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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.

unnamed faults of El Malpais lava field (Class B) No. 2146

Last Review Date: 2016-04-22

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

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2016, Fault number 2146, unnamed faults of El Malpais lava field, 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 03:01 PM.**

Synopsis	These three groups of suspect faults form numerous fissures and cracks in early Quaternary basalt flows of El Malpais lava field. They may include pressure ridges and collapsed lava tubes that give the expression of tectonic activity, but could be related to volcanic processes. Thus, these features are considered to be of suspect origin. No detailed studies of the features have been conducted to confirm their origin or document the amount of vertical displacement, if any, that may be associated with them.
Name	These faults were first mapped by Maxwell (1986 #1720);

comments	additional structures were mapped to the west by Baldridge and others (1989 #1741). Levish and others (1992 #1715), as part of a regional reconnaissance for a dam-hazards study, characterized them as non-tectonic features related to volcanic processes. Levish and others (1992 #1715) referred to the features as "Faults in the Zuni-Bandera volcanic field". The faults form four groups on El Malpais lava field. The southern group trends north across the North Plains, the main (longest) feature of which is named La Rendija. The southern extent of these faults is approximately 10 km south of the map area of Maxwell (1986 #1720). The northwestern group is comprised of two short north-northeast trending faults and associated fissure-like features located about 3 km south and southwest of Hoya de Cibola (Maxwell, 1986 #1720). The northeastern group is comprised of four short faults that trend north to northeast; they are located about 5 km southeast of Cerro Encierro.
County(s) and State(s)	CIBOLA COUNTY, NEW MEXICO
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Fault traces are shown on 1:62,500-scale geologic map of Maxwell (1986 #1720) and a small-scale (approximately 1:400,000 scale) geologic map of Baldridge and others (1989 #1741). Extensions of the fault features west of Maxwell's mapping are shown on 1:100,000-scale geologic map of Anderson (1986 #1281). Fault traces were recompiled and digitized at 1:24,000 scale using photogrammetric methods.
Geologic setting	These fault-like features are present on Quaternary (undifferentiated) basalt flows according to the mapping of Maxwell (1986 #1720). They trend north and northeast and may be related to westward directed extension or to the NE-trending Jemez lineament. Levish and others (1992 #1715) characterized the faults as non-tectonic features related to volcanic processes.
Length (km)	26 km.
Average strike	N7°E
Sense of	Normal

movement	*Comments:* As mapped by Maxwell (1986 #1720), although most of the features are fissures that may not correspond to vertical displacement.
Dip Direction	W; NW; SE *Comments:* As reported by Maxwell (1986 #1720).
Paleoseismology studies	
Geomorphic expression	The faults (?) form short north- and northeast-trending en echelon scarps (?), fissures, and open crevices in lava flows (Maxwell, 1986 #1720). Levish and others (1992 #1715) suggested that the faults are fissures, cracks, pressure ridges, and collapsed lava tubes that give the expression of tectonic activity, but are in fact related to volcanic processes.
Age of faulted surficial deposits	Maxwell (1986 #1720) mapped the faults as having offset Quaternary basalts that have reported K-Ar ages as old as and 1.38±0.29 Ma and Ar-Ar ages as young as 0.593±0.086 Ma (Laughlin and West, 1976 #7420; Laughlin and others, 1993 #7421). These dates suggest that the older (undifferentiated) basalts flows (Qb) span the early to middle Quaternary.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The features are present on basalts flows (Qb) of early to possibly middle Quaternary age. However, Maxwell (1986 #1720) suggested that the southern group of features (La Rendija) is Holocene in age because the crevices are not filled with alluvium, thus suggesting very recent formation of the features. In addition, he suggested that the numerous small fault scarps (?) on unconsolidated alluvium at the eastern edge of North Plains are also young.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr

	Comments: No measurements of offset across the features have been reported. If the features are really faults of Holocene age (Maxwell, 1986 #1720) and have substantial (>10 m) offset, they could have a slip rate that exceeds 0.2 mm/yr. However, the features are formed on an early to middle Quaternary landscape; thus, the recurrence interval for accumulating stress prior to the most recent faulting (suspect) event could be 750 k.y. or more. It therefore seems reasonable that slip rates associated with these suspect faults would be in the lowest slip-rate category.
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1281 Anderson, O.J., compiler, 1986, Geologic map of Fence Lake, New Mexico 1:100,000 metric sheet: New Mexico Bureau of Mines and Mineral Resources Open-File Report 220, 4 p. pamphlet, 4 sheets, scale 1:100,000. #1741 Baldridge, W.S., Perry, F.V., Vaniman, D.T., Nealey, L.D., Leavy, B.D., Laughlin, A.W., Kyle, P., Bartov, Y., Steinitz, G., and Gladney, E.S., 1989, Excursion 8A—Magmatism associated with lithospheric extension—Middle to late Cenozoic magmatism of the southeastern Colorado Plateau and central Rio Grande rift, New Mexico and Arizona, *in* Chapin, C.E., and Zidek, J., eds., Field excursions to volcanic terranes in the Western United States, v. I, Southern Rocky Mountain region: New Mexico Bureau of Mines and Mineral Resources Memoir 46, p. 187-202. #7420 Laughlin, A.W., and West, F.G., 1976, The Zuni Mountains, New Mexico, as a potential dry hot rock geothermal energy site: U.S. Energy Research and Development Administration, Los Alamos Scientific Laboratories Informal Report LA-3197-MS, 13 p. #7421 Laughlin, A.W., Perry, F.V., Damon, P.E., Shafiqullah, M., WoldeGabriel, G., McIntosh, W., Harrington, C.D., Wells, S.G., and Drakos, P.G., 1993, Geochronology of Mount Taylor, Cebollita Mesa, and Zuni-Bandera volcanic fields, Cibola County, New Mexico: New Mexico Geology, v. 16, no. 4, p. 81–92. #1715 Levish, D.R., Vetter, U.R., Ake, J.P., and Piety, L.A., 1992, Seismotectonic study for Black Rock Dam, Bureau of Indian Affairs, Pueblo of Zuni, New Mexico: Bureau of Reclamation

	Seismotectonic Report 92-3, 62 p. #1720 Maxwell, C.H., 1986, Geologic map of El Malpais Lava Field and surrounding areas, Cibola County, New Mexico: U.S. Geological Survey Miscellaneous Investigations Map I-1595, 1 sheet, scale 1:62,500.