

OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1964
H.M.A.S. *GASCOYNE*
Cruise G 2/64

OCEANOGRAPHICAL CRUISE REPORT
NO. 34

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1967

OCEANOGRAPHICAL CRUISE REPORT

No. 34

OCEANOGRAPHICAL OBSERVATIONS IN THE INDIAN OCEAN IN 1964

H.M.A.S. GASCOYNE

Cruise G2/64

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

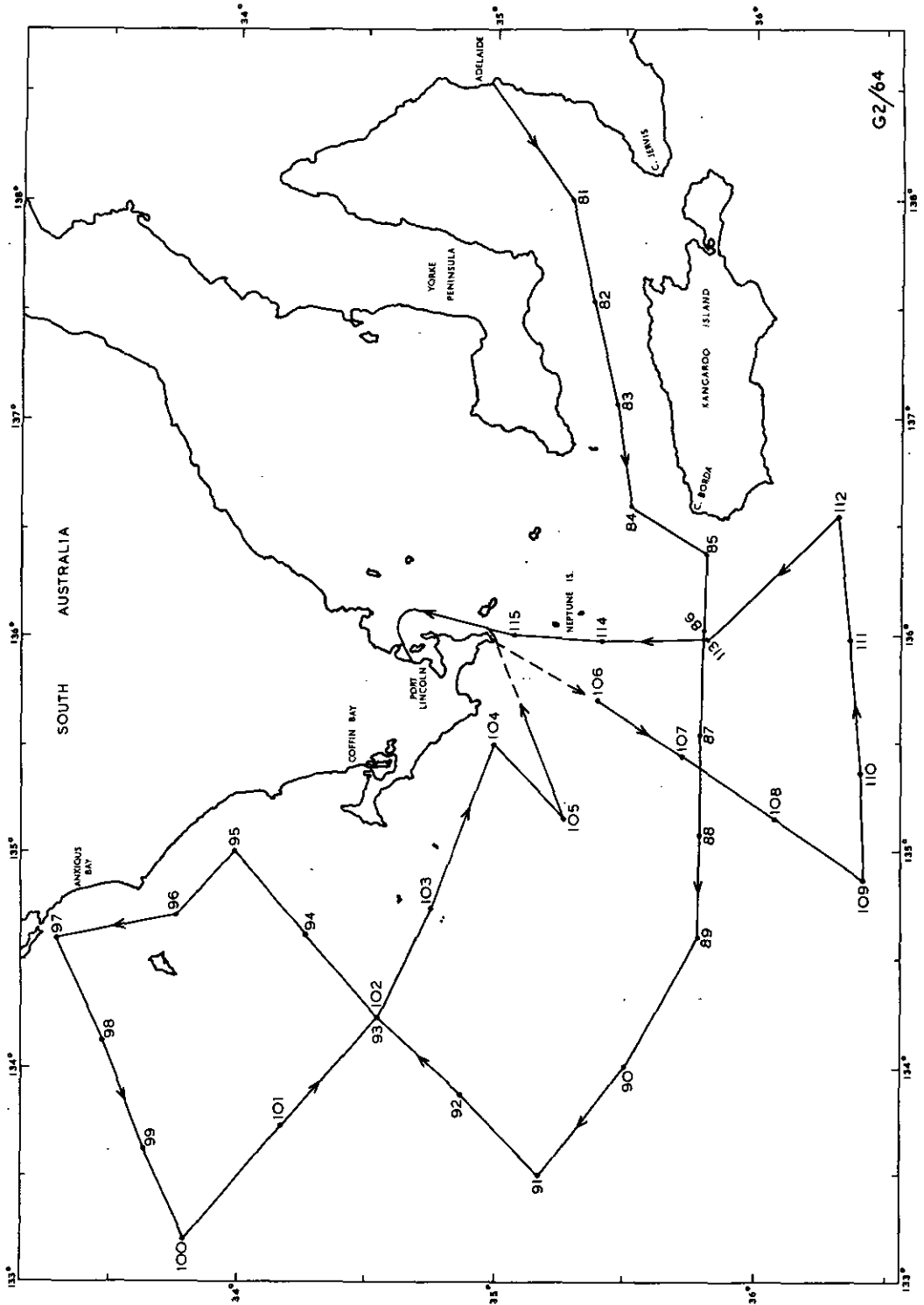
AUSTRALIA

MELBOURNE, 1967

CONTENTS

	Page
I. INTRODUCTION	3
Objective	3
Itinerary	3
Personnel	3
II. WORK ACCOMPLISHED	3
III. METHODS OF COLLECTION AND ANALYSIS OF SAMPLES	4
1. Physics	4
2. Chemistry	5
REFERENCES	
IV. DATA SHEETS	6
Part 1 Hydrology - Subsurface samples	7
Part 2 Hydrology - Surface samples	45
V. FIGURES	
1 Track Chart	facing p. 3

When citing this report, abbreviate as follows:
CSIRO AUST. Oceanogr. Cruise Rep. No. 34



OCEANOGRAPHICAL CRUISE REPORT

No. 34

Oceanographical Observations in the Indian Ocean in 1964

H.M.A.S. Gascoyne

Cruise G2/64

February 21 - 26, 1964

I. INTRODUCTION

This report records the data for the second cruise in 1964 of H.M.A.S. Gascoyne, Royal Australian Navy oceanographical frigate, in the Indian Ocean.

Objective

To examine the chemical and physical environment of the fishing grounds during the South Australian tuna season.

Itinerary

The cruise began at Adelaide on February 21, occupied a series of stations off Yorke and Eyre Peninsulas and in the adjacent waters of the Great Australian Bight, and ended at Port Lincoln on February 26 (Fig. 1).

Scientific Personnel

D. Vaux (Cruise Leader)
R. Bradley
L. Olsen

Salinity and oxygen determinations were done in the ship's laboratory by R. Bradley. The data were processed under the direction of W. Hedge with computer programmes designed by A.D. Crooks. The track chart was prepared by R. Breach. Accuracy of cruise data is the responsibility of the cruise leader, D. Vaux.

II. WORK ACCOMPLISHED

Thirty-five stations were worked (G2/81/64 - G2/115/64). Surface and subsurface hydrology samples were collected at each station.

TABLE 1
WORK DONE AT EACH STATION

Stn No.	Hydrology Surface to Depth (m)	Stn No.	Hydrology Surface to Depth (m)
81	30	99	50
82	25	100	90
83	30	101	75
84	75	102	85
85	100	103	85
86	125	104	70
87	200	105	100
88	1500	106	100
89	1500	107	225
90	1500	108	1500
91	1100	109	1500
92	100	110	1500
93	85	111	300
94	70	112	95
95	55	113	120
96	40	114	85
97	45	115	75
98	50		

III. METHOD OF COLLECTION AND ANALYSIS OF SAMPLES

1. Physics

Temperature.- Water temperatures were taken with deep-sea reversing thermometers. Two protected thermometers were used at each depth, together with an unprotected thermometer on all but the upper six Nansen water bottles. Differences between corrected protected thermometer readings were generally less than 0.04 deg C, and the mean values listed in this report are considered accurate to ± 0.03 deg C.

Thermometric Depth.- Depth calculations were made by the second method described by La Fond (1951), plotting thermometric depth against the difference between thermometric and wire depths. Depths are considered accurate to ± 5 m at depths less than 200 m, ± 10 m at depths between about 200 and 400 m, and to within 2% at depths from 400 to 1500 m.

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

2. Chemistry

Salinity.- A chlorinity-temperature meter of the conductivity type (Hamon 1956) was used on board to estimate chlorinity, which was subsequently converted to salinity by the relation

$$\text{Salinity} = 0.03 + 1.805 \times \text{Chlorinity.}$$

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

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

REFERENCES

- Jacobsen, J.P., Robinson, R.J., and Thompson, T.G. (1950).- A review of the determinations of dissolved oxygen in seawater by the Winkler method. *Publs scient. Ass. Oceanogr. phys.* 11
- Hamon, B.V. (1956).- A portable temperature-chlorinity bridge for estuarine investigations and seawater analysis. *J. scient. Instrum.* 33: 329-33
- La Fond, E.C. (1951).- Processing oceanographic data. U.S. Navy Hydrogr. Off. Publ. No. 614
- Richards, F.A., and Corwin, N. (1956).- Some oceanographic applications of the solubility of oxygen in seawater. *Limnol. Oceanogr.* 1: 263-7

Thompson, T.G., and Robinson, R.J. (1939).- Notes on the determination of dissolved oxygen in seawater.

J. mar. Res. 2: 1-8

U.S. Navy Hydrographic Office (1955).- Instruction manual for oceanographic observations. Publ. No. 607

IV. DATA SHEETS

The data were processed in a C.D.C. 3600 Computer. Explanations of the headings for each section are given at the beginning of the relevant part.

DATA

PART 1

HYDROLOGY

SUBSURFACE SAMPLES

EXPLANATION OF HEADINGS

<u>Parts 1 and 2</u>	<u>Hydrology</u>
STATION	Gives the station identification, for example, G2/82/64 signifies the 82nd station worked by <u>Gascoyne</u> in 1964, on her 2nd 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. Zone time throughout the cruise was Central Australian Standard Time, G.M.T. - $9\frac{1}{2}$ hours, Code J.
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. 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. Hydrogr. Office (1955)
VIS.	Visibility is coded using Table 4 in U.S. Hydrogr. Office (1955)
SEA DIR. AMT.	Sea direction and amount are coded using Tables 5 and 8 in U.S. Hydrogr. Office (1955)
SWELL DIR. AMT.	Sea swell direction and amount are coded using Tables 6 and 8 in U.S. Hydrogr. Office (1955)

ATMOS. PRESSURE	Atmospheric pressure given in millibars
WIRE ANGLES CAST 1 CAST 2 CAST 3	Wire angles are measured at the surface and expressed in degrees for each cast. An asterisk indicates that the wire angle was not measured
CAST	The cast number corresponding to the wire angle is shown
DEPTH	Actual 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
***	Indicates no data available

STATION G 2/ 81/64 DATE 21/ 2/64 TIME 2029 J LATITUDE 35 18 S LONGITUDE 138 00 E

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

37 18.3 22.8 18 2 11 6 7 8 18 2 00 0 1013.5 0 * *

CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.04	36.800	26.14	5.17	105	***	***	***
1	10	20.05	36.800	26.14	5.13	104	***	***	***
1	20	19.89	36.800	26.18	5.16	104	***	***	***
1	30	19.88	36.800	26.18	5.11	103	***	***	***

STATION G 2/ 82/64 DATE 21/ 2/64 TIME 2243 J LATITUDE 35 23 S LONGITUDE 137 32 E

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

35 18.3 22.2 18 2 11 6 8 8 18 2 00 0 1013.0 0 * *

CAST DEPTH TEMP. SALINITY SIGMA-T OXYGEN OXYGEN % SAT. INORG. P TOTAL P NITRATE

1 0 19.78 36.510 25.99 5.21 105 *** ***
 1 10 19.69 36.550 26.04 5.24 105 *** ***
 1 25 19.63 36.550 26.06 5.23 105 *** ***

STATION G 2/ 83/64 DATE 22/ 2/64 TIME 0041 J LATITUDE 35 28 S LONGITUDE 137 04 E

SONIC AIR TEMP. WIND ANEM. CLOUD SWELL ATMOS. WIRE ANGLES
 DEPTH WET DRY DIR. SP. HEIGHT TYPE AMT. VIS. SEA DIR. AMT. PRESSURE CAST1 CAST2 CAST3
 40 18.3 21.1 21 3 11 0 8 7 20 2 00 0 1012.5 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.94	36.470	25.92	5.22	105	***	***	***
1	10	19.87	36.470	25.93	5.22	105	***	***	***
1	20	19.65	36.470	25.99	5.17	104	***	***	***
1	30	19.66	36.470	25.99	5.16	104	***	***	***

STATION DATE TIME LATITUDE LONGITUDE

G 2/ 84/64 22/ 2/64 0243 J 35 33 S 136 36 F

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

82 15.6 17.2 20 6 11 0 8 20 3 21 1 1015.0 5 * *

CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.96	35.880	25.97	5.39	104	***	***	***
1	10	17.96	35.860	25.96	5.55	107	***	***	***
1	20	17.34	35.860	26.11	5.60	107	***	***	***
1	30	15.97	35.700	26.31	5.69	106	***	***	***
1	40	14.56	35.570	26.52	5.16	93	***	***	***
1	50	13.70	35.430	26.60	5.19	92	***	***	***
1	75	13.52	35.390	26.61	5.22	92	***	***	***

STATION G 2/ 85/64 DATE 22/ 2/64 TIME 0506 J LATITUDE 35 50 S LONGITUDE 136 22 E

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

117 13.3 16.1 20 6 11 6 6 7 20 3 20 1 1017.0 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.23	35.880	25.91	5.49	107	***	***	***
1	10	18.20	35.880	25.91	5.47	106	***	***	***
1	20	18.20	35.880	25.91	5.46	106	***	***	***
1	30	18.21	35.880	25.91	5.44	106	***	***	***
1	40	18.10	35.930	25.98	5.44	106	***	***	***
1	50	17.82	35.900	26.02	5.46	105	***	***	***
1	75	13.81	35.430	26.58	5.31	94	***	***	***
1	100	13.24	35.340	26.63	5.30	93	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE										
G 2/	86/64	0700 J	35 49 S	136 01 E										
132	14.4 16.7	20 7	11 8 2 8 20 3 4	2 * *										
SONIC AIR TEMP.	WIND DIR.	SP. DIR.	AMT.	CLOUD TYPE	AMT.	VIS.	SEA DIR.	AMT.	SWELL DIR.	AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
DEPTH	WET	DRY	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TDRG. P	TOTAL P	NITRATE				
1	0	17.62	35.710	25.93	5.55	107	***	***	***	***				
1	10	17.64	35.710	25.92	5.53	106	***	***	***	***				
1	20	17.64	35.710	25.92	5.53	106	***	***	***	***				
1	30	17.64	35.710	25.92	5.52	106	***	***	***	***				
1	50	17.60	35.730	25.95	5.53	106	***	***	***	***				
1	75	13.69	35.430	26.60	5.52	98	***	***	***	***				
1	100	12.66	35.260	26.68	5.55	96	***	***	***	***				
1	125	12.62	35.260	26.69	5.63	97	***	***	***	***				

STATION G 2/ 87/64 DATE 22/ 2/64 TIME 0927 J LATITUDE 35 48 S LONGITUDE 135 32 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

375 11.9 16.1 20 5 11 8 3 8 20 3 19 4 1021.8 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.86	35.660	25.83	5.47	106	***	***	***
1	25	17.60	***	***	5.57	***	***	***	***
1	50	13.46	35.260	26.52	5.57	98	***	***	***
1	75	13.12	35.250	26.58	5.63	98	***	***	***
1	100	13.08	35.250	26.59	5.59	97	***	***	***
1	150	12.97	35.250	26.61	5.62	98	***	***	***
1	200	12.85	35.250	26.63	5.40	94	***	***	***

STATION G 2/ 88/64 DATE 22/ 2/64 TIME 1148 J LATITUDE 35 48 S LONGITUDE 135 04 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

2743 13.3 16.9 20 4 11 8 6 8 20 3 25 4 1023.0 10 10 *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INDRG. P	TOTAL P	NITRATE
2	0	18.10	35.660	25.77	5.52	107	***	***	***
2	25	18.05	35.660	25.78	5.52	107	***	***	***
2	50	17.98	35.660	25.80	5.47	106	***	***	***
2	75	15.61	35.530	26.26	5.90	109	***	***	***
2	100	13.74	35.350	26.53	5.78	102	***	***	***
2	150	13.09	35.320	26.64	5.72	100	***	***	***
2	200	12.64	35.260	26.68	5.72	99	***	***	***
2	300	11.11	35.010	26.78	5.75	96	***	***	***
1	466	8.95	34.650	26.87	5.66	90	***	***	***
1	664	7.69	34.510	26.95	5.03	77	***	***	***
1	864	5.27	34.400	27.19	4.48	65	***	***	***
1	1064	3.60	34.400	27.37	4.20	58	***	***	***
1	1264	2.95	34.510	27.52	3.93	53	***	***	***
1	1464	2.65	34.560	27.59	3.84	52	***	***	***

STATION G 2 / 89/64 DATE 22 / 2/64 TIME 1439 J LONGITUDE 134 36 E
 LATITUDE 35 47 S

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

2743 12.8 16.1 21 5 11 8 4 7 20 3 20 4 1023.0 5 0 *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	17.93	35.620	25.78	5.37	104	***	***	***
2	25	17.92	35.620	25.78	5.41	104	***	***	***
2	50	17.39	35.570	25.88	5.48	105	***	***	***
2	75	14.93	35.430	26.34	5.95	108	***	***	***
2	100	13.22	35.260	26.57	5.61	98	***	***	***
2	150	12.83	35.260	26.65	5.44	94	***	***	***
2	200	12.65	35.250	26.68	5.50	95	***	***	***
2	300	11.11	34.990	26.77	5.57	93	***	***	***
1	489	8.89	34.630	26.87	5.51	87	***	***	***
1	680	7.55	34.490	26.96	4.87	74	***	***	***
1	876	5.18	34.380	27.18	4.39	63	***	***	***
1	1072	3.65	34.400	27.37	4.12	57	***	***	***
1	1270	2.95	34.490	27.50	3.85	52	***	***	***
1	1469	2.66	34.560	27.59	3.81	51	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE					
G 2/ 90/64	22/ 2/64	1858 J	35 30 S	134 00 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	CAS1 CAS2? CAS3	
1829 13.3 17.2	18 5	11	6 6	8	18 3	16 4	1024.0	10 5 *	
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	18.36	35.730	25.76	5.32	104	***	***	***
2	25	18.35	35.710	25.75	5.31	103	***	***	***
2	50	17.21	35.500	25.87	5.45	104	***	***	***
2	75	14.37	35.370	26.41	5.97	107	***	***	***
2	100	13.28	35.300	26.59	5.55	97	***	***	***
2	150	12.79	35.260	26.66	5.53	96	***	***	***
2	200	12.27	35.190	26.70	5.51	94	***	***	***
2	300	10.90	34.960	26.78	5.47	91	***	***	***
1	500	8.66	34.610	26.89	5.47	86	***	***	***
1	700	6.99	34.470	27.02	4.61	70	***	***	***
1	900	4.66	34.400	27.26	4.37	62	***	***	***
1	1100	3.42	34.430	27.41	4.04	56	***	***	***
1	1300	2.89	34.520	27.53	3.76	51	***	***	***
1	1500	2.60	34.600	27.62	3.73	50	***	***	***

STATION G 2/ 91/64 DATE 22/ 2/64 TIME 2240 J LATITUDE 35 10 S LONGITUDE 133 30 E

1134 13.3 15.6 18 3 11 0 6 7 19 3 20 1 1025.5 5 0 *

SONIC AIR TEMP.	WIND DIR.	SP. DIR.	ANEM. HEIGHT	CLOUD TYPE	SEA DIR.	VIS. DIR.	SWELL DIR.	AMT. DIR.	ATMOS. PRESSURE	WIRP ANGLES						
DEPTH WET DRY	TEMP.	DIR.	SP.	AMT.	DIR.	DIR.	DIR.	DIR.	CAST1	CAST2						
1134	13.3	15.6	18	3	11	0	6	7	19	3	20	1	1025.5	5	0	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INDRG.	P	TOTAL	P	NITRATE					
2	0	18.90	35.810	25.68	5.21	103	***	***	***	***	***					
2	25	18.90	35.810	25.68	5.19	102	***	***	***	***	***					
2	50	18.87	35.810	25.69	5.31	105	***	***	***	***	***					
2	75	15.15	35.430	26.29	5.84	107	***	***	***	***	***					
2	100	14.84	35.370	26.31	5.78	105	***	***	***	***	***					
2	150	13.10	35.260	26.59	5.47	95	***	***	***	***	***					
1	200	12.67	35.210	26.64	5.51	95	***	***	***	***	***					
1	300	10.97	34.990	26.79	5.53	92	***	***	***	***	***					
1	500	8.76	34.610	26.87	5.55	87	***	***	***	***	***					
1	700	7.38	34.490	26.98	4.74	72	***	***	***	***	***					
1	900	4.76	34.400	27.25	4.35	62	***	***	***	***	***					
1	1100	3.37	34.430	27.42	4.04	55	***	***	***	***	***					

STATION G 2/ 92/64 DATE 23/ 2/64 TIME 0137 J LATITUDE 34 52 S LONGITUDE 133 53 F

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

115 12.8 16.1 18 2 11 0 8 7 18 2 20 1 1024.0 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.80	35.820	25.72	***	***	***	***	***
1	10	18.80	35.820	25.72	5.21	102	***	***	***
1	20	18.81	35.820	25.71	5.24	103	***	***	***
1	30	18.81	35.820	25.71	5.24	103	***	***	***
1	50	18.79	35.820	25.72	5.27	104	***	***	***
1	75	16.43	35.660	26.17	5.15	97	***	***	***
1	100	15.62	***	***	***	***	***	***	***

STATION G 2/ 93/64 DATE 23/ 2/64 TIME 0403 LATITUDE 34 34 S LONGITUDE 134 14 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

91 12.8 16.1 17 3 11 0 8 7 17 2 20 1 1023.0 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TDRG. P	TOTAL P	NITRATE
1	0	18.64	35.810	25.75	5.28	103	***	***	***
1	10	18.62	35.810	25.76	5.33	104	***	***	***
1	20	18.63	35.810	25.75	5.30	104	***	***	***
1	30	18.64	35.810	25.75	5.30	104	***	***	***
1	50	18.58	35.810	25.77	5.30	104	***	***	***
1	75	16.05	35.730	26.31	5.15	96	***	***	***
1	85	15.67	35.730	26.40	4.77	88	***	***	***

STATION DATE TIME LATITUDE LONGITUDE

G 2/ 94/64 23/ 2/64 0628 J 34 16 S 134 37 E

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

79 13.3 16.7 18 3 11 0 7 8 18 2 22 1 1023.5 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TNORG. P	TOTAL P	NITRATE
1	0	17.49	35.860	26.07	5.44	104	***	***	***
1	10	17.48	35.860	26.08	5.37	103	***	***	***
1	20	17.48	35.860	26.08	5.41	104	***	***	***
1	30	17.46	35.860	26.08	5.43	104	***	***	***
1	50	16.18	35.750	26.30	5.38	100	***	***	***
1	70	15.55	35.620	26.35	5.21	96	***	***	***

STATION 0 2/ 95/64 DATE 23/ 2/64 TIME 0853 J LATITUDE 34 00 S LONGITUDE 135 00 F

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

68 13.3 16.7 18 3 11 0 8 7 18 2 20 1 1024.0 6 * *

CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TNORG. P	TOTAL P	NITRATE
1	0	17.87	35.880	25.99	5.41	105	***	***	***
1	10	17.78	35.880	26.02	5.45	105	***	***	***
1	20	17.65	35.840	26.02	5.39	104	***	***	***
1	30	17.49	35.840	26.06	5.43	104	***	***	***
1	55	15.39	35.610	26.37	5.19	95	***	***	***

STATION 0 2/ 96/64 DATE 23/ 2/64 TIME 1105 J LATITUDE 33 40 S LONGITUDE 134 42 E

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

49 13.9 18.3 18 2 11 6 8 7 18 2 18 4 1024.5 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TOTAL P	NITRATE
1	0	16.05	35.820	26.38	5.42	101	***	***
1	10	16.03	35.810	26.38	5.41	101	***	***
1	20	15.99	35.810	26.39	5.38	100	***	***
1	30	15.67	35.790	26.45	5.11	94	***	***
1	40	15.48	35.790	26.49	4.83	89	***	***

STATION G 2/ 97/64 DATE 23/ 2/64 TIME 1316 J LATITUDE 33 18 S LONGITUDE 134 36 E

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

55 12.2 18.9 19 1 11 6 8 7 19 2 20 1 1024.0 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TNORG. P	TOTAL P	NITRATE
1	0	17.16	35.750	26.07	5.41	103	***	***	***
1	10	17.07	35.750	26.09	5.34	101	***	***	***
1	20	17.05	35.750	26.10	5.41	103	***	***	***
1	30	16.27	35.680	26.23	5.17	97	***	***	***
1	45	15.68	35.640	26.33	5.05	93	***	***	***

STATION G 2/ 98/64 DATE 23/ 2/64 TIME 1552 J LATITUDE 33 28 S LONGITUDE 134 08 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

68 15.0 16.1 16. 3 11 0 6 8 16 3 20 4 1023.5 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.90	35.840	25.96	5.36	104	***	***	***
1	10	17.89	35.840	25.96	5.36	104	***	***	***
1	20	17.80	35.840	25.98	5.40	104	***	***	***
1	30	16.67	35.730	26.17	5.40	102	***	***	***
1	40	16.29	35.710	26.24	5.22	98	***	***	***
1	50	15.76	35.640	26.31	5.22	97	***	***	***

STATION G 2/ 99/64 DATE 23/ 2/64 TIME 1823 J LATTITUDE 33 38 S LONGITUDE 133 40 F

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

62 15.0 15.6 16 3 11 9 8 7 16 3 20 4 1023.0 0 * *

CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.47	35.880	25.84	5.35	105	***	***	***
1	10	18.49	35.880	25.84	5.33	104	***	***	***
1	20	18.49	35.880	25.84	5.35	105	***	***	***
1	30	18.49	35.860	25.83	5.32	104	***	***	***
1	40	18.44	35.860	25.84	5.32	104	***	***	***
1	50	16.68	35.750	26.18	5.35	101	***	***	***

STATION G 2/ 100/64 DATE 23/ 2/64 TIME 2054 J LATITUDE 33 48 S LONGITUDE 133 12 E

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

99	13.3	16.7	17	3	11	6	7	7	17	2	21	1	1024.0	0	*	*
CAST	DEPTH	TEMP.	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INDRG. P	TOTAL P	NITRATE						
1	0	18.90	35.900	25.75	5.30	104	***	***	***	***						
1	25	18.90	35.900	25.75	5.29	104	***	***	***	***						
1	50	18.87	35.880	25.74	5.31	105	***	***	***	***						
1	75	16.13	35.770	26.33	4.92	92	***	***	***	***						
1	90	16.07	35.860	26.41	4.61	86	***	***	***	***						

STATION G 2/ 101/64 DATE 24/ 2/64 TIME 0005 J LATITUDE 34 11 S LONGITUDE 133 44 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

91 12.8 16.7 17 3 11 6 7 7 17 2 21 1 1023.3 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.66	35.880	25.80	5.32	104	***	***	***
1	25	18.66	35.880	25.80	5.32	104	***	***	***
1	50	17.95	35.880	25.98	5.29	102	***	***	***
1	75	15.83	35.710	26.35	4.94	92	***	***	***

STATION 9 2/ 102/64 DATE 24/ 2/64 TIME 0315 J 34 33 S LONGITUDE 134 14 E

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

95 12.8 16.1 17 3 11 6 8 7 18 3 18 1 1022.0 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.66	35.880	25.80	5.29	103	***	***	***
1	10	18.65	35.860	25.79	5.29	104	***	***	***
1	20	18.65	35.860	25.78	5.29	104	***	***	***
1	30	18.66	35.860	25.78	5.29	104	***	***	***
1	50	18.60	35.840	25.78	5.29	104	***	***	***
1	85	15.88	35.700	26.33	4.86	90	***	***	***

STATION G 2/ 103/64 DATE 24/ 2/64 TIME 0605 J LATITUDE 34 45 S LONGITUDE 134 44 F

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

95 12.2 16.7 16 2 11 6 4 8 16 2 17 1 1021.2 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	TNORG. P	TOTAL P	NITRATE
1	0	17.89	35.930	26.03	5.41	105	***	***	***
1	10	17.83	35.930	26.04	5.38	104	***	***	***
1	20	17.85	35.930	26.04	5.41	105	***	***	***
1	30	17.84	35.930	26.04	5.41	104	***	***	***
1	50	16.67	35.700	26.15	5.58	105	***	***	***
1	85	15.01	35.570	26.43	5.11	93	***	***	***

STATION G 2/104/64 DATE 24/2/64 TIME 0953 J LATITUDE 35 00 S LONGITUDE 135 30 F

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

86	13.3	17.8	21	2	11	6	6	8	16	2	17	1	1022.0	5	*	*
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE							
1	0	17.55	36.020	26.18	5.46	105	***	***	***							
1	10	17.49	36.000	26.18	5.48	105	***	***	***							
1	20	17.49	35.990	26.17	5.45	105	***	***	***							
1	30	17.47	35.990	26.18	5.46	105	***	***	***							
1	40	15.88	35.660	26.30	5.67	105	***	***	***							
1	50	14.33	35.480	26.51	5.19	93	***	***	***							
1	60	14.30	35.480	26.51	5.19	93	***	***	***							
1	70	14.28	35.480	26.52	5.16	92	***	***	***							

STATION G 2/ 105/64 DATE 24/ 2/64 TIME 1210 J LATITUDE 35 17 S LONGITUDE 135 09 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

110 16.1 18.9 19 3 11 8 3 8 16 2 18 1 1022.0 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	18.41	35.820	25.82	5.33	104	***	***	***
1	25	18.29	35.820	25.85	5.32	104	***	***	***
1	50	18.27	35.820	25.85	5.33	104	***	***	***
1	75	16.19	35.620	26.20	5.58	104	***	***	***
1	100	14.16	35.460	26.53	5.32	95	***	***	***

STATION G 2 / 106/64 DATE 25 / 2/64 TIME 0500 J LATITUDE 35 24 S LONGITUDE 135 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. PRESSURE CAST1 CAST2 CAST3

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
113	12.8 15.6 19 3	11	* 8	8	19 2	20 1	1021.0	0	*
1	0	17.77	35.990	26.10	5.41	104	***	***	***
1	25	17.79	35.990	26.10	5.34	103	***	***	***
1	50	17.78	35.990	26.10	5.35	103	***	***	***
1	75	14.14	35.430	26.51	5.49	98	***	***	***
1	100	13.83	35.390	26.54	5.11	91	***	***	***

STATION G 2/ 107/64 DATE 25/ 2/64 TIME 0720 J LATITUDE 35 44 S LONGITUDE 135 26 E

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

247 12.8 15.8 18 2 11 6 8 8 18 2 19 4 1022.0 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.95	35.680	25.82	5.40	104	***	***	***
1	25	17.94	35.680	25.83	5.40	104	***	***	***
1	50	17.89	35.680	25.84	5.37	104	***	***	***
1	75	15.06	35.500	26.36	5.82	106	***	***	***
1	100	13.32	35.300	26.58	5.59	98	***	***	***
1	150	12.92	35.280	26.64	5.49	95	***	***	***
1	200	12.63	35.250	26.68	5.49	95	***	***	***
1	225	12.59	35.250	26.69	5.49	95	***	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE	WIRE ANGLES											
0 27 108/64	29/ 2/64	1052 J	36 05 S	135 09 E	CAST1	CAST2										
SONIC AIR TEMP.	WIND DIR.	SP.	ANEM. HEIGHT	CLOUD TYPE	AMT.	SEA DIR.	AMT.	SWELL DIR.	AMT.	ATMOS. PRESSURE	CAST1	CAST2	CAST3			
3292	14.4	17.8	12	3	11	6	7	8	12	2	20	1	1023.0	0	0	*
CST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE							
2	0	17.25	35.530	25.88	5.46	104	***	***	***							
2	25	17.24	35.530	25.88	5.47	104	***	***	***							
2	50	16.65	35.520	26.02	5.62	106	***	***	***							
2	75	14.33	35.480	26.51	5.49	98	***	***	***							
2	100	13.41	35.350	26.60	5.51	97	***	***	***							
2	150	12.88	35.320	26.68	5.49	95	***	***	***							
2	200	12.49	35.280	26.73	5.56	96	***	***	***							
2	300	10.94	35.010	26.81	5.63	94	***	***	***							
1	500	8.74	34.670	26.92	5.59	88	***	***	***							
1	700	7.33	34.520	27.02	4.75	72	***	***	***							
1	900	5.08	34.430	27.24	4.38	63	***	***	***							
1	1100	3.58	34.470	27.43	4.11	57	***	***	***							
1	1300	2.96	34.520	27.53	3.81	52	***	***	***							
1	1500	2.64	34.610	27.63	3.78	51	***	***	***							

STATION G 2/ 109/64 DATE 25/ 2/64 TIME 1244 J LATITUDE 36 25 S LONGITUDE 134 52 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

4499 13.3 16.1 12 3 11 8 7 8 12 2 18 1 1023.0 5 0 *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	17.17	35.590	25.94	5.49	104	***	***	***
2	25	17.01	35.550	25.95	5.49	104	***	***	***
2	50	16.51	35.480	26.02	5.56	104	***	***	***
2	75	13.87	35.410	26.55	5.89	105	***	***	***
2	100	12.98	35.320	26.66	5.56	97	***	***	***
2	150	12.56	35.300	26.73	5.56	96	***	***	***
2	200	12.00	35.190	26.76	5.61	96	***	***	***
2	300	10.66	34.960	26.82	5.57	92	***	***	***
1	500	8.75	34.650	26.90	5.58	88	***	***	***
1	700	7.56	34.520	26.98	4.88	75	***	***	***
1	900	5.30	34.450	27.23	4.40	64	***	***	***
1	1100	3.70	34.430	27.39	4.19	58	***	***	***
1	1300	2.98	34.540	27.54	3.81	52	***	***	***
1	1500	2.67	34.610	27.63	3.78	51	***	***	***

STATION G 2/110/64 DATE 25/2/64 TIME 1603 J LATITUDE 36 24 S LONGITUDE 135 22 E

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

3658	13.3	15.6	13	2	11	6	8	8	14	2	18	1	1021.5	5	0	**
CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN	% SAT.	INDRG.	P	TOTAL	P	NITRATE				
2	0	16.91	35.500	25.94	5.57	105		***	***	***	***	***				
2	25	16.68	35.460	25.96	5.59	105		***	***	***	***	***				
2	50	16.66	35.500	26.00	5.57	105		***	***	***	***	***				
2	75	14.85	35.350	26.29	5.84	106		***	***	***	***	***				
2	100	13.25	35.320	26.61	5.68	99		***	***	***	***	***				
2	150	12.65	35.280	26.70	5.53	96		***	***	***	***	***				
2	200	12.30	35.230	26.73	5.56	95		***	***	***	***	***				
2	300	11.04	35.030	26.81	5.59	93		***	***	***	***	***				
1	500	8.88	34.690	26.91	5.57	88		***	***	***	***	***				
1	700	7.50	34.540	27.01	4.84	74		***	***	***	***	***				
1	900	4.92	34.430	27.26	4.38	63		***	***	***	***	***				
1	1100	3.57	34.470	27.43	4.13	57		***	***	***	***	***				
1	1300	2.95	34.540	27.54	3.84	52		***	***	***	***	***				
1	1500	2.63	34.630	27.64	3.75	51		***	***	***	***	***				

STATION G 2/ 111/64 DATE 25/ 2/64 TIME 1920 J LATITUDE 36 23 S LONGITUDE 135 58 E

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

357 13.3 15.6 12 2 11 6 8 8 13 2 16 1 1021.5 10 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.72	35.700	25.90	5.40	104	***	***	***
1	25	17.65	35.710	25.92	5.39	104	***	***	***
1	50	17.24	35.700	26.01	5.43	103	***	***	***
1	75	14.57	35.480	26.45	5.78	104	***	***	***
1	100	13.45	35.370	26.60	5.67	100	***	***	***
1	150	12.88	35.320	26.68	5.52	96	***	***	***
1	200	12.41	35.250	26.72	5.58	96	***	***	***
1	300	11.55	35.120	26.79	5.62	95	***	***	***

STATION G 2/ 112/64 DATE 25/ 2/64 TIME 2144 J LATITUDE 36 21 S LONGITUDE 136 32 F

SONIC AIR TEMP. WIND DIR. SP. WIND DIR. SP. VIS. SEA DIR. AMT. SWELL DIR. AMT. ATMOS. PRESSURE WIRE ANGLES
 DEPTH WET DRY 13.6 13 2 11 7 8 8 8 8 13 2 20 1 1021.5 5 * * *
 110 13.3 15.6 13 2 11 7 8 8 8 13 2 20 1 1021.5 5 * * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.65	35.840	26.02	5.46	105	***	***	***
1	25	17.56	35.810	26.02	5.51	106	***	***	***
1	50	15.22	35.530	26.35	5.80	106	***	***	***
1	75	13.48	35.390	26.61	5.65	99	***	***	***
1	95	12.88	35.320	26.68	5.43	94	***	***	***

STATION G 2/ 113/64 DATE 26/ 2/64 TIME 0105 J LATITUDE 35 50 S LONGITUDE 135 59 F

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

132 13.3 16.1 13 2 11 0 8 8 13 2 18 1 1020.5 5 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.57	35.750	25.97	5.49	105	***	***	***
1	25	17.58	35.750	25.97	5.46	105	***	***	***
1	50	17.57	35.770	25.98	5.49	105	***	***	***
1	75	14.47	35.500	26.49	5.78	104	***	***	***
1	100	13.02	35.340	26.67	5.50	96	***	***	***
1	120	12.91	35.340	26.69	5.52	96	***	***	***

STATION G 2/ 114/64 DATE 26/ 2/64 TIME 0315 J LATITUDE 35 25 S LONGITUDE 135 58 E

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

95 13.9 15.0 13 2 11 7 7 8 13 1 17 1 1019.0 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INDRG. P	TOTAL P	NITRATE
J	0	17.88	35.950	26.05	5.43	105	***	***	***
1	25	17.84	35.970	26.07	5.46	105	***	***	***
1	50	17.73	35.990	26.11	5.47	105	***	***	***
1	85	13.37	35.410	26.65	5.01	88	***	***	***

STATION G 2/ 115/64 DATE 26/ 2/64 TIME 0544 J LATITUDE 35 05 S LONGITUDE 136 00 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

82 13.9 16.1 15 2 11 6 8 8 * * 17 1 1018.7 0 * *

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	17.95	36.310	26.30	5.56	108	***	***	***
1	10	17.87	36.310	26.32	5.49	106	***	***	***
1	20	17.87	36.310	26.32	5.52	107	***	***	***
1	30	17.85	36.310	26.33	5.49	106	***	***	***
1	40	17.73	36.290	26.34	5.58	108	***	***	***
1	50	16.92	36.080	26.38	5.49	104	***	***	***
1	75	14.61	35.460	26.43	5.19	94	***	***	***

DATA
PART 2
HYDROLOGY
SURFACE SAMPLES

VESSEL	CRUISE NUMBER	STATION	YR.	MTH.	DAY	TIME	Z	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND	SEA	SWELL	WEA.	VIS.	BAROM.	SAMPLING METHOD
												DN. AMT.	DN. AMT.	DN. AMT.				
20	2	81	64	2	21	2029	J	18 S	138	00 E	20.0	36.80	2	18	2	8	1013.5	1
20	2	82	64	2	21	2243	J	23 S	137	32 E	19.8	36.51	2	18	2	8	1013.0	1
20	2	83	64	2	22	0041	J	28 S	137	04 E	19.9	36.47	3	20	0	7	1012.5	1
20	2	84	64	2	22	0243	J	33 S	136	36 E	18.0	35.88	6	20	3	8	1015.0	1
20	2	85	64	2	22	0506	J	50 S	136	22 E	18.2	35.88	6	20	3	7	1017.0	1
20	2	86	64	2	22	0700	J	49 S	136	01 E	17.9	35.71	7	20	4	6	1019.1	1
20	2	87	64	2	22	0927	J	48 S	135	32 E	17.9	35.66	5	20	3	8	1021.8	1
20	2	88	64	2	22	1148	J	47 S	135	04 E	18.1	35.66	4	20	3	8	1023.0	1
20	2	89	64	2	22	1438	J	48 S	134	36 E	17.9	35.62	4	20	3	7	1023.0	1
20	2	90	64	2	22	1858	J	30 S	134	00 E	18.4	35.73	5	18	3	8	1024.0	1
20	2	91	64	2	22	2240	J	10 S	133	30 E	18.9	35.81	3	19	3	7	1025.5	1
20	2	92	64	2	23	0137	J	52 S	133	53 E	18.8	35.82	2	18	2	7	1024.0	1
20	2	93	64	2	23	0403	J	34 S	134	14 E	18.6	35.81	3	17	2	7	1023.0	1
20	2	94	64	2	23	0628	J	16 S	134	37 E	17.9	35.86	3	18	2	8	1023.5	1
20	2	95	64	2	23	0853	J	00 S	135	00 E	17.9	35.88	3	18	2	7	1024.0	1
20	2	96	64	2	23	1105	J	40 S	134	42 E	16.1	35.82	2	18	2	7	1024.5	1
20	2	97	64	2	23	1316	J	18 S	134	36 E	17.2	35.75	19	19	2	7	1024.0	1
20	2	98	64	2	23	1592	J	28 S	134	08 E	17.9	35.84	16	16	3	8	1023.5	1
20	2	99	64	2	23	1823	J	33 S	133	40 E	18.5	35.88	16	16	3	7	1023.0	1
20	2	100	64	2	23	2054	J	48 S	133	12 E	18.9	35.90	17	17	2	7	1024.0	1
20	2	101	64	2	24	0005	J	11 S	133	44 E	18.7	35.88	17	17	2	7	1023.3	1
20	2	102	64	2	24	0315	J	33 S	134	14 E	18.7	35.88	17	18	1	7	1022.0	1
20	2	103	64	2	24	0605	J	45 S	134	44 E	17.9	35.93	16	16	1	8	1021.2	1
20	2	104	64	2	24	0923	J	00 S	135	00 E	17.6	36.02	21	16	1	8	1022.0	1
20	2	105	64	2	24	1210	J	17 S	135	09 E	18.4	35.82	19	16	2	8	1022.0	1
20	2	106	64	2	25	0500	J	35 S	135	42 E	17.8	35.99	19	18	1	8	1021.0	1
20	2	107	64	2	25	0720	J	44 S	135	26 E	18.0	35.68	18	18	2	8	1022.0	1
20	2	108	64	2	25	1052	J	05 S	135	09 E	17.2	35.55	12	12	4	8	1022.0	1
20	2	109	64	2	25	1244	J	25 S	134	22 E	16.9	35.59	12	12	2	8	1023.0	1
20	2	110	64	2	25	1603	J	24 S	135	22 E	17.9	35.50	13	14	1	8	1021.5	1
20	2	111	64	2	25	1920	J	21 S	136	58 E	17.7	35.70	12	13	1	8	1021.5	1
20	2	112	64	2	25	2144	J	36	136	32 E	17.7	35.84	13	13	1	8	1021.5	1
20	2	113	64	2	26	0105	J	50 S	135	58 E	17.6	35.75	13	13	1	8	1020.5	1
20	2	114	64	2	26	0315	J	25 S	135	58 E	17.9	35.95	13	13	1	8	1019.0	1
20	2	115	64	2	26	0544	J	05 S	136	00 E	18.0	36.31	15	17	1	8	1018.7	1

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.
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.
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.
34. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G2/64.