

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](#).

VLA faults (Class A) No. 2125

Last Review Date: 2016-04-15

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 2125, VLA faults, 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	This group of north-trending faults form small-subdued to prominent-large (40-m-high) scarps on piedmont slopes that border the northern and northwestern margin of the San Mateo Mountains, south and east of the San Agustin Plains. The most recent movement on the faults is suspected to have been at about 100 ka on the basis of analyses of scarp morphology and offset of piedmont-slope deposits of late (?) Quaternary age.
Name comments	First mapped by Machette and McGimsey (1983 #1024), these faults were later named by Menges and others (1984 #1269) for the VLA (Very Large Array) Radiotelescope, which occupies the central to eastern portion of the San Agustin Plains, southeast of

	Datil, New Mexico. The faults extend from the southeast margin of the ancient lake basin of Pleistocene Lake San Agustin to the northwest margin of the San Mateo Mountains.
County(s) and State(s)	SOCORRO COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. <i>Comments:</i> Trace from 1:24,000-scale surficial mapping by McCraw (2003 #7450) and Osburn and Ferguson (2011 #7451) combined with accurate placement using photogrammetric methods. Also shown on the 1:250,000-scale fault map of Socorro quadrangle by Machette and McGimsey (1983 #1024) and the 1:100,000-scale geologic map of Socorro County (Osburn, 1984 #1238).
Geologic setting	These north-trending faults extend from the northwest margin of the San Mateo Mountains to near the southeast margin of Lake San Agustin, an ancient (late Pleistocene) pluvial lake that occupied the central portion of the San Agustin Plains, southeast of Datil, New Mexico. Little is known about the structural setting of the faults, nor the origin of the northeast-trending, upper portion of the San Agustin Plains.
Length (km)	15 km.
Average strike	N8°E
Sense of movement	Normal
Dip Direction	W; E
Paleoseismology studies	
Geomorphic expression	Forms small-subdued to prominent-large (40-m-high) scarps on piedmont slopes that border the northern and northwestern margin of the San Mateo Mountains. Machette and McGimsey (1983 #1024) reported scarp heights (estimated from topographic maps) of 10–40 m. Menges and others (1984 #1269) made a more detailed study of the scarps using standard scarp-profiling techniques. The scarps are mainly west and east facing, but there

	is at least one southeast-facing scarp.
Age of faulted surficial deposits	Machette and McGimsey (1983 #1024) reported that middle to early Pleistocene piedmont-slope deposits are offset. Scarps are generally not found on late Pleistocene deposits, with the exception of a single, less than 5-m-high scarp. McFadden and others (1994 #1670) conducted soil, tectonic and climatic-geomorphic investigations of the San Agustin Plans area and reported that their unit Q1 (>500 ka) deposits are offset 20–30 m, and unit Q2 deposits (>75–100 ka) are offset 2–5 m. Unit Q3 (latest Pleistocene, <30 ka) and younger Holocene surfaces do not appear to be disturbed by the faults.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) <i>Comments:</i> This timing is suggested by the presence of large (10–30 m high) scarps on middle Pleistocene deposits and smaller (2–5 m) scarps on suspected late Pleistocene deposits. Menges and others (1984 #1269) reported that movement on the westernmost of the faults (fault 17) is about 100 ka. This estimate is based on analysis of scarp morphology. McFadden and others (1994 #1670) concluded that the VLA faults most recently ruptured in the late Pleistocene, but clearly before the Holocene.
Recurrence interval	100 k.y. <i>Comments:</i> Menges and others (1984 #1269) reported a recurrence interval of about 100 k.y. for the westernmost of the faults (fault 17), and a most recent event of about 100 ka. This estimate is based on an assumption of 2–6 m slip per event, 20–30 m high scarps, and thus 5–10 events during and since the middle Pleistocene (<750 ka). The actual range of acceptable recurrence intervals is 75–150 k.y. Conversely, McFadden and others (1994 #1670, p. 14) reported an average recurrence interval of 10 k.y., but this appears to be a typographical error (sic 100 k.y.).
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Low slip-rate category assigned based on Menges and others' (1984 #1269) report of 20- to 30-m-high scarps formed during and since the middle Pleistocene.
Date and	2016

Compiler(s)	Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	<p>#1024 Machette, M.N., and McGimsey, R.G., 1983, Map of Quaternary and Pliocene faults in the Socorro and western part of the Fort Sumner 1° x 2° quadrangles, central New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF-1465-A, 12 p. pamphlet, 1 sheet, scale 1:250,000.</p> <p>#7450 McCraw, D.J., 2003, Quaternary geology of the Kellog Well 7.5-minute quadrangle: New Mexico Bureau of Geology & Mineral Resources Open-File Geologic Map 064Q, scale 1:24,000.</p> <p>#1670 McFadden, L.D., Lozinsky, R.R., Menges, C.M., Miller, J.R., and Ritter, J., 1994, Soil, tectonic and climatic geomorphologic investigations in the San Agustin Plains area, NM, <i>in</i> 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 Field Conference, September 28-October 1, 1994, Guidebook, p. 12-14.</p> <p>#1269 Menges, C.M., Kawaguchi, G.H., Lozinsky, R.P., and McFadden, L.D., 1984, Rates and amounts of Quaternary faulting on the VLA fault scarp, northeastern San Agustin Plains, New Mexico: Geological Society of America Abstracts with Programs, v. 16, no. 4, p. 248.</p> <p>#7451 Osburn, G.R., and Ferguson, C.A., 2011, Geologic map of the Monica Saddle 7.5-minute quadrangle, Socorro County, New Mexico: New Mexico Bureau of Geology & Mineral Resources Open-File Geologic Map 217, scale 1:24,000.</p> <p>#1238 Osburn, G.R., compiler, 1984, Geology of Socorro County: New Mexico Bureau of Mines and Mineral Resources Open-File Report 238, 13 p. pamphlet, 1 sheet, scale 1:200,000.</p>

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