

**QUARTERLY TECHNICAL REPORT 82-B**

**on**

**Earthquake Monitoring of Eastern Washington and Northern Oregon**

April 1 through June 30, 1982

Geophysics Program

University of Washington

Seattle, Washington

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## Operations

The second quarter of 1982 was exceptionally good insofar as network operations were concerned. Difficulties caused by winter weather were mainly cleaned up by early April, and the eastern Washington stations were up 100% of the time for much of May and June. Two station sites had changes made in their instrumentation. Calibrated S13 seismometers were installed at WA2 and ETT, and a new low-noise VCO was also installed at ETT. The WA2 VCO will be replaced later this year. MDW was scheduled for a change to an S13 seismometer, but site access problems and severe summer temperatures have delayed this. Calibration curves are being prepared and will be included with the annual report.

## Data

There were 117 events processed by the network in the Eastern Washington - Northern Oregon region. Of these 42 were known or suspected blasts and 75 were earthquakes. Only 5 of these were hand picked from film records because they were missed for one reason or another by the on-line computer system. This activity is slightly below normal as compared to the previous several reporting periods. Table I is the event catalog for this quarter and figures 1-4 show the epicenters for earthquakes separate from blasts in the two areas of interest.

There were no felt events nor events of significant size in the reporting area during this quarter. There were no events larger than magnitude 2.1 and no unusual sequences of events. The activity near Wooded Island mentioned in the last quarterly report did not continue, and other than typical activity near Entiat, and a small sequence of 5 events near Yakima there were no unusual concentrations of activity in Eastern Washington. More earthquakes were located to the southwest of Mount St. Helens than in previous quarters. This may be due, at least partly, to the increased sensitivity in this area because of the new stations in the Portland area.

**Downhole Seismometer Program**

Development of a high performance isolation amplifier-data transmission unit for the downhole seismometer was conducted during this quarter. The electrical environment near the test boreholes is very bad, and a need for high common-mode rejection amplifiers was great.

The seismic attenuation model using the modified and corrected Holosonics cross-hole survey was completed. The resulting model is an alternating sequence of high and low velocity layers of thickness ratio roughly 2:1, but sometimes up to 1:1. The model is a substantial improvement over existing ones.

## C A T A L O G

Apr 1982

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	21:46	28.93	48 17.46	119 46.87	0.04*	2.1	9/12	0.33	CC	E1	H
1	22:57	53.79	46 4.83	122 33.01	7.06	1.1	12/12	0.25	BD	S1	
2	1:45	49.38	47 29.85	119 6.29	0.08*	2.0	5/08	0.68	DD	N1	H
2	17:42	19.94	46 15.44	122 26.87	0.07*	0.2	8/11	0.14	AC	S1	P
2	21:38	57.10	46 13.76	122 20.30	0.42	-0.7	7/09	0.13	AC	S1	P
5	11: 4	42.89	46 43.55	120 34.06	14.86	1.7	16/18	0.35	BB	C1	
5	16:15	28.84	47 31.05	119 18.09	0.81	1.3	5/05	0.04	AD	N1	P
6	8:30	40.35	46 3.15	122 42.09	13.97	2.0	19/24	0.19	BC	P1	
6	23:15	4.41	47 31.06	119 16.85	0.07*	1.3	7/07	0.85	CC	N1	P
10	6:33	37.59	48 24.86	119 9.13	0.05*	0.7	5/05	0.14	CD	E1	
10	10:40	58.61	48 24.37	119 10.07	0.07*	1.7	6/08	0.13	BC	E1	
12	6:35	65.68	47 42.38	120 26.80	0.67	1.0	8/09	0.58	DC	N1	
12	19:26	10.20	47 52.68	118 7.27	0.05*	1.8	14/15	0.70	BC	N1	X
15	1: 1	33.49	47 30.64	119 17.19	0.06*	2.1	12/13	0.22	BC	N1	P
15	11:37	12.94	45 48.28	121 53.51	15.02	1.1	20/22	0.25	BC	C1	
15	23:53	55.80	46 48.81	118 8.36	1.32	1.7	12/14	0.43	CD	E1	
16	22:36	40.89	46 13.70	122 20.59	0.94	0.5	9/13	0.09	AB	S1	
18	10: 4	47.19	46 50.00	120 36.87	11.74	1.2	4/07	0.44	CD	N1	H
19	17:57	65.32	46 24.27	122 48.42	18.78	0.8	15/18	0.22	BB	S1	
20	21:42	15.57	47 55.11	118 7.97	0.04*	1.8	13/13	0.72	DD	N1	P
20	23:59	28.35	47 32.11	118 41.77	0.04*	1.7	6/07	2.11	DD	N1	H
21	9:56	10.38	46 32.36	121 25.05	8.20	1.0	14/15	0.25	BB	C1	
21	18:49	27.90	45 42.15	121 27.52	6.57	1.3	13/14	0.32	BC	C1	P
22	2:49	11.26	47 31.41	119 17.71	0.10*	1.7	14/16	0.51	CC	N1	P
22	20:37	22.72	46 23.56	119 10.02	0.04*	1.7	11/12	0.16	AC	E1	
22	21:44	60.20	46 24.54	119 9.98	0.04*	0.9	9/09	0.22	CB	E1	
22	21:57	24.69	47 8.87	118 36.60	0.05*	1.7	20/20	0.72	CD	N1	P
23	21: 4	17.18	46 57.36	120 10.80	3.27	1.6	8/11	0.29	BC	E1	H
24	16:12	14.46	46 14.81	122 33.27	14.91	1.7	22/28	0.14	AB	S1	
24	23:20	15.00	46 13.60	122 19.69	6.94\$	-0.3	8/09	0.11	AB	S1	P
26	23:27	74.28	46 13.71	122 21.23	1.38	-0.5	7/10	0.07	AD	S1	P
27	5:14	66.42	47 41.46	120 7.37	0.46#	0.	16/19	0.35	BC	N1	
27	22:45	42.92	46 3.73	122 35.52	0.07*	0.5	16/17	0.20	BC	S1	P
28	17:40	32.64	46 19.48	122 29.64	0.05*	0.6	16/19	0.22	BC	S1	P
29	8:31	29.43	46 31.50	121 25.13	7.18	1.5	22/24	0.32	BC	C1	
30	18: 1	61.79	46 48.04	119 24.39	1.85	0.6	13/16	0.19	AA	E1	
30	19: 9	8.42	46 21.49	122 32.28	0.09*	1.1	5/06	0.36	CD	S1	P
30	21:41	64.21	46 13.32	122 20.34	0.06*	0.2	9/12	0.19	BB	S1	P

May 1982

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	22: 7	50.13	46 32.94	121 25.02	7.55	1.7	23/25	0.25	BB	C1	
4	12:22	33.44	46 26.33	122 23.48	16.59	0.8	18/26	0.16	AB	S1	
5	20:53	59.42	46 19.23	122 27.51	0.45	1.8	22/24	0.19	BB	S1	P
6	19:44	19.55	46 13.37	122 20.19	0.09*	0.3	8/09	0.18	BB	S1	P
6	20: 0	49.26	45 44.73	120 47.50	13.20	1.4	4/04	0.40	AD	C1	

## May 1982

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
6	20:28	48.48	45 37.89	121 24.99	1.42\$	1.8	6/07	0.91	DC	C1	P
7	21:27	57.73	46 18.34	122 23.59	16.42	-0.3	7/09	0.04	AC	S1	
8	7: 6	12.79	47 31.90	119 43.12	9.40	1.5	12/16	0.16	BC	N1	
11	4:47	28.31	45 53.27	120 8.74	7.35\$	1.4	6/08	0.11	AD	E1	H
12	11:50	68.88	45 10.66	121 14.42	3.87	1.4	6/09	0.17	AC	C1	
12	22:11	9.39	47 51.88	118 5.28	0.07*	1.8	10/10	0.87	DC	N1	P
13	15:18	20.14	47 41.79	120 21.69	0.49#	1.6	12/14	0.28	BB	N1	
13	16:40	47.09	46 13.96	122 18.18	3.02	0.2	7/10	0.18	BB	S1	P
13	21:55	24.73	46 31.89	117 46.94	0.08*	2.0	10/12	0.45	DD	E1	
13	23:23	61.90	47 39.56	120 23.24	0.59	1.3	6/11	0.15	BD	N1	
17	22:23	2.01	46 49.48	118 33.38	1.31	2.1	14/15	0.40	BD	E1	
19	8:13	50.33	46 25.16	122 21.21	17.54	0.7	11/13	0.16	AB	S1	
19	22:10	20.55	46 14.17	122 18.72	0.34	-0.1	8/11	0.08	AB	S1	P
20	15:59	59.59	46 12.51	122 19.05	4.90	0.2	5/07	0.09	BD	S1	P
21	22: 6	51.81	46 19.29	122 29.58	3.63	1.6	19/21	0.21	BC	S1	P
21	23: 4	9.00	47 30.29	119 17.15	0.43	2.1	8/08	0.13	AC	N1	P
22	22: 8	63.72	47 40.61	120 3.97	5.87	0.8	5/10	0.14	BD	N1	
24	19:50	31.73	46 50.00	119 26.84	3.53	0.9	6/07	0.04	AC	E1	
25	23: 7	21.00	46 27.79	121 57.81	4.40	1.5	12/14	0.18	BA	C1	P
26	12:33	52.01	46 25.88	121 38.48	0.47	0.8	12/15	0.11	AC	C1	
26	21:45	20.85	45 45.24	122 31.62	15.95	1.8	21/24	0.14	AB	C1	
27	21:51	45.14	47 40.79	120 13.33	0.08*	1.2	6/08	0.13	AC	N1	
29	13:27	26.41	46 25.80	121 39.79	1.00\$	1.4	17/20	0.21	CC	C1	

## June 1982

DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE
1	5: 9	18.34	45 55.08	122 25.52	20.80	0.6	14/19	0.18	AC	S1	
1	20: 1	61.43	46 19.82	122 30.65	0.09*	0.9	12/13	0.14	AC	S1	P
2	8:33	14.02	46 26.40	122 23.61	13.13	0.4	7/11	0.11	AB	S1	
2	9:10	-0.90	46 45.45	120 37.64	6.63	1.0	4/07	0.24	CD	E1	H
3	4: 5	8.44	46 23.39	119 33.24	17.50	0.9	16/21	0.20	AA	E1	
3	14:47	50.08	45 55.58	122 49.41	21.59	2.0	22/24	0.19	BB	P1	
3	19:57	41.73	47 43.70	121 25.17	3.89	1.6	6/06	0.16	BC	P1	
3	22:25	34.97	47 31.41	119 16.79	0.52	1.4	6/07	0.15	BC	N1	P
6	8:43	15.29	46 10.24	122 19.34	10.78	0.4	13/21	0.13	AA	S1	
7	19:16	70.61	46 19.68	122 30.50	0.05*	0.8	8/09	0.14	BC	S1	P
7	19:30	26.76	45 48.88	121 55.37	13.86\$	0.9	13/13	0.17	AC	C1	
7	22:28	29.20	47 30.61	119 17.53	0.48	1.5	8/08	0.16	BC	N1	P
7	22:43	22.23	46 21.19	122 33.74	0.05*	0.8	9/12	0.33	CC	S1	P
8	22:28	70.74	46 19.95	122 30.80	3.61	0.5	8/09	0.16	BC	S1	P
11	18: 3	55.25	46 21.17	122 30.62	11.00	0.6	5/07	0.10	BD	S1	
11	20:16	24.64	47 32.45	120 39.23	0.42#	1.2	11/13	0.25	BC	N1	
12	12:55	36.44	46 26.30	122 23.54	16.52	0.4	9/14	0.12	AB	S1	
13	12:43	9.07	45 50.22	122 16.10	14.79	1.4	18/21	0.14	AB	S1	
13	18: 1	49.29	47 37.86	120 11.62	2.42	0.4	4/08	0.05	AD	N1	
15	19:10	54.39	46 27.34	121 57.36	4.07	1.7	14/16	0.17	AB	C1	P
15	21:23	34.47	46 16.34	122 20.77	0.89	0.5	11/12	0.14	AB	S1	P
15	21:33	64.31	46 16.38	122 21.02	1.30	0.6	11/12	0.14	AB	S1	P
15	22: 3	31.16	46 17.88	119 46.50	2.70	1.0	13/13	0.26	BC	E1	
16	20:36	15.90	47 6.43	118 43.59	0.07*	1.9	19/19	0.25	CC	N1	P
16	21:18	19.72	46 16.12	122 21.44	1.72	0.5	10/11	0.12	AC	S1	P

June 1982												
DAY	TIME	SEC	LAT	LON	DEPTH	MAG	NS/NP	RMS	Q	MODEL	TYPE	
17	20:56	40.46	46 16.09	122 20.78	1.49	0.2	10/11	0.13	AB	S1	P	
19	1:57	18.80	46 24.38	122 18.24	13.41	0.5	7/11	0.08	AB	S1		
19	18:42	22.13	45 28.58	121 35.66	3.57	1.5	19/19	0.24	BC	S1		
20	18:25	24.43	47 40.20	120 11.88	0.54	0.6	5/07	0.19	BD	N1		
20	19:53	15.63	47 38.62	120 13.23	2.64	0.2	5/08	0.06	AD	N1		
21	15:48	23.56	47 27.05	121 22.97	17.85*	1.4	4/06	0.21	DD	P1	H	
21	21:48	61.11	44 56.57	120 43.25	2.54	1.9	10/10	0.10	AC	C1		
22	3: 5	22.83	45 59.96	122 37.46	16.95*	1.2	15/19	0.21	BB	P1		
22	13:13	57.52	48 25.57	119 59.64	0.09*	1.7	12/12	0.48	CD	N1		
22	19:13	62.71	46 26.53	121 55.88	0.04*	1.3	7/08	0.22	CC	C1	P	
23	1:56	43.03	46 19.81	121 58.74	2.69	0.9	19/23	0.18	BC	S1	P	
23	21:47	39.58	46 15.19	122 23.01	2.36	0.4	12/12	0.36	BB	S1		
23	21:59	18.01	45 53.70	122 13.54	1.36#	0.9	14/14	0.14	BD	S1		
24	19: 6	15.63	45 25.91	121 36.07	4.08	2.0	13/13	0.27	BC	C1		
25	11:48	18.76	45 59.91	122 37.68	18.37	1.1	9/12	0.16	AB	C1		
25	17:32	9.64	45 53.32	122 11.86	3.16	0.4	14/14	0.23	AC	S1		
25	23: 6	27.77	46 19.83	121 59.16	3.65	1.4	17/22	0.13	AC	S1		
26	21:10	64.66	45 26.07	121 36.15	0.09*	1.6	6/06	0.22	CC	C1	P	
27	3: 7	39.97	46 40.64	120 29.73	5.72	1.5	11/11	0.21	AC	C1		
27	5:30	43.25	45 39.13	122 47.96	21.01	2.0	30/31	0.19	AB	P1		
28	14:16	25.31	46 15.93	122 19.55	1.98	0.7	7/09	0.08	AB	S1	X	
30	14:40	54.49	46 40.77	120 31.46	7.77#	1.5	12/14	0.26	BC	E1		
30	14:53	43.13	46 16.08	122 20.10	1.68	0.7	10/12	0.09	AB	S1		
30	21:42	58.92	46 13.96	122 18.26	1.11	1.1	18/22	0.16	AB	S1		
30	21:43	65.29	46 15.99	122 20.48	1.42	0.7	10/14	0.15	AC	S1		
30	21:44	40.95	46 16.10	122 19.87	1.95	0.9	10/16	0.21	BB	S1		

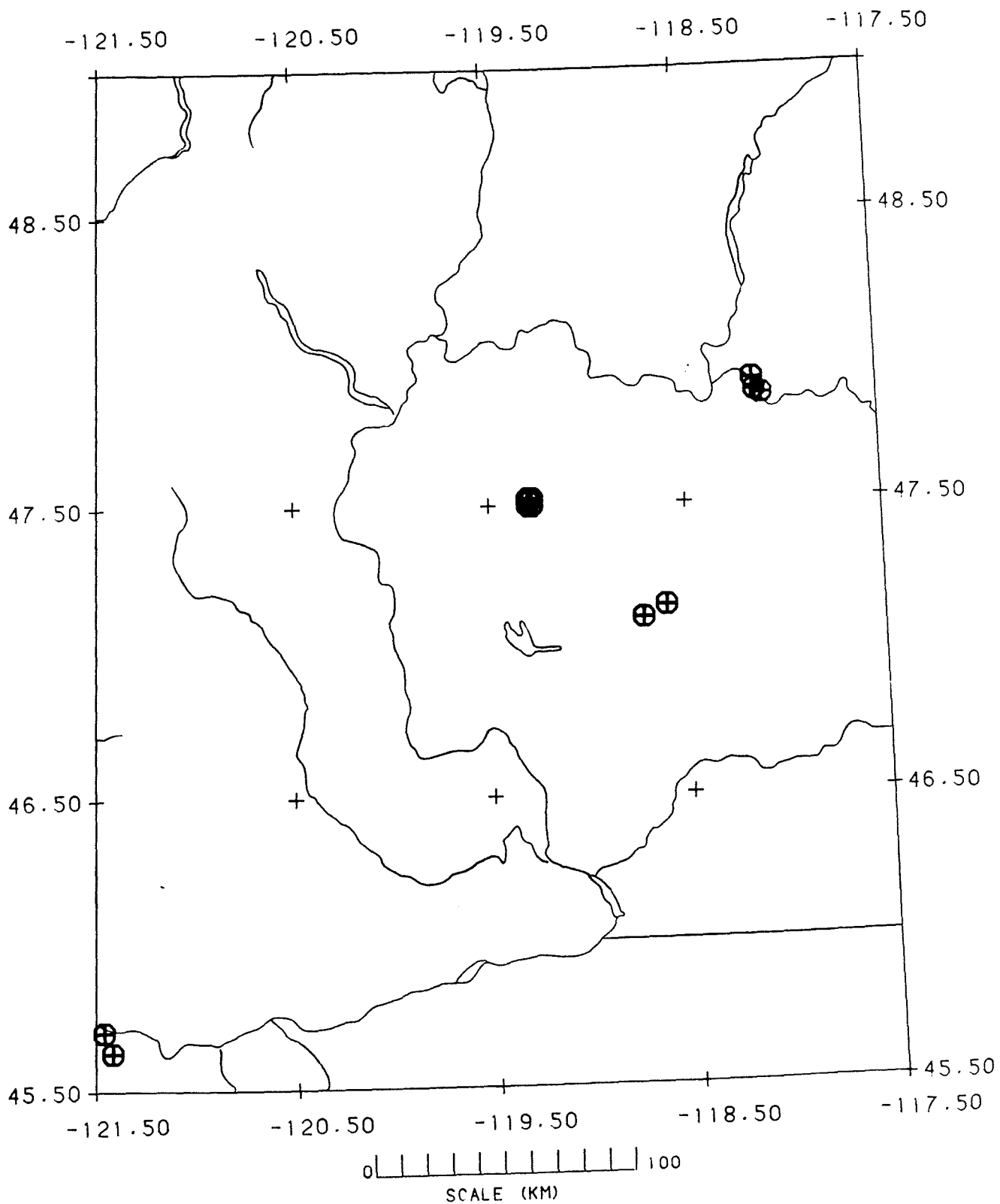


Fig. 1: Eastern Washington known and probable explosions

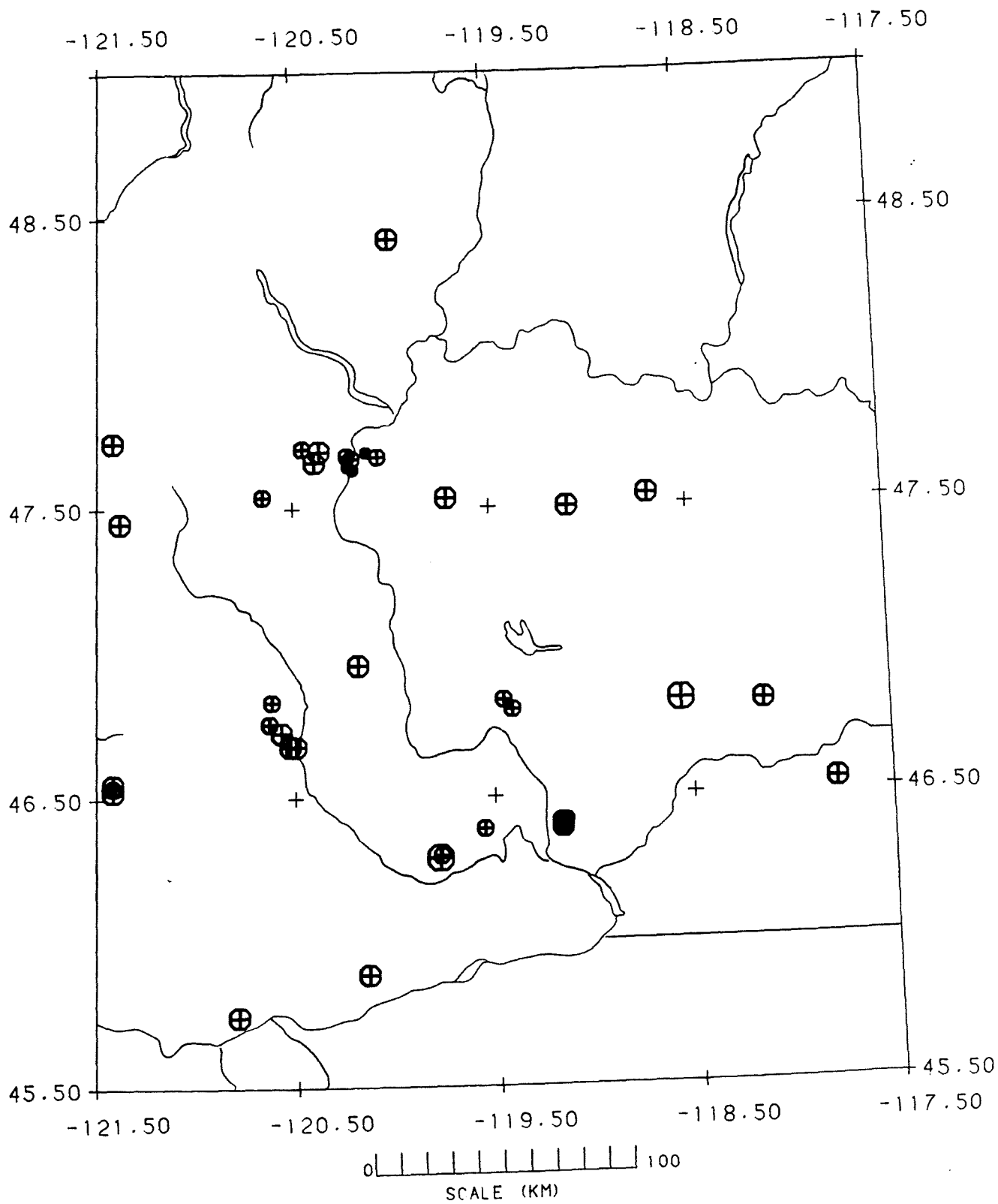
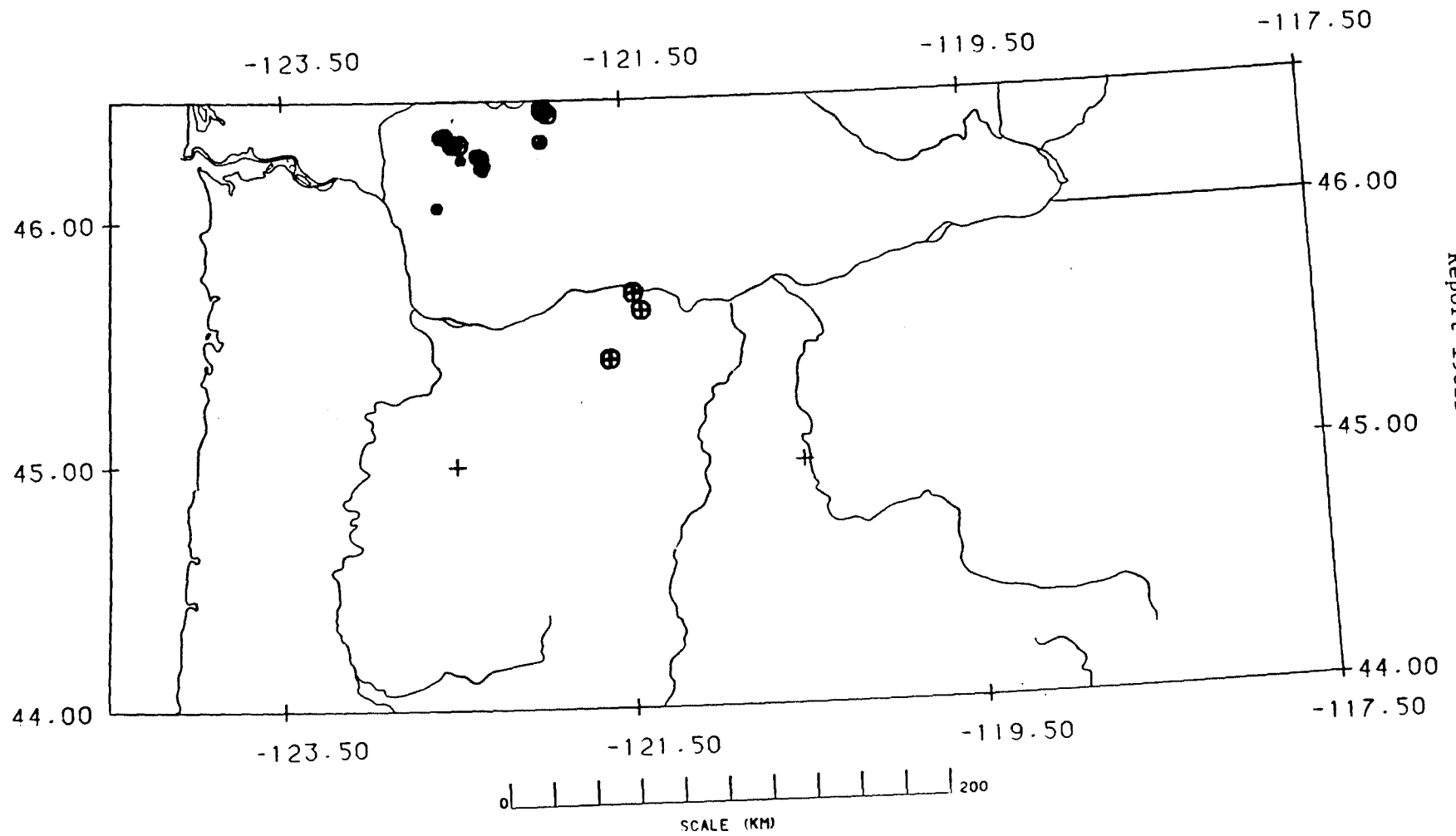


Fig. 2: Eastern Washington Earthquakes, Apr - Jun 1982





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Fig. 3: Southern Washington - Northern Oregon known and probable explosions

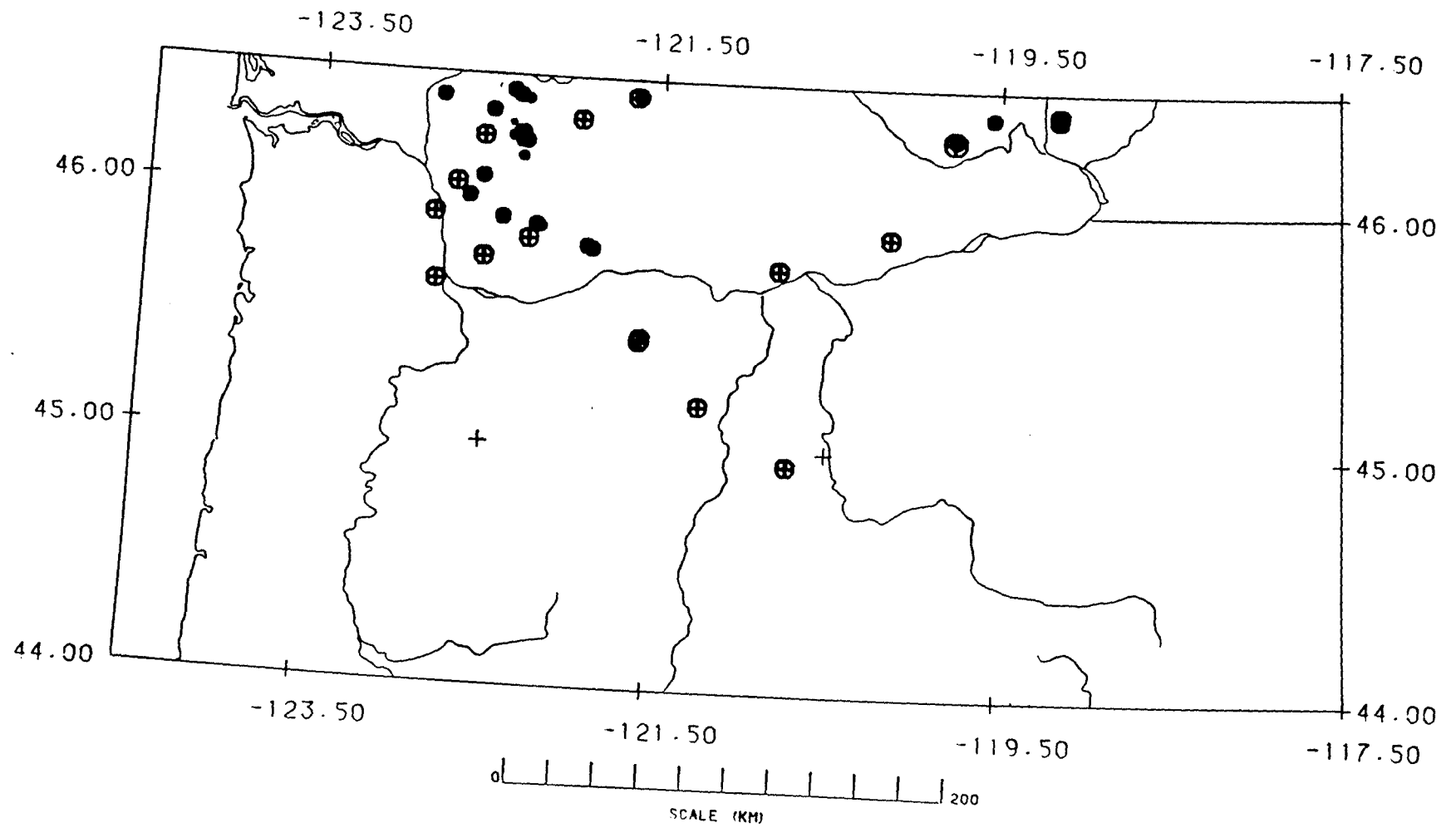


Fig. 4: Southern Washington - Northern Oregon Earthquakes Apr - Jun 1982