

The Eagle Ford Group at the surface: a palynostratigraphic and palaeoenvironmental framework for the Cenomanian - Turonian in South Texas

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Episodic black shale deposition is observed throughout the Cretaceous, with one of the most distinct intervals being Oceanic Anoxic Event 2 (OAE 2) at the Cenomanian-Turonian Boundary (93.9 Ma), spanning ~500 kyr (JARVIS et al., 2015). Late Cretaceous black shale deposition is confined to OAE2 in most places, but it is stratigraphically much more extensive in areas of the SW proto-North Atlantic, particularly in northern Venezuela (Maracaibo and Eastern Venezuela Basins) and offshore Suriname (Demerara Rise), where black shales extend continuously from the Upper Albian to Santonian. Similarly, in the US Gulf Coast region, the Cenomanian–Coniacian Eagle Ford Shale of South Texas consists of organic-rich carbonate mudstones with total organic carbon (TOC) contents locally exceeding 10 wt%. These high TOC mudrocks make the Eagle Ford Group an ideal unconventional hydrocarbon reservoir and much work has been carried out in the last decade to determine the heterogeneous nature of the deposit. The Lozier's Canyon outcrop in Tyrrell County, West Texas, was studied in detail by DONOVAN et al. (2012) to characterise the individual facies and stratigraphy within the Eagle Ford Group. The objective was to develop a surface stratigraphic framework to help correlate the subsurface stratigraphy in future exploration.

Antonio Canyon is a tributary to Lozier's Canyon located 5 miles (8 km) to the southwest, on the border of Val Verde County. This locality provides a unique opportunity to study bedding surfaces obscured at other locations, and to determine horizontal heterogeneities and lateral changes in depositional environment (GARDNER et al., 2013). The stratigraphic framework developed by DONOVAN et al. (2012) at Lozier's Canyon has been applied to constrain lithological correlations with high confidence. In this study we have used palynological correlation to calibrate dinoflagellate cyst markers and to assimilate these into the existing framework setup by DODSWORTH (2015) in Lozier's Canyon. Palynomorph assemblages are dominated by green algal prasinophyte phycomata in the lower parts of the Eagle Ford, and peridinioid dinoflagellate cysts in the upper parts. We document the presence of diverse dinoflagellate cyst assemblages, including inter-regional (high- to mid-latitude) marker events. Additionally, elemental and isotopic geochemical results obtained from Antonio Canyon are integrated with published data to establish a robust outcrop-based biostratigraphic / chemostratigraphic framework for future subsurface work.

DODSWORTH, 2016. *Palynology*, **40**, 357–378.

DONOVAN et al., 2012. *GCAGS Journal*, **1**, 162–185.

GARDNER et al., 2013. *GCAGS Journal*, **2**, 42–52.

JARVIS, I. et al., 2015. *The Depositional Record*, **1**, 53–90.