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Facies and Stratigraphy of the Modern Estuarine and Nearshore, Mixed Siliciclastic-Carbonate Coastline of the Southern Belize Lagoon, Central America

The low-energy southern Belize coast has estuarine, deltaic, shoreface and palimpsest siliciclastic sediments (clays, quartzose sands and rare gravels) that are being intricately mixed with modern carbonates. Cores and surface samples are used to map facies and characterize the recent history of 25 km of coast from Placencia to the Monkey River, from shoreline to 10m depth (a 2 - 5 km-wide area). Waves and longshore currents are the principle agents of marine sediment transport; tides are insignificant. Estuarine and turbid marine environments host an infauna dominated by bivalves and decapod crustaceans. Infauna locally rework older, submerged coastal plain sediments into modern environments across the ravined Holocene flooding surface. Persistent longshore currents usually restrict deltaic plumes of turbid water to areas close to shore. This allows photozoan coral-algal carbonates to exploit areas immediately adjacent to suspended and deposited siliciclastics. Cores show backstepped estuarine facies, and aggraded mudbank, mangrove and coral facies during Holocene flooding. Sediment baffling and retention by mangrove roots, branching corals and seagrasses contributed to the ability of these facies to keep-up with late Holocene sea-level rise, stabilizing coastal geomorphology. There is a strong feedback, in that partitioning of coastal turbidity is enhanced by shoaling (aggrading) mudbanks, coral cays and mangroves that create shelters (local catchments for fines), headlands (reef sites) and conduits (inter-cay and mangrove channels). This contrasts with offshore shelf deposits that generally lack widespread estuarine and appreciable heterogeneous inshore facies because these areas experienced more rapid sea-level rise in the earlier Holocene.