

# ORGANIC MATTER IN BOTTOM SEDIMENTS, CHOCTAWHATCHEE BAY, FLORIDA

JAMES G. PALACAS  
U.S. Geological Survey  
Denver, Colo.

## ABSTRACT

Choctawhatchee Bay, located in the panhandle of northwest Florida, is one of many estuaries that border the northern Gulf of Mexico. A geochemical study of the organic matter of this modern environment was initiated as part of a broader research program to obtain a better understanding of the nature of organic materials in ancient environments. In addition to the brackish-water bay itself, other contiguous depositional environments were sampled for comparative purposes, namely, bayou, barrier island, marsh, river, and fresh-water lake. The following analyses were made: organic and mineral carbon, total nitrogen, total sulfur, elemental (free) sulfur, bitumens, and alkaline-soluble humic matter.

Preliminary studies have shown that the sediments of the bay are predominantly detrital in origin, ranging from fine- to medium-grained, relatively pure quartz sand, in the shallower marginal parts of the bay to finer grained, commonly pelletal, silty-clayey sediment in the deeper parts.

Organic content is highest in the finer grained sediments of the bay and lowest in the nearshore sandy sediments. The finer grained sediment or muds are characterized by average contents of 3.5 percent organic carbon, 0.32 percent total nitrogen, and 1.68 percent total sulfur. Elemental sulfur generally amounts to less than 2 percent of the total sulfur content. However, one river-sediment sample contained an anomalously high value of 54 percent free sulfur relative to total sulfur content. Elemental sulfur seemed to be the clearest indicator of early diagenesis as it invariably diminished in concentration with shallow depth of burial.

The bitumen content in the bay muds ranged from 160 to 380 ppm. of the dried sediment, and the bitumen content generally accounted for less than 0.5 percent of the total organic matter content. In some of the sandy sediments of the bay and barrier island environments, however the bitumen content amounted to 1 to nearly 4 percent of the total organic matter. The environment least favorable for the accumulation of bitumens seemed to be the fresh-water lake environment which, on the basis of a single sample, yielded 85 ppm. bitumen or only 0.13 percent of the total organic matter content.

The alkaline-soluble humic matter, subdivided into humic-acid and fulvic-acid fractions, constituted the largest organic fraction extracted from any of the sediments studied. Quantities of soluble humic substances, ranging from 5,500 to 17,100 ppm. of the dried sediment were found in the finer grained sediments of the bay, whereas a value of 165 ppm. was found in one of the sandy sediments. Higher concentrations of soluble humic matter—30,800, 31,600, and 77,000 ppm.—were found in the bayou, lake, and marsh environments, respectively. In general, the soluble humic substances in these recent sediments comprise about 10-50 percent of the total organic matter and a large part of the remaining organic content is believed to be chiefly insoluble humic compounds.

## DIAPIRS IN THE SOUTHWESTERN GULF OF MEXICO

JOHN EWING

## ABSTRACT

Recent surveys have traced the belt of diapiric structures, first observed in the Sigsbee deep, through the Bay of Campeche to within about 60 miles of the saline basin of southeastern Mexico. This prompts a further examination of the structure of the Gulf of Mexico with particular attention to the possibilities that the diapirs are salt.