

Structural Geometry and Evaluation of Thrust Faulting in the Damon and Wilburton Quadrangles in Latimer County, Southeastern Oklahoma

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The Arkoma Basin and the Ouachita Mountains of southeastern Oklahoma and western Arkansas were formed during the Late Paleozoic Ouachita Orogeny. In Oklahoma, the Choctaw fault forms the structural boundary between the frontal Ouachitas and the Arkoma Basin.

This study is aimed at determining the structural geometry of the Late Paleozoic thrust faults in the Damon, Wilburton, Eastern Gowen, and Higgins Quadrangles, Latimer County, southeastern Oklahoma. Eight balanced structural cross sections are under construction to delineate the structural geometry in the study area. Data from the surface geological maps by the Oklahoma Geological survey, wire-line well logs, scout tickets, and seismic profiles, donated by Exxon and Amoco corporations, were used to construct the cross sections.

The two main structural features of the study area are the south dipping Choctaw and the north dipping Carbon faults. The Carbon fault is a back thrust which forms the Wilburton Triangle with the south dipping Choctaw fault. Two cross sections already constructed, suggest that an antiformal stack, with two sets of horses, is present in the footwall of the Choctaw fault within the area of investigation. The Woodford detachment provided the floor thrust for the antiformal stack which makes a ramp over a normal fault, and becomes the Springer detachment. The lower Atoka Detachment forms the roof thrust of the antiformal stack. The surface trace of the Carbon fault ends north of the Wilburton gas field. Seismic data indicate that the Carbon fault becomes a blind thrust as it continues to define the northern flank of the triangle zone within the eastern part of the study area, probably through a lateral ramp along its fault surface. Additional cross sections will provide a better understanding of subsurface geometry in the Wilburton, Damon, Eastern Gowen, and Higgins Quadrangles.