

Map 69
2004

EARTHQUAKE CATALOG OF PENNSYLVANIA

compiled by
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COMMONWEALTH OF PENNSYLVANIA
Edward G. Rendell, Governor
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Michael DiBerardinis, Secretary
OFFICE OF CONSERVATION AND ENGINEERING SERVICES
Richard G. Sprenkle, Deputy Secretary
BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY
Jay B. Parrish, Director

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EARTHQUAKE CATALOG OF PENNSYLVANIA

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS	VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source			m-lat	m-long	m-mag
1e	1724/08/16	9	30		500	M	single	39.95	-75.16	3.6			IV		39.95	-75.16	
2e	1737/12/08	3	58		501	M	single	39.9	-75.4				IV		39.9	-75.4	
3e	1752/12/17	23			502	M	single	39.98	-75.9				IV		39.98	-75.9	3.6
4e	1755/11/27	1			500	M	single	39.95	-75.16				III		39.95	-75.16	
5e	1758/03/23	3	30		500	M	single	39.95	-75.16				III		39.95	-75.16	
6e	1763/03/22				503	M	single(?)	39.9	-75.3				III		39.9	-75.3	
7e	1763/10/30	21	15		500	M	single(?)	39.95	-75.16				V		39.95	-75.16	
8e	1772/04/25	13			500	M	single	39.95	-75.16				II		39.95	-75.16	
9e	1777/11/22				500	M	1777/11/22	39.95	-75.16				III		39.95	-75.16	
10e	1777/11/23				503	A	1777/11/22	39.9	-75.3				III		39.9	-75.3	
11e	1780/11/29				500	M	single	39.95	-75.16	4.7			III		39.95	-75.16	
12e	1783/11/30a	2			158	F	1783/11/30b	41	-74.5				IV		41	-74.504	4.7
13e	1783/11/30b	3	50		158	M	1783/11/30b	41	-74.5				VI		41	-74.504	4.7
14e	1783/11/30c	7			158	A	1783/11/30b	41	-74.5				IV		41	-74.504	4.7
15e	1798/01/11	7			504	M	single	40.038	-76.306				IV		40.038	-76.306	
16e	1800/03/17				500	M	single	39.95	-75.16				V		39.95	-75.16	
17e	1800/11/20	10			3	M	single	40.12	-76.39		4.1		V		40.11	-76.395	4.1
18e	1800/11/29				500	M	single	39.95	-75.16				IV		39.95	-75.16	
19e	1801/01/27	20	40		504	M	single	40.038	-76.306				IV		40.038	-76.306	
20e	1801/11/12				500	M	single	39.95	-75.16				III		39.95	-75.16	
21e	1811/12/09	1			500	M	1811/12/09	39.95	-75.16	3.4			III		39.95	-75.16	
22e	1811/12/16	8			500	A	1811/12/09	39.95	-75.16				III		39.95	-75.16	
23e	1818/03/19	9			504	M	single	40.038	-76.306				III		40.038	-76.306	
24e	1820/08/21	13	40		506	M	single	40.03	-76.5				V		40.03	-76.5	3.4
25e	1820/08/27	7	30		700	M	single	39.54	-76.35				V		39.54	-76.35	
26e	1822/05/04				504	M	single	40.038	-76.306						40.038	-76.306	
27e	1823/05/30				701	M	single	41.5	-81		3.2		IV		41.5	-81	3.2
28e	1824/07/15	16	20		702	M	single	39.7	-80.5		4.1		IV		39.7	-80.5	4.1
29e	1829/09/06	1	45		504	M	single	40.038	-76.306				III		40.038	-76.306	
30e	1834/02/05	4	30		507	M	single	39.9	-76.18		4.0		V		39.9	-76.18	4.0
31e	1840/11/11				500	M	1840/11/11	39.95	-75.16	2.7			V		39.95	-75.16	
32e	1840/11/14				500	A	1840/11/11	39.95	-75.16						39.95	-75.16	
33e	1841/01/12	5	30		713	M	single	40.79	-74.25						40.807	-74.267	
34e	1846/10/19	2			703	M	single	39.3	-77.9						39.3	-77.9	2.7
35e	1852/09/15				508	M	single	41.63	-80.17		3.7				41.63	-80.17	3.7
36e	1857/02/10	23	30		205	M	single	40.08	-74.75		3.1				40.07	-74.731	3.1
37e	1857/02/27	20	30		725	M	single	42.22	-81.05		3.9		V		42.22	-81.05	3.9
38e	1857/03/01	1	40		705	M	single	41.8	-80.6		3.3		IV		41.8	-80.6	3.3
39e	1865/09/17				4	M	single	39.9	-76.3						39.907	-76.304	3.1
40e	1866/11/07				504	M	single	40.038	-76.306						40.038	-76.306	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
1e	1724/08/16	Philadelphia area	Philadelphia	PA	14	1755/11/27 to 1840/11/14	Gordon and Dewey (1999)
2e	1737/12/08	Media area	Delaware	PA	1	none	Gordon and Dewey (1999)
3e	1752/12/17	Sadsburyville area	Chester	PA	1	none	Gordon and Dewey (1999)
4e	1755/11/27	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
5e	1758/03/23	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
6e	1763/03/22	Darby area	Delaware	PA	2	1777/11/23	SRA (1981)
7e	1763/10/30	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	Gordon and Dewey (1999)
8e	1772/04/25	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
9e	1777/11/22	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
10e	1777/11/23	Darby area	Delaware	PA	2	1763/03/22	SRA (1981)
11e	1780/11/29	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
12e	1783/11/30a	Green Pond	Morris	NJ	4	1783/11/30b,c; 1990/01/26	Gordon and Dewey (1999)
13e	1783/11/30b	Green Pond	Morris	NJ	4	1783/11/30a,c; 1990/01/26	Gordon and Dewey (1999)
14e	1783/11/30c	Green Pond	Morris	NJ	4	1783/11/30a,b; 1990/01/26	Gordon and Dewey (1999)
15e	1798/01/11	Lancaster area	Lancaster	PA	7	1801/01/27 to 1885/03/09	Gordon and Dewey (1999)
16e	1800/03/17	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
17e	1800/11/20	Landisville	Lancaster	PA	2	1995/03/11a	Gordon and Dewey (1999)
18e	1800/11/29	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
19e	1801/01/27	Lancaster area	Lancaster	PA	7	1798/01/11 to 1885/03/09	Gordon and Dewey (1999)
20e	1801/11/12	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
21e	1811/12/09	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
22e	1811/12/16	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	SRA (1981)
23e	1818/03/19	Lancaster area	Lancaster	PA	7	1798/01/11 to 1885/03/09	Armbruster and Seeber (1987)
24e	1820/08/21	Columbia	Lancaster	PA	1	none	Gordon and Dewey (1999)
25e	1820/08/27	Bel Air	Harford	MD	1	none	Gordon and Dewey (1999)
26e	1822/05/04	Lancaster area	Lancaster	PA	7	1798/01/11 to 1885/03/09	Scharnberger (2003)
27e	1823/05/30	Warren area	Trumbull	OH	1	none	Gordon and Dewey (1999)
28e	1824/07/15	Littleton	Wetzel	WV	1	none	CEUS (1996)
29e	1829/09/06	Lancaster area	Lancaster	PA	7	1798/01/11 to 1885/03/09	Scharnberger (2003)
30e	1834/02/05	Quarryville	Lancaster	PA	1	none	Gordon and Dewey (1999)
31e	1840/11/11	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/14	Gordon and Dewey (1999)
32e	1840/11/14	Philadelphia area	Philadelphia	PA	14	1724/08/16 to 1840/11/11	SRA (1981)
33e	1841/01/12	Orange	Essex	NJ	3	1937/09/30, 1938/12/06	NCEER (1985)
34e	1846/10/19	Martinsburg	Jefferson	WV	1	none	VTSO (1999)
35e	1852/09/15	Meadville	Crawford	PA	1	none	Scharnberger (2003)
36e	1857/02/10	Columbus	Burlington	NJ	3	1987/12/06, 1999/05/31	CEUS (1996)
37e	1857/02/27	Lake Erie	Lake	OH	1	none	OhioSeis (2003)
38e	1857/03/01	Ashtabula area	Ashtabula	OH	1	none	Gordon and Dewey (1999)
39e	1865/09/17	Martic Forge	Lancaster	PA	2	1978/07/16	Gordon and Dewey (1999)
40e	1866/11/07	Lancaster area	Lancaster	PA	7	1798/01/11 to 1885/03/09	Scharnberger (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
1e 2e 3e 4e 5e 6e 7e 8e 9e 10e	SRA (1987) SRA (1987) Armbruster and Seeber (1987)	Scharnberger (2003)	CEUS (1996)		
11e 12e 13e 14e 15e 16e 17e 18e 19e 20e	NCEER (1985) NCEER (1985) NCEER (1985) Armbruster and Seeber (1987) Armbruster and Seeber (1987) Scharnberger (2003)	Stover and others (1987a) Stover and others (1987a) Stover and others (1987a) Scharnberger (2003) Scharnberger (2003)	Dombroski (1992) CEUS (1996)	SRA (1987)	NCEER (1985)
21e 22e 23e 24e 25e 26e 27e 28e 29e 30e	Dombroski (1992) Scharnberger (2003) Armbruster and Seeber (1987) NCEER (1985) NCEER (1992) Armbruster and Seeber (1987) Scharnberger (2003)	Scharnberger (2003) Stover and others (1987) VTSO (1999) Armbruster and Seeber (1987)	NCEER (1985) NCEER (1992)	OhioSeis (2003) CEUS (1996)	NCEER (1985)
31e 32e 33e 34e 35e 36e 37e 38e 39e 40e	SRA (1987) NCEER (1992) NCEER (1985) CEUS (1996) Scharnberger (2003)	NCEER (1985) NCEER (1985) NCEER (1992)	NCEER (1985)	Stover and others (1987)	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
1e 2e 3e 4e 5e 6e 7e 8e 9e 10e	Gordon and Dewey (1999) lists 1737/12/19; 3h 45m 0s; 40.8 N, 74.00 W; 5.0 magnitude.
11e 12e 13e 14e 15e 16e 17e 18e 19e 20e	
21e 22e 23e 24e 25e 26e 27e 28e 29e 30e	NCEER (1985) lists 3.7 ML. CEUS (1996) lists 22h, 30m; 39.85 N, 71.14 W; 3.8 magnitude.
31e 32e 33e 34e 35e 36e 37e 38e 39e 40e	NCEER (1985) lists 4.0 MB.

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS	VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source			m-lat	m-long	m-mag
41e	1871/10/09	14	40		706	M	1871/10/09	39.7	-75.5	4.1			VII		39.7	-75.5	4.1
42e	1871/10/10	5	8		706	A	1871/10/09	39.7	-75.5				IV		39.7	-75.5	4.1
43e	1873/08/17	14			509	M	single	41.2	-80.5				III		41.2	-80.5	
44e	1877/01/04	4	30		707	M	single	39.5	-77.3				V		39.5	-77.3	
45e	1877/09/10	14	59		206	M	single	40.1	-74.8	3.2			IV		40.102	-74.801	3.2
46e	1883/03/11	23	57		709	M	single	39.5	-76.4	3.1			IV		39.5	-76.4	3.1
47e	1883/03/12	5			709	A	single	39.5	-76.4	2.7			III		39.5	-76.4	3.1
48e	1884/05/31				510	M	single	40.6	-75.47				V		40.6	-75.47	
49e	1885/01/15	9	10	11	527	M	single	40.3	-76.3						40.3	-76.3	
50e	1885/03/09	1			504	M	single	40.038	-76.306				IV		40.038	-76.306	
51e	1885/08/15	4	5	6	726	M	single	41.3	-81.1	3.2	mb				41.3	-81.1	3.2
52e	1886/09/27	23	21		511	M	1886/09/27	40	-76.47				IV		40	-76.47	
53e	1886/09/29	3			512	A	1886/09/27	40.17	-76.63				IV		40.17	-76.63	
54e	1887/01/03	4	30		900	Q	quarry blast	39.6	-77.2	3.4			V		39.6	-77.2	3.4
55e	1889/03/08	23	40		513	M	single	40	-76.55	4.3			VI		40	-76.55	4.3
56e	1890/12/15	13			519	M	single	41.41	-80.39	2.9			II		41.405	-80.395	2.9
57e	1895/09/01	11	9		710	M	single	40.7	-74.8	4.5			VI		40.7	-74.8	4.5
58e	1895/11/20	8			107	M	single	39.8	-75.6				IV		39.796	-75.596	3.3
59e	1900/04/29	0	7		711	M	single	39.9	-75.1				IV		39.9	-75.1	
60e	1906/05/28	22	30		514	M	single	40.2	-75.8				III		40.2	-75.8	
61e	1907/01/10	9	45		523	M	single	41.2	-77.1						41.2	-77.1	
62e	1908/05/31	17	42		515	M	single	40.6	-75.5	3.1			VI		40.6	-75.5	3.3
63e	1909/04/02	7	25		712	M	single	39.4	-78	3.5					39.4	-78	3.5
64e	1921/01/26	23	40		714	M	single	40	-75	3.3			V		40	-75	3.5
65e	1921/09/27	4	32		516	M	single	42.1	-80.1	2.9			III		42.1	-80.1	2.9
66e	1923/10/30	18			715	M	single	39.3	-74.5				IV		39.3	-74.5	
67e	1926/01/26	23	40		714	M	single	40	-75	3.5					40	-75	3.5
68e	1927/10/29				189	M	single	40.9	-81.2	4.2	mb				40.895	-81.21	4.2
69e	1928/06/22				515	M	single	40.6	-75.5				III		40.6	-75.5	3.3
70e	1929/08/12	6			727	M	single	42.2	-77.2						42.2	-77.2	
71e	1930/02/16	12	17		704	M	single	42.5	-80.31	3.0	ML		III		42.5	-80.31	3.0
72e	1933/01/25	2			716	M	single	40.2	-74.7	3.3			V		40.2	-74.7	3.3
73e	1934/10/29	20	7		517	M	1934/10/29	42.2	-80.2	3.2			V		42.2	-80.2	3.2
74e	1934/11/05	20			518	A	1934/10/29	41.9	-80.4				III		41.9	-80.4	
75e	1936/08/26	9	55		519	M	single	41.4	-80.4	2.9			IV		41.405	-80.395	2.9
76e	1937/03/25	14	54		525	M	single	40.9	-78.2						40.9	-78.2	
77e	1937/06/09	0	4		40	M	single	40.34	-75.93				II		40.353	-75.942	2.7
78e	1937/09/30	22	8	22	713	M	single	40.83	-74.25				III		40.807	-74.267	
79e	1937/12/03	12	15	0	706	M	single	39.7	-75.5	2.8			IV-V		39.7	-75.5	4.1
80e	1938/07/15	22	46	12	520	M	single	40.37	-78.23	3.3	mbLg		VI	1	40.37	-78.23	3.3

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
41e	1871/10/09	Deepwater	Salem	NJ	3	1871/10/10, 1937/12/03	Gordon and Dewey (1999)
42e	1871/10/10	Deepwater	Salem	NJ	3	1871/10/09, 1937/12/03	Gordon and Dewey (1999)
43e	1873/08/17	Sharon area	Mercer	PA	1	none	Scharnberger (2003)
44e	1877/01/04	Libertytown	Frederick	MD	1	none	Gordon and Dewey (1999)
45e	1877/09/10	Roebbing	Burlington	NJ	2	1986/09/15b	Gordon and Dewey (1999)
46e	1883/03/11	Bel Air area	Harford	MD	2	none	Gordon and Dewey (1999)
47e	1883/03/12	Bel Air area	Harford	MD	2	none	VTSO (1999)
48e	1884/05/31	Allentown	Lehigh	PA	1	none	Gordon and Dewey (1999)
49e	1885/01/15	Schaefferstown	Lebanon	PA	1	none	SRA (1981)
50e	1885/03/09	Lancaster area	Lancaster	PA	7	1798/01/11 to 1866/11/07	Gordon and Dewey (1999)
51e	1885/08/15	Garrettsville	Portage	OH	1	none	NCEER (1985)
52e	1886/09/27	Washington Boro	Lancaster	PA	1	none	NCEER (1992)
53e	1886/09/29	Elizabethtown	Lancaster	PA	1	none	Scharnberger (2003)
54e	1887/01/03	Union Bridge	Carroll	MD	1	none	Gordon and Dewey (1999)
55e	1889/03/08	Wrightsville	York	PA	1	none	Gordon and Dewey (1999)
56e	1890/12/15	Greenville	Mercer	PA	2	1936/08/26	OhioSeis (2003)
57e	1895/09/01	Mountainville	Hunterdon	NJ	1	none	Gordon and Dewey (1999)
58e	1895/11/20	Centerville	New Castle	DE	3	1974/04/28, 1998/10/27	Gordon and Dewey (1999)
59e	1900/04/29	Gloucester City	Camden	NJ	1	none	Gordon and Dewey (1999)
60e	1906/05/28	Geigertown	Berks	PA	1	none	Scharnberger (2003)
61e	1907/01/10	SW of Williamsport	Lycoming	PA	1	none	NCEER (1985)
62e	1908/05/31	Allentown	Lehigh	PA	3	1928/06/22, 1951/11/23	Scharnberger (2003)
63e	1909/04/02	Martinsburg	Berkeley	WV	1	none	CEUS (1996)
64e	1921/01/26	Cinnaminson	Burlington	NJ	2	1926/01/26	Gordon and Dewey (1999)
65e	1921/09/27	Erie	Erie	PA	1	none	Scharnberger (2003)
66e	1923/10/30	Margate	Atlantic	NJ	1	none	Gordon and Dewey (1999)
67e	1926/01/26	Cinnaminson	Burlington	NJ	2	1921/01/26	CEUS (1996)
68e	1927/10/29	Alliance	Stark	OH	2	2000/08/07	NCEER (1985)
69e	1928/06/22	Allentown	Lehigh	PA	3	1908/05/31, 1951/11/23	Scharnberger (2003)
70e	1929/08/12	Campbell	Steuben	NY	1	none	NCEER (1985)
71e	1930/02/16	Lake Erie, N of Fairview	Haldimand-Norfolk	ON	1	none	NCEER (1985)
72e	1933/01/25	White Horse (Trenton)	Mercer	NJ	1	none	Gordon and Dewey (1999)
73e	1934/10/29	Lake Erie	Erie	PA	1	none	Gordon and Dewey (1999)
74e	1934/11/05	Albion	Erie	PA	1	none	Scharnberger (2003)
75e	1936/08/26	Greenville	Mercer	PA	2	1890/12/15	Gordon and Dewey (1999)
76e	1937/03/25	Philipsburg	Centre	PA	1	none	NCEER (1985)
77e	1937/06/09	Reading	Berks	PA	3	1995/06/04, 1999/10/22	Scharnberger (2003)
78e	1937/09/30	Verona	Essex	NJ	3	1841/01/12, 1938/12/06	NCEER (1985)
79e	1937/12/03	Deepwater	Salem	NJ	3	1871/10/09, 1871/10/10	DGS (2000)
80e	1938/07/15	Entriiken	Blair	PA	1	none	Gordon and Dewey (1999)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
41e	CEUS (1996)	NCEER (1992)	DGS (2000), VTSO (1999)	Dombroski (1992)	Stover and others (1987a)
42e	Stover and others (1987a)				
43e	SRA (1987)				
44e					
45e	CEUS (1996)	NCEER (1992)	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)
46e	CEUS (1996)	NCEER (1992)	VTSO (1999)	Reger (1999)	NCEER (1985)
47e	Reger (1999)	NCEER (1985)			
48e	Scharnberger (2003)	SRA (1987)	NCEER (1985)		
49e	Scharnberger (2003)	NCEER (1985)			
50e	Scharnberger (2003)	NCEER (1992)	SRA (1987)		
51e	Stover and others (1987)				
52e					
53e	NCEER (1992)				
54e					
55e	Scharnberger (2003)	CEUS (1996)	NCEER (1992)	NCEER (1985)	Stover and Coffman (1993)
56e					
57e	CEUS (1996)	NCEER (1992)	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)
58e					
59e					
60e	SRA (1987)	Stover, Minsch, Person, and Smith (1981)			
61e					
62e	CEUS (1996)	NCEER (1992)	SRA (1987)	NCEER (1985)	Stover and Coffman (1993)
63e	NCEER (1992)	VTSO (1999)	NCEER (1985)		
64e	CEUS (1996)	NCEER (1992)	NCEER (1985)	SRA (1987)	Dombroski (1992)
65e	SRA (1987)	NCEER (1985)	OhioSeis (2003)	NCEER (1992)	
66e					
67e	NCEER (1992)	NCEER (1985)	Stover and others (1987a)		
68e					
69e	SRA (1987)	NCEER (1985)	NCEER (1992)		
70e	Stover and others (1987b)				
71e	OhioSeis (2003)				
72e	CEUS (1996)	NCEER (1992)	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)
73e	Scharnberger (2003)	CEUS (1996)	OhioSeis (2003)	SRA (1987)	NCEER (1985)
74e	SRA (1987)				
75e	Scharnberger (2003)	SRA (1987)	NCEER (1985)	OhioSeis (2003)	
76e					
77e	SRA (1987)				
78e	Stover and others (1987a)	Dombroski (1992)			
79e					
80e	Scharnberger (2003), NCEER (1985)	CEUS (1996), Landsberg (1938)	NCEER (1992)	SRA (1987)	Stover and Coffman (1993)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
41e 42e 43e 44e 45e 46e 47e 48e 49e 50e	
51e 52e 53e 54e 55e 56e 57e 58e 59e 60e	<p>Stover and Coffman (1993) lists 3.9 Mfa. CEUS (1996) lists 40.0 N, 76.0 W; 4.1 magnitude. Newspaper accounts suggest epicenter was farther to the west (C. K. Scharnberger, personal commun., 1999).</p> <p>CEUS (1996) lists 40.46 N, 74.3 W; 4.3 magnitude.</p>
61e 62e 63e 64e 65e 66e 67e 68e 69e 70e	<p>CEUS (1996) lists 40.01 N, 74.91 W; 3.2 magnitude.</p>
71e 72e 73e 74e 75e 76e 77e 78e 79e 80e	<p>OhioSeis (2003) lists 2.9 magnitude.</p> <p>NCEER (1985) lists 4.0 ML.</p> <p>OhioSeis (2003) lists III Felt Intensity.</p> <p>Landsberg (1938) had epicenter (intensity-based) as 40.37 N, 78.23 W (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). CEUS (1996) lists 40.68 N, 78.43 W; 3.2 magnitude.</p>

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source		FOCUS		m-lat	m-long	m-mag
81e	1938/08/23a	3	36	31	717	M	1938/08/23a	40.13	-74.53	3.9	mbLg		V	14		40.13	-74.527	3.9
82e	1938/08/23b	5	4	53	717	A	1938/08/23a	40.13	-74.53	3.8			V	21		40.13	-74.527	3.9
83e	1938/08/23c	7	3	29	717	A	1938/08/23a	40.13	-74.53	3.7	mbLg		IV	3		40.13	-74.527	3.9
84e	1938/12/06	19	38		713	M	single	40.8	-74.3				III			40.807	-74.267	
85e	1939/06/22	23	10		719	F	1939/11/26	39.5	-76.6	2.7						39.5	-76.6	3.5
86e	1939/11/15	2	53	48	718	M	single	39.58	-75.05	3.8			V	3		39.58	-75.05	3.8
87e	1939/11/18	2	33		719	F	1939/11/26	39.5	-76.6	3.1			IV			39.5	-76.6	3.5
88e	1939/11/26	5	20		719	M	1939/11/26	39.5	-76.6	3.5			V			39.5	-76.6	3.5
89e	1940/09/27				521	M	single	41.6	-75.7				II			41.6	-75.7	
90e	1942/10/24	17	27		522	M	single	41	-75.2	3.4	ML					41	-75.2	3.4
91e	1944/01/08				720	M	single	39.8	-75.5	3.2			V			39.8	-75.5	3.2
92e	1944/02/05	16	22		906	M	single	40.8	-76.2	3.7	ML					40.8	-76.2	3.7
93e	1946/10/28	20	36		524	M	single	41.5	-76.6	3.6	ML					41.5	-76.6	3.6
94e	1947/04/01	13	25	54	708	M	single	41	-74.28				III			41	-74.28	
95e	1950/03/20	22	55		905	M	single	41.5	-75.8	3.3	ML					41.5	-75.8	3.4
96e	1951/11/23	6	45		515	M	single	40.6	-75.5	3.3			IV			40.6	-75.5	3.3
97e	1954/01/07a	7	25		526	M	1954/01/07a	40.42	-76.02	3.2			VI			40.42	-76.02	3.2
98e	1954/01/07b	8			57	A	1954/01/07a	40.3	-76				II			40.295	-76.004	3.3
99e	1954/01/07c	19	34		526	A	1954/01/07a	40.42	-76.02				V			40.42	-76.02	3.2
100e	1954/01/24	3	30		57	A	1954/01/07a	40.28	-76.03							40.295	-76.004	3.3
101e	1954/02/21	20			901	Q	mine collapse	41.24	-75.89				VII			41.24	-75.89	
102e	1954/02/24	3	55		901	Q	mine collapse	41.24	-75.89				VI			41.24	-75.89	
103e	1954/08/11	3	40		57	M	1954/08/11	40.3	-76	3.3			IV			40.295	-76.004	3.3
104e	1954/09/24	11			57	A	1954/08/11	40.3	-76				IV			40.295	-76.004	3.3
105e	1955/01/20	3			57	A	1954/08/11	40.3	-76				IV			40.295	-76.004	3.3
106e	1957/03/23	19	2		721	M	single	40.63	-74.83	3.5			VI			40.63	-74.83	3.5
107e	1960/01/22	20	53	22	907	M	single	41.5	-75.5	3.4						41.5	-75.5	3.4
108e	1961/09/15	2	16	56	529	M	single	40.6	-75.4	4.3			V			40.6	-75.4	4.3
109e	1961/12/27	17	6		530	M	single	40.1	-74.9	3.3			V			40.1	-74.9	3.3
110e	1962/09/04	23	40		722	M	single	39.5	-77.7	3.3			IV			39.5	-77.7	3.3
111e	1962/09/07	14	0		902	Q	quarry blast	39.7	-78.2	3.3						39.658	-78.208	3.6
112e	1963/03/02	20	24		905	Q	quarry blast	41.5	-75.8	3.4	ML		V			41.5	-75.8	3.4
113e	1963/10/10	14	59	52.3	902	Q	quarry blast	39.655	-78.197	3.6						39.658	-78.208	3.6
114e	1964/02/13	19	46		903	Q	quarry blast	40.38	-77.96	3.3	mbLg			1		40.393	-77.96	3.3
115e	1964/05/12	6	45		505	M	single	40.298	-76.411	3.2	mbLg		VI	1		40.298	-76.411	3.2
116e	1964/06/16				723	M	single	40.9	-74.3	3.3						40.9	-74.3	3.3
117e	1965/09/29	20	57		724	M	single	41.4	-74.4	3.3						41.4	-74.4	3.3
118e	1965/10/08	2	17		528	M	single	40.1	-79.7	3.3	ML					40.1	-79.7	3.3
119e	1966/09/28				100	M	single	39.3	-80.3	3.1			IV			39.3	-80.3	3.1
120e	1968/12/10	9	12	48	101	M	single	39.92	-74.82	3.0			V			39.92	-74.82	3.0

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
81e	1938/08/23a	Cream Ridge	Monmouth	NJ	4	1938/08/23b,c; 1986/09/15a	Gordon and Dewey (1999)
82e	1938/08/23b	Cream Ridge	Monmouth	NJ	4	1938/08/23a,c; 1986/09/15a	Gordon and Dewey (1999)
83e	1938/08/23c	Cream Ridge	Monmouth	NJ	4	1938/08/23a,b; 1986/09/15a	Gordon and Dewey (1999)
84e	1938/12/06	Livingston	Essex	NJ	3	1841/01/12, 1937/09/30	NCEER (1985)
85e	1939/06/22	Cockeysville	Baltimore	MD	3	1939/11/18, 1939/11/26	Reger (1999)
86e	1939/11/15	Folsom	Gloucester	NJ	1	none	Gordon and Dewey (1999)
87e	1939/11/18	Cockeysville	Baltimore	MD	3	1939/06/22, 1939/11/26	Gordon and Dewey (1999)
88e	1939/11/26	Cockeysville	Baltimore	MD	3	1939/06/22, 1939/11/18	Gordon and Dewey (1999)
89e	1940/09/27	Fleetville	Lackawanna	PA	1	none	SRA (1987)
90e	1942/10/24	Bartonsville	Monroe	PA	1	none	CEUS (1996)
91e	1944/01/08	Bellefonte	New Castle	DE	1	none	Gordon and Dewey (1999)
92e	1944/02/05	Shenandoah	Schuylkill	PA	1	none	CEUS (1996)
93e	1946/10/28	Forksville	Sullivan	PA	1	none	CEUS (1996)
94e	1947/04/01	Pompton Lakes	Passaic	NJ	1	none	NCEER (1985)
95e	1950/03/20	Mill City	Wyoming	PA	2	1963/03/02	CEUS (1996)
96e	1951/11/23	Allentown	Lehigh	PA	3	1908/05/31, 1928/06/22	Scharnberger (2003)
97e	1954/01/07a	Mount Pleasant	Berks	PA	2	1954/01/07c	Gordon and Dewey (1999)
98e	1954/01/07b	Mohnton	Berks	PA	7	1954/01/24 to 1955/01/20, 1993/05/18a, 1995/01/08	Scharnberger (2003)
99e	1954/01/07c	Mount Pleasant	Berks	PA	2	1954/01/07a	Gordon and Dewey (1999)
100e	1954/01/24	Mohnton	Berks	PA	7	1954/01/07b to 1955/01/20, 1993/05/18a, 1995/01/08	NCEER (1985)
101e	1954/02/21	Wilkes-Barre	Luzerne	PA	2	1954/02/24	SRA (1981)
102e	1954/02/24	Wilkes-Barre	Luzerne	PA	2	1954/02/21	SRA (1981)
103e	1954/08/11	Mohnton	Berks	PA	7	1954/01/07b to 1955/01/20, 1993/05/18a, 1995/01/08	Gordon and Dewey (1999)
104e	1954/09/24	Mohnton	Berks	PA	7	1954/01/07b to 1955/01/20, 1993/05/18a, 1995/01/08	Gordon and Dewey (1999)
105e	1955/01/20	Mohnton	Berks	PA	7	1954/01/07b to 1954/09/24, 1993/05/18a, 1995/01/08	Gordon and Dewey (1999)
106e	1957/03/23	White House	Hunterdon	NJ	1	none	Gordon and Dewey (1999)
107e	1960/01/22	Archbald	Lackawanna	PA	1	none	SRA (1981)
108e	1961/09/15	Bethlehem	Lehigh	PA	1	none	Gordon and Dewey (1999)
109e	1961/12/27	Croyden Heights	Bucks	PA	1	none	Gordon and Dewey (1999)
110e	1962/09/04	Boonsboro	Washington	MD	1	none	Gordon and Dewey (1999)
111e	1962/09/07	Hancock	Washington	MD	6	1963/10/10 to 1978/04/26	CEUS (1996)
112e	1963/03/02	Mill City	Wyoming	PA	2	1950/03/20	CEUS (1996)
113e	1963/10/10	Berkeley Springs	Morgan	WV	6	1962/09/07 to 1978/04/26	CEUS (1996)
114e	1964/02/13	Mapleton	Huntingdon	PA	3	1982/05/12, 1991/04/17	CEUS (1996)
115e	1964/05/12	Cornwall	Lebanon	PA	1	none	Gordon and Dewey (1999)
116e	1964/06/16	Fairfield	Essex	NJ	1	none	CEUS (1996)
117e	1965/09/29	6 km S of Middletown	Orange	NY	1	none	CEUS (1996)
118e	1965/10/08	Perryopolis	Fayette	PA	1	none	CEUS (1996)
119e	1966/09/28	Clarksburg	Harrison	WV	1	none	CEUS (1996)
120e	1968/12/10	Medford	Burlington	NJ	1	none	Gordon and Dewey (1999)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
81e	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)	Stover and others (1987a)	
82e	CEUS (1996)	NCEER (1992)	NCEER (1985)		
83e	NCEER (1985)	Stover and others (1987a)			
84e	Stover and others (1987a)	Dombroski (1992)			
85e	VTSO (1999)				
86e	CEUS (1996)	NCEER (1992)	NCEER (1985), ANSS (2003)	Dombroski (1992)	Stover and others (1987a)
87e	Reger (1999)	VTSO (1999)	NCEER (1985)	VTSO (1999)	NCEER (1985)
88e	CEUS (1996)	NCEER (1992)	Reger (1999)		
89e					
90e	NCEER (1992)	SRA (1987)	NCEER (1985)		
91e	CEUS (1996)	DGS (2000)	VTSO (1999)	NCEER (1985) NCEER (1985)	Stover and Coffman (1993)
92e	NCEER (1992)	SRA (1987)	NCEER (1985)		
93e	NCEER (1992)	SRA (1987)	NCEER (1985)		
94e	Stover and others (1987a)	Dombroski (1992)			
95e	NCEER (1992)	SRA (1987)	NCEER (1985)		
96e	CEUS (1996)	NCEER (1992)	SRA (1987)		
97e	Armbruster and Seeber (1987)	CEUS (1996)	NCEER (1992)		
98e	SRA (1987)				
99e					
100e					
101e	Scharnberger (1991)	Scharnberger (1992)	Stover and Coffman (1993)	NCEER (1985)	
102e	Scharnberger (1991)	Scharnberger (1992)	Stover and Coffman (1993)		
103e	CEUS (1996)	NCEER (1992)	SRA (1987)		
104e	SRA (1987)			Stover and others (1987a)	Dombroski (1992)
105e	SRA (1987)	NCEER (1985)			
106e	CEUS (1996)	NCEER (1992)	NCEER (1985)		
107e				SRA (1987) SRA (1987)	Dombroski (1992)
108e	Scharnberger (2003)	CEUS (1996)	NCEER (1992)		
109e	Scharnberger (2003), NCEER (1985)	CEUS (1996)	NCEER (1992)		
110e	CEUS (1996)	NCEER (1992)	NCEER (1985)		
111e	NCEER (1992)	Reger (1999)	VTSO (1999)	NCEER (1985)	ANSS (2003)
112e	NCEER (1992)	SRA (1987)	NCEER (1985)	SRA (1987)	Stover and Coffman (1993)
113e	SRA (1987)	VTSO (1999)	ANSS (2003)		
114e	NCEER (1992)	NCEER (1985)	ANSS (2003)		
115e	Scharnberger (2003)	CEUS (1996)	ANSS (2003), NCEER (1985)		
116e	NCEER (1992)	NCEER (1985)			
117e	NCEER (1992)	NCEER (1985)	Stover and others (1987b)		
118e	NCEER (1992)	SRA (1987)	NCEER (1985)		
119e	NCEER (1992)	NCEER (1985)	OhioSeis (2003)		
120e	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)	CEUS (1996)	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
81e	NCEER (1985) lists 4.6 ML. CEUS (1996) lists 40.05 N, 74.36 W; NCEER (1985) lists 4.0 mbLg, 4.8 ML. NCEER (1985) lists 4.6 ML. NCEER (1985) lists 4.0 mbLg. No newspaper accounts of this large event—possibly mislocated from N. J. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99).
82e	
83e	
84e	
85e	
86e	
87e	
88e	
89e	
90e	
91e	Probably anthracite-mining blast (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Possibly a bituminous-mining blast, but only a suspicion (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Probably anthracite-mining blast (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99).
92e	
93e	
94e	
95e	
96e	
97e	
98e	
99e	
100e	
101e	Mine collapse. Very local effects. Mine collapse. Very local effects. SRA (1981) indicates this was a suspected explosion, rock burst, or nontectonic event.
102e	
103e	
104e	
105e	
106e	
107e	
108e	
109e	
110e	
111e	Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Probably anthracite-mining blast (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Probably a quarry blast at Pennsylvania Glass Sand Corp. quarry at Mapleton (C. K. Scharnberger, personal commun., 1999). NCEER (1985) and Stover and Coffman (1993) list 4.5 mb. CEUS (1996) lists 39.7 N, 74.6 W; 3.2 magnitude. NCEER (1985) lists 2.5 Mb, 2.5 ML.
112e	
113e	
114e	
115e	
116e	
117e	
118e	
119e	
120e	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source		FOCUS		m-lat	m-long	m-mag
121e	1969/05/22	14	59	51.6	902	Q	quarry blast	39.61	-78.245	3.1			IV			39.658	-78.208	3.6
122e	1969/10/06				102	M	single	41.1	-74.6	3.3						41.1	-74.6	3.3
123e	1970/05/27	17	59	41.4	902	Q	quarry blast	39.619	-78.275				IV			39.658	-78.208	3.6
124e	1971/07/14				103	M	single	39.75	-75.55	3.3						39.75	-75.553	3.3
125e	1971/12/29				103	M	1971/12/29	39.75	-75.55	3.3			IV			39.75	-75.553	3.3
126e	1972/01/02	7	8		103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
127e	1972/01/03				103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
128e	1972/01/07	3	45		103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
129e	1972/01/22	6	40		103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
130e	1972/01/23a	1	35		103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
131e	1972/01/23b	7	22		103	A	1971/12/29	39.75	-75.55	2.4			IV			39.75	-75.553	3.3
132e	1972/02/11a	0	16	30	103	A	1971/12/29	39.75	-75.55	3.2			V			39.75	-75.553	3.3
133e	1972/02/11b	15	30	0	104	M	single	39.733	-75.667	2.9			III			39.74	-75.664	2.9
134e	1972/06/25				1	M	single	40.3	-75.9							40.3	-75.9	
135e	1972/08/14	1	9		103	M	1972/08/14	39.75	-75.55	3.3			IV			39.75	-75.553	3.3
136e	1972/09/12	15	17	13.7	111	M	single	39.6	-79.9							39.6	-79.9	3.1
137e	1972/11/26	4	15	0	103	A	1972/08/14	39.744	-75.569	2.4			III-IV			39.75	-75.553	3.3
138e	1972/11/27	13	46	0	103	A	1972/08/14	39.745	-75.57	2.4			III-IV			39.75	-75.553	3.3
139e	1972/11/29	13	0	0	103	A	1972/08/14	39.736	-75.569				III-IV			39.75	-75.553	3.3
140e	1972/12/08	3			2	M	single	40.144	-76.241	3.5			V	2		40.144	-76.241	3.5
141e	1973/02/28	8	21	32.3	105	M	single	39.78	-75.43	3.8	Mn	SLM	V-VI	14		39.78	-75.43	3.8
142e	1973/07/10	4	38	2	106	M	single	39.75	-75.75	3.3			IV			39.75	-75.75	3.3
143e	1973/08/12				1	M	single	40.3	-75.9							40.3	-75.9	
144e	1974/04/27	14	45	39.1	904	Q	quarry blast	40.974	-75.907	3.2	mb	GS		3		40.974	-75.907	3.2
145e	1974/04/28	14	19	20	107	M	single	39.8	-75.6	3.3	Mc		IV			39.796	-75.596	3.3
146e	1975/03/11	3	3	47	103	M	single	39.75	-75.55	2.0			VI			39.75	-75.553	3.3
147e	1975/11/10	3	2	29.2	108	M	single	41.18	-74.38	1.8	Mn	LDO		5		41.18	-74.38	1.8
148e	1976/01/30	18	58	49.8	902	Q	quarry blast	39.68	-78.17	2.8	Mn	BLA		15		39.658	-78.208	3.6
149e	1976/03/11	21	7	20.7	109	M	single	41.01	-74.38	2.8			V	5		41.008	-74.396	2.8
150e	1976/03/12	10	28	56.8	110	M	single	40.95	-74.34	2.2				5		40.94	-74.351	2.2
151e	1976/05/06	18	46	8	111	M	single	39.6	-79.9	3.1			IV			39.6	-79.9	3.1
152e	1976/10/28a	1	10		112	F	1976/10/28b(?)	40.89	-74.49	1.0	Mn	LDO				40.89	-74.49	1.0
153e	1976/10/28b	1	13	31.7	112	M	1976/10/28b(?)	40.89	-74.49	1.0	Mn	LDO				40.89	-74.49	1.0
154e	1976/10/28c	6	47		112	A	1976/10/28b(?)	40.89	-74.49	1.0	Mn	LDO				40.89	-74.49	1.0
155e	1976/12/05	16	21	6.9	113	M	1976/12/05	40.77	-74.76	1.8	Mn	LDO		3.4		40.77	-74.76	1.8
156e	1976/12/07	4	55	7.2	113	A	1976/12/05	40.77	-74.76	1.7	Mn	LDO		5.1		40.77	-74.76	1.8
157e	1977/01/07	0	5	12.8	114	M	single	41.02	-74.51					19		41.02	-74.51	
158e	1977/01/21	20	50	44.5	115	M	single	39.97	-74.32	2.7	Mn	LDO		6		39.97	-74.32	2.7
159e	1977/02/10	19	14	25	103	M	single	39.76	-75.54	2.6	Mc		VI			39.75	-75.553	3.3
160e	1977/06/10	12	48	4.8	116	F	1977/07/02	40.7	-74.89	1.1	Mn	LDO		6		40.7	-74.89	1.1

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
121e	1969/05/22	Berkeley Springs	Morgan	WV	6	1962/09/07 to 1978/04/26	CEUS (1996)
122e	1969/10/06	Franklin	Sussex	NJ	1	none	Gordon and Dewey (1999)
123e	1970/05/27	Berkeley Springs	Morgan	WV	6	1962/09/07 to 1978/04/26	SRA (1981)
124e	1971/07/14	Wilmington	New Castle	DE	35	1971/12/29 to 1998/03/19b	Gordon and Dewey (1999)
125e	1971/12/29	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
126e	1972/01/02	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
127e	1972/01/03	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
128e	1972/01/07	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
129e	1972/01/22	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
130e	1972/01/23a	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
131e	1972/01/23b	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
132e	1972/02/11a	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
133e	1972/02/11b	SW Wilmington	New Castle	DE	2	1986/05/02	DGS (2000)
134e	1972/06/25	Reading	Berks	PA	2	1973/08/12	Scharnberger (2003)
135e	1972/08/14	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
136e	1972/09/12	Morgantown	Monongalia	WV	2	1976/05/06	NCEER (1985)
137e	1972/11/26	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
138e	1972/11/27	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
139e	1972/11/29	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
140e	1972/12/08	Akron	Lancaster	PA	1	none	Gordon and Dewey (1999)
141e	1973/02/28	Penns Grove	Salem	NJ	1	none	Gordon and Dewey (1999)
142e	1973/07/10	Newark	New Castle	DE	1	none	Gordon and Dewey (1999)
143e	1973/08/12	Reading	Berks	PA	2	1972/06/25	Scharnberger (2003)
144e	1974/04/27	Hazleton	Luzerne	PA	1	none	SRA (1981)
145e	1974/04/28	Centerville	New Castle	DE	3	1895/11/20, 1998/10/27	Gordon and Dewey (1999)
146e	1975/03/11	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
147e	1975/11/10	Greenwood Lake	Passaic	NJ	1	none	NUSSN 1 (1976)
148e	1976/01/30	Brosius	Morgan	WV	6	1962/09/07 to 1978/04/26	PDE (2003)
149e	1976/03/11	Kinnelon	Morris	NJ	2	1984/06/03	PDE (2003)
150e	1976/03/12	Towaco	Morris	NJ	3	1981/03/19, 1991/07/05	NUSSN 2 (1976)
151e	1976/05/06	Morgantown	Monongalia	WV	2	1972/09/12	Gordon and Dewey (1999)
152e	1976/10/28a	Denville	Morris	NJ	3	1976/10/28b,c	NUSSN 5 (1977)
153e	1976/10/28b	Denville	Morris	NJ	3	1976/10/28a,c	NUSSN 5 (1977)
154e	1976/10/28c	Denville	Morris	NJ	3	1976/10/28a,b	NUSSN 5 (1977)
155e	1976/12/05	Schooleys Mountain	Morris	NJ	2	1976/12/07	NUSSN 5 (1977)
156e	1976/12/07	Schooleys Mountain	Morris	NJ	2	1976/12/05	NUSSN 5 (1977)
157e	1977/01/07	Newfoundland	Morris	NJ	1	none	NUSSN 6 (1977)
158e	1977/01/21	Lakehurst	Ocean	NJ	1	none	NUSSN 6 (1977)
159e	1977/02/10	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
160e	1977/06/10	High Bridge	Hunterdon	NJ	1	none	NUSSN 7 (1977)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
121e	SRA (1987)	ANSS (2003)			
122e	CEUS (1996)	NCEER (1992)	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)
123e	ANSS (2003)				
124e	DGS (2000)	VTSO (1999)	NCEER (1985)		
125e	DGS (2000)	VTSO (1999)	NCEER (1985)		
126e	DGS (2000)	VTSO (1999)	NCEER (1985)		
127e	DGS (2000)	VTSO (1999)	NCEER (1985)		
128e	DGS (2000)	VTSO (1999)	NCEER (1985)		
129e	DGS (2000)	VTSO (1999)	NCEER (1985)		
130e	DGS (2000)	VTSO (1999)	NCEER (1985)		
131e	DGS (2000)	VTSO (1999)	NCEER (1985)		
132e	DGS (2000)	VTSO (1999)	NCEER (1985)		
133e	VTSO (1999)				
134e					
135e	DGS (2000)	VTSO (1999)	NCEER (1985)		
136e					
137e					
138e					
139e					
140e	Scharnberger (2003)	Geyer (1973)	SRA (1987)	NCEER (1985)	ANSS (2003)
141e	PDE (2003)	DGS (2000)	NCEER (1985), ANSS (2003)	Dombroski (1992)	Stover and others (1987a)
142e	DGS (2000)	NCEER (1985)	SRA (1987)		
143e	NUSSN 2 (1976)				
144e	ANSS (2003)				
145e	NCEER (1992)	DGS (2000)	VTSO (1999)	NCEER (1985)	Dombroski (1992)
146e					
147e	Dombroski (1992)				
148e	ANSS (2003)				
149e	NUSSN 2 (1976)	NCEER (1985)	ANSS (2003)	Stover and others (1987a)	Dombroski (1992)
150e	Dombroski (1992)				
151e	VTSO (1999)	NCEER (1985)			
152e	Dombroski (1992)				
153e	Dombroski (1992)				
154e	Dombroski (1992)				
155e	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)		
156e	NCEER (1985)	Stover and others (1987a)	Dombroski (1992)		
157e	Dombroski (1992)				
158e	Stover and others (1987a)	Dombroski (1992)			
159e	NUSSN 8 (1978)	DGS (2000)	VTSO (1999)	NCEER (1985)	Dombroski (1992)
160e	Dombroski (1992)				

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
121e 122e 123e 124e 125e 126e 127e 128e 129e 130e	Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). DGS (2000) lists 2.4 magnitude. DGS (2000) lists 2.6 magnitude.
131e 132e 133e 134e 135e 136e 137e 138e 139e 140e	 DGS (2000) lists a second event as 1h 55m; 2.4 magnitude; III-IV Felt Intensity. NCEER (1985) lists 2.8 ML.
141e 142e 143e 144e 145e 146e 147e 148e 149e 150e	DGS (2000) lists seven aftershocks to March 4 in the Claymont area, each of Felt Intensity I. PDE (2003) lists 39.72 N, 75.44 W. NCEER (1985) lists 3.8 Mb, 3.8 mbLg, 3.5 ML; 12 dof. DGS (2000) lists 2.6 magnitude. Probably an anthracite-mining blast (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99; SRA, 1981). DGS (2000) lists 2.5 magnitude; V Felt Intensity. Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99). NUSSN 2 (1976) lists 2.4 MBN (LDO). PDE (2003) lists 21h 7m 20.60s; 41.00 N, 74.37 W; 2.4 Mn (PAL). NCEER (1985) lists 2.4 Mn.
151e 152e 153e 154e 155e 156e 157e 158e 159e 160e	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source				m-lat	m-long	m-mag
161e	1977/07/02	11	13	21.6	117	M	1977/07/02	40.7	-74.93	2.3	Mn	LDO		7		40.7	-74.93	2.3
162e	1977/10/27	9	22	10.9	118	M	single	41.07	-74.59	1.5	Mn	LDO		6		41.07	-74.59	1.8
163e	1977/12/04a	23	50	44	119	F	1977/12/23a	40.81	-74.76	1.8	Mn	LDO				40.81	-74.76	2.3
164e	1977/12/04b	23	50	56	119	F	1977/12/23a	40.81	-74.76	2.1	Mn	LDO				40.81	-74.76	2.3
165e	1977/12/06	17	51		119	F	1977/12/23a	40.81	-74.76	1.6	Mn	LDO				40.81	-74.76	2.3
166e	1977/12/07	8	34		119	F	1977/12/23a	40.81	-74.76	1.7	Mn	LDO				40.81	-74.76	2.3
167e	1977/12/23a	4	55	11	119	M	1977/12/23a	40.81	-74.76	2.3	Mn	LDO				40.81	-74.76	2.3
168e	1977/12/23b	4	55	12.3	120	A	1977/12/23a	40.84	-74.74	2.2	Mn	WES				40.84	-74.74	2.2
169e	1977/12/23c	16	20	22	119	A	1977/12/23a	40.81	-74.76	1.4	Mn	LDO				40.81	-74.76	2.3
170e	1977/12/24	10	25		119	A	1977/12/23a	40.81	-74.76	1.6	Mn	LDO				40.81	-74.76	2.3
171e	1977/12/25	15	39	34	119	A	1977/12/23a	40.81	-74.76	1.5	Mn	LDO				40.81	-74.76	2.3
172e	1977/12/26	16	54	46	119	A	1977/12/23a	40.81	-74.76	1.7	Mn	LDO				40.81	-74.76	2.3
173e	1978/02/15	5	28	41	121	M	single	40.92	-74.43	1.6	Mn	LDO		6		40.92	-74.43	1.6
174e	1978/04/26	19	30	23.3	902	Q	quarry blast	39.7	-78.24	3.1	UK	BLA		15		39.658	-78.208	3.6
175e	1978/05/18	1	29	37.9	122	M	single	41.02	-74.34	1.5	UK	PAL		6		41.026	-74.325	1.5
176e	1978/06/16	4	59	50.6	123	M	single	40.99	-74.57							40.99	-74.57	
177e	1978/07/16	6	39	42.3	4	M	single	39.913	-76.307	3.1	Mn	WES	V	18		39.907	-76.304	3.1
178e	1978/10/06	19	25	47.4	5	M	single	40.142	-76.315	3.0	UK	PAL	VI	5		40.142	-76.315	3.0
179e	1979/01/30	16	30	52.1	124	M	single	40.32	-74.26	3.3	UK	PAL	V	5		40.32	-74.26	3.3
180e	1979/02/02	2	26	13.3	125	M	single	40.77	-74.66	1.9	Mn	LDO	III			40.77	-74.66	1.9
181e	1979/02/23	10	23	57.2	126	M	single	40.8	-74.81	2.9	UK	PAL	IV	13		40.8	-74.81	2.9
182e	1979/03/10	4	49	39.7	127	M	single	40.72	-74.5	3.1	UK	PAL	V	2		40.72	-74.5	3.1
183e	1979/06/20	19	21	47.8	128	M	1979/06/20	41.35	-74.38	3.0	Mn					41.352	-74.364	3.0
184e	1979/12/01	16	14	6.9	128	A	1979/06/20	41.35	-74.36	2.0	Mn	LDO				41.352	-74.364	3.0
185e	1980/03/02	11	54	47.9	6	F	1980/03/05a	40.21	-75.08	2.8	Mn	LDO				40.21	-75.08	2.8
186e	1980/03/05a	17	6	56.3	7	M	1980/03/05a	40.19	-75.16	3.5	Mn	LDO	IV	7.9		40.19	-75.16	3.5
187e	1980/03/05b	17	20	32.8	8	A	1980/03/05a	40.18	-75.07	3.1				5		40.18	-75.07	3.1
188e	1980/03/05c	17	20	33.2	9	A	1980/03/05a	40.25	-75.08	2.5	Mn	WES				40.25	-75.08	2.5
189e	1980/03/11a	6	0	26.8	10	A	1980/03/05a	40.15	-75.1	3.3	UK	PAL	V	5		40.15	-75.1	3.3
190e	1980/03/11b	16	16	5.5	11	A	1980/03/05a	40.25	-74.99	2.8				2		40.25	-74.99	2.8
191e	1980/03/25	18	54	35.7	129	M	single	40.97	-75.02	2.8	Mn	LDO		5		40.97	-75.02	2.8
192e	1980/04/25	0	23	35	128	A	1979/06/20	41.35	-74.34	2.4	Mn	LDO				41.352	-74.364	3.0
193e	1980/05/02a	15	23	23.5	12	A	1980/03/05a	40.16	-74.99	2.8	Mn	LDO		5		40.16	-74.99	2.8
194e	1980/05/02b	19	2	24.4	13	A	1980/03/05a	40.25	-75.03	3.0	Mn	LDO				40.25	-75.03	3.0
195e	1980/05/20	21	33	23	128	A	1979/06/20	41.35	-74.37	2.6	Mn	LDO		2.3		41.352	-74.364	3.0
196e	1980/08/30	9	19	9	130	M	single	39.84	-74.86	3.0	Mn	LDO		2.2		39.84	-74.86	3.0
197e	1981/03/19	8	51	35.2	110	M	single	40.94	-74.36	2.0	Mn	LDO		9.6		40.94	-74.351	2.2
198e	1981/06/21	5	4	8.7	118	M	single	41.07	-74.59	1.8	Mn	LDO		8.5		41.07	-74.59	1.8
199e	1981/08/18	0	25	8.4	131	M	single	42.32	-74.27	2.1	Mc	LDO		11		42.32	-74.27	2.1
200e	1982/02/03	4	28	20.6	14	M	single	40.21	-79.05	2.6	Mn	SCP	III	2		40.21	-79.05	2.6

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
161e	1977/07/02	Hampton	Hunterdon	NJ	1	none	NUSSN 8 (1978)
162e	1977/10/27	Sparta	Sussex	NJ	2	1981/06/21	NUSSN 9 (1978)
163e	1977/12/04a	Schooleys Mountain	Morris	NJ	9	1977/12/04b to 1977/12/26	NUSSN 9 (1978)
164e	1977/12/04b	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
165e	1977/12/06	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
166e	1977/12/07	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
167e	1977/12/23a	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
168e	1977/12/23b	Schooleys Mountain	Morris	NJ	1	none	NUSSN 9 (1978)
169e	1977/12/23c	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
170e	1977/12/24	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
171e	1977/12/25	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/26	NUSSN 9 (1978)
172e	1977/12/26	Schooleys Mountain	Morris	NJ	9	1977/12/04a to 1977/12/25	NUSSN 9 (1978)
173e	1978/02/15	Bouton	Morris	NJ	1	none	NUSSN 10 (1978)
174e	1978/04/26	Hancock	Washington	MD	6	1962/09/07 to 1976/01/30	PDE (2003)
175e	1978/05/18	Wanaque	Passaic	NJ	3	1991/05/12, 2000/02/16	PDE (2003)
176e	1978/06/16	Hurdtown	Morris	NJ	1	none	NUSSN 11 (1978)
177e	1978/07/16	Martic Forge	Lancaster	PA	2	1865/09/17	Gordon and Dewey (1999)
178e	1978/10/06	East Petersburg	Lancaster	PA	1	none	Gordon and Dewey (1999)
179e	1979/01/30	Marlboro	Monmouth	NJ	1	none	PDE (2003)
180e	1979/02/02	Chester	Morris	NJ	1	none	NUSSN 14 (1979)
181e	1979/02/23	Budd Lake	Morris	NJ	1	none	Gordon and Dewey (1999)
182e	1979/03/10	Basking Ridge	Morris	NJ	1	none	Gordon and Dewey (1999)
183e	1979/06/20	Goshen	Orange	NY	5	1979/12/01, 1980/04/25, 1980/05/20, 2003/04/20	SRA (1981)
184e	1979/12/01	Goshen	Orange	NY	5	1979/06/20, 1980/04/25, 1980/05/20, 2003/04/20	NUSSN 17 (1980)
185e	1980/03/02	Abington (Southampton)	Bucks	PA	1	none	Bischke (1980)
186e	1980/03/05a	Abington (Horsham)	Montgomery	PA	1	none	Gordon and Dewey (1999)
187e	1980/03/05b	Abington (Ivyland)	Bucks	PA	1	none	Scharnberger (2003)
188e	1980/03/05c	Abington	Bucks	PA	1	none	NUSSN 18 (1980)
189e	1980/03/11a	Abington (Hatboro)	Montgomery	PA	1	none	Gordon and Dewey (1999)
190e	1980/03/11b	Abington (Richboro)	Bucks	PA	1	none	Bischke (1980)
191e	1980/03/25	Hainesburg	Warren	NJ	1	none	NUSSN 18 (1980)
192e	1980/04/25	Goshen	Orange	NY	5	1979/06/20, 1979/12/01, 1980/05/20, 2003/04/20	NUSSN 19 (1981)
193e	1980/05/02a	Abington (Langhorne)	Bucks	PA	1	none	SRA (1981)
194e	1980/05/02b	Abington (Jamison)	Bucks	PA	1	none	Bischke (1980)
195e	1980/05/20	Goshen	Orange	NY	5	1979/06/20, 1979/12/01, 1980/04/25, 2003/04/20	NUSSN 19 (1981)
196e	1980/08/30	Medford	Burlington	NJ	1	none	NUSSN 20 (1981)
197e	1981/03/19	Towaco	Morris	NJ	3	1976/03/12, 1991/07/05	NUSSN 22 (1981)
198e	1981/06/21	Sparta	Sussex	NJ	2	1977/10/27	NUSSN 23 (1981)
199e	1981/08/18	Windham	Greene	NY	1	none	NUSSN 24 (1982)
200e	1982/02/03	Jennerstown	Somerset	PA	1	none	Scharnberger (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
161e 162e 163e 164e 165e 166e 167e 168e 169e 170e	Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992) Dombroski (1992)				
171e 172e 173e 174e 175e 176e 177e 178e 179e 180e	Dombroski (1992) Person (1978b) Dombroski (1992) SRA (1987) NUSSN 11 (1978) Person (1978a) Scharnberger (1978b, 2003) Scharnberger (1978a, 2003) NUSSN 14 (1979) Stover and others (1987a)	Dombroski (1992) Reger (1999) ANSS (2003) Dombroski (1992) SRA (1987) SRA (1987), PDE (2003) Person (1979a) Dombroski (1992)	 VTSO 2 (2003) Dombroski (1992) NUSSN 12 (1979) NUSSN 13 (1979) NCEER (1985), ANSS (2003)	ANSS (2003) VTSO 3 (2003), ANSS (2003) NCEER (1985), ANSS (2003) Dombroski (1992)	 NCEER (1985) Reagor and others (1980) SRA (1987)
181e 182e 183e 184e 185e 186e 187e 188e 189e 190e	PDE (2003) PDE (2003), Person (1979b) NUSSN 15 (1980) SRA (1987) Scharnberger (2003) Bischke (1980) Bischke (1980), Dombroski (1992) SRA (1987)	Person (1979a) NUSSN 14 (1979) Stover and others (1987b) NUSSN 18 (1980) Bischke (1980), Dombroski (1992) SRA (1987) SRA (1987), NUSSN 18 (1980) NUSSN 18 (1980)	NCEER (1985), ANSS (2003) Dombroski (1992) SRA (1987), NUSSN 18 (1980) NUSSN 18 (1980) Stover, Minsch, Person, and Smith (1981)	Dombroski (1992) NCEER (1985), ANSS (2003) NCEER (1985), ANSS (2003) Person (1980), ANSS (2003)	Stover and others (1987a) Stover and others (1987a) Stover, Minsch, Person, and Smith (1981) NCEER (1985)
191e 192e 193e 194e 195e 196e 197e 198e 199e 200e	Stover and others (1987a) Stover (1988) SRA (1987) Stover and others (1987b) NCEER (1985) Dombroski (1992) Dombroski (1992) SRA (1987)	Dombroski (1992) NUSSN 19 (1981) Stover, Minsch, Smith, and Person (1981) Stover and others (1987a) Stover and others (1983)	 NUSSN 19 (1981) Dombroski (1992) Stover (1985)	 NCEER (1985) NCEER (1985)	 ANSS (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
161e 162e 163e 164e 165e 166e 167e 168e 169e 170e	
171e 172e 173e 174e 175e 176e 177e 178e 179e 180e	<p>Probably a quarry blast at U.S. Silica quarry at Berkeley Springs, W. Va. (C. K. Scharnberger, personal commun. to R. L. Wheeler, 1/11/99).</p> <p>NUSSN 12 (1979) lists 3.3 MC (WES), 3.0 MBN (GS), 2.9 MBN (BLA). NCEER (1985) lists 2.8 ML, 3.3 MC.</p> <p>Location based on intensity survey (C. K. Scharnberger, personal commun., 2003). NUSSN 13 (1979) lists 40.05 N, 76.09 W; 3.0 MN (WES), 3.0 MC (WES); and 40.08 N, 76.15 W; 3.0 MN (LDO). PDE (2003) lists 19h 25m 41.60s.</p> <p>NUSSN 14 (1979) lists 3.5 MN (LDO). NCEER (1985) lists 2.7 MN, 3.0 mbLg, 3.2 MC, 3.5 ML.</p>
181e 182e 183e 184e 185e 186e 187e 188e 189e 190e	<p>NCEER (1985) lists 1.8 MN.</p> <p>PDE (2003) lists 3 dof. NCEER (1985) lists 3.1 MN, 2.4 mbLg, 2.8 MC, 2.5 ML.</p> <p>NUSSN 17 (1980) lists 1.7 MC (WES).</p> <p>NUSSN 18 (1980) lists 2.9 MN (WES), 2.7 MC (WES). NCEER (1985) lists 2.9 MN, 2.7 MC.</p> <p>NUSSN 18 (1980) lists 2.4 MC (WES).</p> <p>NUSSN 18 (1980) lists 3.3 MN (WES), 3.2 MC (WES), 3.7 MN (LDO). NCEER (1985) lists 3.3 MN, 3.2 MC.</p> <p>NUSSN 18 (1980) lists 1.8 dof.</p>
191e 192e 193e 194e 195e 196e 197e 198e 199e 200e	<p>NUSSN 22 (1981) lists 1.7 MC (LDO).</p> <p>NUSSN 23 (1981) lists 1.8 MC (LDO).</p> <p>NUSSN 24 (1982) lists 1.8 MN (LDO).</p> <p>NCEER (1985) lists 2.6 mbLg.</p>

EARTHQUAKE CATALOG OF PENNSYLVANIA (Continued)

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source				m-lat	m-long	m-mag
201e	1982/04/12	22	14	32.05	132	M	single	40.05	-74.82	2.8	Mc		V	7.4		40.05	-74.82	2.8
202e	1982/05/12	17	1		15	M	single	40.15	-74.91	2.4			II			40.15	-74.91	2.4
203e	1982/05/12	18	29	33	903	Q	quarry blast	40.41	-77.96	3.0	Mc					40.393	-77.96	3.3
204e	1982/06/12	19	26	3.6	133	M	single	42.287	-74.602	2.4	Mc	LDO		6.9		42.287	-74.602	2.4
205e	1982/08/14	0	11	34.5	16	M	single	41.709	-75.75	1.8	Mc	LDO		2.5		41.709	-75.75	1.8
206e	1982/09/16	6	36	28.6	134	M	single	41.119	-74.645	1.6	Mc	LDO		0.5		41.119	-74.645	1.6
207e	1983/01/22	7	46	57.93	135	M	single	41.85	-81.19	2.7	Mn	GS		5		41.85	-81.19	2.7
208e	1983/02/19	5	45	45.13	136	M	single	40.65	-74.77	2.7	Mn	PAL	IV	6.1		40.65	-74.77	2.7
209e	1983/06/01	9	50	47.9	137	M	single	40.872	-74.525	1.5	Mc	LDO		5.2		40.872	-74.525	1.5
210e	1983/11/17	19	55	6.58	103	M	1983/11/17	39.75	-75.56	2.9	Mc		V	4.8		39.75	-75.553	3.3
211e	1983/12/12	5	15	9.5	103	A	1983/11/17	39.75	-75.56	2.4	Mc		IV	9.9		39.75	-75.553	3.3
212e	1984/01/19	23	3	34.06	103	A	1983/11/17	39.75	-75.56	2.5	Mc		IV	4		39.75	-75.553	3.3
213e	1984/01/20	0	46	13	103	A	1983/11/17	39.75	-75.55	1.8			I-II			39.75	-75.553	3.3
214e	1984/02/15	12	17	54	103	A	1983/11/17	39.767	-75.551	1.5			I-II			39.75	-75.553	3.3
215e	1984/04/19	4	54	55.1	17	F	1984/04/23a	39.94	-76.36	2.9	Mc	LDO		7.5		39.945	-76.355	2.9
216e	1984/04/23a	1	36	2.1	18	M	1984/04/23a	39.92	-76.36	4.2	Mc		VI	5		39.92	-76.36	4.2
217e	1984/04/23b	2	46	0.5	19	A	1984/04/23a	39.947	-76.323	2.5	Mc	LDO		10		39.946	-76.323	2.5
218e	1984/05/10	10	14	52.3	20	M	single	40.322	-75.298	2.2	Mc	LDO		7.5		40.322	-75.298	2.2
219e	1984/05/13	3	18	27.6	138	M	single	40.919	-74.54	2.1				5.6		40.919	-74.54	2.1
220e	1984/05/17	10	15	22.5	19	A	1984/04/23a	39.945	-76.323	2.3	Mc	LDO		10		39.946	-76.323	2.5
221e	1984/06/03	7	4	33.9	109	M	single	41.006	-74.411	1.3	Mc	LDO		0.2		41.008	-74.396	2.8
222e	1984/06/06	17	44	32.8	139	M	single	40.777	-74.484	1.7	Mc	LDO		7		40.777	-74.484	1.7
223e	1984/08/02	1	3	49.1	140	F	1984/08/12a	40.897	-74.708	1.7	Mc	LDO		5.7		40.892	-74.706	2.0
224e	1984/08/12a	21	3	27	141	M	1984/08/12a	40.919	-74.726	2.4	Mc	LDO		3.1		40.922	-74.727	2.4
225e	1984/08/12b	21	12	58.9	141	A	1984/08/12a	40.912	-74.721	2.1	Mc	LDO		4.7		40.922	-74.727	2.4
226e	1984/09/19	8	20		21	M	single	40.06	-76.3				III			40.065	-76.3	1.8
227e	1984/10/20	8	55	27	103	M	single	39.764	-75.551	1.7			III-IV			39.75	-75.553	3.3
228e	1984/10/25	7	18	53.7	140	A	1984/08/12a	40.888	-74.697	2.0	Mc			7.1		40.892	-74.706	2.0
229e	1984/12/03	1	52	49.6	141	A	1984/08/12a	40.926	-74.728	1.5	Mc			1		40.922	-74.727	2.4
230e	1984/12/13	20	13	0.35	141	A	1984/08/12a	40.923	-74.731	1.7	Mc			3.7		40.922	-74.727	2.4
231e	1984/12/14	1	0	56.5	142	M	single	40.586	-75.113	1.7	Mc			1.5		40.577	-75.124	1.7
232e	1984/12/15	14	2	0.5	140	A	1984/08/12a	40.899	-74.712	1.8	Mc			7.8		40.892	-74.706	2.0
233e	1984/12/17	6	52	53.7	141	A	1984/08/12a	40.927	-74.727	1.6	Mc			4.8		40.922	-74.727	2.4
234e	1985/04/14	11	39	54	22	M	single	41.59	-80.4	3.2	Mn			18		41.59	-80.4	3.2
235e	1985/07/11	10	13	19	143	M	single	42.3	-80.79	2.7	Mn			18		42.3	-80.79	2.7
236e	1985/10/11	2	47	51	103	M	1985/10/11	39.768	-75.559	1.9			III-IV			39.75	-75.553	3.3
237e	1985/10/20	7	55	26.6	103	A	1985/10/11	39.764	-75.551	1.7			III-IV			39.75	-75.553	3.3
238e	1986/01/31	16	46	43.33	144	M	1986/01/31	41.65	-81.16	5.0	mb	GS		10		41.643	-81.16	5.0
239e	1986/02/07	18	36	22.34	144	A	1986/01/31	41.65	-81.16	2.5	Mn	GS		6		41.643	-81.16	5.0
240e	1986/02/08	9	18	14.4	140	A	1984/08/12a	40.888	-74.697	1.7	Mn			5.7		40.892	-74.706	2.0

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
201e	1982/04/12	Burlington	Burlington	NJ	1	none	Gordon and Dewey (1999)
202e	1982/05/12	Penndel	Bucks	PA	1	none	Bischke (1982)
203e	1982/05/12	Mapleton	Huntingdon	PA	3	1964/02/13, 1991/04/17	SRA (1981)
204e	1982/06/12	Roxbury	Delaware	NY	1	none	NUSSN 27 (1984)
205e	1982/08/14	Hop Bottom	Susquehanna	PA	1	none	Scharnberger (2003)
206e	1982/09/16	Franklin	Sussex	NJ	1	none	NUSSN 28 (1984)
207e	1983/01/22	Lake Erie, 7 km N of Perry	Lake	OH	1	none	PDE (2003)
208e	1983/02/19	Oldwick	Hunterdon	NJ	1	none	Gordon and Dewey (1999)
209e	1983/06/01	Denville	Morris	NJ	1	none	NUSSN 31 (1984)
210e	1983/11/17	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
211e	1983/12/12	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
212e	1984/01/19	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	Gordon and Dewey (1999)
213e	1984/01/20	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
214e	1984/02/15	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
215e	1984/04/19	Marticville	Lancaster	PA	2	1986/05/02	Gordon and Dewey (1999)
216e	1984/04/23a	Marticville	Lancaster	PA	1	none	Gordon and Dewey (1999), Stover (1988)
217e	1984/04/23b	Marticville	Lancaster	PA	2	1984/05/17	Geyer (1973)
218e	1984/05/10	Hatfield	Bucks	PA	1	none	NUSSN 35 (1985)
219e	1984/05/13	Mount Hope	Morris	NJ	1	none	NUSSN 35 (1985)
220e	1984/05/17	Marticville	Lancaster	PA	2	1984/04/23b	NUSSN 35 (1985)
221e	1984/06/03	Kinnelon	Morris	NJ	2	1976/03/11	NUSSN 35 (1985)
222e	1984/06/06	Morristown	Morris	NJ	1	none	NUSSN 35 (1985)
223e	1984/08/02	Netcong	Morris	NJ	5	1984/10/25, 1984/12/15, 1986/02/08, 1988/08/20	NUSSN 36 (1986)
224e	1984/08/12a	Netcong	Sussex	NJ	6	1984/08/12b to 1984/12/17, 1987/04/24	NUSSN 36 (1986)
225e	1984/08/12b	Netcong	Morris	NJ	6	1984/08/12a to 1984/12/17, 1987/04/24	NUSSN 36 (1986)
226e	1984/09/19	Lancaster	Lancaster	PA	2	2000/03/22	Scharnberger (2003)
227e	1984/10/20	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
228e	1984/10/25	Netcong	Morris	NJ	5	1984/08/02, 1984/12/15, 1986/02/08, 1988/08/20	NUSSN 37 (1986)
229e	1984/12/03	Netcong	Sussex	NJ	6	1984/08/12a to 1984/12/17, 1987/04/24	NUSSN 37 (1986)
230e	1984/12/13	Netcong	Sussex	NJ	6	1984/08/12a to 1984/12/17, 1987/04/24	NUSSN 37 (1986)
231e	1984/12/14	Milford, Pa.	Hunterdon	NJ	2	1992/05/15	NUSSN 37 (1986)
232e	1984/12/15	Netcong	Morris	NJ	5	1984/08/02, 1984/10/25, 1986/02/08, 1988/08/20	NUSSN 37 (1986)
233e	1984/12/17	Netcong	Sussex	NJ	6	1984/08/12a to 1984/12/13, 1987/04/24	NUSSN 37 (1986)
234e	1985/04/14	Shermansville	Crawford	PA	1	none	Scharnberger (2003)
235e	1985/07/11	Lake Erie, 30 km N of Ashtabula, Ohio	Elgin	ON	1	none	NUSSN 40 (1986)
236e	1985/10/11	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
237e	1985/10/20	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	VTSO (1999)
238e	1986/01/31	Chardon (Leroy)	Lake	OH	3	1986/02/07, 1988/12/28	PDE (2003)
239e	1986/02/07	Chardon (Leroy)	Lake	OH	3	1986/01/31, 1988/12/28	PDE (2003)
240e	1986/02/08	Netcong	Morris	NJ	5	1984/08/02, 1984/10/25, 1984/12/15, 1988/08/20	NUSSN 42 (1987)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
201e	Bischke (1982), PDE (2003)	Scharnberger (2003), Dombroski (1992)	NUSSN 27 (1984), Person (1982)	NCEER (1985), ANSS (2003)	Stover and others (1987a)
202e	Scharnberger (2003)	SRA (1987)	Stover (1985)	Reagor and others (1983)	
203e	Stover (1985)				
204e					
205e	NUSSN 28 (1984)				
206e	Dombroski (1992)				
207e	OhioSeis (2003)	NCEER (1985)	ANSS (2003)	Stover and others (1987)	
208e	PDE (2003)	NUSSN 30 (1984)	Person (1983), Dombroski (1992)	NCEER (1985), ANSS (2003)	Stover and others (1987a)
209e	Dombroski (1992)				
210e	PDE (2003)	NUSSN 33 (1985)	Person (1983), Dombroski (1992)	DGS (2000)	ANSS (2003)
211e	PDE (2003)	NUSSN 33 (1985)	Person (1984c)	DGS (2000)	ANSS (2003)
212e	PDE (2003), NUSSN 34 (1985)	Person (1984a)	Dombroski (1992)	DGS (2000)	ANSS (2003)
213e					
214e					
215e	Scharnberger (1984)	NUSSN 35 (1985)	Scharnberger and Howell (1985)	Stover (1988), PDE (2003)	Person (1984b), ANSS (2003)
216e	Scharnberger (1984, 2003)	NUSSN 35 (1985), Scharnberger and Howell (1985)	Armbruster and Seeber (1987)	NCEER (1985), Dombroski (1992)	Stover and Coffman (1993), ANSS (2003)
217e	NUSSN 35 (1985)	Stover (1988)			
218e					
219e	Dombroski (1992)				
220e					
221e	Dombroski (1992)				
222e	Dombroski (1992)				
223e	Dombroski (1992)				
224e					
225e					
226e					
227e					
228e	Dombroski (1992)				
229e	Dombroski (1992)				
230e	Dombroski (1992)				
231e					
232e	Dombroski (1992)				
233e	Dombroski (1992)				
234e	NUSSN 39 (1986)	OhioSeis (2003)			
235e	OhioSeis (2003)				
236e	ANSS (2003)				
237e	ANSS (2003)				
238e	NUSSN 42 (1987)	Person (1986)	OhioSeis (2003)	ANSS (2003)	
239e	Person (1986)	OhioSeis (2003)	ANSS (2003)		
240e	Dombroski (1992)				

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
201e	NCEER (1985) lists 2.4 MN. Possible quarry blast. Probably a quarry blast at Pennsylvania Glass Sand Corp. quarry at Mapleton (C. K. Scharnberger, personal commun., 1999). NUSSN 27 (1984) lists 2.2 MN (LDO). NUSSN 28 (1984) lists 2.1 MN (LDO). NCEER (1985) lists 3.3 MN; 10 dof. NUSSN 30 (1984) lists 2.7 MC (LDO). NCEER (1985) lists 2.4 mbLg, 2.7 MC. DGS (2000) lists one aftershock at 21 h 28 m 1s. NUSSN 33 (1985) lists 2.2 magnitude. PDE (2003) lists 39.83 N, 75.66 W; 2.2 Mn (BLA); 5 dof.
202e	
203e	
204e	
205e	
206e	
207e	
208e	
209e	
210e	
211e	DGS (2000) lists one aftershock at 16h 42m 52s. NUSSN 33 (1985) lists 39.801 N, 75.828 W. PDE (2003) lists 39.83 N, 75.66 W; 2.0 Mn (GS); 5 dof. NUSSN 34 (1985) lists 39.731 N, 75.543 W; 2.4 MC (LDO). PDE (2003) lists 39.79 N, 75.52 W; 2.4 MD (PAL); 5 dof. NUSSN 35 (1985) lists 40.132 N, 76.037 W. PDE (2003) lists 4h 54m 58.38s; 39.92 N, 76.32 W; 3.0 Mn (BLA); 5 dof. NUSSN 35 (1985) lists 4.1 MC (LDO); 4.3 dof. NCEER (1985) lists 4.1 MC; 4 dof. Stover and Coffman (1993) lists 4.1 Mn (GS). NUSSN 35 (1985) lists 2.3 MC (LDO).
212e	
213e	
214e	
215e	
216e	
217e	
218e	
219e	
220e	
221e	
222e	
223e	
224e	
225e	
226e	
227e	
228e	
229e	
230e	
231e	OhioSeis (2003) lists 2.0 magnitude. OhioSeis (2003) lists 2.6 magnitude. NUSSN 42 (1987) lists 1.7 MC.
232e	
233e	
234e	
235e	
236e	
237e	
238e	
239e	
240e	

EARTHQUAKE CATALOG OF PENNSYLVANIA (Continued)

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source		FOCUS		m-lat	m-long	m-mag
241e	1986/02/23	4	3	28.3	145	M	single	40.775	-74.903	1.8	Mc			1.1		40.775	-74.903	1.8
242e	1986/05/02a	13	53	52.62	17	M	single	39.95	-76.35	2.5	Mc	NED	IV	5		39.945	-76.355	2.9
243e	1986/05/02b	13	54	2	104	M	single	39.747	-75.66	2.5	Mc			10		39.74	-75.664	2.9
244e	1986/06/29	6	32	16.5	146	M	single	40.964	-74.401	1.5	Mc			4.1		40.963	-74.382	1.9
245e	1986/07/15	4	22	12.6	147	M	single	41.111	-74.561	1.5	Mc			5.6		41.111	-74.561	1.5
246e	1986/09/15a	22	34	51.2	717	M	single	40.129	-74.518	2.3	Mc			3.5		40.13	-74.527	3.9
247e	1986/09/15b	22	45	16.1	206	M	single	40.103	-74.802	1.9	Mc			5		40.102	-74.801	3.2
248e	1986/11/23	21	29	38.83	148	M	single	40.956	-74.82	2.8	Mc	PAL		7.4		40.956	-74.82	2.8
249e	1987/04/24	7	7	41.1	141	A	1984/08/12a	40.927	-74.729	1.9	Mc			3.4		40.922	-74.727	2.4
250e	1987/07/13a	5	49	17.43	149	M	1987/07/13a	41.896	-80.767	3.8	Mn	GS	IV	5		41.898	-80.76	3.8
251e	1987/07/13b	5	58	52.31	171	M	single	41.884	-80.7	2.2						41.884	-80.7	2.2
252e	1987/07/13c	7	52	12	172	A	1987/07/13a	41.9	-80.8	3.0	Mn	GS		5		41.901	-80.798	3.0
253e	1987/07/13d	13	5	22	172	A	1987/07/13a	41.9	-80.8	2.9	Mn	GS		5		41.901	-80.798	3.0
254e	1987/07/13e	18	25	11.98	149	A	1987/07/13a	41.899	-80.768	2.3						41.898	-80.76	3.8
255e	1987/07/13f	19	0	8.5	149	A	1987/07/13a	41.899	-80.768	2.3						41.898	-80.76	3.8
256e	1987/07/13g	19	39	19.44	149	A	1987/07/13a	41.899	-80.768	2.1						41.898	-80.76	3.8
257e	1987/07/13h	20	53	5.46	149	A	1987/07/13a	41.899	-80.768	2.2						41.898	-80.76	3.8
258e	1987/07/13i	23	49	18	150	A	1987/07/13a	41.93	-80.71	2.7	Mn			5		41.934	-80.718	2.7
259e	1987/07/14a	7	47	27.23	149	A	1987/07/13a	41.902	-80.75	2.4						41.898	-80.76	3.8
260e	1987/07/14b	14	51	10	172	A	1987/07/13a	41.9	-80.8	2.8	Mn	GS		5		41.901	-80.798	3.0
261e	1987/07/16a	4	49	40	172	A	1987/07/13a	41.9	-80.8	2.7	Mn	GS		5		41.901	-80.798	3.0
262e	1987/07/16b	6	2	25.54	149	A	1987/07/13a	41.895	-80.751	2.4						41.898	-80.76	3.8
263e	1987/08/05	4	47	40.4	151	M	1987/08/05	40.92	-74.794	1.7	Mc			2.6		40.911	-74.788	1.7
264e	1987/08/06a	0	7	23.3	151	A	1987/08/05	40.899	-74.779	1.1	Mc			1.8		40.911	-74.788	1.7
265e	1987/08/06b	0	25	37	151	A	1987/08/05	40.914	-74.79	1.1	Mc			1.9		40.911	-74.788	1.7
266e	1987/12/06	8	36	3.7	205	M	single	40.069	-74.733	2.1	Mc			2.5		40.07	-74.731	3.1
267e	1988/03/31	16	30	3.87	194	M	single	41.313	-81.046	2.8						41.313	-81.046	2.8
268e	1988/04/13	9	48	33.3	152	M	single	40.843	-74.533	1.4	Mc			4.8		40.843	-74.533	1.4
269e	1988/06/27	4	46	31.34	195	M	single	41.818	-81.229	2.7						41.816	-81.219	3.4
270e	1988/08/20	11	46	32	140	A	1984/08/12a	40.889	-74.715	1.0	Mc			8		40.892	-74.706	2.0
271e	1988/12/22	7	44	28.9	153	M	single	41.061	-74.298	1.0	Mc			2.7		41.068	-74.287	1.7
272e	1988/12/23	2	30	54.1	154	M	single	41.122	-74.359	1.1	Mc			5.7		41.122	-74.359	1.1
273e	1988/12/25	2	11	34.9	155	F	1988/12/28	41.83	-81.03	2.5	Mn			5		41.83	-81.03	2.5
274e	1988/12/28	23	28	54.7	144	M	1988/12/28	41.63	-81.16	2.8	Mn			5		41.643	-81.16	5.0
275e	1989/01/27	3	9	59.7	156	M	single	41.241	-74.51	1.1	Mc			1.6		41.241	-74.51	1.1
276e	1989/02/02	20	24	17.7	23	M	single	40.384	-75.302					8		40.384	-75.302	
277e	1989/08/01a	16	12	48.75	149	F	1989/08/01b	41.898	-80.758	2.8						41.898	-80.76	3.8
278e	1989/08/01b	16	50	30.74	149	M	1989/08/01b	41.893	-80.752	2.9						41.898	-80.76	3.8
279e	1989/08/03	4	7	48.64	149	A	1989/08/01b	41.9	-80.761	2.2						41.898	-80.76	3.8
280e	1990/01/01	23	3	4.89	172	M	single	41.902	-80.799	2.2						41.901	-80.798	3.0

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
241e	1986/02/23	Port Murray	Hunterdon	NJ	1	none	NUSSN 42 (1987)
242e	1986/05/02a	Marticville	Lancaster	PA	2	1984/04/19	Gordon and Dewey (1999)
243e	1986/05/02b	SW Wilmington	New Castle	DE	2	1972/02/11b	NUSSN 43 (1987)
244e	1986/06/29	Kinnelon	Morris	NJ	3	1992/03/04, 2001/07/14	NUSSN 43 (1987)
245e	1986/07/15	Franklin	Sussex	NJ	1	none	NUSSN 44 (1988)
246e	1986/09/15a	Cream Ridge	Monmouth	NJ	4	1938/08/23a,b,c	NUSSN 44 (1988)
247e	1986/09/15b	Roebeling	Burlington	NJ	2	1877/09/10	NUSSN 44 (1988)
248e	1986/11/23	Tranquility	Warren	NJ	1	none	PDE (2003)
249e	1987/04/24	Netcong	Sussex	NJ	6	1984/08/12a to 1984/12/17	NUSSN 47 (1989)
250e	1987/07/13a	Ashtabula area	Ashtabula	OH	11	1987/07/13e to 1990/09/26	Gordon and Dewey (1999)
251e	1987/07/13b	Ashtabula	Ashtabula	OH	1	none	OhioSeis (2003)
252e	1987/07/13c	Ashtabula area	Ashtabula	OH	6	1987/07/13d to 1990/11/18	PDE (2003)
253e	1987/07/13d	Ashtabula area	Ashtabula	OH	6	1987/07/13c to 1990/11/18	PDE (2003)
254e	1987/07/13e	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
255e	1987/07/13f	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
256e	1987/07/13g	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
257e	1987/07/13h	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
258e	1987/07/13i	Ashtabula area	Ashtabula	OH	5	2001/01/26c,d,e; 2003/02/10	NUSSN 48 (1989)
259e	1987/07/14a	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
260e	1987/07/14b	Ashtabula area	Ashtabula	OH	6	1987/07/13c to 1990/11/18	PDE (2003)
261e	1987/07/16a	Ashtabula area	Ashtabula	OH	6	1987/07/13c to 1990/11/18	PDE (2003)
262e	1987/07/16b	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
263e	1987/08/05	Allamuchy	Warren	NJ	3	1987/08/06a, 1987/08/06b	NUSSN 48 (1989)
264e	1987/08/06a	Allamuchy	Morris	NJ	3	1987/08/05, 1987/08/06b	NUSSN 48 (1989)
265e	1987/08/06b	Allamuchy	Warren	NJ	3	1987/08/05, 1987/08/06a	NUSSN 48 (1989)
266e	1987/12/06	Columbus	Burlington	NJ	3	1857/02/10, 1999/05/31	NUSSN 49 (1990)
267e	1988/03/31	Nelson	Portage	OH	1	none	OhioSeis (2003)
268e	1988/04/13	Dover	Morris	NJ	1	none	NUSSN 51 (1991)
269e	1988/06/27	Lake Erie, N of Painesville	Lake	OH	3	1992/03/15, 2003/06/30	OhioSeis (2003)
270e	1988/08/20	Netcong	Morris	NJ	5	1984/08/02, 1984/10/25, 1984/12/15, 1986/02/08	NUSSN 52 (1991)
271e	1988/12/22	Wanaque	Passaic	NJ	3	1996/02/18, 1996/02/19	NUSSN 53 (1991)
272e	1988/12/23	West Milford	Passaic	NJ	1	none	NUSSN 53 (1991)
273e	1988/12/25	Redbird	Lake	OH	1	none	NUSSN 53 (1991)
274e	1988/12/28	Chardon (Leroy)	Geauga	OH	3	1986/01/31, 1986/02/07	NUSSN 53 (1991)
275e	1989/01/27	NE of Sussex	Sussex	NJ	1	none	NUSSN 54 (1992)
276e	1989/02/02	Perkasie	Bucks	PA	1	none	NUSSN 54 (1992)
277e	1989/08/01a	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
278e	1989/08/01b	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
279e	1989/08/03	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1990/09/26	OhioSeis (2003)
280e	1990/01/01	Ashtabula area	Ashtabula	OH	6	1987/07/13c to 1990/11/18	OhioSeis (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
241e	Dombroski (1992)	Person (1987b)	VTSO 18 (2003)	ANSS (2003)	
242e	Scharnberger (2003)				
243e					
244e	Dombroski (1992)				
245e	Dombroski (1992)				
246e	Dombroski (1992)	ANSS (2003)	Dombroski (1992)		
247e	Dombroski (1992)				
248e	NUSSN 45 (1989)				
249e	Dombroski (1992)	NUSSN 48 (1989)	Person (1987a)	OhioSeis (2003)	ANSS (2003)
250e	PDE (2003)				
251e		Person (1987a)	OhioSeis (2003)	ANSS (2003)	
252e	NUSSN 48 (1989)				
253e	NUSSN 48 (1989)				
254e					
255e					
256e		ANSS (2003)			
257e					
258e	OhioSeis (2003)				
259e					
260e	Person (1987a)				
261e	NUSSN 48 (1989)	Person (1987a)	OhioSeis (2003)	ANSS (2003)	
262e					
263e	Dombroski (1992)				
264e	Dombroski (1992)				
265e	Dombroski (1992)				
266e	Dombroski (1992)				
267e					
268e					
269e					
270e					
271e					
272e					
273e					
274e					
275e					
276e					
277e					
278e					
279e					
280e					

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
241e 242e 243e 244e 245e 246e 247e 248e 249e 250e	VTSO 18 (2003) lists 39.925 N, 76.293 W. The location of this event is questionable. The time of the event is within one minute of event number 242, which is reported in several catalogs. NUSSN 48 (1989) lists 4.1 MN.
251e 252e 253e 254e 255e 256e 257e 258e 259e 260e	NUSSN 48 (1989) lists 41.93 N, 80.71 W; 3.3 MN. NUSSN 48 (1989) lists 24.1s; 41.93 N, 80.71 W; 3.1 MN.
261e 262e 263e 264e 265e 266e 267e 268e 269e 270e	NUSSN 48 (1989) lists 41.93 N, 80.71 W; 3.1 MN.
271e 272e 273e 274e 275e 276e 277e 278e 279e 280e	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source		FOCUS		m-lat	m-long	m-mag
281e	1990/01/13	20	47	55.33	157	M	single	39.425	-76.881	2.5			V	5		39.425	-76.881	2.5
282e	1990/01/26	4	27	29.5	158	M	single	40.994	-74.515	1.0	Mc			11.9		40.999	-74.504	4.7
283e	1990/03/30	8	31	32.8	24	M	single	40.021	-75.738	1.8	Mc			9.6		40.021	-75.738	1.8
284e	1990/04/04	16	15	1.7	159	M	single	39.522	-77.103	1.7				10		39.522	-77.103	1.7
285e	1990/05/10	3	39	26.9	160	M	single	40.802	-74.512	1.8	Mn			0.8		40.802	-74.512	1.8
286e	1990/07/03	3	32	58.8	25	M	single	40.286	-76.108	1.7	Mc			11.5		40.286	-76.108	1.7
287e	1990/07/24	23	4	38.01	196	M	single	41.902	-80.879	2.3				2.6		41.902	-80.879	2.3
288e	1990/09/26	6	13	4.89	149	M	single	41.902	-80.749	2.3						41.898	-80.76	3.8
289e	1990/10/23	1	34	48.27	161	M	single	39.512	-75.506	2.9			V	10		39.512	-75.506	2.9
290e	1990/11/18	9	20	52.81	172	M	single	41.902	-80.79	2.3						41.901	-80.798	3.0
291e	1990/12/14	19	38	7.1	26	M	single	41.83	-77.48	3.0	Mn	OTT		18		41.83	-77.48	3.0
292e	1990/12/17	7	22	48.5	27	M	single	41.953	-80.122	2.5	Mn	OTT	III	5		41.953	-80.122	2.5
293e	1991/04/17	17	42	39	903	Q	quarry blast	40.39	-77.96	2.5	Mn	GS				40.393	-77.96	3.3
294e	1991/05/12	9	36	10.3	122	M	single	41.029	-74.304	1.3				5.7		41.026	-74.325	1.5
295e	1991/07/05	16	26	40.3	110	M	single	40.931	-74.353	1.3				8.8		40.94	-74.351	2.2
296e	1991/08/15	7	16	7.15	28	M	single	40.786	-77.657	3.0	Mn	GS	V	5		40.786	-77.657	3.0
297e	1991/09/28	11	27	34.87	162	M	single	39.564	-76.979	2.4	Mn	GS		5		39.564	-76.979	2.4
298e	1991/09/29	12	21	35	163	M	single	39.848	-75.031	2.2	Mc	PAL		5		39.848	-75.031	2.2
299e	1991/10/13	2	26	38.47	197	M	single	41.711	-81.054	2.0						41.711	-81.054	2.0
300e	1992/01/09	8	50	45.22	164	M	single	40.363	-74.341	3.1	Mc	PAL		7		40.363	-74.341	3.1
301e	1992/03/04	10	31	14.1	146	M	single	40.964	-74.376	1.4				10		40.963	-74.382	1.9
302e	1992/03/15	6	13	55.22	165	M	single	41.911	-81.245	3.5	Mn	GS	IV	5		41.911	-81.245	3.5
303e	1992/03/15	14	49	40.02	195	M	single	41.8	-81.217	2.2						41.816	-81.219	3.4
304e	1992/03/26	3	43	15.27	176	M	1992/03/26	41.87	-80.87	2.5						41.871	-80.853	2.9
305e	1992/03/28	8	22	44.06	198	M	single	41.86	-80.91	2.9						41.86	-80.91	2.9
306e	1992/03/31	1	54	52.11	176	A	1992/03/26	41.86	-80.86	2.5						41.871	-80.853	2.9
307e	1992/04/07	1	35	22.12	176	A	1992/03/26	41.883	-80.85	2.0						41.871	-80.853	2.9
308e	1992/05/15	8	6	51.5	142	M	single	40.568	-75.134	1.6				2.5		40.577	-75.124	1.7
309e	1992/06/07	23	51	14.8	166	M	single	40.964	-74.564	0.4				6		40.964	-74.564	0.4
310e	1992/10/13	16	11	49.5	167	M	single	41.1	-74.417	1.0				7		41.1	-74.417	1.0
311e	1993/01/21	1	30	53.4	168	M	single	42.497	-74.362	2.2	Mc			3.5		42.497	-74.362	2.2
312e	1993/02/26	21	13	33.81	169	M	single	39.876	-74.942	2.5	Mn	GS	IV	5		39.876	-74.942	2.5
313e	1993/03/10	14	32	22	170	M	single	39.26	-76.94	2.5	mbLg	GS		0.4		39.26	-76.94	2.5
314e	1993/05/10	9	15	8.6	29	M	1993/05/10	40.347	-76.018	2.8	Mn	GS	IV	5		40.35	-76.02	2.8
315e	1993/05/11a	2	36	16.2	29	A	1993/05/10	40.35	-76.02	2.0	Mn	GS		5		40.35	-76.02	2.8
316e	1993/05/11b	2	41	47.6	29	A	1993/05/10	40.35	-76.02	2.3	Mn	GS	V	5		40.35	-76.02	2.8
317e	1993/05/11c	2	42	32.5	29	A	1993/05/10	40.35	-76.02	1.6	Mn	GS		5		40.35	-76.02	2.8
318e	1993/05/11d	2	43	57.4	29	A	1993/05/10	40.35	-76.02	2.2	Mn	GS		5		40.35	-76.02	2.8
319e	1993/05/13	7	3	3	29	A	1993/05/10	40.35	-76.02					5		40.35	-76.02	2.8
320e	1993/05/15	16	2	44.4	173	M	single	40.208	-74.401	2.6	Mc			13.6		40.208	-74.401	2.6

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
281e	1990/01/13	Liberty Reservoir	Baltimore	MD	1	none	PDE (2003)
282e	1990/01/26	Green Pond	Morris	NJ	4	1783/11/30a,b,c	NUSSN 58 (1993)
283e	1990/03/30	Downingtown	Chester	PA	1	none	NUSSN 58 (1993)
284e	1990/04/04	New Windsor	Carroll	MD	1	none	Reger (1999)
285e	1990/05/10	Morristown	Morris	NJ	1	none	NUSSN 59 (1994)
286e	1990/07/03	Reinholds	Lancaster	PA	1	none	NUSSN 60 (1994)
287e	1990/07/24	Lake Erie, NW of Ashtabula	Ashtabula	OH	1	none	OhioSeis (2003)
288e	1990/09/26	Ashtabula area	Ashtabula	OH	11	1987/07/13a to 1989/08/03	OhioSeis (2003)
289e	1990/10/23	SW of Salem	Salem	NJ	1	none	Gordon and Dewey (1999)
290e	1990/11/18	Ashtabula area	Ashtabula	OH	6	1987/07/13c to 1990/01/01	OhioSeis (2003)
291e	1990/12/14	Wellsboro	Tioga	PA	1	none	NUSSN 61 (1994)
292e	1990/12/17	Erie	Erie	PA	1	none	PDE (2003)
293e	1991/04/17	Mapleton	Huntingdon	PA	3	1964/02/13, 1982/05/12	PDE (2003)
294e	1991/05/12	Wanaque	Passaic	NJ	3	1978/05/18, 2000/02/16	LCSN (2003)
295e	1991/07/05	Towaco	Morris	NJ	3	1976/03/12, 1981/03/19	LCSN (2003)
296e	1991/08/15	Centre Hall	Centre	PA	1	none	Gordon and Dewey (1999)
297e	1991/09/28	Westminster	Carroll	MD	1	none	PDE (2003)
298e	1991/09/29	Magnolia	Camden	NJ	1	none	PDE (2003)
299e	1991/10/13	Thompson	Geauga	OH	1	none	OhioSeis (2003)
300e	1992/01/09	Spotswood	Middlesex	NJ	1	none	PDE (2003)
301e	1992/03/04	Kinnelon	Morris	NJ	3	1986/06/29, 2001/07/14	LCSN (2003)
302e	1992/03/15	Lake Erie, 17 km N of Fairport Harbor	Lake	OH	1	none	PDE (2003)
303e	1992/03/15	Lake Erie, N of Painesville	Lake	OH	3	1988/06/27, 2003/06/30	OhioSeis (2003)
304e	1992/03/26	Ashtabula	Ashtabula	OH	4	1992/03/31, 1992/04/07, 1995/02/23	OhioSeis (2003)
305e	1992/03/28	Geneva-on-the-Lake	Ashtabula	OH	1	none	OhioSeis (2003)
306e	1992/03/31	Ashtabula	Ashtabula	OH	4	1992/03/26, 1992/04/07, 1995/02/23	OhioSeis (2003)
307e	1992/04/07	Ashtabula	Ashtabula	OH	4	1992/03/26, 1992/03/31, 1995/02/23	OhioSeis (2003)
308e	1992/05/15	Milford	Bucks	PA	2	1984/12/14	LCSN (2003)
309e	1992/06/07	Mount Arlington	Morris	NJ	1	none	LCSN (2003)
310e	1992/10/13	West Milford	Passaic	NJ	1	none	LCSN (2003)
311e	1993/01/21	Middleburg	Schoharie	NY	1	none	LCSN (2003)
312e	1993/02/26	Haddonfield	Camden	NJ	1	none	Gordon and Dewey (1999)
313e	1993/03/10	Columbia	Howard	MD	1	none	VTSO 28 (2003)
314e	1993/05/10	Sinking Spring	Berks	PA	8	1993/05/11a to 1993/05/18b, 1996/02/03	Gordon and Dewey (1999)
315e	1993/05/11a	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b, 1996/02/03	PDE (2003)
316e	1993/05/11b	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b, 1996/02/03	Gordon and Dewey (1999)
317e	1993/05/11c	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b, 1996/02/03	PDE (2003)
318e	1993/05/11d	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b, 1996/02/03	PDE (2003)
319e	1993/05/13	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b, 1996/02/03	Person (1993b)
320e	1993/05/15	Perrineville	Monmouth	NJ	1	none	LCSN (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
281e 282e 283e 284e 285e 286e 287e 288e 289e 290e	Person (1990a) VTSO 25 (2003) PDE (2003)	Reger (1999) ANSS (2003) NUSSN 61 (1994)	VTSO 25 (2003) Person (1990c)	ANSS (2003) ANSS (2003)	 Dombroski (1992)
291e 292e 293e 294e 295e 296e 297e 298e 299e 300e	NUSSN 61 (1994) ANSS (2003) PDE (2003) Person (1992d) Person (1992d) Person (1992a)	Person (1990b) Person (1992b) LCSN (2003) LCSN (2003) LCSN (2003)	OhioSeis (2003) LCSN (2003) Reger (1999) ANSS (2003) ANSS (2003)	ANSS (2003) ANSS (2003) VTSO 26 (2003)	 ANSS (2003)
301e 302e 303e 304e 305e 306e 307e 308e 309e 310e	Person (1992c) 	LCSN (2003) 	OhioSeis (2003) 	ANSS (2003) 	
311e 312e 313e 314e 315e 316e 317e 318e 319e 320e	PDE (2003) LCSN (2003) PDE (2003) Person (1993b) PDE (2003) Person (1993b) Person (1993b) Person (1993b) LCSN (2003) LCSN (2003)	Person (1993a) Reger (1999) Person (1993b) LCSN (2003) Person (1993b) LCSN (2003) LCSN (2003) LCSN (2003) ANSS (2003)	LCSN (2003) LCSN (2003) ANSS (2003) LCSN (2003) ANSS (2003) ANSS (2003)	ANSS (2003) ANSS (2003) ANSS (2003) Seeber and others (1998)	Seeber and others (1998) Seeber and others (1998)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
281e 282e 283e 284e 285e 286e 287e 288e 289e 290e	PDE (2003) lists 2.6 MD (NED). VTSO 25 (2003) lists 39.366 N, 76.851 W. PDE (2003) lists 3.2 MD (NED). NUSSN 61 (1994) lists 39.568 N, 75.384 W; 3.4 MN, 2.9 MC; 5.0 dof.
291e 292e 293e 294e 295e 296e 297e 298e 299e 300e	NUSSN 61 (1994) lists 53.3s; 42.35 N, 79.93 W; 2.5 mbLg (OTT); 18.0 dof. Probably a quarry blast at Pennsylvania Glass Sand Corp. quarry at Mapleton (C. K. Scharnberger, personal commun., 1999). LCSN (2003) lists 7.5s; 40.783 N, 77.667 W; 3.0 mbLg (GS). Felt Intensity V at Centre Hall and IV in Madisonburg and Spring Mills. Perhaps a quarry blast. LCSN (2003) lists 2.4 mbLg (GS). VTSO 26 (2003) lists 39.249 N, 76.722 W. Felt at Randallstown, Md.
301e 302e 303e 304e 305e 306e 307e 308e 309e 310e	LCSN (2003) lists 3.5 mbLg (GS). Felt Intensity IV in the Ashtabula area and III in the Austinburg area.
311e 312e 313e 314e 315e 316e 317e 318e 319e 320e	LCSN (2003) lists 2.5 lg. LCSN (2003) lists 39.235 N, 76.882 W; 2.5 lg; 5 dof. VTSO 28 (2003) lists 39.19 N, 76.87 W. LCSN (2003) lists 2.8 lg, 2.0 mbLg. Seeber and others (1998) lists 40.362 N, 75.988 W; 4.8 dof. Felt Intensity IV at Reading and III at Hamburg and Shillington. LCSN (2003) lists 2.0 mbLg. Felt in the Reading area. One of the five aftershocks of the May 10 event. LCSN (2003) lists 2.3 mbLg, 2.3 lg. Seeber and others (1998) lists 40.344 N, 76.044 W; 5.7 dof. Felt Intensity V at Reading. One of the five aftershocks of the May 10 event. LCSN (2003) lists 1.6 mbLg, 1.6 lg. Felt in the Reading area. One of the five aftershocks of the May 10 event. LCSN (2003) lists 2.2 mbLg, 2.2 lg. Seeber and others (1998) lists 40.345 N, 76.007 W; 5.8 dof. Felt in the Reading area. One of the five aftershocks of the May 10 event.

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS	VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source			m-lat	m-long	m-mag
321e	1993/05/18a	9	5	34.5	57	A	1993/05/10	40.284	-76.001	2.0	lg			1	40.295	-76.004	3.3
322e	1993/05/18b	9	45	24.39	29	A	1993/05/10	40.35	-76.02	2.1	Mn	GS	IV	5	40.35	-76.02	2.8
323e	1993/10/16	6	30	5.32	174	M	single	41.698	-81.012	3.4	mbLg	GS	IV	5	41.698	-81.012	3.4
324e	1993/11/08	18	47		103	F	1994/04/23	39.748	-75.563	1.7	Mc		I-II		39.75	-75.553	3.3
325e	1994/01/16a	0	42	43.2	30	F	1994/01/16b	40.33	-76.04	4.0	mb	GS	V	5	40.324	-76.039	4.6
326e	1994/01/16b	1	49	16.21	30	M	1994/01/16b	40.33	-76.037	4.6	mb	GS	V	5	40.324	-76.039	4.6
327e	1994/01/16c	5	14	32.3	31	A	1994/01/16b	40.32	-76.01	2.9	Mn	GS		5	40.328	-76.004	2.9
328e	1994/01/17a	4	42	25.7	32	A	1994/01/16b	40.369	-76.092	2.7	Mc			1	40.369	-76.092	2.7
329e	1994/01/17b	21	7	47.6	32	A	1994/01/16b	40.369	-76.092	2.4	Mc	PAL		1	40.369	-76.092	2.7
330e	1994/01/18	1	43	31.81	33	M	single	40.19	-76.23	2.6	Mn	GS		5	40.19	-76.23	2.6
331e	1994/02/11	15	46		103	F	1994/04/23	39.75	-75.55	1.9	Mc		I		39.75	-75.553	3.3
332e	1994/03/24	5	20	59.6	32	A	1994/01/16b	40.369	-76.092	2.0	Mc				40.369	-76.092	2.7
333e	1994/04/16	0	53	57.9	34	M	single	40.309	-75.964	2.3	Mc				40.313	-75.965	2.3
334e	1994/04/23	9	9	42.5	103	M	1994/04/23	39.75	-75.56	2.0	Mc		I-II		39.75	-75.553	3.3
335e	1994/05/07	5	31	35.97	30	A	1994/01/16b	40.312	-76.039	2.5	Mn	GS		5	40.324	-76.039	4.6
336e	1994/05/18	5	18	55	35	M	single	40	-76.2	2.4	Mc	NED		5	40	-76.2	2.4
337e	1994/05/23	0	45	20.6	175	M	single	40.956	-74.516	1.6	Mc			4	40.952	-74.509	2.3
338e	1994/05/26	17	21	58.2	36	M	single	39.951	-77.188	2.8	Mc			11	39.951	-77.188	2.8
339e	1994/05/31	5	43	20.1	31	A	1994/01/16b	40.335	-75.998	2.4	Mc			1	40.328	-76.004	2.9
340e	1994/07/03a	3	28	26.3	37	A	1994/01/16b	40.345	-75.882	2.0	Mc				40.345	-75.882	2.0
341e	1994/07/03b	3	59	4.6	38	A	1994/01/16b	40.334	-76.088	2.3	Mc				40.342	-76.095	2.6
342e	1995/01/08	5	8	2.9	57	M	single	40.3	-76	2.5	Mn	GS		5	40.295	-76.004	3.3
343e	1995/01/27	2	37	7.4	175	M	single	40.958	-74.501	2.3	Mc			3	40.952	-74.509	2.3
344e	1995/02/23	9	32	13	176	M	single	41.87	-80.83	2.9	Mn	OTT		5	41.871	-80.853	2.9
345e	1995/03/11a	21	10	16.03	3	M	1995/03/11a	40.1	-76.4	2.7	Mc	PAL	IV	5	40.11	-76.395	4.1
346e	1995/03/11b	22	49		39	A	1995/03/11a	40.1	-76.33	2.0					40.1	-76.33	2.0
347e	1995/04/01	5	50	59.5	175	M	single	40.95	-74.51	1.5	Mc			5	40.952	-74.509	2.3
348e	1995/04/08	20	9	23.8	38	M	single	40.349	-76.102	2.6	Mc			4	40.342	-76.095	2.6
349e	1995/04/09	11	37	29.01	199	M	single	41.97	-80.75	2.4					41.97	-80.75	2.4
350e	1995/05/26	5	24	7.6	177	M	single	40.992	-74.357	1.5	Mc			1	40.99	-74.347	1.9
351e	1995/06/04	4	35	12.5	40	M	single	40.339	-75.966	2.7	Mc			1	40.353	-75.942	2.7
352e	1995/07/08	22	19	23.6	41	M	single	41.95	-79.044	2.4	Mn			18	41.95	-79.044	2.4
353e	1995/08/17	21	9	52.2	42	M	single	40.625	-76.127	1.8	Mc			1	40.625	-76.127	1.8
354e	1995/10/17a	2	12	28.6	103	M	1995/10/17a	39.755	-75.573	2.0	Mc		II		39.75	-75.553	3.3
355e	1995/10/17b	8	51	43.2	103	A	1995/10/17a	39.756	-75.544	2.0			II-III		39.75	-75.553	3.3
356e	1995/10/27a	1	46	45.6	178	M	single	41.148	-74.548	1.3	Mc			7	41.158	-74.553	1.4
357e	1995/10/27b	6	52	54.2	178	M	single	41.153	-74.56	1.4	Mc			8	41.158	-74.553	1.4
358e	1995/12/20	16	32	2.7	103	A	1995/10/17a	39.753	-75.553	1.4	Mc		I-II		39.75	-75.553	3.3
359e	1996/02/03	2	31	14	29	M	single	40.35	-76.02	2.3					40.35	-76.02	2.8
360e	1996/02/18	13	23	57.8	153	F	1996/02/19a	41.073	-74.28	1.5	Mc			1	41.068	-74.287	1.7

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
321e	1993/05/18a	Mohnton	Berks	PA	7	1954/01/07b to 1955/01/20, 1995/01/08	LCSN (2003)
322e	1993/05/18b	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/13, 1996/02/03	Gordon and Dewey (1999)
323e	1993/10/16	Mentor	Geauga	OH	1	none	Gordon and Dewey (1999)
324e	1993/11/08	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
325e	1994/01/16a	Sinking Spring	Berks	PA	3	1994/01/16b, 1994/05/07	Gordon and Dewey (1999)
326e	1994/01/16b	Sinking Spring	Berks	PA	3	1994/01/16a, 1994/05/07	Gordon and Dewey (1999)
327e	1994/01/16c	Sinking Spring	Berks	PA	2	1994/05/31	PDE (2003)
328e	1994/01/17a	Robeson	Berks	PA	3	1994/01/17b, 1994/03/24	LCSN (2003)
329e	1994/01/17b	Robeson	Berks	PA	3	1994/01/17a, 1994/03/24	LCSN (2003)
330e	1994/01/18	Ephrata	Lancaster	PA	1	none	PDE (2003)
331e	1994/02/11	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
332e	1994/03/24	Robeson	Berks	PA	3	1994/01/17a,b	LCSN (2003)
333e	1994/04/16	Reading	Berks	PA	2	1999/04/18	LCSN (2003)
334e	1994/04/23	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
335e	1994/05/07	Sinking Spring	Berks	PA	3	1994/01/16a,b	PDE (2003)
336e	1994/05/18	Strasburg	Lancaster	PA	1	none	PDE (2003)
337e	1994/05/23	Hibernia	Morris	NJ	4	1995/01/27, 1995/04/01, 1997/06/27	LCSN (2003)
338e	1994/05/26	Biglerville	Adams	PA	1	none	LCSN (2003)
339e	1994/05/31	Sinking Spring	Berks	PA	2	1994/01/16c	LCSN (2003)
340e	1994/07/03a	Reading	Berks	PA	1	none	LCSN (2003)
341e	1994/07/03b	Robeson	Berks	PA	2	1995/04/08	LCSN (2003)
342e	1995/01/08	Mohnton	Berks	PA	7	1954/01/07b to 1955/01/20, 1993/05/18a	PDE (2003)
343e	1995/01/27	Hibernia	Morris	NJ	4	1994/05/23, 1995/04/01, 1997/06/27	LCSN (2003)
344e	1995/02/23	Ashtabula	Ashtabula	OH	4	1992/03/26, 1992/03/31, 1992/04/07	PDE (2003)
345e	1995/03/11a	Landisville	Lancaster	PA	2	1800/11/20	Scharnberger (2003)
346e	1995/03/11b	East Petersburg	Lancaster	PA	1	none	Scharnberger (2003)
347e	1995/04/01	Hibernia	Morris	NJ	4	1994/05/23, 1995/01/27, 1997/06/27	LCSN (2003)
348e	1995/04/08	Robeson	Berks	PA	2	1994/07/03	LCSN (2003)
349e	1995/04/09	Lake Erie, N of Ashtabula	Ashtabula	OH	1	none	OhioSeis (2003)
350e	1995/05/26	Kinnelon	Morris	NJ	4	1998/06/20, 1998/06/30, 1999/08/19	LCSN (2003)
351e	1995/06/04	Reading	Berks	PA	3	1937/06/09, 1999/10/22	LCSN (2003)
352e	1995/07/08	Scandia	Warren	PA	1	none	LCSN (2003)
353e	1995/08/17	Schuylkill Haven	Schuylkill	PA	1	none	LCSN (2003)
354e	1995/10/17a	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
355e	1995/10/17b	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
356e	1995/10/27a	McAfee	Sussex	NJ	4	1995/10/27b, 1996/11/12a,b	LCSN (2003)
357e	1995/10/27b	McAfee	Sussex	NJ	4	1995/10/27a, 1996/11/12a,b	LCSN (2003)
358e	1995/12/20	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
359e	1996/02/03	Sinking Spring	Berks	PA	8	1993/05/10 to 1993/05/18b	
360e	1996/02/18	Wanaque	Passaic	NJ	3	1988/12/22, 1996/02/19	LCSN (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
321e 322e 323e 324e 325e 326e 327e 328e 329e 330e	PDE (2003) PDE (2003) VTSO 28 (2003) Person (1994) Person (1994) ANSS (2003) Seeber and others (1998) LCSN (2003)	LCSN (2003) LCSN (2003) ANSS (2003) LCSN (2003) ANSS (2003) Seeber and others (1998) ANSS (2003)	ANSS (2003) OhioSeis (2003) Seeber and others (1998) Seeber and others (1998) LCSN (2003) Seeber and others (1998)	ANSS (2003) LCSN (2003)	
331e 332e 333e 334e 335e 336e 337e 338e 339e 340e	 VTSO 29 (2003) LCSN (2003) ANSS (2003)	 ANSS (2003) ANSS (2003)	 Seeber and others (1998)		
341e 342e 343e 344e 345e 346e 347e 348e 349e 350e	 LCSN (2003) LCSN (2003) PDE (2003)	 ANSS (2003) OhioSeis (2003) LCSN (2003)	 ANSS (2003) ANSS (2003)		
351e 352e 353e 354e 355e 356e 357e 358e 359e 360e	 VTSO 30 (2003) VTSO 30 (2003) VTSO 30 (2003)	 ANSS (2003) ANSS (2003) ANSS (2003)			

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
321e	LCSN (2003) lists 2.0 mc.
322e	LCSN (2003) lists 2.1 mbLg (GS), 2.1 lg. Felt Intensity IV at West Lawn. One of the five aftershocks of the May 10 event.
323e	PDE (2003) lists 3.6 Mn (OTT). LCSN (2003) lists 41.76 N, 81.02 W; 3.6 mn. Felt Intensity IV at Madison and Unionville. Felt in the Perry area.
324e	
325e	LCSN (2003) lists 44.9s; 40.369 N, 76.092 W; 3.8 Mn, 4.2 mb; 1 dof. Seeber and others (1998) lists 40.375 N, 76.034 W; 0.5 dof.
326e	LCSN (2003) lists 17.7s; 40.369 N, 76.092 W; 4.0 Mn; 1 dof. Seeber and others (1998) lists 40.371 N, 76.067 W; 0.1 dof.
327e	LCSN (2003) lists 32.0s; 40.369 N, 76.092 W; 3.1 Mn, 2.9 mb. Seeber and others (1998) lists 40.347 N, 76.005 W; 3.5 dof.
328e	Part of cluster on edge of reporting area.
329e	Part of cluster on edge of reporting area. Seeber and others (1998) lists 40.380 N, 75.991 W; 5.1 dof.
330e	LCSN (2003) lists 36.1s; 40.369 N, 76.092 W; 2.8 Mc, 2.6 mb. Seeber and others (1998) lists 40.342 N, 76.026 W; 1.9 dof.
331e	
332e	
333e	Latitude and longitude may be in error.
334e	
335e	LCSN (2003) lists 37.3s; 40.359 N, 76.008 W, 2.6 Mc, 2.5 mb. Seeber and others (1998) lists 40.350 N, 76.035 W; 3.0 dof. Felt in the Reading area.
336e	Felt at Lampeter and Strasburg.
337e	
338e	
339e	
340e	
341e	
342e	LCSN (2003) lists 2.5 mb, 2.5 mbLg (GS), 2.5 Mc. Felt in Berks County.
343e	
344e	LCSN (2003) lists 2.9 mb, 2.9 mbLg (OTT), 2.4 Mc, 2.4 (GS).
345e	Felt Intensity IV at Adamstown, East Petersburg, and Neffsville, and III at Lancaster, Lititz, and Manheim.
346e	
347e	
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358e	
359e	Data from S. J. Baxter (personal commun., 1997). Millersville showed 16.5s; 40.35 N, 76.0 W; 2.9 duration magnitude.
360e	

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF FOCUS		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source				m-lat	m-long	m-mag
361e	1996/02/19a	13	1	55.3	153	M	1996/02/19a	41.07	-74.283	1.7	Mc			1		41.068	-74.287	1.7
362e	1996/02/19b	17	8	10.9	179	A	1996/02/19a	41.094	-74.308	0.8	Mc			1		41.104	-74.314	0.8
363e	1996/02/23	8	30	29.3	179	A	1996/02/19a	41.114	-74.32	0.8	Mc			5		41.104	-74.314	0.8
364e	1996/02/26	16	0	5.1	180	M	single	40.93	-74.63					6		40.93	-74.63	
365e	1996/06/14	3	52	11.37	103	M	1996/06/14	39.741	-75.549	2.1			II-III			39.75	-75.553	3.3
366e	1996/06/23	19	53	11.22	103	A	1996/06/14	39.745	-75.553	1.7			I-II	0.1		39.75	-75.553	3.3
367e	1996/07/05	16	11	23.35	43	M	single	39.907	-75.492	2.6				17.79		39.907	-75.492	2.6
368e	1996/07/07	5	38	28.6	44	M	single	40.252	-75.952	2.3				24		40.252	-75.952	2.3
369e	1996/10/17	11	43	27.98	45	M	single	39.748	-76.057	2.2	Mc			5		39.748	-76.057	2.2
370e	1996/10/24	6	44	18.93	181	M	single	39.85	-74.33	2.0	Mc			10		39.85	-74.33	2.0
371e	1996/10/28	6	59	40.45	46	M	single	40.27	-76.14	2.5	Mc			0.1		40.27	-76.14	2.5
372e	1996/11/12a	6	37	21.7	178	M	1996/11/12a	41.169	-74.554	1.3	Mc			1		41.158	-74.553	1.4
373e	1996/11/12b	11	23	36.6	178	A	1996/11/12a	41.163	-74.549	0.8	Mc			1		41.158	-74.553	1.4
374e	1997/01/29	3	12	28.8	103	M	single	39.733	-75.55	1.4	Mc		II	0.8		39.75	-75.553	3.3
375e	1997/03/11a	18	31	46.3	182	M	single	40.425	-74.6					10		40.425	-74.6	
376e	1997/03/11b	18	58	58.3	47	M	single	40.308	-74.991	1.6				10		40.308	-74.991	1.6
377e	1997/04/16	1	29	44.5	183	M	single	39.798	-75.556	1.6	Mc		III-IV	0.1		39.798	-75.556	1.6
378e	1997/06/16	5	43	16.63	48	M	1997/06/16	40.098	-76.967	2.4			IV	5		40.099	-76.969	2.4
379e	1997/06/17	2	4		48	A	1997/06/16	40.1	-76.97	1.6						40.099	-76.969	2.4
380e	1997/06/27	20	58	25	175	M	single	40.942	-74.51	1.6	Mc			2		40.952	-74.509	2.3
381e	1997/07/15	17	29	48.9	184	M	single	40.41	-74.542	2.3	Mc			5		40.41	-74.542	2.3
382e	1997/11/14	3	44	11.05	49	M	1997/11/14	40.164	-76.276	3.0	Mn	GS	IV	10		40.167	-76.283	3.0
383e	1997/11/16	10	58		49	A	1997/11/14	40.17	-76.29	1.8						40.167	-76.283	3.0
384e	1998/01/27	0	38	30	185	M	1998/01/27	42.03	-80.99	3.0	Mn			18		42.03	-80.99	3.0
385e	1998/01/30	4	59	18	186	A	1998/01/27	41.97	-81.07	2.4	Mn			18		41.97	-81.07	2.4
386e	1998/03/15	19	25	52.4	103	M	1998/03/15	39.738	-75.54	1.8			III	5.8		39.75	-75.553	3.3
387e	1998/03/19a	5	37	26.3	103	A	1998/03/15	39.736	-75.537	1.7			III	5.9		39.75	-75.553	3.3
388e	1998/03/19b	6	27	55	103	A	1998/03/15	39.734	-75.537	1.0			I-II			39.75	-75.553	3.3
389e	1998/03/25	7	13	6.7	187	M	single	39.464	-75.519	1.9	Mc			10		39.464	-75.519	1.9
390e	1998/06/20	12	54	6.6	177	F	1998/06/30	40.989	-74.359	1.2	Mc			6		40.99	-74.347	1.9
391e	1998/06/30	6	18	37.6	177	M	1998/06/30	40.978	-74.34	1.9	Mc			7		40.99	-74.347	1.9
392e	1998/08/30	3	33	50	50	M	single	42.26	-80.08	2.1	Mn			18		42.26	-80.08	2.1
393e	1998/09/25	19	52	52.3	51	M	1998/09/25	41.47	-80.37	5.1	ML			5		41.468	-80.365	5.1
394e	1998/10/09	8	41	45.78	51	A	1998/09/25	41.477	-80.358	2.0	Mn			5.32		41.468	-80.365	5.1
395e	1998/10/16	2	56	14.74	51	A	1998/09/25	41.465	-80.367					3.52		41.468	-80.365	5.1
396e	1998/10/22	19	56	58.47	51	A	1998/09/25	41.468	-80.365					3.82		41.468	-80.365	5.1
397e	1998/10/23	16	2	3.55	51	A	1998/09/25	41.467	-80.364					3.92		41.468	-80.365	5.1
398e	1998/10/27a	6	41	17.7	107	M	single	39.788	-75.588	1.5			II	2.6		39.796	-75.596	3.3
399e	1998/10/27b	13	9	44.95	51	A	1998/09/25	41.465	-80.367					3.48		41.468	-80.365	5.1
400e	1998/11/01	7	19	12.25	51	A	1998/09/25	41.467	-80.366					3.61		41.468	-80.365	5.1

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
361e	1996/02/19a	Wanaque	Passaic	NJ	3	1988/12/22, 1996/02/18	LCSN (2003)
362e	1996/02/19b	Ringwood	Passaic	NJ	2	1996/02/23	LCSN (2003)
363e	1996/02/23	Ringwood	Passaic	NJ	2	1996/02/19b	LCSN (2003)
364e	1996/02/26	Hopatcong	Morris	NJ	1	none	LCSN (2003)
365e	1996/06/14	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
366e	1996/06/23	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
367e	1996/07/05	Glen Mills	Delaware	PA	1	none	VTSO (1999)
368e	1996/07/07	Angelica	Berks	PA	1	none	
369e	1996/10/17	Nottingham	Chester	PA	1	none	PDE (2003)
370e	1996/10/24	Howardsville	Ocean	NJ	1	none	LCSN (2003)
371e	1996/10/28	Blainsport	Lancaster	PA	1	none	PDE (2003)
372e	1996/11/12a	McAfee	Sussex	NJ	4	1995/10/27a,b; 1996/11/12b	LCSN (2003)
373e	1996/11/12b	McAfee	Sussex	NJ	4	1995/10/27a,b; 1996/11/12a	LCSN (2003)
374e	1997/01/29	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
375e	1997/03/11a	Kendall Park	Somerset	NJ	1	none	LCSN (2003)
376e	1997/03/11b	Pineville	Bucks	PA	1	none	LCSN (2003)
377e	1997/04/16	Talleyville	New Castle	DE	1	none	DGS (2000)
378e	1997/06/16	Dillsburg	York	PA	2	1997/06/17	Scharnberger and others (1999)
379e	1997/06/17	Dillsburg	York	PA	2	1997/06/16	Scharnberger and others (1999)
380e	1997/06/27	Hibernia	Morris	NJ	4	1994/05/23, 1995/01/27, 1995/04/01	LCSN (2003)
381e	1997/07/15	Monmouth Junction	Middlesex	NJ	1	none	LCSN (2003)
382e	1997/11/14	Lititz	Lancaster	PA	2	1997/11/16	VTSO 32 (2003)
383e	1997/11/16	Lititz	Lancaster	PA	2	1997/11/14	
384e	1998/01/27	Lake Erie	Ashtabula	OH	1	none	CNSD (2003)
385e	1998/01/30	Lake Erie	Lake	OH	1	none	CNSD (2003)
386e	1998/03/15	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
387e	1998/03/19a	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19b	DGS (2000)
388e	1998/03/19b	Wilmington	New Castle	DE	35	1971/07/14 to 1998/03/19a	DGS (2000)
389e	1998/03/25	13 km S of Salem	Salem	NJ	1	none	LCSN (2003)
390e	1998/06/20	Kinnelon	Morris	NJ	4	1995/05/26, 1998/06/30, 1999/08/19	LCSN (2003)
391e	1998/06/30	Kinnelon	Morris	NJ	4	1995/05/26, 1998/06/20, 1999/08/19	LCSN (2003)
392e	1998/08/30	Lake Erie	Erie	PA	1	none	CNSD (2003)
393e	1998/09/25	Greenville (Osgood)	Mercer	PA	7	1998/10/09 to 1998/11/01	PDE (2003)
394e	1998/10/09	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/11/01	Armbruster and others (1998)
395e	1998/10/16	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/11/01	Armbruster and others (1998)
396e	1998/10/22	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/11/01	Armbruster and others (1998)
397e	1998/10/23	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/11/01	Armbruster and others (1998)
398e	1998/10/27a	Centerville	New Castle	DE	3	1895/11/20, 1974/04/28	DGS (2000)
399e	1998/10/27b	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/11/01	Armbruster and others (1998)
400e	1998/11/01	Greenville (Osgood)	Mercer	PA	7	1998/09/25 to 1998/10/27b	Armbruster and others (1998)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
361e 362e 363e 364e 365e 366e 367e 368e 369e 370e	VTSO (1999) VTSO (1999) ANSS (2003) LCSN (2003) VTSO 31 (2003)	ANSS (2003) ANSS (2003) Reger (1999)	 VTSO 31 (2003)	 ANSS (2003)	
371e 372e 373e 374e 375e 376e 377e 378e 379e 380e	LCSN (2003) LCSN (2003) LCSN (2003) LCSN (2003) LCSN (2003) ANSS (2003)	ANSS (2003) ANSS (2003) ANSS (2003)	 PDE (2003)		
381e 382e 383e 384e 385e 386e 387e 388e 389e 390e	ANSS (2003) LCSN (2003) OhioSeis (2003) OhioSeis (2003) VTSO 33 (2003) ANSS (2003) ANSS (2003) ANSS (2003)	ANSS (2003) ANSS (2003)	PDE (2003)		
391e 392e 393e 394e 395e 396e 397e 398e 399e 400e	OhioSeis (2003) LCSN (2003), NESN (2000) CNSD (2003) VTSO 33 (2003)	Armbruster and others (1998) LCSN (2003) ANSS (2003)	CNSD (2003) NCEER (1992)	OhioSeis (2003)	ANSS (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
361e 362e 363e 364e 365e 366e 367e 368e 369e 370e	Some data from S. J. Baxter (personal commun., 1997). Data from S. J. Baxter (personal commun., 1997). Some data from S. J. Baxter (personal commun., 1997). LCSN (2003) lists 30.7s; 39.740 N, 76.050 W; 2.3 mb. PDE (2003) lists 2.3 Mn (GS). Some data from S. J. Baxter (personal commun., 1997). LCSN (2003) lists 18.9s; 39.865 N, 74.347 W; 9 dof.
371e 372e 373e 374e 375e 376e 377e 378e 379e 380e	Some data from S. J. Baxter (personal commun., 1997). LCSN (2003) lists 40.5s; 40.330 N, 76.029 W; 2.6 mb; 1 dof. DGS (2000) lists 4/15/97; 13h 12m 29s; north of Wilmington. Duration magnitude 2.2 (S. J. Baxter, personal commun., 1997). 40.445 N, 77.003 W at center of intensity map. PDE (2003) lists 2.2 MD (NED). LCSN (2003) lists 1.9 mb, 2.2 Mc.
381e 382e 383e 384e 385e 386e 387e 388e 389e 390e	Some data from C. K. Scharnberger (personal commun., 1997). 3.0 mbLg, 2.8 ML (S. J. Baxter, personal commun., 1997). PDE (2003) lists 40.19 N, 76.29 W; 5 dof. LCSN (2003) lists 11.7s; 3.0 mb. 40.13 N, 76.33 W at center of intensity map. Data from C. K. Scharnberger (personal commun., 1997).
391e 392e 393e 394e 395e 396e 397e 398e 399e 400e	41.515 N, 80.377 W; 4.6 mb (GS), 4.2 mbLg (GS) (J. W. Dewey, written commun., 1998). LCSN (2003) lists 52.0s; 41.495 N, 80.388 W; 5.2 mb, 5.4 Mn. CNSD (2003) lists 41.52 N, 80.53 W; 5.4 MN. OhioSeis (2003) lists 5.2 magnitude. Location provided by LCSN (2003) and NCEER (1992). CNSD (2003) lists 8h 41m 50s; 41.68 N, 80.37 W; 2.1 MN. Data from J. G. Armbruster (written commun., 11/13/98). Data from J. G. Armbruster (written commun., 11/13/98). Data from J. G. Armbruster (written commun., 11/13/98). Data from J. G. Armbruster (written commun., 11/13/98). Data from J. G. Armbruster (written commun., 11/13/98).

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE and TIME				MAP NO.	MAIN-FOR-AFT		LAT/LONG		MAGNITUDE			INTEN-SITY	DEPTH OF		VALUES USED IN MAP PLOT		
	yr/mo/day	hr	min	sec		F/A	Swarm	Latitude	Longitude	Magn	Type	Source		FOCUS		mlat	mlong	mmag
401e	1998/11/07	2	17	12	52	M	single	41.57	-80.31	2.3	Mn			5		41.57	-80.31	2.3
402e	1999/04/18	9	44	55.7	34	M	single	40.317	-75.966	1.9	Mc			2		40.313	-75.965	2.3
403e	1999/05/31	1	16	31	205	M	single	40.06	-74.71	2.3	Mc			10		40.07	-74.731	3.1
404e	1999/07/27	13	22	43	53	M	single	40.17	-75.79					1.7		40.17	-75.79	
405e	1999/08/19	15	14	55	177	M	single	41	-74.33					4.6		40.99	-74.347	1.9
406e	1999/10/22	14	37	33	40	M	single	40.38	-75.93	1.9	Mc			10.7		40.353	-75.942	2.7
407e	1999/10/30	8	2	48	54	M	single	42.06	-80.4	2.5	Mn			18		42.06	-80.4	2.5
408e	2000/02/16	17	42	13	122	M	single	41.03	-74.33					5.7		41.026	-74.325	1.5
409e	2000/02/24	14	47	19	55	M	single	41.12	-75.75	2.3	Mc			5.9		41.12	-75.75	2.3
410e	2000/03/22	20	48	0	21	M	single	40.07	-76.3	1.8	Mc			1		40.065	-76.3	1.8
411e	2000/06/07a	6	19	18	188	F	2000/06/07b	42.01	-80.78	2.0	Mn			18		42.01	-80.78	2.4
412e	2000/06/07b	6	55	9	188	M	2000/06/07b	42.01	-80.78	2.4	Mn			18		42.01	-80.78	2.4
413e	2000/08/07	2	2	32	189	M	single	40.89	-81.22	3.2	Mn			18		40.895	-81.21	4.2
414e	2000/08/24	7	38		56	M	single	40.1	-76.7	1.9						40.1	-76.7	1.9
415e	2000/10/05	23	33	59	58	M	single	39.94	-76.34	2.1	Mc			6.6		39.938	-76.338	2.1
416e	2000/10/20	23	26	28	190	F	2001/01/26b	41.93	-80.78	2.5	Mn			5		41.935	-80.785	4.3
417e	2001/01/20	2	5	7.5	200	F	2001/01/26b	41.877	-80.774	2.6	Mn	OTT		5		41.879	-80.771	2.6
418e	2001/01/22	12	5	40	191	F	2001/02/03	42.481	-77.524	2.4	Mn			5		42.472	-77.492	3.2
419e	2001/01/25	14	19	23	191	F	2001/02/03	42.496	-77.472	2.5	Mn			5		42.472	-77.492	3.2
420e	2001/01/26a	2	5	7	200	F	2001/01/26b	41.88	-80.78	2.6	Mn			5		41.879	-80.771	2.6
421e	2001/01/26b	3	3	19.7	190	M	2001/01/26b	41.94	-80.79	4.3	Mn	GS		5		41.935	-80.785	4.3
422e	2001/01/26c	3	11	30	150	A	2001/01/26b	41.93	-80.72	2.0	Mn			5		41.934	-80.718	2.7
423e	2001/01/26d	3	45	25	150	A	2001/01/26b	41.93	-80.72	2.2	Mn			5		41.934	-80.718	2.7
424e	2001/01/26e	5	11	5	150	A	2001/01/26b	41.93	-80.72	2.0	Mn			5		41.934	-80.718	2.7
425e	2001/01/26f	5	36	53	192	A	2001/01/26b	41.98	-80.7	3.2	Mn			5		41.98	-80.7	3.2
426e	2001/02/03	20	15	15	191	M	2001/02/03	42.439	-77.48	3.2	Mn	PAL		5		42.472	-77.492	3.2
427e	2001/06/03	22	36	46.46	193	A	2001/01/26b	41.852	-80.673	3.4	Mn	OTT	III	5		41.852	-80.673	3.4
428e	2001/06/05	8	27	15	200	A	2001/01/26b	41.88	-80.76	2.2	Mn			5		41.879	-80.771	2.6
429e	2001/07/14	20	8	29.39	146	M	single	40.96	-74.37	1.9	Mc	PAL		7		40.963	-74.382	1.9
430e	2001/07/17	14	41	20	58	M	single	39.937	-76.337	1.8	Mc			0.7		39.938	-76.338	2.1
431e	2002/08/09	14	59	56	201	M	single	40.62	-74.63	1.5	Mc			3.8		40.62	-74.63	1.5
432e	2002/08/17	8	26	31.89	202	M	single	41.79	-80.98	2.0						41.79	-80.98	2.0
433e	2003/02/10	5	34	43.07	150	M	single	41.95	-80.72	2.4			II			41.934	-80.718	2.7
434e	2003/04/20	12	24	43.79	128	M	single	41.361	-74.37	2.3	Mc	PAL		7		41.352	-74.364	3.0
435e	2003/05/02	15	59	7	203	M	single	41.67	-81.11	2.0						41.67	-81.11	2.0
436e	2003/06/30	19	21	17.2	195	M	single	41.83	-81.21	3.4			IV	4.6		41.816	-81.219	3.4
437e	2003/07/17	0	44	10	204	M	single	41.86	-80.76	2.5			III	2.5		41.86	-80.76	2.5

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	DATE	GEOGRAPHIC LOCATION			COMBINED EVENTS ON MAP		REFERENCES
	yr/mo/day	Town	County	State	No.	Other events	Ref1
401e	1998/11/07	Atlantic	Crawford	PA	1	none	CNSD (2003)
402e	1999/04/18	Reading	Berks	PA	2	1994/04/16	LCSN (2003)
403e	1999/05/31	Columbus	Burlington	NJ	3	1857/02/10, 1987/12/06	LCSN (2003)
404e	1999/07/27	Warwick	Chester	PA	1	none	LCSN (2003)
405e	1999/08/19	Kinnelon	Morris	NJ	4	1995/05/26, 1998/06/20, 1998/06/30	LCSN (2003)
406e	1999/10/22	Reading	Berks	PA	3	1937/06/09, 1995/06/04	LCSN (2003)
407e	1999/10/30	Lake Erie	Erie	PA	1	none	CNSD (2003)
408e	2000/02/16	Wanaque	Passaic	NJ	3	1978/05/18, 1991/05/12	LCSN (2003)
409e	2000/02/24	Penn Lake Park	Luzerne	PA	1	none	LCSN (2003)
410e	2000/03/22	Lancaster	Lancaster	PA	2	1984/09/19	LCSN (2003)
411e	2000/06/07a	Lake Erie	Ashtabula	OH	2	2000/06/07b	CNSD (2003)
412e	2000/06/07b	Lake Erie	Ashtabula	OH	2	2000/06/07a	CNSD (2003)
413e	2000/08/07	Alliance	Stark	OH	2	1927/10/29	CNSD (2003)
414e	2000/08/24	York Haven	York	PA	1	none	
415e	2000/10/05	Martic Forge	Lancaster	PA	2	2001/07/17	LCSN (2003)
416e	2000/10/20	Lake Erie	Ashtabula	OH	2	2001/01/26b	CNSD (2003)
417e	2001/01/20	Ashtabula	Ashtabula	OH	3	2001/01/26a, 2001/06/05	SOSN (2003)
418e	2001/01/22	Atlanta	Steuben	NY	3	2001/01/25, 2001/02/03	SOSN (2003)
419e	2001/01/25	Atlanta	Steuben	NY	3	2001/01/22, 2001/02/03	SOSN (2003)
420e	2001/01/26a	Ashtabula	Ashtabula	OH	3	2001/01/20, 2001/06/05	CNSD (2003)
421e	2001/01/26b	Lake Erie	Ashtabula	OH	2	2000/10/20	PDE (2003)
422e	2001/01/26c	Ashtabula	Ashtabula	OH	5	1987/07/13d, 2001/01/26d,e; 2003/02/10	CNSD (2003)
423e	2001/01/26d	Ashtabula	Ashtabula	OH	5	1987/07/13d, 2001/01/26c,e; 2003/02/10	CNSD (2003)
424e	2001/01/26e	Ashtabula	Ashtabula	OH	5	1987/07/13d, 2001/01/26c,d; 2003/02/10	CNSD (2003)
425e	2001/01/26f	Lake Erie	Ashtabula	OH	1	none	CNSD (2003)
426e	2001/02/03	Atlanta	Steuben	NY	3	2001/01/22, 2001/01/25	SOSN (2003)
427e	2001/06/03	Ashtabula	Ashtabula	OH	1	none	SOSN (2003)
428e	2001/06/05	Ashtabula	Ashtabula	OH	3	2001/01/20, 2001/01/26a	SOSN (2003)
429e	2001/07/14	Kinnelon	Morris	NJ	3	1986/06/29, 1992/03/04	PDE (2003)
430e	2001/07/17	Conestoga	Lancaster	PA	2	2000/10/05	LCSN (2003)
431e	2002/08/09	Pluckemin	Somerset	NJ	1	none	LCSN (2003)
432e	2002/08/17	Geneva	Ashtabula	OH	1	none	OhioSeis (2003)
433e	2003/02/10	Ashtabula area	Ashtabula	OH	5	1987/07/13d, 2001/01/26c,d,e	OhioSeis (2003)
434e	2003/04/20	Goshen	Orange	NY	5	1979/06/20, 1979/12/01, 1980/04/25, 1980/05/20	PDE (2003)
435e	2003/05/02	SE of Painesville	Lake	OH	1	none	OhioSeis (2003)
436e	2003/06/30	Lake Erie, N of Painesville	Lake	OH	3	1988/06/27, 1992/03/15	OhioSeis (2003)
437e	2003/07/17	Ashtabula	Ashtabula	OH	1	none	OhioSeis (2003)

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REFERENCES <i>(Continued)</i>				
	Ref2	Ref3	Ref4	Ref5	Ref6
401e 402e 403e 404e 405e 406e 407e 408e 409e 410e	ANSS (2003) ANSS (2003) OhioSeis (2003)				
411e 412e 413e 414e 415e 416e 417e 418e 419e 420e	OhioSeis (2003) OhioSeis (2003) PDE (2003) PDE (2003) OhioSeis (2003) PDE (2003) ANSS (2003) OhioSeis (2003)	OhioSeis (2003) VTSO 35 (2003) LCSN (2003)	ANSS (2003) ANSS (2003) OhioSeis (2003)	ANSS (2003)	
421e 422e 423e 424e 425e 426e 427e 428e 429e 430e	SOSN (2003) OhioSeis (2003) OhioSeis (2003) OhioSeis (2003) OhioSeis (2003) PDE (2003) PDE (2003) OhioSeis (2003) LCSN (2003) ANSS (2003)	OhioSeis (2003) LCSN (2003) OhioSeis (2003) ANSS (2003) NESN (2001)	ANSS (2003) ANSS (2003) LCSN (2003) NESN (2001)	CNSD (2003) ANSS (2003)	LCSN (2003)
431e 432e 433e 434e 435e 436e 437e	ANSS (2003) LCSN (2003) LCSN (2003)	ANSS (2003)	NESN (2003)		

EARTHQUAKE CATALOG OF PENNSYLVANIA *(Continued)*

EVENT NO.	REMARKS
401e 402e 403e 404e 405e 406e 407e 408e 409e 410e	LCSN (2003) lists 40.44 N, 76.01 W; no magnitude; 11.7 dof.
411e 412e 413e 414e 415e 416e 417e 418e 419e 420e	<p>PDE (2003) lists 2h 2m 30.40s; 40.96 N, 81.15 W; 2.9 Mn (GS); 5 dof.</p> <p>Data from C. K. Scharnberger (personal commun., 2002).</p> <p>Some data from C. K. Scharnberger (personal commun., 2002). LCSN (2003) lists 40.08 N, 76.30 W. PDE (2003) lists 56.38s; 39.95 N, 76.20 W; 2.00 Mn (GS); 5 dof. VTSO 35 (2003) lists 56.4s; 39.949 N, 76.198 W; 5 dof (from NEIC).</p> <p>PDE (2003) lists 2h 5m 7.54s; 41.88 N, 80.77 W.</p>
421e 422e 423e 424e 425e 426e 427e 428e 429e 430e	<p>CNSD (2003) lists 22s; 41.93 N, 80.72 W; 4.4 MN. OhioSeis (2003) lists 20.63s; 41.87 N, 80.76 W; 4.5 mbLg. LCSN (2003) lists 20.06s; 41.942 N, 80.802 W; 4.4 Mn, 4.3 mbLg.</p> <p>PDE (2003) lists 42.35 N, 77.39 W. LCSN (2003) lists 42.34 N, 77.39 W.</p> <p>OhioSeis (2003) lists 22h 36m 46.39s; 41.87 N, 80.76 W; 3.2 mbLg; 2.5 dof. PDE (2003) lists 41.90 N, 80.77 W. LCSN (2003) lists 41.905 N, 80.767 W; 3.0 mbLg.</p> <p>Some data from C. K. Scharnberger (personal commun., 2002). LCSN (2003) lists 39.94 N, 76.34 W.</p>
431e 432e 433e 434e 435e 436e 437e	LCSN (2003) lists 2.9 Mc.