A STUDY OF NEW ENGLAND SEISMICITY

Quarterly Earthquake Report

July - September, 2002

NEW ENGLAND SEISMIC NETWORK

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for
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Notice

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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, 2002. 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 6 earthquakes that occurred within or near the network during this reporting period. Phase information for these earthquakes is included in this report.

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Current Network Operation and Status

The New England Seismic Network currently consists of 14 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 now operates 13 stations with broadband instruments consisting of Guralp CMG-40T three-component sensors. Ground motions recorded by these sensors aredigitized 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 andarchiving. During the year 2001, two new seismic stations were added to the WES network. Station UMM was placed in northeastern Maine and station FFD was placed in central New Hamps hire. Station MIM, in central Mainewas dismantled. 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. A data acquisition program on the PCtriggers on events detected in the short-period data streams and saves them toa disk for manual analysis. Station WFM also has a new three-component, highdynamic range instrument . 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 archivedwith the short-period data. WES and ERL record some stations in analog format on helicorders to provide additional data for analysis.

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Seismicity

There were 6 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. Accordingly, the epicenter is plotted on the maps using the entry from Table 3.

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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 U.S. earthquake activity to 1992. This will be updated as new Northeastern U.S. Seismic Network Bulletins are produced.

MIT/ERL provides two internet utilities, the MIT/ERL web-site("www-erl.mit.edu/NESN/homepage.html") and an anonymousFTP directory, to distribute seismic data. SESAME (Seismic Event Server atMIT/ERL) is the web data server that distributescatalogs, rep orts, earthquake bulletins, and epicenter and station maps(including an archive of recent seismic events). The FTP site,named "sunda.mit.edu", is the current facility available to download waveformdata recorded by the MIT NESN. The client machineIP numbe r must be forwarded to us for the client to gain access to theanonymous FTP directory. After logging on, the user changesdirectories to "pub/seismic". Waveforms of individual events for the periodApril 1995 through the present are accessed asUnix-compres sed SAC files, through the anonymous FTP directory. A "readme"file offers further explanation about the data. Olderwaveform data in SAC format (1981 - March 1995) will be made available on theFTP site upon request.

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:

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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)

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TABLE 1

WESTON OBSERVATORY PERSONNEL

Name	Network Position	voice phone	email address
John E. Ebel	Principal Investigator	617-552-8319	ebel@bc.edu
Alan Kafka	Research Seismologist	617-552-8300	kafka@bc.edu
Anastasia Macherides Moulis	Seismic Analyst	617-552-8325	weston.observatory@bc.edu
Edward Johnson	Project Engineer	617-552-8332	johnson@bc.edu
Patricia Tassia	Administrative Secretary	617-552-8311	tassia@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	toksoz@mit.edu
Robert Cicerone	Research Seismologist	617-253-7863	cicerone@erl.mit.edu
Heather Hooper	Seismic Analyst	617-253-6290	
Sara Brydges	Administrator	617-253-7797	sara@erl.mit.edu
Earth Resources Lab		617-253-8027 617-253-6385 (FAX)	

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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
FFD	43.4702	-71.6533	131.0	Franklin Falls Dam, NH	WES
GLO	42.6403	-70.7272	15.2	Gloucester, MA	MIT
HNH	43.7050	-72.2860	180.0	Hanover, NH	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
UMM	44.7100	-67.4583	35.0	Machias, ME	WES
VT1	44.3317	-7 2.7536	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	914.0	New Haven, CT	WES
PQI	46.6710	-68.0168	175.0	Presque Isle, ME	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

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TABLE 3

EARTHQUAKE HYPOCENTER LIST
NEW ENGLAND AND ADJACENT REGIONS
July - September, 2002

Date Yr/Mo/Dy	Time Hr:Mn:Sec	Lat	Long	Depth (km)	Mag	Int	Location
2002/07/11	21:53:43.37	40.3507	-70.7907	2.05	3.0		NY, 115 KM S OF MARTHA'S VINEYARD
2002/07/15	22:44:21.88	41.8737	-70.2183	4.97	2.5		MA, CAPE COD BAY, 15 KM N OF DENNIS
2002/07/23	02:09:02.05	49.3413	-66.7960	18.00	3.6		QUEBEC CANADA, 50 MI OF SEPT-ILES
2002/08/17	05:53:56.07	47.3182	-70.4935	22.61	3.3		QUEBEC CANADA, 10 KM S FROM BAIE-ST .PAUL
2002/08/22	18:58:38.62	41.8800	-72.5163	0.24	2.2		CT, 4 KM SE OF BROAD BROOK
2002/09/28	23:47:27.13	42.8593	-71.7248	2.71	2.6		NH, 1 MI NNE OF WILTON CENTER

* indicates Mc rather than Mn.

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TABLE 4

EARTHQUAKE PHASE DATA LIST
NEW ENGLAND AND ADJACENT REGIONS
July - September, 2002

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 SOUTHEAST MAINE CRUSTAL MODEL
02JUL11 NY, 115 KM S OF MARTHA'S VINEYARD
  DATE      ORIGIN     LAT N     LONG W    DEPTH    MN  MC   ML GAP    RMS  ERH  ERZ Q
  20711 2153 43.37 40-21.04  70-47.44    2.05  3.0  .0      309    .48 29.2 29.7 D
  STN  DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
  YLE 209.4 301 EP 0 2154 15.35  31.98  31.94    .04 1.56
                ES 0 2154 40.44  57.07  56.85    .22 1.56
  BCX 222.7 352 EPD1 2154 17.42  34.05  33.58    .44 1.10  90 .18  2.7
                 S 0 2154 43.42  60.05  59.76    .23 1.50
  WES 230.2 349  P 2 2154 16.96  33.59  34.51  -.93  .64
                 S 4 2154 48.81  65.44  61.43  4.00  .00
 QUA2 250.9 329 EPC4 2154 17.54  34.17  37.07 -2.93  .00 142 .25  3.0
                 S 2 2154 48.21  64.84  65.98 -1.19  .46
  FFD 353.8 348 EPC4 2154 37.71  54.34  49.77  4.55  .00 220 .17  3.6
                 S 1 2154 72.35  88.98  88.59   .36  .67
  HNH 392.7 342 EPD1 2154 37.33  53.96  54.56  -.63  .52  59 .30  2.9
                 S 4 2154 89.96 106.59  97.12  9.41  .00
SOUTHEAST MAINE CRUSTAL MODEL
02JUL15 MA, 15 KM N OF DENNIS, CAPE COD BAY
  DATE      ORIGIN     LAT N     LONG W    DEPTH    MN  MC   ML GAP    RMS  ERH  ERZ Q
  20715 2244 21.88 41-52.42  70-13.10    4.97  2.5  .0      299    .17  2.3  2.1 B
  STN  DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
  WES 107.5 302  P 0 2244 39.39  17.51  17.32    .19 1.68
                 S 2 2244 52.49  30.61  30.83   -.23  .82
  BRY 109.7 273 EPC0 2244 39.50  17.62  17.66   -.10 1.71  91 .16  2.3
                 S 2 2244 53.60  31.72  31.44    .17  .84
  HRV 131.1 302  P 1 2244 42.85  20.97  21.06   -.12 1.22
 QUA2 182.2 284 EPC2 2244 50.28  28.40  28.26    .11  .71  30 .19  2.1
                 S 4 2244 74.25  52.37  50.30  2.02  .00
  FFD 212.8 326 EPC0 2244 53.86  31.98  32.04   -.07 1.32 180 .18  3.0
                 S 4 2244 80.59  58.71  57.03  1.65  .00
 LSCT 250.8 265  P 3 2244 58.27  36.39  36.73   -.38  .20
  HNH 264.6 320 EP 2 2245   .62  38.74  38.43    .28  .49
                ES 4 2245 31.40  69.52  68.41  1.06  .00
 LBNH 297.4 332  P 4 2244 64.19  42.31  42.48   -.23  .00
NORTHWEST MAINE CRUSTAL STRUCTURE
02JUL23 QUEBEC CANADA, 50 MI OF SEPT-ILES
  DATE      ORIGIN     LAT N     LONG W    DEPTH    MN  MC   ML GAP    RMS  ERH  ERZ Q
  20723  2 9  2.05 49-20.48  66-47.76   18.00  3.6  .0      332    .29 **** **** D
  STN  DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
  PQI 310.6 197 EPC3   2 9 46.53  44.48  43.50    .95  .46 506 .59  3.5
                 S 0   2 9 79.51  77.46  77.43   -.02 2.95
  UMM 517.3 186 EPC2   210 11.21  69.16  69.03    .13  .85 209 .40  3.6
                 S 1   210 64.77 122.72 122.87   -.16 1.28
  WVL 577.9 202 EPD1   210 18.12  76.07  76.50   -.44  .97 128 .58  3.3
                 S 1   210 78.39 136.34 136.17    .15 1.00
 LBNH 689.2 215 EP 3   210 30.57  88.52  90.25 -1.78  .00
  FFD 751.9 210 EPC0   210 40.00  97.95  97.99   -.06  .29 208 .27  4.3
  HNH 755.1 214 EPC1   210 40.52  98.47  98.38    .06  .20  84 .59  3.4
  LOZ 791.4 228 EP 4   210 42.03  99.98 102.86 -2.95  .00
  NCB 824.2 224 EP 3   210 46.63 104.58 106.91 -2.42  .00
  HRV 844.9 206  P 4   210 45.99 103.94 109.46 -5.55  .00
 ACCN 847.2 219 QP 4   210 54.27 112.22 109.75  2.41  .00
 BINY1068.5 222 EP 3   210 77.65 135.60 137.07 -1.55  .00
NORTHWEST MAINE CRUSTAL STRUCTURE
02AUG17 QUEBEC CANADA, 10 KM S FROM BAIE-ST.PAUL
  DATE      ORIGIN     LAT N     LONG W    DEPTH    MN  MC   ML GAP    RMS  ERH  ERZ Q
  20817  553 56.07 47-19.09  70-29.61   22.61  3.3 3.6      120    .46  1.6  3.3 C
  STN  DIST AZM  RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
  DPQ 187.6 248  P 0   554 24.14  28.07  27.89    .18 2.18
                 S 0   554 45.95  49.88  49.64    .24 2.18
  PQI 201.7 111 EP 0   554 25.86  29.79  29.62    .14 2.09
  MOQ 261.0 211  P 0   554 33.30  37.23  36.95    .14 1.73
                 S 2   554 61.50  65.43  65.76   -.58  .85
  CNQ 284.4  39  P 0   554 36.05  39.98  39.83    .12 1.59
                 S 0   554 67.35  71.28  70.90    .32 1.58
  GSQ 308.2  55  P 0   554 38.69  42.62  42.77   -.16 1.45
                 S 3   554 69.13  73.06  76.13 -3.09  .00
  WVL 316.5 168  P 2   554 38.86  42.79  43.80 -1.02  .63  69 .14  3.1 252  3.4
                 S 4   554 78.27  82.20  77.96  4.22  .00
  TRQ 333.2 249  P 0   554 41.38  45.31  45.86   -.55 1.29
                 S 0   554 78.56  82.49  81.63    .86 1.19
 LBNH 359.8 198 EP 0   554 45.10  49.03  49.15   -.18 1.14
  UMM 373.3 141  P 0   554 47.41  51.34  50.81    .52 1.04  38 .13  3.0 255  3.5
                 S 2   554 85.55  89.48  90.44   -.97  .49
  MNQ 378.9  19  P 3   554 49.17  53.10  51.50  1.51  .11
                 S 0   554 87.54  91.47  91.67   -.36 1.03
  GRQ 415.8 259  P 2   554 50.93  54.86  56.05 -1.24  .31
                 S 0   554 95.38  99.31  99.77   -.55  .80
  GAC 422.7 245  P 0   554 52.88  56.81  56.91   -.11  .76
                 S 0   554 96.85 100.78 101.30   -.54  .76
 MSNY 424.5 233  P 0   554 53.93  57.86  57.13    .72  .71
  SMQ 426.5  41  P 0   554 53.26  57.19  57.38   -.25  .74
                 S 0   554 98.14 102.07 102.13   -.17  .74
  FFD 437.2 192 ES 4   555 60.12 124.05  58.70 65.33  .00 382 .17  4.1   0  3.9
  WBO 450.1 235  P 0   554 56.81  60.74  60.29    .44  .59
  OTT 455.0 242  P 0   554 57.52  61.45  60.90    .54  .55
  NCB 472.4 218 EP 0   554 58.78  62.71  63.04   -.43  .46
 ACCN 502.9 210 EP 3   554 60.48  64.41  66.81 -2.46  .00
  HRV 541.3 189  P 2   554 65.96  69.89  71.55 -1.70  .01
 CRLO 545.6 255  P 3   555  5.93  69.86  72.09 -2.26  .00
                 S 2   555 62.75 126.68 128.31 -1.69  .00
  WES 552.2 187 EP 4   555 14.08  78.01  72.89  5.11  .00  58 .39  3.1
                 S 4   555 85.24 149.17 129.75 19.40  .00
  EEO 656.9 263  P 3   555 19.32  83.25  85.82 -2.64  .00
                 S 4   555 85.74 149.67 152.77 -3.22  .00
```

```
  PAL 752.8 201  P 0  554 94.70  98.63  97.67   .94  .00
NORTHWEST MAINE CRUSTAL STRUCTURE
02AUG22 CT, 4KM SE OF BROAD BROOK
  DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
  20822 1858 38.62 41-52.80  72-30.98    .24  2.2  .0     148   .33  2.3  3.2 C
  STN  DIST AZM  RMK HRMN   SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
  YLE  72.0 208  S 0 1858 60.16  21.54  21.38   .16 1.47  70 .19  1.9
  WES 113.6  60 EPC0 1858 56.84  18.22  18.62  -.41 1.35  36 .11  2.0
                 S 0 1858 72.18  33.56  33.14   .40 1.35
  PAL 151.8 230 EP 2 1858 62.98  24.36  24.68  -.34  .61
  FFD 190.3  22 EPE3 1859 14.65  36.03  30.50  5.51  .00  99 .16  2.7
                 S 4 1859 40.94  62.32  54.28  8.00  .00
 LBNH 266.5  10 EP 3 1858 78.55  39.93  39.91  -.04  .22
SOUTHEAST MAINE CRUSTAL MODEL
02SEP28 NH, 1 MI NNE OF WILTON CENTER
  DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
  20928 2347 27.13 42-51.56  71-43.49   2.71  2.6 2.8     119   .40  2.4  3.9 C
  STN  DIST AZM  RMK HRMN   SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
  HRV  41.5 161 EP 0 2347 34.08   6.95   6.93  -.01 1.38
  WES  62.2 148 EPC0 2347 37.52  10.39  10.22   .16 1.32  77 .06  2.0 154  2.8
                ES 3 2347 44.35  17.22  18.19  -.99  .33
  FFD  68.1   5 IPC0 2347 38.60  11.47  11.15   .30 1.31 885 .16  3.0 142  2.7
                ES 0 2347 46.62  19.49  19.86  -.40 1.31
  BCX  73.9 142 EP 4 2347 43.14  16.01  12.07  3.91  .00  74 .14  2.0 148  2.8
                 S 4 2347 51.17  24.04  21.49  2.50  .00
  HNH 104.4 334 EP 0 2347 44.42  17.29  16.92   .34 1.21 280 .24  2.7 145  2.8
                ES 1 2347 56.38  29.25  30.12  -.92  .91
  BRY 105.7 172 EP 0 2347 44.47  17.34  17.12   .16 1.21  99 .12  2.4  97  2.5
                 S 0 2347 57.53  30.40  30.47  -.18 1.21
 LBNH 154.3 354 EP 0 2347 52.26  25.13  24.83   .24 1.07
 ACCN 168.6 290 EP 2 2347 54.74  27.61  26.83   .72  .52
  WVL 249.0  42 EP 4 2348  8.17  41.04  36.75  4.28  .00  64 .26  2.6
                ES 0 2348 32.75  65.62  65.42   .19  .82
  UMM 400.2  59 EP 0 2348 22.34  55.21  55.42  -.22  .41  37 .26  2.8 136  3.0
                 S 4 2348 76.98 109.85  98.66 11.18  .00
  PQI 515.3  35                                                     ****   .0
```

TABLE 5

MICROEARTHQUAKES AND OTHER NON-LOCATABLE EVENTS

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

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NESN Station Map

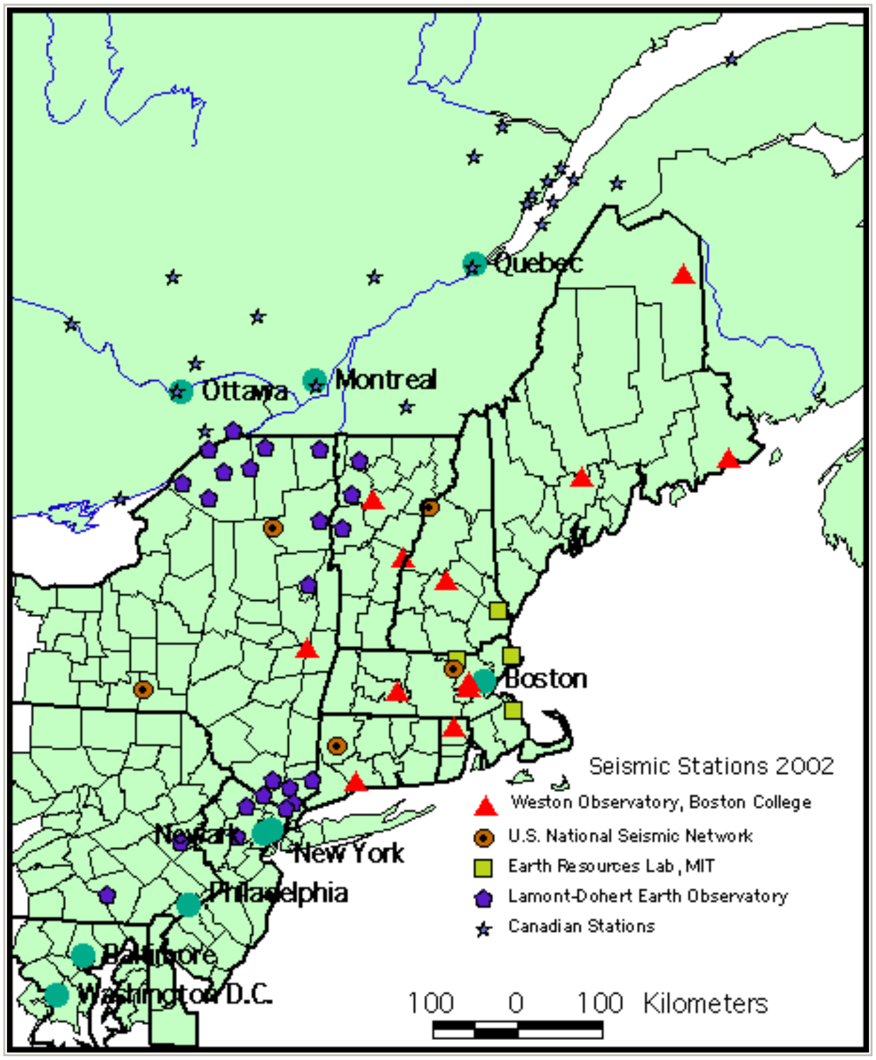

Figure 1: Map of stations of the New England Seismic Network (NESN) in operation during period July - September, 2002. Also included are the US National Seismic Network stations operating in New England during this period.

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NESN Strong-Motion Station Map

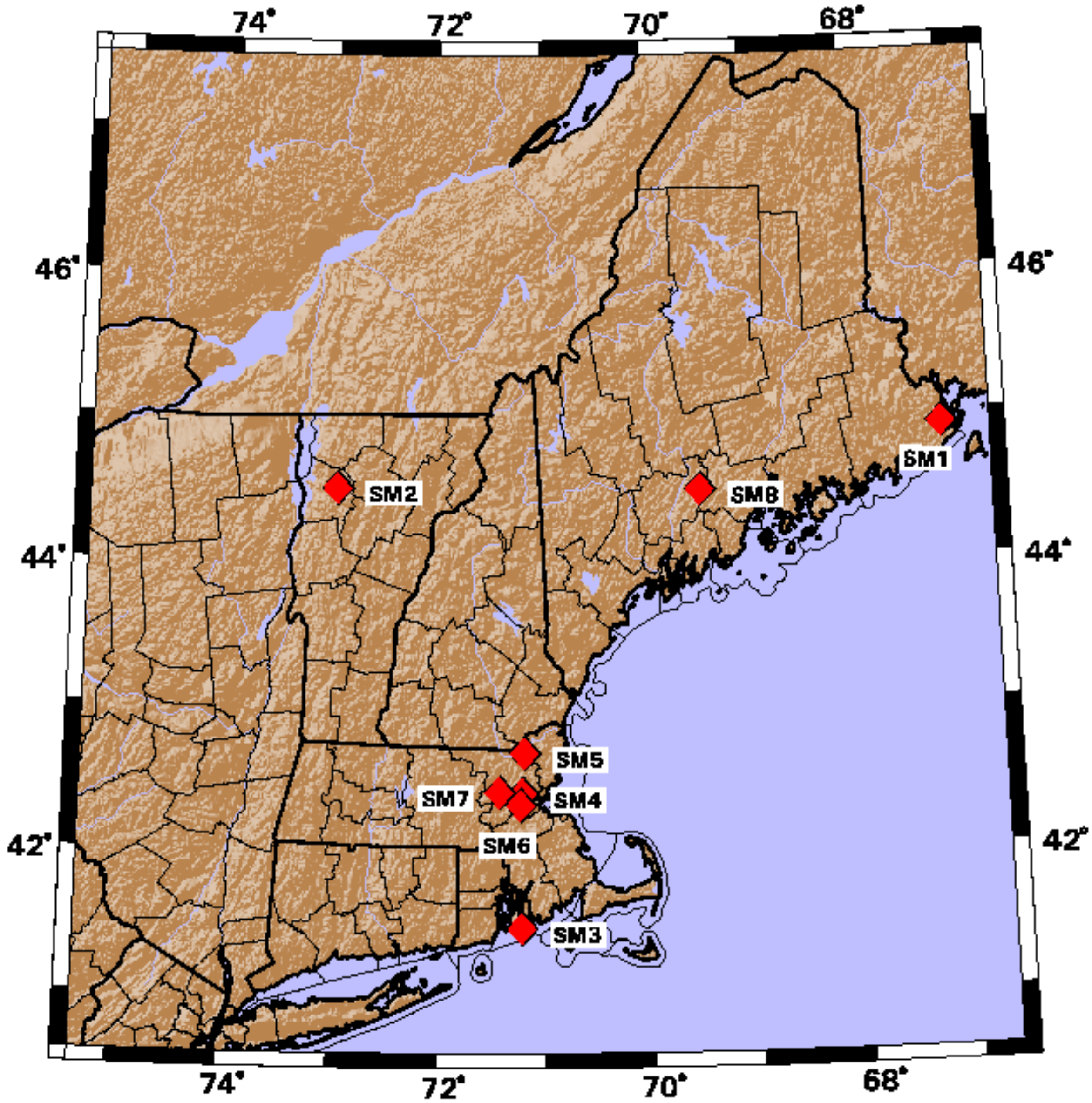

Figure 2: Map of strong-motion stations of the New England Seismic Network (NESN) in operation during period July - September, 2002.

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NESN Quarterly Seismicity Map

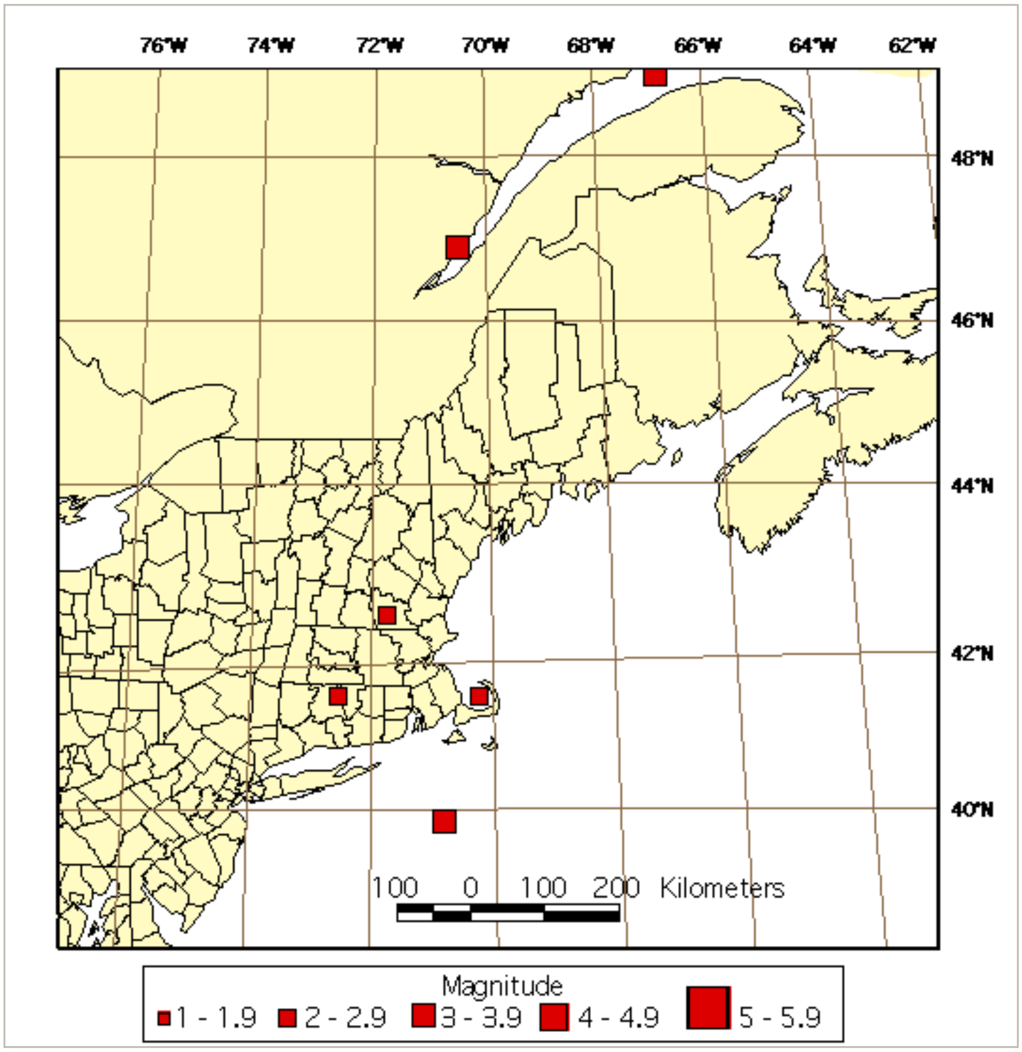

Figure 3: Earthquake epicenters located by the NESN during period July - September, 2002.

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NESN Cumulative Seismicity Map

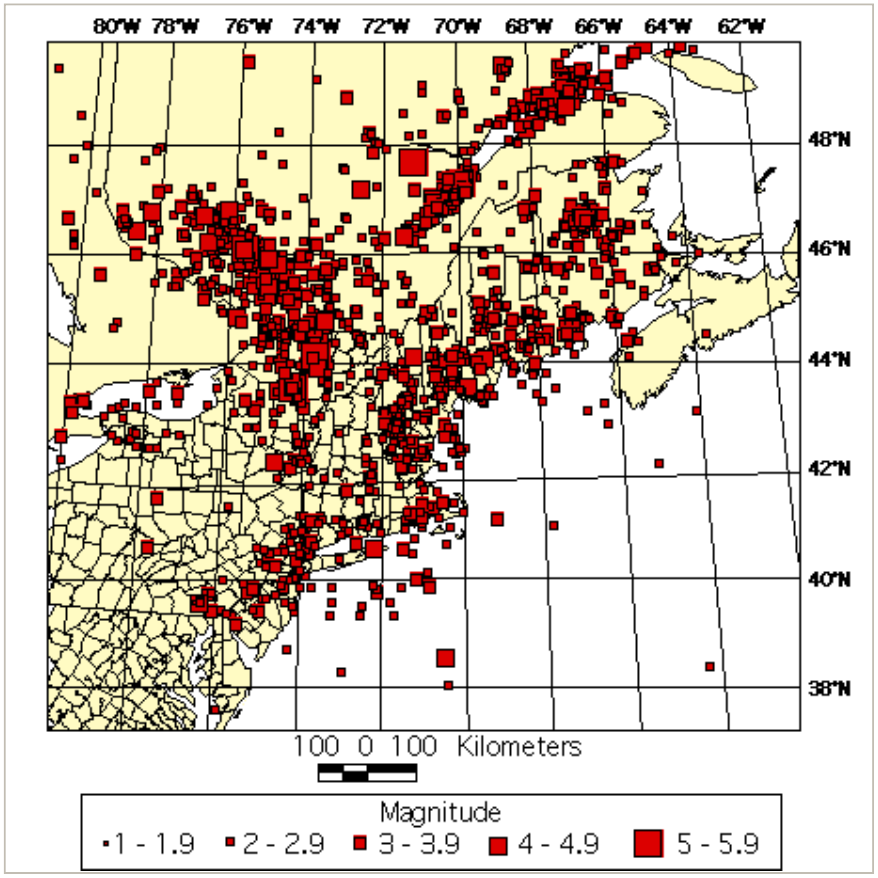

Figure 4: Seismicity for period October, 1975 - September, 2002.

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