

# **STRATIGRAPHIC AND GEOCHEMICAL VARIABILITY OF THE CENOMANIAN TO TURONIAN EAGLE FORD GROUP IN SOUTHWEST TEXAS: IMPLICATIONS FOR IDENTIFYING POTENTIALLY PRODUCTIVE HYDROCARBON PAY ZONES**

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## **ABSTRACT**

Stratigraphic correlation using core data, thin-sections, biostratigraphic data, wire line logs, geochemical analysis from XRF and XRD analysis, bulk rock carbon stable isotope and Rock-Eval total organic carbon (TOC) variations document vertical stratigraphic variations and paleo-redox conditions in the Cenomanian to Turonian Eagle Ford Group in wells in Karnes, McMullen and Live Oak counties in the South Texas Submarine Plateau.

The Eagle Ford Group in these wells is divided into lithological units based on a combination of depositional and diagenetic characteristics such as lithological variations identified in cores and skeletal grain types and abundance observed in thin-sections. The Lower Eagle Ford is mainly composed of dark grey to black mudstone interbedded with light grey skeletal wackestone, packstone and grainstone, with the skeletal grainstone and packstone interbeds occurring more frequently higher up this interval. The Upper Eagle Ford is mainly composed of light grey skeletal grainstone and packstone with few interbeds of skeletal wackestone and mudstone. Several beds in this interval have scoured surfaces and soft-sediment deformation structures. Carbon isotope variations, commonly associated with oceanic anoxic events, is used in conjunction with biostratigraphic data and TOC data to determine the timing and preservation of organic matter in these wells. Mo and U enrichment factors estimated from XRF data provide insight into the paleo-redox conditions at these well locations during deposition. The U-Mo enrichment suggest that the lower Eagle Ford Formation was deposited under euxinic conditions, with TOC values ranging from 2 to 6%, whereas the upper Eagle Ford Formation was deposited under oxic to anoxic conditions, with TOC values ranging from 1 to 3 %. Furthermore, Mo/TOC plots indicate that there was moderate water mass restriction at the study location during deposition.