OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1964
H.M.A.S. *GASCOYNE*
Cruise G5/64

OCEANOGRAPHICAL CRUISE REPORT NO. 41

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1968

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When citing this report, abbreviate as follows:
CSIRO Aust. Oceanogr. Cruise Rep. 41

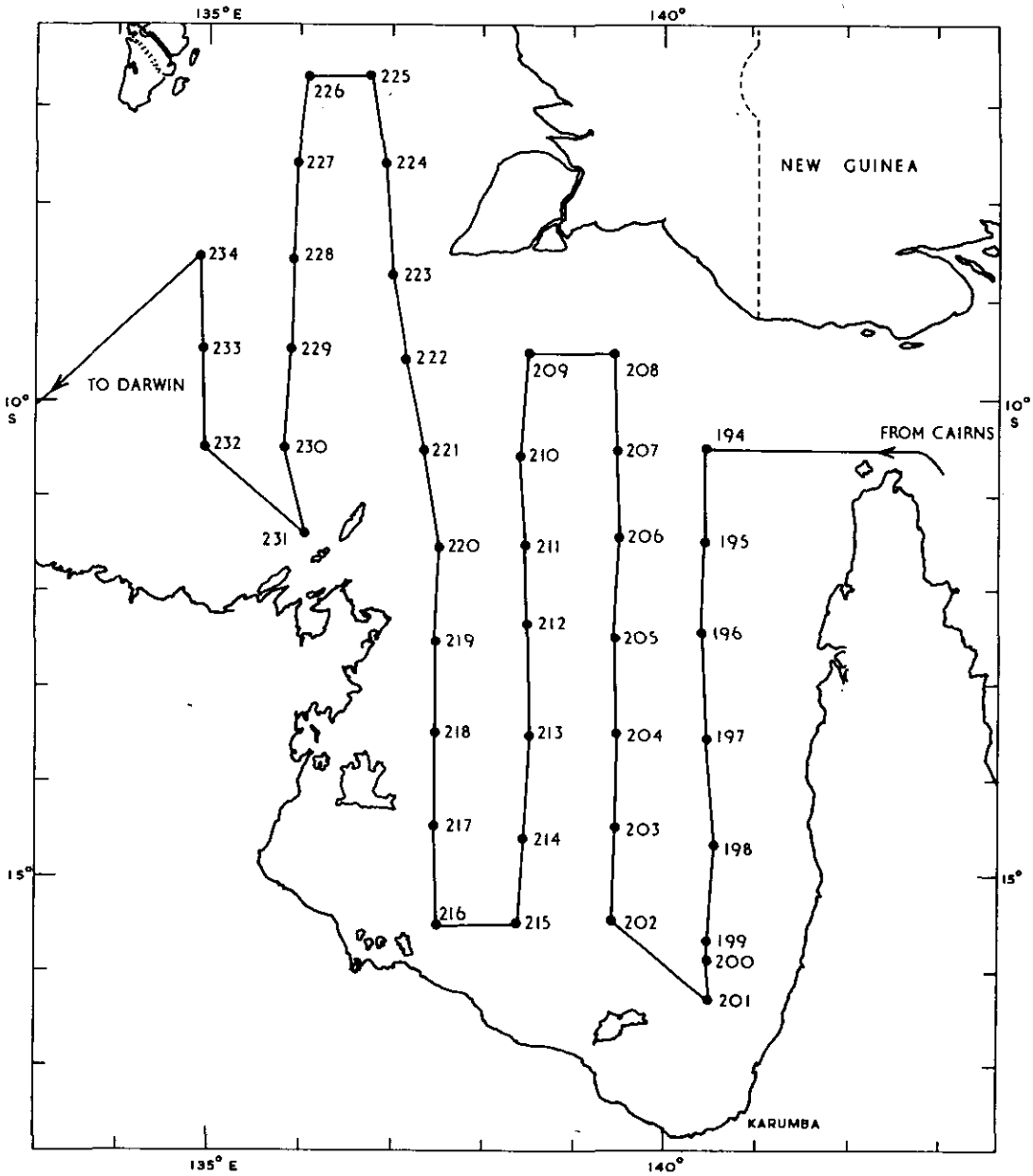

Fig. 1.– Track chart

OCEANOGRAPHICAL CRUISE REPORT

No. 41

Oceanographical Observations in the Indian Ocean in 1964

H.M.A.S. Gascoyne

Cruise G5/64

August 19-30, 1964

I. INTRODUCTION

This report records the data collected during the fifth cruise in 1964 of H.M.A.S. Gascoyne, Royal Australian Navy oceanographical frigate.

Objectives

To study the penetration of phosphate-rich upwelled water from the eastern Arafura Sea into the Gulf of Carpentaria.

To study, in the sediments, the relation between bulk silicates and grain size and mineralogy, and to determine the relation between the chemistry and texture of the sediments.

Itinerary

The cruise began at Cairns, worked six north-south sections in the Gulf of Carpentaria and Arafura Sea, and ended at Darwin (Fig. 1).

Scientific Personnel

D. Rochford (Cruise Leader)
F. Davies
N. Dyson
K. Fleming
J. Kaulback (Bureau of Mineral Resources)

The analyses of hydrological samples were done in the ship's laboratory by Messrs Davies, Dyson, and Fleming. Nitrate analyses were done at Cronulla by Mr Klye. The sediments were examined on board by Mr Kaulback and then stored. Analyses were made by the Bureau of Mineral Resources and the University of Sydney. Samples were analysed for P_2O_5, Cu, Pb, Zn, Ni, Co, Cr, CO_2, V, F, S, and organic C. In addition, 18 piston cores were taken to study late pleistocene sedimentary history.

The hydrology data were processed, under the direction of

Mr Hedge, by Mrs Bailey, Miss Hammond, Mrs Sander, and Miss Wanstall. The track chart was prepared for publication by Mr Breach.

The results of the sediment study will be published separately by Dr C. Phipps of the Department of Geology and Geophysics, University of Sydney.

II. WORK ACCOMPLISHED

Forty-one stations were worked (G5/194/64–G5/234/64). Surface and subsurface hydrology samples were collected at all stations.

TABLE 1

WORK DONE AT EACH STATION

Stn No.	Hydrology Surface to Depth (m)	Stn No.	Hydrology Surface to Depth (m)
194	40	215	50
195	60	216	35
196	60	217	50
197	60	218	50
198	50	219	50
199	35	220	50
200	30	221	50
201	25	222	45
202	45	223	55
203	60	224	35
204	60	225	35
205	60	226	35
206	50	227	35
207	50	228	60
208	35	229	60
209	35	230	50
210	50	231	35
211	55	232	55
212	55	233	100
213	55	234	100
214	55		

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 0.03 degC, and the mean values listed in this report are considered accurate to ± 0.03 degC.

Thermometric Depth.—Depth calculations were made by the method described by Pollak (1950), and are considered accurate to 1%.

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 using 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 by 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 calculated by computer using the simpler of the equations given by Richards and Corwin (1956) -

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

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 1% w/v 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 commenced 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% 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 of 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 preserved with 2 drops of saturated $HgCl_2$. Nitrate was determined at Cronulla by the strychnidine method (Rochford 1947). The reagent was prepared by adding 0.64 g of strychnidine to a litre of nitrate-free sulphuric acid. Five ml of this reagent were added, with minimum agitation, to 5 ml seawater or standard nitrate solution. The standards were made up in a mixture of equal volumes of artificial seawater and nitrate-free sulphuric acid. 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 mµ using a 5 mm cell. Samples with an absorbance greater than the standard corresponding to 14.4 µg-atom/l were diluted with artificial seawater-sulphuric acid mixture before reading. Results are given in µg-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 at the beginning of the listing.

DATA

HYDROLOGY

EXPLANATION OF HEADINGS

Hydrology

STATION	Gives the station identification. For example, G5/194/64 signifies the 194th station worked by Gascoyne in 1964, on her 5th 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 Eastern Australian Standard Time, G.M.T. + 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. 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
CAST	The cast number corresponding to the wire angle is shown
DEPTH	The 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
INORG. P, TOTAL P, and NITRATE	Given in µg-atom/l

* and *** indicate no data available

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 194/64	21/ 8/64	0735 K	10 30 S	140 28 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
46	20.6	26.7	14	3	11	*	0	8	13	2	13	1	1015.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.83	35.160	23.23	4.50	97	0.19	0.36	0.8
1	10	25.75	35.160	23.25	4.56	98	0.19	0.38	0.2
1	20	25.75	35.160	23.25	4.63	99	0.22	0.35	0.1
1	30	25.77	35.160	23.25	4.52	97	0.17	0.30	0.7
1	40	25.75	35.160	23.25	4.57	98	0.21	0.36	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 195/64	21/ 8/64	1400 K	11 30 S	140 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	20.6	27.2	11	4	11	8	3	7	12	2	11	1	1014.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.39	34.930	22.88	4.50	98	0.28	0.46	0.5
1	10	26.37	34.930	22.88	4.56	99	0.26	0.40	0.2
1	20	26.22	34.930	22.93	4.56	99	0.28	0.40	0.0
1	30	26.21	34.950	22.95	4.50	97	0.27	0.40	0.0
1	40	26.21	34.940	22.95	4.55	98	0.28	0.42	0.0
1	50	26.22	34.940	22.94	4.45	96	0.29	0.42	0.0
1	60	26.21	34.940	22.94	4.50	97	0.28	0.42	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 196/64	21/ 8/64	1905 K	12 27 S	140 24 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
70	20.6	28.9	19	1	11	6	7	8	*	*	14	1	1013.5	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.43	35.090	22.99	4.53	98	0.24	0.49	0.1
1	10	26.32	35.070	23.01	4.56	99	0.24	0.43	0.0
1	20	26.20	35.060	23.04	4.55	98	0.25	0.37	0.3
1	30	26.20	35.070	23.05	4.56	99	0.26	0.40	0.0
1	40	26.20	35.070	23.04	4.50	97	0.25	0.42	0.5
1	50	26.21	35.080	23.05	4.44	96	0.26	0.39	0.4
1	60	26.23	35.080	23.04	4.49	97	0.27	0.43	0.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 197/64	22/ 8/64	0030 K	13 35 S	140 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	20.0	26.1	16	2	11	8	2	7	15	2	*	*	1015.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.83	35.030	23.13	4.59	99	0.34	0.32	0.0
1	10	25.82	35.020	23.13	4.56	98	0.34	0.28	0.0
1	20	25.81	35.020	23.13	4.56	98	0.28	***	0.1
1	30	25.79	35.020	23.13	4.49	96	0.28	0.37	0.2
1	40	25.79	35.020	23.14	4.53	97	0.26	0.45	0.1
1	50	25.78	35.020	23.14	4.50	97	0.28	0.32	0.0
1	60	25.81	35.020	23.13	4.49	96	0.27	0.33	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 198/64	22/ 8/64	0545 K	14 43 S	140 29 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	WIRE ANGLES CAST2	WIRE ANGLES CAST3
54	19.4	25.6	09	2	11	8	1	8	09	2	*	*	1014.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.35	35.220	23.42	4.56	97	0.26	0.42	0.0
1	10	25.25	35.220	23.45	4.56	97	0.22	0.37	0.0
1	20	25.26	35.220	23.45	4.45	95	0.19	0.36	0.1
1	30	25.26	35.220	23.45	4.56	97	0.19	0.39	0.1
1	40	25.25	35.220	23.45	4.53	96	0.18	0.38	0.0
1	50	25.26	35.220	23.45	4.56	97	0.23	0.38	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 199/64	22/ 8/64	1020 K	15 41 S	140 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	WIRE ANGLES CAST2	WIRE ANGLES CAST8
40	23.3	17.8	07	3	11	*	*	8	07	2	03	1	1016.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.21	35.430	23.92	4.67	98	0.16	0.36	0.0
1	10	24.20	35.430	23.93	4.67	98	0.16	0.31	0.0
1	20	24.20	35.430	23.93	4.68	98	0.17	0.31	1.3
1	30	24.17	35.430	23.94	4.64	97	0.16	0.36	0.1
1	35	24.17	35.430	23.94	4.72	99	0.16	0.39	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 200/64	22/ 8/64	1136 K	15 52 S	140 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
38	18,3	23,9	06	4	11	*	*	8	06	1	05	1	1016.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.05	35.500	24.03	4.72	98	0.16	***	***
1	30	23.94	35.490	24.05	4.68	97	0.21	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 201/64	22/ 8/64	1400 K	16 17 S	140 30 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
29	18.9	24.7	03	3	11	8	1	8	05	2	03	1	1014.5	*	5	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	23.44	35.420	24.14	4.73	97	***	0.35	0.5
2	10	23.11	35.430	24.25	4.79	98	***	0.40	0.0
2	20	23.09	35.440	24.26	4.79	98	***	0.46	0.2
2	25	23.11	35.440	24.26	4.77	98	***	0.40	0.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 202/64	22/ 8/64	2014 K	15 29 S	139 31 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
49	16,1	24,4	00	0	11	*	0	8	00	0	06	1	1014.5	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.75	35.420	23.76	4.73	100	***	0.39	0.6
1	10	24.74	35.420	23.76	4.73	100	***	0.34	0.5
1	20	24.48	35.430	23.84	4.72	99	***	0.30	0.1
1	30	24.43	35.430	23.86	4.61	97	***	0.40	0.1
1	40	24.41	35.440	23.87	4.62	97	0.13	0.34	0.7
1	45	24.42	35.440	23.87	4.56	96	0.23	0.34	0.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 203/64	23/ 8/64	0107 K	14 30 S	139 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	20.6	25.6	18	1	11	*	0	8	18	2	00	0	1014.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.15	35.120	23.41	4.61	98	0.24	0.35	0.8
1	10	25.14	35.120	23.41	4.59	97	0.20	0.38	0.3
1	20	25.10	35.120	23.42	4.61	98	0.20	0.35	0.4
1	30	25.02	35.120	23.45	4.49	95	0.20	0.35	0.3
1	40	25.01	35.110	23.44	4.50	95	0.20	0.38	0.1
1	50	25.01	35.110	23.44	4.44	94	0.22	0.40	0.4
1	60	25.02	35.110	23.44	4.44	94	0.25	0.40	0.8

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 204/64	23/ 8/64	0615 K	13 30 S	139 34 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	19.4	25.0	09	1	11	*	0	*	09	2	00	0	1013.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.79	35.050	23.16	4.47	96	0.23	0.32	0.7
1	10	25.81	35.040	23.14	4.51	97	0.20	0.32	0.0
1	20	25.74	35.050	23.17	4.48	96	0.20	0.40	0.4
1	30	25.72	35.050	23.18	4.42	95	0.20	0.34	0.7
1	40	25.71	35.050	23.18	4.47	96	0.20	0.41	0.0
1	50	25.71	35.050	23.18	4.40	94	0.22	0.38	0.6
1	60	25.75	35.050	23.17	4.37	94	0.21	0.40	1.6

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 205/64	23/ 8/64	1130 K	12 28 S	139 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	20.6	26.1	14	2	11	8	2	8	15	2	*	*	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.15	34.890	22.92	4.44	96	0.25	0.43	0.0
1	10	26.09	34.890	22.94	4.51	97	0.25	0.47	0.5
1	20	26.07	34.890	22.95	4.49	97	0.25	0.41	0.2
1	30	26.04	34.890	22.96	4.44	96	0.32	0.43	0.8
1	40	26.01	34.880	22.96	4.45	96	0.24	0.41	0.4
1	50	26.00	34.870	22.96	4.36	94	0.33	0.45	0.3
1	60	26.03	34.870	22.95	4.39	95	0.32	0.41	0.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 206/64	23/ 8/64	1600 K	11 24 S	139 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
60	21.1	23.3	12	1	11	8	1	8	12	2	00	0	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.51	34.580	22.58	4.51	98	0.27	0.51	0.4
1	10	26.40	34.710	22.71	4.50	97	0.27	0.42	0.4
1	20	26.35	34.710	22.73	4.47	97	0.27	0.52	0.0
1	30	26.34	34.710	22.73	4.40	95	0.28	0.56	0.6
1	40	26.32	34.710	22.74	4.42	96	0.30	0.54	0.4
1	50	26.32	34.710	22.74	4.38	95	0.38	0.52	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 207/64	23/ 8/64	2015 K	10 29 S	139 32 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	21.1	26.1	12	2	11	8	2	8	12	2	*	*	1010.5	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.32	34.700	22.73	4.56	99	0.25	0.38	0.1
1	10	26.32	34.690	22.72	4.55	98	0.22	0.31	0.4
1	20	26.18	34.700	22.77	4.51	97	0.25	0.39	0.0
1	30	26.18	34.700	22.77	4.50	97	0.25	0.40	0.3
1	40	26.16	34.710	22.79	4.53	98	0.27	0.42	0.0
1	50	26.17	34.710	22.78	4.49	97	0.27	0.42	0.6

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 208/64	24/ 8/64	0022 K	9 33 S	139 30 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
41	20.0	24.4	13	2	11	6	2	8	*	*	10	1	1012.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.16	35.220	23.17	4.53	98	0.24	0.40	0.5
1	10	26.14	35.230	23.18	4.56	99	0.25	0.33	***
1	20	26.14	35.220	23.18	4.57	99	0.24	0.34	0.4
1	30	26.13	35.250	23.20	4.51	98	0.26	0.38	0.0
1	35	26.14	35.300	23.24	4.55	98	0.28	0.41	0.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 209/64	24/ 8/64	0500 K	9 33 S	138 31 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
41	21.1	26.7	*	*	11	8	3	8	*	*	*	*	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.39	34.570	22.61	4.48	97	0.30	0.50	0.0
1	10	26.42	34.560	22.59	4.47	97	0.30	0.50	0.6
1	20	26.41	34.560	22.59	4.45	96	0.30	0.51	0.1
1	30	26.42	34.560	22.59	4.46	97	0.30	0.59	0.1
1	35	26.40	34.560	22.60	4.48	97	0.30	0.55	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 210/64	24/ 8/64	0930 K	10 31 S	138 24 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
57	20.6	27.8	12	1	11	8	1	9	10	*	15	1	1012.5	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.42	34.810	22.78	4.52	98	0.34	0.51	0.4
1	10	26.37	34.800	22.79	4.51	98	0.33	0.55	0.3
1	20	26.31	34.800	22.81	4.48	97	0.34	0.55	0.2
1	30	26.26	34.810	22.83	4.40	95	0.34	0.45	0.8
1	40	26.26	34.810	22.83	4.39	95	0.34	0.56	0.1
1	50	26.25	34.810	22.83	4.41	95	0.34	0.56	0.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 211/64	24/ 8/64	1410 K	11 30 S	138 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
59	21.1	28.3	13	1	11	2	2	8	13	1	*	*	1011.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.81	34.750	22.61	4.59	100	0.30	0.44	0.0
1	10	26.25	34.730	22.77	4.60	99	0.31	0.50	0.6
1	20	26.15	34.740	22.81	4.47	96	0.36	0.54	0.6
1	30	26.11	34.740	22.82	4.32	93	0.36	0.58	0.3
1	40	26.11	34.740	22.83	4.34	94	0.40	0.56	1.0
1	50	26.11	34.740	22.82	4.34	94	0.39	0.54	0.2
1	55	26.14	34.740	22.82	4.34	94	0.41	0.61	0.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 212/64	24/ 8/64	1832 K	12 22 S	138 34 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
60	20.6	27.2	13	*	11	1	3	8	*	*	*	*	1011.5	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.16	34.960	22.97	4.56	98	0.21	0.49	0.0
1	10	26.03	34.980	23.03	4.58	99	0.21	0.42	0.0
1	20	25.90	35.000	23.09	4.58	98	0.21	0.36	0.0
1	30	25.83	35.000	23.11	4.55	98	0.26	0.39	0.0
1	40	25.79	35.080	23.18	4.25	91	0.28	0.49	0.5
1	50	25.79	35.080	23.18	4.22	91	0.28	0.42	0.4
1	55	25.81	35.080	23.17	4.17	90	0.28	0.46	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 213/64	24/ 8/64	2340 K	13 31 S	138 33 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
60	20.0	24.4	16	2	11	*	0	8	15	2	15	1	1012.8	*	5	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
2	0	25.64	35.390	23.46	4.68	100	0.11	0.28	0.1
2	10	25.60	35.380	23.47	4.68	100	0.07	0.26	0.0
2	20	25.52	35.380	23.49	4.66	100	0.09	0.28	0.0
2	30	25.26	35.350	23.55	4.51	96	0.10	0.29	0.1
2	40	25.22	35.350	23.56	4.32	92	0.12	0.33	0.0
2	50	25.22	35.350	23.56	4.30	92	0.17	0.40	0.2
2	55	25.24	35.350	23.55	4.36	93	0.17	0.37	0.5

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 214/64	25/ 8/64	0455 K	14 37 S	138 30 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
62	20.0	25.0	16	2	11	*	0	8	16	1	14	1	1012.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.81	35.400	23.72	4.93	104	0.09	0.32	0.2
1	10	24.82	35.400	23.72	4.92	104	0.08	0.29	0.0
1	20	24.78	35.400	23.73	4.93	104	0.07	0.24	0.1
1	30	24.31	35.390	23.86	4.45	93	0.16	0.32	0.1
1	40	24.29	35.390	23.87	4.41	92	0.16	0.36	0.3
1	50	24.30	35.390	23.87	4.39	92	0.26	0.42	0.1
1	55	24.31	35.390	23.86	4.41	92	0.23	0.35	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 215/64	25/ 8/64	0900 K	15 29 S	138 27 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	18.9	26.7	14	3	11	*	0	8	14	2	15	1	1015.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.22	35.480	23.96	4.74	99	0.10	0.32	0.4
1	10	24.11	35.490	24.00	4.75	99	0.10	0.30	0.0
1	20	24.10	35.490	24.00	4.76	99	0.13	0.33	0.2
1	30	23.84	35.490	24.08	4.70	98	0.13	0.34	0.0
1	40	23.82	35.500	24.09	4.50	93	0.21	0.36	0.1
1	50	23.83	35.500	24.09	4.47	93	0.22	0.37	1.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 216/64	25/ 8/64	1345 K	15 29 S	137 29 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
40	18.3	24.4	12	2	11	*	0	8	12	2	*	*	1013.9	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.86	35.570	24.13	4.78	99	0.11	0.27	0.0
1	10	23.62	35.560	24.20	4.78	99	0.11	0.31	0.1
1	20	23.18	35.630	24.38	4.86	100	0.13	0.31	0.6
1	30	22.70	35.700	24.57	4.74	96	0.16	0.34	0.5
1	35	22.69	35.690	24.56	4.74	96	0.21	0.40	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 217/64	25/ 8/64	1940 K	14 28 S	137 30 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	18.3	24.4	12	3	11	*	0	8	11	2	12	1	1012.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.52	35.480	23.87	4.82	101	0.10	0.37	0.0
1	10	24.42	35.490	23.91	4.83	101	0.10	0.25	0.0
1	20	24.32	35.480	23.93	4.82	101	0.16	0.32	0.0
1	30	23.85	35.490	24.08	4.73	98	0.17	0.42	0.2
1	40	23.81	35.500	24.10	4.72	98	0.17	0.33	0.4
1	50	23.80	35.490	24.09	4.67	97	0.19	0.34	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 218/64	25/ 8/64	2357 K	13 30 S	137 31 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
57	18.9	22.2	12	-1	11	*	0	8	00	0	11	1	1013.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.08	35.420	23.65	4.69	100	0.10	0.21	0.1
1	10	25.01	35.420	23.68	4.71	100	0.09	0.25	0.0
1	20	25.00	35.420	23.68	4.72	100	0.09	0.25	0.0
1	30	24.59	35.440	23.82	4.61	97	0.10	0.33	0.0
1	40	24.58	35.440	23.82	4.61	97	0.18	0.29	0.0
1	50	24.58	35.440	23.82	4.57	96	0.18	0.36	0.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 219/64	26/ 8/64	0450 K	12 31 S	137 31 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	19,4	25,0	14	3	11	*	*	8	14	2	12	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.71	35,220	23,31	4.64	100	0.13	0.27	0.1
1	10	25.65	35,220	23,33	4.72	101	0.15	0.19	0.1
1	20	25.63	35,250	23,36	4.72	101	0.17	0.26	0.9
1	30	25.44	35,450	23,57	4.44	95	0.19	0.34	0.2
1	40	25.43	35,450	23,57	4.43	95	0.21	0.28	0.0
1	50	25.43	35,460	23,58	4.43	95	0.21	0.33	0.2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 220/64	26/ 8/64	0930 K	11 31 S	137 30 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	21.7	27.8	15	2	11	4	1	8	14	2	*	*	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.83	34.580	22.79	4.61	99	0.15	0.39	0.0
1	10	25.81	34.560	22.78	4.58	98	0.11	***	0.0
1	20	25.81	34.570	22.79	4.61	99	0.13	0.44	0.7
1	30	25.79	34.700	22.89	4.59	98	0.11	0.39	0.0
1	40	25.74	34.980	23.12	4.16	89	0.21	0.33	0.3
1	50	25.73	34.980	23.12	4.17	89	0.40	0.44	0.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 221/64	26/ 8/64	1400 K	10 32 S	137 19 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST8
55	20,6	26,1	04	2	11	8	1	9	11	2	15	1	1010,8	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26,12	34,400	22,57	4,73	102	0,41	0,54	0,0
1	10	25,89	34,400	22,64	4,74	102	0,38	0,52	0,0
1	20	25,79	34,400	22,67	4,72	101	0,37	0,57	0,3
1	30	25,57	34,400	22,74	4,60	98	0,40	0,57	0,7
1	40	24,73	34,340	22,95	2,75	58	1,38	1,08	7,1
1	50	24,73	34,340	22,95	2,69	56	1,14	1,08	9,2

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 222/64	26/ 8/64	1825 K	9 35 S	137 10 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
51	21.1	26.7	15	3	11	8	2	8	15	2	15	1	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.70	34.240	22.26	4.62	100	0.48	0.64	0.2
1	10	26.64	34.240	22.28	4.61	100	0.58	0.59	0.0
1	20	26.51	34.240	22.32	4.65	101	1.32	***	0.0
1	30	26.26	34.520	22.61	4.51	97	0.41	0.57	0.0
1	40	26.26	34.530	22.62	4.47	96	0.41	0.59	0.1
1	45	26.25	34.530	22.62	4.50	97	0.49	0.62	0.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 223/64	26/ 8/64	2230 K	8 43 S	137 00 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
60	24,2	26,9	14	3	11	4	6	8	13	2	12	1	1010.8	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.55	34.020	22.15	4.60	100	0.34	0.66	0.4
1	10	26.52	34.080	22.20	4.58	99	0.32	0.65	0.2
1	20	26.18	34.230	22.42	4.32	93	0.40	0.77	0.4
1	30	25.79	34.280	22.58	3.68	79	0.54	1.00	3.1
1	40	25.29	34.320	22.76	3.07	65	0.67	1.08	6.1
1	50	25.11	34.420	22.89	2.75	58	1.01	1.57	7.7
1	55	25.12	34.330	22.82	2.74	58	0.79	1.73	8.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 224/64	27/ 8/64	0400 K	7 30 S	136 58 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
42	21.1	26.1	13	3	11	8	8	7	13	2	*	*	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.60	32.970	21.34	5.10	110	0.17	0.51	0.3
1	10	26.60	32.970	21.34	5.12	110	0.14	0.59	0.3
1	20	25.80	33.840	22.24	3.02	64	1.01	1.28	9.4
1	30	25.73	33.890	22.30	2.88	61	1.16	1.51	10.3
1	35	25.71	33.890	22.31	2.90	62	1.14	1.76	10.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 225/64	27/ 8/64	0830 K	6 32 S	136 55 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
37	21.1	26.1	08	4	11	0	8	5	10	2	13	1	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.46	32.580	21.09	5.13	110	0.18	0.42	0.2
1	10	26.31	32.650	21.19	5.03	108	0.22	0.33	0.0
1	20	24.79	33.880	22.58	1.75	37	1.14	1.25	13.0
1	30	24.76	33.900	22.61	1.77	37	1.16	1.26	12.9
1	35	24.77	33.910	22.61	1.77	37	1.22	1.51	12.7

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 226/64	27/ 8/64	1232 K	6 35 S	136 02 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
37	17.8	25.6	06	3	11	6	8	8	07	2	09	1	1011.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.36	32.450	21.02	4.65	99	0.17	0.36	0.5
1	10	26.33	32.610	21.15	4.44	95	0.23	0.41	0.6
1	20	25.71	33.300	21.87	3.12	66	0.54	0.83	4.7
1	30	25.02	33.840	22.48	2.24	47	0.92	1.16	11.3
1	35	25.04	33.850	22.48	2.28	48	0.77	1.44	8.4

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 227/64	27/ 8/64	1813 K	7 30 S	135 58 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
39	22.8	25.6	13	3	11	2	7	8	13	2	14	1	1010.0	0	0	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.55	33.900	22.05	6.26	135	0.15	0.69	0.5
1	10	26.19	33.910	22.17	5.46	117	0.20	0.89	0.4
1	20	25.88	33.960	22.31	4.55	97	0.45	1.05	1.9
1	30	24.70	34.240	22.88	2.04	43	1.24	1.54	11.0
1	35	24.68	34.250	22.89	1.97	41	1.54	1.58	10.6

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 228/64	27/ 8/64	2245 K	8 30 S	135 54 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
64	21.7	27.2	14	2	11	0	4	7	14	2	17	1	1012.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.62	33.870	22.01	4.83	105	0.61	0.52	0.2
1	10	26.55	33.960	22.10	4.84	105	0.50	0.64	0.9
1	20	26.32	34.130	22.30	4.79	103	0.50	0.52	0.2
1	30	26.23	34.190	22.37	4.81	104	0.51	0.58	0.2
1	40	25.58	34.230	22.60	3.93	84	0.74	0.84	2.7
1	50	24.08	34.440	23.22	1.64	34	1.31	1.38	12.8
1	60	24.09	34.450	23.22	1.64	34	1.28	1.35	12.5

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 229/64	28/ 8/64	0330 K	9 29 S	135 50 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
66	21.7	26.1	14	2	11	4	6	7	16	2	16	1	1011.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.19	34.150	22.36	4.56	98	***	0.43	0.2
1	10	26.18	34.150	22.36	4.61	99	0.48	0.43	0.7
1	20	26.17	34.150	22.36	4.56	98	0.57	0.47	0.4
1	30	26.10	34.150	22.38	4.61	99	0.52	0.43	0.1
1	40	25.91	34.150	22.44	4.62	99	0.51	0.47	0.4
1	50	24.26	34.350	23.09	3.06	64	1.04	0.95	7.8
1	60	24.13	34.390	23.16	2.85	59	0.99	1.00	9.0

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 230/64	28/ 8/64	0815 K	10 30 S	135 48 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
55	21.7	26.7	15	2	11	8	7	7	14	2	14	1	1012.1	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.17	34.120	22.34	4.61	99	0.36	0.49	0.1
1	10	26.11	34.120	22.36	4.65	100	0.31	0.44	0.4
1	20	26.10	34.120	22.36	4.61	99	0.31	0.42	0.6
1	30	25.83	34.160	22.47	4.55	97	0.31	0.46	0.3
1	40	25.82	34.170	22.49	4.55	97	0.36	0.46	1.6
1	50	25.84	34.160	22.47	4.50	96	0.34	0.50	0.1

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 231/64	28/ 8/64	1200 K	11 17 S	136 05 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
40	21.1	26.7	14	2	11	8	3	7	14	2	*	*	1012.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.85	33.750	22.16	4.60	98	0.36	0.57	0.4
1	10	25.58	33.750	22.24	4.63	98	0.33	0.57	0.0
1	20	25.56	33.760	22.26	4.61	98	0.33	0.50	0.1
1	30	25.57	33.770	22.26	4.60	98	0.30	0.53	0.0
1	35	25.56	33.770	22.27	4.61	98	0.33	0.58	0.7

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 232/64	28/ 8/64	2002 K	10 29 S	134 59 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
59	22.2	27.2	10	2	11	6	8	8	14	2	*	*	1012.0	0	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.55	34.390	22.42	4.61	100	0.20	***	1.0
1	10	26.42	34.400	22.47	4.61	100	0.20	***	1.0
1	20	26.24	34.420	22.54	4.49	97	0.21	***	0.2
1	30	25.98	34.440	22.64	4.50	97	0.21	***	0.4
1	40	25.96	34.440	22.64	4.57	98	0.26	***	0.5
1	50	25.96	34.440	22.65	4.52	97	0.24	***	0.4
1	55	26.00	34.440	22.63	4.61	99	0.17	***	0.3

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 233/64	29/ 8/64	0025 K	9 29 S	134 57 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
119	22.2	27.2	13	3	11	4	6	7	13	2	11	1	1011.0	5	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.24	34.180	22.36	4.62	99	0.27	***	0.1
1	10	26.26	34.230	22.39	4.66	100	0.27	***	0.0
1	20	26.23	34.380	22.52	4.66	100	0.21	***	0.0
1	30	26.13	34.410	22.57	4.67	100	0.18	***	0.0
1	40	25.98	34.390	22.60	4.71	101	0.16	***	0.1
1	50	25.91	34.390	22.62	4.55	97	0.24	***	0.6
1	75	21.53	34.610	24.07	2.05	41	1.16	***	17.2
1	100	20.99	34.630	24.23	2.06	40	1.19	***	17.9

STATION	DATE	TIME	LATITUDE	LONGITUDE
G 5/ 234/64	29/ 8/64	0510 K	8 28 S	134 54 E

SONIC DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SP.	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST1	CAST2	CAST3
110	21.7	27.2	10	4	11	4	8	7	12	3	11	1	1010.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.10	33.730	22.07	4.98	107	0.38	***	0.2
1	10	26.11	33.720	22.06	5.00	107	0.38	***	0.2
1	20	25.92	34.000	22.33	4.50	96	0.48	***	0.4
1	30	25.74	34.050	22.42	4.22	90	0.69	***	1.9
1	40	25.80	34.130	22.46	4.37	93	0.61	***	0.1
1	50	25.38	34.230	22.67	3.49	74	0.71	***	1.7
1	75	21.97	34.610	23.95	1.88	37	1.21	***	17.4
1	100	21.79	34.620	24.01	1.82	36	1.24	***	17.7

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.

OCEANOGRAPHICAL CRUISE REPORTS

(Continued)

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.
32. Oceanographical observations in the Pacific Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G1/64.
34. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G2/64.
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.