

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](#).

Sand Tank fault (Class A) No. 943

Last Review Date: 1995-01-04

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1995, Fault number 943, Sand Tank fault, 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	A low but obvious fault scarp trends northwest to north on the western piedmont of the Sand Tank Mountains, southeast of Gila Bend, in the Sonoran Desert subprovince of the Basin and Range. The total length of the obvious fault scarp is about 3 km, but lineaments extend for about 5 km north and southwest of the fault scarp on Pleistocene alluvial surfaces with no discernible offset. Total late Quaternary displacement across the fault zone is less than 2 m. Detailed surficial geologic mapping, fault scarp analysis, and trenching strongly suggest that only one fault rupture has occurred since 70-200 ka, and that event occurred in the latest Pleistocene.
Name	Mapped and named by Schell and Wilson (1982 #2133); further

comments	studied by Pearthree and others (1983 #2083) and Demsey and Pearthree (1990 #2132). The fault trends northwest to north on the piedmont west of the Sand Tank Mountains, southeast of Gila Bend.
County(s) and State(s)	MARICOPA COUNTY, ARIZONA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> Trace based on detailed mapping at 1:24,000 scale with field-checking by Demsey and Pearthree (1990 #2132).
Geologic setting	The Sand Tank fault is a down-to-west, normal fault on the east side of the broad Gila Valley in south-central Arizona. It is located in the heart of the Sonoran Desert subprovince of the Basin and Range, which is characterized by low, pedimented, deeply embayed mountain fronts indicative of long term tectonic stability. The fault vertically displaces middle to upper Pleistocene alluvium by less than 2 m, and latest Pleistocene and Holocene alluvium is not faulted (Demsey and Pearthree, 1990 #2132).
Length (km)	3 km.
Average strike	N22°E
Sense of movement	Normal <i>Comments:</i> Sense based on fault dip and stratigraphic displacements observed in a trench; no slip indicators were observed.
Dip	45° to 90° NW <i>Comments:</i> Fault planes were exposed in a trench in middle to late Pleistocene alluvium.
Paleoseismology studies	Site 943-1. Two trenches excavated across fault zone were interpreted by Demsey and Pearthree (1990 #2132). No datable material was found, but soil-age estimates and offset relationships indicate 1.5-2 m of vertical displacement of middle to late

	Pleistocene alluvium. No clear evidence for more than one faulting event was found. The short length of fault scarps relative to their maximum displacement is enigmatic, however, suggesting the possibility that the scarps may have formed in two events (D.B. Slemmons, oral communication, 1993). Holocene to latest Pleistocene alluvium (estimated age 8-12 ka) is unfaulted.
Geomorphic expression	Faulting has generated low, fairly gentle, west- to northwest-facing piedmont fault scarps that parallel the general trend of the Sand Tank Mountains, and are 2 to 5 km downslope from a pedimented, embayed mountain front. These scarps are as high as 2 m on middle to upper Pleistocene alluvial fans. Analysis of scarp morphology, based on 13 scarp profiles, suggests a latest Pleistocene scarp age (ca. 10 to 20 ka).
Age of faulted surficial deposits	Middle to upper Pleistocene (ca. 70 to 200 ka). Age estimate is based on soil development and regional correlation.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) <i>Comments:</i> Trenching and surface-age estimates indicate that middle to late Pleistocene deposits (ca. 70 to 200 ka) are faulted, whereas early Holocene to latest Pleistocene deposits (8-12 ka) are not faulted. Analysis of fault scarp morphology indicates a latest Pleistocene age of youngest movement (ca. 10 to 20 ka).
Recurrence interval	 <i>Comments:</i> Recurrence intervals are unknown but are probably long; the scarps probably record one, but no more than two faulting events in the past 70 to 200 k.y.
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> A low slip rate is inferred based on 1.5 to 2 m of vertical displacement in the past 70 to 200 k.y. Calculation of slip rates from this information are problematic, because there is no evidence of earlier Quaternary displacement on the fault zone.
Date and Compiler(s)	1995 Philip A. Pearthree, Arizona Geological Survey

References

#2132 Demsey, K.A., and Pearthree, P.A., 1990, Late Quaternary surface-rupture history of the Sand Tank Fault and associated seismic hazard for the proposed superconduction super collider site, Maricopa County, Arizona: Arizona Geological Survey Open-File Report 90-1, 43 p.

#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.

#2133 Schell, B.A., and Wilson, K.L., 1982, Regional neotectonic analysis of the Sonoran Desert: U.S. Geological Survey Open-File Report 82-57, 60 p., 2 pls., scale 1:1,000,000.

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