

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](#).

Intrabasin faults on the Llano de Albuquerque (Class A) No. 2121

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

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Synopsis

These faults are mostly expressed by short faults that offset the early Pleistocene Llano de Albuquerque geomorphic surface. They are collected together as a group for the express purpose of description. Most of these intrabasin faults are partly to nearly completely covered by eolian sand, but on air photographs these features are marked by linear scarps, aligned drainages, and in some cases aligned ephemeral ponds. Quaternary displacement is unknown for most of these faults, but a few have scarps up to 3–12 m high. Some of these faults may be related to volcanic activity, such as those associated with the Wind Mesa and Los

	Lunas volcanic centers.
Name comments	This group of north-trending normal faults forms a series of horsts and grabens on the Llano de Albuquerque, west of Albuquerque. A thick cover of eolian sand covers most of the Llano de Albuquerque, which has led to varying orientations and configurations of mapped faults in this area (Kelley, 1977 #1106; Kelley and Kudo, 1978 #1307; Machette, 1982 #1401; Machette and McGimsey, 1983 #1024; Hawley and Haase, 1992 #1304; Wong and others, 1995 #1155; Hawley and Whitworth, 1996 #1303; Shroba and others, 2003 #7459; Thompson and others, 2009 #7460). Named faults include several strands of the West Mesa and Cat Mesa [2122] fault zones (Wong and others, 1995 #1155; Hawley and Whitworth, 1996 #1303), the Atrisco fault (Hawley and Haase, 1992 #1304), and the Lost Horizon and Wind Mesa faults (Connell, 2008 #7454). We exclude all but the Cat Mesa fault [2122] as specific fault names until more detailed mapping and fault studies are conducted.
County(s) and State(s)	SANDOVAL COUNTY, NEW MEXICO SOCORRO COUNTY, NEW MEXICO BERNALILLO COUNTY, NEW MEXICO VALENCIA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. <i>Comments:</i> Fault traces compiled from 1:24,000-scale mapping of Love and others (1998 #7457), Maldonado and Atencio (1998 #1777, 1998 #1778), Love (1999 #7456), Maldonado, 2003 (#7453), Rawling (2003 #7458), Shroba and others (2003 #7459), McCraw and others (2006 #7255), and Thompson and others (2009 #7460). Additional traces from unpublished 1:24,000-scale mapping of Isleta 7.5-minute quadrangle by Love and others and 1:50,000-scale mapping of Albuquerque metropolitan area by Connell (2008 #7454). All traces compiled digitally and accurately placed using photogrammetric methods. Original fault traces digitized from Machette and McGimsey (1983 #1024) with supplemental geophysical data from Grauch and Millegan (1998 #1721) and U.S. Geological Survey and SIAL Geosciences Inc. (1997 #1722). The area is covered by thick sequences of eolian sand, so most fault strands are subdued and others may be

	obscured.
Geologic setting	This group of intrabasin faults forms a broad zone within the Albuquerque-Belen basin of the Rio Grande rift.
Length (km)	101 km.
Average strike	N3°E
Sense of movement	Normal
Dip Direction	E; W
Paleoseismology studies	
Geomorphic expression	<p>These faults are marked by subdued, discontinuously exposed, mostly sand covered scarps on the Llano de Albuquerque. East of El Rincon (an erosional embayment into the Llano), these structures form an anastomosing group of horsts and grabens that are marked by linear scarps, aligned drainages, and aligned ephemeral ponds (Shroba and others, 2003 #7459; Connell, 2008 #7454; Thompson and others, 2009 #7460). Some of the down-to-the-west faults have linear ponds along their bases, apparently caused by damming of the prevailing east-southeast-flowing drainages. Machette and McGimsey (1983 #1024) measured offsets of 3–12 m on some of these faults on the Llano de Albuquerque. Included in this dataset are buried faults delineated from high-resolution aeromagnetic data (U.S. Geological Survey and SIAL Geosciences Inc., 1997 #1722; Grauch and Millegan, 1998 #1721; Grauch, 1999 #7241). Most of these faults are buried only by a thin (less than 10 m) cover of eolian sediment and probably cut deposits and soils associated with Llano de Albuquerque (Shroba and others, 2003 #7459; Thompson and others, 2009 #7460). However, it is possible that some do not cut post-Pliocene strata.</p>
Age of faulted surficial deposits	<p>These faults offset the early Pleistocene Llano de Albuquerque. This diachronous surface overlies deposits spanning the interval from approximately 1.8–0.8 Ma (Connell and others, 2000 #7455; Connell and others, 2013 #7235).</p>
Historic earthquake	
Most recent	middle and late Quaternary (<750 ka)

<p>prehistoric deformation</p>	<p><i>Comments:</i> Some of these faults offset the early Pleistocene Llano de Albuquerque surface as much as 12 m (Machette and McGimsey, 1983 #1024); these data indicate a recurrent history of faulting that in some cases probably extended at least into the middle Pleistocene following abandonment of the Llano de Albuquerque surface.</p>
<p>Recurrence interval</p>	
<p>Slip-rate category</p>	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> Low slip-rate category assigned based on offsets of 3–12 m of the early Pleistocene (~1.8-0.8 Ma) Llano de Albuquerque (Machette and McGimsey, 1983 #1024; Connell and others, 2013 #7235).</p>
<p>Date and Compiler(s)</p>	<p>2016 Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources Stephen F. Personius, U.S. Geological Survey</p>
<p>References</p>	<p>#7454 Connell, S.D., 2008, Geologic map of the Albuquerque-Rio Rancho metropolitan area and vicinity, Bernalillo and Sandoval Counties, New Mexico: New Mexico Bureau of Geology and Mineral Resources Geologic Map 78, scale 1:50,000.</p> <p>#7455 Connell, S.D., Love, D.W., Maldonado, F., Jackson, P.B., McIntosh, W.C., and Eppes, M.C., 2000, Is the top of the Santa Fe Group diachronous in the Albuquerque Basin? [abs.], <i>in</i> Cole, J.C., ed., Middle Rio Grande basin study—Proceedings of the Fourth Annual Workshop, Albuquerque, New Mexico, February 15–16, 2000: U.S. Geological Survey Open-File Report 00-488, p. 18–20.</p> <p>#7235 Connell, S.D., Smith, G.A., Geissman, J.W., and McIntosh, W.C., 2013, Climatic controls on nonmarine depositional sequences in the Albuquerque Basin, Rio Grande rift, north-central New Mexico, <i>in</i> Hudson, M.R., and Grauch, V.J.S., eds., New perspectives on Rio Grande rift basins—From tectonics to groundwater: Geological Society of America Special Paper 494, p. 383–425, doi:10.1130/2013.2494(15)</p> <p>#7241 Grauch, V.J.S., 1999, Principal features of high resolution</p>

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