

**AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003**

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Core Based Sequence Stratigraphy, Subtropical to Temperate Shelf Succession, North Carolina Paleogene

Cores of the North Carolina Paleogene marine continental shelf succession (including the USGS Kure Beach core) sample the transition between the southern carbonate and northern siliciclastic provinces, eastern U.S. margin. The Paleocene sequence boundary is a hardground on shoreface/shallow-shelf mollusk facies, it is overlain by deeper offshore, glauconitic fine sands to deep marine silt-shale, and capped by thin shoreface sandy-mollusk rudstone. The two Middle Eocene sequences sampled are 25-35 m thick and contain coastal sands, shoreface sandy-mollusk rudstones, offshore bryozoan grainstone/packstones and subwave base fine wackestone/packstone and marls. The Eocene sequences have sands on the sequence boundaries and consist of a broadly deepening- to shallowing-up succession of 3-7 m thick parasequences. Hardgrounds occur on some sequence boundaries and on some major flooding surfaces. Updip along the southern basin (Cape Fear Arch) the Middle Eocene is condensed into two 3-5 m thick sequences dominated by highly thinned intraclastic bryozoan limestone with clasts of lowstand sandstone. The Oligocene sequence has a basal glauconitic hardground or is in sharp contact with the underlying limestone, and consists of a glauconitic transgressive lag overlain by very fine-fine foram sands or planktonic marl, coarsening up into a very fine-fine foram sand capped by shoreface mollusk-bryozoan rudstone. Given the swell-dominated setting, the Paleocene facies indicate a relative sea level rise in excess of 100 m; up to 50-75 m relative sea level rise for the Eocene sequences; and a 100-150 m sea level rise for the Oligocene sequence studied. Boundary current erosion formed the Middle Eocene condensed section over the Cape Fear Arch.