

A map showing the earthquake history of Kentucky from 1779 to 1976, including known dates, locations, and magnitudes of 86 earthquakes is now available from the U.S. Geological Survey, Department of the Interior.

The USGS map lists chronologically all recorded earthquakes occurring in the state prior to 1965 and those registering about 2.5 or higher on the Richter Scale since that time up to 1976.

According to Carl Stover, geophysicist at the USGS National Earthquake Information Service, Golden, Colo., "The western third of the state, including Mayfield, Madisonville and Hopkinsville, has been by far the most seismically active region, having experienced 57 quakes, about two thirds of the recorded total. The central third of the state, including Louisville, Lexington and Bowling Green, has had 16 quakes, while the eastern third, including Pikeville, Ashland and Hazard, has had 11 in the last 197 years."

Most of Kentucky's quakes are reported in terms of their intensity on the Modified Mercalli Intensity Scale (MM), which measures an earthquake's effects in a given area and is based on human observation of damages and other effects. On this scale, a minimum intensity of I is felt by only a few persons, and the maximum intensity of XII produces total destruction. The open-ended Richter Scale, on the other hand, is based on instrument readings of the amount of energy released by an earthquake. The 1906 San Francisco earthquake had a maximum intensity of XI and an estimated Richter magnitude of 8.3

Some highlights of the earthquake history of Kentucky compiled by Stover from the map and other sources:

- \* Kentucky has had 23 earthquakes of intensity V or over in its recorded history, the strongest being intensity VI. The most recent of the five intensity VI quakes to occur in the state was on January 19, 1976, and was centered about 20 miles east of Barbourville.
- \* One of the strongest quakes in the state occurred on September 2, 1925, near Henderson. The quake registered intensity VI and was felt over a 75,000-square-mile area, including parts of Kentucky, Illinois, Indiana and Tennessee.
- \* According to the map, some years have produced more than one earthquake in the state. For example, in the years 1854, 1919, 1925 and 1963, four quakes occurred in the state, and in 1842, 1883, 1898 and 1908 three quakes occurred.
- \* The last earthquake shown on the map occurred April 15, 1976, about 15 miles north of Greenville and registered intensity V. Two mild earthquakes have occurred in the state since the map was compiled.
- \* An earlier USGS report on seismic risk categorizes the southwestern corner of the state as an area in which major destructive earthquakes may occur and says the eastern and parts of north-central Kentucky can expect moderate damage from earthquakes.

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Copies of the 27x12-inch map with marginal text and tables, entitled "Seismicity Map of Kentucky," by C. W. Stover, B. G. Reagor, and S. T. Algermissen, and published as USGS Miscellaneous Field Studies Map MF-1144, may be purchased for 75 cents each from the Branch of Distribution, U.S. Geological Survey, 1200 South Eads St., Arlington, Va. 22202. Orders must include check or money order payable to the U.S. Geological Survey.

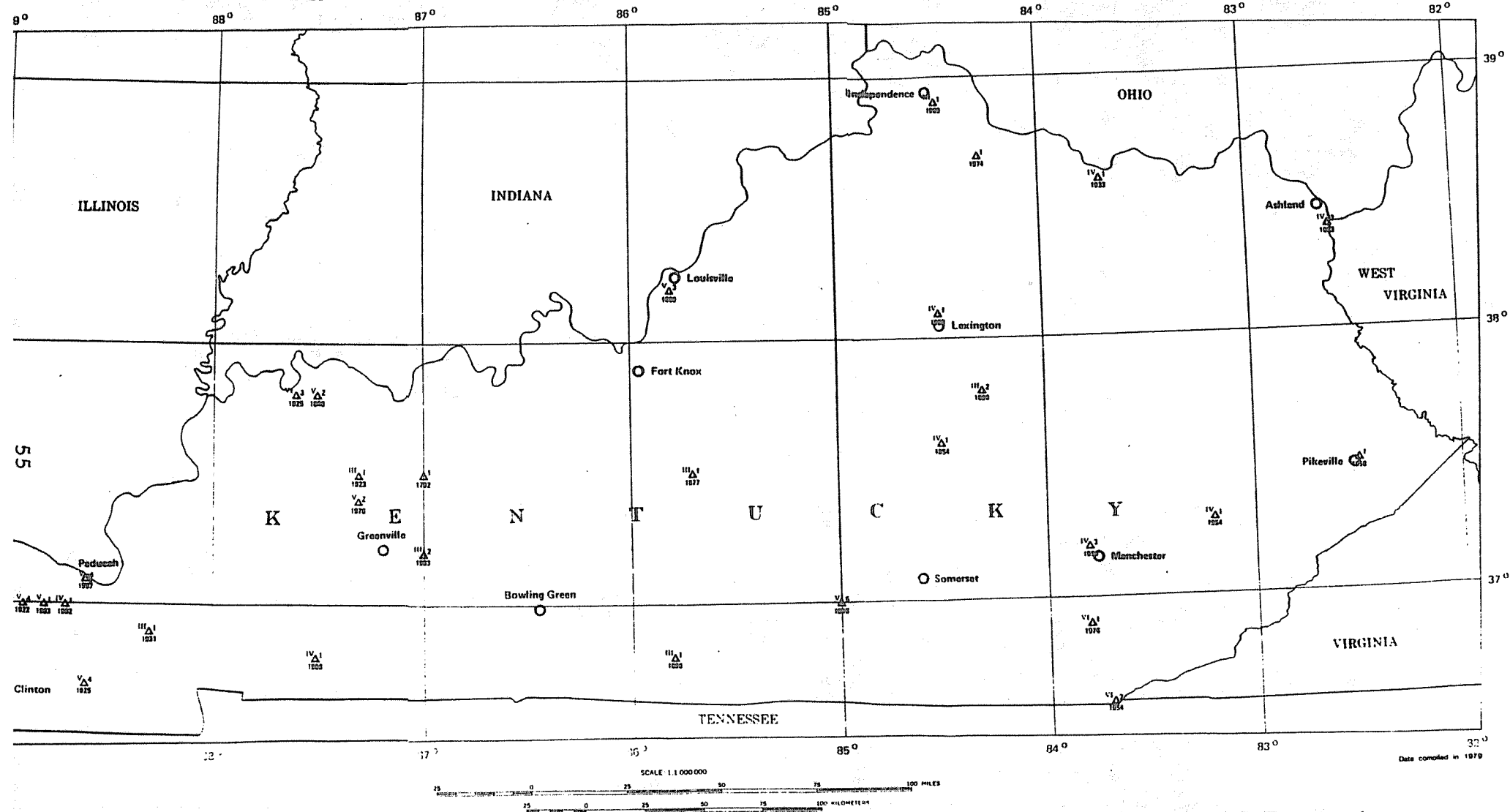
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# SEISMICITY MAP OF THE STATE OF KENTUCKY

DEPARTMENT OF THE INTERIOR  
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES  
MAP MF-1144  
SEISMICITY MAP, KENTUCKY



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1979

## INTRODUCTION

The earthquake data shown on this map and listed in table 1 are a list of earthquakes that were originally used in preparing the Seismic Risk Studies in the United States (Algermissen, 1969) which have been recompiled and updated through 1977. The data have been reexamined and intensities assigned where none had been assigned before, on the basis of available data. Other intensity values were updated from new and additional data sources that were not available at the time of original compilation. Some epicenters were relocated on the basis of new information. The data shown in table 1 are estimates of the most accurate epicenter, magnitude, and intensity of each earthquake, on the basis of historical and current information. Some of the aftershocks from large earthquakes are listed but are incomplete in many instances, especially for ones that occurred before seismic instruments were in universal usage.

The data in table 1 were used to compile the seismicity map. The latitude and longitude were rounded to the nearest tenth of a degree and sorted so that all identical locations were grouped together and counted. A triangle represents the epicenter plotted to a tenth of a degree. The number of earthquakes at each location is shown on the map by the number to the right of the triangle. A Roman numeral to the left of a triangle is the maximum Modified Mercalli intensity (Wood and Neumann, 1931) of all earthquakes located at that geographic position. The absence of an intensity value indicates that no intensities have been assigned to earthquakes at that location. A year shown below a triangle is the latest year for which the maximum intensity was recorded.

## EXPLANATION OF THE TABLES

The data are listed chronologically in table 1 in the following categories: date, origin time, N. latitude, W. longitude, depth, hypocenter quality and referenced data sources, magnitude, and intensity (Modified Mercalli) and intensity source references. Table 1 has some basic limitations in terms of the size (magnitude or intensity) of the earthquakes listed. Prior to 1965 all recorded felt earthquakes are listed, after 1965 only felt earthquakes or those with magnitudes above the 2.5-3.0 range are listed; the lower magnitude levels apply mostly to the eastern United States. The low magnitude events located in recent years with dense seismograph networks have not been included.

Listed below is an explanation of the symbols and codes used in the tables:

- Leaders (...) indicate information not available.
- Latitude and longitude are listed to a hundredth of a degree if they have been published with that degree of accuracy, or greater; however, most historical events have been published only to the nearest degree or tenth of a degree and are therefore listed at this accuracy in table 1. An asterisk (\*) to the right of the longitude indicates that the latitude and longitude were not given in the source reference, but were assigned by the compilers of the data file. An (x) to the right of the longitude indicates that the event is an explosion, a suspected explosion, rockburst, or a nontectonic event; these have not been plotted on the map.
- The letter code in the HYPOCENTER, QUAL column is defined below:
  - Determination of instrumental hypocenters are estimated to be accurate within the ranges of latitude and longitude listed below; each range is letter coded as indicated:
 

A	0.0°-0.1°
B	0.1°-0.2°
C	0.2°-0.5°
D	0.5°-1.0°
E	1.0° or larger
  - Determination of noninstrumental epicenters from felt data are estimated to be accurate within the ranges of latitude and longitude listed below; each range is letter coded as indicated:
 

F	0.0°-0.5°
G	0.5°-1.0°
H	1.0°-2.0°
I	2.0° or larger
- The reference identification numbers in the HYPOCENTER, REF and INTENSITY, REF columns indicate the sources of the hypocenter and intensity. They are listed in numerical order in table 2.
- The magnitudes listed under "USGS" are mb values (Gutenberg and Richter, 1956) published in the Preliminary Determination of Epicenters (PDE) by the National Earthquake Information Service, U. S. Geological Survey and predecessor organizations. Associated with the magnitude values listed under "OTHER" are the source code and type. Type is defined by 1 = ML (Richter, 1958), 2 = mBlg (Nuttli, 1973), 3 = MS (Bath, 1966), and 4 = mb (Gutenberg and Richter, 1956). The source codes are listed below:
 

BLA	- Virginia Polytechnic Institute and State University, Blacksburg, Va.
SLM	- St. Louis University, St. Louis, Mo.
- An asterisk (\*) in the INTENSITY, MH column indicates that the intensity was assigned by the compiler on the basis of the available data at the time the catalog was compiled.

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D A T E	ORIGIN TIME (UTC)	LAT. (N.)	LONG. (W.)	DEPTH (KM)	HYPOCENTER QUAL	REF	MAGNITUDE USGS	OTHER	INTENSITY MH	REF
1779	...	...	...	...	...	...	37.0	85.0	*	...
1792	APR 13	00	...	...	...	...	37.5	87.0	*	...
1817	DEC 12	...	...	...	...	...	37.0	85.0	*	...
1827	JUL 05	12	00	...	...	...	37.0	85.0	*	...
1834	NOV 20	19	40	...	...	...	37.0	85.0	*	...
1839	SEP 05	...	...	...	...	...	36.7	88.6	...	IV 109
1841	DEC 28	05	50	...	...	...	36.6	89.2	...	V 38
1842	MAR 28	05	00	...	...	...	36.6	89.2	...	IV 105
1842	NOV 04	06	30	...	...	...	36.6	89.2	...	V 105
1842	NOV 04	08	30	...	...	...	36.6	89.2	...	V 105
1843	JUN 13	15	00	...	...	...	36.6	89.2	...	III 65
1846	MAR 23	12	45	...	...	...	37.0	85.0	*	IV* 159
1849	JAN 24	...	...	...	...	...	36.6	89.2	...	IV* 159
1850	APR 05	02	05	...	...	...	38.2	85.8	...	IV* 159
1853	AUG 28	...	...	...	...	...	36.6	89.2	...	III 105
1853	DEC 18	...	...	...	...	...	36.6	89.2	...	IV* 105
1854	FEB 13	00	...	...	...	...	37.2	83.8	...	IV* 159
1854	FEB 13	06	00	...	...	...	37.2	83.8	*	IV* 159
1854	FEB 13	11	00	...	...	...	37.2	83.8	...	IV* 159
1854	FEB 28	...	...	...	...	...	37.6	84.5	...	IV 105
1857	NOV 09	...	...	...	...	...	36.6	89.2	*	IV* 159
1858	SEP 21	...	...	...	...	...	36.5	89.2	...	VI* 159
1860	AUG 07	15	30	...	...	...	37.8	87.5	...	V 105
1868	NOV 21	...	...	...	...	...	36.6	89.2	...	III 105
1869	FEB 20	...	...	...	...	...	38.1	84.5	...	IV 105
1869	DEC 14	...	...	...	...	...	36.6	89.2	...	III* 159
1872	MAR 26	...	...	...	...	...	37.1	88.6	...	III 66
1877	JUN 03	...	...	...	...	...	37.5	85.7	...	III 105
1878	MAR 12	10	00	...	...	...	36.8	89.1	...	V 38
1883	MAY 23	...	...	...	...	...	38.4	82.6	...	IV 105
1883	MAY 23	04	30	...	...	...	38.4	82.6	...	IV 105
1883	JUL 14	07	30	...	...	...	37.0	89.1	...	IV* 105
1898	MAR 30	01	30	...	...	...	36.8	85.8	...	III 66
1898	JUN 06	08	30	...	...	...	37.8	84.3	...	III 105
1898	JUN 26	08	30	...	...	...	37.8	84.3	...	III* 105
1908	DEC 27	...	...	...	...	...	37.0	89.0	...	IV 105
1908	DEC 27	21	15	...	...	...	36.8	87.5	...	IV 105
1908	DEC 31	...	...	...	...	...	37.0	88.9	...	III 67
1909	OCT 23	02	...	...	...	...	38.9	84.5	...	III* 105
1913	NOV 11	14	00	...	...	...	38.2	85.8	...	IV 105
1915	OCT 26	07	40	...	...	...	36.7	88.6	...	V 38
1915	DEC 07	18	40	...	...	...	36.7	89.1	...	V 109
1916	OCT 19	08	...	...	...	...	36.7	88.6	...	III 67
1916	DEC 19	05	42	...	...	...	36.6	89.2	...	VI* 109
1919	FEB 11	03	37	...	...	...	37.8	87.5	...	IV* 105
1919	MAY 23	12	30	...	...	...	36.6	89.2	...	III 67
1919	MAY 24	13	30	...	...	...	36.6	89.2	...	III 67
1919	MAY 28	11	30	...	...	...	36.6	89.2	...	III 67
1922	MAR 23	21	45	...	...	...	37.0	88.9	...	V 38
1923	NOV 28	12	30	...	...	...	37.5	87.3	...	III 67
1924	MAR 02	11	18	...	...	...	36.9	89.1	...	V 38
1924	APR 02	11	15	...	...	...	37.1	88.6	...	IV 109
1925	MAY 13	11	00	...	...	...	36.7	88.6	...	IV* 38
1925	SEP 02	11	55	...	...	...	37.8	87.6	...	VI 113
1925	SEP 20	09	00	...	...	...	37.8	87.6	*	IV 113
1925	SEP 20	11	00	...	...	...	37.8	87.6	...	III* 109
1928	APR 23	11	00	...	...	...	36.6	89.2	...	IV 109
1930	AUG 29	06	26	11	...	...	37.0	89.1	...	IV 113
1930	SEP 03	12	00	...	...	...	37.0	88.9	...	III 109
1930	SEP 04	05	30	...	...	...	37.0	88.9	...	III 109
1931	APR 01	23	20	09	...	...	36.9	88.3	...	III 105
1931	APR 06	15	37	03	...	...	36.9	89.0	...	IV 105
1933	MAY 28	15	10	...	...	...	38.6	83.7	...	IV 6
1936	AUG 02	22	15	...	...	...	36.7	89.0	...	III 105
1940	MAY 27	08	30	...	...	...	38.2	85.8	...	II* 13
1940	MAY 31	19	03	04	...	...	37.1	88.6	...	V 105
1941	OCT 21	16	53	...	...	...	37.0	89.1	...	IV 105
1943	APR 13	15	00	...	...	...	38.2	85.7	x	IV* 105
1954	JAN 01	02	30	...	...	...	37.3	83.2	...	IV 26
1954	JAN 02	03	25	...	...	...	36.6	83.7	...	VI 27
1957	JAN 25	18	15	...	...	...	36.6	83.7	...	IV 132
1957	MAR 26	08	27	06	...	...	37.1	88.6	...	V 30
1958	OCT 23	02	29	47.0	...	...	37.5	82.5	...	...
1962	FEB 16	...	...	...	...	...	37.0	88.7	...	...
1963	MAR 31	13	31	04	...	...	36.9	89.0	...	...
1963	AUG 03	00	37	50.3	...	...	37.0	88.8	018	C 36
1963	DEC 05	06	51	02.5	...	...	37.2	87.0	...	C 74
1963	DEC 15	05	31	32.9	...	...	37.2	87.0	...	D 74
1971	FEB 19	23	11	41.7	...	...	37.13	83.25x	000	C 74
1972	JUN 19	05	46	15.3	...	...	37.00	89.08	013	A 45
1972	JUN 19	16	15	18.8	...	...	37.00	89.08	013	A 45
1973	JAN 07	22	56	06.1	...	...	37.44	87.30	015	A 74
1974	JUN 05	00	16	40.4	...	...	38.60	84.77	015	C 74
1974	JUL 07	17	13	17.7	...	...	36.80	89.01	005	A 182
1976	JAN 19	06	20	39.5	...	...	36.88	83.82	005	A 91
1976	APR 15	07	03	34.9	...	...	37.41	87.31	015	B 85

Table 1.—Chronological Listing of Earthquakes for the State of Kentucky