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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.

Arrowhead fault zone (Class A) No. 953

Last Review Date: 2006-04-19

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 2006, Fault number 953, Arrowhead 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 03:14 PM.**

Synopsis	The fault zone is expressed as a short, narrow, sharply defined graben formed on Paleozoic bedrock, lower to middle Pleistocene basalt flows, and middle to upper Pleistocene alluvium. The surface of a lower Pleistocene flow is vertically displaced at least 8.5 m, and middle to upper Pleistocene alluvium has been displaced about 6 m. The long-term slip rate is fairly low, but the middle portion of the fault scarp formed on basalt is nearly vertical and has minimal rock varnish. This evidence suggests that this fault may have ruptured recently, but Holocene alluvium is not faulted.
Name	Mapped and named by Menges and Pearthree (1983 #2073). The

comments	geology of the area was mapped by Moore and Wolfe (1987 #2152).
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	The fault is located near the northeastern edge of the Pliocene-Quaternary San Francisco volcanic field, on an erosion surface cut on Paleozoic rocks that slopes from the Colorado Plateau margin northeast to the Little Colorado River. The fault cuts Paleozoic rocks, lower and middle Pleistocene basalt flows, and middle to upper Pleistocene alluvium.
Length (km)	5 km.
Average strike	N35°W
Sense of movement	Normal *Comments:* Predominantly normal movement is inferred from topographic relations, but slickenlines on an exposed fault plane suggest a minor right-oblique component of movement (Menges, 1981, unpublished field notes).
Dip	81°
Paleoseismology studies	
Geomorphic expression	Faulting is expressed as a sharply defined, roughly symmetric, narrow (<300 m), shallow (<15 m deep) physiographic trough. Scarps are formed on Paleozoic bedrock and Quaternary basalt. The scarp formed on lower Pleistocene basalt on the southwest margin of the trough has a nearly vertical 3-m-high mid-slope with minimal rock varnish, which suggests relatively recent fault rupture.
Age of faulted	Paleozoic, early Pleistocene, middle to late Pleistocene. A basalt

surficial deposits	flow mapped as lower Pleistocene (Moore and Wolfe, 1987 #2152) is clearly displaced by at least 8.5 m (Pearthree and others, 1996 #2153). A younger middle Pleistocene basalt may be faulted, but the evidence for faulting is ambiguous. An alluvial fan that is younger than either of the basalt flows is displaced about 6 m. Based on fairly strong soil development, this alluvial fan is probably of middle to late Pleistocene age (Pearthree, unpublished field data, 1998).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* A middle to late Pleistocene alluvial fan is faulted. However, the fresh appearance of the middle part of fault scarp suggests rupture could be as young as early Holocene to latest Pleistocene.
Recurrence interval	 *Comments:* Amoroso and Caffee (2000 #6891) indicate that this fault can be typified by recurrence intervals similar to other faults on the southern Colorado Plateau (i.e., 5-100 k.y.).
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low average long-term slip rate is suggested by at least 8 m of displacement of a lower Pleistocene basalt flow (750 ka-1.6 Ma). Displacement of a middle to late Pleistocene alluvial fan surface (ca. 100 to 300 ka) by 6 m suggests a slightly higher rate.
Date and Compiler(s)	2006 Philip A. Pearthree, Arizona Geological Survey
References	#6891 Amoroso, L., and Caffee, M., 2000, Displacement history and scarp erosion rate of a faulted Quaternary basalt, Wupatki National Monument, Arizona: Geological Society of America Abstracts with Program, v. 32, no. 5, p. 1. #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. #2152 Moore, R.B., and Wolfe, E.W., 1987, Geologic map of the

	east part of the San Francisco Volcanic Field, north-central Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-1960, 2 sheets, scale 1:50,000. #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.