

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](#).

Fra Cristobal fault zone (Class A) No. 2133

Last Review Date: 2016-02-15

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 2133, Fra Cristobal fault zone, 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 02:21 PM.

Synopsis

Little is known about this range-bounding fault zone that forms the east margin of the Fra Cristobal Range. Although there is a fairly steep (bedrock) escarpment along the range front, there is no published evidence of Quaternary movement along the suspected trace of the fault. At the southern end of the fault, basalts of suspected late Pliocene age are not offset. However, at the northern end of the range, an associated basinward splay forms a relatively small fault scarp of probable late (?) to middle Pleistocene age. No studies have been conducted to discern the age and distribution of Quaternary deposits that overlie either of these faults owing to limited access and property ownership.

Name comments	<p>Main fault named by Nelson (1986 #1176) for the Fra Cristobal Range. The fault zone extends along the eastern margin of the Fra Cristobal Range and appears to be an inactive, but an associated basinward splay at its northern end is Quaternary.</p> <p>Fault ID: Associated with fault 6 on fig. 1 in Machette (1987 #960).</p>
County(s) and State(s)	SOCORRO COUNTY, NEW MEXICO SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	<p>Good Compiled at 1:24,000 scale.</p> <p><i>Comments:</i> Compiled at 1:24,000 scale using photogrammetric methods and compared to approximately 1:34,000-scale map of Nelson and others (2012 #7355) for central and southern traces. Aerial photo reconnaissance by Machette (1987 #960) reported a fault scarp on alluvium at the northeast margin of the Fra Cristobal Range, confirmed by field visits (D. Love, written commun., 2016).</p>
Geologic setting	The Fra Cristobal fault bounds the east margin of the Fra Cristobal Range (an east-titled horst block) and forms the western margin of the Jornada del Muerto basin (a gentle Cenozoic syncline). Most of the structural complexity in the Fra Cristobal range is of Laramide age (Nelson, 1986 #1176). The fault is expressed as a steep mountain-front escarpment and as a basinward splay that forms a scarp on alluvium.
Length (km)	22 km.
Average strike	N0°E
Sense of movement	Normal
Dip Direction	<p>E</p> <p><i>Comments:</i> High-angle according to Nelson (1986 #1176).</p>
Paleoseismology studies	

Geomorphic expression	No evidence of fault scarps or deformed Quaternary deposits are reported by Thompson (1961 #1712) or Nelson (1986 #1176). However, aerial photo reconnaissance by Machette (1987 #960) reported a conspicuous fault scarp on alluvium at the northeast margin of the Fra Cristobal Range.
Age of faulted surficial deposits	From the dissected appearance of the piedmont, it appears that the alluvial fans that are offset by the basinward splay are probably of middle and late (?) Pleistocene age (Machette, 1987 #960). This splay does not appear to displace nearby basalt flows recently dated at about 78 ka (Ar-Ar), although erosion in nearby drainages and atop the lava itself may have removed surface expression of the fault (D. Love, written commun., 2016). No studies have been conducted to discern the age and distribution of Quaternary deposits along this scarp or the main range-front fault owing to limited public access. At the southern end of the fault, basalts of suspected late Pliocene age are not offset by the fault (Nelson, 1986 #1176).
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> Machette (1987 #960) considered the main range-front fault to be primarily of Pliocene age and it is shown as a concealed Quaternary fault herein, whereas the basinward fault scarp is of possible late (?) to middle Pleistocene age.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Low slip-rate category assigned based on lack of confirmed scarps on deposits along the range-front fault and on relatively small (<5 m) scarps along the basinward strand of the fault zone.
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#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.

#1176 Nelson, E.P., 1986, Geology of the Fra Cristobal Range, south-central New Mexico, *in* Clemons, R.E., King, W.E., and Mack, G.H., eds., Truth or Consequences region: New Mexico Geological Society, 37th Field Conference, October 16-18, 1986, Guidebook, p. 83-95.

#7355 Nelson, W.J., Lucas, S.G., Krainer, K., McLemore, V.T., and Elrick, S., 2012, Geology of the Fra Cristobal Mountains, New Mexico, *in* Lucas, S.G., McLemore, V.T., Lueth, V.W., Spielmann, J.A., and Krainer, K., eds., Geology of the Warm Springs region: New Mexico Geological Society 63rd Field Conference, October 3–6, 2012, Guidebook, p. 195–210.

#1712 Thompson, S., 1961, Geology of the southern part of the Fra Cristobal Range, Sierra County, New Mexico: Albuquerque, University of New Mexico, revision of M.S. thesis (1956), 89 p.

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