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BRITTLE EXTENSION OF THE CONTINENTAL CRUST ALONG A ROOTED SYSTEM OF LOW-ANGLE NORMAL FAULTS: COLORADO RIVER EXTENSIONAL CORRIDOR; Barbara E. John and Keith A. Howard, U.S. Geological Survey, Menlo Park, California 94025

A transect across the 100 km wide Colorado River extensional corridor of mid-Tertiary age shows that the upper 10 to 15 km of crystalline crust extended along an imbricate system of brittle low-angle normal faults. The faults cut gently down section in the NE-direction of tectonic transport from a headwall breakaway in the Old Woman Mountains, California. Successively higher allochthons above a basal detachment fault are further displaced from the headwall, some as much as tens of kilometers. Vertical excision across the faults may be as much as 15 km. The basal fault(s) cut initially to paleodepths of at least 10 to 15 km, the measured paleothickness of an upended allochthonous slab of basement rocks above the Chemehuevi-Whipple Mountains detachment fault(s). Allochthonous blocks are tilted toward the headwall as evidenced by the dip of the capping Tertiary strata and originally horizontal Proterozoic diabase sheets. Block tilt and degree of extension increase northeastward across much of the corridor. On the down-dip side of the corridor in Arizona, the faults root under the unbroken Hualapai Mountains and the Colorado Plateau. Slip on faults at all exposed levels of the crust was unidirectional. Brittle thinning above these faults affected the entire upper crust, and wholly removed it locally along the central corridor or core complex region. Isostatic uplift exposed metamorphic core complexes in the domed footwall. These data support a model that the crust in California moved out from under Arizona along an asymmetric, rooted normal-slip shear system. Ductile deformation must have accompanied mid-Tertiary crustal extension at deeper structural levels in Arizona.