

CEER-O-083

DATA REPORT
OHER - OTEC CRUISE

MAY 24-29, 1980



CENTER FOR ENERGY AND ENVIRONMENT RESEARCH
UNIVERSITY OF PUERTO RICO - U.S. DEPARTMENT OF ENERGY

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TABLE OF CONTENTS

	PAGE
List of Figures.....	1
Introduction.....	3
Methods.....	3
Bibliography.....	5
Hydrographic Data.....	6
Zooplankton Data.....	53
Appendix	
Cruise Plan.....	59
List of Participants.....	64
Weather Code.....	65

List of Figures

- Figure 1. Station Plan.
- Figure 2. Small Scale Study.
- Figure 3. Vertical distribution of isotherms at Benchmark station during May 25 through May 27, 1980.
- Figure 4. Vertical distribution of isotherms during small-scale study May 26 and 27, 1980.
- Figure 5. Vertical distribution of isotherms in transects from Benchmark to Vieques Island (S-6 to V-1) and from V-6 to PT-6 on May 27, 1980.
- Figure 6. Vertical distribution of isotherms in transects from Benchmark to Jobos Bay (PT-2 to J-1) and J-6 to G-6 on May 28, 1980.
- Figure 7. Salinity ‰ versus temperature (°C) composite May 25 to 29, 1980.
- Figure 8. Temperature (°C) versus Depth (m) composite May 25 to 29, 1980.
- Figure 9. Salinity (‰) versus depth (m) composite May 25 to 29, 1980.
- Figure 10. Dissolved oxygen (ml/l) versus depth (m) composite May 25 to 29, 1980.
- Figure 11. Phosphate concentration versus depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 12. Phosphate concentrations versus temperature at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 13. Mean phosphate concentrations versus mean depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 14. Phosphate concentrations versus depth (m) in a transect south of Punta Tuna on May 27 and 28, 1980.
- Figure 15. Nitrate-Nitrite concentrations versus depth (m) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 16. Nitrate-Nitrite concentrations versus temperature (°C) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 17. Mean Nitrate-Nitrite concentrations versus mean depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 18. Nitrate-Nitrite concentrations versus depth (m) in a transect south of Punta Tuna (PT) on May 27 and 28, 1980.
- Figure 19. Silicate concentrations versus depth (m) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 20. Silicate concentrations versus temperature (°C) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.
- Figure 21. Mean silicate concentrations versus depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.

List of Figures (cont.)

- Figure 22. Silicate concentrations versus depth (m) in a transect south of Punta Tuna on May 27 and 28, 1980.
- Figure 23. Vertical distribution of Chlorophylla at Benchmark in successive hydrocasts during May 25 and 26, 1980.
- Figure 24. Vertical distribution of Chlorophylla in a transect south of Punta Tuna on May 27 and 28, 1980.

INTRODUCTION

The ability to detect the effects of an OTEC plant on the marine environment is dependent upon the magnitude of its effects relative to the scale and intensity of variability (pattern) within this ecosystem. The scale of pattern examined in this study is approximately 10 km^2 which has been estimated to be the area whose alteration by the operation of an OTEC plant can be physically measured. In addition, we studied the structure of the ocean in transects extending 50 km south of the site. The purpose of this cruise was to determine the magnitude of variability to various ecosystem components within and between such areas. Small scale and large scale transects were run to determine the presence of environmental gradients, if any, and the magnitude of between station variability. The cruise was conducted on the R/V CRAWFORD during May 24 through 29, 1980. This was the fourth cruise in our series of bi-monthly cruises.

METHODS

Hydrographic Data

Hydrocasts were made with 5 liter or 12 liter Niskin bottles usually lowered to depths of 1000 m. Bottles were placed at nominal depths of 0, 10, 25, 50, 75, 100, 150, 200, 250, 300, 400, 500, 650, 800, 1000 m for determinations of temperature, salinity, oxygen, chlorophyll and nutrients (nitrate-nitrite, phosphate, and silicate).

Temperature was measured with paired deep sea reversing thermometers. The thermometers were recently calibrated at the Physical Chemical Oceanographic Data Facility (PCODF) at Scripps Institution of Oceanography and measurements were considered accurate to 0.01°C. Unprotected thermometers were placed on bottles sampling at depths of 100 meters or greater.

Salinity was determined with a Hytech induction salinometer. Readings are considered accurate to 0.003‰.

Dissolved oxygen was determined by the Winkler method as revised by Carpenter (1965) and modified by Anderson (1971). Measurements are accurate to 0.02 ml/l. Nutrients were measured with a Technicon Autoanalyzer using methods described by Strickland and Parsons (1968). Chlorophyll was measured with a Turner Model 111 fluorometer using methods described by Strickland and Parsons (1968).

Station depths were obtained through an E.D.O. Depth Recorder permanently installed on the ship or estimated from a chart, NOS 26659. Sonic depths obtained in Fathoms were converted to meters but were not corrected for speed of sound variations. Chart depths are indicated by (C) and sonic depths by an (S) besides the number. All depths are in meters.

Densities (σ_t) were calculated from a handbook of Oceanographic Tables (Bialek, 1966).

Station times are given in Greenwich Mean Time (GMT), Plankton Tow Times are in local time. Puerto Rico is 4 hours behind G.M.T.

Net Tows

Zooplankton tows were made with a 75 cm opening-closing net equipped with 202 μ m mesh. Volume of water filtered was calculated from a flowmeter suspended off center in the mouth of the net.

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HYDROGRAPHIC DATA

R/V CRAWFORD

OTEC CRUISE 8005

STATION: Benchmark

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°57.3N	65°51.5W	5/25/80	1011 (GMT)	1006 m (s)	145° (Dir)	5 (Kt)	1	145° 1 ft (Dir) (Ht)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.76	36.236	4.37	0.2	0.3	1.6	<.08	.053	.048	23.44
10	27.76	36.233	4.36	<.2	0.3	1.6	<.08	.038	.027	23.44
24	27.76	36.236	4.43	0.2	0.3	1.8	<.08	.051	.022	23.44
54	27.55	36.316	4.52	0.2	0.4	1.7	<.08	.052	.021	23.56
82	24.66	36.757	4.71	0.2	0.4	1.5	<.08	.110	.239	24.80
106	23.72	36.789	4.76	0.2	0.4	1.3	<.08	.115	.134	25.10
136	22.37	36.875	4.54	0.2	0.7	1.1	<.08	.031	.203	25.56
160	20.74	36.767	4.42	<.2	2.2	1.2	<.08	.033	.103	25.93
213	18.86	36.578	4.60	<.2	4.2	5.2	<.08	.009	.009	26.29
315	17.09	36.349	4.19	0.2	7.0	3.1	0.38	.004	.007	26.55
421	15.33	36.070	3.82	0.2	10.2	4.1	0.64			26.75
528	12.64	35.651	3.40	0.2	19.0	1.5	1.11			26.99
682	8.51	35.039	2.94	0.2	27.0	12.5	1.75			27.26
843	6.40	34.848	3.25	0.2	25.4	24.3	2.0			27.42
950	5.67	34.889	3.80	0.2	22.1	25.1	1.84			27.53
1047	5.06	34.927	4.26	0.5	23.2	25.8	1.61			27.64

R/V CRAWFORD

OIEC CRUISE 8005

STATION: Benchmark

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
			(GMT)	(s)	(Dir)	(kt)		(Dir) (Ht)(Period)		
17°57.3N	65°51.5W	5/25/80	2154	1372 m	180°	4	1	180° 4 ft 4s		
Z	T	S	O ₂	NH ₄ -H	N	Si	P0 ₄ -3-P	Ch1a	Phaeo	σ _t
0	28.10	36.242	4.60	<.2	0.3	2.2	<.08	.026	.046	23.33
9	28.08	36.242	4.60	<.2	0.1	1.8	<.03	.033	.037	23.33
25	27.82	36.247	4.62	<.2	0.3	1.9	<.03	.069	.048	23.43
55	27.15	36.330	4.65	<.2	0.3	1.7	<.08	.192	.518	23.70
80	24.42	36.737	4.83	0.2	0.3	1.5	<.08	.140	.138	24.86
105	23.77	36.810	4.73	0.4	0.6	1.6	<.08	.088	.242	25.11
124	22.64	36.879	4.58	<.2	0.7	1.3	<.08	.043	.246	25.49
155	20.51	36.746	4.44	<.2	1.3	1.3	<.08	.016	.169	25.98
210	18.63	36.557	4.51	0.2	3.6	1.9	0.17	.006	.017	26.33
255	18.11	36.496	4.57	0.2	5.0	2.1	0.18	.003	.008	26.41
310	17.31	36.389	4.36	0.3	6.0	2.7	0.30			26.53
415	15.11	36.041	3.79	0.2	13.2	5.3	0.72			26.78
515	12.89	35.685	3.45	0.3	19.8	8.0	0.99			26.97
670	9.05	35.102	2.99	0.3	29.9	17.4	1.78			27.22
820	6.64	34.862	3.26	0.3	33.0	23.0	2.03			27.39
1029	5.27	34.918	4.16	0.4	28.9	24.2	1.71			27.60

R/V CRAWFORD

OTEC CRUISE 8005

STATION: Benchmark

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°57.3N	65°51.5W	5/26/80	0525 (GMT)	1317 m (c)	1/0° (Dir)	05 (Kt)	1	170° 2 ft 5s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
1	28.10	36.178	4.59	0.2	0.4	2.2	<.08	.079	--	23.28
11	27.85	36.239	4.61	<.2	0.4	1.7	<.08	.035	.007	23.41
26	27.77	36.267	4.62	<.2	0.4	1.6	<.08	.036	.006	23.45
56	26.78	36.346	4.66	<.2	0.3	1.7	<.08	.178	.066	23.84
81	24.72	36.735	4.81	<.2	0.4	1.7	<.08	.169	.194	24.76
106	23.69	36.812	--	<.2	0.4	1.5	<.08	.113	.259	25.13
127	22.50	36.869	4.59	0.2	0.6	1.2	<.08	.054	.186	25.53
156	20.88	36.779	4.43	0.2	1.3	1.2	<.08	.031	.108	25.91
212	18.81	36.575	4.50	0.2	3.2	1.3	.14	.008	.006	26.30
256	17.99	36.477	4.55	0.4	4.6	1.9	.38	.006	.003	26.43
312	16.90	36.320	4.13	0.2	8.8	3.2	.73			26.58
427	14.12	35.882	3.68	0.2	14.7	6.4	.89			26.87
517	12.31	35.595	3.37	0.2	20.5	8.2	1.46			27.02
672	8.79	35.072	2.99	0.2	74.1	15.8	1.73			27.24
823	6.38	34.845	3.31	0.3	24.6	??	1.57			27.41
1033	5.17	34.925	4.24	0.4	24.4	23.9	1.67			27.63

R/V CRAWFORD

OTEC CRUISE 8005

STATION: Benchmark

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°57.6N	65°51.9W	5/26/80	1739 (GMT)	1646 m (s)	170° (Dir)	4 (Kt)	1			
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	28.12	36.231	4.59	<.2	0.3	1.6	<.08	.029	.015	23.31
10	27.84	36.244	4.61	<.2	0.3	1.6	<.08	.040	.026	23.42
24	27.78	36.277	4.63	<.2	0.3	1.6	<.08	.034	.028	23.46
54	26.94	36.342	4.69	<.2	0.3	1.6	<.08	.068	--	23.79
79	24.96	36.707	4.78	<.2	0.3	1.4	<.08	.116	.109	24.67
103	23.85	36.772	--	<.2	0.6	1.2	<.08	.092	.334	25.06
123	22.87	36.870	4.62	0.2	0.8	1.1	<.08	.058	.282	25.42
153	20.91	36.789	4.42	0.3	1.2	1.2	<.08	.027	.154	25.91
208	18.75	36.571	4.50	0.2	3.3	1.4	0.12	.004	.005	26.31
252	18.31	36.519	4.63	0.2	3.1	1.7	0.14	.009	<.001	26.38
307	17.21	36.371	4.23	0.2	7.0	2.5	0.31			26.54
411	14.74	35.980	3.70	0.3	11.4	5.4	0.72			26.80
508	12.48	35.621	3.40	0.3	14.5	9.4	1.13			27.01
663	8.94	35.099	3.00	0.2	23.6	18.6	1.79			27.23
811	6.45	34.859	3.27	0.2	24.2	25.4	2.09			27.41
1017	5.22	34.925	4.20	0.3	26.3	26.8	1.84			27.62

R/V CRAWFORD

OIEC CRUISE 8005

STATION: S-1

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
Z	T	S	O ₂	NH ₄ -N	N	Si	P0 ₄ -3-P	Ch1a	Phaeo	σ _t
17°52.5N	65°53.8W	5/26/80	1017 (GMT)	1756 m (s)	190° (Dir)	9 (Kt)	1	180° 2 ft 5s (Dir) (Ht)(Period)		
0	27.85	36.209	4.60	<.2	0.3	1.8	<.08	.028	.037	23.39
10	27.85	36.208	4.60	<.2	0.4	1.9	<.08	.036	.049	23.39
24	27.78	36.256	4.62	<.2	0.4	1.9	<.08	.038	.016	23.44
54	25.97	36.437	4.79	<.2	0.4	1.8	<.08	.049	.105	24.16
79	25.15	36.691	4.80	<.2	0.4	1.8	<.08	.097	.035	24.60
103	23.88	36.786	4.80	<.2	0.3	1.6	<.08	.075	.286	25.96
123	23.01	36.856	4.65	<.2	0.5	1.4	<.08	.058	.300	25.36
153	20.88	36.787	4.40	<.2	1.0	1.4	<.08	.021	.152	25.92
207	18.95	36.591	4.50	<.2	2.9	1.7	.09	.002	.010	26.28
251	18.35	36.517	4.56	<.2	3.7	2.0	.15	.002	.010	26.37
306	17.43	36.397	4.39	<.2	6.7	2.7	0.28			26.51
409	15.04	36.026	3.81	<.2	13.3	5.9	0.71			26.77
507	12.82	35.674	3.45	<.2	19.0	9.3	1.05			26.98
660	9.27	35.123	2.97	<.2	28.0	17.3	1.71			27.20
808	6.94	34.884	3.18	<.2	31.4	23.4	1.98			27.37
1015	5.32	34.919	4.15	0.2	27.4	25.9	1.79			27.60

R/V CRAWFORD

OTEC CRUISE 8005

STATION: S-3

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°55.8N	65°46.5W	5/27/80	0234 (GMT)	1865 m (s)	180° (Dir)	12 (Kt)	1	180° 4 ft 6s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.98	36.252	4.59	0.2	<.1	1.5	<.08	.028	.015	23.37
9	27.98	36.251	4.60	<.2	<.1	1.6	<.08	.025	.022	23.37
28	27.80	36.275	4.62	<.2	<.1	1.6	<.08	.033	.040	23.45
52	27.50	36.313	4.64	0.2	<.1	1.6	<.08	.027	.027	23.58
80	24.81	36.732	4.79	0.2	0.4	1.3	<.08	.090	.105	24.73
107	23.28	36.851	4.71	0.2	0.6	1.2	<.08	.091	.316	25.29
127	22.58	36.872	4.60	0.2	1.1	1.1	<.08	.044	.364	25.51
159	21.52	36.835	4.45	0.2	2.7	1.1	<.08	.025	.205	25.77
211	19.15	36.624	4.43	0.2	4.6	1.4	<.08	.009	.011	26.25
258	18.20	36.506	4.45*	0.3	6.2	1.9	0.14	.002	.016	26.40
309	17.52	36.417	4.37	0.3	13.8	2.5	0.26			26.50
413	14.84	35.992	3.67	0.4	16.2	5.8	0.73			26.79
521	12.12	35.583	3.35	0.3	--	10.0	1.11			27.05
669	9.36	35.145	3.01	0.3	21.1	16.2	1.48			27.20
820	6.46	34.968	3.29	0.3	21.1	22.7	1.77			27.50
1055	5.02	34.937	4.36	0.4	22.6	24.0	1.44			27.65

* Doubtful value

R/V CRAWFORD

OIFC CRUISE 8005

STATION: V-1

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
18°04.4N	65°32.6W	5/27/80	0805 (GMT)	23 m (s)	180° (Dir)	15 (kt)	1	180° 4 ft 6s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	Si	PO ₄ -3-P		Ch1a	Phaeo	σ _t
0	27.98	36.266	4.24	<.2	1.9	<.08		.062	.044	23.38
10	27.97	36.267	4.47	<.2	1.8	<.08		.060	.049	23.39

R/V CRAWFORD

OTEC CRUISE 8005

STATION: V-3

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
18°01.8N	65°32.6W	5/27/80	1059 (GMT)	1646 m (s)	160° (Dir)	3 (Kt)	1	160° 4 ft (Dir) (Ht)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Ch1a	Phaeo	σ _t
0	27.89	36.261	4.59	<.2	0.3	1.6	<.08	.130	.090	23.41
9	27.89	36.261	4.60	0.2	0.3	1.7	<.08	.029	.162	23.41
23	27.88	36.260	4.61	<.2	0.3	1.6	<.08	.037	.034	23.42
52	26.22	36.397	4.77	<.2	0.3	1.3	<.08	.046	.066	24.05
75	25.10	36.639	4.93	0.2	0.3	1.5	<.08	.056	.080	24.58
99	24.01	36.747	4.92	0.2	0.5	1.3	<.08	.073	.092	24.99
117	22.97	36.859	4.68	0.2	0.5	1.2	<.08	.055	.367	25.39
146	22.06	36.859	4.50	0.2	0.9	1.1	<.08	.038	.232	25.64
199	19.48	36.648	4.66*	0.2	1.7	1.4	.08	.007	.024	26.19
240	18.47	36.533	4.53	0.2	2.6	1.8	0.14	.001	.021	26.35
292	17.55	36.421	4.42	0.4	4.8	2.5	0.26			26.49
391	15.71	36.129	3.89	0.3	7.6	4.8	0.60			26.71
486	13.25	35.743	3.52	0.4	11.4	8.5	1.01			26.94
617	9.87	35.202	3.01*	0.3	17.3	16.2	1.64			27.16
767	7.18	34.879	3.07	0.4	30.4	23.7	2.04			27.32
979	5.52	34.904	3.99	0.7	27.5	26.6	1.88			27.57

*Doubtful value, check in plot.

R/V CRAWFORD

OPEC CRUISE 8005

STATION: V-5

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°48.5N	65°32.6W	5/27/80	1438 (GMT)	3840 m (s)	200° (Dir)	17 (Kt)	2	200° 3 ft (Dir) (Ht)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.93	36.197	4.60	<.2	<.1	1.6	<.08	.020	.035	23.35
9	27.93	36.197	4.60	0.2	<.1	1.4	<.08	.028	.018	23.35
23	27.78	36.186	4.65	<.2	<.1	1.3	<.08	.033	.049	23.39
52	26.08	36.362	4.84	<.2	<.1	1.3	<.08	.043	.051	24.06
76	25.61	36.418	4.86	0.2	<.1	1.3	<.08	.076	.070	24.26
100	24.19	36.758	4.89	0.2	<.1	1.0	<.08	.094	.121	24.95
119	23.36	36.863	4.72	0.3	<.1	0.9	<.08	.051	.333	25.28
148	21.62	36.886	4.40	0.2	1.0	0.9	<.08	.018	.262	25.79
200	19.09	36.601	4.51	<.2	2.2	1.3	.07	.006	.024	26.25
243	18.41	36.523	4.61	0.2	3.2	1.5	.12	--	.016	26.36
295	17.62	36.430	4.58	0.2	5.1	2.0	.28			26.49
394	15.36	36.071	3.83	0.3	12.4	4.7	.75			26.74
489	13.19	35.727	3.42	0.2	13.5	1.3	.99			26.95
625	9.66	35.187	3.04	0.2	24.8	15.7	1.73			27.18
775	6.97	34.873	3.12	0.3	28.5	23.4	2.14			27.36
986	5.46	34.928	4.01	0.3	25.2	25.3	1.91			27.59

R/V CRAWFORD

OPEC CRUISE 8005

STATION: V-6

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Mind	Speed	Weather	Dominant Waves	Secchi	
17°32.5N	65°32.6W	5/27/80	1710 (GMT)	1646 m (s)	180° (Dir)	10 (Kt)	2-6	180° 6 ft 6s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	P0 ₄ -3-P	Ch1a	Phaeo	σ _t
1	28.03	36.155	4.57	<.2	0.3	1.9	<.08	.032	.003	23.28
10	28.05	36.156	4.59	<.2	0.3	1.9	<.08	.035	.008	23.27
28	27.03	36.107	4.66	<.2	0.3	1.8	<.08	.054	.057	23.57
53	26.51	36.207	4.77	<.2	0.3	1.9	<.08	.063	.084	23.81
81	25.68	36.457	4.77	<.2	0.3	1.9	<.08	.142	.253	24.26
109	24.67	36.969	4.55	<.2	1.0	1.4	<.08	.079	.414	24.96
128	23.17	37.017	4.42	<.2	2.5	1.3	.07	.018	.230	25.44
161	21.41	36.905	4.05	<.2	4.0	1.6	.15	.014	.050	25.86
214	19.14	36.635	4.19	<.2	4.9	1.9	.22	.005	.015	26.26
260	18.24	36.507	4.38	<.2	7.4	2.3	.27	.000	.014	26.39
312	17.06	36.341	4.20*	<.2	13.9	3.3	.44			26.56
416	14.13	35.884	3.67	0.3	14.1	6.9	.93			26.87
526	11.51	36.464	3.24	.2	21.8	11.8	1.40			27.08
666	9.03	35.109	3.03	0.2	26.2	25.4	2.18			27.23
818	6.22	34.816	3.28	0.2	28.3	25.4	2.19			27.41
1052	5.13	34.918	4.25	0.2	20.1	26.5	1.89			27.62

*Doubtful value

R/V CRAWFORD

OPEC CRUISE 0005

STATION: Pt-6

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°28.0N	65°53.0W	5/27/80	2213 (GMT)	1554 m (s)	180° (Dir)	10 (Kt)	2	180° 3 ft 3s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ ^{-N}	N	Si	PO ₄ ^{-3-P}	Chla	Phaeo	σ _t
0	28.01	36.141	4.58	<.2	0.2	1.3	<.08	.036	.050	23.29
9	28.01	36.140	4.59	<.2	0.2	1.6	<.08	.030	.040	23.29
24	28.00	36.144	4.60	0.2	0.2	1.6	<.08	.034	.037	23.29
53	26.14	36.320	4.81	0.2	0.2	1.6	<.08	.053	.032	24.01
77	25.42	36.536	4.82	0.2	0.3	1.5	<.08	.063	.079	24.40
101	24.62	37.001	4.51	0.3	0.4	1.1	<.08	.111	.440	25.00
120	23.25	37.063	4.22	0.2	1.3	.8	<.08	.037	.226	25.46
149	21.40	36.886	4.34	0.2	1.2	1.1	<.08	.023	.193	25.85
203	18.95	36.604	4.38	0.2	3.5	1.5	0.13	.003	.011	26.29
245	18.30	36.519	4.46	0.3	4.6	1.8	0.20	.003	.014	26.39
299	17.48	36.412	4.31	0.3	7.0	2.5	0.33	.003		26.51
399	14.94	36.012	3.83	0.4	13.3	5.4	0.73	.003		26.79
496	12.66	35.654	3.38*	0.4	18.9	8.7	1.03	.003		27.00
634	9.15	35.127	3.05	0.4	27.7	17.8	1.74	.003		27.22
780	6.58	34.813	3.13	0.2	27.2	25.5	2.12	.003		27.36
989	5.42	34.916	4.07	0.2	17.4	26.6	1.84	.003		27.59

*Doubtful value

R/V CRAWFORD

OIEC CRUISE 8005

STATION: Pt-5

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°44.2N	65°53.0W	5/28/80	0130 (GMT)	988 m (s)	115° (Dir)	7 (Kt)	2	180° 4 ft 6s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ ⁻ N	N	Si	PO ₄ ⁻³ -P	Chla	Phaeo	σ _t
0	27.88	36.201	4.61	0.2	<.1	1.1	<.08	.039	--	23.37
10	27.87	36.198	4.61	0.2	<.1	1.3	<.08	.031	.016	23.37
24	27.88	36.198	4.60	0.6	<.1	1.9	0.5	.076	.033	23.37
49	26.27	36.260	4.80	0.2	<.1	1.3	<.08	.060	.014	23.92
69	25.73	36.413	4.83	0.2	<.1	1.4	<.08	.076	.049	24.22
93	24.99	36.817	4.74	0.2	<.1	.8	<.08	.084	.121	24.75
117	23.31	36.883	4.73	0.2	<.1	.9	<.08	.077	.291	25.30
142	22.34	36.992	4.40	0.2	0.9	.8	<.08	.045	.276	25.66
190	19.63	36.687	4.36	0.3	2.3	1.2	.11	.014	.055	26.18
234	18.43	36.533	4.50	0.3	3.6	1.6	.18	.002	.013	26.36
283	17.64	36.431	4.45	0.3	4.0	2.2	.29			26.48
372	16.10	36.245	4.17	0.5	7.0	3.6	.47			26.71
469	13.73	35.821	3.58	0.3	15.2	7.4	.94			26.90
594	10.88	35.371	3.14	0.4	18.8	12.8	1.37			27.11

R/V CRAWFORD

OCEAN CRUISE 8005

STATION: Pt-3

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°56.0N	65°53.0W	5/28/80	0419 (GMT)	1829 m (s)	345° (Dir)	5 (Kt)		180° 3 ft 6s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
1	27.88	36.175	4.60	<.2	0.4	1.4	<.08	.043	.008	23.35
11	27.91	36.218	4.60	<.2	0.4	1.4	<.08	.046	.002	23.38
26	27.83	36.293	4.61	<.2	0.3	1.3	<.08	.034	.045	23.45
57	26.08	36.417	4.81*	<.2	0.4	1.4	<.08	.056	.071	24.10
81	24.47	36.705	4.86	<.2	0.3	1.1	<.08	.086	.152	24.83
106	23.33	36.853	4.73	<.2	0.3	0.9	<.08	.098	.287	25.27
127	22.47	36.877	4.57	0.3	0.5	0.8	<.08	.042	.301	25.54
157	21.50	36.838	4.44	<.2	0.8	0.8	<.08	.019	.231	25.79
213	18.98	36.601	4.49	<.2	2.2	1.3	.12	.004	.014	26.28
258	18.26	36.513	4.56	0.2	6.2	1.6	.18	--	.015	26.40
314	17.33	36.392	4.34	0.3	6.1	1.5	.16			26.53
419	14.57	35.957	3.74	0.3	10.9	5.8	.78			26.83
520	12.63	35.648*	3.59*	0.3	17.8	9.1	1.12			26.99
676	8.67	35.049	2.96	0.3	27.0	18.7	1.85			27.23
828	6.56	34.845	3.20	0.4	30.8	24.7	2.08			27.39
1039	5.37	34.926	4.10	0.4	23.4	22.8	1.54			27.60

*Doubtful value

R/V CRAWFORD

OJEC CRUISE 8005

STATION: Pt-1

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°58.2N	65°53.0W	5/28/80	: 603 (GMT)	1061 m (s)	-	-	6	--	-	
Z	T	S		N	Si		PO ₄ -3-P	Chla	Phaeo	σ ₊
0	27.82	36.087		<.1	3.4		<.08	.062	.024	23.31
10	27.85	36.256		<.1	1.7		<.08	.043	.032	23.42

R/V CRAWFORD

OTEC CRUISE 8005

STATION: J-1

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi
17°54.8N	66°16.0W	5/28/80	1006 (GMT)	22 m (s)	100° (Dir)	5 (Kt)	5	100° (Dir)	
Z	T	S	NH ₄ -N	N	Si	PO ₄ -3-P	Phaeo	σ _t	
0	28.19	35.848	0.3	<.1	2.4	<.08	.155	23.00	
10	28.24	36.054	0.2	<.1	2.5	<.08	.338	23.14	

R/V CRAWFORD

OCEAN CRUISE 8005

STATION: J-3

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°51.7N	66°16.0W	5/28/80	1306 (GMT)	1042 m (s)	-	-	5	--		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Ch1a	Phaeo	σ _t
0	27.77	35.864	4.56	<.2	0.3	1.9	<.08	.108	.041	23.15
7	27.90	36.092	4.54	0.2	0.3	1.9	<.08	.125	.011	23.28
18	27.92	36.157	4.54	<.2	0.3	2.0	<.08	.095	.064	23.32
37	26.89	36.312	4.66	<.2	0.3	1.9	<.08	.026	.034	23.77
51	25.96	36.448	4.74	0.2	0.3	1.8	<.08	.111	.079	24.17
70	25.31	36.672	4.77	0.2	0.5	1.6	<.08	.132	.081	24.55
87	24.41	36.861	4.68	0.2	0.3	1.4	<.08	.074	.351	24.96
106	23.21	36.843	4.67	0.3	0.6	1.4	<.08	.035	.314	25.30
143	21.54	36.830	4.44	0.2	1.2	1.3	<.08	.090	.147	25.76
176	20.18	36.727	4.36	0.3	2.0	1.7	.86	.011	.087	26.06
213	19.33	36.637	4.45	0.3	2.3	1.6	.11			26.21
283	17.72	36.446	4.53	0.3	4.9	2.5	.28			26.47
354	16.05	36.186	3.91	0.3	9.7	4.4	.61			26.67
457	13.52	35.785	3.49	0.4	15.0	7.8	1.01			26.92
562	10.61	35.347	3.14	0.4	21.0	18.4	1.49			27.14

N

R/V CRAWFORD

OIFC CRUISE 8005

STATION: J-5

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°39.7N	66°16.0W	5/28/80	1544 (GMT)	2377 m (s)	90° (Dir)	10 (Kt)	2	90° 4 ft 5s (Dir) (Ht) (Period)		
Z	T	S	O ₂	NH ₄ -N	N	St	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.89	35.971	4.59	<.2	0.3	1.8	<.08	.121	.196	23.19
9	27.89	35.984	4.59	<.2	0.3	1.7	<.08	.099	.054	23.20
26	27.97	36.123	4.64	<.2	0.3	1.7	<.08	.125	.105	23.28
49	27.33	36.217	4.66	<.2	0.3	1.8	<.08	.127	.058	23.56
76	24.62	36.630	4.93	<.2	0.3	1.5	<.08	.104	.046	24.72
102	23.57	36.823	4.73	<.2	0.6	1.4	<.08	.088	.294	25.18
121	22.66	36.856	4.60	<.2	0.9	1.3	<.08	.040	.118	25.47
151	21.00	36.792	4.43	<.2	1.3	1.3	<.08	.017	.124	25.88
201	19.08	36.610	4.51	<.2	2.7	1.5	.10	.005	.050	26.25
245	18.34	36.527	4.60	<.2	3.9	1.9	.16	<.001	.011	26.39
296	17.72	36.444	4.49	<.2	5.4	2.4	.28			26.47
393	15.39	36.083	3.80	<.2	11.0	5.1	.72			26.75
487	13.11	35.731	3.40	<.2	16.7	8.3	1.06			26.96
627	9.17	35.088	2.88	<.2	25.7	17.3	1.82			27.19
764	6.93	35.063	3.20	0.3	25.2	20.2	1.85			27.51
985	5.43	34.929	4.09	0.4	24.9	25.5	1.88			27.60

R/V CRAWFORD

OCEAN CRUISE 8095

STATION: J-6

Latitude	Longitude	MO/DAV/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°24.5N	66°16.0W	5/28/80	1900 (GMT)	4023 m (s)	170° (Dir)	8 (Kt)	1	170° 4 ft 4s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	P ₀₄ -3-P	Ch1a	Phaeo	σ _t
1	27.89	35.925	4.65	<.2	0.5	1.8	<.08	.086	.158	23.16
9	27.87	35.928	4.66	<.2	0.5	1.7	<.08	.121	.141	23.17
25	27.93	36.101	4.65	<.2	0.4	1.6	<.08	.144	.116	23.28
46	27.09	36.174	4.75	<.2	0.4	1.9	<.08	.118	.088	23.60
71	25.53	36.606	4.72	<.2	0.4	1.6	<.08	.100	.099	24.42
96	24.39	36.797	4.88	<.2	0.4	1.5	<.08	.083	.056	24.92
113	23.73	37.036	4.43	<.2	0.7	1.4	<.08	.053	.291	25.29
142	22.34	36.988	4.21	<.2	2.6	1.3	<.08	.009	.279	25.66
187	20.02	36.739	4.26	<.2	2.6	1.4	.08	.013	.042	26.11
229	18.80	36.586	4.22	0.2	4.5	2.1	.19	.003	.041	26.31
274	17.88	36.462	4.27	0.2	6.1	2.5	.30			26.45
358	16.09	36.188	4.03	0.2	10.1	4.2	.55			26.67
438	13.74	35.810	3.54	0.2	16.4	7.5	.96			26.90
563	10.41	35.279	3.04	0.3	24.1	14.5	1.65			27.12
692	7.49	34.878	2.96	0.4	31.1	22.2	2.11			27.28
904	5.78	34.884	3.74	0.4	28.0	25.7	1.99			27.52

R/V CRAWFORD

OJEC CRUISE 8005

STATION: G-6

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°26.5N	66°45.0W	5/29/80	0004 (GMT)	4023 m (s)	80° (Dir)	15 (Kt)	1	80° 4 ft 4s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.92	36.124	4.60	<.2	0.5	1.9	<.08	.045	.050	23.30
9	27.93	36.130	4.59	<.2	<.1	1.8	<.08	.039	.072	23.30
27	27.84	36.151	4.63	<.2	0.5	1.9	<.08	.040	.071	23.35
51	26.55	36.296	4.80	<.2	0.4	1.9	<.08	.045	.070	23.87
78	25.37	36.534	4.74	<.2	0.4	1.8	<.08	.073	.272	24.42
105	24.08	36.952	4.53	<.2	0.6	1.4	<.08	.072	.227	25.13
129	22.84	36.932	4.51	0.2	0.8	1.4	<.08	.030	.223	25.47
156	21.37	36.838	4.36	<.2	1.2	1.4	0.5	.021	.079	25.82
206	19.32	36.637	4.43	<.2	2.3	1.6	0.10	.011	.016	26.22
252	18.48	36.537	4.56	<.2	3.3	1.9	0.19	--	.018	26.35
303	17.82	36.457	4.51	<.2	5.1	2.4	0.27			26.46
403	15.14	36.035	3.68	<.2	10.0	5.6	0.83			26.76
500	12.09	35.556	3.30	<.2	14.6	10.5	1.30			27.03
647	8.74	35.055	2.94	<.2	23.7	18.6	1.91			27.23
789	6.43	34.795	3.10	0.2	27.5	25.2	2.22			27.36
1016	5.15	34.924	4.25	0.3	21.3	23.4	1.60			27.62

R/V CRAWFORD

OPEC CRUISE 8005

STATION: C-5

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°41.6N	66°45.0W	5/29/80	0300 (GMT)	2195 m (s)	100° (Dir)	15 (kt)		210° 4 ft 4s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Ch1a	Phaeo	σ _t
0	27.89	36.038	4.61	<.2	<.1	1.8	<.08	.068	.061	23.24
8	27.89	36.040	4.60	<.2	<.1	1.6	<.08	.080	.078	23.24
25	27.88	36.091	4.63	<.2	<.1	1.6	<.08	.059	.085	23.29
47	27.15	36.258	4.70	3.3	<.1	1.7	<.08	.069	.103	23.65
73	25.86	36.415	4.79	<.2	0.4	1.8	<.08	.068	.126	24.18
98	24.72	37.073	4.32	<.2	0.8	1.3	<.08	.038	.407	25.02
116	23.43	36.974	4.50*	<.2	0.6	1.1	<.08	.036	.253	25.34
146	21.28	36.834	4.37	<.2	1.1	1.3	<.08	.013	.117	25.84
193	18.99	36.596	4.52	<.2	2.6	1.6	0.14	.005	.013	26.27
236	18.53	36.542	4.54	<.2	3.0	1.9	0.20	--	.017	26.34
283	17.85	36.465	4.53	<.2	5.2	2.4	0.27			26.46
375	16.11	36.193	3.97	<.2	7.6	4.1	0.56			26.67
465	13.63	35.799	3.55	<.2	15.0	7.5	1.02			26.91
602	9.73	35.167	2.92	<.2	19.8	16.1	1.75			27.16
737	7.51	34.898	2.96	0.4	28.9	22.0	2.12			27.30
955	5.61	34.917	3.92	0.2	21.0	25.5	1.94			27.56

*Doubtful value

R/V CRAWFORD

OTEC CRUISE 8005

STATION: G-3

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°53.4N	66°45.0W	5/29/80	0530 (GMT)	677 m (s)	S.E. (Dir)	15 (Kt)	1	S.E. 4 ft 4s (Dir) (Ht)(Period)		
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	27.90	36.071	4.60	0.2	0.4	1.2	<.08	.070	.070	23.27
9	27.91	36.072	4.60	<.2	0.4	1.2	<.08	.060	.083	23.27
27	27.91	36.075	4.60	<.2	0.4	1.4	<.08	.060	.090	23.27
51	27.95	36.117	4.59	<.2	0.4	1.4	<.08	.076	.089	23.28
78	25.17	36.883	4.62	<.2	0.4	0.3	<.08	.080	.170	24.75
105	24.11	36.989	4.53	<.2	0.5	0.3	<.08	.071	.367	25.14
124	23.28	36.953	4.48	0.2	0.7	0.3	<.08	.026	.291	25.36
156	21.03	36.805	4.36	0.2	1.2	1.0	<.08	.004	.023	25.89
207	18.91	36.589	4.51	0.3	2.8	1.3	.12	.000	.017	26.29
252	18.22	36.510	4.57	0.3	3.5	1.6	.19	--	.020	26.39
303	17.46	36.407	4.34	0.3	6.3	1.6	.31			26.51
408	15.40	36.084	3.83	0.4	10.7	4.7	.70			26.75
522	12.56	35.632	3.37	0.3	13.3	10.0	1.19			27.00

R/V CRAWFORD

OIEC CRUISE 8005

STATION: G-1

Latitude	Longitude	MO/DAY/YR	Messenger Time	Bottom	Wind	Speed	Weather	Dominant Waves	Secchi	
17°56.0N	66°45.0W	5/29/80	0731 (GMT)	622 m (s)	70° (Dir)	10 (Kt)	1			
Z	T	S	O ₂	NH ₄ -N	N	Si	PO ₄ -3-P	Chla	Phaeo	σ _t
0	28.18	36.044	4.48	0.7	0.5	2.4	<.08	.172	.165	23.15
15	28.17	36.071	4.51	3.5	0.4	2.3	<.08	.137	.240	23.17
54	28.02	36.108	4.59	0.2	0.4	2.0	<.08	.124	.117	23.25

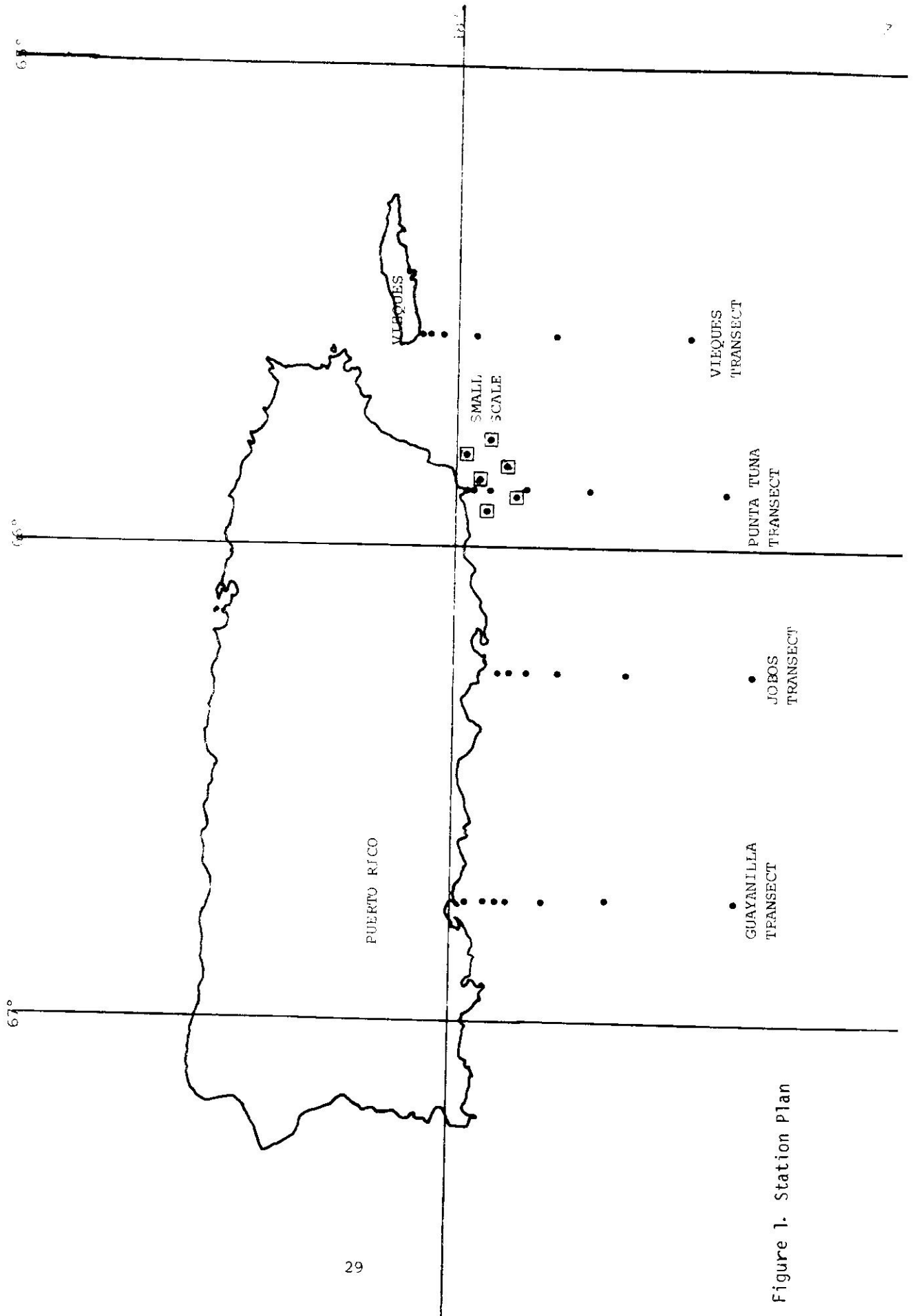
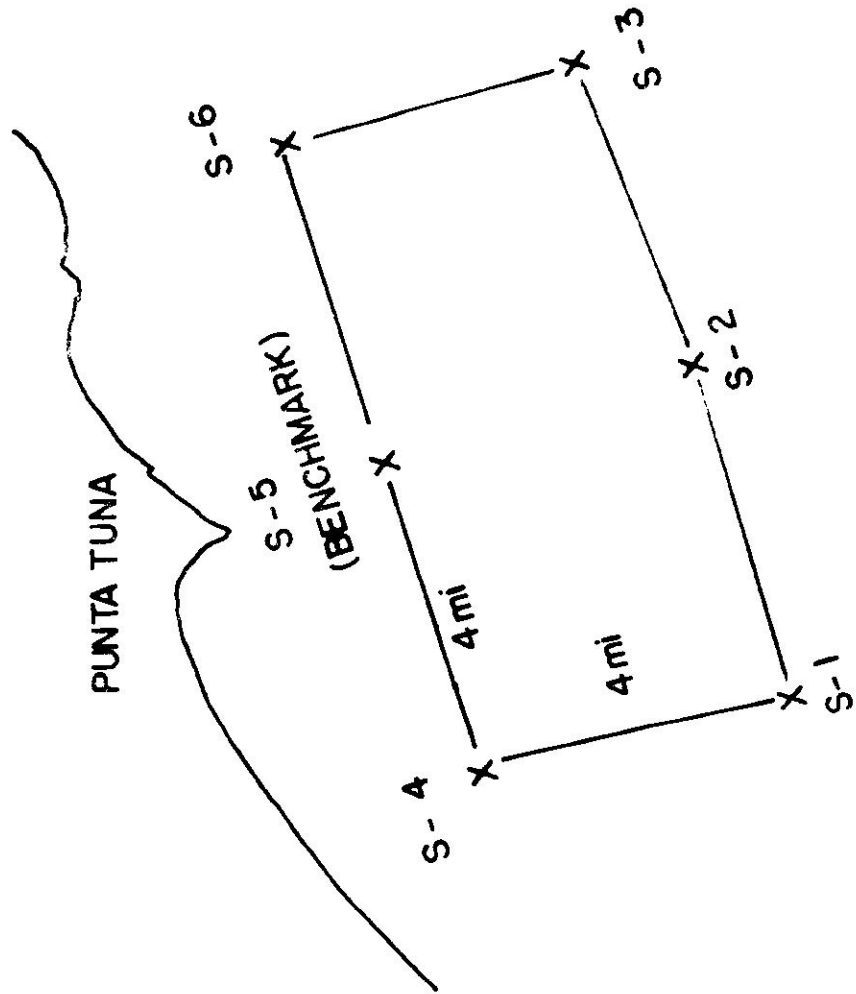


Figure 1. Station Plan

Figure 2. SMALL SCALE STUDY



25/5/80 / 26/5/80 / 17/5/80
 0400 0800 1200 1600 2000 2400 0400 0800 1200 1600 2000 2400 0400 HOURS

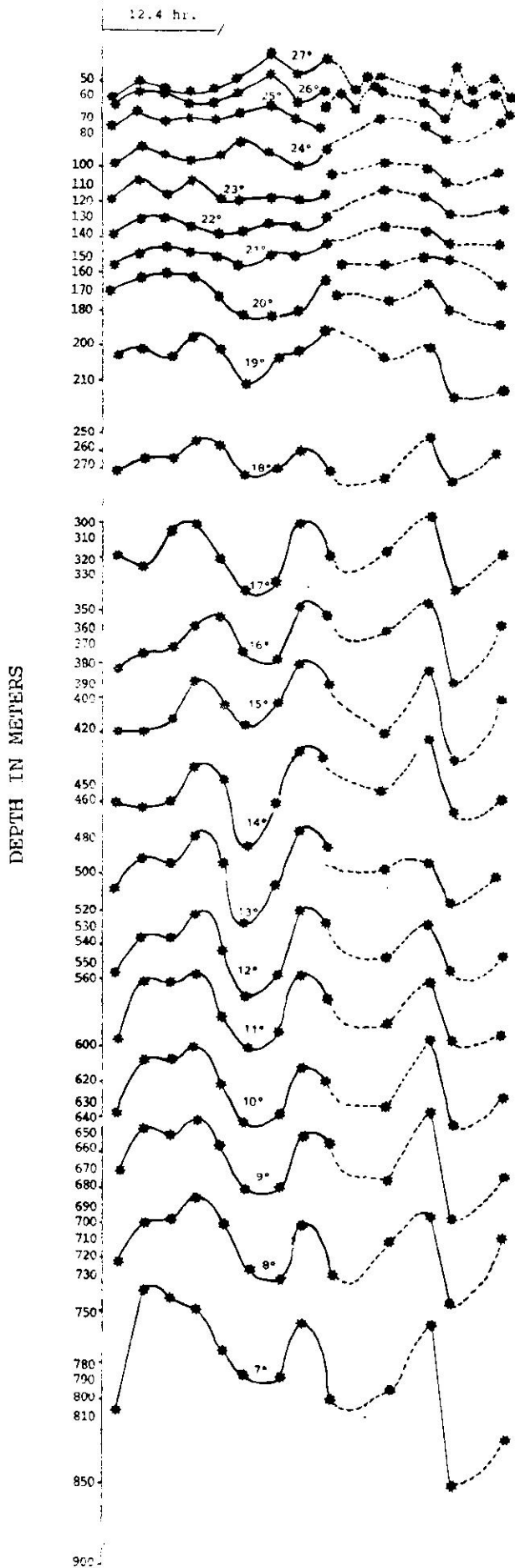


Figure 3. Vertical distribution of isotherms at Benchmark station during May 25 through May 27, 1980.

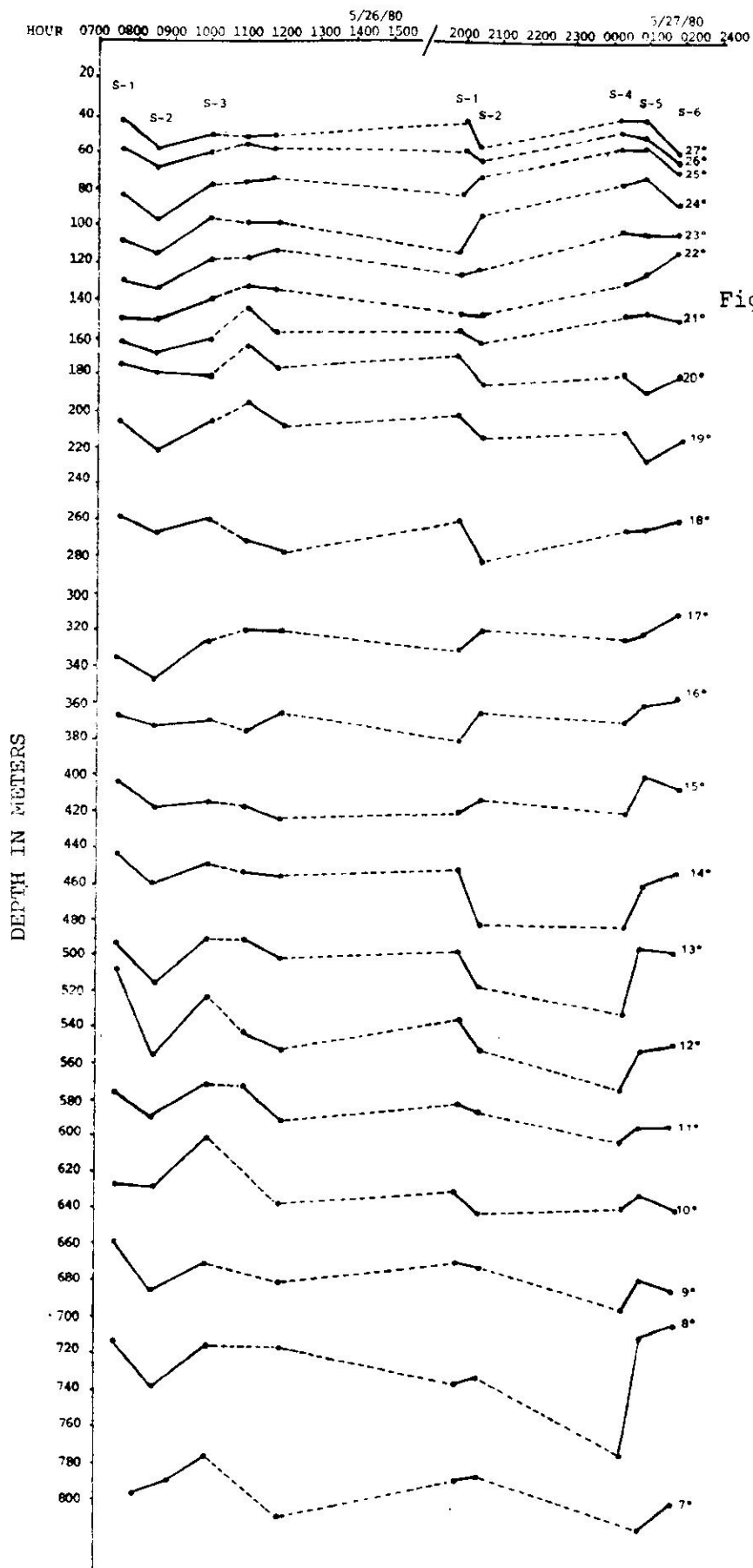


Figure 4. Vertical distribution of isotherms during small-scale study May 26 and 27, 1980

S-6 to V-1 27/5/80 V-6 to PT-6
 0100 0200 0300 0400 1200 1300 1400 1500 1600 1700 HOURS

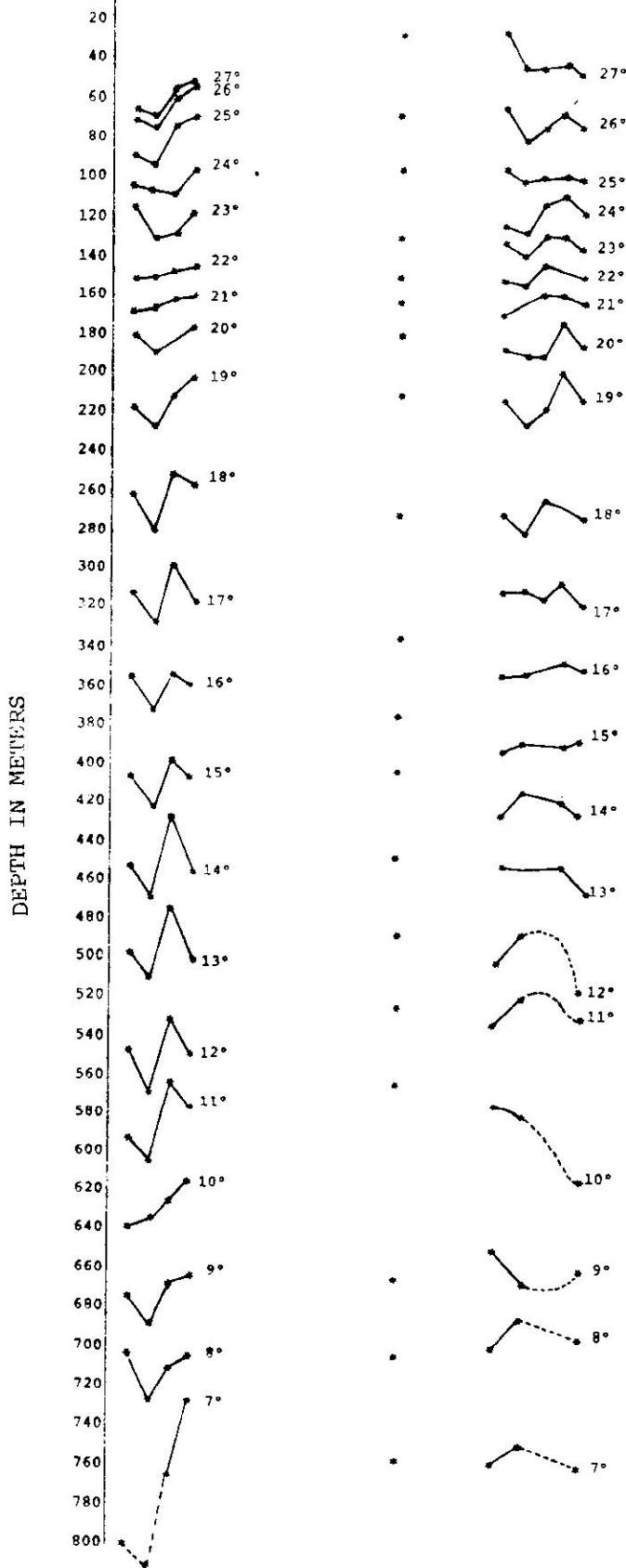


Figure 5. Vertical distribution of isotherms in transects from Benchmark to Vieques Island (S-6 to V-1) and from V-6 to PT-6 on May 27, 1980.

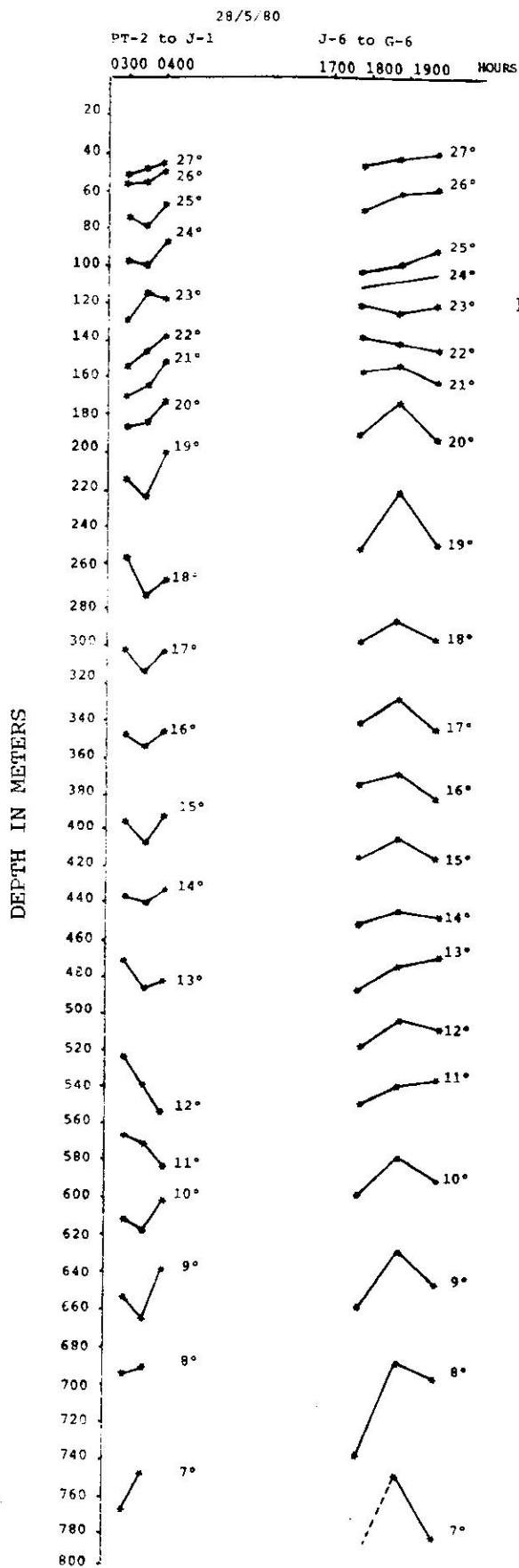


Figure 6. Vertical distribution of isotherms in transects from Benchmark to Jobos Bay (PT-2 to J-1) and J-6 to G-6 on May 28, 1980.

SALINITY 0/00

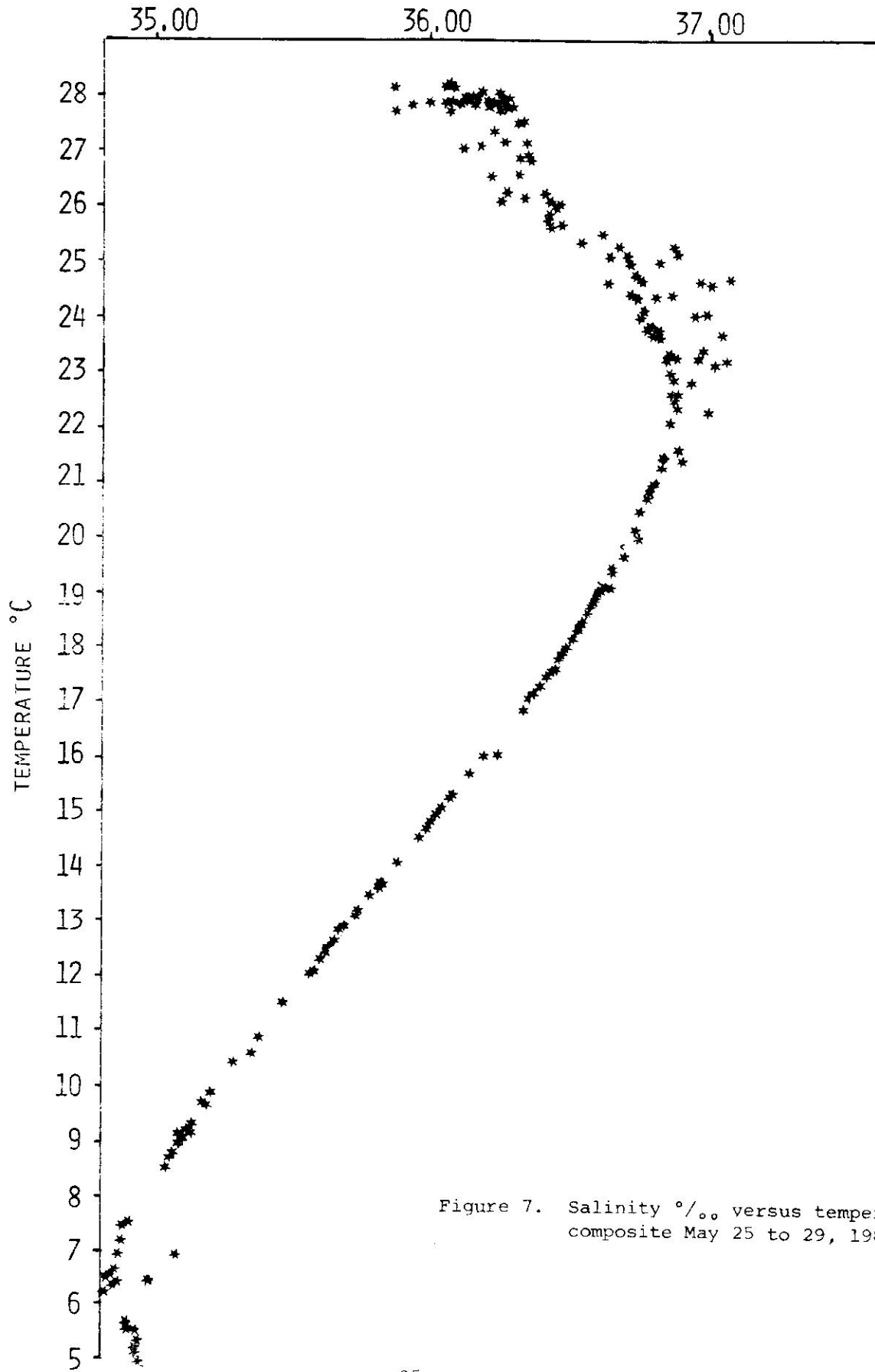


Figure 7. Salinity ‰ versus temperature (°C) composite May 25 to 29, 1980.

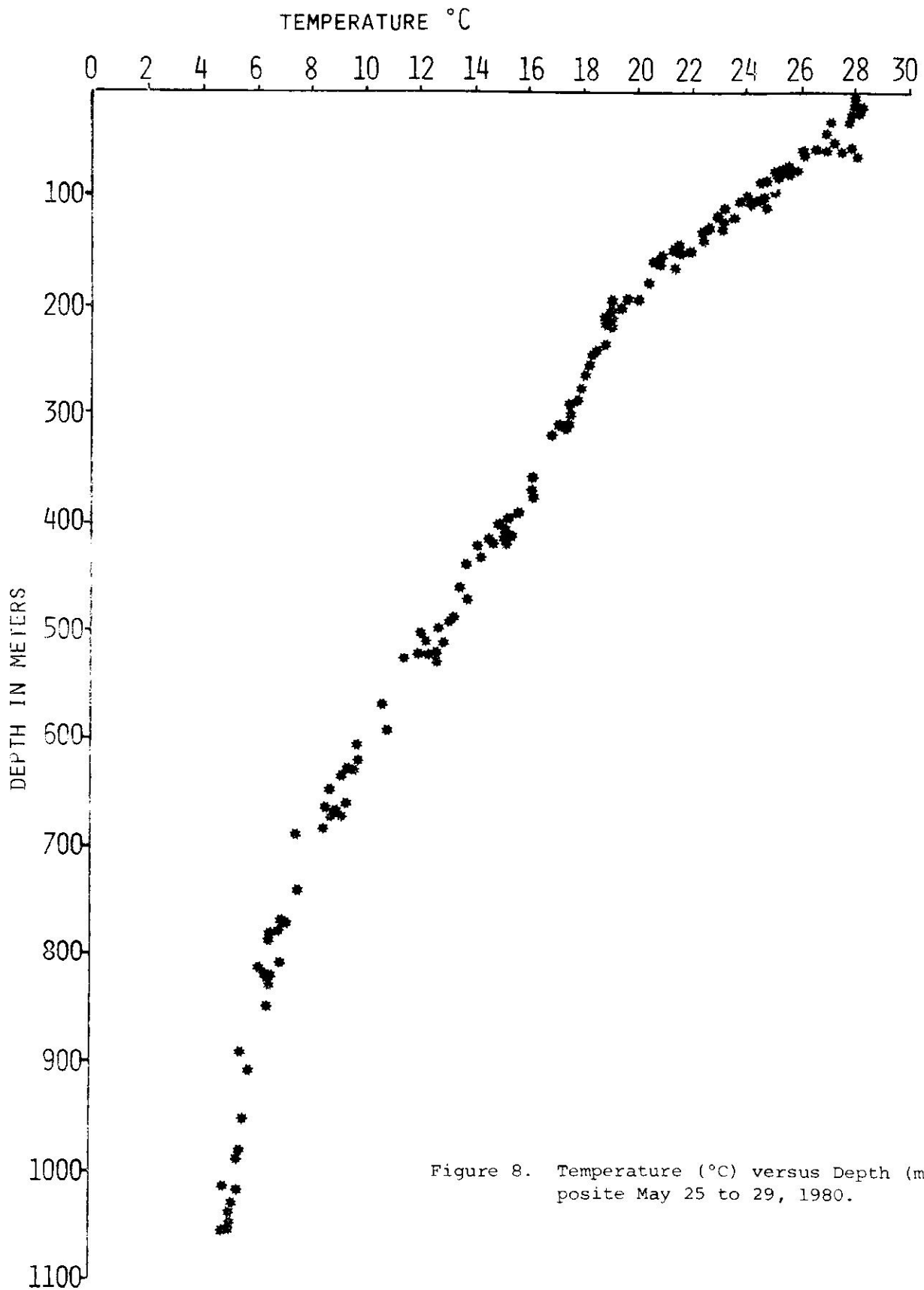


Figure 8. Temperature (°C) versus Depth (m) composite May 25 to 29, 1980.

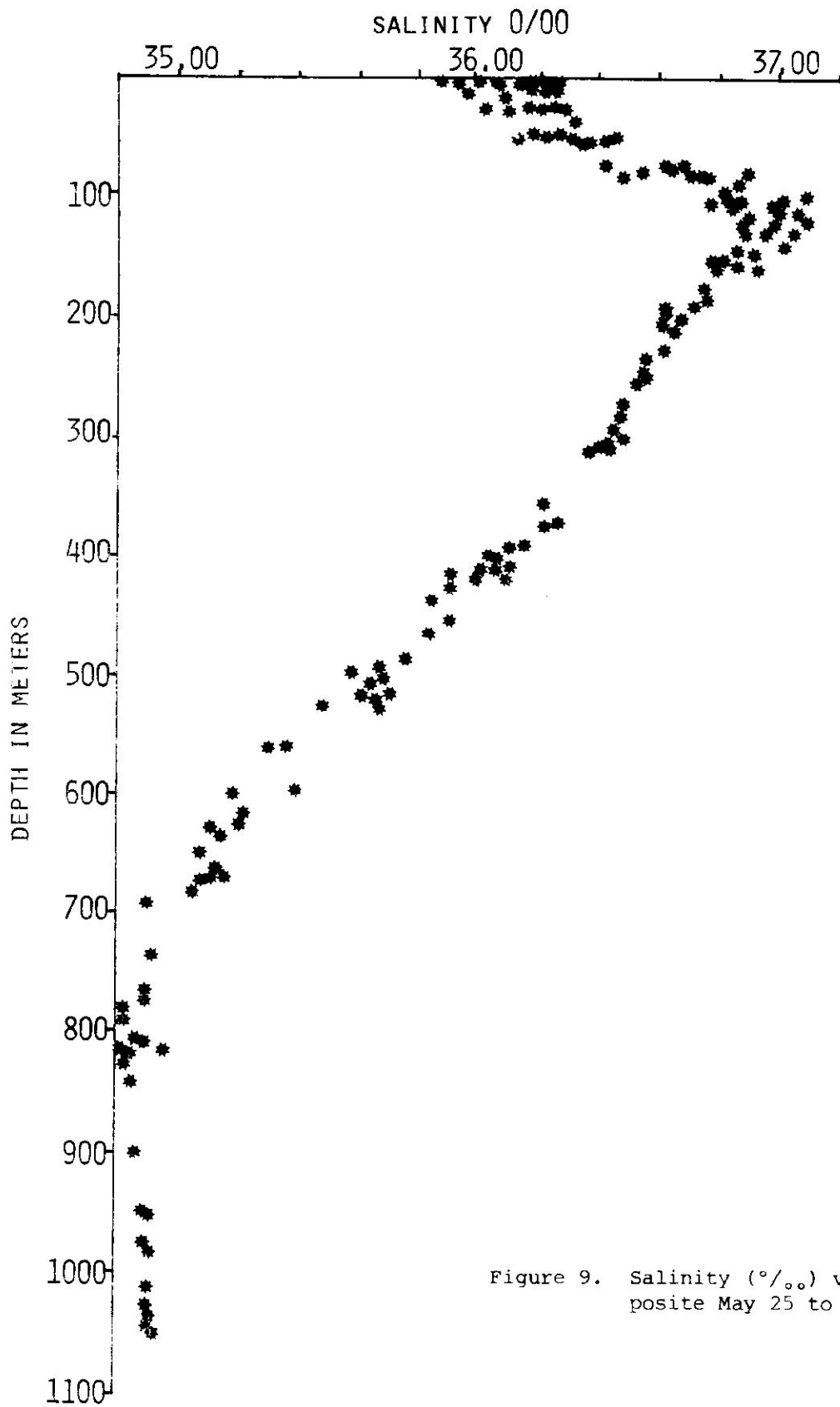


Figure 9. Salinity (‰) versus Depth (m) composite May 25 to 29, 1980.

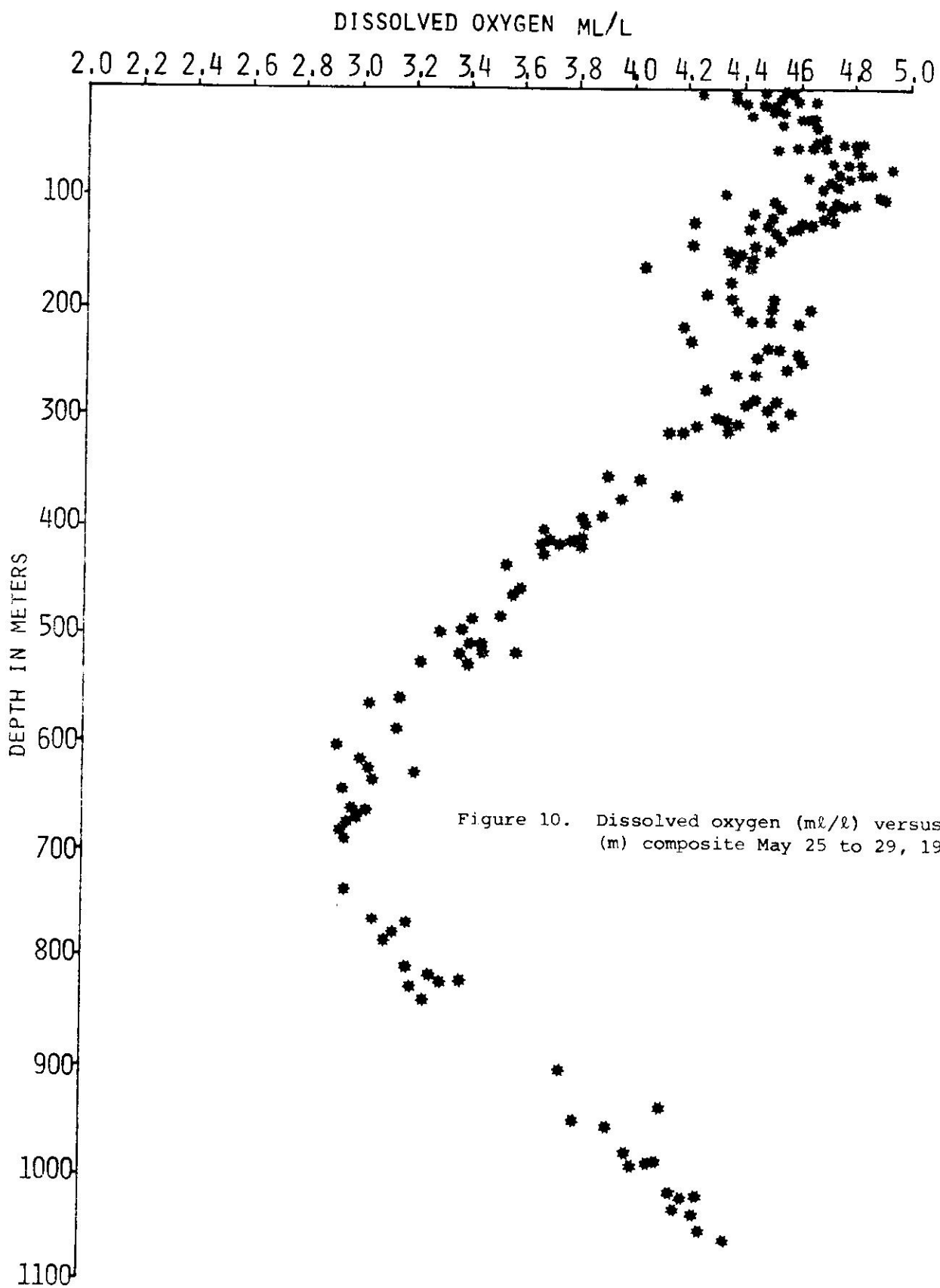


Figure 10. Dissolved oxygen (ml/l) versus Depth (m) composite May 25 to 29, 1980.

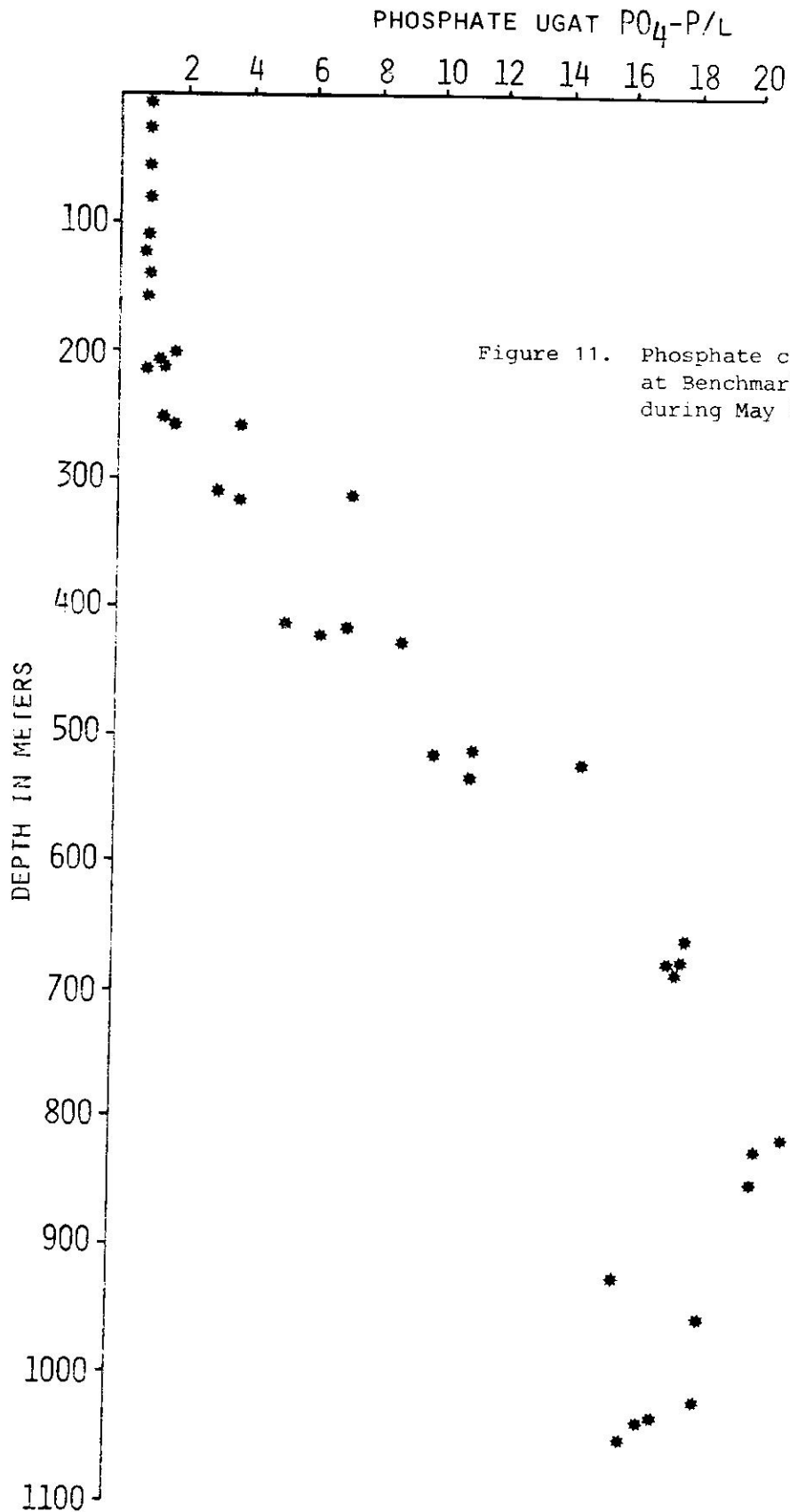
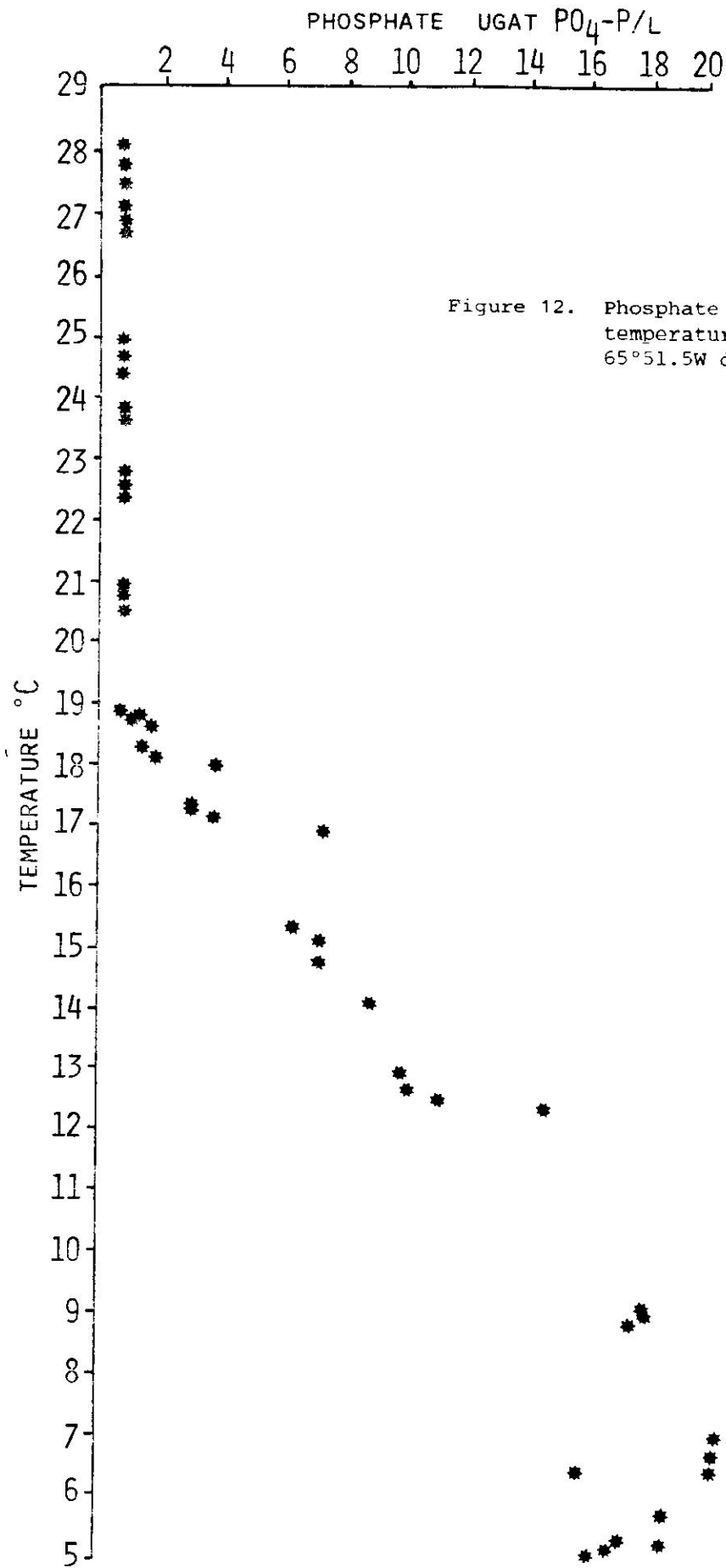
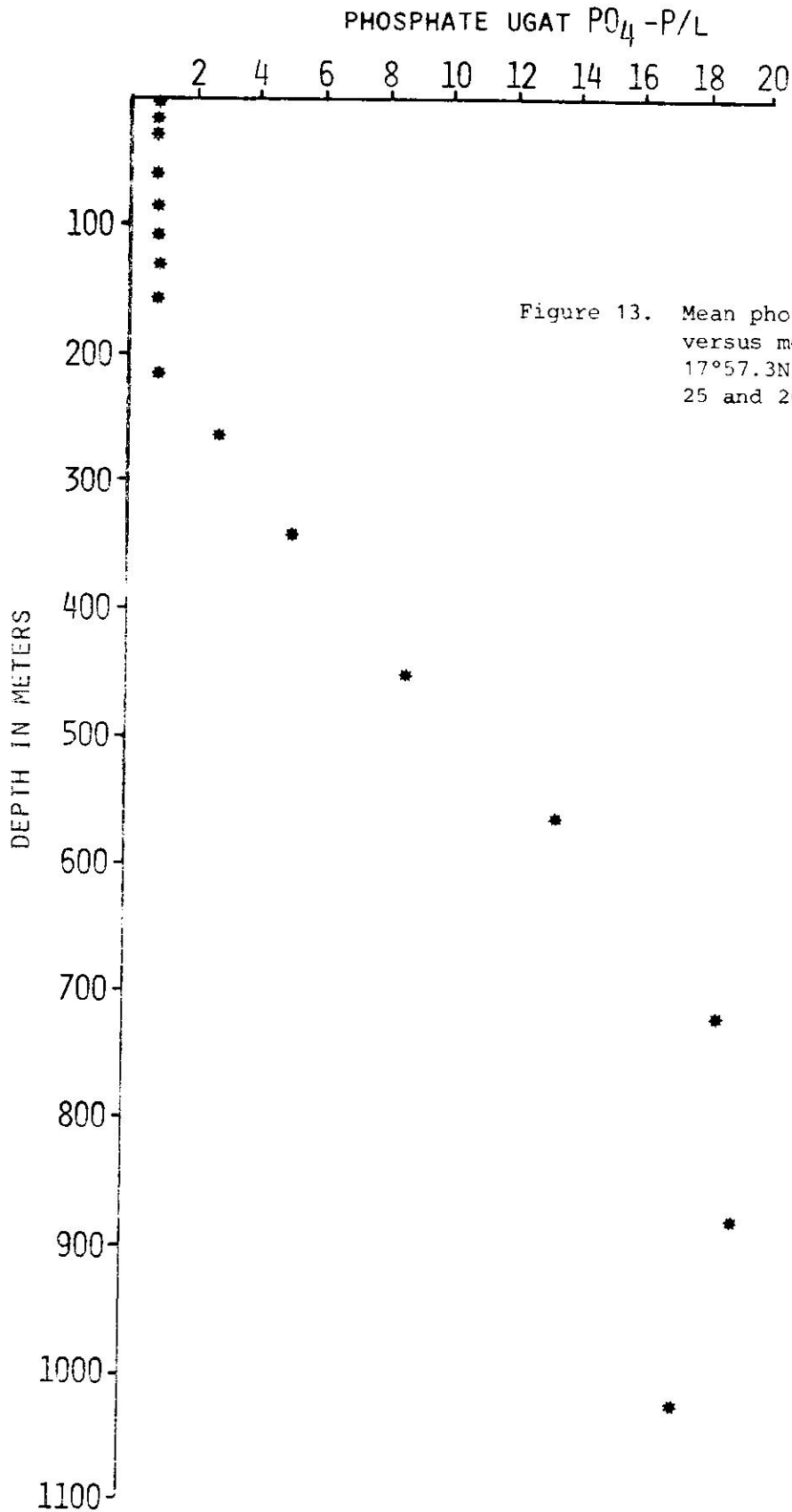
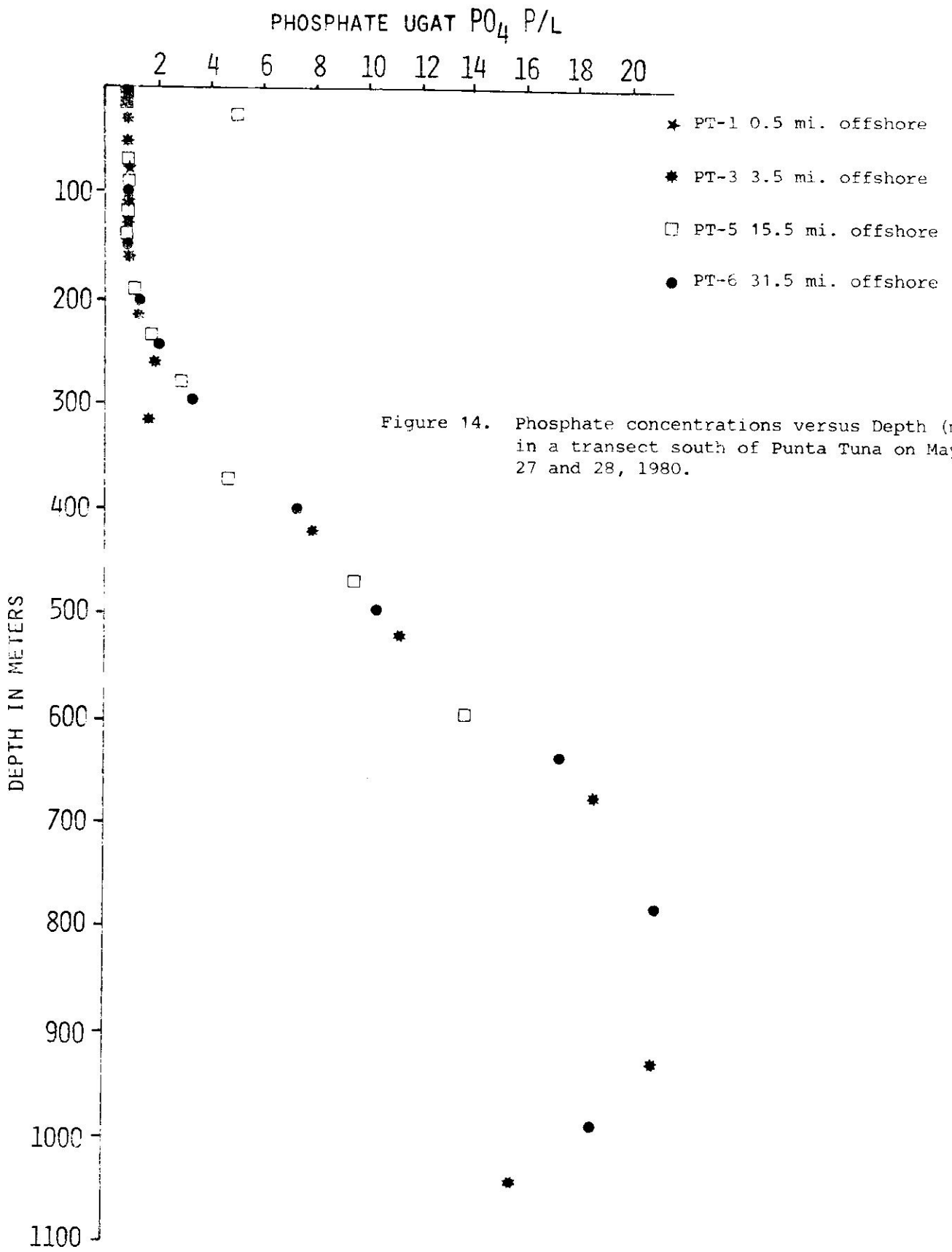
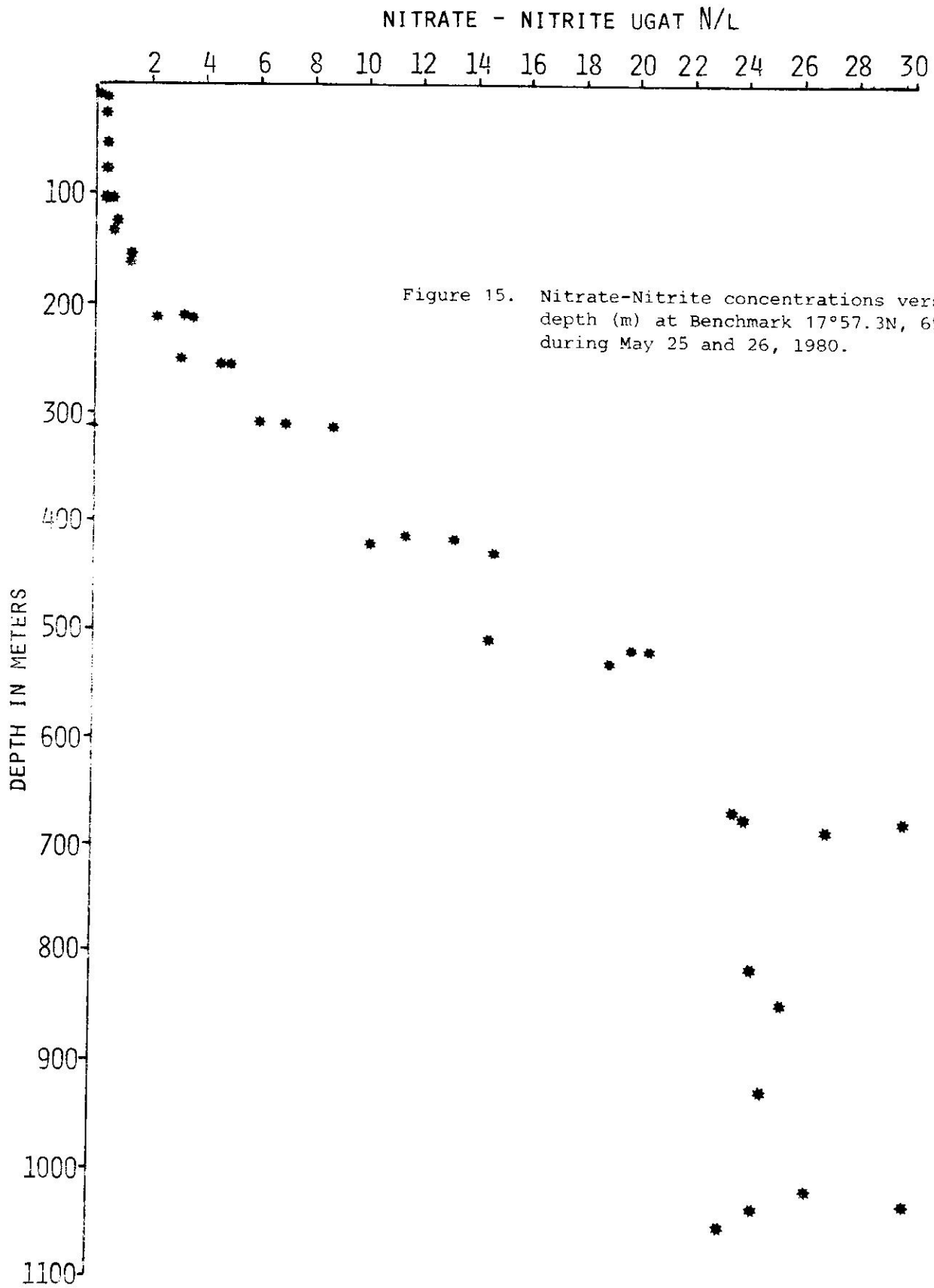


Figure 11. Phosphate concentration versus Depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.









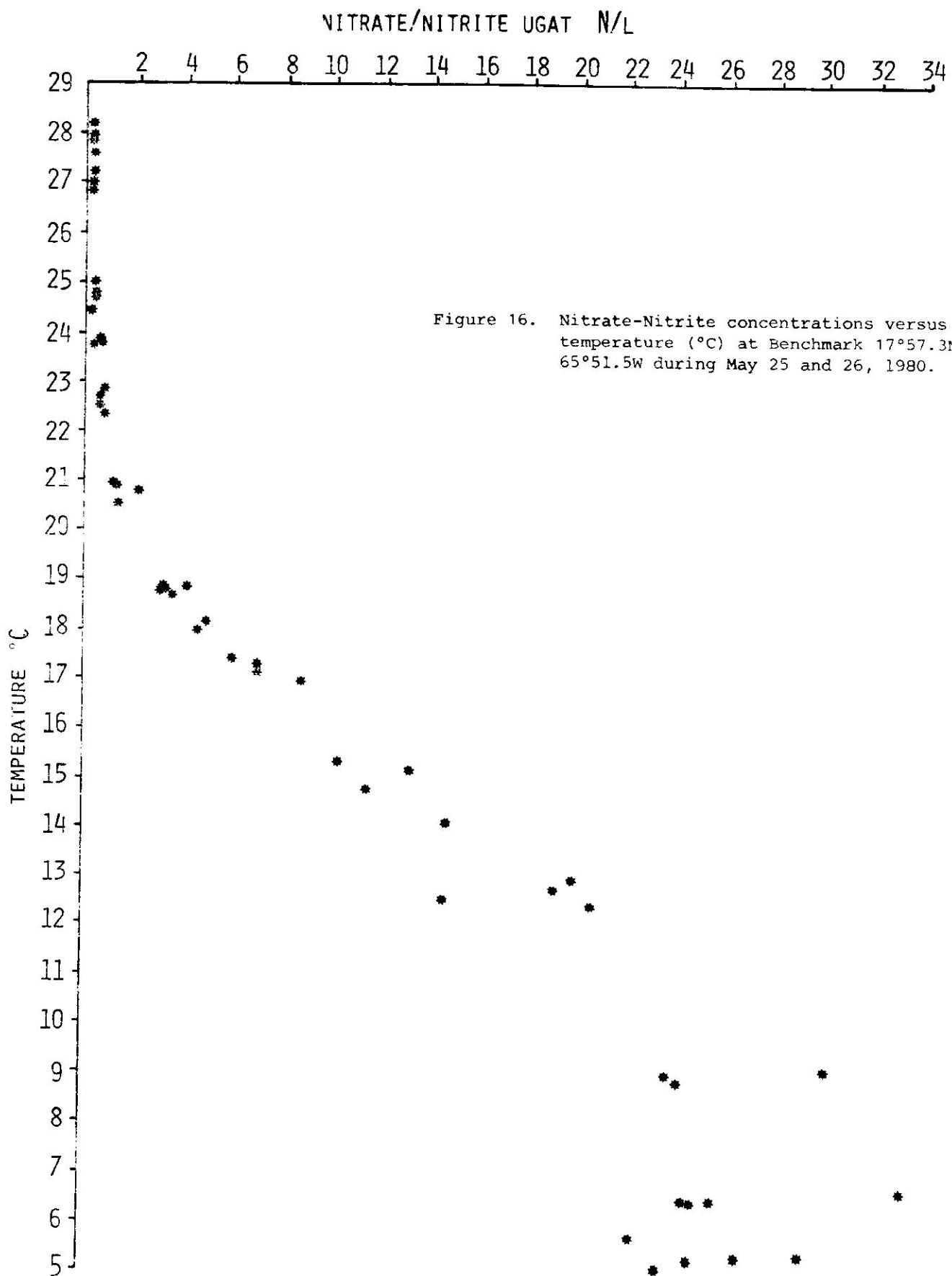
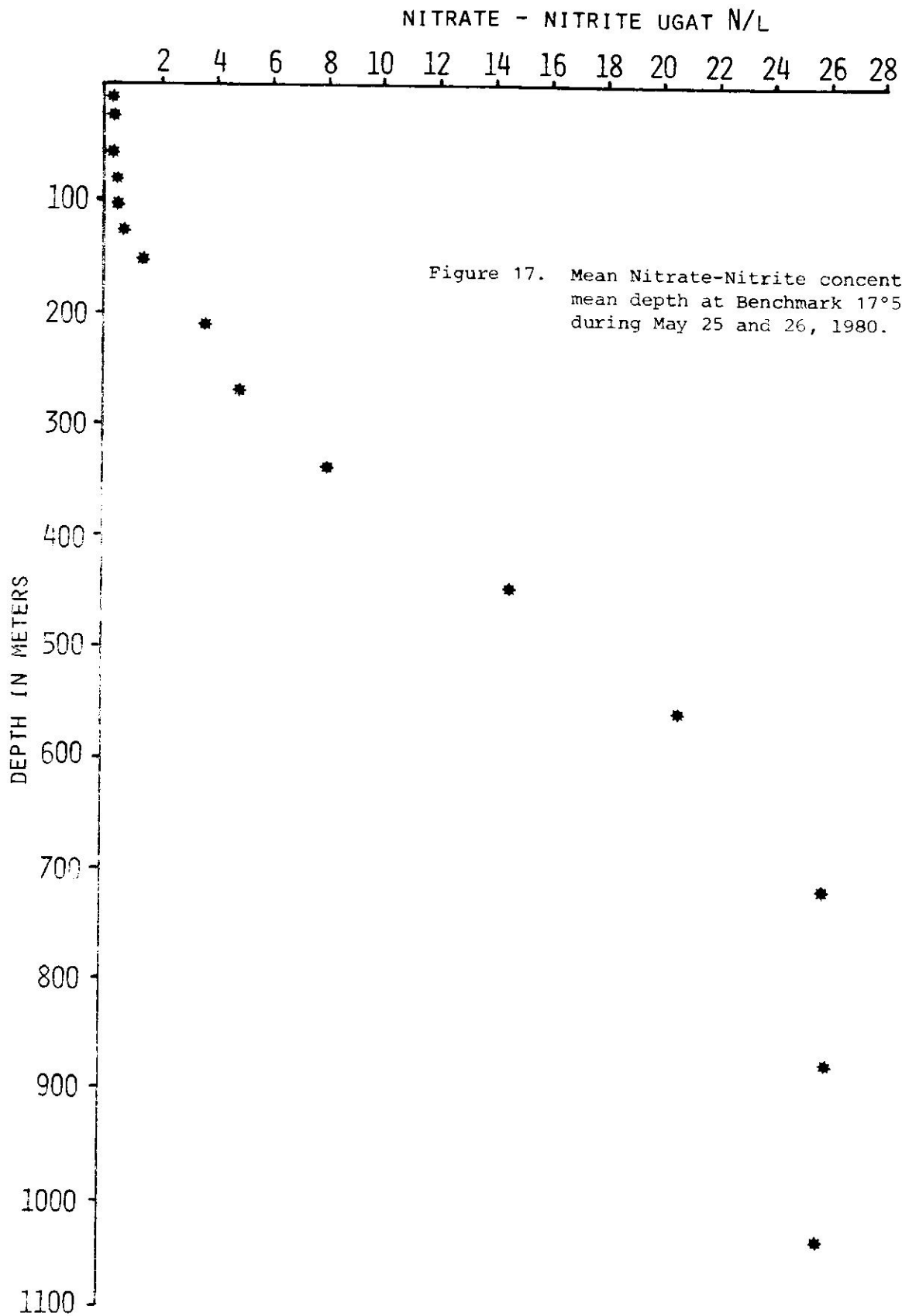
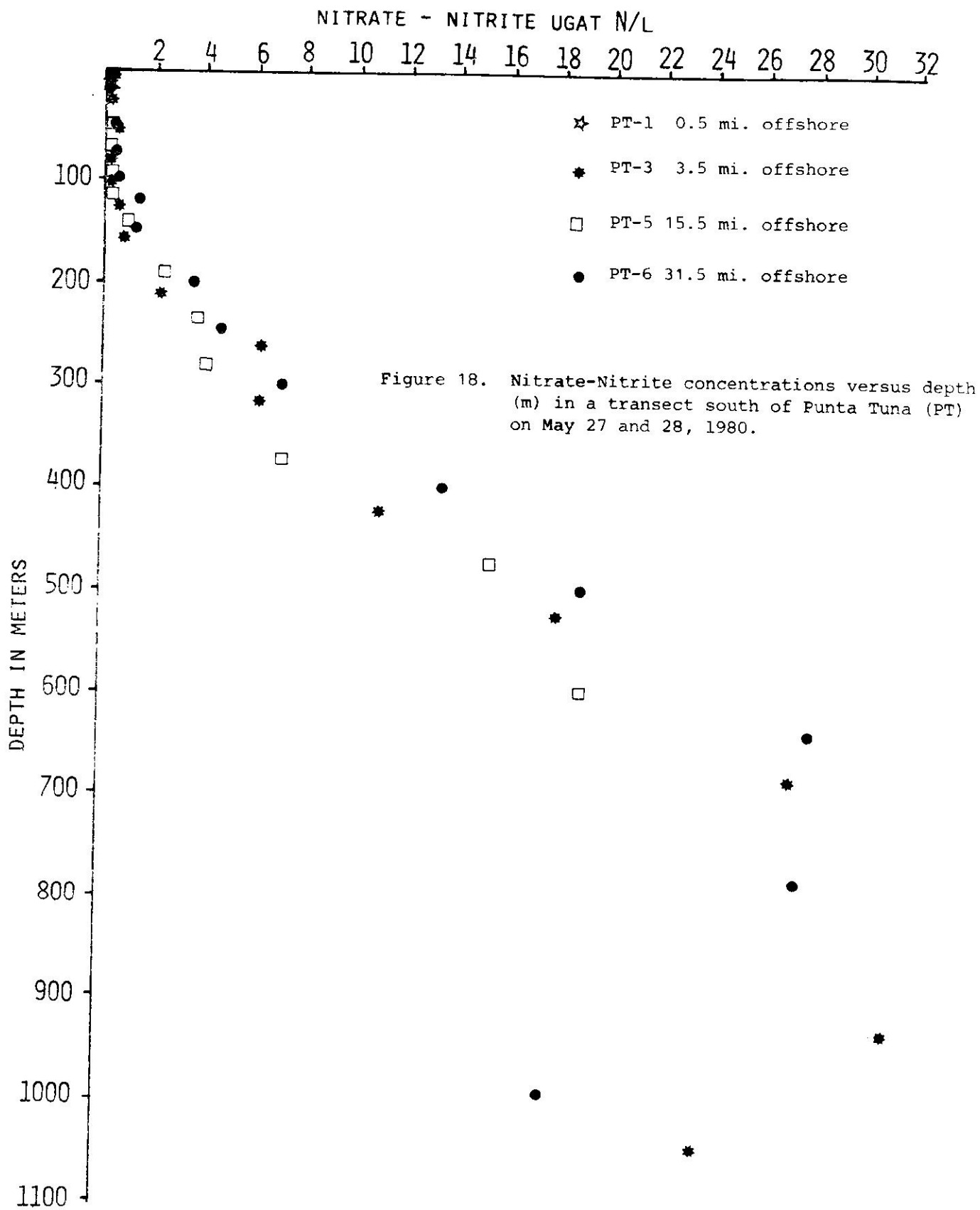


Figure 16. Nitrate-Nitrite concentrations versus temperature (°C) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.





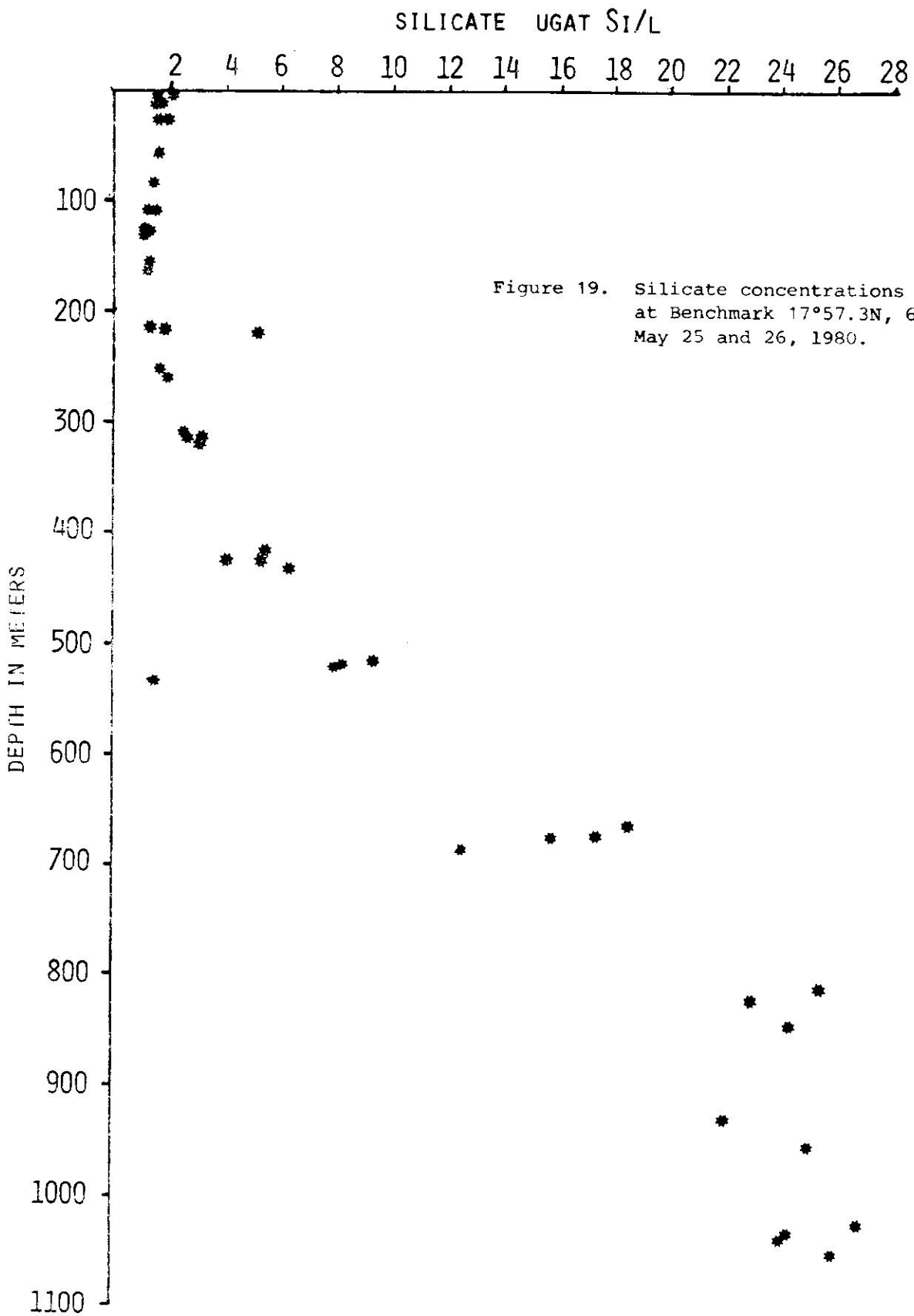


Figure 19. Silicate concentrations versus depth (m) at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.

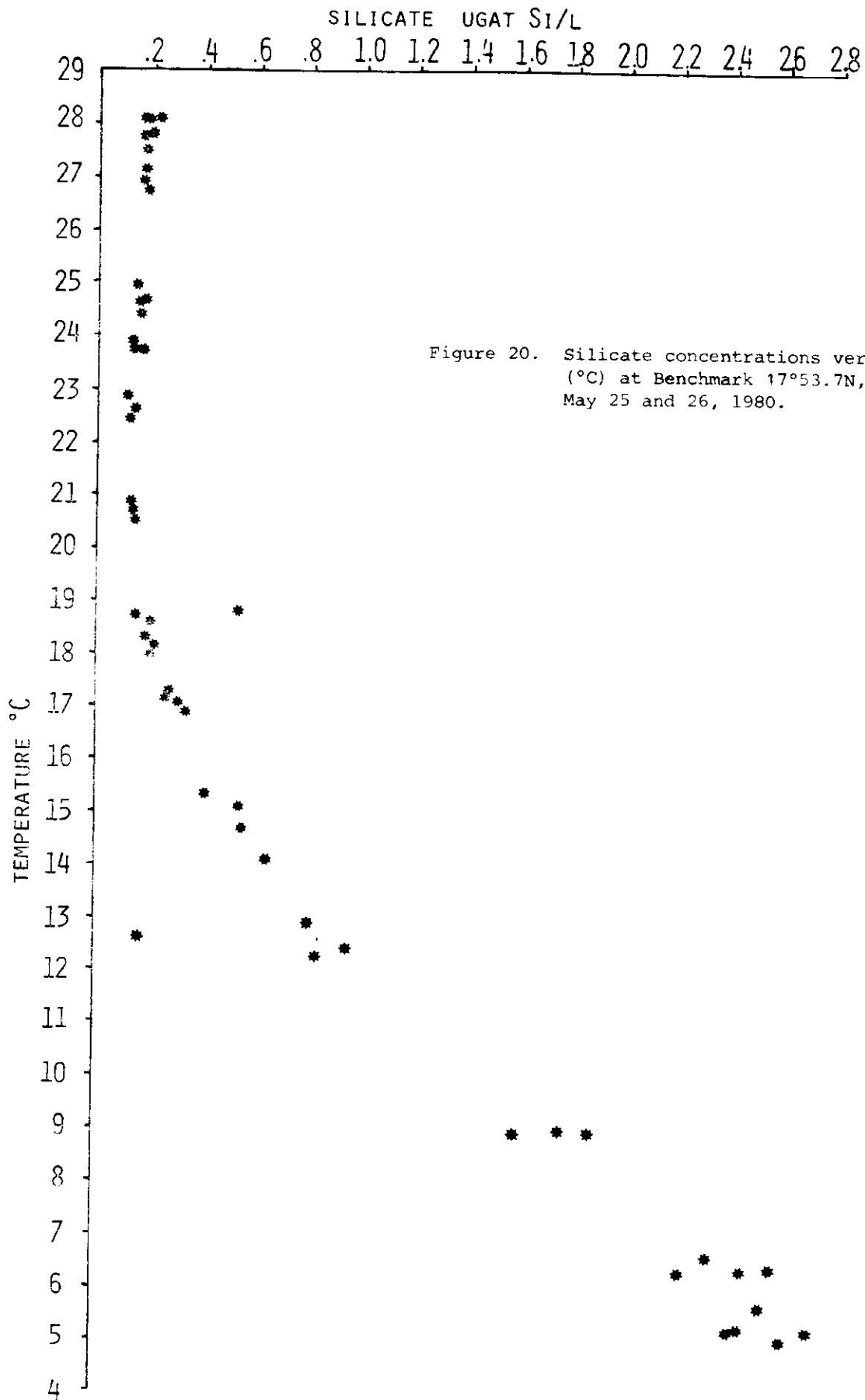


Figure 20. Silicate concentrations versus temperature (°C) at Benchmark 17°53.7N, 65°51.5W during May 25 and 26, 1980.

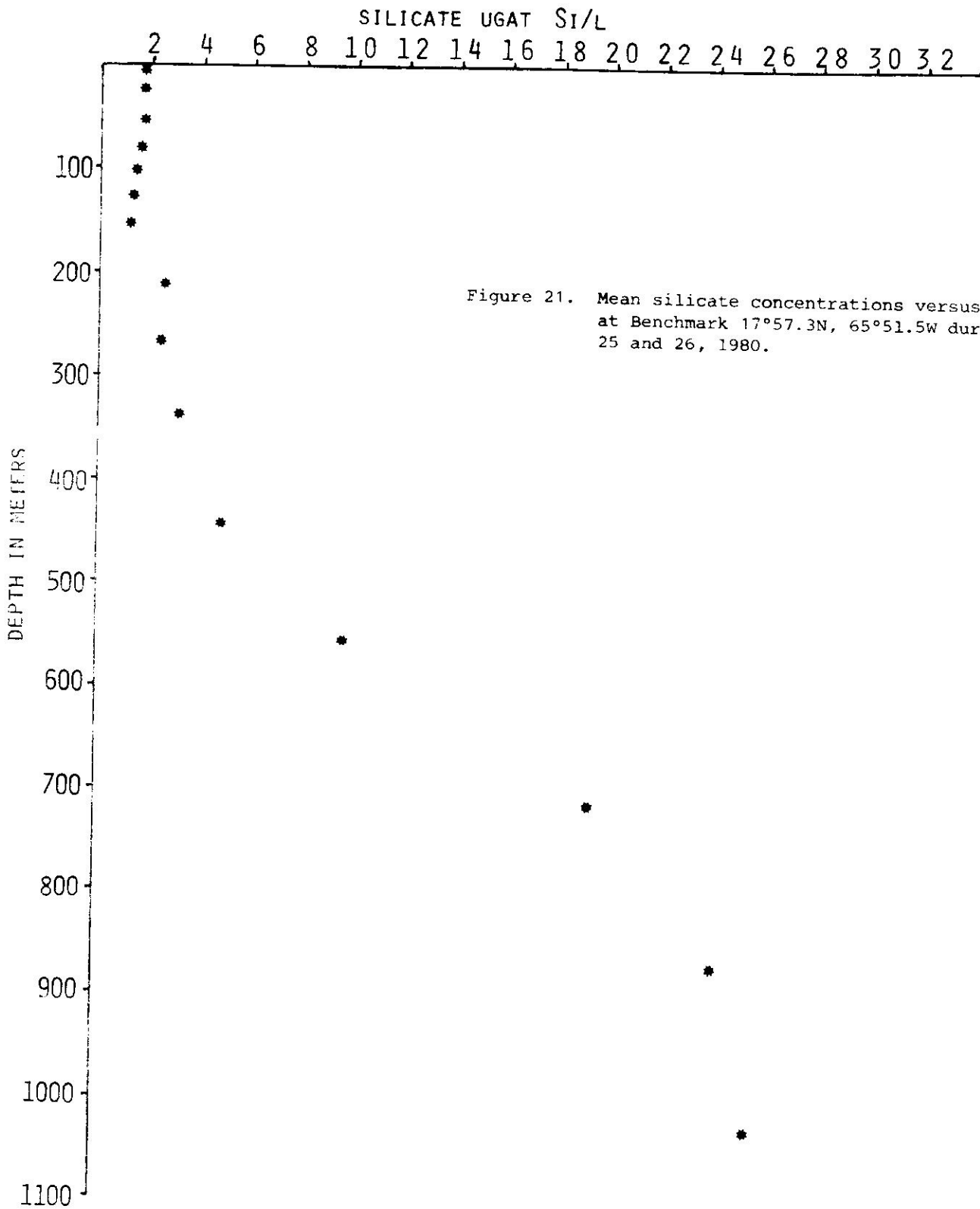
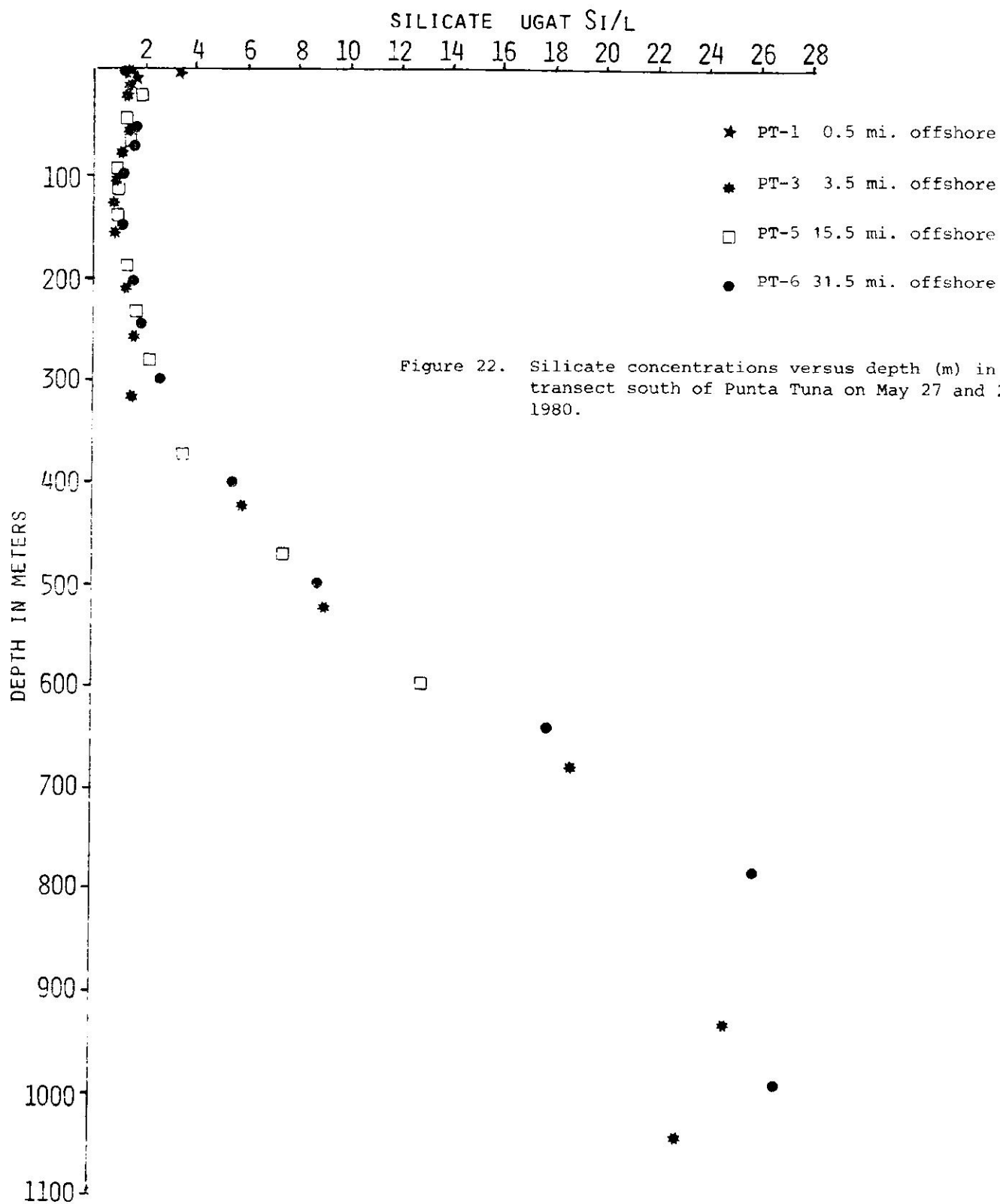
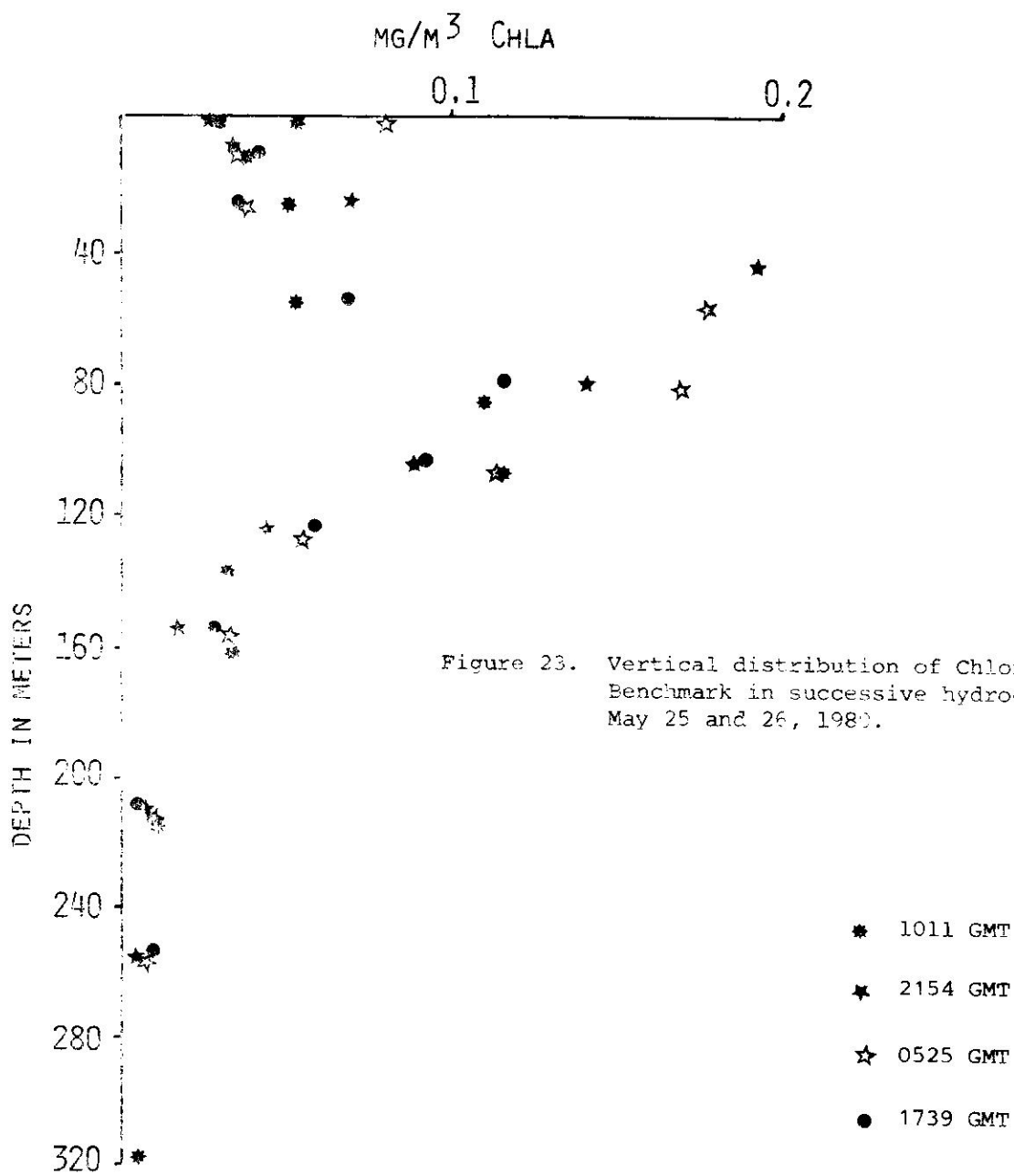


Figure 21. Mean silicate concentrations versus depth at Benchmark 17°57.3N, 65°51.5W during May 25 and 26, 1980.





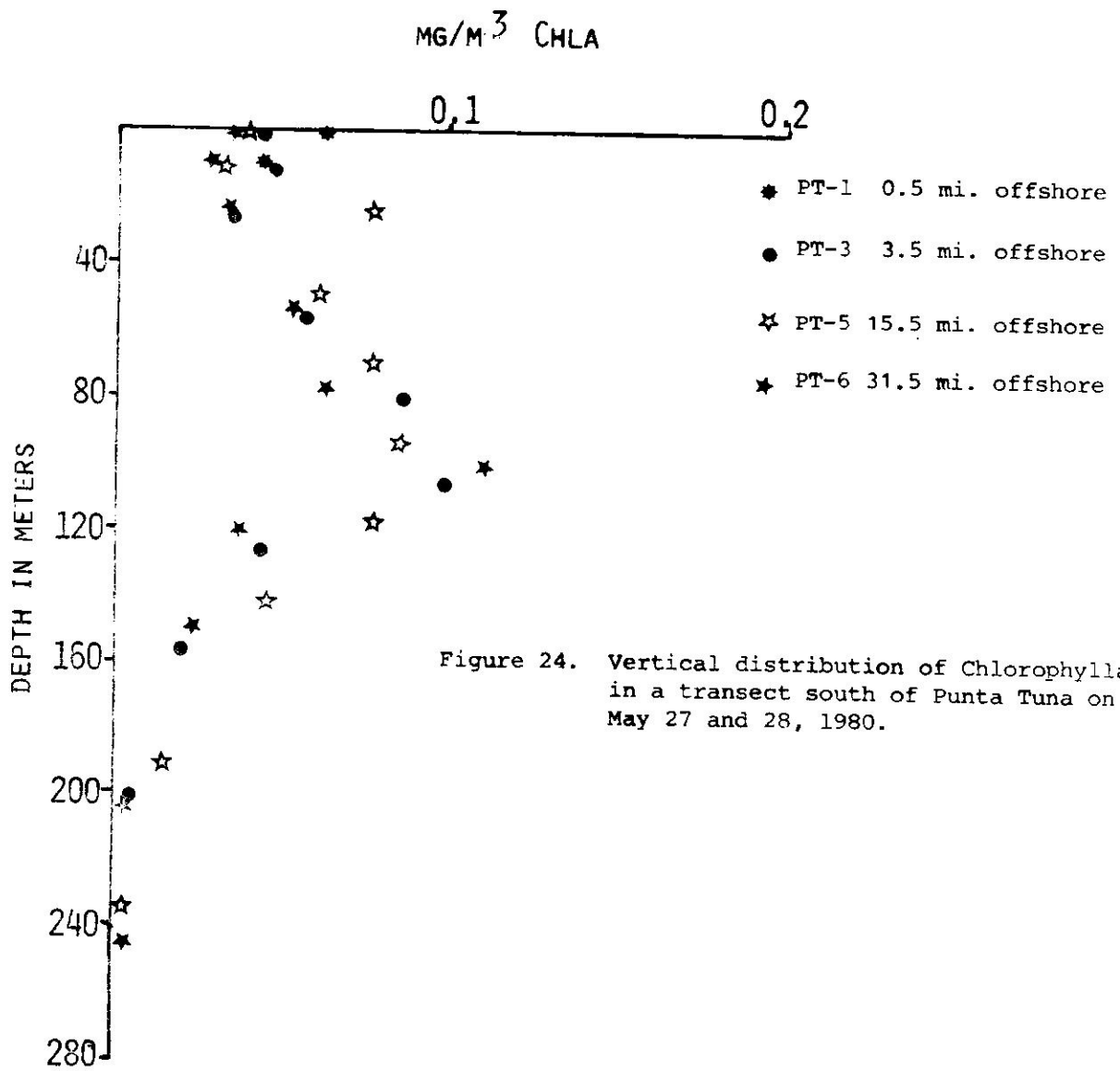


Figure 24. Vertical distribution of Chlorophylla in a transect south of Punta Tuna on May 27 and 28, 1980.

ZOOPLANKTON DATA

FOURTH CRUISE

Station	Date	Time	Depth --(m)--	Latitude	Longitude	Water Filtered --(m)--	Tow Length --(min)	Biomass (ml/1000 m ³)	Total Copepods --(#/m ³)--	Total Larvacean --(#/m ³)--	Total Chaetognaths --(#/m ³)--	Total Ichtyo- Plankton
Benchmark	5/25/80	0933	200-100	17°57.3N	65°51.5W	463.4	18.8	16.2	57.4	10.8	6.5	0
Benchmark	5/25/80	0939	100-0			405.6	18.8	88.8	380.2	76.9	39.9	1.5
Benchmark	5/25/80	1015	200-1000			602.4	39.0	1.2	2.1	0.7	0.2	-
Benchmark	5/25/80	0130	100-200			477.2	16.15	5.2	13.8	3.1	0.3	-
Benchmark	5/25/80	0130	0-100			375.3	16.15	71.9	334.1	32.0	9.6	-
Benchmark	5/25/80	0200	200-1000			884.6	40.31	8.5	9.5	3.2	2.0	0
Benchmark	5/25/80	0320	100-200			484.0	16.07	8.3	19.8	4.5	2.1	0
Benchmark	5/25/80	0320	0-100			358.0	16.07	76.8	304.2	34.4	23.5	4.2
Benchmark	5/25/80	0807	0-100			346.4	14.55	89.5	248.0	24.2	14.7	2.6
Benchmark	5/25/80	0854	0-100			401.2	15.30	109.7	438.2	44.9	34.4	4.5
Benchmark	5/25/80	1115	1000-200			557.1	17.30	6.3	12.4	3.5	3.0	-
Benchmark	5/26/80	0310	1000-200			801.5	23.05	8.7	15.2	1.5	0.7	-
Benchmark	5/26/80	0300	200-100			575.7	17.30	17.4	20.8	14.6	6.3	-
Benchmark	5/26/80	0300	0-100			417.0	17.30	84.0	346.8	38.1	7.2	1.4
Benchmark	5/26/80	0432	100-200			613.0	16.06	11.4	20.0	7.3	8.3	0.5
Benchmark	5/26/80	0437	0-100			390.1	17.24	115.3	461.4	104.5	20.0	3.1
S-1	5/26/80	0657	0-100	17°52.7N	65°53.9W	466.4	17.30	80.4	258.0	34.1	16.1	1.9
S-2	5/26/80	0612	0-100	17°54.0N	65°50.0W	374.0	17.00	95.0	229.4	38.5	28.1	-
S-3	5/26/80	0905	0-100	17°55.9N	65°46.4W	404.5	17.00	95.2	321.1	50.0	17.1	2.2
S-4	5/26/80	1058	0-100	17°56.1N	65°55.3W	361.0	14.55	62.3	218.6	64.8	14.1	1.7
Benchmark	5/26/80	1140	0-100	17°57.3N	65°51.5W	408.2	14.52	61.2	303.5	58.8	30.1	2.2
S-6	5/26/80	1200	0-100	17°58.8N	65°48.2W	409.4	14.48	69.6	307.8	38.8	19.1	-
Benchmark	5/26/80	0246	200-1000	17°57.3N	65°51.5W	830.6	45.00	8.4	16.3	2.2	1.1	-
Benchmark	5/26/80	0500	200-1000			885.0	40.31	10.7	18.0	1.7	2.2	-
Benchmark	5/26/80	0645	100-200			465.0	14.26	17.2	28.4	3.9	1.9	-
S-1	5/26/80	0750	0-100	17°52.7N	65°53.9W	410.0	15.45	90.2	269.3	37.3	13.9	-
S-2	5/26/80	0828	0-100	17°54.0N	65°50.0W	383.2	15.00	98.5	354.6	52.5	6.3	-
S-3	5/26/80	0905	0-100	17°55.9N	65°46.4W	427.4	15.55	9.7	288.5	33.7	10.5	2.1
S-4	5/27/80	0100	0-100	17°56.1N	65°55.3W	391.8	15.30	9.2	367.5	91.9	13.4	0.8
Benchmark	5/27/80	0048	0-100	17°57.3N	65°51.5W	425.8	15.30	89.2	362.8	52.1	17.6	3.5
S-6	5/27/80	0134	0-100	17°58.8N	65°48.2W	303.3	15.35	90.6	316.5	32.6	13.8	2.0
V-1	5/27/80	0417	0-10	18°04.4N	65°32.6W	93.1	5 min	107.4	219.1	32.2	16.1	3.2
V-2	5/27/80	0435	0-10	18°03.6N	65°32.6W	318.4	10.20	64.4	181.5	20.7	6.3	-

FOURTH CRUISE (cont.)

Station	Date	Local Time	Depth (m)	Latitude	Longitude	Water Filtered (m ³)	Tow Length (min)	Biomass (ml/1000 m ³)	Total Copepods (#/m ³)	Total Larvacean (#/m ³)	Total Chaetognaths (#/m ³)	Total Ichthyoplankton
V-3	5/27/80	0517	0-100	18°01.8N	65°32.7W	356.5	16.21	95.4	305.5	30.3	16.0	-
V-4	5/27/80	0809	0-100	17°57.7N	65°32.6W	398.0	16.55	65.3	360.3	52.8	28.6	1.5
V-5	5/27/80	0942	0-100	17°48.5N	65°32.6W	502.5	18.45	53.7	214.9	25.7	17.3	-
V-6	5/27/80	0248	0-100	17°32.5N	65°32.8W	383.1	15.30	100.5	380.6	29.8	15.7	.78
Pt-6	5/27/80	0655	0-100	17°28.0N	65°53.0W	587.0	16.10	76.7	308.7	14.3	10.2	2.0
Pt-5	5/27/80	0823	0-100	17°44.2N	65°53.0W	508.0	15.50	80.7	353.1	42.5	21.3	-
Pt-4	5/27/80	1040	0-100	17°52.0N	65°53.0W	432.0	15.45	103.7	352.3	39.2	16.2	1.9
Pt-3	5/28/80	0105	0-100	17°56.0N	65°53.0W	376.6	15.00	95.6	318.6	28.7	19.1	.80
Pt-1	5/28/80	0208	0-50	17°58.2N	65°53.0W	532.2	15.45	93.0	228.3	18.6	5.1	-
Pt-2	5/28/80	0238	0-100	17°58.1N	65°53.0W	408.5	16.15	113.8	373.1	44.1	8.8	1.5
J-1	5/28/80	0616	0-10	17°54.8N	66°16.0W	474.1	13.20	55.9	119.0	8.2	8.2	-
J-2	5/28/80	0644	0-10	17°53.7N	66°16.1W	529.1	16.05	111.3	128.0	16.7	5.6	1.1
J-3	5/28/80	0736	0-100	17°48.7N	66°16.1W	547.4	16.34	135.2	404.5	129.3	61.4	2.2
J-4	5/28/80	0947	0-100	17°47.7N	66°16.0W	443.7	16.45	96.9	403.0	78.4	27.0	-
J-5	5/28/80	1220	0-100	17°38.7N	66°16.0W	405.5	15.07	120.8	501.6	45.9	14.8	-
J-6	5/28/80	0330	0-100	17°24.5N	66°16.0W	491.2	15.37	208.7	612.0	140.5	52.5	-
G-6	5/28/80	0655	0-100	17°26.5N	66°45.0W	548.9	14.47	53.7	100.9	4.4	2.2	-
G-5	5/28/80	0955	0-100	17°41.6N	66°45.0W	656.5	14.47	144.7	421.3	34.7	23.8	1.8
G-4	5/28/80	0010	0-100	17°49.3N	66°45.0W	448.5	15.10	165.0	484.3	61.5	30.8	1.3
G-3	5/28/80	0205	0-100	17°53.4N	66°45.0W	462.4	15.55	122.2	443.8	45.4	31.1	2.6
G-2	5/28/80	0240	0-100	17°54.9N	66°45.0W	345.6	15.35	131.7	588.5	66.0	38.2	-
G-1	5/28/80	0338	0-100	17°56.0N	66°45.0W	337.1	15.45	130.5	496.6	78.3	32.0	1.8
G-0	5/28/80	0427	0-100	17°58.0N	66°45.7W	384.5	18.02	231.5	1,123.5	126.4	64.0	12.5

FOURTH CRUISE (cont.)

Station	<i>Clausocalanus furcatus</i> (#/m)	<i>Paracalanus parvus</i> (#/m)	<i>Calocalanus pavo3</i> (#/m)	<i>Oithona plumifera</i> (#/m)	<i>Temora turbinata</i> (#/m)	<i>Undinula vulgaris</i> (#/m)	Aliquot (ml)
Benchmark	.69	.09	0	3.7	0	0	30
Benchmark	49.1	2.4	2.4	42.6	8.9	6.5	5
Benchmark*	--	--	--	--	--	--	--
Benchmark**	--	--	--	--	--	--	--
Benchmark	35.2	14.1	3.2	51.2	4.5	2.0	5
Benchmark	.34	.54	.14	.37	.14	.03	40
Benchmark	1.6	.37	0	1.7	0	.06	40
Benchmark	31.5	15.4	3.4	51.0	6.7	2.7	5
Benchmark	33.9	16.6	2.8	39.5	15.2	5.5	5
Benchmark	57.4	10.2	6.6	61.0	3.6	3.6	5
Benchmark	.38	.16	0	.16	0	0	40
Benchmark	1.2	.51	.06	.69	0	.06	50
Benchmark	.47	.05	0	1.0	0	0	40
Benchmark	40.9	5.2	12.7	57.6	5.2	7.5	5
Benchmark	.88	.29	.05	1.7	0	.20	40
Benchmark	73.2	11.1	4.9	50.0	5.5	4.3	5
S-1	49.0	3.1	3.6	37.6	3.6	2.1	5
S-2	56.5	5.1	7.7	36.0	.6	4.5	5
S-3	26.7	7.7	6.5	35.6	2.4	6.5	5
S-4	13.3	10.6	6.6	41.2	6.0	4.0	5
Benchmark	30.5	7.6	3.5	40.6	5.9	1.8	5
S-6	23.4	10.6	4.7	49.8	5.3	2.9	5
Benchmark	1.7	.43	.14	1.6	0	.14	10
Benchmark	.27	.20	0	.54	0	0	20
Benchmark	.77	.52	.13	.77	0	0	20
S-1	48.0	7.0	5.3	23.4	7.6	2.3	5
S-2	88.3	5.6	6.3	28.2	3.8	1.9	5
S-3	48.3	5.1	3.4	42.1	0	.56	5
S-4	37.4	3.7	4.9	25.7	1.8	1.2	5
Benchmark	49.0	8.5	3.9	57.5	2.3	4.5	5
S-6	80.0	9.5	11.1	62.5	8.7	3.2	5
V-1	25.8	15.5	1.3	16.8	1.3	0	10
V-2	44.5	5.3	3.0	8.3	9.0	6.8	5

* These sample's biomass was too small to count Copepods predominant species.

FOURTH CRUISE

Station	<u>Clausocalanus furcatus</u> (#/m ³)	<u>Paracalanus parvus</u> (#/m ³)	<u>Calocalanus papo</u> (#/m ³)	<u>Githona plumifera</u> (#/m ³)	<u>Temora turbinata</u> (#/m ³)	<u>Undinula vulgatis</u> (#/m ³)	<u>Aliquot (ml)</u>
V-3	53.9	2.7	3.4	21.0	6.1	4.0	5
V-4	38.6	3.6	4.2	48.8	.60	1.2	5
V-5	31.0	5.7	3.3	25.8	2.4	0	5
V-6	30.1	4.4	.63	58.3	1.9	0	5
Pt-6	41.7	4.1	7.8	35.6	2.5	2.9	5
Pt-5	34.5	3.3	2.4	50.6	2.4	1.9	5
Pt-4	62.2	5.5	10.0	40.3	1.5	2.5	5
Pt-3	48.4	2.5	3.2	35.7	1.9	1.3	5
Pt-1	39.7	1.4	6.3	24.4	2.7	1.4	5
Pt-2	55.8	1.8	6.5	36.4	4.1	2.4	5
J-1	12.7	6.6	1.0	4.6	13.7	2.0	5
J-2	4.0	1.1	.89	1.3	.89	.67	5
J-3	34.6	3.1	2.6	29.4	17.1	1.8	5
J-4	49.8	9.7	3.2	53.5	5.4	3.8	5
J-5	74.6	10.1	11.8	33.1	4.1	6.5	5
J-6	83.1	13.4	19.5	72.1	2.4	4.9	5
G-6	1.9	0.22	.11	.66	.55	0	20
G-5	64.7	5.1	18.3	14.6	1.1	2.9	5
G-4	37.5	4.8	2.7	30.5	3.2	1.1	5
G-3	45.2	5.7	8.8	20.2	1.6	4.2	5
G-2	86.1	3.5	25.7	59.0	3.5	4.2	5
G-1	84.7	13.5	18.5	63.4	5.0	5.0	5
G-0	108.0	136.7	4.4	38.7	18.7	3.7	5

APPENDIX

MAY 1980 CRUISE PLAN (8005)

DAY 0

1600 Depart Malec3n

DAY 1

0600 Arrive Benchmark station 17° 57.3N 65° 51.5W
XBT
Hydrocast (primary productivity), 15 depths

0800 XBT

1000 Oblique net tows (0-100, 100-200m)

1100 Vertical net tow (1000-200m), XBT

1200 Light profile, secchi

1300 Oblique net tows (0-100, 100-200m)

1400 Vertical net tow (1000-200m), XBT

1500 Oblique net tow (0-100, 100-200m)

1600 Vertical net tow (1000-200m)

1700 Hydrocast
XBT

1930 Vertical net tow (100-200m), XBT

2030 Oblique net tows (0-100, 100-200m)

2130 Vertical net tow (1000-200m)

2230 Oblique net tows (0-100, 100-200m)

2330 Vertical net tow (1000-200m)
XBT

DAY 2

0030 Oblique net tows (0-100, 100-200m)

0130 Hydrocast

0330 XBT

0530 Begin small scale pattern study
Steam for station S-1

0630 Arrive S-1 17° 52.5N 65° 53.8W
Hydrocast at station S-1 (primary productivity)

0915 Oblique net tow (0-100m) station S-1, XBT

1000 Steam for station S-2 17° 54.2N 65° 50.2W

1045 Oblique net tow (0-100m), XBT

1130 Steam for station S-3 17° 55.8N 65° 46.5W

DAY 2 (cont.)

CRUISE 8005

1215 Oblique net tow (0-100m), XBT
 1300 Steam for station S-4 17° 56.0N 65° 55.5W
 1345 Oblique net tow (0-100m), XBT
 1430 Steam for station S-5 (Benchmark) 17° 57.6N 65° 51.9W
 1515 Oblique net tow (0-100m), XBT
 1600 Steam for station S-6 17°59.2N 65° 48.2W
 1645 Oblique net tow (0-100m), XBT
 Return to benchmark
 1730 Hydrocast at benchmark
 1930 Begin night series
 Steam for S-1 17° 52.2N 65° 53.8W
 2000 Oblique net tow (0-100m), XBT
 Steam for S-2 17° 54.2N 65° 50.2W
 2100 Oblique net tow (0-100m), XBT
 Steam for S-3 17° 55.8N 65° 46.5W
 2200 Oblique net tow (0-100m), XBT
 Hydrocast
 Steam for S-4 17° 56.0N 65° 55.5W
 2400 Oblique net tow (0-100m), XBT
 Steam for S-5 (benchmark) 17° 57.6N 65° 51.9W

DAY 3

0000 Oblique net tow (0-100m), XBT
 Steam for S-6 17° 59.2N 65° 48.2W
 0100 Oblique net tow (0-100m), XBT
 0200 Steam to Vieques
 Begin large scale study
 XBT's at 30 min. intervals
 0330 XBT (underway)
 0345 Arrive station V-1 18° 04.4N 65° 32.6W
 Hydrocast (2 depths)
 Shallow net tow
 Steam for V-2 18° 03.6N 65° 32.6W
 Shallow net tow
 0515 Steam for V-3 18° 01.8N 65° 32.6W
 Hydrocast
 Oblique net tow (0-100m)
 Steam for V-4 17° 57.7N 65° 32.6W

DAY 3 (cont)

CRUISE 8005

0830 Oblique net tow (0-100m)
Steam for V-5 17° 48.5N 65° 32.6W
Oblique net tow (0-100m)

1200 Hydrocast

1500 Steam for V-6
Hydrocast 17° 32.5N 65° 32.6W
Oblique net tow (0-100m)
Steam for PT-6
XBT's at 30 min intervals

2000 Arrive PT 6 17° 28'N 65° 53'W
Hydrocast net tow
Oblique net tow (0-100m)

2300 Steam for PT-5
Arrive PT-5
Oblique net tow (0-100m) 17° 44.2'N 65° 53'W
Hydrocast
Steam for PT-4

DAY 4

0100 Arrive PT-4 17° 52.0N 65° 53'W
Oblique net tow (0-100m)
Steam for PT-3 (benchmark)

0200 Arrive PT-3 17° 56.0N 65° 53'W
Hydrocast
Oblique net tow (0-100m)
Steam for PT-2

0430 Arrive PT-2 17° 58.1N 65° 53'W
Oblique net tow
Steam for PT-1

0630 Arrive PT-1 17° 58.2'N 65° 53'W
Shallow hydrocast (2 depths)
Shallow net tow
Steam for J-1

0930 Arrive J-1 17° 54.8N 66° 16.N
Shallow hydrocast (2 depths)
Shallow net tow
Steam for J-2

DAY 4 (cont)

CRUISE 8005

	1000	Arrive J-2 17° 53.7'N 66° 16.0'W Oblique net tow
	1055	Steam for J-3
	1100	Arrive J-3 17° 51.7'N 66° 16.0N Oblique net tow (0-100m) Steam for J-4
	1430	Arrive J-4 17° 47.7N 66° 16.0W Oblique net tow (0-100m) Steam for J-5
	1700	Arrive J-5 17° 39.7N 66° 16.0W Oblique net tow (0-100m) Steam for J-6
	1800	Arrive J-6 17° 24.5N 66° 16.0W Hydrocast Oblique net tow (0-100m)
	1930	Depart for G-6
	2100	XBT (underway)
	2230	Arrive G-6 17° 26.5'N 66° 45'W Oblique net tow (0-100m) Hydrocast Depart for G-5
DAY 5	0200	Arrive G-5 17° 41.6'N 66° 45'W Hydrocast Oblique net tow (0-100m) Depart for G-4
	0430	Arrive G-4 17° 49.3'N 66° 45'W Oblique net tow (0-100m) Depart for G-3
	0600	Arrive G-3 17° 53.4'N 66° 45'W Oblique net tow (0-100m) Hydrocast Depart for G-2
	0730	Arrive G-2 17° 54.9' N 66° 45'W Oblique net tow (0-100m) Depart for G-1
	0815	Arrive G-1 17° 56'N 66° 45'W Oblique net tow

DAY 5 (cont)

CRUISE 8005

0815(cont) Shallow hydrocast
Depart G-0
0845 Arrive G-0 17° 58'N 66° 45.7'W
Oblique net tow
0915 Depart for Malecón

LIST OF PARTICIPANTS

1.	José Manuel López	-	Chief Scientist
2.	Juan G. González	-	Scientist
3.	Paul M. Yoshioka	-	Scientist
4.	Daniel Pesante	-	Scientist
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7.	Jorge Capella	-	Technician
8.	Angel Nazario	-	Technician
9.	Dennis Corales	-	Technician
10.	Carlos Bonafé	-	Technician
11.	Jorge García	-	Technician
12.	Alfredo Mercado	-	Technician
13.	Evelyn Nazario	-	Technician
14.	Jaime García	-	Technician
15.	Angel Marquez	-	Technician

WEATHER CODE

- 0 Clear (no cloud at any level)
- 1 Partly cloudy (scattered or broken clouds)
- 2 Continuous layer (s) of cloud (s)
- 3 Sandstorm, duststorm, or blowing snow
- 4 Fog, thick dust, or haze
- 5 Drizzle
- 6 Rain
- 7 Snow, or rain and snow mixed
- 8 Shower (s)
- 9 Thunderstorm (s)