
The Isla del Carmen Barrier Island Complex: An Analog of a Mixed Carbonate-Siliciclastic Depositional System, Campeche, Mexico

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ABSTRACT

The Isla del Carmen – Laguna de Terminos complex represents an active barrier island – lagoon system bordering the southern Gulf of Mexico. It is unique because it straddles the carbonate sedimentary province of the Yucatan Platform to the east, and the siliciclastic Grijalva, San Pedro, and San Pablo deltaic systems to the west. The geographic hinterland is reflected in the composition of sediments in the area. The northeastern part of the Isla del Carmen barrier island consists of carbonate sediments associated with strongly eroded storm berms; whereas the southwestern portion is characterized by siliciclastic sediments, accreted by waves.

Tidal channels occur at both ends of the island, permitting the inflow of normal sea water into the lagoon which is largely fed by fresh water from the continent. The northern Puerto Real tidal channel has a well developed carbonate flood tidal delta system within the lagoon. In contrast, the southern Carmen channel develops a siliciclastic ebb tidal delta, where the sediments are introduced into the lagoon by a fluvial system.

Within the Laguna de Terminos, the maximum water depth of 4 m occurs in the central area. Sediment distribution within the lagoon follows the dominant wind pattern, mainly from the southeast, except during the northern storms. Thus, most of the northern and central part of lagoon has been filled by carbonate sediments; meanwhile, the southern and southwestern areas are characterized by siliciclastic sediments.

The Isla del Carmen barrier island complex is the only example of a mixed siliciclastic-carbonate depositional system in the Gulf of Mexico region.