

Project Abstract

Paleoseismological investigations of the San Andreas Fault in the Carrizo Plain have greatly influenced models of fault behavior and seismic hazard. Early geomorphic analysis of channel offsets near Wallace Creek led to development of a hypothesis that the Carrizo Plain segment is unusually strong and produces only large earthquakes (>7.8 M) every 240 to 450 years (Sieh and Jahns, 1984) unlike the segments that bound it to the north and south. Investigations of the Bidart Fan site, approximately 5 km southeast of Wallace Creek in the Carrizo Plain, have provided some of the best data on large surface rupturing earthquakes (Grant and Sieh, 1994). The Bidart site has good, reliably datable stratigraphy for discriminating individual earthquakes. Previously published results based on ¹⁴C analysis of 14 samples suggested that five surface ruptures occurred in a "cluster" of earthquakes between 1218 and 1857 A.D, culminating in the 1857 Fort Tejon earthquake. In 2005 and 2006 we excavated 5 additional trenches at the Bidart Fan and found evidence for additional earthquakes during the same time period, yielding an even shorter average recurrence interval of approximately a century (Grant et al., 2005; Akciz et al., 2006; Akciz et al., in prep). The significance of these results warrants thorough vetting prior to publication. Therefore, we have done additional radiocarbon dating of 39 archived samples to improve age constraints on the earthquakes from Grant and Sieh's (1994) original work, and compare with dates of earthquakes from our 2005-2006 trenches. The radiocarbon ages and probabilistic analysis using OxCal provide better constraints on the dates of individual earthquakes. The youngest surface rupture was the historic 1857 earthquake (Event A). Two earthquakes (Events B and C) occurred in the time interval 1540-1840. Event D occurred 1370-1425, and Event E occurred 1285-1340. Dates of 2 older events (F and G) remain poorly constrained as after 200 BC. The five younger events occurred between 1285 and 1857 AD, leading to an average recurrence interval of 143 years.