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Abstract

Paleoseismic studies of the San Andreas Fault in the San Bernadino Area

A trench across the San Bernadino segment of the San Andreas fault in San Bernadino, California, revealed vertical offsets that provide strong evidence for two surface ruptures in the past 800 years. The vertical average recurrence interval between the two events is about 160 years. Seven radiocarbon dates of detrial charcoal are in correct stratigraphic order and indicate an average sedimentation rate of 5.3 mm/year. In addition, these dates constrain the ages of the individual faulting events. The oldest event occurred shortly after A.D. 1812 and the A.D. 1700 events at Pitman Canyon and Wrightwood. A second trench will be open on another young alluvial fan at this site to further investigate the occurrence of recent earthquakes in this area.

Introduction:

The Late Cenozoic San Andreas Fault system forms the boundary b Pacific Plate and the North American plate. The San Andreas Fault ext 1300 km through California where it separates major crustal blocks. I extensive high angle, strike slip faults, trending N 35º- 40º W. Dur the fault curves abruptly eastward to cut diagonally across the Tran then splays into several auxiliary faults before it terminates near t (Wallace, 1990). In southern California, the plate motion is partitic right-lateral faults, the San Andreas, San Jacinto, and Elsinore Faul

The San Andreas Fault is divided into several segments on the ba geometry and historical fault rupture locations. In order for the de segments to be useful, fault segment boundaries should be relatively multiple seismic cycles, and should appear frequently in limiting the earthquakes. Thus sites on the same segment should share more paleose those on different segments (Seitz et al., 1995). Figure 1 shows larg that are believed to produce damaging earthquakes based on historical paleoseismic evidence of large earthquakes and slip rate (Wallace, 19 Bernardino segment has a 28% chance of producing a 7 – 7.5 magnitude next 30 years (SCEC, .1995)

The San Bernardino segment of the southern San Andreas Fault is understanding the behavior of the fault. Constraints on the ages of p along this segment are needed to see whether or not past earthquakes Mojave, San Bernardino, and Coachella segments in a single, very larg that the San Bernardino segment is the most heavily populated sectio

Fault in Southern California makes it important to investigate the va
calculated recurrence intervals and the magnitudes that some earthqua
generate.

Site description:

In this study, we report the preliminary results from a trench
southern San Andreas Fault in the San Bernardino segment, about 45-km
Pitman Canyon (fig.2). At this site, the San Andreas Fault zone comp
fault strands, the northern branch and the southern branch. Our tren
branch of the San Andreas Fault, which carries most of the slip with
Fault zone (Sieh et al., 1994). The site is located in an abandoned o
Creek on the northwest and Oak Creek on the south. The north-south t
contours, perpendicular to Oak Creek, suggest that most of the site
alluvium deposited on the flood plain of Oak Creek (see Qya2 in fig.3
young alluvial fan at the mouth of a gully just southeast of Plunge C
alluvium on the flood plain of Oak Creek (fig.3). The stratigraphy a
relatively well bedded, sandy sediments that are less than 1000 years
In addition, the abundance of detrital charcoal in all parts of the s
makes bracketing the ages of the earthquake horizons possible. The ra
year average sedimentation rate makes it possible to distinguish diff
horizons that are closely spaced in time from each other. This favora
helped to better constrain the ages of the earthquakes and their recu

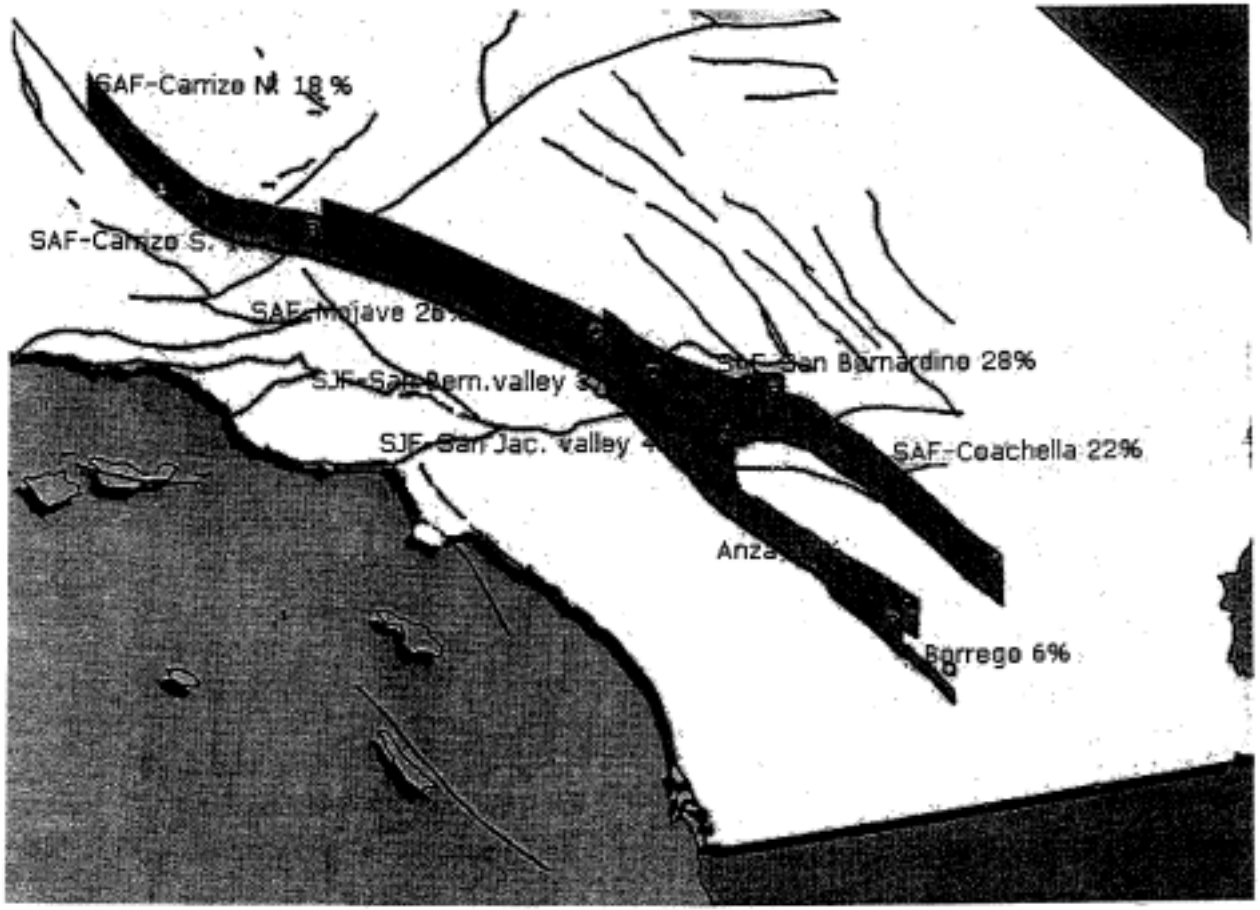

Figure 1. A probability plot of different segments of the San Andreas Faults. Th e San Bernardino segment of the San Andreas Fault shows 28 % probability of rupture in the next 30 years. Modified from SCEC, 1994.

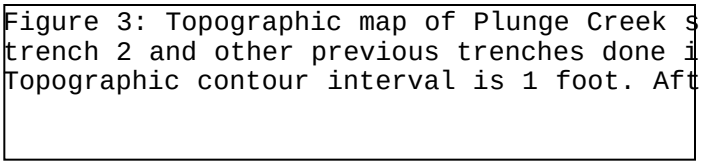

Figure 3: Topographic map of Plunge Creek s
trench 2 and other previous trenches done i
Topographic contour interval is 1 foot. Aft

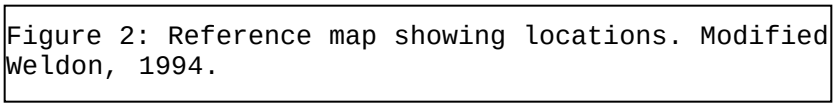

Figure 2: Reference map showing locations. Modified
Weldon, 1994.