

## **Fractures within the Irish Canyon-Vermillion Creek Area Northeastern Uinta Mountains, Northwestern Colorado**

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In the northeast Uinta Mountains, fold axes are observed to be consistent with Laramide ENE-WSW shortening and Sevier NW-SE shortening. The structural trends and fracture patterns may be due to the cumulative effects of Laramide and Sevier deformation. This research addresses the timing and mechanisms of fracturing within eastern Uinta Mountains, as well as the controls on post-orogenic fracturing.

Systematic fracture data collection, detailed field mapping, kinematic analyses of 722 slickensided minor faults and 996 joints, and a combination of 2D seismic interpretations and cross-section analyses were used to address questions concerning the structural geometry and fracture history within the northeastern Uinta Mountains.

Joint measurements are trimodal in distribution. Abutting relationships suggest that the N71E-striking joints are primary, the N1E-striking joints are secondary, and the N40W-striking joints are tertiary. Fault analyses indicate multidirectional deformation with ENE-WSW and NNE-SSW orientations.

The tectonic history of the Irish Canyon-Vermillion Creek area is consistent with three stages of deformation. The first stage is due to Laramide compression and is characterized by N59E-directed thrusting, conjugate strike-slip faulting, and the N71E-striking joint set. The second stage is probably due to a poorly documented late-Sevier/late-Laramide or post-Laramide event and is characterized by an E-W extension resulting in a system of NNW-directed right-lateral faults, localized NNE-directed transpressional thrust faulting, and the N1E-striking joint set. The third stage is due to a Miocene to Holocene extension and is characterized by NE-SW extension resulting in N52W-striking normal faults and the N40W-striking joint set.