

A CORE BASED CHEMOSTRATIGRAPHIC STUDY OF UPPER CRETACEOUS BUDA LIMESTONE AND AUSTIN CHALK, SOUTH TEXAS, USA

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Abstract

Mudrocks present a challenge to geologists in that they are difficult to characterize by visual inspection. Nonetheless these fine-grained deposits preserve detailed records of paleoceanographic conditions. Much research has been devoted to tight shale plays like the prolific Eagle Ford to improve unconventional recovery methods. Less attention has been given to the bounding formations for which the Eagle Ford is thought to play the role of source rock. The Buda Limestone and Austin Chalk formations are calcareous mudrocks deposited on the south Texas shelf that was drowned during Upper Cretaceous transgressions. Geochemical data are collected from five subsurface cores spanning a strike trend from Dimmit County to Lee County, Texas. A handheld x-ray fluorescence unit is used to analyze the elemental composition of the cores at two-inch intervals. Powder samples are extracted from the cores for x-ray diffraction, stable isotope and TOC analyses. The geochemical data are integrated with lithological interpretation to provide greater context for the paleoceanographic conditions in which the Buda and Austin formations were deposited. Production trends from the Eagle Ford's adjacent formations reflect unpredictable success, but it is clear the Buda and Austin are capable of producing economic volumes of petroleum. One obstacle to reliable production from the Buda and Austin formations may be a lack of understanding of the nanopore networks and their influence on fluid flow and fracture propagation. Petrographic thin sections and scanning electron microscopy are used to characterize the faunal assemblages and nanopores and relate them to fractures and production trends.

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