

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](#).

Mormon Lake fault zone (Class A) No. 979

Last Review Date: 1997-01-29

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1997, Fault number 979, Mormon Lake 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 03:11 PM.

Synopsis	Substantial displacement across north northwest-trending normal faults of the Mormon Lake fault zone has generated a west-facing escarpment on upper Miocene volcanic rocks southeast of the Pliocene-Quaternary San Francisco volcanic field. The main fault zone bounds the east side of a trough that contains Mormon Lake; several subsidiary faults follow the trend of the main fault zone. Upper Miocene rocks are displaced at least 60 m. The fault escarpment is fairly steep and linear, but no definitive displacement of Quaternary units has been documented.
Name comments	Mapped and named by Menges and Pearthree (1983 #2073). The general geology of the area was mapped by Weir and others (1989

	#2164) and detailed geologic mapping was published by Holm (1994 #2163).
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 1:24,000 scale, transferred to 1:250,000-scale topographic base map.
Geologic setting	This fault zone is one of several northwest- to north-trending fault zones located southeast of the Pliocene-Quaternary San Francisco volcanic field. The fault zone displaces an erosion surface cut onto Paleozoic rocks near the Mogollon Rim. The Mormon Lake fault zone displaces upper Miocene volcanic rocks at least 60 m (Pearthree and others, 1996 #2153), but most of this displacement may have occurred during the Pliocene (Holm, 1994 #2163). Along the southern part of the fault zone, late Pliocene basalt is not faulted.
Length (km)	15 km.
Average strike	N17°W
Sense of movement	Normal <i>Comments:</i> Predominantly normal movement is inferred from topographic relations.
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	Faulting has generated a fairly high, north northwest-trending escarpment on upper Miocene basalt that defines the east side of a broad, asymmetric physiographic trough. The trough is floored by late Quaternary alluvium deposited in lakes or marshes. The slopes of the escarpment are moderately steep.
Age of faulted surficial	Late Miocene

deposits	
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> Quaternary activity is likely based on the relatively steep, linear fault escarpment, but there is no documented displacement of Quaternary alluvium.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> A low long-term slip rate is inferred based on 60 m of displacement since 6-10 Ma. However, the slip rate during the Quaternary cannot be estimated because there is no documented displacement of Quaternary alluvium.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#2163 Holm, R.F., 1994, Geologic map of the Mormon Lake quadrangle, Coconino County, Arizona: Arizona Geological Survey Contributed Map 94-C, 24 p. pamphlet, 1 sheet, scale 1:24,000. #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. #2164 Weir, G.W., Ulrich, G.E., and Nealey, L.D., 1989, Geologic map of the Sedona 30' x 60' quadrangle, Yavapai and Coconino Counties, Arizona: U.S. Geological Survey Miscellaneous Investigations Map I-1896, 1 sheet, scale 1:100,000.

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