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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.

Cataract Creek fault zone (Class A) No. 990

Last Review Date: 1998-01-14

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 1998, Fault number 990, Cataract Creek 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 03:11 PM.**

Synopsis	Numerous normal faults cut an erosion surface formed on Paleozoic rocks between the southern margin of the Colorado Plateau and the Grand Canyon. The faults are west of the Pliocene-Quaternary San Francisco volcanic field, and Quaternary deposits are very sparse. The Cataract Creek faults trend mainly northwest, but several faults trend north and northeast. The northeast-trending faults in this zone share the same trend and have been considered as part of the regional Bright Angel fault system (Shoemaker and others, 1974 #2166; 1978 #2155). Cataract Creek faults form grabens and other linear depressions; the fault scarps and escarpments are formed on Paleozoic bedrock have quite gentle to fairly steep slopes. On the basis of their

	strong geomorphic expression, Quaternary activity is fairly likely on at least some of these faults, but this age movement has not been conclusively demonstrated. Some historical seismic activity has occurred in this area including a M 5.4 event in 1993 (Lay and others, 1994 #2172; Sanders, 1997 #2173) and probably a M 6.2 event in 1906 (Bausch and Brumbaugh, 1997 #2171).
Name comments	Mapped by Shoemaker and others (1974 #2166; 1978 #2155), faults grouped and named by Menges and Pearthree (1983 #2073). Following the grouping used by Menges and Pearthree, this fault zone includes some north- and northeast-trending faults that Shoemaker and others considered as part of the northeast-trending Bright Angel regional fault system; the term Cataract Creek fault system has been used to encompass a fairly broad, northwest-trending zone of faults and historical seismicity that extends from the Grand Canyon southwest to the Winslow, Arizona, area (Bausch and Brumbaugh, 1997 #2171).
County(s) and State(s)	COCONINO COUNTY, ARIZONA
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Traces based on aerial photo interpretation at 1:130,000 scale; traces transferred to 1:250,000-scale topographic base map.
Geologic setting	These faults are located on an erosion surface cut on Paleozoic rocks between the Mogollon Rim and the Grand Canyon. Extensive unpublished mapping has been conducted in this area (Shoemaker and others, 1974 #2166), but no intermediate or large-scale published maps exist for most of this area. Cataract Creek faults displace Paleozoic bedrock; Quaternary alluvium is sparse in this area. The geology of the southeasternmost faults of the Cataract Creek system has been mapped in detail (Newhall and others, 1987 #2154). These few faults apparently do not offset Pliocene volcanic rocks.
Length (km)	51 km.
Average strike	N23°W

Sense of movement	Normal *Comments:* Predominantly normal movement is inferred from topography and regional relations.
Dip Direction	SE; NW
Paleoseismology studies	
Geomorphic expression	Graben scarps are low to moderately high and slopes range from fairly gentle to quite steep.
Age of faulted surficial deposits	Paleozoic. Quaternary deposits are very sparse in this area.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* This time estimate is very poorly constrained, but the strong geomorphic expression of some fault scarps suggests that there has been Quaternary activity on this fault system.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No data exist to determine a slip rate, but a low rate is inferred on the basis of slip rates on other Quaternary faults in the region.
Date and Compiler(s)	1998 Philip A. Pearthree, Arizona Geological Survey
References	#2171 Bausch, D., and Brumbaugh, D.S., 1997, Relocation study of early Arizona earthquakes—Events of 1906, 1910, and 1912: Flagstaff, Northern Arizona University, Arizona Earthquake Information Center Report, 66 p. #2172 Lay, T., Ritsema, J., Ammon, C.J., and Wallace, T.C., 1994, Rapid source mechanism analysis of the April 29, 1993 Cataract Creek (Mw 5.3), northern Arizona earthquake: Bulletin of the Seismological Society of America, v. 84, p. 451-457.

#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.

#2154 Newhall, C.G., Ulrich, G.E., and Wolfe, E.W., 1987, Geologic map of the southwest part of the San Francisco Volcanic Field, north-central Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-1958, 2 sheets, scale 1:50,000.

#2173 Sanders, C.O., 1997, Cataract Creek earthquake, April 29, 1993: Technical report to Arizona Division of Emergency Management, Phoenix, Arizona, 19 p.

#2166 Shoemaker, E.M., Squires, R.L., and Abrams, M.J., 1974, The Bright Angel and Mesa Butte fault systems of northern Arizona, *in* Karlstrom, T.N.V., Swann, G.A., and Eastwood, R.L., eds., Geology of northern Arizona, Part I, Regional studies: Geological Society of America, Rocky Mountain Section Meeting, Guidebook, p. 355-391.

#2155 Shoemaker, E.M., Squires, R.L., and Abrams, M.J., 1978, Bright Angel and Mesa Butte fault systems in northern Arizona, *in* Smith, R.B., and Eaton, G.P., eds., Cenozoic tectonics and regional geophysics of the Western Cordillera: Geological Society of America Memoir 152, p. 341-367.