QUARTERLY NETWORK REPORT 2006-A

on

Seismicity of Washington and Oregon

January 1 through March 31, 2006

Pacific Northwest Seismograph Network

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This report is prepared as a preliminary description of the seismic activity in Washington State and Oregon. Information contained in this report should be considered preliminary and not cited for publication without checking directly with network staff. The views and conclusions contained in this document should not be interpreted as necessarily representing the official policies, either express or implied, of the U.S. Government**.**

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INTRODUCTION

This is the first quarterly report of 2006 from the Pacific Northwest Seismograph Network (PNSN), at the University of Washington Dept. of Earth and Space Sciences, covering seismicity of Washington and western Oregon. In these reports we provide information about network operations, our educational and outreach activities, and seismicity of the region including special coverage (figures, counts, listings, etc.) of earthquake swarms, aftershock sequences, or unusual events or findings.

This report is preliminary, and subject to revision. The PNSN routinely records signals from selected stations in adjoining networks. This improves our ability to locate earthquakes at the edges of our network. However, our earthquake locations may be revised if new data become available. Findings mentioned in these quarterly reports should not be cited for publication.

Prior to 2004, each quarterly included station tables and maps. Beginning in 2004, station tables and maps appear in the quarterly report only once a year. These tables were included in Appendix 1 of the 2005C Quarterly Report. Comprehensive quarterlies have been produced by the PNSN since the beginning of 1984. Prior to that, we published quarterly reports for western Washington in 1983 and for eastern Washington from 1975 to 1983. Annual technical reports covering seismicity in Washington since 1969 are available from the U.W. Dept. of Earth and Space Sciences. The complete PNSN earthquake catalog is available on-line, both through our web-site and through the ANSS earthquake catalog.

NETWORK OPERATIONS

Lists of currently operating stations are available on-line through web page http://www.pnsn.org/OPS/stations.html. We currently receive data from 286 stations in our network area. There are 215 stations in Washington and 61 in Oregon. These stations provide short-period data from 171 stations, strong motion data from 110 stations, and broadband data from 45 stations. The PNSN also receives data from 41 stations operated by other seismic networks.

Table 1 gives approximate periods of time when individual stations were inoperable. Data for Table 1 are compiled from weekly plots of network-wide teleseismic arrivals and automated and manual digital and analog signal checks, plus records of maintenance and repair visits.

TABLE 1 - Station outages and installations

Station	Outage Dates	Comment
ACES	08/03/05-12/31/05	Bad timing
ALCT	08/16/05-End	Removed for repair
ALST	01/31/06-02/06/06	No communications
ASR	01/27/06-02/15/06	Dead
BEVT	05/20/05-End	Removed for repair
BKC	11/19/05-End	Dead
BPO	01/05/06-End	Noisy
COLT	06/23/05-End	Removed for repair
ELK	12/26/05-01/23/06	Dead
ERW	07/25/05-End	Intermittent communications
GL2	10/21/04-End	Dead
GLK	09/29/05-End	Intermittent
GTWN	06/01/05-End	No communications; telemetry being moved for bldg. renovation
GTWN	08/03/05-12/31/05	Bad timing
HDW	01/16/06-02/15/06	Dead
HOOD	01/16/06-03/06/06	No communications
JBO	10/15/04-End	Noisy
KCAM	02/17/06-03/16/06	No communications
KEEL	05/30/05-01/04/06	Dead
KEEL	01/10/06-03/23/06	Dead
KEEL	03/24/06-End	Removed for repair

TABLE 1 - Station outages and installations		
Station	**Outage Dates**	**Comment**
KFAL	06/15/05-01/10/06	Dead
KICC	03/04/05-End	Bad timing
KICC	12/14/05-End	No communications
KIMR	03/20/06-End	No communications
KMO	12/29/05-End	Dead
KNEL	01/30/06-?	No communications
KOS	11/24/05-03/13/06	Dead
LEOT	03/09/06-03/21/06	No communications
LON	01/30/06-End	Intermittent communications
LTY	09/07/05-End	Intermittent communications
MBKE	06/07/05-02/01/06	No communications
MBW	01/20/06-02/08/06	Dead
MOON	11/27/05-03/04/06	Intermittent
MRIN	10/18/05-01/04/06	Dead
MTM	12/12/05-01/06/06	Dead
NED	11/04/05-01/23/06	Dead
NIHS	03/16/06-03/28/06	No communications
OBC	10/27/05-End	Dead
OBH	01/31/02-End	Temp. removed for logging
OOW	12/15/05-03/14/06	Dead
OSD	12/15/05-03/14/06	Dead because of OOW
OSR	01/17/06-02/22/06	Dead
PCMD	01/12/06-02/02/06	Dead
PCMD	02/02/06-End	Removed for repair due to a flooded vault
PERL	10/04/05-01/04/06	Dead
RBEN	05/19/04	Removed for building renovation
RCM	12/26/05-02/23/06	Dead
RCS	12/29/05-02/22/06	Dead
RCS	02/23/06-End	Intermittent
RER	12/19/05-End	Noisy
RVW	02/01/06-03/02/06	Dead
SBES	05/18/05-End	Short period noisy
SBES	02/17/06-02/26/06	No communications
SCC	08/03/05-12/31/05	Bad timing
SEA.HH?	12/05/03-End	Disconnected for renovation
SEP	02/24/06	Replaced seismometer
SFER	09/01/04-End	Short period dead; needs removal
SLF	02/01/06-02/26/06	Dead
SOPS	08/27/02-End	K2 flash-memory problem
SOS	12/15/05-01/23/06	Dead
SP2	01/12/06-01/24/06	No communications
SSS1	03/05/05-01/27/06	One of 3 downhole 3-D sensors dead
SSS1	01/27/06	Deepest sensor abandoned in place after failed attempt to retrieve it
STD (SP)	12/15/05-01/23/06	Dead
SWID	02/04/06-02/28/06	No communications
TAKO	12/25/05-01/04/06	No communications
TKCO	01/23/06-02/02/06	Bad timing
TKCO	02/03/06-02/08/06	Removed GPS connector adapter for repair
TOLO	12/24/05-01/04/06	No communications
TOLO	02/01/06-02/22/06	Intermittent communications
TRW	01/03/06-01/26/06	Dead
TTW	12/01/05-End	Removed; strong motion sensor moved to USArray site for 2 years

TABLE 1 - Station outages and installations		
Station	**Outage Dates**	**Comment**
UWFH	05/01/05-End	Short period problems; needs removal
VCR	03/07/06-End	Noisy
VGB	09/23/04-End	Intermittent; usually very noisy
VIP	02/19/06-End	Noisy
VT2	01/04/06-End	Intermittent
VTH	02/06/06-End	Noisy
WRW	02/01/06-03/09/06	Dead
WWHS	08/03/05-12/31/05	Bad timing

Mt. St. Helens eruption, 2004-2006

The dome-building eruption of Mount St. Helens that began on September 23, 2004 continues. The procedure for selecting events at Mt. St. Helens to be located remains the same; triggering produces preliminary solutions for locatable events (which are manually processed), webicorders are reviewed to identify events to be manually retrieved from the continuous data stream, and the continuous data are fully reviewed only for one hour of every six.

- **MSH Equipment; destruction and replacement**

Station NED was replaced on January 23. That same day, station ELK was repaired which had been down since late December 2005. Data was not being received for stations SOS and STD short period during the time ELK was dead as well. Signals from YEL, SHW and temporary stations MIBL and RAFT were lost for differing periods starting in mid-to-late March due to very deep snow.

On February 24, the SEP accelerometer was replaced with an L22 three-component seismometer. This has made an improvement in the processing of earthquakes at Mount St. Helens because of a better sensor, better coupling, and higher gain.

Strong Motion & CREST Instrumentation Update

There were no new strong motion or CREST installations this quarter.

As reported in the 4th quarter of 2005, efforts have been ongoing to attempt to retrieve, repair, and/or replace the deepest borehole tri-axial accelerometer at the Seattle School District headquarters in Seattle's south-of-downtown area. This area is underlain by high liquefaction potential alluvial deposits and is of interest to geotechnical engineers. On January 26-27, 2006, a drill rig and borehole specialist were brought in to remove the unit from its borehole. Unfortunately, that attempt was not successful, and the decision was made to abandon the sensor in place. We judged that any further attempts would be a waste of money. At this time, we do not have the resources to purchase a replacement sensor, drill a new hole and install the new sensor.

ANSS Net-Ops Workshop

The ANSS sponsored a "NetOps" workshop on February 6 and 7, 2006, in Salt Lake City, Utah, for seismic-network technical staff - engineers, technicians, data analysts, computer professionals, and a few seismologists. There were 42 participants from 22 organizations in attendance. The PNSN was represented by Pat McChesney, Karl Hagel, Lynn Simmons (USGS), and Amy Wright. The workshop included a wide variety of useful presentations on network-related tools, lively discussion sessions, and a site visit to the University of Utah's network center for practical demos relating both to instrumentation and data processing/analysis. During the workshop, participants considered issues they felt should be communicated to ANSS managers. One first-order, implicit message is that greater attention to the "people" part of ANSS needs to be a fundamental part of ANSS system building.

A post-workshop summary of the Feb. 6-7 ANSS "NetOps" workshop can be found at:
http://www.ceri.memphis.edu/people/withers/NetOps/ANSSNetOpsWorkshopSummary.pdf.

Computer Hardware Update

Scossa continues to be our "master" real-time data processing computer. *Tremito* provides additional computational power for manual processing of earthquake data and acts as a fileserver for all the other networked computers in the group. We

reorganized our hardware configuration to separate data acquisition from data processing. Data acquisition is now done by four dedicated computers; *pigia* handles digitization of analog data, while *verme*, *milli*, and *verli* acquire digital data.

Use of PNSN Data through the IRIS DMC

The IRIS Data Management Center reports 1,072 requests for PNSN trace-data this quarter. More than 30,900,000 traces were requested. The number of traces requested remains at an elevated level compared to a "typical" quarter prior to the current eruption of Mount St. Helens.

PNSN PERSONNEL CHANGES

Last quarter, Dr. John Vidale accepted a position as director of the PNSN. Dr. Vidale is planning to assume those duties in September. The PNSN is currently conducting a search for a Network Manager to oversee day-to-day network operations, including field work, data-acquisition hardware and software, data analysis, and response to significant events. A qualified candidate has been identified, and negotiations were underway at the end of the quarter. Washington State is providing additional funding for network operations, and additional positions will likely be advertised in the near future. Dr. Renate Hartog has been hired part-time to work on our instrument response data base, with the objective of automating our ability to update PNSN response data at the IRIS DMC.

EARTHQUAKE DATA – 2006-A

Between January 1 and March 31, 2006, 1,098 events were digitally recorded and processed at the University of Washington. Tens of thousands of additional unlocated events occurred at Mount St. Helens associated with the dome-building eruption which began in late September 2004. Of the processed events, locations in Washington, Oregon, or southernmost British Columbia were determined for 521 of these events; 446 were classified as earthquakes and 75 as known or suspected blasts. The remaining processed events include teleseisms (125 events), regional events outside the PNSN (53), and unlocated events within the PNSN, mostly at Mt. St. Helens. Due to the extremely large number of events at Mt. St. Helens, only a representative sample seismicity was located. Other unlocated events within the PNSN normally include surficial events on Mt. St. Helens and Mt. Rainier, very small earthquakes, and blasts. Frequent mining blasts occur near Centralia, Washington and we routinely locate them.

Table 2 lists earthquakes reported to have been felt during this quarter. Events with ShakeMaps or Community Internet Intensity Maps (CIIM) are indicated. This quarter, one event generated a ShakeMap. Four events produced "CIIM" maps (**http://pasadena.wr.usgs.gov/shake/pnw/**), which convert "felt" reports sent by the general public (via Internet) into numeric intensity values. CIIM maps show the average intensity by zip code.

Table 3 is this quarter's catalog of earthquakes M 2.0 or greater, located within the network - between 42-49.5 degrees north latitude and 117-125.3 degrees west longitude.

Figure 1. Earthquakes with magnitude greater than or equal to 0.0 (M_c >=0).
Figure 2. Blasts and probable blasts (M_c >=0).
Figure 3. Earthquakes located near Mt. St. Helens (M_c >=0).
Figure 4. Earthquakes located near Mt. Rainier (M_c >=0).

TABLE 2 - Felt Earthquakes during the 1st Quarter of 2006

DATE-(UTC)-TIME	LAT(N)	LON(W)	DEP	MAG	COMMENTS	CIIM	CIIM - # of felt reports	Shake Map
yy/mm/dd hh:mm:ss	deg.	deg.	km	Ml				
06/01/12 18:15:58	46.57	124.14	36.5	2.4	49.4 km NNW of Astoria, OR	✓	40	
06/01/15 12:29:46	48.55	123.50	40.8	3.3	18.8 km NW of Victoria, BC	✓	31	✓
06/01/26 03:53:18	48.82	122.16	0.4	2.4	4.0 km E of Deming, WA	✓	42	
06/01/26 21:43:31	48.83	122.15	1.9	1.8	4.7 km ENE of Deming, WA			
06/01/26 21:54:57	48.80	122.21	19.6	1.7	2.5 km S of Deming, WA			
06/01/29 02:00:53	45.51	122.63	15.4	2.8	2.1 km SSW of Portland, OR	✓	2261	✓
06/02/03 01:47:46	47.95	122.39	33	3.3	14.9 km WSW of Everett, WA	✓	900	✓
06/02/09 19:26:26	47.47	121.80	8.4	2.9	2.6 km SW of North Bend, WA	✓	105	✓
06/02/11 11:47:56	47.47	121.79	7.6	2.9	2.8 km SSW of North Bend, WA			
06/03/04 17:38:47	44.75	123.72	43.5	3.3	29.0 km ENE of Newport, OR	✓	141	

OREGON

During the first quarter of 2006, 17 earthquakes were located in Oregon between 42.0 degrees and 45.5 degrees north latitude, and between 117 degrees and 125 degrees west longitude. A magnitude 2.8 crustal earthquake (around 15 km depth) occurred on Jan.29 (UTC) in the Portland metro area. More than 2000 Portland-area residents reported feeling the earthquake to the CIIM web site.

WESTERN WASHINGTON SEISMICITY

During the first quarter of 2006, 350 earthquakes were located between 45.5 degrees and 49.5 degrees north latitude and between 121.0 degrees and 125.3 degrees west longitude. Most western Washington seismicity this quarter was in the Mount St. Helens area, see discussion below. Six small felt earthquakes were located this quarter in western Washington. Additional earthquakes in northern Oregon and British Colombia were also felt in western Washington this quarter.

The two largest earthquakes felt in western Washington this quarter were both magnitude 3.3. The first was on January 15 (UTC), located about 19 km north-west of Victoria at a depth of about 41 km. The second, on Feb. 3 UTC, was located at 33 km depth about 14 km west-southwest of Everett. The Everett area is well populated, and about 900 felt reports were submitted to CIIM via internet. The deepest earthquakes in western Washington this quarter were at about 73 km depth, magnitudes 1.3 and 1.4, located respectively about 14 km NE of Carnation Washington on Feb. 2 (UTC), and about 10 km west-southwest of Bend, WA on Feb. 22 (UTC).

WASHINGTON CASCADE VOLCANOES

Mount St. Helens

Mount St. Helens seismicity and dome building eruption continued through this quarter. During the first quarter of 2006; seismicity increased. Event counts at HSR more than doubled compared to the 3rd quarter. However, due to the smaller magnitudes of 4th quarter events, the emergent nature of the seismic signals, and loss of a key crater station (NED), the number of located earthquakes declined over last quarter. Located events at Mount St. Helens are only a representative sample of the seismicity. Some changes in the procedure for selecting Mount St. Helens quakes to be located were also made during the 4th quarter (see this report's section on Network Operations).

Figure 3 shows located volcano-tectonic earthquakes near Mount St. Helens. Low frequency (L) and avalanche or rockfall events (S) are not shown. See the operations section for details on destruction, replacement and new instrument installation.

This quarter, 162 earthquakes were located in the area shown in Fig. 3 using conventional manual processing procedures (including 112 earthquakes between magnitude 1.0 and 2.9, and 7 slightly larger events with magnitudes between 3.0 and 3.4).

All locatable earthquakes in the 2004/2006 sequence are relatively shallow. Only a few events have been located deeper that 2 km. Seismicity this quarter continued to be located on the boundary between the old and new domes near the vent that appeared in early October, 2004.

Seth Moran of CVO has provided counts of seismic events during the current eruptive sequence. These numbers represent automated counts at HSR. Towards the middle of March the earthquakes decreased in magnitude, and their amplitudes at HSR became small enough to be missed by the picker, so additional very small earthquakes may not be included in the count.

Mount St. Helens 2004-2006
Quarterly earthquake counts at HSR; provided by CVO.

Year	Quarter	HSR event count
2004	4th	292,352
2005	1st	123,502
	2nd	49,811
	3rd	12,085
	4th	30,315
2006	1st	30,617

Mount Rainier

The number of events in close proximity to the cone of Mt. Rainier varies over the course of the year, since the source of much of the shallow activity is presumably ice movement or avalanching at the surface, which is seasonal in nature. Events with very low frequency signals (1-3 Hz) believed to be icequakes are assigned type "L" in the catalog. Emergent, very long duration signals, probably due to rockfalls or avalanches, are assigned type "S" (see Key to Earthquake Catalog). One event flagged "L" or "S" was located at Mount Rainier this quarter and 23 "L" or "S" events were recorded, but were too small or too emergent to locate reliably. Type L and S events are not shown in Fig. 4.

A total of 25 tectonic events (14 of these were smaller than magnitude 0.0, and thus are not shown in Fig. 4) were located within the region shown in Fig. 4. The largest tectonic earthquake located near Mt. Rainier this quarter was a magnitude 2.0 event on January 15 (UTC), located about 12 km west of the summit of Mt. Rainier at about 8 km depth. This quarter, 16 tectonic earthquakes (9 of them smaller than magnitude 0.0 and thus not shown in Fig. 4) were located in the "Western Rainier Seismic Zone" (WRSZ), a north-south trending lineation of seismicity approximately 15 km west of the summit of Mt. Rainier (for counting purposes, the western zone is defined as 46.6-47.0 degrees north latitude and 121.83-122 west longitude). Within 5 km of the summit, there were 6 (4 of them smaller than magnitude 0.0 and thus not shown in Fig. 4) higher-frequency tectonic-style earthquakes, and the remaining events were scattered around the cone of Rainier as shown in Fig. 4.

EASTERN WASHINGTON SEISMICITY

During the first quarter of 2006, 79 earthquakes were located in eastern Washington in the area between 45.5 - 49.5 degrees north latitude and 117 - 121 degrees west longitude. The largest earthquake recorded in eastern Washington this quarter was a magnitude 2.7 event on January 19 (UTC), located about 24 km west-northwest of Yakima at about 8 km depth.

OTHER SOURCES OF EARTHQUAKE INFORMATION

We provide automatic computer-generated alert messages about significant Washington and Oregon earthquakes by e-mail, FAX or via the pager-based RACE system to institutions needing such information, and we regularly exchange phase data via e-mail with other regional seismograph network operators.

Other regional agencies provide earthquake information. These include the Geological Survey of Canada (Pacific Geoscience Centre), Sidney, B.C. **http://www.pgc.nrcan.gc.ca/seismo/table.htm** and other regional networks in the United States **http://earthquake.usgs.gov/regional/** The US Geological Survey coordinates earthquake information nationally; **http://earthquake.usgs.gov**.

Complete catalog listings are available on-line through **http://www.pnsn.org/CATDAT/catalog.html** Key to earthquake catalog can be found in the last quarterly report of each year, or at:
http://www.pnsn.org/INFO_GENERAL/PNSN_QUARTERLY_EQ_CATALOG_KEY.htm

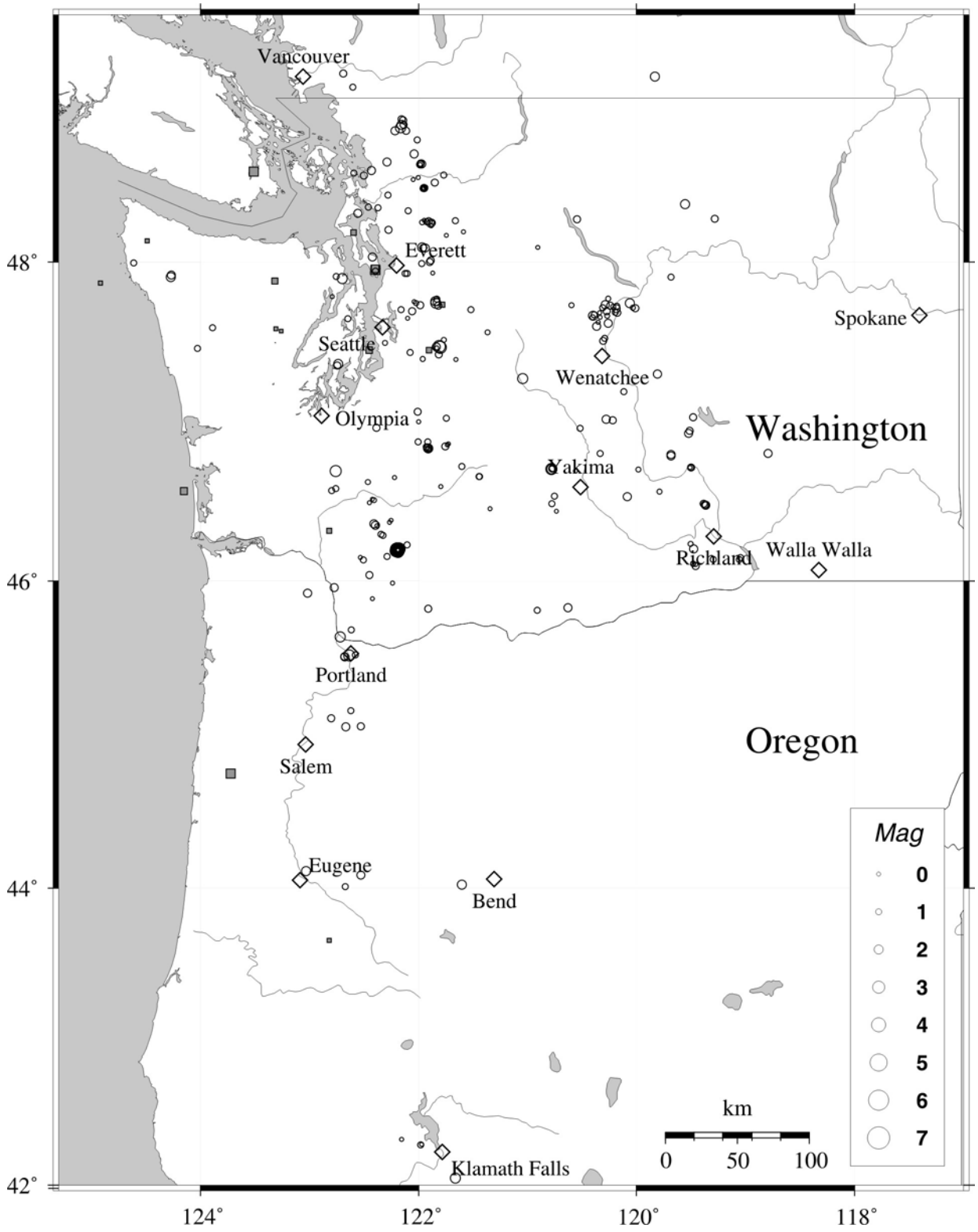

Figure 1 Earthquakes with magnitude greater than or equal to 0.0 (Mc>=0.0).

Unfilled diamonds represent cities. Quakes shallower than 30 km are indicated by circles, and deeper quakes by filled squares.

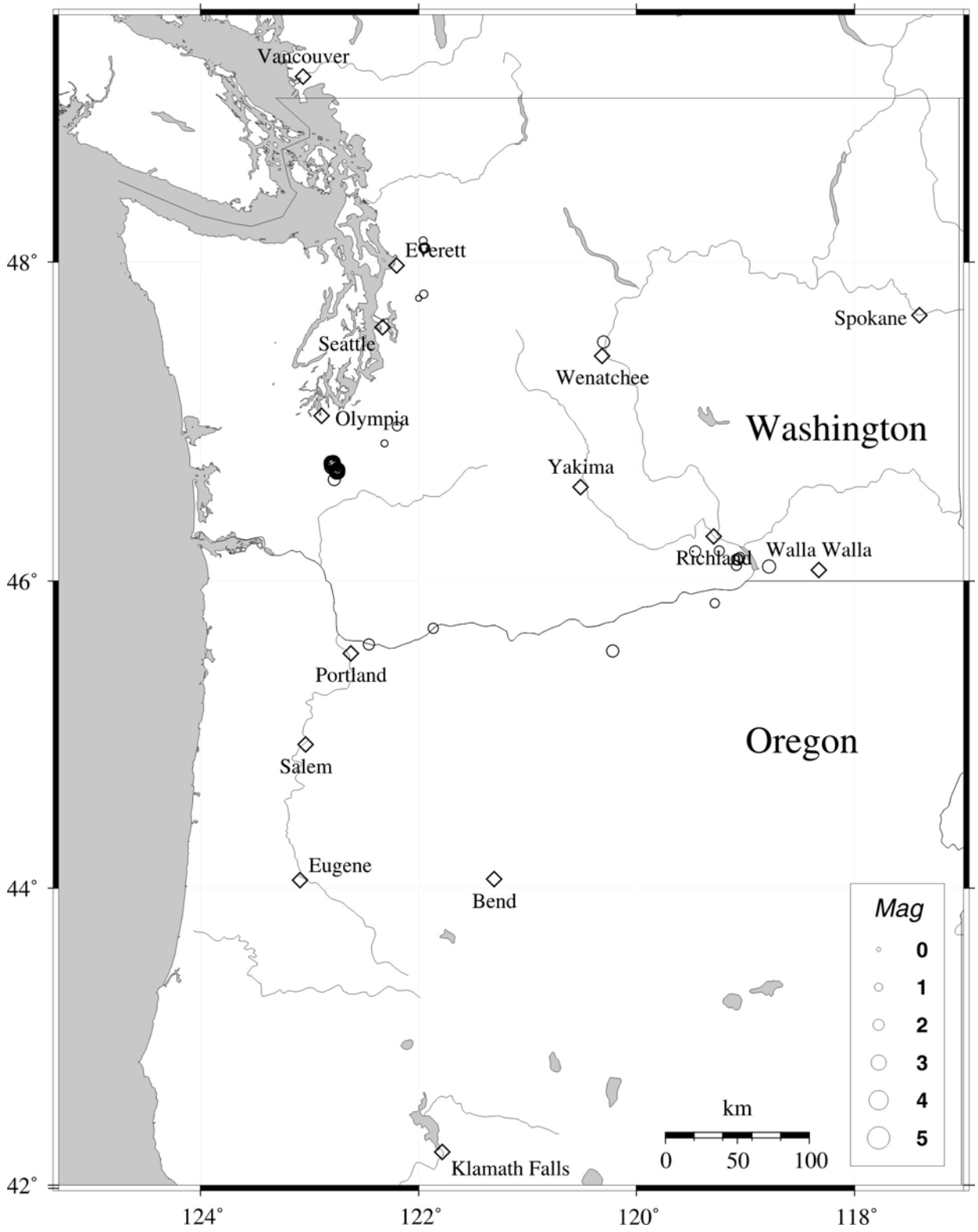

Figure 2. Blasts and probable blasts. Unfilled diamonds represent cities.

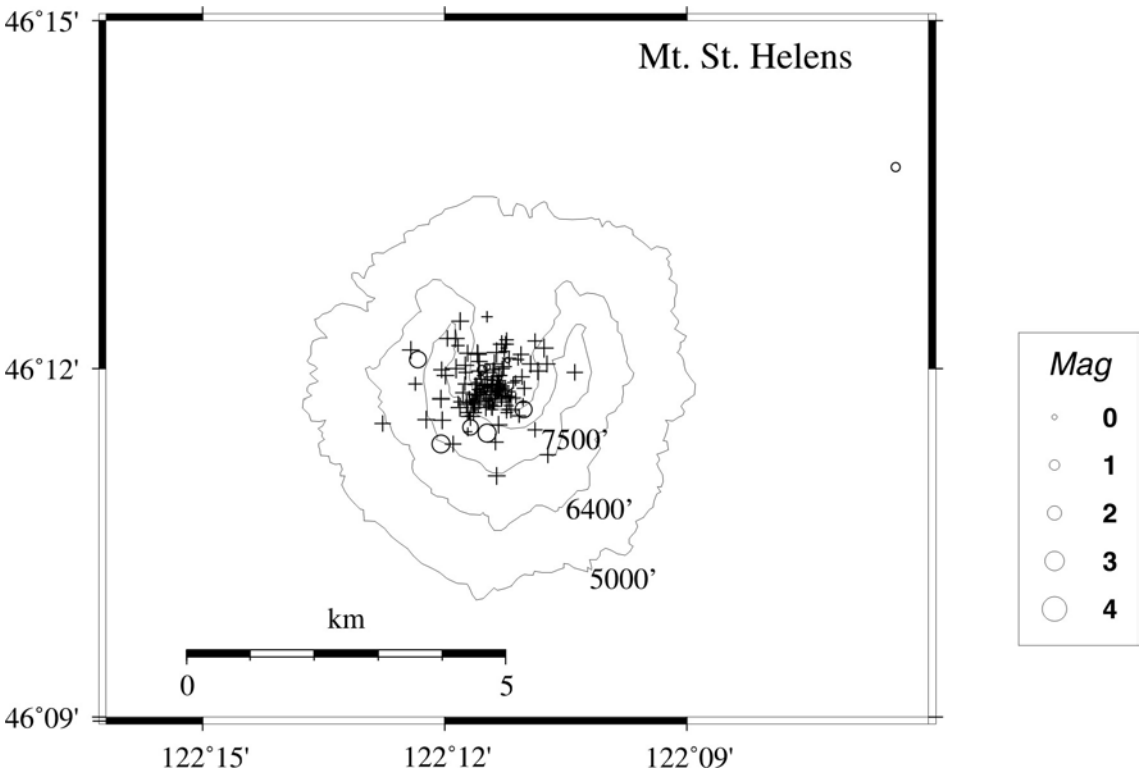

Figure 3. Selected Earthquake at Mt. St. Helens; (Mc>=0.0)
Events elected by the analyst for location are small fraction of the number of events recorded during the quarter.
Plus symbols indicate depth less than 1 km. Circles indicate depth greater than 1 km. Elevation contours shown in feet.

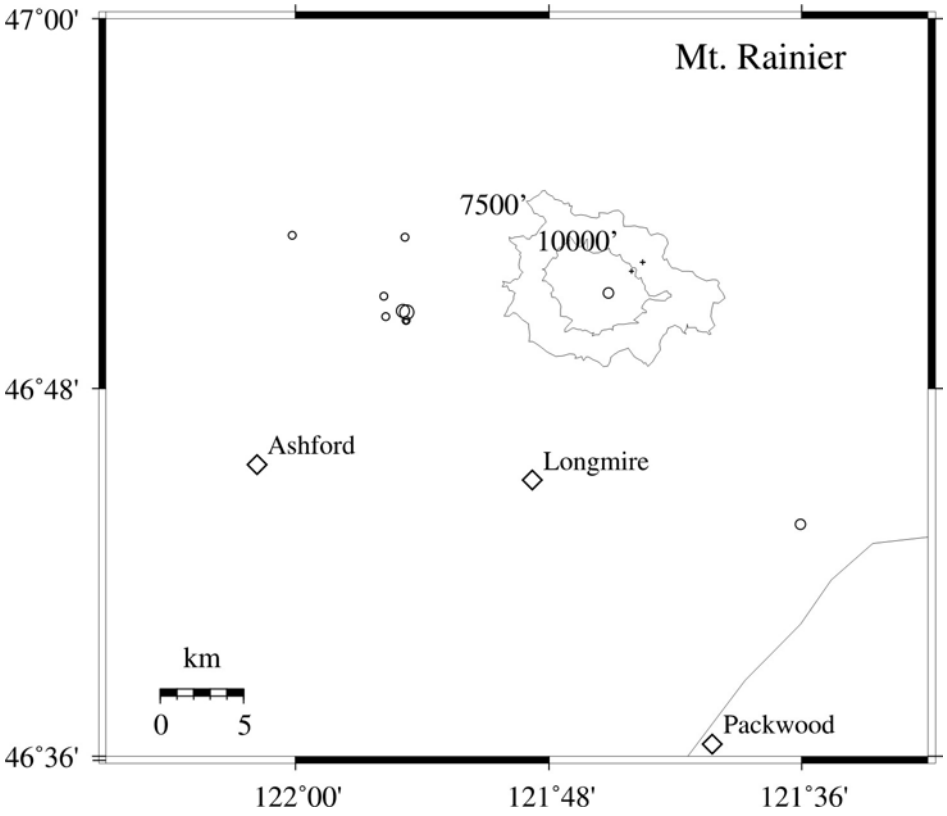

Figure 4. Earthquakes at Mt. Rainier; (Mc>=0.0)

EARTHQUAKE CATALOG, 2006-A

This quarter's catalog lists earthquakes of magnitude 2.0 or larger, except at Mt. St. Helens, where only events of magnitude 3.0 or larger are shown. Complete catalog listings are available on-line through **http://www.pnsn.org/CATDAT/catalog.html**
Key to earthquake catalog can be found in the last quarterly report of each year, or at:
http://www.pnsn.org/INFO_GENERAL/PNSN_QUARTERLY_EQ_CATALOG_KEY.htm

TABLE 3 - EARTHQUAKE CATALOG, 2006-A

Jan-06

DAY	TIME	LAT	LON	DEPTH	M	NS/NP	GAP	RMS	Q	MOD	TYP
1	18:33	46 12.11	122 11.59	0.02*	2.9	8/008	114	0.06	AB	S4	
2	15:19	46 11.85	122 11.41	0.04#	2.2	8/008	98	0.18	BB	S4	
3	9:38	46 11.82	122 11.54	0.04*	2.3	10/010	102	0.32	CB	S4	
4	17:12	46 12.40	122 11.80	0.03*	2.7	11/012	90	0.43	CA	S4	
6	1:06	46 12.11	122 11.06	0.02#	2.4	10/010	140	0.31	CC	S4	
7	2:14	46 11.72	122 11.55	0.05*	2.7	9/009	83	0.11	AA	S4	
8	5:49	46 11.87	122 12.36	0.9	2.0	8/008	114	0.13	AB	S4	
9	0:07	46 12.09	122 11.20	0.03*	2.1	6/006	111	0.08	AC	S4	
9	1:23	46 11.56	122 12.23	0.02*	2.7	11/011	89	0.30	CA	S4	
10	18:16	46 11.45	122 11.47	1.41	2.7	11/011	87	0.27	BA	S4	
11	18:03	46 11.80	122 11.52	0.03*	2.4	9/009	109	0.33	CB	S4	
12	10:56	46 11.94	122 11.99	0.04*	2.8	14/014	74	0.28	BA	S4	
12	18:15	46 34.35	124 08.94	36.46	2.4	22/023	190	0.18	BD	P3	F
13	10:35	46 11.81	122 11.28	0.02*	2.6	12/013	96	0.33	CB	S4	
14	2:01	46 11.65	122 11.02	1.10*	2.4	11/011	81	0.38	CA	S4	
14	15:22	45 38.36	122 43.13	14.17	2.2	33/036	93	0.18	BB	C3	
15	2:10	46 50.47	121 54.72	8.52	2.0	22/022	56	0.09	AB	C3	
15	12:24	46 12.16	122 12.42	0.04*	2.8	14/014	91	0.23	BB	S4	
15	12:29	48 33.31	123 30.56	40.78	3.3	44/046	134	0.33	CB	P3	F
17	1:23	46 11.36	122 12.05	1.35	2.6	13/013	90	0.35	CA	S4	
18	5:29	46 11.84	122 11.30	0.05#	2.7	10/010	96	0.45	CB	S4	
19	4:54	46 42.53	120 46.90	8.2	2.7	36/036	57	0.26	BA	C3	
19	5:43	46 42.68	120 46.45	7.68*	2.4	16/016	130	0.25	BB	C3	
19	15:10	46 12.00	122 11.86	0.02*	3.1	14/014	86	0.42	CA	S4	
21	9:59	46 12.03	122 11.73	0.03*	2.7	11/011	97	0.25	BB	S4	
22	18:43	46 12.13	122 11.35	0.03*	3.2	9/009	98	0.16	BB	S4	
24	0:07	46 11.98	122 12.04	0.80*	2.4	8/008	132	0.28	BB	S4	
25	0:42	46 11.07	122 11.34	0.05*	2.7	18/019	59	0.63	DA	S4	
25	3:21	47 44.91	120 03.58	4.54	2.0	17/019	84	0.25	BB	N3	
25	23:17	42 02.88	121 39.83	6.71$	2.4	7/007	127	0.33	CC	K3	
26	3:53	48 49.28	122 09.74	0.43	2.4	22/023	104	0.49	CC	P3	F
26	5:59	46 11.84	122 11.51	0.05*	2.8	16/016	77	0.14	AA	S4	
27	20:10	46 11.68	122 11.41	0.03*	3.0	11/011	82	0.25	BA	S4	
29	2:00	45 31.15	122 38.04	15.36	2.8	38/038	58	0.20	BA	C3	F
29	4:34	47 45.63	121 50.69	4.71	2.0	29/030	48	0.36	CB	P3	
29	13:28	46 11.52	122 11.33	0.02#	2.7	17/018	48	0.50	CA	S4	
31	10:17	46 12.04	122 11.38	0.02*	3.1	12/013	94	0.27	BB	S4	

Feb-06											
DAY	**TIME**	**LAT**	**LON**	**DEPTH**	**M**	**NS/NP**	**GAP**	**RMS**	**Q**	**MOD**	**TYP**
1	23:54	46 11.85	122 11.47	0.04#	2.7	11/011	99	0.27	BB	S4	
3	0:35	46 11.82	122 11.01	0.02*	2.2	8/008	107	0.33	CB	S4	
3	1:47	47 57.04	122 23.69	33.04	3.3	63/063	52	0.22	BA	P3	F
3	19:19	46 11.81	122 11.29	0.03#	2.8	18/019	52	0.62	DA	S4	
5	15:25	47 57.51	122 23.78	32.76	2.5	44/044	64	0.31	CA	P3	
5	16:14	46 11.55	122 12.03	0.04*	2.7	8/008	146	0.38	CC	S4	
8	8:43	46 12.26	122 11.86	0.02*	2.9	13/013	82	0.33	CA	S4	
9	19:26	47 28.78	121 48.51	8.37	2.9	40/041	57	0.20	BA	P3	F
10	13:58	46 12.20	122 11.28	0.03#	2.7	11/011	108	0.71	DB	S4	
11	11:47	47 28.40	121 47.98	7.61	2.9	57/057	28	0.32	CA	P3	F
12	19:30	46 11.65	122 11.17	0.03#	2.6	10/010	99	0.36	CB	S4	
13	23:05	46 12.04	122 10.93	0.02#	2.8	10/010	108	0.35	CB	S4	
15	4:21	46 11.62	122 11.72	0.04*	2.3	10/010	87	0.19	BA	S4	
16	13:21	46 11.80	122 11.36	0.02*	2.5	12/012	111	0.37	CB	S4	
17	23:47	46 11.97	122 10.38	0.02#	2.4	9/009	110	0.81	DB	S4	
18	10:56	47 16.75	121 02.68	10.76$	2.2	21/021	74	0.48	CB	C3	
19	15:23	46 11.58	122 11.67	0.02*	3.0	14/014	86	0.14	AA	S4	
20	18:08	46 11.71	122 11.43	0.02#	2.5	10/010	104	0.13	AB	S4	
20	20:34	44 06.79	123 01.83	0.05*	2.1	5/005	125	0.10	AD	O0	
21	16:14	46 11.84	122 11.35	0.02*	2.3	9/009	97	0.07	AB	S4	
21	18:52	46 11.91	122 11.54	0.04*	2.1	9/009	99	0.22	BB	S4	
21	19:34	46 11.94	122 11.33	0.03*	2.4	11/011	93	0.20	BB	S4	
22	15:02	46 11.82	122 11.33	0.04*	2.2	7/007	110	0.13	AB	S4	
24	22:27	46 11.97	122 11.47	0.03*	2.9	12/012	74	0.23	BA	S4	
25	3:17	46 12.17	122 10.76	0.03#	3.0	17/017	71	0.53	DA	S4	
25	21:52	46 12.00	122 11.28	0.02*	2.3	9/009	90	0.16	BA	S4	
26	18:43	46 11.97	122 10.83	0.03#	2.9	10/010	127	0.36	CB	S4	
27	8:07	46 12.01	122 11.27	0.02#	2.4	9/009	98	0.16	BB	S4	
27	13:05	46 11.97	122 11.73	0.03#	2.1	9/009	127	0.24	BB	S4	
27	22:32	46 11.36	122 11.36	0.03#	2.4	12/012	115	0.82	DB	S4	
28	3:29	46 12.06	122 11.56	0.05*	2.4	11/011	79	0.08	AA	S4	
28	7:15	46 12.23	122 10.88	0.03*	2.2	7/007	152	0.08	AC	S4	
28	14:12	46 12.20	122 11.25	0.03*	2.4	8/008	113	0.32	CB	S4	
28	22:49	46 11.62	122 11.64	0.02#	2.4	10/010	114	0.47	CB	S4	

Mar-06											
DAY	**TIME**	**LAT**	**LON**	**DEPTH**	**M**	**NS/NP**	**GAP**	**RMS**	**Q**	**MOD**	**TYP**
1	9:29	46 12.04	122 10.72	0.04*	2.6	9/009	142	0.17	BC	S4	
1	21:04	46 12.26	122 11.97	0.04*	2.4	10/010	149	0.51	DC	S4	
2	12:45	46 12.24	122 11.22	0.03#	2.1	9/009	119	0.53	DB	S4	
2	23:47	46 12.07	122 12.32	1.11	2.4	7/007	165	0.25	BC	S4	
3	2:27	46 11.81	122 11.34	0.02*	2.8	13/013	78	0.12	AA	S4	
4	5:25	46 11.69	122 11.58	0.12	2.8	20/021	62	0.12	AA	S4	
4	17:38	44 45.24	123 43.52	43.47	3.3	25/025	130	0.28	BB	O0	F
5	7:29	46 11.91	122 11.47	0.10*	2.4	10/010	99	0.12	AB	S4	
6	7:18	46 11.69	122 11.73	0.29	2.5	12/012	113	0.06	AB	S4	
6	11:25	46 11.93	122 11.03	0.04#	2.3	9/009	148	0.33	CC	S4	
7	5:45	46 11.87	122 11.74	0.03#	2.1	10/010	105	0.29	BB	S4	
7	15:41	46 12.13	122 11.72	0.05#	2.6	12/012	124	0.40	CB	S4	
8	3:12	46 11.93	122 11.40	0.02*	3.1	11/011	78	0.35	CA	S4	
9	11:07	46 11.85	122 11.61	0.43	2.1	12/012	84	0.10	AA	S4	
10	7:25	46 11.36	122 11.90	0.02#	2.5	7/007	202	0.79	DD	S4	
10	22:38	46 11.90	122 11.34	0.05*	2.9	9/009	167	0.36	CC	S4	
11	22:15	46 11.87	122 11.41	0.02*	2.4	11/011	83	0.34	CA	S4	
13	11:28	46 12.13	122 11.59	0.02*	2.7	9/009	82	0.16	BA	S4	
13	12:12	46 11.67	122 11.48	0.10*	2.8	15/016	85	0.13	AA	S4	
14	10:44	47 40.17	120 23.90	0.52	2.1	17/019	93	0.24	BB	N3	
14	12:08	46 11.98	122 11.40	0.02*	2.1	6/007	199	0.34	CD	S4	
15	6:23	46 11.74	122 12.05	0.02#	2.7	14/014	135	0.46	CB	S4	
17	4:51	46 11.48	122 10.88	0.02#	2.2	8/008	103	0.70	DB	S4	
17	15:12	46 11.80	122 11.41	0.02*	2.9	9/009	90	0.10	AA	S4	
19	7:21	46 11.71	122 11.65	0.14	2.8	13/013	78	0.17	BA	S4	
20	5:22	47 44.91	121 50.59	2.39	2.3	26/026	60	0.19	BB	P3	
20	14:54	46 11.26	122 10.71	0.03#	2.4	7/007	118	0.35	CB	S4	
20	22:23	46 11.78	122 11.77	0.49	2.3	16/017	133	0.12	AB	S4	
21	6:47	46 11.87	122 11.34	0.03*	2.7	13/014	143	0.20	BC	S4	
22	22:27	47 53.97	122 41.96	24.88	2.2	38/042	61	0.21	BA	P3	
23	13:38	46 11.52	122 12.76	0.03*	2.5	8/008	170	0.10	AC	S4	
25	15:42	46 11.84	122 11.41	0.21	2.7	11/011	84	0.20	BA	S4	
29	22:32	46 41.80	122 45.42	0.02*	2.6	10/010	83	0.18	BB	P3	
30	7:29	46 11.49	122 11.67	1.08	2.3	13/013	88	0.17	BA	S4	

OUTREACH ACTIVITIES

PNSN staff and faculty participate in an educational outreach program designed to better inform the public, educators, businesses, policy makers, government agencies, engineers, and the emergency management community about earthquake, volcano and related hazards. Our program offers lectures, classes, lab tours, workshops, consultations, and electronic and printed information products. Special attention is paid to the information needs of the media. We provide information directly to the public through information sheets, an audio library, email, and via the Internet at **http://www.pnsn.org**. The following is a partial list of activities this quarter.

Audio Library, Phone

The Seismology Lab responded to ~100 calls from the general public, Emergency Managers and government agencies, and another 25 calls from the media. In addition, the PNSN audio library system received 240 calls this quarter. The audio library offers recordings describing seismic hazards in Washington and Oregon and earthquake prediction. Callers to the audio library have the option of being transferred to the Seismology Lab for additional information.

Internet outreach

PNSN staff replied to ~130 e-mail messages from the public seeking information on a variety of topics via the ***seis_info@ess.washington.edu*** email address. Ruth Ludwin managed this service this quarter, typically responding to routine questions within a day. Complex or sensitive questions are routed to the appropriate staff person for a more in-depth response. Requests may include complex scientific inquiries, assistance with hazard assessments and legal issues, consultations with government agencies, and support for engineering issues related to strong motion data. Bill Steele and other staff members also respond to numerous requests for information via their own email accounts.

Washington State Support Obtained

The University of Washington Board of Regents submitted a supplemental budget request for ~$400,000 for support of information product development and infrastructure hardening of the PNSN. Governor Christine Gregoire included this request in her budget submission to the Legislature. The Senate Ways and Means Committee budget was the first passed this session, and it contained $180,000 for PNSN support. The House Appropriations Committee, chaired by Helen Sommers, then passed their budget containing the full 400K requested by the Governor. In conference committee the 400k prevailed in large part due to the efforts of many organizations including emergency management, engineering, and businesses that use PNSN information. Many letters were written, and a number of supporters visited with legislators and urged their support. The funds (primarily dedicated to PNSN staff additions) will become available July 1, 2006. Bill Steele also testified before the House Natural Resources Committee and the House Appropriations Committee on a bill to modernize the mandate for the Division of Geology and Earth Resources to include identification and mapping of geologic hazards in its mission.

Information Products

CISN display servers are receiving and displaying PNSN recent earthquake data and now provide links to the PNSN ShakeMaps, which are automatically generated following significant earthquakes. The CISN display version 1 was released in December 2004 and distributed to 25 select users including lifeline operators, emergency managers, and large businesses. This product has replaced the CUBE based RACE (Rapid Alert for Cascadia Earthquakes) systems which have largely been removed. After initial registration and configuration, the administrative duties for maintaining these accounts have been light.

Seven CIIM maps were generated for felt events this quarter. The most widely felt events were a mid-crustal magnitude 3.1 earthquake on 01/28/06 located under Portland Oregon (2261 reports) and a 3.6 event on 02/02/06 that generated 866 felt reports. The PNSN generated 4 ShakeMaps this quarter.

Emergency Management

Bill Steele assisted in the development of the third "Blue Cascades" exercise, which was held in March, 2006. The Blue Cascades exercises are infrastructure-interdependencies tabletop exercises to prepare emergency managers for the impacts of a Cascadia megathrust earthquake. Each year has focused on a distinct aspect, and this year's theme was economic impacts to the urban corridor. Bill opened the two-day exercise with an overview of effects expected from a M 9 Cascadia event and served as a science advisor for the duration of the conference. The Blue Cascades exercises have been developed and conducted by regional public and private sector organizations, and over 350 managers participated this year.

K-20 Education Outreach

- PNSN and USGS staff gave 20 Seismology Lab tours and presentations for K-12 students and teachers, serving about 350 students this quarter.
- Bill Steele spoke on urban earthquake hazards and recovery to an international group of students in Urban Planning soon departing for three weeks in Kobe Japan.
- Ruth Ludwin gave talks on NW Native Stories at the Arizona State University Geosciences Colloquium and to a UW Urban Planning class. She also went on a field trip with another Urban Planning class to the area where the Seattle Fault crosses the Duwamish waterway.

Science Meetings

- Steve Malone attended a "Cities on Volcanoes" conference in Quito, Ecuador and presented a paper on Mount St Helens earthquakes.
- Steve Malone and Bill Steele attended an NVEWS (National Volcano Early Warning System) planning meeting in Portland. Steve presented an introductory talk on the needs to be ready before a crisis starts.
- Ruth Ludwin attended the UNAVCO Science Workshop in Denver Colorado to explore EarthScope E&O funding opportunities.

Media Relations

The PNSN staff frequently provide interviews, research support, and referrals to radio, television, film, and print media. The PNSN organizes press conferences, contributes to TV and radio news programs and talk shows, and provides field opportunities linking reporters with working scientists. Staff members also assist news organizations, authors, television producers, and independent documentary makers to design accurate and informative stories and programs related to earthquake and volcano hazards. PNSN staff work to link reporters and producers developing stories with the appropriate research institutions, agencies, and scientists working in the areas to be covered by the piece. The PNSN coordinates the release of information and media relations with the USGS Western Region, the Cascades Volcano Observatory, and the Oregon Department of Geology and Mineral Industries (DOGAMI)

The ongoing eruption of Mount St. Helens (MSH) continued to stimulate occasional media inquiries. Throughout the quarter, PNSN scientists participated in morning science conferences with CVO once a week to share data and interpretations, plan field activities and develop "talking points" for use in interviews when needed. This quarter the 5th anniversary of the Nisqually Earthquake attracted some media attention.

Other Meetings, Presentations and Visitors

- ESS Chair Robert Winglee and Bill Steele hosted the Washington State Seismic Safety Committee at the newly reopened Johnson Hall.
- Bill Steele provided talks on earthquake hazards at: St Andrews Church in Seattle; to the Building Owners and Managers Association (BOMA), and to the Seattle Chapter of the Society of Professional Engineers. Bill also provided a talk to a very large audience at the Magnolia (a landslide-prone Seattle neighborhood) Disaster Fair. Bill's talk on Seattle Earthquake Hazards, followed ESS Prof. Derek Booth's talk on Geology and Landslide Hazards of Seattle.
- Peter Frenzen of the National Forest Service met with Steve Malone and Bill Steele to discuss plans for Mt. St. Helens Visitors Center Remodel.
- Steve Malone participated in a hearing and a number of briefings in Washington DC on NVEWS and the ANSS.