

# Oceanographic Data of the 9th Japanese Antarctic Research Expedition 1967 - 1968

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## 第9次南極地域観測隊海洋部門報告

渡辺 隆三\*・日向野良治\*

**要 旨** 1968) として行なった表面観測, バンサーモグラフ観測および垂直(各層)観測の結果を報告する。  
第9次南極地域観測において定常観測(1967-

This report deals with the data of the oceanographic observations made on board the icebreaker FUJI during the summer mission of the 9th Japanese Antarctic Research Expedition in 1967-1968. The track chart of the cruise shown in Fig. 1, and the locations of the vertical (serial) observation stations and the bathythermograph (BT) observation stations in the southern ocean are given in Fig. 2.

**Surface observations :** Surface temperature measurements and surface water

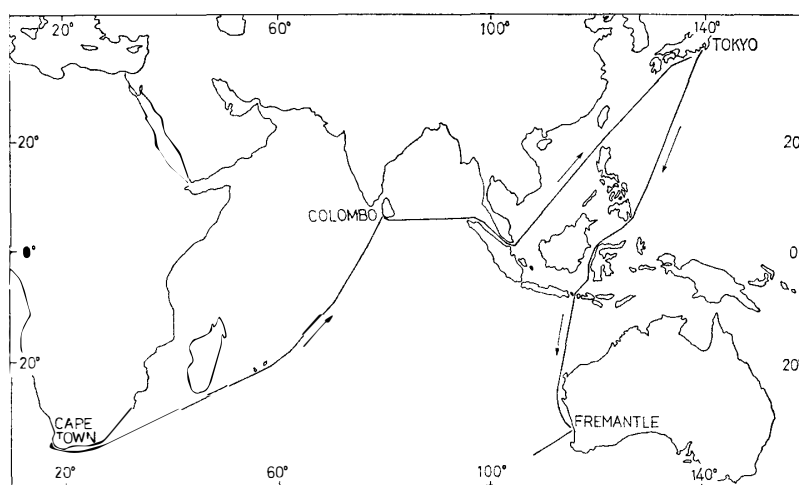


Fig. 1. Track of JARE-9 cruise 1967-68.

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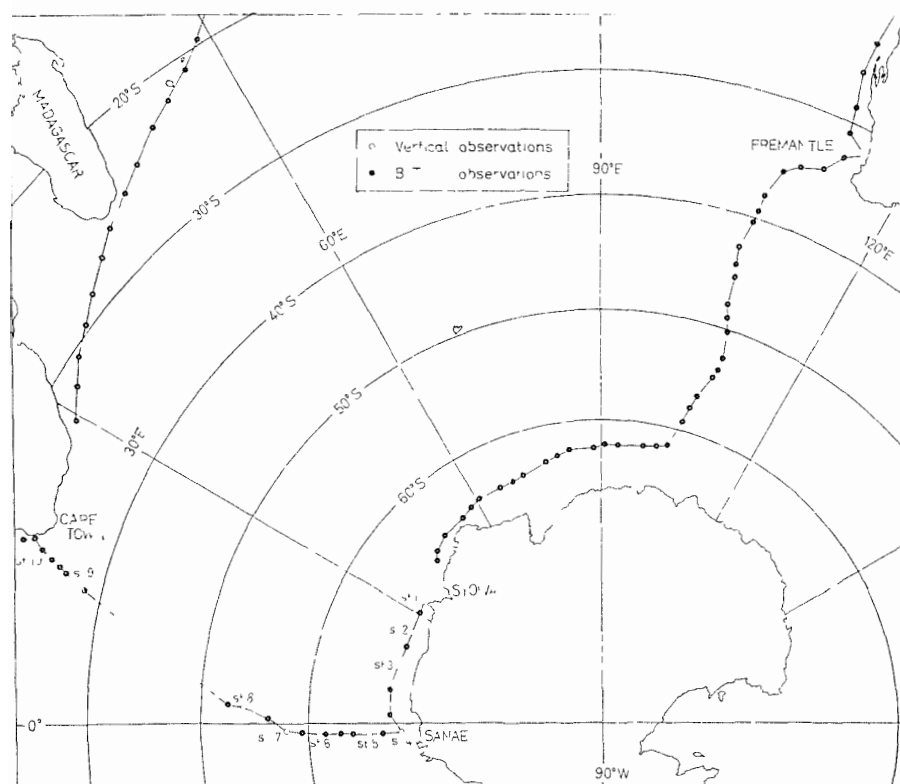


Fig 2 Track of JARE-9 cruise and oceanographic stations

samplings for chemical analyses were made three times a day from Fremantle to Syowa Station and twice a day for the rest of the cruise, so far as the circumstances permitted. The results are given in Table 1.

**Current measurements :** Measurements of surface currents were made by GEK twice a day except the region near the magnetic equator and in the pack ice area. The results are also given in Table 1.

**Bathythermograph observation :** Water temperature in the upper layer (surface to about 250 metres depth) was measured with bathythermograph (BT) at almost the same frequency as the surface observations. The results are given in Table 2.

**Vertical (serial) observation :** The observations were made at 10 stations in the Southern Ocean from Syowa Station to Cape Town, South Africa, using reversing thermometers and Nansen-type water bottles (Fig 2).

The observed 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. These values were calculated using electronic computer facilities available at the Japanese Oceanographic Data Center of the Hydrographic Division.

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

Salinity	Inductive salinometer (Auto-Lab-Model 401 MK III)
pH	pH meter (KPH-51B Yokokawa Electric Works Inc.)
Dissolved oxygen	Winkler's method
Phosphate-P	Molybdenum blue method*
Reactive silicate-Si	Molybdenum yellow method and reduction method**
Nitrate-N	Cadmium column method*
Nitrite-N	Sulphanylamide and N-(1-naphtyl)-ethylenediamine. 2 HCl were used as a reagent*.
Ammonium-N	Ammonia and aminoacid were oxydized to nitrite by hypochlorite, then measured by the same method as nitrite analysis*.
Manganese	Leucomalachite green methode*.
Alkalinity	15.00ml of N/100 HCl was added to 50.0ml of sampl, then pH of the sample was measured and alkalinity was calculated by Strickland's table*.

#### Acknowledgements

The authors are indebted to Rear Admiral T. HONDA of the icebreaker FUJI and his officers and crew for their co-operation which enabled these observations.

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\* Manual of Sea Water Analysis (Fisheries Research Board of Canada).

\*\* Silicate determination was done by the molybdenum yellow method for higher silicate concentration samples, and the reduction method using methol-hyposulfite solution as a reductant was adopted for the majority of the samples of lowre silicate concentration.

Table 1 Surface observation data

Date	Time		Position		An temp	Water temp	S	pH	O <sub>2</sub>	Phos- phate-P	Silicate-Si	Nitrite-N	Nitrate-N	Am- monia-N	Alka- linity	Man- ganese	Current	
	LMT	GMT	Lat	Long	°C		‰		cc/L			μg-at/L				mμg-at/L	Dir	kt Speed
Nov 25			Leave	Tokyo														
26	0800	2300*	32°-24'N	137°57'E	17.6	21.6	34.78	—	—	—	—	—	—	—	—	—	110	0.4
	1900	1000	30-13	136-57	19.8	22.8	34.75	8.23	4.78	0.05	2.0	—	—	—	—	—	237	0.6
27	0800	2300	27-53	135-43	22.0	23.8	34.76	8.30	4.76	0.05	0.9	—	—	—	—	—	130	0.4
	1900	1000	25-50	134-35	23.9	25.1	34.91	8.30	4.68	0.04	0.9	0.0	0.00	—	—	—	130	0.2
28	0800	2300	23-23	133-14	25.0	24.8	34.89	8.27	4.73	0.02	5.4	0.0	0.00	—	—	—	189	0.4
	1900	1000	21-19	132-15	26.2	26.8	34.76	8.26	4.60	0.00	3.0	—	0.02	—	2.35	—	110	0.6
29	0800	2300*	19-00	131-13	26.2	25.8	34.56	8.23	4.54	0.06	5.0	0.0	0.03	—	2.33	—	—	—
	1900	1000	16-47	130-08	26.9	27.4	34.51	8.27	4.50	0.00	3.6	0.0	0.01	—	2.33	—	—	—
30	0800	2300*	14-05	129-19	27.0	27.3	34.43	8.26	4.52	0.02	5.0	0.0	0.02	—	2.33	—	—	—
	1900	1000	11-59	128-28	27.9	27.5	34.24	8.26	4.52	0.08	4.3	0.0	0.01	—	2.33	—	—	—
Dec. 1	0800	2300*	09-16	127-17	25.9	27.1	34.45	8.25	4.55	0.08	3.6	0.0	0.01	—	2.29	—	—	—
	1900	1000	06-30	126-33	28.0	27.2	34.23	8.23	4.52	0.11	3.7	0.0	0.01	—	2.30	—	—	—
2	0800	0000	04-03	124-07	26.1	27.9	34.03	8.21	4.48	0.04	6.2	0.0	0.00	—	2.31	—	—	—
	1900	1100	02-38	122-07	26.4	27.8	33.86	8.19	4.58	0.04	5.2	0.0	0.01	—	2.27	—	—	—
3	0800	0000	00-57	119-47	28.2	28.8	33.87	8.22	4.48	0.04	4.0	0.0	0.00	—	2.24	—	—	—
	1900	1100	01-40S	118-43	27.8	29.2	33.42	8.21	4.50	0.13	7.2	0.0	0.00	—	—	—	—	—
4	0800	0000	04-35	118-42	28.0	28.6	33.43	8.21	4.48	0.06	6.5	0.0	0.00	0.4	2.20	—	—	—
	1900	1100	06-37	117-54	28.2	29.1	33.73	—	4.62	0.04	7.9	0.1	0.00	0.3	2.25	—	—	—
5	0800	0000	08-40	115-43	27.0	29.1	33.91	8.21	4.50	0.06	4.3	0.0	0.00	0.9	2.25	—	—	—
	1900	1100	11-21	115-02	27.1	28.6	34.33	8.22	4.89	0.04	3.0	0.0	0.01	1.9	2.32	—	209	1.7
6	0800	0000	14-15	114-24	26.9	28.1	34.70	8.16	4.45	0.08	4.7	0.0	0.01	2.4	2.23	—	28	0.8
	1900	1100	16-26	113-57	25.9	26.8	34.96	8.24	4.60	0.08	5.0	0.0	0.00	1.9	2.34	—	340	0.5
7	0800	0000	19-07	113-24	24.6	25.4	35.09	8.18	4.72	0.02	6.1	0.0	0.00	0.5	2.33	—	350	1.0
	1900	1100	21-16	112-57	23.5	24.9	35.28	8.18	4.79	0.13	4.4	0.0	0.00	0.2	2.33	4	306	0.1
8	0800	0000	23-58	112-31	22.1	23.9	35.37	8.21	4.83	0.11	3.6	0.0	0.00	1.9	2.33	4	223	0.3
	1900	1100	26-17	112-14	21.2	23.2	35.48	8.13	4.89	0.06	3.3	0.0	0.00	—	—	1	242	0.3
9	0800	0000	28-57	112-57	19.0	20.2	35.87	8.20	5.12	0.13	3.0	0.0	0.00	—	2.44	1	241	0.7
	1900	1100	30-53	113-16	19.3	20.8	35.80	8.24	5.10	0.11	3.2	0.0	0.00	0.5	2.43	0	310	0.9

\* The time of the date of the preceding day.

Date	Time		Position		Air temp	Water temp	S	pH	O <sub>2</sub>	Phos-phate-P	Silicate-Si	Nitrite-N	Nitrate-N	Am-monia-N	Alka-linity	Man-ganese	Current	
	LMT	GMT	Lat.	Long.	°C		‰		cc/L	μg-at/L						mg-at/L	Dir	Speed
Dec. 10			Arrive	in Frem	antle													
16			Leave	Frem	antle													
15	2000	1200	32-49'S	113-45'E	18.5	19.8	35.86	—	5.01	0.08	10.1	0.0	0.00	1.3	—	0	3	0.8
16	0800	0000	34-11	111-17	17.5	19.1	35.94	8.22	5.14	0.08	5.5	0.0	0.00	1.1	—	0	50	0.2
	1400	0600	34-51	110-01	18.0	19.1	35.87	—	5.24	—	3.1	—	0.00	—	—	—	—	—
	2000	1200	35-31	108-46	16.7	17.6	35.82	8.10	5.35	0.08	3.2	0.1	0.00	1.0	2.39	1	245	0.7
17	0800	0100	37-57	107-47	14.6	14.8	35.19	8.15	5.85	0.38	2.5	0.0	0.07	2.2	2.32	—	28	0.2
	1400	0700	39-12	107-30	15.1	14.8	35.06	—	5.94	0.51	3.2	—	0.12	—	—	—	—	—
	2000	1300	40-21	107-16	13.2	13.0	34.85	8.07	6.14	0.70	2.9	6.5	0.14	1.2	2.32	—	23	0.4
18	0800	0100	42-49	106-48	12.4	11.4	34.71	8.17	6.31	0.95	4.3	9.0	0.14	0.3	2.34	5	1	0.6
	1400	0700	44-04	106-54	12.4	11.4	34.66	8.22	6.20	—	9.1	8.5	0.14	—	—	—	—	—
	2000	1300	45-16	107-02	11.9	10.5	34.76	8.10	6.29	0.96	6.9	9.0	0.16	1.4	2.31	5	44	0.4
19	0800	0100	47-45	107-17	9.8	6.9	34.09	8.08	6.90	1.26	6.0	15.5	0.25	1.3	2.32	0	81	0.7
	1400	0700	48-57	107-40	8.2	5.6	33.85	—	7.12	—	—	—	0.30	—	—	—	—	—
	2000	1300	50-08	108-08	5.0	4.7	33.76	8.10	7.21	1.32	7.1	16.2	0.30	1.0	2.32	0	—	—
20	0800	0100	52-34	108-55	4.5	2.7	33.90	8.12	7.52	1.57	6.5	20.	0.31	1.8	2.33	1	130	0.2
	1400	0700	53-44	108-50	3.2	1.6	33.96	8.16	7.71	1.66	—	—	0.32	—	—	—	—	—
	2000	1300	54-27	108-12	2.7	1.8	33.95	8.16	7.64	1.57	10.1	22.	0.32	2.9	2.35	2	0	0.7
21	0800	0100	56-39	106-50	1.0	0.7	33.98	8.10	7.92	1.85	39	25.	0.34	2.3	2.34	0	163	0.1
	1400	0700	57-57	106-01	1.5	1.1	33.93	—	7.71	1.75	—	—	0.29	—	—	—	—	—
	2000	1300	59-19	105-11	1.1	0.6	33.93	8.13	7.73	1.81	59.	25.	0.32	1.6	2.34	2	300	0.2
22	0800	0100	61-40	103-40	1.1	0.4	33.67	8.07	7.92	1.68	55.	22.	0.30	2.8	2.34	—	—	—
	1400	0700	62-02	101-33	1.3	0.4	33.72	8.10	7.97	1.81	56.	—	0.31	—	—	—	—	—
	2000	1300	62-13	98-56	1.0	0.5	33.69	8.13	8.01	1.61	56.	24.	0.28	2.1	2.34	—	148	0.2
23	0800	0200	62-28	93-32	1.3	0.2	33.51	8.10	8.09	1.64	51	23	0.31	1.4	2.32	1	346	0.2
	1400	0800	62-28	90-58	2.2	0.5	33.84	8.15	8.11	1.60	63.	—	0.22	—	—	—	—	—
	2000	1400	62-51	88-31	0.2	0.2	33.65	8.20	8.25	1.58	69	24	0.20	—	2.32	16	—	—
24	0800	0200	62-56	83-08	0.3	0.5	33.74	8.12	7.89	1.72	51	25.	0.30	1.4	2.32	0	329	0.3
	1400	0800	63-13	80-36	1.0	0.6	33.59	8.13	7.76	—	54	27.	—	—	—	—	—	—
	2000	1400	63-33	77-53	0.4	1.1	33.71	8.13	7.73	2.02	60.	27.	0.34	1.9	—	3	330	0.3
25	0800	0300	64-14	72-02	0.0	0.6	33.82	8.09	7.86	1.83	52.	26	0.31	1.2	2.33	1	334	0.3
	1400	0900	64-22	69-12	2.7	0.2	33.76	8.11	7.84	1.83	45.	—	0.27	—	—	—	—	—
	2000	1500	64-28	66-20	0.1	0.1	33.79	8.07	7.88	1.79	45	25.	0.25	1.5	2.34	15	—	0.0



Date	Time		Position		Air temp	Water temp.	S	pH	O <sub>2</sub>	Phos-phate-P	Silicate-Si	Nitrite-N	Nitrate-N	Am-monia-N	Alka-limty	Man-ganese	Current	
	LMT	GMT	Lat.	Long.	°C	°C	‰		cc/L	μg-at/L						mμg-at/L	Dir.	Speed
Dec 23	1730	1530	49-42	05-04	3 3	3.6	33.81	—	—	—	—	—	—	—	—	—	—	—
24	0800	0600	47-11	06-59	4.5	6.0	33.84	8.01	6.74	1.45	5	22.	0 26	0 8	2.30	—	—	—
	1400	1200	46-10	07-41	6.0	5.9	33.85	—	—	—	—	—	—	—	—	—	—	—
	2000	1800	45-10	08-22	7.2	6.5	33.91	8.13	6.86	1.66	5.	22.	0.36	1.2	2.32	—	—	—
25	0800	0600	43-14	10-09	9.5	8.4	34.11	8.11	6.57	1.28	6	19.	0.28	0.0	2.37	—	—	—
	1400	1200	42-13	11-03	10.0	9.2	34.12	—	—	—	—	—	—	—	—	—	—	—
	2000	1800	41-15	11-57	11.0	12.2	34.49	8.16	6.64	0.78	7.	10.	0.18	0.1	2.37	—	—	—
26	0800	0600	39-18	13-33	12.8	17.1	35.42	8.22	5.23	0.35	5.	1.5	0.23	0.0	2.41	—	—	—
	1400	1200	38-36	14-08	14.1	17.5	35.49	—	—	—	—	—	—	—	—	—	—	—
	2000	1800	37-50	14-42	15.3	17.5	35.40	8.23	5.39	0.23	8.	0.23	0.04	0.1	2.44	0	325	0.3
27	0800	0600	36-56	15-19	14.8	17.8	35.45	—	—	—	—	—	—	—	—	—	250	0.2
	1400	1200	36-05	15-54	16.2	18.1	35.50	—	—	—	—	—	—	—	—	—	—	—
	2000	1800	35-18	16-23	16.5	19.2	35.56	—	—	—	—	—	—	—	—	—	—	—
	2300	2100	35-00	16-33	17.2	19.6	35.54	8.22	5.15	0.15	7.	0.17	00.0	0.0	2.38	0	10	0.4
28	0800	0600	34-20	16-57	19.0	20.7	35.50	—	—	—	—	—	—	—	—	—	290	0.3
	1400	1200	33-37	17-41	20.2	15.5	35.04	—	—	—	—	—	—	—	—	—	—	—
	2000	1800	32-41	17-20	19.7	16.5	35.20	—	—	—	—	—	—	—	—	—	313	1.3
Mar 1			Arrive in	Cape	Town													
7			Leave	Cape	Town													
8	0800	0600	35°-03'S	21°-38'E	22.0	21.7	35.45	8.24	5.02	0.15	6.6	0.10	0.02	0.9	2.39	2	340	0.3
	1900	1700	34-35	24-14	22.0	21.1	35.32	8.23	5.18	0.21	9.9	0.27	—	0.5	2.39	2	350	0.3
9	0800	0600	33-47	27-17	20.4	25.4	35.20	8.19	4.63	0.17	7.0	0.28	0.03	1.3	2.32	0	180	1.8
	1900	1700	32-59	29-32	20.8	25.0	35.24	8.23	4.72	0.17	7.7	0.17	0.00	1.0	2.33	0	205	1.6
10	0800	0600	31-40	32-13	20.8	22.9	35.48	8.18	4.91	0.13	5.8	0.15	0.00	0.2	2.41	0	240	0.3
	1900	1700	30-31	34-37	22.0	25.6	35.42	8.20	4.62	0.13	3.2	0.13	0.00	0.4	2.37	0	252	1.3
11	0800	0500	29-37	37-09	22.8	24.6	35.41	8.17	4.74	0.10	3.4	0.15	0.00	0.0	2.40	0	43	0.3
	1900	1600	28-32	39-42	24.0	25.8	35.31	8.18	4.60	0.10	4.8	0.14	0.00	0.0	2.39	0	307	0.5
12	0800	0500	27-22	42-30	24.9	25.8	35.35	8.20	4.66	0.10	9.2	0.15	0.00	0.1	2.36	0	250	0.2
	1900	1600	26-21	44-48	25.0	27.5	34.94	8.21	4.56	0.10	5.6	0.22	0.00	0.3	2.34	5	40	0.5
13	0800	0500	25-08	47-35	25.8	26.8	34.91	8.19	4.58	0.19	5.0	0.18	0.00	0.0	2.37	0	265	1.0
	1900	1600	24-11	49-54	25.7	26.7	34.98	8.19	4.58	0.13	8.0	0.06	0.00	0.0	2.36	19	060	0.1

Date	Time		Position		Air temp	Water temp	S	pH	O <sub>2</sub>	Phos- phate-P	Silicate -Si	Nitrite -N	Nitrate -N	Am- monia-N	Alka-	Man- gane- se	Current	
	LMT	GMT	Lat	Long	°C		‰		cc/L	μg-at/L					limity	mμg- at/L	Dir	kt Speed
Mar 14	0800	0500	22-59	52-31	26.1	26.6	34.98	8.20	4.59	0.10	3.0	0.00	0.00	0.0	2.36	5	245	0.2
	1900	1600	22-03	54-43	25.6	26.7	35.08	8.17	4.59	0.15	7.2	0.02	0.00	1.1	2.36	3	3	1.1
15	0800	0500	21-00	57-10	27.0	26.9	34.68	8.18	4.54	0.15	4.5	0.02	0.00	0.5	2.33	1	264	0.2
	1900	1600	19-42	59-03	27.1	27.4	34.67	8.20	4.52	0.19	3.0	0.01	0.00	0.7	2.34	1	320	0.1
16	0800	0400	18-01	60-59	27.0	27.4	34.51	8.22	4.52	0.17	4.5	0.01	0.00	0.0	2.33	0	5	0.4
	1900	1500	16-32	62-42	27.1	27.8	34.54	8.22	4.47	0.17	4.6	0.01	0.00	0.2	2.33	2	299	0.7
17	0800	0400	15-09	64-59	26.8	27.4	34.48	8.22	4.49	0.17	5.5	0.03	0.00	0.0	2.34	2	296	0.5
	1900	1500	13-34	66-41	27.7	28.8	34.58	8.23	4.43	0.19	6.0	0.02	0.00	0.2	2.35	0	294	1.7
18	0800	0300	11-45	68-32	26.9	27.6	34.35	8.20	4.53	0.17	6.1	0.03	0.01	0.0	2.32	0	185	0.5
	1900	1400	10-05	70-13	26.1	28.6	34.46	8.23	4.43	0.19	2.4	0.03	0.01	0.0	2.32	2	331	0.5
19	0800	0300	08-05	72-17	26.7	27.8	34.27	8.22	4.51	0.10	3.0	0.00	0.00	0.2	2.33	7	276	1.0
	1900	1400	06-08	73-40	27.5	28.4	34.18	8.23	4.49	0.15	5.1	0.00	0.00	0.4	2.33	1	28	1.4
20	0800	0300	03-27	74-53	27.2	28.6	34.06	8.22	4.43	0.15	4.9	0.02	0.00	0.2	2.28	2	20	1.0
	1900	1400	01-10	75-55	25.3	28.8	34.15	8.25	4.45	0.15	4.8	0.04	0.00	0.2	2.28	1	—	—
21	0800	0230	01-00N	77-41	28.1	28.6	34.27	8.24	4.48	0.13	2.8	0.03	0.00	0.1	2.32	0	—	—
	1900	1330	02-43	78-31	28.2	28.7	34.37	8.25	4.44	0.15	4.5	0.03	0.00	0.5	2.33	6	—	—
22	0800	0230	05-11	79-33	28.0	28.5	34.36	8.21	4.46	0.21	6.1	—	0.00	0.0	2.32	6	—	—
			Arrive Leave	in Colombo Colombo														
27	1900	1330	05-43	80-32	27.2	28.4	33.49	—	—	—	—	—	—	—	—	—	—	—
28	0800	0230	05-54	83-13	27.0	28.0	33.41	8.20	4.39	0.17	3	0.03	0.04	—	—	—	—	—
	1900	1330	06-00	85-34	27.0	28.0	33.25	—	—	—	—	—	—	—	—	—	—	—
29	0800	0200	06-05	88-14	27.5	28.1	33.80	8.18	4.43	0.23	5	0.00	0.04	—	—	—	—	—
	1900	1300	06-08	90-39	28.1	29.6	33.09	8.19	4.47	0.17	4	0.00	0.03	—	—	—	—	—
30	0800	0200	06-12	93-32	28.8	28.4	33.49	8.20	4.48	0.23	4	0.18	0.01	—	—	—	—	—
	1900	1300	06-03	95-56	29.0	29.0	32.96	8.23	4.48	0.10	5	0.01	0.01	—	—	—	—	—



Date	Time		Position		Air temp	Water temp	S	pH	O <sub>2</sub>	Phos- phate-P	Silicate -Si	Nitrite -N	Nitrate -N	Am- monia-N	Alka- linity	Man- ganese	Current	
	LMT	GMT	Lat.	Long.	°C	‰	cc/L		μg-at/L							mg- at/L	Dir.	kt Speed
Mar. 31	0800	0100	04-49	98-27	28.0	28.8	32.55	8.21	4.47	0.06	2.	0.00	0.00	—	—	—	—	—
	1900	1200	03-06	100-35	29.0	29.0	32.02	8.15	4.41	0.23	10.	0.08	0.01	—	—	—	—	—
Apr. 1	0800	0100	01-30	103-04	27.9	28.6	32.28	8.19	4.54	0.10	6.	0.00	0.03	0.0	—	1	—	—
	1900	1200	02-07	104-53	28.4	28.4	33.34	8.17	4.44	0.06	6	0.03	0.01	0.1	—	10	—	—
2	0800	0100	04-31	106-25	28.0	27.8	33.57	8.18	4.37	0.04	8	0.04	0.00	0.1	—	0	—	—
	1900	1200	06-23	107-54	27.8	28.2	33.65	8.21	4.51	0.04	4	0.01	0.01	0.1	—	5	—	—
3	0800	0100	08-31	109-34	27.7	27.5	33.70	8.20	4.50	0.02	6	0.04	0.00	0.0	—	1	—	—
	1900	1200	10-21	111-11	27.1	27.7	33.60	8.20	4.55	0.04	6.	0.00	0.01	0.0	—	11	—	—
4	0800	0000	12-12	113-02	26.8	27.2	33.66	8.21	4.49	0.04	3.	0.01	0.01	0.0	2.28	0	—	—
	1900	1100	13-46	114-43	26.2	27.0	33.86	8.23	4.52	0.04	5.	0.03	0.00	0.3	2.28	10	—	—
5	0800	0000	15-33	116-49	26.8	26.5	33.92	8.21	4.54	0.06	4.	0.00	0.00	0.0	2.30	—	—	—
	1900	1100	17-08	118-36	27.5	26.1	34.07	8.22	4.66	0.06	9	0.00	0.00	0.5	2.31	—	—	—
6	0800	2300*	18-57	120-35	25.2	26.9	33.98	8.20	4.73	0.04	4	0.00	0.01	0.0	2.33	1	—	—
	1800	0900	20-25	122-16	25.8	26.0	34.44	8.28	4.67	0.04	7.	0.05	0.00	0.9	2.28	0	—	—
7	0800	2300*	22-29	124-20	22.6	24.1	34.71	8.25	4.75	0.02	3.	0.04	0.00	0.0	2.39	1	135	0.1
	1900	1000	24-08	126-05	21.9	21.9	34.85	8.27	4.44	0.04	3	0.02	0.02	0.0	2.40	16	301	1.1
8	0800	2300*	26-08	128-08	20.4	20.3	—	—	—	—	—	—	—	—	—	—	150	0.7
	1900	1000	27-45	129-50	20.0	21.8	—	—	—	—	—	—	—	—	—	—	150	0.4
9	0800	2300*	29-39	131-54	20.0	21.4	34.79	—	—	—	—	—	—	—	—	—	129	1.0
	1900	1000	31-28	133-26	18.4	18.8	—	—	—	—	—	—	—	—	—	—	46	0.5
10	0800	2300*	33-08	135-50	19.1	17.8	—	—	—	—	—	—	—	—	—	—	105	2.3
	1900	1000	33-59	137-54	17.1	15.0	—	—	—	—	—	—	—	—	—	—	—	—

\* The time of the date of the preceding day

Table 2 Bathythermograph observation data

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Ryuzo WATANABE and Ryōji HIGANO

[南極資料]

St No	Date			Time G M T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)											
	Day	M●	Yr					0	10	20	30	50	75	100	125	150	200	250	
1	26	Nov	1967	2300*	0800	32°-24' N	137°-57' E	21.6	21.6	21.6	21.6	21.6	20.3	18.8	18.3	18.1	17.7	—	
2	26			1000	1900	30°-13'	136°-57'	22.8	22.8	22.8	22.8	22.8	20.1	19.0	18.4	18.2	17.6	—	
3	27			2300*	0800	27°-53'	135°-43'	23.8	23.7	23.7	23.7	22.5	20.7	19.2	18.7	18.2	17.8	—	
4	27			1000	1900	25°-50'	134°-35'	25.1	25.0	25.0	25.0	25.0	21.3	19.3	18.8	18.2	17.6	—	
5	28			2300*	0800	23°-23'	133°-14'	24.8	24.8	24.8	24.8	24.8	19.6	18.9	18.3	17.8	16.8	—	
6	28			1000	1900	21°-19'	132°-15'	26.8	26.8	26.8	26.8	26.8	26.1	23.5	22.1	20.7	—	—	
7	29			2300*	0800	19°-00'	131°-13'	26.8	26.8	26.8	26.8	26.8	26.7	25.3	22.6	20.2	18.3	—	
8	29			1000	1900	16°-47'	130°-08'	27.4	27.4	27.4	27.4	27.3	27.3	26.1	24.3	21.5	20.0	—	
9	30			2300*	0800	14°-05'	129°-19'	27.3	27.2	27.2	27.2	27.3	25.6	23.5	20.8	18.3	15.6	—	
10	30			1000	1900	11°-59'	128°-28'	27.5	27.4	27.4	27.4	26.3	24.1	20.7	17.4	15.0	—	—	
11	1	Dec	1967	2300*	0800	09°-16'	127°-17'	27.1	27.1	27.1	27.0	26.5	24.4	18.8	16.7	15.6	13.4	—	
12	1			1000	1900	06°-30'	126°-33'	27.2	27.1	27.1	26.8	26.1	21.6	18.8	17.7	17.1	—	—	
13	2			0000	0800	04°-03'	124°-07'	27.9	27.7	27.8	27.1	25.0	24.0	22.8	19.0	17.7	16.1	—	
14	2			1100	1900	02°-38'	122°-07'	27.8	27.5	27.5	27.5	27.4	26.4	22.6	20.5	18.5	—	—	
15	3			0000	0800	00°-57'	119°-47'	28.8	28.8	28.8	28.6	26.0	24.4	21.9	20.4	18.1	14.9	—	
16	3			1100	1900	01°-40' S	118°-43'	29.2	29.0	28.0	27.6	25.3	24.2	21.7	19.9	19.4	15.4	—	
17	4			0000	0800	04°-35'	118°-42'	28.6	28.1	28.1	28.1	27.1	24.8	21.0	17.8	16.7	13.1	—	
18	4			1100	1900	06°-37'	117°-54'	29.1	29.1	29.1	28.9	27.3	24.1	20.7	17.5	16.1	12.4	—	
19	5			1100	1900	11°-21'	115°-02'	28.6	26.9	26.2	26.1	24.6	22.8	21.2	19.4	17.3	14.2	—	
20	6			0000	0800	14°-15'	114°-24'	28.1	27.4	26.5	26.4	24.4	24.2	23.0	22.6	20.4	15.5	—	
21	6			1100	1900	16°-26'	113°-57'	26.8	26.7	26.7	26.3	24.4	23.7	22.2	20.5	19.3	16.7	—	
22	7			0000	0800	19°-07'	113°-24'	25.4	25.0	24.8	24.5	23.8	22.6	21.5	21.0	20.5	18.7	—	
23	7			1100	1900	21°-16'	112°-57'	24.9	24.9	24.3	23.9	22.8	22.2	21.2	20.9	20.6	18.7	—	
24	8			0000	0800	23°-58'	112°-31'	23.9	23.1	22.6	22.5	21.9	21.0	20.2	19.7	19.3	18.4	—	
25	8			1100	1900	26°-17'	112°-14'	23.2	23.0	22.8	22.8	21.7	21.3	20.8	20.2	20.0	18.9	17.2	

\* The time of the date of the preceding day

St No.	Date			Time G M.T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)										
	Day	Mo	Yr					0	10	20	30	50	75	100	125	150	200	250
26	9	Dec.	1967	0000	0800	28°-57' S	112°-57' E	20.2	20.2	19.7	19.4	18.6	17.4	16.3	15.6	15.1	13.9	—
27	9			1100	1900	30°-53'	113°-16'	20.8	20.8	20.3	19.9	18.0	16.5	15.9	15.2	14.4	13.2	—
28	15			1200	2000	32°-49'	113°-45'	19.8	19.7	19.6	19.4	18.2	17.6	16.4	15.6	15.0	13.9	—
29	16			0000	0800	34°-11'	111°-17'	19.1	18.9	18.9	18.4	17.1	15.6	15.3	14.8	14.4	13.2	—
30	16			0600	1400	34°-51'	110°-01'	19.1	18.9	18.8	18.8	18.8	17.8	17.2	16.1	15.4	14.5	13.0
31	16			1200	2000	35°-31'	108°-46'	17.6	17.3	17.1	17.0	16.2	15.2	14.0	13.9	13.0	12.5	11.8
32	17			0100	0800	37°-57'	107°-47'	14.8	14.3	13.7	13.4	12.8	12.4	11.9	11.6	11.2	10.8	—
33	17			0700	1400	39°-12'	107°-30'	14.8	14.6	14.3	13.4	13.0	12.2	12.1	11.8	11.8	11.7	—
34	17			1300	2000	40°-21'	107°-16'	13.0	12.5	12.5	12.2	11.4	10.9	10.7	10.6	10.4	10.2	—
35	18			0100	0800	42°-49'	106°-48'	11.4	11.3	11.3	11.2	9.8	9.6	9.5	9.5	9.4	9.4	—
36	18			0700	1400	44°-04'	106°-54'	11.4	11.4	11.3	10.9	9.8	9.6	9.4	9.0	9.0	8.9	—
37	18			1300	2000	45°-16'	107°-02'	10.5	10.5	10.5	10.5	10.4	9.5	9.5	9.5	9.5	9.5	—
38	19			0100	0800	47°-45'	107°-17'	6.9	6.8	6.8	6.7	6.3	6.3	6.1	6.1	6.2	6.2	—
39	19			0700	1400	48°-57'	107°-40'	5.6	5.5	5.3	5.2	5.0	4.2	4.0	3.8	3.5	3.3	—
40	19			1300	2000	50°-08'	108°-08'	4.7	4.7	4.5	4.4	4.2	4.2	3.4	2.5	2.9	3.0	—
41	20			0100	0800	52°-34'	108°-55'	2.7	2.3	2.1	2.0	1.9	1.9	1.9	1.3	0.7	1.6	—
42	20			0700	1400	53°-44'	108°-50'	1.6	1.3	1.2	1.2	1.1	1.1	0.8	-0.1	0.6	1.0	—
43	20			1300	2000	54°-27'	108°-12'	1.8	1.8	1.7	1.7	1.7	1.5	1.0	0.0	0.4	1.8	—
44	21			0100	0800	56°-39'	106°-50'	0.7	0.3	0.3	0.2	0.0	-0.7	-1.3	-1.2	-0.3	1.0	—
45	21			0700	1400	57°-57'	106°-01'	1.1	0.9	0.8	0.7	0.4	-0.6	-0.7	-0.5	-0.1	1.5	—
46	21			1300	2000	59°-19'	105°-11'	0.6	-0.1	-0.1	-0.1	-0.6	-1.2	-0.7	0.1	1.0	1.4	1.6
47	22			0100	0800	61°-40'	103°-40'	0.4	-0.1	-0.6	-1.0	-1.2	-1.0	0.9	1.2	1.6	1.6	—
48	22			0700	1400	62°-02'	101°-33'	0.4	-0.1	-0.8	-0.9	-1.3	-1.1	-0.8	0.2	0.4	0.9	—
49	22			1300	2000	62°-13'	98°-56'	0.5	-0.8	-1.6	-1.7	-1.4	-1.2	-0.7	-0.7	0.3	0.7	1.3
50	23			0200	0800	62°-28'	93°-32'	0.2	-0.8	-1.3	-1.3	-1.3	-1.0	-0.6	-0.1	0.4	0.9	—

St No	Date			Time G M T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)										
	Day	Mo	Yr					0	10	20	30	50	75	100	125	150	200	250
51	23	Dec	1967	0800	1400	62°-28' S	90°-58' E	0.5	-0.3	-1.4	-1.5	-1.7	-1.5	-1.2	-0.7	-0.4	0.3	—
52	23			1400	2000	62°-51'	88°-31'	0.2	-0.4	-1.6	-1.6	-1.7	-1.3	-0.8	-0.5	-0.1	0.4	—
53	24			0200	0800	62°-56'	83°-08'	0.5	0.2	-0.4	-0.5	-1.6	-0.8	0.7	1.2	1.4	1.8	—
54	24			0800	1400	63°-13'	80°-36'	0.6	-0.7	-0.8	-1.0	-1.6	-1.5	0.1	0.8	1.2	1.7	1.8
55	24			1400	2000	63°-33'	77°-53'	1.1	-0.4	-1.0	-1.2	-1.5	-0.5	0.8	1.4	1.7	1.8	—
56	25			0300	0800	64°-14'	72°-02'	0.6	-0.2	-0.7	-1.1	-1.7	-1.8	-1.8	-1.8	-1.7	-1.1	—
57	25			0900	1400	64°-22'	69°-12'	0.2	0.2	-1.0	-1.3	-1.3	-0.9	-0.4	0.4	0.7	1.4	—
58	25			1500	2000	64°-28'	66°-20'	0.1	0.0	-1.4	-1.6	-1.8	-1.8	-1.8	-1.7	-1.1	0.0	—
59	26			0300	0800	64°-40'	60°-53'	0.2	0.1	0.0	-1.1	-1.2	-1.6	1.0	1.3	1.5	1.6	—
60	26			0900	1400	64°-51'	58°-13'	-0.3	-0.3	-0.8	-0.9	-1.3	-1.4	-1.4	-1.4	-1.2	—	—
61	26			1500	2000	65°-17'	55°-30'	-0.5	-1.0	-1.2	-1.2	-1.9	-1.9	-1.9	-1.9	-1.9	-1.8	-1.4
62	27			0400	0800	65°-29'	49°-14'	-0.6	-1.0	-1.1	-1.2	-1.7	-1.8	-1.8	-1.8	-1.8	-1.8	-1.6
63	27			1000	1400	66°-09'	46°-38'	0.2	-1.0	-1.3	-1.3	-1.5	-1.6	-1.6	-1.7	-1.7	-1.6	—
64	7	Feb	1968	1200	1500	66°-47'	43°-51'	0.2	0.1	-0.1	-0.1	-0.2	-1.8	-1.9	-1.9	-1.9	-1.9	-1.4
65	14			0700	0900	68°-07'	33°-30'	-0.9	-1.0	-0.8	-0.9	-1.6	-1.8	-1.8	-1.9	-1.9	-1.8	-0.7
66	14			1800	2000	68°-27'	30°-22'	-1.0	-1.1	-0.9	-1.0	-1.4	-1.9	-1.9	-1.9	-1.9	-1.9	—
67	15			0320	0520	68°-33'	24°-54'	-0.2	-0.3	-0.3	-1.1	-1.8	-1.8	-1.7	-0.9	0.1	0.9	1.1
68	15			1620	1820	68°-38'	20°-37'	-0.8	-0.9	-1.5	-1.5	-1.6	-1.6	-1.7	-1.7	-1.7	-1.5	—
69	16			0500	0700	68°-23'	15°-00'	-0.8	-0.9	-0.9	-1.0	-1.8	-1.8	-1.9	-1.9	-1.9	-1.7	—
70	16			1800	2000	67°-58'	08°-43'	-0.5	-0.5	-0.8	-1.6	-1.6	-1.7	-1.6	-1.0	0.0	0.7	—
71	17			0600	0800	68°-05'	01°-58'	-0.5	-0.5	-0.9	-1.5	-1.6	-0.6	0.6	0.6	0.6	0.9	0.9
72	17			1800	2000	69°-26'	02°-43' W	-1.1	-1.3	-1.8	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9	-1.6	—
73	18			0400	0600	69°-29'	02°-35'	-1.0	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5	-1.4	-1.2	-1.0	-0.7
74	18			1800	2000	67°-34'	02°-42'	0.0	-0.4	-1.5	-1.6	-1.7	-1.6	-1.6	-1.1	-0.2	0.5	—
75	19			0515	0715	66°-07'	02°-46'	0.7	0.6	0.0	-1.6	-1.6	-0.4	0.7	1.0	1.1	1.1	1.1

St No	Date			Time G M T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)										
	Day	Mo	Yr					0	10	20	30	50	75	100	125	150	200	250
76	19	Feb.	1968	1230	1430	64°-39' S	02°-29' W	0.6	0.5	0.5	0.5	-1.8	-0.8	0.7	1.0	1.0	1.1	1.0
77	19			1930	2130	63°-20'	02°-20'	0.8	0.7	0.7	0.7	-1.6	-1.3	0.4	0.8	1.0	1.2	1.2
78	20			0300	0500	61°-55'	02°-10'	0.5	0.4	0.4	0.4	-1.9	-1.9	-1.3	0.0	0.3	—	—
79	20			1100	1300	61°-22'	02°-06'	0.9	0.8	0.8	0.7	-1.7	-1.7	-1.7	-0.7	0.1	0.6	—
80	20			2100	2300	59°-38'	01°-54'	0.9	0.9	0.9	0.7	-1.3	-1.6	-1.1	-0.5	0.1	0.5	—
81	21			0600	0800	58°-08'	01°-20'	0.7	0.7	0.6	0.2	-0.6	-1.3	-1.2	-1.1	-1.0	0.0	0.6
82	21			1800	2000	56°-18'	00°-45' E	1.4	1.4	1.2	1.0	-0.2	-1.1	-1.4	-1.3	-1.0	-0.2	—
83	22			1100	1300	54°-00'	02°-29'	1.8	1.3	1.3	1.1	0.8	0.5	-0.6	-0.9	-0.7	0.6	1.3
84	22			2130	2330	52°-33'	02°-45'	1.8	1.8	1.8	1.7	1.2	0.8	0.5	-0.2	-0.3	0.5	—
85	26			1200	1400	38°-36'	14°-08'	17.5	17.4	17.4	17.4	17.3	17.3	17.3	17.3	16.9	15.9	—
86	26			1745	1945	37°-50'	14°-42'	17.5	17.5	17.3	17.2	17.0	14.8	13.7	12.2	11.6	11.0	—
87	27			0600	0800	36°-56'	15°-19'	17.8	17.2	16.9	16.8	16.7	16.6	15.1	13.8	13.5	12.2	—
88	27			1200	1400	36°-05'	15°-54'	18.1	18.1	18.1	18.1	18.1	17.7	14.7	13.8	13.5	12.7	—
89	27			1800	2000	35°-18'	16°-23'	19.2	19.2	19.1	19.1	18.8	16.4	15.3	14.7	14.1	12.7	—
90	27			2100	2300	35°-00'	16°-33'	19.6	19.5	19.5	19.4	19.3	16.2	15.5	14.7	14.3	13.3	—
91	28			0600	0800	34°-20'	16°-57'	20.7	20.7	20.7	20.7	20.1	17.9	14.6	12.8	11.2	9.6	—
92	28			1200	1400	33°-37'	17°-41'	15.5	15.2	13.8	13.3	12.4	10.4	9.8	9.4	—	—	—
93	28			1800	2000	32°-41'	17°-20'	16.5	15.2	13.1	12.5	11.3	10.2	9.8	9.3	8.8	—	—
94	9	Mar	1968	1700	1900	32°-59'	29°-32'	25.0	25.0	25.0	25.0	23.3	21.5	19.5	17.6	17.2	16.8	—
95	10			0600	0800	31°-40'	32°-13'	22.9	22.9	22.8	22.8	22.2	19.4	17.7	17.0	16.9	16.5	—
96	10			1700	1900	30°-31'	34°-37'	25.6	25.6	25.6	25.6	25.5	23.4	21.7	19.3	17.8	16.2	—
97	11			0500	0800	39°-37'	37°-09'	24.6	24.6	24.6	24.6	23.3	19.9	18.5	18.5	17.0	16.3	—
98	11			1600	1900	28°-32'	39°-42'	25.8	25.7	25.2	25.0	23.3	20.9	18.8	17.5	16.9	16.1	15.2
99	12			0500	0800	27°-22'	42°-30'	25.8	25.8	25.8	24.8	22.5	20.5	18.9	18.1	17.3	15.8	—
100	12			1600	1900	26°-21'	44°-48'	27.5	27.4	27.4	27.3	24.9	22.5	20.2	18.1	17.4	15.9	—

St No	Date			Time G M T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)										
	Day	Mo	Y1					0	10	20	30	50	75	100	125	150	200	250
101	13	Mar	1968	0500	0800	25°-08' S	47°-35' E	26.8	26.8	26.6	24.5	23.2	22.6	21.9	20.9	19.2	17.3	—
102	13			1600	1900	24°-11'	49°-54'	26.7	26.7	26.5	26.3	25.2	23.4	21.8	20.5	19.5	17.8	—
103	14			0500	0800	22°-59'	52°-31'	26.6	26.6	26.5	26.4	25.1	22.7	21.8	20.7	19.9	18.1	16.4
104	14			1600	1900	22°-03'	54°-43'	26.7	26.6	26.2	24.2	22.2	21.1	20.2	19.5	18.5	17.0	15.5
105	15			0500	0800	21°-00'	57°-10'	26.9	26.9	26.9	25.3	22.7	21.0	19.8	19.4	19.0	17.0	—
106	15			1600	1900	19°-42'	59°-03'	27.4	37.3	27.3	27.3	24.7	23.7	22.9	21.8	20.7	18.4	16.4
107	16			0400	0800	18°-01'	60°-59'	27.4	27.4	27.4	27.4	25.6	24.2	23.0	22.0	21.4	19.2	17.5
108	16			1500	1900	16°-32'	62°-42'	27.8	27.8	27.6	27.6	25.3	23.0	21.9	21.3	20.6	18.7	16.9
109	17			0400	0800	15°-09'	62°-59'	27.4	27.4	26.9	26.3	25.3	23.0	21.4	20.2	18.9	16.9	15.1
110	17			1500	1900	13°-34'	66°-41'	28.8	28.5	28.3	27.9	22.5	19.9	18.6	17.9	16.9	14.6	13.3
111	18			0300	0800	11°-45'	68°-32'	27.6	27.3	26.3	23.9	20.7	18.5	16.3	14.9	13.5	12.4	—
112	18			1400	1900	10°-05'	70°-13'	28.6	28.4	28.4	28.3	25.7	22.8	19.2	17.8	16.8	14.8	—
113	19			0300	0800	08°-05'	72°-17'	27.8	27.8	27.7	26.3	23.4	20.1	16.9	15.4	14.0	13.0	—
114	19			1400	1900	06°-08'	73°-40'	28.4	28.4	28.4	28.4	26.2	20.1	16.3	14.4	12.9	11.8	—
115	20			0300	0800	03°-27'	74°-53'	28.6	28.5	28.3	27.1	24.8	21.5	19.6	16.7	14.0	12.1	—
116	20			1400	1900	01°-10'	75°-55'	28.8	28.8	28.8	27.9	24.3	21.2	20.7	18.5	16.1	13.4	12.9
117	21			0230	0800	01°-00' N	77°-41'	28.6	28.6	28.6	28.3	26.7	21.8	20.1	19.2	17.0	14.2	—
118	21			1330	1900	02°-43'	78°-31'	28.7	28.6	28.5	28.5	28.5	26.8	23.4	17.5	15.6	12.8	—
119	22			0230	0800	05°-11'	79°-33'	28.5	28.4	28.4	28.0	27.6	26.8	23.2	18.2	15.9	—	—
120	27			1330	1900	05°-43'	80°-32'	28.4	28.4	28.4	28.4	27.3	27.9	21.7	19.9	16.8	14.0	—
121	28			0230	0800	05°-54'	83°-13'	28.0	28.0	28.0	28.2	28.3	24.4	19.2	16.2	15.6	13.7	—
122	28			1330	1900	06°-00'	85°-34'	28.0	27.8	27.8	27.8	27.5	25.9	19.2	15.9	14.2	12.8	—
123	29			0200	0800	06°-05'	88°-14'	28.1	28.0	28.0	28.0	25.2	22.4	19.7	16.6	14.5	12.9	—
124	29			1300	1900	06°-08'	90°-39'	29.6	28.1	26.4	25.8	23.0	19.1	16.4	15.7	14.1	13.0	—
125	30			0200	0800	06°-12'	93°-32'	28.4	27.7	37.3	27.2	23.7	22.6	19.0	15.8	13.9	12.7	11.4

St. No	Date			Time G M.T	Time Meri- dian	Latitude	Longitude	Temperature (°C) at indicated depth (m)										
	Day	Mo	Yr					0	10	20	30	50	75	100	125	150	200	250
126	30	Mar.	1968	1300	1900	06°-03' N	95°-56' E	29.0	29.2	28.5	28.0	27.0	26.9	24.4	23.4	16.5	14.6	—
127	3	Apr.	1968	0100	0800	08°-31'	109°-34'	27.5	27.3	25.9	25.1	21.9	20.6	19.6	18.5	16.3	14.7	—
128	3			1200	1900	10°-21'	111°-11'	27.7	27.4	26.4	26.5	23.5	21.1	19.4	18.8	17.3	15.3	—
129	4			0000	0800	12°-12'	113°-02'	27.2	27.1	26.7	26.2	25.7	23.3	19.4	17.4	16.1	14.3	—
130	4			1100	1900	13°-46'	114°-43'	27.0	26.6	24.4	23.8	22.3	21.8	21.7	21.0	18.5	16.1	—
131	5			0000	0800	15°-33'	116°-49'	26.5	24.6	24.5	24.3	22.8	21.5	20.1	18.7	17.7	15.4	—
132	5			1100	1900	17°-08'	118°-36'	26.1	25.0	22.7	21.7	19.4	17.7	16.7	15.4	14.3	12.9	—
133	6			2300*	0800	18°-57'	120°-35'	26.9	26.7	26.7	25.5	23.3	21.1	19.6	18.4	17.1	16.1	14.7
134	6			0900	1800	20°-25'	122°-16'	26.0	25.9	25.4	25.3	24.7	24.6	24.1	22.4	20.9	18.1	17.1
135	7			2300*	0800	22°-29'	124°-20'	24.1	24.0	23.5	23.4	23.0	21.6	21.1	20.6	20.2	19.0	—
136	8			2300*	0800	26°-08'	128°-08'	20.3	20.1	20.0	19.9	19.6	19.3	18.9	18.9	18.7	17.8	—
137	8			1000	1900	27°-45'	129°-50'	21.8	21.8	21.5	21.3	20.7	20.0	19.6	19.4	19.0	17.9	17.3
138	9			2300*	0800	29°-39'	131°-54'	21.4	21.4	21.4	21.4	21.4	21.2	20.8	20.4	20.3	19.3	—
139	9			1000	1900	31°-28'	133°-26'	18.8	18.8	18.8	18.8	18.6	18.4	18.3	18.2	17.9	17.7	—
140	10			2300*	0800	33°-08'	135°-50'	17.8	17.5	17.5	17.4	16.7	16.0	15.4	15.3	15.2	13.7	—
141	10			1000	1900	33°-59'	137°-54'	15.0	14.6	14.3	14.1	13.7	13.4	13.0	12.9	12.9	12.9	—

\* The time of the date of the preceding day.

Table 3 Vertical observation data.

ST 1

Date	Feb 14, 1968	Time (GMT)	0700	Wind dir	E
Time (GMT)	0655-0800	(LMT)	0900	vel	18kt
(LMT)	0855-1000	Weather	Snow	Humidity	83%
Lat	68°07'S	Air temp.	-2.3°C	Sea	3
Long	33°30'E	Atm press	988.8mb	Swell	NNE 3, E 1

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (μg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
0	-0.9	33.949	8.13	7.69	1.83	68	0.16	28	0.9	2.42	4	0	-0.9	33.949	27.32	0.000
9	-0.77	966	8.13	7.78	1.79	69	0.17	28	0.4	2.34	0	10	-0.76	33.966	27.33	0.008
18	-0.72	971	8.12	7.81	1.83	69	0.17	30	0.2	2.32	0	20	-0.69	33.977	27.33	0.015
27	-0.60	34.000	8.13	7.78	1.87	70	0.20	29	0.1	2.31	0	30	-0.59	34.008	27.35	0.023
44	-0.76	044	8.11	7.59	1.87	70	0.13	29	0.5	2.33	4	50	-0.95	34.066	27.42	0.037
66	-1.47	121	8.05	7.17	2.04	82	0.16	32	0.3	2.32	4	75	-1.54	34.134	27.49	0.052
88	-1.55	146	8.03	7.02	2.08	80	0.16	34	0.2	2.31	4	100	-1.60	34.164	27.52	0.067
132	-1.73	215	8.02	7.10	2.35	78	0.12	33	0.0	2.31	3	125	-1.72	34.204	27.55	0.081
180	-1.84	270	8.03	7.05	2.16	79	0.08	34	—	2.33	4	150	-1.82	34.235	27.58	0.094
264	-0.52	454	7.86	5.89	2.25	90	0.13	34	0.0	2.34	4	200	-1.61	34.306	27.63	0.118
343	0.82	672	7.93	4.68	2.27	107	0.08	34	0.5	2.35	8	250	-0.80	34.418	27.69	0.140
424	0.52	665	7.94	4.79	2.27	106	0.08	34	0.0	2.35	4	300	0.18	34.564	27.77	0.158
												400	0.78	34.691	27.83	0.190

Ryuzo WATANABE and Ryoji HIGANO

[11] 403 (24)



ST. 2

Date Feb. 15, 1968  
 Time (GMT) 0325-0700  
 (LMT) 0525-0900  
 Lat : 68°33'S  
 Long. 24°54'E

## Meteorological observation

Time (GMT) : 0300 Wind dir. : SSW  
 (LMT) : 0500 vel. : 6kt  
 Weather : Cloudy(broken) Humidity : 77%  
 Air temp. : -2.2°C Sea : 3  
 Atm press. : 988.4mb Swell : NE 3

No. 34 1969]

Oceanographic Data of the 9th JARE 1967-1968

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (μg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
μg-atoms/L																
0	-0.2	34.078	8.15	7.37	1.62	62	0.05	25	0.5	2.34	0	0	-0.2	34.078	27.39	0.000
10	-0.34	.101	8.15	7.90	1.72	63	0.07	26	—	—	—	10	-0.34	34.101	27.42	0.007
19	-0.34	.094	8.15	7.86	1.72	62	0.07	28	1.0	2.35	0	20	-0.33	34.094	27.41	0.014
28	-0.33	.100	8.14	7.91	1.70	62	0.08	28	—	—	—	30	-0.44	34.107	27.43	0.020
47	-1.57	.194	8.07	7.34	1.98	65	0.10	29	1.1	2.35	7	50	-1.65	34.210	27.55	0.032
70	-1.83	.297	8.05	6.99	2.08	70	0.23	33	—	—	—	75	-1.84	34.306	27.64	0.045
93	-1.77	.328	8.05	6.92	2.08	70	0.13	33	0.2	2.36	0	100	-1.67	34.340	27.66	0.056
139	-0.75	.434	7.99	6.03	2.17	79	0.08	34	—	—	—	125	-1.15	34.395	27.69	0.066
183	0.73	.607	7.94	4.70	2.29	94	0.05	35	0.0	2.38	0	150	-0.36	34.478	27.72	0.076
275	1.15	.680	7.93	4.44	2.27	101	0.02	34	—	—	—	200	0.96	34.637	27.78	0.094
366	1.03	.693	7.94	4.53	2.25	103	0.02	35	0.2	2.40	0	250	1.24	34.682	27.80	0.111
457	1.00	.701	7.93	4.54	2.27	105	0.01	34	—	—	—	300	1.13	34.687	27.81	0.126
550	0.89	.701	7.93	4.63	2.27	108	0.05	35	0.3	2.39	3	400	1.01	34.697	27.82	0.157
736	0.72	.696	7.93	4.66	2.29	114	0.03	35	—	—	—	500	0.95	34.702	27.83	0.186
911	0.59	.685	7.93	4.64	2.34	117	0.03	35	0.3	2.39	3	600	0.83	34.700	27.84	0.215
1142	0.41	.685	7.92	4.77	2.36	121	0.05	35	—	—	—	700	0.74	34.697	27.84	0.243
1373	0.23	.678	7.93	4.89	2.34	124	0.03	35	0.7	2.39	—	800	0.67	34.694	27.84	0.271
1836	0.00	.668	7.94	5.06	2.34	127	0.03	35	0.2	2.38	3	1000	0.52	34.689	27.85	0.326
2302	-0.13	.657	7.93	5.22	2.34	127	0.03	35	—	—	—	1200	0.36	34.683	27.85	0.380
2769	-0.23	.659	7.93	5.37	2.32	126	0.03	34	0.7	2.39	3	1500	0.15	34.675	27.86	0.458
3240	-0.28	.653	7.93	5.50	2.25	125	0.05	34	0.6	2.40	3	2000	-0.05	34.663	27.86	0.582
												2500	-0.17	34.658	27.86	0.700
												3000	-0.26	34.657	27.86	0.811

ST 3

Date Feb 16, 1968  
 Time (GMT) 0200-0520  
 (LMT) 0400-0720  
 Lat 68°23'S  
 Long 15°00'E

## Meteorological observation

Time (GMT) 0300 Wind dir SSW  
 (LMT) 0500 vel 16kt  
 Weather Clear Humidity 54%  
 Air temp. -3.6°C Sea 4  
 Atm press .9914mb Swell E 1

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Ryuzo WATANABE and Ryoji HIGANO

[南極資料]

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (μg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	JD
					μg-atoms/L											
0	-1.1	33.850	8.10	7.94	1.77	64	0.16	28	0.7	2.27	0	0	-1.1	33.850	27.25	0.000
9	-0.81	858	8.10	7.59	1.81	63	0.19	29	—	—	—	10	-0.80	33.858	27.24	0.008
19	-0.82	857	8.11	8.31	1.81	62	0.19	29	1.3	2.28	0	20	-0.81	33.855	27.24	0.017
28	-0.81	844	8.11	7.99	1.81	64	0.19	28	—	—	—	30	-0.82	33.851	27.24	0.025
47	-1.12	976	8.11	7.82	1.87	66	0.14	29	0.7	2.29	3	50	-1.20	34.008	27.38	0.041
70	-1.73	34.211	8.08	7.48	2.04	70	0.08	31	—	—	—	75	-1.77	34.229	27.57	0.056
114	-1.80	250	8.07	7.36	2.10	65	0.03	30	0.1	2.31	0	100	-1.86	34.268	27.61	0.069
154	-1.77	271	8.06	7.29	2.08	69	0.03	32	—	—	—	125	-1.79	34.256	27.60	0.081
195	-1.78	291	8.05	7.11	2.10	67	0.02	32	0.0	2.32	—	150	-1.77	34.269	27.60	0.093
273	-0.94	394	8.01	6.25	2.23	80	0.01	33	—	—	—	200	-1.75	34.295	27.63	0.117
353	0.58	610	7.97	4.87	2.33	96	0.01	35	0.2	2.34	0	250	-1.27	34.354	27.66	0.139
438	0.93	639	7.96	4.70	2.29	94	0.01	34	—	—	—	300	-0.40	34.471	27.72	0.159
523	1.01	676	7.95	4.47	2.31	107	0.01	34	0.1	2.35	0	400	0.87	34.638	27.78	0.195
700	0.88	693	7.94	4.59	2.33	114	0.00	36	—	—	—	500	1.00	34.666	27.80	0.227
864	0.63	692	7.95	4.68	2.33	116	0.00	35	0.0	2.36	3	600	0.98	34.689	27.82	0.259
1085	0.50	700	7.96	4.75	2.37	125	0.01	35	—	—	—	700	0.88	34.693	27.83	0.289
1308	0.35	686	7.95	4.81	2.37	133	0.01	34	0.0	2.36	0	800	0.72	34.693	27.84	0.318
1758	0.12	671	7.94	5.06	2.37	134	0.01	34	0.1	2.37	0	1000	0.53	34.698	27.85	0.373
2212	-0.06	667	7.94	5.19	2.33	134	0.00	34	—	—	—	1200	0.42	34.694	27.86	0.426
2673	-0.18	663	7.95	5.33	2.31	128	0.01	33	0.2	2.37	0	1500	0.24	34.678	27.85	0.505
3132	-0.25	—	7.96	5.40	2.29	127	0.01	35	0.5	2.37	6	2000	0.01	34.668	27.86	0.631
												2500	-0.14	34.664	27.86	0.748
												3000	-0.23	—	—	—

## ST. 4

Date · Feb. 18, 1968  
 Time (GMT) 0400-0655  
 (LMT) · 0600-0855  
 Lat · 69°29'S  
 Long 02°35'W

## Meteorological observation

Time (GMT) : 0600 Wind dir. : NE  
 (LMT) : 0800 vel. · 5kt  
 Weather : Fog Humidity · 87%  
 Air temp. : -0 5°C Sea : 2  
 Atm. press : 991.1mb Swell · NE 2

Observed												Interpolated				
Dcpth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (mμg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
0	-1.0	33.798	8.11	7.89	1.81	85	0.20	28	1.1	2.35	0	0	-1.0	33.798	27.20	0.000
10	-1.05	791	8.12	8.08	1.85	80	0.20	29	—	—	—	10	-1.05	33.791	27.20	0.009
19	-1.03	793	8.12	8.07	1.85	80	0.20	27	1.1	2.32	0	20	-1.03	33.792	27.20	0.018
28	-1.15	.810	8.13	8.06	1.85	84	0.20	27	—	2.32	0	30	-1.20	33.847	27.25	0.026
47	-1.68	34.201	8.10	7.24	2.06	75	0.09	31	1.1	2.33	0	50	-1.71	34.223	27.57	0.040
70	-1.77	.266	8.08	7.16	2.10	78	0.12	32	—	—	0	75	-1.76	34.273	27.61	0.052
94	-1.69	292	8.07	7.07	2.10	70	0.11	31	0.8	2.35	0	100	-1.67	34.298	27.63	0.064
140	-1.49	344	8.06	6.75	2.10	80	0.09	33	—	—	—	125	-1.56	34.326	27.65	0.076
187	-1.11	.417	8.06	6.28	2.16	86	0.05	33	0.3	—	0	150	-1.41	34.359	27.67	0.087
281	-0.41	.545	7.99	5.56	2.25	101	0.01	33	—	—	—	200	-1.01	34.436	27.72	0.107
375	0.40	.644	7.98	4.83	2.31	106	0.01	34	0.4	2.38	3	250	-0.64	34.506	27.76	0.125
468	0.71	.686	7.96	4.62	2.33	110	0.02	35	—	—	—	300	-0.23	34.568	27.79	0.141
562	0.76	691	7.96	4.55	2.35	113	0.02	34	0.1	2.38	3	400	0.52	34.660	27.82	0.172
749	0.60	689	7.96	4.58	2.35	124	0.02	33	—	—	—	500	0.74	34.690	27.83	0.200
931	0.50	.683	7.98	4.63	2.35	127	0.01	35	0.0	2.39	0	600	0.73	34.691	27.84	0.229
1166	0.38	683	7.95	4.69	2.37	130	0.01	35	—	—	—	700	0.65	34.690	27.84	0.257
1400	0.18	.673	7.98	4.92	2.37	131	0.02	33	0.2	2.40	0	800	0.56	34.687	27.84	0.285
1868	-0.02	668	7.94	5.14	2.35	132	0.01	34	0.2	—	0	1000	0.46	34.683	27.85	0.340
2338	-0.13	.662	7.96	5.26	2.35	132	0.02	34	—	—	—	1200	0.35	34.682	27.85	0.394
2808	-0.24	660	7.97	5.39	2.35	126	0.02	35	0.0	2.40	3	1500	0.12	34.671	27.85	0.472
												2000	-0.05	34.666	27.86	0.595
												2500	-0.16	34.661	27.86	0.712

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Oceanographic Data of the 9th JARE 1967-1968

ST 5

Date Feb 19, 1968  
 Time (GMT) 0120-0510  
 (LMT) 0320-0710  
 Lat 66°07' S  
 Long 02°46' W

## Meteorological observation

Time (GMT) 0300 Wind dir NW  
 (LMT) 0500 speed 12kt  
 Weather Cloudy(broken) Humidity 74%  
 Air temp 0.6°C Sea 2  
 Atm press 996.3mb Swell WNW 3

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Ryuzo WAKABE and Ryoh HIGANO

[調査資料]

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity (mμg-at/L)	Mn	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
μg-atoms/L																
0	0.8	33.797	8.18	7.82	1.36	46	0.14	21	0.6	—	—	0	0.8	33.797	27.11	0.000
10	0.71	845	8.19	7.84	1.36	44	0.13	22	—	—	—	10	0.71	33.845	27.16	0.009
19	0.78	885	8.20	7.77	1.47	45	0.13	21	1.3	—	—	20	0.75	33.903	27.20	0.018
28	0.32	34.075	8.16	7.63	1.66	55	0.13	25	—	—	—	30	0.09	34.116	27.41	0.026
47	-1.69	371	8.08	6.63	2.25	79	0.27	32	1.5	—	—	50	-1.77	34.382	27.70	0.037
66	-1.53	406	8.07	6.58	2.19	80	0.26	32	—	—	—	75	-0.93	34.468	27.74	0.047
88	0.04	565	8.01	5.05	2.31	94	0.17	33	0.2	—	—	100	0.45	34.610	27.79	0.055
132	0.89	665	7.99	4.42	2.35	102	0.10	31	—	—	—	125	0.87	34.661	27.80	0.063
175	1.07	689	7.99	4.29	2.35	104	0.05	35	0.1	—	—	150	1.01	34.680	27.81	0.071
264	1.07	702	7.95	4.35	2.35	110	0.02	34	—	—	—	200	1.10	34.696	27.82	0.086
350	0.91	704	7.98	4.44	2.33	111	0.01	—	0.0	—	—	250	1.09	34.702	27.82	0.101
437	0.89	705	7.96	4.47	2.35	112	0.02	34	—	—	—	300	1.00	34.703	27.83	0.115
526	0.78	697	7.98	4.46	2.35	114	0.03	—	0.1	—	—	400	0.89	34.705	27.84	0.144
709	0.61	696	7.94	4.46	2.38	120	0.01	—	—	—	—	500	0.81	34.700	27.84	0.172
895	0.51	689	7.96	4.50	2.40	125	0.01	34	0.0	—	—	600	0.70	34.696	27.84	0.200
1030	0.44	686	7.95	4.56	2.40	126	0.01	35	—	—	—	700	0.61	34.696	27.85	0.228
1244	0.31	684	7.97	4.67	2.40	129	0.01	—	0.2	—	—	800	0.55	34.693	27.85	0.255
1679	0.13	677	7.97	4.92	2.37	130	0.00	35	0.1	—	—	1000	0.45	34.686	27.85	0.309
2122	-0.05	672	7.96	5.02	2.35	129	0.01	35	—	—	—	1200	0.33	34.684	27.85	0.362
2569	-0.17	666	7.96	5.27	2.35	128	0.03	33	—	—	—	1500	0.19	34.680	27.86	0.440
3015	-0.24	662	7.97	5.35	2.27	128	0.02	34	—	—	—	2000	0.00	34.673	27.86	0.563
												2500	-0.15	34.667	27.87	0.678
												3000	-0.23	34.662	27.87	0.787

## ST. 6

Date Feb 20, 1968  
 Time (GMT) 0550-1050  
 (LMT) : 0750-1250  
 Lat 61°22' S  
 Long . 02°06' W

Meteorological observation  
 Time (GMT) 0600  
 (LMT) : 0800  
 Weather Snow  
 Air temp 1 0°C  
 Atm press 1004.9mb  
 Wind dir. NW  
 vel 18kt  
 Humidity 86%  
 Sea 4  
 Swell . NW 3

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (mμg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
					μg-atoms/L											
0	0.9	34.033	8.14	7.52	1.51	57	0.23	22	0.3	—	0	0	0.9	34.033	27.30	0.000
9	0.92	.034	8.13	7.60	1.57	56	0.23	25	—	—	—	10	0.92	34.034	27.30	0.008
17	0.92	.032	8.13	7.63	1.55	55	0.22	24	0.8	—	0	20	0.92	34.031	27.29	0.016
25	0.92	.031	8.15	7.69	1.61	57	0.23	25	—	—	—	30	0.97	34.029	27.29	0.024
41	0.90	.045	8.14	7.65	1.61	57	0.23	25	0.2	—	3	50	0.01	34.128	27.42	0.038
67	-1.67	.289	8.09	7.58	2.14	77	0.26	28	0.1	—	0	75	-1.77	34.306	27.63	0.052
82	-1.73	.313	8.04	7.09	2.46	110	0.05	29	—	—	—	100	-1.27	34.397	27.69	0.063
144	0.19	.619	7.97	6.91	2.42	112	0.05	36	—	—	—	125	-0.50	34.520	27.76	0.072
207	0.57	.685	7.99	4.72	2.48	123	0.03	37	0.1	—	3	150	0.27	34.632	27.82	0.080
252	0.55	.690	7.97	4.23	2.50	126	0.03	35	—	—	—	200	0.57	34.685	27.84	0.095
319	0.48	.693	7.97	4.21	2.48	126	0.03	—	0.1	—	—	250	0.55	34.690	27.85	0.108
427	0.46	.691	7.95	4.16	2.48	127	0.01	36	—	—	—	300	0.50	34.693	27.85	0.121
617	0.35	.682	7.96	4.31	2.48	129	0.02	—	0.2	—	6	400	0.46	34.692	27.85	0.148
735	0.32	.684	7.96	4.35	2.48	134	0.02	—	—	—	—	500	0.41	34.687	27.85	0.174
940	0.23	.683	7.97	4.44	2.46	133	0.01	36	0.1	—	3	600	0.36	34.683	27.85	0.200
1149	0.15	—	7.97	4.68	2.44	133	0.01	36	—	—	—	700	0.32	34.683	27.85	0.227
1407	0.02	.674	7.96	4.78	2.44	133	0.01	—	0.1	—	3	800	0.29	34.684	27.86	0.252
1316	0.04	.674	7.98	4.89	2.42	131	0.02	36	0.2	—	6	1000	0.21	34.681	27.86	0.304
1704	-0.09	.662	7.98	4.84	2.42	131	0.02	35	—	—	—	1200	0.11	34.670	27.86	0.354
2130	-0.21	—	7.95	5.02	2.40	129	0.01	35	0.0	—	6	1500	-0.01	34.671	27.86	0.428
2570	-0.28	.661	7.97	5.22	2.35	128	0.01	35	—	—	—	2000	-0.17	34.650	27.86	0.546
3028	-0.34	.658	7.98	5.37	2.35	127	0.01	34	0.4	—	6	2500	-0.27	34.660	27.87	0.657
3535	-0.40	.659	7.95	5.41	2.33	128	0.01	34	—	—	—	3000	-0.33	34.658	27.87	0.762
4053	-0.45	.657	7.95	5.53	2.33	126	0.05	34	0.5	—	0	3500	-0.39	34.659	27.87	0.860
												4000	-0.44	34.657	27.87	0.951

ST. 7

Date Feb 21, 1968  
 Time (GMT) 0440-0835  
 (LMT) 0640-1035  
 Lat 58°08' S  
 Long 01°20' W

Meteorological observation

Time (GMT) 0600 Wind dir. WNW  
 (LMT) 0800 vel 10kt  
 Weather Fog Humidity 86%  
 Air temp 1.1°C Sea 2  
 Atm. press 1003.8mb Swell WNW 1

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Ryuzo WATANABE and Ryoji HIGANO

[1974]

Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- limity(m	Mn μg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
					μg-atoms/L											
0	0.7	33.975	8.02	7.67	1.79	72	0.20	26	—	—	—	0	0.7	33.975	27.26	0.000
9	0.76	34.035	8.03	7.64	1.79	67	0.20	27	—	—	—	10	0.76	34.037	27.31	0.008
18	0.76	037	8.03	7.61	1.83	68	0.20	27	—	—	—	20	0.76	34.037	27.31	0.016
27	0.75	042	8.03	7.53	1.85	71	0.19	28	—	—	—	30	0.73	34.050	27.32	0.023
44	0.52	097	8.04	7.59	1.89	74	0.17	27	—	—	—	50	0.25	34.115	27.40	0.038
66	-0.51	164	—	7.32	2.00	78	0.16	30	—	—	—	75	-0.81	34.198	27.52	0.054
89	-1.13	253	8.03	6.99	2.12	80	0.14	30	—	—	—	100	-1.19	34.292	27.61	0.067
133	-0.93	397	7.99	6.23	2.27	91	0.12	33	—	—	—	125	-1.05	34.373	27.67	0.078
170	-0.30	497	7.98	5.53	2.31	98	0.03	34	—	—	—	150	-0.65	34.446	27.71	0.089
214	0.28	577	7.98	4.76	2.38	113	0.03	34	—	—	—	200	0.11	34.555	27.76	0.107
257	0.71	637	7.97	4.71	2.38	114	0.02	34	—	—	—	250	0.65	34.629	27.79	0.124
343	0.33	643	7.98	4.62	2.38	—	0.05	34	—	—	—	300	0.59	34.649	27.81	0.139
430	0.48	660	7.95	4.52	2.38	—	0.05	35	—	—	—	400	0.40	34.653	27.82	0.169
518	0.50	677	7.96	4.49	2.46	127	0.01	35	—	—	—	500	0.50	34.674	27.84	0.197
695	0.47	682	7.93	4.55	2.44	133	0.01	35	—	—	—	600	0.49	34.682	27.84	0.225
873	0.41	681	7.95	4.75	2.44	134	0.01	35	—	—	—	700	0.46	34.682	27.84	0.252
1103	0.26	676	7.95	4.83	2.44	137	0.01	34	—	—	—	800	0.43	34.682	27.85	0.279
1336	0.16	676	7.96	5.03	2.40	134	0.00	34	—	—	—	1000	0.32	34.678	27.85	0.333
1786	-0.03	672	7.95	5.10	2.40	134	0.00	33	—	—	—	1200	0.21	34.676	27.85	0.385
2241	-0.18	673	7.95	5.02	2.42	132	0.00	34	—	—	—	1500	0.08	34.675	27.86	0.461
2702	-0.29	667	7.96	5.56	2.38	130	0.00	34	—	—	—	2000	-0.10	34.673	27.87	0.581
3159	-0.34	657	7.95	5.48	2.38	127	0.00	34	—	—	—	2500	-0.24	34.670	27.87	0.691
3714	-0.42	654	7.94	5.63	2.35	121	0.00	34	—	—	—	3000	-0.32	34.660	27.87	0.793
4271	-0.48	654	7.99	5.03	2.35	102	0.02	34	—	—	—	3500	-0.38	34.654	27.87	0.891
												4000	-0.45	34.654	27.87	0.984

ST. 8

Date Feb. 22, 1968  
 Time (GMT) 1050-1220  
 (LMT) 1250-1420  
 Lat. 54°00' S  
 Long. 02°28' E

## Meteorological observation

Time (GMT) : 1100 Wind dir SSW  
 (LMT) : 1300 vel. . 4kt  
 Weather : Drizzle Humidity 86%  
 Air temp. 2.0°C Sea : 2  
 Atm. press. : 984.7mb Swell . SW 1

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Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity	Mn (mμg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
0	1.8	33.831	8.08	7.51	1.49	29	0.28	24	0.5	2.33	2	0	1.8	33.831	27.07	0.000
10	1.60	.828	8.08	7.72	1.49	28	0.28	23	—	—	—	10	1.60	33.828	27.09	0.010
20	1.27	.830	8.07	7.79	1.55	30	0.28	25	1.3	2.34	0	20	1.27	33.830	27.11	0.020
30	1.18	.836	8.09	7.79	1.58	32	0.28	26	—	—	—	30	1.18	33.836	27.12	0.029
49	0.79	.883	8.07	7.67	1.70	44	0.27	26	0.9	2.34	0	50	0.76	33.884	27.19	0.048
74	0.18	.914	8.07	7.60	1.87	56	0.27	28	—	—	—	75	0.14	33.915	27.25	0.069
98	-0.57	.961	8.05	7.57	1.98	60	0.27	30	1.2	2.35	0	100	-0.58	33.967	27.32	0.089
147	-0.55	34.135	8.00	6.58	2.14	73	0.15	33	—	—	—	125	-0.56	34.048	27.39	0.107
194	0.49	.340	7.95	5.33	2.33	80	0.02	35	0.3	2.38	0	150	-0.49	34.149	27.46	0.124
292	1.52	.533	7.92	4.24	2.42	85	0.01	36	—	—	—	200	0.58	34.358	27.58	0.153
390	1.73	.617	7.88	4.03	2.42	89	0.00	35	0.2	2.37	—	250	1.22	34.476	27.63	0.177
488	1.79	.658	7.88	4.06	2.38	93	0.00	35	—	—	—	300	1.55	34.543	27.66	0.201
586	1.74	.689	7.90	4.07	2.35	94	0.02	35	0.2	2.39	2	400	1.74	34.622	27.71	0.244
783	1.65	.714	7.92	4.32	2.29	94	0.00	35	—	—	—	500	1.78	34.662	27.74	0.283
980	1.47	.723	7.96	4.39	2.25	100	0.00	34	0.0	2.40	2	600	1.73	34.692	27.77	0.321
1275	1.05	.713	7.94	4.56	2.29	116	0.00	34	—	2.41	—	700	1.69	34.707	27.78	0.357
												800	1.63	34.715	27.79	0.391
												1000	1.44	34.723	27.81	0.459
												1200	1.17	34.718	27.83	0.523

ST 9

Date Feb 26, 1968  
 Time (GMT) 1840-2345  
 (LMT) 2040-0145  
 Lat 37°48' S  
 Long 14°43' E

## Meteorological observation

Time (GMT) 2100 Wind dir SSW  
 (LMT) 2300 vel 20kt  
 Weather Cloudy (overcast) Humidity 62%  
 Air temp 14.8°C Sea 5  
 Atm. press 1020.5mb Swell SSW 4

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Ryuzo WATANABE and Ryoji HIGANO

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Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NO <sub>4</sub> -N	Alka- linity(mμg-at/L)	Mn (mμg-at/L)	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
0	17.5	35.400	8.23	5.39	0.23	8	0.04	0.23	0.1	2.44	0	0	17.5	35.400	25.72	0.000
9	17.67	37.6	8.26	5.38	0.21	5	0.00	0.12	—	2.45	—	10	17.67	35.375	25.66	0.023
18	17.67	37.4	8.26	5.40	0.19	5	0.00	0.13	0.3	2.44	0	20	17.68	35.375	25.65	0.047
27	17.71	37.7	8.26	5.40	0.21	7	0.00	0.11	—	2.44	—	30	17.67	35.372	25.65	0.070
45	17.26	33.3	8.23	5.23	0.27	9	0.18	0.82	0.4	2.42	0	50	16.99	35.316	25.78	0.116
68	15.85	25.4	8.21	5.14	0.46	9	0.30	2.6	—	2.41	—	75	15.42	35.236	26.08	0.169
90	14.54	19.2	8.18	4.96	0.65	9	0.08	8.5	0.0	2.41	0	100	13.91	35.136	26.33	0.215
127	12.41	34.974	8.15	4.98	0.88	12	0.03	12	—	2.41	—	125	12.51	34.987	26.50	0.256
184	10.89	7.88	8.16	5.36	0.94	11	0.04	14	0.0	2.39	0	150	11.62	34.880	26.59	0.295
279	10.04	7.83	8.13	5.01	1.15	13	0.04	17	—	2.40	—	200	10.69	34.778	26.68	0.367
346	9.10	7.06	8.09	4.88	1.36	15	0.03	20	0.1	2.39	0	250	10.21	34.771	26.75	0.437
417	8.36	6.62	8.07	4.63	1.55	20	0.00	24	—	2.38	—	300	9.74	34.760	26.83	0.503
487	7.35	5.56	8.06	4.62	1.74	23	0.02	26	0.0	2.39	5	400	8.53	34.674	26.96	0.626
633	5.38	4.13	8.05	4.75	2.02	31	0.00	29	—	2.39	—	500	7.15	34.539	27.06	0.710
775	4.42	3.68	8.00	4.74	2.10	38	0.00	32	0.0	2.39	0	600	5.77	34.436	27.16	0.845
998	3.40	3.91	7.98	4.51	2.31	52	0.00	34	—	2.40	—	700	4.85	34.383	27.22	0.941
1228	3.00	5.23	7.94	4.00	2.38	67	0.00	34	0.0	2.41	5	800	4.27	34.365	27.27	1.032
1753	2.83	7.58	8.03	4.49	2.02	63	0.00	30	0.0	2.42	3	1000	3.39	34.392	27.39	1.197
1749	2.80	7.59	8.00	4.45	2.00	61	0.00	31	—	2.42	—	1200	3.02	34.504	27.51	1.342
2237	2.64	7.96	8.03	4.70	1.91	55	0.00	29	0.0	2.42	3	1500	2.83	34.664	27.65	1.525
2751	2.41	8.47	8.03	5.08	1.79	58	0.00	27	—	2.42	—	2000	2.72	34.788	27.76	1.785
3292	2.22	8.36	8.01	5.00	1.80	58	0.00	28	0.0	2.43	3	2500	2.52	34.825	27.81	2.016
3846	1.60	7.88	7.99	4.98	2.00	88	0.00	30	—	2.45	5	3000	2.34	34.848	27.84	2.230
												3500	2.03	34.822	27.85	2.436



ST 10

Date Feb 27, 1968  
 Time (GMT) : 2115-0040  
 (LMT) : 2315-0240  
 Lat. : 34°59' S  
 Long. : 16°33' E

## Meteorological observation

Time (GMT) 2100 Wind dir S  
 (LMT) : 2300 vel 14kt  
 Weather Fine(scattered) Humidity 61%  
 Air temp. 17.2°C Sea 3  
 Atm. press. 1022.0mb Swell S, SW 3

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Oceanographic Data of the 9th JARE 1967-1968

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Observed												Interpolated				
Depth(m)	T(°C)	S(‰)	pH	O <sub>2</sub> (cc/L)	PO <sub>4</sub> -P	SiO <sub>3</sub> -Si	NO <sub>2</sub> -N	NO <sub>3</sub> -N	NH <sub>4</sub> -N	Alka- linity(mμg-at/L)	Mn	Depth (m)	T(°C)	S(‰)	σ <sub>t</sub>	ΔD
					Δg-atoms/L											
0	19.6	35.544	8.22	5.15	0.15	7	0.00	0.17	0.0	2.38	0	0	19.6	35.544	25.30	0.000
10	19.45	.544	8.23	5.19	0.17	5	0.00	0.21	—	—	—	10	19.45	35.544	25.34	0.027
19	19.46	.559	8.23	5.20	0.15	5	0.00	0.32	0.1	2.39	5	20	19.46	35.558	25.35	0.053
28	19.50	.545	8.24	5.17	0.15	6	0.00	0.20	—	—	—	30	19.50	35.544	25.32	0.080
47	19.51	.542	8.21	5.17	0.15	6	0.00	0.20	0.4	2.38	5	50	19.60	35.546	25.30	0.133
71	19.28	.528	8.22	5.22	0.17	7	0.00	0.27	—	—	—	75	18.65	35.497	25.51	0.198
90	16.11	.374	8.18	5.07	0.44	6	0.30	4.0	0.6	2.38	0	100	15.43	35.351	26.16	0.253
135	14.81	.352	8.18	4.87	0.61	6	0.05	8.1	—	—	—	125	14.70	35.339	26.31	0.299
179	13.83	.264	8.12	4.84	0.71	8	0.06	10.	0.0	2.38	2	150	14.45	35.325	26.36	0.342
266	12.39	.126	8.13	4.82	0.88	8	0.06	12	—	—	—	200	13.44	35.231	26.50	0.425
352	11.09	34.940	8.10	4.99	1.01	9	0.07	16.	0.1	2.38	5	250	12.62	35.151	26.60	0.503
440	9.81	.804	8.09	4.71	1.30	11	0.01	20	—	—	—	300	11.86	35.052	26.67	0.577
533	7.97	.625	8.09	4.78	1.51	14	0.03	22	0.0	2.37	9	400	10.41	34.864	26.79	0.717
725	5.02	.354	8.02	5.03	1.98	25	0.00	29	—	—	—	500	8.63	34.689	26.95	0.846
816	4.32	.313	8.01	5.02	2.02	32	0.03	30	0.1	2.38	0	600	6.76	34.509	27.09	0.960
1021	3.55	.392	7.99	4.45	2.27	51	0.01	33.	—	—	—	700	5.31	34.378	27.17	1.064
1274	2.99	.530	7.98	4.02	2.35	68	0.00	34	0.1	2.41	5	800	4.41	34.316	27.22	1.160
1614	2.92	.699	7.99	4.25	2.14	66	0.00	31.	0.1	2.42	5	1000	3.59	34.378	27.35	1.335
1964	2.85	.826	8.03	4.82	1.83	53	0.00	27.	—	—	—	1200	3.10	34.488	27.49	1.486
2303	2.65	.856	8.02	4.99	1.79	53	0.05	26	0.1	2.40	0	1500	2.90	34.646	27.63	1.675
2712	2.51	.859	8.03	5.20	1.72	57	0.01	26.	—	2.41	—	2000	2.83	34.832	27.79	1.930
												2500	2.56	34.862	27.84	2.145