QUARTERLY NETWORK REPORT 85-A
on
Seismicity of Washington and Northern Oregon

January 1 through March 31, 1985

Geophysics Program
University of Washington
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INTRODUCTION

This is the first quarterly report of 1985 from the University of Washington Geophysics Program covering seismicity of all of Washington and northern Oregon. These comprehensive quarterlies have been produced since the beginning of 1984. Prior to that we published quarterlies for western Washington in 1983 and for eastern Washington from 1975 to 1983. We have produced annual reports covering seismicity in western Washington since 1969 and in eastern Washington since 1975. In collaboration with the University of Washington the State Department of Natural Resources has published catalogs of earthquake activity in western Washington for the period 1970-1979. We will soon continue this series with annual catalogs for the whole state beginning with the year 1980.

This quarterly report discusses network operations, seismicity of the region, and unusual events or findings. This report is preliminary, and not a substitute for detailed technical reports, an annual catalog, or technical papers. In particular, event magnitudes are preliminary, and subject to revision. Some earthquake locations may be revised if new data become available, such as P and S readings from Canadian seismic stations. Findings mentioned in these quarterly reports should not be cited for publication. Figure 1 shows the major geographical features in the state of Washington and northern Oregon and the seismograph stations currently in operation.

NETWORK OPERATIONS

Western Washington and Northern Oregon

We began recording from several new seismographs during the quarter (see Table 2). BLS in northwest Washington and MEW in the southern Puget sound began operating in March (PGW installed in April is also shown northwest of Seattle on Figure 1). Station STW, accidently destroyed last summer, was operating again in late March. HDW, NLO, and APW ceased operation during the quarter and GSM operated intermittently. We are presently searching for a new site in the Skagit valley to replace LYW which was lost in 1982.

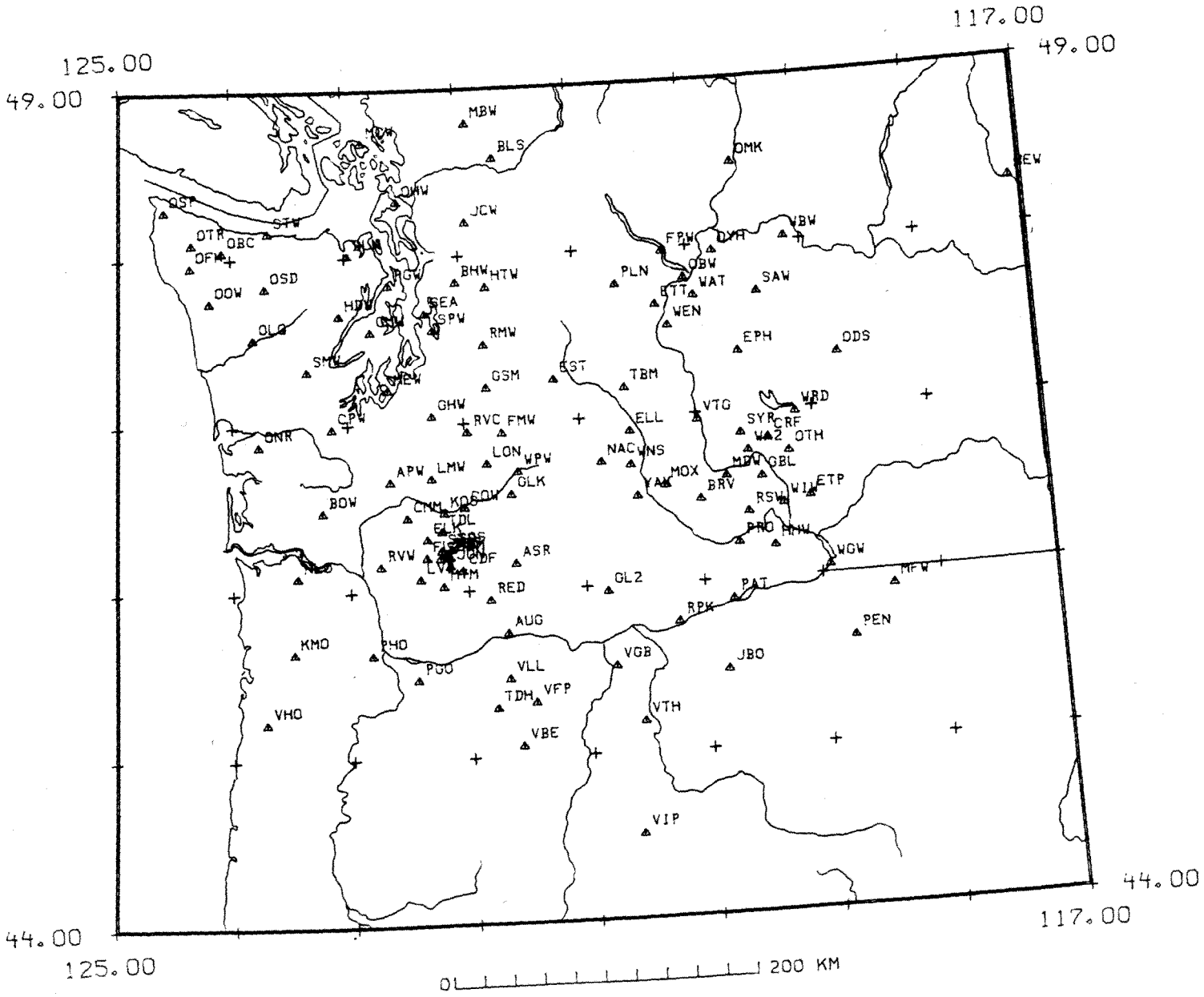

Figure 1 Seismograph stations operating during the first quarter 1985. Station PGW which became operational in April 1985 is also shown.

A number of stations around Mount St. Helens were dead or operated sporadically during the period. These include AUG, MTM, LVP, SUG, ELK, and KOS. Many of these stations are difficult to reach until the snow melts.

Eastern Washington

A new technician Jack Libby was hired to assist Jim Ramey. Jack replaced Jim Hudspeth who is now in charge of maintaining seismic stations in eastern Washington. The maintenance of these stations was formerly done by the Stanwick corporation whose contract expired in December.

Several stations in eastern Washington need repair. Signal quality at VTG fluctuated and MDW apparently has a bad seismometer. Stations FPW, GBW, and SAW showed sporadic signal quality due to a problem in a common telemetry link.

EARTHQUAKE DATA

There were 418 events processed by the University of Washington digitally recording seismic network between January 1 and March 31, 1985. We determined locations for 292 of these in Washington and Northern Oregon; 224 were classified as earthquakes and 68 as known or suspected blasts. The remaining unlocatable events were regional events outside the U. W. network, or teleseisms. Continuous recording by Develocorder was discontinued last quarter. Helicorder records are scanned daily to ensure that significant events are not missed by the on-line digital system. Table 1 is the event catalog for this quarter. Figure 2 shows all earthquakes greater than magnitude 1.0. Figure 3 shows blasts and probable blasts. Figure 4 shows all earthquakes located in western Washington. Figure 5 shows all earthquakes located in eastern Washington. Figure 6 shows earthquakes located at Mount St. Helens.

Western Washington and Oregon

During the first quarter of 1985 169 events were located between 44° and 49° latitude and between 121° and 125° longitude. Seven earthquakes had magnitudes between 3.0 and 3.7 and five of these were reported felt. Several earthquakes occurred below Mercer island near Seattle and one

of these was felt on March 21 (M_c = 3.0). Two events exceeding magnitude 3 occurred near Mount Vernon on March 5 (M_c = 3.1) and March 30 (M_c = 3.3). On January 11 a magnitude 3.3 earthquake was widely felt on the northeast Olympic peninsula. Two moderately deep earthquakes were felt between Seattle and Tacoma on February 28 (M_c = 3.7, depth = 46 km) and March 18 (M_c = 3.5, depth = 52 km). Earthquakes continued to cluster near Morton (east of Chehalis) at depths of 15 to 20 km and near the northwest corner of Mount Rainier National Park at depths of 8 to 12 km. The northwest trend of earthquakes near Mount St. Helens continued to be active with local clusters of events on the mountain (see section about Mount St. Helens below) and at Elk lake.

Eastern Washington and Oregon

Five earthquakes exceeding magnitude 3 occurred during the quarter including a M_c 3.9 event on February 10 that was reported felt near Umatilla on the Oregon-Washington border. Epicenters in eastern Washington were generally scattered except for two tight groups of earthquakes near Entiat (south of lake Chelan) and Vantage (intersection of interstate highway 90 and the Columbia river). The Entiat earthquakes continue a pattern of activity which has been consistent for many years. The Vantage earthquakes began in October, 1984 with eight events with magnitudes between 1.7 and 2.6 by the end of the year. Fourteen more earthquakes occurred near Vantage this quarter and in January two of these had a magnitude of 3.3 .

Mount St. Helens Area

Mount St. Helens was seismically quiet during the first quarter of 1985. We list 23 locatable earthquakes under the mountain in Table 1. See also Figure 6. We detected a number of other seismic events from the summit many of which appear to be rockfall from the dome within the crater. From January 29 to February 7 we recorded several announced blasts from the Army Corps of Engineers tunnel project at Spirit lake.

Catalog

Table 1 is a catalog of located events between January 1, 1985 and March 31, 1985 in the state

STATIONS USED FOR LOCATION OF WESTERN WASHINGTON EVENTS

Table 2 lists stations used in locating seismic events in Washington and Oregon. Stations marked by an asterisk (*) were supported by USGS contract 14-08-0001-21861. Stations marked by ($) were supported by USGS contract 14-08-0001-21978. (+) indicates support under US Dept. of Energy contract DE-AM06-76RL02225. All other stations were supported from other sources.

The first column in the table gives the 3-letter station designator. Station north latitude and west longitude are given in the second and third columns in degrees, minutes and seconds. The fourth column gives station elevation in km, and the fifth indicates landmarks for which stations were named.

TABLE 2

Stations used to locate events

	LAT	LONG	EL	NAME
APW*	46 39 06.0	122 38 51.0	0.457	Alpha Peak
ASR$	46 09 02.4	121 35 33.6	-	Mt. Adams - Stagman Ridge
AUG$	45 44 10.0	121 40 50.0	0.865	Augspurger Mountain
BHW*	47 50 12.6	122 01 55.8	0.198	Bald Hill
BLN*	48 00 26.5	122 58 18.6	0.585	Blyn Mountain
BLS*	48 34 21.0	121 40 00.0	1.341	Baker Lake Shannon
BOW*	46 28 30.0	123 13 41.0	0.870	Boistfort Mountain
BRV+	46 29 07.2	119 59 29.4	0.200	Black Rock Valley
CBW+	47 48 25.5	120 01 57.6	1.160	Chelan Butte
CDF$	46 06 58.2	122 02 51.0	0.780	Cedar Flat
CMM$	46 26 07.0	122 30 21.0	0.620	Crazy Man Mountain
COW$	46 29 27.6	122 00 43.6	0.305	Cowlitz River
CPW*	46 58 25.8	123 08 10.8	0.792	Capitol Peak
CRF+	46 49 30.6	119 23 18.0	0.260	Corfu
DYH+	47 57 37.8	119 46 09.6	-	Dyer Hill
EDM	46 11 50.4	122 09 00.0	1.609	East Dome, Mt. St. Helens
ELK$	46 18 20.0	122 20 27.0	1.270	Elk Rock
ELL+	46 54 35.0	120 34 06.0	0.805	Ellensburg
EPH+	47 21 07.8	119 35 46.2	0.628	Ephrata
EST+	47 14 16.8	121 12 21.8	0.756	Easton
ETP+	46 27 53.4	119 03 32.4	0.250	Eltopia

continued

	LAT	LONG	EL	NAME
ETT+	47 39 18.0	120 17 36.0	0.439	Entiat
FL2$	46 11 47.0	122 21 01.0	1.378	Flat Top 2
FMW*	46 55 54.0	121 40 19.2	1.890	Mt. Fremont
FPW+	47 58 09.0	120 12 46.5	0.352	Fields Point
GBL+	46 35 51.6	119 27 35.4	0.330	Gable Mountain
GHW*	47 02 30.0	122 16 21.0	0.268	Garrison Hill
GL2+	45 57 50.0	120 49 15.0	1.000	New Goldendale
GLK$	46 33 50.2	121 36 30.7	1.320	Glacier Lake
GMW*	47 32 52.5	122 47 10.8	0.506	Gold Mountain
GSM*	47 12 11.4	121 47 40.2	1.305	Grass Mountain
HDW*	47 38 54.6	123 03 15.2	1.006	Hoodsport
HHW+	46 10 59.0	119 22 59.0	0.415	Horse Heaven Hills
HTW*	47 48 12.5	121 46 08.6	0.829	Haystack Lookout
JBO$	45 27 41.7	119 50 13.3	-	Jordan Butte
JCW*	48 11 36.6	121 55 46.2	0.616	Jim Creek
JUN$	46 08 48.0	122 09 10.8	1.049	June Lake
KMO$	45 38 07.8	123 29 22.2	-	Kings Mountain
KOS$	46 27 40.8	122 11 25.8	0.828	Kosmos
LMW*	46 40 04.8	122 17 28.8	1.195	Ladd Mountain
LON	46 45 00.0	121 48 36.0	0.853	Longmire(WWSSS and DWWSS)
LVP$	46 04 06.0	122 24 30.0	1.170	Lake View Peak
MBW*	48 47 02.4	121 53 58.8	1.676	Mt. Baker
MCW*	48 40 46.8	122 49 56.4	0.693	Mt. Constitution
MDW+	46 36 48.0	119 45 39.0	0.330	Midway
MEW*	47 12 00.0	122 38 48.0	0.098	McNeil Island
MFW+	45 54 10.8	118 24 21.0	-	Milton-Freewater
MOX+	46 34 38.0	120 17 35.0	0.540	Moxie City
MTM$	46 01 31.8	122 12 42.0	1.121	Mt. Mitchell
NAC+	46 44 03.8	120 49 33.2	0.738	Naches
NEW	48 15 50.0	117 07 13.0	1.000	Newport Observatory (USGS)
NLO*	46 05 18.0	123 27 00.0	0.900	Nicolai Mountain
OBC$	48 02 07.1	124 04 39.0	0.938	Olympics - Bonidu Creek
OBH$	47 19 34.5	123 51 57.0	0.383	Olympics - Burnt Hill
ODS+	47 18 24.0	118 44 42.0	-	Odessa
OFK$	47 57 00.0	124 21 28.1	0.134	Olympics - Forks
OHW*	48 19 24.0	122 31 54.6	0.054	Oak Harbor
OLQ$	47 30 58.1	123 48 31.5	0.121	Olympics - Lake Quinalt
OMK+	48 28 49.2	119 33 39.0	0.421	Omak
ONR$	46 52 37.5	123 46 16.5	0.257	Olympics - North River
OOW$	47 44 12.0	124 11 22.0	0.743	Octopus West
OSD*	47 49 15.0	123 42 06.0	2.010	Snow Dome
OSP$	48 17 05.5	124 35 23.3	-	Olympics - Sooes Peak
OTH+	46 44 20.4	119 12 59.4	0.260	Othello
OTR$	48 05 08	124 20 39	0.712	Tyee Ridge
PAT+	45 52 50.1	119 45 40.1	0.300	Paterson
PEN+	45 36 43.2	118 45 46.5	-	Pendleton
PGO$	45 28 00.0	122 27 10.0	0.237	Portland - Gresham
PGW*	47 49 24.5	122 37 25.2	0.122	Port Gamble
PHO$	45 37 07.8	122 49 50.2	0.299	Portland - Portland Hills

continued

	LAT	LONG	EL	NAME
PLN+	47 47 04.8	120 37 58.8	2.000	Plains
PRO+	46 12 45.6	119 41 09.0	0.552	Prosser
RED$	45 56 13.2	121 49 10.8	1.510	Red Mountain
RMW*	47 27 35.0	121 48 19.2	1.024	Rattlesnake Mountain
RPK+	45 45 42.0	120 13 50.0	0.330	Roosevelt Peak
RSW+	46 23 28.2	119 35 19.2	1.037	Rattlesnake Mountain
RVC$	46 56 34.5	121 58 17.3	1.000	Mt. Rainier - Voight Creek
RVW*	46 08 58.2	122 44 37.2	0.460	Rose Valley
SAW+	47 42 06.0	119 24 03.6	-	St. Andrews
SEA	47 39 18.0	122 18 30.0	0.030	Seattle
SHW*	46 11 33.0	122 14 12.0	1.423	Mt. St. Helens
SMW*	47 19 10.2	123 20 30.0	0.840	South Mountain
SOS$	46 14 38.5	122 08 12.0	1.270	Source of Smith Creek
SPW*	47 33 13.3	122 14 45.1	0.008	Seward Park
STD$	46 14 16.0	122 13 21.9	1.268	Studebaker Ridge
STW*	48 09 00.8	123 40 12.0	0.308	Striped Peak
SUG	46 12 52.2	122 10 29.4	1.859	Sugar Bowl - Mt. St. Helens
SYR+	46 51 46.8	119 37 04.2	-	Smyrna
TBM+	47 10 10.0	120 35 58.0	-	Table Mountain
TDH$	45 17 23.4	121 47 25.2	-	Tom, Dick, and Harry
TDL$	46 21 03.0	122 12 57.0	1.400	Tradedollar Lake
VBE$	45 03 37.2	121 35 12.6	1.544	Oregon Volcano Net - Beaver Butte
VBP$	44 39 37.8	121 41 20.4	1.876	Oregon Volcano Net - Bald Peter
VFP$	45 19 05.0	121 27 54.3	1.716	Mt. Hood - Flag Point
VGB+	45 30 56.4	120 46 39.0	0.729	Oregon Volcano Net - Gordon Butte
VGT+	45 08 59.4	122 15 55.2	0.993	Oregon Volcano Net - Goat Mtn.
VHO$	45 13 09.0	123 43 31.2	0.951	Oregon Volcano Net - Mt. Hebo
VIP+	44 30 29.4	120 37 07.8	1.731	Oregon Volcano Net - Ingram Point
VLL$	45 27 48.0	121 40 45.0	1.195	Mt. Hood - Laurance Lake
VLM$	45 32 18.6	122 02 21.0	1.150	Oregon Volc. Net-Little Larch Mtn.
VTG+	46 57 28.8	119 59 14.4	0.208	Vantage
VTH+	45 10 52.2	120 33 40.8	0.773	Oregon Volcano Net - The Trough
WA2+	46 45 24.2	119 33 45.5	0.230	Wahluke Slope
WAT+	47 41 55.0	119 57 15.0	0.900	Waterville
WBW+	48 01 04.2	119 08 13.8	-	Wilson Butte
WEN+	47 31 46.2	120 11 39.0	1.061	Wenatchee
WGW+	46 02 40.8	118 55 57.6	-	Wallula Gap
WIW+	46 25 48.8	119 17 13.4	0.130	Wooded Island
WNS+	46 42 37.0	120 34 30.0	1.000	Wenas
WPW+	46 41 53.4	121 32 48.0	1.250	White Pass
WRD+	46 58 11.4	119 08 36.0	-	Warden
YAK+	46 31 15.8	120 31 45.2	0.619	Yakima
YEL	46 12 35.6	122 11 16.5	1.750	Yellow Rock - Mt. St. Helens Crater