

**Lower Permian (Wolfcampian)  
stratigraphic architecture and  
shelf-margin reservoir facies,  
eastern Central Basin Platform,  
West Texas**

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The integration of carbonate microfacies and fusulinid biostratigraphy from several cores with subsurface well log and seismic data enabled the reconstruction of Hueco Group (Wolfcampian, Lower Permian) stratigraphic architecture and reservoir facies along the eastern margin of the Central Basin Platform, Ector County, West Texas. Fusulinid biostratigraphic analyses allowed the recognition and mapping of the Upper Pennsylvanian and Lower Permian carbonate depositional sequences along the platform margin, and carbonate microfacies analyses of cores and cuttings enabled detailed facies reconstruction.

A regional unconformity at the end of the Pennsylvanian (top Bursum) carved an escarpment along the eastern Central Basin Platform margin. During the following Early Permian (Wolfcampian, Nealian) transgression, well-developed Lower Hueco reef-mound complexes with associated packstone-grainstone flanking facies were constructed along the face of the Bursum escarpment. The Lower Hueco reef-mounds display the first development and radiation of the tropical Permian reef community, which is composed of phylloid algae, calcisponges, *Tubiphytes*, laminar encrusting red algae, bryozoans, specialized brachiopods, and botryoidal radial fibrous cements. Reef flank beds are composed of packstones and grainstones dominated by fusulinids, *Tubiphytes*, and phylloid algal fragments. Capping shoal facies are similar but also contain abundant dasycladacean algal fragments. During the subsequent mid-Wolfcampian unconformity, the Lower Hueco shelf-margin complexes were exposed subaerially and meteoric leaching enhanced

reservoir porosity in the buildups. The following Late Wolfcampian (Lenoxian) transgression created less accommodation space along the platform margin, and the overlying Upper Hueco is composed of a relatively thin sequence of well-bedded shelf and shelf-margin fusulinid-skeletal packstone-grainstone shoal facies. The post-Wolfcampian shelf-margin backstepped dramatically, and the Hueco platform carbonates are overlain (and sealed) by Leonardian basinal shales with interbedded lithoclastic-fusulinid debris flows. Hueco reservoir facies include both the platform-margin reef-mound facies and the flanking/capping packstone-grainstone facies, which have somewhat different reservoir characteristics.

Good outcrop analogs of Wolfcampian shelf-margin carbonate complexes are exposed in outliers of the Hueco Mountains in far West Texas.