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Evolution of the Belize Barrier Reef: from an Isolated Carbonate Platform to a Rimmed Mixed Carbonate Siliciclastic Shelf

The northeastern translation of the Caribbean plate and its interaction with the Yucatan margin in the late Paleocene, produced a series of sub-parallel NNE-SSW-oriented ridges and troughs. In the Oligocene, neritic carbonates were deposited on the crests of the highest ridges forming four distinct offshore isolated platforms, referred to as Camels Hump, Turneffe, Glovers, and Lighthouse. Middle/late Miocene tectonic reactivation along the Belize margin triggered the shedding of platform-derived gravity flow deposits in Gladden Basin, whereas massive deposition of siliciclastic sediments, eroded from the Maya Mountains, partially filled up the Camels Basin. In the early Pliocene, siliciclastic sediments in Camels Basin prograded over Camels Hump, except for the northern part of this platform which remained high. Then, the coastline migrated eastwards into the northern part of Camels Basin and along the southeastern margin of the exposed Camels Hump platform, responding to a late Pliocene and early Pleistocene long-term sea-level fall. During the five late Quaternary transgressions and highstands, the shoreline shifted a considerable distance towards the west, re-flooding the Camels Hump platform and promoting the establishment of coral reefs over paleo-beach ridges and elongate coastal deposits formed during the late Pliocene and early Pleistocene long-term sea level lowstand. During the late Quaternary lowstands, the shorelines shifted in front of the barrier reef where sediments were reworked by longshore currents. During these lowstands, the southern lagoon became a fluvial plain where the drainage ran mostly parallel and behind the exposed and karstified barrier reef.