APPENDIX A: Plots of luminescence data

Figures A1 through A7 show probability density plots and radial plots for each luminescence sample presented in Table 1. Probability plots show equivalent dose in seconds for each aliquot from a sample. Radial plots (created using RadialPlotter from Vermeesch, 2009) show the same data, as well as the calculated central age for each sample in seconds (Galbraith and Roberts, 2012).

APPENDIX B: Comparison of terrace ages to incision amounts

Figures B1 through B6 show cumulative incision vs terrace ages on log-log plots to evaluate how the active channel elevation compares to average elevation during times of strath development. Points and joining horizontal bars show min and max ages and age range for each terrace. The power-law exponent (b) of a best-fit line is shown on each plot. Figures B1, B2, B3, B4 and B6 show b>1 for terraces along the Santa Ynez River, which indicates that the modern channel is higher than its long-term average as incision has slowed. Figures B2 and B4 show that when the higher terraces are plotted relative to the elevation of the lowest terrace (to correct for any bias due to unsteady incision and time-dependent incision rates), we still see b>1, which indicates that changes in incision rates over time are real (Gallen et al., 2015), and in this case due to actual changes in tectonic uplift rate over time. The data in Figure B5 further support this by showing that when this analysis is done for a reach of the Santa Ynez River that passes through a footwall syncline we get b<1, which indicates that the channel is currently lower than average due to increased incision as subsidence in the footwall has ceased.

APPENDIX C: Measurements of dip-slip displacement

Figures C1 through C5 show how estimates of dip-slip displacement were made at selected sites along the Santa Ynez, Little Pine, and Baseline faults. Terrace tread profiles are shown as black lines and orange dashed lines show projections of these tread surfaces extended across the fault zones. The assumed maximum and minimum faults dip angles (estimated from nearby measurements shown on published geologic map) are shown as blue lines. Vertical displacement across the faults in shown, along with the average gradient of the terrace surfaces upstream and downstream of the faults. Refer to Figures 3 and 4 in the main text for locations where the faults displace terraces.