

**AAPG Annual Convention  
Salt Lake City, Utah  
May 11-14, 2003**

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### **Internal Architecture and Sequence Stratigraphy of Middle Mississippian (Visean) Grainstones, Eastern Missouri**

The focus of this study is analysis of the architecture and origin of grainstones of the Warsaw Shale and Salem Limestone (Carboniferous, Visean), exposed near St. Louis, Missouri. These analogs provide information on sequence stratigraphy, cyclicity, facies architecture, and reservoir geometry for analogs of North Caspian hydrocarbon reservoirs.

Facies include dark grey shale, spiculitic dolomudstone to wackestone, crinoid-bryozoan-skeletal grainstone, peloid-skeletal packstone, sigmoidally cross-bedded crinoid-foram grainstone with mud drapes, and laminated dolowackestone to packstone with evaporite molds. These are interpreted to represent a spectrum of environments from subwavebase, deeper marine to tidally influenced shoal to tidal flat.

Facies group to form parasequences, generally manifest as cleaning-upward packstone-grainstone cycles, although considerable variation is present as a function of the sequence stratigraphic and paleogeographic setting. High-frequency sequences are composed of parasequences bounded by flooding surfaces. Subaerial exposure features are rare, and hence flooding surfaces are used to define high-frequency sequences. These units form the highstand sequence set of a composite sequence and include highly progradational facies belts.

Salem and Warsaw grainstones have diverse geometries which occur in predictable paleogeographic/sequence stratigraphic settings: a) tabular crinoid-bryozoan, trough cross-stratified grainstone, more common in the lower part of the section and more downdip locations; b) isolated sand waves of skeletal grainstone, up to 3 m high and 60+ m wide, most common above flooding surfaces; c) channel-form to more tabular foram-crinoid-skeletal grainstones, with common sigmoidal cross-bedding and muddy toes and drapes, more common in the upper part of the section and in more updip areas.