

OCEANOGRAPHICAL OBSERVATIONS  
IN THE PACIFIC OCEAN IN 1965  
H.M.A.S. *GASCOYNE*  
Cruise G4/65

OCEANOGRAPHICAL CRUISE REPORT  
NO. 45

DIVISION OF FISHERIES AND OCEANOGRAPHY  
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL  
RESEARCH ORGANIZATION, AUSTRALIA 1969

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AUSTRALIA

MELBOURNE, 1969

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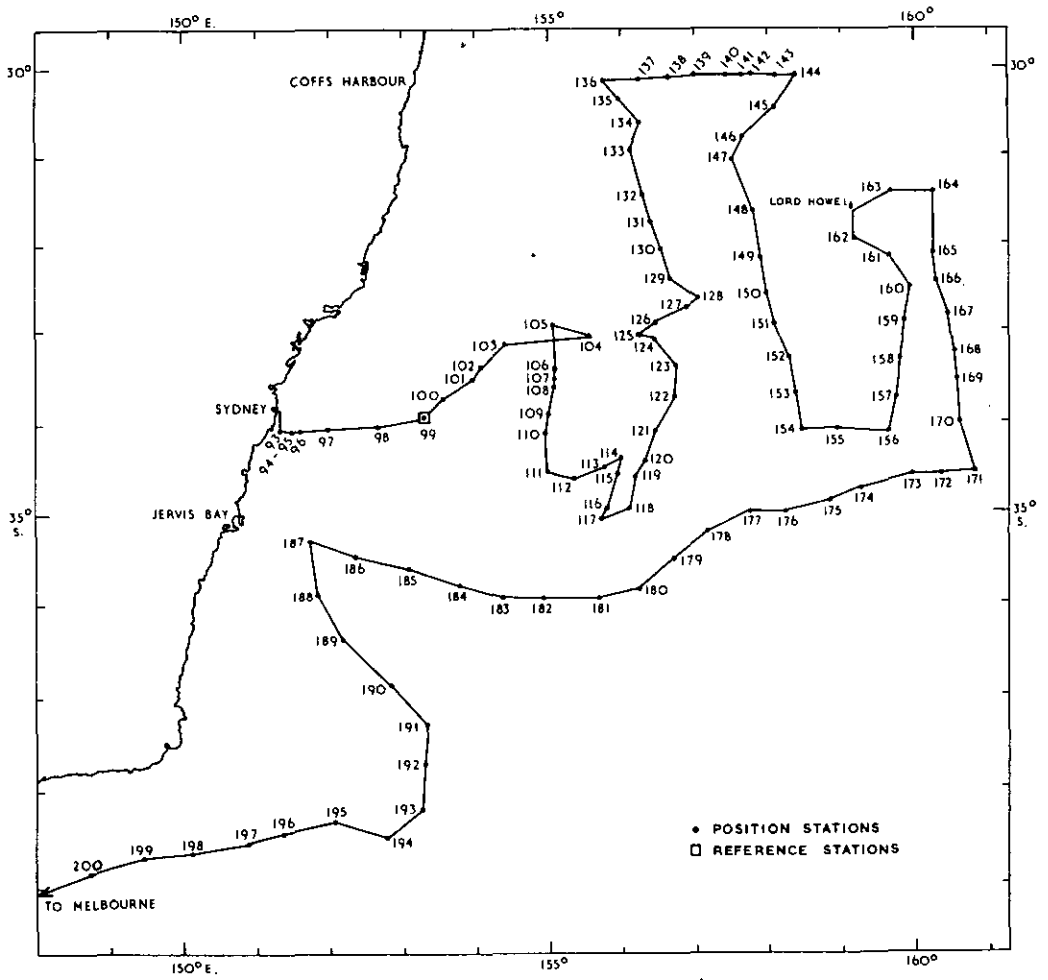


Fig. 1.- Track chart cruise G 4/65

# OCEANOGRAPHICAL CRUISE REPORT

No. 45

Oceanographical Observations in the Pacific Ocean in 1965

H.M.A.S. Gascoyne

Cruise G4/65

March 8-21, 1965

## I. INTRODUCTION

This report records the data collected during the fourth cruise in 1965 of H.M.A.S. Gascoyne, Royal Australian Navy oceanographical frigate.

### Objective

To study the physical and chemical structure of the water in the East Australian Current system.

### Itinerary

The cruise began at Sydney on March 8 and worked six stations to the Reference Station at  $34^{\circ}\text{S.}$ ,  $153^{\circ}20'\text{E.}$  From the Reference Station, 101 stations were worked in the Tasman Sea between  $30^{\circ}$  and  $39^{\circ}\text{S.}$  and  $161^{\circ}\text{E.}$  and Australia (Fig. 1). The cruise ended at Melbourne on March 21.

### Scientific Personnel

B. Hamon (Cruise Leader)  
F. de Castillejo  
N. Dyson  
D. Lockwood  
J. Prothero

Salinity, oxygen, inorganic phosphate, and total phosphorus determinations were made in the ship's laboratory by N. Dyson and J. Prothero. Nitrate analyses were done at Cronulla by J. Klye. GEK observations were made aboard by B. Hamon, F. de Castillejo, and D. Lockwood. The data were processed under the direction of W. Hedge, using computer programmes designed by A. D. Crooks. The track chart was prepared for publication by R. Breach.

## II. WORK ACCOMPLISHED

One hundred and eight stations were worked (G4/93/65-G4/200/65). Bathythermograph casts were made, and surface hydrology samples collected, at all stations. Subsurface hydrology samples were collected at 42 stations. The GEK was streamed continuously between stations.

TABLE 1

## WORK DONE AT EACH STATION

Stn No.	BT	Hydrology		Stn No.	BT	Hydrology		Stn No.	BT	Hydrology	
		1	2			1	2			1	2
93	+	+		125	+	+	1500	157	+	+	
94	+	+		126	+	+		158	+	+	1500
95	+	+		127	+	+		159	+	+	
96	+	+	300	128	+	+	1500	160	+	+	1500
97	+	+	1500	129	+	+		161	+	+	
98	+	+		130	+	+		162	+	+	1500
99	+	+	4500	131	+	+		163	+	+	
100	+	+		132	+	+	1500	164	+	+	1400
101	+	+		133	+	+		165	+	+	
102	+	+	1500	134	+	+		166	+	+	1400
103	+	+		135	+	+		167	+	+	
104	+	+		136	+	+	1500	168	+	+	1400
105	+	+	1500	137	+	+		169	+	+	
106	+	+		138	+	+		170	+	+	1500
107	+	+		139	+	+	1500	171	+	+	1500
108	+	+		140	+	+		172	+	+	
109	+	+		141	+	+		173	+	+	1500
110	+	+	1500	142	+	+		174	+	+	
111	+	+		143	+	+		175	+	+	1500
112	+	+		144	+	+	1500	176	+	+	
113	+	+		145	+	+		177	+	+	1500
114	+	+	1500	146	+	+	1500	178	+	+	
115	+	+		147	+	+		179	+	+	1500
116	+	+		148	+	+	1500	180	+	+	
117	+	+	1500	149	+	+		181	+	+	1500
118	+	+		150	+	+	1500	182	+	+	
119	+	+		151	+	+		183	+	+	1500
120	+	+		152	+	+	1500	184	+	+	
121	+	+	1500	153	+	+		185	+	+	1500
122	+	+		154	+	+	1500	186	+	+	
123	+	+		155	+	+		187	+	+	1500
124	+	+		156	+	+	1500	188	+	+	

Stn No.	BT	Hydrology	Stn No.	BT	Hydrology	Stn No.	BT	Hydrology			
		1 2			1 2			1 2			
189	+	+	1500	193	+	+	1500	197	+	+	1500
190	+	+		194	+	+		198	+	+	
191	+	+	1500	195	+	+	1500	199	+	+	
192	+	+		196	+	+		200	+	+	

BT                    Bathythermograph  
Hydrology            1 Surface  
                          2 Surface to Depth (m)

### III. METHOD OF COLLECTION AND ANALYSIS OF SAMPLES

#### 1. Physics

Temperature.—Water temperatures were taken with deep-sea reversing thermometers; protected thermometers with a range of  $-2^{\circ}$  to  $30^{\circ}\text{C}$ , and unprotected thermometers with a range of either  $-2^{\circ}$  to  $30^{\circ}\text{C}$  or  $-4^{\circ}$  to  $60^{\circ}\text{C}$ . The accuracy of the temperatures is considered to be  $\pm 0.03$  degC.

Bathythermograms.—A 900-ft bathythermograph was used at each of the stations indicated in Table 1. Slides were digitized according to the method of the U.S. National Oceanographic Data Centre (1964) and the results transferred to punched cards.

GEK.—The circuit and method of use were the same as given in CSIRO Aust. (1963). A course change was made every hour, to obtain the total surface current.

Thermometric Depth.—Depth calculations were made by the method described by Pollak (1950), and are considered accurate to  $\pm 15$  m at depths greater than 1000 m, and to 1% above that depth.

Sigma-t.—Sigma-t values were computed from temperature and salinity values, using the equations of Knudsen (La Fond 1951).

#### 2. Chemistry

Salinity.—Salinity was measured on board with an inductive salinometer (Brown and Hamon 1961).

Dissolved Oxygen.—A version of the standard Winkler method was used to determine the amount of dissolved oxygen in the seawater samples. The version used is a modification of that described by Thompson and Robinson (1939) and differs in some respects from

the revision of Jacobsen, Robinson, and Thompson (1950). Potassium iodate was used as the iodometric standard, and the reagents necessary to fix the oxygen in solution were used at different concentrations (Rochford 1963). Duplicate titrations were made on approximately every tenth sample. Saturation values were computed using the simpler of the equations given by Richards and Corwin (1956) -

$$O_2 (\% \text{ Satn.}) = \frac{O_2 (\text{ml/l}) \times (33.5 + T^\circ\text{C}) \times 100}{332.4 - (1.854 \times S\%)} .$$

**Inorganic Phosphate.**—The method of Atkins (1923) was used with 1 ml molybdate reagent (300 ml 10% w/v ammonium molybdate and 100 ml 50% v/v sulphuric acid) and 0.1 ml stannous chloride diluted afresh from a 40% stock solution in hydrochloric acid, which was kept under paraffin. The reagents were dispensed automatically by a piston dispenser.

Standard phosphate solutions were made up in distilled water. At air temperatures less than 25°C, analyses were carried out in batches of 10; readings were begun within 10 min of adding reagents, and completed within 10 min. At air temperatures greater than 25°C, batches of 6 were analysed; readings were begun within 5 min of adding reagents and completed within 7 min. Each batch was compared with a distilled water blank and a 0.65 µg-atom/l standard in a Hilger Spekker absorptiometer using 4 cm cells and Ilford 608 filters. Each day a complete calibration was made using standards up to 3.25 µg-atom/l. Results are given as µg-atom/l with no correction for salt error and are precise to ± 10% for values less than 0.5 µg-atom/l and ± 5% for higher values. To correct for salt effects, the results given should be multiplied by 1.15.

**Total Phosphorus.**—100 ml samples were drawn from the Nansen bottles into 150 ml Pyrex conical flasks, 0.2 ml of 72% v/v perchloric acid was added and digestion at 200°–250°C carried out immediately on a sand tray. After evaporation of water, heating was continued until fuming of the salt residue commenced. The samples were then allowed to cool and 100 ml distilled water and 2 drops of 2% w/v phenolphthalein were added. If alkaline, perchloric acid was added until a slight acidity persisted. The flasks were allowed to stand for about 24 hr to allow the salts to dissolve. Phosphate was then determined as described above for inorganic phosphate. Results are given as µg-atom/l with no salt correction. To correct for salt effects, the results given should be multiplied by 1.15.

**Nitrate.**—after collection, water samples were stored in



plastic bottles and 2 drops of saturated  $\text{HgCl}_2$  were added. Nitrate was determined at Cronulla by the strychnidine method (Rochford 1947). The reagent was prepared by the addition of 0.64 g strychnidine to a litre of nitrate-free sulphuric acid. Five ml of this reagent were added, without agitation, to 5 ml sea-water or standard nitrate solution, after previously cooling to approx.  $5^\circ\text{C}$ . The standards were made up in artificial sea-water preserved with 20 ml/l of saturation  $\text{HgCl}_2$ . The standards and samples were shaken to distribute the reagent, and the colour developed for 2 hr. The solutions were read in a Unicam SP 600 spectrophotometer at a wavelength of 530 m $\mu$  using a 5 mm cell. Samples with an absorbance greater than that of the standard corresponding to 14.4  $\mu\text{g-atom/l}$  were diluted with artificial sea-water/sulphuric acid mixture before reading. Results are given in  $\mu\text{g-atom/l}$ .

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#### IV. DATA SHEETS

The data were processed in a C.D.C. 3600 Computer. An explanation of the headings used is given before the surface hydrology listing.

DATA

PART 1

HYDROLOGY

SURFACE SAMPLES

## EXPLANATION OF HEADINGS

<u>Partsl and 2</u>	<u>Hydrology</u>
STATION	Gives the station identification. For example, G4/96/65 signifies the 96th station worked by Gascoyne in 1965, on her 4th cruise for that year
DATE	Given as day/month/year
TIME	Given in Zone Time, and is the time at the beginning of the first cast. The code letter for the Time Zone follows the time. Zone Time throughout the cruise was Eastern Australian Standard Time, GMT +10 hr, Code K
LATITUDE LONGITUDE	Given in degrees and minutes
SONIC DEPTH	Given in metres, measured at standard sound velocity of 800 fm (1463 m) per second
AIR TEMP. WET DRY	Air temperatures recorded from wet and dry bulb thermometers in °C
WIND DIR. SP.	Wind direction and speed are coded using Tables 8 and 9 in U.S. Navy Hydrogr. Office (1955)
ANEM. HEIGHT	The average height of the anemometer above sea level, given in metres
CLOUD TYPE AMT.	Cloud type and amount are coded using Tables 2 and 3 in U.S. Navy Hydrogr. Office (1955)
WEA.	Weather is coded using Table 1 in U.S. Navy Hydrogr. Office (1955)
VIS.	Visibility is coded using Table 4 in U.S. Navy Hydrogr. Office (1955)
SEA DIR. AMT.	Sea direction and amount are coded using Tables 5 and 8 in U.S. Navy Hydrogr. Office (1955)

SWELL DIR. AMT.	Sea swell direction and amount are coded using Tables 6 and 8 in U.S. Navy Hydrogr. Office (1955)
BAROM., or ATMOS. PRESSURE	Atmospheric pressure given in millibars
WIRE ANGLES CAST1 CAST2 CAST3	Wire angles are measured at the surface and expressed in degrees for each cast
CAST	Gives the cast number
DEPTH	Sampling depth, given in metres
TEMP.	Sea temperatures recorded in °C
SALINITY	Given in parts per thousand
SIGMA-T	Sigma-t to 2 decimal places
OXYGEN	Given in ml/l
OXYGEN % SAT.	Oxygen percentage saturation
INORG. P	Inorganic phosphorus, given in $\mu\text{g-atom/l}$
TOTAL P	Total phosphorus, given in $\mu\text{g-atom/l}$
NITRATE	Given in $\mu\text{g-atom/l}$

\*, \*\*\*, or a blank indicate no data available

CRUISE STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN, AMT.	SEA DN, AMT.	SWELL DN, AMT.	WEA.	VIS.	BAROM.																																												
															07 S	08 S	09 S	10 S	11 S	12 S	13 S	14 S	15 S	16 S	17 S	18 S	19 S	20 S	21 S	22 S	23 S	24 S	25 S	26 S	27 S	28 S	29 S	30 S	31 S	32 S	33 S	34 S	35 S	36 S	37 S	38 S	39 S	40 S	41 S	42 S	43 S	44 S	45 S	46 S	47 S	48 S	49 S	50 S
4	93	65	3	8	1650	K 34	07 S	150	17 E	21.8	35.64																																															
4	94	65	3	8	1720	K 34	09 S	151	24 E	22.6	35.71																																															
4	95	65	3	8	1740	K 34	10 S	151	26 E	22.8	35.70																																															
4	96	65	3	8	1820	K 34	11 S	151	30 E	22.4	35.74			1005.0																																												
4	97	65	3	8	2146	K 34	08 S	152	00 E	22.0	35.74			1010.5																																												
4	98	65	3	9	0237	K 34	02 S	152	39 E	22.2	35.92																																															
4	99	65	3	9	0600	L 33	55 S	153	16 E	22.0	35.72			1006.5																																												
4	100	65	3	9	1115	L 33	43 S	153	37 E	22.6	35.77																																															
4	101	65	3	9	1300	L 33	30 S	153	56 E	23.4	35.68																																															
4	102	65	3	9	1508	L 33	23 S	154	07 E	24.4	35.58			1007.0																																												
4	103	65	3	9	1800	L 33	13 S	154	26 E	24.5	35.59																																															
4	104	65	3	9	1900	L 33	09 S	154	34 E	24.8	35.64																																															
4	105	65	3	9	2205	L 32	57 S	155	03 E	24.7	35.59			1008.5																																												
4	106	65	3	10	0115	L 33	23 S	155	05 E	24.8	35.68																																															
4	107	65	3	10	0215	L 33	30 S	155	05 E	24.6	35.64																																															
4	108	65	3	10	0300	L 33	37 S	155	06 E	24.9	35.63																																															
4	109	65	3	10	0500	L 33	56 S	154	60 E	24.7	35.63																																															
4	110	65	3	10	0700	L 34	08 S	154	58 E	24.7	35.60			1015.0																																												
4	111	65	3	10	1015	L 34	31 S	154	59 E	23.9	35.62																																															
4	112	65	3	10	1215	L 34	35 S	155	20 E	23.5	35.67																																															
4	113	65	3	10	1400	L 34	29 S	155	44 E	24.3	35.65			1015.0																																												
4	114	65	3	10	1525	L 34	23 S	156	00 E	24.6	35.63																																															
4	115	65	3	10	1800	L 34	35 S	155	56 E	23.6	35.69																																															
4	116	65	3	10	2000	L 34	54 S	155	48 E	23.9	35.65			1018.0																																												
4	117	65	3	10	2207	L 35	09 S	155	42 E	22.7	35.72																																															
4	118	65	3	11	0112	L 34	56 S	156	05 E	23.0	35.73																																															
4	119	65	3	11	0320	L 34	37 S	156	12 E	24.2	35.63																																															
4	120	65	3	11	0500	L 34	23 S	156	23 E	23.3	35.68			1013.5																																												
4	121	65	3	11	0555	L 34	05 S	156	30 E	24.2	35.61																																															
4	122	65	3	11	1010	L 33	43 S	156	49 E	23.5	35.67																																															
4	123	65	3	11	1220	L 33	22 S	156	48 E	22.7	35.78																																															
4	124	65	3	11	1400	L 33	09 S	156	28 E	24.2	35.66																																															
4	125	65	3	11	1518	L 33	04 S	156	18 E	24.7	35.64			1009.0																																												
4	126	65	3	11	1813	L 32	53 S	156	30 E	24.5	35.66																																															
4	127	65	3	11	2015	L 32	45 S	156	50 E	24.1	35.65			1008.0																																												
4	128	65	3	11	2210	L 32	39 S	157	03 E	24.3	35.58																																															
4	129	65	3	12	0120	L 32	05 S	156	38 E	24.3	35.67																																															
4	130	65	3	12	0310	L 32	05 S	156	31 E	24.5	35.63																																															
4	131	65	3	12	0500	L 31	45 S	156	23 E	24.4	35.58																																															
4	132	65	3	12	0719	L 31	25 S	156	17 E	24.6	35.58			1004.0																																												

CRUISE NUMBER	STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN, AMT.	SEA DN, AMT.	SWELL DN, AMT.	WEA.	VIS:	BAROM.
4	133	65	3	12	1000	L 30	56 S	156	08 E	24.6	39.63				
4	134	65	3	12	1200	L 30	39 S	156	12 E	24.5	35.60				
4	135	65	3	12	1410	L 30	33 S	155	59 E	25.0	35.62				
4	136	65	3	12	1515	L 30	11 S	155	46 E	25.2	35.61		01	7	1002.0
4	137	65	3	12	1800	L 30	11 S	156	15 E	24.8	35.64				
4	138	65	3	12	2000	L 30	10 S	156	39 E	24.2	35.67				
4	139	65	3	12	2203	L 30	09 S	157	00 E	24.3	35.63		01	7	1002.5
4	140	65	3	13	0110	L 30	09 S	157	26 E	24.2	35.61				
4	141	65	3	13	0813	L 30	08 S	157	37 E	23.9	35.63				
4	142	65	3	13	0810	L 30	08 S	157	47 E	24.2	35.61				
4	143	65	3	13	0900	L 30	08 S	158	07 E	23.6	35.69				
4	144	65	3	13	0650	L 30	08 S	158	22 E	23.1	35.67		01	7	1004.0
4	145	65	3	13	0845	L 30	26 S	158	04 E	24.1	35.61		01	8	1009.5
4	146	65	3	13	1216	L 30	45 S	157	42 E	24.1	35.61				
4	147	65	3	13	1800	L 31	03 S	157	30 E	25.2	35.59		01	8	1004.0
4	148	65	3	13	1810	L 31	41 S	157	39 E	25.0	35.59				
4	149	65	3	13	2330	L 32	11 S	157	49 E	24.8	35.59				
4	150	65	3	14	0012	L 32	33 S	157	57 E	23.8	35.65		01	8	1004.5
4	151	65	3	14	0330	L 32	58 S	158	05 E	23.9	35.64				
4	152	65	3	14	0616	L 33	20 S	158	14 E	24.4	35.58		13	7	1003.0
4	153	65	3	14	0930	L 33	43 S	158	18 E	23.6	35.65				
4	154	65	3	14	1211	L 34	08 S	158	22 E	21.8	35.76		01	7	1001.0
4	155	65	3	14	1515	L 34	09 S	158	58 E	22.9	35.76				
4	156	65	3	14	1818	L 34	11 S	159	37 E	23.1	35.56		03	6	1004.5
4	157	65	3	14	2130	L 33	42 S	159	40 E	23.7	35.55				
4	158	65	3	15	0016	L 33	17 S	159	44 E	23.7	35.54		01	7	1009.0
4	159	65	3	15	0845	L 32	36 S	159	48 E	23.6	35.71		01	8	1011.0
4	160	65	3	15	0610	L 32	32 S	159	51 E	24.1	35.57				
4	161	65	3	15	0930	L 32	12 S	159	36 E	24.1	35.92		01	7	1014.0
4	162	65	3	15	1331	L 31	55 S	159	17 E	24.1	35.57				
4	163	65	3	16	0800	L 31	30 S	159	42 E	23.8	35.72		01	7	1013.8
4	164	65	3	16	0420	L 31	07 S	160	13 E	22.8	35.66		01	7	1013.8
4	165	65	3	16	0930	L 32	07 S	160	16 E	23.8	35.59				
4	166	65	3	16	1211	L 32	27 S	160	18 E	23.2	35.60		02	7	1015.5
4	167	65	3	16	1845	L 32	50 S	160	25 E	22.8	35.64				
4	168	65	3	16	1835	L 33	16 S	160	31 E	22.7	35.62		02	7	1016.0
4	169	65	3	16	2145	L 33	32 S	160	34 E	23.5	35.68				
4	170	65	3	17	0315	L 34	00 S	160	38 E	21.8	35.65		55	7	1017.0
4	171	65	3	17	0754	L 34	36 S	160	43 E	19.1	35.45		01	7	1018.0
4	172	65	3	17	1015	L 34	37 S	160	23 E	20.6	35.65				

CRUISE STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN, AMT.	SEA DN, AMT.	SWELL DN, AMT.	WEA.	VIS.	BAROM.						
4	173	65	3	17	1812	L 34	37 S	159	56 E	21.9	35.63	18	6	18	4	19	4	01	8	1020.0
4	174	65	3	17	1940	L 34	46 S	159	22 E	21.3	35.62	19	6	19	4	18	4	01	7	1020.0
4	175	65	3	17	1810	L 34	53 S	158	50 E	21.3	35.69	18	4	18	2	17	1	01	8	1021.0
4	176	65	3	17	2130	L 35	00 S	158	14 E	20.9	35.63	16	1	16	2	14	1	01	8	1021.0
4	177	65	3	18	0009	L 35	00 S	157	11 E	20.8	35.70	16	1	16	2	14	1	01	8	1021.0
4	178	65	3	18	0330	L 35	19 S	157	11 E	20.5	35.63	16	1	16	2	14	1	01	8	1021.0
4	179	65	3	18	0618	L 35	34 S	156	45 E	20.5	35.70	16	1	16	2	14	1	01	8	1021.0
4	180	65	3	18	0930	L 35	51 S	156	11 E	24.4	35.64	16	2	00	0	11	1	00	7	1023.0
4	181	65	3	18	1817	L 35	58 S	155	42 E	24.3	35.57	16	2	00	0	11	1	00	7	1023.0
4	182	65	3	18	1930	L 35	55 S	154	58 E	22.1	35.68	35	2	35	2	08	1	00	8	1026.0
4	183	65	3	18	1809	L 35	52 S	154	22 E	20.7	35.72	10	3	01	1	35	1	00	7	1020.0
4	184	65	3	18	2130	L 35	45 S	153	43 E	21.7	35.82	02	2	02	2	36	1	00	8	1018.0
4	185	65	3	19	0011	L 35	38 S	153	04 E	21.4	35.73	01	4	01	3	05	4	01	8	1019.5
4	186	65	3	19	0330	L 35	30 S	152	23 E	21.2	35.77	04	2	01	2	36	1	01	8	1018.0
4	187	65	3	19	0611	L 35	23 S	152	43 E	21.6	35.74	21	2	99	2	35	1	02	7	1019.0
4	188	65	3	19	0930	L 35	26 S	151	53 E	21.4	35.66	33	1	00	0	22	1	03	7	1017.0
4	189	65	3	19	1810	L 36	26 S	152	15 E	21.2	35.74	27	2	27	1	23	1	01	8	1016.0
4	190	65	3	19	1943	L 36	35 S	152	51 E	23.2	35.64	02	2	02	2	36	1	01	8	1018.0
4	191	65	3	19	1805	L 37	15 S	153	20 E	20.4	35.71	04	2	01	2	36	1	01	8	1018.0
4	192	65	3	19	2130	L 37	45 S	153	22 E	21.0	35.73	21	2	99	2	35	1	02	7	1019.0
4	193	65	3	20	0013	L 38	12 S	153	19 E	19.2	35.67	33	1	00	0	22	1	03	7	1017.0
4	194	65	3	20	0340	L 38	28 S	152	41 E	19.7	35.69	27	2	27	1	23	1	01	8	1016.0
4	195	65	3	20	0612	L 38	24 S	152	05 E	21.2	35.75	27	2	27	1	23	1	01	8	1016.0
4	196	65	3	20	0930	L 38	36 S	151	23 E	20.9	35.68	27	2	27	1	23	1	01	8	1016.0
4	197	65	3	20	1207	L 38	36 S	150	51 E	19.8	35.69	27	2	27	1	23	1	01	8	1016.0
4	198	65	3	20	1930	L 38	41 S	150	03 E	20.4	35.65	27	2	27	1	23	1	01	8	1016.0
4	199	65	3	20	1800	L 38	47 S	149	30 E	19.5	35.72	27	2	27	1	23	1	01	8	1016.0
4	200	65	3	20	2100	L 38	55 S	148	40 E	18.6	35.71	27	2	27	1	23	1	01	8	1016.0



**DATA**

**PART 2**

**HYDROLOGY**

**DEEP STATIONS**

STATION	DATE	TIME	LATITUDE	LONGITUDE				
G 4/ 96/65	8/ 3/65	1820 K	34 11 S	151 30 E				
SONIC AIR TEMP, WIND	ANEM, CLOUD	VIS, SEA	SWELL	ATMOS.	WIRE ANGLES			
DEPTH WET DRY DIR, SP,	HEIGHT TYPE AMT,	DIR, AMT, DIR, AMT,	DIR, AMT,	PRESSURE	CAST1 CAST2 CAST3			
329 17.2 26.1 29 3	11 9 8	7 29 2	05 1	1005.0	0 * *			
CAST DEPTH	TEMP.	SALINITY	SIGMA=T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE
1 0	22.42	35.699	24.65	4.98	101	0.16	0.31	0.6
1 25	19.89	35.658	25.31	5.43	105	0.26	0.41	0.3
1 50	18.54	35.588	25.60	5.23	98	0.16	0.36	0.5
1 75	16.77	35.493	25.97	4.43	80	0.47	0.75	3.4
1 100	15.77	35.443	26.16	4.48	80	0.54	0.90	4.2
1 150	14.66	35.411	26.38	4.90	85	0.54	0.74	4.3
1 200	13.40	35.281	26.55	4.69	79	0.66	1.15	6.2
1 250	11.91	35.098	26.70	4.68	77	0.86	1.90	8.4
1 300	10.97	34.992	26.79	4.63	74	0.96	1.73	7.3

STATION 0 4/ 97/65 DATE 8/ 3/65 TIME 2146 K LATITUDE 34 00 S LONGITUDE 152 00 E

SONIC AIR TEMP, WIND ANEM, CLOUD SEA SWELL ATMOS, WIRE ANGLES  
 DEPTH WET DRY DIR, SP, HEIGHT TYPE AMT, VIS, DIR, AMT, DIR, AMT, PRESSURE CAST1 CAST2 CAST3  
 2230 17.2 23.9 36 4 11 6 4 7 34 3 03 1 1010.5 0 \* \*

CAST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE
1	0	22.04	35.739	24.79	5.04	101	0.17	***	***
1	25	21.48	35.711	24.92	5.12	102	0.16	***	***
1	50	17.69	35.520	25.76	5.10	94	0.22	***	***
1	75	16.69	35.457	25.96	4.79	87	0.37	***	***
1	100	15.39	35.412	26.22	4.73	83	0.49	***	***
1	150	13.88	35.312	26.47	4.67	80	0.63	***	***
1	200	12.93	35.236	26.61	4.73	79	0.69	***	***
1	300	11.29	35.015	26.75	4.59	74	0.85	***	***
1	500	8.49	34.656	26.95	4.39	70	1.28	***	***
1	700	6.80	34.513	27.08	4.30	63	1.52	***	***
1	900	5.16	34.471	27.26	4.10	58	1.63	***	***
1	1100	4.07	34.529	27.43	3.85	53	1.80	***	***
1	1300	3.36	34.560	27.52	3.61	49	1.90	***	***
1	1500	2.78	34.621	27.62	3.56	47	1.96	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 99/65	9/ 3/65	0600 L	33 55 S	153 16 E					
SONIC AIR TEMP.	WIND DIR. SP.	ANEM. HEIGHT	CLOUD TYPE AMT.	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3		
DEPTH WET DRY	4700 18.9 24.4 01 5	11	1 6	7 02 3 04 1	1006.5	10 5 *			
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE
2	0	21.98	35.724	24.79	5.01	101	0.08	0.31	0.3
2	25	21.31	35.699	24.96	5.19	103	0.15	***	0.6
2	50	19.86	35.640	25.30	5.29	102	0.07	0.35	0.5
2	75	17.83	35.515	25.73	4.97	92	0.22	***	0.7
2	100	15.56	35.400	26.17	4.55	80	0.52	0.76	5.3
2	150	13.29	35.238	26.54	4.48	76	0.73	***	8.2
2	200	11.64	35.061	26.72	4.49	73	0.82	1.14	12.5
2	300	9.82	34.838	26.88	4.63	72	0.98	1.21	16.0
2	400	8.43	34.666	26.97	4.54	69	1.19	***	20.9
2	500	7.29	34.551	27.04	4.38	65	1.44	1.74	24.0
2	700	5.46	34.471	27.22	4.16	59	1.74	2.01	29.6
2	900	4.51	34.485	27.34	3.95	55	1.87	2.16	27.9
2	1100	3.57	34.540	27.49	3.66	49	1.88	2.17	22.9
1	1300	3.11	34.581	27.56	3.53	47	1.91	2.33	26.7
1	1500	2.66	34.660	27.67	3.58	47	1.90	2.08	26.1
1	2000	2.17	34.705	27.74	4.07	53	1.93	2.35	27.3
1	2500	1.82	34.737	27.80	4.19	54	1.90	2.02	29.2
1	3000	1.44	34.755	27.82	4.37	56	2.00	2.25	30.0
1	3500	1.19	34.724	27.83	4.47	57	1.84	2.22	30.7
1	4000	1.15	34.722	27.83	4.50	57	1.81	2.20	30.7
1	4500	1.15	***	***	4.53	***	1.82	2.03	26.9

STATION		DATE		TIME		LATITUDE		LONGITUDE	
G 4/ 102/65		9/ 3/65		1508 L		33 23 S		154 07 E	
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	CAST1	CAST2	CASTS
4680 19.4 25.0	02 4	11 4	2	7 01 2	02 4	1007.0	10	*	*
CST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INCRG, P	TOTAL P	NITRATE
1	0	24.40	35.580	23.98	4.62	97	0.12	***	***
1	25	23.52	35.579	24.24	4.81	99	0.21	***	***
1	49	20.68	35.604	25.06	4.49	88	0.24	***	***
1	74	18.84	35.600	25.54	4.35	82	0.34	***	***
1	99	17.90	35.531	25.72	4.21	78	0.48	***	***
1	148	15.90	35.508	26.18	4.73	84	0.48	***	***
1	197	14.12	35.325	26.43	4.59	79	0.66	***	***
1	296	12.59	35.236	26.68	5.07	84	0.63	***	***
1	494	8.92	34.693	26.91	4.40	67	1.28	***	***
1	692	6.86	34.914	27.08	4.26	58	1.62	***	***
1	890	5.44	34.468	27.22	4.14	58	1.80	***	***
1	1088	4.41	34.489	27.36	3.69	54	1.86	***	***
1	1265	3.55	34.545	27.49	3.60	49	1.92	***	***
1	1483	3.01	34.591	27.58	3.52	47	1.98	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE				
G 4/ 105/65	9/ 3/65	2205 L	32	57 S	155	03 E			
SONIC AIR TEMP, WIND ANEM, CLOUD SWELL ATMOS, WIRE ANGLES									
DEPTH WET DRY	DIR, SP, HEIGHT TYPE AMT,	VIS, SEA DIR, AMT, DIR, AMT,	DIR, AMT,	DIR, AMT,	CAST1	CAST2 CAST3			
4746	19.4 25.0 99 5 11	8 7 7 99 3 29 4	1008.9	7	*	*			
CAST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE
1	0	24.71	35.593	23.90	4.63	98	0.08	***	***
1	25	24.72	35.599	23.90	4.74	100	0.09	***	***
1	50	24.73	35.624	23.92	4.92	95	0.08	***	***
1	75	23.81	35.575	24.15	4.74	98	0.08	***	***
1	100	22.07	35.587	24.66	4.84	97	0.15	***	***
1	150	20.42	35.607	25.13	4.38	85	0.26	***	***
1	200	19.58	35.615	25.36	4.50	86	0.29	***	***
1	300	18.20	35.587	25.69	4.25	79	0.41	***	***
1	500	14.05	35.257	26.39	4.29	73	0.69	***	***
1	700	9.66	34.770	26.85	4.31	67	1.15	***	***
1	900	***	34.523	***	4.31	***	1.41	***	***
1	1100	5.73	34.468	27.19	***	60	1.62	***	***
1	1300	4.55	34.485	27.34	3.93	54	1.74	***	***
1	1500	3.76	34.541	27.47	3.66	50	1.86	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/110/65	10/3/65	0700 L	34 08 S	154 58 E					
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	AMT.	VIS. DIR, AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
4746	14.4 21.1 17 7	11	0 7	7 17 4	21 4	1015.0	20 .12	*	
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	24.70	35.598	23.90	4.72	100	0.18	***	***
2	23	24.30	35.589	24.02	4.78	100	0.19	***	***
2	47	21.41	35.604	24.86	5.02	100	0.17	***	***
2	70	20.13	35.614	25.21	4.37	85	0.33	***	***
2	93	19.37	35.610	25.41	4.36	83	0.38	***	***
2	140	18.42	35.584	25.63	4.37	82	0.44	***	***
2	187	17.19	35.513	25.88	4.23	77	0.52	***	***
2	280	15.18	35.372	26.24	4.33	76	0.63	***	***
1	436	11.15	34.939	26.72	4.31	69	1.08	***	***
1	610	8.82	34.679	26.92	4.38	67	1.31	***	***
1	784	7.05	34.524	27.06	4.37	64	1.53	***	***
1	958	5.84	34.473	27.18	4.22	60	1.79	***	***
1	1132	4.87	34.476	27.30	4.04	56	1.82	***	***
1	1307	4.05	34.512	27.42	3.79	52	1.93	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE						
G 4/ 114/65	10/ 3/65	1525 L	34 23 S	156 00 E						
SONIC AIR TEMP.	WIND DIR, SP.	WIND ANEM. HEIGHT	CLOUD TYPE	AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
4627	16.1 23.3 16 7	11	8 7	7	15 3	16 4	1015.0	18	*	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE	
1	0	24.61	35.634	23.96	4.75	100	0.14	***	***	
1	24	24.60	35.632	23.96	4.75	100	0.13	***	***	
1	48	23.33	35.574	24.29	4.78	98	0.16	***	***	
1	71	21.68	35.587	24.77	4.54	91	0.23	***	***	
1	95	20.48	35.611	25.12	4.43	86	0.31	***	***	
1	142	19.28	35.612	25.43	4.39	84	0.37	***	***	
1	189	18.85	35.619	25.55	4.65	88	0.31	***	***	
1	281	16.70	35.468	25.96	4.00	72	0.98	***	***	
1	457	13.30	35.075	26.41	4.20	71	0.89	***	***	
1	615	10.03	34.869	26.86	4.72	74	0.98	***	***	
1	782	7.92	34.594	26.99	4.34	65	1.35	***	***	
1	965	6.26	34.484	27.13	4.25	61	1.58	***	***	
1	1156	4.90	34.477	27.29	4.03	56	1.70	***	***	
1	1355	3.90	34.522	27.44	3.75	51	1.85	***	***	



STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 117/65	10/ 3/65	2207 L	35 09 S	155 42 E					
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE AMT.	VIS. DIR. AMT.	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3	
DEPTH WET	13.9 20.6 13 5	11	6 3	8 13 3	15 4	1018.0	12 *	*	
4499									
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.69	35.724	24.59	4.93	100	0.10	***	***
1	25	22.69	35.727	24.59	4.95	101	0.10	***	***
1	50	22.26	35.731	24.72	5.00	101	0.11	***	***
1	75	19.35	35.651	25.45	4.90	94	0.20	***	***
1	100	16.41	35.565	25.62	4.20	79	0.41	***	***
1	150	16.86	35.484	25.94	4.14	75	0.57	***	***
1	430	12.25	35.000	26.56	4.60	76	0.89	***	***
1	645	8.45	34.652	26.99	4.49	68	1.25	***	***
1	864	6.48	34.492	27.11	4.27	62	1.54	***	***
1	1076	5.07	34.470	27.27	4.05	57	1.78	***	***
1	1275	4.05	34.509	27.41	3.77	52	1.80	***	***
1	1471	3.33	34.560	27.52	3.56	48	1.91	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 121/65	11/ 3/65	0655 L	34 05 S	156 30 E					
SONIC AIR TEMP, WIND DIR, SP, ANEM, CLOUD	VIS. SEA	SWELL	ATMOS.	WIRE ANGLES					
DEPTH WET DRY	DIR, SP, HEIGHT TYPE AMT,	DIR, AMT, DIR, AMT, PRESSURE	CASI1 CASI2 CASI3						
4640 16.7 22.8 10 5	11 8 7	7 11 3 13 4	1013.5	10 * *					
CAS1	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE
1	0	24.21	35.611	24.06	4.71	99	0.10	***	***
1	25	24.22	35.603	24.05	4.80	100	0.10	***	***
1	50	22.79	35.707	24.55	4.81	98	0.08	***	***
1	75	21.00	35.689	25.04	5.17	102	0.09	***	***
1	100	19.53	35.638	25.39	5.07	97	0.17	***	***
1	150	18.11	35.567	25.70	4.52	84	0.31	***	***
1	200	16.75	35.486	25.97	4.36	79	0.50	***	***
1	300	13.90	35.238	26.41	4.24	72	0.74	***	***
1	500	11.23	35.016	26.77	4.70	76	0.84	***	***
1	700	8.46	34.642	26.94	4.36	66	1.28	***	***
1	900	6.58	34.497	27.10	4.30	62	1.55	***	***
1	1100	5.08	34.472	27.27	4.08	57	1.77	***	***
1	1300	4.08	34.510	27.41	3.79	52	1.85	***	***
1	1500	3.43	34.553	27.51	3.60	49	1.93	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 125/65	11/ 3/65	1518 L	33 04 S	156 18 E					
SONIC AIR TEMP, WIND DIR, SP.	ANEM. HEIGHT TYPE AMT,	VIS. DIR, AMT, SEA DIR, AMT,	SWELL DIR, AMT, ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3					
DEPTH WET DRY	18.3 23.3	12 6	11 8 5	20 * *					
3054									
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.74	35.639	23.92	4.77	101	0.12	***	***
1	25	24.72	35.633	23.93	4.86	103	0.15	***	***
1	49	24.70	35.631	23.93	4.71	99	0.11	***	***
1	74	23.19	35.549	24.31	4.89	100	0.16	***	***
1	98	21.48	35.582	24.83	4.21	84	0.39	***	***
1	147	19.83	35.610	25.29	4.47	86	0.33	***	***
1	196	19.03	35.613	25.50	4.58	87	0.36	***	***
1	295	17.69	35.946	25.78	4.30	79	0.48	***	***
1	491	13.75	35.111	26.34	4.23	72	0.95	***	***
1	687	9.57	34.788	26.88	4.61	72	1.19	***	***
1	884	7.41	34.592	27.03	4.33	64	1.50	***	***
1	1080	5.74	34.470	27.19	4.19	60	1.75	***	***
1	1276	4.54	34.483	27.34	3.93	54	1.82	***	***
1	1473	3.64	34.533	27.47	3.67	50	1.92	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE							
G 4/128/65	11/3/65	2210 L	32	39 S	157	03 E						
SONIC AIR TEMP.	WIND DIR, SP.	WIND	ANEM. HEIGHT	CLOUD TYPE	AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	CAST1	CAST2	CAST3	WIRE ANGLES
DEPTH	WET DRY	DIR, SP.	WIND	TYPE	AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	CAST1	CAST2	CAST3	WIRE ANGLES
5630	17.8 23.3	10 5	11	*	0	8 10 3	11 4	1008.0	10	*	*	*
CST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE			
1	0	24.30	35.581	24.01	4.71	99	0.14	***	***			
1	25	24.28	35.581	24.02	4.72	99	0.13	***	***			
1	50	22.02	35.724	24.78	5.01	101	0.13	***	***			
1	75	20.61	35.665	25.12	4.86	95	0.17	***	***			
1	100	19.23	35.611	25.45	4.72	90	0.31	***	***			
1	150	17.30	35.516	25.86	4.48	82	0.44	***	***			
1	200	15.22	35.334	26.20	4.05	71	0.67	***	***			
1	300	13.48	35.263	26.52	4.54	77	0.72	***	***			
1	500	9.97	34.805	26.82	4.36	68	1.14	***	***			
1	700	7.90	34.588	26.99	4.37	65	1.38	***	***			
1	900	6.20	34.486	27.14	4.22	61	1.59	***	***			
1	1100	4.92	34.471	27.29	4.01	56	1.75	***	***			
1	1300	4.01	34.512	27.42	3.78	52	1.88	***	***			
1	1500	3.24	34.561	27.53	3.56	48	2.00	***	***			

STATION G 4/ 132/65 DATE 12/ 3/65 TIME 0719 L LATITUDE 31 25 S LONGITUDE 156 17 E

SONIC AIR TEMP, WIND DIR, SP, ANEM, CLOUD VIS, SEA SWELL ATMOS, WIRE ANGLES  
 DEPTH WET DRY, DIR, SP, HEIGHT TYPE AMT, DIR, AMT, PRESSURE CAST1 CAST2 CAST3  
 4539 24,4 17,8 08 3 11 8 08 2 07 1 1004,0 10 \* \*

CST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24,60	35,583	23,92	4,64	98	0,11	***	***
1	25	24,58	35,583	23,93	4,72	99	0,10	***	***
1	50	24,60	35,581	23,92	4,64	98	0,08	***	***
1	75	24,46	35,585	23,97	4,60	97	0,09	***	***
1	100	21,39	35,595	24,86	4,21	84	0,34	***	***
1	150	18,77	35,591	25,55	4,41	83	0,34	***	***
1	199	17,06	35,501	25,90	4,21	77	0,52	***	***
1	299	14,23	35,292	26,38	4,33	74	0,70	***	***
1	498	10,83	34,992	26,79	4,92	72	1,00	***	***
1	696	8,33	34,637	26,96	4,41	67	1,34	***	***
1	894	6,60	34,502	27,10	4,25	62	1,60	***	***
1	1092	5,19	34,470	27,26	4,07	57	1,83	***	***
1	1289	4,18	34,503	27,39	3,79	52	1,86	***	***
1	1484	3,44	34,554	27,51	3,61	49	1,97	***	***

STATION		DATE		TIME		LATITUDE		LONGITUDE	
G 4/ 136/65		12/ 3/65		1515 L		30 11 S		155 46 E	
SONIC AIR TEMP,	WIND DIR, SP,	ANEM. HEIGHT	CLOUD TYPE	SEA DIR, AMT,	SWELL DIR, AMT,	ATMOS. PRESSURE	WIND ANGLES		
DEPTH WET DRY	22 3	11	8 1	7 22 2	25 1	1002.0	CAST1	CAST2	CAST3
4700 18.9 23.9							*	*	*
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.15	35.608	23.78	4.64	99	0.05	***	***
1	25	24.97	35.612	23.83	4.69	99	0.06	***	***
1	49	24.99	35.642	23.85	4.97	97	0.04	***	***
1	74	24.13	35.638	24.11	4.78	100	0.06	***	***
1	98	22.18	35.609	24.65	5.03	101	0.12	***	***
1	147	20.25	35.605	25.18	4.05	79	0.35	***	***
1	196	19.08	35.611	25.49	4.29	61	0.36	***	***
1	295	16.26	35.438	26.04	4.05	73	0.59	***	***
1	491	12.52	35.148	26.62	4.49	74	0.79	***	***
1	688	8.72	34.675	26.93	4.40	67	1.27	***	***
1	884	6.67	34.505	27.10	4.24	62	1.55	***	***
1	1080	5.01	34.487	27.29	4.04	56	1.71	***	***
1	1277	4.02	34.515	27.42	3.73	51	1.92	***	***
1	1472	3.30	34.566	27.53	3.47	47	2.00	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE				
G 4/ 139/65	12/ 3/65	2203 L	30 09 S	157 00 E				
SONIC AIR TEMP, WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRE ANGLES		
DEPTH WET DRY	TEMP.	SALINITY	SIGMA <sub>t</sub> T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
4371 18.3 23.9	22 3	11	8 1	7	22 2	24 1	1002.5	10 *
CASST DEPTH	TEMP.	SALINITY	SIGMA <sub>t</sub> T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1 0	24.26	35.628	24.06	4.75	99	0.12	***	***
1 25	24.24	35.627	24.07	4.81	101	0.09	***	***
1 50	22.92	35.607	24.44	4.87	99	0.12	***	***
1 75	21.73	35.705	24.85	4.94	99	0.11	***	***
1 100	20.90	35.625	25.02	4.65	91	0.21	***	***
1 150	19.31	35.611	25.43	4.42	84	0.33	***	***
1 200	18.56	35.591	25.60	4.36	82	0.38	***	***
1 300	15.73	35.429	26.16	4.38	78	0.56	***	***
1 500	11.39	35.009	26.73	4.49	73	0.90	***	***
1 700	8.56	34.660	26.94	4.40	67	1.25	***	***
1 900	5.84	34.495	27.20	4.25	61	1.55	***	***
1 1100	4.98	34.475	27.28	4.01	56	1.77	***	***
1 1300	3.94	34.519	27.43	3.73	51	1.80	***	***
1 1500	3.24	34.572	27.54	3.48	47	1.82	***	***





STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 146/65	13/ 3/65	1216 L	30 45 S	157 42 E					
SONIC AIR TEMP.	WIND	ANEM.	CLOUD	SEA	SWELL	ATMOS.	WIRE ANGLES		
DEPTH MET DRY	DIR, SP.	HEIGHT	TYPE	DIR, AMT.	DIR, AMT.	PRESSURE	CAST1 CAST2 CAST3		
2648	19.4 26.1	28 1	11 4 5	8 28 2	29 1	1005.5	10 * *		
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.10	35.610	24.09	4.75	99	0.10	***	***
1	25	23.73	35.640	24.23	4.79	99	0.09	***	***
1	50	22.81	35.661	24.51	4.92	100	0.09	***	***
1	75	21.30	35.643	24.92	4.76	94	0.14	***	***
1	100	20.45	35.602	25.12	4.57	89	0.21	***	***
1	149	19.38	35.608	25.41	4.44	85	0.30	***	***
1	199	18.68	35.594	25.58	4.47	84	0.36	***	***
1	299	16.55	35.464	25.99	4.10	74	0.52	***	***
1	498	11.81	35.071	26.70	4.53	74	0.85	***	***
1	697	9.23	34.736	26.89	4.48	69	1.18	***	***
1	896	7.21	34.535	27.04	4.33	64	1.43	***	***
1	1094	5.36	34.472	27.24	4.13	58	1.72	***	***
1	1292	4.24	34.505	27.39	3.84	53	1.83	***	***
1	1488	3.39	34.560	27.52	3.58	48	2.01	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE										
G 4/148/65	13/3/65	1810 L	31 41 S	157 39 E										
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	CAST1	CAST2	CAST3	WIRE ANGLES			
2560	18,9 25,0 36 3	11	3	1	8	36	2	07	4	1004,0	7	*	*	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE					
1	0	24.98	35.590	23.81	4.76	101	0.18	***	***					
1	25	24.17	35.651	24.10	4.82	101	0.13	***	***					
1	50	22.73	35.616	24.50	4.98	101	0.16	***	***					
1	75	21.07	35.604	24.95	4.67	92	0.24	***	***					
1	100	20.15	35.608	25.20	4.51	87	0.33	***	***					
1	149	18.84	35.601	25.54	4.51	85	0.38	***	***					
1	199	17.93	35.561	25.74	4.38	81	0.46	***	***					
1	299	16.24	35.465	26.07	4.31	77	0.56	***	***					
1	498	12.56	35.029	26.52	4.36	72	0.97	***	***					
1	696	8.55	34.649	26.93	4.36	66	1.36	***	***					
1	894	6.55	34.492	27.10	4.32	63	1.60	***	***					
1	1091	5.07	34.471	27.27	4.02	56	1.89	***	***					
1	1287	4.07	34.512	27.41	3.74	51	1.89	***	***					
1	1482	3.33	34.564	27.53	3.55	48	2.00	***	***					

STATION	DATE	TIME	LATITUDE		LONGITUDE									
G 4/ 150/65	14/ 3/65	0012 L	32	33 S	157	57 E								
SONIC AIR TEMP, WIND DIR, SP, WIND AMT, CLOUD TYPE AMT, VIS, SEA DIR, AMT, SWELL DIR, AMT, ATMOS. PRESSURE, WIRE ANGLES														
DEPTH WET	DIR, SP,	WIND AMT,	CLOUD TYPE AMT,	VIS,	SEA DIR, AMT,	SWELL DIR, AMT,	ATMOS. PRESSURE	CAS1	CAS2	CAS3				
3100	19.2	24.7	36	2	11	8	35	2	09	4	1004.5	10	*	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN	% SAT.	INORG. P	TOTAL P	NITRATE				
1	0	23.79	35.647	24.21	4.79	99	0.10	0.10	***	***				
1	25	23.53	35.645	24.29	4.85	100	0.13	0.13	***	***				
1	49	22.18	35.655	24.68	5.10	103	0.08	0.08	***	***				
1	74	20.17	35.591	25.18	4.94	96	0.16	0.16	***	***				
1	98	18.71	35.563	25.54	4.47	84	0.35	0.35	***	***				
1	147	16.53	35.465	26.00	4.29	77	0.51	0.51	***	***				
1	196	15.36	35.387	26.21	4.34	76	0.63	0.63	***	***				
1	294	13.21	35.206	26.53	4.44	75	0.76	0.76	***	***				
1	491	10.19	34.857	26.83	4.48	71	1.09	1.09	***	***				
1	687	7.87	34.587	26.99	4.36	65	1.37	1.37	***	***				
1	883	6.13	34.476	27.14	4.26	61	1.59	1.59	***	***				
1	1080	4.96	34.471	27.28	4.02	56	1.80	1.80	***	***				
1	1276	4.08	34.508	27.41	3.70	51	1.82	1.82	***	***				
1	1472	3.39	34.555	27.52	3.55	48	1.92	1.92	***	***				

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 152/65	14/ 3/65	0616 L	33 20 S	158 14 E					
SONIC AIR TEMP.	WIND DIR, SP.	WIND ANEM. HEIGHT	CLOUD TYPE	AMT.	VIS.	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3
3738	17,2 24,4	35 4	11 9 6	7 36 3	06 4	1003,0	*	*	*
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.39	35.576	23.98	4.64	97	0.11	***	***
1	25	24.40	35.571	23.98	4.70	99	0.08	***	***
1	50	22.19	35.581	24.62	4.58	92	0.19	***	***
1	75	20.81	35.603	25.02	4.41	87	0.25	***	***
1	100	20.05	35.604	25.23	4.16	84	0.29	***	***
1	150	18.46	35.591	25.60	3.97	74	0.51	***	***
1	200	16.76	35.459	25.94	3.97	72	0.57	***	***
1	300	14.19	35.296	26.39	4.36	75	0.68	***	***
1	500	10.72	34.950	26.81	4.70	75	0.95	***	***
1	700	8.18	34.615	26.96	4.38	66	1.35	***	***
1	900	6.20	34.480	27.14	4.42	64	1.70	***	***
1	1100	4.95	34.472	27.28	4.01	56	1.84	***	***
1	1300	3.94	34.519	27.43	3.64	50	1.81	***	***
1	1500	3.24	34.569	27.54	3.51	47	2.05	***	***

STATION DATE TIME LATITUDE LONGITUDE  
 G 4/ 154/65 14/ 3/65 1211 L 34 08 S 158 22 E

SONIC AIR TEMP, WIND ANEM, CLOUD VIS. SEA SWELL ATMOS. WIRE ANGLES  
 DEPTH WET DRY DIR, SP, HEIGHT TYPE, AMT, DIR, AMT, DIR, AMT, PRESSURE CAST1 CAST2 CAST3

4590 17.8 23.9 34 3 11 5 7 34 2 07 4 1001.0 10 \* \*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.80	35.624	24.77	4.99	100	0.11	***	***
1	25	21.26	35.662	24.94	5.18	103	0.09	***	***
1	50	20.05	35.608	25.23	5.30	102	0.12	***	***
1	75	18.24	35.544	25.65	4.62	86	0.29	***	***
1	100	16.67	35.475	25.97	4.47	81	0.42	***	***
1	150	14.93	35.383	26.30	4.48	78	0.61	***	***
1	200	14.04	35.309	26.44	4.49	77	0.66	***	***
1	300	12.55	35.167	26.63	4.55	75	0.78	***	***
1	500	9.50	34.770	26.88	4.58	71	1.15	***	***
1	700	7.42	34.553	27.03	4.32	64	1.47	***	***
1	900	5.82	34.471	27.16	4.17	59	1.70	***	***
1	1100	4.61	34.564	27.40	3.92	54	1.88	***	***
1	1300	3.72	34.537	27.47	3.70	50	1.99	***	***
1	1500	3.08	34.586	27.57	3.50	47	2.06	***	***

STATION G 4/ 156/65 DATE 14/ 3/65 TIME 1818 L LATITUDE 34 11 S LONGITUDE 159 37 E

SONIC AIR TEMP, WIND DIR, SP, ANEM, CLOUD VIS. SEA ATMOS. WIRE ANGLES  
 DEPTH WET DRY DIR, SP, WEIGHT TYPE AMT, DIR. AMT, DIR. AMT, PRESSURE CAST1 CAST2 CAST3

2855 13.3 19.4 24 8 11 8 8 6 24 3 24 4 1004.5 8 8 \* \*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.10	35.557	24.35	4.79	98	0.14	***	***
1	25	22.91	35.630	24.46	5.01	102	0.14	***	***
1	50	20.16	35.626	25.22	5.17	100	0.11	***	***
1	75	18.35	35.558	25.63	4.62	86	0.32	***	***
1	100	17.15	35.504	25.88	4.55	83	0.39	***	***
1	150	15.33	35.389	26.22	4.32	76	0.61	***	***
1	200	14.00	35.294	26.43	4.44	76	0.72	***	***
1	300	12.64	35.191	26.63	4.71	78	0.83	***	***
1	500	9.79	34.815	26.86	4.55	71	1.16	***	***
1	700	7.44	34.558	27.03	4.35	64	1.57	***	***
1	900	5.93	34.473	27.17	4.17	60	1.74	***	***
1	1100	4.70	34.478	27.32	4.00	56	1.91	***	***
1	1300	3.88	34.526	27.44	3.70	50	1.98	***	***
1	1500	3.18	34.575	27.55	3.50	47	1.09	***	***

STATION		DATE		TIME		LATITUDE		LONGITUDE	
G 4/ 158/65		19/ 3/69		0016 L		33 17 S		159 44 E	
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. CLOUD	SEA	ATMOS.	WIRE ANGLES				
DEPTH WET	DIR, SP.	HEIGHT TYPE	DIR, AMT.	DIR, AMT.	PRESSURE	CAS1	CAS2	CAS3	
2549	13.3 20.0	24 3	7 22 2	24 4	1005.0	20	*	*	*
CAS1	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.66	35.541	24.17	4.77	99	0.12	***	***
1	25	23.67	35.539	24.17	4.76	99	0.09	***	***
1	50	20.76	35.614	25.04	4.92	96	0.17	***	***
1	75	19.19	35.592	25.44	4.35	83	0.34	***	***
1	100	18.26	35.563	25.66	4.21	79	0.45	***	***
1	125	16.99	35.504	25.92	4.32	79	0.48	***	***
1	400	11.49	34.979	26.69	4.41	71	0.97	***	***
1	638	8.30	34.621	26.95	4.35	66	1.34	***	***
1	846	6.56	34.490	27.10	4.27	62	1.58	***	***
1	1087	4.99	34.473	27.28	4.02	56	1.80	***	***
1	1284	4.04	34.511	27.41	3.75	51	1.95	***	***
1	1485	3.24	34.568	27.54	3.53	47	2.03	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 160/65	15/ 3/65	0610 L	32 32 S	159 51 E					
SONIC AIR TEMP, WIND	ANEM. CLOUD	VIS. SEA	SWELL	ATMOS.	WIRE ANGLES				
DEPTH WET DRY DIR, SP.	HEIGHT TYPE AMT,	DIR. AMT.	DIR. AMT.	PRESSURE	CAST1 CAST2 CAST3				
2496 13.9 21.1 24 5	11 8 2 8 2 4 3 25 1	1011.0	7	*	*				
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.42	35.573	23.97	4.67	98	0.15	***	***
1	25	24.44	35.568	23.96	4.69	99	0.10	***	***
1	50	24.44	35.571	23.96	4.62	97	0.10	***	***
1	75	21.80	35.596	24.74	4.44	89	0.26	***	***
1	100	20.06	35.606	25.23	4.39	85	0.35	***	***
1	150	18.58	35.585	25.59	4.27	80	0.47	***	***
1	200	17.78	35.592	25.77	4.41	82	0.46	***	***
1	300	15.43	35.389	26.19	4.22	74	0.61	***	***
1	500	11.65	35.092	26.71	4.62	75	0.89	***	***
1	700	8.51	34.658	26.95	4.50	68	1.31	***	***
1	900	6.52	34.492	27.11	4.31	62	1.63	***	***
1	1100	5.13	34.469	27.26	4.07	57	1.77	***	***
1	1300	4.19	34.504	27.39	3.86	53	1.88	***	***
1	1500	3.33	34.564	27.53	3.58	48	2.06	***	***



STATION

G 4/ 162/65

DATE

15/ 3/65

TIME

1151 L

LATITUDE

31 55 S

LONGITUDE

159 17 E

SONIC AIR TEMP. WIND ANEM. CLOUD SEA SWELL ATMOS. WIRE ANGLES  
 DEPTH MET DRY DIR. SP. HEIGHT TYPE AMT. VIS. DIR. AMT. DIR. AMT. PRESSURE CAST1 CAST2 CAST3

1719 15.0 25.6 21 5 11 8 6 7 22 3 21 4 1014.0 17 \* \*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.12	35.573	24.06	4.80	100	0.12	***	***
1	24	24.12	35.574	24.06	4.86	101	0.12	***	***
1	48	23.65	35.630	24.24	4.83	100	0.12	***	***
1	73	22.28	35.605	24.62	4.55	92	0.23	***	***
1	97	20.98	35.604	24.98	4.58	90	0.87	***	***
1	145	19.94	35.609	25.26	4.43	86	0.36	***	***
1	194	19.11	35.620	25.48	4.57	87	0.33	***	***
1	291	16.88	35.492	25.94	4.13	75	0.55	***	***
1	485	12.38	35.135	26.64	4.54	75	0.82	***	***
1	679	9.53	34.774	26.87	4.44	69	1.17	***	***
1	873	7.50	34.566	27.03	4.42	65	1.53	***	***
1	1067	5.55	34.473	27.21	4.18	59	1.83	***	***
1	1261	4.38	34.499	27.37	3.90	54	1.95	***	***
1	1455	3.43	34.539	27.50	3.60	49	2.10	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 164/65	16/ 3/65	0420 L	31 30 S	160 13 E					
SONIC AIR TEMP, WIND, ANEM, CLOUD, SWELL, ATMOS, WIRE ANGLES	DEPTH WET DRY DIR, SP, HEIGHT TYPE AMT, VIS, DIR. AMT, DIR. AMT, PRESSURE CAST1 CAST2 CAST3								
1408	17.2 16.1 19 5 11 8 4	7 19 3	19 4	15 * *					
				1013.5					
CAST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.81	35.664	24.51	4.91	100	0.09	***	***
1	24	22.83	35.668	24.51	4.92	100	0.10	***	***
1	49	22.73	35.678	24.55	4.91	100	0.10	***	***
1	73	20.68	35.659	25.10	4.97	97	0.14	***	***
1	97	18.99	35.576	25.48	4.55	86	0.28	***	***
1	146	16.81	35.493	25.95	4.31	78	0.48	***	***
1	195	15.21	35.372	26.23	4.25	75	0.59	***	***
1	292	13.34	35.207	26.50	4.34	73	0.80	***	***
1	487	10.41	34.880	26.81	4.49	71	1.06	***	***
1	682	8.03	34.604	26.98	4.42	66	1.39	***	***
1	877	6.31	34.486	27.13	4.25	61	1.66	***	***
1	1071	4.99	34.479	27.29	4.06	57	1.82	***	***
1	1266	3.61	34.546	27.49	3.64	49	1.96	***	***
1	1362	3.26	34.573	27.54	3.52	47	2.04	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE						
G 4/ 166/65	16/ 3/65	1211 L	32 27 S	160 18 E						
SONIC AIR TEMP.	WIND DIR, SP.	WIND	CLOUD	SEA	VIS.	DIR, AMT.	SWELL	DIR, AMT.	ATMOS.	WIRE ANGLES
DEPTH WET DRY	DIR, SP.	DIR, SP.	TYPE	DIR, AMT.	DIR, AMT.	DIR, AMT.	DIR, AMT.	DIR, AMT.	PRESSURE	CAST1 CAST2 CAST3
1563 13.9 20.6	19 7	19 7	6 8	19 4	19 4	19 4	19 4	1015.5	5	* * *
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN	% SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.22	35.601	24.34	4.85	100	100	0.10	***	***
1	25	23.23	35.597	24.34	4.85	100	100	0.14	***	***
1	50	21.63	35.683	24.86	5.03	100	100	0.11	***	***
1	75	20.87	35.657	25.05	4.86	96	96	0.16	***	***
1	100	19.76	35.649	25.34	4.76	92	92	0.24	***	***
1	150	18.28	35.559	25.65	4.13	77	77	0.48	***	***
1	200	17.22	35.512	25.87	4.26	78	78	0.50	***	***
1	300	14.22	35.291	26.38	4.37	75	75	0.68	***	***
1	500	11.13	34.978	26.75	4.50	72	72	0.98	***	***
1	700	8.24	34.623	26.96	4.36	66	66	1.36	***	***
1	900	6.43	34.518	27.14	4.33	63	63	1.51	***	***
1	1100	5.11	34.474	27.27	4.19	59	59	1.73	***	***
1	1300	4.00	34.516	27.42	3.79	52	52	1.99	***	***
1	1400	3.54	34.548	27.50	3.60	49	49	2.03	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 168/65	16/ 3/65	1835 L	33 16 S	160 31 E					
SONIC AIR TEMP, WIND	ANEM, CLOUD	VIS. SEA	SWELL	ATMOS.	WIRE ANGLES				
DEPTH MET DRY, SP.	HEIGHT TYPE AMT,	DIR, AMT.	DIR, AMT,	PRESSURE	CAST1 CAST2 CAST3				
1460 12.2 18.3 18 8	11 8 8	7 17 4	18 4	1016.0	22 * *				
CST	DEPTH	TEMP.	SALINITY	SIGMA <sub>t</sub>	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.74	35.619	24.50	4.87	99	0.09	***	***
1	23	22.75	35.619	24.49	4.91	100	0.10	***	***
1	47	22.70	35.618	24.51	4.87	99	0.05	***	***
1	70	20.25	35.621	25.19	4.81	93	0.15	***	***
1	93	19.39	35.630	25.42	4.72	90	0.29	***	***
1	140	18.38	35.580	25.64	4.55	81	0.37	***	***
1	186	17.34	35.528	25.86	4.30	79	0.47	***	***
1	279	15.27	35.396	26.24	4.41	77	0.63	***	***
1	465	11.27	34.990	26.74	4.20	73	0.97	***	***
1	653	8.77	34.687	26.93	4.55	69	1.31	***	***
1	843	6.77	34.512	27.09	4.34	63	1.55	***	***
1	1035	5.35	34.468	27.23	4.15	58	1.78	***	***
1	1229	4.38	34.494	27.37	3.91	54	1.91	***	***
1	1326	3.96	34.518	27.43	3.76	51	1.99	***	***

STATION G 4/ 170/65 DATE 17/ 3/65 TIME 0315 L LATITUDE 34 00 S LONGITUDE 160 38 E

SONIC AIR TEMP, WIND ANEM, CLOUD SEA SWELL ATMOS. WIRE ANGLES  
 DEPTH WET DRY DIR, SP, HEIGHT TYPE AMT, VIS, DIR, AMT, DIR, AMT, PRESSURE CAST1 CAST2 CAST3  
 2350 11.1 16.1 18 7 11 8 8 7 18 4 18 7 1017.0 5 \* \*

CAST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG, P	TOTAL P	NITRATE
1	0	21.77	35.650	24.80	5.01	100	0.08	***	***
1	25	21.79	35.650	24.79	5.03	101	0.08	***	***
1	50	21.45	35.646	24.88	4.99	99	0.08	***	***
1	75	19.64	35.595	25.33	4.97	95	0.17	***	***
1	100	18.11	35.548	25.68	4.56	85	0.36	***	***
1	150	16.35	35.457	26.04	4.26	77	0.54	***	***
1	200	14.73	35.364	26.33	4.56	79	0.59	***	***
1	300	12.65	35.153	26.60	4.49	75	0.79	***	***
1	500	9.94	34.840	26.86	4.66	73	1.03	***	***
1	700	7.74	34.573	27.00	4.36	65	1.42	***	***
1	900	6.09	34.476	27.15	4.26	61	1.63	***	***
1	1100	4.76	34.479	27.31	3.99	55	1.87	***	***
1	1300	3.81	34.522	27.45	3.75	51	2.01	***	***
1	1500	3.18	34.974	27.55	3.56	48	2.10	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE								
G 4/ 171/65	17/ 3/65	0754 L	34 36 S	160 43 E								
2304	13.9 20.0	19 4	11 8 7	19 3 7								
SONIC AIR TEMP.	WIND DIR.	SP. WIND DIR.	SEA DIR.	AMT. SWELL DIR.	AMT. ATMOS. PRESSURE	WIKE ANGLES CAST1	CAST2	CAST3				
DEPTH MET	DRY	SP.	DIR.	AMT.	PRESSURE	CAST1	CAST2	CAST3				
2304	13.9	20.0	19	4	11	8	7	19 3 7	1016.0	10	*	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN X SAT.	INORG. P	TOTAL P	NITRATE			
1	0	19.10	35.451	25.36	5.26	100	0.11	***	***			
1	25	19.11	35.445	25.35	5.28	100	0.12	***	***			
1	50	17.84	***	***	***	***	***	***	***			
1	75	15.57	35.449	26.21	4.91	87	0.39	***	***			
1	100	15.01	35.423	26.31	4.93	86	0.46	***	***			
1	150	14.21	35.370	26.45	4.96	85	0.55	***	***			
1	200	13.67	35.338	26.53	5.04	86	0.54	***	***			
1	300	12.25	35.125	26.68	4.96	82	0.68	***	***			
1	500	9.26	34.798	26.94	4.79	74	1.12	***	***			
1	700	7.39	34.770	27.20	4.34	64	1.44	***	***			
1	900	5.93	34.482	27.17	4.21	60	1.66	***	***			
1	1100	4.56	34.486	27.34	3.95	55	1.84	***	***			
1	1300	3.68	34.536	27.47	3.65	49	1.94	***	***			
1	1500	3.20	34.573	27.55	3.53	47	1.97	***	***			

STATION DATE TIME LATITUDE LONGITUDE  
 G 4/ 173/65 17/ 3/65 1212 L 34 37 S 159 56 E

SONIC AIR TEMP, WIND, ANEM. CLOUD VIS, SEA SWELL ATMOS. WIRE ANGLES  
 DEPTH WET DRY DIR, SP, HEIGHT TYPE AMT, DIR, AMT, DIR, AMT, PRESSURE CAST1 CAST2 CAST3

2985 17,2 17,8 18 6 11 8 6 8 18 4 19 4 1020,0 10 \* \*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21,92	35,626	24,74	4,99	100	0,13	***	***
1	25	21,92	35,626	24,73	4,99	100	0,11	***	***
1	50	20,28	35,630	25,19	5,24	102	0,12	***	***
1	75	18,73	35,563	25,54	4,80	90	0,26	***	***
1	100	17,64	35,523	25,78	4,40	81	0,44	***	***
1	150	15,31	35,423	26,25	4,30	76	0,62	***	***
1	200	14,65	35,361	26,35	4,55	79	0,64	***	***
1	300	12,75	35,196	26,61	4,63	77	0,77	***	***
1	500	9,70	34,809	26,87	4,59	71	1,14	***	***
1	700	7,51	34,562	27,02	4,34	64	1,48	***	***
1	900	5,96	34,563	27,23	4,39	63	1,52	***	***
1	1100	4,67	34,482	27,32	3,99	55	1,87	***	***
1	1300	3,77	34,530	27,46	3,74	51	2,01	***	***
1	1500	3,13	34,581	27,56	3,54	47	2,06	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE				
G 4/175/65	17/3/65	1810 L	34	53 S	158	50 E			
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	AMT.	VIS. SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3	
4688	12.8 18.9 19 6 6 11	6 6 6 7 19 4 18 4	6 6 6 7 19 4 18 4	1020.0	19	*	*	*	
CAST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE
1	0	21.30	35.693	24.96	5.09	101	0.13	***	***
1	24	21.29	35.693	24.96	5.08	101	0.13	***	***
1	49	21.25	35.693	24.97	5.08	101	0.13	***	***
1	73	18.03	35.540	25.70	4.82	90	0.30	***	***
1	98	16.50	35.469	26.01	4.63	83	0.45	***	***
1	147	15.04	35.394	26.28	4.61	81	***	***	***
1	196	14.07	35.333	26.45	4.73	81	0.69	***	***
1	294	12.40	35.167	26.66	4.73	78	0.77	***	***
1	459	9.60	34.788	26.87	4.57	71	1.14	***	***
1	685	7.49	34.559	27.02	4.38	65	1.46	***	***
1	881	5.91	34.472	27.17	4.23	60	1.64	***	***
1	1076	4.67	34.476	27.32	4.03	56	1.84	***	***
1	1272	3.75	34.524	27.46	3.71	50	1.98	***	***
1	1468	3.14	34.579	27.56	3.55	48	2.13	***	***



STATION	DATE	TIME	LATITUDE		LONGITUDE					
G 4/ 177/65	18/ 3/65	0009 L	35	00 S	157	44 E				
3593	12,2 18,3	18 4	11	6 3	1021,0	10 * *				
	SONIC AIR TEMP, WIND DIR, SP, ANEM. HEIGHT TYPE AMT, CLOUD TYPE AMT, VIS. DIR. AMT, SEA DIR. AMT, SWELL DIR. AMT, ATMOS. PRESSURE									
	DEPTH WET DRY									
	CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.79	35.705	25.11	5.10	100	0.12	***	***	
1	25	20.80	35.705	25.10	5.14	101	0.12	***	***	
1	50	20.67	***	***	***	***	***	***	***	
1	75	18.87	35.573	25.51	5.15	97	0.18	***	***	
1	100	17.54	35.510	25.79	4.91	90	0.35	***	***	
1	150	15.17	35.416	26.27	4.84	80	0.58	***	***	
1	200	14.11	35.350	26.45	4.66	80	0.64	***	***	
1	300	11.71	35.028	26.71	4.42	72	0.89	***	***	
1	500	8.47	34.652	26.95	4.51	68	1.31	***	***	
1	700	6.76	34.509	27.09	4.32	63	1.52	***	***	
1	900	5.41	34.470	27.23	4.16	59	1.73	***	***	
1	1100	4.43	34.491	27.36	3.94	54	1.90	***	***	
1	1300	3.59	34.536	27.48	3.66	50	1.94	***	***	
1	1500	3.07	34.585	27.57	3.57	48	2.02	***	***	

STATION	DATE	TIME	LATITUDE		LONGITUDE								
G 4/ 179/65	18/ 3/65	0618 L	35	34 S	156	45 E							
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	AMT,	SEA DIR. AMT.	SWELL DIR. AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1 CAST2 CAST3					
4459 12,8 18.9 16 1	11	8	8	4	8	16	2	14	1	1021.0	0	*	*
CAST	DEPTH	TEMP,	SALINITY	SIGMA=T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE				
1	0	20.46	39.701	25.19	5.14	100	0.12	***	***				
1	25	20.48	35.701	25.19	5.14	100	0.10	***	***				
1	50	19.95	35.658	25.30	5.16	100	0.13	***	***				
1	75	18.23	35.555	25.66	4.76	89	0.27	***	***				
1	100	17.40	35.520	25.84	4.44	81	0.48	***	***				
1	150	15.62	35.433	26.18	4.51	60	0.56	***	***				
1	200	14.70	35.395	26.36	4.80	63	0.57	***	***				
1	300	13.56	35.325	26.55	5.01	85	0.61	***	***				
1	500	10.35	34.886	26.82	4.65	73	1.05	***	***				
1	700	8.12	34.606	26.97	4.47	67	1.39	***	***				
1	900	6.26	34.483	27.13	4.22	61	1.64	***	***				
1	1100	5.08	34.465	27.26	4.11	58	1.81	***	***				
1	1300	4.07	34.512	27.41	3.82	52	1.95	***	***				
1	1500	3.26	34.564	27.53	3.62	49	2.07	***	***				

STATION	DATE	TIME	LATITUDE		LONGITUDE				
G 4/ 181/65	18/ 3/65	1217 L	35	58 S	155	42 E			
SONIC AIR TEMP, WIND	ANEM, CLOUD	VIS, SEA	SWELL	ATMOS,	WIRE ANGLES				
DEPTH WET DRY DIR, SP,	HEIGHT TYPE AMT,	DIR, AMT, DIR, AMT,	DIR, AMT,	PRESSURE	CAST1	CAST2			
4261 12.8 18.9 16 2 11	* 0	7 00 0	11 1	1023.0	7	*			
CST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG, P	TOTAL P	NITRATE
1	0	24.33	35.566	25.99	4.85	102	0.13	***	***
1	25	23.87	35.606	24.16	4.87	101	0.10	***	***
1	50	23.78	35.600	24.18	4.91	102	0.14	***	***
1	75	19.87	35.546	25.23	4.72	91	0.15	***	***
1	100	17.70	35.508	25.75	4.13	76	0.61	***	***
1	150	15.64	35.395	26.15	4.21	75	0.65	***	***
1	200	14.34	35.285	26.35	4.24	73	0.66	***	***
1	300	12.82	35.180	26.59	4.55	76	0.68	***	***
1	500	9.82	34.820	26.86	4.58	71	0.94	***	***
1	700	7.82	34.588	27.00	4.44	66	1.23	***	***
1	900	6.11	34.483	27.15	4.27	61	1.45	***	***
1	1100	4.76	34.484	27.32	4.03	56	1.62	***	***
1	1300	3.93	34.517	27.43	3.80	52	1.96	***	***
1	1500	3.21	34.566	27.54	3.62	49	2.02	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 183/65	18/ 3/65	1809 L	35 52 S	154 22 E					
SONIC AIR TEMP.	WIND DIR, SP.	WIND	ANEM. HEIGHT	CLOUD TYPE	AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	WIRG ANGLES
DEPTH WET DRY	14.4 18.3 35 2	35 2	11	* 0	* 0	8 35 2	08 1	1026.0	CAST1 CAST2 CAST3
4535	14.4 18.3 35 2	35 2	11	* 0	* 0	8 35 2	08 1	1026.0	10 * *
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.70	35.723	25.14	5.08	100	0.11	***	***
1	25	20.46	35.724	25.21	5.08	99	0.14	***	***
1	50	20.33	35.719	25.24	5.07	99	0.11	***	***
1	75	20.27	35.724	25.26	4.99	97	0.09	***	***
1	100	20.27	35.723	25.26	5.02	98	0.13	***	***
1	150	18.10	35.551	25.69	4.70	87	0.28	***	***
1	193	16.26	35.453	26.05	4.48	80	0.49	***	***
1	295	13.64	35.293	26.51	4.62	78	0.63	***	***
1	471	10.76	34.955	26.80	4.65	74	0.96	***	***
1	649	8.70	34.678	26.93	4.56	69	1.27	***	***
1	765	7.66	34.534	26.98	4.30	64	1.49	***	***
1	1014	5.52	34.469	27.21	4.10	58	1.77	***	***
1	1206	4.47	34.484	27.35	3.94	54	1.90	***	***
1	1414	3.56	34.536	27.48	3.67	50	2.08	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE									
G 4/185/65	19/3/65	0011 L	35 38 S	153 04 E									
4672	16.7 22.2	10 3	11	0	7	01	1	35	1	1020.0	7	*	*
SONIC AIR TEMP.	WIND DIR, SP.	ANEM. HEIGHT	CLOUD TYPE	AMT.	VIS. DIR, AMT.	SEA DIR, AMT.	SWELL DIR, AMT.	ATMOS. PRESSURE	CAST1	CAST2	CAST3	WIRE ANGLES	
DEPTH WET DRY	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE					
1	0	39.731	24.96	4.96	99	0.15	***	***				***	
1	25	39.729	24.96	4.91	97	0.13	***	***				***	
1	49	39.726	24.97	4.91	97	0.15	***	***				***	
1	74	39.634	25.16	4.76	93	0.21	***	***				***	
1	99	39.609	25.31	4.59	88	0.32	***	***				***	
1	148	39.618	25.45	4.68	89	0.35	***	***				***	
1	197	39.609	25.54	4.66	88	0.38	***	***				***	
1	296	39.960	25.80	4.59	85	0.47	***	***				***	
1	494	35.243	26.55	4.65	78	0.79	***	***				***	
1	692	34.914	26.82	4.65	74	1.08	***	***				***	
1	889	34.591	26.99	4.42	66	1.45	***	***				***	
1	1087	34.474	27.15	4.25	61	1.75	***	***				***	
1	1284	34.473	27.31	3.96	55	1.95	***	***				***	
1	1482	34.522	27.46	3.68	50	2.06	***	***				***	

STATION	DATE	TIME	LATITUDE		LONGITUDE						
G 4/ 187/65	19/ 3/65	0611 L	35	23 S	151	43 E					
4700	17.8 23.3	02 2	8	02 2	36 1	1018.0					
SONIC AIR TEMP,	WIND	ANEM,	CLOUD	SEA	SWELL	ATMOS,	WIRE ANGLES				
DEPTH WET DRY	DIR, SP,	HEIGHT	TYPE	DIR, AMT,	DIR, AMT,	PRESSURE	CAST1 CAST2 CAST3				
4700	17.8 23.3	02 2	11	* 0	8	02 2	36 1	1018.0	0	*	*
CST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE		
1	0	21.62	35.743	24.91	4.98	99	0.15	***	***		
1	25	21.55	35.746	24.93	4.99	99	0.14	***	***		
1	50	21.32	35.748	24.99	4.99	99	0.16	***	***		
1	75	19.41	35.615	25.40	5.11	98	0.19	***	***		
1	100	18.08	35.540	25.68	4.83	90	0.29	***	***		
1	150	15.68	35.392	26.14	4.12	73	0.69	***	***		
1	200	14.30	35.272	26.35	4.18	72	0.73	***	***		
1	300	12.75	35.197	26.61	4.65	77	0.80	***	***		
1	500	9.41	34.768	26.89	4.50	70	1.19	***	***		
1	700	7.14	34.530	27.05	4.29	63	1.57	***	***		
1	900	5.78	34.471	27.18	4.19	60	1.71	***	***		
1	1100	4.56	34.485	27.34	3.93	54	1.96	***	***		
1	1300	3.80	34.525	27.45	3.67	50	1.98	***	***		
1	1500	3.11	34.581	27.56	3.50	47	2.09	***	***		

STATION	DATE	TIME	LATITUDE	LONGITUDE	SONIC AIR TEMP.	WIND DIR.	SP.	WIND	ANEM.	CLOUD	SEA	SWELL	ATMOS.	WIRE ANGLES		
DEPTH	WET	DRY	DIR.	SP.	DIR.	SP.	DIR.	AMT.	DIR.	AMT.	DIR.	AMT.	PRESSURE	CAST1	CAST2	CAST3
4672	16.7	22.8	01	4	11	4	1	4	1	3	05	4	1019.5	0	*	*
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN	% SAT.	INORG. P	TOTAL P	NITRATE						
1	0	21.18	35.743	25.03	4.96	98	98	0.15	***	***						***
1	24	21.11	35.746	25.05	4.95	98	98	0.13	***	***						***
1	48	21.07	35.739	25.06	4.93	97	97	0.13	***	***						***
1	73	20.30	35.661	25.21	4.82	94	94	0.19	***	***						***
1	97	19.50	35.630	25.39	4.68	90	90	0.30	***	***						***
1	145	18.88	35.615	25.54	4.59	87	87	0.34	***	***						***
1	194	17.97	35.567	25.73	4.50	84	84	0.41	***	***						***
1	291	15.61	35.423	26.18	4.42	78	78	0.57	***	***						***
1	484	11.72	35.078	26.72	4.70	77	77	0.85	***	***						***
1	678	8.98	34.700	26.91	4.56	70	70	1.22	***	***						***
1	872	7.09	34.524	27.05	4.31	63	63	1.52	***	***						***
1	1065	5.67	34.469	27.20	4.19	59	59	1.76	***	***						***
1	1259	4.56	34.488	27.34	3.79	52	52	1.90	***	***						***
1	1453	3.80	34.524	27.45	3.73	51	51	2.00	***	***						***

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 4/ 191/65	19/ 3/65	1805 L	37 15 S	153 22 E
SONIC AIR TEMP, WIND ANEM. CLOUD SWELL ATMOS. WIRE ANGLES DEPTH WET DRY DIR. SP. HEIGHT TYPE AMT. VIS. DIR. AMT. SEA DIR. AMT. PRESSURE CAST1 CAST2 CAST3				
6288 16.1 21.1 04 2 11 4 1 8 01 2 36 1 1018.0				0 * *
CAST DEPTH TEMP, SALINITY SIGMA-T OXYGEN OXYGEN % SAT. INORG. P TOTAL P NITRATE				
1 0 20.45 35.713 25.20 5.04 98 0.18 ***				***
1 25 20.28 35.709 25.25 4.99 97 0.15 ***				***
1 50 19.70 35.689 25.38 5.08 98 0.17 ***				***
1 75 19.37 35.672 25.46 5.07 97 0.17 ***				***
1 100 18.72 35.619 25.58 4.88 92 0.26 ***				***
1 149 15.91 35.425 26.11 4.48 80 0.52 ***				***
1 199 14.26 35.309 26.39 4.38 75 0.67 ***				***
1 298 11.70 35.071 26.72 4.58 75 0.83 ***				***
1 491 8.46 34.652 26.95 4.35 66 1.29 ***				***
1 679 6.63 34.503 27.10 4.25 62 1.58 ***				***
1 866 5.42 34.466 27.22 4.07 57 1.70 ***				***
1 1054 4.45 34.481 27.35 3.84 53 1.85 ***				***
1 1241 3.63 34.528 27.47 3.64 49 1.97 ***				***
1 1428 3.08 34.591 27.57 3.61 48 1.99 ***				***



STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 4/ 193/65	20/ 3/65	0013 L	38 12 S	153 19 E					
SONIC AIR TEMP, WIND	ANEM, CLOUD	SEA	SWELL	ATMOS,	WIRE ANGLES				
DEPTH WET DRY DIR, SP,	HEIGHT TYPE AMT,	VIS, DIR, AMT,	DIR, AMT,	PRESSURE	CAST1 CAST2 CAST3				
4462 11,7 18,9 21 2	11 8 8	7 99 2	35 1	1019,0	7 * *				
CST	DEPTH	TEMP,	SALINITY	SIGMA-t	OXYGEN	OXYGEN % SAT,	INORG. P	TOTAL P	NITRATE
1	0	19,16	35,673	25,51	5,10	97	0,14	***	***
1	24	18,98	35,654	25,54	5,15	98	0,12	***	***
1	49	18,66	35,624	25,60	5,15	97	0,13	***	***
1	73	17,27	35,516	25,86	5,05	92	0,22	***	***
1	98	15,41	35,432	26,23	4,98	88	0,37	***	***
1	147	14,43	35,447	26,46	5,04	87	0,50	***	***
1	196	13,77	35,385	26,55	4,94	84	0,57	***	***
1	294	13,51	35,406	26,62	5,27	89	0,52	***	***
1	490	11,64	35,107	26,76	5,18	84	0,72	***	***
1	686	9,11	34,719	26,90	4,94	76	1,10	***	***
1	882	7,40	34,546	27,03	4,32	64	1,51	***	***
1	1078	5,62	34,464	27,20	4,12	58	1,79	***	***
1	1274	4,36	34,476	27,35	3,88	53	1,96	***	***
1	1470	3,70	34,521	27,46	3,64	49	2,05	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE				
G 4/ 195/65	20/ 3/65	0612 L	38	24 S	152	03 E			
SONIC AIR TEMP, WIND	ANEM. CLOUD	VIS. SEA	SWELL	ATMOS.	WIRE ANGLES				
DEPTH WET DRY, SP,	HEIGHT TYPE AMT,	DIR. AMT,	DIR. AMT,	PRESSURE	CAST1 CAST2 CAST3				
4510 15.6 18.3 33 1	11 7 8	7 00 0	22 1	1017.0	0 * *	*			
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.19	35.747	25.03	4.92	97	0.08	***	***
1	25	21.19	35.746	25.03	4.92	97	0.10	***	***
1	50	20.67	35.699	25.13	5.03	99	0.10	***	***
1	75	18.00	35.536	25.70	4.68	87	0.14	***	***
1	100	16.77	35.474	25.95	4.49	81	0.44	***	***
1	150	15.13	35.429	26.29	4.70	82	0.53	***	***
1	200	14.10	35.311	26.42	4.49	77	0.66	***	***
1	300	12.29	35.149	26.67	4.58	76	0.78	***	***
1	500	9.58	34.778	26.87	4.51	70	1.18	***	***
1	700	7.80	34.599	27.01	4.41	66	1.42	***	***
1	900	6.11	34.477	27.15	4.12	59	1.50	***	***
1	1100	4.78	34.473	27.30	3.93	55	1.85	***	***
1	1300	3.84	34.518	27.44	3.69	50	2.00	***	***
1	1500	3.20	34.568	27.54	3.50	47	2.03	***	***

STATION	DATE	TIME	LATITUDE		LONGITUDE				
G 4/ 197/65	20/ 3/65	1207 L	38	36 S	150	51 E			
SONIC AIR TEMP,	WIND	ANEM.	SEA	SWELL	ATMOS.	WIRE ANGLES			
DEPTH WET DRY	DIR, SP,	HEIGHT	DIR, SP,	DIR, AMT,	PRESSURE	CAST1 CAST2 CAST3			
4444 14,4 20,0	27 2	11	6 6	23 1	1016,0	10 * *			
CASST	DEPTH	TEMP,	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT,	INORG, P	TOTAL P	NITRATE
1	0	19,85	35,694	25,35	5,08	98	0,17	***	***
1	25	19,75	35,690	25,37	5,10	98	0,16	***	***
1	50	18,67	35,637	25,61	5,01	94	0,19	***	***
1	75	17,22	35,529	25,89	5,11	93	0,27	***	***
1	100	16,09	35,445	26,09	4,71	84	0,49	***	***
1	150	13,15	35,230	26,56	4,49	75	0,78	***	***
1	200	12,26	35,147	26,67	4,64	76	0,83	***	***
1	300	10,84	34,958	26,79	4,81	77	0,94	***	***
1	500	8,71	34,683	26,94	4,52	69	1,23	***	***
1	700	6,65	34,500	27,09	4,23	61	1,58	***	***
1	900	5,14	34,455	27,25	4,05	57	1,83	***	***
1	1100	4,17	34,496	27,39	3,78	52	2,02	***	***
1	1300	3,45	34,545	27,50	3,58	48	2,13	***	***
1	1500	2,90	34,597	27,59	3,55	47	2,15	***	***

## OCEANOGRAPHICAL CRUISE REPORTS

1. Oceanographical observations in the Indian Ocean in 1959. H.M.A.S. *Diamantina* Cruises Dm1/59 and Dm2/59.
2. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm1/60.
3. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm2/60.
4. Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. *Diamantina* Cruise Dm3/60.
5. Oceanographical observations in the Pacific Ocean in 1960. H.M.A.S. *Gascoyne* Cruises G1/60 and G2/60.
6. Oceanographical observations in the Pacific Ocean in 1960. H.M.A.S. *Gascoyne* Cruise G3/60.
7. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamantina* Cruise Dm1/61.
8. Oceanographical observations in the Pacific Ocean in 1961. H.M.A.S. *Gascoyne* Cruise G1/61.
9. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamantina* Cruise Dm2/61.
10. Oceanographical observations in the Indian and Pacific Oceans in 1961. H.M.A.S. *Gascoyne* Cruise G2/61.
11. Oceanographical observations in the Indian Ocean in 1961. H.M.A.S. *Diamantina* Cruise Dm3/61.
12. Oceanographical observations in the Pacific Ocean in 1961. H.M.A.S. *Gascoyne* Cruise G3/61.
13. Oceanographical observations in the Pacific Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G1/62.
14. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm1/62.
15. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm2/62.
16. Oceanographical observations in the Pacific and Indian Oceans in 1962. H.M.A.S. *Gascoyne* Cruises G2/62 and G3/62.
17. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G4/62.
18. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm3/62.
19. Oceanographical observations in the Pacific Ocean in 1962. H.M.A.S. *Gascoyne* Cruise G5/62.
20. Oceanographical observations in the Indian Ocean in 1962. H.M.A.S. *Diamantina* Cruise Dm4/62.
21. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G1/63.
22. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G2/63.
23. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm1/63.
24. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm2/63.
25. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm3/63.
26. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G3/63.
29. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G4/63.
31. Oceanographical observations in the Pacific Ocean in 1963. H.M.A.S. *Gascoyne* Cruise G5/63.
34. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G2/64.

## OCEANOGRAPHICAL CRUISE REPORTS

(Continued)

32. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G1/64.
35. Oceanographical observations in the Indian and Pacific Oceans in 1964. H.M.A.S. *Gascoyne* Cruise G3/64.
36. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm2/64.
39. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G4/64.
40. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm5/64.
41. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G5/64.
42. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G6/64.
43. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G2/65.
46. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G5/65.