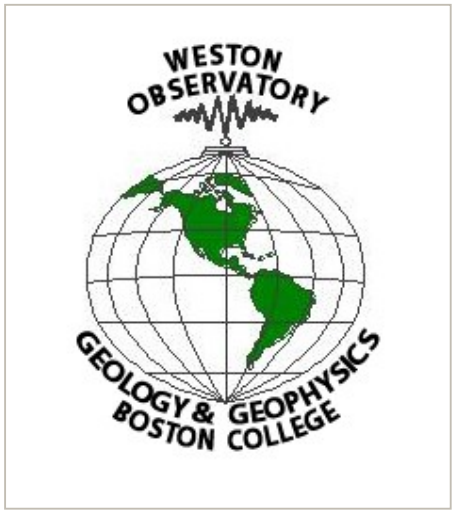
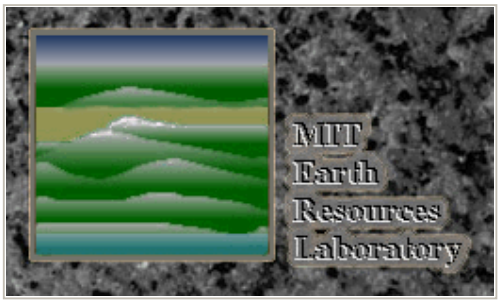
# A STUDY OF NEW ENGLAND SEISMICITY

## Quarterly Earthquake Report

## October - December, 2001

*New England*
*Seismic Network*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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 October - Decmeber, 2001. 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.

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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 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. 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 Hampshire. Station MIM, in central Maine was 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 PC triggers on events detected in the short-period data streams and saves them to a disk for manual analysis. Station WFM also has a new three-component, high dynamic 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 archived with 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 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. 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 anonymous FTP directory, to distribute seismic data. SESAME (Seismic Event Server at MIT/ERL) is the web data server that distributes catalogs, reports, 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 waveform data recorded by the MIT NESN. The client machine IP number must be forwarded to us for the client to gain access to the anonymous FTP directory. After logging on, the user changes directories to "pub/seismic". Waveforms of individual events for the period April 1995 through the present are accessed as Unix-compressed SAC files, through the anonymous FTP directory. A "readme" file offers further explanation about the data. Older waveform data in SAC format (1981 - March 1995) will be made available on the FTP 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/westonobservatory 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@bcvms.bc.edu |
| Susan O'Connor | Seismic Analyst | 617-552-8337 | dannolfo@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<br>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<br>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 | -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 | 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
### October - December, 2001

| Date Yr/Mo/Dy | Time Hr:Mn:Sec | Lat | Long | Depth (km) | Mag | Int | Location |
|---|---|---|---|---|---|---|---|
| 2001/10/02 | 23:40:17.88 | 44.2726 | -71.7168 | 8.41 | 2.6 | | NH, BETHLEHEM |
| 2001/10/03 | 02:28:07.01 | 44.2723 | -71.7020 | 9.70 | 1.6 | | NH, BETHLEHEM (AFTERSHOCK) |
| 2001/10/03 | 09:30:02.96 | 44.2723 | -71.7020 | 9.70 | 1.4 | | NH, BETHLEHEM (AFTERSHOCK) |
| 2001/10/04 | 03:06:06.08 | 44.2723 | -71.7020 | 9.70 | 1.7 | | NH, BETHLEHEM (AFTERSHOCK) |
| 2001/10/05 | 04:53:37.90 | 44.2723 | -71.7020 | 9.70 | 1.2 | | NH, BETHLEHEM (AFTERSHOCK) |
| 2001/10/25 | 00:24:31.29 | 45.2000 | -68.5938 | 9.41 | 3.3 | | ME, 42 KM NE OF BANGOR |
| 2001/10/27 | 05:42:21.60 | 40.8908 | -73.9686 | 15.52 | 2.6 | | NJ, 20 KM E OF PATERSON |

| 2001/12/27 | 20:54:28.92 | 45.0418 | -68.1560 | 21.68 | 2.8 | | ME, 56 KM ENE OF BANGOR |
|---|---|---|---|---|---|---|---|

* indicates Mc rather than Mn.

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# TABLE 4

## EARTHQUAKE PHASE DATA LIST
## NEW ENGLAND AND ADJACENT REGIONS
## October - December, 2001

```
HUGHES AND LUETGERT NH
01OCT02 NH, BETHLEHEM
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
011002 2340 17.88 44-16.36   71-43.01    8.41   2.6           166   0.44   1.8   2.2 C
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
LBNH   17.1 258 EP 1 2340 21.30    3.42    3.21   0.15 1.28
                ES 0 2340 24.00    6.12    5.72   0.30 1.69
 HNH   77.8 216 EPD1 2340 31.32   13.44   12.98   0.43 1.11   61 .14   1.9
                ES 0 2340 40.76   22.88   23.11  -0.28 1.50
 VT1   83.0 275 EP 3 2340 32.79   14.91   13.83   1.06 0.23
                ES 1 2340 41.79   23.91   24.62  -0.74 1.01
 FFD   89.3 177 EP 0 2340 32.79   14.91   14.85   0.06 1.481475 .20   3.4
                ES 0 2340 44.11   26.23   26.44  -0.21 1.48
 WVL 165.8   80 EPC1 2340 45.11   27.23   26.76   0.46 0.90 138 .18   2.7
                ES 2 2340 64.72   46.84   47.64  -0.82 0.52
 WES 212.2 171 EP 1 2340 50.98   33.10   32.56   0.53 0.79   31 .14   2.3
                ES 1 2340 75.33   57.45   57.96  -0.53 0.78
QUA2 227.4 193 EP 1 2340 51.94   34.06   34.44  -0.42 0.76   94 .22   2.7
                ES 2 2340 79.92   62.04   61.31   0.67 0.47
NORTHWEST MAINE CRUSTAL STRUCTURE
01OCT03 NH, BETHLEHEM (AFTERSHOCK)
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
 11003   228  7.01 44-16.34   71-42.12    9.70   1.6           321   0.34   0.0   0.0 C
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 HNH   78.5 217 EP 0   228 20.04   13.03   12.78   0.22 0.96    5 .12   0.9
                ES 0   228 29.36   22.35   22.76  -0.46 1.02
 FFD   89.2 177 EP 0   228 21.41   14.40   14.49  -0.09 1.02   99 .14   2.2
                ES 0   228 32.34   25.33   25.78  -0.45 1.00
NORTHWEST MAINE CRUSTAL STRUCTURE
01OCT03 NH, BETHLEHEM (AFTERSHOCK)
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
 11003   930  2.96 44-16.34   71-42.12    9.70   1.4           321 24.17   0.0   0.0 D
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 HNH   78.5 217 EP 0   930 36.27   33.31   12.78 20.50 0.92    3 .14   0.7
                ES 0   930 50.64   47.68   22.76 24.87 1.05
 FFD   89.2 177 EP 0   930 43.04   40.08   14.49 25.59 1.01   62 .12   2.0
                ES 0   930 53.76   50.80   25.78 25.02 1.02
NORTHWEST MAINE CRUSTAL STRUCTURE
01OCT04 NH, BETHLEHEM (AFTERSHOCK)
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
 11004   3 6  6.08 44-16.34   71-42.12    9.70   1.7           321   0.68   0.0   0.0 D
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 HNH   78.5 217 EP 0   3 6 18.68   12.60   12.78  -0.21 0.92   10 .07   1.3
                ES 0   3 6 29.68   23.60   22.76   0.79 1.04
 FFD   89.2 177 EP 0   3 6 21.35   15.27   14.49   0.78 1.02   44 .06   2.0
                ES 0   3 6 32.60   26.52   25.78   0.74 1.03
NORTHWEST MAINE CRUSTAL STRUCTURE
01OCT05 NH, BETHLEHEM (AFTERSHOCK)
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
 11005   453 37.90 44-16.34   71-42.12    9.70   1.2           321   0.97   0.0   0.0 D
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 HNH   78.5 217 ES 0   454   1.01   23.11   22.76   0.30 0.97    2 .11   0.6
 FFD   89.2 177 EP 0   453 53.49   15.59   14.49   1.10 1.01   26 .08   1.7
                ES 0   453 64.89   26.99   25.78   1.21 1.01
NORTHWEST MAINE CRUSTAL STRUCTURE
01OCT25 ME, 42 KM NE OF BANGOR
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
011025   024 31.29 45-12.00   68-35.63    9.41   3.3           135   0.48   4.3   5.4 C
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 UMM 104.8 121 EP 0   024 48.27   16.98   16.95   0.01 1.611124 .14   3.4
                ES 4   024 58.21   26.92   30.18  -3.28 0.00
 WVL 112.8 229 EP 0   024 49.82   18.53   18.23   0.29 1.57 416 .08   3.1
                ES 4   024 63.34   32.05   32.44  -0.41 0.00
 PQI 169.5   15 EP 0   024 58.45   27.16   26.94   0.18 1.38 157 .09   3.0
                ES 4   024 78.50   47.21   47.96  -0.81 0.00
 FFD 310.7 232 IPD0   025 15.86   44.57   44.38   0.19 0.871109 .16   4.2
                 S 4   025 56.90   85.61   78.99   6.62 0.00
 HNH 337.3 241 IPD0   025 19.18   47.89   47.66   0.20 0.77 135 .21   3.2
                 S 4   025 65.86   94.57   84.83   9.68 0.00
 VT1 343.0 254 EP 4   025 30.87   59.58   48.36 11.20 0.00
                 S 4   025 51.69   80.40   86.08  -5.72 0.00
 BCX 379.9 213   P 0   025 23.00   51.71   52.92  -1.21 0.47 111 .19   3.3
                 S 4   025 71.14   99.85   94.20   5.65 0.00
 WES 382.2 215 EP 0   025 23.08   51.79   53.20  -1.42 0.34   67 .16   3.2
                 S 4   025 62.88   91.59   94.69  -3.12 0.00
SOUTH & COASTAL NEW ENGLAND, CHIBURIS, 1979
01OCT27 NJ, 20 KM E OF PATERSON
 DATE      ORIGIN     LAT N     LONG W    DEPTH    MN   MC   ML GAP    RMS   ERH   ERZ Q
011027   542 21.60 40-53.45   73-58.12   15.52   2.6           320   0.55   8.5   2.4 D
 STN   DIST AZM   RMK HRMN    SEC    TOBS    TCAL    RES    WT AMX PRX XMAG FMP FMAG
 PAL   13.5   22 EP 0   542 24.83    3.23    3.38  -0.15 2.24
 YLE   99.1   62 EP 0   542 37.67   16.07   15.94   0.12 1.88 178 .12   2.6
                ES 1   542 49.94   28.34   28.38  -0.04 1.41
LSCT 107.4   35 EP 2   542 39.68   18.08   17.20   0.83 0.92
```

```
 QUA2 204.7  41 EP 0  542 51.73  30.13  30.32 -0.22 1.44  53 .13  2.6
               ES 1  542 75.07  53.47  53.97 -0.56 1.07
  BRY 233.0  61  S 3  543 20.57  58.97  60.18 -1.22 0.32  93 .12  2.9
  WES 276.1  53 EP 1  543  1.03  39.43  39.13  0.29 0.86  33 .14  2.6
               S 1  543 31.54  69.94  69.65  0.27 0.86
  BCX 283.1  55 EP 2  543  0.54  38.94  40.00 -1.06 0.54
               S 3  543 34.62  73.02  71.19  1.83 0.27
  HNH 342.0  24 EP 3  543 10.40  48.80  47.27  1.50 0.21  15 .18  2.4
               S 4  543 39.44  77.84  84.14 -6.36 0.00
  VT1 395.0  15  S 1  543 63.44 101.84  95.79  6.01 0.00
 SOUTHEAST MAINE CRUSTAL MODEL
 01DEC27 ME, APPROX 56 KM ENE OF BANGOR
  DATE     ORIGIN    LAT N    LONG W   DEPTH   MN  MC  ML GAP   RMS  ERH  ERZ Q
  11227 2054 28.92 45- 2.51  68- 9.36  21.68  2.8          130  0.39  4.6  7.0 C
  STN  DIST AZM  RMK HRMN   SEC   TOBS   TCAL   RES   WT AMX PRX XMAG FMP FMAG
  UMM  66.3 124 IPD1 2054 39.86  10.95  11.19 -0.26 2.61 177 .14  2.3
               S 4 2054 48.05  19.14  19.92 -0.80 0.00
  WVL 132.4 245 IPD4 2054 44.65  15.73  20.44 -4.72 0.00 129 .24  2.5
               S 4 2054 59.25  30.33  36.39 -6.07 0.00
  PQI 181.4   3 EPD4 2054 63.23  34.31  26.50  7.79 0.00
               S 4 2054 80.29  51.38  47.16  4.16 0.00
  LMN 277.3  71  P 3 2055  9.90  40.98  38.34  2.65 0.00
  A11 291.1 327  S 3 2055 39.06  70.15  71.28 -1.15 0.41
  A16 305.2 332  P 1 2055 10.93  42.01  41.77  0.24 1.54
               S 3 2055 42.71  73.79  74.36 -0.56 0.50
 LBNH 312.3 253  P 0 2055 11.70  42.78  42.66  0.07 2.01
  A54 320.0 327  P 1 2055 12.85  43.94  43.61  0.27 1.47
  MOQ 323.4 275  P 1 2055 13.30  44.39  44.03  0.22 1.46
  LMQ 324.9 329  P 0 2055 13.12  44.21  44.22 -0.08 1.94
               S 2 2055 47.55  78.64  78.70 -0.19 0.97
  FFD 329.2 238 EPD4 2055 16.27  47.35  44.75  2.61 0.00 276 .22  3.5
               S 4 2055 60.74  91.82  79.65 12.18 0.00
  A61 330.2 333  S 3 2055 48.21  79.29  79.86 -0.58 0.46
  HNH 361.0 246 EPD4 2055  2.04  33.13  48.66-15.57 0.00
               S 4 2055 66.10  97.19  86.62 10.51 0.00
  DPQ 402.2 297  P 1 2055 22.86  53.95  53.76  0.19 1.11
               S 4 2055 61.81  92.90  95.69 -2.80 0.00
  GSQ 437.8  10  P 1 2055 28.00  59.08  58.15  0.93 0.88
               S 3 2055 72.15 103.23 103.50 -0.28 0.31
  CNQ 473.7   1  P 3 2055 30.49  61.57  62.58 -1.03 0.22
               S 4 2055 78.50 109.58 111.39 -1.85 0.00
  ICQ 502.5   8  P 1 2055 35.00  66.08  66.14 -0.06 0.66
               S 4 2055 85.25 116.33 117.72 -1.40 0.00
  SMQ 586.3  11  P 1 2055 46.09  77.18  76.48  0.63 0.28
  MNQ 612.0 356  P 1 2055 48.40  79.48  79.65 -0.17 0.17
```

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## 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

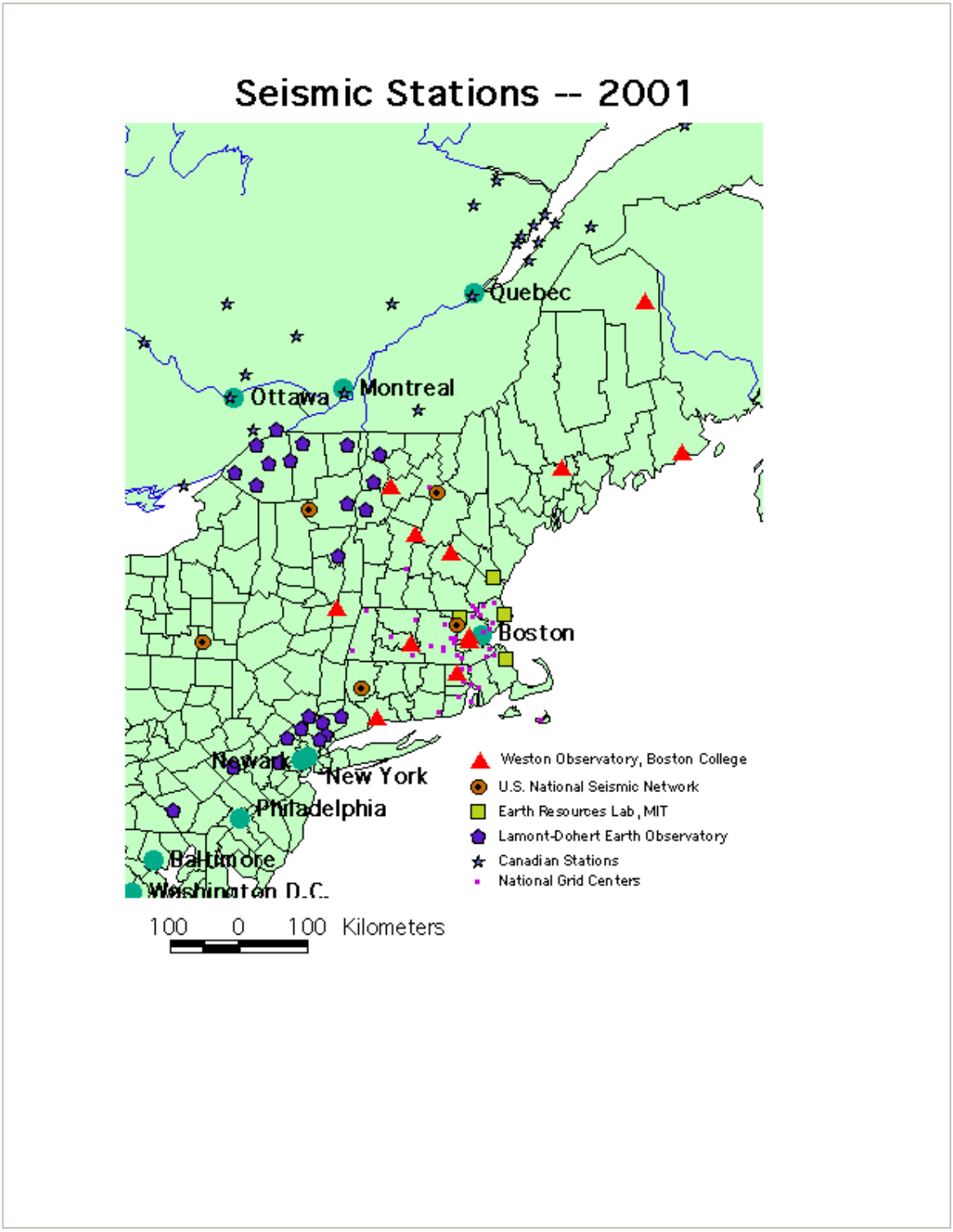


*Figure 1: Map of stations of the New England Seismic Network (NESN) in operation during period October - December, 2001. Also included are the US National Seismic Network stations operating in New England during this period.*

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## NESN Strong-Motion Station Map

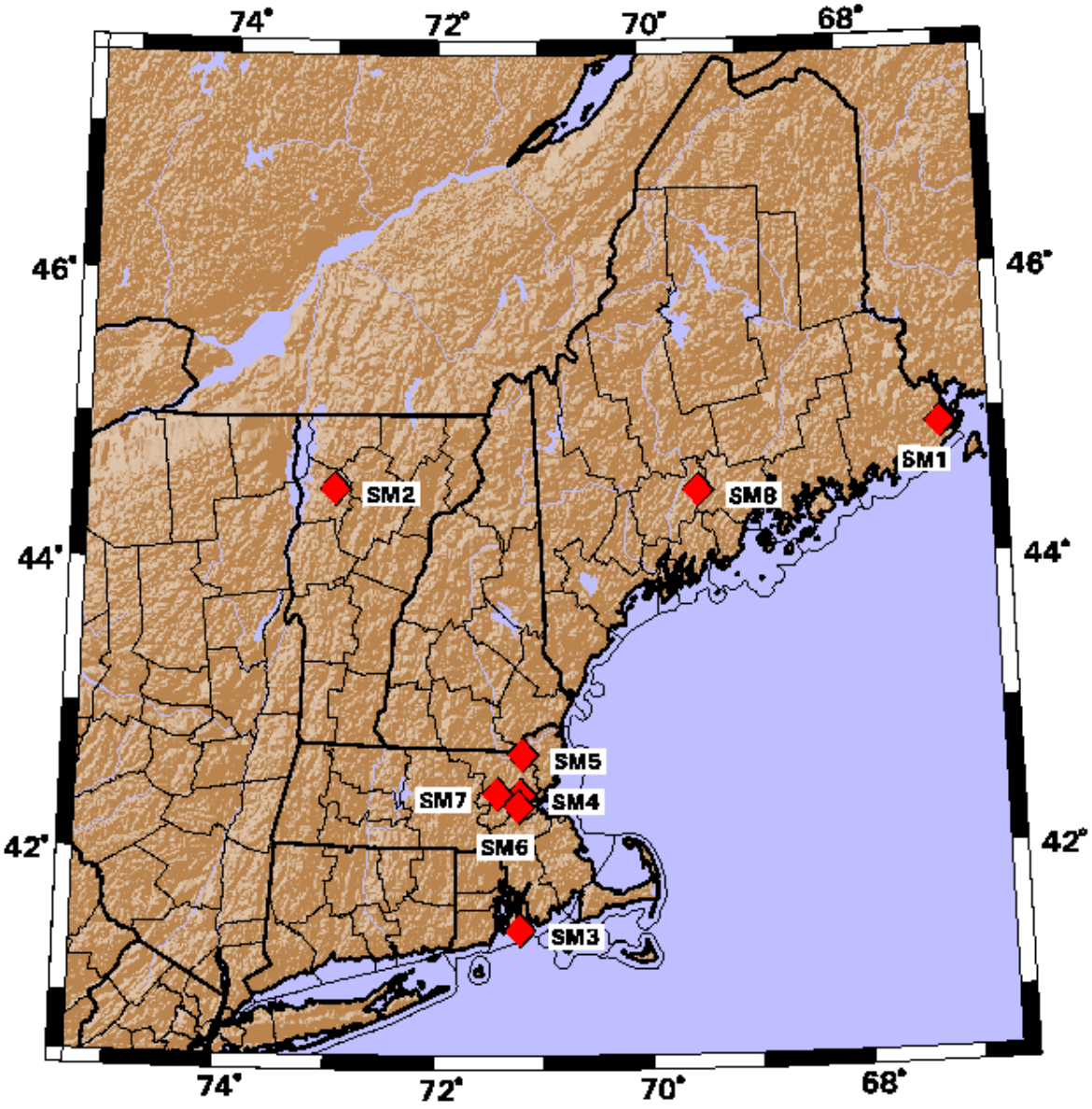


*Figure 2: Map of strong-motion stations of the New England Seismic Network (NESN) in operation during period October - December, 2001.*

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## NESN Quarterly Seismicity Map

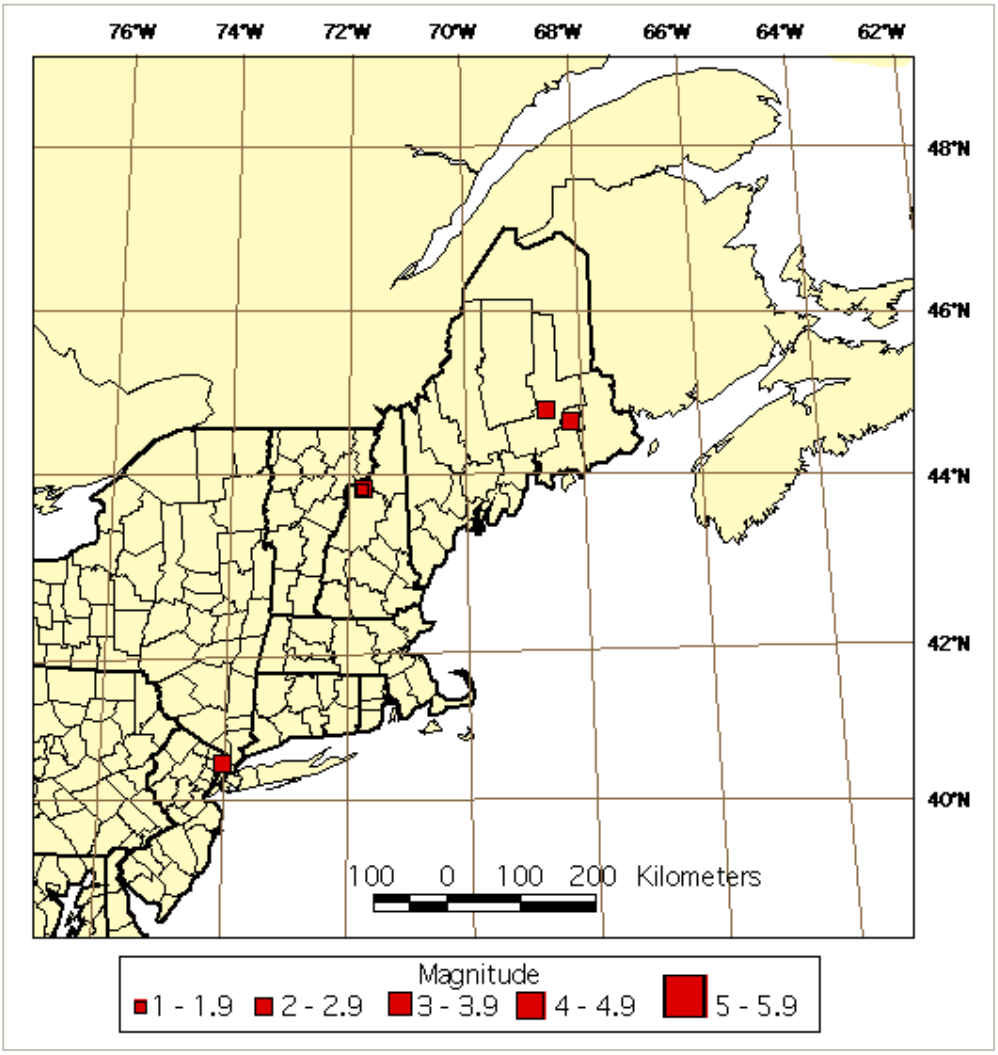


*Figure 3: Earthquake epicenters located by the NESN during period October - December, 2001.*

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## NESN Cumulative Seismicity Map

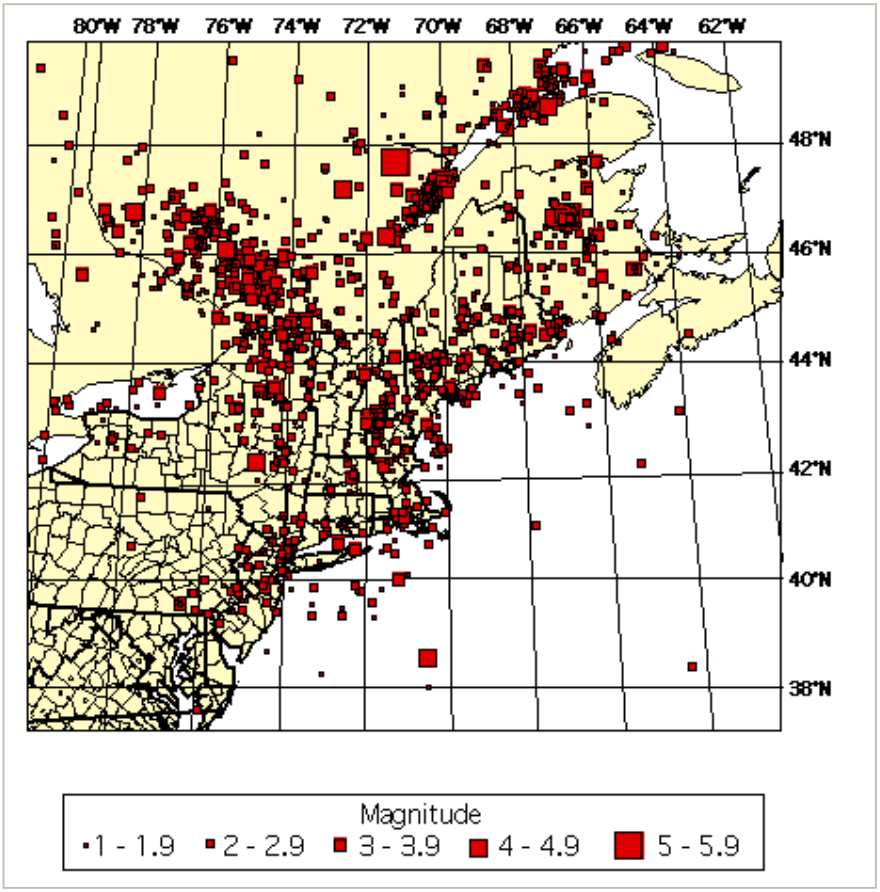


*Figure 4: Seismicity for period October, 1975 - December, 2001.*

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