

Paleoenvironmental Reconstruction of a Coastal Lagoon in Southwestern Dominican Republic

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Abstract

The study of lake sediments can provide valuable insights into lake history and climate variation throughout time. In-depth studies have been carried out at Lake Miragoane, Haiti and in high- and mid-elevation sites in the Dominican Republic, and a few other inland and coastal locations throughout the Caribbean; however, to date little has been published on prehistoric conditions in other coastal areas of Hispaniola. Laguna Alejandro (informally named by researchers) (~18.31°N, 71.03°W), on the southwest coast of the Dominican Republic, was examined to expand our knowledge of long-term environmental history in this region. This ~25 hectare lake is separated from the Caribbean Sea by a 100 m wide limestone ridge about 3–5 m tall. We recovered two consecutive cores (0–100 cm, 100–185.5 cm) close to the limestone barrier to investigate the potential for paleotempestology and other paleoenvironmental reconstructions. Three AMS ¹⁴C dates indicate that the lake is ~1100 years in age. Sediment analyses revealed three major events that correlate with bands of uncharacteristic sediment composition and particle size at 74–77.5 cm, 150.5–153 cm, and 183.5–185.5 cm. Four distinct strata containing serpulids and several pockets of *Ammonia beccarii* provided insights on changes in salinity and the connections between the lagoon and the ocean. The upper deposit (74–77.5 cm, 620 ±60 YBP) contains gypsum and represents a period of increased salinity within the lake brought on by drought. The two lower bands are composed of sand consistent with nearby beach sands. The 150.5–153 cm band provides evidence of a hurricane landfall at 1022 ± 60 YBP. The combination of biological data from 165–183.5 cm and sediments within the 183.5–185.5 cm band provide evidence for salinity

fluctuations that indicate the closure of the lake. Sediments contained a variety of invertebrates that helped to document changes in lake chemistry through time. This study of Laguna Alejandro sediments documented lake history and provided information on recent climatic shifts in the region.

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