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Fracture Architecture of the Tensleep Sandstone at Zeisman Dome and Brokenback Anticline, Wyoming

This study extrapolates the fracture connectivity network in a forced fold using outcrop data. The basic premise of a stochastically generated fracture connectivity network is to use very limited fracture data collected from seismic, well, and outcrop studies to statistically represent a complete network of generated fractures that simulates the fractures in the volume of rock being modeled. FracMan© is the fracture generating program that stochastically derives fracture sets from collected outcrop data. The generated fracture sets are combined to form a complete fracture connectivity network of a forced fold. Fracture data was collected in the Tensleep Sandstone at Zeisman Dome and Brokenback Anticline, in the Bighorn Basin of Wyoming. Zeisman Dome and Brokenback Anticline are asymmetric anticlines formed by a thrust fault. Zeisman Dome has a curved hinge that is doubly plunging; Brokenback Anticline has a straight hinge that is plunging in only one direction. The Tensleep Sandstone is exposed on both features and exhibits variable fracturing. This study is the first documented fracture connectivity network of a fault-propagation fold setting. More specifically, this study is the first documented fracture connectivity network of Zeisman Dome and Brokenback Anticline. FracMan© predicts the distribution and orientation of fractures across these structures. The Tensleep Sandstone is an important hydrocarbon reservoir in the Big Horn Basin. Zeisman Dome and Brokenback Anticline are structures similar to hydrocarbon producing traps commonly found in sedimentary rock.