

data report

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 6008
10-22 August 1960

CCOFI Cruise 6009
9-21 September 1960

CCOFI Cruise 6009-10
22 September - 22 October 1960

SIO Reference 62-10
17 May 1962

UNIVERSITY OF CALIFORNIA
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CCOFI CRUISE 6008
10-22 August 1960

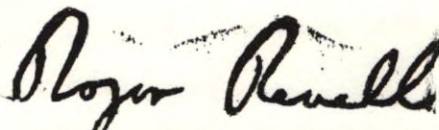
CCOFI CRUISE 6009
9-21 September 1960

CCOFI CRUISE 6009-10
22 September - 22 October 1960

Sponsored by
Marine Research Committee

SIO Reference 62-10
17 May 1962

Approved for distribution:



Roger Revelle, Director

CONTENTS

INTRODUCTION iii

CRUISE 6008

List of Figures vii

Personnel ix

Tabulated Data 314

CRUISE 6009

List of Figures x

Personnel xi

Tabulated Data 324

CRUISE 6009-10

List of Figures xii

Personnel xiii

Tabulated Data 332

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INTRODUCTION

The data presented in this report were collected by the RV Black Douglas of the Bureau of Commercial Fisheries on Cruise 6008, the RV Black Douglas and the RV Hugh M. Smith on Cruise 6009, and the RV Black Douglas, the RV Hugh M. Smith and the RV Spencer F. Baird of the Scripps Institution of Oceanography on Cruise 6009-10 of the California Cooperative Oceanic Fisheries Investigations program. The first two figures in this cruise numbering system represent the year of the cruise; the last two figures, the month. In the case of quarterly cruises the last figures are hyphenated. The cruises preceding this one in the series are 6005 (Scripps Institution report, SIO Ref. 62-7), 6006 (SIO Ref. 62-8) and 6007-8 (SIO Ref. 62-9).

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. The salinity values obtained by salinometer are recorded to three decimal places, provided they meet accepted standards. The third decimal place has been offset to emphasize that the accuracy of the observations is not to one unit in that

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

place, but that the values recorded "have a reproducibility of $\pm 0.004\%$ salinity at the 95 percent probability level, and a probable accuracy of $\pm 0.01\%$ salinity or better at the same level of probability."^{1/} The values are recorded to two decimal places when obtained by chlorinity titration, or by salinometer where only one determination per sample was obtained, or where there is doubt concerning the accuracy of a particular sample, or of all samples on a station. The accuracy of all samples obtained by salinometer and recorded to two decimal places is believed to be equal to or better than those obtained by manual titration.

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.

On stations where more than one cast is lowered, the various property curves may not agree perfectly. This discrepancy may be caused by changes in geographical position, real property changes with time, slight error in measurement, or a combination of these factors. Stations with overlapping casts have the following footnote: Overlapping casts; reconciliation of property curves when necessary.

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.

^{1/} Quotation from Department of Oceanography, University of Washington, Tech. Rep. No. 66, UW Ref. 60-18, October 1960.

Use of the 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.

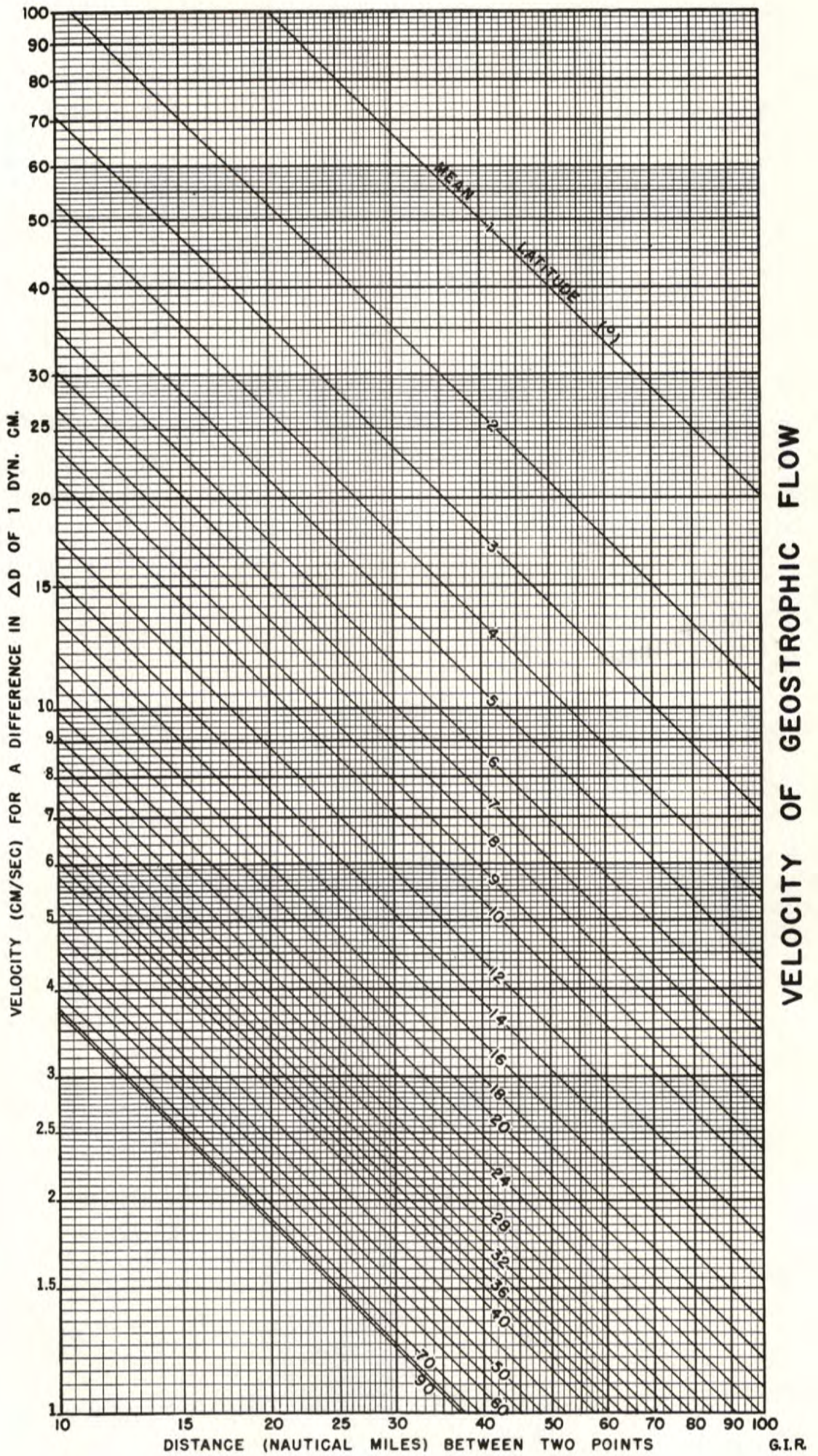
Values which are not drawn through because they seem to be in error without apparent reason are indicated by one of the following notations.

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 1960 volume, the first page of Cruise 6008 is numbered 314; Cruise 6009, 324; Cruise 6009-10, 332.



FIGURES

1. CCOFI Cruise 6008, 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

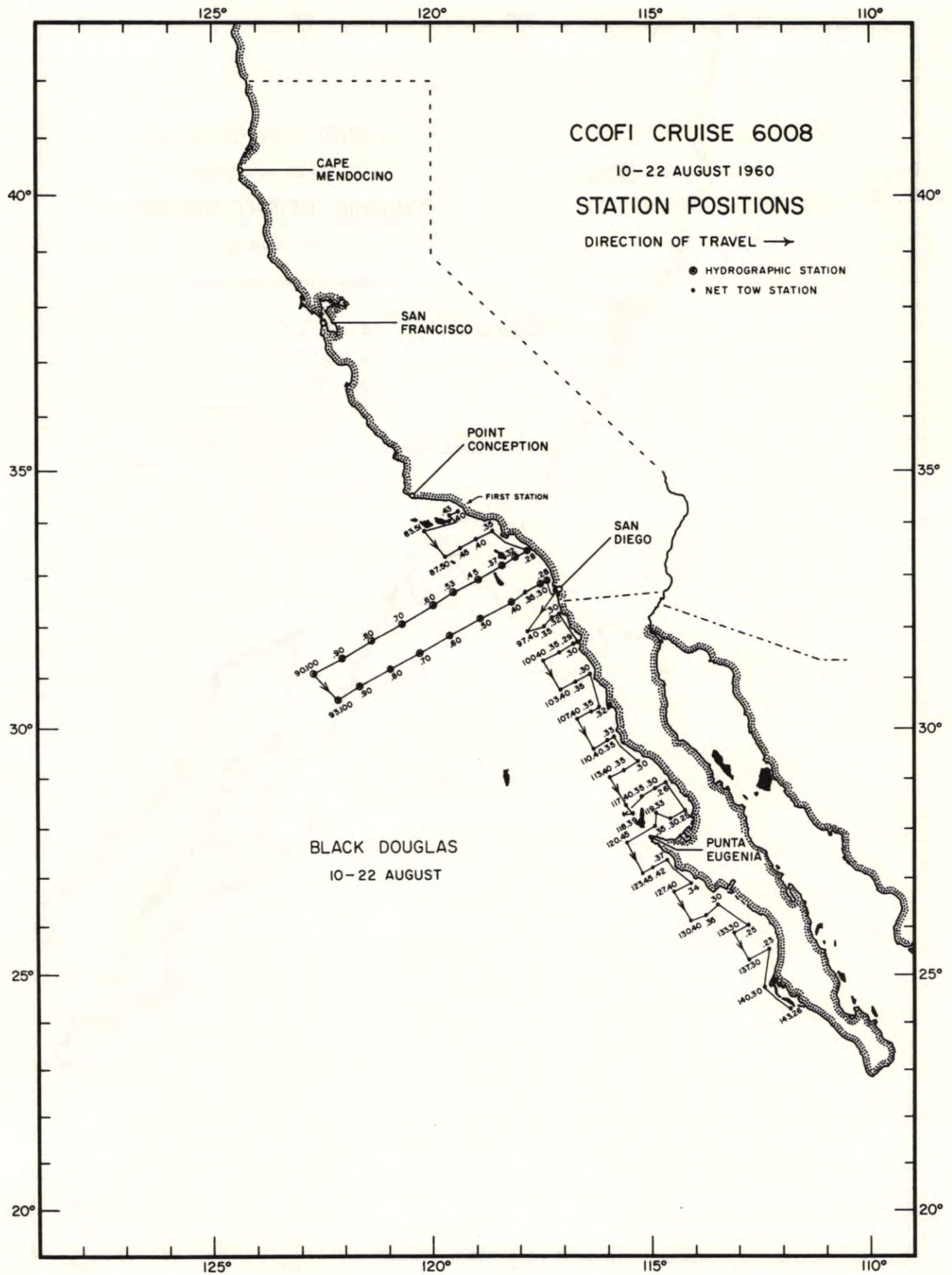


FIGURE 1

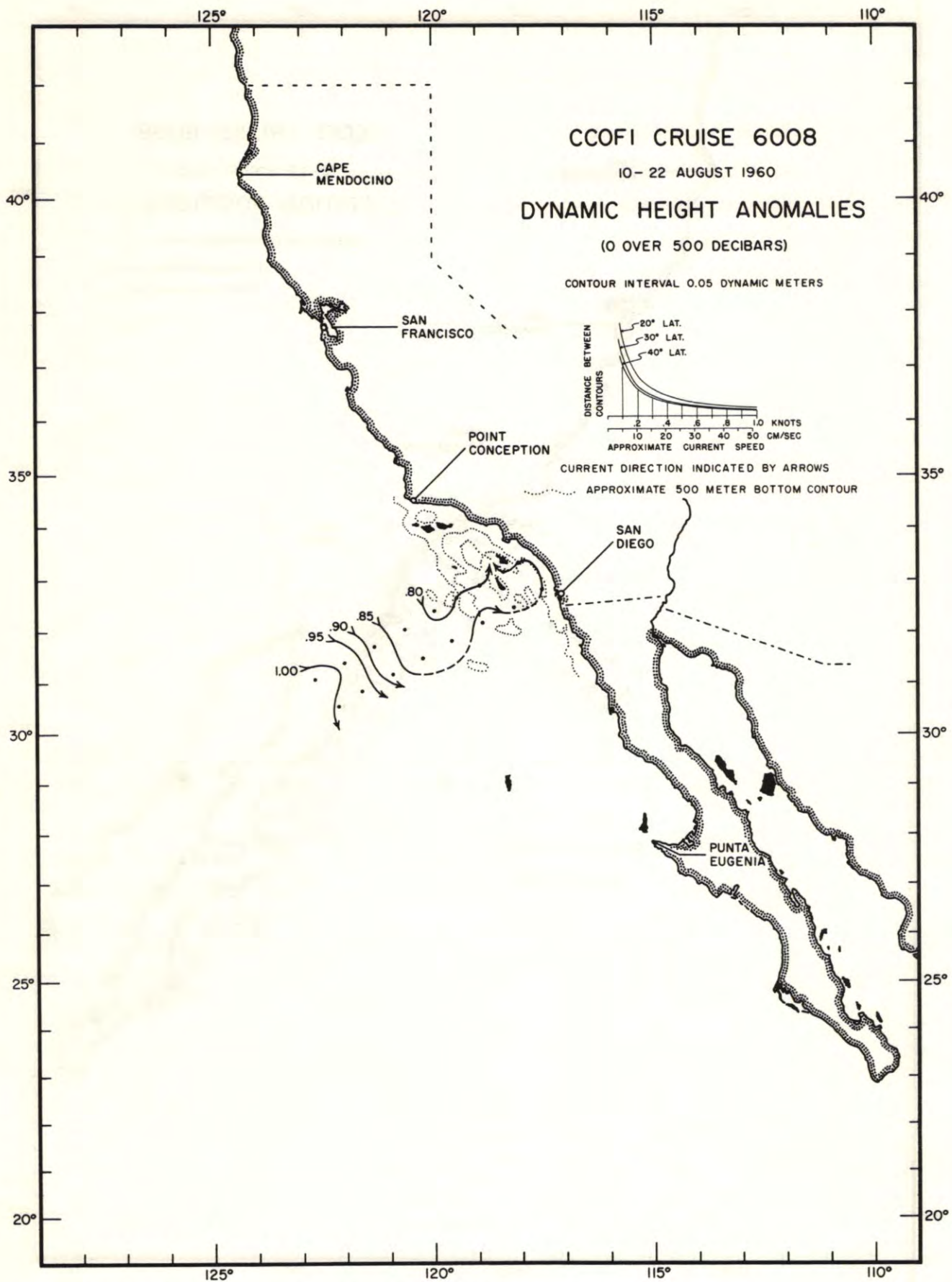


FIGURE 2

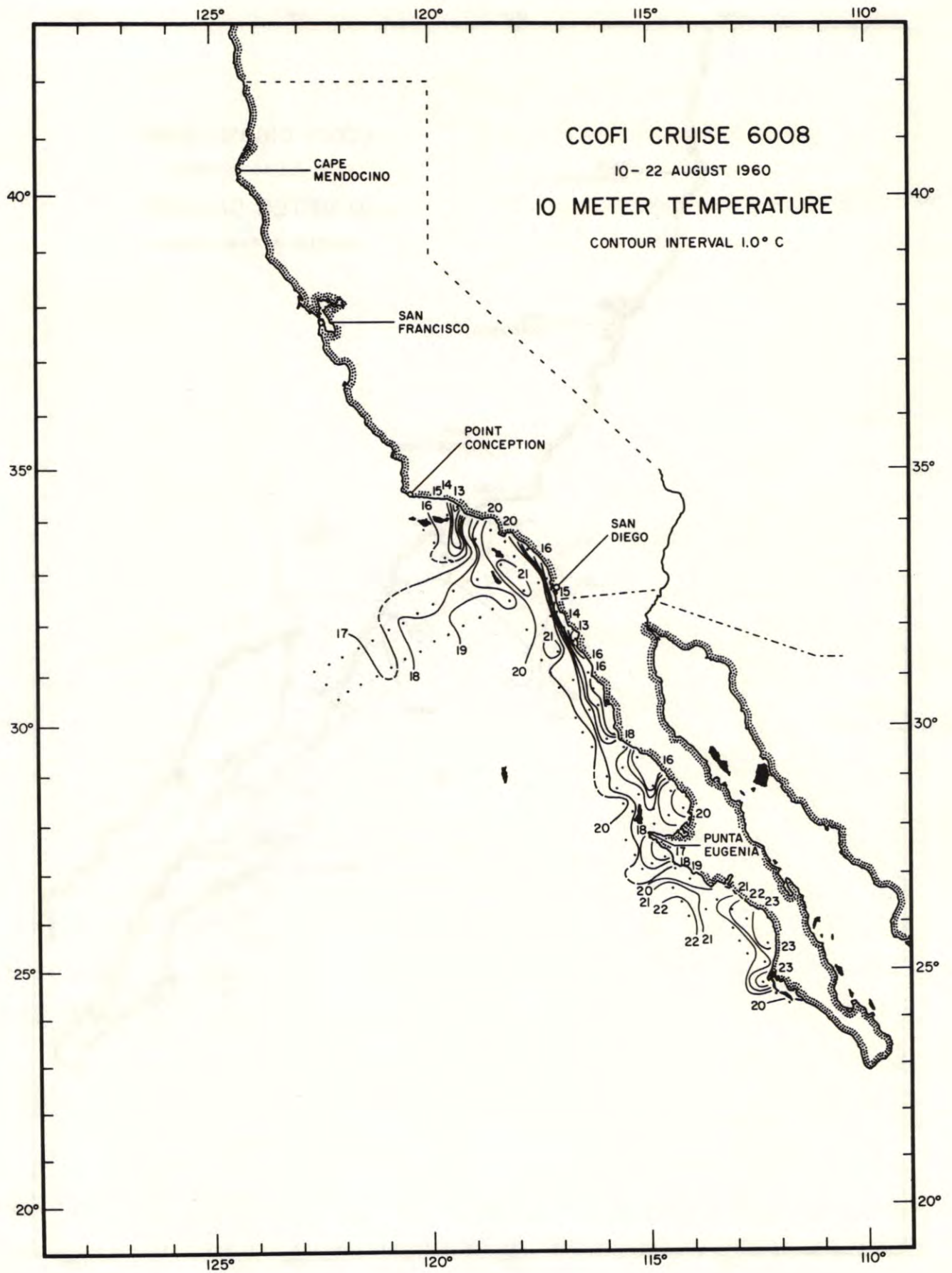


FIGURE 3

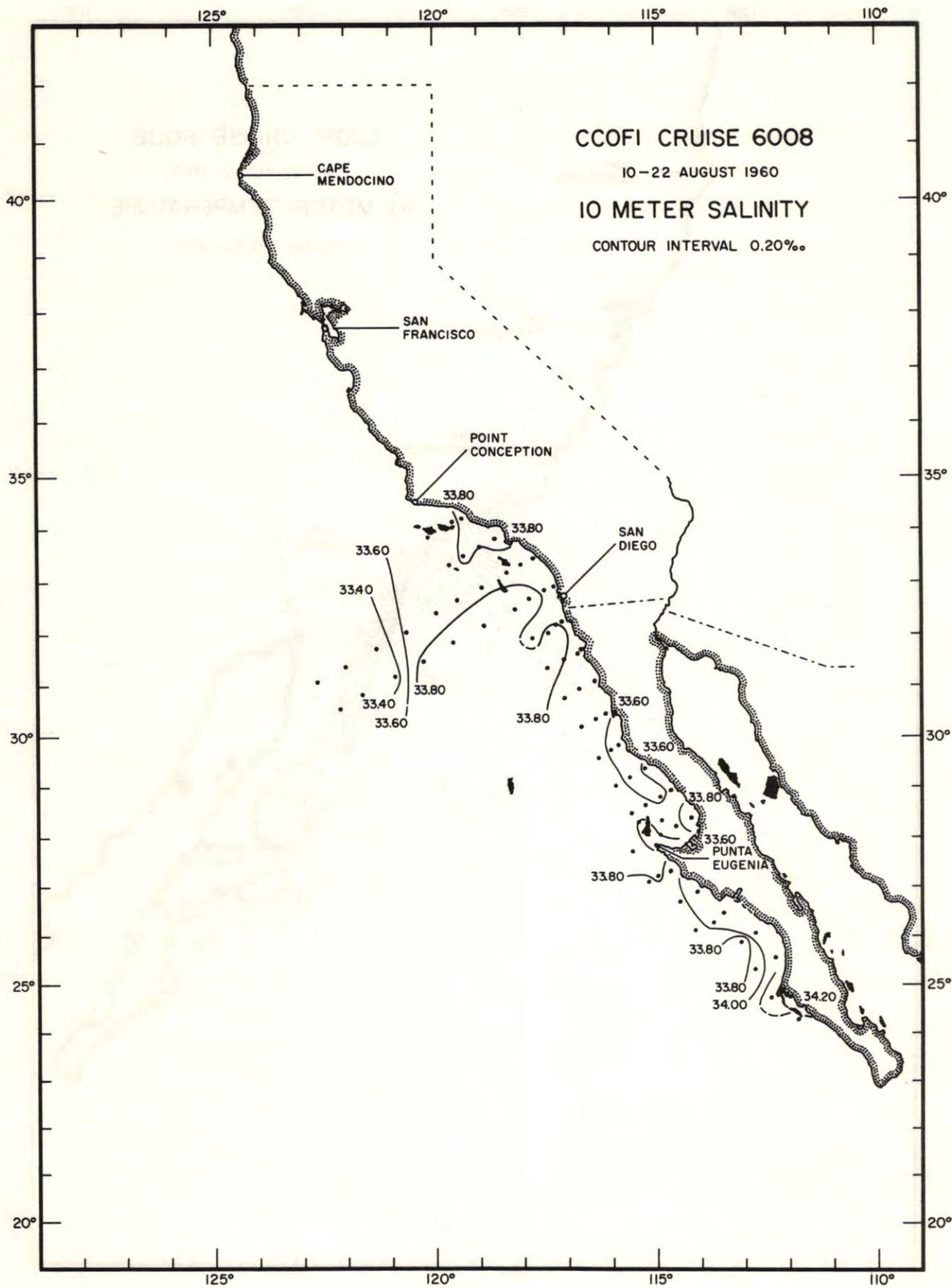


FIGURE 4

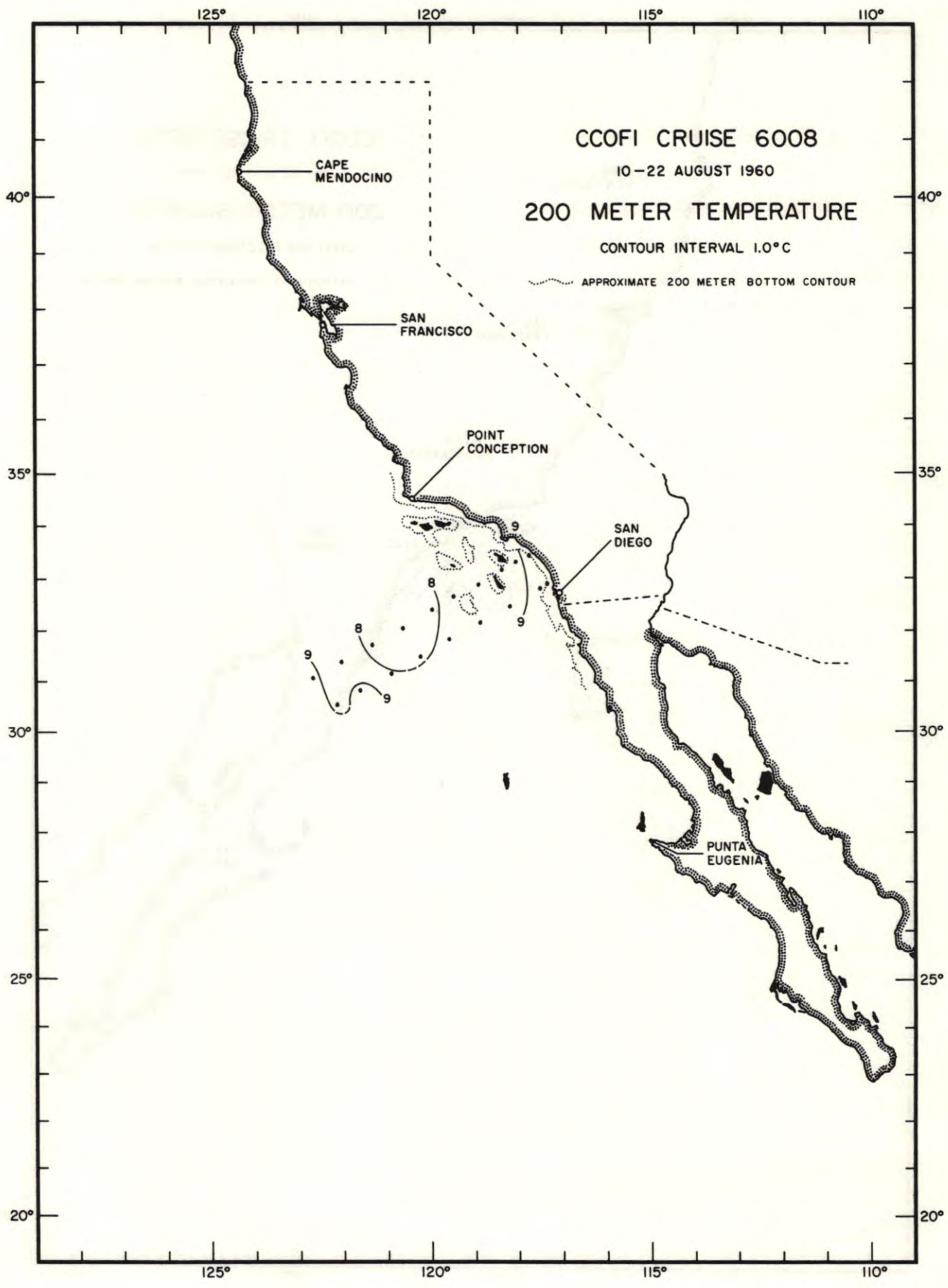


FIGURE 5

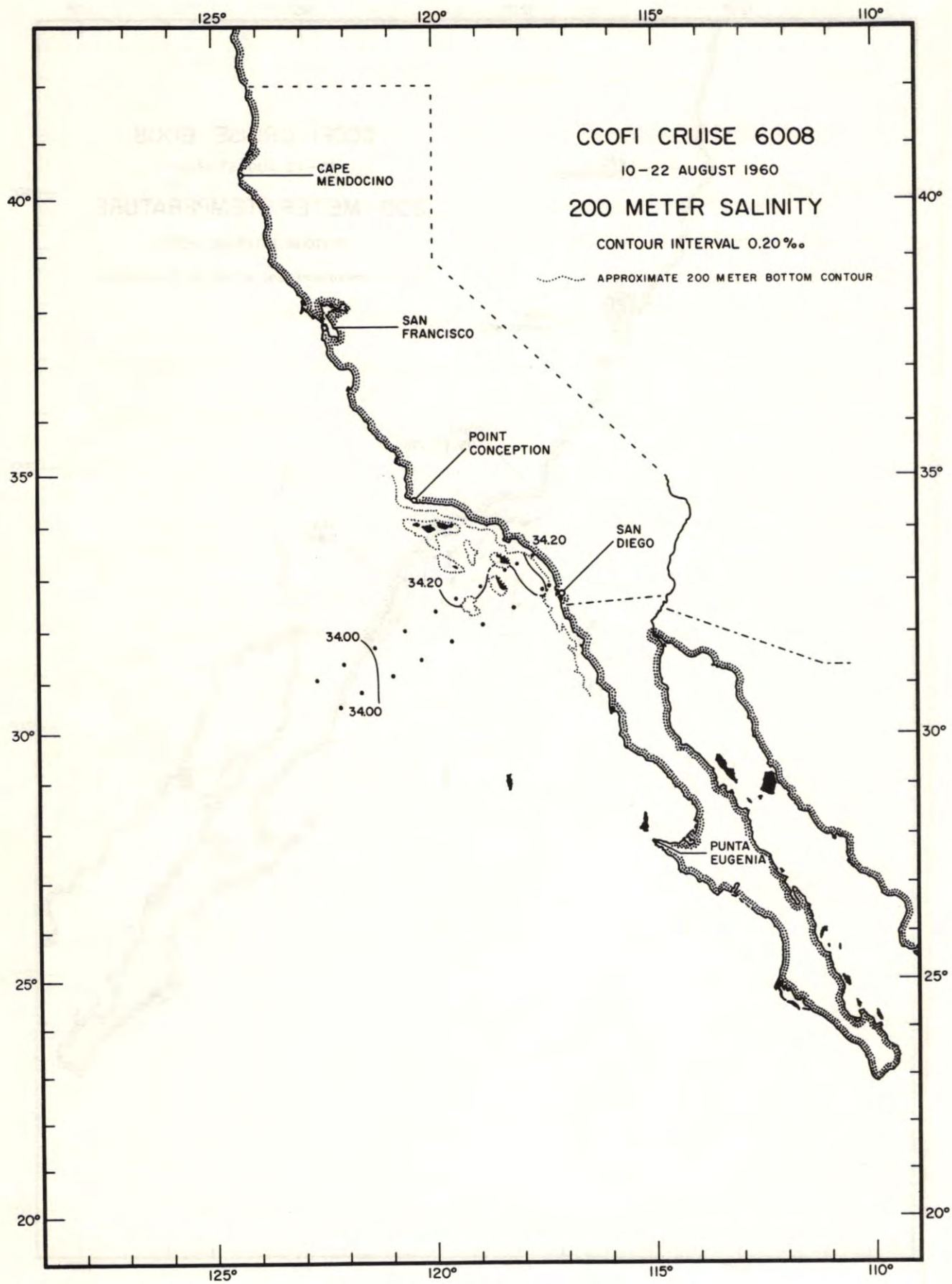


FIGURE 6

PERSONNEL

Cruise 6008

SHIP'S CAPTAIN

Forster, Charles W., RV Black Douglas

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

McGregor, John S., Fishery Biologist, Bureau of Commercial Fisheries

**Asterloh, Thomas, visitor, student

Berry, Frederick H., Fishery Biologist, Bureau of Commercial Fisheries

*Costello, James P., Jr., Laboratory Technician II

**Couey, William F., National Science Foundation Summer Trainee

*Mantyla, Arnold W., Marine Technician

**Mattson, Robert, visitor, student

Navari, Joseph V., National Science Foundation Summer Trainee, Bureau of
Commercial Fisheries

**Van Campen, Stephen, National Science Foundation Summer Trainee

Wolf, Robert S., Fishery Biologist, Bureau of Commercial Fisheries

*Lines 83 through 93 only (first leg).

**Lines 97 through 143 only (second leg).

S10

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6008

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

90.28 BLACK DOUGLAS; August 11, 1960; 1803 GCT; 33°28.5'N, 117°46.5'W; sounding, 200 fm; wind, calm; weather, clear; sea, slight; wire angle, 05°.

0	18.78	33.69	3.54	383	0	18.78	33.69	3.54	24.10	383	0.00
10	17.58	33.66	6.38	357	10	17.58	33.66	6.38	24.37	357	0.04
30	12.92	33.60	4.87	264	20	14.75	33.62	5.57	24.99	298	0.07
50	11.53	33.62	4.08	237	30	12.92	33.60	4.87	25.35	264	0.10
74	10.80	33.73	3.23	216	50	11.53	33.62	4.08	25.63	237	0.15
99	10.26	33.77	2.98	205	75	10.79	33.73	3.22	25.85	216	0.20
124	9.81	33.86	2.86	191	100	10.24	33.77	2.97	25.97	204	0.26
164	9.60	34.03	2.02	175	125	9.80	33.87	2.81	26.12	190	0.31
204	9.14	34.11	1.78	162	150	9.66	33.97	2.28	26.22	181	0.36
253	8.76	34.20	1.38	149	200	9.20	34.10	1.80	26.41	163	0.44
303	8.82	34.33	0.80	141	250	8.77	34.19	1.41	26.55	150	0.52
					300	8.83	34.32	0.86	26.63	142	0.60

90.32 BLACK DOUGLAS; August 11, 1960; 2041 GCT; 33°20.5'N, 118°03.5'W; sounding, 400 fm; wind, 270°, force 3; weather, clear; sea, slight; wire angle, 06°.

0	21.70	33.78	5.03	450	0	21.70	33.78	5.03	23.39	450	0.00
11	20.53	33.72	5.72	424	10	20.60	33.72	5.68	23.66	425	0.04
30	14.82	33.60	6.36	301	20	17.74	33.63	6.30	24.31	362	0.08
40	13.50	33.62	6.00	273	30	14.82	33.60	6.36	24.96	301	0.12
50	12.52	33.62	5.12	255	50	12.52	33.62	5.12	25.44	255	0.17
66	11.40	33.66	4.00	232	75	10.92	33.70	3.59	25.80	220	0.23
81	10.65	33.72	3.45	215	100	10.11	33.80	3.06	26.02	200	0.28
100	10.11	33.80	3.06	200	125	9.71	33.89	2.73	26.16	187	0.33
125	9.71	33.89	2.73	187	150	9.24	34.01	2.27	26.32	171	0.38
145	9.31	33.98	2.37	174	200	8.86	34.21	1.46	26.54	150	0.46
175	8.96	34.13	1.74	158	250	8.60	34.33	0.75	26.68	137	0.53
204	8.86	34.23	1.28	148	300	8.12	34.32	0.73	26.74	131	0.60
224	8.94	34.35	0.71	141	400	7.50	34.36	0.53	26.86	120	0.73
273	8.22	34.30	0.81	134	500	6.62	34.34	0.34	26.98	109	0.85
332	7.97	34.34	0.63	127							
406	7.46	34.36	0.50	119							
481	6.74	34.35	0.33	110							
561	6.25	34.33	0.35	106							

90.37 BLACK DOUGLAS; August 12, 1960; 0003 GCT; 33°11'N, 118°22.5'W; sounding, 650 fm; wind, 260°, force 4; weather, cloudy; sea, slight; wire angle, 18°.

3	21.09	33.98u	4.21u	-	0	(21.09)	(33.79)		(23.57)	(433)	(0.00)
11	21.03	33.79	4.53	431	10	21.04	33.79		23.59	431	0.04
30	15.14	33.70	6.10	301	20	19.98	33.78	4.98	23.85	406	0.09
40	13.16	33.60	4.96	268	30	15.14	33.70	6.10	24.96	301	0.12
54	11.97	33.63	4.32	244	50	12.60	33.61	4.62	25.42	257	0.18
69	10.93	33.66	3.74	224	75	10.84	33.68	3.63	25.80	220	0.24
93	10.12	33.79	3.15	201	100	9.93	33.82	3.06	26.06	196	0.29
112	9.66	33.89	2.88	186	125	9.49	33.99	2.63	26.27	176	0.34
131	9.42	34.01	2.56	174	150	9.04	33.99	2.47	26.34	169	0.38
150	9.04	33.99	2.47	169	200	8.84	34.18	1.59	26.53	152	0.46
178	8.74	34.15	2.05	153	250	8.52	34.31	0.94	26.68	137	0.54
210	8.85	34.20	1.35	151	300	8.04	34.32	0.75	26.75	130	0.60
239	8.62	34.31	0.96	139	400	7.11	34.31	0.48	26.88	118	0.73
287	8.17	34.32	0.78	132	500	6.27	34.33	0.32	27.01	106	0.85
340	7.64	34.30	0.60	126	600	(5.72)	(34.36)	(0.21)	(27.11)	(96)	(0.96)
422	6.92	34.32	0.45	115							
505	6.24	34.33	0.30	105							
590	5.77	34.36	0.21	97							

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

S10
CCOFI
6008

BLACK DOUGLAS; August 12, 1960; 0455 GCT; 32°54.5'N, 118°55.5'W; sounding, 900 fm; wind, 280°, force 4;
weather, clear; sea, moderate; wire angle, 03°.

90.45

1	19.20	33.82	5.04	383	0	(19.20)	(33.82)	(5.04)	(24.10)	(383)	(0.00)
11	19.21	33.79	5.01	385	10	19.21	33.79	5.01	24.07	385	0.04
31	13.57	33.68	5.61	270	20	19.00	33.78	5.03	24.11	381	0.08
41	12.43	33.71	4.86	247	30	13.60	33.68	5.60	25.23	275	0.11
56	10.62	33.74	3.86	213	50	11.59	33.72	4.32	25.69	231	0.16
71	9.93	33.79	3.30	198	75	9.77	33.81	3.21	26.08	194	0.21
97	9.14	33.91	2.75	177	100	9.09	33.92	2.69	26.28	175	0.26
116	8.92	33.95	2.49	170	125	8.87	33.97	2.42	26.36	168	0.30
136	8.80	33.98	2.37	166	150	8.60	34.01	2.17	26.43	161	0.34
156	8.52	34.03	2.01	158	200	8.13	34.21	1.42	26.66	139	0.42
187	8.18	34.22	1.54	139	250	7.74	34.21	1.07	26.71	134	0.49
223	8.13	34.21	1.19	139	300	7.37	34.25	0.79	26.80	126	0.56
252	7.73	34.21	1.06	134	400	6.74	34.30	0.52	26.92	114	0.68
301	7.36	34.25	0.79	126	500	6.15	34.34	0.28	27.04	104	0.80
357	7.01	34.28	0.63	119	600	5.71	34.42	0.18	27.15	93	0.90
441	6.50	34.31	0.43	110							
526	6.02	34.36	0.22	101							
613	5.66	34.43	0.18	91							

BLACK DOUGLAS; August 12, 1960; 0935 GCT; 32°39'N, 119°28.5'W; sounding, 700 fm; wind, 250°, force 4;
weather, clear; sea, moderate; wire angle, 05°.

90.53

0	18.08	33.78	5.25	360	0	18.08	33.78	5.25	24.34	360	0.00
10	18.07	33.78	5.37	360	10	18.07	33.78	5.37	24.34	360	0.04
30	17.08	33.76	5.54	238	20	17.98	33.78	5.43	24.36	358	0.07
40	13.79	33.72	5.10	272	30	17.08	33.76	5.54	24.56	338	0.11
55	10.42	33.77	3.48	207	50	10.97	33.75	3.84	25.82	218	0.16
70	9.77	33.83	3.11	193	75	9.62	33.85	3.10	26.14	188	0.21
95	8.97	33.90	3.00	175	100	8.93	33.91	2.93	26.30	173	0.26
115	8.86	33.92	2.82	171	125	8.84	33.97	2.61	26.36	168	0.30
136	8.84	34.03	2.35	163	150	8.82	34.06	2.21	26.43	161	0.34
155	8.82	34.08	2.12	159	200	8.55	34.23	1.37	26.60	144	0.42
186	8.66	34.21	1.54	147	250	8.00	34.25	1.10	26.71	134	0.49
221	8.39	34.25	1.20	140	300	7.64	34.33	0.62	26.82	124	0.56
250	8.00	34.25	1.10	134	400	6.73	34.31	0.52	26.94	113	0.68
300	7.64	34.33	0.62	124	500	6.21	34.34	0.34	27.03	104	0.80
355	7.08	34.31	0.57	118	600	5.75	34.36	0.27	27.10	97	0.90
439	6.47	34.32	0.46	109							
524	6.11	34.35	0.30	102							
609	5.71	34.36	0.26	97							

BLACK DOUGLAS; August 12, 1960; 1341 GCT; 32°25'N, 119°57.5'W; sounding, 600 fm; wind, 280°, force 4;
weather, clear; sea, moderate; wire angle, 06°.

90.60

1	17.90	33.81	4.97	354	0	(17.90)	(33.81)	(4.97)	(24.40)	(354)	(0.00)
11	17.47	33.77	5.32	346	10	17.48	33.77	5.31	24.48	347	0.04
31	14.75	33.73	5.11	290	20	17.10	33.76	5.31	24.57	338	0.07
41	13.40	33.73	4.87	263	30	14.90	33.73	5.13	25.04	293	0.10
57	12.38	33.76	4.40	242	50	13.00	33.76	4.68	25.46	253	0.16
72	11.80	33.76	3.97	231	75	10.85	33.78	3.53	25.87	214	0.21
96	9.46	33.87	2.76	184	100	9.36	33.88	2.70	26.21	182	0.26
116	9.00	33.92	2.53	174	125	8.82	33.94	2.47	26.34	169	0.31
137	8.64	33.97	2.39	165	150	8.52	34.00	2.24	26.43	161	0.35
157	8.44	34.01	2.14	159	200	7.88	34.08	1.86	26.59	146	0.43
187	8.03	34.06	1.95	149	250	7.34	34.15	1.23	26.72	133	0.50
222	7.61	34.11	1.62	140	300	6.76	34.21	0.83	26.85	121	0.56
251	7.33	34.15	1.22	133	400	6.16	34.28	0.44	26.99	108	0.68
300	6.76	34.21	0.83	121	500	5.85	34.37	0.24	27.09	98	0.79
356	6.37	34.25	0.54	113	600	5.47	34.39	0.21	27.16	92	0.89
440	6.00	34.31	0.36	104							
525	5.78	34.39	0.20	95							
610	5.43	34.39	0.22	91							

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OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

90.70 BLACK DOUGLAS; August 12, 1960; 1909 GCT; 32°04.5'N, 120°38.5'W; sounding, 2080 fm; wind, 280°, force 4; weather, cloudy; sea, rough; wire angle, 07°.

0	18.09	33.62	4.75	372	0	18.09	33.62	4.75	24.21	372	0.00
10	18.07	33.63	5.24	370	10	18.07	33.63	5.24	24.23	370	0.04
20	18.02	33.61	4.61	370	20	18.02	33.61	4.61	24.23	370	0.07
39	14.34	33.28	6.24	315	30	17.36	33.54	4.93	24.33	361	0.11
49	12.84	33.28	5.74	286	50	12.67	33.28	5.68	25.15	283	0.18
64	11.48	33.48	5.01	247	75	11.60	33.55	4.97	25.55	244	0.24
79	11.35	33.58	4.80	237	100	10.40	33.71	3.95	25.90	211	0.30
105	9.97	33.74	3.68	202	125	9.06	33.86	3.17	26.24	180	0.35
124	9.10	33.86	3.19	180	150	8.46	34.01	2.68	26.45	159	0.39
145	8.52	33.97	2.83	163	200	7.88	34.13	1.58	26.64	141	0.47
163	8.32	34.05	1.99	153	250	7.28	34.19	1.14	26.76	130	0.54
193	7.98	34.12	1.65	144	300	6.90	34.22	0.82	26.84	122	0.60
254	7.25	34.19	1.08	129	400	6.07	34.26	0.53	26.99	108	0.72
302	6.88	34.22	0.83	122	500	5.73	34.35	0.27	27.09	98	0.83
356	6.34	34.22	0.75	115	600	5.37	34.39	0.20	27.18	90	0.93
437	5.90	34.30	0.39	103							
522	5.66	34.36	0.23	96							
607	5.34	34.40	0.21	90							

90.80 BLACK DOUGLAS; August 13, 1960; 0110 GCT; 31°44.5'N, 121°19.5'W; sounding, 2000 fm; wind, 300°, force 4; weather, overcast; sea, rough; wire angle, 27°.

0	16.54	33.27	5.41	363	0	16.54	33.27	5.41	24.30	363	0.00
8	16.64	33.29	5.86	362	10	16.64	33.30	5.86	24.32	362	0.04
26	16.58	33.45	5.39	350	20	16.31	33.33	5.49	24.42	352	0.07
35	14.08	33.14	5.91	320	30	16.10	33.41	5.48	24.52	342	0.11
48	13.50	33.16	6.08	307	50	13.36	33.17	6.07	24.93	304	0.17
61	12.62	33.18	5.88	289	75	11.61	33.28	5.41	25.35	263	0.24
85	10.90	33.30	5.15	250	100	10.21	33.34	4.96	25.64	236	0.30
103	10.16	33.36	4.92	233	125	9.63	33.68	3.80	26.00	201	0.36
121	9.80	33.64	3.97	207	150	8.83	33.85	3.07	26.26	177	0.41
138	9.09	33.78	3.36	186	200	7.98	34.04	2.40	26.55	150	0.49
164	8.64	33.96	2.57	166	250	7.24	34.04	1.97	26.65	140	0.57
194	8.04	34.04	2.49	151	300	6.66	34.11	1.31	26.79	127	0.64
219	7.72	34.04	2.00	146	400	6.03	34.19	0.70	26.94	113	0.76
261	7.10	34.05	1.96	137	500	5.57	34.27	0.41	27.06	102	0.87
308	6.60	34.12	1.21	125							
383	6.12	34.18	0.75	115							
462	5.72	34.23	0.52	106							
545	5.38	34.31	0.31	96							

90.90 BLACK DOUGLAS; August 13, 1960; 0615 GCT; 31°24'N, 122°01'W; sounding, 2050 fm; wind, 280°, force 5; weather, cloudy; sea, rough; wire angle, 08°.

1	17.61	33.29	4.60	384	0	(17.61)	(33.29)	(4.60)	(24.08)	(384)	(0.00)
11	17.60	33.29	5.15	384	10	17.60	33.29	5.15	24.08	384	0.04
31	17.57	33.32	4.88	381	20	17.60	33.30	5.07	24.09	383	0.08
41	16.38	33.18	5.67	365	30	17.57	33.32	4.90	24.11	381	0.11
55	15.55	33.19	5.67	347	50	15.82	33.18	5.67	24.41	353	0.19
71	14.35	33.25	5.96	317	75	14.41	33.29	5.94	24.81	315	0.27
96	13.53	33.48	5.47	284	100	13.40	33.48	5.48	25.17	281	0.35
116	12.60	33.49	5.42	266	125	11.83	33.49	5.29	25.47	252	0.42
136	11.07	33.50	5.01	238	150	10.38	33.54	4.26	25.78	223	0.48
155	10.15	33.56	4.05	219	200	8.68	33.87	3.45	26.31	173	0.58
186	8.97	33.79	3.59	183	250	7.82	34.02	2.51	26.56	149	0.66
221	8.35	33.98	3.09	160	300	7.20	34.06	2.05	26.68	138	0.73
250	7.82	34.02	2.51	149	400	6.29	34.16	0.90	26.87	119	0.87
298	7.23	34.06	2.07	138	500	5.74	34.27	0.37	27.03	104	0.98
354	6.58	34.10	1.32	127	600	5.15					
440	6.06	34.21	0.57	112							
525	5.62	34.29	0.30	101							
610	5.10	-	0.23	-							

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

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BLACK DOUGLAS; August 13, 1960; 1120, 1140 GCT; 31°05'N, 122°39'W; sounding, 2000+ fm; wind, 320°, force 4; weather, cloudy; sea, moderate; wire angle, 13°, 13°.

90.100

1	17.84	33.26	4.53	392	0	(17.84)	(33.26)	(4.53)	(24.00)	(392)	(0.00)
11	17.84	33.29	5.40	390	10	17.84	33.29	5.40	24.02	390	0.04
30	17.74	33.29	4.96	387	20	17.79	33.29	5.12	24.04	388	0.08
40	17.68	33.29	5.42	386	30	17.74	33.29	4.96	24.05	387	0.12
55	16.26	33.28	-	355	50	17.09	33.29	5.77	24.20	373	0.19
70	15.35	33.28	5.98	336	75	15.16	33.29	5.97	24.65	330	0.28
95	14.30	33.41	5.80	304	100	14.06	33.44	5.70	24.99	298	0.36
113	13.28	33.49	5.46	279	125	12.22	33.48	5.24	25.39	260	0.43
133	11.47	33.48	5.06	246	150	10.71	33.55	4.45	25.72	228	0.49
153	10.58	33.57	4.31	225	200	9.11	33.82	3.26	26.20	183	0.60
183	9.45	33.78	3.42	191	250	8.21	34.01	2.42	26.48	156	0.69
217	8.88	33.89	3.11	174	300	7.60	34.07	2.16	26.62	143	0.76
245	8.27	34.00	2.45	157	400	6.63	34.21	0.96	26.87	119	0.90
					500	5.88	34.27	0.49	27.01	106	1.02
297	7.64	34.06	2.21	144	600	5.36	34.35	0.28	27.14	93	1.12
351	7.10	34.14	1.44	130							
434	6.36	34.25	0.69	113							
516	5.79	34.27	0.44	104							
602	5.35	34.35	0.28	93							

BLACK DOUGLAS; August 15, 1960; 1255 GCT; 32°54.5'N, 117°22'W; sounding, 300 fm; wind, calm; weather, cloudy; sea, slight; wire angle, 00°.

93.28

0	19.01	33.70	-	388	0	19.01	33.70	-	24.04	388	0.00
10	15.91	33.70	-	317	10	15.91	33.70	-	24.79	317	0.04
30	12.01	33.65	4.16	244	20	13.39	33.66		25.30	269	0.06
50	10.70	33.70	3.49	217	30	12.01	33.65	4.16	25.56	244	0.09
75	10.20	33.84	3.22	198	50	10.70	33.70	3.49	25.84	217	0.14
101	9.94	33.90	2.99	190	75	10.20	33.84	3.22	26.04	198	0.19
125	9.80	33.99	2.61	181	100	9.96	33.90	3.00	26.12	190	0.24
165	9.59	34.09	2.14	170	125	9.80	33.99	2.61	26.22	181	0.28
206	9.24	34.17	1.80	159	150	9.67	34.05	2.34	26.28	175	0.33
255	9.11	34.28	1.29	149	200	9.28	34.16	1.87	26.43	161	0.42
305	8.72	34.31	1.12	140	250	9.13	34.27	1.33	26.55	150	0.49
411	7.86	34.38	0.52	123	300	8.75	34.31	1.15	26.64	141	0.57
					400	7.94	34.37	0.58	26.81	125	0.71

BLACK DOUGLAS; August 15, 1960; 1055 GCT; 32°50.5'N, 117°31'W; sounding, 400 fm; wind, 270°, force 1; weather, cloudy; sea, slight; wire angle, 00°.

93.30

0	21.04	33.79	5.55	432	0	21.04	33.79	5.55	23.58	432	0.00
10	20.66	33.78	5.89	422	10	20.66	33.78	5.89	23.68	422	0.04
30	14.15	33.64	6.22	285	20	19.40	33.74	6.18	23.98	394	0.08
40	12.36	33.68	4.42	248	30	14.15	33.64	6.22	25.13	285	0.12
56	11.19	33.66	4.16	228	50	11.58	33.66	4.21	25.65	234	0.17
70	10.56	33.78	3.72	209	75	10.34	33.83	3.47	26.00	202	0.22
96	9.84	33.95	2.88	183	100	9.79	33.98	2.74	26.22	181	0.27
116	9.68	34.04	2.42	176	125	9.68	34.06	2.31	26.30	174	0.32
136	9.64	34.09	2.14	171	150	9.54	34.13	1.97	26.38	166	0.36
156	9.50	34.14	1.96	165	200	9.37	34.21	1.59	26.47	157	0.44
186	9.43	34.16	1.82	163	250	9.22	34.33	1.15	26.58	147	0.52
221	9.29	34.30	1.32	150	300	9.04	34.40	0.80	26.66	139	0.59
250	9.22	34.33	1.15	147	400	7.72	34.36	0.80	26.84	122	0.73
301	9.02	34.40	0.79	139	500	6.80	34.36	0.41	26.96	110	0.85
356	8.14	34.36	0.90	129	600	5.94	34.37	0.30	27.09	99	0.96
441	7.31	34.36	0.59	117							
526	6.55	34.36	0.36	107							
611	5.86	34.38	0.30	97							

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OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

93.40 BLACK DOUGLAS; August 14, 1960; 2315 GCT; 32°30'N, 118°11.5'W; sounding, 950 fm; wind, 300°, force 4; weather, partly cloudy; sea, slight; wire angle, 22°.

1	18.90	33.82	5.30	376	0	(18.90)	(33.82)	(5.30)	(24.17)	(376)	(0.00)
10	18.73	33.82	5.54	372	10	18.73	33.82	5.54	24.21	372	0.04
29	16.38	33.60	5.97	334	20	18.13	33.75	5.68	24.31	363	0.07
39	14.04	33.62	5.84	284	30	16.27	33.60	5.97	24.52	342	0.11
52	12.00	33.57	4.96	249	50	12.21	33.57	5.07	25.46	253	0.17
66	11.39	33.62	4.63	235	75	11.00	33.66	4.35	25.76	225	0.23
90	10.32	33.76	3.70	206	100	9.92	33.85	3.25	26.08	194	0.28
108	9.75	33.89	3.01	187	125	9.61	33.92	2.90	26.19	183	0.33
127	9.60	33.92	2.87	183	150	9.37	34.04	2.27	26.33	170	0.37
145	9.40	34.02	2.35	172	200	8.74	34.13	1.89	26.50	154	0.46
173	9.19	34.11	2.09	163	250	8.29	34.21	1.29	26.63	142	0.53
205	8.68	34.14	1.80	153	300	8.13	34.31	0.94	26.74	131	0.60
230	8.46	34.18	1.43	146	400	7.00	34.32	0.53	26.90	116	0.73
276	8.16	34.25	1.15	137	500	6.43	34.34	0.32	27.00	107	0.84
325	8.05	34.36	0.69	127	600	(6.16)	(34.38)		(27.07)	(101)	(0.96)
402	6.98	34.32	0.52	116							
481	6.49	34.34	0.36	108							
581	6.21	34.37	0.23	102							

93.50 BLACK DOUGLAS; August 14, 1960; 1825 GCT; 32°10'N, 118°52.5'W; sounding, 770 fm; wind, 320°, force 3; weather, cloudy; sea, moderate; wire angle, 17°.

2	19.34	33.78	5.21	390	0	(19.34)	(33.78)	(5.21)	(24.02)	(390)	(0.00)
12	19.27	33.91	5.34	378	10	19.29	33.90	5.33	24.13	380	0.04
31	15.79	33.53	6.38	327	20	19.23	33.93	5.38	24.17	376	0.08
40	14.03	-	-	-	30	16.00	33.55	6.35	24.66	330	0.11
54	12.84	33.48	5.70	271	50	13.08	33.49	5.76	25.23	275	0.17
68	12.44	33.46	5.50	265	75	12.03	33.54	5.13	25.48	252	0.24
92	11.06	33.82	4.09	214	100	10.63	33.83	3.83	25.95	206	0.30
112	9.96	33.83	3.49	194	125	9.44	33.85	3.45	26.16	186	0.35
130	9.36	33.87	3.41	182	150	9.49	34.04	2.43	26.31	172	0.39
149	9.50	34.04	2.44	173	200	8.98	34.13	2.14	26.46	158	0.48
176	9.33	34.12	2.15	164	250	8.77	34.27	1.25	26.61	143	0.55
208	8.91	34.14	2.11	156	300	7.57	34.18	1.32	26.72	133	0.62
236	9.14	34.33	1.18	146	400	7.26	34.35	0.53	26.90	117	0.75
282	7.88	34.18	1.34	138	500	6.53	34.36	0.28	27.00	107	0.87
333	7.21	34.22	1.13	126							
414	7.23	34.37	0.45	115							
496	6.56	34.36	0.29	107							
579	6.12	34.39	0.24	99							

93.60 BLACK DOUGLAS; August 14, 1960; 1321 GCT; 31°50'N, 119°34'W; sounding, 1200 fm; wind, 320°, force 4; weather, cloudy; sea, rough; wire angle, 05°.

0	18.38	33.82	5.34	364	0	18.38	33.82	5.34	24.29	364	0.00
10	18.37	33.82	5.47	364	10	18.37	33.82	5.47	24.29	364	0.04
30	15.65	33.57	6.03	321	20	18.36	33.82	5.52	24.30	363	0.07
40	13.30	33.52	5.80	277	30	15.65	33.57	6.03	24.75	321	0.11
56	11.94	33.53	5.06	251	50	12.38	33.53	5.37	25.39	259	0.16
69	11.42	33.64	4.41	234	75	11.11	33.69	4.18	25.76	225	0.23
94	10.22	33.77	3.68	204	100	10.03	33.78	3.60	26.01	200	0.28
116	9.64	33.83	3.32	190	125	9.32	33.87	3.27	26.20	183	0.33
136	9.08	33.94	3.19	174	150	9.08	34.06	2.43	26.39	165	0.37
156	9.08	34.08	2.26	163	200	8.76	34.19	1.64	26.54	150	0.45
187	8.81	-	-	-	250	8.42	34.31	1.07	26.69	136	0.52
222	8.66	34.25	1.39	144	300	7.98	34.31	0.80	26.76	129	0.59
250	8.42	34.31	1.07	136	400	7.02	34.34	0.50	26.92	115	0.72
300	7.98	34.31	0.80	129	500	6.22	(34.40)		(27.08)	(100)	(0.83)
356	7.53	34.34	0.59	121	600	5.57					
442	6.61	34.35	0.40	108							
525	6.06	34.52u	0.25	-							
611	5.52	34.40u	0.25	-							

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

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BLACK DOUGLAS; August 14, 1960; 0809 GCT; 31°30'N, 120°14'W; sounding, 2050 fm; wind, 270°, force 5; weather, cloudy; sea, rough; wire angle, 03°.

9370

1	18.42	33.90	5.23	359	0	(18.42)	(33.90)	(5.23)	(24.35)	(359)	(0.00)
11	18.44	33.82	5.60	365	10	18.44	33.82	5.59	24.28	365	0.04
31	15.49	33.59	5.96	316	20	18.44	33.82	5.61	24.28	365	0.07
41	13.24	33.48	5.93	279	30	15.70	33.60	5.93	24.77	319	0.11
56	11.84	33.48	5.21	253	50	11.94	33.48	5.28	25.44	255	0.16
72	11.02	33.66	4.47	226	75	10.67	33.66	4.24	25.81	219	0.22
97	10.36	33.72	3.85	210	100	10.27	33.77	3.69	25.97	205	0.28
117	9.57	33.86	3.16	187	125	9.34	33.87	3.04	26.20	183	0.33
137	9.06	33.91	2.90	176	150	8.78	33.94	2.76	26.34	169	0.37
157	8.66	33.96	2.69	166	200	7.94	34.07	2.26	26.58	147	0.45
186	8.11	34.04	2.34	152	250	7.41	34.09	1.70	26.67	138	0.52
222	7.68	34.09	2.16	142	300	6.96	34.16	1.23	26.79	127	0.59
251	7.40	34.09	1.67	138	400	6.33	34.25	0.71	26.95	112	0.72
301	6.96	34.16	1.22	127	500	5.83	34.35	0.30	27.08	99	0.83
355	6.57	34.20	0.96	119	600	5.30	34.37	0.28	27.17	91	0.93
441	6.12	34.30	0.50	106							
525	5.71	34.36	0.25	97							
611	5.24	34.37	0.29	91							

BLACK DOUGLAS; August 14, 1960; 0228 GCT; 31°10'N, 120°54.5'W; sounding, 2000+ fm; wind, 330°, force 5; weather, cloudy; sea, rough; wire angle, 18°.

9380

1	16.90	33.37	5.14	363	0	(16.90)	(33.37)	(5.14)	(24.30)	(363)	(0.00)
10	16.89	33.36	5.70	363	10	16.89	33.36	5.70	24.30	363	0.04
29	16.00	33.42	5.80	339	20	16.80	33.36	5.75	24.32	361	0.07
39	15.64	33.41	5.93	332	30	15.98	33.42	5.82	24.57	338	0.11
52	13.64	33.39	5.99	293	50	13.93	33.40	5.98	24.99	298	0.17
67	12.70	33.26	5.65	285	75	11.96	33.25	5.46	25.27	271	0.24
90	10.74	33.37	5.10	242	100	10.34	33.50	4.55	25.75	226	0.30
108	10.08	33.60	4.20	215	125	9.37	33.70	3.78	26.06	196	0.36
127	9.30	33.71	3.75	194	150	8.94	33.87	3.54	26.26	177	0.41
144	9.02	33.84	3.60	180	200	8.07	34.05	2.87	26.54	150	0.49
175	8.51	-	-	-	250	7.41	34.14	1.85	26.70	135	0.56
205	7.98	34.06	2.76	148	300	6.91	34.20	1.24	26.82	124	0.63
232	7.60	34.11	2.08	140	400	6.48	34.33	0.67	26.98	109	0.75
279	7.12	34.18	1.49	128	500	5.83	34.39	0.31	27.11	96	0.86
332	6.70	34.23	0.96	118							
415	6.42	34.34	0.60	107							
496	5.87	34.39	0.33	96							
579	5.49	34.42	0.22	90							

BLACK DOUGLAS; August 13, 1960; 2023 GCT; 30°51'N, 121°37'W; sounding, 2000 fm; wind, 340°, force 4; weather, cloudy; sea, rough; wire angle, 10°.

9390

1	17.88	33.39	5.13	383	0	(17.88)	(33.39)	(5.13)	(24.09)	(383)	(0.00)
11	17.89	33.39	5.44	384	10	17.89	33.39	5.44	24.09	384	0.04
30	17.47	33.36	5.42	376	20	17.88	33.39	5.44	24.09	384	0.08
39	15.82	33.16	5.86	354	30	17.47	33.36	5.42	24.16	376	0.11
56	15.11	33.23	-	334	50	15.34	33.20	5.88	24.53	342	0.19
71	13.93	33.28	5.91	307	75	13.63	33.29	5.86	24.97	300	0.27
95	12.00	33.30	5.51	269	100	11.82	33.34	5.47	25.36	263	0.34
115	11.36	33.45	5.36	246	125	11.00	33.51	5.20	25.64	236	0.40
135	10.63	33.58	5.02	225	150	10.17	33.71	4.57	25.94	207	0.46
154	10.04	33.75	4.42	203	200	9.34	33.93	3.82	26.25	178	0.56
184	9.56	33.89	3.95	184	250	8.72	34.00	2.87	26.41	163	0.64
219	9.08	33.96	3.65	172	300	8.00	34.07	2.03	26.57	147	0.72
247	8.74	33.99	2.94	164	400	6.86	34.17	1.07	26.80	126	0.87
296	8.05	34.07	2.09	149	500	6.20	34.28	0.39	26.99	108	0.99
349	7.31	34.11	1.58	135	600	5.58	34.37	0.30	27.13	94	1.10
432	6.62	34.20	0.76	120							
516	6.10	34.30	0.35	106							
600	5.58	34.37	0.30	94							

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OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O ₂	δ _T	Z	T	S	O ₂	σ _t	δ _T	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

93100

BLACK DOUGLAS; August 13, 1960; 1642 GCT; 30°34.5'N, 122°07'W; sounding, 2050 fm; wind, 320°, force 4; weather, cloudy; sea, rough; wire angle, 00°.

0	17.49	33.30	5.37	381	0	17.49	33.30	5.37	24.11	381	0.00
10	17.49	33.29	5.54	382	10	17.49	33.29	5.54	24.10	382	0.04
30	16.80	33.19	5.81	374	20	17.22	33.25	5.69	24.14	378	0.08
41	16.32	33.21	5.79	361	30	16.80	33.19	5.81	24.19	374	0.11
56	16.18	33.30	5.87	352	50	16.23	33.26	5.83	24.38	356	0.19
71	14.82	33.32	6.09	322	75	14.19	33.27	6.04	24.83	313	0.27
96	13.12	33.33	5.87	287	100	13.02	33.33	5.83	25.12	285	0.35
117	12.59	33.45	5.54	268	125	11.73	33.41	5.29	25.43	256	0.42
137	10.72	33.40	4.92	240	150	10.09	33.51	4.41	25.79	222	0.48
157	9.82	33.58	4.21	212	200	8.66	33.88	3.41	26.32	172	0.58
187	8.87	33.86	3.62	176	250	7.89	34.02	2.33	26.55	150	0.66
222	8.34	33.93	2.98	163	300	7.36	34.08	1.73	26.67	139	0.74
251	7.87	34.02	2.32	150	400	6.64	34.22	0.90	26.88	118	0.87
301	7.34	34.08	1.71	138	500	6.09	34.27	0.45	26.99	108	0.99
357	6.88	34.19	1.22	124	600	5.43	34.34	0.30	27.12	95	1.09
442	6.41	34.24	0.69	114							
527	5.94	34.28	0.37	105							
612	5.34	34.35	0.30	93							

Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
83.40-B	VIII-10	1515	34°14.0'	119°22.0'	14	-	-	missing	smooth	12.73	33.86
83.43-B	10	1658	34°08.0'	119°34.0'	130	320°	2	fog	moderate	15.72	33.78
83.51-B	10	2200	33°52.0'	120°08.5'	70	280°	4	haze	moderate	16.68	33.71
87.35-B	11	1210	33°50.0'	118°37.5'	300	calm		clear	slight	20.58	33.86
87.40-B	11	0915	33°40.0'	118°58.0'	480	calm		clear	slight	19.34	33.80
87.45-B	11	0638	33°30.0'	119°19.0'	900	270°	1	clear	slight	13.48	33.83
87.50-B	11	0400	33°20.0'	119°39.5'	40	270°	2	clear	slight	15.33	33.78
93.35-B	15	0758	32°40.0'	117°52.0'	300	270°	3	cloudy	slight	21.38	33.86
97.30-B	17	0755	32°16.0'	117°07.0'	33	320°	2	cloudy	slight	14.43	33.62
97.32-B	17	0645	32°12.0'	117°15.0'	720	280°	2	cloudy	slight	20.67	33.80
97.35-B	17	0408	32°01.5'	117°26.5'	620	280°	3	cloudy	slight	20.54	33.89
97.40-B	17	0148	31°56.0'	117°48.0'	450	270°	3	cloudy	rough	19.96	33.77
100.29-B	17	1235	31°42.0'	116°43.5'	95	320°	2	overcast	slight	12.02	33.66
100.30-B	17	1300	31°40.5'	116°46.5'	180	320°	3	overcast	slight	15.39	33.65
100.35-B	17	1520	31°30.5'	117°07.0'	650	280°	4	overcast	moderate	21.02	33.80
100.40-B	17	1750	31°21.0'	117°27.0'	950	330°	4	cloudy	moderate	20.04	33.85
103.30-B	18	0300	31°06.0'	116°24.5'	40	320°	4	partly cloudy	rough	16.68	33.67
103.35-B	18	0040	30°56.0'	116°45.0'	800	320°	5	cloudy	rough	19.84	33.71
103.40-B	17	2220	30°46.0'	117°04.5'	1100	320°	5	partly cloudy	moderate	20.36	33.77

TEMPERATURE AND SALINITY AT 10 METERS (NET-TOW STATIONS)

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Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
107.32-B	VIII-18	0730	30°26.0'	116°11.0'	350	280°	3	partly cloudy	moderate	16.99	33.61
107.35-B	18	0910	30°21.5'	116°22.5'	900	320°	5	overcast	moderate	18.55	33.62
107.40-B	18	1130	30°11.0'	116°42.0'	1500	320°	5	cloudy	rough	20.70	33.78
110.33-B	18	1920	29°50.0'	115°52.0'	50	330°	3	missing	moderate	15.92	33.56
110.35-B	18	1805	29°46.0'	116°00.0'	480	280°	4	missing	moderate	17.37	33.58
110.40-B	18	1550	29°36.5'	116°19.5'	1300	330°	5	cloudy	rough	20.57	33.69
113.30-B	19	0020	29°22.0'	115°18.0'	31	290°	4	fog	rough	15.30	33.64
113.35-B	19	0235	29°11.5'	115°38.0'	600	300°	5	clear	rough	17.53	33.58
113.40-B	19	0500	29°02.0'	115°57.0'	920	280°	4	clear	moderate	19.09	33.78
117.26-B	20	0005	28°56.0'	114°41.5'	40	270°	2	cloudy	moderate	17.15	33.69
117.30-B	19	2205	28°48.0'	114°56.5'	56	280°	2	cloudy	slight	15.68	33.57
117.35-B	19	1940	28°38.0'	115°16.0'	130	-	-	overcast	moderate	18.78	33.64
117.40-B	19	1000	28°28.0'	115°35.5'	460	280°	1	partly cloudy	slight	20.20	33.71
118.39-B	19	1130	28°18.5'	115°23.5'	120	340°	1	overcast	slight	19.35	33.60
119.33-B	20	0950	28°19.0'	114°53.0'	60	300°	3	cloudy	slight	18.00	33.65
120.25-B	20	0530	28°22.5'	114°15.0'	30	320°	3	partly cloudy	slight	20.84	33.88
120.30-B	20	0730	28°13.0'	114°34.0'	53	320°	3	overcast	slight	19.61	33.78
120.35-B	20	1150	28°03.0'	114°54.0'	45	280°	2	clear	slight	18.10	33.60
120.45-B	20	1630	27°43.0'	115°33.0'	1140	320°	3	partly cloudy	moderate	19.14	33.77

TEMPERATURE AND SALINITY AT 10 METERS (NET-TOW STATIONS)

Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
123.37-B	VIII-21	0145	27°24.0'	114°40.0'	40	300°	1	partly cloudy	rough	16.75	33.96
123.42-B	20	2325	27°14.0'	114°59.0'	800	320°	4	partly cloudy	moderate	17.42	33.78
123.45-B	20	2144	27°08.0'	115°11.5'	2200	280°	3	cloudy	rough	18.10	33.82
127.34-B	21	0655	26°55.0'	114°06.5'	42	180°	2	cloudy	slight	19.44	34.16
127.40-B	21	0955	26°43.5'	114°29.0'	1600	190°	2	missing	slight	21.87	33.84
130.30-B	21	1935	26°29.0'	113°29.0'	38	140°	1	partly cloudy	moderate	20.94	34.11
130.35-B	21	1645	26°16.0'	113°44.5'	150	270°	1	partly cloudy	slight	20.78	34.07
130.40-B	21	1420	26°09.0'	114°07.0'	1050	150°	2	partly cloudy	moderate	22.68	33.96
133.25-B	22	0340	26°04.5'	112°48.0'	46	180°	2	partly cloudy	moderate	22.79	34.08
133.30-B	22	0600	25°54.5'	113°07.5'	100	180°	2	overcast	moderate	20.44	33.77
137.23-B	22	1330	25°34.0'	112°19.0'	41	360°	3	cloudy	slight	23.58	34.13
137.30-B	22	1037	25°20.0'	112°46.0'	200	340°	2	overcast	slight	20.06	33.82
140.30-B	22	1830	24°45.5'	112°24.0'	58	180°	2	cloudy	moderate	23.84	34.30
143.26-B	22	2325	24°19.0'	111°48.0'	46	320°	2	partly cloudy	moderate	19.86	34.18

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