

Evidence for multi-stage infiltration of aqueous fluids in a block-emplaced serpentinite along the San Andreas Fault

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A structural and petrological study of a tectonically-emplaced serpentinite sliver along the San Andreas Fault in California was initiated with the aim of understanding the geological history and emplacement mechanisms of such bodies that are common in the California Coast Ranges and along the San Andreas diffuse plate boundary. This particular serpentinite melange in Redwood City, California is largely composed of cm- to m-scale tectonite blocks that reflect the internal deformation and complex history of interaction with geofluids during peridotite alteration and ascent from the mantle. These tectonite blocks commonly exhibit a core-and-mantle internal structure that indicates that tectonic blocks have not come to mineralogical equilibrium. Innermost core structure often consists of partially-serpentinized Ol/OPx/Cpx peridotite rimmed by layers of greater degrees of serpentinization. These tectonite blocks are typically rimmed with green sheared lizardite indicating that high fluid pressure was present during the last stage of emplacement. We also observed chrysotile filled reticulate arrays of vein fillings that often cross cut the sheared lizardite. We discuss these and other observations in the context of the tectonic and fluid environments of the San Andreas Fault System that originated during Tertiary plate reorganization from subduction to continental transform tectonics.

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