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Eberhard Gischler[1] (1) J.W. Goethe-Universitat, Frankfurt am Main, Germany

Late Quaternary Lagoon Development of Isolated Carbonate Platforms of Belize, Central America

Thirty-one vibracores were taken in platform interior lagoons of the isolated carbonate platforms Glovers, Lighthouse, and Turneffe offshore Belize. Ideal Holocene lagoon successions above Pleistocene limestone include basal soils, mangrove peats, and marine carbonate sediments. Soils formed on top of subaerially exposed Pleistocene limestones before the Holocene transgression. During initial flooding of the platforms by the rising Holocene sea, mangrove peats developed (Glovers ca. 8.5 k.y., Lighthouse ca. 7 k.y., Turneffe ca. 6 k.y. BP). As water depth increased, reefs started to grow at platform margins and lagoonal circulation improved, thereby promoting carbonate production (Glovers ca. 7.5 k.y., Lighthouse ca. 6.5 k.y., Turneffe ca. 4.8 k.y. BP). The bases of carbonate sediments are characterized by shell beds and/or Halimeda packstones-grainstones. Mollusk-dominated wackestones and packstones follow upsection (Glovers, Lighthouse). Organic-rich Halimeda wackestones and packstones dominate within Turneffe. Thicknesses of Holocene lagoon sediments may exceed 6 m in all platforms (max. core length). At present, all platforms have reef margins, however, Glovers has a deep (18 m) lagoon with randomly distributed coral patch reefs, Lighthouse has a shallow (8 m) lagoon with a linear patch reef trend, and Turneffe has a shallow (8 m) lagoon surrounded by mangroves, which has restricted circulation with hardly any patch reefs. Controlling factors that are used to explain these differences among platform interiors are variations in antecedent topography (differences in elevation and relief of the underlying Pleistocene) and in exposure to waves and currents (protected position of Turneffe versus fully exposed locations of Glovers and Lighthouse).