

Unroofing of the Pelona Schist, as Documented by Sedimentologic Evidence Along the San Andreas and Punchbowl Faults

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The informal Paradise formation is located near the hamlet of Paradise Springs, along Big Rock Creek, just east of Devil's Punchbowl County Park. Previous workers have mapped the Paradise formation as basal Punchbowl Formation; our work suggests that the two units should be differentiated.

The Paradise formation probably correlates with the Tick Canyon Formation of the Soledad basin, based on their similar unroofing sequences and stratigraphic position. The Paradise formation primarily consists of 210 m of alluvial conglomerate and sandstone. Conglomerate imbrications indicate transport primarily from NW toward SE (present orientation). Conglomerate clasts are dominantly Paleogene San Francisquito Formation at the base; granitoid, chloritic-breccia, and Pelona Schist clasts are found up section. This progression of clast types is consistent with unroofing of the upper plate (San Francisquito nonconformably on granitoid basement), followed by the San Francisquito-Pelona-Fenner-Orocopia detachment fault system (chloritic breccia), and culminating in exposure of the lower plate (Pelona-Orocopia Schist). Sandstone petrofacies confirm the unroofing sequence. Clasts of Pelona Schist have not been found in the Lower Miocene Vasquez Formation of the Soledad basin, but they do occur in the overlying Tick Canyon Formation.

Reversal of 42 km of dextral slip on the Punchbowl fault places the Paradise formation SE of an area of granitoid basement overlain by San Francisquito Formation. The granitoid basement structurally overlies Pelona Schist along the San Francisquito fault. Thus, the unroofing sequence and paleocurrents of the Paradise formation are consistent with its derivation from terrane across the Punchbowl fault. Alternatively, if average paleocurrents are more N to S, then derivation from the Orocopia Mountains (following reversal of 210 km on the San Andreas fault south of the Punchbowl area) is another possibility. Different models for reversal of clockwise vertical rotations of these blocks produce alternative paleogeography.