

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](#).

Vernon fault zone (Class A) No. 1016

Last Review Date: 1998-02-13

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1998, Fault number 1016, Vernon 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 02:21 PM.

Synopsis

The Vernon fault zone is a generally northwest-trending, probable sinistral and oblique-slip system of faults that cuts through the middle of the Pliocene-Pleistocene Springerville volcanic field in east-central Arizona. The faults are on an erosion surface cut on Mesozoic rocks that slopes from the Colorado Plateaus margin north to the Little Colorado River. Faults cut Mesozoic bedrock, uppermost Miocene volcanic rocks, and upper Pliocene to lower Pleistocene basalt. Displacement is primarily down to the northeast, and Miocene rocks are displaced substantially more than the lower Pleistocene volcanic rocks. Sinistral slip is inferred for the central part of the fault; this area has a small pull-apart basin and minimal topographic relief across the fault. The faults

	of the zone have probably been active in the middle or late Quaternary, but the age of youngest movement is not well constrained.
Name comments	Mapped and named by Crumpler and others (1994 #2101). Some faults at the northern end of the fault zone were mapped but grouped with some other faults of the Concho [1014] and Coyote Wash [1015] fault zones, and labeled the "St. Johns fault set" by Menges and Pearthree (1983 #2073). This name is not used herein because of its collective nature. The general geology was mapped by Crumpler and others (1994 #2101) and Condit (1991 #2102).
County(s) and State(s)	APACHE COUNTY, ARIZONA
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> Mapped at 1:250,000-scale on a topographic base map.
Geologic setting	The Vernon fault zone trends through the middle of the Pliocene-Quaternary Springerville volcanic field in east-central Arizona. The faults are on the Mogollon Slope, an erosion surface cut on Mesozoic rocks that slopes north from the Colorado Plateau margin to the Little Colorado River. Faults cut uppermost Miocene (~6 Ma) to lower Pleistocene (0.9 to 1.3 Ma) volcanic rocks and Mesozoic bedrock. Amounts of displacement have not been reported.
Length (km)	57 km.
Average strike	N46°W
Sense of movement	Left lateral <i>Comments:</i> Left-lateral movement is inferred for the central, north northwest-trending part of the fault on the basis of fault geometry, the presence of a pull-apart basin at a prominent left-step in the fault, orientations of subsidiary structures, and regional relations. Normal and left-lateral movement is inferred for the northern and southern parts of the fault on the basis of topography across the fault and orientations of subsidiary structures

	(Crumpler and others, 1994 #2101).
Dip Direction	NE <i>Comments:</i> Inferred from surface displacement; fault trends vary from north northwest to west northwest.
Paleoseismology studies	
Geomorphic expression	Faulting is expressed as low to moderately high, fairly subdued, northeast-facing scarps formed on Pleistocene to uppermost Miocene basalt flows along the main fault. No morphologic scarp data has been reported. In addition, Pleistocene basalt flows have been tilted and deformed adjacent to the main fault zone and by several subsidiary folds, indicating Quaternary deformation has occurred.
Age of faulted surficial deposits	Mesozoic, late Miocene, Pliocene, early Pleistocene.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> Lower Pleistocene volcanic rocks are displaced by these faults. No faulting of alluvium has been documented and the age of youngest movement is not well constrained.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> No slip rate data have been reported, but the fault zone likely has a low slip rate owing to a lack of clear late Quaternary offset.
Date and Compiler(s)	1998 Philip A. Pearthree, Arizona Geological Survey
References	#2102 Condit, C.D., 1991, Lithologic map of the western part of the Springerville volcanic field, east-central Arizona: U.S. Geological Survey Miscellaneous Investigations Map I-1993, 3

sheets, scale 1:50,000.

#2101 Crumpler, L.S., Aubeler, J.C., and Condit, C.D., 1994, Volcanoes and neotectonic characteristics of the Springerville volcanic field, Arizona, *in* Chamberlin, R.M., Kues, B.S., Cather, S.M., Barker, J.M., and McIntosh, W.C., eds., Mogollon Slope, west-central New Mexico and east-central Arizona: New Mexico Geological Society, 45th Annual Field Conference, Guidebook, p. 147-164.

#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.

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