
Depositional Environments of Sediments near the Paleocene-Eocene Boundary, Bastrop, Texas

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ABSTRACT

A 20 m (65 ft) section of strata just above the Paleocene-Eocene boundary is present in an extensive area of outcrops near Bastrop, Texas. This section contains an expanded interval of shoaling-water deposits capped with a well-developed exposure horizon that is overlain by transgressive deposits. The exposure surface is 5 m (16 ft) above the base of the Carrizo Formation, placing a sequence boundary well above the Calvert Bluff-Carrizo lithologic boundary. The lowest 16 m (52 ft) is a coarsening-upwards interval of Calvert Bluff offshore marine mudstones with thin laminae and small lenses of fine sand conformably overlain by winnowed shore zone sands of the basal Carrizo. The mudstones contain wavy bedded tidal deposits with fine sand laminae throughout and contain layers of storm-deposited hummocky cross-bedded sands in the upper few meters. The overlying sands are thick bedded and well sorted with thin interbeds of mudstone that retain similar thickness and depositional character along strike, indicating deposition in standing water. These deposits were exposed and weathered into a paleosol (containing rooting traces) that is traceable along the outcrop as a planar surface, with one fluvial channel (3 m [10 ft] deep, 20+ m [65+ ft] wide) cut into underlying sediments. Channel deposits consist of sands and thin interbeds of plant-rich mudstones and the channel fill is capped with a sandy lignite composed of granular wood particles and quartz sand. The paleosol exposure surface and channel fill are overlain by well-sorted shore zone marine sands with large tabular to lensing bedding. Trace fossils indicate a marine origin. Previous work placed this area within a continental depositional system, but marine microfossils in mudstones, sedimentary structures in mudstones and sands, and trace fossils are typical of shore zone and shallow marine environments. Nonmarine components are limited to the channel fill and paleosol.