

# data report

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 6310  
2 - 29 October 1963

CCOFI Cruise 6311  
28 - 29 November 1963

and

CCOFI Cruise 6311 (El Golfo)  
9 November - 7 December 1963

SIO Reference 65-1  
9 October 1964

INSERT FOR CCOFI CRUISE 6310 (SIO Ref. 65-1)

The CCOFI cruise-numbering and station-numbering system has been slightly revised in order to make it more consistent with the system used by the National Oceanographic Data Center.

Cruise numbers. Hyphenated numbers indicating quarterly cruises (extending over a period of more than one month) will no longer be used. A four-digit number will appear instead, where the first two digits represent the year, and the last two digits the month in which the first data were collected.

Station numbers. Superscript numbers will not be used any longer, either for indication of the station line (before the decimal point) nor the station position along that line (after the decimal point). (Each station number represents, really, an area of about twelve by four nautical miles.) The exact position will be expressed by latitude and longitude.



UNIVERSITY OF CALIFORNIA  
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 6310  
2 - 29 October 1963

CCOFI Cruise 6311  
28 - 29 November 1963

and

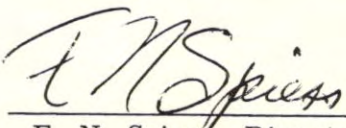
CCOFI Cruise 6311 (El Golfo)  
9 November - 7 December 1963

Sponsored by

Marine Research Committee

SIO Reference 65-1  
9 October 1964

Approved for distribution:

  
F. N. Spiess, Director

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## INTRODUCTION

The data presented in this report were collected by the RV Black Douglas of the Bureau of Commercial Fisheries, the RV Alexander Agassiz and the RV Horizon of the Scripps Institution of Oceanography on Cruise 6310 and by the RV Horizon and the RV Alexander Agassiz on Cruise 6311 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. The cruises preceding this one in the series are 6304 and 6306 (SIO Ref. 64-13) and 6307 and 6309 (SIO Ref. 64-18).

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.<sup>1/</sup> The 125-meter level was introduced into the integration to obtain greater accuracy in the determination of  $\Delta D$ .

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 values recorded "have a reproducibility of  $\pm 0.004\%$  salinity at the 95 per cent probability level, and a probable accuracy of  $\pm 0.01\%$  salinity or better at the same level of probability."<sup>2/</sup> 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

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<sup>1/</sup> Klein, Hans T. A new technique for processing physical oceanographic data. MS.

<sup>2/</sup> Quotation from Department of Oceanography, University of Washington, Tech. Rep. No. 66, UW Ref. 60-18, October 1960.



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 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, two 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.



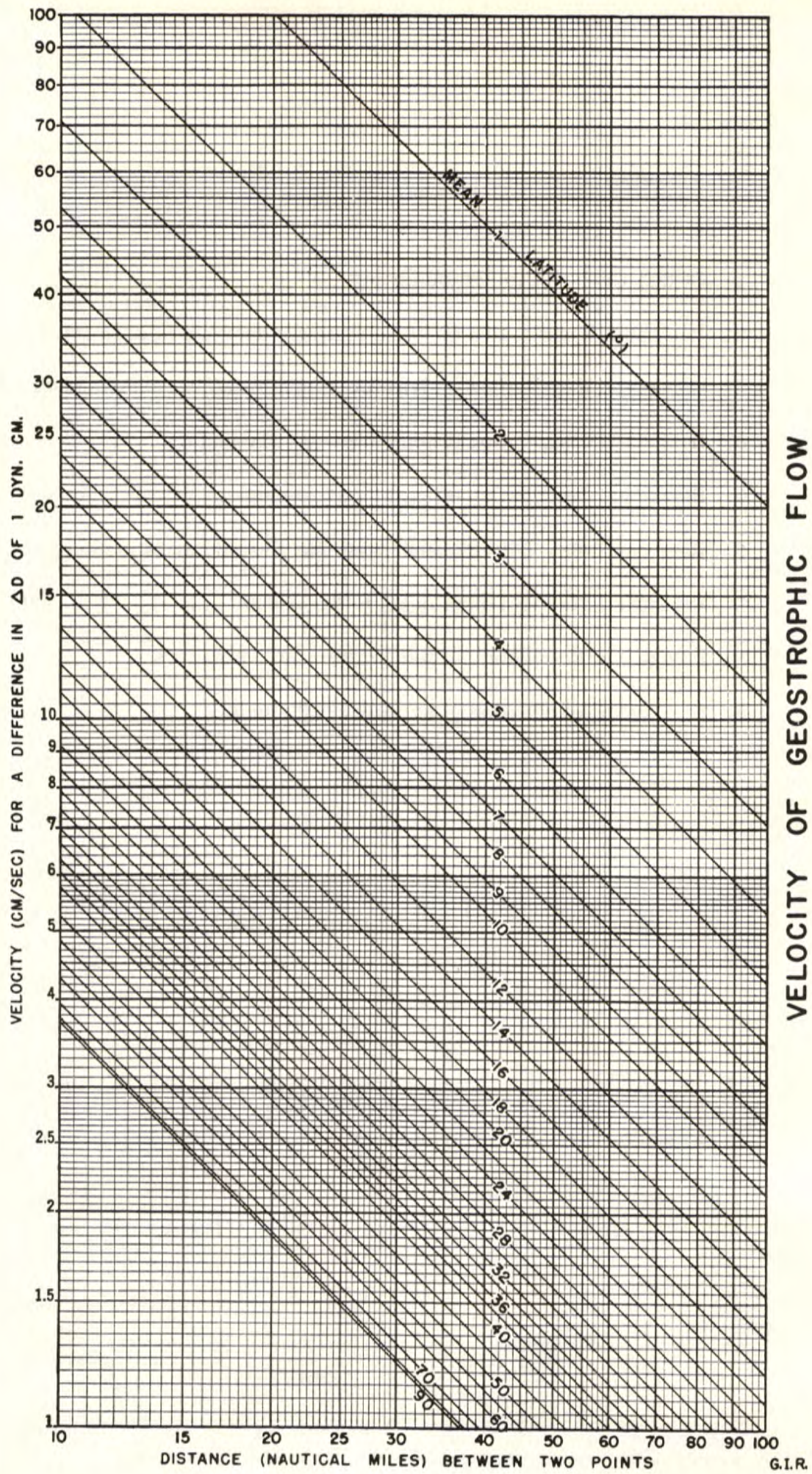
Values which are not drawn through because they seem to be in error without apparent reason are indicated by the following notation.

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.







FIGURES  
Cruise 6310

1. CCOFI Cruise 6310, station positions
2. Horizontal distribution of dynamic height anomaly (0 over 500 d-bar)
3. Horizontal distribution of dynamic height anomaly (200 over 500 d-bar)
4. Horizontal distribution of temperature at 10 meters
5. Horizontal distribution of salinity at 10 meters
6. Horizontal distribution of thermosteric anomaly at 10 meters
7. Horizontal distribution of depth to the thermocline
8. Horizontal distribution of temperature at 200 meters
9. Horizontal distribution of salinity at 200 meters

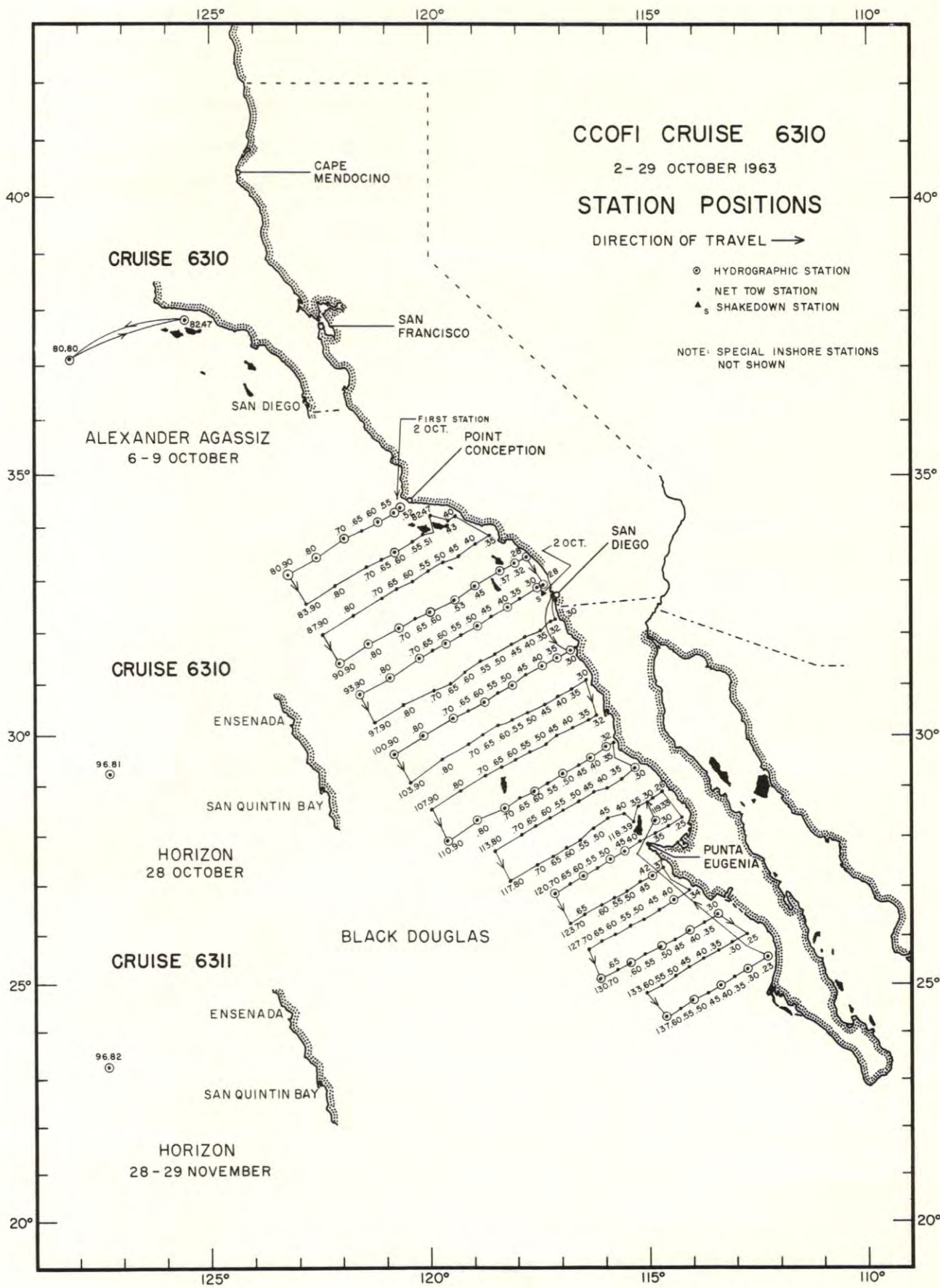


FIGURE 1



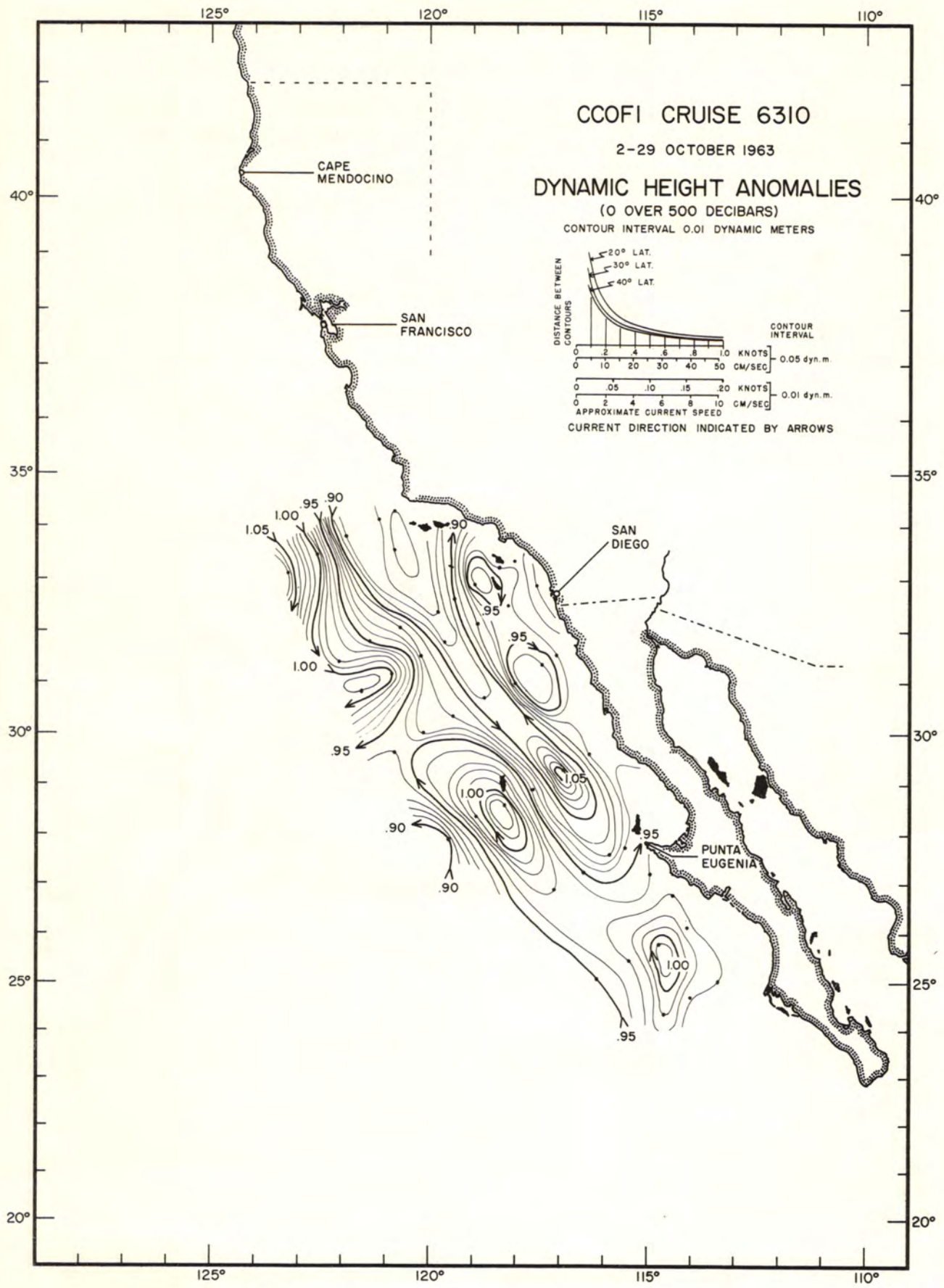


FIGURE 2

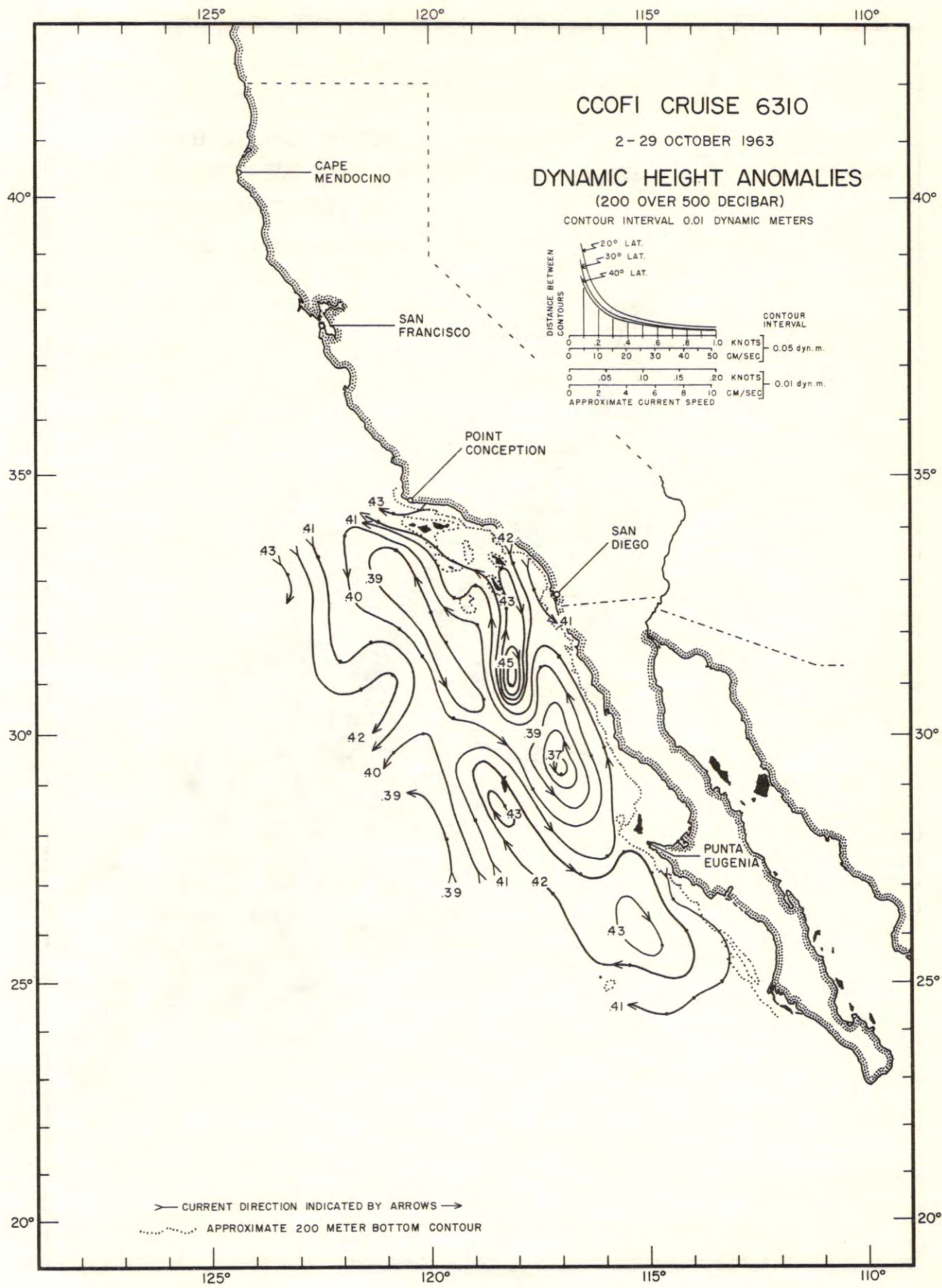


FIGURE 3



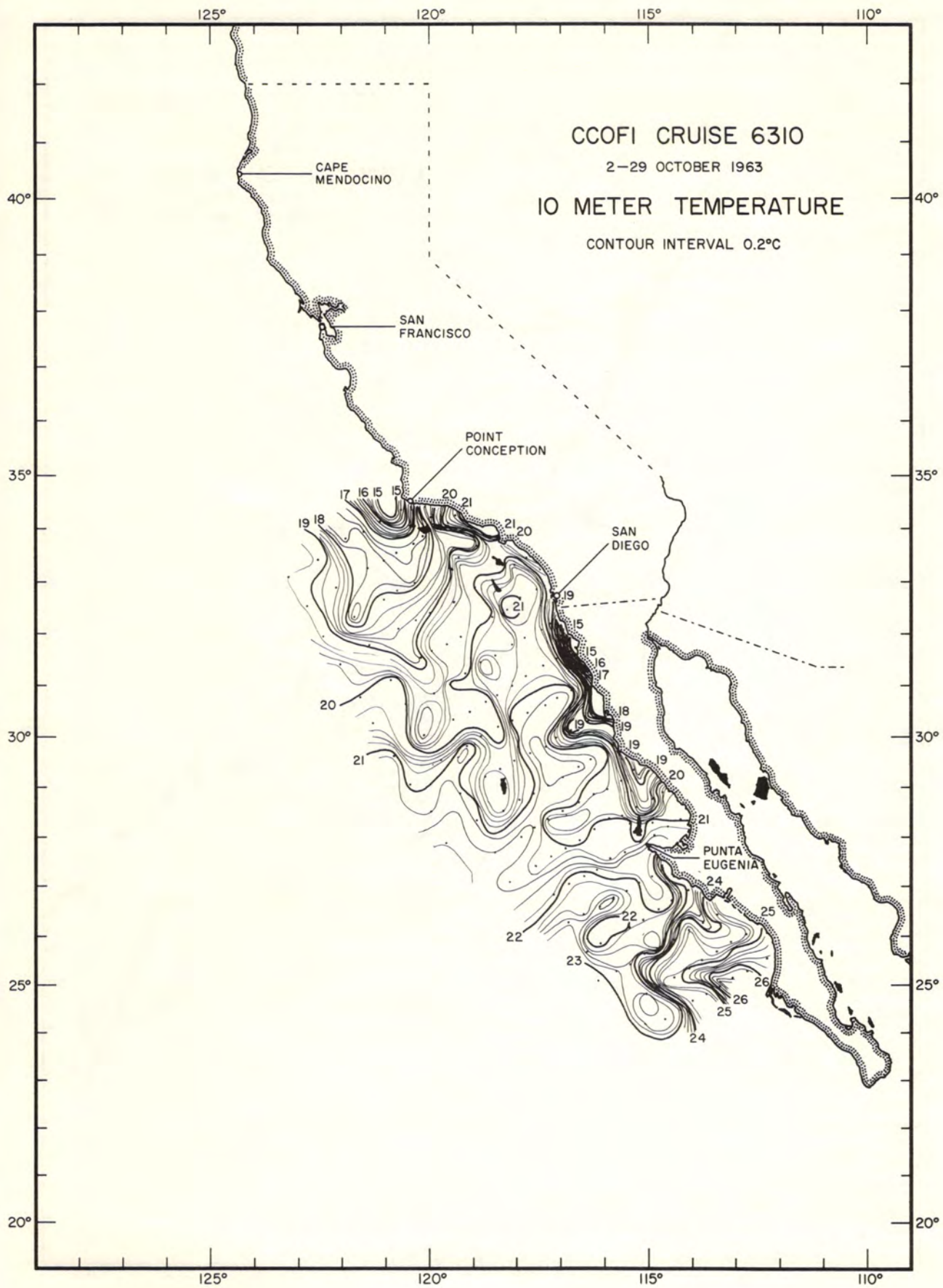


FIGURE 4

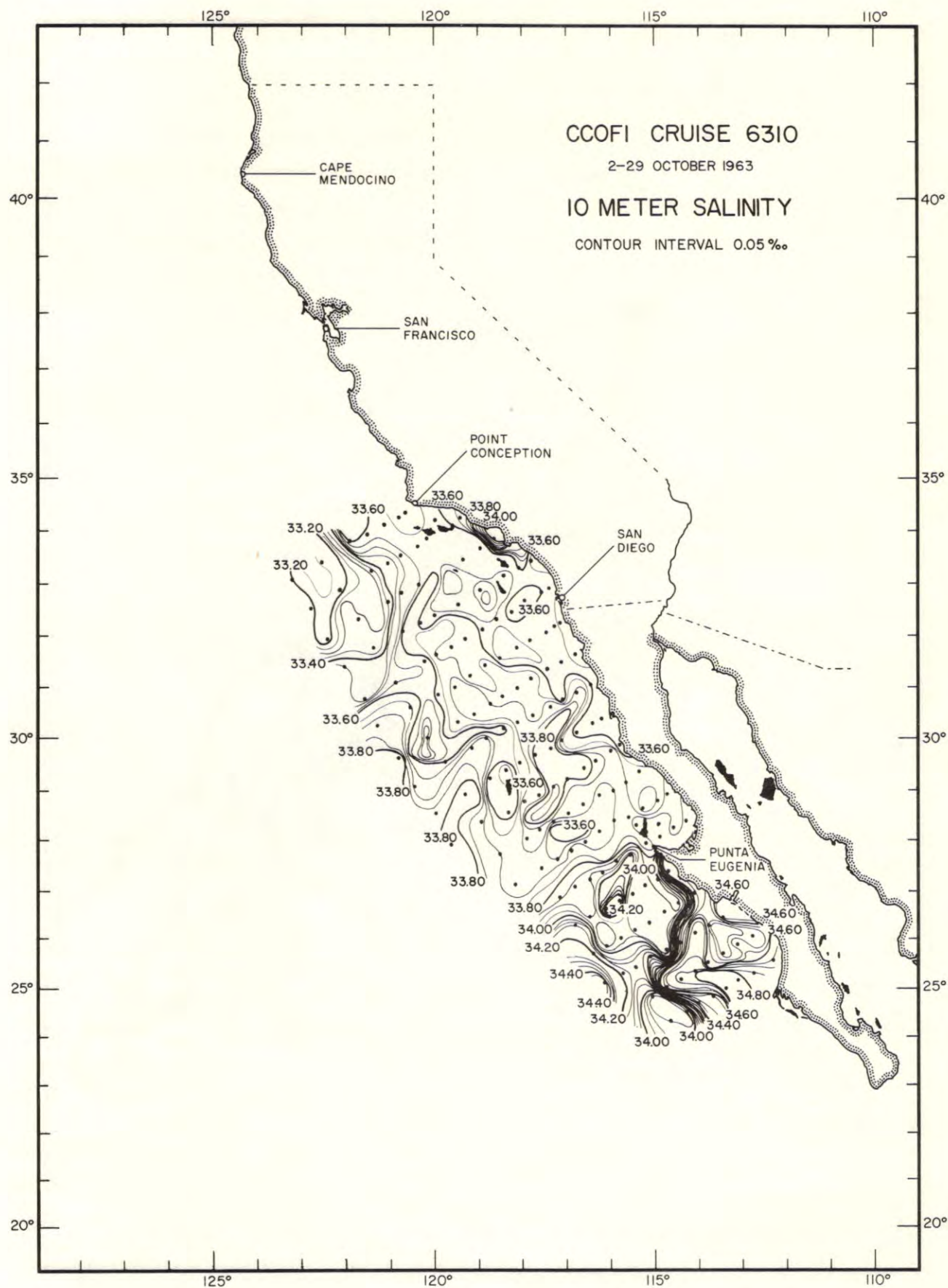


FIGURE 5



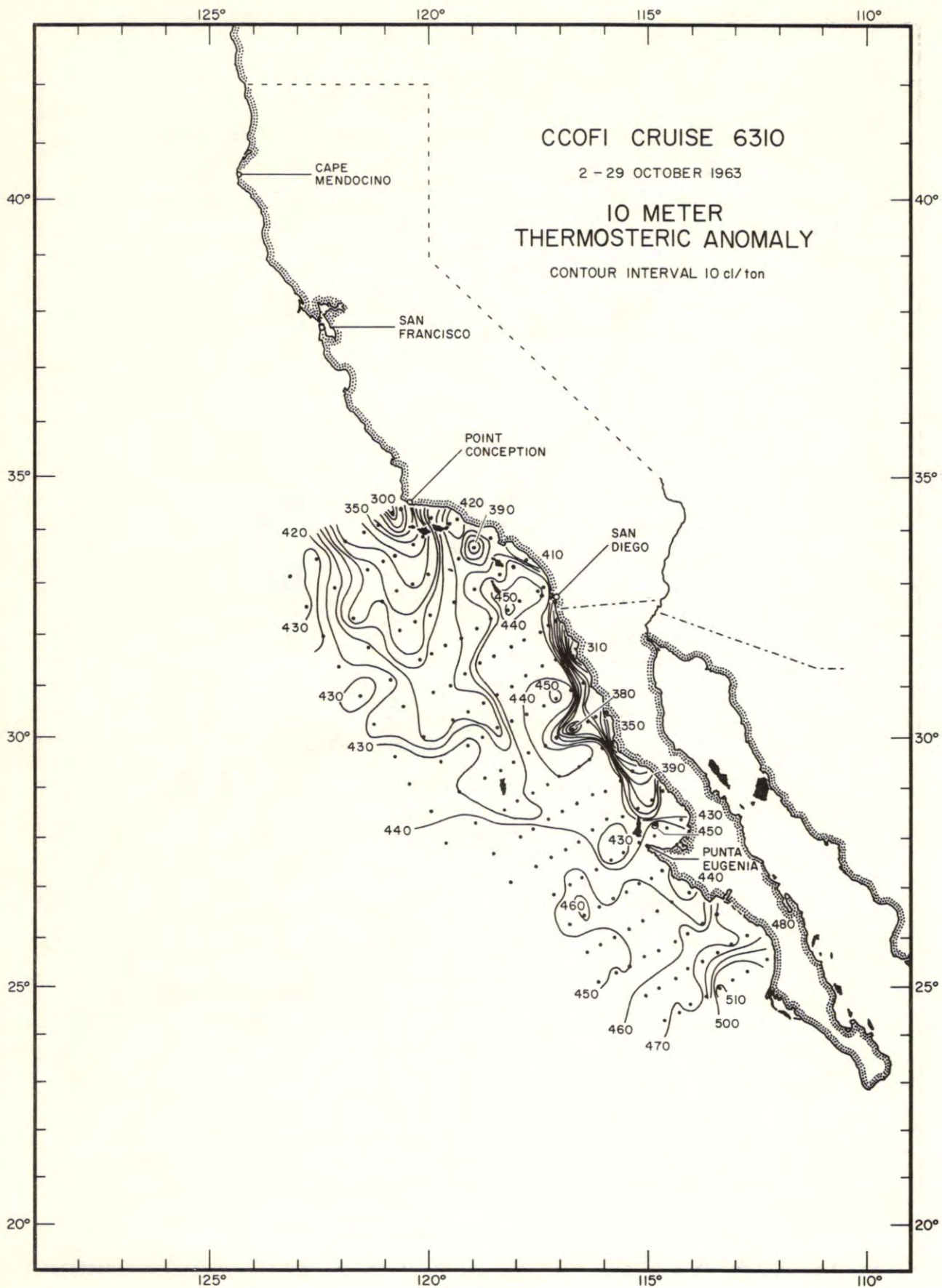


FIGURE 6

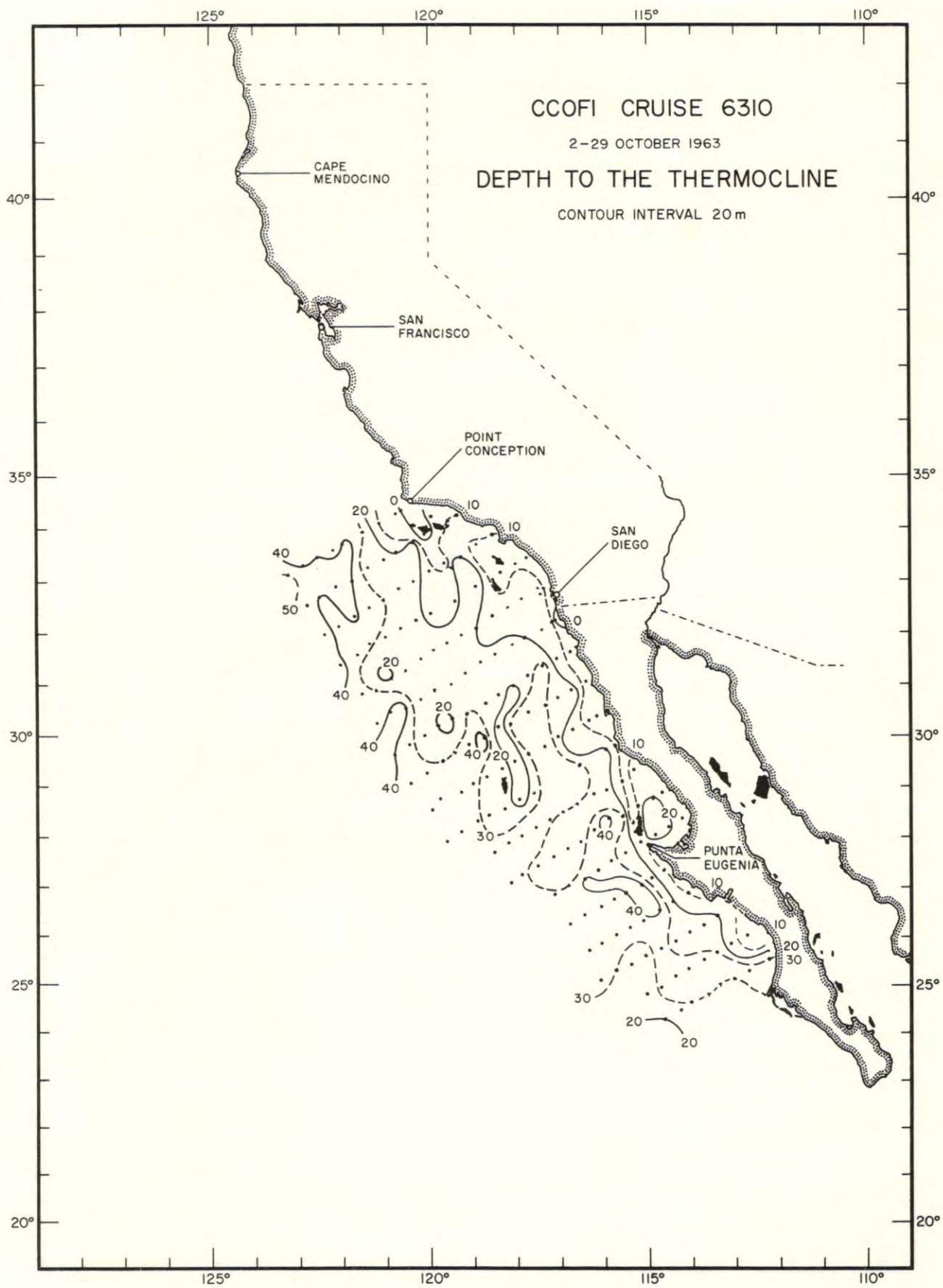


FIGURE 7



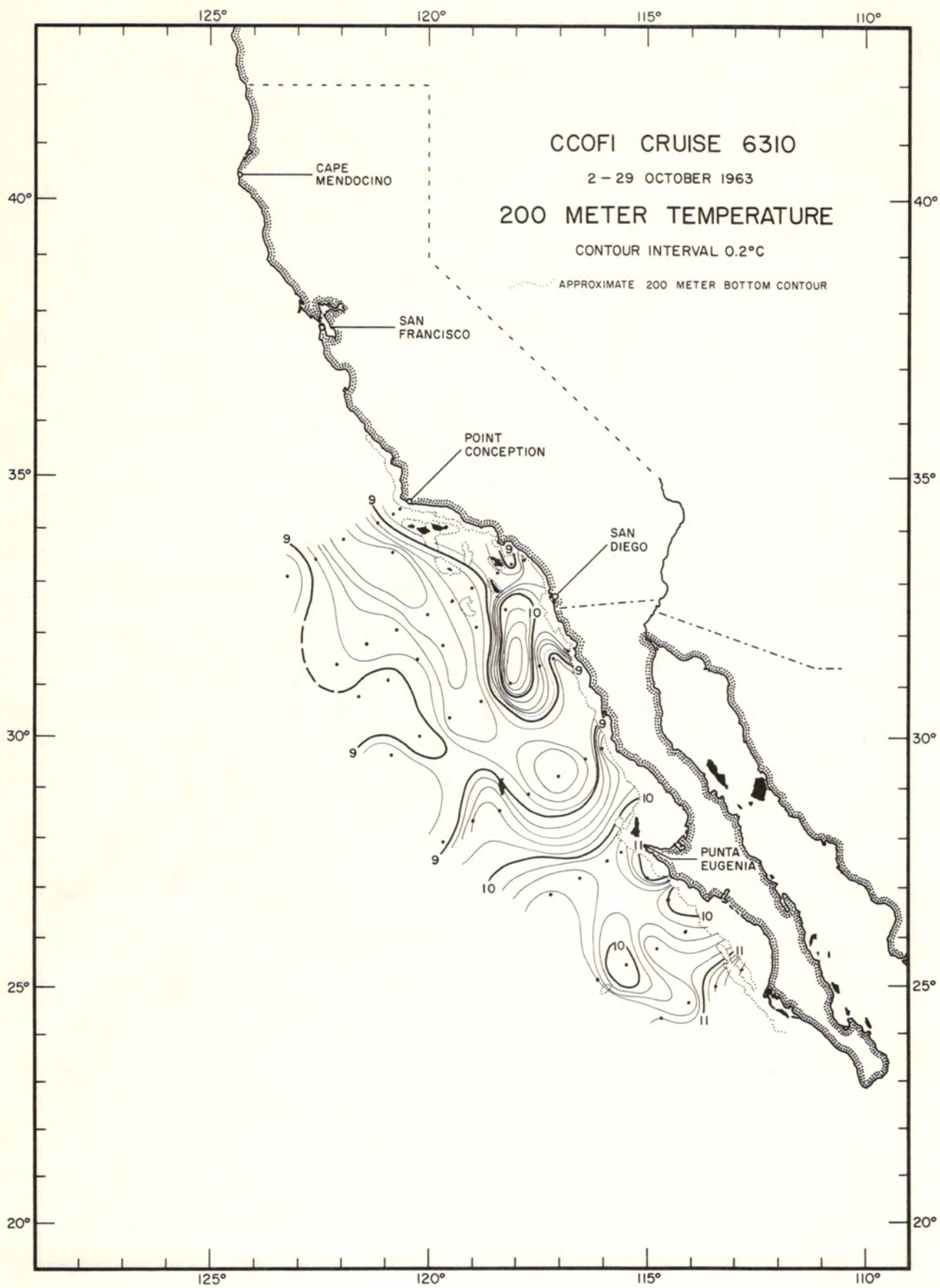


FIGURE 8

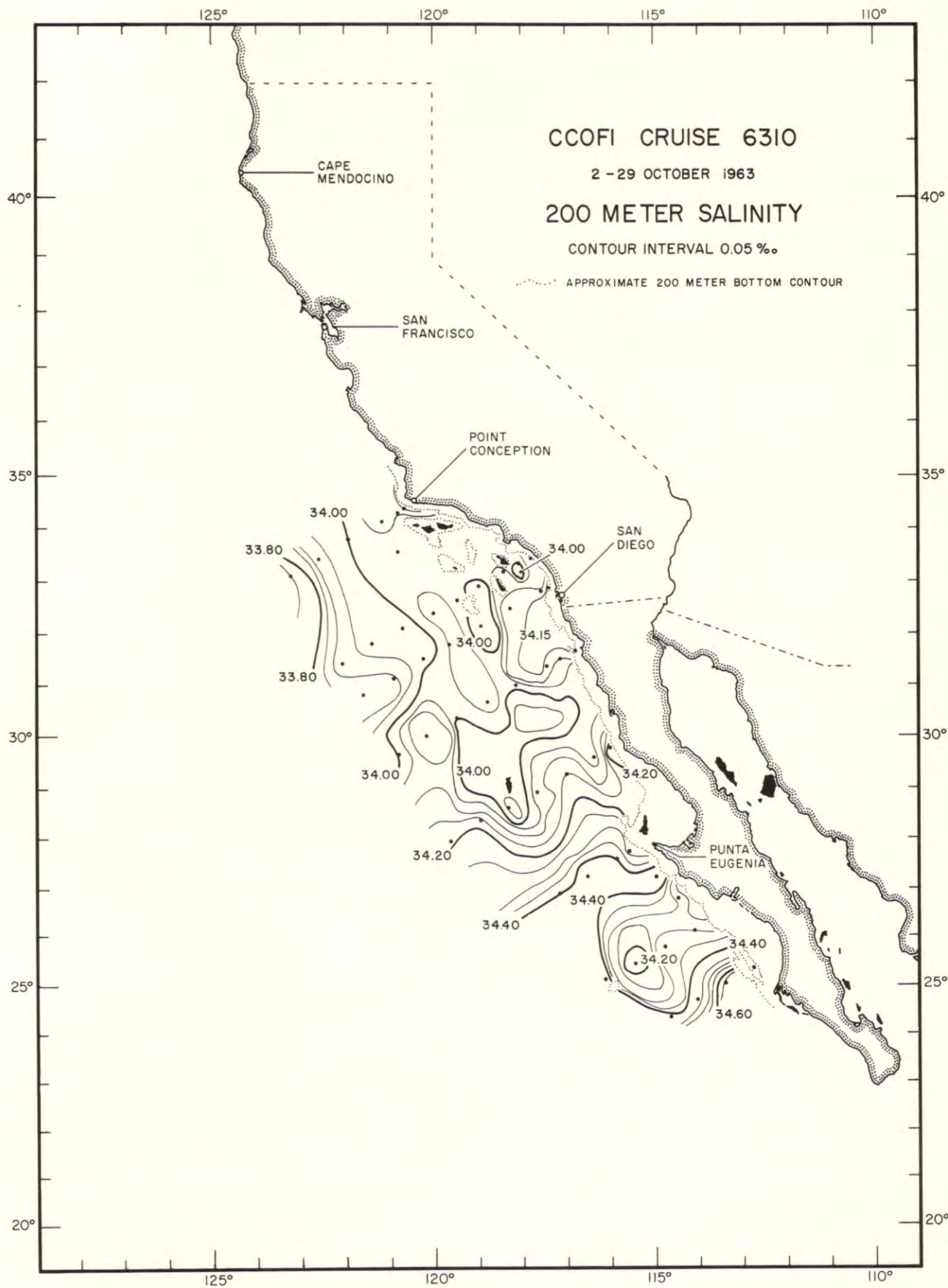


FIGURE 9



PERSONNEL  
Cruise 6310

SHIPS' CAPTAINS

Ferris, Noel L., RV Horizon  
Forster, Charles W., RV Black Douglas  
Newbegin, Robert C., RV Alexander Agassiz

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV Alexander Agassiz

Lawson, Jan B., Senior Marine Technician  
Pine, James S., Senior Marine Technician

RV Black Douglas

Wagner, Vaughn M., Fishery Aid, Bureau of Commercial Fisheries  
Cornelius, Robert C., Marine Technician  
Hart, Joe T., Senior Marine Technician  
Muus, David A., Marine Technician  
Netzley, Ronald L., Marine Technician  
\*Paloma, Peter A., Fisheries Aid, Bureau of Commercial Fisheries  
\*\*Young, Anthony W., Marine Technician

RV Horizon

Brennen, Robert E., Senior Marine Technician  
Burns, William A., Marine Technician

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\*Southern half of cruise  
\*\*Northern half of cruise

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

SIO  
CCOFI  
6310

BLACK DOUGLAS; October 2, 1963; 2239 GCT; 34°24.5'N, 120°36'W; sounding, 153 fm; wind, 320°, force 5;  
weather, cloudy; sea, rough; wire angle, 10°. <sup>a)</sup>

80.52

0	16.46	33.557	6.32	339	0	16.46	33.56	6.32	24.56	339	0.00
10	15.64	33.545	6.50	322	10	15.64	33.54	6.50	24.73	323	0.03
30	12.32	33.533	4.82	258	20	13.10	33.53	5.26	25.26	272	0.06
48	12.09b)	33.612	4.26	248	30	12.32	33.53	4.82	25.41	258	0.09
74	10.76	33.697	3.77	218	50	12.02	33.61	4.19	25.53	247	0.14
97	10.28	33.794	3.29	203	75	10.76	33.70	3.75	25.83	218	0.20
122	10.02	33.849	3.06	195	100	10.26	33.80	3.26	25.99	202	0.25
162	9.58	33.968	2.49	179	125	9.99	33.86	3.01	26.08	194	0.30
200	9.34	34.098	1.84	166	150	9.72	33.92	2.70	26.18	185	0.35
					200	9.34	34.10	1.84	26.38	166	0.44

a) Estimated wire angle.

b) Alternate value, 11.44°C, not used in interpolation.



SIO  
CCOFI  
6310

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

80.55

BLACK DOUGLAS; October 3, 1963; 0037 GCT; 34°18.5'N, 120°48'W; sounding, 415 fm; wind, 320°, force 4; weather, overcast; sea, rough; wire angle, 06°.

0	15.99	33.577	6.76	327	0	15.99	33.58	6.76	24.68	327	0.00
10	14.32	33.538	6.07	296	10	14.32	33.54	6.07	25.01	295	0.03
30	11.36	33.620	4.22	234	20	12.59	33.57	5.09	25.39	260	0.06
39	11.04	33.663	3.99	225	30	11.36	33.62	4.22	25.66	234	0.08
54	10.82	33.702	3.77	219	50	10.87	33.70	3.80	25.81	220	0.13
69	10.70	33.719	3.84	216	75	10.67	33.73	3.83	25.87	214	0.18
94	10.55	33.740	3.51	212	100	10.51	33.75	3.46	25.91	210	0.24
112	10.16	33.819	3.25	199	125	10.03	33.84	3.13	26.06	196	0.29
132	9.98	33.860	3.03	193	150	9.81	33.92	2.75	26.16	186	0.34
152	9.78	33.930	2.70	185	200	9.25	34.05	2.16	26.36	168	0.43
181	9.48	33.980	2.48	177	250	8.86	34.16	1.58	26.50	154	0.51
215	9.10	34.087	1.99	163	300	8.54	34.21	1.29	26.59	145	0.59
244	8.89	34.158	1.63	154	400	7.50	34.24	0.88	26.77	128	0.73
293	8.64	34.209	1.28	147	500	6.47	34.25	0.56	26.92	114	0.86
346	7.78	34.166	1.36	138	600	(5.66)	(34.29)	(0.54)	(27.06)	(101)	(0.97)
427	7.36	34.271	0.65	124							
510	6.38	34.247	0.55	113							
592	5.70	34.289	0.54	102							

80.60

BLACK DOUGLAS; October 3, 1963; 0355 GCT; 34°09'N, 121°09'W; sounding, 1200 fm; wind, 320°, force 5; weather, overcast; sea, rough; wire angle, 25°.

1	16.70	33.562	6.08	344	0	(16.70)	(33.56)	(6.08)	(24.50)	(344)	(0.00)
10	16.65	33.578	6.04	342	10	16.65	33.58	6.04	24.53	342	0.03
28	15.51	33.552	6.18	319	20	16.17	33.57	6.11	24.63	332	0.07
36	14.34	33.474	5.63	301	30	15.28	33.54	6.14	24.81	315	0.10
50	12.20	33.502	4.84	258	50	12.20	33.50	4.84	25.41	258	0.16
63	11.53	33.566	4.28	241	75	10.91	33.66	3.96	25.77	224	0.22
86	10.46	33.729	3.69	211	100	10.03	33.80	3.35	26.03	199	0.27
103	9.97	33.818	3.26	196	125	9.62	33.92	3.00	26.19	183	0.32
122	9.70	33.924	3.01	184	150	9.15	33.95	2.76	26.29	174	0.37
140	9.30	33.907	2.92	179	200	8.85	34.09	2.20	26.45	159	0.45
165	9.01	34.021	2.49	166	250	8.40	34.15	1.76	26.57	148	0.53
196	8.89	34.094	2.19	159	300	7.86	34.18	1.40	26.67	138	0.60
220	8.54	34.094	2.27	154	400	7.13	34.23	0.82	26.82	124	0.74
264	8.31	34.175	1.51	145	500	6.59	34.27	0.60	26.92	114	0.87
311	7.73	34.183	1.36	136							
386	7.21	34.227	0.88	125							
463	6.81	34.257	0.68	118							
543	6.34	34.292	0.50	109							

80.70

BLACK DOUGLAS; October 3, 1963; 0940 GCT; 33°49'N, 121°57'W; sounding, 1950 fm; wind, 320°, force 4; weather, cloudy; sea, rough; wire angle, 13°.

0	17.61	33.610	5.60	361	0	17.61	33.61	5.60	24.32	361	0.00
10	17.60	33.602	5.60	361	10	17.60	33.60	5.60	24.32	362	0.04
29	17.62	33.603	5.63	362	20	17.61	33.60	5.62	24.32	362	0.07
38	16.15	33.423	5.86	342	30	17.62	33.60	5.63	24.31	362	0.11
52	12.82	33.254	5.50	287	50	13.17	33.27	5.56	25.04	293	0.17
67	11.39	33.232	5.08	263	75	10.52	33.27	4.86	25.53	246	0.24
91	9.70	33.427	4.53	221	100	9.46	33.51	4.33	25.90	211	0.30
110	9.26	33.595	4.11	202	125	9.07	33.68	3.74	26.10	193	0.35
129	9.04	33.698	3.64	191	150	8.77	33.85	3.35	26.28	175	0.40
149	8.78	33.845	3.36	176	200	8.11	34.00	3.09	26.49	155	0.48
177	8.41	33.973	3.31	161	250	7.40	34.00	2.65	26.60	145	0.56
209	7.98	34.009	2.99	152	300	6.77	34.04	1.94	26.72	134	0.63
237	7.58	33.999	2.81	147	400	5.94	34.11	0.99	26.88	118	0.76
286	6.94	34.034	2.06	136	500	5.47	34.18	0.68	26.99	107	0.88
338	6.40	34.072	1.48	127	600	(5.10)	(34.26)		(27.10)	(97)	(0.99)
420	5.82	34.128	0.87	115							
504	5.46	34.186	0.67	107							
588	5.13	34.250	0.38	98							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

SIO  
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6310

BLACK DOUGLAS; October 3, 1963; 1525 GCT; 33°28.5'N, 122°32.5'W; sounding, 2050 fm; wind, 330°, force 5; weather, cloudy; sea, rough; wire angle, 16°.

80.80

0	19.18	33.159	5.38	431	0	19.18	33.16	5.38	23.59	431	0.00
10	19.18	33.158	5.43	431	10	19.18	33.16	5.43	23.59	431	0.04
29	19.20	33.156	5.46	432	20	19.20	33.16	5.46	23.59	431	0.09
57	15.59a)	33.169	6.19	349	30	19.20	33.16	5.46	23.59	431	0.13
66	14.65	33.234	6.12	325	50	17.30	33.16	5.96	24.05	387	0.21
84	13.26	33.142	6.14	304	75	14.60	33.23	6.12	24.72	324	0.30
94	12.39	33.224	5.77	282	100	12.02	33.28	5.63	25.27	271	0.38
108	11.60	33.335	5.46	259	125	10.51	33.46	4.92	25.68	232	0.44
131	10.21	33.496	4.75	224	150	9.64	33.66	4.13	25.99	203	0.49
150	9.64	33.662	4.13	203	200	8.73	33.93	3.78	26.34	169	0.59
177	9.02	33.862	4.02	178	250	7.76	34.00	3.17	26.55	150	0.67
204	8.68	33.943	3.73	167	300	6.99	34.03	2.38	26.68	137	0.74
231	8.09	33.982	3.42	156	400	6.16	34.12	1.08	26.86	120	0.88
278	7.30	34.013	2.78	143	500	5.56	34.21	0.56	27.00	106	1.00
328	6.64	34.054	1.82	131							
407	6.12	34.126	1.00	119							
488	5.62	34.193	0.61	108							
570	5.28	34.255	0.37	100							

BLACK DOUGLAS; October 3, 1963; 2103 GCT; 33°08'N, 123°12.5'W; sounding, 2400 fm; wind, 340°, force 5; weather, cloudy; sea, rough; wire angle, 13°.

80.90

0	19.18	33.200	5.25b)	428	0	19.18	33.20	5.25	23.62	428	0.00
10	19.16	33.196	5.41	428	10	19.16	33.20	5.41	23.63	427	0.04
29	19.14	33.204	5.33	427	20	19.15	33.20	5.34	23.63	427	0.09
58	18.08c)	33.218	5.63	400	30	19.13	33.20	5.33	23.64	427	0.13
67	17.32	33.234	5.76	382	50	18.98	33.21	5.37	23.68	422	0.21
82	15.32	33.204	5.96	341	75	15.80	33.21	5.93	24.44	350	0.31
96	14.32	33.252	6.03	317	100	14.00	33.26	5.97	24.86	310	0.39
110	12.97	33.294	5.55	287	125	11.88	33.34	5.16	25.34	264	0.47
134	11.34	33.361	5.00	253	150	10.54	33.46	4.84	25.68	232	0.53
154	10.33	33.484	4.79	227	200	9.28	33.75	4.00	26.12	191	0.64
182	9.65	33.625	4.41	206	250	8.42	34.00	3.06	26.45	159	0.73
211	9.08	33.828	3.73	182	300	7.65	34.04	2.40	26.59	145	0.80
238	8.62	33.977	3.24	164	400	6.48	34.10	1.36	26.80	125	0.94
286	7.86	34.039	2.50	148	500	5.92	34.19	0.66	26.94	112	1.07
338	7.10	34.048	2.11	137	600	(5.50)	(34.29)		(27.08)	(100)	(1.18)
418	6.32	34.114	1.11	122							
500	5.92	34.188	0.66	112							
584	5.55	34.276	0.28	101							

BLACK DOUGLAS; October 4, 1963; 1717 GCT; 33°34'N, 120°45'W; sounding, 700 fm; wind, 220°, force 2; weather, overcast; sea, moderate; wire angle, 09°.

83.60

0	17.46	33.535	5.63	363	0	17.46	33.54	5.63	24.31	363	0.00
10	17.45	33.537	5.63	363	10	17.45	33.54	5.63	24.31	363	0.04
30	13.71	33.163	5.99	311	20	17.25	33.51	5.65	24.33	360	0.07
39	12.66	33.099	5.84	296	30	13.71	33.16	5.99	24.85	311	0.11
54	12.02	33.200	5.54	277	50	12.22	33.16	5.66	25.14	283	0.17
68	11.24	33.424	4.75	247	75	11.16	33.49	4.62	25.59	240	0.23
93	9.78	33.618	4.13	208	100	9.60	33.64	4.07	25.98	204	0.29
111	9.38	33.665	4.01	198	125	9.05	33.77	3.80	26.17	186	0.34
131	8.93	33.818	3.68	180	150	8.80	33.89	3.38	26.30	173	0.38
151	8.79	33.889	3.37	173	200	8.11	34.01	2.48	26.50	154	0.47
179	8.50	33.978	2.77	162	250	7.68	34.11	1.68	26.64	141	0.54
213	7.86	34.037	2.29	148	300	7.30	34.16	1.21	26.74	132	0.61
241	7.74	34.095	1.78	142	400	6.98	34.28	0.62	26.88	118	0.74
290	7.34	34.146	1.33	133	500	6.14	34.32	0.38	27.02	105	0.86
343	7.29	34.254	0.70	124	600	(5.68)	(34.38)	(0.22)	(27.12)	(95)	(0.97)
425	6.83	34.279	0.59	117							
507	6.09	34.321	0.36	104							
591	5.72	34.383	0.22	95							

a) Alternate value, 15.86°C, not used in interpolation.

b) The oxygen samples for this station were run by an inexperienced titrator, and must be considered doubtful.

c) Mean value of 18.02 and 18.14°C.



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

90.28

BLACK DOUGLAS; October 8, 1963; 0955 GCT; 33°28.5'N, 117°46.5'W; sounding, 240 fm; wind, 270°, force 2; weather, partly cloudy; sea, moderate; wire angle, 07°.

0	20.28	33.576	5.57	428	0	20.28	33.58	5.57	23.63	427	0.00
10	19.41	33.546	5.88	408	10	19.41	33.55	5.88	23.83	408	0.04
30	14.86	33.445	6.29	313	20	16.20	33.47	6.28	24.55	340	0.08
49	13.47	33.489	5.65	282	30	14.86	33.44	6.29	24.82	314	0.11
74	11.55	33.575	4.50	241	50	13.42	33.49	5.64	25.16	281	0.17
99	10.56	33.668	4.01	217	75	11.50	33.58	4.48	25.60	240	0.24
123	10.40	33.826	3.14	203	100	10.53	33.67	3.97	25.84	216	0.29
164	9.52	33.891	3.13	184	125	10.33	33.83	3.13	26.00	201	0.35
202	9.57	34.101	1.95	169	150	9.67	33.85	3.13	26.13	189	0.40
251	9.12	34.222	1.32	153	200	9.57	34.09	2.00	26.33	170	0.49
300	8.56	34.278	0.94	141	250	9.14	34.22	1.33	26.51	154	0.57
405	7.36	34.293	0.51	123	300	8.56	34.28	0.94	26.64	140	0.65
					400	7.40	34.29	0.53	26.82	123	0.79

90.32

BLACK DOUGLAS; October 8, 1963; 0733 GCT; 33°21'N, 118°01.5'W; sounding, 400 fm; wind, 280°, force 3; weather, partly cloudy; sea, rough; wire angle, 12°.

0	20.72	33.612	5.42	436	0	20.72	33.61	5.42	23.53	436	0.00
10	20.72	33.605	5.31	437	10	20.72	33.60	5.31	23.53	437	0.04
29	16.76	33.401	5.98	357	20	20.00	33.56	5.46	23.69	422	0.09
38	15.58	33.406	6.09	331	30	16.60	33.40	6.00	24.40	354	0.13
53	13.98	33.436	5.69	296	50	14.30	33.43	5.78	24.93	303	0.19
67	12.60	33.432	5.29	270	75	12.48	33.48	5.18	25.34	264	0.26
92	11.22	33.593	4.37	234	100	10.81	33.63	4.17	25.76	224	0.32
111	10.33	33.683	3.96	212	125	9.96	33.73	3.76	25.99	203	0.38
130	9.86	33.750	3.69	200	150	9.46	33.87	3.27	26.18	184	0.43
150	9.46	33.870	3.27	184	200	8.93	34.00	2.70	26.37	167	0.52
178	9.12	33.938	3.06	174	250	9.12	34.23	1.40	26.52	153	0.60
212	8.84	34.031	2.56	163	300	8.65	34.29	0.94	26.64	141	0.67
240	9.18	34.202	1.64	156	400	7.75	34.30	0.64	26.78	127	0.82
289	8.73	34.288	0.99	142	500	6.72	34.31	0.34	26.93	113	0.94
341	8.30	34.305	0.79	135	600	(5.75)	(34.35)		(27.09)	(98)	(1.06)
421	7.56	34.294	0.59	125							
503	6.68	34.310	0.33	112							
584	5.88	34.347	0.19	100							

90.37

BLACK DOUGLAS; October 8, 1963; 0350 GCT; 33°11'N, 118°22.5'W; sounding, 600 fm; wind, 270°, force 5; weather, partly cloudy; sea, rough; wire angle, 18°.

0	21.02	33.609a)	5.27	444	0	21.02	33.61	5.27	23.45	444	0.00
9	21.02	33.603	5.29	445	10	20.00	33.54	5.50	23.67	423	0.04
28	16.68	33.390	5.97	356	20	18.30	33.46	5.78	24.04	388	0.08
37	15.26	33.347	6.06	329	30	16.45	33.38	5.99	24.42	352	0.12
51	13.60	33.403	5.73	291	50	13.60	33.40	5.73	25.05	292	0.19
65	12.58	33.411	5.39	271	75	12.00	33.48	4.98	25.43	256	0.25
90	11.39	33.576	4.36	238	100	10.92	33.60	4.20	25.72	228	0.32
107	10.90	33.631	4.18	225	125	10.18	33.73	3.64	25.95	206	0.37
126	10.16	33.729	3.63	206	150	9.62	33.83	3.30	26.12	190	0.42
145	9.72	33.813	3.35	193	200	9.26	34.06	2.40	26.36	167	0.51
172	9.29	33.917	3.02	178	250	9.24	34.26	1.21	26.52	152	0.59
205	9.26	34.083	2.24	166	300	8.60	34.27	1.05	26.63	142	0.67
231	9.50	34.264	1.21	156	400	7.67	34.29	0.67	26.79	127	0.81
278	8.76	34.248	1.23	146	500	6.63	34.32	0.34	26.95	111	0.94
331	8.32	34.292	0.83	136							
410	7.58	34.289	0.64	126							
491	6.71	34.311	0.35	113							
573	6.00	34.336	0.24	102							

a) Salinity bottle numbers were not recorded on the data sheet. Since standard handling procedures were used, these salinity values are assumed to be in correct order.



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

S10  
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BLACK DOUGLAS; October 7, 1963; 2315 GCT; 32°54.5'N, 118°55.5'W; sounding, 900 fm; wind, 300°, force 4; weather, partly cloudy; sea, rough; wire angle, 11°.

90.45

0	20.06	33.479	5.41	429	0	20.06	33.48	5.41	23.61	429	0.00
10	20.04	33.478	5.43	429	10	20.04	33.48	5.43	23.61	429	0.04
29	18.62	33.464	5.77	395	20	20.03	33.48	5.43	23.62	428	0.09
38	16.55	33.375	6.04	354	30	18.35	33.46	5.82	24.03	389	0.13
53	14.82	33.326	6.13	321	50	15.55	33.34	6.11	24.59	335	0.20
67	13.67	33.377	5.76	295	75	13.33	33.42	5.62	25.12	285	0.28
92	11.87	33.454	5.07	255	100	11.36	33.50	4.77	25.56	243	0.34
111	10.74	33.560	4.38	228	125	10.19	33.65	4.06	25.89	212	0.40
130	10.06	33.675	3.98	208	150	9.67	33.75	3.69	26.05	197	0.45
150	9.67	33.752	3.69	196	200	8.78	33.99	2.75	26.38	165	0.55
178	9.07	33.916	3.07	175	250	8.24	34.08	2.05	26.54	151	0.63
213	8.64	34.026	2.59	160	300	7.87	34.17	1.44	26.66	139	0.70
241	8.31	34.067	2.16	153	400	7.22	34.26	0.76	26.83	123	0.84
289	7.94	34.143	1.58	142	500	6.48	34.32	0.37	26.97	109	0.96
341	7.62	34.247	1.03	129	600	(5.83)	(34.35)		(27.08)	(99)	(1.07)
422	7.05	34.266	0.66	120							
504	6.46	34.323	0.35	109							
588	5.90	34.345	0.25	100							

BLACK DOUGLAS; October 7, 1963; 1900 GCT; 32°38'N, 119°26.5'W; sounding, 650 fm; wind, 330°, force 5; weather, partly cloudy; sea, rough; wire angle, 17°.

90.53

1	19.45	33.538	5.49	410	0	(19.45)	(33.54)	(5.49)	(23.81)	(410)	(0.00)
11	19.44	33.537	5.34	410	10	19.44	33.54	5.35	23.82	410	0.04
30	16.94	33.546	6.18	351	20	19.10	33.54	5.47	23.90	401	0.08
38	15.16	33.516	5.77	314	30	16.94	33.55	6.18	24.44	350	0.12
52	13.52	33.494	5.39	283	50	13.90	33.50	5.50	25.07	290	0.18
67	12.12	33.513	4.80	255	75	11.52	33.55	4.49	25.57	242	0.25
91	10.48	33.629	4.01	219	100	10.15	33.68	3.88	25.92	209	0.31
108	9.92	33.726	3.75	202	125	9.76	33.77	3.60	26.05	197	0.36
128	9.74	33.772	3.57	196	150	9.40	33.87	3.24	26.19	184	0.41
146	9.49	33.851	3.31	186	200	8.56	34.02	2.41	26.44	160	0.49
173	8.99	33.949	2.88	171	250	8.04	34.14	1.55	26.61	143	0.57
206	8.46	34.040	2.30	157	300	7.74	34.21	1.03	26.71	134	0.64
233	8.14	34.120	1.77	146	400	7.23	34.28	0.54	26.84	122	0.78
280	7.88	34.184	1.19	138	500	6.51	34.31	0.37	26.96	110	0.90
331	7.56	34.243	0.80	129							
409	7.18	34.289	0.49	120							
489	6.59	34.306	0.38	111							
569	5.92	34.324	0.27	102							

BLACK DOUGLAS; October 7, 1963; 1511 GCT; 32°24.5'N, 119°57.5'W; sounding, 525 fm; wind, 330°, force 5; weather, partly cloudy; sea, rough; wire angle, 13°.

90.60

0	19.00	33.593	5.35	395	0	19.00	33.59	5.35	23.97	395	0.00
10	19.00	33.591	5.45	395	10	19.00	33.59	5.45	23.97	395	0.04
30	17.28	33.534	5.90	359	20	18.62	33.59	5.60	24.06	386	0.08
38	14.69	33.394	5.85	314	30	17.28	33.53	5.90	24.34	359	0.12
53	12.66	33.321	5.37	279	50	12.98	33.33	5.47	25.12	285	0.18
67	11.30	33.453	4.62	245	75	11.00	33.50	4.44	25.63	237	0.25
91	10.20	33.592	4.09	217	100	9.95	33.66	3.88	25.94	208	0.30
112	9.68	33.735	3.60	198	125	9.43	33.82	3.35	26.15	188	0.35
131	9.32	33.844	3.23	184	150	8.86	33.94	2.96	26.33	170	0.40
151	8.84	33.946	2.95	169	200	8.24	34.06	2.22	26.52	152	0.48
178	8.38	34.015	2.62	157	250	7.41	34.06	2.09	26.64	141	0.55
212	8.18	34.074	2.02	150	300	7.04	34.12	1.38	26.74	131	0.62
240	7.56	34.058	2.17	143	400	6.51	34.23	0.62	26.90	116	0.75
288	7.10	34.110	1.50	133	500	6.04	34.31	0.32	27.02	104	0.87
340	6.80	34.167	0.96	125	600	(5.56)	(34.35)	(0.24)	(27.12)	(96)	(0.98)
421	6.42	34.245	0.52	114							
504	6.02	34.312	0.30	104							
590	5.60	34.347	0.24	96							



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OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

90.70 BLACK DOUGLAS; October 7, 1963; 0914 GCT; 32°07'N, 120°39'W; sounding, 2000 fm; wind, 340°, force 4; weather, partly cloudy; sea, moderate; wire angle, 06°.

0	18.54	33.600	5.49	384	0	18.54	33.60	5.49	24.09	384	0.00
10	18.55	33.604	5.51	383	10	18.55	33.60	5.51	24.09	384	0.04
30	17.52	33.449	5.76	371	20	18.54	33.60	5.52	24.09	384	0.08
39	15.27a)	33.307	6.21	332	30	17.52	33.45	5.76	24.22	371	0.11
54	14.18	33.286	5.91	311	50	14.44	33.29	6.00	24.80	316	0.18
69	12.86	33.242	5.61	289	75	12.49	33.26	5.50	25.17	281	0.26
94	11.55	33.348	5.04	258	100	11.15	33.41	4.83	25.53	246	0.32
113	10.33	33.561	4.24	221	125	10.15	33.61	4.02	25.86	215	0.38
134	10.01	33.669	3.76	208	150	9.38	33.82	3.27	26.15	187	0.43
154	9.30	33.839	3.23	184	200	8.64	33.98	2.96	26.40	164	0.52
182	8.86	33.932	3.10	171	250	7.77	34.02	2.54	26.56	148	0.60
216	8.42	34.002	2.84	159	300	7.04	34.05	1.93	26.69	136	0.68
245	7.89	34.021	2.62	150	400	6.27	34.20	0.78	26.91	115	0.81
294	7.11	34.048	2.01	137	500	5.75	34.27	0.39	27.03	104	0.92
348	6.50	34.101	1.32	126	600	(5.35)	(34.34)	(0.27)	(27.13)	(94)	(1.03)
430	6.16	34.246	0.49	111							
514	5.69	34.275	0.36	103							
599	5.36	34.335	0.27	95							

90.80 BLACK DOUGLAS; October 7, 1963; 0337 GCT; 31°46'N, 122°22'W; sounding, 2000 fm; wind, 340°, force 4; weather, partly cloudy; sea, rough; wire angle, 03°.

0	18.96	33.327	5.51	413	0	18.96	33.33	5.51	23.78	413	0.00
10	18.96	33.326	5.41	413	10	18.96	33.33	5.41	23.78	413	0.04
30	18.75	33.313	5.59	409	20	18.94	33.33	5.42	23.78	413	0.08
39	16.85	33.328	6.16	364	30	18.75	33.31	5.59	23.81	410	0.12
54	15.36	33.361	6.01	330	50	15.98	33.35	6.07	24.50	344	0.20
69	13.18	33.287	5.80	292	75	12.35	33.29	5.60	25.22	276	0.28
94	11.29	33.336	5.22	254	100	11.07	33.34	5.12	25.49	250	0.34
113	10.41	33.477	4.59	229	125	9.98	33.52	4.37	25.82	219	0.40
133	9.74	33.539	4.26	213	150	9.42	33.79	3.37	26.12	190	0.45
153	9.36	33.817	3.23	187	200	8.68	33.97	3.02	26.38	165	0.54
182	8.96	33.917	3.02	173	250	7.85	34.03	2.60	26.56	149	0.63
217	8.44	34.008	3.02	159	300	7.21	34.06	2.03	26.67	138	0.70
245	7.94	34.030	2.66	150	400	6.25	34.14	1.11	26.86	120	0.83
296	7.26	34.054	2.11	139	500	5.63	34.21	0.65	27.00	107	0.95
349	6.66	34.119	1.27	126	600	5.12	34.28	0.30	27.11	96	1.06
432	6.04	34.157	1.06	116							
516	5.54	34.223	0.51	105							
600	5.12	34.279	0.30	96							

90.90 BLACK DOUGLAS; October 6, 1963; 2217 GCT; 31°24.5'N, 122°01'W; sounding, 2100 fm; wind, 360°, force 4; weather, partly cloudy; sea, moderate; wire angle, 14°.

0	20.10	33.447	5.19	433	0	20.10	33.45	5.19	23.58	432	0.00
10	19.84	33.447	5.18	426	10	19.84	33.45	5.18	23.64	426	0.04
29	19.78	33.501	5.41	421	20	19.80	33.48	5.32	23.68	423	0.09
57	15.40	33.306	6.33	335	30	19.77	33.50	5.42	23.70	421	0.13
67	14.52	33.284	6.23	318	50	17.33	33.38	5.95	24.21	371	0.21
81	12.82	33.359	5.51	280	75	13.48	33.32	5.81	25.02	295	0.29
95	11.94	33.406	5.12	260	100	11.73	33.43	4.98	25.44	255	0.36
109	11.44	33.479	4.74	246	125	10.74	33.57	4.39	25.73	227	0.42
133	10.44	33.605	4.23	220	150	9.97	33.67	3.94	25.94	207	0.48
152	9.93	33.678	3.89	206	200	8.86	33.92	3.13	26.32	172	0.57
180	9.20	33.839	3.42	183	250	7.97	34.02	2.83	26.53	151	0.66
207	8.76	33.935	3.06	169	300	7.35	34.07	2.04	26.66	139	0.73
235	8.21	34.001	3.02	156	400	6.26	34.14	1.08	26.86	120	0.86
282	7.51	34.042	2.28	143	500	5.92	34.28	0.46	27.02	105	0.98
334	7.14	34.128	1.67	132							
414	6.10	34.146	0.98	117							
496	5.94	34.279	0.48	106							
579	5.54	34.324	0.26	97							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

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BLACK DOUGLAS; October 8, 1963; 1748 GCT; 32°55'N, 117°22'W; sounding, 250 fm; wind, 280°, force 2; weather, partly cloudy; sea, moderate; wire angle, 04°.

93.28

0	21.24	33.598	5.58	451	0	21.24	33.60	5.58	23.39	451	0.00
10	20.67	33.589	5.68	437	10	20.67	33.59	5.68	23.53	437	0.04
30	15.16	33.488	6.12	316	20	18.70	33.56	5.93	24.02	390	0.09
49	13.82	33.452	5.60	292	30	15.16	33.49	6.12	24.79	316	0.12
74	11.88	33.537	4.54	249	50	13.70	33.45	5.54	25.07	290	0.18
98	11.15	33.742	3.35	222	75	11.82	33.54	4.47	25.51	248	0.25
123	10.68	33.891	2.55	203	100	11.13	33.75	3.30	25.80	221	0.31
163	9.92	34.004	2.18	182	125	10.62	33.90	2.53	26.01	201	0.36
201	9.59	34.155	1.78	165	150	10.16	33.97	2.28	26.14	188	0.41
250	9.21	34.264	1.20	151	200	9.60	34.15	1.80	26.38	166	0.50
299	8.62	34.278	0.98	141	250	9.21	34.26	1.20	26.53	152	0.58
					300	(8.61)	(34.28)	(0.97)	(26.64)	(141)	(0.66)

BLACK DOUGLAS; October 8, 1963; 1929 GCT; 32°50.5'N, 117°31.5'W; sounding, 450 fm; wind, 290°, force 3; weather, partly cloudy; sea, moderate; wire angle, 12°.

93.30

0	21.24	33.613	5.38	450	0	21.24	33.61	5.38	23.39	450	0.00
10	20.86	33.599	5.52	441	10	20.86	33.60	5.52	23.49	441	0.04
29	15.78	33.501	6.17	329	20	18.30	33.54	6.02	24.10	382	0.09
38	14.18	33.479	5.96	297	30	15.55	33.50	6.14	24.72	324	0.12
48	13.47	33.485	5.47	283	50	13.35	33.49	5.38	25.17	280	0.18
62	12.68	33.541	4.73	264	75	12.04	33.58	4.30	25.50	249	0.25
77	11.98	33.590	4.25	247	100	11.55	33.78	3.32	25.75	226	0.31
96	11.55	33.745	3.42	228	125	10.75	33.84	2.84	25.94	208	0.36
120	10.94	33.833	2.85	211	150	10.14	33.90	2.74	26.09	193	0.41
140	10.30	33.861	2.84	199	200	9.69	34.08	2.00	26.31	172	0.51
168	9.93	33.973	2.41	184	250	9.11	34.23	1.35	26.52	152	0.59
197	9.72	34.073	2.05	173	300	8.58	34.28	0.93	26.64	141	0.67
225	9.37	34.180	1.62	160	400	7.32	34.31	0.50	26.85	121	0.80
263	8.99	34.250	1.21	149	500	6.35	34.33	0.27	27.00	107	0.92
320	8.33	34.298	0.79a)	136							
390	7.45	34.311	0.53a)	122							
462	6.68	34.325	0.33	111							
540	6.04	34.336	0.22	102							

BLACK DOUGLAS; October 9, 1963; 0107 GCT; 32°30'N, 118°11.5'W; sounding, 940 fm; wind, 350°, force 5; weather, cloudy; sea, rough; wire angle, 22°.

93.40

1	21.39	33.636	5.43	452	0	(21.39)	(33.64)	(5.43)	(23.38)	(452)	(0.00)
10	21.38	33.642	5.40	451	10	21.38	33.64	5.40	23.38	451	0.05
29	15.29	33.490	6.17	319	20	20.10	33.63	5.61	23.71	419	0.09
37	14.09	33.442	5.96	298	30	15.10	33.48	6.16	24.80	316	0.13
51	13.42	33.518	5.30	279	50	13.42	33.52	5.30	25.18	279	0.19
65	12.24	33.616	4.49	250	75	11.82	33.66	4.06	25.60	239	0.25
88	11.52	33.706	3.65	231	100	11.36	33.76	3.34	25.77	224	0.31
107	11.22	33.777	3.21	220	125	10.72	33.81	3.12	25.92	209	0.36
124	10.73	33.810	3.13	209	150	10.33	33.89	2.75	26.05	197	0.42
144	10.41	33.866	2.84	200	200	10.10	34.12	1.68	26.27	176	0.51
171	10.10	33.966	2.55	187	250	9.50	34.22	1.52	26.45	159	0.60
203	10.10	34.145	1.59	174	300	8.74	34.25	1.35	26.59	145	0.68
229	9.91	34.213	1.50	166	400	7.47	34.27	0.79	26.80	126	0.82
276	9.04	34.221	1.54	152	500	6.33	34.30	0.39	26.98	109	0.94
327	8.42	34.277	1.04	139							
404	7.43	34.273	0.77	125							
485	6.46	34.293	0.44	111							
567	6.04	34.339	0.30	102							

a) Oxygen samples at 320 and 390 meters appear to have been reversed; they are assumed to be listed in correct order.



SIO		OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
CCOFI	Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD	
6310	m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m	

93.50 BLACK DOUGLAS; October 9, 1963; 0657, 0713 GCT; 32°09'N, 118°54.5'W; sounding, 750 fm; wind, 300°, force 5; weather, partly cloudy; sea, rough; wire angle, 14°, 15°.

1	19.98	33.569	5.34	421	0	(19.98)	(33.57)	(5.34)	(23.70)	(421)	(0.00)
11	19.96	33.582	5.37	419	10	19.96	33.58	5.37	23.71	419	0.04
34	17.64	33.493	5.89	370	20	19.90	33.58	5.39	23.73	418	0.08
44	15.16	33.444	6.16	320	30	18.50	33.52	5.71	24.04	388	0.12
58	13.36	33.415	5.51	286	50	14.17	33.43	5.83	24.96	301	0.19
					75	12.16	33.42	5.04	25.35	263	0.26
73	12.16	33.418	5.04	263	100	10.75	33.56	4.25	25.72	228	0.33
95	10.94	33.525	4.38	234	125	9.87	33.74	3.60	26.01	201	0.38
115	10.26	33.655	3.88	213	150	9.18	33.88	3.40	26.23	179	0.43
134	9.58	33.802	3.45	191	200	8.63	33.99	3.01	26.41	163	0.52
162	8.97	33.914	3.38	174	250	7.80	34.05	2.40	26.58	147	0.60
192	8.70	33.967	3.10	166	300	7.32	34.14	1.57	26.72	133	0.67
230	8.22	34.024	2.69	154	400	6.59	34.23	0.75	26.89	117	0.80
259	7.60	34.066	2.28	143	500	6.24	34.34	0.30	27.02	105	0.92
307	7.29	34.147	1.44	132	600	5.60	34.36	0.30	27.12	95	1.02
370	6.70	34.183	0.96	122							
467	6.42	34.326	0.36	108							
553	5.90	34.343	0.28	100							
627	5.46	34.373	0.32	93							

93.60 BLACK DOUGLAS; October 9, 1963; 1312 GCT; 31°49'N, 119°38'W; sounding, 1700 fm; wind, 320°, force 5; weather, cloudy; sea, rough; wire angle, 09°.

0	19.66	33.629	5.38	408	0	19.66	33.63	5.38	23.83	408	0.00
10	19.66	33.637	5.40	408	10	19.66	33.64	5.40	23.83	408	0.04
30	17.20	33.545	6.11	357	20	19.66	33.64	5.40	23.83	408	0.08
38	13.34	33.429	5.74	284	30	17.20	33.54	6.11	24.37	357	0.12
53	12.14	33.425	5.05	262	50	12.32	33.42	5.18	25.32	266	0.18
68	11.44	33.480	4.63	246	75	11.20	33.51	4.46	25.60	240	0.25
93	10.65	33.601	4.06	224	100	10.34	33.66	3.82	25.87	214	0.30
111	9.90	33.745	3.48	201	125	9.70	33.80	3.27	26.09	193	0.35
131	9.62	33.819	3.19	191	150	9.19	33.92	2.90	26.26	177	0.40
151	9.16	33.920	2.89	176	200	8.30	34.05	2.30	26.50	154	0.49
180	8.63	34.014	2.49	161	250	7.84	34.11	1.76	26.62	143	0.56
214	8.08	34.068	2.16	149	300	7.04	34.11	1.53	26.73	132	0.63
242	7.95	34.112	1.80	144	400	6.50	34.23	0.60	26.90	116	0.76
290	7.10	34.103	1.60	133	500	6.13	34.31	0.34	27.01	105	0.88
344	6.90	34.177	0.98	125	600	(5.52)	(34.35)	(0.24)	(27.12)	(95)	(0.99)
425	6.34	34.251	0.49	112							
507	6.10	34.316	0.32	105							
591	5.58	34.343	0.25	96							

93.70 BLACK DOUGLAS; October 9, 1963; 1824 GCT; 31°30.5'N, 120°12.5'W; sounding, 2000 fm; wind, 330°, force 4; weather, partly cloudy; sea, rough; wire angle, 12°.

0	18.92	33.581	5.47	394	0	18.92	33.58	5.47	23.98	394	0.00
10	18.82	33.585	5.43	391	10	18.82	33.58	5.43	24.00	392	0.04
29	18.59	33.585	5.50	386	20	18.72	33.59	5.46	24.04	389	0.08
38	15.86	33.412	6.19	337	30	18.50	33.58	5.53	24.08	384	0.12
52	15.06	33.376	6.16	323	50	15.22	33.39	6.18	24.70	325	0.19
67	13.24	33.274	5.48	294	75	11.75	33.33	5.09	25.36	262	0.26
92	10.66	33.381	4.76	240	100	10.61	33.48	4.43	25.68	232	0.32
111	10.54	33.617	4.00	220	125	10.10	33.70	3.67	25.94	207	0.38
130	9.94	33.736	3.54	202	150	9.47	33.85	3.09	26.16	186	0.43
149	9.48	33.846	3.10	187	200	8.76	33.99	2.61	26.39	165	0.52
177	9.10	33.933	2.82	174	250	8.00	34.08	2.08	26.57	147	0.60
210	8.60	34.013	2.52	161	300	7.29	34.10	1.70	26.69	136	0.67
237	8.23	34.068	2.18	151	400	6.52	34.20	0.72	26.88	119	0.80
285	7.40	34.084	1.86	139	500	5.99	34.28	0.36	27.01	106	0.92
336	7.06	34.140	1.18	130	600	(5.50)	(34.36)		(27.13)	(94)	(1.03)
415	6.41	34.208	0.65	117							
498	6.00	34.276	0.37	106							
581	5.60	34.344	0.26	97							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

SIO  
CCOFI  
6310BLACK DOUGLAS; October 9, 1963; 2328 GCT; 31°09'N, 120°53'W; sounding, 2100 fm; wind, 340°, force 4;  
weather, partly cloudy; sea, moderate; wire angle, 06°.

93.80

0	20.18	33.485	5.32	432	0	20.18	33.48	5.32	23.58	432	0.00
10	20.08	33.548	5.31	425	10	20.08	33.55	5.31	23.66	425	0.04
30	17.82	33.327	5.90	387	20	19.98	33.54	5.32	23.68	423	0.09
39	16.70	33.271	5.97	365	30	17.82	33.33	5.90	24.06	386	0.13
54	15.61	33.333	5.97	337	50	15.90	33.32	5.97	24.50	344	0.20
69	14.90	33.329	5.89	323	75	14.38	33.33	5.75	24.84	312	0.28
94	12.60	33.332	5.39	278	100	12.58	33.37	5.33	25.23	274	0.36
114	12.08	33.606	5.17	248	125	11.99	33.61	5.11	25.53	246	0.42
134	10.56	33.551	4.32	226	150	10.17	33.64	4.13	25.88	213	0.48
153	10.10	33.652	4.10	211	200	9.09	33.88		26.25	178	0.58
182	9.38	33.828	3.31	186	250	8.23	34.01	3.00	26.48	156	0.66
216	8.85	33.579u	3.27u		300	7.61	34.04	2.50	26.60	145	0.74
244	8.32	34.011	3.06	157	400	6.65	34.15	1.09	26.82	124	0.88
292	7.72	34.035	2.60	147	500	5.90	34.22	0.57	26.97	109	1.00
345	7.00	34.075	1.84	134	600	(5.20)	(34.29)		(27.11)	(96)	(1.11)
426	6.48	34.174	0.81	120							
509	5.84	34.229	0.55	108							
591	5.24	34.281	0.34	97							

BLACK DOUGLAS; October 10, 1963; 0416 GCT; 30°50.5'N, 121°35'W; sounding, 2250 fm; wind, 300°, force 3;  
weather, partly cloudy; sea, moderate; wire angle, 03°.

93.90

0	20.14	33.413	5.35	436	0	20.14	33.41	5.35	23.53	436	0.00
10	19.98	33.412	5.37	432	10	19.98	33.41	5.37	23.58	432	0.04
30	19.70	33.405	5.53	426	20	19.85	33.41	5.45	23.61	429	0.09
59	15.87	33.538	6.03	328	30	19.70	33.40	5.53	23.64	426	0.13
69	15.40	33.575	5.90	315	50	16.31	33.53	6.03	24.57	338	0.21
84	14.81	33.621	5.74	299	75	15.32	33.60	5.86	24.84	312	0.29
98	14.06	33.573	5.65	288	100	13.70	33.54	5.60	25.14	283	0.36
113	12.31	33.502	5.33	260	125	11.69	33.51	5.14	25.51	248	0.43
138	10.84	33.531	4.87	232	150	10.22	33.59	4.72	25.84	217	0.49
158	9.90	33.636	4.67	209	200	9.08	33.88		26.25	178	0.59
187	9.34	33.816	3.64	187	250	8.24	34.02	2.72	26.49	155	0.67
217	8.78	33.554u	3.03u		300	7.39	34.05	2.20	26.64	141	0.75
246	8.31	34.011	2.77	157	400	6.54	34.13	1.26	26.82	124	0.89
295	7.46	34.044	2.28	142	500	5.73	34.19	0.65	26.97	110	1.01
349	6.86	34.087	1.56	131	600	(5.22)	(34.29)	(0.34)	(27.11)	(96)	(1.12)
431	6.34	34.147	1.13	120							
514	5.62	34.199	0.55	108							
596	5.24	34.287	0.35	97							

BLACK DOUGLAS; October 2, 1963; 0007 GCT; 32°45.5'N, 117°25.5'W; sounding, 220 fm; wind, 270°, force 1;  
weather, cloudy; sea, slight; wire angle, 00°. <sup>a)</sup>

94.30

0	22.57	33.527	5.34	491							
10	20.66	33.545	5.94	440							
20	17.56	33.526	6.19	366							
30	15.32	33.400	6.20	326							
39	14.61	33.489	6.00	305							
49	13.72	33.561	5.18	282							
59	13.08	33.628	4.51	265							
69	12.37	33.669	4.10	249							
79	11.98	33.713	3.69	238							
89	11.68	33.742	3.50	231							
98	11.65	33.751	3.51	230							
108	11.46	33.772	3.28	225							
118	11.26	33.800	3.15	219							
128	10.89	33.821	3.21	211							
138	10.50	-	-								
148	10.40	-	-								
158	10.22	33.903	2.62	194							
167	10.06	33.956	2.46	188							

a) Shakedown station.



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

100.30 BLACK DOUGLAS; October 12, 1963; 1840 GCT; 31°40.5'N, 116°46.5'W; sounding, 242 fm; wind, 300°, force 2; weather, clear; sea, moderate; wire angle, 08°.

0	17.33	33.583	5.58	357	0	17.33	33.58	5.58	24.37	357	0.00
10	15.00	33.512	5.90	311	10	15.00	33.51	5.90	24.84	311	0.03
30	13.38	33.596	4.80	273	20	14.50	33.56	5.65	24.99	298	0.06
49	12.64	33.680	4.05	253	30	13.38	33.60	4.80	25.25	273	0.09
73	12.07	33.748	3.61	237	50	12.58	33.69	4.00	25.48	251	0.15
97	11.34	33.829	2.92	218	75	12.03	33.76	3.57	25.64	236	0.21
122	10.79	33.931	2.58	201	100	11.27	33.84	2.86	25.84	216	0.26
161	10.22	34.043	2.19	184	125	10.73	33.94	2.54	26.02	200	0.32
200	9.90	34.181	1.61	168	150	10.36	34.02	2.30	26.15	188	0.37
249	9.28	34.248	1.38	154	200	9.90	34.18	1.61	26.35	168	0.46
297	8.90	34.288	1.03	145	250	9.27	34.25	1.37	26.51	153	0.54
					300	(8.88)	(34.29)	(1.02)	(26.60)	(144)	(0.62)

100.35 BLACK DOUGLAS; October 13, 1963; 0931 GCT; 31°31'N, 117°07'W; sounding, 600 fm; wind, 280°, force 2; weather, clear; sea, moderate; wire angle, 02°.

0	20.58	33.574	5.30	436	0	20.58	33.57	5.30	23.54	436	0.00
10	20.58	33.574	5.30	436	10	20.58	33.57	5.30	23.54	436	0.04
30	19.18	33.519	5.63	405	20	20.50	33.57	5.31	23.56	434	0.09
39	16.76	33.454	6.07	353	30	19.18	33.52	5.63	23.87	405	0.13
49	15.67	33.440	6.10	331	50	15.10	33.43	6.06	24.76	319	0.20
64	13.88	33.418	5.85	296	75	12.84	33.44	5.50	25.24	274	0.28
78	12.60	33.452	5.40	269	100	11.15	33.54	4.70	25.63	236	0.34
98	11.24	33.525	4.76	239	125	10.26	33.72	3.85	25.93	208	0.40
122	10.33	33.695	3.96	211	150	9.67	33.92	3.05	26.18	184	0.45
142	9.84	33.862	3.23	191	200	8.79	34.08	2.44	26.45	159	0.53
170	9.23	34.007	2.76	171	250	8.57	34.21	1.44	26.59	146	0.61
200	8.79	34.084	2.44	158	300	8.30	34.29	0.91	26.69	136	0.69
228	8.54	34.139	1.93	151	400	7.30	34.32	0.49	26.86	120	0.82
268	8.58	34.262	1.21	142	500	6.44	34.34	0.31	27.00	107	0.94
327	8.01	34.301	0.79	131							
400	7.30	34.322	0.49	120							
473	6.60	34.332	0.36	110							
552	6.22	34.352	0.26	103							

100.40 BLACK DOUGLAS; October 13, 1963; 1247 GCT; 31°22'N, 117°25.5'W; sounding, 1000 fm; wind, 320°, force 2; weather, clear; sea, moderate; wire angle, 06°.

0	20.48	33.565	5.28	434	0	20.48	33.56	5.28	23.56	434	0.00
10	20.48	33.561	5.27	434	10	20.48	33.56	5.27	23.56	434	0.04
30	20.49	33.554	5.30	435	20	20.48	33.56	5.28	23.56	434	0.09
39	19.02	33.543	5.70	399	30	20.49	33.55	5.30	23.55	435	0.13
49	17.12	33.563	5.88	353	50	16.90	33.57	5.87	24.46	348	0.21
64	15.14	33.589	5.44	309	75	14.37	33.60	5.24	25.05	292	0.29
79	13.66	33.615	5.00	277	100	11.93	33.71	3.89	25.62	238	0.36
98	11.96	33.703	3.92	239	125	11.03	33.82	3.20	25.87	214	0.41
123	11.08	33.809	3.26	215	150	10.62	33.98	2.49	26.07	195	0.47
143	10.74	33.935	2.64	200	200	9.47	34.14	2.02	26.39	165	0.56
171	10.19	34.075	2.15	181	250	8.80	34.21	1.56	26.55	149	0.64
201	9.46	34.144	2.01	164	300	8.24	34.28	1.00	26.69	136	0.71
230	9.06	34.183	1.79	155	400	7.19	34.32	0.57	26.88	118	0.84
270	8.57	34.230	1.31	144	500	6.37	34.32	0.31	26.99	108	0.96
328	7.95	34.310	0.76	129							
402	7.17	34.326	0.56	118							
475	6.60	34.323	0.35	110							
554	5.84	34.309	0.28	102							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

SIO  
CCOFI  
6310BLACK DOUGLAS; October 13, 1963; 1838 GCT; 31°00'N, 118°07'W; sounding, 920 fm; wind, 300°, force 3;  
weather, partly cloudy; sea, rough; wire angle, 05°.

100.50

0	20.76	33.687	5.09	432	0	20.76	33.69	5.09	23.58	432	0.00
10	20.62	33.682	5.30	429	10	20.62	33.68	5.30	23.61	429	0.04
30	18.18	33.597	5.93	375	20	20.61	33.68	5.30	23.62	429	0.09
39	12.96	33.599	6.02	265	30	18.18	33.60	5.93	24.18	375	0.13
54	12.36	33.705	3.87	246	50	12.51	33.68	4.29	25.49	250	0.19
69	11.34	33.791	3.06	221	75	11.21	33.81	2.90	25.83	218	0.25
94	10.98	33.861	2.51	210	100	10.93	33.87	2.40	25.93	208	0.30
111	10.86	33.878	2.25	207	125	10.78	33.91	2.14	25.99	203	0.35
132	10.74	33.930	2.10	201	150	10.63	33.98	1.86	26.07	195	0.40
152	10.62	33.977	1.84	195	200	10.60	34.04	1.67	26.12	190	0.50
181	10.60	34.017	1.76	192	250	10.42	34.21	1.32	26.28	175	0.60
216	10.58	34.066	1.52	188	300	9.48	34.32	1.19	26.53	151	0.68
244	10.48	34.180	1.33	178	400	7.85	34.32	0.71	26.78	127	0.83
292	9.63	34.307	1.23	155	500	6.78	34.32	0.38	26.93	113	0.95
347	8.66	34.328	0.89	138	600	(6.02)	(34.38)	(0.30)	(27.08)	(99)	(1.07)
429	7.46	34.318	0.61	122							
512	6.68	34.321	0.36	112							
597	6.04	34.377	0.30	99							

BLACK DOUGLAS; October 14, 1963; 0025 GCT; 30°40'N, 118°46.5'W; sounding, 1600 fm; wind, 310°, force 3;  
weather, partly cloudy; sea, rough; wire angle, 13°.

100.60

0	19.99	33.705	5.32	411	0	19.99	33.70	5.32	23.79	412	0.00
10	19.86	33.698	5.23	408	10	19.86	33.70	5.23	23.83	408	0.04
29	19.53	33.687	5.49	401	20	19.71	33.69	5.33	23.86	405	0.08
38	15.74	33.517	6.01	327	30	19.46	33.68	5.54	23.92	400	0.12
53	13.54	33.483	5.59	284	50	14.50	33.49	5.88	24.94	303	0.19
67	11.72	33.539	4.59	246	75	11.30	33.58	4.36	25.64	236	0.26
92	10.54	33.655	4.00	218	100	10.34	33.70	3.84	25.90	211	0.32
111	10.04	33.743	3.67	203	125	9.60	33.78	3.45	26.09	193	0.37
130	9.47	33.800	3.37	190	150	9.14	33.93	2.90	26.28	175	0.41
149	9.16	33.922	2.91	176	200	8.50	34.06	2.31	26.48	156	0.50
178	8.86	33.989	2.57	166	250	7.83	34.10	1.83	26.61	143	0.58
212	8.30	34.081	2.15	151	300	7.17	34.14	1.30	26.74	131	0.65
240	7.98	34.097	1.94	146	400	6.52	34.26	0.55	26.92	114	0.77
288	7.32	34.128	1.39	134	500	5.92	34.30	0.34	27.03	104	0.89
340	6.76	34.159	1.07	125	600	(5.33)	(34.36)		(27.15)	(92)	(0.99)
420	6.44	34.287	0.46	111							
503	5.90	34.302	0.33	103							
585	5.42	34.355	0.28	94							

BLACK DOUGLAS; October 14, 1963; 0614 GCT; 30°21'N, 119°27.5'W; sounding, 2000 fm; wind, 280°, force 4;  
weather, cloudy; sea, rough; wire angle, 14°.

100.70

0	19.80	33.660	5.31	410	0	19.80	33.66	5.31	23.81	410	0.00
10	19.80	33.658	5.35	410	10	19.80	33.66	5.35	23.81	410	0.04
29	18.77	33.594	5.52	389	20	19.70	33.65	5.38	23.83	408	0.08
38	16.53	33.457	6.09	348	30	18.75	33.59	5.53	24.03	389	0.12
52	14.38	33.368	5.94	309	50	14.49	33.37	5.98	24.85	311	0.19
67	12.80	33.421	5.28	275	75	12.58	33.47	5.07	25.31	267	0.26
91	11.40	33.493	4.57	244	100	10.63	33.50	4.40	25.69	231	0.33
108	10.40	33.529	4.32	225	125	9.99	33.68	3.78	25.94	207	0.38
127	9.98	33.689	3.75	206	150	9.32	33.86	3.22	26.20	183	0.43
146	9.40	33.840	3.34	186	200	8.49	34.00	2.93	26.44	160	0.52
173	8.98	33.949	2.88	171	250	7.87	34.11	1.84	26.62	143	0.60
206	8.37	34.009	2.96	158	300	7.44	34.17	1.30	26.72	133	0.67
232	8.04	34.074	2.24	148	400	6.62	34.24	0.69	26.89	117	0.80
279	7.68	34.155	1.52	137	500	5.93	34.29	0.32	27.02	105	0.92
331	7.08	34.186	1.03	127							
410	6.56	34.252	0.63	115							
492	5.99	34.282	0.36	106							
574	5.59	34.360	0.22	95							



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

100.80

BLACK DOUGLAS; October 14, 1963; 1134 GCT; 30°02.5'N, 120°08'W; sounding, 2100 fm; wind, 270°, force 2; weather, partly cloudy; sea, moderate; wire angle, 02°.

0	19.15	33.453	5.39	409	0	19.15	33.45	5.39	23.82	409	0.00
10	19.16	33.450	5.44	409	10	19.16	33.45	5.44	23.82	409	0.04
30	18.18	33.396	5.71	390	20	19.14	33.45	5.46	23.82	409	0.08
39	16.64	33.310	6.05	361	30	18.18	33.40	5.71	24.02	390	0.12
54	14.60	33.280	6.07	320	50	14.95	33.28	6.07	24.68	327	0.19
69	13.32	33.299	5.66	294	75	12.68	33.32	5.45	25.18	280	0.27
94	11.72	33.488	4.96	250	100	11.19	33.51	4.65	25.60	239	0.34
113	10.51	33.545	4.31	255	125	9.98	33.64	4.10	25.91	210	0.39
133	9.76	33.762	3.86	197	150	9.69	33.95	2.93	26.20	182	0.44
152	9.68	33.961	2.90	181	200	9.10	34.12	2.05	26.43	160	0.53
180	9.26	34.044	2.50	168	250	9.09	34.33	0.95	26.60	145	0.61
215	9.08	34.195	1.68	155	300	8.52	34.35	0.69	26.71	135	0.68
244	9.12	34.317	1.00	146	400	7.21	34.34	0.48	26.89	117	0.81
294	8.60	34.346	0.72	136	500	6.14	34.31	0.34	27.01	106	0.93
352	7.92	34.358	0.57	125	600	(5.58)	(34.36)	(0.26)	(27.12)	(95)	(1.04)
430	6.80	34.321	0.43	113							
513	6.05	34.311	0.33	104							
597	5.60	34.352	0.26	96							

100.90

BLACK DOUGLAS; October 14, 1963; 1638 GCT; 29°40'N, 120°47'W; sounding, 2100 fm; wind, 300°, force 3; weather, cloudy; sea, moderate; wire angle, 07°.

0	21.28	33.834	5.17	435	0	21.28	33.83	5.17	23.55	435	0.00
10	21.25	33.834	5.19	434	10	21.25	33.83	5.19	23.56	434	0.04
30	21.28	33.840	5.21	434	20	21.26	33.84	5.20	23.56	434	0.09
39	21.26	33.833	5.23	434	30	21.28	33.84	5.21	23.56	434	0.13
53	15.36	33.642	6.01	309	50	17.50	33.70	5.83	24.42	352	0.21
68	13.92	33.616	5.67	282	75	13.00	33.65	4.90	25.37	262	0.29
92	11.34	33.731	3.69	226	100	10.98	33.71	3.90	25.80	221	0.35
111	10.57	33.697	4.19	215	125	10.00	33.77	3.57	26.01	200	0.40
130	9.88	33.798	3.45	196	150	9.62	33.87	3.23	26.15	187	0.45
150	9.62	33.869	3.23	187	200	8.64	34.00	2.89	26.41	162	0.54
178	9.05	33.968	3.02	171	250	7.84	34.08	2.13	26.60	145	0.62
213	8.40	34.018	2.77	158	300	7.49	34.15	1.49	26.70	135	0.69
241	7.92	34.068	2.28	147	400	6.53	34.24	0.62	26.91	116	0.82
290	7.60	34.131	1.68	138	500	6.09	34.31	0.33	27.02	105	0.94
343	6.99	34.191	0.99	125	600	(5.56)	(34.36)	(0.28)	(27.12)	(95)	(1.04)
426	6.39	34.262	0.52	112							
508	6.05	34.312	0.32	104							
593	5.60	34.354	0.29	96							

110.35

BLACK DOUGLAS; October 19, 1963; 0313 GCT; 29°48.5'N, 116°00'W; sounding, 450 fm; wind, 300°, force 4; weather, partly cloudy; sea, rough; wire angle, 27°.

0	21.10	33.760	5.18	435	0	21.10	33.76	5.18	23.54	435	0.00
9	21.08	33.759	5.20	435	10	21.06	33.75	5.22	23.55	435	0.04
27	20.36	33.655	5.34	424	20	20.89	33.73	5.24	23.58	432	0.09
35	17.79	33.346	5.80	384	30	20.33	33.66	5.34	23.67	423	0.13
48	16.26	33.348	6.04	350	50	16.26	33.36	6.04	24.45	349	0.21
61	15.20	33.587	5.84	310	75	14.20	33.62	4.36	25.10	287	0.29
84	12.84	33.622	4.66	261	100	11.64	33.65	4.16	25.63	237	0.35
100	11.64	33.648	4.16	237	125	10.63	33.76	3.60	25.90	211	0.41
118	10.82	33.735	3.75	216	150	9.92	33.90	3.13	26.13	189	0.46
135	10.38	33.806	3.38	204	200	9.67	34.23	1.80	26.43	161	0.55
160	9.68	33.957	3.00	181	250	9.75	34.43	0.72	26.57	148	0.63
192	9.63	34.171	2.08	165	300	9.11	34.42	0.59	26.67	138	0.70
217	9.78	34.332	1.25	155	400	7.48	34.31	0.70	26.83	123	0.84
262	9.74	34.449	0.62	146	500	6.55	34.36	0.40	27.00	107	0.96
310	8.91	34.404	0.59	136							
384	7.67	34.308	0.72	126							
460	6.92	34.328	0.45	114							
536	6.22	34.385	0.35	101							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

S10  
CCOFI  
6310

BLACK DOUGLAS; October 18, 1963; 2359 GCT; 29°36.5'N, 116°19.5'W; sounding, 1200 fm; wind, 320°, force 4; weather, partly cloudy; sea, rough; wire angle, 04°.

110.40

0	21.31	33.743	5.22	442	0	21.31	33.74	5.22	23.47	442	0.00
10	21.33	33.776	5.23	440	10	21.33	33.78	5.23	23.50	440	0.04
30	21.26	33.783	5.16	438	20	21.30	33.78	5.20	23.51	439	0.09
39	17.83	33.559	5.98	370	30	21.26	33.78	5.16	23.52	438	0.13
54	14.65	33.530	5.94	303	50	15.11	33.53	5.95	24.84	312	0.21
69	13.64	33.590	5.51	278	75	13.10	33.61	5.12	25.32	266	0.28
94	11.52	33.652	4.14	235	100	11.40	33.68	4.14	25.70	230	0.34
113	10.38	33.756	4.14	208	125	10.04	33.80	3.83	26.03	199	0.40
133	9.95	33.849	3.49	194	150	9.87	33.98	2.72	26.20	183	0.45
153	9.84	33.990	2.67	182	200	8.69	34.04	2.80	26.44	160	0.53
182	8.99	34.008	2.97	167	250	7.78	34.07	2.34	26.60	145	0.61
217	8.41	34.055	2.63	155	300	7.19	34.14	1.58	26.74	132	0.68
246	7.86	34.065	2.39	146	400	6.77	34.26	0.70	26.89	117	0.81
296	7.20	34.124	1.64	133	500	6.31	34.34	0.30	27.01	105	0.93
349	7.11	34.222	0.96	124	600	(5.70)	(34.39)	(0.24)	(27.13)	(94)	(1.04)
432	6.54	34.281	0.53	113							
516	6.27	34.354	0.28	104							
599	5.72	34.393	0.24	94							

BLACK DOUGLAS; October 18, 1963; 1852 GCT; 29°16.5'N, 116°59'W; sounding, 1900 fm; wind, 360°, force 2; weather, partly cloudy; sea, rough; wire angle, 00°.

110.50

0	21.64	33.804	5.18	446	0	21.64	33.80	5.18	23.43	447	0.00
10	21.39	33.795	5.23	440	10	21.39	33.80	5.23	23.50	440	0.04
30	19.40	33.702	5.85	397	20	21.33	33.79	5.25	23.51	439	0.09
39	14.90	33.593	6.41	303	30	19.40	33.70	5.85	23.95	397	0.13
49	13.04	33.609	5.75	265	50	12.70	33.61	5.49	25.40	259	0.20
64	11.16	33.667	4.07	227	75	10.71	33.72	3.70	25.85	216	0.26
79	10.58	33.739	3.58	212	100	10.02	33.84	3.18	26.06	196	0.31
98	10.06	33.826	3.21	197	125	9.32	33.98	2.76	26.29	174	0.35
123	9.34	33.971	2.78	175	150	8.98	34.07	2.45	26.41	162	0.40
143	9.08	34.051	2.56	165	200	8.27	34.15	1.69	26.59	146	0.48
171	8.62	34.104	2.13	154	250	7.91	34.22	1.13	26.70	136	0.55
201	8.26	34.154	1.67	145	300	7.24	34.22	0.93	26.79	126	0.62
230	7.98	34.198	1.27	138	400	6.16	34.22	0.66	26.94	113	0.74
270	7.84	34.244	1.02	133	500	5.45	34.28	0.34	27.07	100	0.85
328	6.72	34.197	0.85	121							
402	6.14	34.224	0.65	112							
477	5.58	34.254	0.39	103							
555	5.29	34.342	0.26	93							

BLACK DOUGLAS; October 18, 1963; 1259 GCT; 28°55'N, 117°37.5'W; sounding, 2000 fm; wind, 260°, force 2; weather, partly cloudy; sea, moderate; wire angle, 03°.

110.60

0	20.98	33.733	5.18	434	0	20.98	33.73	5.18	23.55	434	0.00
10	20.98	33.740	5.29	434	10	20.98	33.74	5.29	23.56	434	0.04
30	20.72	33.733	5.42	428	20	20.97	33.74	5.31	23.56	433	0.09
39	18.59	33.557	5.83	388	30	20.72	33.73	5.42	23.62	428	0.13
49	16.72	33.538	6.07	346	50	16.50	33.54	6.07	24.53	341	0.21
64	14.56	33.583	5.87	297	75	13.60	33.61	5.24	25.22	276	0.28
79	13.18	33.619	4.97	267	100	11.58	33.66	4.08	25.65	235	0.35
98	11.64	33.656	4.17	236	125	10.98	33.90	2.80	25.94	207	0.41
122	11.06	33.883	2.89	210	150	10.20	33.94	2.89	26.11	191	0.46
142	10.54	33.946	2.70	196	200	8.69	34.06	2.66	26.45	159	0.54
171	9.11	33.917	3.63	176	250	8.26	34.13	2.00	26.57	147	0.62
201	8.68	34.059	2.65	159	300	7.82	34.20	1.29	26.69	136	0.70
230	8.48	34.103	2.20	152	400	7.36	34.38	0.36	26.90	116	0.83
270	8.06	34.153	1.74	143	500	6.11	34.32	0.35	27.02	104	0.94
328	7.66	34.278	0.82	128							
402	7.34	34.376	0.36	116							
475	6.44	34.339	0.36	107							
554	5.54	34.309	0.33	99							



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

110.70

BLACK DOUGLAS; October 18, 1963; 0719 GCT; 28°36.5'N, 118°18'W; sounding, 1750 fm; wind, direction missing, force 1; weather, partly cloudy; sea, moderate; wire angle, 00°.

0	20.60	33.656	5.26	430	0	20.60	33.66	5.26	23.60	430	0.00
10	20.18	33.572	5.32	426	10	20.18	33.57	5.32	23.65	426	0.04
30	19.93	33.576	5.38	419	20	20.01	33.57	5.36	23.69	421	0.09
39	18.38	33.570	5.79	382	30	19.93	33.58	5.38	23.72	419	0.13
49	17.13	33.562	5.88	354	50	17.04	33.56	5.88	24.42	352	0.20
64	16.35	33.561	5.90	336	75	15.80	33.60	5.84	24.74	322	0.29
79	15.44	33.654	5.71	310	100	13.85	33.67	5.30	25.21	277	0.36
98	14.00	33.666	5.33	280	125	12.44	33.70	4.92	25.52	248	0.43
123	12.60	33.696	4.97	251	150	10.77	33.71	4.10	25.83	217	0.49
143	10.96	33.679	4.36	223	200	9.49	33.95	3.13	26.24	179	0.59
171	10.34	33.873	3.13	198	250	9.16	34.15	1.89	26.45	159	0.68
201	9.48	33.952	3.13	179	300	8.39	34.20	1.45	26.61	144	0.76
230	9.66	34.141	1.98	168	400	7.68	34.28	0.71	26.78	128	0.90
270	8.62	34.159	1.83	150	500	6.59	34.31	0.41	26.95	111	1.02
329	8.22	34.239	1.16	139							
403	7.66	34.377a)	0.69	120							
477	6.81	34.299	0.50	115							
556	6.22	34.339	0.32	104							

110.80

BLACK DOUGLAS; October 18, 1963; 0205 GCT; 28°19.5'N, 118°55.5'W; sounding, 2050 fm; wind, direction missing, force 1; weather, partly cloudy; sea, rough; wire angle, 00°.

0	21.46	33.710	5.20	448	0	21.46	33.71	5.20	23.41	448	0.00
10	21.19	33.697	5.26	442	10	21.19	33.70	5.26	23.48	442	0.04
30	21.14	33.693	5.01	441	20	21.17	33.69	5.14	23.47	442	0.09
39	17.75	33.500	5.70	372	30	21.14	33.69	5.01	23.48	441	0.13
49	16.56	33.441	6.04	350	50	16.50	33.44	6.04	24.45	349	0.21
64	15.66	33.558	5.89	322	75	15.64	33.67	5.82	24.83	313	0.30
79	15.04	33.687	5.70	299	100	13.19	33.80	5.17	25.45	254	0.37
98	13.38	33.803	5.22	258	125	11.42	33.69	4.75	25.70	230	0.43
122	11.62	33.693	4.83	233	150	10.26	33.76	3.89	25.96	205	0.48
142	10.58	33.729	4.14	213	200	9.66	34.18	1.81	26.39	165	0.58
170	9.75	33.928	3.20	185	250	9.15	34.26	1.30	26.54	151	0.66
200	9.66	34.177	1.81	165	300	8.18	34.24	1.16	26.67	138	0.73
229	9.42	34.236	1.46	157	400	7.05	34.26		26.85	121	0.87
268	8.86	34.269	1.22	146	500	6.38	34.33	0.37	27.00	107	0.99
326	7.71	34.222	1.11	133							
400	7.05	34.110u	1.68u								
473	6.56	34.314	0.46	111							
552	6.03	34.360	0.25	101							

110.90

BLACK DOUGLAS; October 17, 1963; 2031 GCT; 27°56.5'N, 119°35'W; sounding, 2100 fm; wind, 290°, force 3; weather, partly cloudy; sea, rough; wire angle, 07°.

0	21.85	33.848	5.02	449	0	21.85	33.85	5.02	23.41	448	0.00
10	21.61	33.841	5.15	443	10	21.61	33.84	5.15	23.47	443	0.04
30	21.59	33.848	5.25	442	20	21.60	33.85	5.20	23.48	442	0.09
59	13.16	33.689	5.17	262	30	21.59	33.85	5.25	23.48	442	0.13
69	11.92	33.755	3.42	234	50	16.00	33.71	5.21	24.78	318	0.21
83	11.28	33.819	3.00	218	75	11.77	33.78	3.27	25.71	230	0.28
97	10.68	33.917	2.62	201	100	10.65	33.93	2.60	26.03	199	0.33
111	10.44	33.997	2.30	191	125	10.22	34.06	2.15	26.20	182	0.38
136	10.08	34.091	2.05	178	150	9.88	34.14	1.90	26.32	171	0.43
155	9.82	34.149	1.83	169	200	8.90	34.19	1.74	26.52	152	0.51
184	9.50	34.226	1.52	159	250	8.23	34.23	1.35	26.66	139	0.58
213	8.52	34.163	1.87	149	300	7.88	34.29	0.80	26.76	130	0.65
242	8.28	34.216	1.48	141	400	7.19	34.36	0.38	26.91	115	0.78
291	7.96	34.278	0.86	132	500	6.54	34.40	0.18	27.03	104	0.90
343	7.56	34.323	0.63	123	600	(5.92)	(34.41)	(0.19)	(27.12)	(95)	(1.00)
426	7.01	34.370	0.29	112							
508	6.49	34.403	0.17	103							
591	5.98	34.411	0.19	96							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

S10  
CCOFI  
6310

BLACK DOUGLAS; October 19, 1963; 1221 GCT; 29°22'N, 115°18'W; sounding, 32 fm; wind, 340°, force 3; weather, partly cloudy; sea, moderate; wire angle, 00°.

113.30

0	18.60	33.685	5.31	379	0	18.60	33.68	5.31	24.13	379	0.00
10	18.59	33.668	5.38	380	10	18.59	33.67	5.38	24.13	380	0.04
30	16.48	33.668	5.38	331	20	18.58	33.67	5.38	24.13	379	0.08
49	13.46	33.653	4.06	270	30	16.48	33.67	5.38	24.64	331	0.11

BLACK DOUGLAS; October 29, 1963; 2308 GCT; 28°19'N, 114°53'W; sounding, 60 fm; wind, 320°, force 4; weather, partly cloudy; sea, moderate; wire angle, 05°.

119.33

0	21.98	33.775	5.06	457	0	21.98	33.78	5.06	23.32	457	0.00
10	21.78	33.772	5.15	452	10	21.78	33.77	5.15	23.37	452	0.05
30	21.28	33.754	5.23	440	20	21.69	33.77	5.18	23.39	450	0.09
49	20.20	33.694	5.31	417	30	21.28	33.75	5.23	23.49	441	0.14
74	15.06	33.692	4.14	299	50	20.00	33.69	5.30	23.78	413	0.22
98	12.57		2.04		75	14.95	(33.69)	(4.11)	(24.99)	(297)	(0.31)
					100	(12.55)					

BLACK DOUGLAS; October 22, 1963; 1806 GCT; 27°43'N, 115°33.5'W; sounding, 1100 fm; wind, 330°, force 3; weather, partly cloudy; sea, moderate; wire angle, 03°.

120.45

0	21.51	34.008	5.05	428	0	21.51	34.01	5.05	23.62	428	0.00
10	21.43	33.995	5.17	427	10	21.43	34.00	5.17	23.64	427	0.04
30	18.95	33.770	5.37	381	20	21.20	33.95	5.26	23.66	424	0.09
39	17.08	33.772	5.17	337	30	18.95	33.77	5.37	24.12	381	0.13
54	15.56	33.812	4.68	301	50	15.40	33.75a)	4.70	24.94	302	0.19
69	13.86	33.751	4.20	271	75	13.33	33.75	4.04	25.38	261	0.27
94	11.80	33.800	3.52	229	100	11.68	33.82	3.43	25.75	225	0.33
113	11.24	33.854	3.08	215	125	11.13	33.92	2.70	25.93	208	0.38
133	11.10	33.981	2.38	203	150	11.28	34.16	1.65	26.09	193	0.43
153	11.31	34.208	1.50	190	200	10.47	34.29	1.28	26.34	170	0.52
182	10.80	34.285	1.30	176	250	10.11	34.39	0.72	26.48	156	0.61
216	10.32	34.297	1.26	167	300	9.26	34.43	0.53	26.65	140	0.69
245	10.14	34.367	0.92	158	400	7.61	34.37	0.40	26.86	120	0.82
295	9.35	34.431	0.56b)	141	500	6.31	34.34	0.28	27.01	105	0.94
348	8.49	34.416	0.40	129	600	(5.73)	(34.38)	(0.23)	(27.12)	(95)	(1.05)
430	7.09	34.341	0.41	115							
513	6.21	34.345	0.27	104							
598	5.75	34.378	0.23	96							

BLACK DOUGLAS; October 22, 1963; 2117 GCT; 27°33.5'N, 115°51.5'W; sounding, 2100 fm; wind, 310°, force 3; weather, partly cloudy; sea, moderate; wire angle, 02°.

120.50

0	21.42	33.881	5.21	435	0	21.42	33.88	5.21	23.55	435	0.00
10	21.14	33.905	5.23	426	10	21.14	33.90	5.23	23.64	426	0.04
30	19.62	33.861	5.40	391	20	21.10	33.90	5.23	23.65	425	0.09
39	16.60	33.768	5.29	327	30	19.62	33.86	5.40	24.01	391	0.13
49	15.51	33.868	4.16	296	50	15.43	33.87	4.12	25.03	294	0.20
64	14.38	33.823	3.77	276	75	13.53	33.85	3.26	25.42	257	0.26
79	13.40	33.881	3.10	252	100	12.36	34.08	1.82	25.83	218	0.32
98	12.42	34.081	1.82	219	125	11.30	34.11	1.95	26.05	197	0.38
123	11.38	34.103	1.90	199	150	10.46	34.17	1.98	26.25	178	0.42
143	10.46	34.112	2.18	183	200	10.26	34.42	0.71	26.47	157	0.51
171	10.61	34.347	1.05	168	250	9.66	34.44	0.56	26.59	145	0.59
201	10.24	34.415	0.71	157	300	9.13	34.46	0.37	26.69	136	0.66
230	9.84	34.418	0.70	150	400	8.03	34.44	0.24	26.85	121	0.80
270	9.52	34.461	0.45	142	500	6.96	34.41	0.18	26.98	108	0.92
329	8.72	34.448	0.32	130							
402	8.00	34.444	0.24	120							
476	7.30	34.431	0.16	111							
554	6.09	34.366	0.23	101							

- a) The temperature inversion indicated by the bathythermograph observation accounts for this salinity value.  
b) Bubbles were noted in this oxygen sample before titration.



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

120.60 BLACK DOUGLAS; October 23, 1963; 0248 GCT; 27°13'N, 116°30.5'W; sounding, 2000 fm; wind, 300°, force 3; weather, overcast; sea, moderate; wire angle, 05°.

0	22.06	33.901	5.11	450	0	22.06	33.90	5.11	23.39	450	0.00
10	22.08	33.902	5.15	451	10	22.08	33.90	5.15	23.38	451	0.05
30	21.97	33.899	5.18	448	20	22.02	33.90	5.16	23.40	449	0.09
54	14.57	33.714	4.82	288	30	21.97	33.90	5.18	23.41	448	0.14
64	13.51	33.734	4.17	265	50	16.60	33.73	4.94	24.65	330	0.21
74	12.77	33.725	3.97	252	75	12.70	33.73	3.94	25.49	250	0.29
89	12.03	33.782	3.41	234	100	11.72	33.86	3.00	25.78	223	0.35
102	11.64	33.865	2.95	221	125	10.78	33.98	2.43	26.04	198	0.40
127	10.76	34.000	2.40	196	150	10.80	34.24	1.54	26.24	179	0.45
147	10.81	34.211	1.63	181	200	10.45	34.43	0.93	26.45	159	0.53
171	10.63	34.342	1.21	168	250	9.93	34.44	0.70	26.55	150	0.61
201	10.44	34.433	0.92	159	300	9.03	34.41	0.66	26.67	138	0.69
229	10.30	34.469	0.55	154	400	8.01	34.40	0.45	26.82	124	0.82
269	9.48	34.406	0.78	145	500	7.30	34.39	0.34	26.92	114	0.95
328	8.71	34.408	0.54	133							
401	8.00	34.399	0.45	123							
474	7.48	34.384	0.38	117							
553	6.92	34.432	0.18	106							

120.70 BLACK DOUGLAS; October 23, 1963; 0859 GCT; 26°53'N, 117°10'W; sounding, 2150 fm; wind, 280°, force 2; weather, clear; sea, slight; wire angle, 04°.

0	21.78	33.835	5.20	448	0	21.78	33.84	5.20	23.42	447	0.00
10	21.80	33.837	5.21	448	10	21.80	33.84	5.21	23.41	448	0.04
30	21.81	33.871	5.24	446	20	21.80	33.84	5.21	23.41	448	0.09
39	20.15	33.746	5.61	412	30	21.81	33.87	5.24	23.43	446	0.13
49	18.12	33.729	5.64	364	50	17.85	33.72	5.63	24.35	359	0.22
64	15.20	33.679	5.57	303	75	14.20	33.69	4.97	25.15	282	0.30
79	13.77	33.695	4.63	273	100	11.85	33.81	3.22	25.71	229	0.36
98	11.94	33.797	3.33	231	125	11.10	34.02	2.29	26.01	200	0.41
123	11.18	34.012	2.31	202	150	10.56	34.10	2.15	26.17	185	0.46
143	10.62	34.074	2.24	188	200	10.66	34.40	0.87	26.39	165	0.55
173	10.46	34.220	1.61	175	250	9.88	34.41	0.80	26.53	151	0.63
201	10.67	34.406	0.85	164	300	9.32	34.44	0.60	26.65	140	0.71
230	10.24	34.409	0.81	157	400	7.65	34.34	0.54	26.83	123	0.85
270	9.58	34.422	0.76	145	500	6.77	34.36	0.30	26.97	110	0.97
330	9.14	34.442	0.43	137							
403	7.60	34.336	0.55	123							
478	6.94	34.348	0.36	113							
554	6.44	34.389	0.20	103							

123.42 BLACK DOUGLAS; October 24, 1963; 0415 GCT; 27°12.5'N, 114°58.5'W; sounding, 1100 fm; wind, 330°, force 4; weather, partly cloudy; sea, moderate; wire angle, 23°.

0	21.78	33.876	4.97	445	0	21.78	33.88	4.97	23.45	444	0.00
8	21.79	33.847	5.16	447	10	21.79	33.84	5.20	23.42	448	0.04
27	21.40	33.813	5.27	439	20	21.70	33.83	5.24	23.43	446	0.09
35	20.39	33.822	5.42	413	30	20.90	33.82	5.35	23.64	426	0.13
48	16.55	33.771	5.05	326	50	15.31	33.67	5.35	24.90	306	0.21
61	14.98	33.666	5.44	300	75	13.32	33.67	4.81	25.32	266	0.28
84	12.92	33.672	4.55	259	100	12.06	33.78	3.64	25.65	235	0.34
100	12.06	33.780	3.64	235	125	11.53	34.02	2.36	25.94	208	0.40
118	11.62	33.976	2.49	212	150	11.32	34.23	1.44	26.14	188	0.45
137	11.15	34.076	2.14	197	200	11.02	34.43	0.86	26.35	169	0.54
162	11.49	34.359	1.01	182	250	9.96	34.44	0.64	26.54	150	0.62
194	11.12	34.417	0.90	171	300	9.66	34.50	0.45	26.64	141	0.70
219	10.66	34.471	0.63	159	400	8.46	34.48	0.26	26.82	124	0.84
263	9.77	34.431	0.64	148	500	6.74	34.39	0.28	27.00	107	0.96
312	9.64	34.508	0.39	140							
387	8.68	34.495	0.26	126							
464	7.38	34.411	0.29	114							
542	5.98	34.393	0.26	97							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

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BLACK DOUGLAS; October 24, 1963; 1807 GCT; 26°43.5'N, 114°29'W; sounding, 1600 fm; wind, 320°, force 4; weather, partly cloudy; sea, rough; wire angle, 08°.

127.40

0	21.87	33.882	5.19	447	0	21.87	33.88	5.19	23.43	447	0.00
10	21.88	33.841	5.19	450	10	21.88	33.84	5.19	23.39	450	0.04
30	21.62	33.831	5.22	444	20	21.82	33.84	5.20	23.41	448	0.09
39	20.12	33.758	5.50	411	30	21.62	33.83	5.22	23.46	444	0.13
54	16.35	33.632	5.86	331	50	17.80	33.66	5.79	24.32	362	0.22
69	14.50	33.684	5.01	289	75	13.97	33.70	4.70	25.21	277	0.30
94	12.26	33.733	3.90	242	100	11.80	33.76	3.71	25.68	232	0.36
112	11.42	33.785	3.54	223	125	10.99	33.86	3.06	25.91	210	0.42
132	10.82	33.908	2.82	204	150	10.45	34.02	2.31	26.13	189	0.47
151	10.44	34.028	2.30	188	200	9.97	34.30	1.26	26.43	161	0.56
179	10.15	34.211	1.68	170	250	9.63	34.37	0.82	26.54	150	0.64
212	9.88	34.319	1.14	158	300	9.21	34.42	0.57	26.65	140	0.71
241	9.70	34.358	0.89	152	400	8.38	34.47	0.26	26.82	124	0.85
287	9.32	34.413	0.62	142	500	7.19	34.43	0.17	26.96	110	0.97
340	8.86	34.439	0.43	133	600	(6.17)	(34.43)		(27.10)	(97)	(1.09)
420	8.20	34.470	0.20	121							
502	7.17	34.430	0.17	110							
585	6.30	34.424	0.19	99							

BLACK DOUGLAS; October 26, 1963; 1258 GCT; 26°29'N, 113°29'W; sounding, 41 fm; wind, calm; weather, clear; sea, slight; wire angle, 02°.

130.30

0	24.78	34.662	4.81	471	0	24.78	34.66	4.81	23.17	471	0.00
10	24.78	34.674	4.82	470	10	24.78	34.67	4.82	23.18	470	0.05
30	23.90	34.480	4.84	459	20	24.70	34.67	4.83	23.20	468	0.09
49	20.36	34.139	5.02	389	30	23.90	34.48	4.84	23.30	459	0.14

BLACK DOUGLAS; October 26, 1963; 0743 GCT; 26°09'N, 114°07'W; sounding, 1200 fm; wind, 330°, force 5; weather, cloudy; sea, rough; wire angle, 04°.

130.40

0	24.64	34.671	4.94	466	0	24.64	34.67	4.94	23.22	466	0.00
10	24.66	34.670	4.94	467	10	24.66	34.67	4.94	23.22	467	0.05
30	22.17	34.366	5.07	420	20	24.65	34.67	4.95	23.22	466	0.09
39	19.87	34.135	4.86	377	30	22.17	34.37	5.07	23.71	419	0.14
54	16.12	33.873	5.03	309	50	17.70	33.97	4.99	24.58	337	0.21
69	14.28	33.842	4.02	273	75	14.17	33.86	3.87	25.29	269	0.29
94	13.24	34.009	2.68	240	100	12.05	33.92	2.71	25.76	224	0.35
113	11.66	33.898	2.71	219	125	11.31	33.94	2.48	25.91	210	0.41
132	11.15	33.981	2.29	204	150	10.86	34.06	2.04	26.09	193	0.46
152	10.81	34.064	2.00	192	200	10.39	34.30	1.25	26.36	168	0.55
181	10.44	34.228	1.53	174	250	10.09	34.44	0.72	26.52	152	0.63
216	10.34	34.358	1.02	162	300	9.74	34.48	0.43	26.61	144	0.71
245	10.12	34.431	0.78	153	400	7.97	34.41	0.40	26.84	122	0.85
294	9.82	34.485	0.43	145	500	7.04	34.44	0.24	26.99	107	0.97
347	8.82	34.439	0.46	132	600	6.34	34.42	0.20	27.07	100	1.08
431	7.62	34.408	0.35	118							
514	6.92	34.443	0.22	106							
600	6.34	34.425	0.20	99							



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

130.50 BLACK DOUGLAS; October 26, 1963; 0135 GCT; 25°49'N, 114°46.5'W; sounding, 1950 fm; wind, 330°, force 5; weather, partly cloudy; sea, rough; wire angle, 05°.

0	22.18	33.845	5.13	458	0	22.18	33.84	5.13	23.31	458	0.00
10	22.18	33.849	5.12	457	10	22.18	33.85	5.12	23.32	457	0.05
30	22.08	33.843	5.18	455	20	22.13	33.85	5.15	23.33	456	0.09
39	21.83	33.833	5.26	449	30	22.08	33.84	5.18	23.34	455	0.14
54	17.10	33.644	5.98	347	50	18.00	33.68	5.88	24.28	365	0.22
69	15.58	33.657	5.76	313	75	14.50	33.66	5.27	25.07	290	0.30
94	13.13	33.696	4.49	261	100	12.52	33.73	4.05	25.52	247	0.37
112	11.88	33.809	3.42	229	125	11.54	33.90	2.73	25.84	217	0.43
132	11.38	33.933	2.50	211	150	11.00	33.99	2.34	26.01	201	0.48
151	10.98	33.998	2.33	200	200	10.62	34.32	1.20	26.33	170	0.58
179	10.62	34.170	1.81	181	250	10.35	34.46	0.63	26.49	155	0.66
213	10.62	34.380	0.95	165	300	9.85	34.50	0.41	26.61	144	0.74
241	10.42	34.444	0.68	157	400	8.62	34.48	0.32	26.79	126	0.88
290	9.97	34.494	0.45	146	500	7.42	34.44	0.17	26.94	112	1.01
344	9.38	34.506	0.27	136	600	(6.35)	(34.44)	(0.20)	(27.09)	(98)	(1.12)
425	8.28	34.464	0.33	123							
508	7.33	34.440	0.17	111							
591	6.45	34.437	0.20	100							

130.60 BLACK DOUGLAS; October 25, 1963; 1925 GCT; 25°28'N, 115°26'W; sounding, 2050 fm; wind, 330°, force 3; weather, cloudy; sea, rough; wire angle, 18°.

0	22.64	34.112	4.99	451	0	22.64	34.11	4.99	23.38	451	0.00
9	22.60	34.106	5.08	450	10	22.60	34.11	5.08	23.39	450	0.05
28	22.58	34.114	5.09	449	20	22.58	34.11	5.09	23.40	449	0.09
37	17.63	33.582	5.81	364	30	22.10	34.07	5.15	23.51	439	0.13
52	15.30	33.624	5.78	309	50	15.48	33.62	5.78	24.82	313	0.21
66	14.02	33.583	5.41	286	75	13.60	33.64	5.08	25.24	274	0.28
89	13.01	33.707	4.62	258	100	12.25	33.72	4.20	25.57	243	0.35
107	11.73	33.740	3.92	232	125	11.04	33.84	3.34	25.89	212	0.41
126	11.02	-	-	-	150	10.76	33.98	2.54	26.04	197	0.46
145	10.82	33.963	2.62	200	200	9.92	34.18	1.80	26.35	169	0.55
172	10.36	34.091	2.13	182	250	9.38	34.30	1.30	26.53	151	0.63
205	9.84	34.196	1.75	166	300	9.08	34.38	0.73	26.64	141	0.71
232	9.49	34.243	1.64	157	400	8.07	34.42	0.36	26.83	123	0.85
279	9.25	34.370	0.83	144	500	6.84	34.39	0.32	26.98	108	0.97
330	8.78	34.396	0.60	135							
411	7.94	34.424	0.33	121							
490	6.94	34.387	0.33	110							
572	6.33	34.435	0.13	99							

130.70 BLACK DOUGLAS; October 25, 1963; 1332 GCT; 25°09'N, 116°05.5'W; sounding, 2000 fm; wind, 320°, force 5; weather, rain; sea, rough; wire angle, 13°.

0	23.26	34.448	4.95	443	0	23.26	34.45	4.95	23.46	443	0.00
10	23.28	34.451	4.96	444	10	23.28	34.45	4.96	23.46	444	0.04
30	23.28	34.442	4.98	444	20	23.28	34.45	4.97	23.46	444	0.09
39	17.69	33.665	5.86	359	30	23.28	34.44	4.98	23.45	444	0.13
53	15.05	33.678	5.47	300	50	15.40	33.68	5.53	24.89	307	0.21
67	13.70	33.668	5.07	274	75	13.20	33.69	4.30	25.36	263	0.28
91	13.31	34.082	2.20	236	100	13.00	34.12	1.93	25.73	227	0.34
109	12.70	34.194	1.69	216	125	12.22	34.23	1.48	25.97	205	0.40
128	12.20	34.241	1.48	203	150	11.44	34.33	1.31	26.19	183	0.45
147	11.46	34.289	1.40	187	200	10.68	34.42	0.94	26.40	164	0.53
175	11.38	34.504	0.71	169	250	9.81	34.42	0.65	26.55	149	0.62
209	10.30	34.367	1.04	161	300	9.30	34.46	0.39	26.67	138	0.69
236	9.94	34.394	0.77	153	400	7.97	34.43	0.30	26.85	121	0.83
285	9.48	34.452	0.47	142	500	7.13	34.43	0.16	26.97	109	0.95
336	8.90	34.473	0.29	131	600	(6.09)	(34.43)		(27.11)	(96)	(1.06)
416	7.76	34.423	0.30	118							
498	7.14	34.432	0.17	109							
580	6.32	34.432	0.15	99							



OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	δ <sub>T</sub>	Z	T	S	O <sub>2</sub>	σ <sub>t</sub>	δ <sub>T</sub>	ΔD
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

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BLACK DOUGLAS; October 28, 1963; 1904 GCT; 25°34'N, 112°19'W; sounding, 40 fm; wind, 320°, force 4; weather, clear; sea, moderate; wire angle, 02°.

137.23

0	25.67	34.667	4.80	496	0	25.67	34.67	4.80	22.91	496	0.00
10	25.60	34.660	4.84	495	10	25.60	34.66	4.84	22.92	495	0.05
30	25.06	34.596	4.92	484	20	25.50	34.65	4.87	22.95	493	0.10
49	19.36	34.167	4.87	362	30	25.06	34.60	4.92	23.04	483	0.15

BLACK DOUGLAS; October 28, 1963; 1544 GCT; 25°20'N, 112°46'W; sounding, 175 fm; wind, 320°, force 4; weather, clear; sea, moderate; wire angle, 05°.

137.30

0	26.14	34.748	4.59	504	0	26.14	34.75	4.59	22.82	504	0.00
10	26.17	34.750	4.78	505	10	26.17	34.75	4.78	22.81	505	0.05
30	26.14	34.748	4.82	504	20	26.16	34.75	4.80	22.82	505	0.10
49	19.74	34.184	4.67	370	30	26.14	34.75	4.82	22.82	504	0.15
74	15.95	34.117	3.44	287	50	19.54	34.18	4.64	24.28	366	0.24
98	15.09	34.274	2.03	257	75	15.91	34.12	3.41	25.11	286	0.32
123	14.16	34.592	0.35	215	100	15.00	34.29	1.90	25.44	254	0.39
163	12.91	34.702	0.17	183	125	14.10	34.61	0.31	25.88	213	0.45
202	11.80	34.672	0.08	164	150	13.30	34.68	0.17	26.10	192	0.50
250	11.31	34.644	0.07	158	200	11.86	34.67	0.08	26.38	166	0.59
					250	11.31	34.64	0.07	26.46	158	0.67

BLACK DOUGLAS; October 28, 1963; 1009 GCT; 25°00'N, 113°23.5'W; sounding, 1200 fm; wind, 310°, force 5; weather, partly cloudy; sea, moderate; wire angle, 12°.

137.40

0	26.55	34.846	4.60	510	0	26.55	34.85	4.60	22.77	509	0.00
10	26.58	34.843	4.70	511	10	26.58	34.84	4.70	22.75	511	0.05
30	26.26	34.789	4.78	505	20	26.54	34.84	4.72	22.76	510	0.10
38	21.71	34.096	5.73	427	30	26.26	34.79	4.78	22.82	505	0.15
53	16.09	33.754	5.52	317	50	16.55	33.76	5.55	24.69	326	0.24
68	14.85	33.849	4.23	284	75	14.00	33.91	3.42	25.36	262	0.31
92	13.34	34.051	2.59	239	100	12.55	34.00	2.36	25.73	228	0.37
111	12.36	34.087	2.24	218	125	11.14	33.99	2.55	25.98	203	0.43
130	11.08	33.992	2.56	202	150	11.82	34.52	0.79	26.27	176	0.47
150	11.82	34.522	0.79	176	200	11.42	34.66	0.20	26.45	159	0.56
178	11.80	34.665	0.24	165	250	10.39	34.59	0.24	26.58	146	0.64
213	11.13	34.642	0.19	155	300	9.55	34.53	0.23	26.68	137	0.71
241	10.55	34.603	0.23	148	400	7.99	34.45	0.21	26.86	120	0.85
290	9.74	34.542	0.24	139	500	6.93	34.42	0.19	26.99	107	0.97
343	8.74	34.483	0.22	128	600	(6.07)	(34.44)	(0.16)	(27.12)	(95)	(1.08)
424	7.72	34.435	0.20	117							
507	6.84	34.420	0.19	106							
590	6.15	34.439	0.16	96							

BLACK DOUGLAS; October 28, 1963; 0428 GCT; 24°40'N, 114°02'W; sounding, 1750 fm; wind, 330°, force 3; weather, clear; sea, moderate; wire angle, 09°.

137.50

0	24.34	34.566	4.86	465	0	24.34	34.57	4.86	23.24	465	0.00
10	24.35	34.561	4.86	466	10	24.35	34.56	4.86	23.23	466	0.05
30	23.88	34.497	4.96	457	20	24.35	34.56	4.87	23.23	466	0.09
39	19.69	33.681	5.62	405	30	23.88	34.50	4.96	23.32	457	0.14
49	17.53	33.801	5.53	345	50	17.52	33.81	5.52	24.50	344	0.22
64	15.92	33.908	4.55	302	75	14.40	33.75	4.92	25.16	282	0.30
79	13.96	33.717	5.00	275	100	13.87	34.21	1.95	25.62	237	0.36
97	13.90	34.213	1.95	238	125	11.38	33.95	2.38	25.91	210	0.42
121	11.40	33.947	2.38	211	150	10.73	34.18	1.75	26.21	182	0.47
140	10.74	34.071	2.03	190	200	10.52	34.43	0.82	26.44	160	0.56
167	10.72	34.314	1.32	172	250	10.06	34.50	0.45	26.57	147	0.64
196	10.56	34.424	0.87	161	300	9.43	34.51	0.23	26.68	137	0.71
224	10.28	34.486	0.60	152	400	7.72	34.40	0.32	26.86	119	0.85
263	9.94	34.509	0.39	145	500	6.84	34.41	0.18	27.00	107	0.97
320	9.07	34.501	0.20	132							
393	7.79	34.402	0.32	120							
467	7.10	34.403	0.21	111							
545	6.51	34.419	0.17	102							



SIO CCOFI 6310	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	δ <sub>T</sub> cl/ton	Z m	T °C	S ‰	O <sub>2</sub> ml/L	σ <sub>t</sub> g/L	δ <sub>T</sub> cl/ton	ΔD dyn m

137.60 BLACK DOUGLAS; October 27, 1963; 2253 GCT; 24°20.5'N, 114°39'W; sounding, 2100 fm; wind, 330°, force 4; weather, partly cloudy; sea, rough; wire angle, 10°.

0	22.78	33.869	5.00	472	0	22.78	33.87	5.00	23.16	472	0.00
10	22.50	33.852	5.16	466	10	22.50	33.85	5.16	23.23	466	0.05
30	21.14	34.080	5.36	413	20	22.40	33.88	5.20	23.28	461	0.09
39	19.90	33.919	5.73	393	30	21.14	34.08	5.36	23.78	413	0.14
54	17.70	33.737	5.93	354	50	17.84	33.74	5.92	24.37	357	0.21
68	16.85	33.812	5.92	329	75	16.57	33.81	5.90	24.72	323	0.30
92	13.70	33.695	5.20	272	100	12.80	33.72	4.56	25.46	253	0.37
111	12.16	33.813	3.85	234	125	11.48	33.89	3.23	25.84	216	0.43
131	11.38	33.910	3.11	213	150	11.00	34.02	2.63	26.03	198	0.48
150	11.00	34.024	2.63	198	200	10.80	34.41	0.96	26.37	166	0.58
178	10.94	34.316	1.35	176	250	10.10	34.50	0.49	26.56	148	0.66
212	10.68	-	0.80		300	9.44	34.51	0.33	26.68	137	0.73
240	10.25	34.491	0.55	151	400	8.19	34.47	0.26	26.85	121	0.87
288	9.59	34.518	0.35	138	500	6.71	34.40	0.23	27.01	106	0.99
340	8.92	34.469	0.31	132	600	(6.48)	(34.49)		(27.11)	(96)	(1.10)
419	7.93	34.465	0.25	118							
500	6.71	34.401	0.23	106							
583	6.50	34.482	0.13	97							



Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
80.50-B	X-2	2024	34°28.0'	120°29.0'	10	300°	3	partly cloudy	moderate	15.56	33.596
80.51-B	2	2134	34°26.0'	120°32.5'	53	300°	5	partly cloudy	moderate	15.70	33.568
80.65-B	3	0650	33°59.0'	121°30.0'	1850	320°	5	partly cloudy	rough	17.68	33.588
82.47-B	5	0130	34°15.0'	119°58.0'	310	260°	3	partly cloudy	moderate	18.92	33.590
83.39-B	5	0636	34°15.5'	119°17.5'	8	220°	1	partly cloudy	moderate	19.90	33.588
83.40-B	5	0545	34°14.0'	119°22.0'	12	240°	1	partly cloudy	moderate	20.22	33.610
83.43-B	5	0415	34°08.0'	119°34.0'	135	250°	3	partly cloudy	moderate	20.42	33.600
83.51-B	4	2200	33°52.0'	120°07.5'	80	300°	2	partly cloudy	moderate	17.16	33.560
83.55-B	4	2002	33°45.0'	120°21.5'	480	-	2	partly cloudy	moderate	17.40	33.589
83.65-B	4	1445	33°25.5'	121°02.5'	1900	270°	2	drizzle	rough	17.70	33.421
83.70-B	4	1200	33°15.0'	121°24.0'	2100	340°	3	partly cloudy	rough	17.82	33.315
83.80-B	4	0650	32°54.0'	122°07.5'	2200	330°	4	partly cloudy	rough	18.74	33.180
83.90-B	4	0145	32°34.5'	122°47.5'	2150	330°	5	partly cloudy	rough	19.24	33.206
87.32-B	5	1245	33°54.0'	118°26.5'	8	280°	2	partly cloudy	moderate	21.24	33.627
87.33-B	5	1330	33°54.0'	118°29.5'	27	240°	2	partly cloudy	moderate	19.44	33.570
87.34-B	5	1420	33°52.0'	118°33.5'	38	270°	3	partly cloudy	moderate	20.22	33.590
87.35-B	5	1511	33°50.0'	118°37.5'	285	280°	3	partly cloudy	moderate	20.96	34.012
87.40-B	5	1732	33°40.0'	118°58.0'	465	280°	3	partly cloudy	moderate	18.52	33.566
87.45-B	5	1950	33°30.0'	119°19.0'	915	280°	3	partly cloudy	moderate	19.76	33.579

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
87.50-B	X-5	2235	33°20.0'	119°39.5'	40	300°	4	partly cloudy	moderate	18.14	-
87.55-B	6	0115	33°10.0'	120°00.0'	660	300°	4	partly cloudy	rough	18.04	33.609
87.60-B	6	0340	33°00.0'	120°21.5'	400	280°	4	partly cloudy	moderate	17.62	33.550
87.65-B	6	0610	32°49.5'	120°42.5'	2050	300°	4	partly cloudy	rough	17.87	33.518
87.70-B	6	0032	32°40.0'	121°03.0'	2052	310°	4	partly cloudy	moderate	18.11	33.373
87.80-B	6	1305	32°20.0'	121°43.0'	2100	310°	2	partly cloudy	moderate	17.65	33.321
87.90-B	6	1740	31°59.0'	122°24.0'	2300	320°	1	partly cloudy	moderate	19.19	33.172
90.28-B	8	1100	33°29.5'	117°45.0'	10	270°	2	partly cloudy	smooth	17.63	33.493
90.65-B	7	1215	32°16.0'	120°19.0'	1800	340°	4	partly cloudy	rough	18.68	33.590
93.26-B	8	1530	32°57.0'	117°16.5'	10	270°	3	partly cloudy	moderate	19.07	33.544
93.26-B	8	1605	32°57.0'	117°16.5'	10	270°	3	partly cloudy	moderate	18.00	33.532
93.27-B	8	1650	32°56.0'	117°19.0'	60	290°	2	partly cloudy	moderate	20.12	33.553
93.35-B	8	2215	32°40.5'	117°57.5'	340	320°	5	partly cloudy	moderate	21.01	33.603
93.45-B	9	0400	32°19.0'	118°33.5'	825	300°	4	partly cloudy	rough	19.91	33.558
93.55-B	9	1007	31°58.0'	119°17.0'	840	320°	5	partly cloudy	rough	19.68	33.613
93.65-B	9	1532	31°40.0'	119°54.5'	2000	320°	5	partly cloudy	rough	19.58	33.641
97.29-B	11	1640	32°19.5'	117°04.0'	28	330°	4	partly cloudy	moderate	15.77	33.524
97.29-B	11	1720	32°17.5'	117°04.5'	10	330°	4	partly cloudy	moderate	15.18	33.556
97.30-B	11	1540	32°15.0'	117°08.5'	33	300°	3	partly cloudy	moderate	18.82	33.541

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
97.32-B	X-11	1430	32°11.5'	117°16.5'	750	320°	4	partly cloudy	rough	19.98	33.567
97.35-B	11	1245	32°05.5'	117°28.0'	660	320°	5	partly cloudy	moderate	20.44	33.575
97.40-B	11	0950	31°57.0'	117°50.0'	850	320°	4	partly cloudy	rough	20.69	33.579
97.45-B	11	0707	31°46.0'	118°08.5'	750	300°	4	partly cloudy	rough	20.30	33.525
97.50-B	11	0425	31°35.5'	118°29.5'	1200	300°	4	partly cloudy	rough	20.52	33.548
97.55-B	11	0145	31°27.0'	118°50.0'	650	340°	3	partly cloudy	moderate	20.76	33.685
97.60-B	10	2305	31°14.0'	119°10.0'	1950	340°	3	partly cloudy	moderate	19.84	33.616
97.65-B	10	2010	31°01.0'	119°30.0'	1950	340°	4	partly cloudy	moderate	19.95	33.719
97.70-B	10	1720	30°52.5'	119°53.0'	1900	360°	3	partly cloudy	moderate	19.40	33.609
97.80-B	10	1305	30°37.5'	120°34.0'	2100	320°	3	partly cloudy	moderate	20.11	33.675
97.90-B	10	0832	30°18.0'	121°12.0'	2100	300°	3	partly cloudy	moderate	20.30	33.737
100.29-B	13	0540	31°42.0'	116°46.5'	70	300°	1	partly cloudy	moderate	15.56	33.604
100.45-B	13	1545	31°12.0'	117°49.0'	850	300°	2	partly cloudy	moderate	20.94	33.701
100.55-B	13	2125	30°50.0'	118°27.5'	1300	270°	4	partly cloudy	rough	20.76	33.662
100.65-B	14	0320	30°30.0'	119°07.5'	1750	280°	3	partly cloudy	rough	19.98	33.742
103.28-B	16	0455	31°08.0'	116°19.0'	9	320°	4	partly cloudy	rough	16.58	33.602
103.29-B	16	0415	31°07.0'	116°21.0'	17	320°	5	partly cloudy	rough	17.02	33.596
103.30-B	16	0330	31°05.5'	116°25.0'	35	320°	5	partly cloudy	rough	19.10	33.604
103.35-B	16	0105	30°56.0'	116°45.0'	850	330°	4	partly cloudy	rough	21.28	33.744

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
103.40-B	X-15	2235	30°46.0'	117°04.5'	900	320°	5	partly cloudy	rough	21.28	33.595
103.45-B	15	2015	30°38.0'	117°22.5'	1000	320°	5	partly cloudy	moderate	21.31	33.744
103.50-B	15	1745	30°28.0'	117°46.0'	1400	330°	4	partly cloudy	moderate	21.07	33.680
103.55-B	15	1500	30°19.5'	118°06.0'	1200	330°	4	partly cloudy	moderate	21.02	33.729
103.60-B	15	1200	30°11.5'	118°27.5'	1800	340°	4	partly cloudy	moderate	19.36	33.567
103.65-B	15	0915	30°01.0'	118°46.0'	2000	300°	3	partly cloudy	moderate	20.76	33.700
103.70-B	15	0655	29°50.0'	119°07.0'	1820	310°	4	partly cloudy	moderate	21.15	33.745
103.80-B	15	0230	29°31.0'	119°42.0'	2000	330°	3	partly cloudy	moderate	20.78	33.639
103.90-B	14	2110	29°05.5'	120°27.0'	2000	300°	3	partly cloudy	moderate	20.94	33.689
107.30-B	16	1000	30°30.0'	116°03.5'	10	320°	3	partly cloudy	moderate	16.76	33.591
107.31-B	16	1053	30°28.0'	116°07.0'	23	320°	3	partly cloudy	moderate	17.33	33.595
107.32-B	16	1130	30°26.0'	116°11.0'	300	300°	3	partly cloudy	rough	18.08	33.581
107.35-B	16	1320	30°20.0'	116°23.0'	850	280°	4	partly cloudy	rough	19.01	33.581
107.40-B	16	1550	30°10.0'	116°45.0'	1400	300°	3	partly cloudy	rough	18.18	33.575
107.45-B	16	1825	30°00.5'	117°07.5'	1200	310°	4	partly cloudy	very rough	20.33	33.646
107.50-B	16	2035	29°50.0'	117°23.0'	1400	300°	4	partly cloudy	high	21.42	33.816
107.55-B	16	2300	29°42.0'	117°42.0'	1850	300°	3	partly cloudy	very rough	21.32	33.815
107.60-B	17	0130	29°32.0'	118°01.5'	1900	300°	4	partly cloudy	rough	20.36	33.671
107.65-B	17	0335	29°21.5'	118°21.0'	1600	280°	2	partly cloudy	rough	20.18	33.533

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
107.70-B	X-17	0600	29°13.5'	118°41.0'	1550	280°	1	partly cloudy	moderate	20.24	33.584
107.80-B	17	1040	28°55.0'	119°17.5'	2000	240°	1	partly cloudy	moderate	21.23	33.890
107.90-B	17	1535	28°32.0'	119°58.0'	2000	280°	4	partly cloudy	rough	21.16	33.772
110.32-B	19	0500	29°52.0'	115°48.0'	14	330°	3	partly cloudy	rough	16.80	33.584
110.45-B	18	2120	29°27.5'	116°37.0'	200	320°	3	partly cloudy	rough	21.46	33.823
110.55-B	18	1545	29°03.0'	117°17.5'	1800	330°	2	partly cloudy	rough	21.40	33.830
110.65-B	18	1005	28°46.5'	117°58.0'	2000	270°	2	partly cloudy	moderate	20.60	33.715
113.28-B	19	1055	29°25.0'	115°12.0'	10	280°	1	partly cloudy	slight	18.14	33.658
113.29-B	19	1127	29°24.0'	115°13.0'	13	280°	1	partly cloudy	slight	17.89	33.649
113.35-B	19	1453	29°10.5'	115°38.0'	650	300°	2	partly cloudy	moderate	20.76	33.697
113.40-B	19	1715	28°59.5'	115°59.0'	900	300°	3	partly cloudy	moderate	20.81	33.701
113.45-B	19	1925	28°53.0'	116°17.0'	800	320°	3	partly cloudy	moderate	20.80	33.666
113.50-B	19	2205	28°41.5'	116°36.5'	2100	300°	4	partly cloudy	rough	21.09	33.737
113.55-B	20	0035	28°32.0'	116°57.0'	2000	320°	3	partly cloudy	moderate	20.88	33.728
113.60-B	20	0310	28°22.0'	117°16.0'	1900	320°	3	partly cloudy	moderate	20.62	33.642
113.65-B	20	0540	28°12.5'	117°35.5'	1950	320°	3	partly cloudy	moderate	21.39	33.745
113.70-B	20	0805	28°02.5'	117°54.0'	2000	340°	4	partly cloudy	moderate	21.52	33.763
113.80-B	20	1250	27°43.0'	118°30.0'	2000	330°	4	partly cloudy	moderate	21.40	33.699
117.25-B	22	0038	28°58.0'	114°37.0'	30	320°	4	partly cloudy	moderate	20.60	33.750

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
117.25-B	X-22	0110	28°58.5'	114°36.5'	10	320°	4	partly cloudy	moderate	20.28	33.725
117.26-B	21	2350	28°56.0'	114°41.5'	35	320°	5	partly cloudy	moderate	20.58	33.741
117.30-B	21	2205	28°48.0'	114°56.5'	50	320°	4	partly cloudy	rough	19.24	33.662
117.35-B	21	1925	28°38.0'	115°16.0'	110	330°	4	partly cloudy	rough	19.45	33.611
117.40-B	21	1440	28°28.0'	115°35.5'	500	340°	5	partly cloudy	rough	20.82	33.712
117.45-B	21	1150	28°22.0'	115°57.5'	2000	330°	5	partly cloudy	rough	20.94	33.700
117.50-B	21	0900	28°10.0'	116°15.5'	2000	340°	5	partly cloudy	rough	21.00	33.691
117.55-B	21	0505	27°58.0'	116°34.5'	2100	340°	5	partly cloudy	very rough	20.93	33.619
117.60-B	21	0330	27°47.5'	116°53.5'	2100	340°	5	partly cloudy	very rough	21.15	33.717
117.65-B	21	0030	27°38.0'	117°13.0'	1750	340°	4	partly cloudy	very rough	21.12	33.652
117.70-B	20	2205	27°27.5'	117°32.0'	2000	340°	5	partly cloudy	rough	21.09	33.665
117.80-B	20	1710	27°08.0'	118°10.5'	2100	300°	4	partly cloudy	rough	21.32	33.672
118.39-B	21	1640	28°18.5'	115°23.5'	135	330°	3	partly cloudy	rough	21.04	33.755
120.22-B	22	0610	28°28.0'	114°04.0'	10	300°	2	partly cloudy	moderate	21.54	33.806
120.23-B	22	0645	28°27.0'	114°06.5'	13	280°	4	partly cloudy	moderate	21.42	33.787
120.24-B	22	0735	28°25.0'	114°10.5'	20	300°	2	partly cloudy	moderate	21.20	33.766
120.25-B	22	0820	28°22.5'	114°15.0'	35	290°	4	partly cloudy	moderate	21.00	33.779
120.30-B	22	1040	28°13.0'	114°34.0'	51	320°	3	partly cloudy	moderate	21.31	33.707
120.35-B	22	1320	28°03.0'	114°54.0'	41	280°	4	partly cloudy	moderate	21.45	33.778

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
120.40-B	X-22	1515	27°56.5'	115°14.0'	20	300°	4	partly cloudy	moderate	20.98	33.740
120.55-B	22	2350	27°23.0'	116°12.0'	2000	300°	3	partly cloudy	moderate	21.94	33.913
120.65-B	23	0530	27°03.0'	116°50.5'	2050	280°	3	partly cloudy	moderate	22.06	33.892
123.36-B	24	0740	27°26.0'	114°36.0'	25	330°	2	partly cloudy	slight	22.41	34.281
123.36-B	24	0840	27°24.0'	114°32.0'	10	330°	2	partly cloudy	slight	23.24	34.410
123.37-B	24	0640	27°24.0'	114°40.0'	36	330°	4	partly cloudy	slight	23.34	34.459
123.45-B	24	0220	27°09.0'	115°11.0'	2250	270°	3	partly cloudy	moderate	21.96	33.859
123.50-B	23	2345	26°58.0'	115°30.5'	2000	320°	1	partly cloudy	moderate	22.22	33.879
123.55-B	23	2115	26°48.5'	115°49.5'	2100	calm		partly cloudy	slight	22.84	34.231
123.60-B	23	1900	26°40.0'	116°06.5'	2050	330°	2	partly cloudy	moderate	22.94	34.235
123.65-B	23	1605	26°28.0'	116°30.0'	2100	360°	1	partly cloudy	moderate	22.36	33.872
123.70-B	23	1335	26°18.5'	116°48.5'	2000	270°	2	partly cloudy	moderate	22.83	34.159
127.32-B	24	1345	26°58.5'	114°00.5'	10	320°	2	partly cloudy	slight	22.84	34.439
127.33-B	24	1420	26°57.5'	114°02.0'	35	320°	2	partly cloudy	slight	22.52	34.386
127.34-B	24	1455	26°55.0'	114°06.5'	75	300°	3	partly cloudy	moderate	23.02	34.505
127.45-B	24	2050	26°33.0'	114°49.5'	1800	320°	4	partly cloudy	rough	22.02	33.882
127.50-B	24	2320	26°22.0'	115°07.0'	1700	320°	5	partly cloudy	rough	22.20	33.863
127.55-B	25	0140	26°12.0'	115°26.0'	1950	340°	5	partly cloudy	rough	22.04	33.856
127.60-B	25	0405	26°03.5'	115°46.5'	2050	320°	5	partly cloudy	rough	21.98	33.940

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
127.65-B	X-25	0635	25°53.0'	116°05.2'	1950	320°	5	partly cloudy	rough	21.70	33.894
127.70-B	25	0905	25°44.0'	116°24.5'	2000	320°	5	partly cloudy	rough	22.71	34.200
130.26-B	26	1540	26°37.0'	113°13.0'	17	360°	4	partly cloudy	slight	23.82	34.587
130.26-B	26	1620	26°38.0'	113°11.0'	10	360°	3	partly cloudy	moderate	23.46	34.531
130.28-B	26	1415	26°33.0'	113°21.0'	30	040°	4	partly cloudy	moderate	24.64	34.670
130.35-B	26	1025	26°19.0'	113°48.0'	200	320°	3	partly cloudy	moderate	23.35	34.409
130.45-B	26	0440	25°58.5'	114°26.5'	1950	330°	5	partly cloudy	rough	23.84	34.481
130.55-B	25	2230	25°40.0'	115°06.5'	2000	330°	4	partly cloudy	very rough	22.96	34.216
130.65-B	25	1640	25°20.5'	115°44.5'	2000	340°	4	partly cloudy	rough	22.86	34.180
133.20-B	26	2200	26°13.5'	112°26.0'	9	240°	4	partly cloudy	slight	24.94	34.548
133.21-B	26	2255	26°12.5'	112°32.5'	25	280°	4	partly cloudy	slight	25.60	34.586
133.23-B	27	0010	26°08.5'	112°40.0'	40	300°	4	partly cloudy	moderate	24.98	34.620
133.25-B	27	0115	26°04.5'	112°48.0'	42	300°	4	partly cloudy	moderate	24.31	34.463
133.30-B	27	0345	25°54.5'	113°07.5'	105	320°	5	partly cloudy	moderate	24.41	34.535
133.35-B	27	0610	25°44.5'	113°26.5'	360	320°	4	partly cloudy	slight	24.43	34.422
133.40-B	27	0840	25°34.5'	113°45.5'	1900	320°	4	partly cloudy	moderate	24.81	34.560
133.45-B	27	1105	25°23.0'	114°06.5'	2000	320°	3	partly cloudy	moderate	24.69	34.716
133.50-B	27	1340	25°11.5'	114°26.0'	2000	330°	3	partly cloudy	moderate	24.78	34.756
133.55-B	27	1605	25°00.0'	114°45.0'	2050	340°	3	partly cloudy	moderate	24.76	34.684

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
133.60-B	X-27	1815	24°50.0'	115°02.0'	2050	340°	3	partly cloudy	rough	22.34	33.819
137.20-B	28	2150	25°40.0'	112°07.0'	8	280°	4	partly cloudy	moderate	25.55	34.579
137.21-B	28	2055	25°38.0'	112°11.0'	15	280°	4	partly cloudy	moderate	25.39	34.576
137.22-B	28	2005	25°36.0'	112°15.0'	30	290°	4	partly cloudy	moderate	25.52	34.591
137.35-B	28	1255	25°10.0'	113°04.5'	550	320°	4	partly cloudy	moderate	26.34	34.818
137.45-B	28	0710	24°50.0'	113°42.5'	1750	320°	4	partly cloudy	moderate	24.58	34.571
137.55-B	28	0140	24°30.0'	114°20.5'	1950	340°	4	partly cloudy	rough	22.69	33.823

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

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