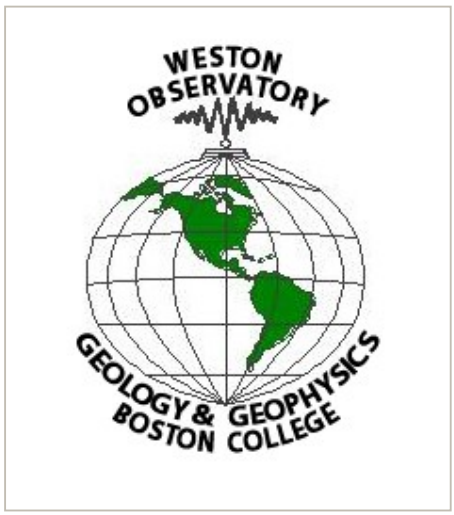
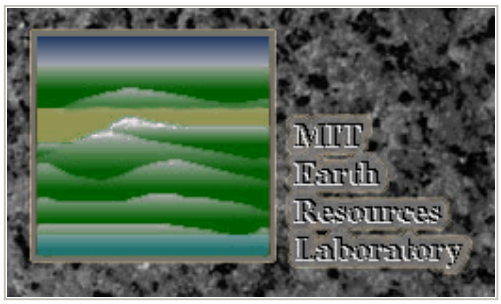
A STUDY OF NEW ENGLAND SEISMICITY

Quarterly Earthquake Report

July - September 1998

New England
Seismic Network





Weston Observatory
381 Concord Road
Weston, MA 02493

Earth Resources Lab
Massachusetts Institute of Technology
42 Carleton Street
Cambridge, MA 02142

NEW ENGLAND SEISMIC NETWORK

John E. Ebel, Principal Investigator M. Nafi Toksöz, Principal Investigator

Weston Observatory
Dept. of Geology and Geophysics
Boston College
381 Concord Road
Weston, MA 02493
Email: ebel@bcvms.bc.edu
Award # 1434-HQ-98-AG-01943

Earth Resources Lab
Dept. of Earth, Atmospheric, and Planetary Sciences
Massachusetts Institute of Technology
42 Carleton Street
Cambridge, MA 02142
Email: nafi@erl.mit.edu
Award # 1434-HQ-98-AG-01926

Prepared by Charles Doll, Jr.
Email: doll@erl.mit.edu
and Susan O'Connor
Email: dannolfo@bcvms.bc.edu
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for
United States Geological Survey
905 National Center
12201 Sunrise Valley Drive
Reston, Virginia 20192

Notice

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Table of Contents

Introduction

The New England Seismic Network (NESN) is operated collaboratively by the Weston Observatory (WES) of Boston College and the Earth Resources Lab (ERL) of the Massachusetts Institute of Technology. The mission of the NESN is to operate and maintain a regional seismic network with digital recording of seismic ground motions for the following purposes: 1) to determine the location and magnitude of earthquakes in and adjacent to New England and report felt events to public safety agencies, 2) to define the crust and upper mantle structure of the northeastern United States, 3) to derive the source parameters of New England earthquakes, and 4) to estimate the seismic hazard in the area.

This report summarizes the work of the NESN for the period July - September 1998. It includes a brief summary of the network's equipment and operation, and a short discussion of data management procedures. A list of participating personnel is given in Table 1. There were 8 earthquakes that occurred within or near the network during this reporting period. Phase information for these earthquakes is included in this report.

Return to Table of Contents

Current Network Operation and Status

The New England Seismic Network currently consists of 11 broadband three-component, 4 short-period vertical, and 8 strong-motion stations. The coordinates of the stations are given in Table 2, and maps of the weak- and strong-motion networks are shown in Figures 1 and 2, respectively.

WES operates 11 stations with broadband instruments consisting of Guralp CMG-40T three-component sensors. Ground motions recorded by these sensors are digitized at 100 sps with 16-bit resolution. Additional gain-ranging provides 126 dB dynamic range. These stations are operated in dialup mode with waveform segments of suspected events transmitted in digital mode to Weston Observatory for analysis and archiving. WES is continuing to upgrade its recording stations with 4 more broadband instruments scheduled for installation in 1999. WES also maintains 8 SMA-1 strong-motion instruments in New England.

ERL at MIT currently operates 4 short-period stations, all located within 100 km of Boston. The short- period instruments have 1.0 Hz L4C vertical seismometers. Data recorded by these seismometers is transmitted continuously in analog mode to ERL and digitized (12-bit) into a PC at 50 sps. Personnel at ERL are in the process of installing a new three-component, high dynamic range instrument at Station WFM. The instrument has a CMG-40T sensor and transmits 3-channel, 24-bit data at 100 sps continuously to a central processor (Pentium PC) at ERL. Waveform windows of suspected events are extracted from the data stream, analyzed and archived. WES and ERL record some stations in analog format on helicorders to provide additional data for analysis.

Return to Table of Contents

Seismicity

There were 8 earthquakes that occurred in or adjacent to the NESN during this reporting period. A summary of the location data is given in Table 3. Figure 3 shows the locations of these events. Figure 4 shows the locations of all events since the beginning of network operation in October, 1975.

Table 4 gives the station phase data and detailed hypocenter data for each event listed in Table 3. In addition to NESN data, arrival time and magnitude data sometimes are contributed for seismic stations operated by the Geological Survey of Canada (GSC), the Lamont-Doherty Cooperative Seismographic Network., and the US National Seismic Network. Final locations for this section were computed using the program HYPO78. For regional events (those too far from the NESN to obtain accurate locations and magnitudes) phase data are given for NESN stations, but the entry in Table 3 lists the hypocenter and geographic location information adopted from the authoritative network.

Return to Table of Contents

Data Management

Recent event locations are available via FTP at: SEISMOEAGLE.BC.EDU. Waveform data are saved in Nanometrics, ASCII, and SEED formats and are available via SEISMOEAGLE.BC.EDU or through personal contact. Earthquake lists can be fingered at QUAKE@SEISMOEAGLE.BC.EDU. Weston Observatory maintains two web pages with information about local earthquakes: "http://www.bc.edu:80/bc_org/avp/cas/wesobs/" and "http://seismoeagle.bc.edu/". The latter page is still under contruction. Currently available on the seismoeagle web page is the full catalog of northeastern earthquake activity to 1991. This will be updated as new Northeastern U.S. Seismic Network Bulletins are produced.

The entire MIT/ERL earthquake database can be accessed through the World Wide Web using the address "http://www-erl.mit.edu/NESN/homepage.html". For extraction of waveforms (recorded by the MIT stations of the NESN through March 1995) and hypocenter data, use our database search engine. Link to "Seismic Event Server at MIT ERL (SESAME)" and then click on "Interactive query form" under the heading "Custom Materials". Alternatively, the more recent local earthquake data, recorded by the MIT stations, may be accessed by logging in to our anonymous FTP directory ("ftp sunda.mit.edu"). To be added to the list of users permitted to access this FTP directory, contact Charles Doll. The waveform files are in SAC format at both sites. Waveforms are downloaded as a Unix-compressed tar volume from our web-site and as individual, Unix-compressed, station files from our FTP site.

For more information on matters discussed in this report or general earthquake information (reports, maps, catalogs, etc.) consult our web-sites www-erl.mit.edu/NESN and www.bc.edu:80/bc_org/avp/cas/wesobs/ or contact:

Charles Doll
MIT Earth Resources Lab

42 Carleton Street
Cambridge, MA 02142

Voice: 617-253-7863 / FAX: 617-253-6385 / Email: doll@erl.mit.edu

Prof. John Ebel
Weston Observatory
381 Concord Road
Weston, MA 02493

Voice: 617-552-8319 / FAX: 617-552-8388 / Email: ebel@bcvms.bc.edu

Return to Table of Contents

Explanation of Tables

Table 1: List of personnel operating the NESN

Table 2: List of Seismic and Strong Motion Stations

1. Code = station name
2. Lat = station latitude, degrees north
3. Long = station longitude, degrees west
4. Elev = station elevation in meters
5. Location = geographic location
6. Operator = network operator

Table 3: Earthquake Hypocenter List

1. Date = date event occurred, Yr (year)/Mo (month)/Dy (day)
2. Time = origin time of event, Hr (hour):Mn (minute):Sec (second)
   in UCT (Universal Coordinated Time, same as Greenwich Mean Time)
3. Lat = event location, latitude north in degrees
4. Long = event location, longitude west in degrees
5. Depth = event depth in kilometers
6. Mag = event magnitude
7. Int = event epicentral intensity
8. Location = event geographic location

Table 4: Earthquake detailed hypocenter and phase data list

Table Header: detailed hypocenter data

1. Geographic location
2. DATE = date event occurred, yr/mo/dy (year/month/day)
3. ORIGIN = event origin time (UCT) in hours, minutes, and seconds
4. LAT N = latitude north in degrees and minutes
5. LONG W = longitude west in degrees and minutes
6. DEPTH = event depth in kilometers
7. MN = Nuttli Lg phase magnitude with amplitude divided by period
8. MC = signal duration (coda) magnitude

   WES: 2.23 Log(FMP) + 0.12Log(Dist) - 2.36 (Rosario, 1979)
   MIT: 2.21 Log(FMP) - 1.7 (Chaplin *et al.*, 1980)

9. ML = local magnitude

   WES: calculated from Wood-Anderson seismograms (Ebel, 1982)
   GSC (Geological Survey of Canada): Richter Lg magnitude

10. GAP = largest azimuthal separation, in degrees, between stations
11. RMS = root mean square error of travel time residual in seconds
12. ERH = standard error of epicenter in kilometers
13. ERZ = standard error of event depth in kilometers
14. Q = solution quality of hypocenter

    A = excellent
    B = good
    C = fair
    D = poor

Table Body: earthquake phase data

1. STN = station name
2. DIST = epicentral distance in kilometers
3. AZM = azimuthal angle in degrees measured clockwise between true north and vector pointing from epicenter to station
4. Description of onset of phase arrival

   I = impulsive
   E = emergent

5. R = phase

   P = first P arrival
   S = first S arrival

6. M = first motion direction of phase arrival

   U = up or compression
   D = down or dilatation

7. K = weight of arrival

   0 = full weight (1.0)
   1 = 0.75 weight
   2 = 0.50 weight
   3 = 0.25 weight
   4 = no weight (0.0)

8. HRMN = hour and minute of phase arrival
9. SEC = second of phase arrival
10. TCAL = calculated travel time of phase in seconds
11. RES = travel time residual (error) of phase arrival
12. WT = weight of phase used in hypocentral solution
13. AMX = peak-to-peak ground motion, in millimicrons, of the maximum envelope amplitude of vertical-component signal, corrected for system response
14. PRX = period in seconds of the signal from which amplitude was measured
15. XMAG = Nuttli magnitude recorded at station
16. FMP = signal duration (coda), in seconds, measured from first P arrival
17. FMAG = coda magnitude recorded at station

Table 5: Microearthquakes and other non-locatable events

1. Date = date event occurred, Yr (year)/Mo (month)/Dy (day)
2. Sta = nearest station recording event
3. Arrival Time = phase arrival time, Hr (hour):Mn (minute):Sec (second)

Return to Table of Contents

TABLE 1

WESTON OBSERVATORY PERSONNEL

Name	Network Position	voice phone	email address
John E. Ebel	Principal Investigator	617-552-8319	ebel@bcvms.bc.edu
Alan Kafka	Research Seismologist	617-552-8300	kafka@bcvms.bc.edu
Susan O'Connor	Seismic Analyst	617-552-8337	dannolfo@bcvms.bc.edu
Edward Johnson	Project Engineer	617-552-8332	johnson@bcvms.bc.edu
Patricia Tassia	Administrative Secretary	617-552-8311	tassia@bcvms.bc.edu
W. Richard Ott, S.J.	Assistant to the Director	617-552-8335	ottwi@mail1.bc.edu
Weston Observatory		617-552-8300 617-552-8388 (FAX)	

MIT/ERL PERSONNEL

Name	Network Position	voice phone	email address
M. Nafi Toksöz	Principal Investigator	617-253-7852	nafi@erl.mit.edu
Charles Doll	Research Seismologist	617-253-7863	doll@erl.mit.edu
Charles Doll	Seismic Analyst	617-253-6290	doll@erl.mit.edu
Sara Brydges	Administrator	617-253-7797	sara@erl.mit.edu
Earth Resources Lab		617-253-8027 617-253-6385 (FAX)	

Return to Table of Contents

TABLE 2

SEISMIC STATIONS OF THE NEW ENGLAND SEISMIC NETWORK

Code	Lat	Long	Elev (m)	Location	Operator
BCX	42.3350	-71.1705	61.0	Chestnut Hill, MA	WES
BRY	41.9178	-71.5388	380.0	Smithfield, RI	WES
DNH	43.1225	-70.8948	24.0	Durham, NH	MIT
DXB	42.0610	-70.6992	8.0	Duxbury, MA	MIT
GLO	42.6403	-70.7272	15.2	Gloucester, MA	MIT
HNH	43.7050	-72.2860	180.0	Hanover, NH	WES
MIM	45.2436	-69.0403	140.0	Milo, ME	WES
NH1	43.5473	-71.5743	402.0	Sanbornton, NH	WES
QUA2	42.2789	-72.3525	168.0	Belchertown, MA	WES
TRY	42.7311	-73.6669	131.0	Troy, NY	WES
VT1	44.3317	-72.7536	410.0	Waterbury, VT	WES
WES	42.3850	-71.3220	60.0	Weston, MA	WES
WFM	42.6106	-71.4906	87.5	Westford, MA	MIT
WVL	44.5648	-69.6575	85.0	Waterville, ME	WES
YLE	41.3100	-72.9269	9.14	New Haven, CT	WES

STRONG MOTION STATIONS OF THE NEW ENGLAND SEISMIC NETWORK

Code	Lat	Long	Location	Operator
SM1	44.90	-67.25	Dennysville, ME	WES
SM2	44.49	-73.10	Essex Junction, VT	WES
SM3	41.45	-71.33	Newport, RI	WES
SM4	42.38	-71.32	Weston, MA	WES
SM5	42.66	-71.30	Lowell, MA	WES
SM6	42.30	-71.34	Natick, MA	WES
SM7	42.39	-71.54	Hudson, MA	WES
SM8	44.48	-69.61	North Vassalboro, ME	WES

Return to Table of Contents

TABLE 3

EARTHQUAKE HYPOCENTER LIST
NEW ENGLAND AND ADJACENT REGIONS
July - September 1998

Date Yr/Mo/Dy	Time Hr:Mn:Sec	Lat	Long	Depth (km)	Mag	Int	Location
1998/07/07	09:41:42.44	43.2115	-71.6683	.17	2.1		NH, W of Concord
1998/07/09	01:52:15.30	44.6763	-73.6460	.17	2.3		NY, W of Plattsburgh
1998/07/15	07:08:05.13	47.0000	-66.6463	5.0	4.3		NB, Miramichi Region
1998/07/30	08:57:24.22	46.2171	-74.7200	34.96	4.0		PQ, Ste Agathe-des Monts
1998/08/24	19:27:35.71	44.0405	-75.8023	1.56	2.9		NY, Near Watertown
1998/09/05	05:19:56.12	44.3475	-68.6405	5.0	2.3		ME, Near Blue Hill Falls
1998/09/16	07:49:10.63	44.9258	-67.2036	5.0	2.6		ME, Approx 30 km NE of Machias < /td>
1998/09/25	19:52:52.48	41.471	-80.483	5.0	5.2		OH,30 km N of Sharon (USGS location)

Return to Table of Contents

TABLE 4

EARTHQUAKE PHASE DATA LIST
NEW ENGLAND AND ADJACENT REGIONS

July - September 1998

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HUGHES AND LUETGERT NH
98JUL07 NH, W OF CONCORD
 DATE      ORIGIN    LAT N     LONG W    DEPTH    MN  MC  ML GAP    RMS  ERH   ERZ Q
980707  941 42.44 43-12.69  71-40.10    0.17  2.1 2.2       87  0.37  1.8   5.8 C
 STN   DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 NH1   38.1  12 IP 0  941 49.23    6.79    6.57   0.22 1.52 303 .16  2.3
                S 0  941 53.92   11.48   11.70 -0.22 1.52
 DNH   63.6  99  P 0  941 53.20   10.76   10.91 -0.15 1.46                98  2.4
                S 4  941 59.20   16.76   19.41 -2.65 0.00
 WFM   68.3 168  P 0  941 54.10   11.66   11.70 -0.05 1.44                59  2.0
                S 4  941 60.80   18.36   20.83 -2.49 0.00
 HNH   74.2 318 IPU1  941 54.62   12.18   12.69 -0.54 0.99   60 .11  1.9
                S 4  941 63.71   21.27   22.58 -1.37 0.00
 WES   96.1 163 EPU0  941 58.75   16.31   16.26   0.04 1.36  51 .15  2.0
                S 4  941 70.06   27.62   28.94 -1.33 0.00
 BCX  105.5 157 EPU2  941 60.91   18.47   17.79   0.68 0.56  65 .21  2.1
                S 4  941 73.70   31.26   31.66 -0.40 0.00
QUA2  117.8 208 EPU2  941 61.52   19.08   19.78 -0.73 0.52  50 .14  2.1
                S 4  941 75.58   33.14   35.21 -2.13 0.00
 BRY  144.1 176 EPU3  941 66.69   24.25   23.94   0.31 0.30  39 .17  2.1
                S 4  941 83.05   40.61   42.61 -2.00 0.00
 DXB  150.5 148  P 4  941 69.30   26.86   24.93   1.93 0.00                49  2.1
                S 4  941 84.50   42.06   44.38 -2.32 0.00
 VT1  152.1 325  S 0  941 87.92   45.48   44.80   0.65 1.04
 TRY  171.5 252 EP 3  941 70.62   28.18   28.18   0.00 0.28  37 .15  2.2
                S 4  941 89.55   47.11   50.16 -3.05 0.00
 WVL  217.5  48 EPU4  941 78.89   36.45   34.17   2.27 0.00  32 .29  2.2
NORTHERN NY AND ADIRONDACKS
98JUL09 NY, W OF PLATTSBURG
 DATE      ORIGIN    LAT N     LONG W    DEPTH    MN  MC  ML GAP    RMS  ERH   ERZ Q
980709  152 15.30 44-40.58  73-38.76    0.17  2.3           298  0.13  1.5   1.3 B
 STN   DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 VT1   80.6 118 EPC1  152 27.79   12.49   12.71 -0.24 1.19 181 .14  2.4
                S 1  152 38.04   22.74   22.62   0.09 1.20
 HNH  153.2 135 EPC1  152 38.93   23.63   23.70 -0.10 1.02  31 .15  2.1
                S 1  152 57.49   42.19   42.19 -0.05 1.02
 NH1  208.0 127 EPC0  152 47.42   32.12   31.97   0.16 1.17  40 .16  2.4
                S 0  152 72.29   56.99   56.90   0.09 1.17
 TRY  216.2 180 EPC3  152 50.26   34.96   32.98   1.99 0.00  35 .17  2.3
                S 2  152 74.15   58.85   58.70   0.16 0.57
QUA2  286.1 159 EP 1  152 56.86   41.56   41.62 -0.08 0.68   9 .12  2.2
                S 4  152 91.89   76.59   74.08   2.46 0.00
NORTHWEST MAINE CRUSTAL STRUCTURE
98JUL15 NB, MIRAMICHI REGION
 DATE      ORIGIN    LAT N     LONG W    DEPTH    MN  MC  ML GAP    RMS  ERH   ERZ Q
980715  7 8  5.13 47- 0.00  66-38.78    5.00  4.3           133  0.33  2.1 **** C
 STN   DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 LMN  190.6 132  P 0  7 8 35.07   29.94   29.99 -0.05 1.79
 GSQ  215.6 351  P 0  7 8 38.86   33.73   33.08   0.63 1.40
                S 0  7 8  1.99   -3.14   58.89-62.05 0.00
 A21  242.7 289  P 0  7 8 41.98   36.85   36.43   0.42 1.47
                S 0  7 8  9.88    4.75   64.84-60.09 0.00
 A11  271.0 276  P 0  7 8 44.77   39.64   39.91 -0.29 1.38
 A61  271.7 286  P 0  7 8 44.82   39.69   40.01 -0.33 1.36
                S 0  7 8 15.78   10.65   71.21-60.58 0.00
 CNQ  277.1 337  P 0  7 8 45.70   40.57   40.67 -0.14 1.36
                S 0  7 8 18.44   13.31   72.40-59.15 0.00
 ICQ  284.2 351  P 0  7 8 46.68   41.55   41.55 -0.01 1.32
                S 0  7 8 22.38   17.25   73.96-56.73 0.00
 LMQ  285.0 282  P 0  7 8 47.00   41.87   41.64   0.16 1.32
 A54  289.9 280  P 0  7 8 47.57   42.44   42.25   0.12 1.30
 SMQ  358.4 359  P 0  7 8 55.51   50.38   50.71 -0.39 0.92
 WVL  361.3 221  S 0  7 9 47.47  102.34   90.89 11.43 0.00
 MNQ  422.4 338  P 0  7 9  2.93   57.80   58.62 -0.82 0.39
 DPQ  469.4 266  P 0  7 9  9.14   64.01   64.41 -0.41 0.39
                S 0  7 9 58.15  113.02  114.66 -1.64 0.00
 MOQ  471.8 247  P 0  7 9 10.26   65.13   64.70   0.28 0.39
                S 0  7 9 57.37  112.24  115.17 -3.19 0.00
LBNH  513.6 233 EP 0  7 9 15.05   69.92   69.87 -0.02 0.18
 NH1  544.6 225 EPC0  7 9 19.32   74.19   73.70   0.48 0.02 667 .28  4.3
 VT1  560.6 238 EPC0  7 9 39.10   93.97   75.67  18.28 0.00
 MNT  562.7 253  P 0  7 9 20.74   75.61   75.93 -0.33 0.00
                S 0  7 9 77.76  132.63  135.16 -2.53 0.00
 HNH  573.6 230 EP 0  7 9 22.21   77.08   77.28 -0.23 0.00 593 .28  4.3
 TRQ  612.2 262  P 0  7 9 26.19   81.06   82.04 -0.99 0.00
 BCX  630.4 215 EPC0  7 9 29.34   84.21   84.28 -0.08 0.00 765 .41  4.3
 WES  632.8 216 EPC0  7 9 29.36   84.23   84.58 -0.37 0.00 661 .38  4.3
 HRV  632.8 218 EP 0  7 9 29.72   84.59   84.59   0.00 0.00
QUA2  693.2 221 EPC0  7 9 58.35  113.22   92.04  21.14 0.00 568 .40  4.3
 GRQ  704.8 266  P 0  7 9 37.61   92.48   93.47 -0.99 0.00
 EEO  949.6 268  P 0  7 9 65.65  120.52  123.69 -3.18 0.00
NORTHWEST MAINE CRUSTAL STRUCTURE
98JUL30 PQ, STE AGATHE-DES-MONTS
 DATE      ORIGIN    LAT N     LONG W    DEPTH    MN  MC  ML GAP    RMS  ERH   ERZ Q
980730  857 24.22 46-13.03  74-43.20   34.96  4.0           125  0.56  2.7   4.4 D
 STN   DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 VT1  260.2 144 EPC1  858  0.82   36.60   35.81   0.78 1.20
                S 4  858 34.48   70.26   63.74   6.49 0.00
 DAQ  327.8  54  P 0  858  8.54   44.32   44.15   0.01 1.46
                S 1  858 43.70   79.48   78.59   0.61 1.08
 EEO  338.1 278  P 1  858 10.22   46.00   45.43   0.58 1.06
 HNH  338.8 145 EPC2  858 11.50   47.28   45.51   1.74 0.401144 .42  3.9
                S 4  858 56.32   92.10   81.01  11.04 0.00
 A54  356.5  67  P 0  858 11.98   47.76   47.71   0.00 1.38
                S 1  858 50.17   85.95   84.92   0.93 0.98
 A11  364.2  72  P 0  858 12.89   48.67   48.65   0.02 1.36
                S 1  858 50.24   86.02   86.60 -0.59 1.00
 LMQ  366.0  66  P 0  858 13.10   48.88   48.88 -0.06 1.35
                S 0  858 50.80   86.58   87.00 -0.54 1.32
 A16  385.5  69  P 0  858 15.61   51.39   51.29   0.11 1.30
 NH1  387.0 140 IPC2  858 17.21   52.99   51.47   1.53 0.47 884 .35  4.0
```

```
                 S 4  858 68.44 104.22  91.61 12.61 0.00
 A61 388.5  65   P 0  858 15.86  51.64  51.65 -0.01 1.29
                 S 1  858 55.50  91.28  91.93 -0.66 0.94
 TRY 396.3 168 EPC1  858 16.32  52.10  52.62 -0.51 0.941713 .79  4.1
                 S 4  858 67.68 103.46  93.66  9.81 0.00
 A64 408.6  64   P 0  858 18.20  53.98  54.13 -0.17 1.23
                 S 0  858 60.68  96.46  96.35  0.08 1.23
 A21 416.8  67   P 0  858 19.41  55.19  55.14  0.05 1.21
                 S 1  858 61.51  97.29  98.15 -0.86 0.86
 WVL 437.8 115 EPC4  858 18.95  54.73  57.74 -3.02 0.00 845 .44  4.0
                 S 4  858 82.28 118.06 102.78 15.26 0.00
 MIM 455.4 104  PC0  858 24.20  59.98  59.91  0.05 1.10
                 S 4  858 87.92 123.70 106.64 17.03 0.00
 WFM 476.2 147 EP 3  858 30.40  66.18  62.48  3.69 0.00
                 S 4  858 91.30 127.08 111.22 15.85 0.00
QUA2 476.8 157 EPC0  858 27.35  63.13  62.55  0.56 1.03 385 .43  3.8
                 S 4  858 92.11 127.89 111.34 16.50 0.00
 EFO 503.1 226   P 1  858 29.25  65.03  65.80 -0.76 0.70
                 S 1  858 80.48 116.26 117.12 -0.86 0.69
 WES 504.9 148 EPC1  858 29.53  65.31  66.02 -0.71 0.70 561 .45  3.9
                 S 4  858 99.89 135.67 117.51 18.15 0.00
 BCX 516.0 147 EPC4  858 48.16  83.94  67.40 16.55 0.00
 DXB 563.0 145 EP 4  858 54.10  89.88  73.19 16.69 0.00
 MNQ 651.2  43   P 0  858 47.75  83.53  84.09 -0.55 0.54
 LMN 769.1  93   P 1  858 62.05  97.83  98.64 -0.80 0.16
NORTHERN NY AND ADIRONDACKS
98AUG24 NY, NEAR WATERTOWN
 DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
980824 1927 35.71 44- 2.43  75-48.14   1.56  2.9          193  0.62  5.5  8.3 D
 STN  DIST AZM  RMK HRMN    SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
 TRQ 261.6  22   P 3 1928 13.26  37.55  38.43 -0.88 0.49
                 S 4 1928 47.35  71.64  68.41  3.23 0.00
 HNH 285.0  98 EPC3 1928 15.58  39.87  41.33 -1.49 0.34  52 .16  2.8
                 S 0 1928 49.91  74.20  73.56  0.58 1.85
 GRQ 285.2 359   P 4 1928 19.78  44.07  41.35  2.71 0.00
 MOQ 314.7  63   P 0 1928 20.57  44.86  45.00 -0.28 1.68
                 S 1 1928 55.92  80.21  80.10 -0.14 1.26
QUA2 341.9 125 EP 0 1928 23.96  48.25  48.36 -0.14 1.49  91 .31  2.9
                 S 2 1928 60.28  84.57  86.07 -1.56 0.46
 NH1 344.6  99 EP 1 1928 25.09  49.38  48.69  0.69 1.07  93 .20  3.1
                 S 2 1928 63.33  87.62  86.67  0.95 0.67
 DPQ 377.0  39   P 0 1928 28.33  52.62  52.69 -0.07 1.24
                 S 3 1928 68.55  92.84  93.79 -0.95 0.29
 EEO 386.5 318   P 0 1928 29.94  54.23  53.85  0.37 1.16
                 S 4 1928 68.24  92.53  95.86 -3.33 0.00
 WES 408.0 117   S 4 1928 82.22 106.51 100.58  5.90 0.00  91 .55  2.9
SOUTHEAST MAINE CRUSTAL MODEL
98SEP05 ME, NEAR BLUE HILL FALLS
 DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
980905  519 56.12 44-20.85  68-38.43   5.00  2.3 2.7      164  0.52  3.9  6.2 D
 STN  DIST AZM  RMK HRMN    SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
 WVL  84.2 284 EP 0  520 10.36  14.24  13.62  0.60 1.79  67 .13  2.0
                 S 0  520 19.79  23.67  24.25 -0.60 1.75
 MIM 104.5 342 IP 0  520 12.70  16.58  16.84 -0.28 1.71  60 .14  2.1 127  2.7
                 S 0  520 26.49  30.37  29.97  0.36 1.71
 NH1 251.9 249 EPC1  520 36.00  39.88  36.87  3.01 0.10  31 .18  2.4
                 S 4  520 65.77  69.65  65.62  4.03 0.00
 HNH 301.0 256 EPC4  520 46.17  50.05  42.92  7.10 0.00  20 .20  2.3
                 S 4  520 81.57  85.45  76.39  9.00 0.00
 MOQ 305.4 291   P 0  520 39.71  43.59  43.46 -0.02 0.94
 WES 307.8 225 EPC0  520 39.91  43.79  43.76  0.02 0.93  13 .15  2.3
                 S 4  520 74.20  78.08  77.90  0.16 0.00
 LMN 345.0  61   P 0  520 43.85  47.73  48.36 -0.63 0.77
                 S 4  520 79.95  83.83  86.08 -2.25 0.00
QUA2 378.9 233   P 4  520 42.11  45.99  52.54 -6.58 0.00  25 .32  2.5
                 S 4  520 60.18  64.06  93.52-29.51 0.00
 A21 381.8 348   P 0  520 48.73  52.61  52.90 -0.29 0.65
                 S 4  520 89.72  93.60  94.16 -0.56 0.00
 DPQ 414.5 309   P 0  520 53.42  57.30  56.93  0.36 0.52
                 S 4  520 94.37  98.25 101.34 -3.09 0.00
 GSQ 521.0  13   P 0  520 66.45  70.33  70.09  0.23 0.11
SOUTHEAST MAINE CRUSTAL MODEL
98SEP16 ME, APPROX 30 KM NE OF MACHIAS
 DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
980916  749 10.63 44-55.55  67-12.22   5.00  2.6 3.0      168  0.66  3.9  4.4 D
 STN  DIST AZM  RMK HRMN    SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
 MIM 148.8 284 IPC0  749 34.24  23.61  23.88 -0.29 2.97  82 .14  2.5 132  2.8
                 S 0  749 53.18  42.55  42.50  0.02 2.97
 WVL 200.1 257 EPC3  749 43.14  32.51  30.47  2.03 0.50  64 .17  2.5 167  3.0
                 S 3  749 60.01  49.38  54.23 -4.87 0.00
 LMN 214.1  61   P 0  749 42.58  31.95  32.20 -0.25 2.49
 A11 346.3 318   P 1  749 59.90  49.27  48.52  0.74 1.12
 A21 363.4 328   P 1  749 61.81  51.18  50.62  0.56 1.02
 A54 374.9 319   P 0  749 63.09  52.46  52.04  0.36 1.30
 A61 379.7 324   P 0  749 63.42  52.79  52.64  0.14 1.26
 NH1 381.5 246 EPC2  750  2.35  51.72  52.86 -1.14 0.61  34 .16  2.9 144  3.1
                 S 4  750 53.65 103.02  94.09  8.93 0.00
 MOQ 399.9 276   P 0  750  5.58  54.95  55.13 -0.32 1.11
                 S 3  750 46.64  96.01  98.13 -2.37 0.21
 HNH 427.6 252 EPC3  750 11.39  60.76  58.56  2.17 0.16  25 .21  2.8
                 S 4  750 68.71 118.08 104.23 13.80 0.00
 WES 435.8 230 EPC2  750 11.19  60.56  59.57  0.98 0.41  17 .25  2.5
                 S 4  750 50.94 100.31 106.03 -5.74 0.00
 GSQ 443.5   1   P 1  750 11.90  61.27  60.51  0.75 0.58
                 S 0  750 58.18 107.55 107.71 -0.18 0.79
 VT1 445.6 261 EPC4  749 22.34  11.71  60.77-49.08 0.00
                 S 4  749 49.05  38.42 108.18-69.79 0.00
 DAQ 458.9 317   P 1  749 72.32  61.69  62.41 -0.88 0.50
 DPQ 475.2 294   P 0  750 14.54  63.91  64.43 -0.52 0.55
                 S 3  750 63.24 112.61 114.68 -2.07 0.12
 CNQ 491.0 352   P 1  749 76.51  65.88  66.38 -0.53 0.33
QUA2 509.3 235   S 4  751 69.90 179.27 122.17 57.04 0.00
 MNQ 634.1 349   P 0  749 94.47  83.84  84.05 -0.21 0.00
SOUTH & COASTAL NEW ENGLAND, CHIBURIS, 1979
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98SEP25 OH, OHIO-PENNSYLVANIA BORDER (NESN LOCATION POOR)
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN  MC  ML GAP   RMS  ERH  ERZ Q
980925 1952 25.78 40-33.17  82-54.98    5.00  5.4 4.7     326  0.18 74.9 **** D
 STN  DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 EEO 744.3  25   P 4 1954 11.88 106.10   98.03   8.07 0.00
               S 4 1954 69.30 163.52 174.49-10.97 0.00
 TRY 808.2  73 IPU0 1954 11.87 106.09 105.92   0.17 2.78
 YLE 846.0  84 EP 4 1954 17.12 111.34 110.58   0.76 0.00               668  4.4
 TRQ 924.9  47   P 0 1954 26.08 120.30 120.33 -0.03 1.10
               S 4 1954 98.26 192.48 214.18-21.70 0.00
 VT1 936.1  63 EPD4 1954  2.34  96.56 121.71-25.17 0.00
 MNT 936.3  54   P 0 1954 27.39 121.61 121.74 -0.13 0.92
 HNH 946.6  68 IPD0 1954 28.62 122.84 123.00 -0.19 0.76
 BRY 966.3  81 IPD0 1954 30.85 125.07 125.44 -0.37 0.41
 WES 989.2  78 IPD0 1954 33.46 127.68 128.27 -0.60 0.032659 .44  5.4   0  4.9
 NH1 995.5  70 IPD0 1954 34.94 129.16 129.04   0.12 0.00
 BCX1002.0  79 IPU0 1954 35.24 129.46 129.85 -0.39 0.004283 .66  5.4   0  4.6
 DPQ1064.8  50   P 0 1954 42.29 136.51 137.60 -1.09 0.00
 WVL1175.4  68 IPU0 1954 56.52 150.74 151.25 -0.52 0.00               855  4.7
 A111263.6  54   P 0 1954 67.36 161.58 162.14 -0.57 0.00
```

Return to Table of Contents

TABLE 5

MICROEARTHQUAKES AND OTHER NON-LOCATABLE EVENTS

Date Yr/Mo/Dy	Sta	Arrival Time Hr:Mn:Sec
None recorded this quarter		

Return to Table of Contents

NESN Station Map

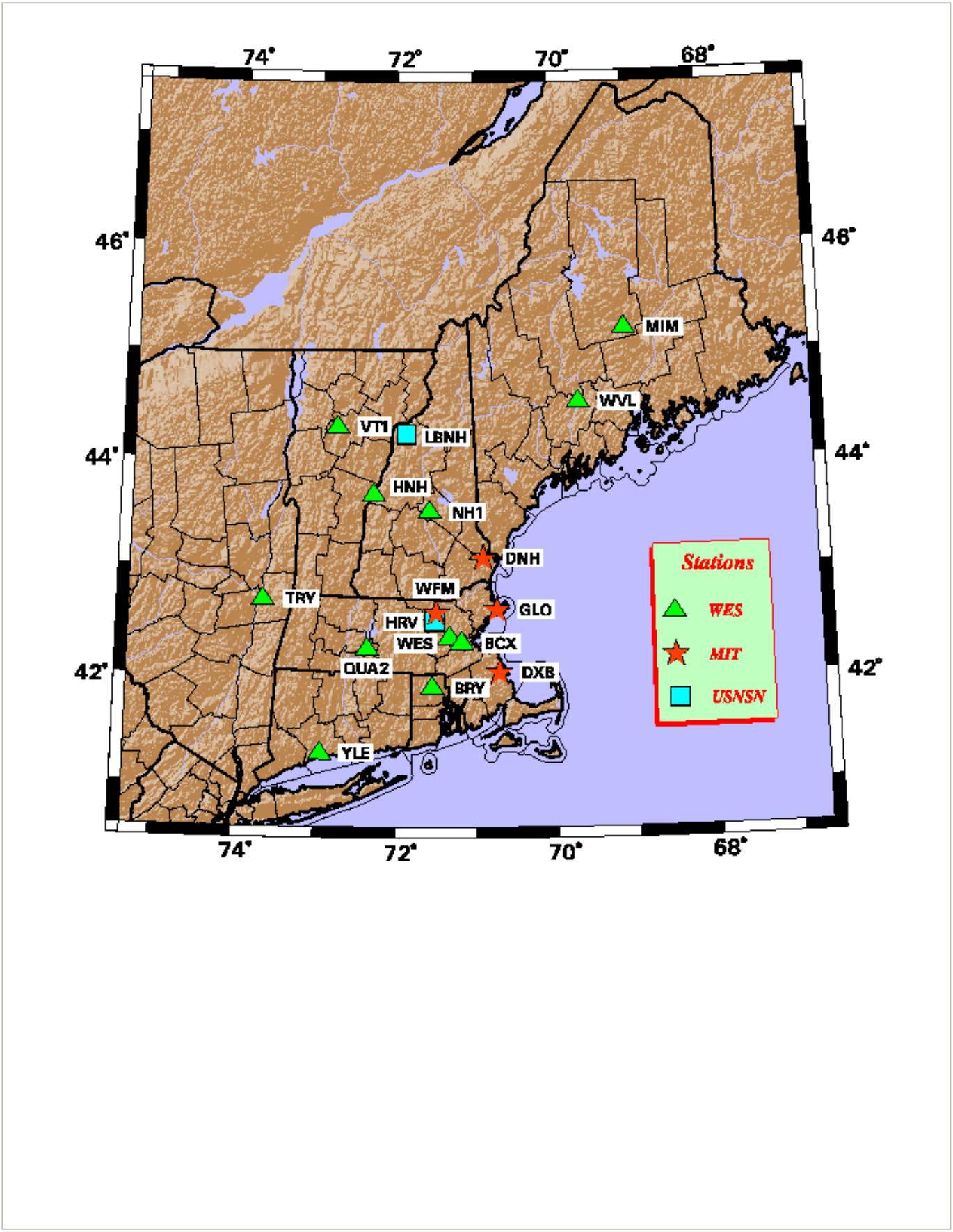

Figure 1: Map of stations of the New England Seismic Network (NESN) in operation during period July - September, 1998. Also included are the US National Seismic Network stations operating in New England during this period.

Return to Table of Contents

NESN Strong-Motion Station Map

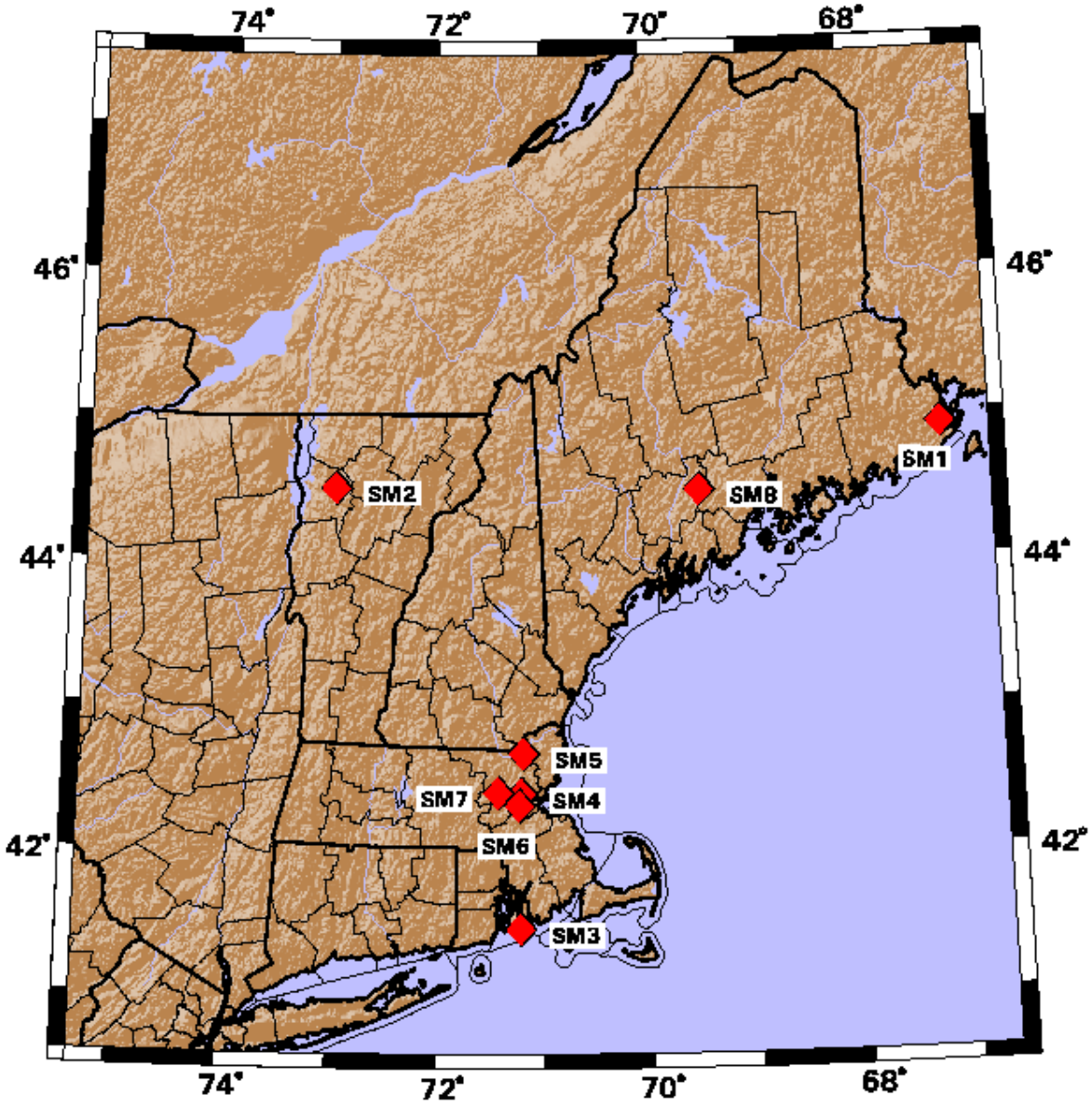

Figure 2: Map of strong-motion stations of the New England Seismic Network (NESN) in operation during period July - September, 1998.

Return to Table of Contents

NESN Quarterly Seismicity Map

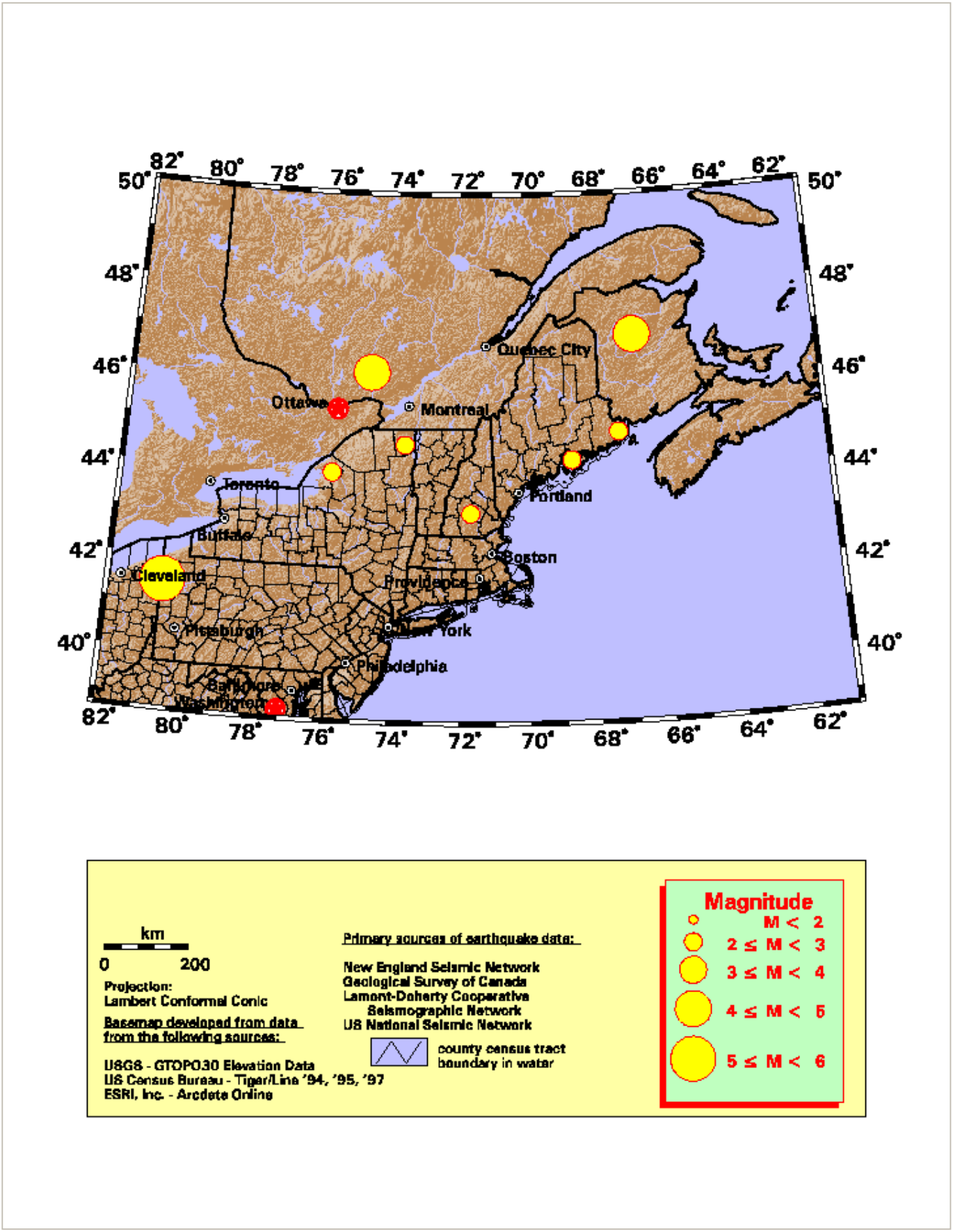

Figure 3: Earthquake epicenters located by the NESN during period July - September, 1998.

Return to Table of Contents

NESN Cumulative Seismicity Map

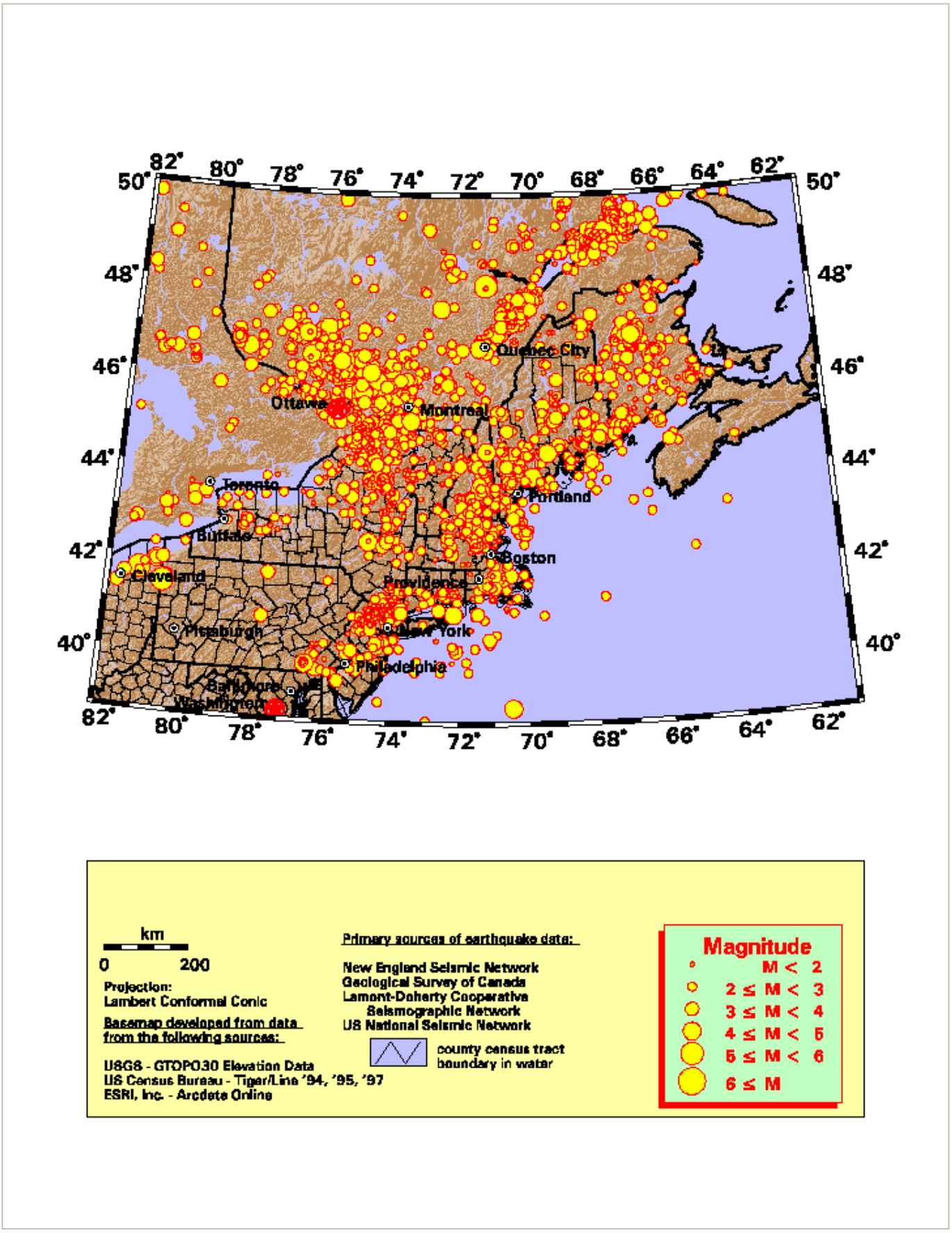

Figure 4: Seismicity for period October, 1975 - September, 1998.

Return to Table of Contents

Acknowledgments

We would like to thank the Undergraduate Research Opportunities Program (UROP) of MIT for its support to the network. Our map database has been developed in-house using ARCINFO and in part basemap data provided by ESRI, Inc. (Arcdata Online), USGS GTOPO30 Elevation Data, and TIGER/Line '94, '95, and '97 (US Census Bureau) spatial data.

References

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Ebel, J.E. (1982), M_L measurements for northeastern United States earthquakes, *Bull. Seism. Soc. Am., 72,* 1367-1378.

Rosario, M. (1979), A coda duration magnitude scale for the New England Seismic Network, *Master's Thesis,* Boston College, 82 pp.

Return to Table of Contents

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