Jump to Navigation

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.

Palos Verdes fault zone, San Pedro Shelf section (Class A) No. 128c

Last Review Date: 1998-10-01

citation for this record: **Treiman, J.A., and Lundberg, M., compilers, 1998, Fault number 128c, Palos Verdes fault zone, San Pedro Shelf 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 02:16 PM.**

Synopsis	**General:** Holocene activity along the southern offshore San Pedro Shelf section of the fault zone [128c] is recognized, but Holocene activity has not been demonstrated for the northern sections. General style of faulting is fairly well understood and recency and slip-rate (1–5 mm/yr) are fairly well established for boundary area between southern and middle sections, but timing, magnitude and distribution of most recent displacement is still not well characterized for remainder of fault zone. **Sections:** This fault has 3 sections. The shown here were designated by Hecker and others (1998 #6118). Working Group on California Earthquake Probabilities (1995 #6123) define two segments; one north and one south of the Redondo Canyon fault. McNeilan and others (1996 #6121) argue for three segments based on change in trend and differences in nature of the three sections. Fischer and

	others (1987 #6117) define three segments based on degree of activity and recency, but data to support segmentation is not sufficient. Three "segments" used loosely by Los Angeles County (Leighton and Associates, 1990 #6120). Section designation is preferred due to lack of detailed studies on all sections. More sections could be counted if fault is continuous with Coronado Bank fault zone [131].
Name comments	**General:** **Section:** Fault ID 3 of Hecker and others (1998 #6118) **Fault ID:** Refers to number 437 (Palos Verdes fault) of Jennings (1994 #2878); Fault ID 1, 2 & 3 of Hecker and others (1998 #6118); number 35 (Palos Verdes Hills fault) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	LOS ANGELES COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER (offshore)
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Location of fault is generally inferred based on 1:250,000-scale map of Vedder and others (1986 #5971). Location of traces vary slightly from 1:48,000-scale map of Darrow and Fischer (1983 #6116); zone of disruption identified in marine geophysical surveys.
Geologic setting	High-angle southwest-dipping dextral oblique fault (reverse component) forms southwestern boundary of Los Angeles basin with Palos Verdes uplift (Wright, 1991 #5950; McNeilan and others, 1996 #6121).
Length (km)	This section is 29 km of a total fault length of 73 km.
Average strike	N36°W (for section) versus N48°W (for whole fault)
Sense of movement	Right lateral *Comments:* 7:1 to 8:1 horizontal to vertical estimated by McNeilan and others (1996 #6121) based on studies at boundary with Palos Verdes Hills section [128b]. However, McNeilan and others (1996 #6121) describe the fault as having a normal component, and

	Fischer and others (1987 #6117) describe a reverse component, both found that the west side has been uplifted relative to the east.
Dip Direction	V
Paleoseismology studies	Location 128-1, Los Angeles Harbor: McNeilan and others (1996 #6121) used high-resolution seismic data, subsurface sampling and calibrated radiocarbon dates to document geometry and age of offset fluvial channels. Location 128-2, Vincent Thomas Bridge: Clarke and Kennedy (1998 #6115) used high-resolution seismic data to locate the Palos Verdes fault in the vicinity of the Vincent Thomas Bridge; faulted deposits were not dated.
Geomorphic expression	topographic "anomalies" (1- to 4-m-high ridge-like irregularities in sea floor); some control of location of submarine gullies (Fischer and others, 1987 #6117).
Age of faulted surficial deposits	Holocene (7.8–4.5 ka) bay deposits (McNeilan and others, 1996 #6121); Holocene horizons, surficial sediments and sea floor (post 5–6 ka) (Fischer and others, 1987 #6117); faults displace Quaternary Lakewood Formation and those that "closely approach or cut the channel floor are considered to be of probable Holocene age" (Clarke and Kennedy, 1998 #6115).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* post-4.5 ka based on offset of dated bay deposits, but no control on past 4.5ka (McNeilan and others, 1996 #6121)(McNeilan and others, 1996)
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* 2–4 mm/yr; 3 mm/yr preferred (Hecker and others, 1998 #6118); 2.7–3 mm/yr based on offset of 7.8–8 ka paleochannel (McNeilan and others, 1996 #6121). Slip is distributed across zone up to 300 m wide. Slip rate assigned by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of

	California was 3.0 mm/yr (with minimum and maximum assigned slip rates of 2.0 mm/yr and 4.0 mm/yr, respectively).
Date and Compiler(s)	1998 Jerome A. Treiman, California Geological Survey Matthew Lundberg, California Geological Survey
References	#6115 Clarke, S.H., and Kennedy, M.P., 1998, Analysis of late Quaternary faulting in the Los Angeles harbor area and hazard to the Vincent Thomas bridge: California Department of Conservation, Division of Mines and Geology Open-File Report 98-01. #6116 Darrow, A.C., and Fischer, P.J., 1983, Activity and earthquake potential of the Palos Verdes fault: Technical report to U.S. Geological Survey, Reston, Virginia, under Contract 14-08-0001-19786, February 25, 1983, 90 p. #6117 Fischer, P.J., Patterson, R.H., Darrow, A.C., Rudat, J.H., and Simila, G., 1987, The Palos Verdes fault zone—Onshore to offshore, *in* Fischer, P.J., ed., Geology of the Palos Verdes peninsula and San Pedro bay: Pacific Section, Society of Economic Paleontologists and Mineralogists and American Association of Petroleum Geologists Guidebook, v. 55, p. 91-133. #6118 Hecker, S., Kendrick, K.J., Ponti, D.J., and Hamilton, J.C., 1998, Fault map and database for southern California, Long Beach 30'x60' quadrangle: U.S. Geological Survey Open-File Report 98-129, http://quake.wr.usgs.gov/research/seismology/scfaults/lb/index.html. #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. #6120 Leighton and Associates, 1990, Technical appendix to the safety element of the Los Angeles County general plan, hazard reduction in Los Angeles County: Technical report to Los Angeles County Department of Regional Planning, 2 vols. #6121 McNeilan, T.W., Rockwell, T.K., and Resnick, G.S., 1996, Style and rate of Holocene slip, Palos Verdes fault, southern California: Journal of Geophysical Research, v. 101, no. B4, p. 8317-8334.

#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.

#8344 Vedder, J.G., Greene, H.G., Clarke, S.H., and Kennedy, M.P., 1986, Geologic map of the mid−southern California continental margin, Map No. 2A (Geology), in Greene, H.G., and Kennedy, M.P., eds., Geology of the mid-southern California continental margin: California Division of Mines and Geology California Continental Margin Geologic Map Series, Area 2 of 7, scale 1:250,000.

#5256 Willis, B., and Wood, H.D., 1922, Fault map of the state of California: Seismological Society of America, scale 1:506,880.

#6124 Woodford, A.O., Schoellhamer, J.E., Vedder, J.G., and Yerkes, R.F., 1954, Geology of the Los Angeles basin, *in* Jahns, R.H., ed., Geology of southern California: California Division of Mines Bulletin 170, p. 65-81.

#6125 Woodring, W.P., Bramlette, M.N., and Kew, W.S.W., 1946, Geology and paleontology of Palos Verdes Hills, California: U.S. Geological Survey Professional Paper 207, 145 p.

#6123 Working Group on California Earthquake Probabilities, 1995, Seismic hazards in southern California—Probable earthquakes, 1994-2024: Bulletin of the Seismological Society of America, v. 85, p. 379-439.

#5950 Wright, T.L., 1991, Structural geology and tectonic evolution of the Los Angeles Basin, California, *in* Biddle, K.T., ed., Active margin basin: American Association of Petroleum Geologists Memoir 52, p. 35–134.

#5930 Yerkes, R.F., McCulloh, T.H., Schoellhamer, J.E., and Vedder, J.G., 1965, Geology of the Los Angeles Basin, California—An introduction: U.S. Geological Survey Professional Paper 420-A, 57 p.

#5931 Ziony, J.I., and Yerkes, R.F., 1985, Evaluating earthquake and surface faulting potential, *in* Ziony, J.I., ed., Evaluating

	earthquake hazards in the Los Angeles region—An earth-science perspective: U.S. Geological Survey Professional Paper 1360, p. 43–91. #581 Ziony, J.I., Wentworth, C.M., Buchanan-Banks, J.M., and Wagner, H.C., 1974, Preliminary map showing recency of faulting in coastal southern California: U.S. Geological Survey Miscellaneous Field Studies Map MF-585, 8 p. pamphlet, 3 sheets, scale 1:250,000.