

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](#).

Carefree fault zone (Class A) No. 947

Last Review Date: 1998-01-12

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1998, Fault number 947, Carefree 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	Forms a series of north- and northwest-trending normal faults within and along the western margin of an extensive bedrock pediment formed on Precambrian granite. Middle Pleistocene alluvium is probably displaced by the fault, but upper Pleistocene and younger alluvium is not. Topographic relief across the fault is less than a few meters, implying a very low slip rate.
Name comments	Pearthree and Scarborough (1984 #2137) initially identified and named this the Carefree fault; it was mapped and analyzed in more detail by Skotnicki and others (1997 #2144).
County(s) and	MARICOPA COUNTY, ARIZONA

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 (Skotnicki and others, 1997 #2144).
Geologic setting	The Carefree fault zone is located near the northeastern margin of the Phoenix Basin, a large, structurally complex physiographic basin near margin of the Sonoran Desert subprovince of the Basin and Range. The fault zone consists of a series of north- and northwest-trending normal faults within and along the western margin of an extensive bedrock pediment formed on Precambrian granite. West of the fault there are limited outcrops of tilted Tertiary volcanic rocks and sediment that filled a small, shallow late Cenozoic basin. The fault is within and extends north of the McDowell Mountains, which consist in this area of hills and a few inselbergs of resistant rock rising above the pediment.
Length (km)	11 km.
Average strike	N30°W
Sense of movement	Normal <i>Comments:</i> The combination of a west dipping fault plane and down-to-west topographic relief indicates predominantly normal displacement.
Dip Direction	SW <i>Comments:</i> Faults are thought to be steeply dipping.
Paleoseismology studies	
Geomorphic expression	Low, fairly well defined, west- to southwest-facing fault scarps as much as 3 m high formed on Precambrian granite and possibly on Quaternary deposits. Along much of the fault zone, the fault is a contact between bedrock on the upthrown (east) side and middle Pleistocene alluvium on the downthrown (west) side. There are no unequivocal fault scarps on alluvium, but probable alluvial fault

	<p>scarps observed at a couple of localities are low and gentle. Recent detailed geologic mapping (Skotnicki and others, 1997 #2144) strongly suggests that middle Pleistocene deposits are faulted. Holocene and upper Pleistocene deposits cross the fault and are not displaced.</p>
Age of faulted surficial deposits	Middle Pleistocene. Inferred from detailed geologic mapping, ages estimated from soil development on deposits, and from and regional stratigraphic relations.
Historic earthquake	
Most recent prehistoric deformation	<p>middle and late Quaternary (<750 ka)</p> <p><i>Comments:</i> Middle Pleistocene alluvium is probably faulted, where as late Pleistocene terraces and alluvial fans are not faulted.</p>
Recurrence interval	
Slip-rate category	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> A low slip rate is inferred based on the topographic relief across fault (<3m). Total Quaternary vertical displacement not well defined but probably on the order of a few meters.</p>
Date and Compiler(s)	<p>1998</p> <p>Philip A. Pearthree, Arizona Geological Survey</p>
References	<p>#2137 Pearthree, P.A., and Scarborough, R.B., 1984, Reconnaissance analysis of possible Quaternary faulting in central Arizona: Arizona Bureau of Geology and Mineral Technology Open-File Report 85-4, 75 p., scale 1:250,000.</p> <p>#2144 Skotnicki, S.J., Leighty, R.S., and Pearthree, P.A., 1997, Geologic map of the Wildcat Hill quadrangle, Maricopa County, Arizona: Arizona Geological Survey Open-File Report 97-2, 17 p., 1 pl., scale 1:24,000.</p>

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