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.

Malpais Tank faults (Class A) No. 975

Last Review Date: 1997-01-31

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 1997, Fault number 975, Malpais Tank 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 03:11 PM.**

Synopsis	Northwest- and north northwest-trending normal faults form a shallow, fairly narrow, symmetric graben on Paleozoic bedrock and lower Pleistocene basalt in the northwestern part of the the Pliocene-Quaternary San Francisco volcanic field. Faults displace lower Pleistocene (750-900 ka) basalt by less than 10 m. Fault scarps are not steep, and no displacement of upper Quaternary alluvium has been documented.
Name comments	Mapped by Menges and Pearthree (1983 #2073), who grouped this fault zone with many others in the area in the SP fault set; this particular fault zone was named and differentiated from other faults in the area by Pearthree and others (1996 #2153). The

	geology of the area was mapped by Ulrich and Bailey (1987 #2156).
County(s) and State(s)	COCONINO COUNTY, ARIZONA
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Trace mapped at 1:50,000 scale; transferred to 1:250,000-scale topographic base map.
Geologic setting	This is one of many fault zones in the northern part of the Pliocene-Quaternary San Francisco volcanic field, on the erosion surface cut on Paleozoic rocks between the Mogollon Rim and the Little Colorado River. The Malpais Tank faults displace Paleozoic bedrock by about 15 m and a lower Pleistocene basalt (830?80 ka Conway and others, 1997 #2162) by less than 10 m.
Length (km)	5 km.
Average strike	N19°W
Sense of movement	Normal *Comments:* Predominantly normal movement is inferred from topographic and regional relations.
Dip Direction	W; E
Paleoseismology studies	
Geomorphic expression	Faulting is expressed as a northwest-trending graben formed on Paleozoic rocks and a lower Pleistocene basalt flow. Upper Quaternary alluvium partially covers the bottom of the trough. Graben-margin scarps on basalt are fairly gentle; scarps on bedrock are steeper, but may have been enhanced by stream erosion.
Age of faulted surficial deposits	Paleozoic, early Pleistocene

Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Uppermost lower Pleistocene basalt flow (about 800 ka) is displaced by as much as 10 m, thus, middle Quaternary or younger fault activity is likely. No definitive evidence of late Quaternary fault activity has been documented.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip rate is inferred based on about 10 m of displacement of basalt flow dated at about 800 ka.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#2162 Conway, F.M., Ferrill, D.A., Hall, C.M., Morris, A.P., Stamatakos, J.A., Connor, C.B., Halliday, A.N., and Condit, C., 1997, Timing of basaltic volcanism along the Mesa Butte fault in the San Francisco Volcanic Field, Arizona, from 40Ar/39Ar dates—Implications for longevity of cinder cone alignments: Journal of Geophysical Research, v. 102, no. 1, p. 815-824. #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.