Holocene Carbonate Sedimentation on Northern Belize Shelf [1]

WALTER C. PUSEY III[2]

ABSTRACT The continental shelf of northern Belize is mantled by calcium carbonate sediments deposited in environments characterized as fluvial, estuarine, and normal marine.

The composition, grain size, and carbonate mineralogy of these Holocene carbonate sediments were determined quantitatively by thin-section point-count analyses, sieve analyses, and X-ray diffraction techniques, respectively. Factor analysis of the accumulated data, supplemented with observations on the presence or absence of sedimentary structures, served to delineate eight facies: (1) reef facies—characterized by an abundance of coralline algae and corals welded into a wave-resistant frame; (2) *Halimeda* facies—characterized by abundant plates of the green alga *Halimeda*; (3) peneroplid-sand facies—typified by an abundance of large peneroplid Foraminifera; (4) miliolid-mud facies—distinguished by the association of many small miliolid Foraminifera with high-magnesium calcite mud; (5) laminated miliolid-mud facies—characterized by a relatively thick sequence containing laminations of foraminiferal sand intercalated with carbonate ("lime") mud; (6) terrigenous facies—characterized by the presence of relatively large quantities of quartz sand; (7) cryptocrystalline-grain facies—distinguished by the relative abundance of cryptocrystalline calcite grains; and (8) ostracod-mud facies—characterized by the association of ostracods and scattered diatoms and charophytes with "lime" and/or terrigenous mud.

The development of the coral-reef and *Halimeda* facies is limited to current-agitated marine waters of normal salinity, whereas the development of the other five carbonate facies is related to reduced current agitation and/or varying degrees of hyposalinity. The volume and mineralogy of the mud in each facies are controlled by current strength. They are determined by the transporting capacity of the currents in each of the depositional environments and, indirectly, by the capacity of the currents to induce the formation of mud-size particles through the abrasion of sand-size constituents.