

Physical and clay mineralogical characteristics of an imbricate in the Copper Basin fault, SE California

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Located south of Picacho State Recreation Area is the Copper Basin fault. The fault generally strikes ~EW and dips 56° S placing Jurassic (~161 Ma) gneiss over ~25 Ma Quechan volcanics. As it is traced westward, it breaks up into at least two imbricates. Here I focus on the most northward imbricate. At the study location, the fault zone of the hanging wall of the northern imbricate can be subdivided into a fault core and damage zone. Fragmentation and grain size comminution increases toward the fault core and through 3 distinctive textural zones of the damage zone. The latter features are referred to, from outermost to the fault core, as damage zones 1, 2, and 3. Grain density systematically decreases toward the fault core, as the bulk density decreases rapidly from the bounding country rock into damage zone 1 and then stays relatively steady to the fault core. Porosity increases rapidly and then remains relatively constant through the fault core. Four samples were evaluated for their clay mineralogy. The < 2 micron fraction analyzed from the sample located in damage zone 2 is composed of montmorilonitic smectite + minor pyrite. In contrast, the < 2 micron fraction evaluated from the innermost part of damage zone 3 is composed of montmorilonitic smectite + calcite + pyrite. Two samples analyzed from the fault core contained significant amounts of calcite + montmorilonitic smectite. In addition, the innermost sample contained mixed-layer illite/smectite with 10% illite. These data as a whole, suggest that fluids were focused through the fault core relative to the adjacent damage zone, and implies further that significant mass redistribution may have occurred within the core.