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The potential for a large-magnitude earthquake (Mw = 7.5) on the right-lateral strike slip San Andreas fault is generally considered high in southern California[1]. What is not known is the potential location of surface rupture from such an event, because a consensus on the primary fault at the surface in this region does not exist. Here, we use geomorphic and geochronologic evidence to present the longest and most continuous slip rate history for the San Andreas fault. This record demonstrates the Mission Creek fault strand as the primary, dominant plate boundary structure between the Pacific-North American plates at the latitude of W116.325 and W116.250 in the region of the San Gorgonio Pass and the Coachella Valley, [contrary to prior studies]. High, constant geologic slip rates of 22-26 mm/yr for the past ~100,000 years were derived from offset paleochannels. These paleochannels were dated over three different time intervals using both U-series dating of soil carbonates that were deposited as subsurface clast rinds, and ^{10}Be terrestrial cosmogenic radionuclide concentrations of surface clasts. These data, combined with published paleoseismic studies[2] imply that ca. 7.0 to 8.5 m of displacement have accumulated here since ca. 1690, the last surface-rupturing earthquake. Our findings underscore the seismic hazard posed by the Mission Creek fault strand and its surface rupture potential in a future San Andreas fault earthquake.

Biography: Dr. Kim Blisniuk (2011, U.C. Davis) is a field geologist and geochronologist interested in landscape evolution, earthquake geology, and tectonic reconstructions of dynamic processes in the upper crust. She is particularly interested in how crustal deformation at depth and changes in Earth's climate are archived on Earth's surface, as this information is critical for understanding regional climate and tectonics. Her research implements a variety of field and laboratory tools aimed at characterizing and quantifying rates of active landscape. These tools include geochronology (specifically terrestrial cosmogenic radionuclides and U-series dating), structural and geomorphic mapping, the analysis of high-resolution topography data, GIS, and the application of mechanical models to simulate the behavior of the structures observed in the field.