



Table 1.—Chronological listing of earthquakes for the state of Nebraska

| DATE | ORIGIN TIME | LAT. | LONG. | DEPTH | HYPOCENTER | MAGNITUDE | INTENSITY |
|--|-------------|-----------|-----------|-------|------------|-----------|-----------|
| YEAR MONTH DAY | H M S (UTC) | | | (KM) | QUAL. REF. | (M) (Ms) | MM REF. |
| 1867 APR 26 | 12 00 00 | 40.7 N. | 95.9 W. | ... | H 185 | ... | IV 185 |
| 1872 OCT 09 | 16 00 00 | 42.7 N. | 97.0 W. | ... | G 253 | ... | V 38 |
| 1875 DEC 09 | 09 00 00 | 40.7 N. | 95.9 W. | ... | G 185 | ... | III 185 |
| 1877 NOV 15 | 17 45 00 | 41.0 N. | 97.0 W. | ... | G 185 | ... | VII 185 |
| Eastern Nebraska between Lincoln and Columbus. Damage was most severe at Columbus where the 38-second shock split the courthouse walls in 9 places and the school house walls were badly damaged. North Platte experienced multiple shocks which cracked walls and overturned printing cases. A wall cracked in a Sioux City, Iowa high school. Multiple shocks were felt. The estimated felt area was listed at 140,000 sq. mi. | | | | | | | |
| 1884 MAR 17 | 20 00 00 | 41.1 N. | 100.8 W. | ... | G 185 | ... | IV 185 |
| 1896 FEB 04 | 11 50 00 | 42.7 N. | 97.0 W. | ... | G 568 | ... | IV 568 |
| 1898 SEP 16 | 09 50 00 | 42.6 N. | 97.4 W. | ... | G 185 | ... | IV 185 |
| 1902 JUL 28 | 18 00 00 | 42.8 N. | 97.6 W. | ... | G 185 | ... | IV 185 |
| Battle Creek, Nebraska. Plaster cracked and one chimney was destroyed at Tilden, Nebraska. The felt area was listed at 35,000 sq. mi. | | | | | | | |
| 1904 DEC 01 | 09 00 00 | 41.8 N. | 96.7 W. | ... | G 185 | ... | III 185 |
| 1908 NOV 14 | 09 00 00 | 40.9 N. | 100.0 W. | ... | G 363 | ... | IV 363 |
| 1909 JAN 26 | 28 15 00 | 42.3 N. | 97.8 W. | ... | H 185 | ... | IV 185 |
| 1910 FEB 28 | 08 00 00 | 41.4 N. | 97.3 W. | ... | G 38 | ... | IV 38 |
| 1915 SEP 16 | 19 00 00 | 42.8 N. | 99.3 W. | ... | G 185 | ... | IV 185 |
| 1916 DEC 02 | 01 50 00 | 41.5 N. | 100.4 W. | ... | H 185 | ... | III 185 |
| 1923 SEP 10 | 06 30 00 | 41.7 N. | 96.2 W. | ... | G 185 | ... | III 185 |
| 1924 SEP 24 | 11 00 00 | 40.9 N. | 100.1 W. | ... | H 185 | ... | IV 185 |
| 1925 AUG 25 | 06 27 00 | 42.8 N. | 97.4 W. | ... | G 185 | ... | IV 185 |
| 1927 OCT 14 | 16 10 00 | 41.6 N. | 98.9 W. | ... | G 185 | ... | IV 185 |
| 1929 OCT 06 | 12 30 00 | 42.8 N. | 97.4 W. | ... | G 185 | ... | V 185 |
| 1933 AUG 08 | 06 00 00 | 41.9 N. | 103.7 W. | ... | G 185 | ... | IV 185 |
| 1934 MAY 11 | 10 40 00 | 41.5 N. | 98.8 W. | ... | G 185 | ... | IV 185 |
| 1934 JUL 30 | 07 20 00 | 42.7 N. | 103.0 W. | ... | G 38 | ... | VI 38 |
| Chadron, Nebraska. The shock damaged chimneys and caused plaster to fall, and objects to topple from shelves. The quake was felt in western Nebraska, and in adjacent portions of Wyoming and South Dakota. The felt area was estimated at 23,000 sq. mi. (Ref. 105). | | | | | | | |
| 1934 NOV 06 | 04 45 00 | 42.8 N. | 97.0 W. | ... | G 38 | ... | IV 185 |
| 1935 MAR 01 | 11 00 00 | 40.3 N. | 96.2 W. | ... | G 38 | ... | VI 38 |
| Tecumseh, Nebraska. Two shocks were felt about 4 minutes apart. The first shock was the stronger of the two. Many chimneys were reported cracked, some windows were broken, plaster cracked, a few walls cracked, and dishes were broken at Tecumseh. The felt area was estimated to be between 50,000 and 70,000 sq. mi. (Ref. 105). | | | | | | | |
| 1935 MAR 01 | 11 04 00 | 40.3 N. | 96.2 W. | ... | G 185 | ... | F 185 |
| 1935 MAR 22 | 22 45 00 | 40.3 N. | 96.2 W. | ... | G 185 | ... | III 185 |
| 1938 MAR 24 | 13 11 00 | 42.7 N. | 103.0 W. | ... | G 185 | ... | III 185 |
| 1948 APR 07 | 01 41 N. | 98.47 W. | ... | ... | G 185 | ... | III 185 |
| 1949 MAY 13 | 04 15 00 | 42.5 N. | 99.8 W. | ... | G 185 | ... | IV 185 |
| 1955 FEB 25 | 01 45 00 | 41.3 N. | 98.6 W. | ... | G 185 | ... | IV 185 |
| 1963 MAR 09 | 15 25 00 | 42.8 N. | 103.0 W. | ... | G 185 | ... | III 185 |
| 1963 JUN 06 | 02 47 00 | 40.7 N. | 96.2 W. | ... | G 253 | ... | III 253 |
| 1964 MAR 28 | 10 08 46.3 | 42.97N. | 101.789W. | 030 | B 349 | 5.1 | III 37 |
| Near Merriman, Nebraska. Corned goods fell from shelves, cracks appeared in the road, and some steep slopes slumped into the Niobrara River. The top part of a chimney fell at Alliance, Nebraska. A number of towns reported cracked or fallen plaster and broken dishes. The felt area was estimated at 90,000 sq. mi. (Ref. 105). An intensity of VI appears to be a more reasonable estimate. | | | | | | | |
| 1966 SEP 09 | 09 50 34.2 | 41.298N. | 98.814W. | 027 | B 349 | 3.1m | DG |
| 1972 OCT 16 | 05 47 32.5 | 42.44 N. | 99.56 W. | 025 | C 214 | 3.7 | 2.9m GOR |
| 1975 MAY 13 | 07 53 46.0 | 42.078N. | 98.503W. | 001 | B 349 | 4.3 | 3.3m DG |
| 1975 AUG 25 | 10 00 34.7 | 42.57 N. | 101.55 W. | 029 | C 214 | ... | 2.9m GOR |
| 1977 AUG 18 | 16 34 26.6 | 41.41 N. | 98.47 W. | 005 | B 305 | ... | 2.5m KGS |
| 1977 DEC 01 | 13 04 34.2 | 40.30 N. | 100.31 W. | 005 | B 305 | ... | 2.3m KGS |
| 1977 DEC 01 | 13 22 38.6 | 40.21 N. | 100.29 W. | 005 | B 305 | ... | 2.4m KGS |
| 1978 FEB 03 | 00 25 49.0 | 40.08 N. | 100.32 W. | 005 | C 239 | ... | 2.7m TUL |
| 1978 MAY 07 | 16 06 23.0 | 42.264N. | 101.949W. | 038 | A 349 | ... | 3.5m DG |
| 1978 MAY 20 | 01 53 44.7 | 40.11 N. | 100.32 W. | 005 | C 239 | ... | 2.9m TUL |
| 1978 SEP 04 | 00 07 N. | 100.28 W. | ... | ... | G 258 | ... | 2.9m KGS |
| 1979 APR 08 | 22 46 07.7 | 41.46 N. | 98.76 W. | 035 | C 214 | ... | 2.8m GS |
| 1979 JUN 06 | 16 16 22.4 | 40.14 N. | 100.41 W. | 002 | B 262 | ... | 2.7m GS |
| 1979 JUL 16 | 00 03 46.4 | 40.17N. | 100.32W. | 004 | C 349 | ... | 3.2m TUL |
| 1979 AUG 02 | 04 16 22.2 | 40.17 N. | 100.40 W. | 005 | B 262 | ... | 2.9m KGS |
| 1979 AUG 31 | 00 00 11.6 | 40.16 N. | 100.33 W. | 012 | B 262 | ... | 2.2m KGS |
| 1981 JUN 26 | 18 55 02.2 | 41.52 N. | 97.63 W. | 004 | B 325 | ... | 2.7m KGS |
| 1981 SEP 07 | 00 30 09.1 | 42.89 N. | 100.52 W. | 005 | B 325 | ... | 3.1m TUL |
| 1981 OCT 09 | 21 54 25.6 | 41.26 N. | 98.70 W. | 005 | B 325 | ... | 2.5m KGS |
| 1983 MAY 06 | 06 14 46.9 | 42.955N. | 102.198W. | 005 | D 368 | ... | 3.5m GS |
| 1987 JAN 01 | 00 02 24.0 | 42.708N. | 103.482W. | 005 | C 577 | ... | 3.5m GS |

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INTRODUCTION

This map is one of a series of seismicity maps produced by the U. S. Geological Survey that show earthquake data of individual states or groups of states at the scale of 1:1,000,000. This map shows only those earthquakes with epicenters located within the boundaries of Nebraska, even though earthquakes in nearby states or countries may have been felt or may have caused damage in Nebraska.

The data in table 1 were used to compile the seismicity map; these data are a corrected, expanded, and updated (through 1987) version of the data used by Algermissen (1969) for a study of seismic risk in the United States. The locations and intensities of some earthquakes were revised and intensities were assigned where none had been before. Many earthquakes were added to the original list from new data sources as well as from some old data sources that had not been previously used. The data in table 1 represent best estimates of the location of the epicenter, magnitude, and intensity of each earthquake on the basis of historical and current information. Some of the afterthoughts from large earthquakes are listed, but not all, especially for earthquakes that occurred before seismic instruments were universally used.

The latitude and longitude coordinates of each epicenter were rounded to the nearest tenth of a degree and sorted so that all identical locations were grouped and counted. These locations are represented on the map by a triangle. The number of earthquakes at each location is shown on the map by the arabic 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 at that geographic location. The absence of an intensity value indicates that no intensities have been assigned to earthquakes at that location. The year shown below each triangle is the latest year for which the maximum intensity was recorded.

EXPLANATION OF THE TABLE

The data in table 1 are listed chronologically in the following categories: date, origin time in Coordinated Universal Time (UTC), N. latitude, W. longitude, depth, hypocenter quality and reference, magnitude, intensity (Modified Mercalli), and intensity reference. The letter F is recorded in the intensity column if an earthquake was felt but not enough information was available to assign an intensity. Table 1 has some basic limitations in the size (magnitude or intensity) of the earthquakes listed. All felt earthquakes or earthquakes with magnitude greater than 2.5 are listed. If no magnitude was computed and the earthquake was felt or an epicenter published, it was included in the earthquake list. The low-magnitude events located in recent years with data from dense seismograph networks have not been included.

Listed below is an explanation of the symbols and codes used in table 1:

- 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 assigned locations based on felt or damage information and are listed in table 1 only to the nearest degree or tenth of a degree. 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, a rockburst, or some other nontectonic event; these have not been plotted on the map. A question mark (?) to the right of the longitude indicates that published descriptions of the event are inconclusive and it may or may not be an earthquake.
- The letter code in the HYPOCENTER, QUAL. column is defined below:
 - Determinations of instrumental hypocenters are estimated to be accurate within the ranges of latitude and longitude (in decimal degrees) 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 |

b. Determinations of noninstrumental epicenters from felt data are estimated to be accurate within the ranges of latitude and longitude (in decimal degrees) 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

- Not felt or, except rarely under especially favorable circumstances, under certain conditions, at and outside the boundary of the area in which great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway—doors may swing, very slowly.
- The reference identification numbers in the HYPOCENTER, REF and INTENSITY, REF columns indicate the sources of the hypocenter and intensity data. They are listed in numerical order in the list of data sources.
- The magnitudes (listed under USGS or mb (modified from Gutenberg and Richter, 1956) or Ms (Bath, 1966) values published in the Preliminary Determination of Epicenters (PDE) by the National Earthquake Information Center, 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, mb (Gutenberg and Richter, 1956), MD (duration or coda length), Mw (magnitude based on felt areas or attenuation), ML (Richter, 1958), Mn (Nuttli, 1973), Ms (Bath, 1966 or Gutenberg, 1945). Magnitudes computed solely from epicentral intensity have not been included. Moment magnitudes (M) are listed by value and source. The value was computed using the formula by Hanks and Kanamori (1979). The source codes are listed below:

- BAR = Borstow, N. L., Brill, K. G., Nuttli, O. W., and Pomeroy, P. W., 1981, An approach to seismic zoning for siting nuclear electric power generating facilities in the eastern United States, NUREG/CR-1577, Washington, D. C.
- DG = Dewey, J. W., and Gordon, D. W., 1984, U. S. Geological Survey, Miscellaneous Field Studies Map MF-1699 Pamphlet, 39 p.
- GOR = Gordon, G. W., 1983, Ph.D. dissertation, Saint Louis University, Mo., 197 p.
- GS = National Earthquake Information Center, U. S. Geological Survey (and predecessor organizations), Golden, Colo.
- KOS = Kansas Geological Survey, Lawrence, Kans.
- TUL = Oklahoma Geological Survey, Oklahoma Geological Survey, Leonard, Okla.

- An asterisk (*) in the INTENSITY, MM column indicates that the intensity was assigned by the compiler on the basis of the available data of the time the catalog was compiled.

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MODIFIED MERCALLI INTENSITY SCALE OF 1931
Adapted from Sieberg's Mercalli-Cancani scale,
modified and condensed (Wood and Neumann, 1931)

- Not felt or, except rarely under especially favorable circumstances, under certain conditions, at and outside the boundary of the area in which great shock is felt: sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway—doors may swing, very slowly.
- Felt indoors by few, especially on upper floors, or by sensitive or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.
- Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded, trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.
- Felt indoors by many, outdoors by few. Awakened few, especially light sleepers. Frightened no one, unless apprehensive from previous experiences. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, floors. The upper range of this grade. Hanging objects swing, in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.
- Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few—slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware to some extent. Cracked windows in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swung generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started, or ran fast or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes shaken slightly.
- Felt by all, indoors and outdoors. Frightened many, excitement general, some alarm, many ran outdoors. Awakened all. Persons made to move uneasily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang—church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especially fine cracks, chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knick-knacks, books, pictures, or crushed endives, in many instances. Moved furnishings of moderately heavy kind.
- Frightened all—general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up, invading to some extent of sand or gravel stream banks. Rang large church bells, etc. Shaken objects made to fly. Overturned negligible or ordinary buildings, considerable in poorly built or badly designed buildings, adobe

SEISMICITY MAP OF THE STATE OF NEBRASKA

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1991



M(200)
MF
no. 1350, 199
c. 1

