OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1964
H.M.A.S. *DIAMANTINA*
Cruise Dm1/64

OCEANOGRAPHICAL CRUISE REPORT NO. 33

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

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MELBOURNE, 1969

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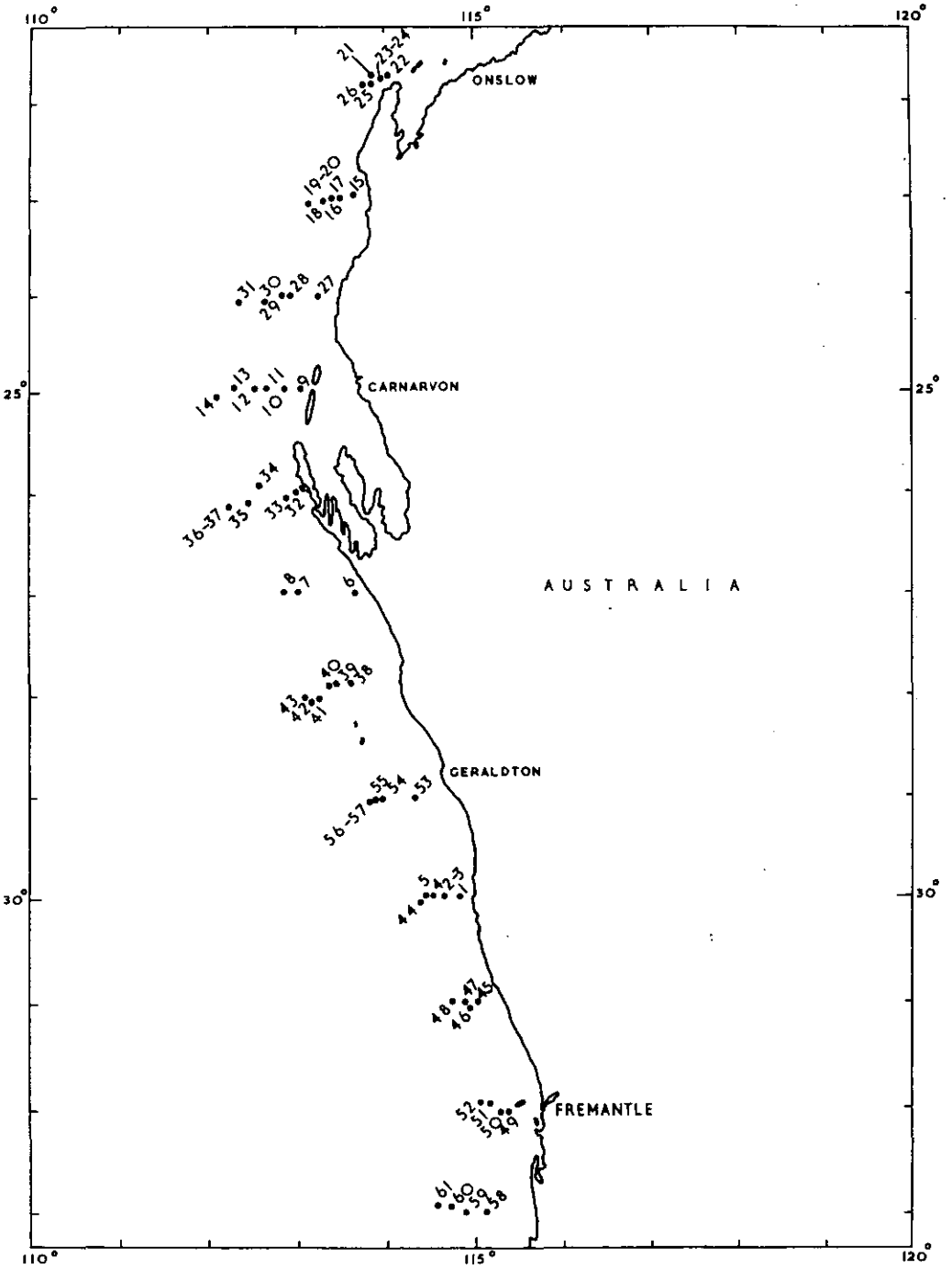

Fig. 1. Track chart Cruise Dm 1/64

OCEANOGRAPHICAL CRUISE REPORT

No. 33

Oceanographical Observations in the Indian Ocean in 1964

H.M.A.S. Diamantina

Cruise Dm1/64

January 28-February 6, February 15-18, 1964

I. INTRODUCTION

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

Objectives

To study the distribution and growth of larval stages of the western crayfish (Panulirus longipes cygnus), testing the hypothesis that final stage larvae settle to the sea floor on the outer portion of the continental shelf.

To sample sediments on the continental shelf.

To examine the hydrological conditions on and adjacent to the continental shelf.

Itinerary

The cruise began at Fremantle on January 28 and a series of traverses was made across the continental shelf, proceeding as far north as North-West Cape. After a temporary return to port, traverses were made extending south to Cape Naturaliste. The cruise ended at Fremantle on February 18 (Fig. 1).

Scientific Personnel

R.G. Chittleborough (Cruise Leader)
K.J. Betjeman, University of Western Australia
J. Prothero
L.R. Thomas

R.G. Chittleborough and L.R. Thomas examined plankton samples for crayfish larvae. K.J. Betjeman operated the grab to sample bottom sediments. Bottom photographs were taken by R.G. Chittleborough and L.R. Thomas. Water samples were collected and analysed in the ship's laboratory by J. Prothero.

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

Sixty-one stations were worked (Dm1/1/64-Dm1/61/64). Surface and subsurface hydrology samples were collected at 47 stations. Sediments were collected at 31 stations, and bottom photographs were taken at 8 stations. Zooplankton samples were collected at 7 stations, micronekton samples at 10 stations, and beam trawling was done at 10 stations.

TABLE 1

WORK DONE AT EACH STATION

Stn No.	Hydrology Surface to Depth (m)	Sediments	Bottom Photography	Beam Trawling	Micronekton	Zooplankton 1	Zooplankton 2
1	50	+					
2	100	+					
3			+	+			
4	180	+					
5					+		
6	75	+					
7	120						
8	170						
9	50	+					
10		+					
11	100	+					
12			+	+			
13	180						
14	500						
15	50	+					
16	100	+					
17			+	+			
18	180	+					
19	500						
20					+		
21	500					+	
22	50	+					
23	100	+					
24				+			
25	200	+					

Stn No.	Hydrology Surface to Depth (m)	Sedi-ments	Bottom Photo-graphy	Beam Trawling	Micro-nekton	plankton 1	plankton 2
26					+	+	
27	50	+					
28	100	+					
29				+			
30	180	+					
31	500				+	+	
32	50	+					
33	100	+					
34				+			
35	190						
36	500						
37					+		
38	50	+					
39	100	+					
40				+			
41	180	+					
42	500						
43					+		
44	500						
45	50	+					
46	100	+		+			
47	200	+					
48	500				+	+	
49	50						
50	100		+	+			
51	170						
52	500				+	+	
53	50	+					
54	100		+				
55	180		+				
56	500						
57					+	+	+
58	50						
59	100		+	+			
60	200		+				
61	500				+	+	+

Zooplankton 1 Indian Ocean Standard Net, vertical haul
2 N70 plankton net, surface tow

III. METHODS 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° to 30°C, and unprotected thermometers with a range of either -2° to 30°C or -4° to 60°C. Temperatures 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 ±15 m at depths greater than 1000 m, and to 1% at depths less than 1000 m.

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 sea-water 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 in different concentrations (Rochford 1963). Duplicate titrations were made on approximately every tenth sample. Saturation values were computed using the simpler of the equation given by Richards and Corwin (1956) -

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

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 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 to ±5% for higher values. To correct for salt effects the results given should be multiplied by 1.15.

3. Zooplankton

Vertical Hauls 200-0 m.—Sampling consisted of vertical hauls through the upper 200 m with the Indian Ocean Standard Net (IOSN). The IOSN was used in the standard manner (Currie 1963), except that a heavier weight (100 lb) was attached to keep the net under control; this was replaced by a 30 lb weight during washing operations. No flowmeter was used. Wire angles averaged 20° from vertical and never exceeded 40°. The length of wire paid out to place the net at 200 m was 200-600 m.

Samples were removed from the net in the following manner. The plankton bucket was detached, the contents were poured into a larger container, and the bucket was replaced. The net was lowered into the water up to the ring and raised again, and the washings collected; remnants still adhering to the codend were washed into the bucket by splashing water from the outside, and these were collected. Finally the net was lowered into the water and washed through without the bucket attached.

Surface Tows.—An N70 plankton net was towed at the surface for 30 min at 3 kt at two night stations (Table 1).

Examination of Samples.—Phyllosoma and puerulus larvae were sorted from the samples on board. There were no crayfish larvae in the IOSN samples. Samples were then concentrated and stored in plastic bottles in neutralized 10% formalin. The samples were sent to the Indian Ocean Biological Centre, Cochin, India, for taxonomic studies.

4. Micronekton

Oblique tows were made through the upper 200 m with a 5-ft Isaacs Kidd midwater trawl, a scaled-down version of the 6-ft trawl (King and Iversen 1962; Aron 1960).

No flowmeter was used. The trawl was fitted with a depth recorder (Hamon, Tranter, and Heron 1963) and lowered from the stern while the ship's speed was 2 kt. When the trawl was clear of the ship, speed was increased to 5 kt and the wire was paid out at 40-50 m/min under a constant and minimum tension. After 600 m of wire had been paid out the ship's speed was reduced to 3 kt and further adjusted according to the reading of a tension gauge. A final 100 m was then paid out making the total 700 m. After 5 min the wire was retrieved at a winch speed of 9 m/min. Tows were made at approx. 2200 h. The paying-out period averaged 15 min and the retrieval period 80 min.

The net was washed from outside into the bucket which was then removed from the net. The net was checked for organisms caught in the meshes (e.g. leptocephali); these were removed. Phyllosoma and puerulus larvae were sorted from the samples on board. Samples were then stored in neutralized 10% formalin in plastic bottles; larger organisms were stored separately. Samples are held at Perth.

5. Benthos

A beam trawl was towed on the sea floor at approx. 3 kt for periods ranging from 45-80 min at stations indicated in Table 1.

Benthic material was sorted on board; crayfish and crayfish larvae were removed and the remainder of the samples was sorted into phyla and sent to the Western Australian Museum.

6. Geology

Sediment Sampling.—Bottom sediments were sampled with a Petersen grab; the samples were stored in plastic bags, and sent to the Geology Department, University of Western Australia to be used in a study of the foraminifera of the continental shelf (Betjeman 1965).

Bottom Photographs.—Bottom photographs were taken at the stations indicated in Table 1, using the Ewing suspended camera as described in CSIRO Aust. (1967).

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IV. DATA

The hydrology data were processed in a C.D.C. 3600 Computer. An explanation of headings used is given at the beginning of each part, except for hydrology, where it is given at the beginning of the surface listing.

DATA

PART 1

HYDROLOGY

SURFACE SAMPLES

EXPLANATION OF HEADINGS

Parts 1 and 2	Hydrology
STATION	Gives the station identification. For example, Dm1/1/64 signifies the 1st station worked by Diamantina in 1964, on her 1st 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 Western Australian Standard Time, GMT +8 hr, Code H
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	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)
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
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 µg-atom P/l

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

CRUISE	STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN.	WIND AMT.	SEA DN.	SEA AMT.	SWELL DN.	SWELL AMT.	VIS.	BAROM.
1	1	64	1	28	1830	H 30 00	S 114 43	E 21.4	35.77	17	4	17	3	19	4	8	1011.8
1	2	64	1	28	1930	H 30 00	S 114 33	E 22.0	35.69	18	4	18	3	19	4	8	1013.0
1	3	64	1	28	2100	H 30 00	S 114 33	E		18	4	18	3	19	4	8	1013.0
1	4	64	1	28	2355	H 30 00	S 114 30	E 21.9	35.72	16	4	16	3	19	1	8	1012.3
1	5	64	1	29	0208	H 30 00	S 114 26	E		18	4	18	4	21	1	8	1012.5
1	6	64	1	29	1713	H 27 00	S 113 38	E 21.6	35.64	17	5	18	4	18	1	8	1013.0
1	7	64	1	29	2008	H 27 00	S 113 00	E 22.8	35.65	18	6	18	4	18	1	8	1014.0
1	8	64	1	29	2125	H 27 00	S 112 50	E 22.8	35.69	17	5	18	4	18	1	8	1014.1
1	9	64	1	30	1220	H 24 58	S 113 02	E 22.7	35.49	15	4	19	3	19	1	7	1013.0
1	10	64	1	30	1345	H 24 59	S 112 51	E		18	5	19	3	19	4	7	1014.0
1	11	64	1	30	1505	H 24 58	S 112 37	E 22.8	35.49	18	6	19	3	19	4	7	1014.0
1	12	64	1	30		H 24 58	S 112 30	E		17	6	17	4	18	1	8	1014.0
1	13	64	1	30	1850	H 24 58	S 112 19	E 23.4	35.47	16	5	16	4	20	4	8	1014.0
1	14	64	1	30	2030	H 25 02	S 112 07	E 23.6	35.53	16	4	15	3	18	1	7	1013.0
1	15	64	1	31	1600	H 22 59	S 113 43	E 24.0	35.23	19	3	21	2	21	1	7	1007.5
1	16	64	1	31	1715	H 23 00	S 113 28	E 25.0	35.20	19	3	19	2	19	1	8	1007.8
1	17	64	1	31	1750	H 23 00	S 113 26	E		19	4	19	2	19	1	7	1008.0
1	18	64	1	31	2030	H 23 02	S 113 23	E 25.6	35.29	20	3	20	3	18	1	8	1009.2
1	19	64	1	31	2200	H 23 04	S 113 13	E 25.3	35.27	20	4	20	3	19	1	8	1009.5
1	20	64	1	31	2300	H 23 05	S 113 13	E		20	3	20	3	19	1	8	1009.5
1	21	64	2	1	1135	H 21 47	S 113 51	E 26.3	35.18	21	3	21	3	21	1	8	1008.0
1	22	64	2	1	1830	H 21 47	S 114 02	E 25.7	35.17	24	3	24	2	22	1	8	1006.0
1	23	64	2	1	1935	H 21 48	S 113 57	E 26.2	35.17	22	2	22	2	22	1	8	1007.0
1	24	64	2	1	2035	H 21 49	S 113 56	E		21	2	20	2	21	1	8	1007.0
1	25	64	2	1	2145	H 21 51	S 113 51	E 26.3	35.18	21	4	20	2	21	1	7	1007.0
1	26	64	2	1	2300	H 21 52	S 113 50	E		21	3	21	2	21	1	7	1008.1
1	27	64	2	2	1355	H 24 00	S 113 13	E 24.0	35.81	20	2	20	2	20	1	8	1009.0
1	28	64	2	2	1540	H 24 00	S 112 55	E 24.1	35.42	21	3	21	2	21	1	8	1008.0
1	29	64	2	2	1635	H 24 00	S 112 51	E		20	3	19	2	20	1	8	1009.0
1	30	64	2	2	1837	H 24 04	S 112 38	E	35.35	20	4	20	3	19	1	8	1009.8
1	31	64	2	2	2025	H 24 04	S 112 20	E 24.7	35.39	17	4	17	2	17	1	7	1010.7
1	32	64	2	3	1300	H 26 00	S 113 00	E 23.3	35.50	18	6	18	3	18	1	7	1013.2
1	33	64	2	3	1402	H 26 03	S 112 55	E 23.4	35.50	18	7	18	3	21	4	7	1013.8
1	34	64	2	3	1605	H 25 54	S 112 38	E		17	7	17	3	16	4	7	1013.0
1	35	64	2	3	1835	H 26 09	S 112 27	E 23.4	35.50	18	6	18	2	18	4	7	1012.9
1	36	64	2	3	2025	H 26 14	S 112 14	E 23.9	35.51	17	7	17	3	18	1	7	1015.0
1	37	64	2	3	2105	H 26 15	S 112 14	E		17	6	17	3	18	1	7	1015.1
1	38	64	2	4	1300	H 27 54	S 113 33	E 21.8	35.74	17	4	17	3	18	1	7	1012.5
1	39	64	2	4	1450	H 27 54	S 113 24	E 21.9	35.67	17	4	17	3	18	1	7	1012.5
1	40	64	2	4	1530	H 27 56	S 113 22	E		17	4	17	3	18	1	7	1011.1

CRUISE	STATION NUMBER	YR.	MTH.	DAY	TIME	LATITUDE	LONGITUDE	TEMP.	SALINITY	WIND DN.	WIND AMT.	SEA DN.	SEA AMT.	SWELL DN.	SWELL AMT.	VIS.	BAROM.
1	41	64	2	4	1705	H 28 01	S 113 16	E 22.3	35.65	19	5	18	2	20	4	7	1010.5
1	42	64	2	4	1830	H 28 03	S 113 10	E 22.5	35.68	19	6	18	3	20	4	7	1011.0
1	43	64	2	4	2040	H 28 02	S 113 07	E		19	6	19	2	19	4	7	1012.0
1	44	64	2	5	1148	H 30 04	S 114 24	E 22.3	35.75	17	4	17	2	20	1	8	1013.0
1	45	64	2	5	1700	H 31 00	S 115 00	E 20.4	35.80	19	4	19	3	19	1	8	1012.2
1	46	64	2	5	1800	H 31 05	S 114 55	E 21.6	35.76	16	3	16	3	18	1	8	1012.2
1	47	64	2	5	2030	H 31 00	S 114 53	E 21.6	35.76	17	5	17	2	19	1	8	1013.0
1	48	64	2	5	2145	H 31 00	S 114 47	E 21.6	35.76	16	4	17	2	19	1	8	1014.0
1	49	64	2	15	1640	H 32 03	S 115 23	E 20.8	35.89	20	3	20	2	18	1	8	1016.0
1	50	64	2	15	1725	H 32 03	S 115 20	E 21.3	35.79	18	4	20	2	18	1	8	1016.1
1	51	64	2	15	2000	H 31 56	S 115 13	E 21.3	35.80	18	3	20	2	20	1	8	1016.7
1	52	64	2	15	2108	H 31 55	S 115 08	E 21.3	35.79	18	3	19	2	19	1	8	1016.7
1	53	64	2	16	1210	H 29 05	S 114 25	E 21.3	35.82	22	2	22	1	20	1	8	1014.2
1	54	64	2	16	1430	H 29 06	S 113 56	E 22.5	35.71	15	2	17	1	17	1	7	1014.2
1	55	64	2	16	1725	H 29 07	S 113 52	E 22.1	35.71	18	4	18	2	18	1	8	1014.2
1	56	64	2	16	1850	H 29 07	S 113 49	E 22.1	35.71	16	4	16	2	18	1	7	1013.8
1	57	64	2	16	2010	H 29 06	S 113 49	E		14	3	13	2	18	1	7	1013.3
1	58	64	2	17	1630	H 33 00	S 115 05	E 20.7	35.83	18	3	20	2	20	1	8	1014.2
1	59	64	2	17	1740	H 33 00	S 114 52	E 19.9	35.82	18	3	20	2	20	1	8	1014.0
1	60	64	2	17	2030	H 32 56	S 114 42	E 20.8	35.83	18	0	18	2	18	1	7	1014.6
1	61	64	2	17	2210	H 32 55	S 114 38	E 20.8	35.83	18	3	18	2	18	1	8	1014.1

DATA

PART 2

HYDROLOGY

DEEP STATIONS

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 1/64	28/ 1/64	1830 H	30 00 S	114 43 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	17.8	22.2	17	4	16	8	4	8	17	3	19	4	1011.8	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.37	35.768	25.00	4.95	98	0.50	***	***
1	10	21.33	35.769	25.01	5.08	101	0.25	***	***
1	20	21.21	35.770	25.04	5.01	99	0.22	***	***
1	30	21.17	35.774	25.06	5.03	99	0.20	***	***
1	40	20.54	35.764	25.22	5.10	100	0.29	***	***
1	50	20.50	35.754	25.22	5.07	99	0.34	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 2/64	28/ 1/64	1930 H	30 00 S	114 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
117	20.0	22.2	18	4	16	8	7	8	18	3	19	4	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.01	35.695	24.76	4.93	99	0.22	***	***
1	25	21.94	35.695	24.78	4.94	99	0.25	***	***
1	50	21.40	35.696	24.93	4.97	99	0.25	***	***
1	75	19.56	35.712	25.44	4.91	94	0.35	***	***
1	100	19.17	35.724	25.55	4.67	89	0.38	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 4/64	28/ 1/64	2355 H	30 00 S	114 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
183	***	***	16	4	16	8	1	8	16	3	19	1	1012.3	10	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.88	35.717	24.82	4.91	98	0.17	***	***
1	25	21.87	35.700	24.80	4.95	99	0.16	***	***
1	50	21.45	35.697	24.92	4.99	99	0.22	***	***
1	75	19.45	35.697	25.46	4.71	90	0.29	***	***
1	100	19.06	35.733	25.58	4.66	88	0.32	***	***
1	150	18.31	35.784	25.81	4.87	91	0.35	***	***
1	180	17.12	35.760	26.09	4.91	90	0.45	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 6/64	29/ 1/64	1713 H	27 00 S	113 38 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
84	19.4	22.8	17	5	16	8	6	8	18	4	18	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.62	35.645	24.83	4.65	93	0.42	***	***
1	10	21.58	35.644	24.84	4.74	94	0.30	***	***
1	20	21.56	35.635	24.84	4.73	94	0.33	***	***
1	30	21.48	35.617	24.85	4.72	94	0.30	***	***
1	40	21.24	35.584	24.89	4.66	92	0.36	***	***
1	50	21.13	35.580	24.92	4.56	90	0.42	***	***
1	75	20.31	35.576	25.14	4.04	79	0.49	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 7/64	29/ 1/64	2008 H	27 00 S	113 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
132	18.9	21.7	18	6	16	8	4	8	18	4	18	1	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.81	35.653	24.50	4.91	100	0.30	***	***
1	25	22.86	35.656	24.49	4.83	99	0.29	***	***
1	50	22.75	35.681	24.54	4.82	98	0.29	***	***
1	75	21.29	35.584	24.88	4.42	88	0.37	***	***
1	100	19.87	35.605	25.27	4.20	81	0.42	***	***
1	120	19.72	35.688	25.38	4.21	81	0.46	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 8/64	29/ 1/64	2125 H	27 00 S	112 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
177	18.9	21.7	17	5	16	8	7	8	18	4	18	1	1014.1	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.82	35.693	24.53	4.88	100	0.29	***	***
1	25	22.77	35.682	24.54	4.83	98	0.17	***	***
1	50	22.76	35.683	24.54	4.87	99	0.21	***	***
1	75	22.60	35.632	24.55	4.76	97	0.30	***	***
1	100	20.82	35.552	24.98	4.42	87	0.36	***	***
1	150	19.37	35.671	25.46	4.66	89	0.42	***	***
1	170	19.01	35.698	25.57	4.54	86	0.45	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 9/64	30/ 1/64	1220 H	24 58 S	113 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
71	19.4	24.4	15	4	16	*	0	7	19	3	19	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.68	35.493	24.42	4.77	97	0.29	***	***
1	10	22.65	35.481	24.42	4.78	97	0.33	***	***
1	20	22.62	35.477	24.43	4.78	97	0.33	***	***
1	30	22.62	35.478	24.43	4.75	96	0.29	***	***
1	40	22.09	35.478	24.57	4.60	92	0.29	***	***
1	50	21.52	35.466	24.72	4.17	83	0.37	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 11/64	30/ 1/64	1505 H	24 58 S	112 37 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
112	18.9	22.2	18	6	16	*	0	7	19	3	19	4	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.77	35.490	24.39	4.83	98	0.33	***	***
1	25	22.71	35.495	24.41	4.77	97	0.28	***	***
1	50	22.51	35.486	24.46	4.73	96	0.28	***	***
1	75	22.35	35.478	24.50	4.61	93	0.27	***	***
1	100	21.82	35.465	24.64	4.49	90	0.41	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 13/64	30/ 1/64	1850 H	24 58 S	112 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	CAST3
185	18.3	21.9	16	5	16	*	0	8	16	4	20	4	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.40	35.475	24.20	4.78	98	0.24	***	***
1	25	23.30	35.476	24.23	4.84	99	0.24	***	***
1	50	23.31	35.493	24.24	4.78	98	0.24	***	***
1	75	21.94	35.468	24.61	4.83	97	0.30	***	***
1	100	20.51	35.529	25.05	4.54	89	0.37	***	***
1	150	18.99	35.692	25.57	4.44	84	0.41	***	***
1	180	18.69	35.712	25.66	4.46	84	0.45	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 14/64	30/ 1/64	2030 H	25 02 S	112 07 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
530	18.9	21.7	15	4	16	*	0	7	15	3	18	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.60	35.529	24.18	4.70	97	0.24	***	***
1	24	23.60	35.529	24.18	4.71	97	0.24	***	***
1	48	23.57	35.531	24.19	4.73	98	0.24	***	***
1	72	21.32	35.561	24.85	5.04	100	0.27	***	***
1	97	20.53	35.619	25.11	4.92	96	0.27	***	***
1	145	18.89	35.683	25.59	4.30	81	0.43	***	***
1	193	17.89	35.810	25.94	4.79	89	0.41	***	***
1	290	15.20	35.638	26.44	5.10	90	0.52	***	***
1	483	8.89	34.689	26.91	5.24	80	0.95	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 15/64	31/ 1/64	1600 H	22 59 S	113 43 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
68	22.2	28.9	19	3	16	*	0	7	21	2	21	1	1007.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.02	35.232	23.83	4.77	99	0.35	***	***
1	10	24.01	35.230	23.83	4.79	100	0.35	***	***
1	20	23.69	35.249	23.94	4.80	99	0.41	***	***
1	30	23.48	35.234	23.99	4.80	99	0.37	***	***
1	40	23.29	35.241	24.05	4.79	98	0.37	***	***
1	50	23.02	35.192	24.09	4.50	92	0.39	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 16/64	31/ 1/64	1715 H	23 00 S	113 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
110	21.7	27.8	19	3	16	*	0	8	19	2	19	1	1007.8	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.96	35.201	23.53	4.69	99	0.29	***	***
1	25	24.27	35.172	23.71	4.74	99	0.27	***	***
1	50	23.77	35.191	23.87	4.67	97	0.29	***	***
1	75	23.10	35.112	24.01	4.15	85	0.43	***	***
1	100	21.88	35.161	24.39	3.87	77	0.53	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 18/64	31/ 1/64	2030 H	23 02 S	113 23 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
183	21.7	26.1	20	3	16	*	0	8	20	3	18	1	1009.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.56	35.287	23.41	4.66	100	0.26	***	***
1	25	25.56	35.260	23.39	4.66	100	0.26	***	***
1	50	25.48	35.252	23.41	4.61	99	0.27	***	***
1	75	23.28	35.174	24.00	4.73	97	0.27	***	***
1	100	21.88	35.148	24.38	3.87	77	0.50	***	***
1	150	20.08	35.441	25.10	4.04	78	0.54	***	***
1	180	19.41	35.485	25.30	4.04	77	0.62	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 19/64	31/ 1/64	2200 H	23 04 S	113 13 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
518	20.6	25.0	20	4	16	*	0	8	20	3	19	1	1009.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.31	35.270	23.47	4.53	97	0.29	***	***
1	25	25.30	35.267	23.47	4.68	100	0.27	***	***
1	50	***	35.294	***	4.80	***	0.27	***	***
1	75	21.74	35.376	24.60	4.80	96	0.29	***	***
1	100	20.97	35.416	24.84	4.47	88	0.39	***	***
1	150	19.92	35.640	25.29	4.60	89	0.49	***	***
1	200	18.72	35.743	25.68	4.85	91	0.54	***	***
1	300	15.90	35.684	26.31	4.87	87	0.64	***	***
1	500	8.66	34.715	26.97	5.17	79	1.09	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 21/64	1/ 2/64	1135 H	21 47 S	113 51 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
512	24.4	28.1	21	3	16	*	0	8	21	3	21	1	1008.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.29	35.183	23.10	4.56	99	0.25	***	***
1	24	26.23	35.178	23.12	4.56	99	0.25	***	***
1	49	24.53	35.110	23.59	4.83	101	0.32	***	***
1	73	23.21	35.109	23.98	4.73	97	0.31	***	***
1	98	22.05	35.106	24.30	3.98	80	0.62	***	***
1	146	19.86	35.211	24.98	3.43	66	0.67	***	***
1	195	18.09	35.539	25.68	3.99	74	0.73	***	***
1	293	13.50	35.222	26.48	4.26	72	0.79	***	***
1	488	9.06	34.749	26.93	4.80	74	1.08	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 22/64	1/ 2/64	1830 H	21 47 S	114 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
51	24.4	27.2	24	3	16	8	1	8	24	2	22	1	1006.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.70	35.166	23.27	4.63	99	0.34	***	***
1	10	25.65	35.145	23.27	4.67	100	0.36	***	***
1	20	***	35.113	***	4.57	***	0.34	***	***
1	30	24.77	35.108	23.51	4.53	95	0.37	***	***
1	40	24.62	35.100	23.55	4.47	94	0.37	***	***
1	50	23.61	35.082	23.84	4.26	88	0.61	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 23/64	1/ 2/64	1935 H	21 48 S	113 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
112	21.7	26.7	22	2	16	8	1	8	22	2	22	1	1007.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	25.18	35.169	23.13	4.59	99	0.37	***	***
1	25	25.01	35.165	23.18	4.64	100	0.37	***	***
1	50	25.07	35.134	23.44	4.72	100	0.40	***	***
1	75	23.61	35.086	23.84	4.50	93	0.42	***	***
1	100	23.18	35.098	23.98	4.33	89	0.62	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 25/64	1/ 2/64	2145 H	21 51 S	113 51 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
274	22.8	26.1	21	4	16	8	1	7	20	2	21	1	1007.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	26.25	35.177	23.11	4.60	100	0.26	***	***
1	25	26.24	35.174	23.11	4.61	100	0.26	***	***
1	50	24.26	35.090	23.65	4.82	101	0.31	***	***
1	75	22.68	35.086	24.11	3.82	77	0.53	***	***
1	100	21.32	35.108	24.51	3.42	68	0.78	***	***
1	150	19.82	35.215	24.99	3.39	65	0.85	***	***
1	190	17.17	35.402	25.80	3.85	70	1.38	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 27/64	2/ 2/64	1355 H	24 00 S	113 13 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	22.2	25.6	20	2	16	*	0	8	20	2	20	1	1009.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.95	35.806	24.29	4.87	102	0.24	***	***
1	10	23.89	35.814	24.31	4.91	102	0.28	***	***
1	20	23.70	35.795	24.35	4.89	101	0.28	***	***
1	30	23.49	35.774	24.40	4.77	99	0.28	***	***
1	40	23.41	35.781	24.42	4.55	94	0.30	***	***
1	50	23.23	35.778	24.48	4.35	89	0.36	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 28/64	2/ 2/64	1540 H	24 00 S	112 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
109	22.2	26.7	21	3	16	*	0	8	21	2	21	1	1008.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.09	35.416	23.95	4.86	101	0.26	***	***
1	25	23.43	35.426	24.15	4.98	103	0.30	***	***
1	50	22.94	35.405	24.28	4.67	95	0.27	***	***
1	75	22.13	35.334	24.45	4.27	86	0.35	***	***
1	100	21.49	35.280	24.59	4.06	81	0.46	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 30/64	2/ 2/64	1837 H	24 04 S	112 38 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
183	21.7	25.0	20	4	16	*	0	8	20	3	19	1	1009.8	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	***	35.349	***	4.85	***	0.27	***	***
1	25	23.90	35.339	23.95	4.86	101	0.24	***	***
1	50	23.56	35.337	24.05	4.69	97	0.26	***	***
1	75	22.29	35.302	24.39	4.64	93	0.30	***	***
1	100	21.03	35.389	24.80	4.31	85	0.39	***	***
1	150	20.15	35.574	25.18	4.46	86	0.48	***	***
1	180	19.39	35.655	25.44	4.58	87	0.49	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 31/64	2/ 2/64	2025 H	24 04 S	112 20 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
558	21.1	24.4	17	4	16	*	0	7	17	2	17	1	1010.7	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	24.74	35.392	23.74	4.79	101	0.23	***	***
1	24	24.56	35.388	23.79	4.74	100	0.22	***	***
1	49	23.41	35.483	24.20	4.95	102	0.26	***	***
1	73	22.20	35.578	24.62	5.00	101	0.33	***	***
1	98	20.35	35.561	25.12	4.49	87	0.38	***	***
1	147	19.09	35.704	25.55	4.49	85	0.46	***	***
1	196	17.58	35.740	25.96	4.60	85	0.60	***	***
1	293	14.96	35.590	26.45	4.92	86	0.61	***	***
1	489	9.22	34.744	26.90	5.31	82	1.06	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 32/64	3/ 2/64	1300 H	26 00 S	113 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
77	20.0	24.4	18	6	16	2	3	7	18	3	18	1	1013.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.26	35.504	24.26	4.77	98	0.27	***	***
1	10	23.19	35.501	24.28	4.79	98	0.28	***	***
1	20	23.18	35.494	24.28	4.76	98	0.24	***	***
1	30	23.19	35.494	24.27	4.77	98	0.23	***	***
1	40	23.17	35.496	24.28	4.77	98	0.24	***	***
1	50	22.87	35.494	24.36	4.84	99	0.25	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 33/64	3/ 2/64	1402 H	26 03 S	112 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
113	20.6	25.0	18	7	16	3	3	7	18	3	21	4	1013.8	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.37	35.499	24.22	4.79	99	0.28	***	***
1	25	23.27	35.483	24.24	4.79	98	0.22	***	***
1	50	23.04	35.484	24.31	4.70	96	0.23	***	***
1	75	21.45	35.522	24.79	4.87	97	0.28	***	***
1	100	20.32	35.547	25.11	4.33	84	0.35	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 35/64	3/ 2/64	1835 H	26 09 S	112 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
192	19.4	22.8	18	6	16	4	6	7	18	2	18	4	1012.9	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.36	35.499	24.23	4.67	96	0.25	***	***
1	25	23.34	35.491	24.23	4.81	99	0.22	***	***
1	50	22.94	35.525	24.37	4.79	98	0.19	***	***
1	75	20.58	35.621	25.10	4.96	97	0.29	***	***
1	100	19.86	35.649	25.31	4.70	91	0.29	***	***
1	150	18.77	35.732	25.66	4.42	83	0.35	***	***
1	190	17.83	35.767	25.92	4.67	87	0.35	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 36/64	4/ 2/64	2025 H	26 14 S	112 14 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
***	19.4	22.2	17	7	16	5	3	7	17	3	18	1	1015.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	23.85	35.507	24.09	4.80	100	0.22	***	***
1	24	23.83	35.503	24.09	4.76	99	0.23	***	***
1	47	22.56	35.753	24.65	4.84	98	0.23	***	***
1	71	22.16	35.809	24.81	4.90	99	0.22	***	***
1	94	19.41	35.765	25.52	4.91	94	0.30	***	***
1	141	17.61	35.802	26.00	5.02	93	0.31	***	***
1	188	16.29	35.745	26.27	5.04	91	0.44	***	***
1	282	13.45	35.382	26.62	5.27	89	0.63	***	***
1	470	9.02	34.693	26.89	5.41	83	1.09	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 38/64	4/ 2/64	1300 H	27 54 S	113 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
55	19.7	25.0	17	4	16	*	0	7	17	3	18	1	1012.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.83	35.745	24.85	4.83	97	0.21	***	***
1	10	21.81	35.744	24.86	4.85	97	0.21	***	***
1	20	21.76	35.747	24.87	4.90	98	0.23	***	***
1	30	21.70	35.745	24.89	4.87	97	0.27	***	***
1	40	21.65	35.779	24.93	4.84	97	0.25	***	***
1	50	20.83	35.672	25.07	4.27	84	0.29	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 39/64	4/ 2/64	1450 H	27 54 S	113 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
112	19.4	25.0	17	4	16	*	0	7	17	3	18	1	1012.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.91	35.675	24.77	4.87	98	0.22	***	***
1	25	21.80	35.676	24.81	4.87	97	0.23	***	***
1	50	21.04	35.716	25.05	4.80	95	0.29	***	***
1	75	19.89	35.652	25.31	4.63	89	0.31	***	***
1	100	19.78	35.656	25.34	4.50	87	0.32	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 41/64	4/ 2/64	1705 H	28 01 S	113 16 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
183	21.7	24.4	19	5	16	*	0	7	18	2	20	4	1010.5	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.29	35.650	24.65	4.83	98	0.23	***	***
1	25	22.10	35.701	24.74	4.84	97	0.21	***	***
1	50	21.78	35.668	24.81	4.81	96	0.22	***	***
1	75	20.99	35.616	24.98	4.67	92	0.22	***	***
1	100	19.72	35.671	25.37	4.67	90	0.25	***	***
1	150	19.04	35.703	25.57	4.38	83	0.31	***	***
1	180	18.87	35.731	25.63	4.47	85	0.47	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 42/64	4/ 2/64	1830 H	28 03 S	113 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
521	20.6	23.1	19	6	16	6	1	7	18	3	20	4	1011.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.49	35.685	24.62	4.90	99	0.20	***	***
1	24	22.42	35.689	24.64	4.84	98	0.20	***	***
1	47	21.91	35.667	24.77	4.84	97	0.20	***	***
1	71	21.26	35.717	24.99	4.81	95	0.25	***	***
1	95	19.91	35.632	25.29	4.56	88	0.26	***	***
1	142	19.05	35.723	25.58	4.64	88	0.29	***	***
1	190	17.95	35.797	25.91	4.76	88	0.28	***	***
1	285	15.84	35.703	26.34	5.07	90	0.32	***	***
1	475	8.17	34.603	26.96	5.10	77	0.99	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 44/64	5/ 2/64	1148 H	30 04 S	114 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
512	21.9	25.8	17	4	16	*	0	8	17	2	20	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.28	35.748	24.73	4.80	97	0.23	***	***
1	24	22.15	35.705	24.73	4.77	96	0.21	***	***
1	47	21.53	35.760	24.95	5.02	100	0.22	***	***
1	71	20.13	35.739	25.31	5.10	99	0.21	***	***
1	95	18.87	35.772	25.66	4.96	94	0.23	***	***
1	142	17.78	35.800	25.96	5.01	93	0.28	***	***
1	189	16.90	35.753	26.13	5.11	93	0.29	***	***
1	284	15.10	35.592	26.42	5.41	95	0.41	***	***
1	473	9.07	34.706	26.90	5.46	84	1.01	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 45/64	5/ 2/64	1700 H	31 00 S	115 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
53	20.0	22.8	19	4	16	4	3	8	19	3	18	1	1012.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.41	35.800	25.28	4.67	91	0.21	***	***
1	10	20.28	35.799	25.32	5.08	99	0.28	***	***
1	20	20.21	35.797	25.33	5.10	99	0.29	***	***
1	30	20.05	35.796	25.37	5.07	98	0.27	***	***
1	40	19.93	35.793	25.40	5.02	97	0.28	***	***
1	48	19.11	35.773	25.60	4.96	94	0.32	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 46/64	5/ 2/64	1800 H	31 05 S	114 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
112	18.3	21.7	16	3	16	4	3	8	16	3	18	1	1012.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.59	35.764	24.93	5.01	100	0.28	***	***
1	25	21.50	35.764	24.96	5.04	100	0.27	***	***
1	50	20.32	35.790	25.30	5.18	101	0.27	***	***
1	75	20.03	35.791	25.37	5.13	99	0.28	***	***
1	100	18.73	35.782	25.71	4.93	93	0.35	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 47/64	5/ 2/64	2030 H	31 00 S	114 53 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
210	20.0	22.2	17	5	16	*	0	8	17	2	19	1	1013.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.61	35.760	24.92	5.10	102	0.21	***	***
1	25	21.58	35.766	24.94	5.04	100	0.27	***	***
1	50	21.34	35.764	25.00	5.01	99	0.30	***	***
1	75	20.74	35.739	25.15	5.10	100	0.26	***	***
1	100	19.52	35.788	25.76	5.01	94	0.28	***	***
1	150	17.65	35.798	25.99	4.97	92	0.32	***	***
1	200	16.87	35.747	26.14	5.04	92	0.30	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 48/64	5/ 2/64	2145 H	31 00 S	114 47 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
585	20.0	22.8	16	4	16	*	0	8	17	2	19	1	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.59	35.758	24.93	5.01	100	0.30	***	***
1	25	21.58	35.763	24.93	4.95	99	0.26	***	***
1	50	21.50	35.758	24.95	5.01	100	0.20	***	***
1	75	20.68	35.748	25.17	5.07	99	0.23	***	***
1	100	18.95	35.756	25.63	5.01	95	0.28	***	***
1	150	17.38	35.774	26.03	4.93	91	0.32	***	***
1	200	16.80	35.740	26.15	5.00	91	0.40	***	***
1	300	14.83	35.553	26.45	5.25	92	0.43	***	***
1	500	9.00	34.685	26.89	5.44	83	1.05	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 49/64	15/ 2/64	1640 H	32 03 S	115 23 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	***	21.7	20	3	16	*	0	8	20	2	18	1	1016.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.75	35.892	25.26	4.98	98	0.24	***	***
1	10	20.76	35.888	25.25	5.07	100	0.24	***	***
1	20	20.72	35.884	25.26	5.06	99	0.28	***	***
1	30	20.57	35.877	25.30	5.00	98	0.25	***	***
1	40	20.51	35.875	25.31	4.99	98	0.25	***	***
1	50	18.71	35.764	25.70	4.88	92	0.30	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 30/64	15/ 2/64	1725 H	32 03 S	115 20 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
112	18.3	21.7	18	4	16	*	*	8	20	2	18	1	1016.1	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.27	35.792	25.04	5.00	99	0.24	***	***
1	25	21.24	35.791	25.05	4.92	97	0.31	***	***
1	50	20.94	35.785	25.13	5.02	99	0.30	***	***
1	75	19.48	35.754	25.49	4.87	93	0.28	***	***
1	100	18.62	35.764	25.72	4.79	90	0.34	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 51/64	15/ 2/64	2000 H	31 56 S	115 13 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
187	18.9	21.7	18	3	16	*	0	8	20	2	20	1	1016.7	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.26	35.797	25.05	4.96	98	0.28	***	***
1	25	21.22	35.794	25.06	4.93	98	0.31	***	***
1	50	21.12	35.789	25.08	4.87	96	0.25	***	***
1	75	19.25	35.756	25.55	4.72	90	0.36	***	***
1	100	18.33	35.774	25.80	4.90	92	0.42	***	***
1	150	16.40	35.715	26.22	5.02	90	0.37	***	***
1	170	15.83	35.664	26.31	5.09	91	0.40	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 52/64	15/ 2/64	2108 H	31 55 S	115 08 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
503	18.9	21.7	18	3	16	*	0	8	19	2	19	1	1016.7	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.34	35.786	25.02	4.94	98	0.31	***	***
1	24	21.35	35.786	25.01	5.06	100	0.24	***	***
1	48	20.82	35.831	25.20	5.04	99	0.30	***	***
1	71	19.65	35.808	25.49	5.19	100	0.26	***	***
1	95	19.03	35.785	25.88	5.23	97	0.35	***	***
1	143	15.69	35.647	26.33	5.24	93	0.36	***	***
1	191	14.55	35.528	26.49	5.30	92	0.48	***	***
1	286	12.75	35.238	26.65	5.39	90	0.64	***	***
1	476	8.04	34.585	26.96	5.07	76	1.31	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 53/64	16/ 2/64	1210 H	29 05 S	114 25 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	23.3	28.3	22	2	16	*	0	8	22	1	20	1	1014.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	21.25	35.816	25.07	5.04	100	0.19	***	***
1	10	20.93	35.804	25.14	5.00	98	0.18	***	***
1	20	20.89	35.805	25.16	4.99	98	0.18	***	***
1	30	20.90	35.807	25.15	4.99	98	0.17	***	***
1	40	20.84	35.805	25.17	4.93	97	0.18	***	***
1	50	20.81	35.808	25.18	4.94	97	0.18	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 54/64	16/ 2/64	1430 H	29 06 S	113 56 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
108	22.2	26.1	15	2	16	8	1	7	17	1	17	1	1014.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.45	35.713	24.65	4.93	100	0.14	***	***
1	25	21.51	35.715	24.92	4.90	98	0.13	***	***
1	50	21.30	35.713	24.97	4.94	98	0.15	***	***
1	75	19.36	35.697	25.48	4.58	87	0.19	***	***
1	100	18.96	35.729	25.61	4.53	86	0.28	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 55/64	16/ 2/64	1725 H	29 07 S	113 52 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
190	22.2	25.0	18	4	16	9	1	8	18	2	18	1	1014.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.14	35.714	24.74	5.02	101	0.13	***	***
1	25	21.65	35.711	24.88	5.07	101	0.14	***	***
1	50	21.47	35.709	24.92	4.93	98	0.09	***	***
1	75	19.31	35.692	25.49	4.58	87	0.19	***	***
1	100	19.04	35.724	25.58	4.55	86	0.24	***	***
1	150	18.11	35.784	25.86	4.87	91	0.27	***	***
1	180	17.56	35.784	26.00	4.76	88	0.25	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 56/64	16/ 2/64	1850 H	29 07 S	113 49 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
585	21.7	23.9	16	4	16	9	1	7	16	2	18	1	1013.8	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	22.13	35.715	24.74	4.85	98	0.13	***	***
1	24	21.73	35.705	24.85	4.96	99	0.11	***	***
1	48	21.59	35.709	24.89	4.91	98	0.14	***	***
1	72	19.76	35.656	25.34	4.65	89	0.18	***	***
1	96	19.17	35.711	25.54	4.60	88	0.22	***	***
1	143	18.38	35.772	25.79	4.71	88	0.24	***	***
1	191	17.58	35.786	25.99	4.91	91	0.27	***	***
1	287	14.94	35.593	26.46	5.05	88	0.36	***	***
1	478	9.02	34.688	26.89	5.27	81	0.95	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 58/64	17/ 2/64	1630 H	33 00 S	115 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
53	19.4	22.2	18	3	16	1	6	8	20	2	20	1	1014.2	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.71	35.829	25.22	5.03	99	0.19	***	***
1	10	20.69	35.831	25.23	5.04	99	0.21	***	***
1	20	20.08	35.827	25.39	5.16	100	0.17	***	***
1	30	19.63	35.808	25.49	5.12	98	0.17	***	***
1	40	19.47	35.803	25.53	5.12	98	0.19	***	***
1	50	19.33	35.794	25.56	5.08	97	0.17	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 59/64	17/ 2/64	1740 H	33 00 S	114 52 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
117	19.4	21.7	18	3	16	1	5	8	20	2	20	1	1014.0	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	19.92	35.823	25.43	5.08	98	0.16	***	***
1	25	19.56	35.820	25.52	5.20	100	0.17	***	***
1	50	19.24	35.819	25.60	5.18	99	0.14	***	***
1	75	19.13	35.820	25.63	5.18	99	0.17	***	***
1	100	18.12	35.768	25.85	5.52	103	0.25	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 60/64	17/ 2/64	2030 H	32 56 S	114 42 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
238	***	***	18	10	16	5	1	7	18	2	18	1	1014.6	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.79	35.826	25.20	5.14	101	0.16	***	***
1	24	20.78	35.826	25.20	5.03	99	0.16	***	***
1	47	20.72	35.821	25.21	5.10	100	0.20	***	***
1	70	20.62	35.815	25.24	5.05	99	0.19	***	***
1	93	19.45	35.787	25.52	5.08	97	0.19	***	***
1	140	17.56	35.754	25.97	5.03	93	0.22	***	***
1	186	13.74	35.770	26.85	5.30	90	0.42	***	***
1	214	12.66	35.203	26.64	5.36	89	0.55	***	***

STATION	DATE	TIME	LATITUDE	LONGITUDE
DM 1/ 61/64	17/ 2/64	2210 H	32 55 S	114 38 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
521	20.0	21.7	18	3	16	*	0	8	18	2	18	1	1014.1	*	*	*

CAST	DEPTH	TEMP.	SALINITY	SIGMA-T	OXYGEN	OXYGEN % SAT.	INORG. P	TOTAL P	NITRATE
1	0	20.83	35.827	25.19	5.02	99	0.15	***	***
1	25	20.52	35.822	25.27	5.06	99	0.15	***	***
1	50	20.21	35.817	25.35	5.08	99	0.14	***	***
1	75	19.40	35.783	25.53	4.99	95	0.19	***	***
1	100	18.42	35.772	25.78	4.99	94	0.21	***	***
1	150	17.46	35.747	26.00	4.96	91	0.26	***	***
1	200	15.09	35.569	26.41	5.33	93	0.29	***	***
1	300	12.43	35.217	26.69	5.47	91	0.46	***	***
1	500	8.76	34.623	26.88	5.44	83	0.94	***	***

DATA

PART 3

CRAYFISH LARVAE

EXPLANATION OF HEADINGS

Part 3	Crayfish Larvae
STN	Gives the station number
DATE	Given as day/month/year
LATITUDE LONGITUDE	Given in degrees and minutes
TIME	Given in Zone Time, and is the time at the beginning of the tow. The code letter for the time zone follows the time. Zone Time throughout the cruise was Western Australian Standard Time, GMT +8hr, Code H
DURATION	Duration of tow, given in minutes
DEPTH	Sampling depth given in metres

A blank indicates no crayfish larvae in sample

MIDWATER TRAWL SAMPLES

STN	DATE	LATITUDE	LONGITUDE	TIME	DURATION	DEPTH	PHYLLOSOMA											PUERULUS	
							Panulirus longipes cygnus Stage									Other panulirids	Other genera	Panulirus longipes cygnus	Other genera
							I	II	III	IV	V	VI	VII	VIII	IX				
5	29/1/64	30 00	S.114 28	E. 0145	H	65	215-0	2											
20	31/1/64	23 05	S.113 12.5	E. 2235	H	72	200-0		1	1	1				1	2	1		
26	1/2/64	21 52	S.113 50	E. 2325	H	80	200-0	1									6		
31	2/2/64	24 06.5	S.112 22	E. 2200	H	77	305-0												
37	3/2/64	26 15	S.112 13.5	E. 2100	H	77	200-0		1		2						1		
43	4/2/64	28 01.5	S.113 07	E. 2100	H	76	290-0	3	1								7		
48	5/2/64	31 00	S.114 47	E. 2220	H	73	260-0												
52	15/2/64	31 54.8	S.115 08.4	E. 2225	H	70	185-0	2	1	1							2	1	
57	16/2/64	29 06	S.113 48.5	E. 2100	H	82	200-0	2		1	1					1	1		2
61	18/2/64	32 55	S.114 37.5	E. 0105	H	81	215-0	8	3								1		

SURFACE PLANKTON SAMPLES

STN	DATE	LATITUDE	LONGITUDE	TIME	DURATION	DEPTH	PHYLLOSOMA								PUERULUS	
							Panulirus longipes cygnus Stage						Other Panulirids	Other genera	*Panulirus longipes cygnus*	Other genera
							I	II	III	IV	V	VI				
57	16/2/64	29 06 S.	113 48.5 E.	2100 H	30	0	3	19	15	16	3	1		4		
61	18/2/64	32 55 S.	114 37.5 E.	0105 H	30	0	51	31	3	2	1			10		

BEAM TRAWL SAMPLES

STN	DATE	LATITUDE	LONGITUDE	TIME	DURATION	DEPTH	PHYLLOSOMA												PUERULUS	
							Panulirus longipes cygnus									Other Panulirids	Other genera		Panulirus longipes cygnus	Other genera
							Stage													
							I	II	III	IV	V	VI	VII	VIII	IX					
3	28/1/64	30 00	S. 114 32.9	E.	2210	H	20	129												
12	30/1/64	24 58	S. 112 30	E.	1630	H	15	129												
17	31/1/64	22 59.7	S. 113 25.5	E.	1855	H	16	130												
24	1/2/64	21 48.5	S. 113 56.1	E.	2020	H	20	132-128												
29	2/2/64	24 00	S. 112 51	E.	1645	H	22	130												
34	3/2/64	25 54	S. 112 38	E.	1600	H	17	128-131												
40	4/2/64	27 56	S. 113 28	E.	1520	H	15	110(approx.)												
46	5/2/64	31 05	S. 114 55	E.	1755	H	20	113-122												
50	15/2/64	32 03	S. 115 20	E.	1845	H	30	111-135									1			1
59	17/2/64	33 00	S. 114 52	E.	1840	H	17	115-132												

DATA

PART 4

SEDIMENTS

EXPLANATION OF HEADINGS

Part 4	Sediments
STATION	Gives the station identification. For example, Dm1/1/64 signifies the 1st station worked by Diamantina in 1964, on her 1st cruise for that year
LATITUDE LONGITUDE	Given in degrees and minutes
SONIC DEPTH	Given in metres, measured at standard sound velocity of 800 fm (1463 m) per second

* indicates no data available

SEDIMENT SAMPLES

STATION	LATITUDE	LONGITUDE	SONIC DEPTH	SAMPLING METHOD	DESCRIPTION OF SEDIMENT
Dm1/ 1/64	30 00 S.	114 43 E.	59	Petersen Grab	Red-speckled, medium-grained calcarenite with bryozoans and many shell fragments
Dm1/ 2/64	30 00 S.	114 33 E.	117	Petersen Grab	Poorly sorted, fine- to very coarse-grained calcarenite, large bryozoans, gastropods
Dm1/ 4/64	30 00 S.	114 30 E.	183	Petersen Grab	Grey-brown, fine- to medium-grained sand
Dm1/ 6/64	27 00 S.	113 28 E.	84	Petersen Grab	Light-brown, medium- to coarse-grained shelly sand
Dm1/ 9/64	24 58 S.	113 02 E.	71	Petersen Grab	Grey-speckled, fine- to medium-grained sand
Dm1/10/64	24 59 S.	112 51 E.	*	Petersen Grab	Black, fine-grained, organic silty sand
Dm1/11/64	24 58 S.	112 37 E.	112	Petersen Grab	Grey-brown, fine- to medium-grained, shelly sand
Dm1/15/64	22 59 S.	113 43 E.	50	Petersen Grab	Grey-brown, fine- to medium-grained, silty sand, abundant scaphopods
Dm1/16/64	23 00 S.	113 28 E.	110	Petersen Grab	Brown, medium- to very coarse-grained poorly sorted calcarenite
Dm1/18/64	23 02 S.	113 23 E.	183	Petersen Grab	Brown, poorly sorted, medium- to coarse-grained calcarenite, some corals
Dm1/22/64	21 47 S.	114 02 E.	51	Petersen Grab	Brown, medium-grained, calcareous sand
Dm1/23/64	21 48 S.	113 57 E.	112	Petersen Grab	Brown-grey, fine- to medium-grained silty sand, ? calcareous
Dm1/25/64	21 51 S.	113 51 E.	274	Petersen Grab	Chocolate-coloured, fine-grained, sandy silt

SEDIMENT SAMPLES

STATION	LATITUDE	LONGITUDE	SONIC DEPTH	SAMPLING METHOD	DESCRIPTION OF SEDIMENT
Dm1/27/64	24 00 S.	113 13 E.	57	Petersen Grab	Brown, medium- to coarse-grained calcarenite
Dm1/28/64	24 00 S.	112 55 E.	109	Petersen Grab	Brown, fine- to medium-grained silty sand
Dm1/30/64	24 04 S.	112 38 E.	183	Petersen Grab	Light-brown, medium- to coarse-grained calcarenite
Dm1/32/64	26 00 S.	113 00 E.	77	Petersen Grab	Red-speckled, medium- to coarse-grained calcarenite, algal nodules
Dm1/33/64	26 03 S.	112 55 E.	113	Petersen Grab	Brown, medium- to coarse-grained calcarenite, abundant molluscs
Dm1/38/64	27 54 S.	113 33 E.	55	Petersen Grab	Medium-grained, well sorted, calcareous sand
Dm1/39/64	27 54 S.	113 24 E.	112	Petersen Grab	Red-speckled, medium- to coarse-grained calcarenite
Dm1/41/64	28 01 S.	113 16 E.	183	Petersen Grab	Grey, fine-grained, sandy silt, abundant Porifera
Dm1/45/64	31 00 S.	115 00 E.	53	Petersen Grab	Medium- to coarse-grained calcarenite
Dm1/46/64	31 05 S.	114 55 E.	112	Petersen Grab	Fine- to medium-grained calcarenite
Dm1/47/64	31 00 S.	114 53 E.	210	Petersen Grab	Grey-brown, fine- to medium-grained, calcareous sand
Dm1/53/64	29 05 S.	114 25 E.	51	Petersen Grab	*

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. *Diamintina* 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.
30. Oceanographical observations in the Indian Ocean in 1963. H.M.A.S. *Diamantina* Cruise Dm6/63.
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.
33. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm1/64.
34. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Gascoyne* Cruise G2/64.

OCEANOGRAPHICAL CRUISE REPORTS

(Continued)

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.
38. Oceanographical observations in the Indian Ocean in 1964. H.M.A.S. *Diamantina* Cruise Dm4/64.
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.
44. Oceanographical observations in the Pacific Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G3/65.
45. Oceanographical observations in the Pacific Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G4/65.
46. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Gascoyne* Cruise G5/65.
49. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Diamantina* Cruise Dm2/65.
51. Oceanographical observations in the Indian Ocean in 1965. H.M.A.S. *Diamantina* Cruise Dm3/65.
53. Oceanographical observations in the Indian Ocean in 1966. H.M.A.S. *Diamantina* Cruise Dm1/66.
54. Oceanographical observations in the Indian Ocean in 1966. H.M.A.S. *Diamantina* Cruise Dm2/66.