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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.

Main Canyon fault (Class A) No. 2350

Last Review Date: 2016-02-08

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Hylland, M.D., and Haller, K.M., compilers, 2016, Fault number 2350, Main Canyon fault, 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 03:00 PM.**

Synopsis	Poorly understood Quaternary fault east of East Canyon is antithetic to the East Canyon fault [2354]. A single trench excavated near the northern end of the fault suggests recurrent late Quaternary faulting resulting in uphill facing fault scarps that blocked.
Name comments	Piety and others (2010 #7322) divide the fault into five sections (3–8.5 km long) based on differences in geomorphic expression to simplify discussion; that division is not followed here **Fault ID:** Not included in compilation by Hecker (1993 #642).

County(s) and State(s)	MORGAN COUNTY, UTAH SUMMIT COUNTY, UTAH
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault traces from mapping of Bryant (1990 #4511) and Coogan and King (2001 #5029).
Geologic setting	Arcuate, northeast- to northwest-trending fault cutting Tertiary bedrock (Wasatch Formation) on the east side of East Canyon in the Wasatch Range. Much of the fault trace is nearly coincident with the axial trace of the Parleys Canyon syncline as mapped by Bryant (1990 #4511). The fault is antithetic to the East Canyon fault [2354a, 2354b], and proprietary seismic reflection and well data indicate the fault soles into a salt bed within the Jurassic Pruess Formation at a depth of 4-5 km (James C. Coogan, Anschutz Exploration, oral commun., December 2001).
Length (km)	24 km.
Average strike	N11°E
Sense of movement	Normal
Dip	70–81° W. *Comments:* The main shear zone near the base of the trench exposure has an average dip of 81° W.; other shear zones have average dips between 70° W. and 75° W. (Piety and others, 2010 #7322).
Paleoseismology studies	Site 2350-1. Unnamed trench site documented by Piety and others (2010 #7322). The trench was excavated across a 0.4-m-high, southwest-facing scarp located in the northern 3.5 km of the Main Canyon fault where late Quaternary surfaces are offset. The exposure revealed predominately slope colluvium on the upthrown block and interbedded marsh deposits and slope colluvium on the down-thrown block resulting from uphill-facing fault scarps temporarily blocked drainages resulting in intermittent marsh-like conditions. The timing of surface rupture is constrained by analyses of nine luminescence samples, one

	radiocarbon sample, and degree of soil development. Piety and others (2010 #7322) present evidence of three surface ruptures; the last two have occurred since 30–38 ka (37,700 +2860 years and 36,200 +2490 years).
Geomorphic expression	The fault mostly shows poor geomorphic expression on Tertiary bedrock (Wasatch Formation). Definite evidence for late Quaternary surface rupture is present only along the northern about 3.5 km of the fault, where the fault juxtaposes relatively younger deposits west of the fault against relatively older deposits east of the fault (Piety and others, 2010 #7322).
Age of faulted surficial deposits	Tertiary bedrock (Wasatch Formation), Quaternary (?) deposits.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Interpretations of fault history from trench exposure include surface rupture that occurred shortly before about 5000 to 6000 years ago, possibly 12,000 to 15,000 years ago (Piety and others, 2010 #7322). This age is consistent with the young geomorphic expression of the northern part of the fault; however, similar evidence for long-term movement throughout the late Cenozoic is lacking (Piety and others, 2010 #7322).
Recurrence interval	*Comments:* Piety and others (2010 #7322) do not report recurrence intervals resulting from their study, but based on the ages they present, the interval between the two most recent events is likely tens of thousands of years.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on the overall poor geomorphic expression of the fault and apparent long intervals between surface rupture (Piety and others (2010 #7322).
Date and Compiler(s)	2016 Michael D. Hylland, Utah Geological Survey Kathleen M. Haller, U.S. Geological Survey

References	#4511 Bryant, B., 1990, Geologic map of the Salt Lake City 30' x 60' quadrangle, north central Utah, and Uinta County, Wyoming: U.S. Geological Survey Miscellaneous Investigations Map I-1944, scale 1:100,000. #5029 Coogen, J.C., and King, J.K., 2001, Progress report—Geologic map of the Ogden 30' x 60' quadrangle, Utah and Wyoming: Utah Geological Survey Open-File Report 380, 1 sheet, scale 1:100,000. #642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000. #7322 Piety, L.A., Anderson, L.W., and Ostenaa, D.A., 2010, Late Quaternary faulting in East Canyon Valley, northern Utah: Utah Geological Survey Miscellaneous Publication 10-5, 40 p., http://geology.utah.gov/online/mp/mp10-05/mp10-05.pdf and http://geology.utah.gov/online/mp/mp10-05/mp10-05appendices.pdf.