UNIVERSITY OF CALIFORNIA SCRIPPS INSTITUTION OF OCEANOGRAPHY

data report

PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 6210-11
5 October - 18 November 1962

and

CCOFI Cruise 6212
17 - 19 December 1962

SIO Reference 63-25
22 August 1963

UNIVERSITY OF CALIFORNIA

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CCOFI CRUISE 6210-11
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Sponsored by
Marine Research Committee

SIO Reference 63-25
22 August 1963

Approved for distribution:

Roger Revelle

Roger Revelle, Director

CONTENTS

INTRODUCTION

The data presented in this report were collected by the RV Black Douglas of the Bureau of Commercial Fisheries and the RV Alexander Agassiz of the Scripps Institution of Oceanography on Cruises 6210-11 and 6212 of the California Cooperative Oceanic Fisheries Investigations program. The RV Alexander Agassiz participated in both cruises; the RV Black Douglas, in 6210-11 only. 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 6203-4 (Scripps Institution report, SIO Ref. 63-9) and 6207-8 (SIO Ref. 62-23).

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 place, but that the values recorded "have a reproducibility of ± 0.004‰ salinity at the 95 percent probability level, and a probable accuracy of ± 0.01‰ salinity or better at the same level of probability."[2/] The values are recorded to two decimal places when obtained by chlorinity titration, or by salinometer where only one determination

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[1/] Klein, Hans T. A new technique for processing physical oceanographic data. MS.

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

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.

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

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

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

p: pretrip or posttrip.

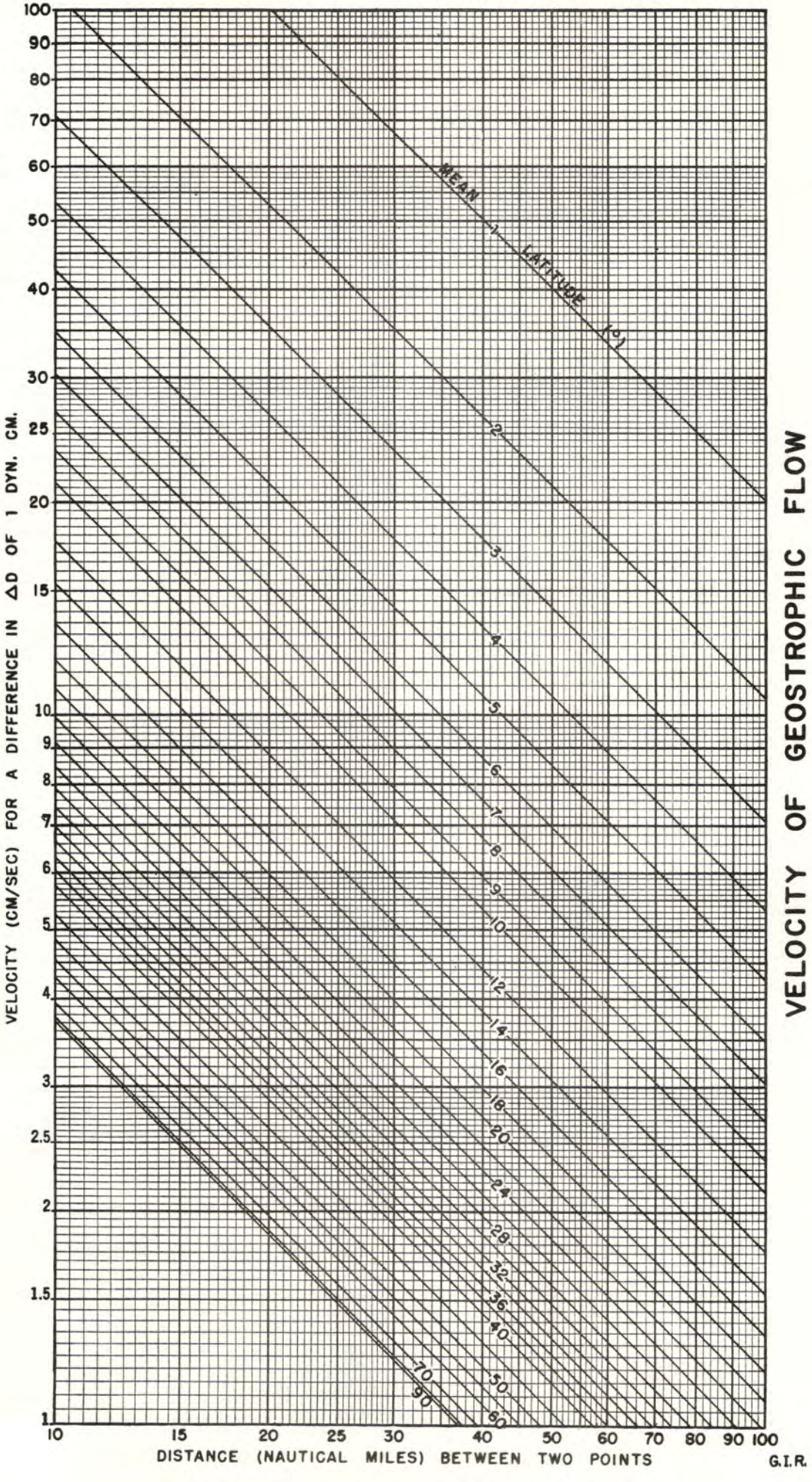
Values which are not drawn through because they seem to be in error without apparent reason are indicated by one of the following notations.

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

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

FORMAT

These data are typed in the format of the University of California Press publication, Oceanic Observations of the Pacific. So that these pages can be used as copy for the 1962 volume, the first page of Cruise 6210-11 data is numbered 143; Cruise 6212, 190.


VELOCITY OF GEOSTROPHIC FLOW
VELOCITY (CM/SEC) FOR A DIFFERENCE IN ΔD OF 1 DYN. CM.
DISTANCE (NAUTICAL MILES) BETWEEN TWO POINTS
MEAN LATITUDE (°)
100
90
80
70
60
50
40
30
25
20
15
10
9
8
7
6
5
4
3
2.5
2
1.5
1
10
15
20
25
30
40
50
60
70
80
90
100
2
3
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7
8
9
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12
14
16
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28
32
36
40
70
90
50
60
G.I.R.

FIGURES

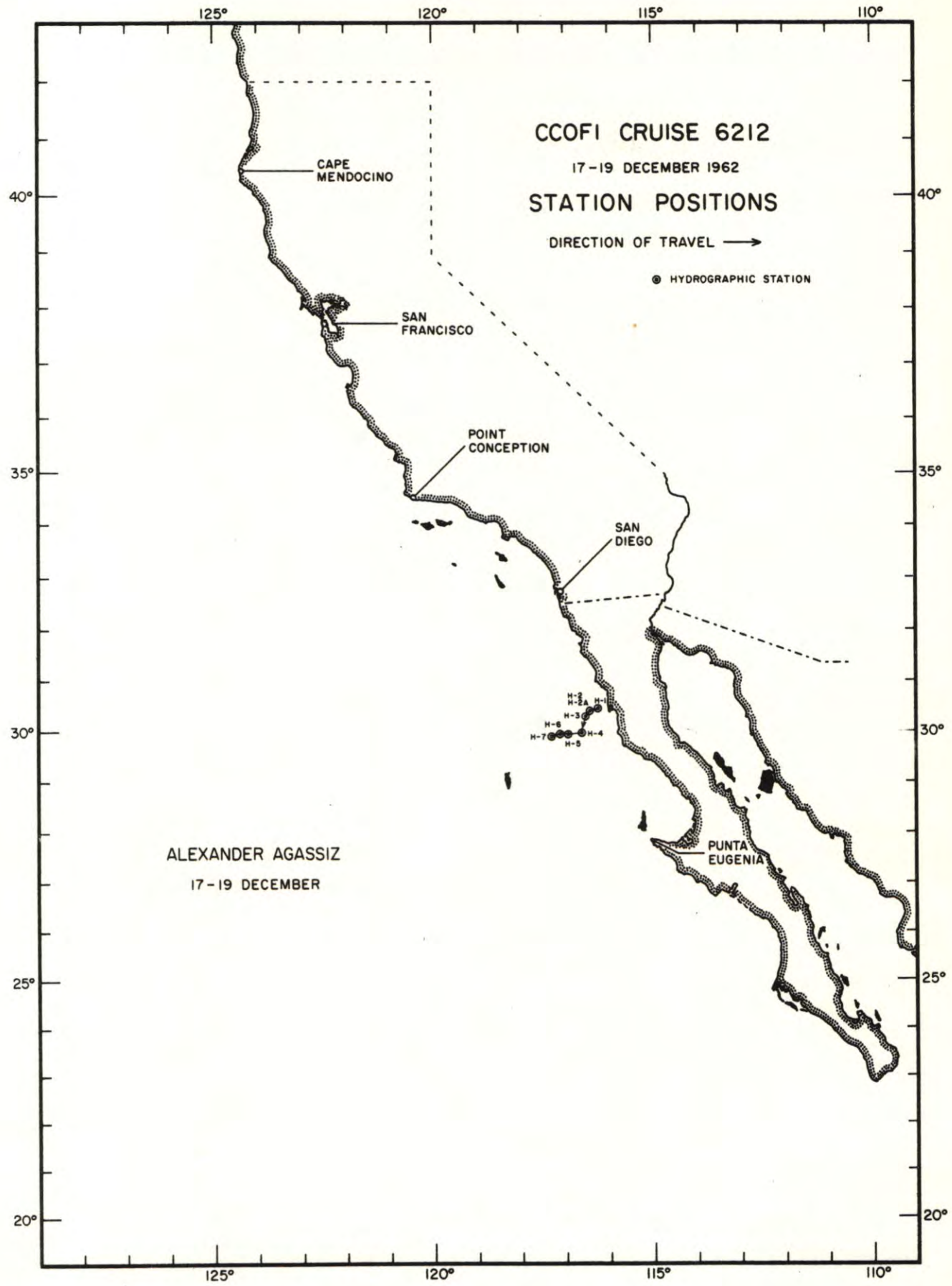
CCOFI CRUISE 6212
17-19 DECEMBER 1962
STATION POSITIONS
DIRECTION OF TRAVEL
HYDROGRAPHIC STATION
CAPE MENDOCINO
SAN FRANCISCO
POINT CONCEPTION
SAN DIEGO
PUNTA EUGENIA
H-1
H-2
H-2A
H-3
H-4
H-5
H-6
H-7
ALEXANDER AGASSIZ
17-19 DECEMBER
125°
120°
115°
110°
40°
35°
30°
25°
20°

FIGURE 1

PERSONNEL
Cruise 6212

SHIP'S CAPTAIN

Miller, Frank, RV Alexander Agassiz

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV Alexander Agassiz

Bottom, Kenneth S., Senior Marine Technician
Farrell, David E., Marine Technician
Pine, James S., Senior Marine Technician

SIO

CCOFI
6212

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

106.33
(H-1)

ALEXANDER AGASSIZ; December 17, 1962; 1649 GCT; 30°28'N, 116°16'W; sounding, 725 fm; wind, 120°, force 3; weather, overcast; sea, very rough; wire angle, 22°. a)

2	15.65	33.625	5.35b)	317	0	(15.65)	(33.62)	(5.35)	(24.79)	(317)	(0.00)
11	15.58	33.626	5.65	315	10	15.58	33.63	5.64	24.81	315	0.03
34	14.73	33.593	5.35	300	20	15.30	33.62	5.60	24.86	310	0.06
62	13.05	33.707	2.85	258	30	15.10	33.61	5.51	24.90	306	0.09
85	12.28	33.747	2.47	241	50	13.30	33.67	3.21	25.32	266	0.15
99	11.98	33.790	2.06	233	75	12.62	33.73	2.66	25.50	249	0.22
113	11.65	33.823	2.16	224	100	11.97	33.79	2.07	25.68	232	0.28
140	10.98	33.940	1.99	204	125	11.35	33.87	2.09	25.85	216	0.33
158	10.58	34.039	1.98	190	150	10.72	33.98	1.98	26.05	197	0.39
180	10.39	34.140	1.58	179	200	10.02	34.19	1.38	26.34	170	0.48
213	9.83	34.215	1.26	165	250	9.51	34.28	1.04	26.49	155	0.56
267	9.39	34.316	0.96	150	300	8.95	34.33	0.82	26.62	143	0.64
322	8.61	34.334	0.74	137	400	7.65	34.32	0.57	26.81	124	0.78
403	7.61	34.316	0.56	124	500	6.57	34.32	0.40	26.96	110	0.90
523	6.37	34.328	0.36	107	600	5.80	34.36	0.33	27.09	98	1.01
628	5.62	34.377	0.32	94	700	5.19	34.40	0.31	27.20	88	1.12
783	4.74	34.436	0.30	80	800	4.67	34.44	0.33	27.29	79	1.21
945	4.21	34.473	0.56	72	1000	4.07	34.48	0.58	27.39	70	1.37
1143	3.72	34.510	0.64	64	1200	3.50	34.53	0.78	27.48	61	1.52
1223	3.48	34.529	0.80	61							

106.35
(H-2)

ALEXANDER AGASSIZ; December 17, 1962; 1859 GCT; 30°24'N, 116°26'W; sounding, 940 fm; wind, 180°, force 3; weather, rain; sea, very rough; wire angle, 16°.

1	15.27	33.420	5.65	324	0	(15.27)	(33.42)	(5.65)	(24.72)	(324)	(0.00)
11	15.18	33.587	5.70	310	10	15.19	33.58	5.70	24.86	310	0.03
30	14.34	33.592	4.76	292	20	14.60	33.59	5.08	24.99	297	0.06
60	12.89	33.558	4.58	266	30	14.34	33.59	4.76	25.05	292	0.09
78	12.32	33.686	3.54	246	50	13.22	33.56	4.62	25.25	272	0.15
93	11.54	33.734	3.32	229	75	12.43	33.66	3.71	25.49	250	0.21
108	11.22	33.796	2.82	219	100	11.38	33.76	3.10	25.76	224	0.27
132	10.52	33.919	2.49	198	125	10.76	33.88	2.59	25.97	205	0.33
152	9.94	34.017	2.22	181	150	9.97	34.00	2.26	26.20	183	0.38
176	9.86	34.122	1.84	172	200	9.53	34.20	1.49	26.43	161	0.47
204	9.48	34.209	1.42	160	250	9.09	34.29	1.04	26.57	148	0.54
253	9.07	34.293	1.03	147	300	8.73	34.33	0.73	26.66	139	0.62
310	8.64	34.340	0.68	137	400	7.65	34.32	0.57	26.81	124	0.76
402	7.62	34.316	0.57	124							

a) Eight hydrographic stations were occupied in conjunction with drogue measurements on December 13 and 14 off Baja California to determine if drogue movements were consonant with the geostrophic flow. Results of this study are reported by Reid (1963).

b) Bubbles were noted in the oxygen samples before reagents were added.

SIO
CCOFI
6212

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

106.35
(H-2A)

ALEXANDER AGASSIZ; December 19, 1962; 2259 GCT; 30°23.5'N, 116°26'W; sounding, 845 fm; wind, 300°, force 3; weather, overcast; sea, rough; wire angle, 18°.

1	15.62	33.592	5.59	318	0	(15.62)	(33.59)	(5.59)	(24.77)	(319)	(0.00)
10	15.62	33.594	5.57	318	10	15.62	33.59	5.57	24.77	319	0.03
29	13.90	33.529	5.21	288	20	14.67	33.58	5.40	24.97	300	0.06
53	12.92	33.600	4.34	264	30	13.88	33.53	5.19	25.10	287	0.09
67	12.35	33.644	3.85	250	50	13.08	33.59	4.42	25.31	268	0.15
81	11.76	33.705	3.44	235	75	12.00	33.68	3.60	25.58	241	0.21
96	11.12	33.792	2.94	217	100	11.00	33.81	2.89	25.87	214	0.27
120	10.55	33.897	2.59	200	125	10.43	33.92	2.43	26.06	196	0.32
138	10.21	34.018	1.98	185	150	10.18	34.09	1.72	26.23	180	0.37
157	10.18	34.123	1.61	177	200	9.49	34.23	1.32	26.46	158	0.46
186	9.70	34.210	1.40	163	250	9.13	34.29	1.05	26.56	148	0.53
233	9.23	34.271	1.15	151	300	8.80	34.33	0.80	26.65	140	0.61
284	8.98	34.325	0.88	143	400	7.52	34.33	0.52	26.84	122	0.75
360	7.98	34.335	0.59	128	500	6.51	34.33	0.37	26.98	109	0.87
454	6.96	34.320	0.44	115	600	5.70	34.37	0.28	27.11	96	0.98
553	6.06	34.355	0.29	101	700	5.08	34.41	0.29	27.22	86	1.08
697	5.10	34.408	0.28	86	800	4.75	34.44	0.32	27.28	80	1.17
844	4.62	34.445	0.34	78	1000	4.12	34.49	0.47	27.39	70	1.33
995	4.16	34.490	0.45	70							
1077	3.86	34.501	0.59	66							

107.37
(H-3)

ALEXANDER AGASSIZ; December 18, 1962; 0016 GCT; 30°17'N, 116°31'W; sounding, 850 fm; wind, 100°, force 4; weather, overcast; sea, high; wire angle, 11°.

1	16.00	33.614	5.56a)	325	0	(16.00)	(33.61)	(5.56)	(24.70)	(325)	(0.00)
11	16.00	33.612	5.33	325	10	16.00	33.61	5.35	24.70	325	0.03
35	14.70	33.592	5.62	299	20	15.50	33.60	5.40	24.80	315	0.06
65	13.69	33.635	4.12	276	30	14.79	33.59	5.63	24.95	301	0.10
90	12.07	33.725	3.25b)	239	50	14.31	33.60	5.04	25.06	291	0.15
105	11.42	33.697	3.77	230	75	13.00	33.69	3.68	25.40	259	0.22
120	10.82	33.737	3.57	216	100	11.62	33.70	3.64	25.67	233	0.29
149	9.92	33.917	2.82	188	125	10.67	33.76	3.46	25.89	212	0.34
169	9.66	33.990	2.50	179	150	9.89	33.92	2.81	26.15	188	0.39
193	9.70	34.159	1.70	167	200	9.65	34.20	1.59	26.41	163	0.48
228	9.30	34.248	1.33	154	250	9.06	34.27	1.21	26.56	149	0.56
287	8.68	34.296	1.00	141	300	8.57	34.30	0.90	26.66	139	0.64
347	8.24	34.337	0.62	132	400	7.59	34.32	0.56	26.82	124	0.77
435	7.16	34.316	0.54	118	500	6.54	34.33	0.41	26.97	109	0.90
564	6.02	34.353	0.30	101	600	5.77	34.37	0.27	27.11	97	1.01
676	5.32	34.396	0.23	90	700	5.19	34.40	0.23	27.20	88	1.11
839	4.58	34.450	0.36	77	800	4.75	34.44	0.30	27.28	80	1.20
1006	4.03	34.487	0.49	69	1000	4.06	34.48	0.48	27.39	70	1.37
1210	3.46	34.532	0.75	60	1200	3.49	34.53	0.73	27.49	61	1.52
1292	3.28	34.541	0.84	58							

a) Bubbles were noted in the oxygen samples before reagents were added.
b) Alternate value, 3.12 ml/L, not used in interpolation.

SIO

CCOFI
6212

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

107.47
(H-6)

ALEXANDER AGASSIZ; December 18, 1962; 2146 GCT; 29°55.5'N, 117°09'W; sounding, 1152 fm; wind, 300°, force 2; weather, partly cloudy; sea, very rough; wire angle, 04°.

1	16.54	33.665	5.54	333	0	(16.54)	(33.66)	(5.54)	(24.61)	(333)	(0.00)
11	16.33	33.667	5.55	328	10	16.35	33.67	5.55	24.67	329	0.03
31	16.27	33.665	5.52	327	20	16.29	33.67	5.54	24.68	327	0.07
57	15.61	33.656	5.52	314	30	16.27	33.67	5.52	24.68	327	0.10
72	13.78	33.585	4.78	281	50	15.99	33.66	5.50	24.74	321	0.16
87	12.55	33.556	4.69	260	75	13.20	33.56	4.72	25.26	272	0.24
102	11.88	33.594	4.43	245	100	11.98	33.58	4.47	25.51	248	0.30
128	10.76	33.682	3.66	219	125	10.87	33.67	3.73	25.78	222	0.36
148	10.26	33.748	3.34	206	150	10.20	33.75	3.32	25.96	205	0.42
168	9.82	33.794	3.21	196	200	9.20	33.98	2.55	26.31	172	0.51
197	9.26	33.978	2.58	173	250	8.38	34.04	2.45	26.48	156	0.60
248	8.40	34.039	2.48	156	300	7.79	34.12	1.69	26.63	141	0.67
303	7.77	34.123	1.66	141	400	7.34	34.30	0.55	26.84	122	0.81
382	7.46	34.285	0.66	124	500	6.54	34.33	0.30	26.97	109	0.93
483	6.68	34.325	0.30	111	600	5.89	34.38	0.30	27.10	97	1.04
588	5.97	34.379	0.31	98	700	5.26	34.40	0.27	27.19	89	1.15
739	5.02	34.413	0.28	85	800	4.74	34.42	0.31	27.27	81	1.24
894	4.35	34.456	0.41	75	1000	4.03	34.49	0.53	27.40	69	1.41
1052	3.88	34.494	0.58	67							
1137	3.66	34.496	0.59	65							

107.49
(H-7)

ALEXANDER AGASSIZ; December 18, 1962; 2347 GCT; 29°52'N, 117°19.5'W; sounding, 1190 fm; wind, 300°, force 2; weather, partly cloudy; sea, very rough; wire angle, 11°.

1	16.36	33.537	5.52	338	0	(16.36)	(33.54)	(5.52)	(24.56)	(338)	(0.00)
11	16.18	33.528	5.58	335	10	16.19	33.53	5.58	24.59	335	0.03
31	16.12	33.531	5.52	334	20	16.14	33.53	5.55	24.61	334	0.07
55	14.96	33.405	5.72	318	30	16.12	33.53	5.52	24.61	334	0.10
70	13.58	33.447	5.43	288	50	15.41	33.46	5.63	24.72	324	0.17
85	12.72	33.433	5.28	272	75	13.47	33.45	5.40	25.12	285	0.24
99	11.66	33.595	4.94	241	100	11.62	33.60	4.91	25.59	240	0.31
125	10.96	33.645	4.18	225	125	10.96	33.64	4.18	25.74	226	0.37
144	10.40	33.718	3.61	211	150	10.21	33.75	3.48	25.96	205	0.42
164	9.84	33.845	3.14	192	200	8.93	33.95	2.79	26.33	170	0.52
193	9.06	33.933	2.88	174	250	8.44	34.11	2.00	26.53	151	0.60
243	8.48	34.085	2.14	154	300	8.25	34.23	1.22	26.65	140	0.68
298	8.27	34.229	1.23	140	400	7.38	34.31	0.53	26.84	122	0.81
376	7.54	34.293	0.66	125	500	6.73	34.37	0.23	26.98	108	0.93
474	6.93	34.367	0.25	111	600	5.90	34.37	0.24	27.09	98	1.05
579	6.07	34.369	0.23	100	700	5.28	34.40	0.27	27.19	89	1.15
726	5.12	34.414	0.28	86	800	4.80	34.43	0.31	27.27	81	1.24
890	4.49	34.451	0.35	76	1000	4.05	34.48	0.41	27.39	70	1.41
1045	3.94	34.494	0.46	68							
1130	3.70	34.510	0.61	64							

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
ALEXANDER AGASSIZ; December 18, 1962; 1550 GCT; 29°56'N, 116°56'W; sounding, 705 fm; wind, direction missing, force 1; weather, partly cloudy; sea, very rough; wire angle, 08°.											107.44 (H-5)
1	16.32	33.684	5.52	327	0	(16.32)	(33.68)	(5.52)	(24.68)	(327)	(0.00)
11	16.32	33.675	5.51	327	10	16.32	33.67	5.51	24.67	328	0.03
31	16.32	33.681	5.49	327	20	16.32	33.68	5.49	24.68	327	0.07
57	13.72	33.558	4.96	282	30	16.32	33.68	5.49	24.68	327	0.10
71	12.14	33.651	3.71	246	50	14.71	33.59	5.19	24.97	300	0.16
85	11.26	33.799	2.62	219	75	11.79	33.70	3.29	25.64	236	0.23
101	10.94	33.897	2.00	207	100	10.95	33.89	2.01	25.94	207	0.28
126	10.69	33.979	1.63	196	125	10.69	33.98	1.64	26.06	196	0.34
145	10.64	34.037	1.45	191	150	10.63	34.05	1.39	26.12	190	0.38
165	10.61	34.086	1.29	187	200	10.34	34.17	1.41	26.27	176	0.48
196	10.38	34.157	1.42	178	250	9.87	34.28	1.15	26.43	161	0.56
246	9.92	34.269	1.19	162	300	9.21	34.36	0.76	26.60	144	0.64
301	9.20	34.360	0.77	144	400	7.99	34.34	0.55	26.78	128	0.79
380	8.30	34.349	0.58	131	500	6.68	34.33	0.40	26.96	111	0.91
478	6.84	34.325	0.42	113	600	5.99	34.35	0.30	27.06	101	1.03
582	6.10	34.347	0.31	102	700	5.43	34.39	0.25	27.16	91	1.13
730	5.26	34.398	0.25	89	800	4.80	34.43	0.30	27.27	81	1.22
884	4.38	34.462	0.40	74	1000	4.13	34.48	0.54	27.38	71	1.39
1038	4.04	34.490	0.58	69							
1122	3.72	34.514	0.70	64							
ALEXANDER AGASSIZ; December 18, 1962; 1303 GCT; 29°58.5'N, 116°36.5'W; sounding, 1525 fm; wind, 150°, force 2; weather, partly cloudy; sea, very rough; wire angle, 09°.											108.40 (H-4)
1	16.27	33.667	5.51	327	0	(16.27)	(33.67)	(5.51)	(24.68)	(327)	(0.00)
11	16.28	33.667	5.54	327	10	16.28	33.67	5.52	24.68	327	0.03
31	16.26	33.665	5.52	327	20	16.27	33.67	5.52	24.68	327	0.07
61	15.02	33.624	5.19	304	30	16.26	33.67	5.52	24.69	327	0.10
80	12.90	33.587	4.41	264	50	15.90	33.65	5.40	24.75	320	0.16
96	12.02	33.694	3.80	240	75	13.43	33.59	4.64	25.24	274	0.24
111	11.48	33.780	3.26	224	100	11.87	33.72	3.65	25.64	236	0.30
135	10.81	33.861	2.67	207	125	11.08	33.83	2.90	25.87	214	0.36
155	10.38	33.955	2.35	193	150	10.49	33.94	2.39	26.06	196	0.41
180	9.60	33.987	2.66	178	200	9.03	33.98	2.73	26.34	170	0.50
210	8.83	33.978	2.72	167	250	8.41	34.09	2.10	26.52	152	0.59
260	8.34	34.119	1.91	149	300	8.23	34.21	1.28	26.64	141	0.66
319	8.20	34.256	1.05	137	400	7.78	34.35	0.48	26.82	124	0.80
408	7.71	34.360	0.45	122	500	6.77	34.35	0.34	26.96	111	0.93
517	6.63	34.350	0.32	109	600	5.98	34.36	0.27	27.07	100	1.04
626	5.80	34.368	0.24	97	700	5.41	34.39	0.24	27.17	91	1.14
786	5.00	34.418	0.27	84	800	4.94	34.42	0.27	27.24	84	1.24
956	4.20	34.475	0.43	72	1000	4.02	34.49	0.50	27.40	69	1.41
1116	3.67	34.516	0.67	63	1200	(3.43)	(34.53)	(0.78)	(27.49)	(60)	(1.55)
1197	3.46	34.533	0.77	60							

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