OCEANOGRAPHICAL OBSERVATIONS
IN THE INDIAN OCEAN IN 1960
H.M.A.S. *DIAMANTINA*
Cruise Dm 3/60

OCEANOGRAPHICAL CRUISE REPORT NO. 4

DIVISION OF FISHERIES AND OCEANOGRAPHY
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL
RESEARCH ORGANIZATION, AUSTRALIA 1962

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CORRIGENDA

p.5. line 8. read "(Fig. 1)"

p.9. line 7. after "nearest 100 m" add "and is in 100 m units."

p.10. below NITRATE read "A short vertical line in first line of certain columns of figures indicates position of decimal point."

p.22. Column S ‰, line 15 delete 34714, substitute 34727.

Column Total P, line 8. The 848 m value of 123 is doubtful and should be rejected.

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MELBOURNE, 1962

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C.S.I.R.O. Aust. Oceanogr. Cruise Rep. No. 4.

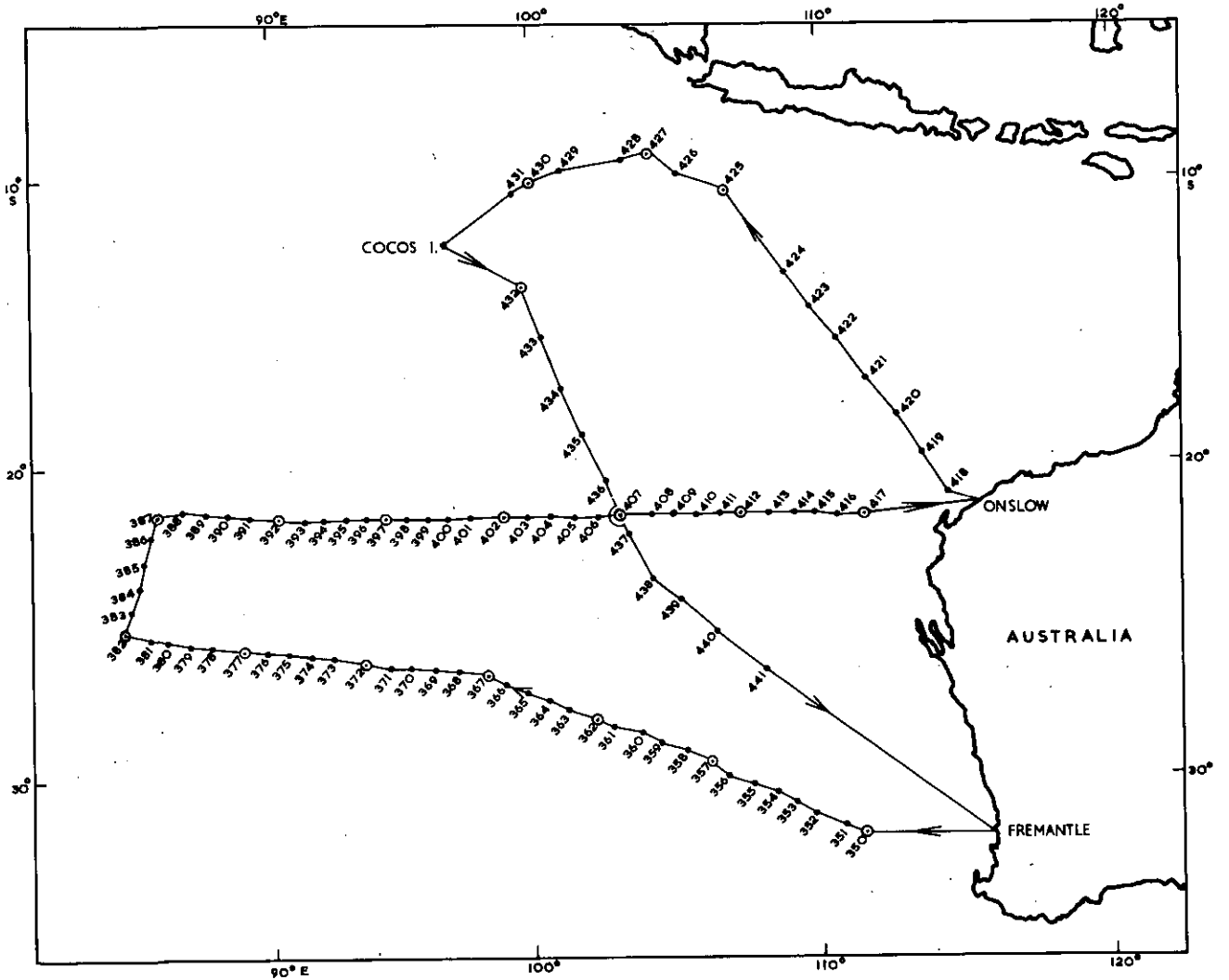


Fig. 1.- Track Chart

OCEANOGRAPHICAL CRUISE REPORT

No. 4

Oceanographical Observations in the Indian Ocean in 1960

H.M.A.S. DIAMANTINA

Cruise Dm 3/60

I. INTRODUCTION

In this volume data are recorded from the third cruise in 1960 of H.M.A.S. Diamantina, Royal Australian Navy frigate, which undertakes oceanographic cruises in the Indian Ocean.

II. METHODS OF COLLECTION AND ANALYSIS OF SAMPLES

1. Physics

See C.S.I.R.O. Aust. (1962 a)

2. Chemistry

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

σ_t.- Sigma-t values were calculated by computer.

Dissolved Oxygen.- See C.S.I.R.O. (1962 a)

Oxygen Saturation.- See C.S.I.R.O. (1962 a). Oxygen percentage saturation values were calculated by computer.

Inorganic Phosphate.- See C.S.I.R.O. (1962 a)

Total Phosphorus.- 100 ml samples were drawn from the Nansen water 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, 100 ml of distilled water and 2 drops of 2% phenolphthalein were added. If alkaline, perchloric acid was added until a slight acidity persisted. The flasks were

allowed to stand for about 24 hours to allow the salts to dissolve. Phosphate was then determined as described for inorganic phosphate (C.S.I.R.O. Aust. 1962 a). Results are given as µg at./l, without salt correction. If it is wished to correct for salt effects, the results given should be multiplied by 1.15.

Nitrate.- Samples were dispensed at sea into plastic bottles and preserved with 2 drops of saturated H_gCl_2. Nitrate was determined at the Cronulla laboratory by the strychnidine method (Rochford 1947). The reagent was prepared by the addition of 0.64 g strychnidine to a litre of nitrate free sulphuric acid. 5 ml of this reagent were added, with minimum agitation, to 5 ml sea water or standard nitrate solution. The standards were made up in a mixture of equal volumes of artificial sea water and nitrate-free sulphuric acid. The standards and samples were shaken to distribute the reagent, and the colour developed for 2 hours. The solutions were read in a UNICAM SP 600 spectrophotometer at a wavelength of 530 mµ using a 5mm cell. Samples with an absorbence greater than that of the standard corresponding to 14.4µg at./l were diluted with artificial sea water-sulphuric acid mixture before reading. Results are given in µg at./l.

REFERENCES

Brown, N.L. and Hamon, B.V. (1961).- An inductive salinometer. Deep-Sea Res. 8 : 65-75.

C.S.I.R.O. Aust. (1962 a).- Oceanographical observations in the Indian Ocean in 1959. H.M.A.S. Diamantina Cruises Dm 1/59, Dm 2/59. C.S.I.R.O. Aust. Oceanogr. Cruise Rep. 1.

C.S.I.R.O. Aust. (1962 b).- Oceanographical observations in the Indian Ocean in 1960. H.M.A.S. Diamantina Cruise Dm 1/60. C.S.I.R.O. Aust. Oceanogr. Cruise Rep. 2.

Rochford, D.J. (1947).- The preparation and use of Harvey's reduced strychnine reagent in oceanographical chemistry. Coun. Sci. Industr. Res. Aust. Bull. No. 220.

III. CRUISE Dm 3/60

Objective

To work stations in the area 10° - 32°S, 85° - 110°E as close to the bottom as practicable in order to determine the extent of the influx of Antarctic Intermediate, Atlantic Deep and Antarctic Bottom water.

Itinerary

On this cruise 91 stations were worked (Fig. 2). The cruise commenced at Fremantle on October 16, 1960 occupied the reference station and then a series of stations west to 82°E, five stations were worked north of this point and then a series of stations east to Onslow, where the ship arrived on October 30. A series of stations was worked north west and west to Cocos and finally there was a series to Fremantle where the cruise concluded on November 1. At 65 stations bathythermograph casts were made, at 71 stations surface hydrology samples were collected, and in addition 20 deep hydrology stations were worked. Table 1 shows the work done at each station.

TABLE 1

WORK DONE AT EACH STATION

Cruise Dm 3/60

Station Number	BT	Hydrology Surface	Hydrology Deep	Station Number	BT	Hydrology Surface	Hydrology Deep
350	+		+	396	+	+	
351	+	+		397			+
352	+	+		398	+	+	
353	+	+		399	+	+	
354	+	+		400	+	+	
355	+			401	+	+	
356	+	+		402			+
357	+		+	403	+	+	
358	+	+		404	+	+	
359	+	+		405	+	+	
360	+	+		406	+	+	
361	+	+		407			+

Station Number	BT	Hydrology Surface	Hydrology Deep	Station Number	BT	Hydrology Surface	Hydrology Deep
362			+	408	+	+	
363	+	+		409	+	+	
364	+	+		410	+	+	
365	+	+		411	+	+	
366	+	+		412			+
367			+	413	+	+	
368	+	+		414	+	+	
369	+	+		415	+	+	
370	+	+		416	+	+	
371	+	+		417			+
372			+	418		+	
373	+	+		419	+	+	
374	+	+		420	+	+	
375	+	+		421	+	+	
376	+	+		422	+	+	
377			+	423	+	+	
378	+	+		424	+	+	
379	+	+		425			+
380	+	+		426	+	+	
381	+	+		427			+
382			+	428	+	+	
383	+	+		429	+	+	
384		+		430			+
385		+		431	+	+	
386		+		432			+
387			+	433		+	
388	+	+		434		+	
389	+	+		435		+	
390	+	+		436		+	
391	+	+		437		+	
392			+	438			+
393	+	+		439	+	+	
394	+	+		440	+	+	
395	+	+		441			+

Scientific Personnel

D.J. Rochford (Cruise Leader)
F. Davies
J. Staniforth

The analyses of hydrological samples were done in the ship's laboratory by Messrs Davies, Rochford and Staniforth.

The analyses for total phosphorus and for nitrate were done at the laboratory at Cronulla by Messrs J. Dal Pont, F. Davies, G. Janovsky, W. Prothero and C. Walker.

The data were processed under the direction of Mr A.D. Crooks by Miss L. Lalor and Mesdames Tarbutt and Wood. The plots were prepared for publication by Mr R. Breach and Mrs B. Walters and the master sheets were typed by Mrs D. Schmitzer.

IV. DATA SHEETS AND TABLES

The data sheets for Cruise Dm 3/60 are arranged in two parts. Part 1 contains the hydrology data for deep stations. Part 2 gives the temperature and salinity data for surface sampling.

Explanation of Headings on Data Sheets

The following notes are supplied to help explain the headings used on the data sheets.

SHIP — All cruises aboard Diamantina are designated by the letters Dm or the figures 11.

CRUISE — The letters Dm are followed by the number of the cruise and the year. Cruise numbers are allotted each year beginning with 1 for the first cruise.

STATION — Stations are numbered consecutively for each ship for each year.

TIME — Given in Local Mean Time and is the time at the beginning of the first cast. The code letter used for the time zone (Table 2) follows the time.

TABLE 2

CODE FOR TIME ZONES

Longitude Exceeding		Up to but not exceeding	Time Zone (hrs)	Code
07°30'E	-	22°30'E	-1	A
22°30'E	-	37°30'E	-2	B
37°30'E	-	52°30'E	-3	C
52°30'E	-	67°30'E	-4	D
67°30'E	-	82°30'E	-5	E
82°30'E	-	97°30'E	-6	F
97°30'E	-	112°30'E	-7	G
112°30'E	-	127°30'E	-8	H
127°30'E	-	142°30'E	-9	I
142°30'E	-	157°30'E	-10	K
157°30'E	-	172°30'E	-11	L
172°30'E	-	180°	-12	M
180°	-	172°30'W	+12	Y
172°30'W	-	157°30'W	+11	X
157°30'W	-	142°30'W	+10	W
142°30'W	-	127°30'W	+9	V
127°30'W	-	112°30'W	+8	U
112°30'W	-	97°30'W	+7	T
97°30'W	-	82°30'W	+6	S
82°30'W	-	67°30'W	+5	R
67°30'W	-	52°30'W	+4	Q
52°30'W	-	37°30'W	+3	P
37°30'W	-	22°30'W	+2	O
22°30'W	-	07°30'W	+1	N
07°30'W	-	07°30'E	0	Z

LATITUDE LONGITUDE	The position of each station is given in degrees and minutes.
SONIC DEPTH	Given in metres, measured at standard sound velocity of 800 fm (1463 m) per second.
MAX. SAMP. DEPTH	Maximum sampling depth is given to the nearest 100 m.
AIR TEMP. WET DRY	Air temperatures are recorded from wet and dry bulb thermometers in centigrade degrees to one decimal place.
WIND DIR. SPEED	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 is 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 is recorded in millibars to one decimal place. 1000 should be added to the figures given.
WIRE ANGLES CAST 1 CAST 2	Wire angles are measured at the surface and expressed in degrees for each cast. No more than two wire angles are recorded; if there is a third cast, the shallow cast angle is neglected.

CAST	The cast numbers (corresponding to the wire angles) are shown.
DEPTH	Actual sampling depth given in metres, a blank indicates 0 metres.
TEMP.	Sea temperatures are recorded in degrees centigrade, to 2 decimal places.
S ‰	Salinities are recorded in parts per thousand, to 3 decimal places.
σ_t	Sigma-t recorded to 3 decimal places.
O_2	Oxygen is given in ml/l to 2 decimal places.
O_2 % Sat.	Oxygen percentage saturation.
INORG. P	Inorganic phosphate values are given in µg at./l to 2 decimal places.
TOTAL P	Values given as µg at./l to 2 decimal places.
NITRATE	Values given as µg at./l to 1 decimal place.

DATA

PART 1

HYDROLOGY

DEEP STATIONS

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	350	60	10	17	0215 G	3155 S	11134 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5037	46	117	128	17	1	16	7	1	4	17	2	21	1	245		

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		1740	35812	26058	558	111	17		42	14	
2	25	1701	35826	26163	562	111	13			13	
2	50	1649	35795	26262	561	110	20		37	15	
2	75	1632	35828	26327	570	111	20			13	
2	100	1590	35795	26399	560	108	20		45	17	
2	150	1498	35642	26488	556	105	32			24	
2	192	1423	35532	26567	570	106	42		47	2	
2	275	1250	35219	26680	565	102	49		73	54	
2	458	948	34750	26864	578	97	103		111	118	
2	625	844	34608	26925	545	86	120		131	14	
2	800	593	34422	27126	478	74	165		165	189	
1	990	469	34402	27258	440	66	195		195	22	
1	1170	345	34469	27440	402	56	205		214		
1	1350	327	34556	27527	358	52	215		215		
1	1800	261	34676	27683	367	52	200		193	272	
1	2250	218	34725	27758	382	54	202		213	262	
1	2700	185	34730	27789	408	57	197			281	
1	3180	158	34731	27810	430	59				255	
1	3650	162	34722	27800	442	61				223	
1	4110	121	34719	27827	455	62				232	
1	4580	115	34717	27829	459	63				237	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	357	60	10	18	0900 G	2947 S	10612 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5303	46	133	161	14	4	16	7	1	4	14	2	19	4	234		

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		1667	35739	25687	543	111	13		33	8	
2	23	1852	35755	25750	540	105	14			9	
2	45	1851	35751	25750	542	106	17		37	1	
2	69	1845	35779	25773	543	110	17			1	1
2	90	1799	35843	25937	542	109	17		37	1	2
2	135	1738	35818	26070	517	85	27			1	3
2	177	1649	35767	26241	525	103	27		55	1	4
2	250	1473	35679	26495	555	105	42		52	3	6
2	400	1101	34983	26779	575	100	78		95	1	2
2	550	937	34736	26871	575	96	105		118	13	3
2	810	740	34519	27000	555	85	145		153	24	3
1	990	498	34400	27224	445	67	172		195	26	2
1	1170	408	34495	27398	358	53	210		215	39	4
1	1360	352	34550	27498	348	51	210		215	40	4
1	1800	275	34669	27670	354	48	208		212	40	
1	2250	232	34716	27740	383	54	208		212	37	2
1	2700	191	34732	27786	404	56	198			35	6
1	3140	167	34729	27802	428	59	198			37	4
1	3570	142	34732	27822	445	61	194			35	2
1	4000	123	34725	27830	459	63	194			33	6
1	4400	111	34716	27831	467	64	194			34	6
1	4560	109	34715	27832	477	65				38	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	362	60	10	19	0900 G	2822 S	102 6 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
4481	40	144	189	14	3	16	8	1	2	14	2	22	1	237		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		1885	35789	25680	537	110	13		36	6	
2	25	1840	35828	25823	537	109	13			14	
2	48	1832	35845	25856	536	108	13		36	3	
2	70	1783	35876	26002	543	109	17			22	
2	92	1709	35844	26157	529	105	22		36	25	
2	140	1588	35736	26358	535	103	31			26	
2	184	1518	35702	26490	550	105	32		47	34	
2	275	1416	35556	26600	546	102	35		57	36	
2	455	1074	34952	26804	562	97	87		102	13	
2	630	910	34710	26895	551	92	105		115	25	8
2	816	698	34481	27034	483	76	153		157	31	
1	993	479	34438	27275	414	62	185		195	39	8
1	1170	381	34513	27439	380	56	205		215	38	6
1	1340	344	34586	27535	357	52	205		236	44	6
1	1870	261	34693	27697	384	55	203		211	39	8
1	2310	215	34726	27762	397	56	203		213	43	8
1	2720	179	34735	27797	407	57	197			46	8
1	3180	151	34734	27817	442	61	190			44	6
1	3625	122	34729	27834	464	64	188			43	
1	3900	108	34725	27839	468	61	188			39	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	367	60	10	20	0900 G	2654 S	098 8 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4938	45	156	189	31	1	16	8	1	2	31	1	22	1	2122		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		1916	35816	25621	539	111	18		34		
2	25	1871	35841	25755	540	110	16				
2	50	1805	35865	25950	544	105	16		34		
2	74	1795	35876	25970	541	104	16				
2	96	1747	35810	26040	520	104	23		34		
2	140	1661	35771	26215	526	103	24			1	2
2	184	1521	35621	26421	526	100	24		50	1	7
2	272	1289	35029	26456	540	98	55		64	5	3
2	448	1060	34940	26820	556	96	88		94	9	2
2	625	907	34707	26897	549	91	110		104	11	9
2	801	686	34487	27055	481	76	149		150	23	1
1	1065	454	34466	27330	393	56	200		200	25	2
1	1255	399	34534	27438	338	50	220		203	21	3
1	1360	340	34591	27550	336	47	220		207	30	4
1	1800	266	34695	27694	349	50	210		195	33	6
1	2250	220	34732	27762	362	54	208		199	36	8
1	2690	178	34741	27803	410	57	205		197	27	6
1	3140	154	34737	27818	423	58	202		195	26	8
1	3590	128	34733	27833	446	61	195		182	25	4
1	4040	113	34726	27838	462	63	195		185	26	4
1	4500	111	34719	27833	464	63	196		185	26	6

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	372	60	10	21	0900 F	2626 S	09342 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
4938	45	161	172	19	3	16	8	1	2	19	2	22	1	180		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		2019	35469	25087	535	112	18		37		
2	23	1962	35670	25390	537	111	17				
2	46	1919	35804	25604	533	110	14		32		
2	69	1917	35812	25615	535	110	16				
2	92	1893	35820	25683	540	111	18		30		
2	140	1816	35836	25890	525	106	22				
2	185	1690	35764	26150	504	95	31		32	1	
2	280	1393	35442	26561	534	99	43		50	3	4
2	465	1117	35136	26869	559	98	73		81	8	4
2	650	928	34739	26888	555	93	98		108	14	9
2	834	728	34523	27025	494	79	139		143	22	6
1	990	621	34461	27121	462	72	152		172	27	8
1	1160	461	34494	27340	355	53	190		208	38	6
1	1310	386	34541	27457	337	49	197		202	38	
1	1690	289	34665	27649	340	49	192		211	31	8
1	2100	238	34720	27738	372	53	195		203	36	
1	2515	195	34737	27787	400	56	192			32	
1	2970	168	34736	27806	418	58	192			23	2
1	3445	143	34733	27822	428	59	183			27	2
1	3920	119	34732	27838	449	61	183			26	8
1	4405	110	34719	27834	464	63	183			31	6

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	377	60	10	22	0900 F	2608 S	08910 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4755	40	156	183	00		16	8	1	2			21	4	1688		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	°/₀ O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2035	35721	25236	535	112	20		35	4	
2	23	1972	35723	25405	532	110	15			1	
2	46	1949	35712	25456	535	111	19		34		
2	69	1947	35725	25471	535	110	14				
2	94	1920	35787	25589	540	111	19		34		
2	140	1893	35811	25676	541	111	16				
2	185	1799	35796	25901	526	106	20		34		
2	278	1463	35501	26457	527	99	43		62	1	8
2	455	1180	35106	26728	545	96	70		84	7	5
2	638	1024	34872	26830	553	94	90		97	10	1
2	816	841	34630	26941	530	87	121		135	18	4
1	975	622	34464	27122	467	73	160		173	22	6
1	1144	448	34471	27336	361	57	197		199	26	4
1	1320	369	34540	27480	351	49	212		215	27	
1	1750	282	34679	27460	347	48	201		208	29	2
1	2200	227	34731	27756	367	52	200		208	25	4
1	2650	184	34739	27797	407	57	195		203	30	8
1	3110	162	34733	27808	419	58	197		203	21	6
1	3570	136	34729	27824	437	60	191		202	25	2
1	4030	111	34717	27832	457	62	187		202	22	8

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	382	60	10	23	0930 F	2531 S	08457 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
4389	43	17|2	17|8	28	3	16	7	1	4	28	2	25	1	15|2		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		20|07	35|717	25|308	5|36	112	18		35	1	1
2	23	1978	35755	25420	529	106	18				1	2
2	45	1935	35766	25534	533	110	15		35		1	5
2	68	1922	35782	25580	534	110	18				1	4
2	90	1913	35793	25611	537	110	19		32		1	5
2	130	1909	35806	25631	531	109	13				1	1
2	170	1835	35802	25816	522	106	22		32			8
2	255	1619	35674	26239	520	101	38		42			6
2	410	1247	35211	26680	545	98	62		72		7	4
2	570	1092	34970	26785	552	96	87		100		8	6
2	730	930	34734	26881	547	91	102		112		11	6
1	960	608	34472	27147	445	69	160		175		22	4
1	1130	435	34479	27357	371	55	195		205		33	2
1	1310	378	34549	27472	337	49	210		226		34	1
1	1740	286	34677	27662	341	49	203		213		35	8
1	2190	231	34724	27747	378	53	205		215		33	6
1	2630	190	34731	27786	413	58	193				29	2
1	3090	163	34736	27810	438	61	187				36	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	387	60	10	24	0900 F	2141 S	086 4 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5121	40	178	206	14	7	16	7	1	2	14	2	19	1	216		

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2306	34957	23904	500	109	19		35	1	1
2	24	2306	34956	23910	500	105	19				8
2	47	2233	35090	24210	508	105	21		33	1	1
2	71	2152	35217	24536	515	110	13			1	2
2	95	2122	35224	26700	539	93	20		37		9
2	142	2108	34371	24014	505	106	22				8
2	190	2013	34616	24454	473	98	24		45		5
2	285	1743	35739	25995	482	96	35		48		6
2	480	1240	34224	25929	539	96	65		84	7	6
2	675	994	34832	26850	553	94	96		108	14	1
2	870	743	34540	27017	491	79	142		153	3	9
1	1000	519	34553	27320	300	45	193		217	4	4
1	1170	449	34622	27455	273	41	209		228	18	2
1	1360	373	34626	27538	295	43	213		223	33	6
1	1810	271	34718	27708	337	48	201		223	33	2
1	2260	217	34736	27768	373	52	201		219	45	4
1	2730	183	34738	27797	402	56	197			47	2
1	3190	161	34734	27810	425	59	195			32	
1	3660	144	34727	27817	426	59	189			41	4
1	4130	142	34725	27817	426	59	189			27	8

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	392	60	10	25	0900 F	2158 S	09034 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
5303	44	161	200	14	5	16	7	1	4	14	2	22	1	2288		15

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		2219	35072	24239	516	111	20		32		4
2											1
2	24	2151	35296	24598	512	109	17				
2	48	2077	35430	24902	526	111	16		34	1	2
2	72	2051	35545	25060	509	107	20			1	
2	95	1997	35609	25252	532	111	21		33	1	2
2	143	1944	35762	25507	532	110	20				5
2	190	1865	35786	25728	501	102	25		38		8
2	285	1569	35635	26324	494	95	45		48		8
2	470	1124	35046	26786	538	94	82		88	1	2
2	650	847	34655	26952	522	86	122		132	18	2
2	830	581	34508	27209	369	57	179		190	24	2
1	980	505	34584	27360	275	40	213		220	27	9
1	1150	444	34606	27448	273	41	216		230	35	7
1	1320	387	34636	27532	285	42	213		222	24	3
1	1730	294	34707	27678	324	46	208		216	21	4
1	2150	229	34727	27751	370	52	206		212	20	4
1	2560	188	34732	27788	395	55	200			21	4
1	2990	160	34730	27808	410	57	195			16	
1	3450	141	34728	27820	432	59	195			16	8
1	3900	116	34719	27830	452	59	192			17	4
1	4380	111	34718	27833	469	64	191			12	1

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	397	60	10	26	0900 F	2153 S	09432 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
5303	48	172	211	13	4	16	7	0		13	2	20	1	212		15

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		2269	34837	23919	507	110	19		34	5	
2	23	2260	34832	23941	502	109	18			9	
2	47	2241	34895	24043	505	109	19		34	9	
2	70	2154	35270	24570	502	107	19			5	
2	95	2110	35433	24815	499	106	21		40	4	
2	142	1973	35496	25229	425	88	40			37	
2	190	1886	35725	25629	468	96	30		43	1	
2	275	1531	35582	26369	482	92	43		60	39	
2	470	1139	35054	26760	549	92	73		90	92	
2	660	898	34714	26917	541	90	108		119	127	
2	845	611	34474	27144	460	71	162		123	201	
1	1010	450	34522	27374	378	56	200		216	34	
1	1190	409	34605	27484	289	43	211		223	31	
1	1370	350	34639	27571	304	44	212		226	314	
1	1810	264	34714	27711	335	48	200		219	31	
1	2260	216	34737	27770	369	52	202		217	316	
1	2710	184	34737	27795	387	54	200			316	
1	3150	157	34735	27814	398	55	193			373	
1	3600	138	34735	27828	426	59	193			282	
1	4040	116	34720	27831	455	62	182			297	
1	4480	108	34717	27834	466	64	183			25	
1	4750	110	34716	27832	468	64	183			380	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	402	60	10	27	0930 G	2150 S	09850 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5303	47	178	217	13	5	16	7	1	2	13	2	19	1	211	15	

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	O_2 % SAT.	INORG. P		TOTAL P	NITRATE	
2		2202	35048	24268	524	113	17		32	15	
2	46	2077	35390	24880	525	106	17		30	15	
2	92	2018	35628	25211	516	108	20		30	16	
2	138	1926	35759	25552	502	103	23			5	
2	185	1805	35782	25876	485	98	32		40	18	
2	230	1665	35728	26173	482	94	38			32	
2	275	1493	35556	26433	510	97	43		48	34	
2	365	1248	35240	26700	538	97	63			68	
2	450	1080	34971	26808	557	96	85		90	94	
2	540	971	34810	26872	556	94	95			118	
2	630	870	34662	26921	544	90	113		120	15	
2	810	595	34489	27177	415	64	172		167	242	
2	990	476	34548	27370	299	43	203		217	282	
2	1170	422	34614	27480	277	39	218		224	296	
1	1340	363	34636	27556	296	43	217		222	354	
1	1770	273	34712	27701	341	49	205		213	372	
1	2220	218	34739	27770	367	52	208		211	329	
1	2660	183	34740	27798	391	54	201			325	
1	3110	155	34731	27812	403	56	196			285	
1	3560	139	34726	27820	429	59	197			288	
1	4010	125	34731	27833	446	61	193			256	
1	4470	111	34728	27841	465	64	188			273	
1	4740	113	34728	27839	471	64	193			264	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	407	60	10	28	0930 G	2146 S	103 4 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4206	38	17|2	20|6	13	5	16	7	1	2	13	2	19	1	22|4		25

CAST	DEPTH	TEMP.	S °/oo	σ_t	O_2	O_2 °/o SAT.	INORG. P		TOTAL P	NITRATE	
2		21|43	35|334	24|649	5|25	112	13		32	7	
2	47	2086	35390	24847	531	112	12		30	1	1
2	95	2039	35490	25050	496	98	15		30	1	
2	135	1997	35647	25231	503	105	15			1	3
2	180	1936	35718	25495	476	98	22		33	2	
2	220	1861	35777	25732	481	98	27			1	7
2	250	1731	35753	26035	488	97	32		42	2	9
2	330	1442	35541	26533	530	99	40			4	4
2	400	1212	35194	26735	546	97	60		80	8	8
2	480	1044	34915	26828	567	97	78			12	6
2	560	944	34767	26884	562	94	100		112	15	
2	730	739	34563	27040	465	74	147		163	24	6
1	980	489	34582	27378	279	42	208		214	35	7
1	1165	432	34641	27488	263	39	218		232	38	9
1	1335	376	34643	27549	291	43	213		222	35	5
1	1770	280	34704	27689	337	48	201		220	36	4
1	2220	220	34732	27762	367	52	203		220	38	3
1	2650	188	34734	27790	386	54	201			35	
1	3085	153	34734	27816	419	58	199			35	
1	3530	133	34728	27825	431	59	192			35	5
1	3800	128	34724	27826	442	61	192			34	4

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	412	60	10	29	0940 G	2143 S	10712 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
4755	40	183	217	14	5	16	7	1	4	14	3	19	1	191		

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2198	35266	24445	506	109	15		30	7	
2	47	2168	35262	24525	515	110	13		32	9	
2	95	2050	35500	25028	524	110	13		30	7	
2	143	1990	35580	25248	507	105	20			7	
2	180	1979	35604	25296	509	106	20		32	9	
2	215	1944	35677	25443	489	101	22			3 1	
2	247	1849	35809	25786	492	100	23		32	3 3	
2	315	1487	35514	26414	487	92	46			6 2	
2	395	1201	35134	26710	538	96	63		71	8 1	
2	470	1030	34888	26832	558	95	83			10 6	
2	560	918	34729	26897	552	92	101		110	12 7	
2	728	659	34507	27107	446	70	158		170	27 9	
1	940	525	34599	27350	250	38	212		224	34 8	
1	1120	469	34628	27437	232	35	222		237	38 1	
1	1290	414	34638	27505	237	38	222		224	40 2	
1	1710	281	34689	27676	323	46	212		222	34 8	
1	2160	224	34731	27758	353	50	209		214	33 8	
1	2590	183	34731	27791	386	54	203			34 8	
1	3020	155	34731	27812	410	57	194			37	
1	3460	135	34727	27823	421	58	194			33 8	
1	3990	119	34721	27830	442	61	194			34 6	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	417	60	10	30	0900 G	2149 S	11141 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5212	45	200	233	17	5	16	8	0		17	2	19	4	1614	20	

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		2290	35244	24170	500	104	18		32	1	
2	45	2270	35256	24240	502	103	18		31	1	
2	90	2067	35425	24935	469	95	24		40	17	
2	135	1989	35613	25290	490	98	21			2	
2	175	1907	35707	24578	476	94	28		41	15	
2	212	1781	35691	25860	460	89	40			28	
2	250	1636	35720	26250	521	97	30		37	17	
2	330	1209	35157	26712	543	97	30			72	
2	415	1024	34871	26829	560	96	85		95	108	
2	503	892	34684	26903	546	90	110			14	
2	590	736	34546	27020	488	75	145		152	198	
2	768	574	34590	27280	264	39	204		222	27	
1	820	531	34610	27351	225	34	214		225	292	
1	940	469	34629	27438	233	35	222		225	24	
1	1100	417	34639	27503	250	37	220		228	277	
1	1540	302	34679	27649	310	45	210		220	178	
1	2000	239	34722	27739	342	48	210		218	178	
1	2440	195	34732	27783	367	51	204			195	
1	2890	164	34728	27803	390	54	202			184	
1	3340	141	34726	27818	420	58	199			189	
1	3780	125	34723	27827	435	60	190			264	
1	4230	119	34716	27832	437	58	190			194	
1	4500	121	34716	27824	444	61	190			188	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	425	60	11	04	0700 G	1020 S	10649 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
6035	56	233	278	14	4	16	8	1	2	14	2	19	1	138		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2653	34421	22452	482	111	18		28	5	
2	47	2618	34424	22564	479	110	13		28	1	
2	95	2404	34708	23429	480	107	20		32	1	8
2	140	1829	34481	24822	285	57	108			14	5
2	185	1490	34513	25637	276	52	128		132	18	
2	230	1274	34520	26092	253	45	150			18	3
2	275	1195	34534	26256	249	44	156		162	22	4
2	365	985	34591	26678	219	37	184			24	2
2	450	895	34655	26876	209	35	191		193	25	3
2	545	802	34654	27019	196	32	202			23	9
2	640	725	34691	27161	175	28	221		221	23	9
2	830	585	34630	27301	199	31	222		226	21	3
1	987	505	34613	27384	217	33	213		223	28	1
1	1166	445	34646	27478	227	34	219		229	23	2
1	1340	394	34666	27548	239	35	221		231	24	5
1	1790	289	34744	27720	291	40	210		226	23	5
1	2242	226	34744	27767	347	49	209		213	24	8
1	2690	187	34741	27796	374	52	202			26	3
1	3130	155	34738	27818	396	55	202		214	23	
1	3586	133	34728	27825	425	58	200			24	
1	3950	120	34728	27834	433	59	200		211	25	3
1	4400	118	34721	27830	449	61	196			12	7
1	4860	119	34715	27825	453	62	191		201	11	5
1	5310	121	34713	27822	448	61	189		203	11	1
1	5590	126	34715	27820	460	63	193		203	11	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	427	60	11	05	0600 G	900 S	10416 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5569	54	244	278	14	3	16	6	1	2	14	2	15	1	104		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
2		2739	34144	21970	475	111	10		20	1	2
2	48	2721	34183	22057	470	110	10		25		2
2	95	2396	34547	23331	378	84	42		59	4	3
2	117	2083	34543	24212	285	60	85			12	2
2	138	1854	34548	24811	272	55	100			11	7
2	180	1411	34551	25836	253	47	137		148	20	9
2	230	1245	34594	26206	234	42	152			20	2
2	265	1145	34725	26498	191	33	162		171	32	1
2	360	985	34725	26782	215	36	173			25	4
2	455	883	34712	26936	212	35	189		189	27	2
2	550	809	34744	27080	172	28	204			37	
2	643	743	34700	27142	172	28	206		218	36	8
2	825	604	34658	27298	165	29	219		229	39	
2	998	501	34646	27415	204	31	229			38	6
1	1225	445	34665	27493	217	32	221			39	2
1	1400	414	34736	27580	223	31	217		231	32	
1	1820	281	34751	27730	295	40	213		224	31	6
1	2260	223	34749	27770	337	45	203		221	40	2
1	2700	189	34740	27794	371	52	203			35	2
1	3150	162	34730	27806	390	54	201			35	8
1	3600	132	34717	27817	420	58	201			39	2
1	4050	118	34713	27824	443	61	194			31	2
1	4500	116	34714	27826	452	62	189			24	
1	4940	120	34716	27825	452	62	189			22	
1	5390	126	34713	27818	459	63	188			46	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	430	60	11	06	1200 G	1000 S	100 3 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
5303	25	239	283	14	3	16	8	1	2	14	2	18	1	135	99	

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	O_2 °/₀ SAT.	INORG. P		TOTAL P	NITRATE	
1		27137	34250	22056	460	108	13		30	14	
1			34403	22511	468	108	15		30	14	
1	90	2630	34564	25020	267	51	106		119	11	
1	185	1774	34656	26838	213	36	180		199	19	2
1	430	919	34695	26977	195	32	191		205	36	4
1	500	851	34691	27116	183	29	207		221	31	2
1	580	756	34652	27260	184	29	209		**226**	**39**	**0**
1	740	630	34632	27376	197	30	220		232	30	8
1	900	525	34679	27523	219	32	223		232	34	
1	1225	428	34737	27689	274	39	215		232	34	8
1	1640	309	34745	27757	325	46	205		229	55	2
1	2070	239	34739	27786	367	51	202		218	28	2
1	2490	197									

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	432	60	11	10	0415 G	1354 S	09939 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
576	50	239	256	11	4	16	7	1	2	11	2	12.1		1012		15

CAST	DEPTH	TEMP.	S ‰	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2588	34522	27730	467	107	20		33	1	2
2	43	2581	34517	27749	474	108	20		32	1	3
2	85	2424	34688	23355	464	108	20		34	1	2
2	105	2361	34748	23586	450	99	24			1	2
2	125	2311	34867	23821	437	96	28			1	2
2	165	2042	34932	24618	337	70	67		74	6	3
2	203	1671	34910	25532	283	55	101			10	8
2	245	1606	35268	25958	354	68	80		89	8	
2	335	1225	35140	26668	441	79	88			8	1
2	420	1014	34874	26849	496	85	100		110	13	
2	505	829	34656	26980	461	75	132			22	9
2	595	739	34634	27096	280	45	190		190	32	2
2	765	638	34654	27251	194	30	212		212	44	6
2	940	530	34640	27376	199	30	218		227	32	6
1	1100	474	34633	27436	206	31	228		228	30	4
1	1272	420	34654	27512	221	33	221		236	40	
1	1710	309	34713	27669	279	40	211		220	37	2
1	2130	235	34739	27756	326	46	202		212	37	8
1	2550	194	34740	27790	360	50	202			35	
1	2980	162	34731	27807	387	54	202		210	20	8
1	3420	138	34725	27820	407	56	200			28	8
1	3855	125	34711	27817	430	59	193		201	18	
1	4290	120	34716	27825	440	60	190		193	26	
1	4735	114	34718	27831	452	62	192		193	18	4
1	4990	117	34717	27828	457	63	190		196	24	2

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	438	60	11	12	0800 G	2353 S	104 8 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP.		WIND		ANEM. HEIGHT	CLOUD		VIS.	SEA		SWELL		ATMOS. PRESSURE	WIRE ANGLES	
		WET	DRY	DIR.	SPEED		TYPE	AMT.		DIR.	AMT.	DIR.	AMT.		CAST 1	CAST 2
5486	51	189	211	14	3	16	8	1	2	14	2	14	1	1612		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2259	35212	24232	503	109	15		28	3	
2	48	2200	35265	24438	501	108	13		28	1	
2	95	2052	35417	24965	465	94	22		45	1 2	
2	140	1967	35596	25321	464	96	31			1 2	
2	185	1893	35725	25611	462	94	30		42	8	
2	230	1821	35821	25866	491	99	22			6	
2	275	1674	35760	26176	504	99	25		43	9	
2	365	1328	35317	26599	532	97	51			4 4	
2	450	1116	34998	26764	550	96	74		80	8 6	
2	545	979	34808	26857	559	95	88			12 5	
2	640	888	34677	26904	535	89	106		120	15 5	
2	815	617	34493	27152	398	62	173		185	32	
2	997	502	34566	27350	279	42	203		205	38	
1	1160	447	34607	27445	258	38	205		220	37	
1	1340	393	34630	27521	271	40	213		220	39 8	
1	1790	283	34683	27669	330	47	205		216	39 2	
1	2230	222	34726	27756	346	49	198		200	24 7	
1	2680	190	34729	27784	380	53	196			24 7	
1	3120	165	34727	27801	405	56	193		198	25 8	
1	3550	140	34720	27814	418	58	193			21 4	
1	4000	128	34718	27821	438	60	190		198	25 4	
1	4450	103	34714	27835	457	62	185		196	23 4	
1	4900	108	34711	27829	459	63	183		195	19 6	
1	5070	110	34711	27828	474	65	187		195	20 8	

SHIP	CRUISE	STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE
11	3	441	60	11	13	0900 C	2641 S	108 2 E

SONIC DEPTH	MAX. SAMP. DEPTH	AIR TEMP. WET	AIR TEMP. DRY	WIND DIR.	WIND SPEED	ANEM. HEIGHT	CLOUD TYPE	CLOUD AMT.	VIS.	SEA DIR.	SEA AMT.	SWELL DIR.	SWELL AMT.	ATMOS. PRESSURE	WIRE ANGLES CAST 1	WIRE ANGLES CAST 2
5852	52	183	211	21	4	16	8	0		21	2	19	1	114		

CAST	DEPTH	TEMP.	S °/₀₀	σ_t	O_2	% O_2 SAT.	INORG. P		TOTAL P	NITRATE	
2		2065	35430	24935	522	110	15		33	4	
2	46	2045	35430	24988	522	110	18		30	2	
2	92	2016	35493	25113	490	102	20		32	3	
2	136	1959	35637	25380	496	99	20			0	4
2	180	1862	35773	25730	505	99	20		35	1	6
2	227	1703	35825	25963	499	100	23			1	6
2	270	1683	35803	26188	520	102	25		35	1	6
2	360	1423	35485	26515	540	97	40			5	6
2	450	1174	35072	26719	550	93	60		72	9	5
2	535	1010	34842	26831	565	96	81			14	6
2	630	915	34710	26887	555	92	97		109	15	
2	810	668	34478	27072	481	76	147		149	30	5
2	993	495	34522	27324	321	48	195		206	37	4
1	1160	398	34516	27425	343	50	194		200	37	7
1	1334	394	34613	27506	281	41	214		216	39	5
1	1780	280	34669	27661	347	50	200		216	34	4
1	2230	225	34719	27748	359	51	193		208	37	7
1	2660	193	34729	27782	389	54	192			34	4
1	3110	168	34727	27799	406	56	191			32	8
1	3550	143	34736	27825	425	59	189			37	3
1	4000	128	34717	27820	444	61	188			36	5
1	4440	112	34715	27830	461	63	180			35	
1	4890	108	34710	27828	466	64	179			37	7
1	5150	111	34710	27828	476	62	183			34	4

DATA

PART 2

HYDROLOGY

SURFACE SAMPLING

STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE	TEMP. ↓	S‰ ↓
350	60	10	17	1150	3155S	11134E	1740	3581
351	60	10	17	9150	3138S	11050E	1790	3581
352	60	10	17	1300G	3119S	10958E	1840	3577
353	60	10	17	1700G	3100S	10907E	1740	3587
354	60	10	17	2100G	3043S	10827E	1850	3574
355	60	10	18	100G	3027S	10741E		
356	60	10	18	500G	3010S	10650E	1880	3579
357	60	10	18	900G	2947S	10612E	1867	3573
358	60	10	18	1700G	2925S	10512E	1860	3577
359	60	10	18	2100G	2908S	10426E	1800	3581
360	60	10	19	100G	2852S	10339E	1880	3578
361	60	10	19	500G	2836S	10240E	1720	3591
362	60	10	19	900G	2822S	10206E	1885	3578
363	60	10	19	1700G	2801S	10109E	1920	3579
364	60	10	19	2100G	2745S	10025E	1920	3579
365	60	10	20	100G	2729S	9940E	1920	3578
366	60	10	20	500G	2712S	9853E	1740	3585
367	60	10	20	900G	2654S	9808E	1916	3581
368	60	10	20	1700F	2649S	9711E	1970	3593
369	60	10	20	2100F	2645S	9617E	1970	3590
370	60	10	21	100F	2641S	9526E	1980	3570
371	60	10	21	500F	2637S	9436E	1940	3566
372	60	10	21	900F	2626S	9342E	2019	3546
373	60	10	21	1700F	2620S	9239E	1970	3581
374	60	10	21	2100F	2616S	9149E	1940	3580
375	60	10	22	100F	2613S	9100E	1990	3553
376	60	10	22	500F	2610S	9000E	1980	3577
377	60	10	22	900F	2608S	8910E	2035	3572
378	60	10	22	1700F	2600S	8807E	2120	3568
379	60	10	22	2100F	2553S	8717E	2100	3551
380	60	10	23	100F	2547S	8627E	1780	3584
381	60	10	23	500F	2543S	8551E	1960	3562
382	60	10	23	930F	2531S	8457E	2007	3571
383	60	10	23	1700F	2445S	8510E	2030	3572
384	60	10	23	2100F	2402S	8523E	2060	3570
385	60	10	24	100F	2319S	8535E	2070	3500
386	60	10	24	500F	2227S	8547E	2090	3509
387	60	10	24	900F	2141S	8604E	2306	3495
388	60	10	24	1700F	2141S	8706E	2150	3537
389	60	10	24	2100F	2143S	8755E	2150	3535
390	60	10	25	100F	2145S	8842E	2190	3515
391	60	10	25	500F	2147S	8928E	2120	3526
392	60	10	25	900F	2158S	9034E	2219	3507
393	60	10	25	1700F	2200S	9133E	2220	3497
394	60	10	25	2100F	2158S	9216E	2200	3493

STATION	YEAR	MONTH	DAY	TIME	LATITUDE	LONGITUDE	TEMP. ↓	S ‰ ↓
395	60	10	26	100F	2155S	9303E	2080	3494
396	60	10	26	500F	2153S	9350E	2090	3486
397	60	10	26	900F	2153S	9432E	2269	3483
398	60	10	26	1700F	2154S	9513E	2390	3464
399	60	10	26	2100F	2155S	9603E	2320	3465
400	60	10	27	100F	2154S	9651E	2240	3470
401	60	10	27	500G	2152S	9739E	2130	3509
402	60	10	27	930G	2150S	9850E	2202	3504
403	60	10	27	1700G	2151S	9947E	2230	3482
404	60	10	27	2100G	2150S	10034E	2210	3473
405	60	10	28	100G	2150S	10125E	2190	3492
406	60	10	28	500G	2150S	10215E	1980	3531
407	60	10	28	900G	2146S	10304E	2143	3533
408	60	10	28	1700G	2146S	10406E	2140	3521
409	60	10	28	2100G	2146S	10457E	2220	3497
410	60	10	29	100G	2146S	10547E	2150	3538
411	60	10	29	500G	2146S	10638E	2220	3515
412	60	10	29	945G	2143S	10712E	2198	3526
413	60	10	29	1700G	2143S	10813E	2190	3496
414	60	10	29	2100G	2144S	10902E	2220	3518
415	60	10	30	200G	2146S	10952E	2130	3523
416	60	10	30	600G	2148S	11042E	2270	3523
417	60	10	30	900G	2149S	11141E	2290	3524
418	60	11	1	1600H	2102S	11429E	2400	3500
419	60	11	2	1H	1953S	11337E	2440	3494
420	60	11	2	800H	1823S	11242E	2510	3484
421	60	11	2	1600G	1710S	11143E	2590	3486
422	60	11	3	1G	1548S	11038E	2560	3428
423	60	11	3	800G	1432S	10946E	2720	3449
424	60	11	3	1600G	1317S	10852E	2760	3451
425	60	11	4	800G	1020S	10649E	2653	3442
426	60	11	5	1G	952S	10506E	2740	3428
427	60	11	5	600G	900S	10416E	2739	3414
428	60	11	5	1600G	917S	10312E	2680	3439
429	60	11	6	1G	939S	10131E	2680	3420
430	60	11	6	900G	1000S	10005E	2737	3425
431	60	11	6	1645G	1030S	9919E	2670	3434
432	60	11	10	430G	1354S	9939E	2588	3452
433	60	11	10	1600G	1538S	10016E	2580	3453
434	60	11	11	1G	1721S	10100E	2420	3454
435	60	11	11	800G	1901S	10144E	2360	3488
436	60	11	11	1600G	2041S	10229E	2400	3466
437	60	11	11	2400G	2221S	10317E	2200	3528
438	60	11	12	800G	2353S	10408E	2259	3521
439	60	11	12	1600G	2432S	10503E	2170	3527
440	60	11	13	100G	2530S	10625E	2080	3539

V. FIGURES

Figs. 2-13 Hydrology - Vertical Sections

HYDROLOGY

VERTICAL SECTIONS

Vertical sections were prepared from the data in Section IV for temperature (°C), salinity (‰), oxygen (ml/l), inorganic phosphate (µg at./l), total phosphorus (µg at./l), nitrate (µg at./l).

Figs. 2-5 Vertical sections for line of Stations 350-382. Degrees of longitude (S) indicated at bottom of section.

Fig. 2 Temperature to 550 m depth.

Fig. 3 Temperature 400 m to bottom.

Fig. 4 Salinity to 550 m depth.

Fig. 5 Salinity 400 m to bottom.

Figs. 6-13 Vertical sections for line of Stations 387-417.

Fig. 6 Temperature to 550 m depth.

Fig. 7 Temperature 400 m to bottom.

Fig. 8 Salinity to 550 m depth.

Fig. 9 Salinity 400 m to bottom.

Fig. 10 Oxygen surface to bottom.

Fig. 11 Inorganic phosphate (No salt correction) surface to bottom.

Fig. 12 Total phosphorus (No salt correction) surface to bottom.

Fig. 13 Nitrate surface to bottom.

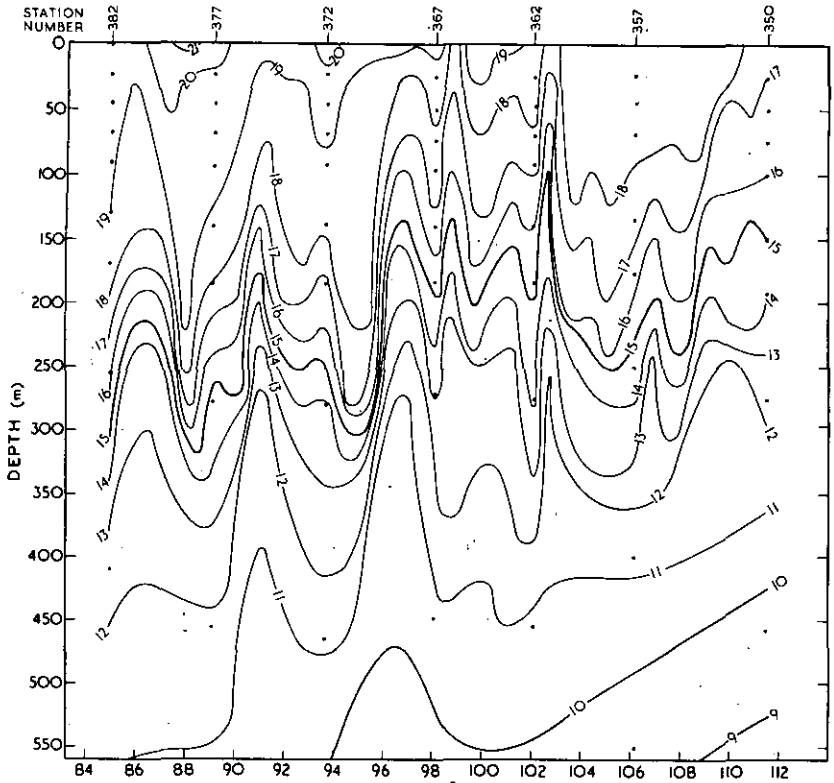
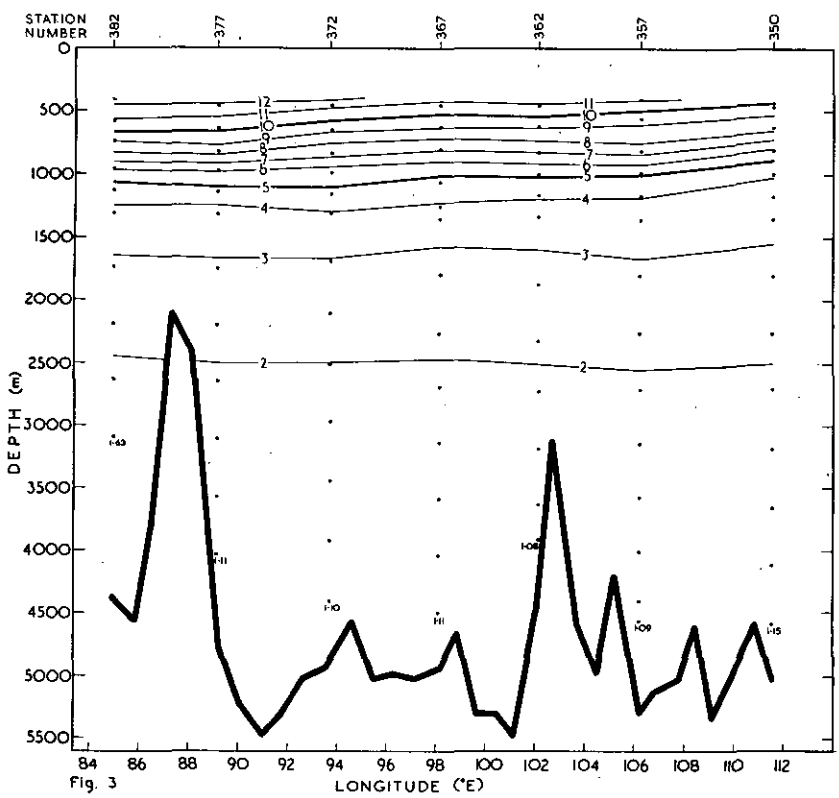

STATION NUMBER
382
377
372
367
362
357
350
DEPTH (m)
LONGITUDE (°E)
84
86
88
90
92
94
96
98
100
102
104
106
108
110
112

Fig. 2


STATION NUMBER
382
377
372
367
362
357
350
DEPTH (m)
LONGITUDE (°E)
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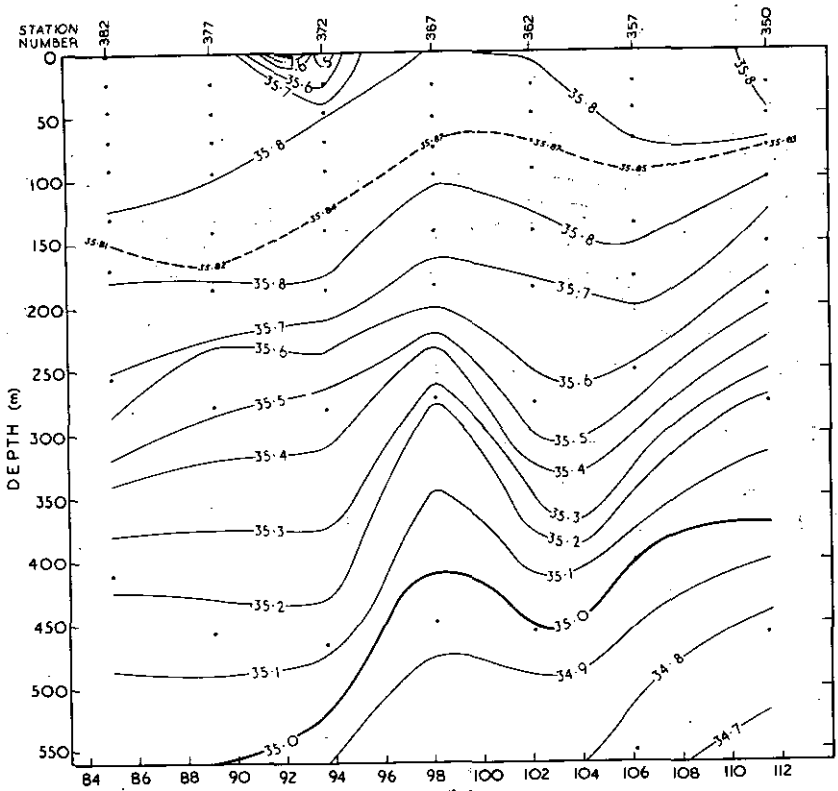
86
88
90
92
94
96
98
100
102
104
106
108
110
112

Fig. 3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372
367
362
357
350
DEPTH (m)
LONGITUDE (°E)
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86
88
90
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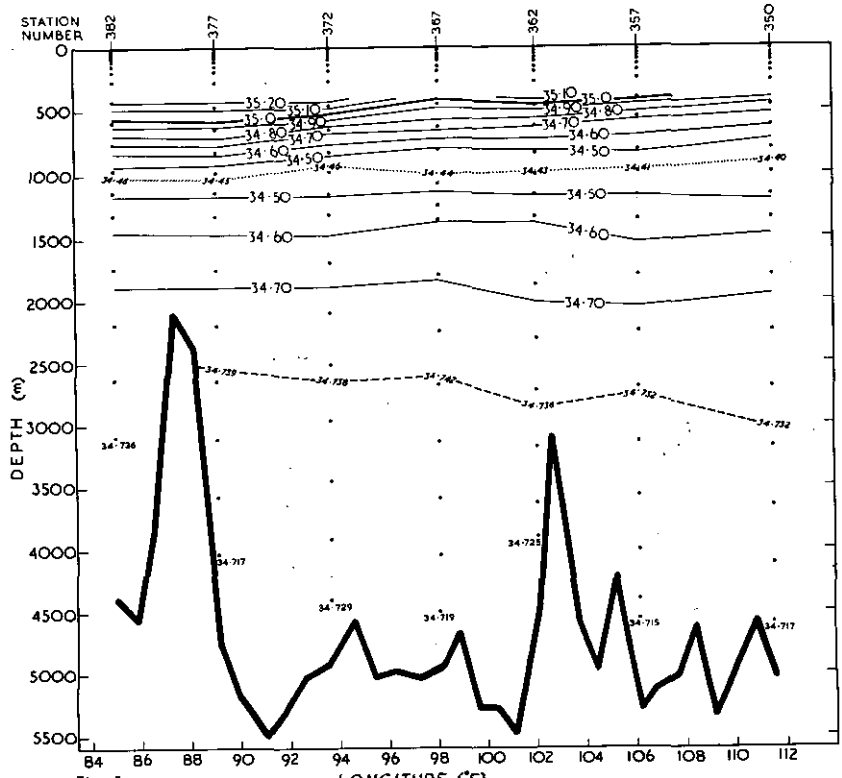
98
100
102
104
106
108
110
112

Fig. 4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372
367
362
357
350
DEPTH (m)
LONGITUDE (°E)
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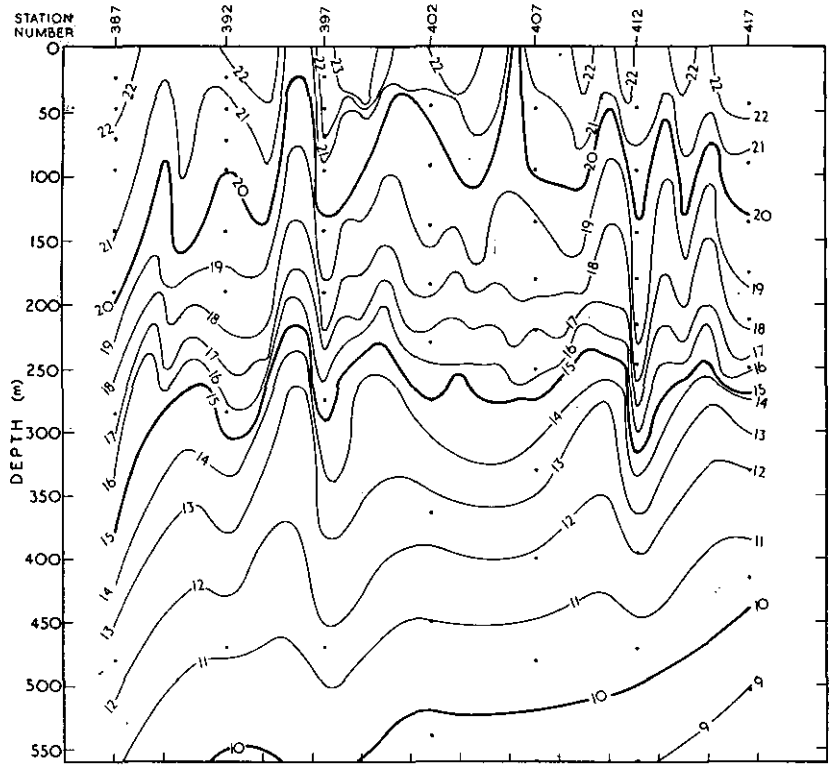
86
88
90
92
94
96
98
100
102
104
106
108
110
112

Fig. 5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397
402
407
412
417
DEPTH (m)
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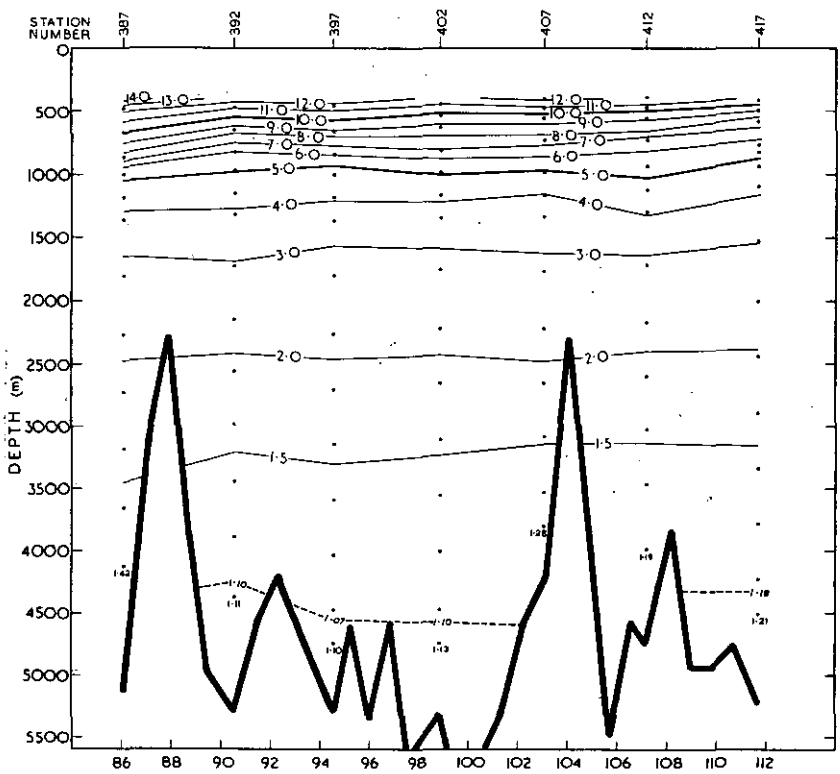
100
150
200
250
300
350
400
450
500
550
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 6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397
402
407
412
417
DEPTH (m)
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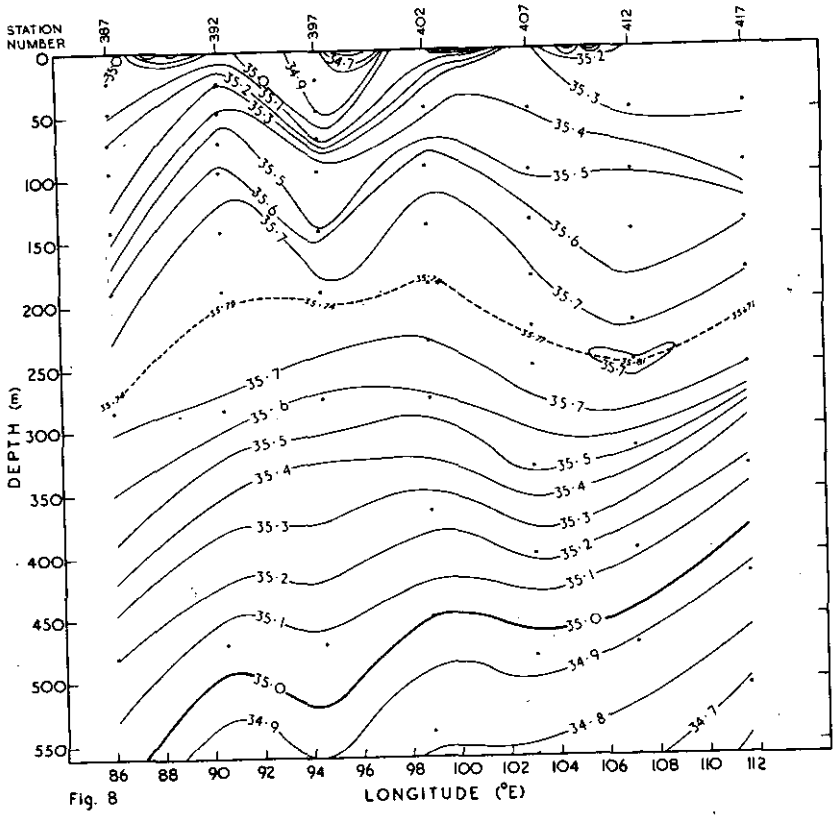
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 7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387
392
397
402
407
412
417
DEPTH (m)
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50
100
150
200
250
300
350
400
450
500
550
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)
35·0
35·1
35·2
35·3
35·4
35·5
35·6
35·7
34·9
34·8
34·7

Fig. 8

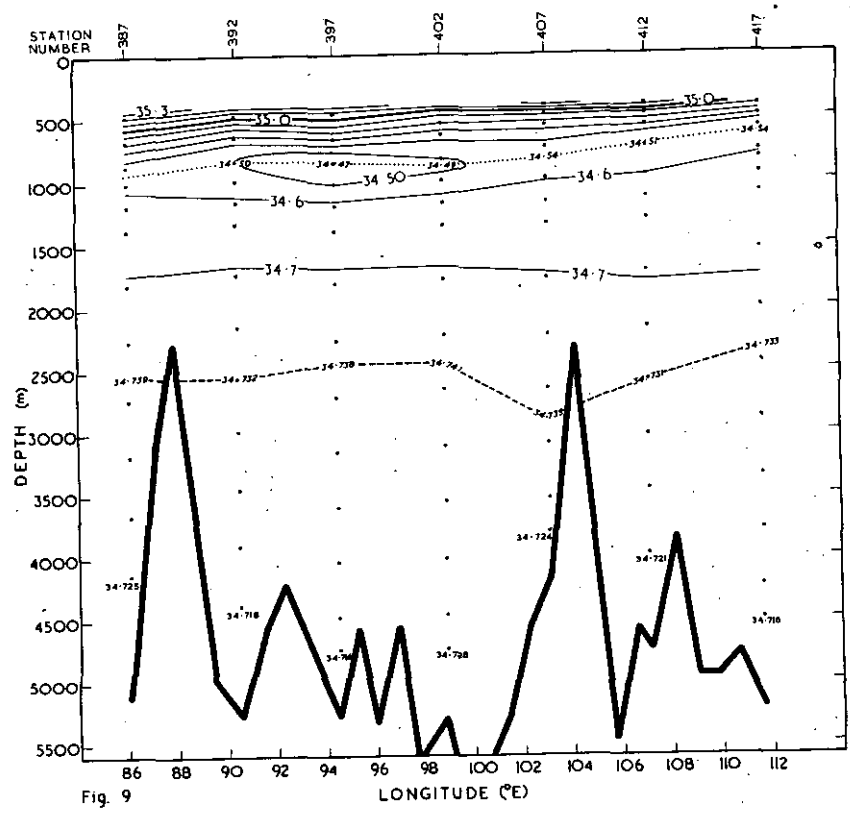
STATION NUMBER
387
392
397
402
407
412
417
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)
35·3
35·0
34·6
34·7
34·725
34·718
34·724
34·721
34·716

Fig. 9

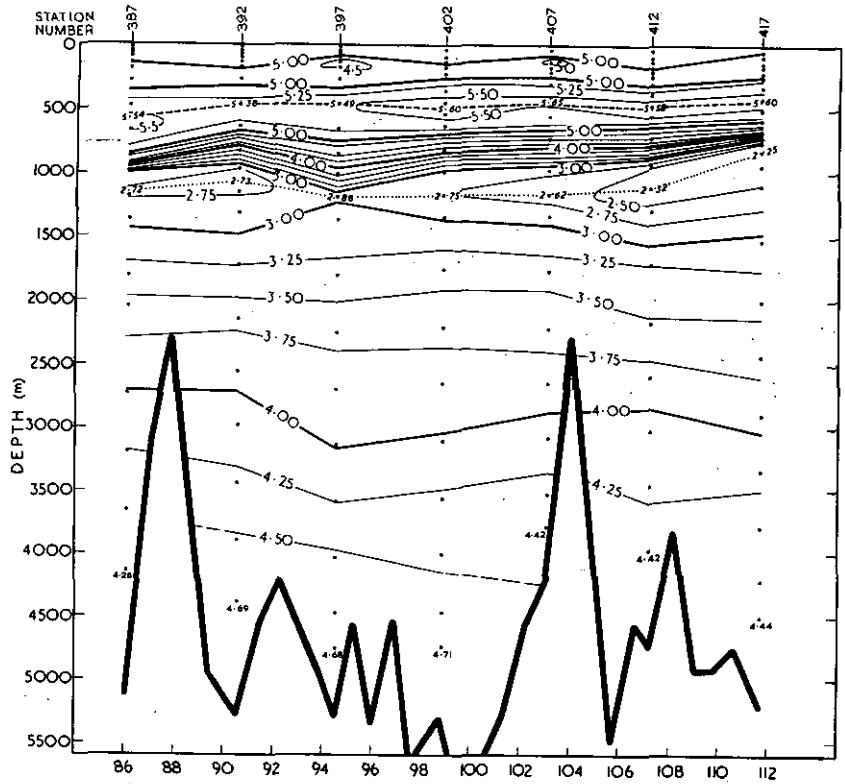
STATION NUMBER
387
392
397
402
407
412
417
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 10

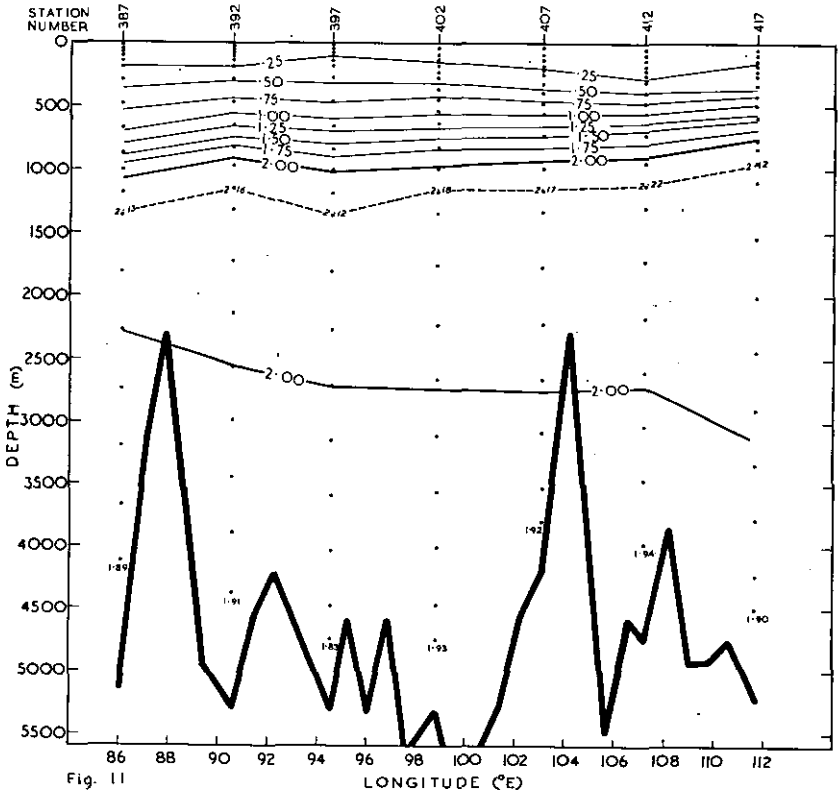
STATION NUMBER
387
392
397
402
407
412
417
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 11

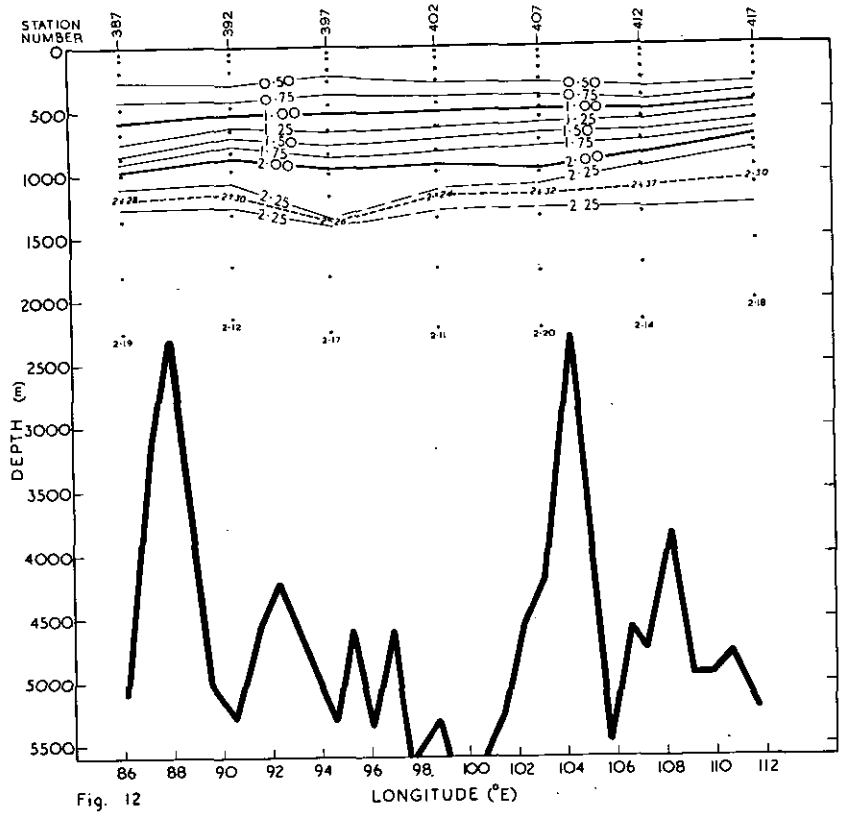
STATION NUMBER
387
392
397
402
407
412
417
0·50
0·75
1·00
1·25
1·50
1·75
2·00
2·25
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 12

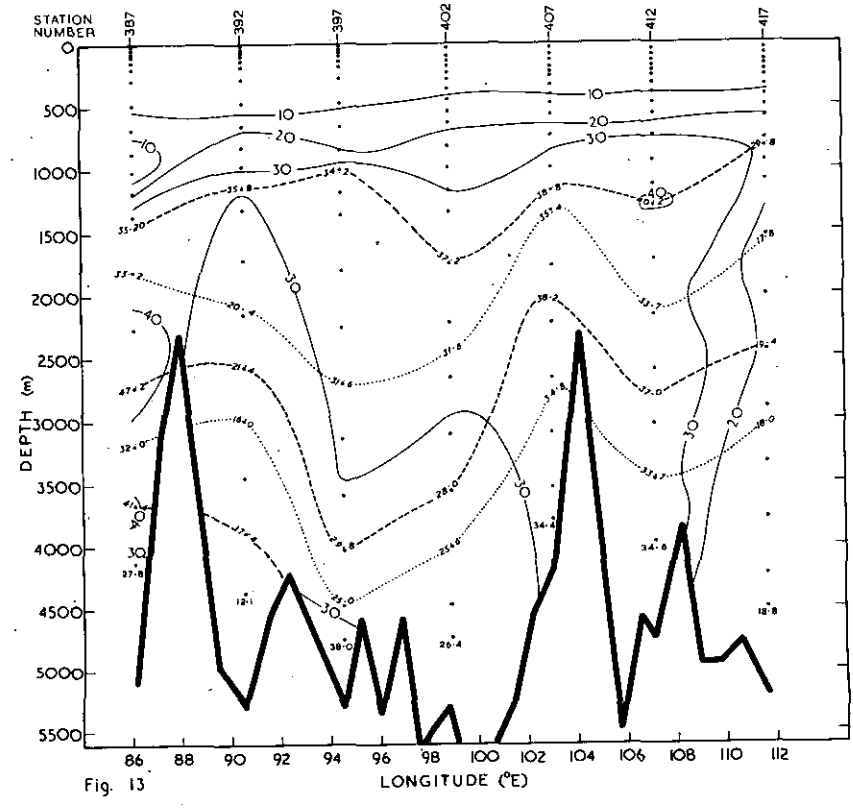
STATION NUMBER
387
392
397
402
407
412
417
10
20
30
40
DEPTH (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
86
88
90
92
94
96
98
100
102
104
106
108
110
112
LONGITUDE (°E)

Fig. 13