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Geometric and Mechanical-Stiffness Controls on Jointing in Cataclastic Deformation Bands

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1 Geometric and Mechanical-Stiffness Controls on Jointing in Cataclastic Deformation

2 Bands

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10 Keywords: cataclastic deformation bands, joints, stress re-orientation, mechanical stiffness

11 contrast

12

13 Abstract

14 Cataclastic deformation bands on the Waterpocket Fold in southern Utah contain cross-
15 cutting joints that terminate at the contacts between the deformation bands and surrounding
16 sandstone. The mechanical contrast between sandstone host rock and stronger deformation
17 bands is analogous to inter-bedded weak and strong layers in a sedimentary sequence, a situation
18 known to result in joints preferentially forming in the stronger layers with joints perpendicular to
19 layer boundaries. Deformation bands in the field area represent conjugate strike-slip shear
20 zones, many with internal Riedel shear geometry, creating a three-dimensional network of
21 mechanically strong zones in variable orientations. Joint attitudes were found to vary
22 systematically as a function of deformation band strike, and the angle between each deformation

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