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Variations of fault slip per event on the Carrizo Segment, San Andreas fault: Is the repetition of fault slip characteristic through time*?*

The southern Wallace Creek site on the San Andreas fault provides an excellent opportunity for testing uniform or non-uniform slip in the middle of a geometrically simple fault segment (Figure 1). We completed a detailed topographic map of the offset channels B and C to prepare for 3-D excavations (Figure 2). We excavated two fault parallel trenches across the 1857 stream offsets at the Carrizo plain (Figure 1C). We are currently mapping the trench walls and will soon begin 3-D excavations. We have already met with BLM personnel and have received all necessary permits for our excavations.

The history of deposition and erosion is somewhat different from what we had suggested last year, based upon our recent investigations. The stratigraphy exposed in the upstream trench consists of Holocene alluvial and colluvial deposits. Trench wall exposures reveal very-fined grained laminated siltly alluvium, that most likely represent suspended load deposits. The stratigraphically highest laminated silty alluvium is beautifully exposed, with a capping organic layer. We interpret the fine-grained alluvium as representing ponded alluvium, that formed upstream from a small shutter ridge or uphill-facing fault scarp. The capping organic material probably represents organic material (e.g. grasses, etc.) that settled out of the water column. The presence of a thin organic layer that immediately overlie the fine-grained alluvium and burn layers will allow us to precisely date past earthquakes. Stratigraphically below the uppermost ponded alluvial deposit lie two additional fine-grained alluvial deposits, each representing suspended load that ponded upstream from a shutter ridge. Laterally correlative to the middle ponded alluvium is a burn layer. We confident that we will be able to map in three dimensions piercing lines along the channel thalweg and channel edge to the San Andreas fault.

The downstream trench exposes Holocene alluvial and colluvial deposits. Here, post-1857 channel deposits are not extensively bioturbated. Alluvial channel deposits are well exposed, thus allowing us to map upstream in three dimensions piercing lines along the channel thalweg and channel edge to the San Andreas fault. Because of the excellent trench wall exposures in the upstream and downstream excavations, we are confident that we will be able to continue fault parallel excavations and determine precise offset along the older offset gullies, farther northwest from source channels A, B, and C. Colluviation at the base of the fault scarp has buried these small gullies near the fault, and so determining their precise geometry from surface geomorphology is difficult.

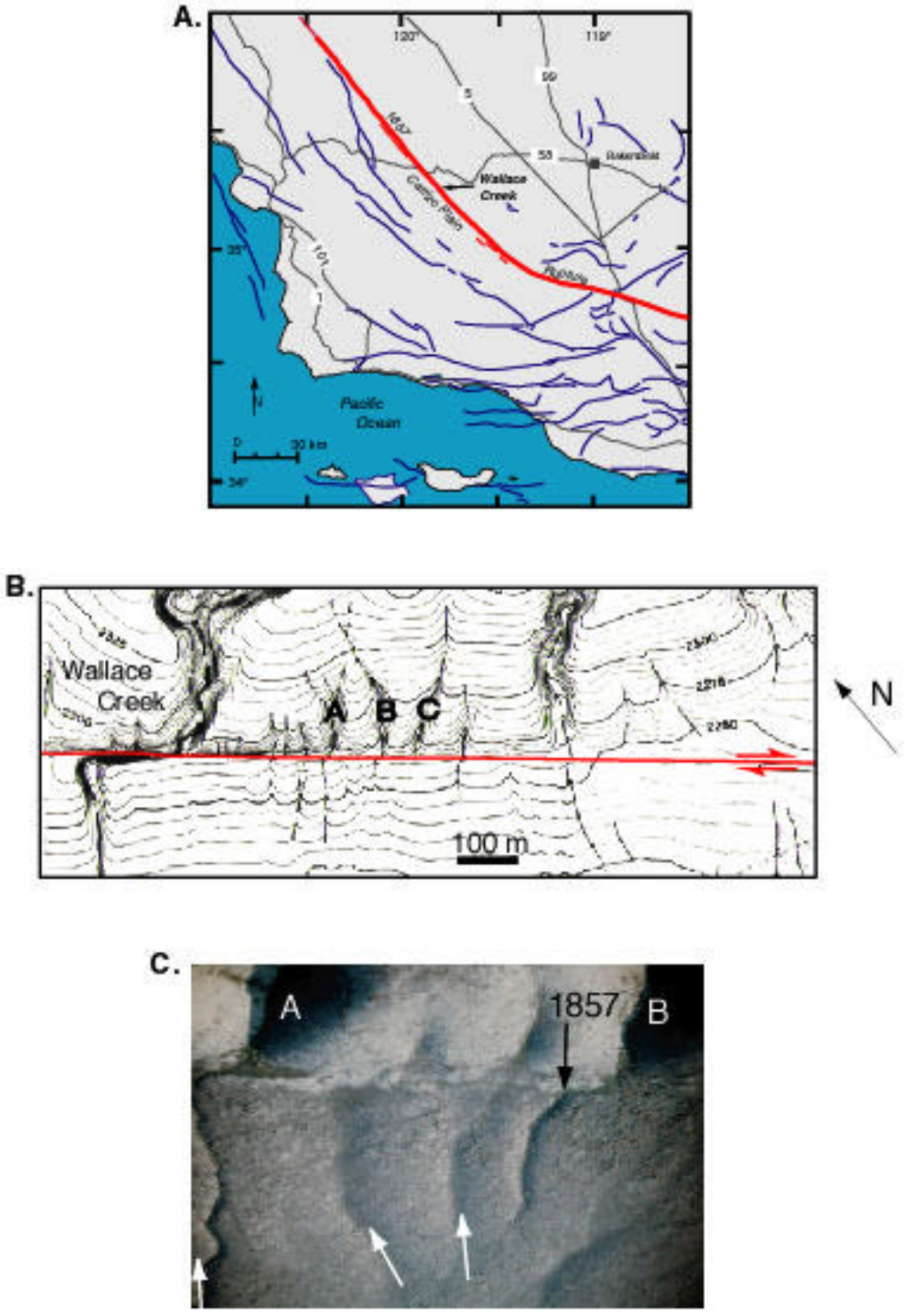

Figure 1. A. Location map of Wallace Creek, along the 1857 rupture of the San Andreas fault. Fault map from Jennings [1975]; B. Topographic map of Wallace Creek and nearby small offset streams; contour interval = 5 feet; C. Oblique aerial photos of small channels A and B and their offset downstream segments

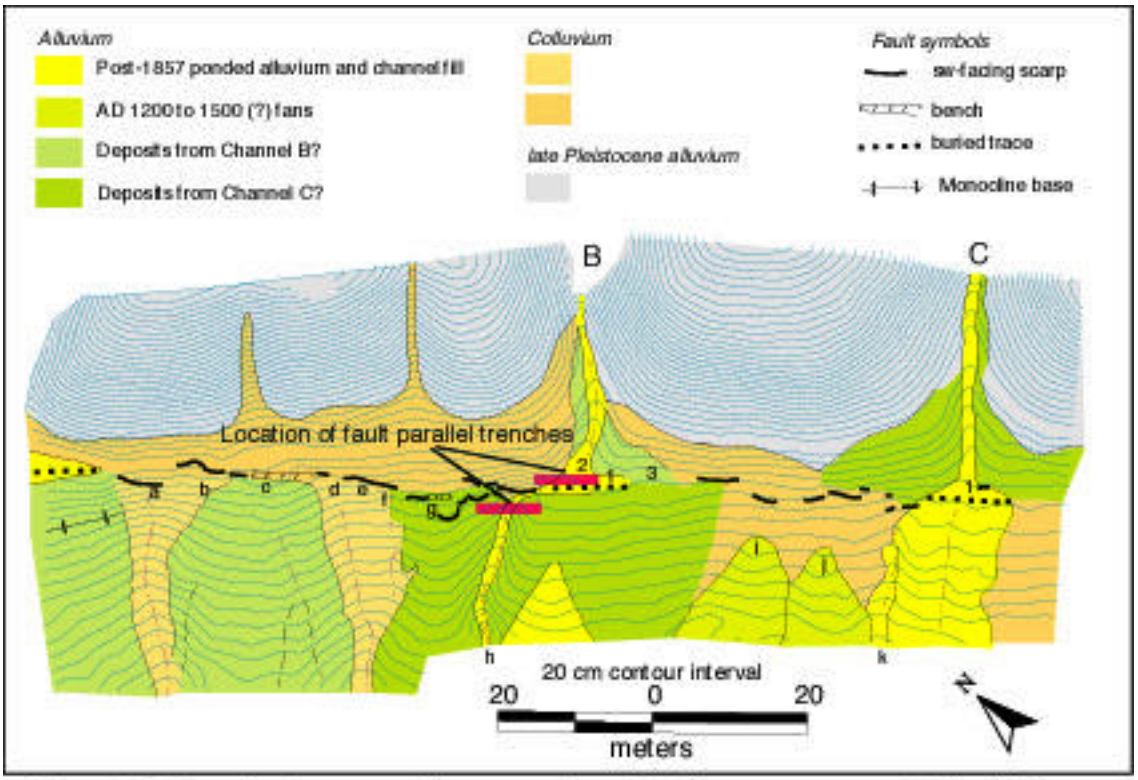

Figure 2. Detailed topographic map of small offset streams and alluvial fans, southwest of Wallace Creek.

Site Reconnaissance for Paleoseismic Studies along the Sierra Madre fault from Big Tujunga to San Antonio Canyon

Scott Lindvall and I identified two potential excavation sites using the detailed topography (6° U.S.G.S. topographic maps, [e.g., Rubin and Sieh, 1994], and Whittier Fairchild aerial photographic collection. One site is near the Monvoria Nursery, the other just a few kilometers east of the nursery. We are planning on obtaining permission from the landowners and will submit a joint NEHRP this coming spring.

Hydraulic Trench Shoring for Paleoseismic Studies in Southern California

Twenty two hydraulic shores, hydraulic pumps, tools, and connectors were purchased from Trench Shoring Corporation in Los Angeles, California. The company has given SCEC a substantial price discount. The shores are stored at Kresge Laboratory, a few miles from the Seismological Laboratory, Caltech and at San Diego State University. Kresge has proved to be an ideal storage facility; it is a secure location and is easily accessible and located close to freeways. Two sheds, one with a new concrete pad were build at the laboratory for storage. The shores have been used in numerous SCEC supported research projects (e.g., Burro Flats and Carrizo plain sites along the San Andreas fault, Sierra Madre fault, etc.).