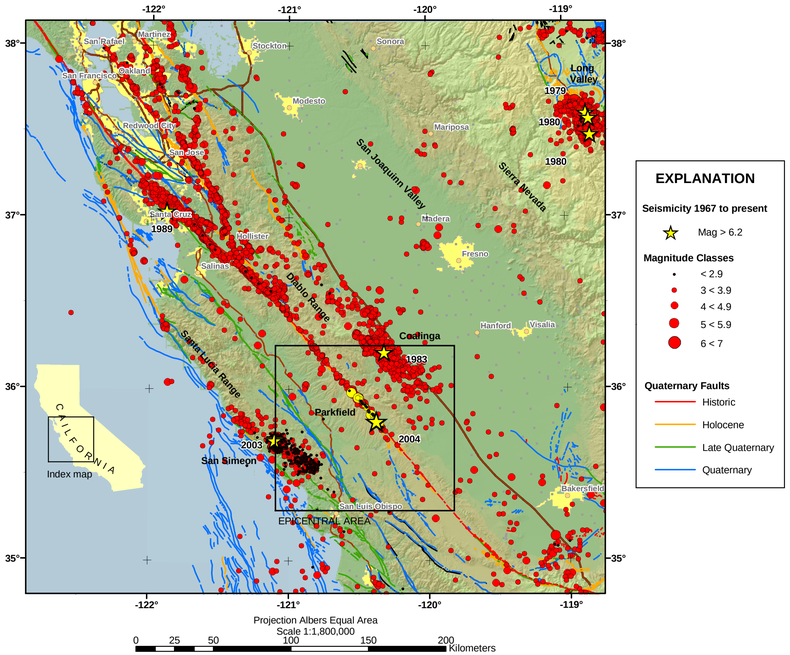
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

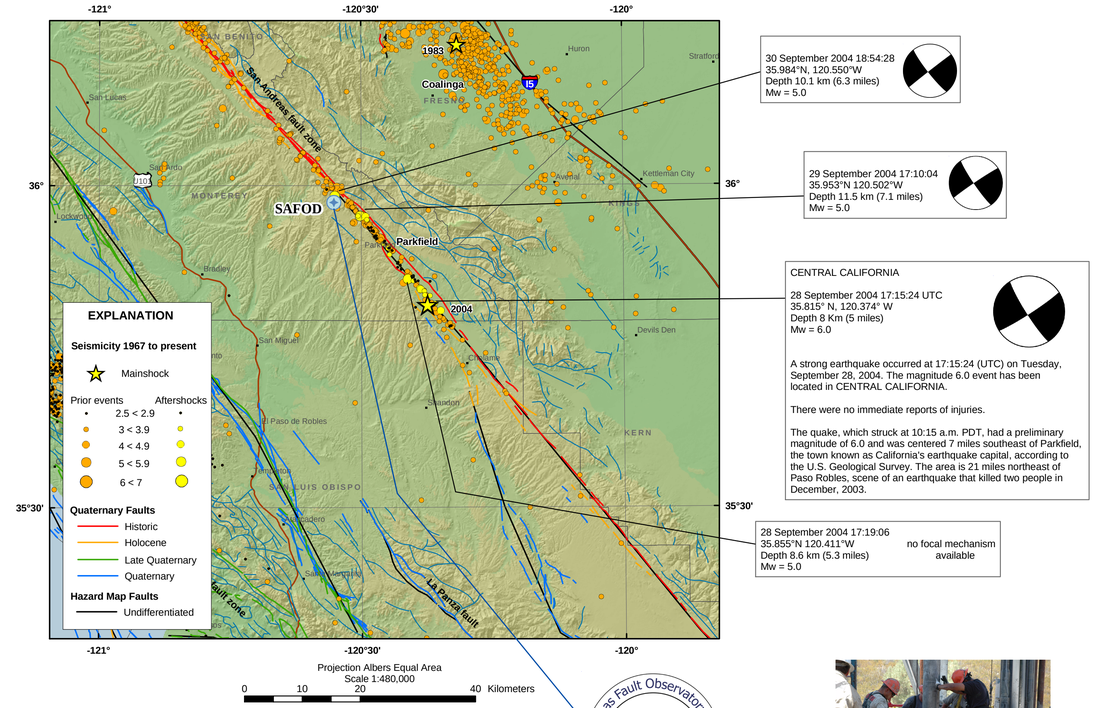
M6.0 28 September 2004 Parkfield, California Earthquake

Prepared in cooperation with. CISN California Integrated Seismic Network — a partner in ... Advanced National Seismic System ANSS

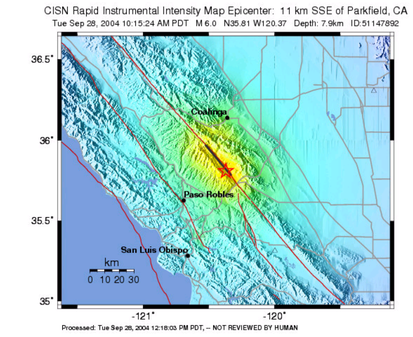
Seismicity and Physiographic Setting



Epicentral Area



Instrumental Intensity Map

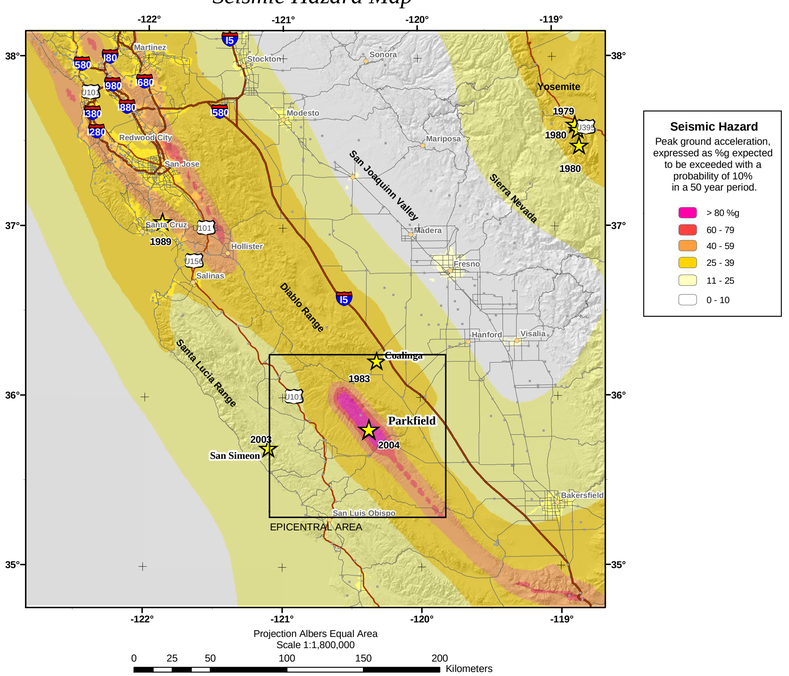


PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

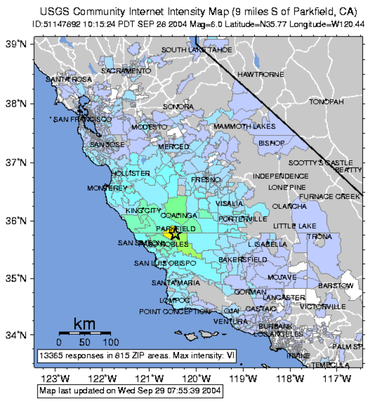
SHAKEMAP
A Shakemap is a representation of ground shaking produced by an earthquake. While an earthquake has one magnitude and one epicenter, it produces a range of ground shaking levels at sites throughout the region. These different shaking levels depend on distance from the earthquake, rock and soil conditions at sites, and variations in the propagation of seismic waves from the earthquake due to complexities in the earth's crust.

The red star marks the epicenter and the black line shows the inferred fault rupture.

Seismic Hazard Map



Reported Intensity Map



INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+
SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy

COMMUNITY INTERNET INTENSITY MAP
The CIIM, commonly referred to as "Did you feel it?", summarizes the online questionnaire responses provided by internet users. An intensity number is assigned to each community from which a completed from was received, each intensity value reflects the effects of earthquake shaking on the people and structures in the community. The color- coded ZIP code on the map represents the average of the indiviudal intensity vlaues in that ZIP code zone. For more information about CIIM go to: http://earthquake.usgs.gov/. Select "Did you feel it?"

TECTONIC SUMMARY

This earthquake occurred on a relatively straight section of the San Andreas Fault near Parkfield, California. The well-known San Andreas fault is a right-lateral strike-slip fault that stretches 1300 km from the Gulf of California to Cape Mendocino in Northern California. The fault is part of the principal plate boundary between the North American plate and the Pacific plate. The Pacific plate moves northwest with respect to the North American plate at a velocity of 46 mm/yr. At the latitude of Parkfield, approximately seventy percent of the overall relative plate motion is accommodated by slip on the San Andreas.

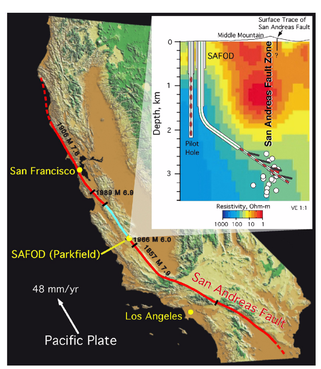
In the Parkfield section of the San Andreas (Parkfield to Goldhill), the fault transitions from a creeping zone in the north to a locked zone in the south. The creeping section stretches north of the Parkfield section to San Juan Bautista. Along the creeping section, the motion between the Pacific and North American plates is accommodated by continuous non-seismic slip along the fault and numerous small earthquakes with magnitudes generally less than 5. To the south of the Parkfield section, the San Andreas has been locked since the magnitude 7.9 Fort Tejon earthquake of 1857. In this section of the San Andreas, relative plate motions have caused elastic strain to accumulate for almost a century and a half. When the strength of the fault is finally exceeded, the ensuing earthquake will be much larger than the shock of September 28, 2004.

The Parkfield section has been characterized for a century and a half by frequent minor and moderate shocks. Earthquakes of comparable size to this recent quake (magnitude 6) occurred in 1857, 1881, 1901, 1922, 1934, and 1966. There is substantial overlap between the zone of the aftershocks of this recent earthquake and the aftershock zone of the 1966 earthquake. The fault segment that ruptured in the 1966 earthquake had a length of about 25 km and a width of about 5 km; the average displacement of the fault rupture was about 50 cm.

DISCLAIMER

Base map data, such as place names, highways and other cultural features,are the best available but may not be current or may contain inaccuracies, and therefore should not be regarded as having official significance.

The San Andreas Fault Observatory at Depth (SAFOD) is a component of EarthScope. EarthScope will investigate the structure and evolution of the North American continent and the physical processes controlling earthquakes and volcanic eruptions. EarthScope is funded by the National Science Foundation and conducted in partnership with the US Geological Survey.



Rig hands attach a new drill bit to the drill pipe.

Geologist Jessica Mitchel examines ground up rock chips collected from the drilling mud to determine variations in rock composition and physical properties in the San Andreas fault zone.

FAULT-ZONE DRILLING NEAR PARKFIELD

Last summer, an international team of scientists embarked on a project to drill an angled hole through a seismically active portion of the San Andreas Fault Zone, creating a San Andreas Fault Observatory at Depth (SAFOD). 10,000 feet of drilling brought the borehole within hundreds of feet of the fault zone, and instruments are now being installed to collect data on the locations of small San Andreas earthquakes in preparation for the next phase of drilling.

Next summer, SAFOD will drill directly through the fault to a depth of about 3 km, obtaining samples and making geophysical measurements within and adjacent to the fault zone, and installing instruments to continuously monitor variations in rock deformation and other parameters during the earthquake cycle. A third phase of drilling in 2007 will target selected portions of the fault zone that host repeating small earthquakes.

When completed, SAFOD will provide direct information on the composition and mechanical properties of fault rocks, the nature of stresses responsible for earthquakes, the role of fluids in controlling faulting and earthquake recurrence, and the physics of earthquake initiation and rupture. By observing earthquakes up close, SAFOD will mark a major advance in the pursuit of a rigorous scientific basis for earthquake hazards assessment and prediction.

DATA SOURCES
USGS, National Earthquake Information Center
California Integrated Seismic Network
US Quaternary Faults and Fold Database
California Geological Survey
USGS EROS Data Center
ESRI Data and Maps
National Science Foundation - Earthscope

ONLINE SOURCES
http://earthquake.usgs.gov/
http://www.cisn.org/
http://qfaults.cr.usgs.gov/
http://www.consrv.ca.gov/cgs/
http://www.earthscope.org/

Map prepared by U.S. Geological Survey
National Earthquake Information Center
30 September 2004 2:00 pm PDT (2100 UTC)
Map not approved for release by Director USGS