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Quaternary Fault and Fold Database of the United States

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Ventura fault (Class A) No. 91

Last Review Date: 2002-02-19

Compiled in cooperation with the California Geological Survey

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Synopsis	Ventura fault is a north-dipping reverse-oblique slip fault that is expressed at the surface as a monocline with secondary normal faulting (Sarna-Wojcicki and others, 1976 #1316; Smith, 1976 #6030; Smith, 1978 #6031). Prentice and Powell (1991 #6025) reported evidence of steeply north-dipping faults between 4.5 and 9 m below the surface in borings; otherwise trench investigations done in compliance with California's Alquist-Priolo Earthquake Fault Zoning Act (Hart and Bryant, 1997 #4856) have only exposed secondary normal faults related to monoclinal flexure. There is disagreement as to the seismogenic potential of the fault: Yeats (1982 #6032; 1982 #6033) suggests that the fault is a bending moment fault with no potential for large, damaging

	earthquakes; Sarna-Wojcicki and others (1976 #1316) and Sarna-Wojcicki and Yeats (1982 #6028) concluded that the Ventura and Pitas Point [180] faults do have the potential for producing damaging earthquakes. Clark and others (1984 #2876) reported late Pleistocene to Holocene dip-slip rate of 0.8-2.4 mm/yr, based on south-facing scarp observed by Sarna-Wojcicki and others (1976 #1316) across Harmon alluvial fan. Various studies (e.g., Sarna-Wojcicki and others, 1976 #1316; Yerkes and others, 1987 #6035; Yerkes and Lee, 1987 #6037; Dahlen, 1989 #6020) have presumed that the onshore Ventura fault is an extension of the offshore Pitas Point fault [180], because of their similar strike and inferred end points west of Ventura (Sarna-Wojcicki and others, 1976 #1316). In this compilation, the Ventura fault name is used for the onshore north-dipping reverse-oblique fault. The offshore Pitas Point fault [180] will be considered separately.
Name comments	Fault first suggested by Putnam (1942 #6026), who noted that terraces in the Ventura area were disrupted by several vertical and south-dipping high angle reverse faults. Ogle and Hacker (1969 #6023) show a north-dipping reverse fault along the south margin of the Ventura Avenue anticline. First named Ventura Foothills fault by Quick (1973 #6027) and Nichols (1974 #6022). Sarna-Wojcicki and others (1976 #1316), who provide the most detailed mapping of the fault, named the fault the Ventura fault and associated this onshore fault with the offshore Pitas Point fault [180]. Ziony and others (1985 #5931) refer to this fault zone as the Pitas Point-Ventura fault. The name Pitas Point fault [180] has also been assigned to the Ventura fault. **Fault ID:** Refers to number 336 (Ventura fault) of Jennings (1994 #2878) and number 55 (Pitas Point-Ventura fault) of Ziony and others (1985 #5931).
County(s) and State(s)	VENTURA COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Location of fault from Qt_flt_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to

	1:24,000-scale map by Smith (1976 #6030) augmented by 1:750000-scale map by Jennings (1994 #2878).
Geologic setting	The Ventura fault is a north-dipping reverse-oblique slip fault located in the western Transverse Ranges geomorphic province. The fault extends from the mouth of the Ventura River eastward to near the town of Saticoy. Some workers consider that the Ventura fault extends westward offshore and connects with the Pitas Point fault [180] (e.g., Sarna-Wojcicki and others, 1976 #1316; Yerkes and others, 1987 #6035). Total displacement along the Ventura fault is not well documented. Ogle and Hacker (1969 #6023) reported an apparent vertical separation of 245 m of the Pleistocene Las Posas Formation.
Length (km)	13 km.
Average strike	N89°W
Sense of movement	Reverse, Left lateral *Comments:* Ogle and Hacker (1969 #6023) reported a 245 m vertical separation of the base of the Pleistocene Los Posas Formation based on oil well data, although they associated this displacement with the Pitas Point fault [180]. Sarna-Wojcicki and others (1976 #1316) and Yerkes and others (1987 #6035) reported that fault is primarily reverse with a component of sinistral strike-slip displacement, based on geomorphic expression of the fault and selected focal plane solutions. Yerkes and others (1987 #6035) estimated 3:1 vertical to horizontal displacement components.
Dip	55°-65° N. *Comments:* Dip reported by Yerkes and others (1987 #6035).
Paleoseismology studies	There have been 28 site-specific investigations using trenching in compliance with the Alquist-Priolo Earthquake Fault Zoning Act (Hart and Bryant, 1997 #4856). These studies principally have attempted to locate Holocene active traces of the Ventura fault. Specific paleoseismic investigations have not been attempted.
Geomorphic expression	The 10-km-long fault is delineated by a south-facing scarp on late Pleistocene and Holocene alluvium.

Age of faulted surficial deposits	Fault offsets early to mid-Pleistocene San Pedro Formation (Sarna-Wojcicki and others, 1976 #1316), 80-ka marine terrace deposits (Yerkes and others, 1987 #6035). Sarna-Wojcicki and others (1976 #1316) mapped Holocene Harmon Canyon alluvial fan as offset.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Timing of the most recent paleoevent is poorly constrained. Sarna-Wojcicki and others (1976 #1316) reported that Harmon Canyon alluvial fan is offset by the Ventura fault. Amino acid racemization ages of rodent bones recovered from 4 m depth below the fan surface range from 5,700 yr BP to 6,300 yr BP (Sarna-Wojcicki and others, 1976 #1316). Clark and others (1984 #2876) estimated age range of 5.7 ka to 15 ka for alluvial fan surface, based on data from Sarna-Wojcicki and others (1976 #1316).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* 0.4 mm/yr vertical component reported by Yerkes and others (1987 #6035); value is uplift rate in last 80 ka, based on interpretation of deformation in emergent marine terraces. Clark and others (1984 #2876) and Petersen and Wesnousky (1994 #6024) reported a dip-slip rate of 0.8-2.4 mm/yr, based on the maximum scarp height of 12-13.9 m (assuming fault dips 60? to 90?) reported for the fault (Sarna-Wojcicki and others, 1976 #1316) and an assumed age of 5.7-15 ka, the age range of the Harmon alluvial fan. However, Sarna-Wojcicki and others (1976 #1316) reported age of for the surface of the Harmon alluvial fan is 5.7-6.3 ka, based on amino acid racemization of rodent bones found about 4 m below the fan surface. Slip rate assigned by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 1.0 mm/yr (with minimum and maximum assigned slip rates of 0.5 mm/yr and 1.5 mm/yr, respectively).
Date and Compiler(s)	2002 Sue Perry, Southern California Earthquake Center/U.S. Geological Survey

	William A. Bryant, California Geological Survey
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