

Morphology of a Marsh-Dominated Coast as Determined from Airborne Laser in Eastern Gulf of Mexico

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Abstract

The geomorphic features of a marsh-dominated coastal lowland are mapped from airborne laser data collected on the Gulf coast of Florida in the Cedar Key Scrub and Waccasassa State Preserve. Remotely surveyed surface elevations are accurate to $0.11\text{m} \pm 0.06\text{ m}$ with a horizontal resolution of 2–10 m. The newly mapped surface provides a faithful representation of topographic relief beneath canopies of salt marsh and coastal forest. Coastal morphology is reliably depicted in the minutiae of tidal channel configuration, karst features, modest topographic undulation, and relict sand dunes. This surveying method delineates surface features at a resolution previously unavailable. Such detailed landscape morphology sheds light on historic and modern processes and sea level fluctuation.

The study area is located along coastal lowlands adjacent to a shallow offshore shelf, with near surface limestone, and a marsh-dominated shoreline. Expansion and widening of tidal creeks, increased tidal flooding of inland areas, and loss of coastal forest are common. Repeat data collections with airborne laser may provide an opportunity to monitor coastal change on marsh-dominated coasts.