USGS Woods Hole, Mass.

Acoustic Reflection Profiles

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BAY OF CAMPECHE

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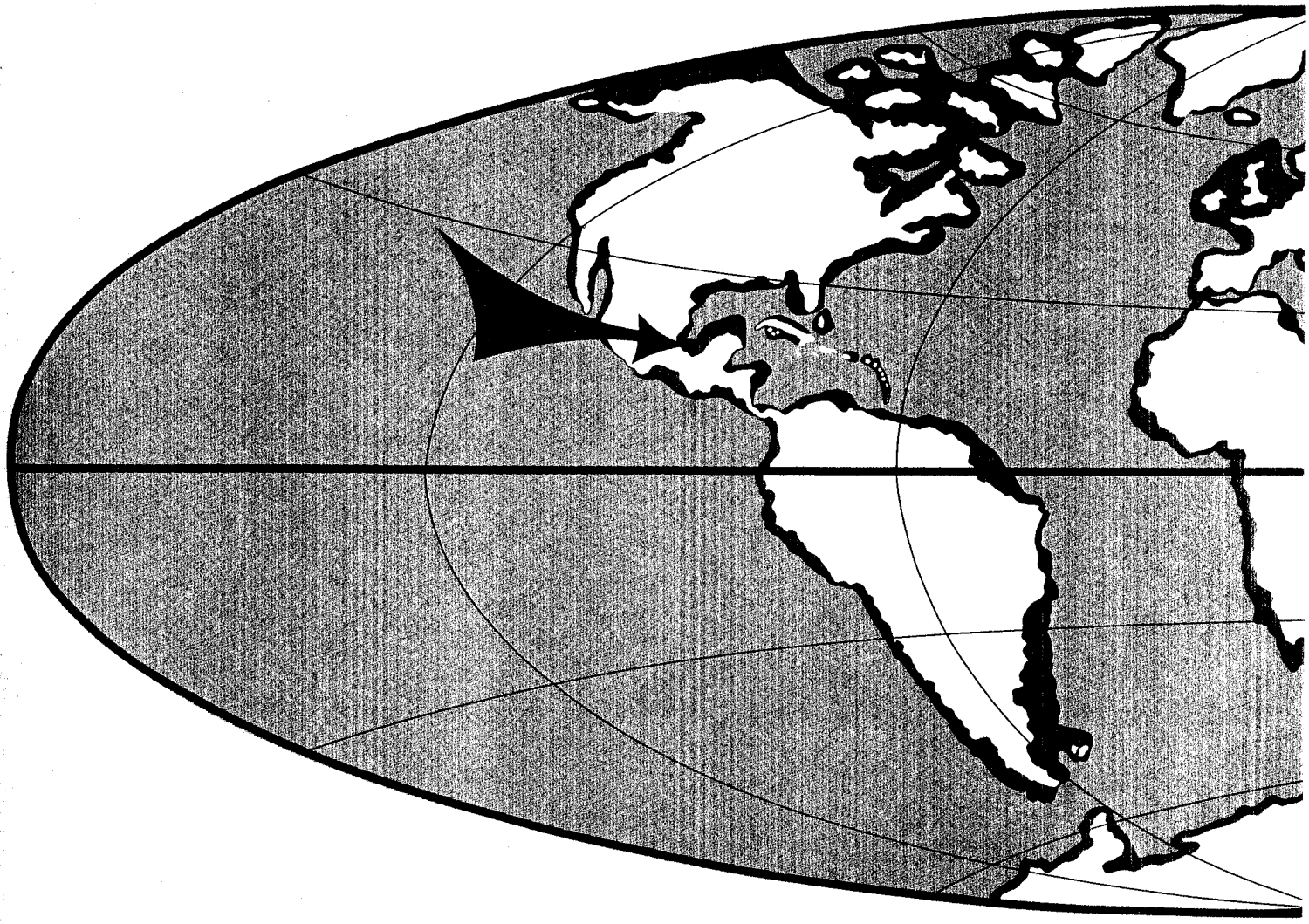

INTERNATIONAL DECADE OF OCEAN EXPLORATION

U. S. GEOLOGICAL SURVEY

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INTERNATIONAL DECADE OF OCEAN EXPLORATION

U.S. GEOLOGICAL SURVEY

LEG 1, 1971 CRUISE, UNITEDGEO I

G. W. MOORE, CHIEF SCIENTIST

ACOUSTIC-REFLECTION PROFILES

BAY OF CAMPECHE

USGS-GD-72-002

1972

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INTRODUCTION

As part of a cooperative marine research program designated the International Decade of Ocean Exploration (IDOE), the United States Geological Survey is participating in an investigation of the geologic framework and resource potential of continental margins and small ocean basins in the Gulf of Mexico, Caribbean Sea, and west African continental shelf areas. These studies are funded through the National Science Foundation. Acoustic-reflection profiles of Leg 1, described in this report concern mainly a 200 X 250 kilometer project area in the Bay of Campeche in the southwestern part of the Gulf of Mexico (fig. 1). The cruise leg began at Corpus Christi, Texas and ended at Veracruz, Mexico. Other geophysical records collected during the cruise include magnetometry, gravimetry, and bathymetry.

Visiting scientists from the Institute of Geophysics of the National University of Mexico, the Oceanographic Commission of the Mexican Navy, and the Mexican Institute of Petroleum joined the research vessel UNITEDGEO I throughout the cruise in the Bay of Campeche. The cruise offered an excellent opportunity for scientific interchange between investigators from Mexico and the United States and permitted collaboration in the instrumentation, operational techniques, and interpretation of acoustic-reflection records aboard the research vessel.

SCIENTIFIC PARTY

U.S. Geological Survey

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SHIP SCHEDULE

A total of 19 days was spent at sea in the Gulf of Mexico during Leg 1, which began at Corpus Christi on May 27, 1971 and ended at Veracruz on June 17, 1971. In addition, information collected in the Bay of Campeche during a 1-day run out of Veracruz at the start of Leg 2 has been made a part of the data of Leg 1. The subbottom acoustic profiles obtained between Corpus Christi and Veracruz and within the project area at the southwest corner of the Bay of Campeche near Veracruz were run at an average ship speed of 8.3 knots.

Day 147 (27 May 1971)	Left Corpus Christi
Day 151 (31 May 1971)	Arrived Veracruz; main Mexican team boarded
Day 153 (2 June 1971)	Left Veracruz
Day 158 (7 June 1971)	Refraction (sonobuoy) station no. 1
Day 161 (10 June 1971)	Dredge station
Day 166 (15 June 1971)	Refraction (sonobuoy) station no. 2
Day 168 (17 June 1971)	Arrived Veracruz at end of Leg 1
Day 170 (19 June 1971)	Left Veracruz to begin Leg 2
Day 172 (21 June 1971)	End Bay of Campeche survey

OBJECTIVES OF INVESTIGATION

Scientific objectives of this cruise leg were: (1) to define the details of folding and faulting on the west side of the Bay of Campeche; (2) to study the extension into the bay of the Mexican volcanic belt and related volcanic lineaments; (3) to investigate the origin of a belt of salt domes that extends along the floor of the east side of the basin; and (4) to acquire new evidence that might bear on the origin of the Gulf of Mexico.

GEOLOGIC SETTING

The area bordering the Bay of Campeche has a Paleozoic granitic and metamorphic basement overlain by Upper Jurassic redbeds, salt, and gypsum (Viniegra, 1971). These rocks are in turn overlain by thin-bedded Cretaceous and Paleocene sedimentary rocks upon which a thick sequence of coastal-plain sediment was deposited aroung the margin of the bay.

were within about 120 m (380 ft.) of a plotted average. Precision of satellite fixes while underway is estimated at about 180 m (600 ft.).

The radar system was a Decca RM 329, with 25 kw of power and a range up to about 65 km (40 mi.). A 9-foot wave-guide antenna giving a beam width of less than 1° at the half-power points provided high azimuth resolution. Accuracy of radar fixes, where used as primary control near the shore, is estimated at about 400 m (1200 ft.). Plotting was done on E. Uchupi's map titled "Map showing relation of land and submarine topography, Mississippi delta to Bahia de Campeche", which was published in 1968 in the U.S. Geological Survey's Miscellaneous Geologic Investigations Series as Map I-512.

Time for navigation and scientific records is referred to Greenwich Mean Time (Z), and days are numbered consecutively from the first day of the year. Scientific clocks were adjusted according to WWV radio.

Acoustic-Reflection System

The acoustic-reflection profiles were obtained using a sparker system consisting of separate, van-mounted, self-contained 160- and 120-kilojoule units triggered from a single source. Maximum total usable power was about 220 kilojoules. The triggered discharge of large capacitors through 6 twin-electrode "ladders" trailed behind the ship created sparks that produced the low-frequency acoustic pulse. These pulses were reflected from the sea bottom and from subbottom surfaces and were received and preamplified by a 100-hydrophone streamer. They were then selectively filtered and recorded graphically on a Raytheon recorder. The sparker ladders were trailed about 70 m behind the navigation antenna; the center of the hydrostreamer was at about 180 m.

Organization of profile records.--The subbottom acoustic profiles at the back of this report are presented in numerical order at approximately 1/5th scale. Many are shown reversed in order to facilitate comparison of structural and sedimentary features from profile to profile. All east-west profiles have been assembled with the west end at the left; thus, the user views such profiles as though looking northward. The start and end of each line are indicated, as are time marks every hour. Day notations are listed consecutively from day one of the year 1971. The records in this report were made between days 147 and 172 (May 27 to June 21). Hour marks shown on the profiles are in GMT and correspond with those on the detailed track chart (Plate 1, pocket).

The subbottom profiles were chiefly run at a 12-second firing rate and alternately gated 6-second sweep. Brief periods at the beginning of line 1 and at sonobuoy stations on lines 18 and 44 had a 6-second firing rate and 6-second sweep. Line 50 was run at a 4-second firing rate and 4-second sweep. The vertical scale shown on the acoustic profiles is two-travel time in seconds. The sparker energy source was generally set at 220 kj, but 80 kj was used on line 50, 120 kj on lines 1 and 48-49, 160 kj on lines 22a and 28, 165 kj on line 18, 180 kj on lines 35 and 40-46, 190 kj on lines 4 and 5, and 215 kj on lines 15 and 16. The filter band pass was generally 125/20 hz but was 98/20 hz for the first 1-1/2 hours on line 1 and 125/16 hz on line 50. The average vertical exaggeration of the sea-floor profile is about 10:1; the range is between 9:1 and 13:1.

Depth Recorder

A 3.5 khz Edo acoustic-reflection system was used as an echo-sounder and shallow-penetration subbottom profiler. Twelve transducers mounted in a sea chest in the ship's hull emitted a pulse signal programmed by a Gifft graphic recorder that provided uncorrected water depths in seconds (two-way travel time). These water depths were transcribed at quarter-hour intervals and, in conjunction with navigation fixes, were computer-processed using corrections from Matthews' tables. Computer output was printed at one-hour intervals and includes the position of each station, the observed depth in seconds, and the corrected depth in meters (Table 1).

Table 1.--Positions and depths expressed in two-way travel time and corrected meters along lines of Leg 1, Bay of Campeche, 1971.

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
1	147	1500	26.4357	96.5019	0.095	72
1	147	1600	26.3149	96.4484	0.095	72
1	147	1700	26.1940	96.3950	0.105	80
1	147	1800	26.0732	96.3415	0.180	137
1	147	1900	25.9462	96.2909	0.380	288
1	147	2000	25.8169	96.2417	0.580	438
1	147	2100	25.6842	96.1952	0.885	666
1	147	2200	25.5524	96.1450	1.242	932
1	147	2300	25.4216	96.0906	1.378	1032
1	148	0000	25.2909	96.0361	1.350	1011
1	148	0100	25.1576	95.9839	1.620	1211
1	148	0200	25.0241	95.9331	2.340	1748
1	148	0300	24.8886	95.8784	3.040	2273
1	148	0400	24.7527	95.8205	3.570	2671
1	148	0500	24.6144	95.7617	3.800	2845
1	148	0600	24.4760	95.7029	3.800	2845
1	148	0700	24.3376	95.6440	4.410	3309
1	148	0800	24.2049	95.5896	4.420	3316
1	148	0900	24.0717	95.5280	4.380	3286
1	148	1000	23.9374	95.4797	4.451	3340
1	148	1100	23.8047	95.4299	4.407	3306
1	148	1200	23.6718	95.3798	4.468	3353
1	148	1300	23.5373	95.3282	4.325	3244
1	148	1400	23.4028	95.2766	4.475	3359
1	148	1500	23.2701	95.2257	4.571	3431
1	148	1600	23.1376	95.1749	4.636	3480
1	148	1700	23.0046	95.1216	4.670	3505
1	148	1800	22.8716	95.0683	4.644	3486
1	148	1900	22.7378	95.0155	4.682	3514
1	148	2000	22.6038	94.9630	4.693	3523
1	148	2100	22.4691	94.9128	4.675	3509
1	148	2200	22.3333	94.8655	4.680	3513
1	148	2300	22.1970	94.8167	4.678	3511
1	149	0000	22.0606	94.7679	4.677	3511
1	149	0100	21.9243	94.7191	4.656	3495
1	149	0200	21.7839	94.6727	4.672	3507
1	149	0300	21.6396	94.6287	4.642	3484
1	149	0400	21.4981	94.5858	4.585	3442
1	149	0500	21.3575	94.5432	4.528	3399
1	149	0600	21.2155	94.5015	4.460	3347
1	149	0700	21.0740	94.4589	4.370	3278
1	149	0800	20.9376	94.4090	4.270	3201
1	149	0900	20.7950	94.3676	4.090	3064

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
2	149	1100	20.6799	94.1638	3.150	2356
2	149	1200	20.6468	94.0429	3.210	2401
2	149	1300	20.6134	93.9196	3.400	2543
2	149	1400	20.5797	93.7960	2.750	2056
2	149	1500	20.5462	93.6749	2.910	2176
2	149	1600	20.5107	93.5595	2.190	1636
2	149	1700	20.4760	93.4412	2.361	1763
2	149	1800	20.4432	93.3166	2.100	1569
2	149	1900	20.4100	93.1971	2.010	1503
2	149	2000	20.3765	93.0785	1.765	1318
2	149	2100	20.3419	92.9440	2.200	1643
2	149	2200	20.3073	92.8095	2.000	1495
2	149	2300	20.2727	92.6750	2.057	1538
2	150	0000	20.2381	92.5405	2.595	1939
2	150	0100	20.2027	92.4011	2.285	1707
2	150	0200	20.1669	92.2668	0.990	745
2	150	0300	20.1281	92.1425	0.165	125
2	150	0400	20.0729	92.0499	0.115	87
3	150	0400	20.0729	92.0499	0.115	87
3	150	0500	20.0036	92.1823	0.207	157
3	150	0600	19.9317	92.3110	1.050	789
3	150	0700	19.8612	92.4409	1.100	827
3	150	0800	19.7924	92.5757	0.590	446
3	150	0900	19.7236	92.7111	0.940	707
3	150	1000	19.6532	92.8451	0.900	677
3	150	1100	19.5828	92.9791	1.078	810
3	150	1200	19.5120	93.1120	0.880	663
3	150	1300	19.4396	93.2413	0.772	582
3	150	1400	19.3677	93.3718	0.687	518
3	150	1500	19.2990	93.4993	0.958	721
3	150	1600	19.2313	93.6253	0.835	629
3	150	1700	19.1641	93.7543	0.715	539
3	150	1800	19.0970	93.8835	0.960	722
3	150	1900	19.0298	94.0120	0.920	692
3	150	2000	18.9621	94.1355	0.950	715
3	150	2100	18.8968	94.2598	0.660	498
3	150	2200	18.8382	94.3886	0.470	356
4	150	2300	18.8002	94.5113	0.780	588
4	151	0000	18.8511	94.6314	0.830	625
4	151	0100	18.9061	94.7550	1.110	834
4	151	0200	18.9596	94.8784	1.417	1061
4	151	0300	19.0099	95.0017	1.700	1270

, '71 LEG 1 - CAMPECHE

AY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
51	0400	19.0602	95.1249	1.870	1397
51	0500	19.1105	95.2481	1.924	1438
51	0600	19.1614	95.3690	1.913	1430
.51	0700	19.2108	95.4924	1.890	1412
151	0800	19.2298	95.6245	1.720	1285
151	0900	19.2300	95.7625	0.650	491
151	1000	19.2343	95.8929	0.090	68
153	1700	19.2701	95.9381	0.040	30
153	1800	19.2010	95.8962	0.067	51
153	1900	19.2058	95.7523	0.200	152
153	2000	19.2159	95.6130	0.950	715
153	2100	19.2178	95.4761	1.990	1488
153	2200	19.2168	95.3311	2.187	1634
153	2300	19.2159	95.1862	2.480	1852
154	0000	19.2150	95.0408	2.510	1875
154	0100	19.2144	94.8918	2.450	1830
154	0200	19.3150	94.8453	2.634	1969
154	0300	19.4599	94.8492	2.992	2237
154	0400	19.6034	94.8546	3.215	2404
154	0500	19.7463	94.8588	3.450	2580
154	0600	19.8876	94.8601	3.575	2675
154	0700	20.0311	94.8617	3.750	2808
154	0800	20.1738	94.8611	3.890	2913
154	0900	20.3166	94.8665	4.010	3003
154	1000	20.4552	94.8725	4.082	3058
154	1100	20.5680	94.9278	4.130	3094
154	1200	20.5636	95.1160	4.000	2995
154	1300	20.5546	95.2895	3.780	2830
154	1400	20.5456	95.4630	3.418	2556
154	1500	20.5376	95.6364	3.138	2347
154	1600	20.5311	95.8097	2.920	2184
154	1700	20.5280	95.9749	2.560	1913
154	1800	20.5254	96.1393	2.253	1683
154	1900	20.5236	96.3051	1.760	1314
154	2000	20.5220	96.4711	0.858	646
154	2100	20.5236	96.6414	0.025	19
154	2200	20.5314	96.8201	0.007	5
154	2300	20.5033	96.8449	0.060	45
155	0000	20.5033	96.7131	0.124	94

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
10	155	0100	20.5033	96.5813	0.550	416
10	155	0200	20.5032	96.4495	0.990	745
10	155	0300	20.4910	96.3058	1.770	1322
10	155	0400	20.4802	96.1620	2.122	1586
10	155	0500	20.4663	96.0255	2.450	1830
10	155	0600	20.4525	95.8880	2.890	2161
10	155	0700	20.4382	95.7480	2.955	2210
10	155	0800	20.4233	95.6102	3.353	2507
10	155	0900	20.4091	95.4756	3.451	2581
10	155	1000	20.3952	95.3440	3.650	2732
10	155	1100	20.3841	95.2158	3.884	2908
10	155	1200	20.3905	95.0798	3.980	2980
10	155	1300	20.4012	94.9429	4.080	3056
10	155	1400	20.4177	94.8038	4.100	3071
10	155	1500	20.4371	94.6615	4.090	3064
10	155	1600	20.4548	94.5178	3.840	2875
10	155	1700	20.4706	94.3725	2.700	2019
10	155	1800	20.4863	94.2272	2.290	1710
10	155	1900	20.4970	94.0777	2.650	1981
10	155	2000	20.5122	93.9251	3.459	2587
11	155	2100	20.4552	93.8938	3.000	2243
12	155	2200	20.4187	94.0150	2.030	1518
12	155	2300	20.4215	94.1763	2.600	1943
12	156	0000	20.4243	94.3375	2.450	1830
12	156	0100	20.4269	94.4983	3.930	2943
12	156	0200	20.4327	94.6616	4.100	3071
12	156	0300	20.4405	94.8200	4.090	3064
12	156	0400	20.4394	94.9828	4.090	3064
12	156	0500	20.4376	95.1465	3.923	2937
12	156	0600	20.4312	95.3166	3.680	2754
12	156	0700	20.4242	95.4862	3.439	2572
12	156	0800	20.4148	95.6486	3.150	2356
12	156	0900	20.4086	95.8082	2.922	2185
12	156	1000	20.4023	95.9700	2.435	1819
12	156	1100	20.3949	96.1323	2.150	1606
12	156	1200	20.3909	96.2967	1.575	1177
12	156	1300	20.3923	96.4646	0.566	428
12	156	1400	20.4000	96.6246	0.170	129
12	156	1500	20.4070	96.7880	0.050	38
14	156	1600	20.3426	96.7714	0.043	32
14	156	1700	20.3535	96.6279	0.120	91

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
14	156	1800	20.3645	96.4844	0.470	356
14	156	1900	20.3643	96.3370	1.335	1000
14	156	2000	20.3611	96.1999	1.837	1372
14	156	2100	20.3573	96.0634	2.303	1720
14	156	2200	20.3498	95.9250	2.720	2034
14	156	2300	20.3423	95.7867	2.945	2202
14	157	0000	20.3347	95.6483	3.121	2334
14	157	0100	20.3274	95.5124	3.540	2648
14	157	0200	20.3206	95.3819	3.619	2708
14	157	0300	20.3163	95.2350	3.859	2889
14	157	0400	20.3123	95.0862	3.964	2968
14	157	0500	20.3192	94.9314	4.000	2995
14	157	0600	20.3293	94.7755	4.000	2995
14	157	0700	20.3395	94.6260	3.900	2920
14	157	0800	20.3465	94.4794	3.425	2561
14	157	0900	20.3510	94.3340	2.750	2056
14	157	1000	20.3548	94.1890	3.180	2378
14	157	1100	20.3586	94.0449	2.670	1996
14	157	1200	20.3623	93.9034	2.000	1495
15	157	1300	20.3118	93.8550	2.135	1595
16	157	1400	20.1833	93.8750	1.972	1474
16	157	1500	20.1895	94.0410	2.104	1572
16	157	1600	20.1940	94.2072	1.956	1462
16	157	1700	20.2006	94.3758	2.300	1718
16	157	1800	20.2087	94.5368	3.000	2243
16	157	1900	20.2178	94.6903	3.880	2905
16	157	2000	20.2257	94.8439	3.942	2952
16	157	2100	20.2363	95.0041	3.910	2928
16	157	2200	20.2318	95.1643	3.856	2887
16	157	2300	20.2273	95.3245	3.654	2735
16	158	0000	20.2222	95.4864	3.225	2412
16	158	0100	20.2149	95.6550	3.116	2330
16	158	0200	20.2073	95.8226	2.830	2116
16	158	0300	20.1993	95.9887	2.615	1954
16	158	0400	20.1965	96.1538	2.050	1532
16	158	0500	20.1943	96.3186	1.120	841
16	158	0600	20.1920	96.4835	0.217	165
16	158	0700	20.1902	96.6139	0.120	91
18	158	0800	20.1788	96.5560	0.090	68
18	158	0900	20.1957	96.4146	0.296	225
18	158	1000	20.1978	96.2729	1.410	1056

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
18	158	1100	20.1995	96.1271	2.205	1647
18	158	1200	20.1996	95.9819	2.634	1969
18	158	1300	20.1976	95.8373	2.929	2190
18	158	1400	20.1948	95.6932	3.130	2341
18	158	1500	20.1920	95.5491	3.167	2368
18	158	1600	20.1891	95.4049	3.578	2677
18	158	1700	20.1906	95.2602	3.774	2826
18	158	1800	20.1977	95.1147	3.880	2905
18	158	1900	20.2079	94.9670	3.890	2913
18	158	2000	20.2205	94.8146	3.920	2935
18	158	2100	20.2303	94.6650	3.740	2800
18	158	2200	20.2394	94.5160	2.800	2094
18	158	2300	20.2482	94.3672	3.074	2299
18	159	0000	20.2537	94.2206	2.410	1800
18	159	0100	20.2587	94.0705	2.168	1620
18	159	0200	20.2633	93.9167	2.625	1962
19	159	0300	20.1175	93.9213	3.120	2333
19	159	0400	20.0518	94.0218	3.570	2671
19	159	0500	20.0566	94.1851	3.560	2663
19	159	0600	20.0619	94.3471	3.258	2436
19	159	0700	20.0640	94.5092	2.100	1569
19	159	0800	20.0649	94.6689	3.570	2671
19	159	0900	20.0731	94.8335	3.775	2827
19	159	1000	20.0813	94.9952	3.760	2815
20	159	1100	20.0868	95.1566	3.771	2824
20	159	1200	20.0865	95.3173	3.525	2636
20	159	1300	20.0862	95.4780	3.256	2435
20	159	1400	20.0860	95.6387	3.020	2258
20	159	1500	20.0857	95.7994	2.866	2143
20	159	1600	20.0855	95.9611	2.684	2006
20	159	1700	20.0855	96.1247	1.955	1461
20	159	1800	20.0884	96.2886	0.954	718
20	159	1900	20.0978	96.4508	0.130	99
21	159	2000	20.0925	96.6029	0.030	22
22	159	2100	19.9972	96.5316	0.050	38
22	159	2200	20.0032	96.3913	0.130	99
22	159	2300	20.0092	96.2510	0.912	686
22	160	0000	20.0124	96.1089	1.850	1382
22	160	0100	20.0077	95.9620	2.527	1888
22	160	0200	20.0019	95.8158	2.765	2068

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
22	160	0300	19.9943	95.6707	2.852	2133
22	160	0400	19.9866	95.5259	3.190	2386
22	160	0500	19.9790	95.3812	3.438	2571
22	160	0600	19.9775	95.2341	3.559	2662
22	160	0700	19.9755	95.0878	3.651	2732
22	160	0800	19.9801	94.9376	3.656	2736
22	160	0900	19.9845	94.7836	3.510	2625
22	160	1000	19.9988	94.6484	2.950	2206
22	160	1100	20.0242	94.5517	3.760	2815
23	160	1200	20.0658	94.5517	3.300	2468
23	160	1300	20.0718	94.4999	3.038	2272
24	160	1400	20.0664	94.5029	3.438	2571
24	160	1500	20.0571	94.5305	3.000	2243
24	160	1600	20.0500	94.5343	3.000	2243
25	160	1700	20.0466	94.5224	2.190	1636
25	160	1800	20.0469	94.4904	2.320	1733
25	160	1900	20.0833	94.4783	2.850	2131
25	160	2000	20.0799	94.5203	3.053	2283
26	160	2100	20.0677	94.5491	3.800	2845
26	160	2200	20.0686	94.5075	2.800	2094
27	160	2300	20.0704	94.4735	2.592	1937
27	161	0000	20.0752	94.4882	2.024	1513
28	161	0300	20.0366	94.5595	2.900	2169
28	161	0400	19.9917	94.5024	3.060	2288
28	161	0500	20.0022	94.3624	2.706	2023
28	161	0600	20.0145	94.2151	1.610	1203
28	161	0700	20.0251	94.0705	1.951	1458
28	161	0800	20.0333	93.9300	2.200	1643
30	161	0900	19.9172	93.9432	1.600	1196
30	161	1000	19.9235	94.1019	2.330	1740
30	161	1100	19.9304	94.2606	2.440	1822
30	161	1200	19.9383	94.4193	2.640	1973
30	161	1300	19.9465	94.5762	2.388	1783
30	161	1400	19.9551	94.7311	3.595	2690
30	161	1500	19.9656	94.8893	3.634	2719
30	161	1600	19.9758	95.0499	3.598	2692
30	161	1700	19.9799	95.2123	3.650	2732

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
30	161	1800	19.9819	95.3735	3.435	2569
30	161	1900	19.9788	95.5345	3.205	2397
30	161	2000	19.9747	95.6931	2.790	2086
30	161	2100	19.9711	95.8480	2.630	1966
30	161	2200	19.9721	96.0049	2.288	1709
30	161	2300	19.9754	96.1630	1.430	1070
30	162	0000	19.9845	96.3271	0.170	129
30	162	0100	20.0052	96.5035	0.066	50
31	162	0200	19.9265	96.4702	0.050	38
32	162	0300	19.8354	96.3954	0.060	45
32	162	0400	19.8436	96.2579	0.150	114
32	162	0500	19.8520	96.1182	1.300	975
32	162	0600	19.8561	95.9821	2.060	1540
32	162	0700	19.8530	95.8489	2.340	1748
32	162	0800	19.8504	95.7108	2.605	1947
32	162	0900	19.8474	95.5727	2.830	2116
32	162	1000	19.8445	95.4347	3.283	2455
32	162	1100	19.8415	95.2966	3.416	2555
32	162	1200	19.8452	95.1557	3.480	2602
32	162	1300	19.8533	95.0129	3.495	2614
32	162	1400	19.8651	94.8692	3.545	2652
32	162	1500	19.8780	94.7252	3.450	2580
32	162	1600	19.8894	94.5824	2.250	1680
32	162	1700	19.9004	94.4399	2.124	1587
32	162	1800	19.9080	94.2973	2.590	1935
32	162	1900	19.9118	94.1546	2.250	1680
32	162	2000	19.9155	94.0120	1.640	1225
33	162	2100	19.8792	93.8608	2.150	1606
33	162	2200	19.7478	93.9108	2.065	1544
34	162	2300	19.7146	94.0367	2.150	1606
34	163	0000	19.7173	94.1878	1.880	1405
34	163	0100	19.7192	94.3445	1.730	1292
34	163	0200	19.7246	94.4993	1.750	1307
34	163	0300	19.7303	94.6546	2.470	1845
34	163	0400	19.7365	94.8109	3.420	2558
34	163	0500	19.7427	94.9672	3.360	2513
34	163	0600	19.7489	95.1235	3.410	2550
34	163	0700	19.7517	95.2787	3.395	2539
34	163	0800	19.7465	95.4316	3.250	2430
34	163	0900	19.7428	95.5803	2.710	2026

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
34	163	1000	19.7441	95.7334	2.390	1785
34	163	1100	19.7455	95.8898	1.900	1420
34	163	1200	19.7467	96.0501	1.270	953
34	163	1300	19.7516	96.2060	0.158	120
34	163	1400	19.7649	96.3522	0.040	30
36	163	1500	19.6775	96.3442	0.040	30
36	163	1600	19.6760	96.2061	0.130	99
36	163	1700	19.6808	96.0656	0.500	379
36	163	1800	19.6832	95.9230	1.610	1203
36	163	1900	19.6749	95.7744	2.090	1562
36	163	2000	19.6644	95.6265	2.240	1673
36	163	2100	19.6562	95.4800	2.610	1950
36	163	2200	19.6487	95.3340	3.215	2404
36	163	2300	19.6412	95.1879	3.270	2445
36	164	0000	19.6370	95.0422	3.288	2459
36	164	0100	19.6385	94.8972	3.283	2455
36	164	0200	19.6394	94.7531	3.177	2376
36	164	0300	19.6400	94.6097	1.580	1181
36	164	0400	19.6396	94.4675	2.300	1718
36	164	0500	19.6351	94.3304	1.515	1133
36	164	0600	19.6288	94.1923	1.810	1352
36	164	0700	19.6214	94.0563	1.420	1063
36	164	0800	19.6135	93.9190	1.630	1218
38	164	0900	19.5704	94.0302	1.670	1248
38	164	1000	19.5680	94.1861	1.880	1405
38	164	1100	19.5649	94.3440	2.250	1680
38	164	1200	19.5663	94.5014	1.735	1296
38	164	1300	19.5703	94.6586	2.530	1890
38	164	1400	19.5770	94.8139	3.154	2359
38	164	1500	19.5844	94.9687	3.212	2402
38	164	1600	19.5922	95.1230	3.210	2401
38	164	1700	19.5999	95.2769	3.155	2359
38	164	1800	19.6019	95.4308	2.570	1920
38	164	1900	19.6019	95.5863	2.480	1852
38	164	2000	19.6007	95.7448	2.000	1495
38	164	2100	19.6005	95.9071	1.420	1063
38	164	2200	19.6035	96.0713	0.235	179
38	164	2300	19.6072	96.2395	0.080	61
39	165	0000	19.5480	96.3149	0.040	30
39	165	0100	19.5063	96.2539	0.050	38

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
40	165	0300	19.5108	95.9742	0.310	236
40	165	0400	19.5069	95.8296	1.500	1121
40	165	0500	19.5023	95.6826	2.097	1567
40	165	0600	19.4960	95.5290	2.310	1725
40	165	0700	19.4897	95.3754	2.870	2146
40	165	0800	19.4834	95.2219	3.110	2326
40	165	0900	19.4812	95.0681	3.090	2311
40	165	1000	19.4837	94.9140	2.995	2240
40	165	1100	19.4856	94.7613	2.935	2195
40	165	1200	19.4869	94.6101	2.338	1746
40	165	1300	19.4879	94.4620	2.100	1569
40	165	1400	19.4899	94.3132	1.865	1394
40	165	1500	19.4902	94.1668	1.832	1369
40	165	1600	19.4869	94.0256	1.534	1147
41	165	1700	19.4414	93.9312	1.228	922
42	165	1800	19.3863	94.0247	1.220	916
42	165	1900	19.3861	94.1789	1.790	1337
42	165	2000	19.3873	94.3343	1.565	1170
42	165	2100	19.3903	94.4907	1.850	1382
42	165	2200	19.3944	94.6472	2.290	1710
42	165	2300	19.3985	94.8038	2.850	2131
42	166	0000	19.4024	94.9584	2.867	2144
42	166	0100	19.4044	95.1108	3.000	2243
42	166	0200	19.4014	95.2644	2.790	2086
42	166	0300	19.3959	95.4268	2.560	1913
42	166	0400	19.3906	95.5895	2.230	1666
42	166	0500	19.3882	95.7563	1.530	1144
42	166	0600	19.3870	95.9216	0.240	183
42	166	0700	19.3860	96.0886	0.095	72
43	166	0800	19.3882	96.2407	0.042	32
44	166	0900	19.3324	96.1293	0.065	49
44	166	1000	19.3373	95.9912	0.131	99
44	166	1100	19.3468	95.8594	0.295	224
44	166	1200	19.3526	95.7199	1.688	1261
44	166	1300	19.3555	95.5744	2.190	1636
44	166	1400	19.3553	95.4234	2.490	1860
44	166	1500	19.3546	95.2717	2.666	1993
44	166	1600	19.3558	95.1187	2.896	2166
44	166	1700	19.3579	94.9651	2.805	2098
44	166	1800	19.3635	94.8170	2.740	2049

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
44	166	1900	19.3710	94.6675	2.195	1640
44	166	2000	19.3806	94.5273	1.355	1015
44	166	2100	19.3886	94.3897	1.950	1458
44	166	2200	19.3965	94.2520	1.260	945
44	166	2300	19.4050	94.1140	1.300	975
44	167	0000	19.4149	93.9754	1.254	941
45	167	0100	19.2878	93.9408	1.325	993
45	167	0200	19.1479	93.9400	1.060	797
45	167	0300	19.0081	93.9388	0.725	547
45	167	0400	18.8683	93.9443	0.670	506
45	167	0500	18.7285	93.9516	0.240	183
45	167	0600	18.5815	93.9598	0.105	80
46	167	0700	18.4893	94.0106	0.060	45
46	167	0800	18.5177	94.1558	0.090	68
46	167	0900	18.5461	94.3070	0.100	76
46	167	1000	18.5837	94.4585	0.120	91
46	167	1100	18.6239	94.6083	0.126	96
46	167	1200	18.6660	94.7569	0.129	98
46	167	1300	18.7056	94.9102	0.123	93
46	167	1400	18.7396	95.0625	0.107	81
46	167	1500	18.7728	95.2143	0.095	72
46	167	1600	18.8041	95.3647	0.090	68
46	167	1700	18.8353	95.5152	0.080	61
46	167	1800	18.8847	95.6610	0.070	53
47	167	1900	18.9243	95.6642	0.073	55
47	167	2000	18.9206	95.5167	0.120	91
47	167	2100	18.9179	95.3729	0.215	163
47	167	2200	18.9153	95.2291	0.360	273
47	167	2300	18.9127	95.0853	0.876	660
47	168	0000	18.9109	94.9426	1.029	774
47	168	0100	18.9098	94.8008	1.202	902
47	168	0200	18.9119	94.6549	0.780	588
47	168	0300	18.9050	94.5050	0.857	645
47	168	0400	18.9102	94.3561	0.690	521
47	168	0500	18.9417	94.2368	0.670	506
48	168	0600	19.0493	94.2406	1.010	760
49	168	0700	19.0880	94.3569	1.340	1004
49	168	0800	19.0923	94.5107	1.470	1100
49	168	0900	19.0965	94.6645	1.456	1089

I.D.O.E. '71 LEG 1 - CAMPECHE

LINE	DAY	TIME (Z)	LATITUDE (NORTH)	LONGITUDE (WEST)	DEPTH (SEC)	DEPTH (M)
49	168	1000	19.1007	94.8183	2.052	1534
49	168	1100	19.1050	94.9721	2.174	1624
49	168	1200	19.1058	95.1269	2.040	1525
49	168	1300	19.1055	95.2819	1.705	1274
49	168	1400	19.1003	95.4357	1.293	970
49	168	1500	19.1059	95.5907	0.675	509
49	168	1600	19.1084	95.7452	0.080	61
49	168	1700	19.1424	95.8745	0.060	45
50	171	0200	19.2947	95.8919	0.167	127
50	171	0300	19.3560	95.7669	1.455	1089
50	171	0400	19.4146	95.6410	1.810	1352
50	171	0500	19.4708	95.5144	2.275	1699
50	171	0600	19.5221	95.3864	2.818	2107
50	171	0700	19.5723	95.2591	2.823	2111
50	171	0800	19.6225	95.1458	3.238	2421
50	171	0900	19.6724	95.0398	3.285	2457
50	171	1000	19.7222	94.9354	3.390	2535
50	171	1100	19.7769	94.8322	3.463	2590
50	171	1200	19.8338	94.7295	3.104	2321
50	171	1300	19.8914	94.6326	2.616	1955
50	171	1400	19.9493	94.5370	1.970	1473
50	171	1500	20.0068	94.4422	2.566	1917
50	171	1600	20.0616	94.3548	2.370	1770
50	171	1700	20.1168	94.2645	2.596	1940
50	171	1800	20.1670	94.1814	1.980	1480
50	171	1900	20.2121	94.1129	2.096	1567
50	171	2000	20.2592	94.0440	2.556	1910
50	171	2100	20.3062	93.9750	2.000	1495
50	171	2200	20.3533	93.9061	2.109	1576
50	171	2300	20.4090	93.7782	2.405	1796
50	172	0000	20.4360	93.6626	2.923	2186