

## TECTONO-GEOMORPHIC CONTEXT OF GEODETIC DATA ACROSS AN ACTIVE BASIN AND RANGE NORMAL FAULT, CRESCENT VALLEY, NEVADA

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Geodetic strain and late Quaternary faulting in the Basin and Range province is distributed over a region much wider than historic seismicity, which is localized near the margins of the province. In the relatively aseismic interior, both the magnitude and direction of geodetic strain may be inconsistent with the Holocene faulting record. We document the best example of such a disagreement across the NE-striking,  $\sim 55^\circ$  NW-dipping Crescent normal fault, where a NW-oriented, 70 km geodetic baseline records contemporary shortening of  $\sim 2$  mm/yr orthogonal to the fault trace. In contrast, our morphometric, paleoseismic, and geochronologic analyses of the Crescent fault imply that an extensional surface-rupturing earthquake occurred during the late Holocene. An excavation across the fault at Fourmile Canyon reveals the most recent event occurred at  $2.8 \pm 0.1$  ka, with net vertical tectonic displacement of  $4.6 \pm 0.4$  m, corresponding to

the release of  $\sim 3$  m of accumulated NW-SE extension. Measured alluvial scarp profiles suggest a minimum rupture length of 30 km along the range front for the event, implying a moment magnitude  $M_w$  between 6.6 and 7.3. No prior event occurred between  $\sim 2.8$  ka and  $\sim 6.4 \pm 0.1$  ka, the  $^{14}\text{C}$  calendar age near the base of the exposed section in the excavation. Assuming typical slip rates for Basin and Range faults ( $\sim 0.3$  mm/yr), these results imply that up to 1/3, or  $\sim 1$  m, of the extensional strain could have reaccumulated across the fault. However, the contemporary shortening implies that the fault is unloading due to a transient process, whose duration is limited to between 6 years (geodetic recording time) and 2.8 ka (the age of the most recent event). These results emphasize the importance of providing accurate geologic data on the time scale of the earthquake cycle in order to evaluate geodetic measurements.