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Validation of Discreet Fracture Network Reservoir Models

Existing software tools for rule-based and stochastic generation of discreet fracture networks (DFNs) are increasingly being used in the process of predicting fracture network geometry for reservoir simulation and interpretation of well pressure tests. A greater appreciation of the relationship between model inputs such as surface curvature and the resulting fracture pattern is key to the effective use of these tools for the creation of geologic models which accurately reflect natural fracture systems.

This contribution presents new quantitative fracture data from the Moab Member of the Entrada Sandstone in the footwall to the Moab Fault in the immediate vicinity of several fault bends. A digital representation of the fracture pattern in this layer has been recorded from aerial photographs and 3-D structural models of the bounding surfaces of this formation built from digital terrain data and published geologic maps.

Geometric attributes derived from the stratigraphic bounding surfaces provide the basis for several alternative realizations of synthetic fracture networks. These are compared with and calibrated against the observed pattern. Model validation is both spatially quantitative in terms of fracture orientation, length and intensity and topologically quantitative in terms of measured network connectivity.