

QUARTERLY TECHNICAL REPORT 83-D

on

Seismicity of the Washington and Northern Oregon Cascades

October 1, through December 31, 1983

Geophysics Program

University of Washington

Seattle, Washington

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Introduction

Seismicity in the Washington and northern Oregon Cascades remained at level similar to the previous nine months. There were three felt earthquakes; a magnitude 3.0 near North Bend and two magnitude 3.8 events near Yakima. In the Oregon cascades, most stations were down this quarter and due to snow are inaccessible for maintenance until spring or summer. In the Washington Cascades, the operational status has been better all along and most stations were up during the quarter.

Data

There were 192 events in the Cascades processed by the network during the time period October 1 through December 31, 1984. Of these, 45 were known or suspected blasts, and 147 were earthquakes. 21 of the earthquakes were hand-picked from film records, because they did not trigger the online system. 70 of the earthquakes occurred in the Mt. St. Helens-Elk Lake area. Table 1 is the event catalog for this quarter. Figure 1 shows the earthquakes in the northern and southern Cascades excluding Mount St. Helens (MSH); and figure 2 shows earthquakes in the MSH area. Blasts and probable blasts are not plotted.

During the second quarter of 1983, three felt events occurred in the Cascades. A $M=3.0$ earthquake was felt at North Bend on October 5, 1983 at 03:46 GMT. There were two felt events on the eastern flanks of the Cascades. The first was a magnitude 3.8 which occurred near Yakima on November 14 and was widely felt. A Modified Mercalli intensity of V (NEIS) was reported at Selah and an intensity IV was reported at Yakima. This event was preceded by three smaller earthquakes ($M=1.4, 1.6, 1.9$) during the hour before the main shock. During the next 20 days, 10 aftershocks, with magnitudes ranging from 1.5 to 2.4, were located in the immediate vicinity of the main shock. A cluster of 5 earthquakes occurred

35 kilometers south of the main shock in the 8 days following the main shock. On December 5, another magnitude 3.8 earthquake occurred 30 kilometers north of the event on November 14. This earthquake had no detected aftershocks, nor were there any detected foreshocks within 15 kilometers of the event. This earthquake was felt in Ellensburg and in the Wenas Valley with intensity IV-V. Seismic activity in the general region of both magnitude 3.8 earthquakes ceased for 32 days after the second magnitude 3.8.

In the southern Cascades, the only striking cluster is a group of aftershocks of the 1981 Elk Lake earthquake ($M=5.5$). Fifteen earthquakes occurred in the aftershock zone; the largest event in this group was $M=2.2$ earthquake.

At Mt. St. Helens, the final quarter of 1983 was the most seismically active of the year, based on counts of earthquakes from visual records. The dome growth that began in February continued throughout the quarter, resulting in a new extrusion near the summit of the dome in early October and new activity on its north side in December.

141 events in the Mt. St. Helens area were selected for off-line processing during the quarter. Of the 100 that were located, 42 occurred underneath the volcano and 30 were known blasts. Most of the remaining events were in the Elk Lake aftershock zone.

During the first half of the quarter, an average of 12 significant low-frequency volcanic earthquakes were observed daily on the visual records. The only sizeable departure from this trend occurred from October 10 to 16, when a new extrusion of lava made its debut along the southern border of the currently active northeastern lobe of the dome. Earthquake activity was somewhat greater during this period; about 20 significant volcanic earthquakes were seen daily. The slow growth rate of this extrusion and its location on the broad flat summit of the dome kept its life mostly peaceful; few rockfall signals of significance were seen as it grew.

Seismicity in the latter half of the quarter was somewhat higher overall, but more variable. Mid-November was a comparatively quiet period; from the 10th through the 18th, daily counts generally ran about 6 quakes per day. An irregular increase in earthquake activity began on the 19th and continued through the 29th; by the 27th, seismicity had attained "moderate" levels and was averaging 26 quakes per day, surpassing even the mid-October activity.

December had the highest earthquake activity of any month in 1983. It inherited the increase in seismicity of late November, which lasted through the first six days of the month. It then decreased somewhat and became more variable. From the 9th through the end of the month, the earthquake rate fluctuated between 9 and 23 significant events per day. During the final few days of 1983 the counts were near the higher end of this range.

In mid-December, U.S. Geological Survey field crews noticed increased rates of spreading, incandescence, and cracking in the north and northeast sides of the lava dome. Perhaps the comparatively high seismicity observed that month was associated with the resumption of eruptive activity in those areas.

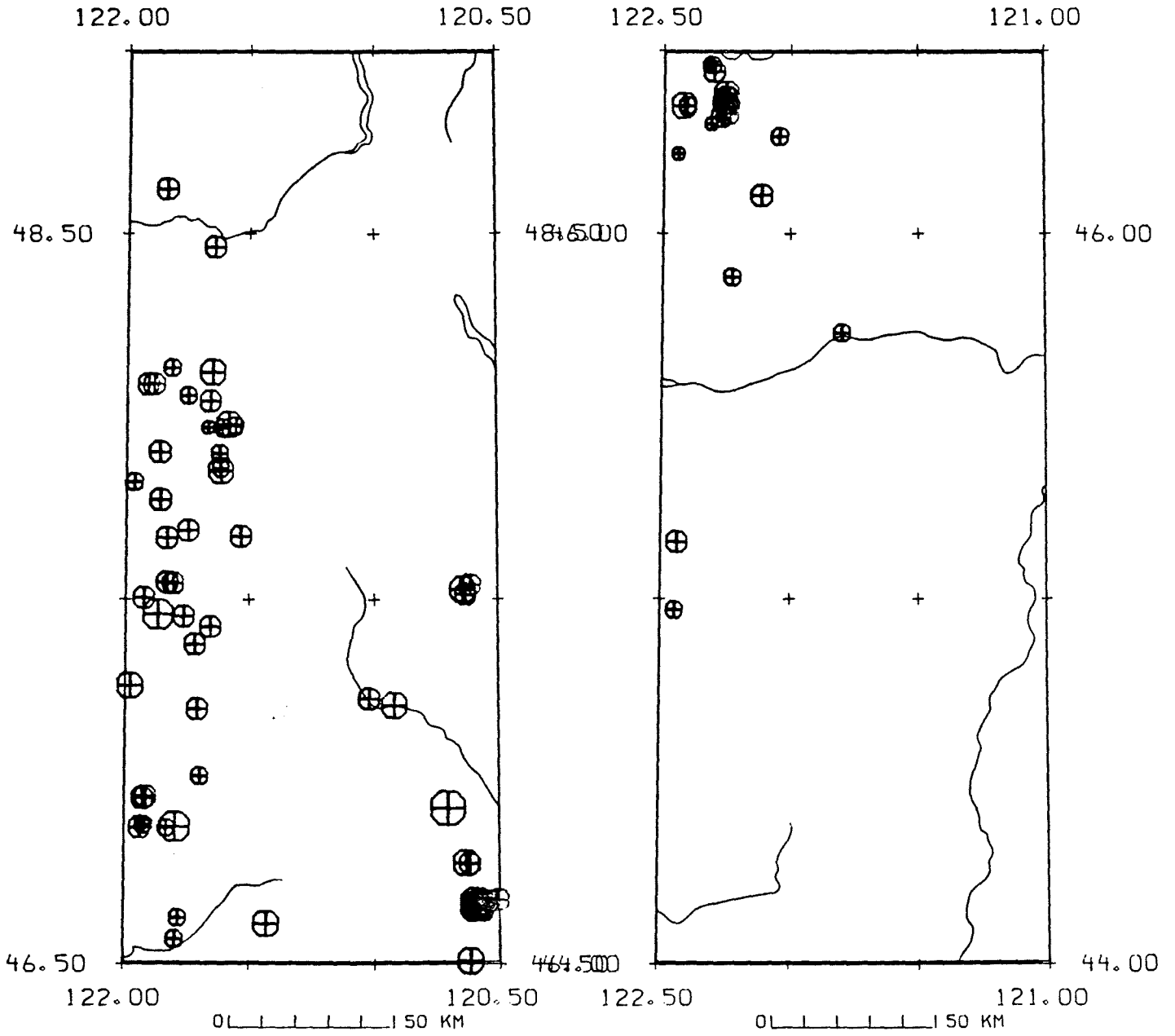


Figure 1. Earthquakes in northern and southern Cascades excluding Mt. St. Helens area, October 1, through December 31, 1983

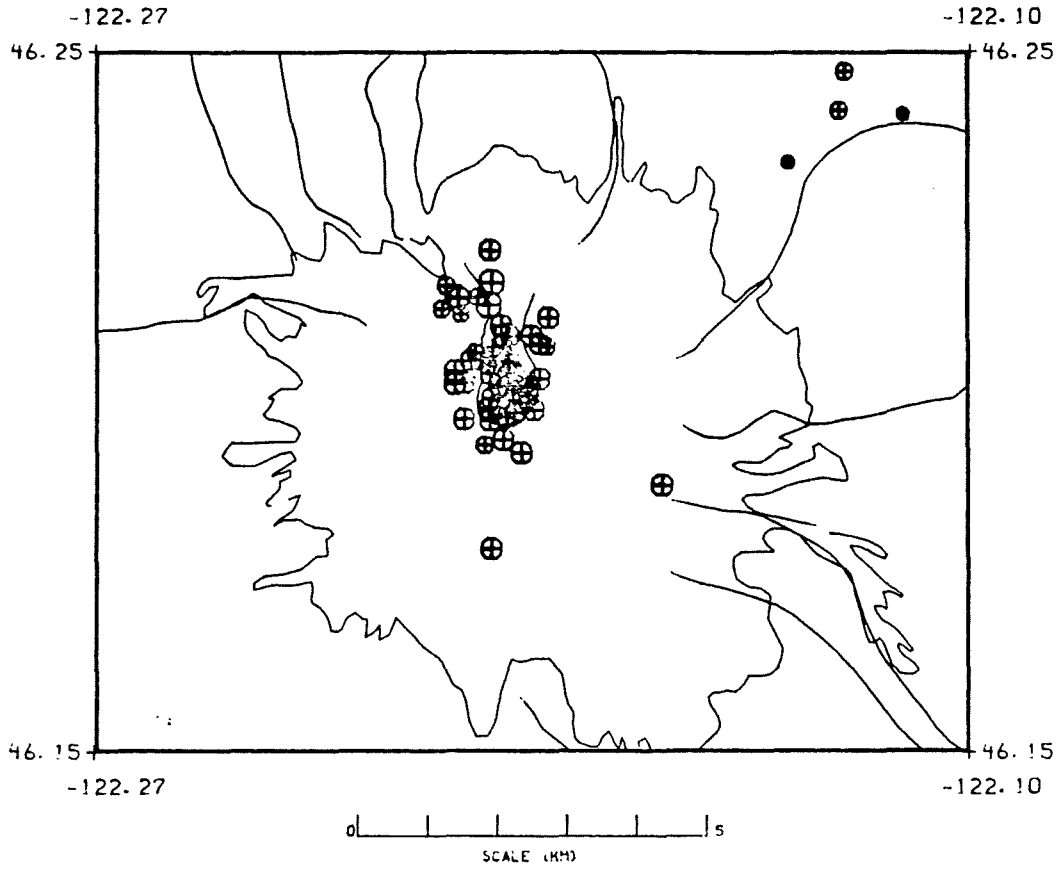


Figure 2. Earthquakes in Mt. St. Helens area, October 1, through December 31, 1983

C A T A L O G

Oct 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	0:43	74.12	46 12.12	122 11.13	0.04*	1.6	13/13	0.27	BA	S1	
1	1:56	20.02	46 11.67	122 11.63	4.55	0.6	8/08	0.17	BB	S1	
1	7:15	23.07	47 1.09	121 41.81	10.10	0.9	7/11	0.18	BB	C1	
1	19:11	49.57	46 27.89	122 27.58	5.69	1.0	27/27	0.18	BC	P1	P
2	1:17	58.26	47 25.62	121 39.36	9.21	1.4	18/21	0.40	CB	P1	
2	6:14	47.25	46 22.90	122 15.07	9.36	2.2	36/44	0.24	BB	S1	
3	11:30	28.77	46 22.70	122 14.52	8.96	0.5	19/25	0.09	AB	S1	
3	11:33	35.12	46 22.69	122 14.58	9.89	0.8	20/26	0.09	AB	S1	
4	20: 8	52.77	46 13.99	122 22.52	0.34	0.	12/13	0.20	BC	S1	P
4	23: 2	49.64	46 5.42	121 53.28	2.50	1.8	6/08	0.06	AC	P1	H
5	0:48	27.14	46 30.57	120 37.10	14.97	2.4	25/28	0.22	BA	C1	
5	3:46	50.13	47 27.66	121 52.05	22.75	3.0	38/41	0.25	BA	P1	F
5	9:48	30.76	46 14.25	122 7.69	9.23	1.2	27/32	0.21	BA	S1	
5	16: 5	55.48	46 26.66	122 17.92	23.01	1.5	7/09	0.18	BB	P1	H
5	16: 5	56.32	46 27.71	122 18.35	16.81	1.0	26/33	0.16	BA	S1	
5	17: 0	43.27	46 27.62	122 19.12	16.34	0.3	11/17	0.10	AB	S1	
5	20: 8	59.35	46 12.25	122 20.12	0.78	0.2	14/15	0.21	BB	S1	X
5	23: 2	52.21	46 30.62	120 37.08	15.21	2.6	31/32	0.30	CA	C1	
6	1:13	21.52	46 13.85	122 8.26	11.03	0.3	10/18	0.08	AB	S1	
6	7:42	15.73	46 19.98	122 14.28	8.40	-0.4	12/18	0.10	AB	S1	
6	17:11	48.14	46 13.49	122 17.96	0.02*	0.	6/08	0.18	BC	S1	X
6	19:42	17.60	46 11.36	122 9.65	0.02*	1.3	6/06	0.18	BD	S1	L
7	0:16	24.91	47 54.27	121 51.77	11.61*	1.5	6/09	0.18	BC	P1	
7	0:50	14.24	46 57.69	121 54.69	2.69	1.9	6/07	0.14	AC	P1	H
7	1:20	63.42	47 58.33	121 40.10	3.77	0.4	7/09	0.17	BD	P1	
7	12:28	69.93	46 11.99	122 11.23	0.63	1.7	14/14	0.14	AA	S1	L
7	21:57	28.09	47 57.48	121 49.87	8.72#	1.1	9/10	0.26	BC	P1	P
8	16:27	41.70	46 12.24	122 11.97	0.04*	1.6	11/11	0.18	BA	S1	L
8	17:55	18.53	46 16.11	122 19.02	4.44	0.1	5/06	0.14	BD	S1	P
9	8:11	53.80	48 27.92	121 38.56	0.58\$	1.5	4/07	0.40	DD	C1	H
10	0: 7	37.08	46 16.03	122 2.55	11.24	0.5	17/24	0.14	AB	S1	
10	5:55	54.28	46 12.65	122 10.92	0.26	1.4	11/11	0.12	AA	S1	L
10	16:34	35.63	46 13.59	122 17.60	1.53	0.1	9/09	0.12	AC	S1	P
10	18:59	42.73	46 22.26	122 14.99	10.30	0.2	10/16	0.09	AB	S1	
10	19:23	12.25	46 13.93	122 21.87	0.41#	-0.1	11/12	0.17	BD	S1	X
10	22:38	38.70	46 32.31	121 57.29	0.02*	1.1	9/11	0.10	AC	S1	P
10	22:51	69.00	46 5.14	122 17.87	0.44	1.3	26/28	0.23	BB	S1	P
11	4: 3	51.54	46 12.12	122 11.18	1.51	0.6	10/11	0.08	AB	S1	
12	22:23	63.19	47 13.82	121 36.73	9.16	1.4	19/20	0.49	CB	P1	P
13	2:26	58.22	47 40.22	121 49.97	16.04\$	1.4	4/07	0.17	DD	P1	H
13	8:31	25.92	46 37.77	121 46.92	11.10	0.9	14/17	0.23	BB	C1	
13	17:12	32.61	47 58.55	121 33.33	5.97#	1.0	10/11	0.28	BD	P1	
13	18: 3	20.29	46 13.43	122 17.85	0.90	0.1	12/14	0.13	AB	S1	P
13	23: 8	18.35	46 11.49	122 21.91	0.03*	0.8	18/20	0.20	BA	S1	X
14	15:15	18.28	46 15.14	122 19.60	2.84*	-0.1	10/10	0.22	BD	S1	X
14	15:57	70.89	46 13.23	122 18.03	2.07#	0.1	7/07	0.16	BD	S1	X

Oct 1983												
DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE	
14	16:5	35.20	46 22.33	122 15.24	9.36	1.5	24/30	0.16	BB	S1		
14	20:44	37.66	48 2.66	121 39.59	1.88	1.8	7/09	0.11	AD	P1		H
14	20:47	15.38	48 37.43	121 50.44	0.03*	1.7	4/05	0.13	AD	C1		H
14	21:7	57.55	46 14.00	122 18.86	2.96	-0.1	10/10	0.12	AD	S1		X
14	23:18	25.80	46 4.79	122 18.24	0.80	1.1	18/18	0.18	BB	S1		X
14	23:19	32.69	46 4.95	122 17.91	0.18*	1.1	24/24	0.24	BB	S1		X
15	1:27	51.73	46 1.23	122 7.82	2.77	0.8	11/11	0.10	AC	S1		P
17	6:3	33.93	46 12.43	122 10.94	1.84	1.2	9/09	0.07	AB	S1		
17	8:57	13.10	46 10.87	122 11.55	0.13*	1.7	8/08	0.23	BA	S1		L
17	19:18	66.11	46 13.13	122 16.78	1.27	0.5	14/15	0.27	BB	S1		P
17	21:31	26.22	45 16.40	122 6.37	2.25	1.5	10/10	0.39	CD	C1		P
17	23:11	22.22	47 12.13	121 42.48	1.94	1.5	5/07	0.05	AD	P1		H
18	9:53	42.45	47 12.68	120 55.03	0.02*	2.1	23/23	0.35	CC	C1		
18	12:18	38.57	46 53.02	121 55.22	7.88	0.8	11/15	0.17	BB	C1		
18	14:18	73.71	46 53.00	121 54.98	8.05	0.6	6/09	0.07	AC	C1		
19	18:28	41.58	46 13.22	122 17.82	2.03	1.1	13/13	0.19	BB	S1		P
19	22:32	63.61	46 13.33	122 17.62	2.07*	0.6	12/13	0.08	AB	S1		P
19	22:38	60.13	46 4.96	122 17.90	1.28	1.2	21/22	0.19	BB	S1		P
19	22:39	53.73	46 5.13	122 17.93	0.04*	0.8	11/12	0.30	BB	S1		P
19	22:41	39.78	46 4.13	122 18.35	2.39	0.3	11/11	0.19	CC	S1		X
20	21:49	17.34	47 12.42	121 33.83	6.60	1.4	5/08	0.07	AD	P1		P
21	14:23	62.45	46 20.79	122 13.94	7.92	-0.1	9/13	0.08	AB	S1		
21	22:6	42.83	47 32.90	121 49.87	7.88	1.7	7/09	0.14	BC	P1		H
22	1:47	53.53	46 57.44	121 55.48	2.61	1.4	7/08	0.11	AB	C1		
22	4:1	12.70	46 52.57	121 49.85	1.33\$	0.9	8/10	0.36	CC	C1		
22	22:26	67.37	46 12.72	122 12.11	2.68	1.0	12/12	0.15	AA	S1		
24	11:47	41.73	46 21.12	122 13.29	0.68	0.4	11/12	0.23	BC	S1		
24	15:58	25.99	46 13.31	122 18.20	1.56	0.1	13/16	0.11	AB	S1		P
24	23:37	15.29	46 13.34	122 17.37	1.17	0.1	14/17	0.24	BB	S1		P
25	23:1	54.45	46 14.36	121 55.04	1.45\$	0.9	16/20	0.13	AC	S1		P
26	3:56	52.17	47 32.78	121 48.46	24.90	1.3	4/08	0.22	DD	P1		H
26	16:56	33.73	46 3.75	122 19.30	6.58	0.6	8/08	0.08	AC	S1		X
27	1:8	18.46	45 52.97	122 13.43	4.72	1.1	22/24	0.23	BC	S1		
27	2:27	33.96	46 12.29	122 11.40	1.69	0.3	6/06	0.16	BC	S1		
27	21:25	53.31	46 13.41	122 18.84	1.68*	0.	7/09	0.07	AB	S1		X
27	22:54	35.47	46 12.37	121 54.12	0.02*	1.4	18/18	0.14	AC	S1		P
27	22:57	56.52	46 4.60	122 17.93	0.68	1.3	16/18	0.18	BB	S1		P
27	23:33	30.39	45 52.40	121 50.76	0.03*	1.5	27/27	0.23	BB	C1		P
28	7:57	52.03	47 31.68	120 38.46	2.60	2.2	28/30	0.27	BC	C1		
28	23:21	56.43	46 5.14	122 17.69	0.58	0.5	14/15	0.21	BB	S1		P
30	14:21	51.18	47 40.48	121 31.95	87.12	1.3	8/08	0.21	CC	C1		H
31	19:27	56.39	46 13.30	122 18.41	1.41	0.4	14/17	0.14	AB	S1		P
31	22:1	36.85	46 11.91	122 11.30	1.60	1.5	11/12	0.20	BB	S1		

Nov 1983												
DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE	
1	16:50	11.69	46 17.45	121 36.49	2.89	1.4	4/04	0.09	BD	S1		P
1	20:18	32.93	46 19.21	122 16.26	11.19	2.0	22/27	0.22	BB	S1		
2	20:31	63.09	47 49.34	121 57.88	5.42	0.9	9/12	0.33	CB	P1		
2	20:47	45.15	45 52.69	121 50.70	0.03*	1.3	20/22	0.41	CB	C1		P
4	23:9	63.86	47 51.22	121 36.92	9.39	2.1	12/14	0.36	CB	P1		

Nov 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
5	0:20	36.31	47 45.70	121 48.91	6.12	1.3	11/12	0.37	CC	P1	P
5	13: 3	24.86	46 36.82	121 25.72	0.03*	2.4	28/29	0.35	CC	C1	
6	6:53	51.36	46 22.38	122 14.81	7.46	1.3	21/29	0.11	AB	S1	
6	11:19	60.81	45 43.81	121 47.71	11.20	1.0	22/25	0.32	CB	C1	
7	0:11	26.82	48 3.56	121 45.00	10.04	1.2	4/07	0.19	BD	P1	H
7	13:22	16.28	46 12.81	122 11.71	0.02*	0.8	7/07	0.21	BB	S1	
8	8:34	51.35	47 51.57	121 36.99	9.47	0.5	6/08	0.13	AD	P1	
9	0:29	43.77	46 14.22	122 6.97	9.46	0.3	10/14	0.11	AA	S1	
9	4:11	58.30	46 11.86	122 11.57	1.22#	1.7	13/15	0.15	AA	S1	L
9	21:57	48.20	46 13.43	122 18.67	1.96	0.3	11/12	0.12	AB	S1	X
10	15:45	34.35	46 19.63	122 16.07	8.46	0.4	11/16	0.10	AA	S1	
11	14:20	49.43	46 21.07	122 24.32	7.68	0.5	15/20	0.10	AA	S1	
11	19: 7	17.51	47 13.80	121 1.10	3.97	2.0	16/18	0.27	BC	C1	
11	19:56	65.76	46 38.99	120 36.58	11.40	1.7	5/07	0.30	CD	E1	H
12	5: 3	39.61	47 30.37	121 55.42	19.99	1.6	6/09	0.26	CC	P1	H
14	10:58	18.01	46 40.01	120 32.91	1.53	1.6	4/07	0.32	CD	C1	H
14	10:59	38.61	46 40.03	120 33.39	3.43	1.4	4/07	0.23	CD	C1	H
14	11:10	34.67	46 39.45	120 34.74	0.03*	1.9	12/12	0.24	BC	C1	
14	11:18	61.43	46 39.90	120 35.44	6.45	3.8	47/47	0.30	BC	C1	F
14	11:21	67.25	46 40.17	120 35.16	2.45*	2.2	20/20	0.36	CC	C1	
14	12: 5	33.39	46 21.33	122 15.66	9.77	1.5	19/22	0.14	AA	S1	
14	12:11	48.23	46 39.45	120 35.50	3.63	2.3	19/20	0.29	BC	C1	
14	12:13	63.08	46 39.48	120 34.49	4.70	2.1	14/14	0.29	BC	C1	
14	14:25	24.12	46 40.52	120 32.61	1.72\$	1.6	4/07	0.30	DD	C1	H
14	15: 7	54.95	46 39.73	120 35.42	3.28	2.0	21/22	0.37	CC	C1	
14	16: 4	16.84	46 39.21	120 35.34	7.14	1.7	6/08	0.17	BC	C1	H
14	17:57	65.99	46 39.77	120 36.04	0.03*	2.4	31/31	0.29	BC	C1	
14	19:45	34.92	46 39.00	120 33.73	0.02*	1.5	4/05	0.26	BD	C1	
15	9:51	71.28	46 52.76	121 47.67	0.02*	2.9	5/05	0.37	CD	C1	
16	23:52	52.39	46 14.55	122 7.63	10.41	0.6	14/18	0.19	BA	S1	
17	17:47	24.56	46 12.75	122 11.59	0.02*	2.1	7/07	0.18	BB	S1	
18	5:15	64.75	46 12.14	122 11.97	0.04*	1.3	5/05	0.05	AD	S1	
19	8: 3	18.82	46 12.81	122 11.94	0.04*	2.1	6/06	0.10	AC	S1	
19	14:56	73.98	46 12.03	122 11.55	0.13*	1.3	8/10	0.17	BB	S1	
20	0:13	73.21	46 12.68	122 11.90	0.02*	1.1	5/05	0.11	AD	S1	L
20	11:18	54.85	46 40.66	120 30.22	3.62	1.4	4/06	0.44	DD	E1	H
22	18: 9	73.41	46 12.16	122 11.36	0.54	0.6	8/08	0.10	AB	S1	
22	18:36	56.18	46 12.43	122 11.44	1.15	1.8	6/06	0.06	AC	S1	L
22	19:48	44.16	46 12.15	122 11.86	2.85#	1.8	6/06	0.07	AC	S1	L
22	20:32	-0.34	44 58.34	122 26.42	16.91	0.8	9/10	0.20	CD	C1	
22	20:53	58.48	46 12.13	122 11.47	0.90*	1.6	15/15	0.18	BA	S1	
22	22:48	7.78	47 41.44	121 44.84	45.22	1.3	4/05	0.76	DD	P1	H
23	9:35	48.99	46 13.17	122 11.58	0.04*	1.8	5/05	0.16	BD	S1	L
23	15:55	61.25	46 34.26	121 47.66	11.53	0.8	10/13	0.11	AB	C1	
23	16:37	45.64	46 21.74	122 14.85	9.16	1.2	19/25	0.14	AA	S1	
27	11:36	19.59	46 11.97	122 11.46	0.04*	1.8	7/07	0.26	BC	S1	L
27	22: 7	66.18	47 15.89	121 58.60	11.43\$	2.3	46/46	0.43	CC	P1	
28	1:10	25.27	46 18.02	122 18.61	10.86	0.3	10/16	0.09	AB	S1	
28	9:41	58.12	46 12.28	122 11.29	0.04*	1.8	6/06	0.10	EC	S1	L
28	16:24	50.49	46 12.18	122 11.02	0.02*	1.6	5/05	0.08	AD	S1	L
28	20:21	23.09	48 8.07	121 48.94	11.99	0.9	6/08	0.19	BC	P1	

Nov 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
28	20:52	64.97	46 13.04	122 18.20	0.57	0.5	14/15	0.23	BB	S1	X
29	1:11	40.84	46 12.31	122 11.34	0.35	1.6	7/07	0.18	BB	S1	L
29	5:39	24.79	46 11.61	122 11.22	0.02*	1.9	6/06	0.11	AC	S1	L
29	10:37	48.53	46 11.88	122 11.37	0.05*	2.0	7/07	0.09	AB	S1	L
29	12:35	34.85	46 7.38	121 39.02	7.26	2.2	21/22	0.32	CC	P1	
29	21:0	41.51	47 46.49	121 51.63	5.50	1.9	18/20	0.43	CB	P1	

Dec 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	21:23	44.77	46 12.35	122 11.55	0.02*	1.3	6/06	0.05	AC	S1	L
3	20:20	14.90	46 46.79	120 38.03	7.74	2.5	31/33	0.32	CB	C1	
3	20:26	53.82	46 46.61	120 37.14	8.41*	1.5	6/10	0.21	BC	C1	
5	7:24	19.58	46 55.78	120 42.23	6.10	3.8	51/52	0.29	BB	C1	F
5	17:0	24.94	46 12.45	122 11.02	0.02*	1.7	6/06	0.03	AC	S1	L
5	22:44	61.02	47 46.52	121 51.48	5.61	2.0	20/20	0.44	CB	P1	P
9	14:6	21.40	47 30.90	120 37.78	0.04#	1.9	13/15	0.20	BC	N1	
10	1:27	22.37	46 12.22	122 11.57	0.95	1.5	15/16	0.12	AA	S1	
11	4:20	23.80	46 52.57	121 56.10	4.87	1.4	8/12	0.14	AB	C1	
11	23:58	27.20	47 22.75	121 43.11	20.51	1.4	11/13	0.31	CB	P1	
12	3:41	60.02	46 12.80	122 11.92	0.04*	1.4	11/12	0.13	AA	S1	
12	21:32	48.97	46 2.01	121 42.29	2.03	1.7	10/12	0.17	BC	P1	P
13	4:4	47.62	46 19.70	122 14.69	9.07	1.8	28/35	0.16	BA	S1	
13	7:3	6.60	47 32.39	120 36.67	0.04*	1.4	7/08	0.13	AD	N1	
13	9:19	60.95	47 58.30	121 36.51	7.54	0.8	5/07	0.18	BD	P1	
13	20:47	54.10	46 12.28	122 11.53	0.03*	1.2	6/06	0.09	AC	S1	
13	21:51	19.21	46 14.04	122 21.91	0.33*	0.8	16/17	0.18	BB	S1	P
14	0:38	20.58	46 11.95	122 11.59	0.20	1.8	8/08	0.05	AB	S1	L
14	2:0	28.97	46 11.87	122 11.86	0.05*	1.5	7/07	0.11	AB	S1	
14	3:9	51.43	46 12.51	122 11.11	0.94*	2.0	6/06	0.13	AC	S1	L
14	6:27	47.39	46 12.05	122 11.14	0.02*	1.9	5/05	0.09	AD	S1	L
15	12:46	33.03	46 12.90	122 12.07	0.03*	1.0	11/11	0.24	BA	S1	L
16	22:52	41.19	47 27.37	121 45.87	0.03*	1.6	8/11	0.49	CC	P1	H
17	9:13	49.01	46 11.94	122 11.08	1.14	1.5	8/08	0.10	AB	S1	L
18	3:35	30.68	46 12.31	122 11.54	0.80	1.5	9/09	0.12	AB	S1	
18	5:35	60.80	46 6.37	122 6.72	12.57	1.9	27/33	0.23	BA	S1	
18	21:25	33.88	45 9.49	122 25.98	2.61	1.6	22/23	0.31	CD	C1	
19	0:18	25.62	46 5.40	121 54.67	3.91	1.8	17/19	0.23	BC	P1	
19	4:46	18.12	46 12.38	122 11.74	0.25*	1.1	10/10	0.14	AA	S1	
19	20:55	54.89	46 13.16	122 26.31	8.65	0.	11/16	0.15	BB	S1	
20	5:15	32.81	46 12.51	122 11.39	0.03#	2.1	6/06	0.07	AC	S1	
20	14:8	73.48	46 12.07	122 11.31	1.17	1.1	10/11	0.08	AB	S1	
22	0:32	46.38	46 12.32	122 11.79	0.04*	1.5	5/05	0.05	AD	S1	L
22	6:53	39.46	46 12.59	122 11.45	0.05#	1.7	5/05	0.08	AD	S1	L
22	9:58	15.34	46 21.32	122 16.27	10.09	1.2	18/21	0.19	BA	S1	
23	13:56	65.62	46 12.92	122 11.56	0.20*	2.2	5/05	0.01	AD	S1	
24	4:24	24.64	47 54.05	121 37.21	15.33	0.7	5/07	0.20	BD	P1	
27	11:49	26.02	47 58.83	121 34.99	5.76	2.4	19/21	0.37	CC	P1	
27	16:22	63.82	46 11.71	122 11.42	0.03*	1.9	10/10	0.33	CC	S1	L
30	9:7	37.71	46 20.91	122 24.34	8.20	0.5	14/17	0.10	AA	S1	
30	16:23	53.36	46 21.02	122 24.99	7.20	2.6	30/34	0.24	BB	S1	