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Quaternary Fault and Fold Database of the United States

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Kohala Volcano, Kohala graben section (Class B) No. 2600c

Last Review Date: 2006-09-16

citation for this record: **Cannon, E.C., and Burgmann, R., compilers, 2006, Fault number 2600c, Kohala Volcano, Kohala graben section, 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	**General:** Kohala is the oldest volcano on the Island of Hawai'i. It has two poorly defined volcanic lineaments inferred along broad topographic ridges: the northwest [2600a] and southeast [2600b] volcanic lineaments. These volcanic lineaments may follow the general trend of earlier shield-stage rift zones. At the summit region in the Kohala Mountains, the volcanic lineaments are co-located with the northwest-trending Kohala graben [2600c] (Wolfe and Morris, 1996 #6977). Along the northeast coast of the Kohala Peninsula, a coastal "headwall" [2600d] trends approximately northwest from Kukuihaele to Akokoa Point. The Kohala graben most likely is a pull-apart graben at the head of the 3,500 square kilometer Pololu submarine debris avalanche (Moore and others, 1989 #6961). **Sections:** This fault has 4 sections. The sections are the northwest

	[2600a] and southeast [2600b] volcanic lineaments, the Kohala graben [2600c], and the Kohala headwall [2600d].
Name comments	**General:** Kohala Volcano is located on sheet 1 of 3 of the 1:100,000-scale geologic map compiled by Wolfe and Morris (1996 #6977), which is available in digital format from Trusdell and others (2006 #6976). **Section:** Informal section name based on Moore and others (1989 #6961).
County(s) and State(s)	HAWAII COUNTY, HAWAII
Physiographic province(s)	HAWAIIAN-EMPEROR ISLAND-SEAMOUNT CHAIN
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* The 32 normal fault traces that compose the Kohala graben are shown on Sheet 1 of 3 of Wolfe and Morris (1996 #6977). Faults generalized from Trusdell and others (2006 #6976).
Geologic setting	Kohala is a postshield-stage volcano and is the northernmost and oldest volcano on Hawai'i with an approximate age of 120-700 ka (Wolfe and Morris, 1996 #6977).
Length (km)	This section is 9 km of a total fault length of 22 km.
Average strike	N. 54° W. (for section) versus N. 53° W. (for whole fault)
Sense of movement	Normal *Comments:* From Wolfe and Morris (1996 #6977).
Dip Direction	SW; NE *Comments:* Dip of fault is generally southwest or northeast as shown by Wolfe and Morris (1996 #6977).
Paleoseismology studies	
Geomorphic expression	The Kohala graben is composed of a series of normal faults that form a broad zone trending roughly N. 55? W. Moore and others

	(1989 #6961) interpret the normal faults to represent a pull-apart graben at the head of a visible subaerial landslide amphitheater, which continues offshore as the submarine Pololu debris avalanche (see Kohala headwall section [2600d]).
Age of faulted surficial deposits	The faults of the Kohala graben cut middle to late Pleistocene Hawi lava flows and domes, scoria cones, and Pololu lava flows. Wolfe and Morris (1996 #6977) summarize the K-Ar ages from several researchers for the postshield-stage Hawi Volcanics as being between 230 ka and 120 ka. Dalrymple (1971 #6938) calculates 700 ka as the weighted mean age of five tholeiitic shield-stage Pololu lava flows in Waipi'o Valley. Wolfe and Morris (1996 #6977) redefine the Pololu Volcanics as shield-stage to transitional.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Moore and others (1989 #6961) estimate the age of the Pololu debris avalanche to be "slightly older" than 370 ka. Their estimate is based on bathymetry that suggests the debris avalanche material shows a slope change attributed to the transition from shield-stage to postshield-stage volcanism dated at 370 ka from subsidence rates and modeled coral reef ages. Surface faults cut through both shield-stage Pololu Volcanics and postshield-stage 230 ka to 120 ka Hawi Volcanics (Wolfe and Morris, 1996 #6977).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Herein considered to be <0.2 mm/yr and likely inactive. The Pololu debris avalanche may represent a one-time, catastrophic event, perhaps triggered by an earthquake. If so, then the Kohala graben, interpreted by Moore and others (1989 #6961) as a pull-apart graben at the head of the Pololu debris avalanche, may be inactive at present. Additionally, postshield-stage eruptive activity at Kohala has ceased (Wolfe and Morris, 1996 #6977).
Date and Compiler(s)	2006 Eric C. Cannon, none Roland Burgmann, University of California at Berkeley

References	#6938 Dalrymple, G.B., 1971, Potassium-argon dates of from the Pololu volcanic series, Kohala Volcano, Hawaii: Geological Society of America Bulletin, v. 82, no. 7, p. 1997-2000. #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.