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## Evidence for Sea-Level Fluctuation and Stratigraphic Sequences in the Council Grove Group (Lower Permian), Hugoton Embayment, Southern Mid-Continent: Abstract

## J. Puckette<sup>1</sup>, D. R. Boardman II<sup>2</sup>, Z. Al-Shaieb<sup>3</sup>

## ABSTRACT

The Council Grove Group in the Hugoton embayment is formed by a series of sequences composed of shallow marine limestones, shales, and nonmarine red beds. The repetitive nature of these units documents glacial eustatic, cyclic sealevel oscillations. The Council Grove contains two distinct types of sequences. Those in the lower part (Foraker through Grenola Formations) consist of (l) a basal transgressive surface, (2) a shallow marine limestone with a marine condensed section that represents the transgressive and highstand systems tracts, (3) shallow water carbonates with a weathered upper surface (exposure sulface) that represents forced regression, and (4) red caliche-bearing, blocky claystones and siltstones (red beds) that may correspond to the lowstand systems tract (LSI of the shelf margin. Sequences in the upper part (Beattie Limestone through Speiser Shale) are similar to those in the lower Council Grove, but lack the marine condensed section that represents a well-defined highstand systems tract (HST).

The lower sequence boundaries are characterized by thin (<l ft) transgressive lag deposits which separate the limestones from the underlying nonmarine red beds. The transgressive systems tracts (TSTs) consist of upward-deepening carbonate. Maximum flooding within the HST is represented by a carbonate marine condensed section containing glaucony and skeletal phosphate, including abundant conodonts. Forced regression is represented by upward-shoaling carbonates punctuated by minor flooding surfaces that delineate parasequences. The upper surces of the regressive carbonate units and overlying nonmarine claystones and siltstones exhibit evidence of subaerial exposure. The limestones developed weathered zones consisting of carbonate regolith in a red-green clay and silt matrix. The succeeding claystones are red and contain nodular caliche. These features indicate subaerially exposed rocks and paleosols. A variety of karstic features (such as vugs and solution channels) are common in the limestones. Some of these dissolution features are filled with red clay.

Porosity in the Council Grove carbonate units is secondary and formed by the dissolution of carbonated grains and cement. The highest porosity values (>10%) are found in upward-shoaling ooid and skeletal grainstones. Karsted rocks with vugs and channels filled by infiltrated sediment exhibit porosity of <10%.

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1 Oklahoma State University, Stillwater, OK

2 Oklahoma State University, Stillwater, OK

3 Oklahoma State University, Stillwater, OK