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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.

San Andres Mountains fault, central section (Class A) No. 2053b

Last Review Date: 2015-12-21

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 2053b, San Andres Mountains fault, central section, 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	**General:** Little is known about this long and possibly hazardous fault owing to its location on the White Sands Missile Range, which has limited access. The fault is shown on a number of small-scale regional maps, and a limited study of fault scarp morphology by the compiler has been used to suggest a model for segmentation of the fault, which has not been tested by paleoseismic studies or numerical dating. **Sections:** This fault has 3 sections. Machette (1987 #847) suggested three segments for the fault based on fault geometry

	and scarp morphology data. However, these data are not compelling from a seismogenic sense, and the segments are treated as sections herein.
Name comments	**General:** The young fault scarps along the eastern margin of the San Andres Mountains were first recognized by Kelley (1955 #989) during his bedrock mapping of the mountains. Because of restricted access to White Sands Proving Grounds (Missile Range) since the mid 1940s, the fault's history is still largely unstudied. Machette (1987 #847) named the fault for its position along the eastern margin of the San Andres Mountains. The fault extends from the latitude of Capital Peak, in the northern part of the White Sands Proving Ground, south to Antelope Hill, just south of U.S. Highway 70, where it joins the Organ Mountains fault [2052]. Seager (1981 #968) suggested that the San Andres Mountains fault extends north to Mockingbird Gap, a prominent graben-shaped valley that bisects the northern end of the San Andres Mountains. **Section:** This section extends from about 1 km north of Rhodes Canyon (road), south to the latitude of Lead Camp Canyon, just west of the north end of Lake Lucero. The boundary for the south end of the section is based on consistent differences in fault scarp morphology between the areas north and south of Lead Camp Canyon (Machette, 1987 #847, fig. 6). **Fault ID:** Referred to as fault 3 on figure 1 and table 2 of Machette (1987 #847) and fault 11 on figure 1 of Machette (1987 #960).
County(s) and State(s)	DONA ANA COUNTY, NEW MEXICO SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Trace of fault based on 1:125,000-scale mapping by Seager (1987 #627) supplemented by detailed (1:24,000-scale) fault mapping by Machette (1987 #847). In places, the trace of the fault was adjusted using photogrammetry.
Geologic setting	This north-trending fault forms the eastern margin of the San Andres Mountains and the western margin of the Tularosa basin

	(Neogene). The fault has uplifted the San Andres Mountains into a westward-tilted block and exposed Precambrian and lower Paleozoic rocks along most of the footwall. The hanging wall block is characterized by a thick sequence of Tertiary and Quaternary basin-fill sediment; those deposits faulted at the surface are primarily of middle to late Quaternary age.
Length (km)	This section is 51 km of a total fault length of 113 km.
Average strike	N6°W (for section) versus N2°E (for whole fault)
Sense of movement	Normal *Comments:* Inferred from drilling and gravity measurements in the southern part of the Tularosa Basin. Seager (1981 #968) estimated there may be as much as 4–5 km of throw across the Organ Mountains fault, San Andres Mountains fault, and associated buried (major) faults on the west side of the Tularosa Basin.
Dip Direction	E *Comments:* High-angle dip as inferred from nearby exposures of the Organ Mountains fault [2052], which joins the San Andres fault on the south.
Paleoseismology studies	
Geomorphic expression	The fault forms nearly continuous scarps from 3 m to more than 29 m high on unconsolidated surficial deposits and poorly consolidated basin-fill deposits that underlie extensive piedmont-slope and alluvial-fan surfaces along the eastern margin of the San Andres Mountains. Morphology studies by Machette (1987) suggested that the scarps are probably latest Pleistocene in age.
Age of faulted surficial deposits	Little work has been done on the age of offset Quaternary deposits along the fault. However, general reconnaissance by Machette (1987 #847) suggested that the oldest faulted landforms are underlain by early to middle Pleistocene sediment equivalent to the Camp Rice Formation to the west. Although unmeasured, scarps on these deposits are large, probably in the 50–60 m range as estimated from topographic maps of the area. Piedmont-slope and alluvial-fan surfaces of middle (Tortugas alluvium, 250±50 ka) and late Pleistocene (Picacho alluvium, 100±30 ka) age are

	offset 26–29 m and 6–15 m, respectively. The youngest faulted alluvium (late Pleistocene, >15 ka) has 2.7–5.4 m high scarps.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The morphology of scarps on the youngest faulted alluvium suggests that the most recent faulting occurred before 15 ka, perhaps about 25–35 ka (Machette, 1987 #847).
Recurrence interval	20–50 k.y. (<100±30 ka) *Comments:* Machette (1987 #847) published a rough estimate of 20–50 k.y. based on an assumption of 2–5 faulting events for deposits correlated with the Picacho alluvium (100±30 ka) and as many as 10 faulting events for deposits correlated with the Tortugas alluvium (250±50 ka).
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip rate is inferred from 6–15 m offset of Picacho alluvium (100±30 ka).
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#989 Kelley, V.C., 1955, Regional tectonics of south-central New Mexico, *in* Guidebook of south-central New Mexico: New Mexico Geological Society, 6th Field Conference, November 11-13, 1955, Guidebook, p. 96-104. #847 Machette, M.N., 1987, Preliminary assessment of paleoseismicity at White Sands Missile Range, southern New Mexico—Evidence for recency of faulting, fault segmentation, and repeat intervals for major earthquakes in the region: U.S. Geological Survey Open-File Report 87-444, 46 p. #960 Machette, M.N., 1987, Preliminary assessment of Quaternary faulting near Truth or Consequences, New Mexico: U.S. Geological Survey Open-File Report 87-652, 40 p. #968 Seager, W.R., 1981, Geology of Organ Mountains and southern San Andres Mountains, New Mexico: New Mexico

	Bureau of Mines and Mineral Resources Memoir 36, 97 p., 4 pls. #627 Seager, W.R., Hawley, J.W., Kottlowski, F.E., and Kelley, S.A., 1987, Geology of east half of Las Cruces and northeast El Paso 1° x 2° sheets, New Mexico: New Mexico Bureau of Mines and Mineral Resources Geologic Map 57, 3 sheets, scale 1:125,000.