

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](#).

Kealakekua fault system (Class A) No. 2603

Last Review Date: 2006-09-16

citation for this record: Cannon, E.C., and Burgmann, R., compilers, 2006, Fault number 2603, Kealakekua fault system, 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 02:53 PM.

Synopsis

The Kealakekua fault system may represent part of a landslide fault scarp for the numerous submarine debris avalanches and slumps off the west flank of Mauna Loa Volcano: Alikea 1 and 2 debris avalanches, South Kona debris avalanche and slump, Ka Lae East and West debris avalanches (Lipman, 1995 #6987; Moore and Chadwick, 1995 #6959; Moore and others, 1995 #6958). The Kealakekua fault system may connect with the Kahuku fault system [2604] to form the southwest Hawai'i slide complex, possibly buried beneath lava flows on the western flank of Mauna Loa (Moore and others, 1989 #6961; Lipman, 1995 #6987). Wolfe and Morris (1996 #6977) indicate that the subaerial traces of the Kealakekua fault system are concealed by overlying mapped volcanic units (mainly lava flows) that are 10 ka or younger, and thus the most recent movement must be pre-Holocene.

Name comments	The Kealakekua fault system is located on sheet 3 of 3 of the 1:100,000-scale geologic map compiled by Wolfe and Morris (1996 #6977).
County(s) and State(s)	HAWAII COUNTY, HAWAII
Physiographic province(s)	HAWAIIAN-EMPEROR ISLAND-SEAMOUNT CHAIN
Reliability of location	Poor Compiled at 1:100,000 scale. <i>Comments:</i> Wolfe and Morris's (1996 #6977) 1:100,000-scale geologic map shows the subaerial traces of the Kealakekua fault system as concealed by Holocene volcanic units. At Kealakekua Bay, the fault trace is shown inferred as much as about 0.5 km offshore of the steep coastal scarp. Location of fault generalized from Trusdell and others (2006 #6976).
Geologic setting	The Kealakekua fault system is located on the western flank of Mauna Loa Volcano. The fault system probably is the subaerial headwalls of massive submarine landslides (Lipman and others, 1990 #6954; Moore and others, 1995 #6958) that moved westward off the coast of Mauna Loa. The region is seismically active, with a trend in epicenter distribution associated with the fault system (Okubo, 1995 #6967). Wolfe and Morris (1996 #6977) indicate that the traces of the Kealakekua fault system are concealed by overlying mapped units 10 ka or younger.
Length (km)	30 km.
Average strike	N. 16° W.
Sense of movement	Normal <i>Comments:</i> From (Wolfe and Morris, 1996 #6977).
Dip Direction	W; SW
Paleoseismology studies	
Geomorphic expression	The eight fault traces or zones are concealed normal faults that trend northwest to north with southwest and west hanging wall blocks (Wolfe and Morris, 1996 #6977).

Age of faulted surficial deposits	Wolfe and Morris (1996 #6977) indicate that the subaerial traces of the Kealakekua fault system are concealed by overlying mapped volcanic units (mainly flows) that are 10 ka or younger. Lipman (1995 #6987) determined that lava flows exposed in the Kealakekua landslide fault scarp have a K-Ar age of 166±63 ka. Moore and others (1989 #6961) bracket faulting on the Kealakekua fault system between 31 ka and 13-16 ka, based on a 31 ka lava sequence cut by the fault. The fault is overlain by an unfaulted coral reef, with an age of 13 ka (Lipman and others, 1988 #6953) or 16 ka (Moore and others, 1990 #6963). Moore and Chadwick (1995 #6959) interpret the Alika debris avalanches to have occurred prior to about 30 ka, the estimated general age of the oldest surface rocks found on Hualalai and Mauna Loa, which show no evidence of tsunami deposits or faulting. Movement of the Alika 2 debris avalanche may have produced 105 ka tsunami deposits on the Island of Lana'i (Moore and Chadwick, 1995 #6959).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) <i>Comments:</i> Herein considered to be constrained between about 31 ka and 13-16 ka (Lipman, 1995 #6987; Lipman and others, 1988 #6953; Moore and Chadwick, 1995 #6959).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Herein considered to be <0.2 mm/yr based on a lack of evidence of Holocene movement with the most recent movement constrained between about 31 ka and 13-16 ka (Lipman, 1995 #6987; Lipman and others, 1988 #6953; Moore and Chadwick, 1995 #6959). The faults seem to be controlled by catastrophic volcanic-flank failure events that generated the submarine debris avalanches and slumps offshore. Slip rates most likely are not uniform over time and are punctuated by catastrophic faulting events.
Date and Compiler(s)	2006 Eric C. Cannon, none Roland Burgmann, University of California at Berkeley
References	#6987 Lipman, P.W., 1995, Declining growth of Mauna Loa

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