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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.

SP fault zone (Class A) No. 958

Last Review Date: 1997-01-06

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 1997, Fault number 958, SP 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 03:13 PM.**

Synopsis	This series of faults cut Paleozoic bedrock and lower to upper Pleistocene basalt flows. A middle Pleistocene flow surface is displaced at least 5 m vertically. One of these faults probably cuts a upper Pleistocene basalt flow (the SP flow), and the mid-section of a fault scarp formed on middle Pleistocene basalt is nearly vertical and has minimal rock varnish. This fault may have ruptured recently, perhaps during the Holocene or latest Pleistocene (<15 ka).
Name comments	Mapped, named and grouped with several other faults by Menges and Pearthree (1983 #2073); separated from this larger group of faults by Pearthree and others (1996 #2153) because of evidence of younger fault rupture. 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	These faults are located in the northern part of the Pliocene-Quaternary San Francisco volcanic field, on the erosion surface cut on Paleozoic rocks that slopes from the Colorado Plateau margin northeast to the Little Colorado River. Faults cut Paleozoic rocks, lower, middle and probably upper Pleistocene (70 ka) basalt flows.
Length (km)	13 km.
Average strike	N3°W
Sense of movement	Normal *Comments:* Predominantly normal movement is inferred from topographic and regional relations.
Dip Direction	W; E
Paleoseismology studies	
Geomorphic expression	A series of several-meter-high, sharply defined fault scarps with the west side down are formed on middle Pleistocene basalt flows. The middle part (about 2 m) of a 4-m-high scarp is vertical and has minimal rock varnish, suggesting a young rupture event. A photo lineament on trend with these scarps continues south across the upper Pleistocene SP basalt flow; the flow surface is extremely rough and irregular, so scarps are not obvious. The central part of the fault zone, north of SP flow, is a roughly symmetric, 750-m-wide, shallow (about 5-m-deep) physiographic trough (graben) with fault scarps on east and west sides.
Age of faulted	

Age of faulted surficial deposits	Paleozoic, early Pleistocene, middle Pleistocene, late Pleistocene(?)
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* A middle Pleistocene basalt flow is faulted, and an upper Pleistocene basalt flow is most likely faulted. The fresh appearance of the middle part of one of the fault scarps suggests Holocene to latest Pleistocene (<15 ka) rupture.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A middle Pleistocene basalt flow is displaced at least 5 m, suggesting a low long-term slip rate.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#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.

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