

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](#).

Hualalai Volcano, north volcanic lineament (Class B) No. 2602b

Last Review Date: 2006-09-16

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Synopsis

General: Hualalai Volcano, the oldest of the three active volcanoes on Hawai'i, has three poorly defined volcanic lineaments inferred along broad topographic ridges, the northwest [2602a], north [2602b], and south-southeast [2602c] volcanic lineaments. Other researchers, including Moore and others (1987 #6962) and Kauahikaua and others (2002 #6947), use the term "rift zone" rather than "volcanic lineament." The rift zones in Moore and others (1987 #6962) appear to radiate from a central point approximately 5 km east of the summit of Hainoa Crater. Holcomb and others (2000 #6945) offer alternative rift zone models. Offshore, the North Kona slump is located on the western flanks of Hualalai and Mauna Loa Volcanoes (Moore and Chadwick, 1995 #6959). The landslide head may correspond with the northwest rift zone on Hualalai (Moore and Chadwick, 1995 #6959).

	<p>Sections: This fault has 3 sections. The sections are the northwest [2602a], north [2602b], and south-southeast [2602c] volcanic lineaments.</p>
<p>Name comments</p>	<p>General: Hualalai Volcano is located on sheet 1 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) use the 1:50,000-scale geologic map of Hualalai from Moore and Clague (1991 #6960).</p> <p>Section: Informal section name based on Moore and others (1989 #6962).</p>
<p>County(s) and State(s)</p>	<p>HAWAII COUNTY, HAWAII</p>
<p>Physiographic province(s)</p>	
<p>Reliability of location</p>	<p>Poor Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> The north volcanic lineament may follow a preexisting, shield-stage rift zone structure. Peterson and Moore (fig. 7.2, 1987 #6970) show the general trend of the north rift zone in a regional-scale map of Hawai'i. Holcomb and others (2000 #6945) offer alternative rift zone models. Moore and others (1987 #6962) present an aerial photograph of the north rift zone. Fault location generalized from Trusdell and others (2006 #6976).</p>
<p>Geologic setting</p>	<p>The surface of postshield-stage Hualalai consists of transitional to postshield-stage Holocene and Pleistocene Hualalai Volcanics, and the Pleistocene Wa'awa'a Trachyte Member (Moore and Clague, 1991 #6960; Wolfe and Morris, 1996 #6977). The transition from shield- to postshield-stage volcanism occurred between 130 ka and 105 ka (Wolfe and Morris, 1996 #6977). The most recent eruption occurred along the northwest rift zone in 1800-1801 (Clague and Dalrymple, 1987 #6937; Moore and others, 1987 #6962; Kauahikaua and others, 2002 #6947). Based on records of increased seismicity, Moore and others (1987 #6962) speculate that an intrusion occurred in 1929. Future eruptions may have short periods of precursory seismic activity (Moore and others, 1987 #6962), although there is concern for the possibility of a rapid rise of magma without much seismic activity</p>

	(D.A. Swanson, written commun., 2005).
Length (km)	km.
Average strike	N. 8° W. (for section) versus N. 32° W. (for whole fault)
Sense of movement	Normal <i>Comments:</i> Unknown, presumably normal due to extension.
Dip Direction	E; W <i>Comments:</i> Unknown, presumably near vertical to vertical.
Paleoseismology studies	
Geomorphic expression	The north volcanic lineament is very weakly defined by a series of Hualalai Volcanics spatter and scoria cones and the Pu'u Wa'awa'a Trachyte scoria cone. The north rift zone does not form a topographically high ridge with respect to the volcanic edifice. Moore and others (1987 #6962) describe the north rift zone as "ill-defined" due to the decreased numbers of volcanic vents and cones. No lava flowed from the north rift zone during the 1800-1801 eruption.
Age of faulted surficial deposits	The ages of Hualalai Volcanics scoria and spatter cones that define the north volcanic lineament range in age from 1.5-3.0 ka to >10.0 ka; the oldest Hualalai Volcanics basalt flow is older than 13 ka (Wolfe and Morris, 1996 #6977). See Moore and others (1987 #6962) for a detailed list of dated samples from Hualalai Volcano.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> The transition from shield- to postshield-stage volcanism occurred between 130 ka and 105 ka for Hualalai (Wolfe and Morris, 1996 #6977). Once the volcano reached postshield-stage, volcanic activity along the north rift zone probably declined greatly and postshield-stage volcanism buried the inactive, shield-stage rift zone. The Holocene and latest Pleistocene (<15 ka) volcanic rocks found along the north volcanic lineament today indicate that some magma transport may

	have followed old rift zone pathways to the surface.
Recurrence interval	
Slip-rate category	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> Slip rate not reported by Moore and others (1987 #6962). Herein considered to be <0.2 mm/yr and likely inactive. Although eruptions have occurred as recently as 1800-1801 and in the Holocene, the volcano transitioned into postshield-stage volcanism between 130 ka and 105 ka (Wolfe and Morris, 1996 #6977), suggesting that the shield-stage rift zones are inactive at present.</p>
Date and Compiler(s)	<p>2006</p> <p>Eric C. Cannon, none</p> <p>Roland Burgmann, University of California at Berkeley</p>
References	<p>#6937 Clague, D.A., Dalrymple, G.B., 1987, The Hawaiian-Emperor volcanic chain. Part I. Geologic evolution, <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. 5-54.</p> <p>#6945 Holcomb, R.T., Nelson, B.K., Reiners, P.W., and Sawyer, N.-L., 2000, Overlapping volcanoes: The origin of Hilo Ridge, <i>Hawaii: Geology</i>, v. 28, no. 6, p. 547-550.</p> <p>#6947 Kauahikaua, J., Cashman, K.V., Clague, D.A., Champion, D., and Hagstrum, J.T., 2002, Emplacement of the most recent lava flows on Hualalai Volcano, Hawai'i, <i>Bulletin of Volcanology</i>, v. 64, p. 229-253, DOI 10.1007/s00445-001-0196-8</p> <p>#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., <i>Mauna Loa revealed-Structure, composition, history, and hazards</i>: American Geophysical Union Geophysical Monograph, v. 92, p. 21-44.</p> <p>#6960 Moore, R.B., and Clague, D.A., 1991, Geologic map of Hualalai Volcano, Hawaii: U.S. Geological Survey Miscellaneous Investigations Series Map I-2213, scale 1:50,000.</p> <p>#6962 Moore, R.B., Clague, D.A., Rubin, M., and Bohrsen, W.A., 1987, Hualalai Volcano-A preliminary summary of geologic,</p>

petrologic, and geophysical data, *in* Decker, R.W., Wright, T.L., and Stauffer, P.H., eds., *Volcanism in Hawaii*: U.S. Geological Survey Professional Paper 1350, v. 1, p. 571-585.

#6970 Peterson, D.W., and Moore, R.B., 1987, Geologic history and evolution of geologic concepts, Island of Hawaii, *in* Decker, R.W., Wright, T.L., and Stauffer, P.H., eds., *Volcanism in Hawaii*: U.S. Geological Survey Professional Paper 1350, v. 1, p. 149-189.

#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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