

# 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](#).

## Kahuku fault system (Class A) No. 2604

Last Review Date: 2006-09-16

*citation for this record:* Cannon, E.C., and Burgmann, R., compilers, 2006, Fault number 2604, Kahuku 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 Kahuku fault system is located on the southwestern part of Mauna Loa Volcano, where Mauna Loa's southwest rift zone [2605c] shifts eastward approximately 5 km. The west-dipping normal faults of the fault system are co-located along crater chains and fissure vents active as recently as 1868 (Wolfe and Morris, 1996 #6977). The Kahuku fault system may connect with the Kealakekua fault system [2603] 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). Offshore of Ka Lae (South Point), the normal fault system extends for an additional 20-40 km to the south, with the hanging wall block down to the west (Fornari, 1987 #6942; Moore and Chadwick, 1995 #6959). The South Kona slump and Ka Lae East debris avalanche are located to the west of the offshore extension of the Kahuku fault system (Moore and others, 1989 #6961; Moore and Chadwick, 1995 #6959).

<b>Name comments</b>	The Kahuku fault system is on sheet 3 of 3 of the 1:100,000-scale geologic map compiled by Wolfe and Morris (1996 #6977), available in digital format from Trusdell and others (2006 #6976). Wolfe and Morris (1996 #6977) name only the Kahuku fault on their map but show six additional fault splays and traces. Lipman (1995 #6987) identified the Kahuku fault system on a generalized map of Hawai'i. The term "Kahuku fault system" is used here to identify the group of faults containing the Kahuku fault and six additional splays and traces.
<b>County(s) and State(s)</b>	HAWAII COUNTY, HAWAII
<b>Physiographic province(s)</b>	HAWAIIAN-EMPEROR ISLAND-SEAMOUNT CHAIN
<b>Reliability of location</b>	Good Compiled at 1:100,000 scale.  <i>Comments:</i> Based on the 1:100,000-scale geologic map from Wolfe and Morris (1996 #6977). An approximately 160-m-high erosionally modified fault scarp (Lipman, fig. 1, 1995 #6987) forms a prominent topographic feature on southern Mauna Loa. Fault location generalized from Trusdell and others (2006 #6976).
<b>Geologic setting</b>	Mauna Loa is an active shield-stage volcano (Wolfe and Morris, 1996 #6977). The most recent eruption occurred in 1984.
<b>Length (km)</b>	24 km.
<b>Average strike</b>	N. 12° W.
<b>Sense of movement</b>	Normal  <i>Comments:</i> Wolfe and Morris (1996 #6977).
<b>Dip Direction</b>	W  <i>Comments:</i> Moore and Chadwick (1995 #6959), Wolfe and Morris (1996 #6977).
<b>Paleoseismology studies</b>	
<b>Geomorphic</b>	The Kahuku fault is a north-trending, west-side-down, erosionally

<b>expression</b>	modified fault scarp with as much as about 160 m of relief. Offshore, the fault system has almost 2000 m of vertical offset between the eastern shallow ridge and western downthrown block (Garcia and others, 1995 #6943). The South Kona slump and Ka Lae East debris avalanche are located to the west of the eastern shallow ridge (Moore and others, 1989 #6961; Moore and Chadwick, 1995 #6959).
<b>Age of faulted surficial deposits</b>	The fault cuts the Kahuku Basalt which has an estimated age of older than 31 ka. The Kahuku Basalt is also overlain by unfaulted Pahala Ash with an estimated age of >30 ka (Wolfe and Morris, 1996 #6977).
<b>Historic earthquake</b>	Ka'u earthquake 1868
<b>Most recent prehistoric deformation</b>	late Quaternary (<130 ka)  <i>Comments:</i> Most recent event considered to be older than 30 ka, the estimated age of the unfaulted Pahala Ash (Wolfe and Morris, 1996 #6977).
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Less than 0.2 mm/yr  <i>Comments:</i> Herein considered to be <0.2 mm/yr based on a lack of Holocene movement with the most recent movement constrained to be >30 ka (Wolfe and Morris, 1996 #6977). The faults seem to be controlled by catastrophic volcanic flank failure events that have generated the submarine debris avalanches and slumps offshore. Slip rates most likely are not uniform over time and are punctuated by catastrophic faulting events.
<b>Date and Compiler(s)</b>	2006 Eric C. Cannon, none Roland Burgmann, University of California at Berkeley
<b>References</b>	#6942 Fornari, D.J., 1987, The geomorphic and structural development of Hawaiian submarine rift zones, <i>in</i> Decker, R.W., Wright, T.L., and Stauffer, P.H., eds., <i>Volcanism in Hawaii</i> : U.S. Geological Survey Professional Paper 1350, v. 1, p. 125-132.  #6986 Garcia, M.O., Hulsebosch, T.P., and Rhodes, J.M., 1995, Olivine-rich submarine basalts from the southwest rift zone of

Mauna Loa Volcano—Implications for magmatic processes and geochemical evolution, *in* Rhodes, J.M., and Lockwood, J.P., eds., *Mauna Loa revealed—Structure, composition, history, and hazards: American Geophysical Union Geophysical Monograph*, v. 92, p. 219-239

#6987 Lipman, P.W., 1995, Declining growth of Mauna Loa during the last 100,000 years—Rates of lava accumulation vs. gravitational subsidence, *in* Rhodes, J.M., and Lockwood, J.P., eds., *Mauna Loa revealed—Structure, composition, history, and hazards: American Geophysical Union Geophysical Monograph*, v. 92, p. 45-80.

#6959 Moore, J.G., and Chadwick, W.W., Jr., 1995, Offshore geology of Mauna Loa and adjacent areas, Hawaii *in* Rhodes, J.M., and Lockwood, J.P., eds., *Mauna Loa revealed-Structure, composition, history, and hazards: American Geophysical Union Geophysical Monograph*, v. 92, p. 21-44.

#6961 Moore, J.G., Clague, D.A., Holcomb, R.T., Lipman, P.W., Normark, W.R., Torresan, M.E., 1989, Prodigious submarine landslides on the Hawaiian Ridge: *Journal of Geophysical Research*, v. 94, no. B12, p. 17,465-17,484.

#6976 Trusdell, F.A., Wolfe, E.W., and Morris, J., 2006, Digital database of the geologic map of the island of Hawai'i: U.S. Geological Survey Data Series 144 supplement to Miscellaneous Investigations Series Map I-2524-A, 18 p, 1 sheet, scale 1:100,000.

#6977 Wolfe, E.W., and Morris, J., 1996, Geologic map of the island of Hawaii: U.S. Geological Survey Miscellaneous Investigations Series Map I-2524-A, 18 p., 3 sheets, scale 1:100,000.

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