

OLIGOCENE CARBONATE PLATFORM EVOLUTION AND REEF DEVELOPMENT IN THE EASTERN GULF COASTAL PLAIN

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Throughout the Early Oligocene, the eastern Gulf Coast was characterized by three paleogeographic/carbonate facies provinces: (1) Shelf Province (Alabama/NW Florida), with foramol/bryomol limestones and local red algal pavements; (2) Gulf Trough/Apalachicola Embayment Province (N Florida/SW Georgia), a deep, current-swept structure with shallow, flanking coralgall reefs; and (3) Florida Platform Province (peninsular Florida/SE Georgia), a miliolid, peloidal, chlorozoan limestone with local patch reefs and coral thickets.

During the mid-Oligocene highstand (T01.2 depositional sequence), the Shelf Province became a drowned ramp with a shelf margin condensed section (Glendon LS). This carbonate system was unable to keep-up with sealevel rise because of the slow-growing, temperate water character of its fauna (30 °N paleolatitude). Around the Gulf Trough, however, coralgall reefs (Bridgeboro LS) kept pace with sealevel rise and formed a rimmed platform. Despite their comparatively high paleolatitude (29-32°N), the tropical fauna of these carbonates thrived because of the influence of warm Gulf Trough waters originating in the Caribbean. The Florida Platform also kept pace with sealevel rise, and was partially emergent (so-called "Orange Island").

This mosaic of adjacent tropical and temperate water carbonates, developed on rimmed platform and ramp settings, is comparable to the modern shelf margin from south Florida (Florida Reef Tract), westward to the west Florida carbonate ramp slope. A good modern analog for the Gulf Trough-Florida Platform Facies Provinces is the Florida Reef Tract-Florida Straits-Bahama Bank system.

During the 30 Ma eustatic sealevel fall, coralgall reefs moved from the flanks of the Gulf Trough (Bridgeboro LS) into the Trough (Okapilco Member, Suwannee Limestone). This time-transgressive shift in reef development continued to step down the bathymetric gradient (tracking sealevel fall) until by the Late Oligocene, reefs were growing along the northern Gulf shelf margin in southern Mississippi and Alabama (Heterostegina Zone) as a rimmed shelf. Isolated, time-equivalent reefs grew on the shoals produced by emerging salt domes in Texas and Louisiana (e.g., Damon Mound).