

QUARTERLY TECHNICAL REPORT 83-C

on

Seismicity of the Washington and Northern Oregon Cascades

July 1 through September 30, 1983

Geophysics Program
University of Washington
Seattle, Washington

This report is prepared as a preliminary description of the seismic activity in the Cascade Mountains of Washington and Northern Oregon. Information contained in this report should be considered preliminary, and not cited for publication. Seismic network operations in and around the Cascade Range are supported by the following contracts:

U.S. GEOLOGICAL SURVEY
CONTRACT NO. 14-08-0001-21192
and CONTRACT NO 14-08-0001-19848

and

U.S. DEPARTMENT OF ENERGY
CONTRACT NO. EY-76-S-06-2225
TASK AGREEMENT NO. 39

and

U.S. NUCLEAR REGULATORY AGENCY
UNDER CONTRACT NO. NRC-04-81-177

Operations

Many of the Oregon Cascade and Coast Range stations were accessed in June and July, permitting us to restore reasonable monitoring in northern Oregon. Most of the J402 amplifier/VCO's in the former USGS sites had failed and have been replaced with Develco 6202's, virtually eliminating our stock of spares. While several problems still exist with the northern Oregon stations, it appears that most or all will be operational by mid-November.

In the Washington Cascades, the operational status has been better all along and was improved further during the quarter.

Data

There were 207 events in the Cascades processed by the network during the time period July 1 through September 30, 1983. Of these, 66 were known or suspected blasts, and 141 were earthquakes. Ten of the earthquakes were hand-picked from film records, because they did not trigger the online system. 35 of the earthquakes occurred in the Mt. St. Helens area. The apparent decrease in the number of Mt. St. Helens events this quarter as compared to last quarter is due to a change in the processing of earthquakes at MSH and not to a change in level of seismic activity. As of early July, events not well recorded by the online PDP 11/34 are no longer processed. Table 1 is the event catalog for this quarter. The region considered in this report is outlined. 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, one felt event occurred in the Cascades. A $M=3.1$ earthquake was felt at North Bend. on August 12, 1983 at 18:12 PDT. This was also the largest event to occur in the Cascades during the third quarter. The

clustered epicenters in the central Cascades are aftershocks of the 1981 Goat Rocks earthquake. Eight earthquakes occurred in this cluster; the largest event was a magnitude 2.1.

In the southern Cascades, the only striking cluster is a group of aftershocks of the 1981 Elk Lake earthquake (M=5.1). Fourteen earthquakes occurred in the aftershock zone; the largest events in this group were M=1.3 earthquakes.

At Mt. St. Helens, a cornucopia of low-frequency earthquakes and gas emissions reflected the continuous slow dome growth seen during the quarter. 35 earthquakes were located in the Mt. St. Helens region during the quarter. Numerous gas emissions and avalanches also occurred throughout the quarter. On September 16, deformation rates on the south side of the dome increased significantly. The increase was not associated with an increase in seismic activity. In fact, the seismic activity showed a marked decrease at this time; from 8 earthquakes per day prior to this date to 4 earthquakes per day following this date.

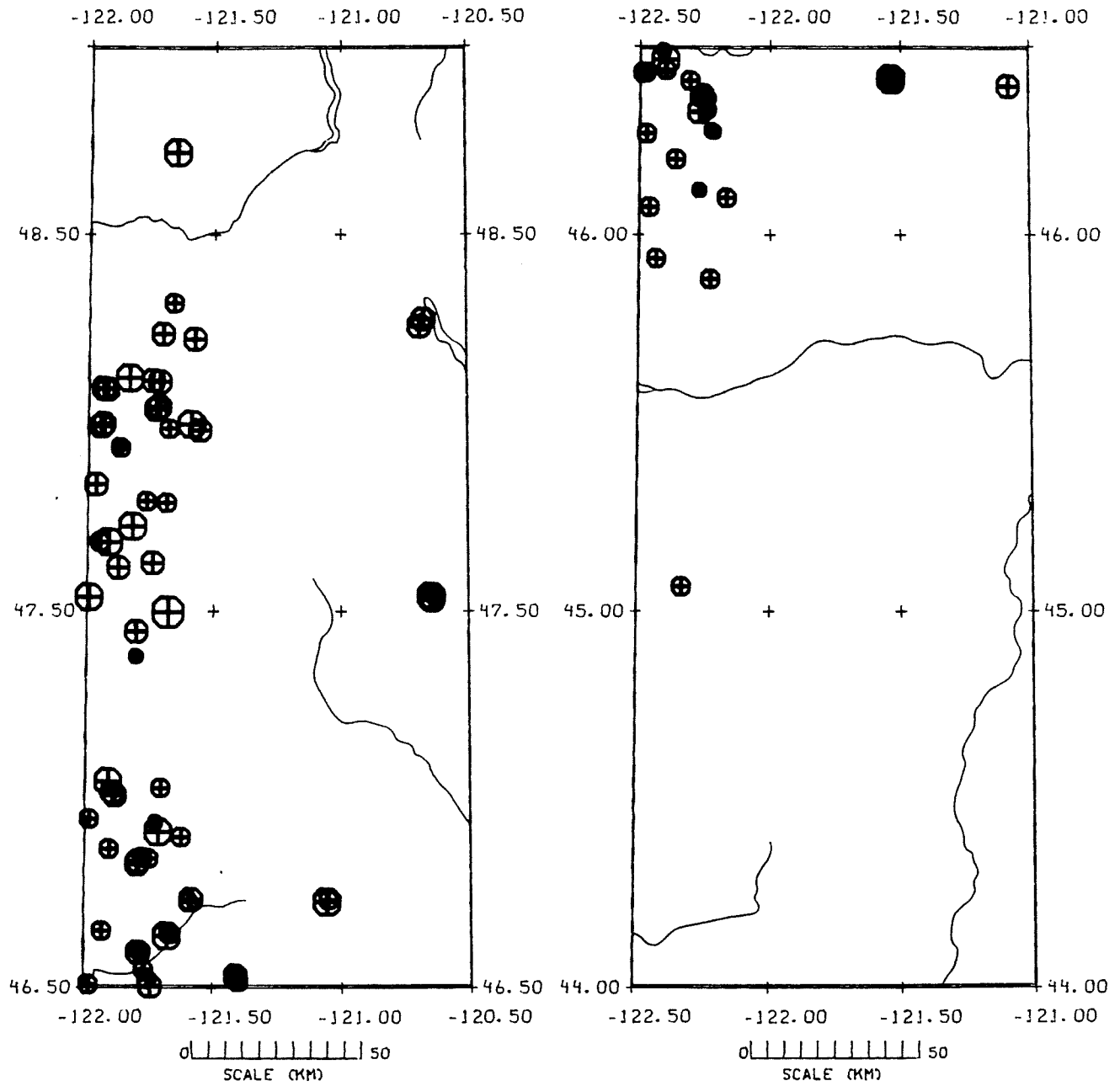


Figure 1. Earthquakes in northern and southern Cascades excluding Mt. St. Helens area, July 1 through September 30, 1983

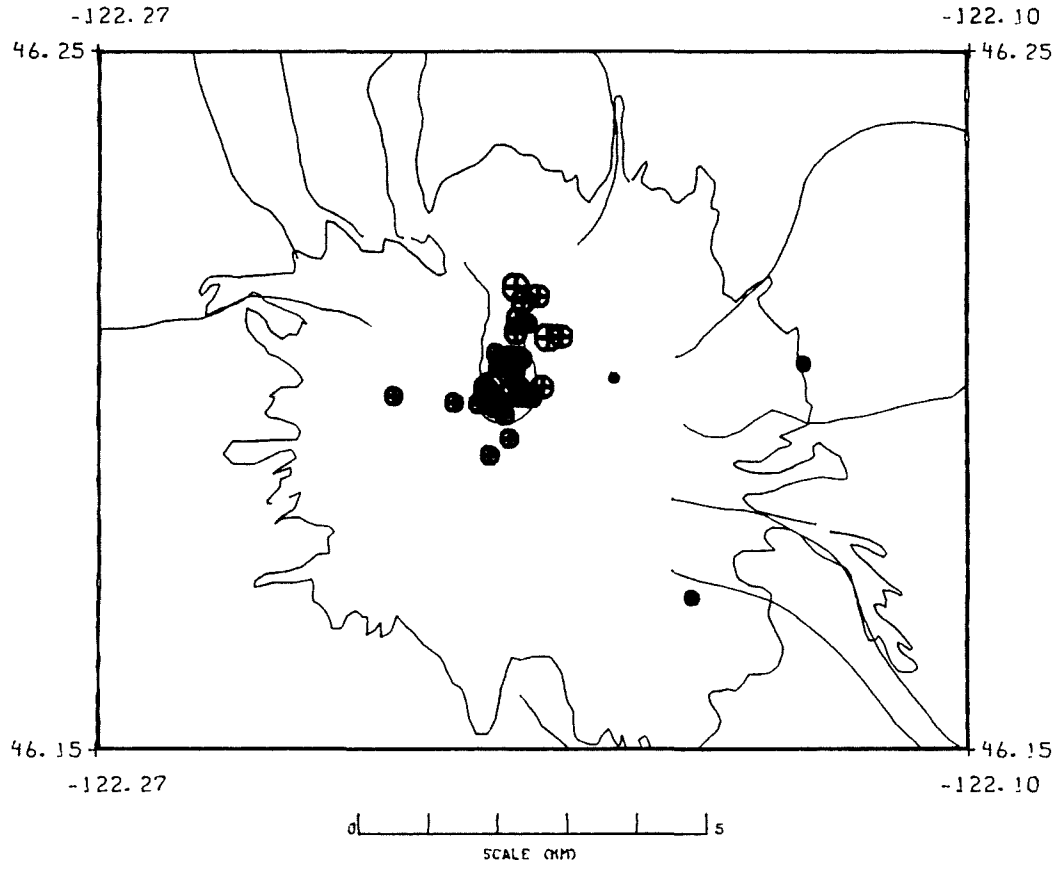


Figure 2. Earthquakes in Mt. St. Helens area, July 1 through September 30, 1983

CATALOG

July 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	1:38	63.98	48 43.01	121 38.97	0.04*	2.1	9/10	0.24	DD	C1	
1	5:43	30.44	46 12.03	122 12.66	0.36	1.0	7/07	0.12	BB	S1	L
1	13:45	51.04	46 12.01	122 11.49	0.21	0.6	9/09	0.08	AB	S1	
1	13:45	61.96	46 12.25	122 11.49	1.78	1.2	11/11	0.12	AB	S1	
1	19:58	67.42	46 21.95	122 16.07	10.52	0.5	18/27	0.17	BA	S1	
1	21:39	50.10	46 12.62	122 11.27	2.21	1.3	6/06	0.15	BD	S1	L
2	7:25	57.06	47 40.91	121 54.66	23.85	2.3	27/28	0.25	BA	P1	
2	17:50	59.33	46 25.78	122 28.46	17.75	0.9	18/23	0.13	AA	S1	
2	17:51	-1.05	46 25.70	122 29.11	18.23	1.1	4/08	0.06	AD	P1	H
4	1:58	59.37	47 32.27	120 38.64	2.00	2.1	21/25	0.23	BC	N1	
4	4:25	15.72	46 22.36	122 15.37	9.84	-0.1	11/16	0.13	AB	S1	
4	8:29	43.02	46 12.10	122 11.57	0.10*	2.1	7/07	0.12	BB	S1	L
4	17:53	65.48	46 16.54	122 13.30	8.46	0.	11/19	0.11	AA	S1	
5	3:10	59.48	46 12.09	122 11.63	0.31*	1.7	8/08	0.11	BB	S1	L
5	6:34	55.47	46 12.49	122 10.78	2.07	1.7	6/06	0.14	BC	S1	L
5	15:11	49.68	46 11.94	122 11.53	0.24	0.9	8/08	0.06	AB	S1	
5	22:33	62.40	48 17.89	121 28.81	10.26#	1.5	5/06	0.09	BD	P1	P
6	3:19	29.64	46 12.14	122 11.30	0.83	1.0	6/06	0.08	AC	S1	L
6	10:28	16.37	48 6.48	121 42.79	8.77	1.4	4/07	0.08	AD	P1	H
6	14:15	46.15	46 12.80	122 11.04	0.04*	1.8	7/07	0.21	BB	S1	L
6	14:59	40.50	46 12.36	122 11.51	0.67	0.8	6/06	0.04	AC	S1	L
6	15: 9	20.51	46 23.58	121 4.78	0.05*	2.0	7/10	0.10	AD	C1	
6	20:57	11.93	46 12.34	122 11.35	0.09*	1.1	6/06	0.05	BC	S1	
7	4:14	48.49	48 6.66	121 44.47	14.74	1.9	12/15	0.13	AB	P1	
7	21: 1	9.98	47 0.60	121 52.66	17.26	1.4	13/18	0.24	AB	P1	
7	21:39	35.36	46 38.33	121 48.83	0.05*	2.0	10/14	0.24	BC	C1	X
8	12:46	28.35	46 12.10	122 10.99	1.68	1.6	8/08	0.03	AB	S1	
8	15:35	43.54	46 35.34	121 46.59	11.02	0.2	8/12	0.12	AB	C1	
9	2:44	66.92	46 12.59	122 11.16	0.07#	1.1	7/07	0.12	BB	S1	L
9	4:52	56.85	46 11.88	122 11.41	0.05*	0.9	7/07	0.09	BB	S1	
9	15:18	23.61	46 12.32	122 11.21	1.71	1.0	13/14	0.11	AB	S1	
9	17:45	41.51	46 35.54	121 46.99	9.90	1.4	18/23	0.21	BB	C1	
9	17:57	70.16	46 35.97	121 47.44	3.67	-0.3	5/08	0.05	BD	C1	
10	13:35	41.53	47 36.89	121 52.33	7.37	1.8	8/12	0.26	AC	P1	
11	11:16	40.50	45 3.91	122 19.56	16.69	1.2	6/09	0.11	AC	C1	
11	18:10	22.17	48 3.52	121 52.08	0.99	1.1	5/07	0.04	AD	P1	P
12	6:54	70.70	46 12.52	122 11.29	0.07*	1.5	6/06	0.10	BC	S1	L
13	1:13	30.78	46 22.47	122 15.23	10.87	0.6	15/23	0.11	AA	S1	
13	3:44	60.67	46 22.06	122 15.17	10.12	-0.3	8/13	0.05	AB	S1	
13	11:45	60.94	48 7.08	121 49.96	13.28	2.5	18/20	0.19	AB	P1	
13	23:10	31.69	46 11.98	122 11.98	1.17	1.1	8/08	0.19	BB	S1	L
14	5:18	53.90	46 21.67	122 13.99	6.35	-0.2	8/11	0.16	BB	S1	
14	8:23	47.03	46 11.70	122 11.36	0.04*	0.7	6/06	0.14	CC	S1	
14	21:26	49.86	48 24.93	121 19.66	3.15	1.4	5/05	0.18	BD	P1	P
15	19:44	34.72	48 13.26	121 34.53	4.53	1.3	7/08	0.27	BD	P1	
16	23:33	27.87	48 3.42	121 46.83	0.44	1.0	5/05	0.19	BD	P1	P

July 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
17	11:3	23.85	46 30.17	121 44.18	3.36	1.6	19/23	0.17	AC	C1	
17	12:44	31.39	47 55.98	121 52.01	13.74	1.2	5/08	0.18	AD	P1	
18	22:45	33.03	48 2.07	121 43.69	2.38	1.8	10/12	0.15	BC	P1	
19	21:56	58.43	46 32.76	121 45.68	12.02	1.1	14/20	0.14	AB	C1	
20	15:50	15.10	46 43.66	121 3.25	8.43	2.2	19/23	0.18	BC	C1	
20	19:31	13.22	46 12.17	122 11.30	0.28*	1.2	6/06	0.07	BC	S1	L
20	20:17	36.54	46 12.23	122 11.31	0.41*	1.8	6/06	0.10	BC	S1	L
21	3:34	18.43	46 19.82	122 14.28	9.60	0.	11/20	0.11	AA	S1	
21	5:18	48.59	46 21.70	122 15.00	9.72	0.5	16/24	0.13	AA	S1	
21	13:20	62.07	46 38.50	121 39.85	0.81	1.1	16/21	0.19	AB	C1	
21	23:36	33.61	47 59.72	121 35.22	0.50	2.2	26/28	0.42	CC	P1	
22	2:12	58.19	46 38.38	121 39.82	0.84	0.1	4/07	0.16	BD	C1	
22	2:40	46.98	46 10.47	122 9.32	8.38	0.1	16/23	0.21	AB	S1	
22	6:12	50.78	46 16.68	122 12.70	9.04	-0.4	11/16	0.07	AA	S1	
22	9:18	40.89	47 58.77	121 33.28	5.83#	1.3	7/09	0.22	BD	P1	
22	22:37	36.67	48 3.11	121 53.43	2.70	1.1	6/08	0.15	BC	P1	P
23	9:36	51.15	45 56.15	122 25.79	12.41	0.9	22/28	0.18	BB	P1	
23	14:25	47.73	47 47.43	121 45.77	7.06	1.0	6/06	0.17	BD	P1	
23	23:40	49.32	47 32.12	121 59.25	14.46	2.2	29/31	0.35	BB	P1	
24	4:51	33.09	47 43.43	121 49.06	16.67	2.1	19/23	0.38	BB	P1	
24	21:30	65.93	46 16.35	122 12.78	6.28	-0.1	12/20	0.13	AA	S1	
25	3:34	47.42	46 11.57	122 11.58	0.04*	0.9	5/05	0.07	CD	S1	L
25	22:21	28.66	46 29.61	122 18.42	8.15	1.7	23/27	0.34	CB	C1	P
26	4: 6	50.25	46 7.04	122 15.99	7.69	0.3	10/13	0.19	BB	S1	
26	14: 4	48.25	46 7.25	122 16.34	1.60	1.5	22/26	0.22	BB	S1	P
27	13:28	66.47	47 59.22	121 44.76	7.14	1.0	9/10	0.44	CC	P1	P
27	23:43	28.60	48 2.49	121 42.88	2.34	1.3	5/07	0.10	AD	P1	H
28	14:24	38.72	46 11.94	122 11.43	1.27	0.9	7/07	0.04	AB	S1	
29	0:45	63.09	47 50.10	121 57.82	5.91	1.6	5/06	0.15	AD	P1	H
29	11:34	16.71	47 26.70	121 47.99	21.22	1.6	10/12	0.23	BB	P1	
30	23:49	66.38	47 59.91	121 27.80	0.06*	0.6	6/06	0.24	CC	P1	P
31	20:27	17.36	46 38.16	121 40.37	2.51	2.1	24/27	0.23	BB	C1	

Aug 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	4:51	59.67	46 4.32	122 27.42	15.19	0.6	13/18	0.12	AB	S1	
1	6: 5	14.77	46 21.57	122 15.28	10.49	0.3	15/21	0.15	AA	S1	
1	18:20	27.32	48 14.08	121 42.09	14.37\$	1.5	4/07	0.46	DD	P1	H
1	23:10	50.01	46 12.72	122 22.33	0.06*	1.0	19/22	0.22	BA	S1	X
1	23:24	64.45	46 56.29	121 43.19	18.63	0.4	6/08	0.32	CC	C1	
2	10:21	8.14	47 31.68	120 38.35	0.04*	1.5	6/09	0.36	CD	N1	H
2	23:18	57.28	47 59.36	121 39.17	5.78	1.4	14/16	0.28	BC	P1	P
3	22:13	28.71	48 24.74	121 44.94	0.24	1.4	14/14	0.38	BC	P1	P
3	22:26	66.96	48 5.43	121 54.16	0.55	1.2	9/10	0.07	AC	P1	P
4	3:17	33.78	46 12.32	122 11.25	0.08*	1.8	7/07	0.13	BB	S1	L
4	16: 0	12.96	47 1.01	121 53.23	15.63	1.3	16/20	0.30	BB	P1	
4	17:19	45.55	46 29.27	122 24.33	16.23	0.3	12/17	0.17	AA	S1	
4	17:55	62.58	46 10.75	121 51.91	0.06*	2.0	20/21	0.15	AC	S1	P
4	19: 5	34.06	46 22.23	122 15.38	9.43	0.4	14/22	0.12	AB	S1	
4	19:23	68.85	46 12.07	121 57.34	0.05*	0.6	9/11	0.12	BD	S1	P
5	21: 6	69.05	46 29.91	122 18.44	0.07*	1.7	22/26	0.28	BB	S1	P

Aug 1983											
DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
7	1:7	53.66	48 19.02	121 39.55	0.07*	1.2	6/07	0.12	AD	P1	
7	14:30	46.31	48 31.28	121 44.93	2.16#	0.8	11/15	0.15	CC	C1	
8	18:20	30.78	48 30.42	121 58.53	1.24	0.7	6/08	0.15	BC	S1	
10	19:33	20.29	46 3.95	122 2.72	1.14	1.1	18/20	0.19	BB	S1	P
10	20:52	70.25	46 4.96	122 3.91	1.32	1.1	18/18	0.21	BC	S1	P
10	22:44	59.29	47 4.66	121 21.50	0.08*	1.8	23/23	0.37	CC	C1	P
12	1:12	58.42	47 29.78	121 40.55	14.68	3.1	40/42	0.22	BA	C1	F
12	18:58	41.44	48 29.73	122 18.16	0.06*	0.9	17/20	0.20	BB	S1	P
12	19:41	21.74	47 8.10	121 26.52	2.12	1.4	13/13	0.37	BC	C1	P
12	22:14	30.36	48 57.64	121 55.29	4.32	1.0	15/15	0.15	AB	P1	P
13	11:28	13.64	48 43.97	121 2.93	3.24	0.7	7/07	0.09	BC	C1	
14	20:42	55.80	46 5.83	122 9.79	7.15	0.7	14/19	0.15	AB	S1	
15	23:31	60.98	48 38.51	121 47.84	0.04*	1.6	13/13	0.13	CC	C1	X
16	0:33	32.60	47 59.94	121 35.35	2.96	1.6	14/14	0.22	BC	P1	P
16	15:58	67.92	46 12.76	122 11.21	0.10*	1.5	6/06	0.20	CC	S1	L
17	12:43	19.37	48 20.08	122 14.68	8.83	0.4	20/28	0.19	BA	S1	
17	13:21	57.91	46 50.06	121 47.07	1.10	1.3	6/06	0.28	BC	C1	L
17	20:6	66.32	47 59.02	121 40.52	7.07	0.7	4/06	0.07	BD	P1	
18	18:13	39.99	46 9.15	121 39.15	0.09*	0.9	10/14	0.30	BD	C1	P
19	4:13	28.86	48 12.04	122 11.27	1.42	1.2	9/10	0.11	AB	S1	
19	13:24	39.17	48 12.11	122 11.25	0.34	0.9	12/12	0.13	AA	S1	
21	5:20	15.12	48 19.51	122 14.52	8.87	0.3	18/24	0.20	BA	S1	
22	5:20	19.24	48 38.94	121 55.54	9.68	0.6	10/17	0.14	AB	C1	
22	21:43	28.23	48 1.49	121 56.81	2.08	0.5	4/05	0.07	CD	P1	P
24	14:26	62.60	48 20.74	122 14.29	7.63	0.2	17/26	0.16	AB	S1	
24	23:15	65.53	48 57.86	121 55.21	3.94	0.9	18/18	0.24	BA	P1	P
25	0:56	60.92	47 47.18	121 41.00	9.93	0.7	6/09	0.20	BC	P1	
25	15:57	74.73	48 11.56	121 59.66	0.76	1.3	22/25	0.18	AB	S1	P
28	1:8	-3.89	48 15.29	120 41.14	1.62	1.6	6/10	0.30	CD	N1	H
26	2:4	-0.54	48 16.41	120 40.20	0.35#	1.9	10/13	0.95	DC	N1	H
26	18:23	26.13	48 12.48	122 10.93	0.04*	2.2	9/09	0.25	BA	S1	L
28	23:22	26.03	48 44.01	121 34.72	1.88\$	1.6	17/19	0.23	BA	C1	
27	1:24	22.61	45 20.06	121 39.53	1.28\$	2.0	8/08	0.36	CC	C1	P
27	16:39	17.45	45 23.29	121 34.36	1.03	1.1	4/04	0.11	AD	C1	P
27	17:25	65.38	48 49.63	121 47.41	0.73	1.9	4/04	0.05	AD	C1	L
27	18:59	43.45	48 12.84	122 3.59	0.05*	2.1	25/25	0.23	BB	S1	X
27	20:54	42.51	48 5.40	121 56.21	3.70	1.7	6/10	0.27	BC	P1	H
29	4:2	75.88	48 11.97	122 11.71	1.50	0.5	12/13	0.11	AB	S1	
29	18:44	4.08	45 57.76	121 18.49	8.08	1.4	21/21	0.20	BC	C1	P
29	22:23	15.90	48 50.52	121 44.72	1.07	0.5	6/08	0.25	BC	C1	
30	0:52	34.60	47 59.78	121 35.30	0.89	1.7	19/21	0.31	BC	P1	P
30	5:14	43.23	48 43.64	121 35.31	0.06*	0.5	6/07	0.16	BC	C1	
30	21:28	59.90	48 11.37	122 21.21	0.52	0.4	15/17	0.24	BB	S1	X
30	22:26	21.90	46 11.94	122 22.43	0.07*	0.7	19/23	0.27	BC	S1	X
30	22:39	4.57	45 34.83	121 38.09	3.47	1.8	15/15	0.32	BC	C1	P
31	21:7	52.17	48 51.90	121 45.70	0.04*	1.1	8/09	0.14	BC	C1	P
31	22:26	44.95	47 7.93	121 26.52	0.10*	1.5	15/15	0.30	CC	C1	P

Sept 1983											
DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	17:57	28.09	46 12.04	122 22.40	0.09*	0.7	12/15	0.32	CC	S1	X

Sept 1983

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
2	5:58	20.15	46 26.19	122 23.79	9.76*	0.9	21/28	0.10	AB	S1	
2	11:42	32.07	46 16.05	122 28.19	15.20	1.0	21/28	0.12	AA	S1	
2	18:44	15.12	47 56.27	121 52.52	11.64	0.2	4/06	0.14	BD	P1	
2	22:32	62.92	46 11.66	121 57.32	0.98#	0.9	19/20	0.14	AC	S1	P
4	4: 5	57.32	46 35.82	121 45.78	9.69	0.4	5/11	0.07	AD	C1	
4	16:57	5.90	47 22.74	121 48.02	23.22	0.4	6/08	0.19	BC	P1	
4	20:22	30.69	46 54.78	121 42.52	0.92	2.2	5/05	0.35	CD	C1	L
6	1:40	55.55	46 52.02	121 53.91	9.18	0.5	9/12	0.13	AB	C1	
6	23:50	55.17	46 53.94	121 37.20	0.08*	0.5	10/13	0.26	BB	C1	
7	19:52	39.41	46 11.56	122 20.88	0.08*	0.4	11/14	0.22	BB	S1	X
7	20:13	41.34	47 10.05	121 56.66	8.25	1.4	15/17	0.38	BB	P1	P
9	18:23	71.94	46 12.35	122 22.37	0.08*	1.0	13/16	0.20	BB	S1	X
10	16: 3	66.20	46 12.28	122 8.08	9.03	-0.3	6/10	0.10	AC	S1	
10	16: 4	24.56	46 12.17	122 10.19	6.77	-0.4	8/11	0.13	AB	S1	
10	17:28	14.57	47 59.36	121 56.73	10.02*	1.8	8/10	0.23	BC	P1	
11	13:22	48.44	45 52.93	122 13.41	12.15	1.0	19/23	0.18	BB	S1	
11	19:18	35.65	46 31.45	121 24.72	0.09*	0.9	7/09	0.20	CD	C1	
11	22: 4	28.06	46 12.87	122 11.29	0.04*	2.2	10/10	0.25	BA	S1	L
11	23:44	71.48	46 31.80	121 24.30	0.02*	1.8	13/16	0.27	BC	C1	
11	23:46	56.75	46 30.91	121 23.68	4.34\$	0.7	6/08	0.27	CD	C1	
12	1: 9	55.67	46 31.81	121 24.20	4.40#	0.8	9/12	0.16	BC	C1	
14	8:28	57.21	47 2.72	121 54.29	17.77	2.2	26/31	0.17	BA	C1	
14	20:18	44.72	47 59.78	121 56.05	10.64\$	1.9	10/12	0.27	CC	P1	
14	23:18	54.55	46 13.90	122 17.34	0.58	0.6	10/10	0.22	BC	S1	X
15	14:58	25.41	46 14.16	122 18.19	0.62	-0.2	8/10	0.12	AD	S1	P
15	18: 2	61.19	46 27.80	122 23.97	16.74	2.3	29/37	0.14	AA	S1	
16	12:14	58.08	47 40.90	121 56.75	26.30	0.6	10/13	0.18	BB	P1	
16	15:58	71.66	46 13.87	122 18.01	0.84*	0.6	13/15	0.16	BB	S1	X
16	21:45	37.52	47 52.72	121 57.45	7.83	1.0	4/06	0.12	AD	P1	P
16	21:56	12.77	48 5.28	121 55.27	3.86	1.8	5/07	0.45	CD	P1	H
17	18: 8	27.74	46 12.02	122 11.25	1.62	0.7	10/10	0.08	AA	S1	
18	2:16	69.34	46 12.99	122 1.87	1.39	1.4	15/17	0.28	BC	S1	X
19	14:25	76.67	46 12.03	122 11.12	0.03*	1.6	10/10	0.25	BB	S1	L
20	0:24	73.70	46 13.56	122 16.93	1.78	0.4	13/18	0.22	BB	S1	P
20	2:27	31.14	47 1.74	121 42.03	7.15	1.2	17/21	0.21	BB	C1	
20	23:18	72.94	46 14.15	122 18.87	0.47	0.6	13/15	0.17	BB	S1	X
21	2:28	19.94	47 9.44	121 56.55	3.94	1.6	19/19	0.45	CC	P1	P
22	23:12	34.45	46 22.94	122 28.28	6.05	1.5	22/24	0.21	BC	S1	P
23	17:45	52.66	46 13.69	122 18.01	1.93	0.9	12/12	0.13	AB	S1	X
24	5: 6	15.30	46 24.48	121 31.93	0.04*	2.0	34/36	0.30	BC	C1	
24	16:27	18.13	47 32.12	120 38.69	0.95	1.3	7/09	0.23	BC	N1	
25	19:44	27.86	46 11.94	122 21.39	12.64	0.5	14/20	0.19	BB	S1	
25	22:38	22.84	46 11.54	121 57.34	1.58	0.9	18/19	0.16	BC	S1	P
26	10:54	32.46	46 24.78	121 32.09	0.44\$	2.1	33/35	0.25	CC	C1	
26	15: 7	41.20	47 37.63	121 44.26	12.96	1.7	11/13	0.13	AC	P1	
26	15:35	56.92	46 19.53	122 16.13	8.99	1.3	20/28	0.18	BA	S1	
26	19:35	23.04	46 15.03	122 19.31	1.66	0.5	10/11	0.14	AC	S1	X
27	11:28	49.50	46 24.32	121 31.71	0.04*	1.6	31/32	0.31	CC	C1	
27	21:36	16.59	46 24.06	121 31.60	0.02*	1.1	12/12	0.28	BC	C1	
28	19:18	43.16	46 13.76	122 22.03	0.28	0.4	9/10	0.15	BD	S1	X
28	23:11	52.01	46 24.49	122 18.27	9.52	0.5	17/26	0.14	AB	S1	

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DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
29	8:16	30.13	46 24.30	121 31.66	0.03*	1.2	23/24	0.29	BC	C1	
29	12:37	58.14	47 32.19	120 37.53	6.89	1.0	13/15	0.31	CC	N1	
29	12:42	28.99	46 19.76	122 13.98	8.48	0.1	17/25	0.16	BB	S1	
29	15:18	23.29	46 13.23	122 18.06	1.23	0.3	15/15	0.20	BB	S1	X
29	16:51	20.81	46 13.73	122 18.32	1.59\$	-0.3	7/07	0.09	AB	S1	P
29	17:40	22.83	47 11.71	121 46.64	2.43	1.1	10/10	0.21	BA	P1	P
29	19:36	63.76	46 13.74	122 18.34	1.51	-0.2	12/12	0.11	AB	S1	X
29	21:18	69.25	45 11.32	121 47.05	18.00*	1.7	6/06	0.28	BC	C1	P
29	21:58	50.31	46 4.64	122 6.22	15.83	1.0	16/18	0.22	BB	S1	P
29	22:17	57.09	46 13.39	122 17.24	0.96*	0.2	13/14	0.21	BB	S1	P
29	23:56	62.82	46 56.77	121 58.66	0.04*	0.7	7/07	0.39	CC	P1	
30	2:25	19.43	46 38.57	121 47.88	2.60	0.9	8/08	0.20	BC	C1	X
30	17:31	5.06	45 59.13	121 31.54	6.31	1.7	24/24	0.20	BC	C1	P
30	21:37	62.78	46 50.70	121 46.15	0.97\$	1.0	15/19	0.30	CC	C1	