AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

Kimberly D. Combs[1], Kevin J. Smart[1], Roger M. Slatt[1] (1) University of Oklahoma, Norman, OK

Surface Fracture Characterization of Jackfork Group Turbidite Sandstones in the Ouachita Mountains, Oklahoma: Implications for Gas Exploration

The Ouachita Mountains fold-thrust system in southeastern Oklahoma and southern Arkansas represents the exposed portion of a >2000 km long orogenic system that includes the Marathon thrust belt in Texas, as well as the Appalachian orogenic system. The majority of the Oklahoma Ouachitas consist of Mississippian to Pennsylvanian clastic rocks of the Central Ouachitas that are deformed into broad, open synclines separated by tight anticlines and a few thrust faults. The Pennsylvanian Jackfork Group, a deepwater turbidite deposit, is a major exposed interval in the Central Ouachitas and plays an important role in the subsurface in Oklahoma as a tight gas reservoir interval (e.g., the Potato Hills field). Here we report initial results on characterizing outcrop scale fractures in the Jackfork. This work is part of a larger structural and stratigraphic study focused on fracture processes in deepwater turbidites and the implications of such fractures on tight gas reservoirs.

Fracture orientation and intensity measurements were collected via standard linear scanline techniques on several Jackfork bedding surfaces exposed in the north limb of the Lynn Mountain syncline south of Big Cedar, Oklahoma. Stratigraphic and mechanical bed thickness was also recorded for each surface. Two primary fracture orientations were observed. The more dominant set is approximately strike-parallel and bed-perpendicular with an average orientation of 104/60N. The second set is dip-parallel and bed-perpendicular with an average orientation of 017/89W. The second set generally terminates against the first. Both fracture sets show positive correlations between fracture spacing and bed thickness (particularly mechanical bed thickness) such that thicker beds exhibit larger spacings. Further work will focus on refining the areal fracture density, outcrop-scale connectivity, and also the relationship between lithology and fracture characteristics. As such, this research should aid current and future production from the Jackfork and similar stratigraphic intervals.