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Quaternary Fault and Fold Database of the United States

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Santa Ynez fault zone, Western section (Class A) No. 87b

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Synopsis	**General:** Other than the basic geologic map location from Dibblee (1950 #5977; 1966 #5978) and a few other local studies, very little is known about most of this fault zone. Paleoseismic studies have been done in only two localities--the Alegria Canyon site along the Santa Ynez, South Branch section [87c] and the Rancho San Marcos site near the assigned section boundary between the Santa Ynez, Western section [87b] and Santa Ynez, Eastern sections [87d]. Although the latter study site, demonstrating Holocene displacement, is tentatively placed in the Santa Ynez, Eastern section [87d], the majority of this section (especially in Ventura County) is very poorly studied with respect to recency of activity. The South Branch is a little better known as a result of investigations in the late 1970's and early 1980's for a proposed Liquefied Natural Gas (LNG) facility (Envicom, 1978 #5981; Yerkes and others, 1980 #5993; Rice and others, 1981

	#5986) as well as an earlier study cited by Hart (1978 #5983). **Sections:** This fault has 4 sections.
Name comments	**General:** **Section:** Section extends from the vicinity of Highway 1 and El Jaro Creek eastward to the vicinity of Lake Cachuma. This section includes Santa Ynez, North Branch of Dibblee (Dibblee, 1950 #5977). **Fault ID:** Refers to numbers 301 (Pacifico fault), 320 (Santa Ynez fault) and 321 (Santa Ynez fault, south branch) of Jennings (1994 #2878) and number 44 (Santa Ynez fault) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	SANTA BARBARA COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1:750,000 scale. *Comments:* Location digitized from 1:750,000 map of Jennings (1994 #2878).
Geologic setting	Santa Ynez fault, an east-west structure along the north side of the Santa Ynez and Topatopa Ranges, is largely responsible for the uplift of these ranges (Dibblee, 1982 #5980). The fault has several kilometers of vertical displacement but also a strong, but unknown sinistral component (Dibblee, 1982 #5980); fault (along with Santa Ynez River fault) is modeled to accommodate clockwise rotation of the Transverse Ranges (Hornafius and others, 1986 #5922).
Length (km)	This section is 39 km of a total fault length of 148 km.
Average strike	N84°E (for section) versus N83°E (for whole fault)
Sense of movement	Left lateral *Comments:* Sinistral component inferred based on several studies along the eastern section (Page and others, 1951 #5985; Keaton, 1978 #5984; Sylvester and Darrow, 1979 #5989; Darrow and Sylvester, 1984 #5976) in addition to evidence of sinistral slip,

	such as horizontal slickensides as well as structural and stratigraphic offsets, a normal component is indicated by uplift of ranges to the south (Dibblee, 1982 #5980).
Dip Direction	S *Comments:* Most of the fault has near vertical dips; some secondary splays have lower dips (Dibblee, 1950 #5977); 46? S at depth near Santa Ynez peak (Page and others, 1951 #5985).
Paleoseismology studies	
Geomorphic expression	Fault-line valleys, saddles, sinistrally deflected drainages, fault marks base of north slope of Santa Ynez mountain front (Dibblee, 1950 #5977).
Age of faulted surficial deposits	Tertiary and Cretaceous bedrock units are juxtaposed; no Quaternary offsets are mapped (Dibblee, 1950 #5977; Dibblee, 1966 #5978).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* No data available from this section; timing based on Jennings (1994 #2878); Ziony and others (1974 #581) indicate late Quaternary displacement (<500,000 yr).
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Slip rate inferred from site 87d-1 which is near section boundary. At site 87d-1 a slip rate of greater than 1 mm/yr can be inferred based on 5-10 m left-lateral separation of mid- to late Holocene terrace deposits (Darrow and Sylvester, 1984 #5976; Troutman and others, 1986 #5990). Slip rate assigned to this part of the fault by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 2.0 mm/yr (with minimum and maximum assigned slip rates of 1.0 mm/yr and 3.0 mm/yr, respectively.
Date and	2000

Compiler(s)	Jerome A. Treiman, California Geological Survey
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