

DRAFTING ROOM

Errata 28 Oct 63 ✓

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UNIVERSITY OF CALIFORNIA SCRIPPS INSTITUTION OF OCEANOGRAPHY

data report

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 5911
16-25 November 1959

and

CCOFI Cruise 5912
9-19 December 1959

SIO Reference 61-21
24 April 1961

UNIVERSITY OF CALIFORNIA
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CCOFI CRUISE 5911
16-25 November 1959

and

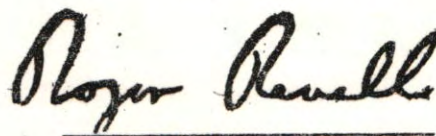
CCOFI CRUISE 5912
9-19 December 1959

Sponsored by

Marine Research Committee

SIO Reference 61-21
24 April 1961

Approved for distribution:



Roger Revelle, Director

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CRUISE 5912

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DISTRIBUTION LIST 475

Approved for distribution:

Roger Kavelle, Director

INTRODUCTION

The data presented in this report were collected on the one hundred and twenty-sixth and one hundred and twenty-seventh consecutive cruises of the California Cooperative Oceanic Fisheries Investigations program. Two vessels of the Scripps Institution participated in these cruises: R/V Paolina-T, in Cruise 5911; R/V Orca, in Cruise 5912.

The data are tabulated at observed depths; the interpolated and computed values are tabulated at standard depths and are accompanied by charts of horizontal distribution. The presentation of data in this report does not constitute publication; however, the data contained in this report have been carefully edited and no modifications should be necessary before final publication.

STANDARD PROCEDURES

Processing of the data was carried out using the method described by Klein.^{1/} Certain approximations have been introduced for the determination of the integrated pressure terms which may result in errors whose maximum values are less than 0.5 dynamic centimeter at 0 over 200 decibars, 1.0 dynamic centimeter at 0 over 500 decibars, and 2.0 dynamic centimeters at 0 over 1000 decibars. The 125-meter level was introduced into the integration to obtain greater accuracy in the determination of ΔD .

To indicate degree of accuracy, temperatures are recorded in tenths of a degree when obtained by bucket thermometer, thermograph, or bathythermograph, while temperatures from reversing thermometers are recorded in hundredths of a degree. Extrapolated values and values interpolated between remote observations are entered within parentheses. A hyphen is used to indicate a missing observed value. The time is the time of messenger release. When more than one cast was made on a station, messenger times and wire angles are given in the order of increasing depth. A line is left blank between the observed data of each cast.

^{1/}Klein, Hans T. A new technique for processing physical oceanographic data. MS.

FOOTNOTES

Laboratory personnel, before titrating the salinity samples, note any possible imperfections in the sealing of the bottles as follows:

Loose bottle cap: The cap is definitely loose so that it could be moved with very little applied pressure. The salinity values obtained from these samples may be usable depending on time and/or conditions of storage.

Possible evaporation: Either the cap was sealed with less than usual pressure, the bottle edge chipped, the rubber washer cracked, or the bale broke on opening, etc.

Use of the above values in interpolation depends upon consistency with other values of salinity and other properties, and these footnotes are supplemented with "falls on property curve" or "does not fall on property curve," depending upon whether the property curve was drawn through the value or not.

In addition to footnotes, three special notations are used without footnotes because their meaning is always the same.

To indicate a premature or a delayed reversal of the water-sampling device which results in certain depth and property errors, the following notation is used.

p: pretrip or posttrip.

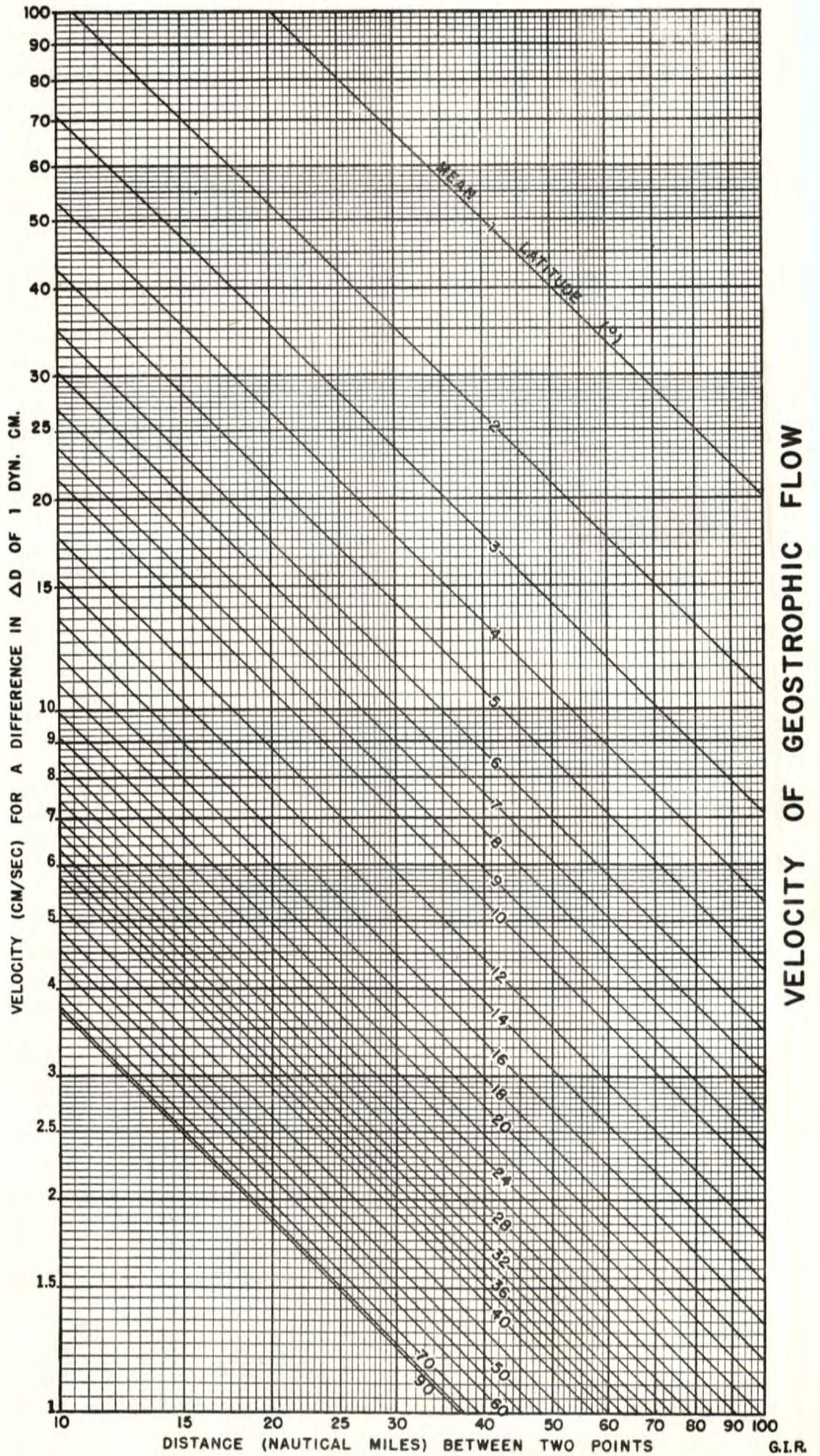
Values which are not drawn through because they seem to be in error without apparent reason are indicated by one of the following notations.

r: rejected value (value seems to be definitely wrong),

u: uncertain value (value may be correct; occasionally it can influence the drawing of the property curve).

FORMAT

These data are typed in the format of the University of California Press publication, Oceanic Observations of the Pacific. So that these pages can be used as copy for the 1959 volume, the first page of the Cruise 5911 data is numbered 450; Cruise 5912, 461.



FIGURES

1. CCOFI Cruise 5912, station positions
2. Horizontal distribution of dynamic height anomaly (0 over 500 d-bar)
3. Horizontal distribution of temperature at 10 meters
4. Horizontal distribution of salinity at 10 meters
5. Horizontal distribution of temperature at 200 meters
6. Horizontal distribution of salinity at 200 meters

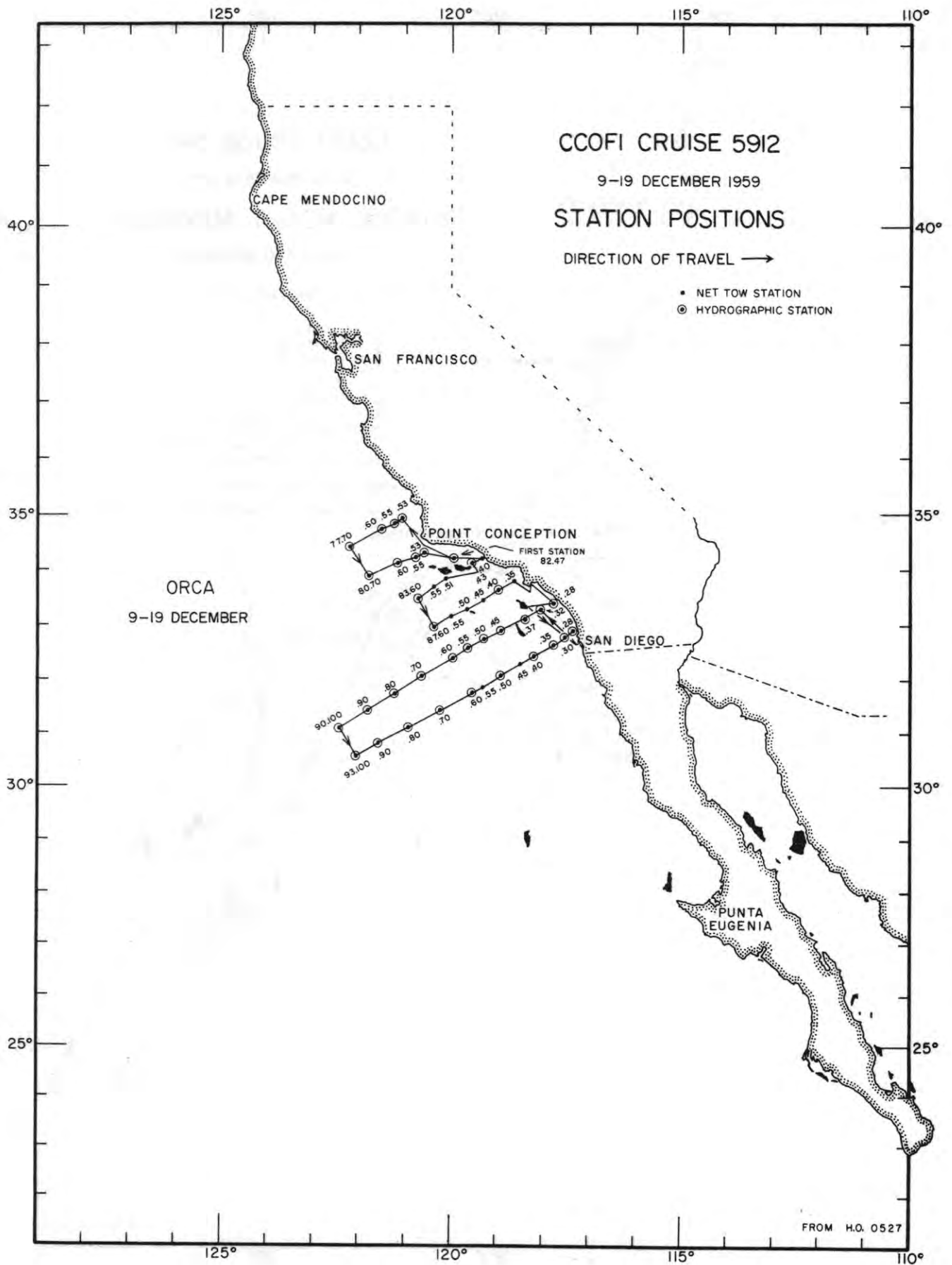


FIGURE 1

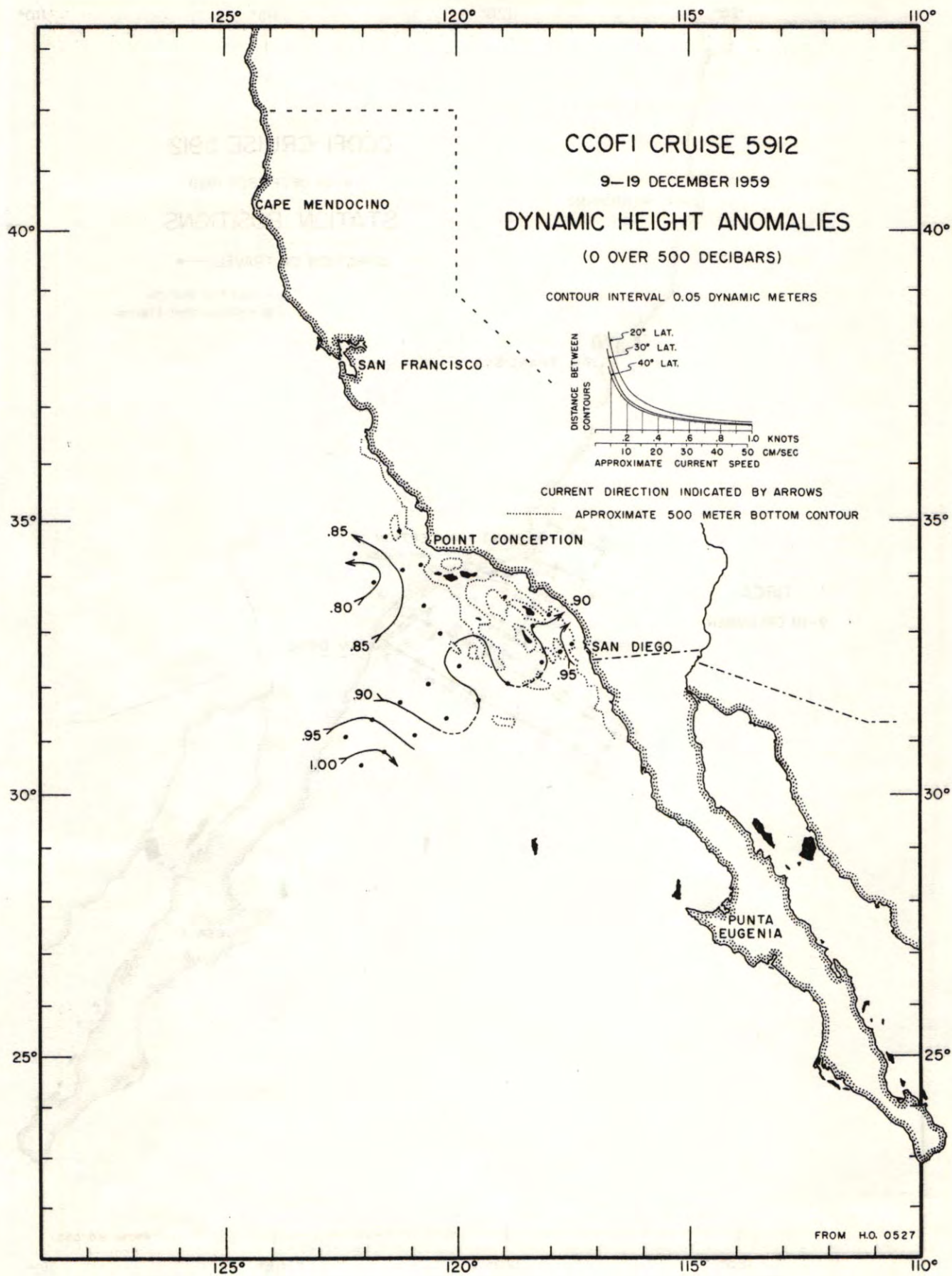


FIGURE 2

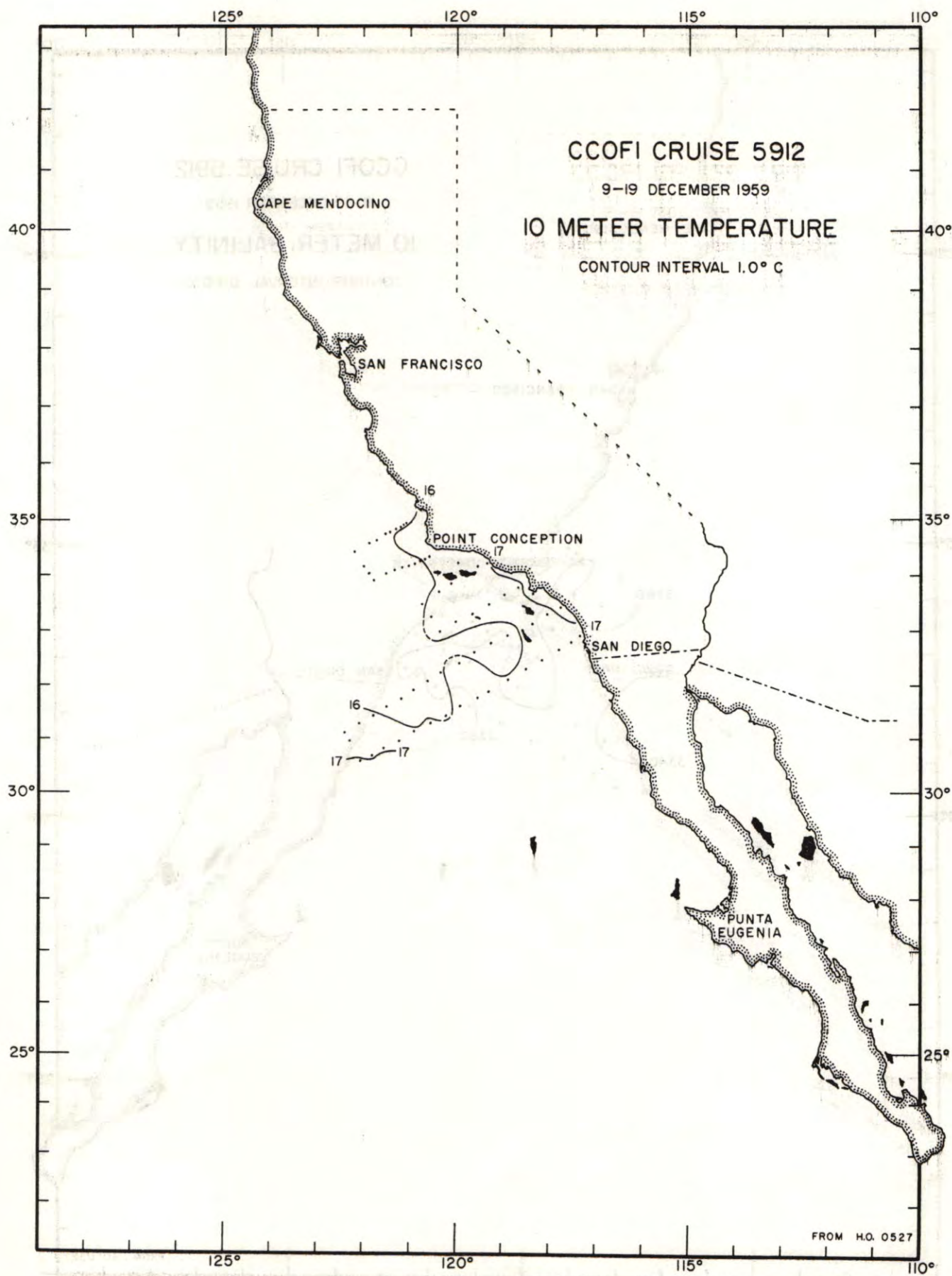


FIGURE 3

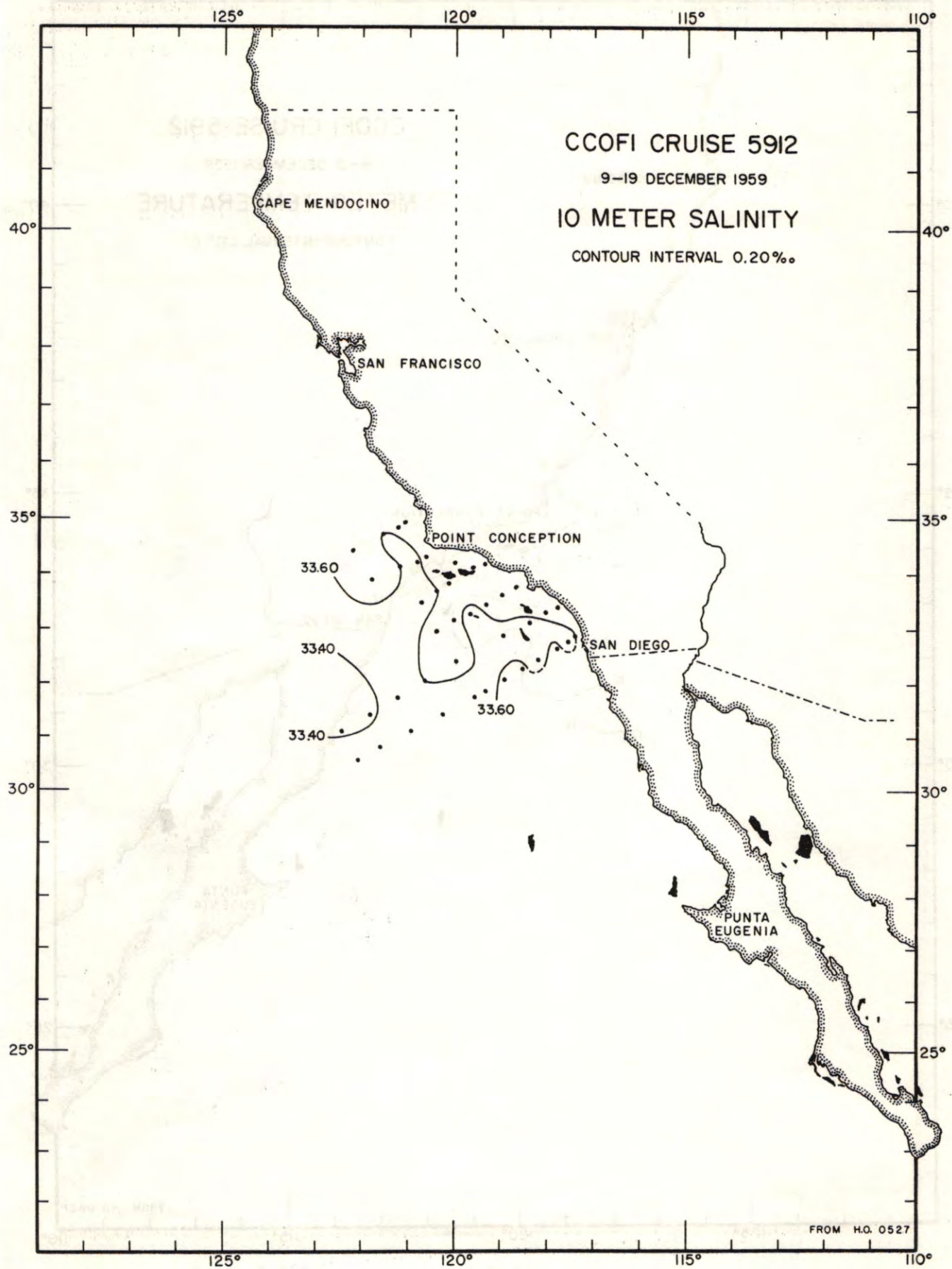


FIGURE 4

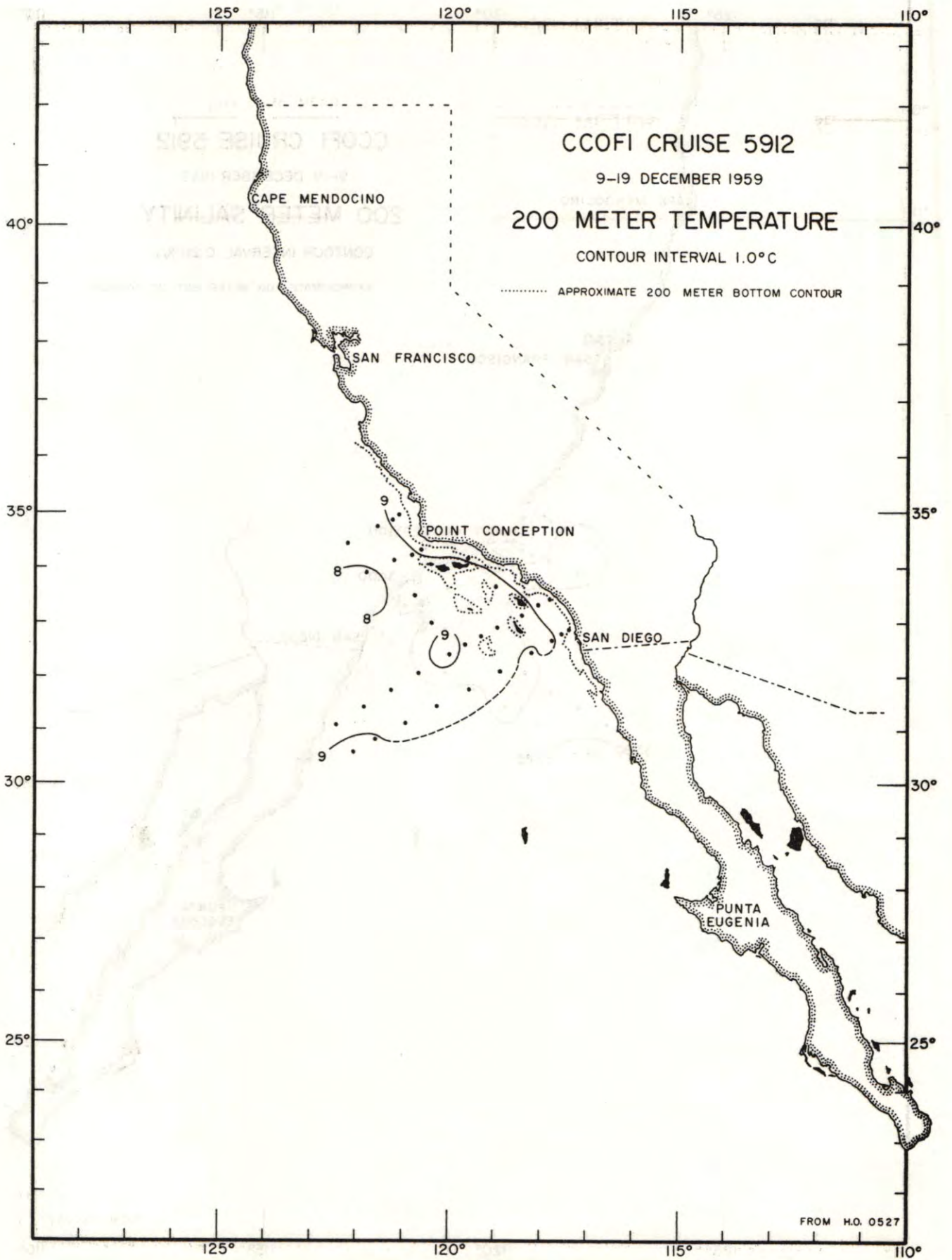


FIGURE 5

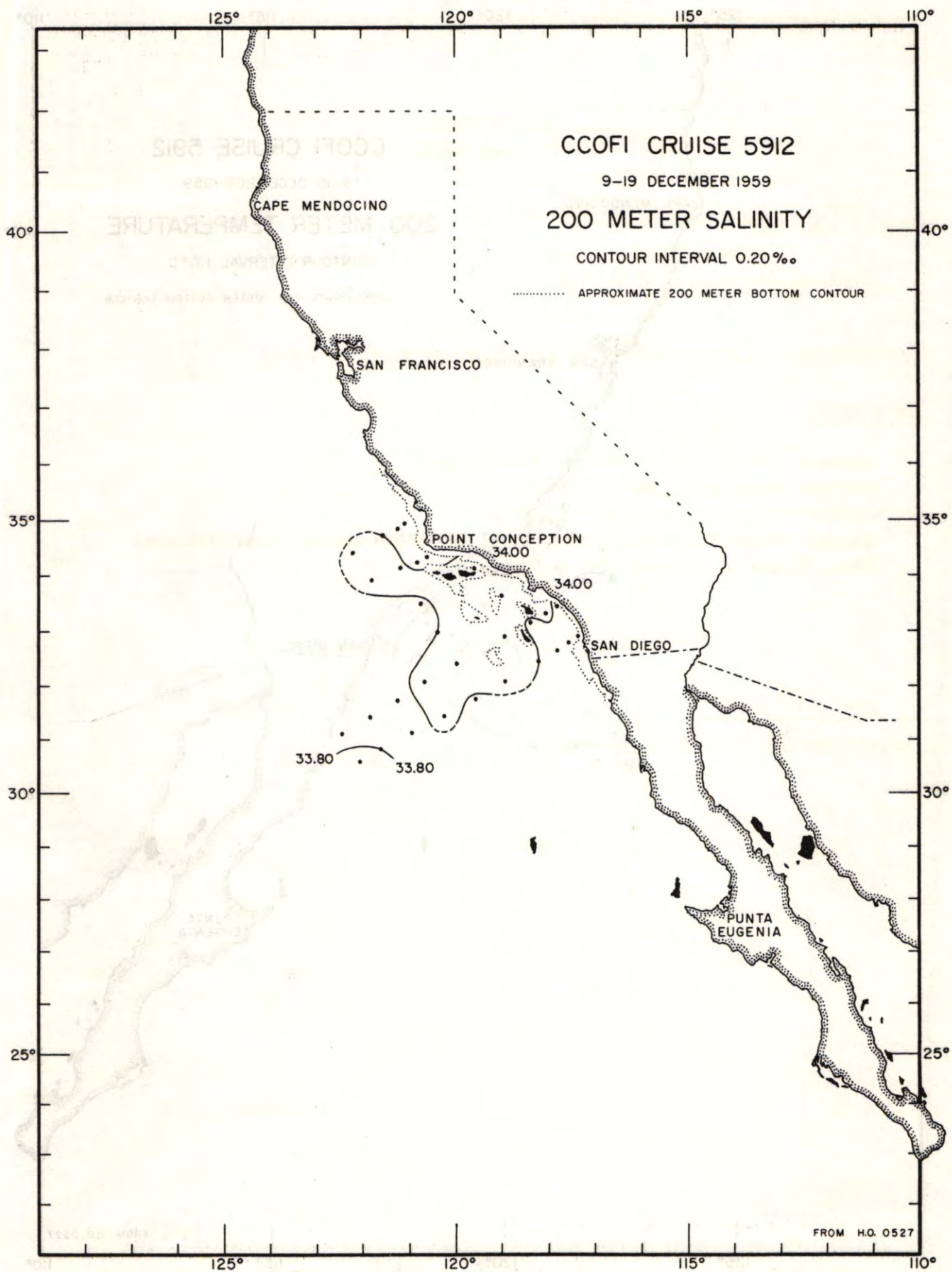


FIGURE 6

PERSONNEL
Cruise 5912

SHIP'S CAPTAIN

Hopkins, Marvin F., R/V Orca

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

R/V Orca

Lawson, Jan B., Senior Marine Technician
Bottom, Kenneth S., Marine Technician
*Fisher, Oliver L., Marine Technician
Justice, David K., Fishery Aid, U. S. Bureau of Commercial Fisheries
Pine, James S., Marine Technician

*From San Diego to San Pedro only.

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δT	Z	T	S	O ₂	σ_t	δT	ΔD	
m	°C	‰	ml/L	$\frac{10^{-5} \delta T}{10 \text{ cm/g}}$	m	°C	‰	ml/L	g/L	$\frac{10^{-5} \delta T}{10 \text{ cm/g}}$	dyn. m	

SIO
CCOFI
5912

ORCA; December 9, 1959; 2240 GCT; 34°57'N, 121°04.5'W; sounding, 281 fm; wind, 280°, force 2; weather, cloudy; sea, moderate; wire angle, 05°.

7753

1	15.96	33.64	5.42	322	0	(15.96)	(33.64)	(5.42)	(24.73)	(322)	(0.00)
11	15.94	33.63	5.67	322	10	15.95	33.63	5.65	24.73	322	0.03
30	15.78	33.61	5.19	320	20	15.89	33.62	5.44	24.74	321	0.06
49	14.72	33.55	5.11	303	30	15.78	33.61	5.19	24.76	320	0.10
75	12.70	33.49	4.63	268	50	14.68	33.55	5.10	24.95	302	0.16
100	11.96	33.51	4.37	252	75	12.70	33.49	4.63	25.30	268	0.23
124	10.62	33.57	3.92	225	100	11.96	33.51	4.37	25.47	252	0.30
163	9.68	33.82	2.95	192	125	10.61	33.58	3.91	25.77	224	0.36
203	9.04	33.99	2.28	169	150	9.98	33.74	3.27	26.00	202	0.41
253	8.34	34.03	2.14	155	200	9.11	33.98	2.33	26.32	171	0.50
302	8.06	34.15	1.36	143	250	8.39	34.03	2.17	26.47	156	0.59
408	7.23	34.23	0.83	126	300	8.07	34.15	1.37	26.62	143	0.67
					400	7.29	34.23	0.87	26.79	127	0.81

ORCA; December 10, 1959; 0032 GCT; 34°52.5'N, 121°13.5'W; sounding, 320 fm; wind, 280°, force 2; weather, overcast; sea, moderate; wire angle, 08°.

7755

1	15.85	33.62	5.58	322	0	(15.85)	(33.62)	(5.58)	(24.74)	(322)	(0.00)
11	15.84	33.64	5.59	320	10	15.84	33.64	5.59	24.76	320	0.03
30	14.98	33.57	5.28	307	20	15.76	33.66	5.53	24.80	316	0.06
50	13.14	33.55	4.66	271	30	14.98	33.57	5.28	24.89	307	0.10
60	12.66	33.55	4.51	262	50	13.14	33.55	4.66	25.27	271	0.15
70	12.53	33.57	4.45	258	75	12.43	33.58	4.42	25.42	257	0.22
85	12.19	33.58	4.36	252	100	11.36	33.60	4.07	25.64	236	0.28
100	11.36	33.60	4.07	236	125	10.22	33.70	3.59	25.92	209	0.34
115	11.10	33.62	3.96	230	150	9.82	33.78	3.48	26.05	197	0.39
139	9.92	33.77	3.48	199	200	9.23	33.99	2.64	26.32	171	0.48
169	9.64	33.80	3.43	193	250	8.50	34.10	2.19	26.51	153	0.57
204	9.15	34.01	2.54	169	300	7.98	34.17	1.65	26.65	140	0.64
254	8.44	34.11	2.16	151	400	7.23	34.34	0.92	26.89	117	0.78
303	7.94	34.18	1.59	138	500	6.25	34.28	0.55	26.98	109	0.89
408	7.16	34.34	0.86	116							
508	6.16	34.27	0.51	108							

ORCA; December 10, 1959; 0335 GCT; 34°43.5'N, 121°33.5'W; sounding, 400 fm; wind, 280°, force 2; weather, overcast; sea, moderate; wire angle, 10°.

7760

2	15.78	33.59	5.37	322	0	(15.78)	(33.59)	(5.37)	(24.74)	(322)	(0.00)
11	15.80	33.60	5.36	322	10	15.80	33.60	5.36	24.74	322	0.03
31	15.56	33.60	5.17	316	20	15.77	33.60	5.35	24.75	321	0.06
41	12.34	33.40	4.68	268	30	15.59	33.60	5.19	24.79	317	0.10
56	11.10	33.44	4.35	243	50	11.28	33.42	4.43	25.51	248	0.15
71	10.58	33.63	3.90	220	75	10.55	33.66	3.83	25.84	217	0.21
95	9.96	33.73	3.29	202	100	9.89	33.74	3.22	26.02	200	0.26
115	9.74	33.78	3.14	196	125	9.64	33.80	3.02	26.10	192	0.31
135	9.53	33.83	2.97	188	150	9.42	33.91	2.70	26.22	180	0.36
155	9.37	33.93	2.67	178	200	8.72	34.00	2.40	26.41	163	0.45
184	8.90	33.95	2.70	170	250	8.07	34.10	1.38	26.57	147	0.53
219	8.49	34.07	1.89	155	300	7.92	34.17	1.22	26.65	140	0.60
248	8.08	34.20u	1.39	-	400	7.29	34.23	0.89	26.80	126	0.74
298	7.94	34.16	1.23	140	500	6.42	34.29	0.45	26.96	110	0.86
353	7.56	34.21	1.05	131	600	5.51	34.34	0.32	27.11	96	0.97
437	7.02	34.25	0.73	121							
523	6.18	34.31	0.39	106							
608	5.45	34.34	0.31	95							

SIO

CCOFI
5912

OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δT_{-5}^3	Z	T	S	O ₂	σ_t	δT_{-5}^3	ΔD
m	°C	‰	ml/L	10 ⁻⁵ cm ³ /g	m	°C	‰	ml/L	g/L	10 ⁻⁵ cm ³ /g	dyn. m

77.70

ORCA; December 10, 1959; 0841 GCT; 34°25.5'N, 122°11.5'W; sounding, 2200 fm; wind, 280°, force 2; weather, cloudy; sea, moderate; wire angle, 06°.

0	15.54	33.56	5.59	319	0	15.54	33.56	5.59	24.77	319	0.00
10	15.54	33.68	5.59	310	10	15.54	33.68	5.59	24.86	310	0.03
30	14.07	33.42	5.28	300	20	15.43	33.67	5.57	24.87	309	0.06
39	12.28	33.39	4.97	268	30	14.07	33.42	5.28	24.97	300	0.09
54	11.34	33.57	4.05	238	50	11.58	33.54	4.25	25.55	244	0.15
69	11.14	33.63	3.81	230	75	11.02	33.64	3.76	25.74	227	0.21
94	10.60	33.64	3.57	220	100	10.18	33.65	3.39	25.89	212	0.26
114	9.82	33.73	3.13	200	125	9.68	33.79	2.97	26.09	193	0.31
134	9.46	33.84	2.79	186	150	9.32	33.88	2.57	26.21	182	0.36
155	9.27	33.89	2.49	180	200	8.44	34.03	1.96	26.47	157	0.45
185	8.82	34.02	1.89	164	250	7.59	34.05	1.97	26.62	143	0.52
219	7.96	34.04	2.03	149	300	7.44	34.17	1.20	26.72	133	0.59
248	7.60	34.05	1.98	143	400	6.82	34.23	0.59	26.86	120	0.72
298	7.45	34.17	1.21	133	500	6.15	(34.30)	0.36	(27.01)	(106)	(0.84)
353	7.10	34.18	0.85	127	600	5.65		0.27			
438	6.58	34.27	0.47	114							
523	6.00	34.38u	0.34	-							
608	5.63	34.31u	0.26	-							

80.53

ORCA; December 11, 1959; 0300 GCT; 34°20'N, 120°36.5'W; sounding, 280 fm; wind, 320°, force 5; weather, missing; sea, rough; wire angle, 40°.

1	16.28	33.68	5.54	326	0	(16.28)	(33.68)	(5.54)	(24.69)	(326)	(0.00)
9	16.28	33.68	5.58	326	10	16.28	33.68	5.58	24.69	326	0.03
24	16.17	33.67	5.57	324	20	16.23	33.68	5.57	24.70	325	0.07
38	15.28	33.59	5.36	312	30	15.90	33.65	5.52	24.75	321	0.10
58	12.93	33.53	4.70	269	50	13.40	33.53	4.84	25.20	278	0.16
75	12.32	33.58	4.42	254	75	12.32	33.58	4.42	25.45	254	0.22
93	11.21	33.63	3.94	231	100	10.94	33.67	3.76	25.78	223	0.28
124	10.11	33.80	3.21	200	125	10.09	33.80	3.20	26.02	200	0.34
156	9.64	33.87	3.00	187	150	9.70	33.86	3.05	26.13	189	0.39
200	9.23	33.91	2.54	178	200	9.23	33.91	2.54	26.25	178	0.48
244	8.79	34.08	1.81	158	250	8.73	34.09	1.74	26.47	157	0.57
343	7.78	34.22	0.91	133	300	8.22	34.16	1.30	26.60	144	0.64

80.55

ORCA; December 11, 1959; 0023 GCT; 34°14.5'N, 120°47'W; sounding, 440 fm; wind, 320°, force 5; weather, partly cloudy; sea, rough; wire angle, 20°.

2	15.92	33.58	5.47	326	0	(15.92)	(33.58)	(5.47)	(24.69)	(326)	(0.00)
11	15.92	33.56	5.51	327	10	15.92	33.56	5.50	24.68	327	0.03
30	15.88	33.55	5.49	327	20	15.92	33.56	5.50	24.68	327	0.07
40	14.32	33.44	5.43	302	30	15.88	33.55	5.49	24.68	327	0.10
54	13.40	33.44	5.18	284	50	13.69	33.44	5.27	25.07	290	0.16
68	11.92	33.51	4.70	252	75	11.74	33.52	4.64	25.51	248	0.23
92	10.54	33.62	4.14	220	100	10.19	33.66	3.94	25.90	211	0.29
111	9.60	33.72	3.63	198	125	9.36	33.76	3.47	26.11	191	0.34
130	9.30	33.78	3.42	188	150	9.09	33.83	3.30	26.22	181	0.38
149	9.10	33.83	3.31	182	200	8.48	33.95	2.82	26.41	163	0.47
177	8.70	33.92	3.01	169	250	7.92	34.06	2.16	26.57	148	0.55
211	8.36	33.97	2.72	160	300	7.52	34.11	1.57	26.67	138	0.62
239	8.02	34.04	2.34	150	400	6.92	34.31	0.83	26.90	116	0.76
287	7.62	34.09	1.74	141	500	6.31	34.33	0.44	27.01	106	0.87
339	7.25	34.19	1.25	129	600	(5.68)	(34.37)		(27.11)	(96)	(0.98)
421	6.80	34.32	0.73	113							
505	6.27	34.33	0.43	106							
588	5.74	34.36	0.35	97							

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δT	Z	T	S	O ₂	σ_t	δT	ΔD	
m	°C	‰	ml/L	$10^{-5} \text{ cm}^3/\text{g}$	m	°C	‰	ml/L	g/L	$10^{-5} \text{ cm}^3/\text{g}$	dyn. m	

SIO
COFI
5912

ORCA; December 10, 1959; 2036 GCT; 34°09'N, 121°10'W; sounding, 1300 fm; wind, 320°, force 4; weather, partly cloudy; sea, moderate; wire angle, 15°.

80.60

0	15.68	33.58	5.39	320	0	15.68	33.58	5.39	24.75	320	0.00
10	15.68	33.60	5.22	318	10	15.68	33.60	5.22	24.77	318	0.03
30	15.66	33.60	5.19	318	20	15.67	33.60	5.21	24.77	318	0.06
59	14.27	33.46	4.95	300	30	15.66	33.60	5.19	24.78	318	0.10
69	12.39	33.33	4.60	274	50	15.60	33.60	5.16	24.79	317	0.16
83	11.09	33.46	4.06	241	75	11.30	33.35	4.19	25.47	252	0.23
97	9.93	33.56	3.97	214	100	9.80	33.58	2.91	25.90	211	0.29
112	9.54	33.66	3.66	201	125	9.25	33.77	3.32	26.13	189	0.34
136	9.04	33.81	3.22	182	150	8.82	33.84	3.20	26.27	176	0.39
155	8.74	33.86	3.19	174	200	8.15	34.02	2.89	26.50	154	0.47
185	8.36	33.99	2.92	159	250	7.59	34.10	2.30	26.65	140	0.54
213	8.00	34.04	2.88	150	300	7.12	34.14	1.40	26.75	130	0.62
242	7.70	34.09	2.47	142	400	6.62	34.27	0.65	26.91	115	0.74
291	7.12	34.12	1.53	132	500	6.01	34.30	0.38	27.03	104	0.86
345	7.11	34.25	0.96	122	600	(5.33)	(34.35)	(0.36)	(27.15)	(93)	(0.96)
430	6.35	34.25	0.52	111							
514	5.92	34.31	0.36	102							
598	5.34	34.35	0.36	93							

ORCA; December 10, 1959; 1503 GCT; 33°55'N, 121°48.5'W; sounding, 2000 fm; wind, 320°, force 3; weather, partly cloudy; sea, moderate; wire angle, 23°.

80.70

2	15.45	33.68	5.61	308	0	(15.45)	(33.68)	(5.61)	(24.88)	(308)	(0.00)
10	15.45	33.68	5.56	308	10	15.45	33.68	5.56	24.88	308	0.03
30	15.44	33.65	5.50	310	20	15.45	33.67	5.53	24.87	309	0.06
39	15.45	33.69	5.52	308	30	15.44	33.65	5.50	24.86	310	0.09
52	11.70	33.50	4.06	249	50	12.10	33.51	4.19	25.44	255	0.15
66	10.70	33.55	3.89	228	75	10.19	33.58	3.82	25.83	218	0.21
87	9.64	33.60	3.68	207	100	9.48	33.74	3.24	26.08	194	0.26
105	9.42	33.80	3.14	189	125	8.90	33.88	3.06	26.28	175	0.31
122	8.98	33.87	3.07	177	150	8.52	33.95	2.77	26.39	164	0.35
139	8.62	33.91	3.00	169	200	7.84	34.08	2.50	26.59	145	0.43
161	8.42	34.00	2.52	159	250	6.91	34.13	2.30	26.77	128	0.50
192	8.00	34.07	2.47	148	300	6.37	34.10	1.72	26.82	124	0.56
218	7.48	34.09	2.55	139	400	5.80	34.19	0.81	26.96	110	0.68
261	6.76	34.13	2.16	126	500	5.34	34.28	0.44	27.09	98	0.79
309	6.30	34.10	1.64	123							
385	5.90	34.18	0.87	112							
464	5.42	34.24	0.55	102							
545	5.27	34.34	0.25	93							

ORCA; December 9, 1959; 1407 GCT;^{a)} 34°14'N, 119°59'W; sounding, 313 fm; wind, direction missing, force 1; weather, partly cloudy; sea, slight; wire angle, 02°.

82.47

426	6.87	34.27	0.35	118							
436	6.82	34.27	0.37	117							
446	6.78	34.27	0.19	116							
456	6.72	34.25	0.22	117							
466	6.64	34.26	0.06	116							
476	6.62	34.26	0.05	115							
486	6.59	34.28	0.04	113							
496	6.55	34.29	-	112							
506	6.55	34.29	0.05	112							
515	6.52	34.30	-	111							
525	6.50	34.27	-	113							
535	6.52	34.28	0.03	112							
545	6.50	34.29	-	111							
555	6.50	34.27	-	113							
565	6.48	34.27	-	112							
575	6.49	34.27	-	112							

a) Special cast.

S10
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5912

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δT	Z	T	S	O ₂	σ_t	δT	ΔD	
m	°C	‰	ml/L	$\frac{10^{-5}}{10 \text{ cm/g}}$	m	°C	‰	ml/L	g/L	$\frac{10^{-5}}{10 \text{ cm/g}}$	dyn. m	

8343

ORCA; December 11, 1959; 1333 GCT; 34°07.5'N, 119°34.5'W; sounding, 135 fm; wind, 040°, force 3; weather, missing; sea, slight; wire angle, 06°.

1	16.65	33.69	5.50	334	0	(16.65)	(33.69)	(5.50)	(24.61)	(334)	(0.00)
11	16.53	33.64	5.49	335	10	16.55	33.65	5.49	24.60	335	0.03
31	15.54	33.57	5.40	318	20	16.12	33.61	5.46	24.67	328	0.07
50	14.66	33.52	5.20	304	30	15.57	33.57	5.41	24.77	319	0.10
75	13.54	33.51	4.70	282	50	14.66	33.52	5.20	24.93	304	0.16
100	11.86	33.58	4.61u	246	75	13.54	33.51	4.70	25.15	282	0.23
125	10.10	33.73	3.47	205	100	11.86	33.58		25.53	246	0.30
165	9.42	33.91	2.55	180	125	10.10	33.73	3.47	25.96	205	0.36
204	8.99	34.07	1.92	162	150	9.65	33.85	2.86	26.13	189	0.41
					200	9.04	34.05	2.00	26.39	164	0.50

8360

ORCA; December 12, 1959; 0126, 0208 GCT; 33°30.5'N, 120°43.5'W; sounding, 1100 fm; wind, 310°, force 4; weather, partly cloudy; sea, very rough; wire angle, 20°, 25°.

2	15.92	33.51	5.48	331	0	(15.92)	(33.51)	(5.48)	(24.64)	(331)	(0.00)
11	15.90	33.53	5.50	329	10	15.91	33.53	5.49	24.66	329	0.03
35	15.85	33.51	5.32	329	20	15.89	33.52	5.45	24.66	329	0.07
45	14.09	33.29	5.09	309	30	15.87	33.52	5.36	24.66	329	0.10
58	11.89	33.19	4.76	275	50	12.90	33.21	4.91	25.08	292	0.16
73	10.98	33.26	4.55	254	75	10.93	33.27	4.53	25.47	252	0.23
96	10.25	33.48	4.06	226	100	10.08	33.53	3.95	25.81	220	0.29
116	9.40	33.67	3.64	198	125	9.19	33.72	3.53	26.11	191	0.34
135	9.03	33.75	3.45	187	150	8.86	33.79	3.31	26.22	181	0.39
165	8.70	33.84	3.23	175	200	8.30	33.96	3.01	26.44	160	0.48
193	8.38	33.95	3.11	162	250	7.60	34.05	2.08	26.60	144	0.55
231	7.88	34.00	2.37	151	300	7.24	34.11	1.50	26.70	135	0.62
					400	6.47	34.15	0.92	26.85	121	0.76
247	7.64	34.04	2.14	145	500	5.99	34.27	0.36	27.01	106	0.88
293	7.30	34.11	1.55	136	600	5.50	34.33	0.34	27.10	97	0.98
353	6.76	34.11	1.26	128							
447	6.22	34.22	0.55	113							
531	5.84	34.29	0.33	104							
604	5.48	34.33	0.34	96							

8740

ORCA; December 12, 1959; 1843 GCT; 33°40'N, 118°58.5'W; sounding, 510 fm; wind, 330°, force 3; weather, partly cloudy; sea, moderate; wire angle, 14°.

0	16.96	33.66	5.24	342	0	16.96	33.66	5.24	24.52	342	0.00
9	16.62	33.67	5.23	334	10	16.61	33.67	5.23	24.61	334	0.03
28	16.10	33.55	5.34	332	20	16.62	33.64	5.29	24.59	336	0.07
38	15.33	33.53	5.52	317	30	16.03	33.54	5.37	24.64	331	0.10
53	13.44	33.48	5.01	282	50	13.75	33.49	5.13	25.09	288	0.16
68	12.87	33.52	4.65	268	75	12.46	33.54	4.42	25.39	259	0.23
91	11.44	33.59	4.08	238	100	10.92	33.62	4.02	25.74	226	0.29
111	10.35	33.66	3.96	214	125	9.82	33.75	3.73	26.03	199	0.35
130	9.66	33.79	3.59	193	150	9.30	33.84	3.29	26.19	184	0.40
149	9.31	33.84	3.30	184	200	8.78	34.04	2.32	26.43	161	0.48
177	8.98	33.96	2.72	170	250	8.29	34.17	1.65	26.60	145	0.56
212	8.68	34.07	2.16	158	300	7.84	34.23	1.28	26.72	133	0.63
241	8.37	34.14	1.74	148	400	7.20	34.31	0.75	26.87	119	0.76
290	7.92	34.22	1.35	136	500	6.49	34.31	0.12	26.96	110	0.88
344	7.57	34.27	1.14	127	600	(5.78)	(34.42)	(0.04)	(27.14)	(93)	(0.99)
426	6.98	34.31	0.54	116							
509	6.42	34.31	0.06	109							
592	5.84	34.40	0.04	95							

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δT_3	Z	T	S	O ₂	σ_t	δT_3	ΔD	
m	°C	‰	ml/L	$\frac{10^{-5}}{10 \text{ cm/g}}$	m	°C	‰	ml/L	g/L	$\frac{10^{-5}}{10 \text{ cm/g}}$	dyn. m	

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5912

ORCA; December 12, 1959; 0653 GCT; 33°00.5'N, 120°21.5'W; sounding, 600 fm; wind, 330°, force 4; weather, clear; sea, very rough; wire angle, 08°.

87.60

2	16.75	33.64	5.37	339	0	(16.75)	(33.64)	(5.37)	(24.56)	(339)	(0.00)
12	16.76	33.64	5.42	339	10	16.76	33.64	5.41	24.56	339	0.03
37	16.74	33.64	5.37	339	20	16.76	33.64	5.41	24.56	339	0.07
47	14.04	33.44	5.51	297	30	16.75	33.64	5.39	24.56	339	0.10
61	12.94	33.47	5.19	273	50	13.77	33.46	5.48	25.07	290	0.16
76	11.88	33.51	4.51	252	75	11.96	33.51	4.57	25.46	253	0.23
100	10.42	33.68	3.80	214	100	10.42	33.68	3.80	25.87	214	0.29
121	9.90	33.74	3.48	201	125	9.80	33.76	3.40	26.04	198	0.34
140	9.41	33.85	3.15	185	150	9.26	33.86	3.09	26.21	182	0.39
170	8.97	33.88	2.92	176	200	8.56	34.00	2.57	26.43	161	0.48
200	8.56	34.00	2.57	161	250	7.88	34.14	1.70	26.64	140	0.56
239	8.05	34.13	1.85	144	300	7.40	34.18	1.30	26.74	131	0.63
269	7.61	34.16	1.48	136	400	6.70	34.31	0.66	26.95	112	0.75
319	7.27	34.20	1.15	128	500	6.02	34.31	0.38	27.03	104	0.87
383	6.83	34.31	0.75	114	600	5.62	34.35	0.32	27.11	96	0.97
483	6.10	34.31	0.40	105							
572	5.72	34.34	0.34	98							
647	5.43	34.38	0.29	92							

ORCA; December 13, 1959; 1222 GCT; 33°27'N, 117°46'W; sounding, 165 fm; wind, 270°, force 2; weather, partly cloudy; sea, moderate; wire angle, 05°.

90.28

1	17.44	33.70	5.21	350	0	(17.44)	(33.70)	(5.21)	(24.44)	(350)	(0.00)
11	17.58	33.73	5.16	351	10	17.58	33.73	5.16	24.43	351	0.04
31	17.26	33.69	5.10	347	20	17.49	33.72	5.11	24.44	350	0.07
51	16.52a)	33.58	5.17	339	30	17.30	33.69	5.10	24.47	347	0.11
75	14.04	33.50	4.95	293	50	16.61	33.59	5.17	24.55	340	0.17
100	12.98	33.53	4.48	270	75	14.04	33.50	4.95	25.04	293	0.25
125	11.64	33.60	4.05	240	100	12.98	33.53	4.48	25.28	270	0.32
165	10.44	33.71	3.47	212	125	11.64	33.60	4.05	25.59	240	0.39
205	9.40	33.93	2.53	179	150	10.81	33.67	3.70	25.80	221	0.45
254	9.04	34.13	1.67	159	200	9.51	33.90	2.66	26.20	183	0.55
					250	9.07	34.11	1.75	26.43	160	0.64

ORCA; December 16, 1959; 0214 GCT; 33°20.5'N, 118°03'W; sounding, 440 fm; wind, 220°, force 1; weather, partly cloudy; sea, slight; wire angle, 04°.

90.32

1	16.38	33.61	5.34	334	0	(16.38)	(33.61)	(5.34)	(24.61)	(334)	(0.00)
11	16.36	33.61	5.42	333	10	16.36	33.61	5.42	24.62	333	0.03
31	16.28	33.62	5.38	330	20	16.33	33.61	5.41	24.63	332	0.07
61	12.69	33.40	4.75	274	30	16.29	33.62	5.39	24.64	331	0.10
71	11.84	33.46	4.54	254	50	16.03	33.60	5.34	24.69	326	0.17
86	11.13	33.54	4.11	236	75	11.70	33.48	4.46	25.49	250	0.24
102	10.87	33.57	3.99	229	100	10.90	33.56	4.00	25.70	230	0.30
117	10.21	33.69	3.64	210	125	10.03	33.72	3.56	25.96	205	0.35
142	9.74	33.77	3.42	196	150	9.63	33.81	3.26	26.10	192	0.40
162	9.48	33.89	2.87	183	200	9.04	34.06	2.24	26.40	163	0.49
192	9.08	34.01	2.41	168	250	8.64	34.21	1.45	26.58	147	0.57
220	8.96	34.18	1.79	154	300	8.00	34.22	1.33	26.69	136	0.65
250	8.64	34.21	1.45	147	400	7.12	34.32	0.75	26.89	117	0.78
300	8.00	34.22	1.33	136	500	6.26	34.37	0.37	27.04	103	0.89
356	7.51	34.29	0.91	125	600	5.71	34.40	0.26	27.13	94	1.00
440	6.72	34.33	0.62	111							
525	6.08	34.39	0.29	99							
610	5.68	34.40	0.25	93							

a) Alternate value, 16.91°C, not used in interpolation.

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5912

OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δT_{-5}^3	Z	T	S	O ₂	σ_t	δT_{-5}^3	ΔD
m	°C	‰	ml/L	10 ⁻⁵ cm/g	m	°C	‰	ml/L	g/L	10 ⁻⁵ cm/g	dyn. m

90.37

ORCA; December 16, 1959; 0530 GCT; 33°08.5'N, 118°23'W; sounding, 520 fm; wind, 220°, force 1; weather, partly cloudy; sea, slight; wire angle, 08°.

2	16.24	33.58	5.26	332	0	(16.24)	(33.58)	(5.26)	(24.63)	(332)	(0.00)
12	16.24	33.58	5.39	332	10	16.24	33.58	5.37	24.63	332	0.03
32	15.74	33.58	5.24	322	20	16.23	33.58	5.39	24.63	332	0.07
42	15.26	33.58	5.15	312	30	16.00	33.58	5.31	24.68	327	0.10
56	13.90	33.54	4.92	287	50	14.30	33.55	5.01	25.03	294	0.16
71	12.77	33.53	4.52	266	75	12.70	33.56	4.46	25.36	262	0.23
96	11.38	33.59	4.08	236	100	11.12	33.60	3.97	25.70	230	0.29
116	10.38	33.66	3.59	214	125	10.32	33.68	3.53	25.89	212	0.35
135	10.26	33.70	3.54	209	150	9.82	33.74	3.31	26.02	200	0.40
155	9.62	33.75	3.28	196	200	8.89	33.96	2.43	26.34	169	0.50
185	9.00	33.88	2.80	176	250	8.52	34.14	1.58	26.54	150	0.58
220	8.78	34.05	1.95	160	300	8.07	34.29	1.10	26.72	133	0.65
250	8.52	34.14	1.58	150	400	7.13	34.29	0.75	26.87	119	0.78
299	8.08	34.29	1.10	133	500	6.53	34.31	0.47	26.96	110	0.90
353	7.48	34.33	0.88	121	600	5.88	34.34	0.27	27.07	100	1.01
438	6.90	34.27	0.61	118							
522	6.38	34.33	0.41	107							
606	5.84	34.34	0.26	100							

90.45

ORCA; December 16, 1959; 0939 GCT; 32°55.5'N, 118°56'W; sounding, 1000 fm; wind, 270°, force 1; weather, partly cloudy; sea, moderate; wire angle, 04°.

1	15.64	33.58	5.47	319	0	(15.64)	(33.58)	(5.47)	(24.76)	(319)	(0.00)
11	15.64	33.58	5.48	319	10	15.64	33.58	5.48	24.76	319	0.03
31	15.51	33.57	5.50	317	20	15.60	33.58	5.49	24.77	319	0.06
62	15.40	33.58	5.43	315	30	15.53	33.57	5.50	24.78	318	0.10
71	13.15	33.48	4.93	277	50	15.44	33.58	5.47	24.80	316	0.16
86	11.95	33.56	4.42	249	75	13.02	33.51	4.84	25.26	272	0.23
100	10.88	33.61	4.04	226	100	10.88	33.61	4.04	25.74	226	0.30
115	10.28	33.68	3.72	212	125	9.98	33.73	3.51	25.98	203	0.35
140	9.51	33.81	3.15	189	150	9.45	33.86	2.99	26.18	185	0.40
160	9.40	33.91	2.81	180	200	8.84	34.03	2.27	26.41	163	0.49
190	8.98	34.00	2.40	167	250	8.33		1.74			
220	8.58	34.09	2.01	154	300	8.07		1.31			
250	8.33	-	1.74	-	400	7.18		0.87			
300	8.07	-	1.31	-	500	6.49		0.49			
355	7.53	-	1.08	-	600	5.83		0.33			
440	6.92	-	0.63	-							
525	6.32	-	0.44	-							
610	5.78	-	0.31	-							

90.50

ORCA; December 16, 1959; 1250 GCT; 32°46.5'N, 119°16.5'W; sounding, 220 fm; wind, 220°, force 1; weather, overcast; sea, moderate; wire angle, 03°.

1	15.58		5.46		0	(15.58)		(5.46)			
11	15.57		5.51		10	15.57		5.51			
31	15.52		5.46		20	15.56		5.50			
51	15.15		5.34		30	15.54		5.47			
76	11.69		4.37		50	15.20		5.35			
101	10.62		3.95		75	11.78		4.41			
126	9.73		3.36		100	10.68		3.97			
165	9.10		2.54		125	9.79		3.39			
205	8.64		1.95		150	9.30		2.80			
255	8.36		1.41		200	8.70		2.02			
305	7.78		1.29		250	8.40		1.45			
					300	7.86		1.30			

OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δT_3	Z	T	S	O ₂	σ_t	δT_3	ΔD
m	°C	‰	ml/L	10^{-5} cm/g	m	°C	‰	ml/L	g/L	10^{-5} cm/g	dyn. m

S10
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5912

ORCA; December 16, 1959; 1553 GCT; 32°37'N, 119°38'W; sounding, 550 fm; wind, 230°, force 2; weather, cloudy; sea, moderate; wire angle, 12°.

90.55

1	15.45	-	5.42	-	0	(15.45)		(5.42)			
11	15.46	-	5.40	-	10	15.46		5.41			
30	15.46	-	5.46	-	20	15.46		5.42			
40	15.46	-	5.46	-	30	15.46		5.46			
50	14.55	-	5.16	-	50	14.55		5.16			
64	13.22	-	5.05	-	75	12.82		4.94			
79	12.70	-	4.88	-	100	11.18		4.11			
98	11.28	-	4.24	-	125	10.12		3.50			
122	10.24	-	3.54	-	150	9.50		2.83			
141	9.68	-	2.95	-	200	8.74		2.08			
170	9.15	-	2.60	-	250	8.40		1.43			
200	8.74	-	2.08	-	300	7.73		1.27			
229	8.55	34.31	1.56	138	400	6.84		0.76			
268	8.22	34.27	1.33	136	500	6.14		0.41			
327	7.30	34.20	1.18	129							
400	6.84	34.24	0.76	120							
474	6.31	34.32	0.45	107							
555	5.86	34.38	0.37	97							

ORCA; December 16, 1959; 1855 GCT; 32°25'N, 119°58'W; sounding, 530 fm; wind, 220°, force 2; weather, cloudy; sea, moderate; wire angle, 15°.

90.60

1	15.86	-	-	-	0	(15.86)	(33.62)		(24.74)	(321)	(0.00)
10	15.9	-	-	-	10	15.9	(33.62)		(24.73)	(322)	(0.03)
30	15.92	33.62	5.49	322	20	15.9	(33.62)		(24.73)	(322)	(0.06)
39	15.84	33.63	5.43	320	30	15.92	33.62	5.49	24.73	322	(0.10)
54	15.02	33.58	5.30	306	50	15.42	33.61	5.36	24.83	313	(0.16)
69	12.80	33.57	4.70	264	75	12.50	33.55	4.62	25.39	260	(0.23)
92	11.39	33.70a)	3.77	229	100	11.12	33.72	3.57	25.78	222	(0.29)
111	10.72	33.75	3.30	214	125	10.40	33.82	3.02	25.99	203	(0.35)
130	10.31	33.86	2.93	198	150	10.11	33.90	2.77	26.09	193	(0.40)
149	10.12	33.89	2.78	194	200	9.61	34.03	2.37	26.28	175	(0.49)
176	9.82	33.96	2.57	184	250	9.32	34.18	1.86	26.45	159	(0.58)
210	9.53	34.06	2.26	171	300	8.99	34.24	1.54	26.55	149	(0.66)
239	9.38	34.16	1.94	162	400	7.52	34.24	1.03	26.78	128	(0.80)
287	9.10	34.24	1.60	152	500	6.35	34.33	0.49	27.00	107	(0.92)
343	8.38	34.23	1.33	141	600	(5.74)	(34.36)	(0.38)	(27.10)	(97)	(1.03)
425	7.14	34.25	0.90	122							
510	6.26	34.34	0.46	105							
594	5.76	34.36	0.38	97							

ORCA; December 17, 1959; 0013 GCT; 32°04.5'N, 120°38'W; sounding, 2150 fm; wind, 150°, force 1; weather, cloudy; sea, very rough; wire angle, 13°.

90.70

1	15.82	33.48	5.36	331	0	(15.82)	(33.48)	(5.36)	(24.64)	(331)	(0.00)
10	15.74	33.60	5.48	320	10	15.74	33.60	5.48	24.75	320	0.03
30	15.68	33.53	5.44	324	20	15.71	33.56	5.46	24.73	322	0.06
59	14.04	33.47	5.44	295	30	15.68	33.53	5.44	24.71	324	0.10
69	12.29	33.21	5.23	281	50	15.60	33.52	5.44	24.72	323	0.16
83	11.66	33.33	4.94	260	75	11.99	33.26	5.09	25.26	272	0.24
98	10.76	33.42	4.51	238	100	10.67	33.43	4.45	25.64	236	0.30
112	10.16	33.60	3.93	215	125	9.62	33.69	3.70	26.02	200	0.36
136	9.19	33.75	3.63	189	150	8.90	33.84	3.50	26.25	178	0.40
155	8.80	33.87	3.47	174	200	8.17	34.02	2.42	26.50	154	0.49
183	8.38	33.98	2.57	160	250	7.64	34.10	1.87	26.64	141	0.56
212	8.02	34.04	2.36	150	300	7.19	34.17	1.30	26.76	130	0.63
242	7.72	34.09	1.86	143	400	6.51	34.20	0.66	26.88	118	0.76
290	7.25	34.14	1.37	131	500	5.94	34.34	0.40	27.06	101	0.88
345	6.92	34.18	0.92	125	600	(5.48)	(34.34)	(0.35)	(27.12)	(95)	(0.98)
428	6.28	34.23	0.52	113							
512	5.88	34.35	0.39	99							
596	5.50	34.34	0.35	96							

a) Possible evaporation; value falls on property curve.

467

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OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δT_3	Z	T	S	O ₂	σ_t	δT_3	ΔD
m	°C	‰	ml/L	10 ⁻⁵ cm/g	m	°C	‰	ml/L	g/L	10 ⁻⁵ cm/g	dyn. m

90.80

ORCA; December 17, 1959; 0535 GCT; 31°45'N, 121°13'W; sounding, 2150 fm; wind, 250°, force 1; weather, cloudy; sea, moderate; wire angle, 07°.

1	15.69	33.44	5.51	331	0	(15.69)	(33.44)	(5.51)	(24.64)	(331)	(0.00)
11	15.66	33.43	5.56	331	10	15.67	33.43	5.55	24.64	331	0.03
31	15.62	33.44	5.55	329	20	15.64	33.43	5.56	24.65	330	0.07
61	15.00	33.38	5.50	321	30	15.63	33.44	5.55	24.66	329	0.10
70	12.58	33.14	5.35	291	50	15.57	33.44	5.54	24.67	328	0.16
85	11.78	33.27	4.95	267	75	12.44	33.15	5.32	25.09	288	0.24
100	10.98	33.44	4.52	240	100	10.98	33.44	4.52	25.59	240	0.31
115	10.18	33.55	4.19	219	125	9.79	33.61	4.06	25.92	209	0.37
140	9.24	33.73	3.84	191	150	9.09	33.76	3.80	26.16	187	0.42
159	8.98	33.80	3.75	182	200	8.22	33.98	2.78	26.46	158	0.50
188	8.39	33.94	3.02	163	250	7.63	34.08	1.66	26.63	142	0.58
217	7.99	34.01	2.49	152	300	7.18	34.19	1.24	26.78	127	0.65
247	7.66	34.07	1.72	143	400	6.38	34.19	0.80	26.89	117	0.78
295	7.22	34.19	1.29	128	500	5.76	34.27	0.41	27.03	104	0.89
350	6.66	34.18	0.97	122	600	5.22	34.31	0.39	27.12	95	1.00
435	6.22	34.22	0.62	113							
519	5.60	34.29	0.37	100							
604	5.21	34.31	0.39	95							

90.90

ORCA; December 17, 1959; 1053 GCT; 31°26'N, 121°49'W; sounding, 2000+ fm; wind, 250°, force 1; weather, cloudy; sea, moderate; wire angle, 04°.

1	16.10	33.40	5.46	343	0	(16.10)	(33.40)	(5.46)	(24.51)	(343)	(0.00)
11	16.10	33.39	5.50	344	10	16.10	33.39	5.50	24.50	344	0.03
31	16.07	33.40	5.50	342	20	16.09	33.40	5.50	24.51	343	0.07
61	14.94	33.37	5.64	320	30	16.08	33.40	5.50	24.52	342	0.10
71	14.04	33.30	5.52	307	50	16.06	33.40	5.50	24.53	341	0.17
86	13.22	33.35	5.34	288	75	13.79	33.31	5.47	24.95	301	0.25
100	12.31	33.39	5.05	268	100	12.31	33.39	5.05	25.32	268	0.32
115	11.60	33.46	4.76	250	125	11.10	33.51	4.60	25.62	238	0.39
140	10.34	33.59	4.40	219	150	9.99	33.65	4.30	25.92	209	0.44
159	9.68	33.71	4.18	200	200	8.73	33.87	3.58	26.30	173	0.54
189	8.91	33.82	3.72	180	250	7.84	33.97	2.74	26.51	153	0.63
219	8.42	33.93	3.35	164	300	7.11	34.05	1.80	26.68	137	0.70
249	7.86	33.97	2.75	153	400	6.18	34.14	0.95	26.87	119	0.84
298	7.14	34.05	1.83	137	500	5.68	34.23	0.46	27.01	106	0.95
353	6.50	34.09	1.26	126	600	5.11	34.31	0.31	27.14	94	1.06
437	5.98	34.18	0.70	113							
522	5.56	34.24	0.43	104							
606	5.08	34.32	0.30	93							

90.00

ORCA; December 17, 1959; 1555 GCT; 31°07'N, 122°26'W; sounding, 2000+ fm; wind, 250°, force 1; weather, cloudy; sea, moderate; wire angle, 08°.

1	16.40	33.39	5.18	330	350	0	(16.40)	(33.39)	(5.18)	(24.64)	(330)	(0.00)		
11	16.40	33.37	5.28	332	352	10	16.40	33.38	5.27	24.63	43	331	351	0.04
31	16.38	33.39	5.26	329	350	20	16.40	33.38	5.27	24.63	43	331	351	0.07
60	16.39	33.39	5.25	329	350	30	16.39	33.39	5.26	24.65	44	329	350	0.11
70	16.39	33.39	5.26	329	350	50	16.39	33.39	5.26	24.65	44	329	350	0.18
85	14.25	33.33	5.39	309		75	14.80	33.35	5.37	24.77		319		0.26
99	12.72	33.23	5.17	288		100	12.68	33.23	5.16	25.10		287		0.34
114	11.72	33.35	4.82	260		125	11.20	33.42	4.58	25.53		246		0.40
139	10.56	33.52	4.22	228		150	10.13	33.65	4.22	25.90		211		0.46
159	9.80	33.77	4.21	197		200	8.87	33.90	3.73	26.30		173		0.56
189	9.05	33.87	3.81	178		250	8.12	34.04	3.07	26.52		152		0.64
219	8.57	33.93	3.60	166		300	7.31	34.05	2.13	26.65		140		0.72
248	8.14	34.04	3.09	152		400	6.45	34.23	0.91	26.91		115		0.85
298	7.34	34.05	2.14	140		500	5.66	34.30	0.46	27.07		100		0.96
352	6.82	34.16	1.39	126		600	5.18	34.39	0.37	27.20		88		1.06
436	6.14	34.26	0.62	109										
520	5.52	34.31	0.44	98										
606	5.16	34.40	0.36	87										

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δ_T	Z	T	S	O ₂	σ_t	δ_T	ΔD	
m	°C	‰	ml/L	$10^{-5} \frac{3}{\text{cm}^3/\text{g}}$	m	°C	‰	ml/L	g/L	$10^{-5} \frac{3}{\text{cm}^3/\text{g}}$	dyn. m	

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ORCA; December 19, 1959; 1415 GCT; 32°55'N, 117°21.5'W; sounding, 285 fm; wind, 340°, force 1; weather, light fog; sea, slight; wire angle, 04°.

93.28

1	16.72	33.59	5.42	342	0	(16.72)	(33.59)	(5.42)	(24.52)	(342)	(0.00)
11	16.74	33.60	5.39	342	10	16.74	33.60	5.39	24.52	342	0.03
31	16.68	33.60	5.43	341	20	16.72	33.60	5.41	24.53	342	0.07
51	14.80	33.54	5.57	305	30	16.70	33.60	5.42	24.54	341	0.10
75	13.00	33.55	4.87	269	50	14.95	33.54	5.57	24.88	308	0.17
100	11.34	33.60	4.27	235	75	13.00	33.55	4.87	25.29	269	0.24
125	10.30	33.65	3.76	214	100	11.34	33.60	4.27	25.65	235	0.30
165	9.38	33.80	3.09	188	125	10.30	33.65	3.76	25.87	214	0.36
205	9.12	34.02	2.19	168	150	9.64	33.72	3.39	26.03	198	0.41
255	8.74	34.14	1.62	153	200	9.15	34.00	2.28	26.34	169	0.51
305	8.26	34.20	1.24	142	250	8.79	34.13	1.68	26.49	155	0.59
409	7.24	34.24	0.78	125	300	8.32	34.19	1.30	26.62	143	0.67
					400	7.32	34.24	0.82	26.80	126	0.81

ORCA; December 19, 1959; 1057 GCT; 32°49.5'N, 117°32'W; sounding, 493 fm; wind, 310°, force 1; weather, partly cloudy; sea, missing; wire angle, 08°.

93.30

1	16.62	33.53	5.50	345	0	(16.62)	(33.53)	(5.50)	(24.49)	(345)	(0.00)
11	16.62	33.53	5.48	345	10	16.62	33.53	5.48	24.49	345	0.03
31	16.68	33.61	5.49	340	20	16.66	33.58	5.48	24.51	343	0.07
41	16.50	33.61	5.48	336	30	16.68	33.61	5.49	24.54	340	0.10
51	15.88	33.53	5.49	322	50	16.19	33.59	5.49	24.64	331	0.17
66	14.42	33.43	5.48	306	75	13.71	33.45	5.23	25.07	290	0.25
80	13.36	33.48	5.04	281	100	12.09	33.59	4.33	25.50	249	0.32
100	12.09	33.59	4.33	249	125	11.38	33.64	3.99	25.67	233	0.38
124	11.40	33.64	4.00	233	150	10.34	33.65	3.70	25.86	215	0.43
144	10.58	33.64	3.78	219	200	9.23	33.92	2.79	26.26	177	0.53
173	9.62	33.78	3.23	194	250	8.78	34.11	1.79	26.48	156	0.62
202	9.20	33.93	2.76	176	300	8.44	34.21	1.26	26.60	144	0.70
231	8.88	34.03	2.20	164	400	7.43	34.27	0.84	26.80	125	0.84
270	8.69	34.18	1.47	150	500	6.36	34.30	0.39	26.98	109	0.96
329	8.14	34.23	1.11	138							
403	7.39	34.27	0.81	124							
475	6.60	34.29	0.46	113							
557	5.94	34.34	0.27	101							

ORCA; December 19, 1959; 0745 GCT; 32°39.5'N, 117°47.5'W; sounding, 360 fm; wind, 280°, force 1; weather, cloudy; sea, moderate; wire angle, 04°.

93.35

1	16.58	33.63	5.15	336	0	(16.58)	(33.63)	(5.15)	(24.59)	(336)	(0.00)
11	16.57	33.68	5.21	333	10	16.57	33.67	5.21	24.62	333	0.03
31	16.54	33.68	5.22	332	20	16.57	33.68	5.21	24.63	332	0.07
41	16.42	33.66	5.22	331	30	16.55	33.68	5.22	24.63	332	0.10
56	14.22	33.53	5.02	294	50	14.68	33.53	5.10	24.93	304	0.16
71	13.70	33.53	4.77	284	75	13.59	33.53	4.72	25.16	281	0.24
96	12.97	33.61	4.34	264	100	12.83	33.63	4.22	25.39	259	0.30
116	12.30	33.69	3.92	246	125	11.68	33.65	3.94	25.62	237	0.37
136	10.60	33.58	3.96	224	150	10.04	33.64	3.76	25.91	210	0.42
156	9.88	33.68	3.62	205	200	8.96	33.94	2.65	26.32	171	0.52
185	9.24	33.87	2.90	181	250	8.70	34.16	1.55	26.53	151	0.60
220	8.70	34.02	2.33	162	300	8.16	34.22	1.16	26.66	139	0.68
250	8.70	34.16	1.55	151	400	7.23	34.26	0.76	26.83	123	0.82
300	8.16	34.22	1.16	139	500	6.50	34.30	0.52	26.96	110	0.94
355	7.56	34.24	0.89	129	600	5.80	34.34	0.33	27.08	99	1.05
439	6.96	34.29	0.65	117							
524	6.30	34.31	0.45	107							
609	5.74	34.34	0.32	98							

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OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δT	Z	T	S	O ₂	σ_t	δT	ΔD
m	°C	‰	ml/L	$10^{-5} \text{ cm}^3/\text{g}$	m	°C	‰	ml/L	g/L	$10^{-5} \text{ cm}^3/\text{g}$	dyn. m

93.40

ORCA; December 19, 1959; 0425 GCT; 32°27.5'N, 118°10.5'W; sounding, 900 fm; wind, 280°, force 1; weather, partly cloudy; sea, moderate; wire angle, 11°.

1	16.62	33.58	5.30	341	0	(16.62)	(33.58)	(5.30)	(24.54)	(341)	(0.00)
10	16.64	33.57	5.38	342	10	16.64	33.57	5.38	24.52	342	0.03
30	16.54	33.62	5.37	336	20	16.61	33.60	5.38	24.56	339	0.07
40	16.31	33.62	5.42	331	30	16.54	33.62	5.37	24.59	336	0.10
54	13.25	33.44	5.11	282	50	13.60	33.42	5.22	25.07	290	0.16
69	12.30	33.55	4.51	255	75	12.02	33.59	4.35	25.51	248	0.23
94	11.24	33.63	4.00	231	100	11.01	33.64	3.94	25.74	227	0.29
114	10.47	33.68	3.81	215	125	10.12	33.79	3.60	26.01	201	0.35
133	9.91	33.82	3.46	195	150	9.58	33.84	3.19	26.14	188	0.40
152	9.55	33.84	3.18	188	200	9.04	34.00	2.54	26.35	168	0.49
182	9.20	33.94	2.75	175	250	8.43	34.15	1.77	26.56	148	0.57
217	8.88	34.05	2.31	162	300	8.14	34.25	1.16	26.69	136	0.64
246	8.46	34.14	1.82	149	400	7.01	34.32	0.66	26.90	116	0.77
295	8.18	34.24	1.21	138	500	6.29	34.32	0.42	27.01	106	0.89
344	7.62	34.32	0.97	124	600	5.75	34.40	0.33	27.13	94	0.99
433	6.73	34.32	0.54	112							
518	6.17	34.33	0.40	104							
602	5.74	34.39	0.32	94							

93.50

ORCA; December 18, 1959; 2242 GCT; 32°07'N, 118°53.5'W; sounding, 810 fm; wind, 290°, force 3; weather, partly cloudy; sea, rough; wire angle, 14°.

0	16.23	33.61	5.52	330	0	16.23	33.61	5.52	24.65	330	0.00
9	16.06	33.64	5.52	324	10	16.05	33.64	5.52	24.71	324	0.03
28	16.01	33.61	5.46	325	20	16.02	33.62	5.47	24.70	325	0.07
58	14.24a)	33.62	5.45	288	30	16.01	33.61	5.46	24.70	325	0.10
68	13.62	33.53	5.18	282	50	15.94	33.61	5.46	24.72	323	0.16
82	12.57	33.48	4.78	266	75	13.05	33.50	4.97	25.29	273	0.24
96	11.40	33.52	4.36	242	100	11.05	33.57	4.18	25.68	232	0.30
111	10.46	33.67	3.82	215	125	10.00	33.75	3.48	26.00	202	0.36
135	9.77	33.78	3.35	196	150	9.50	33.83	3.19	26.14	188	0.41
154	9.43	33.84	3.15	186	200	8.85	34.07	2.32	26.44	160	0.49
183	9.00	33.96	2.68	170	250	8.29	34.14	1.88	26.58	147	0.57
211	8.74	34.11	2.15	155	300	7.89	34.19	1.56	26.67	138	0.65
240	8.36	34.13	1.93	148	400	7.10	34.27	0.85	26.85	121	0.78
289	8.00	34.18	1.64	140	500	6.44	34.29	0.52	26.96	110	0.90
343	7.42	34.20	1.21	130	600	(5.86)	(34.34)	(0.38)	(27.08)	(99)	(1.01)
427	6.94	34.29	0.73	117							
510	6.36	34.29	0.49	109							
594	5.88	34.34	0.38	100							

93.60

ORCA; December 18, 1959; 1627 GCT; 31°47'N, 119°32'W; sounding, 2050 fm; wind, 290°, force 1; weather, cloudy; sea, rough; wire angle, 05°.

1	16.46	33.45	5.42	347	0	(16.46)	(33.45)	(5.42)	(24.47)	(347)	(0.00)
11	16.44	33.46	5.39	346	10	16.44	33.46	5.39	24.48	346	0.03
31	16.42	33.43	5.39	348	20	16.43	33.45	5.39	24.47	347	0.07
56	15.93	33.35	5.55	342	30	16.42	33.43	5.39	24.46	348	0.10
66	13.00	33.25	5.28	291	50	16.41	33.43	5.40	24.46	348	0.17
76	12.76	33.46	4.95	271	75	12.79	33.45	4.97	25.26	272	0.25
91	12.12	33.51	4.77	256	100	11.40	33.53	4.50	25.58	241	0.32
106	10.82	33.54	4.21	231	125	9.82	33.64	3.82	25.94	207	0.37
130	9.62	33.68	3.73	201	150	9.02	33.79	3.23	26.19	184	0.42
150	9.02	33.79	3.23	184	200	8.24	33.99	2.47	26.47	157	0.51
175	8.57	33.91	2.83	168	250	7.74	34.05	2.19	26.59	146	0.59
205	8.19	34.00	2.43	156	300	7.36	34.18	1.35	26.74	131	0.66
235	7.89	34.02	2.36	150	400	6.69	34.23	0.66	26.88	118	0.79
274	7.52	34.12	1.76	138	500	5.97	34.32	0.36	27.04	103	0.90
334	7.16	34.21	1.00	126							
409	6.61	34.24	0.61	116							
484	6.07	34.31	0.38	104							
563	5.65	34.35	0.27	97							

470

a) Alternate value, 15.88°C, not used in interpolation.

OBSERVED					INTERPOLATED				COMPUTED			
Z	T	S	O ₂	δT_3	Z	T	S	O ₂	σ_t	δT_3	ΔD	
m	°C	‰	ml/L	$\frac{-5}{10} \text{ cm/g}$	m	°C	‰	ml/L	g/L	$\frac{-5}{10} \text{ cm/g}$	dyn. m	

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ORCA; December 18, 1959; 1035 GCT; 31°27'N, 120°14'W; sounding, 2250 fm; wind, direction missing, force 1; weather, cloudy; sea, rough; wire angle, 02°.

93.70

1	15.74	33.48	5.33	329	0	(15.74)	(33.48)	(5.33)	(24.66)	(329)	(0.00)
11	15.74	33.42	5.38	333	10	15.74	33.42	5.37	24.62	333	0.03
31	15.68	33.46	5.39	330	20	15.71	33.44	5.38	24.63	332	0.07
56	14.95	33.40	5.37	318	30	15.69	33.46	5.39	24.65	330	0.10
66	13.14	33.26	5.23	292	50	15.66	33.46	5.39	24.66	329	0.17
76	12.66	33.36	4.94	276	75	12.73	33.35	4.97	25.19	278	0.24
91	11.37	33.55	4.28	239	100	10.88	33.57	4.12	25.71	229	0.31
106	10.58	33.59	4.02	223	125	9.59	33.70	3.64	26.02	199	0.36
131	9.42	33.73	3.55	194	150	9.06	33.84	3.28	26.22	181	0.41
151	9.04	33.84	3.27	180	200	8.32	34.04	2.16	26.49	155	0.49
176	8.60	33.94	2.80	166	250	7.58	34.10	1.80	26.65	140	0.57
206	8.24	34.05	2.08	153	300	7.17	34.22	1.19	26.81	125	0.64
235	7.77	34.08	1.92	144	400	6.59	34.31	0.59	26.96	111	0.76
275	7.32	34.13	1.54	134	500	6.05	34.35	0.35	27.06	101	0.87
334	7.00	34.30	0.85	117							
409	6.52	34.31	0.54	110							
484	6.12	34.34	0.37	103							
564	5.80	34.38	0.27	96							

ORCA; December 18, 1959; 0528 GCT; 31°08'N, 120°55'W; sounding, 2250 fm; wind, direction missing, force 1; weather, cloudy; sea, rough; wire angle, 02°.

93.80

1	16.04	33.52	5.45	332	0	(16.04)	(33.52)	(5.45)	(24.63)	(332)	(0.00)
11	16.02	33.48	5.52	335	10	16.02	33.48	5.52	24.60	335	0.03
31	15.94	33.40	5.46	339	20	15.99	33.45	5.50	24.58	336	0.07
61	15.98	33.42	5.45	338	30	15.95	33.40	5.47	24.56	339	0.10
71	15.80	33.40	5.42	336	50	15.98	33.41	5.45	24.57	338	0.17
86	12.65	33.25	5.27	284	75	15.00	33.36	5.39	24.72	323	0.25
101	11.64	33.41	4.82	254	100	11.70	33.40	4.85	25.43	256	0.32
116	10.89	33.49	4.49	236	125	10.42	33.54	4.29	25.76	224	0.38
141	9.60	33.66	3.91	202	150	9.34	33.71	3.84	26.08	194	0.44
161	9.08	33.78	3.76	185	200	8.44	33.94	3.07	26.39	164	0.53
191	8.56	33.91	3.35	168	250	7.73	34.07	1.81	26.60	144	0.61
220	8.16	34.00	2.29	155	300	7.13	34.11	1.40	26.72	133	0.68
250	7.73	34.07	1.81	144	400	6.33	34.18	0.69	26.89	117	0.81
299	7.14	34.11	1.41	133	500	5.95	34.32	0.41	27.04	102	0.92
355	6.58	34.14	0.95	123	600	5.48	34.35	0.34	27.13	95	1.03
439	6.16	34.23	0.52	112							
525	5.84	34.34	0.38	100							
609	5.42	34.35	0.33	94							

ORCA; December 18, 1959; 0017 GCT; 30°49'N, 121°35'W; sounding, 2350 fm; wind, 250°, force 2; weather, cloudy; sea, very rough; wire angle, 10°.

93.90

1	16.99	33.55	5.30	351	0	(16.99)	(33.55)	(5.30)	(24.43)	(351)	(0.00)
11	16.96	33.54	5.42	351	10	16.97	33.54	5.41	24.43	351	0.04
30	16.87	33.53	5.34	350	20	16.93	33.53	5.38	24.44	350	0.07
59	16.79	33.53	5.39	348	30	16.87	33.53	5.34	24.44	350	0.11
70	16.54	33.53	5.40	343	50	16.83	33.53	5.35	24.45	349	0.15
85	15.68	33.53	5.63	324	75	16.18	33.53	5.52	24.60	335	0.26
100	14.48	33.39	5.60	310	100	14.48	33.39	5.60	24.86	310	0.34
114	14.08	33.55	5.38	290	125	13.30	33.52	5.23	25.21	277	0.42
137	11.52	33.42	4.84	251	150	10.78	33.54	4.62	25.70	230	0.48
157	10.48	33.60	4.51	220	200	9.13	33.80	3.97	26.18	184	0.59
186	9.40	33.76	4.15	192	250	8.08	34.01	2.67	26.50	154	0.67
215	8.88	33.84	3.76	177	300	7.35	34.03	2.09	26.63	142	0.75
244	8.18	33.99	2.76	156	400	6.33	34.17	1.00	26.88	118	0.89
292	7.46	34.02	2.20	144	500	5.69	34.22	0.54	27.00	107	1.00
347	6.84	34.12	1.40	128	600	(5.19)	(34.27)	(0.56)	(27.09)	(97)	(1.11)
431	6.09	34.19	0.82	114							
515	5.62	34.23	0.50	105							
597	5.20	34.27	0.56	98							

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OBSERVED				INTERPOLATED				COMPUTED			
Z	T	S	O ₂	Z	T	S	O ₂	σ_t	δT_3	ΔD	
m	°C	‰	ml/L	m	°C	‰	ml/L	g/L	$\frac{\delta T_3}{10 \text{ cm/g}}$	dyn. m	

93100

ORCA; December 17, 1959; 2018 GCT; 30°35.5'N, 122°03'W; sounding, 2300 fm; wind, 250°, force 3;
weather, cloudy; sea, very rough; wire angle, 10°.

0	17.10	33.57	5.33	353	0	17.10	33.57	5.33	24.41	353	0.00
10	17.04	33.58	5.39	350	10	17.04	33.58	5.39	24.44	350	0.04
30	17.02	33.55	5.35	352	20	17.03	33.57	5.37	24.43	351	0.07
60	17.03	33.55	5.33	352	30	17.02	33.55	5.35	24.42	352	0.11
68	17.02	33.56	5.34	351	50	17.03	33.55	5.34	24.42	352	0.18
83	16.96	33.54	5.35	351	75	17.01	33.55	5.34	24.43	351	0.26
98	16.58	33.86	5.47	320	100	16.50	33.86	5.46	24.78	318	0.35
113	15.56	33.81	5.33	301	125	14.05	33.64	5.19	25.15	282	0.42
137	12.16	33.42	5.05	263	150	11.37	33.48	4.68	25.55	244	0.49
156	11.07	33.51	4.53	238	200	9.41	33.77	4.04	26.12	191	0.60
186	9.83	33.68	4.29	204	250	8.34	33.98	3.17	26.45	159	0.69
215	9.01	33.86	3.71	178	300	7.70	34.12	2.40	26.65	140	0.77
244	8.42	33.96	3.25	162	400	6.51	34.18	1.04	26.86	120	0.91
293	7.79	34.11	2.51	142	500	5.77	34.30	0.44	27.05	102	1.02
348	7.08	34.13	1.54	131	600	(5.19)	(34.33)	(0.51)	(27.14)	(93)	(1.13)
431	6.23	34.22	0.84	113							
514	5.67	34.31	0.38	100							
597	5.20	34.33	0.51	93							

Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
82.47-O	XII-11	0745	34°15.5'	119°58.5'	330	320°	3	missing	rough	16.70	33.69
83.40-O	11	1140	34°13.5'	119°21.5'	12	040°	3	missing	slight	16.96	33.77
83.51-O	11	1940	33°51.5'	120°07.5'	80	290°	3	partly cloudy	rough	16.23	33.69
83.55-O	11	2209	33°43.0'	120°23.5'	680	310°	4	partly cloudy	very rough	16.19	33.60
87.35-O	12	2132	33°48.5'	118°39.0'	470	320°	2	partly cloudy	moderate	16.96	33.76
87.45-O	12	1545	33°29.0'	119°18.0'	950	330°	2	partly cloudy	moderate	16.26	33.61
87.50-O	12	1315	33°19.5'	119°39.5'	42	-	1	missing	moderate	16.42	33.58
87.55-O	12	0950	33°12.0'	120°00.5'	630	330°	2	partly cloudy	very rough	16.84	33.62
93.45-O	19	0137	32°19.5'	118°30.0'	870	290°	3	partly cloudy	rough	16.33	33.67
93.55-O	18	1914	31°53.0'	119°19.0'	560	290°	1	partly cloudy	rough	16.24	33.53

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