Mechanically-Partitioned Deformation Related to Reactivated Oblique Slip Faults, Pecos River Canyon

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ABSTRACT

Pre-existing structural elements can have profound effects on fracture and fault development in younger strata, especially in areas that undergo significant changes in tectonic setting due to reactivation along older structures. Increased fracture development around the faults may be difficult to detect in subsurface data, but highlights the volumetric extent of deformation within the fault damage zone and gives insight into the potential reservoir permeability impact faults may have in the subsurface. Observations of fracture style in outcrop can provide evidence of the conditions the fracture set developed within (e.g., extension, shear, or compressional). Moreover, fault-related fractures can vary in their intensity based on the mechanical properties of the host rock.

The focus of this study centers on the effects of potentially-reactivated Paleozoic faults along the Devils River Uplift on the development of faults and fractures in Cretaceous strata. Fault and fracture data were characterized in carbonate outcrop exposures with stratigraphic layers of varying mechanical properties. Additionally, this work inspects the impact of small faults on fracture development within variable strength strata as well as the role of mechanical stratigraphy on fault and fracture styles with specific attention given to the effect of diagenetic fabrics on fracture densities.

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