UNIVERSITY OF CALIFORNIA

SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CIRCE EXPEDITION

16 March - 1 December 1968

Sponsored by

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W. A. Nierenberg, Director

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INTRODUCTION

CIRCE Expedition was primarily a deep-sea geological-geophysical cruise, with the work on Legs I and II consisting mainly of seismic reflection surveys and bottom sampling by core and dredge.

CIRCE Expedition, Legs VIII and IX, had three major objectives and several satellite programs; they were mainly geological and geochemical in orientation:

1) An examination of a portion of the Walvis Ridge off western South Africa with standard geophysical and geological methods to develop hypotheses regarding the origin of this aseismic ridge which has been variously considered a volcanic chain, an ancient fracture zone complex and an old plate boundary with a low rate of convergence and which has an obvious but not yet understood significance for the opening of the South Atlantic.

2) A sedimentological and geochemical study of the recent sediments and their overlying waters on the continental margin near Walvis Bay. Deposits of very high organic content have long been known to accumulate in this area, and various investigators have regarded them as precursors of organic metal-bearing shales of the Kupferschiefer type. One of the purposes of this cruise was to establish the nature and regional distribution of these sediments, relate their composition to overlying waters and circulation, and determine their composition and possible content of heavy metals and trace elements. This included a hydrographic and nutrient survey in the inner part of the Benguela Current with particular reference to upwelling and the composition (nutrient and oxygen contents) of the bottom water on the shelf.

3) Surveying a geophysical and geological traverse of the Mid-Atlantic Ridge at a mid-southern latitude where, so far, very little information exists. This traverse, supplemented with detailed area surveys in five locations was designed to provide further information on the origin of the crestal zone of the Ridge and associated fracture zones and on the evolution of the Ridge structure and relief with increasing distance from the Ridge axis. Magnetic observations and reflection profiling were continuous; bathymetric observations were made continuously when possible. Some plankton tows were made.

In addition, supplementary programs included a series of casts of a large-volume water sampler for a long-term study of radioactive fallout in the oceans for Woods Hole Oceanographic Institution (WHOI), a program of trace element studies of seawater for the University of Capetown, and a study of the alkalinity of Atlantic intermediate and deep water by Scripps Institution. Large volumes of seawater (surface to bottom) were collected at 5 stations on Leg VIII and at 4 stations on Leg IX, as well as at 9 other points from the surface only. These were analyzed for carbon 14 by Dr. J. C. Vogel, National Physical Research Laboratory, Pretoria, South Africa; for such fallout nuclides as strontium 90, cesium 137 and plutonium 238 and 239 by Dr. V. T. Bowen, WHOI; and aliquots were collected for later analysis for tritium by Dr. W. Roether, University of Heidelberg, Germany. This was a part of a continuing program using long-lived artificial radionuclides for the study of water or particle movement in the Atlantic Ocean.

The main programs were the responsibility of Oregon State University with collaboration from the University of Edinburgh, Scotland, for item 2).

Legs VIII and IX of CIRCE Expedition were supported by the Office of Naval Research. Supplementary funding for the main program came from a grant of the National Science Foundation to Oregon State University and for the fallout study from a contract of the Atomic Energy Commission with Woods Hole Oceanographic Institution. Further funding was provided by the South African Council for Scientific and Industrial Research, the Carnegie Trust for the Universities of Scotland, and International Nickel.

STANDARD PROCEDURES

The data presented in this report were collected on CIRCE Expedition Legs I, II, VIII and IX. The data were obtained from Nansen bottle casts and were collected and processed primarily by the Data Collection and Processing Group (DCPG, MLRG), Scripps Institution of Oceanography, University of California at San Diego.

The table below summarizes the hydrographic work completed on CIRCE:

Leg	No. of Stations	Casts	Total No. of Bottles	Maximum Depth
I	1	single	6	within 350m of bottom
II	4	single	5	within 350m of bottom
VIII	19	single	4-16	less than 350m
	1	single	21	~1500m
	5	multiple	22-51	bottom
IX	3	single	22	~1500m
	5	multiple	44-65	bottom

Hydrographic Casts

Temperature was measured with paired deep-sea reversing thermometers and is tabulated to hundredths of a Celsius degree. In some instances, however, specially scaled thermometers were used; these values are recorded to thousandths of a degree. Unprotected thermometers were included in most bottles lowered deeper than 100 meters.

Water samples for chemical and nutrient analyses were obtained from the Nansen bottles.

Salinity was determined with a conductive salinometer (Univ. of Wash., 1960). The values are recorded to three decimal places, provided

accepted standards are met. Salinity is recorded to two decimal places when only one determination per sample was obtained or where there is doubt about the accuracy of a particular sample or of all samples on a station.

Dissolved oxygen was determined by the Winkler method as revised by Carpenter (1965).

Reactive phosphate was determined by the method of Murphy and Riley (1960); reactive silicate by the method of Strickland and Parsons (1965); nitrate by the method of Wood et al. (1967); and nitrite by the method of Bendschneider and Robinson (1952).

The nutrient analyses on Leg VIII and subsequent processing were done by S. E. Calvert and N. B. Price, University of Edinburgh. Questions concerning these data should be directed to them.

Silicate data from Leg IX, stations 245 and 246, have been cited in Edmond and Anderson (1971). The silicate values used were calculated incorrectly, being about half what they should be. The correct values are tabulated in this report.

The observed data have been evaluated using the method described by Klein (1973). This involves consideration of their variation as functions of density or depth and their relations to each other, and comparison with previous or adjacent observations.

TABULATED DATA

Nansen bottle data are listed with observed values on the left side of the page and with interpolated and calculated values at standard depths on the right side of the page. The values listed at standard depths are computer interpolations according to a modified Rattray (1962) technique.

The time given for bottle casts is that of the messenger release in Greenwich Mean Time. When more than one cast was lowered on a station, the times for the first and last casts are given. The observed depths of multiple casts are footnoted except for the cast which includes the shallowest Nansen bottle.

The bottom depth, listed in meters, was determined by applying corrections from Matthews (1939) tables to echo soundings.

The weather and dominant waves are coded using the National Oceanographic Data Center (NODC) method.

The column headings from the computer are explained as follows:

Z	Depth	Meters
T	Temperature	°C
S	Salinity	°/oo
O2	Dissolved oxygen	ml/L
PO4	"Reactive" inorganic phosphate-phosphorus	µg at/L
SiO3	"Reactive" inorganic silicate-silicon	µg at/L
NO2	"Reactive" nitrite-nitrogen	µg at/L
NO3	"Reactive" nitrate-nitrogen	µg at/L
DT	δ_T Thermosteric anomaly	cl/ton
SIGT	$\sigma_t = (\rho_{s,t,0} - 1)10^3$ where $\rho_{s,t,0}$ is the density the parcel would have if moved isothermally to the sea surface.	g/L
DD	Geopotential anomaly, referred to the sea surface.	dyn. meters

FOOTNOTES

Data which appears to be in error without obvious reason is reported, but flagged uncertain with a U. Such data was not used in the determination of values at standard depths. Footnotes are used to indicate data which has required special processing.

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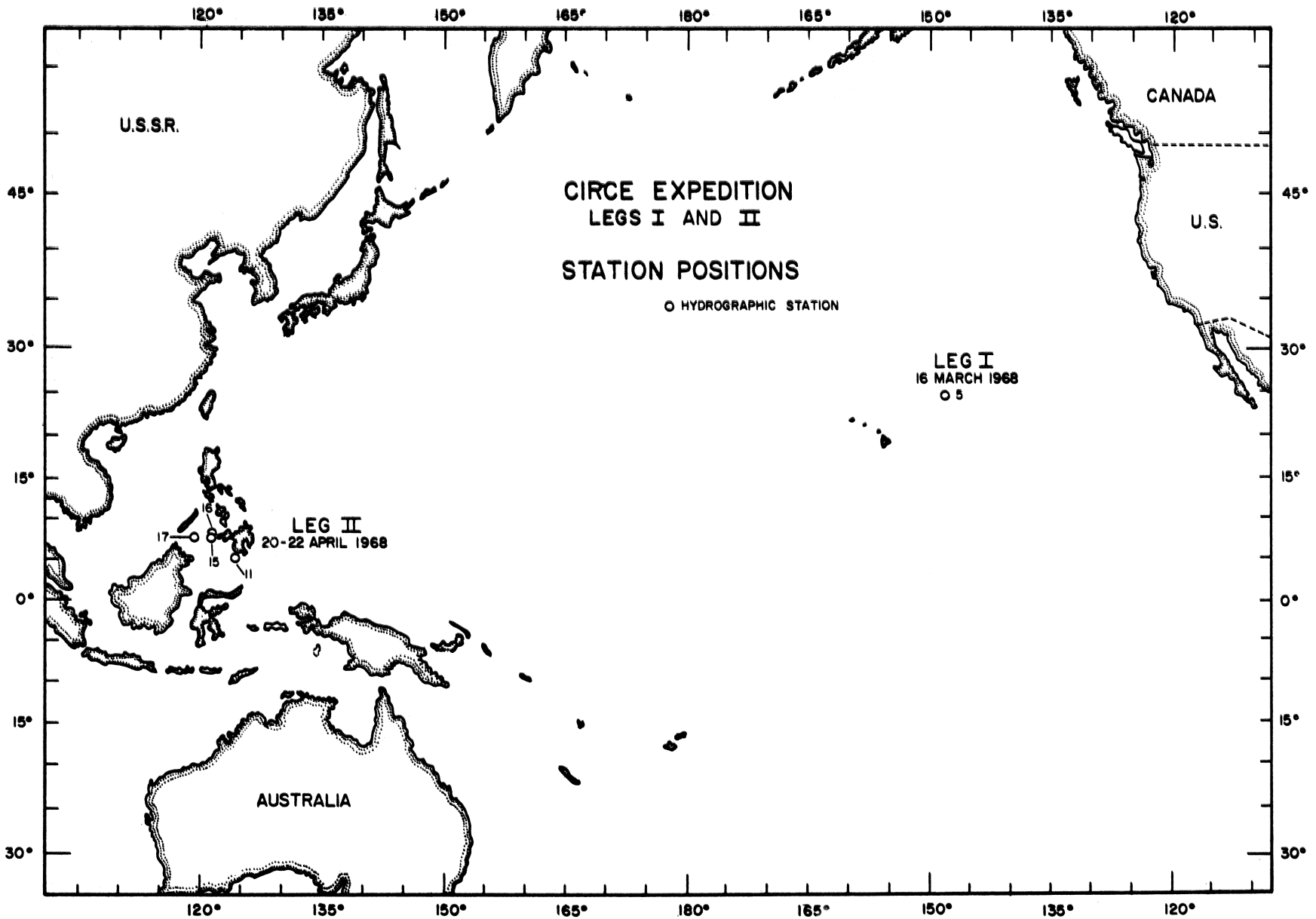
CIRCE EXPEDITION
LEGS I AND II
STATION POSITIONS
O HYDROGRAPHIC STATION
U.S.S.R.
CANADA
U.S.
AUSTRALIA
LEG I
16 MARCH 1968
5
LEG II
20-22 APRIL 1968
16
17
15
11
120°
135°
150°
165°
180°
165°
150°
135°
120°
45°
30°
15°
0°
15°
30°

FIGURE 1

PERSONNEL

CIRCE Expedition I and II

SHIP'S CAPTAIN

Phinney, Alan W. RV Argo, Legs I and II

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV ARGO	Participation (Leg)
Shor, G. G., Jr., SIO*, Chief Scientist	I
Karig, D. E., SIO " "	II
Abbott, J. L., SIO	I
Bach, J. E., SIO	I, II
Busch, R. J., U.S. Naval Oceanographic Office	II
Cornelius, J. F., International Business Machines	I, II
Dixon, F. S., SIO	I
Donovan, J. T., SIO	I
Earl, J. L., SIO	I, II
Edmond, J. M., SIO	I, II
Francheteau, J., SIO	II
Johnson, B. P., SIO	I
Jones, A. C., SIO	I
Kishii, T., Maizuru Marine Observatory	II
Kolesnikow, V., SIO	II
Kroopnick, P., SIO	I
Lee, J., Loyola University	I
Lucas, J. C., SIO	I
Morris, G. S., Jr., SIO	I
Mudie, J. D., SIO	I
Nagasaka, K., Maizuru Marine Observatory	II
Newhouse, D. A., SIO	I
Osborn, T., SIO	I
Pine, J. S., SIO	I, II
Rowe, R. A., SIO	I, II
Samora, F. E., SIO	I, II
Smith, M. V., Volunteer	I, II
Smith, W. L., SIO	I, II

* Scripps Institution of Oceanography

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 38.8N	148 13.0W	03/16/68	0020	5350M	060	06KT	2	060 06 05

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
339A	10.18	34.138	4.81					176.1
3244	1.52	34.680	3.33					33.4
3714		34.689	3.53					
4181		34.778	3.53					
4648		34.719	3.69					
5117	1.48	34.696	3.94					31.9

A) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE. THIS IS HEAT FLOW PROBE LOWERING ONE (HF-1).

RV ARGO — CIRCE EXPEDITION II — 11

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
5 15.3N	124 32.0E	04/20/68	0658	5771M		KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
3540A	3.64	34.596	2.24					57.1
3973		34.593	2.27					
4451		34.592	2.27					
4935		34.596	2.28					
5415	3.86	34.593	2.32					59.4

RV ARGO — CIRCE EXPEDITION II — 15

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 40.0N	121 28.0E	04/21/68	1920	4974M		KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
2900B	10.23	34.465	1.63U					152.7
3388		34.462	1.52					
3876	10.40	34.463	1.51					155.7
4364		34.462	1.52					
4852		34.459	1.70U					

RV ARGO — CIRCE EXPEDITION II — 16

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 40.0N	121 34.0E	04/22/68	1305	4292M		KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
2226C	10.16	34.455	1.51					152.3
2717	10.24	34.461	1.45					153.2
3204	10.32	34.465	1.44					154.2
3701	10.40	34.463	1.47					155.7
4203	10.48	34.460	1.54					157.2

RV ARGO — CIRCE EXPEDITION II — 17

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 43.0N	119 35.0E	04/22/68	2342	3677M		KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1634D	10.10	34.450	1.56					151.7
2097	10.14	34.468U	1.50					
2573	10.23	34.496U	1.43					
3054	10.29	34.459	1.44					154.1
3547	10.37	34.457	1.48					155.6

A) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE AND HAD ONLY ONE THERMOMETRIC DEPTH.
THIS IS HEAT FLOW PROBE LOWERING FOUR (HF-4).

B) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE AND HAD ONLY ONE THERMOMETRIC DEPTH. THE DEPTHS HAVE BEEN COMPUTED USING THE CORRECTED PDR SOUNDING, THE DISTANCE BETWEEN THE BOTTOM AND THE PINGER, AND THE SPACING BETWEEN THE NANSEN BOTTLES AND THE PINGER.
THIS IS HEAT FLOW PROBE LOWERING SEVEN (HF-7).

C) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE.
THIS IS HEAT FLOW PROBE LOWERING EIGHT (HF-8).

D) THE DEPTHS ARE UNCERTAIN BECAUSE THE CAST WAS TAKEN WITH THE HEAT FLOW PROBE.
THIS IS HEAT FLOW PROBE LOWERING NINE (HF-9)

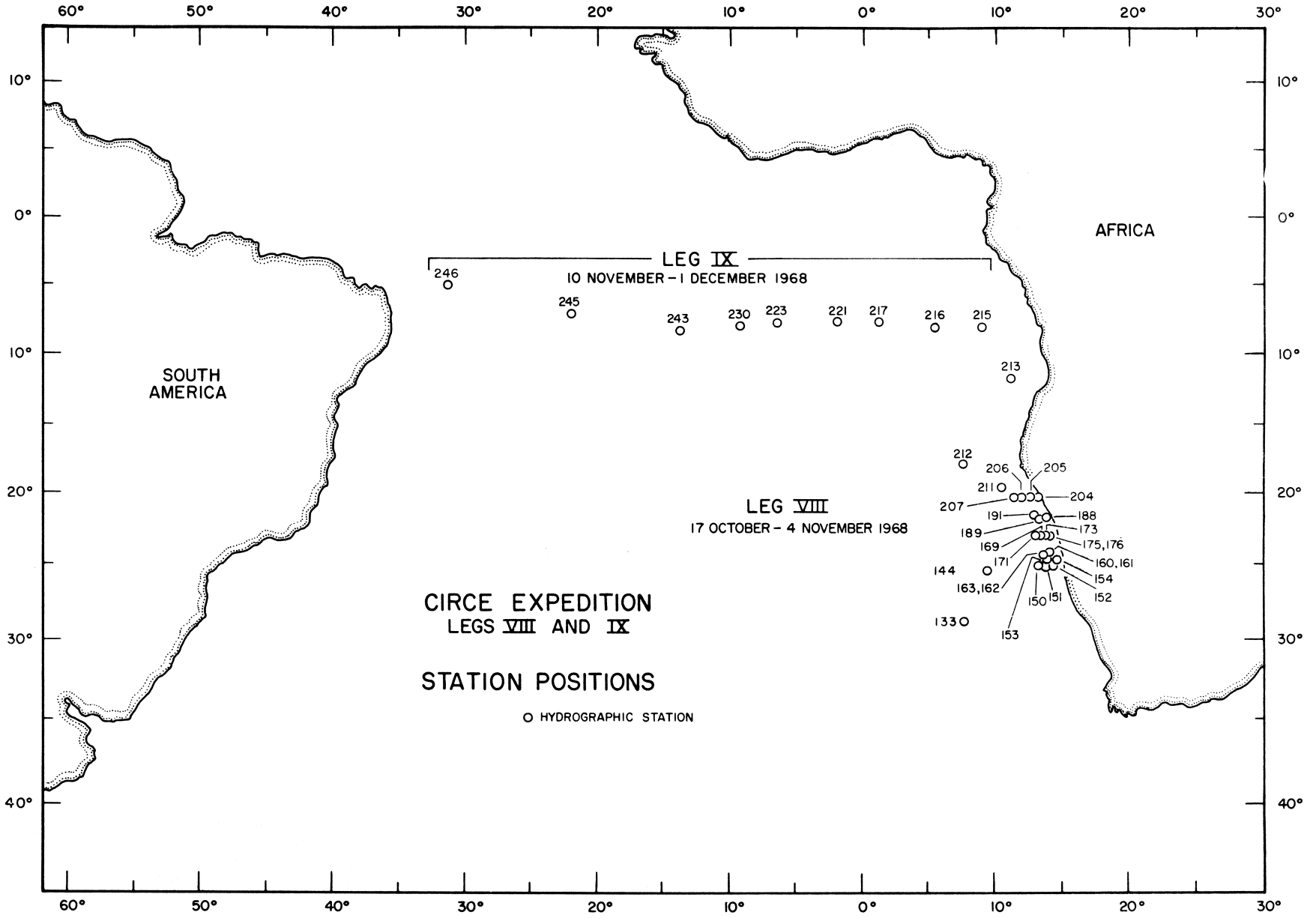
60°
50°
40°
30°
20°
10°
0°
10°
20°
30°
10°
0°
10°
20°
30°
40°
SOUTH AMERICA
AFRICA
LEG IX
10 NOVEMBER – 1 DECEMBER 1968
246
245
243
230
223
221
217
216
215
213
LEG VIII
17 OCTOBER – 4 NOVEMBER 1968
212
206
205
211
204
207
191
188
189
173
169
175,176
171
160,161
144
154
163,162
152
150
151
133
153
CIRCE EXPEDITION
LEGS VIII AND IX
STATION POSITIONS
HYDROGRAPHIC STATION

FIGURE 2

PERSONNEL

CIRCE Expedition VIII and IX

SHIP'S CAPTAINS

Hansen, Terry RV Argo, Leg VIII
Phinney, Alan W. RV Argo, Leg IX

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

RV ARGO	Participation (Leg)
van Andel, Tj. H., SIO*, Chief Scientist	VIII, IX
Anderson, G. C., SIO	VIII, IX
Bach, J. E., SIO	VIII, IX
Beer, R. M., SIO	VIII, IX
Blow, W. H., British Petroleum	VIII, IX
Bowen, V. T., WHOI**	VIII, IX
Burke, J. C., WHOI	IX
Calvert, S. E., University of Edinburgh	VIII
Coatsworth, J. L., SIO	IX
Edmond, J. M., SIO	VIII, IX
Heath, G. R., SIO	VIII, IX
Hohnhaus, G. W., SIO	VIII, IX
de Matos, J. E., Portuguese Navy	VIII
Moore, T. C., SIO	VIII, IX
Mudie, J. D., SIO	VIII
Orren, M. J., University of Capetown	VIII
Price, N. B., University of Edinburgh	VIII
Saban, D., SIO	IX
Schroeder, B., WHOI	VIII, IX

* Scripps Institution of Oceanography
** Woods Hole Oceanographic Institution

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
28 31.1S	7 33.8E	10/17/68	1814	5063M	200	12KT	2	230 05

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	17.49	35.64	5.74					210.6
48	17.34	35.65	5.84					206.4
96	16.57 A	35.55	5.54					196.3
145	15.63	35.42	5.59					185.2
193	14.16	35.32	5.10					161.9
241	13.14	35.16	5.37					153.5
289	12.35	35.07	5.12					145.2
338	11.55	35.00	4.96					135.8
387	10.82	34.92	4.61					129.0
483	8.98	34.71	4.73					114.8
580	6.92	34.50	4.74					101.3
677	5.46	34.39	4.70					91.6
774	4.48	34.36	4.70					83.1
871	3.99	34.37	4.54					77.5
968	3.59	34.40	4.44					71.4
1210	3.18	34.56	4.23					55.6
1453	3.03	34.69	4.46					44.4
1502B	3.04	34.73	4.54					41.5
1662C	3.07							
1743B	3.03	34.80	4.79					36.1
1984B	2.97	34.85	5.10					31.8
2034C	2.96							
2225B	2.84	34.87	5.28					29.2
2465B	2.71	34.87						28.1
2497C	2.67							
2705B	2.57	34.87	5.43					27.0
2944B	2.48	34.87	5.46					26.2
2959C	2.46							
3180B	2.40	34.87						25.6
3415B	2.33	34.86	5.43					25.8
3647B	2.237	34.86						25.0
3878B	1.979	34.82	5.30					26.1
4167D	1.46	34.79	5.04					24.6
4181D	1.43	34.78	5.11					25.2
4415D	1.190							
4428D	1.18	34.77	4.64					24.3
4657D	1.135	34.76	5.00U					24.8
4681D	1.13	34.74	4.32					26.2
4784D	1.15	34.74						26.4

Z	T	S	O2	SIGT	DT	DD
0	17.49	35.64	5.74	25.905	210.6	0
10	17.46	35.63	5.76	25.909	210.2	.021
20	17.43	35.63	5.78	25.916	209.6	.042
30	17.40	35.64	5.80	25.925	208.7	.063
50	17.32	35.65	5.83	25.953	206.1	.105
75	16.95	35.60	5.67	26.005	201.1	.156
100	16.51	35.54	5.55	26.063	195.6	.206
125	16.06	35.47	5.58	26.116	190.5	.256
150	15.48	35.41	5.53	26.199	182.7	.303
200	13.99	35.30	5.13	26.436	160.2	.392
250	12.98	35.14	5.34	26.523	151.9	.473
300	12.17	35.05	5.09	26.617	143.0	.550
400	10.59	34.89	4.63	26.785	127.1	.693
500	8.60	34.67	4.73	26.941	112.3	.822
600	6.57	34.47	4.73	27.080	99.1	.937
700	5.18	34.38	4.70	27.182	89.4	1.040
800	4.32	34.36	4.66	27.266	81.5	1.133
1000	3.50	34.42	4.40	27.396	69.2	1.300
1200	3.19	34.55	4.23	27.533	56.2	1.442
1500	3.04	34.73	4.54	27.687	41.6	1.617
2000	2.97	34.85	5.12	27.792	31.6	1.862
2500	2.67	34.87	5.39	27.831	27.9	2.085
3000	2.45	34.87	5.46	27.851	26.0	2.301
3500	2.31	34.86	5.42	27.857	25.4	2.518
4000	1.78	34.81	5.19	27.857	25.5	2.727
4500	1.17	34.77	4.53	27.868	24.4	2.915

A) ALTERNATE VALUE, 16.45 DEGREES.
B) CAST IV. X-17-68, 2227 GMT.
C) CAST VII. X-18-68, 0110 GMT.
D) CAST IX. X-18-68, 1205 GMT.

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 45.9S	9 26.4E	10/24/68	0305	4676M	160	16KT		170 05 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	17.24	35.535	5.85					212.5
49	16.12	35.454	5.92					193.3
97	15.45	35.407	5.57					182.3
103A	15.64 V	35.439V						
146	13.82	35.238	5.16					161.1
194	12.71	35.088	5.20					150.6
200A	12.55	35.091						147.3
244	11.79	35.033	4.97					137.7
292	10.86	34.929	5.06					129.0
341	9.87	34.834	4.61					119.6
391	8.90	34.702	4.75					114.2
396A	9.11 V	34.725V						
488	7.10	34.536	4.28					101.0
586	5.37	34.423	4.01					88.1
588A	5.60 V	34.435						
604	4.81	34.447	3.49					80.1
779A	4.34	34.454						74.6
782	4.34	34.451	3.60					74.9
880	3.90	34.476	3.79					68.6
970A	3.62	34.502						64.0
978	3.59	34.511	3.99					63.0
1159A	3.40	34.619						53.1
1218	3.36	34.663	4.24					49.4
1459	3.315	34.818	4.75					37.3
1525B	3.27	34.828	4.79					36.2
1812B	3.08	34.858	5.12					32.2
2023B	3.03	34.874	5.16					30.6
2274B	2.92	34.884	5.40					28.8
2569B	2.75	34.890	5.50					26.9
2811B	2.61	34.912	5.52					24.1
3051B	2.49	34.886	5.53					25.1
3292B	2.41	34.882						24.7
3532B	2.339	34.868	5.44					25.2
3775B	2.178	34.853						25.1
3995C	1.83	34.813	5.19					25.5
4020B	1.770	34.810	5.19					25.3
4185C	1.48	34.775	5.22U					25.9
4195C	1.46	34.778	5.09					25.5
4372C	1.21	34.751	5.21U					25.9
4382C	1.209	34.749	5.00					26.1
4669B	1.112	34.711D						28.3

Z	T	S	O2	SIGT	DT	DD
0	17.24	35.535	5.85	25.885	212.5	0
10	16.98	35.515	5.86	25.933	208.0	.021
20	16.73	35.497	5.88	25.977	203.7	.042
30	16.50	35.480	5.89	26.018	199.8	.062
50	16.11	35.453	5.92	26.089	193.1	.101
75	15.79	35.435	5.76	26.149	187.5	.150
100	15.36	35.397	5.54	26.217	181.0	.196
125	14.55	35.314	5.31	26.331	170.1	.241
150	13.72	35.219	5.16	26.433	160.5	.283
200	12.55	35.091	5.17	26.571	147.3	.363
250	11.68	35.021	4.99	26.685	136.5	.437
300	10.70	34.913	4.99	26.782	127.3	.506
400	8.73	34.683	4.72	26.933	113.0	.633
500	6.85	34.516	4.25	27.079	99.2	.747
600	5.25	34.424	3.92	27.211	86.7	.847
700	4.70	34.443	3.51	27.290	79.2	.938
800	4.29	34.459	3.63	27.348	73.7	1.022
1000	3.57	34.531	4.01	27.479	61.3	1.173
1200	3.37	34.650	4.22	27.592	50.6	1.302
1500	3.29	34.825	4.78	27.740	36.6	1.464
2000	3.03	34.872	5.16	27.802	30.7	1.697
2500	2.79	34.887	5.49	27.836	27.5	1.919
3000	2.51	34.892	5.53	27.865	24.8	2.134
3500	2.35	34.869	5.45	27.861	25.2	2.349
4000	1.82	34.812	5.19	27.857	25.5	2.562
4500	1.16	34.733		27.841	27.0	2.759

A) CAST IX. X-24-68, 0553 GMT.
B) CAST III. X-23-68, 2255 GMT. NINE OXYGEN SAMPLES WERE COLLECTED FROM THE TWELVE NANSEN BOTTLES ON THIS CAST, BUT NO RECORD WAS MADE TO INDICATE THE LEVEL FROM WHICH THEY WERE DRAWN. INFORMATION FROM THE CAST SUMMARY SHEET AND THE DESIRED SAMPLE DEPTH SHEET WOULD SUGGEST THE ARRANGEMENT GIVEN.
C) CAST I. X-23-68, 1943 GMT
D) THE LAST SAMPLE BOTTLE OF THIS CAST CONTAINED MUD.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO — CIRCE EXPEDITION VIII — 150

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 10.6S	13 18.5E	10/25/68	2232	1358M	170	20KT		160 11 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	16.27	35.232		.64	0.0	.11	3.4	212.8
49	15.97	35.217	5.85	.55	0.0	.19	4.1	207.3
96	13.18	35.142	4.60	1.05	1.5	.03	12.8	155.6
112A	12.93	35.118						152.5
143	12.25	35.068	4.34	.68	2.0	.01	16.0	143.5
190	11.38	34.991	3.86	.91	5.9	.01	17.0	133.5
202A	11.09	34.956						131.0
239	10.30	34.877	3.50	2.18	7.8	.02	22.1	123.4
286	9.58	34.810	2.79	2.39	10.5	.01	27.5	116.7
287A	9.79 V	34.838V						
334	8.66	34.711	2.97	2.86	11.4	.00	29.0	109.9
380A	7.98	34.652						104.4
383	7.84	34.633	2.97	3.10	12.4	.02	31.7	103.8
474A	6.61	34.582						91.1
477	6.51	34.556	2.30	2.92	18.6	.01	37.1	91.8
573A	5.89 V	34.540						
574B	5.74	34.514						85.6
577	5.65	34.546U	2.58	2.76	23.0	.01	39.2	
649B	5.16	34.482	2.84	2.56	25.9	.00	36.9	81.3
666B	5.08	34.483						80.3
674	4.99	34.478	2.87	2.72	24.8	.01	37.8	79.7
676A	5.14 V	34.488						
760B	4.52	34.464	3.38	2.68	29.5	.00	37.2	75.7
780B	4.43	34.469						74.4
857B	4.22	34.472	3.50	2.83	30.4	.00	36.0	72.1
905B	4.04	34.488						69.1
1047B	3.66	34.548	3.96	2.57	36.9	.00	33.2	60.9
1193B	3.43	34.656	3.89					50.6

Z	T	S	O2	SIGT	DT	DD
0	16.27	35.232		25.882	212.8	0
10	16.21	35.229		25.893	211.8	.021
20	16.15	35.226		25.905	210.7	.042
30	16.09	35.223		25.916	209.5	.064
50	15.91	35.215	5.81	25.952	206.2	.105
75	14.39	35.169	5.04	26.253	177.6	.154
100	13.10	35.136	4.56	26.496	154.5	.196
125	12.66	35.097	4.39	26.555	148.9	.235
150	12.13	35.060	4.27	26.630	141.8	.272
200	11.14	34.962	3.80	26.739	131.4	.342
250	10.13	34.861	3.31	26.842	121.7	.408
300	9.31	34.780	2.84	26.916	114.7	.470
400	7.52	34.606	2.85	27.055	101.5	.585
500	6.30	34.541	2.31	27.172	90.3	.688
600	5.49	34.496	2.67	27.239	84.0	.782
700	4.79	34.467	3.01	27.298	78.4	.871
800	4.37	34.470	3.45	27.347	73.8	.955
1000	3.76	34.525	3.86	27.454	63.6	1.109
1200	3.42	34.670	3.85	27.604	49.5	1.240

RV ARGO — CIRCE EXPEDITION VIII — 151

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 10.0S	14 03.2E	10/26/68	0742	187M	180	16KT	0	010 06 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	13.16	34.926	6.48	.46	0.0	.24	7.1	171.0
30	13.10	34.936						169.1
35	13.07	34.930	6.44	.49	0.0	.28	7.2	169.0
70	11.92	34.955						145.7
75	11.66	34.946	4.62	1.42	8.8	.25	18.6	141.7
115	11.25	34.994	2.82	1.53	10.5	.02	24.1	131.0
125	11.09	34.980						129.2
149	10.81	34.956						126.2
153	10.80	34.949	1.92	2.35	20.3	.03	24.4	126.5
176	10.75	34.946						125.9
180	10.75	34.949	1.77	2.08	23.4	.06	25.5	125.7

Z	T	S	O2	SIGT	DT	DD
0	13.16	34.926	6.48	26.322	171.0	0
10	13.14	34.931	6.47	26.330	170.2	.017
20	13.12	34.935	6.46	26.337	169.6	.034
30	13.10	34.936	6.45	26.342	169.1	.051
50	12.75	34.943	5.87	26.417	161.9	.084
75	11.66	34.946	4.62	26.630	141.7	.123
100	11.40	34.976	3.44	26.701	135.0	.158
125	11.09	34.980	2.51	26.762	129.2	.192
150	10.81	34.954	1.96	26.794	126.2	.224

RV ARGO — CIRCE EXPEDITION VIII — 152

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 09.9S	14 15.2E	10/26/68	0924	170M	180	18KT	0	010 06 09

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	13.27	34.967	6.18	.72	0.0	.38	7.3	170.1
31	13.07	34.963						166.6
37	13.06	34.955	6.19	.64	1.1	.40	8.3	167.0
70	11.55	34.954						139.2
80	11.37	34.943	4.47	1.30	8.2	.04	19.2	136.8
114	10.95	34.949	3.06	1.75	17.7	.02	24.0	129.1
125	10.89	34.945						128.3
152	10.56	34.920						124.6
165	10.56	34.921	1.49		36.6	.18	27.7	124.5

Z	T	S	O2	SIGT	DT	DD
0	13.27	34.967	6.18	26.331	170.1	0
10	13.18	34.959	6.18	26.342	169.1	.017
20	13.11	34.957	6.19	26.355	167.9	.034
30	13.07	34.962	6.19	26.367	166.7	.051
50	12.53	34.951	5.77	26.467	157.2	.083
75	11.45	34.948	4.72	26.672	137.8	.121
100	11.08	34.944	3.63	26.736	131.7	.155
125	10.89	34.945	2.67	26.772	128.3	.188
150	10.58	34.921	1.88	26.809	124.8	.220

A) CAST IV. X-26-68, 0134 GMT.
B) CAST II. X-26-68, 0002 GMT.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO — CIRCE EXPEDITION VIII — 153

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 09.5S	14 26.8E	10/26/68	1055	131M	180	17KT	0	010 06 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	12.34	34.951	5.95	1.44	1.7	.62	11.3	153.7
28	12.05	34.943						149.0
38	11.93	34.947	5.14	1.53	6.4	.70	15.4	146.5
57	11.63	34.945						141.3
68	11.29	34.939	4.36	1.42	7.8	.06	19.1	135.7
82	11.10	34.921						133.7
106	10.57	34.905	2.34	1.75	26.8	.06	25.2	125.9
123	10.59	34.924						124.8
128	10.59	34.917	1.58	1.74	32.4	.12	26.1	125.3

Z	T	S	SIGT	DT	DD
0	12.34	34.951	26.504	153.7	0
10	12.25	34.945	26.517	152.5	.015
20	12.14	34.942	26.536	150.7	.031
30	12.03	34.944	26.559	148.5	.046
50	11.77	34.947	26.611	143.6	.075
75	11.18	34.929	26.707	134.5	.110
100	10.68	34.905	26.778	127.7	.143
125	10.59	34.921	26.807	125.0	.176

RV ARGO — CIRCE EXPEDITION VIII — 154

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
25 09.4S	14 37.6E	10/26/68	1221	80M	190	23KT	0	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	11.25	34.902	4.20	1.49	21.9	.23	22.2	137.7
12	11.01	34.910	4.15	1.72	24.1	.22	21.5	133.0
37	10.83	34.916						129.5
43	10.83	34.901	3.35	1.69	26.5	.20	23.7	130.6
53	10.81	34.898	3.36	1.59	25.7	.16	23.2	130.4
58	10.80	34.902						130.0
66	10.64		2.30	1.75	32.2	.20	24.8	
71	10.61	34.910						126.2
75	10.60	34.909	1.98	1.77	35.8	.21	25.0	126.1

Z	T	S	SIGT	DT	DD
0	11.25	34.902	26.673	137.7	0
10	11.04	34.908	26.716	133.6	.014
20	10.95	34.911	26.735	131.9	.027
30	10.88	34.913	26.749	130.4	.040
50	10.82	34.898	26.749	130.5	.066
75	10.60	34.909	26.796	126.1	.099

RV ARGO — CIRCE EXPEDITION VIII — 160

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 13.5S	14 15.5E	10/27/68	0605	112M	170	12KT	0	210 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	12.45	34.942	6.00	.71	1.2	.31	11.1	156.4
11	12.41	34.941	5.98	.97	1.9	.31	10.9	155.8
15	12.43	34.940						156.2
30	12.41	34.951	5.91	1.16	2.4	.30	11.2	155.0
40	12.20	34.953						151.0
69	11.30	34.981	2.82	1.41	11.8	.14	19.4	132.8
78	11.15	34.974						130.7
93	11.00	34.967	1.71	1.87	32.8	.19	22.6	128.6
102	11.01	34.966						128.9
107	11.02	34.966	1.71	1.87	32.1	.19	22.6	129.0

Z	T	S	SIGT	DT	DD
0	12.45	34.942	26.476	156.4	0
10	12.41	34.941	26.482	155.8	.016
20	12.42	34.944	26.482	155.8	.031
30	12.41	34.951	26.490	155.0	.047
50	11.88	34.965	26.604	144.3	.077
75	11.19	34.977	26.741	131.3	.112
100	11.01	34.966	1.71	26.767	128.8	.145

RV ARGO — CIRCE EXPEDITION VIII — 161

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 13.5S	14 05.4E	10/27/68	0900	297M	180	17KT	0	170 07 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	13.08	34.927	6.34	.53	0.5	.35	8.5	169.4
28	12.98	34.936	6.34	.47	2.4	.35	8.8	166.8
145A	10.61	34.936						124.2
150A	10.59	34.934	1.43	2.05	21.6	.15	26.7	124.1

A) CAST II. X-27-68, 0915 GMT.

RV ARGO — CIRCE EXPEDITION VIII — 162

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 15.1S	13 51.5E	10/27/68	1100	255M	180	17KT	0	170 07 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	14.21	34.974	6.21	1.13	1.2	.37	7.8	188.2
37	13.92	34.981	6.13	1.49	2.7	.27	7.5	181.9
58	13.18	35.034						163.5
77	12.43	35.023	4.45	1.33	7.7	.26	17.0	150.1
105	11.86	35.043						138.2
115	11.78	35.035	3.98	1.46	11.3	.01	20.3	137.3
142	11.32	35.000						131.7
161	11.05	34.962	3.46	1.76	9.4	.01	20.1	129.8
180	10.73	34.932						126.6
199	10.36	34.894	3.15	1.95	12.5	.01	23.0	123.2
209	10.19	34.884						121.1
228	9.76	34.841	2.39	1.97	15.6	.00	27.0	117.3
248	9.63	34.848						114.7
252	9.62	34.844	1.99	2.60	20.2	.03	29.9	114.8

Z	T	S	O2	SIGT	DT	DD
0	14.21	34.974	6.21	26.141	188.2	0
10	14.13	34.976	6.19	26.159	186.5	.019
20	14.05	34.978	6.17	26.177	184.8	.037
30	13.97	34.979	6.15	26.195	183.1	.056
50	13.49	35.015	5.61	26.323	170.9	.091
75	12.50	35.025	4.54	26.529	151.3	.132
100	11.92	35.040	4.10	26.654	139.5	.169
125	11.63	35.024	3.86	26.698	135.3	.204
150	11.21	34.984	3.57	26.744	130.9	.238
200	10.34	34.892	3.13	26.828	123.0	.304
250	9.62	34.846	2.02	26.915	114.7	.366

RV ARGO — CIRCE EXPEDITION VIII — 163

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
24 14.2S	13 41.6E	10/28/68	1307	294M	170	21KT	0	170 08 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	14.47	34.975	6.21	1.23	1.3	.21	7.0	193.4
39	14.25	34.971	6.26	.64	1.6	.22	6.3	189.2
58	14.21	34.974						188.2
77	13.77	35.088	5.32	1.05	4.3	.20	11.2	171.1
106	12.84	35.114						151.1
115	12.61	35.102	4.24	1.16	6.7	.01	15.7	147.7
144	12.03	35.076						138.8
163	11.58	35.018	3.95	1.38	8.1	.02	17.9	135.0
181	11.31	35.001						131.5
201	11.05	34.974	3.02	2.05	12.7	.02	20.6	129.0
210	10.81	34.962						125.7
229	10.35	34.900	2.73	1.97	14.4	.01	25.7	122.6
249	10.05	34.878						119.2
268	9.73	34.847	2.02	2.42	18.9	.00	27.8	116.4
274	9.69	34.843						116.0
278	9.68	34.844	1.96	2.44	19.5	.01	29.1	115.8

Z	T	S	O2	SIGT	DT	DD
0	14.47	34.975	6.21	26.086	193.4	0
10	14.40	34.973	6.22	26.100	192.1	.019
20	14.33	34.971	6.24	26.112	190.9	.038
30	14.28	34.971	6.25	26.122	189.9	.058
50	14.23	34.973	6.05	26.136	188.6	.096
75	13.83	35.075	5.38	26.299	173.2	.141
100	13.03	35.120	4.63	26.497	154.4	.183
125	12.40	35.096	4.17	26.604	144.2	.221
150	11.88	35.057	4.02	26.675	137.5	.257
200	11.07	34.975	3.04	26.763	129.1	.326
250	10.03	34.875	2.32	26.869	119.1	.391

RV ARGO — CIRCE EXPEDITION VIII — 171

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
23 02.6S	13 07.1E	10/28/68	1338	340M	170	23KT	2	160 12 13

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	14.94	35.089	5.79	.50	0.0	.25	8.3	194.8
28	14.94	35.077	5.80	.48	0.0	.25	8.5	195.6
56	14.74	35.290	5.16	.77	0.0	.25	9.2	175.9
74	14.06	35.240	4.79	.75	0.0	.06	10.9	165.7
79	13.92	35.225						164.0
97	13.62	35.200	4.52	.85	0.0	.04	12.5	159.9
138	12.76	35.145	3.73	1.19	1.7	.03	16.7	147.3
148	12.46	35.132						142.6
185	11.98	35.091	2.56	1.56	4.9	.02	23.1	136.8
190	11.84	35.079						135.2
232	11.06	34.988	2.39	1.91	5.9	.00	25.9	128.1
237	10.96	34.979						127.0
276	10.23	34.906		2.06	9.8	.03	29.0	120.1
319	9.75	34.856						116.0
324	9.73	34.854	1.49	2.24	14.0	.07	31.0	115.8

Z	T	S	O2	SIGT	DT	DD
0	14.94	35.089	5.79	26.072	194.8	0
10	14.94	35.085	5.79	26.068	195.1	.020
20	14.94	35.080	5.80	26.065	195.4	.039
30	14.93	35.088	5.76	26.075	194.5	.059
50	14.78	35.235	5.32	26.219	180.8	.096
75	14.03	35.237	4.78	26.382	165.3	.140
100	13.57	35.196	4.47	26.446	159.2	.181
125	13.08	35.162	4.01	26.521	152.1	.221
150	12.43	35.131	3.40	26.625	142.2	.259
200	11.63	35.055	2.51	26.722	133.1	.330
250	10.70	34.953	2.27	26.813	124.4	.397
300	9.91	34.872	1.80	26.888	117.3	.460

RV ARGO — CIRCE EXPEDITION VIII — 173

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
22 59.5S	13 41.0E	10/28/68	1707	153M	190	15KT	1	180 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	13.63	35.03	5.69	1.16	0.0	.20	10.4	172.5
24	13.60	35.02	5.63	1.21	0.0	.21	10.4	172.7
38	13.58	35.04	5.63	.76	0.0	.23	10.0	170.8
57	13.02	35.08	4.40	1.39	1.8	.18	15.8	157.0
66	12.57	35.09						147.8
84	12.02	35.08	2.92	1.78	8.8	.09	20.6	138.4
89	11.95	35.06						138.6
107	11.67	35.06	2.06	2.52	14.8	.13	24.1	133.5
116	11.61	35.04						133.9
132	11.60	35.04	1.75	2.27	14.9	.17	24.6	133.7
137	11.60	35.04						133.7
140	11.60	35.04	1.74	3.14	10.7	.15	24.4	133.7

Z	T	S	O2	SIGT	DT	DD
0	13.63	35.03	5.69	26.306	172.5	0
10	13.62	35.03	5.66	26.305	172.6	.017
20	13.61	35.02	5.63	26.305	172.7	.035
30	13.59	35.03	5.63	26.313	171.9	.052
50	13.29	35.07	4.93	26.403	163.3	.086
75	12.24	35.09	3.37	26.635	141.3	.124
100	11.77	35.06	2.27	26.696	135.6	.159
125	11.60	35.04	1.78	26.714	133.8	.194

RV ARGO — CIRCE EXPEDITION VIII — 175

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
22 56.4S	13 59.6E	10/28/68	1936	134M	190	16KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	12.97	35.021	5.03	1.36	12.7	.32	18.6	160.4
29	12.41	35.064	3.53	1.61	7.9	.14	19.4	146.7
39	12.33	35.078		1.71	5.6	.14	19.7	144.2
43	12.19	35.084						141.2
53	12.04	35.072	3.01	1.81	6.5	.12	21.3	139.3
67	11.82	35.062						136.1
76	11.58	35.036	2.14	1.90	13.1	.20	25.0	133.7
90	11.44	35.037						131.1
100	11.36	35.033	1.01	2.27	22.0	.16	25.7	130.0
117	11.23	35.017						128.9
120	11.23	35.015	.96	2.67	29.0	.36	26.7	129.1
122	11.22	35.022	.97	2.64	30.0	.35	25.0	128.4

Z	T	S	O2	SIGT	DT	DD
0	12.97	35.021	5.03	26.434	160.4	0
10	12.72	35.036	4.41	26.495	154.6	.016
20	12.53	35.051	3.89	26.544	149.9	.031
30	12.40	35.063	3.51	26.579	146.6	.046
50	12.07	35.072	3.07	26.650	139.9	.075
75	11.61	35.039	2.18	26.713	133.9	.109
100	11.36	35.033	1.01	26.754	130.0	.143

RV ARGO — CIRCE EXPEDITION VIII — 176

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
22 57.0S	14 13.9E	10/28/68	2352	127M	160	18KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	12.75	35.029	4.77	1.39	11.8	.09	19.9	155.7
24	12.32	35.11 A	3.41	1.54	4.4	.21	18.8	141.7
33	12.12	35.085						139.8
44	11.99	35.072	2.61	1.65	7.1	.15	19.4	138.4
58	11.83	35.071						135.6
68	11.67	35.057	2.19	1.90	6.0	.16	20.6	133.7
86	11.29	35.024						129.4
100	11.25	35.025	.62	2.38	23.6	.30	22.0	128.7
110	11.25	35.021						129.0
114	11.25	35.045	.49	2.31	26.8	.04	20.1	127.2

Z	T	S	O2	SIGT	DT	DD
0	12.75	35.029	4.77	26.484	155.7	0
10	12.59	35.089	4.15	26.562	148.2	.015
20	12.40	35.111	3.61	26.616	143.1	.030
30	12.18	35.094	3.13	26.645	140.3	.044
50	11.93	35.072	2.51	26.678	137.3	.072
75	11.51	35.042	1.82	26.734	131.9	.106
100	11.25	35.025	.62	26.768	128.7	.139

RV ARGO — CIRCE EXPEDITION VIII — 188

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
21 51.5S	13 46.8E	10/29/68	1022	93M	150	13KT		180 04 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	13.75	35.084	6.75	.18	0.0	.01	0.0	171.0
10	13.65	35.069	6.27	.32	0.0	.03	0.9	170.1
29	12.40	35.103						143.7
34	12.31	35.107	1.46	1.97	18.5	.10	24.6	141.7
53	11.96	35.101	1.16	2.01	19.6	.39	21.8	135.7
63	11.93	35.105						134.9
73	11.82	35.099	.02	2.53	46.0	2.23	8.5	133.3
88	11.77	35.081						133.8
93	11.78	35.084	.01	2.97	45.2	3.24	7.4	133.7

Z	T	S	O2	SIGT	DT	DD
0	13.75	35.084	6.75	26.323	171.0	0
10	13.65	35.069	6.27	26.332	170.1	.017
20	12.99	35.082	4.28	26.477	156.3	.033
30	12.38	35.104	2.27	26.615	143.2	.048
50	12.00	35.102	1.21	26.687	136.4	.077
75	11.81	35.096	.02	26.718	133.4	.111

RV ARGO — CIRCE EXPEDITION VIII — 189

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
21 52.4S	13 36.0E	10/30/68	0020	132M	170	13KT		050 04 11

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	14.11	35.077	7.04	.02	0.0	.04	0.0	178.6
26	13.74	35.089	6.11	.44	0.0	.08	3.1	170.4
31	13.60	35.070						169.0
36	13.51	35.075	5.38	.42	0.0	.10	7.7	166.9
55	13.23	35.064	4.52	.99	2.2	.18	13.6	162.3
65	12.95		3.89	1.14	5.7	.19	19.4	
69	12.61	35.065						150.4
74	12.40	35.074	2.28	1.17	6.2	.20	22.6	145.8
84	12.03	35.098	1.20	2.14	18.5	.13	25.2	137.2
89	11.84	35.084						134.8
103	11.64	35.069	.57	2.03	25.0	.02	26.2	132.3
111	11.61	35.066	.58	2.29	37.3	.06	26.2	132.0
116	11.61	35.069						131.8
121	11.61	35.067	.60	2.31	37.9	.11	25.7	131.9

Z	T	S	O2	SIGT	DT	DD
0	14.11	35.077	7.04	26.241	178.6	0
10	14.04	35.104	6.85	26.277	175.2	.018
20	13.88	35.103	6.45	26.310	172.1	.035
30	13.63	35.073	5.82	26.340	169.3	.052
50	13.31	35.065	4.73	26.397	163.8	.086
75	12.36	35.078	2.14	26.598	144.8	.125
100	11.65	35.070	.67	26.728	132.5	.160

A) THIS SAMPLE BOTTLE WAS BROKEN AT THE TOP. THE VALUE HAS BEEN ACCEPTED ALTHOUGH EVAPORATION WAS POSSIBLE.

RV ARGO — CIRCE EXPEDITION VIII — 191

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
21 53.3S	13 11.8E	10/30/68	0330	173M	100	14KT		140 06 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	14.73	35.094	5.73	.47	0.0	.13	6.2	190.0	0	14.73	35.094	5.73	26.122	190.0	0
27	14.16	35.147	4.99	.82	1.6	.17	10.6	174.5	10	14.61	35.104	5.44	26.154	186.9	.019
37	13.74	35.189						163.1	20	14.39	35.125	5.17	26.220	180.7	.037
56	13.55	35.187	4.32	1.07	3.1	.14	14.4	159.5	30	14.03	35.160	4.92	26.323	170.9	.055
66	13.29	35.195						153.8	50	13.59	35.182	4.46	26.432	160.6	.088
85	12.88	35.153	3.58	1.13	4.6	.05	17.6	149.0	75	13.08	35.177	3.84	26.532	151.1	.128
104	12.63	35.155	3.11	1.29	4.8	.08	18.1	144.1	100	12.68	35.154	3.21	26.594	145.2	.165
127	12.19	35.123						138.3	125	12.23	35.127	2.69	26.662	138.8	.202
145	11.84	35.074	2.27	1.93	8.6	.07	23.2	135.5	150	11.77	35.073	2.14	26.708	134.3	.237
155	11.72	35.073						133.5							
158	11.71	35.071	1.93	1.79	11.2	.08	24.0	133.4							

RV ARGO — CIRCE EXPEDITION VIII — 204

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
20 19.9S	13 01.8E	10/31/68	0233	117M	160	17KT		160 04

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	13.81	35.112	5.38	1.02	3.3	.41	11.6	170.1	0	13.81	35.112	5.38	26.332	170.1	0
10	13.75	35.115	5.35	.96	3.5	.47	11.8	168.7	10	13.75	35.115	5.35	26.346	168.7	.017
29	13.54	35.109	4.85	1.23	7.2	.47	13.8	165.0	20	13.64	35.112	5.09	26.367	166.7	.034
34	13.22	35.114						158.4	30	13.48	35.110	4.73	26.400	163.6	.050
39	13.02	35.11	3.71	1.54	13.0	.56	19.4	154.8	50	12.96	35.106	3.58	26.502	153.9	.082
58	12.91	35.104	3.49	2.01	13.2	.53	19.5	153.2	75	12.77	35.109	3.15	26.542	150.2	.121
68	12.85	35.103						152.1	100	12.13	35.117	1.53	26.673	137.7	.157
77	12.74	35.111	3.08	1.06	14.8	1.06	21.4	149.4							
100	12.13	35.117						137.7							
104	12.13	35.119	1.14	2.46	21.0	2.46	26.3	137.5							

RV ARGO — CIRCE EXPEDITION VIII — 205

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
20 22.2S	12 51.4E	10/31/68	0405	138M	150	14KT		160 04 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	13.74	35.12	5.37	1.06	5.5	.40	13.0	168.1	0	13.74	35.12	5.37	26.352	168.1	0
29	13.67	35.12	5.18	1.17	4.7	.43	12.1	166.7	10	13.72	35.12	5.34	26.357	167.6	.017
43	13.57	35.117	4.96	1.40	5.8	.42	14.6	165.0	20	13.69	35.12	5.28	26.362	167.2	.034
58	13.54	35.22 U	4.92	1.17	7.1	.42	14.6		30	13.66	35.12	5.16	26.368	166.6	.050
62	13.54	35.119						164.3	50	13.56	35.12	4.93	26.389	164.7	.084
77	13.48	35.123	4.74	1.14	6.9	.41	14.6	162.8	75	13.49	35.12	4.76	26.405	163.1	.125
82	13.47	35.14						161.3	100	12.98	35.16	3.00	26.538	150.5	.165
105	12.77	35.156	2.55	1.73	9.1	.20	21.6	146.7	125	12.18	35.13	1.42	26.672	137.8	.202
112	12.51	35.151						142.2							
123	12.18	35.13						137.6							
127	12.18	35.12	1.33	2.12	16.1	.33	26.6	138.4							

RV ARGO — CIRCE EXPEDITION VIII — 206

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
20 24.0S	12 39.1E	10/31/68	0547	198M	160	20KT	2	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	14.98	35.117	6.11	.94	0.0	.14	3.7	193.5	0	14.98	35.117	6.11	26.085	193.5	0
29	14.90	35.191	5.71	.86	0.0	.16	6.3	186.5	10	14.95	35.134	6.03	26.104	191.7	.019
58	14.44	35.232	4.76	1.17	0.9	.21	12.7	174.0	20	14.92	35.160	5.89	26.130	189.2	.038
68	14.21	35.257						167.5	30	14.89	35.192	5.68	26.162	186.2	.057
87	13.50	35.218	3.55	1.41	4.2	.01	18.9	156.2	50	14.60	35.220	5.06	26.246	178.2	.094
111	12.59	35.169						142.4	75	13.97	35.249	4.10	26.404	163.2	.137
116	12.51	35.161	1.73	1.91	12.1	.00	22.6	141.4	100	12.95	35.190	2.81	26.567	147.7	.176
140	12.24	35.139						138.1	125	12.39	35.149		26.649	140.0	.213

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
20 24.8S	12 28.0E	10/31/68	0725	268M	160	20KT	1	150 04 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	15.09	35.181	6.21	.81	0.0	.22	4.6	191.2
39	14.95	35.191	5.79	.90	0.0	.25	5.6	187.5
58	14.48	35.254						173.2
77	13.95	35.243	3.94	1.57	4.8	.07	17.4	163.3
106	13.34	35.215						153.3
116	13.24	35.207	2.81	1.74	7.9	.08	23.3	152.0
144	12.90	35.197						146.2
163	12.58	35.25 U	1.76	1.98	12.7	.03	27.4	
182	12.14	35.126						137.2
211	11.91	35.102						134.7
230	11.63	35.076	1.14	2.15	17.2	.02	27.4	131.6
239	11.41	35.050	.96	2.21	23.5	.09	29.7	129.6
250	11.39	35.050						129.3
255	11.39	35.068	.73	2.47	24.6	.11	28.4	128.0

Z	T	S	O2	SIGT	DT	DD
0	15.09	35.181	6.21	26.110	191.2	0
10	15.05	35.183	6.10	26.119	190.2	.019
20	15.02	35.186	5.99	26.129	189.3	.038
30	14.98	35.188	5.89	26.139	188.4	.057
50	14.70	35.229	5.29	26.233	179.5	.094
75	14.00	35.246	4.05	26.394	164.2	.137
100	13.44	35.221	3.21	26.493	154.7	.178
125	13.14	35.204	2.58	26.540	150.3	.217
150	12.81	35.195	2.01	26.601	144.6	.255
200	11.98	35.107	1.43	26.695	135.6	.327
250	11.39	35.050	.79	26.762	129.3	.396

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
19 58.1S	10 42.3E	10/31/68	2310	1390M	160	16KT		

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	16.15	35.279	5.77	1.04	0.0	.27	9.6	206.8
49	15.58	35.315	5.43	1.08	0.0	.55	19.4	191.8
96	13.94	35.291	3.94	1.75	7.2	.05	23.0	159.6
146	13.35	35.269	2.52	1.83	9.0	.03	26.5	149.5
195	12.25	35.158	1.28	1.79	9.3	.04	30.0	136.8
217A	11.56	35.077						130.3
244	11.09	35.036	1.09	1.99	12.3	.02	32.2	125.1
293	10.52	34.972	.93	2.13	14.3	.00	38.5	120.1
343	9.53	34.864	.88	2.19	14.9	.00	39.2	111.9
392	8.91	34.806	1.03	2.21	16.5	.00	40.8	106.6
488	7.46	34.686	1.52	2.46	19.4	.00	39.6	94.6
591	6.19	34.585	1.95	2.55	23.9	.00	42.8	85.7
658A	5.55	34.514						83.3
689	5.34	34.527	2.44	2.41	28.9	.00	41.5	79.9
789	4.73	34.502	2.81	2.48	32.0	.00	41.7	75.1
879A	4.33	34.504						70.8
887	4.31	34.506	3.14	2.68	35.4	.00	38.0	70.4
986	3.97	34.549	3.49	2.35	39.0	.00	39.4	63.8
1085A	3.80	34.601						58.2
1179	3.69	34.693	3.88	1.95	39.5	.00	35.4	50.2
1324	3.54	34.774	4.33	1.88	38.3	.00	31.4	42.7
1358	3.52	34.817	5.27U	1.88	38.7	.00	33.3	39.3

Z	T	S	O2	SIGT	DT	DD
0	16.15	35.279	5.77	25.946	206.8	0
10	16.03	35.265	5.70	25.961	205.2	.021
20	15.92	35.262	5.63	25.986	202.9	.041
30	15.80	35.269	5.56	26.018	199.8	.061
50	15.55	35.314	5.40	26.111	191.1	.101
75	14.67	35.302	4.67	26.294	173.7	.147
100	13.88	35.291	3.82	26.455	158.4	.189
125	13.56	35.285	3.10	26.518	152.4	.228
150	13.28	35.263	2.40	26.558	148.6	.267
200	12.09	35.138	1.26	26.698	135.3	.340
250	11.02	35.029	1.07	26.813	124.4	.408
300	10.38	34.956	.92	26.871	118.9	.472
400	8.79	34.795	1.07	27.011	105.6	.592
500	7.30	34.674	1.57	27.141	93.3	.699
600	6.09	34.573	2.00	27.224	85.5	.797
700	5.27	34.526	2.48	27.290	79.2	.887
800	4.67	34.501	2.85	27.339	74.6	.973
1000	3.94	34.555	3.52	27.460	63.1	1.128
1200	3.66	34.702	3.94	27.605	49.3	1.260

A) CAST IV. XI-01-68, 0111 GMT.

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
18 11.9S	7 35.7E	11/02/68	0601	5140M	140	13KT	1	

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
1	17.93	35.619	5.64					222.4
44A	17.89	35.622	5.67					221.2
77	16.31	35.511	5.36					193.4
100	14.21	35.332	4.36					162.0
133	13.13	35.237	3.64					147.6
165	12.44	35.165	3.44					139.9
198	11.72	35.109	3.24					130.8
226B	11.06							
230	11.13	35.047	2.94					125.0
264	10.41	35.044U	2.96					
329	9.24 C	34.816	3.31					110.9
395	8.39	34.756	1.78					102.6
425B	7.17 V							
461	7.26	34.663	1.93					93.6
526	6.21	34.554	2.78					88.2
593	4.98 U	34.456	3.19					
622B	4.96							
660	4.63	34.457	3.44					77.4
820B	4.13							
826	4.07	34.482	2.98U					69.8
919B	3.91							
995	3.74	34.559	3.87					60.8
1118B	3.67							
1215B	3.59							
1412B	3.52							
1590D	3.44	34.882	4.86					33.7
1606B	3.44							
1845D	3.30	34.914	5.13					30.0
2082D	3.12	34.931	4.94U					27.1
2229D	3.00	34.925	5.18					26.5
2576D	2.74	34.920	5.26					24.6
2618D	2.72	34.913						25.0
2822D	2.60	34.904	5.32					24.6
3069D	2.50	34.918	5.33					22.7
3315D	2.43	34.920	5.38					22.0
3561D	2.396	34.916	5.29					22.1
3611D	2.377	34.895	5.38					23.5
3808D	2.37	34.901	5.40					23.0
3858D	2.378	34.894						23.6
3908E	2.37	34.898	5.38					23.2
4054D	2.378	34.895	5.40					23.5
4102E	2.374	34.897						23.3
4150E	2.38	34.893	5.36					23.7
4397E	2.399	34.904	5.36					23.0
4406E	2.40	34.895						23.7
4595E	2.41	34.893	5.02U					23.9
4643E	2.42	34.890						24.2
4775E	2.449	34.891						24.4
4890E	2.44	34.894	5.43					24.1
4965E	2.449	34.890						24.5
5019E	2.455	34.890	5.46					24.5

Z	T	S	O2	SIGT	DT	DD
0	17.93	35.619	5.64	25.781	222.4	0
10	17.92	35.619	5.65	25.784	222.1	.022
20	17.91	35.620	5.65	25.786	221.9	.044
30	17.90	35.621	5.66	25.789	221.6	.067
50	17.72	35.613	5.61	25.829	217.8	.111
75	16.45	35.521	5.38	26.062	195.7	.163
100	14.21	35.332	4.36	26.417	162.0	.209
125	13.27	35.253	3.75	26.552	149.2	.248
150	12.74	35.197	3.50	26.615	143.2	.286
200	11.64	35.095	3.22	26.750	130.4	.356
250	10.84	35.023	2.95	26.840	121.8	.422
300	9.72	34.869	3.15	26.916	114.6	.484
400	8.31	34.750	1.79	27.051	101.9	.599
500	6.62	34.597	2.42	27.174	90.2	.703
600	5.20	34.480	3.22	27.261	82.0	.796
700	4.54	34.472	3.52	27.330	75.4	.882
800	4.21	34.487	3.70	27.378	70.8	.962
1000	3.74	34.562	3.88	27.487	60.5	1.110
1200	3.60	34.691	4.22	27.602	49.6	1.239
1500	3.47	34.845	4.72	27.739	36.7	1.402
2000	3.19	34.927	5.15	27.832	27.9	1.632
2500	2.79	34.919	5.24	27.862	25.0	1.843
3000	2.52	34.912	5.33	27.880	23.3	2.049
3500	2.41	34.916	5.31	27.893	22.1	2.254
4000	2.37	34.896	5.39	27.880	23.4	2.469
4500	2.40	34.893	5.37	27.875	23.8	2.700
5000	2.45	34.889	5.46	27.868	24.5	2.947

A) A PRETRIP MAY HAVE STARTED WITH THIS NANSEN BOTTLE SO ALL THE DEPTHS FOR THIS CAST BELOW THIS LEVEL ARE SLIGHTLY UNCERTAIN.
B) CAST IX XI-02-68, 1326 GMT.
C) MEAN VALUE OF 9.27 AND 9.21 DEGREES.
D) CAST VI. XI-02-68, 1052 GMT. TWELVE OXYGEN SAMPLES WERE COLLECTED FROM THE FOURTEEN NANSEN BOTTLES ON THIS CAST, BUT NO RECORD WAS MADE TO INDICATE THE LEVEL FROM WHICH THEY WERE DRAWN. THE VALUES IN THE ORDER DETERMINED ARE 4.86, 5.13, 4.94, 5.18, 5.26, 5.32, 5.33, 5.38, 5.29, 5.38, 5.40, 5.40. COMPARING THE OXYGEN VERSUS DEPTH CURVES FOR STATIONS 211 - 216 WOULD SUGGEST THE ARRANGEMENT GIVEN.
E) CAST I. XI-02-68, 0300 GMT.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
11 59.0S	11 12.5E	11/04/68	1043	3518M	150	03KT	2	140 05 14

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
3	23.49	35.865	5.06	.18	3.2	.02		347.5	0	23.49	35.865	5.06	24.466	347.5	0
52	15.91	35.582	1.52	1.53	8.2	.36		179.4	10	22.03	35.769	4.36	24.814	314.4	.033
100	14.50	35.464	1.12	1.79	11.2	.03		158.2	20	20.16	35.678	3.47	25.256	272.4	.063
198	12.93	35.270	1.19	1.94	13.0	.03		141.4	30	18.55	35.625	2.72	25.632	236.6	.088
201	12.87	35.272		1.95	13.1	.01		140.1	50	16.10	35.584	1.60	26.192	183.4	.130
247	11.94	35.156	1.08	2.04	14.0	.01		131.3	75	15.23	35.522	1.33	26.340	169.3	.175
295	11.03	35.051	.92	2.16	16.2	.10		122.9	100	14.50	35.464	1.12	26.456	158.2	.216
345	10.01	34.938	.65	2.40	18.7	.00		114.2	125	14.05	35.389	1.14	26.495	154.6	.256
393	9.10	34.858	.62	2.51	20.6	.02		105.7	150	13.64	35.332	1.16	26.538	150.5	.296
441	8.25	34.760	.58	2.72	23.1	.00		100.2	200	12.89	35.271	1.19	26.643	140.5	.371
444		34.754			23.1				250	11.88	35.149	1.07	26.746	130.8	.441
491	7.310	34.672	.94	2.47U	25.4	.03		93.6	300	10.93	35.039	.89	26.838	122.1	.508
538	6.760	34.637	1.09	2.84	27.3	.05		89.0	400	8.98	34.843	.61	27.020	104.8	.629
588	6.293	34.602	1.36	2.86	28.7	.00		85.7	500	7.19	34.664	.97	27.148	92.6	.736
684	5.47	34.542	1.91	2.81	31.7	.03		80.3	600	6.19	34.597	1.43	27.230	84.9	.833
687	5.440	34.539		2.72U	31.5	.01		80.2	700	5.33	34.536	2.00	27.291	79.1	.923
780	4.82	34.565	2.44	2.71	33.2	.08		71.3	800	4.73	34.565	2.53	27.383	70.4	1.007
971	4.228	34.571	3.21	2.64	38.3	.04		64.7	1000	4.19	34.587	3.30	27.459	63.2	1.159
1206	4.03	34.724	3.85	2.53	36.0	.01		51.2	1200	4.03	34.719	3.84	27.581	51.6	1.294
1439	3.83	34.861	4.56	2.18	31.7	.00		38.9	1500	3.79	34.904	4.77	27.753	35.3	1.462
1442	3.832	34.866		1.88	31.5	.00		38.6							

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
8 18.8S	9 00.3E	11/10/68	1732	4366M	200	06KT	1	190 05 07

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT	Z	T	S	O2	SIGT	DT	DD
0	24.61	35.886	4.94	.25				377.7	0	24.61	35.886	4.94	24.149	377.7	0
45	15.76	35.561	1.94	1.46				177.7	10	22.04	35.710	4.05	24.765	319.1	.035
101	14.47	35.463	1.80	1.65				157.7	20	19.82	35.613	3.29	25.296	268.6	.064
202	12.99	35.279						141.9	30	17.94	35.570	2.65	25.742	226.2	.089
205	12.90	35.271	1.70	1.82				140.7	50	15.64	35.551	1.93	26.270	175.9	.130
223	12.61	35.237	1.62	1.80				137.7	75	15.07	35.506	1.86	26.364	167.0	.173
302	10.97	35.036	1.76	1.95				123.0	100	14.49	35.464	1.80	26.458	158.1	.214
353	10.15	34.952	.80	2.35				115.4	125	14.21	35.430	1.78	26.494	154.7	.254
404	9.03	34.836	.58	2.59				106.2	150	13.87	35.388	1.75	26.532	151.1	.293
452	7.91	34.726						97.9	200	13.03	35.283	1.70	26.625	142.3	.369
455		34.725	.75	2.42U					250	12.06	35.167	1.67	26.726	132.6	.441
504	7.16	34.663	1.03	2.58				92.3	300	11.01	35.041	1.76	26.824	123.4	.508
546	6.58	34.610	1.43	2.76				88.7	400	9.12	34.845	.60	26.997	107.0	.631
603	6.04	34.582	1.77	2.69				84.1	500	7.21	34.668	1.00	27.148	92.6	.739
703	5.26	34.584U							600	6.06	34.584	1.76	27.236	84.3	.836
706	5.250	34.524	2.20	2.69				79.2	700	5.28	34.525	2.18	27.288	79.4	.926
804	4.71	34.516	2.79	2.69				73.8	800	4.73	34.517	2.77	27.344	74.1	1.011
1003	4.23	34.591	3.36	2.33				63.2	1000	4.23	34.590	3.35	27.457	63.4	1.167
1202	4.19	34.752	3.96	2.11				50.7	1200	4.19	34.750	3.95	27.589	50.8	1.303
1505	3.83	34.888	4.83	1.70				36.9	1500	3.84	34.885	4.82	27.734	37.1	1.473
1508	3.845	34.886						37.2							

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
8 04.5S	5 29.3E	11/11/68	1612	5103M	220	08KT	1	190 04 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	24.85	35.879	4.91	.21	1.1	.00	0.3	385.1
8	24.47	35.887	4.96	.19		.01	0.2	373.6
13A	24.33	35.558U	4.97	.20	1.2	.00	0.3	
22B	24.26	35.863	4.97					369.3
32B	23.13	35.770	5.05	.18	1.7	.00	1.9	344.3
41C	16.66	35.609	2.57	1.23	5.9	.28	7.7	194.0
47A	15.92	35.183U	2.10	1.40	6.9	.31	21.4	
50C	15.68	35.545	1.67					177.1
94A	13.90	35.275U	1.80	1.67	9.4	.03	25.3	
100B	14.25 V	35.430	1.93					
141A	12.90	35.396U	1.83	1.64	10.1	.01	26.3	
188A	12.14	35.075U	1.82	1.81		.03	28.8	
192D	12.16	35.177						133.8
236	11.27	35.073	1.76	1.90	12.7			125.5
282	10.52	35.003	1.04	2.22	15.1	.00	36.1	117.8
330	9.79	34.907	1.53	2.16	15.9	.00	35.0	112.9
378	9.19	34.842	1.29	2.35	17.8	.01	38.4	108.2
389D	8.99	34.834						105.8
472	7.67	34.701	1.07	2.60	22.0	.01	42.6	96.4
567	6.41	34.597	1.51	2.75	26.4	.01	44.0	87.5
588D	6.03	34.570						84.8
711	5.18	34.519	2.40	2.75	30.7	.01	42.5	78.7
786D	4.61	34.505						73.6
830	4.53	34.517	3.07	2.49	31.3	.01	35.5	71.9
950	4.25	34.562	3.26	2.46	35.8	.01	38.0	65.6
1189	4.08	34.747	4.03	2.10	31.7	.01	32.1	50.0
1227D	4.08	34.783						47.3
1431	3.93	34.883	4.80	1.83	27.4	.01	26.5	38.3
1516E	3.85	34.909	4.92	1.65	26.3		25.4	35.5
1713D	3.65	34.938						31.4
1760E	3.60	34.941	5.32	1.50	26.1		23.0	30.7
2003E	3.37	34.941	5.50	1.46	28.9		22.2	28.6
2249E	3.13	34.935	5.45	1.47	32.6		22.6	26.8
2492E	2.93	34.929						25.5
2503E	2.93	34.927	5.42	1.53	38.1		22.9	25.7
2733E	2.78	34.921	5.45	1.56	40.8		23.2	24.9
2946F	2.68	34.916	5.34U	1.57	43.5		23.3	24.4
2972E	2.64	34.912	5.44	1.57	44.8		23.5	24.4
3183F	2.56	34.908						24.0
3192F	2.57	34.911	5.38	1.60	45.6		23.3	23.9
3423F	2.50	34.906						23.7
3432F	2.51	34.905	5.34	1.60	49.3		24.3	23.8
3667F	2.41	34.898						23.5
3677F	2.413	34.899	5.23	1.82U	53.2		24.9	23.5
3915F	2.366	34.894	5.33		53.6		24.4	23.5
3960G	2.36	34.890	5.30	1.76U	54.4	.00	24.5	23.7
4194G	2.37	34.889						23.9
4203G	2.36	34.891	5.32	1.76U	54.6	.00	25.6	23.7
4432G	2.36	34.886						24.0
4441G	2.37	34.886	5.41	1.60	52.5		24.3	24.1
4677G	2.384	34.886						24.2
4687G	2.389	34.885	5.44	1.62	53.7		24.2	24.3
4927G	2.41	34.882						24.7
4937G	2.425	34.887	5.45	1.60	53.1		23.7	24.5
5014G	2.427	34.885	5.43	1.62	55.5		24.0	24.7

Z	T	S	O2	SIGT	DT	DD
0	24.85	35.879	4.91	24.071	385.1	0
10	24.41	35.863	4.97	24.194	373.5	.038
20	24.28	35.854	4.97	24.226	370.4	.075
30	23.36	35.787	5.03	24.447	349.3	.111
50	15.68	35.545	1.67	26.257	177.1	.164
75	14.42	35.287	1.74	26.338	169.5	.208
100	13.74	35.430	1.93	26.418	161.9	.250
125	13.17	35.158	1.87	26.499	154.2	.290
150	12.67	35.132	1.83	26.579	146.6	.329
200	12.07	35.176	1.80	26.731	132.2	.401
250	11.03	35.051	1.51	26.829	122.9	.467
300	10.24	34.966	1.19	26.904	115.7	.530
400	8.80	34.818	1.24	27.028	104.0	.647
500	7.32	34.671	1.16	27.134	93.9	.754
600	5.90	34.561	1.71	27.240	83.9	.851
700	5.21	34.520	2.33	27.292	79.0	.941
800	4.58	34.508	2.93	27.355	73.0	1.025
1000	4.21	34.598	3.40	27.465	62.6	1.179
1200	4.08	34.757	4.07	27.607	49.2	1.312
1500	3.87	34.904	4.90	27.746	36.0	1.478
2000	3.37	34.941	5.50	27.824	28.6	1.714
2500	2.93	34.926	5.42	27.855	25.6	1.933
3000	2.63	34.911	5.43	27.870	24.3	2.146
3500	2.50	34.904	5.30	27.876	23.7	2.362
4000	2.36	34.889	5.30	27.875	23.8	2.583
4500	2.37	34.885	5.42	27.871	24.1	2.814
5000	2.43	34.885	5.43	27.866	24.6	3.061

A) THE SALINITY SAMPLE BOTTLE NUMBERS ON CAST I FROM 13 TO 188 METERS, INCLUSIVE, APPEAR TO HAVE BEEN ENTERED INCORRECTLY ON THE ORIGINAL DATA SHEET. THE INTERPOLATED VALUES ARE BASED ON THE SALINITY VALUES FROM CASTS X AND XI.
B) CAST X. XI-12-68, 0149 GMT.
C) CAST XI. XI-12-68, 0208 GMT.
D) CAST VII. XI-11-68, 2321 GMT.
E) CAST IX. XI-12-68, 0048 GMT.
F) CAST VI XI-11-68, 2151 GMT.
G) CAST III XI-11-68, 1828 GMT.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO CIRCE EXPEDITION IX 217

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 55.9S	1 37.9E	11/13/68	0031	5385M	160	10KT		180 04

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	23.68	35.667	4.99	.23	4.0	.04	0.1	367.1
29	22.22	35.698	5.12	.23	4.3	.01	0.0	324.7
36	19.36	35.677	4.30	.59	8.2	.11	5.6	252.6
99	14.84	35.518	1.83	1.65		.01	22.9	161.3
198		35.284						
201	12.91	35.270	1.76	1.79	12.5	.00	27.1	141.0
247	12.31	35.204	1.78	1.84	13.5	.07	28.2	134.6
298	11.24	35.071	1.77	2.19	14.4	.00	29.6	125.1
345	10.31	34.972	.84	2.29	18.2	.01	34.8	116.6
395	9.31	34.869	.76	2.58	23.4	.01	37.6	108.1
444		34.785						
447	8.39	34.769	1.17	2.56	22.4			101.6
494	7.70	34.707	1.19	2.70	24.3	.00	40.2	96.4
535	7.03	34.705U	1.43	2.66	26.6	.00	40.2	
590	6.26	34.585	1.68	2.76	28.7	.00	41.2	86.5
690	5.40	34.523	2.30	2.80	33.0	.00	39.2	80.9
693	5.398							
789	4.80	34.508	2.66	2.84	33.2	.00	38.4	75.4
983	4.19	34.586	3.45	2.48	36.5	.00	35.5	63.2
1178	4.06	34.736	4.04	2.10	41.0	.00	32.2	50.6
1475	3.86	34.904	4.98	1.86	28.5	.00	26.0	36.0
1478	3.858	34.907						35.8

Z	T	S	O2	SIGT	DT	DD
0	23.68	35.667	4.99	24.261	367.1	0
10	23.18	35.675	5.03	24.414	352.5	.036
20	22.67	35.686	5.08	24.567	337.9	.071
30	21.83	35.690	5.01	24.810	314.8	.103
50	18.36	35.621	3.75	25.677	232.3	.158
75	16.56	35.550	2.77	26.058	196.1	.212
100	14.80	35.510	1.83	26.426	161.1	.258
125	13.99	35.352	1.81	26.479	156.1	.298
150	13.41	35.262	1.79	26.531	151.2	.338
200	12.91	35.267	1.76	26.636	141.2	.413
250	12.25	35.196	1.78	26.711	134.0	.485
300	11.20	35.066	1.73	26.810	124.7	.553
400	9.22	34.858	.80	26.992	107.4	.677
500	7.60	34.698	1.22	27.116	95.7	.787
600	6.12	34.573	1.74	27.220	85.9	.886
700	5.37	34.526	2.34	27.277	80.4	.977
800	4.75	34.510	2.71	27.337	74.7	1.064
1000	4.17	34.599	3.51	27.471	62.1	1.219
1200	4.05	34.746	4.12	27.601	49.8	1.351
1500	3.84	34.924	5.03	27.764	34.3	1.515

RV ARGO CIRCE EXPEDITION IX 221

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 26.7S	1 40.3W	11/16/68	0327	3556M	150	13KT		150 05 07

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	23.53	35.788	4.97					354.2
49	22.35	35.874	4.77					315.5
69	19.93	35.851	3.63					254.1
99	14.79	35.495	1.82					162.0
198		35.109						
201	11.53	35.100	1.89					128.1
247	10.64	34.997	2.02					120.2
297	9.94	34.915	1.92					114.7
347	9.39	34.859	1.81					110.1
396	8.75	34.789	1.81					105.5
399		34.727						
448	8.10	34.722	1.78					100.9
495	7.54	34.682	1.71					96.0
536	7.06	34.640	1.58					92.7
592	6.35	34.580	1.93					88.0
691	5.368	34.520	2.51					80.8
695	5.342	34.518						80.6
791	4.69	34.498	3.11					75.0
987	4.15	34.583	3.69					63.0
1182	4.10	34.738	4.06					50.9
1481	3.912	34.899	4.95					36.9
1484	3.912	34.897						37.0

Z	T	S	O2	SIGT	DT	DD
0	23.53	35.788	4.97	24.396	354.2	0
10	23.29	35.804	4.93	24.479	346.3	.035
20	23.05	35.821	4.89	24.562	338.4	.069
30	22.81	35.838	4.85	24.645	330.5	.103
50	22.25	35.875	4.72	24.831	312.8	.168
75	18.90	35.774	3.24	25.657	234.2	.236
100	14.76	35.490	1.82	26.421	161.6	.287
125	13.96	35.381	1.84	26.508	153.3	.327
150	13.16	35.280	1.86	26.596	145.0	.365
200	11.56	35.103	1.89	26.771	128.4	.436
250	10.59	34.991	2.02	26.861	119.9	.500
300	9.91	34.911	1.91	26.918	114.4	.562
400	8.70	34.783	1.81	27.016	105.1	.679
500	7.48	34.678	1.69	27.117	95.6	.787
600	6.25	34.575	1.98	27.205	87.3	.887
700	5.31	34.516	2.57	27.277	80.4	.980
800	4.65	34.499	3.15	27.340	74.4	1.066
1000	4.15	34.595	3.72	27.470	62.2	1.220
1200	4.09	34.747	4.11	27.598	50.0	1.353
1500	3.91	34.907	5.01	27.743	36.3	1.521

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 47.1S	6 09.0W	11/18/68	0733	4605M	150	16KT	2	140 05 08

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	24.13	36.001	4.91	.18	1.3	.00	0.0	355.7
17	23.45	36.176	4.94	.16	0.9	.01	0.0	323.9
45	22.94	36.194	5.00	.17	1.1	.01	0.0	308.5
70	18.73	35.892	3.52	.90	3.7	.32	10.0	221.6
99	15.47	35.592	2.70	1.40	6.2	.06	18.8	169.2
149	12.09	35.171	2.36	1.67	9.8	.01	25.6	133.0
198	10.98	35.036	2.47	1.84	11.2	.01	27.7	123.2
203A	10.52 V	34.981V						
248	10.21	34.947	2.28	2.02	13.3	.00	29.6	116.8
297	9.74	34.893	2.07	2.11	14.6	.01	32.3	113.1
347	9.22	34.839	1.88	2.25	16.1	.00	34.8	108.9
396	8.73	34.788	1.90	2.36	17.4	.01	36.2	105.2
400A	8.51 V	34.763V						
494	7.39	34.664	1.76	2.60	21.6	.01	39.3	95.3
592	5.99	34.555	2.29	2.71	25.9	.00	40.8	85.5
597A	6.02 V	34.554						
689	5.24	34.500	2.97	2.64	28.6	.00	38.2	80.8
786	4.68	34.484	3.35	2.61	31.5	.00	37.8	75.9
794A	4.70 V	34.485						
883	4.29	34.510	3.57	2.55	33.8	.00	37.0	69.9
981	4.17	34.583	3.67	2.50	34.4	.01	35.5	63.2
1238A	4.10	34.767						48.7
1248A	4.09	34.772	4.24	2.17	29.5	.00	30.4	48.2
1483A	3.92	34.907						36.4
1493A	3.90	34.909	5.06	1.66	24.2		24.9	36.0
1724A	3.66	34.944						31.1
1734A	3.64	34.944	5.46	1.52	23.7		22.6	30.9
1964A	3.43	34.945						28.8
1973A	3.41	34.940	5.58	1.52	27.4		22.5	29.0
2197A	3.14	34.934	5.64		30.2		22.2	27.0
2333B	3.12	34.932	5.50					27.0
2436B	3.01	34.925	5.57	1.56	34.0		23.1	26.5
2668B	2.81	34.916	5.51					25.5
2677B	2.80	34.916	5.52	1.60	38.8		22.6	25.4
2909B	2.65	34.909	5.50					24.7
2918B	2.65	34.906	5.50	1.61	41.5		23.6	24.9
3151B	2.56	34.903	5.55					24.4
3160B	2.56	34.901	5.56	1.66	43.0		23.6	24.5
3387C	2.47	34.903	5.49					23.6
3393B	2.48	34.896	5.43V	1.63	46.2		23.5	24.2
3576C	2.42	34.897	5.54	1.62	46.3		23.7	23.7
3672C	2.40	34.895	5.51	1.63	48.2		23.7	23.7
3767C	2.39	34.894	5.55					23.7
3862C	2.37	34.892	5.59	1.68	48.6		23.9	23.7
3882B	2.358	34.891	5.65V					23.6
3958C	2.35	34.889	5.62	1.72	49.3		23.9	23.7
4055C	2.34	34.890	5.61	1.65	49.5		23.9	23.6
4104C	2.34	34.886	5.64					23.9
4152C	2.33	34.896	5.60	1.67	50.4		23.6	23.0
4201C	2.33	34.889	5.70U	1.65	49.5		23.9	23.6
4250C	2.331	34.886	5.63	1.61	49.6		23.8	23.8
4297C	2.326	34.884	5.64	1.66	49.3		24.0	23.9
4325B	2.335	34.882	5.64					24.1
4347C	2.312	34.885	5.62					23.7
4396C	2.318	34.883	5.62	1.68	51.1		23.9	23.9
4446C	2.325	34.882	5.65	1.69	50.5		24.3	24.1

Z	T	S	O2	SIGT	DT	DD
0	24.13	36.001	4.91	24.380	355.7	0
10	23.70	36.118	4.93	24.598	335.0	.035
20	23.40	36.164	4.95	24.721	323.3	.068
30	23.21	36.148	4.97	24.762	319.3	.100
50	22.19	36.134	4.73	25.045	292.4	.161
75	18.07	35.836	3.33	25.913	209.9	.225
100	15.38	35.581	2.69	26.353	168.0	.273
125	13.39	35.350	2.52	26.602	144.4	.312
150	12.05	35.167	2.36	26.727	132.6	.348
200	10.94	35.032	2.47	26.829	122.9	.414
250	10.19	34.944	2.27	26.895	116.6	.476
300	9.71	34.889	2.06	26.935	112.9	.537
400	8.68	34.783	1.89	27.019	104.9	.653
500	7.30	34.657	1.78	27.127	94.6	.760
600	5.91	34.549	2.35	27.229	85.0	.858
700	5.17	34.496	3.02	27.278	80.3	.949
800	4.61	34.485	3.39	27.333	75.1	1.035
1000	4.16	34.600	3.70	27.472	62.0	1.190
1200	4.11	34.744	4.11	27.592	50.6	1.324
1500	3.89	34.910	5.08	27.748	35.8	1.492
2000	3.36	34.937	5.59	27.822	28.8	1.728
2500	2.96	34.920	5.55	27.848	26.4	1.950
3000	2.62	34.904	5.52	27.865	24.7	2.166
3500	2.44	34.896	5.52	27.874	23.9	2.382
4000	2.34	34.889	5.62	27.876	23.7	2.602
4500	2.32	34.883	5.64	27.873	23.9	2.831

A) CAST VI. XI-18-68, 0555 GMT.
B) CAST IV. XI-18-68, 0341 GMT.
C) CAST II. XI-18-68, 0058 GMT.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

RV ARGO CIRCE EXPEDITION IX 230

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
8 10.3S	9 01.5W	11/21/68	1034	3804M	130	13KT	2	120 05 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	24.13	36.043	4.93	.23	3.8	.00	0.4	352.7
58	23.59	36.227	5.02	.23	3.1	.00	0.2	324.2
78	22.34	36.297	4.73	.33	3.2	.06	1.1	284.7
99	20.60	36.187	4.23	.58	4.5	.33	11.6	246.8
201		35.087						
204	11.28	35.073	2.16	1.97	12.3	.00	27.5	125.7
250	10.15	34.943	2.01	2.06	16.4	.01	31.0	116.1
301	9.55	34.874	1.86	2.22	16.1		33.6	111.5
350	8.96	34.809	1.98	2.32	17.3	.00	34.1	107.2
400	8.47	34.763	1.91	2.40	20.5	.01	35.7	103.2
450		34.712						
453	7.93	34.705	2.10	2.47	21.0	.01	36.5	99.7
501	7.48	34.667	2.10	2.56	22.8	.01	36.6	96.3
542	6.92	34.623	2.09	2.66	23.9	.00	38.0	92.1
600	6.24	34.569	2.36	2.71	26.2	.00	39.8	87.5
701	5.30	34.512	2.85	2.78	29.6	.01	38.9	80.6
703	5.262	34.505						80.7
801	4.60	34.488	3.39		33.6	.00	38.2	74.8
1000	4.067	34.571	3.96	2.56	41.3	.01	35.3	63.1
1197	4.01	34.743	4.20	2.32	40.4	.01	30.3	49.6
1497	3.80	34.909	5.16	1.93	33.4	.02	23.0	35.0
1500	3.821	34.917						34.6

Z	T	S	O2	SIGT	DT	DD
0	24.13	36.043	4.93	24.412	352.7	0
10	24.04	36.074	4.95	24.463	347.8	.035
20	23.94	36.105	4.96	24.515	342.9	.070
30	23.85	36.137	4.98	24.567	337.9	.104
50	23.66	36.201	5.01	24.670	328.1	.171
75	22.56	36.291	4.78	25.059	291.0	.249
100	20.49	36.172	4.20	25.543	245.1	.317
125	17.90	35.849	3.57	25.963	205.1	.374
150	15.55	35.575	3.03	26.309	172.2	.422
200	11.56	35.108	2.21	26.776	128.0	.499
250	10.15	34.943	2.01	26.901	116.1	.563
300	9.56	34.874	1.86	26.948	111.6	.623
400	8.47	34.763	1.91	27.036	103.2	.737
500	7.49	34.668	2.10	27.108	96.4	.845
600	6.24	34.569	2.36	27.203	87.5	.946
700	5.31	34.514	2.84	27.275	80.6	1.038
800	4.60	34.487	3.38	27.335	74.9	1.124
1000	4.07	34.571	3.96	27.460	63.1	1.280
1200	4.01	34.744	4.21	27.603	49.6	1.413
1500	3.82	34.917		27.760	34.6	1.577

RV ARGO CIRCE EXPEDITION IX 243

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
8 22.2S	13 18.4W	11/26/68	0507	2988M	120	10KT		140 05 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	24.93	35.953	4.83	.21	1.1	.01	0.0	382.1
59	24.94	35.944	4.70	.19	1.3	.01	0.0	383.1
83	23.89	36.088	4.83	.20	1.5	.04	0.4	342.6
103	22.12	36.122	4.40	.37	2.2	.14	3.0	291.4
118	17.79	35.853	3.41	2.20A	4.7	.10	12.8	202.1
148	16.02	35.691	3.13	1.18	6.1	.14	16.2	173.9
168	13.98	35.424	2.68	1.46	7.2	.03	21.2	150.6
220	10.27	34.950	2.33	1.97	13.0	.01	29.4	117.5
242B	9.95	34.916						114.8
293	8.99	34.807	2.04	2.21	16.4	.03	33.8	107.8
343	8.36	34.742	2.23	2.30	18.0	.01	35.0	103.2
392	7.91	34.705	2.12	2.41	19.7	.02	37.2	99.5
437B	7.67	34.685						97.6
489	7.18	34.634	2.22	2.50	22.0	.00	39.9	94.7
586	6.18	34.559	2.46	2.60	24.7	.01	39.2	87.5
632B	5.76	34.527						84.8
684	5.38	34.511	2.80	2.62	28.9	.01	38.7	81.6
782	4.67	34.494	3.22	2.65	33.2	.05	38.8	75.1
827B	4.48	34.502						72.5
881	4.25	34.529	3.55	2.57	35.0	.01	37.4	68.1
982	4.08	34.587	3.86	2.40	35.7	.00	35.5	62.0
1199C	4.02	34.714	4.12	2.09	32.5		32.0	51.9
1267B	4.06	34.793						46.3
1396C	3.99	34.864	4.78	1.72	26.6		27.0	40.3
1511B	3.87	34.900						36.4
1594C	3.64	34.926	5.30	1.50	25.5		22.6	32.2
1756B	3.43	34.928						30.1
1791C	3.41	34.927	5.43	1.50	28.4		22.8	30.0
1988C	3.19	34.922	5.55	1.55	32.2		22.8	28.4
2000B	3.11 V	34.923						
2185C	3.04	34.917	5.57	1.50	34.1		23.0	27.4
2284C	3.01	34.915	5.60	1.51	35.9		23.2	27.3
2382C	2.97	34.919	5.59	1.55	34.7		22.9	26.6
2479C	2.90	34.911	5.60	1.55	36.7		22.8	26.6
2492B	2.90	34.913						26.5
2576C	2.82	34.907	5.57	1.61	38.3		23.1	26.3
2674C	2.71	34.905	5.64	1.61	40.3		23.2	25.5
2688B	2.74	34.905						25.7
2722C	2.70	34.903	5.63	1.62	40.8		23.3	25.5
2770C	2.712	34.903	5.62	1.64	40.8		23.2	25.6
2819C	2.68	34.902	5.62	1.61	40.9		23.0	25.4
2866C	2.66	34.900	5.64	1.61	41.4		22.7	25.4
2914C	2.654	34.906	5.64	1.63	41.9		23.2	24.9
2962C	2.64	34.904	5.64	1.57	43.1		23.0	25.0

Z	T	S	O2	SIGT	DT	DD
0	24.93	35.953	4.83	24.103	382.1	0
10	24.93	35.951	4.81	24.101	382.3	.038
20	24.93	35.949	4.79	24.100	382.5	.077
30	24.94	35.948	4.76	24.098	382.6	.115
50	24.94	35.945	4.72	24.095	382.9	.192
75	24.34	36.041	4.79	24.349	358.7	.285
100	22.56	36.137	4.51	24.943	302.1	.369
125	17.38	35.811	3.34	26.064	195.5	.432
150	15.82	35.665	3.09	26.317	171.5	.479
200	11.32	35.080	2.39	26.799	125.7	.555
250	9.80	34.898	2.16	26.926	113.7	.618
300	8.89	34.796	2.07	26.996	107.0	.676
400	7.87	34.702	2.13	27.080	99.1	.785
500	7.07	34.625	2.24	27.135	93.9	.890
600	6.05	34.548	2.50	27.211	86.7	.988
700	5.25	34.506	2.87	27.276	80.5	1.080
800	4.59	34.496	3.28	27.344	74.1	1.165
1000	4.08	34.597	3.88	27.479	61.3	1.319
1200	4.02	34.715	4.12	27.579	51.8	1.452
1500	3.89	34.896	5.09	27.738	36.8	1.623
2000	3.18	34.923	5.55	27.828	28.3	1.858
2500	2.90	34.912	5.59	27.847	26.4	2.075

A) THE VALUE DETERMINED FROM A REPLICATE SAMPLE WAS 2.08. THE SAMPLE WAS PROBABLY CONTAMINATED.
B) CAST IV. XI-26-68, 0306 GMT.
C) CAST II. XI-26-68, 0103 GMT.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
7 08.9S	21 21.1W	11/29/68	1013	5365M	120	14KT	1	130 03 10

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	25.95	36.080	4.76	.20	0.6	.00	0.2	403.0
50	25.89	36.076						401.5
99	22.48	36.616	4.81					265.5
124	19.28	36.173	3.83	.71	2.4	.05	7.6	214.6
143	15.96	35.625	2.54					177.4
163	13.90	35.379	2.23	1.52	7.6	.04	23.8	152.3
221	10.91	35.063	2.25	1.81	10.9	.05	28.8	120.0
226		35.019						
292	9.64	34.879	2.09	2.08	13.6	.01	32.6	112.6
382	8.28	34.740	1.89	2.31	19.4	.00	39.0	102.2
450		34.741U						
453	7.51	34.666	2.09	2.41	19.1	.01	39.C	96.8
500	7.10	34.632	2.24	2.45	20.8	.00	38.4	93.8
542	6.66	34.592	2.47	2.47	21.6	.01	40.1	91.0
598	6.12	34.554	2.60	2.52	23.6	.00	39.2	87.1
698	5.34	34.497						82.2
701	5.327	34.493	2.86A	2.54	25.3	.00	38.7	82.3
798	4.58	34.544	3.12A	2.49	26.8	.00	38.2	70.4
996	4.06	34.569	3.82	2.35	33.7	.01	36.2	63.2
1192	4.19	34.762	4.28	2.08	28.0	.00	30.4	50.0
1491	4.10	34.935						36.0
1494	4.100	34.939		1.62	20.0	.00	23.7	35.7
1670B	3.89	34.968	5.56	1.47	18.7	.00	22.1	31.5
1755B	3.75	34.967	5.73	1.48	18.9	.04	21.2	30.2
1765B	3.75	34.963						30.5
1860B	3.58	34.963	5.75	1.47	20.3	.03	21.2	28.9
1954B	3.44	34.952	5.74	1.42	22.0	.00	22.1	28.4
2134B	3.22	34.940	5.75	1.46	26.8	.08U	22.4	27.3
2144B	3.22	34.938						27.4
2381B	2.96	34.921	5.68		32.5	.10U	22.4	26.4
2607B	2.83	34.918	5.66	1.47	35.9	.22U	21.8	25.5
2616B	2.81	34.913						25.7
2852B	2.70	34.908	5.62	1.53	38.4	.01	21.3	25.2
3081B	2.65	34.911	5.76	1.48	37.8	.01	21.6	24.5
3086B	2.65	34.910						24.6
3180B	2.61	34.909	5.76	1.48	37.5		22.0	24.3
3271B	2.60	34.913	5.89	1.46	35.1		21.4	23.9
3364B	2.56	34.918	5.91	1.46	35.3		21.3	23.2
3457B	2.543	34.913	5.95	1.47	35.4		21.4	23.5
3550B	2.494	34.909						23.4
3644C	2.40	34.899	5.86	1.50	40.5		22.1	23.4
3877C	2.12	34.869						23.4
3886C	2.09	34.869	5.78	1.55	51.9		23.7	23.2
4129C	1.59	34.814	5.56	1.89	70.7		27.0	23.7
4363C	1.04	34.759						24.2
4372C	1.03	34.755	5.35	2.11	92.6		30.3	24.5
4615C	.87	34.732	5.25	2.18	101.1		31.5	25.2
4845C	.77	34.748U						
4854C	.77	34.719	5.25	2.21	105.2		31.9	25.6
5031C	.74	34.718						25.5
5041C	.74	34.718	5.27	2.26	106.9		32.3	25.5
5124C	.74	34.716						25.7
5134C	.74	34.716	5.22	2.14D	109.		32.7	25.7
5216C	.74	34.717						25.6
5225C	.747	34.715	5.20	2.21	108.5		32.7	25.8
5307C	.74	34.712	5.33	2.28	107.2		32.7	26.0
5316C	.747	34.718						25.6

Z	T	S	O2	SIGT	DT	DD
0	25.95	36.080	4.76	23.884	403.0	0
10	25.94	36.079	4.77	23.887	402.7	.040
20	25.93	36.078	4.77	23.891	402.4	.081
30	25.91	36.077	4.78	23.894	402.1	.121
50	25.89	36.076	4.79	23.900	401.5	.202
75	24.59	36.439	4.80	24.572	337.4	.295
100	22.37	36.605	4.78	25.351	263.3	.371
125	19.10	36.140	3.76	25.885	212.5	.431
150	15.13	35.517	2.36	26.360	167.4	.480
200	11.63	35.142	2.24	26.787	126.9	.556
250	10.22	34.947	2.20	26.892	116.9	.619
300	9.50	34.863	2.06	26.948	111.6	.679
400	8.06	34.719	1.92	27.064	100.6	.792
500	7.10	34.632	2.24	27.136	93.8	.897
600	6.10	34.552	2.60	27.207	87.0	.996
700	5.33	34.494	2.86	27.257	82.3	1.089
800	4.57	34.544	3.13	27.384	70.2	1.174
1000	4.06	34.573	3.83	27.462	62.9	1.324
1200	4.19	34.765	4.30	27.601	49.7	1.458
1500	4.10	34.940	5.12	27.750	35.6	1.626
2000	3.36	34.946	5.74	27.829	28.1	1.862
2500	2.89	34.918	5.67	27.852	25.9	2.080
3000	2.66	34.908	5.71	27.865	24.7	2.295
3500	2.53	34.911	5.94	27.879	23.4	2.512
4000	1.82	34.839	5.68	27.879	23.5	2.721
4500	.93	34.742	5.28	27.864	24.9	2.903
5000	.75	34.718	5.27	27.857	25.5	3.066

A) THE OXYGEN AND NUTRIENT VALUES FOR THESE TWO LEVELS HAVE BEEN REVERSED, CORRECTING A PROBABLE MIXUP DURING SAMPLING.
B) CAST II. XI-29-68, 0832 GMT.
C) CAST I. XI-29-68, 0601 GMT.
D) THE PHOSPHATE AND SILICATE VALUES AT THIS DEPTH ARE SOMEWHAT SUSPECT.

LATITUDE	LONGITUDE	MO/DAY/YR	MESSENGER TIME	BOTTOM	WIND	SPEED	WEATHER	DOMINANT WAVES
5 10.0S	30 53.0W	12/01/68	1701	4893M	120	14KT	1	140 04 06

Z	T	S	O2	PO4	SIO3	NO2	NO3	DT
0	27.11	35.914	4.70	.08	0.9	.00	0.2	450.0
56	26.87	35.907	4.73					443.2
96	23.58	36.546	4.63	.23	1.4	.04	0.3	300.9
116	19.93	36.117	3.50	1.00	2.7	.16	9.2	234.8
139	16.69	35.775	3.21	.97	4.5	.04	14.6	182.6
156	14.96	35.545	3.15	1.06	5.6	.08	16.9	161.9
188	12.64	35.230	3.10		8.3	.02	21.9	138.8
201A	11.68	35.116						129.6
216	10.56	34.976	2.63	1.70	11.3	.02	27.3	120.4
249	9.96	34.898	2.71	1.70	12.5	.01	28.3	116.3
286	9.33	34.830	2.70	1.85	13.9	.03	30.0	111.3
374		34.706	2.59	2.01	16.9	.00	33.9	
392A	7.69	34.669						99.1
443	7.04	34.608	2.78		19.7	.00	35.3	94.8
489	6.27	34.549	2.93	2.28	22.4	.00	36.7	89.3
530	6.03	34.531	3.02					87.7
582A	5.54	34.495						84.6
591	5.53	34.496	3.24	2.31	24.6	.02	36.4	84.4
637	5.164	34.482	3.42					81.3
686	4.857	34.471	3.50	2.36	29.1	.00	36.8	78.8
776A	4.43 V	34.476V						
782	4.47	34.487	3.73	2.43	31.5	.02	36.2	73.5
971A	4.17 V	34.585V						
976	4.19	34.589	3.85	2.28	32.8	.01	34.9	63.0
1172	4.23	34.756	4.18	2.02	28.7	.01	31.0	50.8
1477	4.32	34.941	5.14	1.47	20.5	.02	23.9	37.8
1507B	4.26	34.937	5.25	1.49	18.2		22.8	37.5
1605B	4.06	34.943	5.38	1.46	18.8		22.1	35.0
1752B	3.88	34.956						32.3
1802B	3.80	34.960	5.79	1.41	17.6		20.8	31.2
1998B	3.48	34.951	5.87		20.4		20.6	28.8
2008B	3.492	34.948						29.2
2234B	3.19	34.938	5.90	1.39	24.0		21.0	27.2
2483B	2.964	34.921						26.4
2492B	2.95	34.922	5.88	1.47	28.7		21.5	26.2
2675B	2.84	34.914	5.84	1.39	30.1		21.3	25.9
2769B	2.77	34.898	5.80	1.49	33.2		21.9	26.5
2863B	2.77	34.911	5.86	1.44	31.8		21.4	25.5
2954B	2.71	34.925	5.92	1.48	31.8		21.3	24.0
3005C	2.69	34.923	5.90	1.41	31.8		21.2	23.9
3104C	2.66	34.921	5.88	1.44	32.0		21.3	23.8
3202C	2.64	34.920	5.95	1.42	31.1		20.7	23.8
3203D	2.63	34.901U						
3301C	2.62	34.918	5.96	1.35	31.4		20.6	23.7
3400C	2.59	34.917	5.98	1.43	31.1		20.6	23.6
3454D	2.55	34.896U						
3498C	2.56	34.916	6.06	1.36	30.5		20.3	23.4
3595C	2.49	34.916	6.06	1.40	31.7		20.6	22.8
3704D	2.37	34.882U						
3745C	2.32	34.894	6.03	1.51	37.2		21.2	23.1
3954D	1.99	34.840U						
3996C	1.88	34.844	5.77	1.73	56.9		24.6	23.5
4179D	1.43	34.774U						
4232C	1.33	34.788	5.53	1.88	78.3		27.3	23.9
4301D	1.20	34.750U						
4446D	1.03	34.709U						
4473C	1.02	34.751	5.38	2.28E	91.6		30.8	24.7
4542D	.984	34.703U						
4569C	.94	34.740	5.34	2.23E	95.8		31.5	25.1
4638D	.864	34.689U						
4666C	.82	34.725	5.28	2.32E	100.9		32.1	25.5
4761C	.717	34.714	5.26	2.45E	104.7		33.3	25.7
4770C	.69	34.710						25.8
4856C	.640	34.703						26.1
4860C				2.52E	108.6		33.2	

Z	T	S	O2	SIGT	DT	DD
0	27.11	35.914	4.70	23.392	450.0	0
10	27.07	35.912	4.71	23.404	448.8	.045
20	27.02	35.911	4.71	23.417	447.5	.090
30	26.98	35.910	4.72	23.430	446.3	.135
50	26.90	35.907	4.73	23.456	443.9	.224
75	25.80	36.312	4.68	24.106	381.9	.328
100	22.87	36.469	4.40	25.104	286.8	.412
125	18.54	35.971	3.39	25.898	211.2	.476
150	15.52	35.623	3.16	26.354	168.0	.524
200	11.75	35.125	2.89	26.751	130.3	.601
250	9.94	34.895	2.71	26.900	116.2	.665
300	9.10	34.805	2.67	26.971	109.5	.725
400	7.59	34.660	2.64	27.087	98.4	.835
500	6.19	34.543	2.95	27.189	88.8	.936
600	5.48	34.494	3.28	27.240	84.0	1.029
700	4.79	34.471	3.53	27.302	78.0	1.118
800	4.42	34.493	3.75	27.360	72.5	1.201
1000	4.19	34.611	3.88	27.477	61.4	1.353
1200	4.24	34.780	4.25	27.608	49.1	1.485
1500	4.27	34.938	5.23	27.729	37.6	1.656
2000	3.48	34.950	5.87	27.821	28.9	1.902
2500	2.94	34.920	5.88	27.849	26.2	2.124
3000	2.69	34.922	5.90	27.873	23.9	2.340
3500	2.56	34.915	6.06	27.879	23.4	2.556
4000	1.87	34.842	5.77	27.878	23.5	2.766
4500	1.01	34.750	5.37	27.864	24.8	2.950

A) CAST VII. XII-01-68, 1459 GMT.
B) CAST VI. XII-01-68, 1340 GMT.
C) CAST II. XII-01-68, 0850 GMT.
D) CAST IV. XII-01-68, 1126 GMT. COMPARISON OF THE DATA FOR THIS STATION AND STATION 245 INDICATES A BIAS IN THE SALINITY VALUES FOR CAST IV.
E) THESE SAMPLES WERE COLLECTED IN NON-STANDARD NUTRIENT SAMPLE BOTTLES. THE SAMPLES MAY HAVE BEEN CONTAMINATED SLIGHTLY CAUSING WHAT APPEARS TO BE HIGH PHOSPHATE CONCENTRATIONS.
V) BECAUSE OF TIME DIFFERENCES, OVERLAPPING CASTS SHOW SOME DIFFERENCES. THIS SAMPLE HAS BEEN DELETED FOR THE INTERPOLATION.