

Microseismic Monitoring and Structural Interpretation of Reactivated Laramide Fractures North-Central New Mexico

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Abstract

Existing geologic structure often has strong impacts on the geometry and failure mode of microseismicity mapped during hydraulic fracture stimulation treatments. A new interpretation of structural development that investigates the role of strike-slip faulting in north-central New Mexico is applied to the interpretation of two microseismic monitoring results. The Cenozoic geologic history of the north-central New Mexico region is dominated by two main tectonic events that occurred along the eastern boundary of the Colorado Plateau: the Laramide orogeny and the Rio Grande rift. The San Juan basin lies immediately west of the Nacimiento uplift and marks the eastern boundary of the Colorado Plateau. Miocene extension disrupted the Laramide-age crustal structure by movement along Rio Grande rift-related normal fault systems, clastic and volcanic rock sequences, and formation of the Valles caldera. This disruption can make distinguishing Laramide deformation from Miocene extensional faulting difficult due to overprinting.