

# Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the [interactive fault map](#).

## San Simeon fault (Class A) No. 80

Last Review Date: 1995-07-06

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<b>Synopsis</b>	Detailed geologic mapping of pre-Quaternary stratigraphy and structure is provided by Hall (1976 #7826) and Hall and others (1979). Detailed mapping of marine and fluvial terraces (Weber, 1983 #7834; Hanson and others, 1992 #7827; 1994 #7828; Hanson and Lettis, 1994 #5403) and paleoseismic trenching and mapping investigations (Hall and others, 1994 #5401) of the southern onshore reach of the fault provide data on the late Quaternary behavior of the fault. Additional geophysical, seismological, and geologic data regarding the activity of the fault, particularly in the offshore region, is provided by (PG&E, 1974 #7832, 1975 #7835, 1988 #7833; Leslie, 1980 \$7829, 1981 \$7830). The main onshore trace meets the criteria of “sufficiently active and well-defined” to warrant zoning under the Alquist-Priolo Earthquake Fault Zoning Act (Manson, 1985 #7831).
<b>Name comments</b>	Onshore parts of the fault were first mapped by Taliaferro (1943), #5356), who referred to it as the Arroyo Laguna thrust fault.

	<p>Pacific Gas and Electric (PG&amp;E) (1974 #7832, 1975 #7835) later mapped the fault and assigned the name San Simeon fault.</p> <p><b>Fault ID:</b> Refers to number 255 (San Simeon fault) of Jennings (1994 #2878).</p>
<b>County(s) and State(s)</b>	SAN LUIS OBISPO COUNTY, CALIFORNIA
<b>Physiographic province(s)</b>	PACIFIC BORDER
<b>Reliability of location</b>	<p>Good Compiled at 1:24,000 and 1:48,000 scale.</p> <p><i>Comments:</i> Location of fault from Qt_fit_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to 1:48,000-scale map by Hall and others (1979 #7840); 1:250,000-scale maps by Lettis and others (2004 #7844) and McCulloch (1989 #5738); and Manson (1985 #8188) mapped at unspecified scale. Quaternary mapping along entire onshore section at scale of 1:24,000 (Weber, 1983 #7834), detailed Quaternary map of southern onshore region of fault (Oak Knoll Creek south to coastline) at scale of 1:24,000 (PG&amp;E, 1988 #7833; Hanson and others, 1994 #7828); data compiled (without photogrammetry or similar methods) onto 1:250,000 scale map (PG&amp;E, 1988 #7833; Lettis and others, 2004).</p>
<b>Geologic setting</b>	Convergent right-slip (transpressional) fault (Hall, 1975 #7825; PG&E 1974 #7832, 1975 #7835, 1988 #7833; Weber, 1983 #7834; Hall and others, 1994 #5401; Hanson and Lettis, 1994 #5403).
<b>Length (km)</b>	97 km.
<b>Average strike</b>	
<b>Sense of movement</b>	<p>Right lateral</p> <p><i>Comments:</i> Ratio of horizontal to vertical slip measured from displaced late Quaternary (~210 ka to 120 ka) terraces range from 8:1 to 50:1 (Hanson and Lettis, 1994 #5403). Based on plunge of slickensides observed in trench exposures, the ratio of strike slip to dip slip is at least 8:1 to 10:1 (Hall and others, 1994 #5401).</p>

<p><b>Dip Direction</b></p>	<p>V</p> <p><i>Comments:</i> Measured in several trenches at multiple sites (Hall and others, 1994 #5401); based on general linearity of onshore fault traces that cut across topography.</p>
<p><b>Paleoseismology studies</b></p>	<p>Detailed mapping of Pleistocene marine terraces along the southern onshore reach provides data on the style and rate of late Pleistocene slip (Hanson and Lettis, 1994 #5403).</p> <p>Mapping, geomorphic analysis, drilling, and logging of natural and trench wall exposures were performed at the following four localities to characterize the Holocene behavior of the southeastern onshore reach of the fault (Hall and others, 1994 #5401). Age control provided by radiocarbon dating of charcoal and detrital charcoal, thermoluminescence analysis of silty organic clay, and soil-stratigraphic relationships.</p> <p>Site 80-1—Oak Knoll Creek Site located 3km northwest of San Simeon Bay consisted of six6 trenches. Displacement per event documented for minor fault at this site (horizontal component <math>1.2\pm 0.03</math> m; vertical component 0.2 m; net slip <math>1.23\pm 0.04</math> m; stratigraphic evidence suggests single-event displacement.</p> <p>Site 80-2—Airport Creek Site located 900m northwest of San Simeon Bay consisted of seven trenches and two exploratory pits. This site provided best data for slip rate and recurrence; 1.8 m right deflection, measured in both walls, of the active channel of Airport Creek appears to have occurred during one or at most two slip events on the main fault trace suggesting 1- to 2-m offsets.</p> <p>Site 80-3—Borrow Pit Site located 600m northwest of San Simeon Bay consisted of 5 trenches, 13 flight-auger holes, and shallow seismic refraction survey.</p> <p>Site 80-4—San Simeon Cove in San Simeon Bay. Detailed logging of available sea cliff exposures and limited hand excavations.</p>
<p><b>Geomorphic expression</b></p>	<p>Well expressed, locally defined by prominent linear northeast-facing escarpment, linear stream channels, springs, linear scarps and ridges, side-hill benches, sag ponds, offset stream channels and stream valleys, vegetation and tonal lineaments, captured and beheaded streams, and ponded alluvium. Many features typical of</p>

	strike-slip faulting (Weber, 1983 #7834; Hanson and Lettis, 1994 #5403).
<b>Age of faulted surficial deposits</b>	Onshore section: Latest Pleistocene to Holocene eolian and fluvial deposits (15%), Pleistocene marine deposits (70%), bedrock (predominantly Cretaceous to Jurassic) (15%).
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	latest Quaternary (<15 ka)  <i>Comments:</i> Evidence for multiple Holocene surface-faulting events, geomorphic evidence for most recent event occurring during the late Holocene (Hall and others, 1994 #5401).
<b>Recurrence interval</b>	265–2,000 yr  <i>Comments:</i> Average recurrence frequencies of 265 to 2,000yr, with best-constrained values between 600 to 1,800yr. Preliminary estimate based on paleoseismic investigations at the Airport Creek Site (Hall and others, 1994 #5401). Recurrence frequencies indirectly estimated based on estimated range of slip rate and net slip per event. Estimate for single (main) fault trace within a zone of faulting; therefore, may underestimate the occurrence of events within the broader zone. Evidence at this site suggests that slip events may not occur at uniform intervals.
<b>Slip-rate category</b>	Between 1.0 and 5.0 mm/yr  <i>Comments:</i> Estimated Pleistocene slip rate based on displaced 80 to 210 ka marine terraces ranges from 0.4 to 11 mm/yr, with best constrained values of 1–3 mm/yr (Hanson and Lettis, 1994 #5403). Estimated Holocene slip rate for the main trace within fault zone based on paleoseismic trench data ranges from 0.9 to 3.4mm/yr, with best constrained value of 1.0–1.4 mm/yr (Hall and others, 1994 #5401).
<b>Date and Compiler(s)</b>	1995 Kathryn L. Hanson, AMEC Environment & Infrastructure (AMEC E&I)
<b>References</b>	#7825 Hall, C.A., Jr., 1975, San Simeon-Hosgri fault system, coastal California—Economic and environmental implications: Science, v. 190, p. 1291–1294.

#7826 Hall, C.A., Jr., 1976, Geologic map of the San Simeon-Piedras Blancas region, San Luis Obispo County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-784, scale 1:24,000.

#7840 Hall, C.A., Jr., Ernst, W.G., Prior, S.W., and Wiese, J.W., 1979, Geologic map of the San Luis Obispo-San Simeon region, California: U.S. Geological Survey Miscellaneous Investigations Series I-1097, 3 sheets, scale 1:48,000.

#5401 Hall, N.T., Hunt, T.D., and Vaughan, P.R., 1994, Holocene behavior of the San Simeon fault zone, south-central California, *in* Alterman, I.B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., *Seismotectonics of the Central California Coast Ranges*: Geological Society of America Special Paper 292, p. 167–189.

#5403 Hanson, K.L., and Lettis, W.R., 1994, Estimated Pleistocene slip rate for the San Simeon fault zone, south-central coastal California, *in* Alterman, I.B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., *Seismotectonics of the Central California Coast Ranges*: Geological Society of America Special Paper 292, p. 133–150.

#7827 Hanson, K.L., Lettis, W.R., Wesling, J.R., Kelson, K.I., and Mezger, L., 1992, Quaternary marine terraces, south-central coastal California—Implications for crustal deformation and coastal evolution, *in* Fletcher, C.H., and Wehmler, J.F., eds., *Quaternary coasts of the United States—Marine and lacustrine systems*: Society for Sedimentary Geology, SEPM Special Publication 48, p. 323–332.

#7828 Hanson, K.L., Wesling, J.R., Lettis, W.R., Kelson, K.I., and Mezger, L., 1994, Correlation ages, and uplift rates of Quaternary marine terraces—South-central coastal California, *in* Alterman, I.B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., *Seismotectonics of the central California Coast Ranges*: Geological Society of America Special Paper 292, p. 45–72, 4 plates.

#2878 Jennings, C.W., 1994, Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000.

#7829 Leslie, R.B., 1980, Acoustic reflection profiles, Yankee Point to Estero Bay, April, 1979, Cruise of the R/V Scammon, central California offshore: U.S. Geological Survey Open-File Report 80-352.

#7830 Leslie, R.B., 1981, Continuity and tectonic implications of the San Simeon-Hosgri fault zone, central California: U.S. Geological Survey Open-File Report 81-430, 59 p.

#7844 Lettis, W.R., Hanson, K.L., Unruh, J.R., McLaren, M., and Savage, W.U., 2004, Quaternary tectonic setting of south-central coastal California, *in* Keller, M.A., eds., Evolution of sedimentary basins/offshore oil and gas investigations—Santa Maria province: U.S. Geological Survey Bulletin 1995-AA, 21 p., 1 plate, scale 1:250,000.

#7831 Manson, M., 1985, San Simeon fault zone and Cambria fault, San Luis Obispo County, California: Department of Conservation, Division of Mines and Geology Fault Evaluation Report FER-170, 12 p.

#8188 Manson, M.W., 1985, San Simeon fault zone and Cambria fault, San Luis Obispo County, California: California Division of Mines and Geology Fault Evaluation Report FER-170, 16 p., in Fault Evaluation Reports Prepared Under the Alquist-Priolo Earthquake Fault Zoning Act, Region 1 – Central California: California Geological Survey CGS CD 2002-01 (2002).

#5738 McCulloch, D.S., 1989, Geologic map of the north-central California continental margin, Map No. 6A (Geology), *in* Green, H.G., and Kennedy, M.P., eds., Geology of the north-central California continental margin: California Division of Mines and Geology California Continental Margin Geologic Map Series, Area 6 of 7, scale 1:250,000.

#8197 McCulloch, D.S., 1989, Geologic map of the south-central California continental margin, Map No. 4A (Geology), *in* Greene, H.G., and Kennedy, M.P., eds., Geologic map of the south-central California continental margin: California Division of Mines and Geology California Continental Margin Geologic Map Series, Area 4 of 7, map scale 1:250,000.

#7832 Pacific Gas and Electric (PG&E), 1974, Geology of the



southern Coast Ranges and the adjoining offshore continental margin of California, with special reference to the geology in the vicinity of the San Luis Range and Estero Bay— Appendix 2.5D: Final Safety Analysis Report for Diablo Canyon Nuclear Power Plant, U.S. Atomic Energy Commission Docket Nos. 50-275 and 50-323.

#7835 Pacific Gas and Electric (PG&E), 1975, Geology and seismology— Appendix 2.5E: Final Safety Analysis Report for Diablo Canyon Nuclear Power Plant, U.S. Atomic Energy Commission Docket Nos. 50-275 and 50-323.

#7833 Pacific Gas and Electric (PG&E), 1988, Final report of the Diablo Canyon Long Term Seismic Program for the Diablo Canyon Power Plant: U.S. Nuclear Regulatory Commission Docket Nos. 50-275 and 50-323.

#5356 Taliaferro, N.L., 1943, Geologic history and structure of the central Coast Ranges of California, *in* Geologic formations and economic development of the oil and gas fields of California: California Division of Mines Bulletin 118, part 2, p. 119–163.

#7834 Weber, G.E., 1983, Geologic investigation of the marine terraces of the San Simeon region and Pleistocene activity of the San Simeon fault zone, San Luis Obispo County, California: U.S. Geological Survey Final Technical Report, Contract No. 14-08-0001-18230, 66 p., 5 plates (map scale 1:24,000).

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