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Pleistocene-to-Holocene Carbonate Platform Evolution in Northern Belize

Pleistocene (isotope stage 5e) facies mosaics in northern Belize markedly contrast those in the Holocene. The upper 6 m of exposed limestone comprise a shallowing-upward HST cycle terminated by a sequence-bounding unconformity. Platform-margin deposits are coralgal boundstones, which locally may have been interspersed with oolite shoals, that directly underlie the modern barrier reef. Farther leeward is a wide outer-platform tract of coral-Halimeda sands and gravels with scattered patch reefs, similar to those in the Holocene, which extends well onto Ambergris Caye; associated facies include pelecypod (Codakia)-dominated grass beds. Behind that is a narrow tract of complexly juxtaposed facies, including: (a) coral-Halimeda sands and gravels; (b) oolite and miliolid foram shoals, the latter which is not present in Holocene deposits; (c) coarse-grained, molluscan-dominated strandline gravels to the immediate lee of which are either (d) sandy to gravelly, cerithid-dominated beach deposits and/or muddy caye deposits. These facies pass laterally to inner-platform deposits, encompassing nearly all of Chetumal Bay, composed of pelecypod (Chione and Anadara)-dominated wackestones and packstones.

The fundamental control on evolving platform architecture over time was karstification of the Pleistocene limestones, which resulted in an antecedent topography of strike-parallel bedrock ridges. These now emergent to shallow-submerged ridges (e.g., Ambergris Caye) segment the narrow Holocene platform into three distinct depositional-biotic provinces with relatively sharp lateral contacts. In contrast, the subjacent Pleistocene platform was non-barred and wider. The presence of oolites in the Pleistocene may suggest that reef-forming conditions may have been somewhat arrested either because of climatic conditions or differences in shelf hydrography.