

# 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](#).

## Kentucky River fault system (Class B) No. 2650

Last Review Date: 1994-03-17

*citation for this record:* Crone, A.J., compiler, 1994, Fault number 2650, Kentucky River fault system, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, <https://earthquakes.usgs.gov/hazards/qfaults>, accessed 01/04/2021 10:24 AM.

### Synopsis

Kentucky River fault system is one of a series of major regional fault systems that extends east-northeasterly across Kentucky. The western members of these fault systems are the Shawneetown and Rough Creek (discussed separately as Class C faults) fault systems in southern Illinois and western Kentucky. The Kentucky River fault system crosses central and eastern Kentucky, and the Woodward fault is the eastern member of this network in western West Virginia. Information on Quaternary faulting in the fault system is based on work of Van Arsdale (1986 #684). Although this study found evidence of Quaternary deformation in trenches across various strands of the fault system, the amount of deformation is generally small and could be related to collapse from solution of the underlying bedrock. The evidence is equivocal, and thus the feature is assigned to Class B in this compilation. Van Arsdale's (1986 #684) report of possible Quaternary movement on this regional fault system is based on

	studies at four sites on various fault strands. Because there is no geomorphic expression of Quaternary faulting at any of these sites, it is impossible to define and measure specific fault parameters (azimuth, length, etc.) for Quaternary faulting.
<b>Name comments</b>	
<b>County(s) and State(s)</b>	MADISON COUNTY, KENTUCKY CLARK COUNTY, KENTUCKY FAYETTE COUNTY, KENTUCKY
<b>Physiographic province(s)</b>	INTERIOR LOW PLATEAUS
<b>Reliability of location</b>	Good Compiled at 1:226,000 scale.  <i>Comments:</i> The regional location of VanArsdale's four study sites are shown in figure 2 of Van Arsdale (1986 #684), and for each study site, he provides a more detailed map. The digital data for each of the four study sites is derived from his regional location map (his figure 2).
<b>Geologic setting</b>	The Kentucky River fault system (KRFS) forms part of the northern boundary of the Rome trough, which is interpreted to be part of an east-trending aulacogen of late Precambrian to early Paleozoic age. In Early Paleozoic time, the north-south-trending Cincinnati arch developed in central Kentucky. The part of the KRFS studied by Van Arsdale (1986 #684) lies on the eastern flank of the arch. Throughout their history, faults in the system have had senses of slip that included sinistral, dextral, normal, and reverse slip. The net throw on the faults is down-to-the-south, and cumulative displacement of Precambrian rocks in Van Arsdale's study area is approximately 463 m (cited by Van Arsdale).
<b>Length (km)</b>	km.
<b>Average strike</b>	
<b>Sense of movement</b>	Normal, Reverse  <i>Comments:</i> Van Arsdale (1986 #684) documents folding and faulting in trenches at several sites, all of which indicate compressional deformation in Quaternary deposits. In contrast,

	<p>these faults are mapped as normal faults on the state geologic map of McDowell and others (1981 #693).</p>
<p><b>Dip Direction</b></p>	<p>SW; NE</p> <p><i>Comments:</i> Dips reported in the trenches range between 25–80°.</p>
<p><b>Paleoseismology studies</b></p>	<p>Van Arsdale (1986 #684) describes detailed studies at four sites along the fault system. These detailed study sites were identified following reconnaissance work that consisted of electrical-resistivity surveys and drilling a series of auger holes across the projected traces of faults at 25 sites.</p> <p>At one site, no deformation was documented in Quaternary deposits.</p> <p>At a second site (2650-1), Van Arsdale excavated five trenches across these faults and found faulted Quaternary deposits in two of the trenches. Faulted Quaternary deposits in one trench have a maximum stratigraphic separation of 0.7 m across a reverse fault that dips 70° to the northeast, and in another trench, two N. 40° W.-trending faults formed a small graben.</p> <p>At a third site (2650-2), Van Arsdale (1986 #684) describes evidence of folding that postdates deposition of Kentucky River terrace deposits; these deposits may have as much as 1.1 m of stratigraphic separation. He cites three possible explanations for the folding including solution collapse. On the basis of one radiocarbon date, he concludes that the deformation occurred within the past 350 years.</p> <p>At the fourth site, he did not find evidence of faulting or deformation in Quaternary deposits.</p> <p>Van Arsdale (1986 #684) argues that solution collapse is not likely to be responsible for the features found in the trenches. However the characteristics of the deformation are not inconsistent with minor subsidence related to the development of solution-collapse features in carbonate rocks. The existing evidence of a tectonic origin for these features is equivocal, and therefore they are classified as Class B features.</p>
<p><b>Geomorphic expression</b></p>	<p>None.</p>

<b>Age of faulted surficial deposits</b>	Quaternary terrace deposits of the Kentucky River. Age of deposits is uncertain but is believed to be Pliocene-Pleistocene.
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	undifferentiated Quaternary (<1.6 Ma)  <i>Comments:</i> The age of faulted Quaternary deposits is poorly known. At Van Arsdale's second site (1986 #684), he indicates that the faulted deposits are estimated to be pre-Illinoian (730,000-900,000) based on the weathering profile formed in the deposits.
<b>Recurrence interval</b>	<i>Comments:</i> No individual earthquakes have been recognized, so no recurrence interval can be calculated.
<b>Slip-rate category</b>	Less than 0.2 mm/yr  <i>Comments:</i> The greatest vertical displacement of Quaternary deposits reported by Van Arsdale (1986 #684) is 0.7 m at the second site. At the third site, Quaternary deposits, conservatively estimated to be 500,000 yr old, may have as much as 1.1 m of stratigraphic separation. On the basis of this information, the lowest slip-rate category is suggested for the KRFS.
<b>Date and Compiler(s)</b>	1994 Anthony J. Crone, U.S. Geological Survey, Emeritus
<b>References</b>	#693 McDowell, R.C., Grabowski, G.J., Jr., and Moore, S.L., 1981, Geologic map of Kentucky: U.S. Geological Survey in cooperation with The Eleventh Kentucky Geological Survey, 4 sheets, scale 1:250,000.  #684 VanArsdale, R.B., 1986, Quaternary displacement on faults within the Kentucky River fault system of east-central Kentucky: Geological Society of America Bulletin, v. 97, p. 1382-1392.

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