

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](#).

Wheeler fault zone and graben (Class A) No. 1006

Last Review Date: 1997-04-03

Compiled in cooperation with the Arizona Geological Survey

citation for this record: Pearthree, P.A., compiler, 1997, Fault number 1006, Wheeler fault zone and graben, 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 02:19 PM.

Synopsis

The Wheeler fault zone, located west of the Grand Wash fault [1005] in the Grand Wash trough, includes a major north northeast-trending, down-to-the-west normal fault, and a related north-trending graben. Plio-Quaternary alluvium is displaced about 10-15 m in the Wheeler graben, suggesting that some Quaternary activity has occurred, but the resultant scarps are quite gentle implying that they are fairly old. The fault zone as described by Lucchitta (1967 #2085) continues south of Wheeler Ridge along the west side of Grapevine Mesa. The mountain front along this section of the fault is quite linear, but no evidence of

	Quaternary activity has been reported.
Name comments	Fault zone mapped and investigated by Lucchitta (1967 #2085; 1987 #2086); the subsidiary Wheeler graben was investigated by Menges and Pearthree (1983 #2073). The reconnaissance fault mapping by Dohrenwend and others (1991 #288) covers the southwestern end of the fault.
County(s) and State(s)	MOHAVE COUNTY, ARIZONA
Physiographic province(s)	BASIN AND RANGE COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. <i>Comments:</i> The fault zone was mapped on 1:130,000-scale aerial photos, transferred to 1:250,000-scale topographic base map for digitization.
Geologic setting	The Wheeler fault zone is a north northeast-trending, down-to-the-west normal fault with a subsidiary, north-trending graben near its northern end. The fault zone is located west of the Grand Wash fault. The northern part of the fault zone bounds the west side of Wheeler Ridge, which is composed of Paleozoic rocks. Paleozoic rocks are displaced between 1500 and 3500 m in the Wheeler Ridge area, and late Miocene deposits are displaced about 300 m (Lucchitta, 1967 #2085). Plio-Quaternary alluvium is displaced about 10-15 m in the Wheeler graben, which appears to be subsidiary to the northern Wheeler fault zone. Displacement decreases to the north, where the fault becomes a monocline and dies out in the Grand Wash trough. No evidence of Quaternary activity has been reported for the southern part of the fault zone, which bounds the west side of Grapevine Mesa.
Length (km)	45 km.
Average strike	N8°E
Sense of movement	Normal <i>Comments:</i> Inferred from topography and structural relations.
Dip	60° W

	<i>Comments:</i> Dip measurement from Lucchitta (1987 #2086).
Paleoseismology studies	
Geomorphic expression	The Wheeler fault is associated with a steep, linear bedrock escarpment on the west side of Wheeler Ridge. The Wheeler graben is expressed as relatively low alluvial fault scarps on upper Pliocene to middle Pleistocene alluvium. These scarps range in height from about 4 to 12 m and have maximum slope angles of 7° to 16° respectively. Morphologic analyses of these scarps suggest a middle to late Pleistocene age of youngest faulting (Pearthree and others, 1983 #2083).
Age of faulted surficial deposits	Paleozoic, Miocene, late Pliocene to middle Pleistocene
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> Deposits roughly estimated to be Pliocene-Pleistocene in age are displaced along the main fault zone. The steepness and linearity of the fault escarpment along Wheeler Ridge is consistent with Quaternary activity. Alluvial scarps associated with the Wheeler graben are readily recognizable but are subdued, so the fault zone likely has been active since 750 ka but may not have been active during the late Quaternary.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Plio-Pleistocene deposits are displaced by about 10 to 15 m across the Wheeler graben. This implies a low long-term slip rate.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#288 Dohrenwend, J.C., Menges, C.M., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Las Vegas 1° by 2° quadrangle, Nevada, California, and Arizona: U.S. Geological Survey Miscellaneous Field Studies

Map MF-2182, 1 sheet, scale 1:250,000.

#2085 Lucchitta, I., 1967, Cenozoic geology of the upper Lake Mead area adjacent to the Grand Wash Cliffs, Arizona: University Park, Pennsylvania State University, unpublished Ph.D. dissertation, 218 p., 6 sheets.

#2086 Lucchitta, I., 1987, The mouth of the Grand Canyon and edge of the Colorado Plateau in the upper Lake Mead area, Arizona, *in* Beaus, S.S., ed., Rocky Mountain Section of the Geological Society of America: Geological Society of America, Centennial Field Guide, v. 2, p. 365-370.

#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.

#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.

#1081 Thelin, G.P., and J., P.R., 1991, Landforms of the conterminous United States—A digital shaded-relief portrayal: U.S. Geological Survey Miscellaneous Investigations Map I-2206, 16 p. pamphlet, scale 1:3,500,000.

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