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TEXAS A&M UNIVERSITY RADIOCARBON DATES IV

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Organic and carbonate carbon in sediments deposited in the Cariaco Basin and on the Mississippi River Delta and the total dissolved inorganic carbon in four water column profiles comprise the samples in this list. Except as noted below the samples were processed using the benzene synthesis and other procedures described by Mathews, *et al* (1972).

The Mississippi Delta borehole samples contained low amounts of organic and inorganic carbon so that as little as 0.25g of carbon were obtained in combusting the maximum amount of sediment (typically 60g dry weight). The standard benzene synthesis procedure, with "normal" amounts of carbon (1-3g), results in a yield of 85 to 95% (carbon as benzene/carbon as CO_2). When processing smaller samples (less than 1g), the yield drops off rapidly with sample size. This loss of efficiency is due primarily to the volume within the vacuum system (designed to deal with several liters of gas), the inaccuracy of the vacuum gauges and evaporative losses of benzene during transfers. In an attempt to analyze these small samples, a dilution technique was used to bring the amount of carbon to be processed up to a minimum of one gram. As part of the technique, modifications were made to the system to 1) collect and use all of the sample CO_2 introduced into the system and 2) measure more accurately the amount of sample CO_2 obtained.

The necessary modifications, referred to in Figure 1, are 1) the addition of a cold finger (G in Fig 1) within the storage area to draw all of the sample CO_2 out of the collection traps, 2) the addition of a mercury manometer (C in Fig 1) to allow more accurate pressure measurement, and 3) the connection of tubing to allow the metering of CO_2 from a compressed gas tank through a needle valve (E in Fig 1). A second Hg manometer was connected to the collection trap area to assure complete transfer of CO_2 from the traps to the storage flask.

Only enough CO_2 was allowed to enter the system to bring the total amount of carbon to one gram. It was judged best to restrict the amount of dilution gas to minimize the effects in the statistical calculations.

Counting time was adjusted using the background level and sample activity so that the net count rate error was 2%, with a maximum counting time of 10,000 minutes. Ages were calculated using a ^{14}C half-life of 5568 years. Indicated errors for the ages are one standard deviation.

SAMPLE DESCRIPTIONS

1. OCEAN SEDIMENT SAMPLES

Cariaco Basin series

Sediments were coll by gravity coring at 3 locations within anoxic level of basin, ca 400m to basin floor. Unless otherwise noted, data is for combusted carbonate-free organic material within homogenized 10cm

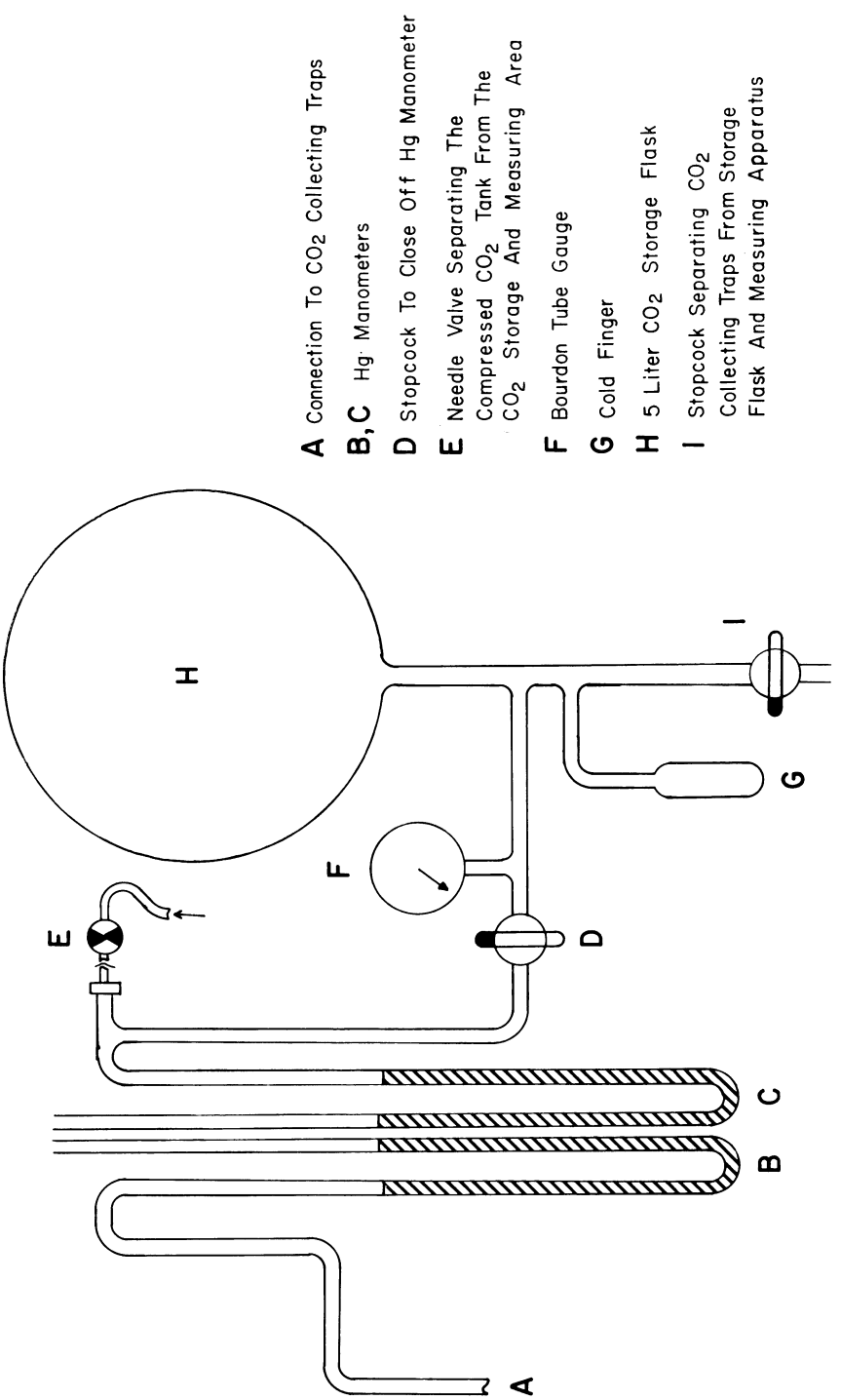

Fig. 1. Schematic of CO_2 storage and measuring section on the benzene preparation system showing modifications for handling small amounts of sample carbon.

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interval. $\delta^{13}C$, relative to PDB, for top, middle and bottom samples in each core were determined by Gormly (1975). Values for samples listed here were interpolated assuming a linear change from datum point to datum point. Samples were coll 1972 by B J Presley, L Jeffrey, and J Gormly on Texas A&M Cruise 72-A-16.

Station 2, Median Ridge (10° 41′ N, 65° 04′ W), water depth 850m.

TAM-332. 20 to 30cm **1580 ± 180**
$\delta^{13}C = -19.9‰$

TAM-342. 40 to 50cm **2160 ± 180**
$\delta^{13}C = -20.0‰$

TAM-362. 50 to 60cm **2280 ± 160**
$\delta^{13}C = -20.1‰$

TAM-333. 80 to 90cm **3130 ± 170**
$\delta^{13}C = -20.2‰$

TAM-360. 100 to 110cm **4510 ± 150**
$\delta^{13}C = -20.3‰$

TAM-324. 100 to 110cm, carbonate **5010 ± 180**
Coarse (>62μm) calcium carbonate.

TAM-341. 120 to 130cm **5490 ± 240**
$\delta^{13}C = -20.2‰$

TAM-329. 130 to 140cm **5530 ± 190**
$\delta^{13}C = -20.5‰$

TAM-323. 130 to 140cm, carbonate **6475 ± 100**
Coarse (>62μm) calcium carbonate.

Station 3, Eastern Deep (10° 34′ N, 64° 45′ W), water depth 1330m.

TAM-343. 0 to 10cm **1390 ± 200**
$\delta^{13}C = -20.6‰$

TAM-364. 20 to 30cm **1750 ± 140**
$\delta^{13}C = -20.6‰$

TAM-330. 20 to 30cm, carbonate **1280 ± 150**
$\delta^{13}C = 0‰$
Coarse (>62μm) calcium carbonate.

TAM-348. 40 to 50cm **1580 ± 160**
$\delta^{13}C = -20.5‰$

TAM-345. 80 to 90cm **1650 ± 190**
$\delta^{13}C = -20.5‰$

TAM-349. 110 to 120cm **1690 ± 130**
$\delta^{13}C = -20.5‰$

TAM-363. 120 to 130cm **2100 ± 170**
$\delta^{13}C = -20.5‰$

TAM-344. 140 to 150 cm **2380 ± 180**
$\delta^{13}C = -20.5‰$

Station 4, Western Deep (10° 38′ N, 65° 37′ W), water depth 1350m.

TAM-358. 10 to 20cm **710 ± 180**
$\delta^{13}C = -20.2‰$

TAM-352. 30 to 40cm **1010 ± 180**
$\delta^{13}C = -20.0‰$

TAM-354. 60 to 70cm **2430 ± 170**
$\delta^{13}C = -19.9‰$

TAM-356. 90 to 100cm **2370 ± 170**
$\delta^{13}C = -20.1‰$

TAM-361. 100 to 110cm **2440 ± 140**
$\delta^{13}C = -20.2‰$

TAM-357. 130 to 140cm **3210 ± 190**
$\delta^{13}C = -20.3‰$

TAM-355. 150 to 160cm **2990 ± 200**
$\delta^{13}C = -20.4‰$

Mississippi Delta Borehole series

This borehole (BH-1A) was drilled as part of sediment mass movement study by US Geol Survey. Sediment was characteristically low in both organic and inorganic carbon except for shell hash layer at ca 37m (TAM-387). Borehole was in pro-delta facies, Block 47 of South Pass area (28° 52′ 38.05″ N, 89° 09′ 46.81″ W). All dates are for carbonate-free organic material except TAM-387. Samples were coll 1974 by Marine Geol Lab, USGS Corpus Christi, Texas and subm by W R Bryant, Texas A&M Univ, Dept Oceanog, College Station, Texas.

TAM-375. BH-1A-11 3.4m **3010 ± 140**
$\delta^{13}C = -21.6‰$

TAM-383. BH-1A-23 7.0m **3980 ± 140**
$\delta^{13}C = -23.3‰$

TAM-373. BH-1A-35 10.7m **4540 ± 170**
$\delta^{13}C = -22.9‰$

TAM-382. BH-1A-47 14.3m **4350 ± 160**
$\delta^{13}C = -23.2‰$

TAM-399. BH-1A-51 15.5m **4440 ± 170**
$\delta^{13}C = -23.4‰$

TAM-377. BH-1A-61 18.6m **5200 ± 290**
$\delta^{13}C = -23.6‰$

TAM-423. BH-1A-96 29.3m **6270 ± 290**
$\delta^{13}C = -22.5‰$

TAM-432. BH-1A-121 36.9m **4680 ± 180**
$\delta^{13}C = -21.3‰$

TAM-387. BH-1A-121 36.9m, carbonate **7030 ± 130**
$\delta^{13}C = 0‰$ *EST*

Shell hash-small bivalves.

TAM-381. BH-1A-141 43.0m **16,970 ± 740**
$\delta^{13}C = -25.1‰$

TAM-378. BH-1A-178 54.2m **17,370 ± 1300**
$\delta^{13}C = -24.4‰$

II. SEA WATER SAMPLES

Water samples coll 1975 on Texas A&M Cruise 75-G-8 on *R/V Gyre* by D Reid.

Station 3 (28° 20.5′ N, 92° 36.5′ W).

TAM-301. 3m $\delta^{14}C = 83 \pm 12‰$
$\Delta = 27 \pm 12‰$

TAM-302. 18m $\delta^{14}C = 291 \pm 8‰$
$\Delta = 224 \pm 8‰$

TAM-305. 46m Barrel 2 $\delta^{14}C = 302 \pm 7‰$
$\Delta = 234 \pm 7‰$

TAM-306. 46m Barrel 1 $\delta^{14}C = 330 \pm 8‰$
$\Delta = 261 \pm 8‰$

East Cameron Bank Station (28° 31.2′ N, 92° 24.9′ W).

TAM-307. 4m $\delta^{14}C = 304 \pm 8‰$
$\Delta = 236 \pm 8‰$

Station 22 (28° 05.5′ N, 91° 05′ W).

TAM-308. SFC Barrel 2 $\delta^{14}C = 278 \pm 9‰$
$\Delta = 212 \pm 9‰$

TAM-308. SFC Barrel 3 $\delta^{14}C = 258 \pm 9‰$
$\Delta = 193 \pm 9‰$

Station 24 (28° 11.5′ N, 91° 28.1′ W).

TAM-310. SFC $\delta^{14}C = 243 \pm 8‰$
$\Delta = 179 \pm 8‰$

TAM-311. SFC No. 1 $\delta^{14}C = 255 \pm 8‰$
$\Delta = 190 \pm 8‰$

Water samples coll 1975 on Texas A&M Cruise 75-G-13 on *R/V Gyre* by W Sackett.

Station 18 (23° 28.2′ N, 92° 37.65′ W).

TAM-314. SFC $\delta^{14}C = 213 \pm 10‰$, $\Delta = 150 \pm 10‰$

East Cameron Bank Station (28° 31.2′ N, 92° 24.9′ W).

TAM-307. 4m $\delta^{14}C = 304 \pm 8‰$, $\Delta = 236 \pm 8‰$

Station 22 (28° 05.5′ N, 91° 05′ W.)

TAM-308. SFC Barrel 2 $\delta^{14}C = 278 \pm 9‰$, $\Delta = 212 \pm 9‰$

TAM-309. SFC Barrel 3 $\delta^{14}C = 258 \pm 9‰$, $\Delta = 193 \pm 9‰$

Station 24 (28° 11.5′ N, 91° 28.1′ W).

TAM-310. SFC $\delta^{14}C = 243 \pm 8‰$, $\Delta = 179 \pm 8‰$

TAM-311. SFC No. 1 $\delta^{14}C = 255 \pm 8‰$, $\Delta = 190 \pm 8‰$

Water samples coll 1975 on Texas A&M Cruise 75-G-13 on *R/V Gyre* by W Sackett.

Station 18 (23° 28.2′ N, 92° 37.65′ W).

TAM-314. SFC $\delta^{14}C = 213 \pm 10‰$, $\Delta = 150 \pm 10‰$

TAM-347. SFC #2 $\delta^{14}C = 252 \pm 21‰$, $\Delta = 187 \pm 21‰$

TAM-315. 150m $\delta^{14}C = 214 \pm 10‰$, $\Delta = 154 \pm 10‰$

TAM-320. 600m $\delta^{14}C = -22 \pm 9‰$, $\Delta = -70 \pm 9‰$

TAM-339. 900m $\delta^{14}C = -10 \pm 19‰$, $\Delta = -59 \pm 19‰$

TAM-368. 900m #2 $\delta^{14}C = -14 \pm 17‰$, $\Delta = -64 \pm 17‰$

TAM-346. 2500m $\delta^{14}C = -12.5 \pm 22‰$, $\Delta = -62 \pm 22‰$

References

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