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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.

Hilger fault (Class A) No. 674

Last Review Date: 1993-04-19

Compiled in cooperation with the Montana Bureau of Mines and Geology

citation for this record: **Machette, M.N., compiler, 1993, Fault number 674, Hilger 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 02:04 PM.**

Synopsis	Poorly studied, range-bounding, normal fault; estimates of its most recent movement are based on qualitative statements about rates of stream incision versus uplift. The fault is inferred to lie at the range margin, and to project beneath the abutment of Upper Holter Lake on the Missouri River.
Name comments	Pardee (1950 #46) probably first named this range-front fault for its location near Hilger, a small town along the Missouri River. Witkind (1975 #317) followed the same usage, but Johns and others (1982 #259) refer to it as the Hilger Valley fault. The original name is used here. **Fault ID:** Refers to fault 44 (Hilger fault along northeast side

	Hilger Valley) of Witkind (1975 #317) and fault 31 (Hilger Valley fault) of Johns and others (1982 #259).
County(s) and State(s)	LEWIS AND CLARK COUNTY, MONTANA
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* Transferred from figure 15 (scale approximately 1:200,000) of Pardee (1950 #46) to 1:250,000 sheet, trace was then adjusted to topography.
Geologic setting	Range-bounding, down-to-the-southwest, high-angle(?) normal fault that forms 3- to 5-km wide, 20-km-long "trenchlike" depression (Hilger Valley) (Pardee, 1950 #46). Limits and location of fault are poorly known; as shown on figure 15 of Pardee (1950 #46), fault extends from about 2 km west of Little Prickly Pear Creek near Sieben, east to Spring Gulch, about 2 km southeastward of the Missouri River.
Length (km)	20 km.
Average strike	N61°W
Sense of movement	Normal *Comments:* Witkind (1975 #317)
Dip	>55° *Comments:* Johns and others (1982 #259). Witkind (1975 #317) also suggests that the fault has a high angle (dip).
Paleoseismology studies	
Geomorphic expression	Forms linear escarpment with aligned truncated spurs (facets) at base of Big Belt Mountains (Pardee, 1950 #46). At the western end of fault (near Sieben), the lower 30 m of the escarpment (in shale) is steeper (40?) than the remainder of mountain front. Valleys of Little Prickly Pear Creek and Missouri River, which cross the fault's projection, have steep lower gorges about 200 m

	deep. Upper canyon walls are less steep and wider, suggesting lower (younger) gorges were formed mostly by a phase of accelerated incision since early to middle Pleistocene time (Pardee, 1950 #46). However, there are no scarps along the projection of fault according to Witkind (1975 #317).
Age of faulted surficial deposits	Bregman (1981 #530) mapped undifferentiated Quaternary deposits across the trace of the fault, but Johns and others (1982 #259) note that these deposits could be as young as Holocene. Fault cuts Cambrian strata and Precambrian Belt Group rocks in hangingwall block.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Timing based on qualitative assessments of Pardee (1950 #46) and lack of fault scarps (Witkind, 1975 #317). However, Pardee (1950 #46) stated that most of the 200 m of postulated uplift that stranded the ancient paleovalleys must have been accomplished by early or middle Pleistocene time. Johns and others (1982 #259) cite late Pleistocene as time of latest movement.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Lack of fault scarps (Witkind, 1975 #317) supports interpretation of low slip rate.
Date and Compiler(s)	1993 Michael N. Machette, U.S. Geological Survey, Retired
References	#530 Bregman, M.L., 1981, Structural geology of the Sheep Creek and Rattlesnake Mountain quadrangles, Lewis and Clark County, Montana: Montana Bureau of Mines and Geology Geologic Map 26, 19 p. pamphlet, 1 sheet, scale 1:24,000. #259 Johns, W.M., Straw, W.T., Bergantino, R.N., Dresser, H.W., Hendrix, T.E., McClernan, H.G., Palmquist, J.C., and Schmidt, C.J., 1982, Neotectonic features of southern Montana east of 112°30' west longitude: Montana Bureau of Mines and Geology Open-File Report 91, 79 p., 2 sheets.

	#46 Pardee, J.T., 1950, Late Cenozoic block faulting in western Montana: Geological Society of America Bulletin, v. 61, p. 359-406. #317 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in western Montana: U.S. Geological Survey Open-File Report 75-285, 36 p. pamphlet, 1 sheet, scale 1:500,000.