

## Project Abstract

We have documented the stratigraphy and structure of several trenches across the San Bernardino strand of the San Andreas fault at the Plunge Creek site, near San Bernardino, southern California. The most recent faulting event exposed in the trenches (event W) appears to have occurred between about AD 1440 and AD 1660, if the radiocarbon dates are taken at face value. Two of the trenches reveal suggestive evidence for an older faulting event (event R), which post-dates AD 1220.

Because the age control at Plunge Creek is based on radiocarbon dating of detrital-charcoal samples, we must consider all of the radiocarbon ages as maximum estimates of the depositional ages for the layers from which the samples were collected. Thus, event W is not strictly constrained to predate AD 1660. We use ecological arguments to infer that the detrital-charcoal samples at the Plunge Creek site probably overestimate the depositional ages of the sedimentary layers by about 1 +/-1 fire-cycle (i.e., by about 70 +/- 70 years). An independent estimate, based on extrapolation of sedimentation rates to the ground surface, suggests a similar value (0-95 years) for the lag time between the calibrated radiocarbon date of a sample and the depositional date of the layer from which it was collected. After applying an estimated correction (70 years) for the inherited ages of the detrital-charcoal samples, the date of event W is most likely between AD 1510 and AD 1730, with a preferred date of about AD 1630. The preferred date for event R is about AD 1450.

It is unlikely that event W represents the southeastern continuation of the AD 1812 earthquake. In order for this to be true, the 16 dated samples that most closely overlie event W would all have to have had inherited ages larger than 245 years, if we use the median dates of the samples. Alternatively, all 16 of these sample would have to have had inherited ages larger than 150 years, if the true dates for all 16 samples were at the younger ends of their two-sigma error bars. It is also unlikely that any earthquake younger than event W has ruptured the ground surface at Plunge Creek. Although ambiguities exist in some of the trenches, relationships in trench 10 argue against any surface rupture subsequent to event W. Stratified deposits extend for the entire length of trench 10 and are unfaulted above the level of event W.