Jump to Navigation

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.

Faults along the Lava Creek caldera margin (Class B) No. 763

Last Review Date: 1999-12-07

citation for this record: **Pierce, K.L., and Machette, M.N., compilers, 1999, Fault number 763, Faults along the Lava Creek caldera margin, 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 02:02 PM.**

Synopsis	The Lava Creek caldera is the youngest of three large Yellowstone calderas that have formed since about 2.1 Ma. This last catastrophic eruption produced ash that spread across most of the Western and Central U.S. The Lava Creek ash (630 ka) is a regional marker bed that provides valuable age control for deposits of early to middle Quaternary age. The faults shown here are related to the topographic margin of the caldera, which is probably slightly outward from the true structural wall owing to modest collapse and erosion. The faults are largely concealed beneath moat-filling deposits of the caldera. Although probably not seismogenic, the faults are included here as Class B structure because they control the extent and geometry of other Quaternary faults and may move during major earthquakes on other seismogenic faults in the region.

Name comments	This group of faults forms the margin of the 630-ka (middle Quaternary) Lava Creek caldera. Also included are several faults that represent collapse of the northwestern caldera margin. They are probably related largely to eruption and subsequent rapid collapse of the caldera about 630 ka.
County(s) and State(s)	GALLATIN COUNTY, MONTANA PARK COUNTY, WYOMING TETON COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:125,000 scale. *Comments:* Faults were mapped at 1:62,500 scale by Christiansen and Blank (1974 #2264), Blank and others (1974 #2274). Fault traces recompiled at 1:125,000 scale on map with topographic base.
Geologic setting	These faults form the margin of the 630-ka (middle Quaternary) Lava Creek caldera (Prostka and others, 1975 #2259). Also included are several faults that represent gravational collapse of the northwestern caldera margin (Christiansen, 2001 #1784).
Length (km)	66 km.
Average strike	N49°W
Sense of movement	Normal
Dip Direction	Unknown *Comments:* Faults dip toward the interior of the caldera, and thus have all compass orientations.
Paleoseismology studies	
Geomorphic expression	The position of the concealed faults is based on the preserved topographic wall of the Lava Creek caldera.
Age of faulted surficial deposits	The faults cut volcanic rocks and bedrock that predate the eruption of the Lava Creek caldera about 630 ka (Christiansen, 2001 #1784). Younger rhyolite flows bury much of the fault trace.

Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Faulting is coeval with formation of the Lava Creek caldera (630 ka) (Christiansen, 2001 #1784).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Most of these faults are related to the ancient (630 ka) eruption and subsequent collapse of the Lava Creek caldera. As such, their slip during the subsequent middle and late Quaternary has been minimal (no younger deposits have been mapped as being displaced). Thus, the fault slip rates have likely been <0.2 mm/yr since collapse of the Lava Creek caldera, and may have been inactive for the entire late Quaternary.
Date and Compiler(s)	1999 Kenneth L. Pierce, U.S. Geological Survey, Emeritus Michael N. Machette, U.S. Geological Survey, Retired
References	#2274 Blank, H.R., Jr., Prostka, H.J., Keefer, W.R., and Christiansen, R.L., 1974, Geologic map of the Frank Island quadrangle, Yellowstone National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1209, scale 1:62,500. #1784 Christiansen, R.L., 2001, The Quaternary and Pliocene Yellowstone Plateau volcanic field of Wyoming, Idaho, and Montana: U.S. Geological Survey Professional Paper 729-G, 145 p., 3 pls., scale 1:125,000. #2264 Christiansen, R.L., and Blank, H.R., Jr., 1974, Geologic map of the Old Faithful quadrangle, Yellowstone, National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1189, scale 1:62,500. #2259 Prostka, H.J., Smedes, H.W., and Christiansen, R.L., 1975, Geologic map of the Pelican Cone quadrangle, Yellowstone National Park and vicinity, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1243.

	#639 U.S. Geological Survey, 1972, Geologic map of Yellowstone National Park: U.S. Geological Survey Miscellaneous Geologic Investigations I-711, 1 sheet, scale 1:125,000.