



DISCUSSION

This map is one of a set of six environmental geologic maps for the Corpus Christi 1° x 2° quadrangle, Texas. The six maps constitute a marine geologic atlas that has been designed to integrate a variety of environmental data and to show the fundamental geologic and associated processes involved in the building and evolution of the Continental Shelf.

The topical maps interrelate data on water circulation and sedimentation, trace metals, geochemistry, biogeology, sea-level change, and deformational movements within the Continental Shelf, including folding, faulting, diapirism, and slumping. The types of data portrayed on individual maps are those that when a cause-and-effect interrelationship in the environment. For example, amounts of trace elements and numbers of invertebrates that live in bottom sediments are both closely related to the grain size or texture of the sediments. Likewise, the sediment-deposition rate is dependent on the speed and direction of oceanographic currents (both surface and subsurface). The maps are organized to emphasize the interactions of processes as a function of time and to demonstrate the long-term effects of the related processes. Thus, map A covers the most fundamental aspect of marine geology, the rate at which sediment introduced to the ocean is spread by its transporting medium, water. The rate of spreading varies from minutes and hours to seasons and years; therefore, yearly rates of sediment deposition are related to the movement of water averaged in both yearly and seasonal increments. Map B shows trace-metal data for surficial bottom sediments (sampled to a depth of 5 cm), and the variations in the texture and type of sediment deposited over hundreds or thousands of years, as revealed by gravity cores that penetrated to depths from a few tens of centimeters to 2 m. The amount of sediment deposited over the Continental Shelf and the extent and magnitude of faulting since the last low stand of sea level, about 18,000 years ago, are shown on map D. Map E shows paleogeography of the shelf when it was exposed as land. The cumulative deformation caused by the interaction of sediment loading, diapirism, and sea-level changes over the past several hundred thousand years are shown on map F.

The maps of the Corpus Christi 1° x 2° quadrangle include the Federal lease block grid and bathymetry, so that the data and interpretations can be easily tied to a specific legal geographic entity within the region at a scale large enough to permit reasonable accuracy of location. These maps provide a summary state-of-the-art inventory of the segment of the Continental Shelf located in the Corpus Christi 1° x 2° quadrangle that can be used in planning specific site studies as well as more detailed topographic investigations.

SUPPLEMENTARY READINGS

Berryhill, H. L., Jr., editor, 1977a, Environmental studies, south Texas outer continental shelf, 1975—An atlas and integrated summary: U.S. Geological Survey, report to the U.S. Bureau of Land Management, contract 08550-MUS-20, 303 p.

1977b, Environmental studies, south Texas outer continental shelf, 1976—Geology: Reston, Va., U.S. Geological Survey, available only from U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22161, as Report PB 277-337/AS, 626 p.

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Bright, T. J., Razak, Richard, editors, 1976, A biological and geological reconnaissance of selected topographical features on the Texas continental shelf: Texas A&M Research Foundation and the Texas A&M University Department of Oceanography, report to the U.S. Bureau of Land Management contract 08550-CTS-4, 377 p.

Parker, R. H., 1960, Ecology and distributional patterns of marine macro-invertebrates, northern Gulf of Mexico in Shepard, F. P., and others, eds., Recent sediments, northwest Gulf of Mexico: Tulsa, Oklahoma, American Association of Petroleum Geologists, Special Publication, p. 352-357.

Shepard, F. P., Moore, D. G., 1955, Central Texas coast sedimentation—Characteristics of sedimentary environment, Recent history, and diagenesis: American Association of Petroleum Geologists Bulletin, v. 39, no. 8, p. 1463-1593.

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EXPLANATION

APPROXIMATE POSITION OF FORMER SHORELINE DURING LOW STAND OF SEA LEVEL—Occurred about 18,000 years before present during the Wisconsin Glaciation. The area between the ancient shoreline and the present shoreline was exposed as part of the coastal plain.

GEOMORPHIC FEATURES OF EMERGED CONTINENTAL SHELF

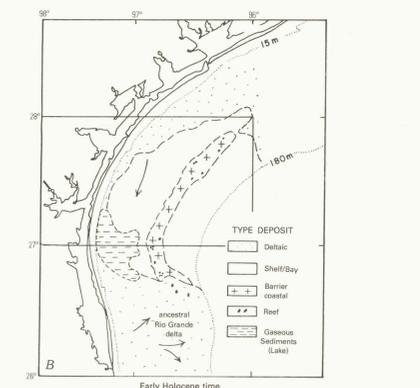
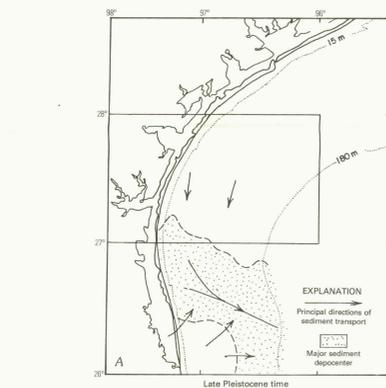
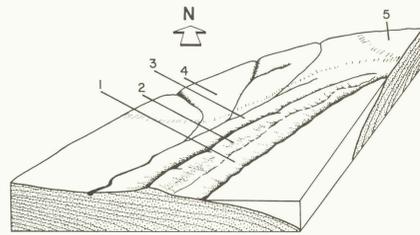
1 Coastal lowland

2 Topographic ridge of low relief—Slightly steeper along the western side, amount of relief decreases northward. Dashed line indicates general outline of carbonate reefs buried beneath Holocene sediments; black indicates outcrop of reef. The reefs grew along the topographic ridge after sea level reached a sillstand, 40-50 m above low stand.

3 Broad valley of low relief eroded by ancient stream—Channeled in an approximate position shown on map.

4 Coastal plain surface of very low relief incised by river channels during low stand of sea level—Stream channels were downed and areas became a coastal lowland and fluvial plain marked by thin coalescing deltaic lobes when the sea rose to a sillstand 40-50 m above the low stand. Dark yellow areas indicate general positions of major stream channels that flowed during the low stand; relief was very low in northeastern part of area even during the low stand so dark yellow area represents a broad distributary stream or this deltaic system.

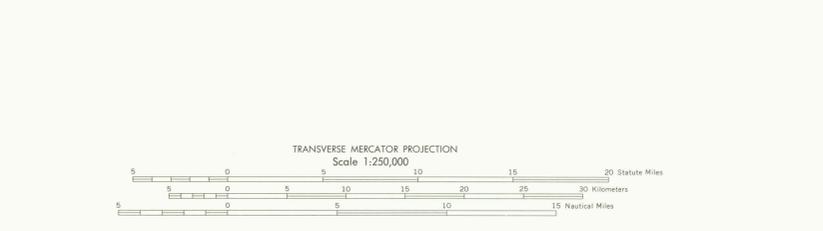
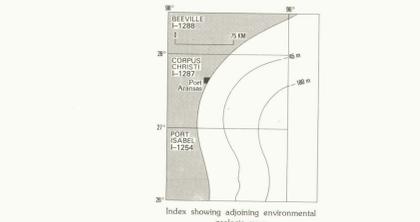
5 Delta plain—Southwestern edge of the ancestral Colorado-Brazos River delta that was built outward across the emerged Continental Shelf during the low stand of sea level. The late Pleistocene sedimentary structure is similar to that of the ancestral Rio Grande delta.



Regional summary maps comparing the paleogeographic relationship during the A, late Pleistocene and B, early Holocene along the south Texas outer Continental Shelf. Outline of Corpus Christi quadrangle shown.

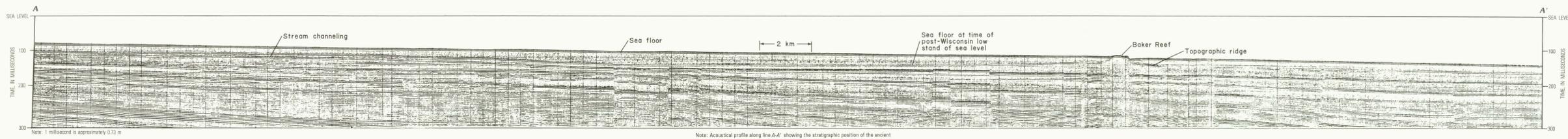
EVALUATION OF BATHYMETRIC SURVEY ACCURACY

SURVEY NUMBER	SURVEY DATE	SCALE	SURVEY LINE SPACING (NAUT. MILES)	HORIZONTAL POSITION (METERS)
H-8012	1939	1:10,000	0.2	15-30
H-8613	1934	1:10,000	0.2	15-30
H-5663	1934-35	1:20,000	0.3	20-40
H-5664	1934-35	1:20,000	0.2	15-20-40
H-8394	1938	1:20,000	0.7	15-20-40
H-8395	1938	1:20,000	0.4	15-20-40
H-8396	1938	1:20,000	0.5	15-20-40
H-6397	1938	1:20,000	0.6	17-20-40
H-6401	1938	1:40,000	2.2	30-100
H-6422	1938	1:40,000	1.2	28-30-100
H-6403	1938	1:40,000	4.1	30-100
H-6404	1938	1:80,000	5.5	210-400
H-6405	1938	1:80,000	10	200-400
H-6406	1938	1:80,000	0.8	124-400
H-6407	1938	1:80,000	3.6	170-400
H-6408	1939	1:80,000	6.0-16.3	600-1600
H-8002	1968	1:20,000	1.6	22-20-40
H-8005	1968	1:20,000	1.6	43-20-40



Base from U.S. National Ocean Survey.
Base map information including bathymetry, compiled by the U.S. National Ocean Survey from NOS hydrographic surveys supplemented by hydrographic information from other sources.
Bathymetric contour intervals: 10 meters to the 200-meter depth, supplemented by 2-meter intervals, thence 50 meters to maximum depth. Datum MHW.
Universal Transverse Mercator Grid, Zone 14; 10,000-meter ticks (—) are shown on the coastline.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1981—08018
Compiled from data by H. L. Berryhill, Jr. in 1978.



Note: Acoustical profile along line A-A' showing the stratigraphic position of the ancient land surface depicted on the map above. Maniplotter with output of 780 inches; the sound analog was recorded at a 1.0 second sweep rate in a filter band range of 60-100 Hz.

MAP SHOWING PALEO GEOGRAPHY OF THE CONTINENTAL SHELF DURING THE LOW STAND OF SEA LEVEL, WISCONSIN GLACIATION, CORPUS CHRISTI 1° x 2° QUADRANGLE, TEXAS

By
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1981