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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.

Red Hill faults (Class A) No. 2138

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 2138, Red Hill 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 02:21 PM.**

Synopsis	These subparallel Quaternary faults trend south-southwest across Quaternary, Pliocene, and Miocene basalt flows. At the north end, the faults displace basalt flows that are early Quaternary in age, thus confirming that a portion of the fault traces have Quaternary movement. No information exists about the fault chronology, nor have detailed studies been made to better define the most recent movement along the faults.
Name comments	These faults are named for Red Hill, a small knoll located about 15 km east of the New Mexico/Arizona state boundary along U.S. Highway 60. The Quaternary traces of these faults were mapped by Chamberlin and others (1994 #1256). From U.S. Highway 60,

	they extend as a 4- to 12-km-wide zone of faults south-southwest for a distance of about 15 km.
County(s) and State(s)	CATRON COUNTY, NEW MEXICO
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Traces from 1:100,000-scale geologic map of the Quemado 30 x 60-minute sheet by Chamberlin and others (1994 #1256) and accurate placement at 1:24,000 scale using photogrammetric methods.
Geologic setting	This north-northwest-trending set of faults cuts early Quaternary to late Pliocene basalt and basin fill deposits (Quemado Formation) and late Miocene basalt flows south of Cimarron Mesa, a high plateau that is formed by late Miocene basalt flows (Chamberlin and others, 1994 #1256). These faults are part of a larger system of faults that strike northeast in the region. They are parallel to subparallel to the trend of upper Miocene eruptive centers (cones, vents, etc.) (Chamberlin and others, 1994 #1256).
Length (km)	15 km.
Average strike	N25°E
Sense of movement	Normal *Comments:* As reported by Chamberlin and others (1994 #1256).
Dip Direction	SE; NW
Paleoseismology studies	
Geomorphic expression	These faults form scarps on basalt as well as scarps that separate basin-fill deposits from basalt. No information has been published about the size or morphology of the scarps. Levish and others (1992 #1715) noted that scalloped escarpments on basalt flows may represent volcanic flow margins rather than fault scarps along the unnamed fault of Bonita Canyon [2144] and the Continental Divide fault [2145]. This observation may apply to some of the Red Hill fault scarps as well.

Age of faulted surficial deposits	Chamberlin and others (1994 #1256) showed the fault as offsetting basalt and sediment of the Quemado Formation, a Pliocene to lower Pleistocene unit that is widespread but locally derived from sources in western New Mexico. The basin-fill deposits are primarily unconsolidated to poorly consolidated gravel. The youngest faulted basalt returned early Pleistocene Ar-Ar ages of about 2.5 Ma to 0.86 Ma (McIntosh and Cather, 1994 #1719). Younger basaltic tephra of 70–210 ka age (unit Qbt) is not mapped as being offset by the Red Hill faults (Chamberlin and others, 1994 #1256).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Timing based on faulted basalt flows with Ar-Ar ages as young as 0.86 Ma (McIntosh and Cather, 1994 #1719).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on inferred small size of scarps and slip rates determined for similar faults in the region.
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1256 Chamberlin, R.M., Cather, S.M., Anderson, O.J., and Jones, G.E., 1994, Reconnaissance geologic map of the Quemado 30 x 60 minute quadrangle, Catron County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Open-File Report 406, 29 p. pamphlet, 1 sheet, scale 1:100,000. #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. #1719 McIntosh, W.C., and Cather, S.M., 1994, $^{40}Ar/^{39}Ar$ geochronology of basaltic rocks and constraints on late Cenozoic

	stratigraphy and landscape development in the Red Hill-Quemado area, New Mexico, *in* 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. 209–224.