Search BC



<u>bc home</u> > <u>research</u> > <u>weston observatory</u> >

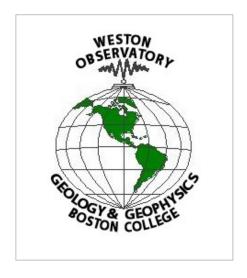
A STUDY OF NEW ENGLAND SEISMICITY

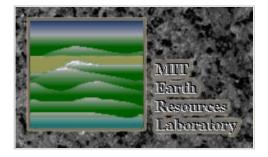
Quarterly Earthquake Report

January - March, 2003

NEW ENGLAND SEISMIC NETWORK







Weston Observatory 381 Concord Road Weston, MA 02493 Earth Resources Lab Massachusetts Institute of Technology 42 C arleton Street Cambridge, MA 02142

NEW ENGLAND SEISMIC NETWORK

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

Dept. of Earth, A tmospheric, and Planetary Sciences Massachusetts Institute of Technology 42 Carleton Street Cambridge, MA 02142 Email: toksoz@mit.edu Award # 1434-HQ-98-AG-01926

Prepared by Anastasia Macherides Moulis Email: macherid@bc.edu< br> July, 2003

> for United States Geological Survey 905 National Center 12201 Sunrise Valley Drive Reston, Virginia 20192

Notice

Network operation supported by the U.S. Geological Survey (USGS), Department of the Interior, under USGS award number 1434-HQ-98-AG-01943 and award number 1434-HQ-98-AG-01926. Theviews and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

> Quarterly Earthquake Report January - March, 2003

Table of Contents

- Introduction
- Current Network Operationand Status
- Seismicity
- Data Management
- Tables
 - **Explanation of Tables**

 - Table 1 Project Personnel
 Table 2 Seismic Stations
 Table 3 Earthquake Hypocenter List
 - Table 4 Earthquake Phase Data List
 - Table 5 Microearthquakes and Other Non-locatable Events
- Figures
 - NESN Station Map
 - NESN Strong-Motion Station Map
 - NESN Quarterly Seismicity Map
 - NESN Cumulative Seismicity Map
- **Acknowledgments**
- References

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 January - March, 2003. 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 4 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 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 strongmotion 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 sensorand 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.

Return to Table of Contents

Seismicity

There were 4 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 <u>US National Seismic Network.</u> 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.

Return to Table of Contents

Data Management

Recent event locations are available at www.bc.edu/westonobservatory. Waveform data are saved in Nanometrics, ASCII, and SEED formats and are available through personal contact, Anastasia Macherides Moulis, via email at macherid@bc.edu. Earthquake lists can be found at www.bc.edu/westonobservatory. Currently available on the Weston Observatory web page is the full catalog of northeastern U.S. earthquake activity to 2003. This will be updated as new Northeastern U.S. Seismic Network Quarterly Earthquake Reports 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.bc.edu/westonobservatory or contact:

Robert Cicerone MITEarth Resources Lab 42 Carleton Street Cambridge, MA 02142

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

Prof. John Ebe I Weston Observatory 381 Concord Road Weston, MA 02493

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

Return to Table of Contents 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 = st ation name
- 2. Lat = station latitude, degrees north
- 3. Long = station longitude, degrees west
- 4. Elev = station elevation in meters
- 5. Location = geographic location6. Operator = network operator

Table 3: Earthquake Hypocenter List

- D ate = date event occurred, Yr (year)/Mo (month)/Dy (day)
 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 listTable 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 \it 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 se paration, 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 arr ival
 - 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 arriva I
- 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 = sign al 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 = neares t 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@bc.edu		
Alan Kafka	Research Seismologist	617-552-8300	kafka@bc.edu		
Anastasia Macherides Moulis	Seismic Analyst	617-552-8325	macherid@bc.edu		
Edward Johnson	Project Engineer	617-552-8332	johnson@bc.edu		
Patricia Tassia	Administrative Secretary	617-552-8311	tassia@bc.edu		
Dina Smith	Assistant to the Director	617-552-8335	dina.smith.1@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 Invest igator	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)	

Return to Table of Contents

TABLE 4

EARTHQUAKE PHASE DATA LIST NEW ENGLAND AND ADJACENT REGIONS January - March, 2003

	NORTHWEST MAINE CRUSTAL STRUCTURE													
							TURE ER QUEBE	C. CANAI	DA					
DATE		ORIG			AT				ми мс	ML	GAP		RMS ERH	ERZ Q
	09 161								3.0 .0		154		.51 1.9	
STN CRLO							C TOBS 1 27.13			15	AMA	PKA	XMAG FMP	FMAG
WBO	183.4	181	ΕP	0 1	618	30.4	2 27.34	27.49	15 2.	13				
	185.8 187.8						7 26.79 9 27.91		-1.00 . 12 2.					
DFQ	107.0	0,9					2 50.44							
			ΕP	0 1	618	37.0	0 33.92	33.45	.44 1.	85				
							0 38.02		4.33 .					
MOQ	2/4.5	123	ES	0 1	618	72.0	3 39.15 7 68.99	68.94	.28 1. 20 1.					
KGNO	286.8	200	EΡ	1 1	618	43.9	3 40.85	40.25	.59 1.	15				
	204 2	270					8 71.50							
EEU	294.3	210					4 42.66 8 72.80			3 <i>1</i>				
			ΕP	2 1	618	44.5	3 41.45	42.21	77 .	72				
							7 42.59 6 42.98			40 34				
	335.3						1 49.43			00				
			ES	3 1	618	87.9	9 84.91	82.30	2.33 .	31				
SADO	369.3	236					0 50.12			79				
LBNH	372.5	136					0 88.12 4 52.06			00 26				
	376.7						6 51.38							
									14 1.					
	383.4						5 53.47 8 52.30			24 95				
Ling	303.0	, ,					3 92.55			24				
A11	389.3	80					5 52.67			93				
unu	400 9	145					1 90.33 9 104.51			00 00	14	20	2.5	
	406.5						7 55.29			83		. 20	2.3	
				0 1			0 -3.08		*****	00				
	406.8 425.4			2 1			9 97.31 8 61.10			42 00				
AU4	423.4	12					8 101.70			54				
A21	436.0	74		1 1					53 .	50				
	451 0	1 4 1					9 104.21			66	100		2 -	
							2 122.74 9 69.21			00	188	. 33	3.5	
	643.0						5 84.57		.26 .	00				
~~							4 148.66			00				
	674.6 746.2						3 153.75 7 95.39	96.96		00 00				
							8 102.90			00				
SOUTI	122Cm													
						MODEL								
	R16 ME	, 21	KM	W O	F B	ORHAM	LONG W				GAD	,	DMC FDU	FP7 O
O3MAI DATI 3031	R16 ME E	, 21 ORIG	KM IN	W O	F B	ORHAM N	LONG W 0-41.63	DEPTH	ми мс	МL	GAP 156		RMS ERH .42 3.1	ERZ Q 7.6 C
DATE 3031 STN	R16 ME E 16 34 DIST	, 21 ORIG 5 18 AZM	KM IN .40 R	W 0 L 43- MK H	F B AT 41.	ORHAM N 34 7 SE	0-41.63 C TOBS	DEPTH 1.38 TCAL	MN MC 1.8 .0 RES	ML WT	156 AMX	PRX	.42 3.1 XMAG FMP	7.6 C
DATE 3031	R16 ME E 16 34 DIST	, 21 ORIG 5 18 AZM	KM IN .40 RI EP	W 0 43- MK H 4	F B AT 41. RMN 345	ORHAM N 34 7 SE 24.4	0-41.63 C TOBS 4 6.04	DEPTH 1.38 TCAL 13.30	MN MC 1.8 .0 RES -7.28 .	ML WT :	156	PRX	.42 3.1 XMAG FMP	7.6 C
DATE 3031 STN FFD	R16 ME E 16 34 DIST	, 21 ORIG 5 18 AZM 253	KM IN .40 RI EP	W 0 43- MK H 4 0	F B 41. 241. 345	ORHAM N 34 7 SE 24.4 42.6	0-41.63 C TOBS	DEPTH 1.38 TCAL 13.30 23.68	MN MC 1.8 .0 RES -7.28 .	ML WT :	156 AMX	PRX .16	.42 3.1 XMAG FMP	7.6 C
DATE 3031 STN FFD WVL	R16 ME E 16 34 DIST 81.2	, 21 ORIG 5 18 AZM 253	KM IN .40 RI EP S EP S	W O 43- MK H 4 0 4	F B 41. 241. 345 345 345	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3	0-41.63 C TOBS 4 6.04 5 24.25 1 17.61 9 32.99	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90	MN MC 1.8 .0 RES -7.2854 12.57 .	ML WT : 00 69 00	156 AMX 81	PRX .16	.42 3.1 XMAG FMP 2.1	7.6 C
DATE 3031 STN FFD WVL	R16 ME E 16 34 DIST 81.2	, 21 ORIG 5 18 AZM 253	KM IN .40 EP S EP S EP	W O L 43- MK H 4 0 4 4	F B 41. RMN 345 345 345 345	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3	0-41.63 C TOBS 4 6.04 5 24.25 1 17.61 9 32.99 4 20.94	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78	MN MC 1.8 .0 RES -7.2854 12.572.9313 1.	ML WT 7 00 69 00 00	156 AMX 81	PRX .16	.42 3.1 XMAG FMP 2.1	7.6 C
DATE 3031 STN FFD WVL	R16 ME E 16 34 DIST 81.2 124.5	, 21 ORIG 5 18 AZM 253 41	KM IN .40 RI EP S EP S EP	W O L 43- MK H 4 0 4 0 0	F B 41. RMN 345 345 345 345 345	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8	0-41.63 TOBS 4 6.04 5 24.25 1 17.61 9 32.99 4 20.94 9 36.49	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 1.	ML WT 7 00 69 00 00 54 49	156 AMX 81 23 13	PRX .16 .14	.42 3.1 XMAG FMP 2.1 1.8 1.6	7.6 C
DATE 3031 STN FFD WVL HNH	R16 ME E16 34 DIST 81.2 124.5 128.3	, 21 ORIG 5 18 AZM 253 41 271	KM IN .40 EP SEP SEP SIP	W O L 43 - MK H 4 0 4 4 0 0 C 2 1	AT 41. 345 345 345 345 345 345 345	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8	0-41.63 C TOBS 4 6.04 5 24.25 1 17.61 9 20.94 2 20.94 9 36.49 2 24.32 5 44.15	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16	MN MC 1.8 .0 RES -7.28 . .54 1. -2.57 . -2.93 . .13 1. 55 1. 50 .	ML WT 7 00 69 00 00 54 49 70	156 AMX 81 23	PRX .16 .14	.42 3.1 XMAG FMP 2.1 1.8	7.6 C
DATE 3031 STN FFD WVL HNH	R16 ME E 16 34 DIST 81.2 124.5	, 21 ORIG 5 18 AZM 253 41 271	KM IN .40 EP SEP SIP SIP	W O L 43 - MK H 4 0 4 4 0 0 C 2 1 4	F B 41. RMN 345 345 345 345 345 345 346	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 6.9	0-41.63 C TOBS 4 6.04 5 24.25 1 17.61 9 32.99 4 20.94 9 36.49 2 24.32 5 44.53	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 .	ML WT 7 00 69 00 00 54 49 70 08	156 AMX 81 23 13	PRX .16 .14	.42 3.1 XMAG FMP 2.1 1.8 1.6	7.6 C
DATE 3033 STN FFD WVL HNH WES	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7	, 21 ORIG 5 18 AZM 253 41 271 199 221	KM IN .40 EP SEP SEP SEP SEP SEP	W O L 43- MK H 4 0 4 0 0 C2 1 4 3	F B 41. RMN 345 345 345 345 346 346	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 6.9 17.0	0-41.63 C TOBS 4 6.04 5 24.25 1 17.61 19 32.99 4 20.94 9 36.49 2 24.32 5 24.32 5 3 48.53	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 102 1. 16.79 . 2.11 .	ML WT 7 00 69 00 00 54 49 70 08 00 01	156 AMX 81 23 13 12	PRX .16 .14 .16 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6	7.6 C
DATE 3033 STN FFD WVL HNH WES QUA2	R16 ME E 16 34 DIST 81.2 124.5 128.3 153.7 207.0	, 21 ORIG 5 18 AZM 253 41 271 199 221 66	KM IN .40 RI EP SP EP SP EP SP EP	W O L 43-MK H 4 O 4 4 O C 2 1 4 3 C 4 2	F B 41. RMN 345 345 345 345 346 346 346 346	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 17.0 24.7 31.5	0-41.63 S TOBS C TOBS 17.61 17.61 94 20.99 9 36.49 9 36.49 24.32 5 44.15 3 48.53 2 58.62 7 73.17	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 25.26 .	ML WT 7 00 69 00 00 54 49 70 08	156 AMX 81 23 13 12	PRX .16 .14 .16	.42 3.1 XMAG FMP 2.1 1.8 1.6	7.6 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE	R16 ME E 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN	KM IN .40 EP SP EP SP EP SP EP SP EP SP EP	W 0 43- MK H 4 0 4 0 0 C2 1 4 3 C4 2 RUST	F B 41. 345 345 345 345 346 346 AL	ORHAM N 34 7 24.4 42.6 36.0 51.3 39.3 39.3 42.7 62.5 6.9 17.0 24.7 MODEL	0-41.63 C TOBS 4 6.04 25 1 17.61 9 32.99 4 20.99 9 36.49 9 24.32 5 44.15 3 48.53 2 58.62 0 66.30 7 73.17	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45 41.03	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 25.26 .	ML WT 7 00 69 00 54 49 70 08 00 01	156 AMX 81 23 13 12	PRX .16 .14 .16 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6	7.6 C
DATE 3033 STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE	R16 ME E 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN, 17	KM IN 40 EP SP EP SP EP SC EP	W O L 43-MK H 4 0 4 4 0 0 C 2 1 4 3 C 4 2 RUST W O	F B 41. RMN 345 345 345 345 346 AL F B	ORHAM N 34 7 SE 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 6.9 17.0 24.7 MODEL ORHAM	0-41.63 TOBS 4 6.04 5 24.25 1 17.61 9 32.94 9 2 24.32 5 44.15 3 48.53 2 48.53 2 66.30 7 73.17	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 541.03 73.03	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 102 1. 16.79 . 2.11 . 25.2612 .	ML WT 700 69 00 54 49 70 08 00 01 00 49	156 AMX 81 23 13 12 7 6	PRX .16 .14 .16 .20 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6	7.6 C FMAG
DATE 3033 STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE DATE	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN , 17 ORIG 6 15	KM IN . 40 EP SS EP SS EP SP SP EP SP EP SP EP SP EP SP EP SP SP EN	W 0 L 43 - MK H 4 0 0 C 2 1 4 3 C 2 RUST W L 43 - 43 - 43 - 43 - 43 - 43 - 43 - 43	F B AT 41. RMNN 345 345 345 345 345 345 346 6AL B AT 40.	ORHAM N 34 7 SEE 4.442.6 36.0 51.3 39.3 42.7 62.5 6.9 1.5 MODEL ON N 69 7	0-41.63 TOBS C4 6.04 5 24.25 19 32.94 9 32.94 9 2 24.32 5 44.15 3 48.53 2 58.63 0 66.30 7 73.17	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 41.03 73.03	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 150 2.11 25.2612 .	ML WT 1000 69 00 00 54 49 70 08 00 01 000 49	156 AMX 81 23 13 12 7 6 GAP 155	PRX .16 .14 .16 .20 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.8 1.8 1.4 1.8 1.4 1.6 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE DATE 303: STN	R16 ME E 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN, 17 06 15 AZM	KM IN .40 EP SS EP SS EP SP EP SP EP SP EN LN LN R	W OL 43 MK H 4 0 0 0 C 2 1 4 3 C 4 2 S T W OL 43 MK H	F AT 1. M 4 1 1 1 3 4 4 5 5 3 4 4 5 5 3 4 4 5 5 3 3 4 4 5 6 6 6 6 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4	ORHAM N 34 7 24.44.6 36.0 51.3 39.3 54.8 42.7 62.5 62.9 17.0 24.7 MODEL ORHAM N 69 7 SE	0-41.63 TOBS C4 6.04 5 24.25 1 17.61 9 32.94 9 36.49 2 24.32 5 44.15 3 48.53 2 44.15 3 48.53 2 7 73.17 LONG W 0-39.59 C TOBS	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES	ML WT 1 00 69 00 00 54 49 00 01 00 49	156 AMX 81 23 13 12 7 6 GAP 155	PRX .16 .14 .16 .20 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE DATE 303:	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN, 17 06 15 AZM	KM IN . 40R EP SP SP EP SP EP SP EP SP EN EP SP EN	W O L 43 - MK H 4 0 0 4 4 0 0 0 C 2 1 4 3 C 4 2 S T U	F A T 1. M 4 5 5 4 5 5 5 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7	ORHAM N 34 7 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 61.9 24.7 31.5 ORHAM N 69 7 28.6	0-41.63 C TOBS C T TOBS C T T T T T T T T T T T T T T T T T T	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL 13.58	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES RES	ML WT 1000 69 000 54 49 000 01 000 49 ML WT 122	156 AMX 81 23 13 12 7 6 GAP 155	PRX .16 .14 .16 .20 .20	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.8 1.8 1.4 1.8 1.4 1.6 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE DATE 303: STN FFD	R16 ME E 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST	, 21 ORIG 5 18 AZM 253 41 271 199 221 66 MAIN, 17 ORIG 6 15 AZM 254	KM IN . 40R EP SP SP EP SP EP SP EP SP EN EP SP EN	W 0 L 43 - MK H 4 0 0 C 2 1 4 3 - MK U L 43 - MK H 0 0 C 2 MK H 0 0 C 2 MK H 0 0 C 4 4 5 - MK H 0 0 C 4 5 - MK H 0 0 C 4 5 - MK H 0 C 4 4 5 - MK H 0 C 4 5 - MK H 0	F B 41. NA 53 44 53 34 45 53 34 45 53 34 45 53 34 46 66 B A4 MM R 34 66 8 34 66 8 34 66 8 34 66 8 34 66 8 34 66 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	ORHAM N 34 7 24.4 42.6 36.0 51.3 39.3 54.8 42.7 62.5 6.9 17.0 31.5 MODEL ON 69 7 SE6 40.0	0-41.63 C TOBS C T TOBS C T T T T T T T T T T T T T T T T T T	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 41.03 73.03 DEPTH 2.96 TCAL 13.58 24.18	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 168 .	ML WT 1 00 69 00 00 54 49 00 01 00 49	156 AMX 81 23 13 12 7 6 GAP 155	PRX .16 .14 .16 .20 .20 .17	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.8 1.8 1.4 1.8 1.4 1.6 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAI DATE 303: STN FFD WVL	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34 B3.5 123.6	, 21 ORIG 18 AZM 253 41 271 1999 221 666 MAIN, 17 OR 17 OR 17 OR 17 AZM 254	KM IN 40. EP SP EP SEP EP EN EP SEP EP SEP SEP SEP SEP S	W 0 L 43 - MK 4 0 4 4 4 0 0 C 2 1 4 3 C 2 S T 0 C 4 3 - MK 6 0 0 C 4 3 - MK 6 0 0 C 4 4 5 - MK 6 0 C 4 5 - MK 6	FAT	ORHAM 73 4 4.4 42.4 42.6 36.0 51.3 354.8 42.7 62.6 6.9 17.0 731.5 MORHAM ORHAM ON 69 28.6 40.0 32.6 45.4	0-41.63 S TOBS C T T T T T T T T T T T T T T T T T T	DEPTH 1.38 TCAL 3.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45 41.71 56.45 41.71 56.45 41.71 56.45 41.71 56.45 41.71	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 1685.21 .	ML WT 1000 69 000 000 54 49 70 000 49 ML WT 22 99 00 00 00 00	156 AMX 81 23 13 12 7 6 GAP 155 AMX	PRX .16 .14 .16 .20 .20 .17 PRX .16	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAI DATE 303: STN FFD WVL	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME 16 34 DIST 83.5	, 21 ORIG 18 AZM 253 41 271 1999 221 666 MAIN, 17 OR 17 OR 17 OR 17 AZM 254	KM IN 40. EP SEP SP EP EP EN EP SC EN EP SC EP SC EP SC EP SC EP	W 0 L 43 - H 44 0 0 4 4 4 0 0 C 2 1 4 4 3 - H W 5 C 2 2 S T W 0 L 4 3 - H W 6 C 0 0 D 4 4 D 0 0 D 0 D 0 D 0 D 0 D 0 D 0	FAT1NN455445533445533445533445566 B .NA 344666 B .NA 344666 33446	ORHAM 73 34 54.4 42.4 436.0 51.3 39.3 39.3 39.3 42.7 62.5 17.0 24.7 31.5 MODELM	0-41.63 C TOBS C 4 6.04 4 6.04 4 25.19 4 20.94 4 20.94 4 8.53 2 4.32 58.63 2 58.63 2 7 73.17 LONG W 0-39.59 C TOBS C TOBS C 13.47 0 17.47 3 6 4 20.81	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 41.03 73.03 DEPTH 2.96 TCAL 13.58 19.95 35.52 21.14	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 168682.505.2136 1.	ML WT 1000 699 000 000 000 000 000 000 000 000	156 AMX 81 23 13 12 7 6 GAP 155 AMX	PRX .16 .14 .16 .20 .20 .17 PRX .16	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.8 1.8 1.4 XMAG FMP 2.1 1.8 XMAG FMP	7.6 C FMAG ERZ Q 5.2 C
DATE 3033 STN FFD WVL HNH WES QUA2 UMM SOUTE 3033 STN FFD WVL HNH	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34 B3.5 123.6	, 210 ORIGE	KM IN . 40 EP S EP S EP S EP S EP S EP S E CM IN . 13 EP S EP	W 0 L 3 - H 4 3 - H 4 0 0 4 4 0 0 2 1 4 3 4 2 S T 0 2 4 2 S T 0 0 4 4 0 0 0 4 4 0 0 0 4 4 0 0 0 0 0	FAT 141N1534555445553445553445553445666 B 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ORHAM 70 24.42.60 36.00 519.38 54.84 42.75 66.90 124.75 MORHAM 7E 40.00 40.00 40.00 40.00 40.00 40.00 40.00 40.00 40.00 40.00 40.00	0-41.63 S TOBS C T T T T T T T T T T T T T T T T T T	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 35.52 21.14 37.63	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 1682.505.2136 1.	ML WT 1000 669 000 000 544 770 000 000 000 000 000 000 000 000 0	156 AMX 81 23 13 12 7 6 GAP 155 AMX	PRX .16 .14 .20 .20 .17 PRX .16 .14	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE ATE 303: STN FFD WVL HNH WES	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST 83.5 123.6 131.1	, 21 ORIG AZM 253 41 271 199 221 666 MAIN , 17 ORIG 6 15 AZM 254 40 271 201	KM IN A OR EP SP SP EP SP EP E SC EP	W 0 L - W 43 - H 40 4 4 0 0 C 2 1 4 3 C 2 2 S T 0 0 0 C 0 D 4 4 D D D D D D D D D D D D D D D D	FA1134455454554455646666666646666666666666	ORHAM 78 24.46 36.03 39.38 39.38 42.77 62.59 1775 MODLEL MODRHAM 69 28.60 32.64 35.94 40.10	0-41.63 S TOBS C 4 6.04 4 6.04 4 6.04 4 6.04 4 6.04 4 6.04 6 6.04	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 41.03 73.03 DEPTH 2.96 TCAL 13.58 19.95 35.52 21.14 37.63 24.70 43.96	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 1682.505.2136 136 136 136 136 1.	ML WT 299000660600204	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37	PRX .16 .14 .16 .20 .17 PRX .16 .14 .19	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.8 1.8 XMAG FMP 2.3 2.0 2.2	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE ATE 303: STN FFD WVL HNH WES	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST 83.5 123.6	, 21 ORIG AZM 253 41 271 199 221 666 MAIN , 17 ORIG 6 15 AZM 254 40 271 201	KM IN O EP SP EP SP EP	W 0 L - 4 3 - H 4 0 0 4 4 4 0 0 0 C 2 1 4 3 - H 4 3 - H 4 3 - H 4 3 - H 4 3 - H 4 3 - H 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FAT1 4RN 4555445554454555445554456666 B M 6666466 B M 66664666 B M 6466466666 B M 646646666 B M 64664666 B M 6466466 B M 6466466 B M 64664666 B M 64664666 B M 64664666 B M 64664666 B M 6466466 B M 64664666 B M 646646666 B M 6466466666 B M 646646666 B M 6466666 B M 6466666 B M 646666 B M 646666 B M 6466666 B M 646666 B M 64666 B M 646666 B M 6466	ORHAM 70 24.42.60 36.03 519.38 54.87 66.97 124.75 66.97 124.75 MORHAM 7E6.40 30.06 45.44 35.44 46.60 46.06	0-41.63 S TOBS C	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.76 31.63 24.70 43.96 31.65	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 102 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 168 8 -2.505.2133 111 133 1.	ML WT	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37	PRX .16 .14 .16 .20 .17 PRX .16 .14 .19	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME 216 34 B3.5 123.6 131.1 153.5	, 21 OR 18 AZM 253 41 271 199 221 66 MAIN 0RIG 6 15 AZM 40 271 201	KM IN A CRP EPS EPS EPS EPS EPS EN	W 0 L - W 43 H 40 4 4 0 0 C 2 1 4 3 4 2 S T 0 C 4 2 S T W 43 H 0 0 0 C 0 0 D 4 4 0 D 0 C 0 D 0 D 4	FAT . NA 455	ORHAM 7 24.46 36.00 51.3 54.8 42.7 62.7 62.7 62.7 62.7 62.7 62.7 62.7 6	0-41.63 S TOBS 4 6.04 5 24.25 1 17.61 9 32.99 9 32.94 9 36.49 2 24.32 5 44.15 3 48.53 2 5 8.62 0 66.30 7 73.17 LONG W 0-39.59 C TOBS 0 13.47 30.33 44.90 30.33 47 30.33 47 30.33 47 30.33 47 30.33 47 30.33 47 30.33 47 30.33	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 35.52 21.14 37.63 24.70 43.965 36.34	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 150 1 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 1685.21685.2136 133 111 112 .	ML WT	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24	PRX .16 .14 .20 .20 .17 PRX .16 .14 .19 .18	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST 83.5 123.6 131.1	, 21 OR 18 AZM 253 41 271 199 221 66 MAIN 0RIG 6 15 AZM 40 271 201	KM I 4 RI E PS E E PS E E S I E PS E E KM I 1 1 3 RI E PS E E F S E E F S E PS E PS E PS E PS	W 0 1 - H 43 H 44 0 0 4 4 0 0 2 1 4 3 4 2 ST 0 1 - H M C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FAT1 A4 A55 A54 A55 A55	OR HAM 7E 24.46.03 34 4.4.46.03 51.3 354.87 62.90 174.75 MODLEL MODRHAM 7E 40.66 40.64 455.94 40.66 60.9	0-41.63 S TOBS C	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 19.95 35.52 21.14 37.63 24.70 31.65 56.34 40.61	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 1. 2.13 1. 25.2612 . MN MC 2.2 .0 RES14 125.2612 . MN MC 2.2 .0 RES14 133 111 133 111 118 322 .	ML WT 00000000000000000000000000000000000	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37	PRX .16 .14 .20 .20 .17 PRX .16 .14 .19 .18	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES QUA2	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME 216 34 B3.5 123.6 131.1 153.5	, 21 OS 188 AZM 253 41 271 1999 221 666 MAINN, 17 ORIG 6 AZM 254 40 271 201 222	KM I A OR EPP EPP EPS EPS EN IN 1 3 RP EPS EPS EPS EPS EPS EPS EPS EPS EPS EP	W 0 1 - 4 3 H 4 4 0 0 4 4 4 0 0 2 1 4 3 H 4 3 H 5 C 2 R W 4 X 1 - H 6 C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FAT . MAS 3 4 4 5 5 5 6 4 6 6 6 6 7 3 3 4 4 6 6 6 6 6 8 3 3 4 4 6 6 6 6 6 8 3 3 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	ORHAM 7 E 24.46 36.00 519.38 54.27 66.90 174.75 174	0-41.63 S TOBS 4 6.04 5 24.25 1 17.61 9 32.99 4 20.94 9 34.32 5 44.15 3 48.53 20.666.30 7 73.17 LONG W 0-39.59 C TOBS 0 13.47 30.33 44.90 0 43.87 6 30.33 4 24.90 0 17.47 6 30.33 4 24.90 0 17.47 6 30.33 6 30	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 35.52 21.14 37.63 24.70 43.96 56.34 40.61 72.28	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 150 1. 25.2612 . MN MC 2.2 .0 RES14 1682.505.2133 111 136 133 111 112 .	ML WT 00 69 00 00 54 49 00 00 00 00 00 00 00 00 00 00 00 00 00	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24	PRX .16 .14 .20 .20 .17 PRX .16 .14 .19 .18	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 03MAE 303: STN FFD WVL HNH WES QUA2 UMM	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME 16 34 DIST 83.5 123.6 131.1 153.5 207.9 280.4	, 21 07 18 AZM 253 41 271 199 221 66 15 AZM 271 201 201 222 66 32	KM I A R. E PP SP E SP	W 0 1 - 43 H MK4 0 0 4 4 0 0 2 1 4 3 4 2 U S 1 1 - 4 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F A 1 N 1 S 2 S 2 S 2 S 2 S 2 S 2 S 2 S 2 S 2 S	OR HAM 7E 64 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0-41.63 S TOBS S 4 6.04 S 5 24.25 1 9 32.94 9 9 2 24.32 5 8 66.30 7 73.17 LONG W 5 9 S 5 44.15 3 2 45 8 6 8 9 5 9 5 4 5 9 5 7 2 5 0 9 45 8 9 9 45 8 5 7 9 9 45 8 5 7 2 5 5 2 2 9 7 5 9 2 2 113.09	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 35.52 21.14 37.63 24.70 43.96 56.34 40.61 72.28	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 150 1. 25.2612 . MN MC 2.2 .0 RES14 1682.505.2133 111 136 133 111 112 .	ML WT 00000000000000000000000000000000000	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24	PRX .16 .14 .20 .20 .17 PRX .16 .14 .19 .18	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES STN FFD WVL HNH WES QUA2 UMM PQI SOUTE SOU	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E 16 34 DIST 83.5 123.6 131.1 153.5 207.9	, 21 OS 188 AZM 253 41 271 199 221 66 MAINN, 17 ORIG 6 AZM 254 40 271 201 222 66 32 MAIN	KM A CE SPS E SPS C E	W 43 H TO L - H A A A A A A A A A A A A A A A A A A	F A 4 M 4 4 K 4 5 5 5 5 6 6 6 6 6 6 7 7 8 8 8 8 8 8 8 8 8 8 8 8	OR HAM 7E 6 1 2 4 2	0-41.63 S TOBS 4 6.04 5 24.25 1 17.61 9 32.94 4 20.94 9 2 24.32 5 44.15 3 2 48.53 2 48.53 2 66.30 7 73.17 LONG W 0-39.59 S TOBS 0 13.47 30.33 44.20.33 44.20.33 44.20.33 45.50 66.30 7 73.17	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 31.71 56.45 41.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 35.52 21.14 37.63 24.70 43.96 56.34 40.61 72.28	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 150 1. 25.2612 . MN MC 2.2 .0 RES14 1682.505.2133 111 136 133 111 112 .	ML WT 00 69 00 00 54 49 00 00 00 00 00 00 00 00 00 00 00 00 00	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24	PRX .16 .14 .20 .20 .17 PRX .16 .14 .19 .18	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1	7.6 C FMAG ERZ Q 5.2 C
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES QUA2 UMM PQI SOUTE 03MAE 0ATE 040 SOUTE 040 SOUTE 040 SOUTE 040 SOUTE 050 SO	R16 ME 16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME 16 34 DIST 83.5 123.6 131.1 153.5 207.9 280.4 392.1 HEAST HEAST HEAST R16 ME	, 21 05 188 AZM 253 41 271 199 221 66 MAIN, 17 ORIGG 254 40 271 201 222 66 32 MAIN, 00 00 00 00 00 00 00 00 00 00 00 00 00	KM ARPS E SP	W 0 1 - 4 3 H	FA4R334455566666 B .N666666666666667ALFT	OR HAM 7E 6 6 7 7 9 1 2 4 2 . 4 6 . 0 3 1 5 1 9 . 3 8 4 2 2 . 6 6 7 9 1 2 4 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1 5 1	0-41.63 S TOBS S 4 6.04 S 5 24.25 1 9 32.94 9 9 32.95 6 6.30 7 73.17 LONG W 10.81 S 7 25.04 4 20.81 5 37.32 5 6.30 1 3.47 0 9 31.56 0 9 45.87 9 31.56 0 9 45.87 9 9 31.56 0 9 45.87 9 9 9 45.87 9 9 9 45.87 9 9 9 45.87 9 9 9 45.87 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 44.16 31.71 541.03 73.03 DEPTH TCAL 13.58 19.95 35.52 21.14 37.63 24.70 31.65 56.34 40.61 72.28 54.39 6.82 DEPTH	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 1682.505.2136 136 136 136 13234 111 11218 3 5.2422 . 43.16 . 16.21 .	ML WT 1000 000 000 000 000 000 000 000 000 0	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24 25	PRX .16 .20 .17 PRX .16 .14 .19 .18 .21	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 XMAG FMP 2.3 2.0 2.2 2.1 2.3 XMAG FMP	7.6 C FMAG ERZ Q 5.2 C FMAG
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTH 303: STN FFD WVL HNH WES QUA2 UMM PQI SOUTH 03MAH DATE 303:	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34 153.5 123.6 131.1 153.5 207.9 280.4 392.1 HEAST R16 ME E16 35	, 21 OS 188 AZM 253 41 271 199 221 66 MAIN, 17 ORIGG 6 AZM 254 40 271 222 66 32 MAIN, 07IGG 132	KM LA EPSPESPSCM E E SPSCM E SPSCM E E KM 3 R E SPSPSCM E E KM 5 E E E KM 5 E E E E KM 5 E E E E E E E E E E E E E E E E E E	W 43 H TO L - H A A A A A A A A A A A A A A A A A A	FA4R333333333333AFA4R33333333333333AFA7R33333333333333333333	OR HAM 7E 6 1 2 4 2 . 6 . 6 . 6 . 7 . 7 . 5 . 1 4 4 2 . 6 . 6 9 . 7 . 5 . 1 4 6 7 . 5 . 4 4 2 6 . 6 6 6 6 . 6 6 6 . 6 6 . 6 6 . 6 6 . 6 6 . 6 6 .	0-41.63 S TOBS 4 6.04 5 24.25 1 17.61 9 32.94 9 32.99 4 20.94 9 2 24.32 5 44.15 3 2 48.52 0 66.30 7 73.17 LONG W 0-39.59 S 24.92 0 17.47 3 24.92 0 17.47 6 30.33 4 4 20.81 5 37.32 7 25.04 4 20.81 5 37.32 7 25.04 9 31.56 0 43.87 9 31.56 0 43.87 9 31.56 0 43.87 9 31.56	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 44.16 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.70 43.96 32.1.14 37.63 24.70 43.96 56.34 40.61 72.28 54.39 96.82 DEPTH	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 1682.505.2133 111 133 111 133 111 134 135 2422 . 43.16 . 16.21 .	ML WT	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24 25	PRX .16 .14 .19 .18 .21	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1 2.3	7.6 C FMAG ERZ Q 5.2 C FMAG
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTH 303: STN FFD WVL HNH WES QUA2 UMM PQI SOUTH 03MAH DATE 303:	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 35 123.6 131.1 153.5 207.9 280.4 392.1 HEAST R16 ME E16 35 DIST	, 21 ORIGE ORIGE 253 41 271 199 221 66 MAINN ORIGE 6 15 AZM 40 271 222 66 32 40 32 40 31 32 41 40 40 40 41 41 41 41 41 41 41 41 41 41 41 41 41	KM 1N 40 RPS PS P	W 0 1 - 4 4 4 4 0 0 4 4 0 0 2 1 4 3 4 2 S 0 1 - 4 4 0 0 4 4 0 0 0 0 0 0 0 0 0 0 0 0 0	F A 4 R 3 3 3 4 4 5 5 5 6 6 6 6 7 7 8 8 N N 5 5 5 6 6 6 6 7 7 8 8 N N 5 5 5 6 6 6 6 6 7 7 8 8 N N 5 5 6 6 6 6 6 6 7 7 8 8 8 8 8 8 8 8 8 8 8 8	ORHAM 7E6003 4 4 4 4 4 2 1 5 1 1 3 1 4 2 1 5 1 1 3 1 3 1 4 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0-41.63 S TOBS 4 6.04 5 24.25 1 17.61 9 32.94 9 32.99 4 20.94 9 2 24.32 5 44.15 3 2 48.52 0 66.30 7 73.17 LONG W 0-39.59 S 24.92 0 17.47 3 24.92 0 17.47 6 30.33 4 4 20.81 5 37.32 7 25.04 4 20.81 5 37.32 7 25.04 9 31.56 0 43.87 9 31.56 0 43.87 9 31.56 0 43.87 9 31.56	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 44.61 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 21.14 37.63 24.70 43.96 31.65 40.61 72.28 96.82 DEPTH 5.00	MN MC 1.8 .0 RES -7.2854 12.572.9313 15.5 15.00.2 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 1682.505.2133 111 11218 3 . 5.2422 . 43.16 . 16.21 . MN MC 1.4 .0 RES	ML WT 1000 000 000 000 000 000 ML WT 1	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24 25	PRX .16 .14 .19 .18 .21	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 XMAG FMP 2.3 2.0 2.2 2.1 2.3 XMAG FMP	7.6 C FMAG ERZ Q 5.2 C FMAG
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES QUA2 UMM PQI SOUTE 303: STN FFD	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34 DIST 83.5 123.6 131.1 153.5 207.9 280.4 392.1 HEAST R16 ME E16 35 DIST 91.6	, 21 ORIGG ORIGG ORIGG 253 41 271 199 221 666 MAINN, 17 ORIGG 1254 40 271 222 666 32 MAINN, 071 GRIGG 132 AZMAINA	KM OARPSPESPSCM ESPSCM ESPSCM ESPSCM ESPSCM ESPSPSCM ESPSCM E E KN 5 R E E KN 5 R E E KN 5 R E KN 5 R E E E E E E E E E E E E E E E E E E	W 43 H TO L - H A 4 4 0 0 2 1 4 3 4 2 U S 0 1 - H A 4 0 0 2 1 4 3 4 2 U S 0 1 - H A 5 1 H A 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	FA4R33333333333AFA4R3333333333333AAAAR3333333333	OR HAM 7E 6 6 6 0 0 1 3 4 4 2 4 2 6 6 6 0 0 7 3 5 3 5 4 4 2 2 5 5 6 1 2 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0-41.63 S TOBS S S S S S S S S S S S S S S S S S S	DEPTH 1.38 TCAL 13.30 23.68 20.17 35.90 20.78 36.99 144.16 31.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.70 43.96 32.1.14 37.63 24.70 43.96 56.34 40.61 72.28 54.39 96.82 DEPTH TCAL 14.79 63.33	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 155 155 1. 2.13 155 155 155 155 155 155 155 102 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES14 1682.505.2133 111 133 111 133 111 134 135 137 138 138 138 139 130 131 131 131 132 133 133 133 134 135 2436 137 138 138 139 130 131 131 131 131 131 132 133 1	ML WT 000 690 000 000 000 000 000 000 ML WT 023	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24 25	PRX .16 .20 .17 PRX .16 .14 .19 .18 .21	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1 2.3 RMS ERH .48 6.8 XMAG FMP	7.6 C FMAG ERZ Q 5.2 C FMAG
DATE 303: STN FFD WVL HNH WES QUA2 UMM SOUTE 303: STN FFD WVL HNH WES QUA2 UMM PQI SOUTE 303: STN FFD	R16 ME E16 34 DIST 81.2 124.5 128.3 153.7 207.0 282.4 HEAST R16 ME E16 34 131.1 153.5 207.9 280.4 392.1 HEAST R16 ME	, 21 ORIGG ORIGG ORIGG 253 41 271 199 221 666 MAINN, 17 ORIGG 1254 40 271 222 666 32 MAINN, 071 GRIGG 132 AZMAINA	KM OF EPSP EPSC E E SP	W 43 H TO 44 O O 2 1 4 3 4 2 S O 3 - H A C 2 1 4 3 4 2 S O 0 D 4 4 O O O O O O O O O O O O O O O O O	FA4R3334455566666 B .NN5554455566666 B .NN5554455566666 B .NN55511 B .NN55511	ORHAM 7E9 8.6066.79.75LM ORN 3 4 4.2.5.75 12.31 DEAM 7E600RH 9 8.606.49 3.52.41 5.46 6.79.75 2.45 6.79.75 2.45 6.79.75 2.45 6.79.75 2.45 6.79.75 2.45 6.79.75 2.45 6.79.75 2.45 6.79 6.79 6.75 6.75 6.75 6.75 6.75 6.75 6.75 6.75	0-41.63 S TOBS S 13.87 S 15.88 S 15.8	DEPTH 1.38 TCAL 23.68 20.17 35.90 20.78 36.99 24.81 44.63 1.71 541.03 73.03 DEPTH 2.96 TCAL 13.58 24.18 19.95 221.14 37.63 24.70 43.96 31.65 40.61 72.28 96.82 DEPTH 5.00 L14.79 26.33 17.97	MN MC 1.8 .0 RES -7.2854 12.572.9313 155 15002 1. 16.79 . 2.11 . 25.2612 . MN MC 2.2 .0 RES -14 1682.505.2133 111 11218 3 . 5.2422 . 43.16 . 16.21 . MN MC 1.4 .0 RES -9335 145 1.	ML WT 000 69 000 000 000 000 000 000 ML WT 70 23 17	156 AMX 81 23 13 12 7 6 GAP 155 AMX 82 37 46 24 25	PRX .16 .20 .17 PRX .16 .14 .19 .18 .21	.42 3.1 XMAG FMP 2.1 1.8 1.6 1.6 1.6 1.8 RMS ERH .34 2.4 XMAG FMP 2.3 2.0 2.2 2.1 2.3 RMS ERH .48 6.8 XMAG FMP	7.6 C FMAG ERZ Q 5.2 C FMAG

HNH	135.7	266	EΡ	2	351	52.91	20.86	21.79	96	.61	4	.13	1.1
			S	1	351	71.10	39.05	38.79	.21	1.13			
WES	166.3	201	EPD	2	351	58.87	26.82	26.30	.52	.67	8	.21	1.5
			S	1	351	78.84	46.79	46.81	03	1.04			
QUA2	219.9	220	ΕP	1	351	65.10	33.05	32.91	.12	.90	5	.22	1.4
				4	2 5 1	0 E 2 E	E2 20	E0 E0	E 12	0.0			

TABLE 5

MICROEARTHQUAKES AND OTHER NON-LOCATABLE EVENTS

Date Sta Arrival Time Yr/Mo/Dy Hr:Mn:Sec

None recorded this period.

Return to Table of Contents

NESN Station Map

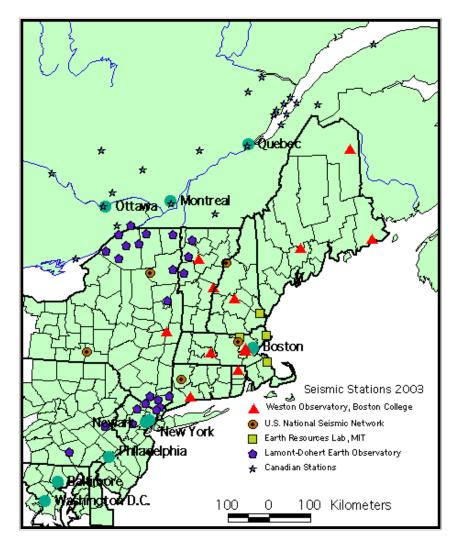


Figure 1: Map of stations of the New England Seismic Network (NESN) in operation during period January - March, 2003.

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

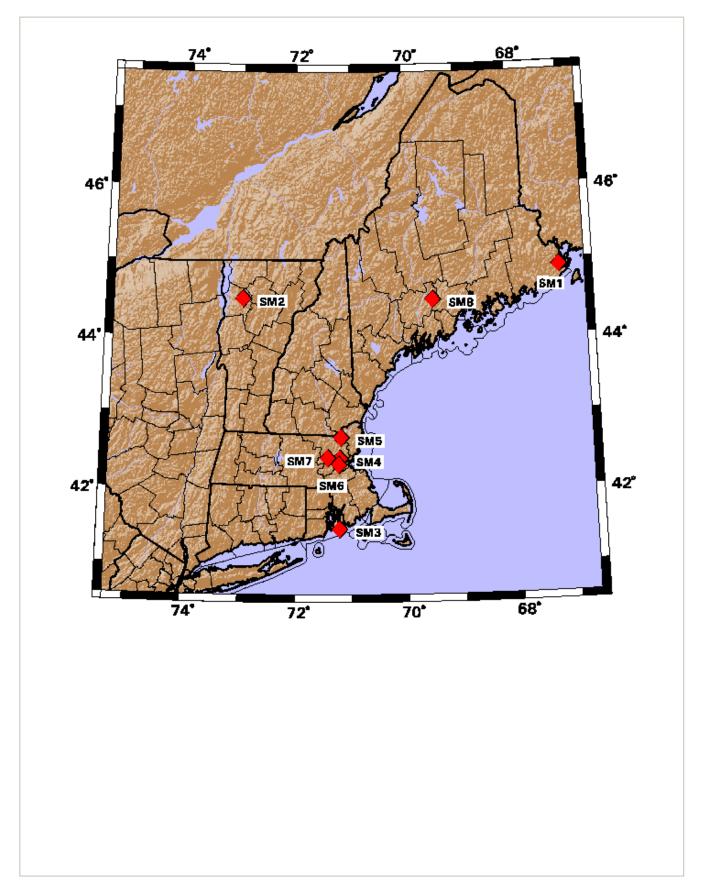


Figure 2: Map of strong-motion stations of the New England Seismic Network (NESN) in operation during period January - March, 2003.

Return to Table of Contents

NESN Quarterly Seismicity Map

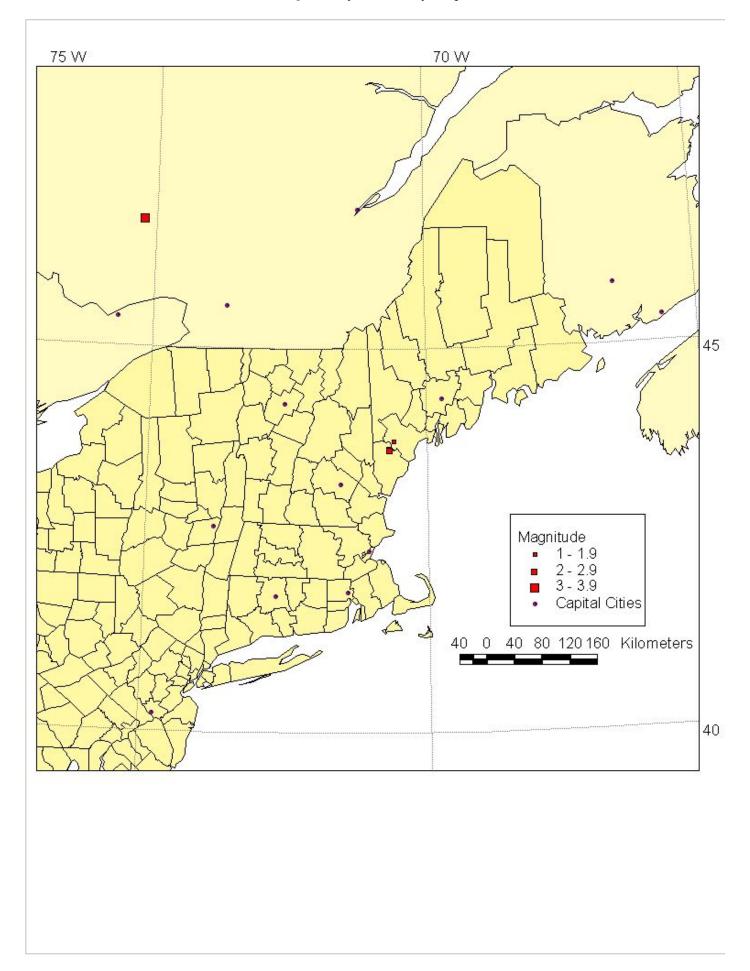


Figure 3: Earthquake epicenters located by the NESN during period January - March, 2003.

Return to Table of Contents

NESN Cumulative Seismicity Map

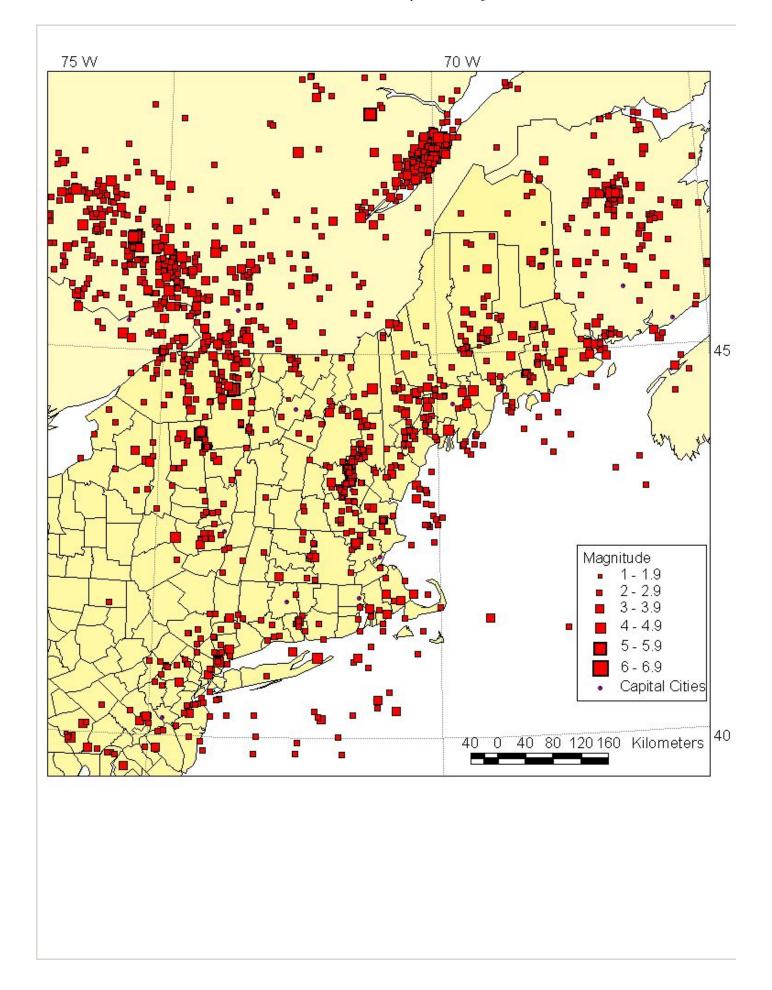


Figure 4: Seismicity for period October, 1975 - March, 2003.

Return to Table of Contents

Acknowledgments

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

References

Chaplin, M.P., Taylor, S.R., and Toksöz, M.N. (1980), A coda lengthmagnitude scale for New England, Earthquake Notes, 51, 15-22.

Ebel, J.E. (1982), M_I measurements for northeastern UnitedStates earthquakes, Bull. Seism. Soc. Am., 72, 1367-1378.

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

Return to Table of Contents

Updated: July 12, 2011

Maintained by: Weston Observatory

Accessibility | Contact | Feedback