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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.

Guadalupe fault (Class A) No. 2058

Last Review Date: 2015-12-14

Compiled in cooperation with the New Mexico Bureau of Geology & Mineral Resources

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2015, Fault number 2058, Guadalupe fault, 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 02:22 PM.**

Synopsis	Little is known about this short but recently active portion of the Guadalupe fault, which forms scarps on unconsolidated Quaternary deposits at the western base of the Guadalupe Mountains. No detailed studies have been published.
Name comments	Young movement on the Guadalupe fault is demonstrated by a relatively short scarp that extends from about 3 km north of the Chaves-Otero County line to 2 km south of the county line and 1–2 km east of Pinon Creek. The scarp was first mentioned by Kelley (1971 #990) as part of a regional geologic study of southeastern New Mexico. It was named by Kelley (fig 4. in 1971 #990) for its location along the base of the Guadalupe Mountains.

County(s) and State(s)	CHAVES COUNTY, NEW MEXICO OTERO COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Scarps first shown on photograph (fig. 13 in Kelley, 1971 #992) and registered to roadlog for field trip (mile 126.8, Kelley and Singletary, 1971 #990). Machette relocated the scarps in the field (unpublished 1:24,000-scale mapping, 1981) and transferred their location to a 1:250,000-scale base map. Ziegler (2009 #7301) map covered traces of the fault at 1:24,000 scale. The location of the fault was digitized at 1:24,000 scale using photogrammetry to accurately map its trace from this map and extended southward from analysis of aerial photography.
Geologic setting	The scarps are along the Guadalupe fault, which forms the northern part of the western escarpment (The Rim) of the Guadalupe Mountains. Kelley (p. 38 1971 #992) considered the Guadalupe Mountains as largely a late Tertiary Basin and Range fault block. If so, the scarps reflect minor late Quaternary reactivation of the uplift.
Length (km)	6 km.
Average strike	N6°W
Sense of movement	Normal
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The fault forms a zone of short but continuous scarps on unconsolidated sediment (alluvial fans and colluvium) shed from the Guadalupe Mountains. Scarps are formed on three different alluvial surfaces, and show progressively more offset on higher (hence, older) surfaces. Five topographic profiles (M32-1 to -5, M.N. Machette, 1981) across the fault show that the scarps are about 2–12 m high and have maximum scarp-slope angles of 16.5°–24.4°. The youngest surface has scarps that are 2.1–3.3 m high, whereas the next higher surface has scarps that are 4.3–5.1

	m high and thus are the product of at least two discrete faulting events. The highest surface has a young scarp element (6 m high) superposed on a larger compound scarp that is nearly 12 m high.
Age of faulted surficial deposits	No studies have been made of the age of the faulted surficial deposits. However, the presence of three discrete alluvial surfaces suggests that the highest one could be as old as the penultimate glaciation (130 ka). At this location, the fault separates unconsolidated Quaternary deposits on the west from Permian Yeso Formation (bedrock) on the east.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Data from the youngest measured scarps, which are 2.1 and 3.3 m high and have maximum slope angles of 16.5° and 19°, suggest that the most recent scarp-forming event occurred in the early Holocene or latest Pleistocene.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip rate is inferred from the short length of scarps and from relatively small amounts (2–6 m) of displacement of the two younger alluvial surfaces.
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#992 Kelley, V.C., 1971, Geology of the Pecos country, southeastern New Mexico: [New Mexico] Bureau of Mines and Mineral Resources Memoir 24, 75 p., 7 pls. #990 Kelley, V.C., and Singletary, C.E., 1971, Road log of a route from Roswell to Rio Penasco, Dunken uplift, Guadalupe escarpment, and to Carlsbad (Second Day), *in* Kelley, V.C., ed., Stratigraphy and structure of the Pecos country, southeastern New Mexico: West Texas and Roswell Geological Societies Publication 71-58, October 27-29, 1971, Guidebook, p. 21-29.

	#857 King, P.B., 1948, Geology of the southern Guadalupe Mountains Texas: U.S. Geological Survey Professional Paper 215, 183 p., 1 pl., scale 1:48,000. #7301 Zeigler, K.E., 2009, Geologic map of the Piñon Ranch quadrangle, Chaves and Otero Counties, New Mexico: New Mexico Bureau of Geology and Mineral Resources Open-File Geologic Map 193, scale 1:24,000.