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HYDROGRAPHIC DATA FROM
EQUATORIAL PACIFIC WATERS
NEAR THE GALAPAGOS

NOVEMBER 1993

by

BRIAN H. MILLER
VERNON N. ANDERSON
CURTIS A. COLLINS

AUGUST, 1994

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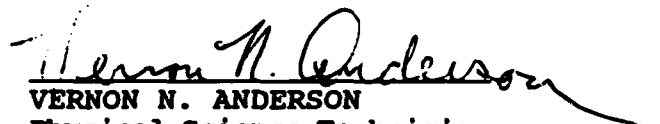
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13. ABSTRACT (maximum 200 words) This data report presents hydrographic (CTD) data from a cruise in an area extending to approximately three hundred kilometers from the Galapagos Islands. A total of 30 CTD casts were made. The report includes remarks concerning data processing and analysis.				
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**HYDROGRAPHIC DATA FROM
EQUATORIAL PACIFIC WATERS
NEAR THE GALAPAGOS**

November 1993

by

**Brian H. Miller
Vernon N. Anderson
Curtis A. Collins**

INTRODUCTION

The CTD data included in this report were collected as part of an Office of Naval Research (ONR) funded project to study how oceanic iron concentration limits phytoplankton growth. This survey was conducted between 5 and 24 November 1993 aboard the Research Vessel Columbus Iselin and has been referred to as IRONEX2. Figure 1 shows the region of study which extended to roughly 300 km from the Galapagos Islands. Sampling stations are also indicated in the figure. A total of 30 CTD casts were made to 1500 m, depth permitting.

These data were collected by Professor Curt Collins and Mr. Vernon Anderson of the Naval Postgraduate School. Professor Richard Barber, Duke University, was the Chief Scientist for the cruise.

We thank the scientific participants and the ship's master and crew for their capable and consistent contributions to the success of this survey.

DATA ACQUISITION AND CALIBRATION

Hydrographic data were acquired using a Neil Brown Mark III-B CTD. A General Oceanics rosette sampler was attached to the CTD and was equipped with twelve 10-liter Niskin bottles for in situ water sampling. The sampling rate was 31.25 Hz and raw data were collected using an EG&G Marine Instruments developed software package called Oceansoft. CTD data were acquired only on the downcast with a winch speed of approximately 30 m min⁻¹ to 150 m, and then 60 m min⁻¹ to the

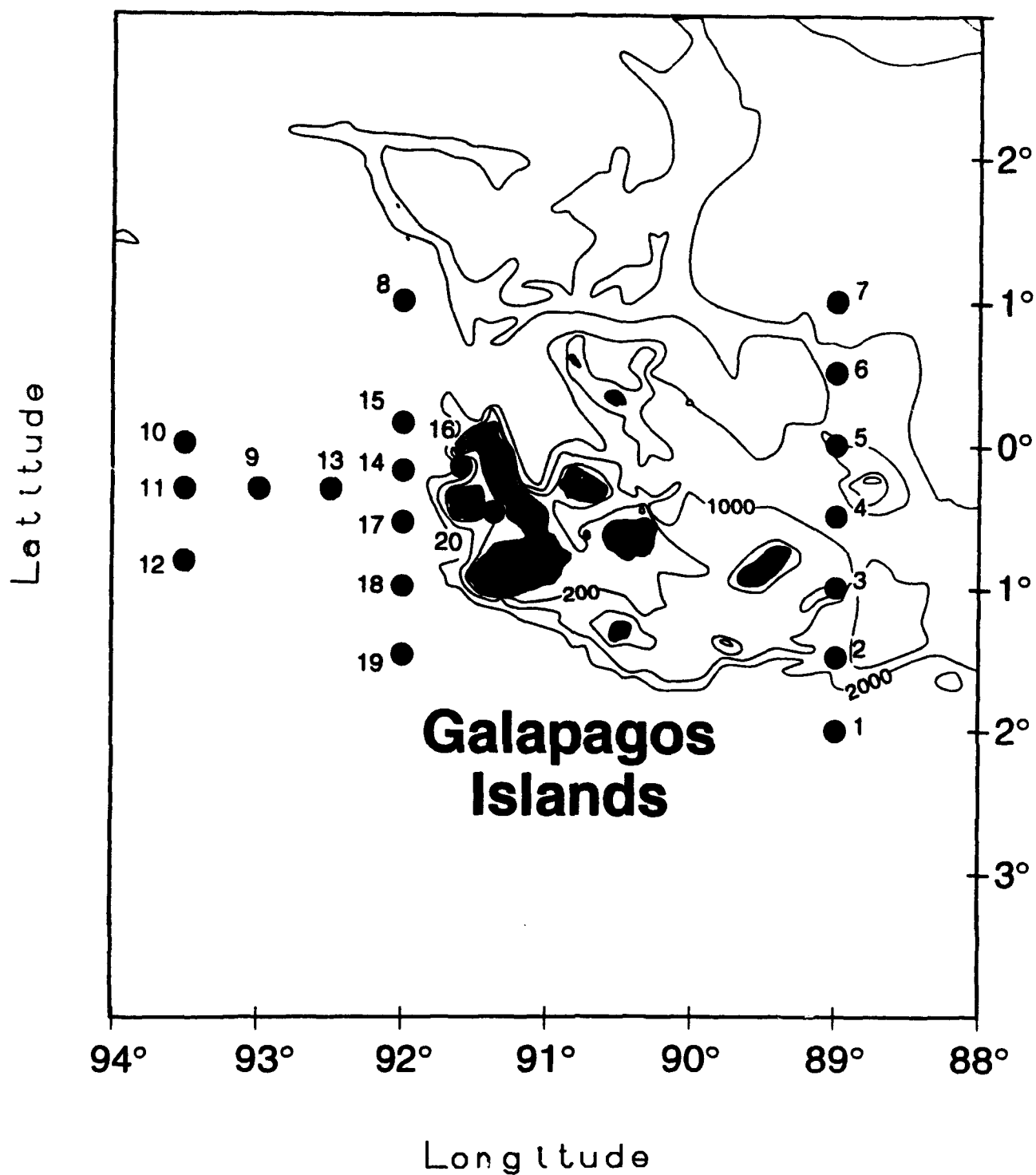


Figure 1. Hydrographic Stations near the Galapagos Islands. Positions shown were occupied by the RV Columbus Iselin during the period 9-19 November 1993.

bottom of the cast. The data were acquired using an HP Vectra computer and stored on the computer's hard disk as well as backed up to a rewritable optical disk. Upon return to shore the data were transferred to and processed on an Amdahl 5995 mainframe computer.

In addition to the CTD data, an underway data acquisition loop recorded wind speed and direction and sea surface temperature and salinity. The sensors used to acquire these data included a Bendex Friez anemometer for the wind speed and direction, two platinum probes for sea surface temperature and a Sea Bird Model 21 thermosalinograph for sea surface salinity. Figures 2 - 4 show wind speed, sea surface temperatures, and sea surface salinities, respectively, measured during the cruise. Additionally, Figure 5 shows plots of surface salinity and temperature versus time and Figure 6 shows a plot of surface temperature versus surface salinity.

The pressure, temperature, and conductivity sensors on the CTD were calibrated prior to the cruise. The pressure calibration was accomplished using an EG&G dead weight tester as a standard. At 6 approximately equally spaced pressures from 0 to 1516 dbar, indicated pressures from the standard and the CTD sensor were recorded. A regression was then performed fitting the CTD pressures to the standard. The result yielded a linear fit with a slope of 0.999933. The CTD pressure offset (the surface pressure value returned by the CTD unit on

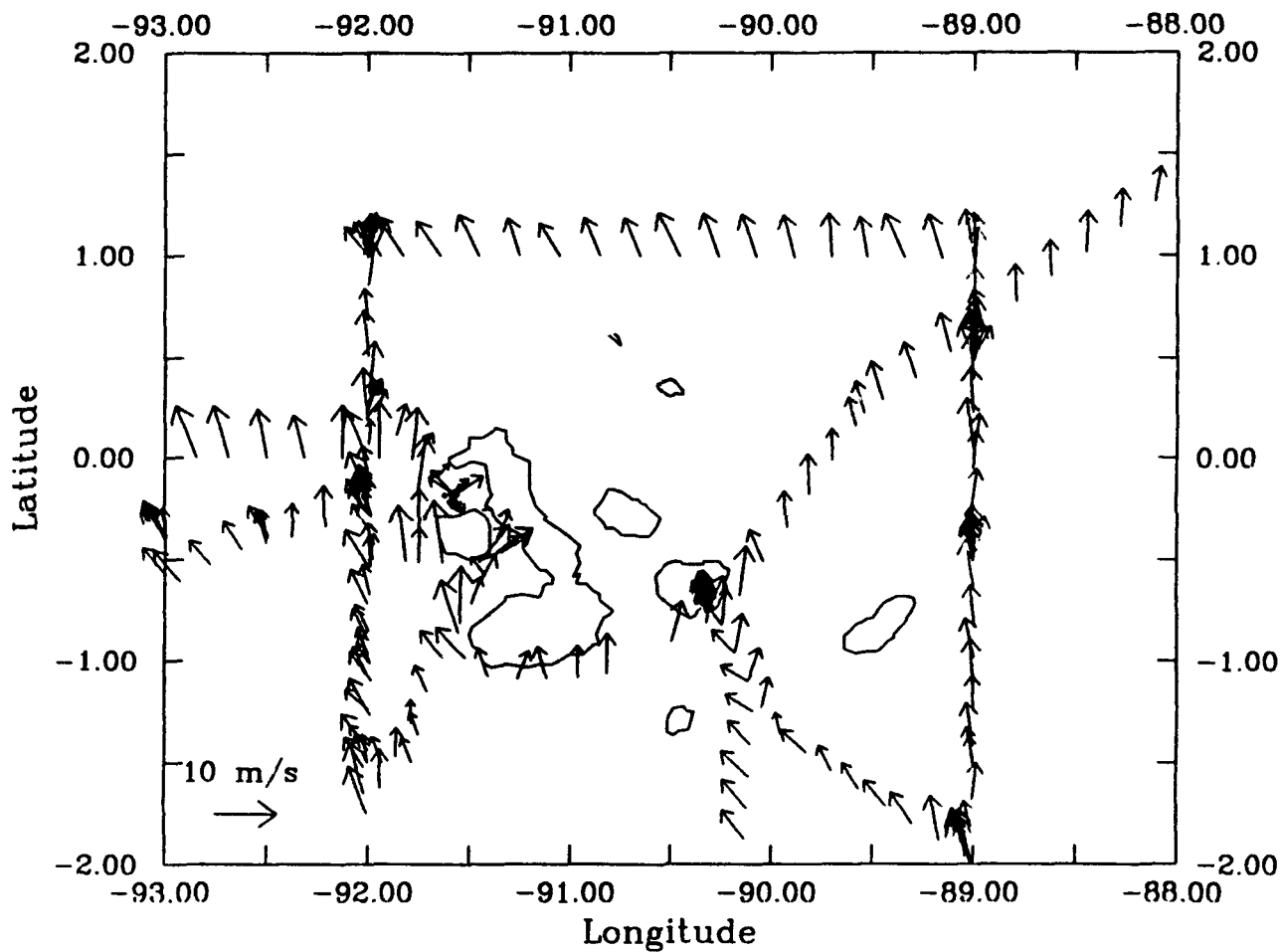


Figure 2. Hourly averaged observed winds (m s^{-1}) near the Galapagos Islands during IRONEX2.

Temperature Map

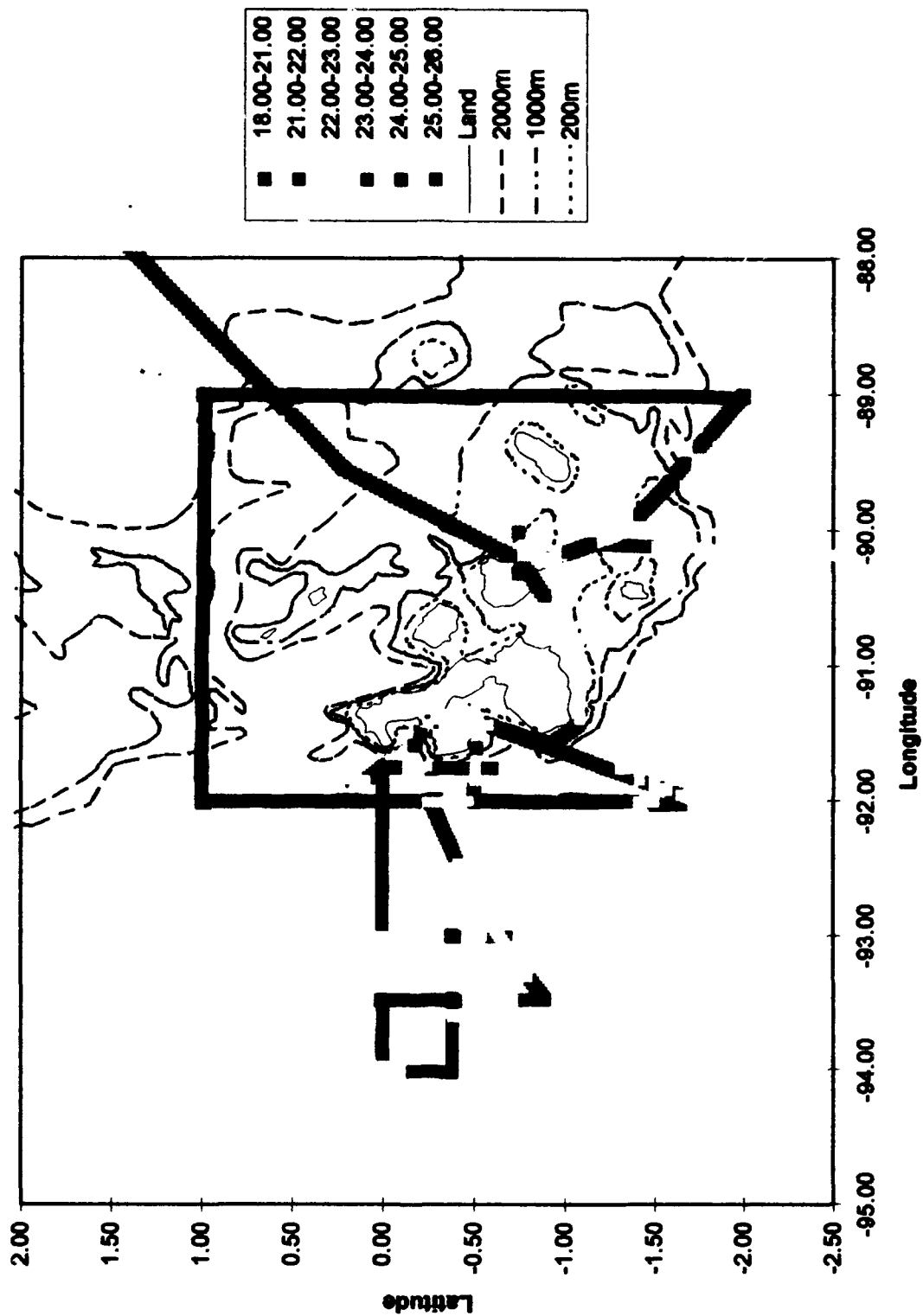


Figure 3. Map of surface temperature (°C) during IRONEX2.

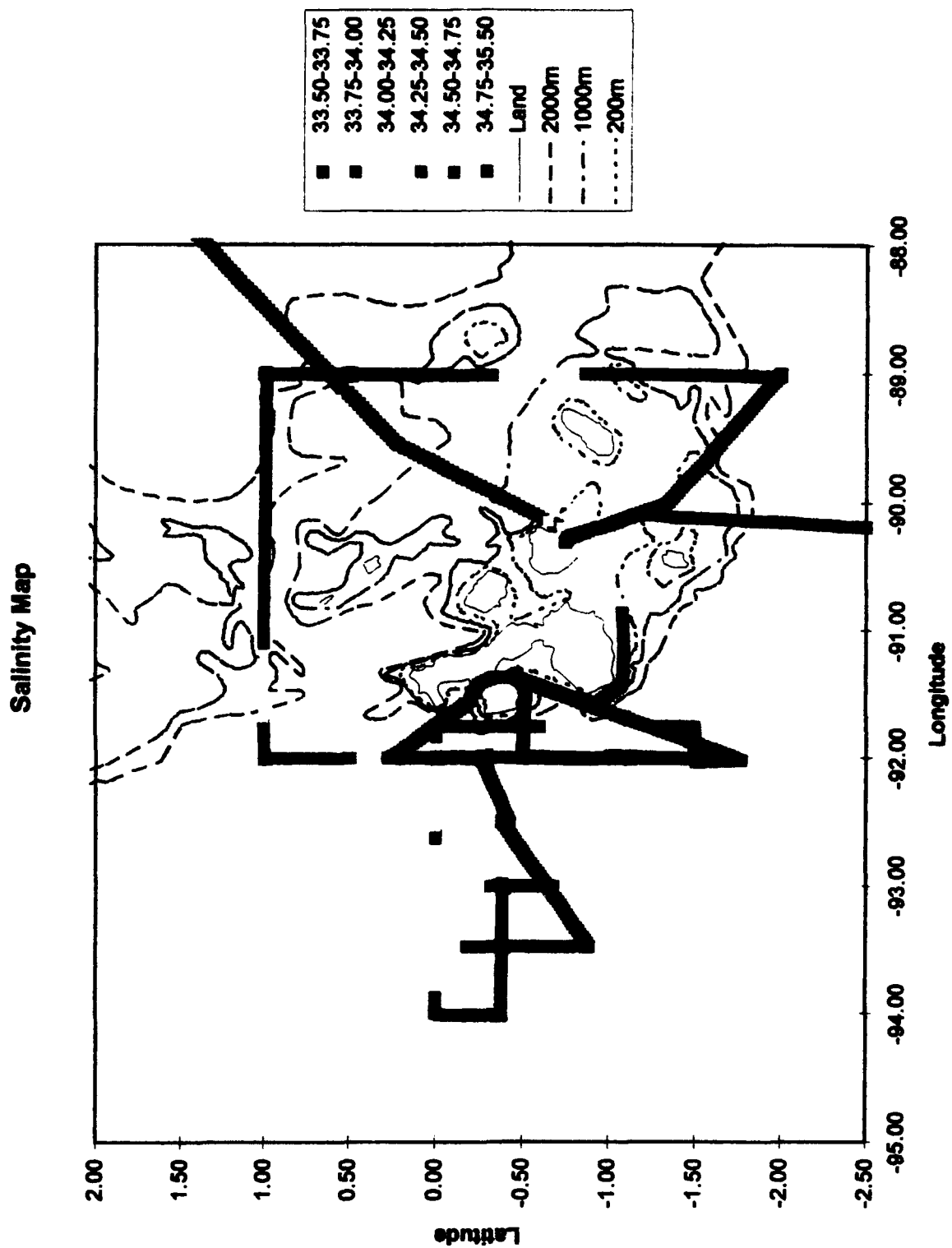


Figure 4. Map of surface salinity (psu) during IRONEX2.

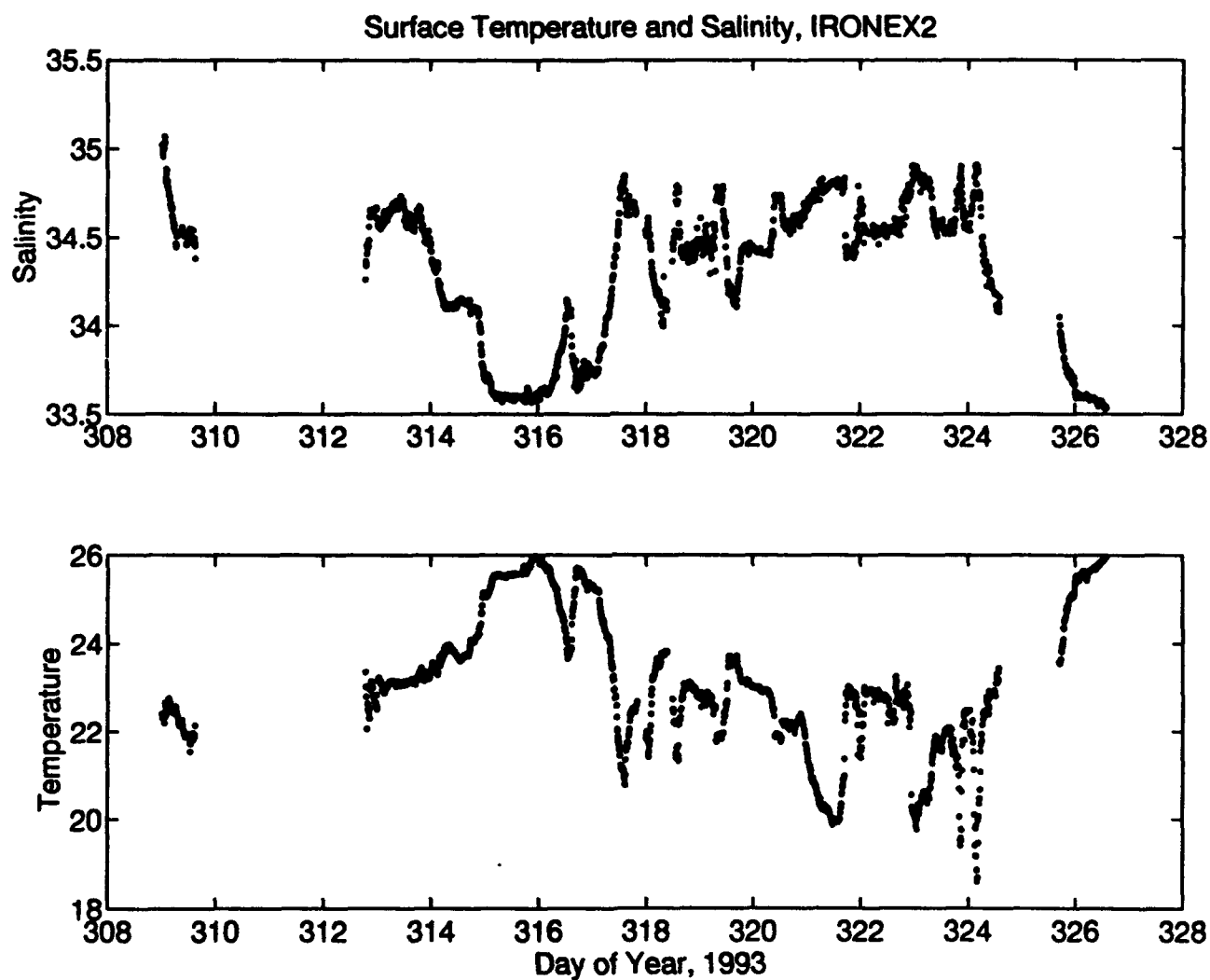


Figure 5. Surface salinity (psu) and temperature (°C) versus time during IRONEX2.

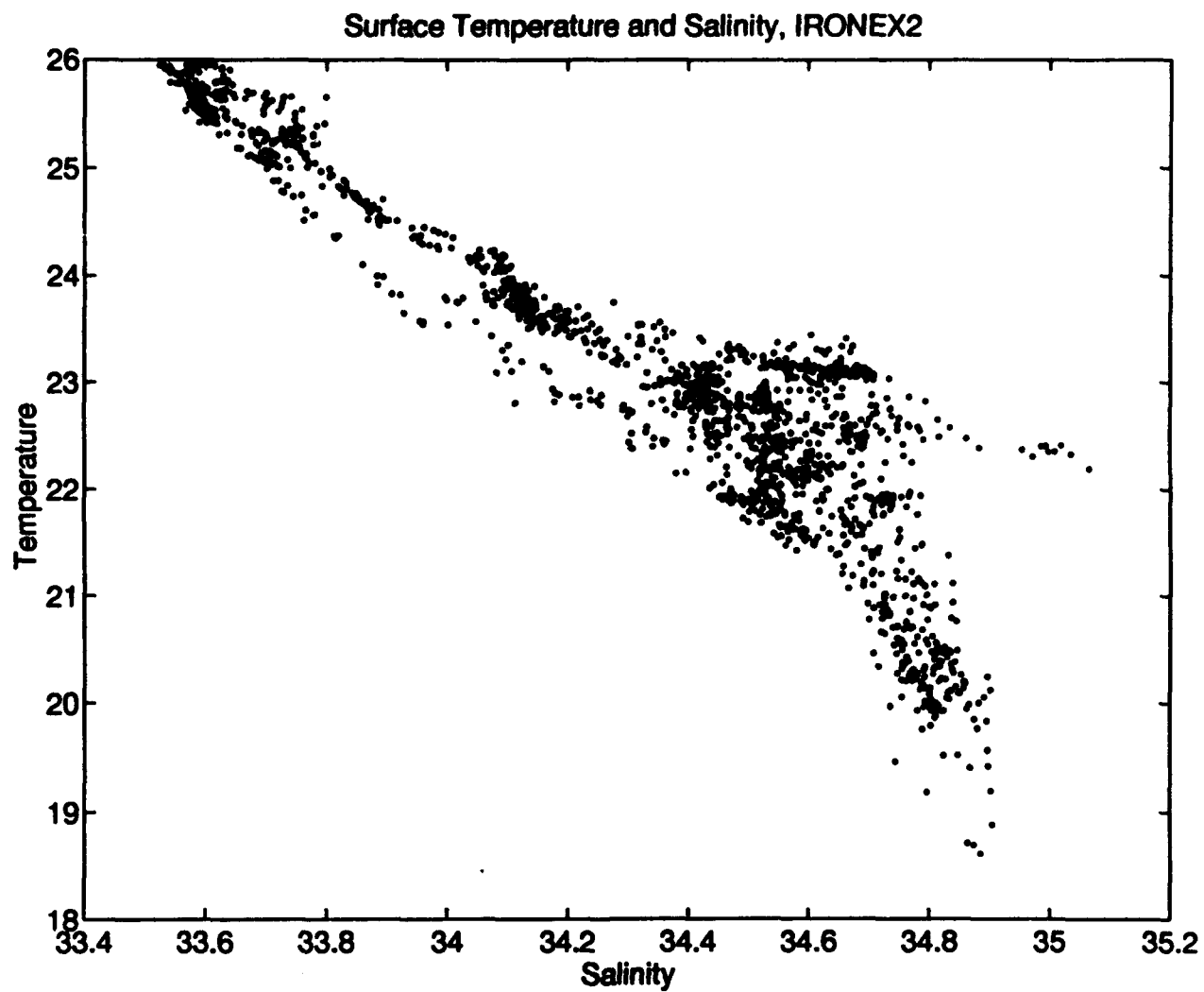


Figure 6. Surface temperature ($^{\circ}\text{C}$) versus surface salinity (psu) during IRONEX2.

deck) at the beginning of each cast was used as the intercept.

The temperature calibration was done using a Rosemount Platinum Resistance Thermometer. This standard sensor is recalibrated approximately every six months using a triple point water cell and a gallium melt point cell. A temperature bath of 70 - 80 liters of fresh water in an insulated tub was used to compare the standard and CTD sensor at 2°C increments from 6 - 30°C. Thirty data points were collected at each temperature and then averaged to yield a single value for each step. A regression was run on the 13 steps revealing a near difference between the standard and the CTD sensor. The coefficients were 1.000022 (slope) and -0.003267 (intercept). A post-cruise calibration was also done resulting in a linear fit with a slope of 0.999999 and an intercept of 0.001625. Since the differences between pre and post-cruise calibration coefficients were less than 0.005°C, the pre-cruise coefficients were used.

The conductivity calibration was carried out using an EG&G Conductivity Transfer Standard which was standardized with IAPSO standard sea water. A constant conductivity bath was used to compare the standard and sensor conductivities at five different conductivity levels. Regression analysis was then performed on the standard and sensor conductivities. A linear fit was found for the CTD sensor with coefficients of 1.009232 (slope) and 0.020469 (intercept). The post-cruise calibration gave a linear fit with a slope of 1.009387 and an intercept of

0.010081. As with the temperature calibration, the pre-cruise coefficients for conductivity were used.

A total of 182 water samples were taken during the cruise for further calibration of the CTD salinity data. The CTD pressure, temperature, and conductivity were recorded as each sample was taken. These numbers, after applying the pre-cruise calibration coefficients, were used to calculate salinity and the results were compared with the water sample salinities calculated using an AGE Minisal. After removing any obvious outliers, the mean and standard deviation of the differences between the CTD salinities and sample salinities were calculated. Points with differences greater than two standard deviations from the mean were discarded. This left 143 data points. Regression analysis of the remaining points yielded a linear best fit with a negligible slope, an intercept of -0.012 , and a standard deviation for the difference between the bottle salinities and the corrected CTD salinities of 0.007 . This correction (-0.012) was applied to the CTD salinities. This was the final adjustment to the CTD salinities. The cast, depth of sample, sample salinity from the Minisal, corrected CTD salinity, and difference between Minisal and corrected CTD salinities are listed in Table 1.

DATA PROCESSING

The raw CTD data were processed on an IBM compatible PC using an EG&G Marine Instruments software package called Oceansoft. It automatically flags suspicious pressure,

temperature and conductivity points based on user specified first difference criteria, allowing the user to examine and interpolate across flagged points if necessary. Once any bad points were eliminated through interpolation, salinity was calculated from corrected values of pressure, temperature, and conductivity according to the algorithm of Lewis and Perkin (1981) and utilizing a dual time lag filter to remove time lag spikes. The data were then averaged to 2 dbar. The final salinity correction (as described above) was then applied.

Salts from the underway acquisition loop were averaged over ten minute periods. These salts were then compared with both bottle and corrected CTD salts. Bottle salts (9 samples) averaged 0.061 psu higher with a standard deviation of 0.015 psu. CTD salts (30 samples) averaged 0.052 psu higher with a standard deviation of 0.027 psu. The ten minute averaged underway salts were corrected by subtracting 0.052 psu so that results would be consistent with those yielded by the CTD.

Table 1. Comparison of CTD and Bottle Salinity Measurements near the Galapagos Islands. The original data were acquired during the period 9-19 November 1993 aboard the RV Columbus Iselin. Salinity values from the corrected CTD file are compared with bottle salinities from the same depth.

CAST	DEPTH	SALINITY (psu)		
		BOTTLE	CTD	DIFFERENCE
1	50	35.000	34.986	0.004
1	75	34.996	34.992	0.004
1	101	35.017	35.018	-0.001
1	125	35.004	35.009	-0.005
1	150	34.993	34.994	-0.001
1	175	34.979	34.981	-0.002
1	300	34.780	34.783	-0.003
1	400	34.727	34.731	-0.004
1	506	34.644	34.650	-0.006
3	1	34.599	34.588	0.011
3	10	34.597	34.593	0.004
3	100	34.977	34.981	-0.004
3	250	34.851	34.848	0.003
3	500	34.667	34.647	0.020
3	750	34.585	34.584	0.001
3	1000	34.576	34.576	0.000
3	1250	34.590	34.589	0.001
3	1308	34.599	34.601	-0.002
4	3	34.443	34.437	0.006
4	150	34.971	34.967	0.004
5	9	34.259	34.241	0.018
5	50	35.043	35.034	0.009
5	74	34.961	34.969	-0.008
5	100	34.993	34.995	-0.002
5	750	34.572	34.580	-0.008
7	1	33.818	33.818	0.000
7	10	33.829	33.821	0.008
7	50	34.920	34.920	0.000
7	76	34.912	34.909	0.003
7	100	34.999	34.996	0.003
7	151	34.951	34.955	-0.004
7	251	34.867	34.873	-0.006
7	503	34.651	34.656	-0.005
7	755	34.572	34.577	-0.005
7	1520	34.620	34.622	-0.002
10	10	33.704	33.712	-0.008
10	51	34.936	34.921	0.015
10	75	34.987	34.990	-0.003
10	101	34.993	34.965	0.028
10	151	34.934	34.931	0.003
10	253	34.838	34.834	0.004
10	755	34.574	34.574	0.000

Table 1. (continued)

CAST	DEPTH	SALINITY (psu)		
		BOTTLE	CTD	DIFFERENCE
10	1008	34.569	34.570	-0.001
10	1530	34.616	34.615	-0.003
12	10	33.911	33.887	0.024
12	76	34.863	34.876	-0.013
12	101	34.871	34.867	0.004
12	151	34.924	34.917	0.007
12	252	34.807	34.815	-0.008
12	503	34.634	34.632	0.002
12	756	34.578	34.577	0.001
12	1009	34.573	34.572	0.001
12	1528	34.617	34.614	0.003
14	1	34.518	34.518	0.000
14	21	34.802	34.792	0.010
14	32	34.854	34.851	0.003
14	40	34.921	34.893	0.028
14	71	34.974	34.952	0.022
14	51	34.942	34.940	0.002
14	100	35.028	35.026	0.002
15	100	35.033	35.028	0.005
15	149	34.946	34.958	-0.012
15	252	34.888	34.897	-0.009
15	505	34.648	34.648	0.000
15	755	34.578	34.577	0.001
15	1008	34.566	34.564	0.002
15	1260	34.578	34.577	0.001
15	1529	34.602	34.604	-0.002
16	51	34.868	34.880	-0.012
16	251	34.865	34.856	0.009
16	752	34.573	34.570	0.003
16	1001	34.564	34.564	0.000
16	1250	34.579	34.575	0.004
16	1510	34.606	34.604	0.002
18	1	34.552	34.537	0.015
18	11	34.554	34.543	0.011
18	247	34.884	34.881	0.003
18	498	34.641	34.642	-0.001
18	751	34.571	34.569	0.002
18	999	34.565	34.566	-0.001
18	1247	34.574	34.572	0.002
18	1510	34.603	34.603	0.000
19	251	34.853	34.867	-0.014
19	499	34.629	34.633	-0.004
19	751	34.561	34.563	-0.002
19	1001	34.565	34.568	-0.003
19	1508	34.603	34.604	-0.001
20	70	35.104	35.102	0.002

Table 1. (continued)

CAST	DEPTH	SALINITY (psu)		
		BOTTLE	CTD	DIFFERENCE
20	102	34.991	34.985	0.006
20	499	34.653	34.653	0.000
20	750	34.572	34.574	-0.002
20	1001	34.562	34.566	-0.004
20	1512	34.605	34.606	-0.001
21	75	35.058	35.049	0.009
21	101	35.038	35.032	0.006
21	152	34.978	34.983	-0.005
21	252	34.862	34.862	0.000
21	502	34.625	34.625	0.000
21	751	34.569	34.569	0.000
21	999	34.562	34.567	-0.005
21	1506	34.604	34.606	-0.002
23	75	34.878	34.870	0.008
23	152	34.918	34.909	0.009
23	249	34.893	34.892	0.001
23	500	34.671	34.662	0.009
23	747	34.575	34.580	-0.005
23	1000	34.565	34.566	-0.001
23	1507	34.603	34.605	-0.002
24	50	34.917	34.906	0.011
24	125	35.008	35.007	0.001
25	75	34.989	34.979	0.010
25	101	35.009	35.006	0.003
25	151	34.979	34.992	-0.013
25	250	34.888	34.886	0.002
25	500	34.662	34.658	0.004
25	751	34.569	34.571	-0.002
25	1000	34.567	34.564	0.003
25	1515	34.599	34.604	-0.005
27	100	35.190	35.191	-0.001
27	150	34.975	34.991	-0.016
27	251	34.888	34.887	0.001
27	501	34.651	34.651	0.000
27	751	34.573	34.568	0.005
27	1001	34.566	34.564	0.002
27	1516	34.611	34.609	0.002
28	75	35.192	35.190	0.002
28	148	34.961	34.953	0.008
28	250	34.890	34.890	0.000
28	501	34.642	34.642	0.000
28	751	34.575	34.575	0.000
28	1001	34.560	34.561	-0.001
28	1511	34.611	34.610	0.001
29	100	35.033	35.029	0.004
29	150	34.952	34.949	0.003

Table 1. (continued)

CAST	DEPTH	SALINITY (psu)		
		BOTTLE	CTD	DIFFERENCE
29	500	34.616	34.620	-0.004
29	750	34.572	34.575	-0.003
30	51	35.038	35.028	0.010
30	75	35.027	35.020	0.007
30	101	35.022	35.015	0.007
30	151	34.950	34.944	0.006
30	199	34.938	34.930	0.008
30	240	34.930	34.923	0.007
30	252	34.929	34.921	0.008

DATA PRESENTATION

Density anomaly, specific volume, dynamic height, and spiciness are computed from the processed, corrected values of pressure, temperature, and salinity. The density anomaly (γ_θ) at atmospheric pressure and the specific volume anomaly (δ) were calculated from algorithms found in Volume 4 of the International Oceanographic Tables (UNESCO, 1987). Spiciness (π) was computed with algorithms of Flament (1986).

The data sets are presented with the following parameters, symbols, and units:

P [dbar]	pressure
T [$^{\circ}$ C]	temperature
S [psu]	salinity
γ_θ [kg m^{-3}]	density anomaly
δ [$10^{-8} \text{ m}^3 \text{ kg}^{-1}$]	specific volume anomaly
ΣAD [$10^{-1} \text{ m}^2 \text{ s}^{-2}$]	dynamic height
π [dimensionless]	spiciness

DATA AVAILABILITY

These data may be obtained from the National Oceanographic Data Center, P.O. Box 271, La Jolla, CA 92037.

DATA TABULATIONS

CAST: 1 DATE: 11/ 9/93 0748 GMT

LAT: 2° 0.0 S. LON: 89° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.873	34.718	23.758	413.19	0.004	3.902
2.0	22.873	34.718	23.758	413.22	0.008	3.902
5.0	22.873	34.719	23.759	413.23	0.021	3.903
10.0	22.873	34.723	23.762	413.16	0.041	3.905
15.0	22.830	34.761	23.804	409.39	0.061	3.922
20.0	22.705	34.797	23.867	403.58	0.082	3.912
25.0	22.225	34.862	24.053	386.04	0.102	3.825
30.0	21.589	34.972	24.314	361.34	0.120	3.730
35.0	20.640	34.920	24.534	340.57	0.138	3.430
40.0	19.192	34.829	24.844	311.11	0.154	2.977
45.0	17.784	34.934	25.278	269.97	0.168	2.704
50.0	16.911	34.986	25.528	246.34	0.181	2.532
55.0	16.621	35.016	25.619	237.75	0.293	2.487
60.0	16.367	35.016	25.678	232.29	0.205	2.427
65.0	16.180	35.009	25.716	228.83	0.216	2.378
70.0	16.115	34.995	25.721	228.58	0.228	2.352
75.0	16.095	34.991	25.723	228.55	0.239	2.345
100.0	15.634	35.018	25.849	217.34	0.296	2.259
125.0	15.108	35.009	25.960	207.51	0.349	2.134
150.0	14.600	34.994	26.060	198.69	0.399	2.011
175.0	14.292	34.980	26.116	194.04	0.448	1.934
200.0	13.543	34.942	26.244	182.44	0.495	1.747
225.0	12.186	34.868	26.457	162.36	0.538	1.420
250.0	11.804	34.836	26.506	158.29	0.578	1.321
300.0	10.812	34.783	26.647	145.59	0.654	1.097
350.0	10.196	34.746	26.727	138.79	0.725	0.960
400.0	9.897	34.731	26.768	135.89	0.794	0.896
450.0	9.303	34.698	26.841	129.51	0.861	0.772
500.0	8.469	34.652	26.938	120.56	0.924	0.604
510.0	8.400	34.649	26.946	119.89	0.936	0.591

CAST: 2

DATE: 11/ 9/93

1106 GMT

LAT: 2° 0.0 S.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.872	34.813	23.830	406.26	0.004	3.975
2.0	22.872	34.814	23.831	406.25	0.008	3.975
5.0	22.871	34.815	23.832	406.26	0.020	3.975
10.0	22.855	34.817	23.839	405.86	0.041	3.972
15.0	22.709	34.838	23.896	400.56	0.061	3.945
20.0	22.344	34.900	24.048	386.34	0.081	3.888
25.0	21.340	34.976	24.385	354.32	0.099	3.665
30.0	20.293	34.902	24.612	332.88	0.116	3.323
35.0	18.602	34.877	25.030	293.26	0.132	2.864
40.0	17.169	34.975	25.457	252.68	0.145	2.586
45.0	16.700	35.019	25.602	239.03	0.158	2.508
50.0	16.338	35.029	25.695	230.40	0.169	2.431
55.0	16.144	34.998	25.716	228.50	0.181	2.362
60.0	16.077	34.986	25.722	228.10	0.192	2.337
65.0	16.066	34.988	25.726	227.87	0.204	2.336
70.0	16.072	35.007	25.740	226.76	0.215	2.352
75.0	15.923	35.024	25.787	222.43	0.226	2.331
100.0	15.388	35.011	25.899	212.58	0.280	2.199
125.0	14.733	35.001	26.036	200.20	0.331	2.047
150.0	14.537	34.994	26.074	197.39	0.381	1.998
152.0	14.520	34.994	26.077	197.09	0.385	1.994

CAST: 3

DATE: 11/ 9/93

2136 GMT

LAT: 1° 30.0 S.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	23.061	34.588	23.606	427.71	0.004	3.857
2.0	23.057	34.591	23.609	427.46	0.009	3.858
5.0	23.031	34.596	23.620	426.51	0.021	3.854
10.0	22.770	34.593	23.693	419.75	0.043	3.776
15.0	22.529	34.612	23.777	411.99	0.063	3.721
20.0	21.957	34.686	23.994	391.46	0.083	3.615
25.0	21.125	34.787	24.301	362.40	0.102	3.461
30.0	19.880	34.920	24.735	321.18	0.120	3.227
35.0	18.989	35.023	25.044	291.90	0.135	3.074
40.0	18.910	35.036	25.075	289.19	0.149	3.063
45.0	18.690	35.061	25.150	282.19	0.164	3.027
50.0	18.183	35.006	25.235	274.29	0.177	2.857
55.0	17.363	34.960	25.400	258.69	0.191	2.620
60.0	17.090	34.979	25.480	251.22	0.203	2.569
65.0	16.829	35.001	25.559	243.88	0.216	2.524
70.0	16.474	35.023	25.659	234.46	0.228	2.457
75.0	16.182	35.007	25.715	229.30	0.239	2.377
100.0	15.202	34.981	25.917	210.82	0.293	2.134
125.0	15.140	34.992	25.940	209.44	0.346	2.128
150.0	14.653	34.971	26.031	201.47	0.398	2.005
175.0	14.301	34.965	26.103	195.33	0.447	1.924
200.0	14.054	34.966	26.156	190.94	0.496	1.872
225.0	13.376	34.936	26.274	180.25	0.542	1.708
250.0	11.968	34.848	26.484	160.43	0.584	1.362
300.0	10.992	34.794	26.624	147.94	0.662	1.138
350.0	10.433	34.761	26.698	141.73	0.734	1.012
400.0	9.613	34.712	26.800	132.57	0.803	0.834
450.0	9.061	34.681	26.867	126.85	0.867	0.720
500.0	8.487	34.657	26.939	120.48	0.929	0.610
600.0	7.085	34.603	27.103	105.14	1.043	0.363
700.0	6.504	34.588	27.170	99.47	1.145	0.272
800.0	5.764	34.579	27.259	91.33	1.242	0.171
900.0	5.063	34.575	27.340	83.57	1.330	0.084
1000.0	4.536	34.576	27.400	77.82	1.410	0.026
1100.0	4.039	34.580	27.457	72.28	1.486	-0.023
1200.0	3.826	34.588	27.486	69.93	1.557	-0.039
1300.0	3.539	34.601	27.525	66.26	1.626	-0.057
1340.0	3.397	34.607	27.544	64.38	1.652	-0.066

CAST: 4

DATE: 11/10/93

0200 GMT

LAT: 1° 0.0 S.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	23.195	34.437	23.452	442.37	0.004	3.780
2.0	23.195	34.437	23.452	442.40	0.009	3.780
5.0	23.194	34.437	23.453	442.46	0.022	3.780
10.0	23.191	34.439	23.455	442.44	0.044	3.780
15.0	23.022	34.459	23.519	436.53	0.066	3.746
20.0	22.357	34.554	23.781	411.74	0.088	3.627
25.0	20.936	34.753	24.326	360.01	0.107	3.384
30.0	19.410	34.959	24.887	306.67	0.124	3.134
35.0	18.533	35.026	25.162	280.68	0.138	2.961
40.0	18.307	35.040	25.229	274.43	0.152	2.914
45.0	17.716	35.037	25.373	260.88	0.166	2.766
50.0	17.560	35.044	25.417	256.95	0.179	2.733
55.0	17.309	35.054	25.485	250.61	0.191	2.680
60.0	16.616	35.059	25.653	234.69	0.203	2.518
65.0	16.440	35.050	25.688	231.55	0.215	2.470
70.0	16.207	35.021	25.720	228.70	0.227	2.393
75.0	16.042	35.003	25.744	226.56	0.238	2.342
100.0	15.167	34.948	25.899	212.49	0.292	2.101
125.0	14.552	34.966	26.048	199.01	0.344	1.980
150.0	14.079	34.967	26.150	190.00	0.393	1.879
175.0	13.760	34.954	26.208	185.21	0.440	1.802
200.0	13.450	34.934	26.257	181.18	0.486	1.722
225.0	12.618	34.888	26.389	169.03	0.530	1.519
250.0	12.318	34.870	26.434	165.33	0.572	1.446
300.0	11.579	34.826	26.541	156.10	0.652	1.270
350.0	10.342	34.757	26.711	140.47	0.727	0.994
352.0	10.270	34.750	26.718	139.79	0.730	0.976

CAST: 5

DATE: 11/10/93

1041 GMT

LAT: 0° 30.0 S.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	23.541	34.240	23.202	466.21	0.005	3.731
2.0	23.541	34.240	23.203	466.24	0.009	3.731
5.0	23.540	34.240	23.203	466.33	0.023	3.731
10.0	23.529	34.241	23.207	466.13	0.047	3.728
15.0	23.439	34.253	23.243	462.96	0.070	3.710
20.0	22.722	34.362	23.532	435.53	0.092	3.584
25.0	21.811	34.509	23.900	400.59	0.113	3.439
30.0	18.896	34.876	24.955	300.15	0.131	2.938
35.0	18.672	35.002	25.109	285.75	0.146	2.977
40.0	18.097	35.109	25.334	264.43	0.159	2.915
45.0	17.681	35.051	25.392	259.06	0.173	2.768
50.0	17.567	35.034	25.407	257.84	0.185	2.727
55.0	17.419	35.014	25.428	256.04	0.198	2.675
60.0	16.248	34.958	25.661	233.90	0.211	2.355
65.0	15.673	34.934	25.775	223.26	0.222	2.205
70.0	15.482	34.941	25.823	218.82	0.233	2.167
75.0	15.317	34.990	25.898	211.83	0.244	2.168
100.0	14.908	34.995	25.992	203.61	0.296	2.080
125.0	14.567	34.994	26.066	197.31	0.346	2.005
150.0	14.472	34.994	26.088	196.05	0.395	1.984
175.0	14.292	34.980	26.116	194.07	0.444	1.934
200.0	13.692	34.950	26.219	184.82	0.491	1.784
225.0	12.973	34.895	26.324	175.36	0.535	1.594
250.0	12.121	34.859	26.463	162.46	0.578	1.399
300.0	11.571	34.827	26.543	155.88	0.658	1.270
350.0	10.352	34.746	26.701	141.45	0.732	0.987
400.0	9.589	34.714	26.806	132.03	0.800	0.832
450.0	9.261	34.697	26.847	128.90	0.865	0.764
500.0	8.637	34.666	26.923	122.16	0.929	0.640
600.0	7.521	34.620	27.055	110.24	1.045	0.437
700.0	6.533	34.588	27.167	99.88	1.150	0.276
800.0	5.748	34.576	27.258	91.34	1.245	0.166
900.0	4.929	34.572	27.353	82.07	1.331	0.067
1000.0	4.521	34.578	27.404	77.49	1.410	0.026
1100.0	4.131	34.585	27.451	73.05	1.485	-0.010
1200.0	3.742	34.596	27.500	68.31	1.556	-0.041
1242.0	3.684	34.597	27.507	67.87	1.585	-0.046

CAST: 6 DATE: 11/10/93 1341 GMT

LAT: 0° 30.0 S. LON: 89° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	23.459	34.258	23.240	462.60	0.005	3.721
2.0	23.460	34.259	23.240	462.62	0.009	3.722
5.0	23.460	34.260	23.242	462.62	0.023	3.723
10.0	23.442	34.262	23.248	462.20	0.046	3.718
15.0	23.386	34.269	23.271	460.28	0.069	3.707
20.0	23.270	34.286	23.317	456.06	0.092	3.685
25.0	22.900	34.335	23.461	442.54	0.115	3.615
30.0	22.035	34.457	23.799	410.49	0.136	3.461
35.0	21.040	34.623	24.198	372.54	0.156	3.312
40.0	18.975	34.892	24.948	301.24	0.173	2.970
45.0	18.726	35.002	25.095	287.38	0.187	2.990
50.0	18.666	35.051	25.148	282.54	0.202	3.012
55.0	17.973	35.082	25.345	263.96	0.215	2.863
60.0	17.660	35.056	25.402	258.71	0.228	2.766
65.0	17.544	35.034	25.413	257.79	0.241	2.720
70.0	17.529	35.032	25.416	257.74	0.254	2.715
75.0	17.509	35.028	25.418	257.73	0.267	2.707
100.0	15.193	34.998	25.932	209.38	0.325	2.145
125.0	14.845	34.998	26.010	202.76	0.377	2.069
150.0	14.490	34.997	26.086	196.20	0.426	1.990
152.0	14.487	34.997	26.087	196.19	0.430	1.989

CAST: 7

DATE: 11/10/93

2348 GMT

LAT: 0° 0.0 N.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	24.911	33.818	22.477	535.57	0.005	3.820
2.0	24.910	33.819	22.478	535.49	0.011	3.820
5.0	24.903	33.821	22.482	535.25	0.027	3.819
10.0	24.896	33.821	22.484	535.24	0.054	3.817
15.0	24.861	33.826	22.499	534.07	0.080	3.810
20.0	24.686	33.849	22.569	527.55	0.107	3.774
25.0	24.441	33.884	22.670	518.16	0.133	3.726
30.0	24.206	33.918	22.765	509.24	0.159	3.681
35.0	22.783	34.179	23.376	451.01	0.183	3.461
40.0	19.072	34.796	24.850	310.58	0.202	2.921
45.0	18.765	34.879	24.991	297.28	0.217	2.906
50.0	18.641	34.920	25.054	291.47	0.232	2.906
55.0	18.477	34.917	25.094	287.90	0.246	2.862
60.0	18.434	34.927	25.112	286.33	0.261	2.858
65.0	18.437	34.935	25.118	286.00	0.275	2.865
70.0	18.094	34.939	25.206	277.72	0.289	2.782
75.0	16.875	34.919	25.486	251.19	0.303	2.472
100.0	15.088	34.996	25.954	207.31	0.359	2.121
125.0	14.727	34.977	26.019	201.86	0.410	2.026
150.0	14.426	34.957	26.069	197.81	0.460	1.945
175.0	14.208	34.941	26.104	195.22	0.509	1.886
200.0	14.085	34.970	26.153	191.27	0.558	1.881
225.0	13.362	34.927	26.270	180.59	0.604	1.698
250.0	12.471	34.872	26.406	168.07	0.648	1.477
300.0	11.803	34.838	26.509	159.32	0.729	1.321
350.0	10.383	34.746	26.695	141.98	0.804	0.992
400.0	9.511	34.703	26.810	131.56	0.871	0.810
450.0	9.265	34.696	26.846	129.04	0.936	0.764
500.0	8.487	34.655	26.937	120.62	0.998	0.609
600.0	7.438	34.615	27.063	109.38	1.113	0.422
700.0	6.442	34.587	27.178	98.68	1.219	0.263
800.0	5.726	34.574	27.259	91.19	1.314	0.162
900.0	5.066	34.572	27.337	83.83	1.402	0.082
1000.0	4.496	34.577	27.406	77.25	1.482	0.022
1100.0	4.054	34.585	27.459	72.10	1.556	-0.018
1200.0	3.777	34.593	27.494	68.96	1.627	-0.040
1300.0	3.478	34.605	27.534	65.22	1.695	-0.060
1400.0	3.237	34.613	27.564	62.43	1.759	-0.077
1500.0	3.021	34.620	27.590	59.97	1.820	-0.091
1534.0	2.953	34.624	27.599	59.07	1.840	-0.094

CAST: 8

DATE: 11/11/93

0411 GMT

LAT: 0° 30.0 N.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	25.989	33.718	22.072	574.32	0.006	4.079
2.0	25.989	33.718	22.072	574.36	0.011	4.079
5.0	25.673	33.718	22.169	565.19	0.029	3.980
10.0	25.358	33.717	22.266	556.16	0.057	3.880
15.0	25.357	33.718	22.267	556.25	0.084	3.880
20.0	25.356	33.718	22.268	556.41	0.112	3.879
25.0	25.356	33.718	22.268	556.56	0.140	3.879
30.0	25.341	33.721	22.275	556.13	0.168	3.876
35.0	24.884	33.793	22.468	537.86	0.195	3.791
40.0	20.332	34.559	24.341	359.12	0.219	3.069
45.0	18.354	34.824	25.053	291.43	0.234	2.760
50.0	17.759	34.913	25.268	271.11	0.248	2.681
55.0	17.752	34.921	25.276	270.54	0.262	2.685
60.0	17.722	34.927	25.288	269.55	0.275	2.682
65.0	17.716	34.932	25.294	269.18	0.289	2.685
70.0	17.702	34.943	25.305	268.24	0.302	2.689
75.0	17.667	34.952	25.321	266.91	0.316	2.688
100.0	15.625	34.970	25.814	220.66	0.377	2.220
125.0	15.254	34.976	25.903	212.99	0.431	2.142
150.0	14.615	34.972	26.040	200.61	0.483	1.997
152.0	14.615	34.973	26.041	200.60	0.487	1.998

CAST: 9

DATE: 11/11/93

0818 GMT

LAT: 0° 30.0 N.

LON: 89° 0.0 W.

P	T	S	γ_0	δ	EAD	π
1.0	25.349	33.711	22.263	555.99	0.006	3.873
2.0	25.349	33.711	22.263	556.03	0.011	3.873
5.0	25.349	33.711	22.264	556.14	0.028	3.873
10.0	25.349	33.711	22.264	556.33	0.056	3.872
15.0	25.349	33.711	22.264	556.52	0.083	3.872
20.0	25.349	33.711	22.265	556.71	0.111	3.872
25.0	25.372	33.716	22.262	557.20	0.139	3.882
30.0	25.298	33.722	22.289	554.80	0.167	3.864
35.0	21.845	34.283	23.712	418.98	0.192	3.282
40.0	18.220	34.836	25.095	287.21	0.209	2.736
45.0	17.800	34.905	25.251	272.50	0.223	2.685
50.0	17.734	34.923	25.281	269.80	0.236	2.682
55.0	17.707	34.928	25.292	268.98	0.250	2.679
60.0	17.700	34.937	25.301	268.31	0.263	2.684
65.0	17.700	34.952	25.312	267.39	0.277	2.696
70.0	17.702	34.964	25.321	266.71	0.290	2.705
75.0	17.626	34.983	25.355	263.73	0.303	2.701
100.0	15.453	34.988	25.866	215.65	0.361	2.196
125.0	15.090	34.980	25.942	209.25	0.414	2.108
150.0	14.530	34.956	26.046	200.02	0.465	1.967
175.0	14.044	34.933	26.132	192.47	0.514	1.845
200.0	13.893	34.963	26.188	187.90	0.562	1.836
225.0	12.966	34.895	26.325	175.23	0.608	1.593
250.0	12.013	34.842	26.471	161.70	0.650	1.365
300.0	11.399	34.813	26.564	153.80	0.728	1.227
350.0	10.456	34.756	26.690	142.50	0.803	1.013
400.0	9.766	34.714	26.776	134.96	0.871	0.861
450.0	9.148	34.685	26.856	127.96	0.937	0.737
500.0	8.436	34.653	26.944	119.98	0.999	0.599
600.0	7.251	34.610	27.085	107.02	1.112	0.392
700.0	6.611	34.592	27.159	100.68	1.214	0.289
800.0	5.835	34.576	27.247	92.51	1.312	0.177
900.0	4.889	34.571	27.356	81.64	1.398	0.062
1000.0	4.420	34.579	27.415	76.15	1.477	0.016
1100.0	4.020	34.585	27.463	71.68	1.551	-0.021
1200.0	3.703	34.594	27.503	67.99	1.621	-0.046
1300.0	3.443	34.606	27.538	64.72	1.688	-0.062
1400.0	3.087	34.617	27.581	60.33	1.751	-0.087
1500.0	2.908	34.625	27.604	58.24	1.810	-0.097
1530.0	2.895	34.626	27.606	58.20	1.828	-0.098

CAST: 10

DATE: 11/11/93

2318 GMT

LAT: 1° 0.0 N.

LON: 89° 0.0 W.

P	T	S	Y_0	δ	ΣAD	π
1.0	25.745	33.702	22.135	568.27	0.006	3.990
2.0	25.745	33.703	22.136	568.22	0.011	3.990
5.0	25.744	33.707	22.140	568.02	0.028	3.993
10.0	25.752	33.712	22.141	568.08	0.057	3.999
15.0	25.751	33.715	22.144	568.00	0.085	4.001
20.0	25.747	33.716	22.146	568.03	0.114	4.000
25.0	25.743	33.717	22.149	568.00	0.142	3.999
30.0	25.734	33.718	22.153	567.88	0.170	3.997
35.0	25.725	33.781	22.204	563.22	0.199	4.042
40.0	20.047	34.544	24.405	353.01	0.224	2.982
45.0	18.246	34.846	25.096	287.25	0.239	2.750
50.0	17.643	34.919	25.301	267.98	0.253	2.657
55.0	17.467	34.934	25.355	262.97	0.266	2.625
60.0	17.294	34.947	25.407	258.21	0.279	2.593
65.0	17.182	34.987	25.465	252.85	0.292	2.597
70.0	16.705	35.015	25.599	240.21	0.304	2.505
75.0	16.574	34.990	25.611	239.25	0.316	2.455
100.0	16.321	34.966	25.652	236.15	0.376	2.376
125.0	14.932	34.971	25.969	206.58	0.431	2.066
150.0	14.656	34.929	25.998	204.61	0.482	1.973
175.0	14.226	34.909	26.075	197.92	0.533	1.865
200.0	13.742	34.938	26.200	186.70	0.580	1.785
225.0	13.096	34.906	26.308	176.92	0.626	1.628
250.0	12.003	34.835	26.467	162.03	0.668	1.358
300.0	11.095	34.788	26.600	150.20	0.746	1.152
350.0	10.477	34.754	26.685	143.00	0.819	1.015
400.0	9.826	34.716	26.768	135.81	0.888	0.873
450.0	9.047	34.676	26.865	127.00	0.954	0.713
500.0	8.366	34.642	26.946	119.70	1.016	0.580
600.0	7.282	34.602	27.074	108.06	1.130	0.390
700.0	6.722	34.587	27.141	102.62	1.235	0.300
800.0	5.992	34.571	27.224	95.01	1.333	0.193
900.0	5.186	34.564	27.317	85.98	1.424	0.090
1000.0	4.556	34.569	27.393	78.59	1.506	0.023
1100.0	4.230	34.576	27.434	74.94	1.583	-0.007
1200.0	3.910	34.585	27.475	71.19	1.656	-0.033
1300.0	3.550	34.597	27.521	66.68	1.724	-0.059
1400.0	3.286	34.607	27.554	63.47	1.790	-0.077
1500.0	2.985	34.618	27.591	59.69	1.851	-0.096
1530.0	2.981	34.619	27.593	59.75	1.869	-0.096

CAS: 11

DATE: 11/12/93

1723 GMT

LAT: 0° 59.7 N.

LON: 91° 59.8 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	25.484	33.808	22.295	552.95	0.006	3.990
2.0	25.470	33.808	22.300	552.56	0.011	3.985
5.0	25.424	33.807	22.313	551.38	0.028	3.970
10.0	25.345	33.811	22.341	548.99	0.055	3.948
15.0	23.600	34.139	23.110	475.67	0.081	3.671
20.0	22.829	34.260	23.424	445.83	0.104	3.537
25.0	22.756	34.299	23.475	441.16	0.126	3.546
30.0	20.434	34.618	24.358	357.08	0.146	3.143
35.0	20.212	34.718	24.494	344.34	0.164	3.160
40.0	20.148	34.754	24.538	340.31	0.181	3.170
45.0	20.133	34.774	24.558	338.62	0.198	3.182
50.0	20.065	34.815	24.607	334.13	0.215	3.194
55.0	19.739	34.863	24.730	322.62	0.231	3.145
60.0	17.865	34.839	25.185	279.29	0.246	2.649
65.0	17.606	34.871	25.273	271.11	0.260	2.610
70.0	17.524	34.866	25.290	269.72	0.273	2.586
75.0	17.309	34.849	25.329	266.15	0.287	2.521
100.0	15.049	34.862	25.859	216.29	0.345	2.009
125.0	14.135	34.861	26.056	198.22	0.396	1.810
150.0	13.950	34.908	26.132	191.71	0.445	1.807
158.0	13.806	34.914	26.167	188.60	0.460	1.781

CAST: 12

DATE: 11/12/93

2018 GMT

LAT: 1° 0.0 N.

LON: 92° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	25.220	33.848	22.406	542.35	0.005	3.938
2.0	25.220	33.848	22.406	542.38	0.011	3.938
5.0	25.219	33.848	22.407	542.42	0.027	3.938
10.0	24.869	33.887	22.542	529.69	0.054	3.859
15.0	23.581	34.153	23.126	474.11	0.079	3.676
20.0	23.410	34.168	23.187	468.47	0.102	3.636
25.0	22.954	34.279	23.403	448.07	0.125	3.588
30.0	20.807	34.581	24.230	369.31	0.146	3.215
35.0	20.118	34.726	24.524	341.42	0.163	3.141
40.0	20.122	34.763	24.552	339.00	0.180	3.170
45.0	20.026	34.803	24.608	333.85	0.197	3.175
50.0	19.684	34.856	24.738	321.62	0.214	3.125
55.0	18.249	34.887	25.127	284.74	0.229	2.782
60.0	17.612	34.872	25.272	271.00	0.243	2.613
65.0	17.455	34.864	25.304	268.13	0.256	2.568
70.0	17.194	34.853	25.359	263.09	0.269	2.497
75.0	16.065	34.867	25.634	236.97	0.282	2.243
100.0	14.445	34.869	25.995	203.24	0.336	1.883
125.0	14.028	34.894	26.104	193.63	0.385	1.813
150.0	13.727	34.916	26.184	186.66	0.432	1.766
175.0	13.562	34.912	26.216	184.31	0.479	1.729
200.0	12.857	34.892	26.344	172.70	0.524	1.570
225.0	12.323	34.861	26.426	165.44	0.566	1.441
250.0	11.526	34.818	26.544	154.55	0.606	1.255
300.0	10.637	34.765	26.664	143.87	0.680	1.052
350.0	9.830	34.722	26.771	134.41	0.749	0.879
400.0	9.318	34.692	26.833	129.22	0.814	0.770
450.0	8.495	34.655	26.935	119.85	0.877	0.611
500.0	8.048	34.632	26.986	115.58	0.936	0.525
600.0	7.230	34.598	27.078	107.60	1.050	0.379
700.0	6.695	34.585	27.143	102.38	1.155	0.295
800.0	5.655	34.568	27.263	90.69	1.251	0.149
900.0	4.971	34.562	27.340	83.35	1.338	0.064
1000.0	4.434	34.571	27.407	76.92	1.419	0.011
1100.0	4.129	34.574	27.443	73.84	1.494	-0.019
1200.0	3.851	34.583	27.479	70.61	1.566	-0.041
1300.0	3.632	34.592	27.509	68.06	1.636	-0.056
1400.0	3.256	34.603	27.554	63.40	1.701	-0.083
1500.0	2.969	34.607	27.584	60.30	1.763	-0.106
1526.0	2.895	34.614	27.596	59.06	1.778	-0.107

CAST: 13

DATE: 11/12/93

2348 GMT

LAT: 1° 0.0 N.

LON: 92° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	25.126	33.852	22.438	539.28	0.005	3.913
2.0	25.126	33.853	22.438	539.28	0.011	3.913
5.0	25.126	33.854	22.439	539.32	0.027	3.913
10.0	25.126	33.854	22.440	539.51	0.054	3.913
15.0	25.103	33.857	22.449	538.79	0.081	3.908
20.0	24.528	33.963	22.703	514.78	0.107	3.813
25.0	23.708	34.205	23.129	474.28	0.132	3.753
30.0	22.583	34.363	23.573	432.04	0.155	3.545
35.0	22.336	34.396	23.668	423.14	0.176	3.500
40.0	20.506	34.627	24.346	358.60	0.196	3.168
45.0	20.138	34.734	24.526	341.66	0.213	3.152
50.0	20.043	34.788	24.592	335.54	0.230	3.168
55.0	19.825	34.834	24.685	326.87	0.247	3.145
60.0	19.405	34.889	24.836	312.65	0.263	3.077
65.0	17.770	34.873	25.235	274.73	0.277	2.652
70.0	17.578	34.868	25.278	270.82	0.291	2.601
75.0	17.350	34.857	25.325	266.49	0.304	2.537
100.0	14.547	34.867	25.972	205.48	0.361	1.903

CAST: 14

DATE: 11/14/93

1630 GMT

LAT: 0° 23.0 S.

LON: 93° 0.3 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	22.597	34.518	23.685	420.11	0.004	3.669
2.0	22.596	34.518	23.685	420.16	0.008	3.669
5.0	22.580	34.516	23.688	419.99	0.021	3.663
10.0	22.475	34.518	23.720	417.17	0.042	3.634
15.0	21.996	34.605	23.921	398.20	0.062	3.564
20.0	21.216	34.785	24.274	364.75	0.081	3.484
25.0	21.065	34.817	24.340	358.68	0.099	3.467
30.0	20.549	34.849	24.503	343.25	0.117	3.351
35.0	19.813	34.850	24.699	324.77	0.134	3.155
40.0	19.378	34.893	24.845	311.02	0.150	3.074
45.0	18.977	34.941	24.985	297.89	0.165	3.007
50.0	18.088	34.960	25.223	275.40	0.179	2.798
55.0	17.636	34.899	25.287	269.43	0.193	2.640
60.0	16.736	34.879	25.487	250.52	0.206	2.408
65.0	16.064	34.895	25.656	234.58	0.218	2.264
70.0	15.892	34.938	25.728	227.88	0.230	2.257
75.0	15.576	34.969	25.823	218.93	0.241	2.209
100.0	14.843	35.026	26.030	199.98	0.293	2.090
125.0	14.180	34.976	26.135	190.66	0.341	1.909
150.0	13.810	34.950	26.193	185.83	0.388	1.810
160.0	13.706	34.940	26.208	184.75	0.407	1.780

CAST: 15

DATE: 11/14/93

1841 GMT

LAT: 0° 23.8 S.

LON: 92° 59.6 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.799	34.512	23.623	426.09	0.004	3.723
2.0	22.799	34.512	23.623	426.11	0.009	3.723
5.0	22.766	34.512	23.633	425.30	0.021	3.713
10.0	22.376	34.538	23.763	413.05	0.042	3.621
15.0	21.662	34.675	24.067	384.22	0.062	3.524
20.0	21.157	34.798	24.300	362.27	0.081	3.478
25.0	20.760	34.836	24.436	349.44	0.099	3.398
30.0	19.894	34.848	24.676	326.75	0.116	3.175
35.0	19.323	34.905	24.869	308.60	0.131	3.070
40.0	19.027	34.987	25.007	295.59	0.146	3.056
45.0	17.977	34.956	25.247	272.94	0.161	2.768
50.0	17.594	34.895	25.294	268.59	0.174	2.626
55.0	16.288	34.891	25.601	239.49	0.187	2.313
60.0	16.041	34.903	25.667	233.38	0.199	2.265
65.0	15.793	34.949	25.759	224.78	0.210	2.243
70.0	15.639	34.983	25.820	219.12	0.221	2.235
75.0	15.552	35.016	25.865	214.96	0.232	2.241
100.0	14.749	35.028	26.052	197.88	0.283	2.071
125.0	14.209	34.984	26.135	190.71	0.332	1.921
150.0	13.815	34.957	26.198	185.41	0.379	1.816
175.0	13.653	34.930	26.212	184.80	0.425	1.761
200.0	13.629	34.927	26.215	185.25	0.471	1.753
225.0	13.539	34.920	26.229	184.61	0.518	1.729
250.0	12.958	34.901	26.332	175.28	0.562	1.595
300.0	11.669	34.824	26.523	157.89	0.646	1.285
350.0	10.471	34.755	26.687	142.83	0.719	1.014
400.0	9.400	34.695	26.822	130.33	0.788	0.786
450.0	8.771	34.659	26.896	123.86	0.851	0.657
500.0	8.547	34.649	26.923	122.00	0.913	0.613
600.0	7.424	34.611	27.061	109.47	1.029	0.417
700.0	6.546	34.575	27.155	101.02	1.135	0.268
800.0	5.924	34.567	27.229	94.38	1.233	0.181
900.0	5.027	34.554	27.327	84.66	1.323	0.064
1000.0	4.488	34.565	27.397	78.03	1.404	0.012
1100.0	4.081	34.568	27.443	73.69	1.479	-0.029
1200.0	3.879	34.574	27.469	71.61	1.552	-0.045
1300.0	3.722	34.584	27.494	69.76	1.623	-0.053
1400.0	3.467	34.593	27.526	66.71	1.690	-0.071
1500.0	3.218	34.601	27.557	63.77	1.755	-0.089
1528.0	3.098	34.604	27.570	62.27	1.773	-0.097

CAST: 16

DATE: 11/15/93

1530 GMT

LAT: 0° 0.1 N.

LON: 93° 28.3 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	23.342	34.279	23.290	457.88	0.005	3.702
2.0	23.342	34.279	23.290	457.90	0.009	3.702
5.0	23.328	34.279	23.294	457.62	0.023	3.698
10.0	23.103	34.315	23.387	448.99	0.046	3.659
15.0	22.110	34.523	23.827	407.16	0.067	3.534
20.0	21.842	34.608	23.967	394.05	0.087	3.523
25.0	21.482	34.693	24.131	378.53	0.106	3.487
30.0	20.938	34.789	24.353	357.60	0.125	3.410
35.0	20.066	34.833	24.620	332.35	0.142	3.209
40.0	19.478	34.859	24.794	315.96	0.158	3.074
45.0	16.515	34.833	25.502	248.53	0.172	2.322
50.0	15.946	34.873	25.665	233.20	0.184	2.220
55.0	15.813	34.908	25.723	227.88	0.196	2.217
60.0	15.364	34.922	25.834	217.40	0.207	2.126
65.0	15.201	34.944	25.888	212.45	0.218	2.107
70.0	15.127	34.971	25.925	209.09	0.228	2.111
75.0	15.110	34.998	25.949	206.91	0.239	2.128
100.0	14.140	34.969	26.137	189.70	0.288	1.895
125.0	13.907	34.960	26.180	186.36	0.335	1.839
150.0	13.691	34.939	26.210	184.26	0.382	1.777
175.0	13.596	34.928	26.222	183.82	0.428	1.748
200.0	13.542	34.923	26.229	183.81	0.474	1.732
225.0	12.982	34.897	26.324	175.36	0.518	1.598
250.0	12.345	34.858	26.419	166.72	0.562	1.442
300.0	11.710	34.823	26.514	158.71	0.642	1.292
350.0	10.503	34.758	26.684	143.16	0.720	1.022
400.0	9.644	34.705	26.790	133.60	0.789	0.834
450.0	8.871	34.666	26.885	124.93	0.853	0.678
500.0	8.475	34.647	26.933	121.03	0.914	0.601
600.0	7.334	34.602	27.067	108.82	1.030	0.397
700.0	6.614	34.570	27.142	102.35	1.137	0.273
800.0	6.136	34.579	27.212	96.39	1.236	0.217
900.0	5.100	34.562	27.325	85.01	1.326	0.078
1000.0	4.576	34.564	27.387	79.21	1.409	0.021
1100.0	4.102	34.565	27.438	74.17	1.485	-0.029
1200.0	3.871	34.573	27.469	71.59	1.558	-0.046
1300.0	3.721	34.584	27.494	69.74	1.629	-0.053
1400.0	3.440	34.595	27.530	66.23	1.697	-0.072
1500.0	3.048	34.602	27.573	61.62	1.760	-0.103
1526.0	3.039	34.604	27.576	61.53	1.776	-0.102

CAS: 17

DATE: 11/15/93

2018 GMT

LAT: 0° 23.1 S.

LON: 93° 28.3 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	22.920	34.540	23.609	427.36	0.004	3.779
2.0	22.920	34.540	23.609	427.39	0.009	3.779
5.0	22.920	34.543	23.612	427.28	0.021	3.781
10.0	22.681	34.552	23.687	420.29	0.043	3.719
15.0	22.173	34.646	23.902	399.97	0.063	3.645
20.0	21.369	34.819	24.258	366.29	0.082	3.552
25.0	20.479	34.858	24.528	340.66	0.100	3.339
30.0	19.528	34.888	24.802	314.74	0.116	3.110
35.0	18.332	34.880	25.101	286.48	0.131	2.798
40.0	17.563	34.942	25.337	264.13	0.145	2.655
45.0	17.388	34.995	25.421	256.37	0.158	2.654
50.0	17.378	35.213	25.590	240.43	0.170	2.818
55.0	16.217	35.082	25.764	223.99	0.182	2.444
60.0	15.766	35.031	25.828	218.05	0.193	2.301
65.0	15.472	35.012	25.880	213.23	0.204	2.220
70.0	15.203	35.026	25.950	206.67	0.214	2.170
75.0	15.000	35.036	26.003	201.79	0.224	2.134
100.0	14.172	34.988	26.145	188.96	0.273	1.917
125.0	13.750	34.948	26.203	184.11	0.320	1.797
150.0	13.580	34.928	26.224	182.86	0.366	1.745
152.0	13.578	34.928	26.225	182.87	0.369	1.745

CAST: 18

DATE: 11/15/93

2230 GMT

LAT: 0° 23.4 S.

LON: 93° 28.3 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	22.829	34.537	23.634	425.05	0.004	3.751
2.0	22.829	34.538	23.634	425.05	0.009	3.751
5.0	22.827	34.541	23.637	424.90	0.021	3.753
10.0	22.722	34.540	23.667	422.28	0.042	3.721
15.0	22.225	34.620	23.869	403.20	0.063	3.641
20.0	21.608	34.764	24.150	376.55	0.083	3.577
25.0	20.756	34.847	24.446	348.50	0.101	3.406
30.0	19.845	34.870	24.706	323.93	0.118	3.179
35.0	18.665	34.876	25.014	294.76	0.133	2.879
40.0	17.658	34.890	25.274	270.12	0.147	2.639
45.0	17.451	34.972	25.388	259.48	0.160	2.651
50.0	17.485	35.112	25.487	250.26	0.173	2.767
55.0	16.773	35.132	25.673	232.72	0.185	2.612
60.0	16.218	35.083	25.764	224.11	0.197	2.444
65.0	15.832	35.035	25.816	219.31	0.208	2.319
70.0	15.486	35.004	25.870	214.30	0.219	2.216
75.0	15.186	35.016	25.947	207.19	0.229	2.159
100.0	14.435	35.006	26.103	193.00	0.279	1.987
125.0	13.952	34.968	26.177	186.67	0.326	1.854
150.0	13.588	34.931	26.225	182.80	0.372	1.749
175.0	13.533	34.924	26.232	182.86	0.418	1.732
200.0	13.065	34.921	26.325	174.60	0.463	1.634
225.0	12.704	34.888	26.372	170.70	0.506	1.536
250.0	12.468	34.876	26.409	167.72	0.548	1.479
300.0	11.484	34.811	26.547	155.48	0.629	1.241
350.0	10.435	34.752	26.691	142.43	0.702	1.006
400.0	9.690	34.709	26.785	134.06	0.771	0.845
450.0	8.739	34.657	26.899	123.51	0.835	0.650
500.0	8.347	34.635	26.943	119.93	0.896	0.572
600.0	7.388	34.600	27.058	109.75	1.010	0.403
700.0	6.823	34.587	27.127	104.06	1.118	0.314
800.0	5.943	34.571	27.230	94.34	1.216	0.186
900.0	5.093	34.554	27.320	85.51	1.306	0.071
1000.0	4.459	34.566	27.401	77.60	1.388	0.010
1100.0	4.038	34.570	27.449	73.01	1.463	-0.031
1200.0	3.894	34.573	27.467	71.87	1.535	-0.044
1300.0	3.751	34.578	27.486	70.56	1.607	-0.055
1400.0	3.467	34.595	27.528	66.57	1.675	-0.070
1500.0	3.102	34.607	27.572	61.91	1.740	-0.094
1522.0	3.052	34.605	27.575	61.59	1.754	-0.100

CAST: 19

DATE: 11/16/93

1030 GMT

LAT: 0° 53.2 S.

LON: 93° 28.2 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	21.673	34.845	24.193	371.73	0.004	3.658
2.0	21.673	34.845	24.193	371.75	0.007	3.658
5.0	21.672	34.845	24.193	371.84	0.019	3.657
10.0	21.669	34.846	24.195	371.86	0.037	3.657
15.0	21.633	34.847	24.206	370.98	0.056	3.648
20.0	21.346	34.860	24.295	362.71	0.074	3.577
25.0	20.852	34.888	24.451	348.02	0.092	3.463
30.0	20.219	34.922	24.647	329.56	0.109	3.318
35.0	19.578	34.943	24.832	312.15	0.125	3.165
40.0	18.811	34.934	25.022	294.21	0.140	2.960
45.0	18.440	34.980	25.150	282.14	0.154	2.901
50.0	18.222	35.215	25.385	260.00	0.168	3.027
55.0	17.498	35.235	25.578	241.75	0.181	2.865
60.0	16.423	35.187	25.797	221.05	0.192	2.572
65.0	15.611	35.131	25.940	207.52	0.203	2.343
70.0	15.337	35.105	25.981	203.74	0.213	2.261
75.0	14.862	35.055	26.048	197.54	0.223	2.118
100.0	14.228	34.991	26.136	189.88	0.271	1.931
125.0	13.741	34.945	26.203	184.15	0.318	1.792
150.0	13.614	34.933	26.221	183.17	0.364	1.756
175.0	13.454	34.934	26.256	180.57	0.409	1.724
200.0	13.084	34.916	26.317	175.33	0.454	1.634
225.0	12.573	34.895	26.403	167.69	0.497	1.515
250.0	12.096	34.870	26.477	161.18	0.538	1.403
300.0	11.212	34.802	26.590	151.25	0.615	1.184
350.0	10.090	34.738	26.739	137.58	0.687	0.936
400.0	9.063	34.682	26.866	125.86	0.754	0.722
450.0	8.632	34.656	26.915	121.90	0.816	0.633
500.0	8.130	34.632	26.973	116.82	0.875	0.537
600.0	7.437	34.601	27.052	110.40	0.990	0.411
700.0	6.369	34.572	27.175	98.78	1.094	0.242
800.0	5.672	34.565	27.259	91.13	1.187	0.149
900.0	5.140	34.561	27.320	85.60	1.276	0.082
1000.0	4.481	34.567	27.399	77.80	1.357	0.013
1100.0	4.077	34.580	27.453	72.75	1.431	-0.020
1200.0	3.909	34.580	27.471	71.54	1.503	-0.037
1300.0	3.744	34.585	27.492	69.95	1.574	-0.050
1400.0	3.480	34.599	27.530	66.43	1.642	-0.065
1500.0	3.213	34.604	27.560	63.49	1.707	-0.087
1520.0	3.185	34.606	27.564	63.13	1.720	-0.088

CAST: 20

DATE: 11/16/93

1930 GMT

LAT: 0° 23.2 S.

LON: 92° 30.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	21.807	34.698	24.044	385.93	0.004	3.583
2.0	21.807	34.698	24.044	385.95	0.008	3.583
5.0	21.805	34.698	24.044	386.01	0.019	3.582
10.0	21.453	34.691	24.137	377.41	0.038	3.478
15.0	19.955	34.816	24.635	330.07	0.056	3.168
20.0	19.634	34.860	24.753	319.06	0.072	3.117
25.0	19.246	34.888	24.875	307.63	0.088	3.038
30.0	18.000	34.927	25.218	275.08	0.102	2.752
35.0	17.290	35.022	25.464	251.87	0.116	2.651
40.0	17.172	35.206	25.634	235.90	0.128	2.764
45.0	16.675	35.145	25.706	229.24	0.139	2.599
50.0	16.208	35.102	25.781	222.20	0.151	2.457
55.0	16.123	35.122	25.817	218.99	0.162	2.453
60.0	15.807	35.099	25.871	213.97	0.172	2.362
65.0	15.566	35.096	25.923	209.11	0.183	2.306
70.0	15.435	35.102	25.957	206.04	0.193	2.280
75.0	15.264	35.098	25.992	202.86	0.204	2.239
100.0	14.228	34.989	26.134	190.02	0.252	1.929
125.0	13.869	34.957	26.186	185.81	0.299	1.828
150.0	13.731	34.932	26.196	185.57	0.346	1.779
175.0	13.705	34.925	26.197	186.20	0.392	1.768
200.0	13.286	34.914	26.275	179.42	0.438	1.673
225.0	12.454	34.870	26.407	167.28	0.482	1.473
250.0	12.203	34.859	26.448	163.98	0.523	1.415
300.0	10.903	34.781	26.630	147.33	0.601	1.112
350.0	10.089	34.735	26.737	137.79	0.672	0.933
400.0	8.881	34.668	26.884	124.00	0.738	0.682
450.0	8.792	34.665	26.897	123.75	0.800	0.665
500.0	8.482	34.653	26.936	120.69	0.861	0.606
600.0	7.460	34.614	27.059	109.78	0.976	0.424
700.0	6.674	34.584	27.145	102.16	1.081	0.292
800.0	5.536	34.561	27.272	89.63	1.176	0.129
900.0	5.134	34.555	27.316	85.97	1.264	0.077
1000.0	4.451	34.566	27.402	77.50	1.345	0.009
1100.0	4.003	34.575	27.457	72.21	1.419	-0.031
1200.0	3.839	34.576	27.475	70.97	1.491	-0.047
1300.0	3.675	34.588	27.501	68.88	1.561	-0.055
1400.0	3.349	34.600	27.543	64.75	1.627	-0.077
1500.0	3.099	34.605	27.571	62.02	1.690	-0.096
1524.0	3.052	34.608	27.578	61.39	1.705	-0.098

CAST: 21

DATE: 11/17/93

0241 GMT

LAT: 0° 16.0 S.

LON: 92° 0.3 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	20.655	34.842	24.469	345.42	0.003	3.376
2.0	20.646	34.843	24.471	345.18	0.007	3.374
5.0	20.610	34.845	24.483	344.18	0.017	3.366
10.0	20.027	34.874	24.660	327.51	0.034	3.231
15.0	18.492	34.947	25.111	284.75	0.049	2.891
20.0	18.210	34.955	25.188	277.66	0.063	2.826
25.0	17.928	34.941	25.247	272.21	0.077	2.745
30.0	17.550	34.909	25.315	265.91	0.091	2.627
35.0	17.112	34.919	25.428	255.28	0.104	2.530
40.0	16.639	34.907	25.531	245.68	0.116	2.407
45.0	16.371	34.942	25.620	237.33	0.128	2.372
50.0	16.202	35.005	25.708	229.15	0.140	2.381
55.0	15.657	35.026	25.849	215.88	0.151	2.273
60.0	15.533	35.040	25.887	212.38	0.162	2.255
65.0	15.468	35.041	25.903	211.04	0.172	2.242
70.0	15.407	35.049	25.923	209.32	0.183	2.233
75.0	15.376	35.048	25.929	208.86	0.193	2.226
100.0	15.166	35.032	25.964	206.33	0.245	2.166
125.0	14.725	35.006	26.042	199.66	0.296	2.049
150.0	14.404	34.984	26.094	195.38	0.345	1.961
175.0	14.252	34.963	26.112	194.47	0.394	1.912
200.0	13.244	34.910	26.280	178.89	0.441	1.661
225.0	12.358	34.865	26.422	165.84	0.484	1.450
250.0	12.250	34.863	26.442	164.57	0.525	1.427
300.0	11.042	34.792	26.613	148.97	0.603	1.146
350.0	10.021	34.732	26.746	136.86	0.675	0.919
400.0	9.183	34.684	26.849	127.63	0.742	0.742
450.0	8.655	34.664	26.918	121.67	0.805	0.643
500.0	7.785	34.625	27.019	112.15	0.863	0.481
600.0	7.135	34.601	27.094	106.00	0.973	0.368
700.0	6.178	34.576	27.203	95.86	1.074	0.221
800.0	5.495	34.565	27.280	88.79	1.165	0.127
900.0	5.176	34.557	27.313	86.37	1.252	0.083
1000.0	4.431	34.567	27.405	77.17	1.334	0.008
1100.0	3.969	34.577	27.462	71.65	1.408	-0.033
1200.0	3.852	34.576	27.473	71.13	1.480	-0.046
1300.0	3.734	34.586	27.494	69.76	1.550	-0.050
1400.0	3.369	34.599	27.540	65.07	1.617	-0.076
1500.0	3.149	34.606	27.567	62.56	1.681	-0.091
1524.0	3.118	34.607	27.571	62.27	1.696	-0.093

CAST: 22

DATE: 11/17/93

1336 GMT

LAT: 0° 16.0 S.

LON: 91° 59.8 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	19.758	34.912	24.760	317.69	0.003	3.190
2.0	19.695	34.913	24.777	316.11	0.006	3.174
5.0	19.488	34.921	24.837	310.51	0.016	3.126
10.0	18.875	34.915	24.990	296.14	0.031	2.963
15.0	18.286	34.955	25.168	279.31	0.045	2.845
20.0	18.254	34.957	25.178	278.55	0.059	2.838
25.0	17.888	34.935	25.252	271.72	0.073	2.730
30.0	17.003	34.904	25.442	253.77	0.086	2.492
35.0	16.842	34.910	25.485	249.86	0.099	2.458
40.0	16.842	34.925	25.497	248.92	0.111	2.469
45.0	16.846	34.948	25.514	247.49	0.123	2.488
50.0	16.805	34.971	25.541	245.04	0.136	2.495
55.0	16.592	35.010	25.621	237.58	0.148	2.475
60.0	16.429	35.055	25.694	230.82	0.159	2.471
65.0	15.995	35.047	25.788	221.98	0.171	2.365
70.0	15.737	35.062	25.859	215.46	0.182	2.318
75.0	15.641	35.069	25.886	213.00	0.192	2.302
100.0	15.331	35.054	25.945	208.22	0.245	2.219
125.0	14.555	35.006	26.078	196.19	0.296	2.012
150.0	14.306	34.972	26.106	194.25	0.345	1.931
152.0	14.299	34.971	26.107	194.24	0.349	1.929

CAST: 23

DATE: 11/17/93

1800 GMT

LAT: 0° 15.7 N.

LON: 92° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	23.049	34.511	23.550	432.99	0.004	3.794
2.0	23.049	34.512	23.551	432.96	0.009	3.795
5.0	22.739	34.514	23.642	424.44	0.022	3.707
10.0	21.744	34.537	23.939	396.24	0.042	3.441
15.0	21.274	34.564	24.090	382.09	0.061	3.331
20.0	21.049	34.587	24.169	374.77	0.080	3.286
25.0	20.456	34.663	24.387	354.16	0.099	3.184
30.0	20.159	34.696	24.491	344.45	0.116	3.129
35.0	19.818	34.754	24.625	331.87	0.133	3.083
40.0	19.466	34.794	24.747	320.38	0.149	3.021
45.0	19.133	34.839	24.867	309.12	0.165	2.969
50.0	18.829	34.879	24.976	298.98	0.180	2.922
55.0	18.004	34.916	25.210	276.75	0.194	2.743
60.0	16.767	34.878	25.479	251.28	0.208	2.414
65.0	15.896	34.864	25.670	233.19	0.220	2.202
70.0	15.674	34.867	25.723	228.35	0.231	2.153
75.0	15.361	34.869	25.795	221.63	0.243	2.085
100.0	14.970	34.886	25.895	212.88	0.297	2.010
125.0	14.894	34.994	25.996	204.08	0.349	2.076
150.0	13.865	34.907	26.149	190.08	0.398	1.788
175.0	13.740	34.913	26.180	187.78	0.445	1.766
200.0	13.746	34.914	26.180	188.53	0.492	1.767
225.0	13.738	34.916	26.185	188.86	0.540	1.767
250.0	12.839	34.891	26.348	173.71	0.585	1.564
300.0	11.197	34.800	26.591	151.13	0.665	1.180
350.0	10.179	34.739	26.725	139.01	0.737	0.952
400.0	9.720	34.713	26.783	134.27	0.806	0.853
450.0	9.297	34.693	26.838	129.78	0.872	0.767
500.0	8.591	34.662	26.927	121.73	0.935	0.630
600.0	7.260	34.607	27.081	107.37	1.047	0.390
700.0	6.802	34.597	27.138	103.02	1.153	0.319
800.0	5.569	34.567	27.273	89.62	1.250	0.138
900.0	5.021	34.553	27.327	84.66	1.336	0.062
1000.0	4.599	34.566	27.386	79.36	1.418	0.025
1100.0	4.167	34.573	27.438	74.38	1.494	-0.016
1200.0	3.931	34.576	27.466	72.11	1.567	-0.038
1300.0	3.793	34.581	27.484	70.86	1.639	-0.049
1400.0	3.527	34.594	27.521	67.38	1.709	-0.065
1500.0	3.184	34.604	27.562	63.13	1.773	-0.089
1522.0	3.130	34.607	27.570	62.40	1.787	-0.092

CAST: 24

DATE: 11/17/93

2118 GMT

LAT: 0° 15.7 N.

LON: 92° 0.0 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.639	34.543	23.692	419.49	0.004	3.700
2.0	22.614	34.543	23.699	418.83	0.008	3.693
5.0	22.543	34.541	23.718	417.14	0.021	3.671
10.0	22.055	34.535	23.851	404.65	0.042	3.527
15.0	21.796	34.539	23.927	397.65	0.062	3.457
20.0	20.427	34.670	24.399	352.78	0.081	3.181
25.0	19.505	34.792	24.735	320.95	0.098	3.031
30.0	19.365	34.806	24.782	316.68	0.113	3.004
35.0	19.299	34.814	24.805	314.66	0.129	2.993
40.0	19.087	34.842	24.881	307.60	0.145	2.960
45.0	18.860	34.874	24.964	299.90	0.160	2.927
50.0	17.939	34.906	25.218	275.82	0.175	2.719
55.0	16.156	34.864	25.610	238.63	0.187	2.262
60.0	15.774	34.866	25.699	230.28	0.199	2.175
65.0	15.546	34.870	25.753	225.25	0.210	2.127
70.0	15.346	34.871	25.799	221.04	0.222	2.082
75.0	15.263	34.871	25.818	219.43	0.233	2.064
100.0	14.957	34.887	25.898	212.53	0.287	2.008
125.0	14.717	35.007	26.044	199.46	0.339	2.047
150.0	13.744	34.913	26.179	187.22	0.387	1.767

CAST: 25

DATE: 11/18/93

0411 GMT

LAT: 0° 10.0 S.

LON: 91° 34.9 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.762	34.633	23.725	416.31	0.004	3.805
2.0	22.750	34.634	23.729	415.94	0.008	3.802
5.0	22.616	34.636	23.769	412.27	0.021	3.765
10.0	18.802	34.943	25.030	292.34	0.039	2.966
15.0	17.799	35.035	25.350	262.03	0.053	2.786
20.0	17.514	35.054	25.434	254.19	0.065	2.730
25.0	17.129	35.069	25.539	244.41	0.078	2.649
30.0	17.013	35.064	25.562	242.33	0.090	2.617
35.0	16.748	35.048	25.613	237.68	0.102	2.542
40.0	16.022	34.972	25.723	227.32	0.114	2.314
45.0	16.015	35.018	25.760	223.97	0.125	2.348
50.0	15.794	34.976	25.779	222.37	0.136	2.265
55.0	15.732	34.971	25.789	221.51	0.147	2.247
60.0	15.734	34.978	25.794	221.23	0.158	2.253
65.0	15.814	35.014	25.804	220.44	0.169	2.299
70.0	15.686	34.987	25.812	219.84	0.180	2.248
75.0	15.622	34.979	25.821	219.19	0.191	2.227
100.0	15.421	35.012	25.892	213.21	0.245	2.207
125.0	15.125	34.986	25.939	209.51	0.298	2.121
150.0	14.857	34.990	26.001	204.34	0.350	2.064
175.0	14.434	34.968	26.077	197.84	0.400	1.955
200.0	13.947	34.935	26.155	191.04	0.449	1.825
225.0	13.498	34.919	26.236	183.86	0.496	1.720
250.0	12.745	34.886	26.363	172.27	0.540	1.541
300.0	11.312	34.808	26.576	152.60	0.621	1.207
350.0	10.558	34.775	26.687	142.86	0.697	1.045
400.0	9.638	34.710	26.795	133.13	0.765	0.837
450.0	8.839	34.667	26.891	124.35	0.829	0.674
500.0	8.670	34.658	26.911	123.27	0.891	0.639
600.0	7.101	34.597	27.096	105.81	1.007	0.361
700.0	6.766	34.589	27.136	103.10	1.111	0.308
800.0	5.330	34.562	27.297	86.86	1.205	0.106
900.0	5.061	34.558	27.327	84.80	1.291	0.071
1000.0	4.664	34.564	27.377	80.33	1.373	0.030
1100.0	3.968	34.577	27.462	71.64	1.448	-0.033
1200.0	3.818	34.576	27.477	70.72	1.519	-0.049
1300.0	3.715	34.585	27.495	69.60	1.589	-0.053
1400.0	3.452	34.596	27.530	66.31	1.657	-0.070
1500.0	3.243	34.604	27.557	63.86	1.722	-0.084
1530.0	3.230	34.605	27.559	63.83	1.742	-0.085

CAST: 26

DATE: 11/18/93

1330 GMT

LAT: 0° 10.0 S.

LON: 91° 34.9 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	22.347	34.639	23.848	404.59	0.004	3.691
2.0	22.242	34.644	23.881	401.48	0.008	3.664
5.0	21.835	34.654	24.002	390.02	0.020	3.557
10.0	20.352	34.789	24.509	341.89	0.038	3.253
15.0	18.297	34.911	25.130	282.95	0.054	2.816
20.0	17.096	35.072	25.548	243.31	0.067	2.644
25.0	16.869	35.033	25.573	241.18	0.079	2.559
30.0	16.182	34.961	25.678	231.32	0.091	2.343
35.0	16.136	35.019	25.733	226.23	0.102	2.377
40.0	16.013	35.019	25.762	223.69	0.114	2.348
45.0	15.924	35.007	25.773	222.78	0.125	2.319
50.0	15.788	34.974	25.779	222.39	0.136	2.262
55.0	15.766	34.973	25.783	222.15	0.147	2.256
60.0	15.764	34.978	25.787	221.88	0.158	2.259
65.0	15.761	34.979	25.789	221.85	0.169	2.260
70.0	15.755	35.000	25.807	220.38	0.180	2.274
75.0	15.699	34.997	25.818	219.50	0.191	2.259
100.0	15.153	35.011	25.951	207.59	0.245	2.147
125.0	14.785	34.981	26.009	202.78	0.296	2.042
150.0	14.652	34.975	26.034	201.16	0.346	2.008

CAST: 27

DATE: 11/18/93

2336 GMT

LAT: 0° 30.2 S.

LON: 91° 59.9 W.

P	T	S	γ_0	δ	$\Sigma \Delta D$	π
1.0	19.900	34.966	24.763	317.35	0.003	3.269
2.0	19.888	34.966	24.767	317.07	0.006	3.265
5.0	19.857	34.966	24.775	316.40	0.016	3.257
10.0	19.359	34.968	24.906	304.08	0.031	3.128
15.0	18.477	34.977	25.138	282.21	0.046	2.910
20.0	18.057	34.995	25.256	271.14	0.060	2.818
25.0	17.933	34.999	25.290	268.07	0.073	2.791
30.0	17.905	35.001	25.299	267.46	0.087	2.785
35.0	17.854	35.002	25.312	266.37	0.100	2.773
40.0	17.801	35.000	25.324	265.43	0.113	2.758
45.0	17.721	34.999	25.343	263.77	0.127	2.738
50.0	17.487	34.993	25.395	258.98	0.140	2.676
55.0	17.524	35.027	25.413	257.48	0.153	2.711
60.0	17.502	35.072	25.452	253.89	0.165	2.740
65.0	17.512	35.118	25.485	250.94	0.178	2.777
70.0	17.621	35.276	25.580	242.11	0.190	2.925
75.0	17.396	35.270	25.630	237.52	0.202	2.866
100.0	16.332	35.191	25.823	219.98	0.258	2.552
125.0	15.481	35.089	25.939	209.61	0.312	2.279
150.0	14.428	34.999	26.101	194.78	0.363	1.978
175.0	13.963	34.948	26.161	189.69	0.411	1.840
200.0	13.208	34.906	26.284	178.48	0.457	1.651
225.0	12.729	34.889	26.368	171.08	0.501	1.542
250.0	12.608	34.887	26.391	169.58	0.543	1.515
300.0	11.402	34.812	26.563	153.93	0.625	1.227
350.0	10.062	34.735	26.742	137.33	0.698	0.928
400.0	9.047	34.676	26.864	126.04	0.764	0.714
450.0	8.788	34.665	26.898	123.69	0.826	0.664
500.0	8.404	34.651	26.947	119.63	0.887	0.593
600.0	6.982	34.598	27.113	104.03	0.998	0.345
700.0	6.224	34.576	27.197	96.49	1.099	0.227
800.0	5.698	34.568	27.258	91.26	1.193	0.154
900.0	5.538	34.562	27.274	90.78	1.285	0.129
1000.0	4.488	34.564	27.396	78.11	1.369	0.011
1100.0	4.053	34.576	27.452	72.75	1.445	-0.025
1200.0	3.845	34.576	27.474	71.05	1.516	-0.047
1300.0	3.778	34.582	27.486	70.60	1.587	-0.049
1400.0	3.432	34.598	27.534	65.91	1.657	-0.071
1500.0	3.110	34.607	27.571	62.01	1.721	-0.093
1528.0	2.999	34.610	27.584	60.62	1.738	-0.101

CAST: 28

DATE: 11/19/93

0453 GMT

LAT: 1° 0.1 S.

LON: 91° 59.9 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	20.274	34.928	24.635	329.52	0.003	3.339
2.0	20.254	34.929	24.642	328.96	0.007	3.334
5.0	20.190	34.931	24.660	327.31	0.016	3.319
10.0	20.015	34.935	24.710	322.78	0.033	3.275
15.0	19.641	34.936	24.809	313.55	0.049	3.177
20.0	19.053	34.932	24.958	299.55	0.064	3.021
25.0	18.947	34.929	24.983	297.34	0.079	2.992
30.0	18.804	34.930	25.020	294.00	0.094	2.956
35.0	18.788	34.932	25.026	293.61	0.108	2.953
40.0	18.793	34.941	25.032	293.27	0.123	2.961
45.0	18.815	34.955	25.037	292.96	0.138	2.977
50.0	18.848	34.970	25.040	292.82	0.152	2.997
55.0	18.822	35.070	25.124	285.09	0.167	3.066
60.0	18.189	35.163	25.354	263.33	0.181	2.978
65.0	17.590	35.187	25.520	247.67	0.193	2.850
70.0	17.156	35.188	25.625	237.80	0.205	2.745
75.0	16.742	35.189	25.725	228.48	0.217	2.648
100.0	15.176	35.026	25.957	206.98	0.272	2.163
125.0	14.349	34.995	26.114	192.71	0.321	1.959
150.0	14.059	34.952	26.143	190.69	0.369	1.863
175.0	13.874	34.941	26.174	188.46	0.416	1.816
200.0	13.554	34.922	26.226	184.12	0.463	1.734
225.0	13.312	34.922	26.276	180.01	0.509	1.684
250.0	12.645	34.890	26.386	170.06	0.553	1.525
300.0	11.639	34.832	26.535	156.76	0.635	1.286
350.0	10.344	34.776	26.725	139.10	0.710	1.009
400.0	9.022	34.675	26.867	125.72	0.776	0.710
450.0	8.680	34.658	26.909	122.51	0.839	0.642
500.0	8.320	34.642	26.953	118.99	0.899	0.573
600.0	7.331	34.612	27.075	108.03	1.013	0.404
700.0	6.651	34.583	27.147	101.91	1.117	0.288
800.0	5.926	34.562	27.225	94.77	1.214	0.177
900.0	5.547	34.562	27.273	90.90	1.308	0.130
1000.0	4.567	34.561	27.385	79.32	1.394	0.018
1100.0	4.265	34.570	27.425	75.82	1.472	-0.008
1200.0	3.898	34.576	27.469	71.70	1.545	-0.041
1300.0	3.743	34.584	27.492	70.02	1.616	-0.051
1400.0	3.547	34.593	27.519	67.70	1.685	-0.064
1500.0	3.217	34.610	27.564	63.10	1.750	-0.082
1524.0	3.165	34.611	27.570	62.55	1.765	-0.086

CAST: 29

DATE: 11/19/93

0953 GMT

LAT: 1° 30.0 S.

LON: 92° 0.0 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	21.634	34.668	24.069	383.52	0.004	3.511
2.0	21.634	34.668	24.069	383.55	0.008	3.511
5.0	21.633	34.668	24.069	383.65	0.019	3.511
10.0	21.627	34.670	24.073	383.51	0.038	3.510
15.0	21.394	34.713	24.170	374.41	0.057	3.479
20.0	20.921	34.794	24.361	356.44	0.076	3.410
25.0	20.540	34.864	24.517	341.75	0.093	3.360
30.0	19.929	34.976	24.765	318.34	0.110	3.283
35.0	19.217	35.120	25.060	290.38	0.125	3.207
40.0	18.295	35.166	25.329	264.97	0.139	3.008
45.0	17.274	35.191	25.598	239.45	0.151	2.777
50.0	16.950	35.192	25.676	232.19	0.163	2.700
55.0	16.723	35.190	25.729	227.35	0.174	2.645
60.0	16.606	35.184	25.752	225.35	0.186	2.612
65.0	16.382	35.176	25.798	221.10	0.197	2.553
70.0	15.556	35.099	25.928	208.85	0.208	2.305
75.0	15.251	35.031	25.944	207.47	0.218	2.185
100.0	14.794	35.029	26.043	198.74	0.269	2.082
125.0	14.210	34.982	26.134	190.83	0.318	1.920
150.0	13.908	34.949	26.172	187.86	0.365	1.829
175.0	13.803	34.940	26.188	187.10	0.412	1.800
200.0	13.705	34.941	26.210	185.74	0.458	1.780
225.0	13.310	34.931	26.284	179.30	0.504	1.690
250.0	12.615	34.889	26.391	169.56	0.548	1.518
300.0	10.971	34.789	26.624	147.93	0.626	1.130
350.0	10.470	34.758	26.689	142.59	0.699	1.017
400.0	9.239	34.688	26.843	128.24	0.767	0.754
450.0	8.657	34.657	26.912	122.22	0.830	0.637
500.0	7.939	34.620	26.992	114.82	0.889	0.499
600.0	7.477	34.599	27.044	111.14	1.002	0.415
700.0	6.465	34.578	27.168	99.67	1.107	0.259
800.0	6.190	34.572	27.200	97.65	1.205	0.218
900.0	5.587	34.564	27.269	91.29	1.300	0.137
1000.0	4.553	34.565	27.390	78.85	1.386	0.019
1100.0	4.174	34.568	27.433	74.84	1.463	-0.019
1200.0	3.965	34.574	27.461	72.68	1.536	-0.036
1300.0	3.794	34.585	27.487	70.58	1.608	-0.045
1400.0	3.343	34.604	27.547	64.38	1.676	-0.074
1500.0	3.154	34.609	27.569	62.40	1.740	-0.088
1524.0	3.091	34.612	27.577	61.57	1.755	-0.091

CAST: 30

DATE: 11/19/93

2348 GMT

LAT: 0° 27.5 S.

LON: 91° 20.8 W.

P	T	S	γ_0	δ	ΣAD	π
1.0	22.211	34.701	23.933	396.48	0.004	3.699
2.0	22.208	34.702	23.935	396.36	0.008	3.699
5.0	22.202	34.705	23.939	396.11	0.020	3.699
10.0	20.010	34.810	24.616	331.73	0.038	3.178
15.0	19.726	34.870	24.736	320.46	0.055	3.149
20.0	18.727	34.931	25.040	291.74	0.070	2.937
25.0	17.444	35.014	25.421	255.66	0.084	2.682
30.0	17.153	35.048	25.517	246.67	0.096	2.638
35.0	17.082	35.044	25.531	245.47	0.108	2.618
40.0	16.823	35.039	25.589	240.17	0.121	2.552
45.0	16.516	35.036	25.659	233.68	0.132	2.478
50.0	16.400	35.029	25.680	231.77	0.144	2.445
55.0	16.274	35.024	25.706	229.48	0.156	2.412
60.0	16.202	35.027	25.725	227.85	0.167	2.397
65.0	16.128	35.026	25.741	226.45	0.178	2.379
70.0	16.075	35.026	25.754	225.44	0.190	2.367
75.0	15.921	35.020	25.785	222.64	0.201	2.327
100.0	15.722	35.015	25.827	219.46	0.256	2.277
125.0	14.545	34.966	26.049	198.91	0.310	1.979
150.0	14.038	34.944	26.141	190.85	0.359	1.853
175.0	13.886	34.935	26.167	189.09	0.406	1.814
200.0	13.742	34.930	26.194	187.28	0.453	1.779
225.0	13.623	34.926	26.216	185.87	0.500	1.750
250.0	13.502	34.921	26.238	184.49	0.546	1.721
252.0	13.489	34.921	26.240	184.29	0.550	1.718

LIST OF REFERENCES

- Flament, P., 1986: A Note on Seawater Spiciness and Diffusive Stability. Personal Communication.
- Lewis, E.L. and R.G. Perkin, 1981: The Practical Salinity Scale 1978: Conversion of Existing Data. Deep Sea Res., 28A, 307-328.
- UNESCO, 1987: International Oceanographic Tables, Vol. 4, National Institute of Oceanography of Great Britain and UNESCO (Paris).

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