																						
15	204	198	194	201	214	227	237	245	244	238	227	206	186	179	170	169	178	193	206	219	228	230	227	221	5041	210	5253	210																						
16	212	211	209	209	220	231	240	245	247	242	231	212	196	179	175	167	172	179	189	198	207	207	207	211	4996	208	5196	208																						
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18	208	212	217	226	233	236	241	244	240	238	234	226	221	212	202	202	198	194	195	196	199	201	206	212	5193	216	5414	217																						
19	221	230	240	246	252	257	261	259	253	245	244	239	237	230	229	222	213	209	202	198	191	185	190	197	5450	227	5656	226																						
20	206	223	235	245	253	259	256	250	243	237	232	228	226	227	229	225	221	213	202	188	179	171	171	177	5296	221	5484	219																						
21	188	207	226	242	256	261	259	247	240	234	224	222	226	230	235	239	238	230	218	198	180	168	159	162	5289	220	5468	219																						
22	179	194	219	241	254	262	262	253	237	227	220	215	215	228	240	250	255	249	234	215	193	171	154	152	5319	222	5485	219																						
23	166	179	201	225	245	255	255	244	227	212	199	193	198	212	226	242	252	252	244	223	202	175	152	144	5123	213	5268	211																						
24	145	161	184	210	235	250	251	242	223	203	187	176	178	191	211	236	248	259	259	245	218	190	166	149	5017	209	5160	206																						
25	143	155	179	204	230	246	253	245	227	207	186	170	167	177	200	226	247	262	268	260	241	212	183	161	5049	210	5194	208																						
26	145	157	176	196	220	238	246	243	225	204	179	161	150	154	176	204	232	254	264	270	257	235	208	185	4979	207	5138	206																						
27	159	167	179	198	225	244	250	250	237	215	188	163	151	147	159	185	212	238	256	265	258	244	224	204	5018	209	5203	208																						
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30	221	214	212	215	232	245	255	259	255	244	229	202	181	163	152	150	161	174	195	212	224	234	232	232	5093	212	5323	213																						
1	230																																																	
																							MONTHLY MEAN		210.4 cm																									

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : OCT . 1 . - OCT . 31 , 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(25H)																							
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2	219	228	232	237	249	251	260	263	261	257	253	244	231	220	208	202	190	187	192	193	200	204	211	220	5412	226	5642	226																						
3	230	239	249	254	260	262	259	256	250	248	239	234	225	217	212	206	193	179	174	168	163	164	170	179	5230	218	5422	217																						
4	192	209	227	236	246	251	248	244	239	231	230	229	230	232	234	233	226	213	201	185	176	166	166	176	5220	218	5412	216																						
5	192	209	229	247	260	269	264	257	250	244	239	245	252	269	278	290	293	284	268	245	232	217	207	209	5949	248	6169	247																						
6	220	238	258	277	292	298	292	275	264	248	237	236	241	249	266	277	284	279	265	244	218	197	182	178	6015	251	6202	248																						
7	187	203	224	242	262	269	264	252	233	212	202	197	203	216	236	257	266	273	264	247	222	197	179	168	5475	228	5646	226																						
8	171	185	210	228	245	260	255	244	223	202	186	176	179	193	216	240	258	268	270	254	232	208	185	171	5259	219	5429	217																						
9	170	179	200	226	244	258	260	248	231	208	185	172	172	181	205	234	255	272	281	275	258	235	209	192	5350	223	5535	221																						
10	185	191	209	229	249	262	265	256	238	212	190	172	163	170	188	215	240	261	275	273	263	239	215	199	5359	223	5544	222																						
11	185	183	197	218	238	251	253	251	234	212	186	166	154	151	166	197	222	243	261	272	264	249	230	216	5199	217	5408	216																						
12	209	201	210	227	246	263	268	265	254	234	207	184	168	164	170	188	212	237	256	267	266	257	241	227	5421	226	5636	225																						
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14	219	213	216	223	239	253	259	260	254	241	218	194	176	165	161	168	181	198	216	232	238	243	238	230	5235	218	5462	218																						
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17	221	222	228	235	238	244	244	243	242	238	231	218	207	202	190	189	186	185	183	192	194	199	204	211	5146	214	5362	214																						
18	216	224	230	235	241	243	239	238	235	229	222	215	212	207	203	198	192	184	182	179	177	178	179	190	5048	210	5249	210																						
19	201	210	220	229	230	230	226	219	210	206	202	198	196	200	197	195	192	184	177	170	159	157	162	172	4742	198	4927	197																						
20	185	201	218	233	238	237	232	221	211	204	203	201	205	211	219	221	219	215	203	186	176	164	165	172	4940	206	5127	205																						
21	187	206	225	244	254	257	249	237	222	213	207	210	214	229	244	256	261	256	241	224	203	187	179	178	5383	224	5573	223																						
22	190	209	229	246	261	262	253	235	212	198	188	186	193	210	232	248	258	258	248	230	206	182	166	162	5262	219	5430	217																						
23	168	183	207	229	244	249	241	223	200	177	160	156	164	182	211	235	254	263	258	244	220	197	176	166	5007	209	5176	207																						
24	169	181	204	225	243	251	247	228	204	177	154	144	146	165	193	226	252	269	276	270	249	224	203	186	5086	212	5266	211																						
25	180	189	209	226	244	255	251	234	208	179	152	133	129	141	168	200	229	255	271	276	263	244	225	208	5069	211	5268	211																						
26	199	200	215	236	255	269	269	259	238	207	178	155	140	144	163	192	223	249	273	285	280	267	253	238	5387	224	5610	224																						
27	223	219	227	244	256	270	271	264	245	216	186	157	135	126	136	158	188	216	240	257	263	259	250	240	5246	219	5476	219																						
28	230	226	231	243	258	271	276	272	262	243	212	185	164	150	149	163	183	209	232	251	264	270	266	262	5472	228	5726	229																						
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30	241	240	240	242	250	256	260	262	256	245	230	210	191	177	163	155	156	161	171	183	194	206	214	219	5122	213	5347	214																						
31	225	230	235	237	242	247	251	249	246	243	234	223	212	201	192	183	176	172	174	178	183	191	201	211	5136	214	5357	214																						
1	221																																																	
																							MONTHLY MEAN		219.8 cm																									

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : NOV. 1, - NOV. 30, 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(25H)			
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2	209	220	231	238	241	241	234	225	219	215	212	212	216	218	221	223	217	207	194	187	179	176	179	185	5099	212	5299	212		
3	200	215	227	239	244	242	230	216	211	198	194	200	208	219	231	238	241	236	222	208	192	182	180	184	5157	215	5354	214		
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5	192	206	222	236	243	243	232	214	192	175	165	163	172	191	213	233	245	249	244	229	210	189	178	175	5011	209	5192	208		
6	181	197	214	229	239	243	232	212	190	169	152	147	155	175	199	223	245	253	253	241	224	202	186	179	4940	206	5120	205		
7	180	192	210	226	236	240	231	212	187	161	141	130	129	146	172	198	224	240	244	240	222	203	187	175	4726	197	4900	196		
8	174	183	196	214	229	236	231	213	189	163	141	123	122	133	158	187	215	235	249	249	237	221	206	193	4697	196	4882	195		
9	185	193	210	223	240	250	248	235	214	185	160	141	135	139	158	187	214	237	254	260	253	238	223	211	4993	208	5196	208		
10	203	203	214	230	244	256	254	244	227	199	172	148	135	135	146	169	198	222	243	251	251	246	232	221	5043	210	5256	210		
11	213	208	219	232	244	257	259	250	238	212	185	163	146	138	144	161	186	209	228	240	244	244	235	223	5078	212	5295	212		
12	217	214	216	227	241	252	256	252	240	221	198	174	154	146	147	156	176	196	216	230	237	241	236	230	5073	211	5297	212		
13	224	222	222	230	242	250	253	253	244	229	211	189	172	157	154	160	172	187	204	217	228	236	236	232	5124	214	5359	214		
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19	205	219	231	239	242	237	223	209	198	190	187	195	206	221	238	246	249	244	232	217	206	196	191	199	5220	218	5430	217		
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21	204	217	234	245	250	245	229	205	181	159	147	147	162	183	210	238	257	267	263	252	233	212	200	197	5137	214	5338	214		
22	201	213	229	242	250	249	234	209	179	150	132	126	133	156	185	217	245	262	269	263	247	228	212	202	5033	210	5236	209		
23	203	213	228	241	252	254	243	217	188	157	130	114	112	128	158	192	224	249	265	268	259	246	232	217	4990	208	5203	208		
24	213	221	233	247	258	263	255	237	206	172	139	114	102	110	131	160	192	222	244	257	258	246	237	225	4942	206	5160	206		
25	218	220	229	244	255	263	260	249	224	190	157	127	108	103	112	137	166	194	219	239	247	246	240	233	4880	203	5106	204		
26	226	223	231	244	258	267	271	264	249	223	193	164	139	126	125	137	159	185	207	228	242	247	245	241	5094	212	5330	213		
27	236	232	232	239	249	261	265	263	254	238	212	185	161	142	133	136	147	163	181	198	214	225	227	227	5020	209	5247	210		
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30	224	230	233	230	229	230	226	228	226	226	226	223	220	218	213	209	203	199	198	200	205	210	217	229	5252	219	5489	220		
1	237																													
MONTHLY MEAN																											210.9 cm			

STATION : SYOWA STATION
 LATITUDE : 69°00'28"S
 LONGITUDE: 39°34'13"E
 DURATION : DEC . 1, - DEC . 31, 1999
 UNIT : CENTIMETRE

Data	Time																							(24H)	(24H)	(25H)	(25H)		
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3	218	228	236	239	237	230	216	200	187	178	174	179	195	208	224	238	246	244	240	228	216	212	209	213	5195	216	5420	217	
4	225	236	246	252	252	246	233	214	196	180	173	178	189	207	227	247	261	263	258	250	237	223	217	216	5426	226	5649	226	
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6	217	227	242	250	255	254	242	221	197	174	157	148	153	175	198	228	251	266	271	269	258	245	235	227	5360	223	5590	224	
7	230	241	254	267	275	275	263	245	220	193	171	158	156	172	196	223	250	272	281	283	274	261	248	240	5648	235	5887	235	
8	239	248	259	271	282	285	278	261	236	209	182	164	155	165	183	210	238	261	278	283	277	268	252	241	5725	239	5960	238	
9	235	238	248	261	272	276	273	258	237	206	179	158	145	147	160	183	213	237	256	266	267	258	246	239	5458	227	5691	228	
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11	229	225	227	237	250	260	263	257	243	220	194	168	147	143	140	153	175	197	219	236	245	248	244	236	5156	215	5389	216	
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23	233	238	249	260	269	272	262	242	214	179	144	121	113	118	140	172	203	232	255	270	272	264	255	245	5222	218	5462	218	
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25	230	226	232	244	256	267	269	262	249	223	190	158	131	119	116	129	152	179	202	222	238	242	238	233	5007	209	5234	209	
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27	227	218	214	217	225	235	244	251	252	244	230	211	191	172	159	155	160	173	186	203	218	225	231	230	5071	211	5295	212	
28	224	220	214	210	213	217	226	233	235	234	227	216	206	192	180	173	173	177	185	196	210	217	222	224	5024	209	5245	210	
29	221	216	213	210	202	207	210	212	216	219	217	215	211	206	200	194	192	192	195	202	209	214	217	221	5011	209	5236	209	
30	225	225	219	214	209	204	199	200	203	203	206	209	210	212	212	212	207	205	205	208	211	213	216	219	5046	210	5270	211	
31	224	224	221	214	208	199	191	185	180	179	183	187	193	204	212	216	218	218	212	212	212	210	211	216	4929	205	5148	206	
1	219																												
MONTHLY MEAN																							216.4 cm						

STATION : SYOWA STATION
 LATITUDE : 69° 00' 28" S
 LONGITUDE : 39° 34' 13" E
 DURATION : JAN. 1, - JAN. 31, 2000
 UNIT : CENTIMETRE

Data	Time																								(24H)	(24H)	(25H)	(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	219	223	224	220	215	209	194	181	173	169	170	177	186	200	212	226	233	236	232	228	223	221	218	225	5014	209	5244	210																							
2	230	235	239	238	234	225	212	194	179	171	168	171	180	196	212	232	244	245	245	242	233	227	223	224	5199	217	5430	217																							
3	231	236	244	245	244	237	222	202	184	170	160	161	171	187	209	231	249	260	261	256	249	240	233	233	5315	221	5552	222																							
4	237	243	251	257	256	252	238	213	193	171	153	148	153	169	192	216	239	256	260	258	250	238	226	221	5290	220	5515	221																							
5	225	230	242	249	253	250	241	220	194	170	148	137	137	152	175	202	228	247	259	258	251	241	229	220	5158	215	5378	215																							
6	220	225	238	246	255	258	248	231	207	179	154	137	133	143	162	192	219	244	259	267	263	251	241	232	5204	217	5432	217																							
7	228	231	242	253	264	271	266	252	229	199	171	148	138	140	155	179	209	235	253	265	262	252	244	233	5319	222	5542	222																							
8	223	222	230	244	257	264	262	253	237	209	179	151	134	129	139	158	185	212	231	244	248	243	233	220	5107	213	5318	213																							
9	211	209	213	224	240	253	257	251	241	215	189	161	142	132	136	153	173	200	223	239	248	248	239	230	5027	209	5247	210																							
10	220	214	219	226	243	260	269	269	266	246	220	195	174	160	157	166	183	204	224	244	255	256	249	241	5360	223	5592	224																							
11	232	223	220	225	237	251	261	268	266	254	239	215	195	180	174	177	187	203	222	240	251	258	255	247	5480	228	5719	229																							
12	239	227	220	220	224	236	247	251	257	250	239	223	203	190	179	176	183	192	207	222	232	240	239	235	5331	222	5559	222																							
13	228	220	210	204	207	214	221	229	234	235	230	219	210	201	192	188	189	196	204	215	226	233	235	236	5176	216	5404	216																							
14	228	220	215	206	202	206	207	212	220	223	225	223	221	215	212	211	210	210	214	220	227	232	235	239	5233	218	5469	219																							
15	236	230	224	214	209	206	201	202	209	212	216	221	224	231	233	236	234	233	231	232	232	235	236	237	5374	224	5611	224																							
16	237	234	231	223	211	203	192	182	181	181	186	195	208	219	231	241	244	245	243	241	238	236	236	238	5276	220	5517	221																							
17	241	239	236	230	220	207	191	177	168	161	162	172	185	207	225	241	254	259	257	253	247	243	240	239	5254	219	5497	220																							
18	243	244	245	245	240	226	206	184	167	152	147	150	162	185	211	235	255	267	269	268	258	246	240	238	5283	220	5523	221																							
19	240	242	247	250	246	238	217	188	162	141	124	119	128	149	177	208	235	253	263	264	256	246	237	233	5063	211	5295	212																							
20	232	239	248	256	259	256	242	216	186	154	131	117	116	132	158	189	221	249	266	272	268	258	245	235	5145	214	5377	215																							
21	232	238	249	261	270	273	265	245	216	183	147	124	115	118	140	168	198	227	249	262	264	254	242	230	5170	215	5392	216																							
22	222	225	235	248	261	272	271	259	236	205	168	136	115	112	121	145	176	203	227	244	249	244	235	220	5029	210	5241	210																							
23	212	208	213	228	246	261	269	266	253	230	197	164	140	127	127	144	167	192	219	239	246	244	236	223	5051	210	5263	211																							
24	212	203	203	212	232	249	260	266	264	249	222	197	169	151	144	150	168	191	213	231	242	243	237	224	5132	214	5344	214																							
25	212	201	194	198	212	229	242	250	254	249	233	211	191	174	162	163	176	190	209	226	237	240	237	226	5116	213	5330	213																							
26	214	203	193	192	199	211	225	235	242	244	237	221	207	193	182	180	184	194	210	222	231	238	236	227	5120	213	5336	213																							
27	216	205	196	189	187	195	205	215	221	227	227	221	214	208	205	198	200	207	213	223	236	237	237	236	5118	213	5346	214																							
28	228	213	205	197	193	192	195	202	209	213	217	219	217	213	215	215	218	219	223	229	237	237	236	233	5175	216	5404	216																							
29	229	223	214	207	199	193	190	189	191	194	197	202	205	210	213	222	223	226	226	232	233	233	231	233	5115	213	5345	214																							
30	230	226	222	212	206	201	190	182	180	180	180	182	191	201	212	220	228	232	232	232	230	228	224	224	5045	210	5268	211																							
31	223	221	219	215	210	204	192	179	169	163	162	165	174	184	201	220	232	238	240	236	232	228	223	223	4953	206	5178	207																							
1	225																																																		
																								MONTHLY MEAN		215.9 cm																									