

**EFFECTS OF LOCAL AND REGIONAL ANTECEDENT GEOLOGY  
ON THE MODERN INNER CONTINENTAL SHELF: SOUTHERN LONG BAY,  
SOUTH CAROLINA**

By

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**ABSTRACT**

Swath bathymetry, side-scan sonar and high-resolution seismic reflection surveys groundtruthed with grab samples and vibracores, have been used to map the surficial and sub-bottom geology of the inner continental shelf of Southern Long Bay, SC (i.e. between Murrells and North Inlets). Analyses of these data reveal the integral role that antecedent geology has played in the area's geomorphologic evolution, which was a primary objective of the study.

The study area is situated on the southwest flank of the Cape Fear Arch, a structural high on the Carolina Platform. Uplift of the arch is thought to have caused a migration of fluvial systems away from its axis, which has been interpreted to be at least partially responsible for the observed lack of post-Paleocene deposition within the study area. Extensive paleo-fluvial incision and truncation of Tertiary strata at the seafloor appear to be results of the combined affects of structural influence and fluctuation of eustatic sea level. Surficial sediments within the area exist primarily as a patchy and discontinuous sand sheet that is often observed to thin significantly, allowing for outcrop/sub-crop of a regionally identifiable marine erosional unconformity and the strata that underlie it. Over longer temporal scales geologic framework seems to have heavily influenced the evolution of depositional settings within the area, largely dictating the positions of tidal inlets and the accumulations of sediment associated with them. On the shorter term, inner shelf hydrodynamic processes appear to have provided the primary means for the subsequent reworking and redistribution of these sediments into readily identifiable bedforms of varying scale.

Integrated interpretation of these data sets have allowed for the area to be divided into five distinct provinces based upon sub-surface geology, surficial geomorphology and past and present depositional environments. In addition, these interpretations have allowed for the improvement of the previously proposed (Domeracki, 1982) paleo-geographic reconstruction for the area.