

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](#).

Cedar Ranch fault zone (Class A) No. 961

Last Review Date: 1997-01-06

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1997, Fault number 961, Cedar Ranch fault 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 03:13 PM.

Synopsis	Normal faulting has generated a fairly large (about 50-m-high) escarpment on Paleozoic bedrock and lower Pleistocene basalt flows; the displacement is down to the east. The surface of a middle Pleistocene basalt flow is displaced about 3 m. This low fault scarp is subtle and gentle, suggesting that the fault may not have ruptured during the late Quaternary.
Name comments	Mapped and called the "Mesa Butte South" fault by Menges and Pearthree (1983 #2073). The geology was mapped and fault named "Cedar Ranch" by Wolfe and others (1987 #2158) and Ulrich and Bailey (1987 #2156); Pearthree and others (1996 #2153) also called it the Cedar Ranch fault.

County(s) and State(s)	COCONINO COUNTY, ARIZONA
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> Trace mapped at 1:50,000 scale, transferred to 1:250,000-scale topographic base map.
Geologic setting	The fault is located in the northern part of the Pliocene-Quaternary San Francisco volcanic field, on the erosion surface cut on Paleozoic rocks that slopes from the Colorado Plateaus margin northeast to the Little Colorado River. This fault may be a branch or splay of the Mesa Butte North fault [987]; there is no definitive evidence that the main trace of the Mesa Butte fault in this area has been active during the Quaternary. The Cedar Ranch fault cuts Paleozoic rocks and lower and middle Pleistocene basalt flows. Paleozoic rocks are vertically displaced as much as 50 m and lower Pleistocene basalt may be displaced by a similar amount, however, a middle Pleistocene (500-600 ka) basalt flow is displaced only about 3 m.
Length (km)	10 km.
Average strike	N17°E
Sense of movement	Normal <i>Comments:</i> Predominantly normal movement is inferred from topographic relations.
Dip Direction	SE; NW
Paleoseismology studies	
Geomorphic expression	The fault forms a fairly high (about 50-m-high), curvilinear, east-facing escarpment on Paleozoic bedrock and lower Pleistocene basalt flows. The lower Pleistocene flows may have cascaded over an existing escarpment, making displacement estimates problematic. There is a 3-m-high fault scarp formed on a middle Pleistocene basalt that flowed down a valley and across the fault zone. This low fault scarp is gentle, suggesting pre-late

	Quaternary activity.
Age of faulted surficial deposits	Paleozoic, early Pleistocene, middle Pleistocene
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> A middle Pleistocene basalt flow is faulted (but the scarp is gentle) suggesting possibility pre-late Quaternary activity.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> A middle Pleistocene basalt flow (500-600 ka) is displaced about 3 m whereas a lower Pleistocene flow (750 ka-1.6 Ma) may be displaced as much as 50 m. However, older flow may have cascaded over a bedrock escarpment, so the net Quaternary fault displacement is likely much less than 50 m. If one considers the 3-m offset of the 500-600 ka basalt, the resulting minimum long-term slip rate is low.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#2073 Menges, C.M., and Pearthree, P.A., 1983, Map of neotectonic (latest Pliocene-Quaternary) deformation in Arizona: Arizona Geological Survey Open-File Report 83-22, 48 p., scale 1:500,000. #2153 Pearthree, P.A., Vincent, K.R., Brazier, R., and Hendricks, D.M., 1996, Plio-Quaternary faulting and seismic hazard in the Flagstaff area, northern Arizona: Arizona Geological Survey Bulletin 200, 40 p., 2 pls. #2156 Ulrich, G.E., and Bailey, N.G., 1987, Geologic map of the SP Mountain part of the San Francisco volcanic field, north-central Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-1956, 2 sheets, scale 1:50,000. #2158 Wolfe, E.W., Ulrich, G.E., and Newhall, C.G., 1987,

Geologic map of the northwest part of the San Francisco volcanic field, north-central Arizona: U.S. Geological Survey
Miscellaneous Field Studies Map MF-1957, 2 sheets, scale
1:50,000.

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