Rec 1961

PENNSYLVANIA

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Start of 62 is on last sheet.

699

THE PENNSYLVANIA STATE UNIVERSITY
MINERAL INDUSTRIES EXPERIMENT STATION
GEOPHYSICAL LABORATORY
Project C-19

Seismograph Report XXXI
1 January 1961 - 11 January 1962
College of Mineral Industries
Department of Geophysics and Geochemistry
University Park, Penna., U.S.A.

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Locality: The station is located in a vault under the central wing of the College of Mineral Industries Building. The instruments are mounted on a concrete pillar separated from the foundations and anchored to bedrock (dolomite). The geographic coordinates are:

ϕ = 40° 48' N λ = 77° 52' W H = 354 m

The geocentric coordinates are (courtesy of Gutenberg and Richter):

A = 40° 36' N λ = 77° 52' W H = + 3 km.

Please address all communications to:
Geophysical Laboratory
220 Mineral Sciences Bldg.
University Park, Pennsylvania, U.S.A.

During 1961 three seismographs were in continuous operation except for brief intervals during repairs, adjustments and record changing. All components were recorded photographically at a rate of 1.56 cm/min. The east-west component was recorded also by a pen galvanometer at a rate of 1.70 cm/min. The free periods of the instruments when last measured (Seis. 3 July 1960; Galv. 26 Aug. 1959; Damp. 30 June 1960) were:

Component	Seismometer Period	Galvanometer Period	overall damping A_1/A_2 cycle
North-South	11 sec	2.3 sec	2.9
East-West	14 sec	3.65 sec	2.1
Vertical	3.4 sec	4.0 sec	1.85

Adjustments made on the vertical and east-west- component instruments have been made since the last calibration which may have resulted in changes in their period and damping.

The time is controlled by a Stromberg clock, which is compared daily with signals from radio station WWV. The time accuracy of the records is estimated to be about ± 1 second, except for those marked "—". The latter pulses start during the time marks and have an added uncertainty of ± 2 sec.

Epicenter locations, origin times and focal depths reported below are thru the courtesy of the United States Coast and Geodetic Survey.

In January 1962, new instruments provided under the VELA-Uniform program replaced the above. Future bulletins will be based on data obtained with these instruments.

699

Date	Phase and component		G.M.C.T.	Remarks
2 Jan. 1961		N,E		Seismic activity observed between the hours of 10:41 and 11:55
5 Jan. 1961	-P	N,E,Z	14:16:58	Epicenter 51.6°N, 176.3°W Andreanof Islands, Aleutian Islands O=14:06:25.9 h=about 37 km. Δ=7110 km.
	i	N,E,Z	14:17:16	
	eS	E	14:25:29	
	i	N,E	14:25:34	
5 Jan. 1961		N,E		Seismic activity observed between the hours of 18:28 and 20:54
9 Jan. 1961		N,E		Seismic activity observed between the hours of 03:20 and 03:31
9 Jan. 1961		N,E		Seismic activity observed between the hours of 19:31 and 20:10
10 Jan. 1961	eP	N,Z	14:34:14	Epicenter 49.9°N, 156.2°E Kurile Islands region O=14:22:18.2 h=about 29 km. Δ=8660 km.
	eS	N,E	14:44:03	
	i	N,E	14:44:29	
11 Jan. 1961	iP	N,Z	12:10:08	Epicenter 51.8°N, 171.0°W Fox Islands, Aleutian Islands O=11:59:55.0 h=about 47 km. Δ=6780 km.
	iS	N,E	12:18:24	
14 Jan. 1961	eP	Z	16:48:33	Epicenter 53.9°N, 163.7°W, Unimak Island region O=16:38:55.6 h=about 41 km. Δ=6240 km.
	e		16:48:44	
	eS	N,E	16:56:18	

Date	Phase and component		G.M.C.T.	Remarks
16 Jan. 1961	eSKS	N,E	07:44:05	Epicenter 36.0°N, 141.1°E, Near east coast of Honshu, Japan 0=07:20:18.6 h=about 131 km. Δ=10620 km.
	eS	N,E	07:44:45	
	eSS	E	07:51:19	
16 Jan. 1961	eS	N,E	12:36:45	Epicenter 36.2°N, 141.7°E, Honshu, Japan 0=12:12:34.4 h=about 105 km. Δ=10580 km.
16 Jan. 1961		N,E		Seismic activity observed between the hours of 16:06 and 17:25
18 Jan. 1961		N,E		Seismic activity observed between the hours of 00:10 and 00:25
19 Jan. 1961		E		Seismic activity observed between the hours of 05:22 and 05:42
20 Jan. 1961		N,E		Seismic activity observed between the hours of 17:29 and 18:20
22 Jan. 1961		N,E		Seismic activity observed between the hours of 03:50 and 06:20
25 Jan. 1961		E		Seismic activity observed between the hours of 06:22 and 06:48
26 Jan. 1961		N,E		Seismic activity observed between the hours of 16:39 and 19:10

Date	Phase and component		G.M.C.T.	Remarks
28 Jan. 1961		N,E,Z		Seismic activity observed between the hours of 20:45 and 21:27
30 Jan. 1961		N,E,Z		Seismic activity observed between the hours of 12:33 and 13:15
31 Jan. 1961	eP	Z	00:57:33	Epicenter 55.8°N,
	i	N,Z	00:57:44	153.9°W, Near Kodiac
	i	N,Z	00:58:22	Island, Alaska
	eS	N,E	01:04:40	O=00:48:36.5
	eScS	N	01:07:20	h=about 26 km.
				Δ=5570 km.
31 Jan. 1961		N,E		Seismic activity observed between the hours of 21:55 and 22:10
1 Feb. 1961		N,E,Z		Seismic activity observed between the hours of 00:39 and 01:30
1 Feb. 1961		N,E		Seismic activity observed between the hours of 08:06 and 08:16
2 Feb. 1961		N,E		Seismic activity observed between the hours of 00:21 and 00:35
4 Feb. 1961		N,E		Seismic activity observed between the hours of 07:00 and 07:45
5 Feb. 1961		N,E		Seismic activity observed between the hours of 15:53 and 16:13

Date	Phase and component		G.M.C.T.	Remarks
6 Feb. 1961	iPP	Z	22:05:38	Epicenter 6.8°S, 155.3°E Solomon Islands 0=21:45:13.5 h=about 59 km. Δ=13550 km.
8 Feb. 1961	iP -S	Z N,E	08:12:27 08:18:58	Epicenter 10.6°S, 71.0°W, Brazil-Peru border 0=08:04:13.8 h=about 669 km. Δ=5730 km.
9 Feb. 1961		N,E		Seismic activity observed between the hours of 02:40 and 03:50
11 Feb. 1961		N,E		Seismic activity observed between the hours of 06:36 and 07:14
11 Feb. 1961		N,E		Seismic activity observed between the hours of 21:26 and 22:50
12 Feb. 1961		N,E,Z		Seismic activity observed between the hours of 04:05 and 04:10
12 Feb. 1961	iP iSKS iS	N,E,Z N,E N,E	22:06:25 22:16:46 22:16:56	Epicenter 43.7°N, 147.6°E, Kurile Islands 0=21:53:43.6 h=about 45 km. Δ=9610 km.
12 Feb. 1961	iP	Z	23:39:17	Epicenter 44.0°N, 147.7°E Kurile Islands 0=23:26:34.5 h=about 23 km. Δ=9570 km.
13 Feb. 1961		N,E		Seismic activity observed between the hours of 07:10 and 08:45

Date	Phase and component		G.M.C.T.	Remarks
13 Feb. 1961	iP	N,Z	16:40:05	Epicenter 43.7°N, 149.6°E, Kurile Islands 0=16:27:20.9 h=about 25 km. Δ=9520 km.
	i	N,Z	16:40:17	
14 Feb. 1961	eP	N,Z	03:34:46	Epicenter 43.8°N, 147.9°E, Kurile Islands 0=03:22:00.7 h=about 20 km. Δ=9580 km.
	e	E	03:38:46	
15 Feb. 1961	iP	N,Z	10:57:56	Epicenter 43.7°N, 147.4°E, Kurile Islands 0=10:45:15.9 h=about 69 km. Δ=9610 km.
	ipP	Z	10:58:14	
	eS	N,E	11:08:29	
	esS	N,E	11:08:54	
16 Feb. 1961		N,E		Seismic activity observed between the hours of 14:45 and 15:05
18 Feb. 1961		N,E		Seismic activity observed between the hours of 17:20 and 17:55
19 Feb. 1961		N,E		Seismic activity observed between the hours of 08:21 and 08:41
19 Feb. 1961		N,E		Seismic activity observed between the hours of 12:37 and 13:00
19 Feb. 1961		N,E		Seismic activity observed between the hours of 13:34 and 13:52
20 Feb. 1961		N,E		Seismic activity observed between the hours of 13:32 and 14:10

Date	Phase and component		G.M.C.T.	Remarks
20 Feb. 1961		N,E		Seismic activity observed between the hours of 22:30 and 23:20
23 Feb. 1961		N,E		Seismic activity observed between the hours of 05:09 and 05:30
26 Feb. 1961	iP	Z	06:00:56	Epicenter 32.7°S, 111.2°W, Easter Island region 0=05:48:46.3 h=about 29 km. Δ=8820 km.
	e	E	07:11:05	
	iScS	N	06:11:25	
26 Feb. 1961	iPP	N,E,Z	19:29:04	Epicenter 31.4°N, 131.2°E, Near coast of Kyushu, Japan 0=18:10:48.7 h=about 54 km. Δ=11480 km.
	iSKS	N,E	19:35:25	
	eS	E	19:36:28	
	iPS	N	19:38:02	
	eSS	E	19:43:44	
5 Mar. 1961		E		Seismic activity observed between the hours of 02:33 and 02:53
6 Mar. 1961	e	N,Z	12:17:20	Epicenter 48.1°N, 80.0°W, Ontario Province, Canada 0=12:13:31.0 h=about 49 km. Δ=830 km.
	e	N,Z	12:17:26	
7 Mar. 1961		N,E		Seismic activity observed between the hours of 07:01 and 07:29
7 Mar. 1961	iPP	N,E,Z	10:30:06	Epicenter 28.2°S, 175.7°W, Kermadec Islands region 0=10:10:38.9 h=about 43 km. Δ=12600 km.
	e	N	10:37:53	
	ePS	N	10:39:42	
7 Mar. 1961		N,E		Seismic activity observed between the hours of 19:45 and 21:15

Date	Phase and component		G.M.C.T.	Remarks
9 Mar. 1961	eS	E	04:13:44	Epicenter 10.9°N, 41.7°W, Atlantic Ocean O=03:59:08.7 h=about 27 km. Δ=4840 km.
11 Mar. 1961	eP	N,Z	01:43:40	Epicenter 48.7°N, 154.6°E, Kurile Islands O=01:31:34.4 h=about 26 km. Δ=8840 km.
	e	Z	01:44:08	
	iS	N,E	01:53:39	
	i	N,E	01:54:02	
12 Mar. 1961		N,E		Seismic activity observed between the hours of 03:08 and 03:24
13 Mar. 1961		N,E		Seismic activity observed between the hours of 00:21 and 00:51
13 Mar. 1961	eP	Z	08:10:17	Epicenter 19.2°N, 107.3°W, Off west coast of Mexico O=08:03:43.9 h=about 49 km. Δ=3680 km.
	ePP	Z	08:11:26	
	e	Z	08:12:06	
	iS	N	08:15:42	
15 Mar. 1961		N,E		Seismic activity observed between the hours of 12:35 and 12:40
16 Mar. 1961		N,E		Seismic activity observed between the hours of 14:16 and 16:05
17 Mar. 1961		N,E		Seismic activity observed between the hours of 21:10 and 21:40
18 Mar. 1961		N,E		Seismic activity observed between the hours of 15:18 and 17:18

Date	Phase and component		G.M.C.T.	Remarks
19 Mar. 1961	iP'	Z	05:18:50	Epicenter 6.4°S, 105.5°E, Soenda Strait 0=04:59:19.3 h=about 120 km. Δ=16180 km.
20 Mar. 1961	iP	N,Z	06:22:31	Epicenter 11.5°N, 86.3°W Off west coast of Nicaragua 0=06:16:23.9 h=about 122 km. Δ=3350 km.
20 Mar. 1961	e	E	16:12:27	Epicenter 18.4°S, 175.2°W Tonga Islands 0=15:53:09.9 h=about 175 km. Δ=11920 km.
	eSKS	E	16:17:36	
	e	N,E	16:18:28	
	i	N,E	16:19:04	
	i	E,Z	16:21:20	
21 Mar. 1961		N,E,Z		Seismic activity observed between the hours of 00:11 and 02:40
27 Mar. 1961		N,E		Seismic activity observed between the hours of 21:06 and 21:45
28 Mar. 1961	iP'	N,E,Z	09:55:09	Epicenter 0.2°N, 123.6°E, Northern Celebes 0=09:35:55.4 h=about 83 km. Δ=14980 km.
	i	N,E,Z	09:55:23	
	iPP	N,E,Z	09:57:45	
	i	N,E,Z	09:58:29	
	i	N,E.Z	09:58:40	
	i	N,E	09:59:24	
	e	N,E	10:01:34	
	i	N,Z	10:02:15	
28 Mar. 1961	iP	N,Z	21:12:19	Epicenter 22.0°S, 68.0°W, Chile-Bolivia border region 0=21:01:56.2 h=about 125 km. Δ=7020 km.
	ipP	N,E,Z	21:12:49	
	-sP or PcP	N,Z	21:12:58	
	eSPP	N	21:15:30	
	iS	N,E	21:20:42	
	isS	E	21:21:30	
	e	E	21:22:51	

Date	Phase and component		G.M.C.T.	Remarks
30 Mar. 1961	eS	N,E	07:54:37	Epicenter 22.0°N, 107.8°W, Gulf of California O=07:42:59.4 h=about 20 km. Δ=3500 km.
1 Apr. 1961	ePP	N,Z	15:35:50	Epicenter 39.6°N, 77.7°E, Sinkiang Province, China O=15:18:22.8 h=about 21 km. Δ=10770 km.
	eSKS	N,E	15:42:31	
	eS	N,E	15:43:11	
	ePS	N	15:44:40	
3 Apr. 1961		N,E		Seismic activity observed between the hours of 08:05 and 08:20
4 Apr. 1961		N,E,Z		Seismic activity observed between the hours of 10:13 and 11:30
6 Apr. 1961		N,E		Seismic activity observed between the hours of 04:19 and 04:46
8 Apr. 1961	iP	N,Z	18:11:47	Epicenter 38.2°S, 72.7°W, Chile O=17:59:46.7 h=about 60 km. Δ=8750 km.
	iS	N,E	18:21:43	
9 Apr. 1961		N,E,Z		Seismic activity observed between the hours of 07:37 and 08:36
9 Apr. 1961		N,E,Z		Seismic activity observed between the hours of 16:04 and 17:30

Date	Phase and component		G.M.C.T.	Remarks
12 Apr. 1961	eP	N,Z	22:26:29	Epicenter 13.1°N,
	i	N,E,Z	22:26:47	88.9°W El Salvador
	esP	E	22:27:08	0=22:20:33.6
	e	N,E	22:27:50	h=about 122 km.
	eS	N,E	22:31:17	Δ=3250 km.
13 Apr. 1961		N,E		Seismic activity observed between the hours of 17:00 and 18:17
16 Apr. 1961		N,E		Seismic activity observed between the hours of 12:42 and 13:00
19 Apr. 1961		N,E		Seismic activity observed between the hours of 21:11 and 21:25
20 Apr. 1961		N,E		Seismic activity observed between the hours of 22:28 and 23:00
21 Apr. 1961	eP	Z	20:22:49	Epicenter 47.7°N, 154.6°E, Kurile Islands 0=20:10:38.3 h=about 27 km. Δ=8930 km.
21 Apr. 1961	eP	N,Z	21:37:06	Epicenter 51.7°N,
	e	N,Z	21:37:21	173.9°W Andreanof
	eS	N,E	21:45:34	Islands, Aleutian Islands 0=21:26:42.1 h=about 36 km. Δ=6960 km.
23 Apr. 1961	eP	N,Z	09:14:13	Epicenter 44.6°N,
	i	N,E,Z	09:14:15	150.2°E, Kurile
	ePP	N,E	90:17:27	Islands
	iS	N,E	09:24:32	0=09:01:41.8 h=about 44 km. Δ=9410 km

Date	Phase and component		G.M.C.T.	Remarks
23 Apr. 1961	eP	N,Z	17:03:30	Epicenter 44.5°N, 150.1°E, Kurile Islands 0=16:51:03.6 h=about 76 km. Δ=9420 km
	-S	E	17:13:58	
25 Apr. 1961	iPP	Z	01:30:27	Epicenter 44.5°N, 150.0°E, Kurile Islands 0=01:17:42.7 h=about 78 km. Δ=9430 km.
	eS	E	01:40:30	
25 Apr. 1961		N,E		Seismic activity observed between the hours of 12:21 and 12:55
26 Apr. 1961	eP	N,Z	07:51:32	Epocenter 44.6°N, 149.9°E, Kurile Islands 0=07:38:54.1 h=about 20 km. Δ=9420 km.
	eS	N,E	08:01:56	
26 Apr. 1961		N,E		Seismic activity observed between the hours of 20:24 and 20:50
29 Apr. 1961	iP	E,Z	09:26:45	Epicenter 40.6°N, 127.5°W, off coast of northern Calif. 0=09:19:28.3 h=about 26 km. Δ=4140 km.
	ePP	N,E	09:28:05	
	iS	N,E,Z	09:32:35	
30 Apr. 1961	eS	N,E	07:45:54	Epicenter 52.0°N, 31.9°W, North Atlantic Ocean 0=07:33:53.5 h=about 38 km. Δ=3680 km.

Date	Phase and component		G.M.C.T.	Remarks
30 Apr. 1961	eS	E	11:38:23	Epicenter 44.6°N, 149.7° E, Kurile Islands O=11:15:19.7 h=about 70 km. Δ=9430 km.
30 Apr. 1961		N,E		Seismic activity observed between the hours of 15:38 and 16:30
30 Apr. 1961		N,E		Seismic activity observed between the hours of 17:48 and 18:06
1 May 1961		N,E		Seismic activity observed between the hours of 03:00 and 03:28
1 May 1961	eS	N,E	03:34:28	Epicenter 40.7°N, 127.4°W, off coast of northern Calif. O=07:21:26.2 h=about 54 km. Δ=4130 km.
1 May 1961	eS	N,E	12:32:12	Epicenter 40.6°N, 127.5°W Off coast of northern Calif. O=12:19:05.6 h=about 29 km. Δ=4140 km.
1 May 1961	eS	E	18:58:30	Epicenter 40.7°N, 127.3°W, Off coast of northern Calif. O=18:45:28.9 h=about 69 km. Δ=4120 km.
2 May 1961		N,E		Seismic activity observed between the hours of 03:36 and 03:50

Date	Phase and component		G.M.C.T.	Remarks
2 May 1961		N,E		Seismic activity observed between the hours of 10:30 and 10:40
2 May 1961	e	N,E	23:00:40	Epicenter 27.8°S, 176.5°W, Kermadec Islands region
	eSKS	N,E	23:10:10	O=22:44:44.3
	ePS	N,E	23:13:58	h=about 47 km.
				Δ=12640 km.
3 May 1961		N,E		Seismic activity observed between the hours of 09:06 and 09:20
3 May 1961		N,E		Seismic activity observed between the hours of 14:22 and 14:45
4 May 1961	eS	N,E	02:30:36	Epicenter 40.6°N, 127.1°W, Off coast of northern Calif.
				O=02:17:34.0
				h=about 25 km.
				Δ=4100 km.
4 May 1961	eP	N,Z	07:07:35	Epicenter 17.7°N, 46.4°W, Atlantic Ocean
	eS	N,E	07:13:12	O=07:00:32.9
				h=about 19 km.
				Δ=3950 km.
4 May 1961		N,E		Seismic activity observed between the hours of 20:59 and 21:35
5 May 1961		N,E		Seismic activity observed between the hours of 09:45 and 10:10
5 May 1961		N,E		Seismic activity observed between the hours of 14:10 and 15:25

Date	Phase and component		G.M.C.T.	Remarks
5 May 1961		N		Seismic activity observed between the hours of 16:31 and 16:52
6 May 1961		N,E		Seismic activity observed between the hours of 20:10 and 20:35
7 May 1961		N,E,Z		Seismic activity observed between the hours of 00:14 and 02:42
7 May 1961	iP'	N,Z	04:51:48	Epicenter 8.6°S, 111.4°E, North coast of Java O=04:32:14.5 h=about 113 km. Δ=16320 km.
7 May 1961		N,E		Seismic activity observed between the hours of 06:23 and 06:39
7 May 1961	epP'	Z	10:42:14	Epicenter 5.8°N, 126.8°E, Off coast of Mindanao, P.I. O=10:22:43.7 h=about 89 km. Δ=14270 km.
	e	N,Z	10:45:40	
7 May 1961		N,E		Seismic activity observed between the hours of 17:08 and 17:57
8 May 1961	iP	N,Z	19:34:16	Epicenter 24.3°S, 69.7°W, Northern Chile O=19:23:35.4 h=about 48 km. Δ=7250 km.
	iS	N,E,Z	19:43:04	
9 May 1961		N,E		Seismic activity observed between the hours of 00:11 and 00:43

Date	Phase and component		G.M.C.T.	Remarks
9 May 1961		N,E		Seismic activity observed between the hours of 12:26 and 12:43
10 May 1961		N		Seismic activity observed between the hours of 18:39 and 18:44
11 May 1961	eP	N	08:50:22	Epicenter 37.2°S, 73.6°W, Near coast of southern Chile O=08:38:27.1 h=about 47 km. Δ=8640 km.
	ePP	N	08:53:22	
	eS	N,E	09:00:16	
11 May 1961		N		Seismic activity observed between the hours of 19:07 and 19:24
12 May 1961		N,E		Seismic activity observed between the hours of 05:37 and 06:10
12 May 1961		N,E		Seismic activity observed between the hours of 17:56 and 18:10
12 May 1961		N		Seismic activity observed between the hours of 22:10 and 22:18
13 May 1961		N,E		Seismic activity observed between the hours of 06:01 and 06:12
13 May 1961		N,E		Seismic activity observed between the hours of 09:00 and 09:30
13 May 1961		N,E		Seismic activity observed between the hours of 14:44 and 16:12

Date		Phase and component	G.M.C.T.	Remarks
13 May 1961		N,E		Seismic activity observed between the hours of 20:04 and 20:30
14 May 1961		N,E		Seismic activity observed between the hours of 03:36 and 04:13
14 May 1961		N,E		Seismic activity observed between the hours of 15:28 and 16:34
14 May 1961	eP eS	N,Z N,E	19:39:05 19:44:37	Epicenter 40.8°N, 127.4°W, off coast of northern Calif. O=19:31:34.4 h=about 45 km. Δ=4120 km.
14 May 1961		N,E		Seismic activity observed between the hours of 23:09 and 23:17
16 May 1961		N		Seismic activity observed between the hours of 04:02 and 04:38
16 May 1961		N,E		Seismic activity observed between the hours of 18:03 and 19:05
16 May 1961		N,E		Seismic activity observed between the hours of 22:06 and 23:30
17 May 1961		N		Seismic activity observed between the hours of 03:42 and 03:50

Date	Phase and component		G.M.C.T.	Remarks
17 May 1961	iP	N,E,Z	19:40:24	Epicenter 52.0°N,
	i	N,E,Z	19:40:31	173.9°E, Near Islands,
	i	N,E,Z	19:40:43	Aleutian Islands
	e	N,E,Z	19:41:16	O=19:29:19.3
	ePP	N	19:43:01	h=about 21 km.
	iS	N,E	19:49:23	Δ=7620 km.
	i	N,E	19:49:35	
	eP'P'	Z	20:08:40	
19 May 1961		N,E		Seismic activity observed between the hours of 09:33 and 10:02
19 May 1961		N		Seismic activity observed between the hours of 15:03 and 15:48
19 May 1961		N		Seismic activity observed between the hours of 17:48 and 18:00
21 May 1961		N,E		Seismic activity observed between the hours of 04:02 and 04:10
21 May 1961		N,E		Seismic activity observed between the hours of 08:19 and 08:27
21 May 1961		N,E		Seismic activity observed between the hours of 15:37 and 15:47
21 May 1961		N		Seismic activity observed between the hours of 17:55 and 18:13
22 May 1961	eS	N	14:11:01	Epicenter 21.3°S, 174.4°W, Tonga Islands O=13:44:35.8 h=about 97 km. Δ=12050 km.

Date	Phase and component		G.M.C.T.	Remarks
22 May 1961	iPP	E,Z	17:51:30	Epicenter 22.8°S, 176.1°W, Tonga Islands region 0=17:32:21.6 h=about 35 km. Δ=12280 km.
	eSKS	E	17:57:30	
	ePS	E	18:01:00	
22 May 1961		N,E		Seismic activity observed between the hours of 22:29 and 22:40
23 May 1961	iP	N,E,Z	02:57:09	Epicenter 36.4°N, 28.3°E, Dodecanese Islands 0=02:45:16.0 h=about 49 km. Δ=8630 km.
	-S	N	03:06:57	
23 May 1961	-P	Z	03:46:58	Epicenter 9.8°N 84.0°W, Costa Rica 0=03:40:26.1 h=about 136 km. Δ=3480 km.
	ePP	Z	03:48:14	
23 May 1961		N,E		Seismic activity observed between the hours of 08:42 and 08:50
23 May 1961	iP	N,E,Z	16:50:54	Epicenter 12.6°N, 87.3°W Near coast of Nicaragua 0=16:44:59.4 h=about 138 km. Δ=3250 km.
	esP	N	16:51:46	
	iS	N,E	16:55:41	
24 May 1961		N,E		Seismic activity observed between the hours of 02:48 and 02:58
24 May 1961		N,E		Seismic activity observed between the hours of 13:54 and 14:01
24 May 1961		N		Seismic activity observed between the hours of 17:43 and 17:47

Date	Phase and component	G.M.C.T.	Remarks
24 May 1961	N,E		Seismic activity observed between the hours of 19:17 and 19:23
25 May 1961	N,E		Seismic activity observed between the hours of 21:04 and 21:10
28 May 1961	N,E		Seismic activity observed between the hours of 17:31 and 17:45
29 May 1961	N,E		Seismic activity observed between the hours of 00:51 and 01:33
29 May 1961	N,E		Seismic activity observed between the hours of 07:50 and 08:31
31 May 1961	N,E		Seismic activity observed between the hours of 04:58 and 05:10
31 May 1961 eS	N	14:29:06	Epicenter 29.8°N, 114.0°W, Gulf of California O=14:17:43.8 h=about 74 km. Δ=3470 km.
31 May 1961	N		Seismic activity observed between the hours of 19:57 and 21:00
1 June 1961 eP eS	N,Z N,E	10:07:40 10:11:52	Epicenter 19.5°N, 69.3°W, Near coast of Dominican Republic O=10:02:45.1 h=about 53 km. Δ=2500 km.

Date	Phase and component		G.M.C.T.	Remarks
1 June 1961	ePP	N	23:47:36	Epicenter 10.6°N,
	-PS	N,E	23:56:58	39.3°E, Ethiopia
				O=23:29:21.1
				h=about 51 km.
				Δ=11420 km.
2 June 1961	ePP	N,E	05:09:28	Epicenter 9.8°N,
	eSKS	N,E	05:16:02	40.0°E, Ethiopia
	ePS	N,E	05:18:45	O=04:51:10.4
				h=about 41 km.
				Δ=11540 km.
3 June 1961	eS	N,E	01:33:52	Epicenter 56.1°N,
	eScS	N,E	01:34:39	164.8°E, Off east
	eSS	N,E	01:41:53	coast of Kamchatka
				O=01:13:25.4
				h=about 29 km.
				Δ=7770 km.
4 June 1961	eP	N,Z	07:47:04	Epicenter 33.8°N,
	ePP	N,Z	07:51:21	81.8°E, Tibet
	ePPP	N,Z	07:53:28	O=07:33:05.4
	eS	N	07:58:49	h=about 46 km.
	eSP	N	08:00:20	Δ=11490 km.
6 June 1961		N		Seismic activity observed between the hours of 00:50 and 01:59
6 June 1961		N,E		Seismic activity observed between the hours of 04:07 and 04:14
7 June 1961	iP	N,E,Z	14:27:08	Epicenter 5.4°S,
	eS	N	14:36:53	11.6°W, Ascension Island region
				O=14:15:18.9
				h=about 17 km.
				Δ=8430 km.
10 June 1961	eP	N,Z	08:59:34	Epicenter 8.1°N,
	ePP	N,E,Z	09:01:12	103.4°W, South
	eS	N,E	09:05:35	of Mexico
				O=08:52:01.1
				h=about 25 km.
				Δ=4410 km.

Date	Phase and component		G.M.C.T.	Remarks
10 June 1961	eP	N,Z	20:43:16	Epicenter 24.1°S, 112.1°W, Easter Island region
	eS	N,E	20:52:41	0=20:31:50.9 h=about 47 km. Δ=8000 km.
11 June 1961	eP	N,Z	05:24:09	Epicenter 27.9°N, 54.7°E Southern Iran
	e	N,E,Z	05:27:38	0=05:10:27.7 h=about 44 km. Δ=10970 km.
	ePP	N,E,Z	05:28:11	
	eSKS	N,E	05:34:50	
11 June 1961	eP	Z	06:04:37	Epicenter 51.4°N, 159.3°E, Near south coast of Kamchatka 0=05:52:51.7 h=about 18 km. Δ=8400 km.
12 June 1961		N,E		Seismic activity observed between the hours of 00:28 and 00:59
13 June 1961		N		Seismic activity observed between the hours of 22:04 and 22:30
14 June 1961		N		Seismic activity observed between the hours of 16:39 and 16:51
14 June 1961		N		Seismic activity observed between the hours of 19:01 and 19:11
14 June 1961		N,E		Seismic activity observed between the hours of 21:02 and 22:06

Date	Phase and component		G.M.C.T.	Remarks
16 June 1961	iP	Z	07:20:35	Epicenter 41.1°S, 74.5°W, Off coast of northern Chile O=07:08:16.5 h=about 17 km. Δ=9060 km.
16 June 1961	iP eS	N,E,Z N,E	10:38:18 10:44:10	Epicenter 8.8°N, 73.4°W, Northern Colombia O=10:31:56.2 h=about 120 km. Δ=3570 km.
17 June 1961	eP eS	Z N,E	11:05:39 11:13:06	Epicenter 11.9°S, 75.3°W, Peru O=10:56:30.3 h=about 29 km. Δ=5830 km.
17 June 1961	iP esS	N,Z N,E,Z	15:13:29 15:18:53	Epicenter 14.2°N, 92.2°W, Mexico-Guatemala border O=15:07:36.1 h=about 147 km. Δ=3260 km.
17 June 1961	epP esS	Z N,E	18:46:07 18:51:05	Epicenter 14.5°N, 92.1°W, Near coast of Guatemala O=18:39:51.4 h=about 105 km. Δ=3220 km.
18 June 1961	iP'	N,Z	03:31:05	Epicenter 5.9°S, 113.0°E, Java Sea O=03:12:35.7 h=about 641 km. Δ=15990 km.
19 June 1961		N,E		Seismic activity observed between the hours of 02:56 and 03:21
19 June 1961		N,E		Seismic activity observed between the hours of 08:25 and 09:00

Date	Phase and component		G.M.C.T.	Remarks
20 June 1961		N		Seismic activity observed between the hours of 04:17 and 05:10
20 June 1961		N,E		Seismic activity observed between the hours of 10:05 and 10:15
21 June 1961	eP eS	N,Z N	04:03:14 04:07:58	Epicenter 15.3°N, 87.3°W, Northwestern Honduras O=03:57:44.0 h=about 114 km. Δ=2970 km.
21 June 1961	iP'	N,Z	20:44:28	Epicenter 7.6°S, 110.0°E, Near north coast of Java O=20:25:00.9 h=about 163 km. Δ=16250 km.
22 June 1961		N		Seismic activity observed between the hours of 20:13 and 20:35
23 June 1961	iP ePP -S	N,E,Z N,E N,E	09:03:05 09:04:21 09:08:58	Epicenter 43.9°N, 128.9°W, Off coast of Oregon O=08:55:55.2 h=about 56 km. Δ=4150 km.
24 June 1961	eP eS	N,Z N	05:13:52 05:18:42	Epicenter 13.6°N, 90.2°W, Near coast of El Salvador O=05:07:56.0 h=about 90 km. Δ=3240 km.
24 June 1961		N		Seismic activity observed between the hours of 10:54 and 11:13

Date	Phase and component		G.M.C.T.	Remarks
25 June 1961	ePP	N,Z	17:05:21	Epicenter 21.7°N, 143.1°E, North of Mariana Islands O=16:46:32.9 h=about 13 km. Δ=11900 km.
26 June 1961		N		Seismic activity observed between the hours of 13:13 and 13:25
26 June 1961	iP	N,Z	14:58:24	Epicenter 52.4°N, 174.5°E, Near Islands, Aleutian Islands O=14:47:26.1 h=about 60 km. Δ=7560 km.
	ipP	N,Z	14:58:35	
	i	N,E	15:07:21	
	e	N	15:08:23	
	e	N	15:08:34	
27 June 1961		N,E		Seismic activity observed between the hours of 07:55 and 08:45
4 July 1961		N,E,Z		Seismic activity observed between the hours of 05:12 and 05:21
4 July 1961		N,E		Seismic activity observed between the hours of 11:25 and 11:31
6 July 1961	iP'	N,Z	22:28:23	Epicenter 20.0°S, 169.0°E, New Hebrides Islands O=22:09:31.4 h=about 47 km. Δ=13350 km.
	ePP	E	22:29:49	
	e	Z	22:30:17	
	ePS	N,E	22:39:23	
7 July 1961	eP'	Z	13:31:34	Epicenter 5.7°S, 149.7°E, New Britain O=13:10:43.8 h=about 57 km. Δ=13890 km.
	ePP	N,Z	13:29:49	
	ePS	E	13:41:38	
	eSS	N	13:48:29	

Date	Phase and component		G.M.C.T.	Remarks
8 July 1961		N,E,Z		Seismic activity observed between the hours of 03:04 and 05:15
8 July 1961		N,E,Z		Seismic activity observed between the hours of 15:15 and 18:15
8 July 1961		N,E		Seismic activity observed between the hours of 22:15 and 23:44
9 July 1961	eP	N,Z	06:38:28	Epicenter 15.0°N, 87.2°W, Honduras
	eS	N	06:43:18	O=06:32:52.4 h=about 165 km. Δ=3000 km.
11 July 1961	-P'	Z	09:50:59	Epicenter 8.3°N,
	ePP	N,Z	09:53:11	93.3°E, Nicobar
	epPP	N	09:53:40	Islands region
	esPP	N,Z	09:54:20	O=09:31:57.2 h=about 163 km. Δ=14500 km.
16 July 1961		N		Seismic activity observed between the hours of 14:32 and 14:44
17 July 1961	eP	N,Z	01:07:12	Epicenter 16.7°N,
	eS		01:12:16	97.7°W, Oaxacta, Mexico O=01:01:11.2 h=about 74 km. Δ=3280 km.
17 July 1961		N		Seismic activity observed between the hours of 09:21 and 09:35
17 July 1961		N		Seismic activity observed between the hours of 16:48 and 18:10

Date	Phase and component		G.M.C.T.	Remarks
18 July 1961	iP	N,Z	14:17:44	Epicenter 29.4°N,
	ePP	N,Z	14:22:03	131.6°E, Northern
	e	N	14:27:49	Ryukyu Islands
	ePS	N,Z	14:31:14	O=14:03:36.5
				h=about 21 km.
				Δ=11670 km.
23 July 1961		N		Seismic activity observed between the hours of 00:18 and 00:31
23 July 1961	iP	N,Z	14:47:11	Epicenter 6.9°N,
	eS	N,Z	14:54:43	123.5°W, Pacific Ocean, about 2000 miles northwest of Galapagos Islands
				O=14:38:03.5
				h=about 89 km.
				Δ=5870 km.
23 July 1961		N,Z		Seismic activity observed between the hours of 22:04 and 02:30, 24 July 1961
24 July 1961		N		Seismic activity observed between the hours of 10:58 and 11:03
28 July 1961	iP	N,Z	01:13:16	Epicenter 2.2°S,
	ipP	N,Z	01:13:50	77.1°W, Ecuador
	-PP	N,Z	01:14:58	O=01:05:30.0
	iScP	Z	01:18:42	h=about 136 km.
	iS	N,E,Z	01:19:31	Δ=4760 km.
28 July 1961		N,E		Seismic activity observed between the hours of 06:45 and 08:06

Date	Phase and component		G.M.C.T.	Remarks
28 July 1961	eP	N,Z	10:20:30	Epicenter 20.0°N,
	ePP	Z	10:21:50	109.2°W, Pacific
	-S	N	10:25:58	Ocean, West of
				Jalisco, Mexico
				O=10:13:51.1
				h=about 42 km.
				Δ=3760 km.
29 July 1961		N,E		Seismic activity observed between the hours of 17:27 and 18:00
29 July 1961		N		Seismic activity observed between the hours of 21:29 and 21:45
31 July 1961		N,E		Seismic activity observed between the hours of 00:25 and 00:33
1 Aug. 1961		N,E		Seismic activity observed between the hours of 14:49 and 15:00
2 Aug. 1961		N,E		Seismic activity observed between the hours of 02:50 and 03:57
3 Aug. 1961	iP	N,Z	03:13:11	Epicenter 18.2°N
	eS	N	03:17:34	66.2°W, Puerto Rico
	i	Z	03:17:54	O=03:08:02.3
				h=about 141 km.
				Δ=2740 km.
4 Aug. 1961		N		Seismic activity observed between the hours of 00:04 and 01:00
4 Aug. 1961		N,E		Seismic activity observed between the hours of 11:30 and 12:20

Date	Phase and component		G.M.C.T.	Remarks
4 Aug. 1961		N		Seismic activity observed between the hours of 14:51 and 15:00
4 Aug. 1961		N		Seismic activity observed between the hours of 17:10 and 17:16
4 Aug. 1961	-S	N	18:46:58	Epicenter 34.8°N, 38.7°W, North Atlantic Ocean 0=18:35:20.8 h=about 26 km. Δ=3480 km.
4 Aug. 1961	iP i eS	N,Z Z N	23:05:19 23:05:30 23:15:40	Epicenter 45.3°N, 151.1°E, Kurile Islands 0=22:52:49.2 h=about 20 km. Δ=9300 km.
5 Aug. 1961	iP eS	N,Z N	02:34:42 02:41:29	Epicenter 60.5°N, 148.6°W, Kenai Peninsula, Alaska 0=02:26:22.4 h=about 105 km. Δ=5160 km.
5 Aug. 1961	eP ipP esP ePcP eS	N,Z N,Z N,Z N,Z N,E	09:37:46 09:38:15 09:38:27 09:38:38 09:45:49	Epicenter 18.8°S, 68.2°W, Near Chile-Bolivia border 0=09:27:45.5 h=about 113 km. Δ=6660 km.
7 Aug. 1961		N		Seismic activity observed between the hours of 04:45 and 05:31
7 Aug. 1961		N,E		Seismic activity observed between the hours of 13:14 and 14:59
8 Aug. 1961		N,E		Seismic activity observed between the hours of 01:10 and 01:54

Date	Phase and component		G.M.C.T.	Remarks
8 Aug. 1961	iP	N,E,Z	12:28:35	Epicenter 50.9°N, 170.7°W, Fox Islands Aleutian Islands O=12:18:18.9 h=about 24 km. Δ=6810 km.
	iS	N,E	12:36:56	
	eP'P'	Z	12:57:56	
8 Aug. 1961		n		Seismic activity observed between the hours of 18:16 and 18:35
10 Aug. 1961		N		Seismic activity observed between the hours of 01:24 and 01:40
11 Aug. 1961	iP	N,E,Z	16:04:23	Epicenter 42.9°N, 145.1°E, Eastern Hokkaido, Japan O=15:51:35.4 h=about 71 km. Δ=9790 km.
	ipP	N,E,Z	16:05:22	
	isP	N,E,Z	16:05:39	
	iSKS	N,E	16:14:44	
14 Aug. 1961		N		Seismic activity observed between the hours of 19:18 and 20:40
14 Aug. 1961		N,E		Seismic activity observed between the hours of 23:58 and 01:30, 15 Aug. 1961
15 Aug. 1961	ePP	N,Z	19:21:32	Epicenter 32.8°N, 142.4°E, South of Honshu, Japan O=19:03:55.7 h=about 39 km. Δ=10880 km.
	e	N,Z	19:21:45	
	eS	N	19:28:10	
17 Aug. 1961		N		Seismic activity observed between the hours of 06:59 and 07:27

Date	Phase and component		G.M.C.T.	Remarks
17 Aug. 1961	iP	N,E,Z	21:28:42	Epicenter 46.3°N,
	ipP	N,E,Z	21:29:20	149.3°E, Kurile
	esP	N,Z	21:29:47	Islands
	ePP	N,Z	21:31:52	O=21:16:30
	epPP	N,Z	21:32:37	h=about 186 km.
	iS or SKS	N,E	21:38:45	Δ=9290 km.
19 Aug. 1961	iP	N,E,Z	05:18:03	Epicenter 10.7°S,
	iPeP	N,Z	05:19:06	71.0°W, Peru-
	ipP	N,Z	05:19:54	Brazil border
	iScP	Z	05:22:01	O=05:09:49.5
	ePcS	N,E,Z	05:23:04	h=about 649 km.
	iS	N,E,Z	05:24:41	Δ=5740 km.
	iScS	N,E,Z	05:26:47	
19 Aug. 1961	iP	Z	05:47:07	Epicenter 36.0°N, 136.5°E, Off west coast of Honshu, Japan O=05:33:30.6 h=about 17 km. Δ=10810 km.
19 Aug. 1961	iP	N,E,Z	14:57:37	Epicenter 18.0°N,
	eS	N,E	15:01:48	68.8°W, Mona Passage O=14:52:31.4 h=about 146 km. Δ=2670 km.
23 Aug. 1961		N,E,Z		Seismic activity observed between the hours of 01:17 and 01:26
25 Aug. 1961		N,E		Seismic activity observed between the hours of 05:57 and 06:15
25 Aug. 1961		N,E		Seismic activity observed between the hours of 07:28 and 08:10
27 Aug. 1961		N,E		Seismic activity observed between the hours of 01:12 and 01:28

Date	Phase and component		G.M.C.T.	Remarks
27 Aug. 1961	iP	N,Z	02:04:19	Epicenter 15.3°S, 13.1°W, South of Ascension Island 0=01:51:51.8 h=about 49 km. Δ=9100 km.
27 Aug. 1961	iP	N,Z	16:34:26	Epicenter 46.6°N, 154.1°E, Kurile Islands 0=16:22:08.1 h=about 31 km. Δ=9050 km.
	i	N,Z	16:34:35	
	eS	N,E	16:44:31	
28 Aug. 1961	esS	N,E	20:46:45	Epicenter 22.9°S, 113.4°W, Easter Island region 0=20:26:04.2 h=about 56 km. Δ=7940 km.
28 Aug. 1961	iP	N,Z	21:36:38	Epicenter 14.0°S, 74.4°W, Near coast of Peru 0=21:27:12.1 h=about 73 km. Δ=6070 km.
	-	Z	21:36:58	
	eS	N,E	21:44:15	
29 Aug. 1961	eP	N,Z	15:01:28	Epicenter 52.2°N, 170.8°W, Fox Islands Aleutian Islands 0=14:51:14.2 h=about 41 km. Δ=6750 km.
	eS	N	15:09:43	
30 Aug. 1961	eP	Z	03:44:17	Epicenter 7.0°N, 33.2°W, North Atlantic Ocean 0=03:35:07.7 h=about 69 km. Δ=5790 km.
	eS	N,E	03:51:36	
31 Aug. 1961	iP	N,E,Z	01:56:51	Epicenter 10.6°S, 70.9°W, Peru-Brazil border 0=01:48:37.5 h=about 626 km. Δ=5730 km.
	ipCP	N,Z	01:57:54	
	ipP	N,Z	01:58:34	
	isP	N,Z	01:59:37	
	isPP	N,Z	02:01:36	
	ePcS	N,E	02:01:52	
	iS	N,E,Z	02:03:24	
	eScS	E	02:05:30	
	eSS	E	02:06:45	

Date	Phase and component		G.M.C.T.	Remarks
31 Aug. 1961	iP	N,Z	02:05:17	Epicenter 10.4°S,
	iPcP	N,Z	02:06:23	70.7°W, Peru-
	ipP	Z	02:07:12	Brazil border
	-sPP	N,Z	02:09:58	0=01:57:08.0
	iPcS	N,E	02:10:25	h=about 629 km.
	iS	N,E,Z	02:11:51	Δ=5710 km.
1 Sept. 1961	iP'	N,Z	00:27:45	Epicenter 59.3°S,
	ePP	N,E	00:28:19	27.3°W, Sandwich
	ePPP	N,E	00:30:34	Islands region
	eSKS	N,E,Z	00:34:07	0=00:09:34.6
	eSP	N,E,Z	00:37:32	h=about 131 km.
	eSS	N	00:42:48	Δ=12020 km.
	esSS?	Z	00:43:48	
1 Sept. 1961	iP	N,E,Z	18:56:42	Epicenter 13.5°N,
	ePP	N,E	18:57:43	92.5°W, Off coast
	eS	E	19:01:36	of Guatemala
				0=18:50:35.4
				h=about 37 km.
				Δ=3340 km.
2 Sept. 1961	iP	N,E,Z	00:36:18	Epicenter 52.0°N,
	eS	N,E	00:44:34	170.9°W, Fox Islands
				Aleutian Islands
				0=00:26:06.2
				h=about 39 km.
				Δ=6760 km.
4 Sept. 1961	iP	N,E,Z	09:59:50	Epicenter 51.4°N,
	iPcP	N,Z	10:00:23	178.1°W, Andreanof
	eS	N,E	10:08:30	Islands, Aleutian
	eScS	N,E	10:09:40	Islands
				0=09:49:10.7
				h=about 35 km.
				Δ=7220 km.
4 Sept. 1961		N,E		Seismic activity observed between the hours of 19:43 and 20:10
5 Sept. 1961		N,E		Seismic activity observed between the hours of 03:00 and 03:30

Date	Phase and component		G.M.C.T.	Remarks
5 Sept. 1961	iP	N,Z	11:43:10	Epicenter 59.9°N,
	ipP	N,E,Z	11:43:28	150.6°W, Kenai
	-PP	N,Z	11:45:00	Peninsula
	ipPP	N,E,Z	11:45:19	O=11:34:37.3
	-S	N,E	11:50:00	h=about 44 km.
	e	N,E	11:50:15	Δ=5280 km.
8 Sept. 1961		N,E,Z		Seismic activity observed between the hours of 05:11 and 05:50
8 Sept. 1961	iP	Z	11:40:33	Epicenter 56.1°S,
	i	N,Z	11:43:50	27.3°W, Sandwich
	eP'	N,E	11:44:34	Islands region
	iPP	N,E	11:44:52	O=11:26:32.8
	epPP	N,E,Z	11:45:16	h=about 125 km.
	iPPP	E	11:47:23	Δ=11730 km.
	-?	N	11:48:59	
	-SKS	N,E,Z	11:50:58	
	i?	N	11:51:41	
	eS	E	11:52:20	
	eSP	N,Z	11:53:56	
	eSS	N,Z	11:59:48	
9 Sept. 1961		N,E		Seismic activity observed between the hours of 19:27 and 19:41
10 Sept. 1961	iP	N,Z	04:55:17	Epicenter 22.7°S,
	eS	N,E	05:03:17	63.1° W, Salta Province
				O=04:45:27.1
				h=about 519 km.
				Δ=7180 km.
11 Sept. 1961		N,E		Seismic activity observed between the hours of 05:00 and 05:10
12 Sept. 1961		N,E,Z		Seismic activity observed between the hours of 19:34 and 20:13

Date	Phase and component		G.M.C.T.	Remarks
13 Sept. 1961	iP	N,Z	21:31:38	Epicenter 41.6°S, 73.2°W, Southern Chile 0=21:19:26 h=about 154 km. Δ=9130 km.
	eS or SKS	N	21:41:47	
15 Sept. 1961	iP	N,Z	01:58:30	Epicenter 35.1°N, 33.9°E, Cyprus 0=01:46:08.4 h=about 25 km. Δ=9090 km.
16 Sept. 1961		N,E		Seismic activity observed between the hours of 03:41 and 03:50
17 Sept. 1961		N		Seismic activity observed between the hours of 09:48 and 10:05
17 Sept. 1961		N,E		Seismic activity observed between the hours of 16:12 and 16:25
18 Sept. 1961		N,E,Z		Seismic activity observed between the hours of 02:41 and 03:15
19 Sept. 1961	iP	N,Z	02:35:18	Epicenter 20.3°S, 63.2°W, Southern Bolivia 0=02:25:49.2 h=about 609 km. Δ=6920 km.
	ePcP	Z	02:35:54	
	iS	N,E	02:43:04	
	eScS	N,E,Z	02:44:10	
	eSS	E	02:47:14	
19 Sept. 1961	iP	N,Z	09:53:04	Epicenter 6.7°N, 82.4°W, South of Panama 0=09:46:17.7 h=about 33 km. Δ=3800 km.
	iS	E	09:58:35	
20 Sept. 1961		N,E		Seismic activity observed between the hours of 20:00 and 20:40

Date	Phase and component		G.M.C.T.	Remarks
23 Sept. 1961		N		Seismic activity observed between the hours of 03:38 and 03:49
24 Sept. 1961	iP iS	N,Z N,E,Z	19:10:31 19:15:17	Epicenter 18.4°N, 98.6°W, Puebla, Mexico O=19:04:40.7 h=about 81 km. Δ=3170 km.
25 Sept. 1961	ipP	N,Z	02:36:12	Epicenter 60.3°N, 153.0°W, Southern Alaska O=02:27:13.4 h=about 125 km. Δ=5400 km.
25 Sept. 1961	-P -S	E,Z N	05:39:58 05:48:58	Epicenter 19.9°N, 155.3°W, Hawaii Island, Hawaii O=05:29:00.8 h=about 82 km. Δ=7550 km.
27 Sept. 1961		N,E		Seismic activity observed between the hours of 12:10 and 13:30
27 Sept. 1961	iP	N,Z	19:30:54	Epicenter 52.5°N, 168.7°W, Fox Islands Aleutian Islands O=19:20:48.6 h=about 42 km. Δ=6610 km.
27 Sept. 1961	iP eS	N,Z N,E	19:37:06 19:45:16	Epicenter 52.2°N, 168.7°W, Fox Islands, Aleutian Islands O=19:27:00.7 h=about 22 km. Δ=6620 km.
28 Sept. 1961	iP'	Z	01:43:26	Epicenter 3.9°S, 102.0°E, Sumatra O=01:23:59.6 h=about 78 km. Δ=15920 km.

Date	Phase and component		G.M.C.T.	Remarks
28 Sept. 1961		N,E		Seismic activity observed between the hours of 04:49 and 06:05
29 Sept. 1961	iP'	Z	19:25:49	Epicenter 0.5°N, 122.4°E, Northern Celebes O=19:06:13.4 h=about 110 km Δ=15000 km
	eSKP	Z	19:28:46	
	ipPKS	N,Z	19:29:19	
29 Sept. 1961	iP	Z	22:45:43	Epicenter 1.7°N, 79.3°W, Near coast of southern Columbia O=22:38:05.9 h=about 60 km. Δ=4330 km
	eS	N,E	22:51:34	
2 Oct. 1961	iP'	Z	06:41:11	Epicenter 7.6°S. 107.0°E, Near coast of Java O=06:21:32.8 h=about 85 km Δ=16300 km
	e	Z	06:41:29	
4 Oct. 1961		N,E		Seismic activity observed between the hours of 03:22 and 04:05
7 Oct. 1961		N,E,Z		Seismic activity observed between the hours of 16:06 and 17:10
8 Oct. 1961		N,E		Seismic activity observed between the hours of 22:25 and 23:00
18 Oct. 1961	iP	N,Z	17:03:51	Epicenter 36.7°S, 72.6°W, Near coast of southern Chile O=16:52:00.2 h=about 67 km Δ=8590 km
	eS	N,E	17:13:40	

Date	Phase and component		G.M.C.T.	Remarks
19 Oct. 1961		N,E		Seismic activity observed between the hours of 05:25 and 05:40
26 Oct. 1961		N,E,Z		Seismic activity observed between the hours of 15:49 and 18:00
28 Oct. 1961		N,E		Seismic activity observed between the hours of 23:35 and 00:06, 29 Oct. 1961
29 Oct. 1961	iP eS	Z N,E	09:19:20 09:25:03	Epicenter 49.0°N 128.7°W, Vancouver Island Region O=09:12:15.7 h=about 16 km. Δ=4040 km
29 Oct. 1961		N,E		Seismic activity observed between the hours of 15:06 and 15:40
30 Oct. 1961		N,E		Seismic activity observed between the hours of 02:04 and 02:15
30 Oct. 1961	eP eS	E,Z N,E	02:23:36 02:29:23	Epicenter 42.3°N, 126.7°W, Off coast of Oregon O=02:16:32.7 h=about 36 km Δ=4020 km
30 Oct. 1961		N,E		Seismic activity observed between the hours of 09:03 and 09:24
4 Nov. 1961		N,E		Seismic activity observed between the hours of 18:47 and 19:05

Date	Phase and component		G.M.C.T.	Remarks
5 Nov. 1961		N,E		Seismic activity observed between the hours of 06:21 and 06:59
7 Nov. 1961		N		Seismic activity observed between the hours of 01:46 and 01:51
9 Nov. 1961	eP	N,Z	04:30:06	Epicenter 22.9°S, 67.9°W, Northern Chile-Argentina border O=04:19:42.0 h=about 84 km Δ=7120 km
	eS	N,E	04:38:36	
14 Nov. 1961	eP	Z	04:49:20	Epicenter 7.3°N, 82.4°W, Off coast of Panama O=04:42:26.5 h=about 29 km Δ=3730 km
	eS	E,Z	04:54:32	
15 Nov. 1961		N,E		Seismic activity observed between the hours of 05:56 and 06:05
15 Nov. 1961	-P	N,E,Z	07:29:59	Epicenter 43.1°N, 145.1°E, Near coast of Hokkaido, Japan O=07:17:12.4 h=about 43 km Δ=9770 km
	iPP	N,Z	07:33:38	
	iSKS	N,E	07:40:21	
	iS	N,E	07:40:39	
	-	N,Z	07:41:59	
18 Nov. 1961		N,E		Seismic activity observed between the hours of 12:15 and 12:55
20 Nov. 1961		N,E		Seismic activity observed between the hours of 12:44 and 13:20

Date	Phase and component		G.M.C.T.	Remarks
20 Nov. 1961	eP	E	18:04:43	Epicenter 31.3°N, 40.9°W, North Atlantic Ocean O=17:58:17.5 h=about 44 km Δ=3460 km
	i	N,E,Z	18:05:31	
	-S	N,E	18:09:58	
27 Nov. 1961		N,E		Seismic activity observed between the hours of 06:51 and 07:10
27 Nov. 1961		N,E,Z		Seismic activity observed between the hours of 17:30 and 19:30
1 Dec. 1961		N		Seismic activity observed between the hours of 21:42 and 22:30
3 Dec. 1961		N,E		Seismic activity observed between the hours of 01:15 and 01:40
4 Dec. 1961		N,E		Seismic activity observed between the hours of 13:33 and 13:55
6 Dec. 1961		N,E		Seismic activity observed between the hours of 14:34 and 15:00
6 Dec. 1961	iP	N,Z	16:51:35	Epicenter 49.4°N, 155.2°E, Kurile Islands O=16:39:31.5 h=about 22 km Δ=8750 km
	iS	N,E	17:01:31	
	i	N	17:01:52	
9 Dec. 1961	eP	Z	02:24:24	Epicenter 56.3°N, 153.9°W, Kodiak Island, Alaska region O=02:15:22.0 h=about 31 km Δ=5560 km

Date	Phase and component		G.M.C.T.	Remarks
9 Dec. 1961	iP	N,Z	11:30:41	Epicenter 43.7°S, 75.2°W, Near coast of southern Chile O=11:18:08.9 h=about 34 km Δ=9350 km
	iS	E	11:41:15	
12 Dec. 1961		N,E		Seismic activity observed between the hours of 22:29 and 22:52
12 Dec. 1961	eP	N,Z	23:19:02	Epicenter 43.5°N, 146.2°E, Near coast of Hokkaido, Japan O=23:06:18.4 h=about 44 km Δ=9690 km
	i	N,Z	23:19:18	
14 Dec. 1961		N,E		Seismic activity observed between the hours of 08:10 and 08:38
20 Dec. 1961	iP	N,E,Z	13:32:21	Epicenter 4.6°N, 75.6°W, West-central Colombia O=13:25:34.4 h=about 176 km Δ=4080 km
	ipP	N,Z	13:33:18	
	eS	N,E	13:37:50	
	esS	E,Z	13:38:53	
25 Dec. 1961		E		Seismic activity observed between the hours of 09:14 and 09:21
26 Dec. 1961	iP'	Z	04:43:32	Epicenter 5.5°S, 110.7°E, Java Sea O=04:24:55.4 h=about 566 km Δ=16000 km
29 Dec. 1961		N,E		Seismic activity observed between the hours of 15:05 and 15:30

Date	Phase and component		G.M.C.T.	Remarks
30 Dec. 1961	iP	N,E,Z	00:50:16	Epicenter 52.3°N, 177.7°E, Rat Islands, Aleutian Islands O=00:39:24.1 h=about 52 km Δ=7400 km
	iS	N,E,Z	00:59:07	
30 Dec. 1961		N,E		Seismic activity observed between the hours of 17:15 and 17:30
31 Dec. 1961		N,E		Seismic activity observed between the hours of 18:22 and 18:48

Date	Phase and component		G.M.C.T.	Remarks
8 Jan. 1962	iP iS	N,E,Z N,E	01:05:30 01:09:44	Epicenter 18.5°N, 70.5°W, Near south coast of Dominican Republic 0=01:00:24.2 h=about 63 km Δ=2570 km
10 Jan. 1962		N,E		Seismic activity observed between the hours of 06:49 and 07:01
11 Jan. 1962		N,E		Seismic activity observed between the hours of 05:40

PENNSYLVANIA

12.1.62 – 31.12.62

THE PENNSYLVANIA STATE UNIVERSITY
MINERAL INDUSTRIES EXPERIMENT STATION
GEOPHYSICAL LABORATORY
Project C-19

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Seismograph Report XXXII
12 January 1962 - 31 December 1962
College of Mineral Industries
Department of Geophysics and Geochemistry
University Park, Penna., U.S.A.

Code - SCP

B.F. Howell, Jr., Director
S.C. Merdler, Graduate Assistant
Y. Nakamura, Graduate Assistant

Locality: The station is located in a vault in the College of Mineral Industries storage shed. The instruments are mounted on a concrete pillar separated from the foundations and set on subsoil. The geographic coordinates are:

$\phi = 40^\circ\ 48'\ 35.5''$ N $\lambda = 77^\circ\ 52'\ 09.8''$ W H = 353 m

The geocentric coordinates are:

$\phi = 40^\circ\ 37'$ N $\lambda = 77^\circ\ 52'$ W

Height above sphere of equal volume = - 1.63 km.

Please address all communications to:

Geophysical Laboratory
220 Mineral Sciences Bldg.
University Park, Pennsylvania, U.S.A.

In January 1962, the old State College Observatory was replaced by a new one equipped by the Advanced Research Projects Agency of the U.S. Department of Defense thru the U.S. Coast and Geodetic Survey under the VELA-Uniform program. The new instruments were put into use on January 19, 1962 and have been in continuous operation since then except for interruptions to change records, to make minor adjustments and for the period September 11 to October 7, 1962, during which the main pier was rebuilt to provide better isolation from the building in which it is housed. One instrument remains in operation at the old site to operate a visable recorder. The present set-up is temporary until 1964, when the observatory will move to a permanent location 100 yards from the location of the old observatory.

The instruments have been maintained at the following characteristics throughout the year:

Component	Seismometer Period	Galvanometer Period	Overall damping (overshoot ratio) A_1/A_2	Sensitivity
SPN	1 sec.	0.76 sec.	16[1]	100,000[4]
SPE	1 sec.	0.75 sec.	24[2]	100,000[4]
SPZ	1 sec.	0.71 sec.	15[3]	100,000[4]
LPN	30 sec.	100 sec.	critical	750
LPE	30 sec.	100 sec.	critical	750
LPZ	30 sec.	100 sec.	critical	750

1. overdamped after October 7, 1962
2. 15.6 after October 7, 1962
3. 13.3 after October 7, 1962
4. 50,000 up to May 25, 1962

The time is controlled by a crystal clock which is checked daily against radio station WWV. Time signals are recorded automatically on the SPN component. The amount of drift of the station clock is such that the recorded time marks are correct at all times to within 0.005 seconds.

The recorded seismograms are filed with the U.S. Coast and Geodetic Survey in Washington D.C. Copies of individual seismograms may be obtained from them. The list which follows shows the earliest observed motion of each earthquake recorded, and lists the components on which this earthquake is observable. Where readable, the direction of first motion is indicated by the following symbols:

N and S = North and South

E and W = East and West

U and D = Up and Down

i means readable to 0.1 sec. on at least 1 trace

e means not readable to 0.1 sec.

RF means record failure. No seismogram exists for this earthquake on this component.

* means earthquake recorded by this component, direction of first motion not read (no implication that it is unreadable).

\- means seismogram exists, but body waves not strongly or not clearly recorded. Surface waves may be clearly recorded.

Earthquakes with observed motions of P.

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
JANUARY									
26	08:29.3		S	E	U	-	-	-	
27	23:23.7	i	S	-	-	-	-	-	
30	08:40.4		S	E	-	-	-	-	
FEBRUARY									
1	06:45.9		-	W	-	-	-	-	
4	17:54.3		N	-	U	-	-	-	
4	21:40.4		-	-	-	-	-	-	
10	19:38.0		S	-	-	-	-	-	
13	01:01.5		N	-	-	-	-	U	
14	06:48.0		N	W	-	-	-	-	
16	18:32.9	i	N	W	D	-	-	-	
18	17:31.8	e	S	-	D	S	-	D	
18	23:33.4	e	-	-	U	-	-	-	
20	16:18.5	i	-	-	U	-	-	-	
20	22:58		-	-	-	-	-	-	
21	21:53.4	i	N	W	D	-	-	-	
23	21:23		-	-	-	-	-	-	
27	14:48.3		N	-	-	RF	-	-	
MARCH									
2	20:42.5	i	N	E	U	-	-	-	
3	20:01.7	i	S	E	U	-	-	-	
8	21:00.5	i	S	E	U	-	-	-	
17	20:55.5	i	S	W	D	-	-	-	
18	15:40.5	i	N	E	D	-	-	-	
19	06:13.5		N	-	-	-	-	-	
20	23:16.3	i	N	E	D	-	-	-	
21	15:34		-	-	D	-	-	-	
30	20:40:50	i	S	E	U	-	-	-	
30	23:29:41.8	i	S	E	D	-	-	-	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
MARCH (cont.)									
31	00:02:04.5	i	S	E	U	-	-	-	
31	03:17:39.9	i	S	E	U	-	-	-	
APRIL									
- /1	00:59:13		-	-	U	-	-	-	
- /1	05:14:51	e	-	-	U	-	-	-	
- /1	12:30:07.6	i	-	-	U	-	-	-	
- /3	16:27:30.0	i	N	W	D	-	-	-	
3	20:15:45.6	i	N	W	D	-	-	-	
3	22:45:40	e	S	W	D	-	-	-	
- /4	14:19:08	e	N	E	U	-	-	-	
- /4	21:02:58	e	-	W	D	-	-	-	
5	01:40:16.5	i	S	W	U	-	-	-	
5	03:03:19.1		iS	e	eD	-	-	-	
5	03:49:47	e	-	-	D	-	-	-	
5	12:37:10.3		eN	-	iU	-	-	-	
5	21:11:06.6	i	N	W	D	-	-	-	
5	23:10:30.2		eN	iE	iU	-	-	-	
6	16:00:13.3	i	S	W	D	-	-	-	
- /6	17:01:56	e	N	-	U	-	-	-	
- /10	04:47:22.8		eN	-	iU	-	-	-	
10	13:31:58.1	i	S	W	U	-	-	-	
- /10	21:48:32.5		-	eW	iU	-	-	eU	
- /11	10:58:52.8	i	-	W	D	-	-	-	
- /12	01:06:56	e	-	-	-	N	W	U	
13	23:11:34	e	N	W	-	-	-	-	
- /15	18:56:52	e	-	-	U	-	-	-	
15	13:02:02	e	-	-	U	-	-	-	
- /17	10:14:41.3		eN	iE	iD	-	-	-	
17	18:46:17.3	i	N	W	D	-	-	-	
- /17	22:46:12	e	N	-	D	-	-	D	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
APRIL (cont.)									
18	03:03:48.6		iN	-	eU	-	-	-	
18	13:50:28.4		iN	eE	iU	-	-	-	
18	15:43:14.5	i	S	E	U	-	-	-	
18	19:23	i	-	-	-	-	-	U	
19	22:27:12.4	i	S	W	U	-	-	-	
19	23:26:56.1		eS	iE	iU	-	-	-	
20	05:52:39.1	i	S	E	D	S	E	D	
22	04:51:10	e	N	-	U	N	E	U	
23	06:11:00.5		eS	eE	iU	-	-	-	
24	16:02:50.8	i	S	E	U	-	-	-	
24	16:14:40	e	N	-	U	-	-	-	
25	03:40:27	e	-	-	U	-	-	-	
25	16:00:39	e	-	-	-	-	-	U	
27	07:00:01	e	-	-	D	-	-	D	
27	07:00:01.6		iN	eW	iU	-	-	-	
28	11:30:45.0		-	eE	iD	-	-	eD	
28	12:55:34.7		-	eE	-	-	-	-	
28	12:55:35.0		eN	-	-	-	-	-	
28	12:55:35.3		-	-	iD	-	-	-	
30	02:39:36	e	-	-	U	S	E	U	
30	07:55:20	e	N	-	U	-	-	-	
30	23:59:10	e	-	-	U	-	-	-	
MAY									
2	09:06:52.2		iN	-	-	-	-	-	
2	09:06:52.4		-	iW	iD	-	-	-	
2	12:43:29.3		iN	eW	iD	-	-	-	
3	02:45:46	e	*	*	*	-	-	-	
5	15:38:05.8	i	N	W	U	-	-	-	
6	19:14:27	e	-	-	-	-	-	D	
7	17:52:28.6		-	eE	iU	-	-	iU	
8	18:17:20.9	i	S	E	D	-	-	-	
8	18:34:23.4	i	S	W	U	-	-	-	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
MAY (cont.)									
9	15:46:10	e	S	W	U	-	-	-	
9	15:58:30.7		eS	iW	iD	-	-	-	
10	00:12:03.0	i	N	W	D	-	-	-	
10	05:22:24	e	N	W	U	-	-	-	
11	14:18:00.0	i	N	E	U	N	E	U	
11	20:09:27.5		eS	eE	iU	-	-	iU	
13	09:19:04.7		iN	eW	iU	-	-	-	
14	10:53:00.5		eN	iE	iU	-	-	-	
15	00:06:44.6		*	*	*	-	-	-	
15	03:31:47.7		*	*	*	-	-	-	
15	05:40:25.0		-	-	-	-	-	eU	
15	19:43:53.6	i	-	-	-	-	-	U	
19	15:04:21.2	i	N	E	U	N	E	U	
20	00:05:48.0	i	N	E	D	-	-	-	
21	12:16:48.7		-	-	*	-	-	*	
21	21:29:24	e	-	-	-	-	-	*	
22	08:25:09	e	*	*	*	-	-	*	
23	22:30:44.8	i	*	*	*	-	-	-	
29	00:00:18.0	i	S	W	-	-	-	-	
30	10:09:05	e	-	E	-	-	E	U	
31	06:46:40±05	e	-	-	-	-	*	*	
31	21:31:05.6		-	iE	iD	-	-	-	
JUNE									
1	07:54:24.0		-	-	eU	-	-	-	
3	15:09:03	e	-	*	*	-	*	*	
7	05:46:40.5	i	*	*	*	-	-	-	
8	19:40:10.4		-	-	iD	-	-	-	
9	20:03:31.1	i	-	W	D	-	-	-	
10	00:02:16.0	i	N	E	U	-	-	-	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
JUNE (cont.)									
10	18:46:52.3	i	S	W	D	-	-	-	
11	01:01:19.0	i	S	E	U	-	-	-	
11	07:26:33.7	i	N	-	D	-	-	-	
11	20:31:26.5	i	N	W	U	-	-	-	
12	00:35:03.8	i	N	E	D	-	-	-	
12	05:20:52	e	S	W	U	-	-	-	
12	14:18:38.9	i	N	W	U	-	-	-	
12	18:35:40.0	i	N	W	D	-	-	-	
12	21:10:41.3	i	N	W	U	-	-	-	
13	08:03:00	e	*	*	*	-	-	*	
14	14:35:25.2	i	S	W	D	-	-	-	
14	15:19:21.2	i	S	-	D	-	-	-	
14	17:58:11.1	i	-	W	D	-	-	-	
14	19:40:30.1	i	S	E	D	-	-	-	
15	02:08:54.5	i	N	E	U	-	-	-	
15	03:28:48.8	i	S	W	U	-	-	-	
15	06:40:50.8	i	N	W	U	-	-	U	
18	06:29:35.6	i	-	W	U	-	-	-	
18	20:57:57.9	i	N	-	U	-	-	-	
19	00:01:23.2	i	-	-	U	-	-	-	
19	19:55:55.4	i	N	-	U	-	-	-	
21	02:08:19.4	i	*	*	*	-	-	*	
21	04:50:38.0	i	N	E	-	*	*	*	
23	10:17:09.5	i	N	E	U	-	-	-	
23	17:55:51	e	*	*	*	-	-	-	
23	22:15:40	e	*	*	*	-	-	-	
24	08:16:31.3	i	*	*	-	-	-	-	
25	02:59:16	e	N	E	U	-	-	-	
25	06:38:44.0	i	N	E	U	-	-	-	
25	11:29:16	e	-	-	*	-	-	*	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
JUNE (cont.)									
25	18:41:26.9	i	*	*	-	-	-	-	
25	19:02:14.3	i	N	E	U	-	-	-	
25	19:04:17.0	i	N	E	U	-	-	-	
25	19:30:36.9	i	S	E	D	-	-	-	
25	21:50:13.3	i	N	W	U	-	-	-	
26	00:17:16.9	i	S	W	D	-	-	-	
26	01:11:50.6	i	*	-	*	-	-	-	
26	12:41:04.2	i	-	E	D	-	-	-	
26	19:01:54.7	i	-	*	*	-	-	-	
26	20:25:08.8	i	N	E	D	-	-	-	
26	20:44:39.1	i	S	E	D	-	-	-	
26	20:56:42.0	i	N	E	U	-	-	-	
26	22:13:14.2	i	S	E	U	-	-	-	
27	01:31:05	e	S	W	D	-	-	-	
28	00:07:44.5	i	-	*	*	-	-	-	
28	04:38:16	e	S	W	D	-	-	-	
28	19:13:10	e	S	W	U	-	-	U	
29	00:46:15.4	i	*	*	*	-	-	-	
29	16:36:40.5	i	S	E	U	-	-	U	
29	16:42:37	e	N	W	U	-	-	-	
29	22:19:08.0	i	N	W	D	-	-	-	
JULY									
2	21:17:39	e	S	E	D	-	-	-	
3	15:20:22.3	i	-	*	*	-	-	-	
4	18:20:50.3	i	S	W	D	-	-	-	
4	18:33:18.9	i	S	E	D	-	-	-	
4	18:55:23.0	i	*	*	*	-	-	-	
6	09:27:36	e	-	-	D	-	-	-	
6	23:18:45.0		eS	eW	iD	eS	-	eD	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
JULY (cont.)									
7	06:23:34.3	i	S	-	U	S	-	U	
7	21:32:41.0	i	N	W	U	-	-	-	
8	03:32:49.4	i	S	W	U	-	-	-	
8	07:39:30	e	S	-	U	-	-	-	
13	03:50:55	e	-	-	D	-	-	-	
14	20:49:54.3	i	-	-	U	-	-	-	
15	02:24:48.8	i	*	-	*	-	-	*	
15	04:58:23.0	i	*	-	*	-	-	*	
15	07:15:12.0	i	-	*	*	-	-	-	
16	13:03:18.0	i	S	E	U	-	-	U	
17	04:18:55.8	i	N	-	U	-	-	-	
17	05:44:34.8	i	-	-	D	-	-	D	
17	17:33:12.1	i	*	*	*	-	-	*	
17	18:06:19.8	i	*	*	*	-	-	*	
18	06:13:18.5	i	*	*	*	-	-	-	
18	10:22:05.5	i	*	*	*	-	-	*	
23	01:19:09.0	i	N	W	U	-	-	-	
23	22:17:13	e	N	W	U	-	-	-	
24	04:05:32.2		iN	eE	iU	-	-	-	
24	21:14:05.8	i	S	-	U	-	-	-	
25	04:42:37	e	S	E	D	-	-	-	
25	04:42:43	e	-	-	-	S	E	D	
26	08:21:22	e	N	-	-	-	-	-	
26	08:21:22.4	i	-	-	D	-	-	D	
26	08:21:23	e	-	E	-	-	-	-	
28	06:13:33.4	i	*	*	*	-	-	-	
28	14:04:39.1	i	*	-	*	-	-	-	
30	17:35:49.4	i	*	*	*	-	*	*	
30	20:25:24.8	i	*	*	*	-	-	-	
31	15:59:55.4		eS	iW	iD	-	-	-	
31	18:24:47.3	i	S	W	D	-	-	-	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
AUGUST									
1	04:56:01	e	-	-	*	-	-	-	
2	04:46:40.9	i	*	-	*	-	-	-	
3	09:06:42.8	i	*	-	*	S	E	D	
4	02:55:49	e	-	-	D	-	-	-	
6	01:41:46.0	i	S	E	D	-	-	D	
10	21:10:56.7	i	-	W	U	-	-	-	
13	06:43:20	e	*	-	*	*	-	*	
15	08:30:58.2		i*	-	e*	-	-	-	
17	03:34:59.0	i	N	E	U	-	-	-	
17	05:25:25	e	*	-	*	*	*	*	
17	07:34:42.5	i	*	-	*	-	-	-	
18	16:52:30.9	i	*	*	*	-	-	*	
18	17:54:51.7	i	*	*	*	-	-	*	
19	18:39:50.5	i	*	*	*	-	-	*	
19	23:23:43.8	i	*	*	*	-	-	*	
20	10:59:30	e	*	*	*	*	*	*	
20	13:18:08.9	i	-	-	*	-	-	-	
20	22:24:59.6	i	*	*	*	-	-	-	
21	17:38:49.2	i	*	*	*	-	-	-	
21	18:19:54.2	i	-	-	*	-	-	-	
21	18:30:19	e	*	*	*	-	-	*	
21	21:21:39.8	i	*	-	*	-	*	*	
23	12:55:00.8	i	*	*	*	-	-	-	
23	19:35:56.8	i	*	*	*	*	*	*	
24	09:30	e	-	-	-	*	*	*	
24	13:25:27.2	i	*	*	*	-	-	-	
25	19:57:16.8	i	*	*	*	-	-	-	
25	08:50:07	e	-	-	*	*	*	*	
28	11:11:20.3	i	S	E	U	S	E	U	
30	13:40:53.8	i	*	*	*	*	*	*	
31	17:13:28.8	i	*	*	*	*	*	*	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
SEPTEMBER									
1	03:56:50.3	i	*	*	*	*	*	*	
1	04:52:25.0	i	*	*	*	-	-	-	
1	05:10:18.0	i	*	*	*	-	-	-	
1	08:01:51.2	i	*	*	*	*	*	*	
1	19:33:38.9	i	*	*	*	*	*	*	
2	03:13:13.8	i	*	*	*	-	-	-	
2	15:41:34.2	i	*	*	*	*	-	*	
4	15:23:19.2 A	i	N	E	U	-	-	-	
4	17:24:13.7	i	*	*	*	-	-	-	
4	21:52:19	e	-	E	D	-	-	-	
4	23:11:48 K	e	-	-	D	-	-	-	
5	08:47:25.9	i	-	-	U	-	-	-	
7	14:01:05.7		S	W	D	-	-	-	
9	03:31:28	e	S	W	D	-	-	-	
9	19:21:11.2	i	N	W	U	-	-	-	
10	09:48:21	e	N	-	D	-	-	-	
10	21:58:15.6	i	N	E	U	-	-	-	
OCTOBER									
16	07:35:08.0	i	S	W	D	-	-	-	
16	18:13:03.0	i	S	W	U	-	-	-	
18	04:25:37.8	i	S	W	U	-	-	-	
21	02:13:45.5	i	-	E	D	-	-	-	
25	09:53:22	e	-	-	U	-	-	-	
25	15:58:57.8	i	-	-	U	-	-	-	
27	08:16:16.5	i	N	-	U	-	-	-	
27	13:58:56.0	i	N	E	U	-	-	-	
28	22:59:00		-	-	-	-	-	-	
29	00:26:23	e	N	W	U	-	-	-	
30	08:37:50.7	i	N	-	U	-	-	-	
31	11:39:22.8	i	-	W	U	-	-	U	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
NOVEMBER									
2	15:06:18.7		eS	iE	iU	-	-	-	
2	17:09:24.5	i	N	W	D	-	-	-	local disturbance
3	23:06:00.8	i	S	W	D	-	-	D	
6	03:43:14	e	-	-	-	-	-	-	
10	01:45:56.8	i	S	-	U	-	-	-	
11	11:44:17.0	i	N	-	D	-	-	-	
11	22:26:44	e	S	W	D	-	-	D	
13	16:19:11.2	i	S	W	D	-	-	-	local disturbance
15	23:34:01.5	i	N	W	U	-	-	-	
16	07:30:38.0	i	-	-	U	-	-	-	
16	21:29:02	e	-	-	U	-	-	-	
17	00:17:55	e	-	-	U	-	-	-	
17	11:13:26.4	i	N	E	U	-	-	-	
17	14:42:10.8	i	N	E	D	-	-	-	
20	07:05:28.8	i	-	-	U	RF	-	-	
20	07:44:03	e	-	-	D	RF	-	-	
30	21:57:25	e	-	-	-	-	-	-	
DECEMBER									
1	02:00:25.6	i	-	-	U	-	-	-	
2	22:56:48.4	i	S	W	U	-	-	-	
4	18:11:01.5	i	N	W	D	-	-	-	local disturbance
8	21:37:20.6	i	S	-	D	-	-	D	
8	23:05:38.5		eN	eE	iD	-	-	-	
10	05:15:54.5	i	S	E	D	-	-	-	
14	04:39:46.1	i	N	W	U	-	-	-	
14	15:05:41.8	i	-	-	D	-	-	-	
21	01:03:56.8	e	-	-	-	-	-	D	
21	01:03:57.4	i	S	E	U	-	-	-	

Date	GMT of 1st motion	Type of Onset	Observable on Short Period NS	EW	Z	Long Period NS	EW	Z	Remarks
DECEMBER (cont.)									
21	06:37:50.2	i	N	E	U	-	-	-	
21	08:52:48.7	i	S	W	D	-	-	U	
21	09:10:41.6	i	N	W	D	-	-	-	
21	09:20:01.5	i	S	E	U	-	-	-	
21	09:46:12.0	i	N	W	D	-	-	-	
21	21:35:38.2	i	S	-	D	-	-	-	
22	01:11:11.2	e	-	-	D	-	-	-	
22	02:19:27.8	i	S	-	U	-	-	-	
22	15:30:31.0	i	-	W	D	-	-	-	
26	22:36:23.1	i	N	W	D	-	-	-	
26	23:57:21.6	e	-	-	U	-	-	-	
26	23:57:22.2	i	N	W	D	-	-	-	
27	00:23:15.4	i	S	W	D	-	-	-	
27	18:00:34.8	i	N	W	D	-	-	-	quarry blast?
28	16:59:57.4	i	S	E	U	-	-	-	" "
28	21:51:29.4	i	S	E	D	-	-	-	
29	04:31:20.0	i	S	-	U	-	-	-	
29	10:51:15.1	i	N	W	U	-	-	-	
29	10:51:16.0	i	-	-	-	N	-	U	

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