

Oceanographic Data of the 18th Japanese Antarctic Research Expedition 1976–1977

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第18次南極地域観測隊海洋部門報告

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要旨：第18次南極地域観測において、定常観測（1976–1977）として海上保安庁水路部の担当した海洋観測の結果を報告する。

Abstract: This report presents the results of oceanographic observations, which were carried out by the 18th Japanese Antarctic Research Expedition in 1976–1977.

This report presents the data of the oceanographic observations obtained on board the icebreaker FUJI during the summer mission of the 18th Japanese Antarctic Research Expedition in 1976–1977. The track chart of the cruise is shown in Fig. 1. The locations of serial (vertical) observation stations, the Salinity-Temperature-Depth (STD) recorder observation stations, the bathythermograph (BT) observation stations and the expendable bathythermograph (XBT) observation stations in the Southern Ocean are given in Fig. 2.

Surface observation: Surface temperature measurements and surface water samplings for chemical analysis were made three times a day during the cruise. The results are given in Table 1.

Current measurement: Measurements of surface current were made by Geomagnetic Electrokinetograph (GEK) through the cruise except in the magnetic equator region and in the pack ice area. The results are also shown in Table 1.

BT observation: Water temperature distributions in the upper layer (down to about 250 m) were surveyed with bathythermograph (BT) at almost the same frequency as the surface observations. The results are given in Table 2.

XBT observation: The vertical distributions of temperature in the upper layer (down to about 500 m and 2000 m) were investigated at 22 stations in the

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Southern Ocean along the track from Fremantle to Mauritius through Syowa Station. The results are shown in Table 4.

STD recorder observation: The vertical distribution of temperature and salinity was measured at 6 stations in the Southern Ocean along the track from Fremantle to Mauritius through Syowa Station. The results are shown in Fig. 3.

Serial observation: The serial observations were made at 16 stations in the Southern Ocean along the track from Fremantle to Mauritius (Fig. 2). The data are shown in Table 3 with relevant meteorological data. The interpolated and computed values (temperature, salinity, sigma-*t* and dynamic depth anomalies) at standard depths are also included in Table 3.

Chemical analysis of sea water: The following are the elements and the methods (or instruments) of analysis. The results are also presented in Table 3.

Salinity	Inductive salinometer (Auto-Lab Model 601 MK III)
pH	pH meter (Denki-Kagaku Keiki Co. HG-3)
Dissolved oxygen	Winkler's method
Phosphate-P	Molybdenum blue method
Reactive silicate-Si	Molybdenum yellow method
Nitrate-N	Modified Morris and Riley method
Nitrate-N	Sulphanilamide and N-(1-naphtyl)-ethylene-diamine 2 HCl were used as reagent.
Ammonium-N	Indophenol method
Alkalinity	After 25 ml of 1/100N HCl was added to 100 ml sample, pH of the sample was measured and alkalinity was calculated by STRICKLAND's table*.

Acknowledgments

The authors are indebted to Captain T. KURAMOTO of the icebreaker FUJI and his officers and crew, and also to the members of the 18th Japanese Antarctic Research Expedition for their co-operation during the cruise.

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* STRICKLAND, J. D. H. and PARSONS, T. R. (1960): A manual of sea water analysis. Bull. Fish. Res. Bd. Canada, **125**, 185 p.

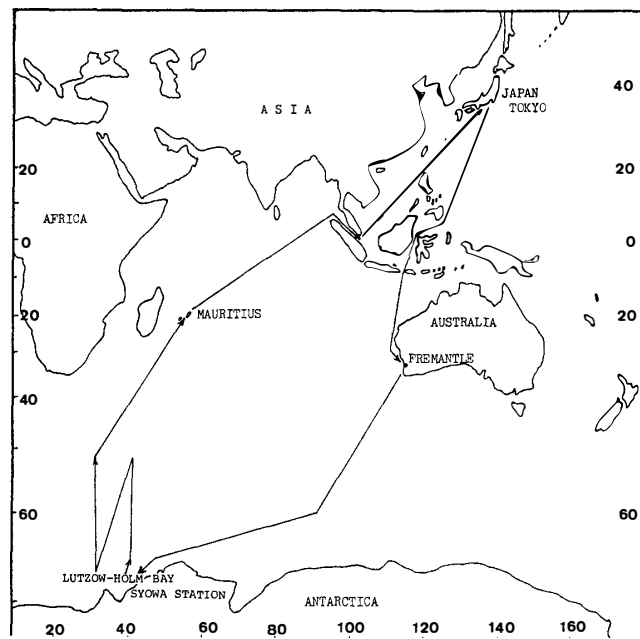


Fig. 1. Track of JARE-18 cruise 1976-1977.

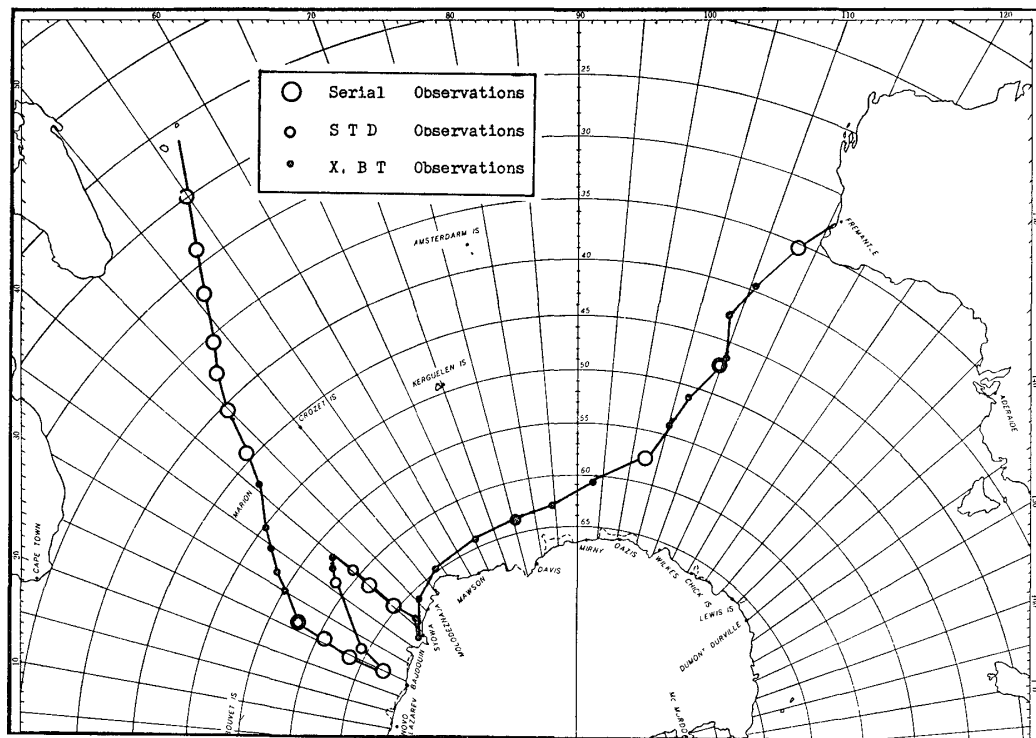
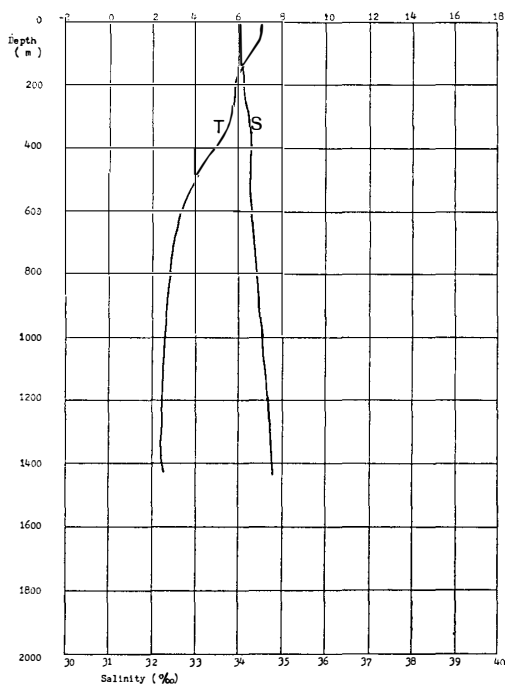


Fig. 2. Track of JARE-18 cruise and oceanographic station.

LOCATION 47°06' S , 109°37' E
 TIME(GMT) 08 h 05 m
 DATE Dec. 20, 1976
 REMARKS Water Temp. 7.6°C

OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Fu 1

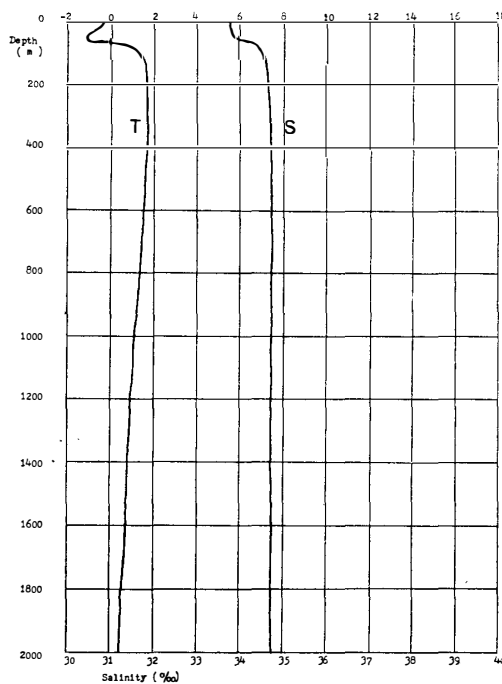
Temp. (°C)



LOCATION 63°41' S , 75°54' E
 TIME(GMT) 03 h 40 m
 DATE Dec. 26, 1976
 REMARKS Water Temp. -0.3°C

OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Fu 2

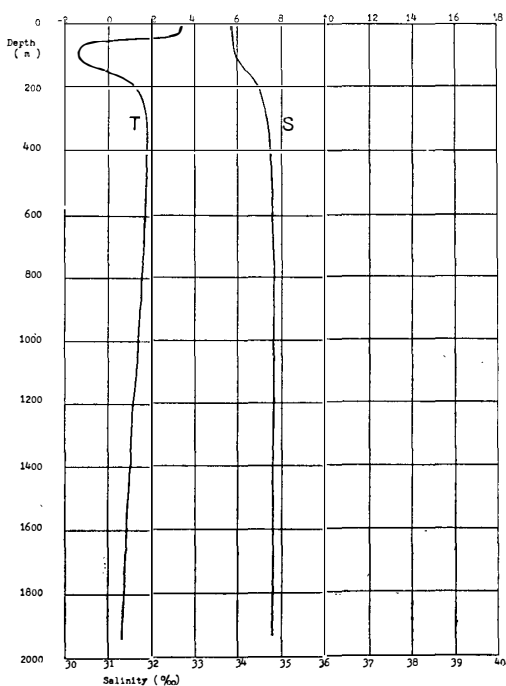
Temp. (°C)



LOCATION 59°20' S , 40°17' E
 TIME(GMT) 03 h 50 m
 DATE Feb. 20, 1977
 REMARKS Water Temp. 3.4°C

OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Fu 3

Temp. (°C)



LOCATION 50°30' S , 36°45' E
 TIME(GMT) 06 h 10 m
 DATE Feb. 22, 1977
 REMARKS Water Temp. 3.8°C

OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Fu 4

Temp. (°C)

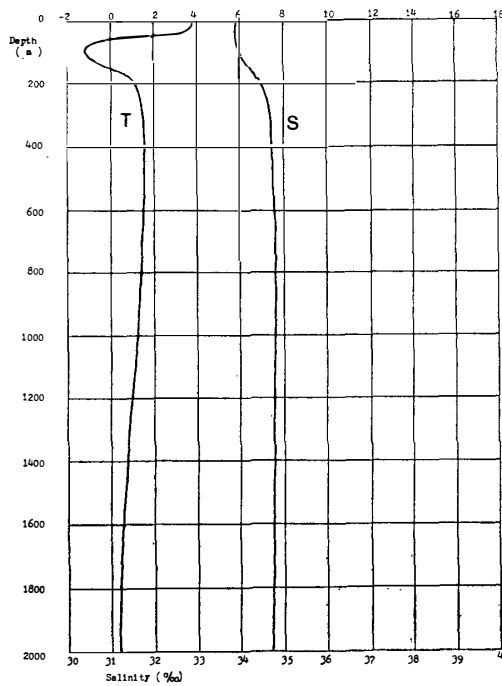


Fig. 3. Water temperature and salinity profiles measured by STD.

LOCATION $64^{\circ}16'N$, $27^{\circ}50'W$
 TIME(GMT) 06^h 15^m
 DATE Feb. 24, 1977
 OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Pu 5
 REMARKS Water Temp. $1.5^{\circ}C$

LOCATION $52^{\circ}45'S$, $26^{\circ}31'E$
 TIME(GMT) 06^h 00^m
 DATE Mar 1, 1977
 OPERATOR K. ODA T. IMANISHI
 SERIAL NO. Pu 6
 REMARKS Water Temp. $3.5^{\circ}C$

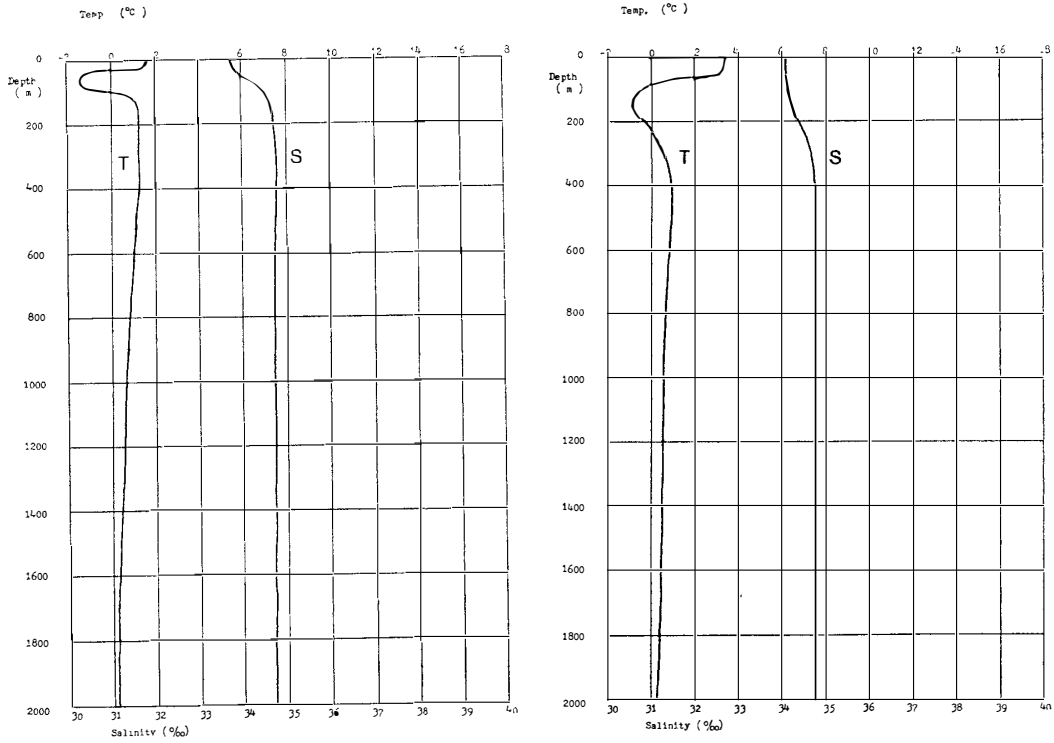


Fig. 3. Water temperature and salinity profiles measured by STD.

Table 1. Surface observation data.

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phos- phate- P	Sili- cate- Si	Ni- trite- N	Ni- trate- N	Ammo- nia-N	Alkalin- ity meq/L	Current		
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L					Dir.	Speed (Kn)						
1976																		
Nov. 25			Leave Tokyo															
26	23-00*	08-00	31-54N	135-08E	17.8	20.7	34.202	8.33	5.67	0.04	9	0.14	0.00	0.2	2.37	165	1.1	
	03-00	12-00	31-05	137-42	17.9	20.7	34.315	8.32	5.10	0.00	3	0.24	0.00	0.9	2.33			
	09-00	18-00	29-45	136-59	19.2	23.1	34.602	8.41	4.94	0.00	5	0.28	0.00	0.0	2.36			
27	23-00*	08-00	26-40	135-24	19.5	22.9	34.578	8.35	4.92	0.02	5	0.03	0.10	0.2	2.34	110	0.6	
	03-00	12-00	25-59	135-00	19.1	24.1	34.542	8.40	4.90	0.02	2	0.02	0.06	0.3	2.34			
	09-00	18-00	24-53	134-26	19.3	24.2	34.518	8.33	4.95	0.00	2	0.04	0.01	0.2	2.33	262	0.6	
28	23-00*	08-00	21-51	132-55	23.5	26.2	34.455	8.37	4.75	0.04	2	0.03	0.04	0.4	2.30	284	0.9	
	03-00	12-00	21-03	132-33	25.8	26.4	34.344	8.37	4.74	0.00	0	0.03	0.04	0.6	2.34			
	09-00	18-00	19-59	132-09	24.7	27.0	34.358	8.39	4.70	0.00	1	0.03	0.04	0.0	2.33	311	0.4	
29	23-00*	08-00	17-29	131-05	27.0	28.4	34.592	8.40	4.53	0.00	2	0.04	0.03	0.5	2.34	206	1.5	
	03-00	12-00	16-47	130-44	27.1	28.6	34.533	8.41	4.48	0.02	0	0.01	0.05	0.4	2.33			
	09-00	18-00	15-46	130-13	26.0	28.7	34.224	8.38	4.52	0.00	2	0.01	0.04	0.6	2.32			
30	23-00*	08-00	13-12	129-08	28.5	28.7	34.474	8.40	5.06	0.00	5	0.03	0.04	1.1	2.33			
	03-00	12-00	12-31	128-51	29.9	28.7	34.196	8.39	4.50	0.04	5	0.03	0.04	0.2	2.34			
	09-00	18-00	11-23	128-24	28.2	28.7	34.415	8.35	4.69	0.00	3	0.01	0.05	0.4	2.34			
Dec. 1	23-00*	08-00	08-46	127-50	28.7	28.9	34.335	8.37	4.51	0.00	2	0.00	0.01	0.2	2.34			
	03-00	12-00	07-56	127-08	26.3	29.0	34.254	8.36	4.53	0.00	2	0.01	0.06	0.0	2.33			
	09-00	18-00	06-33	126-38	29.2	29.2	34.238	8.35	4.92	0.04	2	0.03	0.04	0.6	2.34			
2	00-00	08-00	04-10	124-11	27.5	28.8	34.334	8.41	4.41	0.00	0	0.02	0.05	0.1	2.32			
	04-00	12-00	03-37	123-01	28.7	28.6	34.229	8.41	4.56	0.02	1	0.02	0.04	0.2	2.33			

* The time of the date of the preceding day.

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phosphate-P	Silicate-Si	Nitrite-N	Nitrate-N	Ammonia-N	Alkalinity meq/L	Current	
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L					Dir.	Speed (Kn)					
Dec. 2	10-00	18-00	02-46N	122-38 E	27.9	28.7	34.240	8.37	4.52	0.02	2	0.02	0.01	0.0	2.33		
	00-00	08-00	01-29	120-34	27.2	28.0	33.580	8.34	4.60	0.00	2	0.01	0.04	0.6	2.31		
	04-00	12-00	01-05	119-58	26.2	28.6	33.513	8.33	4.56	0.02	3	0.01	0.04	0.5	2.30		
4	10-00	18-00	00-03	119-27	26.7	28.6	33.449	8.37	4.66	0.02	4	0.03	0.01	0.3	2.29		
	00-00	08-00	02-27 S	118-40	27.0	28.8	33.219	8.34	4.63	0.00	3	0.01	0.09	0.1	2.29		
	04-00	12-00	03-25	118-32	25.2	28.8	33.552	8.30	4.63	0.00	5	0.02	0.06	0.4	2.29		
5	10-00	18-00	04-48	118-19	25.0	29.0	33.717	8.38	4.66	0.04	2	0.05	0.04	0.3	2.30		
	00-00	08-00	07-27	116-34	28.8	29.2	33.535	8.27	4.65	0.02	2	0.03	0.06	0.0	2.31		
	04-00	12-00	08-05	116-04	28.9	28.6	33.590	8.30	4.64	0.04	2	0.05	0.03	0.2	2.31		
6	10-00	18-00	08-57	115-40	28.2	28.3	33.768	8.29	4.91	0.02	3	0.03	0.04	0.0	2.31		
	00-00	08-00	11-27	115-04	27.4	28.2	34.551	8.27	4.88	0.02	3	0.01	0.01	1.1	2.34	100	1.5
	04-00	12-00	12-13	114-55	28.0	28.4	34.499	8.33	5.13	0.02	5	0.01	0.03	0.4	2.32		
7	10-00	18-00	13-19	114-43	26.9	28.2	34.426	8.32	4.72	0.00	4	0.01	0.07	0.0	2.33	173	1.4
	00-00	08-00	15-56	114-17	26.0	26.6	34.614	8.31	4.71	0.04	5	0.03	0.06	0.4	2.33	186	1.4
	04-00	12-00	16-40	114-09	25.5	26.4	34.693	8.32	4.73	0.04	4	0.00	0.06	0.1	2.33		
8	10-00	18-00	17-50	113-53	25.1	25.1	34.803	8.34	4.89	0.00	3	0.01	0.05	0.2	2.33	231	1.0
	00-00	08-00	20-41	113-18	25.7	25.3	34.899	8.34	4.78	0.00	0	0.01	0.05	0.4	2.33	190	1.2
	04-00	12-00	21-22	113-10	25.1	25.2	34.933	8.32	4.80	0.04	3	0.02	0.01	0.2	2.33		
9	10-00	18-00	22-27	113-12	24.1	24.2	35.000	8.33	4.84	0.00	5	0.03	0.04	0.2	3.33		
	00-00	08-00	24-52	112-38	19.9	21.1	35.359	8.27	5.52	0.00	3	0.04	0.03	0.0	2.34		
	04-00	12-00	25-32	112-38	20.9	21.3	35.304	8.29	5.15	0.00	3	0.04	0.04	0.3	2.34		
10	10-00	18-00	26-30	112-51	20.5	21.4	35.255	8.21	5.12	0.04	3	0.01	0.04	0.0	2.34		
	00-00	08-00	29-07	113-36	19.9	20.3	35.533	8.21	5.52	0.00	2	0.03	0.01	0.1	2.35		

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phos- phate- P	Sili- cate- Si	Ni- trite- N	Ni- trate- N	Ammo- nia-N	Alkalin- ity mep/L	Current	
	GMT	LMT	Lat.	Long.	°C	μg-atoms/L					Dir.	Speed (Kn)					
Dec. 11			Arrive in Fremantle														
16			Leave Fremantle														
17	00-00	08-00	35-18 S	113-08 E	19.0	17.5	35.558	8.41	5.51	0.06	0	0.01	0.05	0.0	2.36	147	0.3
	10-00	18-00	36-31	112-19	20.0	18.6	35.606	8.23	5.41	0.13	3	0.02	0.07	0.3	2.37	165	0.2
18	01-00	08-00	38-59	110-32	17.5	17.5	35.254	8.27	6.01	0.13	1	0.08	0.21	—	2.36	250	0.5
	05-00	12-00	39-35	111-05	16.6	18.0	35.486	8.29	5.79	0.02	0	0.03	0.07	0.9	2.36		
	11-00	18-00	40-27	109-37	15.0	18.6	34.953	8.22	6.16	0.02	2	0.15	3.31	0.3	2.35	124	0.7
19	01-00	08-00	42-43	108-41	12.8	11.2	34.073	8.16	6.30	0.15	3	0.27	0.41	0.4	2.34	279	0.6
	05-00	12-00	43-18	108-48	12.8	10.8	34.597	8.18	6.43	0.28	7	0.28	5.75	0.7	2.34		
20	01-00	08-00	46-25	110-25	11.3	7.6	34.065	8.26	6.78	0.93	0	0.27	11.25	0.4	2.34	155	1.0
	11-00	18-00	47-18	109-48	7.8	7.4	34.279	8.23	6.83	1.17	2	0.28	18.45	0.8	2.33		
21	01-00	08-00	49-25	108-00	6.0	6.5	33.973	8.21	7.31	1.08	2	0.23	16.20	0.6	2.32	162	0.7
	05-00	12-00	50-08	107-20	5.5	6.4	33.928	8.22	6.81	1.26	5	0.22	15.30	1.0	2.33		
	11-00	18-00	50-51	106-54	5.2	5.2	33.790	8.23	7.17	1.43	3	0.24	20.25	1.1	2.33		
22	01-00	08-00	53-15	105-28	3.7	3.6	33.865	8.23	7.42	1.22	0	0.26	13.50	1.1	2.33		
	05-00	12-00	54-00	105-00	5.4	4.8	33.895	8.24	7.41	1.21	2	0.27	19.53	0.5	2.33		
	11-00	18-00	55-10	104-20	1.8	3.4	34.007	8.14	7.65	1.69	38	0.37	26.64	0.8	2.33		
23	01-00	08-00	57-43	102-26	2.0	2.6	34.090	8.21	7.24	1.49	44	0.34	25.02	0.2	2.35	75	0.2
	11-00	18-00	58-34	100-03	2.1	2.5	34.090	8.22	7.59	1.67	48	0.28	29.88	0.3	2.35	62	0.3
24	02-00	08-00	60-12	94-39	1.7	1.2	33.864	8.17	8.14	1.33	23	0.27	18.00	—	2.34	140	0.4
	06-00	12-00	60-37	93-12	2.2	1.2	33.744	8.19	7.96	1.40	25	0.28	20.25	—	2.33		
	12-00	18-00	61-14	91-01	2.0	1.2	33.814	8.11	8.05	1.28	49	0.27	24.57	—	2.34	131	0.4
25	02-00	08-00	62-38	85-51	0.4	-0.1	33.903	8.17	8.31	1.36	56	0.20	20.97	0.6	2.36	124	0.3

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phosphate-P	Silicate-Si	Nitrite-N	Nitrate-N	Ammonia-N	Alkalinity meq/L	Current		
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L					Dir.	Speed (Kn)						
Dec. 25	06-00	12-00	62-59 S	84-31 E	0.0	-0.1	33.497	8.24	8.38	1.24	43	0.26	21.42	0.6	2.34			
	12-00	18-00	63-16	82-29	0.2	-0.1	33.482	8.17	8.22	1.28	46	0.29	27.00	0.9	2.34			
26	03-00	08-00	63-41	75-54	0.2	-0.3	33.713	8.16	7.81	1.47	59	0.20	24.30	0.5	2.35			
	13-00	18-00	63-39	73-07	0.3	0.8	33.774	8.08	8.12	1.56	49	0.24	24.03	1.0	2.34			
27	04-00	08-00	64-03	67-03	0.5	0.4	33.501	8.18	8.37	1.17	50	0.20	16.47	0.9	2.34			
	08-00	12-00	64-10	65-19	0.0	0.6	33.615	8.22	8.52	1.10	46	0.17	17.82	0.8	2.34			
	14-00	18-00	64-21	62-30	-0.2	0.6	33.570	8.17	9.21	0.97	49	0.22	19.80	1.0	2.33			
28	04-00	08-00	64-47	55-50	0.3	0.6	33.597	8.22	8.18	1.15	41	0.13	21.06	—	2.35			
	08-00	12-00	64-54	53-56	0.6	0.6	33.611	8.19	8.48	1.08	46	0.18	23.67	1.0	2.35			
	14-00	18-00	65-27	51-32	0.3	0.6	33.664	8.12	8.21	1.34	49	0.14	24.93	—	2.34			
29	05-00	08-00	65-43	46-04	0.0	-1.1	33.258	8.19	8.20	1.32	65	0.21	25.92	1.3	2.32			
	09-00	12-00	66-01	45-23	0.0	-1.1	33.028	8.16	7.98	1.56	71	0.25	27.90	0.8	2.31			
	15-00	18-00	66-28	44-34	0.0	-1.5	32.812	8.16	8.11	1.54	69	0.22	24.30	1.7	2.31			
30	05-00	08-00	67-21	42-18	-0.1	-1.0	33.069	8.29	8.66	0.99	59	0.16	22.77	0.3	2.31			
	09-00	12-00	67-32	41-49	1.5	-0.4	33.341	8.22	8.30	1.51	66	0.18	24.12	0.8	2.32			
	15-00	18-00	67-47	41-16	2.4	2.2	33.902	8.13	8.13	1.64	66	0.24	23.13	0.3	2.31			
31	05-00	08-00	68-24	38-51	-2.7	-0.1	33.752	8.13	8.00	1.56	68	0.21	30.15	0.3	2.34			
	09-00	12-00	68-26	38-42	-4.1	-0.4	33.735	8.17	8.25	1.56	68	0.13	28.35	1.0	2.33			
			Arrive at Ongul Islands															
1977																		
Feb. 17	Leave Ongul Islands																	
18	05-00	08-00	64-50	39-59	0.0	2.1	33.745	8.21	7.62	1.80	58	0.46	27.60	0.9	2.34			
	09-00	12-00	64-44	40-59	1.0	2.3										90	0.4	

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phos- phate- P	Sili- cate- Si	Ni- trite- N	Ni- trate- N	Ammo- nia-N	Alkalin- ity meq/L	Current	
	GMT	LMT	Lat.	Long.	°C	μg-atoms/L					Dir.	Speed (Kn)					
Feb. 18	15-00	18-00	63-52 S	40-00 E	1.0	2.3	33.792	8.19	8.72	1.47	59	0.49	26.22	0.8	2.34	170	0.4
19	05-00	08-00	61-47	40-00	2.4	3.1	33.964	8.21	7.45	1.78	49	0.44	28.34	0.4	2.35	73	0.3
	15-00	18-00	61-28	40-00	3.0	3.2	33.911	8.16	8.59	1.71	50	0.38	30.54	0.8	2.34		
20	05-00	08-00	59-20	40-17	4.1	3.3	33.934	8.16	7.19	1.61	37	0.40	—	0.2	2.35	135	0.5
	15-00	18-00	58-27	40-19	4.4	3.6	33.862	8.18	7.60	1.71	42	0.49	20.24	1.0	2.35		
21	05-00	08-00	56-43	39-37	4.2	3.4	33.947	8.17	7.60	1.33	38	0.39	20.24	1.9	2.34		
	09-00	12-00	56-55	38-56	4.6	3.6	33.955	8.17	7.73	1.41	22	0.41	20.70	2.5	2.34		
	15-00	18-00	57-18	38-07	4.5	3.8	33.957	8.20	7.70	1.41	10	0.36	20.42	2.8	2.34		
22	06-00	08-00	58-38	36-45	5.0	3.8	33.904	8.20	7.86	1.37	22	0.41	21.62	0.0	2.34	130	0.6
	16-00	18-00	59-30	35-54	2.0	2.8	33.797	8.14	7.58	1.55	47	0.45	23.74	0.0	2.33	230	0.4
23	16-00	18-00	61-58	31-26	2.1	2.3	33.807	8.16	7.64	1.61	52	0.30	21.34	0.3	2.35		
24	06-00	08-00	64-16	27-50	0.7	1.5	33.780	8.16	7.71	1.61	57	0.43	23.92	0.6	2.35	178	0.4
	16-00	18-00	65-29	26-44	1.2	1.5	33.122	8.16	7.71	1.92	58	0.46	25.02	2.2	2.32	70	0.6
25	06-00	08-00	67-34	25-40	0.6	1.0	32.956	8.17	8.06	1.61	49	0.32	23.37	1.3	2.33	132	0.3
26	10-00	12-00	67-09	25-35	1.0	0.5	32.680	8.18	7.47	1.23	67	0.43	—	0.8	2.31		
	16-00	18-00	66-13	25-28	0.0	0.5	32.641	8.19	7.73	1.53	66	0.43	—	1.1	2.31	162	0.5
27	06-00	08-00	63-54	25-42	2.0	2.0	33.726	8.23	7.65	1.82	55	0.32	20.70	1.6	2.34		
	10-00	12-00	63-49	25-43												135	0.4
	16-00	18-00	62-46	25-45	2.8	2.8	33.665	8.17	7.58	1.63	53	0.28	—	0.0	2.34		
28	06-00	08-00	60-38	25-54	3.3	3.7	33.807	8.27	7.56	1.37	27	0.40	26.04	—	2.35	147	0.4
	16-00	18-00	59-39	26-03	3.0	3.5	33.267	8.22	7.41	1.67	41	0.40	—	0.0	2.35	147	0.4
Mar. 1	06-00	08-00	57-45	26-31	3.2	3.5	34.098	8.19	7.29	1.57	46	0.41	22.82	0.7	2.36		
	16-00	18-00	57-06	27-22	3.5	3.7	34.018	8.19	7.34	1.57	28	0.31	24.84	1.5	2.36	305	0.1

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phosphate-P	Silicate-Si	Nitrite-N	Nitrate-N	Ammonia-N	Alkalinity meq/L	Current	
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L						Dir.	Speed (Kn)				
Mar. 2	06-00	08-00	55-00 S	30-13 E	1.1	4.1	33.928	8.17	7.35	1.27	21	0.22	16.47	0.3	2.35	159	0.6
	10-00	12-00	54-24	31-00	3.9	4.0	33.904	8.17	7.47	1.22	28	0.26	22.82	0.0	2.35		
	16-00	18-00	53-28	32-09	4.0	4.6	33.847	8.18	7.36	1.37	13	0.25	16.47	0.0	2.35	188	0.2
3	06-00	08-00	51-28	34-51	4.7	4.8	33.804	8.19	7.28	1.41	12	0.26	22.82	0.3	2.34	125	0.6
	10-00	12-00	50-57	35-33	6.2	4.8	33.796	8.19	7.21	1.48	11	0.26	22.08	0.1	2.35		
	16-00	18-00	50-09	36-39	6.4	5.7	33.765	8.23	7.09	1.04	5	0.20	20.75	—	2.35		
4	05-00	08-00	48-20	39-10	8.3	6.2	33.749	8.24	7.01	1.12	5	0.20	23.46	—	2.34		
	09-00	12-00	47-42	39-56	7.8	6.4	33.712	8.25	6.93	1.35	5	0.22	20.88	—	2.34		
	15-00	18-00	46-48	40-56	7.4	7.2	33.750	8.22	6.88	1.27	5	0.20	17.94	—	2.34		
5	05-00	08-00	44-18	42-45	8.7	8.9	33.752	8.26	6.62	1.22	2	0.19	15.46	0.3	2.34	155	0.1
	15-00	18-00	42-51	43-27	10.0	10.1	33.750	8.24	6.60	0.94	8	0.11	9.66	1.3	2.33	142	0.7
6	05-00	08-00	40-25	44-47	16.2	16.0	35.065	8.33	5.73	0.24	5	0.03	0.03	0.7	2.36	355	0.2
	15-00	18-00	39-23	45-29	18.0	17.0	34.857	8.36	6.00	0.14	3	0.02	0.02	1.7	2.36	134	0.3
7	05-00	08-00	37-39	46-51	20.4	19.6	35.536	8.33	5.30	0.10	3	0.02	0.02	0.2	2.37	123	0.9
	15-00	18-00	37-16	47-45	20.5	19.8	35.504	8.34	5.37	0.24	5	0.01	0.01	0.3	2.37		
8	05-00	08-00	35-21	48-51	21.0	20.1	35.459	8.36	5.34	0.08	5	0.07	0.06	0.4	2.36	160	0.4
	15-00	18-00	34-19	49-31	21.0	21.4	34.992	8.35	5.18	0.16	4	0.03	0.03	1.0	2.35	125	0.1
9	05-00	08-00	31-57	51-01	24.2	23.5	34.576	8.20	4.96	0.04	3	0.03	0.03	0.4	2.37	212	0.7
	15-00	18-00	30-54	51-38	23.8	23.9	34.625	8.20	4.97	0.24	4	0.03	0.03	0.0	2.37	115	1.2
10	04-00	08-00	28-43	52-55	25.0	26.4	35.289	8.35	4.73	0.02	4	0.02	0.02	0.1	2.36	227	0.5
	14-00	18-00	27-31	53-36	26.1	26.2	35.420	8.29	4.84	0.08	4	0.01	0.01	0.6	2.36	122	0.9
11	04-00	08-00	24-58	54-54	25.3	27.0	35.084	8.33	4.85	0.06	2	0.04	0.04	1.1	2.35	136	0.9
	14-00	18-00	23-37	55-12	26.6	27.8	35.118	8.31	4.70	0.16	5	0.03	0.03	1.3	2.36		

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phos- phate- P	Sili- cate- Si	Ni- trite- N	Ni- trate- N	Ammo- nia-N	Alkalin- ity meq/L	Current			
	GMT	LMT	Lat.	Long.	°C	Dir.										Speed (Kn)			
Mar. 12	04-00	08-00	21-27 S	56-09 E	27.1	27.8	35.201	8.28	4.74	0.02	5	0.04	0.04	0.3	2.36				
13			Arrive in Mauritius																
18			Leave Mauritius																
18	14-00	18-00	19-10	58-45	27.8	28.8	34.784	8.35	4.52	0.14	5	0.04	0.00	0.4	2.34				
19	04-00	08-00	17-45	61-06	28.5	28.5	34.882	8.43	4.66	0.04	7	0.01	0.01	0.3	2.34	195	0.3		
	08-00	12-00	17-16	61-46	28.9	28.6	34.823	8.43	4.56	0.10	9	0.01	0.03	0.2	2.35				
	14-00	18-00	16-28	62-46	28.2	28.2	35.306	8.40	4.59	0.14	10	0.03	0.01	0.2	2.36				
20	04-00	08-00	15-15	64-51	28.2	28.2	35.046	8.44	4.59	0.06	7	0.00	0.01	0.8	2.35				
	08-00	12-00	14-48	65-25	28.5	28.2	35.074	8.44	4.58	0.08	7	0.00	0.04	0.5	2.35				
	14-00	18-00	14-10	66-27	28.2	28.5	34.884	8.44	4.57	0.16	7	0.00	0.02	0.3	2.35				
21	03-00	08-00	12-50	68-25	28.4	28.6	34.245	8.33	4.63	0.06	13	0.01	0.02	0.7	2.35	157	1.1		
	07-00	12-00	12-25	69-00	29.3	28.7	34.300	8.33	4.63	0.06	11	0.01	0.04	0.5	2.35				
	13-00	18-00	11-47	69-50	27.1	28.7	34.204	8.35	4.82	0.10	10	0.02	0.05	0.6	2.35			122	0.7
22	03-00	08-00	10-17	71-46	27.8	28.2	33.617	8.39	4.60	0.00	9	0.00	0.00	0.9	2.31				
	07-00	12-00	09-52	72-20	27.2	28.8	34.202	8.37	4.62	0.00	9	0.00	0.02	0.6	2.33				
	13-00	18-00	09-10	73-16	27.9	29.2	34.172	8.39	4.62	0.06	5	0.00	0.02	0.5	2.33				
23	03-00	08-00	07-39	75-19	29.2	29.4	34.120	8.33	4.76	0.00	8	0.01	0.01	0.3	2.32				
	07-00	12-00	07-15	75-55	28.9	29.6	34.084	8.33	4.69	0.00	9	0.00	0.01	0.6	2.32				
	13-00	18-00	06-41	76-46	27.1	29.2	34.128	8.33	4.63	0.08	8	0.01	0.00	0.6	2.32				
24	03-00	08-00	05-14	78-56	28.2	29.1	34.062	8.33	4.67	0.00	8	0.01	0.00	0.3	2.32				
	07-00	12-00	04-49	79-33	28.8	28.9	34.062	8.33	4.65	0.00	9	0.01	0.01	0.4	2.33				
	13-00	18-00	04-09	80-35	25.7	28.4	33.564	8.35	4.58	0.10	7	0.01	0.00	0.6	2.30				
25	02-00	08-00	02-40	83-01	28.6	28.8	34.421	8.40	4.67	0.00	4	0.01	0.07	0.6	2.33				

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phosphate-P	Silicate-Si	Nitrite-N	Nitrate-N	Ammonia-N	Alkalinity meq/L	Current	
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L					Dir.	Speed (Kn)					
Mar. 25	06-00	12-00	02-10 S	83-31 E	29.7	29.4	34.618	8.39	4.61	0.00	3	0.01	0.15	0.2	2.33		
	12-00	18-00	01-23	84-28	29.2	30.1	34.680	8.39	4.58	0.08	4	0.00	0.17	0.3	2.34		
26	02-00	08-00	00-17N	86-47	28.7	29.4	34.685	8.35	4.62	0.00	10	0.00	0.04	0.8	2.34		
	06-00	12-00	00-44	87-28	28.0	29.4	34.566	8.36	4.54	0.02	16	0.00	0.11	1.4	2.34		
27	12-00	18-00	01-26	88-27	29.2	29.8	34.654	8.35	4.54	0.14	10	0.00	0.11	0.6	2.34		
	02-00	08-00	03-01	90-36	29.5	29.2	34.619	8.40	4.86	0.00	6	0.00	0.01	0.2	2.34		
28	06-00	12-00	03-30	91-18	30.3	29.9	34.282	8.43	4.69	0.00	6	0.01	0.00	0.4	2.33		
	12-00	18-00	04-16	92-16	25.8	29.8	34.392	8.45	4.73	0.06	9	0.01	0.01	0.0	2.33		
29	01-00	08-00	05-57	94-31	29.7	30.0	33.533	8.45	4.63	0.02	1	0.01	0.10	0.0	2.31		
	05-00	12-00	06-15	95-13	29.3	28.7	32.851	8.39	4.60	0.04	6	0.01	0.07	0.1	2.29		
30	11-00	18-00	06-11	96-18	27.9	28.8	32.948	8.39	4.76	0.06	16	0.01	0.01	0.1	2.29		
	01-00	08-00	05-42	98-38	28.7	28.8	32.564	8.37	4.59	0.08	14	0.02	0.00	0.5	2.28		
31	01-00	08-00	03-37	100-18	28.5	28.8	31.744	8.37	4.77	0.04	13	0.01	0.01	0.6	2.25		
	11-00	18-00	02-48	101-02	28.2	28.9	31.751	8.38	4.76	0.10	16	0.07	0.00	0.4	2.26		
Apr. 1	00-30	08-00	01-30	103-02	26.4	27.9	32.514	8.32	4.69	0.08	10	0.03	0.01	0.3	2.28		
	04-30	12-00	01-10	103-39	29.2	28.8	32.801	8.33	4.54	0.12	13	0.04	0.00	0.4	2.29		
8	Arrive in Singapore																
8	Leave Singapore																
8	10-30	18-00	02-01	104-59	27.5	28.1	32.736	8.36	4.66	0.00	8	0.04	0.00	0.1	2.29		
9	00-30	08-00	04-30	106-23	27.1	27.4	33.543	8.37	4.72	0.00	10	0.04	0.00	0.2	2.31		
	04-30	12-00	05-12	106-52	27.1	27.5	33.408	8.39	4.76	0.02	8	0.03	0.00	0.4	2.30		
10	10-30	18-00	06-11	107-30	27.2	27.4	33.493	8.34	4.84	0.02	6	0.02	0.03	0.8	2.31		
	00-30	08-00	08-30	109-06	27.3	27.4	33.422	8.33	4.70	0.03	6	0.02	0.02	0.7	2.30		

Table 1 (continued).

Data	Time		Position		Air temp.	Water temp.	S ‰	pH	O ₂ cc/L	Phos- phate- P	Sili- cate- Si	Ni- trite- N	Ni- trate- N	Ammo- nia-N	Alkalin- ity meq/L	Current	
	GMT	LMT	Lat.	Long.	°C	µg-atoms/L					Dir.	Speed (Kn)					
Apr. 10	04-30	12-00	09-09N	109-35E	28.4	27.6	33.443	8.34	4.71	0.06	6	0.03	0.00	0.7	2.30		
	10-30	18-00	10-01	110-29	27.4	27.4	33.462	8.36	4.86	0.00	8	0.01	0.02	0.0	2.30		
11	00-00	08-00	11-53	112-38	27.5	27.1	33.485	8.36	4.73	0.02	13	0.01	0.04	0.6	2.30		
	04-00	12-00	12-24	113-17	28.2	27.6	33.463	8.36	4.72	0.04	15	0.03	0.04	0.3	2.30		
12	10-00	18-00	13-15	114-09	27.8	27.8	33.463	8.39	4.86	0.06	8	0.02	0.01	0.3	2.30		
	00-00	08-00	15-16	116-17	27.0	26.8	33.644	8.39	4.83	0.04	14	0.01	0.03	0.3	2.30		
13	04-00	12-00	15-51	116-56	28.9	27.9	33.627	8.40	4.71	0.04	11	0.01	0.01	0.3	2.30		
	10-00	18-00	16-42	117-52	27.5	28.0	33.943	8.38	4.69	0.06	7	0.02	0.07	0.8	2.32		
14	00-00	08-00	18-43	120-08	27.6	27.5	33.982	8.34	4.77	0.04	6	0.01	0.03	0.6	2.32		
	04-00	12-00	19-24	120-46	27.0	26.4	33.926	8.34	4.79	0.04	5	0.02	0.02	0.9	2.32		
15	10-00	18-00	19-56	121-58	26.9	27.7	33.371	8.37	4.68	0.10	4	0.01	0.05	0.4	2.33		
	23-00*	08-00	21-42	123-57	26.8	26.8	34.450	8.38	4.74	0.06	11	0.02	0.12	1.9	2.34		
16	03-00	12-00	22-19	124-35	26.8	26.1	34.668	8.37	4.75	0.04	6	0.03	0.04	1.8	2.34		
	09-00	18-00	23-09	125-22	26.0	26.1	34.693	8.38	4.83	0.08	9	0.01	0.13	1.2	2.34		
17	23-00*	08-00	24-47	127-06	25.2	25.0	34.737	8.40	4.93	0.00	9	0.02	0.05	0.0	2.34		
	03-00	12-00	25-14	127-36	25.5	24.1	34.790	8.40	5.14	0.00	5	0.03	0.04	0.0	2.35		
18	09-00	18-00	26-04	128-17	25.1	24.7	34.751	8.40	4.98	0.04	7	0.02	0.04	0.0	2.34		
	23-00*	08-00	27-48	130-12	21.6	22.8	34.653	8.43	5.00	0.04	13	0.01	0.03	0.0	2.34		
19	03-00	12-00	28-16	130-44	21.9	23.2	34.767	8.42	5.00	0.04	5	0.00	0.02	0.0	2.34		
	09-00	18-00	29-08	131-33	22.2	23.4	34.580	8.43	4.92	0.08	5	0.02	0.04	0.0	2.34		
			Arrive in Tokyo														

* The time of the data of the preceding day.

Table 2. Bathythermograph data.

St. No.	Date			Time		Position		Temperature (°C) at indicated depth (m)										
	Day	Month	Year	GMT	LMT	Lat.	Long.	0	10	20	30	50	75	100	125	150	200	250
1	26	Nov.	1976	23-00*	08-00	31-54N	135-08 E	20.7	20.7	20.7	20.7	20.7	20.1	17.7	16.2	14.6	12.4	
2	26			09-00	18-00	29-45	136-59	23.1	23.1	23.1	23.1	23.1	23.1	23.1	23.1	22.9	20.2	
3	27			23-00*	08-00	26-40	135-24	22.9	22.9	22.9	22.9	22.9	22.8	22.3	20.5	19.6	18.0	
4	27			09-00	18-00	24-53	134-26	24.2	24.2	24.2	24.2	24.2	24.0	23.0	20.8	19.7	18.6	
5	28			23-00*	08-00	21-51	132-55	26.2	26.2	26.2	26.2	26.2	23.6	21.4	20.4	19.5	17.3	
6	28			09-00	18-00	19-59	132-09	27.0	27.0	27.0	27.0	26.8	25.1	22.8	21.1	19.9	17.6	
7	29			23-00*	08-00	17-29	131-05	28.4	28.4	28.4	28.4	28.4	27.2	25.8	24.2	22.2	19.3	
8	29			09-00	18-00	15-46	130-13	28.7	28.7	28.7	28.7	28.7	27.8	26.6	24.6	22.8	18.6	
9	30			23-00*	08-00	13-12	129-08	28.7	28.7	28.7	28.7	28.5	26.6	24.9	22.6	20.6	17.3	
10	30			09-00	18-00	11-23	128-24	28.7	28.7	28.7	28.7	28.4	27.0	24.8	22.3	18.9	15.3	
11	1	Dec.	1976	23-00*	08-00	08-46	127-50	28.9	28.9	28.9	28.9	27.4	25.8	23.4	20.4	17.8	13.2	
12	1			10-00	18-00	06-33	126-38	29.2	29.2	29.2	29.2	28.6	26.9	23.8	20.9	17.2	14.7	11.9
13	6			00-00	08-00	11-27 S	115-04	28.2	28.2	28.2	28.2	25.5	22.5	21.1	20.0	18.3	13.6	12.5
14	6			10-00	18-00	13-19	114-43	28.2	28.2	28.2	28.2	27.9	24.3	23.2	20.7	18.8	15.4	12.3
15	7			00-00	08-00	15-56	114-17	26.6	26.6	26.5	26.5	25.1	24.6	23.9	22.6	20.8	18.0	15.5
16	7			10-00	18-00	17-50	113-53	25.1	25.1	24.9	24.8	24.0	23.2	21.5	20.4	20.2	18.1	
17	8			00-00	08-00	20-41	113-18	25.3	25.3	25.0	24.8	23.8	21.1	20.4	20.0	19.3	17.9	15.4
18	17			00-00	08-00	35-18	113-08	17.5	17.5	17.2	16.9	16.6	16.2	15.4	15.0	14.0	12.6	11.6
19	17			10-00	18-00	36-31	112-19	18.6	18.3	18.0	17.9	17.8	16.9	15.9	15.1	14.6	13.3	
20	18			01-00	08-00	38-59	110-32	15.6	15.6	15.6	15.6	14.9	14.1	13.8	13.9	13.7	12.7	12.2
21	18			11-00	18-00	40-27	109-37	13.6	13.6	13.6	13.4	13.2	13.1	13.2	12.8	12.8	11.7	11.5
22	20			11-00	18-00	47-18	109-48	7.4	7.4	7.3	7.3	7.2	7.1	6.7	6.9	7.0	6.6	
23	21			01-00	08-00	49-25	108-00	5.9	5.9	5.9	5.9	5.8	5.3	5.1	4.8	4.8	4.5	
24	23			01-00	08-00	57-43	102-26	2.6	2.6	2.3	1.2	-0.2	-0.7	-0.8	-0.8	-0.5	1.4	1.7

* The time of the data of the preceding day.

Table 2 (continued).

St. No.	Date			Time		Position		Temperature (°C) at indicated depth (m)										
	Day	Month	Year	GMT	LMT	Lat.	Long.	0	10	20	30	50	75	100	125	150	200	250
25	23	Dec.	1976	11-00	18-00	58-34 S	100-03 E	2.5	2.5	2.5	1.8	0.3	-0.2	-0.2	0.2	0.9		
26	24			02-00	08-00	60-12	94-39	1.2	0.8	0.3	-1.0	-1.0	-1.0	-0.7	0.8	1.4		
27	24			12-00	18-00	61-14	91-01	1.2	0.6	0.6	0.3	-1.3	-1.3	-1.3	-1.1	-0.8	0.3	
28	25			02-00	08-00	62-38	85-51	-0.1	-0.1	-0.4	-0.9	-1.2	-1.2	-0.2	-0.2	0.1	0.9	
29	25			12-00	18-00	63-16	82-29	-0.1	-0.1	-0.2	-0.4	-0.9	-0.1	1.3	2.1	2.1		
30	18	Feb.	1977	05-00	08-00	64-50	39-59	2.1	2.1	2.1	1.5	-0.9	-1.1	0.7	1.1	1.3	1.6	
31	18			15-00	18-00	63-52	40-00	2.3	2.3	2.3	0.1	-1.3	-1.3	-0.2	1.1	1.3	1.7	
32	19			05-00	08-00	61-47	40-00	3.1	3.1	3.1	3.0	-0.9	-1.2	-1.2	-0.6	0.9	1.8	2.0
33	20			05-00	08-00	59-20	40-17	3.3	3.3	3.3	3.3	1.8	-1.3	-1.3	-1.2	-0.7	1.2	1.7
34	22			06-00	08-00	58-38	36-45	3.8	3.8	3.8	3.8	3.8	-0.3	-0.4	-0.4	-0.6	1.1	
35	22			16-00	18-00	59-30	35-34	2.8	2.8	2.8	2.8	-0.3	-0.7	-0.4	-0.3	0.4	1.4	
36	23			16-00	18-00	61-07	31-26	2.3	2.3	2.3	2.3	-1.1	-1.1	-0.8	0.3	1.3	1.5	
37	24			06-00	08-00	64-16	27-50	1.5	1.5	1.5	1.5	-1.2	-1.6	-1.1	0.8	1.2	1.2	1.2
38	24			16-00	18-00	65-29	26-44	1.5	1.5	1.5	-0.5	-1.2	-1.4	-1.3	-0.5	0.0		
39	25			06-00	08-00	67-34	25-40	-0.2	-0.2	-0.2	-1.2	-1.5	-1.6	-1.6	-1.5	-1.0	0.0	0.9
40	26			16-00	18-00	66-13	25-28	0.5	0.5	-0.9	-1.0	-1.5	-1.4	-0.6	0.5	0.9		
41	27			06-00	08-00	63-54	25-42	2.0	2.0	1.9	1.7	-0.5	-0.7	-0.7	-0.5	0.4	1.3	1.6
42	27			16-00	18-00	62-46	25-45	2.8	2.7	2.5	2.5	-0.8	-1.3	-1.4	-0.8	-0.1		
43	28			06-00	08-00	60-38	25-54	3.7	3.7	3.7	3.7	3.7	-0.2	-0.2	-0.2	-0.2	0.0	0.7
44	28			16-00	18-00	59-39	26-03	3.5	3.5	3.5	3.5	3.5	0.3	0.0	-0.2	-0.2	1.2	
45	1	Mar.	1977	06-00	08-00	57-45	26-31	3.5	3.5	3.5	3.5	3.6	1.1	0.0	-0.1	-0.3	0.0	0.6
46	1			16-00	18-00	57-06	27-22	3.7	3.7	3.7	3.7	2.7	0.6	0.7	0.7	0.5	1.6	
47	5			05-00	08-00	44-18	42-45	8.9	8.9	8.9	8.9	8.9	7.6	5.6	5.1	4.5	4.4	4.2
48	5			15-00	18-00	42-51	43-27	10.1	10.0	9.9	9.9	9.0	7.9	6.4	5.8	5.8	5.5	5.8
49	6			05-00	08-00	40-25	44-47	16.0	16.0	16.0	15.9	15.6	14.5	13.7	12.6	12.3	11.2	10.6

Table 2 (continued).

St. No.	Date			Time		Position		Temperature (°C) at indicated depth (m)										
	Day	Month	Year	GMT	LMT	Lat.	Long.	0	10	20	30	50	75	100	125	150	200	250
50	6	Mar.	1977	15-00	18-00	39-23 S	45-29 E	17.0	16.7	16.5	15.9	14.9	13.4	12.5	11.8	11.7	11.0	
51	7			05-30	08-30	37-39	46-51	19.6	19.5	19.3	19.3	19.0	17.7	16.6	16.2	15.7	15.4	15.4
52	7			15-00	18-00	37-16	47-45	19.8	19.6	19.5	19.3	19.2	18.8	17.8	17.2	16.6	15.9	15.5
53	8			05-00	08-00	35-21	48-51	20.1	19.8	19.6	19.4	19.2	17.9	17.2	16.7	16.2	15.4	15.2
54	8			15-00	18-00	34-19	49-31	21.4	21.4	21.3	21.2	20.9	18.0	16.7	15.9	15.3	14.8	14.5
55	9			05-00	08-00	31-57	51-01	23.5	23.5	23.2	23.2	22.7	19.3	17.2	16.0	15.6	15.0	14.6
56	9			15-00	18-00	30-54	51-38	23.9	23.8	23.5	23.3	23.0	17.6	16.3	15.8	15.3	15.0	14.8
57	10			04-00	08-00	28-43	52-55	26.4	26.4	25.7	25.5	25.5	21.4	19.8	18.9	17.8	16.1	15.0
58	10			14-00	18-00	27-31	53-36	26.2	25.9	25.5	25.4	25.4	22.1	21.1	20.4	19.8	18.2	
59	11			04-00	08-00	24-58	54-54	27.0	27.0	27.0	27.0	26.5	22.8	18.6	18.7	17.6	15.9	14.9
60	11			14-00	18-00	23-37	55-12	27.8	27.5	27.4	27.2	26.9	25.0	23.6	22.5	21.6	20.1	
61	19			04-00	08-00	17-45	61-06	28.5	28.5	28.5	28.5	28.5	27.4	25.8	24.9	22.6	20.2	18.4
62	19			14-00	18-00	16-28	62-46	28.2	28.2	28.2	28.2	28.2	24.7	22.2	21.3	20.5	19.0	17.1
63	20			04-00	08-00	15-15	64-51	28.2	28.2	28.2	28.2	27.6	24.7	23.2	22.6	21.9	20.2	18.4
64	20			14-00	18-00	14-10	66-27	28.5	28.5	28.5	28.4	27.6	24.0	22.4	21.4	21.0	18.3	15.7
65	21			03-00	08-00	12-50	68-25	28.6	28.6	28.6	28.6	28.6	25.8	20.8	19.5	17.8	15.0	12.5
66	21			13-00	18-00	11-47	69-50	28.7	28.7	28.7	28.7	28.7	26.1	21.7	20.4	17.7	14.6	12.4
67	22			03-00	08-00	10-17	71-46	28.2	28.2	28.2	28.1	26.3	24.0	21.2	20.2	17.4	14.7	12.9
68	22			13-00	18-00	09-10	73-16	29.2	29.2	29.1	28.3	26.3	23.9	22.2	19.7	18.0	15.1	13.3
69	23			03-00	08-00	07-39	75-19	29.4	29.4	29.0	26.7	24.2	20.7	18.1	15.5	15.3	13.2	12.3
70	23			13-00	18-00	06-41	76-46	29.2	29.2	29.2	26.9	21.8	17.9	15.4	14.5	13.7	12.7	12.4
71	24			03-00	08-00	05-14	78-56	29.1	28.9	28.5	27.7	22.7	20.1	17.3	15.6	14.1	12.4	
72	24			13-00	18-00	04-09	80-35	28.4	28.6	28.0	27.6	26.7	23.3	19.8	17.8	14.5	12.4	
73	25			02-00	08-00	02-40	83-01	28.8	28.8	28.8	28.8	28.4	27.5	23.0	17.6	14.7	12.6	
74	25			12-00	18-00	01-23	84-28	30.1	29.5	29.4	29.3	29.2	27.6	21.0	17.0	15.7	13.6	12.3

Table 2 (continued).

St. No.	Date			Time		Position		Temperature (°C) at indicated depth (m)										
	Day	Month	Year	GMT	LMT	Lat.	Long.	0	10	20	30	50	75	100	125	150	200	250
75	26	Mar.	1977	02-00	08-00	00-17N	86-47 E	29.4	29.4	29.4	29.3	29.1	28.9	23.3	18.9	16.6	14.5	
76	26			12-00	18-00	01-26	88-27	29.8	29.8	29.2	29.2	29.1	27.0	21.6	18.5	15.7	13.4	12.0
77	27			02-00	08-00	03-01	90-36	29.2	29.2	29.2	29.0	27.7	25.2	20.7	14.9	13.9	12.2	11.8
78	27			12-00	18-00	04-16	92-16	29.8	29.8	29.5	29.4	29.1	26.3	21.7	17.8	15.8	13.0	
79	28			01-00	08-00	05-57	94-31	30.0	30.0	29.7	29.4	28.9	27.7	20.5	15.8	14.8	13.0	
80	28			11-00	18-00	06-11	96-18	28.8	28.8	28.7	28.7	28.0	27.3	21.1	16.1	13.6	12.3	12.1

Table 3. Vertical observation data.

St. 1

		Meteorological observation			
Date	: Dec. 17, 1976	Time (GMT)	: 00-00	Wind direction:	SW
Time (GMT)	: 0030-0300	(LMT)	: 08-00	velocity	: 8 m/s
(LMT)	: 0830-1100	Weather	: Cloudy	Humidity	: 69%
Latitude	: 35-18S	Air temperature	: 19.0°C	Sea	: 3
Longitude	: 113-08E	Atmospheric pressure:	1022.8 mb	Swell	: WSW/5

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
0	17.50	35.559	8.35	5.51	0.06	0	0.01	0.0	0.0	2.37	0	17.50	35.559	25.84	217
9	17.44	35.554	8.36	5.55	0.08	2	0.65	0.0	0.6	2.37	10	17.43	35.558	25.86	215
19	17.24	35.593	8.39	5.52	0.15	4	0.11	0.0	2.3	2.38	20	17.20	35.592	25.94	208
28	16.90	35.576	8.39	5.55	0.10	2	0.16	0.0	0.0	2.38	30	16.86	35.573	26.00	202
47	16.66	35.547	8.39	5.60	0.11	2	0.23	0.0	1.0	2.38	50	16.60	35.540	26.04	199
70	16.15	35.494	8.38	5.58	0.10	1	0.13	0.0	1.6	2.38	75	16.01	35.485	26.14	191
94	15.49	35.456	8.38	5.58	0.10	2	0.18	0.0	0.0	2.38	100	15.39	35.450	26.25	181
117	15.05	35.428	8.39	5.55	0.15	1	0.09	0.0	0.2	2.37	125	14.73	35.408	26.36	171
140	14.10	35.363	8.36	5.56	0.17	1	0.11	0.7	0.6	2.37	150	13.82	35.334	26.50	158
185	13.07	35.227	8.34	5.55	0.29	1	0.07	2.1	—	2.36	200	12.73	35.178	26.60	150
230	12.02	35.074	8.33	5.38	0.48	2	0.04	4.6	0.2	2.35	250	11.47	34.994	26.70	141
274	10.85	34.904	8.33	5.45	0.58	2	0.03	5.1	0.5	2.36	300	10.38	34.843	26.78	134
363	9.61	34.746	8.34	5.53	0.90	2	0.03	8.3	0.0	2.35	400	9.32	34.692	26.84	129
453	9.03	34.631	8.13	5.52	0.92	5	0.03	11.9	0.0	2.36	500	8.83	34.603	26.86	130
546	8.58	34.580	8.12	5.40	0.96	7	0.14	15.0	0.1	2.36	600	7.93	34.516	26.92	124
732	6.08	34.368	8.04	4.63	1.71	24	0.10	17.4	0.1	2.36	700	6.56	34.403	27.03	114
920	4.27	34.357	7.95	4.32	2.25	45	0.03	26.8	0.0	2.36	800	5.31	34.364	27.16	101
1110	3.74	34.419	7.95	3.91	2.11	58	0.01	30.6	0.0	2.38	1000	3.96	34.378	27.32	85
1397	3.08	34.523	7.89	3.64	2.34	73	0.04	32.7	0.9	2.37	1200	3.51	34.452	27.42	76
1885	2.49	34.668	7.92	3.81	2.44	89	0.02	32.3	1.6	2.38	1500	2.92	34.559	27.56	63
2375	2.05	34.727	7.94	4.06	2.23	100	0.03	29.5	0.8	2.38	2000	2.38	34.690	27.71	50
2871	1.71	34.682	7.93	4.26	2.19	108	0.01	29.5	0.8	2.39	2500	1.96	34.719	27.77	44
3866	1.21	34.674	7.92	4.56	2.13	117	0.02	29.1	1.0	2.40	3000	1.63	34.675	27.76	45
											3500	1.37	34.677	27.78	42

Table 3 (continued).

St. 2

Date : Dec. 20, 1976
 Time (GMT): 0540-0800
 (LMT): 1240-1500
 Latitude : 47-06S
 Longitude : 109-57E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 12-00
 Weather : Cloudy
 Air temperature : 7.4°C
 Atmospheric pressure: 981.5 mb
 Wind direction: W
 velocity : 11 m/s
 Humidity : 81%
 Sea : 5
 Swell : WSW/5

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(meq/L)					
0	7.60	34.065	8.26	6.78	0.96	0	0.27	11.3	0.4	2.34	0	7.60	34.065	26.62	143
6	7.32	33.996	8.26	6.85	0.92	3	0.50	11.9	0.4	2.33	10	7.33	33.997	26.60	144
12	7.34	33.997	8.26	6.84	0.92	3	0.32	13.5	0.6	2.33	20	7.30	33.979	26.59	145
19	7.31	33.980	8.27	6.85	0.86	3	0.27	15.8	0.5	2.34	30	7.23	33.971	26.60	145
30	7.23	33.971	8.25	6.83	0.92	3	0.24	15.8	0.4	2.34	50	7.22	33.978	26.61	144
48	7.22	33.974	8.24	6.88	0.94	3	0.26	15.6	0.3	2.31	75	7.12	33.985	26.62	142
58	7.22	33.993	8.25	6.91	0.83	3	0.25	16.8	0.4	2.04	100	6.56	34.014	26.72	133
72	7.16	33.985	8.26	6.87	0.92	3	0.20	17.1	0.4	2.34	125	6.11	34.031	26.80	126
85	6.94	33.985	8.26	6.83	0.90	4	0.30	18.2	0.4	2.34	150	5.97	34.011	26.80	126
114	6.23	34.040	8.23	6.86	1.15	6	0.37	18.9	0.7	2.34	200	5.82	34.034	26.83	122
142	6.01	34.011	8.22	6.77	1.15	8	0.13	21.3	0.2	2.34	250	5.77	34.100	26.89	117
170	5.91	34.019	8.22	6.71	1.15	10	0.05	21.8	0.0	2.34	300	5.75	34.171	26.95	111
224	5.77	34.056	8.23	6.53	1.21	11	0.03	22.9	0.1	2.33	400	5.12	34.194	27.04	103
278	5.77	34.149	8.21	5.92	1.34	17	0.05	25.9	0.0	2.34	500	4.18	34.183	27.14	93
342	5.63	34.196	8.18	5.59	1.46	21	0.03	28.5	0.0	2.34	600	3.49	34.197	27.22	86
438	4.72	34.192	8.16	5.47	1.73	27	0.03	31.3	0.3	2.35	700	3.09	34.243	27.30	79
542	3.86	34.181	8.11	5.28	1.86	35	0.02	32.4	0.1	2.34	800	2.91	34.300	27.36	73
634	3.31	34.211	8.09	5.15	1.96	44	0.01	34.4	0.1	2.34	1000	2.71	34.410	27.46	63
780	2.94	34.288	8.05	4.76	2.11	55	0.01	32.9	0.2	2.36	1200	2.55	34.496	27.54	55
1024	2.70	34.423	8.05	4.28	2.25	72	0.01	34.7	0.3	2.36	1500	2.37	34.623	27.66	44
1242	2.52	34.512	8.03	4.29	2.25	80	0.00	29.3	0.1	2.36					
1431	2.42	34.599	8.04	4.29	2.15	82	0.00	25.7	0.1	2.36					
1660	2.23	34.661	8.06	4.50	1.92	84	0.00	31.5	0.2	2.36					

Table 3 (continued).

St. 3

Date : Dec. 23, 1976		Time (GMT) : 01-00		Wind direction: E	
Time (GMT): 0120-0340		Time (LMT) : 08-00		velocity : 8 m/s	
(LMT): 0820-1040		Weather : Cloudy		Humidity : 85%	
Latitude : 57-43S		Air temperature : 2.0°C		Sea : 3	
Longitude : 103-26E		Atmospheric pressure: 968.5 mb		Swell : ESE/1	

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
0	2.60	34.005	8.20	7.24	1.53	44	0.34	25.0	0.2	2.35	0	2.60	34.005	27.15	93
8	2.62	34.008	8.22	7.84	1.59	44	0.38	27.9	0.2	2.34	10	2.62	34.008	27.15	93
17	2.61	34.001	8.24	7.88	1.54	44	0.36	28.4	0.2	2.35	20	2.61	33.993	27.14	94
25	2.60	33.982	8.24	7.90	1.57	43	0.35	28.6	0.1	2.34	30	1.98	33.993	27.19	89
42	0.23	34.033	8.23	8.64	1.29	36	0.22	28.6	0.4	2.36	50	-0.16	34.038	27.36	73
65	-0.36	34.040	8.20	8.17	1.73	50	0.16	30.1	0.4	2.35	75	-0.57	34.052	27.39	70
84	-0.71	34.061	8.18	8.08	1.80	56	0.32	33.3	0.7	2.35	100	-0.72	34.056	27.40	69
105	-0.72	34.055	8.18	7.82	1.77	55	0.22	32.6	0.5	2.34	125	-0.79	34.091	27.43	66
125	-0.79	34.091	8.16	7.87	1.71	56	0.20	30.8	0.3	2.36	150	-0.35	34.166	27.47	62
168	0.23	34.248	8.09	6.38	2.00	59	0.15	35.1	0.1	2.35	100	1.42	34.445	27.59	51
196	1.36	34.433	8.05	4.76	2.17	79	0.01	36.9	0.1	2.36	250	1.61	34.513	27.63	47
244	1.59	35.506	8.06	4.49	1.96	82	0.01	37.8	0.1	2.37	300	1.72	34.559	27.66	44
320	1.74	34.572	8.02	4.41	2.05	85	0.00	36.9	0.2	2.36	400	1.73	34.609	27.70	40
390	1.72	34.604	8.03	4.40	1.77	87	0.01	35.3	0.0	2.37	500	1.76	34.633	27.72	39
455	1.78	34.632	8.04	4.58	1.77	88	0.01	35.6	0.1	2.37	600	1.71	34.638	27.73	38
584	1.73	34.635	8.11	4.58	1.79	91	0.01	35.3	0.2	2.38	700	1.57	34.660	27.75	35
699	1.57	34.660	8.04	4.71	1.88	94	0.01	33.3	0.1	2.38	800	1.55	34.666	27.76	35
950	1.51	34.676	8.06	4.67	1.88	97	0.01	33.3	0.2	2.37	1000	1.40	34.662	27.77	34
981	1.43	34.660	8.04	4.78	1.82	98	0.01	34.4	0.3	2.37	1200	1.24	34.675	27.79	32
1177	1.26	34.676	8.05	4.79	1.94	105	0.00	34.7	0.2	2.37	1500	0.99	34.653	27.79	32
1460	1.02	34.655	8.05	4.88	2.02	112	0.00	32.2	0.2	2.37	2000	0.63	34.634	27.80	31
1810	0.76	34.641	8.02	4.39	2.07	118	0.00	33.1	0.1	2.37					
2440	0.37	34.618	8.00	5.06	2.15	128	0.01	35.8	0.2	2.37					

Table 3 (continued).

St. 4

Date : Feb. 18, 1977
 Time (GMT): 0450-0810
 (LMT): 0750-1110
 Latitude : 64-50S
 Longitude : 39-59E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 0.0°C
 Atmospheric pressure: 985.9 mb
 Wind direction: SSE
 velocity : 2 m/s
 Humidity : 58%
 Sea : 3
 Swell : E/4

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(meq/L)					
0	2.10	33.745	8.21	7.62	1.80	58	0.46	27.6	0.9	2.34	0	2.10	33.745	26.98	108
10	2.22	33.745	8.21	7.62	1.72	64	0.54	28.1	1.0	2.35	10	2.22	33.745	26.97	109
19	2.21	33.725	8.20	7.64	1.82	62	0.49	29.3	1.5	2.35	20	2.17	33.730	26.96	110
29	1.55	33.819	8.21	7.72	1.80	65	0.36	30.0	0.9	2.35	30	1.41	33.840	27.11	96
49	-1.10	34.224	8.21	7.37	1.86	65	0.17	30.5	0.7	2.36	50	-1.16	34.230	27.55	54
74	-1.29	34.285	8.20	7.23	1.86	68	0.24	30.2	0.6	2.37	75	-1.21	34.294	27.61	49
99	0.76	34.509	8.09	5.00	2.20	93	0.07	34.0	0.8	2.37	100	0.79	34.513	27.69	41
123	1.06	34.554	8.07	4.53	2.25	99	0.10		1.2	2.37	125	1.08	34.557	27.71	40
148	1.29	34.588	8.05	4.37	2.25	104	0.04	32.7	0.6	2.37	150	1.30	34.590	27.72	39
198	1.40	34.625	8.05	4.34	2.29	106	0.01	35.2	0.8	2.37	200	1.40	34.626	27.74	37
247	1.40	34.650	8.05	4.38	2.20	108	0.00	34.8	0.8	2.37	250	1.40	34.651	27.76	35
297	1.41	34.662	8.06	4.39	2.23	108	0.00	35.7	0.6	2.37	300	1.41	34.663	27.77	34
395	1.40	34.682	8.08	4.47	2.20	115	0.00	36.6	0.7	2.37	400	1.40	34.682	27.78	32
472	1.33	34.681	8.08	4.54	2.06	119	0.00	34.2	0.5	2.37	500	1.31	34.683	27.79	32
567	1.26	34.687	8.07	4.59	2.16	118	0.00	35.1	1.3	2.37	600	1.23	34.686	27.80	31
757	1.06	34.683	8.11	4.85	2.12	123	0.00	34.5	0.8	2.37	700	1.12	34.685	27.81	30
949	0.88	34.679	8.06	4.72	2.16	126	0.00	36.8	0.5	2.37	800	1.02	34.682	27.81	30
1140	0.72	34.672	8.08	4.73	2.16	126	0.01	35.7	0.5	2.37	1000	0.83	34.677	27.82	29
1429	0.55	34.663	8.05	4.75	2.25	136	0.01	34.3	0.9	2.37	1200	0.68	34.669	27.82	29
1915	0.34	34.694	8.03	4.89	2.20	140	0.01	32.5	1.0	2.37	1500	0.52	34.668	27.83	28
2404	0.15	34.645	8.06	5.12	2.18	140	0.03		1.1	2.37	2000	0.31	34.687	27.86	25
2894	-0.02	34.639	8.05	5.28	2.29	141	0.01	30.6	1.0	2.37	2500	0.12	34.642	27.83	28
3385	-0.18	34.630	8.05	5.45	2.25	151	0.03	33.7	1.8	2.37	3000	-0.06	34.637	27.84	27
3878	-0.24	34.629	8.09	5.56	2.25	140	0.00	34.9	2.4	2.37	3500	-0.20	34.630	27.84	27
4374	-0.31	34.625	8.03	5.75	2.20	141	0.00	34.7	1.0	2.37	4000	-0.26	34.628	27.84	27

Table 3 (continued).

St. 5

Date : Feb. 19, 1977
 Time (GMT): 0520-0920
 (LMT): 0820-1220
 Latitude : 61-45S
 Longitude : 42-32E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 08-88
 Weather : Cloudy
 Air temperature : 2.4°C
 Atmospheric pressure: 982.1 mb
 Wind direction: NE
 velocity : 5 m/s
 Humidity : 92%
 Sea : 1
 Swell : NNW/3

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
0	3.10	33.964	8.21	7.45	1.78	49	0.44	28.3	0.4	2.35	0	3.10	33.964	27.07	100
10	3.02	33.868	8.21	7.47	1.80	51	0.48	26.9	0.1	2.35	10	3.02	33.868	27.00	106
20	2.84	33.856	8.22	7.49	1.80	50	0.44	27.9	0.0	2.35	20	2.84	33.856	27.01	106
30	2.71	33.849	8.22	7.57	1.76	50	0.44	28.5	0.1	2.35	30	2.71	33.849	27.01	105
50	-1.02	34.046	8.25	7.13	1.80	50	0.22	28.2	0.1	2.35	50	-1.02	34.046	27.40	69
75	-1.82	34.087	8.24	7.93	1.86	53	0.33	27.6	0.0	2.35	75	-1.82	34.087	27.46	63
100	-1.60	34.106	8.22	7.66	1.82	59	0.24	29.0	0.1	2.36	100	-1.60	34.106	27.47	62
125	-1.04	34.188	8.18	6.95	1.94	66	0.35		0.0	2.36	125	-1.04	34.188	27.52	58
150	0.46	34.374	8.11	5.37	2.25	82	0.04	30.2	0.1	2.36	150	0.46	34.374	27.60	50
200	1.36	34.535	8.04	4.52	2.39	95	0.00	35.9	0.0	2.36	200	1.36	34.535	27.67	43
250		34.584	8.05	4.33	2.41	100	0.00	36.8	0.0	2.37	250	1.40	34.584	27.71	40
299	1.44	34.627	8.07	4.38	2.31	103	0.00	37.7	0.0	2.37	300	1.44	34.628	27.74	37
399	1.45	34.665	8.05	4.41	2.29	109	0.00	36.2	0.0	2.37	400	1.45	34.665	27.77	34
499	1.45	34.669	8.06	4.43	2.21	111	0.00	35.2	0.3	2.37	500	1.45	34.669	27.77	34
599	1.38	34.692	8.07	4.49	2.21	113	0.00	35.3	0.0	2.37	600	1.38	34.692	27.79	32
799	1.21	34.696	8.08	4.61	2.20	120	0.00	36.0	0.6	2.37	700	1.30	34.694	27.80	31
998	1.02	34.711	8.08	4.68	2.23	124	0.00	35.6	0.0	2.37	800	1.21	34.696	27.81	30
1198	0.79	34.686	8.07	4.68	2.23	132	0.00	35.1	0.0	2.37	1000	1.02	34.711	27.83	28
1497	0.61	34.680	8.06	4.74	2.23	139	0.00	35.1	0.1	2.37	1200	1.79	34.686	27.83	28
1996	0.39	34.676	8.05	4.85	2.29	144	0.00	33.4	0.0	2.37	1500	0.61	34.680	27.33	28
2495	0.19	34.668	8.05	5.13	2.27	144	0.00	35.0	0.0	2.37	2000	0.39	34.676	27.84	27
2996	0.00	34.658	8.03	5.21	2.29	143	0.00		0.2	2.37	2500	0.19	34.668	27.85	26
3494	-0.13	34.650	8.02	5.42	2.29	144	0.00	35.0	0.3	2.37	3000	-0.00	34.658	27.85	26
3993	-0.20	34.652	8.04	5.53	2.18	144	0.00	35.9	0.0	2.37	3500	-0.13	34.650	27.85	26
4479	-0.26	34.634	8.05	5.78	2.10	140	0.04	35.2	0.5	2.38	4000	-0.20	34.652	27.86	26
4977	-0.30	34.628	8.02	5.76	2.35	149	0.00	30.5	0.6	2.37	4500	-0.26	34.633	27.84	27

Table 3 (continued).

St. 6

Date : Feb. 25, 1977
 Time (GMT): 0715-0930
 (LMT): 0915-1130
 Latitude : 67-35S
 Longitude : 25-39E

Meteorological observation

Time (GMT) : 06-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 0.6°C
 Atmospheric pressure: 984.2 mb
 Wind direction: NNW
 velocity : 6m/s
 Humidity : 90%
 Sea : 2
 Swell : ENE/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
					(μg-atoms/L)					(meq/L)					
0	-0.20	33.736	8.18	8.06	1.61	55	0.32	23.4	1.3	2.35	0	-0.20	33.736	27.12	96
10	-0.20	33.640	8.19	8.13	1.69	59	0.37	25.4	0.8	2.35	10	-0.20	33.640	27.04	103
19	-0.29	33.814	8.20	8.14	1.63	53	0.33	27.3	1.1	2.35	20	-0.37	33.818	27.19	89
28	-1.10	33.844	8.21	8.15	1.76	53	0.14	28.2	1.0	2.35	30	-1.19	33.882	27.27	81
48	-1.55	34.267	8.17	7.54	1.86	67	0.15	30.2	1.1	2.35	50	-1.57	34.286	27.61	49
72	-1.66	34.365	8.15	8.29	2.00	72	0.19	27.4	0.9	2.35	75	-1.66	34.364	27.68	42
94	-1.63	34.357	8.15	7.03	2.06	75	0.17	29.4	3.2	2.36	100	-1.59	34.366	27.68	42
114	-1.49	34.393	8.13	6.59	2.08	76	0.18	29.8	1.2	2.36	125	-1.42	34.407	27.71	40
141	-1.29	34.427	8.12	6.52	2.12	78	0.22	32.1	0.3	2.36	150	-1.19	34.439	27.73	38
188	-0.59	34.504	8.09	5.98	2.16	86	0.01	30.1	0.5	2.36	200	-0.26	34.536	27.77	34
236	0.64	34.625	8.04	4.89	2.20	101	0.03	33.5	1.0	2.37	250	0.78	34.642	27.79	32
283	0.92	34.665	8.05	4.71	2.20	105	0.03	32.9	0.4	2.37	300	0.96	34.673	27.81	30
379	0.98	34.694	8.04	4.74	2.20	110	0.01	33.1	0.4	2.37	400	0.99	34.697	27.82	29
474	0.99	34.703	8.05	4.71	2.18	112	0.00	34.5	0.4	2.37	500	0.97	34.705	27.83	28
569	0.89	34.707	8.05	4.73	2.16	115	0.01	34.0	0.5	2.37	600	0.83	34.701	27.84	27
759	0.58	34.670	8.07	4.87	2.20	121	0.01	33.1	0.3	2.37	700	0.67	34.682	27.83	28
947	0.59	34.691	8.04	4.80	2.29	128	0.01	33.6	0.2	2.37	800	0.58	34.673	27.83	28
1134	0.41	34.688	8.04	4.93	2.25	132	0.01	34.3	0.7	2.37	1000	0.55	34.690	27.85	27
1413	0.25	34.678	8.03	5.01	2.27	135	0.01	35.7	0.2	2.37	1200	0.36	34.686	27.85	26
1885	0.06	34.669	8.04	5.20	2.27	136	0.03	34.8	1.1	2.37	1500	0.21	34.676	27.85	26
2365	-0.08	34.657	8.03	5.44	2.21	134	0.02	34.0	0.6	2.37	2000	0.02	34.665	27.86	26
2852	-0.15	34.664	8.01	5.48	2.21	135	0.01	34.0	0.9	2.37	2500	-0.10	34.659	27.86	26
3345	-0.21	34.660	8.01	5.54	2.25	134	0.00	33.3	0.6	2.38	3000	-0.18	34.663	27.86	25
3645	-0.11	34.660	8.03	5.67	2.29	134	0.00	31.3	0.3	2.37	3500	-0.18	34.660	27.86	25

Table 3 (continued).

St. 7

Date : Feb. 27, 1977
 Time (GMT): 0600-0945
 (LMT): 0800-1145
 Latitude : 63-54S
 Longitude : 25-42E

Meteorological observation
 Time (GMT) : 06-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 2.0°C
 Atmospheric pressure: 993.0 mb

Wind direction: WSW
 velocity : 5 m/s
 Humidity : 75%
 Sea : 2
 Swell : WNW/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
0	2.00	33.730	8.23	7.65	1.82	55	0.46	20.7	1.6	2.34	0	2.00	33.730	26.98	109
10	1.83	33.723	8.23	7.63	1.84	58	0.47	23.2	0.9	2.34	10	1.83	33.723	26.98	108
20	1.80	33.740	8.23	7.66	1.88	56	0.46	24.9	1.3	2.34	20	1.80	33.740	27.00	107
30	1.39	33.770	8.22	7.64	1.90	57	0.41	27.6	1.2	2.34	30	1.39	33.770	27.05	102
49	-1.28	34.073	8.25	7.93	1.86	58	0.24	23.5	0.8	2.35	50	-1.33	34.082	27.44	65
74	-1.53	34.194	8.23	7.71	1.92	56	0.30	24.8	0.6	2.35	75	-1.54	34.196	27.54	56
99	-1.57	34.240	8.22	7.52	1.94	58	0.30	26.8	0.6	2.35	100	-1.55	34.243	27.58	52
123	-0.79	34.338	8.17	6.57	2.16	74	0.25	31.3	0.6	2.36	125	-0.69	34.349	27.63	47
148	0.36	34.477	8.09	5.24	2.29	92	0.04	34.0	0.2	2.36	150	0.41	34.484	27.69	41
197	1.03	34.591	8.06	4.62	2.39	103	0.00	33.6	0.5	2.36	200	1.05	34.595	27.74	37
246	1.17	34.640	8.06	4.49	2.35	105	0.00	32.4	0.7	2.37	250	1.18	34.643	27.77	34
295	1.24	34.668	8.07	4.48	2.35	107	0.00	32.8	0.8	2.37	300	1.24	34.669	27.78	32
396	1.22	34.683	8.06	4.59	2.33	108	0.00	33.9	0.7	2.37	400	1.22	34.684	27.80	31
492	1.16	34.699	8.07	4.61	2.31	113	0.00	33.3	0.7	2.37	500	1.15	34.700	27.82	29
591	1.07	34.706	8.07	4.63	2.25	115	0.00	32.4	0.0	2.37	600	1.06	34.707	27.83	28
788	0.89	34.725	8.07	4.67	2.29	123	0.00	31.4	1.4	2.37	700	0.97	34.718	27.84	27
984	0.70	34.715	8.08	4.72	2.29	132	0.00	33.9	0.6	2.37	800	0.88	34.725	27.85	26
1180	0.57	34.698	8.06	4.76	2.31	133	0.00	34.3	0.8	2.37	1000	0.69	34.714	27.86	26
1475	0.43	34.689	8.06	4.82	2.35	135	0.00	34.5	0.7	2.37	1200	0.56	34.697	27.85	26
1973	0.22	34.681	8.06	5.05	2.35	137	0.00	34.0	1.4	2.37	1500	0.42	34.689	27.85	26
2469	0.04	34.669	8.06	5.20	2.35	141	0.00	34.0	1.2	2.37	2000	0.21	34.680	27.86	25
2961	-0.10	34.664	8.05	5.42	2.35	140	0.00	33.9	0.8	2.37	2500	0.03	34.669	27.86	25
3454	-0.20	34.661	8.04	5.46	2.61	140	0.00	35.0	1.2	2.37	3000	-0.11	34.664	27.86	25
3948	-0.27	34.660	8.06	5.59	2.23	137	0.07	34.2	0.8	2.37	3500	-0.21	34.661	27.86	25
4444	-0.30	34.657	8.04	5.65	2.25	140	0.00	33.4	1.1	2.37	4000	-0.27	34.660	27.87	25
4944	-0.35	34.652	8.05	5.75	2.35	140	0.00	33.1	1.1	2.37	4500	-0.30	34.657	27.86	25

Table 3 (continued).

St. 8

Date : Feb. 28, 1977
 Time (GMT): 0700-1015
 (LMT): 0900-1215
 Latitude : 60-38S
 Longitude : 25-54E

Meteorological observation

Time (GMT) : 06-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 3.3°C
 Atmospheric pressure: 998.5 mb
 Wind direction: NW
 velocity : 9 m/s
 Humidity : 73%
 Sea : 3
 Swell : NE/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(meq/L)					
0	3.70	33.807	8.27	7.56	1.37	27	0.40	26.0	0.0	2.35	0	3.70	33.807	26.89	117
6	3.70	33.863	8.29	7.54	1.49	27	0.45	23.9	0.0	2.35	10	3.71	33.860	26.93	113
13	3.71	33.857	8.29	7.38	1.49	26	0.44	26.3	0.3	2.35	20	3.71	33.853	26.93	114
19	3.71	33.853	8.30	7.48	1.51	27	0.42	25.9	0.0	2.35	30	3.67	33.854	26.93	113
32	3.66	33.856	8.29	7.50	1.47	28	0.45	25.1	0.0	2.36	50	0.94	33.903	27.19	89
50	0.94	33.903	8.27	6.98	1.74	42	0.28	27.4	0.0	2.35	75	-0.37	33.999	27.34	75
67	-0.10	33.969	8.26	8.12	1.82	47	0.27	29.4	0.0	2.36	100	-0.46	34.084	27.41	68
85	-0.53	34.034	8.24	8.00	1.96	53	0.33	30.2	0.0	2.35	125	-0.40	34.172	27.48	61
97	-0.50	34.074	8.23	7.38	1.96	56	0.31	30.2	0.3	2.36	150	-0.41	34.162	27.47	62
103	-0.41	34.094	8.23	7.96	2.00	56	0.32	30.5	0.0	2.36	200	0.06	34.288	27.55	55
128	-0.40	34.178	8.19	7.68	2.02	63	0.44	32.2	0.3	2.36	250	0.74	34.277	27.50	59
139	-0.45	34.160	8.21	7.68	2.06	63	0.40	31.3	0.3	2.36					
147	-0.43	34.154	8.20	7.58	2.06	65	0.29	31.3	0.4	2.36					
270	1.08	34.465	8.08	4.73	2.31	95	0.03	35.9	0.0	2.37					
280	1.22	34.635	8.07	4.59	2.31	100	0.03	34.0	0.0	2.37					

Table 3 (continued).

St. 9

Meteorological observation

Date : Mar. 1, 1977
 Time (GMT): 0930-1136
 (LMT): 1130-1336
 Latitude : 57-45S
 Longitude : 26-31E

Time (GMT) : 10-00
 (LMT) : 12-00
 Weather : Cloudy
 Air temperature : 3.2°C
 Atmospheric pressure: 985.3 mb

Wind direction: NNW
 velocity : 12 m/s
 Humidity : 85%
 Sea : 5
 Swell : NNW/3

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₃ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
					(μ g-atoms/L)					(meq/L)					
0	3.60	34.098	8.19	7.29	1.57	46	0.41	22.8	0.7	2.36	0	3.60	34.098	27.13	94
7	3.27	34.090	8.20	7.45	1.61	47	0.46	23.5	0.8	2.36	10	3.27	34.090	27.16	92
15	3.27	34.089	8.20	7.37	1.57	53	0.37	24.2	1.4	2.36	20	3.28	34.093	27.16	92
22	3.28	34.094	8.21	7.40	1.67	52	0.39	25.6	0.3	2.36	30	3.28	34.093	27.16	92
35	3.27	34.092	8.21	7.38	1.67	52	0.41	26.0	0.6	2.36	50	3.23	34.095	27.16	91
52	3.23	34.098	8.20	7.41	1.71	61	0.40	27.6	0.5	2.36	75	0.77	34.209	27.45	64
68	1.15	34.184	8.19	7.82	1.76	63	0.30	28.5	0.9	2.36	100		34.257		
83	0.54	34.230	8.19	7.86	1.84	69	0.30	29.9	1.1	2.36					
97	0.24	34.252	8.17	7.48	1.84	73	0.28	32.4	0.5	2.37					
123		34.307			2.06	75	0.38	33.1	1.1	2.36					

Table 3 (continued).

St. 10

Date : Mar. 5, 1977
 Time (GMT): 0510-0720
 (LMT): 0810-1020
 Latitude : 44-18S
 Longitude : 42-45E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 8.7°C
 Atmospheric pressure: 1018.2 mb
 Wind direction: SW
 velocity : 8 m/s
 Humidity : 63%
 Sea : 4
 Swell : WSW/4

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(meq/L)					
0	8.90	33.752	8.26	6.62	1.22	2	0.19	15.5	0.3	2.34	0	8.90	33.752	26.18	185
9	8.96	33.742	8.27	6.64	1.22	0	0.19	15.6	0.2	2.33	10	8.96	33.741	26.16	186
17	8.94	33.739	8.28	6.62	1.23	2	0.20	16.6	0.5	2.33	20	8.94	33.739	26.16	186
26	8.93	33.739	8.28	6.63	1.23	4	0.15	16.6	0.4	2.33	30	8.93	33.740	26.16	186
43	8.92	33.745	8.28	6.66	1.23	4	0.19	15.6	0.0	2.33	50	8.81	33.746	26.19	184
65	8.57	33.757	8.29	6.69	1.29	4	0.20	17.0	0.7	2.33	75	7.64	33.785	26.39	164
88	6.31	33.823	8.28	6.83	1.41	4	0.52	20.0	0.5	2.34	100	5.52	33.841	26.72	133
109	5.12	33.849	8.26	6.94	1.49	0	0.05	22.1	0.0	2.33	125	4.85	33.861	26.81	124
130	4.82	33.864	8.25	6.96	1.57	8	0.00	22.7	0.2	2.33	150	4.64	33.875	26.85	121
173	4.51	33.891	8.23	6.94	1.63	9	0.07	22.7	0.0	2.34	200	4.41	33.921	26.91	115
214	4.38	33.942	8.21	6.71	1.63	9	0.01	22.8	0.0	2.34	250	4.35	34.013	26.99	108
256	4.35	34.026	8.16	6.48	1.67	15	0.01	24.7	0.0	2.34	300	4.29	34.108	27.07	100
335	4.20	34.160	8.15	6.01	1.92	17	0.01	27.6	0.0	2.34	400	3.85	34.200	27.19	89
409	3.79	34.202	8.12	5.77	1.96	27	0.00	29.3	0.0	2.35	500	3.26	34.217	27.26	82
485	3.72	34.217	8.09	5.60	2.04	31	0.00	31.5	0.4	2.35	600	2.95	34.217	27.29	79
641	2.88	34.218	8.10	5.20	2.21	42	0.01	32.1	0.2	2.36	700	2.78	34.233	27.31	77
801	2.67	34.272	8.06	5.19	2.31	59	0.01	35.4	0.1	2.36	800	2.67	34.272	27.36	73
961	2.53	34.365	8.04	4.47	2.43	69	0.01	36.9	0.0	2.36	1000	2.51	34.383	27.46	63
1205	2.46	34.467	8.03	4.14	2.29	80	0.00	35.1	0.0	2.37	1200	2.46	34.465	27.53	57
1604	2.37	34.600	8.05	4.43	2.14	80	0.00	30.8	0.1	2.37	1500	2.40	34.569	27.62	48
2104	2.13	34.726	8.17	4.59	2.00	85	0.00	27.8	0.2	2.37	2000	2.19	34.704	27.74	37

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〔南極資料〕

Table 3 (continued).

St. 11

Date : Mar. 6, 1977
 Time (GMT): 0510-0715
 (LMT): 0810-1015
 Latitude : 40-25S
 Longitude : 44-47E

Meteorological observation
 Time (GMT) : 05-10
 (LMT) : 08-10
 Weather : Cloudy
 Air temperature : 16.2°C
 Atmospheric pressure: 1022.5 mb

Wind direction: NNE
 velocity : 11 m/s
 Humidity : 83%
 Sea : 3
 Swell : WSW/4

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
0	16.00	35.065	8.35	5.73	0.24	5	0.03	0.1	0.7	2.36	0	16.00	35.065	25.82	219
9	16.07	35.078	8.33	5.79	0.24	5	0.04	0.3	0.7	2.36	10	16.06	35.078	25.81	220
14	16.03	35.077	8.34	5.78	0.25	4	0.04	0.2	0.5	2.36	20	16.03	35.076	25.82	219
22	16.03	35.075	8.35	5.77	0.25	3	0.02	0.2	0.5	2.36	30	16.01	35.069	25.82	219
35	15.99	35.066	8.34	5.78	0.29	1	0.04	0.3	0.2	2.36	50	15.93	35.078	25.84	217
53	15.87	35.083	8.34	5.71	0.47	3	0.07	0.5	0.3	2.36	75	14.80	35.128	26.13	189
70	14.88	35.122	8.28	5.44	0.49	5	0.19	3.1	0.4	2.36	100	13.75	35.110	26.34	169
88	14.55	35.131	8.27	5.39	0.69	4	0.10	4.1	0.4	2.36	125	12.76	35.075	26.52	153
105	13.39	35.099	8.26	5.34	0.74	5	0.00	7.8	1.9	2.36	150	12.38	35.049	26.57	147
140	12.54	35.059		5.22	0.84	5	0.01	9.2	0.5	2.36	200	11.31	34.917	26.67	138
175	11.96	35.009	8.27	5.25	0.88	5	0.00	9.8	0.9	2.35	250	10.50	34.792	26.72	133
209	11.08	34.882	8.25	5.42	0.94	6	0.00	11.2	1.2	2.36	300	10.10	34.739	26.75	130
279	10.26	34.757	8.22	5.56	1.08	8	0.01	13.1	0.4	2.35	400	9.54	34.712	26.82	123
349	9.81	34.718	8.21	5.37	1.12	7	0.01	14.9	1.1	2.36	500	8.40	34.634	26.95	112
418	9.43	34.709	8.19	5.07	1.23	15	0.01	17.7	0.9	2.35	600	6.75	34.507	27.09	99
555	7.53	34.566	8.17	4.75	1.63	20	0.00	22.7	0.2	2.36	700	5.23	34.402	27.20	88
693	5.30	34.405	8.12	4.84	1.96	32	0.00	29.4	1.6	2.35	800	4.53	34.385	27.26	82
831	4.40	34.379	8.10	4.84	2.12	40	0.00	32.8	0.3	2.36	1000	3.76	34.412	27.37	72
1038	3.66	34.426	8.06	4.38	2.25	57	0.00	33.4	0.4	2.36	1200	3.25	34.492	27.48	61
1420	2.88	34.591	8.04	4.12	2.21	72	0.00	33.9	0.4	2.37	1500	2.79	34.620	27.62	48
1855	2.67	34.729	8.06	4.49	2.06	75	0.00	29.3	0.3	2.37					

Table 3 (continued).

St. 12

Date : Mar. 7, 1977
 Time (GMT): 0515-0720
 (LMT): 0815-1020
 Latitude : 37-39S
 Longitude : 46-51E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 20.4°C
 Atmospheric pressure: 1023.9 mb
 Wind direction: NE
 velocity : 6 m/s
 Humidity : 90%
 Sea : 3
 Swell : SW/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(mep/L)					
0	19.60	35.536	8.33	5.30	0.10	3	0.02	0.0	0.2	2.37	0	19.60	35.536	25.29	269
9	19.65	35.540	8.34	5.38	0.12	3	0.01	0.2	0.4	2.37	10	19.64	35.540	25.29	269
17	19.52										20	19.48	35.542	25.33	265
26	19.41	35.542	8.34	5.46	0.16	3	0.01	0.1	0.1	2.37	30	19.40	35.542	25.35	263
43	19.25	35.539	8.34	5.38	0.16	3	0.00	0.1	0.1	2.37	50	18.86	35.535	25.48	251
65	17.90	35.526	8.33	5.43	0.20	3	0.03	0.2	0.1	2.37	75	17.43	35.524	25.83	218
86	17.05	35.523	8.33	5.30	0.27	4	0.14	0.5	0.6	2.37	100	16.86	35.522	25.97	205
106	16.80	35.522	8.33	5.29	0.31	5	0.17	0.6	0.2	2.37	125	16.36	35.522	26.08	194
128	16.29	35.522	8.33	5.27	0.33	5	0.07	1.4	0.3	2.37	150	15.99	35.519	26.17	186
169	15.85	35.516	8.33	5.24	0.35	5	0.01	1.9	0.2	2.37	200	15.77	35.514	26.21	181
208	15.77	35.514	8.32	5.31	0.39	5	0.02	2.2	0.2	2.37	250	15.70	35.506	26.22	180
249	15.70	35.506	8.33	5.37	0.37	5	0.01	1.5	0.3	2.37	300	15.61	35.496	26.24	179
326	15.54	35.490	8.32	5.40	0.39	4	0.01	1.4	0.3	2.36	400	15.20	35.458	26.30	173
405	15.17	35.455	8.30	5.35	0.43	5	0.01	2.4	0.8	2.37	500	14.29	35.360	26.42	161
482	14.44	35.376	8.28	5.13	0.55	6	0.00	5.2	0.2	2.37	600	13.43	35.266	26.53	151
646	13.04	35.221	8.27	4.60	0.74	5	0.00	8.0	1.0	2.37	700	12.55	35.155	26.62	143
803	11.55	35.020	8.23	4.52	0.98	6	0.00	12.9	0.1	2.36	800	11.58	35.024	26.71	135
962	9.76	34.810	8.17	4.94	1.27	10	0.00	17.9	0.3	2.36	1000	9.20	34.754	26.91	115
1201	6.32	34.504	8.09	4.73	1.84	25	0.00	27.4	0.1	2.36	1200	6.33	34.505	27.14	93
1605	3.39	34.472	8.02	4.25	2.29	61	0.01	33.9	0.0	2.37	1500	3.87	34.480	27.41	68
2020	2.74	34.645	8.04	4.22	2.21	76	0.01	33.1	0.3	2.37	2000	2.77	34.635	27.64	46
2446	2.45	34.719	8.06	4.49	2.08			26.7	0.5	2.37					

Table 3 (continued).

St. 13

Date : Mar. 8, 1977
 Time (GMT): 0505-0920
 (LMT): 0805-1220
 Latitude : 35-21S
 Longitude : 48-51E

Time (GMT) : 05-00
 (LMT) : 08-00
 Weather : Rain
 Air temperature : 21.0°C
 Atmospheric pressure: 1021.1 mb

Meteorological observation
 Wind direction: NE
 velocity : 20 m/s
 Humidity : 94%
 Sea : 4
 Swell : NE/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
					(μ g-atoms/L)					(meq/L)					
0	20.10	35.469	8.36	5.34	0.08	5	0.07	0.0	0.4	2.36	0	20.10	35.469	25.11	286
8	20.06	35.436	8.36	5.31	0.14	4	0.03	0.2	0.6	2.36	10	20.05	35.447	25.11	286
15	20.03	35.488	8.37	5.34	0.14	4	0.01	0.4	1.4	2.36	20	20.02	35.520	25.17	280
23	20.00	35.536	8.37	5.32	0.14	6	0.01	0.4	0.6	2.36	30	19.89	35.552	25.23	275
38	19.73	35.553	8.37	5.32	0.16	4	0.04	0.4	0.7	2.36	50	19.58	35.538	25.30	268
57	19.45	35.527	8.38	5.36	0.16	5	0.01	0.6	0.4	2.36	75	18.64	35.523	25.53	246
77	18.54	35.523	8.39	4.81	0.16	4	0.03	0.4	0.5	2.36	100	17.64	35.529	25.78	222
96	17.75	35.531	8.37	5.24	0.25	6	0.11	0.4	0.4	2.36	125	17.11	35.520	25.90	211
114	17.33	35.521	8.36	5.06	0.33	7	0.06	1.9	0.5	2.36	150	16.69	35.519	26.00	201
151	16.67	35.519	8.37	4.96	0.35	6	0.04	2.5	0.5	2.37	200	15.97	35.449	26.12	190
186	16.14	35.495	8.35	5.04	0.39	6	0.05	2.9	0.3	2.36	250	15.59	35.423	26.18	184
219	15.78	35.391	8.36	5.14	0.39	5	0.03	2.5	0.9	2.37	300	15.20	35.483	26.32	171
284	15.38	35.493	8.33	5.20	0.43	6	0.04	2.8	0.6	2.36	400	14.08	35.349	26.46	158
347	14.61	35.453	8.32	5.02	0.53	7	0.02	5.0	0.4	2.36	500	13.15	35.433	26.72	134
408	14.01	35.334	8.31	5.04	0.61	9	0.03	5.9	0.6	2.36	600	11.98	35.184	26.75	130
543	12.71	35.449	8.30	5.06	0.74	7	0.04	8.4	0.8	2.36	700	10.91	34.882	26.72	133
637	11.51	34.996	8.28	5.05	1.02	9	0.02	12.7	0.6	2.36	800	10.00	34.805	26.82	124
784	10.17	34.825	8.27	5.00	1.22	10	0.00	17.3	0.8	2.35	1000	7.76	34.591	27.01	106
1005	7.70	34.586	8.17	4.71	1.67	19	0.00	23.9	0.4	2.35	1200	5.47	34.473	27.22	85
1374	3.85	34.445	8.09	4.43	2.29	52	0.02	32.4	0.3	2.36	1500	3.31	34.487	27.47	62
1744	2.84	34.606	8.06	4.20	2.35	77	0.04	33.0	0.4	2.37	2000	2.52	34.671	27.69	42
2112	2.48	34.688	8.05	4.39	2.20	85	0.02	30.0	0.8	2.37					

Table 3 (continued).

St. 14

Date : Mar. 9, 1977
 Time (GMT): 0510-0715
 (LMT): 0810-1015
 Latitude : 31-57S
 Longitude : 51-01E

Meteorological observation

Time (GMT) : 05-00
 (LMT) : 08-00
 Weather : Rain
 Air temperature : 24.2°C
 Atmospheric pressure: 1021.1 mb
 Wind direction: N
 velocity : 9 m/s
 Humidity : 94%
 Sea : 4
 Swell : N/1

Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	Observed					Alkalinity (meq/L)	Interpolated				
					PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N		Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)										
0	23.50	35.576	8.20	4.94	0.04	3	0.03	0.0	0.4	2.37	0	23.50	35.576	24.24	369
8	23.49	35.599	8.20	4.98	0.08	0	0.02	0.3	0.4	2.37	10	23.49	35.599	24.27	367
15	23.48	35.599	8.21	5.02	0.08	3	0.00	0.2	0.2	2.37	20	23.47	35.608	24.28	365
23	23.44	35.614	8.22	4.95	0.10	3	0.00	0.2	0.1	2.37	30	23.23	35.615	24.35	358
38	22.96	35.617	8.21	5.04	0.10	3	0.01	0.3	0.0	2.37	50	22.90	35.612	24.45	349
57	22.68	35.604	8.21	5.06	0.12	3	0.04	0.4	0.2	2.37	75	20.27	35.552	25.13	284
75	20.27	35.552	8.22	5.51	0.13	3	0.03	0.2	0.0	2.37	100	17.69	35.525	25.77	224
93	18.21	35.530	8.24	5.68	0.20	3	0.02	0.2	0.0	2.37	125	16.50	35.514	26.04	197
111	17.07	35.520	8.24	5.54	0.25	5	0.03	0.3	0.0	2.37	150	15.89	35.498	26.17	185
144	16.01	35.504	8.23	5.22	0.39	5	0.07	1.2	0.0	2.37	200	15.27	35.470	26.29	174
172	15.56	35.477	8.21	5.20	0.47	5	0.04	2.0	0.1	2.37	250	14.81	35.433	26.36	167
204	15.23	35.469	8.21	5.23	0.47	4	0.00	2.1	0.3	2.37	300	14.35	35.379	26.42	162
262	14.71	35.421	8.18	5.19	0.53	3	0.01	2.8	0.1	2.36	400	13.39	35.275	26.54	150
321	14.15	35.354	8.17	5.14	0.59	6	0.00	3.7	0.2	2.37	500	12.65	35.180	26.62	143
383	13.52	35.290	8.17	5.14	0.67	6	0.02	6.8	0.5	2.36	600	11.67	35.045	26.71	135
502	12.64	35.178	8.17	5.14	0.78	6	0.01	8.2	0.3	2.37	700	10.68	34.926	26.80	126
615	11.51	35.024	8.14	5.08	1.02	7	0.01	9.4	0.0	2.36	800	9.41	34.782	26.90	116
727	10.39	34.894	8.11	5.05	1.14	8	0.03	12.5	0.1	2.36	1000	6.78	34.536	27.11	97
895	8.07	34.640	8.06	4.80	1.57	17	0.02	15.6	0.5	2.36	1200	4.81	34.433	27.27	81
1228	4.59	34.428	7.98	4.63	2.08	41	0.00	22.7	0.1	2.36	1500	3.38	34.482	27.46	63
1560	3.25	34.509	7.93	4.19	2.37	70	0.01	32.4	0.0	2.37					
1891	2.71	34.638	7.29	4.11	2.35	82	0.01	31.3	0.0	2.37					

Table 3 (continued).

St. 15

Date: Mar. 10, 1977
 Time (GMT): 0415-0607
 (LMT): 0815-1007
 Latitude : 28-43S
 Longitude : 52-55E

Meteorological observation
 Time (GMT) : 04-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 25.0°C
 Atmospheric pressure: 1022.2 mb

Wind direction: N
 velocity : 5 m/s
 Humidity : 84%
 Sea : 3
 Swell : N/1

Depth (m)	Observed										Interpolated				
	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity (meq/L)	Depth (m)	T(°C)	S(‰)	σ_t	ΔD
($\mu\text{g-atoms/L}$)															
0	26.40	35.289	8.34	4.73	0.02	4	0.02	0.1	0.1	2.36	0	26.40	35.289	23.15	473
9	26.39	35.282	8.36	4.77	0.08	4	0.01	0.1	0.5	2.36	10	26.39	35.283	23.15	473
18	26.36	35.292	8.37	4.78	0.06	3	0.00	0.1	0.3	2.36	20	26.19	35.306	23.22	466
27	25.56	35.358	8.38	4.71	1.37	2	0.00	0.2	0.2	2.36	30	25.55	35.363	23.47	443
45	25.51	35.371	8.38	4.68	0.06	0	0.01	0.2	0.3	2.36	50	24.84	35.394	23.71	420
69	21.80	35.494	8.37	5.37	0.10	3	0.01	0.3	0.5	2.37	75	21.11	35.514	24.87	309
92	19.72	35.556	8.37	5.03	0.20	4	0.07	0.2	0.3	2.37	100	19.46	35.576	25.36	262
114	19.17	35.599	8.36	5.07	0.20	4	0.08	0.1	0.4	2.37	125	18.76	35.599	25.56	244
137	18.25	35.588	8.32	4.90	0.27	3	0.09	0.4	0.3	2.37	150	17.64	35.565	25.81	220
180	18.38	35.506	8.30	4.63	0.45	5	0.03	2.6	0.4	2.37	200	15.90	35.490	26.16	186
222	15.52	35.475	8.29	4.91	0.45	6	0.04	3.1	0.4	2.37	250	15.03	35.436	26.32	171
265	14.79	35.413	8.27	5.05	0.53	5	0.03	3.1	0.2	2.36	300	14.35	35.373	26.42	162
349	13.84	35.320	8.26	5.13	0.63	6	0.00	5.0	0.4	2.37	400	13.27	35.257	26.55	149
434	12.93	35.215	8.25	5.15	0.73	6	0.00	7.5	0.2	2.36	500	12.49	35.148	26.63	142
522	12.35	35.126	8.24	5.07	0.76	7	0.02	8.1	0.3	2.37	600	11.63	35.020	26.69	136
692	10.62	34.890	8.13	5.08	1.02	10	0.00	12.4	0.3	2.36	700	10.53	34.881	26.79	127
863	8.57	34.695	8.16	4.89	1.41	17	0.01	19.6	0.3	2.36	800	9.36	34.765	26.90	117
1035	6.16	34.486	8.10	4.51	1.86	30	0.00	27.6	0.1	2.36	1000	6.64	34.522	27.11	96
1296	3.88	34.479	8.04	4.13	2.29	58	0.00	33.3	0.1	2.37	1200	4.55	34.482	27.34	75
1737	2.77	34.651	8.01	3.91	2.29	78	0.00	33.6	0.2	2.38	1500	3.10	34.552	27.54	56
2186	2.44	34.703	8.01	4.07	2.25	95	0.01	29.4	0.3	2.38	2000	2.52	34.689	27.70	40
2644	2.18	34.763	8.02	4.23	2.20	105	0.01	29.4	0.0	2.38	2500	2.25	34.743	27.77	34

Table 3 (continued).

St. 16

Date : Mar. 11, 1977
 Time (GMT): 0410-0620
 (LMT): 0810-1020
 Latitude : 24-58S
 Longitude : 54-54E

Meteorological observation

Time (GMT) : 04-00
 (LMT) : 08-00
 Weather : Cloudy
 Air temperature : 25.3°C
 Atmospheric pressure: 1018.7 mb
 Wind direction: S
 velocity : 2 m/s
 Humidity : 83%
 Sea : 2
 Swell : NNE/1

Observed											Interpolated				
Depth (m)	T(°C)	S(‰)	pH	O ₂ (cc/L)	PO ₄ -P	SiO ₃ -Si	NO ₂ -N	NO ₃ -N	NH ₄ -N	Alkalinity	Depth (m)	T(°C)	S(‰)	σ _t	ΔD
					(μg-atoms/L)					(meq/L)					
0	26.90	35.053	8.33	4.85	0.06	2	0.03	0.0	1.2	2.35	0	26.90	35.053	22.81	505
9	27.05	35.135	8.36	4.77	0.04	3	0.06	0.1	0.3	2.36	10	27.05	35.140	22.83	504
18	27.01	35.152	8.34	4.88	0.06	3	0.06	0.1	0.5	2.36	20	27.01	35.146	22.85	502
27	26.98	35.120	8.37	4.76	0.10	4	0.07	0.1	1.2	2.36	30	26.93	35.121	22.85	502
45	26.70	35.127	8.34	4.84	0.06	3	0.04	0.2	0.8	2.36	50	26.24	35.161	23.10	478
68	23.89	35.320	8.33	5.24	0.08	2	0.03	0.2	0.8	2.36	75	22.70	35.379	24.33	361
91	20.30	35.485	8.35	5.14	0.14	4	0.04	0.2	1.2	2.37	100	19.74	35.509	25.24	274
113	19.27	35.521	8.33	4.95	0.22	1	0.04	0.3	0.9	2.37	125	18.70	35.521	25.51	248
136	18.20	35.521	8.30	4.63	0.37	5	0.07	1.0	1.1	2.37	150	17.62	35.520	25.78	222
180	16.59	35.517	8.31	4.64	0.43	8	0.04	0.8	0.5	2.37	200	16.14	35.504	26.12	190
224	15.72	35.482	8.29	4.73	0.53	7	0.03	2.9	0.9	2.37	250	15.25	35.456	26.28	175
266	14.97	35.437	8.29	4.89	0.59	6	0.04	3.3	1.0	2.37	300	14.29	35.381	26.44	160
348	13.40	35.294	8.26	5.04	0.67	5	0.03	4.6	0.9	2.36	400	12.77	35.216	26.62	142
430	12.48	35.175	8.26	5.14	0.74	4	0.03	7.2	1.0	2.37	500	11.85	35.091	26.71	135
510	11.77	35.080	8.27	5.16	0.86	6	0.01	8.5	0.4	2.37	600	10.98	34.984	26.79	127
673	10.26	34.901	8.24	5.18	1.08	6	0.02	11.7	1.2	2.37	700	9.92	34.858	26.87	119
836	8.06	34.651	8.15	4.76	1.57	15	0.00	20.0	0.8	2.36	800	8.58	34.704	26.97	109
998	5.79	34.514	8.10	4.15	1.98	37	0.01	29.3	0.5	2.36	1000	5.77	34.514	27.22	86
1242	4.12	34.542	8.02	3.55	2.39	64	0.01	32.9	0.9	2.38	1200	4.31	34.526	27.40	69
1655	2.82	34.643	8.02	3.77	2.31	87	0.02	32.3	0.5	2.38	1500	3.15	34.601	27.58	52
2079	2.37	34.748	8.03	3.91	2.29	94	0.01	28.3	0.0	2.38	2000	2.41	34.732	27.74	36
2527	2.09	34.754	8.02	3.90	2.35	108	0.02	28.7	0.0	2.39	2500	2.10	34.754	27.79	32

Table 4. Expendable Bathythermograph Data.

St.	1	2	3	4	5	6	7	8	9	10	11
Date	Dec. 18	Dec. 19	Dec. 20	Dec. 21	Dec. 22	Dec. 24	Dec. 25	Dec. 26	Dec. 27	Dec. 28	Dec. 29
Year	1976										
Time (GMT)	05-05	01-30	01-00	11-05	05-00	06-00	06-00	04-00	08-00	08-00	09-00
(LMT)	12-05	08-30	08-00	18-05	12-00	12-00	12-00	09-00	12-00	12-00	12-00
Lat.	39-35 S	42-43 S	46-25 S	50-51 S	54-00 S	60-37 S	62-59 S	63-41 S	64-10 S	64-54 S	66-01 S
Long.	110-32 E	108-41 E	110-25 E	106-54 E	105-00 E	93-12 E	84-31 E	75-54 E	65-19 E	53-56 E	45-23 E
0	14.8	11.2	7.6	5.2	4.8	1.2	-0.1	-0.3	0.6	0.6	-1.1
10	14.7	11.2	7.6	5.2	4.8	0.9	2.8	-0.5	0.8	0.6	-1.1
20	14.6	11.1	7.6	5.2	4.7	0.7	3.3	-0.6	0.0	0.5	-1.3
30	14.6	11.1	7.6	5.2	4.7	0.2	0.8	-0.7	-0.3	-0.5	-1.4
50	14.5	11.1	7.5	5.1	3.4	-0.4	-1.0	-1.3	-1.2	-1.5	-1.7
75	14.4	11.0	7.5	3.6	2.8	-0.4	-1.5	-0.8	-0.4	-1.4	-1.8
100	14.4	10.8	7.0	3.1	2.4	-1.0	-1.5	0.9	1.1	-1.1	-1.8
125	14.4	10.6	6.2	2.7	2.1	-0.1	-1.4	1.3	1.5	-0.6	-1.8
150	14.4	10.5	6.5	2.7	2.0	0.5	-1.2	1.8	1.8	-0.5	-1.5
200	14.4	10.4	7.0		1.8	1.7	-0.4	1.5	1.8	-0.6	-0.1
250	13.0	10.3	5.6		1.6	1.8	0.7	1.5	1.8	0.4	0.6
300	12.0	10.2	6.2		2.1	1.8	0.6	1.5	1.8	0.7	0.7
400	9.8	10.2	5.7		2.5	1.8	1.0	1.6	1.8	0.9	0.7
500	8.2	9.9	5.0		2.3	1.7	1.1		1.8	0.9	0.8
600	7.4	9.6	4.2		2.4	1.7	1.1		1.8	0.9	
700	6.4	9.0	3.7		2.4	1.7	1.0		1.8	0.9	
800	5.5	8.2	3.3		2.4	1.6	1.0		1.8	0.9	
1000	5.5	5.9	3.0		2.3	1.3	0.8		1.6	0.8	
1200	3.5	4.2	3.0		2.3	1.0	0.6		1.4	0.5	
1500	2.7	3.2	2.7		2.1	0.8	0.4		1.2	0.3	
1800	2.5	2.8	2.6		1.8	0.6	0.3		0.8		

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Oceanographic Data of the 18th JARE

Table 4 (continued).

St.	12	13	14	15	16	17	18	19	20	21	22
Date	Dec. 30	Dec. 31	Jan. 13	Feb. 17	Feb. 21	Feb. 21	Mar. 2	Mar. 2	Mar. 3	Mar. 3	Mar. 4
Year	1976		1977								
Time (GMT)	09-00	09-00	12-20	05-00	05-00	14-55	06-10	16-10	06-20	16-00	14-50
(LMT)	12-00	12-00	15-20	08-00	08-00	17-55	08-10	18-10	08-20	18-00	17-50
Lat.	67-32 S	68-26 S	68-37 S	67-13 S	56-43 S	57-18 S	55-00 S	53-28 S	51-28 S	50-09 S	46-48 S
Long.	41-49 E	38-42 E	38-48 E	42-32 E	39-37 E	38-07 E	30-13 E	32-09 E	34-51 E	36-39 E	40-56 E
0	-0.4	0.0	-1.9	1.0	3.4	3.8	4.1	4.6	4.8	5.7	7.2
10	-1.1	-0.9	-2.0	1.0	3.3	3.8	4.1	4.6	4.8	5.7	7.2
20	-1.3	-1.2	-2.1	1.0	3.3	3.8	4.1	4.5	4.8	5.6	7.2
30	-1.5	-1.6	-2.1	1.0	3.2	3.8	4.1	4.5	4.8	5.6	7.2
50	-1.7	-1.7	-2.1	-1.3	3.0	3.7	4.0	4.5	4.7	5.6	7.2
75	-1.7	-1.7	-2.1	-1.7	-1.2	-0.1	3.7	4.1	4.7	5.6	7.1
100	-1.7	-1.7	-2.0	-1.9	-1.7	-0.5	1.0	1.7	2.0	4.8	6.6
125	-1.7		-2.0	-1.9	-1.5	-0.5	0.7	1.1	1.6	3.1	4.9
150	-1.8		-2.0	-1.9	-0.8	-0.2	0.7	1.2	1.3	3.1	4.4
200	-1.8		-2.0	-1.5	1.2	0.9	1.0	1.8	1.5	3.1	4.1
250	-1.7		-1.4	0.2	1.7	1.6	1.6	1.9	1.8	3.2	4.3
300	-1.7		-1.5	0.6	1.7	1.7	1.8	2.2	2.0	3.2	4.1
400	0.4		-1.5	0.7	1.8	1.8	1.9	2.2	2.3	3.1	3.5
500	0.6		-1.6	0.8	1.8	1.8	2.0	2.6	2.3	3.6	3.5
600							2.0	2.9	2.4	3.9	3.0
700							2.0	2.9	2.4	3.9	3.0
800							1.8	2.9	2.3	4.2	3.3
1000							1.8	2.9	2.3	4.9	3.1
1200							1.6	2.7	2.3	5.2	2.8
1500							1.5	2.2	2.3	4.5	2.8
1800							1.2	1.7	2.2	4.5	