

Comparative Analysis of the Stratigraphic Framework in Relation to the Geomorphic Evolution of the Caillou Bay Headland, South Central, Louisiana

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Abstract

Previous studies have documented spatially and temporally variable rates of surface subsidence across the Mississippi River delta plain of Louisiana. Variations in patterns and rates of delta plain subsidence may reflect the subsurface distribution of compaction-prone lithosomes.

This research investigates whether historical changes in the surface geomorphology of the Caillou Bay headland are correlated to the distribution of buried lithosomes within the headland. The goal is to contribute toward the development of stratigraphic models that provide a predictive measure for patterns of future land loss.

The project consisted of two phases: 1) the development of a lithostratigraphic framework model for the Caillou Bay headland, and 2) documentation of the headland's geomorphic evolution as indicated by maps. In Phase 1 twenty-seven cores were collected and integrated with preexisting borehole data to establish the fundamental stratigraphic architecture of the headland. These data were used to identify primary lithosomes and establish the spatial distribution of different sedimentary units (e.g., peat versus sandy lithosomes). Phase 2 focused on developing a database of maps that collectively show patterns of shoreline change and interior wetland loss across the headland. Patterns of shoreline change and interior land loss for three time intervals were determined, indicating that total land loss varied through time. Land loss maps were then overlain on lithosome contour maps to calculate the amount of land loss overlying each lithosome contour interval. Preliminary analyses of our results reveal that land loss was not uniform throughout the headland and that land loss patterns for several time periods vary as a function of the thickness of the compaction-prone lithosomes.