

# SEDIMENTARY ENVIRONMENTS ALONG THE TEXAS COAST <sup>1</sup>

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## ABSTRACT

As a result of more than three years study of the sediments along the Texas coast centering around Rockport and Aransas Pass it has been possible to determine the special characteristics of a variety of sedimentary environments in the bays, on the barrier islands, and across the continental shelf. Altogether 16 environments have been recognized and it is felt that the sediments of each are sufficiently distinctive so that the environment of most samples can be diagnosed correctly although, as would be expected, there are borderline cases between two contiguous environments.

The characterization of environments has been the result of a cooperative study among various staff members of Scripps Institution and, to a limited extent, scientists from other institutions. Thus the work has involved size analyses of large numbers of samples; binocular examination of the sievings of the coarse fraction; counts of the Foraminifera, Ostracods, macroorganisms, bacteria and microfossils; study of the salinities of bays and of the interstitial waters of the sediments along with measurements of pH and Eh in the sediments; analysis of the heavy minerals; analysis of the clay minerals; study of such chemical properties as carbonate nitrogen and carbon content; and special studies of the sediments such as roundness, orientation, and minor structures as shown by cores.

Using these and other techniques it is found that a variety of influences are operating on the sediments to give them environmental characteristics; such influences as the nearness to entering streams or to tidal inlets, the salinity of the water in which deposition is taking place, the water depths, the exposure to wave and current effects, and the prevailing wind directions. Among the characteristics which appear to be most reliable are (1) glauconite and echinoid fragments as indicators of open marine conditions, (2) wood fibres and ferruginous nodules as indicators of nearness to stream mouths, (3) pelagic Foraminifera as indicators of outer shelf conditions, and (4) high terrigenous sand content as an indicator of barrier island or nearshore conditions.

Although most studied samples have been from the Rockport-Aransas Pass area, a sufficient number have been compared from a variety of other localities along the Texas coast to indicate that similar characteristics will serve to distinguish the same general bay, barrier island, and shelf conditions from other depositional localities. By boring in the Recent down to depths of almost 100 feet it has been found that the same characteristics can be found in underlying sediments. Most of the borings were made in the Rockport area but a number of borings from other localities along the Texas coast, supplied by various petroleum companies, show that the same carry-over from the study of modern sediments can be made. Stratigraphically it is found that deposition similar to the present has been going on for some thousands of years in the area. Ages are partly checked by carbon 14 determinations.

<sup>1</sup> This investigation has been supported by grants from the American Petroleum Institute, Project 51.