
The Eagle Ford (Boquillas Formation) of Val Verde County, Texas— A Window on the South Texas Play

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ABSTRACT

The Upper Cretaceous Eagle Ford, locally called the Boquillas Formation, is well exposed in several deep roadcuts along U.S. Highway 90 in Val Verde County, West Texas. Interest in these outcrops derives from the current Eagle Ford oil and gas play in McMullen, LaSalle, and Maverick counties in the South Texas Maverick Basin, with production from mudrocks. Outcrops in Val Verde and Terrell counties are in the same basin, and provide an accessible window for improved understanding of the play. The formation is approximately 200 ft thick in Val Verde County, significantly thicker in the producing counties, and over ten times thicker in northern Mexico. The Eagle Ford was deposited during the Cenomanian-Turonian Oceanic Anoxic Event.

The outcropping Eagle Ford (Boquillas) Formation can be informally divided into three members. The lowest member consists of unstable slope strata including debris flows, slump folds and breccias, possible turbidites, and contourites.

Industry interest focuses primarily on the middle member, which can be further divided into lower beds comprising limestone-marlstone cycles (parasequences) that form a transgressive parasequence set with an upward decrease in the number of carbonate beds. The middle beds are composed almost entirely of marlstones, while the upper beds include increasing proportions of limestone towards the top and are interpreted as a regressive parasequence set. The middle member, when seen in an unweathered condition, consists of black, organic-rich strata that exudes a strong petroleum odor when broken. Fine laminations are undisturbed by bioturbation and every indication suggests anaerobic subsea floor and dysaerobic bottom water conditions during sedimentation. Planktonic forams and calcispheres are the common microfossils and small ammonites are common, while the low-oxygen tolerant inoceramids are the only bottom-living fauna.

The upper member is marked by several thicker limestone beds at the base, with Chondritid burrows (normally associated with low-oxygen environments). The main part of the upper member contains abundant irregular echinoids and is interpreted to represent a return to more normal, oxygenated water conditions.

Thin ash beds occur throughout the formation, but to date have not provided any aids to correlation.

Analytical studies of Eagle Ford shale samples from the fresh outcrop include measurement of TOC (total organic carbon), thermal maturity, carbonate content, porosity and permeability, and SEM (scanning electron microscopic) petrography.