

## **Lithofacies, Stratal Architecture, and Depositional Model of an Inner Platform Transgressive Rudist Complex, Basal Edwards Formation (Lower Cretaceous), West- Central Texas**

**Ayobami M. Oyedeji and Peter F. Holterhoff**  
*Department of Geosciences, Texas Tech University*

The Cretaceous Fredricksburg Group of west-central Texas is divisible into a northern open platform facies belt and a southern inner platform facies belt. Exposures of the Fredricksburg Group on the inner platform contain a distinctive Trypanites hardground representing a sequence boundary separating the underlying “Walnut – Comanche Peak” sequence from the overlying Edwards Formation. The basal Edwards Formation at the inner platform study section south of Sweetwater, Texas contains a thin lowstand marl overlain by a prominent 3 to 4 meter thick rudist complex representing the transgressive systems tract of the Edwards sequence.

Three major carbonate lithofacies are developed within this transgressive unit. Ooid – mollusk grainstones contain a variable mixture of coated grains and dominantly fine to some coarse mollusk grains. Porosity in this facies averages 17%. Ooid – peloid grainstones also contain mollusks, green algae and composite grains, with porosity averaging 10%. Rudist rudstones are dominated by very coarse rudist debris with a medium to coarse skeletal sand matrix. Rudist rudstones have up to 30% porosity.

These lithofacies are organized into back-stepping clinoforms, with each characteristic of specific portions of the clinothem. Ooid – mollusk grainstones compose the bulk of the toe-sets, downlapping onto the lowstand marl and grading upward into the rudist rudstone. The rudstone facies is the thickest portion of the clinothem and grades upward into flat – lying top-set ooid – peloid grainstones. This complex clinoform architecture and lithofacies/rock property partitioning would greatly reduce connectivity and fluid flow through this apparently tabular flow unit analog.