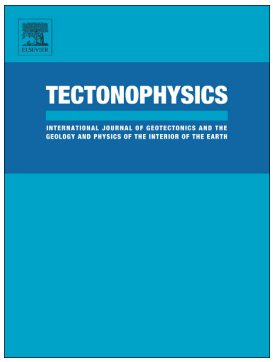

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Cyclical shear fracture and viscous flow during transitional ductile-brittle deformation in the Saddlebag Lake Shear Zone, California

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Abstract

Exhumed shear zones often contain folded and/or dynamically recrystallized structures, such as veins and pseudotachylytes, which record broadly contemporaneous brittle and ductile deformation. Here, we investigate veins within the Saddlebag Lake Shear Zone, central Sierra Nevada, California, to constrain the conditions and processes that caused fractures to form during ductile deformation. The shear zone mylonites contain compositional banding at centimeter- to meter- scales, and a ubiquitous, grain-scale, continuous- to spaced-foliation defined by aligned muscovite and chlorite grains. Veins of multiple compositions formed in two predominant sets: sub-parallel to the foliation and at high angle to the foliation. Some foliation sub-parallel veins show apparent shear offset consistent with the overall kinematics of the shear zone. These veins are folded with the foliation and are commonly boudinaged, showing they were rigid inclusions