Southeastern United States Seismic Network Bulletin

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SEISMICITY OF THE SOUTHEASTERN UNITED STATES DURING 2003 included 47 tectonic (not induced) earthquakes and 4 reservoir associated earthquakes with magnitudes exceeding 1.0. The largest earthquake reported during the year was $mb_{(Lg)}$ = 4.6 occurring on April 29, 2003. The epicenter was near Fort Payne, Alabama.

Figure 1 is an epicenter map of earthquakes located during the report period. Figures 2 and 3 are cumulative epicenter maps for the period from July 1977 through December 2003, covered by SEUSSN Bulletins 1 through 38.

SOUTHEASTERN U.S. EARTHQUAKES DURING 2003 lists hypocentral parameters, magnitudes, and arrival times for tectonic earthquakes in the southeastern United States.

SOUTHEASTERN U.S. RESERVOIR ACTIVITY DURING 2003 lists hypocentral parameters, magnitudes, and arrival times for earthquakes near the reservoirs in South Carolina.

SEISMIC STATION LISTING AND NETWORK MAPS contains a listing of seismic stations potentially operational during the report period and maps showing the locations of stations of contributing operators in the region. The SEUSSN monitoring area is considered to include all of Florida, Georgia, Alabama, South Carolina, North Carolina, Virginia, West Virginia (south of latitude 37.72 deg North), Maryland, and Delaware; and includes Tennessee and Kentucky (east of longitude 87 degrees West).

INTERNET ACCESS TO SOUTHEASTERN U.S. EARTHQUAKE CATALOG INFORMATION AND ELECTRONIC VERSIONS OF THE BULLETIN describes how to download southeastern U.S. earthquake catalogs and electronic versions of the SEUSSN Bulletins via the Virginia Tech Seismological Observatory website ***http://www.geol.vt.edu/outreach/vtso***. Hypocentral parameters of events in Bulletin 38 are accessible via the ANSS catalog at ***http://quake.geo.berkeley.edu/anss***.

DEFINITIONS AND NETWORK OPERATOR CODES contains definitions of various terms and abbreviations used in the Bulletin as well as a listing of codes for network operators and/or contributors.

Acknowledgments

This report is the thirty-eighth SOUTHEASTERN UNITED STATES SEISMIC NETWORK BULLETIN and covers the period from January through December, 2003. The organizations supplying data for this Bulletin are Auburn University, College of Charleston, Delaware Geological Survey, Georgia Institute of Technology, Maryland Geological Survey, Millersville University, United States Geological Survey (National Earthquake Information Center), University of Memphis (Center for Earthquake Research and Information), University of South Carolina, University of Tennessee/Tennessee Valley Authority- Joint Institute for Energy and Environment, Virginia Polytechnic Institute and State University (Virginia Tech Seismological Observatory), and the Westinghouse Savannah River Company.

Several of the plots in this report were generated using the Generic Mapping Tools (GMT) software package developed by Wessel and Smith (1991).

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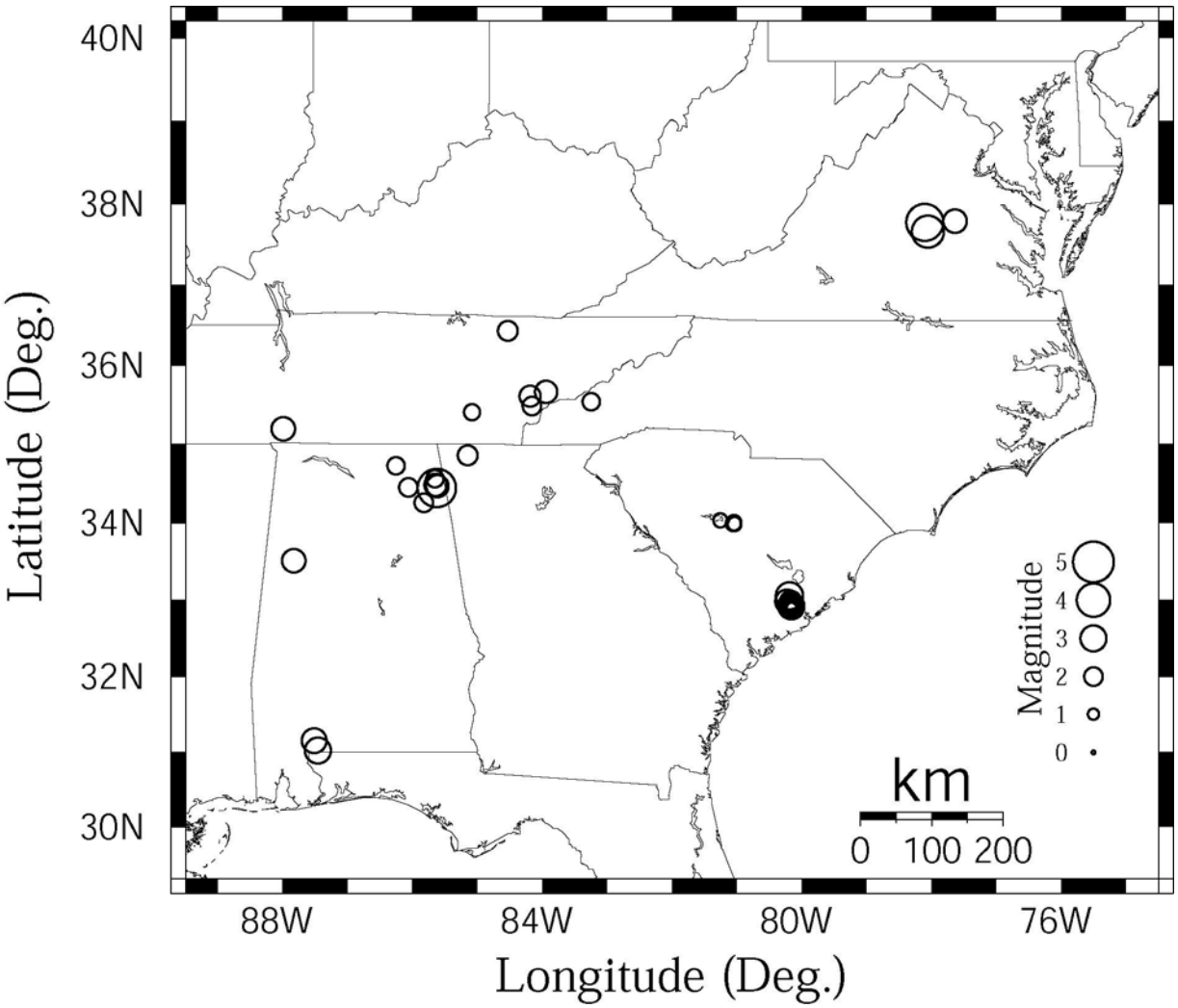

FIGURE 1. Epicenters of earthquakes (M ≥ 0.0) in the southeastern United States for this report period.

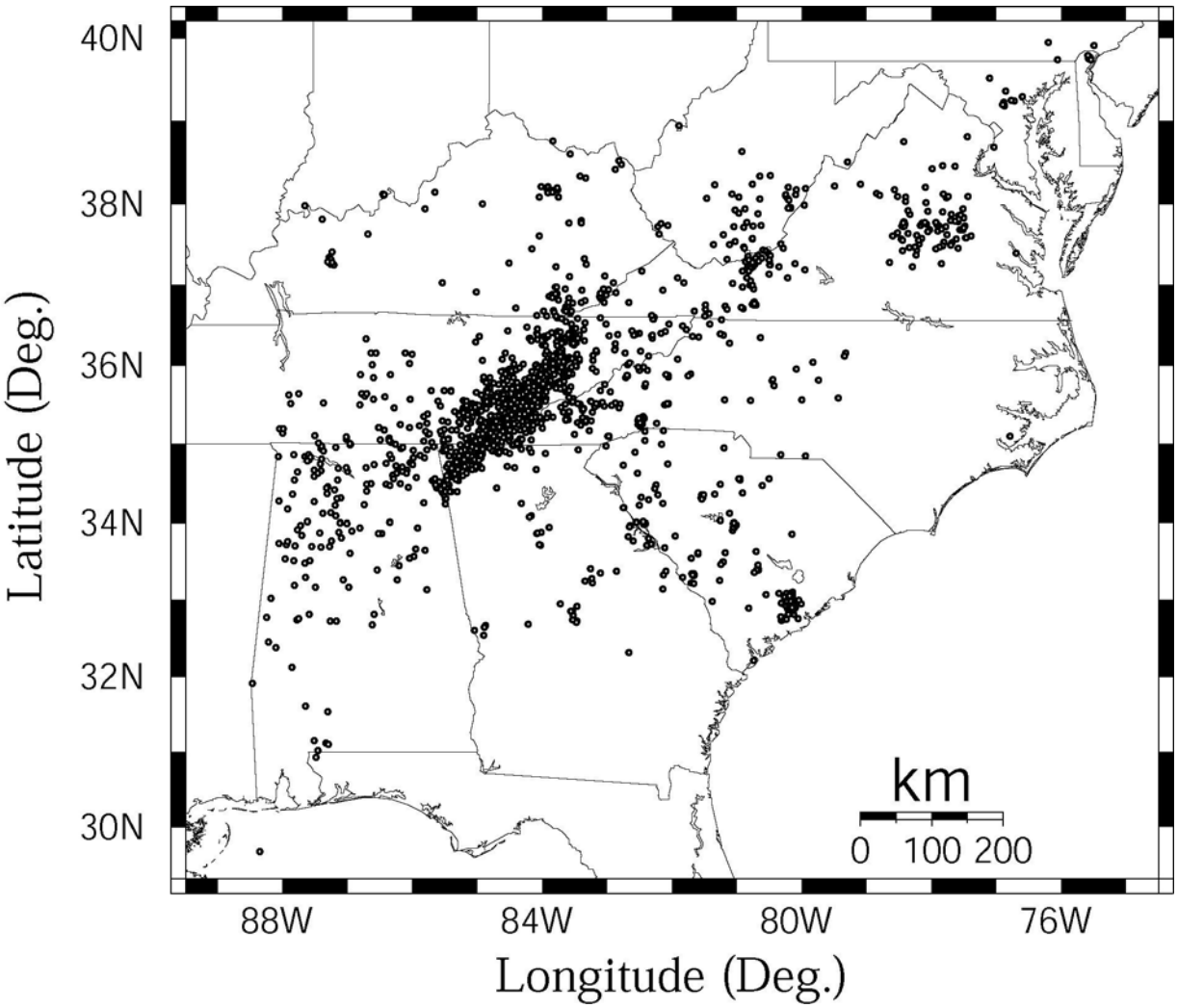

FIGURE 2. Epicenters of earthquakes (M ≥ 0.0) in the southeastern United States from July 1977 through this report period.

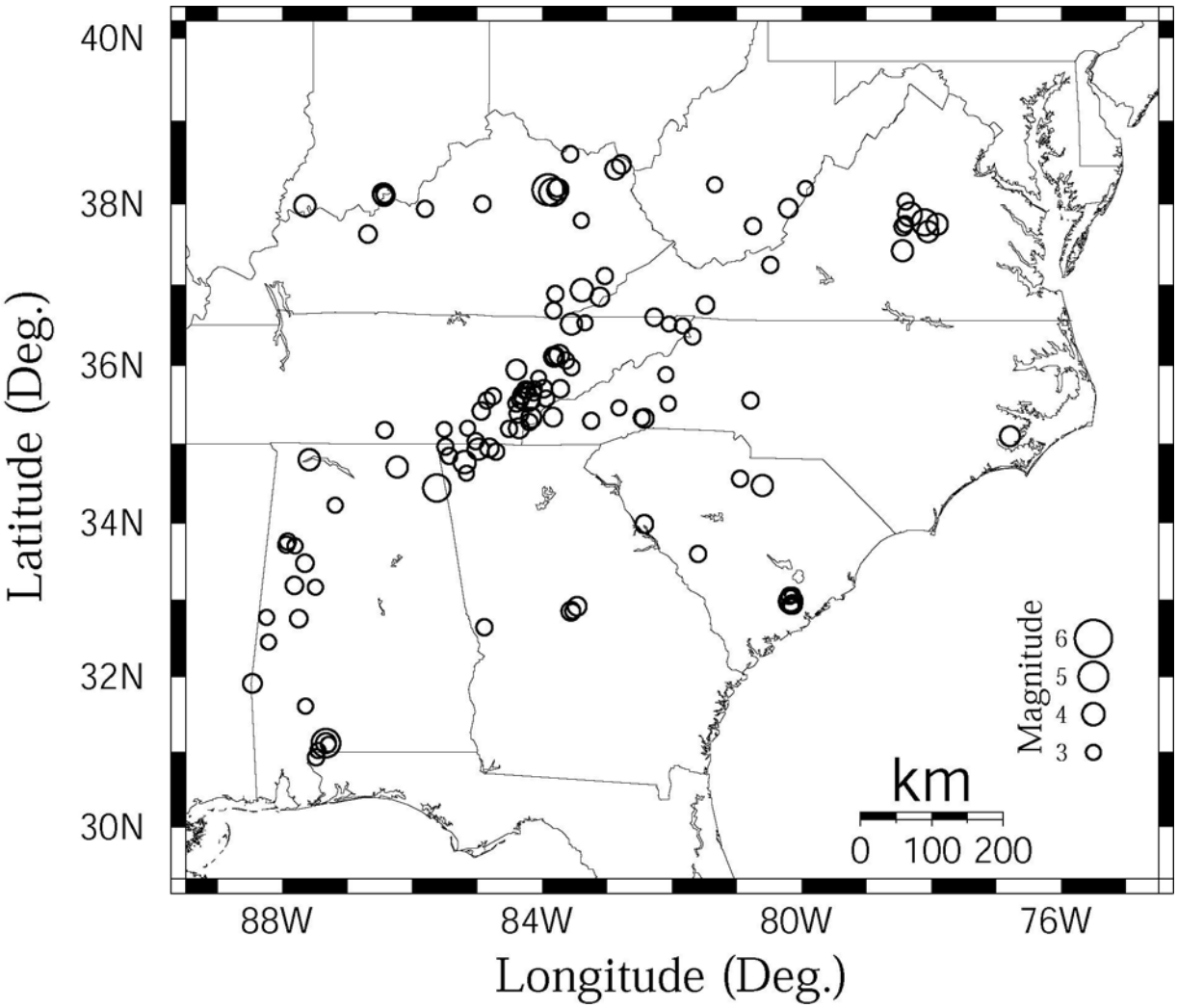

FIGURE 3. Epicenters of earthquakes (M ≥ 3.0) in the southeastern United States from July 1977 through this report period.

SEUSSN EARTHQUAKE CATALOG STATISTICS

TABLE 1. SEUSSN Report Period Earthquake Catalog Statistics

Period: January through December 2003 (1 year)	Tectonic
Number of Earthquakes with M ≥ 0.0	47
Number of Earthquakes with M ≥ 2.0	30
Number of Earthquakes with M ≥ 3.0	6
Number of Earthquakes with M ≥ 4.0	2
Number of Felt Earthquakes	3
Number of Earthquakes with Known ERZ ≤ 5.0 km	38

Largest Earthquake: 29 April 2003; 08:59 – Fort Payne, AL, $mb_{(Lg)}$ = 4.6, Maximum Intensity VII MM

Period: July 1977 through December 2003 (26.5 years)	Tectonic
Number of Earthquakes with M ≥ 0.0	2091
Number of Earthquakes with M ≥ 2.0	838
Number of Earthquakes with M ≥ 3.0	124
Number of Earthquakes with M ≥ 4.0	10
Number of Felt Earthquakes	235
Number of Earthquakes with Known ERZ ≤ 5.0 km	1524

Largest Earthquake: 27 July 1980; 18:52 - Sharpsburg, KY, mb= 5.2, MMI= VII

SOUTHEASTERN U.S. EARTHQUAKES DURING 2003

Events are listed chronologically (this also applies to multiple hypocenter locations for the same event). All times are Universal Coordinated Time. Most entries in the listing are self-explanatory. Items that might require further explanation are defined in the section entitled DEFINITIONS AND NETWORK OPERATOR CODES.

*****2003 JANUARY 06; 00:04 – RINGGOLD, GEORGIA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030106	000428.1	34.857	85.143	10.6	11	82	116	0.1	D	C/D	0.9	4	0.3	3.3	C		2.2		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
UTK	SWET	82.3	299	iPu	00:04:41.50	(-0.03)	iS	00:04:51.40	(0.01)
UTK	MYNC	95.8	75	iP-	:43.75	(0.10)	eS	:54.97	(-0.09)
UTK	SHAL	141.8	251	eP	:50.91	(0.02)	eS	:05:07.17	(-0.42)
UTK	EGT	203.8	55	eP	:05:00.22	(-0.49)	eS	:24.32	(-0.08)
UTK	GOGA	222.7	136	eP	:01.26	(-2.30X)	eS	:28.97	(-0.33)
UTK	LRAL	265.0	221	eP	:09.15	(-0.34)	eS	:38.85	(0.46)

*****2003 FEBRUARY 01; 06:49 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030201	064911.1	32.931	80.154	5.5	12	4	117	0.1	B	A/B	0.3	360	0.3	0.7			2.1		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MGS	3.9	161	iPd	06:49:12.78	(0.03)	iSn	06:49:13.23	(-0.03)
USC	RGR	4.6	235	iPd	:12.85	(0.06)	iSd	:13.62	(0.40)
USC	SVS	9.7	295	iPd	:13.49	(-0.06)	iSn	:14.72	(0.03)
USC	CSB	9.9	52	iPd	:13.34	(-0.02)	iSn	:14.43	(-0.44)
USC	CSU	9.9	52	iPd	:13.38	(0.00)	iSn	:14.48	(-0.44)
USC	WAS	14.4	230	iPd	:14.45	(0.10)	iSn	:16.33	(-0.10)

*****2003 FEBRUARY 05; 01:34 – SCOTTSBORO, ALABAMA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030205	013437.1	34.729	86.248	15.4	13	46	122	0.3	C	C/C	0.9	308	0.3	1.5	B		1.9		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
UTK	SHAL	46.2	225	eP-	01:34:44.87	(-0.13)	eS	01:34:51.00	(0.22)
UTK	SWET	61.2	28	iPd	:46.92	(-0.38)	iS	:55.12	(0.31)
UTK	PLAL	169.5	280	eP	:35:05.46	(1.24)	eS	:35:23.76	(-0.16)
UTK	MYNC	197.5	78	eP	:08.28	(-0.26)	eS	:30.95	(-0.40)
UTK	LRAL	200.3	200	eP	:11:15	(2.20X)	eS	:32.80	(0.75)
UTK	WVT	211.7	318	eP	:09.78	(-0.91)	iS	:35.19	(0.15)
UTK	ORT	219.9	53	eP	:12.39	(-0.58)	eS	:38.83	(1.83)

*****2003 FEBRUARY 26; 09:42 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030226	094239.3	32.936	80.157	7.9	12	4	122	0.1	B	A/B	0.4	360	0.4	0.6			2.1		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MGS	4.5	161	iPd	09:42:41.39	(0.03)	iSn	09:42:42.14	(-0.03)
USC	RGR	4.7	228	iPu	:41.38	(0.04)	iSd	:42.42	(0.38)
USC	SVS	9.3	293	iPd	:41.80	(-0.11)	iSn	:43.17	(0.00)

USC	CSU	9.8	55	iPd	:41.82	(0.05)	iSn	:43.16 (-0.32)
USC	WAS	14.6	227	iPd	:42.69	(-0.03)	iSn	:44.75 (-0.19)
USC	HBF	16.5	275	iPd	:42.96	(0.02)	iSn	:44.82 (0.05)

*****2003 FEBRUARY 28; 07:02 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030228	070236.5	32.932	80.150	4.3	12	4	117	0.0	B	A/B	0.3	360	0.3	0.6			2.6		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	3.9	167	iPd	07:02:37.99 (0.01)	iSn	07:02:38.36 (-0.01)
USC	RGR	4.9	237	iPd	:38.10 (0.02)	iSd	:38.47 (0.02)
USC	CSU	9.6	51	iPd	:38.64 (0.00)	iSn	:40.09 (0.00)
USC	SVS	10.0	294	iPd	:38.76 (-0.16)	iSn	:39.98 (-0.07)
USC	WAS	14.8	230	iPd	:39.70 (-0.04)	iSn	:41.82 (-0.02)
USC	HBF	17.2	276	iPu	:40.10 (0.03)	iSn	:41.93 (0.06)

*****2003 MARCH 02; 17:18 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030302	171826.5	32.931	80.165	6.5	14	4	93	0.1	B	A/B	0.3	360	0.3	0.5			2.9		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	RGR	3.8	226	iPu	17:18:28.21 (0.01)	iSd	17:18:28.68 (0.01)
USC	MGS	4.3	149	iPd	:28.30 (0.01)	iSu	:28.92 (-0.02)
USC	SVS	8.8	298	iPd	:28.80 (-0.05)	iSn	:29.91 (-0.05)
USC	CSU	10.7	55	iPd	:29.04 (0.09)	iSn	:30.69 (0.04)
USC	WAS	13.7	227	iPd	:29.75 (0.11)	iSn	:31.53 (-0.13)
USC	HBF	15.8	277	iPd	:29.85 (-0.04)	iSn	:31.74 (0.16)
USC	TWB	21.2	16	iPu	:30.74 (-0.15)	iSn	:33.19 (0.01)

*****2003 MARCH 15; 09:02 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030315	090224.4	32.918	80.160	5.8	10	3	104	0.1	B	A/B	0.3	360	0.3	0.5			0.9		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	2.9	141	iPd	09:02:25.98 (-0.02)	iSn	09:02:26.34 (-0.10)
USC	RGR	3.4	250	iPd	:26.02 (0.01)	iSd	:26.51 (0.15)
USC	SVS	10.0	304	iPd	:26.83 (-0.09)	iSn	:28.06 (-0.04)
USC	CSU	11.3	48	iPd	:26.98 (0.05)	iSn	:28.88 (0.23)
USC	WAS	13.1	233	iPd	:27.56 (0.11)	iSn	:29.28 (-0.09)

2003 MARCH 15; 15:56 – CHARLESTON, SOUTH CAROLINA**

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030315	155648.9	32.937	80.137	5.4	12	4	136	0.0	B	A/C	0.3	360	0.3	0.7			2.3		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	4.3	184	iPd	15:56:50.57 (0.00)	iSn	15:56:51.10 (0.00)
USC	RGR	6.2	239	iPd	:50.78 (0.01)	iSu	:51.65 (0.28)
USC	CSU	8.3	49	iPd	:50.92 (0.02)	iSn	:52.46 (0.21)
USC	SVS	10.9	289	iPd	:51.43 (-0.09)	iSn	:52.78 (-0.02)
USC	WAS	16.0	232	iPd	:52.41 (0.01)	iSn	:54.66 (-0.02)
USC	HBF	18.3	274	iPd	:52.70 (0.01)	iSn	:54.73 (0.07)

*****2003 MARCH 15; 16:24 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030315	162454.7		32.939	80.138	5.3	12	5	134	0.1	B	A/B	0.3	360	0.3	0.7			2.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	4.5	184	iPd	16:24:56.37 (-0.03)	iSn	16:24:56.90 (-0.04)
USC	RGR	6.3	237	iPd	:56.58 (-0.01)	iSu	:57.52 (0.34)
USC	CSU	8.2	50	iPd	:56.72 (0.02)	iSn	:58.34 (0.32)
USC	SVS	10.9	288	iPu	:57.42 (0.10)	iSn	:58.57 (-0.01)
USC	WAS	16.1	231	iPd	:58.20 (-0.03)	iSn	:25:00.62 (0.10)
USC	HBF	18.3	273	iPd	:58.39 (-0.11)	iSn	:00.43 (-0.03)

*******2003 APRIL 29; 08:59 – FORT PAYNE, ALABAMA*******

UTK Light earthquake felt in parts of at least three states: Alabama, Georgia and Tennessee. This is the largest earthquake known to have occurred in the East Tennessee Seismic Zone historically and is one of the largest earthquakes known to have occurred anywhere in the southern Appalachians. As of 9:00 am, CDT, there had been approximately 12 aftershocks, most of which were too small to be felt.

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030429	085938.2		34.446	85.617	9.1	67	64	70	0.9	D	D/D	0.2	360	0.2	0.4	A	4.6	4.9		6

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	RCGA	63.8	23	eP	08:59:49.16 (0.51)	eS	09:00:09.93 (13.52X)
UTK	SWET	90.2	341	iPc	:52.94 (0.10)	iS	:03.70 (0.06)
UTK	SHAL	90.5	269	iPd	:53.71 (0.84)		
UTK	GMG	98.4	62	iPd	:54.87 (0.72)	eS	:15.71 (9.80X)
UTK	DYTN	125.5	22	iPd	:58.58 (0.18)	eS	:19.40 (6.13X)
UTK	ETT	144.3	47	iPd	09:00:01.67 (0.30)	eS	:22.57 (4.17X)
UTK	MYNC	153.1	63	iPd	:03.27 (0.51)	iS	:21.57 (0.76)
UTK	BHT	167.1	21	iPd	:05.11 (0.13)	eS	:26.05 (1.40)
UTK	BCRT	174.5	33	iPd	:06.16 (0.03)	eS	:27.02 (0.39)
UTK	GRBT	188.1	43	eP	:08.07 (-0.19)	eS	29.22 (-1.10)
UTK	ORT	201.7	36	iPd	:10.22 (-0.19)	eS	:34.92 (1.00)
UTK	LRAL	202.1	220	ePd	:10.73 (0.27)	eS	:35.43 (1.43)
UTK	GOGA	229.6	119	iPc	:14.79 (0.17)	eS	:42.59 (1.46)
UTK	PWLA	231.9	286	eP	:14.54 (-0.37)	eS	:35.14 (-6.49X)
UTK	PLAL	232.9	286	eP	:14.20 (-0.84)	iS	:42.15 (0.30)
UTK	GTTN	233.7	49	iPd	:14.54 (-0.67)	eS	:35.35 (-6.80X)
UTK	JVW	247.5	75	iPu	:17.92 (1.04)		
UTK	CCK	248.8	74	iPd	:17.86 (0.80)		
UTK	MMC	250.6	81	eP-	:18.12 (0.89)		
UTK	CRTN	252.9	39	ePd	:16.50 (-1.04)		
UTK	BG3	253.4	75	eP	:18.58 (1.00)		
UTK	EGT	265.9	52	ePd	:18.53 (-0.68)		
UTK	WVT	274.7	314	ePc	:19.59 (-0.59)	iS	:52.79 (2.04)
UTK	ASTN	285.4	42	eP	:20.58 (-0.99)	eS	:41.74(-11.41X)
UTK	OXF	348.4	272	ePd	:28.47 (-0.80)	eS	:59.55 (-6.92X)
UTK	UTMT	362.3	306	eP+	:30.24 (-0.75)	eS	:01:02.94 (-6.51X)
UTK	HALT	376.0	297	iPc	:31.37 (-1.30)	eS	:15.75 (3.40)
UTK	SLTN	387.2	54	iPd	:33.33 (-0.85)		
UTK	GLAT	390.1	302	eP+	:33.43 (-0.99)	eS	:19.19 (3.81)
UTK	MR10	393.7	91	eP	:34.36 (-0.50)		
UTK	MR07	394.7	90	eP	:34.54 (-0.44)		
UTK	MR01	397.6	91	iP+	:34.62 (-0.72)		
UTK	JSC	401.4	91	eP	:34.72 (-1.09)		
UTK	MET	402.2	282	iPd	:35.27 (-0.63)	eS	:22.42 (4.49)
UTK	MR02	404.7	93	eP+	:35.00 (-1.21)		
UTK	WCI	423.0	351	iPc	:38.02 (-0.46)	eS	:24.67 (2.27)
UTK	GNAR	434.7	294	eP+	:38.81 (-1.10)	eS	:30.25 (5.38X)

UTK	COW	469.6	103	iPu	:42.70	(-1.51)		
UTK	HBAR	476.1	286	eP-	:43.99	(-1.02)	eS	:36.96 (3.26)
UTK	SIUC	486.5	319	iPc	:45.16	(-1.14)	eS	:38.16 (2.22)
UTK	NHSC	525.2	105	ePc	:49.18	(-1.88)	eS	:50.61 (6.45X)
UTK	BLO	530.7	352	ePc	:50.50	(-1.27)	iS	:45.40 (0.01)
UTK	SLM	622.2	320	eP+	:01:01.69	(-1.35)	eS	:02:05.79 (0.90)
UTK	CCM	645.0	310	iPc	:04.31	(-1.51)	eS	:10.81 (1.10)
UTK	ACSO	683.3	19	ePd	:08.86	(-1.72)	eS	:21.23 (3.29)
UTK	DWPF	807.2	149	eP	:24.75	(-1.06)	eS	:44.50 (0.21)

Additional Data

MVU	iPu	09:01:51.4	eS?	09:03:39.0

*****2003 APRIL 30; 03:54 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030430	035424.8	32.909	80.162	6.9	10	2	120	0.1	B	B/B	0.6	360	0.6	0.5			1.6		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MGS	2.3	122	iPu	03:54:26.52	(0.06)	iSn	03:54:27.01	(0.00)
USC	RGR	3.0	267	iPu	:26.33	(-0.14)	iSd	:26.99	(0.06)
USC	CSU	12.1	45	iPd	:27.43	(-0.04)	iSn	:29.55	(0.19)
USC	WAS	12.4	236	iPd	:27.80	(0.05)	iSn	:29.58	(-0.04)
USC	HBF	16.5	285	iPd	:28.38	(0.06)	iSn	:29.80	(-0.31)

*****2003 MAY 05; 10:53 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030505	105349.9	33.055	80.190	11.4	16	10	123	0.1	B	A/B	0.3	360	0.3	0.7			3.1		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	TWB	10.4	51	iPd	10:53:52.87	(-0.10)	iSn	10:53:54.30	(0.06)
USC	SVS	11.1	210	iPd	:52.91	(-0.10)	iSn	:54.73	(0.00)
USC	CSB	13.5	125	iPu	:53.19	(0.08)	iSn	:55.41	(0.02)
USC	RGR	16.4	181	iPd	:53.68	(-0.02)	iSd	:55.73	(-0.10)
USC	HBF	17.9	228	iPd	:53.87	(-0.01)	iSn	:56.12	(0.09)
USC	MGS	18.0	165	iPu	:54.01	(0.04)	iSn	:56.47	(0.06)
USC	DRC	19.4	287	iPd	:54.39	(0.01)	iSn	:57.12	(-0.20)
USC	WAS	24.3	198	iPd	:54.96	(0.03)	iSn	:58.61	(0.16)

*****2003 MAY 05; 16:32 – CARTERSVILLE, VIRGINIA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
VTSO	030505	163233.9	37.655	78.055	2.8	7	86	213	0.2	D	D/D	11.8	302	2.3	13.9	D	3.9			3

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
VTSO	CBN	85.6	44	eP	16:32:48.00	(0.08)	eS	16:32:58.16	(-0.03)
VTSO	BLA	215.0	257	ePd	:33:06.80	(-0.32)	eS	:33:31.58	(0.28)
VTSO	MCWV	271.6	326	eP	:14.31	(0.31)	eS	:43.05	(-0.14)
VTSO	SSPA	331.3	2	P	:20.77	(-0.51)	S	:59.33	(3.54x)

Additional Data

MVU	iPd	16:33:16.8	eS	16:33:49.5

*****2003 MAY 17; 14:49 – MAGGIE VALLEY, NORTH CAROLINA*****

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030517	144914	.1	35.537	83.244	6.3	10	41	140	0.3	C	B/C	1.3	298	0.3	2.2	B		1.8		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
UTK	EGT	40.7	353	iPu	14:49:20.72	(-0.12)	eS	14:49:25.98	(0.10)
UTK	MYNC	95.4	238	iPd	:29.46	(-0.13)	iS	:41.34	(0.25)
UTK	SLTN	142.7	45	eP	:37.14	(0.01)	eS	:55.19	(1.10)
UTK	GOGA	236.6	185	eP	:53.02	(1.35)	eS	:50:18.04	(-0.99)
UTK	SWET	246.9	262	eP	:52.46	(-0.52)	eS	:21.38	(0.09)

*****2003 JUNE 12; 23:33 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030612	233317	.2	32.982	80.227	10.4	18	2	130	0.2	B	B/B	0.3	360	0.3	0.5			2.6		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	SVS	2.0	256	iPu	23:33:19.46	(-0.02)	iSn	23:33:20.43	(-0.02)
USC	RGR	7.9	156	iPu	:19.89	(-0.02)	iSd	:21.03	(-0.07)
USC	HBF	10.2	254	iPd	:20.21	(0.07)	iSn	:21.75	(0.36)
USC	MGS	11.6	136	iPd	:20.37	(-0.02)	iSn	:22.04	(-0.02)
USC	NHSC	14.5	18	iPu	:20.79	(0.30)	iSn	:23.64	(0.15)
USC	WAS	14.5	196	iPd	:20.86	(0.04)	iSn	:23.11	(-0.03)
USC	CSB	14.6	88	iPu	:20.63	(0.15)	iSn	:23.04	(0.21)
USC	CSU	14.6	88	iPu	:20.66	(0.16)	iSn	:23.19	(0.30)
USC	TWB	19.6	36	iPd	:21.45	(-0.13)	iSn	:23.82	(0.01)

*****2003 JUNE 22; 23:49 – FORT PAYNE, ALABAMA*****

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030622	234954	.2	34.562	85.649	3.1	17	54	101	0.3	D	C/D	0.8	320	0.3	1.5	B		1.9		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
UTK	RCGA	53.6	31				eS	23:50:09.57	(-0.10)
UTK	SHAL	88.7	261	eP	23:50:08.68	(-0.12)	eS	:19.33	(-0.25)
UTK	DYTN	114.9	26	eP	:13.06	(0.05)	eS	:26.77	(-0.12)
UTK	MYNC	150.3	67	eP	:18.30	(-0.33)	eS	:35.94	(-0.61)
UTK	BHT	156.3	24	eP	:20.36	(0.77)	eS	:38.02	(-0.20)
UTK	BCRT	165.5	36	eP	:21.51	(0.49)			
UTK	ORT	193.2	39	eP	:34.38	(9.00X)	eS	:48.25	(0.02)
UTK	LRAL	210.5	217	iP-	:28.29	(0.19)	eS	:53.09	(0.19)
UTK	PLAL	227.0	283	eP	:29.75	(-0.96)	eS	:57.35	(0.08)
UTK	GTTN	227.7	52				eS	:58.14	(0.61)
UTK	GOGA	238.6	122				eS	:59.69	(-0.57)

*****2003 JULY 02; 10:18 – HUNTSVILLE, TENNESSEE*****

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030702	101826	.2	36.426	84.524	2.9	9	125	156	0.3	D	C/D	0.9	349	0.7	2.8	C		2.2		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
UTK	EGT	124.7	118	iP+	10:18:46.73	(0.17)	eS	10:19:01.57	(-0.01)
UTK	MYNC	154.3	166	iP+	:50.94	(-0.26)	iS	:09.59	(0.00)
UTK	SWET	185.0	224	eP	:56.14	(0.09)	eS	:18.40	(0.42)
UTK	WCI	256.3	321	eP	:19:05.42	(-1.18)	eS	:35.77	(-0.23)
UTK	PLAL	359.1	245	eP	:23.55	(4.27X)	eS	:59.05	(1.11)

*****2003 JULY 13; 02:41 – MARYVILLE, TENNESSEE*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030713	024135.5	35.661	83.942	15.8	14	43	111	0.3	C	B/C	0.3	338	0.2	0.8	A		2.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	ORT	42.9	310	iPu	02:41:42.95 (0.09)	iS	02:41:48.38 (0.10)
UTK	EGT	64.0	65	iPd	:45.90 (-0.21)	iS	:54.10 (0.14)
UTK	MYNC	67.3	195	eP	:46.67 (0.06)	iS	:54.77 (-0.02)
UTK	SLTN	185.6	62	iPd	:42:04.69 (-0.41)	eS	:42:27.45 (0.82)
UTK	SWET	187.3	255	iPd	:04.86 (-0.46)	eS	:27.38 (0.38)
UTK	GOGA	253.3	170	eP	:14.74 (0.53)	eS	:42.84 (0.47)
UTK	SHAL	278.3	241	eP	:18.07 (0.76)	eS	:46.48 (-1.25)

*****2003 JULY 19; 14:22 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030719	142221.3	32.924	80.137	5.7	12	3	146	0.0	B	A/C	0.7	360	0.7	0.7			2.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	2.9	187	iPd	14:22:22.84 (-0.02)	iSn	14:22:23.30 (0.00)
USC	RGR	5.6	251	iPd	:23.07 (-0.05)	iSd	:23.84 (0.16)
USC	CSU	9.3	42	iPd	:23.52 (0.04)	iSn	:24.96 (0.00)
USC	CSB	9.3	42	iPd	:23.47 (0.01)	iSn	:24.64 (-0.26)
USC	WAS	15.2	236	iPd	:24.63 (-0.04)	iSn	:26.91 (0.05)
USC	TWB	21.4	9	iPd	:25.71 (-0.01)	iSn	:28.02 (0.00)

*****2003 JULY 25; 07:23 – RAINSVILLE, ALABAMA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030725	072341.1	34.451	86.053	14.8	8	51	116	0.2	C	B/D	1.0	234	0.6	1.2	A		2.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	SHAL	50.5	268	iPd	07:23:49.44 (-0.13)	iS	07:23:55.98 (0.15)
UTK	LRAL	179.9	209	iP	:24:09.74 (-0.05)	eS	:24:30.62 (-0.03)
UTK	PLAL	194.5	288	eP	:14.55 (2.52X)	iS	:34.40 (-0.10)
UTK	ORT	227.0	44			eS	:43.44 (0.87)
UTK	GOGA	265.5	115	iP	:14.29 (-7.12X)	eS	:51.44 (0.70)
UTK	OXF	308.4	272	eP	:38.61 (11.91X)	eS	:25:01.34 (1.45)

*****2003 AUGUST 23; 07:39 – VONORE, TENNESSEE *****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030823	073958.6	35.605	84.186	11.3	12	35	97	0.3	C	B/C	0.4	270	0.3	1.1	A		2.3		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	ORT	35.5	342	iP+	07:40:04.69 (0.03)	iS	07:40:09.24 (0.11)
UTK	MYNC	59.1	175	eP	:08.52 (0.16)	eS	:15.37 (-0.19)
UTK	EGT	86.8	68	iPu	:12.57 (-0.18)	eS	:23.19 (0.04)
UTK	GOGA	252.1	165	eP	:37.81 (0.19)	eS	:41:06.94 (0.95)
UTK	SHAL	255.9	240	eP	:37.04 (-1.07)	eS	:05.61 (-1.23)
UTK	PLAL	360.4	260	eP	:54.16 (3.18X)	eS	:29.11 (0.01)
UTK	LRAL	384.9	223	eP	:57.19 (3.19X)	iS	:33.99 (-0.33)

*****2003 SEPTEMBER 24; 10:31 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030924	103129.9	32.898	80.148	4.9	9	1	155	0.1	C	B/C	0.5	360	0.5	0.4			1.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
USC	MGS	0.7	89	iPd	10:31:31.16	(-0.01)	iSn	10:31:31.42	(0.02)
USC	RGR	4.4	284	iPd	:31.41	(-0.04)	iSu	:31.81	(0.00)
USC	CSU	12.2	37	iPu	:32.44	(-0.03)	iSn	:33.76	(-0.52)
USC	SVS	12.2	310	iPu	:32.73	(0.06)	iSn	:35.42	(1.32X)
USC	WAS	12.9	244	iPd	:32.93	(0.12)	iSn	:34.56	(-0.10)

*******2003 SEPTEMBER 24; 14:48– ATHENS, TENNESSEE*******

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030924	1448	45.9	35.486	84.158	13.4	10	46	117	0.2	C	B/C	0.5	279	0.2	2.2	B		2.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
UTK	MYNC	45.7	177	iP-	14:48:53.77	(0.15)	iS	14:48:59.22	(-0.11)
UTK	ORT	48.9	344	eP+	:53.99	(-0.12)	eS	:49:00.15	(0.00)
UTK	CRTN	84.3	20	iP	:59.77	(0.12)	iS	:09.79	(0.04)
UTK	EGT	90.4	59	eP	:59.81	(-0.84)	eS	:11.66	(0.18)
UTK	SWET	164.0	260	eP+	:49:12.12	(-0.10)	eS	:31.48	(0.03)

*******2003 SEPTEMBER 25; 23:30– ATMORE, ALABAMA*******

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030925	2330	58.0	31.151	87.517	0.0	13	374	300	1.2	D	D/D	19.1	1	3.2	29.0	D		2.9		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
UTK	SHAL	374.0	13	eP	23:30:52.28	(0.23)	eS	23:31:32.24	(-0.25)
UTK	OXF	412.7	335	eP	:53.45	(-3.35)	eS	:42.43	(1.52)
UTK	PLAL	428.2	353	eP	:31:00.31	(1.59)	eS	:44.61	(0.31)
UTK	SWET	474.5	18	eP	:04.82	(0.34)	eS	:54.78	(0.29)
UTK	MYNC	537.9	35	eP	:12.97	(0.68)	eS	:32:08.02	(-0.29)
UTK	ORT	606.3	29	eP	:21.92	(1.21)			
UTK	CRTN	655.6	30	eP	:27.09	(0.29)			
UTK	EGT	656.6	36	eP	:26.78	(-0.20)			

*******2003 SEPTEMBER 30; 02:28– ATMORE, ALABAMA*******

UTK Minor, felt earthquake.

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	030930	0228	04.5	31.031	87.462	12.5	18	227	281	0.3	D	C/D	6.0	23	1.5	8.5	D		3.0		F

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
UTK	LRAL	226.5	11	iPd	02:28:39.10	(-0.03)	iS	02:29:05.00	(0.23)
UTK	SHAL	385.8	12	iPu	:58.71	(-0.08)	eS	:39.48	(-0.10)
UTK	OXF	427.0	335	eP	:29:04.40	(0.56)	eS	:47.78	(-0.74)
UTK	PLAL	442.0	353	eP	:06.01	(0.31)	eS	:51.06	(-0.75)
UTK	GOGA	459.9	54	eP	:08.83	(0.92)	eS	:55.35	(-0.36)
UTK	SWET	485.7	17	eP	:08.24	(-2.89X)	eS	:30:00.68	(-0.73)
UTK	MYNC	545.9	34	eP	:19.37	(0.82)	eS	:15.52	(0.97)
UTK	ORT	615.6	28	eP	:27.34	(0.22)	eS	:28.25	(-1.47)
UTK	EGT	664.5	35	eP	:33.81	(0.59)			
UTK	WCI	802.9	7	eP	:51.29	(1.09)	eS	:32:08.43	(-2.15)

*******2003 OCTOBER 14; 10:45 – CHARLESTON, SOUTH CAROLINA*******

SRCE	DATE	HRMN	SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031014	1045	38.6	32.946	80.177	7.2	14	5	135	0.1	B	A/C	0.3	360	0.3	0.6			2.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	RGR	4.6	201	iPu	10:45:40.41 (-0.10)	iSd	10:45:41.20 (0.07)
USC	MGS	6.3	148	iPd	:40.66 (-0.08)	iSn	:41.30 (-0.33)
USC	SVS	7.2	290	iPd	:40.74 (-0.10)	iSn	:41.78 (-0.03)
USC	CSB	10.8	66	iPd	:41.18 (0.04)	iSn	:43.12 (0.26)
USC	CSU	10.8	66	iPd	:41.23 (0.07)	iSn	:43.24 (0.32)
USC	WAS	14.1	219	iPu	:41.96 (0.06)	iSn	:44.03 (0.02)
USC	HBF	14.6	271	iPd	:41.79 (-0.09)	iSn	:43.58 (0.14)

*****2003 OCTOBER 18; 02:55– TUSCALOOSA, ALABAMA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	031018	025527.0	33.514	87.831	11.5	13	94	183	0.5	D	C/D	0.7	42	0.2	1.2	A		2.7		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	LRAL	94.1	124	iPd	02:55:42.40 (0.12)	iS	02:55:53.62 (0.13)
UTK	PLAL	164.4	352	eP	:52.87 (-0.50)	iS	:56:13.17 (0.50)
UTK	OXF	183.0	308	ePu	:56.08 (-0.22)	iS	17.90 (0.25)
UTK	SWET	257.2	42	eP	:56:05.44 (-1.27)	eS	:36.46 (0.89)
UTK	GOGA	405.9	90	eP	:24.12 (-0.88)	eS	:57:09.22 (2.02)
UTK	EGT	492.4	56	eP	34.67 (-1.10)	eS	:25.03 (-0.81)
UTK	WCI	537.7	14	eP	:51.33 (10.08X)	eS	:38.09 (2.77)

*****2003 OCTOBER 20; 05:59 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031020	055932.0	32.925	80.158	7.0	10	3	102	0.0	B	A/B	0.6	360	0.6	0.6			1.4		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	3.4	153	iPd	05:59:33.78 (-0.03)	iSn	05:59:34.49 (0.05)
USC	RGR	3.9	240	iPd	:33.72 (-0.09)	iSd	:34.37 (0.02)
USC	CSU	10.6	50	iPd	:34.49 (0.00)	iSn	:36.06 (-0.15)
USC	WAS	13.8	231	iPd	:35.25 (0.04)	iSn	:37.07 (-0.20)
USC	DRC	29.5	313	iPu	:38.08 (0.03)	iSn	:42.08 (-0.08)

*****2003 OCTOBER 22; 23:36 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031022	233627.9	32.983	80.166	7.5	13	8	78	0.1	B	A/B	0.3	360	0.3	0.7			2.4		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	SVS	7.9	258	iPu	23:36:30.23 (-0.02)	iSn	23:36:31.29 (-0.03)
USC	RGR	8.8	198	iPd	:30.29 (-0.04)	iSd	:31.45 (0.06)
USC	CSU	8.9	88	iPd	:30.25 (0.08)	iSn	:32.02 (0.28)
USC	MGS	9.7	166	iPu	:30.49 (-0.02)	iSn	:31.64 (-0.14)
USC	TWB	15.7	22	iPd	:31.35 (-0.10)	iSn	:33.05 (-0.01)
USC	WAS	18.1	213	iPd	:31.79 (-0.04)	iSn	:34.01 (-0.45)
USC	DRC	25.0	304	iPd	:33.29 (0.12)		

*****2003 OCTOBER 28; 16:42 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031028	164243.5	32.927	80.170	7.4	10	3	149	0.1	C	B/C	0.8	360	0.8	0.6			1.7		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	RGR	3.1	227	iPu	16:42:45.24 (-0.06)	iSd	16:42:45.87 (0.04)
USC	MGS	4.2	140	iPd	:45.47 (0.05)	iSn	:46.12 (-0.03)

USC	CSU	11.3	54	iPd	:46.10	(-0.03)	iSn	:47.93 (-0.03)
USC	WAS	13.0	227	iPu	:46.68	(0.07)	iSn	:48.53 (-0.08)
USC	TWB	21.8	17	iPd	:48.08	(0.05)	iSn	:50.27 (-0.17)

*****2003 NOVEMBER 06; 12:22 – ROCKVILLE, VIRGINIA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
VTSO	031106	122249.2	37.783	77.634	3.9	13	52	230	0.9	D	D/D	9.5	331	2.8	6.3	D	2.6			

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
VTSO	CBN	52.1	26	eP	12:22:57.86 (0.13)	eS	12:23:04.88 (0.88)
VTSO	CVVA	83.3	289	eP	:23:02.15 (-0.70)	eS	:12.90 (0.06)
VTSO	SDMD	201.0	18	eP	:18.69 (-1.83)	eS	:43.38 (0.07)
VTSO	BLA	254.4	256	ePn	:27.56 (0.45)	eSn	:54.83 (0.11)
VTSO	ELN	281.1	259	ePn	:31.72 (1.34)	eSn	:24:01.55 (1.18)
VTSO	FWV	281.2	266	ePn	:29.88 (-0.52)	eSn	:03.20 (2.79X)
VTSO	PWV	305.6	262	ePn	:35.38 (1.98)	eSn	:06.06 (0.47)

*****2003 NOVEMBER 18; 06:49 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031118	064913.9	32.888	80.169	3.4	8	3	177	0.1	C	B/C	0.9	360	0.9	1.0			1.1		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	2.9	67	iPd	06:49:15.09 (-0.04)	iSn	06:49:15.70 (0.38)
USC	RGR	3.2	313	iPd	:15.09 (-0.04)	iSu	:15.70 (0.47)
USC	WAS	10.6	245	iPd	:16.39 (0.00)	iSn	:18.07 (0.17)
USC	CSU	14.3	40	iPd	:16.85 (0.06)	iSn	:18.30 (-0.54)

*****2003 DECEMBER 01; 09:18 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031201	091819.6	32.939	80.139	8.4	8	5	175	0.0	C	B/C	0.9	360	0.9	0.7			2.1		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	4.6	182	iPd	09:18:21.74 (0.02)	iSn	09:18:22.59 (-0.01)
USC	RGR	6.2	236	iPu	:21.79 (-0.06)	iSu	:22.74 (0.02)
USC	CSB	8.3	51	iPd	:21.86 (-0.03)	iSn	:23.45 (0.02)
USC	WAS	16.1	230	iPd	:23.47 (0.08)	iSn	:25.59 (-0.04)

*****2003 DECEMBER 02; 21:21 – CHARLESTON, SOUTH CAROLINA*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031202	212131.1	32.928	80.149	5.4	10	3	118	0.1	B	A/B	0.6	360	0.6	0.9			1.3		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	3.4	167	iPu	21:21:32.64 (-0.02)	iSn	21:21:33.09 (-0.02)
USC	RGR	4.8	242	iPd	:32.79 (0.01)	iSd	:33.61 (0.39)
USC	CSU	9.8	49	iPd	:33.36 (0.03)	iSn	:35.20 (0.35)
USC	SVS	10.3	296	iPu	:33.55 (-0.06)	iSn	:35.03 (0.21)
USC	WAS	14.5	232	iPd	:34.33 (-0.02)	iSn	:36.47 (0.04)

*****2003 DECEMBER 07; 20:46– SODDY-DAISY, TENNESSEE*****

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	031207	204604.8	35.409	85.082	10.8	6	90	181	0.7	D	D/D	99.0	322	0.6	99.0	D		1.6		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
UTK	ORT	89.7	51	eP	20:46:18.84	(-0.49)	eS	20:46:29.49	(-0.54)
UTK	CRTN	142.4	52	eP	:27.07	(-0.59)	iS	:45.23	(0.78)
UTK	SHAL	176.1	232	iP	:32.50	(-0.46)	eS	:54.73	(1.12)

*******2003 DECEMBER 09; 20:59 – CENTRAL VIRGINIA*******

VTSO Felt intensity 6 in Goochland, Fluvanna and Cumberland Counties. Tectonic area approximately 200,000 square kilometers.

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
VTSO	031209	205918.7	37.774	78.100	10.0F	16	47	201	0.9	D	D/D	8.8	352	2.6	6.3	D	4.5			6

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
VTSO	CVVA	47.0	306	eP	20:59:26.06	(-0.48)	eS	20:59:32.18	(-0.12)
VTSO	CBN	79.8	53	eP	:31.31	(-0.54)	eS	:41.69	(0.20)
VTSO	SDMD	212.2	31	iPc	:49.40	(-1.33)	eS	21:00:16.40	(2.35)
VTSO	BLA	214.5	254	ePd	:50.49	(-0.57)	eS	:15.09	(0.48)
VTSO	FWV	240.2	266	ePd	:54.87	(0.65)	eS	:23.00	(2.93)
VTSO	ELN	240.7	258	ePd	:54.24	(-0.02)	eS	:22.74	(2.59)
VTSO	MCWV	258.5	325	eP	:57.15	(0.75)	eS	:28.81	(4.96X)
VTSO	PWV	265.0	260	ePd	:57.24	(-0.01)	eS	:29.83	(4.51X)
VTSO	MVL	289.9	31	eP	:58.94	(-1.28)	eS	:32.17	(1.71)

Additional Data

MVU				iPu	20:59:58.9		eS	21:00:32.2	

*******2003 DECEMBER 11; 04:14– SAVANNAH, TENNESSEE *******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	031211	041412.6	35.197	87.991	0.0	12	25	136	0.5	C	C/C	0.7	230	0.5	1.0	A		2.7		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
UTK	PLAL	25.1	198	iPu	04:14:16.54	(-0.20)	iS	04:14:19.94	(0.14)
UTK	PLDM	27.5	239	iP	:17.55	(0.41)	iS	:20.53	(0.02)
UTK	UTMT	149.6	328	eP	:38.09	(1.09)	iS	:55.94	(1.00)
UTK	OXF	150.3	240	iP-	:36.77	(-0.35)	eS	:54.52	(-0.63)
UTK	LRAL	256.8	159	eP-	:52.05	(-1.33)	eS	:15:24.15	(1.08)
UTK	WCI	364.7	23	eP	:15:12.40	(5.70X)	eS	:47.20	(1.10)
UTK	CCM	430.4	318	eP	:13.32	(-1.45)			

*******2003 DECEMBER 22; 07:32 – CHARLESTON, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031222	073212.5	32.929	80.162	10.2	8	4	181	0.0	C	B/D	1.0	360	1.0	0.6			1.8		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME	(RES)	PHASE	ARRIVAL TIME	(RES)
USC	RGR	3.8	232	iPu	07:32:14.79	(0.00)	iSd	07:32:15.70	(0.01)
USC	MGS	3.9	150	iPd	:14.85	(0.01)	iSn	:15.87	(0.00)
USC	CSU	10.7	53	iPd	:15.25	(-0.06)	iSn	:17.29	(0.02)
USC	WAS	13.7	229	iPd	:16.11	(0.09)	iSn	:18.11	(-0.07)

*******2003 DECEMBER 22; 23:50 – CHARLESTON, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031222	235026.0	32.924	80.157	5.6	14	3	103	0.1	B	A/B	0.3	360	0.3	0.6			3.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	3.3	152	iPd	23:50:27.64 (0.03)	iSn	23:50:28.04 (-0.03)
USC	RGR	3.9	242	iPd	:27.59 (-0.05)	iSd	:28.08 (0.06)
USC	CSU	10.6	50	iPd	:28.51 (0.10)	iSn	:30.03 (-0.02)
USC	CSB	10.6	50	iPd	:28.46 (0.06)	iSn	:29.78 (-0.22)
USC	WAS	13.7	231	iPd	:29.12 (-0.09)	iSn	:30.83 (-0.31)
USC	TWB	21.7	13	iPd	:30.23 (-0.04)	iSn	:32.76 (-0.08)
USC	DRC	29.7	313	iPu	:32.17 (0.11)	iSn	:36.15 (-0.01)

*******2003 DECEMBER 22; 23:53 – CHARLESTON, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031222	235359.9	32.904	80.151	6.7	12	1	113	0.1	B	B/B	0.6	360	0.6	0.4			1.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	MGS	1.2	128	iPu	23:54:01.64 (0.09)	iSn	23:54:02.04 (0.00)
USC	RGR	4.1	275	iPd	:01.61 (-0.10)	iSd	:02.27 (0.04)
USC	CSU	11.8	40	iPu	:02.55 (-0.03)	iSn	:03.81 (-0.61)
USC	CSB	11.8	40	iPd	:02.48 (-0.08)	iSn	:04.37 (0.00)
USC	WAS	13.0	241	iPd	:03.13 (0.06)	iSn	:04.88 (-0.06)
USC	TWB	23.8	11	iPd	:04.66 (0.10)	iSn	:06.72 (-0.71)

*******2003 DECEMBER 25; 01:43– COLLINSVILLE, ALABAMA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
UTK	031225	014324.0	34.253	85.823	7.8	8	74	224	0.9	D	D/D	1.0	279	0.6	3.4	C		2.0		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
UTK	SHAL	74.3	286	iP	01:43:34.79 (-1.38)	iS	01:43:45.66 (0.49)
UTK	SWET	107.3	355	eP	:43.04 (1.61)	iS	:54.18 (-0.06)
UTK	LRAL	173.6	219	iP+	:52.15 (0.30)	eS	:44:15.33 (3.06)
UTK	PLAL	221.8	292	eP	:56.36 (-3.07)	eS	:22.81 (-2.37)

SOUTHEASTERN U.S. RESERVOIR ACTIVITY DURING 2003

Events are listed chronologically (this also applies to multiple hypocenter locations for the same event). All times are Universal Coordinated Time. Most entries in the listing are self-explanatory. Items that might require further explanation are defined in the section entitled DEFINITIONS AND NETWORK OPERATOR CODES.

*******2003 APRIL 04; 23:01 - MONTICELLO RESERVOIR, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030404	230146.6	33.986	81.032	0.5	17	6	165	0.1	C	B/C	0.3	360	0.3	1.4			1.4		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)	PHASE	ARRIVAL TIME (RES)
USC	ACFL	5.6	53	iPd	23:01:47.40 (-0.13)	iSn	23:01:48.28 (0.01)
USC	MR02	29.4	321	iPd	:51.30 (0.00)	iSn	:54.97 (-0.01)
USC	JSC	39.0	327	iPd	:52.87 (0.05)	iSu	:57.56 (-0.14)
USC	LGEL	39.3	49	iPu	:52.97 (0.09)	iSn	:57.79 (0.00)
USC	MR01	45.4	328	iPd	:53.93 (0.07)	iSn	:59.44 (-0.09)
USC	BBLV	47.0	262	iPd	:54.15 (0.04)	iSn	:02:00.11 (0.14)
USC	MR10	48.0	324	iPd	:54.35 (0.08)	iSn	:00.30 (0.04)
USC	MR07	50.6	328	iPd	:54.76 (0.08)	iSn	:00.99 (-0.01)
USC	HAW	87.6	218	iPd	:02:00.45 (-0.10)	iSn	:11.86 (0.42X)

*******2003 MAY 08; 11:33 - MONTICELLO RESERVOIR, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030508	113306.0	33.989	81.053	0.9	10	28	355	0.1	D	D/D	4.2	360	4.2	99.0			1.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MR02	28.0	324	iPd	11:33:10.37	(-0.10)	iSn	11:33:13.99	(0.02)
USC	JSC	37.7	330	iPu	:11.97	(-0.05)	iSd	:16.69	(-0.05)
USC	MR01	44.2	330	iPu	:13.04	(-0.01)	iSn	:18.58	(0.02)
USC	MR10	46.7	326	iPu	:13.54	(0.09)	iSn	:19.70	(0.44)
USC	MR07	49.4	330	iPu	:13.95	(0.07)	iSn	:20.86	(0.83)

*******2003 JUNE 27; 06:20 - MONTICELLO RESERVOIR, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	030627	062042.5	34.027	81.256	2.9	8	19	340	0.0	D	C/D	3.4	360	3.4	14.8			1.4		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MR02	18.6	7	iPu	06:20:45.48	(0.01)	iSn	06:20:47.85	(0.03)
USC	JSC	28.2	359	iPd	:47.01	(0.01)	iSu	:50.51	(-0.03)
USC	MR01	34.0	354	iPd	:47.90	(-0.01)	iSn	:52.10	(-0.06)
USC	MR10	35.1	348	iPu	:48.07	(-0.02)	iSn	:52.55	(0.07)

*******2003 DECEMBER 11; 20:00 - MONTICELLO RESERVOIR, SOUTH CAROLINA*******

SRCE	DATE	HRMN SEC	LAT-N	LON-W	DPTH	PH	DMN	GAP	RMS	Q	SQD	ERH1	AZ	ERH2	ERZ	Q	MN	MD	MAGT	I
USC	031211	200052.2	33.997	81.046	1.1	10	28	354	0.1	D	D/D	5.4	360	5.4	99.0			1.5		

SRCE	STA	DIST (KM)	AZM	PHASE	ARRIVAL TIME (RES)		PHASE	ARRIVAL TIME (RES)	
USC	MR02	27.6	322	iPu	20:00:56.47	(-0.11)	iSn	20:01:00.07	(0.04)
USC	JSC	37.3	328	iPd	:58.04	(-0.07)	iSn	:02.71	(-0.05)
USC	MR01	43.7	328	iPu	:59.18	(0.03)	iSn	:04.59	(-0.01)
USC	MR10	46.3	325	iPu	:59.61	(0.06)	iSn	:05.51	(0.19)
USC	MR07	48.9	328	iPd	:01:00.06	(0.09)	iSn	:06.05	(-0.02)

SEISMIC STATION LISTING AND NETWORK MAPS

Stations potentially operational in the SEUSSN during the report period are listed below. A list of operator code definitions may be found in the section entitled DEFINITIONS AND NETWORK OPERATOR CODES. After the station listing is a plot of all the stations, followed by maps of individual networks (with station identification codes) operated by the various groups contributing to the SEUSSN bulletin.

Sta. Code	Lat. N (Dg-Min)	Lon. W (Dg-Min)	Elev. (M)	Dates Open-Close	Current Operator	Locality
ABTN	35-53.13	86-06.54	363	8409-	TVA/UTK	Auburntown, TN
ANTN	36-10.30	85-13.88	612	8305	TVA/UTK	Anderson, TN
ASTN	36-19.61	83-28.53	753	-	CERI	Avondale Springs, TN
BG3	34-59.58	82-55.90	366	86 -	DPC	Lake Jocassee, SC
BHT	35-51.78	84-56.39	732	-	CERI	Blowhole, TN
BLA	37-12.68	80-25.21	634	6209-	VTSO/NEIC	Blacksburg, VA
BRBC	35-44.34	82-17.16	1976	8205-	CERI	Blue Ridge Broadcasting Co.
BVD	39-46.49	75-29.96	58	8502-	DGS	Bellevue State Park, DE
BWD	39-47.97	75-34.60	63	8502-	DGS	Brandywine Creek State Park, DE
CBN	38-12.30	77-22.40	70	0105 -	NEIC	Corbin, VA
CCK	35-01.37	82-59.49	701	9201-	USC	Bad Creek Res., SC

CEH	35-53.46	79-05.58	152	7508-	UNC/NEIC	Chapel Hill, NC
COW	33-22.90	80-41.96	60	7710-	USC	Cow Castle Creek, SC
CPCT	35-26.99	84-31.31	275	-	CERI	Cooper Cave, TN
CRTN	36-11.99	83-50.44	488	8403-	TVA/UTK	Comb Ridge, TN
CVVA	38-01.31	78-31.93	159	-	CERI	Charlottesville, VA
CSB	32-59.22	80-04.31	83	9705-	CSU-NEIC	Charleston Southern Univ., SC
CSU	32-59.22	80-04.31	7	9705-	CSU-NEIC	Charleston Southern Univ., SC
DEMA	39-19.12	75-36.59	12	9910-	DGS	DE Emergency Mgmt Agency, DE
DRC	33-06.45	80-23.30	20	8303-	CSU-NEIC	Dorchester, SC
DYTN	35-29.47	85-05.54	580	-	CERI	Dayton, TN
DXN	33-03.23	81-37.32	61	9607-	WSRC	Girard, GA
DWPF	28-06.61	81-25.97	-142	9808	NEIC-IRIS	Disney World, FL
ELK	33-20.88	81-20.83	88	9511--	WSRC	Elko, SC
ELN	37-13.70	80-45.10	634	9612 -	VTSO	Prospectdale, VA
ETT	35-19.56	84-27.30	588	-	CERI	Etowah, TN
FDKY	36-47.40	85-47.65	306	8703 -	TVA/UTK	Freedom, KY
FWV	37-34.90	80.48.70	756	9612-	VTSO	Forrest Hill, WV
GFM	36-06.66	81-48.42	1726	8205-	CERI	Grandfather Mtn., NC
GMG	34-51.76	84-40.22	1097	8511-	GIT-CERI	Grassy Mountain, GA
GOGA	33-24.67	83-28.00	150	94 -	NEIC	Godfrey, GA
GRBT	35-40.45	84-11.82	329	-	CERI	Greenback, TN
GTTN	35-48.73	83-39.99	917	-	CERI	Green Top, TN
HAKY	37-06.34	86-35.10	169	8706 -	TVA/UTK	Hadley, KY
HAW	33-21.60	81-36.60	85	0010-	WSRC	Hawthorne Fire Tower, SC
HBF	32-56.85	80-19.96	-89	7303-	USC	Harts Bluff, SC
JSC	34-16.90	81-15.62	120	7405-	USC	Jenkinsville, SC
JVW	34-59.54	82-59.86	554	9111-	USC	Bad Creek Res., SC
LAL	34-26.20	87-20.23	320	8903-	TVA	Leola, AL
LRAL	33-02.09	86-59.87	130	0107-	NEIC	Lakeview Retreat, AL
MCWV	39-39.49	79-50.74	280	94 -	NEIC	Mont Chateau, WV
MGS	32-53.87	80-08.46	9	7603-	CSU -USC	Middleton Gardens, SC
MMC	34-46.79	82-54.91	280	8707-	DPC	Morgan Memorial Church, SC
MOB	33-11.60	81-48.89	67	9510-	WSRC	Waynesboro, GA
MOTN	36-37.08	87-59.20	177	8308-	TVA/UTK	Model, TN
MR01	34-19.91	81-17.74	131	7711-	USC -SCEG	Monticello Res., SC
MR02	34-11.58	81-13.81	84	7711-	USC -SCEG	Monticello Res., SC
MR05	34-16.05	81-20.05	103	7807-	USC -SCEG	Monticello Res., SC
MR07	34-22.32	81-19.50	134	7807-	USC -SCEG	Monticello Res., SC
MR10	34-20.18	81-20.25	137	7807-	USC -SCEG	Monticello Res., SC
MSAL	34-50.80	86-40.41	260	8307	TVA/UTK	Monte Sano, AL
MVL	39-59.96	76-20.94	91	7410-	MVU	Millersville, PA
MYNC	35-04.43	89-07.67	550	94 -	NEIC	Murphy, NC
NED	39-43.58	75-44.17	90	7211-	DGS	Newark, DE
NHSC	33-06.40	80-10.67	12	0007-	NEIC	New Hope, SC
NPRS	33-15.42	81-38.28	79	91 -	WSRC	Savannah River Lab, SC
OLT	35-09.00	85-01.44	445	9308 -	TVA/UTK	Ooltewah, TN
ORT	35-54.57	84-18.29	370	8307 -	TVA/UTK	Oak Ridge, TN
PDTN	35-16.40	85-50.97	335	8509 -	TVA/UTK	Piedmont, TN
PKNC	36-02.77	81-09.45	785	8211-	CERI	Pores Knob, NC
PLAL	34-58.94	88-04.53	165	9807-	SLU	Pickwick Lake, AL
PWLA	34-58.80	88-03.84	204	8005-	CERI	Pickwick Lake, AL
PWV	37-20.16	81-02.86	820	9001-	VTSO	Princeton, WVA
RCGA	34-58.57	85-20.90	460	-	CERI	Rock City, GA
RBNC	35-21.42	82-59.16	1829	8205-	CERI	Richland Balsam, NC
RGRS	32-54.45	80-11.65	-52	8606-	CSU-NEIC	(Roger Stewart) SC
RICH	35-55.17	82-49.12	968	8306-	CERI	Rich Mountain, NC
SDMD	39-24.61	76-50.42	215	-	MGS	Soldiers Delight, MD
SLTN	36-26.59	82-07.23	1280	8401 -	TVA/UTK	Elizabethton, TN
SMNC	35-35.01	81-38.16	722	9907-	CERI	South Mountain, NC
SMSC	34-55.85	82-58.26	498	7704-	USC	Smeltzer Mtn. (Jocassee), SC
SMT	34-55.85	82-58.26	498	-	USC	Smeltzer Mtn, SC

SOKY	37-31.56	85-57.90	204	8410-	UK	Sonora, KY
SRAV	33-19.50	81-40.80	91	-	WSRC	Savannah River Lab, SC
SRPD	33-09.30	81-42.75	31	7608-	WSRC	Savannah River Lab, SC
SRPN	33-19.74	81-35.33	95	7608-	WSRC	Savannah River Lab, SC
SRPW	33-12.14	81-34.69	77	7608-	WSRC	Savannah River Lab, SC
SVS	32-58.10	80-14.89	3	7603-	USC	Slandsville, SC
SWET	35-12.98	85-55.92	581	0005-	CERI	Sewanee, TN
TAL	33-22.66	81-42.45	125	-	WSRC	Savannah River Lab, SC
TCT	36-00.32	87-33.17	245	8803-	TVA/UTK	Tennessee City, TN
TKL	35-39.48	83-46.44	350	78 -	UTK	Tuckaleechee Caverns, TN
TQTN	35-30.96	84-43.55	260	8607 -	TVA/UTK	Tranquillity, TN
TRYN	35-14.76	82-16.02	915	8303	CERI	Tryon Peak, NC
TWB	33-06.88	80-06.18	9	8803-	CSU -USC	Tillman's/White's Bay, SC
WAS	32-50.81	80-16.30	9	8303-	CSU-NEIC	West Ashley, SC
WMTN*	35-14.88	84-58.39	378	8507-9306	TVA	White Oak Mountain, TN
WMTN*	36-24.61	84-10.54	830	-	CERI	White Oak Mountain, TN
WMV	37-06.51	80-58.23	1157	8210-	VTSO	Walker Mtn., VA
WVT	36-07.8	87-49.80	153	94	NEIC	Waverly, TN

* Note: 2 stations with very different locations. Periods of operation do not overlap. TVA station is closed.

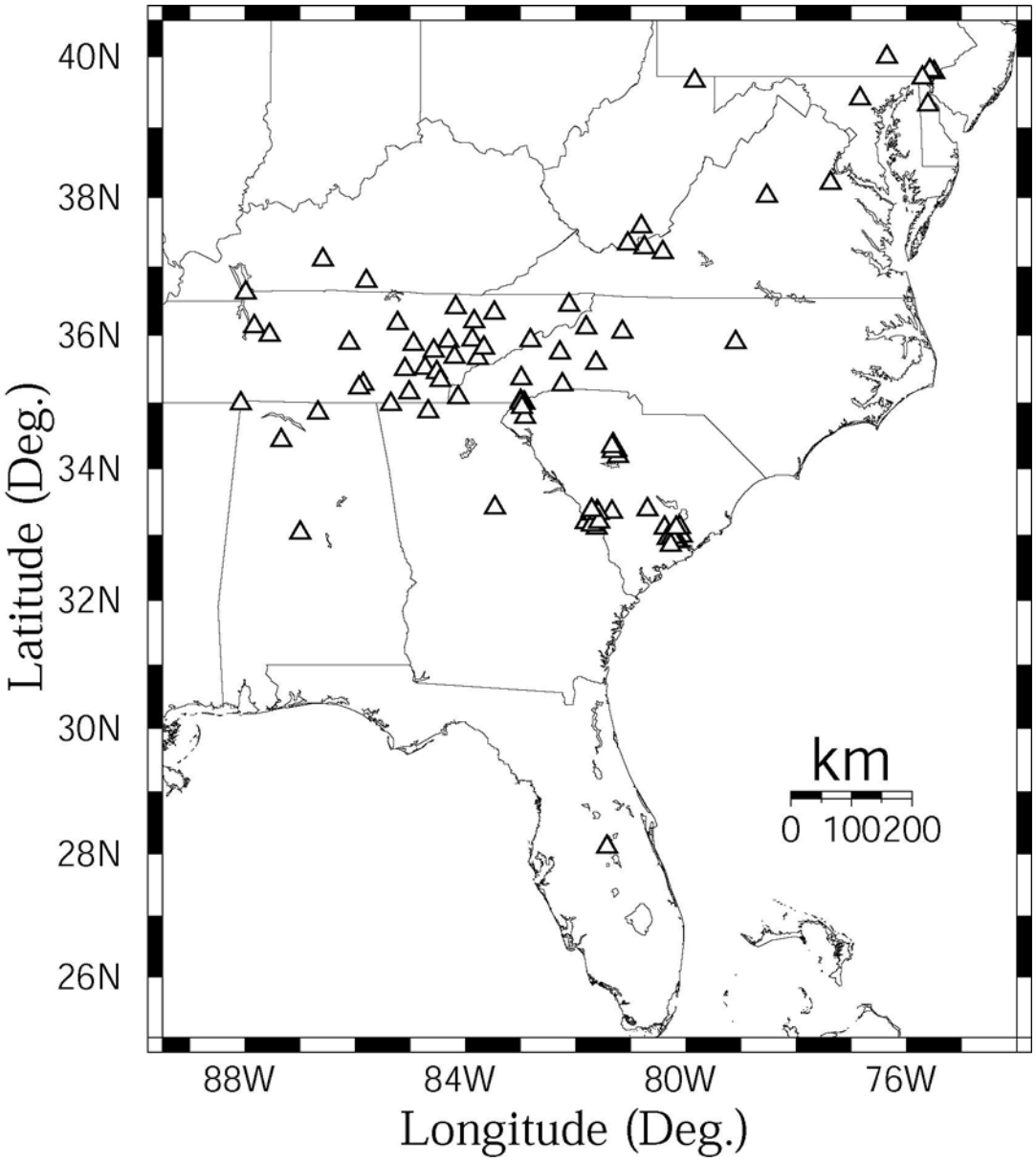

FIGURE 4. Seismic stations (triangles) in the SEUSSN. Triangles indicate stations operating during the report period.

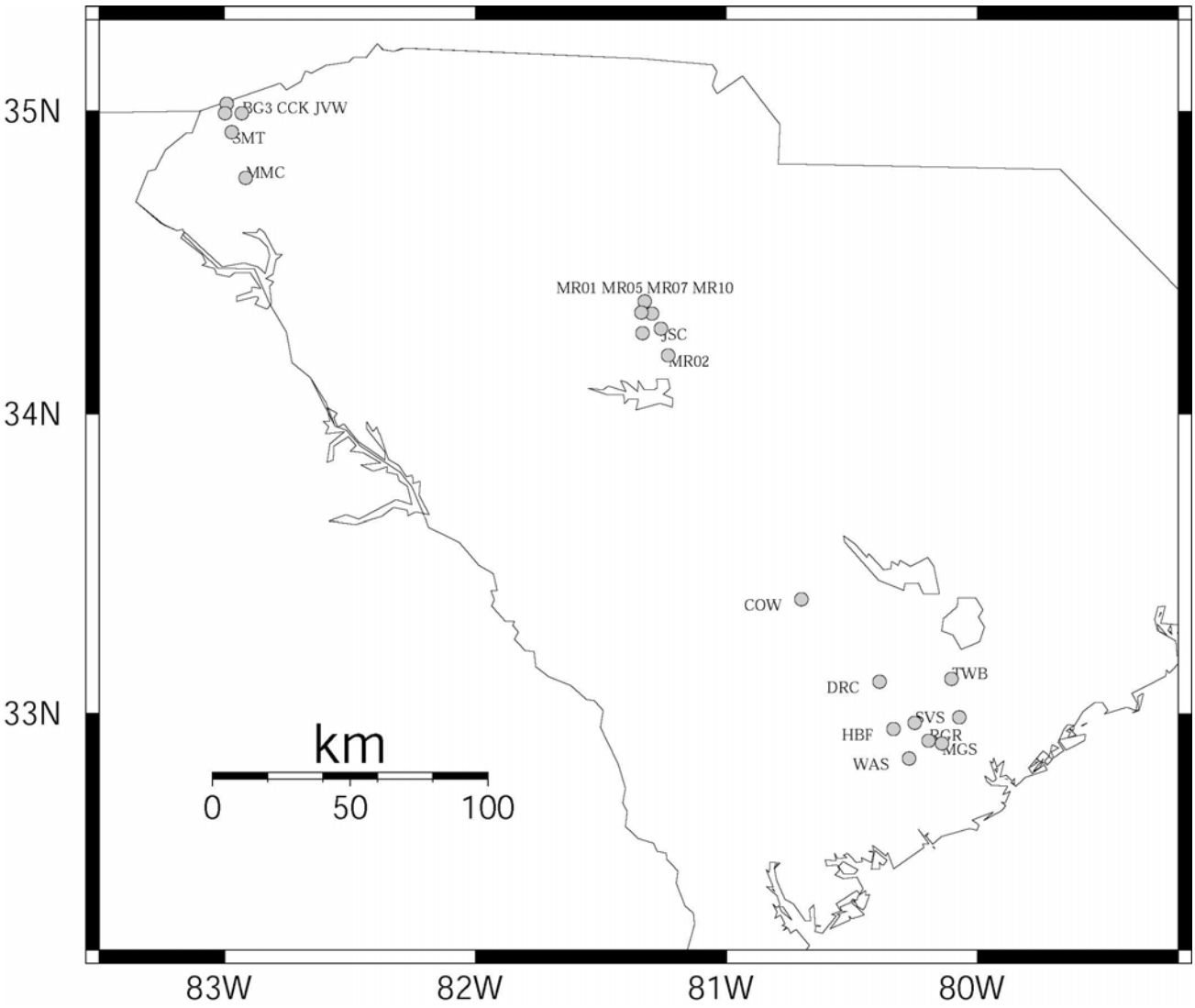

FIGURE 5. University of South Carolina Seismic Network.

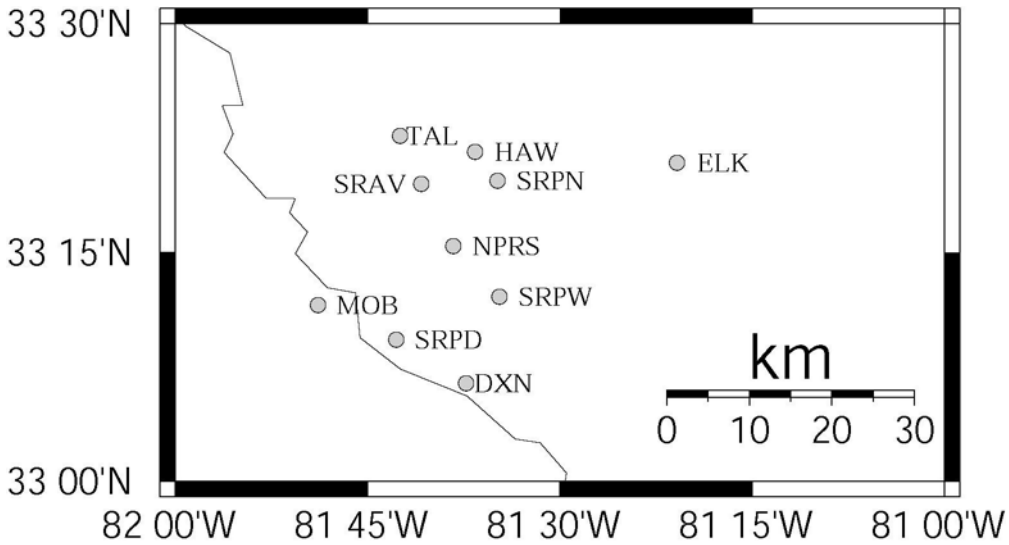

FIGURE 6. Westinghouse Savannah River Site network.

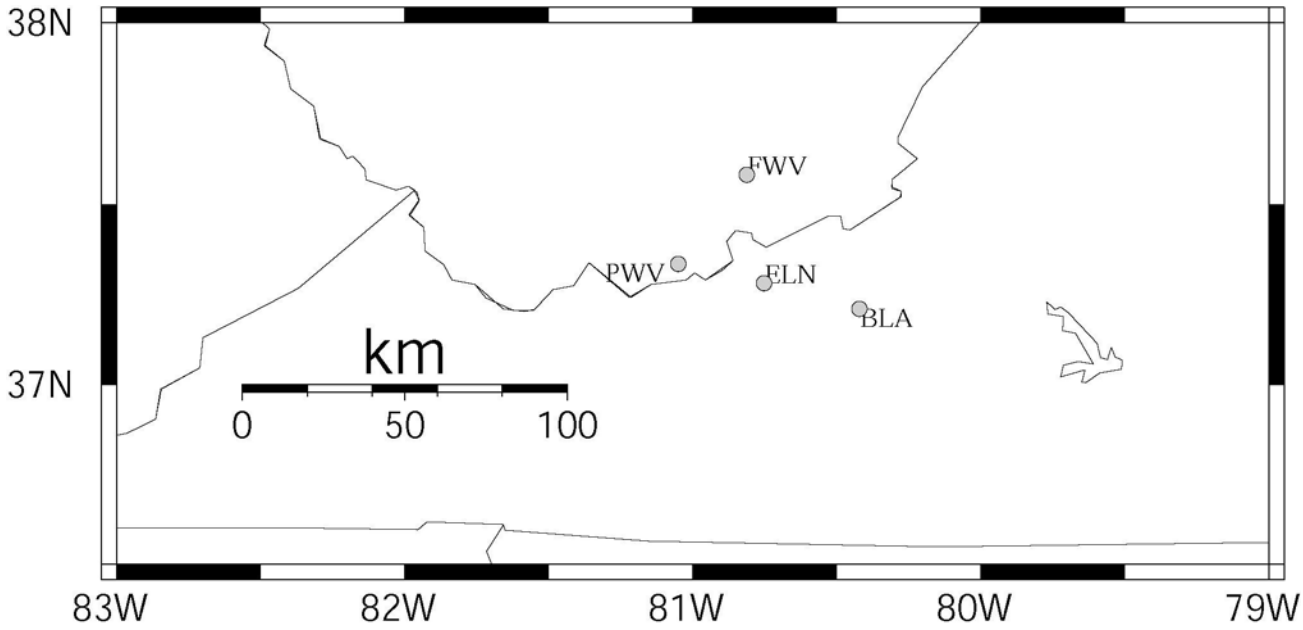

FIGURE 7. Virginia Tech Seismic Network.

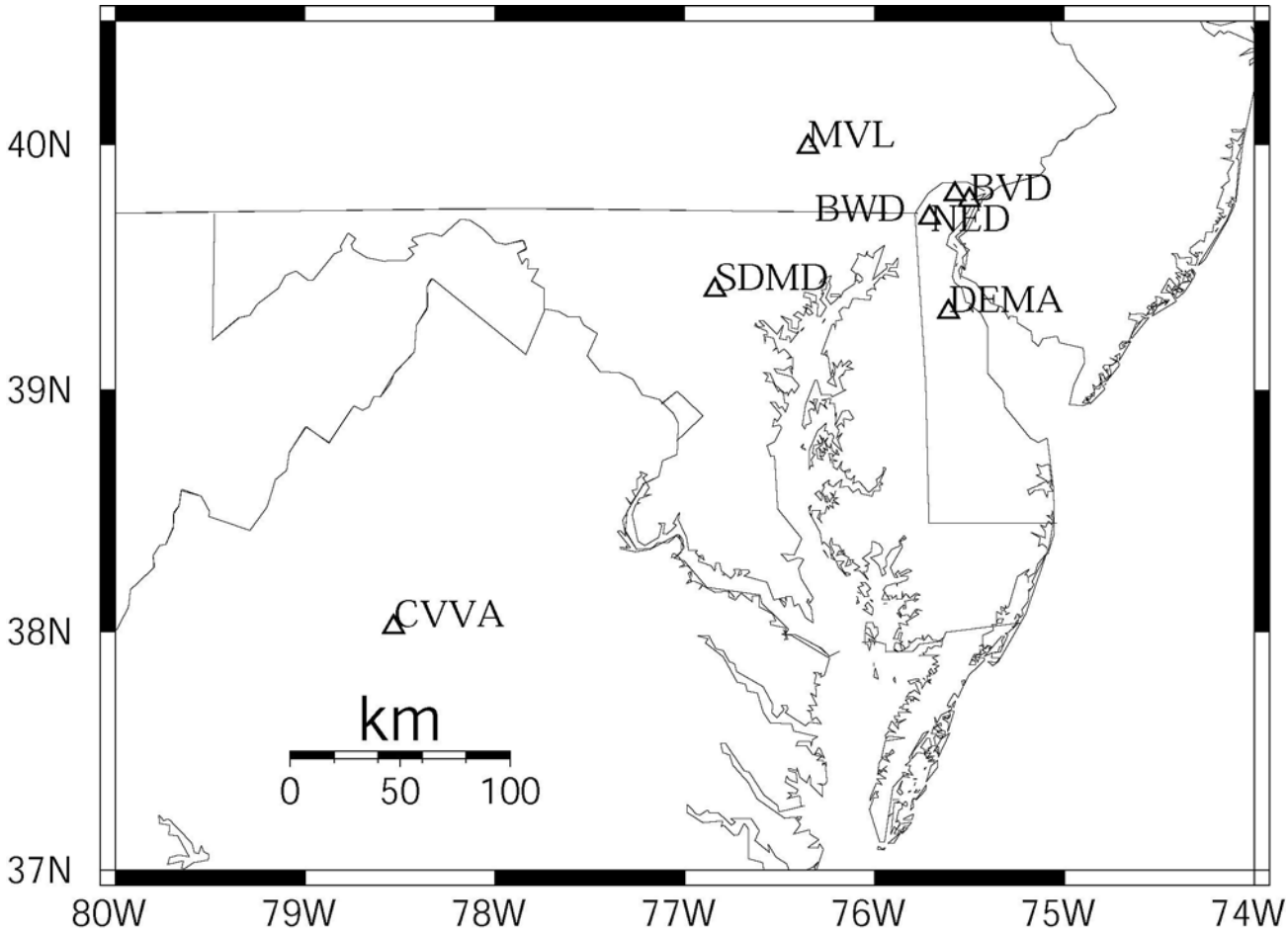

FIGURE 8. Stations of Delaware Geological Survey, Millersville University, Maryland Geological Survey and CERI-ANSS (CVVA)

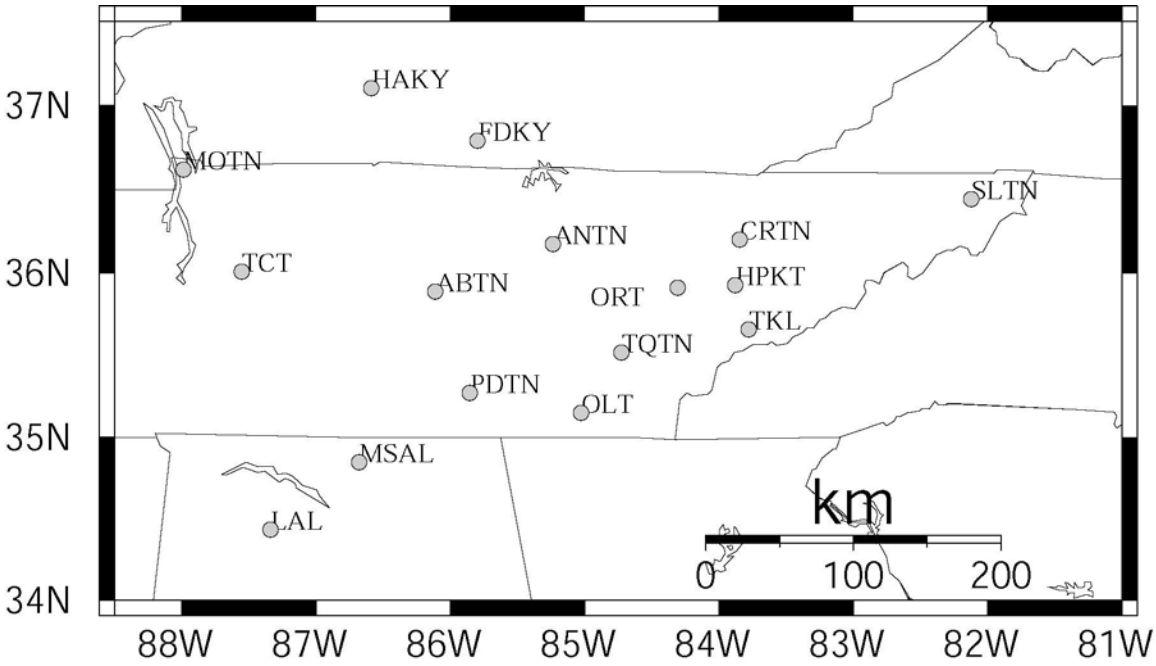

FIGURE 9. University of Tennessee/TVA JIEE seismic network

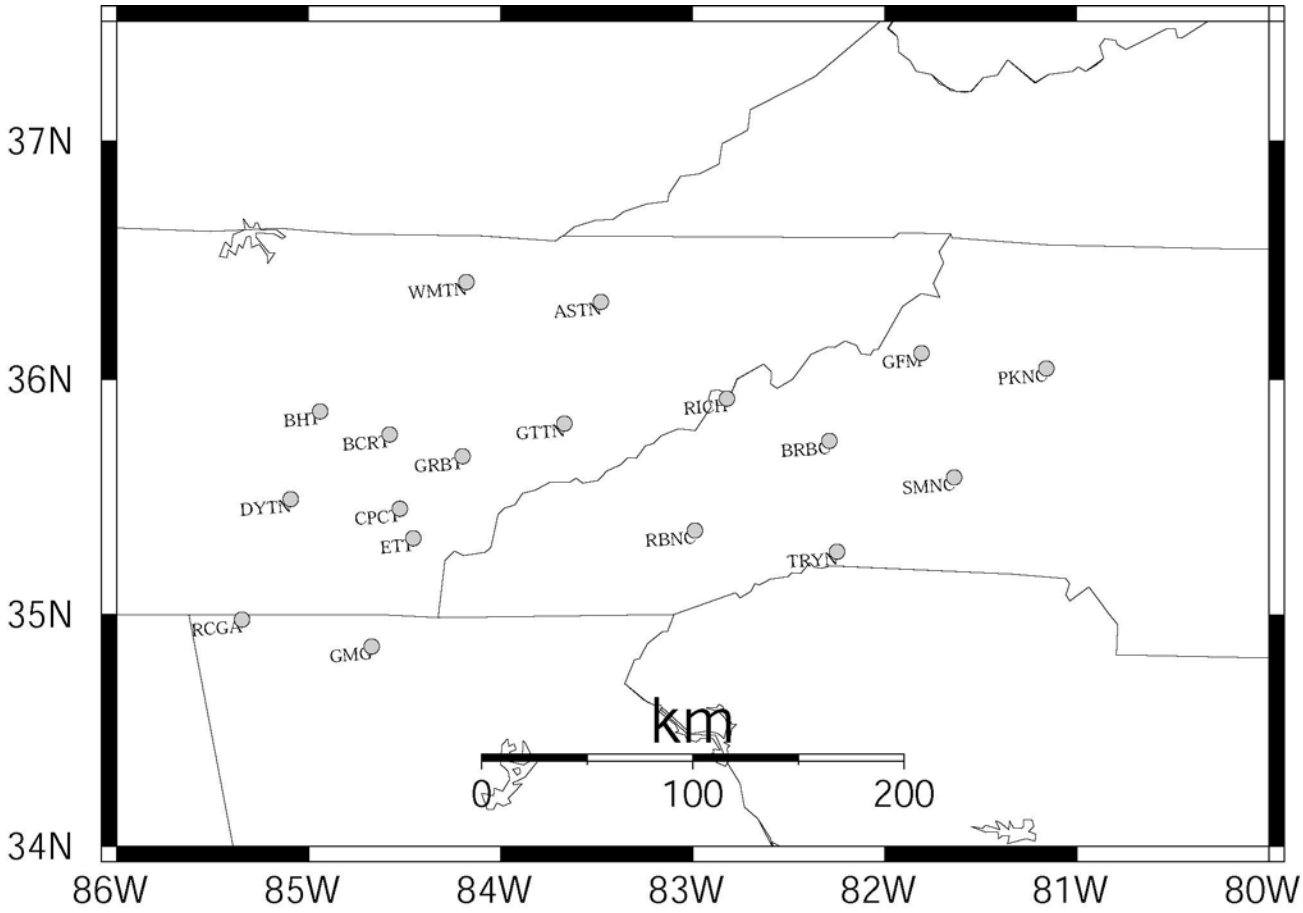

FIGURE 10. Center for Earthquake Research and Information (CERI) seismic network.

INTERNET ACCESS TO SOUTHEASTERN U.S. EARTHQUAKE CATALOG INFORMATION AND ELECTRONIC VERSIONS OF THE BULLETIN

Southeastern U. S. Seismic Network Bulletins

Text files of SEUSSN Bulletins No. 1 through 38, are accessible at **http://www.geol.vt.edu/outreach/vtso/.**

Catalog of Southeastern United States Earthquakes

A catalog of pre-instrumental and instrumentally located earthquakes in the southeastern U.S. region is available at **http://www.geol.vt.edu/outreach/vtso/**. The catalog is a synthesis of information contained in the U.S. Geological Survey State Seismicity Map Series (Stover, C. W., B. G. Reagor, and S. T. Algermissen, 1984, "United States Earthquake Data File," U.S. Geological Survey Open File Report 84-225) and earthquake hypocenter parameters and magnitudes determined by regional seismic network operators in the region. For the period subsequent to July, 1977, the catalog is composed of data appearing in the SEUSSN Bulletins. An important aspect of the Southeastern U.S. Catalog is the estimation of magnitude for a large number of pre-instrumental shocks in the region. These estimates were derived using the region specific relationships between felt area, maximum intensity, and mb(Lg) magnitude developed by Sibol et al. (Bull. Seism. Soc. Am., 77, 1987, pp. 1635-1654).

The Southeastern U.S. Catalog of earthquakes subsequent to July, 1977, is incorporated into the ANSS Composite Catalog, accessible at **http://quake.geo.berkeley.edu/anss/.**

DEFINITIONS AND NETWORK OPERATOR CODES

Below are some entries in this Bulletin that might require definition. Also given is a detailed listing of agencies or groups (and their letter codes) that supply information to this Bulletin.

AZM:	Azimuthal angle from epicenter to station as measured from north (in deg),
DEP:	Focal depth estimate (in km); FXD indicates that the depth was held fixed during the epicentral determination,
DIST (KM)	Epicentral distance (in km) between the epicenter and a station,
ERROR ELLIPSE:	Semi-axes, expressed as lengths (km) and azimuths (deg), of the vertical projection of the error ellipsoid (Lahr, 1980). Horizontal axes are expressed as the semi-major axis (ERHMAX), it's azimuth (AZ), and the semi-minor axis (ERHMIN). The vertical axis (ERZ) is the largest vertical deviation of the error ellipsoid from the hypocenter. A quality measure (Q) for the ellipsoid based on the length of the largest semi-axis (ERHMAX, ERHMIN, or ERZ) may also be supplied. For this Bulletin the following statistics apply for error estimates: CERI, UTK, and VTSO: Error ellipse projected semi-axes from HYPOELLIPSE corresponding to a chi-square statistic (68%) with one degree of freedom,

GIT: Error ellipse projected semi-axes from LOCA, and
USC: Standard error estimates from HYPO71.
NEIC and NEIC: Unknown,

GAP: The largest azimuthal separation (in deg) between recording stations,

HYPOELLIPSE: Computer hypocenter location program (Lahr, 1980),

HYPO71: Computer hypocenter location program (Lee and Lahr, 1974),

LOCA: Computer hypocenter location program developed at the Georgia Institute of Technology,

MBN or mb(Lg): Body wave magnitude determination using Nuttli's formulas for the Lg phase (Nuttli, 1973),

MDB, MDL, MD: Duration/coda length magnitude that approximates either the mb, ML, or an unknown magnitude scale, respectively. As of June 1986 (SEUSSN Bulletin 17), those using a duration magnitude approximating mb(Lg) are CERI, DGS, GIT, UTK and VTSO. Specifically:
CERI: MDB = -2.36 + 2.23 Log(D) + 0.12 Log(K) (MDB > 2.6)
MDB = -3.38 + 2.74 Log(D) (MDB < 2.7)
VTSO, UTK, and GIT: MDB = -3.45 + 2.85 Log(D) where D is signal duration measured from the P-wave arrival time to the time when the signal returns to background noise, and K is the epicentral distance in kilometers. Those using a duration magnitude approximating ML are USC and NEIC.
Specifically:
NEIC: MDL = -0.87 + 2.0 Log(D) + 0.0035 X where D is signal duration measured from the P-wave arrival time to the time when the signal returns to twice background noise, and X is the epicentral distance in kilometers. For more information please see SEUSSN Bulletin 17 (page 1) or contact the agency making the estimate for details on their specific procedure,

ML: Local magnitude; contact the agency or group making the estimate for details on their specific procedure,
NO: Number of P, S, and S-P readings used in locating the event,

PHASE: Phase descriptions for either P or S waves, or S-P times. Included under this heading may also be the descriptors; 'i' for an impulsive arrival or 'e' for an emergent arrival. Preliminary first motions may also be given for P wave polarities. These include; 'u', 'c', or '+' for a compressional first arrival, and 'd' or '-' for a dilatational first arrival. '?' indicates that the arrival time is questionable.

Q: Solution quality of the hypocenter (the average of the SQD quality measures, see below; Lee and Lahr, 1974),

RES: Arrival time residual (the difference between the observed and the calculated arrival time, in seconds). An "X" following the value of the arrival time residual means that the arrival time was not used to compute the location of that event,

RMS: Root-mean-square of the weighted arrival time residuals (in sec),

S-P: Difference between the S and P wave arrival times (in sec),

SQD: Measures of the statistical quality of the solution (S), and of the distribution of stations (D) around the hypocenter (Lee and Lahr, 1974),

*XXXX: Code indicating the agency or group that made the hypocentral/magnitude determination; a listing of agencies and groups that operate seismographs in the SEUSSN and/or who supply information to this BULLETIN follows.

Operator Codes

AUAL - Auburn University, AL
CERI - Center for Earthquake Research and Information, TN
CPL - Carolina Power and Light Company, NC
CSU - Charleston Southern University, SC (formerly BCC, Baptist College at Charleston-changed 1991)
DGS - Delaware Geological Survey, DE
DPC - Duke Power Company, SC
GIT - Georgia Institute of Technology, GA
GSA - Geological Survey of Alabama, AL
GSW - Georgia Southwestern College, GA
IRIS - Incorporated Research Institutions for Seismology, DC
MGS - Maryland Geological Survey, MD
MVU - Millersville University, PA
NASA - National Aeronautics and Space Administration/Goddard Space Flight Center, WV
NEIC - National Earthquake Information Center, NEIC, CO
SCEG - South Carolina Electric and Gas Company, SC
SLU - St. Louis University, MO
TCC - Tidewater Community College, VA
USC - University of South Carolina, SC
NEIC - United States Geological Survey, CO
UTK - University of Tennessee/Tennessee Valley Authority- Joint Institute for Energy and Environment
UTM - University of Tennessee at Martin, TN
VP - Virginia Power, VA
VTSO - Virginia Tech Seismological Observatory, VA
VSCC - Volunteer State Community College, TN
WAL - Washington and Lee University, VA
WSRC - Westinghouse Savannah River Company, SC
WVGS - West Virginia Geological and Economic Survey, WV
WVU - West Virginia University, WV