

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, Palos Verdes Hills section (Class A) No. 128b

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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

	<p>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].</p>
Name comments	<p>General:</p> <p>Section: Fault ID 1 of Hecker and others (1998 #6118)</p> <p>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).</p>
County(s) and State(s)	LOS ANGELES COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	<p>Poor Compiled at 1:250,000 scale.</p> <p><i>Comments:</i> Location of fault from Qt_ft_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to Darrow and Fischer (1983 #6116). Onshore trace is largely concealed, and location is inferred based on topographic expression (trace selected from various interpretations compiled by Darrow and Fischer, 1983 #6116; Fischer and others, 1987 #6117). Fault mapped in northeastern Palos Verdes Hills (Woodring and others, 1946 #6125) may be antithetic to concealed trace.</p>
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 12 km of a total fault length of 73 km.
Average strike	N57°W (for section) versus N48°W (for whole fault)

Sense of movement	<p>Right lateral</p> <p><i>Comments:</i> Sense of movement dominantly right-lateral interpreted by Stephenson and others (1995 #6122); 7:1 to 8:1 horizontal to vertical estimated by McNeilan and others (1996 #6121) based on studies in adjacent section to the south [128b]. Most of Palos Verdes Hills section may have a larger reverse component than the other sections due to the change in strike of the fault.</p>
Dip	<p>50° SW. to 90°</p> <p><i>Comments:</i> Dip increases with depth as interpreted from seismic reflection profiles (Stephenson and others, 1995 #6122).</p>
Paleoseismology studies	
Geomorphic expression	<p>General topographic escarpment along northeast margin of Palos Verdes Hills, linear drainages, saddles, tilted or uplifted surfaces (Fischer and others, 1987 #6177).</p>
Age of faulted surficial deposits	<p>upper Pleistocene (Palos Verdes sand and non-marine terrace cover) and possible Holocene (non-marine terrace cover) (Woodring and others, 1946 #6125); late-Pleistocene channel (post-120 to 80 ka) (Stephenson and others, 1995 #6122). This section is concealed over much of its length by landslides, colluvium, and slopewash.</p>
Historic earthquake	
Most recent prehistoric deformation	<p>late Quaternary (<130 ka)</p> <p><i>Comments:</i> Timing of the most recent coseismic surface deformation is late Quaternary and presumed Holocene, assuming this section ruptures with San Pedro Shelf section [128c].</p>
Recurrence interval	
Slip-rate category	<p>Between 1.0 and 5.0 mm/yr</p> <p><i>Comments:</i> 2–4 mm/yr; 3 mm/yr preferred (Hecker and others, 1998 #6118); 2.5–3.8 mm/yr at southern end of section (Stephenson and others, 1995 #6122); 2.7–3 mm/yr based study immediately to the south (McNeilan and others, 1996 #6121). Slip rate assigned to the</p>

	entire fault 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)	2017 Jerome A. Treiman, California Geological Survey Matthew Lundberg, California Geological Survey William A. Bryant, California Geological Survey
References	<p>#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.</p> <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, <i>in</i> Fischer, P.J., ed., <i>Geology of the Palos Verdes peninsula and San Pedro bay</i>: Pacific Section, Society of Economic Paleontologists and Mineralogists and American Association of Petroleum Geologists Guidebook, v. 55, p. 91-133.</p> <p>#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.</p> <p>#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.</p> <p>#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.</p> <p>#6121 McNeilan, T.W., Rockwell, T.K., and Resnick, G.S., 1996, Style and rate of Holocene slip, Palos Verdes fault, southern California: <i>Journal of Geophysical Research</i>, v. 101, no. B4, p. 8317-8334.</p> <p>#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</p>

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