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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.

Verde fault zone (Class A) No. 948

Last Review Date: 1998-02-23

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 1998, Fault number 948, Verde 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 Verde fault zone is the main (master) fault on the southwestern margin of the Verde Valley, which is a large, asymmetric, southwest-tilted graben in the Basin and Range province near the margin of the Colorado Plateaus. This steeply northeast-dipping fault zone follows the base of a high, relatively linear, steep, northeast-facing mountain front. The only documented evidence of Quaternary movement along the fault exists along a short section of the southern part of the fault zone, where fault scarps as much as about 7 m high are formed on high, dissected alluvial fans of probable early to middle Pleistocene age. Morphologic analysis of scarp profiles suggests an early to middle Holocene time of youngest movement (Pearthree and others, 1983 #2083); however, if the steep slope elements of these

	scarps are due to local erosion, then the youngest faulting may be late Pleistocene (Euge and others, 1992 #2095). No evidence of late Quaternary faulting has been documented along the mountain front either north or south of the alluvial scarps, implying that late Quaternary faulting has only occurred on a short portion of the Verde fault zone.
Name comments	The northern part of the fault zone was mapped by Anderson and Creasey (1958 #2145) whereas part of the southern portion of the fault zone was mapped by Wolfe and others (1983 #2147). The surficial geology along most of the fault zone was mapped by House and Pearthree (1993 #2146) and House (1994 #2109). Quaternary fault activity was investigated by Menges and Pearthree (1983 #2073) and Pearthree and others (1983 #2083), who called the section with evidence of Quaternary activity the "Camp Verde fault", and by Euge and others (1992 #2095), who called this same section the "Allen Canyon scarp".
County(s) and State(s)	YAVAPAI COUNTY, ARIZONA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Trace based on detailed mapping at 1:24,000 scale (House, 1994 #2109), transferred to 1:250,000-scale topographic base map.
Geologic setting	The Verde fault is located in the Central Highlands portion of the Basin and Range province near the margin of the Colorado Plateaus. The Verde fault zone is the main (master) fault on the southwestern margin of the Verde Valley, which is a large, asymmetric, southwest-tilted graben. Major subsidence of the Verde basin and displacement on the Verde fault occurred during the late Miocene and Pliocene (Bressler and Butler, 1978 #2108; Nations and others, 1981 #2110). During most of that time, the Verde Valley was a closed, undissected basin. However, during the Quaternary, the Verde River has downcut substantially and the Verde Valley has undergone dramatic dissection, leaving suites of dissected fan and terrace remnants that range from late Pliocene/early Pleistocene to early Holocene in age (House and Pearthree, 1993 #2146; House, 1994 #2109).

Length (km)	8 km.
Average strike	N29°W
Sense of movement	Normal *Comments:* Inferred from fault exposures, topography, and regional relations.
Dip	62° -85° NE *Comments:* A fault exposed in a 10-m-deep stream channel projects to the surface coincident with an alluvial fault scarp (Menges and Pearthree, unpublished field notes, 1982 and Euge and others, 1992 #2095). The main fault zone dips about 70? to the northeast. Subsidiary shear zones dip from 62? to 85? to the northeast.
Paleoseismology studies	
Geomorphic expression	The Verde fault zone follows the base of a high, relatively linear, steep, northeast-facing mountain front. Along the northern half of the fault zone, however, middle and early Pleistocene alluvial fans and terraces cross the fault zone and are not displaced. The only clear evidence of Quaternary fault activity exists along a short portion of the southern part of the fault zone, where fault scarps as much as about 7 m high are formed on high, dissected, probable lower to middle Pleistocene alluvial fans. Nine topographic profiles of these scarps have been surveyed (Pearthree and others, 1983 #2083). The scarps are clearly segmented and formed in multiple rupture events, and maximum slopes range from 13 degrees to 28 degrees. Morphologic analyses of scarp data suggest an early to middle Holocene time of youngest movement (Pearthree and others, 1983 #2083). Euge and others (1992 #2095) argued that the steep slope segments represent a local erosional anomaly, and the time of youngest faulting is late or middle Pleistocene. No evidence of late Quaternary faulting has been documented along the mountain front either north or south of the alluvial scarps, implying that late Quaternary faulting has occurred along a short portion of the Verde fault zone.
Age of faulted	Early to middle Pleistocene, late Pleistocene(?). Along a short

surficial deposits	portion of the southern part of the Verde fault, lower to middle Pleistocene alluvial fans (ca. 300 to 500 ka) are displaced about 5 m, and upper to uppermost Pleistocene terrace deposits are probably displaced as well (Pearthree and others, 1983 #2083). Detailed surficial geologic mapping by House (1994 #2109) and House and Pearthree (1993 #2146) confirms that there is no definitive evidence of Quaternary activity along the fault zone to the north or south of these alluvial scarps. These age estimates are based on rough examination of soil characteristics, the position of the alluvial surfaces in the landscape, and regional correlation.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* This estimate is based on morphologic scarp analysis and rough estimates for the age of faulted deposits. Pearthree and others (1983 #2083) inferred that the youngest faulting occurred in the latest Pleistocene to early Holocene. Based on the short length of the alluvial scarps and the absence of definitive evidence of young faulting along the mountain front to the north and south, Euge and others (1992 #2095) argued for a late to middle Pleistocene age of youngest faulting. Because of the dispute over the origin of the steep elements of the fault scarps, we conservatively choose late Quaternary as the probable time of the most recent event.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip rate is inferred based on about 5 m of vertical displacement of deposits estimated to be about 300 to 500 ka.
Date and Compiler(s)	1998 Philip A. Pearthree, Arizona Geological Survey
References	#2145 Anderson, C.A., and Creasey, S.C., 1958, Geology and ore deposits of the Jerome area, Yavapai County, Arizona: U.S. Geological Survey Professional Paper 308, 185 p. #2108 Bressler, S.L., and Butler, R.B., 1978, Magnetostratigraphy of the late Tertiary Verde Formation, central Arizona: Earth and Planetary Science Letters, v. 38, no. 2, p. 319-330.

#2095 Euge, K.M., Schell, B.A., and Lam, I.P., 1992, Development of seismic acceleration maps for Arizona: Arizona Department of Transportation Report AZ92-344, 327 p., 5 sheets, scale 1:1,000,000.

#2109 House, P.K., 1994, Surficial geology of the southern Verde Valley, Yavapai County, Arizona: U.S. Geological Survey Open-File Report 94-23, 20 p., 3 sheets, scale 1:24,000.

#2146 House, P.K., and Pearthree, P.A., 1993, Surficial geology of the northern Verde Valley, Yavapai County, Arizona: Arizona Geological Survey Open-File Report 93-16, 19 p., 4 sheets, 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.

#2110 Nations, J.D., Hevly, R.H., Landye, J.J., and Blinn, D.W., 1981, Paleontology, paleoecology, and depositional history of the Miocene-Pliocene Verde Formation, Yavapai County, Arizona: Arizona Geological Society Digest 13, p. 133-150.

#2083 Pearthree, P.A., Menges, C.M., and Mayer, L., 1983, Distribution, recurrence, and possible tectonic implications of late Quaternary faulting in Arizona: Arizona Geological Survey Open-File Report 83-20, 51 p.

#2147 Wolfe, E.W., Wallace, A.R., McColly, R.A., and Korzeb, S.L., 1983, Mineral resource potential map of the Arnold Mesa Roadless Area, Yavapai County, Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-1577A, 1 sheet, scale 1:24,000.