

Evolution of Florida Bay from island stratigraphy

PAUL ENOS *Department of Geological Sciences, State University of New York at Binghamton, Binghamton, New York 13501*
RONALD D. PERKINS *Department of Geology, Duke University, Durham, North Carolina 27708*

ABSTRACT

The sedimentary record of most Florida Bay islands is an asymmetric cycle consisting of a transgressive sequence followed by a regressive sequence, both formed during a continuous Holocene rise in sea level. The principal sedimentary environments of Florida Bay and the south Florida mainland are represented in the cycle by an upward succession of (1) freshwater pond, (2) coastal mangrove swamp, (3) shallow bay ("lake"), (4) mud bank, and (5) island. Some parts of the cycle may be missing, but the sequence is always the same. Supratidal carbonate sedimentation on islands may develop from coastal mangrove swamps or by mangrove colonization of mud banks. Islands have developed from mud banks at many different times during the rise of sea level into Florida Bay, indicating that mud banks must have existed throughout most of the history of the bay. Present trends of island formation and growth suggest that Florida Bay will evolve into a coastal carbonate plain with inland mangrove swamps and freshwater ponds, very similar to the present southwest Florida mainland.

INTRODUCTION

Florida Bay with time. Progressively larger areas of the bay are building into the supratidal zone through both vertical and lateral accretion. If the present depositional trend continues without significant increase in the rate of sea-level rise, the present area of Florida Bay will eventually be accreted to the Florida mainland as a coastal mangrove swamp, a supratidal "marl prairie," and a series of shallow lake basins.

Setting

Sediments in Florida Bay are being deposited disconformably on an almost planar surface of Pleistocene pelletoidal lime packstone and grainstone (Perkins, 1977). Extensive sediment probing and observations both from the air and underwater reveal no appreciable Pleistocene depositional relief. The Pleistocene surface is pitted by small solution holes several centimetres (less than 1 ft) deep, producing a microkarst topography similar to that exposed farther north in the Everglades. The surface slopes southward and southwestward from the Florida mainland at about 1:100,000 (0.5 ft/mi) until it dies abruptly along the Florida Keys, reflecting depositional morphology of coralline limestone. Florida Bay also carries to a shallow, wedge-shaped basin that is