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No. 3

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SEISMOGRAPHIC STATION

BULLETIN

1951

Eijo E. Vesanen
John W. Jones

Seattle

1952

Seattle, University of Washington Campus:

Latitude: 47° 39.3' N
 Longitude: 122° 18.5' W
 Elevation: 30 m
 Underground: Compact glacial till

Instrumental constants (Sprengnether seismographs):

	T ₁	T ₂	f	V	
Z	1.3	1.6	.12	3000	
N-S	1.2	1.3	.10	2000	
E-W	1.2	1.2	.11	2200	
N-S	8.5	8.6	.00	3500	(2200; Jan 1-Apr 7, Nov 2-Dec 31)
E-S	7.9	7.9	.00	3200	(2000; Jan 1-Apr 7, Nov 2-Dec 31)

Symbols:

- * Local shock
- C Compression
- D Dilatation
- ! An exceptionally prominent impulse

Ground movement:

u up
 d down
 N to north
 E to east
 NE to northeast
 etc.

All times G.M.T.

*

During 1951 312 earthquakes were recorded at the University of Washington Seismographic Station. Thirty-three of these shocks were local (distance less than two degrees).

P of distant earthquakes is recorded almost exclusively on vertical component seismograms. The first impulse on seismograms of horizontal components is seldom the initial P impulse, but an impulse connected with the Mohorovicic Discontinuity which follows 5-6 seconds later.

During the winter season (October to April) microseismic activity at Seattle is normally so intense that the magnification of the long-period instruments must be reduced. The microseismic interference seems to be connected with the geologic structure in the Seattle area. Casual observation of relative microseismic intensities at many points in the Puget Basin during gravimetric field surveys indicate the ground movements caused by microseisms are much greater at Seattle than elsewhere in the Basin.

The readings in this bulletin are given in principally the same manner as in our previous bulletins. Times for named and exceptionally prominent impulses are given in a single, "Time" column. Supplementary readings are given in the "Remarks" column. In this bulletin the true initial ground movements of all well-recorded impulses are presented. The information follows the times of the impulses and is denoted by u (up), d (down), W (to west), etc.

The mechanism of certain earthquakes seems to be multiple in some fashion. This would, at any rate, explain the presence of certain strong anomalous impulses, or the repetition of impulse groups, on certain seismograms. Time for impulses possibly resulting from a multiple earthquake mechanism are noted in the readings by subscripts to impulse symbols.

Earthquakes with epicentral distances of less than two degrees are marked with an asterisk. Since the three auxiliary stations at Longmire, Olympia, and Neah Bay are not yet in operations, precise triangulation of epicenters of local shocks was impossible. However, it was possible, in many cases, to give distance, epicentral location, and approximate time of origin (Table 1, p.).

The principal areas of local activity during 1951 were the San Juan Islands, Whidby Island, Chelan, and the Duvall Mt. Si area

Seal. dir gpt 5/21/59

Date & Phase	Time	Remarks
Jan 01		
iP	20 29 24D	i 2957, i 3010, i 3012,
i	30 u	i 3020, i 3026, i 3038
i	36 u	Strong microseisms
ipP	50 u	No surface waves
isP	30 04	h about 100
		USCGS: 18S, 169E; H:201620
Jan 03		
eL	12 41	Very strong microseisms
		USCGS: 18N, 106W; H:122131
*Jan 04		
iP	13 43 12D	About 47.7N, 120.5W
i	14	H:134249
i	15	Distance about 1.2 dg.
iS	28	Felt in Chelan
i	30	
i	32	
i	35	
Jan 05		
iP	01 02 00D	e 0206, e 0218
epP	29	Strong microseisms
esP	46	No surface waves
iPcP	03 02	h about 130
esPcP	44	USCGS: 7N, 81W; H:005240;
eScS	11 56	h:100
Jan 06		
iP	05 30 22C	i 3041, i 3126, i 3132,
i	25 d	i 3149, i 3204, i 3228,
i	30 u	i 3236, i 3302, i 3547,
i	53 d	i 3624, i 3636, e 4420,
ipP	31 16 d	e 4440
isP	39	Strong microseisms
ipPP	35 09	No surface waves
isPP	31	USCGS: 36 $\frac{1}{2}$ N, 70 $\frac{1}{2}$ E; H:051719;
iPPP	36 02	h:250
isPPP	37 18	
eSKS	40 24	

(continued)

Date &

Phase

Time

Remarks

eSKKS	50
eS	41 20
eSP	42 22
ePS	58
eSPP	43 11
epS	28
esS	56
e _o	45 05
e _n	25
ePKKP	46 40
eSS	47 40

Jan 06

iP	08 00 48D	i 0052, i 0056; i 0102,
i	01 20 u	e 0109, i 0113, e 0124,
i	31 d	e 0209, e 0228, e 0235,
iPcP	48	e 0247, e 0254, e 0259,
iPP	02 50	e 0336, e 0341, e 0408,
ePPP	04 00	e 0458, e 0907, e 1004,
ePcS	05 31	e 1050, e 1133, e 1236,
eS	08 20	Depth of focus not over 7
eScS	10 39	USCGS: 7 $\frac{1}{2}$ N, 81W; H:075131
eSS	11 03	h:100
eSSS	13 08	
eL	15	
eR	29	

*Jan 07

e(P)	04 15 38	Weak local shock
e	43	Aftershock of Jan 04?
iS	51	
i	56	

Jan 08

iP	18 43 32D	i 4338, e 4404, e 4445
iPcP	48 d	Strong microseisms
ipP	57 u	h about 100
esP	44 09	USCGS: 35N, 140E; H:18321

Date & Phase	Time	Remarks
Jan 08 iP i	21 52 40D 53 19	Strong microseisms USCGS: 5S, 151E; H:213929
Jan 09 eP iPcP ePP iPPP	16 09 06 10 08 11 13 52	e 0913, i 0936, i 0950 Strong microseisms USCGS: 81N, 122E; H: 160024
Jan 10 eL	10 50	USCGS: 28S, 177 $\frac{1}{2}$ W; H:101248 h:50
Jan 15 iP ipP isP eS	04 25 26C? 26 13 36 36 20	i 2544, i 2555, i 2709, i 2721 Strong microseisms h about 190 USCGS: 15S, 167E; H:041214; h: 150
Jan 18 iP ipP ePP ePPP eS	21 22 45C 55 24 03 28 28 19 E	i 2303, i 2319, i 2330, i 2339, i 2349, e 2413 Very strong microseisms USCGS: 52N, 177W; H:211550; h:60
Jan 22 iPKP1 iPKP2	12 35 49D 59D	i 3555, i 3602, i 3624, i 3656, e 3712, e 3744, e 3819 Strong microseisms USCGS: 17 $\frac{1}{2}$ S, 41E; H:121602
Jan 23 e(P) e	07 05 18 31	Strong microseisms

Date &
Phase

Time

Remarks

Jan 24

ePKP

ePP

05 08 45

12 23 u

e 0853, e 0946, e 1230
e 1247, e 1330

Strong microseisms

USCGS: Sandwich Island

H:044928

Jan 24

eP

i

i

ePP

e(SS)

iPcP

iL

07 20 44C

50 d

53 d

07 20 56

23 58

25 53

26 14

i 2114, i 2119, i 2200

i 2206, i 2220, i 2226

i 2257, e 2311, e 2324

e 2330, e 2411, e 2436

i 2511, i 2517, i 2533

i 2541

USCGS: 33N, 115 3/4W;

H:071701

Jan 29

e(P)

e

i

i

05 03 27

47

04 08

19

USCGS: Foreshock (of Ja
29, 05); H:050203

Jan 29

eP

e(P*)

e(Pg)

iS

i(S*)

i(Sg)

iL

05 45 16

27

41

46 24

43

47 24

38

e 4536, e 4608, i 4715

USCGS: 43N, 128W; H:054

*Jan 29

iS

15 32 44

Weak local shock

Jan 30

iP

eL

11 24 05D?

37.4

USCGS: 15 $\frac{1}{2}$ N, 99W; H:1116

Jan 30

e(P)

19 07 46D?

USCGS: 15 $\frac{1}{2}$ N, 99W, H:1900

Date & Phase	Time	Remarks
Feb 06		
eP i	06 11 15 38	USCGS: Off east coast of Alaska Peninsula; H:060604
Feb 07		
eP ePcP epP esP	03 50 05C 17 d 31 43	e 5011, e 5050, e 5116 e 5131 Strong microseisms USCGS: Bonin Islands region; H:033837; h:100
Feb 12		
iP i i i iPcP ePP ePPP eS eScS eSS eL	17 31 18D 22 d, SE 32 10 d, E 22 E 29 33 10 34 14 38 44 41 04 42 50 47	i 3132, i 3140, i 3146, i 3159, i 3216, e 3342, e 4506 USCGS: 66N, 136E; H:172202
Feb 13		
eL	06 31	USCGS: Near southern coast of Lower California; H:061630
Feb 13		
iP i(P2) iPcP i(PcP2) ipP ipPcP(pP2) i(pPcP2) iBPcP i(sPcP2) iPP ePPP	12 07 27D 30C 36 39 08 32 42 E 58 W 09 08 W 22 W 10 15 11 09	i 0744, i 0758, i 0805, i 0811, i 0824, i 0854, e 1157, e 1735, e 1745, i 1809, e 1836, e 1931, e 2418, e 3428, e 3439, e 3537, e 3815, e 3920, Multiple? No surface waves Depth of focus 270-300 USCGS: 15S, 175W; H:115550; h:250

(continued)

Date & Phase	Time	Remarks
iS	12 17 04 SW	
i	11 NE	
iScS	27	
iPS	18 03	
epS	26	
Feb 13		
iP	22 17 59D	i 1811, i 1816, i 1820,
i	18 06 d	i 1848, i 1911, i 1926,
i(PF)	25	USCGS: 56N, 155 $\frac{1}{2}$ W; H:221258
iPcP!	21 09	
iS	22 09	
eL	23	
Feb 14		
eP	00 53 14	USCGS: 44N, 127W, H:005148
e	43	
e	54 27	
Feb 14		
e(P)	10 02(04)	e 0213, e 0208
e(S)	04 08	
Feb 15		
eL	05 40	USCGS: Off coast of Colima, Mexico; H: 052020
*Feb 15	15 27 27	Weak local shock
e(P)		
Feb 17		
iP!	21 20 21D	i 2034, i 2049, i 2114,
ipP	21 12	e 2209, i 2416, i 2427,
isP	30	i 2445, i 2516, i 2528,
iPP	24 22	i 2607, i 2648, i 2703,
ipPP	25 11	i 2715, i 2727, i 3116,
isPP	2	i 3142, i 3204, i 3240,

(continued)

(continued)

Date & Phase	Time	Remarks
iPP	21 26 32	
iSKS	30 41 SW	i 3300, i 3329, i 3346,
iS	31 10	i 3408, i 3425, e 4850,
iPKKP	36 25	No surface waves
iSS	37 25	h about 200
isSS	38 42	USCGS: 7S, 146E; H:210658 h:100
Feb 19		
eL	22 50	USCGS: 25S, 117W; H:221154
Feb 21		
eL	17 15.2	USCGS: 43N, 112W; H:171003
*Feb 22		
e(P)	11 24 20	Weak local shock
iS	25 N	Distance not over 0.5 dg.
e	30	
e	40	
Feb 23		
eP	00 02 43	Strong microseisms USCGS: Oregon coast foreshock H:000109
Feb 23		
eP	00 15 13	Strong microseisms Oregon coast foreshock?
Feb 23		
eP	02 08 05	Strong microseisms USCGS: Oregon coast foreshock H:020626
Feb 23		
iP	02 58 14C?	e 5859, e 5948
eS	59 29	Strong microseisms
eL	03 00 20	USCGS: 44½N, 129½W; H:025642

Date & Phase	Time	Remarks
Feb 23 eP	04 18 03	Strong microseisms USCGS: Oregon coast aftershock H:041634
Feb 27 eL	18 54	
Mar 04 e	11 29(30)	Very strong microseisms
*Mar 05 iP iS	13 26 36C 42	From NE? Horizontal component very weak Duvall area Distance not over 0.5 dg.
Mar 05 iP iPcP epP isP	21 23 51D 24 01 33 59	i 2413, i 2555 Very strong microseisms USCGS: 29N, 128E; H:201145; h:150
Mar 09 eSKS ePPS eSS eL	20 10 43 15 20 19 58 37	Strong microseisms USCGS: 8S, 124½E; H:194416
Mar 10 iP i(pP) i(sP) ePP ePPP eSKS iS eSP! eSS	22 10 12C 50 d 11 08 13 48 15 30 20 39 21 06 51 27 30	i 1028, i 1115, i 1139, i 1156, i 1211, i 1238, i 1432, i 1525, i 1630, e 1720, i 2123, e 2256, e 2314, e 2350, e 2430, e 2459, e 2631, e 3544, e 3728 Multiple impulses h about 150 USCGS: 15½S, 167½E; H:215737; h:200

Date & Phase	Time	Remarks
*Mar 13 iS	14 58 08	Weak local shock
Mar 17 eL	05 17	USCGS: 32N, 97E; H:042735
Mar 17 eL	10 48	USCGS: Near east coast of Mindanao, Philippine Islands; H:091808
Mar 19 ePKP	09 49 24D?	e 4940, e 4946, e 5052 USCGS: 21½S, 33E; H:092935
Mar 19 iP ePP eS eL	20 37 22D 38 54 44(15) 56	i 3729, i 3739, i 3745, i 3805 USCGS: 57N, 160E; H:202855
Mar 23 iP i i i(pP) i(sP) iSKS eSP eSS	21 51 46D 53 u 52 18 W 27 u 46 u 22 01 43 E 03 43 09 05	i 5150, i 5223, i 5318, i 5331, i 5346, e 5449, e 5505, e 5621, e 0203, e 0240, e 0504 No surface waves USCGS: 31S, 180; H:213854; h:300
Mar 24 eP i e(pP) isP eSKS	00 30 06D 13 E 48 31 09 d 40 25	e 3103, e 3129, e 3143, e 4048, e 4103, e 4140, e 4206 No surface waves h:175 USCGS: 11S, 166E; H:001738; h:150

Date & Phase	Time	Remarks
Mar 24 eP	21 01 13	e 0130, e 0203, e 0302 USCGS: 13N, 88W; H:205236; h:100
Mar 26 e	16 56 45	
Mar 28 iP i	10 16 17D 30	Strong microseisms USCGS: 17 $\frac{1}{2}$ S, 167E; H:100311
Mar 31 iP ipP isP	09 25 16D 26 11 34	i 2554, i 2619 USCGS: 60 $\frac{1}{2}$ N, 154W; H:092034; h:250
Apr 01 eP i iS iL	19 23 08D? 15 24 25 25 45	i 2320, i 2324, i 2329, i 2340, i 2349, i 2413, i 2504, i 2527 USCGS: 40 $\frac{1}{2}$ N, 125W; H:192110
Apr 02 eP ePP eS eL	00 21 40 23 08 28 15 35	e 2210, e 2234, e 2242, e 2408 USCGS: 13N, 90W; H:001334
Apr 08 iP i	21 51 28C 32	Very strong microseisms USCGS: 37N, 35E; H:213820; h:100
Apr 10 iP iPcP ipP esP	11 07 40C 54 08 06 d 18	e 0746, i 0812, e 0836, e 0847 Strong microseisms USCGS: 15.0S, 173.5W; H;105541

Date &
Phase

Time

Remarks

*Apr 11

eP

05 12(09)

P very weak

i

10 SW

Weak local shock

i

14

Distance 0.7 dg.

i

16

iS

19

i

24

Apr 11

aL

22 56 30

Apr 12

eL

04 55 30

Aftershock of Apr. 11, 22

Apr 12

eL

06 30 50

Aftershock of Apr. 11, 22

*Apr 13

eP

14 58(07)

Weak local shock

i

08 S

Aftershock of Apr 11, 05

eS

20

Apr 14

eP

00 57 49D

e 5804, e 5813, e 5848,

i!

56 u

e 5907, i 5917, i 5927,

ipP

58 42 E

e 5930, e 0043, e 0102,

isP

59 04

i 0204, e 0824, e 0840,

i

01 00 26 E

e 0859, e 1003, e 1020,

ePP

01 28

e 1057, e 1345, e 1513,

ipPP

02 25

e 1712

eSKS

07 58

h about 220

eS

08 10

USCGS: 24S, 66½W; H:004528;

eSP

09 20

h:250

esS

39

e

11 03

Apr 14

iP

04 23 21C?

i 2341, e 2425, e 2444

i

29

USCGS: Southeastern Turkestan

i

37

H:041005

Date &
Phase

Time

Remarks

Apr 14

iP 13 42 31C
isP 52
ePcP 43 30
e(pPcP) 47
ePP 44 38
ePPP 45 47
eS 50 14
ePS 25
eSS 53 59
eSSS 56 12
eL 14 00

e 4240; e 4246, i 4248,
e 4306, i 4313, e 4342,
e 4355, e 4401, e 5050,
e 5428, e 5612, e 5846
USCGS: 61N, 136E; H:133259

Apr 15

eSKS 00 05 11
eS 56
eL 34

Strong microseisms
USCGS: 28 $\frac{1}{2}$ N, 94E; H:234051

Apr 16

iP! 20 03 45C
iPcP 04 08
i! 58 d
ipP 05 26 d
esP 06 20

i 0353, i 0357, i 0424,
i 0428, i 0434, i 0438,
i 0453, i 0503
Strong microseisms
No surface waves
USCGS: 31N, 137E; H:195256;
h:500

Apr 22

i(L) 12 54 29

Strong microseisms
USCGS: 76N, 73W; H:123616

Apr 23

iP 00 59 56C
ePP 01 01 19
ePPP 40
ePcP 02 02
eS 06 03
eSSS 09 00
eL 10.5

i 0004, e 0019, e 0026,
e 0107, e 0135, e 0150
USCGS: 19N, 155 $\frac{1}{2}$ W; H:005221

Date & Phase	Time	Remarks
Apr 23 eL	07 31	
Apr 23 eP	13 29 07	e 2916, i 3920, i 3953,
e(P2)	10	e 4021, i 4100, e 4124
e(sP)	30 38	Strong microseisms
iS	39 09 NE	No surface waves
e(pS)	40 10	USCGS: 20 $\frac{1}{2}$ S, 67W; H:131700
e(sS)	40	h:250
Apr 30 eP	15 41 16	e 4119, e 4127, e 4141,
eSKS	51 55	e 4218
eL	16 10	Very strong microseisms
		USCGS: 8S, 153E; H:152800
May 01 ePKP	05 21 43	e 2212, e 2218, e 4136
ePP	23 27	Very strong microseisms
ePKS	25 17	USCGS: 50 $\frac{1}{2}$ S, 149E; H:050241
eSKSP	33 14	
ePS	33 36	
ePPS	35 16	
eL	06 00	
May 02 ePKP	16 37 22	USCGS: 42S, 80E; H:161701
ePKP2	38 37	
eL	17 40	
May 03 eP	04 18 39	Strong microseisms
e	44	USCGS: 15 $\frac{1}{2}$ N, 61W; H:040849;
e	54	h:150
e	19 29	

Date & Time	Time	Remarks
May 04		
eP	12 03 11C?	e 0328, e 0423, e 1150
epP	04 07 d	Strong microseisms
ePP	05 22	No surface waves
eS	11 20	h about 250
		USCGS: 44N, 142E; H:115305; h:200
*May 05		
iP	03 30 37D S	Epicenter south of Seattle
i	38 E	Distance about 0.5 dg.
iS	43	
May 06		
eP	23 11 41D	e 1241, i 1251, i 1624,
ipP	59	i 1633, i 1644, i 1655,
isP	12 08	i 1851, i 1857
iP2	16 08D	Two shocks!
ipP2	27	h about 70-75
iPcS	17 09	USCGS: 13 $\frac{1}{2}$ N, 88W; H1:230335,
eS	18 06	H2:230804; h:150
ipS	25	
esS	37	
eL	29	
eR	33 40	
May 07		
eP	20 30 40	e 3046, e 3211
eSS	40 10	Strong microseisms
eL	48	Aftershock of May 06
eR	52 40	USCGS: 13 $\frac{1}{2}$ N, 88W; H:202237; h:150
May 08		
e	20 11 56	USCGS: 7 $\frac{1}{2}$ S, 80W; H:200108;
eL	37	h:200
May 10		
ePKP	09 38 15D	i 3822, i 3836, i 3839,
iPKP	16.00	i 3849, i 3903, i 3910,
iPKP2	26	i 3915, i 3929, i 3945,
iPKP3	40 39	i 4007, i 4152, i 4205

(continued)

Date & Phase	Time	Remarks
iPP eL	09 40 47 10 39	No significant impulses between 0943 and surface waves! USCGS: 21S, 33E; H:091825
May 10 eP e e(pPcP) eL	19 52 17 53 09 54 54 20 21	USCGS: 51N, 180; H:194452; h:60
May 10 eL	22 21	USCGS: 34S, 72W; H:213302; h:100
May 11 eL	02 48	USCGS: 13N, 87½; H:021551; h:100
May 12 eL	16 20	
May 14 eL	05 04	USCGS: 30N, 70E; H:040734
May 14 iP i i i eL	13 11 21D 28 u 35 u 53 30	USCGS: 9N, 86W; H:130240; h:100
May 15 iP i(P2)! e(pP2) e(sP2) i(S2)	05 31 02C 17D 37 48 41 20	e 3123, e 3229, i 4131 Strong microseisms Multiple? Second shock slightly deeper than normal USCGS: 21S, 69½W; H:051846; h:100

Date & Phase	Time	Remarks
May 15		
iP	09 59 59C	Strong microseisms
e	10 00 31	h about 175
epP	43	USCGS: 19N, 146E; H:094820;
esP	01 04	h:200
eS	10(50)	
May 15		
iP	23 06 27C?	Strong microseisms
e	31	USCGS: 45N, 9E; H:225423
e	45	
e	07 15	
May 16		
iP	13 34 53D	USGCS: 15S, 69 $\frac{1}{2}$ W; H:132310;
epP	35 43	h:200
eS	44 30	
May 17		
eL	15 42.3	
eR	44 03	
May 19		
iP	16 06 27D	USCGS: 38N, 4W; H:155425
e	41	
May 20		
eP	12 24 35	e 2453, e 2511
May 20		
e(P)	14 41 30	
eL	15 00	
May 20		
eL	16 47	Same region as the previous shock
May 21		
eL	04 59	

Date & Time	Time	Remarks
May 21		
iP	08 40 09C	i 4128, i 4115, e 4430,
ipP	47 d	e 4502, i 5104, i 5500,
iaP	41 05	i 5620, i 5712
ePP	43 48	USCGS: 6S, 154 $\frac{1}{2}$ E; H:082721
iSKS	50 24	h:150
iS	52 E	
iSKS	51 24	
isS	56 W	
iSP	52 17	
ipSP	43	
iSPP	53 33	
iSS	56 40	
ePKKP	58 00	
eSSS	09 00 30	
eSKS	03 36	
eL	09	
*May 22		
i	09 45 29	Weak local shock
i	31	
May 22		
iP	17 54 24C	
e	42	
May 25		
eP	21 58 56C	Strong microseisms
e	59 10	USCGS: 17S, 179W; H:214731;
e	28	h:600
e	34	
May 26		
eL	21 57	
May 29		
eSKS	06 27 28	USCGS: 3S, 138 $\frac{1}{2}$ E; H:060306
ePS	29 50	
ePPS	30 40	
eSS	35 30	

Date &
Phase
May 30

Time

Remarks

eSKS	20 22 00	Weak surface waves! USCGS: 3S, 126 $\frac{1}{2}$ E; H:195701
eSKKS	35	
eS	50	
e	23 40	
ePS	24 44	
ePPS	25 20	
ePKKP	27 15	
eSS	29 35	
eSSS	33 00	
ePKPPKP	35 15	

May 31

iP	21 09 08C	i 0912, i 0921, i 0927,
ipP	33	i 0950, i 0954, i 1022,
isP	46	e 2024, i 2139
iSKS	19 40 NW	No surface waves
iS	20 10 SE	h about 95
ipS	42 W	USCGS: 19N, 121E; H:205600;
isS	49	h:100
iSP	21 06 N	
ePS	30	
eSPP	22 08	
ePPS	23 20	

Jun 01

eP	16 36 08	e 3643, e 4744
e(pP)	39	h about 120?
e(sP)	55	USCGS: 14 $\frac{1}{2}$ N, 145E; H:162335
eS	46 15	
e(pS)	46	
eL	17 10	

Jun 01

ePl	20 08 37	e 0843, e 0920, e 0953,
eSl	13 45	e 1418, i 1506, e 1602
iPcSl	14 58 d	Two shocks!
eSSl	15 33	USCGS: 52 $\frac{1}{2}$ N, 172W; H1:200214,
eS2	16 25	H2:200453; h:100
ePcS2	17 39	

Date & Phase	Time	Remarks
Jun 02		
eSKS	07 12 50	Strong microseisms
eSKS	13 18	USCGS: 7N, 117E; H:064752
ePPS	16 48	
ePKKP	17 22	
*Jun 03		
eP	05 59 03	Distance about 1.5 dg.
e	13	San Juan Islands?
iS	21	
i	24 S	
i	33	
Jun 03		
eP	21 05 15	e 0521, e 0552, e 0613,
eS	06 42	e 0631, e 0650
eL	07 12	Distance about 7½ dg. NW from Seattle?
Jun 05		
eP	01 43 02D?	USCGS: 9½N, 86W; H:013420;
e	11	h:60
e	24	
Jun 05		
iP	17 09 43D	i 0950, i 1049, i 1058,
iPcP	56	e 1650, i 2014, i 2027,
ipP	10 00	i 2042, e 2140, e 2155,
isP	08	e 2328
ipPcP	13	h about 70
isPcP	23 SE	Multiple?
i(P2)	34 d	USCGS: 30N, 132E; H:165747;
i(P3)	11 36 d	h:100
ePP	12 58	
ePPP	14 50	
is(SKS)	20 03 E	
iPS	56	
iPPS	21 25	
ePKKP	27 45	
ePKKS	31 06	
eL	33	

Date & Phase	Time	Remarks
Jun 06		
eP	16 20 02	e 2051, e 2134, i 2235,
iPcP	21 15	e 2323, e 2328, e 2842,
ePP	22 05	e 2930, e 3011, e 3326
i(pPP)	18	USCGS: 71 $\frac{1}{2}$ N, 8W; H:161052;
ePPP	23 05	h:60
ePcS	25 17	
eS	27 26	
ePS	36	
eSS	31 05	
eSSS	32 41	
eL	36	
Jun 07		
eL	24	USCGS: 27 $\frac{1}{2}$ S, 176W; H:225900
*Jun 09		
e	18 34 35	Weak local shock
i	41	
Jun 16		
e	05 35 36	Distance not over 0.5 dg.
i	41 S	Foreshock of Jan 17, 11-35
i	51	
Jun 16		
eL	05 59 50	Vancouver Island region?
		Foreshock of Jun 17, 09?
Jun 16		
eL	23 46 40	Foreshock of Jun 17, 09?
Jun 16		
iP	23 48 36D	i 4840, i 4851, i 4918
iS	49 48	USCGS: Foreshock; H:234658
eL	50 50	
Jun 17		
eP	11 00 20	USCGS: Aftershock; H:105843
eS	01 33	
eL	02	

Date & Phase	Time	Remarks
*Jun 17 iP iS	11 35 25C? 32 d, SE	Distance about 0.5 dg.
Jun 23 eL	03 43 30	USCGS: 31½N, 113½W; H:033240
Jun 24 eP eL	11 07 35 35	Strong microseisms USCGS: 19N, 146½E; H:105540
Jun 24 eP eSKS eS eL	17 02 40 13 02 40 32	e 0315, e 1530 USCGS: 5S, 154E; H:164913
Jun 25 eP eS eL	03 23 27 27 25 29.5	Strong microseisms USCGS: 56N, 154W; H:031823
Jun 25 iP ipP esP i(P2)! i e(pP2) e(sP2) i eS e(S2) eL	16 17 12D 26 u 38 44 d 50 W 18 01 11 41 E 21 12 32 24	e 1806, e 1821, e 1824, i 2150, i 2201, i 2210 Multiple? USCGS: 61N, 150W; H:161232; h:100
Jun 25 eL	19 52	California?
Jun 25 eL	20 48	USCGS: 1N, 85W; H:201626

Date & Phase	Time	Remarks
Jun 26 eL	01 34	California?
Jun 26 eL	04 09.5	
*Jun 26 iP e e iS i i	18 58 26C? 28 31 35 41 44	Distance about 0.7 dg.
Jun 27 eP i e e eL	10 52 46 52 53 30 42 54 20	Vancouver Island region?
Jul 02 eP i i eSKS eS eL	21 59 09C? 30 u 57 d 22 09 28 40 (40)	Strong microseisms USCGS: 21S, 176W; H:214630
Jul 04 eP e e	12 28 51 29 10 22	Strong microseisms USCGS: 14N, 143 $\frac{1}{2}$ E; H:121606; h:150
Jul 08 iP i i iS i	04 35 08D 11 14 NE 19 20 22	From NW Distance about 0.7 dg. Whidby Island area

Date &
Phase

Time

Remarks

Jul 08

ePP
ePPP
ePKS
eSKS
eSKKS
eSKS
ePKKP!
eSKKS
ePKPPKS
eL

06 01(59)
04 16
06 07
08 39
09 00
50
14 26
22 00
25 45
33

e 0315, e 1255, e 2400,
e 2941
USCGS: 11N, 122E; H:054420

Jul 09

eR

00 44

USCGS: 53N, 167W; H:233040

Jul 09

eP
e(pP)
ePcP
e(S)
eL

01 11 10D?
26
13 32
17 36
24

e 1117, e 1139, e 1149,
e 1808
USCGS: 16N, 96W; H:000354;
h:60

Jul 11

eL

10 37

Jul 11

eP
e

13 03 28
42

Deeper than normal!
USCGS: 52N, 178E; H:125619;
h:150

Jul 11

eP
i
i
iPcP
iPP
iS
eSS

18 32 49C
55
33 00
05
35 50
41 49 NW
46 45

i 3311, i 3339, i 3344,
i 3425, i 3556, i 3605,
i 3624, i 3807, i 4204,
i 4212, i 4238, e 4450
Many impulses!
USCGS: 28½N, 139½E; H:182200
h:550

Date & Phase	Time	Remarks
Jul 13		
e	02 03 57	Strong microseisms
eS	05 04	USCGS: 50N, 130W; H:020225
eL	06	
Jul 13		
eL	15 45	Aftershock?
Jul 13		
eSKS	20 17 46	Strong microseisms
eS	18 10	USCGS: 7S, 156E; H:195400;
e	19 10	h:100
eL	37	
Jul 14		
eP	07 27 43	Strong microseisms
e	36 20	USCGS: 4.7N, 154 $\frac{1}{2}$ E; H:071812
eSS	38 18	
eL	45	
*Jul 14		
iS	17 33 42	Weak local shock Foreshock of Jul 17, 10
*Jul 15		
iP	14 52 47C	Weak local shock
iS	53 SW	Duvall area? Foreshock of Jul 17, 10
Jul 16		
eP	10 53 37C?	e 5407, e 5447, e 5814,
eSKS	11 03 58	e 5919, e 0618
eSKKS	04 58	USCGS: 6S, 146E; H:104023;
ePS	06 52	h:200
ePPS	07 30	
eSS	12 28	
eL	26	

Date &
Phase

Time

Remarks

Jul 17

iP

10 59 18C

Distance about 0.5 dg.
Duvall area?

iS

23 SW

Jul 17

eP

15 01 25C

i 0147, i 0153, i 0236,

epP

02 02

e 0521, e 1410

ePP

05 08

No surface waves

eS

12(03)

USCGS: 14S, 167E; H:144846;

eSP

13 05

h:150

ePS

18

Jul 17

e

16 30 30

e

51

Jul 17

eL

20 00 30

Jul 18

eP

09 19 33C?

i 1947, i 1949, i 1955,

i

37 u

i 1959, e 2014, i 2034,

i

43 u

e 2111, e 2205, e 2412,

i

20 51 S

e 2422, e 2535, i 260

i

21 38 S

e 2646, e 2750, e 2848,

i

52 N

i 3042, i 3124, e 3245,

iPP

22 47

e 3325, i 3428, i 3444,

i

23 08 S

e 3700, e 3740, e 3808,

ePPP

24 48

e 4107, e 4155, e 4248,

ePPPP

26 17

e 4328, e 4432, e 4530,

eSKS

29 54

e 4652, e 4737, e 5110

eS

30 09

Multiple?

iPS

31 04

USCGS: 1N, 27W; H:090616

iSS

36 07

ePKKP

09 36 42

iPKKS

40 33

iPPP

46 07

eL

48 22

eR

58 42

Date & Phase	Time	Remarks
*Jul 19		
eP	14 50 13	Distance about 1.5 dg.
i	19	
iS	33 SW	
i	37	
Jul 19		
iP	20 48 23D?	i 4829, i 4845, i 4850,
ePP	49 45	i 4857, i 4909, i 4913,
ePPP	50 10	e 5020, i 5415, i 5428,
iPcP	50	e 5524
iS	54 02 NE	USCGS: $51\frac{1}{2}$ N, $177\frac{1}{2}$ W; H:204125;
e!	50	h: 60
eSS	56 15	
eL	59	
Jul 19		
eL	21 25	USCGS: Aftershock; H:210707
Jul 20		
eL	00 06	USCGS: Aftershock; H:234750
*Jul 20		
iP	06 47 03D	From N
i	04 SE	Distance about 0.7 dg.
i	05	Whidby Island area
iS	13	
Jul 21		
e	08 50 16	e 5041, e 5636
eL	09 26	
Jul 24		
eL	18 04	USCGS: $18\frac{1}{2}$ N, $101\frac{1}{2}$ W; H:174540;
		h:100
Jul 24		
e	19 00 45	Short distance shock?
e	51	

Date & Phase	Time	Remarks
*Jul 25 eP iS i	02 28 29 31 32	Seattle area
Jul 26 eP e! eS eL	10 10 32D 40 19 09 43	i 1044, e 1206, e 1235, e 1216, e 2048 Weak surface waves USCGS: 41N, 143E; H:100000; h:100
Jul 26 eL	12 41	
Jul 28 iP eS ePS ePPS eScS eSSS eL	23 15 38 24 21 28 48 25 30 30 28 38	e 1606, e 1619, e 3414 USCGS: 37N, 143E; H:230433
Jul 29 eP eL	10 56 33 59.5	e 5652, e 5732, e 5803 USCGS: 36½N, 121½W; H:105341
Jul 29 eP eS eL	23 51 23 57 40 24 00.5	e 5134, e 5210, e 5825
Jul 30 eL	02 28	
Aug 01 eP eL	03 32 16 52	USCGS: 3N, 84W; H:032246; h:100

Date & Phase	Time	Remarks
Aug 02 eP	03 52 33	i 5429, e 5510, e 0312
epP	54 22	No surface waves
iSKS	04 02 17	USCGS: 4S, 154 $\frac{1}{2}$ W; H:034027;
iS	41	h:500
esS	05 50	
Aug 02 e	10 42 35	USCGS: 1700 miles south of
eL	11 02	Easter Island; H:101600
Aug 02 eP	20 38 32	e 3835, e 3841
eR	58 27	USCGS: 13N, 87 $\frac{1}{2}$ W; H:203017;
		h:100
Aug 03 eP	00 32 11	e 3225, e 3248, e 3320,
e(P2)	15	e 3450, e 3930, e 4350
e(pP2)	31	Multiple?
e(sP2)	41	h about 75
iScS	42 34	USCGS: 13N, 87 $\frac{1}{2}$ W; H:002358;
eL	44 42	h:100
eR	52 10	
Aug 03 eR	05 53 58	USCGS: 13N, 87 $\frac{1}{2}$ W; H:052545;
		h:100
*Aug 03 eS	19 24 54	Weak local shock
Aug 03 eL	17 12	
Aug 06 eP	08 17 12	USCGS: 13N, 87 $\frac{1}{2}$ W; H:080856;
eR	37 08	h:100
Aug 06 eL	09 11 00	USCGS: 36 $\frac{1}{2}$ N, 121 $\frac{1}{4}$ W; H:090503

Date & Phase	Time	Remarks
Aug 06 eL	10 33	Aftershock?
Aug 06 eP iSKS iS e ePS eL	15 23 52C 34 32 41 58 36 37 54	USCGS: 6S, 152E; H:151042
Aug 08 eL	01 53	
Aug 08 eP eS eL	12 44 25 45 20 46.1	e 4438, 4 4453, e 4509, e 4527, e 4533, e 4540 USCGS: 49N, 129W; H:124307
Aug 08 eS eL	14 15 23 16.1	e 1530, e 1542 USCGS: Aftershock; H:141308
Aug 08 eL	21 48.9	Foreshock of the next cne?
Aug 08 eP i eS eL	22 30 10 19 31 18 31.9	e 3029, e 3033, e 3037, e 3042, e 3049, e 3057, e 3105, e 3111 USCGS: 44N, 128W; H:222840
Aug 08 eL	23 38.5	Aftershock?
Aug 10 eP ePS eL	05 44 48 55 30 06 13	e 4505, e 4609 USCGS: 8 $\frac{1}{2}$ N, 40W; H:053233

Date & Phase	Time	Remarks
Aug 10 eL	11 39.1	Vancouver Island region? Aftershock of Aug 08, 22
Aug 10 iP i i	23 10 05C 11 50	USCGS: 46N, 143 $\frac{1}{2}$ E; H:230021; h:300
Aug 12 eP eL	21 23 40 56	USCGS: 3 $\frac{1}{2}$ S, 141E; H:211000
Aug 13 iP iPcP i i e! e! e! e! i! ePP epPP esPP ePPP iSKS iS iPPS eSS ePKKS eL	18 46 33D 35 d 40 d 47 02 d 19 58 48 12 34 49 08 50 07 d 24 d 30 u 51 54 57 08 24 S 58 43 19 03 04 07 50 12	i 4645, i 4653, i 4707, i 4715, e 4727, e 4741, e 4754, e 4827, e 4858, e 4915, e 4925, e 4950, e 5052, e 5256, e 5310, e 5445, i 5919, i 0030 USCGS: 43N, 32 $\frac{1}{2}$ E; H:183340
Aug 16 eL	02 43	
Aug 18 eL	05 07	

Date & Phase	Time	Remarks
Aug 20 eP eL	06 02 21D 04 20	USCGA: 23 $\frac{1}{2}$ N, 108W; H:055914
Aug 20 eL	12 06	
Aug 21 iP i iPP iPPP iS eL	11 04 32C 33D 05 01 19 10 32 16.5	i 0437, i 0440, i 1007, i 1039, i 1103, i 1110 USCGS: 19 N, 156 156W; H:105657
Aug 22 eL	06 05	USCGS: 10N, 83W; H:054131
Aug 24 eP e(pP) iS e(pS) iScS i(pScS)	14 31 01C 41 38 39 39 34 40 30 41 13	e 3215, i 3852, e 4042, e 4049, i 4504 h about 160? USCGS: 47N, 151E; H:142115
Aug 25 eL	10 54	USCGS: 29 $\frac{1}{2}$ N, 112W; H:104155
Aug 26 eL	13 40	USCGS: Near Colima, Mexico; H:132130; h:100
Aug 26 eP e eL	18 43(48) 44 06 52.5	Very strong microseisms USCGS: 24N, 109W; H:183823

Date & Phase	Time	Remarks
Aug 28		
eP	16 43 31C?	i 4615, i 4627, i 4649,
epP!	45 34 d	e 5311, e 5620, e 5730
eS	53 01	P very weak
i!	36	No surface waves
iSP	54 07	USCGS: 27.0S, 178.0E; H:163111; h:600
Aug 31		
iP	10 20 52D	i 2132, i 2208, e 3041,
i	21 05 u	i 3109, e 3143
iSP	23 41	USCGS: 19S, 179W; H:100918;
iS	30 31	h:600
Sep 01		
eL	05 22	USCGS: 33S, 110W; H:044040
Sep 01		
eP	09 01 42	e 0150, e 0203, e 0230
iS	12 06	Strong microseisms
ePS	43	USCGS: 33S, 110W; H:084918
iPPS	13 02	
eL	30	
Sep 02		
eP	16 31 43	e 3156, e 3206, e 3216
eL	36 50	USCGS: 31N, 117W; H:162732
Sep 05		
e	07 49 42	
Sep 05		
eP	08 04 24	USCGS: Mariana Islands region;
eL	(35)	H:075215
Sep 05		
eL	19 10	
*Sep 06		
iS	01 19 51	Weak long period

Date & Phase	Time	Remarks
Sep 09 iP i	04 56 01C 07 d	Very strong microseisms USCGS: 16S, 173W; H:044300
Sep 10 eL	12 58	
Sep 12 eP e e e	15 20 17 27 21 07 22 00	Strong microseisms USCGS: 45½N, 151E; H:15101
Sep 14 eP eL	07 09 09 10.8	e 0944, e 0950, e 1041 USCGS: 49N, 128½; H:070721
Sep 16 iP e i	01 55 17D 23 56 41 d	i 5548, i 5603, i 5623 Strong microseisms USCGS: 15S, 167½; H:013158 h:100
Sep 16 eL	12 00	USCGS: 20N, 155½W; H:11425
Sep 17 iP eL	12 10 01C 39	i 1019, i 1037, i 1108 Strong microseisms USCGS: 18S, 173W; H:115739
Sep 20 eP e e	05 58 47 56 59 05	Very strong microseisms USCGS: 5½S, 81W; H:054803
Sep 20 e e eL	12 44 00 08 50.5	Very strong microseisms USCGS: 65N, 154W; H:123940
Sep 20	17 16	

Date & Phase	Time	Remarks
Sep 20 eL	18 03	
Sep 21 1P 1S	11 23 07 SW 13	Weak local shock
Sep 22 eP 1S eL	10 17 54 18 52 19.5	e 1809, e 1841, e 1859, e 1909, e 1916 USCGS: 48N, 127W, H:10170
Sep 24 eL	13 14	USCGS: 49 $\frac{1}{2}$ N, 156E; H:1310 h:100
Sep 27 eP 1 1S 1L	19 25 360 51 u 26 28 49	1 2540, 1 2603, 1 2611, 1 2614, 1 2623 USCGS: 49N, 129W; H:19241
Sep 27 e	19 45(40)	USCGS: Aftershock; H:19432
Sep 27 eP e	19 55 26 37	Aftershock?
Sep 28 eL	12 36	USCGS: 11 $\frac{1}{2}$ N, 86W; H:12072 h:200
Sep 28 eP e e	15 21 29 22 33 23 00	USCGS: 50 $\frac{1}{2}$, 130W; H:15182
Sep 28 eL	15 22	USCGS: 11 $\frac{1}{2}$ N, 86W, H:14511 h:200

Date & Phase	T ₁	Remarks
Sep 28		
eP	23 42(10)	e 4220, e 4231, e 4238,
eSKS	35	e 5344, e 5914
eS	53 03	Strong microseisms
eL	24 20	USCGS: 30S, 178W; H:232837
Sep 29		
eP	18 26 49	Very strong microseisms
e	27 38	USCGS: 26 $\frac{1}{2}$ S, 120W; H:181505
Sep 30		
eP	13 33 16	Strong microseisms
e	22	Vancouver Island region?
e	40	
Oct 01		
e	10 17(40)	Very strong microseisms
e	23 22	USCGS: 55N, 166W; H:101140
eL	25	
Oct 01		
e	10 57(00)	Very strong microseisms
*Oct 04		
iP	23 27 24C	Distance about 0.5 dg
iS	30 SW	Duvall area?
i	38	
Oct 05		
eS	12 01 46	Strong microseisms
ePS	02 52	USCGS: 28 $\frac{1}{2}$ S, 177W; H:113730
eL	23	
Oct 06		
eL	04(15)	Strong microseisms
		USCGS: Kermadec Islands regi
		H:032845
*Oct 06		
iP	20 59 41	Weak local shock
		Seattle area

Date & Phase	Time	Remarks
Oct 08		
eP	04 12 31	i 1327, i 1333
iS	13 40	USCGS: 40N, 125W; H:04103
iL	14 05	
*Oct 09		
iP	22 59 36D	From NW
iS	46	Distance about 0.6 dg.
		Whidby Island area
Oct 11		
eP	01 50 41	e 0125, e 0152, e 0210,
i(pP)	51 00	e 0345, e 0910, e 1430
e(sP)	09	Strong microseisms
eSKS	02 01 12	USCGS: 5S, 152E; H:013731
ePPS	02 57	
eSS	07 36	
ePcPPKP	12 20	
eL	18	
Oct 13		
eP	19 46 32	e 4635, e 4654, e 4734,
eS	47 51	e 4744
iL	48 24	Strong microseisms
		USCGS: 43½N, 127W; H:19450
Oct 16		
iP	21 13 40	Very strong microseisms
i	50	USCGS: 33N, 134E; H:210157
Oct 16		
eL	07 22 30	USCGS: 76N, 5E; H:065433
Oct 18		
iP	08 36 57D	i 3925, i 4023, e 4748
i	37 08 d	Very strong microseisms
i(P2)!	15 d	Maybe two shocks
iPcP	32	h about 75
i(pP2)	38	USCGS: 42N, 142E; H:082625
(continued)		

(continued)

Date &
Phase

Time

Remarks

i(PcP2)

08 37 56

h:100

e(S2)

45 32

e(ScS2)

46 25

eL

56

Oct 21

iP

21 47 13C?

i 4718, i 4723, i 4827

i(P2)!

26 u?

Multiple? Note the following
shocks

eS

57 58

e(S2)

58 11

USCGS: 24N, 122E; H:213413

Oct 21

iP

23 08 24D?

i 0831, i 0843

i(pP)

49

Slightly deeper than normal?

USCGS: 24N, 122E; H:225554

Oct 22

iP

03 42 26C?

i 4228, i 4245

i(P2)!

31

Multiple?

eS

53 12

USCGS: 24N, 122E; H:032926

i(S2)!

17

Oct 22

eP

04 05 17

Aftershock?

Oct 22

eP

04 41 03C?

Strong microseisms

e

20

USCGS: 24N, 122E; H:042805

e

42 06

Oct 22

iP

05 30 42C?

Strong microseisms

i

31 47

USCGS: 24N, 122E; H:051744

Oct 22

iP

05 36 52

Strong microseisms

USCGS: 24N, 122E; H:052353

Date & Phase	Time	Remarks
Oct 22		
iP	05 55 59C?	i 5613, i 5625, i 5634,
i(P2)	56 07	i 5711, i 5734
eS	06 06 40	Strong microseisms
e(S2)	48	Multiple?
		USCGS: 24N, 122E; H:054301
Oct 22		
iP	07 20 30D?	Strong microseisms
e(S)	25 12	
Oct 22		
iP	08 46 50?	Strong microseisms
Oct 22		
eP	11 24 00	Strong microseisms
e	12	USCGS: 24N, 122E; H:111112
e	31	
Oct 22		
eP	13 01 38	Strong microseisms
e	41	USCGS: 24N, 122E; H:124838
e	51	
Oct 22		
eP	13 14 17	Strong microseisms
		Formosa aftershock?
Oct 22		
eP	15 42 47	Strong microseisms
e	59	USCGS: 24N, 122E; H:152947
eS	53 33	
e	51	
Oct 23		
iP	01 32 36D?	i 3314, i 3342, i 3350
iS	43 20	Strong microseisms
e	36	Slightly deeper than normal?
		USCGS: 24N, 122E; H:101935
Oct 23		
eP	09 08 10	Strong microseisms
i(P2)	19	Multiple?
i	09 13	USCGS: 24N, 122E; H:085513
iS	19 00	

Date & Phase	Time	Remarks
Oct 24 eP e	03 51 59 52 25	Very strong microseisms
Oct 25 eL	04 31	Very strong microseisms USCGS: 15N, 93W; H:040600
Oct 25 eP eS	12 32 37 43 20	e 32 41, e 3256 Very strong microseisms USCGS: 24N, 122E; H:121938
Oct 28 eP	02 08 48	Strong microseisms
Oct 28 eP e eL	07 06 44 07 15 55	Strong microseisms
Oct 28 eP eL	14 52(48) 55	Strong microseisms USCGS: Off coast of Vancouver Island; H: 145114
Oct 31 eP eL	07 16 38 08(12)	Very strong microseisms USCGS: 3N, 101E; H:065621
Nov 01 eP e	11 29 54 30 12	Strong microseisms
Nov 06 iP 1	15 06 51D 07 18	e 0733, e 0814 Strong microseisms USCGS: 47N, 154E; H:145715

Date & Phase	Time	Remarks
Nov 06		
e(P)?	16 49 35D?	e 5020, i 5045, e 5138,
iP!	42D	e 5227, e 5236, e 5334,
i	47 u	e 5517, e 5750, e 0003
i	54 u	Strong microseisms
iPcP	50 54	USCGS: 47N, 154E; H:164006
ePP	51 43	
ePPP	53 02	
ePcS	54 41	
eS	57 20	
Nov 06		
iP	19 00 05D	e 0051, e 0104, e 0110
		Strong microseisms
		USCGS: 47N, 154E; H:185027
Nov 08		
eP	13 50 35	i 5050, e 5507, e 5623
iPP	51 05	USCGS: 54 $\frac{1}{2}$ N, 160W; H:134506
iS	55 02	
eL	58.3	
Nov 08		
e	19 41 51	Strong microseisms
eL	52	USCGS: 19N, 155 $\frac{1}{2}$ W; H:193413
Nov 09		
iP	22 20 20D	i 2024, i 2027, i 2042,
i(pP)	21 08	i 2150, i 2156, i 2243
i(eP)	30	Strong microseisms
iS	30 45	h about 200?
e(pS)	31 42	USCGS: 22S, 68W; H:220753;
		h:100
Nov 12		
e	08 19 25	Very strong microseisms
eL	(40)	USCGS: 47N, 154E; H:080926
Nov 13		
eL	11 28.5	Very strong microseisms
		USCGS: 40 $\frac{1}{2}$ N, 125W; H:112446

Date & Phase	Time	Remarks
Nov 14 eP eS	08 41 48 43 02	i 4211, e 4320 Strong microseisms USCGS: 40 $\frac{1}{2}$ N, 124W; H:083951
Nov 15 eP eL	08 34 49 54	i 3459, e 3516, e 3539 Strong microseisms USCGS: 52 $\frac{1}{2}$ N, 160 $\frac{1}{2}$ E; H:082553; h:60
Nov 15 eL	10 33	Strong microseisms USCGS: 52 $\frac{1}{2}$ N, 160 $\frac{1}{2}$ E; H:100242 h:60
Nov 15 eL	10 54	Strong microseisms USCGS: 52 $\frac{1}{2}$ N, 160 $\frac{1}{2}$ E; H:103133; h:60
Nov 15 eP eS eSS eSSS eL	19 51 14 57 43 20 01 10 02 50 07	e 5128, e 5146 Strong microseisms USCGS: 52 $\frac{1}{2}$ N, 160 $\frac{1}{2}$ E; H:194212 h:60
Nov 15 e e eL	22 09 21 18 00 31	Strong microseisms USCGS: 52 $\frac{1}{2}$ N, 160 $\frac{1}{2}$ E; H:215918; h:60
Nov 18 eP	09 40 14	Very strong microseisms USCGS: 31N, 90 $\frac{1}{2}$ E; H:092633
Nov 18 eP ePP ePPP IS ePPS eL	09 49 22 53 25 55 33 10 00 39 03 10 22	i 4935, i 5015, i 5308, i 5336, i 5347, e 0046 e 0053, e 0113 Very strong microseisms USCGS: 31N, 90 $\frac{1}{2}$ E; H:093543

Date & Phase	Time	Remarks
Nov 21 e(P)	08 09 34	
Nov 22 eP	02 17 58	Strong microseisms
e	18 15	USCGS: 5S, 151½E; H:0204
eS	29 03	
eL	47	
Nov 22 eL	10 01	USCGS: North of Easter I H:093420
Nov 24 e	04 37 21	USCGS: 51½N, 176½W; H:04 h:60
Nov 24 e	07 28 15	
eL	35	
*Nov 24 i iS	14 40 55 d 57 NW	Weak local shock
Nov 24 iP i i iP2 i(P3) eS eS2 eL	19 00 15D 33 d 44 d 03 23D 34 d 11 03 14 17 30	e 0109, i 0123, i 0137, e 0355, i 0445, i 0535, e 0643, e 1605, e 1809 Multiple! USCGS: 23N, 121½E; H1:18 H2: 185019
Nov 26 iP i	06 51 33D 38 d	Strong microseisms USCGS: 23N, 121½E; H:063
*Nov 28 iS i	00 57 14 SW 17	Very strong microseisms Weak local shock

Date & Phase	Time	Remarks
Dec 06		
iPKP	04 34 20D	e 3521, e 3533, i 3613,
i	26 d	i 3633, i 3930, i 4020,
i	38 u	i 4030, i 4048, e 4057,
iFKP2	58	e 4228, e 4450
iPP	39 55	Very strong microseisms
iSKS	41 22	USCGS: 34S, 56½E; H:041420; h:100
Dec 08		
eP	15 22 30	Very strong microseisms
Dec 12		
iP	01 44 52D	i 4501, i 4544, i 4612,
i!	45 10 u	i 4618, i 4735, i 4830,
i	13 W	i 4956, e 5118, e 5330
i	20 d	Strong microseisms
ePP	46 32	h not over 75
eS	50 43	USCGS: 17N, 94½W; H:013734;
eSS	53 50	h:100
eSSS	54 26	
eL	55	
eR!	02 00 50	
*Dec 15		
iP	22 03 28 D?	Distance about 1.8 dg.
i	34	San Juan Islands?
i	43	
iS	51	
i	56	
*Dec 16		
iS	01 29 20	Same area
Dec 21		
eL	09 27	Very strong microseisms
		USCGS: 26½N, 100E; H:083728
Dec 24		
eL	06 08	USCGS: About 200 miles off the coast of Colima, Mexico; H:055041

Date & Phase	Time	Remarks
Dec 26 iP iL	00 50 37C 54 42	1 5045, 1 5302, e 5348 USCGS: 32.6N, 118.7W; H:004649
Dec 26 eP e eL	06 33 10 21 35 05	Strong microseisms USCGS: 43 $\frac{1}{2}$ N, 127W; H:063146
Dec 26 eP e	16 43 39 44 00	USCGS: Northern Kansu, China; H:163051
Dec 28 eP e! ePP e! ePcP eS eL	09 27 28D 28 03 52 29 04 d 55 33 09 38	e 2736, e 2817, e 2940, e 3324, e 3406, e 3600 Strong microseisms USCGS: 17N, 98 $\frac{1}{2}$ W; H092025

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Jun 17 eP i i eS iL	09 41 52C 54D 59 d, SW 43 05 50	1 4205, 1 4210, 1 4219, e 4234, e 4256 USCGS: 44 $\frac{1}{2}$ N, 130W; H:094015
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TABLE 1
List of the recorded local earthquakes in 1951

Date	Time of Origin	Suggested Epicenter	Remarks
Jan 04	13 42 49	47 $\frac{3}{4}$ N, 120 $\frac{1}{2}$	Felt in Chelan (IV) Chelan aftershock?
Jan 07	04 15 15		
Jan 29	15 32		
Feb 15	15 27	47 $\frac{3}{4}$ N, 122W	Duvall area
Feb 22	11 24 12		
Mar 05	13 26 28		
Mar 13	14 58	48 $\frac{1}{4}$ N, 122 $\frac{3}{4}$ W	Whidby Island area Whidby Island aftershock
Apr 11	05 11(55)		
Apr 13	14 57(53)		
May 05	03 30 29	48 $\frac{1}{4}$ N, 123W	South of Seattle San Juan Islands?
May 12	09 45		
Jun 03	05 58 35		
Jun 09	18 34	48 $\frac{1}{4}$ N, 122 $\frac{1}{2}$ W	Duvall-Mt. Si area? Whidby Island area Duvall foreshock
Jun 16	05 35 28		
Jun 17	11 35 17		
Jun 26	18 58 08	48 $\frac{1}{4}$ N, 122 $\frac{1}{2}$ W	Duvall area? Duvall area?
Jun 08	04 34 54		
Jul 14	17 33 34		
Jul 15	14 52 39	48 $\frac{1}{4}$ N, 122 $\frac{1}{2}$ W	Whidby Island area (III) Seattle area
Jul 17	10 59 10		
Jul 19	14 49 45		
Jul 20	06 46 45	47 $\frac{1}{4}$ N, 122W	Duvall area
Jul 25	02 28 27		
Aug 03	19 24		
Sep 06	01 19	47 $\frac{1}{4}$ N, 122W	Duvall area
Sep 21	11 23		
Oct 04	23 27 16		