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Quaternary Fault and Fold Database of the United States

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Simi-Santa Rosa fault zone, Simi-Santa Rosa section (Class A) No. 98c

Last Review Date: 2000-05-01

citation for this record: **Treiman, J.A., compiler, 2000, Fault number 98c, Simi-Santa Rosa fault zone, Simi-Santa Rosa section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 03:11 PM.**

Synopsis	**General:** The Simi fault zone is best known from oil exploration; ground water studies have also helped locate the faults, especially western sections. Surface traces are known principally from thesis mapping, later compilations, and recent geotechnical studies, but some sections of the fault zone are still only moderately well located at the surface. Age control for most-recent surface rupture and Holocene fault history is limited to the Springville fault and one site in the middle of the Simi fault. Camarillo and Santa Rosa Valley faults are interpreted principally from geomorphology and subsurface data, with sparse confirmation as surface faults. It is not known if the various faults comprising the zone rupture together or as semi-independent elements and sections or segments have not been previously defined in the literature. **Sections:** This fault has 3 sections. Sections have not been

	specifically discussed in the literature. The Springville and Camarillo faults were initially discussed as separate faults (Bailey, 1951 #5998; State Water Resources Board, 1956 #6017), but later discussed as part of the Simi-Santa Rosa fault zone (for example, Weber and others, 1976 #5992). Sections, which are distinguished here based on deformational style and step-overs, include the Springville section [98a], Camarillo-Santa Rosa section [98b], and Simi-Santa Rosa section [98c].
Name comments	**General:** **Section:** Refers to fault #346 of Jennings (1994 #2878); Simi and Santa Rosa faults were first mapped (in part) by Kew (1919 #6013; 1924 #6014); Simi fault was named by Bailey (1951 #5998); Santa Rosa fault (zone) was named by State Water Resources Board (1956 #6017), which reference also referred to the Simi-Santa Rosa fault system. Simi or Santa Rosa have been used interchangeably for some strands of the fault zone. Treiman (1998 #6019) attempted to standardize the nomenclature for several main strands; section extends easterly from Calleguas Creek to northeast end of Simi Valley. **Fault ID:** Refers to numbers 346 (Simi/Santa Rosa fault), 348 (Springville fault) and 349 (Camarillo fault) of Jennings (1994 #2878) and numbers 65 (Springville fault), 66 (Camarillo fault), and 67 (Simi fault) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	LOS ANGELES COUNTY, CALIFORNIA VENTURA COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Location of fault traces are taken from 1:24,000 compilation by Treiman (1998 #6019) and Division of Mines and Geology (1999 #6004; 1999 #6005; 1999 #6006).
Geologic setting	The Simi-Santa Rosa fault zone is dominated by moderate to high-angle north-dipping reverse faults that probably also have a left-lateral component of displacement (Treiman, 1998 #6019). The fault zone extends for 40 km in an east-northeast direction within the southern California Transverse Ranges. Simi fault is a Tertiary fault with up to 1,600 m vertical separation (Oligocene

	Sespe) and continued Quaternary activity (Hanson, 1981 #6010). In a westward direction late-Quaternary activity steps left from the Simi across the Santa Rosa, Santa Rosa Valley and Camarillo fault elements of the zone, and also northwest (right-step) to the Springville fault.
Length (km)	This section is 38 km of a total fault length of 47 km.
Average strike	N77°E (for section) versus N77°E (for whole fault)
Sense of movement	Left lateral *Comments:* Most this section displays compressional features, but in the eastern half of the section a left-lateral component of displacement may dominate (based on striae and mullion plunging 30° NE. reported by Hitchcock, 1998 #6011). There is some evidence of strain partitioning within the fault zone (Treiman, 1998 #6019).
Dip	10–90° N. *Comments:* Petroleum data indicates sub-surface dips of 60–77° (Jakes, 1979 #6012; Hanson, 1981 #6010). Simi fault has high-angle (up to 90°) surface trace with shallower reverse and thrust faults south of main trace but also includes some local south dips related to inferred flower structure and backthrusts. Santa Rosa fault appears to have more moderate dips (Treiman, 1998 #6019).
Paleoseismology studies	Site 98-2, Arroyo Simi: enhanced exposure in arroyo bank exposed vertical fault; detrital charcoal in faulted and unfaulted deposits constrained last Holocene event within several thousand year bracket, Slip indicators observed in fault plane (Hitchcock and others, 1998 #6011).
Geomorphic expression	Large-scale expression includes relatively abrupt linear mountain front with some sinuosity and restricted drainage exit from Simi Valley. Small-scale expression includes scarps, faceted spurs, deflected and incised drainages, linear drainages, side-hill benches, aligned saddles and ponded alluvium. Western portion of Simi fault is within elevated portion of hills and is expressed principally by fault-line morphology, with clearer tectonic geomorphology associated with the Santa Rosa fault to the south (Treiman, 1998 #6019).

Age of faulted surficial deposits	Holocene fluvial and colluvial deposits (Hitchcock and others, 1998 #6011); late Quaternary fluvial and colluvial deposits (Treiman, 1997 #6018; 1998 #6019); Plio-Pleistocene marine and non-marine deposits, Miocene marine and volcanics (Dibblee, 1992 #5999; 1992 #6000; 1992 #6001).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Most recent paleoevent bracketed between 1,205±80 and 7,666±50 yr BP based on detrital 14C in faulted and unfaulted sediments (Hitchcock and others, 1998 #6011).
Recurrence interval	*Comments:* Study by Hitchcock and others (1998 #6011) suggests interval may be greater than about 1,000 yr for this section.
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Deformation rate of 0.5–1.0 mm/yr estimated by Treiman (1998 #6019) based on comparison of geomorphic expression to "moderate activity" category (0.1–1.0 mm/yr) of Slemmons and dePolo (1986 #3409). 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 0.5mm/yr and 1.5 mm/yr, respectively).
Date and Compiler(s)	2000 Jerome A. Treiman, California Geological Survey
References	#5998 Bailey, T.L., 1951, Geology of a portion of Ventura basin, Los Angeles and Ventura Counties, California: scale 1:48,000. #5999 Dibblee, T.W., Jr., 1992, Geologic map of the Santa Susana quadrangle, Ventura and Los Angeles Counties, California: Dibblee Geological Foundation Map DF-38, scale 1:24,000. #6000 Dibblee, T.W., Jr., 1992, Geologic map of the Simi quadrangle, Ventura County, California: Dibblee Geological Foundation Map DF-39, scale 1:24,000. #6001 Dibblee, T.W., Jr., 1992, Geologic map of the Moorpark quadrangle, Ventura County, California: Dibblee Geological

Foundation Map DF-40, scale 1:24,000.

#6004 Division of Mines and Geology, 1999, State of California earthquake fault zones, Moorpark quadrangle, official map, effective May 1, 1999:California Department of Conservation, Division of Mines and Geology, scale 1:24,000.

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#4860 Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation, Division of Mines and Geology Open-File Report 96-08 (also U.S. Geological Open-File Report 96-706), 33 p.

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