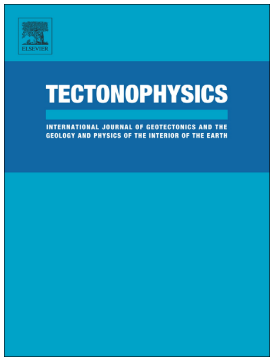

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Stratigraphic Record of Pliocene-Pleistocene Basin Evolution and Deformation Within the Southern San Andreas Fault Zone, Mecca Hills, California

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ABSTRACT

A thick section of Pliocene-Pleistocene nonmarine sedimentary rocks exposed in the Mecca Hills, California, provides a record of fault-zone evolution along the Coachella Valley segment of the San Andreas fault (SAF). Geologic mapping, measured sections, detailed sedimentology, and paleomagnetic data document a 3-5 Myr history of deformation and sedimentation in this area. SW-side down offset on the Painted Canyon fault (PCF) starting ~3.7 Ma resulted in deposition of the Mecca Conglomerate southwest of the fault. The lower member of the Palm Spring Formation accumulated across the PCF from ~3.0 to 2.6 Ma during widespread subsidence. SW-side up slip on the PCF and related transpressive deformation from ~2.6 to 2.3 Ma created a time-transgressive angular unconformity between the lower and upper members of the Palm Spring Formation. The upper member accumulated in discrete fault-bounded depocenters until initiation of modern deformation, uplift, and basin inversion starting at ~0.7 Ma.

Some spatially restricted deposits can be attributed to the evolution of fault-zone geometric complexities. However, the deformation events at ca. 2.6 Ma and 0.7 Ma are recorded regionally along ~80 km of the SAF through Coachella Valley, covering an area much larger