

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](#).

Gray Mountain faults (Class A) No. 1018

Last Review Date: 1997-02-05

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1997, Fault number 1018, Gray Mountain faults, 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 02:20 PM.

Synopsis

Numerous normal faults cut the erosion surface formed on Paleozoic rocks on Gray Mountain, which is on the northeasternmost part of the Coconino Plateau, south of the Grand Canyon. The faults are north of the Pliocene-Quaternary San Francisco volcanic field. Fault trends range from north to west-northwest and they form numerous narrow grabens and other linear depressions. This large set of faults has been grouped together because field investigations of them have been minimal and little is known about their behavior or recency of movement. Pleistocene activity has been inferred for at least some of these faults. Quaternary faulting is suggested by fairly sharply defined scarps associated with some of these faults.

Name comments	The name applies to a large number (about 50) generally north- or northwest-trending possible Quaternary faults on Gray Mountain. Some of the faults were mapped and described in general by Barnes (1974 #2104). Menges and Pearthree (1983 #2073) mapped, grouped together and called them the Gray Mountain fault set. Faults and general geology were mapped by Ulrich and others (1984 #2157). This group of faults includes the Burro Canyon graben of Barnes (Barnes, 1974 #2104).
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 1:250,000 scale; transferred to 1:250,000-scale topographic base map.
Geologic setting	These faults are located on an erosion surface cut onto Paleozoic rocks of the Coconino Plateau between the Pliocene-Quaternary San Francisco volcanic field and the Grand Canyon. These faults are on top of Gray Mountain, a topographic prominence that forms the easternmost part of the Coconino Plateau. This relatively high area evidently was uplifted by monoclinial folding during regional compression of the late Cretaceous-early Tertiary Laramide orogeny. Several folds with different orientations come together in this area, creating a complex pattern that may have affected later normal faulting as well (Barnes, 1974 #2104). The Gray Mountain faults cut Paleozoic rocks and possibly some Quaternary alluvium, although Quaternary faulting has not been conclusively demonstrated.
Length (km)	22 km.
Average strike	N10°W
Sense of movement	Normal <i>Comments:</i> Predominantly normal movement inferred from topographic relations.

Dip Direction	E; W; NE; SW
Paleoseismology studies	
Geomorphic expression	Low to fairly high escarpments bound grabens formed on Paleozoic bedrock along the highest part of the Coconino Plateau. Some troughs are quite sharp with fairly steep scarps; others are subtle and weakly defined. The sharp geomorphic expression of some of the grabens and scarps suggests possible Quaternary activity.
Age of faulted surficial deposits	Paleozoic, Quaternary(?)
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> Pleistocene activity has been inferred for at least some of these faults (Barnes, 1974 #2104). Displacement of Quaternary deposits has not been conclusively demonstrated, but the fairly sharp geomorphic expression of Burro Canyon graben and some of the other faults in this set suggests Quaternary activity.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> No data exist to determine a slip rate, but the <0.2 mm/yr category is inferred on the basis of slip rates on other Quaternary faults in the region.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#2104 Barnes, C.W., 1974, Interference and gravity tectonics in the Gray Mountain area, Arizona, <i>in</i> Karlstrom, T.N.V., Swann, G.A., and Eastwood, R.L., eds., Geology of Northern Arizona with notes on archaeology and paleoclimate, Part II, Area studies and field guides; north-central Arizona: Geological Society of America, Rocky Mountain Section Meeting, v. 27, p. 442-453.

#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.

#2157 Ulrich, G.E., Billingsley, G.H., Hereford, R., Wolfe, E.W., Nealey, L.D., and Sutton, R.L., 1984, Maps showing geology, structure, and uranium deposits of the Flagstaff 1° by 2° quadrangle, Arizona: U.S. Geological Survey Miscellaneous Investigations Map I-1446, 2 sheets, scale 1:250,000.

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