

## Lithofacies, Diagenesis, and Pore Network of the Pennsylvanian Caddo Limestone in Stephens County, Texas

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### ABSTRACT

The uppermost part of Pennsylvanian Caddo Limestone forms economic reservoirs in Stephens County, northern Texas. Ten sedimentary lithofacies and one diagenetic lithofacies were distinguished by a detailed study of thin sections and Caddo cores from the Eliasville and Breckenridge fields. Porous and permeable beds are best developed in phylloid-algal wackestones and packstones as well as *Komia* wackestones and pack-stones. The Caddo Limestone was intensively altered by diagenesis. Near-surface diagenetic processes have great impact on the reservoir quality. Large volumes of secondary porosity (e.g., molds and vugs) were produced through dissolution related to subaerial exposure, and many of them are still open, providing the principal pore spaces of the reservoir interval. Partial dolomitization has created intercrystalline pores, and dolomitic limestones are less heterogeneous in pore size and distribution. This study provides a case study of carbonate mounds in which *Komia* is the major allochem and mound builder, and *Komia* lithofacies are the main reservoir rocks.