

Localization control for chlorite breccia deformation beneath Catalina detachment fault, Rincon Mountains, Tucson, Arizona [Journal of Structural Geology, v. 50, pp. 237-253]

The structural location of an approximately 3-km stretch of the Catalina detachment fault zone appears to have been controlled by an ultramylonite shear zone within mylonites of the Catalinae Rincon metamorphic core complex. The Catalina detachment fault zone consists of the detachment fault surface, a 3-5 m interval of cataclasite and ultracataclasite, up to ~50 m of chlorite breccia, and a discrete subdetachment fault. Beneath the subdetachment fault is a km-scale thickness of mylonites. Progressive ductile-to-brittle shear-zone evolution of the fault-rock stratigraphy started with mylonitization, was followed by overprinting of mylonites by chlorite brecciation, and culminated in the formation of the Catalina detachment fault and associated ultracataclasites. The detachment fault is cospatial with and subparallel to the zone of chlorite breccia. The subdetachment fault is subparallel to the interval of chlorite brecciation and to the detachment fault. The 'plane' of projection of the ~30-m thick ultramylonite shear zone within the mountain of mylonite, when followed down-dip, coincides with the base of the 'chlorite breccia' brittle shear zone. Ultramylonite is preserved in places in the immediate lower plate of the subdetachment fault. The position and orientation of the subdetachment fault appears to have been controlled by an ultramylonite shear zone within the lowerplate mylonites. The rheological properties and orientation of this ultramylonite shear zone favored its reactivation as the brittle sole fault of the zone of chloritic brecciation.