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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.

Dume fault (Class A) No. 100

Last Review Date: 2017-01-31

citation for this record: **Fisher, M.A., and Bryant, W.A., compilers, 2017, Fault number 100, Dume fault, 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 02:20 PM.**

Synopsis	The Dume fault strikes east-west between Pt. Dume and Anacapa Island. It is a left-oblique reverse fault that forms part of the province boundary between the Western Transverse Ranges on the north and the California Continental Borderland on the south.
Name comments	Dume fault; also referred to as Anacapa (Dume) fault by Ziony and Yerkes (1985 #5931) and Anacapa-Dume fault by Dolan and others (2000 #5964). **Fault ID:** Refers to number 78 of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	VENTURA COUNTY, CALIFORNIA (offshore) LOS ANGELES COUNTY, CALIFORNIA (offshore)
Physiographic province(s)	PACIFIC BORDER

Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location of fault from Qt_flt_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to 1:250,000-scale map of Junger and Wagner (1977) and unspecified scale map of Fisher and others (2005 #8097).
Geologic setting	The Dume, Malibu Coast [99], and Santa Monica [101] faults are part of the province boundary between the Western Transverse Ranges (Santa Monica Mountains) on the north and the California Continental Borderland on the south (Dolan and others, 2000 #5964); Sorlien and others, 2000; Fisher and others, 2005 #8097). The Santa Monica fault [101] is a left-oblique reverse fault that ends near Pt. Dume, and the Dume fault continues as the province boundary farther west. Basement rocks north of the province boundary include slate of Late Jurassic protolith age that was intruded by mid-Cretaceous granitic rocks (Dibblee, 1982). This basement is overlain by thick Late Cretaceous and early Tertiary, primarily marine sedimentary, rocks as well as by Oligocene and Miocene marine and terrestrial sedimentary rocks and the locally thick, middle Miocene Conejo Volcanics In contrast to the granite and slate basement north of the province boundary, basement rocks south of the boundary are made up of Catalina Schist, interpreted to be a metamorphic core complex that was exhumed from beneath the rotating western Transverse Ranges (Crouch and Suppe, 1993 #7886; Bohannon and Geist, 1998 #8389). This basement is overlain by Miocene and younger sedimentary rocks and middle Miocene volcanic rocks, which extend southward from the province boundary to underlie the Santa Monica basin. This basin borders the continental shelf and slope on the south (*e.g.* Vedder, 1987 #8390).
Length (km)	km.
Average strike	
Sense of movement	Left lateral, Reverse
Dip Direction	N

	Comments: The shallow part of the fault dips 40–60˚ and the deeper part dips about 20˚, but values vary along strike (Fisher and others, 2005 #8097).
Paleoseismology studies	
Geomorphic expression	Dume fault locally offsets seafloor and is expressed by south-facing scarp.
Age of faulted surficial deposits	Seafloor and probable Holocene sediment of the Dume fan are offset (Fisher and others, 2005 #8097).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:*
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* 2.4 mm/yr left lateral and 0.2 mm/yr contraction for what Meade and Hager (2005) call the Santa Monica Mountains fault, which appears to be part of the same fault system as the Malibu Coast [99], Dume, and Santa Monica [101] faults. These values qualitatively match the left-oblique-reverse focal mechanism of the 1973 Mw5.3 Pt. Mugu earthquake (Ellsworth and others, 1973n #8391; Stierman and Ellsworth, 1976 #8392).
Date and Compiler(s)	2017 Michael A. Fisher, U.S. Geological Survey William A. Bryant, California Geological Survey
References	#8389 Bohannon, R. G., and Geist, E. L., 1998, Upper crustal structure and Neogene tectonic development of the California continental borderland: Geological Society of America Bulletin, v. 110, p. 779–800. #7886 Crouch, J.K., and Suppe, J., 1993, Late Cenozoic tectonic evolution of the Los Angeles basin and inner California borderland—A model for core complex-like crustal extension:

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#8392 Stierman, D.J., and Ellsworth, W.L., 1976, Aftershocks of the February 21, 1973 Point Mugu, California earthquake: Bulletin Seismological Society America, v. 66, p. 1931–1952.

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	potential of the southern California borderland, *in* Scholl, D.W., Grantz, A., and Vedder, J.G., eds., Geology and resource potential of the continental margin of western North America and adjacent ocean basins—Beaufort Sea to Baja California: Circum-Pacific Council for Energy and Mineral Resources Earth Science Series, v. 6, p. 403–448. #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.