

# 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](#).

## Lo'ihl Seamount, north rift zone (Class A) No. 2611b

Last Review Date: 2006-09-16

*citation for this record:* Burgmann, R., compiler, 2006, Fault number 2611b, Lo'ihl Seamount, north rift zone, 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 02:54 PM.

### Synopsis

**General:** Lo'ihl is the youngest seamount of the Hawaiian-Emperor island-seamount chain. The base of the volcano is approximately 5 km below sea level, and the summit platform is approximately 1.2 km below sea level (Caplan-Auerbach and Duennebier, 2001 #6936). Volcanic rocks from the seamount have preshield-stage alkalic, transitional, and shield-stage tholeiitic signatures (Clague and Dalrymple, 1987 #6937; Langenheim and Clague, 1987 #6949). Growing up through the Mauna Loa Punalu'u slump and building concurrently with Hilina slump activity, Lo'ihl may rise above the sea surface within the next few tens of thousands of years (Moore and Chadwick, 1995 #6959). The seamount has a summit caldera and two major rift zones: the north and the south rift zones. Lo'ihl is seismically active, and a seismic swarm in 1996 produced summit deformation (Caplan-Auerbach and Duennebier, 2001 #6936). Similar to the subaerial

	<p>volcanoes of Hawai'i, magmatic activity and gravitational failure of the Lo'ihi volcanic edifice can generate underwater faulting and catastrophic mass movement.</p> <p><b>Sections:</b> This fault has 3 sections. The sections designated for Lo'ihi Seamount are Lo'ihi's caldera [2611a], the north rift zone [2611b], and the south rift zone [2611c].</p>
<b>Name comments</b>	<b>General:</b> Lo'ihi (Hawaiian for "long") Seamount is the north-south elongate underwater volcano south of Kilauea Volcano [2608] (Malahoff, 1987 #6956).
<b>County(s) and State(s)</b>	HAWAII COUNTY, HAWAII (offshore)
<b>Physiographic province(s)</b>	
<b>Reliability of location</b>	<p>Poor Compiled at 1:500,000 scale.</p> <p><i>Comments:</i> Large contour intervals are used on maps showing the north rift zone. The bathymetric contour interval on maps from Malahoff (fig. 6.2, 1987 #6956), Smith and others (fig. 3d, 1999 #6973), and Caplan-Auerbach and Duennebier (fig. 2, 2001 #6936) are 50 fathoms (approximately 91 m), 100 m, and 100 m, respectively.</p>
<b>Geologic setting</b>	Lo'ihi is the southeasternmost and youngest member of the Hawaiian-Emperor island-seamount chain. The seamount has an age of probably less than 0.5 Ma (Malahoff, 1987 #6956) and has a height of about 4,000 m, but it remains submerged on the deep southeastern flank of the Island of Hawai'i (Caplan-Auerbach and Duennebier, 2001 #6936). Moore and Chadwick (1995 #6959) map the seafloor surface of Lo'ihi as mostly submarine basaltic pillow lavas. Three significant debris avalanches are located on the east, west, and south flanks that cover about one-half of the volcano (Malahoff, 1987 #6956; Moore and Chadwick, 1995 #6959).
<b>Length (km)</b>	This section is 7 km of a total fault length of 27 km.
<b>Average strike</b>	N. 8° E. (for section) versus N. 43° W. (for whole fault)
<b>Sense of movement</b>	<p>Normal</p> <p><i>Comments:</i> Unknown, presumably extension.</p>

<b>Dip Direction</b>	E; SE  <i>Comments:</i> Unknown, presumably vertical to near vertical.
<b>Paleoseismology studies</b>	
<b>Geomorphic expression</b>	The north rift zone forms a bathymetrically high ridge that trends generally north and then ends trending northeast (Malahoff, 1987 #6956). Where Malahoff (1987 #6956) shows a single north rift zone, Smith and others (1999 #6973) interpret the north rift zone with an additional rift zone splay to the north. Moore and Chadwick (1995 #6959) comment that significant mass wasting of the volcanic edifice has occurred on Lo'ihl, producing steep headwalls and leaving behind rift zones that resemble "narrow blade-like ridges."
<b>Age of faulted surficial deposits</b>	<0.5 Ma.
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	latest Quaternary (<15 ka)  <i>Comments:</i> Caplan-Auerbach and Duennebler (2001 #6936) do not report whether deformation occurred on the north rift zone as a result of the 1996 seismic swarm.
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Greater than 5.0 mm/yr  <i>Comments:</i> Slip rate not reported. Lo'ihl is an actively growing and deforming submarine volcano with rift zones that probably have active extension. The estimated slip rate of >5 mm/yr is based on slip rates for the rift zones found on Hawai'i's two other active volcanoes, the rift zones of Mauna Loa [2605b, 2605c] and Kilauea [2608b, 2608c] Volcanoes.
<b>Date and Compiler(s)</b>	2006 Roland Burgmann, University of California at Berkeley
<b>References</b>	#6936 Caplan-Auerbach, J. and Duennebler, F.K., 2001,

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