

Calcareous nannofossils, Oceanic Anoxic Event 2, and the Cenomanian/Turonian boundary in cores from eastern Louisiana, USA

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Sediments of the Tuscaloosa Formation extend across the northern Gulf of Mexico basin and east of the Sabine uplift in Texas and Louisiana. The sediments consist of three informal units: the lower Tuscaloosa, the Tuscaloosa marine shale, and the upper Tuscaloosa. They are equivalent in age to the Woodbine Sandstone and Eagle Ford Shale in west Texas. Collectively, these sediments are associated with the onset of sea-level rise during the early to late Cenomanian, with maximum transgression during the late Cenomanian and into the early Turonian, and with a regression in the middle Turonian.

Although extensive biostratigraphic analyses have been published on west and east Texas Cenomanian–Turonian sections, very few biostratigraphic data exist from similarly aged sediments from eastern Louisiana. Here we examine the calcareous nannofossil assemblages from spot cores in the Biloxi Marshlands P-2 and O-1 wells and compare them to assemblages from the updip Eads Poitevent core. The oldest spot cores are from Biloxi Marshlands P-2 and are early Cenomanian (Zones UC1 and UC2, lower Tuscaloosa) to late Cenomanian (Zone UC3, Tuscaloosa marine shale) in age. The presence of *Eiffellithus turriseiffelii* and *Corollithion kennedyi* in the basal sample places the bottom of the core in Zone UC1. The first occurrence of *Broinsonia gammation* (Zone UC2) is at 21,263.2 ft (6481.0 m), and the first occurrence of *Lithraphidites acutus* (base of Zone UC3) is at 21,253.2 ft (6477.9 m). *Corollithion kennedyi* is present through the highest cored sample (20,110.0 ft), suggesting an age no younger than late Cenomanian. The cored interval in the Biloxi Marshlands O-1 well is from the upper Tuscaloosa, is late Cenomanian to early Turonian in age, and it is assigned to Zones UC4–UC7. The last occurrence of *Helenia chiesta* at 19,411.8 ft (5916.7 m) marks the Cenomanian/Turonian boundary.

Examination of total organic carbon (TOC) and carbon isotope ratios of bulk organic carbon ($\delta^{13}\text{C}_{\text{org}}$) from the Biloxi Marshlands O-1 well suggests that Oceanic Anoxic Event 2 (OAE2) is present from 19,413–19,407 ft (5917.0–5915.2 m). The base of the event was not cored, as evidenced by the fact that carbon isotopes are at their heaviest in the base of the core. The TOC is at 4–5% throughout the OAE2 interval. Carbon isotope ratios shift more negatively from -23‰ to -25‰ above the Cenomanian/Turonian boundary. However, an unconformity is identified using biostratigraphy at the UC6a/UC7 zonal boundary, which indicates that the top of OAE2 is truncated. Preliminary comparison with the updip Eads Poitevent core suggests that in eastern Louisiana, the carbon isotope excursion for OAE2 may not be isochronous, and further work is needed to confirm this finding.