Quarterly Technical Report 77 - B

for

Hanford Seismic Network

April 1, 1977 through June 30, 1977

Geophysics Program

University of Washington

August 1, 1977

This report is also being sent to the Washington Public Power Supply System as part of the reporting requirements for Contract #C-10976.

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Operations

The stations used during this quarter are basically the same as were used last quarter (Figure 1). The new stations, ETT, PLN, WTP, were added around July 1, 1977, thus they have not been used for locations during this quarter. There have been no major operational problems during this quarter other than the slowness of the telephone company installing service for our new stations.

Data

The data for this quarter were processed as outlined in our annual technical report of July 15, 1977. The data are separated into north and south sections with different volocity models being used to locate the work (table 1). The catalog at the end of this report is similarly divided. The magnitude scale used is the updated one used in the annual report.

Figure 2 shows all of the earthquakes located in eastern Washington during the quarter. As in previous quarters the majority of the activity is in the Chelan area. The Hanford area remains quiet with a few small events in the Saddle Mountain area. Figure 3 is the same plot as Figure 2 with the known or possible blasts removed. The three events to the west near Yakima are not thought to be blasts though one of them may be. We are currently expanding our blast identification efforts.

Other Studies

The progress in other research projects has been covered through the end of June in our annual technical report of July 15, 1977.

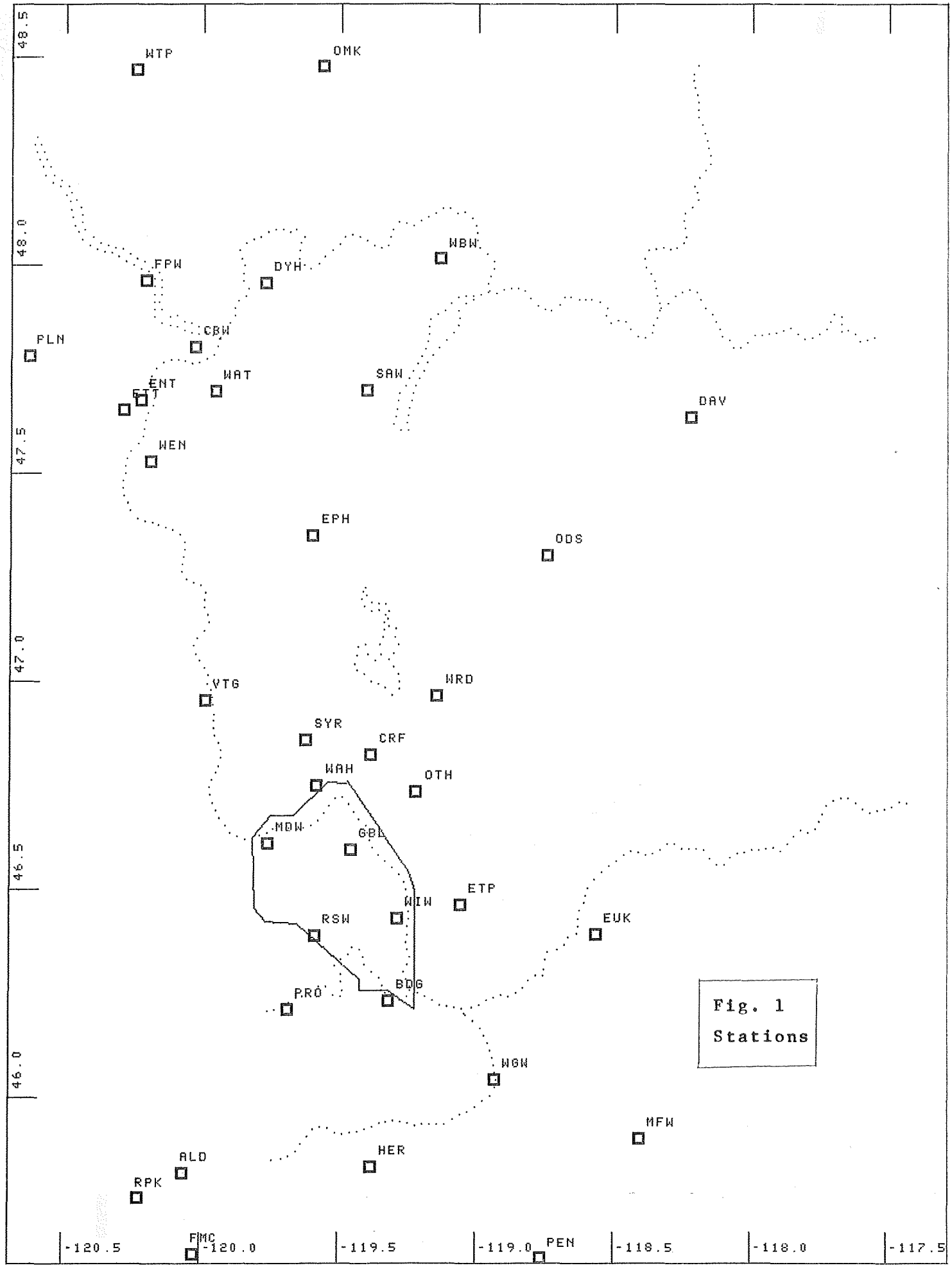
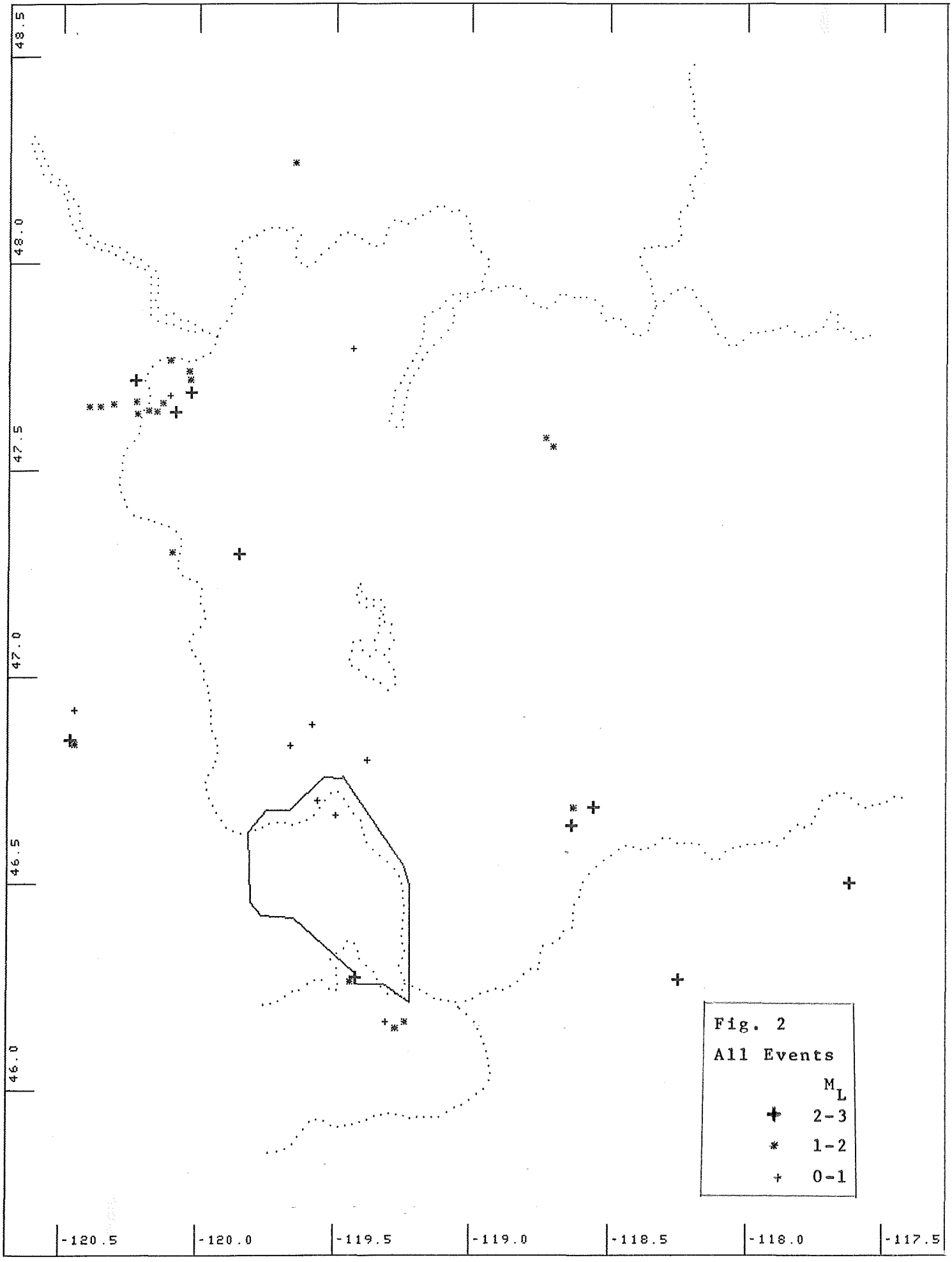
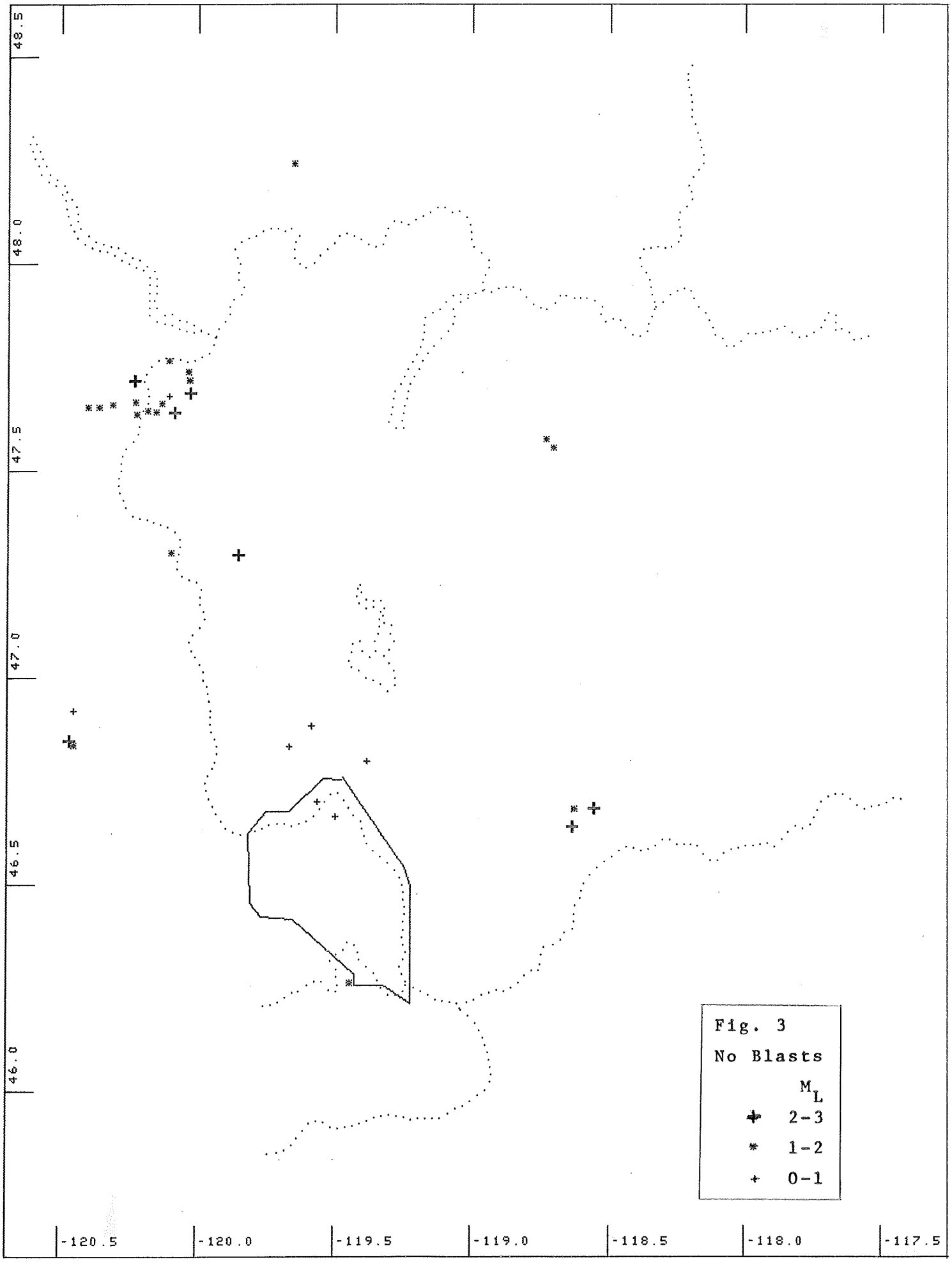


Fig. 1
Stations


48.5
48.0
47.5
47.0
46.5
46.0
-120.5
-120.0
-119.5
-119.0
-118.5
-118.0
-117.5
Fig. 2
All Events
M_L
2-3
1-2
0-1


48.5
48.0
47.5
47.0
46.5
46.0
-120.5
-120.0
-119.5
-119.0
-118.5
-118.0
-117.5
Fig. 3
No Blasts
M_L
2-3
1-2
0-1

Located with North Model

DATE	YRDAY	HRMN	SEC	N LAT	W LON	DEPTH	MAG	STA	GAP	ERR	ERZ	Q	TYPE
2/20/77	51	1 5	18.9	47-36.54	119-39.02	.5	2.1	8	122	.7	155*	C	X
4/ 8/77	98	1533	21.3	46-50.79	120-26.13	3.0	1.7	8	187	5.8	6.4	D	
4/ 8/77	98	2153	42.4	47-39.06	120- 8.62	.5	1.9	11	156	1.1	253*	C	
4/21/77	111	723	59.2	49- 7.25	117-40.10	4.2	3.6	9	287	74.8	53.2	D	R
4/22/77	112	1831	27.4	47-40.19	120-18.17	3.0	1.8	10	208	.8	5.8	D	
4/29/77	119	1154	45.5	48-15.11	119-37.96	2.0	1.0	8	138	.5	14.3	C	
4/29/77	119	1623	30.8	47-18.77	120- 5.16	2.1	1.7	10	172	1.4	25.2	C	
5/ 2/77	122	222	34.2	48-45.39	117-31.17	1.7	2.1	7	265	4.9	4.5	D	
5/ 2/77	122	1316	32.4	47-41.41	120- 5.54	12.0	.9	7	140	.7	1.5	B	
5/ 6/77	126	1727	48.8	47-44.93	120- 1.28	6.1	1.5	10	121	.3	.6	B	
5/ 7/77	127	1513	31.7	47-38.64	120- 5.25	6.4	2.1	12	133	.8	1.4	C	
5/ 9/77	129	2350	43.5	47-43.12	120-14.03	7.4	2.0	7	191	4.1	2.4	D	
5/10/77	130	1913	3.4	47-33.99	118-41.55	6.8	1.3	8	111	2.4	3.2	C	
5/12/77	132	948	14.9	47-40.33	120- 7.10	3.0	1.6	7	148	1.4	10.8	C	
5/12/77	132	1656	58.1	47-35.20	118-43.01	.1	1.2	7	114	1.6	3.3	C	
5/13/77	133	2228	36.6	46-50.97	120-28.03	1.0	2.0	12	166	3.1	3.1	C	
5/15/77	135	749	33.0	47-39.27	120-10.39	3.0	1.1	6	169	1.0	7.0	C	
5/17/77	137	414	8.4	47-39.83	120-20.88	1.5	1.5	9	98	.7	2.4	C	
5/17/77	137	10 3	48.5	46-55.81	120-26.16	6.6	.9	9	173	2.5	3.0	C	
5/18/77	138	20 6	47.7	46-30.19	117-37.60	3.0	2.3	9	297	9.6	3.3	D	P
5/23/77	143	1149	20.3	49-25.59	119-59.77	8.7	2.2	15	257	15.4	6.9	D	
5/23/77	143	12 9	.9	47-43.71	120- 1.01	7.8	1.6	12	120	.7	2.0	B	
5/27/77	147	028	51.1	47-39.76	120-23.34	6.7	1.7	9	223	.9	1.0	C	
5/29/77	149	1232	27.1	46-41.20	118-33.37	2.1	2.1	14	159	2.0	44.8	C	
5/31/77	151	2046	5.4	47-38.70	120-12.80	3.6	1.1	7	186	.3	1.7	C	
6/ 7/77	158	8 9	52.4	47-58.52	121-30.30	7.9	2.0	7	113	2.3	4.3	C	W
6/11/77	162	1624	32.0	47-40.47	120-13.07	6.9	1.7	10	187	.8	2.0	C	
6/18/77	169	1744	15.3	47-17.96	119-51.21	.1	2.3	16	120	.5	1.8	C	
6/19/77	170	323	.2	47-46.50	120- 5.55	3.0	1.0	6	141	.2	.6	B	
6/22/77	173	15 6	47.1	47-41.38	120- 1.93	4.7	2.3	12	122	.6	1.6	B	
6/23/77	174	044	13.4	47-48.08	119-25.20	.5	.9	6	206	1.6	166*	D	P

Located with South Model

DATE	YRDAY	HRMN	SEC	N LAT	W LON	DEPTH	MAG	STA	GAP	ERR	ERZ	Q	TYPE
4/ 4/77	94	2327	12.4	46-10.52	119-17.74	.5	.6	5	277	4.7	3.6	D	X
4/10/77	100	2313	44.4	46-42.72	119-32.67	2.5	.2	7	177	1.1	6.3	C	
4/14/77	104	1955	9.0	45- 7.49	120-52.78	9.7	2.8	17	268	8.4	9.2	D	R
4/26/77	116	0 2	23.8	46-16.63	119-25.48	.5	2.1	13	131	.8	1.4	B	X
4/28/77	118	2033	58.4	46-16.21	118-14.95	.6	2.1	14	263	3.2	2.6	D	P
5/10/77	130	2213	4.4	46-16.59	119-25.42	.2	2.1	6	131	.6	5.5	C	X
5/12/77	132	2326	17.8	46-16.44	119-25.62	.7	1.8	10	134	.5	1.1	B	
5/16/77	136	13 5	5.1	46-48.49	119-21.88	1.5	.4	5	237	3.1	9.9	D	
5/17/77	137	414	37.2	46-53.66	119-34.12	6.4	.8	4	252	0.0	0.0	C	
5/17/77	137	2258	12.8	46-10.56	119-13.60	1.1	1.4	7	188	1.4	3.6	C	X
5/29/77	149	1232	27.1	46-38.53	118-38.12	.9	2.1	10	244	4.0	5.1	D	
6/ 2/77	153	2327	20.0	46- 9.69	119-15.61	.5	1.9	9	163	.7	1.0	B	X
6/ 3/77	154	627	9.2	46-41.51	118-36.82	.8	1.5	9	178	2.8	6.5	C	
6/12/77	163	20 4	48.0	46-50.70	119-38.86	1.5	.4	5	256	.8	3.5	C	
6/26/77	177	010	20.4	46-40.45	119-28.87	17.2	.9	10	102	1.1	2.7	B	

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Title, Author(s), Affiliation

MICROEARTHQUAKE SWARMS NEAR WOODED ISLAND, WASHINGTON

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Body of Abstract

The seismicity of Eastern Washington is characterized by numerous microearthquake swarms which may be related to ongoing folding of the flood basalts. These swarms follow a classic pattern, isolated in space and time, building up in number of events and then decaying away with no outstanding principal event. The Wooded Island Area on the Hanford Reservation has shown great persistence in seismicity over the past six years, although the level of its activity fluctuates. A portable seismic array consisting of up to eight stations was used to study in detail the second half of a swarm at Wooded Island during the summer of 1975. Examination of joint P and S location of over 200 events of magnitude, M_C = -0.5 to 2.0, as a function of time and space has revealed details not observed in previous studies of microearthquake swarms. The hypocenters are all less than 4 km deep with most located within a 2.5 km cube, whose upper side is the ground surface. The activity during the recorded period consists of a major burst of activity (sub-swarm) from each of several source regions within the general swarm area, superimposed on a base level of about one event per day. Composite focal mechanisms for events occurring during each of the sub-swarms are basically oblique thrust striking NW, but differ in their strike-slip component. These differences in epicentral source region, time of occurrence, and focal mechanisms suggest that more than one shear plane is responsible for each of these sub-swarms.

CLASSIFICATION (underline one):

Recent Earthquakes
Seismic Source Functions
Wave Propagation
Seismicity
Seismic Risk
Engineering Seis.
Strain Seis.
Microseismicity
Instrumentation
Array Processing
Mantle-Core Struct.
Gen. Seismology & Geophysics
Other_____

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Name of Speaker: George H. Rothe, III

Indicate Authors who are not members of SSA: _____

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