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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.

Dolores fault zone (Class B) No. 2289

Last Review Date: 1997-09-04

Compiled in cooperation with the Colorado Geological Survey

citation for this record: **Widmann, B.L., compiler, 1997, Fault number 2289, Dolores 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 03:02 PM.**

Synopsis	The Dolores fault zone forms two grabens on the crest of the Dolores anticline, a salt-cored structure. The grabens formed in response to flowage and dissolution of underlying Pennsylvanian evaporitic rocks in the Paradox Formation (Cater, 1970 #2672). Cater (1955 #2668) postulated that small folds and faults in Quaternary deposits within the grabens indicate present-day, small-scale collapse and readjustment of the system. Williams (1964 #2789) mapped Quaternary deposits as abutting against the fault, and Cater (1970 #2672) showed no offset of Quaternary deposits. Kirkham and Rogers (1981 #792) suggested possible Holocene movement on this system. The most recent paleoevent on this fault zone is herein considered to have occurred during the

	Quaternary (<1.6 Ma). The faults may not extend to seismic depths, thus they are herein considered to be class B structures.
Name comments	This unnamed series of faults consists of multiple west-northwest-trending faults between the town of Slick Rock and the Utah/Colorado border. The faults appear to form a pair of grabens that are between and generally parallel to Lisbon Valley and Disappointment Valley. The grabens lie on the crest of the Dolores anticline, which is the south extension of the Lisbon Valley anticline in Utah. The name "Dolores fault zone" was initiated by Shawe and others (1959 #2743). Although not mapped in Utah, the fault is probably present for some distance west of the Colorado border and may connect (or be part of the Lisbon Valley fault zone [2511]. **Fault ID:** Fault 93 in Kirkham and Rogers (1981 #792) and fault number Q39 of Widman and others (1998 #3441).
County(s) and State(s)	SAN MIGUEL COUNTY, COLORADO SAN JUAN COUNTY, UTAH
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* The faults were mapped at a scale of 1:24,000 by Cater (1955 #2668), 1:62,500 by Cater (1970 #2672) and 1:250,000 by Williams (1964 #2789). The trace used herein is from Williams (1964 #2789).
Geologic setting	Faults of the Dolores fault zone are normal and form two en echelon grabens. Throw is generally down toward the axes of the grabens. The faults are south of Paradox Basin and Big Gypsum Valley, both of which are collapsed salt-cored anticlines and are on trend with Lower Lisbon and Disappointment Valleys. The faults are on the crest of a the Dolores anticline, a salt-cored structure. The Dolores anticline has not experienced major collapse, as have the Paradox Basin and Big Gypsum Valley anticlines, only minor readjustments (Cater, 1970 #2672). The Dolores anticline is a broad, asymmetric fold with limbs that dip 2? SW and 9? NE (Shawe, 1970 #2742). Formation of the anticline is believed to be controlled by major subsurface basement faults that displace bedrock beneath the evaporitic

	Paradox Formation (Cater, 1970 #2672; Shawe, 1970 #2742). Shawe (1970 #2742) reported down-to-the-northeast, dip-slip displacement of several hundred meters on this basement fault zone. Thickness of the Paradox Formation increases by about 610 m along the axis of the anticline (Shawe and others, 1968 #3464).
Length (km)	15 km.
Average strike	N67°W
Sense of movement	Normal *Comments:* Kirkham and Rogers (1981 #792) indicated normal movement on these faults.
Dip Direction	NE; SW
Paleoseismology studies	
Geomorphic expression	Cater (1955 #2668) alluded to small faults and folds in Quaternary deposits which may indicate continued collapse and readjustment of the system.
Age of faulted surficial deposits	Williams (1964 #2789) mapped Quaternary deposits as abutting faults of the Dolores fault zone. Cater (1955 #2668) mapped the Cretaceous Dakota Sandstone and Burro Canyon Formation as the youngest deposits offset by the faults, but in the accompanying text he indicated small folds and faults are present in Quaternary deposits within the grabens. Quaternary movement was suggested by Shawe (1970 #2742) who reported a grade of about 30 m/km for tilted terrace gravel between the Dolores River and Glade Mountain, whereas the average grade for untilted gravel in the area is only 7.5 m/km. The faults lie primarily within Triassic to Cretaceous; only about 5 percent of the fault system extends beneath Quaternary deposits.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Although Quaternary deposits are not mapped as offset, text provided by Cater (1955 #2668) indicated that small folds and faults are in fact present within this system. He postulated that the presence of these features in Quaternary deposits indicates possible present-day collapse and readjustment

	of the system. Shawe (1970 #2742) discussed the possibility of as much as 300 m of Pleistocene folding, as suggested by tilted terrace gravel, but believed significant fault movement may only be early to middle Tertiary in age. Williams (1964 #2789) mapped surficial deposits as abutting the faults. Kirkham and Rogers (1981 #792) suggested possible Holocene movement on these faults. The most recent paleoevent for this fault system is herein considered to have occurred during the Quaternary (<1.6 Ma) based on Cater (1955 #2668) and Shawe (1970 #2742).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Widmann and others (1998 #3441) placed this structure within the <0.2 mm/yr slip-rate category.
Date and Compiler(s)	1997 Beth L. Widmann, Colorado Geological Survey
References	#2668 Cater, F.W., Jr., 1955, Geology of the Horse Range Mesa quadrangle, Colorado: U.S. Geological Survey Geologic quadrangle Map GQ-64. #2672 Cater, F.W., Jr., 1970, Geology of the salt anticline region in southwestern Colorado, with a section on stratigraphy by F.W. Cater and L.C. Craig: U.S. Geological Survey Professional Paper 637, 80 p. #792 Kirkham, R.M., and Rogers, W.P., 1981, Earthquake potential in Colorado: Colorado Geological Survey Bulletin 43, 171 p., 3 pls. #2742 Shawe, D.R., 1970, Structure of the Slick Rock District and vicinity, San Miguel and Dolores Counties, Colorado: U.S. Geological Survey Professional Paper 576-C, 18 p. #2743 Shawe, D.R., Archibold, N.L., and Simmons, G.C., 1959, Geology and uranium-vanadium deposits of the Slick Rock district, San Miguel and Dolores Counties, Colorado: Economic Geology, v. 54, no. 3, p. 395-415. #3464 Shawe, D.R., Simmons, G.C., and Archibold, N.L., 1968, Stratigraphy of the Slick Rock District and vicinity, San Miguel

	and Dolores Counties, Colorado: U.S. Geological Survey Professional Paper 576-A, 108 p. #3441 Widmann, B.L., Kirkham, R.M., and Rogers, W.P., 1998, Preliminary Quaternary fault and fold map and database of Colorado: Colorado Geological Survey Open-File Report 98-8, 331 p., 1 pl., scale 1:500,000. #2789 Williams, P.L., 1964, Geology, structure, and uranium deposits of the Moab quadrangle, Colorado and Utah: U.S. Geological Survey Miscellaneous Geologic Investigations I-360.