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Radiocarbon

1983

GEOSECS INDIAN OCEAN AND MEDITERRANEAN RADIOCARBON

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This paper is the third of a series detailing the general features of ^{14}C distribution in the world oceans. In the preceding papers, we discussed the ^{14}C activities of Atlantic and Pacific Ocean waters (Stuiver and Östlund, 1980; Östlund and Stuiver, 1980). We now give an outline of the ^{14}C distribution of the Indian Ocean and profiles for one Mediterranean and three Red Sea stations.

This ^{14}C study was an integral part of the Geochemical Ocean Section Study (GEOSECS) program which was designed to make an inventory of several chemical constituents in the oceans. Twenty-two hundred water samples were collected and CO_2 was extracted on board at 124 stations, of which 41 were in the Indian Ocean. The Indian Ocean study was the final seagoing phase of the GEOSECS program lasting from December 4, 1977 to April 24, 1978 (Craig and Turekian, 1980). The sampling covered the three major basins in detail (fig. 1). Sampling and measurement techniques were described previously (Östlund and Stuiver, 1980; Stuiver and Östlund, 1980).

Relatively few ^{14}C data are available for the Indian Ocean. Previous work includes profiles measured by Bien, Rakestraw, and Suess (1963; 1965), Linick (1978), and Delibrias (1980). Some earlier ^{14}C data from the Mediterranean Sea are available in papers by Broecker and Gerard (1969) and Östlund (1974).

The replacement times of abyssal waters (> 1500m depth) of the Atlantic, Pacific, and Indian Oceans can be calculated from the GEOSECS data. This calculation yields a 250-year replacement time for the deep waters of the Indian Ocean (Stuiver, Quay, and Östlund, 1983).

THE $\Delta^{14}C$ SCALE

The $\Delta^{14}C$ values are given relative to a standard (NBS oxalic acid), after normalization on a fixed $\delta^{13}C$ ratio of $-25‰$, according to the procedures given by Stuiver and Polach (1977). Appropriate corrections for the decay of the NBS ^{14}C standard were also made.

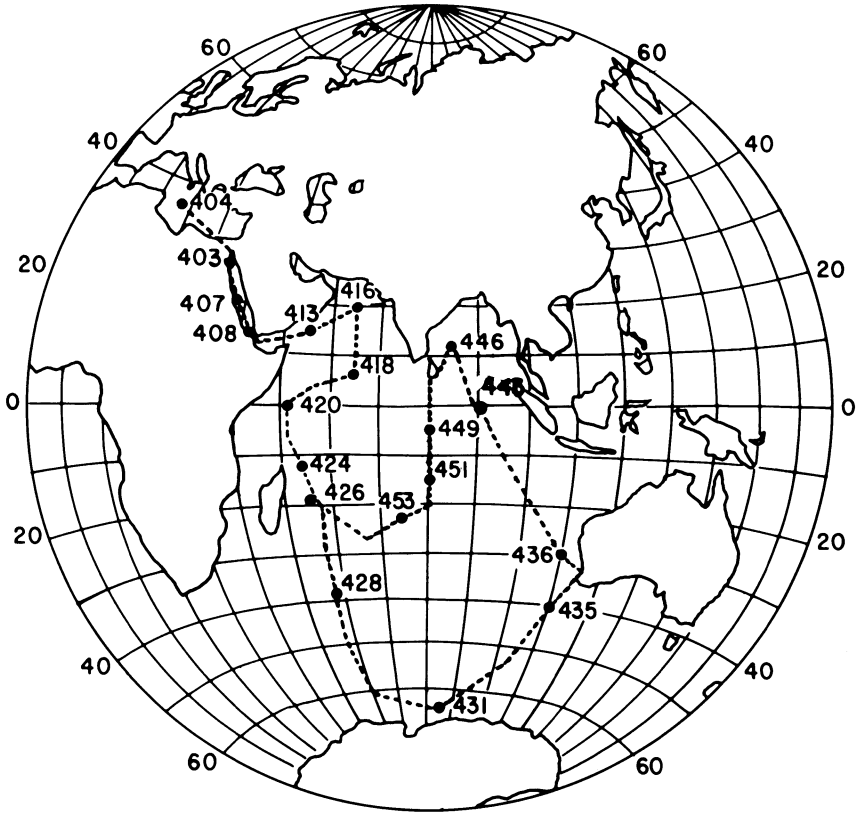

Fig 1. GEOSECS Indian Track 1977-78

EXPLANATION OF THE TABLES

All data on position, depths, hydrography, and total CO_2 were furnished by the GEOSECS Operations Group (now Physical and Chemical Ocean Data Facility) at Scripps Institution of Oceanography, which handled the logistics and operations on board the ship and serves as a temporary repository for all GEOSECS data. The following explains the column headings:

POSITION: Given in degrees and minutes. The ship frequently drifted during station time, so the position is defined to no better than ± a few minutes.

SAMPLE #: This is the operational sample number, in which the two last digits indicate the Gerard barrel number and the preceding digits, the cast number. The first on station 421 is sample no. 588; *ie*, cast # 5, Gerard # 88.

DEPTH M: Given in meters as calculated from density and pressure.

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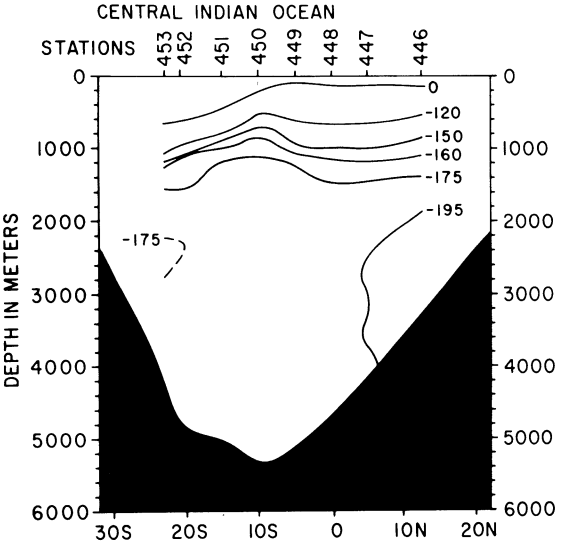

Fig 2. Central Indian Ocean; N-S section. Isolines are in $\Delta^{14}C$ units.

POT T DEG C: Potential temperature in degrees centigrade.
SAL‰: Salinity in unit g/kg sea water.
SIGMA THETA: Deviation from unity, in per mil, of the relative density in g/ml where ml has the old value of 1.000027cm^3.
TCO2 μM: The total amount of inorganic carbon in μ-moles per kg of sea water. All TCO2 data listed are still preliminary.
DC14‰: This is $\Delta^{14}C$ on the scale that was defined above. The accuracy is typically ± 4‰ and precision ± 3.5‰.
C14 LAB #: This columm lists ML for the Miami Laboratory and QL for the Washington Laboratory with numbers referring to our laboratory journals.

THE SECTIONS

The track of the Indian Ocean GEOSECS expedition allows for the construction of vertical sections in the eastern and western Indian Ocean (pl 1 and 2), and of truncated vertical section of the Central Part (fig 2). Latitudes of each station are plotted along the abscissa.

The lack of deep convection in the northern Indian Ocean results in a pool of "old" water in the north with the lowest $\Delta^{14}C$ values in the Bay of Bengal (stations 445 and 446). The bay is a major nutrient source for the deep Indian Ocean (Broecker, Toggweiler, and Takahashi, 1980).

Figure 3 gives the ^{14}C distribution in the Northern Indian Ocean and the Red Sea. Here, the horizontal scale is proportional to the distance between the stations along the track.

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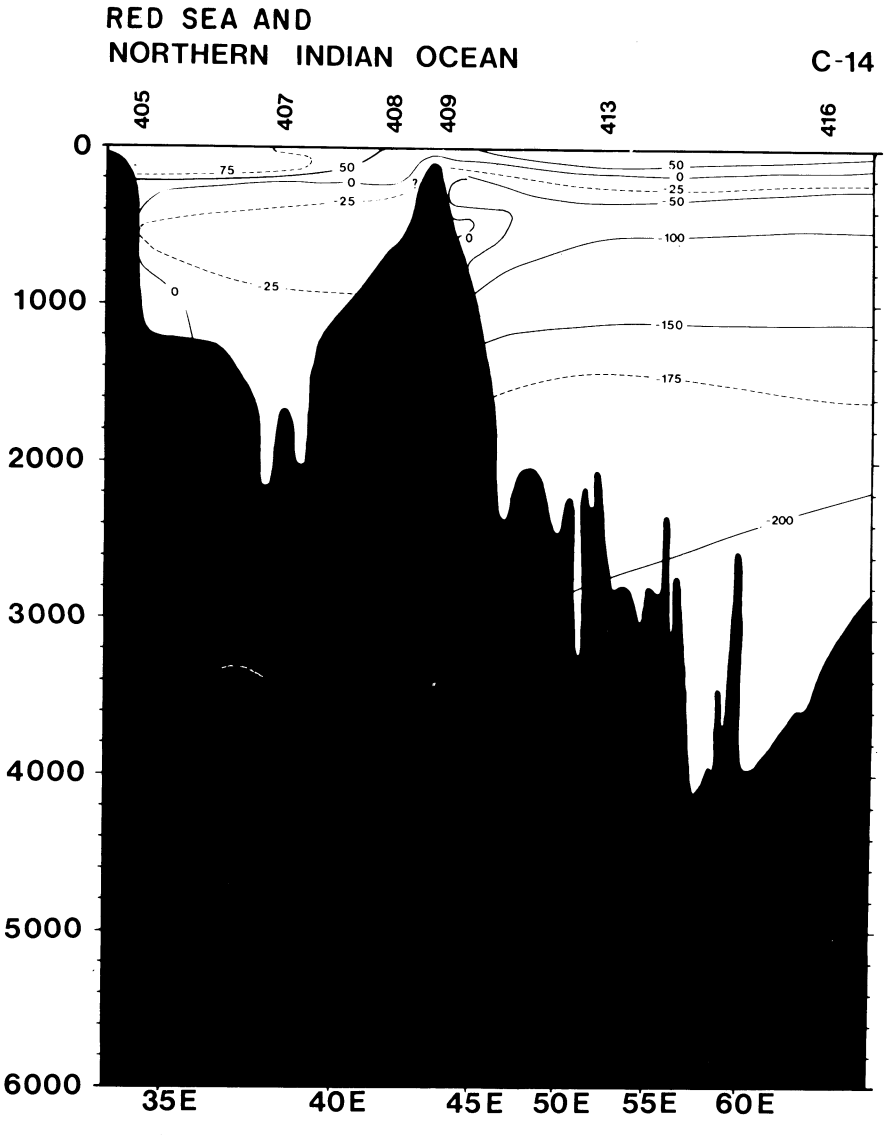

Fig 3. $\Delta^{14}C$ isolines for the Red Sea-Arabian Sea cruise track

Our previous research indicated strong latitudinal differences in the integrated amount of nuclear bomb carbon in, eg, the Atlantic Ocean (Stuiver, 1980). Bomb-produced ^{14}C was mostly encountered near the center of the large mid-latitude gyres, whereas the equatorial region had a lower ^{14}C inventory (Broecker, Peng, and Stuiver, 1978; Stuiver, Östlund,

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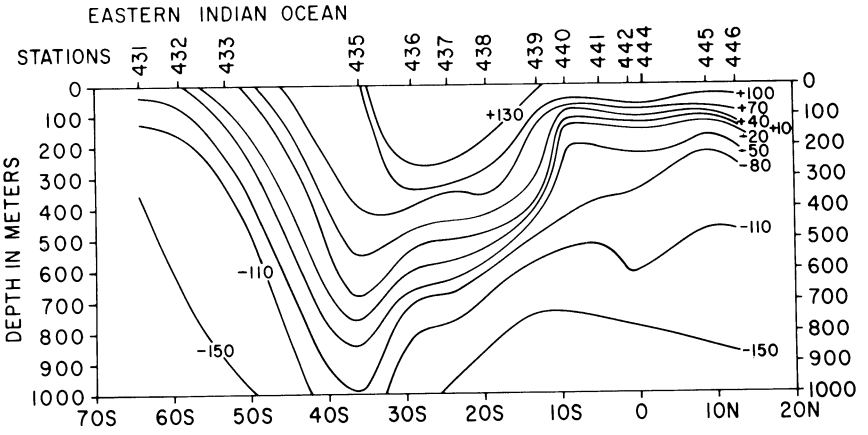

Fig 4. East Indian Ocean; N-S section of the upper 1000m. Isolines are in $\Delta^{14}C$ units.

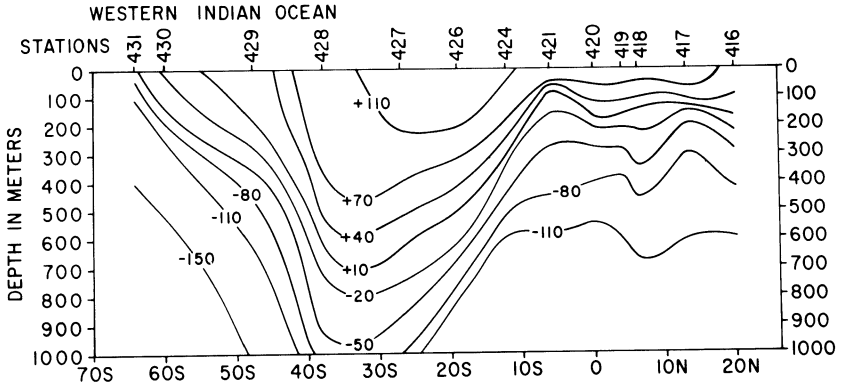

Fig 5. West Indian Ocean; N-S section of the upper 1000m. Isolines are in $\Delta^{14}C$ units.

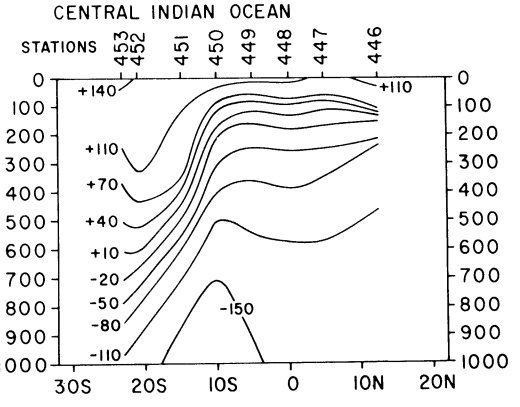

Fig 6. Central Indian Ocean; N-S section of upper 1000m.
Isolines are in $\Delta^{14}C$ units.

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and McConnaughey, 1981; Quay, Stuiver, and Broecker, in press). Due to the geographical restriction of the Northern Indian Ocean, a major mid-latitude gyre is absent in the north and, as a result, the amount of bomb ^{14}C at mid-depths (ca 1000m) is much less in the Northern Indian Ocean than in the southern portion. The penetration of bomb ^{14}C is especially deep between 40° to 50° S latitude, suggesting downward transport of bomb ^{14}C to at least 2000m depth. This part of the Indian Ocean appears to be an important region for direct transport of excess fossil fuel CO_2 from the surface into the deep waters of the world oceans.

Figures 4 to 6 give the ^{14}C distribution of the upper 1000m in more detail. The influence of the mid-latitude southern gyre on downward transport of ^{14}C is evident. The upwelling of water near the equator conforms with the patterns found for the Pacific and Atlantic Oceans.

The estimated ^{14}C bomb inventory in the east Atlantic is 74% of the inventory of the west Atlantic (Stuiver, 1980). Bomb ^{14}C appears also more abundantly in the west Pacific than in the east Pacific. For instance, the upper 1000m east-west Pacific Ocean section along 30° N has appreciably more ^{14}C in the west than in the east (pl 3, Östlund and Stuiver, 1980). For the Indian Ocean, the east-west $\Delta^{14}C$ gradient differs from the above pattern. Total integrated excess ^{14}C is higher in the east Indian Ocean where the maximum surface $\Delta^{14}C$ values near 25° S are ca 20‰ above those found in the west. A similar $\Delta^{14}C$ difference is encountered in the surface waters near the equator (figs 4 and 6).

Although an anticyclonic system of currents, similar to the corresponding system of the south Atlantic Ocean, prevails in the southern part of the Indian Ocean, it is subjected to greater annual variations (Sverdrup, Johnson, and Fleming, 1970). Particularly the currents in the northern part are strongly influenced by monsoons and change in seasons. During the southwest monsoon from April to October, strong upwelling takes place off the coast of Somali, causing vast areas of low surface temperature. Such western margin upwelling occurs only in the Indian Ocean, which may account for the reversed east-west bomb ^{14}C pattern.

The $\Delta^{14}C$ values of samples of the west Indian Ocean (0° to 30° S Lat) are extremely uniform from 2000 to 3500m depth. The average $\Delta^{14}C$ value of 20 samples collected for this body of water at stations 436 to 442 is −189.6‰, with a standard deviation around the mean of 2.4‰. The observed 2.4‰ variability in $\Delta^{14}C$ is even smaller than the 4‰ accuracy of each measurement.

The abyssal waters of the central and east basins are less uniform in ^{14}C activity. The change in average $\Delta^{14}C$ value of water below 1500m with latitude is nearly 7‰ per 10° latitude (see Stuiver, Quay, and Östlund, in press).

When crossing the 90° E ridge between the western and central basins (station 442 in the west and station 445 in the central part), abyssal waters change in $\Delta^{14}C$ level (*ie*, the waters between 2000 and 3500m at station 445 average −199.7‰ whereas those in the west basin, as discussed,

average −189.6‰).

For a large series of measurements extending over a long period of time, a small number of anomalous results are often observed. In our opinion, the 4611m sample of station 435 is anomalously low in $\Delta^{14}C$ due to counting gas purity and dilution problems; the sample depths of samples QL-770, QL-2008, and QL-2009 of station 442 probably suffer from mislabeling.

ACKNOWLEDGMENTS

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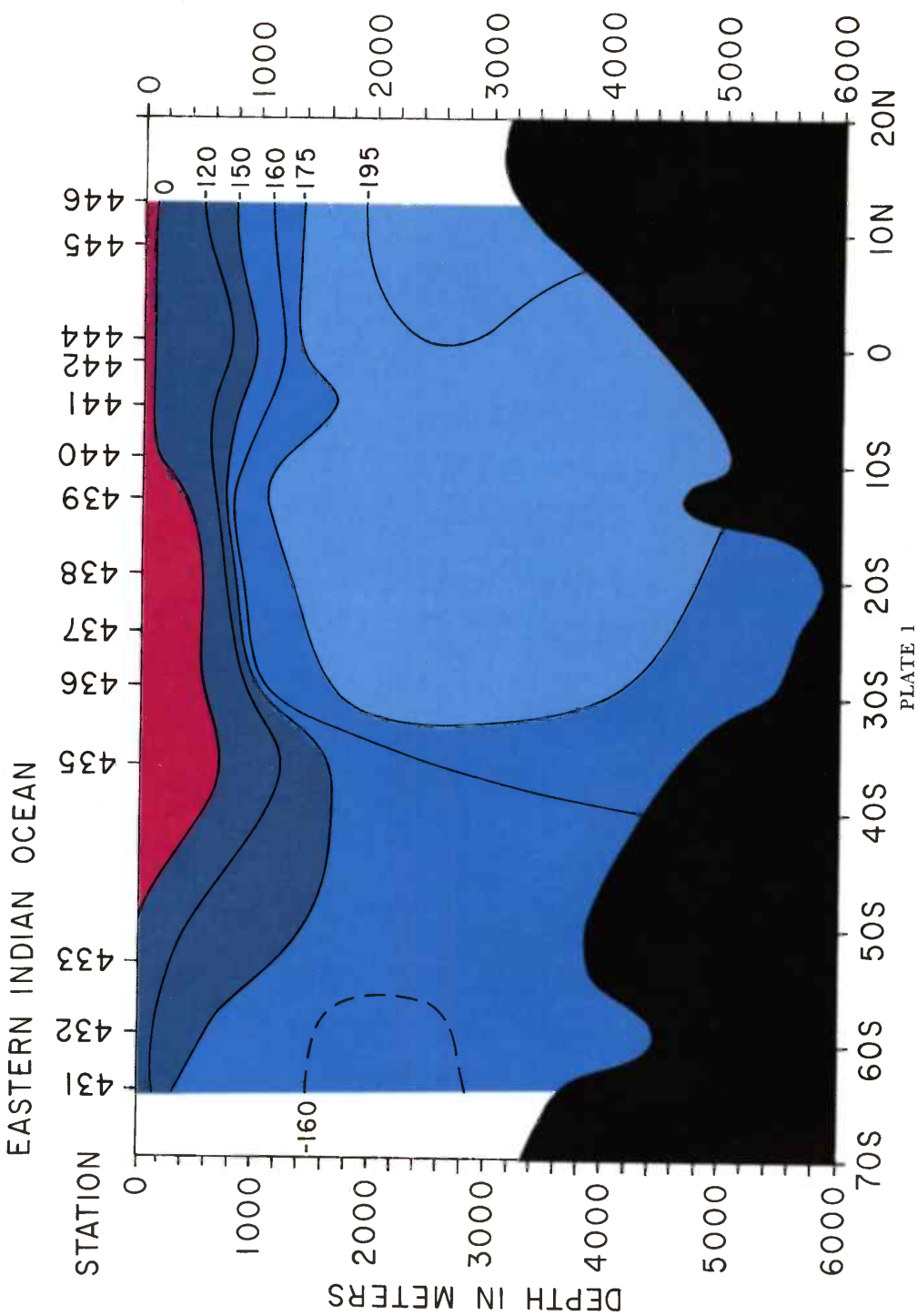

PLATE 1

East Indian Ocean; N-S section. Isolines are in $\Delta^{14}C$ units. The dashed isoline surrounds a region where $\Delta^{14}C$ is a couple of per mil above $-160‰$.

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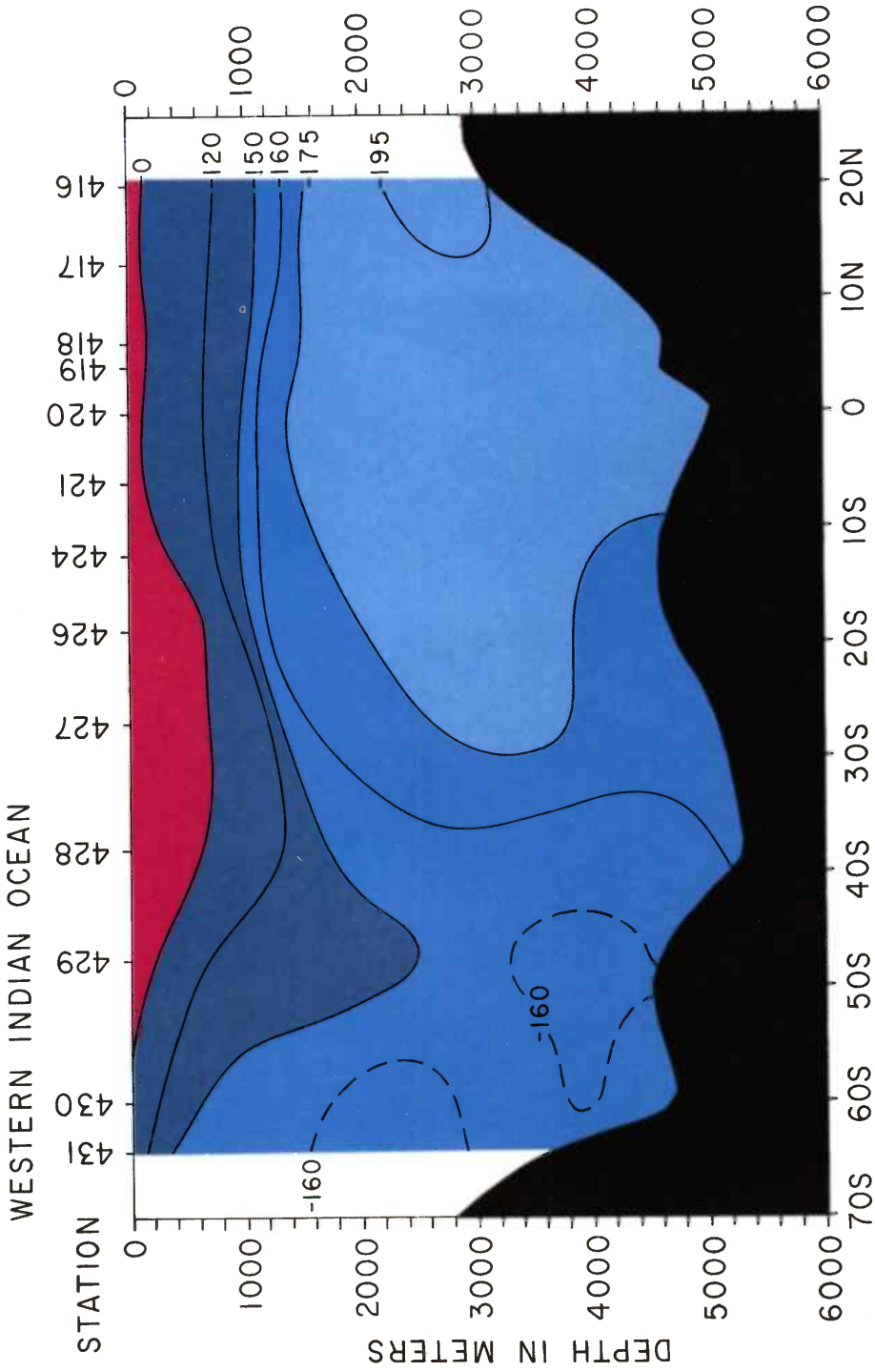

PLATE 2

West Indian Ocean; N-S section. Isolines are in $\Delta^{14}C$ units. The dashed isolines surround regions where $\Delta^{14}C$ is a couple of per mil above $-160‰$.

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STATION 404 MEDITERRANEAN SEA

POSITION 35 36 N 17 15 E DATE 771209 BOTTOM 4051 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
335	5					44.2	QL 782
286	85	16.11	38.392	28.354	2263	92.1	QL 773
287	169	14.98	38.870	28.992	2315	80.1	QL 774
288	368	14.15	38.815	29.130	2335	38.6	QL 775
290	665	13.72	38.750	29.175	2332	-20.3	QL 776
291	1340	13.43	38.701	29.200	2323	-58.2	QL 777
292	1984	13.32	38.680	29.206	2323	-60.5	QL 778
293	2776	13.25	38.667	29.211	2323	-60.0	QL 779
294	3470	13.23	38.663	29.212	2329	-59.0	QL 780
295	3917	13.23	38.664	29.213	2334	-45.4	QL 781

STATION 405 RED SEA

POSITION 27 16 N 34 31 E DATE 771219 BOTTOM 1181 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	29	23.35	40.400	27.944	2100	98.9	ML2060
287	84	22.36	40.368	28.210	2120	88.8	ML2059
288	149	21.84	40.412	28.391	2136	84.2	ML2067
290	249	21.60	40.500	28.528	2176	35.1	ML2066
291	399	21.57	40.549	28.572	2190	-3.6	ML2065
292	548	21.57	40.583	28.599	2191	-30.9	ML2064
293	698	21.55	40.589	28.611	2187	-12.8	ML2063
294	847	21.49	40.587	28.624	2173	5.3	ML2062
295	996	21.42	40.583	28.642	2169	25.7	ML2061

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STATION 407 — RED SEA

POSITION 19 55 N 38 29 E DATE 771222 BOTTOM 1665 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
386	20	27.26	39.363	25.961	2067	75.4	ML2083
387	70	26.30	39.606	26.442	2074	86.4	ML2082
388	119	23.04	40.207	27.888	2112	86.4	ML2081
390	179	22.02	40.409	28.329	2169	53.4	ML2079
391	242	21.85	40.518	28.452	2207	-0.7	ML2078
286	296	21.72	40.560	28.539	2221	-18.8	ML2077
287	445	21.64	40.593	28.586	2213	-33.8	ML2076
288	594	21.61	40.603	28.603	2199	-39.0	ML2075
290	794	21.58	40.607	28.614	2189	-25.3	ML2074
291	893	21.57	40.608	28.620	2186	-25.2	ML2073
292	1093	21.56	40.612	28.625	2182	-19.7	ML2072
293	1292	21.55	40.610	28.624	2175	-18.0	ML2070
294	1540	21.54	40.609	28.628	2176	-18.3	ML2069
295	1788	21.53	40.602	28.624		-13.4	ML2068*

STATION 408 — RED SEA

POSITION 14 42 N 42 10 E DATE 771224 BOTTOM 587 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	18	26.72	37.336	24.605		46.2	ML2092
287	57	26.62	37.455	24.725		40.8	ML2091
288	75	23.79	37.783	25.733	2141	36.5	ML2090
290	82	23.21	38.420	26.484	2166	34.5	ML2089
291	102	23.20	40.015	27.697	2132	72.3	ML2088
292	175	22.01	40.429	28.362	2180	27.2	ML2087
293	308	21.70	40.569	28.552	2212	-25.8	ML2086
294	436	21.66	40.595	28.584	2203	-41.2	ML2085
295	578	21.64	40.602	28.594	2202	-44.9	ML2084

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STATION 409 GULF OF ADEN

POSITION 12 10 N 43 57 E DATE 771225 BOTTOM 580 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	18	26.77	36.355	23.848	2031	46.6	ML2101
287	53	23.11	35.761	24.504	2135	39.5	ML2100
288	147	16.31	35.639	26.195	2251	-34.6	ML2099
290	196	15.07	35.642	26.473	2253	-48.7	ML2098
291	246	14.84	35.804	26.665	2254	-54.3	ML2097
292	336	14.40	35.976	26.886	2263	-53.6	ML2096
293	412	17.77	37.241	27.068	2218	-14.1	ML2095
294	493	18.56	37.619	27.159	2204	2.9	ML2094
295	580	18.73	37.839	27.280		-2.5	ML2093*

STATION 413

POSITION 13 22 N 53 16 E DATE 771227 BOTTOM 2815 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	28	26.02	36.034	23.842	2037	72.0	ML2116
487	118	22.71	35.669	24.546	2115	49.6	ML2115
488	200	16.62	35.505	26.018	2239	-6.3	ML2114
490	302	13.94	35.515	26.628	2256	-47.7	ML2113
491	448	12.94	35.681	26.968	2286	-70.4	ML2112
286	593	11.85	35.669	27.173	2286	-102.9	ML2111
287	791	10.84	35.678	27.370	2301	-113.4	ML2110
288	988	9.00	35.458	27.513	2326	-136.0	ML2109
290	1235	6.56	35.182	27.662	2362	-164.0	ML2108
291	1580	4.44	34.973	27.756	2368	-183.1	ML2107
292	1876	3.17	34.867	27.799	2383	-189.9	ML2106
293	2171	2.41	34.807	27.817	2371	-196.8	ML2104
294	2468	1.97	34.775	27.827	2365	-195.0	ML2103
295	2715	1.70	34.762	27.834	2360	-198.3	ML2102

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STATION 416

ARABIAN SEA

POSITION 19 46 N 64 37 E DATE 771231 BOTTOM 3209 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
395	40	26.24	36.482	24.110	2054	58.7	ML2137
394	120	20.39	36.026	25.461	2235	32.3	ML2136
393	186	17.89	35.937	26.042	2267	-8.7	ML2135
392	261	16.12	36.051	26.553	2283	-35.9	ML2134
391	301	15.05	35.941	26.715	2288	-59.6	ML2133
390	376	13.83	35.814	26.885	2293	-74.5	ML2130
594	475	12.74	35.734	27.049	2302	-90.4	ML2138
387	576	11.72	35.640	27.176	2306	-108.0	ML2129
386	823	9.92	35.504	27.399	2326	-127.5	ML2128
286	1008	8.59	35.385	27.526	2340	-147.8	ML2127
287	1271	6.82	35.199	27.642	2356	-157.9	ML2124
288	1534	5.22	35.047	27.725	2367	-172.9	ML2123
290	1797	3.89	34.924	27.774	2369	-193.1	ML2122
291	2060	2.96	34.845	27.799	2375	-193.4	ML2121
292	2323	2.36	34.801	27.817	2375	-201.0	ML2120
293	2588	1.94	34.772	27.826	2378	-204.2	ML2119
294	2858	1.67	34.755	27.834	2388	-200.3	ML2118
295	3140	1.48	34.744	27.838	2398	-188.6	ML2117

STATION 417

POSITION 12 58 N 64 29 E DATE 780102 BOTTOM 4117 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	40	26.60	36.407	23.944	2040	74.6	ML2157
487	99	22.25	36.056	24.970	2188	46.1	ML2156
488	174	16.16	35.617	26.217	2265	-47.1	ML2154
490	248	13.40	35.473	26.701	2274	-76.3	ML2153
491	398	11.71	35.415	27.004	2281	-91.5	ML2152
492	497	11.35	35.451	27.105	2282	-99.4	ML2151
493	647	10.41	35.411	27.241	2306	-115.5	ML2150
494	846	9.22	35.362	27.405	2320	-128.8	ML2149
495	1045	7.86	35.242	27.526	2329	-147.9	ML2148
286	1245	6.72	35.148	27.615	2337	-152.9	ML2147
287	1594	4.67	34.967	27.725	2354	-181.1	ML2146
288	1942	3.11	34.843	27.785	2361	-189.0	ML2145
290	2291	2.32	34.792	27.812	2361	-192.9	ML2144
291	2639	1.84	34.761	27.826	2361	-194.9	ML2143
292	2987	1.56	34.743	27.831	2365	-190.2	ML2142
293	3336	1.46	34.742	27.839	2357	-197.8	ML2141
294	3686	1.39	34.736	27.838	2345	-190.7	ML2140
295	4035	1.35	34.739	27.894	2367	-187.9	ML2139

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STATION 418

POSITION 6 11 N 64 25 E DATE 780105 BOTTOM 4706 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
688	30	27.79	35.620	22.977	1993	75.1	ML2180
687	150	17.23	35.236	25.665	2182	6.8	ML2179
686	198	15.39	35.234	26.095	2195	-17.2	ML2178
586	299	12.93	35.182	26.583	2215	-38.9	ML2177
587	398	11.39	35.148	26.857	2237	-67.3	ML2176
588	497	10.73	35.148	26.978	2250	-93.5	ML2175
590	647	9.97	35.212	27.163	2291	-107.7	ML2174
591	797	8.89	35.174	27.313	2316	-125.4	ML2173
592	995	7.42	35.103	27.480	2333	-144.2	ML2172
593	1294	5.70	34.977	27.612	2336	-166.6	ML2171
594	1592	4.05	34.888	27.717	2342	-178.0	ML2170
595	1941	2.88	34.804	27.775	2344	-185.3	ML2169
286	2191	2.42	34.783	27.798	2349	-193.1	ML2168
287	2489	2.01	34.765	27.816	2349	-194.9	ML2167
288	2835	1.67	34.748	27.827	2345	-192.7	ML2166
290	3085	1.53	34.740	27.832	2338	-192.8	ML2165
291	3384	1.41	34.734	27.836	2340	-188.5	ML2163
292	3681	1.35	34.731	27.837	2338	-180.7	ML2161
293	4031	1.32	34.733	27.841	2342	-189.3	ML2160
294	4383	1.31	34.732	27.841	2341	-176.6	ML2159
295	4634	1.30	34.717	27.814	2339	-178.6	ML2158

STATION 419

POSITION 3 57 N 56 48 E DATE 780108 BOTTOM 4658 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	20	26.96	35.340	23.022	1981	94.8	ML2199
487	98	20.44	35.246	24.818	2085	50.0	ML2198
488	227	13.22	35.222	26.562	2207	-41.0	ML2197
490	406	10.05	35.027	27.005	2227	-88.2	ML2195
491	546	9.83	35.140	27.129	2264	-104.1	ML2194
492	756	8.33	35.081	27.325	2293	-131.7	ML2193
493	845	8.45	35.159	27.370	2301	-123.9	ML2192
494	1094	6.69	35.040	27.535	2320	-161.7	ML2191
495	1295	5.66	34.973	27.614	2334	-163.6	ML2190
286	1593	4.25	34.885	27.705	2333	-179.6	ML2189
287	1992	2.71	34.797	27.783	2344	-190.3	ML2188
288	2389	2.03	34.767	27.816	2338	-198.9	ML2187
290	2787	1.71	34.751	27.827	2335	-190.4	ML2186
291	3185	1.46	34.739	27.836	2325	-186.9	ML2185
292	3584	1.29	34.733	27.843	2320	-184.2	ML2184
293	3884	1.18	34.729	27.847	2323	-182.6	ML2183
294	4183	1.07	34.722	27.849	2314	-178.6	ML2182
295	4584	0.96	34.720	27.854	2307	-174.0	ML2181

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STATION 420

POSITION 00 03 S 50 56 E DATE 780110 BOTTOM 5102 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
586	20	26.96	35.249	22.953	1995	93.1	ML2218
587	98	19.00	35.201	25.194	2106	49.1	ML2217
588	197	14.02	35.171	26.347	2172	-1.8	ML2216
590	296	11.80	35.078	26.725	2214	-53.7	ML2215
591	494	9.73	35.006	27.043	2255	-104.5	ML2214
592	714	8.90	35.094	27.248	2290	-124.2	ML2213
593	934	7.48	35.076	27.451	2325	-145.6	ML2212
594	1243	5.35	34.911	27.603	2333	-170.5	ML2211
595	1541	3.86	34.834	27.706	2338	-179.0	ML2210
386	1939	2.82	34.785	27.764	2341	-189.5	ML2209
387	2338	2.07	34.757	27.804	2343	-191.5	ML2208
388	2737	1.70	34.744	27.822	2339	-190.1	ML2207
390	3136	1.53	34.736	27.829	2335	-186.2	ML2206
391	3535	1.32	34.730	27.838	2330	-186.4	ML2205
392	3934	1.16	34.726	27.846	2327	-185.8	ML2204
393	4334	0.99	34.721	27.852	2315	-179.9	ML2203
394	4734	0.91	34.717	27.854	2312	-179.4	ML2201
395	5035	0.88	34.716	27.856	2310	-180.0	ML2200

STATION 421

POSITION 06 09 S 50 54 E DATE 780113 BOTTOM 4837 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
588	19	28.72	34.884	22.126	1956	94.7	ML2219
486	99	15.56	35.160	26.005	2160	2.9	ML2227
487	222	11.97	35.062	26.681	2177	-39.3	ML2226
490	346	10.56	34.950	26.853	2191	-66.2	ML2225
491	546	8.50	34.816	27.095	2233	-105.6	ML2224
492	795	7.08	34.842	27.324	2288	-145.2	ML2223
493	1095	5.70	34.856	27.516	2316	-155.9	ML2222
494	1394	4.14	34.792	27.644	2324	-173.5	ML2221
495	1694	3.13	34.764	27.720	2324	-181.4	ML2220
286	1957	2.52	34.758	27.769	2330	-189.0	ML2237
287	2256	2.12	34.753	27.798	2327	-191.9	ML2236
288	2555	1.79	34.747	27.818	2326	-190.9	ML2235
290	2854	1.61	34.742	27.827	2328	-189.4	ML2234
291	3153	1.49	34.738	27.832	2326	-192.0	ML2233
292	3451	1.39	34.734	27.836	2334	-185.2	ML2232
293	3852	1.21	34.728	27.844	2322	-183.8	ML2230
294	4300	0.94	34.720	27.855	2310	-172.3	ML2229
295	4752	0.84	34.716	27.858	2309	-171.4	ML2228

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STATION 424

POSITION 12 18 S 53 41 E DATE 780116 BOTTOM 4676 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	19	28.95	35.016	22.158	1949	110.7	ML2255
487	97	23.50	34.973	23.758	2024	102.4	ML2254
488	205	15.42	35.401	26.214	2106	60.4	ML2253
490	270	12.98	35.224	26.604	2132	25.3	ML2252
491	343	11.01	34.985	26.802	2150	-17.9	ML2251
492	683	7.06	34.689	27.206	2233	-111.6	ML2250
493	843	6.06	34.738	27.378	2280	-135.4	ML2249
494	1043	5.19	34.750	27.494	2298	-155.1	ML2248
495	1392	3.81	34.715	27.616	2303	-163.6	ML2247
286	1745	2.83	34.728	27.719	2304	-174.8	ML2246
287	2043	2.22	34.736	27.776	2317	-181.4	ML2245
288	2422	1.87	34.743	27.809	2327	-184.0	ML2244
290	2721	1.69	34.741	27.821	2321	-176.7	ML2243
291	3138	1.46	34.736	27.834	2316	-182.7	ML2242
292	3566	1.27	34.728	27.840	2317	-170.3	ML2241
293	3884	1.10	34.723	27.847	2302	-176.8	ML2240
294	4281	0.87	34.716	27.856	2289	-175.1	ML2239
295	4581	0.79	34.600	27.804	2295	-175.1	ML2238

STATION 426

POSITION 18 54 S 54 47 E DATE 780120 BOTTOM 4737 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
386	19	27.95	35.094	22.532	1972	123.8	ML2273
387	69	26.14	35.058	23.063	1966	126.5	ML2272
390	172	22.12	35.177	24.342	2018	116.7	ML2271
391	296	16.94	35.423	25.878	2094	99.1	ML2270
392	544	10.80	34.938	26.804	2129	7.4	ML2269
393	843	6.72	34.562	27.153	2228	-116.4	ML2268
395	1191	4.37	34.647	27.506	2291	-162.4	ML2266
388	1437	3.52	34.661	27.602	2295	-166.6	ML2265
286	1692	2.79	34.680	27.685	2302	-165.9	ML2264
287	1941	2.36	34.704	27.740	2303	-177.8	ML2263
290	2192	2.08	34.725	27.778	2313	-178.8	ML2262
291	2491	1.86	34.733	27.802	2324	-185.5	ML2261
292	2792	1.69	34.736	27.817	2320	-178.6	ML2260
294	3689	1.21	34.726	27.842	2316	-174.7	ML2258
295	4137	0.92	34.719	27.855	2310	-169.1	ML2257
288	4585	0.67	34.711	27.864	2299	-167.4	ML2256

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STATION 427

POSITION 27 04 S 56 58 E DATE 780130 BOTTOM 5169 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	5	25.59	35.239	23.374	1974	129.7	ML2295
487	129	19.07	35.484	25.397	2058	115.4	ML2294
488	183	16.96	35.516	25.948	2083	113.0	ML2293
490	367	13.41	35.285	26.564	2097	76.3	ML2292
491	542	11.73	35.066	26.729	2119	34.2	ML2291
492	717	10.13	34.863	26.862	2123	-12.1	ML2290
493	1096	5.01	34.439	27.268	2216	-107.7	ML2289
494	1349	3.45	34.513	27.491	2266	-148.5	ML2288
495	1747	2.57	34.659	27.686	2278	-166.5	ML2287
286	2068	2.21	34.721	27.765	2290	-163.5	ML2286
287	2470	1.91	34.740	27.804	2306	-174.8	ML2285
290	3224	1.39	34.730	27.834	2311	-178.1	ML2283
291	3595	1.12	34.724	27.846	2307	-179.5	ML2280
292	3984	0.88	34.718	27.857	2291	-165.8	ML2277
293	4333	0.69	34.713	27.865	2288	-165.4	ML2276
294	4700	0.56	34.708	27.868	2285	-161.5	ML2275
295	5066	0.51	34.706	27.870		-161.4	ML2274*

STATION 428

POSITION 37 46 S 57 38 E DATE 780202 BOTTOM 5383 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
386	9	18.44	35.340	25.448	2032	98.9	ML2304
387	119	14.55	35.377	26.391	2085	91.2	ML2303
388	193	13.70	35.282	26.507	2097	91.6	ML2302
390	254	13.54	35.318	26.563	2085	88.3	ML2301
391	498	11.59	35.012	26.714	2119	44.2	ML2300
392	797	7.97	34.607	27.012	2163	-39.9	ML2299
393	1096	4.62	34.374	27.263	2202	-83.5	ML2298
394	1418	3.14	34.463	27.478	2247	-130.6	ML2297
395	1739	2.58	34.605	27.643	2269	-151.5	ML2296
586	2042	2.35	34.702	27.738	2272	-153.0	ML2313
587	2490	2.02	34.754	27.807	2268	-160.9	ML2312
588	2939	1.63	34.749	27.832	2271	-156.4	ML2311
590	3387	1.20	34.740	27.855	2285	-150.0	ML2310
591	3834	0.61	34.710	27.867	2281	-156.0	ML2309
592	4282	0.22	34.691	27.873	2281	-158.1	ML2308
593	4730	0.09	34.687	27.878	2283	-154.3	ML2307
594	5175	0.04	34.682	27.876	2278	-162.9	ML2306
595	5325	0.03	34.688	27.881		-159.8	ML2305*

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STATION 429

POSITION 47 40 S 57 51 E DATE 780206 BOTTOM 4563 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	4	6.49	33.726	26.525	2108	28.0	ML2331
487	74	6.21	33.760	26.588	2101	29.4	ML2330
488	149	4.12	33.813	26.868	2137	14.3	ML2329
490	248	3.08	34.045	27.152	2165	-16.5	ML2328
491	452	2.59	34.247	27.355	2217	-81.3	ML2327
492	684	2.42	34.436	27.520	2247	-124.8	ML2326
493	995	2.38	34.595	27.652	2264	-149.8	ML2325
494	1382	2.23	34.722	27.765	2257	-147.0	ML2324
495	1765	2.01	34.764	27.815	2255	-143.7	ML2323
286	2065	1.76	34.770	27.839	2252	-143.6	ML2322
287	2406	1.44	34.757	27.852	2257	-149.6	ML2321
288	2745	1.11	34.739	27.860	2274	-151.3	ML2320
290	3085	0.75	34.719	27.866	2270	-159.6	ML2319
291	3424	0.42	34.701	27.871	2276	-161.5	ML2318
292	3762	0.18	34.688	27.874	2269	-160.0	ML2317
293	4098	0.00	34.681	27.878	2277	-169.3	ML2316
294	4433	-0.18	34.708	27.923	2268	-164.9	ML2315
295	4562	-0.28	34.671	27.883		-158.2	ML2314*

STATION 430

POSITION 59 59 S 60 59 E DATE 780210 BOTTOM 4738 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	4	1.80	33.842	27.093		-19.9	ML2349*
487	99	-0.85	34.023	27.383	2193	-41.9	ML2348
488	309	1.91	34.583	27.678	2270	-143.0	ML2347
490	498	1.89	34.666	27.746	2276	-149.4	ML2346
491	747	1.82	34.723	27.797	2270	-153.6	ML2345
492	997	1.67	34.746	27.827	2265	-149.3	ML2344
493	1296	1.38	34.745	27.846	2264	-154.0	ML2343
494	1593	1.08	34.735	27.857	2265	-155.1	ML2342
495	1814	0.89	34.721	27.859	2273	-161.5	ML2341
286	2135	0.62	34.708	27.865	2276	-163.3	ML2340
287	2486	0.39	34.698	27.870	2276	-163.3	ML2339
288	2835	0.19	34.686	27.872	2277	-158.1	ML2338
290	3186	-0.01	34.679	27.876	2278	-160.8	ML2337
291	3536	-0.17	34.674	27.880	2272	-159.1	ML2336
292	3874	-0.31	34.667	27.881	2276	-162.8	ML2335
293	4213	-0.44	34.663	27.884	2274	-159.5	ML2334
294	4561	-0.55	34.661	27.883	2264	-159.1	ML2333
295	4695	-0.64	34.658	27.888		-145.8	ML2332*

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STATION 431

POSITION 64 11 S 83 59 E DATE 780213 BOTTOM 3624 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	9	2.36	33.789	27.009	2167	-66.9	ML2375
287	29	0.69	33.961	27.248	2182	-67.9	ML2374
288	46	-0.86	34.186	27.516	2204	-92.9	ML2373
290	210	1.60	34.655	27.758	2277	-147.8	ML2372
292	674	1.32	34.721	27.830	2270	-155.1	ML2370
293	905	1.09	34.721	27.846	2278	-159.1	ML2369
294	1119	0.93	34.718	27.855	2281	-164.0	ML2368
295	1392	0.73	34.712	27.862	2281	-159.5	ML2367
395	1665	0.50	34.701	27.866	2284	-161.4	ML2366
394	1939	0.32	34.692	27.869	2281	-161.2	ML2365
393	2214	0.14	34.682	27.871	2283	-161.6	ML2364
392	2490	-0.01	34.676	27.874	2289	-163.1	ML2363
391	2763	-0.14	34.674	27.879	2281	-161.7	ML2362
390	2975	-0.23	34.674	27.883	2278	-155.5	ML2361
388	3186	-0.29	34.674	27.886	2276	-151.9	ML2360
387	3396	-0.35	34.677	27.892	2273	-148.8	ML2359
386	3580	-0.43	34.680	27.897	2276	-151.4	ML2358

STATION 432

POSITION 59 20 S 92 38 E DATE 780216 BOTTOM 4490 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	9	1.82	33.864	27.110		-54.0	ML2401*
487	91	-0.84	34.170	27.502	2232	-93.8	ML2400
488	252	1.32	34.589	27.725	2277	-135.9	ML2399
490	413	1.51	34.674	27.781	2281	-142.7	ML2397
491	588	1.54	34.715	27.811	2276	-149.5	ML2396
492	797	1.51	34.740	27.833	2284	-152.8	ML2395
493	1096	1.20	34.731	27.848	2280	-151.5	ML2394
494	1395	0.91	34.721	27.858	2283	-155.6	ML2393
495	1693	0.69	34.711	27.863	2289	-163.1	ML2392
286	1986	0.46	34.700	27.868	2283	-159.7	ML2391
287	2292	0.26	34.690	27.871	2295	-164.2	ML2390
288	2597	0.09	34.684	27.875	2295	-168.2	ML2389
595	2612	0.08	34.684	27.875	2294	-160.4	ML2402
290	2903	-0.06	34.680	27.880	2279	-159.9	ML2388
291	3209	-0.18	34.680	27.885	2282	-156.1	ML2387
292	3514	-0.27	34.679	27.889	2280	-154.8	ML2385
293	3818	-0.34	34.678	27.891	2288	-152.5	ML2378
294	4122	-0.40	34.678	27.894	2274	-151.9	ML2377
295	4427	-0.48	33.276	28.939	2110	-141.7	ML2376

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STATION 433

POSITION 53 00 S 103 02 E DATE 780218 BOTTOM 3942 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	10	3.33	33.905	27.018	2156	-14.4	ML2404
586	59	3.22	33.909	27.031	2154	-19.4	ML2422
590	139	0.90	34.038	27.310	2198	-49.6	ML2421
587	350	1.98	34.473	27.585	2268	-120.8	ML2420
591	639	2.16	34.677	27.733	2270	-145.8	ML2419
592	860	1.98	34.717	27.780	2279	-149.1	ML2418
593	1079	1.84	34.740	27.809	2275	-144.7	ML2417
594	1298	1.67	34.750	27.831	2276	-154.5	ML2416
595	1583	1.37	34.743	27.845	2281	-148.6	ML2415
588	1867	1.15	34.736	27.854	2284	-153.7	ML2414
287	2182	0.83	34.719	27.861	2287	-159.0	ML2403
387	2381	0.68	34.712	27.865	2283	-171.4	ML2413
391	2612	0.42	34.700	27.870	2291	-154.3	ML2411
392	2843	0.26	34.693	27.873	2285	-158.2	ML2410
393	3073	0.07	34.687	27.878	2284	-156.0	ML2409
394	3300	-0.05	34.684	27.882	2289	-156.8	ML2408
395	3527	-0.14	34.682	27.885	2297	-153.2	ML2407
388	3749	-0.16	34.682	27.886	2293	-157.5	ML2406

STATION 435

POSITION 39 57 S 109 58 E DATE 780222 BOTTOM 4621 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	4	15.49	34.842	25.771		98.1	QL 789*
490	53	13.72	34.747	26.084	2085	87.8	QL 792
487	208	10.38	34.775	26.750	2102	89.4	QL 790
491	432	9.94	34.790	26.838	2114	68.4	QL 793
492	644	8.86	34.655	26.913	2134	26.0	QL 794
493	858	6.97	34.486	27.059	2168	-56.1	QL 795
494	1071	4.41	34.356	27.269	2208	-97.8	QL 796
495	1369	3.01	34.442	27.475	2250	-144.0	QL 797
488	1672	2.58	34.576	27.619	2272	-150.7	QL 791
291	2975	1.38	34.744	27.845	2278	-159.5	QL 784
292	3305	1.06	34.730	27.856	2285	-162.8	QL 785
293	3632	0.75	34.717	27.865	2282	-166.3	QL 786
294	3959	0.59	34.710	27.868	2284	-161.2	QL 787
295	4286	0.51	34.706	27.870	2292	-165.3	QL 788
288	4611	0.47	34.705	27.871	2288	-210.3	QL 783

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STATION 436

POSITION 29 15 S 109 58 E DATE 780308 BOTTOM 5556 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	10	24.51	35.734	24.070	2007	140.4	QL 761
487	74	19.44	35.866	25.588	2048	147.3	QL 806
488	134	16.20	35.678	26.251	2075	146.0	QL 807
490	223	13.63	35.336	26.559	2088	138.6	QL 808
491	312	11.35	35.013	26.759	2107	106.8	QL 809
492	437	9.50	34.749	26.880	2124	50.9	QL 810
493	797	5.00	34.404	27.243	2214	-106.3	QL 811
494	1146	3.49	34.546	27.513	2281	-167.6	QL 812
495	1492	2.72	34.651	27.666	2300	-169.9	QL 813
286	1896	2.22	34.714	27.760	2313	-185.0	QL 798
287	2295	1.87	34.726	27.796	2315	-190.8	QL 799
288	2694	1.59	34.729	27.818	2311	-187.6	QL 800
290	3093	1.35	34.728	27.834	2310	-190.0	QL 801
291	3491	1.15	34.726	27.847	2313	-184.4	QL 762
292	3990	0.93	34.719	27.855	2305	-178.0	QL 802
293	4488	0.78	34.718	27.863	2301	-172.9	QL 803
294	4986	0.67	34.714	27.867	2294	-160.3	QL 804
295	5485	0.61	34.711	27.868	2293	-167.8	QL 805

STATION 437

POSITION 24 28 S 104 55 E DATE 780311 BOTTOM 1587 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	10	24.29	35.739	24.139	2009	149.5	QL 814
287	39	23.25	35.699	24.415	2012	142.7	QL 815
288	70	21.18	35.638	24.951	2026	151.6	QL 816
290	158	17.96	35.742	25.877	2089	142.4	QL 817
291	228	15.78	35.598	26.287	2087	146.1	QL 818
292	298	13.22	35.300	26.616	2097	86.7	QL 819
293	377	11.17	34.996	26.780	2108	116.8	QL 820
294	457	9.65	34.774	26.876	2118	46.8	QL 821
295	719	5.36	34.455	27.235	2219	-88.5	QL 822

STATION 438

POSITION 19 29 S 101 17 E DATE 780312 BOTTOM 5825 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	15	26.25	35.279	23.194	1973	137.5	QL 763
487	69	23.46	35.312	24.062	1986	138.6	QL 850
488	198	18.34	35.658	25.717	2075	125.8	QL 851
490	348	12.12	35.156	26.724	2108	76.2	QL 852
491	498	9.13	34.730	26.927	2128	6.5	QL 853
492	646	6.91	34.567	27.132	2214	-107.1	QL 854
493	946	5.32	34.646	27.397	2302	-167.5	QL 855
494	1196	4.40	34.648	27.502	2319	-169.3	QL 856
495	1494	3.45	34.672	27.615	2309	-181.6	QL 857
286	1888	2.52	34.714	27.735	2312	-191.1	QL 841
287	2238	2.00	34.726	27.786	2314	-189.7	QL 842
288	2737	1.55	34.728	27.820	2309	-188.5	QL 843
290	3236	1.23	34.723	27.839	2310	-191.0	QL 844
291	3734	1.00	34.718	27.850	2305	-182.4	QL 845
292	4232	0.86	34.716	27.857	2305	-179.6	QL 846
293	4729	0.76	34.714	27.862	2298	-176.0	QL 847
294	5223	0.71	34.713	27.864	2293	-165.4	QL 848
295	5717	0.70	34.713	27.864	2289	-169.4	QL 849

STATION 439

POSITION 13 02 S 97 08 E DATE 780315 BOTTOM 1487 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
286	15	28.74	34.393	21.754		130.0	QL 858*
287	149	18.59	34.950	25.109	2090	63.8	QL 859
288	268	13.21	35.185	26.530	2126	47.0	QL 860
290	348	10.47	34.944	26.864	2127	35.2	QL 861
291	447	8.41	34.681	26.997	2185	-72.9	QL 862
292	597	7.03	34.659	27.186	2271	-143.5	QL 863
293	895	5.09	34.631	27.410	2308	-171.9	QL 864
294	1196	4.11	34.661	27.543	2319	-179.7	QL 865
295	1495	3.31	34.713	27.663		-186.3	QL 866*

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STATION 440

POSITION 09 21 S 95 01 E DATE 780317 BOTTOM 5238 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
1035	0					123.3	QL 867
486	60	24.06	34.541	23.302	1985	104.2	QL 868
487	103	18.55	34.652	24.892	2119	24.9	QL 869
488	146	14.55	34.703	25.878	2178	-21.6	QL 870
490	264	11.29	34.884	26.674	2222	-75.5	QL 871
491	539	8.34	34.769	27.082	2255	-110.4	QL 872
492	786	6.56	34.738	27.314	2302	-153.8	QL 873
493	1132	4.76	34.698	27.502	2327	-172.7	QL 874
494	1478	3.75	34.741	27.643	2330	-187.9	QL 875
495	1822	2.76	34.746	27.739	2333	-189.9	QL 876
286	2201	2.09	34.739	27.786	2329	-191.0	QL 877
287	2497	1.81	34.736	27.807	2330	-190.1	QL 878
288	2793	1.58	34.734	27.823	2328	-187.2	QL 879
290	3089	1.39	34.726	27.830	2325	-193.1	QL 880
291	3484	1.11	34.720	27.844	2324	-189.8	QL 881
292	3878	0.91	34.716	27.854	2309	-185.9	QL 882
293	4273	0.81	34.714	27.859	2307	-179.9	QL 883
294	4669	0.77	34.714	27.861	2299	-179.9	QL 884
295	5063	0.76	34.714	27.862	2303	-178.9	QL 885

STATION 441

POSITION 05 01 S 91 46 E DATE 780320 BOTTOM 4927 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	20	28.94	34.481	21.757	1926	122.6	QL 886
487	75	24.38	35.319	23.817	2062	67.1	QL 887
488	159	14.76	34.830	25.911	2186	-33.1	QL 888
490	249	11.64	34.987	26.686	2210	-68.9	QL 889
491	379	10.15	34.923	26.907	2239	-83.9	QL 890
492	499	9.08	34.873	27.046	2262	-106.6	QL 891
493	798	7.08	34.855	27.334	2309	-150.5	QL 892
494	1198	5.14	34.805	27.543	2330	-170.7	QL 893
495	1594	3.60	34.785	27.692	2337	-168.9	QL 894
286	1993	2.55	34.758	27.767	2332	-186.5	QL 895
287	2295	2.07	34.746	27.796	2329	-192.4	QL 896
288	2597	1.76	34.739	27.814	2333	-187.2	QL 897
290	2899	1.54	34.733	27.825	2325	-191.5	QL 898
291	3301	1.25	34.724	27.838	2326	-191.0	QL 899
292	3700	0.97	34.717	27.851	2316	-182.5	QL 900
293	4097	0.82	34.713	27.857	2311	-173.9	QL2001
294	4492	0.79	34.715	27.861	2298	-179.4	QL2002
295	4881	0.77	34.714	27.861	2308	-181.3	QL2003

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POSITION 01 12 S 90 45 E DATE 780322 BOTTOM 4606 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
394	20	29.67	33.731	20.955	1872	119.4	QL2005
586	89	23.12	35.183	24.061	2081	50.1	QL 769
587	149	15.45	35.126	25.999	2195	-27.6	QL2006
588	247	12.97	35.114	26.522	2208	-59.2	QL2007
590	396	10.80	35.029	26.873	2239	-87.8	QL2008
591	595	9.25	34.955	27.083	2256	-105.1	QL2009
592	796	8.07	34.989	27.297	2301	-77.3	QL 770
593	1096	6.24	34.919	27.498	2323	-152.3	QL2010
594	1495	4.00	34.829	27.688	2333	-180.9	QL2011
595	1790	3.10	34.797	27.750	2336	-188.3	QL2012
287	2138	2.27	34.765	27.796	2334	-188.4	QL2013
288	2489	1.84	34.749	27.816	2334	-189.7	QL2014
290	2840	1.57	34.739	27.828	2335	-185.3	QL2015
291	3190	1.38	34.731	27.835	2332	-193.3	QL2016
292	3539	1.07	34.724	27.849	2323	-188.7	QL2017
293	3888	0.84	34.719	27.860	2307	-176.6	QL2018
294	4236	0.81	34.718	27.862	2300	-179.7	QL2019
295	4582	0.79	34.717	27.862	2305	-176.2	QL2020

STATION 444

POSITION 0 36 N 88 36 E DATE 780324 BOTTOM 4464 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
186	2054	2.35	34.766	27.788		-181.8	QL2021
187	2352	1.99	34.750	27.807	2333	-190.5	QL2022
188	2651	1.69	34.741	27.821	2334	-203.5	QL2023
190	2951	1.48	34.733	27.830	2330	-190.1	QL2024
191	3250	1.29	34.728	27.839	2334	-192.7	QL2025
192	3549	1.11	34.724	27.847	2324	-190.7	QL2026
193	3849	1.05	34.720	27.848	2324	-193.6	QL2027
194	4149	1.05	34.719	27.848	2333	-189.2	QL2028
195	4448	1.04	34.718	27.847	2319	-188.1	QL2029

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STATION 445

POSITION 08 31 N 86 02 E DATE 780326 BOTTOM 3642 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	20	29.03	34.227	21.531	1910	102.3	QL2030
487	59	25.71	34.285	22.618	1999	83.6	QL2031
488	129	17.35	34.869	25.358	2200	-39.0	QL2032
490	238	12.22	35.015	26.595	2265	-85.3	QL2033
491	348	10.74	35.035	26.888	2278	-99.7	QL2034
492	497	9.63	35.017	27.068	2293	-111.6	QL2035
493	747	7.89	34.978	27.314	2317	-143.1	QL2036
494	996	6.52	34.933	27.472	2332	-155.9	QL2037
495	1245	5.30	34.887	27.591	2341	-167.5	QL2038
286	1484	4.28	34.848	27.671	2345	-187.0	QL2039
287	1733	3.24	34.808	27.745	2345	-188.3	QL2040
288	1982	2.57	34.779	27.782	2348	-195.7	QL2041
290	2230	2.16	34.760	27.800	2353	-203.9	QL2042
291	2479	1.86	34.748	27.813	2354	-197.7	QL2043
292	2727	1.64	34.740	27.823	2344	-198.3	QL2044
293	3024	1.44	34.731	27.831	2347	-202.0	QL2045
294	3322	1.26	34.728	27.841	2346	-196.5	QL2046
295	3617	1.14	34.722	27.844	2362	-195.4	QL2047

STATION 446 BAY OF BENGAL

POSITION 12 29 N 84 29 E DATE 780328 BOTTOM 3286 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
386	20	28.32	33.688	21.359	1891	116.6	QL2048
387	44	27.98	33.701	21.476	1902	97.7	QL2049
388	99	27.44	35.057	22.658	1987	91.5	QL2050
390	162	18.26	34.848	25.120	2195	-27.1	QL2051
391	247	12.64	34.995	26.497	2264	-81.9	QL2052
392	396	10.42	35.029	26.941	2296	-103.5	QL2053
393	597	8.96	35.003	27.167	2320	-129.8	QL2054
394	796	7.64	34.969	27.344	2323	-149.9	QL2055
395	995	6.49	34.929	27.473	2330	-157.4	QL2056
186	1190	5.53	34.898	27.570	2340	-164.6	QL2057
187	1441	4.48	34.856	27.658	2347	-177.5	QL2058
188	1692	3.32	34.810	27.739	2352	-187.5	QL2059
190	1943	2.59	34.779	27.780	2353	-198.1	QL2060
192	2443	1.88	34.749	27.813	2364	-199.0	QL2061
193	2692	1.66	34.740	27.822	2363	-202.2	QL2062
194	2991	1.44	34.732	27.832	2354	-194.3	QL2063
195	3286	1.22	34.725	27.841	2362	-197.8	QL2064

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STATION 447

POSITION 04 59 N 79 57 E DATE 780405 BOTTOM 4187 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	2	29.99	33.917	20.990	1903	105.0	QL2065
487	30	28.86	34.848	22.055	1955	102.8	QL2066
488	94	20.53	34.827	24.492	2140	17.7	QL2067
490	188	12.89	35.072	26.511	2249	-72.3	QL2068
491	288	11.61	35.099	26.779	2246	-68.9	QL2069
492	388	10.68	35.064	26.921	2245	-89.3	QL2070
493	499	10.06	35.059	27.027	2262	-100.2	QL2071
494	801	7.95	34.982	27.309	2312	-137.0	QL2072
495	1196	5.72	34.912	27.558	2338	-123.8	QL2073
286	1463	4.53	34.859	27.657	2334	-177.1	QL2074
287	1662	3.84	34.835	27.708	2349	-185.3	QL2075
288	1961	2.64	34.783	27.780	2344	-194.9	QL2076
290	2361	1.99	34.757	27.811	2336	-193.5	QL2077
291	2760	1.61	34.739	27.825	2343	-197.9	QL2078
292	3159	1.37	34.730	27.835	2349	-185.0	QL2079
293	3559	1.19	34.726	27.843	2344	-195.1	QL2080
294	3859	1.10	34.720	27.845	2339	-191.5	QL2081
295	4158	1.05	34.720	27.848	2334	-187.7	QL2082

STATION 448

POSITION 00 01 N 80 03 E DATE 780406 BOTTOM 4640 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
595	1	29.84	34.328	21.349	1904	112.7	QL2083
486	49	25.01	34.544	23.023	1978	95.1	QL2084
487	177	15.10	35.165	26.026	2189	-19.2	QL2085
488	295	11.76	35.069	26.723	2213	-63.8	QL2086
490	494	9.71	34.969	27.017	2238	-93.1	QL2087
491	693	8.37	35.000	27.258	2296	-126.7	QL2088
492	893	7.56	34.985	27.368	2308	-143.1	QL2089
493	1093	5.92	34.916	27.536	2326	-158.8	QL2090
494	1292	5.28	34.882	27.588	2329	-163.3	QL2091
495	1590	3.85	34.829	27.704	2333	-183.7	QL2092
286	1755	3.24	34.804	27.742	2338	-181.1	QL2093
287	2154	2.30	34.766	27.793	2341	-186.3	QL2094
288	2554	1.77	34.741	27.814	2338	-185.7	QL2095
290	2952	1.46	34.733	27.831	2334	-192.9	QL2096
291	3352	1.27	34.724	27.837	2348	-191.7	QL2097
292	3650	1.17	34.722	27.842	2334	-184.8	QL2098
293	3949	1.10	34.720	27.845	2343	-196.2	QL2099
294	4248	1.05	34.720	27.848	2328	-187.1	QL2100
295	4597	1.02	34.718	27.849	2328	-191.1	QL2101

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POSITION 05 00 S 79 59 E DATE 780408 BOTTOM 5107 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	10	29.30	34.433	21.602	1917	114.5	QL2102
487	129	16.66	35.068	25.680	2176	-2.2	QL2103
488	297	10.69	34.930	26.816	2220	-73.7	QL2104
490	496	9.04	34.859	27.040	2244	-99.8	QL2105
491	696	7.81	34.849	27.225	2285	-131.1	QL2106
492	906	6.53	34.815	27.378	2313	-145.3	QL2107
493	1196	4.99	34.786	27.546	2324	-174.0	QL2108
494	1470	4.03	34.790	27.653	2336	-187.2	QL2109
495	1741	3.08	34.774	27.733	2330	-184.6	QL2110
286	2043	2.34	34.760	27.786	2332	-190.5	QL2111
287	2394	1.88	34.747	27.811	2329	-187.4	QL2112
288	2745	1.60	34.737	27.824	2326	-192.0	QL2113
291	3496	1.18	34.726	27.844	2331	-191.1	QL2115
292	3895	1.08	34.723	27.848	2336	-196.8	QL2116
293	4295	1.04	34.723	27.851	2326	-188.1	QL2117
294	4692	0.99	34.720	27.852	2320	-189.9	QL2118
295	5089	0.95	34.720	27.854	2318	-188.5	QL2119

STATION 450

POSITION 10 00 S 79 59 E DATE 780410 BOTTOM 5334 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	9	28.21	34.408	21.932	1918	128.9	QL2120
487	118	18.41	34.854	25.089	2129	33.8	QL2121
488	376	9.43	34.757	26.899	2216	-85.3	QL2122
490	595	7.33	34.707	27.183	2276	-138.3	QL2123
491	745	6.50	34.735	27.321	2306	-154.5	QL2124
492	894	5.44	34.692	27.416	2314	-163.8	QL2125
493	1165	4.57	34.743	27.559	2327	-175.8	QL2126
494	1446	3.65	34.756	27.665	2327	-186.0	QL2127
595	1746	2.81	34.750	27.738	2325	-186.3	QL2128
286	1973	2.41	34.747	27.769	2324	-183.1	QL2129
287	2372	1.91	34.738	27.802	2315	-186.2	QL2130
288	2772	1.58	34.730	27.820	2316	-189.9	QL2131
290	3173	1.33	34.723	27.832	2321	-190.4	QL2132
291	3574	1.13	34.718	27.841	2326	-188.0	QL2133
292	3974	1.04	34.716	27.846	2318	-184.1	QL2134
293	4374	0.99	34.717	27.849	2322	-186.5	QL2135
294	4922	0.97	34.716	27.850	2317	-186.3	QL2136
295	5325	0.97	34.715	27.850	2317	-185.4	QL2137

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STATION 451

POSITION 14 59 S 79 57 E DATE 780413 BOTTOM 5001 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	10	27.82	34.547	22.161	1923	126.6	QL2138
487	132	21.58	35.058	24.400	2034	107.3	QL2139
488	266	14.97	35.175	26.143	2128	50.5	QL2140
490	316	13.99	35.394	26.539	2103	94.1	QL2141
491	465	9.85	34.828	26.883	2168	-5.0	QL2142
492	646	7.19	34.602	27.119	2209	-101.9	QL2143
493	941	5.41	34.698	27.427	2299	-155.0	QL2144
494	1199	4.45	34.703	27.540	2311	-175.0	QL2145
495	1595	3.14	34.716	27.682	2314	-189.7	QL2146
286	1884	2.52	34.730	27.748	2318	-183.9	QL2147
287	2185	2.06	34.734	27.788	2317	-193.4	QL2148
288	2485	1.76	34.733	27.809	2308	-191.3	QL2149
290	2884	1.48	34.730	27.827	2313	-186.7	QL2150
291	3284	1.26	34.726	27.839	2317	-189.9	QL2151
292	3683	1.10	34.723	27.847	2310	-187.2	QL2152
293	4080	1.03	34.720	27.850	2312	-194.5	QL2153
294	4477	1.01	34.719	27.850	2319	-191.8	QL2154
295	4874	1.00	34.720	27.851	2313	-191.2	QL2155

STATION 452

POSITION 20 05 S 79 59 E DATE 780415 BOTTOM 4791 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	10	26.80	34.753	22.636		124.7	QL2156*
487	118	21.09	35.284	24.708	2038	115.1	QL2157
488	246	17.10	35.505	25.904	2090	132.5	QL2158
490	346	13.66	35.341	26.555	2108	108.3	QL2159
491	445	11.54	35.063	26.764	2111	64.3	QL2160
492	596	9.52	34.765	26.890	2128	13.2	QL2161
493	847	5.85	34.496	27.213	2225	-106.0	QL2162
494	1197	4.20	34.647	27.522	2304	-166.6	QL2163
495	1492	3.33	34.696	27.648	2313	-173.2	QL2164
286	1786	2.69	34.724	27.729	2310	-187.8	QL2165
287	2086	2.20	34.728	27.771	2317	-181.3	QL2166
288	2386	1.85	34.728	27.798	2303	-173.5	QL2167
290	2687	1.62	34.728	27.815	2305	-179.4	QL2168
291	3087	1.36	34.729	27.835	2307	-186.1	QL2169
292	3486	1.16	34.725	27.845	2310	-183.9	QL2170
293	3885	1.06	34.720	27.847	2316	-184.5	QL2171
294	4284	1.01	34.719	27.849	2320	-189.6	QL2172
295	4681	1.00	34.718	27.850	2323	-189.4	QL2173

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STATION 453

POSITION 23 00 S 74 01 E DATE 780418 BOTTOM 4153 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	14	24.74	35.415	23.762	1988	142.9	ML2452
487	98	20.40	35.691	25.192	2034	135.5	ML2451
488	198	15.82	35.558	26.245	2084	122.4	ML2450
490	347	12.47	35.152	26.652	2102	74.3	ML2449
491	546	10.62	34.923	26.824	2121	27.8	ML2448
492	746	8.41	34.646	26.974	2148	-36.2	ML2447
493	926	5.49	34.439	27.212	2198	-107.1	ML2446
494	1228	3.73	34.571	27.510	2285	-158.9	ML2445
686	1515	3.09	34.671	27.651	2303	-173.9	ML2453
286	1597	3.00	34.696	27.678	2305	-177.3	ML2437
287	1794	2.64	34.716	27.725	2307	-177.9	ML2444
288	2023	2.24	34.721	27.762	2302	-181.4	ML2493
290	2373	1.77	34.728	27.804	2290	-173.4	ML2442
291	2724	1.49	34.733	27.829	2285	-174.2	ML2441
292	3075	1.26	34.731	27.843	2291	-178.4	ML2440
293	3426	1.17	34.726	27.845	2297	-183.1	ML2439
294	3772	1.12	34.724	27.847	2303	-190.0	ML2438

STATION 454

POSITION 26 59 S 67 05 E DATE 780421 BOTTOM 4834 M

CST BOT	DEPTH M	POT-T C	SALIN o/oo	SIGMA THETA	TCO2 uM	DC14 o/oo	LAB/ PREP#
486	9	24.48	35.521	23.920	1990	134.8	ML2471
487	88	22.13	35.587	24.631	2014	135.7	ML2470
488	198	16.48	35.557	26.093	2080	117.8	ML2469
490	298	13.99	35.364	26.504	2106	100.7	ML2468
491	447	12.20	35.126	26.686	2116	67.3	ML2467
492	598	10.88	34.958	26.803	2128	18.9	ML2466
493	847	8.45	34.653	26.975	2148	-48.9	ML2465
494	1131	4.46	34.430	27.323	2225	-123.0	ML2464
495	1415	3.31	34.568	27.548	2280	-148.5	ML2463
286	1697	2.65	34.653	27.674	2288	-164.7	ML2462
287	1897	2.41	34.685	27.717	2287	-167.6	ML2461
288	2197	1.90	34.717	27.787	2296	-173.7	ML2460
290	2598	1.65	34.724	27.810	2301	-173.0	ML2459
291	2998	1.50	34.725	27.821	2300	-179.0	ML2458
292	3396	1.39	34.724	27.828	2300	-174.6	ML2457
293	3795	1.27	34.722	27.835	2309	-174.0	ML2456
294	4193	1.22	34.720	27.837	2310	-169.0	ML2455
295	4688	1.21	34.721	27.839	2304	-170.6	ML2454

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