
Extending Facies Interpretations by Integrating Core, Image-Log, and Wireline-Log Data in the Upper Cretaceous Olmos Formation of South Texas

Ramon H. Trevino¹, Robert G. Loucks¹, Julia F. W. Gale¹, and Abdelmoniem K. Abdelmoniem²

¹Bureau of Economic Geology, Jackson School of Geosciences,
The University of Texas at Austin, Austin, Texas 78713

²Energy and Earth Resources Graduate Program, Jackson School of Geosciences,
The University of Texas at Austin, Austin, Texas 78713

ABSTRACT

The Olmos Formation is composed of shelf, shoreface, and delta-system sandstones and associated mudstones. Facies architecture has distinct lateral and vertical variations. Cores are essential for documenting specific facies, but cores are rare. Hydrodynamic and biological features down to several inches are apparent and recognizable on image logs calibrated to core. With calibrated image logs, facies can readily be interpreted from the image logs resulting in a broader base for facies interpretations because image logs are more readily available than cores. In conjunction with wireline logs, facies can be reasonably predicted, extending facies, depositional systems, systems tract and sequence stratigraphic interpretations over a much larger area. The shelf strata in cores are extensively bioturbated, corresponding to the *Cruziana* ichnofacies (*Asterosoma*, *Schaubcylindrichnus*, *Zoophycus*, *Bergaueria*, *Scolicia*, *Thalassinoides*, *Chondrites* and *Diplocraterion*). The bioturbated strata appear as nonlaminated sandstone on the image log. The shoreface strata in core exhibit cross-bedding and *Ophiomorpha* and *Macaronichnus* trace fossils correspond to the *Skolithos* ichnofaces. The cross-bedding and burrowing are identifiable on image logs. The deltaic system is characterized by channel and salt-marsh subenvironments. The salt-marsh related facies comprise beds of carbonaceous shale laminae to thin beds of coal, and very fine-grained, mud-rich, bioturbated sandstone and dark-gray bioturbated (*Psilonichnus*) sandy mudstone with common root traces. Channel related facies comprise fine- to medium-grained, cross-bedded sandstone, containing up to 50% rock fragments with common shale clasts and minor amounts of detrital coal. The channel-related sandstone is well-laminated. These two subenvironments compose a wave-dominated, deltaic depositional system, and the related facies can be identified on image logs.