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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.

Oceanside fault (Class A) No. 187

Last Review Date: 2007-12-18

citation for this record: **Ryan, H.F., compiler, 2007, Fault number 187, Oceanside 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 02:25 PM.**

Synopsis	The Oceanside fault has been described as a major east dipping low-angle normal fault underlying the inner continental borderland from Laguna Beach south to the Mexican border. This low angle fault formed in early Miocene time (Crouch and Suppe, 1993; Bohannon and Geist, 1998). Compressive, fault-related folds in the hanging wall of the Oceanside detachment (Crouch and Bachman, 1989; Fischer and Mills, 1991) suggest that the detachment surface has been, at least locally, reactivated as a blind thrust (Rivero and others 2000). The best documented evidence for the reactivation of the Oceanside detachment surface as a blind thrust occurs along the continental slope off of San Mateo Point (see San Mateo thrust section of the San Onofre fault zone [294a]). Evidence for large-scale reactivation of the entire Oceanside detachment surface as a blind thrust include uplift of marine terraces (Lajoie and others, 1992) and the surficial bowing of the continental slope between Dana Pt and Oceanside (Fisher and Mills, 1991). The lack of along-strike continuity of fault-related folds, the areal extent of the marine terraces beyond the

	southern end of the Oceanside fault, and geodetic modeling (Hanson and others, 2002) argue against reactivation of the entire detachment surface. Industry multichannel reflection profiles do not show evidence that an active thrust fault extends uninterrupted from as far north as Laguna Beach to as far south as Mexican border (USGS, 2006). Based on the relocation of microseismicity, Grant and Shearer (2004) suggest that the Oceanside fault is terminated in its down-dip direction by the Newport-Inglewood/Rose Canyon fault zone [127].
Name comments	The Oceanside fault is a name that has been applied to the reactivation of the Oceanside detachment surface (Crouch and Suppe, 1993; Bohannon and Geist, 1998) as a blind thrust (Rivero and others, 2000). Fold and thrust belts associated with the Oceanside fault include the San Mateo thrust (Fischer and Mills, 1991), and the San Joaquin Hills thrust [186] (Grant and others, 1999).
County(s) and State(s)	SAN DIEGO COUNTY, CALIFORNIA ORANGE COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1: 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 Plesch and others (2007). Location is based on an extensive suite of migrated deep-penetration seismic reflection data (Rivero and others, 2000), although evidence for reactivation of the surface as a blind thrust fault is equivocal and only well-documented off of San Mateo Point.
Geologic setting	
Length (km)	143 km.
Average strike	335
Sense of movement	Thrust *Comments:* The detachment surface originated as a normal fault (Crouch and Suppe, 1993; Bohannon and Geist, 1998). It is reactivated as a thrust fault in the areas where southwest-verging

	folds are imaged at or near the sea floor (Fisher and Mills, 1991).
Dip	3–25° NE. *Comments:* Dip on the Oceanside detachment surface is calculated from seismic reflection profiles (Bohannon and Geist, 1998; Rivero and others, 2000; USGS, 2006).
Paleoseismology studies	
Geomorphic expression	The detachment surface is concealed and has no geomorphic expression. However, the surficial bowing of the continental slope may be a geomorphic expression of movement on the detachment surface.
Age of faulted surficial deposits	
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* No ages are available for the time of most recent coseismic offset on fault zone.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Rivero and others (2000) calculate an uplift rate of between 0.27 and 0.41 mm/yr based on the uplift of the San Joaquin Hills (Grant and others, 1999).
Date and Compiler(s)	2007 Holly F. Ryan, U.S. Geological Survey
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