HOLOCENE GEOLOGICAL EVOLUTION OF SEPETIBA BAY AND MARAMBAIA BARRIER ISLAND, BRAZIL

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High resolution seismic profiles and radiocarbon dates indicate that before the Holocene transgression (late Pleistocene), Sepetiba Bay was exposed to erosional processes. The paleo-topography consisted of a plain with some higher elevations (some are now islands of bedrock), a topographic high in the southern part of the bay (now the barrier island), and a sinuous river channel that ran parallel to the topographic high, perhaps exiting near Marambaia Peak. The grain-size analyses showed progressive upward fining of sediment in cores, and a higher percentage of clay in surficial deposits in 1996 than that observed during a previous spatial survey in the 1970s. Based on 210Pb geochronology, accumulation rates range from 0.37 cm yr-1 to 2.4 cm yr-1 for the last hundred years. By contrast, seismic stratigraphy indicates a range from 0.01 to 0.17 cm yr-1 over the last 7000 years. Particularly high accumulation rates are found in the northeast part of the bay, and, as a consequence of these high rates, the shoreline in the northern part of the bay prograded approximately 400 m in the last 100 years. The apparent increase in accumulation rates and the tendency for deposits to fine upward over the last ~100 years are attributed to watershed disturbance and soil erosion inland, which have been accelerated with economic development since the late 1970s. This interpretation is consistent with trace metal sediment profiles, which indicate an increase in Zn deposition following establishment of a Zn-smelting facility on the bay in the 1970s.